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Technical Report Overview

Report: 2021 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs

Overview: This report presents the 2021 results of the regional groundwater monitoring program and the site-specific programs at Fording River Operations, Greenhills Operations, Line Creek Operations, Elkview Operations, and Coal Mountain mine required under Sections 8.2 and 9.4 of Permit 107517. This report summarizes the results of groundwater quality and quantity in 2021 and compares them to relevant screening values and historical data. It also compares groundwater chemistry to nearby surface water chemistry to understand groundwater transport pathways and groundwater/surface water interaction.

This report was prepared for Teck by SNC-Lavalin Inc.

For More Information

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Future studies will be made available at **teck.com/elkvalley.**

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2021 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs

Fording River Operations

Greenhills Operations

Line Creek Operations

Elkview Operations

Coal Mountain mine

Regional Groundwater Monitoring Program

VOLUME I OF IV

Prepared for:

Teck Coal Limited

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3	Summary of Quality Assurance/Quality Control (QA/QC) Assessment	All (per relevant report section)	All (per relevant report section)
4	Groundwater Monitoring Locations	Katrina Cheung	Stefan Humphries
5	Groundwater-Surface Water Interactions in Management Unit 5	Teck Coal Limited	
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Executive Summary

At the request of Teck Coal Limited (Teck), SNC-Lavalin Inc. (SNC-Lavalin) has completed the reporting requirements for the 2021 Annual Site-Specific Groundwater Monitoring Program (SSGMP) for Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO), and Coal Mountain mine (CMm, previously identified as Coal Mountain Operations [CMO] and now in care and maintenance), and the Regional Groundwater Monitoring Program (RGMP). Teck's Operations are in southeastern British Columbia's Elk Valley. The reports were completed based on requirements outlined in Permit 107517 issued by the Ministry of Environment & Climate Change Strategy (ENV).

In 2021, quarterly groundwater monitoring and sampling events were completed for wells specified in the 2017 RGMP and 2018 SSGMP Updates as they are the most recent monitoring programs approved by ENV. The monitoring programs were updated in 2020 (2020 RGMP Update) and 2021 (2021 SSGMP Updates) and awaiting ENV's approval. Quarterly manual and/or continuous groundwater level measurements were collected for monitoring wells, where applicable. Groundwater samples for these programs were analyzed for parameters on the respective analyte lists. Any modifications to the programs were not expected to negatively impact the overall quality or interpretation of the data.

Groundwater quality data were compared to applicable primary and secondary screening criteria focussing on the mine-related "order constituents" (OC) which are nitrate as nitrogen (nitrate-N), sulphate, dissolved cadmium, and dissolved selenium. These OCs are considered to be the main indicators of mine-influence on groundwater quality based on the 2014 Elk Valley Water Quality Plan. Other mine-related constituents above applicable criteria were also discussed. Discussion of trends as well as interpretation of water levels and selected parameters are presented by Operation. To assess groundwater and surface water interaction and increase understanding of constituents transport pathways, groundwater chemistry was compared to chemistry at nearby surface water stations.

The objective of the 2021 SSGMP and RGMP annual report was to fulfill the reporting requirements outlined in Permit 107517 (as amended on December 1, 2021) and the overall objectives of groundwater monitoring in the RGMP and SSGMP as outlined in the 2017 RGMP Update. This report summarizes the results from the 2021 quarterly groundwater monitoring and sampling activities completed at FRO, GHO, LCO, EVO, and CMm as well as various regional and background monitoring locations. The following sections summarize the 2021 groundwater monitoring and sampling results by Operation.

Background Groundwater Monitoring Summary

Twenty-one monitoring wells in 14 locations (five nested) were monitored and sampled in 2021 as part of the background monitoring network that was initially developed in the 2020 RGMP Update. The background groundwater monitoring network continues to be under evaluation and consultation with the Groundwater Working Group (GWG). Teck is continuing to add monitoring wells to the background network and continuing to monitor the current network. An update to the 2020 Background Assessment (BGA) is planned for the 2023 RGMP Update.

A summary of notable results is provided below.

Upgradient of Study Area 4 (GHO)

At GH_MW_BG1A/B/C, a higher concentration of 5.52 µg/L of dissolved selenium was previously measured in the groundwater from GH_MW_BC1A; however, in 2021, dissolved selenium ranged from non-detect (detection limit of 0.050 µg/L) to 0.328 µg/L. Therefore, the elevated concentration measured in 2020 appears to be an outlier.

Upgradient of Study Area 7 (EVO)

EV_MW_GV4A and EV_MW_GV4B are located in the Grave Creek Watershed. OC concentrations at both wells were less than the primary screening criteria in 2021, and there were insufficient data to complete a Mann-Kendall trend analysis at both wells. In 2021, the dissolved selenium concentration ranged from 3.27 to 4.9 µg/L at EV_MW_GV4A, and 3.7 to 4.05 µg/L at EV_MW_GV4B. Additionally, EV_MW_GV4A and EV_MW_GV4B both plot outside of natural, non-contact water on the Se:SO4(S) plot, indicating it is possible that these wells may not currently be reflective of background conditions. Continued monitoring should occur in conjunction with isotopic sampling to assess the provenance of the groundwater. New wells have been installed in the area which should provide additional information on groundwater flow regime and potential influences on the groundwater quality at this location.

Upgradient of Study Area 10

Monitoring wells RG_MW_AC1A/B were installed in Q4 2021 and only one data point is available for each well. Concentrations of OC were relatively low, and the Se:SO4(S) plot shows that the groundwater does not appear to be mine-influenced. However, the temporal dataset is very limited and additional data will be collected and assessed in the future.

Upgradient of Study Area 11 (CMm)

CM_MW3-SH and CM_MW3-DP are both located in the Michel Creek Watershed, while CM_MW6-DP is located in the Corbin Creek Watershed. OC concentrations remain at least one order of magnitude below primary screening criteria at all wells in 2021. However, the Mann-Kendall trend analysis indicated that nitrate, sulphate, and dissolved selenium were increasing at CM_MW3-SH. All other constituents of interest (CI) were stable, had decreasing trends, or had no trend at CM_MW3-SH/DP and CM_MW6-DP. At this time, the monitoring wells selected for background monitoring and sampling are considered appropriate, however, continued trend analysis will be conducted annually to understand changes as additional monitoring data are collected.

FRO SSGMP and RGMP Summary

Twenty-six wells, including twenty-four monitoring wells and two supply wells at eighteen locations (eight nested), were monitored and sampled for the 2021 Fording River Operations (FRO) SSGMP. Three wells included in the SSGMP were also monitored and sampled as part of the RGMP within Study Area 1, while three additional wells located near the compliance point are included in the RGMP only. One other monitoring well located within the Porter Creek drainage in Study Area 1 of the RGMP is also included in the GHO SSGMP, and is therefore discussed in Appendix IX. The SSGMP and RGMP monitoring at FRO has been divided into three primary watersheds consisting of Henretta Creek, Swift Creek, and the Fording River. Wells located in the Henretta Creek and Swift Creek watersheds monitor groundwater from mine-influence sources located within the watersheds, while wells located along the Fording River valley bottom monitor groundwater constituents transported along the valley bottom as well as from upland tributaries.

Henretta Creek Watershed

In the Henretta Creek Valley, monitoring well FR_HMW5 was originally intended to be installed upgradient of mining activity as a background well. Concentrations of OC at FR_HMW5 in 2021 were less than the primary screening criteria; however, since 2016 this well shows some evidence of mine-influence and the trend analyses indicate increasing trends for sulphate and dissolved selenium. Monitoring wells FR_HMW1S/D, FR_HMW2, and FR_HMW3 are located within source areas down-valley from FR_HMW5, and monitor groundwater quality within the Henretta spoils and the Henretta backfilled pits. Groundwater analytical results indicate that OC concentrations remain greater than the primary screening criteria and that these areas continue to be a source of loading to groundwater in the Henretta Creek valley bottom. Concentrations of OC in 2021 were similar to previous years, although the concentrations of selenium and sulphate within the Henretta spoils (FR_HMW2) were lower in 2021 than recent years.

Fording River Watershed and Study Area 1

In the Fording River valley upgradient of the South Tailings Pond (STP), shallow monitoring wells FR_TBSSMW-2 and FR_MW-1B are inferred to be influenced by interaction with surface water in the Fording River, while FR_GCMW-2 is influenced by surface water in the Clode Creek Settling Pond. Each of these three wells had OC concentrations greater than the primary screening criteria, indicating there is mine-influence and transport of OC in the shallow aquifer. Concentrations of OC were also greater than the primary screening criteria at the FR_POTWELLS supply wells and the water chemistry suggests a hydraulic connection between these locations and the Fording River. Deeper monitoring wells FR_TBSSMW-1 and FR_GCMW-1B had OC concentrations less than primary screening criteria and the Se:SO4(S) ratios are indicative of waters that are naturally sourced.

Concentrations of OC at monitoring wells FR_NTPSE and FR_09-04-A/B, located directly downgradient of the North Tailings Pond (NTP) and STP, respectively, were less than the primary screening criteria. There is continued evidence of selenium attenuation by microbial reduction within the NTP/STP and vicinity groundwater based on the Se:SO4(S) ratios at these locations. In the Kilmarnock alluvial fan area (monitored by FR_KB-1, FR_KB-2, and FR_KB-3A/B), groundwater concentrations of OC are greater than the primary screening criteria and the highest amongst all wells included in the SSGMP or RGMP in 2021 within the Fording River valley. Mine-influenced Kilmarnock Creek loses to ground over the Kilmarnock alluvial fan in this area and mine-influenced groundwater has been identified downgradient of the fan.

In the South Kilmarnock Phase 2 Secondary Settling Pond (SKP2) and Greenhouse areas, OC concentrations exceed the primary screening criteria at monitoring wells FR_MW-SK1A, FR_09-01-A/B, FR_09-02-A/B, and FR_GH_WELL4. OC concentrations were comparatively low and below the primary screening criteria at deep well FR_MW-SK1B, although the concentrations of dissolved selenium, nitrate-N, and sulphate are increasing. The increasing OC concentrations and selenium to sulphate ratios suggest there is mine-influenced groundwater extending to the base of the aquifer in this area. An additional well (or wells) installed in bedrock will help to assess mine-influence at depth.

Monitoring wells FR_MW-SK1A and FR_GH_WELL4 are located along an inferred transport pathway between the Kilmarnock Creek alluvial fan and the Greenhouse Side Channel, while monitoring wells FR_09-01-A/B are inferred to be along an inferred pathway between the Kilmarnock Creek alluvial fan and Fording River. Monitoring wells FR_09-02-A/B are inferred to be both seasonally influenced by Kilmarnock Creek as well as from SKP2 water infiltrating to ground and by the adjacent Fording River which is losing over this reach. There are currently no wells in the SSGMP or RGMP along an inferred transport pathway between the Fording River and a regional groundwater discharge zone within and upgradient of the side channel area, although monitoring wells installed in support of the Mass Balance Investigation (MBI) are located along this inferred pathway and are expected to address this gap in the future. These wells will be evaluated for potential inclusion once sufficient data has been collected and MBI reporting has been finalized.

Swift Creek Watershed

Concentrations of OC in groundwater downgradient of the Swift Creek Primary Sediment Pond were greater than the primary screening criteria, and the source is inferred to be seepage from the pond. Seepage from the Swift Creek sediment ponds is currently being evaluated.

Drainage from the Cataract Creek watershed has been diverted via a pipeline to the Swift Creek sediment ponds since 2019 and effluent from the sediment ponds is routed to one of the Active Water Treatment Facility-South (AWTF-S) intakes. Seepage from the Cataract Creek Sediment Pond is also currently under investigation to evaluate potential loading to the Fording River valley bottom.

GHO SSGMP and Relevant RGMP Study Area Summary

Twenty-six monitoring wells in seventeen locations (nine nested) and five supply wells were monitored and sampled for the 2021 GHO SSGMP and RGMP. The GHO summary provided below is split into the three primary surface water drainage areas: Porter Creek; Greenhills Creek and Study Area 3; and the Elk River Valley and Study Area 4.

Porter Creek Watershed and Study Area 1

In the Porter Creek watershed, monitoring well GH_MW-PC (screened across the bedrock/surficial sediment contact) monitors groundwater quality downgradient of spoils in the drainage. A hydraulic connection between surface water and groundwater is present, which results in concentrations of dissolved selenium above primary screening criteria in groundwater. Preliminary results from a 2021 flow accretion study completed in this catchment found that Porter Creek is gaining from the spoils upstream of the settling pond and then stable downstream of the settling pond. Surface water is inferred to be the main transport pathway for loading of OC to the Fording River valley bottom in Study Area 1.

Nested well pair GH_MW-PC4A/B was installed in the Porter Creek alluvial fan in August 2021 to determine if a preferential groundwater pathway exists from Porter Creek to the mainstem of the Fording River. This well nest has been incorporated into the SSGMP and will be sampled quarterly in 2022. Shallow well GH_MW_PC4B was dry and OC concentrations at GH_MW_PC4A were below applicable criteria.

Greenhills Creek Watershed and Study Area 3

In 2021, monitoring well GH_MW-SITE-A was decommissioned and replaced with GH_MW-GHC-1A/B which are located downgradient along the toe of the Site A coarse coal rejects (CCR). Groundwater is inferred to flow southeast towards Greenhills Creek from the Site A CCR. Sandstone bedrock in this location (GH_MW-GHC-1A) has consistently had higher concentrations of dissolved selenium and lower concentrations of sulphate than in the overburden (GH_MW-GHC-1B). In the overburden, reducing conditions was inferred to be present within or upgradient of the monitoring well and groundwater was influenced by CCR. Groundwater in bedrock may be influenced by the upgradient CCR and the Hawk and East spoils via Greenhills Creek surface water.

Nested well pair GH_MW_GHC_4A/B monitors mining influence from Hawk and East spoils to the Greenhills Creek alluvial sediments and bedrock. In the lower portions of the Greenhills Creek Watershed, the highest measured concentrations of sulphate, nitrate-N and dissolved selenium were at GH_MW_GHC_4B, indicating influence from the Hawk and East spoils.

A deep, artesian monitoring well (GH_MW-TD) is located downgradient of the toe of the Site D/E CCR piles and installed in low permeability material. Low concentrations of OC have been measured in groundwater at this location, indicating the absence of a deep groundwater pathway and interaction with surface water. Field measured redox indicators indicate there may be attenuation of nitrate and dissolved selenium by microbial reduction within the upgradient TSF and underlying aquifer.

Monitoring well GH_MW_RLP-2 was installed adjacent to the Rail Loop Sediment Pond in 2020 to target the shallower water bearing zone and replaces deeper well GH_MW-RLP-1D. Groundwater at GH_MW-RLP-2 was influenced by the CCR and microbial reduction. Low concentrations of nitrate-N, dissolved oxygen (DO), and oxidation reduction potential (ORP) suggest reducing conditions may be present at this location.

Supply wells GH_POTW09, GH_POTW10, GH_POTW15 and GH_POTW17 are located in the Greenhills Creek alluvial fan and connected to the Fording River valley bottom channel deposits and Study Area 3. OC concentrations at the supply wells were generally less than the primary screening criteria in 2021. Groundwater from the wells is a mix of natural non-contact water, water influenced by spoils, and coal rejects seepage.

Newly installed wells RG_MW-FR11A/B are to assess the potential of a groundwater pathway from the Fording River valley bottom to the Elk River watershed along mapped glaciofluvial sediments. These wells were sampled in Q3 only. Concentrations of dissolved metals at both wells were below primary screening criteria in Q3.

Elk River Valley and Study Area 4

Several monitoring wells installed along the GHO mine permitted boundary in the Elk River valley are used to monitor potential effects on groundwater quality resulting from surface water infiltration, including tributaries originating within the permitted boundary. In 2021, five new monitoring wells were incorporated into the GHO program including a nested well pair installed in the Leask Drainage downgradient of the Leask Ponds (RG_MW_LC3A/B), a nested well pair installed in the Wolfram Drainage downgradient of the Wolfram Ponds (RG_MW_WC2A/B) and a single well installed in the Wolfram Drainage downgradient of the Leask Ponds but upgradient of the Wolfram Ponds (RG_MW_LCWC1).

Shallow groundwater in the Mickelson Drainage had OC concentrations reflective of the Elk River (GH_MW-MC-1S) or Mickelson Creek (GH_MW-MC-2S). Deep groundwater at GH_MW-MC1D and GH_MW-MC2D showed sodium enrichment possibly indicating influence from bedrock.

In the Leask Drainage, groundwater at GH_GA-MW-4 appeared to be seasonally mixing with spoil influenced water from Leask Ponds. OC concentrations at RG_MW_LC3A/B were generally greater than primary screening criteria. Groundwater in the Wolfram Drainage appears to mix with mine-influenced water from the Wolfram Ponds. Water quality at new wells RG_MW_WC2A/B and RG_MW_LCWC1, in conjunction with existing well GH_GA-MW-2, indicate selenium concentrations greater than primary and secondary screening criteria at all locations in 2021.

Groundwater quality at GH_GA-MW-3 is inferred to be influenced by both the Elk River side channel and mine-influenced Thompson Creek. During times of peak flow, groundwater quality is more reflective of surface water infiltration from Thompson Creek. At periods of low flow, water from the Elk River side channel infiltrates to ground and influences the groundwater quality at this well. In recent years, concentrations of OC at GH_GA-MW-3 have generally decreased, and the major ion distribution indicates that there has been a greater influence from side channel on groundwater quality relative to surface water from Thompson Creek.

Downgradient of the major tributaries at GHO, GH_MW-ERSC-1 monitors groundwater quality in the Elk River valley bottom sediments and surface water infiltration. In 2021, concentrations of nitrate-N and dissolved selenium were greater than the primary screening criteria. Groundwater in this area is interpreted to be mixing with surface water from the Elk River as well as mine-influenced water; however, the potential source and transport pathway of the mine-influenced water is not known. Monitoring wells installed for the MBI will be assessed for potential incorporation into the program as part of the 2022 Annual Report.

Farther downgradient in Study Area 4, Mann-Kendall trend analyses completed for OC in groundwater indicated increasing trends in nitrate, sulphate and selenium at municipal supply well RG_DW-01-03. Groundwater at RG_DW-01-03 appears to be mixing with mine-influenced water. New monitoring wells GH_MW_EF1A/B were installed in 2020 upgradient of RG_DW-01-03 to assess a potential transport pathway from GHO and concentrations have remained within the same order of magnitude as the Elk River.

LCO SSGMP and Relevant RGMP Study Area Summary

The LCO SSGMP and RGMP focuses on monitoring groundwater quality in three areas: LCO Dry Creek; LCO Phase I; and the Process Plant and Elk Valley. Thirty-eight monitoring wells in 28 locations (10 clustered pairs) were included in the 2021 LCO SSGMP and the RGMP. Eleven monitoring wells at seven locations (four clustered pairs) are under evaluation for inclusion in future programs. This is a threefold increase over the 2020 SSGMP and RGMP since several new wells were drilled last year, and many Phase I locations were added to the program in anticipation of approval of the recommendations in the 2021 SSGMP Update report.

LCO Phase II Upper and Lower LCO Dry Creek Watershed (Study Area 2)

Eight monitoring wells in the LCO Dry Creek area monitor potential groundwater transport of OC from the Phase II mining operations, which includes waste rock storage at the southern portion of the LCO Dry Creek watershed, north of the Phase I mining area. Concentrations of all OCs in groundwater in the upper and lower watershed were less than the primary screening criteria.

In the lower portion of the watershed where LCO Dry Creek discharges into the Fording River, a hydraulic connection is suspected between surface water and groundwater via the alluvial fan deposits. Based on flow accretion studies conducted in 2020, LCO Dry Creek is expected to lose water over the alluvial fan (Golder, 2020; SNC-Lavalin, 2020a). A new clustered pair of monitoring wells (LC_MW_DC1A/B) were installed in 2021, adjacent to the LCO Dry Creek watercourse, to corroborate surface water and groundwater interactions. The deep well (RG_MW_DC1A) was screened across sand and gravel / gravelly silt units at a depth of 20 m, while the shallow well (RG_MW_DC1B) was screened across a sand and gravel unit at 6 m depth. A silt layer separates the upper and lower sand and gravel units, although its lateral extent is not known. The vertical gradient was strongly upwards and the deeper well exhibited hydrostatic pressures above ground surface (i.e., artesian).

Surface water losses within Lower LCO Dry Creek, at the confluence with the Fording River, (as previously expected based on flow accretion studies) were not confirmed by the vertical gradients observed in the new Study Area 2 wells. Based on initial monitoring data, vertical hydraulic gradients in these wells were upwards. As such, the effects of potential infiltration of mine-influenced LCO Dry Creek surface water on groundwater in the alluvial fan are expected to be relatively lower than from the Fording River, where loads and concentrations of OC are higher.

LCO Phase I Line Creek

Reporting groundwater quality monitoring of the Phase I area, as part of the SSGMP for LCO, is new for the 2021 Annual Report. The inclusion of LCO Phase I area is based on the 2021 SSGMP Update, which identified potential sources and transport pathways of OCs in this area. Seven new monitoring wells were installed in 2021 and several wells (previously installed for various investigations) were added to the LCO SSGMP program. Phase I has been separated into five subareas: Upper Line Creek; Centre Line Creek (both North and South); West Line Creek; and Lower Line Creek.

Within the Phase I area, the upland areas consist primarily of thin layers of colluvium, with thicker deposits of fluvial and/or glaciofluvial sediments in the valley bottoms. Till is also mapped within the upland areas and along the valley flanks. Near the confluence of West Line and Centre Line creeks, fill material overlies a coarse sand and gravel unit. Further up the West Line and Line creeks' valley slope, lower permeability materials predominant.

Groundwater flow is interpreted to generally follow topography, flowing towards Line Creek along the valley sides, and parallel to Line Creek along the valley bottom. Groundwater flow in the West Line Creek watershed basal aquifers and within perched aquifers flows to the southeast, towards Line Creek.

Groundwater sampling for the Upper Line Creek and North Centre Line Creek subareas will begin in 2022. In the South Centre Line Creek subarea, several monitoring locations had OC parameter concentrations of selenium and nitrate-N greater than the primary screening criteria. Groundwater concentrations indicated mixed mine-influenced water. In the West Line Creek subarea, groundwater concentrations indicated mine- and spoils-influenced water. Groundwater from the West Line Creek subarea also had concentrations greater than primary screening criteria for barium, iron, lithium, manganese, and uranium; however, barium, lithium, and manganese have been identified as non mine-related.

Groundwater concentrations within the Lower Line Creek subarea at some locations indicated mine-influenced water. Initial groundwater samples from new wells LC_MW_CP1A and LC_MW_CP1B yielded dissolved selenium concentrations greater than primary screening criteria, with higher concentrations reported at the deeper well. However, results were limited to two sampling events and will be confirmed with subsequent sampling programs.

Process Plant and Elk Valley (Study Areas 5 and 6)

Seventeen monitoring wells in the Process Plant area monitor potential groundwater transport of OC from upstream sources including the Phase I mining operations, Process Plant ponds, CCR, and reclaimed CCR. Study Area 5 is downstream of LCO Phase I mining operations in the valley bottom where Line Creek converges with the Fording River, while Study Area 6 is farther downstream in the valley bottom at the confluence of the Elk and Fording Rivers and downgradient of the CCR.

All groundwater OC concentrations for the four sampled wells located at the Process Plant were less than primary screening criteria.

A new clustered pair of monitoring wells (LC_MW_LC4A/B) were installed in 2021 adjacent to Lower Line Creek watercourse to corroborate surface water and groundwater interactions the furthest upgradient section of the Line Creek alluvial fan. Groundwater samples from these two new wells had dissolved selenium at concentrations greater than primary screening criteria. Preliminary water level data from these new wells indicated downwards flow of groundwater from the shallow sand and gravel unit (alluvial fan material) to the deeper shale bedrock. This preliminary data supports the flow and load accretion study completed in 2020, which identified Lower Line Creek as a losing reach (Drawing LC-02; SNC-Lavalin 2020c, 2020d; Golder, 2021).

A new clustered pair of monitoring wells (LC_MW_ERX1A/B) were installed in 2021 between the ERX CCR Refuse Spoil and Grave Lake. All groundwater OC concentrations were less than primary screening criteria.

Two new clustered pairs of monitoring wells (LC_MW_SRD1A/B and LC_MW_SRD2A/B) were installed in 2021 between the CCR and the Elk River. These compliment the understanding of groundwater flow with the existing monitoring well LC_MW_ER4A/B, which is located on the bank of the Elk River. Groundwater at these wells had concentrations of dissolved selenium and nitrate greater than primary screening criteria, except for the two deeper wells LC_MW_SRD2A and LC_MW_ER4A. The sands and gravels encountered in the new and existing wells were interpreted as the south- and westwards extension of the Line Creek alluvial fan that underlies the Process Plant area. Initial groundwater-surface elevations (based on one monitoring event) indicated a downward gradient at LC_MW_SRD1 and upward gradient at LC_MW_SRD2. An upwards gradient was also present at LC_MW_ER4, which was consistent with last year's data. During freshet, the gradient was the weakest, likely owing to the increased surficial pressures from spring melt water volumes as this well pair may be located within 10 m the high-water mark of the Elk River but will be confirmed in 2022 with a hydrology field survey.

EVO SSGMP and Relevant RGMP Study Area Summary

Forty-six monitoring wells in 33 locations (eleven nested), one domestic well and six groundwater supply wells were monitored and sampled for the 2021 EVO SSGMP and RGMP. The EVO summary is split up based on inferred groundwater flow to potential receptors as defined in the groundwater conceptual model: Grave/Harmer Creek and Elk River downstream of Grave Creek (Study Area 7), Elk River proximal to EVO (Study Area 8), Sparwood Area (Study Areas 9a and 12), Michel Creek downstream of Gate Creek and Bodie Creek (Study Area 9b), and Erickson Creek and Michel Creek downgradient of Erickson Creek (Study Area 10).

Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (Study Area 7)

A bedrock well RG_MW_GCA was installed in Q3 2021 along Grave Creek prior to the confluence with the Elk River. OC concentrations at all the wells were less than the primary screening criteria in 2021. The Se:SO4 (S) ratios at nested well pair EV_GV4A/B and its location relative to the confluence with Harmer Creek suggest a natural non-contact signature; however, additional monitoring and isotopic analysis is recommended to confirm they are reflective of background conditions. Continued monitoring and sampling at the newly installed wells is expected to provide further insight into groundwater-surface water interaction in Harmer and Grave creeks and potential mine-influence on groundwater. Elevated turbidity was measured at the newly installed well RG_MW_GCA during sampling in Q4 2021 and the analytical results may not be representative of groundwater in bedrock in this area. This well should be further developed to attempt to collect a more representative water quality sample.

Study Area 7 is in the Elk River valley bottom where Harmer Creek flows into the Elk River. Loading of mine-influenced constituents to groundwater is inferred to be primarily from infiltration of Elk River surface water as groundwater transport of OC is inferred to be minimal. Infiltration of surface water from the Elk River is considered a key influence on groundwater quality in this area.

Elk River Proximal to EVO (Study Area 8)

Groundwater from monitoring wells EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw, in tributary creek watersheds (Balmer, Lindsay, Goddard and Otto creeks), within the Elk River watershed, contained OC concentrations below the screening criteria in 2021. Surface water from Goddard Creek Sedimentation Pond had the highest selenium concentrations in surface water in this area. The source of mine-influenced water is interpreted to be related to seepage through a known fault as it flows from the Cedar North Pit through a conveyor tunnel to the valley bottom. Teck is planning to divert flow from the conveyor tunnel for use as process water starting in the spring of 2022.

Monitoring well EV_MW_GC1B had sulphate concentrations similar to those measured at Goddard Creek. The Se:SO4 (S) ratio for EV_MW_GC1B indicates that groundwater in this area has undergone selenium reduction and the proximity of the well to Goddard Creek Sedimentation Pond suggests it may have been locally influenced by the pond.

Groundwater at EV_OCgw, near Otto Creek, contained concentrations of OC less than the primary screening criteria and the Se:SO4 (S) ratios indicate that groundwater is not mine-influenced. The monitoring well is located at the base of the unconfined aquifer and completed above bedrock. The major ion distribution of groundwater at EV_OCgw and Otto Creek were distinct from one another, indicative that surface water – groundwater interaction between the creek and deep groundwater is limited in this area.

Groundwater concentrations at RG_DW-03-10 (Sparwood Municipal Supply Well 4) were less than the primary screening criteria for all OC in 2021. The well is located on the opposite (west) side of the Elk River from EVO, which is expected to act as a groundwater divide. This groundwater divide acts as a natural barrier to groundwater transport from potential sources at EVO to the groundwater supply well.

Sparwood Area (Study Areas 9a and 12)

Wells installed at the base of Baldy Ridge (EV_MW_MC4, EV_MW_AQ1 and EV_MW_AQ2) did not contain OC concentrations greater than primary screening criteria in 2021. Flow from Baldy Ridge is inferred to be the dominant process in this area as opposed to down-valley flow along Michel Creek, as evidenced by muted to limited seasonal influence measured in these wells compared to wells installed along the Michel Creek aquifer. Although concentrations of OC have typically been less than the primary screening criteria, concentrations of dissolved selenium at EV_MW_AQ1 are similar or lower than concentrations in surface water at nearby Aqueduct Creek (EV_AQ1), which flows from Baldy Ridge (Qualtieri Creek is also diverted to Aqueduct Creek). In addition, concentrations of dissolved selenium at EV_MW_AQ1 fluctuate seasonally, similar to what is observed at Aqueduct Creek. The Se:SO_4 (S) ratios also suggest mixing by mine-influenced water. Other wells at the base of Baldy Ridge are not near any streams and have much lower dissolved selenium concentrations. Therefore, the main transport pathway of OC from sources on Baldy Ridge to groundwater in the Sparwood Area valley bottom aquifer is inferred to be through surface water infiltration associated with Aqueduct Creek.

Downgradient from Sparwood Ridge, continuous groundwater elevation data suggests a hydraulic connection between groundwater and surface water Michel Creek. Concentrations of OC in EV_MW_MC3 were generally below primary criteria. Based on the groundwater Se:SO4 (S) ratios, groundwater is inferred to be mixing with a mine-influenced water source. Seep EV_SPR1B is located in the general vicinity of EV_MW_MC3 and has contained concentrations of dissolved selenium greater than the primary screening criteria during Q2 sampling events since 2019. As the major ion distribution at EV_SPR1B is not consistent with the distribution at EV_MW_MC3, another source of mine-influenced water is inferred to be mixing at EV_MW_MC3.

Farther downgradient, the only OC concentration measured greater than screening criteria was dissolved selenium at shallow monitoring well EV_MW_SPR1C during Q1 sampling events since sampling began in 2019. Upward gradients have been calculated in the triple nested wells (EV_MW_SPR1A/B/C) and groundwater may be recharging surface water in this area. The Se:SO_4 (S) plot indicates mine-influenced groundwater at shallow well EV_MW_SPR1C only and the ratios are similar to those at EV_MW_MC3.

Study Area 12 is located in the Elk River valley bottom downgradient from the confluence of Michel Creek and Elk River. Seasonal fluctuations in OC concentrations at RG_DW-03-04 (Sparwood Well #3), RG_MW-03-04 and EV_ER1gwS were similar to those observed in surface water from the Elk River and Michel Creek. OC concentrations in deep well EV_ER1gwD also exhibited seasonal fluctuations prior to July 2019. However, fluctuations have since become more muted and concentrations have generally decreased, which may be the result of the cessation of pumping at municipal groundwater supply well RG_DW-03-04. Municipal groundwater extraction has now shifted to RG_DW-03-10 (Sparwood Well #4).

Under pumping conditions, between 2016 to 2020, groundwater quality at the former municipal well RG_DW-03-04 appeared to generally reflect Elk River surface water quality, with some influence from Michel Creek. However, in 2021, water quality at this well more closely resembled that of Michel Creek. Concentrations of OC at RG_MW-03-04 were relatively consistent with concentrations measured in domestic well RG_DW-03-04. The confining layer identified as clay at RG_DW-03-04 and silt and clay at RG_MW-03-04 is not inferred to be fully continuous and the confined/semi-confined aquifer unit may interact with the shallow unconfined aquifer as well as infiltrating surface water. The Se:SO4 (S) plot shows that groundwater at RG_MW-03-04 and RG_DW_03-04 plot more closely to that of Michel Creek surface water, indicating that Michel Creek is influencing this water. Conversely, groundwater at EV_ER1gwS/D plot more closely with Elk River water, which indicate that the Elk River is a stronger influence. Continued monitoring should occur to understand post-pumping conditions in the aquifer.

Michel Creek Downstream of Gate Creek and Bodie Creek (Study Area 9b)

In the Bodie and Gate Creek area, some of the the highest concentrations of sulphate, nitrate-N and dissolved selenium in 2021 were measured at EV_RCSgw, however, the source of mine-influence at this well EV_RCSgwremains uncertain. Preliminary flow accretion data from July 2021 indicates that Michel Creek is a gaining reach from South Gate Creek to Bodie Creek. Prior to 2019, OC concentrations at EV_RCSgw were higher than those in surface water at Gate and Bodie creeks (EV_GT1 and EV_BC1, respectively) and in groundwater at EV_MW_GT1B and EV_MW_BC1A/B, which suggested that the source may be related to a local groundwater pathway, although mixing with infiltration from a surface water source may also be occurring.

The source of elevated OC at EV_MW_GT1B and EV_MW_BC1A/B is inferred to be related to surface water recharge to the valley bottom aquifer. Concentrations of OC and the major ion distributions of groundwater are consistent with surface water in Bodie and Gate creeks, indicative of a potential hydraulic connection between the creeks and shallow groundwater. The relatively low sulphate and nitrate-N and consistent sulphate suggest that deep groundwater at EV_MW_GT1A is not mine-influenced. Continued monitoring and sampling at EV_MW_GT1B and EV_MW_BC1A/B is required to further assess the source of OC.

In Michel Creek valley bottom upgradient of the Sparwood Area, dissolved selenium concentrations were above primary screening criteria at shallow nested well EV_MW_MC2B and supply wells EV_HW1 and EV_BRgw in 2021. Concentrations of OC at these locations were higher compared to concentrations in Michel Creek (EV_MC2) indicating there is a potential groundwater pathway of OC in this area, inferred to extend from the Bodie and Gate Creek areas. The distribution of the elevated OC concentrations are greater in shallow wells relative to those screened deeper in the aquifer. The loading of mine-influenced constituents to groundwater in the valley bottom of Michel Creek near EVO are inferred to primarily be sourced from infiltration of surface water and upload groundwater flow from Bodie and Gate creeks, followed by down-valley groundwater flow along Michel Creek.

Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10)

Groundwater from monitoring wells EV_WF_SW and EV_ECgw, in the Erickson Creek watershed, contained OC concentrations below screening criteria in 2021. There does not appear to be a strong hydraulic connection between groundwater at EV_ECgw and surface water in Erickson Creek. The main transport pathway of mine-influence to the Michel Creek valley bottom is probably through surface water.

Concentrations of OC in groundwater samples from Michel Creek downstream of Erickson Creek remained less than the primary screening criteria in 2021. Se:SO_4 (S) ratios at intermediate well EV_MW_SP1B indicates some mine-influence in Q1 only; ratios at EV_MW_SP1A/C are more reflective of natural non-contact water. There are limited data so influences on water quality at this location will continue to be evaluated as more data are collected.

CMm SSGMP and Relevant RGMP Study Area Summary

Nineteen monitoring wells (seven nested locations) were monitored and sampled for the 2021 Coal Mountain mine (CMm) SSGMP and RGMP. CMm can be divided into two primary watersheds: Corbin Creek valley; and Michel Creek valley including Study Area 11 of the RGMP.

Corbin Creek Watershed

Among the seven monitoring wells in the Corbin Creek Watershed, OC concentrations above primary screening criteria were limited to dissolved selenium at one well (CM_MW5-SH) in Q2, Q3, and Q4 2021. The dissolved selenium at CM_MW5-SH is inferred to be the result of surface water infiltration from Corbin Creek. Corbin Creek is sampled upstream of CM_MW5-SH at CM_CCPD.

Michel Creek Watershed and Study Area 11

Among the twelve monitoring wells in the Michel Creek valley, OC concentrations above primary screening criteria were limited to sulphate at monitoring well CM_MW7-DP in all quarters, and sulphate at CM_MW2-SH in Q3. CM_MW7-DP is at mid-elevation within CMm in bedrock (sandstone interpreted to be Kootenay Group) directly below the spoil footprint approximately 800 m upgradient of the Michel Creek valley bottom, while CM_MW2-SH is downgradient of CMm in the Michel Creek valley.

Study Area 11 is the focal point of groundwater flow at CMm along the Michel Creek valley bottom directly downgradient of the confluence of Michel and Corbin Creeks. OC concentrations were less than primary screening criteria for the five monitoring wells in Study Area 11 in 2021. Monitoring well CM_MW1-OB had the highest OC concentrations of Study Area 11 monitoring wells (still below primary screening criteria) suggesting surface water infiltration from Corbin and Michel creeks into shallow groundwater. Concentrations of OC in Michel Creek surface water from MC_MC2 are almost always above all monitoring wells, which also suggests that the potential source of OC is from surface water.

Recommendations

Recommendations identified in the SSGMP for FRO, GHO, LCO, EVO and CMm and the RGMP are presented in the table below.

Summary of New Recommendations from SSGMPs and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs	
FRO SSGMP	A local background well should be installed at FRO to replace the mine-influenced FR_HMW5 if a suitable location can be identified.
	An attempt should be made to retrieve the tubing that is stuck in monitoring well FR_HMW2. If this is not possible, the well should be decommissioned and a new well installed within spoils in the Henretta Creek watershed to replace it.
	An attempt should be made to complete another hydraulic conductivity test at monitoring well FR_HMW1S, where recovery was too rapid and there was insufficient displacement for analysis in 2011.
	A datalogger should be re-installed in monitoring well FR_MW_NTPSE, which had it's datalogger pulled when monitoring ceased as part of the previous program.
	Consideration should be given to the need for installing new monitoring wells within overburden and bedrock in Study Area 1 once recently installed monitoring wells have been evaluated for inclusion in the FRO SSGMP and/or RGMP.
	Monitoring wells RG_MW_FR1A/B/C should be incorporated into the SSGMP and RGMP to eventually replace supply well FR_GH_WELL4. Addition of these new wells will provide water quality and groundwater elevation data over the entire overburden thickness in the Fording River valley bottom. However, sampling of monitoring well FR_GH_WELL4 should continue for a period of time until a relationship between the water quality at FR_GH_WELL4 and RG_MW_FR10A/B/C is established.
GHO SSGMP	Replace the transducer in GH_MW_GHC-1B.
	Install a transducer in GH_MW_RLP2.
LCO SSGMP	Assess available data from LC_MW_LC1-1A, LC_MW_LC1-2A, and LC_MW_LC1-3A for potential continuous groundwater level monitoring and install a transducer in a minimum of one well. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater in this area.
	Develop the repaired well LC_PIZP1101 prior to next sampling event and assess whether water quality is representative of the aquifer. Conduct new geodetic survey of ground surface and top of casing. Deploy protection measures to mitigate future damage.
	Utilize a bladder pump at LC_PIZP1105.
	In 2022, Teck will conduct hydrologic surveys to confirm the location of the high-water marks of LCO Dry Creek and Elk River near RG_MW_DC1A/B and LC_MW_ER4A/B, respectively. If the hydrologic surveys determine that the well locations are within 10 m of the high-water mark, future reporting will be updated to reflect the appropriate guideline.

Summary of New Recommendations from SSGMPs and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs (Cont'd)	
EVO SSGMP	Complete hydraulic conductivity tests at EV_GV3gwS, EV_GV3gw, RG_MW_GCA, EV_BALgw, EV_MW_MCgwA/B, and EV_MW_BC1B.
	Re-develop monitoring well RG_MW_GCA to attempt to reduce turbidity in the water column.
	Review cross section EA-EA' to include borehole log data from the Harmer Reservoir project, where appropriate. Review data to confirm whether a secondary cross section should be included in the area.
	Conduct a site visit to determine the feasibility of installing additional wells north of Sparwood Ridge and south of Michel Creek to further investigate groundwater flow and the source of selenium at EV_MW_MC3.
	Collect water quality from seep EV_SPR1B quarterly for at least one year to investigate possible selenium sources at EV_MW_MC3.
	Collect quarterly water samples from discharge point EV_SPR5 for at least one year to confirm trends.
CMm SSGMP	Complete hydraulic conductivity testing at CM_MW4-SH/DP.
	Install transducers in monitoring wells CM_MW6-DP/SH, CM_MW7-DP/SH, CM_MW8, CM_MW9, and CM_MW10 to understand groundwater-surface water interaction and groundwater recharge.
Regional Groundwater Monitoring Program	
AMP KU 6.3 (Triggers)	A full year of data from monitoring wells installed in drinking water aquifers (i.e., GH_MW_EF1A/B, RG_MW_WW and RG_MW-03-04). The next steps for trigger development will be to analyze data from wells to understand whether triggers will be effective in achieving objectives through a defined response framework.
Background	Update the Background Assessment as part of the 2023 RGMP Update, including a review of the adequacy of the current background monitoring well network. Continue to supplement the background monitoring network with new monitoring wells.
	Evaluate analytical results for newly installed background wells including RG_MW_AC1A/B once one year of data is available to assess whether they should be added to the background monitoring network.
	Sample groundwater at all background monitoring wells once for isotope analysis (^{3}H, ^{2}H, ^{18}O and potentially ^{14}C) to obtain a better understanding of the origin of groundwater in background monitoring wells.
	Install data loggers within GH_MW_BG1A/B/C to assess continuous groundwater level changes.
	Assess trends of Cl in background monitoring wells on an annual basis, and reassess annually if they should continue to be considered as representative of background groundwater quality.
	RG_DW-03-10 (Sparwood Well 4) in Study Area 8 should be added to the background monitoring network.

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Summary of New Recommendations from SSGMPs and RGMP

Program	Recommendation
Regional Groundwater Monitoring Program (Cont'd)	
Study Area 1	Add monitoring wells RG_FR7A/B and RG_FR8A/B/C to the RGMP as they are located along the inferred flow paths between source areas (Kilmarnock Alluvial fan and Fording River) and the regional groundwater discharge zone.
Study Area 2	Evaluate the feasibility of installing transducers in RG_MW_DC1A and RG_MW_DC1B for continuous groundwater level monitoring. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater at this location.
Study Area 3	No recommendations
Study Area 4	Lower the hanging depth of loggers installed in RG_MW_LC3A/B
Study Area 7	Surface water from Grave Creek at EV_GV1 or a new equivalent location adjacent to RG_MW_GCA should be added to the surface water program.
Study Area 8	A hydrometric station should be established at the Goddard Creek Sedimentation Pond and the water level in the pond should be monitored to better understand the redox conditions at EV_MW_GC1B.
Study Area 9a/b	Survey wellhead elevations at EH_WH50 and EV_HW1 so that pressure transducer groundwater level data can be correlated to groundwater elevations.
Study Area 10	Consider re-establishing surface water monitoring station EV_MC3A to evaluate surface water quality in Michel Creek immediately downgradient of Erickson Creek, and consider establishing a new station in Michel Creek downgradient of Mulligan Creek. These additional locations will help in the understanding of OC inputs to Michel Creek.
Study Area 11	No new recommendations.
Study Area 12	Install pressure transducer at RG_MW_03-04.

Summary of Existing Recommendations from SSGMPs and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs	
FRO SSGMP	Nested monitoring wells should be installed in the Henretta Creek Valley bottom west of Henretta Lake to investigate a potential down-valley pathway of mine-influenced groundwater sourced from the spoils and backfilled pits that may bypass the lake and creek, as well as the hydrogeologic conditions in bedrock in the Henretta Creek Valley.
	Surface water data collected from Henretta Lake in vertical profiles to investigate potential groundwater discharge and stratification of OC should be evaluated.
	Additional monitoring wells should be installed in the area of the FR_POTWELLS and instrumented with dataloggers to investigate the hydraulic connection between the supply wells and the Fording River in the vicinity of the drying reach.
	Monitoring wells should be installed in the area between the FR_POTWELLS and Clode Creek and in the area west of the Clode Creek ponds, where groundwater quality is unknown.

Summary of Existing Recommendations from SSGMPs and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs (Cont'd)	
FRO SSGMP (Cont'd)	Historic monitoring wells FR_BH-03-16 and FR_BH-04-16 south of the STP should be monitored and sampled to assess the source of OC in this area, while wells FR_09-03-A/B should be monitored and sampled to assess whether attenuation of OC also occurs east of FR_09-04-A/B.
	Monitoring wells recently installed in the Henretta Creek Valley, Turnbull Bridge Spoil area, Clode Creek area, Lake Mountain Creek area, Eagle pond area, Kilmarnock Creek area, and Swift Creek sediment ponds area should be evaluated for potential inclusion in the SSGMP once interpretation of the data have been published. Consideration will also be given to the need for installing new monitoring wells within overburden and bedrock once the evaluations have been completed. There is a general lack of monitoring wells completed within bedrock at FRO, particularly in Study Area 1.
GHO SSGMP	Decommission GH_GA-MW-4 now that one year of data has been collected at RG_MW_LC3A/3B.
	Decommission GH_GA-MW-2 now that one year of data has been collected at RG_MW_WC2A/2B.
LCO SSGMP	Install pressure transducers for continuous groundwater level monitoring at LC_PIZDC1404S, LC_MW_CP1A, and LC_MW_CP1B. Assess whether a pressure transducer can be installed at LC_PIZDC1306. Continuous groundwater level measurements would facilitate more detailed assessments of groundwater at these locations.
LCO SSGMP (Cont'd)	Reduce sampling frequency to twice per year for the following wells (LC_PIZDC1307, LC_PIZDC1308, LC_PIZP 1101 and LC_PIZP1103) because OCs are less than primary screening levels, baseline data has been established with a long period of data and trends are stable or decreasing according to Mann-Kendall statistical analysis.
	Reduce manual water level measurement frequency to twice per year for the following wells; LC_PIZP1001, LC_PIZP1002 and LC_PIZP1003 because groundwater levels for these wells are only needed to augment interpreted groundwater flow direction at the Process Plant. Recommend continuous groundwater level monitoring of all three wells.
	Investigate the reason for the anomalously high groundwater elevations at LC_PIZP1002 and LC_PIZP1003 (17 m and 9 m, respectively). Depths to bottom and depths to water information should be validated. A new geodetic survey of the ground surfaces and tops of casings may be warranted.
EVO SSGMP	Sample monitoring wells near the Dry Creek Sedimentation Pond (EV_MW_DC1 through EV_MW_DC7 and EV_PW_DC1) as well as near the Harmer Reservoir (EV_MW_HC1 through EV_MW_HC5) per recommendations in the 2021 SSGMP Update. Assess analytical results from the Harmer Reservoir in 2022 for potential inclusion in the SSGMP. Assess analytical results from the Dry Creek Sedimentation Pond in 2023 for potential inclusion in the SSGMP.
	Survey surface water stations at Harmer Creek (EV_HC1) and Goddard Creek (EV_GC2) to a local datum.
	Add monitoring well EV_GV3gwS to the SSGMP.

Summary of Existing Recommendations from SSGMPs and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs (Cont'd)	
EVO SSGMP (Cont'd)	Re-develop monitoring well RG_MW_GCA to attempt to reduce turbidity in the water column.
	Results from the groundwater investigation planned for Lagoon D decommissioning should be completed to evaluate whether additional investigations regarding shallow groundwater (including near EV_OCgw) are required.
	Review results from investigation activities planned west of Cedar North Pit to Elk River (Permit 107517 Condition 8.2.4) to assess possible transport pathways of mine-influenced groundwater within faults and fractures.
	Review the findings of the Goddard Marsh load balance study as well as the existing monitoring network to assess whether additional groundwater monitoring is warranted.
	Complete a hydraulic conductivity test at EV_OCgw.
	Decommission nested well pair EV_MCgwS/D since both of these wells are installed in the aquitard.
	Continue monitoring chemistry at EV_MW_MC3 and at nearby SEEP_1B and review isotope results.
	Survey surface water stations at Bodie Creek (EV_BC1) and Gate Creek (EV_GC1) to a local datum.
	Investigate the condition of monitoring wells EV_MW_BC2 and EV_MW_BC3 and if appropriate, add to SSGMP to obtain a better understanding of shallow groundwater and to monitor the bedrock pathway.
	Collect water quality from discharge point EV_SPR5 quarterly to confirm trends.
	Review contaminant load study related to Condition 4C3.4ii in Permit 107517 to understand whether a load imbalance along Michel Creek exists.
	Add additional wells screened through middle portion of sand and gravel aquifer, near EV_RCSgw, and further downstream, at EV_MW_MC1A/B, to identify heterogeneities within the aquifer that may be affecting groundwater flow and transport of dissolved selenium.
	Complete a site reconnaissance of the Balmer North mine area (in progress).
	Complete a site reconnaissance near Milligan Creek Sedimentation Pond to assess the possible installation of a well nest.
	Sample newly installed monitoring wells in Erickson Creek (EV_MW_EC3A/B) for at least two years. Assess analytical results in 2023 for potential inclusion in the SSGMP.
	Complete a hydraulic conductivity test at EV_ECgw.
	Sampling frequency at EV_BALgw, EV_LSgw, EV_OCgw, EV_GCgw, EV_MW_MC1A, EV_MW_MC2A, EV_MW_AQ1, EV_MW_AQ2, EV_MW_MC4, EV_MW_SPR1A, EV_MW_GT1A, and EV_BCgw should be reduced to semi-annual per recommendations in the 2021 SSGMP Update.
	Remove monitoring well EV_WF_SW from the SSGMP as the well is located upland along Erickson Creek and has significant groundwater variations. The well is screened below 159 m of waste rock and concentrations of OC are less than the primary screening criteria.

Summary of Existing Recommendations from SSGMPs and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs (Cont'd)	
CMm SSGMP	It is unlikely CM_MW9 will ever be successfully developed, therefore development efforts on CM_MW9 should cease. Continue collecting quarterly groundwater levels to verify the minimal water seepage into the well.
	Complete a flow accretion study on relevant water courses (Corbin Creek from Corbin Pond to confluence with Michel Creek, Michel Creek from upgradient of CM_MC1 to downstream of confluence with Andy Good Creek, and the lower portion of Andy Good Creek). Survey continuous water level monitoring stations at CM_CC1, CM_MC1 and CM_SPD relative to sea level. Establish continuous level monitoring at CM_MC2.
	Complete hydraulic conductivity testing at CM_MW7-DP/SH and CM_MW8.
	Update sampling frequency of monitoring wells CM_MW4-SH, CM_MW4-DP, CM_MW5-DP, CM_MW6-SH, CM_MW6-DP, CM_MW7-SH and CM_MW8 to twice per year. OC are below primary screening levels in these monitoring wells, there is a relatively long period of record and trends are stable or decreasing according to Mann-Kendall statistical analysis.
Regional Groundwater Monitoring Program	
AMP KU 6.3 (Triggers)	A full year of data from monitoring wells installed in drinking water aquifers (i.e., GH_MW_EF1A/B, RG_MW_WW and RG_MW-03-04). The next steps for trigger development will be to analyze data from wells to understand whether triggers will be effective in achieving objectives through a defined response framework.
Background	Continue to monitor/sample background locations at least two times in a year, as recommended in the 2020 RGMP Update (SNC-Lavalin, 2020b).
Study Area 1	Potential inclusion of wells installed in support of the MBI other than RG_MW_FR1A/B/C, RG_MW_FR7A/B and RG_MW_FR8A/B/C (newly recommended to be added) should be assessed once the interpretive reporting for that program has been completed.
	Review results of ongoing MBI and Porter Creek investigations to assess the potential groundwater transport from the Porter Creek catchment.
Study Area 3	Assess results from GHO Greenhills-Fording Aquifer Study drilling program and evaluate the new monitoring wells for potential inclusion in the GHO SSGMP.
Study Area 4	Assess results of isotope samples (^{18}O-H_2O, ^{2}H-H_2O, tritium and sulphate) at GH_MW-MC-2D and GH_MW-MC-1D. If results are inconclusive, further field investigation of the deep groundwater flow regime will be conducted.
	Assess results from MBI investigation downgradient of Thompson Creek watershed to assess potential inclusion of new monitoring wells into SSGMP/RGMP.
Study Areas 5/6	Install transducers in newly drilled clustered monitoring wells RG_MW_LC4A and RG_MW_LC4B. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater at this location.
	Teck has existing water supply wells near the top of the Line Creek alluvial fan. It may be possible that one or some of the existing water supply wells near LC_LC4 can provide supplemental information to facilitate characterization of groundwater – surface water interactions in the alluvial fan. Assess available relevant data for inclusion into the SSGMP and potentially validate through monitoring.

Summary of Existing Recommendations from SSGMPs and RGMP

Program	Recommendation
Regional Groundwater Monitoring Program (Cont'd)	
Study Areas 5/6 (Cont'd)	Confirm the December 2021 repairs were successful and the well integrity of PIZP1101 has been maintained. If the well was successfully repaired, remove PIZP1101 as part of the Study Areas 5/6 assessment but retain sampling as part of the Background Groundwater Assessment. If subsequent analytical results do not align with historical ranges (i.e. within two sampling events), this well should be decommissioned.
	Add LC_MW_ER4A and LC_MW_ER4B to the RGMP. Continue quarterly sampling and continuous groundwater level measurements.
Study Area 7	Establish a new surface water monitoring location at Grave Creek near RG_MW_GCA to replace former EV_GV1 location which is very difficult to access.
Study Area 8	A hydrometric station should be established at the Goddard Creek Sedimentation Pond and the water level in the pond should be monitored to better understand the redox conditions at EV_MW_GC1B.
Study Area 9a/b	Install multilevel well nest adjacent to EV_RCSgw and EV_BRgw. Install dataloggers at these new locations. Dataloggers cannot be installed at EV_RCSgw and EV_BRgw as the downhole pumps cannot be removed to facilitate installation. Also, these two wells do not have a borehole log, construction details are unknown and there is uncertainty as to the source of dissolved copper from these wells. Nested monitoring wells will aid in the understand the surface water/groundwater relationship and any potential effects of pumping of these wells.
Study Area 11	Complete a flow and load accretion study on Michel Creek, lower Corbin Creek, and lower Andy Good Creek to help assess if the adequacy of the existing groundwater monitoring network. Then assess if additional groundwater monitoring well(s) are required and/or if existing monitoring wells should be replaced/abandoned.

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Acronyms

Acronym	Definition
Ammonia-N	Ammonia-Nitrogen
AMP	Adaptive Management Plan
AW	Aquatic Life Water Use
AWFT	Active Water Treatment Facility
AWTF-N	Active Water Treatment Facility-North
AWTF-S	Active Water Treatment Facility-South Program
BGA	Background Assessment
BCWQG	*British Columbia Approved Water Quality Guidelines*, includes Working Water Quality Guidelines for BC (BCWQG). British Columbia Ministry of Environment & Climate Change Strategy (ENV), updated 2021
CCR	Coarse Coal Rejects
CI	Constituents of interest
CMm	Coal Mountain mine
CMO	Coal Mountain Operations, now known as Coal Mountain mine (CMm)
COA	Certificates of Analysis
CP	Compliance Point
COV	Coefficient of Variance
CSM	Conceptual Site Model
CSR	*Contaminated Sites Regulation* (CSR), B.C. Reg. 375/96, includes amendments up to B.C. Reg. 179/202, July 7, 2021
DL	Detection limit
DO	Dissolved Oxygen
DW	Drinking Water Use
DW AF	Drinking Water Allocation Factor
EMA	*Environmental Management Act (EMA), B.C. Reg. 179/2021 / effective July 7, 2021.*
EMC	Environmental Monitoring Committee
EMLI	Ministry of Energy, Mines and Low Carbon Innovation (formerly known as The Ministry of Energy, Mines and Petroleum Resources [EMPR])
EMS	Environmental Monitoring Station
ENV	Ministry of Environment & Climate Change Strategy
ERT	Electrical Resistivity Tomography
ERX	East Refuse Expansion
EVO	Elkview Operations
EVWQP	Elk Valley Water Quality Plan
FRO	Fording River Operations

Acronym	Definition
GHO	Greenhills Operations
GWG	Groundwater Working Group
HBV	Health-based Value
IHA	Interior Health Authority
IW	Irrigation Water Use
KCWD	Kilmarnock Clean Water Diversion
KNC	Ktunaxa First Nation
KU	Key Uncertainty (part of the AMP)
LCO	Line Creek Operations
LW	Livestock Water Use
mBGS	Meters below ground surface
MBI	Mass Balance Investigation
MU	Management Unit
MDL	Method Detection Limit
MoE	Ministry of Environment, now known as Ministry of Environment & Climate Change Strategy (ENV)
MQ	Management Questions under the Adaptive Management Plan
MF	Morrissey Formation
non-OC	non-Order Constituents
n	Number of Samples
Nitrate-N	Nitrate-Nitrogen
Nitrite-N	Nitrite-Nitrogen
NTP	North Tailings Pond
OC	Order Constituents
ORP	Oxidation Reduction Potential
PAG	Potentially Acid Generating
Q1, Q2, Q3, Q4	First, Second, Third, Fourth Quarter
QA/QC	Quality Assurance/Quality Control
RDWMP	Regional Drinking Water Monitoring Program
RGMP	Regional Groundwater Monitoring Program
RPD	Relative Percent Difference
RSL	Regional Screening Level
RSMP	Regional Seep Monitoring Program
RWQM	Regional Water Quality Model
Se:SO4 (S)	Selenium to sulphate (as sulphur)
S	Mann-Kendal Statistic

Acronym	Definition
SKP2	South Kilmarnock Phase 2 Secondary Settling Pond
SP&P	Standard Practice and Procedures
SPO	Site Performance Objective
SRF	Saturated Rock Fill Water Treatment Facility
SSGMP	Site-Specific Groundwater Monitoring Program
STP	South Tailings Pond
TDI	Tolerable Daily Intakes
TDS	Total Dissolved Solids
TG	Technical Guidance
TKN	Total Kjeldahl Nitrogen
TOR	Terms of Reference
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
UU	Underlying Uncertainty
WLC	West Line Creek

1 Introduction

This report addresses the annual reporting requirements for the Site-Specific Groundwater Monitoring Programs (SSGMP) at Teck Coal Limited's (Teck) five coal mines as well as the Regional Groundwater Monitoring Program (RGMP) in southeastern British Columbia's Elk Valley, as outlined in *Environmental Management Act (EMA)* Permit 107517[1] issued by the Ministry of Environment & Climate Change Strategy[2] (ENV) and included in Appendix I. The five coal mines include Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO), and Coal Mountain mine [CMm], previously identified as Coal Mountain Operations [CMO] and now in care and maintenance; Drawing 1). The Elk River and associated tributary system flows north to south through the Elk Valley. The Fording River and Michel Creek represent the largest of the tributary catchments within the broader Elk River watershed. The Elk Valley includes the communities of Elkford, Sparwood, Hosmer, Fernie, and Elko, and is in the Ktunaxa First Nation (KNC) traditional territory.

SNC-Lavalin Inc. (SNC-Lavalin) and Teck developed an RGMP to monitor groundwater in the valley bottoms for defined areas within Management Units (MU[s]) 1, 2, 3, 4 and portions of 5 as described in the Permit 107517 and shown on Drawing 1. The bedrock, surficial geology and karst potential for the region are presented on Drawings 2 to 6.

An SSGMP is required for each of Teck's five coal mines in the Elk Valley. The annual reports for the RGMP and SSGMPs for FRO, GHO, LCO, EVO, and CMm are presented herein.

1.1 Background and Regulatory Requirements

An RGMP for the Elk Valley and SSGMPs for each of Teck's five coal mines are required as conditions of Permit 107517, amended December 1, 2021 (Appendix I).

1.1.1 RGMP

As per Ministry of Environment & Climate Change Strategy (ENV) Approval letter dated April 18, 2017, the RGMP was updated and submitted in September 2017 ("2017 RGMP Update", SNC-Lavalin, 2017), and focused on mine-related "constituents of interest" (CI). For the 2017 RGMP Update, CI were defined as constituents identified in the *Environmental Management Act* (EMA) Permit 107517 (dissolved selenium, dissolved cadmium, sulphate, and nitrate-N, called Order Constituents [OC]). However, the 2020 RGMP Update (SNC-Lavalin, 2020b) defined CI to include non-Order Constituents (non-OC; total dissolved solids [TDS], nitrite, dissolved antimony, cobalt, nickel, and uranium), which were defined in the Background Assessment (BGA). Molybdenum has been added to the non-Order constituents as it may be a by-product of antiscalants used for calcite treatment in specific locations (Azimuth 2021). The 2017 RGMP Update was approved by ENV on February 19, 2020, and the approval was amended on July 9, 2020 (Appendix II). On December 4, 2020, the RGMP was updated ("2020 RGMP Update"; SNC-Lavalin, 2020b) and is pending ENV's approval.

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[1] Permit 107517, amended December 1, 2021.
[2] Formerly known as Ministry of Environment (MoE).

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1.1.2 SSGMP

In October 2018, the SSGMPs for FRO, GHO, LCO, EVO, and CMm were also updated ("FRO/GHO/LCO/EVO/CMO 2018 SSGMP Update"; SNC-Lavalin, 2018a, b, c; Golder Associates Ltd. [Golder], 2018, SRK Consulting Inc. [SRK], 2018a). ENV provided comments regarding the 2018 SSGMP Updates and revisions were made accordingly. The 2018 SSGMP Updates for FRO, GHO, LCO and EVO were re-submitted to ENV in September 2019 and ENV provided approval on March 11, 2020 (Appendix II; SNC-Lavalin, 2019a, b, c; Golder, 2019a). The SSGMPs were subsequently updated and submitted to ENV in October 2021 ("2021 SSGMP Update"; SNC-Lavalin, 2021a) and are pending ENV's approval. Table A, below, summarizes the submissions and activities that have taken place since submission of the 2017 RGMP Update.

Table A: Notable Submissions and Engagement Activities since Submission of the 2017 RGMP

Timeline	Activity
September 29, 2017	Submission of the 2017 RGMP Update report to ENV.
March 31, 2018	Submission of 2017 SSGMP Annual Reports to ENV for FRO, GHO, LCO, EVO, and CMO[1].
May 8 and 9, 2018	Groundwater Working Group (GWG) meeting to discuss groundwater in the Adaptive Management Plan (AMP), as well as GWG and Environmental Monitoring Committee (EMC) feedback on the 2017 RGMP.
May 16, 2018	Submission of the 2017 RGMP Annual Report to ENV.
October 31, 2018	2018 SSGMP Update Reports for FRO, GHO, LCO, EVO, and CMO[1] submitted to ENV.
December 21, 2018	Water Quality AMP for all Teck Coal Operations in the Elk Valley submitted to ENV.
March 31, 2019	2018 SSGMP Annual Reports for FRO, GHO, LCO, EVO and CMO[1] submitted to ENV.
April 2 to 9, 2019	Review and recommendations from ENV for the SSGMP Updates and 2017 SSGMPs for each operation.
April 4, 2019	Amended Permit 107517 issued by ENV.
April 10 and 11, 2019	GWG meeting to discuss the groundwater Conceptual Site Model (CSM), RGMP progress update, and RGMP links to the AMP.
May 16, 2019	2018 RGMP Annual Report submitted to ENV.
July 25, 2019	GWG meeting to discuss data gaps in the RGMP and proposed schedule to fill those gaps. Discussion also included the progress on groundwater trigger development.
September 30, 2019	2018 SSGMP Update Reports for FRO, GHO, LCO and EVO re-submitted to ENV.
October 8, 2019	Submission of Draft Proposed September 2020 and post-September 2020 Well Drilling and Investigations Activities.
November 26 and 27, 2019	GWG meeting to discuss progress on groundwater trigger development, current program data gaps, and a proposed 2020 program work plan.
January 29, 2020	GWG meeting to discuss the Terms of Reference (TOR) and Prioritization Framework for the 2020 RGMP Update.
February 19, 2020	ENV conditional approval of the 2017 RGMP Update.

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Table A (Cont'd): Notable Submissions and Engagement Activities since Submission of the 2017 RGMP

Timeline	Activity
February 20, 2020	First Quarter (Q1) GWG meeting to discuss proposed RGMP drilling and Prioritization Framework.
March 11, 2020	Approval of the FRO, GHO, EVO, LCO, and CMO[1] 2018 SSGMP Updates.
March 31, 2020	Submission of the 2019 Combined Annual Report for the Elk Valley Regional and Site-Specific Groundwater Monitoring Programs.
July 7 and 8, 2020	Second Quarter (Q2) 2020 GWG Meeting to provide an update on field activities and groundwater trigger development. Also discussed prioritization framework and feedback on the 2019 Combined Annual Report.
July 9, 2020	An update of the 2017 RGMP Approval Letter issued by ENV on February 29, 2020, to amend Condition 2.6.
September 22, 2020	Third Quarter (Q3) 2020 GWG Meeting to provide updates for field program and cobalt and lithium in drinking water. Also provide an approach for understanding karst and bedrock flows, and to further discuss annual report comments.
September 25, 2020	Amended Permit 107517 issued by ENV.
October 22, 2020	Amended Permit 107517 issued by ENV.
November 12 and 13, 2020	Fourth Quarter (Q4) 2020 GWG Meeting to provide an update on lithium and cobalt in drinking water. Discuss preliminary findings for the 2020 RGMP Update, including an update on karst potential and the prioritization framework.
December 4, 2020	Submission of the 2020 RGMP Update (SNC-Lavalin, 2020b).
February 25, 2021	Q1 2021 GWG Meeting to provide an update on the RGMP Update recommendations and proposed program changes.
March 11, 2021	Amended Permit 107517 issued by ENV.
March 31, 2021	Submission of the 2020 Combined Annual Report for the Elk Valley Regional and Site-specific Groundwater Monitoring Programs.
May 31, 2021	Submission of the Sparwood Area Groundwater Study.
June 24, 2021	Q2 2021 GWG meeting to provide an update on SSGMP Update terms of reference and the RGMP and SSGMP drilling field program.
July 22, 2021	Amended Permit 107517 issued by ENV.
July 31, 2021	2020 Adaptive Management Plan Annual Report for Teck Coal Operations in the Elk Valley submitted to ENV.
September 22, 2021	Q3 2021 GWG Meeting to provide an update on the SSGMP Update and the RGMP and SSGMP drilling program.
October 31, 2021	2021 SSGMP Update Reports for FRO, GHO, LCO, EVO, and CMm submitted to ENV.
November 24, 2021	Q4 2021 GWG Meeting to provide an update on the recommendations outlines in the SSGMP Update and the RGMP and SSGMP drilling program.
December 1, 2021	Amended Permit 107517 issued by ENV.
December 15, 2021	Water Quality Adaptive Management Plan for Teck Coal Operations in the Elk Valley – 2021 Update submitted to ENV.

Note:
[1] Currently referred to as Coal Mountain mine (CMm).

1.2 RGMP Purpose and Objectives

The RGMP currently monitors twelve areas, referred to as "Study Areas", to understand potential regional groundwater pathways of mine-related CI. These areas are defined based on identified receptors and source and transport pathway information from SSGMPs for the five operating mines in the Elk Valley (SNC-Lavalin, 2017).

Using the framework of the Elk Valley Water Quality Plan (EVWQP; Teck, 2014), Teck has developed three purpose statements and supporting objectives for the RGMP. These were developed in consultation with the GWG and presented in the 2017 RGMP Update (SNC-Lavalin, 2017).

The purpose statements and objectives that relate to each of the purpose statements are listed in Table B.

Table B: Purpose Statements and Objectives to Support Purpose Statements

Purpose Statements	Objective
Purpose 1: Using the framework of the EVWQP, the RGMP will be updated to monitor and evaluate potential quality effects to groundwater resources from mining activities to protect current groundwater users (initial focus) in the Elk Valley. Monitoring and evaluations will continue to inform management decisions that work towards protection of future groundwater users in the Elk Valley.	To identify the current receptors (i.e., drinking water, aquatic life, livestock watering and irrigation watering) and evaluate the potential for a complete transport pathway between source and receptors.
	To collect groundwater quality information from a monitoring network with appropriate locations to assess the presence of complete transport pathways (i.e., between source and receptors) for CI.
	Evaluate groundwater quality information against established screening criteria to assess potential effects to identified users and evaluate temporal/spatial trends.
Purpose 2: Using the framework of the EVWQP, the RGMP will be updated to monitor and evaluate groundwater as a potential pathway for transport of mine-related constituents of interest (CI) to surface water to support management decisions under the AMP.	To collect necessary groundwater information to support the refinement of surface water quality predictions.
	To evaluate the need to manage groundwater to meet surface water quality compliance.
Purpose 3: Using the framework of the EVWQP, the RGMP will be updated to evaluate and refine the CSM for source, transport and fate of mine-related CI in groundwater in the Elk Valley.	To review and synthesize regional and site-specific groundwater monitoring data on a three-year timeframe to update and refine the Regional CSM.

1.3 Linkages between the SSGMPs and RGMP

The SSGMPs focus on identifying and monitoring possible sources of mine-related constituents in groundwater and transport pathways to groundwater in the valley bottom of the main stem rivers (i.e., Elk and Fording Rivers, Michel Creek). Most of the site-specific groundwater monitoring is within or proximal to mine operation permitted boundaries. The RGMP focuses on groundwater fate and transport in the valley bottom of the main stems, and how they relate to applicable receptors. Regional groundwater monitoring is completed both within and outside mine operation permitted boundaries. The RGMP also includes data from select locations in the Regional Drinking Water Monitoring Program (RDWMP).

1.4 Linkage to Adaptive Management Plan

As required in Permit 107517, a Water Quality Adaptive Management Plan was developed for Teck Coal Operations in the Elk Valley (AMP), which was most recently updated in December 2021 (Teck, 2021b). The objective of the AMP is to support the implementation of the EVWQP to achieve water quality targets, ensure that human health and the environment are protected, and where necessary, restored, and to facilitate continuous improvement of water quality in the Elk Valley. Following an adaptive management framework, the AMP identifies six Management Questions (MQs) that will be re-evaluated at regular intervals as part of AMP updates throughout EVWQP implementation. The AMP also identifies Key Uncertainties (KUs) that, as reduced, fill gaps in current understanding and support achievement of the EVWQP objectives.

There are currently five MQs in the AMP that the data and interpretations in the RGMP inform:

- MQ1: “Will water quality limits and Site Performance Objectives (SPOs) be met for selenium, nitrate, sulphate and cadmium?”
- MQ2: “Will the aquatic ecosystem be protected by meeting the long-term SPOs?”
- MQ3: “Are the combinations of methods for controlling selenium, nitrate, sulphate and cadmium included in the implementation plan the most effective for meeting limits and SPOs?”
- MQ5: “Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?”
- MQ6: “Is water quality being managed to be protective of human health?”

MQs 1, 3 and 6 have KUs specifically related to groundwater:

- MQ1: KU 1.2: “How will uncertainty in the Regional Water Quality Model (RWQM) be evaluated to assess future achievement of limits and SPOs?”
- MQ 3: KU 3.2: “What additional flow and groundwater information do we need to support water quality management?”
- MQ 3: KU 3.2, Underlying Uncertainty (UU) 3.2.1: “Is it necessary for water management structures (that collect surface water from mine-influenced water tributaries) to collect groundwater and/or be lined in order to achieve limits and SPOs?”
- MQ 6: KU 6.1: “Is our understanding of local groundwater conditions for current and future drinking water use sufficient to minimize human exposure to constituents?”
- MQ 6: KU 6.2: “Is the spatial extent of mine-influenced groundwater sufficiently characterized to manage water quality in order to support meeting the environmental objectives of the EVWQP?”
- MQ 6: KU 6.3: “What are appropriate groundwater-related triggers and how can they be used?”

The RGMP Annual Report provides updates on MQ1, MQ3 and MQ6 on an annual basis. Groundwater monitoring results relevant to MQs and KUs are discussed in Section 6. Refer to the AMP (Teck, 2021b) for more information on the adaptive management framework, MQ, KU, response framework, continuous improvement, linkages between the AMP and other EVWQP programs, and AMP reporting.

1.5 Linkage to Regional Seep Monitoring Program

As an outcome of a 2017 site inspection, Teck has implemented a Regional Seep Monitoring Program (RSMP). The initial phase of the RSMP (Phase 1) was initiated in 2018, and involved identification of seep locations, development of sampling procedures, and initial collection of sample. A second phase (Phase 2) was conducted in Q1 2019, and involved technical evaluation of seep water quality and quantity using the data collected in Phase 1. Based on the findings of Phase 2, a long-term RSMP was developed and implemented in Q2, 2019, (Teck, 2018, 2019; SRK, 2019).

The objective of the monitoring program is to improve understanding of current and potential future loading of mine-influenced water to the receiving environment through geochemical interpretation and evaluation of trends in seeps within or near mining operations in the Elk Valley. Emphasis is placed on monitoring seeps downstream of spoils, coarse coal rejects (CCR), tailings, and open pits, particularly monitoring downstream of where the Morrissey Formation (generally located below the coal-bearing Mist Mountain Formation) is exposed by mining. This unit contains potentially acid generating (PAG) materials with the potential for water quality effects. The current long-term Elk Valley Regional Seep Monitoring Plan includes 89 seep monitoring stations around the five Elk Valley mine operations. As of 2021, 24 seeps are included at FRO; 18 at GHO; 12 at LCO; 19 at EVO; and 16 at CMm (SRK, 2022). Where possible, seeps are monitored semi-annually; during spring freshet and late summer/fall lower flows. Monitoring consists of collecting water quality samples, calcite presence identification, and flow measurements. The plan also provides a systematic approach to adding and removing seeps from the program based on monitoring results and evolving considerations around risk to aquatic health and receiving environment.

For the RGMP and SSGMP, select seeps in the monitoring program inform the interpretation of sources and flow paths to the main stem valley bottom groundwater. These seeps have been identified in the 2020 RGMP Update (SNC-Lavalin, 2020b), and further review of seeps in relation to potential sources was completed in the 2021 SSGMP Updates (SNC-Lavalin, 2021a). In 2021, 84 seep locations were monitored at least once, and 149 seep samples were collected. Two seeps previously categorized as possibly influenced by the Morrissey Formation (MF) were categorized as not MF influenced during 2021. Three seeps that were previously categorized as not being influenced by the MF were categorized as possibly being influenced by it in 2021. Five seeps were identified as not consistently categorized. One new seep at CMm was identified in 2021, along with eight new seeps at GHO. Four of the GHO seeps were sampled. New seeps were not identified at FRO, LCO, or EVO. Two seeps, one at FRO and one at EVO, were identified for retirement from the program (SRK, 2022).

The respective Operations appendices provide a discussion of specific seeps in relation to the RGMP and SSGMPs.

1.6 RGMP Isotope Sampling Program

At the request of Teck Coal, SNC-Lavalin completed an isotope sampling program for the RGMP to further improve the Elk Valley water isotope dataset. A more robust isotopic dataset will help to advance understanding of groundwater flow paths and refine the Regional and Site-specific hydrogeological CSMs. The RGMP isotope sampling program included collection of water samples for analysis of stable isotopes ($\delta^{2}H_{H2O}$ [deuterium] and $\delta^{18}O_{H2O}$) and radioactive isotope (tritium, ^{3}H).

Between October 2021 and January 2022, 108 isotope samples ($\delta^{18}O$, $\delta^{2}H$ and tritium) were collected from groundwater, seep, surface water and precipitation from locations associated with FRO, GHO, LCO, EVO and CMO as well as from regional locations off the mine permitted area. Appendix IV provides an interim update of the RGMP isotope sampling program for inclusion in the 2021 SSGMP/RGMP annual report, which includes available analytical results (85 samples). The data presented in Appendix IV were collected relatively recently and as such, due to time limitations, isotope data presented in this interim update will not be used to advance Regional or Site-Specific hydrogeological CSMs in the 2021 RGMP/SSGMP Annual Report. However these data will be considered in refinement of hydrogeological CSMs in future deliverables.

1.7 ENV Approval Conditions and Previous Recommendations

The ENV approval letters for the 2017 RGMP and the 2018 SSGMP updates are provided in Appendix II. The EMC is an advisory committee composed of an independent scientist and subject matter experts from ENV, KNC, Interior Health Authority (IHA), and The Ministry of Energy, Mines and Low Carbon Innovation (EMLI, formerly known as The Ministry of Energy, Mines and Petroleum Resources [EMPR]). Appendix III also includes recommendations from the 2020 Annual Report and the 2021 SSGMP Updates (SNC-Lavalin, 2021a; 2021b).

1.8 Permit Requirements and Report Structure

The 2021 Annual Report for the Elk Valley Regional and Site-specific Groundwater Monitoring Programs has been prepared following the approved 2017 RGMP Update (SNC-Lavalin, 2017), the approved 2018 SSGMP updates (SNC-Lavalin, 2019a, b, c; Golder, 2019a; SRK, 2018a), and the annual groundwater reporting requirements listed in Permit 107517. Where possible, recommendations from the submitted 2020 RGMP Update (SNC-Lavalin, 2020b) and the 2021 SSGMP Update (SNC-Lavalin, 2021a) have been included; however, it is noted that this has not yet been approved by ENV. The structure and content of this report have incorporated past feedback from the GWG on previous reports. The 2021 Annual Report addresses the permit conditions as summarized in Table C.

The report presents the monitoring results nearest to the source areas (SSGMPs), followed by the nearest downgradient receiving environment (RGMP) Study Area. The monitoring under the RGMP generally overlaps with the SSGMPs, as monitoring is required at many locations under both an SSGMP and the RGMP. Where monitoring requirements overlap between an SSGMP and the RGMP, the results are presented in the respective SSGMP Appendix and further discussed in the regional context.

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Table C: Summary of SSGMP and RGMP Permit Requirements and Report Sections

Description of Permit Requirement	Relevant Report Sections					
	Background Appendix VII	FRO; Study Area 1 Appendix VIII	GHO; Study Areas 1, 3 and 4 Appendix IX	LCO; Study Areas 2 and 5/6 Appendix X	EVO; Study Areas 7, 8, 9, 10, and 12 Appendix XI	CMm; Study Area 11 Appendix XII
i. A map of monitoring locations with Environmental Monitoring Sites (EMS) and Permittee descriptors.	Drawing BG-01	Drawings FR-01 and FR-02	Drawing GH-01	Drawing LC-01	Drawing EV-01	Drawing CM-01
ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and inferred groundwater flow. Cross sections should be in the direction of groundwater flow and/or perpendicular to groundwater flow.	Drawing LC-03, Drawing LC-07, Drawing LC-10	Drawings FR-05 to -12	Drawings GH-02 to -11	Drawings LC-03 to -10	Drawings EV-04 to -13	Drawings CM-03 to -05
iii. Drawings showing locations and water quality data of groundwater sampling points.	Drawings BG-02 to -05	Drawings FR-01, FR-02, and FR-13 to -20	Drawings GH-01, GH-13 to -16, GH-18 to -21	Drawings LC-01, LC-11 to -14	Drawings EV-01, EV-14 to -21	Drawings CM-01, CM-06 to -09
iv. A summary of program modifications relative to previous years and additional one-time activities, such as the installation of new monitoring wells.	Section 1.3 of Appendix VII; and Appendix II	Section 1.2 of Appendix VIII; and Appendix II	Section 1.3 of Appendix IX; and Appendix I	Section 1.3 of Appendix X; and Appendix II	Section 1.3 of Appendix XI; and; Appendix II	Section 1.3 of Appendix XII; and Appendix II
v. A summary of measured parameters, including appropriate graphs and comparison of results to Approved and Working Water Quality Guidelines, or other criteria and benchmarks as specified by the Director.	Section 1.4 of Appendix VII; Tables BG-03 and -04; Figures BG-01 to -09	Sections 1.3 to 1.5 of Appendix VIII; Tables FR-03 to -05; Figures FR-01 to -34	Section 1.4 to 1.6 of Appendix IX; Tables GH-03 to -05; Figures GH-01 to -21	Sections 1.4 to 1.6 of Appendix X; Tables LC-03 to -05; Figures LC-01 to -17	Sections 1.4 to 1.8 of Appendix XI; Tables EV-03 to -05; Figures EV-01 to -45	Sections 1.4 to 1.5 of Appendix XII Tables CM-03 to -05 Figures CM-01 to -30
vi. If applicable, a summary of exceedances of screening benchmarks.	Section 1.4 of Appendix VII; Tables BG-03 and -04	Sections 1.3 to 1.5 of Appendix VIII; Tables FR-03 to -05	Section 1.4 to 1.6 of Appendix IX; Tables GH-03 to -05	Sections 1.4 to 1.6 of Appendix X; Tables LC-03 to -05	Sections 1.4 to 1.8 of Appendix XI; Tables EV-03 to -05	Sections 1.4 to 1.5 of Appendix XII Tables CM-03 to -05
vii. Evaluation and discussion of spatial patterns and temporal trends.	Section 1.4 of Appendix VII	Sections 1.3 to 1.5 of Appendix VIII	Sections 1.4 to 1.6 of Appendix IX	Sections 1.4 to 1.6 of Appendix X	Sections 1.4 to 1.8 of Appendix XI	Sections 1.4 to 1.5 of Appendix XII
viii. Evaluation and discussion of the correlation between the monitoring results of surface water and groundwater monitoring stations, where relevant, in terms of spatial distribution and temporal changes.	Section 1.5 of Appendix VII	Sections 1.3 to 1.5 of Appendix VIII; Drawings FR-13 to -20 Figures FR-01 to -34 Diagrams FR-01 to -03	Section 1.4 to 1.6 of Appendix IX; Drawings GH-12 to -21 Tables GH-03 to -05 Figures GH-01 to -21	Sections 1.4 to 1.6 of Appendix X; Drawings LC-11 to -14 Figures LC-01 to -17 Diagrams LC-01 to -03	Sections 1.4 to 1.8 of Appendix XI; Drawings EV-14 to -21 Figures EV-01 to -45 Diagrams EV-01 to -04	Sections 1.4 to 1.5 of Appendix XII Drawings CM-06 to -09 Figures CM-01 to -30 Diagram CM-01
ix. Relevant information from specific studies on surface water and groundwater to support the hydrogeological characterization.	Section 1.4 of Appendix VII	Sections 1.3 to 1.5 of Appendix VIII	Section 1.4 to 1.6 of Appendix IX	Sections 1.4 to 1.6 of Appendix X	Sections 1.4 to 1.8 of Appendix XI	Sections 1.4 to 1.5 of Appendix XII
x. A summary of all Quality Assurance and Quality Control (QA/QC) issues during the year.	Section 3.1 of main report and Appendix V	Section 3.2 of main report and Appendix V	Section 3.3 of main report and Appendix V	Section 3.4 of main report and Appendix V	Section 3.5 of main report and Appendix V	Section 3.6 and Appendix V
xi. Recommendations for further study or measures to be taken.	See Executive Summary of main report or see Appendix VII	See Executive Summary of main report or see Appendix VIII	See Executive Summary of main report or see Appendix IX	See Executive Summary of main report or see Appendix X	See Executive Summary of main report or see Appendix XI	See Executive Summary of main report or see Appendix XII

2 Geochemical Screening and Interpretation Methodology

2.1 Groundwater Quality Screening Criteria

Groundwater quality data were screened against different criteria based on applicable receptors. A technically based screening process was described in both the 2020 RGMP Update (SNC-Lavalin, 2020b) and the 2021 SSGMP Update (SNC-Lavalin, 2021a). Primary and secondary screening criteria can be re-evaluated and adjusted based on the needs and requirements for other programs under the AMP.

2.1.1 Primary Screening Criteria

The primary screening criteria provide the main indicators for groundwater quality, and the approach is consistent with regulatory guidance, including Technical Guidance Document 6 (TG 6): *Assessment of Hydraulic Properties for Water Use Determination* (BC MOE, 2015) for EMA Applications and Technical Guidance Document 15 (TG 15): *Concentration Limits for the Protection of Aquatic Receiving Environments* (BC ENV, 2017). The primary screening process considers the following receptors:

› Human Health – groundwater for drinking water use (DW) for current and future consumption as a default, consistent with TG 6. Primary screening of groundwater data for protection of DW is conducted against the applicable *Contaminated Sites Regulation* (CSR) for DW (BC ENV, 2021).

› Freshwater Aquatic Life – groundwater discharging to aquatic environments was listed as a default use, consistent with TG 6. Primary screening of groundwater data for protection of aquatic life is completed against CSR aquatic life (AW) standards. Consistent with TG 15, the *British Columbia Water Quality Guidelines* (BCWQG, BC ENV, 2021) were applied to any wells located close to or within 10 m of the high-water mark.

› Irrigation and Livestock Watering – groundwater for livestock or irrigation watering use. This use is not described in TG 6; however, these uses were applied to be conservative as livestock and irrigation water supplies are sourced from groundwater wells in some locations. In addition, the EMC have indicated livestock watering use was an appropriate surrogate for wildlife watering. As such, livestock watering was be applied as a default use. Primary screening of groundwater data protection of irrigation and livestock watering is completed against CSR Irrigation (IW) and Livestock (LW) standards.

This screening process allows for comparison of water to uniform criteria for groundwater protection across the Elk Valley using the CSR standards, as well as the Approved and Working BCWQG, as applicable. The default uses, which consist of human health, freshwater aquatic life, irrigation watering, and livestock watering as a surrogate for wildlife, were applied across the entire valley.

SNC-Lavalin reviewed wells within ten meters of a high-water mark, based on water features provided by Teck and consistent with TG 15 described above. Monitoring wells LC_PIZDC1307, LC_PIZDC1308, and EV_OCgw are within 10 m of a high-water mark, however, LC_PIZDC1307 and LC_PIZDC1308 are installed beneath a fine-grained unit and are not inferred to be connected to surface water and EV_WF_SW is a deep well screened between 151.5 and 159.4 mBGS and has been installed in spoils. Results from monitoring wells EV_OCgw will be compared to BCWQG for FAL.

According to Technical Guidance Document 15 (TG15; BC ENV, 2017), water from a groundwater well may be subject to the British Columbia (Approved and Working) Water Quality Guidelines (BC WQGs) if the groundwater well is within 10 m of the high-water mark of an aquatic receiving environment. An aquatic receiving environment is defined by Procedure 8 (BC ENV, 2021) as any surface water, watercourse, wetland, sediment or porewater containing aquatic life, and the 10 m distance is defined in TG15 as applicable to an area that is not a maintained watercourse. Currently, additional field validation is required to determine if monitoring wells RG_MW_DC1A/B and LC_MW_ER4A/B are located within 10 m of an aquatic receiving environment.

2.1.1.1 Proposed Groundwater Screening Criteria for Cobalt and Lithium

Ramboll completed a desktop literature review of analytical data for the Elk Valley. The intent of the study was to address MQ 6: “Is water quality being managed to be protective of human health?” focussing on KU 6.1: “Is our understanding of local groundwater conditions for current and future DW use sufficient to minimize human exposure to constituents?” (Ramboll, 2021).

As part of the study, Ramboll proposed health-based values (HBVs) to be used as primary screening criteria for lithium and cobalt as suitable national and provincial guidelines are not available for these parameters. Although DW standards for these two parameters are provided under British Columbia’s CSR, cobalt was only recently adopted as a DW guideline and the intended use of these standards are for groundwater quality management (BC ENV, 2020). The CSR standards for both cobalt and lithium originate from the United States Environmental Protection Agency (USEPA) Regional Screening Level (RSL) database where provisional toxicity values that were not well supported were used during development, and incorporate very large uncertainty adjustments (Ramboll, 2021). Based on developed criteria, the daily doses of cobalt and lithium from background exposure (diet and other environmental sources) typically exceed the current CSR values. Therefore, exceedances of these values are not considered a meaningful indicator of potential for health risks from exposure to cobalt or lithium in DW (Ramboll, 2021).

Ramboll calculated HBVs for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), as presented below in Table D and documented in the 2020 Annual Report (SNC-Lavalin, 2021b).

Table D: Calculated Health-based Values (Ramboll, 2021)

Constituent	TDI (mg/kg-day)	DW AF (unitless)	Health-based Value (mg/L)
Cobalt	0.03	0.8	1.2
Lithium	0.07	0.7	2.4

If approved, DW concentrations are expected to be screened against these proposed criteria for dissolved cobalt and lithium (1.2 mg/L and 2.4 mg/L, respectively) in addition to the CSR. However, it should be noted that lithium is not considered a mining-influenced parameter based on the BGA which is discussed in detail in Section 2.1.3.

The proposed HBVs are being presented in this Section in accordance with the commitment made in the Q3 and Q4 2020 GWG meetings to include screening criteria in the 2020 RGMP and SSGMP report. Multiple engagements were conducted during the development of the proposed screening criteria with regulators and stakeholders and is expected to continue. The proposed HBVs may be updated as per comments from regulators in future reports. In consideration of the KNC’s comments, the HBVs were not compared to monitoring data in this RGMP SSGMP Annual Report.

2.1.2 Secondary Screening

Groundwater analytical chemistry is compared to a secondary screening criterion for aquatic life when concentrations of dissolved selenium are above the primary screening criteria. The secondary screening criterion provides context for Teck's operational surface water quality requirements, as well as a technical-based framework for regional evaluation of groundwater to protect aquatic life in the Elk Valley. Surface water quality is collected at Order Stations that are specified in Permit 107517. Each surface water Order Station has an area-based SPO and Compliance Point (CP) concentration, which is specified in Permit 107517. As these concentrations differ along the flow path of the main stem rivers, groundwater concentrations are compared to criteria from the nearest downstream surface water CP or SPO Order Station. A summary of relevant Order Stations is presented in Table E and on Drawing 7.

Table E: Secondary Groundwater Screening Criteria of Aquatic Life

Operation / Program[1]	Study Area (s)	SPO		CP	
		Surface Water Station (EMS ID)[2]	Selenium (µg/L)	Surface Water Station (EMS ID)[2]	Selenium (µg/L)
FRO	-	GH_FR1 (0200378)	63	FR_FRABCH (E223753)	85
	Background, 1	GH_FR1 (0200378)	63	FR_FRABCH (E223753)	85
				GH_FR1 (0200378)	63
GHO	Background	GH_ER1 (E206661)	19	GH_ERC (E300090)	15
	3	GH_FR1 (0200378)	63	GH_FR1 (0200378)	63
	4	GH_ER1 (E206661)	19	GH_ERC (E300090)	15
				-	-
LCO	Background, 2	GH_FR1 (0200378)	63	GH_FR1 (0200378)	63
	-	-	-	LC_LCDSSLCC (E297110)	50
	Background, 5	LC_LC5 (0200028)	51	-	-
		EV_ER4 (0200027)	23	-	-
	6	EV_ER4 (0200027)	23	-	-
EVO	Background	EV_ER1 (0200393)	19	-	-
		-	-	EV_MC2 (E300091)	28
	7, 8, 12	EV_ER1 (0200393)	19	-	-
	9	EV_ER1 (0200393)	19	-	-
	10	EV_ER1 (0200393)	19	EV_MC2 (E300091)	28
CMm	Background	EV_ER1 (0200393)	19	CM_MC2 (E258937)	19
	11	EV_ER1 (0200393)	19	CM_MC2 (E258937)	19
			19	EV_MC2 (E300091)	28
RDWMP	4	LC_LC5 (0200028)	51	-	-
	7, 8, 12	EV_ER1 (0200393)	19	-	-

Notes:

[1] Operation/Program refers to the Operation (FRO, GHO, LCO, EVO, CMm) or Program (RDWMP) that is responsible for carrying out the monitoring related to each Study Area.

[2] EMS: Environmental Monitoring Station.

'-' denotes no relevant Order Station or concentration.

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2.1.3 Comparison to Background Concentrations

A BGA on concentrations of select constituents was completed to develop a list of mine-related constituents and to support groundwater trigger development (SNC-Lavalin, 2020b). The approach used for the BGA was a modification of BC CSR Protocol 9[3], with an additional assessment of outliers, seasonality and variability across well groupings (i.e., unconsolidated overburden background, bedrock background and mine-influenced). Details of the BGA are discussed in the 2020 RGMP Update (SNC-Lavalin, 2020b).

In addition to the OC (i.e., cadmium, nitrate as nitrogen [nitrate-N], selenium and sulphate), the constituents listed in Table F will be used for comparison to background concentrations as they were determined to be mine-related in groundwater. This list of CI may be further adjusted as additional temporal data is collected and additional background monitoring wells are added to improve the program's spatial dataset.

Table F: Mine-related Parameters in Groundwater for Comparison to Background

Parameter		
Antimony	Nickel	TDS
Cobalt	Nitrite-N	Uranium
Molybdenum*		

* Molybdenum has been added to the non-Order constituents as it is a component of antiscalants used for calcite treatment in specific locations.

The BGA in the 2020 RGMP Update (SNC-Lavalin, 2020b) also identified a number of reference locations for continued monitoring. Background concentrations for these select reference locations were compared to the concentrations developed in the BGA. Teck has received advice and input on the BGA and the monitoring wells within it, which is being considered, along with further supplementation of the background monitoring network and planned update in 2023.

2.1.4 Drinking Water Triggers (Via Surface Water Pathway)

In support of MQ 6: "*Is water quality being managed to be protective of human health?"* and KU 6.3: "*What are appropriate groundwater-related triggers and how can they be used?*", Azimuth Consulting Group Inc. (Azimuth) developed groundwater triggers in 2020 that consider the surface water-groundwater relationship (Azimuth, 2021). The trigger development was conducted in consultation with the GWG and relates specifically to aquifers that may potentially be influenced by the infiltration of surface water elevated in mine-related constituents. The surface water locations presented in Table G were selected for surface water to groundwater triggers.

[3] BC CSR Protocol 9 for Contaminated Sites: Establishing Local Background Concentrations in Groundwater. Version 2. February 1, 2021.

Table G: Groundwater Trigger Monitoring Points and Rationale (Azimuth, 2021)

Monitoring Point	Rationale
GH_ERC (CP)	Upstream of Elkford municipal supply well in Study Area 4
GH_ER1 (Order Station)	
EV_ER4 (Order Station)	Upstream of DW wells in Study Area 7 and downstream of LCO
EV_ER1 (Order Station)	Downstream of all mining activity
CM_CC1 (Surface Water Monitoring Location)	Upstream of Corbin DW users, downstream of Coal Mountain
EV_MC2 (CP)	Downstream of CMm, some of EVO but upstream of Sparwood Municipal wells

For this report, analytical data from the surface water stations listed in Table G have been compared to trigger values, developed by Azimuth, based on primary screening criteria and Health Canada guidelines for DW (Health Canada, 2020). Trigger values for OC, based on the BGA, are presented in Table H and Table I, respectively. The 2021 analytical data for surface water stations list below will be used in the testing of the triggers developed by Azimuth. The results will be discussed in detail in Section 6.

Table H: Trigger Values as Screening Ratio for Order Constituents (Azimuth, 2021)

Station	Cadmium	Nitrate-N	Selenium	Sulphate
GH_ERC	2.503	5.16	5.70	264.2
GH_ER1	2.505	5.13	5.70	262.3
EV_ER4	2.506	6.39	-	286.0
EV_ER1	2.507	5.94	9.72	285.4
CM_CC1	2.524	8.01	-	-
EV_MC2	2.515	6.51	-	313.9

Note:
"-" denotes trigger value could not be computed as baseline median exceeded screening values.

Table I: Trigger Values as Screening Ratio for non-Order Constituents (Azimuth, 2021)

Station	Antimony	Molybdenum	Nickel	Nitrite-N	TDS	Uranium
GH_ERC	3.05	44.5	40.25	0.5005	350.5	10.40
GH_ER1	3.05	44.5	40.25	0.5005	342.0	10.38
EV_ER4	3.05	44.6	40.25	0.5005	389.5	10.55
EV_ER1	3.05	44.6	40.30	0.5006	387.3	10.54
CM_CC1	3.23	44.9	57.55	0.5160	-	12.61
EV_MC2	3.11	44.6	41.09	0.5010	438.1	10.63

Note:
"-" denotes trigger value could not be computed as baseline median exceeded screening values.

Azimuth (2021) could not calculate trigger values for selenium at EV_ER4, CM_CC1 and EV_MC2, and for sulphate and TDS at CM_CC1 because the baseline median for these cases exceeded the applicable screening values.

2.1.5 Seep Screening Criteria

Seep analytical results were screened against the BCWQG for the protection of freshwater aquatic life as seeps are described in Technical Guidance on Contaminated Sites 15 (TG15) as surface water in aquatic receiving environments to assess potential impacts to the downstream environment (BC ENV, 2017; 2021). This is appropriate as the seeps are expected to report to surface water bodies, and applying the CSR DW, AW, LW, or IW is not deemed appropriate as they are strictly used for screening groundwater. The screening criteria for seep water is described in the 2021 RSMP (SRK, 2022; Appendix III).

2.2 Analytical Visual Representation

Where there is sufficient data, groundwater analytical data has been presented on hydrographs and time-series plots for OC, where applicable. Groundwater elevations and flow direction (where possible) are presented in the respective drawing sets for each Operation. Piper and Schoeller diagrams showing major ion distribution for select locations (if required) are also presented for each respective Operation. Selenium to sulphate (as sulphur) [Se:SO4 (S)] ratio graphs have also been used as a diagnostic tool to assess relative mining influence, mixing and selenium attenuation processes such as microbial reduction (SRK, 2018b). Based on the distribution of concentrations, select graphs have been presented on a logarithmic scale. If available and where applicable, surface water levels, chemistry, and precipitation data from the nearest weather station have also been included in the visual representation.

2.3 Statistical Trend Analysis

Concentration trends for OC in groundwater were evaluated based on available historical analytical data using the Mann-Kendall analysis. Results from statistical tests display quantifiable patterns in geochemical concentrations over time; however, it is noted that this test is only a statistical test and should be used along with other lines of evidence to confirm patterns over time.

The Mann-Kendall statistical test is a non-parametric trend analysis test that identifies changes in environmental conditions (Gilbert, 1987). The analysis tests the null hypothesis of no trend against the alternative hypothesis of a significant trend. Sampling locations with less than seven sampling events were not selected for assessment. Where field duplicates were collected, the higher value was selected for analysis. Concentrations below the method detection limit (MDL) were assigned the MDL concentration. Where the sample size of a dataset exceeded 40 samples, the trend analysis was completed for the 40 most recent samples. Trend analysis was not completed for parameters where concentrations were consistently less than, or within five times the MDL. The analytical results were reviewed prior to completing trend analysis and any obvious outliers were removed from the dataset. In addition, where wells had not fully stabilized after installation, the early data for that well had been removed. Based on the results of the Mann-Kendall trend analysis, further analysis of seasonal trends for select locations and parameters may be warranted if there is a sufficient dataset (at least seven years of samples in the same season).

The analysis for each parameter is determined by calculating Mann-Kendall Statistic (S), the percent confidence of a significant trend, and the coefficient of variance (COV). The S value is calculated as the number of calculated positive differences minus the number of calculated negative differences; differences are calculated in a time-series by assuming an initial S value of 0 (e.g., no trend). If a data value in the time-series is higher than a value from earlier in the period, S increases by 1. Conversely, if a data value later in the time-series is lower than a value from earlier in the dataset, S decreases by 1. A high positive S is one indicator of an increasing trend, while a low negative is an indicator of a decreasing trend. The percent confidence of a significant trend is calculated using a Kendall probability table, which requires the S value of the test and the number of samples (n). The Kendall table identifies the probability of rejecting a null hypothesis (no trend) of a given level of significance. The confidence level is subsequently calculated by subtracting the probability from 1 (Newell et al., 2007). A COV value is the standard deviation divided by the average and presented as a percent. A COV below 100% can be used to infer stability in groundwater concentrations, whereas a value above 100% indicates a non-stable trend and a greater degree of scatter. The process of determining a significant trend and stability is in Table J (Aziz et al., 2003).

‘No trend’ and ‘stable’ both indicate that neither an increasing nor a decreasing trend could be discerned within the specified confidence limit. However, a ‘stable’ result also signifies that data had minimal scatter (less than 100% COV), which further emphasizes that concentrations are relatively unchanging over time.

The analytical results are subject to a variety of influences affecting the analysis of trends and stability. Such factors include subtle variations in sample acquisition or laboratory techniques and disparities caused by seasonality and other natural cycles. Consequently, these factors should be considered when establishing and validating actual trends in aquifer conditions with any certainty.

Table J: Mann-Kendall Analysis Decision Matrix

S	Trend Confidence	Concentration Trend
S>0	> 95%	Increasing
S>0	90 – 95%	Probably Increasing
S>0	< 90%	No Trend
S≤0	< 90% and COV ≥ 100%	No Trend
S≤0	< 90% and COV < 100%	Stable
S<0	90 – 95%	Probably Decreasing
S<0	> 95%	Decreasing

Notes:
S – Mann-Kendall Statistic
COV – coefficient of variance

3 Summary of Quality Assurance/Quality Control (QA/QC) Assessment

Teck provided field and laboratory data relevant to the SSGMPs and RGMP to SNC-Lavalin. In addition, data from several wells presented in this report were sampled by SNC-Lavalin in 2021. Analysis of the Quality Assurance/Quality Control (QA/QC) data was completed by SNC-Lavalin on a quarterly basis to proactively address potential issues. For wells sampled by Teck, SNC-Lavalin has relied on data and information provided by Teck in terms of completeness and accuracy. Interpretations and conclusions within this report are made with the assumption that data collection was completed in accordance with Permit 107517, the British Columbia Field Sampling Manual (Clark, 2013), and Teck's Standard Practice and Procedures (SP&P) or SNC-Lavalin's Preferred Operating Procedures.

The QA/QC assessment completed for the SSGMPs and RGMP reviewed shipping and handling issues, summarized results of relative percent differences (RPDs) from duplicate samples, summarized detections of analytes in field and trip blanks, and reviewed laboratory quality control reports. QA/QC results for RGMP wells within mine boundaries are presented within the discussion of their respective operations, while background wells outside of mine boundaries are presented in their own section. In addition, select RDWMP wells are presented with the nearest Operation. A detailed summary of methods and results of the QA/QC programs, including discussions regarding shipping and handling issues, elevated RPDs, analyte detection in field and trip blanks, and laboratory QA/QC results, are included in Appendix V. A summary of the QA/QC results for each Operation/Program are present in the sections below.

3.1 Background Monitoring Locations

The background monitoring network consisted of monitoring and sampling 22 wells. Results from nine background monitoring wells were included in each operations SSGMP, and therefore, QA/QC results for these wells were also included in their respective operation sections. The QA/QC discussion for the background network focused on the remaining 13 wells.

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for use in this report. Calculated RPDs were greater than 50% for four parameters from three samples. Calculated RPDs were less than 50% for all other parameters in the twelve duplicate samples. Hold time exceedances were identified for pH and ORP in all samples, and turbidity in GH_MW-Wolf-2D in Q3. The results reflect low variability for handling and sampling for the program.

The laboratory quality control reports were reviewed and the data are considered reliable. Concentrations of parameters in field blanks were less than five times the DL, with the exception of ammonia-N (LC_PIZP1101) in Q4. Concentrations of parameters in trip blanks were less than five times the DL, with the exception of dissolved molybdenum in Q4. Field measurements and manual and/or continuous water levels were collected from all background wells in 2021 and data were considered reliable.

3.2 Fording River Operations

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for use in this report. A total of 108 samples, 14 field duplicates, 8 trip blanks and 7 field blanks were collected in 2021 were included in the FRO QA/QC assessment.

Calculated RPDs for all parameters in the duplicate samples were less than 50% except for dissolved cadmium, ammonia-N, nitrate-N and total Kjeldahl nitrogen (TKN) in three sample/duplicate pairs. Hold time exceedances were only for orthophosphate, nitrate-N, nitrite-N, and turbidity; however, the concentrations were consistent with other historical results from those wells and therefore, did not affect data interpretation. The results reflect low variability for handling and sampling for the program.

The laboratory quality control reports were reviewed, and the data were considered reliable. Detectable concentrations of ammonia-N, nitrate-N, several dissolved metals in field and trip blanks were greater than five times the DL and considered in the interpretation of the result. Concentrations of detectable parameters in blanks were well below the applicable primary screening criteria and did not affect data interpretation.

Manual and/or continuous water levels were collected from select wells in 2021; however, continuous water level data from FR_HMW1D could not be downloaded in 2021 due to a connection error. Overall, field measurements collected were considered reliable, except for an erroneous manual water level measurement made at FR_HMW5 in Q1.

3.3 Greenhills Operations

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for use in this report. A total of 107 samples, eleven field duplicates and fourteen blanks, collected in 2021 were included in the GHO QA/QC assessment.

Calculated RPDs for all parameters in the duplicate samples were less than 50% except for total suspended solids (TSS), turbidity, dissolved bromide, nitrate-N, total and TKN at select wells. Hold times were met by the laboratory with the exception of alkalinity, bicarbonate, carbonate, hydroxide and nitrate-N in two batches. Reported concentration values from samples with hold time exceedances were considered in the results interpretation.

Detectable concentrations of ammonia-N and TKN in two of the eleven trip and field blanks submitted were greater than five times the MDL. These parameter concentrations in samples and blanks collected in 2021 were well below applicable primary screening criteria and therefore, did not affect data interpretation.

Continuous groundwater level data was unavailable at wells GH_MW-PC (Q3), GH_MW-GHC-1B (Q3, Q4), GH_MW-ERSC-1 (Q2), GH_MW_EF1A (Q4), and GH_MW_EF1B (Q4) due to instrumentation errors. A pressure transducer was installed at the newly installed wells GH_MW_PC4A/4B in Q3 and at RG_MW_FR11A/11B in Q4.

3.4 Line Creek Operations

A total of 106 samples, 15 field duplicates, eight field blanks, and seven trip blanks were included in the 2021 LCO QA/QC assessment. The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for use in this report, except for dissolved molybdenum samples at LC_PIZP1101 (Q1 to Q4) and the sample for dissolved antimony at LC_PIZP1105 (Q1). Exceedances of these parameters at these wells were not within acceptable ranges of uncertainty.

Review of the sample and duplicate RPDs greater than 20% revealed that data interpretation was not affected.

Detectable concentrations in blanks were less than five times the DLs, except for ammonia-N, dissolved magnesium, dissolved calcium, dissolved strontium, and turbidity. However, the concentrations were less than applicable primary screening criteria and therefore, did not affect the data interpretation.

Most laboratory qualifiers did not affect overall interpretation, except for all dissolved molybdenum samples at LC_PIZP1101 and the Q1 sample for dissolved antimony at LC_PIZP1105, both of which were not representative of formation groundwaters. Molybdenum is considered to be naturally occurring in the Process Plant area and not mining-related; however, antimony was inferred to be mine-related. Sampling procedures should be reviewed regularly to ensure consistency in methods.

In addition, some field parameters and manual water levels could not be collected in 2021; however, the missing data is not expected to impact the overall dataset interpretation.

3.5 Elkview Operations

The field Quality Assurance / Quality Control (QA/QC) program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for use in this report. A total of 181 samples, 18 field duplicates and 34 blanks collected in 2021 were included in the EVO QA/QC assessment.

Calculated RPDs for all parameters in the duplicate samples were less than 50% except for turbidity, TKN, TSS, total phosphorus, chloride, and nitrate-N in five duplicate samples. However, these parameter concentrations were either less than applicable primary screening criteria, or screening criteria was not available. These RPD exceedances did not affect data interpretation.

Hold times were exceeded primarily for re-analyzed samples; however, TDS and TSS at select wells had also exceeded hold times, as analysis of these parameters were overlooked by the laboratory. No other issues were identified in the laboratory quality control reports and the data were considered reliable.

Detectable concentrations of parameters in blanks were less than five times the MDL with the exception of ammonia-N in two samples; however, concentrations were well less than primary screening criteria and did not affect data interpretation.

3.6 Coal Mountain mine

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for use in this report. A total of 68 samples, eight field duplicates and eight blanks collected in 2021 were included in the CMm QA/QC assessment.

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected were acceptable for the analyses conducted in this report. Calculated RPDs for the eight duplicate samples collected were less than 50% with the exception nitrate-N in two samples, nitrite-N in one sample and sulphate in one sample. Hold time exceedances were only identified for pH and ORP. The results reflect low variability for handling and sampling for the program.

The laboratory quality control reports were reviewed and the data were considered reliable. There were no detectable parameter concentrations in field blanks. Detectable concentrations in trip blanks were below five times the detection limits with the exception of ammonia-Nitrogen (ammonia-N), nitrate-N, TKN, and dissolved zinc in separate trip blanks. The concentrations of ammonia-N, nitrate-N, TKN, and dissolved zinc in samples collected in 2021 were well below applicable screening criteria and therefore, did not affect data interpretation. Field measurements and manual and/or continuous water levels were collected from select CMm wells in 2021 and data were considered reliable.

The laboratory quality control reports were reviewed, and the data were considered reliable. Where detectable, parameter concentrations in blanks were less than five times the DL, with the exception of dissolved molybdenum in Q4. Field measurements and manual and/or continuous water levels were collected from all background wells in 2021 and data were considered reliable.

4 Groundwater Monitoring

The 2021 groundwater monitoring locations were sampled in accordance with the approved 2017 RGMP Update and 2018 SSGMP Updates (SNC-Lavalin, 2017, 2019a, 2019b, 2019c; SRK, 2018a; Golder, 2019). Additional monitoring locations have also been included based on recommendations outlined in the 2020 RGMP and 2021 SSGMP Updates; however, these locations are pending approval from ENV (SNC-Lavalin, 2020b, 2021a). The following table summarizes the number of groundwater monitoring locations, monitoring wells and supply wells sampled for each program (Table K). Lists of monitoring wells relating to the RGMP and each SSGMP (FRO, GHO, LCO, EVO, CMm) are also included as Tables 1 through 6, respectively.

Table K: Summary of Groundwater Monitoring Locations

Operation/Program	Monitoring Locations	*Monitoring Wells	Supply/Domestic Wells
RGMP	61	79	13
FRO	18	24	2
GHO	22	26	5
LCO	28	38	0
EVO	22	30	1
CMm	11	19	0

Notes:
Wells sampled as part of the Regional Drinking Water Program (RDWP) but included in the RGMP are grouped within the nearest Operation.
*Nested monitoring wells constitute a single monitoring location.

A summary of potential sources of OC and possible transport pathways to groundwater were identified in the 2020 RGMP Updates and the 2021 SSGMP Updates (SNC-Lavalin, 2020b; SNC-Lavalin, 2021a). Discussions in the report focus mainly on three of the OC (nitrate-N, sulphate and dissolved selenium), as concentrations of dissolved cadmium were typically less than primary screening criteria and the MDL, or marginally above the MDL. Field sampling methodologies including Teck's Best Management Practices and current approved analyte list are presented in Appendix VI.

The results for the background groundwater monitoring, FRO, GHO, LCO, EVO and CMm and related RGMP Study Areas are presented in Appendices VII through XII, respectively. Results for wells sampled as part of the RDWMP are presented with the nearest Operation. Additional details including Universal Transverse Mercator (UTM) locations, elevations, well installation details, description of screened lithologies, and estimated hydraulic conductivities are provided in tables and borehole logs attached to each respective Operation Appendix. Certificate of Analyses (COAs) have been included for each Operation in Appendix XIII.

5 Groundwater-Surface Water Interactions in Management Unit 5

An assessment of potential surface water-groundwater interactions in MUs 1-5 was completed. Study Areas in MUs 1 to 4 are discussed above. Infiltration of the Elk River is interpreted to occur on the local-scale downstream of MU 4 based on results from the RDWMP (SNC-Lavalin, 2014). The degree to which surface water infiltration influences water quality in other downgradient MUs is variable and likely a function of a number of factors, including relative water levels in the river, its tributaries and the groundwater system, river morphology, river gradient, hydraulic properties of the streambed and valley bottom surficial deposits, distance from river and the degree of pumping from wells (SNC-Lavalin, 2017). Where possible, Teck is currently monitoring private and municipal water wells in addition to surface water stations in MU 5. As there are no Teck related inputs of OC below MU4, it is inferred groundwater quality would likely be similar to, or better than that of Elk River surface water. Since surface water is the only transport pathway in this MU, the current monitoring programs are considered acceptable for understanding the degree of surface water-groundwater interaction. Assessment of these data will be considered under the AMP and in future annual reports, as appropriate.

6 Summary of Results for AMP

The RGMP and/or SSGMPs are listed in the AMP as inputs to MQs 1, 2, 3, 5, and 6. These programs collect data that directly support MQs 1, 3, and 6. Data from these programs indirectly support MQ 2 and 5 by informing the RWQM. The 2020 RGMP Update (SNC-Lavalin, 2020b) provided updates to the following as part of Condition 2.6 of the July 9, 2020 ENV 2017 RGMP Update Approval Letter:

› MQ1: "*Will water quality limits and Site Performance Objectives (SPOs) be met for selenium, nitrate, sulphate and cadmium?*

› MQ3: "*Are the combinations of methods for controlling selenium, nitrate, sulphate and cadmium included in the implementation plan the most effective for meeting limits and site performance objectives?*"

› MQ6: "*Is water quality being managed to be protective of human health?*"

The following sections provide a summary of updates relating to the MQs listed above since the 2020 Annual Report and include the updates provided in the 2020 RGMP Update and 2021 SSGMP Update (SNC-Lavalin, 2020b; SNC-Lavalin, 2021a).

6.1 MQ1 Update

Key Uncertainty 1.2: *"How will uncertainty in the Regional Water Quality Model (RWQM) be evaluated to assess future achievement of limits and SPOs?*" and its UU 1.2.4: "*What mechanisms are causing the reduction in mass observed between tributaries and at monitoring stations in the mainstems?"* relate to groundwater. The MBI is being undertaken to assess the nitrate-N and selenium load sinks in the Elk River and Fording River valleys, which will inform KU 1.2. The use of 'instream sinks' has been applied to account for the discrepancy between measured and modelled concentrations of selenium and nitrate-N (parameters indicative of mine-influence) in the RWQM. Without the sinks, the model over-predicts selenium and nitrate-N, whereas sulphate, which is typically considered to be a conservative constituent, is not over-predicted. The MBI is currently investigating the effect of residence time in groundwater (Hypothesis 1) and biogeochemical removal mechanisms in groundwater (deep groundwater [Hypothesis 2a] and in hyporheic zones and ponds [Hypothesis 2b]). The MBI is also investigating potential for high concentrations of naturally occurring sulphate in the Elk Valley and potential role in the sulphate load balance. Areas of focus for the MBI include: the Fording River downstream of FRO and upstream of GHO and LCO (Study Area 1), and the Elk River downstream of the GHO West Spoils (portion of Study Area 4). Information and understanding of groundwater conditions collected therein will be incorporated, as appropriate, into the RGMP. MBI field programs from 2019 to 2021 included: flow and load accretion studies, geophysical surveys, installation of hydrometric stations and surface water sampling, drive point investigations, drilling investigations, groundwater sampling and aquifer pumping tests.

In addition to the MBI, groundwater bypass estimates for key surface water drainages were developed to be used as model inputs and for calibration in the 2020 RWQM Update (Teck, 2021c). The compilation included load balance analyses and flow bypass estimates focused on RWQM tributary nodes with the greatest OC load calibration errors. An update on characterization of RWQM nodes listed in Teck (2021c) as well as additional nodes where characterization work is ongoing is described below by Operation:

FRO

- **Clode Creek (FR_CC1):** Seepage from the Clode Creek Sediment Ponds has been investigated in support of the Fording River Saturated Rock Fill-North (FRO-N SRF; Golder, 2021a). Monitoring wells FR_GCMW-1B and FR_GCMW-2 are located along an inferred pathway between the Clode Creek Secondary Sediment Pond and the Fording River and were added to the SSGMP in 2019 to address KU 1.2.
- **Kilmarnock Creek (FR_KC1, FS_INF_K):** Groundwater bypass of the FR_KC1 and AWTF-South (AWTF-S) intake has been the subject of extensive investigation for several years and is known to occur where Kilmarnock Creek loses water over the alluvial fan. Monitoring wells FR_KB-1, FR_KB-2, and FR_KB-3A/B were installed within the alluvial fan in 2018 and incorporated into the SSGMP in 2019 to address KU 1.2. An additional eleven monitoring wells (FR_KB-10MW, FR_KB-11MW, FR_KB-13A/B, FR_KB-14MW, FR_KB-15MW, FR_KB-16MW, FR_KB-17MW, FR_KB-18MW, FR_KB-19MW, FR_KB-20MW) were installed in 2021 as part of ongoing investigations to better understand the magnitude and fluctuation of groundwater volume and load bypassing the Kilmarnock Creek Intake. These wells will be evaluated for potential incorporation into the FRO SSGMP when sufficient data are available to further reduce uncertainty.
- **Swift Creek (GH_SC1, GH_CC1):** Bypass of the AWTF-S intake, which also treats drainage from the Swift and Cataract watersheds, may be occurring as seepage from the Swift Creek and Cataract Creek sediment ponds. Monitoring well FR_MW18-02 was incorporated into the SSGMP in 2021 to address KU1.2. Seepage from the Swift and Cataract Creek Sediment ponds is currently under investigation, and more monitoring wells will be considered for incorporation into the SSGMP to address this uncertainty once investigations are complete.

GHO

- **Porter Creek (GH_PC1):** Nested monitoring wells GH_MW-PC4A/B were installed in 2021 to assess potential bypass in the Porter Creek alluvial fan. A groundwater study was conducted in this catchment in 2021 to inform potential mitigation related decisions. (Teck, 2021a).
- **Greenhills Creek (GH_GH1):** Fourteen additional monitoring wells were installed along the GHO Fording River valley bottom area in 2021, and numerical groundwater modelling focused on this area is underway in 2022. This modelling will further inform on constituent transport in the Greenhills Creek alluvium and the influence of GHO supply well pumping on instream flows in the lower reaches of Greenhills Creek in addition to the Fording River.
- **Thompson Creek (GH_TC1):** Groundwater bypass has been identified through seepage at the Lower Thompson Pond at monitoring well GH_GA-MW-3. MBI well RG_MW_ER3A is located nearby and will be assessed in 2022 to reduce the uncertainty related to KU1.2 for this station.

LCO

- **Lower Dry Creek, LCO Dry Creek by the Mouth (LC_DC1):** Losing conditions were measured in a flow accretion study over an inferred alluvial fan deposit (SNC-Lavalin, 2020a) near LC_DC1 and groundwater bypass of this station could potentially occur. New monitoring well cluster RG_MW_DC1A/B were installed in 2021 to reduce this uncertainty.

- **Line Creek (LC_LCDSSLCC):** Surface water and groundwater leaving the LCO Phase I site is funneled through the Line Creek canyon, but this surface water station appears to be within a gaining reach (Golder, 2021b) with discharge from groundwater occurring downstream of this station and prior to the canyon. Therefore, there is potential for groundwater bypass. Clustered wells LC_MW_CP1A/B were installed in 2021 to reduce this uncertainty.
- **West Line Creek (LC_WLC):** There is an existing AWTF in West Line Creek (WLC) and potential groundwater bypass of the existing intake is currently being studied to understand the magnitude of groundwater bypass at the intake location (Golder, 2021b). Monitoring wells have been installed (LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A) to better understand WLC aquifers. The geology at these new locations consisted of an incised bedrock valley, filled with glaciofluvial sands and gravels interbedded with glaciolacustrine clay lenses.
- **Elk River (EV_ER4):** Monitoring well pair LC_MW_ER4A/B were installed in late 2020 as part of the RGMP. Results from quarterly monitoring of this well pair indicated the shallow aquifer is transporting some load of OC, but the deep aquifer is not. New monitoring well pairs LC_MW_SRD1A/B and LC_MW_SRD2A/B were installed in 2021 to improve understanding of potential bypass from the ERX CCR.

EVO

- **EVO Dry Creek Sediment Pond Decant (EV_DC1):** EVO Dry Creek is a tributary of Harmer Creek. Wells EV_MW_DC1 through EV_MW_DC7 were installed near the Dry Creek Sediment Pond either in overburden or bedrock to better understand groundwater flow, groundwater quality and groundwater-surface water interactions and to assess the amount of infiltration occurring from the pond (Golder, 2021c; Golder 2021d; Lorax, 2019). Groundwater monitoring and sampling results from these wells will be reviewed and select wells may be added to the SSGMP to further reduce uncertainties.
- **Harmer Creek (EV_HC1):** Potential groundwater bypass through seepage losses at the Harmer Reservoir will be assessed through continued monitoring of nested wells EV_GV3gwS/EV_GV3gw and newly installed wells EV_MW_HC1 through EV_MW_HC5. Results from EC_MW_HC1 through EV_HW_MC5 will be reviewed and select wells may be added to the SSGMP. The network will ultimately reduce the uncertainty related to KU1.2 for this station.
- **Erickson Creek at Mouth (EV_EC1) and Intake (EV_ECBridge):** There is uncertainty with regards to the groundwater flow component at the confluence of Erickson Creek and Michel Creek. Flow monitoring, water quality and flow accretion studies are helping to reduce this uncertainty. Groundwater and surface water components of flow were investigated at the Erickson Creek Intake to the EVO Saturated Rockfill Treatment Facility (SRF). Wells EV_MW_EC3A/B were installed in 2021 to investigate groundwater flow and quality in this area and whether mine-influenced groundwater is bypassing the intake. During drilling, significant hydrostatic pressures (above ground surface artesian conditions) were encountered, which prevented further wells from being installed. Surface and groundwater flow, groundwater quality measurements, and flow accretion studies are being done to gain an improved understanding of any groundwater that may bypass the intake and reduce uncertainty.
- A water and load balance for Erickson Creek and Michel Creek is also being conducted as part of Condition 4C3. 4i in Permit 107517, which should address uncertainty related to surface water – groundwater interaction near EV_EC1 as well as EV_MC2 and EV_ER1.

CMm

- **Michel Creek (MC_MC2):** At CMm, all surface water and groundwater leaving the mine site is inferred to funnel through the Michel Creek valley bottom. To date, improving understanding to help inform MQ 1 at CMm has been addressed through flow and water quality measurements being collected along Michel Creek to understand loading of OCs along the west side of CMm. Monitoring wells were installed near CM_MC2 (near the confluence of Andy Good Creek and Michel Creek) to facilitate a better understanding of groundwater bypass leaving the general area of CMm. Flow and load accretion studies on Corbin Creek, Michel Creek, and Andy Good Creek were recommended as part of the 2021 SSGMP Update (SNC-Lavalin, 2021a) to further reduce uncertainty.

As appropriate, the above information will continue to be evaluated and incorporated into the subsequent RGMP and SSGMP reports, where possible.

In addition, Teck will be conducting a review of available groundwater information to identify data gaps related to potential bypass and aquifer storage at relevant main stem monitoring locations and WSC stations. The steps for this were further clarified for input at the Q1 2022 GWG. To track this, Teck will be adding new key/underlining uncertainty to the AMP under the appropriate management question to address how uncertainties related to potential bypass of mainstem nodes and delays related to aquifer storage could impact the RWQM calibration and future projections.

6.2 MQ3 Update

MQ3: "*Are the combinations of methods for controlling selenium, nitrate, sulphate and cadmium included in the implementation plan the most effective for meeting limits and site performance objectives?*" supports Teck in selecting the most effective water quality management and mitigation methods in order to meet limits and SPO specified in Permit 107517. There are currently six areas where groundwater studies are being conducted to support planned water quality management through Active Water Treatment Facility (AWTF) or Saturated Rock Fill Water Treatment Facility (SRF) in order to address KU 3.2: *"What additional flow and groundwater information do we need to support water quality management?*" and its UU 3.2.1: *"Is it necessary for water management structures (that collect surface water from mine-influenced water tributaries) to collect groundwater and/or be lined in order to achieve limits and SPOs?"*:

- **FRO AWTF-S:** Groundwater studies of Kilmarnock, Swift and Cataract Creek Sedimentation Ponds;
- **FRO Active Water Treatment Facility-North (AWTF-N):** Groundwater studies of Clode, Liverpool and Post Ponds as well as Turnbull Bridge Spoils and Henretta Pit lake;
- **FRO Eagle 4 SRF:** Groundwater studies of backfilled pits and downgradient areas in Clode Creek catchment;
- **GHO Greenhills Creek and West Spoil:** Desktop assessment of gaps related to catchment hydrology and the Greenhills Tailings Storage Facility (TSF) extension project;
- **LCO Line Creek including West Line Creek:** Groundwater studies of potential groundwater bypass of the existing intake are currently being undertaken to understand the magnitude of groundwater bypass at the intake location; and
- **EVO F2 SRF:** Groundwater studies of backfilled F2 pits and downgradient areas in Erickson Creek catchment.

Groundwater investigations related to each of these planned or potential mitigations are ongoing. Findings from these studies are anticipated to reduce UU 3.2.1: *"Is it necessary for water management structures (that collect surface water from mine-influenced water tributaries) to collect groundwater and/or be lined in order to achieve limits and SPOs?"*, which is specifically related to whether groundwater should be collected and/or tributary lined to achieve limits and SPOs.

In 2021, Condition 4D2.4 AMP Studies was added under Permit 107517 ENV: "*The permittee must develop and implement the following studies under the AMP to resolve uncertainties regarding operation of the Kilmarnock Clean Water Diversion and the need for additional flow and groundwater information to support water quality management in FRO-S. The study designs must be submitted to the director and KNC by April 30, 2021. The permittee must provide quarterly updates to ENV and KNC on implementation of the work plans. This enhanced engagement will end when written notice is provided by the director."*

ii. *Uncertainty: Kilmarnock Creek Intake groundwater load bypass study. The study must resolve the uncertainty related to the magnitude and seasonal fluctuation of groundwater load bypassing the FRO-S AWTF Kilmarnock Creek Intake.*

› The Kilmarnock Creek Intake Groundwater Bypass gap analysis and work plan was submitted to ENV and KNC in April 2021 (SNC-Lavalin, 2021c). A hydrogeological investigation progressed in 2021, designed to increase understanding of the magnitude and fluctuation of groundwater volume and load bypassing the Kilmarnock Creek Intake. Field investigations included drilling and monitoring well installation, geophysics (including borehole geophysics and electrical resistivity tomography (ERT)), a pumping test, flow and load accretion studies, and water quality sampling/monitoring. Interpretation of the results is ongoing but the investigation was intended to address the following data gaps:
  - The extent of the fluvial gravel channel deposits, which comprise the preferential pathway for groundwater bypass, are unknown;
  - The extent of the zone of groundwater bypass is not known; and
  - Future changes to the hydrogeological conditions associated with the AWTF-S and Kilmarnock Clean Water Diversion (KCWD) infrastructure are not known.

iii. *Uncertainty: Fording River valley groundwater study. The study must resolve uncertainty related to the parameter of concern groundwater plume and load in the Fording River valley bottom between well FR_GH_WELL4 and FR_FRABCH.*

› Hydrogeological conditions in the Fording River valley bottom between FR_GH_WELL4 and FR_FRABCH is an area of focus for the MBI. Interpretive hydrogeological reporting for the MBI is in progress and is scheduled to be completed in Q2 of 2022, after which a separate deliverable is proposed to specifically address uncertainty 4D2.4iii. Teck is also assessing the use of additional active and passive investigation methods to address uncertainty and comments from the GWG.

Table L presents how the 2021 SSGMP and/or RGMP address MQ3 and/or reduce the KU in select areas.

Table L: 2021 SSGMP and RGMP Activities Addressing MQ3

Location	Program Addressing MQ3	RGMP/SSGMP Monitoring Wells Sampled to Address MQ3
Kilmarnock Creek Alluvial Fan	FRO SSGMP and RGMP Study Area 1	**Within the alluvial fan:** FR_KB-1, FR_KB-2, FR_KB-3A/B, FR_MW-SK1A **Downgradient:** FR_GH_WELL4, FR_09-01A/B, and FR_09-02A/B, RG_MW_FR10A/B/C
Clode Creek and Turnbull Spoils	FRO SSGMP	FR_TBSSMW-1, FR_TBSSMW-2, FR_GCMW-1B, and FR_GCMW-2
Swift Creek	FRO SSGMP	FR_MW18-02
Erickson Creek	EVO SSGMP and RGMP Study Area 10	EV_WF_SW, EV_ECgw, and EC_MW_SP1A/B/C
West Line Creek	SSGMP	**2022 SSGMP:** LC_PIZ1206A, LC_PIZ1206C LC_PIZ1207A, LC_PIZ1207B, LC_PIZ1210B, LC_PIZ1210C, LC_PIZ1211N, and LC_PIZ1212

Groundwater monitoring and sampling will continue as part of the RGMP and SSGMPs. The SSGMP was updated in October 2021 for each operation and may have included additional monitoring locations from ongoing groundwater investigations to further reduce uncertainty related to MQ3 and UU 3.2.1. At present, no new KUs have been identified.

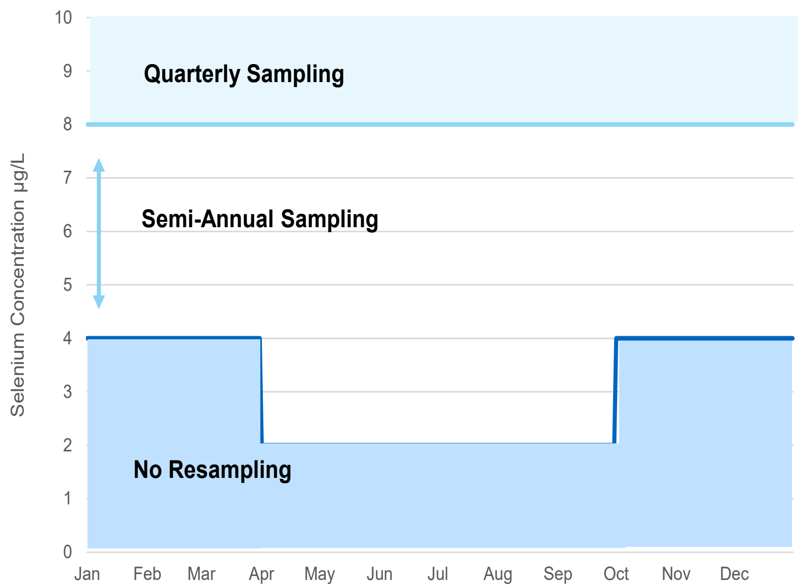
6.3 MQ6 Update

MQ 6: *"Is water quality being managed to be protective of human health?"* specifically considers groundwater as it relates to human health. In 2021, a total of 178 monitoring wells were monitored and sampled as part of the RGMP and SSGMPs. Results from the programs were generally consistent with previous years results. Monitoring will continue and gaps in knowledge will be filled under the RGMP and SSGMP. Additional groundwater monitoring locations are planned for installation in 2022 to increase the background monitoring network and to fill gaps identified in the RGMP in Study Areas 1, 2, 3, 5 and 7. Updates to the relevant KUs are discussed in detail in the 2020 RGMP Update and 2021 SSGMP Update and summarized below.

6.3.1 KU 6.1

KU 6.1: *"Is our understanding of local groundwater conditions for current and future drinking water use sufficient to minimize human exposure to constituents*?" relates to whether an understanding of groundwater is sufficient to minimize human exposure. Teck (2014) initiated the RDWMP in the Elk Valley and monitors private and municipal wells, screening against the BC Source Drinking Water Quality Guideline (BCSDWQG). Although participation in the program is optional, Teck undertakes significant public outreach activities to encourage landowners and well operators to join the RDWMP. Analytical results from private wells are typically confidential and therefore, not presented in the annual report; however, Teck has installed monitoring wells near some DW wells for which data is included in this report. In 2021, Teck sampled 29 DW wells for mine-related constituents. Sampling frequency was determined based on the usage and an understanding of historical water quality (Figure A).

Figure A: Monitoring Frequency for Regional Drinking Water Wells in the Elk Valley (Teck, 2014)



Note:Figure A shows the minimum sampling frequency, additional sampling is conducted on a case by case basis.

The analytical results indicated that concentrations of selenium were greater than the BCSDWQG at nine wells; three of the nine wells also contained sulphate concentrations greater than the BCSDWQG. Water quality results were provided to the respective well users and mitigation measures such as delivery of potable water, installation of new well or the installation of a water treatment system, reverse osmosis system were applied, as appropriate.

All Study Areas contain valley bottom sediments that could function as aquifers for current or future DW use. An update by Study Area as they relate to this KU is provided below:

- In Study Area 1, groundwater quality generally does not meet primary screening criteria for DW. There are currently no DW receptors in Study Area 1 and therefore only future DW use is considered. In 2020 and 2021, 22 monitoring wells have been installed in Study Area 1 in support of the MBI, which will reduce uncertainty related to KU 6.1. Monitoring wells are being monitored and sampled quarterly for the MBI program and will be evaluated for potential inclusion in the SSGMP and/or RGMP once sufficient data are available and interpretive reporting has been completed. However, given the lack of current groundwater usage and residential development in the Fording River valley, the potential for DW use in near future is considered very low. Treatment mine-influenced water by the SRF, AWTF-N and AWTF-S systems is expected to improve groundwater quality in Study Area 1 in the future.
- In Study Area 2, the monitoring well network was expanded in 2021 with the construction of a monitoring well cluster in Study Area 2 (RG_MW_DC1A and RG_MW_DC1B), where LCO Dry Creek discharges to the Fording River. The objective of this work was to better understand the groundwater and surface water interactions of mapped permeable fluvial sediments (the LCO Dry Creek alluvial fan). Data will be collected as part of ongoing monitoring and discussed in future reports.

- In Study Areas 4, 7, 9, 10 and 12, groundwater quality generally does not meet primary screening criteria for DW in some areas. The aquifers in these Study Areas are currently being used as a DW source, and private and municipal water wells that could potentially yield elevated levels of mine-related constituents, are monitored through the Teck RDWMP. In 2021, flow and load accretion studies were carried out on Michel Creek to assist with interpreting losing zones of Michel Creek and its influence on groundwater quality in the aquifer in Study Area 12. Early warning triggers considering the surface water-groundwater relationship have also been developed by Azimuth (2021). These proposed triggers are discussed in more detail in Section 6.3.3, where they are compared to 2021 analytical data for select surface water stations.
- In Study Areas 6, 8 and 11, groundwater quality are below primary screening criteria for OC. In 2021, two well clusters: LC_MW_SRD1A/B and LC_MWSRD2A/B were installed in Study Area 6 and will be assessed for inclusion to SSGMP for LCO.
- Uncertainty relating to local groundwater conditions in Study Areas 3 and 5 have been addressed through the installation of new monitoring wells in these Study Areas, which is anticipated to reduce uncertainty related to KU 6.1.Summaries for both Study Areas are presented in the Executive Summary section of this report. Details for Study Area 3 are presented in Section 1.5.1 of Appendix IX GHO 2021 SSGMP and RGMP Report. Details for Study Area 5 are presented in Section 1.6.1.4 of Appendix X LCO 2021 SSGMP and RGMP Report.

6.3.2 KU 6.2

KU 6.2 asks, *“Is the spatial extent of mine-influenced groundwater sufficiently characterized to manage water quality in order to support meeting the environmental objectives of the EVWQP?”* Study Areas 1 and 4 have a known groundwater pathway. Understanding of the spatial extent of elevated OC concentrations in these Study Areas have improved and are currently being investigated through the MBI. While the MBI is focused towards understanding groundwater as it relates to the uncertainties in the RWQM, the data collected is also anticipated to reduce the uncertainty as it relates to KU6.2. Continued quarterly monitoring of existing MBI wells is planned for 2022, as part of the MBI. Remaining uncertainty related to KU 6.2 will be re-assessed after these studies have been completed.

At LCO, the valley bottom deposits downgradient of the mine site (RGMP Study Areas 5 and 6) could be used for future for DW purposes and aquifers in Study Area 7 are currently used for DW. There are gaps in understanding the surface water losses in the Line Creek alluvial fan, the effects of the CCR on the valley bottom aquifers downgradient of the Process Plant, and ultimately spatial extent of mine-influenced groundwater is not well understood. Data from the newly installed monitoring wells listed above will assist in filling these gaps, which is anticipated to reduce the uncertainty related to KU 6.1 and 6.2.

6.3.3 KU 6.3

KU 6.3 considers “*What are appropriate groundwater-related triggers and how can they be used?”.* Groundwater triggers have been developed and additional options are being evaluated for implementation in monitoring programs. Trigger development has been conducted in consultation with the GWG. Two types of triggers are currently being evaluated for suitability, as they relate to transport pathway and receptor:

- Drinking Water Triggers (Via Surface Water Pathway) – triggers related to infiltration of surface water elevated in mine-related constituents to DW aquifers; and
- Aquatic Life/Drinking Water Triggers – triggers related to transport of mine-related constituents through groundwater, not related to surface water recharge.

An update on these triggers is provided below.

6.3.3.1 Drinking Water Triggers (Via Surface Water Pathway)

Drinking water triggers were defined in the 2018 and 2021 AMP and are applied at the receptor (i.e., screening DW quality from wells against DW guidelines) (Teck, 2018a). The triggers were developed in 2020 and presented to the EMC at the Q2 2020 and 2020 Q3 GWG meetings. The triggers were revised to incorporate additional GWG comments and re-submitted on November 23, 2021. The finalized triggers were included in the 2021 AMP Update (Teck, 2021b).

The approach taken to develop additional early warning triggers (EWTs) was to use the conceptual model for surface water-groundwater hydraulic connectivity to establish EWTs in surface water. A key outcome was to enable proactive identification of potential changes in constituent concentrations that may affect hydraulically connected downstream DW wells. In addition, the use of surface water was considered due to the availability of frequent, long-term data.

Azimuth prepared a memorandum describing proposed groundwater triggers associated with the surface water to groundwater pathway for the protection of DW users in identified populated areas of the Elk Valley downstream of Teck's operations (Azimuth, 2021). The locations used for comparison to triggers in this report were the selected for Azimuth's memo.

Surface water quality from six locations were analyzed as part of the assessment: GH_ERC, GH_ER1, EV_ER4, EV_ER1, CM_CC1, and EV_MC2 (Drawing 7). Rationale for assessing water quality at these locations are presented in Table G in Section 2.1.4. The focus of the assessment was on mine-related CIs. Trigger values were developed by comparing monthly monitoring data from 2010 to 2016 (considered to be baseline) against applicable screening criteria.

Monthly mean values were calculated from the 2021 analytical dataset for the six surface water locations. Results were compared to the calculated trigger values shown in Table H and Table I within Section 2.1.4. Where concentrations were less than the analytical detection limit, the detection limit was used for calculation. Table M presents the number of monthly means in 2021 greater than the established trigger criteria.

Table M: 2021 Surface Water Results Exceeding Trigger Criteria

Station	GH_ERC	GH_ER1	EV_ER4	EV_ER1	CM_CC1	EV_MC2
Cadmium	0	0	0	0	0	0
Nitrate-N	0	0	0	0	0	0
Selenium	0	0	-	11	-	-
Sulphate	0	0	0	0	-	0
Antimony	0	0	0	0	0	0
Molybdenum	0	0	0	0	0	0
Nickel	0	0	0	0	0	0
Nitrite-N	0	0	0	0	0	0
TDS	0	0	2	2	-	0
Uranium	0	0	0	0	0	0

Notes:
"-" denotes trigger value could not be computed as baseline median exceeded screening values.
Shaded values denote number of monthly means greater than the trigger criteria.

Results for 2021 from the trigger assessment identified mean concentrations were less than the trigger criteria, with the exception of dissolved selenium at EV_ER1, and TDS at EV_ER4 and EV_ER1. Dissolved selenium was greater than the trigger criteria of 5.70 µg/L at EV_ER1 (along the Elk River in Study Area 12) in every month in 2021, except in June, which was consistent with 2020 observations (SNC-Lavalin, 2021b). In 2021, the greatest monthly mean for selenium at EV_ER1 was measured in March, with a concentration of 16.34 µg/L. TDS was greater than the trigger criteria at EV_ER4 and EV_ER1 in March and April, and January and March, respectively. Concentrations of TDS were also above trigger values at these two locations in 2020, but in 2019 did not trigger. Conversely, monthly mean concentrations of nickel at CM_CC1 and TDS at EV_MC2 did not trigger in 2020 and 2021 but triggered for two months in 2019.

6.3.3.2 Groundwater Triggers (Groundwater Pathway)

Triggers for the groundwater pathway are under evaluation with respect to feasibility and implementation. At present, it is not certain how effective they will be since there is not enough information for evaluation. Groundwater conditions are constantly being refined/characterized in Study Areas where a groundwater transport pathway has been identified, which contributes to the difficulty of implementing triggers. Key to trigger development is the presence of sentry/sentinel wells.:

It is anticipated that if triggers were to be developed for the groundwater pathway, they would not be applied regionally. Rather, they would be developed for select, localized areas such as the monitoring wells installed in DW aquifers (i.e., GH_MW_EF1A/B, RG_MW_WW and RG_MW-03-04). The next steps for trigger development will be to analyze data from wells to understand whether triggers will be effective in achieving objectives through a defined response framework. A further update on groundwater trigger development will be provided in a future Annual Report.

7 Conclusions

SNC-Lavalin has reviewed and compiled groundwater and surface water information available from the 2021 SSGMP and RGMP. The 2021 Annual Report has been written to meet the requirements outlined in Permit 107517 (amended December 1, 2021).

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Teck Coal Limited (Teck). 2021c. 2020 Elk Valley Regional Water Quality Model Update – Annex B, Hydrology Modelling – Set-up, Calibration and Future Projections Report. Prepared with Assistance from Golder Associates Ltd. March 2021.

9 Notice to Reader

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Tables

TABLE 1: RGMP - Summary of Groundwater Monitoring Program Locations

Study Area	Watershed / Description	Well ID	Rationale
Background[a]	Fording River valley and tributaries	FR_MW_FRRD1	Representative of groundwater quality on flank of Fording River valley near Study Area 1.
		FR_MW_CH1-A	Representative of groundwater quality in Chauncey Creek tributary near Study Area 1.
		FR_MW_CH2	
	Dry Creek valley bottom	LC_PIZDC1307[d]	Representative of deep groundwater quality in the Dry Creek valley bottom upgradient of Study Area 2.
		LC_PIZDC1308[d]	
	Elk River valley bottom and tributaries	GH_MW_BG1A	Representative of groundwater in the Elk River valley bottom upgradient of Study Area 4.
		GH_MW_BG1B	
		GH_MW_BG1C	
		GH_MW-Willow-1D	Representative of groundwater quality in Willow Creek tributary on flank of Elk River valley near Study Area 4.
		GH_MW-Willow-2S	
		GH_MW-Willow-2D	
		GH_MW-Wolf-1S	Representative of groundwater quality in Wolf Creek tributary on flank of Elk River valley near Study Area 4.
		GH_MW-Wolf-1D	
		GH_MW-Wolf-2D	
	Elk River	LC_PIZP1101	Representative of deep groundwater quality in Study Area 6.
		LC_PIZP1103	
	Grave Creek upgradient of Harmer Creek	EV_MW_GV4A	Representative of groundwater in the Grave Creek valley bottom upgradient of Harmer Creek (Study Area 7).
		EV_MW_GV4B	
	Michel Creek	CM_MW3-DP	Representative of groundwater quality in the Michel Creek valley bottom (Study Area 11).
		CM_MW3-SH	
	Alexander Creek	RG_MW_AC1A[e]	Background monitoring well upgradient of mining operations.
		RG_MW_AC1B[e]	
	Corbin Creek	CM_MW6-DP	Representative of groundwater quality in the Corbin Creek valley bottom (Study Area 11).
1	Fording River Valley - Kilmarnock Alluvial Fan and downgradient	FR_09-01-A	Monitor groundwater level, quality and additional inputs of mine-affected groundwater in valley-bottom sediments downgradient of the STP and South Kilmarnock Settling Ponds (i.e., Transport Pathway #2). Monitor mine-affected groundwater at southern extent of mine-permitted area.
		FR_09-01-B	
		FR_GH_WELL4[b]	Monitor mine-influenced groundwater downgradient of FRO (Transport Pathway #1).
	Fording River Valley - Porter Creek Drainage	GH_MW-PC	Monitor groundwater level, quality and surface water infiltration near the Porter Creek Sedimentation Pond associated with historical waste spoils in the Porter Creek drainage.
	Fording River Valley near Chauncey Creek	RG_MW_FR10A[c]	Monitor groundwater levels and quality downgradient of FRO in the vicinity of the compliance point at surface water station FR_FRABCH.
		RG_MW_FR10B[c]	
		RG_MW_FR10C[c]	

Notes:

a: Wells have been included based on the background assessment completed as part of the 2020 RGMP Update.

b: As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

c: Monitoring well added to the RGMP Program as per the 2021 SSGMP Update.

d: Monitoring well added to the RGMP Program as per the 2020 RGMP Update.

e: Monitoring well installed in 2021 to support the relevant SSGMP and/or RGMP Program.

f: Monitoring well EV_RCSgw was formerly referred to as EV_RCgw.

g: EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

h: Under evalution for inclusion in monitoring program.

"-" denotes data not available.

TABLE 1: RGMP - Summary of Groundwater Monitoring Program Locations

Study Area	Watershed / Description	Well ID	Rationale
2	Dry Creek	RG_MW_DC1A[c]	Monitor infiltration through the Dry Creek alluvial fan in deeper groundwater.
		RG_MW_DC1B[c]	Monitor infiltration of mine-influenced surface water through the Dry Creek alluvial fan.
3	Fording River Valley - Greenhills Creek Alluvial Fan	GH_POTW09	Supply well which monitors groundwater quality in the Fording River valley-bottom aquifer relating to surface water infiltration from Rail Loop Pond.
		GH_POTW10	Supply wells which monitors surface water infiltration from Greenhills Creek and the Fording River aquifer near confluence of Greenhills Creek and Fording River. Monitors groundwater quality relating to down-valley groundwater flow in Fording River valley bottom.
		GH_POTW15	
		GH_POTW17	Supply well located in the Fording River Valley-Bottom aquifer below Greenhills Creek sedimentation pond that monitors groundwater quality relating to infiltration from Greenhills Creek and groundwater flow from upland areas at GHO.
4	Elk River Valley - Mickelson Drainage	GH_MW-MC-1D	Monitor groundwater levels and quality in the valley bottom associated with waste spoils in Mickelson, Leask, Wolfram, and Thompson Creek drainages and ponds at the base of each drainage system. Monitor the groundwater systems to evaluate connectivity to surface water and shallow groundwater. Monitor groundwater quality between the Leask and Wolfram Creek drainages, upgradient of Wolfram Ponds. Monitor groundwater quality downgradient from Leask Creek and Leask Pond. Monitor groundwater quality in the Wolfram Creek Drainage, downgradient of the Wolfram Ponds. After one more year of data, consider discontinuing monitoring at GH_GA-MW-2.
		GH_MW-MC-1S	
	Elk River Valley - Leask Drainage	GH_GA-MW-4	
	Elk River Valley - Wolfram Drainage	GH_GA-MW-2	
	Elk River Valley - Thompson Drainage	GH_GA-MW-3	
	Elk River Valley - Downgradient of Thompson Drainage	GH_MW-ERSC-1	Monitor groundwater level and quality in the Elk River valley bottom sediments downgradient of GHO. Monitor surface water infiltration from the Elk River side channel.
	Elk River valley bottom near Elkford	GH_MW_EF1A[d]	Monitor groundwater level and quality in the vicinity of drinking water aquifers #1056 and #1062.
		GH_MW_EF1B[d]	
		RG_DW-01-03 (Town Centre Well)	Monitor groundwater within Elk River valley-bottom sediment approximately 5 km downgradient of Study Area 4.
5/6	ERX	RG_MW_LC4A[h]	Monitor infiltration groundwater through the Line Creek alluvial fan.
		RG_MW_LC4B[h]	Monitor infiltration of surface water through the Line Creek alluvial fan.
	Elk River Valley	LC_MW_ER4A[d]	Monitors groundwater interactions with the Elk River valley bottom adjacent to EV_ER4.
		LC_MW_ER4B[d]	
7	Elk River Valley - Grave Creek / Harmer Creek	EV_GV3gw	The nearest upgradient well of Study Area 7, within the Grave Creek valley bottom. Monitor upland and tributary valley-bottom input from drainages to the northeast of EVO.
		RG_MW_GCA[e]	Monitor groundwater quality and levels along Grave Creek before confluence with Elk River within bedrock.
	Elk River Downstream of Grave Creek Confluence	RG_DW-02-20	Monitors potential down-valley groundwater flow from upgradient Study Area 6.
		RG_MW_WW[d]	Monitor surface water infiltration to the Elk River valley bottom.

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TABLE 1: RGMP - Summary of Groundwater Monitoring Program Locations

Study Area	Watershed / Description	Well ID	Rationale
8	Elk River Proximal to EVO	EV_LSgw	Monitor possible infiltration to groundwater near the valley bottom. Upland groundwater and surface water infiltration associated with Lindsay, Otto/Cossarini and Goddard creek drainages. Monitor possible recharge to groundwater from infiltration from tailings ponds and other discharge.
		EV_OCgw	
		EV_MW_GC1B[d]	
		RG_DW-03-10	Monitors groundwater withdrawals within Aquifer 1078.
9a	Sparwood Area - Michel Creek	EV_MW_SPR1C[d]	Monitor shallow groundwater level and quality downgradient of EV_MW_MC2-A. Monitors recharge to groundwater from infiltration of Michel Creek and upland groundwater.
		EV_MW_MCgwA[d]	Potential sentinel wells that monitor recharge to groundwater from infiltration of Michel Creek and down-valley groundwater quality.
		EV_MW_MCgwB[d]	
		EV_MW_MCgwS	Located 1.8 km upgradient of the confluence of Michel Creek and the Elk River. Monitor spatial distribution of water quality within Michel Creek valley-bottom sediments in relation to potential inputs in Study Area 9.
		EV_MW_MCgwD	
9b	Bodie and Gate Creek Area	EV_MW_GT1A[d]	Monitor shallow and deep groundwater quality from upland groundwater in the Bodie and Gate Creek drainages. Monitor surface water infiltration associated with Bodie and Gate creeks.
		EV_MW_GT1B	
		EV_MW_BC1A	
		EV_MW_BC1B	
		EV_RCSgw[f]	Monitor groundwater quality from upland groundwater in the Bodie and Gate Creek drainages. Monitor surface water infiltration associated with Bodie and Gate creeks. Monitors groundwater withdrawals from supply wells.
		EV_BCgw	
		EV_WH50gw	
	Michel Creek Downstream of Gate Creek and Bodie Creek	EV_BRgw	
		EV_HW1 (EV_HM1)[d,g]	Monitors groundwater withdrawals.
		EV_MW_MC2A[d]	Monitor down-valley groundwater level, quality and transport. Monitors potential recharge to groundwater from infiltration of Michel Creek.
		EV_MW_MC2B[d]	
10	Erickson Creek	EV_ECgw	Monitor groundwater quality and levels within valley fill sediments downgradient of Erickson Spoils.
		EV_MW_SP1A[d]	Monitors surface water infiltration from the South Pit Creek Decant Pond and groundwater interaction with Michel Creek.
		EV_MW_SP1B[d]	
		EV_MW_SP1C[d]	
11	Michel Creek	CM_MW1-OB	Monitor groundwater level and quality from upland groundwater and tributaries discharging into Michel Creek. Monitor groundwater flow through the Michel Creek valley bottom.
		CM_MW1-SH	
		CM_MW1-DP	
		CM_MW_AG1A[d]	Monitor recharge to the groundwater system from the CMO Loadout and Infiltration Ponds.
		CM_MW_AG1B[d]	

Notes:

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b: As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

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d: Monitoring well added to the RGMP Program as per the 2020 RGMP Update.

e: Monitoring well installed in 2021 to support the relevant SSGMP and/or RGMP Program.

f: Monitoring well EV_RCSgw was formerly referred to as EV_RCgw.

g: EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

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TABLE 1: RGMP - Summary of Groundwater Monitoring Program Locations

Study Area	Watershed / Description	Well ID	Rationale
12	Sparwood Area - Elk River	EV_ER1gwS	Monitor groundwater quality down-valley of Michel Creek groundwater flow from Study Area 9, Elk River groundwater from Study Area 8, and confluence of Michel Creek and Elk River. Monitor groundwater interactions with Elk River and Michel Creek.
		EV_ER1gwD	
		RG_DW-03-04 (WTN 77913; TH99-2, Sparwood Well 3)	
		RG_MW-03-04[d]	

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b: As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

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e: Monitoring well installed in 2021 to support the relevant SSGMP and/or RGMP Program.

f: Monitoring well EV_RCSgw was formerly referred to as EV_RCgw.

g: EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

h: Under evalution for inclusion in monitoring program.

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TABLE 2: FRO - Summary of Groundwater Monitoring Program Locations

Watershed	Sub-Area	Well ID	Rationale
Henretta Creek Watershed	Henretta Backfilled Pits and Spoils	FR_HMW1D	Monitor groundwater in backfilled pits between the Henretta reclaimed channel and the spoils to the north, downgradient of the discharge area for the Henretta Pit sump water.
		FR_HMW1S	Monitor deep groundwater system high in Cl in backfilled pits and continue to evaluate connectivity to surface water and shallow groundwater.
		FR_HMW2	Monitor upland groundwater high in Cl north of the Henretta reclaimed channel near the base of the spoil.
		FR_HMW3	Monitor groundwater in backfilled pits in the eastern portion of the former South Henretta Pit. This well provides local-scale triangulation to assess groundwater flow direction near the pits.
	Henretta Valley Bottom Upgradient	FR_HMW5[a]	Monitor reference groundwater conditions upgradient of mining impacts in Henretta valley bottom.
Fording River Watershed	Upgradient of the STP	FR_TBSSMW-1	Monitor groundwater and attenuation downgradient of Turnbull spoil and Henretta Valley and provide more understanding of groundwater-surface water interactions in Fording River valley bottom.
		FR_TBSSMW-2	
		FR_POTWELLS[b]	Monitor groundwater and attenuation downgradient of Henretta Valley and the Turnbull spoil.
		FR_GCMW-1B	Monitor groundwater quality downgradient of Clode Creek and Clode Settling Pond as several potential sources and transport pathways to groundwater were identified.
		FR_GCMW-2	
		FR_MW-1B	Monitor seepage from upgradient spoils, Turnbull Pit, and Clode Creek and Lake Mountain Pit Lake.
	Downgradient of NTP	FR_MW_NTPSE[d]	Monitor groundwater in the valley bottom sediments downgradient of the NTP.
	Directly downgradient of the STP	FR_09-04-A	Monitor groundwater quality in valley bottom sediments downgradient of the South Tailings Pond.
		FR_09-04-B	Monitor seepage from the South Tailings Pond to overburden material immediately downgradient within the Fording River valley bottom.
	Kilmarnock Alluvial Fan and Study Area 1	FR-KB-1	Monitor mine-influenced groundwater quality and hydraulic gradients to the Kilmarnock Creek alluvial fan.
		FR-KB-2	
		FR-KB-3A	
		FR-KB-3B	
		FR_MW-SK1A	Monitor mine-influenced groundwater quality and hydraulic gradients downgradient of the Kilmarnock Creek alluvial fan and South Tailings Pond on the eastern side of the Fording River Valley.
		FR_MW-SK1B	
		FR_09-01-A	Monitor groundwater quality in valley bottom sediments downgradient of the South Tailings Pond and South Kilmarnock Settling Ponds. Monitor mine impact at the southern extent of the mine-permitted area.
		FR_09-01-B	Monitor additional inputs to Fording River valley bottom sediments downgradient of the South Tailings Pond.
		FR_09-02-A	Monitor groundwater quality in valley bottom sediments downgradient of the South Tailings Pond and South Kilmarnock Settling Ponds. Assess influence of losing Fording River to valley bottom sediments.
		FR_09-02-B	
		FR_GH_WELL4[c]	Monitor mine-influenced groundwater downgradient of the FRO mining operations.

Notes:

a: Analytical data prior to May 2016 were used as part of the RGMP Background Assessment; however, since May 2016 this well appears to be impacted and has been included as part of the FRO SSGMP.

b: FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96).

c: As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017.

d: Monitoring well added to the SSGMP Program as per the 2021 SSGMP Update.

TABLE 2: FRO - Summary of Groundwater Monitoring Program Locations

Watershed/Sub-Area		Well ID	Rationale
Swift Creek Watershed	Swift Creek	FR_MW18-02[d]	Monitor groundwater quality in shallow groundwater downgradient-of and influenced-by the Swift Creek Sediment Ponds.

Notes:

a: Analytical data prior to May 2016 were used as part of the RGMP Background Assessment; however, since May 2016 this well appears to be impacted and has been included as part of the FRO SSGMP.

b: FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96).

c: As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017.

d: Monitoring well added to the SSGMP Program as per the 2021 SSGMP Update.

TABLE 3: GHO - Summary of Groundwater Monitoring Program Locations

Watershed/Sub-Area		Well ID	Rationale
Fording River	Porter Creek Drainage	GH_MW-PC	Monitor groundwater quality and surface water infiltration near the Porter sedimentation pond associated with historical waste spoils in the Porter Creek drainage.
		GH_MW-PC4A	Nested well pair to assess potential OC transport through the alluvial fan and bedrock to the mainstem of the Fording River.
		GH_MW-PC4B	
	Greenhills Creek	GH_MW-GHC-1A	Nested well pair to monitor shallow and deep groundwater quality downgradient of Site A to E Coarse Coal Rejects (CCR), the coal process plant, and the overland conveyor.
		GH_MW-GHC-1B	
		GH_MW_GHC_4A	Nested well pair to monitor mining influence from waste rock sources (Hawk and East spoils) in groundwater in the Greenhills Creek alluvial sediments and bedrock; Monitoring only (no sampling) for GH_MW_GHC-4A.
		GH_MW_GHC_4B	
	TSF and Site D/E Rejects	GH_MW-TD	Monitor groundwater quality downgradient of the TSF and Site D and E CCR.
	Rail Loop	GH_MW_RLP-2	Monitor shallow groundwater quality in the vicinity of the clean coal and dryer buildings/ponds and the rail loop/load out area.
	Greenhills Creek Alluvial Fan	GH_POTW09	Supply well located in the Greenhills Creek alluvial fan. Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
		GH_POTW10	Supply well located in the Greenhills Creek alluvial fan. Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
		GH_POTW15	Supply well located in the Greenhills Creek alluvial fan. Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
		GH_POTW17	Supply well located in the Fording River valley-bottom aquifer near the rail loop area. Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
	Fording River	RG_MW_FR11A	Nested well pair to assess potential groundwater pathway from the Fording River valley bottom to the Elk River watershed along mapped glaciofluvial sediments.
		RG_MW_FR11B	
Elk River Valley	Mickelson Drainage	GH_MW-MC-1D	Monitor groundwater quality near the Mickelson Creek sedimentation ponds. Monitor the groundwater system in the Mickelson drainage to evaluate connectivity to surface water and shallow groundwater.
		GH_MW-MC-1S	
		GH_MW-MC-2D	
		GH_MW-MC-2S	
	Leask Drainage	GH_GA-MW-4	Monitor groundwater in the valley bottom associated with waste spoils in Leask, Wolfram, and Thompson Creek drainages and sedimentation ponds at the base of each drainage system. Monitor the groundwater system to evaluate connectivity to surface water and shallow groundwater.
		RG_MW_LC3A	
		RG_MW_LC3B	
	Wolfram Drainage	RG_MW_LCWC1	
		RG_MW_WC2A	
		RG_MW_WC2B	
		GH_GA-MW-2	
	Thompson Drainage	GH_GA-MW-3	
	Downgradient of Thompson Drainage	GH_MW-ERSC-1	Monitor groundwater quality in the Elk River valley bottom sediments downgradient of GHO and to monitor surface water infiltration from the Elk River side channel.

TABLE 4: LCO - Summary of Groundwater Monitoring Program Locations

Watershed/Sub-Area		Well ID	Rationale
LCO Phase II Upper and Lower Dry Creek	Diversion Structure	LC_PIZDC0901	Monitor water quality to detect for seepage near the diversion structure for proposed water treatment plant.
		LC_PIZDC1306	
		LC_PIZDC1307	
		LC_PIZDC1308	
		LC_PIZDC1404S	
		LC_PIZDC1404D	
LCO Phase I Line Creek	Upper Line Creek 1 (Tornado Creek)	LC_MW_LC1-1A[a]	Monitor groundwater in the fluvial deposits where Tornado Creek joins Line Creek, upgradient of LCO.
		LC_MW_LC1-2A[a]	
		LC_MW_LC1-3A[a]	
	Centre Line Creek (North)	LC_PIZM0903[a]	Monitor groundwater quality of the northern sub-watersheds.
	Center Line Creek (South)	LC_MW20_01[a]	Monitor shallow and deeper groundwater quality near Line Creek, upgradient of the confluence with WLC.
		LC_MW20_02A[a]	
		LC_MW20_02B[a]	
		LC_MW20_03[a]	
	West Line Creek	LC_PIZ1206A[a]	Monitor water quality in the perched alluvial aquifer within and immediately surrounding the WLC Spoils.
		LC_MW_WLC-1A[c]	Monitor water quality in the Basal Alluvial Aquifer within and immediately surrounding the WLC Spoils.
		LC_MW_WLC-2A[c]	
		LC_MW_WLC-3A[c]	
		LC_PIZ1210B[a]	
		LC_PIZ1211N[a]	
		LC_PIZ1212[a]	
		LC_PIZ1206C[a]	Monitor water quality in bedrock within and immediately surrounding the WLC Spoils.
		LC_PIZ1207A[a]	
		LC_PIZ1207B[a]	
		LC_PIZ1210C[a]	
	Lower Line Creek to LC_LC4	WL_MW-15-02-A[a]	Monitor groundwater quality near the AWTF residual landfill – on a semi-annual basis.
		WL_MW-15-02-B[a]	
		WL_MW-15-04-B[a]	
		LC_MW_CP1A[a]	Monitor for shallow groundwater bypass of surface water station LC_LCDSSLCC.
		LC_MW_CP1B[a]	Monitor deeper groundwater bypass of surface water station LC_LCDSSLCC.
Process Plant	East of the Process Plant at the former Gasoline Refuelling Area	LC_PIZP1001[b]	Monitor groundwater levels to augment interpreted flow direction at the Process Plant.
		LC_PIZP1003[b]	
	South of the Process Plant at the former Diesel Refuelling Area	LC_PIZP1002[b]	
	Process Plant Ponds	LC_PIZP1101	Monitor water quality downgradient of Process Plant ponds prior to the Elk River and Fording River confluence to detect seepage from Process Plant ponds.
		LC_PIZP1103	
		LC_PIZP1104	
		LC_PIZP1105	

Notes:

a: Monitoring well added to the SSGMP Program as per the 2021 SSGMP Update.

b: Monitored water levels only.

c: Under evalution for inclusion in monitoring program

TABLE 4: LCO - Summary of Groundwater Monitoring Program Locations

Watershed/Sub-Area		Well ID	Rationale
Process Plant	ERX	LC_MW_ERX1A[c]	Monitor potential transport of OC in shallow groundwater from the Coarse-Coal Rejects.
		LC_MW_ERX1B[c]	
		LC_MW_SRD1A[c]	
		LC_MW_SRD1B[c]	
		LC_MW_SRD2A[c]	
		LC_MW_SRD2B[c]	

Notes:

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b: Monitored water levels only.

TABLE 5: EVO - Summary of Groundwater Monitoring Program Locations

	Well ID	Rationale
Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence	EV_GV3gw	Monitor groundwater quality and levels within valley fill sediments downgradient of the EVO Dry Creek Spoils.
	EV_GV3gwS	
	EV_MW_GV4A	Monitor background groundwater conditions in Grave Creek valley bottom above Harmer Creek.
	EV_MW_GV4B	
	RG_MW_GCA[a]	Monitor groundwater quality and levels along Grave Creek before confluence with Elk River within bedrock.
Elk River Proximal to EVO	EV_BALgw	Monitor groundwater quality and levels downgradient of spoils in Balmer Creek catchment.
	EV_LSgw	Monitor groundwater quality and levels in valley fill sediments downgradient of spoils in upper Lindsay Creek.
	EV_GCgw	Monitor groundwater quality and levels in the valley sediments near Goddard Creek and adjacent to Lagoons B and C, and in the Goddard Marsh.
	EV_OCgw	Monitor groundwater quality and levels in valley fill sediments near Otto Creek and Lagoon D.
	EV_MW_GC1B	Monitor possible infiltration to groundwater from Goddard Sedimentation Ponds.
Sparwood Area - Baldy and Sparwood Ridges	EV_MW_AQ1	Monitor groundwater quality and levels at the base of Baldy Ridge near Aqueduct Creek.
	EV_MW_AQ2	
	EV_MW_MC4	Monitor groundwater quality and levels at the base of Baldy Ridge near Aqueduct Creek.
	EV_MW_MC3	Monitor groundwater quality and levels in valley fill sediments near Michel Creek.
Sparwood Area - Michel Creek	EV_MC_MCgwS	Monitor groundwater quality and levels in valley fill sediments near Michel Creek; wells selected that are not influenced by down-valley groundwater transport of elevated OC.
	EV_MC_MCgwD	
	EV_MW_SPR1A	Monitor groundwater quality and levels along the Michel Creek valley bottom.
	EV_MW_SPR1B	
	EV_MW_SPR1C	
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek	EV_MW_GT1A	Monitor groundwater quality and levels in valley fill sediments near Michel Creek down gradient of Bodie Creek, Bodie Sedimentation Pond, Gate Creek and Gate Creek Sedimentation Pond.
	EV_MW_GT1B	
	EV_MW_BC1A	
	EV_MW_BC1B	
	EV_RCSgw	
	EV_BCgw	
Michel Creek Downstream of Gate Creek and Bodie Creek - Michel Creek Valley Bottom	EV_MW_MC2A	Monitor groundwater quality and levels along the Michel Creek valley bottom.
	EV_MW_MC2B	
	EV_MW_MC1A	
	EV_MW_MC1B	
Erickson Creek	EV_WF_SW	Monitor groundwater downgradient from the West Fork Tailings Facility (WFTF).
	EV_ECgw	Monitor groundwater quality and levels within valley fill sediments downgradient of Erickson Spoils.

Notes:

a: Monitoring wells installed in 2020 to support the SSGMP.

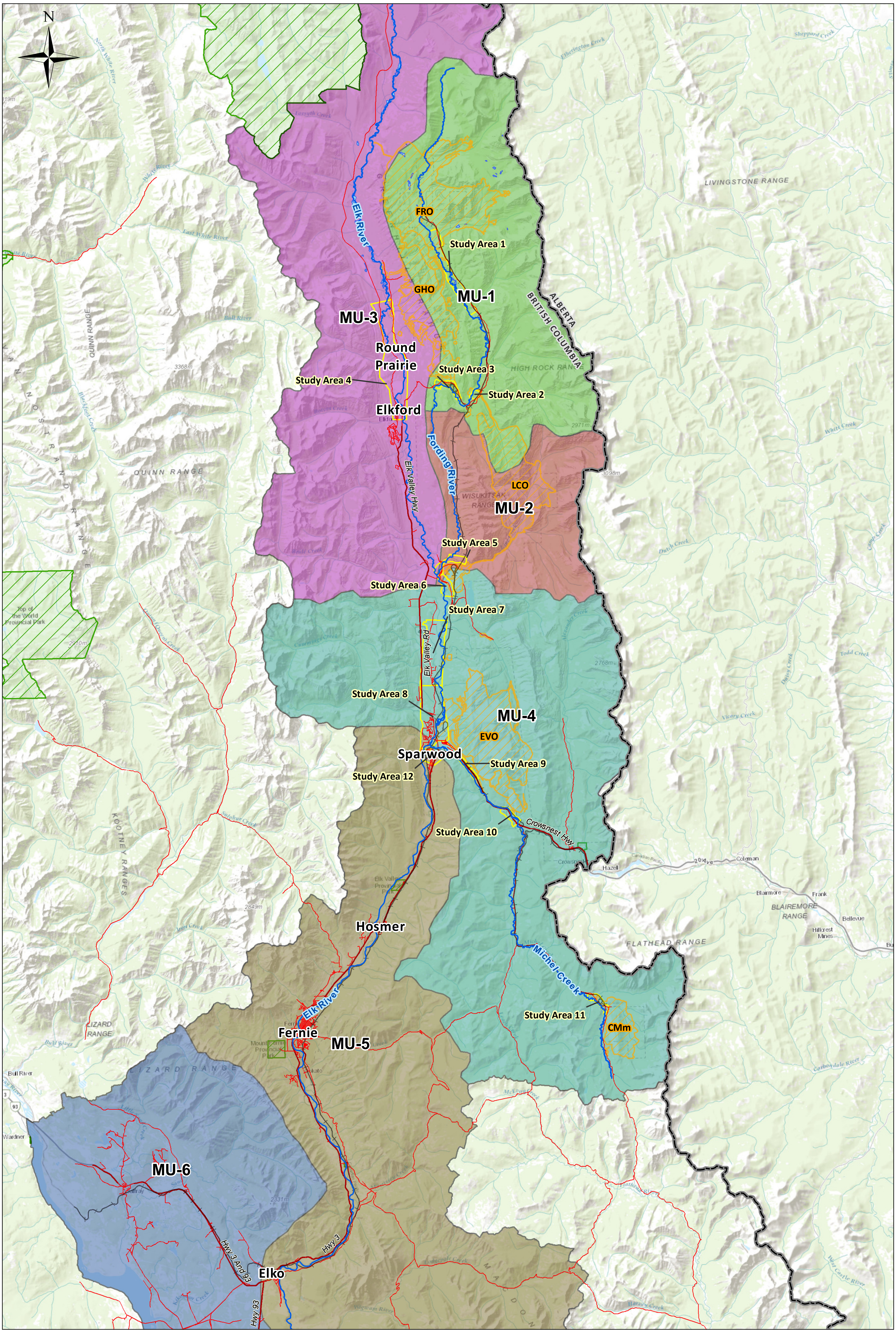
b: Monitoring well EV_RCSgw was formerly referred to as EV_RCgw.

TABLE 6: CMm - Summary of Groundwater Monitoring Program Locations

Watershed/Sub-Area		Well ID	Rationale
Corbin Creek Valley	Corbin Creek valley bottom	CM_MW4-SH	Monitor groundwater quality in valley bottom (both wells screened in bedrock) downgradient of Main Interceptor Sedimentation Ponds. Nested well pair provides for measurement of vertical hydraulic gradient.
		CM_MW4-DP	
		CM_MW5-SH	Monitor groundwater quality in valley-bottom sediments and bedrock downgradient of 14 Pit, CMO spoils in Corbin Creek watershed, and North Ditch. Nested well pair provides for measurement of vertical hydraulic gradient and identification of potential sources of water quality in valley-bottom sediments and Corbin Creek. Deployed pressure transducers provide high-resolution temporal characterization of groundwater elevation and hydraulic gradient variability.
		CM_MW5-DP	
		CM_MW6-SH	Monitor groundwater quality in valley-bottom sediments and bedrock downgradient of Corbin Pond, which receives seepage from East Spoils, 34 Pit and 37 Pit via the Corbin Creek Rock Drain. Nested well pair provides for measurement of vertical hydraulic gradient and identification of potential sources of water quality in valley-bottom sediments and Corbin Creek.
		CM_MW6-DP	
		CM_MW9	Monitor groundwater quality in valley-bottom sediments downgradient of Main Interceptor Sedimentation Ponds.
Michel Creek Valley	Michel Creek valley bottom	CM_MW1-OB	Monitor groundwater in regional receiving environment downgradient of CMO. Well nest includes three screens, providing an indication of the potential vertical transport pathways affecting the groundwater as well as groundwater-surface water interaction with Michel Creek.
		CM_MW1-SH	
		CM_MW1-DP	
		CM_MW_AG1A	Downgradient wells characterizing groundwater level and quality nearby Andy Good Creek at two levels in unconsolidated materials.
		CM_MW_AG1B	
	Downgradient of CMm	CM_MW2-SH	Monitor groundwater quality in valley-bottom sediments downgradient of spoils and open pits within Michel Creek catchment and West Ditch. Monitor groundwater levels in valley-bottom sediments to provide indication of groundwater-surface water interaction along segment of Michel Creek adjacent to CMO.
	CMm west spoils	CM_MW7-SH	Monitor groundwater quality proximal to spoils and 34 Pit in Michel Creek catchment, providing an indication of potential constituent loads travelling to valley bottom through groundwater. Monitor groundwater levels proximal to 34 Pit.
		CM_MW7-DP	
		CM_MW8	Monitor groundwater quality proximal to spoils and 37 Pit in Michel Creek catchment, providing an indication of potential constituent loads travelling to valley bottom through groundwater. Monitor groundwater levels proximal to 37 Pit (water level understood to be controlled by connectivity through bedrock to 34 Pit) to provide an indication of flow directions around the open pit.
	Michel Creek valley bottom	CM_MW3-SH	Monitor groundwater quality and groundwater-surface water interaction in valley-bottom sediments upstream of CMO (reference wells).
		CM_MW3-DP	
	Mid-slope southwest of Middle Mountain CCR	CM_MW10	Monitor groundwater quality downgradient of Middle Mountain CCR along flow pathways expected to report to valley-bottom sediments along Michel Creek.

Drawings

1: Site Location and Management Units
2: Bedrock Geology – North Half
3: Bedrock Geology – South Half
4: Surficial Geology – North Half
5: Surficial Geology – South Half
6: Karst Potential
7: Order Station Location Plan



Legend

- BC-Alberta Border
- Rails
- Highway
- Secondary Road
- Rivers
- Study Areas
- Mine Permitted Areas
- Surface Water
- Provincial Park

Management Units

- MU-1
- MU-2
- MU-3
- MU-4
- MU-5
- MU-6

FRO - Fording River Operations
GHO - Greenhills Operations
LCO - Line Creek Operations
EVO - Elkview Operations
CMm - Coal Mountain mine

Notes:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

0 2.5 5 10 15 20 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC · LAVALIN

Site Location and Managment Units

CHK'D: RS	DATE: 2022-03-21	SCALE: 1:350,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 1

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

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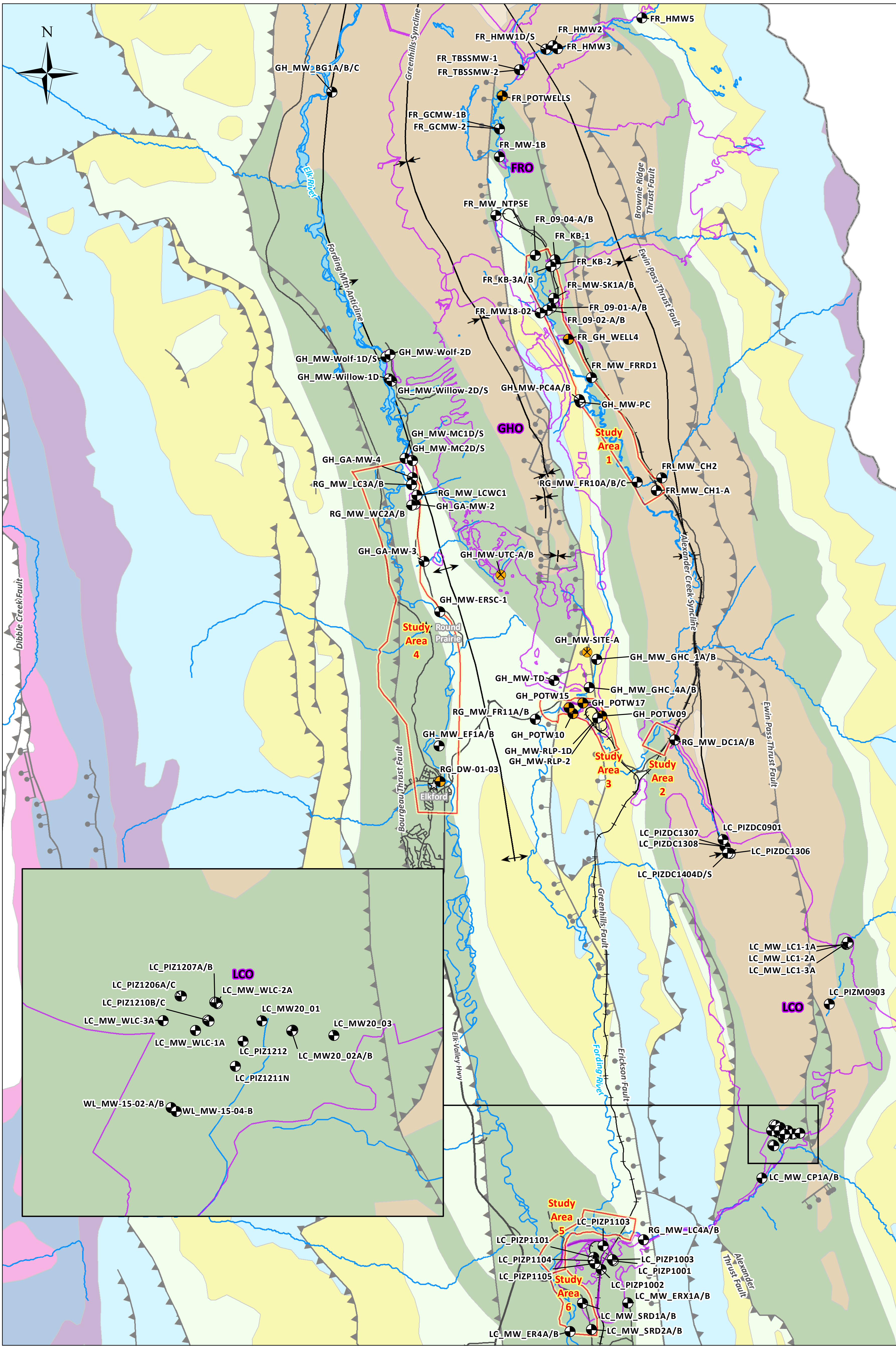

Legend

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- Monitoring Well (Decommissioned)

Site Features
- Study Areas
- Anticline[3]
- Syncline[3]
- BC-Alberta Border
- Rails
- Highway
- Secondary Road
- Rivers
- Mine Permitted Areas
- Surface Water

Bedrock Geology[2]
- Blairmore Group (sandstone, siltstone, mudstone, conglomerate)
- Kootenay Group (siltstone, sandstone, mudstone, coal)
- Fernie Formation (dark shales, siltstone, sandstone)
- Spray River Group (dolomitic sandstone and siltstone)
- Rocky Mountain Group (chert, sandstone, siltstone)
- Rundle Group (limestone and dolomite)
- Banff and Exshaw Formations (limestone and organic shale)
- Palliser Formation (limestone and dolomite)
- Fairholme Group - Sassenach and Alexo Formations (shale and limestone)

Fault Type[2]
- Normal fault
- Thrust fault

Notes:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.

References:
1. Data provided by Teck Coal Limited.
2. Cui, Y., Miller, D., Schiarizza, P., and Diakow, L.J., 2017. British Columbia digital geology. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Open File 2017-8, 9p. Data version 2019-12-19.
3. Syncline, anticline and cross section geology source: Price, R.A., Grieve, D.A., and Patenaude,C.1992: Geology and structure cross-section, Fording River (West Half), British Columbia-Alberta; Geological Survey of Canada, Map 1824A, scale 1:50000.

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Bedrock Geology - North Half

CHK'D: RS	DATE: 2022-03-21	SCALE: 1:120,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 2

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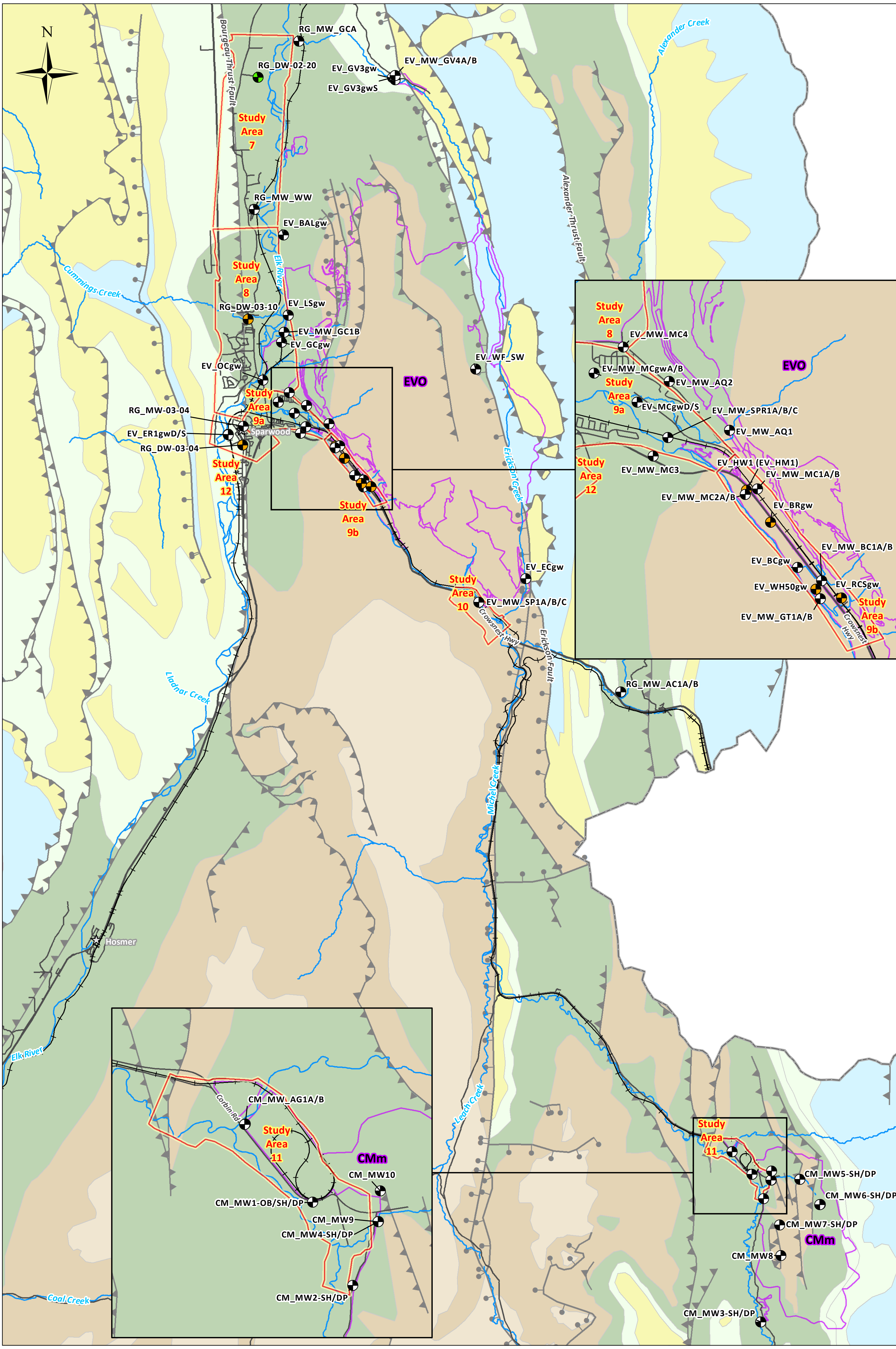

Legend

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- Monitoring Well (Decommissioned)

Site Features
- Study Areas
- Anticline[3]
- Syncline[3]
- BC-Alberta Border
- Rails

- Highway
- Secondary Road
- Rivers
- Mine Permitted Areas
- Surface Water

Bedrock Geology[2]
- Blairmore Group (sandstone, siltstone, mudstone, conglomerate)
- Kootenay Group (siltstone, sandstone, mudstone, coal)
- Fernie Formation (dark shales, siltstone, sandstone)
- Spray River Group (dolomitic sandstone and siltstone)
- Rocky Mountain Group (chert, sandstone, siltstone)
- Rundle Group (limestone and dolomite)
- Banff and Exshaw Formations (limestone and organic shale)
- Palliser Formation (limestone and dolomite)
- Fairholme Group - Sassenach and Alexo Formations (shale and limestone)

Fault Type[2]
- Normal fault
- Thrust fault

Notes:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.

References:

1. Data provided by Teck Coal Limited.
2. Cui, Y., Miller, D., Schiarizza, P., and Diakow, L.J., 2017. British Columbia digital geology. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Open File 2017-8, 9p. Data version 2019-12-19.
3. Syncline, anticline and cross section geology source: Price, R.A., Grieve,D.A., and Patenaude,C.1992: Geology and structure cross-section, Fording River (West Half), British Columbia-Alberta; Geological Survey of Canada, Map 1824A, scale 1:50000.

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Bedrock Geology - South Half

CHK'D: RS	DATE: 2022-03-21	SCALE: 1:120,000	Ref Num:
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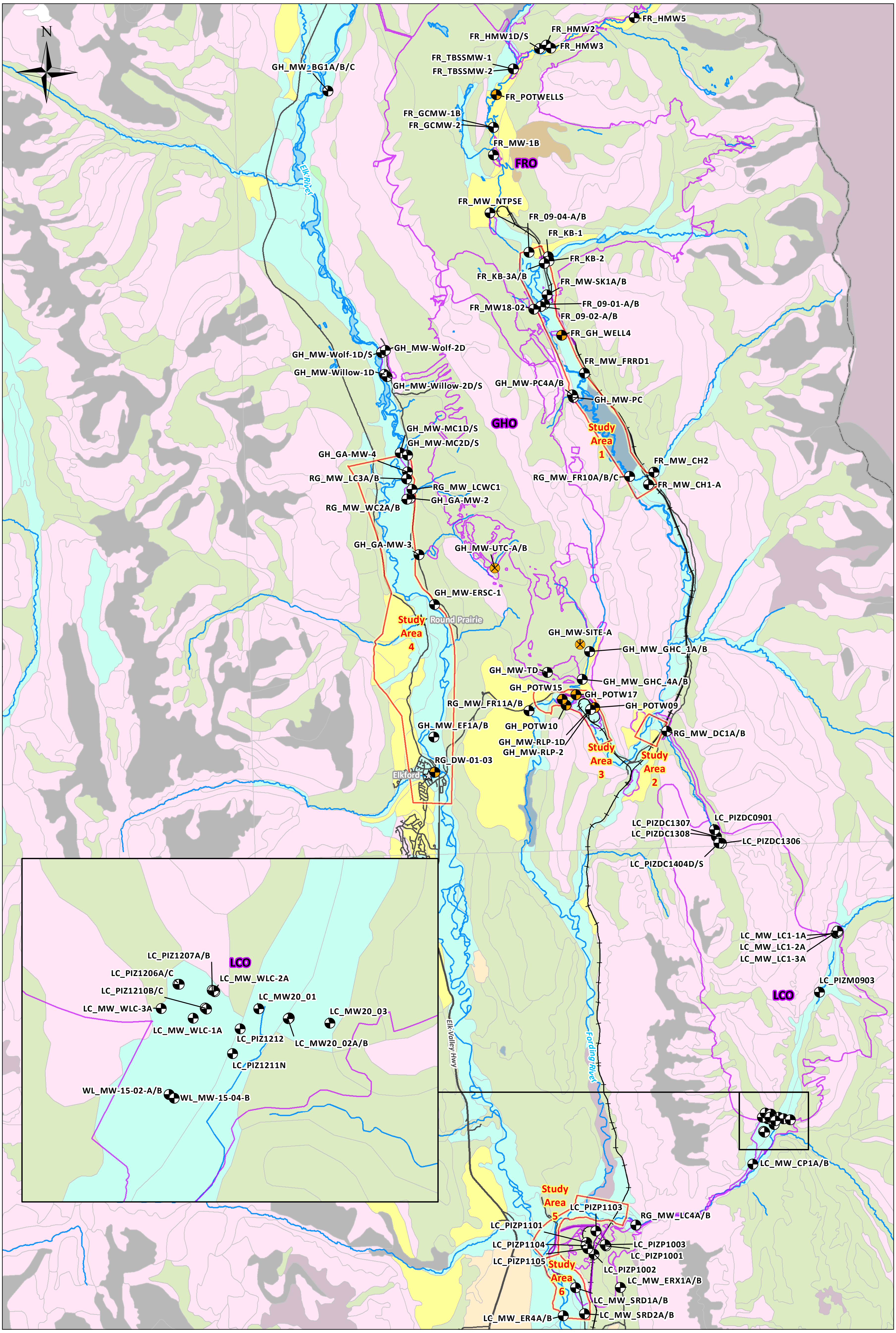

Legend

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- Monitoring Well (Decommissioned)

Site Features
- Highway
- Secondary Road
- BC-Alberta Border
- Rails
- Rivers
- Surface Water
- Study Areas
- Mine Permitted Areas

Surficial Unit[2]
- Anthropogenic Material
- Bedrock
- Colluvium
- Fluvial Material
- Glaciofluvial Material
- Ice
- Lacustrian Material
- Morainal Material (Till)
- Not Classified
- Organic Material
- Undifferentiated Material

Notes:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.

References:
1. Data provided by Teck Coal Limited.
2. *Surficial geology data source*: Ministry of Environment and Climate Change Strategy, Knowledge Management. Received on May 26, 2021 from the Province of British Columbia Open Data Portal (https://catalogue.data.gov.bc.ca/dataset/3f6280a0-11d6-430f-92c5-a4a66023e6a1)

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Surficial Geology - North Half

CHK'D: RS	DATE: 2022-03-21	SCALE: 1:120,000	Ref Num: DRAWING 4
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		

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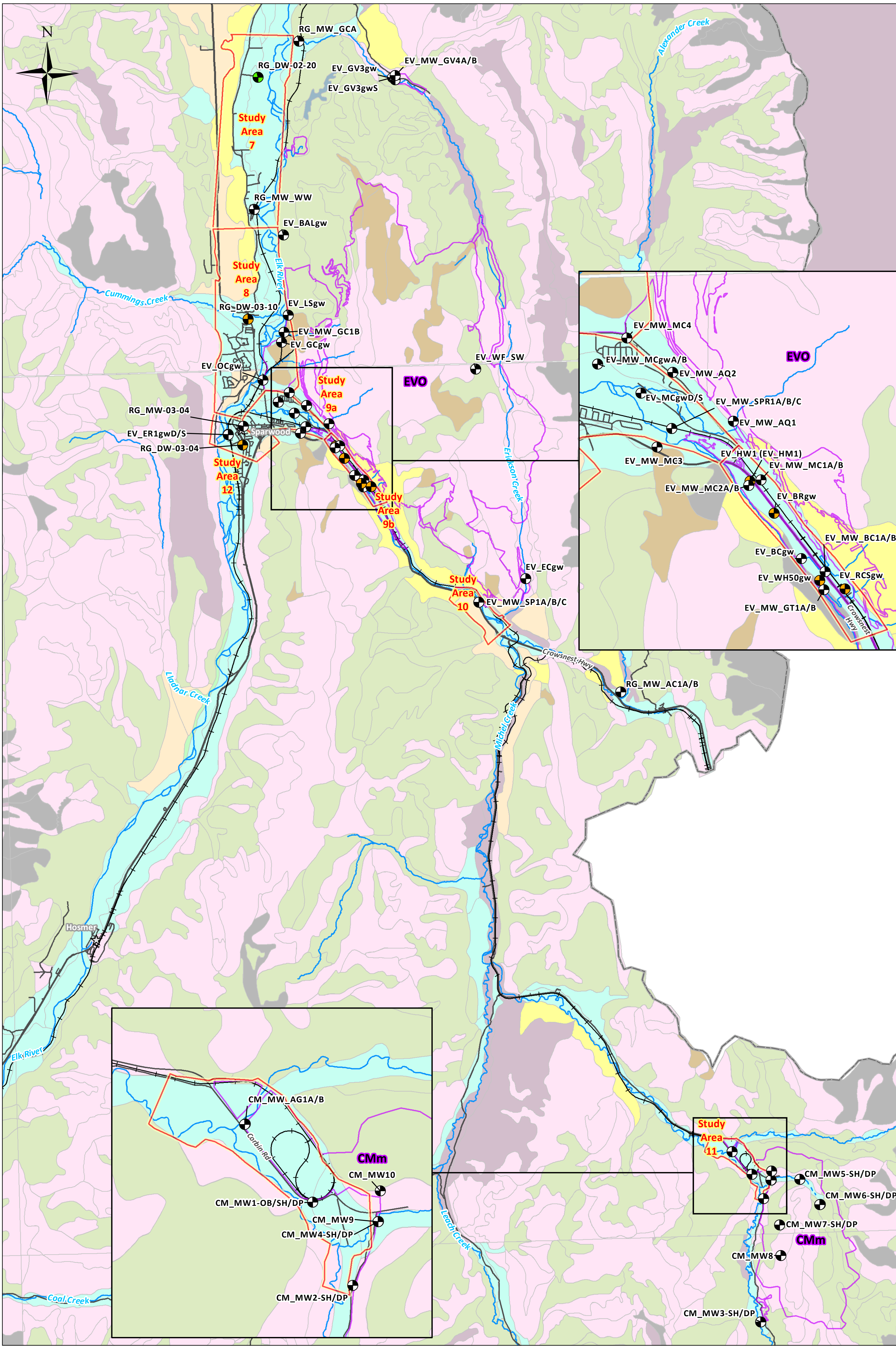


Legend

Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well
- Monitoring Well (Decommissioned)

Site Features
- Highway
- Secondary Road
- BC-Alberta Border
- Rails
- Rivers
- Surface Water
- Study Areas
- Mine Permitted Areas

Surficial Unit[2]
- Anthropogenic Material
- Bedrock
- Colluvium
- Fluvial Material
- Glaciofluvial Material
- Ice
- Lacustrian Material
- Morainal Material (Till)
- Not Classified
- Organic Material
- Undifferentiated Material

Notes:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.

References:
1. Data provided by Teck Coal Limited.
2. *Surficial geology data source*: Ministry of Environment and Climate Change Strategy, Knowledge Management. Received on May 26, 2021 from the Province of British Columbia Open Data Portal (https://catalogue.data.gov.bc.ca/dataset/3f6280a0-11d6-430f-92c5-a4a66023e6a1)

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

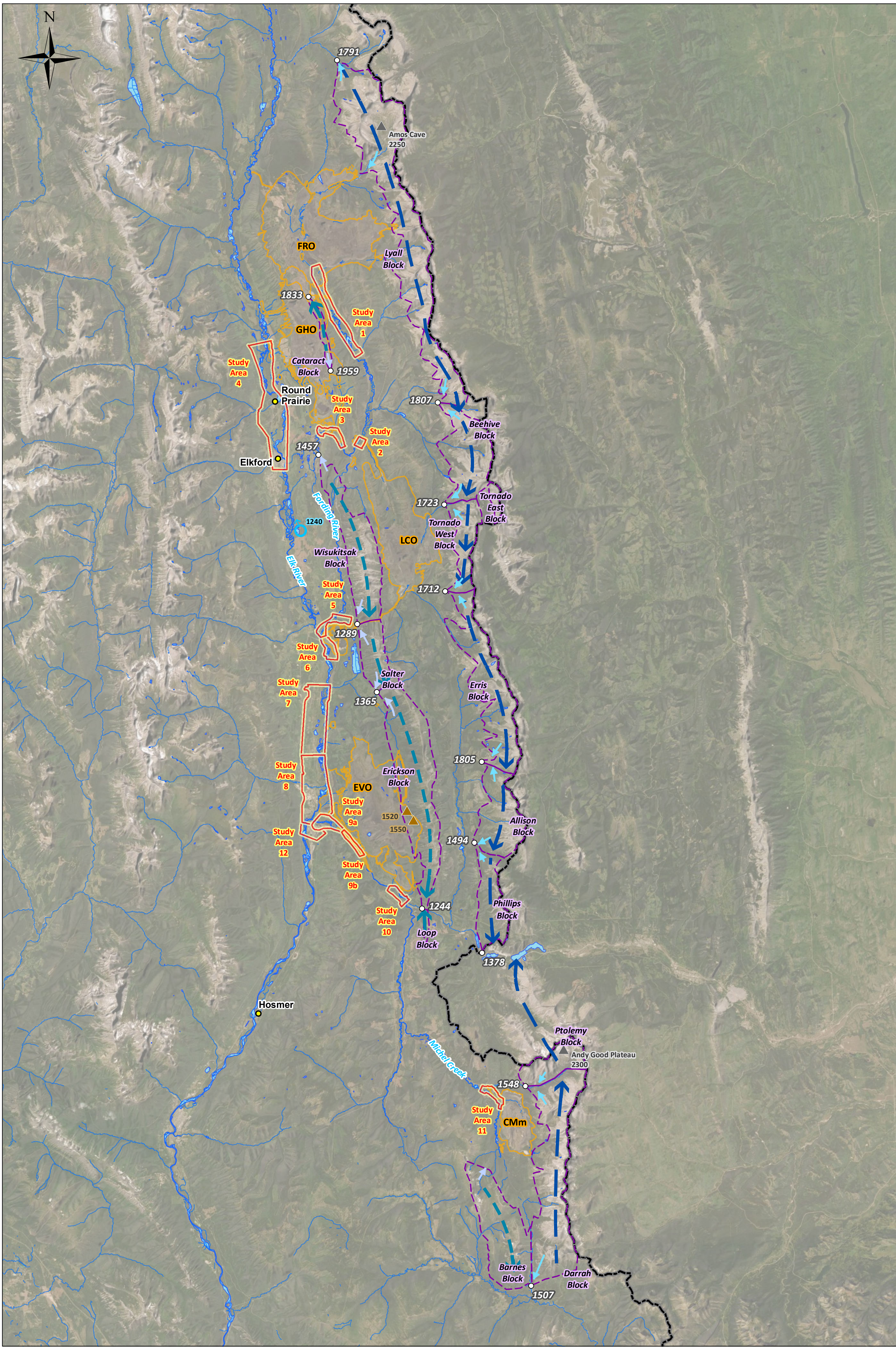
SNC·LAVALIN

Surficial Geology - South Half

CHK'D: RS	DATE: 2022-03-21	SCALE: 1:120,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 5

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-5-SurficialGeology_South.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Site Features
- RGMP Study Areas
- Mine Permitted Areas
- Karst Potential Blocks
- Fording Mtn. Warm Spring (masl)
- Amos Cave and Andy Good Plateau (masl)
- Cave Identified during bat habitat study (masl)
- BC-Alberta Border
- 1000 Lowest Elevations (masl) corresponding to a Karst Potential Block

Water Features
- Water Features
- Rivers
- Inferred Primary Strike-Oriented Groundwater Flow Direction[1]
- Inferred Secondary Strike-Oriented Groundwater Flow Direction[1]
- Inferred Primary Strike-Oriented Groundwater Flow Direction[2]
- Inferred Secondary Strike-Oriented Groundwater Flow Direction[2]

Notes:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale, however scale bar will remain accurate.
3. Intended for illustration purposes, accuracy has not been verified for construction or navigation purposes.

References:
1. Based on this assessment.
2. Based on Worthington, 1991.
3. Data provided by Teck Coal Limited.
4. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 2 4 8 12 16 20 km

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Limited

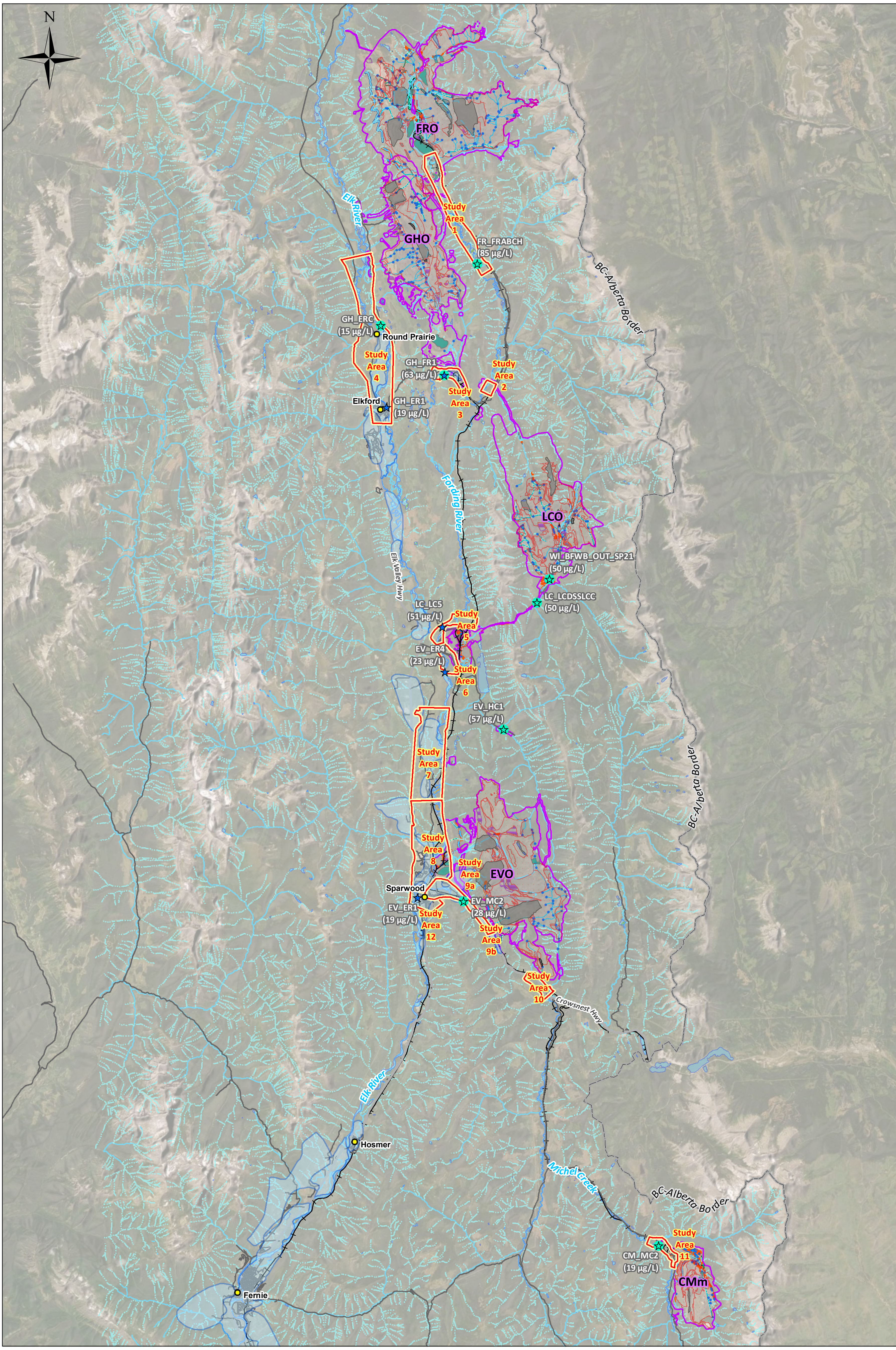
SNC·LAVALIN

Karst Potential

CHK'D: RS	DATE: 2022-03-03	SCALE: 1:330,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 6

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-6-Karst Potential.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Legend

Compliance Point
Order Station (Site Performance Objective)
Compliance Point and Order Station (Site Performance Objective)

Site Features
BC Communities
Study Areas
BC-Alberta Border
Highway
Secondary Road
Rails
Mapped Aquifers
Tailings/Settling Pond
Waste Water Pond
End-Pit Lake
Pit
Stockpiles
Waste Dump (Spoils)
Mine Permitted Areas

Water Features
Stream + Stream Ditch
Intermittent + Indefinite Stream
Subsurface
Culvert
Ditch
Potable Waterline
Rock Drain
Water Pipeline
Bypass/Diversion Channel
Island
Lake/River Bed
Wetted Area/Wetland (Based on 1:250000 Scale)

(XX µg/L) Site Performance Objective Screening Criteria and Compliance Point Screening Criteria

Notes:
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References:
1. Information provided by Teck Coal Limited.
2. Service Layer Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 2 4 8 12 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Order Stations Location Plan

CHK'D: RS	DATE: 2022-03-03	SCALE: 1:250,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 7

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-7-OrderStn_LP.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

Appendix I

Permit 107517 (amended December 1, 2021)

BRITISH COLUMBIA

December 1, 2021

Tracking Number: 389889
Authorization Number: 107517

REGISTERED MAIL

Teck Coal Limited
3300-550 Burrard ST
Vancouver, BC V6C 0B3

Dear Permittee:

Enclosed is Amended Permit 107517 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

When a spill occurs, or there is an imminent risk of one occurring, the responsible person must ensure that it is reported in accordance with the Spill Reporting Regulation. Additional information on spill reporting requirements is available at gov.bc.ca/reportaspill

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the director, designated officer, or as further instructed.

Please be reminded that the director may require the permittee to do one or more of the following at any time:

- repair, alter, remove, improve or add to existing works, or to construct new works, and to submit plans and specifications for works specified in this authorization.
- conduct monitoring, and may specify procedures for monitoring and analysis, and procedures or requirements respecting the handling, treatment, transportation, discharge or storage of waste.
- provide security in the amount and form, and subject to the conditions, specified by the director.
- conduct studies and to report information in accordance with the specifications of the director.
- recycle certain wastes and recover certain reusable resources, including energy potential from wastes, in accordance with the specifications of the director.
- submit copies of reports and notifications to specified Indigenous Groups, within specified timelines, in accordance with the specifications of the director.

For more information about how the Ministry will assess compliance with your permit please refer to gov.bc.ca/environmentalcompliance.

For more information about how to make changes to your permit and to access waste discharge amendment forms and guidance, please refer to gov.bc.ca/wastedischarge-authorizations.

Yours truly,

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

MINISTRY OF ENVIRONMENT
AND CLIMATE CHANGE
STRATEGY

PERMIT

107517

Under the Provisions of the Environmental Management Act

Teck Coal Limited

3300-550 Burrard ST
Vancouver, BC V6C 0B3

is authorized to discharge effluent to the land and water from five coal mine sites located within the Elk Valley near Elkford and Sparwood, British Columbia, subject to the terms and conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may lead to prosecution.

The terms and conditions included in this permit are intended to ensure implementation of commitments and processes contained in the Elk Valley Area Based Management Plan approved November 18, 2014. Should any conflict exist between this permit and the Elk Valley Area Based Management Plan, the permit requirements take precedence.

Date issued:	November 19, 2014
Date amended: (most recent)	December 1, 2021

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

TABLE OF CONTENTS

1. DEFINITIONS AND GLOSSARY

Unless otherwise defined, all terms used in this permit are defined as in the Area Based Management Plan titled "The Elk Valley Water Quality Plan", approved November 18, 2014.

ABMP: Area Based Management Plan titled "The Elk Valley Water Quality Plan".

AMP: Adaptive Management Plan

AWTF: Active Water Treatment Facility

BCWQG FWAL: British Columbia Water Quality Guideline for Fresh Water Aquatic Life

CMO: Coal Mountain Operations as described in the latest approved *Mines Act* Permit C-84

Compliance Point: an effluent monitoring location specified in the permit at which discharge limits apply

Designated Area: a portion of southeastern British Columbia that contains the Elk Valley Watershed and the portion of Koocanusa Reservoir within Canada, and is geographically defined by Ministerial Order M113 (references to the Elk Valley are references to the Designated Area)

EVWQP: The Area Based Management Plan titled 'The Elk Valley Water Quality Plan"

EMC: Environmental Monitoring Committee

EMS: Environmental Monitoring System (provincial environmental quality data base)

EVO: Elkview Operations as described in the latest approved *Mines Act* Permit C-2

FRO: Fording River Operations as described in the latest approved *Mines Act* Permit C-3

GHO: Greenhills Operations as described in the latest approved *Mines Act* Permit C-137

KNC: Ktunaxa Nation Council

LAEMP: Local Aquatic Effects Monitoring Program

LCO: Line Creek Operations as described in the latest approved *Mines Act* Permit C-129, including Phase I and Phase II

LCO Phase I: permitted mining area in upper portion of Line Creek.

LCO Phase II: permitted mining area in LCO Dry Creek watershed.

Order (the): Ministerial Order number M113, which was the directive issued by the B.C. Minister of Environment in April 2013 requiring Teck Coal Limited to develop an Area Based Management Plan for the Designated Area in the Elk Valley.

Order Constituents: Identified in Ministerial Order M113: selenium, cadmium, nitrate, and sulphate.

Order station: a monitoring location specified by the Order to monitor water quality in the Designated Area, at which site performance objectives apply

Parameter of Concern: any physical, chemical, or biological substance in air, soil or water at a concentration, or predicted to be at a concentration that exceeds regulatory thresholds, or may have an adverse effect on environmental or human health receptors

RAEMP: Regional Aquatic Effects Monitoring Program

Regulatory Document: means any document that the permittee is required to provide to the director or the Province pursuant to:

i. This authorization;
ii. Any regulation made under the *Environmental Management Act* that regulates the facilities described in this authorization or the discharge of waste from those facilities; or
iii. Any order issued under the *Environmental Management Act* directed against the permittee that is related to the facilities described in this authorization or the discharge of waste from those facilities.

SPO: Site Performance Objective

SRF: Saturated Rock Fill Water Treatment Facility

Standing Water: For Section 8.1.2.4, Table 8A, standing water is defined as pooled effluent in the Floodplain Widening Sediment Pond of at least 0.5 metre depth, with no decant occurring from the pond.

WLC: West Line Creek

2. AUTHORIZED DISCHARGES

Sections 2.1 to 2.7 refer to compliance points that correspond to locations where all or most of the point and non-point discharges from a mine site or specified portions of a mine site are expected to accumulate. These accumulated discharges are subject to the concentration limits (the "limits") at the compliance points.

For Sections 2.1 to 2.7, the limits are expressed as monthly average concentrations and/or specified daily maximums. The monthly average concentration is defined as the average value of measured concentrations for all samples collected in a calendar month at the sample location, except for months when there is an authorized bypass of a selenium and nitrate treatment facility and enhanced monitoring occurs. With enhanced monitoring, as per Appendix 4, the monthly average concentration shall be calculated as follows:

$$CMo = [(\Sigma C24/N24)*(D24/DMo)] + [(\Sigma CR/NR)*((DMo-D24)/DMo)]$$

Where:

- CMo is the monthly average concentration;
- C24 are the concentrations of the samples collected during a 24-hour recirculation in the month;
- N24 are the number of samples collected during a 24-hour recirculation in the month;
- D24 is the number of days in 24-hour recirculation in the month;
- DMo is the number of days in the month;
- CR are the concentrations of the routine samples collected in the month; and
- NR are the number of routine samples collected in the month

For months where only one result is collected, that result shall be compared to both the monthly average and daily maximum limits. Daily maximums are defined as any single grab sample.

2.1 FORDING RIVER OPERATIONS – FORDING RIVER COMPLIANCE POINT (FR_FRABCH)

This section applies to effluent from Teck Coal Limited mine operations (Fording River Operations and the Greenhills Operations into the Fording River watershed) upstream of FRO Compliance Point (EMS E223753). The FRO Compliance Point (EMS E223753) is located approximately 100 m upstream of Chauncey Creek as shown in Appendix 1.

2.1.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE	
PARAMETERS	Mar. 10, 2021	Dec. 31, 2023
Total selenium (µg/L)	85	58
Nitrate as N (mg/L)	18.0	12.0
Sulphate (mg/L)	577	605

2.1.2 The characteristic of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM	EFFECTIVE DATE	
PARAMETERS	Dec.31, 2021	Dec. 31, 2023
Total selenium (µg/L)	100	67
Nitrate as N (mg/L)	21.0	14.0

2.1.3 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, diversions, ditches, pipelines and pumping, active water treatment facility, antiscalant addition systems, sewage treatment plants, and related appurtenances.

2.2 GREENHILLS OPERATIONS – FORDING RIVER COMPLIANCE POINT (GH_FR1)

This section applies to effluent from Teck Coal Limited mine operations (Fording River Operations, Greenhill Operations and Line Creek Operations) upstream of GHO Fording River Compliance Point (EMS 0200378). The GHO Fording River Compliance Point (EMS 0200378) is located 205 m downstream of Greenhills Creek as shown in Appendix 1.

2.2.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2019	Dec. 31, 2023
Total selenium (µg/L)	80	63	57
Nitrate as N (mg/L)	20	14.0	11.0

2.2.2 The characteristics of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2019	Dec. 31, 2023
Total selenium (µg/L)	100	78	62
Nitrate as N (mg/L)	29	17.0	15.0

2.2.3 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants, antiscalant addition system, and related appurtenances.

2.3 GREENHILLS OPERATIONS – ELK RIVER COMPLIANCE POINT (GH_ERC)

This section applies to effluent from Teck Coal Limited mine operations (Greenhills Operations into the Elk River watershed) upstream of GHO Elk River Compliance Point (EMS 300090). The GHO Elk River Compliance Point (EMS 300090) is located 220 m downstream of Thompson Creek as shown in Appendix 1.

2.3.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE	
PARAMETERS	Immediately	Dec. 31, 2027
Total selenium (µg/L)	15	8
Nitrate as N (mg/L)	3.0	3.0

2.3.2 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants and related appurtenances.

2.4 <u>LINE CREEK OPERATIONS – LINE CREEK COMPLIANCE POINT (LC_LCDSSLCC)</u>

This section applies to effluent from Teck Coal Limited mine operations (Line Creek Operations into the Line Creek Watershed) above LCO Compliance Point (EMS E297110). The LCO Compliance Point (EMS E297110) is located approximately 1500 m downstream of the West Line Creek Active Water Treatment Facility (WLC AWTF) outfall as shown in Appendix 1.

2.4.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2015	Dec. 31, 2033
Total selenium (µg/L)	80	50	29
Nitrate as N (mg/L)	14	7.0	3.0

2.4.2 The characteristics of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2015	Dec. 31, 2033
Total selenium (µg/L)	95	58	33
Nitrate as N (mg/L)	20	9.0	4.0

2.4.3 The authorized works associated with this compliance point are tailings impoundments, sedimentation and infiltration ponds, active water treatment facility, diversions, sewage treatment plants, and related appurtenances.

2.5 ELKVIEW OPERATIONS – HARMER CREEK COMPLIANCE POINT (EV_HC1)

This section applies to effluent from Teck Coal Limited mine operations (Elkview Operations into the Harmer Creek watershed) above EVO Harmer Compliance Point (EMS E102682). The EVO Harmer Compliance Point (EMS E102682) is located at the Harmer Spillway as shown in Appendix 1.

2.5.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE		
PARAMETERS	Nov. 19, 2014	Dec. 31, 2017	Dec. 31, 2021
Total selenium (µg/L)	45	57	57
Nitrate as N (mg/L)	4	16.0	8.0
Sulphate (mg/L)	300	380	450

2.5.2 The authorized works associated with this compliance point are sedimentation and infiltration ponds, diversions, and related appurtenances.

2.6 ELKVIEW OPERATIONS – MICHEL CREEK COMPLIANCE POINT (EV_MC2)

This section applies to effluent from Teck Coal mine operations (Elkview Operations into the Michel Creek watershed) above EVO Michel Creek Compliance Point (EMS E300091). The EVO Michel Creek Compliance Point (EMS E300091) is located at the Highway 3 bridge over Michel Creek as shown in Appendix 1.

2.6.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE		
PARAMETERS	Nov.19, 2014	Dec. 31, 2021	Dec. 31, 2025
Total selenium (µg/L)	28	20	19
Nitrate as N (mg/L)	6.0	6.0	6.0

2.6.2 The authorized works associated with this compliance point are sedimentation and infiltration ponds, tailings impoundments, saturated rock fill treatment facility, diversions, sewage treatment plants, and related appurtenances.

2.7 COAL MOUNTAIN OPERATIONS (CMO) – MICHEL CREEK COMPLIANCE POINT (CM_MC2)

This section applies to effluent from Teck Coal Limited mine operations (Coal Mountain Operations) above CMO Compliance Point (EMS E258937). The CMO Compliance Point (EMS E258937) is located 50 m upstream of Andy Goode Creek as shown in Appendix 1.

2.7.1 The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE	EFFECTIVE DATE
PARAMETERS	Nov.19, 2014
Total selenium (µg/L)	19
Nitrate as N (mg/L)	5.0
Sulphate (mg/L)	500

2.7.2 The authorized works associated with this compliance point are sedimentation and infiltration ponds, diversions, sewage treatment plant, and related appurtenances.

2.8 LCO DRY CREEK SEDIMENTATION PONDS TO DRY CREEK

This section applies to the discharge of effluent from the discharge pipe of the LCO Dry Creek (2) Sedimentation Ponds to Dry Creek. The site reference number for this discharge is E295211.

2.8.1 The authorized works are the upper LCO Dry Creek Valley ditches, sumps, pumps, LCO Dry Creek rock drain, diversion embankment structure, dual lined head pond with leak detection and recovery system and spillway for flows in excess of Q10 up to Q200 flows, transfer pipeline, two dual lined sedimentation ponds with leak detection and recovery system and spillway for flows in excess of Q10, bypass works, return channel, decant structure, flocculant addition station, fish barrier and related appurtenances.

2.8.2 The location of the facilities from which the discharge originates and the location of the point of discharge is Lot 1 District Lot 4588, Kootenay District Plan NEP 21818. PID 019-075-308.

2.8.3 Controlled Bypasses to LCO Dry Creek
Bypass of the LCO Dry Creek Sedimentation Ponds via the bypass works is authorized by Permit 5353 on a seasonal basis, during non-freshet flows to reduce or avoid the generation of bioavailable selenium. A record of bypass of the LCO Dry Creek Sedimentation Ponds must be presented in the quarterly and annual reports.

2.9 LCO DRY CREEK SEDIMENTATION PONDS TO FORDING RIVER

This section applies to the discharge of effluent from a diffuser and conveyance pipeline from the LCO Dry Creek (2) Sedimentation Ponds to the Fording River. The site reference number for this discharge is E295231.

2.9.1 The maximum authorized rate of discharge is the Q10 flow of 1.8 cubic meters per second.

2.9.2 The characteristics of the discharge must not exceed:

Parameter	**Limit**
Total Dissolved Solids	1,982 mg/L
Nitrate	141 mg/L
Total Cadmium	0.0014 mg/L
Total Selenium	0.32 mg/L
Sulphate	1067 mg/L

2.9.3 The authorized works are the upper LCO Dry Creek Valley ditches, sumps, pumps, LCO Dry Creek rock drain, diversion embankment structure, dual lined head pond with leak detection and recovery system and spillway for flows in excess of Q10 up to Q200 flows, transfer pipeline, two dual lined sedimentation ponds with leak detection and recovery system and spillway for flows in excess of Q10, return channel, decant structure, flocculant addition station, conveyance pipeline, outfall, diffuser, fish barrier and related appurtenances.

2.9.4 The location of the facilities from which the discharge originates is Lot 1 District Lot 4588, Kootenay District Plan NEP 21818. PID 019-075-308 and the location of the point of discharge is Lot 1 District Lot 4588, Kootenay District Plan 11279 except plans 572, 12976, NEP70655 and NEP70656.

3. SITE PERFORMANCE OBJECTIVES

3.1 SITE PERFORMANCE OBJECTIVES FOR ORDER STATIONS

The following Site Performance Objectives (SPO) are established at the Order Stations. It is expected that SPOs will be maintained during all timeframes shown in the tables or immediately maintained if no date is indicated. Site performance objectives are expressed as monthly average concentrations. The monthly average concentration is defined as the average of all samples collected in a calendar month.

ORDER STATION {Teck ID} (EMS number)	ORDER DESCRIPTION (Teck location description)	PARAMETER	UNIT	Nov. 19, 2014[3]	Dec. 31, 2019[3]	Dec. 31, 2023[3]	Dec. 31, 2025[3]	Dec. 31, 2028[3]
FR4 {GH_FR1} (0200378)	Fording River Downstream of Greenhills Creek	Total Selenium	µg/L	-	63	57	57	57
		Nitrate as N[2]	mg/L	20	14.0	11.0	11.0	11.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium[1]	µg/L	0.39	0.39	0.39	0.39	0.39
FR5 {LC_LC5} (200028)	Fording River at the Mouth (Fording River downstream of Line Creek)	Total Selenium	µg/L	-	51	40	40	40
		Nitrate as N[2]	mg/L	18	10.0	10.0	10.0	10.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium[1]	µg/L	0.39	0.39	0.39	0.39	0.39
ER1 {GH_ER1} (206661)	Elk River downstream of Greenhills Operations (Upstream of Boivin Creek)	Total Selenium	µg/L	19	19	19	19	19
		Nitrate as N	mg/L	3	3.0	3.0	3.0	3.0
		Sulphate	mg/L	309	309	309	309	309
		Dissolved Cadmium[1]	µg/L	0.24	0.24	0.24	0.24	0.24
ER2 {EV_ER4} (200027)	Elk River from Fording River to Michel Creek (upstream of Grave Creek)	Total Selenium	µg/L	23	23	19	19	19
		Nitrate as N	mg/L	-	4.0	4.0	3.5	3.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium[1]	µg/L	0.24	0.24	0.24	0.24	0.24
ER3 {EV_ER1} (200393)	Elk River downstream of Michel Creek	Total Selenium	µg/L	19	19	19	19	19
		Nitrate as N	mg/L	-	3.0	3.0	3.0	3.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium[1]	µg/L	0.24	0.24	0.24	0.24	0.24

ER4 {RG_ELKORES} (E294312)	Elk River at Elko Reservoir	Total Selenium	µg/L	19	19	19	19	19
		Nitrate as N	mg/L	-	3.0	3.0	3.0	3.0
		Sulphate	mg/L	429	429	429	429	429
		Dissolved Cadmium[1]	µg/L	0.24	0.24	0.24	0.24	0.24
LK2 {RG_DSELK} (E300230)	Koocanusa Reservoir south of the Elk River	Total Selenium	µg/L	2	2	2	2	2
		Nitrate as N	mg/L	3	3.0	3.0	3.0	3.0
		Sulphate	mg/L	308	308	308	308	308
		Dissolved Cadmium[1]	µg/L	0.19	0.19	0.19	0.19	0.19

[1] Cadmium SPOs are hardness dependent based on the following formula:
Cd (in µg/L) = $10^{0.83\log10(\text{hardness})-2.53}$ where hardness is in mg/L of $CaCO_3$

[2] Nitrate SPOs for FR4 {GH_FR1} as of 2023 and FR5 {LC_LC5} as of 2019 are hardness dependent based on the following formula:

Level 1 benchmark for the Fording River N as mg/L = $10^{1.0003\log 10(\text{hardness})-1.52}$ where hardness is in mg/L of $CaCO_3$

For the purposes of calculating the targets above, hardness is based on the following concentrations:

FR4{GH_FR1}, FR5{LC_LC5}, and ER1{GH_ER1} – 360 mg/L
ER2{EV_ER4}, ER3{EV_ER1}, and ER4{RG_ELKORES} – 200 mg/L
LK2{RG_DSELK} – 150 mg/L

[3] Effective Date

3.2 TRIGGERS FOR REASSESSMENT OF LIMITS

In the event that a site performance objective listed in Section 3.1 is exceeded without an exceedance of limits in Section 2, the permittee must:

i. Immediately notify the director and KNC of the exceedance;
ii. Re-sample within 7 days of receiving data to confirm results;
iii. If the results continue to exceed an SPO, the permittee must re-assess discharge sources and determine appropriate limits for the compliance points detailed in Section 2, or new compliance points based on the re-assessment of discharge sources; and
iv. Provide to the director and KNC an explanation of the temporary exceedance or an application for an amendment of this permit with new or revised Section 2 limits within 3 months.

Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

The director may specify additional monitoring in the event of a continued exceedance.

3.3 SITE PERFORMANCE OBJECTIVES FOR COMPLIANCE POINTS

The following Site Performance Objectives (SPOs) are established at the Compliance Points for sites where permit limits have not been specified in Section 2. It is expected that the SPOs will be maintained during all time frames.

COMPLIANCE POINT	SITE PERFORMANCE OBJECTIVE	
GHO Fording River, GHO Elk River, LCO, EVO Michel Creek	Sulphate: BCWQG FWAL[1] (hardness dependent)	
	WATER HARDNESS[2] (mg/L)	**SULPHATE GUIDELINE (mg/L)**
	Very Soft (0-30)	128
	Soft to moderately soft (31-75)	218
	Moderately soft/hard to hard (76-180)	309
	Very hard (181-250)	429
	In addition, the following water quality benchmark as developed for the ABMP will be applied:	
	Very hard (>250)	429
All Compliance Points	Cadmium: Cd (in µg/L) = $10^{\{0.83(\log[\text{hardness}])-2.53\}}$ where hardness is in mg/L of CaCO3	

[1]BC Water Quality Guideline for Freshwater Aquatic Life
[2]Hardness is in mg/L $CaCO_3$

Site performance objectives are expressed as monthly average concentrations. The monthly average concentration is defined as the average of the samples collected in a month.

3.4 SITE PERFORMANCE OBJECTIVES – CALCITE

The permittee must manage calcite levels in streams in Management Units 1, 2, 3, and 4 for streams that are fish bearing, provide fish habitat or flow directly into fish bearing streams and are not scheduled by an Environmental Assessment Certificate or *Mines Act* Permit to be buried. These streams must meet the following Site Performance Objectives:

1) By December 31, 2024 CIConc $\leq$ 0.50
2) By December 31, 2029 CItotal $\leq$ 0.50

Where:

CItotal:	Calcite Index (total)	=	CIConc + CIPres
CIConc:	Calcite Concretion	=	$\frac{\text{Sum of pebble concretion scores}}{\text{Number of pebbles counted}}$
CIPres:	Calcite Presence	=	$\frac{\text{Number of pebbles with calcite}}{\text{Number of pebbles counted}}$

3.5 LCO DRY CREEK WATER MANAGEMENT AND SITE PERFORMANCE OBJECTIVES

3.5.1 LCO DRY CREEK WATER MANAGEMENT PLAN

The Permittee shall develop and implement an LCO Dry Creek Water Management Plan to achieve Site Performance Objectives while maintaining Minimum Instream Flow Requirements in order to minimize impacts to fish habitat. The Plan must clearly identify proposed works, management actions and contingencies to ensure that the Site Performance Objectives and Minimum Instream Flow Requirements will be met.

3.5.1.1 Approval of the Dry Creek Water Management Plan (dated December 23, 2015) was subject to the following conditions:

i. Teck will participate in a process with KNC and MOE to establish long-term Site Performance Objectives (SPO) and in-stream Flow Requirements for LCO Dry Creek and provide the required information for review in a timely manner. In this regard, reference is made to the recommended actions found in Table 1 of the MOE memo dated February 10, 2015 (S. Reddekopp to J. Carmody-Fallows). Teck is requested to provide submissions for a decision making framework for this process by September 30, 2015.

ii. All inflows into the LCO Dry Creek Sediment Ponds must discharge through the return channel back into LCO Dry Creek until December 31, 2019, with the exception of the commissioning period and during scheduled maintenance of the ponds.

iii. For the purposes of commissioning the sediment ponds (diverting water to fill the ponds) and routine maintenance of the ponds Teck must maintain a minimum instream flow requirement of 20% MAD in LCO Dry Creek.

iv. Teck will provide the predicted monthly mean SPO constituent concentrations at the SPO location (E295210) and at the mouth of LCO Dry Creek (E288270), for all months up to January 1, 2020. This summary shall be submitted to the Director by May 30, 2015.

v. Teck will update the December 15, 2014 LCO Nitrate Management Plan to control nitrate releases from the site. The updated Nitrate Management Plan must be implemented and submitted to the Director by June 1, 2015.

vi. Teck shall take reasonable efforts to collect at least two years of continuous monitoring at the East Tributary of LCO Dry Creek (E288274) and at LCO Dry Creek near its Mouth (E288270) for the purposes of updating the streamflow model. Teck shall develop and implement contingencies to maintain continuous data collection at the LCO Dry Creek Station.

Teck must report on and provide detail demonstrating how mine affected surface and sub-surface water is being captured by the lined head pond and embankment in its next annual report (2015), and provide an estimate of the proportion of mine-affected water (surface and sub-surface) that is not captured by the system in its subsequent annual reports, required initially by OIC Permit 106970, and currently by Permit 107517.

3.5.1.2 Updated LCO Dry Creek Water Management Plan

The updated Dry Creek Water Management Plan will include proposed long-term SPOs and IFRs for LCO Dry Creek along with proposed timing for when they come into effect and a plan and schedule for implementation of active water treatment. The submission date for the updated LCO Dry Creek Water Management Plan is April 30, 2020, with the following conditions:

1) Teck Coal Ltd. shall continue to provide bi-weekly updates to the Director and members of the Structured Decision-Making Process and studies to date until the SDM process is complete. Once the SDM process is completed Teck shall provide updates on water quality results and the status of work in Dry Creek related to the DCWMP to the Director, KNC, and EMLI at a minimum on a quarterly basis between October and April each year and on a monthly basis during bypass of the LCO Dry Creek Sedimentation Ponds via the bypass works.

2) Teck will provide a progress report on the SDM process to the Director on December 15, 2019. The progress report must include:

a. Summary of the investigations to date;

b. Mitigation measures and a schedule for implementation to prevent/reduce selenium bioaccumulation in aquatic species; and
c. Updated schedule for the SDM process to ensure submission of the updated plan by April 30, 2020.

3) Teck must provide a comprehensive findings report from its investigations and studies regarding the unexpected Se concentrations and unexpected Se bioaccumulation in LCO Dry Creek to the working group and Director in support of the updated LCO Dry Creek Water Management Plan on April 30, 2020.

3.5.2 INSTREAM FLOW REQUIREMENTS

3.5.2.1 Minimum Instream Flow Requirements (IFRs) for LCO Dry Creek will be developed by the Director for the protection of fish habitat. Minimum IFRs shall be developed in consultation with the Permittee. Minimum IFRs for LCO Dry Creek must be met each and every year once waste rock placement in the LCO Dry Creek watershed commences.

3.5.2.2 Interim Instream Flow Requirements
Commencing on January 1, 2020, Interim Instream Flow Requirements for LCO Dry Creek must be met if the Permittee discharges to Fording River through the LCO Dry Creek Water Management System. These Interim Flow Requirements for LCO Dry Creek will be the values outlined below or as otherwise specified by the Director as the result of a process with KNC and MOE to establish long-term SPO and Instream Flow Requirements for LCO Dry Creek.

Aug 1 – Apr 1, 20% Mean Annual Discharge (MAD); for the purpose of summer rearing and overwintering periods
Apr 15 – Apr 30, 50% MAD; for the purpose of natural freshet ramp-up
May 1 – May 14, 100% MAD; for the purpose of braided areas, side channel connectivity
May 15 – June 14, 209% MAD for the purpose of migration and spawning
June 15 – July 14, 105% MAD for the purpose of out-migration
July 15 – July 31, 40% MAD for the purpose of out-migration, incubation

3.5.2.3 The Mean Annual Discharges for LCO Dry Creek and the East Tributary are as follows:
LCO Dry Creek – 0.382 m3/s
East Tributary – 0.113 m3/s

3.5.2.4 In the event that the stream flow in the East Tributary drops below East Tributary IFRs, a LCO Dry Creek IFR adjustment shall be calculated using the following equation:
(Modified DryCreekIFR) = (Dry Creek IFR) * (EastTributaryStreamFlow /EastTributaryIFR)

3.5.3 SITE PERFORMANCE OBJECTIVES

The following Site Performance Objectives (SPOs) are established for LCO Dry Creek, Unnamed Creek and Grace Creek:

Parameter	**Objective**
Total Selenium	<0.010 mg/L
Total Cadmium	<10 [log 1-0.83*(log 700 – log H)]
	To a maximum of 0.00038 mg/L
	(H = site water hardness as CaCO3)

3.5.3.1 The requirement to meet SPOs for LCO Dry Creek in Section 3.5.3 is suspended until January 1, 2020. Prior to this date the Director may re-establish or set alternative SPOs as deemed necessary by the Director for the protection of the environment. The permittee may convey water to the Fording River to maintain any established SPOs provided IFRs are maintained.

A plan and schedule for implementation of active water treatment to the Director's satisfaction must be submitted to the Director by December 31, 2019, or earlier if required by the Director.

3.5.3.2 The Director may require the Permittee to develop and implement a plan to achieve the Site Performance Objectives at the mouth of Unnamed Creek (E295213) and/or at Grace Creek upstream of the CP rail tracks (E288275). The plan shall be to the satisfaction of the Director.

3.5.3.3 The Permittee must undertake a comprehensive review of the Site Performance Objectives every three years. The review should consider all available general and site-specific data and science, including but not limited to: The Elk Valley Area Based Management Plan, B.C. Water Quality Guidelines and standards from other jurisdictions, water quality sampling and Aquatic Effects Monitoring Program results, mixtures toxicity testing results, the Upper Fording River Westslope Cutthroat Trout Population Study, and other special studies and relevant research. Terms of Reference for the first review must be submitted to the Director for approval, by March 31, 2017. The next review of Site Performance Objectives must be submitted to the Director by March 31, 2023. The Director may require an earlier review if significant information becomes available.

3.5.4 ESTABLISHING LONG-TERM SITE PERFORMANCE OBJECTIVES AND INSTREAM FLOW REQUIREMENTS

To support the process for developing long term SPOs and IFRs for LCO Dry Creek, Teck is required to undertake the following:

i. Completion of an Interim Report for the Tributary Management Plan by July 31, 2017.
ii. Compilation of all available chronic toxicity and water quality monitoring data through August 31, 2016. The data must be provided to the Director and KNC for review by September 30, 2016.
iii. Submission of the report to the Director validating the Westslope Cutthroat Trout Habitat Suitability Index Model as required by Condition 13 of EAC #13-02 by August 31, 2016.
iv. Submission of the instream flow needs study required by Condition 14 of EAC#13-02 but August 31, 2017. In addition, Teck must include a review of frequency analysis, using intensity-duration-frequency curves, to ensure appropriateness and applicability.
v. Submission of an updated streamflow model (based on the UBC Watershed Model) using all available data to September 30, 2016.
vi. Submission of an options analysis on the SPOs and IFRs and the DCWMP by October 30, 2016, which shall include the following:
   a. An evaluation of the resultant flow impacts to LCO Dry Creek under differing SOP values ranging from the original SPO in OIC 106970 (10 ug/L) to that proposed in the 2014 DCWMP for the date December 23, 2024 (70 ug/L), and timelines for when conveyance might be required to meet the specific SPO.

b. An evaluation of other potential mitigations explored by Teck to meet both instream flow requirements and site performance objectives.
c. Proposed triggers for construction of active water treatment, conveyance or other necessary mitigations.

vii. Teck shall provide progress reports to MOE and KNC on July 30, 2015, and January 31, 2016, regarding the above requirements.

viii. An additional progress report regarding the requirements of the LCO Dry Creek Water Management Plan approval must be made to the Director and to KNC by November 30, 2016.

4. TRIBUTARY EVALUATION AND MANAGEMENT

The permittee must develop and implement a phased study design for a Tributary Evaluation Program and develop and implement a Tributary Management Plan. The Tributary Evaluation Program and the Tributary Management Plan must include all tributaries affected or potentially influenced by the permittee's current operations and future development plans in Management Units 1, 2, 3, and 4, as defined in the Elk Valley Water Quality Plan.

The Tributary Evaluation Program is intended to evaluate the ecological value of tributaries to the Elk and Fording Rivers to support identification of tributaries that play a significant role in supporting the health of the ecosystem as a whole. The Tributary Evaluation Program must include the following elements:

i. Inventory of tributaries to the Elk and Fording Rivers that are located in Management Units 1, 2, 3, and 4 that are affected or potentially influenced by the permittee's current and future development plans;

ii. Maps of Management Units 1, 2, 3, and 4 showing the locations of the tributaries of the Elk and Fording Rivers, and identifying the tributaries that are affected or potentially influenced by the permittee's current and future development plans;

iii. Collation of existing and readily available data and information on each tributary, including surface-water chemistry, surface-water toxicity, sediment chemistry, sediment-toxicity, calcification, flow, habitat value ranking, benthic invertebrate community structure, and habitat use by fish and/or sensitive aquatic dependent wildlife (i.e., water birds);

iv. Evaluation of historical (i.e. conditions relevant to the 1980 timeframe, where available) and current habitat value, based on surface-water quality, sediment quality, extent of calcification, flow, amount of habitat available, habitat types, physical features, connectivity to fish habitat, status of riparian habitat, and habitat use by fish and sensitive aquatic dependent wildlife species;

v. Evaluation of the potential for rehabilitation of aquatic and riparian habitat and potential for improvement of water quality conditions; and

vi. Prioritization of each tributary for ongoing protection and/or restoration based on the evaluation of current ecological value, potential for rehabilitation, and potential to contribute to the objectives of the EVWQP.

The purpose of this evaluation is to provide context for the development of specific management objectives for tributaries included in the Tributary Management Plan. As the Tributary Evaluation Program will also provide essential information for assessing the potential effects of planned mine expansions and new projects, the components of the program that relate to the upper Fording River and the Michel Creek watershed should be completed on a priority basis as part of the phased study design.

Following the evaluation of the tributaries, the permittee must develop and implement a Tributary Management Plan. The Tributary Management Plan is intended to incorporate protection and rehabilitation goals for tributaries that will support achieving the area-based objectives of the Elk Valley Water Quality Plan. In development of the Tributary Management Plan, those tributaries that are not impacted by mining activities, that provide relatively high habitat value, and/or support ongoing habitat use by fish and sensitive aquatic dependent wildlife (i.e. directly or indirectly through food production) shall be identified as the highest priority tributaries for permanent protection. Those tributaries that have been impacted by mining, provide or have the potential to provide relatively high habitat value, and/or support or could support habitat use by fish and sensitive aquatic dependent wildlife shall be identified as the highest priority tributaries for restoration/rehabilitation. The Tributary Management Plan will consider the permittee's future mine development plans. The scope of the Tributary Management Plan excludes tributaries that have been permanently removed or severely altered (e.g., covered by waste spoils or other mine infrastructure or dewatered) by mining activities within the permittee's current mine permit boundaries. Loss of habitat for such tributaries is governed by requirements under the Federal *Fisheries Act* and the provincial mitigation policy.

The Tributary Evaluation Program and Tributary Management Plan will complement the Elk Valley Water Quality Plan and clearly detail any proposed management of water quality conditions, flows and ecological values within the tributaries affected or influenced by the permittee's current operations and planned developments in Management Units 1, 2, 3, and 4, as defined in the Elk Valley Water Quality Plan.

The following development and implementation timelines apply:

1) A Phased Study Design for the Tributary Evaluation Program, including a listing of all tributaries to be evaluated, must be submitted to the EMC by May 1, 2015.
2) The Phased Study Design for the Tributary Evaluation Program must be submitted for acceptance to the director by May 31, 2015.
3) The Terms of Reference for the Tributary Management Plan must be submitted to the EMC by March 31, 2016.
4) Data collected during the Tributary Evaluation Program for current ecological value of tributaries within Management Units 1, 2, 3 and 4 must be compiled into a written report and submitted to the EMC by March 31, 2016.
5) Analysis and interpretation of Tributary Evaluation Program data, assessment of potential for rehabilitation and/or mitigation, and prioritization of tributaries for potential future habitat rehabilitation must be compiled into a written interim report and submitted to the EMC by August 31, 2016.
6) Interim Tributary Management Plan report must be submitted to the EMC by July 31, 2017. The Tributary Management Plan must be submitted for acceptance to the director by December 31, 2017. The Tributary Management Plan must be implemented by March 1, 2018.
7) An updated Tributary Management Plan must be submitted for acceptance to the director by July 31, 2020. Thereafter, the Plan must be updated and submitted for acceptance to the director by July 31st every three years. Updated Tributary Management Plans must be prepared in consultation with the EMC. The updates shall, at a minimum, incorporate any changes to the permittee's current and future development plans.
8) The accepted Tributary Management Plan must be implemented, and an annual implementation report must be submitted to the director and to the EMC by January 31st of each year. The annual report must describe implementation activities undertaken in tributaries in the Designated Area including those under the Tributary Management Plan itself, other legal requirements and other supporting programs, in the previous 12 months to rehabilitate impacted tributaries and protect high value, unimpacted tributaries.

5. CONTAMINANT MANAGEMENT PLANS

5.1 CALCITE MANAGEMENT PLAN

The permittee must update and submit the Calcite Management Plan to the satisfaction of the director, as outlined in Chapter 7 of the Elk Valley Water Quality Plan, by July 31, 2016 and every three years thereafter. The Calcite Management Plan must include a list of streams that according to Section 3.4 must meet the Calcite Site Performance Objectives and provide a schedule for implementation of mitigation measures. Mitigation measures must be implemented according to the schedule.

Refer to Appendix 5 for calcite treatment facility operational requirements.

5.1.1 Antiscalant Effects Assessment

The permittee must develop and implement a study design for assessing the cumulative effects of regional antiscalant application in parallel to work being undertaken by the permittee in accordance with Sections 3.4 and 5.1. The study design must be reviewed by the EMC prior to submission to the director. The assessment must include the permittee's operating calcite treatment facilities and future planned calcite treatment facilities as outlined within the 2022 Calcite Management Plan.

The purpose of this assessment is to evaluate the potential effects of planned calcite treatment projects on a regional scale. The assessment must address the potential toxic effects of exposure of ecological and human receptors to antiscalant addition as well as to modelled concentrations of metal constituents typically attenuated during calcite formation. Should the assessment demonstrate that the planned calcite treatment projects represent an unacceptable level of risk to the environment or human health, the director may require submission of an interim Calcite Management Plan.

The following timelines apply:

i. A study design for the Antiscalant Effects Assessment must be submitted to the director, for approval, by April 20, 2022.

ii. Analysis and an integrated interpretation of Antiscalant Effects Assessment data in the Elk River Watershed and evaluation of the potential for antiscalant cumulative effects must be compiled into a written report and submitted to the director and the EMC by March 31, 2023. The assessment must be accompanied by recommendations from a Qualified Professional regarding whether any changes or updates are needed to the most recent version of the Calcite Management Plan.

5.2 NICKEL MANAGEMENT

5.2.1 Development of Nickel Benchmark

The permittee must develop a nickel benchmark derivation workplan and submit it to the director for approval by August 31, 2021. The workplan must incorporate feedback from the EMC and include proposed methodologies and timelines for the derivation of a nickel benchmark that could be applied in the receiving environment of the Elk Valley.

Once the final nickel benchmark is derived, the director may require additional mitigation to be implemented.

5.2.2 ELKVIEW OPERATIONS

5.2.2.1 Trigger Response Plan for Nickel

The permittee must develop and implement a Trigger Response Plan (TRP) for nickel. The TRP must be submitted to the director for approval 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the approved TRP. The TRP must describe the actions to be taken if total nickel concentrations in the effluent exceed an initial trigger value of 36 ug/L, calculated as a quarterly (13-week) rolling average at the Effluent Retention Pond Outlet (F2_BPO, E321812), when the SRF is discharging to Erickson Creek.

The purpose of the TRP is to ensure that procedures to manage nickel concentrations in the effluent are implemented in a timely manner to minimize risks associated with elevated nickel concentrations in the receiving environment of Erickson Creek. The TRP procedures must include, but not be limited to, an increase in effluent and/ or receiving environment monitoring to confirm exceedances of triggers, specific management actions to be implemented where trigger exceedances are confirmed, and a schedule for implementation of the management actions.

The permittee must review and update the TRP within 9 months of the submission of the final nickel benchmark to the director. The updated TRP must be submitted to the director and must include consideration of:

i. The final nickel benchmark as per Section 5.2.1,
ii. Results from the Elkview Operations Local Aquatic Effects Monitoring Program as per Section 8.3.5, and
iii. any other relevant plans, data or information.

5.3 NITROGEN SOURCE CONTROL PLAN

The permittee must develop a Nitrogen Source Control Plan that applies to operations at each of the Teck Coal Mine Sites in the Designated Area prepared by a Qualified Professional. The Nitrogen Source Control Plan must be submitted to the director by May 31, 2021. The plan must include, at a minimum, the following:

i. A discussion of the current state of understanding of the physical and biogeochemical processes occurring within and downgradient of waste rock spoils as a result of loss of nitrogen species to the environment from blasting practices.

ii. A discussion of nitrogen speciation, interaction effects with other Parameters of Concern, changes to concentrations over time, etc.

iii. A description of management strategies that have been and will be implemented to prevent the loss of nitrogen species to the environment. Each nitrogen management strategy must be coupled with measurable key performance indicators (KPIs) and/or management performance metrics, with timelines for achievement, that will allow the success of each management strategy to be measured.

The submitted Nitrogen Source Control Plan must be implemented and any updates to the plan must be submitted to the director within 30 days of adoption.

6. GENERAL REQUIREMENTS

6.1 MAINTENANCE OF WORKS AND EMERGENCY PROCEDURES

The permittee must inspect the authorized works regularly and maintain them in good working order. In the event of a condition or emergency which prevents effective operation of the authorized works, leads to unauthorized discharge, or results in a permit exceedance, the permittee must:

i. Comply with all applicable statutory requirements, including the Spill Reporting Regulation;

ii. Immediately contact the director or an officer designated by the director by e-mail and/or telephone;

iii. Take immediate appropriate remedial action for the prevention or mitigation of pollution; and

iv. Submit written documentation of any malfunction or emergency condition. The report must include all the corrective and preventative actions that will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly report required in Section 9 unless otherwise required by the director.

During an emergency event, the director may suspend conditions under this permit where the emergency event will prevent compliance with a requirement of this permit.

During and/or after the emergency event or condition, the permittee must conduct appropriate sampling and analysis of discharges, which may be more stringent than the monitoring requirements of this permit and/or applicable statutory requirements. As the results of such sampling become available, the permittee must provide the results to the director or a designated officer. The director may require additional monitoring or reporting at any time by specifying such in writing to the permittee.

The director may specify contingency actions to be implemented to protect human health and the environment while authorized works and/or standard operating procedures are being restored.

6.2 EFFLUENT NON-TOXICITY

6.2.1 Effluent is not acutely toxic if it does not cause greater than 50% mortality in 96 hr Rainbow Trout (*Oncorhynchus mykiss)* single concentration toxicity tests (EPS 1/RM/13 2nd edition, December 2000) or greater than 50% mortality in 48 hr *Daphnia magna* single concentration toxicity tests (EPS 1/RM/14 2nd edition, December 2000).

6.2.2 Where acute toxicity testing is required at discharge monitoring sites in Appendix 2 Tables 9 through 22, effluent must not be acutely toxic, as per Section 6.2.1.

6.3 CONTROLLED BYPASSES

Bypass of the authorized works, except for the two (2) LCO Dry Creek Sedimentation Ponds seasonally during non-freshet flows as per Section 2.8.3, calcite treatment facilities as per Appendix Section 5A3 and selenium and nitrate treatment facilities as per Appendix Sections 4C3.5, 4D2.3, and 4E2.3 is prohibited unless the prior approval of the director is obtained and confirmed in writing. The director may specify conditions to address the bypass.

6.4 QUALIFIED PROFESSIONAL

A qualified professional is defined as follows:

"Qualified Professional" means an applied scientist or technologist specializing in an applied science or technology applicable to the duty or function, including, but not limited to agrology, biology, chemistry, engineering, geology or hydrogeology and who:

i. is registered with the appropriate professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization, and

ii. through suitable education, experience, accreditation and/or knowledge, may be reasonably relied on to provide advice within their area of expertise.

All documents submitted to the director by a Qualified Professional must be signed by the author(s).

6.5 ENVIRONMENTAL EMERGENCY RESPONSE PLAN

The permittee must maintain an Environmental Emergency Response Plan which includes effective procedures for responding to all probable environmental emergencies associated with the Teck Coal operations and mine site areas, including the suspension of discharge of effluent(s) where appropriate, if required. The permittee must keep this plan up to date and provide the director with any updates to this plan within 30 days of adoption of the plan update.

The director may require periodic review of the response plan, and/or a report on any emergency event associated with the mine operation or occurring at the mine site.

6.5.1 The Emergency Response Plan shall at a minimum include:

i. Identification of Environmental Aspects as defined by the ISO 14001 Environmental Management System Standards that pose a risk to the environment or public safety;

ii. An evaluation of the identified environmental aspects including a fate and effects assessment where applicable;

iii. Maps identifying areas of high environmental sensitivity around the mine sites including along the transportation corridors, and areas downstream of water-crossings where spilled materials can reasonably be anticipated to impact;

iv. Site specific spill response tactics, including the required training and resources to implement those tactics for each of the identified materials or risks during an emergency event;

v. Requirements and procedures for spill reporting and/or emergency notification to various levels of government, including the KNC; and

vi. Procedure for establishing formal interagency communication for the duration of the emergency and clean-up as necessary.

6.5.2 The permittee must maintain an Environmental Emergency Response Plan and ensure:

i. Adequate equipment caches are available at each operation, at a minimum, to enable timely and effective response to the identified highly sensitive areas and implementation of the plan;

ii. Identify, train and have available a sufficient number of emergency responders to effectively and efficiently respond and implement the identified emergency response tactics;

iii. Conduct regularly scheduled emergency response drills and exercises to test and refine the plan; and

iv. Participate in efforts to harmonize spill response kits and plans with other industrial operators and municipalities.

6.6 PUBLIC NOTIFICATION REGARDING POTABLE WATER USE IN ELK VALLEY

The permittee must provide annual notification to all current water users (specifically surface and shallow groundwater users along the Fording and Elk Rivers) downstream of the Teck Operations, where impacts from mining are causing exceedances of the British Columbia Drinking Water Quality Guidelines. The notification must:

i. Advise current water users in the Elk Valley of the risks for drinking water sources to exceed drinking water guidelines

ii. Remind all water users to have their source water sources tested to identify if treatment is required prior to drinking;

iii. Have the same information accessible and maintained on the Internet; and

iv. Annually by March 31, submit a written report to the director describing compliance with the requirements of this section for the previous year.

A draft of the notification shall be submitted to Interior Health (email: hbe@interiorhealth.ca) and to the director 30 days prior to distribution. This notification requirement shall continue until such time as water quality in the affected areas improves such that BC Drinking Water Quality Guidelines are achieved for mining-related Parameters of Concern determined through the Regional Groundwater Monitoring Program.

7. ABMP COMMITMENTS

The following section identifies specific commitments made by the permittee in the Elk Valley Area Based Management Plan.

The permittee must aggressively pursue all viable approaches for reducing contaminant loadings to the environment and implement in a timely manner. Treatment approaches include passive and active water treatment.

7.1 TREATMENT

7.1.1 ACTIVE WATER TREATMENT FACILITIES

The permittee must design, construct and operate the following active water treatment facilities (AWTF) or alternative water treatment technology as approved by the director, by the date shown. The permittee must employ best achievable technology in the development of these treatment facilities. Phosphorus treatment must be included if necessary, to ensure BC Water Quality Guidelines for chlorophyll -a for freshwater aquatic life in streams is met.

TREATMENT FACILITY	TREATMENT SCOPE	APPROXIMATE CAPACITY OF AWTF	OPERATIONAL DATE
Fording River South	Cataract, Swift, Kilmarnock Creeks	20,000 m^3/day	December 31, 2018
Elkview Phase I*	Bodie, Gate, Erickson Creeks	30,000 m^3/day	December 31, 2020
Fording River North	Clode Creek, North Spoil, Swift Pit	15,000 m^3/day	December 31, 2022
Elkview Phase II	Erickson	20,000 m^3/day	December 31, 2024
Greenhills	GHO West Spoil (Thompson, Leask, Wolfram), Greenhills Creek	7,500 m^3/day	December 31, 2026
Fording River North Phase II	Swift Pit Discharge	15,000 m^3/day	December 31, 2030

*Elkview Operations SRF Phase 2 replaces Elkview Phase I

Notwithstanding the above requirements to construct and operate active water treatment facilities, the permittee must ensure that all necessary active water treatment works or alternative water quality mitigation works are designed, constructed and operated in sufficient time and at sufficient capacity to meet targets and timeframes for water quality consistent with the ABMP.

7.2 RESEARCH AND TECHNOLOGY DEVELOPMENT

7.2.1 RESEARCH ACTIVITIES

i. The permittee shall conduct a research and technology development program aimed at:

   a) Identifying, evaluating, and verifying measures to minimize the release of selenium, nitrate, sulphate, cadmium, calcite, and any other Parameters of Concern designated by the director; and

   b) Developing mitigation strategies to improve the management of water quality and calcite within the Designated Area.

ii. Research and technology development activities shall specifically include research to identify, evaluate, and validate measures to reduce the reliance on long term active water treatment.

iii. Research areas shall include, but not be limited to, the following topics:

   a) geochemical release mechanisms, release rates and relationships between factors that influence contaminant release;

   b) saturated and unsaturated flow mechanisms in waste piles;

   c) mine waste rock management and dump design alternatives;

   d) cover systems including soil and vegetative covers, complex soil covers and geomembranes;

   e) water capture, diversion and conveyance systems;

   f) active and semi-passive water treatment, including partially saturated waste rock fills;

   g) water treatment residuals management;

   h) treatment strategies for phosphorus reduction;

i) treatment strategies for sulphate and cadmium reduction, if needed in the future;

j) nitrate reduction through treatment and improved blasting practices; and,

k) predictive tools and treatment/management technologies for calcite formation.

iv. All on-site field trials for mitigation strategies and on-site piloting work for water treatment shall be discussed with the director to determine whether they will require permit amendments before proceeding.

7.2.2 REPORTING

The permittee must submit an annual Research and Technology Development Progress Report by March 31st of each year that contains:

i. A detailed rationalization of the overall research program including reasons why specific research areas are/are not being investigated in a given year;

ii. Detailed information on research objectives, study designs, data collected, results and interpretation, and plans for future research and technology development;

iii. An evaluation of the technologies relative to their potential for implementation at specific locations within the Designated Area;

iv. A timeframe for implementation of technologies at pilot and at full-scales and for integration into the Adaptive Management Plan; and,

v. Portions of the report that contain proprietary information must be marked "Confidential – Proprietary." Release of information is subject to the Freedom and Information Privacy Act.

8. MONITORING REQUIREMENTS

The director may alter the monitoring and reporting requirements in this permit as needed. The need for changes to the programs will be based on results submitted as well as any other information obtained by the director in connection with the discharges.

8.1 DISCHARGE AND RECEIVING ENVIRONMENT MONITORING PROGRAMS

The permittee must sample the parameters at the sampling sites at the specific frequencies as defined in Appendix 2 Tables 9 through 22. The permittee must sample flow at the sites listed and at the frequency recommended in Appendix B in the approved Regional Surface Flow Monitoring Plan. The discharge and receiving environment water sampling sites are located approximately as shown in Appendix 1.

8.1.1 SAMPLING SITES

Discharge and receiving environment sample collection locations are described and numerically identified in Tables 1 through 8.

TABLE 1: COMPLIANCE POINTS SAMPLING LOCATIONS (APPENDIX 1C)

EMS #	*TECK IDENTIFIER*	*SITE*	*SITE DESCRIPTION*
E223753	FR_FRABCH	FRO	Fording River, approximately 100 m upstream of Chauncey Creek
0200378	GH_FR1	GHO	Fording River, approximately 205 m downstream of Greenhills Creek
E300090	GH_ERC	GHO	Elk River, approximately 220 m downstream of Thompson Creek
E297110	LC_LCDSSLCC	LCO	Line Creek immediately downstream of South Line Creek Confluence (approximately 1500 m downstream of the WLC WTP outfall)
E102682	EV_HC1	EVO	Harmer Spillway
E300091	EV_MC2	EVO	Michel Creek at Highway 3 Bridge
E258937	CM_MC2	CMO	Michel Creek, approximately 50m upstream of Andy Goode Creek
E291569	WL_BFWB_OUT_SP21	LCO (Effluent)	WLC WTP Outfall (Effluent)

Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

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for Director, *Environmental Management Act*
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TABLE 2: ORDER STATIONS SAMPLING LOCATIONS (APPENDIX 1D AND 1E)

EMS #	*ORDER STATION (TECK IDENTIFIER)*	*SITE DESCRIPTION*
0200378	FR4 (GH_FR1)	Fording River Downstream of Greenhills Creek
0200028	FR5 (LC_LC5)	Fording River downstream of Line Creek
E206661	ER1 (GH_ER1)	Elk River upstream of Boivin Creek
0200027	ER2 (EV_ER4)	Elk River upstream of Grave Creek (from Fording River to Michel Creek)
0200393	ER3 (EV_ER1)	Elk River Downstream of Michel Creek
E294312	ER4 (RG_ELKORES)	Elk River at Elko Reservoir
E300230	LK2 (RG_DSELK)	Koocanusa Reservoir south of the Elk River

TABLE 3: FORDING RIVER OPERATION DISCHARGE, RECEIVING ENVIRONMENT, AND OTHER SAMPLE LOCATIONS (APPENDIX 1F)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E102475	FR_TP1	Tailings Slurry to North Tailings Pond
E206660	FR_TP3	Tailings Slurry to South Tailings Pond
E102476	FR_NL1	North Loop Settling Pond Decant to the Fording River
E102478	FR_MS1	Maintenance and Services Settling Pond Decant
E102480	FR_EC1	Eagle Settling Pond Decant
E102481	FR_CC1	Clode Settling Pond Decant
E208394	FR_SKP1	South Kilmarnock Settling Pond Decant - Phase 1
E208395	FR_SKP2	South Kilmarnock Settling Pond Decant- Phase 2
E216781	FR_HP1	Henretta Pit Effluent into diversion culvert
E217403	FR_3PIT	Swift Pit Effluent to Fording River
E261897	FR_SP1	Smith Ponds Decant
E304835	FR_LP1	Liverpool Sed. Pond Decant
E304750	FR_PP1	Post Sed. Pond Decant
0200252	FR_KC1	Kilmarnock Cr. D/S of Rock Drain
E306924	FR_LMP1	Lake Mountain Sediment Pond Decant
0200201	FR_FR2	Fording River upstream of Kilmarnock Creek
0200251	FR_FR1	Fording River downstream of Henretta
E216777	FR_UFR1	Fording River upstream of Henretta
E216778	FR_HC1	Henretta Cr. upstream of Fording River
E300096	FR_HC3	Henretta Creek upstream of McQuarrie Creek
E300097	FR_FRRD	Fording River near Fording River Road
E300071	FR_FRCP1	Fording River, approximately 525 m downstream of Cataract Creek
E320693	FR_FR3	Fording River upstream of FRO-S AWTF Outfall Structure
E320694	FR_SCOUT	Discharge from the pipeline conveying the combined, untreated mine-influenced flow from Swift-Cataract dosed with antiscalant, and Swift Clean Water Diversion at the FRO-S AWTF Outfall Structure
E320695	FR_SCOUTDS	Fording River downstream (approx. 100 m) of FRO-S AWTF Outfall Structure
E325311	FR_FWP1	Floodplain Widening Sediment Pond Decant
E325312	FR_FWP1H	Floodplain Widening Sediment Pond in-pond sample location

TABLE 4: GREENHILLS OPERATION DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1G)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E287438	GH_TPS	Tailings Pond Water
E102709	GH_GH1	Greenhills Creek Sed. Pond Decant
E207436	GH_TC2	Thompson Creek Sed. Pond Decant
0200385	GH_PC1	Porter Creek Sed. Pond Decant
E257795	GH_WC1	Wolfram Creek Sed. Pond Decant
E257796	GH_LC1	Leask Creek Sed. Pond Decant
E207437	GH_RLP	Rail Loop Sed. Pond Decant
0200388	GH_MC1	Mickelson Creek at LRP Road
E287433	GH_WADE	Wade Creek at LRP Road
E305855	GH_WOLF_SP1	Wolf Creek Sed. Pond Decant
E305854	GH_WILLOW_SP1	Willow Creek Sed. Pond Decant
0200389	GH_ER2	Elk River upstream of Greenhills Operation
E102714	GH_TC1	Thompson Creek at LRP Road
E287432	GH_COUGAR	Cougar Creek at LRP Road
E287437	GH_BR_F	Branch F at LRP Road
E305875	GH_NNC	No Name Creek
E305876	GH_ER1A	Elk River Side Channel D/S Wolfram Creek
E305877	GH_ERSC2	Elk River D/S of Thompson Creek
E305878	GH_ERSC4	Elk River Side Channel U/S Wolfram Creek

TABLE 5: LINE CREEK OPERATION PHASE I DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1H)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E221268	LC_LC9	No Name Cr. Pond Decant
E216144	LC_LC7	MSA North Ponds Effluent to Line Creek
E304613	LC_LC7DSTF	MSA North Ponds Effluent to Line Creek Alternate
E219411	LC_LC8	Contingency Treatment System Effluent to Line Creek
E293371	WL_WLCI_SP01	WLC WTP West Line Creek (Influent)
E293370	WL_LCI_SP02	WLC WTP Line Creek (Influent)
200044	LC_LC4	Line Creek u/s of Process Plant (~5,550 m d/s of WLC WTP outfall)
200337	LC_LC3	Line Creek d/s of West Line Creek (~200 m d/s of WLC WTP Outfall)
200335	LC_LC2	Line Creek upstream of Rock Drain
E293369	LC_LCUSWLC	Line Creek u/s of West Line Creek, below rock drain (~ 140 m u/s of WLC WTP outfall)
E216142	LC_LC1	Line Creek upstream MSA North Pit
E282149	LC_SLC	South Line Creek West Side of Main Rock Drain
E261958	LC_WLC	West Line Creek
E223240	LC_LC12	North Horseshoe Creek Near Mouth

Date issued: November 19, 2014
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(most recent)

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for Director, *Environmental Management Act*
Mining Authorizations

TABLE 6: LINE CREEK OPERATION PHASE II DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1I)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E295211	LC_SPDC	LCO Dry Creek Sedimentation Ponds effluent to Dry Creek
E295231	LC_SPFR	LCO Dry Creek Sedimentation Ponds effluent to Fording River
E295313	LC_DSSW	Diversion Structure Spillway
E295314	LC_SP1SW	Sedimentation Pond 1 Spillway
E295315	LC_SP2SW	Sedimentation Pond 2 Spillway
E295316	LC_SP3SW	Sedimentation Pond 3 Spillway
E288274	LC_DCEF	East Tributary of LCO Dry Creek
E288273	LC_DC3	LCO Dry Creek upstream of East Tributary Creek
E295210	LC_DCDS	LCO Dry Creek downstream of sedimentation ponds
E288270	LC_DC1	LCO Dry Creek near mouth (at bridge)
E295213	LC_UC	Unnamed Creek
E288275	LC_GRCK	Grace Creek upstream of the CP rail tracks
E295232	LC_FRUS	Fording River 100m upstream of conveyance outfall
E288271	LC_FRUSDC	Fording River upstream of LCO Dry Creek, 100m downstream of conveyance outfall
E288272	LC_FRDSDC	Fording River downstream of LCO Dry Creek
E295214	RG_CH1	Chauncey Creek

TABLE 7: ELKVIEW OPERATION DISCHARGE, RECEIVING ENVIRONMENT AND OTHER SAMPLE LOCATIONS (APPENDIX 1J)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E296310	EV_GH1	GEHO Line Valve at Plant (West Fork Tailings Effluent)
0200097	EV_EC1	Erickson Creek at Mouth
E296311	EV_SP1	South Pit Creek Sed. Pond Decant
E208057	EV_MG1	Milligan Creek Sed. Pond Decant
E206231	EV_GT1	Gate Creek Sed. Pond Decant
E102685	EV_BC1	Bodie Creek Sed. Pond Decant
E102679	EV_OC1	Otto Creek 70 m upstream of the Elk River
E208043	EV_GC2	Goddard Creek Sed. Pond Decant
E258135	EV_LC1	Lindsay Creek Infiltration Pond
E298590	EV_DC1	Dry Creek Sed. Pond Decant
E102681	EV_SM1	6 Mile Creek Sed. Pond Decant
E302170	EV_AQ6	Aqueduct Control Structure to Aqueduct Creek
0200203	EV_MC3	Michel Creek upstream of Erickson Creek
0200111	EV_ER2	Elk River upstream of Michel Creek
E298592	EV_BLM2	Balmer Creek at CFI Road
E298591	EV_FC1	Fennelon Creek at CFI Road
E298594	EV_SPR2	Spring Creek at Mouth
E298593	EV_TC1	Thresher Creek at Milligan Road

TABLE 8: COAL MOUNTAIN OPERATION DISCHARGE AND RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1K)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E102488	CM_SPD	Decant Discharge from Main Interceptor Sedimentation Ponds to Corbin Creek
E206438	CM_CCPD	Decant Discharge from Corbin Sedimentation Pond to Corbin Creek
E298733	CM_PC2	Pengelly Channel to Corbin Creek
E298734	CM_SOW	Sowchuck Sump
E258175	CM_MC1	Michel Creek upstream of Operations
E200209	CM_CC1	Corbin Creek near Confluence with Michel Creek

TABLE 9: KOOCANUSA RESERVOIR RECEIVING ENVIRONMENT SAMPLE LOCATIONS (APPENDIX 1E)

EMS #	*TECK IDENTIFIER*	*SITE DESCRIPTION*
E300095	RG_KERRRD	Koocanusa Reservoir downstream of Kikkoman Creek
E300092	RG_GRASMERE	Koocanusa Reservoir west of Grasmere
E300093	RG_USGOLD	Koocanusa Reservoir upstream of Gold Creek
E300094	RG_BORDER	Koocanusa Reservoir upstream of the Canada/US border

Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

8.1.2 SAMPLING AND ANALYTICAL PROCEDURES

The following sections apply to the monitoring required as per Section 8 of this permit.

8.1.2.1 SAMPLING PROCEDURES & LAB ANALYSES

Sampling is to be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples," or by suitable alternative procedures as authorized by the director.

A copy of the manual may be viewed online at:
http://www.env.gov.bc.ca/epd/wamr/labsys/field_man_03.html

Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air," or by suitable alternative procedures as authorized by the director.

A copy of the manual may be viewed online at:
http://www.env.gov.bc.ca/epd/wamr/labsys/lab_meth_manual.html

Copies of the above manual(s) may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

Copies of the manuals are also available at all Environmental Protection offices.

8.1.2.1.1 *Minimum Detection Limit*

Minimum analytical detection limits for each parameter required by this permit must be suitable for comparison with the applicable standards listed in the most recent Approved and Working Water Quality Guidelines prepared by the ministry or other applicable limits acceptable to the director.

8.1.2.1.2 *Quality Assurance/Quality Control (QA/QC) Program*

The permittee must implement a Quality Assurance and Quality Control plan in accordance with the Environmental Data Quality Assurance Regulation and guidance provided in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emissions, Water, Wastewater, Soil, Sediment, and Biological Samples", and "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air." All data analyses required to be submitted by this permit must be conducted by an analytical laboratory(ies) registered under the inter-laboratory comparison program as identified in the Environmental Data Quality Assurance Regulation unless otherwise instructed by the director.

8.1.2.2 FLOW MONITORING

8.1.2.2.1 *Flow Calculation*

Flow calculation methods for receiving streams or creeks where flow measurements are not taken must be based on a regional hydrological evaluation and recommendations made by a qualified professional. Appropriate current and historical stream gauging data should be utilized. Methods must be updated at a frequency and in a manner recommended by a qualified professional and acceptable to the director.

For the purposes of permit fee calculation, mean annual flows for the previous calendar year will be used.

8.1.2.2.2 *Flow Measurement*

Flow monitoring programs must be designed and implemented, and flow measurements conducted, with the intent of achieving acceptable data quality standards as defined in the approved Regional Surface Flow Monitoring Plan.

In order to appropriately determine data quality, flow measurement must be conducted in accordance with the Manual of British Columbia Hydrometric Standards (RISC, 2018), or by suitable alternative procedures as authorized by the director. The "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples" may also be used in conjunction with the Hydrometric Standards to provide more detailed guidance on monitoring of flow using rated structures, or as a reference for alternative monitoring methods.

8.1.2.2.3 *Metadata Summary*

The permittee must compile flow monitoring station metadata for all mine sites and Elk Valley monitoring locations, including:

i. Station lat/long, elevation, basin area and median basin elevation;

ii. Measurement method;

iii. Measurement frequency;

iv. Rating curve established, and stability of rating curve;

v. Identify where benchmarks and staff gauge are installed;

vi. Identify where flow is measured and where it is calculated (by summing/subtracting/scaling other gauged flows);

vii. Identify where data is collected to meet a permit condition;

viii. Identify qualitatively where station information is considered representative of "mine affected" or "natural" catchments;

ix. Targeted RISC data grade as defined in the approved Regional Surface Flow Monitoring Plan;

x. identify the percent contribution of mean annual flow to nearest downstream order station listed;

xi. identify qualitatively where station information likely representative of total watershed yield, and if not, list the known issues affecting the ability of the station to represent total watershed yield;

xii. a general site description of each hydrometric monitoring station including a photo(s) of the station; and,

xiii. The permittee must submit an updated Metadata Summary every three years, beginning February 28, 2021.

8.1.2.2.4 *Regional Surface Flow Monitoring Plan*

The permittee must develop a Regional Surface Flow Monitoring Plan. The intent of the Regional Surface Flow Monitoring Plan is to review the permittee's flow monitoring network in the Elk Valley (including receiving environment and discharge locations) to define the appropriate temporal and spatial frequency of flow monitoring locations. The plan should include:

i. Definition of the assessment criteria and associated data requirements for the different types of flow monitoring locations

ii. An assessment of each existing flow monitoring location, identification of stations not meeting the assessment criteria; and identification of locations where additional flow monitoring is needed; and,

iii. A plan with timelines to implement or modify flow monitoring locations based on results of the assessment, including definition of the appropriate measurement methods and acceptable data quality standard for each type of flow monitoring location.

iv. The permittee must submit an updated version of the Regional Surface Flow Monitoring Plan for approval by the director every three years, beginning December 31, 2020. Updates must include, when appropriate, changes to the location, frequency and grading of monitoring stations and to data needs and grading criteria. In the interim if changes to the monitoring program are recommended that result in a reduction in monitoring requirements these changes must be approved by the director prior to adoption.

8.1.2.3 TEMPORARY MODIFIED SAMPLING SCHEDULE FOR THE LCO MSX SHORT DUMP PROJECT

i. Site E304613 shall be temporarily used to collect water samples only when access to E216144 is restricted due to safety concerns with the progression of the MSX Short Dump.

ii. At least twice per year during the duration of the MSX Short Dump Project, paired samples shall be taken from the site E304613 and E216144 when safe access is available to E216144. The results should be compared in the Annual Report.

iii. During the duration of the MSX Short Dump Project, water samples do not have to be collected when access to 0200335 is restricted due to safety concerns with the progression of the MSX Short Dump. In the event regular scheduled sampling times cannot be met every effort must be made to obtain the number of samples normally required for a 6-month period. Missed samples and non-routine sampling times shall be itemized in the Quarterly Report.

8.1.2.4 TEMPORARY SAMPLING SCHEDULE FOR THE FLOODPLAIN WIDENING SEDIMENT POND

The permittee must conduct the additional monitoring and sampling for the Floodplain Widening Sediment Pond as described in Table 8A below:

TABLE 8A – FORDING RIVER OPERATIONS FLOODPLAIN WIDENING SEDIMENT POND TEMPORARY SAMPLING SCHEDULE

	FLOODPLAIN WIDENING SEDIMENT POND INLET	FLOODPLAIN WIDENING SEDIMENT POND IN-POND SAMPLE LOCATION
EMS Number	-	*E325312*
PARAMETER		
Field Parameters(a)	M	As per Table 13
Conventional Parameters (b)	M	As per Table 13
Major Ions (c)	M	As per Table 13
Nutrients (d)	M	As per Table 13
Total and Dissolved Metals Scan (e)	M	As per Table 13
Visual Observation	M	W(2)
Dissolved and Total Organic Carbon	-	M(1)
Selenium Speciation(i)	-	M(1)
Chlorophyll-*a*	-	M(1)

1) Sample collection must be conducted immediately during the growing season (March 15 to October 31) if: standing water is present in the pond for > 1 week; and the most recent sample results received for either the pond inlet or in-pond samples show elevated levels of dissolved selenium (≥2.0 µg/L) and total phosphorus (≥0.010 mg/L).
2) Weekly observations from March 15 to October 31 of each year.

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(most recent)

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8.2 GROUNDWATER MONITORING PROGRAM

8.2.1 REGIONAL GROUNDWATER MONITORING

The permittee must implement a comprehensive regional groundwater monitoring program for Management Units 1, 2, 3, 4 and relevant portions of 5, as defined in the Elk Valley Water Quality Plan, prepared by a Qualified Professional. The intent of the program is to monitor groundwater and groundwater systems within the valley bottom unconsolidated deposits along the mainstems in the Elk Valley and where appropriate, underlying bedrock, outside the mine operations boundaries.

The program must include the following as they pertain to the regional program:

i. A program to establish and maintain a groundwater monitoring well network in the Elk Valley, with wells (single/multi-level in unconsolidated deposits and bedrock, as appropriate for intended purpose) installed in locations that are representative of background and mine-impacted conditions.

ii. An ongoing monitoring program, developed in accordance with the BC Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (ENV, 2016).

iii. A conceptual hydrogeological model for the Elk Valley, developed and updated by integrating all available groundwater information collected as part of the regional and site-specific groundwater monitoring programs, relevant operational field investigations, and relevant conceptual and numerical modelling studies carried out for diverse purposes (e.g., as part of permitting applications, water supply assessments and geotechnical investigations). The conceptual hydrogeological model must include, but is not limited to, a description of the following, where relevant: aquifer characteristics (e.g., location, extent and geometry and hydraulic properties), regional groundwater flow patterns (directions, gradients and velocities), recharge and discharge areas, groundwater interactions with surface water, the effects of surface and groundwater withdrawals, groundwater quality and the transport of mine-related parameters of concern. Seasonal fluctuations and trends of all relevant hydrogeological variables must also be included in the hydrogeological characterization.

iv. An evaluation of the regional effects of the permittee's operations on groundwater and where relevant on surface water, as a result of surface water – groundwater interaction, in Management Units 1, 2, 3, 4 and relevant portions of 5, by comparison to all applicable standards.

v. Identification of limitations and data gaps and recommendation of additional field activities and/or studies to fill in gaps, where possible, and to refine the conceptual hydrogeological model.

vi. A proposed schedule for the additional recommended field activities and studies described in point v.

vii. Where appropriate, identify activities, studies and investigations proposed to be discontinued or existing monitoring infrastructure to be decommissioned/removed in order to optimize/improve the program.

The plan must be updated every three years starting in 2017 and submitted to the director by September 30 for approval. Each update must consider relevant changes to permit requirements and results of special studies.

8.2.2 SITE SPECIFIC GROUNDWATER MONITORING

The permittee must develop and implement a comprehensive groundwater monitoring program at each mine site (Fording River Operations, Greenhills Operations, Line Creek Operations, Elkview Operations, Coal Mountain Operations), prepared by a Qualified Professional. The intent of each program is to monitor groundwater and groundwater systems within the valley bottom unconsolidated deposits and, where appropriate, the bedrock downgradient of potential mine-related sources of groundwater contamination within or in proximity of the mine operations boundaries.

Updated Site-Specific Groundwater Monitoring Plans must be submitted to the director for approval by October 31, 2021. Thereafter, the plans must be updated and submitted to the director for approval by October 31 every three years. The plans must include points i. to vii. in Section 8.2.1, as they pertain to each mine site.

8.2.2.1 LINE CREEK MINE PHASE II GROUNDWATER MONITORING PROGRAM

The Permittee must develop and implement a comprehensive groundwater monitoring program for the Line Creek Mine Phase II area, prepared by a qualified professional. This program must be conducted to the satisfaction of the Director and should achieve the following objectives at a minimum:

i. Characterize the groundwater resource (including water quality, quantity, flow characteristics, hydraulic conductivity of the affected aquifer(s), and relationship to surface water system);

ii. Identify (and if necessary, quantify) impacts to groundwater from mining-related activities;

iii. Provide the information necessary to support the development and verification of water quality predictions for the mine site (as per Section 9.9);

The Terms of Reference for the monitoring program shall be submitted to the Director, Environmental Protection by January 31, 2013.

The monitoring program must be submitted to the Director for approval by March 31, 2014. Monitoring activities must commence in 2014.

Monitoring results and interpretation shall be compiled into a written report and submitted on an annual basis for each calendar year to the Director, Environmental Protection, by March 31 of the following year. Included in the submission must be a Study Design for the next year.

8.2.3 SPARWOOD AREA GROUNDWATER SUPPORTING STUDY

The permittee must implement the approved Sparwood Area groundwater monitoring study. A study report must be submitted to the director as per Section 9.4.2. In the study report, the permittee must include Sparwood Ridge monitoring data relevant to the interpretation of the Sparwood Area groundwater study.

8.2.4 CEDAR NORTH IN-PIT BACKFILL EXTENSION

8.2.4.1 The permittee must develop a study design to refine the hydrogeological characterization of fault F42 and to obtain site-specific estimates of hydraulic conductivity in the weathered bedrock located between Cedar North Pit and the Elk River and Michel Creek valley bottom. The study design must be developed by a Qualified Professional and should include, but not be limited to:

i. estimating hydraulic conductivity using hydraulic testing methods, along the F42 fault alignment south of the interception with the conveyor tunnel, and along a hypothetical fault extension towards Michel Creek;

ii. estimating hydraulic conductivity of the weathered bedrock to obtain site-specific estimates of hydraulic conductivity between Cedar North Pit and the Elk River valley bottom; and

iii. establishing monitoring well(s) along the F42 fault alignment south of the interception with the conveyor tunnel at the hydraulic testing site(s), if the results indicate a potential for the fault to convey mine-impacted groundwater, currently or as a result of future mining activities.

A study design for the completion of the field activities described at i. and ii. must be submitted to the director for approval by October 31, 2021. The permittee must implement the approved study design.

8.2.4.2 The permittee must update the BRE Project groundwater flow model by adding the following as calibration targets:

i. the groundwater levels collected as part of the activities outlined in Section 8.2.4.1; and

ii. the streamflow and groundwater level data set collected from the hydrometric stations and monitoring wells located near the model's west – southwest boundary, on Lindsay Creek, Goddard Creek, Otto Creek, Aqueduct Creek, Bodie Creek and Gate Creek.

The BRE Project groundwater flow model update must also include the simulation of faults in the model.

8.2.4.3 The permittee must use the information obtained from activities outlined in Section 8.2.4.1 and 8.2.4.2 to refine the groundwater flow component of the water balances for the Cedar North Pit and EVO Dry Creek catchments.

8.3 LOCAL AQUATIC EFFECTS MONITORING PROGRAM (LAEMP)

The permittee may be required to develop, with input from the EMC, and implement a Local Aquatic Effects Monitoring program (LAEMP) to determine the effects of a mining effluent discharge(s) on the receiving environment.

8.3.1 LINE CREEK OPERATIONS

8.3.1.1 LCO Phase I

The permittee must develop and implement a Local Aquatic Effects Monitoring program to determine the effects of the Line Creek discharge on the receiving environment. An annual study design for the program must be prepared in consultation with the EMC and submitted to the director for approval by May 1 each year. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.1.2 LCO Phase II

The permittee must develop and implement a Local Aquatic Effects Monitoring Program to determine the effects of mining activities from Line Creek Phase II in the LCO Dry Creek, Grace Creek and Unnamed Creek receiving environments. An annual study design for the program must be prepared in consultation with the EMC and submitted to the director for approval by May 1 each year. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.2 FORDING RIVER OPERATIONS

The permittee must complete to the satisfaction of the director a study design for a LAEMP which will focus on the upper Fording River for 2021-2023 by April 1, 2021. The study design must be reviewed by the EMC and be designed to an appropriate temporal scale to capture short term, local effects to the immediate receiving environment. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.3 COAL MOUNTAIN OPERATIONS

The permittee must complete to the satisfaction of the director, a study design for a LAEMP by February 28, 2019. The study design must be reviewed by the EMC and be designed to assess the magnitude and extent of influence from CMO on water quality, calcite and benthic invertebrate communities downstream of CMO and to assess what factors are contributing to the observed effects. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.4 GREENHILLS OPERATIONS

The permittee must complete to the satisfaction of the director a study design for a LAEMP which will focus on the upper Elk River and the Elk River side channel and tributaries located on the west side of Greenhills Operation between EMS sites 0200389 and E3000090 for 2017-2020 by June 1, 2017. The study design must be reviewed by the EMC and be designed to an appropriate temporal scale to capture short term, local effects to the immediate receiving environment. Any changes to the approved study design must be reported in the annual LAEMP report.

8.3.5 ELKVIEW OPERATIONS

The permittee must develop and implement a LAEMP to determine the magnitude and extent of influence from EVO SRF discharge on water quality (including temperature), calcite and benthic invertebrate communities to assess what factors are contributing to the observed effects. The study design must be reviewed by the EMC and submitted to the director for approval by June 30, 2021. The LAEMP must be designed to an appropriate temporal scale to capture short term, local effects to the immediate receiving environment, and must consider the possibility of impacts resulting from potential selenium speciation. The LAEMP must focus on Erickson Creek from EV_ECOUT (E321814) to EV_EC1 (0200097) and Michel Creek between EV_MC3 (0200203) and EV_MC2 (E300091) for 2021-2023.

Until the 2021-2023 LAEMP study design is approved and implemented, the permittee must continue the pre-operational aquatic effects monitoring program as outlined in Section 8.2.2 the EVO SRF Phase 2 Operations application.

The permittee must notify the director at least 15 days prior to implementing any proposed changes to the approved LAEMP. Any changes to the approved study design must be reported in the annual LAEMP report.

8.4 REGIONAL AQUATIC EFFECTS MONITORING PROGRAM (RAEMP)

The permittee must implement the Regional Aquatic Effect Monitoring Program as per the November 14, 2014 approval or the latest director approved program. A final Study Design for each subsequent three-year cycle must be submitted to the director by February 28 in the first year of each three-year cycle.

8.5 CALCITE MONITORING

8.5.1 CALCITE MONITORING PROGRAM

i. The permittee shall continue to conduct annual calcite monitoring following the methods in the approved monitoring program.

ii. The permittee shall submit, for director's approval, changes to the monitoring program by April 15 of the data collection year.

8.5.2 SEASONAL CALCITE SUPPORTING STUDY – 2015/2016

The permittee must have a Qualified Professional develop a monitoring program to assess seasonality of calcite formation and potential dissolution. The program must, at minimum, include multiple locations and assess seasonal variation in the rate of calcite formation or dissolution, water quality, and presence and density of algae, and the presence and density of benthic invertebrates.

i. An Initial Study Design for the program must be submitted to the Environmental Monitoring Committee for input prior to submission to the director for acceptance by March 1, 2015.

ii. Monitoring results and interpretation for the 2015 program must be compiled into a written report with a study design for the 2016 program and submitted to the satisfaction of the director by March 31, 2016.

iii. Monitoring results and interpretation of the 2016 program must be compiled into a written report and submitted to the satisfaction of the director by March 31, 2017.

8.6 SELENIUM SPECIATION MONITORING PROGRAM

The permittee must develop and implement a Selenium Speciation Monitoring Program. The Selenium Speciation Monitoring Program is intended to:

- Identify sites in the Designated Area, affected or potentially influenced by the permittee's current operations, where organic and reduced forms of selenium are occurring or are likely to occur;
- Investigate the physical and/or biogeochemical mechanisms driving selenium speciation and the generation of organic and reduced forms of selenium species; and
- Assess the site-specific bioaccumulation of selenium in biological resources.

The Selenium Speciation Monitoring Program must include the following elements:

i. Assessment of water quality and selenium tissue concentrations in benthic invertebrates; and

ii. Characterization of factors that lead to enhanced selenium bioaccumulation in the receiving environment, as applicable.

The following timelines apply:

1) A written report of selenium speciation data collected to-date within the Designated Area, that includes analysis and interpretation of the data, must be compiled and submitted to the EMC and the director by March 31, 2021.
2) Selenium Speciation Monitoring Program Study Design must be reviewed by the EMC prior to submission to the director, for approval, by July 30, 2021. Thereafter, the study design must be updated and submitted, for approval, to the director by July 30th every three years.

The approved Selenium Speciation Monitoring Program Study Design must be implemented, and an annual report must be submitted to the director and to the EMC as per Section 9.11.

8.7 KOOCANUSA RESERVOIR WORKING GROUP

A Koocanusa Reservoir Monitoring and Research Working Group will be established under the BC & Montana government to government Memorandum of Understanding. The permittee must participate fully in the Koocanusa Reservoir Monitoring and Research Working Group.

The permittee is required to contribute to the costs of the Koocanusa Reservoir Monitoring and Research Program as operated by the Koocanusa Reservoir Monitoring and Research Working Group

8.8 KOOCANUSA RESERVOIR BURBOT BASELINE STUDY 2015

The permittee shall undertake a sampling program in Koocanusa Reservoir to evaluate the potential for selenium related effects in Burbot. The permittee shall make reasonable efforts to collaborate with Ktunaxa Nation representatives to identify suitable fishing locations in Koocanusa Reservoir, to develop a sampling plan, and to implement the program.

The sampling must be initiated in February 2015 and include the following:

i. Sampling will occur at representative locations within Koocanusa Reservoir and should consider areas upstream of Elk River, near the mouth of the Elk River, and near of the mouth of Gold Creek.

ii. All fish captured during the sampling program will be identified and enumerated with results captured on field sheets and sexually mature burbot measured and sampled in the field as follows:

   a) Field examination of condition of each fish for external deformities, erosions, lesions, or tumors with condition recorded on field sheets

   b) Muscle tissue will be sampled from each fish

   c) Collection of eggs from up to 10 ripe female burbot from the three sampling locations where available.

iii. Tissue and eggs will be analysed for metals using a high-resolution inductively coupled plasma mass spectrometry.

iv. Results will be reported on a dry weight basis along with the moisture content.

Results of the sampling program shall be submitted to the director by July 31, 2015.

The permittee will evaluate the human health risk with respect to Ktunaxa consumers specific to the burbot tissue data.

8.9 CHRONIC TOXICITY TESTING PROGRAM

The permittee must develop and implement a toxicity testing program for receiving environments affected by coal mining operations. The purpose of the program is to evaluate chronic toxicity at the compliance points and other locations throughout the Elk Valley.

The program shall be planned and implemented by qualified professionals using methods that have documented test procedures, reliability, and quality assurance.

The toxicity testing program must include, at a minimum, the following elements:

i. Once every three years beginning in 2015, bioassays must be conducted to evaluate the survival and development (incidence of deformities) of targeted aquatic species using gametes obtained from species using habitats in the Elk River, the Fording River, their tributaries, and associated lentic habitats, and the Koocanusa Reservoir. The concentrations of selenium in the eggs of each female spawned must be measured.

ii. For the purposes of the following requirements the listed mine-influenced stations must include:

- FR_FRCP1 (EMS E300071),
- FR_FRABCH (EMS 223753),
- GH_FR1 (EMS 0200378),
- LC_LC5 (EMS E200028),
- GH_ERC (E300090),
- CM_MC2 (EMS E258937),
- EV_MC2 (EMS E300091),
- EV_HC1 (EMSE102682),
- LC_LCDSSLCC (EMS E297110),
- LC_LC3 (EMS 200337), and

- LC_DCDS (EMS E295210).

Appropriate reference stations must be determined in consultation with the Environmental Monitoring Committee.

The following toxicity test must be conducted during each semi-annual (spring and fall) sampling event at all listed mine-influenced stations plus multiple reference stations:

- 30-day early life-stage test with the rainbow trout (*Oncorhynchus mykiss*; EPS1/RM/28) using <24-hour post-fertilization eggs; endpoints: survival, viability, length, wet weight (plus documentation of observed deformities or behavioral changes); and
- 28-day water-only test with amphipod, *Hyalella azteca* (adapted from USEPA 2000, with appropriate supplementation of halides); endpoints: survival, growth.

The following toxicity tests must be conducted during each semi-annual (summer and winter) sampling event at all listed mine-influenced stations plus multiple reference stations:

- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; endpoints: survival, normal development, length, biomass (plus documentation of observed deformities or behavioral changes).

The following toxicity tests must be conducted during each quarterly sampling event at all listed mine-influenced stations plus multiple reference stations:

- 7-day water-only test with the cladoceran, *Ceriodaphnia dubia* (EPS1/RM/21); endpoints: survival, reproduction; and
- 72-hour test with the alga, *Pseudokirchneriella subcapitata* (EPS1/RM/25); endpoints: growth inhibition.

iii. Toxicity testing methods must be consistent with Environment Canada's, U.S. Environmental Protection Agency's, or ASTM's approved biological test methods. Waters used for fathead minnow (Pimephales promelas) and rainbow trout (Oncorhynchus mykiss) 30-day early life-stage tests may be augmented with up to, and not exceeding, 20 ug/L copper to control for fungi and microbial pathogens. Ameliorating factors that influence copper toxicity (e.g., water hardness, dissolved organic carbon, and major ions) must be considered when determining the lowest and most effective dose below this limit.

iv. A Quality Assurance/Quality Control component.

v. A proposed schedule of dates that coincide with water quality sampling and that target predicted worst-case times such as low flow, during flocculant use, or when discharge quality is expected to be reduced.

The suite of toxicity tests will be reviewed on an annual basis by the EMC and recommendations provided to the director for consideration.

8.9.1 SULPHATE TOXICITY AT HIGH HARDNESS CONCENTRATIONS

The permittee must develop with input from the EMC and implement a toxicity testing program specifically to assess sulphate toxicity at high hardness concentrations. Results will be used to support finalization of long-term sulphate site performance objectives.

The following toxicity test shall be conducted as a component of the Sulphate toxicity testing program.

- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; endpoints: survival, hatching, growth, deformity.
- Other sensitive species (amphibian, trout, water flea, etc.) shall be included.

Monitoring results and interpretation must be compiled into a written report and submitted to the satisfaction of the director by December 31, 2017.

8.9.2 SUBLETHAL TOXICITY STUDY

The permittee must develop with input from the EMC and implement a sublethal toxicity study to confirm that surface waters meeting the Site Performance Objectives for the order stations are not toxic to sensitive aquatic receptors. The permittee must submit the study design to the director by April 30, 2015.

8.10 HUMAN HEALTH RISK ASSESSMENT

The permittee must conduct a Human Health Risk Assessment (HHRA), in consultation with the EMC to examine the potential effects of mine-related parameters of concern including selenium, mercury cadmium, chromium, copper, manganese, nickel, vanadium and zinc for the Designated Area. The permittee is responsible for developing the HHRA design and addressing any concerns raised by the Interior Health Authority.

A draft terms of reference and a work plan for the HHRA must be discussed at the EMC. A final terms of reference and work plan for the HHRA shall be submitted by May 31, 2015 and be of a quality acceptable to the director.

The Human Health Risk Assessment must follow the BC Contaminated Sites Regulation approved methodologies and levels of acceptable risk for Human Health Risk Assessment.

The permittee must provide the results of the HHRA by March 31, 2016 to the EMC. The permittee must provide the results of the HHRA to the director by March 31, 2016. The risk assessment must be to the satisfaction of the director.

The assessment must determine the exposure pathways and potential human health risks from selenium and other mine-related parameters of concern which may be present in vegetation, fish and wildlife that are potentially used for food or medicinal sources, or present in currently known potable water sources. The assessment must take into consideration First Nations consumption patterns and risk sensitivities.

The study must incorporate information available from a variety of sources such as: traditional use studies, consultation records, consumption surveys, and baseline and monitoring data for mine-related parameters of concern.

Wherever possible, the assessment must incorporate data obtained from established monitoring programs. If required for the assessment, additional sampling programs must be implemented to ensure data gaps are addressed.

The conclusions and findings of the Human Health Risk Assessment shall be risk ranked and prioritized and include recommended risk management controls and other mitigation actions to address human health risks identified in the human health risk assessment for inclusion in the adaptive management plan for the area.

8.11 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

The permittee shall re-evaluate the Screening Level Ecological Risk Assessment. The Screening Level Ecological Risk Assessment re-evaluation must address the following points:

i. some contaminants of potential concern exceeded the criteria for negligible risk,
ii. there was an incorrect use of tissue concentrations as indicators of toxicity, and
iii. multiple food type dietary exposure was not incorporated.

The re-evaluation must be conducted by an approved Contaminated Sites Approved Professional (CSAP) or follow the BC Contaminated Sites Regulation approved methodologies. If the re-evaluation is not conducted by an approved CSAP, the re-evaluation must be submitted to the director for review and acceptance. The re-evaluation shall be submitted by July 31, 2015.

In the event that this re-evaluation determines changes to the monitoring requirements, this information shall be shared with the EMC and a report with recommendations provided to the director regarding the outcome of the re-evaluation.

8.12 DETAILED ECOLOGICAL RISK ASSESSMENT

A Detailed Ecological Risk Assessment may be required.

9. REPORTING REQUIREMENTS

9.1 SUBMISSION RESULTS

The permittee must submit the results of all discharge and ambient water quality data associated with surface and groundwater sampling programs, as well as results of all benthic invertebrate tissue sampling associated with aquatic effects monitoring programs directly into the EMS database using the appropriate EMS site identification numbers within 30 days of the end of the quarter in which the samples were collected. Flow data is to be submitted annually.

For instructions on the electronic submission process or for more information visit the Ministry website:
https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/ems-data-uploads

All data and calculations required in this permit but not uploaded to EMS must be managed by the permittee and provided to the director or member of the EMC upon request in a format specified by the director or member of the EMC. The permittee must provide all requested data within 10 business days of the original request or within the timeline agreed upon by both the permittee and the requestor.

All data lab sheets are to be kept on site and are to be provided in an electronic format to the director or member of the EMC upon request.

All deliverables required by Section 9 must not exceed manageable file sizes or must be divided into smaller files prior to submittal.

9.2 DISCHARGE AND RECEIVING ENVIRONMENT MONITORING DATA

9.2.1 NON-COMPLIANCE NOTIFICATION

The permittee must immediately notify the director or designate by e-mail (ENVSECoal@gov.bc.ca) of any non-compliance with the requirements of this permit, including requirements within the appendices, by the permittee and take appropriate remedial action to remedy any effects of such non-compliance.

The permittee must provide the director and KNC with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification unless otherwise directed by the director.

9.2.2 NON-COMPLIANCE REPORTING

If the permittee fails to comply with any of the requirements of this authorization, the permittee must, within 30 days of such non-compliance, submit to the director and KNC, a written report that is satisfactory to the director and includes, but is not necessarily limited to, the following:

i. all relevant test results obtained by the permittee related to the noncompliance,

ii. an explanation of the most probable cause(s) of the noncompliance, and

iii. a description of remedial action planned and/or taken by the permittee to prevent similar noncompliance(s) in the future.

The permittee must submit all non-compliance reporting required to be submitted under this section by email to (ENVSECoal@gov.bc.ca).

9.2.3 MONITORING AND REPORTING FOLLOWING TOXICITY NON-COMPLIANCE

In addition to Section 9.2.1, for any acute toxicity test failure in the effluent, the permittee must:

i. Immediately conduct a confirmatory test on the effluent using multiple concentrations (i.e. 96 hr LC50 for Rainbow Trout or 48 hr LC50 for Daphnia magna, as appropriate). The director may require a Toxicity Identification Evaluation (TIE) to be initiated to determine the cause of the effluent toxicity,

ii. Immediately take corrective action, and

iii. Forward all test results including raw laboratory data sheets to the director as soon as they are available. As soon as possible, submit a full report indicating the cause and effects of the incident, which identifies all actions taken by the permittee to correct, restore and prevent a similar event from occurring in the future. This report must be submitted with the next quarterly report or as otherwise instructed by the director.

9.2.4 QUARTERLY REPORTING

The permittee must submit a written quarterly report to the director or designate, due within 30 days of the end of the quarter in which the samples were taken. The quarterly report must include:

i. Effluent water quality results used to calculate monthly averages for the limits in Section 2, if applicable;

ii. Effluent water quality results exceeding limits and targets or other criteria, such as daily maximums or as specified by the director;

iii. Identification of all missing data and all QA/QC issues;

iv. All toxicity test results and raw laboratory data sheets for all mortality results;

v. All reportable spills or other incidents related to water quality, occurring in the quarter;

vi. Explanation of the most probable cause(s) of any non-compliances;

vii. All measures taken to reduce or eliminate non-compliances;

viii. All other reports or documentation as specified by this permit to be submitted quarterly; and

ix. Any additional sampling results for the compliance points identified in Section 2 obtained for any reason, whether compliance, maintenance, or operational purposes. All test data must be reported within 30 days of the end of the quarter in which sampling occurred. These additional results may be reported in summary form. Further information on the testing event may be requested in writing by the director.

   a) Any data collected at the compliance points in Section 2 for research-oriented activities that do not meet the analytical requirements in Section 8.1.2.1 of the Permit must be submitted separate from Quarterly Reports in a project report at the completion of the applicable study.

x. A summary of measures taken under the Nitrogen Source Control Plan, Section 5.3.

The format of the quarterly report shall be suitable for review by the public.

9.2.5 ANNUAL REPORTING

The permittee must prepare on an annual basis a report or series of reports summarizing activities, incidents, and discharge/receiving environment monitoring results. The report(s) must include but is not limited to:

i. A map of monitoring locations with EMS and permittee descriptors.

ii. A summary of non-compliances with the permit conditions for the previous calendar year. This must include interpretation of significance, and the status of corrective actions and/or ongoing investigations.

iii. A summary of measured parameters including all collected monitoring data for the reporting year suitably tabulated (i.e., excel spreadsheets), appropriate graphs and comparison of results to limits, Approved and Working Water Quality Guidelines, Site Performance Objectives, or other criteria and benchmarks as specified by the director.

iv. An analysis and discussion of early warning triggers for management action as developed under the Adaptive Management Plan for surface water quality. This analysis will include order constituents and non-order parameters of concern at key receiving environment sites as identified in the AMP and an evaluation of upstream source sites and activities when monitoring results exceed the early warning trigger criteria.

v. All acute toxicity test-specific reports from the laboratory and an interpreted summary and discussion of results, including recommendations and all subsequent actions.

vi. All acute toxicity test lab reports must include data and/or observations for hardness, alkalinity, pH, temperature, and formation of precipitate either in the vessel or on the organism.

vii. A summary of all QA/QC issues during the year.

viii. The following hydrology information:

a) A description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary.

b) A summary table of the discharge measurements recorded during the year. The summary must include staff gauge measurements, calculated flow values from a stage-discharge rating curve, and manual flow measurements.

c) A hydrograph(s) at a scale appropriate for visually comparing flow values between stations.

d) A data quality grade for each monitoring station using the Manual of British Columbia Hydrometric Standards (RISC, 2018) methodology, and comparison of the grade to target grades as listed in the Regional Surface Flow Monitoring Program.

e) In conjunction with the submission of the annual report, final non-continuous flow data will be uploaded to the EMS database while final continuous flow data records and associated rating curves will be provided in Excel format.

ix. An interpreted summary and discussion of the effectiveness of measures taken under the Nitrogen Source Control Plan, Section 5.3.

The Annual Report must be submitted to the director by March 31 of each year following the data collection calendar year.

The format of the Annual Report shall be suitable for review by the public. The Permittee must post a copy of the report to the Teck website annually, within six months of submission. Copies must be made available for the Ministry of Energy, Mines, and Petroleum Resources and Ktunaxa First Nation. The Permittee may omit proprietary information from the publicly available annual report in accordance with the Freedom of Information and Protection of Privacy Act, as agreed to by the Director.

9.3 TOXICITY REPORTING

All acute toxicity test lab reports must include data and/or observations for pH, temperature, and formation of precipitate either in the vessel or on the organism. Lab reports for the 48-hour *Daphnia magna* single concentration toxicity test must also include data and/or observations for hardness and alkalinity.

The permittee must prepare on an annual basis a report summarizing all acute and chronic toxicity data from the laboratory and an interpreted summary and discussion of results, including recommendations and subsequent actions. The report is to be submitted to the director by April 30 of each year following the data collection calendar year.

9.4 GROUNDWATER

9.4.1 ANNUAL GROUNDWATER MONITORING REPORTING

The permittee must prepare on an annual basis a report or series of reports summarizing monitoring activities and results for the Regional and Site-Specific Groundwater Monitoring Programs. The annual report(s) must be submitted to the director by March 31st of each year following the data collection calendar year.

The annual report(s) must include, but is not limited to:

i. A map of surface and groundwater monitoring locations with EMS and permittee descriptors;

ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and where relevant surface water elevations and inferred groundwater flow direction(s). Cross sections should be in the direction of groundwater flow and/or perpendicular to groundwater flow, as appropriate;

iii. Drawings showing locations and water quality data of groundwater sampling points;

iv. Summary of program modifications relative to previous years and additional one-time activities, such as the installation of new monitoring wells;

v. Summary of measured parameters, including appropriate graphs and comparison of results to, Approved and Working Water Quality Guidelines, or other criteria and benchmarks as specified by the director;

vi. If applicable, a summary of exceedances of screening benchmarks;

vii. Evaluation and discussion of spatial patterns and temporal trends;

viii. Evaluation and discussion of the correlation between the monitoring results of surface water and groundwater monitoring stations, where relevant, in terms of spatial distribution and temporal changes;

ix. Relevant information from specific studies on surface water and groundwater to support the hydrogeological characterization;

x. A summary of all QA/QC issues during the year; and

xi. Recommendations for further study or measures to be taken.

9.4.2 SPARWOOD AREA GROUNDWATER STUDY REPORT

The permittee must prepare a report summarizing monitoring activities and results for the Sparwood Area Groundwater Study and submit it to the director by May 31, 2021.

The report must include, but is not limited to:

i. Items i. to x. in Section 9.4.1, as they pertain to the study; and

ii. Recommendations related to the next steps for the study.

9.5 **LAEMP**

The LAEMP Annual Reports must be reported on in accordance with generally accepted standards of good scientific practice in a written report and submitted to the director of each year following the data collection calendar year on the following dates:

i. LCO LAEMP: April 30

ii. GHO LAEMP: May 31

iii. FRO LAEMP: May 31

iv. CMO LAEMP: June 30 (The first report is due June 30, 2020)

v. EVO LAEMP: June 30 (The first report is due June 30, 2022)

9.6 RAEMP

The RAEMP report for the first approved cycle under the ABMP must be submitted to the director by September 30, 2017 and by November 30 of the final year of each subsequent three-year monitoring cycle.

The permittee shall submit a report that contains a detailed rationalization of the overall RAEMP including reasons why specific monitoring areas are/are not being monitored in a given year. The report may include a discussion and analysis of the results of the previous cycle of monitoring of the following components:

i. Water quality
ii. Sediment quality and calcite
iii. Water and sediment toxicity testing
iv. Periphyton productivity and community structure
v. Benthic invertebrate community structure and tissue contaminants
vi. Fish population metrics and tissue contaminants
vii. Amphibian and bird egg tissue contaminants
viii. QA/QC

Each report will also discuss cumulative effects by providing an integrated interpretation of conditions in the Elk River Watershed.

Each report will, on a three-year cycle, verify and calibrate the selenium bioaccumulation model using the most recent three years of water quality, aquatic effects and other data from any special studies undertaken.

9.7 CALCITE

A Calcite Monitoring Annual Report must be submitted to the director by April 15 of each year following the data collection calendar year. The report must include the following, at minimum:

i. A map of monitoring locations;
ii. A summary of background information on that year's program, including discussion of program modifications relative to previous years;
iii. Results of stream selection reassessment – highlight streams added/removed;
iv. Summary of where sampling followed the methodology in the monitoring plan document, and details where sampling deviated from the approved methodology;
v. Statement of results for the period over which sampling was conducted;
vi. Reference to the raw data, provided as appendices;
vii. General discussion of observations, including summary tables of sites with increasing and decreasing deposition indices;
viii. Interpretation of location, extent, and any other observations;
ix. A summary of any QA/QC issues during the year;
x. Recommendations for sites to add, sites to remove, modifications to methodology, monitoring frequency adjustments; and
xi. A statistical evaluation of monitoring data to evaluate the presence of short and long term calcite related trends in the Elk Valley main stems and select tributaries.

9.8 KOOCANUSA RESERVOIR

The permittee must prepare on an annual basis a report summarizing activities and monitoring results. The report must be submitted to the Koocanusa Reservoir Monitoring and Research Working Group (Koocanusa Reservoir Working Group) and the EMC by June 30 of each year.

9.9 WATER QUALITY MODELLING

The permittee must update the regional water quality model and complete a water quality prediction report for each mine site and the Designated Area as a whole to be submitted to the director.

This report must be updated every 3 years starting October 31, 2017, or more frequently as required, based on changes to the mine plan, when observed water quality and water quantity are regularly and significantly different from predicted values, or as otherwise required by the director in writing. The report must include data collected from the monitoring programs described in Section 8 as well as any other special studies undertaken to investigate water quality in the Designated Area.

On a three-year cycle, verify and, failing verification, calibrate the Elk Valley Regional Water Quality Model using the most recent three years of water quality data and regional flow data from appropriate (e.g. Environment Canada regional) hydrometric data stations.

The report must provide:

i. Current and projected (through the next twenty years) bank cubic meters of waste rock at the mine, detailed by affected drainage;

ii. Hydrology modelling information, detailed by affected drainage:

   a) Identify the specific hydrology information used in the modeling work;

   b) An evaluation of the relative data accuracy/precision and overall confidence in the data used. The evaluation should consider any relative bias that a station may introduce (e.g. a stations' ability to represent total watershed yield). Documentation must clearly provide a rational for why specific data was selected for use in the model;

iii. Current and predicted concentrations of Parameters of Concern as required, in the surface water of affected drainages through the life of the mine based on current model, which incorporates waste rock volumes and local hydrology, compared to BC Water Quality Guidelines or water quality targets for selenium, nitrate, sulphate and cadmium;

iv. A description of the calibration and validation of the flow model and water quality;

v. A sensitivity analysis for variation in flows and potential errors in measured input data;

vi. Water quality and water quantity model output in electronic format;

vii. A monitoring plan for continued evaluation of ii), iii) and iv) as the mine progresses;

viii. Refined hydrology, hydrogeology and geochemical source term information (including refinements for cadmium source terms), together with any site-specific water balance models and hydrogeology studies;

ix. Changes to the mine plan; and

x. Information and outcomes from research and technology development studies that have been incorporated into the model.

9.9.1 EVALUATION OF WATER QUALITY MODELLING FOR TRIBUTARIES (LCO)

i. The permittee shall assess the conservatism and uncertainty associated with the scaling approach used to predict tributary concentrations in the EVWQP by independent comparison with predictions obtained from project specific model outputs and provide recommendation for evaluating future water quality in tributaries in the Elk River watershed.

ii. During operations, the Permittee must track waste rock placement, water quality and flow monitoring data to enable calibration, updating and refinement of the water quality predictions and model. The Permittee must complete the first water quality prediction report for Line Creek Operations and submit it to the Director, Environmental Protection by March 31, 2014.

iii. A report presenting the comparison and analysis of water quality modelling methods, as well as a list of tributaries where the scaling method was/or was not applied in the EVWQP shall be provided to the director by February 28, 2015.

9.10 ENVIRONMENTAL IMPACT ASSESSMENT - CHANGES TO MINE PLANS

Where changes to a mine plan requires amendment of the *Mines Act* Permit for a site, the permittee shall provide the director and KNC with a project description detailing the changes and results of water quality modelling that assesses the effects on water quality at the applicable order stations/compliance points. The director may require an environmental impact assessment to be completed to evaluate the effects of the changes on the environment.

9.10.1 FRO MINE PLAN

If FRO's mine plan changes such that FRO's total waste rock volume exceeds the maximum volume assessed in the Swift Environmental Assessment Certificate application and the North Spoil Re-handle screening-level assessment an environmental effects assessment be conducted.

9.11 SELENIUM SPECIATION MONITORING PROGRAM

The permittee must prepare an annual report documenting the activities and results of monitoring undertaken for each element of the Selenium Speciation Monitoring Program, as per Section 8.6. The report must be submitted to the director and the EMC by April 15th of each year.

10. ADAPTIVE MANAGEMENT

The permittee must develop and implement a detailed adaptive management plan (AMP) to support implementation of the ABMP, to achieve water quality targets including calcite targets, ensure that human health and the environment are protected, and where necessary, restored, and to achieve continuous improvement of water quality in the Elk Valley. The adaptive management cycle consists of six stages, as summarized below. Elements of the AMP required for this permit have been included in the ABMP, but other key components remain outstanding, as described below. The permittee must prepare and implement an AMP to the satisfaction of the director. The AMP must fulfill the following requirements at a minimum:

1) Stage one – Assess and Define the Scope

   a) Section 1.2 of the Elk Valley Area Based Management Plan identifies the following environmental management objectives that apply to the AMP: protection of aquatic ecosystem health; management of bioaccumulation of Parameters of Concern in the receiving environment (including fish tissue); protection of human health; and protection of groundwater.

   b) The AMP should support continuous improvement of water quality conditions in the Elk Valley such that human health and ecosystem health are protected in the long-term, without restrictions or limitations on the use of water resources or associated biological resources.

   c) Identify areas of uncertainty for further analysis and development of hypotheses to support adaptive management. Uncertainties may include effects on aquatic health, actual water quality conditions in space and time, treatment capability and results, R&D project success and implementation, efficacy of passive and semi-passive mitigation methods, etc.

   d) The conceptual water quality model in Annex D of the ABMP should link management activities to effects to water quality and other components of the aquatic environment.

   e) Select measurement end points for monitoring and determining what activities and/or actions could be adjusted to influence the measurement endpoints to improve water quality and the aquatic environment to meet the environmental management objectives of the ABMP.

2) Stage two – Design of Adaptive Management Plan

   a) Review of existing monitoring programs in relation to uncertainties and alternative hypotheses developed above in 1.b and ensure that the monitoring will provide sufficient information to evaluate which hypothesis is most supported. Clear linkages between the AMP and the RAEMP, supporting studies, other monitoring and water quality modelling must be included.

   b) Establish early-warning triggers for management action. If not already in place, identify the locations where the indicators will be monitored and develop a monitoring program to assess the status of these indicators.

   c) An assessment framework for evaluating whether an outcome is acceptable or not must be provided. Monitoring and operational outcomes or indicators must be detailed and what responses will be taken as a result of exceedances of each indicator, as well as the order and timeframe in which the responses will be implemented.

d) Develop and test hypotheses associated with alternative mitigation strategies. The intention is to evaluate applying active adaptive management to research and development activities related to non-active water treatment plant technologies and calcite management.

3) Stage three – Implement the Adaptive Management Plan

a) Implement the AMP as designed.

b) Document all deviations to the AMP including rationale and information considered in the decision to deviate.

4) Stage four - Conduct Monitoring

a) Implement and follow the various monitoring programs and supporting studies in this permit and within the ABMP. Additional monitoring may be required as per 2.b above.

b) Identify how collected information/data will be managed to facilitate evaluation of hypotheses and status of indicators.

5) Stage five – Evaluate the results of monitoring activities

a) Describe how the information/data from the monitoring programs and supporting studies will be analyzed/evaluated for the AMP.

b) Document exceedances of the indicators and the management responses that were undertaken.

c) Identify whether the results were expected, where results deviated from those expected, why the deviations occurred, and what lessons were learned.

d) Communicate results to the EMC (Section 11.2).

6) Stage six – Adjust and Revise the Hypotheses and Management Strategies

a) Adjust the ABMP implementation plans and actions as required, including knowledge gained from Section 7.2 – Research and Development.

b) Communicate changes to ABMP implementation plans and activities to the EMC.

c) Reassess expected outcomes, potential impacts, and responses to these outcomes for an adjusted plan. Where plan components are related to impacts on Human Health, the permittee shall make reasonable efforts to consult with Interior Health (hbe@interiorhealth.ca).

d) Adjust the AMP as required in consultation with the EMC.

The permittee must develop and implement an Adaptive Management Plan to ensure that the management goals in the approved ABMP are met. The permittee shall deliver the following:

i. The permittee must prepare a draft Terms of Reference (TOR) for the Adaptive Management Plan for discussion at the EMC by February 15, 2015.

ii. The permittee must submit a final TOR by March 15, 2015 to the director for review and approval.

iii. The permittee must prepare a draft AMP for discussion at the EMC by September 30, 2015.

iv. The permittee must submit the final AMP by February 29, 2016 to the director for review and acceptance.

v. The permittee must prepare and submit an annual report documenting the activities undertaken in each stage of the Adaptive Management Plan. The AMP report must be submitted to the director annually by July 31. The first AMP report is due July 31, 2016.

vi. The permittee must update and revise the AMP every three years. The next update report is due December 15, 2021.

vii. The permittee shall implement the AMP to the satisfaction of the director.

viii. The permittee shall notify the director immediately regarding significant deviations from or adjustments to the accepted AMP (e.g., changes in triggers, responses, timeframes and/or study designs).

11. DATA ANALYSIS ACCOUNTABILITY AND TRANSPARENCY

11.1 FIRST NATIONS REPORTING REQUIREMENT

Unless otherwise agreed to by the KNC and the permittee, the permittee shall provide the KNC with information related to any material changes to the Initial Implementation Plan, Adaptive Management Plan, the Calcite Management Plan and the Research and Technology Development Plan. In addition, the permittee shall provide the KNC with all data, information and/or reports generated during the implementation of these plans in accordance with this permit.

11.2 ENVIRONMENTAL MONITORING COMMITTEE (EMC)

The permittee must establish an Environmental Monitoring Committee (EMC), consisting of representatives from the Ministry of Environment and Climate Change Strategy, the Ministry of Energy and Mines, Environment Canada, the Ktunaxa Nation, Interior Health Authority, and the permittee. The Committee will review submissions and provide technical advice to the permittee and director regarding monitoring submissions in Sections:

- 8.2.1 Groundwater Monitoring Program
- 8.3 Local Aquatic Effects Monitoring
- 8.4 Regional Aquatic Effects Monitoring
- 8.5 Calcite Monitoring
- 8.6 Selenium Speciation Monitoring Program
- 8.9 Chronic Toxicity Testing Program
- 8.10 Human Health Risk Assessment
- 10. Adaptive Management
- 11.3 Third-Party Audit

The committee will also provide input to the permittee regarding reports which are required under Sections:

- 4 Tributary Evaluation and Management
- 8.8 Koocanusa Reservoir Burbot Baseline Study 2015
- 9.2.5 Annual Reporting
- 9.3 Toxicity Reporting
- 9.4 Groundwater
- 9.5 LAEMP
- 9.6 RAEMP
- 9.7 Calcite
- 9.8 Koocanusa Reservoir
- 9.9 Water Quality Modelling
- 9.11 Selenium Speciation Monitoring Program
- 10 Adaptive Management
- 11.3 Third-Party Audit

The EMC will convene a public meeting once per calendar year for the purpose of informing the public of information reviewed by the committee and any audit results as per Section 11.3.

The EMC will confirm the scope of third-party audit in Section 11.3 a minimum of 9 months prior to the audit submission deadline.

11.3 **THIRD-PARTY AUDIT**

Monitoring data for this permit and its analysis is subject to the review and audit by a third-party qualified professional on a three-year cycle. The audit must include a review of monitoring data and data analysis for reports submitted under this permit relevant to at least three components (monitoring endpoints) of Teck's environmental monitoring programs undertaken as requirements of this permit for the previous three years and must address at least the following:

i. Data quality and completeness;

ii. Protocols and procedures from the QA/QC plan for the monitoring program; and,

iii. Standard operating procedures and data handling protocols in place for Teck Coal Limited.

The audit objectives scope, components, and criteria must be selected in consultation with the EMC. Each Third-Party Audit Report must be submitted to the EMC and to the director, by October 31 of each audit year. The next Third-Party Audit Report must be submitted to the director by October 31, 2020. The Third-Party Audit Report must report on actions taken to address findings of previous reports.

12. **SECURITY**

Although financial security under the *Environmental Management Act* is not required at this time, the director may require security in the amount and form subject to the conditions the director specifies.

13. **PUBLICATION OF DOCUMENTS**

The Ministry publishes Regulatory Documents on its website for the purpose of research, public education, and to provide transparency in the administration of environmental laws. The permittee acknowledges that the Province may publish any Regulatory Document submitted by the permittee, excluding information that would be excepted from disclosure if the document was disclosed pursuant to a request under section 5 of the *Freedom of Information and Protection of Privacy Act,* and the permittee consents to such publication by the Province.

Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

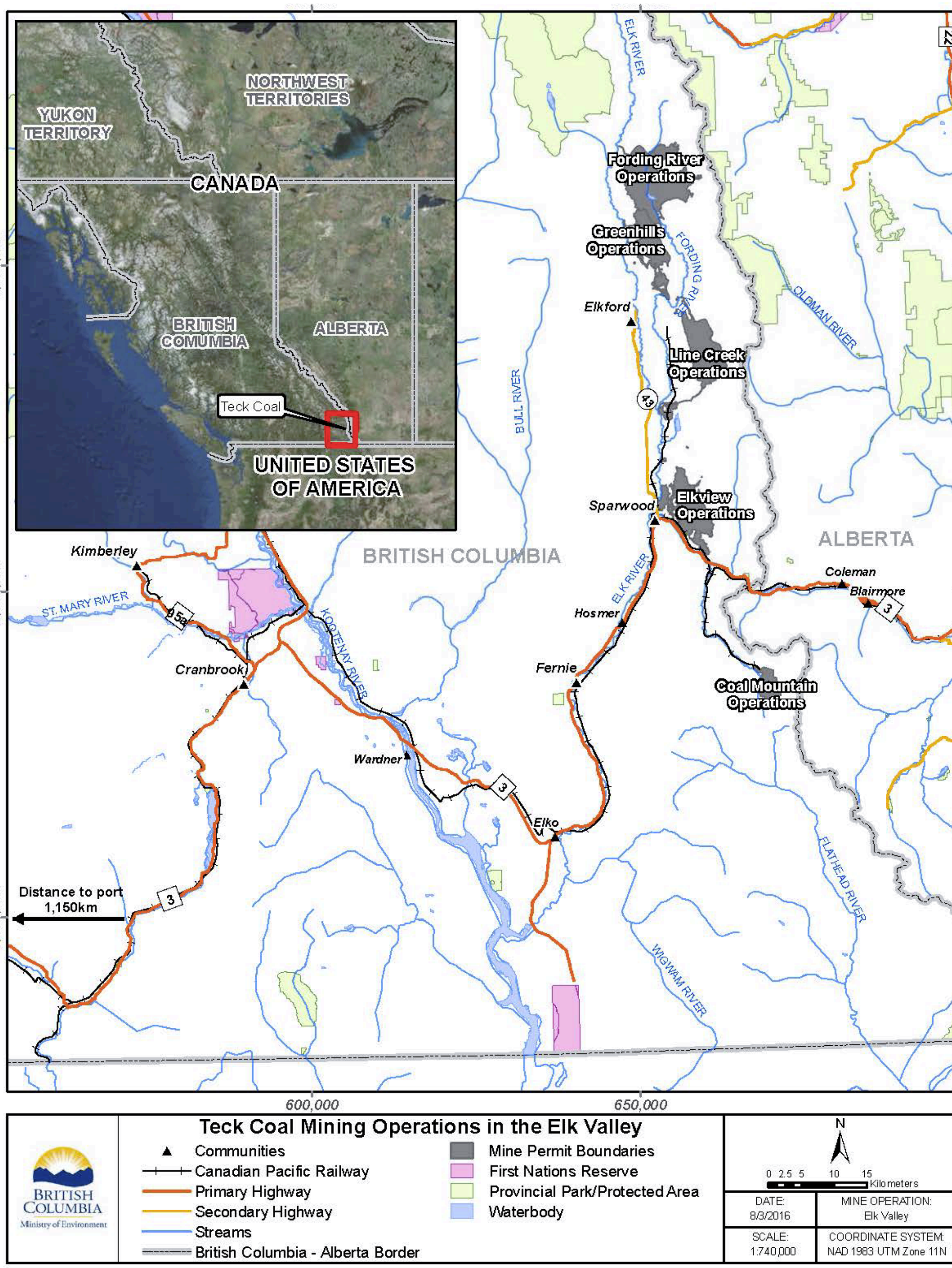
A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDICES 1A-1K: TECK COAL LIMITED OPERATIONS MAPS

Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

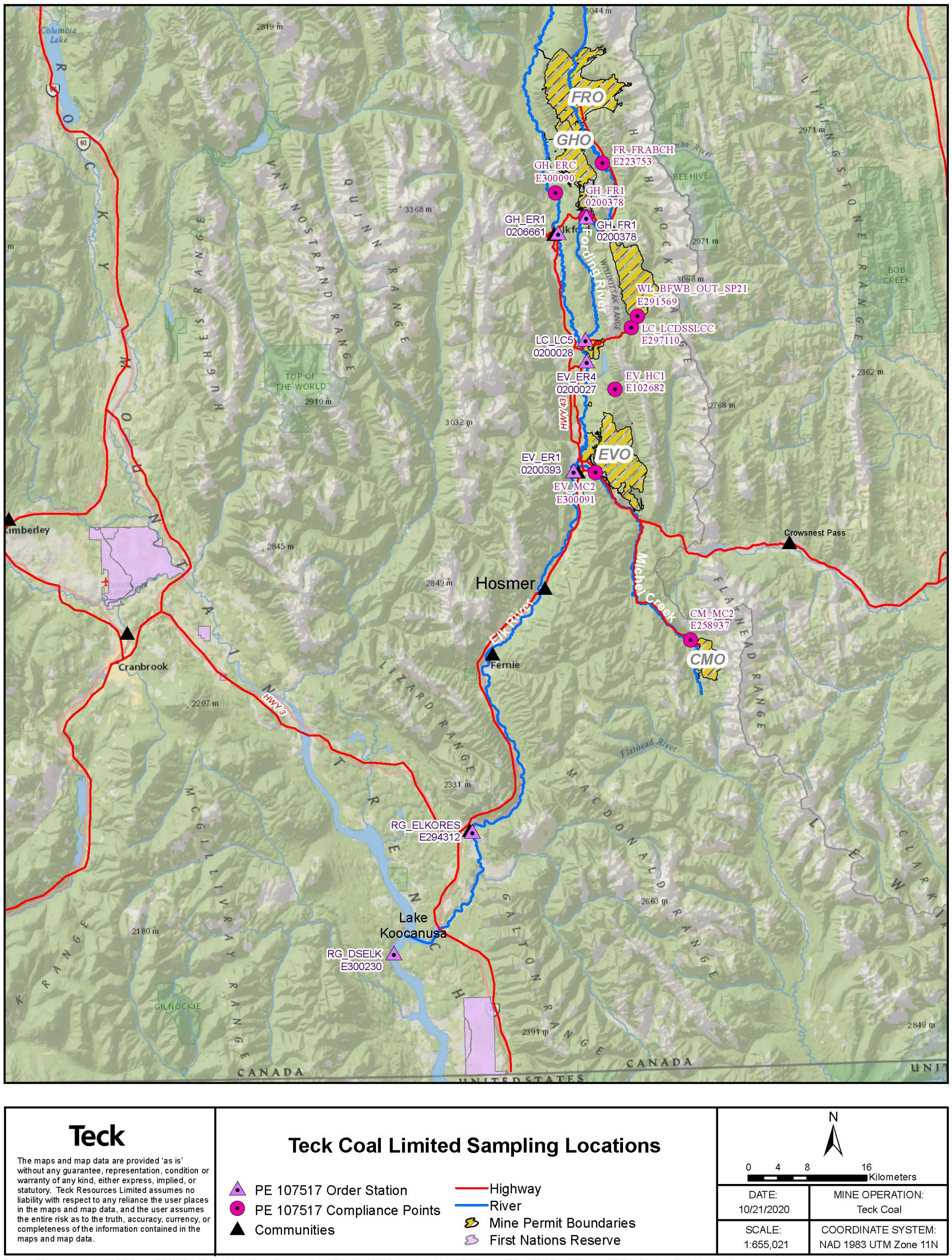
APPENDIX 1A – Teck Coal Limited Location Map



Date issued:	November 19, 2014
Date amended: (most recent)	December 1, 2021

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1B – Teck Coal Limited Sampling Locations Overview Map



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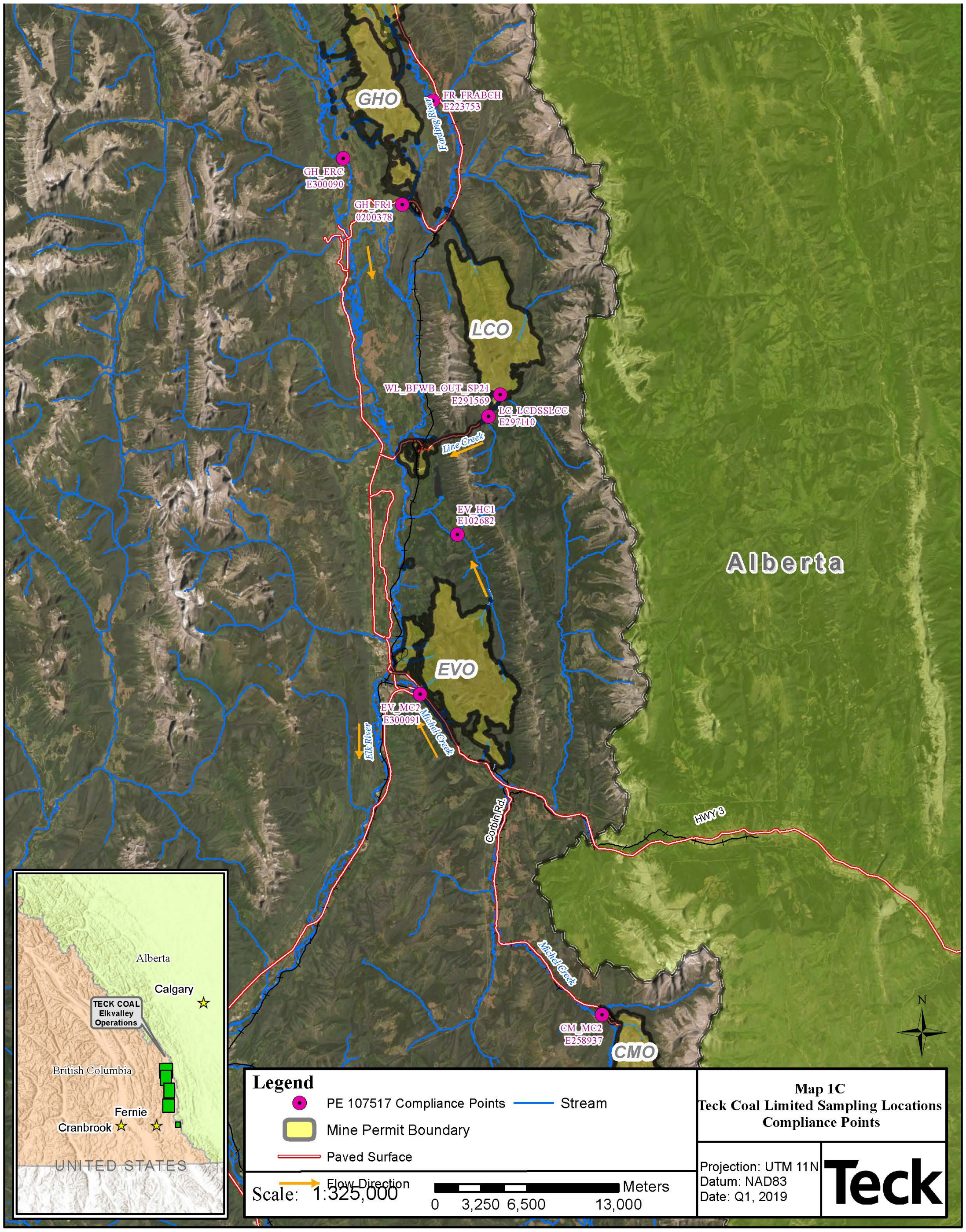
Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1C – Teck Coal Limited Sampling Locations Map – Compliance Points



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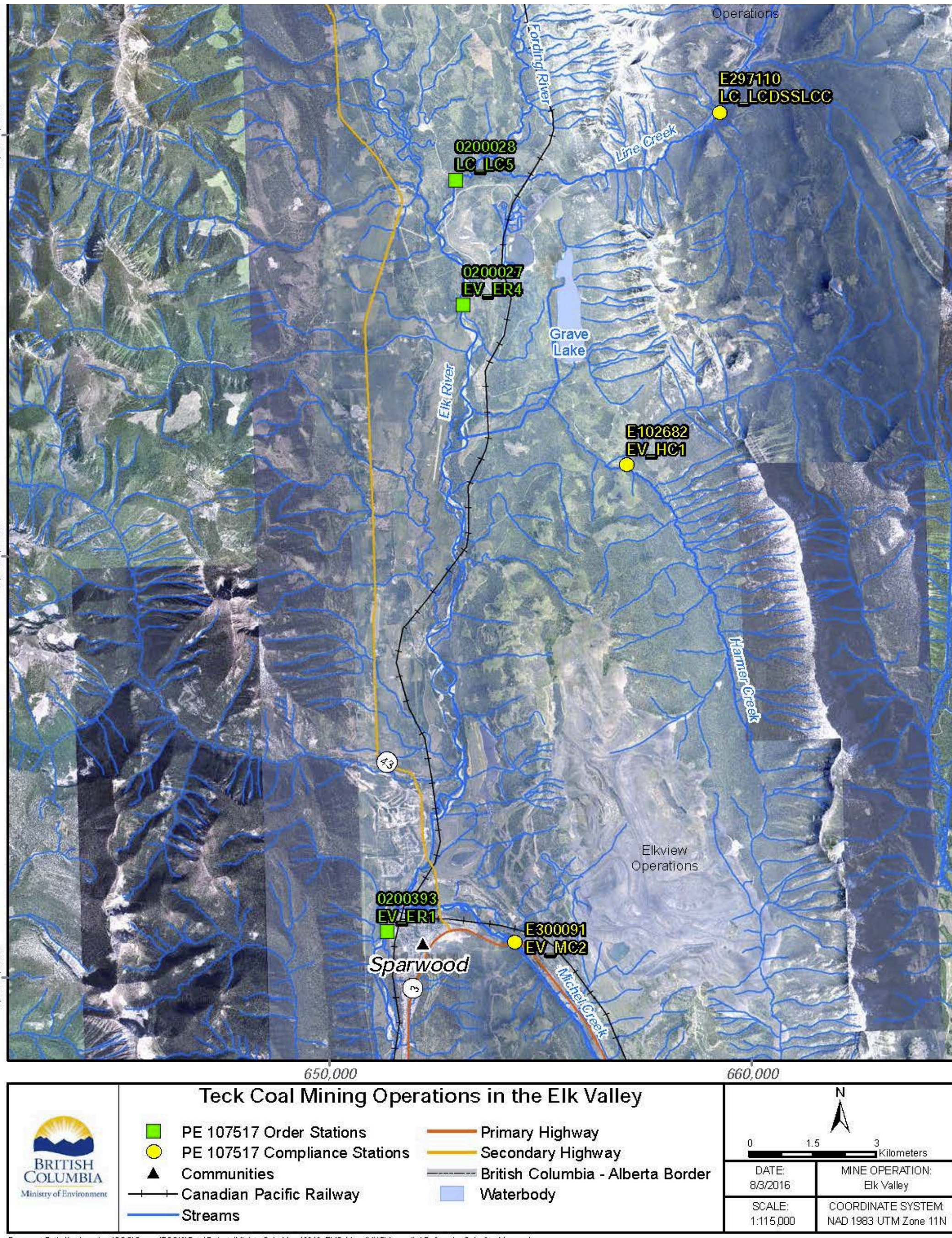
Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

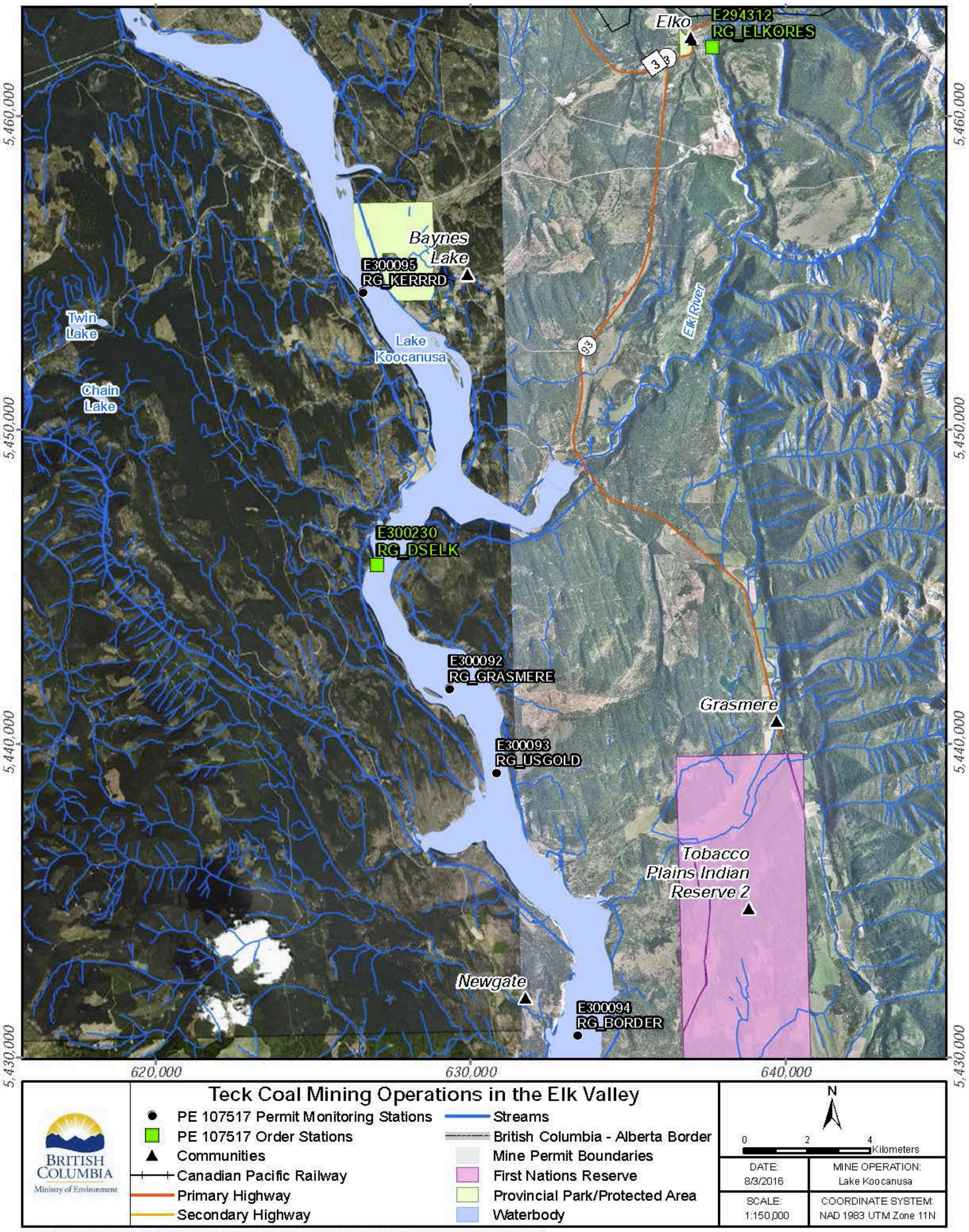
APPENDIX 1D – Teck Coal Limited Sampling Locations Map – Order Stations



Date issued:	November 19, 2014	
Date amended:	December 1, 2021	
(most recent)		

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

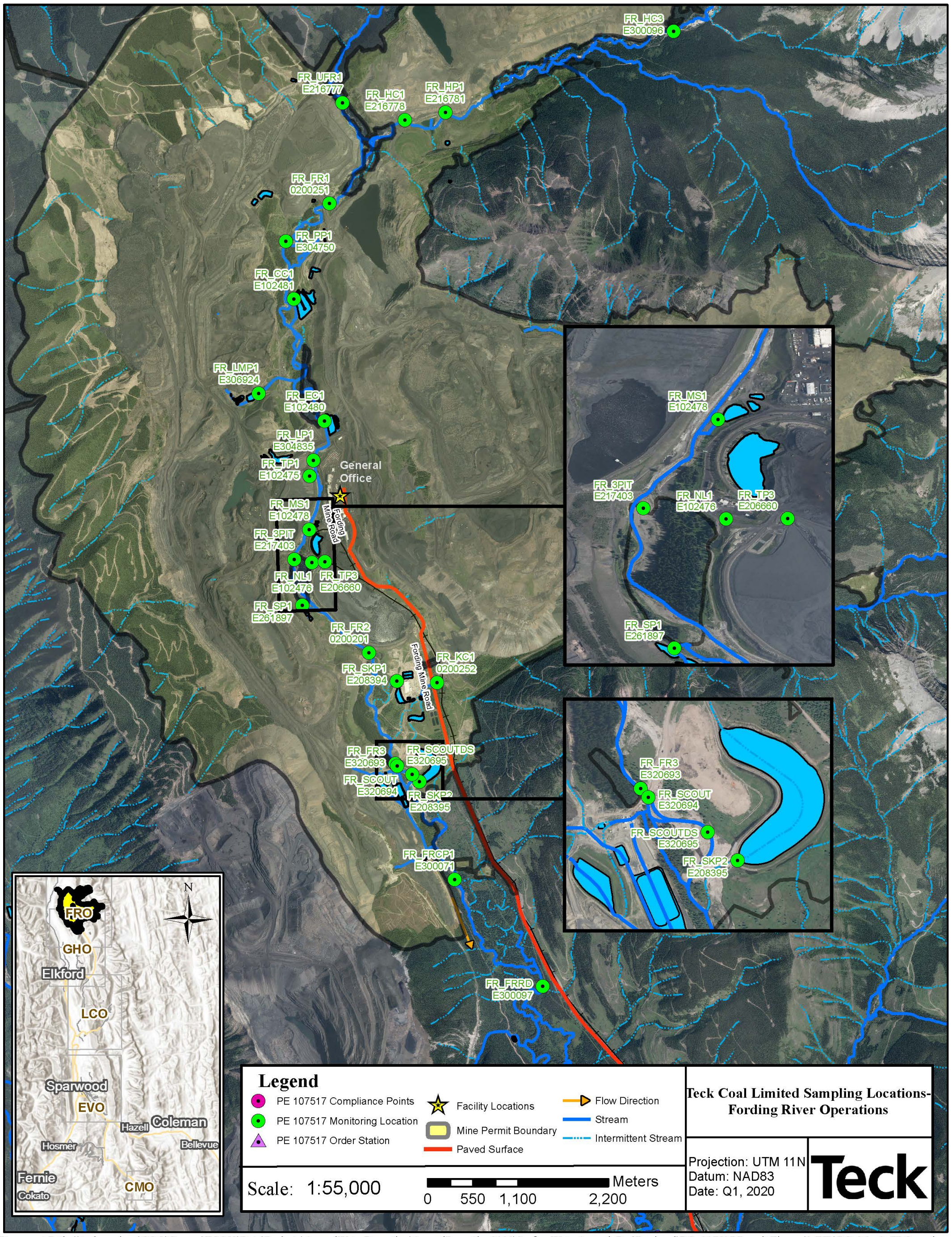
APPENDIX 1E – Teck Coal Limited Sampling Locations Map – Koocanusa Reservoir



Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

APPENDIX 1F – Teck Coal Limited Sampling Locations Map – Fording River



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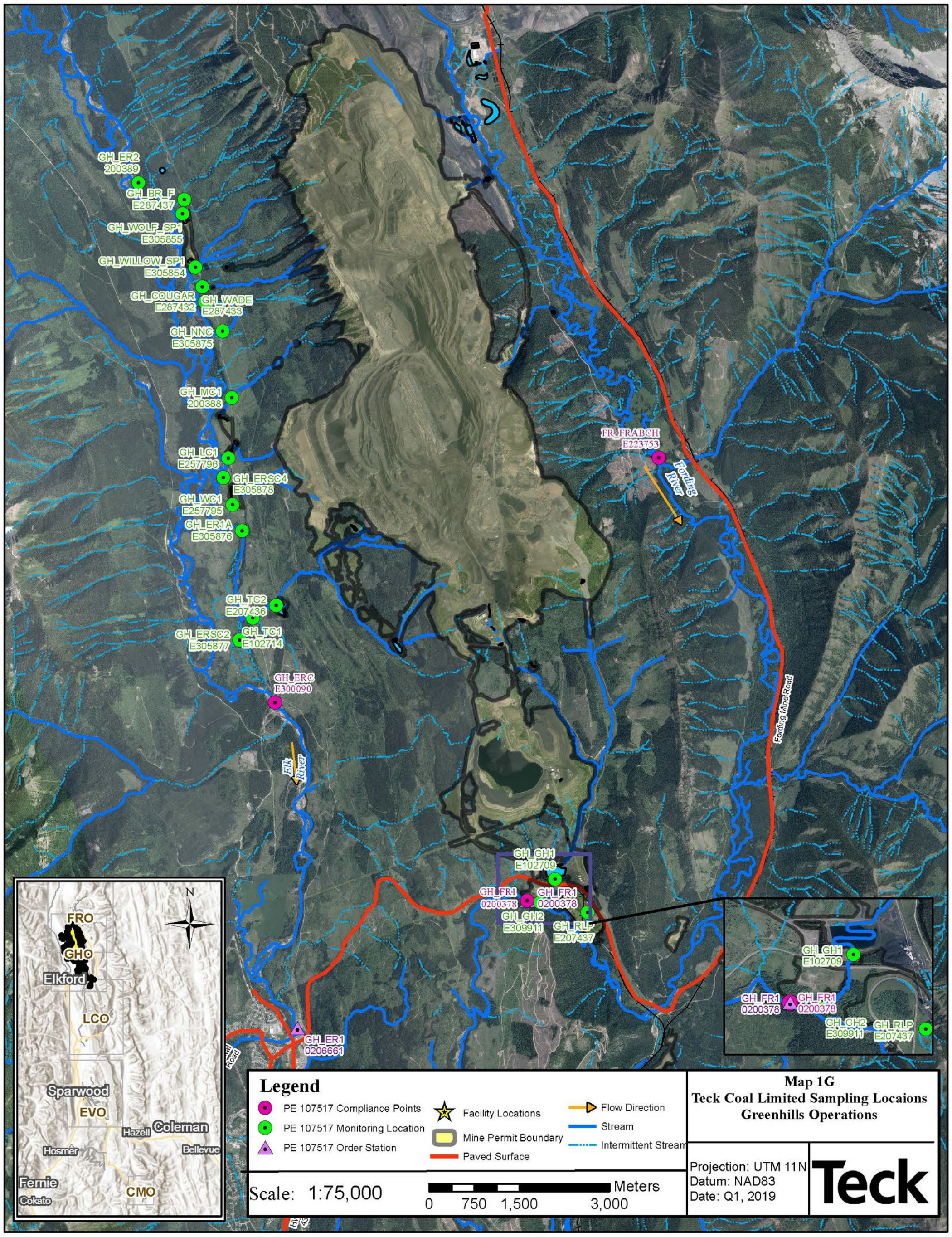
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

 Permit Number: 107517

APPENDIX 1G – Teck Coal Limited Sampling Locations Map – Greenhills Operations



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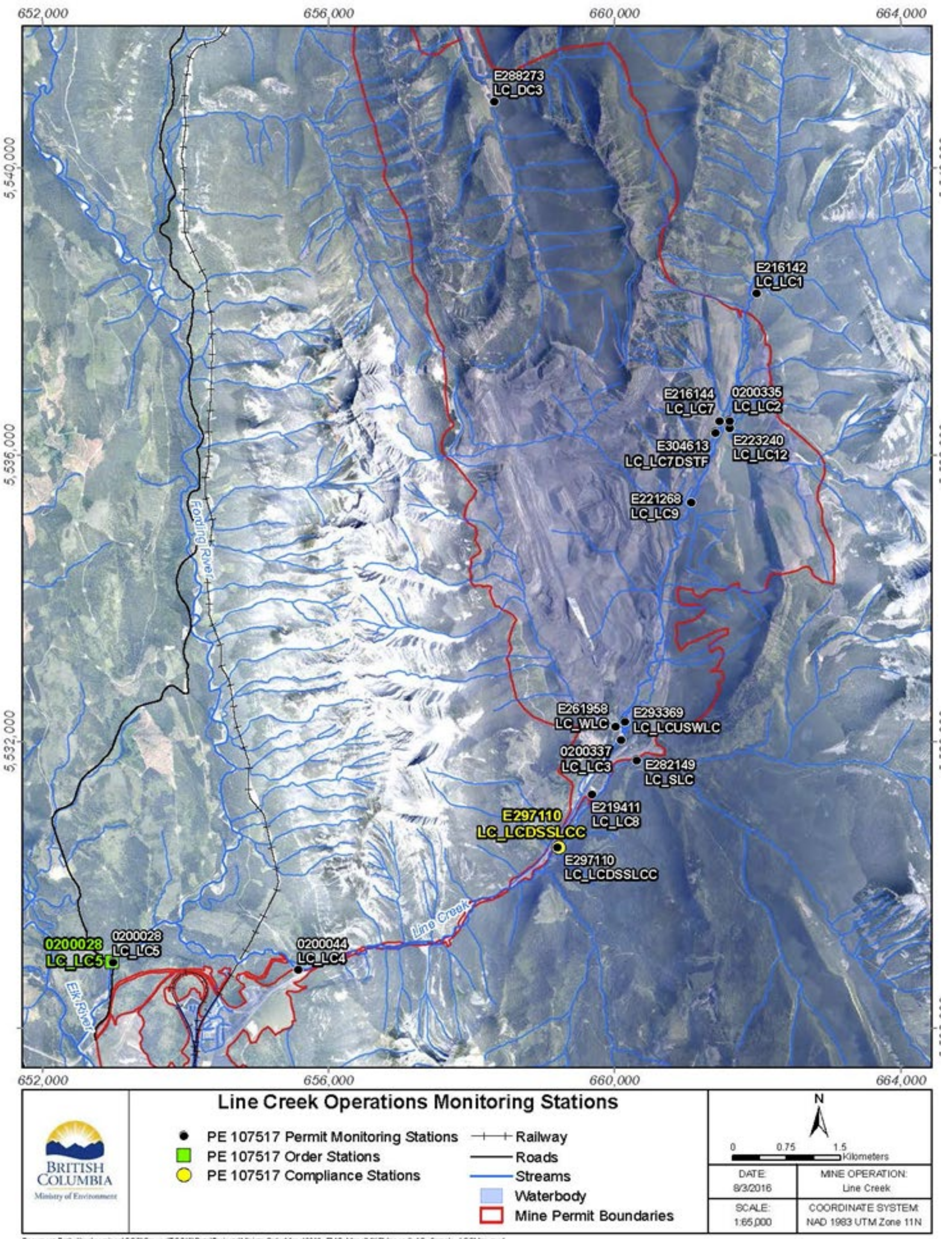
APPENDIX 1H – Teck Coal Limited Sampling Locations Map – Line Creek Operations Phase I



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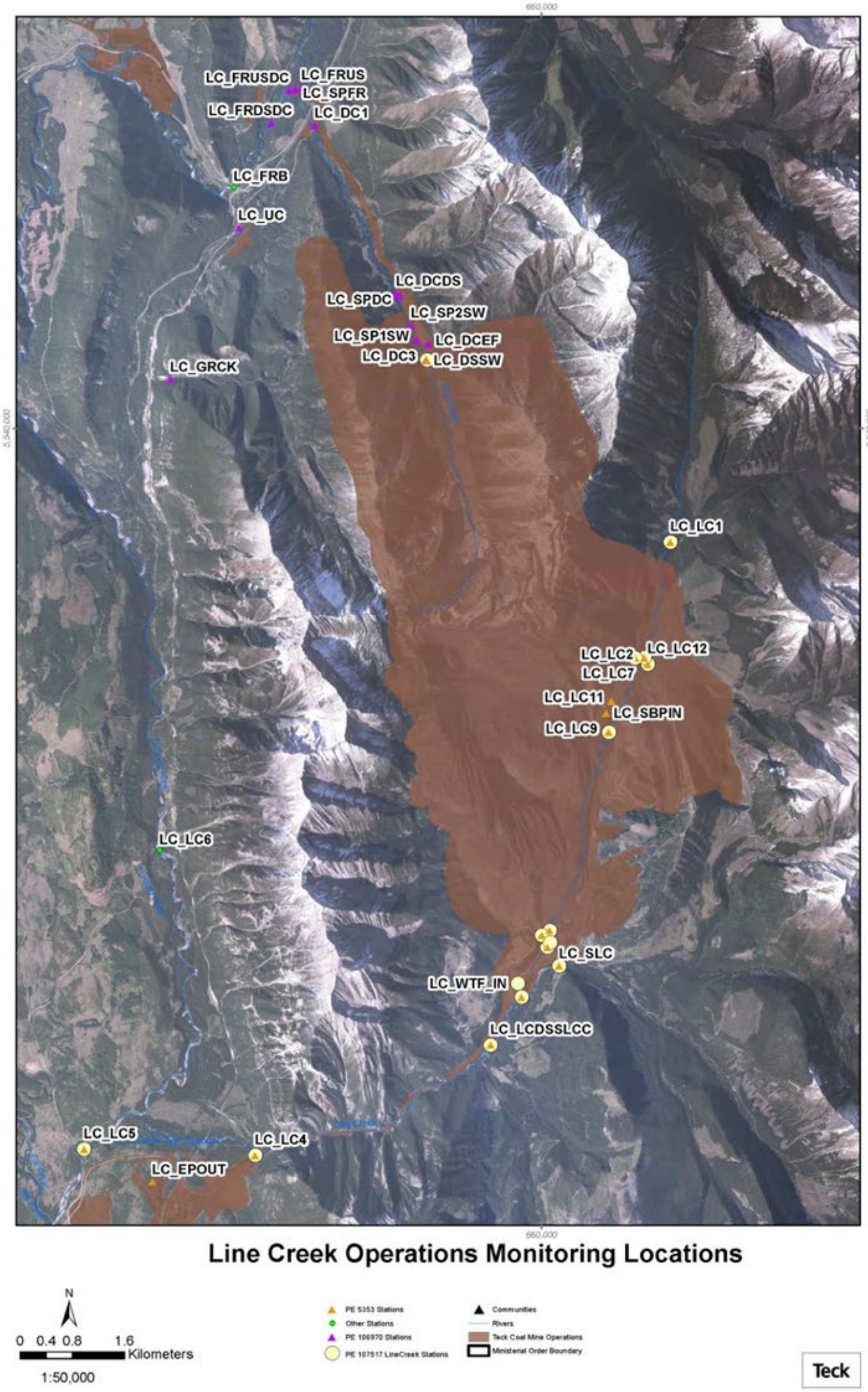
APPENDIX 1I – Teck Coal Limited Sampling Locations Map – Line Creek Operations Phase II



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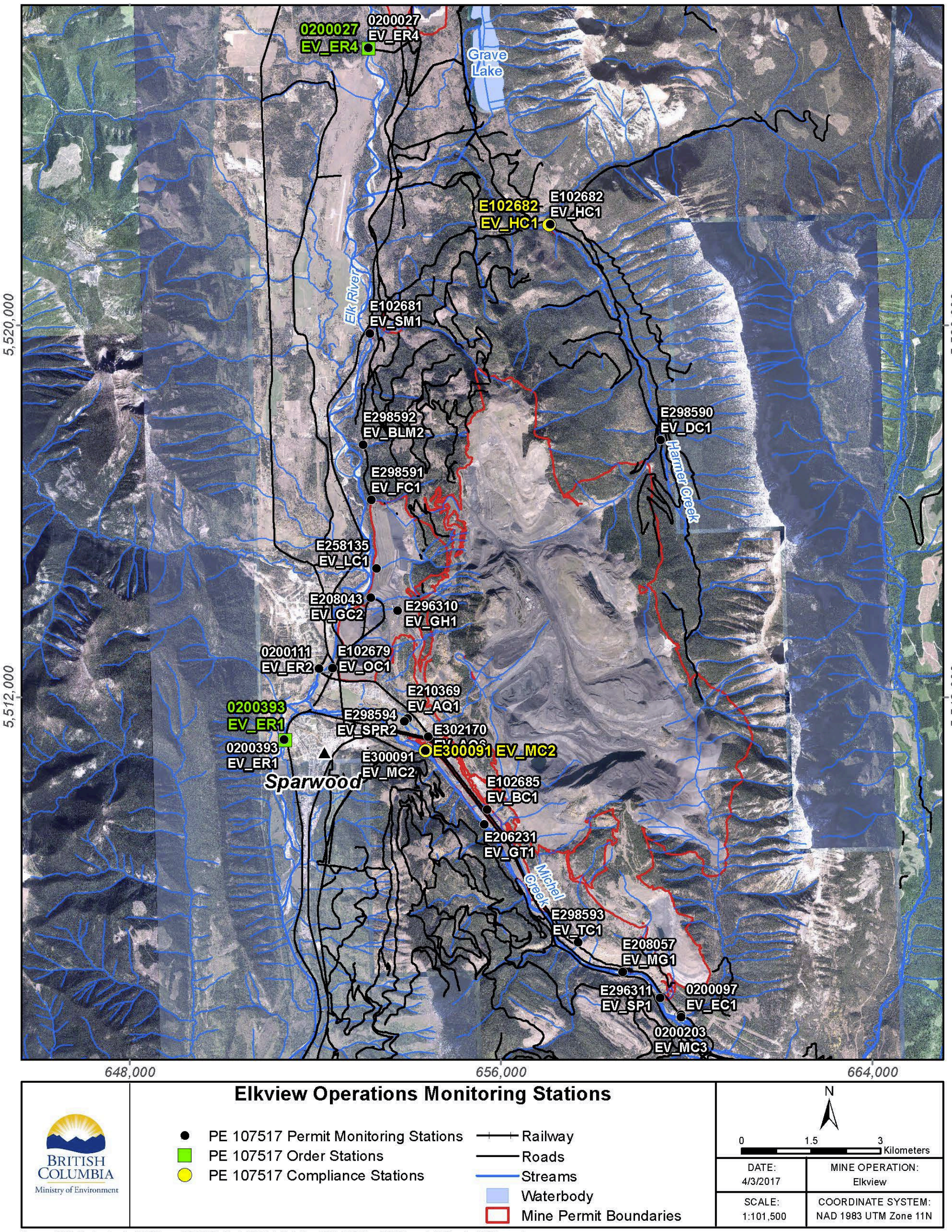
APPENDIX 1J – Teck Coal Limited Sampling Locations Map – Elkview Operations



Document Path: \\teckcominco.loc\CGO\Groups\TCGIS\Data\Projects\MinistryOrderMaps\2016_EMC_Maps\MXD\Appendix1G_Sample_EVOMap.mxd

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APPENDIX 1K – Teck Coal Limited Sampling Locations Map – Coal Mountain

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APPENDIX 2: SURFACE WATER DISCHARGE AND RECEIVING ENVIRONMENT MONITORING PROGRAM

TABLE 10 - DESIGNATED AREA MONITORING PROGRAM – COMPLIANCE POINTS

	FRO – FORDING RIVER ~100m UPSTREAM OF CHAUNCEY CREEK (4)	GHO – FORDING RIVER ~205m DOWNSTREAM OF GREENHILLS CREEK	GHO – ELK RIVER ~220m DOWNSTREAM OF THOMPSON CREEK	LCO – LINE CREEK IMMEDIATELY DOWNSTREAM OF SOUTH LINE CREEK CONFLUENCE	EVO – HARMER SPILLWAY	EVO – MICHEL CREEK AT HWY 3 BRIDGE (4)	CMO – MICHEL CREEK 50m UPSTREAM OF ANDY GOODE CREEK
EMS Number	*E223753*	*0200378*	*E300090*	*E297110*	*E102682*	*E300091*	*E258937*
PARAMETER							
Field Parameters (a)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Conventional Parameters (b)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Major Ions (c)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Nutrients (d)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
Total and Dissolved Metals Scans (e)	W/M	W/M	W/M	W/M	W/M	W/M	W/M
BOD	-	-	-	M	-	-	-
Chlorophyll-*a*	-	-	-	Three times annually, between July 15 & Sept 30 annually	-	-	-
Total Phosphorus	-	-	-	Every two weeks beginning Jun 15 through Sept 30, annually	-	-	-
Bromate	-	-	-	W/M	-	-	-
Hydrogen Peroxide	-	-	-	W/M	-	-	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 4.

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TABLE 11 – DESIGNATED AREA MONITORING PROGRAM – ORDER STATIONS

	FR4 GH_FR1	FR5 LC_LC5	ER1 GH_ER1	ER2 EV_ER4	ER3 EV_ER1	ER4 RG_ELKORES	LK2 RG_DSELK
	UPPER FORDING RIVER (DOWNSTREAM OF GREENHILLS CREEK)	LOWER FORDING RIVER (FORDING RIVER DOWNSTREAM OF LINE CREEK)	ELK RIVER UPSTREAM OF BOIVEN CREEK	ELK RIVER UPSTREAM OF GRAVE CREEK (FROM FORDING RIVER TO MICHEL CREEK)	ELK RIVER DOWNSTREAM MICHEL CREEK	ELK RIVER AT ELKO RESERVOIR	LAKE KOOCANUSA SOUTH OF THE ELK RIVER
EMS Number	*0200378*	*0200028*	*E206661*	*0200027*	*0200393*	*E294912*	*E300230*
PARAMETER							
Field Parameters(a)	W/M	W/M	W/M	W/M	W/M	W/M	M
Conventional Parameters (b)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Major Ions (c)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Nutrients (d)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Total and Dissolved Metals Scan (e)	W/M	W/M	W/M	W/M	W/M	W/M	M/EH
Secchi depth and chlorophyll-a	-	-	-	-	-	-	M

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 12 - DESIGNATED AREA MONITORING PROGRAM – KOOCANUSA RESERVOIR RECEIVING ENVIRONMENT STATIONS

	KOOCANUSA RESERVOIR DOWNSTREAM OF KIKKOMAN CREEK	KOOCANUSA RESERVOIR WEST OF GRASMERE	KOOCANUSA RESERVOIR UPSTREAM OF GOLD CREEK	KOOCANUSA RESERVOIR UPSTREAM OF CANADA/US BORDER
EMS Number	*E300095*	*E300092*	*E300093*	*E300094*
PARAMETER				
Field Parameters(a)	M	M	M	M
Conventional Parameters (b)	M/EH	M/EH	M/EH	M
Major Ions (c)	M/EH	M/EH	M/EH	M
Nutrients (d)	M/EH	M/EH	M/EH	M
Total and Dissolved Metals Scan (e)	M/EH	M/EH	M/EH	M
Secchi depth and chlorophyll-a	M	M	M	M

Note: sample collection is based upon access; ice on the reservoir may prevent sample collection, if this is the case, the monitoring report must include a reason in the report

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 13 - FORDING RIVER OPERATIONS DISCHARGE MONITORING PROGRAM

	TAILINGS SLURRY TO NORTH TAILINGS POND	TAILINGS SLURRY TO SOURTH TAILINGS POND	NORTH LOOP POND (h)	MAINTENANCE AND SERVICES SED POND	EAGLE POND DECANT (h)	CLODE POND (h)	SOUTH KILMARNOCK SED. POND – PHASE I (h)	SOUTH KILMARNOCK SED. POND – PHASE II (h)	HENRETTA PIT EFFLUENT INTO DIVERSION CULVERTS (j)	SMITH PONDS (h)	SWIFT PIT EFFLUENT TO FORDING RIVER	SWIFT-CATARACT SED. POND DOSED WITH ANTISCALANT TO FORDING RIVER (4;5)	LIVERPOOL SED PONDS TO FORDING RIVER (h)	POST SED PONDS TO FORDING RIVER (h)	LAKE MOUNTAIN SEDIMENT PONDS TO LAKE MOUNTAIN CREEK	FLOODPLAIN WIDENING SED. POND DECANT (h)
EMS Number	*E102475*	*E206660*	*E102476*	*E102478*	*E102480*	*E102481*	*E208394*	*E208395*	*E216781*	*E261897*	*E217403*	*E320694*	*E304835*	*E304750*	*E306924*	*E325311*
(h) In-pond sample *EMS Number*	-	-	*E310046*	-	*E310047*	*E310048*	*E310049*	*E310050*	-	*E310051*	-	-	*E310052*	*E310053*	-	*E325312*
PARAMETER																
Field Parameters (a)	-	-	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Conventional Parameters (b)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Major Ions (c)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Nutrients (d)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Total and Dissolved Metals Scan (e)	SA	SA	M	M	M	M	M	M	M	M	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	-	-	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	-	Q	Q
48 hour *Daphnia magna* single concentration toxicity test (g)	-	-	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	-	Q	Q

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 5.
5) Samples are to be collected only when there is discharge via overflow from the FRO-S AWTF Swift Creek Intake. If the discharge is initiated because of a recirculation event at FRO-S AWTF, the monitoring program is not effective during the first four (4) hours of the recirculation event.

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TABLE 14 – FORDING RIVER OPERATIONS RECEIVING ENVIRONMENT AND OTHER MONITORING PROGRAM

	FORDING RIVER U/S OF KILMARNOCK CREEK	FORDING RIVER D/S OF FRO-S AWTF OUTFALL STRUCTURE (4)	FORDING RIVER ~525 m D/S OF CATARACT CREEK	FORDING RIVER D/S OF HENRETTA	FORDING RIVER U/S OF HENRETTA	HENRETTA CREEK AT MOUTH	HENRETTA CREEK UPSTREAM OF MCQUARRIE CREEK	FORDING RIVER NEAR FORDING ROAD	KILMARNOCK AT MOUTH
EMS Number	*0200201*	*E320695*	*E300071*	*0200251*	*E216777*	*E216778*	*E300096*	*E300097*	*0200252*
PARAMETER									
Field Parameters (a)	W/M	W/M	W/M	M	M	W/M	M	M	M
Conventional Parameters (b)	W/M	W/M	W/M	M	M	W/M	M	M	M
Major Ions (c)	W/M	W/M	W/M	M	M	W/M	M	M	M
Nutrients (d)	W/M	W/M	W/M	M	M	W/M	M	M	M
Total and Dissolved Metals Scan (e)	W/M	W/M	W/M	M	M	W/M	M	M	M

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
4) Monitoring location appears in three monitoring tables in this permit, therefore monitoring data must be reported according to the requisite reporting requirements in Section 9 and Appendices 4 and 5.

TABLE 15 – GREENHILLS OPERATIONS DISCHARGE MONITORING PROGRAM

	TAILINGS POND WATER	GREENHILLS CREEK SED. POND DECANT (4)	THOMPSON CREEK SED. POND DECANT	PORTER CREEK SED. POND DECANT	WOLFRAM CREEK SED. POND DECANT	LEASK CREEK SED. POND DECANT	RAIL LOOP SED. POND DECANT	MICKELSON CREEK AT LRP ROAD	WADE CREEK AT LRP ROAD	WOLF CREEK SED. POND DECANT	WILLOW CREEK SED. POND DECANT
EMS Number	*E287438*	*E102709*	*E207436*	*0200385*	*E257795*	*E257796*	*E207437*	*0200388*	*E287433*	*E305855*	*E305854*
PARAMETER											
Field Parameters (a)	-	M	M	M	M	M	M	M	M	M	M
Conventional Parameters (b)	SA	M	M	M	M	M	M	M	M	M	M
Major Ions (c)	SA	M	M	M	M	M	M	M	M	M	M
Nutrients (d)	SA	M	M	M	M	M	M	M	M	M	M
Total and Dissolved Metals Scan (e)	SA	M	M	M	M	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	-	Q	Q	Q	Q	Q	-	-	Q	Q	Q
48 hour *Daphnia magna* single concentration toxicity test (g)	-	Q	Q	Q	Q	Q	-	-	Q	Q	Q

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 5.

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TABLE 16 – GREENHILLS OPERATIONS RECEIVING ENVIRONMENT MONITORING PROGRAM

	ELK RIVER UPSTREAM OF GREENHILLS OPERATIONS	THOMPSON CREEK AT LRP ROAD [3]	COUGAR CREEK AT LRP ROAD	BRANCH F AT LRP ROAD	NO NAME CREEK (GH_NNC)	ELK RIVER SIDE CHANNEL D/S WOLFRAM CREEK (GH_ER1A)	ELK RIVER D/S OF THOMPSON CREEK	ELK RIVER SIDE CHANNEL U/S WOLFRAM CREEK
EMS Number	*0200389*	*E102714*	*E287432*	*E287437*	*E305875*	*E305876*	*E305877*	*E305878*
PARAMETER								
Field Parameters (a)	M	M	M	M	M	M	M	M
Conventional Parameters (b)	M	M	M	M	M	M	M	M
Major Ions (c)	M	M	M	M	M	M	M	M
Nutrients (d)	M	M	M	M	M	M	M	M
Total and Dissolved Metals Scan (e)	M	M	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	-	Q	-	-	-	-	-	-
48 hour *Daphnia magna* single concentration toxicity test (g)	-	Q	-	-	-	-	-	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) The requirement for monitoring at this site will be re-evaluated upon acceptance of the GHO LAEMP study design.
4) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 17 - LINE CREEK OPERATIONS PHASE I DISCHARGE MONITORING PROGRAM

	NO NAME CREEK POND EFFLUENT TO LINE CREEK	MSA NORTH PONDS EFFLUENT TO LINE CREEK	MSA NORTH PONDS EFFLUENT TO LINE CREEK ALTERNATE (4)	CONTINGENCY TREATMENT SYSTEM EFFLUENT TO LINE CREEK (r)
EMS Number	*E221268*	*E216144*	*E304613*	*E219411*
PARAMETERS				
Field Parameters (a)	M	M	M	M
Conventional Parameters (b)	M	M	M	M
Major Ions (c)	M	M	M	M
Nutrients (d)	M	M	M	M
Total and Dissolved Metals Scan (e)	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	Q	Q	Q	-
48 hour *Daphnia magna* single concentration toxicity test (g)	Q	Q	Q	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.
4) Monitoring location E304613 to be used as an alternate for E216144, as required.

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TABLE 18 - LINE CREEK OPERATIONS PHASE II DISCHARGE MONITORING PROGRAM

	LCO DRY CREEK SEDIMENTATION PONDS EFFLUENT TO DRY CREEK VIA THE RETURN CHANNEL	LCO DRY CREEK SEDIMENTATION PONDS EFFLUENT TO FORDING RIVER VIA OUTFALL (WHEN IN USE)	DIVERSION STRUCTURE SPILLWAY (WHEN IN USE)	SEDIMENTATION POND 1 SPILLWAY (WHEN IN USE)	SEDIMENTATION POND 2 SPILLWAY (WHEN IN USE)	SEDIMENTATION POND 3 SPILLWAY (WHEN CONSTRUCTED AND IN USE)
EMS Number	*E295211*	*E295231*	*E295313*	*E295314*	*E295315*	*E295316*
PARAMETER						
Field Parameters (a)	BP-W/M (j)	W/M	D*/W	D*/W	D*/W	D*/W
Conventional Parameters (b)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
Major Ions (c)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
Nutrients (d)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
Dissolved Metals Scan (e)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
Total Metals Scan (e)	BP-W/M	W/M	D*/W	D*/W	D*/W	D*/W
96-hour LC50 Rainbow Trout(g)	Q	Q	-	-	-	-
48-hour LT50 *Daphnia magna* (g)	Q	Q	-	-	-	-
Selenium Species	BP-W/M	-	-	-	-	-
Chlorophyll-*a*	BP-W/M	-	-	-	-	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 19 – LINE CREEK OPERATIONS PHASE I RECEIVING ENVIRONMENT MONITORING PROGRAM

	LINE CREEK UPSTREAM OF PROCESS PLANT	LINE CREEK DOWNSTREAM OF WEST LINE CREEK	LINE CREEK UPSTREAM OF ROCK DRAIN	LINE CREEK UPSTREAM OF WLC BELOW ROCK DRAIN	LINE CREEK UPSTREAM MSA NORTH PIT	SOUTH LINE CREEK	WEST LINE CREEK	NORTH HORSESHOE CREEK NEAR MOUTH
EMS Number	*0200044*	*0200337*	*0200335*	*E293369*	*E216142*	*E282149*	*E261958*	*E223240*
PARAMETER								
Field Parameters (a)	W/M	W/M	M	M	M	M	M	M
Conventional Parameters (b)	W/M	W/M	M	M	M	M	M	M
Major Ions (c)	W/M	W/M	M	M	M	M	M	M
Nutrients (d)	W/M	W/M	M	M	M	M	M	M
Nitrate	-	-	-	W	-	-	W	-
Total and Dissolved Metals Scan (e)	W/M	W/M	M	M	M	M	M	M
BOD	-	W/M	M	M	-	M	-	-
Total Sulphide	-	W/M	-	-	-	-	-	-
Bromate	W/M	W/M	-	-	-	-	-	-
Hydrogen peroxide (Teck Internal Lab Results)	W/M	W/M	-	-	-	-	-	-

1) Refer to Table 23, Appendix 3, for abbreviation description.
2) Refer to Table 24, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 20 – LINE CREEK OPERATIONS PHASE II RECEIVING ENVIRONMENT MONITORING PROGRAM

	EAST TRIBUTARY OF LCO DRY CREEK	LCO DRY CREEK UPSTREAM OF EAST TRIBUTARY CREEK	LCO DRY CREEK DOWNSTREAM OF SEDIMENTATION PONDS	LCO DRY CREEK NEAR MOUTH	UNNAMED CREEK	GRACE CREEK UPSTREAM OF THE CP RAIL TRACKS	FORDING RIVER 100M UPSTREAM OF THE CONVEYANCE OUTFALL (K)	FORDING RIVER UPSTREAM OF LCO DRY CREEK, 100M DOWNSTREAM OF THE CONVEYANCE OUTFALL TO FORDING RIVER (K)	FORDING RIVER DOWNSTREAM OF LCO DRY CREEK	CHAUNCEY CREEK
EMS Number	*E288274*	*E288273*	*E295210*	*E288270*	*E295213*	*E288275*	*E295232*	*E288271*	*E288272*	*E295214*
PARAMETER										
Field Parameters(a)	M	BP-W/M	BP-W/M**(j)**	W/M	M	M	M	M	W/M	M
Conventional Parameters(b)	M	BP-W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Major Ions (c)	M	BP-W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Nutrients (d)	M	BP-W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Dissolved Metals Scan (e)	M	BP-W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Total Metals Scan (e)	M	BP-W/M	BP-W/M	W/M	M	M	M	M	W/M	M
Selenium Species	-	BP-W/M	BP-W/M	-	-	-	-	-	-	-
Chlorophyll-*a*	M	BP-W/M	BP-W/M	W/M	-	-	-	-	-	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 21 - ELKVIEW OPERATIONS DISCHARGE MONITORING PROGRAM

	WESTFORK TAILINGS IMPOUNDMENT DISCHARGE TO GROUND	ERICKSON CREEK (@MOUTH) DISCHARGE TO MICHEL CREEK	SOUTH PIT CREEK SEDIMENTATON POND DISCHARGE TO MICHEL CREEK	MILLIGAN CREEK SEDIMENTATION POND DISCHARGE TO MICHEL CREEK	GATE CREEK SEDIMENTATION POND DISCHARGE TO MICHEL CREEK	BODIE CREEK SEDIMENTATION POND DISCHARGE TO MICHEL CREEK	AQUEDUCT CREEK CONTROL STRUCTURE TO AQUEDUCT CREEK
EMS Number	*E296310*	*0200097*	*E296311*	*E208057*	*E206231*	*E102685*	*E302170*
PARAMETER							
Field Parameters (a)	SA	M	M	M	M	M	M
Conventional Parameters (b)	SA	M	M	M	M	M	M
Major Ions (c)	SA	M	M	M	M	M	M
Nutrients (d)	SA	M	M	M	M	M	M
Total and Dissolved Metals Scan (e)	SA	M	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	-	Q	Q	Q	Q	Q	Q
48 hour *Daphnia magna* single concentration toxicity test	-	Q	Q	Q	Q	Q	Q

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 22 - ELKVIEW OPERATIONS DISCHARGE MONITORING PROGRAM (CONTINUED)

	OTTO CREEK (@MOUTH) DISCHARGE TO ELK RIVER	GODDARD CREEK SEDIMENTATION POND DECANT DISCHARGE TO GODDARD MARSH VIA ELK RIVER	LINDSAY CREEK INFILTRATION BASIN DISCHARGE TO GROUND	DRY CREEK SEDIMENTATION POND DECANT TO HARMER CREEK	6 MILE CREEK SEDIMENTATION POND DECANT DISCHARGE TO ELK RIVER
EMS Number	*E102679*	*E208043*	*E258135*	*E298590*	*E102681*
PARAMETER					
Field Parameters (a)	M	M	M	M	M
Conventional Parameters (b)	M	M	M	M	M
Major Ions (c)	M	M	M	M	M
Nutrients (d)	M	M	M	M	M
Total and Dissolved Metals Scan (e)	M	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	Q	Q	Q	Q	Q
48 hour *Daphnia magna* single concentration toxicity test(g)	Q	Q	Q	Q	Q

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 23– ELKVIEW OPERATIONS RECEIVING ENVIRONMENT AND OTHER MONITORING PROGRAM

	MICHEL CREEK UPSTREAM OF ERICKSON CREEK	ELK RIVER UPSTREAM OF MICHEL CREEK	BALMER CREEK @ CFI ROAD	FENNELON CREEK @ CFI ROAD	SPRING CREEK @ MOUTH WITH AQUADUCT CREEK	THRESHER CREEK @ MILLIGAN ROAD
EMS Number	*0200203*	*0200111*	*E298592*	*E298591*	*E298594*	*E298593*
PARAMETER						
Field Parameters (a)	W/M	M	M	M	M	M
Conventional Parameters (b)	W/M	M	M	M	M	M
Major Ions (c)	W/M	M	M	M	M	M
Nutrients (d)	W/M	M	M	M	M	M
Total and Dissolved Metals Scan (e)	W/M	M	M	M	M	M

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 24– COAL MOUNTAIN OPERATIONS DISCHARGE MONITORING PROGRAM

	DECANT DISCHARGE FROM MAIN INTERCEPTOR SEDIMENTATION PONDS (h)	DECANT DISCHARGE FROM CORBIN SEDIMENTATION POND (h)	PENGELLY CHANNEL DECANT (h)	SOWCHUCK SUMP
EMS Number	*E102488*	*E206438*	*E298733*	*E298734*
PARAMTER				
Field Parameters (a)	M	M	M	M
Conventional Parameters (b)	M	M	M	M
Major Ions (c)	M	M	M	M
Nutrients (d)	M	M	M	M
Total Metals Scan (e)	M	M	M	M
96 hour Rainbow Trout single concentration toxicity test (g)	Q	Q	Q	-
48 hour LT_{50} *Daphnia magna* single concentration toxicity test (g)	Q	Q	Q	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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TABLE 25 – COAL MOUNTAIN OPERATIONS RECEIVING ENVIRONMENT MONITORING PROGRAM

	MICHEL CREEK UPSTREAM OF OPERATIONS	CORBIN CREEK NEAR CONFLUENCE WITH MICHEL CREEK
EMS Number	*E258175*	*0200209*
PARAMETER		
Field Parameters(a)	M	W/M
Conventional Parameters (b)	M	W/M
Major Ions (c)	M	W/M
Nutrients (d)	M	W/M
Total Metals Scan (e)	M	W/M

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.1.2.2 and the Regional Surface Flow Monitoring Plan for flow monitoring requirements.

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APPENDIX 3: MONITORING PROGRAM NOTES AND EXPLANATIONS

Table 26 - Abbreviations for Surface Water Monitoring Program

A	Annual frequency
3X/W	Sampling three times per week
1X/2W	Sampling once every two weeks
1X/6W	Six week in-stream cycle
TW	Twice weekly
TA	Twice annually
C	Continuous Monitoring refer to (f) Table 24
D	Daily frequency
D*/W	One sample within the first 24 hours when actively discharging at spillway, then weekly thereafter for continued discharge from the spillways. Discharge from the spillway(s) occurs for flows greater than a 1:10 year, 24-hour storm event.
M	Monthly frequency
M/EH	Monthly frequency of one epilimnetic composite of water sampled from three depths (e.g. 1m, 5m,10m) and another hypolimnetic composite of water sampled from three depths (e.g. 20m,32m,45m) Stratification into an epilimnion and hypolimnion will be confirmed wherever a thermocline (defined as a 1°C change over 1 meter depth) is recorded. This temperature differential must be sustained in order to constitute stratification. Where stratified, one composite sample will be formed from three evenly spaced grab samples in the epilimnion and one composite sample similarly from the hypolimnion. Where unstratified, samples will be collected 3 m from the surface, 3 m from the substrate and at the mid-point of the water column. These samples will be averaged to comprise a composite sample.
Q	Quarterly frequency
Q*	Toxicity testing done weekly until one year after commissioning is completed, at which time testing must be done quarterly.
SA	Semi-Annual frequency (twice per year), SA sampling schedules must coincide with the monthly sampling schedule for sampling locations where both sampling frequencies are required.
W/M	Weekly frequency March 15 – July 15, monthly during the rest of the year.
BP-W/M	Weekly frequency March 15 to at least August 31 during bypass of the LCO Dry Creek Water Management System, monthly during the rest of the year, depending on unexpected monitoring results that indicate potential ortho-P uptake or the generation of organic selenium species
BOD	5-day Biochemical Oxygen Demand
EPH	Extractable Petroleum Hydrocarbons, a combination of HEPH (C19-32) & LEPH (C10-19)
TSS	Total Suspended Solids

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Table 27- Surface Water Monitoring Program: Explanatory Notes

a	**Field Parameters** must include water temperature, specific conductance, dissolved oxygen, pH; for Koocanusa Reservoir locations this includes vertical profiles of dissolved oxygen and temperature
b	**Conventional Parameters** must include specific conductance, total dissolved solids, total suspended solids, hardness, alkalinity, dissolved organic carbon, total organic carbon, and turbidity.
c	**Major Ions** must include bromide, fluoride, calcium, chloride, magnesium, potassium, sodium, sulphate.
d	**Nutrients** must include ammonia, nitrate, nitrite, TKN, orthophosphate, total phosphorus.
e	**Dissolved Metals Scan** must include aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. **Total Metals Scan** must include aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc.
f	Flow monitoring locations may be changed through approved flow monitoring plan and must follow latest approved plan. Flow measurements must be taken in accordance with Section 8.1.2.2 or in accordance with an approved Flow Monitoring Plan.
g	Acute toxicity tests must coincide with water quality sampling and-must be implemented in accordance with the toxicity testing program approved by the director. Teck shall collect samples when ponds are decanting within the permitted sampling frequency
h	If the discharge point is not decanting to the receiving environment, water quality samples must be taken just inside the decant point for all parameters, with the exception of toxicity.
i	**Selenium Speciation** must include total selenium, dissolved selenium, selenate (Se (VI)), selenite (Se (IV)), methylseleninic acid (MeSe (IV)), selenocyanate (SeCN), selenomethionine (SeMe), selenosulfate, dimethylselenoxide (DMSeO), methaneselenonic acid (MeSe(VI) and unknown selenium species.
j	Field observations of algae growth (presence/absence and photograph)
k	Monitoring at this location is not required until commissioning of the conveyance works authorized in section 2.9 for the discharge to the Fording River. The permittee must notify the Ministry 1 year prior to discharge through the outfall to discuss initiation of monitoring at this location.
o (LCO)	Water temperature, dissolved oxygen, pH must be continuously monitored.
r (LCO)	To be sampled only when in use.

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APPENDIX 4: SELENIUM AND NITRATE TREATMENT FACILITIES

APPENDIX 4A – Selenium and Nitrate Treatment Facility General Operational Requirements

APPENDIX 4B – West Line Creek Active Water Treatment Facility (AWTF)

APPENDIX 4C – Elkview Operations Saturated Rock Fill (EVO SRF)

APPENDIX 4D – Fording River Operations – South (FRO-S) AWTF

APPENDIX 4E – Fording River Operations – North (FRO-N) SRF

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APPENDIX 4A – Selenium and Nitrate Treatment Facility General Operational Requirements

This section includes requirements that apply to all selenium and nitrate treatment facilities. Subsequent sections include facility-specific requirements.

4A1 COMMISSIONING

For the purpose of this permit, commissioning means bringing selenium and nitrate treatment facility works into operation. A maximum of 120 days in forward flow during commissioning is considered a reasonable time to undertake operational refinement or adjustment of works to optimize efficiency and/or effluent quality prior to moving to the operational phase of the treatment facility. The permittee must notify the director when the facility commences forward flow and commissioning must be completed within 120 days of commencing forward flow. Alternative commissioning periods must be approved by the director.

During pre-commissioning and commissioning of a treatment facility, the authorized discharge limits and associated site performance objectives for each specific facility included in the subsequent sections do not apply, but the discharge is required to be non-acutely toxic as per Section 6.2 and the downstream Compliance Point compliance limits apply. During the time that commissioning is underway, periodic reporting on the status of commissioning must be provided to the satisfaction of the director. Once the commissioning phase is complete, or the maximum approved commissioning period has ended, whichever occurs first, the operational phase begins, and the permittee must notify the director.

4A2 COMMISSIONING PLAN

A Commissioning Plan for each selenium and nitrate treatment facility must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of the discharge from the treatment facility while in forward flow during the commissioning phase. The Commissioning Plan must include but is not necessarily limited to operational procedures required to commission and to start-up following a shut-down of the water treatment facility, including sequencing, estimated timeline of steps, and any additional monitoring and reporting required to demonstrate that no adverse environmental impacts result from commissioning. The

Commissioning Plan must, at a minimum, include the operational monitoring for each specific facility as required by subsequent sections.

4A3 **OPERATIONS PLAN**

An Operations Plan for each selenium and nitrate treatment facility and the associated authorized works in Appendix 4 must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of the discharge from the treatment facility during the operational phase. The Operations Plan must include but is not necessarily limited to:

i. The facility operator's manual, with provision for its continual improvement;

ii. An overview of the planned maintenance program which includes an inventory of facility components and authorized replacement parts, and a detailed description of inspection, repair and replacement frequency for facility components;

iii. Documentation to verify that the facility is operated at all times within specifications and in a manner to ensure compliance with this authorization and other applicable legislation;

iv. Procedures for safely shutting down the treatment facility; and

v. Actions to be taken if effluent quality fails to meet the requirements of this permit;

vi. Contingency planning which describes built-in redundancy of the facility and outlines measures to prevent emergency conditions from occurring; and

vii. Key metrics to be used to demonstrate the performance of the treatment facility relative to the intended performance.

The Operations Plan must be reviewed and updated following the first year of facility operations and as needed thereafter to assess its appropriateness for the authorized works, discharges and conditions. Results of the initial review must be provided to the director in the commissioning report prepared under Section 4A6 of this permit. Changes in procedures may be required by the director on the basis of this or later assessments, the operational records for the treatment facility and/or the results of discharge and receiving environment monitoring under Section 8. Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the quarterly report for the time period when the minor update was made.

4A4 **PROCESS MODIFICATIONS**

The permittee must notify the director in writing, prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge from the selenium and nitrate treatment facilities. Notwithstanding notification under this Section, permitted levels must not be exceeded.

4A5 **NEW WORKS**

The director may require upgrading of the selenium and nitrate treatment works and disposal facilities based on monitoring results, and/or any other pertinent information. Plans and specifications for new pollution treatment works and upgrades to existing works must be submitted to the director as an amendment application. All new works must be approved before a discharge from the works commences.

4A6 **SITE SPECIFIC ENVIRONMENTAL EMERGENCY RESPONSE PLAN**

A Site-Specific Environmental Emergency Response Plan must be prepared for all selenium and nitrate treatment facilities. The plan must be submitted to the director prior to commencement of the discharge from the selenium and nitrate treatment facilities.

The plan must include, but is not limited to:

i. A description of measures to mitigate any health or environmental impacts, if emergencies occur;
ii. Specific reference to the Spill Reporting Regulation; and
iii. Instructions for staff in the event of an emergency, including contact information for local authorities (fire, police, public health), Emergency Management BC, and the director.

Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the quarterly report for the time period when the minor update was made.

4A7 DISCHARGE MONITORING

The permittee must sample the parameters at the sampling sites at the specific frequencies as defined in subsequent sections in Appendix 4. The influent and discharge water sampling sites are located approximately as shown in subsequent sections in Appendix 4. Sampling and analytical procedures in Section 8.1.2 apply to the monitoring required per Appendix 4 of this permit.

4A8 COMMISSIONING REPORT

Within 12 months of finalizing the commissioning phase of the selenium and nitrate treatment facility, the permittee must submit a commissioning report, prepared by a Qualified Professional to the director. The report must document the results of performance monitoring and system optimization over the first year of operations at the facility and recommend any necessary system improvements.

4A9 QUARTERLY TREATMENT PERFORMANCE REPORT

The permittee must submit a quarterly treatment performance report to the director within 30 days of the end of the quarter in which the samples were collected. The quarterly treatment performance report must include the following for each water treatment facility:

i. Effluent water quality results used to calculate monthly averages for the limits in Section 2 and Appendix 4, if applicable;
ii. Calculated rolling 30-day cumulative total consecutive hours in recirculation for each day of the quarter;
iii. A summary of timing and duration of authorized and unauthorized bypass events (i.e., full recirculation events) and routine and enhanced monitoring conducted during each bypass event.
iv. Effluent water quality results exceeding limits and targets or other criteria, such as daily maximums or as specified by the director;
v. Facility throughput and availability;
vi. Selenium and nitrate load removal;
vii. A summary of selenium speciation data;
viii. Identification of all missing data and all QA/QC issues;

ix. All toxicity test results and raw laboratory data sheets for all mortality results;

x. All reportable spills or other incidents related to water quality, occurring in the quarter;

xi. A summary of operational and/or performance highlights and trends from the quarter, including key performance indicators;

xii. Effluent water quality results exceeding alarm level 3 at the effluent retention pond;

xiii. Explanation of the most probable cause(s) of any non-compliances;

xiv. All measures taken to reduce or eliminate non-compliances; and

xv. Any additional sampling results for the compliance points identified in Section 2 obtained for any reason, whether compliance, maintenance, or operational purposes. All test data must be reported within 30 days of the end of the quarter in which sampling occurred. These additional results may be reported in summary form. Further information on the testing event may be requested in writing by the director.

Results from samples collected in the last month of the quarter that are not available must be included in the following quarterly report. Any deviation from the information listed in this section must be communicated in the quarterly report and include rationale for the changes.

4A10 **ANNUAL TREATMENT PERFORMANCE REPORT**

The permittee must submit an annual treatment performance report to the director by March 31 of each year following the data collection calendar year. The report may include all facilities, though discussion for each facility must be distinct. Alternatively, the permittee may submit a series of reports. Each deliverable should not exceed manageable file sizes.

The report must include the following for each water treatment facility:

i. A summary of facility performance compared to the key performance metrics listed in the Operations Plan;

ii. Influent sources and flow rates, including alternate sources;

iii. Selenium and nitrate load removal;

iv. Quantities of reagents used and residuals generated;

v. Details on continuous improvement initiatives;

vi. A description of any incidents including process upsets, spills (quantity and quality, including analytical results), issues with and bypasses of the Authorized Works, including recirculation events and contingency discharges;

vii. Quantity and quality of effluent (e.g., non-hazardous waste liquids) discharged to the Turnbull South Pit Tailings Storage Facility;

viii. A summary of all non-compliances with the requirements of Appendix 4, submitted in an Annual Status Form;

ix. A map of monitoring locations with EMS and permittee descriptors;

x. A summary and evaluation of key operational and receiving environment monitoring data associated with the selenium and nitrate treatment facilities and all analytical results from the monitoring plans in Appendix 4 for the reporting year. Data must be suitably tabulated (i.e., excel spreadsheets), with appropriate graphs and comparison of results to limits, Approved and Working Water Quality Guidelines, Site Performance Objectives, or other criteria and benchmarks as specified by the director;

xi. If Site Performance Objectives in Appendix 4 are exceeded the permittee must provide an interpretation of significance, and the status of corrective actions and/or ongoing investigations;

xii. All acute toxicity test-specific reports from the laboratory and an interpreted summary and discussion of results, including recommendations and all subsequent actions;

xiii. All acute toxicity test lab reports must include data and/or observations for hardness, alkalinity, pH, temperature, and formation of precipitate either in the vessel or on the organism.

A summary of all QA/QC issues during the year.

APPENDIX 4B – West Line Creek (WLC) AWTF

Additional requirements are detailed in Appendix 4A.

4B1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the West Line Creek Active Water Treatment Facility (WLC AWTF) Phase 1 to Line Creek. The WLC AWTF influent is comprised of contact water from waste rock piles and non-hazardous leachate from the WLC AWTF residual waste landfill. The site reference number for this discharge is E291569 (WL_BFWB_OUT_SP21) as shown in Appendix 4B4.

4B1.1 The maximum authorized rate of discharge is 8,300 cubic meters per day.

4B1.2 The treated effluent discharged to Line Creek must not be acutely toxic, as per Section 6.2. The characteristics of the discharge at the Buffer Pond Outfall (E291569) must not exceed:

PARAMETER	Daily Maximum Concentration
Ammonia (as N)	1.0 mg/L
Biological Oxygen Demand	25 mg/L
pH Range	6.5-8.5 pH units
Nitrate (as N)	3.0 mg/L
Total Phosphorus	0.3 mg/L
Total Selenium	20 µg/L, Monthly Average
Total Suspended Solids	10.0 mg/L
Antiscalant	25 mg/L, two-minute time weighted average

4B1.3 This discharge is authorized from Authorized Works which are the West Line Creek intake structure and pipeline, active water treatment plant, the advanced oxidation process facility, combined Line Creek intake and outfall structure and pipeline, infrastructure associated with transferring leachate influent from the biosolids residual management facility, buffer pond, buffer pond overflow spillway and wet pond, and groundwater diversion, and related appurtenances.

4B1.4 The location of the facilities from which the discharge originates and the location of the point of discharge is District Lot 6772, District Lot 4588, Kootenay Land District.

4B2 SITE PERFORMANCE OBJECTIVES

Additional requirements for WLC AWTF are detailed in Appendix 4A.

4B2.1 The following Site Performance Objectives are established for Line Creek immediately downstream of the confluence with South Line Creek. The site reference number where the Site Performance objectives apply is E297110 as shown in Appendix 1.

PARAMETER	OBJECTIVE	METHOD/NOTES
Total Phosphorus	≤ 20µg/L	Growing season average calculated from measurements collected every two weeks between June 15 and September 30 annually.

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4B3 WLC AWTF MONITORING PROGRAM

	WLC AWTF WEST LINE CREEK (Influent)	WLC AWTF LINE CREEK (Influent)	BUFFER POND OUTFALL (Effluent)
EMS Number	*E293371*	*E293370*	*E291569*
PARAMETER			
TSS & Turbidity (field parameters) [3]	D	D	D
BOD	-	-	3X/W
Total Selenium	-	-	3X/W
Selenium Speciation (i)	-	-	M
Field Parameters (a)	D	D	D
Conventional Parameters (b)	M	M	M
Major Ions (c)	M	M	M
Nutrients (d)	M	M	M
Nitrate (Teck Internal Lab Results)	W	W	W
Total Sulphide	-	-	M
Total and Dissolved Metals Scan (e)	M	M	M
Bromate	-	-	M
Hydrogen Peroxide (Teck Internal Lab Results)	-	-	M
Ozone (Teck Internal Lab Results)	-	-	M
Flow (f)	C	C	C
96 hour Rainbow Trout single concentration toxicity test (g)	-	-	Q*
48 hour *Daphnia magna* single concentration toxicity test (g)	-	-	Q*

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) TSS may be determined as per Permit 5353, Section 2.3.
4) Teck must notify the director within 24 hours if an LCO laboratory result for TSS is greater than 10 mg/L at the WLC AWTF Buffer Pond outlet (E291569).
5) Teck must notify the director immediately if a third-party laboratory result is greater than 10 mg/L TSS at the WLC AWTF Buffer Pond outlet (E291569).

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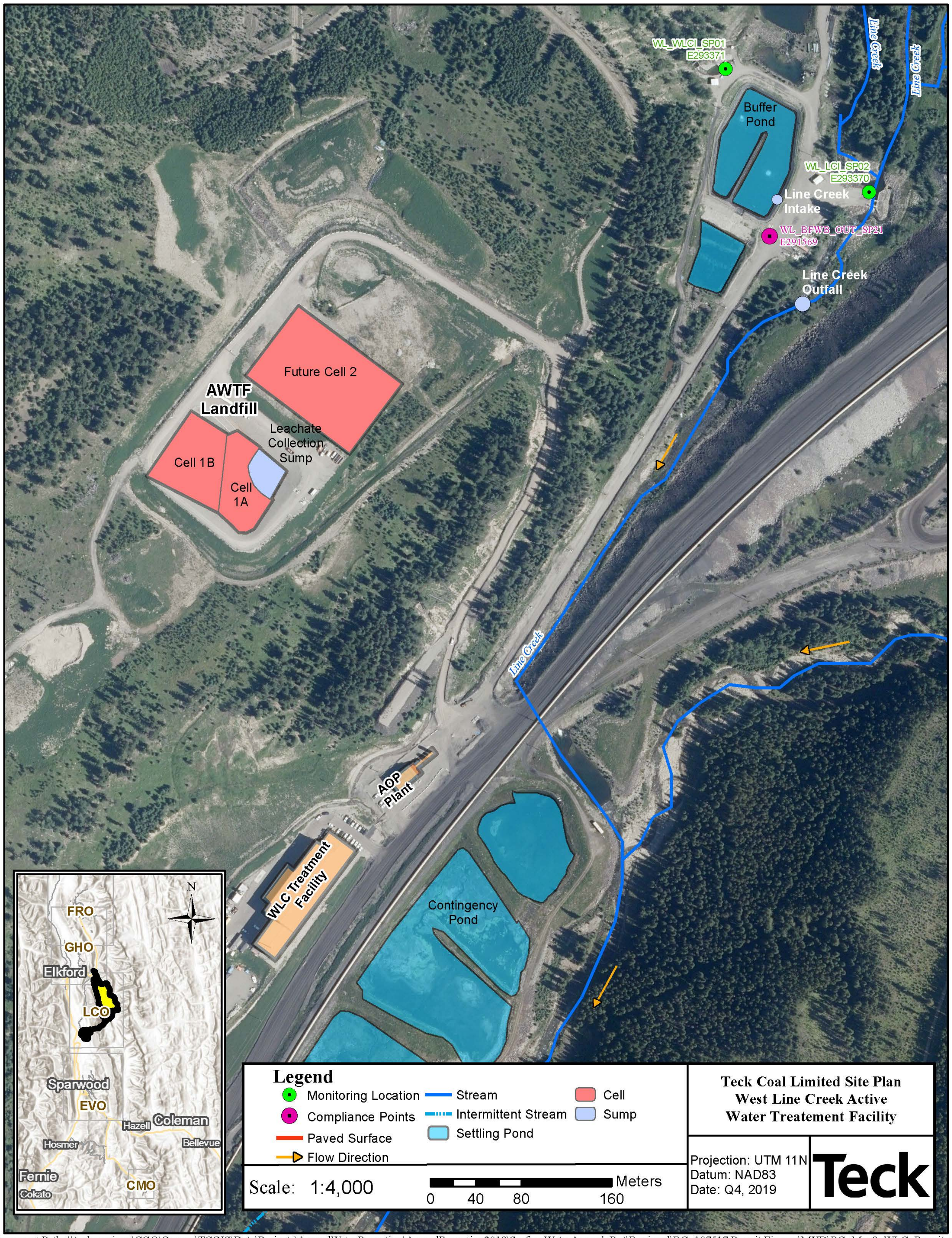
4B4 WLC AWTF SITE PLAN



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APPENDIX 4C – ELKVIEW OPERATIONS SATURATED ROCK FILL (EVO SRF)

Additional requirements are detailed in Appendix 4A.

4C1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Elkview Operations Saturated Rock Fill (EVO SRF) to Erickson Creek and Bodie Rock Drain. The EVO SRF influent is comprised of contact water from Erickson Creek and Natal Pit. The site reference number for this discharge is the Effluent Retention Pond Outlet (F2_BPO, E321812) as shown in Appendix 4C5.

4C1.1 The typical flow is to be used to calculate permit fees for effluent discharges. The typical flow through the EVO SRF is 20,000 cubic meters per day (i.e., 95% of the design capacity of 21,053 m^3/day). The typical flow refers to the discharge rate expected during normal operations and should not be interpreted as a compliance limit or requirement.

4C1.2 The treated effluent discharged to Erickson Creek must not be acutely toxic, as per Section 6.2. The characteristics of the discharge at the Effluent Retention Pond Outlet (F2_BPO, E321812) must be equivalent to or better than:

PARAMETER	LIMIT[(a)]
Effluent Toxicity (96 hr rainbow trout single concentration, and 48 hr *Daphnia magna* single concentration)	< 50% mortality
Antiscalant	25 mg/L, based on a two-minute time weighted average [(b)]
Ammonia	1.2 mg/L
Biochemical Oxygen Demand (BOD)	25 mg/L

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Nitrite (as N)	0.4 mg/L
Total Sulphide	0.01 mg/L
Total Phosphorus	0.10 mg/L (monthly average)
pH	Minimum: 6.5 Maximum: 9.0
Dissolved Oxygen	5.0 mg/L

(a) Compliance with the limits above must be determined by third party CALA certified laboratory results except for Antiscalant which will be determined by dosing rates and pH and DO which will be via field analysis.
(b) According to the calculation in the Operations Plan

4C1.3 Limits for total selenium and nitrate (as N) in effluent discharged from the EVO SRF are included in the Elkview Operations compliance limit at the Elkview Operations Michel Creek Compliance Point (EV_MC2) (Section 2.6).

4C1.4 The discharge is authorized from Authorized Works which are the Erickson Creek intake, influent pipeline from Erickson Creek, influent piping from Natal Pit, reagent dosing facilities, conveyance pipelines, injection wells, monitoring wells, extraction wells, Effluent retention pond, Erickson Creek effluent pipeline, Erickson Creek outfall, Bodie Rock Drain, low point drains, high point vents, pressure safety valves, rupture discs and related appurtenances approximately located as shown on the Site Plan in Appendix 4C5.

4C1.5 The location of the facilities from which the discharge originates and the location of the points of discharge are Lot 1, District Lot 4588 4589 Kootenay District, Plan 7590 9330, except parts included in Plans 9591 9262 10218 10797 11205 12980 14030 14643 15615 15081 17773 18084 18351 12403 NEP59847 NEP22563 NEP60990 NEP61045 NEP61240 NEP61298 NEP62835 NEP66365 NEP68373 NEP73532 NEP89674 PID: 010-681-043.

4C2 RECEIVING ENVIRONMENT LIMITS

4C2.1 Water Temperature

Water temperature measured at Erickson Creek at mouth (EV_EC1; 0200097) must be managed to be equivalent to or below the following maximum daily temperature limits:

PARAMETER		LIMIT (*maximum daily temperature*)
Temperature	January 1 to April 30 and November 1 to December 31	7°C
	May 1 to August 31	13°C
	September 1 to October 31	10°C

Based on the results of the LAEMP, the director may adjust these limits, and the permittee may be required to implement mitigation measures if needed to achieve the updated limits.

4C3 OPERATIONAL REQUIREMENTS

4C3.1 SRF Operational Contingency Plan

The permittee must develop and implement an operational contingency plan (alarm strategy) to manage the parameters listed in Section 4C1.2 related to operation of the EVO SRF. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the plan. The plan must include an operational monitoring program and thresholds that trigger management actions that will be implemented to mitigate the risk of impacts.

If the onsite laboratory sample results are in exceedance of the limits specified in Section 4C1.2, the permittee must immediately collect samples for analysis at a CALA certified laboratory. These results must be included in the routine reports per Section 4A of Appendix 4.

4C3.2 EVO SRF Performance Metrics

The permittee must develop and track key metrics demonstrating the performance of the EVO SRF, including but not limited to removal of nitrate and selenium load. The performance metrics to be tracked must be submitted to the director 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the metrics. The performance metrics must align with the EVWQP goals and environmental management objectives. The permittee must present the performance metrics results at routine regulator updates and in routine reports per Section 4A of Appendix 4.

4C3.3 Erickson Creek Discharge Management Plan

The permittee must develop and implement a discharge management plan to manage discharge from the EVO SRF to Erickson Creek. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the EVO SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the plan. The plan must describe the actions and monitoring Teck will implement to minimize change in streamflow between upstream and downstream of the Erickson Creek intake/outfall structure and follow the Federal Department of Fisheries and Oceans Canada (DFO) guidance on allowable rates of change in streamflow to avoid adverse effects to fish habitat. The permittee must report the monitoring results from the plan in the routine reports per Section 4A of Appendix 4.

4C3.4 Adaptive Management Plan Studies

The permittee must develop and implement the following studies under the Adaptive Management Plan (AMP) to resolve uncertainties regarding the water balance in Erickson Creek and potential unidentified mine contact water discharge pathways. The study designs must incorporate feedback from the Elk Valley Groundwater Working Group and be submitted to the director for approval by March 31, 2021.

i. Uncertainty: Erickson Creek water balance study. The study must resolve uncertainty related to the magnitude of total precipitation, evapotranspiration, surface flow and groundwater flow in the watershed. In completing the study, the permittee must demonstrate closure of the Erickson Creek water balance to the satisfaction of the director.

ii. Uncertainty: Michel Creek contaminant load balance study. The study must resolve uncertainty related to the potential existence of an unaccounted mine contact water discharge pathway from EVO to Michel Creek. The study must utilize measured water quality data from mine contact surface water and groundwater sources. If the mass balance for contaminant loadings cannot be adequately closed to the satisfaction of the director, then Teck must develop and implement an additional study to locate and characterize the missing contaminant load pathway(s).

Progress updates and study findings must be reported in the annual AMP report per Section 10.

4C3.5 EVO SRF Maintenance of Works, Emergency Procedures and Bypasses

This section refers only to authorized discharges and Authorized Works defined in Section 4C1 and is applicable during the operational phase of this facility.

The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan.

The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges.

The permittee must not allow any discharge of influent or effluent authorized in Section 4C1 to bypass the Authorized Works, except with the prior written approval of the director or as defined in the following table.

EVENT	CONSECUTIVE HOURS IN RECIRCULATION (hrs)	REPORTING	MEET ALL EXISTING REQUIREMENTS OF PERMIT	ENHANCED MONITORING	IMMEDIATE NOTIFICATION TO DIRECTOR
Planned maintenance, unplanned maintenance and other downtime when influent bypasses the SRF	<24	X	X	-	-
	≥24	X	X	X	X
Discharge from influent or effluent pipelines to maintain design pressure, prevent freezing or prevent water quality changes	n/a	-	X	-	-

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(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
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For the purpose of this condition the following definitions apply.

i. Immediate notification to director: notify the director of the emergency or other condition via the ENVSECoal@gov.bc.ca email address, or as otherwise instructed by the director.

ii. Meet all existing permit requirements: continue to meet the requirements of this authorization, including, but not limited to, meeting Section 2 compliance limits at all Compliance Points.

iii. Reporting: submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly treatment performance report required in Section 4A9 unless otherwise required by the director.

iv. Normal or effective operation of the SRF: The SRF is considered to be operating effectively if it is removing the facility's portion of the selenium and nitrate load to meet the downstream monthly average limits at EV_MC2. Under normal operations, temporary recirculation (i.e., downtime) occurs both during routine maintenance and during unscheduled events such as power fluctuations or alarm level exceedances.

v. Influent Bypass: When the SRF is put into temporary recirculation mode (i.e., full recycle) and untreated influent contact water from Erickson Creek temporarily bypasses the facility.

vi. Enhanced monitoring: The permittee must collect daily samples at EV_EC1 (0200097) and EV_MC2 (E300091) and analyze them for total selenium and nitrate for the remainder of the bypass event.

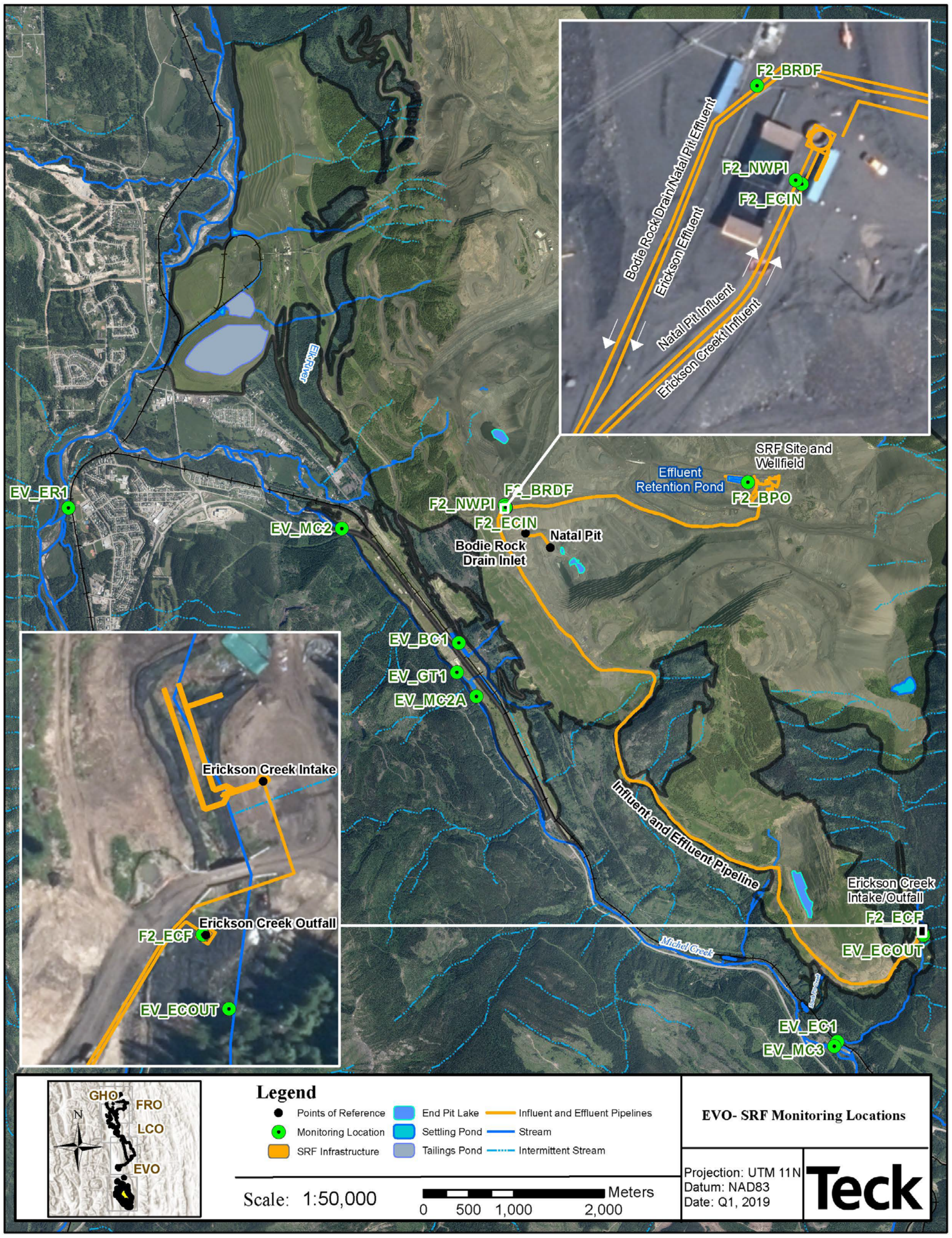
vii. Discharge from the influent or effluent pipelines to maintain design pressure, prevent freezing, or prevent water quality changes: Discharges from either the influent or effluent pipeline at low point drains, high point vents, pressure safety valves or rupture discs at booster stations. This means discharges associated with the intended function of the Authorized Works to control pressure and vacuum, prevent freezing, and prevent water quality changes within the pipeline (e.g., generation of H2S). The released water must be controlled via the operation's surface water management system.

4C4 <u>EVO SRF MONITORING PROGRAM</u>

	NATAL PIT INTAKE (Influent)	ERICKSON CREEK INTAKE (Influent)	EFFLUENT RETENTION POND OUTLET (Effluent)	ERICKSON CREEK OUTFALL (Effluent)	BODIE ROCK DRAIN (Effluent)	ERICKSON CREEK IMMEDIATELY DOWNSTREAM OF OUTFALL	ERICKSON CREEK AT MOUTH (3)	EVO MICHEL CREEK COMPLIANCE POINT (3)	MICHEL CREEK UPSTREAM OF BODIE AND GATE CREEK	MICHEL CREEK UPSTREAM OF ERICKSON CREEK (3)	GATE CREEK DISCHARGE MONITORING LOCATION (3)	BODIE CREEK DISCHARGE MONITORING LOCATION (3)	ELK RIVER DOWNSTREAM OF MICHEL CREEK
EMS Number	*E321791*	*E321811*	*E321812*	*E321813*	*E321815*	*E321814*	*0200097*	*E300091*	*310168*	*0200203*	*E206231*	*E102685*	*200393*
Teck Station ID	*F2_NWPI*	*F2_ECIN*	*F2_BPO*	*F2_ECF*	*F2_BRDF*	*EV_ECOUT*	*EV_EC1*	*EV_MC2*	*EV_MC2a*	*EV_MC3*	*EV_GT1*	*EV_BC1*	*EV_ER1*
PARAMETER													
Field parameters[a]	D	D	D	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Conventional Parameters[b]	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Major Ions [c]	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Nutrients[d]	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Total Sulphide	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Dissolved Metals Scan[e]	W	W	W	-	-	M/W	M/W	M/W	M/W	M/W	M/W	M/W	M/W
Total Metals Scan[e]	M	M	M	-	-	M	M	M/W	M	M/W	M	M	M/W
Total Selenium	-	-	3X/W	-	-	-	-	-	-	-	-	-	-
Flow	C	C	C	C	C	C	C	C	-	-	C	C	-
Temperature	C	C	-	C	-	-	C	-	-	-	-	-	-
96 hour Rainbow Trout single concentration toxicity test[g]	-	-	Q	-	-	Q	Q	-	-	-	Q	Q	-
48 hour Daphnia magna single concentration toxicity[g]	-	-	Q	-	-	Q	Q	-	-	-	Q	Q	-
Selenium Speciation(i)	W	W	W	-	-	-	-	M	M	M	-	-	-
Calcite Precipitation Propensity Monitoring	-	-	M	-	-	M	-	-	-	-	M	M	-
Rock Mass Monitoring (4)													

1) Refer to Table 26, Appendix 3, for abbreviation descriptions
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 4.
4) Rock mass monitoring to be conducted 1X/6W on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods. Locations to be determined, both upstream and downstream of EV_ECOUT.

4C5 **EVO SRF SITE PLAN**



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for Director, *Environmental Management Act*
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APPENDIX 4D – Fording River Operations – South AWTF (FRO-S AWTF)

Additional requirements are detailed in Appendix 4A.

4D1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Fording River Operations – South Active Water Treatment Facility (FRO-S AWTF) to the Fording River and Kilmarnock Creek. The FRO-S AWTF influent is comprised of contact water from waste rock piles in the Kilmarnock Creek, Cataract Creek, and Swift Creek catchments, non-hazardous leachate from the WLC AWTF residual waste landfill, and other sources as approved by the director in writing. The site reference number for this discharge is E321351 (FS_BPO) as shown in Appendix 4D4.

4D1.1 The typical flow is to be used to calculate permit fees for effluent discharges. The typical flow through the FRO-S AWTF is 20,000 cubic meters per day (i.e., 95% of the design capacity of 21,053 m^3/day). The typical flow refers to the discharge rate expected during normal operations and should not be interpreted as a compliance limit or requirement.

4D1.2 The treated effluent discharged to the Fording River and Kilmarnock Creek must not be acutely toxic, as per Section 6.2. The characteristics of the discharge at the Effluent Retention Pond outlet (FS_BPO, E321351) must be equivalent to or better than:

PARAMETER	LIMIT [(a)]
Effluent Toxicity (96 hr rainbow trout single concentration, and 48 hr *Daphnia magna* single concentration)	≤ 50% mortality
Antiscalant	25 mg/L, two-minute time weighted average [(b)]

(a) Compliance with the limits above must be determined by third party CALA certified laboratory results except for Antiscalant which will be determined by dosing rates.
(b) According to the calculation in the Operations Plan

4D1.3 Limits for total selenium and nitrate (as N) in effluent discharged from the FRO-S AWTF are included in the Fording River Operations compliance limit at the Fording River Operations Compliance Point (Section 2.1).

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4D1.4 The permittee must manage FRO-S AWTF effluent temperature to be equivalent to or below the following monthly average limits at the Fording River Outfall (FS_EFF-SC; E323231).

PARAMETER	LIMIT (*monthly average*)	
Temperature	January 1 to February 28	6°C
	March 1 to April 30*	6°C
	May 1 to September 30	13°C
	October 1 to October 31*	10°C
	November 1 to November 30*	6°C
	December 1 to December 31	6°C

*Effective date – September 1, 2022

4D1.5 The permittee must manage the parameters listed in the table below in accordance with the operational contingency plan required in Section 4D2.1. Treated effluent during normal operations was predicted in the FRO-S AWTF operations application to have characteristics as presented in the following table. These maximum concentrations should not be interpreted as compliance limits; however, are to be used to calculate permit fees for effluent discharges:

PARAMETER	MAXIMUM PREDICTED CONCENTRATION (a)
Sulphide	0.05 mg/L
Nitrite	0.2 mg/L
Ammonia	1 mg/L
Dissolved Oxygen	8 mg/L (min)
pH	6.5 – 8.5
Hydrogen Peroxide	0.1 mg/L
Ozone	20 µg/L
Biological Oxygen Demand	45 mg/L
Total Phosphorus	0.1 mg/L
Chloride	150 mg/L
Total Suspended Solids	5 mg/L

(a) from FRO-S AWTF operations application Table 5.3-3

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4D1.6 The discharge is authorized from Authorized Works which are the Swift Creek Intake, Kilmarnock Creek Intake, influent and effluent conveyance pipelines, Effluent Retention Structure, Active Water Treatment Plant, Fording River Outfall, Kilmarnock Creek Outfall, low point drains, high point vents, pressure safety valves, rupture discs and related appurtenances approximately located as shown on the Site Plan in Appendix 4D4.

4D1.7 The location of the facilities from which the discharge originates and the location of the point of discharge is District Lot 6637, District Lot 6047, District Lot 6688, Kootenay Land District.

4D2 <u>OPERATIONAL REQUIREMENTS</u>

4D2.1 AWTF Operational Contingency Plan

The permittee must develop and implement an operational contingency plan to manage the parameters listed in Section 4D1.5 related to operation of the AWTF. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the FRO-S AWTF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the plan. The plan must include an operational monitoring program and thresholds that trigger management actions that will be implemented to mitigate the risk of impacts.

4D2.2 FRO-S AWTF Performance Metrics

The permittee must develop and track key metrics demonstrating the performance of the AWTF, including but not limited to removal of nitrate and selenium load, and implementation of alarm strategy level 3 responses. The performance metrics must align with the EVWQP goals and environmental management objectives.

i. The performance metrics to be tracked must be submitted to the director 30 days prior to the end of the commissioning period for the FRO-S AWTF.

ii. The permittee must notify the director at least 15 days prior to implementing any proposed changes to the metrics.

iii. The permittee must present the performance metrics results at routine regulator updates and in routine reports per Section 4A of Appendix 4.

iv. The permittee must include a performance metric to assess performance of the temperature management system in managing temperature downstream of the Fording River Outfall (at FR_SCOUTDS) to within +/- 1 degree Celcius of background (at FR_FR3). The performance metric must consider the influence of the Swift Creek Sediment Pond discharge and available chiller capacity.

v. The permittee must complete an engineering review of the temperature management system to determine necessary operational changes and process modifications needed to meet the permit limits for temperature in Section 4D1.4, and submit the report to the director by July 31, 2021.

4D2.3 FRO-S AWTF Maintenance of Works, Emergency Procedures and Bypasses

This section refers only to authorized discharges and Authorized Works defined in Section 4D1 and is applicable during the operational phase of this facility.

The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan.

The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges.

The permittee must not allow any discharge of influent or effluent authorized in Section 4D1 to bypass the Authorized Works, except with the prior written approval of the director or as defined in the following table.

EVENT	CONSECUTIVE HOURS IN RECIRCULATION (hrs)	REPORTING	MEET ALL EXISTING REQUIREMENTS OF PERMIT	ENHANCED MONITORING	IMMEDIATE NOTIFICATION TO DIRECTOR
Planned maintenance, unplanned maintenance and other downtime when influent bypasses the AWTF	<24	X	X	-	-
	≥24	X	X	X	X
	(a)				
Discharge from influent or effluent pipelines to maintain design pressure, prevent freezing or prevent water quality changes	n/a	-	X	-	-

(a) The permittee must not exceed a total of 144 hours in recirculation per month (i.e., rolling 30-day cumulative total)

For the purpose of this condition the following definitions apply.

i. Immediate notification to director: notify the director of the emergency or other condition via the ENVSECoal@gov.bc.ca email address, or as otherwise instructed by the director;

ii. Meet all existing permit requirements: continue to meet the requirements of this authorization, including, but not limited to, meeting Section 2 compliance limits at all Compliance Points;

iii. Reporting: submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly treatment performance report required in Section 4A9 unless otherwise required by the director.

iv. Normal or effective operation of the AWTF: The AWTF is considered to be operating effectively if it is removing the facility's portion of the selenium and nitrate load to meet the downstream monthly average limits at FR_FRABCH. Under normal operations, temporary recirculation (i.e., downtime) occurs both during routine maintenance and during unscheduled events such as power fluctuations or alarm level exceedances.

v. Influent Bypass: When the AWTF is put into a temporary recirculation mode and untreated influent water temporarily bypasses the facility. This occurs with full closure of the intakes.

vi. Enhanced monitoring: The permittee must collect daily samples at FR_FRABCH (E223753) and FR_SCOUTDS (E320695) and analyze them for total selenium and nitrate for the remainder of the bypass event.

vii. Discharge from the influent or effluent pipelines to maintain design pressure, prevent freezing, or prevent water quality changes: Discharges from either the influent or effluent pipeline at low point drains, high point vents, pressure safety valves or rupture discs at booster stations. This means discharges associated with the intended function of the Authorized Works to control pressure and vacuum, prevent freezing, and prevent water quality changes within the pipeline (e.g., generation of H2S). The released water must be controlled via the operation's surface water management system.

4D2.4 Adaptive Management Plan Studies

The permittee must develop and implement the following studies under the Adaptive Management Plan (AMP) to resolve uncertainties regarding operation of the Kilmarnock Clean Water Diversion and the need for additional flow and groundwater information to support water quality management in FRO-S. The study designs must be submitted to the director and KNC by April 30, 2021. The permittee must provide quarterly updates to ENV and KNC on implementation of the workplans. This enhanced engagement will end when written notice is provided by the director.

i. Uncertainty: Kilmarnock Clean Water Diversion study. The study must resolve uncertainty related to how operation of the Kilmarnock Clean Water Diversion influences the magnitude of mine contact water entering groundwater.

ii. Uncertainty: Kilmarnock Creek Intake groundwater load bypass study. The study must resolve the uncertainty related to the magnitude and seasonal fluctuation of groundwater load bypassing the FRO-S AWTF Kilmarnock Creek Intake.

iii. Uncertainty: Fording River valley groundwater study. The study must resolve the uncertainty related to the parameter of concern groundwater plume and load in the Fording River valley between well FR_GH_WELL4 and FR_FRABCH.

iv. Uncertainty: Swift Creek Sediment Ponds seepage study. The study must resolve the uncertainty related to the magnitude of seepage from the Swift Creek Sediment Ponds and the resulting parameter of concern groundwater plume and load towards the Fording River valley aquifer.

Progress updates and study findings must be reported in the annual AMP report per Section 10.

4D2.5 Upper Fording River Chronic Toxicity Study

The permittee must submit a study design for an Upper Fording River Chronic Toxicity Study to the director by January 31, 2021, for approval. The study design must be reviewed by the EMC and be designed as a study to evaluate the cause, extent, and magnitude of chronic effects in the upper Fording River. The permittee must provide a summary of EMC advice and how it was considered in the study design. Monitoring results and interpretation must be compiled into a written report and submitted to the director by April 15, 2022. The final report must be to the satisfaction of the director.

4D2.6 Fording River Compliance Point Monitoring Frequency

The permittee must undertake a study to assess the accuracy of monthly average surface water nitrate, selenium and sulphate concentration calculations at FR_FRABCH with the below listed sampling frequencies. Accuracy must be estimated for each parameter for each calendar month for each sampling program. A report on findings must be submitted to the director by May 31, 2022.

i. Weekly sampling March 15 through July 15 and monthly sampling August through February.

ii. Weekly sampling March 15 through July 15 and twice-monthly sampling in August through February.

iii. Weekly sampling year-round.

4D2.7 FRO-S AWTF Recirculation Event Mass Loading Travel Time Assessment

The permittee must undertake an assessment to determine the appropriate timing for water quality sample collection at FR_FRABCH that is representative of the conditions during FRO-S AWTF recirculation. The FRO Compliance Point is approximately 11.8 km downstream of the Fording River Outfall and the full realization of recirculation on surface water quality is not expected to be instantaneous. The assessment must incorporate both seasonal and temporal aspects to inform the appropriate timing of water quality sample collection during recirculation. A summary report must be submitted to the director by April 30, 2023.

4D2.8 Fording River Outfall Fish Plan

i. The permittee must develop a plan to manage potential residual risks to fish resulting from effluent discharged from the Fording River Outfall. The permittee must prepare the plan in consultation with the Elk Valley Fish and Fish Habitat Committee and/or the Westslope Cutthroat Trout Recovery Working Group and include a summary of advice and how it was incorporated in the plan. The plan must include a trigger response plan and mitigations, or reference previously developed guidance, that can be implemented to prevent fish stranding and reduce the risks of isolation and fish mortality. The scope and scale of the plan is limited to areas of the Fording River that could be directly affected by the FRO-S AWTF operations. The plan must be submitted to the director by 7 days prior to forward flow commissioning of the FRO-S AWTF. The submitted Fording River Outfall Fish Plan must be implemented and any updates to the plan must be submitted to the director within 30 days of adoption. The permittee must submit an annual summary of trigger exceedances and actions taken to the director by June 30th of each year.

ii. The permittee must complete an assessment of modifications required to meet a potential site performance objective for temperature of +/- 1 degree Celcius of background downstream of the Fording River Outfall, or other temperature requirements developed to support the Westslope Cutthroat Trout Recovery Plan. The assessment must be submitted to the director by June 30, 2023.

4D3 FRO-S AWTF MONITORING PROGRAM

	KILMARNOCK CREEK FRO-S AWTF INFLUENT (Influent)	SWIFT-CATARACT CREEKS FRO-S AWTF INFLUENT (Influent)	FRO-S AWTF EFFLUENT RETENTION POND OUTLET (Effluent)	FRO-S AWTF OUTFALL STRUCTURE	FORDING RIVER UPSTREAM OF FRO-S AWTF OUTFALL STRUCTURE (5)	FORDING RIVER ~100 M DOWNSTREAM OF FRO-S AWTF OUTFALL STRUCTURE (5)	FORDING RIVER OPERATIONS COMPLIANCE POINT
EMS Number	*E321412*	*E321411*	*E321351*	*E323231*	*E320693*	*E320695*	*E223753*
Teck Station ID	*FS_INF-K*	*FS_INF-S*	*FS_BPO*	*FS_EFF-SC*	*FR_FR3*	*FR_SCOUTDS*	*FR_FRABCH*
PARAMETER							
TSS & Turbidity (field parameters) (3)	D	D	D	-	-	-	-
BOD	-	-	3X/W	-	-	W/M	-
Total Selenium	-	-	3X/W	-	-	-	-
Selenium Speciation (i)	-	-	M	-	-	M	-
Field Parameters (a)	D	D	D	-	-	W/M	W/M
Conventional Parameters (b)	M	M	M	-	-	W/M	W/M
Major Ions (c)	M	M	M	-	-	W/M	W/M
Nutrients (d)	M	M	M	-	-	W/M	W/M
Nitrate (Teck Internal Lab Results)	3X/W	3X/W	3X/W	-	-	-	W/M
Total Sulphide	-	-	M	-	-	W/M	-
Total and Dissolved Metals Scan (e)	M	M	M	-	-	W/M	W/M
Bromate	-	-	M	-	-	M	-
Hydrogen Peroxide (Teck Internal Lab Results)	-	-	M	-	-	M	-
Ozone (Teck Internal Lab Results)	-	-	M	-	-	-	-
Flow	C	C	C	-	-	-	-
Temperature	-	-	-	C	C	C	-
96 hour Rainbow Trout single concentration toxicity test (g)	-	-	Q*	-	-	-	-
48 hour *Daphnia magna* single concentration toxicity test (g)	-	-	Q*	-	-	-	-
Calcite Precipitation Propensity -Monitoring	-	-	-	-	1X/2W	1X/2W	-
Rock Mass Monitoring (4)	-	-	-	-	1X/6W, as needed	1X/6W, as needed	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) TSS may be determined as per Permit 424, Section 2.3.
4) Rock mass monitoring to be conducted on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods.
5) Monitoring location appears in multiple monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in Section 9 and Appendices 4 and 5.

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for Director, *Environmental Management Act*
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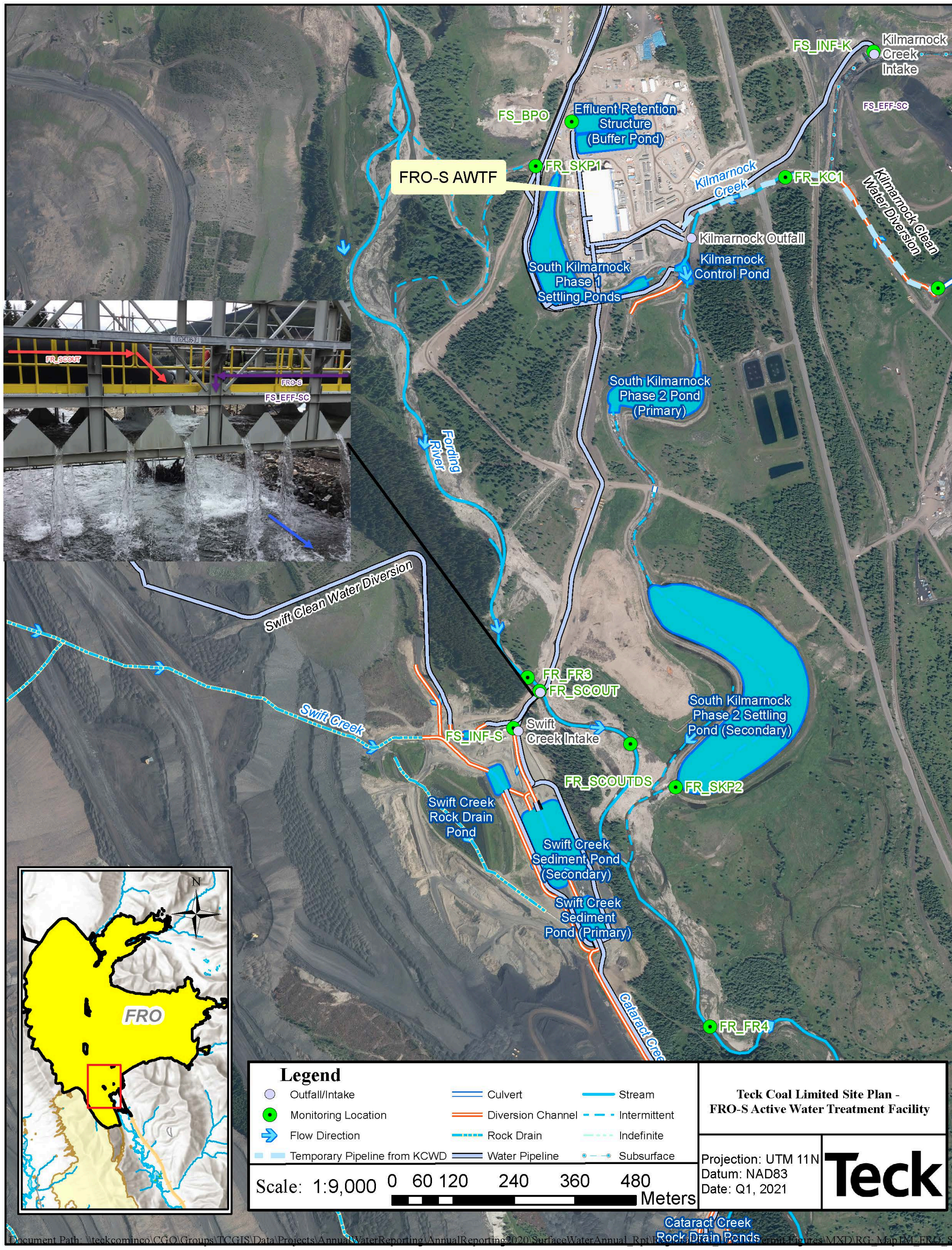
Permit Number: 107517

4D4 FRO-S AWTF SITE PLAN



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APPENDIX 4E – Fording River Operations – North SRF (FRO-N SRF) Phase 1

Additional requirements are detailed in Appendix 4A.

4E1 AUTHORIZED DISCHARGES

This authorization applies to the discharge of effluent from Phase 1 of the Fording River Operations North Saturated Rock Fill North Project (FRO-N SRF) which includes the conveyance of treated effluent from the Effluent Retention Pond (E326355, E4_BPO) to the E4 Discharge Injection wells, to Clode Settling Ponds (E102481, FR_CC1) and thence to the Fording River. For the purpose of this authorization, influent is defined as Eagle 4 Pit water directed to the injection wells and effluent is defined as treated effluent from the Effluent Retention Pond.

4E1.1 This discharge is authorized from November 01, 2021 to January 1, 2024.

4E1.2 The maximum weekly average flow is to be used to calculate permit fees for effluent discharges. The maximum weekly average flow through the FRO-N SRF is 9,500 cubic metres per day. This flow rate refers to the maximum discharge rate expected during normal operations and should not be interpreted as a compliance limit or requirement.

4E1.3 The characteristics of the discharge at the Effluent Retention Pond Outlet (E326355, E4_BPO) to the E4 Discharge Injection wells must be equivalent to or better than:

PARAMETER	LIMIT[(a)]
Ammonia (as N)	7.0 mg/L
Biological Oxygen Demand	25 mg/L
Nitrite (as N)	1.1 mg/L
Total Sulphide	0.032 mg/L
Total Phosphorus	0.2 mg/L (monthly average)
pH	Minimum ≥ 6.5 Maximum ≤ 9.0
Dissolved Oxygen	5 mg/L

(a) Compliance with the limits above must be determined by third party CALA certified laboratory results except for pH and DO which will be via field analysis.

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4E1.4 The effluent discharged at the Clode Settling Pond Decant must not be acutely toxic, as defined in Section 6.2. The characteristics of the discharge at the Clode Settling Pond Decant (E102481, FR_CC1) must be equivalent to or better than:

PARAMETER	LIMIT[(a)]
Antiscalant	25 mg/L, based on a two-minute time weighted average [(b)]

(a) Compliance with the limits above must be determined by third party CALA certified laboratory results except for Antiscalant which will be determined by dosing rates.
(b) According to the calculation in the Operations Plan

4E1.5 The discharge is authorized from Authorized Works which are the influent source pumping wells within the E4 Pit, reagent dosing facilities, conveyance piping system, injection wells, monitoring wells, extraction wells, Effluent Retention Pond, E4 Discharge Injection wells, Antiscalant system, low point drains, high point vents, pressure safety valves, rupture discs and related appurtenances approximately located as shown on the Site Plan in Appendix 4E4.

4E1.6 The location of the facilities from with the discharge originates and the location of the point of discharge is District Lot 6700, District Lot 6701, and District Lot 6709, Kootenay Land District.

4E2 OPERATIONAL REQUIREMENTS

4E2.1 SRF Operational Contingency Plan

The permittee must develop and implement an operational contingency plan to manage the parameters listed in 4E1 related to operation of the FRO-N SRF. The plan must be submitted to the director 30 days prior to the end of the commissioning period for the FRO-N SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the plan. The plan must include an operational monitoring program and thresholds that trigger management actions that will be implemented to mitigate the risk of impacts.

If the onsite laboratory sample results are in exceedance of the limits specified in Section 4E1.3, the permittee must immediately collect samples for analysis at a CALA certified laboratory. These results must be included in the routine reports per Section 4A of Appendix 4.

4E2.1.1 Nickel

The SRF Operational Contingency Plan must include nickel trigger(s) and response actions to manage nickel concentrations in effluent at the Clode Settling Pond Decant (FR_CC1). The plan must describe actions to be taken if total nickel concentrations in effluent at FR_CC1 exceed an initial trigger value of 90 µg/L, the maximum projected 2022 base-case concentrations, when the SRF is discharging to the E4 Discharge Injection Wells. The purpose of the contingency plan is to ensure that nickel concentrations in lower Clode Creek do not exceed the level 1 nickel interim screening value of 157 µg/L due to operation of the FRO-N SRF. The plan must be updated within 9 months of the submission of the final nickel benchmark to the director.

4E2.2 FRO-N SRF Performance Metrics

The permittee must develop and track key metrics demonstrating the performance of the FRO-N SRF, including but not limited to removal of nitrate and selenium load. The performance metrics to be tracked must be submitted to the director 30 days prior to the end of the commissioning period for the FRO-N SRF, and the permittee must notify the director at least 15 days prior to implementing any proposed changes to the metrics. The performance metrics must align with the EVWQP goals and environmental management objectives. The permittee must present the performance metrics results at routine regulator updates and in routine reports per Section 4A of Appendix A.

4E2.3 FRO-N SRF MAINTENANCE OF WORKS, EMERGENCY PROCEDURES AND BYPASSES

This section refers only to authorized discharges and Authorized Works defined in Section 4E1 and is applicable during the operational phase of this facility.

The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan. The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must not allow any discharge of influent or effluent authorized in 4E1 to bypass the Authorized Works, except with the prior written approval of the director or as defined in the following table.

EVENT	CONSECUTIVE HOURS IN RECIRCULATION (hrs)	REPORTING	MEET ALL EXISTING REQUIREMENTS OF PERMIT	IMMEDIATE NOTIFICATION TO DIRECTOR
Planned maintenance, unplanned maintenance and other downtime when influent bypasses the SRF	<24	X	X	-
	≥24	X	X	X
Discharge from influent or effluent pipelines to maintain design pressure, prevent freezing or prevent water quality changes	n/a	-	X	-
Discharge to Turnbull South Pit Tailings Storage Facility as per EMA Permit 424	n/a	X	X	X
Use as per WSA Water Licences	n/a	-	n/a	-

For the purpose of this condition the following definitions apply.

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i. Immediate notification to director: notify the director of the emergency or other condition via the ENVSECoal@gov.bc.ca email address, or as otherwise instructed by the director.

ii. Meet all existing permit requirements: continue to meet the requirements of this authorization, including, but not limited to, meeting Section 2 compliance limits at all Compliance Points.

iii. Reporting: submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next quarterly treatment performance report required in Section 4A9 unless otherwise required by the director.

iv. Normal operation of the SRF: Under normal operations, temporary recirculation (i.e., downtime) occurs both during routine maintenance and during unscheduled events such as power fluctuations or alarm level exceedances.

v. Influent Bypass: When the SRF is put into temporary recirculation mode (i.e., full recycle) or contingency discharge mode (i.e., discharge to Turnbull South Pit Tailings Storage Facility) and untreated influent contact water from Eagle 4 Pit temporarily bypasses the facility.

vi. Discharge from the influent or effluent pipelines to maintain design pressure, prevent freezing, or prevent water quality changes: Discharges from either the influent or effluent pipeline at low point drains, high point vents, pressure safety valves or rupture discs at booster stations. This means discharges associated with the intended function of the Authorized Works to control pressure and vacuum, prevent freezing, and prevent water quality changes within the pipeline (e.g., generation of H2S). The released water must be controlled via the operation's surface water management system.

4E3 **FRO-N SRF PHASE 1 MONITORING PROGRAM**

	FORDING RIVER UPSTREAM OF HENRETTA	FORDING RIVER DOWNSTREAM OF HENRETTA	FORDING RIVER UPSTREAM OF CLODE PONDS DISCHARGE	SOUTHERN FAR FIELD WELL (Influent)	NORTHERN FAR FIELD WELL (Influent)	EFFLUENT RETENTION POND OUTLET (Effluent)	CLODE SETTLING POND DECANT (Discharge)	GRASSY CREEK	FORDING RIVER DOWNSTREAM OF CLODE PONDS DISCHARGE	WEST EXFILTRATION DITCH	FORDING RIVER UPSTREAM OF KILMARNOCK CREEK	FORDING RIVER OPERATIONS COMPLIANCE POINT
EMS Number	*E216777*	*0200251*	*E326352*	*E326353*	*E326354*	*E326355*	*E102481*	*E326356*	*E326357*	*E326358*	*0200201*	*E223753*
Teck Station ID	*FR_UFR1*	*FR_FR1*	*FR_FRUSCC1*	*E4_PW_01*	*E4_PW_02*	*E4_BPO*	*FR_CC1*	*FR_GC1*	*FR_FRDSCC1*	*FR_WED1*	*FR_FR2*	*FR_FRABCH*
PARAMETER												
Field parameters[(a)]	M	M	-	TW	TW	D	W	M	M	M	W/M	W/M
BOD	-	-	-	-	-	W	W	-	-	-	-	-
Conventional Parameters[(b)]	M	M	-	TW	TW	W	W	M	M	M	W/M	W/M
Major Ions [(c)]	M	M	-	TW	TW	W	W	M	M	M	W/M	W/M
Nutrients[(d)]	M	M	-	TW	TW	W	W	M	M	M	W/M	W/M
Total Sulphide	M	M	-	TW	TW	W	W	M	M	M	W/M	W/M
Dissolved Metals Scan[(e)]	M	M	-	TW	TW	W	W	M	M	M	W/M	W/M
Total Metals Scan[(e)]	M	M	-	TW	TW	W	W	M	M	M	W/M	W/M
Flow	-	-	-	C	C	C	-	-	-	-	-	-
96 hour Rainbow Trout single concentration toxicity test[(g)]	-	-	-	-	-	-	Q	-	-	-	-	-
48 hour Daphnia magna single concentration toxicity[(g)]	-	-	-	-	-	-	Q	-	-	-	-	-
Selenium Speciation[(i)]	-	-	-	-	-	W	-	-	-	-	-	-
Calcite Precipitation Propensity Monitoring	-	-	M	-	-	-	M	-	M	-	-	-
Rock Mass Monitoring (4)				-	-	-		-		-	-	-

1) Refer to Table 26, Appendix 3, for abbreviation descriptions
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 4.
4) Rock mass monitoring to be conducted 1X/6W on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods. Locations to be determined, both upstream in the Fording River and downstream of FR_CC1.

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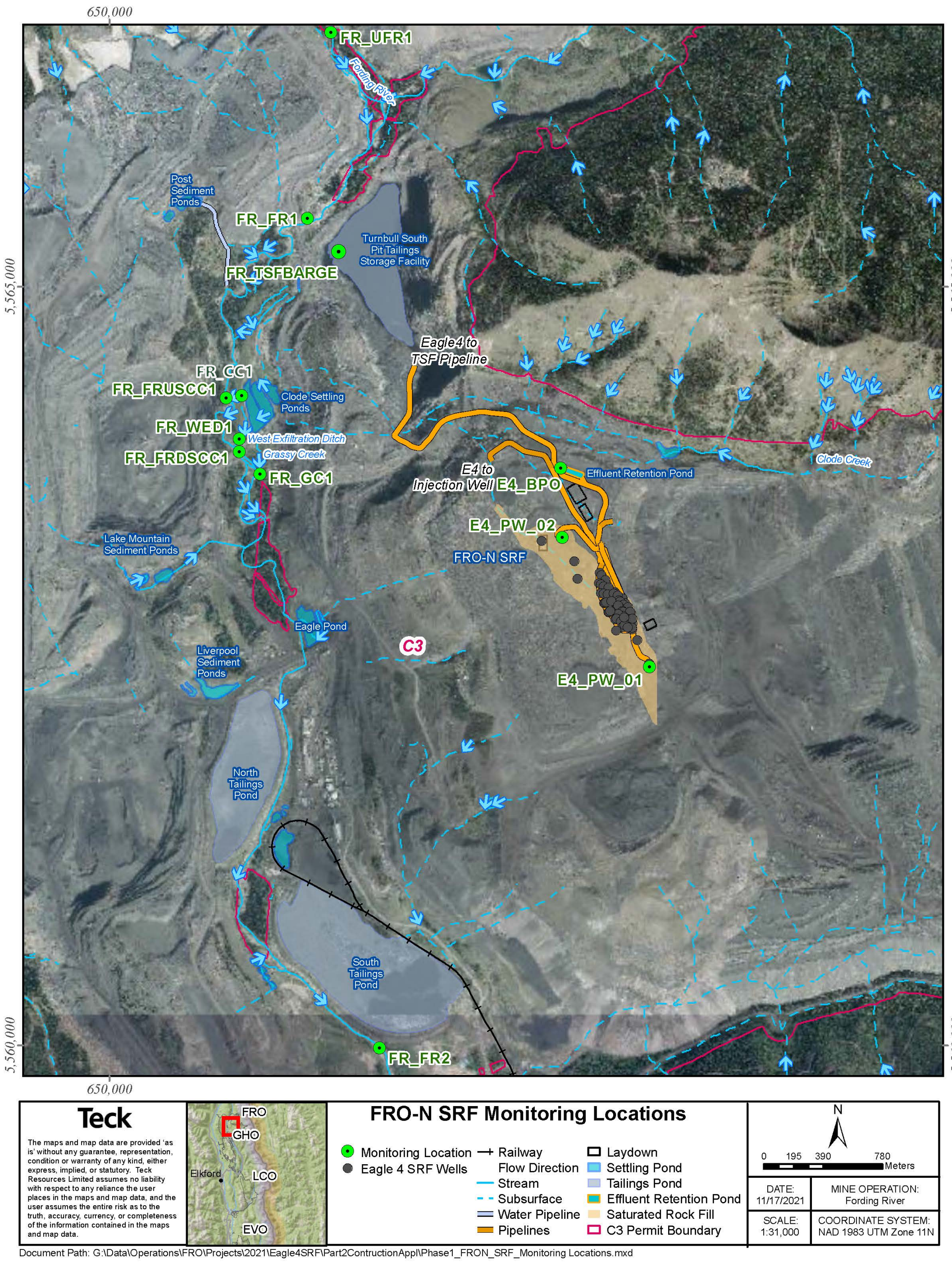
4D4 **FRO-N SRF SITE PLAN**



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APPENDIX 5: CALCITE TREATMENT FACILITIES

APPENDIX 5A – Calcite Treatment Facility General Operational Requirements

APPENDIX 5B – Lower Greenhills Creek Antiscalant Addition System

APPENDIX 5C – Swift-Cataract Antiscalant Addition System

APPENDIX 5D – Line Creek Operations (LCO) Dry Creek Antiscalant Addition System

APPENDIX 5A – Calcite Treatment Facility General Operational Requirements

This section includes requirements that apply to all calcite treatment facilities. Subsequent sections include facility-specific requirements.

5A1 <u>COMMISSIONING PLAN</u>

A Commissioning Plan for calcite treatment facilities must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of discharge from the calcite treatment facility. The Commissioning Plan may include all facilities, though discussion for each facility must be distinct. Alternatively, the permittee may submit a Commissioning Plan for each facility. The Commissioning Plan must include but is not necessarily limited to operational procedures required to commission the calcite treatment facilities, including any additional monitoring and reporting required to demonstrate that no adverse environmental impacts result from commissioning.

5A2 <u>OPERATIONS PLAN</u>

An Operations Plan for calcite treatment facilities must be prepared by a Qualified Professional, submitted to the director and implemented prior to commencement of the discharge from the calcite treatment facilities. The Operations Plan may include all facilities, though discussion for each facility must be distinct. Alternatively, the permittee may submit an Operations Plan for each facility. The Operations Plan must include all stand-alone calcite treatment systems. Calcite treatment associated with any treatment facility (e.g., WLC AWTF) must be captured in the Operations Plan for that treatment facility.

The Operations Plan must include but is not necessarily limited to:

i. The facility operator's manual, with provision for its continual improvement;
ii. An overview of the planned maintenance program which includes an inventory of facility components and authorized replacement parts, and a detailed description of inspection, repair and replacement frequency for facility components;
iii. Information on reagent usage and storage;

iv. Documentation to verify that the facility is operated at all times within specifications and in a manner to ensure compliance with this authorization and other applicable legislation;

v. Actions to be taken if effluent quality fails to meet the requirements of the permit;

vi. Contingency planning which describes built-in redundancy of the facility and outlines measures to prevent emergency conditions from occurring.

Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the annual report for the time period when the minor update was made.

5A3 CALCITE TREATMENT FACILITY MAINTENANCE OF WORKS, EMERGENCY PROCEDURES AND BYPASSES

This section refers only to authorized discharges and Authorized Works defined within Appendix 5.

The permittee must regularly inspect the Authorized Works and maintain them in good working order, in accordance with the Operations Plan.

The permittee must maintain a record of inspections and maintenance of the Authorized Works and make the record available to an officer upon request.

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must:

i. take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges; and

ii. submit written documentation of the emergency or other condition and the remedial action that has and will be taken, a schedule of implementation of actions and the date the findings as to the cause of the incident will be reported to the director and KNC. This information must be submitted with the next annual performance report required in Section 5A9 unless otherwise required by the director.

The permittee must not allow any discharge of influent or effluent authorized in Appendix 5 to bypass the Authorized Works, except with the prior written approval of the director or as defined in Sections 5B1.6, 5C1.5, and 5D1.5.

Normal or effective operation of Calcite Treatment Facilities is defined as follows: Calcite Treatment Facilities are considered to be operating effectively if they are achieving the prevention of calcite formation in the downstream receiving environment that the facility is intended to manage. According to the Commissioning and Operations Plans, under normal operation, temporary downtime may occur during commissioning, trouble shooting, maintenance, unsuitable in-stream flows, power fluctuations or facility alarm exceedances.

5A4 **PROCESS MODIFICATIONS**

The permittee must notify the director in writing, prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge from the calcite treatment facilities. Notwithstanding notification under this Section, permitted levels must not be exceeded.

5A5 **NEW WORKS**

The director may require upgrading of the calcite treatment works based on monitoring results, and/or any other pertinent information. Plans and specifications for new pollution treatment works and upgrades to existing works must be submitted to the director as an amendment application. All new works must be approved before a discharge from the works commences.

5A6 **SITE SPECIFIC ENVIRONMENTAL EMERGENCY RESPONSE PLAN**

A Site-Specific Environmental Emergency Response Plan must be prepared for all stand-alone calcite treatment systems. The plan must be submitted to the director prior to commencement of the discharge from the calcite treatment facilities. Calcite treatment associated with any treatment facility (e.g., WLC AWTF) must be captured in the Emergency Response Plan for that treatment facility.

The plan must include, but is not limited to:

i. A description of measures to mitigate any health or environmental impacts, if emergencies occur;
ii. Specific reference to the Spill Reporting Regulation; and
iii. Instructions for staff in the event of an emergency, including contact information for local authorities (fire, police, public health), Emergency Management BC, and the director.

Any significant update to the plan must be submitted to the director within 30 days of adoption. Minor updates must be summarized in the annual report for the time period when the minor update was made.

5A7 **MONITORING**

The permittee must conduct monitoring associated with the calcite treatment facilities as defined in subsequent sections in Appendix 5. The discharge and receiving environment water sampling sites are located approximately as shown in subsequent sections in Appendix 5.

5A8 **COMMISSIONING REPORT**

A commissioning report must be submitted to the director within 60 days of completing commissioning of any new calcite treatment facility. If the commissioning report deadline corresponds with the annual report deadline, one report may be submitted to meet both requirements.

The commissioning report must include, but is not limited to:

i. operating times;
ii. influent flow rates or treated water volume;
iii. antiscalant dosing rates;
iv. calculated in-pipe antiscalant concentrations (where applicable); and
v. monitoring data.

5A9 <u>ANNUAL PERFORMANCE REPORT</u>

An annual performance report must be submitted to the director by March 31 for each year following the data collection calendar year. The report must include, but is not limited to:

i. operating availability of the Authorized Works;

ii. influent flow rates or treated water volume;

iii. quantity of antiscalant used and dosing rates;

iv. calculated in-pipe antiscalant concentrations (where applicable);

i. a description of any incidents including process upsets, spills, issues with and bypasses of the Authorized Works;

ii. monitoring data;

iii. interpretation and analysis of monitoring data;

iv. discussion of results and recommendations for changes to management and/or regulatory controls to improve protection of the environment, as appropriate; and

v. summary of all non-compliances with the requirements of Appendix 5, submitted in an Annual Status Form.

The report must also include operational performance results of antiscalant addition systems associated with selenium and nitrate treatment facilities, including:

i. quantity of antiscalant used and dosing rates;

ii. rock mass monitoring and calcite precipitation propensity monitoring data;

iii. *Daphnia magna* and rainbow trout acute toxicity results; and

iv. Calcite Indices.

APPENDIX 5B – Lower Greenhills Creek Antiscalant Addition System

Additional requirements are detailed in Appendix 5A.

5B1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Lower Greenhills Creek Antiscalant Addition System to Greenhills Creek. The Lower Greenhills Creek Antiscalant Addition System influent is Greenhills Creek sedimentation pond effluent. The site reference number for this discharge is E309912 as shown in Appendix 5B5.

5B1.1 Treated effluent discharged to Greenhills Creek at E309912 (GH_CAM1EFF) must not be acutely toxic, as per Section 6.2.

5B1.2 Treated effluent discharged to Greenhills Creek at E309912 must not exceed an antiscalant concentration of 150 mg/L based on a 2-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.

5B1.3 Antiscalant concentrations in Greenhills Creek at E309911 (GH_GH2) must not exceed 5 mg/L based on a 2-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.

5B1.4 Notification of deviation from the identified antiscalant in the Teck application "Greenhills Operations Lower Greenhills Creek Calcite Management Project" dated June 15, 2017 must be provided to the director and KNC prior to implementation.

5B1.5 The discharge is authorized from Authorized Works which are: antiscalant addition module and related appurtenances approximately located as shown in Appendix 5B5.

5B1.6 The Lower Greenhills Creek Antiscalant Addition System may operate intermittently, in accordance with the Operations Plan, as required to meet the Site Performance Objectives for Calcite per Section 3.4 and prevent acute toxicity failures per Section 6.2.

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5B2 AQUATIC EFFECTS MONITORING

The permittee must implement the monitoring program as described in the approved monitoring program "Greenhills Creek Aquatic Effects Assessment and Monitoring Program". The permittee must submit to the director any changes to the aquatic effects monitoring program prior to implementation. The director may make or request changes to the aquatic effects monitoring program at any time by specifying such in writing to the permittee.

5B3 AQUATIC EFFECTS MONITORING PROGRAM ANNUAL REPORT

The Greenhills Creek Aquatic Effects Assessment and Monitoring Program annual report must be reported on in accordance with generally accepted standards of good scientific practice in a written report and submitted to the director of each year following the data collection calendar year by June 30.

5B4 LOWER GREENHILLS CREEK ANTISCALANT ADDITION SYSTEM MONITORING PROGRAM

	GREENHILLS CREEK SED. POND DECANT (Influent) (4)	LOWER GREENHILLS CREEK ANTISCALANT MODULE (Effluent)	GREENHILLS CREEK D/S OF ANTISCALANT MODULE (~80 m Downstream)	GREENHILLS CREEK D/S OF SED. POND DECANT (~600 m Downstream)
EMS Number	*E102709*	*E309912*	*E321331*	*E309911*
Teck Station ID	*GH_GH1*	*GH_CAM1EFF*	*GH_CA04*	*GH_GH2*
PARAMETER				
Field Parameters (a)	M	M	-	M
Conventional Parameters (b)	M	M	-	M
Major Ions (c)	M	M	-	M
Nutrients (d)	M	M	-	M
Total and Dissolved Metals Scan (e)	M	M	-	M
96 hour Rainbow Trout single concentration toxicity test (g)	Q	Q	-	Q
48 hour *Daphnia magna* single concentration toxicity test (g)	Q	Q	-	Q
Flow(f)	C	-	-	-
Calcite Precipitation Propensity Monitoring	1X/2W	-	1X/2W	-
Rock Mass Monitoring	1X/6W, as needed	-	1X/6W, as needed	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.5.1 and the approved annual calcite monitoring program for Calcite Index Monitoring requirements.
4) Monitoring location appears in two monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in both Section 9 and Appendix 5.

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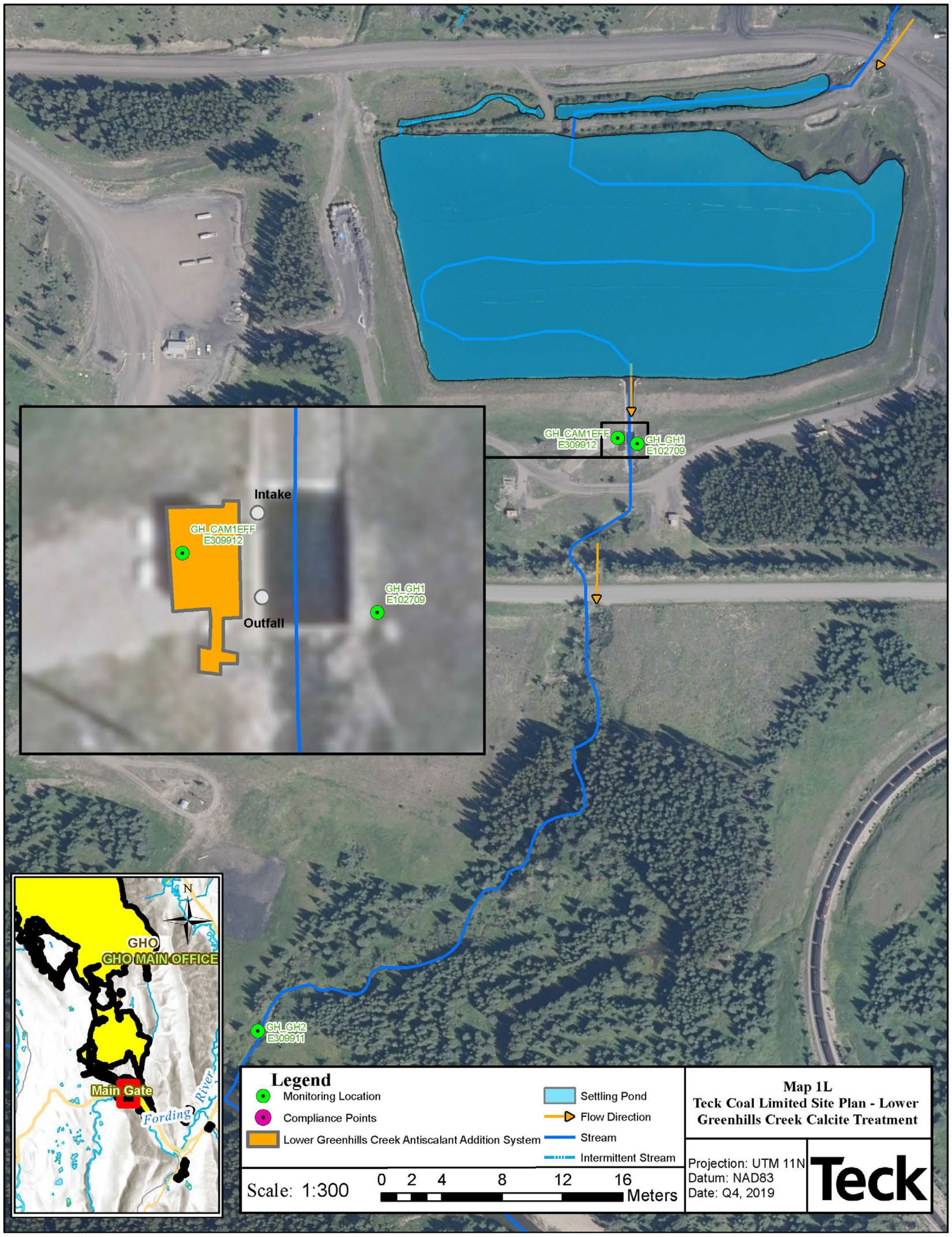
5B5 LOWER GREENHILLS CREEK ANTISCALANT ADDITION SYSTEM SITE PLAN



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APPENDIX 5C – Swift-Cataract Antiscalant Addition System

Additional requirements are detailed in Appendix 5A

5C1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the Swift-Cataract Antiscalant Addition System to the Fording River via the Swift Creek Intake structure, FRO-S AWTF bypass pipeline and the Fording River Outfall (i.e., saw-tooth weir on the Fording River Road crossing). The Swift-Cataract Antiscalant Addition System influent is Swift Creek Sediment Ponds effluent comprised of combined flow of Swift Creek and Cataract Creek. The site reference number for this discharge is E320694 (FR_SCOUT) as shown in Appendix 5C3.

5C1.1 Treated effluent discharged at E320694 must not be acutely toxic, as per Section 6.2.

5C1.2 Treated effluent at E320694 must not exceed an antiscalant concentration of 25 mg/L based on a two-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.

5C1.3 Notification of deviation from the identified antiscalant in the Teck application "Swift Cataract Antiscalant Addition Project" dated August 30, 2019 must be provided to the director and KNC prior to implementation.

5C1.4 The discharge is authorized from Authorized Works which are: antiscalant addition module and related appurtenances approximately located as shown in Appendix 5C3.

5C1.5 The Swift-Cataract Antiscalant Addition System may operate intermittently, in accordance with the Operations Plan, as required to meet the Site Performance Objectives for Calcite per Section 3.4 and prevent acute toxicity failures per Section 6.2.

5C2 SWIFT-CATARACT ANTISCALANT ADDITION SYSTEM MONITORING PROGRAM

	SWIFT-CATARACT SED. POND DOSED WITH ANTISCALANT TO FORDING RIVER (3;4) (Effluent)	FORDING RIVER U/S OF FRO-S AWTF OUTFALL STRUCTURE (Upstream in receiving environment)	FORDING RIVER D/S OF FRO-S AWTF OUTFALL STRUCTURE (Downstream in receiving environment) (4)	SWIFT CREEK SEDIMENT PONDS TO FORDING RIVER
EMS Number	*E320694*	*E320693*	*E320695*	*E319331*
Teck Station ID	*FR_SCOUT*	*FR_FR3*	*FR_SCOUTDS*	*FR_SCCAT*
PARAMETER				
Field Parameters (a)	M	-	M	-
Conventional Parameters (b)	M	-	M	-
Major Ions (c)	M	-	M	-
Nutrients (d)	M	-	M	-
Total and Dissolved Metals Scan (e)	M	-	M	-
96 hour Rainbow Trout single concentration toxicity test (g)	Q	-	-	-
48 hour *Daphnia magna* single concentration toxicity test (g)	Q	-	-	-
Flow(f)	-	-	-	C
Calcite Precipitation Propensity Monitoring	1X/2W	1X/2W	1X/2W	-
Rock Mass Monitoring (5)	-	1X/6W, as needed	1X/6W, as needed	-

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Samples are to be collected only when there is discharge via overflow from the FRO-S AWTF Swift Creek Intake. If the discharge is initiated because of a recirculation event at FRO-S AWTF, the monitoring program is not effective during the first four (4) hours of the recirculation event.
4) Monitoring location appears in three monitoring tables in this permit; therefore, monitoring data must be reported according to the requisite reporting requirements in Section 9, Appendix 4, and Appendix 5.
5) Rock mass monitoring to be conducted on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods.

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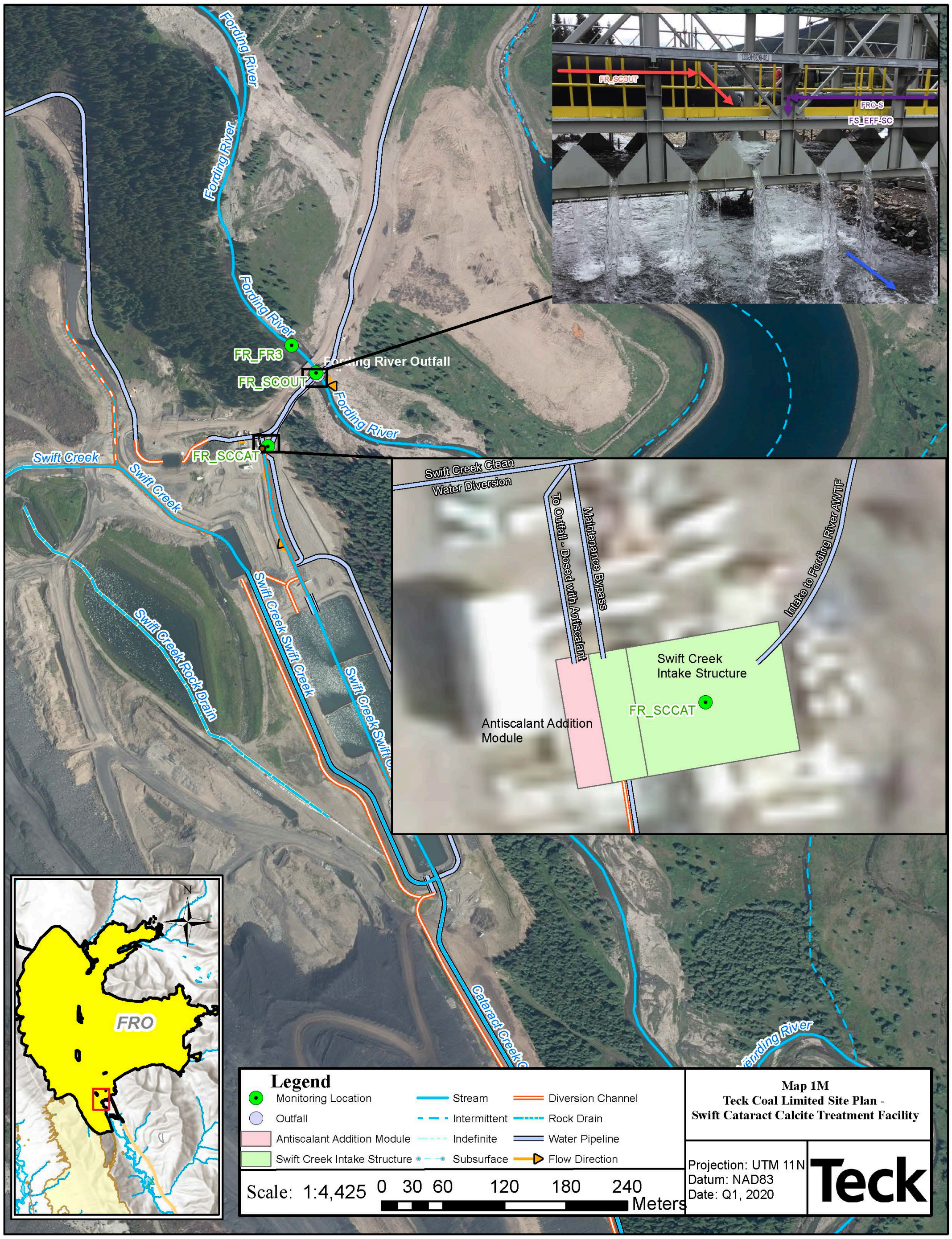
5C3 SWIFT-CATARACT ANTISCALANT ADDITION SYSTEM SITE PLAN



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APPENDIX 5D – LCO Dry Creek Antiscalant Addition System

Additional requirements are detailed in Appendix 5A.

5D1 AUTHORIZED DISCHARGES

This section applies to the discharge of effluent from the LCO Dry Creek Antiscalant Addition System to Dry Creek. The LCO Dry Creek Antiscalant Addition System influent is Dry Creek Sediment Pond effluent. The site reference number for this discharge is E295211 (LC_SPDC) as shown in Appendix 5D4.

5D1.1 Treated effluent discharged at E295211 must not be acutely toxic, as per Section 6.2.

5D1.2 Treated effluent at E295211 must not exceed an antiscalant concentration of 25 mg/L based on a two-minute time-weighted average, according to the sampling and calculation procedure in the Operations Plan.

5D1.3 Notification of deviation from the identified antiscalant in the Teck application "Line Creek Operations Dry Creek Calcite Management Project" dated May 8, 2020 must be provided to the director and KNC prior to implementation.

5D1.4 The discharge is authorized from Authorized Works which are: antiscalant addition module, the combined effluent pipeline, and related appurtenances approximately located as shown in Appendix 5D4.

5D1.5 The LCO Dry Creek Antiscalant Addition System may operate intermittently, in accordance with the Operations Plan, as required to meet the Site Performance Objectives for Calcite per Section 3.4 and prevent acute toxicity failures per Section 6.2.

5D2 DRY CREEK DOWNSTREAM MONITORING REVIEW

5D2.1 The permittee must provide an analysis and interpretation of monitoring results from Dry Creek downstream monitoring locations during the initial period of 12 months during project commissioning and operations to the director and KNC. The report must be submitted within 14 months of the project start date and include a recommendation for ongoing monitoring at these locations.

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Mining Authorizations

5D3 **LCO DRY CREEK ANTISCALANT ADDITION SYSTEM MONITORING PROGRAM**

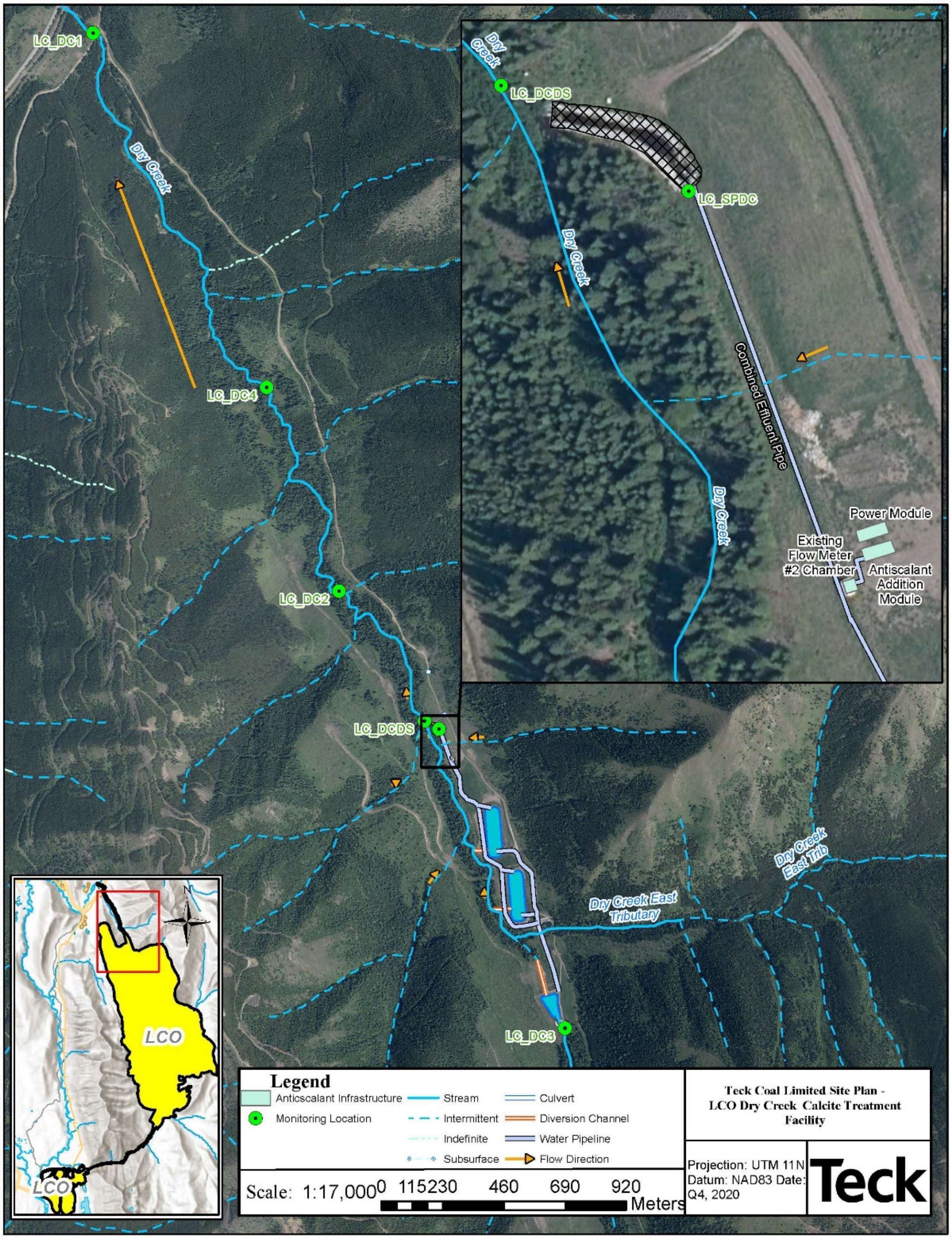
	LCO DRY CREEK U/S OF DCWMS HEAD POND	LCO DRY CREEK SEDIMENT POND COMBINED EFFLUENT D/S OF ANTISCALANT ADDITION (Effluent)	LCO DRY CREEK 30 M D/S OF DCWMS DISCHARGE LOCATION IN REACH 4 (Downstream in receiving environment)	LCO DRY CREEK 0.6 KM D/S OF DCWMS IN REACH 3 (Downstream in receiving environment)	LCO DRY CREEK 1.5 KM D/S OF DCWMS IN REACH 3 (Downstream in receiving environment)	LCO DRY CREEK 0.5 KM U/S OF FORDING RIVER IN REACH 1 (Downstream in receiving environment)
EMS Number	*E288273*	*E295211*	*E295210*	*200335*	*200044*	*E216142*
Teck Station ID	*LC_DC3*	*LC_SPDC*	*LC_DCDS*	*LC_DC2*	*LC_DC4*	*LC_DC1*
PARAMETER						
Field Parameters (a)	M	M	M	-	-	-
Conventional Parameters (b)	M	M	M	-	-	-
Major Ions (c)	M	M	M	-	-	-
Nutrients (d)	M	M	M	-	-	-
Total and Dissolved Metals Scan (e)	M	M	M	-	-	-
96 hour Rainbow Trout single concentration toxicity test (g)	-	Q	-	-	-	-
48 hour *Daphnia magna* single concentration toxicity test (g)	-	Q	-	-	-	-
Flow(f)	-	C	-	-	-	-
Calcite Precipitation Propensity Monitoring	M	M	M	M	M	M
Rock Mass Monitoring (4)	1X/6W, as needed	-	1X/6W, as needed	-	-	1X/6W, as needed

1) Refer to Table 26, Appendix 3, for abbreviation description.
2) Refer to Table 27, Appendix 3, for explanatory notes.
3) Refer to Section 8.5.1 and the approved annual calcite monitoring program for Calcite Index Monitoring requirements.
4) Rock mass monitoring to be conducted on an as-needed basis as a confirmatory measure of the more frequent calcite monitoring methods.
5) If monitoring locations appear in multiple monitoring tables in this permit, monitoring data must be reported according to the requisite reporting requirements in Appendix 5 and the other associated sections.

Date issued: November 19, 2014
Date amended: December 1, 2021
(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

5D4 **LCO DRY CREEK ANTISCALANT ADDITION SYSTEM SITE PLAN**



Document Path: \\teckcominco\CGO\Groups\TCGIS\Data\Projects\AnnualWaterReporting\AnnualReporting2020\SurfaceWaterAnnual_Rpt\Regional\RG_107517 Permit Figures\MXD\RG_Map_LCODC_Antisca

Date issued: November 19, 2014
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(most recent)

A.J. Downie, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Mining Authorizations

Appendix II

Environment Approval Conditions and Previous Recommendations

1 ENV Approval Conditions and Previous Recommendations

The Ministry of Environment & Climate Change Strategy (ENV) approval letters for the 2020 Regional Groundwater Monitoring Program (RGMP) and the 2018 Site-specific Groundwater Monitoring Program (SSGMP) updates for the Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO), and Coal Mountain Mine (CMm) are also included in this Appendix. CMm is presently in care and maintenance.

1.1 2021 Site-Specific Groundwater Monitoring Program Update Recommendations

Recommendations were developed in the 2021 SSGMP Update and are provided below for each operation (SNC-Lavalin, 2021a). These recommendations were incorporated or assessed in this year's annual report.

Fording River Operations

- Review existing data on the stratification of Henretta Lake. If the assessment is seasonally limited, collect field data and water quality samples in a vertical profile of the water column in Henretta Lake in other seasons.
- Installation of additional nested monitoring wells completed in bedrock and overburden west of Henretta Lake.
- Additional monitoring and sampling of newly installed wells to assess loading from Turnbull Bridge spoil, and evaluation of data.
- Installation of additional monitoring wells installed in overburden to assess influence of groundwater extraction on flows and load in the Fording River.
- Review ongoing studies and access in this area, and installation of new monitoring well in Fording River valley-bottom west of the Clode Creek ponds and between the FR_POTWELLS and Lake Mountain Pit/Clode Creek.
- Monitoring and sampling of newly installed bedrock wells and evaluation of data to assess potential westward flow of bedrock seepage from E4 Saturated Rock Fill (SRF; now FRO-N SRF).
- Monitoring and sampling of newly installed wells FR_LMA-1, FR_LMA-2, and FR_LMA-3 to assess seepage from the river towards the pit.
- Monitoring and sampling of newly installed wells and evaluation of data to assess groundwater quality and groundwater surface water interactions with the pond which overlies the historic Clode Creek alluvial fan.
- Monitoring and sampling historic wells and seeps at the toe of the slope of the STP to assess source of mine related constituents south of the STP (FR_BH-03-16 and FR_BH-04-16) and whether there is attenuation of order constituents (OC) at FR_09-03-A/B.

- Seepage study of the Swift Creek sediment ponds is ongoing. Once complete, the findings will be assessed to inform whether select wells need to be added to the SSGMP.
- Teck is undertaking a seepage study of the Cataract Creek sediment ponds to understand potential seepage and pathway from the pond to the Fording River though groundwater. The findings of this study will be reviewed by the SSGMP.
- Additional monitoring and sampling of wells installed in under the Mass Balance Investigation (MBI) and evaluation of data for potential incorporation into the SSGMP or RGMP.
- Create a new surface water monitoring station at the confluence of the Fording River and the Oxbow Channel downstream of the regional groundwater discharge zone.

Greenhills Operations

- Review results of ongoing Mass Balance Investigation (MBI) and Porter Creek investigations.
- Assess results from GHO Greenhills-Fording Aquifer Study drilling program and evaluate the new monitoring wells for potential inclusion in the GHO SSGMP.
- Assess results of isotope samples (18O-H_2O, 2H-H_2O, tritium and sulphate) at GH_MW-MC-2D. If results are inconclusive, further field investigation of the deep groundwater flow regime will be conducted.
- Assess results from MBI investigation downgradient of Thompson Creek watershed to assess potential inclusion of new monitoring wells into SSGMP/RGMP.

Line Creek Operations

- Assess need for a bedrock monitoring well within the Dry Creek Drainage, near the Dry Creek sedimentation ponds.
- Well pair RG_MW_DC1A/B should be monitored quarterly for one year and, following data review, considered for incorporating into subsequent SSGMPs.
- Install a shallow well in the Dry Creek drainage, downgradient from the sedimentation ponds.
- Review the findings of the groundwater bypass study once it has been concluded and evaluate future planned monitoring wells near Upper Line Creek and the upper portions of Centre Line Creek to assess the need for additional investigations.
- Review the findings of the groundwater bypass study once it has been concluded and evaluate future planned monitoring wells in the vicinity of the West Line Creek Active Water Treatment Facility (WLC AWTF) to assess the need for additional investigations.
- Monitor groundwater at LC_MW_CP1A/B.
- Monitor groundwater at LC_MW_ER4A/B and LC_MW_SRDA/B.
- Monitor groundwater at RG_MW_LCA/B.
- Decommission LC_PIZP1101 and replace with an appropriate well.
- Inspect LC_PIZP1105 to confirm well integrity.

Elkview Operations

- Review of data obtained from recent well installations and test pits at the Harmer Reservoir.
- Review groundwater monitoring and sampling data obtained from new Dry Creek Sedimentation Pond wells after two years of data are collected.
- Review data obtained from Harmer Reservoir decommissioning study, including preparation of a cross section extending from EV_GV3gw to the new wells near the reservoir.
- Restore surface water monitoring location EV_GV1 or add new surface water monitoring location near new well RG_MW_GCA.
- Cedar North in-pit Backfill Extension (CNIBE) - Fault F42 to investigate hydraulic conductivity, connectivity and preferred pathways of faults and weathered bedrock as part of Permit 107517 Condition 8.2.4.
- Decommission EV_MCgwS/D.
- Review Goddard Marsh load balance study.
- Review wells to be installed near Lagoon D as part of decommissioning investigation.
- Conduct single-well response tests at EV_OCgw and EV_ECgw to re-evaluate hydraulic conductivity.
- Continue monitoring chemistry at EV_MW_MC3 and at nearby SEEP_1B and review isotope results.
- Survey datum at Gate Creek and Bodie Creek monitoring stations to be consistent with groundwater wells.
- Install multilevel well nest adjacent to EV_RCSgw (formerly known as EV_RCgw) and near MV_MW_MC1A/B to investigate OC pathways.
- Complete a site reconnaissance of the Balmer North mine area in conjunction with an opportunistic sampling program where surface water seeps or where other surface water is noted.
- Perform a reconnaissance to understand potential suitable locations to install well nest near Milligan Creek Sedimentation Pond.
- Review of data obtained from new wells EV_MW_MC3A/B installed as part of RGMP drilling near Erickson Creek intake.

Coal Mountain mine

- Hydraulic conductivity testing at CM_MW7-SH, CM_MW7-DP and CM_MW8.
- Conduct a flow and load accretion Study to inform the need and location for potential additional groundwater monitoring well(s).

2 2020 Annual Report Recommendations by Program

Recommendations were developed in the 2020 Annual Report and are provided below for each operation (SNC-Lavalin, 2021b). These recommendations were incorporated or assessed in this year's annual report.

FRO SSGMP

Table A: FRO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Conduct a review of additional studies and existing information in the Henretta Creek valley upgradient of the confluence of the Fording River and Henretta Creek. The evaluation should consider whether a new nested groundwater monitoring well is required as part of the SSGMP and whether a new well would provide better spatial coverage to monitor a possible groundwater pathway from the backfilled pits. If so, the new nested well may replace FR_HMW1S/D in the SSGMP.	Ongoing	Borehole logs and the locations of monitoring wells installed in 2021 were reviewed in the 2021 SSGMP Update Report as well as this report, and were concluded to not be suitable to address the potential down-valley pathway from the source areas. New nested monitoring wells completed in overburden and bedrock west of Henretta Lake have therefore been recommended and planned to be drilled in 2022. Continued monitoring of FR_HMW1S/D is recommended until such a time that the relationship between groundwater levels and quality in the backfilled pits and those down-valley has been established.
Install dataloggers in FR_09-02-B, and FR_09-04-B. If possible, well FR_GH_WELL4 should be surveyed to the groundwater datum in order to process continuous water level data that is being collected.	Ongoing	Dataloggers were been installed in FR_09-02-B and FR_09-04-B in Q1 of 2022. An attempt was made to install at FR_GH_WELL4 in 2021 but it was not possible due to the configuration of the wellhead instrumentation.
Assess the need for installing a monitoring well in the vicinity of the FR_POTWELLS to monitor the effects of withdrawals in the area, since the FR_POTWELLS cannot be instrumented with dataloggers.	Ongoing	Reviewed as part of the 2021 SSGMP Update and additional monitoring wells have been recommended.

GHO SSGMP

Table B: GHO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Decommission well GH_MW-SITE-A as it is typically dry and does not serve the routine SSGMP monitoring purpose. Neighbouring monitoring wells (GH_MW-GHC-1A/1B) will continue to be monitored downgradient along the flow path from Site A.	Complete	This well was decommissioned in 2021.
A well pair screened in a single hydrogeological unit, below the groundwater surface and downstream of the Porter Creek Settling Pond should be installed in 2021 and should be added to the GHO SSGMP to replace well GH_MW-PC. Well GH_MW-PC should be decommissioned once one year of data overlap occurs with the new nested well.	Complete	Nested well GH_MW-PC4A/B was installed in 2021.
Decommission well GH_MW-UTC-A as it is irreparably damaged. Since GH_MW-UTC-B does not intersect a mine-influenced pathway and is not considered connected to surface water this well is recommended to be decommissioned.	Complete	These wells were decommissioned in 2021.
Collect isotope samples ($^{18}O-H_2O$, $^{2}H-H_2O$, tritium) once from wells GH_MW-MC-2S/D and additional wells upon review to investigate the groundwater flow path to well GH_MW-MC-2S/D and increase understanding of the elevated dissolved Se at this well.	Ongoing	Samples have been collected and are being analysed as part of the RGMP.

LCO SSGMP

Table C: LCO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Install transducer in monitoring well LC_PIZDC1306. This well historically has a large fluctuation in water levels and temporarily undergoes artesian flow conditions. In addition, Se/SO_4 ratio plot suggest this well potentially mixes with surface water. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater at this location.	Ongoing	Assess whether a pressure transducer can be installed for continuous groundwater level monitoring.

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Table C (Cont'd): LCO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Install a transducer in monitoring well LC_PIZDC1404S to establish if there are seasonal changes to vertical hydraulic gradient in this location not captured by quarterly groundwater level collection. Continuous groundwater level measurements at nearby nested monitoring wells LC_PIZDC1307 and LC_PIZDC1308 historically show temporary upwards vertical gradients during freshet. Installing a transducer in LC_PIZDC1404S will facilitate understanding of vertical hydraulic gradient.	Ongoing	Pressure transducer to be installed in 2022.
Reduce sampling frequency to twice per year for the following wells (LC_PIZDC1307, LC_PIZDC1308, LC_PIZP 1101 and LC_PIZP1103) because OCs are below primary screening levels, baseline data has been established with a long period of data and trends are stable or decreasing according to Mann-Kendall statistical analysis.	Ongoing	Recommended as part of the 2021 SSGMP Update.
Reduce water level measurement frequency to twice per year for the following wells; LC_PIZP1001, LC_PIZP1002 and LC_PIZP1003 because groundwater levels for these wells are only needed to augment interpreted groundwater flow direction at the Process Plant.	Ongoing	Recommended as part of the 2021 SSGMP Update.
Verify the groundwater elevations difference for LC_PIZP1001 and LC_PIZP1003 as the 2019 LCO SSGMP indicated that there was a 30.3 m difference in groundwater elevation between. Depths to bottom and depths to water information should be validated.	Ongoing	Groundwater elevations were verified. Recommendations for 2022 program include investigating the anomalously high groundwater elevations at LC_PIZP1002 and LC_PIZP1003 and confirming depths to bottom and depths to water information. A new geodetic survey of the ground surfaces and tops of casings may be warranted.

EVO SSGMP

Table D: EVO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Add well EV_GV3gwS to the SSGMP in the 2021 SSGMP Update to obtain a better understanding of groundwater surface water interaction prior to the confluence with Harmer Creek.	Complete	Recommended as part of the 2021 SSGMP Update.

Table D (Cont'd): EVO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Collect isotope samples ($^{18}O-H_2O$, $^{2}H-H_2O$, tritium) once from EV_GV3gwS, EV_GV3gw, and EV_GV4gwA/B to differentiate relative age of groundwaters, recharge areas, and flow paths.	Ongoing	Completed in 2021/2022 and will be reviewed and included in future reporting once all analytical data is available.
Develop two cross sections that includes EV_GV3gwS, EV_GV3gw, and EV_GV4gwA/B for the 2021 SSGMP Update to allow for visualization of the surface water – groundwater interaction at Harmer and Grave creeks, as well as the relationship between deeper wells EV_GV3gw and EV_GV4gwA.	Ongoing	One cross section was completed through Grave Creek upgradient and downgradient of the confluence of Harmer Creek and presented as Drawing EV-04. The cross sections will be further reviewed once data associated with the Harmer Reservoir study becomes available.
Install pressure transducer in EV_WF_SW to understand potential groundwater surface water interactions in the WFTF.	Ongoing	Pressure transducer was to be installed in 2022; however, the 2021 SSGMP Update and this report (Appendix IX) proposes removal of this well from the SSGMP program. The well is located upland along Erickson Creek and has significant groundwater variations. The well is screened below 159 m of waste rock and concentrations of OC are less than the primary screening criteria.
Conduct a data gap analysis to understand the sources of mine-influenced water in the Michel Creek valley-bottom Study Area 9 as part of the 2021 SSGMP Update. As indicated below, a dedicated monitoring well should be installed at EV_RCSgw.	Ongoing	Data gap analysis recommended as part of the 2021 SSGMP Update along with installing a monitoring well near EV_RCSgw. A desktop review of former Balmer North Mine is in progress. Monitoring well is proposed to be installed in 2022.
Surveying surface water stations at Goddard Creek (EV_GC2) and Harmer Creek (EV_HC1).	Ongoing	Transducers installed and data collected at EV_HC1 as of Q3 2020. A transducer has been installed at EV_GC2; however, the station needs to be surveyed to a common datum in 2022.

CMO SSGMP

Table E: CMO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Install transducers in well nest CM_MW4-SH/DP to understand hydraulic heads and vertical hydraulic gradient between two flowing artesian monitoring wells.	Complete	Transducers installed in October 2021.

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Table E (Cont'd): CMO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Install transducer in CM_MW2-SH to fully understand seasonal fluctuations in this well and to assess potential connectedness to surface water.	Complete	Transducer installed in May 2021.
It is unlikely CM_MW9 will ever be successfully developed, therefore development efforts on CM_MW9 should cease. Continue collecting quarterly groundwater levels to verify the minimal water seepage into the well.	Ongoing	Ongoing.
Update sampling frequency as part of the 2021 SSGMP Update, with reductions at CM_MW4-SH; CM_MW4-DP; CM_MW5-DP; CM_MW6-SH; CM_MW6-DP; CM_MW7-SH; and CM_MW8 to twice per year. OC are below primary screening levels in these monitoring wells, there is a relatively long period of record and trends are stable or decreasing according to Mann-Kendall statistical analysis.	Ongoing	Updated sampling frequency recommended in 2021 SSGMP Update.
Continue with quarterly sampling at monitoring wells that exceeded primary screening criteria: CM_MW5-SH (selenium); and CM_MW7-DP (sulphate).	Ongoing	Sampling frequency recommended in 2021 SSGMP Update.
Continue with quarterly sampling at monitoring wells adjacent to Michel Creek above Corbin Creek confluence (CM_MW2-SH; CM_MW3-SH; and CM_MW3-DP) so this information can continue to be used to facilitate a comparison to relatively new surface water monitoring stations.	Ongoing	Sampling frequency recommended in 2021 SSGMP Update.
Continue with quarterly sampling at relatively new monitoring well CM_MW10.	Ongoing	Sampling frequency recommended in 2021 SSGMP Update.
Install transducers in monitoring well nest CM_MW1-OB/SH/DP to collect continuous water level data to assist in understanding seasonal influences on vertical hydraulic gradients.	Complete	Transducer installed in December 2020.
Continue with quarterly sampling at monitoring wells adjacent to Michel Creek to help understand groundwater surface water interactions along Michel Creek downgradient of Corbin Creek confluence: CM_MW1-OB; CM_MW1-SH; CM_MW1-DP; CM_MW_AG1A; and CM_MW_AG1B.	Ongoing	Sampling frequency recommended in 2021 SSGMP Update.

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Table E (Cont'd): CMO SSGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
After a year of transducer measurements and continued quarterly sampling at CM_MW3-SH, CM_MW3-DP, CM_MW2-SH, CM_MW1-OB, CM_MW1-SH, CM_MW1-DP, CM_MW_AG1A and CM_MW_AG1B, groundwater levels and gradients should be analyzed in conjunction with available surface water flow/stage measurements and water quality sampling at CM_MC1, CM_MC2, CM_MC4, CM_MC5, CM_MC6 and CM_MC7 to understand gaps regarding potential mine-influences and groundwater surface water interactions along this stretch of Michel Creek.	Ongoing	Transducer installation complete in Q2 2021. Retained as a recommendation in Appendix XII.

RGMP

Table F: RGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Background		
Continue to monitor/sample background locations two times in a year as recommended in the 2020 RGMP Update (SNC-Lavalin, 2020a).	Ongoing	Monitoring and sampling has been completed and will continue.
Continue to assess trends of Constituent of Interest (CI) in groundwater to further refine the background well network and reduce uncertainty on background concentrations.	Ongoing	Complete and ongoing.
Install one background well in order to increase the spatial distribution of background wells in the Elk Valley; Alexander Creek, upgradient of Michel Creek is currently being assessed as a potential background location. Evaluate analytical data once one year of data is available to assess the need for additional background wells and location.	Ongoing	Monitoring wells RG_MW_AC1A/B were installed in Q4 2021. Analytical data will be assessed once one year of data is available.
Evaluate analytical results for newly installed background wells including GH_MW_BG1A/B/C and EV_MW_GV4A/B once one year of data is available to assess the need for additional data.	Ongoing	Ongoing.
Sample groundwater at EV_MW_GV4A/B and CM_MW3-SH once for isotope analysis (^{3}H, ^{2}H, ^{18}O and potentially ^{14}C) to obtain a better understanding of origin of water in this area.	Complete	CM_MW3-SH sampled, see Appendix IV. EV_MW_GV4A/B sampled in January 2022, awaiting results.

Table F (Cont'd): RGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Study Area 1		
The hydrogeological conceptual model for Study Area 1 should be refined with additional data from the MBI program once one year of monitoring data is available. Based on the results and interpretation, a subset of MBI monitoring wells appropriate to augment RGMP should be incorporated. This would include monitoring locations considered best positioned to understand the down-valley migration of OC and the degree of interaction with the Fording River.	Ongoing	The hydrogeological conceptual model was updated with limited data (two events in Q4 of 2020) for the 2021 SSGMP Update. Five monitoring wells at two locations have been recommended to be added to the RGMP as par of this report. The conceptual model will continue to be refined as new data are available, and additional wells may be recommended for inclusion in the RGMP once sufficient data is available and interpretive reporting of the MBI program has been completed.
Install a nested monitoring well in the southern portion of Study Area 1 targeting the middle of the Fording River Valley, valley-bottom aquifer, near or upgradient of FR_FRABCH. Data collected from wells installed at this location will help facilitate an understanding of groundwater quality farther downgradient of mine-influences and near/within a wetted area.	Complete	Monitoring wells were installed in April 2021 and incorporated into the RGMP as of the 2021 SSGMP Update.
Study Area 2		
As per SNC-Lavalin (2020a), install a nested groundwater monitoring well in the Dry Creek alluvial fan near the confluence of the creek and the Fording River to characterize surface water/groundwater interaction in this area and potential OC pathways. The monitoring wells should be outfitted with pressure transducers for continuous monitoring of water levels.	Ongoing	Monitoring wells were installed in 2021 and will be incorporated into the RGMP as of the 2021 SSGMP Update.
Study Area 3		
As specified in the 2020 RGMP Update, install a monitoring well nest near western boundary of Study Area 3 along potential groundwater flow path to Elk River watershed prior to Josephine Falls for the purpose of characterizing the potential groundwater flow path through glaciofluvial sediments leaving Study Area 3 to the west into the Elk River Valley.	Complete	Nested wells GH_MW_FR11A/B were installed in 2021.
Where possible, install pressure transducers for continuous water level measurements in existing production wells in the Fording River valley-bottom monitored under the RGMP (wells GH_POTW09, GH_POTW10, GH_POTW15, GH_POTW17).	Ongoing	Pressure transducers have been installed in these wells and data will be assessed as part of the 2022 annual report.

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Table F (Cont'd): RGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Study Area 4		
Once one year of data is available at the new wells drilled near Leask and Wolfram Creek Sedimentation Ponds as Part of Cougar Phase 5 and Phase 7-2 Project, compile and assess the inclusion of new monitoring wells and whether they are more appropriate to be included in the RGMP compared to the current well network.	Ongoing	Monitoring wells RG_MW_LC3A/B, RG_MW_LCWS1, and RG_MW_WC2A/B were added to the program in the 2021 SSGMP Update.
Review data from newly installed hydrometric stations as part of the MBI (GH_LC3, GH_WC4, GH_TC3).	Ongoing	Newly installed hydrometric stations will be assessed as part of the MBI in 2021.
Once one year of data has been collected from the MBI wells (GH_MW_LC3-A/B/C, RG_MW_LCWC1, GH_MW_WC2-A/B, RG_MW_ER1A/B, RG_MW_ER2A/B, RG_MW_ER3A/B, RG_MW_ER4A/B, RG_MW_ER5A/B, RG_MW_ER6A/B, RG_MW_ER7A/B, RG_MW_ER8), determine if the gap relating to the potential source and transport pathway of mine-influenced water at GH_MW-ERSC-1 has been filled and select monitoring wells for inclusion in RGMP. Additional monitoring wells will be installed as part of MBI in 2021 based on the preliminary assessments of available data.	Ongoing	Once sufficient data is available and the MBI report is finalized additional MBI wells will be considered for inclusion into the program.
Add a new pair of groundwater monitoring wells GH_MW_EF1A/B to the RGMP and review one year of data to evaluate if gap at RG_DW-01-03 related to investigating potential groundwater pathway from GHO to RG_DW-01-03 is filled.	Complete	Monitoring well was incorporated into the program in 2020.
Study Area 5/6		
As per the 2020 RGMP Update, install a nested groundwater monitoring well in the Line Creek alluvial fan near the confluence of the creek and the Fording River to characterize groundwater surface water interactions in this area and potential OC pathways. The monitoring wells should be outfitted with pressure transducers for continuous monitoring of water levels.	Complete	Monitoring wells were installed in 2021 and will be incorporated into the RGMP as of the 2021 SSGMP Update.

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Table F (Cont'd): RGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Study Area 5/6 (Cont'd)		
Teck has existing water supply wells near the top of the Line Creek alluvial fan. It may be possible that one or some of the existing water supply wells near LC_LC4 can provide supplemental information to facilitate characterization of groundwater - surface water interactions in the alluvial fan. Pumping rates, capture zones, water quality and water levels should be reviewed, if available.	Ongoing	To be conducted in 2022.
Remove PIZP1101 as part of the Study Area 5/6 assessment but retain sampling as part of the Background Groundwater Assessment. Concentrations of OC have been near or less than analytical detection limits since 2013 with no apparent seasonal trend, indicative that the well does not monitor an active OC transport pathway.	Ongoing	PIZP1101 was repaired in December 2021. Samples should be collected to confirm the well was successfully repaired. If subsequent analytical results do not align with historical ranges, this well should be decommissioned.
Continue groundwater sampling at LC_MW_ER4A/B and review one year of data for potential long-term inclusion in the RGMP.	Ongoing	Monitoring of LC_MW_ER4A/B will be ongoing.
Study Area 7		
No recommendations	n/a	n/a
Study Area 8		
A hydrometric station should be established at the Goddard Creek Sedimentation Pond and the water level in the pond should be monitored to better understand the redox conditions at EV_MW_GC1B.	Complete	Staff gauge installed in Q4 2021.
Study Area 9		
Dataloggers cannot be installed at EV_RCSgw and EV_BRgw as the downhole pumps cannot be removed to facilitate installation. Also, the wells do not have a log, construction details are unknown and there is uncertainty as to the source of dissolved copper from these wells. A new monitoring well should be installed in this area to better understand the surface water/groundwater relationship, and any potential effects of pumping of these wells.	Ongoing	New wells proposed for 2022 adjacent to EV_RCSgw and EV_BRgw.
Where possible, survey the existing supply wells to develop the relationship between pumping, effects on mine-influenced groundwater, and surface water interactions	Ongoing	Remaining wells to be surveyed are EV_HW1 and EV_WH50gw, to be completed in 2022.

Table II-F (Cont'd): RGMP – 2020 Annual Report Recommendations

Recommendation	Status	Comments
Study Area 10		
Survey surface water station elevation at Erickson Creek (EV_EC1) to understand the relative elevation of surface water compared to groundwater in the Study Area in order to further assess groundwater surface water interaction near Erickson Creek and potential OC transport.	Ongoing	To be completed in 2022.
Add ^{3}H, ^{2}H, ^{18}O and potentially ^{14}C isotopes to the analytical suite for EV_MW_SP1A/B/C to attempt to differentiate relative age of groundwaters, recharge areas, and flow paths.	Ongoing	Sampling completed in 2021. Reporting in progress.
Study Area 11		
Install transducers in monitoring well nest CM_MW3-SH/DP to understand seasonal influences on hydraulic heads and vertical gradient direction that may be missed by quarterly water level measurements.	Complete	Completed in 2021. Appendix XII-1. Figure CM-13.
After a year of continuous groundwater level monitoring and quarterly sample collection at CM_MW_AG1A and CM_MW_AG1B, this new well nest should be compared to surface water quality results at CM_AG2 (and CM_MC2) to assess differences in OC concentrations between groundwater and surface water as well as potential gaps.	Complete	Completed in 2021. Appendix XII-1.
Study Area 12		
No recommendations.	n/a	n/a

Notes:
n/a denotes Not applicable.

2.1 ENV Approval Letters

The 2017 RGMP and 2018 SSGMP updates were accepted with conditions listed in associated approval letters included in this Appendix. The 2020 RGMP Update is pending approval.

3 References

SNC-Lavalin. 2021a. 2021 Site-specific Groundwater Monitoring Program Update. Report prepared for Teck Coal Limited. Dated October 31, 2021.

SNC-Lavalin, 2021b. 2020 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs. Report prepared for Teck Coal Limited. Dated March 31, 2021.

Attachment 1: 2020-07-09 2017 RGMP ENV Approval and App Rev1 Borehole Logs

File: PE107517

July 9, 2020

Mariah Arnold
Sr. Lead Environmental Sciences
Cam Jaeger
Coordinator Environment
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Teck Coal Limited
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RE: Elk Valley Regional Groundwater Monitoring Program (RGMP) - 2017 Update

[**Rev. 1 – Amendment of Condition 2.6.** This document is an update of the Approval Letter issued on February 19, 2020, whereby Condition 2.6 is modified as follows:
From:
"An update on how the RGMP addresses the changes introduced in the 2018 Adaptive Management Plan (AMP), with reference to Question 4 (effects of groundwater discharge to streams on calcite development) and Question 6 (groundwater triggers)."
To:
"An update on how the RGMP addresses the changes introduced in the 2018 Adaptive Management Plan (AMP)".]

The 2017 update of the Elk Valley Regional Groundwater Monitoring Program (2017 RGMP) dated September 2017 has been received and reviewed by ministry staff, along with the 2017 and 2018 Regional Groundwater Monitoring Program Annual Reports dated March 2018 and March 2019.

Pursuant to Section 9.2.1 of Permit PE107517, I hereby accept the 2017 update of the Elk Valley Regional Groundwater Monitoring Program (2017 RGMP), subject to the following conditions:

1. The Groundwater Work Plan will be carried out as written. The Groundwater Work Plan and the accompanying Table of Proposed Drilling Locations (Proposed Drilling Locations), which were discussed during the Groundwater Working Group (GWG) meeting of November 26-27, 2019 and submitted to ENV on January 7, 2020, are included as appendices to this Letter. Specifically, the monitoring wells proposed as part of the ongoing Mass Balance Investigation studies in support of the Regional Water Quality Model will be installed as soon as possible, subject to access and permitting constraints, and added to the Regional Groundwater Monitoring Network. Updates on the implementation of the Work Plan will be provided to the GWG during the Group's meetings and

conference calls. All proposed changes to the Work Plan and Proposed Drilling Locations will need to be justified and will require review by the GWG and approval prior to being implemented.

2. An update of the RGMP must be submitted to the Director for approval **by September 30, 2020** and will meet in full, all the requirements detailed in point *i* to *vii* Of Section 9.2.1 of Permit PE107517.

   Specifically, the 2020 RGMP update will contain the following:

   2.1 Based on the data acquired from the monitoring between 2017 and December 31, 2019, a "updated description of relevant aquifer characteristics (e.g. hydraulic conductivity, storage properties, transmissivity, etc.), and a description of regional groundwater flow patterns (directions and velocities) and recharge areas, fate, groundwater interactions with surface waters, the effects of groundwater withdrawals on the SW/GW interactions, and the mobility of mine related constituents of interest." (point *vi* of Section 9.2.1).

   2.2 An updated Conceptual Site Model (CSM), and on a closer integration with the Site-Specific groundwater programs, the Mass Balance Investigation and the Sparwood Area Groundwater Study.

   2.3 A list of all the hydrogeological studies conducted between 2017 and 2019, in support of other programs included in the Elk Valley Area-Based Management Plan (e.g. Regional Aquatic Effects Assessment, Regional Water Quality Model) or permit applications (e.g. Fording River South water treatment plant intake, Elkview and Fording River North Saturated Rock Fill), with an overview of each study and indication of whether and what information resulting from these studies is relevant to inform the CSM.

   2.4 In addition to the maps included in the 2017 update, include the following maps:

   i. Updated maps of the location of the existing groundwater monitoring wells included in the RGMP and proposed new RGMP wells (if applicable). The location of surface water monitoring stations should also be added as a reference.
   ii. Updated maps allowing the visualization of the main aspects of the Conceptual Site Model (e.g. surface and groundwater pathways, indicative gaining and losing stream reaches, receptors associated with monitoring wells).
   iii. Maps showing all the locations of the hydrogeological studies referred to in point 2.3 (two maps showing the study locations located in the northern and southern portion of the Elk Valley, respectively).

   2.5 Updated hydrogeological cross-sections to reflect the information acquired from new wells (and updated locations in plan view, where cross-sections have been extended to include new wells). Additional cross-sections will be developed for all the wells included in the updated regional groundwater monitoring network, in directions parallel and perpendicular to the main direction of flow. The cross-sections should show all the wells (including wells drilled for purposes other than monitoring, e.g. geotechnical wells) used to define them, with the following details:

topographic profile, bedrock contact elevation (where this is available or can be inferred), well screens location, average groundwater elevation and elevation of nearby surface water bodies. The stratigraphic logs of all the wells used to define the cross-sections will also be provided.

2.6 An update on how the RGMP addresses the changes introduced in the 2018 Adaptive Management Plan (AMP).

3. Provide a proposed Work Plan for 2020-2023 with proposed well drilling locations to fill in any remaining gaps identified during the update, with a tentative schedule for its implementation, as per condition *iv* of PE107517, Section 9.2.1 "Identify limitations and data gaps and conduct additional studies necessary to refine the hydrogeological conceptual model, determine the location and extent of mine-affected groundwater discharge to surface waters and to evaluate management and mitigation options."

Further, the Director expects the following:

- The GWG established in October 2016 will continue to provide guidance for groundwater programs. The GWG will consist of members from Teck Coal Limited (Teck), the Ktunaxa Nation Council (KNC), Ministry of Environment (ENV), Interior Health Authority (IHA) and may expand to include participants from Ministry of Energy and Mines (MEM), Ministry of Forest, Lands and Natural Resource Operations and Rural Development (FLNRORD).

- A minimum of two (2) in-person meetings and two (2) conference calls of the GWG will be held in 2020. The GWG will meet approximately every three months, to maintain continuity in the communication and activities related to the groundwater programs. This will ensure that these programs achieve the objectives of the Elk Valley Area-Based Management Plan (ABMP) to protect groundwater, human health and aquatic ecosystems.

If you have any questions, please contact Sarah Alloisio, Hydrogeologist, at Sarah.Alloisio@gov.bc.ca or at 236-468-2286.

Yours truly,

Liz Freyman, Head, Environmental Impact Assessment Section - Mining
for Director, *Environmental Management Act*
Mining Operations

cc: Heather McMahon, Ktunaxa Nation Council (HMcMahon@ktunaxa.org)

Regional Groundwater Monitoring Program: Work Plan 2020

Relevant Study Area	ENV Condition	Teck Response
Background/Northeast of Study Area 1	Add a newly drilled well pair in the Henretta Creek valley bottom upstream of FR_HMW5, to replace FR_HMW5 as background well	Teck proposes to install a monitoring well nest in this Study Area in 2020. The timeline and final location for the wells are contingent on regulatory approval landowner permission, and weather but is anticipated to be complete by Q3 2020. Teck has begun ongoing engagement with EMPR and other regulatory bodies to better understand regulatory requirements and pre-disturbance obligations for this location.
Background/North of Study Area 1	Add a newly drilled well pair (shallow and deep) in Upper Fording River, north of Henretta Creek and spoil.	Teck proposes to install a monitoring well nest in this Study Area in 2020. This timeline and final location for the wells are contingent on regulatory approval landowner permission and weather but is anticipated to be completed by Q3 2020. Teck has begun ongoing engagement with EMPR and other regulatory bodies to better understand regulatory requirements and pre-disturbance obligations for this location.
Background/South of Study Area 4	Select an additional well pair among the existing CPX2 baseline wells (GH_MW-Wolf-1S/D, GH_MW-Willow-1S/D and GH_MW-Willow-2S/D) or add a newly drilled well pair (shallow and deep) north of surface water sampling station GH_ER2 if the existing wells are not suitable for monitoring.	Geochemical analysis of water in the Wolf and Willow wells indicate that they are not representative of background Elk River alley aquifer conditions but may be suitable for use as background wells for their respective tributaries. The British Columbia MoE Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (2016) indicates that a minimum of 1 year of quarterly data collection is required for adequate baseline groundwater chemistry characterization. Insufficient data has been collected to make this determination and as such the Wolf and Willow Creek wells will continue to be monitored until such time that their suitability for baseline characterization can be established. In 2020, a number of wells are scheduled to be drilled on the west side of GHO under the scope of the MBI. Results from this program will be evaluated to determine whether one or more of these wells are representative of background Elk River valley bottom groundwater chemistry.
• **Background/North of Study Area 4** • **Background/West portion of Study Area 8** • **Background/South of Study Area 10** • **Background/North of Study Area 11**	Add a newly drilled well pair (shallow and deep) in the Boivin Creek alluvial fan north of Elkford.	A draft framework for identifying and prioritizing additional areas for investigation under the RGMP was included in the Terms of Reference to meet Condition 2 of the April 18, 2017 approval letter from ENV. This framework ranked Study Areas based on purpose statements and stated objectives of the groundwater monitoring programs as well as timeline requirements. The 2017 RGMP update used this ranking to develop a schedule for additional studies in the prioritized study areas. This gap was not identified as a priority for the 2017-2020 cycle. As such data collected during the current program cycle will be reviewed as part of the 2020 Update and if this gap remains it will be ranked and prioritized for the 2020-2023 program.
Background/East of Study Area 7	Add a newly drilled well pair (shallow and deep) in Grave Creek valley bottom sediments upstream of the confluence with Harmer Creek.	A draft framework for identifying and prioritizing areas of investigation under the RGMP was included in the Terms of Reference to meet Condition 2 of the April 18, 2017 approval letter from ENV. This framework ranked Study Areas based on purpose statements and stated objectives of the groundwater monitoring programs as well as timeline requirements. The 2017 RGMP update used this ranking to develop a schedule for additional studies in the prioritized study areas. This gap was not identified as a priority for the 2017-2020 cycle. A number of investigations are planned for 2020, including flow and load accretion studies over Grave Creek Alluvial fan. All data collected will be reviewed and will determine the placement and ranking of monitoring wells for the 2020-2023 program. There is one location scheduled to be drilled in Study Area 7 by Q3 2020 to support the development and implementation of groundwater triggers but the timeline and final location for the wells are contingent on regulatory approval, landowner permission, and weather.
Background/South of Study Area 11	Evaluate the adequacy of wells CM_MW3-SH and CM_MW3-DP as background wells for CMO. If the data indicate that groundwater quality in these wells is likely mine-influenced, drill a new well pair (shallow and deep) upgradient from the mining operations at a location that is deemed to be representative of background conditions.	Available data for CM_MW3-SH and CM_MW3-DP will be reviewed in 2020 in order to evaluate the suitability of these wells to serve as background monitoring locations. The findings of these evaluations will inform the need for additional background wells upgradient of CMO. If additional well(s) are required, installation of the well(s) will be ranked under the prioritization framework for the 2020-2023 program during the 2020 Update.
Study Area 1	Upper Fording River valley bottom. Select additional well(s) among the recently drilled five wells (FR_MW_FRRD1, FR_MW_CASW6-A/B and FR_MW_CH1-A/B), or install a newly drilled well pair (shallow and deep) if none of the five wells is suitable for monitoring.	Available groundwater chemistry data for FR_MW_FRRD1, FR_MW_CASW6-A/B and FR_MW_CH1-A/B were evaluated in October 2019. Analysis suggests that these wells do not intersect a potential down-valley plume of mine related constituents. The same data gap was identified under the scope of the MBI) program. A number of investigations including geophysics and flow accretion studies were completed in Q4 2019 and new groundwater monitoring wells are scheduled to be completed by the end of Q3 2020. The timeline and final location for the wells are contingent on regulatory approval, landowner permission, and weather. The data collected within the scope of the MBI will be reviewed prior to the 2020 Update and if additional wells are required they will be ranked under the prioritization framework for the 2020-2023 program.
Study Area 2	Dry Creek – Fording River confluence. Add a newly drilled well pair (shallow and deep) in the Dry Creek alluvial fan.	This Study Area was ranked low in relative priority in 2017(12 out of 13). The same data gap was identified under the scope of the MBI program. A number of investigations including geophysics and the addition of new groundwater monitoring wells were completed under that program in Q4 2019. The data collected MBI program will be reviewed prior to the 2020 Update and if additional wells are required they will be ranked under the 2020 Update prioritization framework for the 2020-2023 program.
Study Area 3	Fording River valley bottom upstream of Josephine Falls. Add a newly drilled well pair (shallow and deep) in the glaciofluvial sediments to the west of where Fording River turns to the south, upgradient of Josephine Falls.	The same data gap was identified under the scope of the MBI program. A number of investigations including geophysics, flow and load accretion studies were completed in Study Area 3 in 2019. This data will inform the number and location of new groundwater monitoring wells scheduled to be drilled under that program in 2020. The data collected within the scope of the MBI program will be reviewed prior to the 2020 RGMP Update and if additional wells are required they will be ranked under the 2020 Update prioritization framework for the 2020-2023 program.
Study Area 4	Upgradient of GH_GA-MW-4. Remove well GH_GA-MW-1 from the regional network and replace it either with recently drilled wells GH_MW-MC-1S/D and GH_MW-MC-2S/D or with a newly drilled well pair (shallow and deep) upgradient of GH_GA-MW-4, if the existing wells are not suitable for monitoring.	A desktop review of available water chemistry data completed in October 2019 suggests that while GH_MW-MC-1S/D and GH_MW-MC-2S/D may be suitable for use as background piezometers in their respective drainages, they are not representative of groundwater chemistry in the Elk River valley-bottom. The same data gap was identified under the scope of the MBI program. A number of investigations including geophysics, bedrock reconnaissance, and flow and load accretion studies were completed in November 2019. This data will inform the number and location of new groundwater monitoring wells completed under the MBI program in 2020. The data collected will be reviewed prior to the 2020 Update and if additional wells are required they will be ranked under prioritization framework for the 2020-2023 RGMP program. Teck will also drill a new well in this Study Area in 2020 to support groundwater trigger development. The timeline and final location for the wells are contingent on regulatory approval, landowner permission, and weather.

Relevant Study Area (Cont.)	ENV Condition (Cont.)	Teck Response (Cont.)
Study Area 5	Line Creek valley bottom downgradient of LC_LC4. Add a newly drilled well pair at the eastern portion of Study Area 5 downgradient of surface water monitoring station LC_LC4, in the area mapped as glaciofluvial sediments on the edge of the Fording River floodplain.	The same data gap was identified under the scope of the MBI program. A number of investigations including geophysics and flow and load accretion studies were completed in November 2019. The data collected will inform the number and location of new groundwater monitoring wells drilled under the MBI in 2020. MBI program results will be reviewed prior to the 2020 Update and if additional wells are required they will be ranked under the prioritization framework for the 2020-2023 program.
Study Area 6	Downgradient of Process Pond and CCR Pile. Add a newly drilled well pair downgradient of the CCR pile and adjacent to Order Station EV_ER4.	Teck proposes to install a nested monitoring well in this Study Area in 2020 to address this gap. This timeline and final location for the wells are contingent on regulatory approval, landowner permission and weather.
Study Area 7	Grave Creek alluvial fan at confluence with Elk River. Add a newly drilled well pair (shallow and deep) in the Grave Creek alluvial fan close to the confluence with Elk River.	Teck will complete two rounds of flow and load accretion studies over Grave Creek alluvial fan in 2020. Data collected will inform the location of an additional well for the 2020 update. Teck will also drill a new well in this Study Area in 2020 to support groundwater trigger development but the timeline and final location for the wells are contingent on regulatory approval, landowner permission, and weather.
Study Area 8	Valley bottom aquifers near Goddard Creek Sedimentation Pond. Add wells EV_TW1 and EV_TW2 to monitor the deep and shallow valley bottom aquifer in the area of Goddard Creek Sedimentation Pond or drill a new well pair (shallow and deep) near the Pond, if these wells are not suitable for monitoring.	EV_TW1 and EV_TW were assessed in November 2019 and found to be unsuitable for monitoring. Teck proposes to install a nested replacement monitoring well to fill this gap by Q3 2020. This timeline and final location for the well(s) are contingent on regulatory acceptance, landowner permission, and the weather.
Study Area 9	Michel Creek valley bottom aquifer. Conduct K-testing of well EV_MCgwS/D and replace it with a newly drilled well pair (shallow and deep) if the K-testing results indicate that EV_MCgwS/D is not suitable for monitoring. Replace EV_RCgw this well with one of the recently installed well pairs as part of the Sparwood Area Study, if suitable for monitoring, or add a newly drilled well pair (shallow and deep).	Conductivity (K) testing was completed in November 2019 on groundwater monitoring well EV_MCgwS/D. Evaluation of this data (scheduled for Q1 2020) will inform whether a new well will be drilled before the 2020 RGMP update. If a well is required, the timeline and final location for the well(s) are contingent on regulatory approval, landowner permission, and weather. In addition, 15 new groundwater wells were installed in Study Area 9 in Q1 2019 as a part of the Sparwood Area and Study Area Study. Teck will collect and evaluate a year of baseline data in the new well network. This will inform the prioritization process for new monitoring wells in this Study Area under the scope of the 2020 RGMP update.
Study Area 10	Michel Creek valley bottom downgradient of confluence with Erickson Creek. Add a newly drilled well pair (shallow and deep) between surface water monitoring stations EV_EC1 and EV_SP1, one well pair between EV_SP1 and EV_MG1 and one well pair downgradient of EV_MG1.	Teck collected flow and load accretion studies in Erickson Creek in Q3 2019. Evaluation of this data will inform the final location and number of wells in this Study Area. Teck proposes to install a nested monitoring well nest in this Study Area by Q3 2020. This timeline and final location for the well(s) are contingent on regulatory approval, landowner permission, and weather.
Study Area 11	Michel Creek valley bottom downgradient of CMO. Add a newly drilled well pair (shallow and deep) in the Michel Creek valley bottom aquifer downgradient of CM_MW1-OB/SH/DP.	Teck proposes to install a nested monitoring well in this Study Area by Q3 2020. This timeline and final location for the wells are contingent on regulatory approval, weather, and landowner permission.
Study Area 12	Michel Creek northern valley bottom aquifer. Add a newly drilled well pair (shallow and deep) in the valley bottom sediments north of Michel Creek in the Sparwood area.	Sparwood well #4 was drilled in Q4 2019 and full commissioning and tie in with the drinking water supply has not yet been completed. Drilling and pumping data as well as historic Well #1, #2, and #3 data will be evaluated in Q1 2020. This will inform the placement and prioritization of new wells in SA12 for the 2020 update as well as the value of adding Well # 4 to the RGMP. Teck will also drill a new well in this Study Area by Q3 2020 to support groundwater trigger development but the timeline and final location for the well(s) are contingent on regulatory approval, landowner permission, and weather.
Drinking Water	Add at least three monitoring well pairs (shallow and deep) in targeted areas where groundwater is used for drinking water supply, to support the development and implementation of Groundwater Triggers.	Teck proposes to install nested monitoring wells in Study Areas 4, 7, 12 by Q3 2020. Please refer to those sections for more details. This timeline and final locations for the wells are contingent on evaluation of available 2019 data as well as regulatory approval, landowner permission and weather.
Regional	3. An update of the RGMP will be submitted to the Director for approval by September 30, 2020, and will contain the following at a minimum: a. An updated Conceptual Site Model, based on the data acquired from the monitoring wells added in 2019 and 2020 and a closer integration with the Site-Specific Groundwater Monitoring Programs. b. Updated versions of the 3D block diagrams based on the most recent data. c. Maps allowing the visualization of the main aspects of the conceptual site model (e.g. surface and groundwater pathways, gaining and losing stream reaches at macro-scale and inferred seasonality, receptors associated with monitoring wells). d. A map showing all the areas where studies with a groundwater component have been carried out or are ongoing (e.g. groundwater investigations in support of the design of the intake for water treatment plants). e. Proposed areas requiring additional data collection and/or studies. This should include a list of proposed modifications of the existing Study Areas, if any are warranted; a system for prioritizing the implementation of groundwater studies for the areas where gaps are identified; a tentative schedule for the additional studies. f. Groundwater triggers that integrate with the Elk Valley Adaptive Management Plan, based on the framework discussed within the Groundwater Working Group. g. A framework for the development of a Groundwater Trigger Response Plan.	Teck commits to submission of the RGMP Update to the Director by October 31st, 2020. However, the Adaptive Management Plan (AMP) 2018 Approval Letter from Doug Hill (ENV) dated May 23, 2019 indicated that groundwater triggers should be finalized, through engagement with EMC, prior to the December 15, 2021 AMP update. Teck will continue to engage with the Groundwater Working Group and EMC to develop and finalize the groundwater triggers, which will be included in the December 15, 2021 AMP update and 2021 RGMP report. The framework for the groundwater triggers will be the Response Framework developed under the AMP.

Please Note: The timeline for the proposed investigations and drilling program presented in this table do not represent the finalized 2020 program schedule and are subject to change due to limitations in access, permit application and approvals, pre-disturbance work, results of additional evaluations and drilling activities outside the scope of this program, and other factors.

Accompanying Table of Numbered Proposed Drilling Locations

Possible Location ID[1]	Location[2]	Summary of Gap[3]	Proposed Studies[4]	Proposed Timing[5]
1	SA1/background	There is no background well upgradient of mine operations in the Fording River Valley	Drill a well location in the Upper Fording River Valley, north of Henretta Creek and influence from spoils.	2020
2	SA1/background	Concentrations of Cl in monitoring well FR_HMW5 are increasing and this well is no longer suitable as a background well.	Drill a well location in the Henretta Creek valley bottom upstream of FR_HMW5 to replace FR_HMW5 as a background well.	2020
3	SA4/background	Background monitoring well network sufficiency.	Further evaluate background monitoring network through trigger development. If greater spatial coverage is required, drill a well location near surface water sampling station GH_ER2.	post 2020
4	SA4	Well GH_MW-ERSC-1 may not be a suitable downgradient sentry well for monitoring.	Monitoring well network, flow accretion and geophysical studies to be completed as part of the Mass Balance Investigation in late 2019/2020. Once complete, assess the need for and location of additional wells near the southern boundary of Study Area 4 and north of Elkford	post 2020
5	SA2	Groundwater quality in the Fording River valley bottom downgradient of the confluence with Dry Creek is not currently monitored.	As above, Mass Balance Investigation to perform studies in this area. If results suggest a gap remains, consider adding a well location in the Dry Creek alluvial fan	post 2020
6	SA4/background	Background monitoring well network sufficiency.	Further evaluate background monitoring network through trigger development. If greater spatial coverage is required, evaluate the need for a well location in the Boivin Creek alluvial fan north of Elkford.	post 2020
7	SA3	Possibility of deep groundwater flow to the west and surface water infiltration from the Fording River before Josephine Falls.	Flow and load accretion studies to be completed in Fording River to Josephine Falls as part of Mass Balance Investigation. Pending results, consider adding a well location in the glaciofluvial sediment upgradient of Josephine Falls	post 2020
10	SA6	There are limited data for the Elk River valley-bottom aquifer downgradient of LCO to monitor possible effects from the LCO process plant site and CCR pile.	Drill a nested well pair downgradient of CCR Pile and adjacent to Order Station EV_ER4.	2020
11	SA7	Grave Creek potentially loses to ground over an alluvial fan. There are currently no monitoring wells in the valley bottom in this area.	Flow and load accretion studies over the Grave Creek alluvial fan at confluence with Elk River will be completed in 2020, with the last study to be completed in fall 2020. Results will inform the need for and location of a well in the alluvial fan.	post 2020
12	SA8/Background	Background monitoring well network sufficiency	Further evaluate background monitoring network through trigger development. If greater spatial coverage is required, evaluate the need for a well location in Cummings Creek alluvial fan.	post 2020
13	SA9	Uncertain whether EV_MCgwS/D is suitable for monitoring based on the materials they are screened in. These wells do not intersect deep pathway, but newly-installed monitoring wells do.	Hydraulic conductivity testing to be completed in 2019 at EV_MCgwS/D. Collect a year of baseline data from the newly-installed monitoring well network and review data to assess deep flow pathway. Based on a review of these data, a well location may be drilled west of RG_DW-03-01.	2020
15	SA10	There are no groundwater monitoring data for the Michel Creek valley-bottom aquifer downgradient of Erickson Creek and the South Pit Decant Pond and local groundwater conditions are unknown.	Load and flow accretions studies have been completed on Erickson Creek. Drill a nested well pair after a review of the flow accretion studies from Erickson Creek.	2020
16	SA11/background	Background monitoring well network sufficiency.	Further evaluate background monitoring network through trigger development, including suitability of review of data from CH_MW3-SH and CM_MW3-DP as background monitoring wells. If greater spatial coverage is required, evaluate the need for adding a well location upstream of the confluence of Leach Creek with Michel Creek	post 2020
17	SA11	Only one monitoring well (CM-MW1-OB) is in gravel in the valley bottom in Michel Creek downgradient of CMO.	Drill a well location in the Michel Creek valley-bottom aquifer downgradient of CM_MW1-OB/SH/DP and RG_DW-07-01 (and downgradient boundary of SA11).	2020
18	SA10/background	Background monitoring well network sufficiency.	Further evaluate background monitoring network through trigger development. If greater spatial coverage is required, evaluate the possibility of adding a well location in Alexander Creek valley bottom sediment at the confluence with Lower Alexander Creek.	post 2020
21	SA7/background	Background monitoring well network sufficiency.	Further evaluate background monitoring network through trigger development. If greater spatial coverage is required, evaluate the need for a nested well pair in Grave Creek valley-bottom sediment upstream of the confluence with Harmer Creek.	post 2020
22	SA8	Groundwater quality is unknown in shallow and deep valley-bottom aquifers near Goddard Creek Sedimentation Pond.	Drill a well location near the Goddard Creek Sedimentation Pond by EV_GC2.	2020
-	SA4	Additional data required in targeted areas where groundwater is used for drinking water supply to support the development and implementation of groundwater triggers.	Monitoring well will be drilled where groundwater is used for drinking water supply to support the groundwater trigger development (location TBD).	2020
-	SA7	Additional data required in targeted areas where groundwater is used for drinking water supply to support the development and implementation of groundwater triggers.	Monitoring well will be drilled where groundwater is used for drinking water supply to support the groundwater trigger development (location TBD).	2020
-	SA12	Additional data required in targeted areas where groundwater is used for drinking water supply to support the development and implementation of groundwater triggers.	Monitoring well will be drilled where groundwater is used for drinking water supply to support the groundwater trigger development (location TBD).	2020

Notes: 1) Refers to the assigned possible well location number outlined on the wall map as 'Proposed RGMP Monitoring Well to drill in 2020' or 'Proposed RGMP Monitoring Well to drill post 2020'; 2) Refers to associated Study Area (SA) or closest Study Area and whether or not the possible well location is related to background monitoring well network; 3) Brief summary of gap as outlined in previous 2019 GWG meetings; 4) Proposed studies to fill the gap, as outlined in previous 2019 GWG meetings and ENV correspondence, as well as November 26/29 GWG meeting; 5) 2020 refers to work to be completed pre-2020 RGMP Update (shown in green highlight) and post 2020 refers to work to be completed afterwards.

Attachment 2: 2020-03-11 2018 Site-Specific GWMP Approval Letter

File: PE107517

March 11, 2020

Mariah Arnold
Sr. Lead Environmental Sciences
Cam Jaeger
Coordinator Environment

Teck Coal Limited
124B Aspen Drive
Sparwood, BC V0B 2G0

Dear Mariah and Cam:

RE: Elk Valley Site-Specific Groundwater Monitoring Programs (SSGMP) - 2018 Update

The 2018 update of the Site-Specific Groundwater Monitoring Plans (2018 SSGMPs) for Teck's operations in the Elk Valley (Fording River, FRO; Greenhills, GHO; Line Creek, LCO; Elkview, EVO; Coal Mountain, CMO) dated October 31, 2018 were received and reviewed by staff of the Ministry of Environment and Climate Change Strategy (ENV). Ministry Assessments for the 2018 SSGMPs were submitted by ENV to Teck in April 2019, which indicated that four of the five plans (FRO, GHO, LCO and EVO) did not meet the requirements described in Permit 107517. ENV requested a revised version of these plans to be submitted by September 30, 2019. ENV has received and completed the review of the revised submissions.

Pursuant to Section 9.2.2 of Permit PE107517, the 2018 update of the Elk Valley Site-Specific Groundwater Monitoring Plans (2018 SSGMP) for the following operations: Fording River Operations (FRO); Greenhills Operations (GHO); Line Creek Operations (LCO); Elkview Operations (EVO) and Coal Mountain Operations (CMO), are accepted with the following conditions:

1. Updated Site-Specific Groundwater Monitoring Plans for FRO, GHO, LCO, EVO and CMO will be submitted to the Director for approval **by October 31, 2021.**

2. The 2021 SSGMP updates will include the following:

a. Expand the site-specific monitoring well network as follows:
    i. FRO - Swift Creek valley bottom. Add a well to the FRO network, to investigate the presence of a potential mine-affected groundwater transport pathway in overburden and/or shallow weathered bedrock in the area downgradient of the Swift Creek sediment management system towards the Fording River valley bottom aquifer.
    ii. GHO – Porter Creek valley bottom. Replace GH_MW-PC with a well pair installed in unconsolidated sediments and bedrock, to monitor a potential mine-affected groundwater transport pathway and investigate the surface water – groundwater interaction upgradient of the confluence with Fording River.
    iii. LCO – Dry Creek. Add to the LCO well network the new well that is planned to be installed in Study Area #2 and added to the RGMP network, as per the Work Plan included in the ENV Acceptance Letter for the 2017 RGMP Update.
    iv. LCO – Confluence of West Line Creek and Line Creek. Add to the LCO well network well AWTF-MW-15-02B and AWTF-Seep, if suitable, and/or a new well pair installed in the area downstream of the confluence of West Line Creek with Line Creek, where the surficial geology mapping indicates the presence of fluvial deposits. The objective of monitoring this well(s) and seep is to investigate the presence of a potential mine-affected groundwater transport pathway by-passing the AWTF intake location.
    v. LCO – Background. Install a well pair (overburden / bedrock) upstream of the LCO mine-affected areas in the area within the Tornado Creek watershed where surficial geology mapping indicates the presence of fluvial deposits. Use this well to characterize background conditions for LCO. If no unconsolidated deposits are found in the area indicated by mapping, install a well in weathered bedrock to characterize background bedrock conditions in LCO.
    vi. EVO – Grave Creek. Install a well in unconsolidated sediments in the Grave Creek valley fill aquifer, at a shallower depth than EV_GV3gw, to investigate a potential shallow groundwater pathway and the interaction between surface and shallow groundwater.
b. Update the Conceptual Site Model for each operation, based on the integration of the updated groundwater monitoring data set and relevant information obtained from other groundwater studies supporting site-specific permit applications or regional programs (e.g. Kilmarnock alluvial fan groundwater study conducted in support of the FRO-S Active Wastewater Treatment Plant, groundwater investigations in the Clode Creek watershed, updated modelling and flow accretion survey in Dry Creek as part of the LCO Dry Creek Structured Decision Making process (SDM)).
c. Update maps for the same themes and in the same format as those included in the revised 2018 SSGMPs. Update the maps for LCO and CMO using the same format and notation of the maps included in FRO, GHO and EVO.

d. Update hydrogeological cross-sections to reflect the information acquired from new wells (and updated locations in plan view, where cross-sections have been extended to include new wells). Additional cross-sections will be developed for all wells, in directions parallel and perpendicular to the main direction of flow. The cross-sections should show all the wells (including wells drilled for purposes other than monitoring, e.g. geotechnical wells) used to define them, with the following details: well screens location, average groundwater elevation and elevation of nearby surface water bodies. The stratigraphic logs of all the wells used to define the cross-sections will also be provided.
e. Update the structure of the documents describing the plans for LCO and CMO to be consistent with those prepared for FRO, GHO and EVO.
f. Update the characterization of the effect of dewatering of the pits that intercept groundwater on the groundwater head, flow pattern and on interaction of groundwater with surface water.

If you have any questions, please contact Sarah Alloisio, Hydrogeologist, at Sarah.Alloisio@gov.bc.ca or at 236-468-2286.

Yours truly,

Liz Freyman
for Director, *Environmental Management Act*
Mining Operations

Cc: Jeanien Carmody-Fallows, Section Head, Mining Authorizations, ENV
Heather McMahon, Ktunaxa Nation Council

Appendix III

Seep Monitoring Program

FINAL

Elk Valley Regional Seep Monitoring: 2021 Annual Report

Teck Coal Limited

SRK Consulting (Canada) Inc. ▪ 1CT017.358 ▪ March 2022

FINAL

Elk Valley Regional Seep Monitoring: 2021 Annual Report

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Revision History

Revision	Purpose	Date	Initials
Draft1, Rev 0 to 1	Drafts for internal SRK review	November 8, 2021, to December 17, 2021	AMD, CBK
Draft1, Rev 2	Teck review draft	January 19, 2022	CJ, NB
Draft2, Rev 0 to 1	Drafts for internal SRK review	January 20, 2022, to February 3, 2022	AMD, SJD
Draft2, Rev 2	Teck review draft	February 3, 2022, to February 22, 2022	CJ, NB
Draft3, Rev 0	SRK draft	February 22, 2022, to March 4, 2022	AMD
Draft3, Rev 1	Teck review draft	March 4, 2022, to March 22, 2022	CJ, NB
Final	Final		AMD

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Definitions

This list contains definitions of symbols, units, abbreviations, and terminology that may be unfamiliar to the reader.

FWAL BCWQG	British Columbia Water Quality Guideline for Freshwater Aquatic Life (approved and working)
CCR	Coarse coal reject
DL	Detection limit
DO	Dissolved oxygen (milligrams per litre, mg/L)
DOC	Dissolved organic carbon (milligrams per litre, mg/L)
EC	Electrical conductivity (micro siemens per centimeter, µS/cm)
ELMI	Ministry of Energy, Mines, and Low Carbon Innovation
EMPR	BC Ministry of Energy and Petroleum Resources
High Flow	March 15th to July 15th
MF	Morrissey Formation
ORP	Oxidation reduction potential (millivolts, mV)
PAG	Potentially acid-generating
The Plan	Regional Seep Monitoring Plan – Phase 3
QA/QCX	Quality assurance/quality control
RPD	Relative percent difference
RSMP	Regional Seep Monitoring Program
SI	Saturation indices
Teck	Teck Coal Limited
TDS	Total dissolved solids (milligrams per litre, mg/L)
TOC	Total organic carbon (milligrams per litre, mg/L)
TSS	Total suspended solids (milligrams per litre, mg/L)
WR	Waste rock

Executive Summary

This report presents the 2021 results of the Elk Valley Regional Seep Monitoring Program (RSMP). Seep monitoring occurs across Teck Coal Limited's (Teck) five Elk Valley operations: Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO), and Coal Mountain Mine (CMm) (previously called Coal Mountain Operations [CMO] and currently in Care and Maintenance). Teck previously sampled seeps during 2018, 2019, and 2020, making this the fourth year of the RSMP. Seeps were visited at least twice during 2021; during high flows (between March 15, 2021, and July 15, 2021) and low flows (between September 1, 2021, and December 31, 2021). In 2021, Teck Coal personnel sampled 80 seeps during high flow and 68 during low flow.

A conformity review of the 2021 RSMP to commitments in previous reports and letters was conducted. A QA/QC review found that the data quality of the 2021 dataset is acceptable for annual reporting. Samples collected in 2021 were screened against the BC Water Quality Guidelines (BGWQG) for Freshwater Aquatic Life (FWAL).

A geochemical review was conducted to develop interpretations based on the four years of accumulated data. While a visual qualitative study was conducted to identify seasonality or year-on-year trends, statistical evaluations such as Mann-Kendall trend analysis were not conducted, given the number of available data points. PHREEQC was used to evaluate solubility controls by interpreting saturation indices and calcite controls. Cross plots of metal concentrations with field pH were used to assess pH as a solubility control. Cross plots of metal concentrations with field dissolved oxygen (DO) were used to evaluate the solubility of redox-sensitive parameters. Seeps were compared to their closest downstream permitted surface water monitoring location using sulfate as a conservative tracer and suboxic indicator ratios.

Across the Elk Valley, qualitative seasonality and year-on-year trends for several parameters were identified at individual seeps but did not show consistent patterns. pH across the Elk Valley ranges from 6.5 to 9.5 and appears to act as a solubility control on several parameters. Dissolved oxygen (DO) does not appear to be a strong solubility control. However, manganese and iron negatively correlate with field DO across the Elk Valley. Suboxic categorization shows a weak relationship with field DO at elevated selenium to sulfate (Se/SO_4) ratios and DO.

Most seeps in the Elk Valley have a partial pressure of carbon dioxide (pCO_2) greater than $10^{-3.4}$ atm, indicating CO_2 over-pressurization. As CO_2 off-gasses, pH will increase, and the waters may become oversaturated with calcite, resulting in increased potential for calcite precipitation. Saturation indices (SI) for calcite are essential to evaluate the potential for calcite concretions to form. Ferrihydrite can help understand disequilibrium with oxygen and the potential for sequestration of metals. Gypsum can potentially control sulfate concentrations. Apart from CMm, seeps at FRO, GHO, LCO, and EVO do not show apparent spatial trends in calcite saturation indices. At CMm, seeps to the east of the site have been categorized as undersaturated and seeps to the west as oversaturated. About half (54%) of all the RSMP seeps had a calcite SI above 0.6 and may exhibit a predisposition to precipitate calcite. No seeps had a gypsum SI above zero and therefore are not likely to be precipitating gypsum, and most seeps (99%) are in equilibrium or precipitating ferrihydrite.

During the initial seep prioritization by SRK in 2019, seeps were categorized based on Zn/Cd and sulfate concentration to estimate source conditions related to the Morrissey Formation (MF). Parts of the MF are known to be potentially acid-generating (PAG), and seeps showing possible MF influences may indicate areas where future changes in water quality might be expected. Seeps were also categorized based on Se/SO_4 and sulfate concentration to evaluate the influence of low-oxygen conditions on seeps originating from waste materials.

Results of samples collected in 2021 were compared to previous years' categorizations. The results are as follows:

- One seep at FRO, FR_FRVWSEEP3, has been consistently classified as possibly MF influenced, and all seeps at FRO have been consistently classified as oxic. To date, FR_FRVWSEEP3 is pH neutral.
- At GHO, GH_E1 in the GH_CCR group has been consistently categorized as possibly MF influenced. To date, GH_E1 is pH neutral. Two GHO seeps have been consistently classified as suboxic: GH_SEEP_21 and GH_W-SEEP (both in the GH_CCR group), indicating possible suboxic zones within the GHO CCR storage facility. Most seeps at GHO do not change oxidation or MF influence categorization seasonally.
- No LCO seeps have been consistently categorized as suboxic or possibly MF influenced and did not seasonally change categorization.
- At EVO, EV_SEEP_ERICKSON1 and EV_SEEP_PLANT23 continue to be consistently categorized as possibly MF influenced. To date, both seeps are pH neutral. All seeps at EVO have been categorized as oxic. Most seeps do not seasonally change categorization.
- At CMm, CM_PLANT-SEEP1 is consistently categorized as possibly MF influenced and is pH neutral to date. Two CMm seeps, CM_WD19 and CM_MM-SEEP3, have been consistently categorized as suboxic. Most seeps do not seasonally change categorization.

Two seeps (EV_SEEP_NATALPIT2 [EVO] and FR_HENSEEP1 [FRO]) have been formally retired from the RSMP. Nine new seeps were identified at GHO, and one new seep was identified at CMm.

During subsequent RSMP sampling and reporting, SRK recommends that:

1. Seep retirement surveys should be completed for FR_SHNSEEP1, FR_SCRDSEEP1, FR_FSEAMWSEEP4, and CM_MM-SEEP5 in 2022.
2. GH_SEEP_98 and RG_ERSP3 should be included in the RSMP for future sampling because they add spatial coverage to the program. The remaining seven seeps at GHO and one seep at CMm were determined not to add value to the RSMP and should not be carried forward.

1 Introduction

Teck Coal Limited carried out monitoring under the Regional Seep Monitoring Program (RSMP) within the Elk Valley (Figure 1) during high flows (March 15 to July 15, 2021) and low flows (September 1 to December 31, 2021). The purpose of the RSMP is to comply with a directive from the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI). The purpose of this report is to demonstrate Teck's compliance with monitoring commitments for 2021.

This report summarizes results collected under the RSMP in 2021 and provides an initial geochemical interpretation of all the data collected under the RSMP thus far. Sampling was conducted by Teck personnel, annual reporting provided herein was prepared using information and data supplied by Teck.

The report has been structured as follows:

Section 1 **Introduction**

Section 2 **Background**: The context and background for the initiation of the RSMP.

Section 3 **Conformity Review**: The implementation of the RSMP in 2021 was assessed for conformity with recommendations and commitments made in the SRK 2018 seep assessment (SRK 2019), 2019 annual RSMP report (SRK 2020), 2020 annual RSMP report (SRK 2021), EMPR's (now The Ministry of Energy, Mines and Low Carbon Innovation [EMLI]) review letter, and Teck's response to EMLI.

Section 4 **Quality Assurance/Quality Control (QAQC):** Summary of QAQC of all seep samples collected in 2021.

Section 5 **Review Methods:** Summary of methods applied to review the water chemistry of seeps.

Section 6 **Regional Seepage Geochemical Interpretation:** The geochemical review builds on interpretations from previous years and summarizes key geochemical controls that affect water chemistry both at the seeps monitoring within the RSMP and at downstream permitted surface water locations. This section will summarize controls and trends that apply in a regional context to the Elk Valley.

Section 7 **Seepage Monitoring Results by Operation:** The water chemistry review compared seep water quality results against the BC Approved and Working Water Quality Guidelines (BCWQGs) and water chemistry criteria described in SRK (2019). In addition, site-specific seepage geochemical interpretations are provided.

The tables below summarize each seep's main characteristics during high flow and low flow seasons that have been identified thus far.

Table 11 - Fording River Operations (FRO),
Table 15 - Greenhills Operations (GHO),
Table 19 - Line Creek Operations (LCO),
Table 23 - Elkview Operations (EVO),
Table 27 - Coal Mountain Mine (CMm)

Section 8 **New Seeps Review:** Summary of new seeps identified during 2021 and review for inclusion in the ongoing RSMP.

Section 9 **Seep Retirement Review:** Summary of seeps identified for retirement from the RSMP during 2021.

Section 10 **Summary:** Summary of the results of the 2021 review.

Section 11 **Recommendations:** Recommendations for monitoring and annual reporting in 2022.

2 Background

Teck operates five steelmaking coal mines in the Elk Valley: Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO), and Coal Mountain mine (CMm) (formerly Coal Mountain Operations [CMO], currently in Care and Maintenance). These are referred to collectively herein as the Elk Valley Operations. Teck monitors select seeps at mine site facilities at these operations; however, based on an inspection in 2017, the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI) ordered Teck to develop a Regional Seep Monitoring Plan for the Elk Valley Operations. In response, Teck (2018) proposed to implement the Plan in three phases:

- Phase 1: Identification of seep locations, development of sampling procedures, and collection of samples.
- Phase 2: Technical evaluation of seep water quality and quantity data collected during Phase 1. The assessment completed in Phase 2 aided in determining the sampling locations and frequency for seeps in Phase 3 (SRK 2019). Future monitoring would also consider the following:
  - Comparison of monitoring data to the BCWQGs freshwater aquatic life media to understand the potential risk to aquatic health
  - The classification of seeps and the potentially associated discharge point to the receiving environment (via ground infiltration, surface water sediment pond, directly to receiving environment, etc.)
  - Mining related constituent concentrations relative to discharge water in the case where the seep flows into existing mine infrastructure
  - Unexpected changes in water quality in seeps, associated discharges, or the receiving environment
- Phase 3: A longer-term Regional Seep Monitoring Program was developed and implemented, including reducing redundant seep sampling and sampling of seeps collected by existing site infrastructure (Teck 2019b). Phase 3 described any changes to the water quality analyses for seep monitoring and the locations and frequencies for ongoing seep monitoring.

In its June 21, 2018, letter, EMLI stated the 2018 Regional Seep Monitoring Plan only partially satisfied the requirement for regional seep monitoring because it only included Phase 1. EMLI required Teck to submit Phase 2 of the Plan with the 2018 Annual Reclamation Report on March 31, 2019 (EMLI 2018).

As part of Phase 2 of the Plan, Teck retained SRK Consulting (Canada) Inc. (SRK) to review the 2018 seep water quantity and quality dataset. SRK recommended seeps that should continue to be monitored as part of the longer-term Regional Seep Monitoring Program (i.e., Phase 3). The 2018 Regional Seep Monitoring Plan (SRK 2019) was submitted with the 2018 Annual Reclamation Report (ARR). This report provided the approach used as part of Phase 2 of the Plan to prioritize seeps for sampling and listed the proposed locations where seep monitoring was recommended to be continued.

EMLI provided comments to Teck in a letter dated April 30, 2019. In response, Teck submitted a revised Regional Seep Monitoring Plan – Phase 3 (referred to herein as “the Plan”) to EMLI on May 28, 2019 (Teck 2019b), which incorporated the EMLI review comments.

In 2020 and 2021, the Elk Valley Regional Seep Monitoring Annual Reports for 2019 and 2020 were submitted with the 2019 and 2020 Annual Reclamation Reports (ARRs), respectively. The 2021 Elk Valley Regional Seep Monitoring Program Report will be submitted with the 2021 ARR in March 2022. In addition, data from the Elk Valley Regional Seep Monitoring Reports may be discussed in other studies such as the Regional Groundwater Monitoring Program (RGMP), the Site-Specific Groundwater Monitoring Program (SSGMPs), and the Mine Water Management Plans (MWMP) at each operation or in other monitoring programs, as appropriate.

3 Conformity Review

Table 1 summarizes commitments from previous reports or letters and reviews and whether the 2021 RSMP met these commitments. The Elk Valley Regional Seep Monitoring 2019 and 2020 Annual reports did not include any new recommendations in addition to those previously stated. All commitments were met in 2021.

Table 1: Commitment Review

Category	Commitment	Source	Implementation Review	Additional Recommendations
Sampling Procedure	Samples will be collected (or attempted to be collected) for all seeps identified in the Plan two times per year, once during high flows (between March 15 and July 15) and once during low flows (Between September 1 and December 31).	Regional Seep Monitoring Plan – Phase 3 SRK (2019)	Commitment met.	-
	A standardized field form will collect field information to ensure appropriate and consistent information is collected across all operations.	Regional Seep Monitoring Plan – Phase 3 SRK (2019)	Commitment met.	-
	Blanks and duplicates will each account for 10% of the sampling.	Regional Seep Monitoring Plan – Phase 3 SRK (2019)	Commitment met.	-
	Field parameters will be measured at the time of seep sampling.	Regional Seep Monitoring Plan – Phase 3 SRK (2019)	Commitment met.	-
	Field filtering and preservation of samples will occur at the collection point to determine element concentrations.	Regional Seep Monitoring Plan – Phase 3 SRK (2019)	Commitment met.	-
	Seep samples collected will be analyzed for water quality parameters outlined in Section 3.8 of the Plan.	Regional Seep Monitoring Plan – Phase 3	Commitment met.	-
	When possible and safe to do so, flow measurements will be taken at each location at the time of sample, following the Teck Coal Flow Monitoring Protocol.	Regional Seep Monitoring Plan – Phase 3	Commitment met.	-
	The direction of flow of the seeps will be noted in the field sheets to help map and track possible changes to seep water quality.	Regional Seep Monitoring Plan – Phase 3 SRK (2019) EMLI Review (April 2019)	Commitment met.	-
	Observations of calcite precipitate presence will be noted in the field sheets if observed at seep locations.	Regional Seep Monitoring Plan – Phase 3 EMLI Review (April 2019)	Commitment met.	-

Category	Commitment	Source	Implementation Review	Additional Recommendations
New Seep Identification	General site surveys will be conducted annually to identify any new seeps.	Regional Seep Monitoring Plan – Phase 3 EMLI Review (April 2019)	Commitment met.	-
	Newly identified seeps will be sampled (or attempted to be sampled) two times in the first year, once during high flow (March 15 to July 15) and once during low flow (September 1 to December 31).	Regional Seep Monitoring Plan – Phase 3	Commitment met.	-
Seep Retirement	When seeps are found to be dry or covered by mined-out material, the seep retirement framework will be used to determine if a seep can be retired from the RSMP.	SRK (2021)	Commitment met.	-
QAQC	Data will be reviewed immediately upon receipt from the laboratory to rectify any discrepancies to initiate resampling if required.	Regional Seep Monitoring Plan – Phase 3	Commitment met.	-
	Teck’s data quality objectives (DQOs) are implemented.		Commitment met.	-

Sources: Compiled in text.

4 Quality Assurance/Quality Control

QA/QC is essential for establishing data reliability. Teck provided quality control data to SRK, which were reviewed regarding the QA/QC program in the Plan and using SRK's internal chemical analysis quality control systems.

4.1 Teck Data Quality Objectives

The Plan includes the following data quality objectives (DQOs) for screening duplicate samples:

- Category 1 – relative percent difference (RPD) less than 20% or RPD greater than 20% and results less than five times the detection limit. Samples pass screening with no further action required.
- Category 2 – RPD greater than 20% and less than 50% with results greater than five times the detection limit. After follow-up, samples pass screening with the lab to investigate whether variance continues to be between 20% and 50%.
- Category 3 – RPD greater than 50% with results greater than five times the detection limit. The sample fails screening and is not suitable for quantitative use. If variance greater than 50% continues, follow-up with the lab is required to investigate.

An RPD of between 20 and 50% for concentrations greater than five times the detection limit (i.e., Category 2) after Teck (2018) was used to evaluate data validity.

4.2 SRK QA/QC Procedures

In addition to the QA/QC procedures established in the Plan, SRK applied the following QA/QC procedures, which were used to evaluate data quality:

- Differences between field and lab pH – corresponding values should be within one pH unit.
- Difference between field and lab conductivity – samples should have an RPD of less than 30%.
- Difference between total and dissolved metals – for parameters greater than ten times the detection limit, RPD should be ±30%.
- Ion balances – for electrical conductivity (EC) greater than 100 micro siemens per centimeter (μS/cm), the percent difference should be ±10%.

4.3 Duplicates and Blanks

There were 19 paired field duplicates, representing 13% of all samples collected compared to a target of 10%. There were 35 field blank samples (approximately 24% of the total samples collected compared to a target of 10%) where a full suite of parameters was available for QA/QC. A summary of QA/QC samples collected during the 2021 RSMP is in Table 2.

Table 2: QA/QC sample summary by operation

Operation	Field Blanks		Field Duplicates		Total Samples	
	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow
FRO	1	1	3	2	20	12
GHO	7	5	2	1	17	9
LCO	4	1	2	1	12	10
EVO	8	4	2	2	18	16
CMm	2	2	2	2	15	15
TOTAL	**22**	**13**	**11**	**8**	**82**	**62**

Sources:
https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/2021%20QAQC/2021_WQ_Accounting_amd_v0.xlsx

4.4 QA/QC Review Summary

QA/QC concerns could not be evaluated via re-analysis since samples were discarded or past the recommended holding times. The QA/QC review findings are summarized in Table 3 and Table 4. A detailed discussion of the QAQC review results is provided in Appendix G.

Data for trip blanks pass all QA/QC criteria.

Table 3: Summary of 2021 Field Blanks and Duplicates QA/QC Review

QC Test	n	QC Criteria	Parameters	Results
FRO				
Field Blank	2	<5x DL	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	All passed.
Pair Field Duplicates	5	For samples >X10 DL, <30% RPD	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	1 sample pair failed for Mn-T and Turbidity. 1 sample pair failed for Cd-T & Cd-D, Mn-T, and Mn-D. See discussion in Appendix G. 1 sampled pair failed for Cd-T, Al-T, and Mn-T. See discussion in Appendix G.
GHO				
Field Blank	12	<5x DL	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	1 sample failed for lab pH. 1 sample failed phosphorus, DOC, and TOC. See discussion in Appendix G.
Pair Field Duplicates	3	For samples >X10 DL, <30% RPD	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	1 sample pair failed for Al-T, Fe-T, Phosphorus, Si-T, and Se-T. See discussion in Appendix G. 1 sample pair failed for Al-T, Fe-T, Mn-T, Phosphorus, and Turbidity.
LCO				
Field Blank	5	<5x DL	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	All passed.
Pair Field Duplicates	30	For samples >X10 DL, <30% RPD	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	All passed.
EVO				
Field Blank	12	<5x DL	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	2 failed for lab pH. See discussion in Appendix G.
Pair Field Duplicates	4	For samples >X10 DL, <30% RPD	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	1 sample pair failed for Mn-T.
CMm				
Field Blank	4	<5x DL	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	1 failed for lab pH. See discussion in Appendix G.
Pair Field Duplicates	4	For samples >X10 DL, <30% RPD	Physical Parameters, Major Anions and Nutrients, Organic Carbon, Dissolved Metals	All passed.

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/!020_Project_Data/020_Client/2021%20QA%20Samples/2021_WQ_QAQC_samples_QAQC_mlt.xlsx

Table 4: Summary of 2021 Sample Results QA/QC Review

QC Test	N	QC Criteria	Parameters	Results	Data Accepted
FRO					
Lab vs. Field pH	22	Difference should not be greater than 1 pH unit	pH	4 failed.	Yes. See discussion in Appendix G.
Lab vs Field conductivity	29	<30% RPD	Conductivity	7 failed.	Yes. See discussion in Appendix G.
Total vs Dissolved Metals	161	For >10 DL, <30% RPD	Total and Dissolved Metals	1 sample failed for Cd. 1 sample failed for Se.	Yes. See discussion in Appendix G.
Ion Balance	161	For EC>100 µS/cm, within +-/10%	Cations and Anions	85 failed.	Yes. See discussion in Appendix G.
GHO					
Lab vs. Field pH	41	Difference should not be greater than 1 pH unit	pH	4 failed.	Yes. See discussion in Appendix G.
Lab vs Field conductivity	41	<30% RPD	Conductivity	All passed.	Yes. See discussion in Appendix G.
Total vs Dissolved Metals	51	For >10 DL, <30% RPD	Total and Dissolved Metals	1 sample failed for Fe and Mn.	Yes. See discussion in Appendix G.
Ion Balance	48	For EC>100 µS/cm, within +-/10%	Cations and Anions	1 failed.	Yes. See discussion in Appendix G.
LCO					
Lab vs. Field pH	21	Difference should not be greater than 1 pH unit	pH	1 failed.	Yes. See discussion in Appendix G.
Lab vs Field conductivity	21	<30% RPD	Conductivity	2 failed	Yes. See discussion in Appendix G.
Total vs Dissolved Metals	30	For >10 DL, <30% RPD	Total and Dissolved Metals	1 sample failed for Mn.	Yes. See discussion in Appendix G.
Ion Balance	27	For EC>100 µS/cm, within +-/10%	Cations and Anions	1 failed.	Yes. See discussion in Appendix G.
EVO					
Lab vs. Field pH	35	Difference should not be greater than 1 pH unit	pH	All passed.	Yes.
Lab vs Field conductivity	35	<30% RPD	Conductivity	All passed.	Yes.
Total vs Dissolved Metals	42	For >10 DL, <30% RPD	Total and Dissolved Metals	1 sample failed for Mo, 1 sample failed for S, 1 sample failed for Mn.	Yes. See discussion in Appendix G.
Ion Balance	42	For EC>100 µS/cm, within +-/10%	Cations and Anions	All passed.	Yes.

QC Test	N	QC Criteria	Parameters	Results	Data Accepted
CMm					
Lab vs. Field pH	29	Difference should not be greater than 1 pH unit	pH	All passed.	Yes.
Lab vs Field conductivity	29	<30% RPD	Conductivity	11 failed.	Yes. See discussion in Appendix G.
Total vs Dissolved Metals	34	For >10 DL, <30% RPD	Total and Dissolved Metals	All passed.	Yes.
Ion Balance	33	For EC>100 µS/cm, within +-/10%	Cations and Anions	All passed.	Yes.

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/!020_Project_Data/020_Client/2021%20QA%20Samples/2021_WQ_QAQC_samples_QAQC_mlt.xlsx

Seven out of 318 samples had RPD greater than 30% for the difference between dissolved and total metal concentrations for parameters greater than ten times the detection limit. This could indicate potential contamination during field filtration for samples filtered in the field. Potentially anomalous dissolved metal concentrations identified are summarized in Table 5.

Table 5: Potentially Anomalous Dissolved Metal Concentrations Identified

Seep ID	Sample Date	Parameter	Dissolved Concentration (mg/L)	Total Concentration (mg/L)	Comment
FR_CCSEEPE1	2021-11-10	Cadmium	0.00195	0.00144	Possible contamination. Use total concentration for dissolved.
FR_FRVWSEEP3	2021-11-17	Selenium	0.186	0.136	Possible contamination. Use total concentration for dissolved.
GH_SEEP_26	2021-06-28	Manganese	2.9	0.445	Possible contamination. Use total concentration for dissolved.
		Iron	1.11	0.552	Possible contamination. Use total concentration for dissolved.
LC_SEEP1	2021-10-08	Manganese	0.00191	0.00114	Possible contamination. Use total concentration for dissolved.
EV_SEEP_SOUTHPIT6	2021-09-28	Manganese	0.0131	0.00761	Possible contamination. Use total concentration for dissolved.
EV_SEEP_PLANT10	2021-09-26	Sulfur	198	140	Possible contamination. Use total concentration for dissolved.
EV_SEEP_CFI1	2021-09-26	Molybdenum	0.00152	0.00108	Possible contamination. Use total concentration for dissolved.

Sources:
https://srk.sharepoint.com/sites/NA1CT017.358/Internal/!020_Project_Data/020_Client/2021%20QA%20Samples/2021_WQ_QAQC_samples_QAQC_mlt_Rev02.xlsx

4.5 Field Parameters

Field pH

No field pH measurements during 2021 sampling were below 6 compared to the 2018 – 2020 seep dataset, where three samples (both 2020 samples from EV_SEEP_10MILE, 1 sample from FR_STPWSEEP) were identified with field pH readings below 6.

Temperature

A review of the 2021 seep dataset identified one sample with a field temperature reading above 35 degrees Celsius: 35.3 °C at GH_SEEP_77 during high flows. This seep was sampled at 13:55 on June 28, 2021, which was a sunny day. It is assumed that the elevated water temperature measured at this seep is representative of field conditions.

Dissolved Oxygen

No field DO readings during 2021 sampling were above 14.6 mg/L, the theoretical maximum amount of dissolved oxygen at a temperature of 0°C.

4.6 QA/QC Conclusion

SRK's opinion is that data quality is acceptable for 2021 annual reporting. Field duplications and field blanks surpassed the DQO target of 10%. Refer to Section 11 for an additional step Teck will be undertaking to mitigate QAQC issues.

5 Review Methods

The purpose of review in this report was to establish consistency with the selection criteria used in SRK 2019, 2020, and 2021 and stability in results. Establishing consistency was achieved by comparing the samples collected in 2021 against the same seeps sampled from 2018 to 2020. When looking at results to establish stability, factors such as year to year precipitation should be considered in terms of impact to flow and constituent load from seeps. In addition, seeps where facility size is changing will likely impact flow and constituent loading. Natural variability can exaggerate the scale of minor changes within a small dataset of two samples each year over four years. Continued sampling for the RSMP will allow the characterization of baseline conditions and detect any potential trends in the data.

After the initial geochemical review conducted in last year's report (SRK 2021), analyses were conducted to determine if the findings were consistent after four years of collected samples.

In the 2019 RSMP annual report, results were reported for field pH, sulfate, dissolved selenium, nitrate as nitrogen (nitrate-N), dissolved cadmium, dissolved cobalt, and dissolved nickel. The review for stability of results for the 2020 RSMP annual report was completed for the parameters mentioned above. In addition, nitrite as nitrogen (nitrite-N), total dissolved solids (TDS), dissolved antimony, dissolved molybdenum, and dissolved uranium were added based on the findings of the 2020 Regional Groundwater Monitoring Program Update (RGMP BGA; SNC-Lavalin 2020). Reporting will continue with all the above parameters.

5.1 Comparison to Previous Years

5.1.1 BCWQGs Comparison

Seep water quality results were screened against the British Columbia Water Quality Guidelines (BCWQG) for Freshwater Aquatic Life (FWAL; ENV 2019, 2021). The purpose of screening seep water quality results against the FWAL BCWQG is to identify seeps with changing water quality that may impact the downstream receiving environment. Seeps with changing BCWQG categorization may indicate where further monitoring or water management may need to be considered.

Seeps were highlighted if the BCWQG screening categorization for field pH, sulfate, nitrate-N, nitrite-N, dissolved cadmium, total Co, total molybdenum, total nickel, total selenium, or total uranium changed. The BCWQG screening guidelines are presented in Table 6.

Table 6: BC Water Quality Guidelines for Freshwater Aquatic Life

Parameter	Unit	BCWQG FWAL		Notes
Field pH	pH units	Minimum Maximum	6.9 9	- -
Sulfate	mg/L	Chronic	128 to 429 mg/L	Hardness dependent
Nitrate-N	mg-N/L	Chronic Acute	3 32.8	- -
Nitrite-N	mg-N/L	Chronic Acute	0.02 to 0.2 mg/L 0.06 to 0.6 mg/L	Chloride dependent
Dissolved Cadmium	mg/L	Chronic Acute	0.004 to 2.5 mg/L 0.003 to 18.5 mg/L	Hardness dependent
Total Cobalt	mg/L	Chronic Acute	0.004 0.11	- -
Total Molybdenum	mg/L	Chronic Acute	1 2	- -
Total Nickel	mg/L	Chronic	25 to 150 µg/L	Working Guideline Hardness dependent
Total Selenium	mg/L	Chronic:	0.002	-
Total Uranium	mg/L	Chronic:	0.0085	Working Guideline

Sources: ENV 2019 and ENV 2021

5.1.2 Water Chemistry Criteria

During seep prioritization in 2019, seeps were categorized based on Zn/Cd and sulfate concentration to estimate source conditions related to the Morrissey Formation (MF). Parts of the MF are potentially acid generating (PAG), and seeps showing possible MF influences may indicate areas where future changes in water quality might be expected. Based on experience with acid rock drainage in the Elk Valley, seeps with a Zn/Cd above 200 mg/mg and a sulfate concentration greater than 100 mg/L are possibly influenced by the MF.

Seeps were also classified as suboxic or oxic during the 2019 seep prioritization based on the sulfate concentration and Se/SO_4 ratios. Se/SO_4 was used to evaluate the influence of low-oxygen conditions on seeps originating from waste materials (Hay et al., 2016). Based on experience primarily with evaluating waters in saturated backfills, Se/SO_4 of about $1x10^{-4}$ mol/mol represents dominantly oxidizing conditions and is consistent with the typical characteristics of unsaturated oxidizing waste rock. In comparison, ratios below $1x10^{-5}$ mol/mol are considered to show selenium attenuation under oxygen-deficient conditions, including backfills, reject spoils, suboxic zones in waste rock or along groundwater flow pathways.

Seeps with a sulfate concentration greater than 500 mg/L and a Se/SO_4 less than $1x10^{-5}$ mol/mol are considered to be suboxic. Seeps where the oxidation or MF influence classification has changed between 2019 and 2020 were highlighted in the results section for each operation (Section 7). Changes in classification may be an early semi-quantitative indication of trending; however, several more years of data collection will be necessary to assess if these are indications of seasonal or long-term trends.

5.2 Year to Year and Seasonal Trends

The 2018 – 2021 RSMP dataset was reviewed for seasonality and trending. A visual qualitative review of time trends in concentrations was conducted.

There is insufficient data in the 2018 – 2021 seep dataset to conduct statistical analysis such as Mann-Kendall trend analysis to determine quantitative water quality or loading changes through time. A statistical evaluation was not conducted due to the temporal limit on the dataset; however, this approach will be considered in future reports when more samples have been collected.

In addition, due to the often-diffuse nature of seeps, flow measurements that are subsequently used for loading calculations are inherently imprecise. It is often not possible to capture flow from the whole seep in one measurement. In addition, because seep flows are only measured during seep surveys, it is difficult to determine if the measured flow is representative of "low" or "high" flow conditions in the annual hydrological cycle at each location. Therefore, loadings calculated based on seep flow measurements should be regarded as semi-quantitative.

Summaries of parameters of interest with year to year and seasonal patterns are discussed by operation in Sections 7.1 through 7.5.

5.3 Geochemical Review Metrics

As the RSMP dataset has expanded, it is now possible to investigate geochemical controls on water chemistry and the potential sources of loadings. These interpretations may inform the regional water quality model, operation-specific water and load balance models, and research and development to manage water quality.

For the cumulative dataset through 2021, the following methods were used to evaluate the data:

- Understanding of solubility controls:
  - Metal concentrations with field pH cross plots to evaluate pH as a solubility control. Metal concentrations are generally correlated with field pH. Metals are more mobile in lower pH environments ($pH < 6$), and metal concentrations decrease as pH increases.
  - PHREEQC (Parkhurst and Appelo 1999) modelling evaluates solubility controls by interpretation of saturation indices and calcite controls. Metals such as cadmium, cobalt, zinc, and to a lesser extent, nickel may be attenuated through co-precipitation with calcite. PHREEQC modelling methods are described in more detail in subsection 5.3.1.
- Effect of Low Oxygen Conditions
  - Metal concentrations with field DO cross plots to evaluate the solubility of redox-sensitive species that may correlate with measured DO concentrations. Iron and manganese reduction is expected in reducing environments, which may release iron and manganese through the reductive dissolution of oxyhydroxides. Other metals (e.g., cobalt, nickel, and zinc) adsorbed or co-precipitated with iron and manganese minerals may also be released.
  - Se/SO_4 with field DO cross plots to evaluate the linkage between suboxic conditions development and DO. The expectation is that Se/SO_4 will be lower when DO is lower due to

reductive processes that remove oxygen and convert selenium to less mobile forms. As previously described in Section 5.1.2, the ratio Se/SO_4 can be used to determine if a seep originates in low oxygen conditions.

- Comparison between seeps and downstream locations might indicate suboxic conditions that are subsequently “lost” to dilution and mixing from other sources further downstream. Box and whisker plots of suboxic indicator ratios for seeps were compared to permitted surface water downstream monitoring locations.

- Downstream Attenuation
  - Metal concentrations with sulfate cross plots for seeps compared to downgradient permitted surface water monitoring locations. Sulfate is assumed to be a conservative tracer because it is unlikely to be attenuated along the flow path from the source (i.e., seep) to the downstream monitoring location. Metal concentrations as a function of sulfate concentrations for seeps were compared to the corresponding permitted surface water monitoring locations. This comparison may indicate whether dissolved metals from the seep are attenuated along the flow path (e.g., sequestration through calcite precipitation).

Discussion of overarching controls or trends across all operations is provided in Section 6. Discussions of controls and trends of individual sites, seep groups, and seeps are provided in Sections 7.1 through 7.5, divided by operation.

5.3.1 PHREEQC Modelling Methods

Saturation indices (SI) for gypsum ($CaSO_4 \cdot 2H_2O$), calcite ($CaCO_3$), and ferrihydrite ($Fe(OH)_3$) were modeled using PHREEQC with the minteq.v4 database. Gypsum is considered due to its potential to control sulfate concentrations. Calcite is considered due to the potential for calcite concretions to form. Ferrihydrite can help understand disequilibrium with oxygen and the potential for sequestration of metals. Modelling inputs included field pH, oxidation-reduction potential (ORP) (corrected to Eh), and temperature. Seeps that did not include a field ORP measurement were not modeled. All remaining seeps had field pH and field temperature measurements. Concentrations below the detection limit were modeled using the detection limit concentration.

An SI value of zero conventionally indicates the mineral is at equilibrium (neither forming nor dissolving); however, this might change due to dilution, dissolution of other minerals, and changes in the gas phases. An evaluation of calcite precipitates and water chemistry in the Elk Valley shows that calcite has a practical SI reference value of 0.6 (i.e., an SI of at least 0.6 is needed before calcite precipitates) (SRK 2011). This is inferred to be due to the slow kinetics of calcite nucleation resulting from dissolved magnesium in the waters. Samples with a modeled calcite SI of 0.6 were considered at equilibrium. Any seeps below or above the reference value were considered undersaturated or oversaturated, respectively. If oversaturated, the seep has the potential to precipitate calcite.

No gypsum or ferrihydrite SI reference values have been established for the Elk Valley. An SI value of zero generally represents equilibrium for gypsum and ferrihydrite. It was assumed that seeps with gypsum or ferrihydrite SIs below -0.5 indicated undersaturation, values between -0.5 and 0.5 indicated near equilibrium, and values above 0.5 indicated oversaturation.

6 Regional Seepage Geochemical Interpretation

6.1 Seasonality and Year-on-Year Trends

Based on a qualitative visual review of water quality timeseries, no consistent seasonality or year-on-year trends were identified across all seeps at any one operation or across the Elk Valley as a whole. From the qualitative visual review, some individual seeps were identified to be showing potential seasonality or year-on-year trends and are summarized in the operation-specific sections below (Section 7). As more samples are collected, water quality timeseries will be re-examined for potential seasonality and year-on-year trends. Water quality timeseries for field pH, nitrate-N, nitrite-N, sulfate, TDS, antimony, cobalt, cadmium, molybdenum, nickel, uranium, and selenium are in Appendix A.

6.2 Solubility Controls

6.2.1 pH

pH greater than 7 continues to dominate in seeps across the Elk Valley due to the strong control exerted by the dissolution of carbonate minerals. However, localized influences of PAG materials can depress pH to below 6. Field pH measured in the seeps ranged from 6.5 to 9.5 except for two seeps (EV_SEEP_10MILE9 and GH_SEEP_21). The lower field pH measurements reported at EV_SEEP_10MILE9 (range of 5.92 to 7.21) and GH_SEEP_21 (range of 6.38 to 7.92) show no other indicators of acidity such as relatively elevated metal or sulfate concentrations. Therefore, these low field pH measurements are likely not influenced by local PAG materials.

The addition of 2021 samples supports the previous findings that the dominant circumneutral to alkaline pH measured in the seeps across the Elk Valley operations acts as a solubility control on several parameters. For example, uranium shows a weak positive qualitative correlation with field pH in Figure 3. As pH increases, uranium is expected to increase (i.e., become more mobile) because it occurs in solution as an oxyanion (e.g., $UO_2(CO_3)_2^{2-}$), which results in less adsorption as H^+ decreases. The positive correlation between field pH and uranium is most visible at EVO seeps. Selenium continues to show no qualitative correlation with field pH in Figure 4. Therefore, changes to pH in the range observed across the Elk Valley are not expected to impact selenium mobility. Cobalt shows a qualitative negative correlation with field pH (Figure 5). As pH increases, cobalt is expected to decrease (i.e., become less mobile). The negative correlation between field pH and cobalt is most visible at CMm seeps, where cobalt concentrations show the largest range (between 0.1 µg/L and just below 100 µg/L). The graphs for uranium (Figure 3) and cobalt (Figure 5) are examples of metals for which pH acts as a solubility control, a detailed account of parameters impacted by pH are summarized by operation in Table 11 (FRO), Table 15 (GHO), Table 19 (LCO), Table 23 (EVO), and Table 27 (CMm).

Seeps or seep groups that showed some correlation with pH as a solubility control are identified and described in the following sections split by operations (Section 7). Cross plots of metal concentrations with field pH are in Appendix B.

6.2.2 Mineral Saturation Indices

Across the Elk Valley, 54% of seeps had modelled calcite saturation above 0.6, indicating oversaturation (calcite precipitation may be occurring) for one or both flow regimes. Calcite SIs during low flow were generally higher than in high flows, reflecting the more dilute conditions resulting from snowmelt. Across all operations, calcite saturation for 11% of seeps changed seasonally in 2021. As in 2020, seasonal calcite saturation changes do not appear to coincide with other category changes (e.g., oxidation, MF influence). Over half of the seeps that had a seasonal change in calcite saturation changed from undersaturated during high flows to oversaturated during low flow (7% of all Elk Valley seeps). The remaining seeps seasonally changed calcite saturation in the opposite direction (4% of all Elk Valley seeps).

Figure 6 shows modelled calcite SI compared to modelled partial pressure of carbon dioxide (pCO_2). pCO_2 above $10^{-3.4}$ atm indicates CO_2 is over-pressurized (dashed vertical line in Figure 6). As seeps equilibrate with atmospheric pressure, dissolved CO_2 will decrease along the flow path (White 2020). pH will increase as a result, and calcite may become oversaturated and precipitate. Most seeps in the Elk Valley have $pCO_2 > 10^{-3.4}$, indicating over-pressurization (Figure 6).

No seeps in the Elk Valley had a gypsum SI above zero; hence they are not likely to precipitate gypsum. Most seeps (99%) are in equilibrium or oversaturated with ferrihydrite, a common finding for water with alkaline pH under dominantly oxidizing conditions. Plots generated from PHREEQC modelling are in Appendix D.

6.3 Effect of Low Oxygen Conditions

6.3.1 Dissolved Oxygen

In reducing environments, iron and manganese may be released through the reductive dissolution of oxyhydroxides. Other metals (e.g., cobalt, nickel, and zinc) adsorbed or co-precipitated with iron, and manganese minerals may also be released. Lower manganese concentrations tended to be associated with higher field DO concentrations (Figure 7). In contrast, higher manganese concentrations were spread across the field DO range measured during the seep sampling events. Qualitatively, a similar relationship between iron and field DO was observed, but to a lesser extent because iron was not detected in many samples (Figure 8). Seeps did not show a correlation of concentrations of other metals with field DO. Cross plots of metal concentrations with field DO are in Appendix C.

Figure 9 shows the suboxic indicator ratio Se/SO_4 compared to field DO measurements. There is a cluster of data points where field DO and Se/SO_4 are relatively elevated and scatter across the range of Se/SO_4 at lower field DO. The scatter is generally consistent with expectations, and it is conceivable that low Se/SO_4 can be present under a wide range of DO because water can reoxygenate after being reduced. Still, higher Se/SO4 is less likely to be present in suboxic waters. The criterium previously set by SRK (2019) for identifying suboxic conditions, where Se/SO_4 is less than $1x10^{-5}$ mol/mol, appears to continue to provide a generally reliable indication of waters affected by suboxic conditions.

6.3.2 Comparison of Suboxic Indicator Ratios to Downstream Monitoring Locations

Box and whisker plots of the suboxic indicator ratios for seeps and their nearest downstream permitted surface water monitoring points are in Appendix F. Figures are grouped by seeps with the same permitted surface monitoring location. For example, Figure 10 shows the log-ratio for Se/SO_4 (mol/mol) for permitted surface water monitoring location FR_FR1 and nearby upstream seeps (see Table 8 for a list of seeps associated with FR_FR1).

Each box in Figure 10 shows the range of Se/SO_4 for each seep and Fording River surface water monitoring location FR_FR1. The permitted surface water monitoring location is the leftmost green shaded box. Each seep box is labeled with its ID on the x-axis and labels for the number of samples and average sulfate concentration. Seep boxes are color-coded based on their upstream material grouping in the legend. The $1x10^{-5}$ Se/SO_4 line indicating the division between the suboxic and oxic water categorizations has been added to each figure for reference. Any location with a box below the $1x10^{-5}$ Se/SO_4 line that also has an average sulfate concentration above 500 mg/L should be considered as generally suboxic. Any seeps with a box below the $1x10^{-5}$ Se/SO_4 line with average sulfate concentration below 500 mg/L and any boxes above the $1x10^{-5}$ Se/SO_4 line, regardless of average sulfate concentration, are considered oxic. In Figure 10, FR_HENSSEEP1 is generally suboxic and is assumed to contribute flow to FR_FR1. However, by the time any suboxic waters from this seep reaches FR_FR1, the water is inferred to have been diluted by oxic water from other seeps and runoff sources, as FR_FR1 plots within the oxic zone of the figure.

7 Seepage Monitoring Results by Operation

The analysis and review detailed below were conducted on the seeps recommended by SRK for carryover from 2018 through 2020. Table 8 summarizes the number of seeps identified and sampled during 2021. Apart from two seeps at GHO (GH_SEEP_60 and GH_SEEP_79) that were unsafe to access due to mining operations and one seep at EVO (EV_SEEP_CFI3) that was missed during low flow sampling, all seeps previously recommended for further monitoring were successfully visited. Some RSMP seeps were dry or covered by mined-out material (spoiled over) and were not sampled in 2021.

The number of seeps recommended by SRK (2021) in Table 8 includes:

- the number of seeps initially identified for inclusion in the RSMP
- The addition of any newly identified seeps assessed for inclusion since 2018
- the removal of any seeps that have been formally retired following the seep retirement framework in SRK (2021)

The number of seeps identified and sampled during high flows in Table 8 refers to all seeps revisited and sampled between March 15 and July 15, 2021, following Teck's formal definition of the high flows monitoring period. The number of seeps identified and sampled during low flows in Table 8 refers to all the seeps revisited and sampled between September 1, 2021, and December 31, 2021.

Results of the review are discussed below by operation.

Table 7: Summary of Seep Samples Collected by Operation

Operation	Number of seeps recommended for continued sampling in RSMP (SRK 2021)	Seeps Revisited in 2021		Seeps Sampled in 2021	
		High Flow[1]	Low Flow[2]	High Flow[1]	Low Flow[2]
FRO	24	20[5]	20[5]	20	18
GHO	18	18	16[4]	16	9
LCO	12	12	10	12	10
EVO	19	18[3]	18[3]	17[6]	16
CMm	16	16	16	15	15
All	89	84	80	80	68

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/2021%20QAQC/2021_WQ_Accounting_amd_v0.xlsx

Notes:

[1] High flow includes samples collected between March 15, 2021, and July 15, 2021.

[2] Low flow includes samples collected between September 1, 2021, and December 31, 2021.

[3] One seep at EVO has been backfilled (EV_SEEP_NATALPIT2).

[4] Two seeps at GHO were unsafe to access during low flow sampling (GH_SEEP_60 and GH_SEEP_79).

[5] One seep at FRO was retired following a seep retirement survey (FR_HENSEEP1), and additionally, three seeps at FRO have been covered with mined out material (FR_SCRDSEEP1, FR_SHNSEEP1, and FR_FSEAMWSEEP4).

[6] One seep at EVO was missed during low flow sampling (EV_SEEP_CFI3).

7.1 Fording River Operation (FRO)

Seep monitoring locations at the FRO mine site facilities are presented in Figure 11. Seeps are color-coded by the nearest downgradient permitted surface water sampling location. Table 8 summarizes the seeps visited during the 2021 RSMP.

The group name associated with each seep ID in the seep tables for each operation is a product of the seep grouping conducted by SRK (2019). Seeps were assigned a sub-area/material type on an operation-by-operation basis to help identify each seep based on the general area and upstream material type related to each seep. The groupings were used for graphing purposes to evaluate the geochemical influence of different material types. In addition, each group of seeps was assigned a downstream comparison point, either a surface water monitoring location or an authorized discharge location. Grouping seeps to a downgradient comparison point was used to make concentration comparisons, evaluate the overall significance of a given seep to a group, and evaluate seepage water for possible attenuation.

Seeps in groupings ending with the WR suffix have been assigned to a sub-area that is assumed to be downstream of a waste rock dump. Seep in groupings ending with the CCR suffix have been assigned to a sub-area that is assumed to be downstream of a coarse coal reject (CCR) pile. Seeps in groupings ending with the PIT suffix have been assigned to a sub-area that is assumed to be downstream of a pit. Seeps in groupings ending with the TAILINGS suffix have been assigned to a sub-area downstream of a tailings storage facility. Seeps in groupings ending with the PLANT suffix have been assigned to a sub-area downstream of a plant facility.

FR_HENSEEP1 has been formally retired from the RSMP after undergoing a seep retirement assessment (Section 9). FR_SHNSEEP1, FR_SCRDSEEP1, and FR_FSEAMWSEEP4 were covered by mined out material before 2021 sampling began and may be retired from the RSMP following a seep retirement assessment in 2022.

Table 8: 2021 FRO Seeps

Seep ID	Group Name	Nearest Permitted Surface Water Sampling Location or Comparison Point	Permitted Surface Water Sampling Location Type[1]	Notes	Seep Status
FR_HENSEEP3	FR_HEN_WR	FR_FR1	SW	-	Active
FR_TURNSEEP1	FR_TURNBULLWREAST_WR	FR_FR1	SW	Dry in November 2021	Active
FR_HENSSEEP1	FR_HEN_WR	FR_FR1	SW	-	Active
FR_HENSEEP1	FR_HEN_WR	FR_FR1	SW	Retired from program in 2021	Retired from Program
FR_TBWSEEP1	FR_TURNBULLWRWEST_WR	FR_PP1	DL	-	Active
FR_TURNSEEP2	FR_TURNBULLWRWEST_WR	FR_PP1	DL	-	Active
FR_FCSEEP2	FR_TURNBULLWREAST_WR	FR_CC1	DL	-	Active
FR_CCSEEPE1	FR_CLODECR_WR	FR_CC1	DL	-	Active
FR_CCSEEPSE1	FR_CLODECR_WR	FR_CC1	DL	-	Active
FR_LMCWSEEP5	FR_LAKEMTN_WR_PITS	FR_LMP1	DL	-	Active
FR_FSEAMWSEEP4	FR_FSEAM_WR	FR_LP1	DL	Covered by mined out material Q3 2020	Awaiting Retirement Survey
FR_SHNSEEP1	FR_SHANDLEY_WR	FR_LP1	DL	Covered by mined out material Q1 2021	Awaiting Retirement Survey
FR_ASPSEEP1	FR_A_CCR	FR_LP1	DL	-	Active
FR_EAGLENORTH	FR_EAGLE_WR	FR_EC1	DL	-	Active
FR_DOKASEEP1	FR_DOKA_WR	FR_NL1	DL	-	Active
FR_SPRWSEEP1	FR_BLAIN_CCR	FR_NL1	DL	-	Active
FR_FRVWSEEP3	FR_SMITH_WR	FR_SP1	DL	-	Active
FR_BLAKESEEP1	FR_BLAIN_CCR	FR_FR2	SW	-	Active
FR_BLAINESEEP1	FR_BLAIN_CCR	FR_FR2	SW	-	Active
FR_BLAINESEEP5	FR_BLAIN_CCR	FR_FR2	SW	-	Active
FR_STPNSEEP	FR_SOUTHTAILS_TAILINGS	FR_FR2	SW	Dry in November 2021	Active
FR_STPWSEEP	FR_SOUTHTAILS_TAILINGS	FR_FR2	SW	-	Active
FR_STPSWSEEP	FR_SOUTHTAILS_TAILINGS	FR_FR2	SW	-	Active
FR_SCRDSEEP1	FR_SWIFTWR_ROCKDRAIN_WR	GH_SC1[2]	DL	Covered by mined out material Q1 2021	Awaiting Retirement Survey

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Master_Seep_WQ_Database_rev2_amd.xlsx

Notes:

[1] Permitted Surface Water Sampling Location Types are surface water (SW) or discharge location (DL).

[2] GH_SC1 became FR_SCCAT for 424 in April 2020 and FR_SCOUT for 107517 in September 2020. The comparison point ID GH_SC1 refers to data under these three IDs.

7.1.1 Morrissey Formation and Oxidation Category

FRO seeps where the oxidation category or MF influence category has changed between 2020 and 2021 are listed in Table 9.

- One FRO seep (FR_FRVWSEEP3) changed MF influence categories between 2020 and 2021, going from consistently possibly MF influenced since 2018 to not MF influenced during 2021 low flow sampling.
- One FRO seep (FR_HENSSEEP1) changed oxidation categories between 2020 and 2021, going from oxic since 2019 low flow sampling to suboxic during 2021 low flow sampling.

Table 9: FRO seeps with changed oxidation or MF influence category

Seep ID	2018		2019		2020		2021	
	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow
FR_HENSSEEP1	Suboxic	-	Suboxic	Oxic	Oxic	-	Oxic	Suboxic
FR_FRVWSEEP3	Possible MF Influence	Possible MF Influence	-	Possible MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence	No MF Influence

Sources: Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\SeepCategorization_1CT017-358_r0_amd.xlsx

Notes: “-“ denotes sampling events when the seep was visited but not sampled (i.e., because it was dry).

The oxidation category for FR_HENSSEEP1 continues to change each year. Oxic categorization for 2021 high flows coincides with a higher-than-average sulfate concentration (1,140 mg/L to an average of 539 mg/L) and a higher-than-average Se/SO_4 (1x10^{-5} mol/mol to an average of 3.4x10^{-6} mol/mol). The higher-than-average Se/SO_4 can be attributed to a higher-than-average selenium concentration of 9.42 µg/L to an average of 1.55 µg/L at the seep. The suboxic categorization for 2021 low flows coincides with a higher-than-average sulfate concentration (1,130 mg/L) and a dip in Se/SO_4 below 1x10^{-5} mol/mol back closer to historical values at 1.7x10^{-6} mol/mol. There is no qualitative/visual increasing, decreasing, or seasonal trends for either sulfate or selenium at FR_HENSSEEP1; this seep's oxidation category remains uncertain.

FR_FRVWSEEP3 has been categorized as not MF influenced for the first time since sampling at this location began in 2018. Sulfate concentrations at this seep are consistently above 100 mg/L (ranging from 478 to 582 mg/L); therefore, the change in MF influence categorization at FR_FRVWSEEP3 is related to a dip in Zn/Cd to 150 mg/mg, 50 mg/mg below the 200 mg/mg criterium. Before 2021 low flows, Zn/Cd at FR_FRVWSEEP3 ranged from 260 to 500 mg/mg. There is no qualitative/visual overall increasing, decreasing, or seasonal trends for either zinc or cadmium concentrations at FR_FRVWSEEP3; this seep's MF category may change with future sampling.

7.1.2 Site-Specific Seepage Geochemical Interpretation

The oxidation and MF influence categorization of seeps and modelled calcite and ferrihydrite saturation at FRO are summarized in Table 11. Figure 12 and Figure 13 show the high and low flow oxidation categorizations for FRO seeps, respectively. Figure 14 and Figure 15 show the high and low flow Morrissey Formation categorizations for FRO seeps, respectively.

Seeps where categorization is less certain have been denoted with “potentially” before the categorization varies over the course of the monitoring period. For example, FR_HENSEEP3 in Table 11 has been categorized as "potentially undersaturated" for calcite during high flows, meaning that most high flow samples at FR_HENSEEP3 have been categorized as undersaturated, but not all the high flow samples at FR_HENSEEP3 have been categorized as undersaturated. The uncertainty of FR_HENSEEP3’s categorization is reflected in an average high flow calcite SI of 0.60 (right on the equilibrium mark for calcite saturation). Calcite SIs have been reported in Table 11 to provide more context for each seep’s calcite saturation categorization.

Seeps that have been given an oxidation or MF categorization of “undetermined” are seeps where the categorization for all samples has fallen equally between the two end-members of the categorization in question. For example, FR_TURNSEEP1 in Table 11 has been categorized for MF influenced as “undetermined” during high flows, meaning that half of the high flow samples at FR_TURNSEEP1 show MF influence, and the other half of high flow samples at this seep do not show MF influence.

Most seeps at FRO are categorized as oxic and not MF influenced and did not seasonally change oxidation or MF influence categorization. FR_FRVWSEEP3 is the only seep at FRO showing possible MF influence. All FRO seeps have been categorized as oxic or undetermined.

After four years of sampling, two seeps (FR_HENSSEEP1 and FR_STPWSEEP) seasonally changed modelled calcite saturation:

- FR_HENSSEEP1 was oversaturated during high flows (average calcite SI of 1.03) and undersaturated during low flows (average calcite SI of 0.34)
- FR_STPWSEEP was undersaturated during high flows (average calcite SI of 0.42) and oversaturated during low flows (average calcite SI of 0.58).

Three FRO seeps had an underdetermined (an equal number of samples categorized as oversaturated and undersaturated) modeled calcite saturation:

- FR_TURNSEEP1 during high flows (average high flow calcite SI of 0.56)
- FR_SPRWSEEP1 during high flows (average high flow calcite SI of 0.28)
- FR_LMCWSEEP5 during low flows (average low flow calcite SI of 0.49).

Maps of calcite saturation during high and low flows in Figure 16 and Figure 17, respectively, show some spatial trends for calcite saturation at FRO.

- Three seeps (FR_BLAKESEEP1, FR_BLAINSEEP1, and FR_BLAINSEEP5) in the Blain CCR area are consistently categorized as oversaturated.

- Three seeps (FR_TBWSEEP, FR_TURNSEEP1, and FR_FCSEEP2) in the Turnbull West Area are consistently categorized as undersaturated.

PHREEQC modelling of seeps with sulfate concentrations above 1,000 mg/L indicates mineral equilibrium with gypsum, where the remainder were undersaturated (see Appendix D). All FRO seeps were modeled as oversaturated for ferrihydrite.

Most seeps at FRO did not visually show seasonality in parameter concentrations. However, some seeps displayed seasonality of sulfate concentrations. Seeps displaying sulfate seasonality have consistently higher sulfate concentrations during low flows. Seasonality and year-on-year trends identified in Table 11 are based on a qualitative visual review of water quality timeseries. Possible increasing year-on-year trends based on visual identification in conjunction with FWAL BCWQG limit exceedances have been identified at the following seeps:

- sulfate (1,140 and 1,130 mg/L) and cobalt (5 µg/L) at FR_HENSSEEP1
- selenium (range of 90.8 to 125 µg/L) at FR_ASPSEEP1
- selenium (75.5 and 136 µg/L) at FR_FRVWSEEP3

Certain parameter concentrations at FRO show correlations with field pH and field DO. Across FRO dissolved molybdenum and nickel show a positive correlation with field pH. Dissolved molybdenum and nickel positively correlate with field DO. In addition, dissolved selenium, uranium, and zinc also positively correlate with field DO.

In Appendix E, sulfate concentrations at FRO seeps compared to corresponding permitted surface water monitoring locations show that average sulfate concentrations at the permitted surface water monitoring stations are often less than or equal to the average sulfate concentrations of their corresponding upstream seeps. If sulfate is assumed to be a conservative tracer, this would indicate that their upstream seeps do not primarily influence the permitted surface water sampling locations at FRO.

A comparison of average flows at each FRO seep and its associated downgradient permitted surface water monitoring location is reported in Table 10. The majority of seeps at FRO do not contribute a significant volume of water to their downgradient permitted surface water monitoring location counterparts, with a few exceptions:

- FR_CCSEEPE1 average high flow rates are 55% of flow rates at FR_CC1
- FR_EAGLENORTH average low flow rates are 101% of flow rates at FR_EC1.

Both FR_CCSEEPE1 and FR_EAGLENORTH have been categorized as oxic, not MF influenced, and likely oversaturated for calcite. Calcite precipitate has not been identified in the field at either seep. Both FR_CC1 and FR_EC1 have also been categorized as oxic and not MF influenced. FR_CC1 samples show oversaturation for calcite. FR_EC1 samples are classified as oversaturated during high flow and undersaturated during low flows, indicating that FR_EAGLENORTH may not as strongly influence FR_EC1 as flow rates may suggest. As with other seeps, flow rates at FR_EAGLENORTH may have a high degree of uncertainty due to the challenge of measuring diffusive flow accurately.

Table 10: Average seasonal flows for FRO seeps and downgradient permitted surface water monitoring locations

Permitted Surface Water Monitoring Location	Permitted Surface Water Monitoring Location Flow (m³/d)		Seep Location	Seep Flow[1] (m³/d)			
				High Flow		Low Flow	
	High Flow	Low Flow		Flow (m³/d)	% Permitted location flow	Flow (m³/d)	% Permitted location flow
FR_CC1	7,548	4,191	FR_FCSEEP2	2,002	27%	290	7%
			FR_CCSEEPE1	4,181	55%	650	16%
			FR_CCSEEPSE1	57	1%	58	1%
FR_EC1	413	508	FR_EAGLENORTH	179	42%	513	95%
FR_FR1	151,133	25,425	FR_HENSEEP3	12	0%	4	0%
			FR_TURNSEEP1	26	0%	-	-
			FR_HENSSEEP1	6	0%	1	0%
FR_FR2	160,817	70,004	FR_BLAKESEEP1	41	0%	-	-
			FR_BLAINESEEP1	165	0%	239	0%
			FR_BLAINESEEP5	15	0%	1	0%
			FR_STPNSEEP	423	0%	-	-
			FR_STPWSEEP	590	0%	439	1%
			FR_STPSWSEEP	91	0%	39	0%
FR_LMP1	24,859	3,654	FR_LMCWSEEP5	571	2%	206	6%
FR_LP1	2,114	2,515	FR_ASPSEEP1	192	9%	104	4%
FR_NL1	1,344	3,518	FR_DOKASEEP1	30	2%	-	-
			FR_SPRWSEEP1	13	1%	8	0%
FR_PP1	6,071	1,703	FR_TBWSEEP1	558	9%	182	11%
			FR_TURNSEEP2	936	936	15%	709
FR_SP1	3,598	1,739	FR_FRVWSEEP3	38	1%	9	0%

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/LoadingComparison_1CT017-358_r0_amd.xlsx

Notes:

[1] Due to the often-diffuse nature of seeps, seep flow measurements that are inherently imprecise. The comparisons reported here should be regarded as semi-quantitative.

Table 11: Summary of Trends and Controls on Water Quality for Seeps at FRO

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
FR_HENSEEP3	FR_HEN_WR	High Flow	Oxic	Not MF Influenced	***Potentially Undersaturated***	0.60	Yes	Oversaturated	Possible increasing NO_2	-	▪ Weak correlation between field pH and Mn. ▪ High Se concentrations for FRO seeps (> 110 mg/L).	SO_4, NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	***Undersaturated***	0.36	No field note	Oversaturated	Possible decreasing Mo			
FR_TURNSEEP1	FR_TURNBULLWREAST_WR	High Flow	Oxic	Not MF Influenced	***Not determined***	0.56	Yes	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH	NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	No Samples	No Samples	-	No Samples				
FR_HENSSEEP1	FR_HEN_WR	High Flow	***Not determined***	Not MF Influenced	Oversaturated	1.03	No	Oversaturated	Possible increasing SO_4, Cd, Co, Zn	-	▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	SO_4, Se-T, **Co-T**
		Low Flow	***Not determined***	Not MF Influenced	***Undersaturated***	0.34	No field note	***Oversaturated***				
FR_TBWSEEP1	FR_TURNBULLWRWEST_WR	High Flow	Oxic	Not MF Influenced	***Undersaturated***	-0.13	No	Oversaturated	Possible decreasing NO_3, Ni, Zn	-	▪ Possible negative correlation between field pH and Cd, Se, U.	Se-T, NO_3-N
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.01	No	Oversaturated		Higher field pH		
FR_TURNSEEP2	FR_TURNBULLWRWEST_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	-0.05	Yes	Oversaturated	Possible decreasing NO_3, Ni, Sb, Zn	-	▪ Possible negative correlation between field pH and Cd, Mo, Se, U.	Se-T, NO_3-N
		Low Flow	Oxic	Not MF Influenced	Undersaturated	0.03	Yes	Oversaturated				
FR_FCSEEP2	FR_TURNBULLWREAST_WR	High Flow	Oxic	Not MF Influenced	***Undersaturated***	-0.10	Yes	Oversaturated	-	-	▪ Weak negative correlation between field pH and Cd, U. Low Zn (<0.001 mg/L).	Se-T, NO_3-N
		Low Flow	Oxic	Not MF Influenced	Undersaturated	0.15	Yes	Oversaturated		Higher SO_4, Se, NO_3, TDS, U		
FR_CCSEEPE1	FR_CLODECR_WR	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.84	No	Oversaturated	-	-	▪ Weak positive correlation between field pH and Al, Mo, Ni, U. ▪ Weak negative correlation between field pH and Cd, Zn. ▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)). ▪ High Ni (0.05-0.09 mg/L)	-
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.71	No	Oversaturated		Higher SO_4, Se, NO_3, Cd, Co, Ni, TDS, U		
FR_CCSEEPSE1	FR_CLODECR_WR	High Flow	Oxic	Not MF Influenced	***Potentially Undersaturated***	0.30	No	Oversaturated	-	-	▪ Weak negative correlation between field pH and Mn.	-
		Low Flow	Oxic	Not MF Influenced	***Undersaturated***	0.42	No	Oversaturated		Higher SO_4, Se, NO_3, Cd, Co, Ni, U		
FR_LMCWSEEP5	FR_LAKEMTN_WR_PITS	High Flow	Oxic	Not MF Influenced	***Undersaturated***	0.09	No field note	Oversaturated	Possible decreasing field pH	-	▪ Possible negative correlation between field pH and Cd, Mn, Mo, Ni, Se, U, Zn.	SO_4, NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.49	No	Oversaturated	Possible increasing Cd, Ni, U, Zn	Higher SO_4, Se, NO_3, U		
FR_ASPSEEP1	FR_A_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	0.10	No	Oversaturated	Possible increasing Se, NO_3, TDS	-	▪ Possible negative correlation between field pH and Cd. ▪ Possible positive correlation between field pH and Mo, Ni, U. ▪ Increasing calcite SI towards oversaturation (> 0.6) during low flow.	SO_4, NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	***Undersaturated***	0.46	No	Oversaturated		Higher SO_4, Se, NO_3, TDS, U		

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
FR_EAGLENORTH	FR_EAGLE_WR	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.72	No	Oversaturated	-	-	▪ Possible negative correlation between field pH and Cd. ▪ Indication that calcite is oversaturated during High Flow (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	-
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.77	No	Oversaturated				
FR_DOKASEEP1	FR_DOKA_UNKNOWN	High Flow	***Oxic***	***Not MF Influenced***	***Oversaturated***	0.96	***No***	***Oversaturated***	-	-	▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	-
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.80	No field note	Oversaturated				
FR_SPRWSEEP1	FR_BLAIN_CCR	High Flow	Oxic	Not MF Influenced	***Not determined***	0.28	No	Oversaturated	-	-	▪ Indication that calcite is oversaturated during low flow (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)). ▪ High Mn concentrations, low Ni concentrations.	NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.75	No	Oversaturated				
FR_FRVWSEEP3	FR_SMITH_WR	High Flow	Oxic	Possibly MF Influenced	***Oversaturated***	0.85	No	Oversaturated	Possible increasing Se, U, Mo. Possible decreasing TDS	-	▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)). ▪ Possible negative correlation between field pH and Cd	SO_4, Se-T
		Low Flow	Oxic	***Potentially Possibly MF Influenced***	Oversaturated	0.97	No	Oversaturated		Higher SO_4		
FR_BLAKESEEP1	FR_BLAIN_CCR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.98	No	Oversaturated	-	-	▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)). ▪ Possible positive correlation between field pH and Mn	SO_4, NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.92	No	Oversaturated				
FR_BLAINESEEP1	FR_BLAIN_CCR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.89	No	Oversaturated	-	-	▪ Possible negative correlation between field pH with Co. ▪ High Ni and U concentrations.	SO_4, NO_3-N, Se-T, U-T
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.99	No field note	Oversaturated		Higher SO_4, NO_3, U		
FR_BLAINESEEP5	FR_BLAIN_CCR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.80	No	Oversaturated	-	-	▪ High U concentrations. ▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a less extent)).	SO_4, NO_3-N, Se-T, U-T
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.78	No	Oversaturated				
FR_STPNSEEP	FR_SOUTHTAILS_TAILINGS	High Flow	Oxic	Not MF Influenced	***Undersaturated***	-0.03	No	Oversaturated	-	-	▪ Possible negative correlation between field pH and Mn	NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	Undersaturated	0.30	No	Oversaturated		Higher NO_3		
FR_STPWSEEP	FR_SOUTHTAILS_TAILINGS	High Flow	Oxic	Not MF Influenced	Undersaturated	0.42	Yes	Oversaturated	Possible decreasing Co	-	▪ High Co and Mn concentrations. ▪ Indication that calcite is undersaturated during High Flow, oversaturated during low flow (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a less extent)). ▪ Possible negative correlation between field pH and Mn, Ni	-
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.58	No	***Oversaturated***				
FR_STPSWSEEP	FR_SOUTHTAILS_TAILINGS	High Flow	Oxic	Not MF Influenced	Undersaturated	0.41	No	Oversaturated	Possible decreasing Cd, Co	-	▪ High Mn concentrations. ▪ Possible negative correlation between field pH and Mn	-
		Low Flow	Oxic	Not MF Influenced	Undersaturated	0.37	No	Oversaturated				

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Report_Tables_1CT017-358_r0_amd.xlsx

Notes: ***Bold and italicized*** categorizations indicate categorizations that have changed since last year. Categorizations labelled as "Not determined" indicates seep where an equal number of instances occurred for each category, so classification could not be determined.

7.2 Greenhills Operation (GHO)

Seep monitoring locations at the GHO mine site facilities are presented in Figure 18 with seeps color-coded by the nearest downgradient permitted surface water sampling location. Table 12 summarizes the seeps visited during the 2021 RSMP.

Table 12: 2021 GHO Seeps

Seep ID	Group Name	Nearest Permitted Surface Water Sampling Location or Comparison Point	Permitted Surface Water Sampling Location Type[1]	Notes	Seep Status
GH_SEEP_12	GH_PORTER_CREEK	GH_PC1	DL	Dry in September 2021	Active
GH_SEEP_76	GH_LEASK_WR	GH_LC1	DL	-	Active
GH_SEEP_77	GH_WOLFRAM_WR	GH_WC1	DL	-	Active
GH_SEEP_50	GH_UPSTREAM_CCR	GH_TC2	DL	Dry in September 2021	Active
GH_SEEP_5	GH_THOMPSON_WR	GH_TC2	DL	-	Active
GH_SEEP_46	GH_THOMPSON_WR	GH_TC2	DL	Dry in September 2021	Active
GH_SEEP_60	GH_THOMPSON_WR	GH_TC2	DL	Unsafe to access in September 2021	Active
GH_SEEP_79	GH_WOLFRAM_WR	GH_TC2	DL	Unsafe to access in September 2021	Active
GH_SEEP_15	GH_UPSTREAM_CCR	GH_FC1	DL	Dry in September 2021	Active
GH_SEEP_30	GH_UPSTREAM_CCR	GH_FC1	DL	Dry in September 2021	Active
GH_WTDS	GH_CCR	GH_FC1	DL	-	Active
GH_SEEP_16	GH_CCR	GH_GH1	DL	-	Active
GH_SEEP_21	GH_CCR	GH_GH1	DL	-	Active
GH_SEEP_22	GH_CCR	GH_GH1	DL	Dry in September 2021	Active
GH_E3	GH_CCR	GH_GH1	DL	-	Active
GH_W-SEEP	GH_CCR	GH_GH1	DL	Dry in September 2021	Active
GH_SEEP_26	GH_CCR	GH_GH1	DL	Dry in September 2021	Active
GH_E1	GH_CCR	GH_GH1	DL	-	Active

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Master_Seep_WQ_Database_rev2_amd.xlsx

Notes:

[1] Permitted Surface Water Sampling Location Types are surface water (SW) or discharge location (DL).

7.2.1 Morrissey Formation and Oxidation Category

GHO seeps where the oxidation category or MF influence category has changed between 2020 and 2021 are listed in Table 13.

- One GHO seep (GH_E1) changed MF influence categories between 2020 and 2021, going from consistently categorized as possibly MF influenced since 2018 to not MF influenced during 2021 low flow sampling.
- Three GHO seeps (GH_E3, GH_SEEP_21, and GH_SEEP_22) changed oxidation categories between 2020 and 2021. Two of these seeps have not consistently been categorized. One seep went from being consistently categorized as suboxic to oxic during 2021 high flow sampling.

Table 13: GHO seeps with changed oxidation or MF influence category

	2018		2019		2020		2021	
	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow
GH_E1	Possible MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence	No MF Influence
GH_E3	Oxic	Suboxic	Oxic	Suboxic	Oxic	Suboxic	Suboxic	Suboxic
GH_SEEP_21	Suboxic	Suboxic	Suboxic	Suboxic	Suboxic	Suboxic	Oxic	Suboxic
GH_SEEP_22	Oxic	Suboxic	Oxic	Oxic	Suboxic	-	Oxic	-

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\SeepCategorization_1CT017-358_r0_amd.xlsx

Notes: “-“ denotes sampling events when the seep was visited but not sampled (i.e., because it was dry).

GH_E1 has been categorized as not MF influenced during the 2021 low flow sampling event for the first time. Sulfate concentrations at GH_E1 are consistently above 100 mg/L (ranging from 700 to 1,300 mg/L). The change in MF influence categorization is related to a decrease in Zn/Cd to 200 mg/mg (the MF categorization threshold for Zn/Cd), specifically a decrease in the measured zinc concentration shown in Figure 25. Between 2018 and 2021 high flow sampling, zinc concentrations at GH_E1 ranged from 0.006 to 0.01 mg/L. Zinc was measured to be 0.002 mg/L during the 2021 low flow sampling survey. Zinc has thus far not displayed a year-on-year trend; therefore, it is uncertain whether this seep will continue to be categorized as not MF influenced.

Before 2020, GH_E3 displayed a seasonal oxidation categorization trend, categorizing as oxic during high flows and suboxic during low flows. Both 2021 samples at GH_E3 have been categorized as suboxic. Sulfate concentrations continue to be above the 200 mg/L threshold, therefore changes in oxidation categorization at GH_E3 are related to the seasonal change in Se/SO_4 driven by seasonal selenium variability, shown in Figure 26. In 2021, selenium concentrations veered away from previous seasonal trends and were the lowest measured to date at this seep location.

GH_SEEP_21 was categorized as oxic once during 2021 high flow sampling due to an elevated selenium concentration (11.4 µg/L). Previously selenium concentrations at GH_SEEP_21 have ranged from 0.46 to 8.4 µg/L. There is no visual year-on-year or seasonality in selenium concentrations or sulfate concentrations at GH_SEEP_21.

The changing oxidation categorization of GH_SEEP_22 is also related to selenium variability. There is no visual year-on-year or seasonality in selenium or sulfate concentrations at GH_SEEP_22.

7.2.2 Site-Specific Seepage Geochemical Interpretation

The oxidation and MF influence categorization of seeps and modelled calcite and ferrihydrite saturation at GHO are summarized in Table 15. Figure 19 and Figure 20 show the high and low flow oxidation categorizations for GHO seeps, respectively. Figure 21 and Figure 22 show the high and low flow Morrissey Formation categorizations for GHO seeps, respectively.

Most seeps north of GH_SEEP_50 are categorized as oxic and not MF influenced in high and low flow seasons. Seeps suspected to originate from the CCR storage and TSF areas show higher water quality variability throughout the year. Three GHO seeps have been consistently categorized as suboxic: GH_E1, GH_SEEP_21, and GH_W-SEEP (all within the GH_CCR group). These results suggest that there may be suboxic zones within the CCR storage facility at GHO. GH_E1 has also been consistently categorized as possibly MF influenced. Any seeps with a change in oxidation, or MF influence categorization in 2021 belong to the GH_CCR group. In addition, seeps in the GH_CCR group show a positive correlation between dissolved manganese and field pH. In contrast, the two seeps, GH_SEEP_76 and GH_SEEP_60, that showed the most evident parameter concentration variability between high and low flow sampling, are believed to originate from waste rock areas. Seasonality and year-on-year trends identified in Table 15 are based on a qualitative visual review of water quality timeseries.

After four years of sampling, no GHO seeps seasonally changed modelled calcite saturation. Three GHO seeps had an undetermined modeled calcite saturation: GH_SEEP_60 (average low flow calcite SI of 0.84) and GH_SEEP_22 (average low flow calcite SI of 0.56) during low flows and GH_SEEP_21 during high flows (average high flow calcite SI of 0.65). Maps of calcite saturation during high and low flows in Figure 23 and Figure 24, respectively, show no apparent spatial trends for calcite saturation at GHO. It is expected that as CO_2 off-gasses, calcite saturation indices will decrease along flow paths, but this is not apparent in Figure 23 and Figure 24.

PHREEQC modelling of seeps with sulfate concentrations above 1,000 mg/L indicates mineral equilibrium with gypsum, where the remainder were undersaturated (see Appendix D). All GHO seeps have been classified as oversaturated for ferrihydrite.

Certain parameter concentrations at GHO show correlations with field pH and field DO. Across GHO, dissolved iron and manganese negatively correlate with field pH, whereas dissolved molybdenum positively correlates with field pH. Dissolved iron and manganese also negatively correlate with field DO, whereas cadmium, molybdenum, and zinc positively correlate with field DO.

Possible increasing year-on-year trends based on visual identification in conjunction with FWAL BCWQG limit exceedances for sulfate (813 and 809 mg/L in 2021) and dissolved selenium (631 and 595 µg/L in 2021) have been identified at GH_SEEP_76.

In Appendix E, sulfate concentrations at GHO seeps compared to corresponding permitted surface water monitoring locations indicate that average sulfate concentrations at permitted surface water monitoring stations are often less than or equal to average sulfate concentrations of their corresponding seeps. However, the following seeps at GHO have lower sulfate concentrations and higher metal concentrations than their downstream permitted surface water monitoring counterparts:

- GH_SEEP_12, upstream of GH_PC1, has lower sulfate concentrations and higher cadmium, manganese, and molybdenum concentrations.
- GH_SEEP_5, upstream of GH_TC2, has lower sulfate concentrations and higher cadmium, cobalt, and nickel concentrations.
- GH_SEEP_79, upstream of GH_WC1, has lower sulfate concentrations and higher concentrations for manganese.

Seeps with higher metal to sulfate ratios than their downgradient permitted surface water monitoring counterparts may indicate potential metal attenuation.

A comparison of average flows during high and low flows at each GHO seep, and its associated downgradient permitted surface water monitoring location is reported in Table 14. The majority of seeps at GHO do not contribute a significant volume of water to their downgradient permitted surface water monitoring location counterparts, with one exception:

- GH_WTDS average low flow rates are 196% of flow rates at GH_FC1.

GH_WTDS has been categorized as oxic, not MF influenced, and oversaturated for calcite. Calcite precipitate was identified in the field at this seep during 2021 low flow sampling. No field note for calcite presence was made during 2021 high flow sampling. GH_FC1 has also been categorized as oxic and not MF influenced. GH_FC1 samples are classified as calcite oversaturated during high flow and calcite undersaturated during low flows, indicating that GH_WTDS may not as strongly influence GH_FC1 as flow rates show.

Table 14: Average seasonal flows for GHO seeps and downgradient permitted surface water monitoring locations

Permitted Surface Water Monitoring Location	Permitted Surface Water Monitoring Location Flow (m^3/d)		Seep Location	Seep Flow[1] (m^3/d)			
				High Flow		Low Flow	
	High Flow	Low Flow		Flow (m^3/d)	% Permitted location flow	Flow (m^3/d)	% Permitted location flow
GH_FC1	643	45	GH_SEEP_15	1	0%	4	8%
			GH_SEEP_30	1	0%	-	-
			GH_WTDS	133	21%	89	196%
GH_GH1	11,904	4,304	GH_E1	13	0%	45	1%
			GH_E3	816	7%	70	2%
			GH_SEEP_16	-	-	-	-
			GH_SEEP_21	54	0%	22	1%
			GH_SEEP_22	41	0%	24	1%
			GH_SEEP_26	3	0%	-	-
			GH_W-SEEP	3	0%	-	-
GH_LC1	418	214	GH_SEEP_76	52	1%	12	2%
GH_PC1	1,269	200	GH_SEEP_12	-	-	4	2%
GH_TC2	10,612	2,574	GH_SEEP_46	2	0%	-	-
			GH_SEEP_5	36	0%	20	1%
			GH_SEEP_60	18	0%	-	-
			GH_SEEP_50	4	0%	8	0%
			GH_SEEP_79	42	0%	9	0%
GH_WC1	2,397,230	2,179	GH_SEEP_77	533	0%	148	6%

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/LoadingComparison_1CT017-358_r0_amd.xlsx

Notes:

[1] Due to the often-diffuse nature of seeps, seep flow measurements that are inherently imprecise. The comparisons reported here should be regarded as semi-quantitative.

Table 15: Summary of Trends and Controls on Water Quality for Seeps at GHO

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
GH_SEEP_12	GH_PORTER_CREEK	High Flow	Oxic	Not MF Influenced	***Potentially Undersaturated***	0.58	Yes	Oversaturated	Possible decreasing field pH	-	■ Poor correlation of metal concentrations with field pH. ■ Low SO_4 (< 40 mg/L)	-
		Low Flow	Oxic	Not MF Influenced	***Undersaturated***	0.40	Yes	***Oversaturated***				
GH_SEEP_76	GH_LEASK_WR	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.73	Yes	Oversaturated	Possible decreasing NO_3, Sb, NO_2, TDS, Mo Possible increasing SO_4, Se	Higher SO_4, Se, Co, Ni, Sb, U, Mo	■ Poor correlation of metal concentrations with field pH. High Co, Ni, and Se. ■ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	SO_4, NO_3-N, NO_2-N, ***Se-T***, U-T
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.69	No field note	Oversaturated		-		
GH_SEEP_77	GH_WOLFRAM_WR	High Flow	Oxic	Not MF Influenced	Oversaturated	1.03	Yes	Oversaturated	-	-	■ Poor correlation of metal concentrations with field pH. Highest Cd, Co, Ni, Se, and U of group. ■ SO_4 range from 800 – 1,500 mg/L. ■ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	SO_4, NO_3-N, ***NO_2-N***, Se-T, U-T
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.89	Yes	Oversaturated				
GH_SEEP_50	GH_UPSTREAM_CCR	High Flow	Oxic	Not MF Influenced	***Not determined***	0.24	No	Oversaturated	-	-	■ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	-
		Low Flow	Oxic	Not MF Influenced	***Oversaturated***	0.63	No	Oversaturated				
GH_SEEP_5	GH_THOMPSON_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	-0.10	No	Oversaturated	-	-	■ Poor correlation of metal concentrations with field pH. Highest Cd, Co, and Ni of group.	Se-T
		Low Flow	***Oxic***	***Not MF Influenced***	***Undersaturated***	0.09	No	***Oversaturated***				
GH_SEEP_46	GH_THOMPSON_WR	High Flow	Oxic	Not MF Influenced	***Not determined***	0.46	Yes	Oversaturated	-	-	■ Insufficient samples collected (n=2).	SO_4, NO_3-N, Se-T
		Low Flow	No Samples	No Samples	No Samples	No Samples	-	No Samples				
GH_SEEP_60	GH_THOMPSON_WR	High Flow	Oxic	Not MF Influenced	***Undersaturated***	0.15	Yes	Oversaturated	-	-	■ Poor correlation of metal concentrations with field pH. ■ High Se.	SO_4, NO_3-N, Se-T, U-T
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.45	Unsafe to access	Oversaturated		Higher field pH, SO_4, Se, NO_3		
GH_SEEP_79	GH_WOLFRAM_WR	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.67	Unsafe to access	Oversaturated	-	-	■ Poor correlation of metal concentrations with field pH. ■ Indication that calcite is oversaturated (possible calcite control). ■ SO_4 < 100 mg/L.	-
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.71	Unsafe to access	Oversaturated				
GH_SEEP_15	GH_UPSTREAM_CCR	High Flow	***Not determined***	Not MF Influenced	Oversaturated	1.09	No	Oversaturated	-	-	■ Insufficient samples collected (n=2).	-
		Low Flow	Suboxic	Not MF Influenced	Oversaturated	0.87	No	Oversaturated				
GH_SEEP_30	GH_UPSTREAM_CCR	High Flow	Oxic	Not MF Influenced	***Oversaturated***	1.13	***Dry***	***Oversaturated***	-	-	■ Insufficient samples collected (n=2).	-
		Low Flow	No Samples	No Samples	No Samples	No Samples	***Dry***	No Samples				
GH_WTDS	GH_CCR	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.85	No field note	Oversaturated	Possible decreasing Cd, Co, Ni	-	■ Poor correlation of metal concentrations with field pH. Highest Cd, Co, Mo, Ni, and Zn of group. ■ Strong negative correlation of Mn concentration with field DO (whole seep group), low Mn. ■ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	Se-T
		Low Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.90	Yes	Oversaturated				

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
GH_E3	GH_CCR	High Flow	***Potentially Oxic***	Not MF Influenced	***Potentially Oversaturated***	0.94	No field note	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH. ▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)). ▪ Mineral SI indicates gypsum undersaturated.	SO_4
		Low Flow	***Suboxic***	Potentially Not MF Influenced	***Potentially Oversaturated***	0.78	Yes	Oversaturated				
GH_E1	GH_CCR	High Flow	Suboxic	Possibly MF Influenced	***Potentially Oversaturated***	0.99	No field note	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH. High Co, Ni, and Zn. ▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)). ▪ Mineral SI indicates close to or in equilibrium with gypsum.	SO_4
		Low Flow	Suboxic	***Potentially Possibly MF Influenced***	***Potentially Oversaturated***	0.91	Yes	Oversaturated				
GH_SEEP_16	GH_CCR	High Flow	Oxic	Not MF Influenced	***Potentially Undersaturated***	0.57	Yes	Oversaturated	Possible increasing Zn	-	▪ Poor correlation of metal concentrations with field pH. ▪ Highest Se of group.	Se-T
		Low Flow	Oxic	***Potentially Possibly MF Influenced***	***Undersaturated***	0.31	Yes	Oversaturated		Higher Zn		
GH_SEEP_21	GH_CCR	High Flow	Suboxic	Not MF Influenced	***Potentially Oversaturated***	0.92	Yes	***Potentially Oversaturated***	-	-	▪ Poor correlation of metal concentrations with field pH, possible exception Cd. ▪ Higher Mn concentration of group, lowest field DO (strong negative correlation of Mn concentrations with field DO of whole seep group).	SO_4, Se-T
		Low Flow	Suboxic	Not MF Influenced	***Potentially Undersaturated***	0.57	Yes	Oversaturated				
GH_SEEP_22	GH_CCR	High Flow	Potentially Oxic	Not MF Influenced	***Oversaturated***	1.08	Yes	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH, possible exception Cd and Mo.	SO_4, Se-T, U-T
		Low Flow	Not determined	Not MF Influenced	***Not determined***	0.56	Dry	Oversaturated				
GH_SEEP_26	GH_CCR	High Flow	Suboxic	Not MF Influenced	Oversaturated	0.96	Yes	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH, possible exception Cd and Mo.	SO_4
		Low Flow	No Samples	No Samples	No Samples	No Samples	Dry	No Samples				
GH_W-SEEP	GH_CCR	High Flow	Suboxic	Not MF Influenced	Oversaturated	0.96	Yes	Oversaturated	Possible decreasing TDS, U	-	▪ Poor correlation of metal concentrations with field pH. ▪ Indication that calcite is oversaturated (possible calcite coprecipitation of metals (Cd, Co, Mn, Zn, and Ni to a lesser extent)).	SO_4
		Low Flow	***Suboxic***	***Not MF Influenced***	Oversaturated	0.79	No	Oversaturated				

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Report_Tables_1CT017-358_r0_amd.xlsx

Notes: ***Bold and italicized*** categorizations indicate categorizations that have changed since last year. Categorizations labelled as "Not determined" indicates seep where an equal number of instances occurred for each category, so classification could not be determined.

7.3 Line Creek Operation (LCO)

Seep monitoring locations at the LCO mine site facilities are presented in Figure 27. Seeps are color-coded by the nearest downgradient permitted surface water sampling location. Table 16 summarizes the seeps visited during the 2021 RSMP.

Table 16: 2021 LCO Seeps

Seep ID	Group Name	Nearest Permitted Surface Water Sampling Location or Comparison Point	Permitted Surface Water Sampling Location Type[1]	Notes	Seep Status
LC_UDHP	LC_DC_WR	LC_DCDS	SW	-	Active
LC_UDP1	LC_DC_WR	LC_DCDS	SW	-	Active
LC_SEEP8	LC_DC_WR	LC_DCDS	SW	-	Active
LC_SEEP19	LC_HSP_WR	LC_LC12	DL	-	Active
LC_3KM	LC_MSA_WR	LC_LC9	DL	-	Active
LC_SEEP1	LC_MSA_WR	LC_LC9	DL	-	Active
LC_WLC_LOT2	LC_WLC_WR	LC_WLC	SW	-	Active
LC_SEEP2	LC_MAXAM	LC_SLC	SW	-	Active
LC_SEEP15	LC_DISTURBEDWSLOPE	LC_LC3	SW	-	Active
LC_SEEP14	LC_DC_WR	LC_LC3	SW	-	Active
LC_SEEP10	LC_PLANT	EV_ER4	SW	-	Active
LC_SEEP11	LC_PLANT	EV_ER4	SW	-	Active

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Master_Seep_WQ_Database_rev2_amd.xlsx

Notes:

[1] Permitted Surface Water Sampling Location Types are surface water (SW) or discharge location (DL).

7.3.1 Morrissey Formation and Oxidation Category

LCO seeps where the oxidation category or MF influence category has changed between 2020 and 2021 are listed inTable 17.

- Two LCO seeps (LC_SEEP1 and LC_SEEP15) changed MF influence categories between 2020 and 2021. LC_SEEP1 has not been consistently categorized. The other seep, LC_SEEP15, changed from being consistently categorized as not MF influenced to possibly MF influenced during 2021 low flow sampling.
- No LCO seeps changed oxidation categories.

Table 17: LCO seeps with changed oxidation or MF influence category

Seep ID	2018		2019		2020		2021	
	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow
LC_SEEP1	Possible MF influence	-	No MF Influence	Possible MF influence	Possible MF influence	-	No MF Influence	No MF Influence
LC_SEEP15	No MF Influence	No MF Influence	No MF Influence	No MF Influence	No MF Influence	-	No MF Influence	Possible MF influence

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\SeepCategorization_1CT017-358_r0_amd.xlsx

Notes: "-" denotes sampling events when the seep was visited but not sampled (i.e., because it was dry).

The MF categorization for LC_SEEP1 continues to change. Both the sulfate concentration and Zn/Cd ratio impact the categorization of this seep. Sulfate concentrations thus far have ranged from 42.7 to 137 mg/L, and the Zn/Cd ratio has ranged from 140 to 850 mg/mg. Because of the limited dataset, there are no visible year-on-year or seasonal trends in sulfate, zinc, or cadmium concentrations.

LC_SEEP15, which is not influenced by waste rock spoiling, has been categorized as possibly MF influenced for the first time. Sulfate concentrations at LC_SEEP15 are consistently above 100 mg/L; therefore, the change in categorization during the 2021 low flow sampling event is related to an increase in the Zn/Cd ratio above the 200 mg/mg threshold. Before the 2021 low flow sampling event, the Zn/Cd ratio at LC_SEEP15 had previously been close to 200 mg/mg, ranging from 65 to 200 mg/mg. No year-on-year or seasonal trends are visible for zinc or cadmium concentrations. Given past Zn/Cd fluctuation at this seep, LC_SEEP15 may be categorized as possibly MF influenced again in future sampling. Field pH at LC_SEEP15 does not show any visible year-on-year or seasonal trends.

7.3.2 Site-Specific Seepage Geochemical Interpretation

The oxidation and MF influence categorization of seeps and modelled calcite and ferrihydrite saturation at LCO are summarized in Table 19. Figure 28 and Figure 29 show the high and low flow oxidation categorizations for LCO seeps, respectively. Figure 30 and Figure 31 show the high and low flow Morrissey Formation categorizations for LCO seeps, respectively.

All seeps at LCO were categorized as oxic, and no seeps were consistently categorized as possibly MF influenced. In addition, no seeps changed oxidation or MF influence categorization seasonally. Six of the 12 RSMP seeps at LCO displayed parameter concentration seasonality. Seasonality and year-on-year trends identified in Table 19 are based on a qualitative visual review of water quality timeseries.

PHREEQC modelling of seeps with sulfate concentrations above 1,000 mg/L indicates mineral equilibrium with gypsum, where the remainder were undersaturated (see Appendix D). Ferrihydrite was modelled and classified as oversaturated for all seeps at LCO.

After four years of sampling, one LCO seep (LC_SEEP8) seasonally changed modelled calcite saturation from oversaturated during high flows (average calcite SI of 0.92) to undersaturated during low flows (average calcite SI of 0.55). Maps of calcite saturation during high and low flows in Figure 32 and Figure 33, respectively, show that there are no apparent spatial trends for calcite saturation at LCO.

Overall, select parameter concentrations at LCO show correlations with field pH and field DO. Across LCO, dissolved cobalt, iron, and manganese negatively correlate with field pH, whereas dissolved aluminum, antimony, and molybdenum positively correlate with field pH. Dissolved cobalt, iron, and manganese also negatively correlate with field DO, whereas cadmium, molybdenum, selenium, uranium, and zinc positively correlate with field DO.

Possible increasing year-on-year trends based on visual identification in conjunction with FWAL BCWQG limit exceedances have been identified at the following seeps:

- selenium (up to 33 µg/L) at LC_UDHP
- selenium (2.17 µg/L during 2021 high flow sampling) at LC_SEEP11

Sulfate concentrations at LCO seeps compared to corresponding permitted surface water monitoring locations in Appendix E show that average sulfate concentrations at permitted surface water monitoring stations are often less than or equal to the average sulfate concentrations of their corresponding seeps. However, LC_SEEP8 (LC_DC_WR group), upstream of LC_DC1, has lower sulfate concentrations and higher metal concentrations for certain metals (Sb, Mo, Zn). Seeps with higher metal to sulfate ratios than their downgradient permitted surface water monitoring counterparts may indicate potential metal attenuation.

A comparison of average flows during high and low flows at each LCO seep, and its associated downgradient permitted surface water monitoring location is reported in Table 18. Several permitted surface water monitoring locations at LCO do not have flow measurements against which to compare because the location was not discharging or has not been measured over the monitoring period. No LCO seeps contribute a significant volume of water to their downgradient permitted surface water monitoring location counterparts.

Table 18: Average seasonal flows for LCO seeps and downgradient permitted surface water monitoring locations

Permitted Surface Water Monitoring Location	Permitted Surface Water Monitoring Location Flow (m^3/d)		Seep Location	Seep Flow[1] (m^3/d)			
				High Flow		Low Flow	
	High Flow	Low Flow		Flow (m^3/d)	% Permitted location flow	Flow (m^3/d)	% Permitted location flow
LC_DCDS	48,552	11,258	LC_SEEP8	-	-	-	-
			LC_UDHP	180	0%	144	1%
			LC_UDP1	9	0%	3	0%
EV_ER4	-	-	LC_SEEP11	79	-	118	-
LC_WLC	7,013	3,689	LC_WLC_LOT2	1,601	23%	422	11%
LC_LC5	-	-	LC_SEEP10	81	-	87	-
LC_LC12	-	-	LC_SEEP19	84	-	448	-
LC_LC3	164,647	35,542	LC_SEEP14	8	0%	9	0%
			LC_SEEP15	70	0%	3	0%
LC_LC9	1,032	-	LC_3KM	399	39%	107	-
GH_LC1	418	214	LC_SEEP1	12	1%	76	-
LC_SLC	227,499	37,733	LC_SEEP2	-	-	9	0%

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/LoadingComparison_1CT017-358_r0_amd.xlsx

Notes:

[1] Due to the often-diffuse nature of seeps, seep flow measurements that are inherently imprecise. The comparisons reported here should be regarded as semi-quantitative.

Table 19: Summary of Trends and Controls on Water Quality for Seeps at LCO

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
LC_UDHP	LC_DC_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	-0.33	No	Oversaturated	Possible increasing SO_4, Se, TDS	Higher Sb	▪ Poor correlation of metal concentrations with field pH. ▪ High Se. ▪ Low SO_4 (majority < 100 mg/L).	NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.11	***No field note***	***Oversaturated***		Higher field pH, SO_4, Se, TDS		
LC_UDP1	LC_DC_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	-0.27	No	Oversaturated	-	Higher Sb	-	Se-T
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.09	***No field note***	***Oversaturated***		-		
LC_SEEP8	LC_DC_WR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.92	No	Oversaturated	-	-	▪ Indication that calcite is oversaturated during High Flow (possible calcite control). ▪ Low SO_4 (< 3 mg/L). ▪ Highest field pH of group (around 8.4).	-
		Low Flow	***Oxic***	***Not MF Influenced***	***Undersaturated***	0.55	No	***Oversaturated***				
LC_SEEP19	LC_HSP_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	0.11	No	***Oversaturated***	-	-	▪ Poor correlation of metal concentrations with field pH. High Cd, Ni, Zn.	NO_3-N, Se-T, U-T
		Low Flow	Oxic	Not MF Influenced	Potentially Undersaturated	0.37	No	***Oversaturated***		Higher NO_3, Se, SO_4, NO_3, Cd, Ni, TDS, U, Mo		
LC_3KM	LC_MSA_WR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.96	No	Oversaturated	Possible decreasing SO_4, Se Possible increasing U	Higher Sb, SO_4	▪ Indication that calcite are oversaturated (possible calcite control).	-
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.64	Yes	Oversaturated		-		
LC_SEEP1	LC_MSA_WR	High Flow	Oxic	***Not determined***	***Potentially Oversaturated***	0.53	No	Oversaturated	Possible increasing U	-	▪ Most Co and Ni low or < DL. ▪ Indication that calcite is oversaturated (possible calcite control).	Se-T
		Low Flow	Oxic	***Not determined***	Oversaturated	0.90	No field note	Oversaturated				
LC_WLC_LOT2	LC_WLC_WR	High Flow	Oxic	Not MF Influenced	***Not determined***	0.53	No	***Oversaturated***	-	-	-	SO_4, ***NO_3-N, Se-T***
		Low Flow	Oxic	Not MF Influenced	***Oversaturated***	0.88	No	***Oversaturated***				
LC_SEEP2	LC_MAXAM	High Flow	Oxic	Not MF Influenced	Undersaturated	0.05	No	Oversaturated	-	Higher Se, NO_3	▪ Most Ca, Co, Ni, Sb, Zn low or < DL. ▪ Low SO_4 (< 40 mg/L).	NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	***Potentially Undersaturated***	0.24	No	***Oversaturated***		Higher field pH		
LC_SEEP15	LC_DISTURBEDWSLOPE	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.72	Yes	Oversaturated	Possible decreasing Se, NO_3	-	▪ Indication that calcite is oversaturated (possible calcite control). ▪ Most Cd, Co, Ni, Sb, NO_2, and Zn concentrations low or < DL. ▪ High Se.	NO_3-N, Se-T
		Low Flow	Oxic	***Potentially Not MF Influenced***	***Potentially Oversaturated***	0.64	No	Oversaturated				

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
LC_SEEP14	LC_DC_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	0.41	No	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH, high Cd, Ni, U, Zn.	NO_3-N, Se-T
		Low Flow	Oxic	Not MF Influenced	Undersaturated	0.44	No	Oversaturated				
LC_SEEP10	LC_PLANT	High Flow	Oxic	Not MF Influenced	Undersaturated	0.18	***Yes***	***Oversaturated***	-	-	▪ Seep group shows weak negative correlation for Cd, Co, Mn, Ni, Zn with field pH.	***Se-T***
		Low Flow	Oxic	Not MF Influenced	Undersaturated	0.16	No	***Potentially Oversaturated***				
LC_SEEP11	LC_PLANT	High Flow	Oxic	Not MF Influenced	***Potentially Undersaturated***	0.31	No	***Oversaturated***	Possible increasing SO_4, Se, TDS	-	▪ Seep group shows weak negative correlation for Cd, Co, Mn, Ni, Zn with field pH.	Se-T
		Low Flow	Oxic	Not MF Influenced	Potentially Undersaturated	0.52	No	***Oversaturated***		Higher Sb		

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Report_Tables_1CT017-358_r0_amd.xlsx

Notes: ***Bold and italicized*** categorizations indicate categorizations that have changed since last year. Categorizations labelled as “Not determined” indicate a seep where an equal number of instances occurred for each category, so classification could not be determined.

7.4 Elkview Operation (EVO)

Seep monitoring locations at the EVO mine site facilities are presented in Figure 34. Seeps are color-coded by the nearest downgradient permitted surface water sampling location. Table 20 summarizes the seeps visited during the 2021 RSMP.

Table 20: 2021 EVO Seeps

Seep ID	Group Name	Nearest Permitted Surface Water Sampling Location or Comparison Point	Permitted Surface Water Sampling Location Type[1]	Notes	Seep Status
EV_SEEP_ERICKSON1	EV_ERICKSON_WR	EV_EC1	DL	-	Active
EV_SEEP_ERICKSON2	EV_ERICKSON_WR	EV_EC1	DL	-	Active
EV_SEEP_SOUTHPIT6	EV_SOUTHPIT_PIT	EV_SP1	DL	-	Active
EV_SEEP_SOUTHPIT3	EV_SOUTHSLOPE	EV_TC1	SW	-	Active
EV_SEEP_SOUTHPIT4	EV_SOUTHSLOPE	EV_TC1	SW	-	Active
EV_SEEP_HOPPER2	EV_BALDYRIDGEWR	EV_BC1	DL	-	Active
EV_SEEP_NATALPIT2	EV_BALDYRIDGEWR	EV_BC1	DL	Natal Pit has been backfilled	Retire from program
EV_SEEP_TURCON1	EV_BALDYRIDGEWR	EV_AQ6	DL	-	Active
EV_SEEP_PLANT10	EV_PLANT	EV_GC2	DL	-	Active
EV_SEEP_PLANT1	EV_PLANT	EV_OC1	DL	Dry in fall 2021	Active
EV_SEEP_PLANT11	EV_PLANT	EV_OC1	DL	-	Active
EV_SEEP_BREAKERLAKE	EV_BALDYRIDGEWR	EV_GC2	DL	-	Active
EV_SEEP_PLANT23	EV_PLANT	EV_GC2	DL	-	Active
EV_WLAGC	EV_CCR/TP	EV_GC2	DL	-	Active
EV_CN1	EV_CEDARWR	EV_LC1	DL	-	Active
EV_SEEP_10MILE5	EV_CEDARWR	EV_LC1	DL	-	Active
EV_SEEP_10MILE9	EV_CEDARWR	EV_LC1	DL	-	Active
EV_SEEP_CFI1	EV_CCR	EV_LC1	DL	-	Active
EV_SEEP_CFI3	EV_CCR	EV_LC1	DL	Not sampled in fall 2021	Active

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Master_Seep_WQ_Database_rev2_amd.xlsx

Notes:

[1] Permitted Surface Water Sampling Location Types are surface water (SW) or discharge location (DL).

7.4.1 Morrissey Formation and Oxidation Category

EVO seeps where the oxidation category or MF influence category has changed between 2020 and 2021 are listed in Table 21.

- Two EVO seeps changed MF influence categories between 2020 and 2021. One seep (EV_SEEP_PLANT10) has not been consistently categorized yet, and the other continues to be categorized as possibly MF influenced after a change in categorization during 2020 high flow sampling (EV_SEEP_ERICKSON2).
- One EVO seep (EV_SEEP_PLANT10) changed oxidation categories between 2020 and 2021, going from consistently categorized as oxic since 2019 high flow sampling to suboxic during 2021 high flow sampling.

Table 21: EVO seeps with changed oxidation or MF influence category

Seep ID	2018		2019		2020		2021	
	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow
EV_SEEP_PLANT10	Suboxic	Suboxic	Oxic	Oxic	Oxic	Oxic	Suboxic	Oxic
	Possible MF Influence	Possible MF Influence	No MF Influence	No MF Influence	Possible MF Influence	No MF Influence	No MF Influence	No MF Influence
EV_SEEP_ERICKSON2	No MF Influence	No MF Influence	No MF Influence	No MF Influence	No MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\SeepCategorization_1CT017-358_r0_amd.xlsx

The oxidation category for EV_SEEP_PLANT10 has changed for the first time since 2018. Since 2019, the Se/SO_4 ratio for this seep has fluctuated between $1.5x10^{-6}$ and $4.1x10^{-5}$ mol/mol, while sulfate concentrations are less variable, around 375 and 519 mg/L. EV_SEEP_PLANT10 was categorized as suboxic during the 2021 high flow sampling event because of a higher sulfate concentration along with a lower selenium concentration. There are no visible year-on-year or seasonal trends in sulfate or selenium concentrations. As sulfate concentrations are consistently above 100 mg/L, changes to the MF influence categorization are due to changes to the Zn/Cd ratios at EV_SEEP_PLANT10. There are no visible year-on-year or seasonal trends in zinc or cadmium concentrations in Figure 41.

The last three sampling events at EV_SEEP_ERICKSON2 have been categorized as possibly MF influenced because of increasing zinc concentrations, as shown in Figure 41. Sulfate concentrations are consistently above 100 mg/L at this seep. There are no visible year-on-year or seasonal trends in cadmium or sulfate concentrations. In Figure 41, the change from no MF influence to possibly MF influenced has not been accompanied by a drop in field pH at EV_SEEP_ERICKSON2 thus far.

7.4.2 Site-Specific Seepage Geochemical Interpretation

The oxidation and MF influence categorization of seeps and modelled calcite and ferrihydrite saturation at EVO are summarized in Table 23. Figure 35 and Figure 36 show the high and low flow oxidation categorizations for EVO seeps, respectively. Figure 37 and Figure 38 show the high and low flow Morrissey Formation categorizations for EVO seeps, respectively.

All seeps at EVO were categorized as oxic, except for EV_SEEP_PLANT10, which was categorized as not determined for high flows. The same two EVO seeps were consistently categorized as possibly MF influenced: EV_SEEP_ERICKSON1 and EV_SEEP_PLANT23. Most seeps did not seasonally change oxidation or MF influence categorization. Many seeps displayed seasonality in some parameter concentrations. Seasonality and year-on-year trends identified in Table 23 are based on a qualitative visual review of water quality timeseries.

Seven seeps seasonally changed modelled calcite saturation:

- Two seeps (EV_SEEP_SOUTHPIT3 and EV_SEEP_PLANT10) indicated calcite was undersaturated in high flows and not determined in low flows
- One seep, EV_SEEP_PLANT1, indicated calcite was undersaturated in low flows and not determined high flows
- One seep, EV_SEEP_BREAKERLAKE, indicated calcite was oversaturated in high flows and not determined in low flows
- Two seeps (EV_SEEP_PLANT11 and EV_SEEP_PLANT23) indicated calcite was undersaturated in high flows and oversaturated in low flows
- One seep, EV_SEEP_CFI1, indicated calcite was oversaturated in high flows and undersaturated in low flows.

Maps of calcite saturation during high and low flows in Figure 39 and Figure 40, respectively, show no apparent spatial trends for calcite saturation at EVO.

PHREEQC modelling of seeps with sulfate concentrations above 1,000 mg/L indicates mineral equilibrium with gypsum, where the remainder were undersaturated (see Appendix D). Ferrihydrite was modelled and classified as oversaturated for all EVO seeps except EV_SEEP_10MILE9 and EV_SEEP_TURCON1, classified as at equilibrium during high flows.

Certain parameter concentrations at EVO show correlations with field pH and field DO. Across EVO, dissolved manganese negatively correlates with field pH, whereas dissolved antimony, molybdenum, nickel, selenium, and uranium positively correlate with field pH. Dissolved cobalt and manganese also negatively correlate with field DO, whereas antimony, cadmium, molybdenum, nickel, selenium, and uranium positively correlate with field DO.

Sulfate concentrations at EVO seeps compared to corresponding permitted surface water monitoring locations in Appendix E show that average sulfate concentrations at permitted surface water monitoring stations are often less than or equal to the average sulfate concentrations of their corresponding seeps. However, the following seeps at EVO have lower sulfate concentrations and higher metal concentrations than their downstream permitted surface water monitoring counterparts:

- EV_WLAGC, upstream of EV_GC2, has lower sulfate concentrations and higher metal concentrations for arsenic, manganese, and molybdenum.

- EV_SEEP_ERICKSON1, upstream of EV_EC1, has lower sulfate concentrations and higher metal concentrations for arsenic and manganese.
- EV_SEEP_10MILE9, upstream of EV_LC1, has lower sulfate concentrations and higher metal concentrations for cadmium, cobalt, manganese, and nickel.
- EV_SEEP_TURCON1, upstream of EV_BC1, has lower sulfate concentrations and higher metal concentrations for manganese.
- EV_SEEP_CFI3, upstream of EV_LC1, has lower sulfate concentrations and higher metal concentrations for manganese.
- EV_SEEP_SOUTHPIT4, upstream of EV_TC1, has lower sulfate concentrations and higher metal concentrations for manganese and selenium.

Seeps with lower sulfate concentrations and higher metal concentrations for certain metals may indicate possible metal attenuation is occurring.

A comparison of average flows during high and low flows at each EVO seep, and its associated downgradient permitted surface water monitoring location is reported in Table 22. The majority of seeps at EVO do not contribute a significant volume of water to their downgradient permitted surface water monitoring location counterparts, with one exception:

- EV_CN1 average high flow rates are 1,244%, and average low flow rates are 526% of flow rates at EV_LC1.
- EV_SEEP_CFI1 average high flow rates are 50% of flow rates at EV_LC1.

EV_CN1 and EV_SEEP_CFI1 have both been categorized as oxic and not MF influenced. EV_CN1 is likely calcite saturated and EV_SEEP_CFI1 has been categorized as calcite oversaturated during high flows and undersaturated during low flows. Calcite precipitate presence was noted in 2021 during high flows only at EV_CN1 and during low flows only at EV_SEEP_CFI1. EV_LC1 has also been categorized as oxic and not MF influenced. EV_LC1 samples are classified as calcite saturated during high flow and low flows.

Table 22: Average seasonal flows for EVO seeps and downgradient permitted surface water monitoring locations

Permitted Surface Water Monitoring Location	Permitted Surface Water Monitoring Location Flow (m³/d)		Seep Location	Seep Flow[1] (m³/d)			
				High Flow		Low Flow	
	High Flow	Low Flow		Flow (m³/d)	% Permitted location flow	Flow (m³/d)	% Permitted location flow
EV_AQ6	750	921	EV_SEEP_TURCON1	27	4%	36	4%
EV_BC1	689	953	EV_SEEP_HOPPER2	55	8%	42	4%
EV_EC1	16,185	13,019	EV_SEEP_ERICKSON1	129	1%	202	2%
			EV_SEEP_ERICKSON2	83	1%	14	0%
EV_GC2	4,744	2,634	EV_SEEP_BREAKERLAKE	-	-	-	-
			EV_SEEP_PLANT23	16	0%	11	0%
			EV_WLAGC	251	5%	120	5%
			EV_SEEP_PLANT10	1	0%	2	0%
EV_LC1	214	192	EV_CN1	1,126	526%	2,388	1,245%
			EV_SEEP_10MILE5	3	2%	1	0%
			EV_SEEP_10MILE9	7	3%	32	17%
			EV_SEEP_CFI1	108	50%	53	28%
			EV_SEEP_CFI3	3	2%	-	-
EV_OC1	679	330	EV_SEEP_PLANT1	14	2%	4	1%
			EV_SEEP_PLANT11	26	4%	17	5%
EV_SP1	848	658	EV_SEEP_SOUTHPIT6	48	6%	32	5%
EV_TC1	1,384	-	EV_SEEP_SOUTHPIT3	21	2%	13	-
			EV_SEEP_SOUTHPIT4	29	2%	24	-

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/LoadingComparison_1CT017-358_r0_amd.xlsx

Notes:

[1] Due to the often-diffuse nature of seeps, seep flow measurements that are inherently imprecise. The comparisons reported here should be regarded as semi-quantitative.

[1]

Table 23: Summary of Trends and Controls on Water Quality for Seeps at EVO

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite (CaCO3 aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
EV_SEEP_ERICKSON1	EV_ERICKSON_WR	High Flow	Oxic	Not MF Influenced	Undersaturated	-1.54	No	Oversaturated	-	-	▪ Poor correlation of metal concentration with field pH. ▪ High Fe, low Se.	SO_4
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.77	No	***Potentially Oversaturated***				
EV_SEEP_ERICKSON2	EV_ERICKSON_WR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.89	No field note	Oversaturated	Possible increasing Cd	-	▪ High Se (>400 ug/L). ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, ***NO_3-N***, Se-T, ***U-T***
		Low Flow	Oxic	Not MF Influenced	Not determined	0.67	No	Oversaturated				
EV_SEEP_SOUTHPIT6	EV_SOUTHPIT_PIT	High Flow	Oxic	Not MF Influenced	Oversaturated	1.03	No field note	Oversaturated	-	-	▪ Negative correlation between field pH and Cd, Mn, Ni, Zn. ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	No Samples	No Samples	No Samples	No Samples	Yes	Oversaturated		Higher SO_4, Cd		
EV_SEEP_SOUTHPIT3	EV_SOUTHSLOPE	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.60	No field note	Oversaturated	Possible decreasing Cd	-	▪ Positive correlation of field pH with Cd. ▪ Indication that calcite is undersaturated during High Flow, oversaturated during low flow (possible calcite control).	Se-T
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.50	No	Oversaturated				
EV_SEEP_SOUTHPIT4	EV_SOUTHSLOPE	High Flow	Oxic	Not MF Influenced	Undersaturated	-1.54	No field note	Oversaturated	-	Higher SO_4	▪ Low SO_4 (< 10 mg/L).	-
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.77	No	Oversaturated		Higher U		
EV_SEEP_TURCON1	EV_BALDYRIDGEWR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.89	No	***Potentially at Equilibrium***	-	-	▪ Possible negative correlation between field pH and Mo	-
		Low Flow	Oxic	Not MF Influenced	Not determined	0.67	No	***Potentially Undersaturated***				
EV_SEEP_PLANT10	EV_PLANT	High Flow	Oxic	Not MF Influenced	Oversaturated	1.03	No	Not determined	-	-	▪ Possible negative correlation between field pH and U	SO_4
		Low Flow	No Samples	No Samples	No Samples	No Samples	No	Potentially Oversaturated		Higher Co, TDS		
EV_SEEP_PLANT1	EV_PLANT	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.60	No	Oversaturated	-	-	▪ Low SO_4 (<150 mg/L) ▪ Weak negative correlation of metal concentration with field pH (Cd, Se, U, Zn).	Se-T
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.50	Dry	Oversaturated		Higher Ni, Mo		
EV_SEEP_PLANT11	EV_PLANT	High Flow	Oxic	Not MF Influenced	Undersaturated	-1.54	No	Oversaturated	-	Higher U	▪ Indication that calcite is oversaturated during Low Flow (possible calcite control). ▪ Possible negative correlation of metal concentration with field pH (Mo, Ni, U)	-
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.77	No	Oversaturated		-		
EV_SEEP_BREAKERLAKE	EV_BALDYRIDGEWR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.89	No	Oversaturated	Possible increasing SO_4, Sb	Higher field pH	▪ Indication that calcite is oversaturated during High Flow (possible calcite control). ▪ Possible negative correlation between field pH and Sb, Cd, Co, Mn, Mo, Ni.	Se-T
		Low Flow	Oxic	Not MF Influenced	Not determined	0.67	No	Oversaturated		Higher SO_4, Co, Ni, Sb, Mo, TDS		
EV_SEEP_PLANT23	EV_PLANT	High Flow	Oxic	Not MF Influenced	Oversaturated	1.03	***Yes***	***Potentially Oversaturated***	-	-	▪ Poor correlation of metal concentration with field pH. ▪ Indication that calcite is oversaturated during High Flow (possible calcite control).	SO_4, Se-T
		Low Flow	No Samples	No Samples	No Samples	No Samples	Yes	Oversaturated				

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite (CaCO3 aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
EV_WLAGC	EV_CCR/TP	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.60	No	Oversaturated	-	-	▪ Low SO_4 (< 30 mg/L). ▪ Poor correlation of metal concentration with field pH.	-
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.50	No	Oversaturated		Higher Co, Ni		
EV_CN1	EV_CEDARWR	High Flow	Oxic	Not MF Influenced	Undersaturated	-1.54	Yes	Oversaturated	Possible increasing NO_3	-	▪ Poor correlation of metal concentration with field pH with the possible exception of Cd ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.77	No	Oversaturated		Higher SO_4, Se, NO_3, Ni, Sb, U, TDS, NO_2		
EV_SEEP_10MILE5	EV_CEDARWR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.89	Yes	Oversaturated	-	-	▪ Indication that calcite is oversaturated (possible calcite control). ▪ Poor correlation of metal concentration with field pH.	SO_4, Se-T
		Low Flow	Oxic	Not MF Influenced	Not determined	0.67	Yes	Oversaturated				
EV_SEEP_10MILE9	EV_CEDARWR	High Flow	Oxic	Not MF Influenced	Oversaturated	1.03	No	***Potentially at Equilibrium***	-	-	▪ Correlations of metal concentrations with field pH (As, Cd, Co, Mo, U) ▪ Low SO_4 (< 14 mg/L).	Se-T
		Low Flow	No Samples	No Samples	No Samples	No Samples	No	***Potentially Oversaturated***				
EV_SEEP_CFI1	EV_CCR	High Flow	Oxic	Not MF Influenced	***Potentially Oversaturated***	0.60	No field note	Oversaturated	-	-	▪ Very low SO_4 (< 12 mg/L). ▪ Indication that calcite is oversaturated during High Flow (possible calcite control). ▪ Possible negative correlation between field pH and Ni, Co, Cd	-
		Low Flow	Oxic	Not MF Influenced	***Not determined***	0.50	Yes	Potentially Oversaturated				
EV_SEEP_CFI3	EV_CCR	High Flow	Oxic	Not MF Influenced	Undersaturated	-1.54	Yes	Oversaturated	-	-	▪ Insufficient samples collected (n=2).	-
		Low Flow	Oxic	Not MF Influenced	Undersaturated	-0.77	No field note	No Samples				
EV_SEEP_HOPPER2	EV_BALDYRIDGEWR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.89	No	Oversaturated	-	-	▪ Indication that calcite is oversaturated (possible calcite control).	-
		Low Flow	Oxic	Not MF Influenced	Not determined	0.67	No	Oversaturated		Higher Se, NO_3, Co, TDS		

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Report_Tables_1CT017-358_r0_amd.xlsx

Notes: ***Bold and italicized*** categorizations indicate categorizations that have changed since last year. Categorizations labelled as “Not determined” indicates seep where an equal number of instances occurred for each category, so classification could not be determined.

7.5 Coal Mountain Mine (CMm)

Seep monitoring locations at the CMm mine site facilities are presented in Figure 42. Seeps are color-coded by the nearest downgradient permitted surface water sampling location. Table 24 summarizes the seeps visited during the 2021 RSMP.

Table 24: 2021 CMm Seeps

Seep ID	Group Name	Nearest Permitted Surface Water Sampling Location or Comparison Point	Permitted Surface Water Sampling Location Type[1]	Notes	Seep Status
CM_CS1	CM_EASTWR	CM_CCPD	DL	-	Active
CM_CCDS	CM_EASTWR	CM_SPD	DL	Dry in September 2021	Active
CM_37PIT-SEEP-E	CM_37PIT	CM_SPD	DL	-	Active
CM_37PIT-SEEP-W	CM_37PIT	CM_SPD	DL	-	Active
CM_WD4	CM_WESTWR	CM_SPD	DL	-	Active
CM_WD7	CM_WESTWR	CM_SPD	DL	-	Active
CM_WD15	CM_WESTWR	CM_SPD	DL	-	Active
CM_WD18	CM_WESTWR	CM_SPD	DL	-	Active
CM_WD19	CM_WESTWR	CM_SPD	DL	-	Active
CM_PLANT-SEEP1	CM_EASTWR	CM_SPD	DL	-	Active
CM_MM-SEEP1	CM_MMCCR	CM_SPD	DL	-	Active
CM_NS4	CM_MMCCR	CM_SPD	DL	-	Active
CM_NS7	CM_MMCCR	CM_SPD	DL	-	Active
CM_NS1	CM_EASTWR	CM_SPD	DL	-	Active
CM_MM-SEEP3	CM_MMCCR	CM_SPD	DL	-	Active
CM_MM-SEEP5	CM_MMCCR	CM_SPD	DL	Dry in June 2021	Active

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Master_Seep_WQ_Database_rev2_amd.xlsx

Notes:

[1] Permitted Surface Water Sampling Location Types are surface water (SW) or discharge location (DL).

7.5.1 Morrissey Formation and Oxidation Category

CMm seeps where the oxidation category or MF influence category has changed between 2020 and 2021 are listed in Table 25.

- Four CMm seeps changed MF influence categories between 2020 and 2021. Three have not been consistently categorized (CM_37PIT-SEEP-E, CM_37PIT-SEEP-W, and CM_WD19). One of the seeps (CM_NS7) was consistently categorized as not MF influenced changed to possibly MF influenced during 2021 low flow sampling.
- Six CMm seeps changed oxidation categories between 2020 and 2021.
  - One seep (CM_37PIT-SEEP-E) went from consistently suboxic to oxic
  - Three seeps (CM_37PIT-SEEP-W, CM_NS1, CM_WD15) went from consistently oxic to suboxic
- Two seeps (CM_NS4 and CM_NS7) have not been consistently categorized yet

Table 25: CMm seeps with changed oxidation or MF influence category

Seep ID	2018		2019		2020		2021	
	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow	High Flow	Low Flow
CM_37PIT-SEEP-E	Suboxic	Oxic	Suboxic	Suboxic	Suboxic	Suboxic	Oxic	Oxic
	No MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence	No MF Influence	Possible MF Influence	No MF Influence	No MF Influence
CM_37PIT-SEEP-W	Suboxic	Oxic	Suboxic	Suboxic	Oxic	Oxic	Oxic	Suboxic
	No MF Influence	No MF Influence	Possible MF Influence	Possible MF Influence	No MF Influence	No MF Influence	Possible MF Influence	No MF Influence
CM_NS1	Oxic	Suboxic	Oxic	Oxic	Oxic	Oxic	Oxic	Suboxic
CM_NS4	Oxic	Suboxic	Oxic	Oxic	Oxic	Suboxic	Oxic	Suboxic
CM_NS7	Oxic	Suboxic	Oxic	Oxic	Oxic	Suboxic	Oxic	Suboxic
	No MF Influence	Possible MF Influence	No MF Influence	No MF Influence	No MF Influence	No MF Influence	No MF Influence	Possible MF Influence
CM_WD15	Oxic	Suboxic	Oxic	Oxic	Oxic	Suboxic	Suboxic	Suboxic
CM_WD19	No MF Influence	No MF Influence	No MF Influence	Possible MF Influence	No MF Influence	Possible MF Influence	Possible MF Influence	Possible MF Influence

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\SeepCategorization_1CT017-358_r0_amd.xlsx

The oxidation and MF potential categorization for CM_37PIT-SEEP-E continues to fluctuate. At this seep, the Se/SO_4 ratio is consistently below $1x10^{-5}$ mol/mol, and oxic categorization coincides with events when sulfate concentrations are less than 500 mg/L. Sulfate at CM_37PIT-SEEP-E has been decreasing since 2019. However, sulfate concentrations at this seep continue to be consistently above 100 mg/L. Therefore, changes to the MF influence classification of this seep are related to Zn/Cd.

Figure 49 shows that cadmium concentrations are variable, while zinc concentrations show a possible decreasing trend—both zinc and cadmium show higher concentrations in high flows than low flow sampling events.

The oxidation and MF potential categorization for CM_37PIT-SEEP-W continues to fluctuate. Se/SO_4 ratios at this seep are also consistently below $1x10^{-5}$ mol/mol, and oxic categorization coincides with events when sulfate concentrations are less than 500 mg/L. There is no consistent visual trend in sulfate concentrations. Sulfate concentrations are still above 100 mg/L. Therefore, changes to the MF influence classification of this seep are related to Zn/Cd. There is also no apparent visual Zn/Cd ratio trend, despite a possible decreasing trend in zinc at this seep.

Until the 2021 low flow sampling event, CM_NS1 had not been classified as suboxic since the low flow 2018 sampling survey. Sulfate at this seep is consistently above 500 mg/L (970 to 1,580 mg/L). Therefore, the two suboxic categorization events coincide with Se/SO_4 ratios below $1x10^{-5}$ mol/mol. There is no visual increasing or decreasing trend in Se/SO_4. Selenium shows higher concentrations in high flows compared to low flow sampling events.

The oxidation categorization of CM_NS4 continues to fluctuate. Sulfate is generally above 500 mg/L, except during the 2019 low flow sampling event when it measured 477 mg/L. Suboxidation categorization events at CM_NS4 coincide with Se/SO_4 below $1x10^{-5}$ mol/mol. There is no increasing or decreasing trend in Se/SO_4. Selenium shows higher concentrations in high flows compared to low flow sampling events.

The oxidation categorization of CM_NS7 continues to fluctuate. Before the 2021 low flow sampling event, CM_NS7 had not been classified as possibly MF influenced since the low flow 2018 sampling survey. Sulfate concentrations at this seep are consistently above 500 mg/L; therefore, changes to this seep's oxidation or MF influence categorization are related to changes in Se/SO_4 or Zn/Cd ratios, respectively. Selenium, zinc, and cadmium all show higher concentrations in high flows than low flow sampling events.

The oxidation categorization for CM_WD15 continues to fluctuate. Sulfate at this seep is consistently above 500 mg/L. Therefore, the two suboxic categorization events coincide with Se/SO_4 ratios below $1x10^{-5}$ mol/mol. There is no apparent visual year-on-year or seasonal trends in Se/SO_4, sulfate, or selenium concentrations at CM_WD15.

The MF influence category for CM_WD19 has changed from not MF influenced to possibly MF influenced. Sulfate concentrations are consistently above 100 mg/L; therefore, the change in categorization is related to an increasing trend in Zn/Cd over time because of decreasing cadmium trends at this seep. In addition to a possible year-on-year decrease, cadmium also has higher concentrations during high flows than low flow sampling events. Zinc and sulfate concentrations do not show a noticeable increasing or decreasing trend, although zinc also shows seasonality with higher concentrations during high flows.

7.5.2 Site-Specific Seepage Geochemical Interpretation

The oxidation and MF influence categorization of seeps and modelled calcite and ferrihydrite saturation at CMm are summarized in Table 27. Figure 43 and Figure 44 show the high and low flow oxidation categorizations for CMm seeps, respectively. Figure 45 and Figure 46 show the high and low flow Morrissey Formation categorizations for CMm seeps, respectively.

Two seeps (CM_WD19 and CM_MM-SEEP3) have been consistently categorized as suboxic. One CMm seep (CM_PLANT-SEEP1) has been consistently categorized as possibly MF influenced.

Seasonality and year-on-year trends identified in Table 27 are based on a qualitative visual review of water quality timeseries.

Two seeps (CM_WD4 and CM_WD7) seasonally changed modelled calcite saturation, indicating modelled calcite was undersaturated during high flows and oversaturated during low flows. Maps of calcite saturation at CMm during high and low flows in Figure 47 and Figure 48, respectively, show spatial trends for calcite saturation. Seeps to the east of the site have generally been categorized as undersaturated, seeps to the west have been categorized as oversaturated.

Sulfate concentrations at CMm seeps compared to corresponding permitted surface water monitoring locations in Appendix E show that average sulfate concentrations at permitted surface water monitoring stations are often less than or equal to average sulfate concentrations of their corresponding seeps.

A comparison of average flows during high and low flows at each CMm seep, and its associated downgradient permitted surface water monitoring location is reported in Table 26. No seeps at CMm contribute a significant volume of water to their downgradient permitted surface water monitoring location counterparts.

Table 26: Average seasonal flows for CMm seeps and downgradient permitted surface water monitoring locations

Permitted Surface Water Monitoring Location	Permitted Surface Water Monitoring Location Flow (m^3/d)		Seep Location	Seep Flow[1] (m^3/d)			
	High Flow	Low Flow		High Flow		Low Flow	
				Flow (m^3/d)	% Permitted location flow	Flow (m^3/d)	% Permitted location flow
CM_CCPD	32,655	9,782	CM_CS1	45	0%	2	0%
CM_SPD	16,598	5,807	CM_CCDS	717	4%	-	0%
			CM_37PIT-SEEP-E	378	2%	-	-
			CM_37PIT-SEEP-W	31	0%	-	-
			CM_MM-SEEP1	24	0%	10	0%
			CM_MM-SEEP3	4	0%	3	0%
			CM_MM-SEEP5	12	0%	10	0%
			CM_NS1	100	1%	18	0%
			CM_NS4	43	0%	6	0%
			CM_NS7	73	0%	17	0%
			CM_PLANT-SEEP1	3	0%	3	0%
			CM_WD15	120	1%	42	1%
			CM_WD18	146	1%	23	0%
			CM_WD19	136	1%	35	1%
			CM_WD4	854	5%	185	3%
			CM_WD7	2	0%	8	0%

Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/LoadingComparison_1CT017-358_r0_amd.xlsx

Notes:

[1] Due to the often-diffuse nature of seeps, seep flow measurements that are inherently imprecise. The comparisons reported here should be regarded as semi-quantitative.

Table 27: Summary of Trends and Controls on Water Quality for Seeps at CMm

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
CM_CS1	CM_EASTWR	High Flow	Oxic	Not MF Influenced	Undersaturated	0.14	No	Oversaturated	-	Higher Se	▪ Weak correlation of metal concentrations with field pH. ▪ Low SO_4, Cd, Co, Ni, and U compared to CM_NS1 and CM_PLANT-SEEP1	SO_4, Se-T
		Low Flow	Oxic	Not MF Influenced	***Undersaturated***	0.38	No field note	Oversaturated		Higher Sb, Mo		
CM_CCDS	CM_EASTWR	High Flow	Oxic	Not MF Influenced	Undersaturated	-0.07	No	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH. ▪ Low SO_4, Cd, Co, Ni, and U compared to CM_NS1 and CM_PLANT-SEEP1. ▪ Low Co, Mn, Ni, Zn concentrations compared to others in group	Se-T
		Low Flow	No Samples	No Samples	No Samples	No Samples	Dry	No Samples				
CM_37PIT-SEEP-E	CM_37PIT	High Flow	***Potentially Suboxic***	Potentially Not MF Influenced	Undersaturated	0.09	No	Oversaturated	Possible decreasing Co, Ni, TDS, U	Higher Cd	▪ Negative correlation with field pH (Cd, Co, Co, Mn, Ni, Zn). ▪ Negative correlation with field DO (Cd, Co, Mn, Ni, Zn).	SO_4, Co-T
		Low Flow	***Not determined***	***Potentially Possibly MF Influenced***	***Undersaturated***	0.25	No	Potentially Oversaturated		Higher field pH		
CM_37PIT-SEEP-W	CM_37PIT	High Flow	***Not determined***	***Not determined***	***Potentially Undersaturated***	0.31	Yes	Oversaturated	Possible decreasing Co, Ni, TDS, U	-	▪ Negative correlation with field pH (Cd, Co, Co, Mn, Ni, Zn). ▪ Negative correlation with field DO (Cd, Co, Mn, Ni, Zn).	SO_4, Co-T
		Low Flow	***Potentially Suboxic***	Potentially Not MF Influenced	***Undersaturated***	0.51	No	***Not determined***				
CM_WD4	CM_WESTWR	High Flow	Oxic	Not MF Influenced	Undersaturated	0.45	No	Oversaturated	-	Higher Se	▪ Indication that calcite is undersaturated during High Flow, oversaturated during low flow (possible calcite control). ▪ Poor correlation of metal concentrations with field pH	SO_4, Se-T
		Low Flow	Oxic	Not MF Influenced	Potentially Oversaturated	0.72	No	Oversaturated		-		
CM_WD7	CM_WESTWR	High Flow	Oxic	Not MF Influenced	Undersaturated	0.35	Yes	Oversaturated	-	Higher Se, Mo	▪ Indication that calcite is undersaturated during High Flow, oversaturated during low flow (possible calcite control). ▪ Poor correlation of metal concentrations with field pH	Se-T
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.86	Yes	Oversaturated		Higher field pH, Sb		
CM_WD15	CM_WESTWR	High Flow	***Potentially Oxic***	Not MF Influenced	Oversaturated	0.82	Yes	Oversaturated	Possible decreasing NO_3	Higher Se, Cd, Mo	▪ Weak correlation between Cd and field pH. ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	Potentially Suboxic	Not MF Influenced	Oversaturated	0.83	Yes	Oversaturated		-		
CM_WD18	CM_WESTWR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.92	Yes	Oversaturated	-	Higher Cd, Mo	▪ Weak correlation between Mn and field pH. Weak correlation between Mn and field DO. ▪ Highest Se of CMm seeps (>11 ug/L) ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	Oxic	Not MF Influenced	Oversaturated	0.95	Yes	Oversaturated		-		
CM_WD19	CM_WESTWR	High Flow	Potentially Suboxic	***Potentially Not MF Influenced***	***Not determined***	0.81	Yes	Oversaturated	-	Higher Cd	▪ Poor correlation of metal concentrations with field pH. ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	Potentially Suboxic	***Potentially Possibly MF Influenced***	Oversaturated	0.97	Yes	Oversaturated		-		
CM_PLANT-SEEP1	CM_EASTWR	High Flow	Oxic	Possibly MF Influenced	Undersaturated	0.20	No	Potentially Oversaturated	-	-	▪ Weak negative correlation with field pH (Co, Mn, Ni, Se, and Zn) ▪ Highest Fe (> 1 mg/L), Mn (> 0.4 mg/L) of CMm seeps. ▪ Lowest Se (< 1 ug/L) of CMm seeps	Co-T
		Low Flow	Oxic	Possibly MF Influenced	***Potentially Undersaturated***	0.39	Yes	Potentially Oversaturated				

Seep ID	Material Group	Flow Period	Oxidation Category	MF Influence	Calcite ($CaCO_3$ aq)	Calcite ($CaCO_3$ aq) SI	Calcite Precipitate Presence (2021)	Ferrihydrite	Year-on-Year	Seasonality	Geochemical Indicators	Parameters Exceeding FWAL BCWQGs
CM_MM-SEEP1	CM_MMCCR	High Flow	Oxic	Not MF Influenced	***Undersaturated***	0.36	Yes	Oversaturated	-	-	▪ Poor correlation of metal concentrations with field pH.	Se-T
		Low Flow	Oxic	Not MF Influenced	Potentially Undersaturated	0.57	No field note	Oversaturated				
CM_NS4	CM_MMCCR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.88	Yes	Oversaturated	-	Higher Se, NO_3, Cd, Mo	▪ Weak correlation negative correlation between Cd and field pH ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	Potentially Suboxic	Not MF Influenced	***Potentially Oversaturated***	0.85	Yes	Oversaturated		-		
CM_NS7	CM_MMCCR	High Flow	Oxic	Not MF Influenced	Oversaturated	0.86	Yes	Oversaturated	-	Higher Se, Cd, U, Mo	▪ Poor correlation of metal concentrations with field pH. ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	Potentially Suboxic	***Not determined***	Oversaturated	0.91	Yes	Oversaturated		-		
CM_NS1	CM_EASTWR	High Flow	Oxic	Not MF Influenced	Potentially Oversaturated	0.72	No	Oversaturated	Possible decreasing Cd	Higher Se	▪ Poor correlation of metal concentrations with field pH. Highest field pH of group. ▪ Indication calcite is oversaturated (possible calcite control).	SO_4, Se-T
		Low Flow	***Not determined***	Not MF Influenced	Oversaturated	1.00	Yes	Oversaturated		-		
CM_MM-SEEP3	CM_MMCCR	High Flow	Suboxic	Not MF Influenced	Oversaturated	0.88	Yes	Oversaturated	-	Higher SO_4	▪ Poor correlation of metal concentrations with field pH ▪ Lowest Mo of CMm seeps. ▪ Indication that calcite is oversaturated (possible calcite control).	SO_4
		Low Flow	Suboxic	Not MF Influenced	Oversaturated	0.92	Yes	Oversaturated		-		
CM_MM-SEEP5	CM_MMCCR	High Flow	No Samples	No Samples	No Samples	No Samples	Dry	No Samples	-	-	▪ Insufficient samples collected (n=1).	-
		Low Flow	Oxic	Possibly MF Influenced	Oversaturated	0.61	Dry	Oversaturated				

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\Report_Tables_1CT017-358_r0_amd.xlsx

Notes: ***Bold and italicized*** categorizations indicate categorizations that have changed since last year. Categorizations labelled as “Not determined” indicates seep where an equal number of instances occurred for each category, so classification could not be determined.

8 New Seeps Review

This section describes the methodology used to evaluate new seep(s) identified in 2021. Teck identified eight new seeps at GHO and one new seep at CMm in 2021. In addition, one new seep, GH_SEEP_98, was identified in 2020 in the rail loop area at GHO but was too late for inclusion in the 2020 RSMP annual report and was included in this year's reporting. No new seeps were identified at FRO, LCO, or EVO in 2021. Based on the coordinates for the new seeps, it was determined that these are new seeps and not a case of re-sampling a historical seep eliminated in the SRK (2019) seep prioritization.

The newly identified seeps were compared to the nearest seep sampled in 2021 based on the seep groupings developed by SRK (2019). Seeps were compared based on oxidation categorization, MF categorization, and BCWQG exceedances for sulfate, selenium, and nitrate-N.

The new seeps were considered different from the closest historical seep if the categorization of oxidation and MF influence were different, or the new seeps had more or different BCWQG exceedances for sulfate, selenium, or nitrate-N than the comparison seeps' water quality results.

The new seep GH_SEEP_98 is geographically not close to any other seeps in the RSMP and does not lie within a previously demarcated Seep Group. Therefore, there is no existing seep in the RSMP that can be used for comparison. Seeps RG_ERSP1 through RG_ERSP8 in Table 28 will be compared to the previously identified and sampled GH_SEEP_60, which is the closest upgradient seep.

Table 29 summarizes the oxidation, MF influence categorization, and the BCWQG exceedance screening of the newly identified seeps to their RSMP seep counterparts sampled in 2021.

Table 28: New seeps identified in 2021 in relation to historical seep locations

Operation	Seep Group	Seep ID	Sampling Dates	Nearest Historical Seep Sampled in 2021 in Same Group	Distance to 2021 Seep (m)
GHO	N/A	GH_SEEP_98	2021-06-21 2021-07-06	No nearby seeps	N/A
GHO	GH_THOMPSON_WR	RG_ERSP1	2021-03-04	GH_SEEP_60	3,500
GHO	GH_THOMPSON_WR	RG_ERSP2	2021-03-04	GH_SEEP_60	3,600
GHO	GH_THOMPSON_WR	RG_ERSP3	2021-03-04	GH_SEEP_60	3,600
GHO	GH_THOMPSON_WR	RG_ERSP4	No Sample	GH_SEEP_60	3,500
GHO	GH_THOMPSON_WR	RG_ERSP5	No Sample	GH_SEEP_60	3,500
GHO	GH_THOMPSON_WR	RG_ERSP6	No Sample	GH_SEEP_60	3,600
GHO	GH_THOMPSON_WR	RG_ERSP7	No Sample	GH_SEEP_60	3,600
GHO	GH_THOMPSON_WR	RG_ERSP8	No Sample	GH_SEEP_60	3,600
CMm	CM_EASTWR	CM_NS-SEEP1	2021-11-22	CM_NS1	565

Sources: compiled in text.

Table 29: New seeps: Oxidation, MF influence, and BCWQGs comparison

Type	Seep ID	High Flows		Low Flows		BCWQG Exceedances of SO_4, Se, and NO_3 in 2021
		Oxidation	MF Influence	Oxidation	MF Influence	
New	GH_SEEP_98	Oxic	Not MF Influenced	Not Available	Not Available	2 Exceedances for Se-T and 1 Exceedance for SO_4 for 2 samples
Existing	*No nearby seeps*	-	-	-	-	-
New	RG_ERSP1	Oxic	Not MF Influenced	Oxic	Not MF Influenced	No Exceedances
New	RG_ERSP2	Oxic	Not MF Influenced	Oxic	Not MF Influenced	No Exceedances
New	RG_ERSP3	Oxic	Not MF Influenced	Not Available	Not Available	2 Exceedances for Se-T for 2 samples
New	RG_ERSP4	Oxic	Not MF Influenced	Oxic	Not MF Influenced	No Exceedances
New	RG_ERSP5	Not Available	Not Available	Oxic	Not MF Influenced	No Exceedances
New	RG_ERSP6	Not Available	Not Available	Oxic	Not MF Influenced	No Exceedances
New	RG_ERSP7	Not Available	Not Available	Oxic	Not MF Influenced	No Exceedances
New	RG_ERSP8	Not Available	Not Available	Oxic	Not MF Influenced	No Exceedances
Existing	*GH_SEEP_60*	*Oxic*	*Not MF Influenced*	*Oxic*	*Not MF Influenced*	*1 Exceedance for* SO_4, NO_3*-N, Se-T, and U-T for 1 sample*
New	CM_NS-SEEP1	Not Available	Not Available	Oxic	Not MF Influenced	1 Exceedance for Se-T and SO_4 for 1 sample
Existing	*CM_NS1*	*Oxic*	*Not MF Influenced*	*Not determined*	*Not MF Influenced*	*2 Exceedances for Se-T and* SO_4 *for 2 samples*

Sources: \\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\SeepCategorization_1CT017-358_r0_amd.xlsx

\\van-svr0.van.na.srk.ad\Projects\02_MULTI_SITES\Elk_Valley_Coal_Corp\1CT017.358_2021_Annual_Seep_Monitoring_Report\Task100 Data Interpretation\BCWQGScreening_1CT017-358_r0_amd.xlsx

Notes: *Italicized* rows indicate historical seeps.

GH_SEEP_98 should be added to the current set of seeps to be monitored during 2022 because it adds additional spatial coverage to the existing RSMP. Based on a comparison between the RG_ERSP seeps and GH_SEEP_60, SRK recommends that RG_ERSP3 should be added to the current set of seeps to be monitored during 2022 because it will also add further spatial coverage to the existing RSMP and of the RG_ERSP seeps sampled, RG_ERSP3 was the only seep to have exceedances for selenium. The remaining seeps, RG_ERSP1, RG_ERSP2, RG_ERSP4, RG_ERSP5, RG_ERSP6, RG_ERSP7, and RG_ERSP8 can be discontinued from further sampling as they appear to be chemically similar and do not add any additional spatial coverage to the RSMP.

CM_NS-SEEP1 can be discontinued from further sampling as it appears to be chemically similar to existing RSMP seep CM_NS1 and does not add any additional spatial coverage to the RSMP.

9 Seep Retirement Review

Following the seep retirement framework laid out in SRK (2021), the following one seep at FRO and one seep at EVO listed in Table 30 have been retired from the RSMP.

Table 30: RSMP seeps identified for retirement in 2021

Seep ID	Seep Group	Reason for Retirement
EV_SEEP_NATALPIT2	EV_BALDYRIDGEWR	Natal Pit has been backfilled; seep is no longer accessible. Because this seep was located within a pit, it is unlikely the seep will re-emerge elsewhere.
FR_HENSEEP1	FR_HEN_WR	Seep has been consistently dry. FRO personnel conducted a retirement survey during 2021 freshet to confirm retirement. No nearby seeps were identified.

Sources: Compiled in text.

FR_SHNSEEP1, FR_SCRDSEEP1, and FR_FSEAMWSEEP4 were covered over by mined-out material before 2021. A targeted survey of the surrounding area should be conducted in 2022 to determine whether the seeps have re-emerged nearby.

10 Summary

The results of the 2021 annual review of the Elk Valley RSMP show the following:

- The RSMP has been implemented consistent with the RGMP, follow-up requirements from EMLI, and previous recommendations made by SRK.
- Several parameters' seasonal and year-on-year trends were identified based on a qualitative visual review of water quality timeseries. No seasonality or year-on-year trends showed consistent patterns across the Elk Valley region.
- The following geochemical controls were noted and are consistent with noted controls from 2020 annual reporting:
  - pH across the Elk Valley operations ranges from 6.5 to 9.5 and may act as a solubility control on select parameters.
  - Dissolved oxygen shows a weak association with manganese and iron concentrations, Se/SO_4 ratios consistent with higher solubility of the metals, and selenium reduction under suboxic conditions.
  - Most seeps in the Elk Valley have $pCO_2 > 10^{-3.4}$ atm, indicating they are over-pressurized relative to atmospheric CO2 and are likely to off-gas.
  - No seeps in the Elk Valley had a gypsum SI above zero and were unlikely to precipitate gypsum. Most seeps (99%) are in equilibrium or oversaturated with ferrihydrite and likely precipitate ferrihydrite.
- Nine new seeps were identified at GHO in 2021, and one new seep was identified at CMm in 2021.
- One seep at FRO, FR_HENSEEP1, and one at EVO, EV_SEEP_NATALPIT2, have been retired from the RSMP.

11 Recommendations

1. Conduct a review of QA/QC issues with the laboratory to further understand and implement additional corrective actions.
2. A retirement survey around the areas where FR_SHNSEEP1, FR_SCRDSEEP1, FR_FSEAMWSEEP4, and CM_MM-SEEP5 were located should be completed in 2022.
3. Two new seeps at GHO (GH_SEEP_98 and RG_ERSP3) should be included in the RSMP.
4. Nine new seeps were identified at GHO in 2021, and one new seep was identified at CMm in 2021. Two new seeps identified at GHO (GH_SEEP_98 and RG_ERSP3) will add value to the program. However, the remaining seeps at GHO and the new seep identified at CMm are not expected to add value to the RSMP and should be discontinued from future sampling.

Closure

This report, Elk Valley Regional Seep Monitoring: 2021 Annual Report, was prepared by

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SRK Consulting (Canada) Inc Engineers and Geoscientist BC Permit to Practice No: 1003655

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Figures

Figure 1: Teck Operations Map

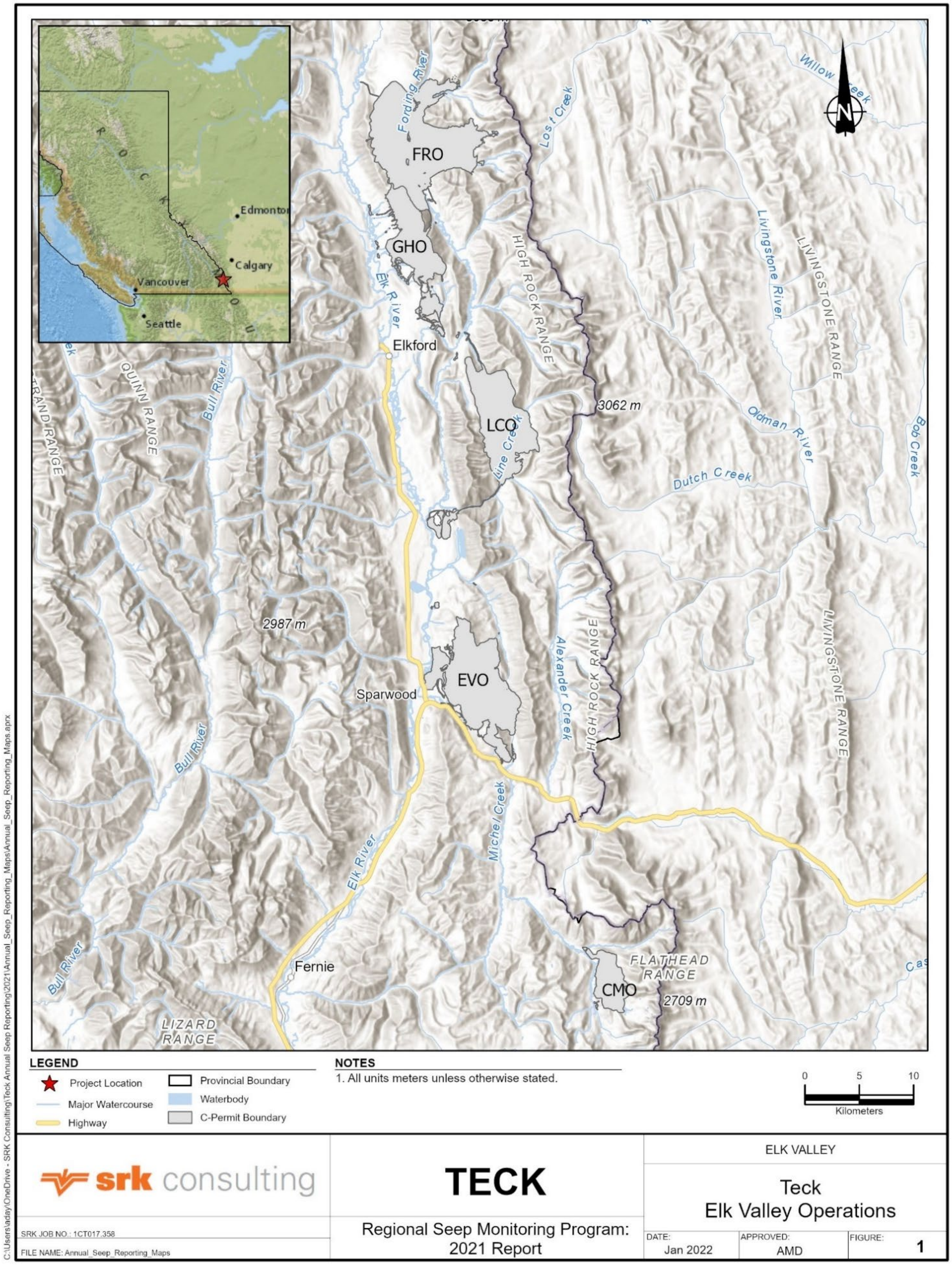
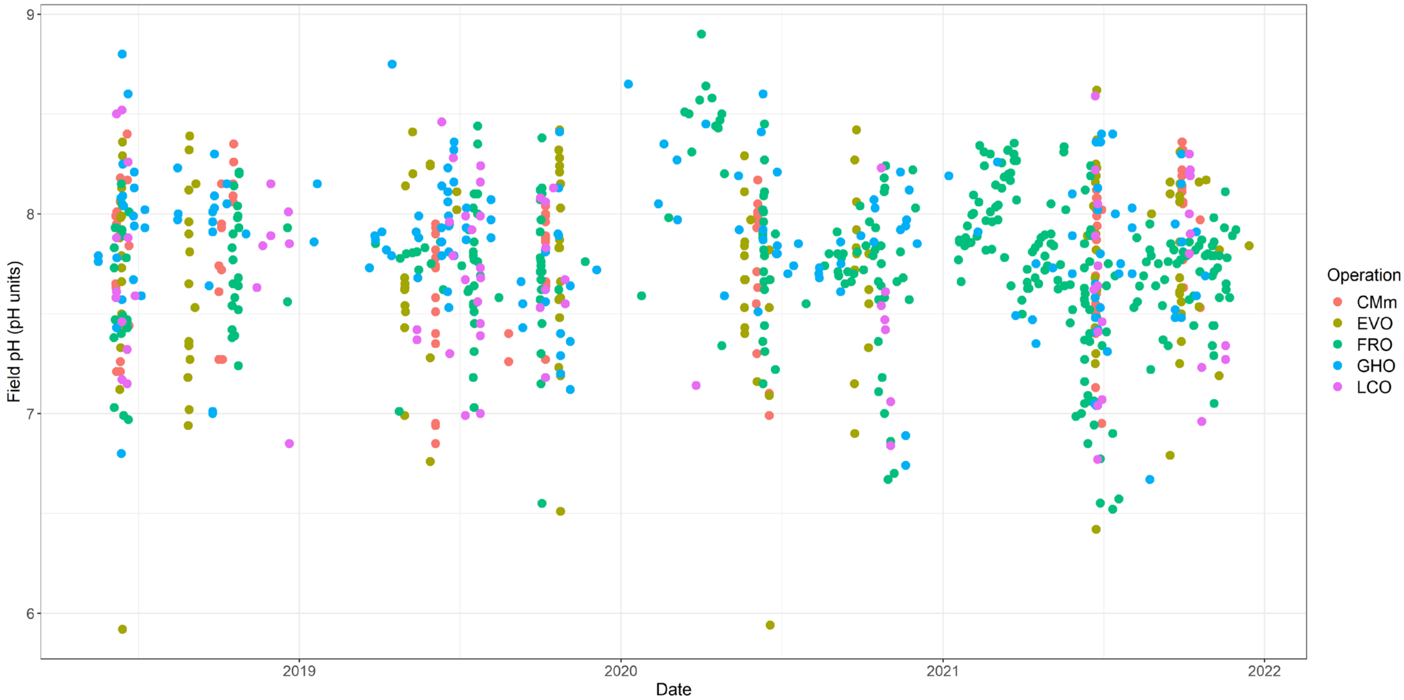
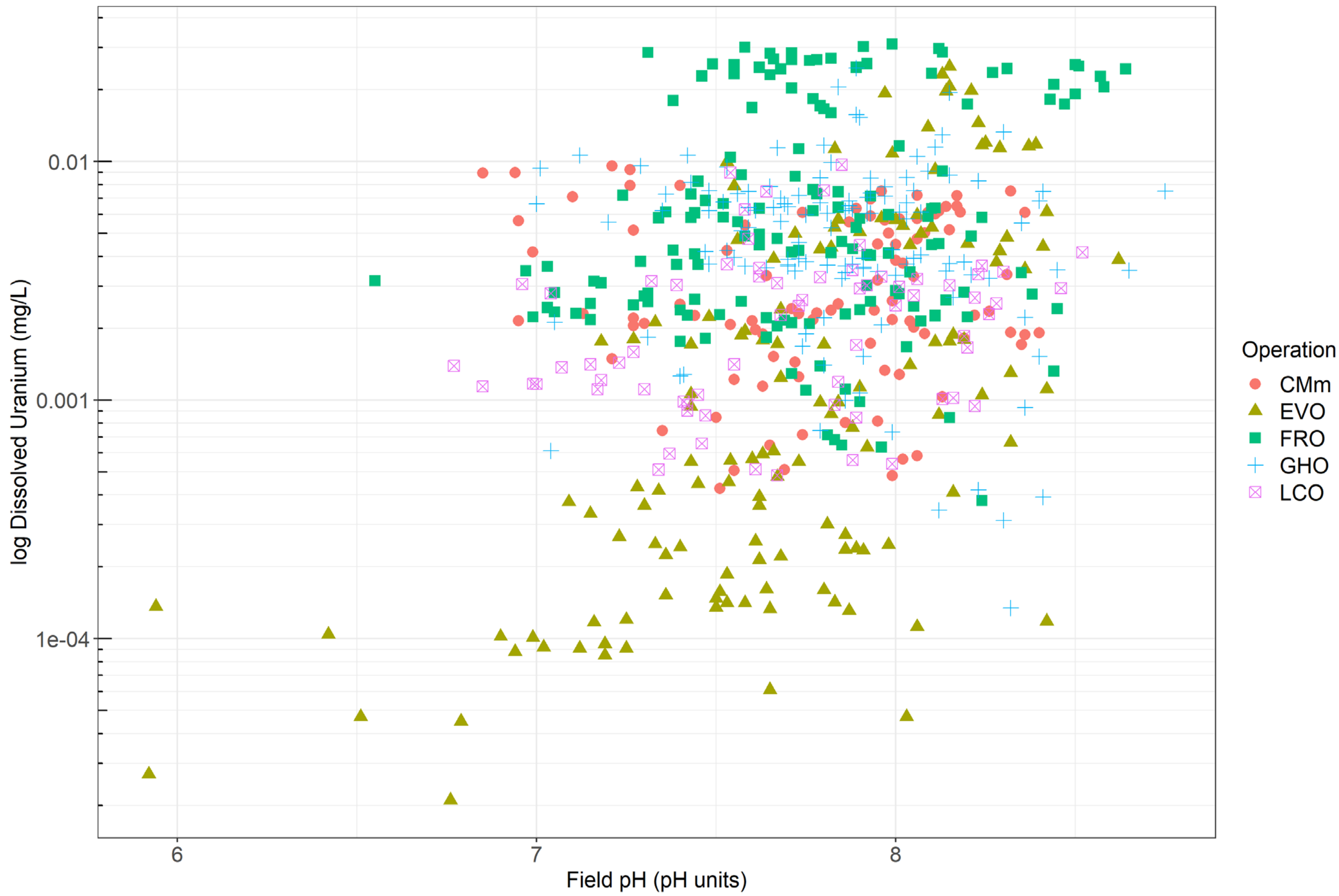


Figure 2: Measured field pH for QA/QC review



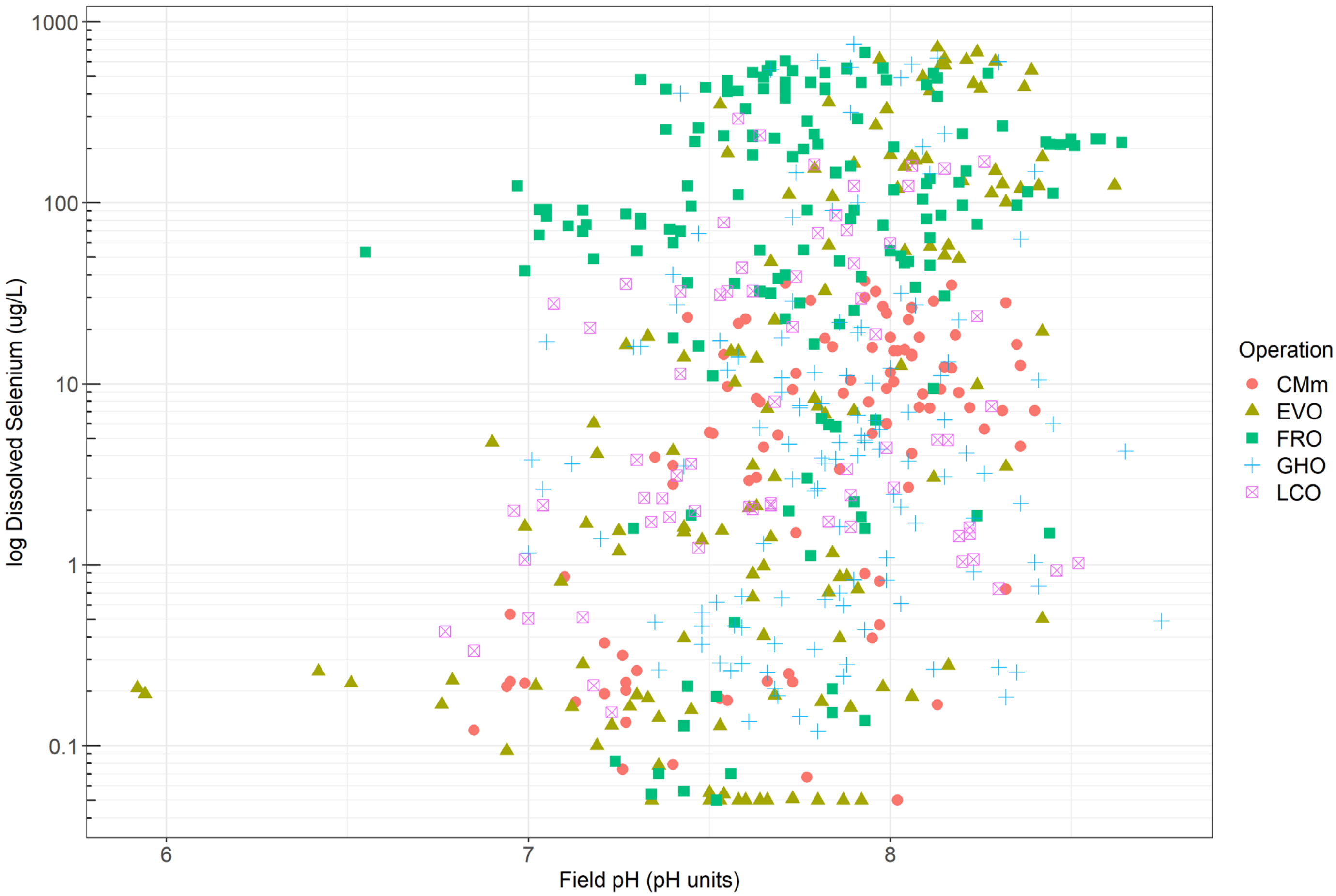
Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_Timeseries_Graphs%202021.Rmd

Figure 3: Uranium versus field pH across the Elk Valley



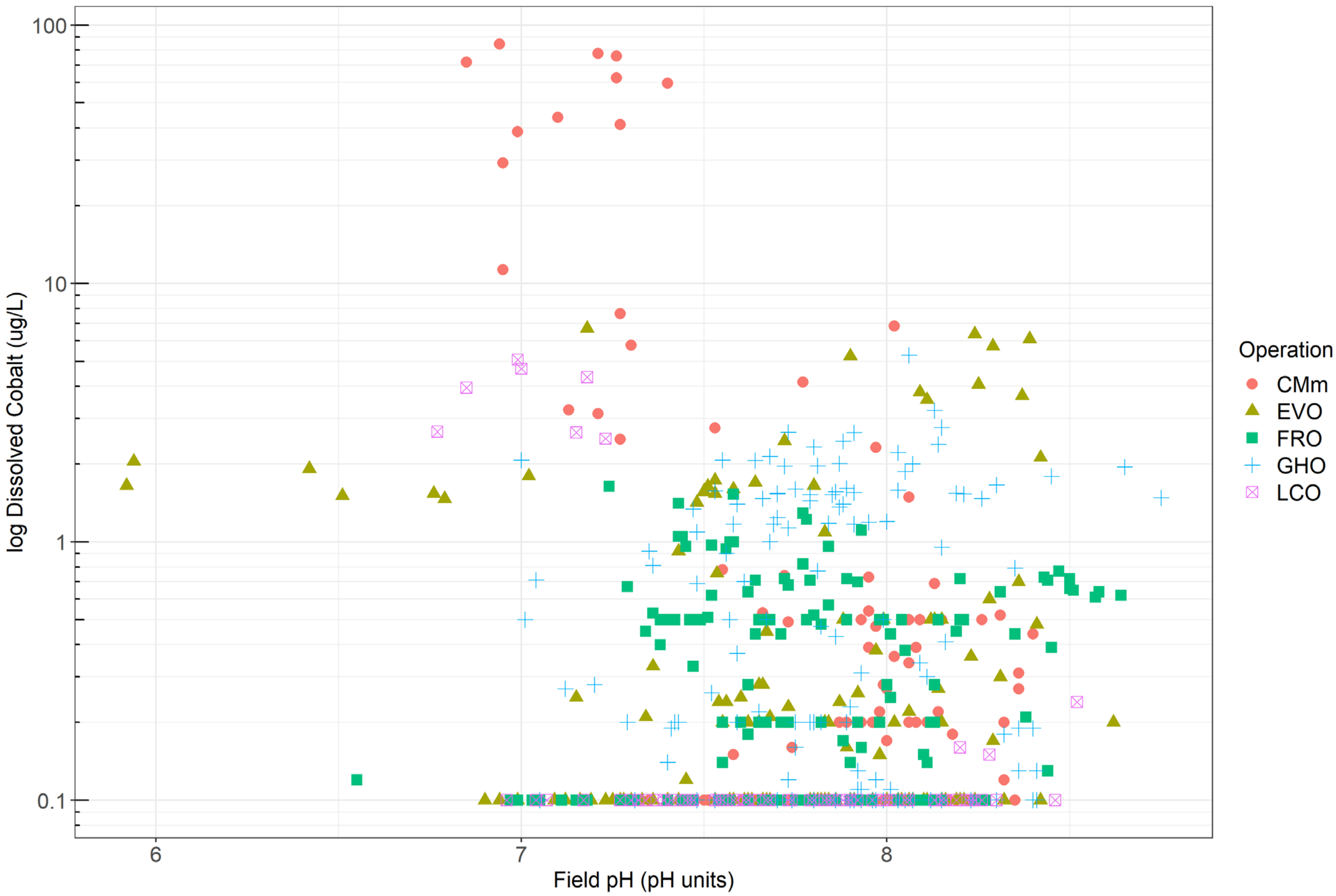
Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_CrossPlots_Graphs%202021.Rmd

Figure 4: Selenium versus field pH across the Elk Valley



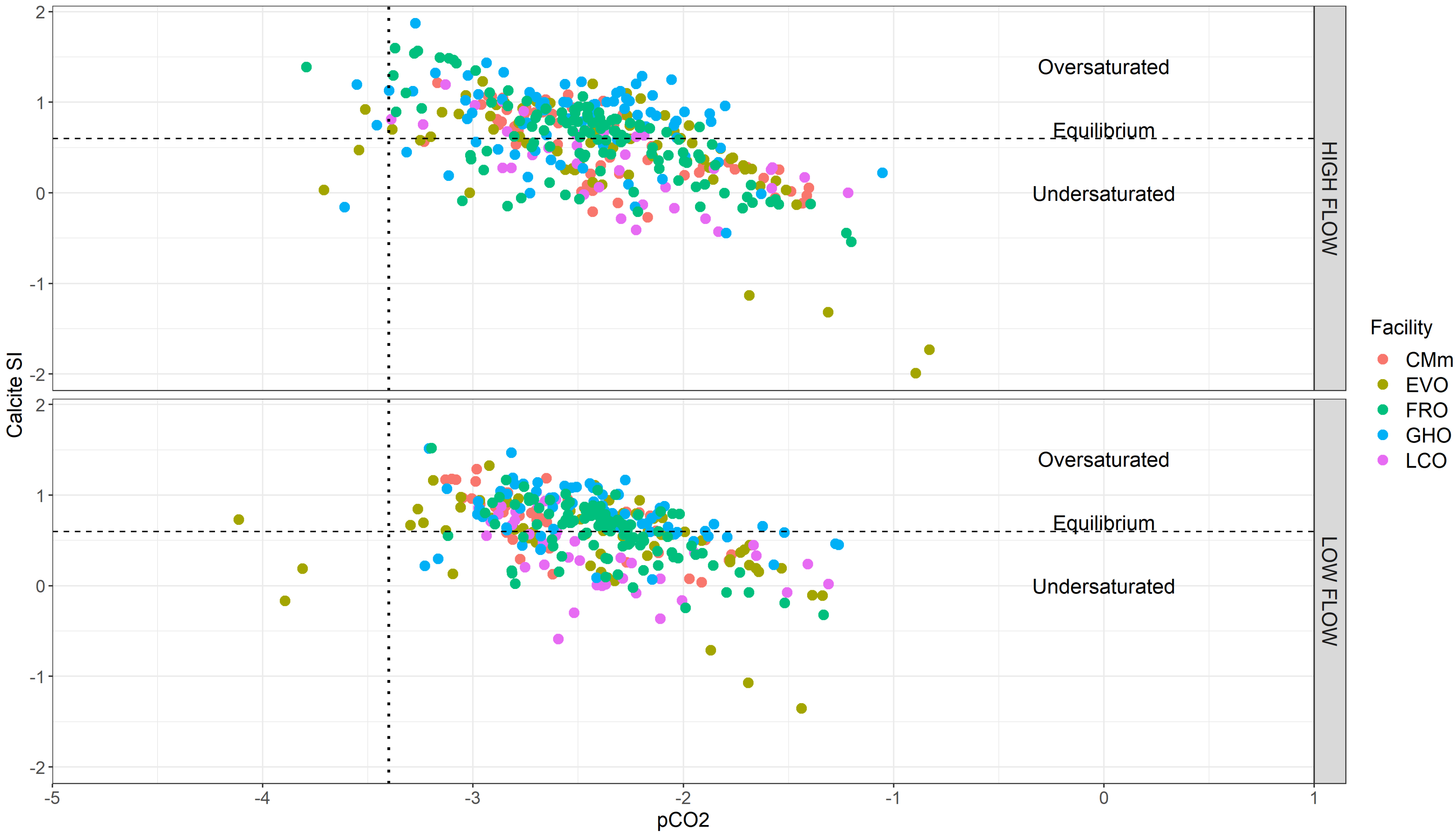
Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_CrossPlots_Graphs%202021.Rmd

Figure 5: Cobalt versus field pH across the Elk Valley



Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_CrossPlots_Graphs%202021.Rmd

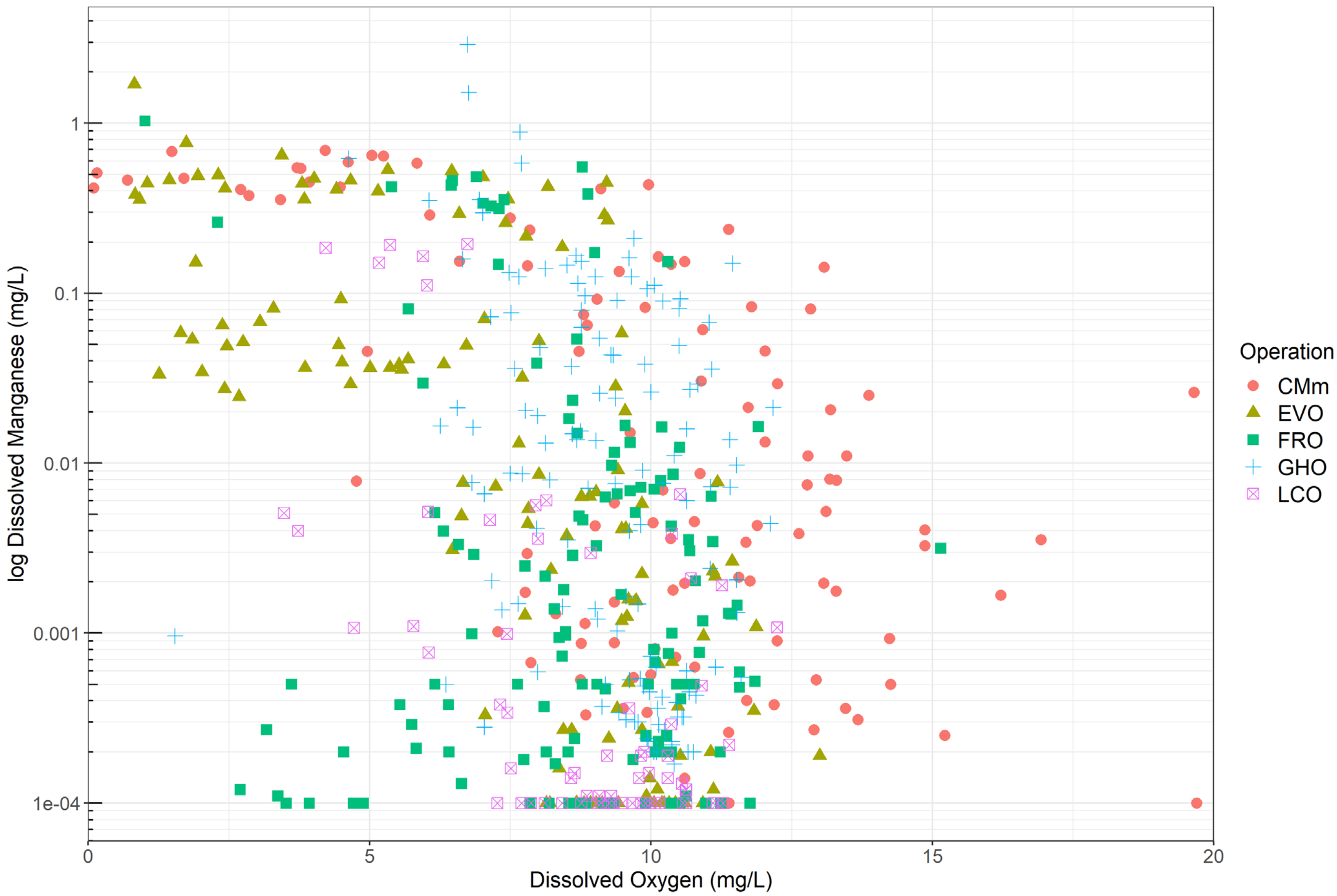
Figure 6: Modelled calcite SI compared to partial pressure (pCO_2) of carbon dioxide across all operations in the Elk Valley



Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_PHREEQC_Graphs%202021.Rmd

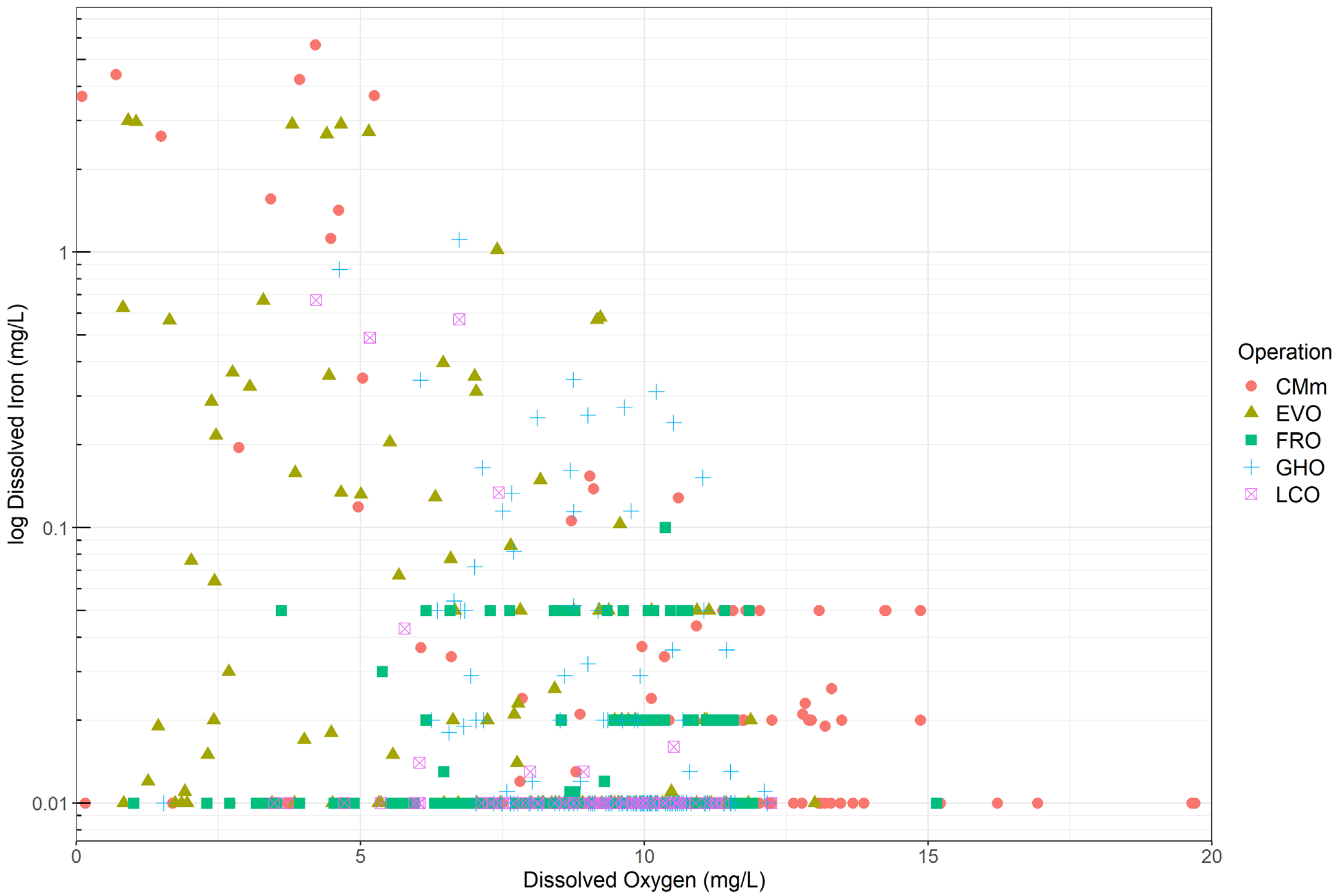
Notes: The vertical dashed line indicates pCO_2 at atmospheric pressure ($10^{-3.4}$ atm). The horizontal dashed line indicates calcite equilibrium.

Figure 7: Manganese concentrations versus dissolved oxygen measurements across all operations in the Elk Valley



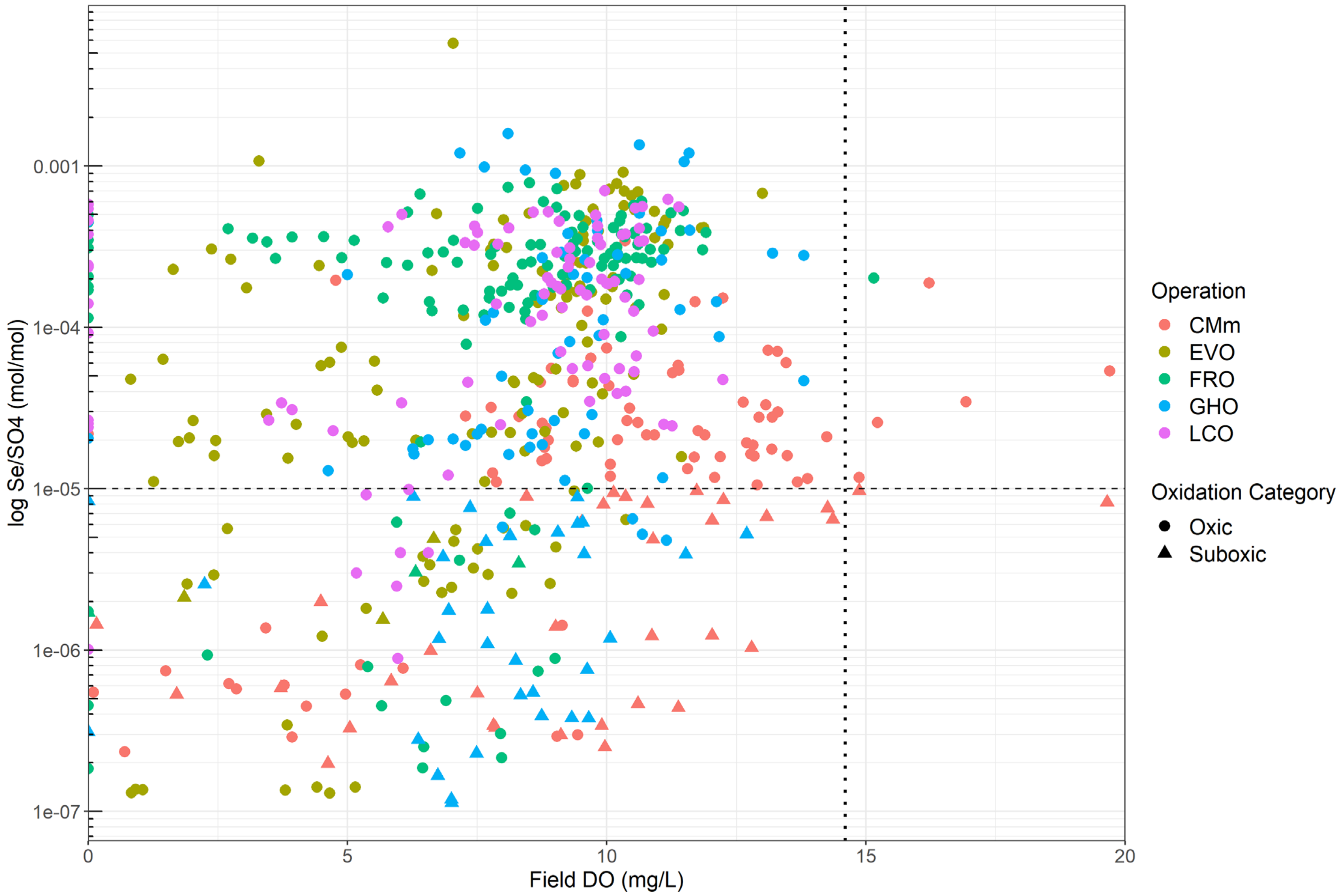
Sources:
https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_CrossPlots_Graphs%202021.Rmd

Figure 8: Iron concentrations versus dissolved oxygen measurements across all operations in the Elk Valley



Sources:
https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_CrossPlots_Graphs%202021.Rmd

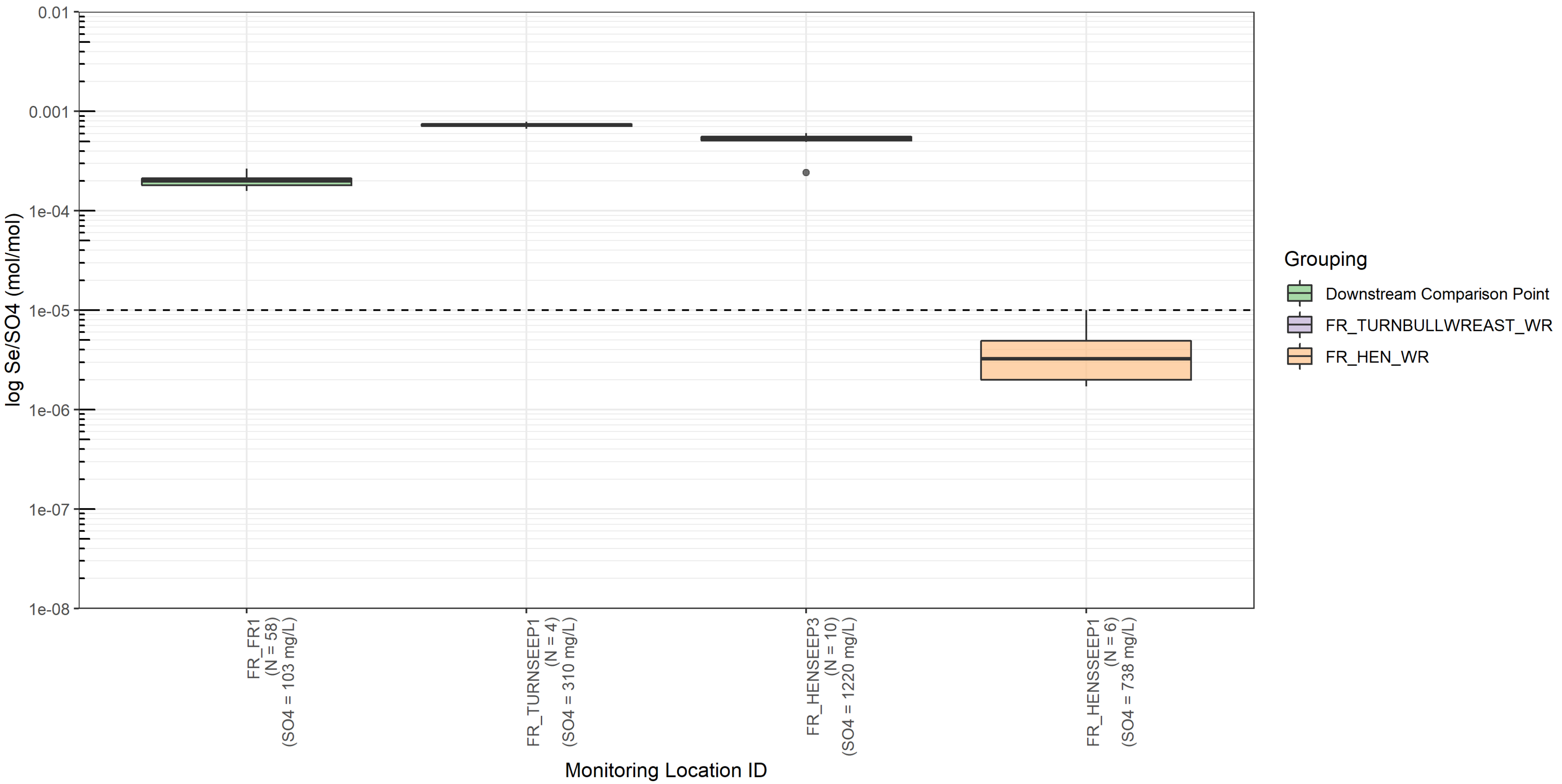
Figure 9: Se/SO_4 versus dissolved oxygen measurements across all operations in the Elk Valley



Sources:
https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_CrossPlots_Graphs%202021.Rmd

Notes: The horizontal dashed line delineates the Se/SO_4 criterium that is applied to categorize seeps as suboxic/oxic. The vertical dashed line delimits the 14.6 mg/L limit for acceptable field DO readings.

Figure 10: Se/SO₄ boxplot for permitted surface water monitoring location FR_PP1 and corresponding FRO seeps



Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_Boxplots%202021.Rmd

Notes: The horizontal dashed line indicates the $Se/SO_4 = 1x10^{-5}$ mol/mol cutoff between the suboxic and oxic water categorization.

Figure 11: 2021 Seeps and Selected Permitted Surface Water Monitoring Locations - FRO

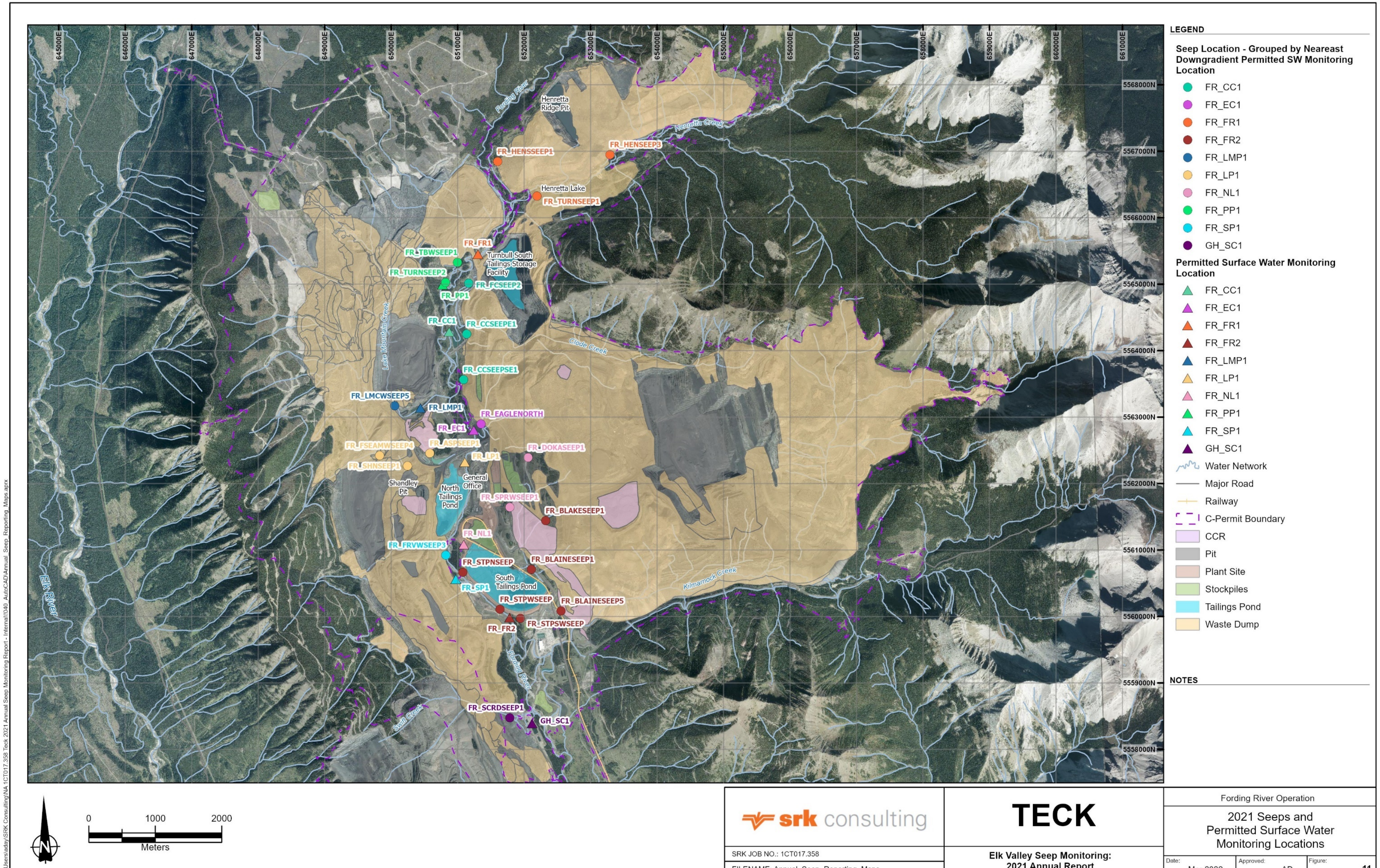


Figure 12: High Flow Seep Oxidation Category - FRO

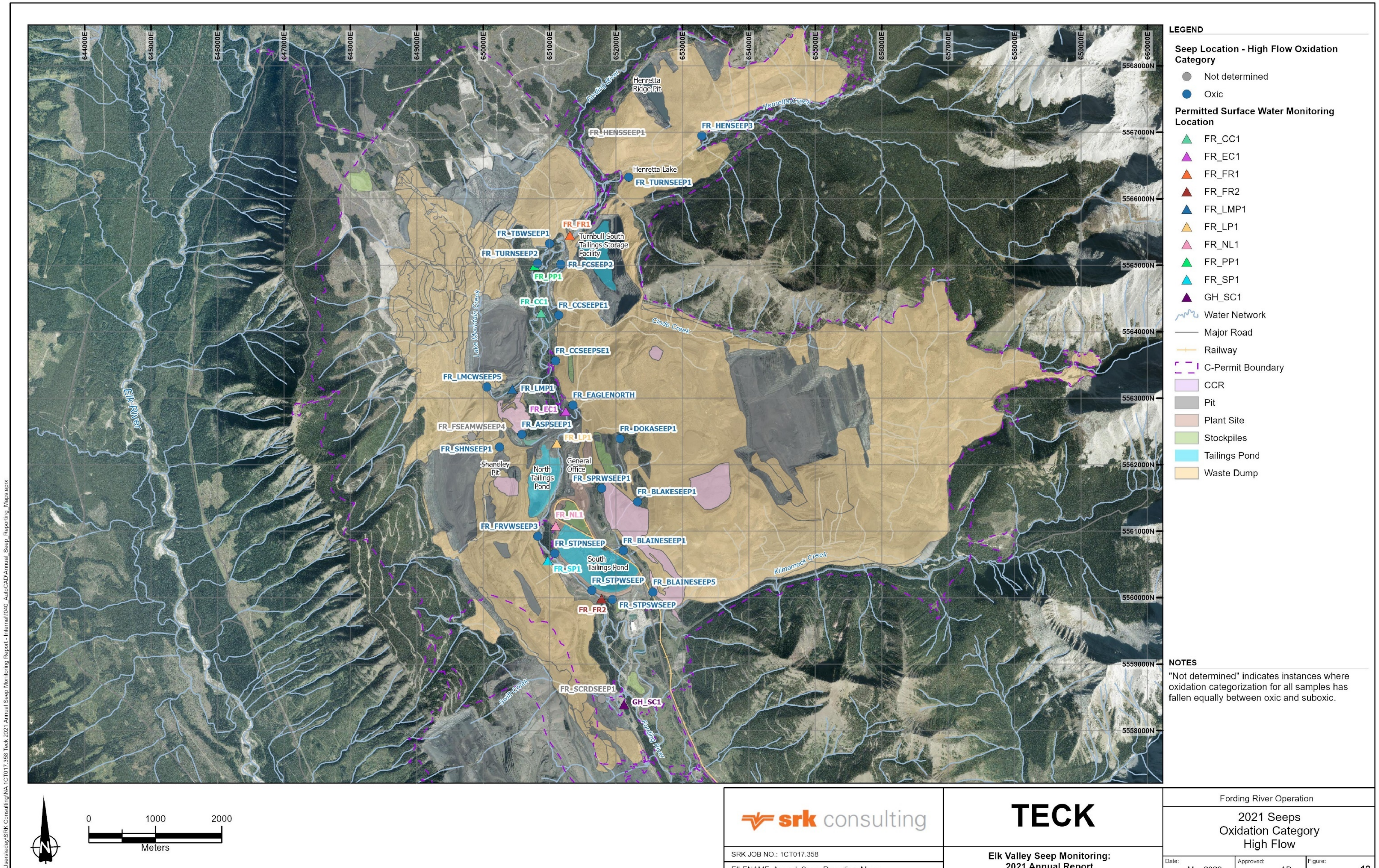
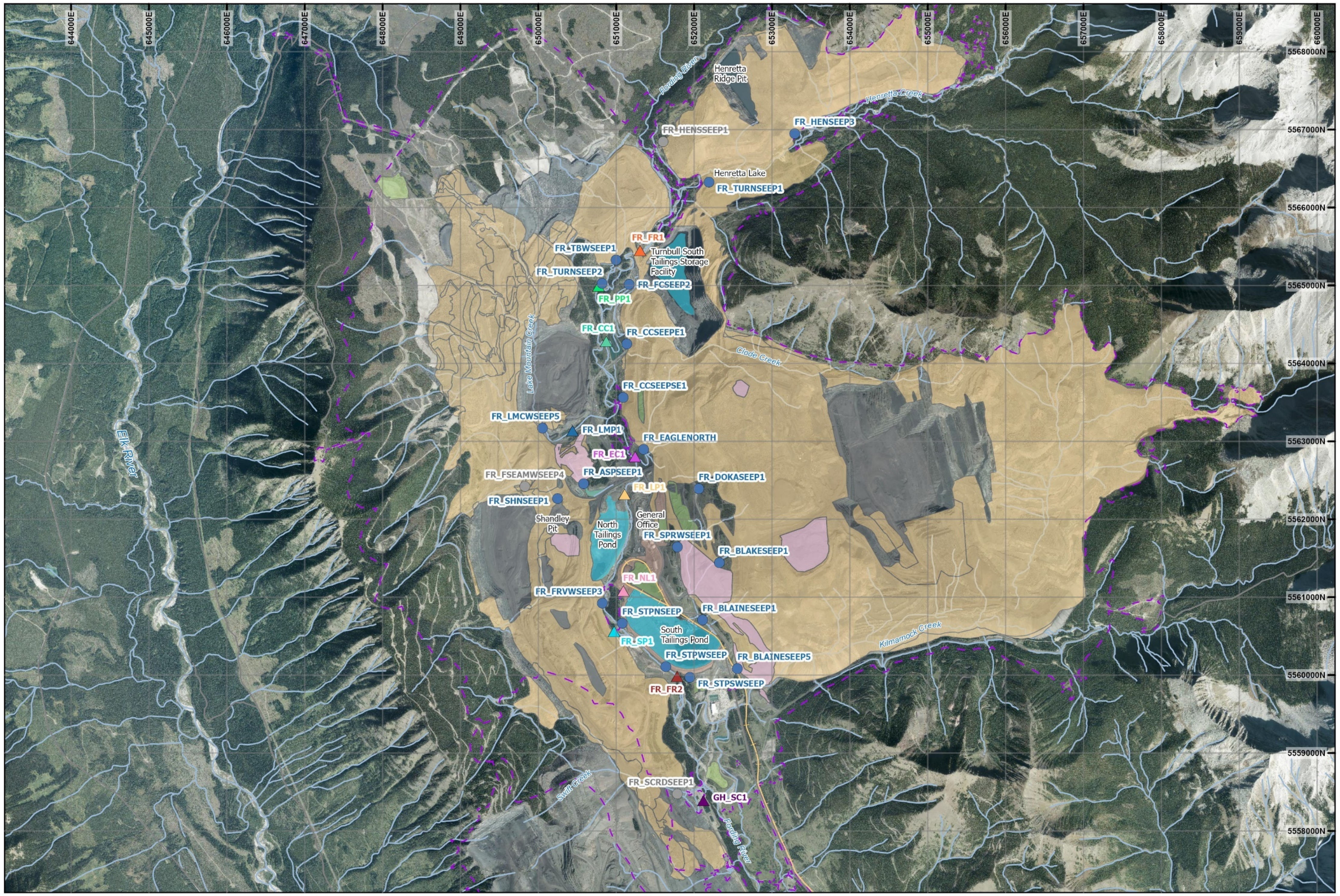


Figure 13: Low Flow Seep Oxidation Category - FRO



LEGEND

Seep Location - Low Flow Oxidation Category
- Not determined
- Oxic

Permitted Surface Water Monitoring Location
- FR_CC1
- FR_EC1
- FR_FR1
- FR_FR2
- FR_LMP1
- FR_LP1
- FR_NL1
- FR_PP1
- FR_SP1
- GH_SC1
- Water Network
- Major Road
- Railway
- C-Permit Boundary
- CCR
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump

NOTES

"Not determined" indicates instances where oxidation categorization for all samples has fallen equally between oxic and suboxic.

0 1000 2000
Meters

srk consulting	TECK	Fording River Operation 2021 Seeps Oxidation Category Low Flow
SRK JOB NO.: 1CT017.358	Elk Valley Seep Monitoring: 2021 Annual Report	Date: Mar 2022 | Approved: AD | Figure: 13
FILENAME: Annual_Seep_Reporting_Maps		

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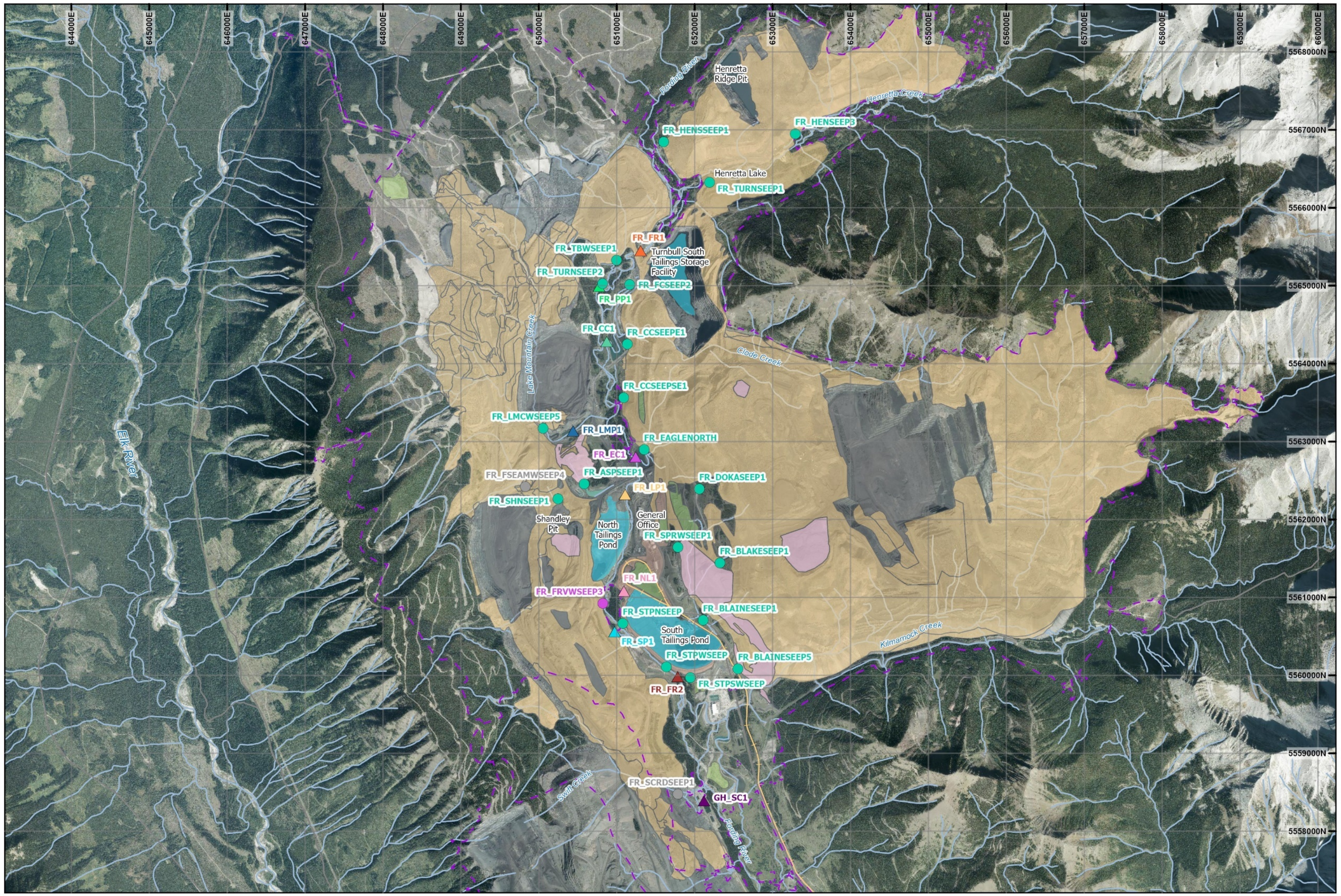
Figure 14: High Flow Seep Morrissey Formation Influence Category - FRO



LEGEND

Seep Location - High Flow MF Influence Category

- Not MF Influenced
- Possibly MF Influenced
- Not determined

Permitted Surface Water Monitoring Location

- FR_CC1
- FR_EC1
- FR_FR1
- FR_FR2
- FR_LMP1
- FR_LP1
- FR_NL1
- FR_PP1
- FR_SP1
- GH_SC1
- Water Network
- Major Road
- Railway
- C-Permit Boundary
- CCR
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump

NOTES

"Not determined" indicates instances where the Morrissey Formation categorization for all samples has fallen equally between Not MF Influenced and and Possibly MF Influenced.

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2021 Annual Report

Fording River Operation

2021 Seeps
Morrissey Formation Category
High Flow

Date:	Approved:	Figure:
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Figure 15: Low Flow Seep Morrissey Formation Influence Category - FRO

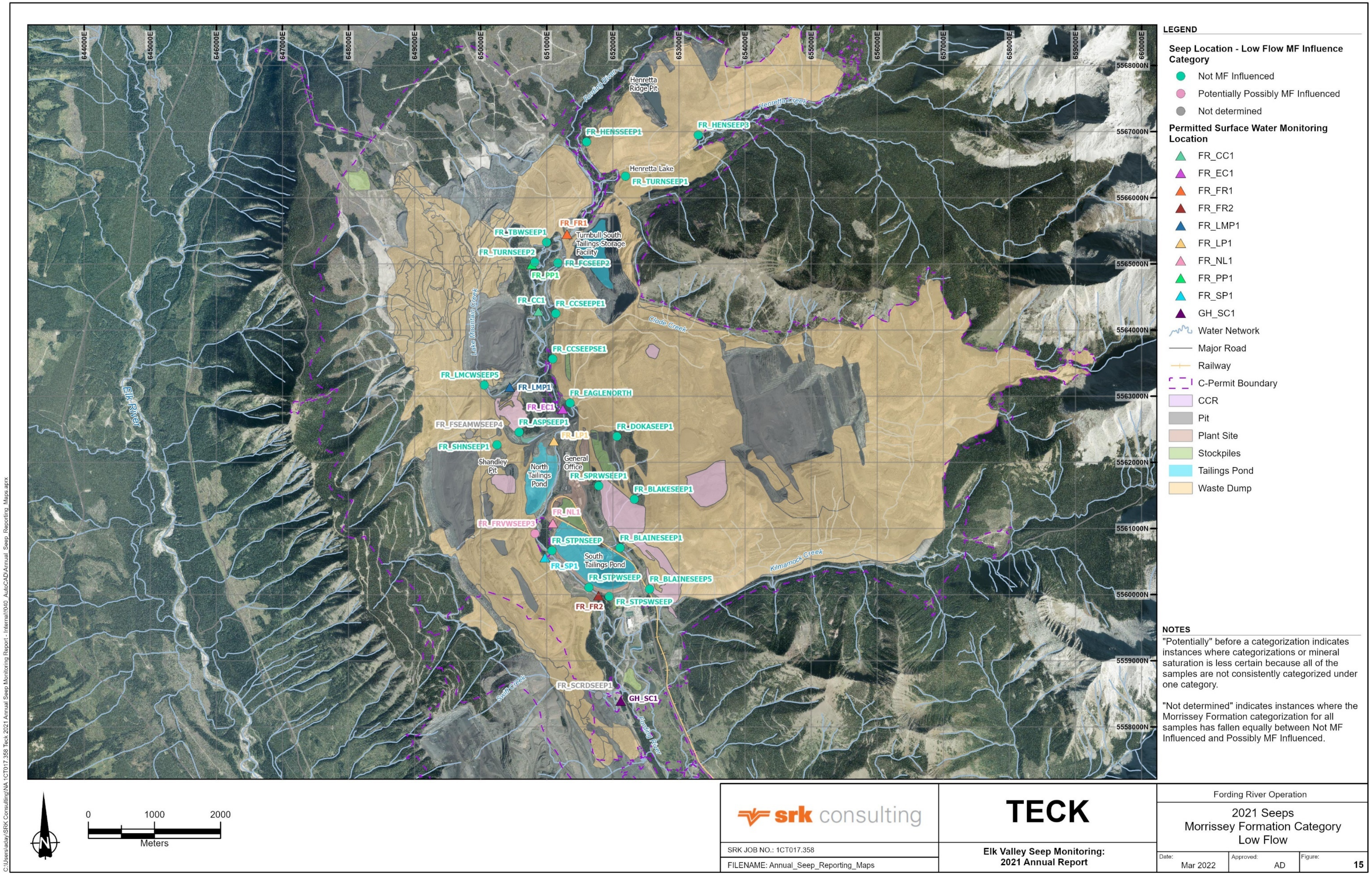

Figure 16: High Flow Calcite Saturation - FRO

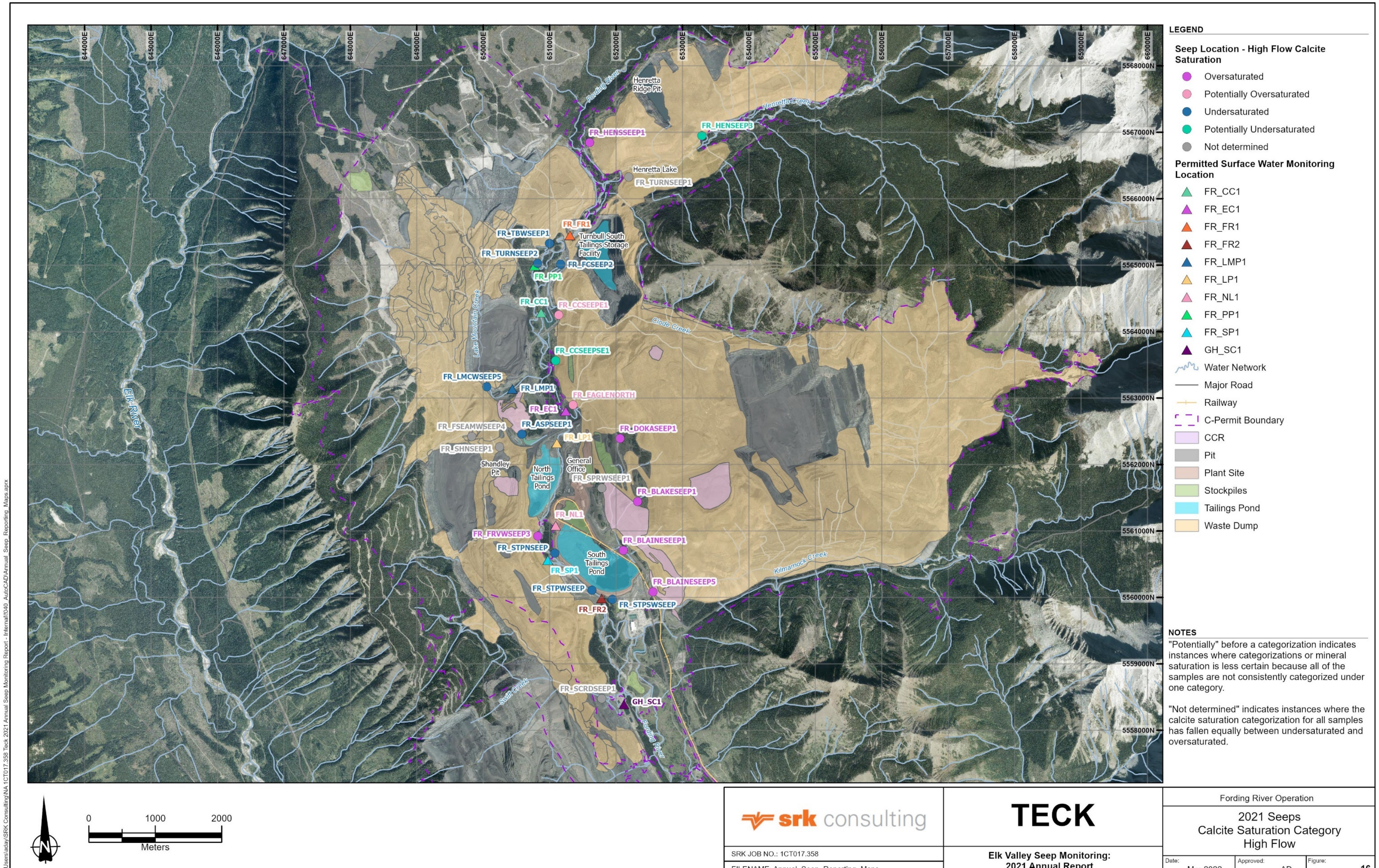

Figure 17: Low Flow Calcite Saturation - FRO

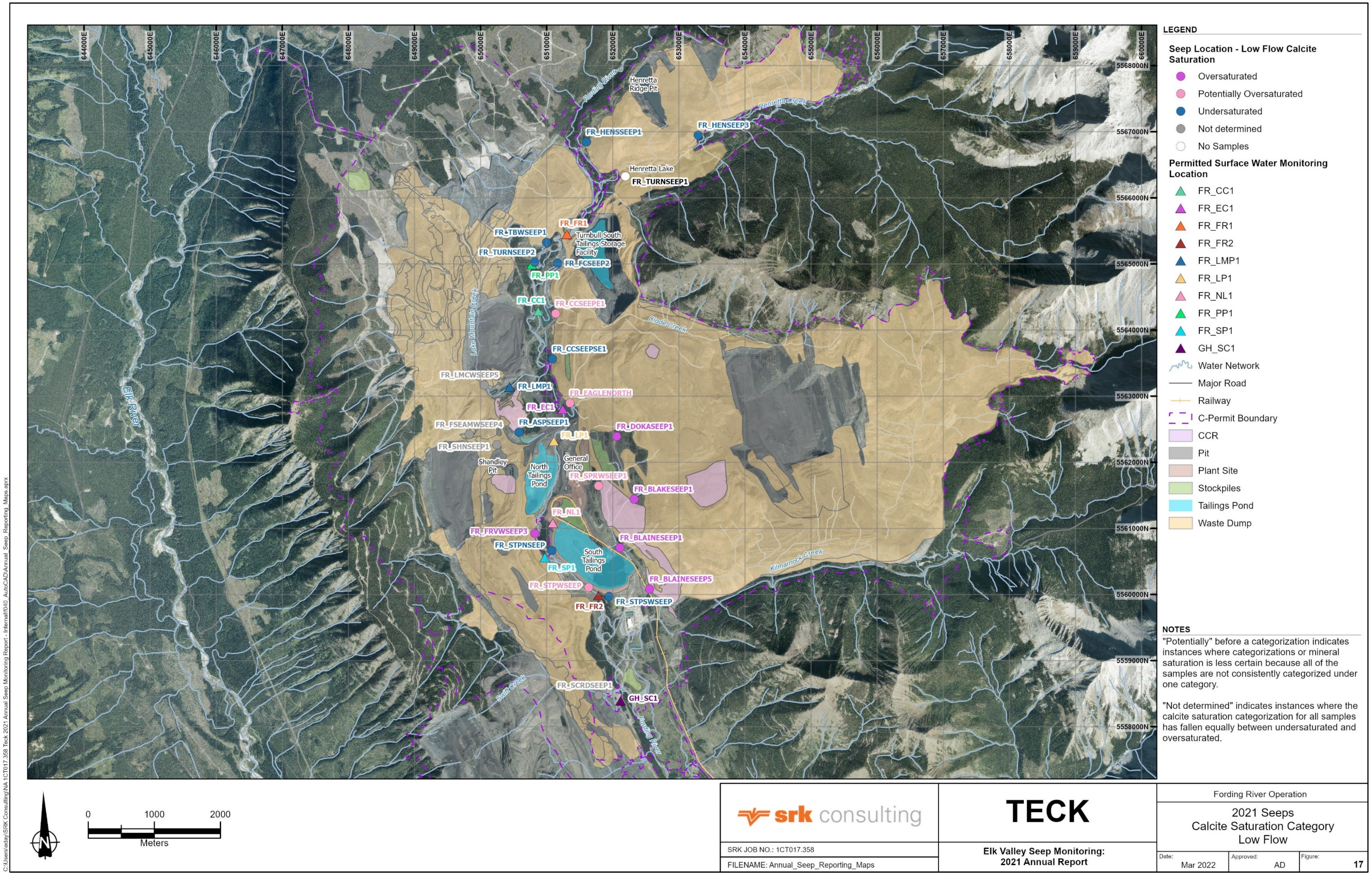

Figure 18: 2021 Seeps and Selected Permitted Surface Water Monitoring Locations - GHO

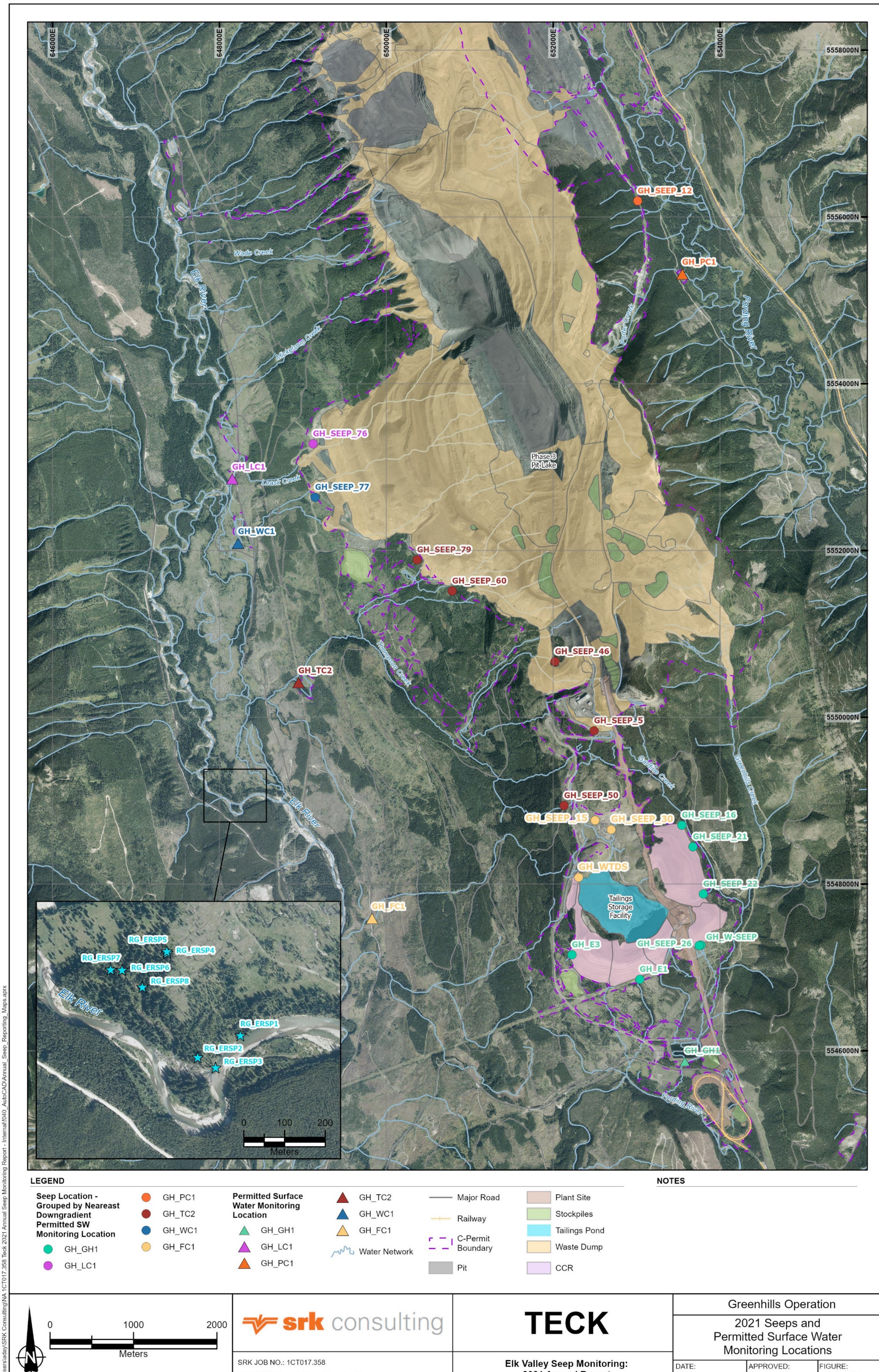

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Figure 19: High Flow Seep Oxidation Category - GHO

LEGEND

Seep Location - High Flow Oxidation Category
- Oxic
- Potentially Oxic
- Suboxic
- Not determined

Permitted Surface Water Monitoring Location
- GH_GH1
- GH_LC1
- GH_PC1
- GH_TC2
- GH_WC1
- GH_FC1

- Water Network
- Major Road
- Railway
- C-Permit Boundary
- CCR
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump

NOTES

"Potentially" before a categorization indicates instances where categorizations or mineral saturation is less certain because all of the samples are not consistently categorized under one category.

"Not determined" indicates instances where the categorization for all samples has fallen equally between oxic and suboxic.

0 1000 2000
Meters

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FILENAME: Annual_Seep_Reporting_Maps

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2021 Annual Report

Greenhills Operation

2021 Seeps
Oxidation Category
High Flow

DATE:	APPROVED:	FIGURE:
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Figure 20: Low Flow Seep Oxidation Category - GHO

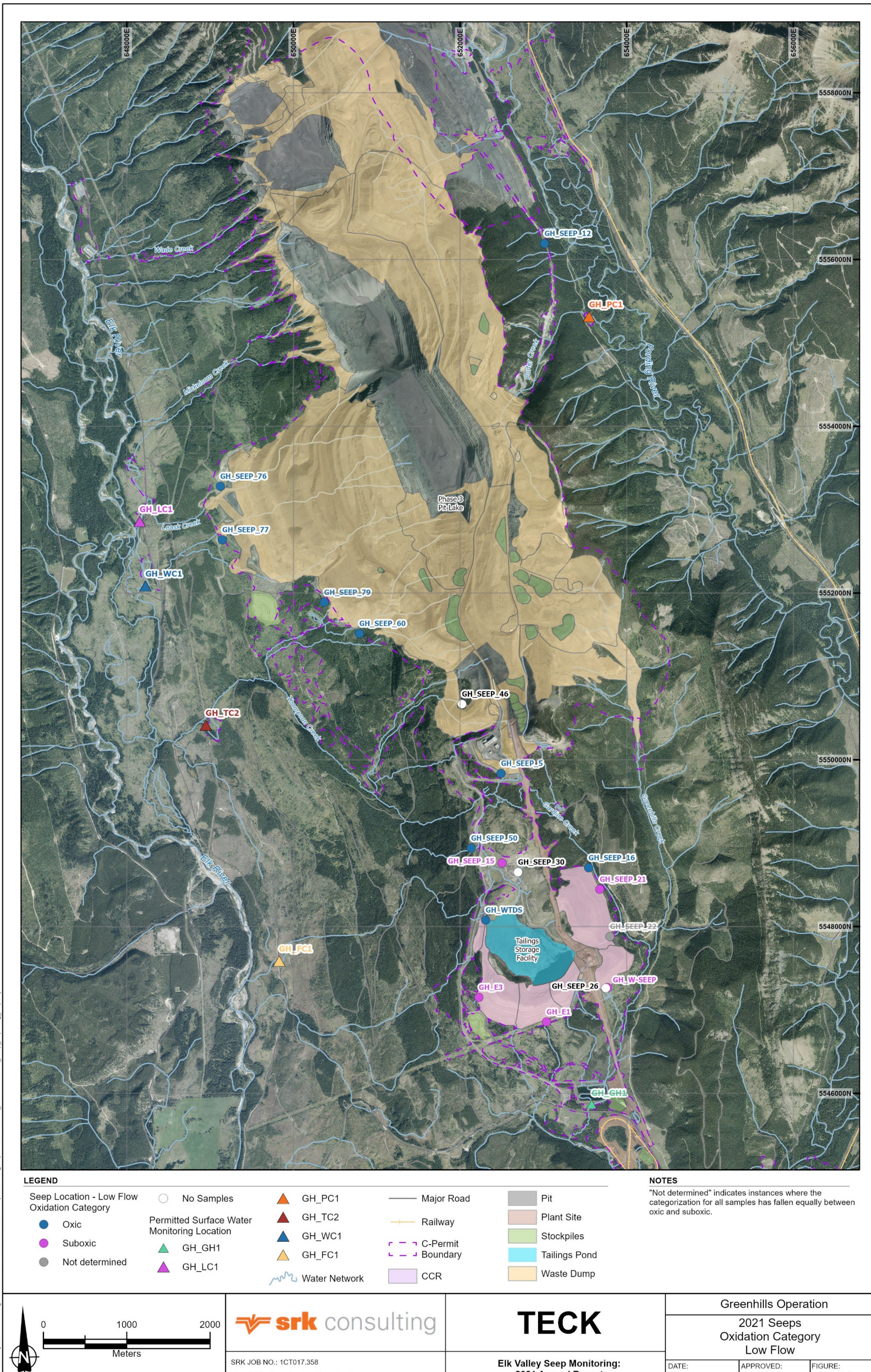

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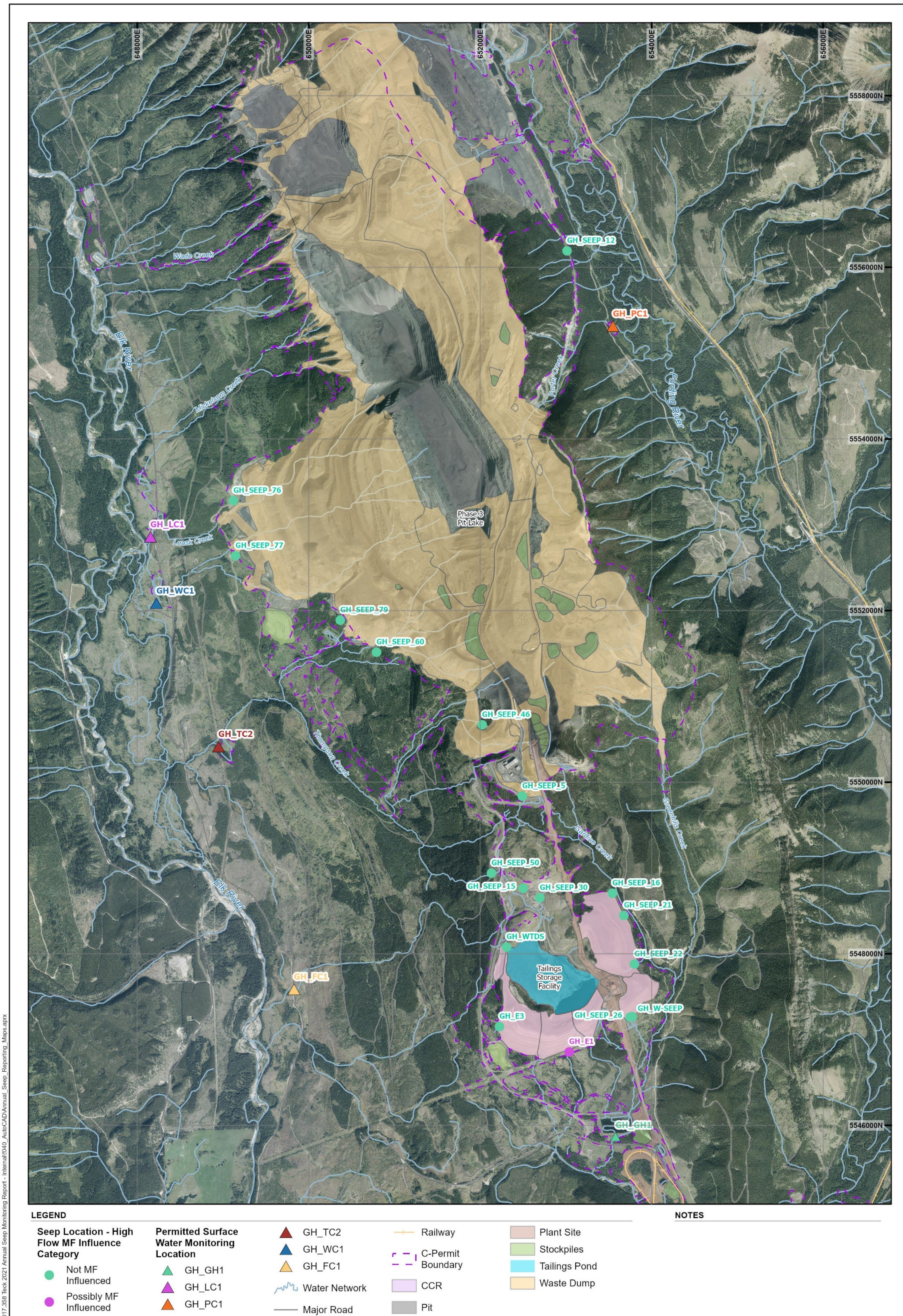
Figure 21: High Flow Seep Morrissey Formation Influence Category - GHO



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SRK JOB NO.: 1CT017.358 FILENAME: Annual_Seep_Reporting_Maps	Elk Valley Seep Monitoring: 2021 Annual Report	DATE: MAR 2022	APPROVED: AD	FIGURE: 21

Figure 22: Low Flow Seep Morrissey Formation Influence Category - GHO

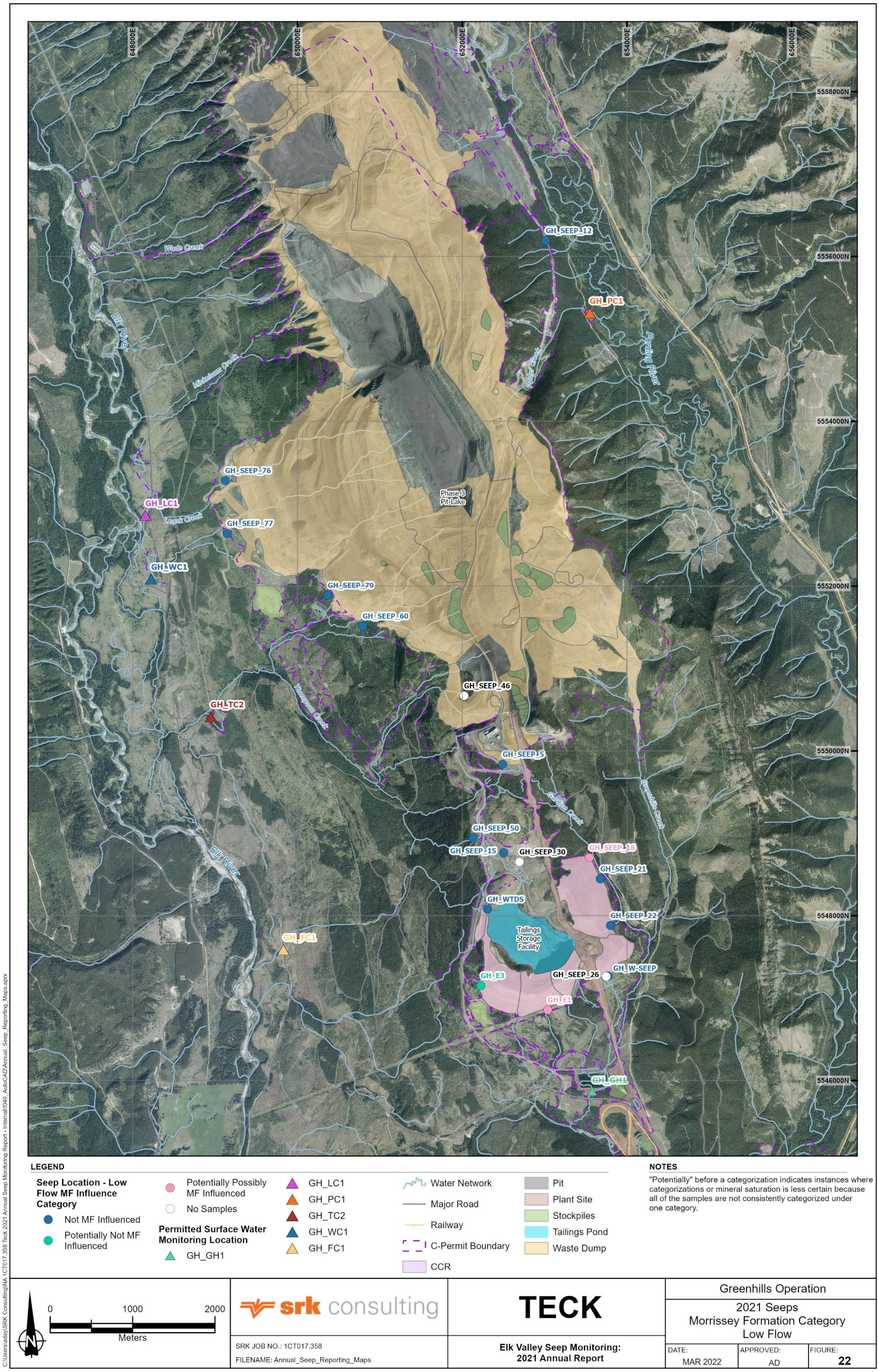


Figure 23: High Flow Calcite Saturation - GHO

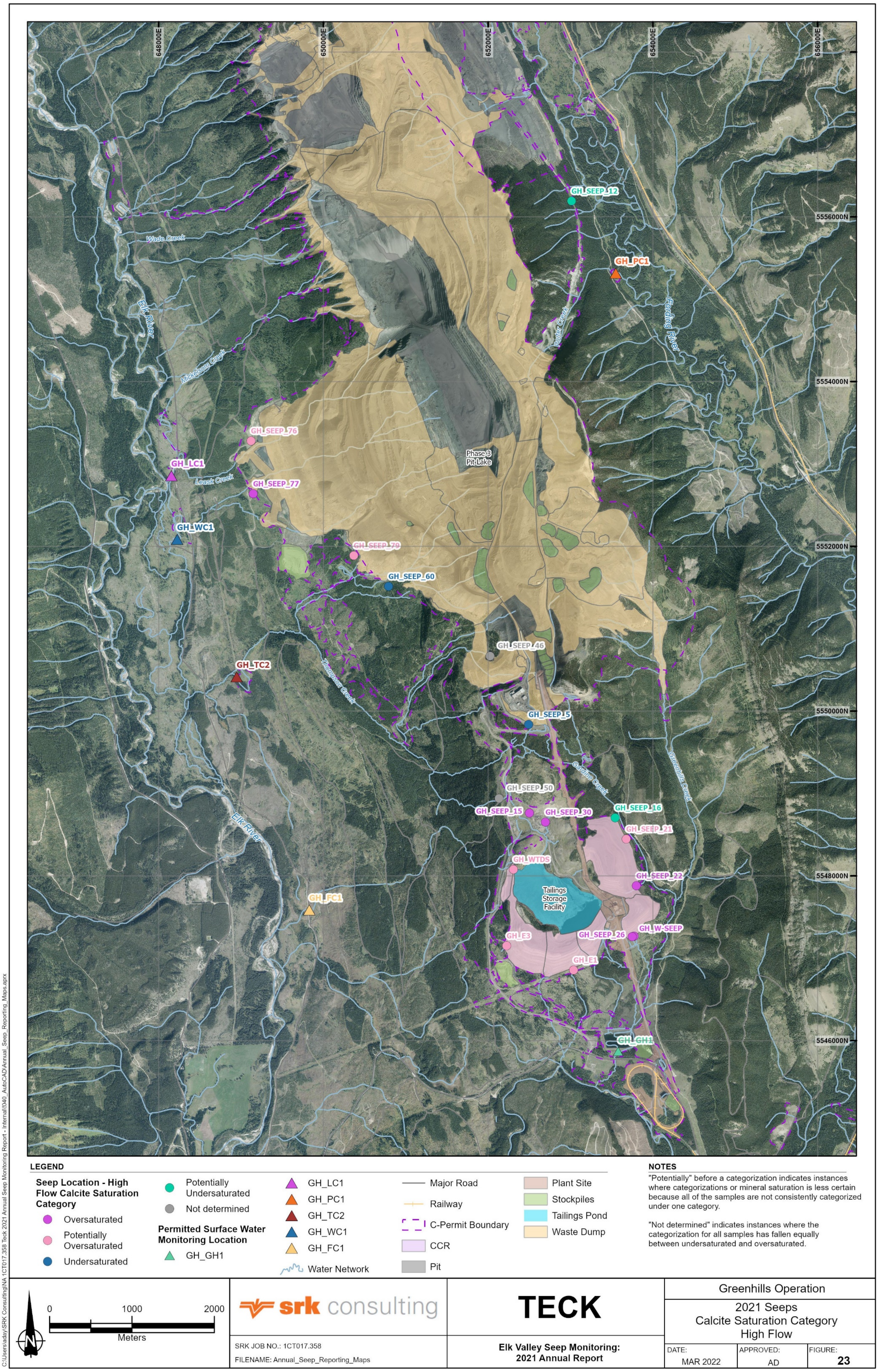


Figure 24: Low Flow Calcite Saturation - GHO

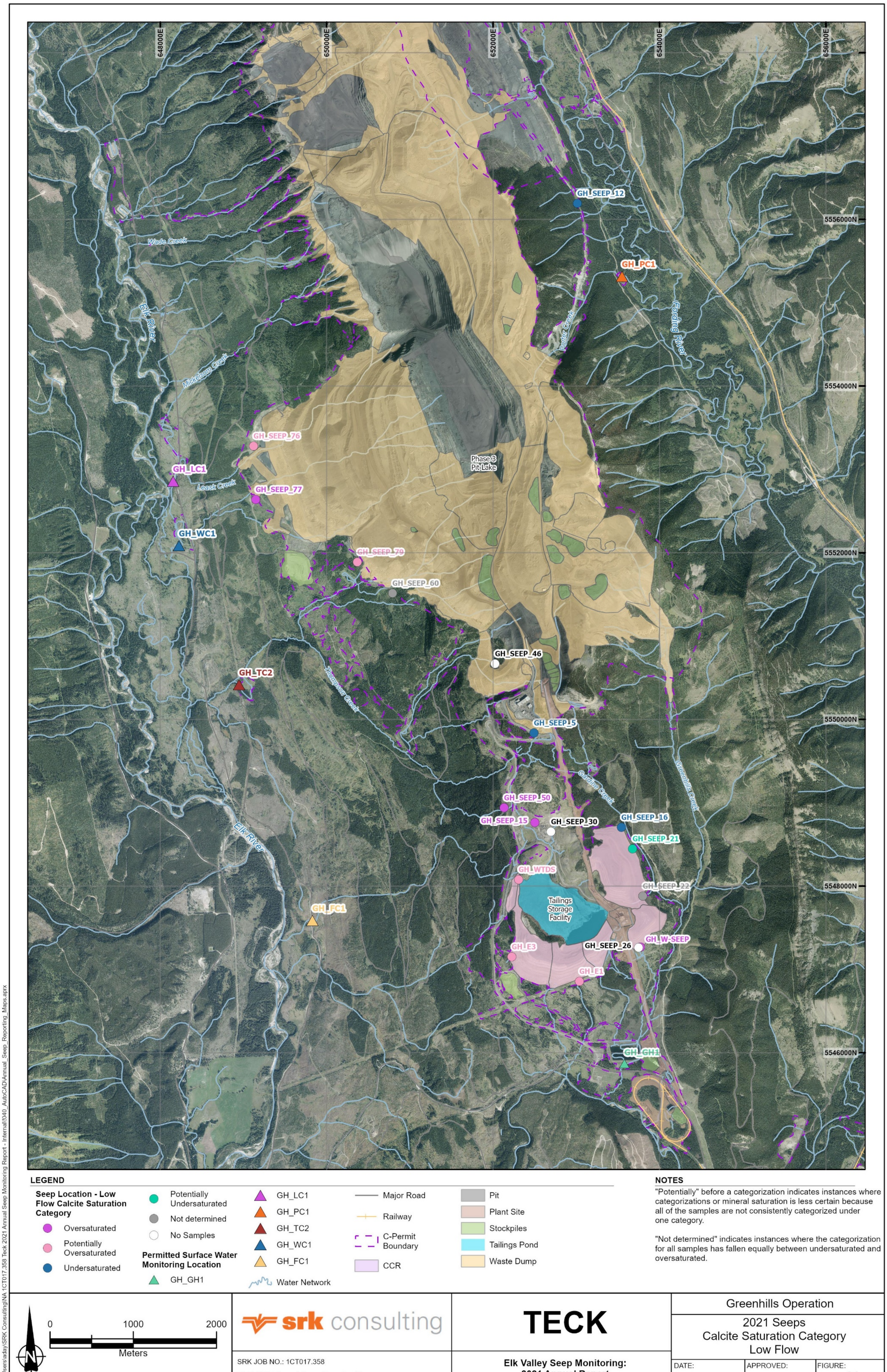
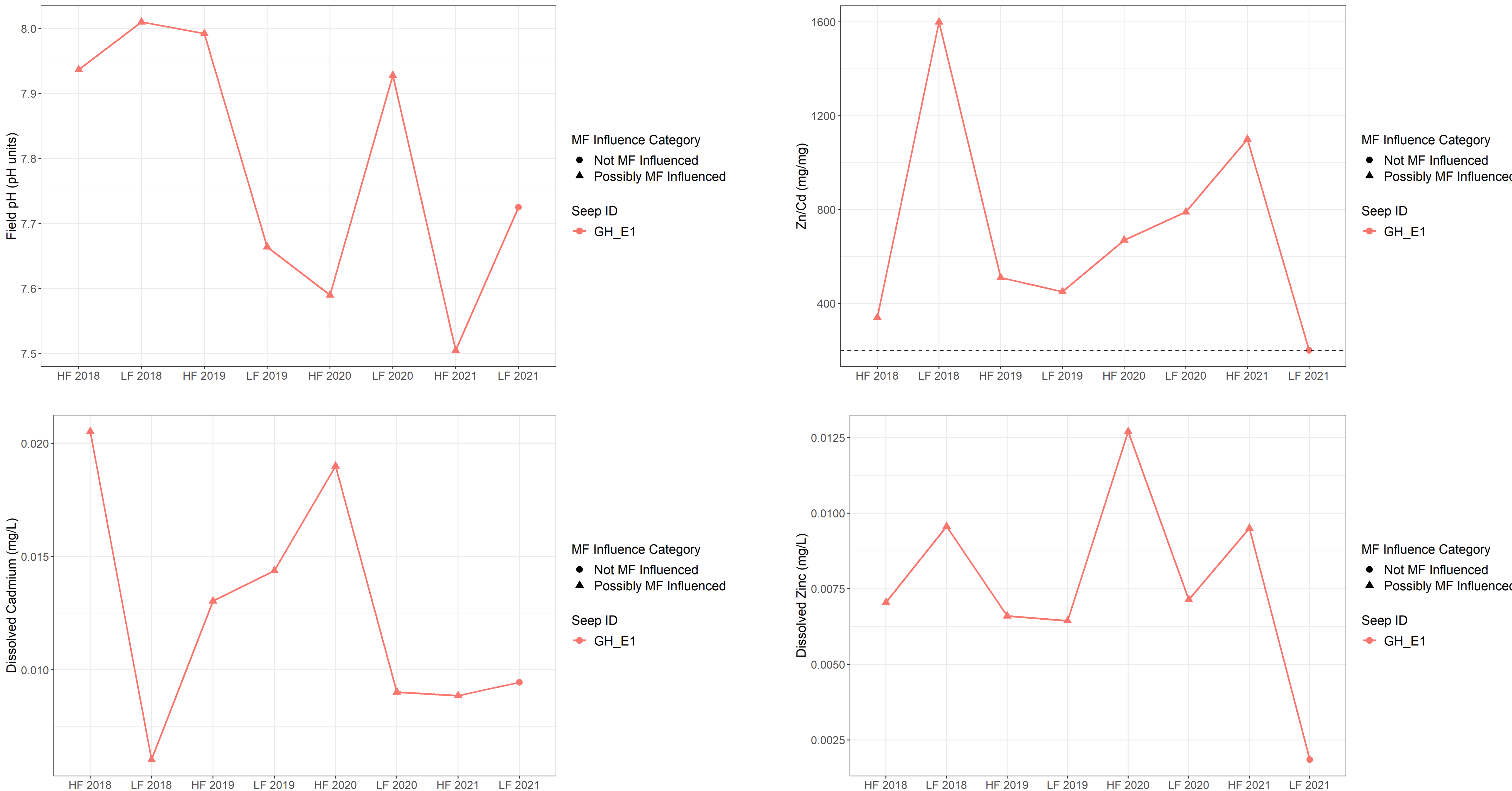
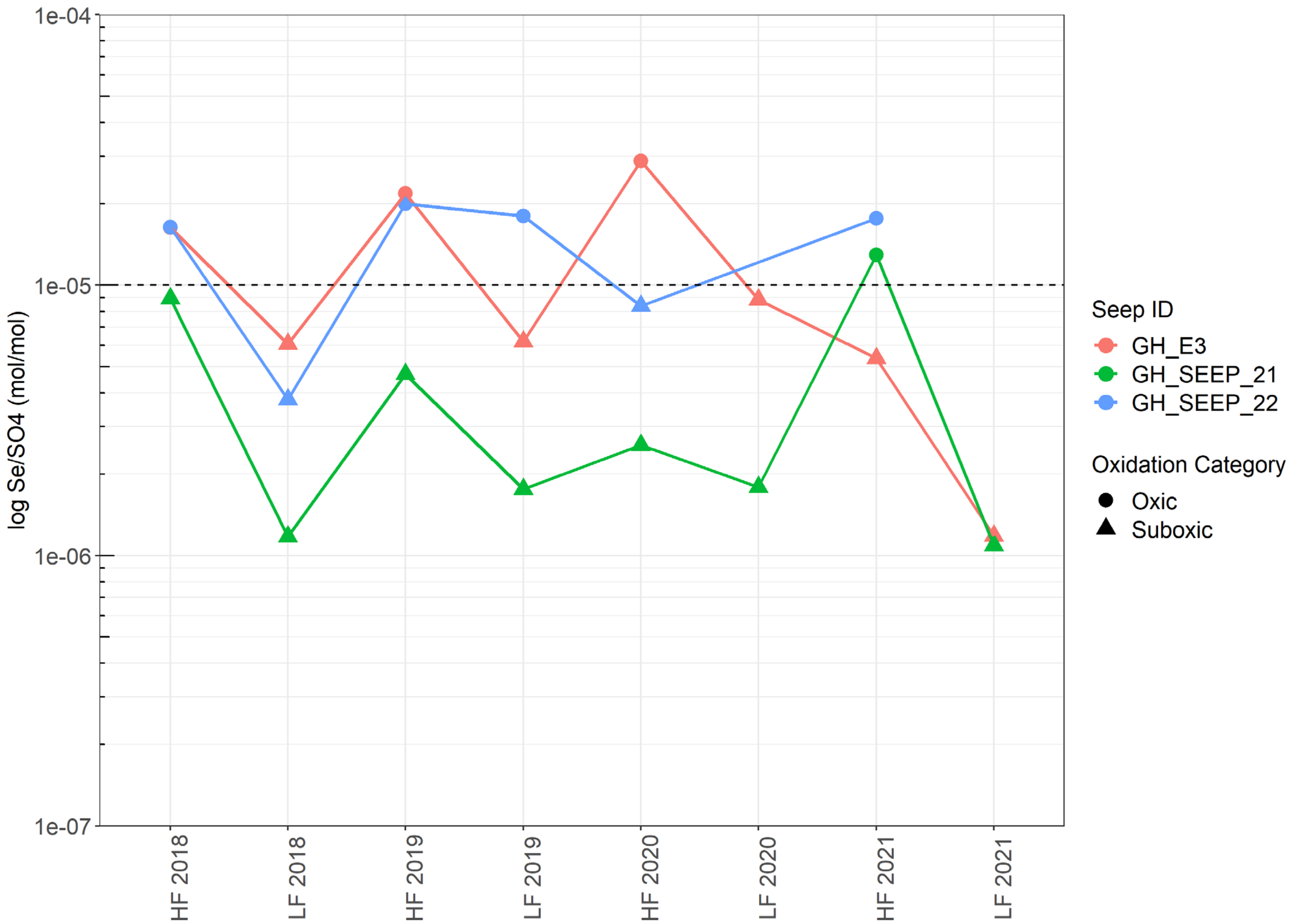


Figure 25: GHO water quality timeseries for field pH, zinc, cobalt, and Zn/Cd at GH_E1 and GH_E3



Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_Timeseries_Graphs%20Zn_Cd%20and%20Se_SO4%202021.Rmd
Notes: Dashed line shows the Zn/Cd criterion that is applied to categorize seeps as possibly MF influenced.

Figure 26: GHO seep GH_E3, GH_SEEP_21, and GH_SEEP22 water quality timeseries for Se/SO_4



Sources:
https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_Timeseries_Graphs%20Zn_Cd%20and%20Se_SO4%202021.Rmd

Notes: Dashed line shows the Se/SO_4 criterion that is applied to categorize seeps as suboxic/oxic.

Figure 27: 2021 Seeps and Selected Permitted Surface Water Monitoring Locations - LCO

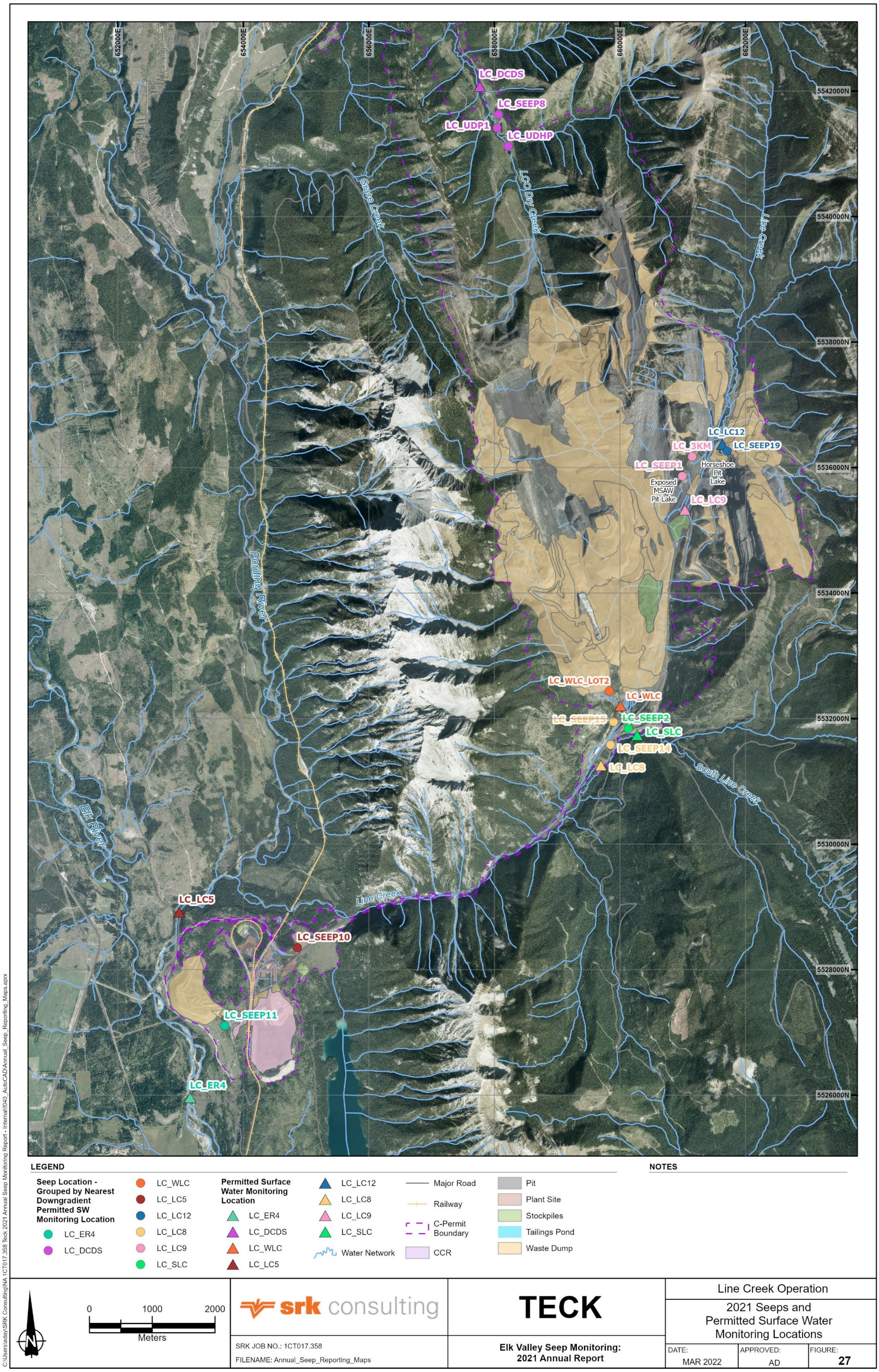


Figure 28: High Flow Seep Oxidation Category - LCO

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Line Creek Operation

2021 Seeps and Oxidation Category High Flow

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Figure 29: Low Flow Seep Oxidation Category - LCO

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Line Creek Operation

2021 Seeps and Oxidation Category Low Flow

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Figure 30: High Flow Seep Morrissey Formation Influence Category - LCO

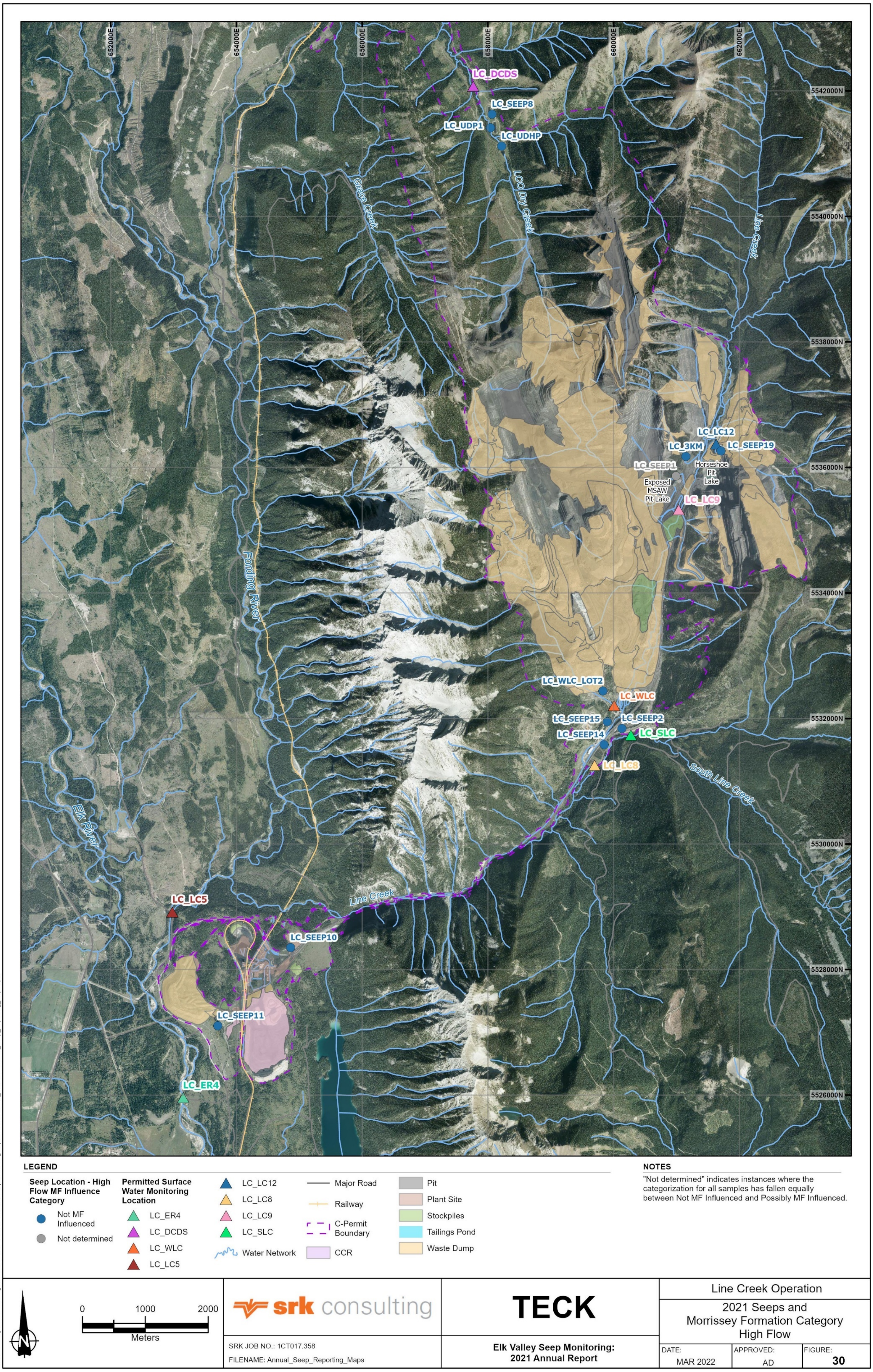
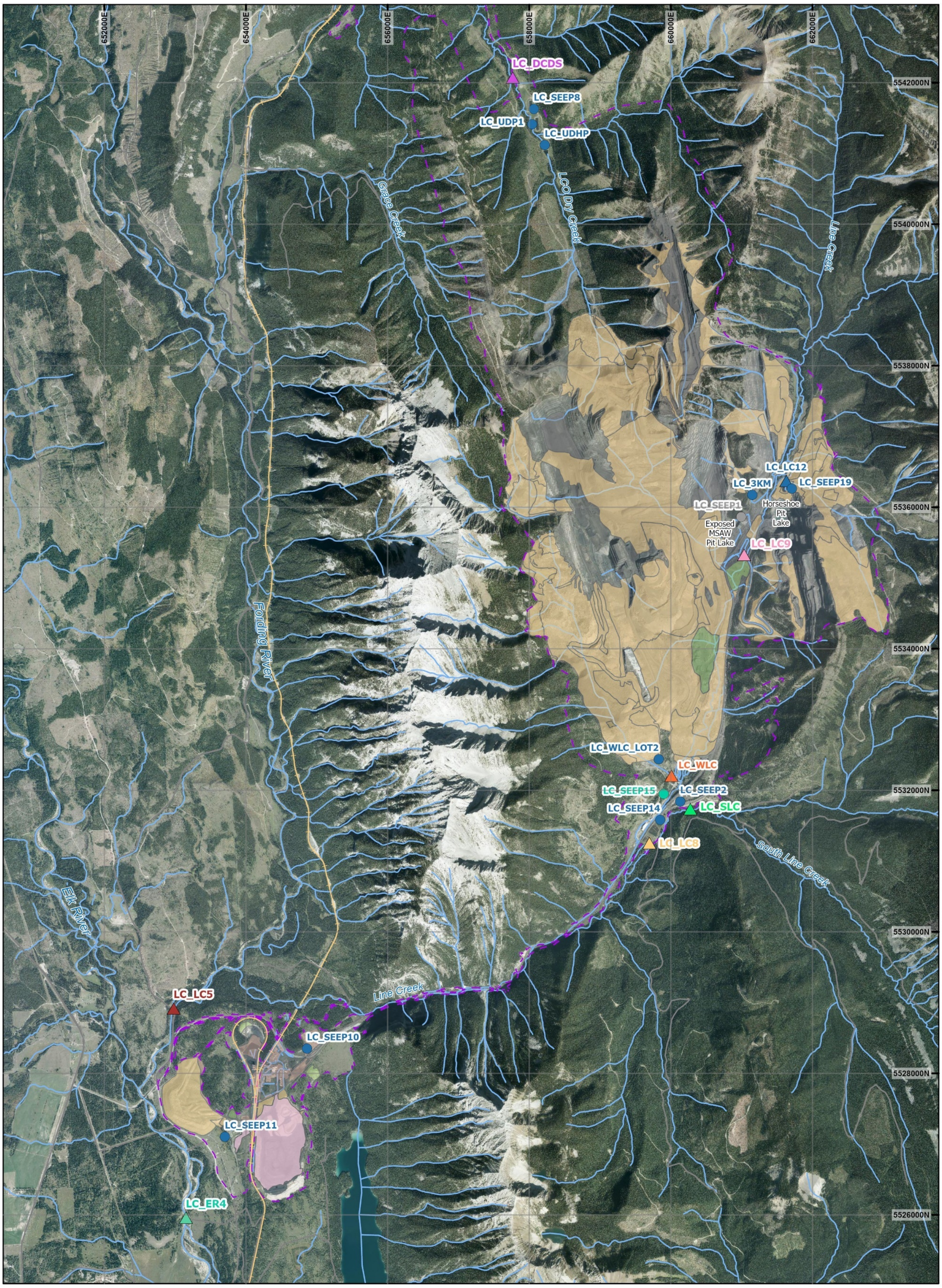


Figure 31: Low Flow Seep Morrissey Formation Influence Category - LCO



LEGEND

Seep Location - Low Flow MF Influence Category
- Not MF Influenced
- Potentially Not MF Influenced
- Not determined

Permitted Surface Water Monitoring Location
- LC_ER4
- LC_DCDS
- LC_WLC
- LC_LC5
- LC_LC12
- LC_LC8
- LC_LC9
- LC_SLC

- Railway
- C-Permit Boundary
- CCR
- Water Network
- Major Road
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump

NOTES

"Potentially" before a categorization indicates instances where categorizations or mineral saturation is less certain because all of the samples are not consistently categorized under one category.

"Not determined" indicates instances where the categorization for all samples has fallen equally between Not MF Influenced and Possibly MF Influenced.

0 1000 2000
Meters

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Line Creek Operation

2021 Seeps and Morrissey Formation Category Low Flow

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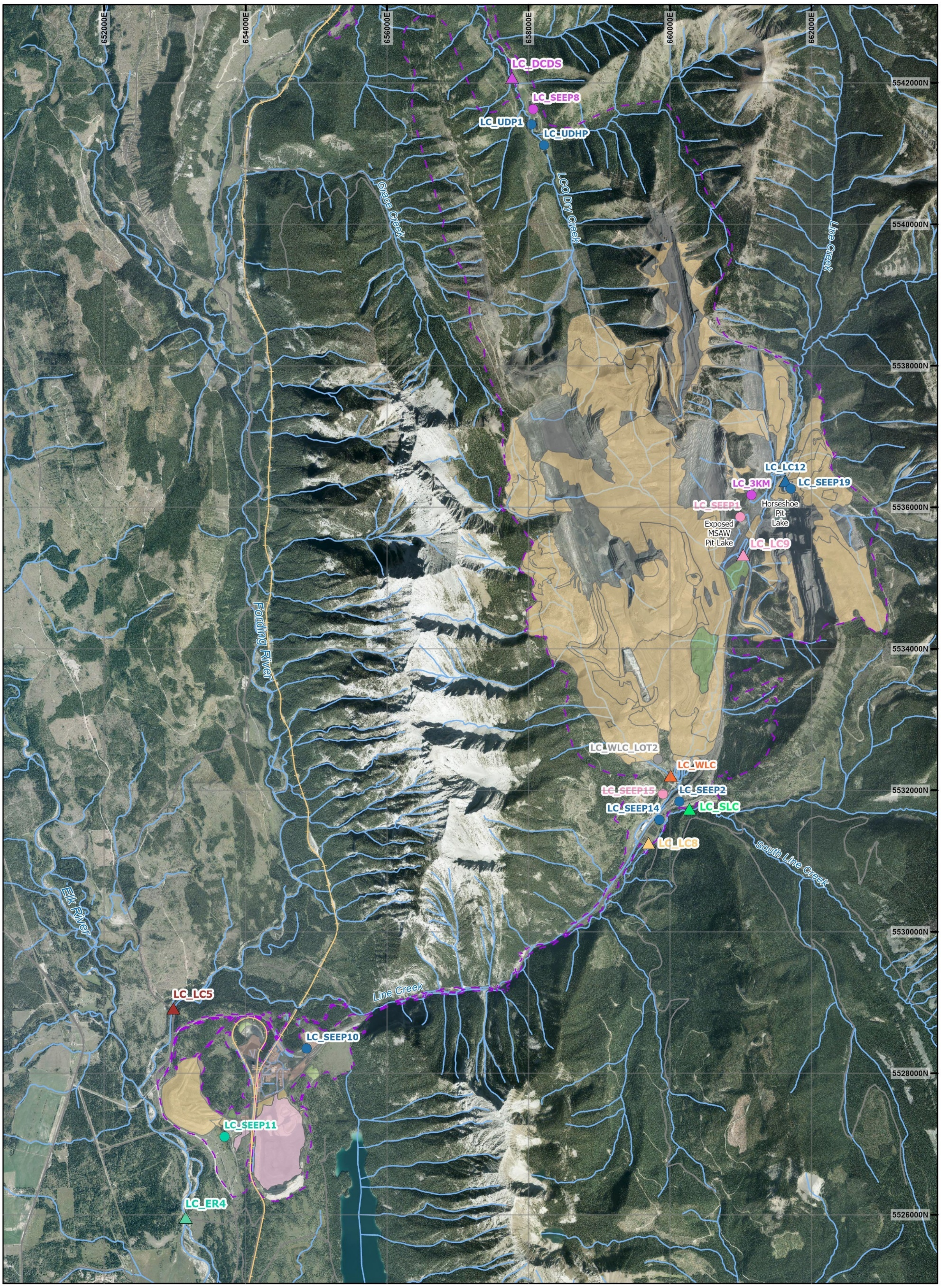
Figure 32: High Flow Calcite Saturation - LCO



LEGEND

Seep Location - High Flow Calcite Saturation
- Oversaturated
- Potentially Oversaturated
- Undersaturated
- Potentially Undersaturated
- Not determined

Permitted Surface Water Monitoring Location
- LC_ER4
- LC_DCDS
- LC_WLC
- LC_LC5
- LC_LC12
- LC_LC8
- LC_LC9
- LC_SLC

- Railway
- C-Permit Boundary
- Water Network
- Major Road
- CCR
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump

NOTES

"Potentially" before a categorization indicates instances where categorizations or mineral saturation is less certain because all of the samples are not consistently categorized under one category.

"Not determined" indicates instances where the categorization for all samples has fallen equally between undersaturated and oversaturated.

0 1000 2000
Meters

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Elk Valley Seep Monitoring:
2021 Annual Report

Line Creek Operation

2021 Seeps and
Calcite Saturation Category
High Flow

DATE: MAR 2022 | APPROVED: AD | FIGURE: 32

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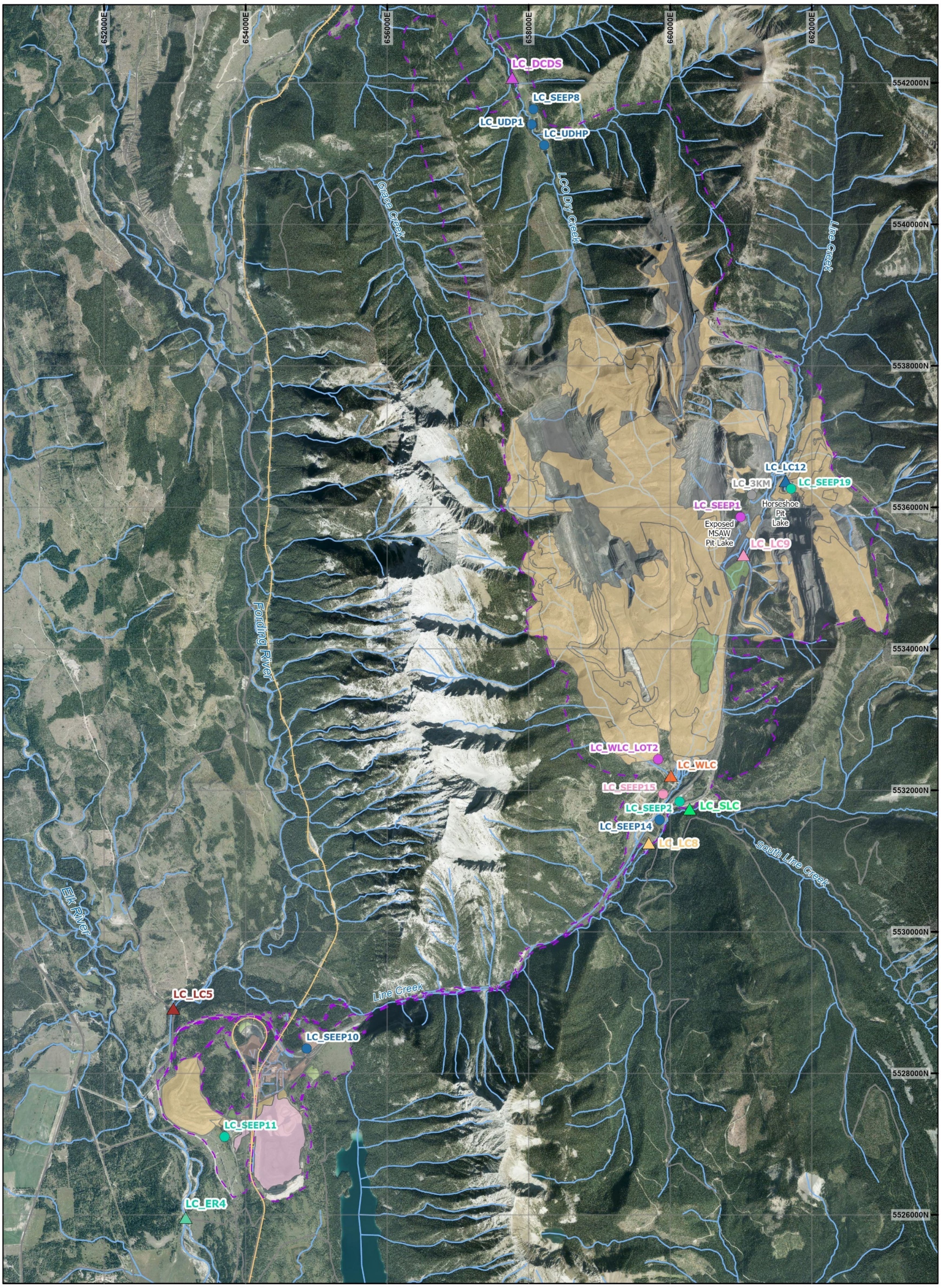
Figure 33: Low Flow Calcite Saturation - LCO



LEGEND

Seep Location - Low Flow Calcite Saturation
- Oversaturated
- Potentially Oversaturated
- Undersaturated
- Potentially Undersaturated
- Not determined

Permitted Surface Water Monitoring Location
- LC_ER4
- LC_DCDS
- LC_WLC
- LC_LC5
- LC_LC12
- LC_LC8
- LC_LC9
- LC_SLC

- Railway
- C-Permit Boundary
- Water Network
- Major Road
- CCR
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump

NOTES

"Potentially" before a categorization indicates instances where categorizations or mineral saturation is less certain because all of the samples are not consistently categorized under one category.

"Not determined" indicates instances where the categorization for all samples has fallen equally between undersaturated and oversaturated.

0 1000 2000
Meters

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Line Creek Operation

2021 Seeps and Calcite Saturation Category Low Flow

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Figure 34: 2021 Seeps and Selected Permitted Surface Water Monitoring Locations - EVO

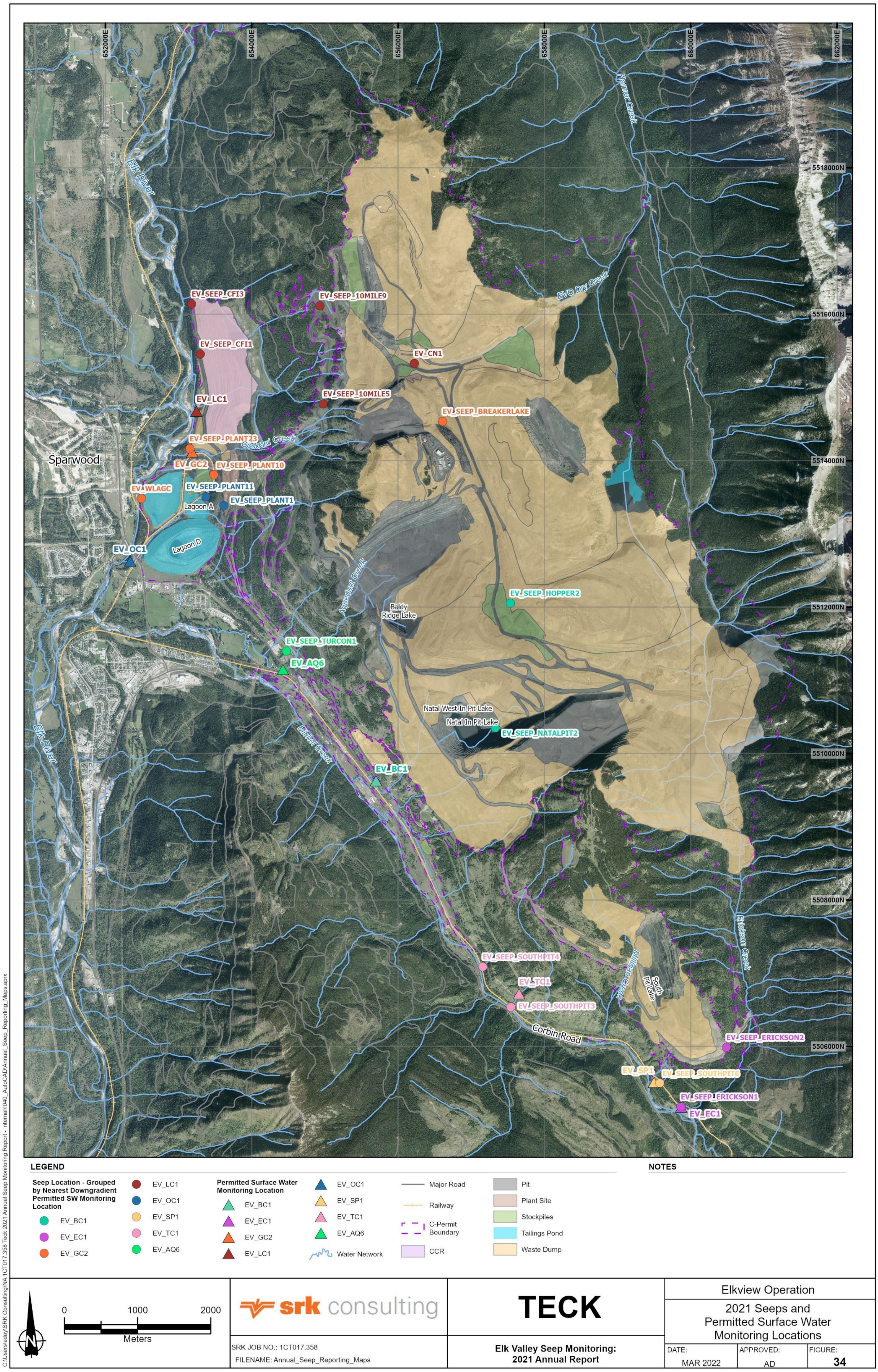

Figure 35: High Flow Seep Oxidation Category - EVO

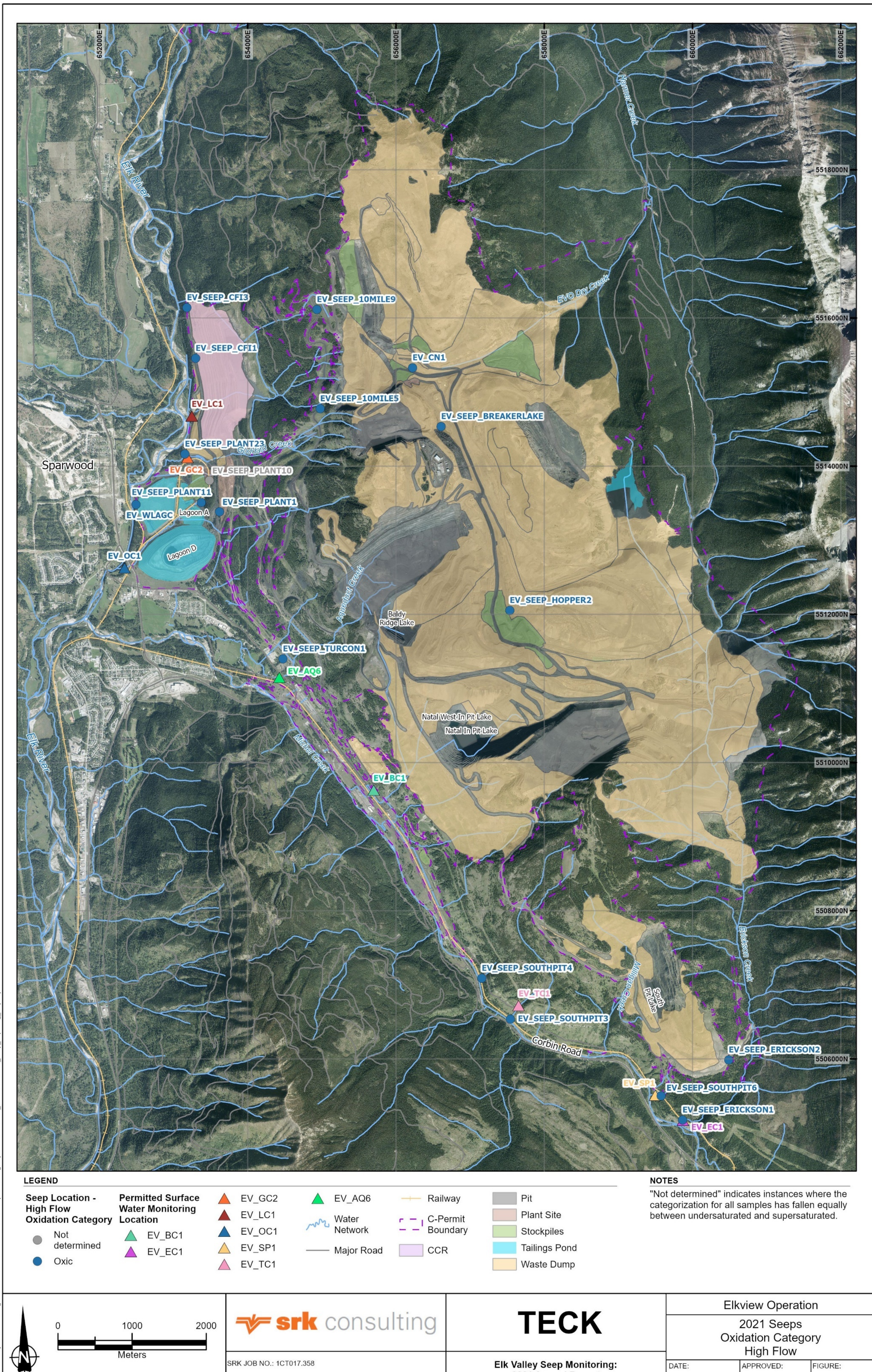

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Figure 36: Low Flow Seep Oxidation Category - EVO

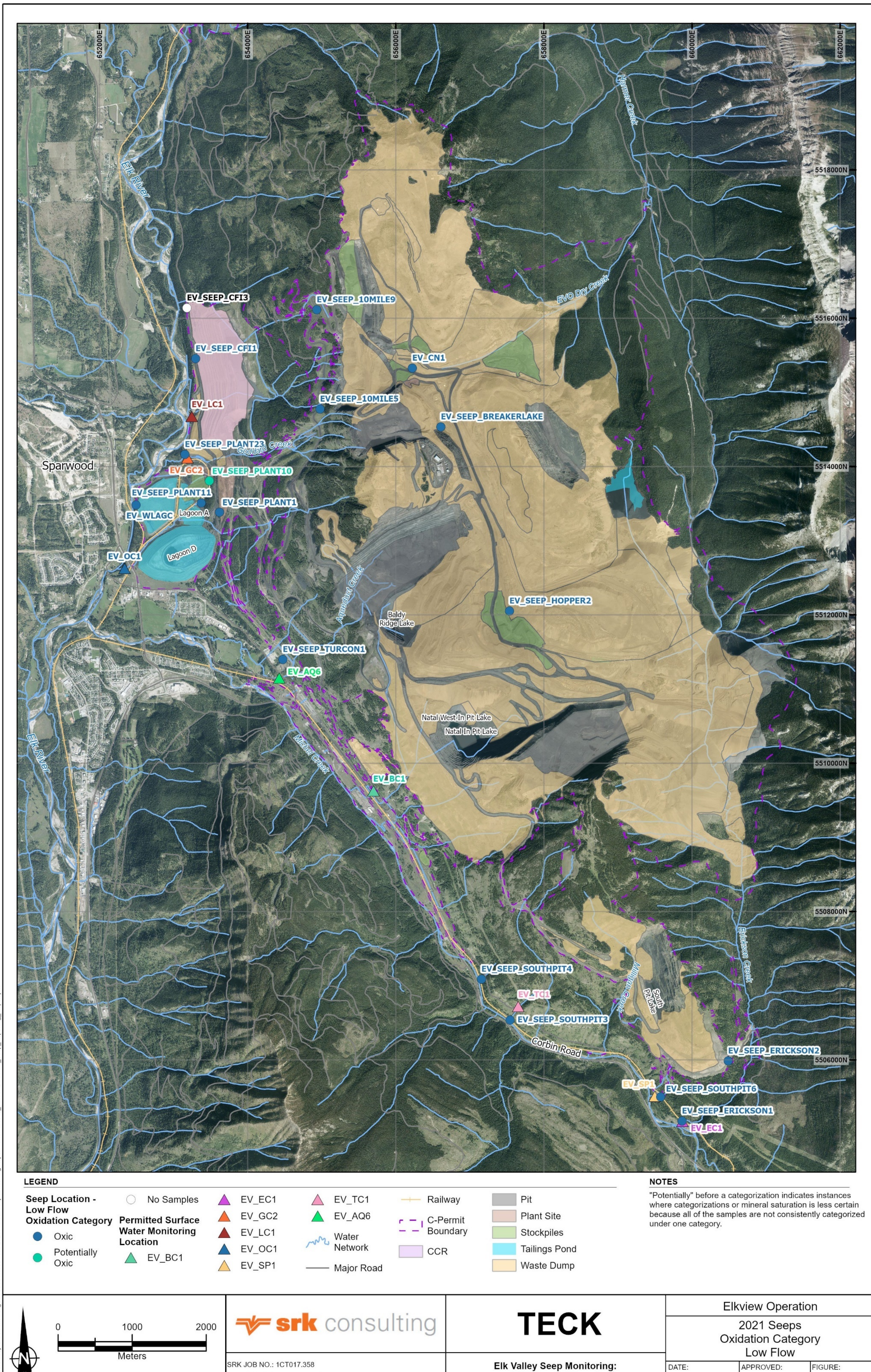


Figure 37: High Flow Seep Morrissey Formation Influence Category - EVO

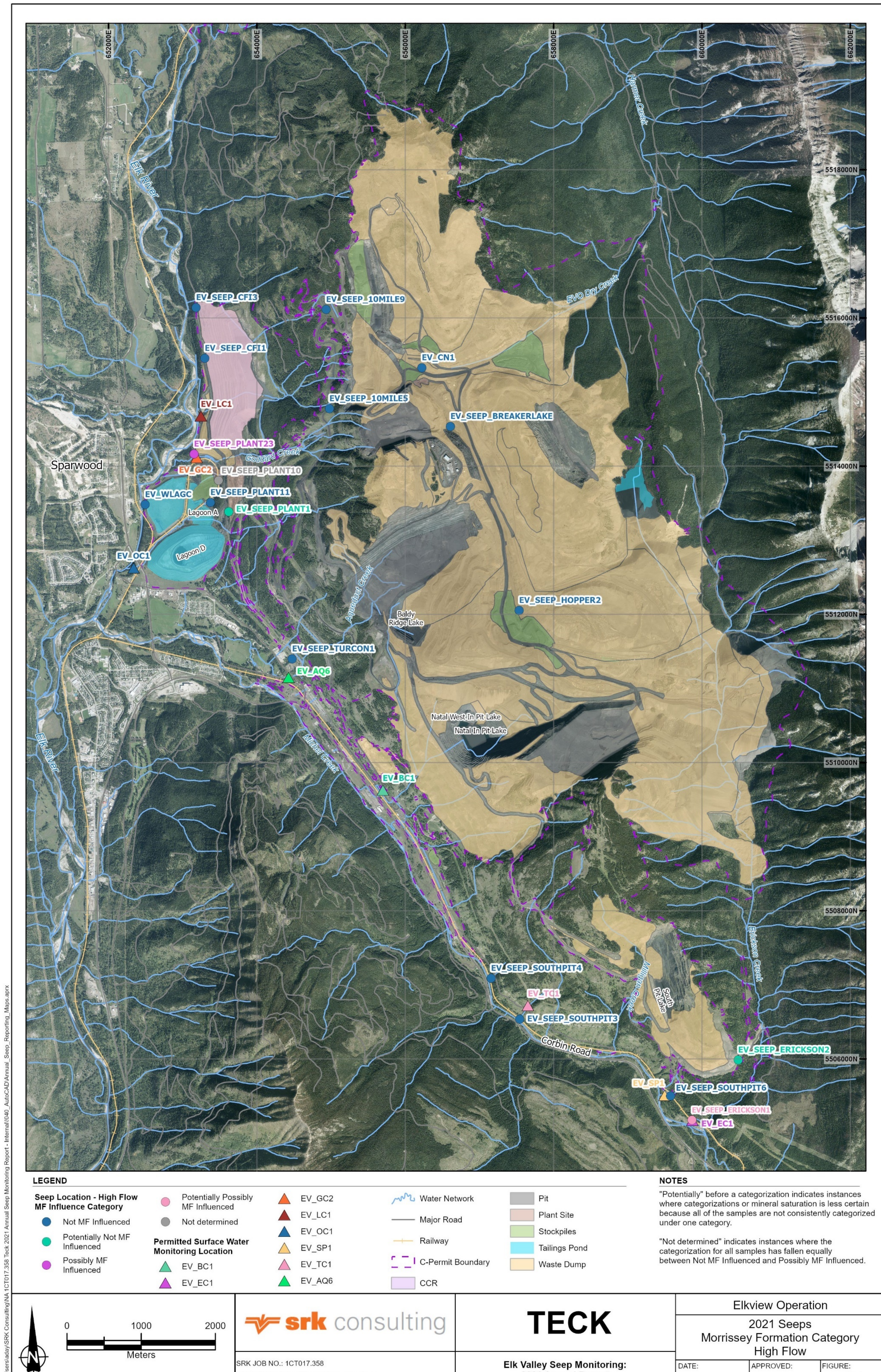


Figure 38: Low Flow Seep Morrissey Formation Influence Category - EVO

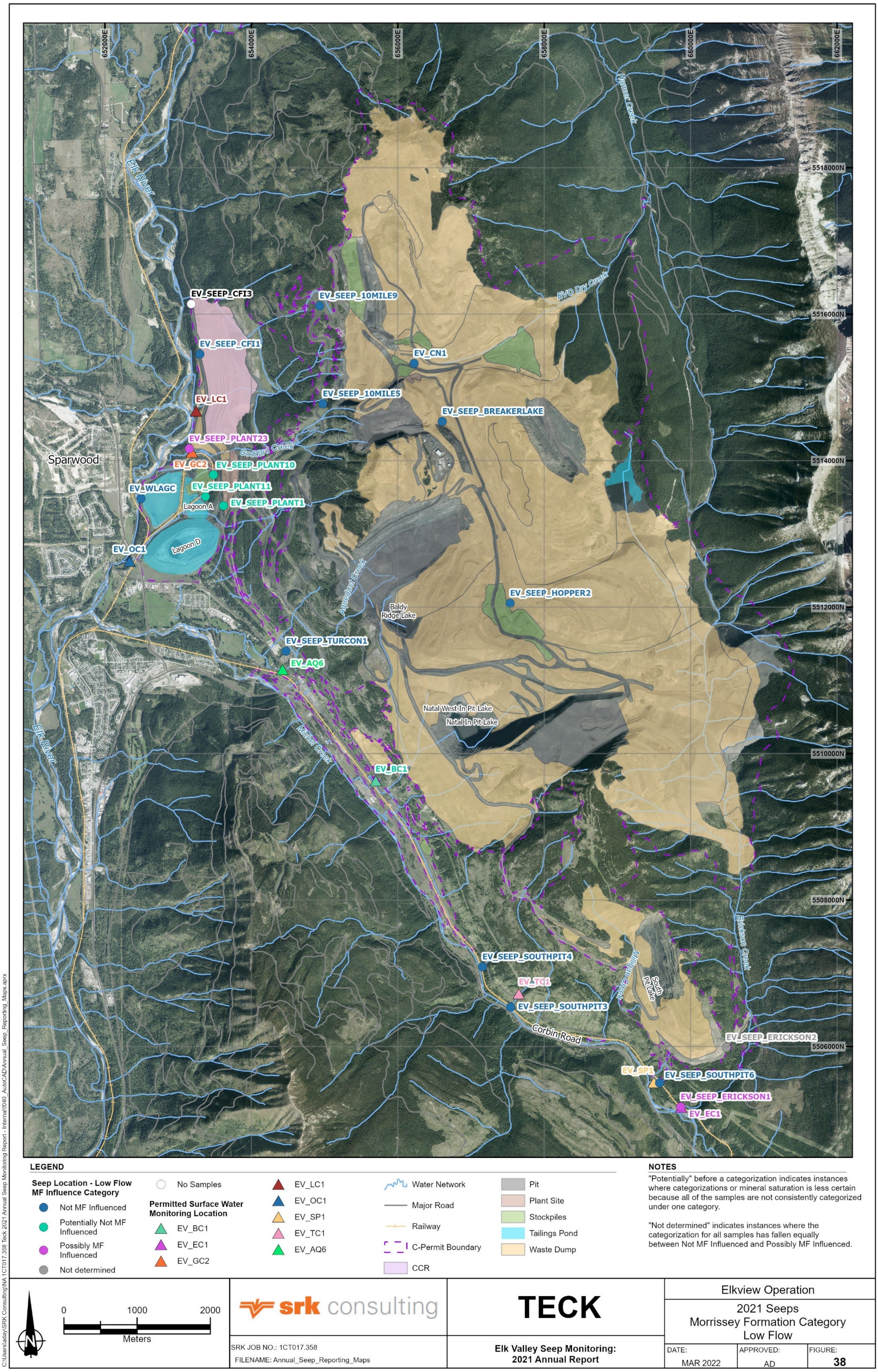


Figure 39: High Flow Calcite Saturation – EVO

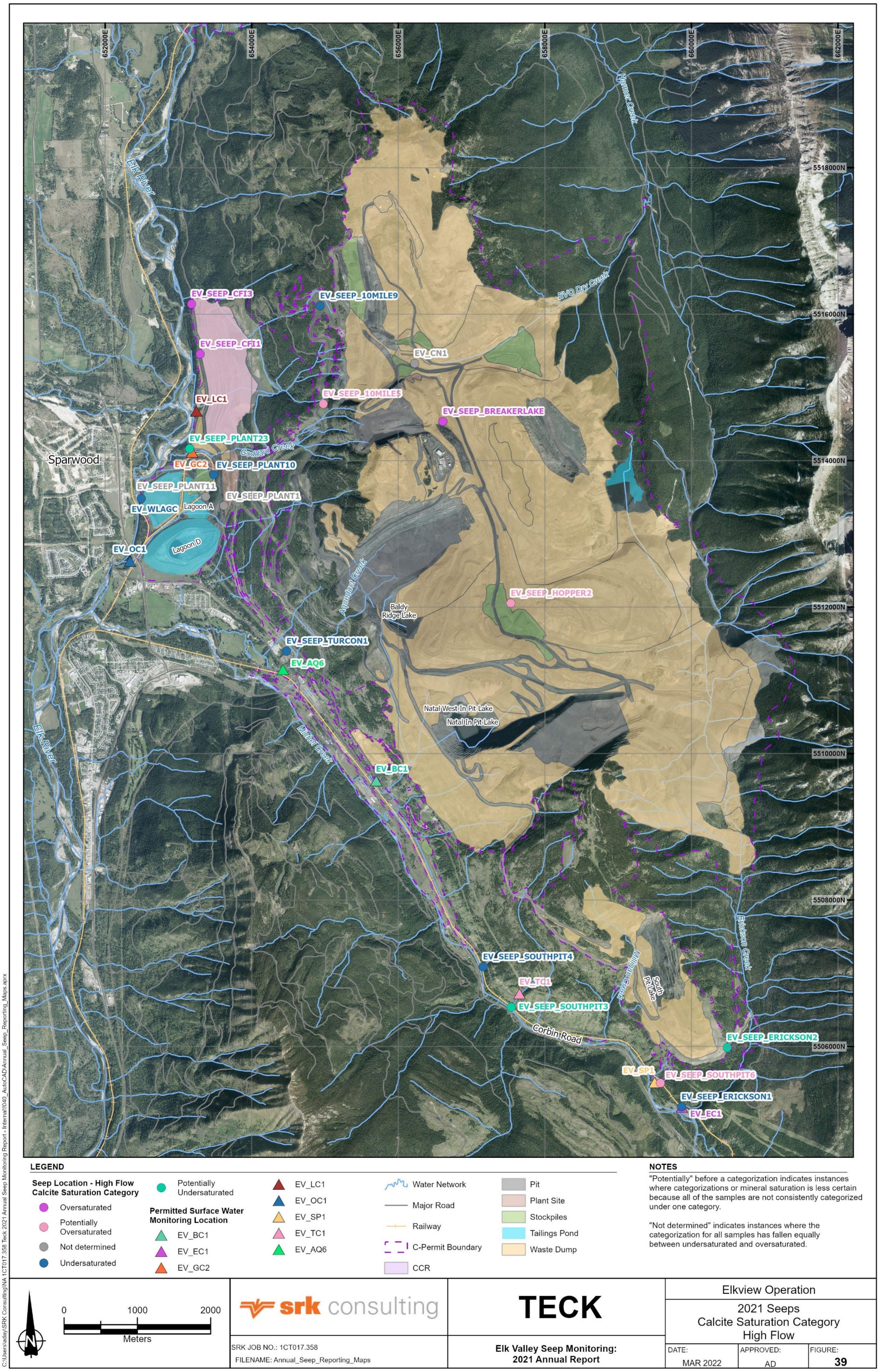


Figure 40: Low Flow Calcite Saturation – EVO

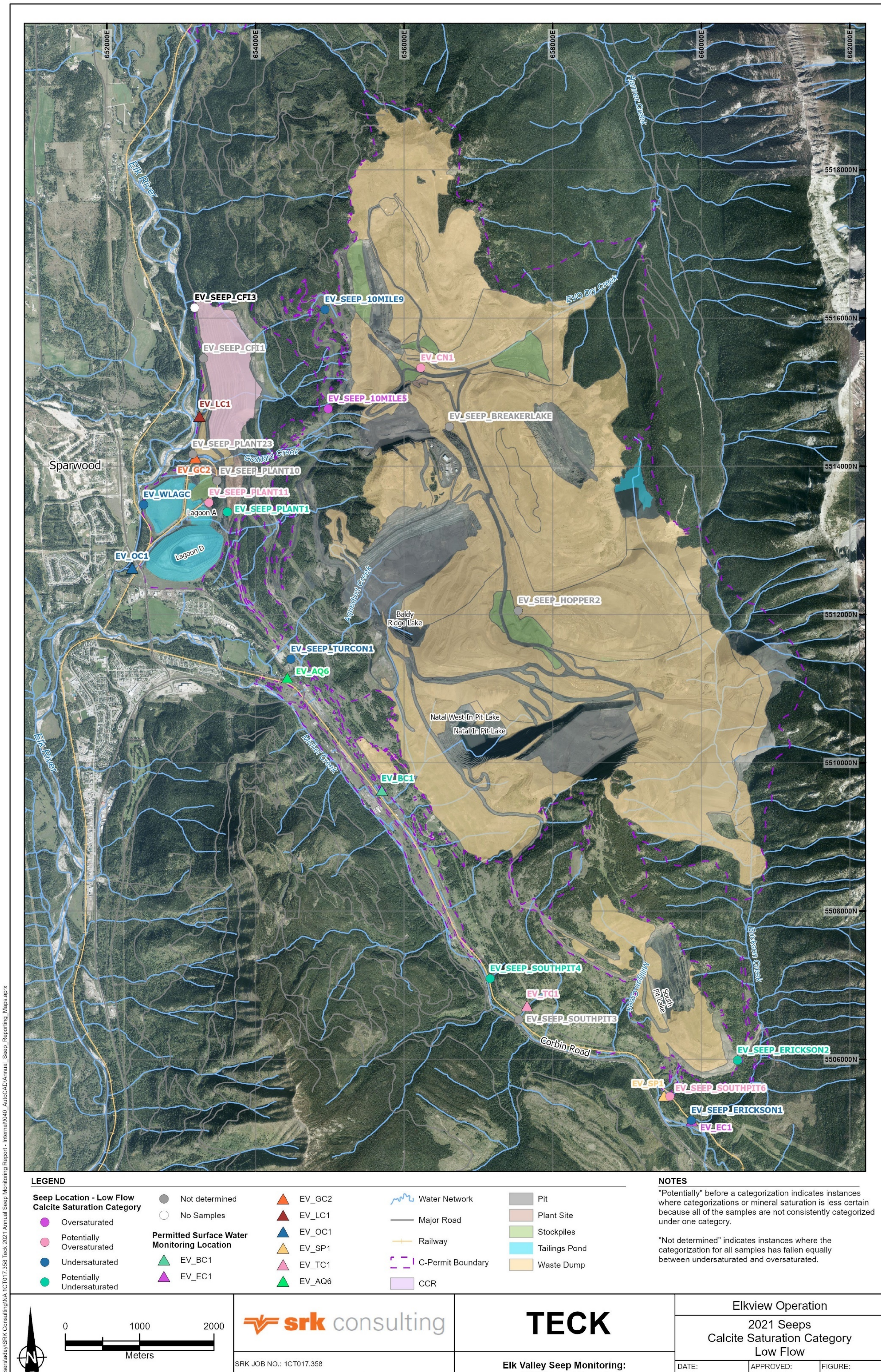
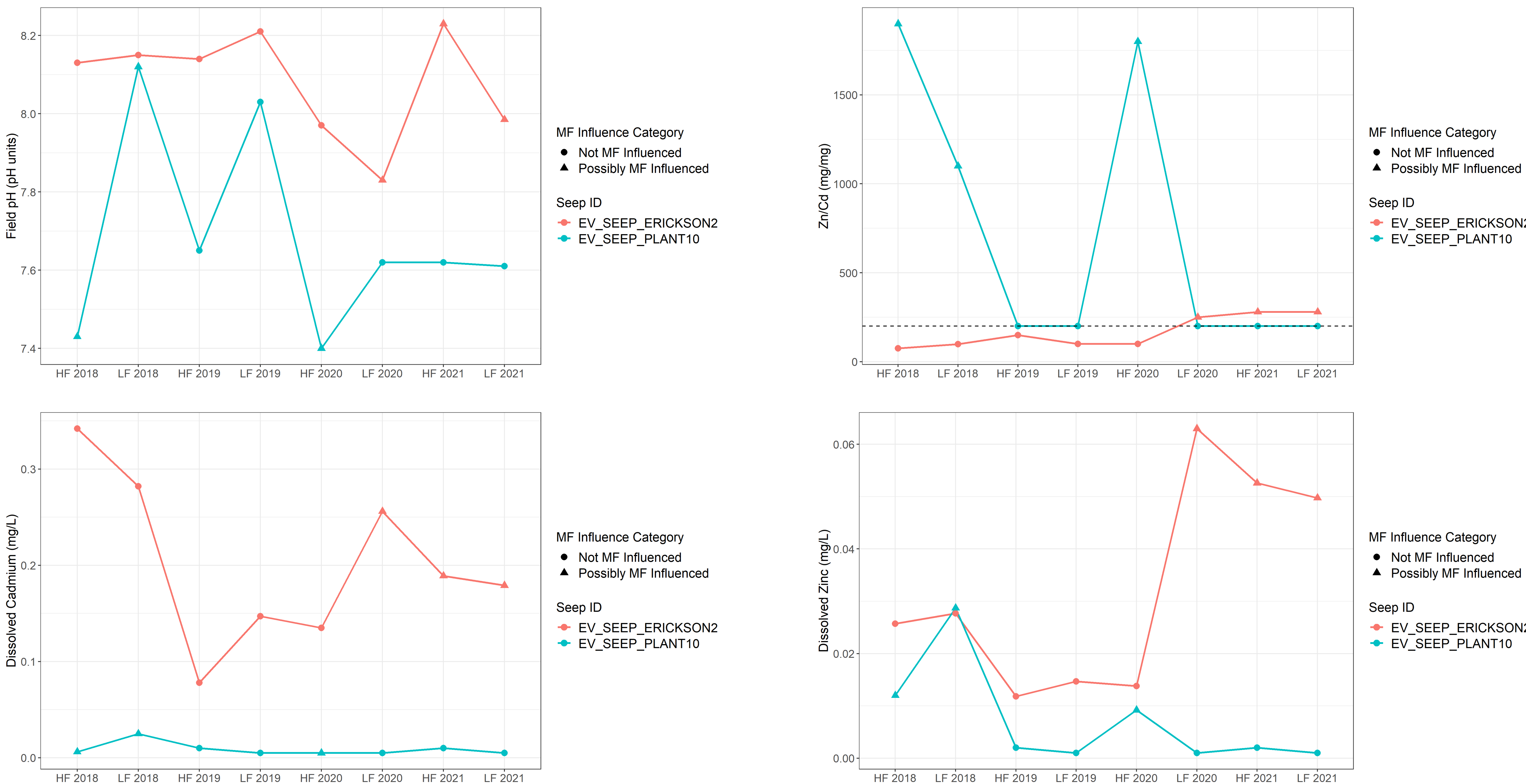
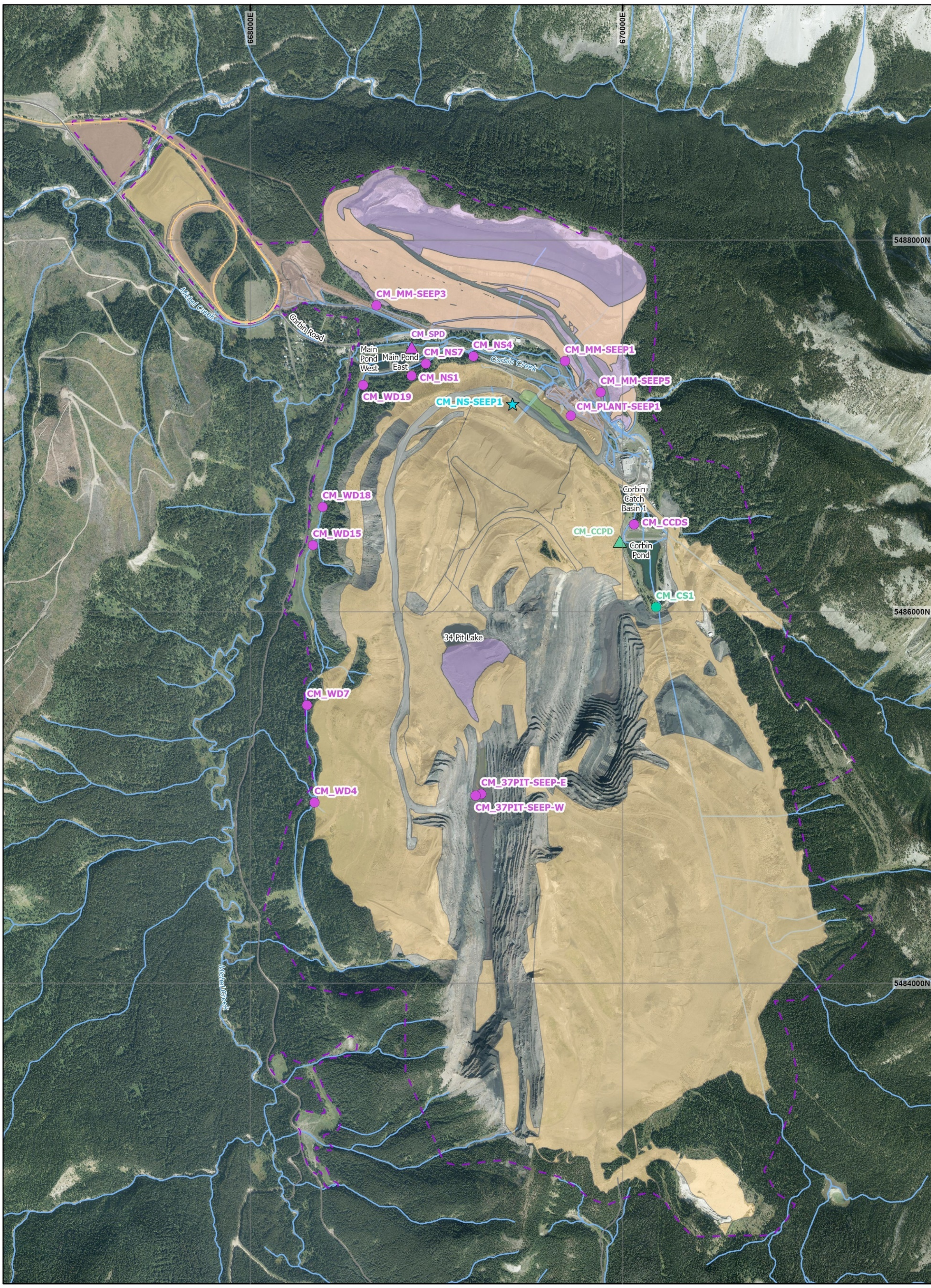


Figure 41: EVO water quality timeseries for field pH, zinc, cobalt, and Zn/Cd at EV_SEEP_PLANT10 and EV_SEEP_ERICKSON2



Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_Timeseries_Graphs%20Zn_Cd%20and%20Se_SO4%202021.Rmd
Notes: Dashed line shows the Zn/Cd criterion that is applied to categorize seeps as possibly MF influenced.

Figure 42: 2021 Seeps and Selected Permitted Surface Water Monitoring Locations – CMM



LEGEND

Seep Location - Grouped by Nearest Downgradient Permitted SW Monitoring Location
- CM_CCPD
- CM_SPD

New Seep

Permitted Surface Water Monitoring Location
- CM_CCPD
- CM_SPD

Water Network

Major Road
Railway
C-Permit Boundary
CCR
Pit

Plant Site
Stockpiles
Tailings Pond
Waste Dump

NOTES

0 500 1000
Meters

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Elk Valley Seep Monitoring: 2021 Annual Report

Coal Mountain Mine

2021 Seeps and Permitted Surface Water Monitoring Locations

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Figure 43: High Flow Seep Oxidation Category - CMM

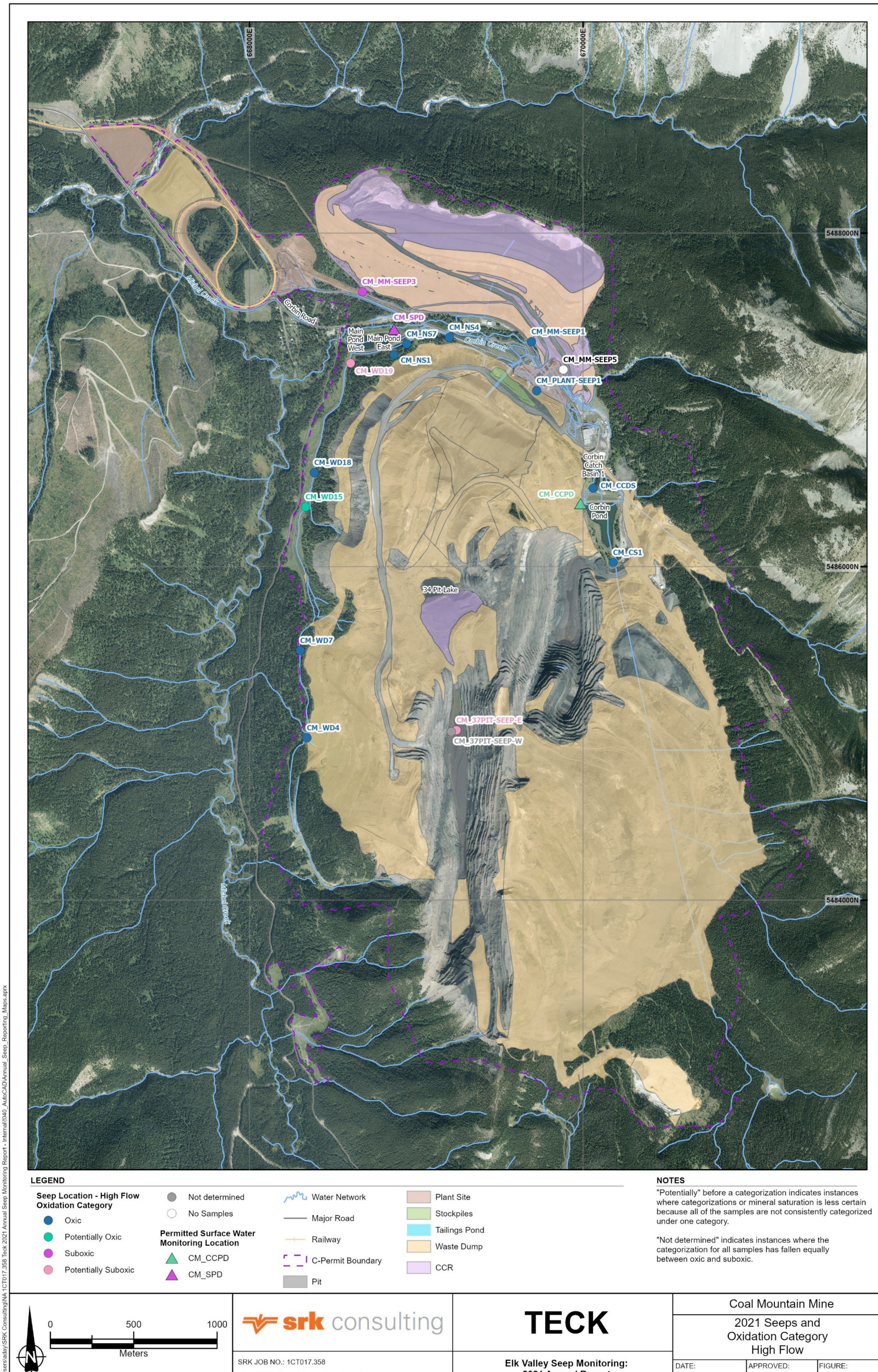
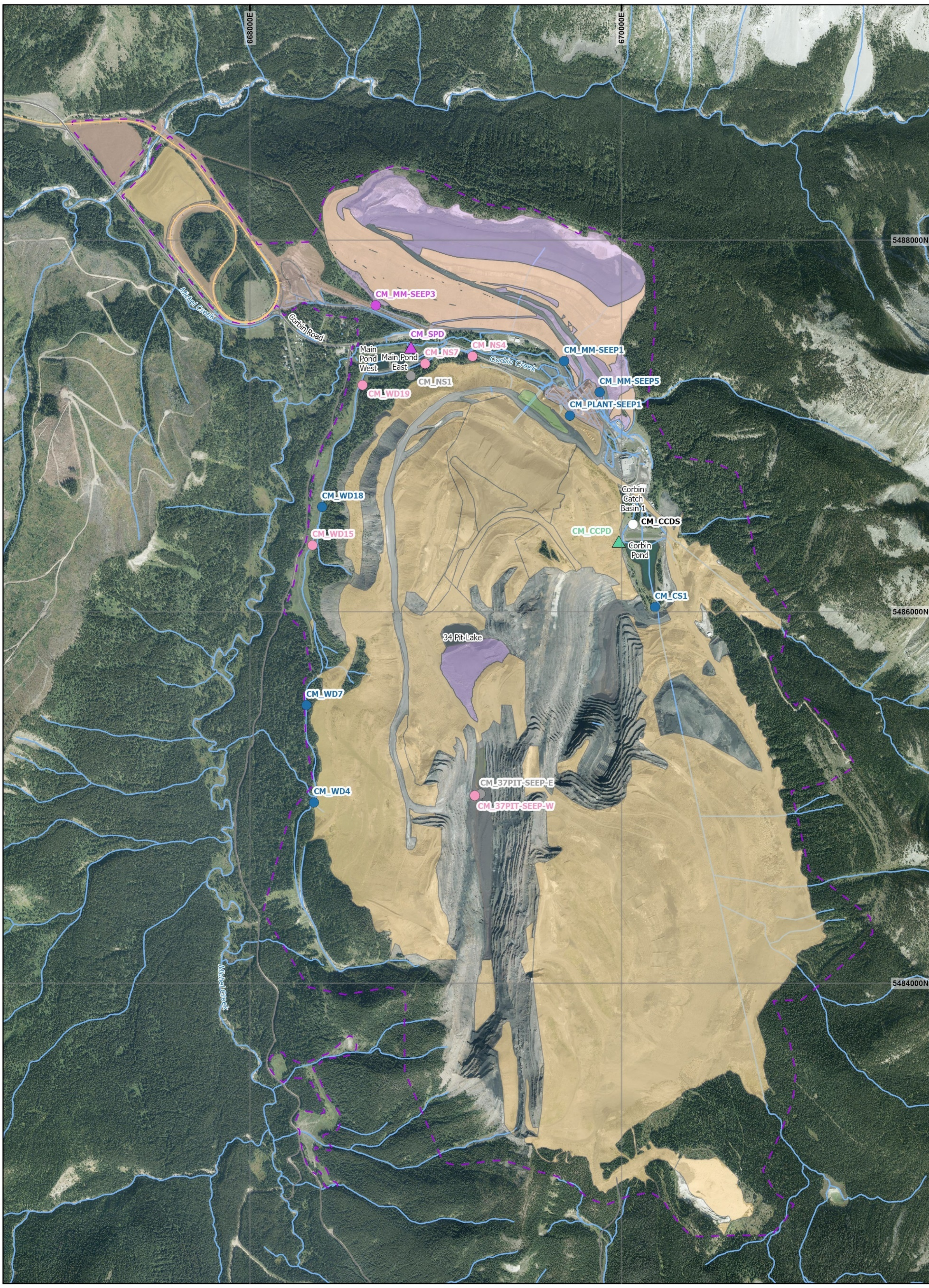


Figure 44: Low Flow Seep Oxidation Category - CMM



LEGEND

Seep Location - Low Flow Oxidation Category
- Oxic
- Suboxic
- Potentially Suboxic
- Not determined

No Samples

Permitted Surface Water Monitoring Location
- CM_CCPD
- CM_SPD

Water Network

Major Road
Railway
C-Permit Boundary
Pit
Plant Site

Stockpiles
Tailings Pond
Waste Dump
CCR

NOTES

"Potentially" before a categorization indicates instances where categorizations or mineral saturation is less certain because all of the samples are not consistently categorized under one category.

"Not determined" indicates instances where the categorization for all samples has fallen equally between oxic and suboxic.

0 500 1000
Meters

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Elk Valley Seep Monitoring:
2021 Annual Report

Coal Mountain Mine

2021 Seeps and
Oxidation Category
Low Flow

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Figure 45: High Flow Seep Morrissey Formation Influence Category - CMM

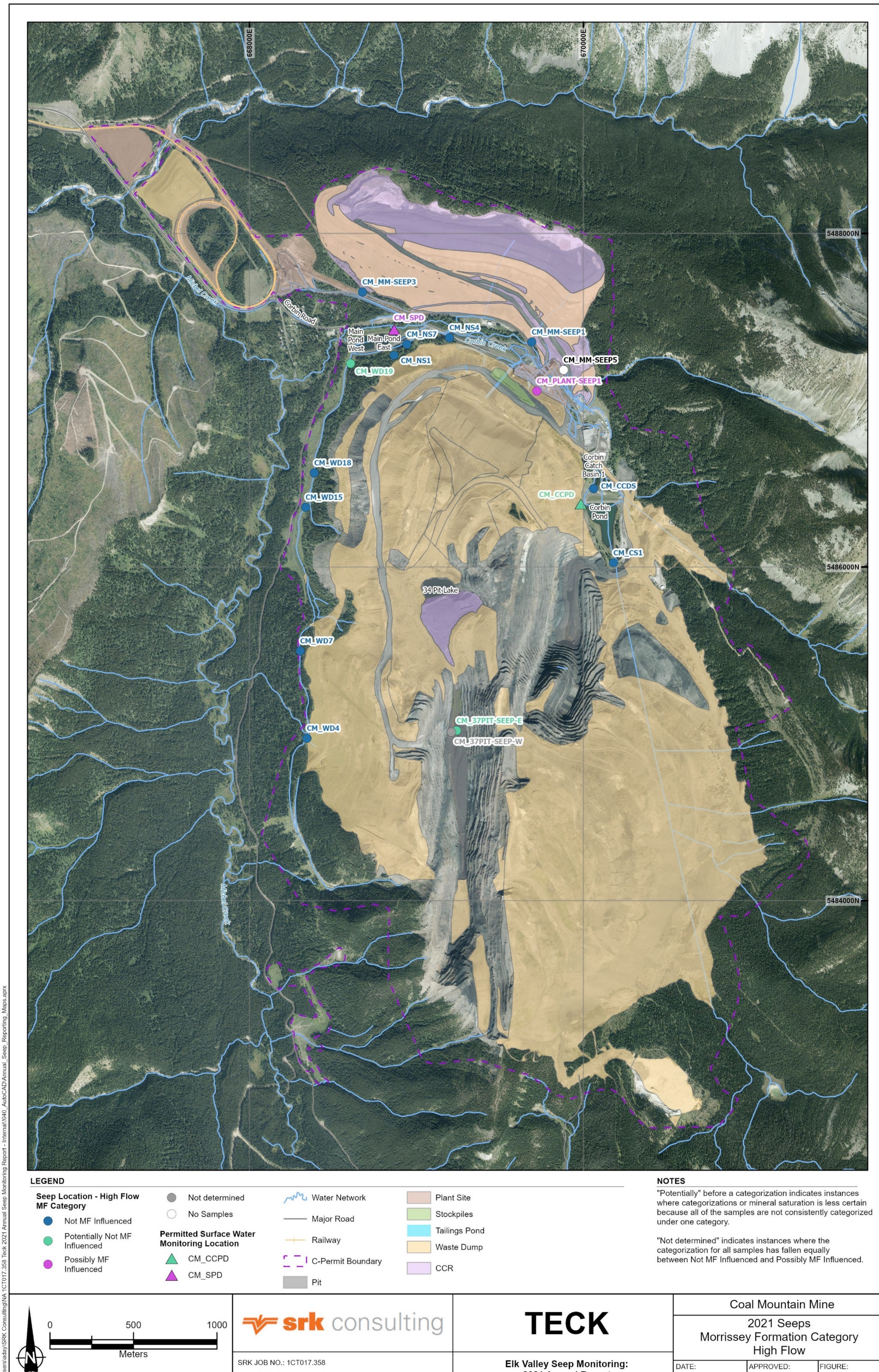
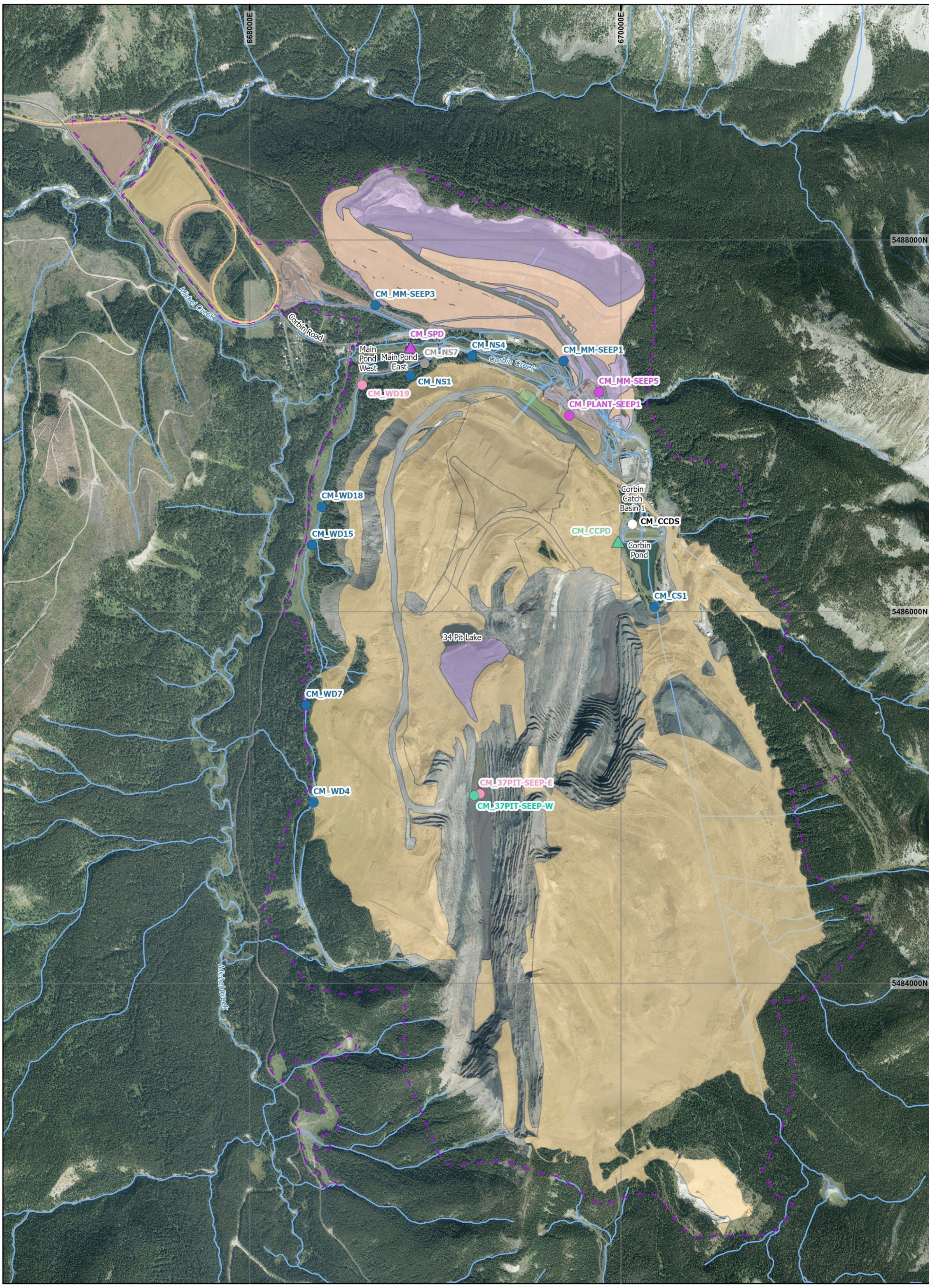


Figure 46: Low Flow Seep Morrissey Formation Influence Category - CMM



LEGEND

Seep Location - Low Flow MF Category
- Not MF Influenced
- Potentially Not MF Influenced
- Possibly MF Influenced
- Potentially Possibly MF Influenced
- Not determined
- No Samples

Permitted Surface Water Monitoring Location
- CM_CCPD
- CM_SPD
- Water Network
- Major Road
- Railway
- C-Permit Boundary
- Pit
- Plant Site
- Stockpiles
- Tailings Pond
- Waste Dump
- CCR

NOTES

"Potentially" before a categorization indicates instances where categorizations or mineral saturation is less certain because all of the samples are not consistently categorized under one category.

"Not determined" indicates instances where the categorization for all samples has fallen equally between Not MF Influenced and Possibly MF Influenced.

0 500 1000
Meters

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FILENAME: Annual_Seep_Reporting_Maps

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Elk Valley Seep Monitoring: 2021 Annual Report

Coal Mountain Mine
2021 Seeps
Morrissey Formation Category
Low Flow

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Figure 47: High Flow Calcite Saturation - CMM

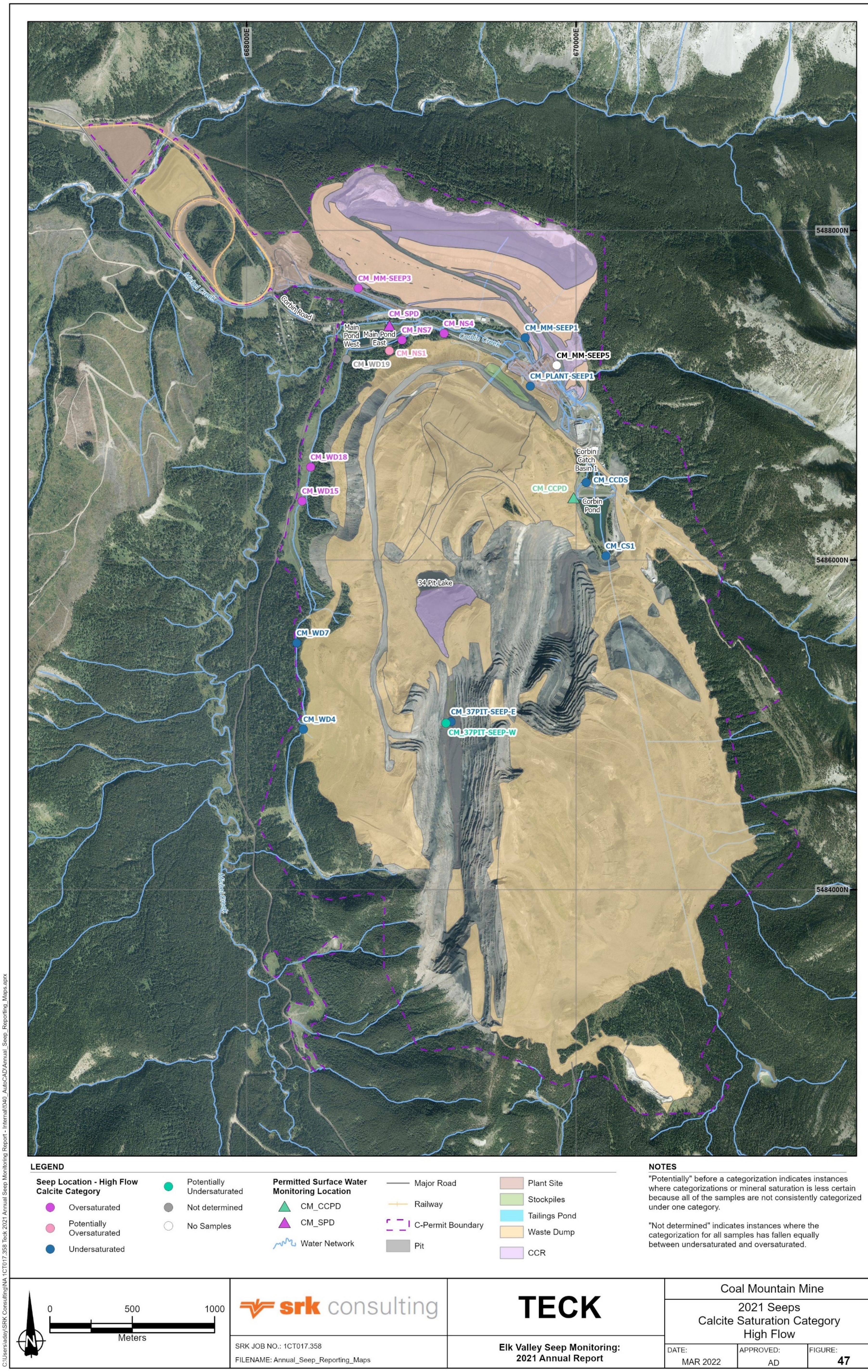


Figure 48: Low Flow Calcite Saturation - CMM

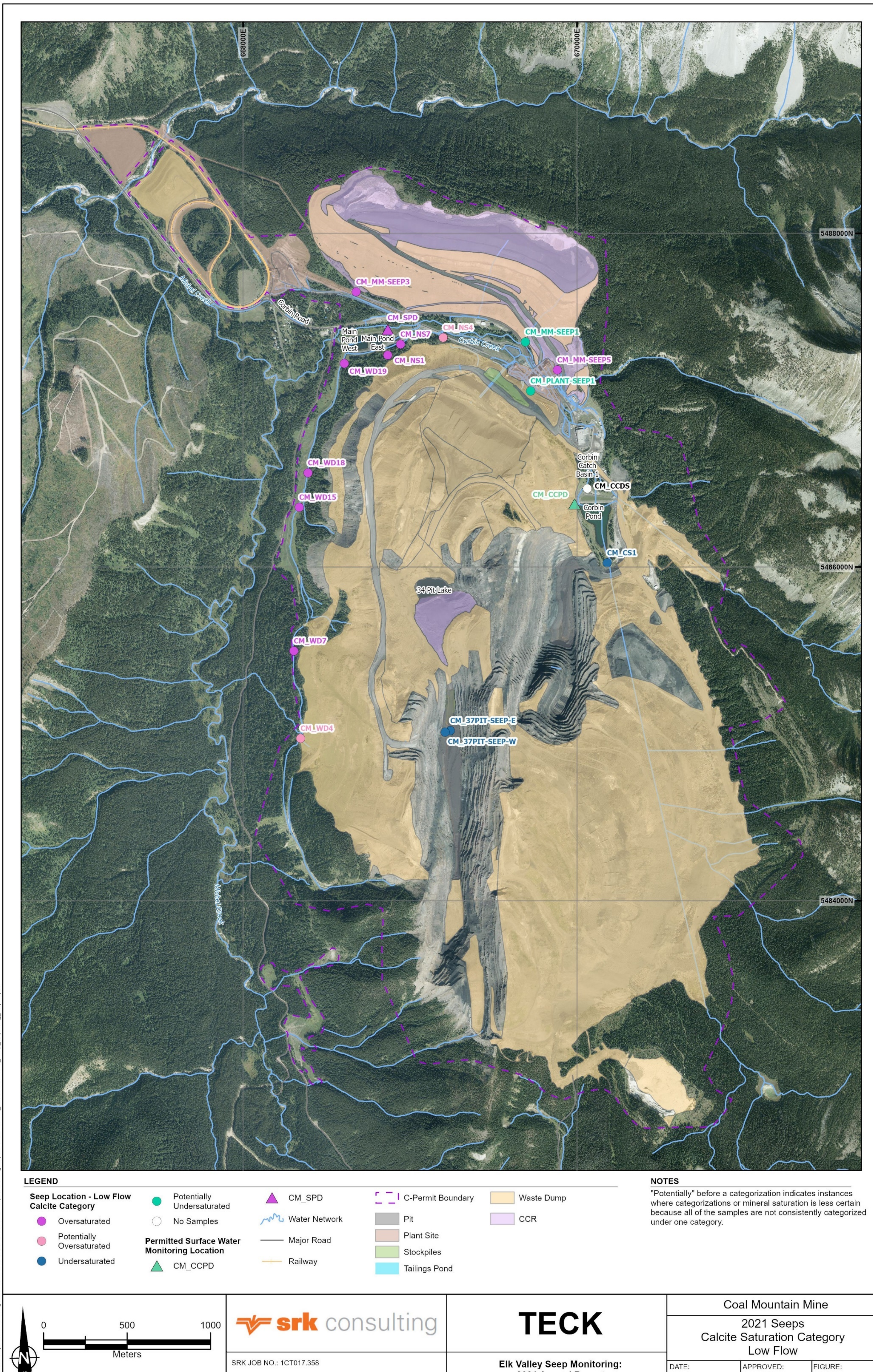
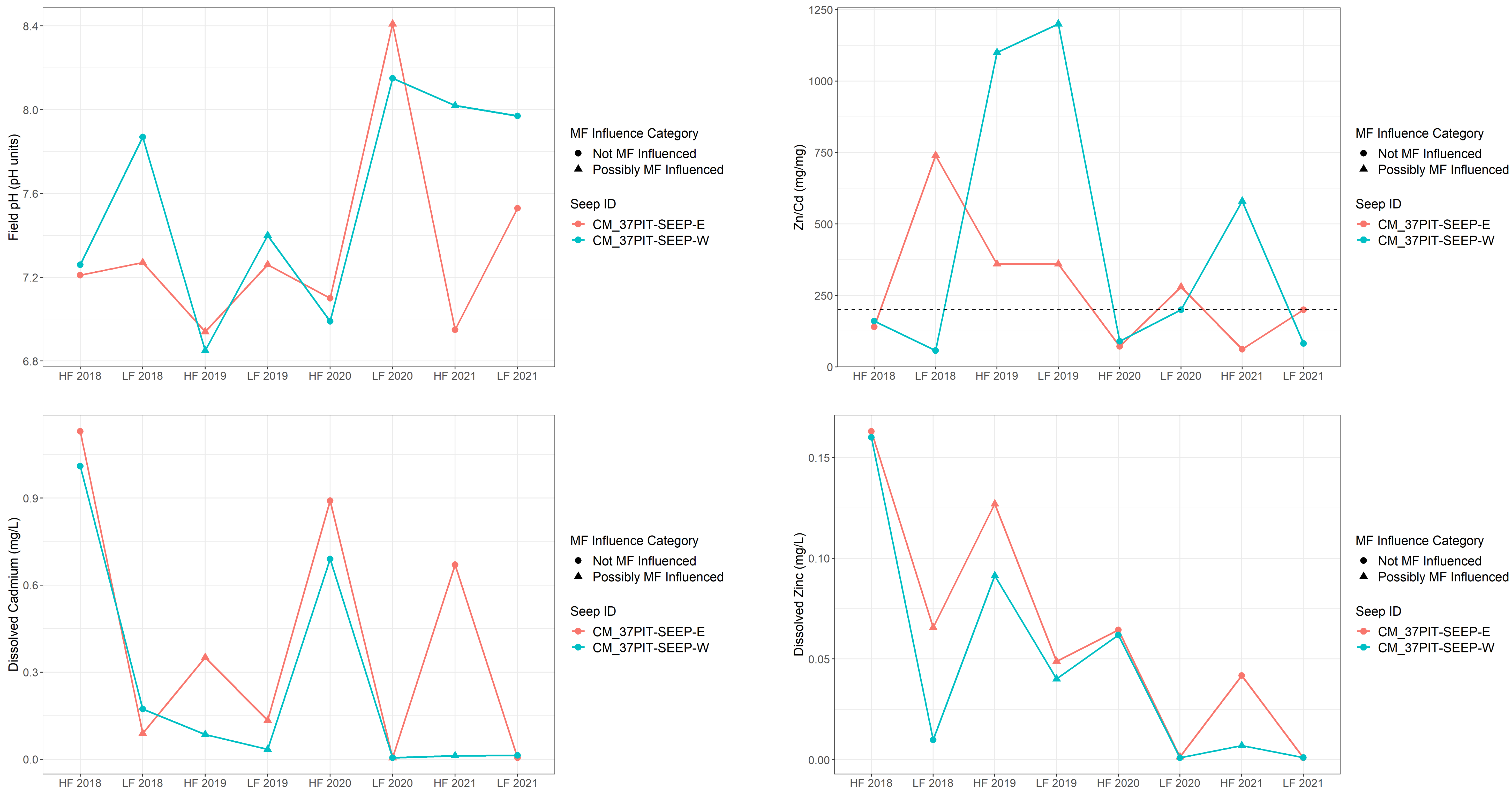
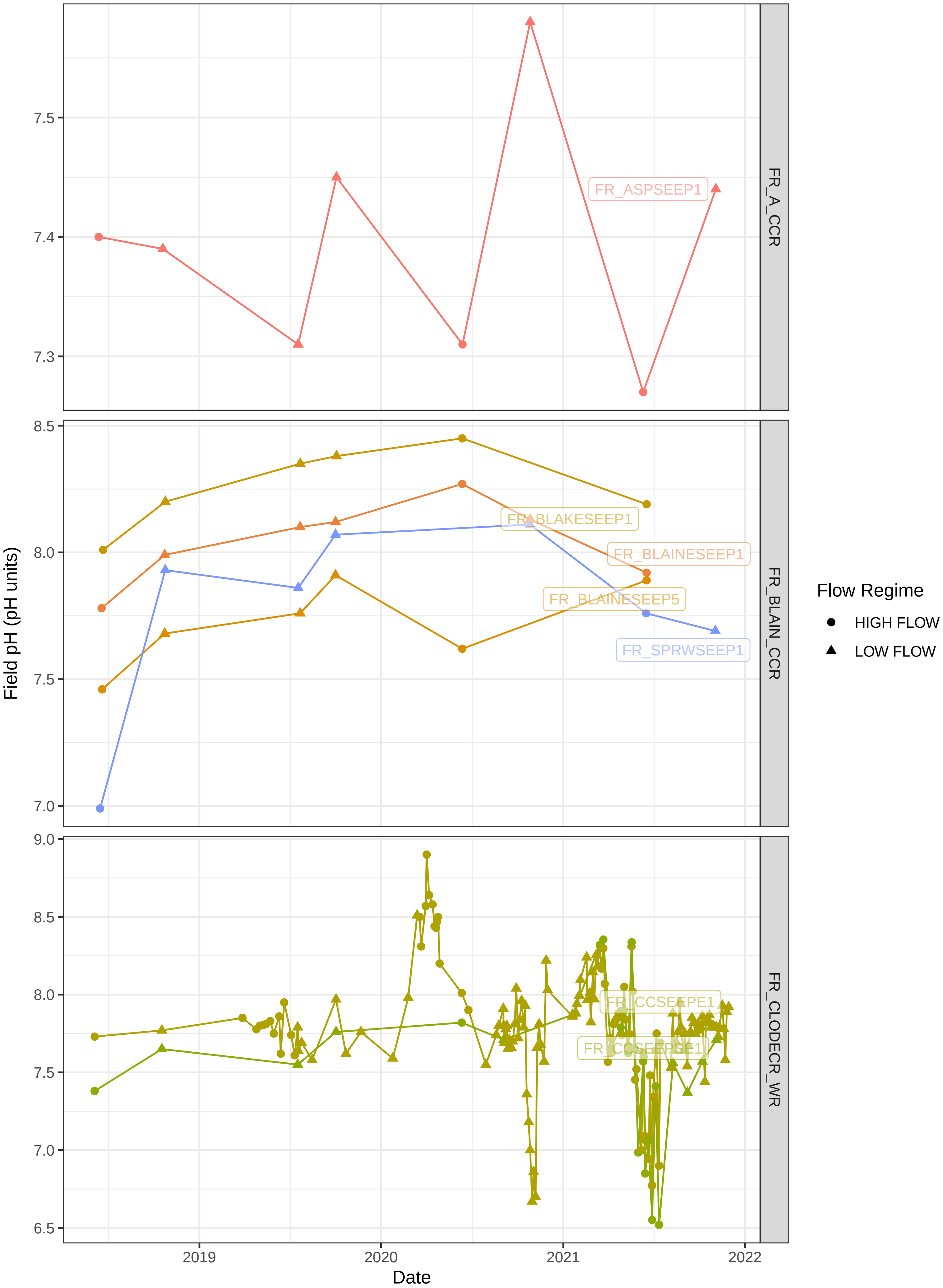


Figure 49: CMm water quality timeseries for field pH, zinc, cobalt, and Zn/Cd at CM_37PIT-SEEP-E and CM_37PIT-SEEP-W

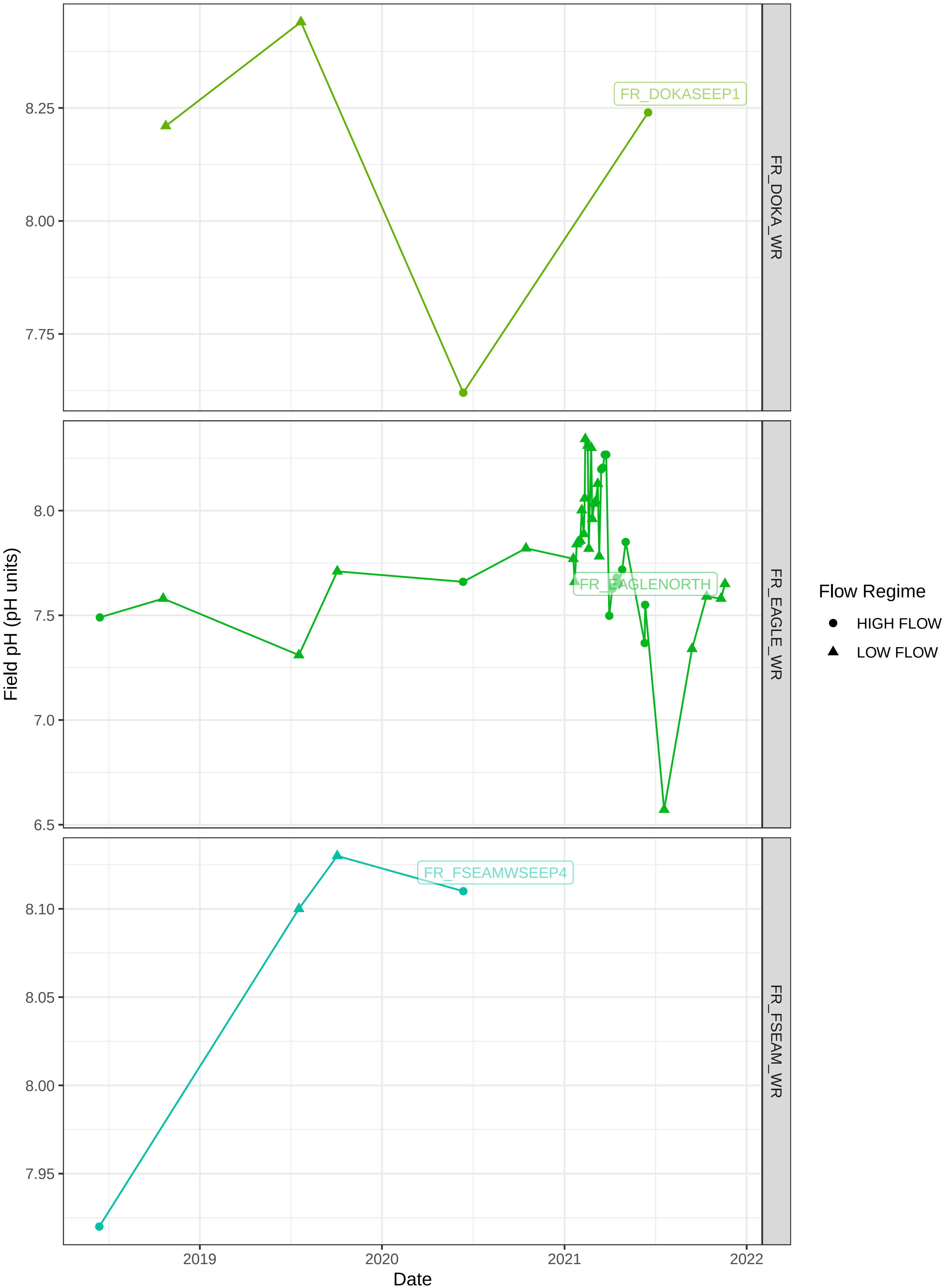


Sources: https://srk.sharepoint.com/sites/NA1CT017.358/Internal/Task100%20Data%20Interpretation/Seep_RCode_Analysis_2021/Graphing/WQ_Timeseries_Graphs%20Zn_Cd%20and%20Se_SO4%202021.Rmd
Notes: Dashed line shows the Zn/Cd criterion that is applied to categorize seeps as possibly MF influenced.

Appendix A Water Quality Timeseries Plots



Note: Gray labels on right of graphs denote the material grouping.



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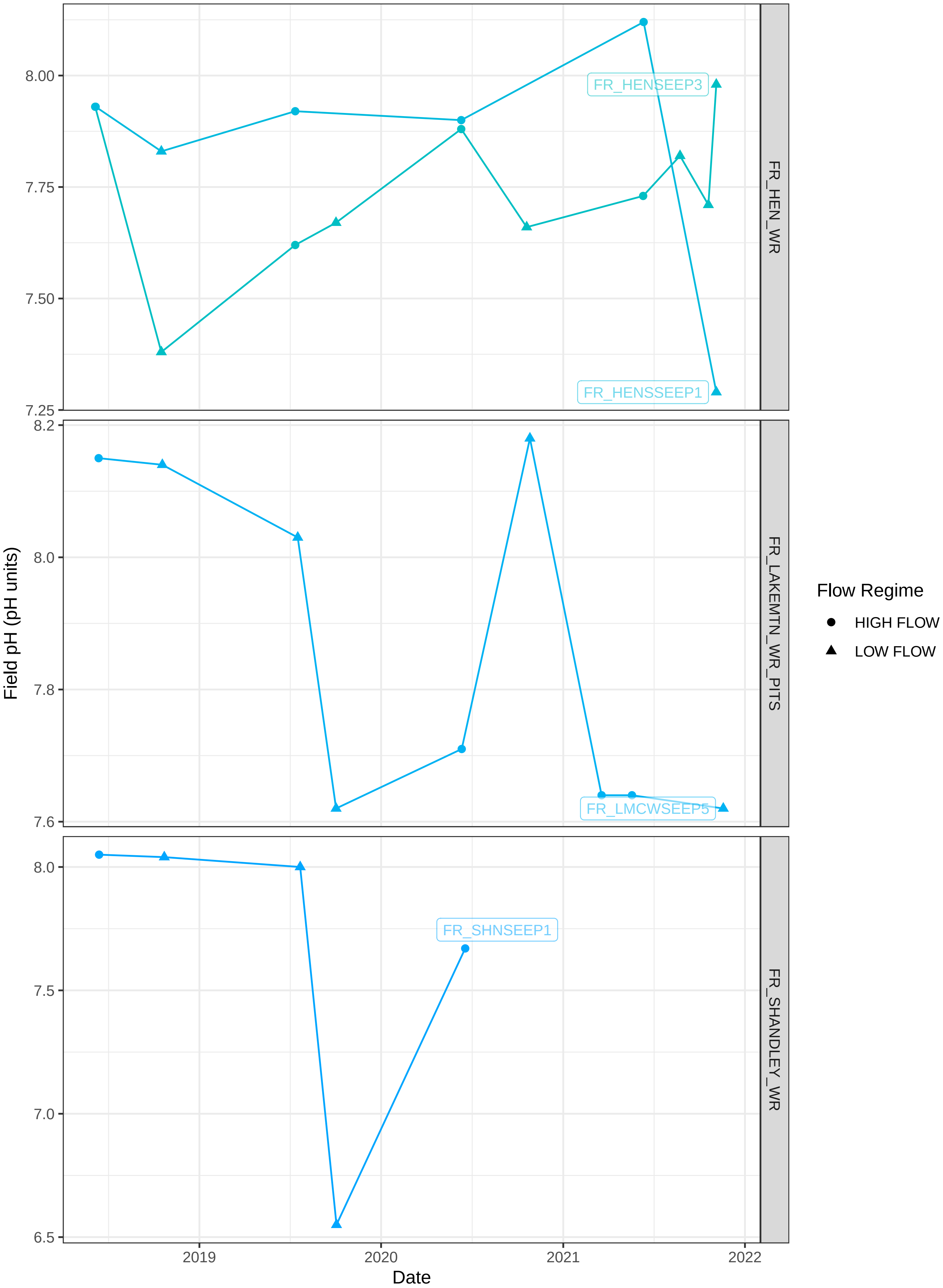

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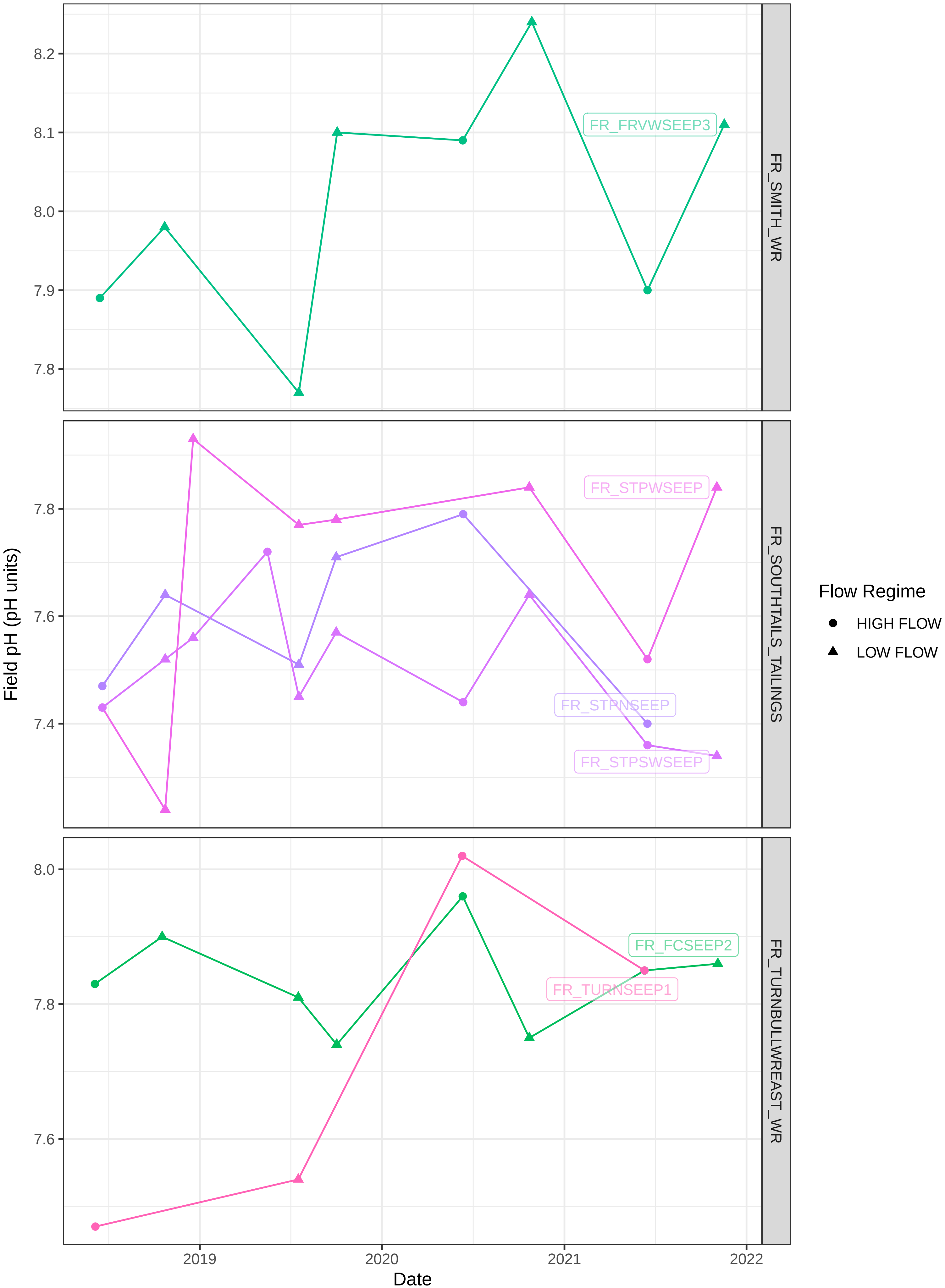

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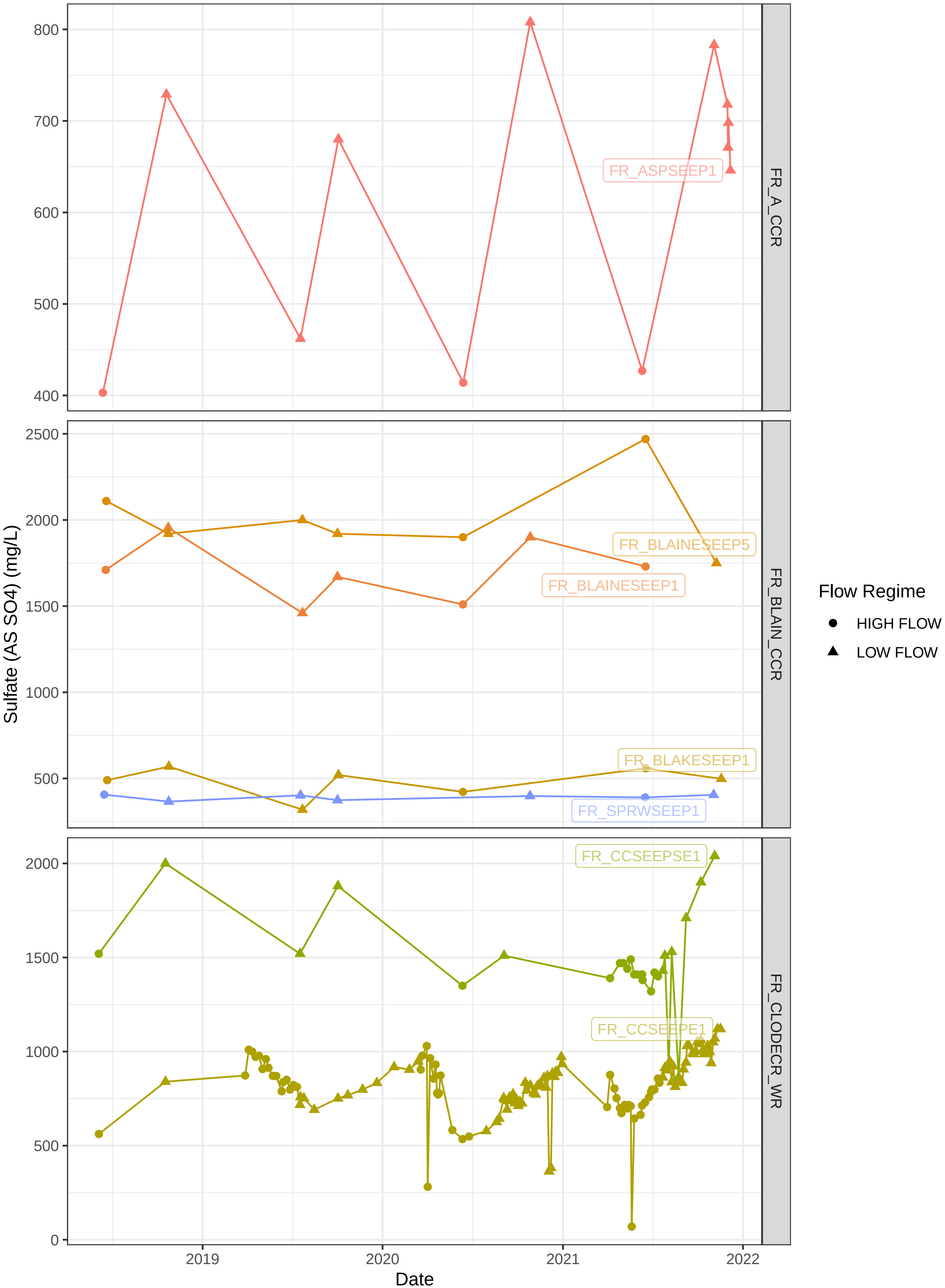

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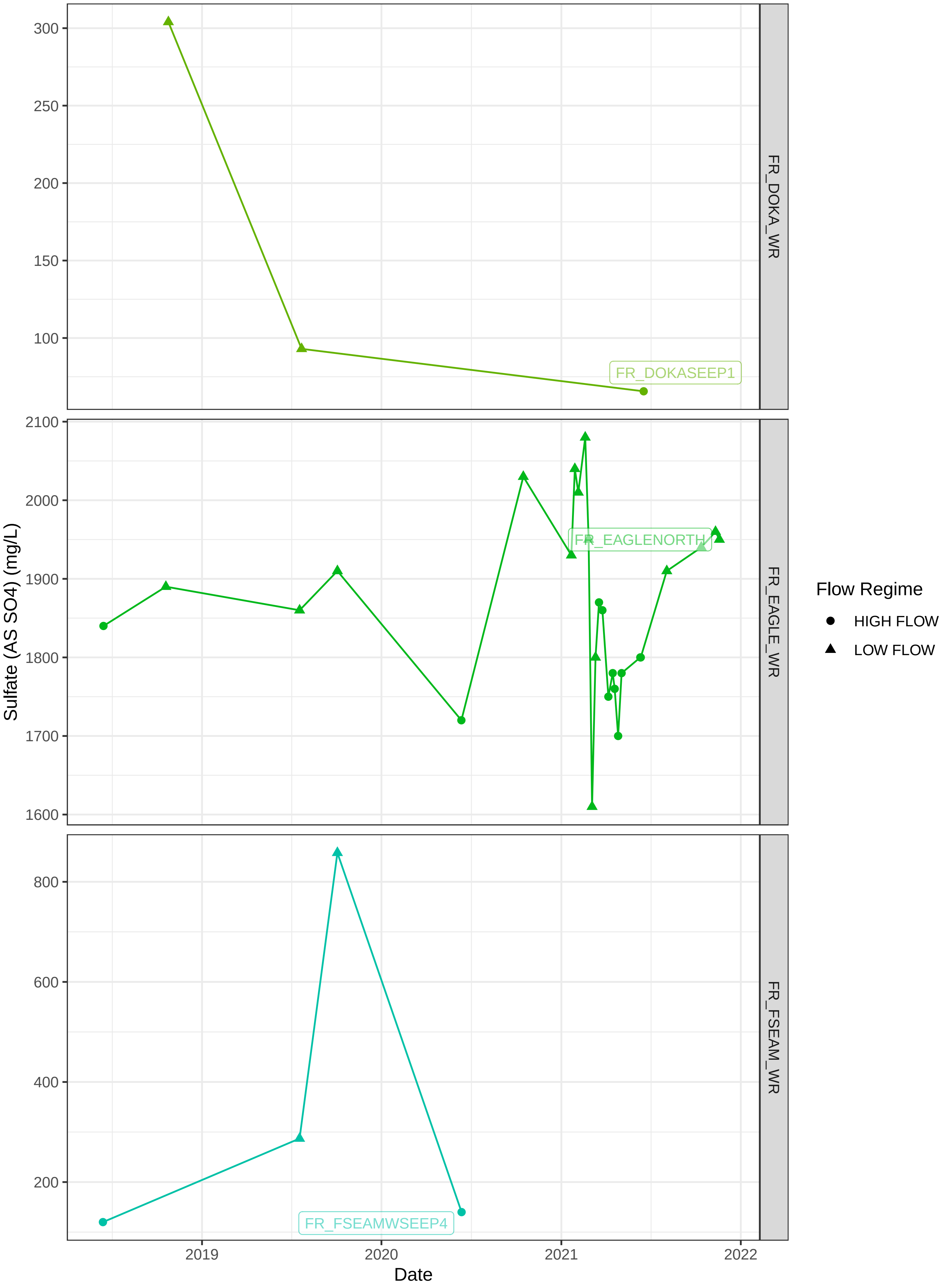

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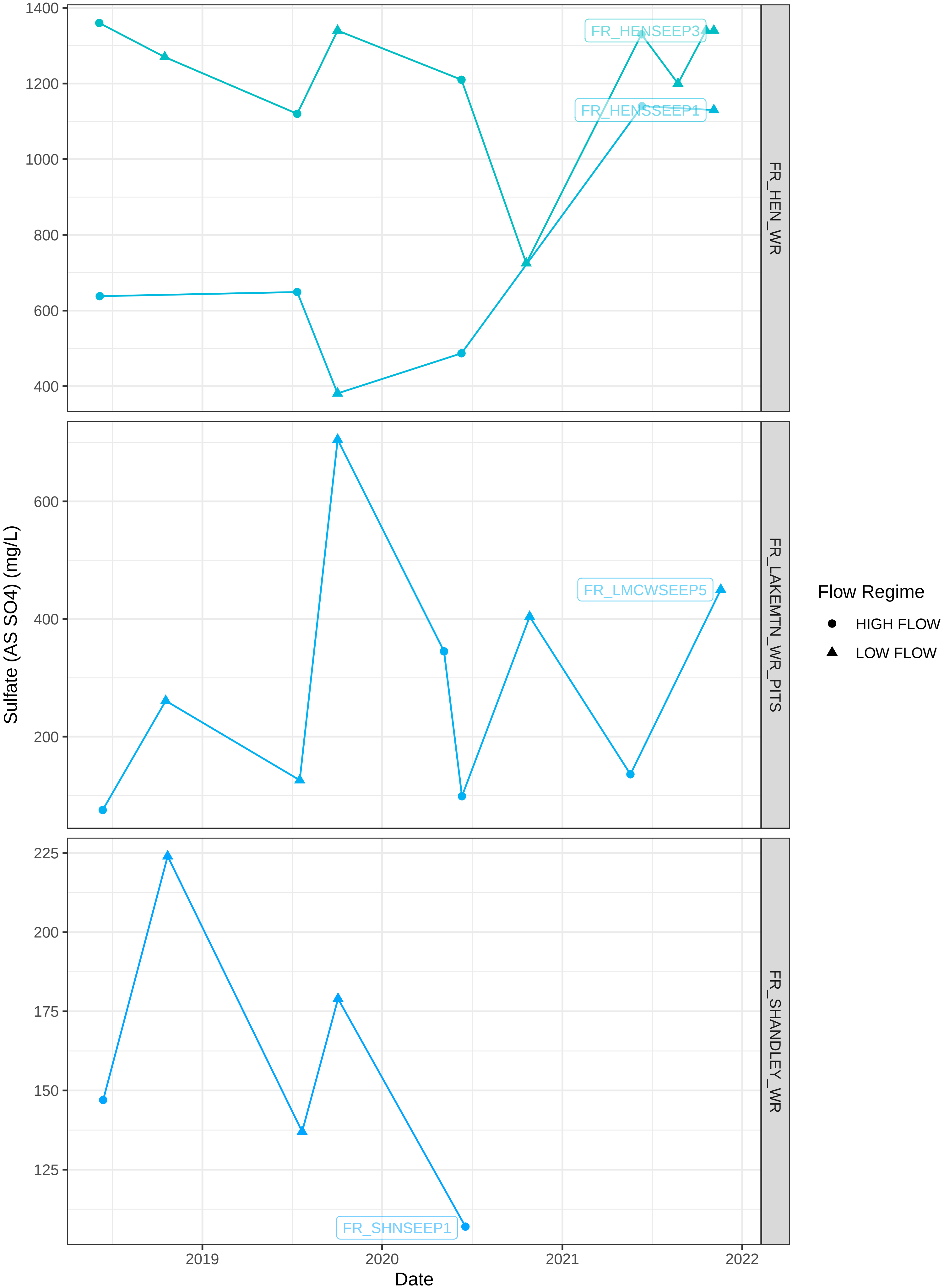

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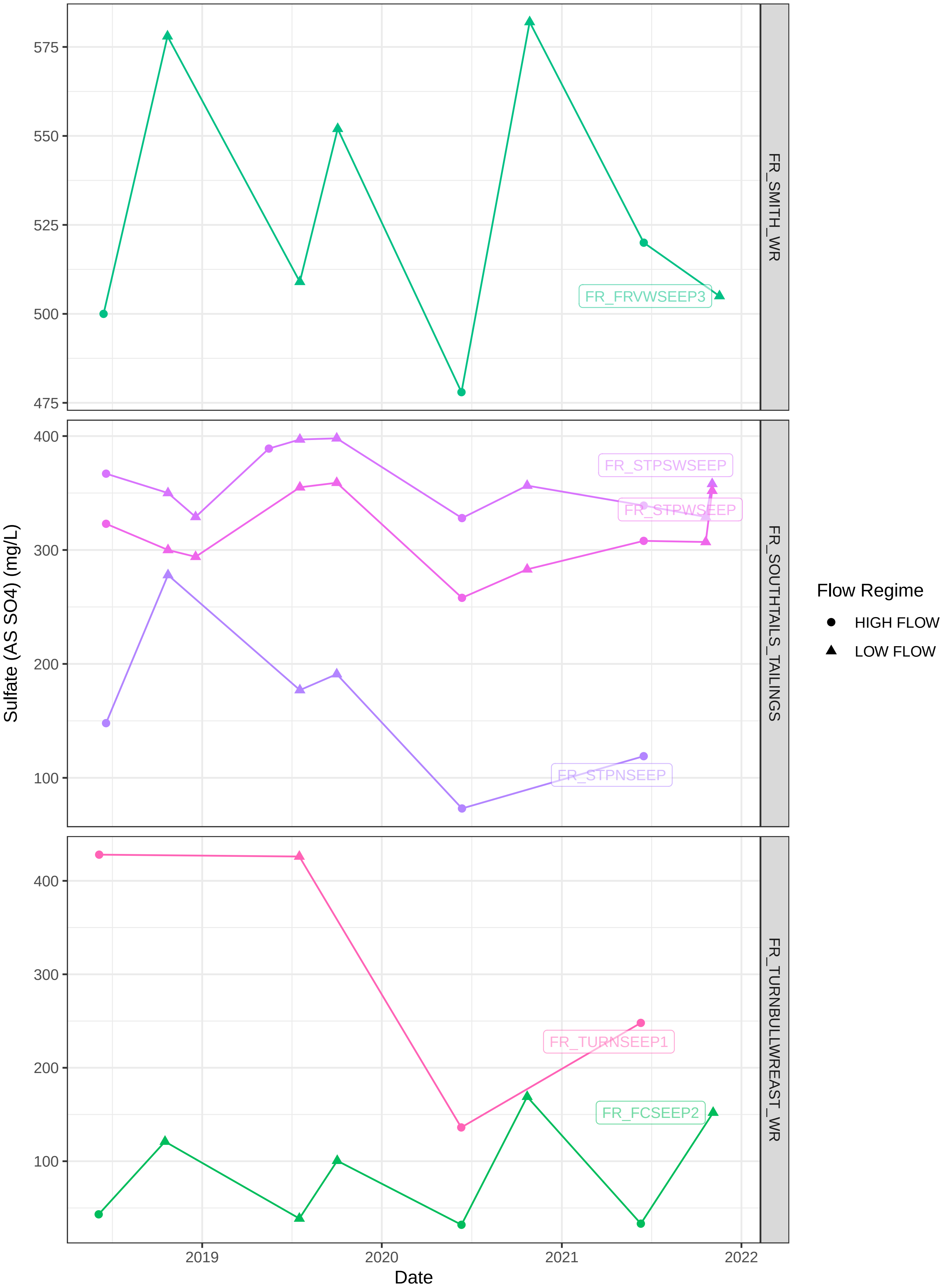

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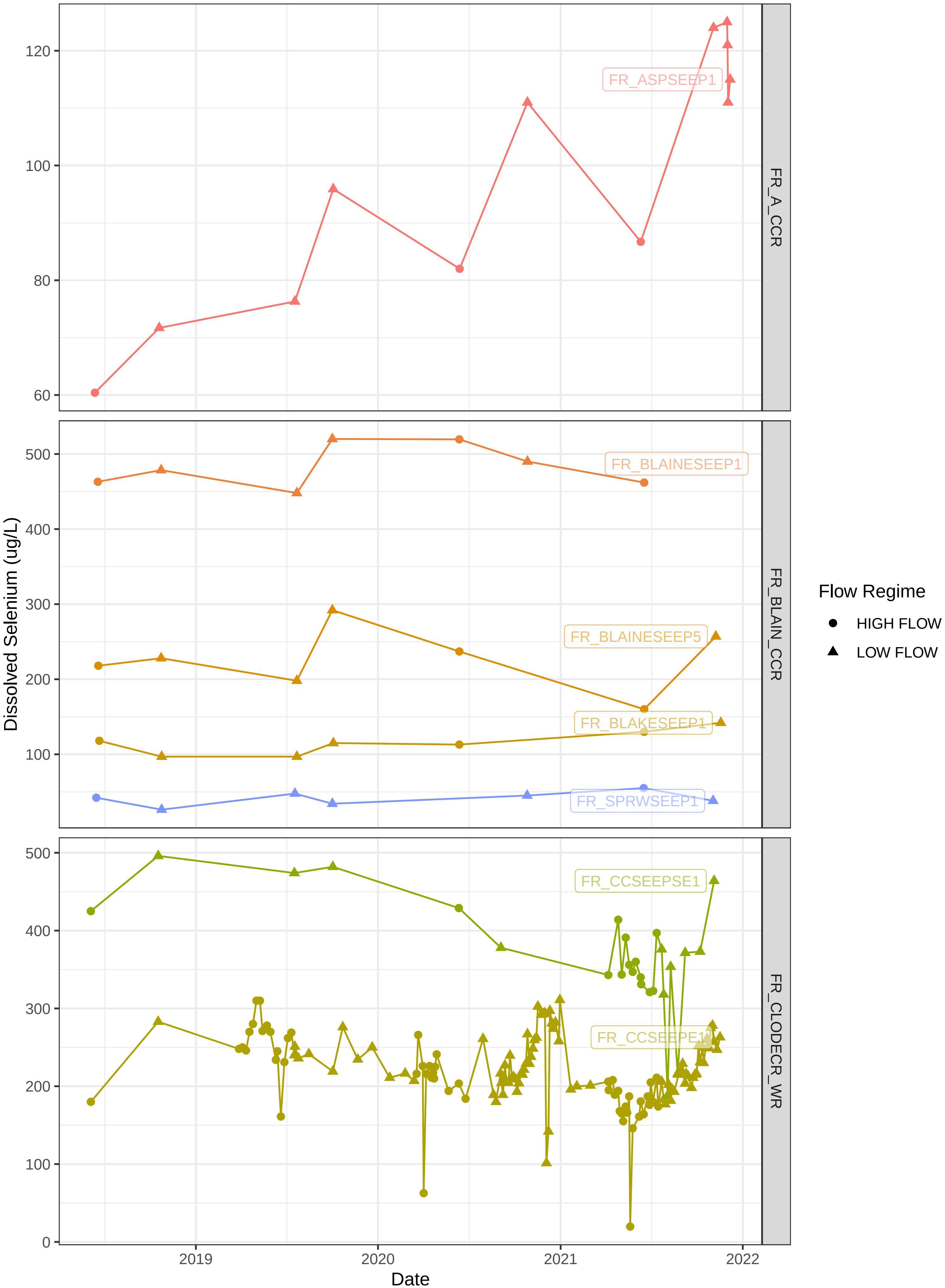

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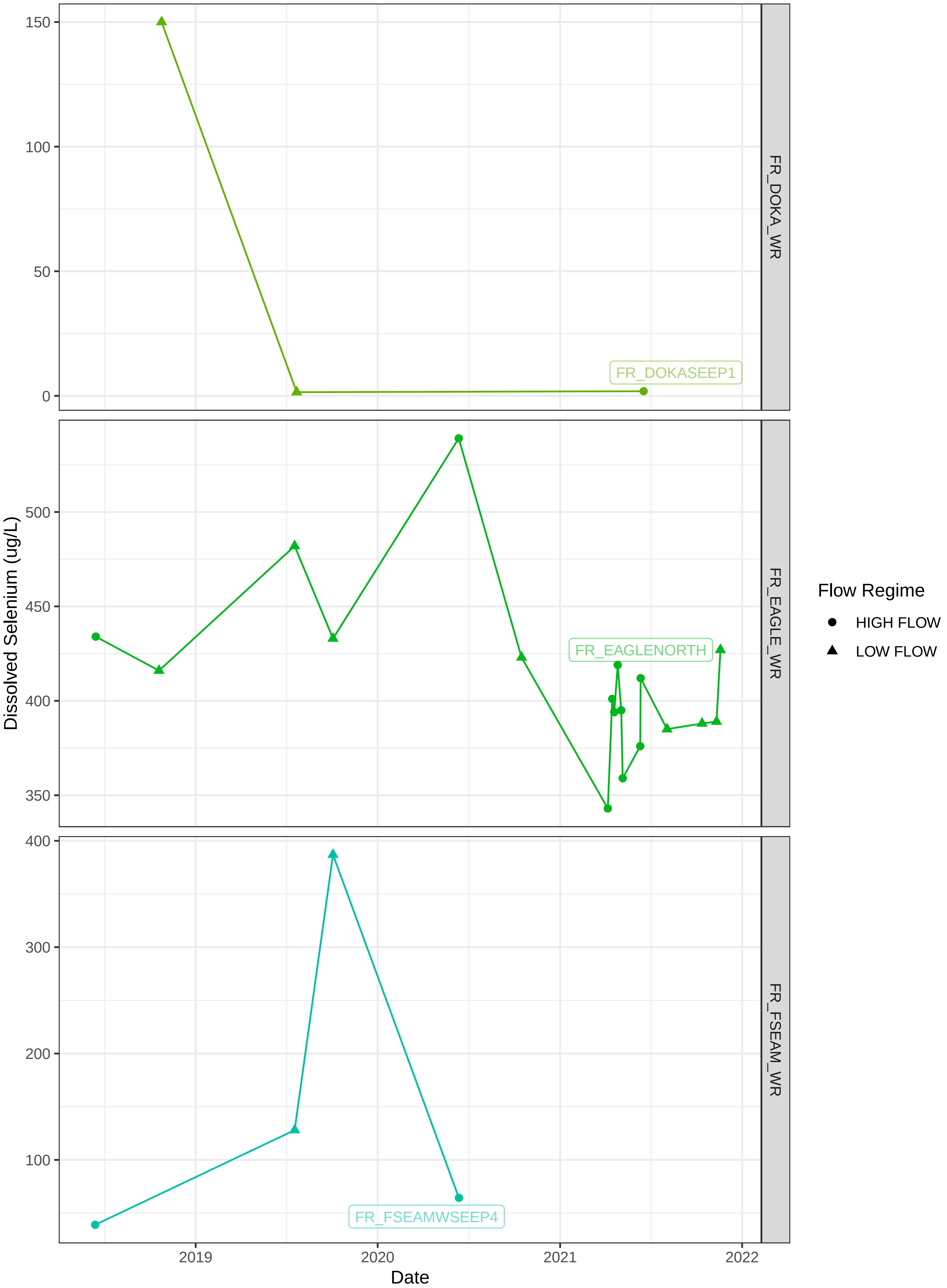

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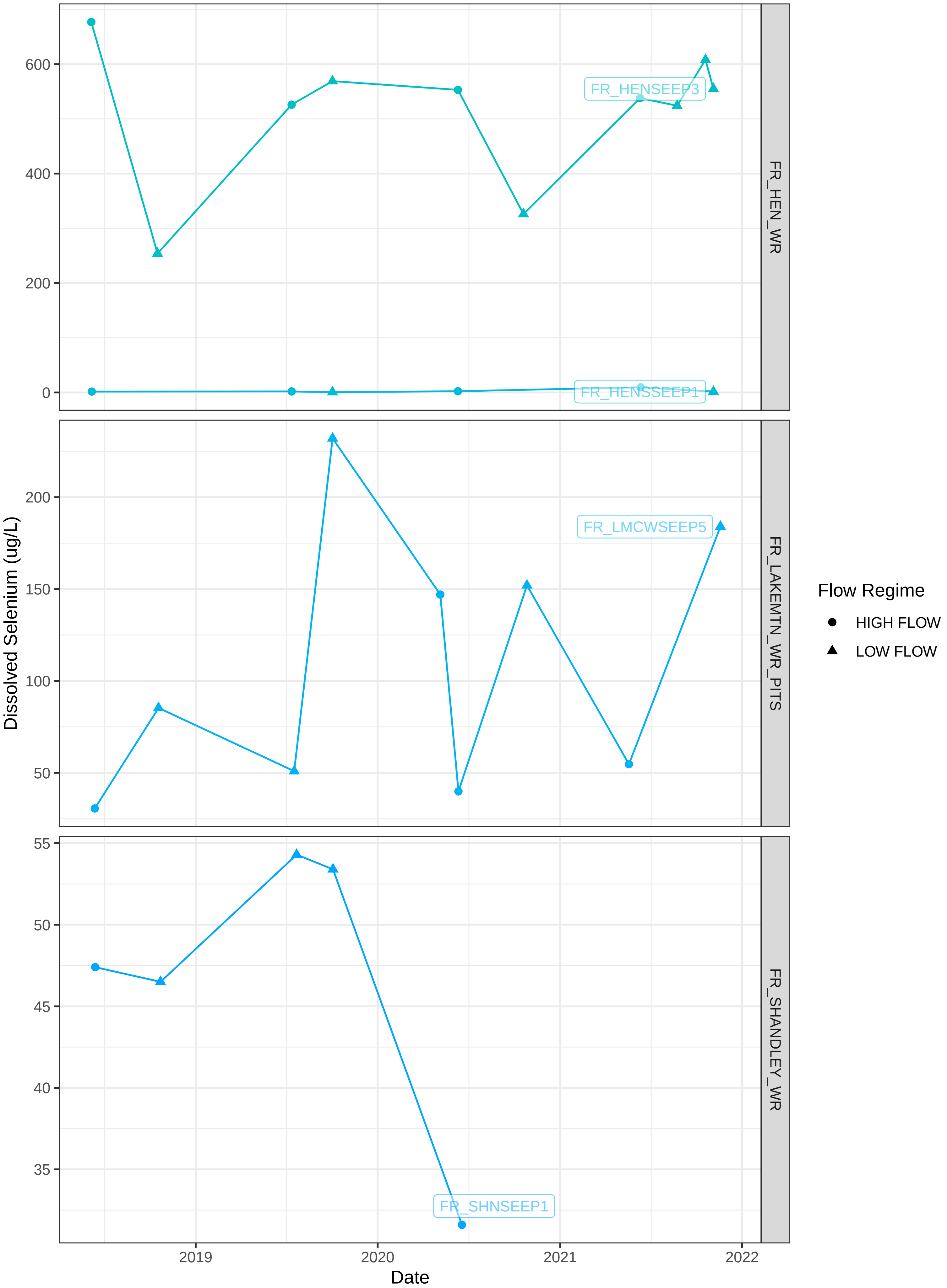

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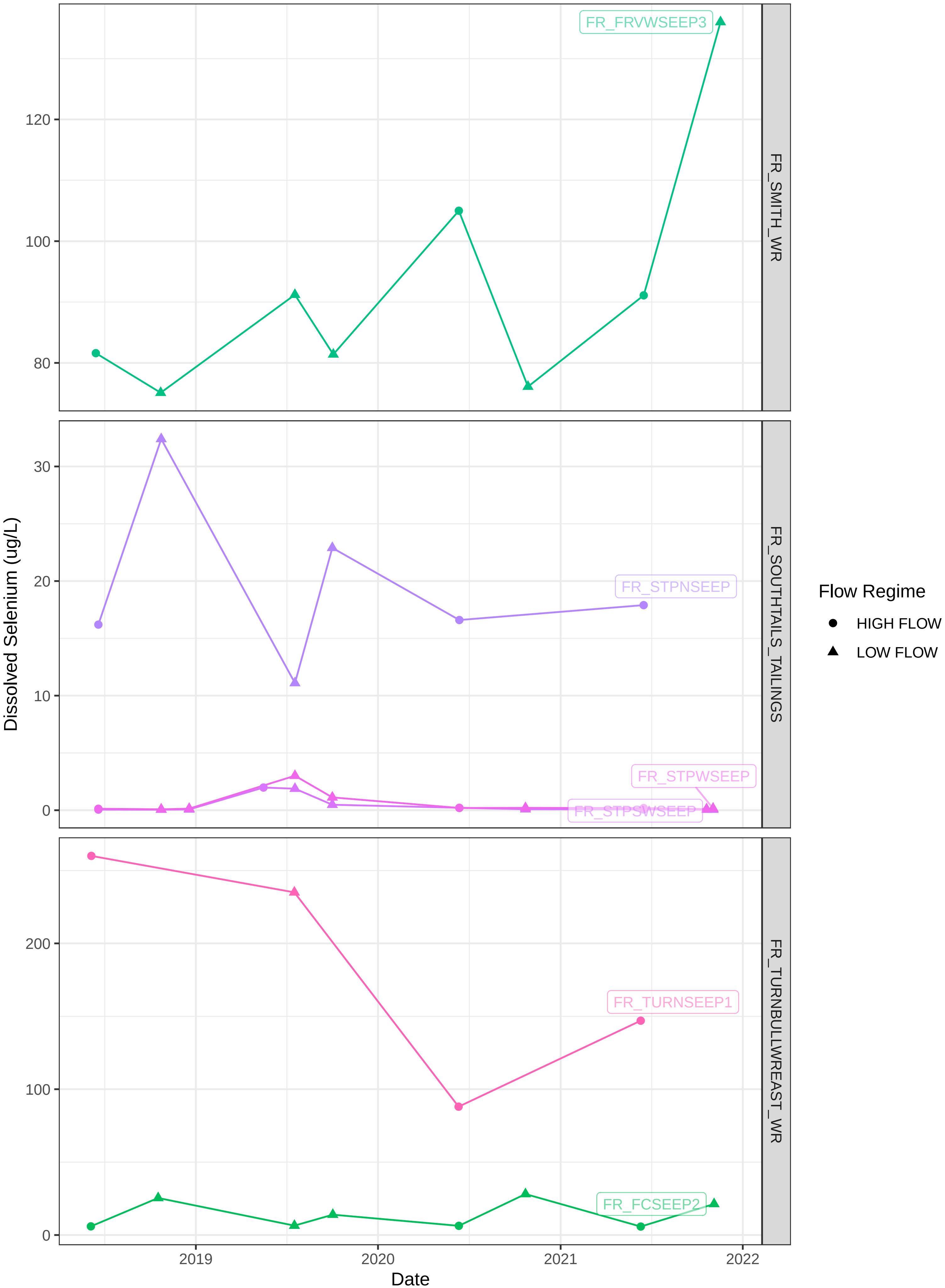

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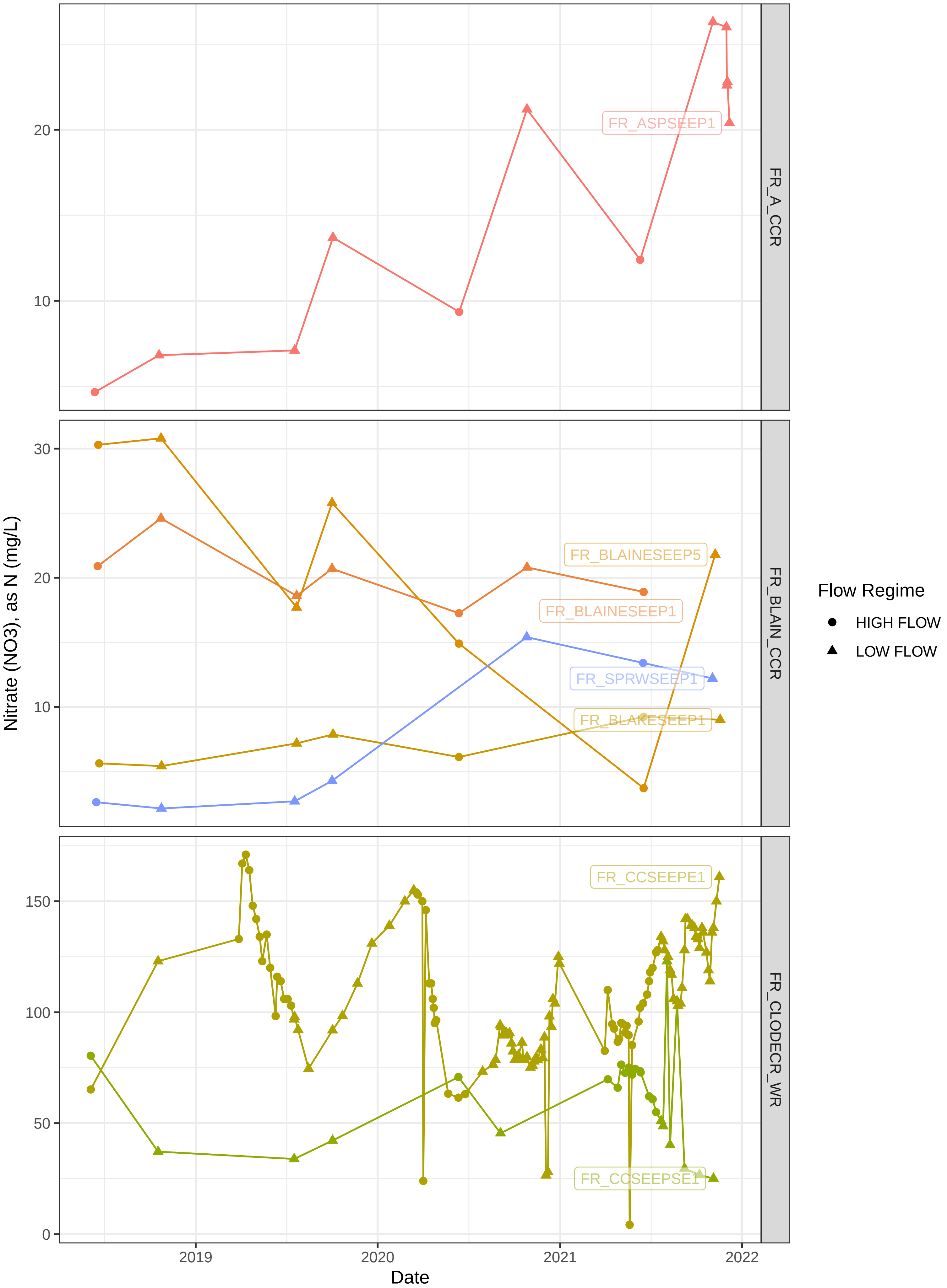

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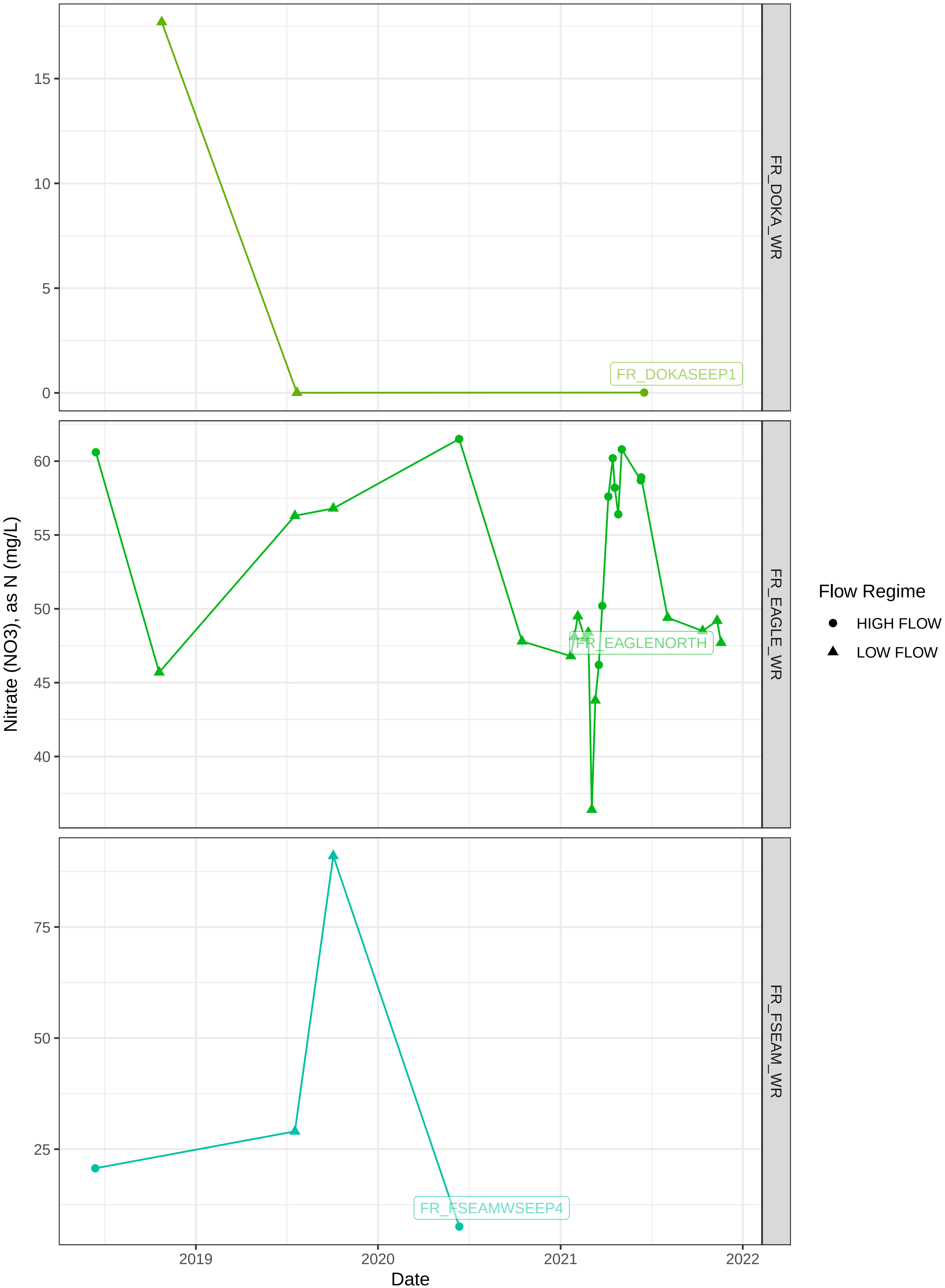

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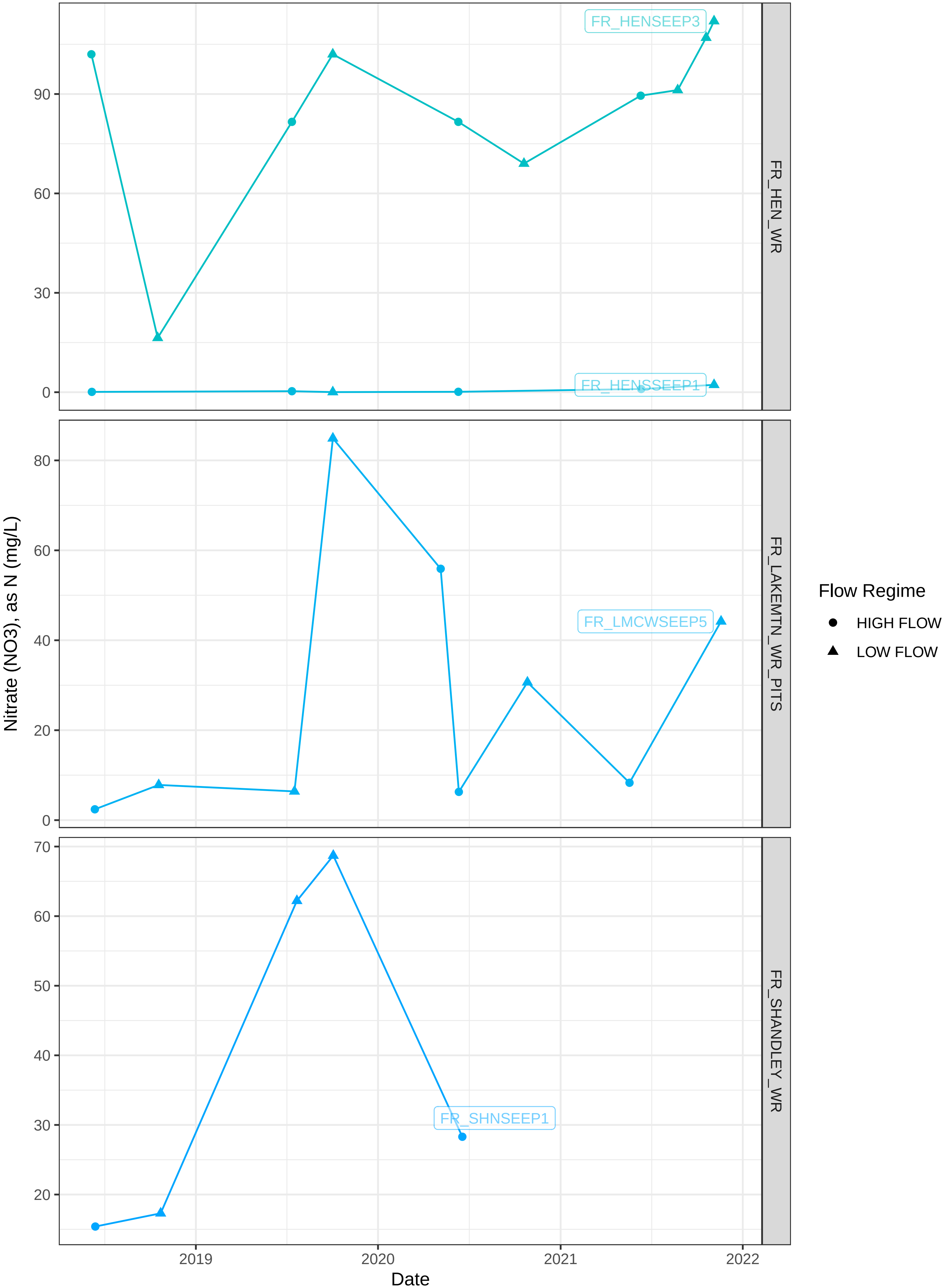

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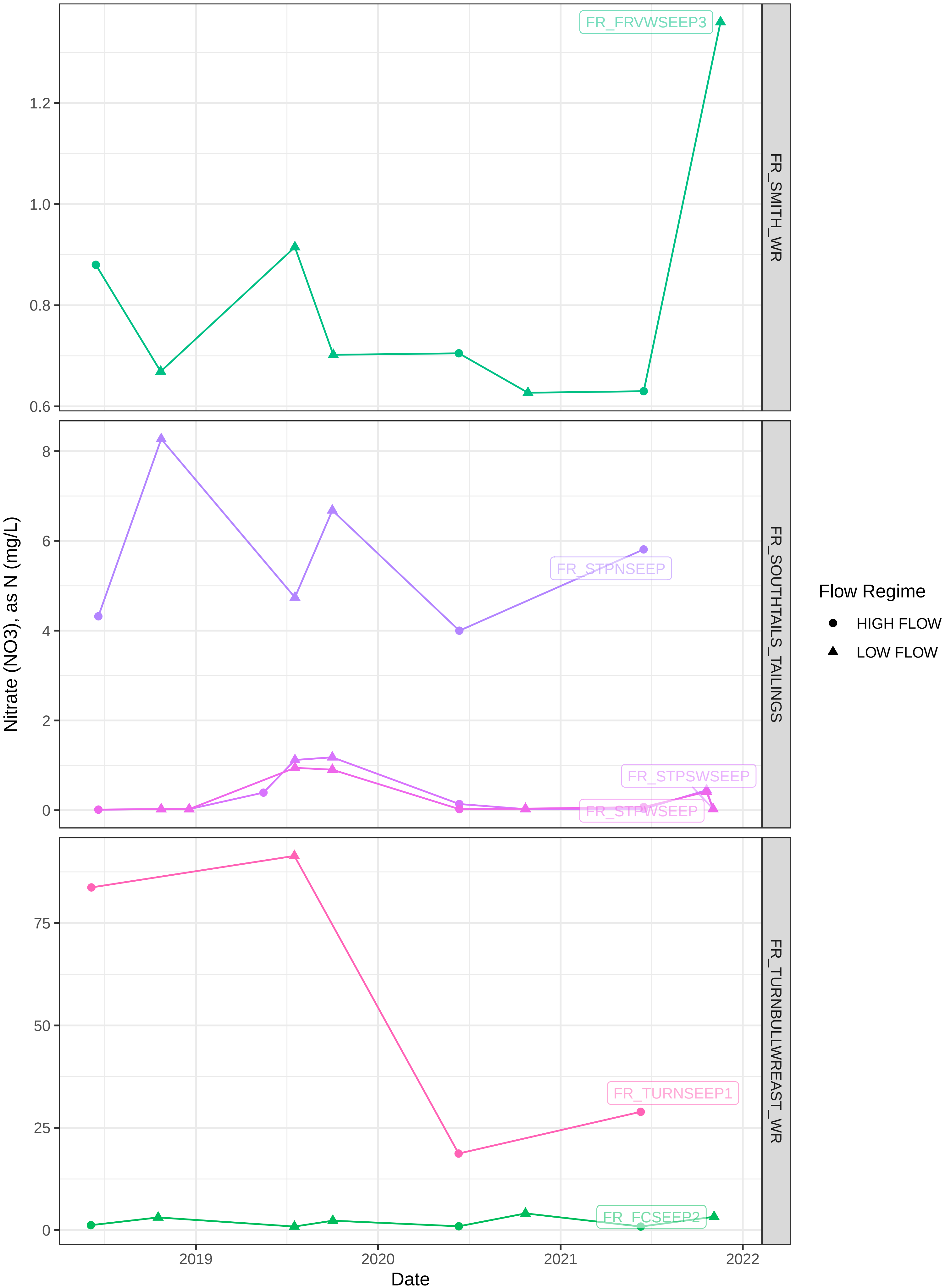

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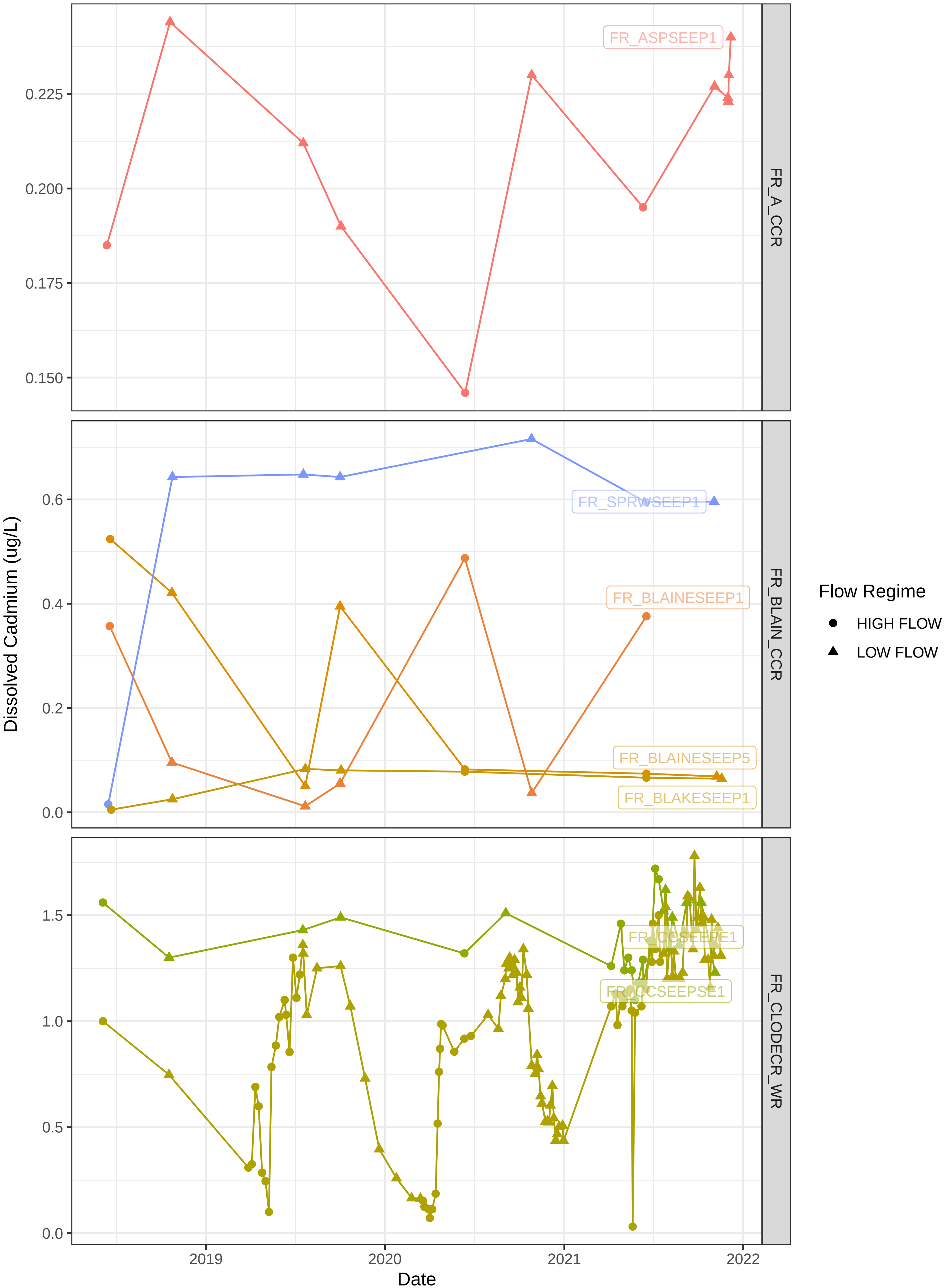

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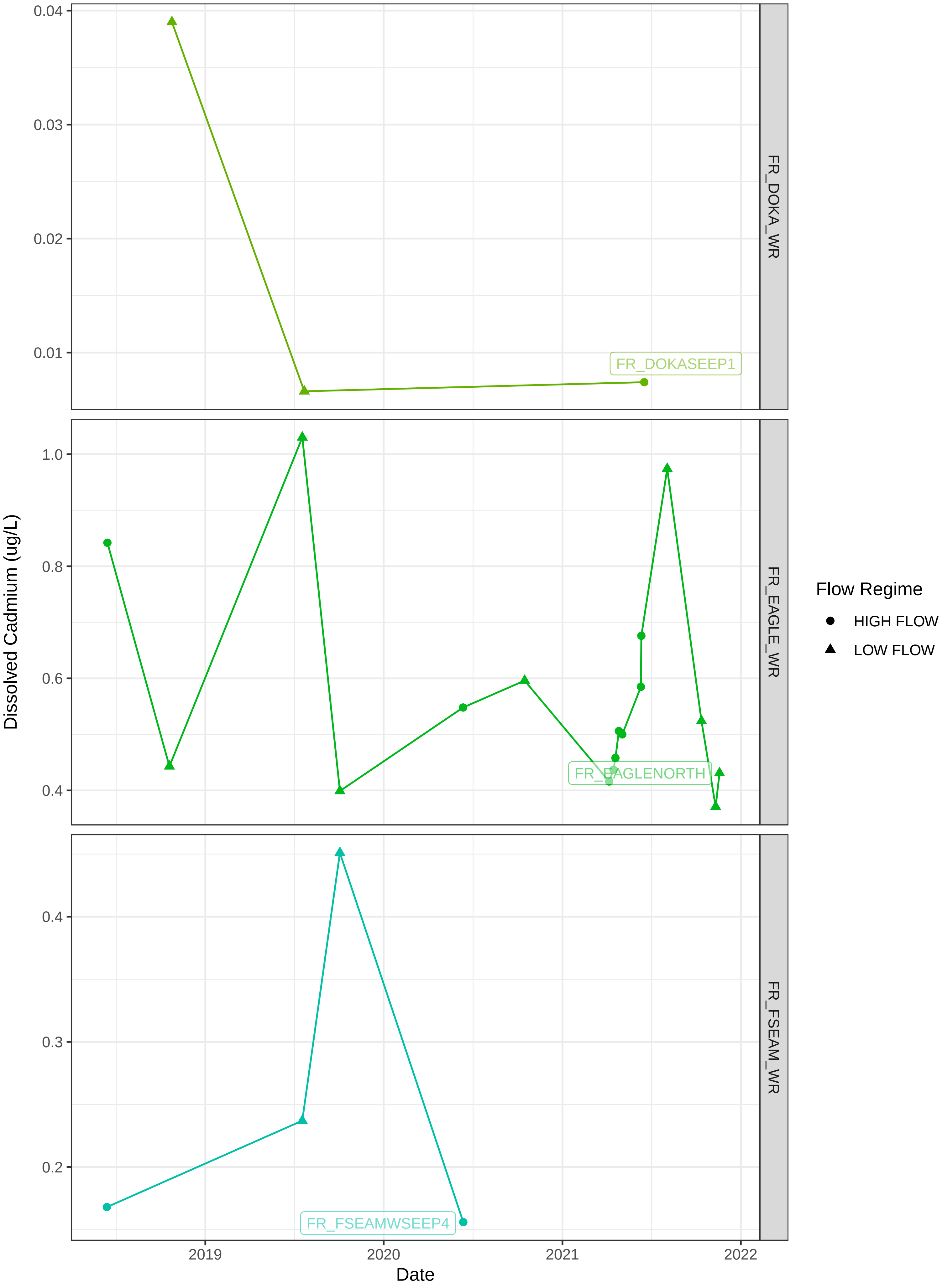

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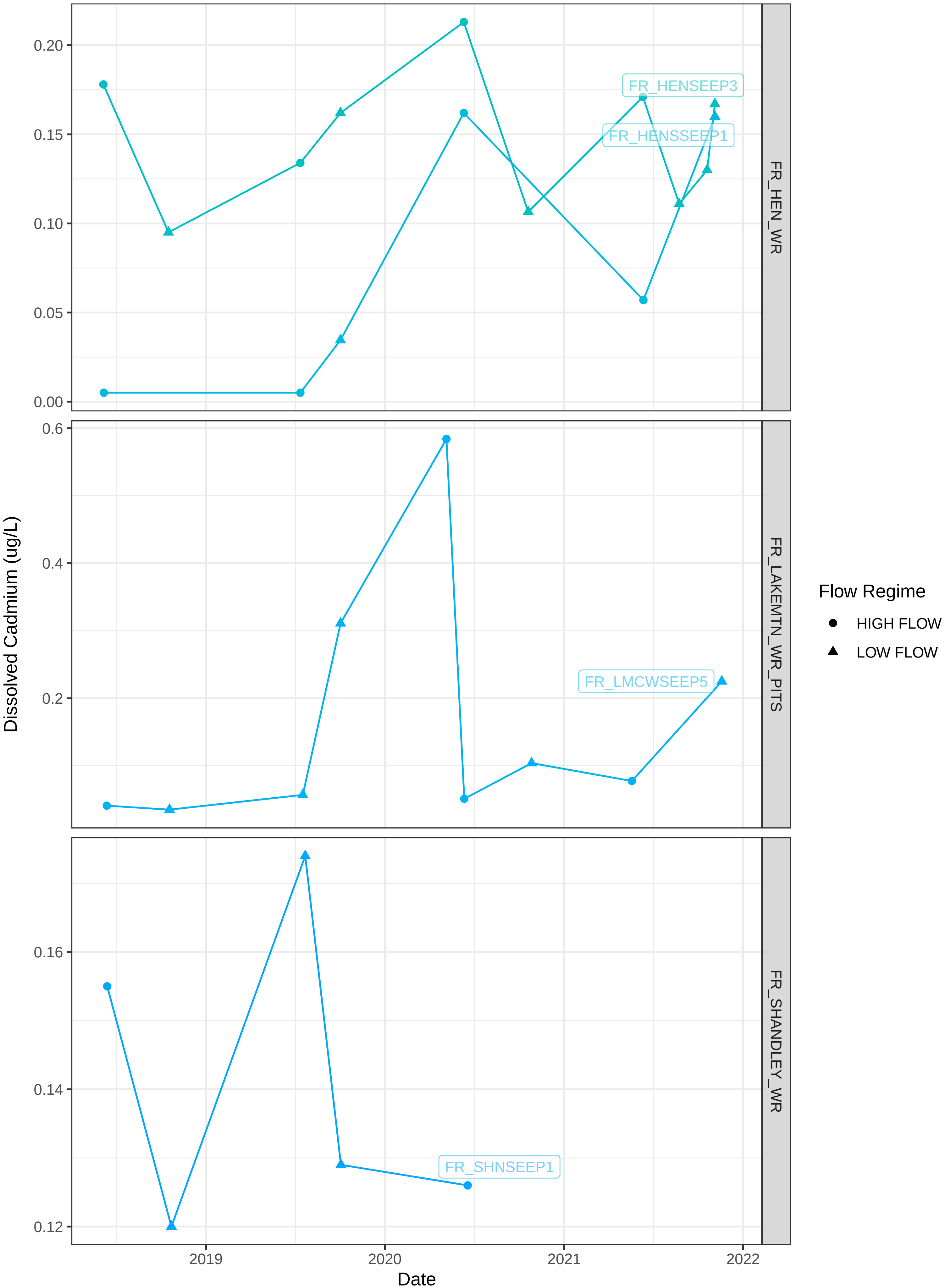

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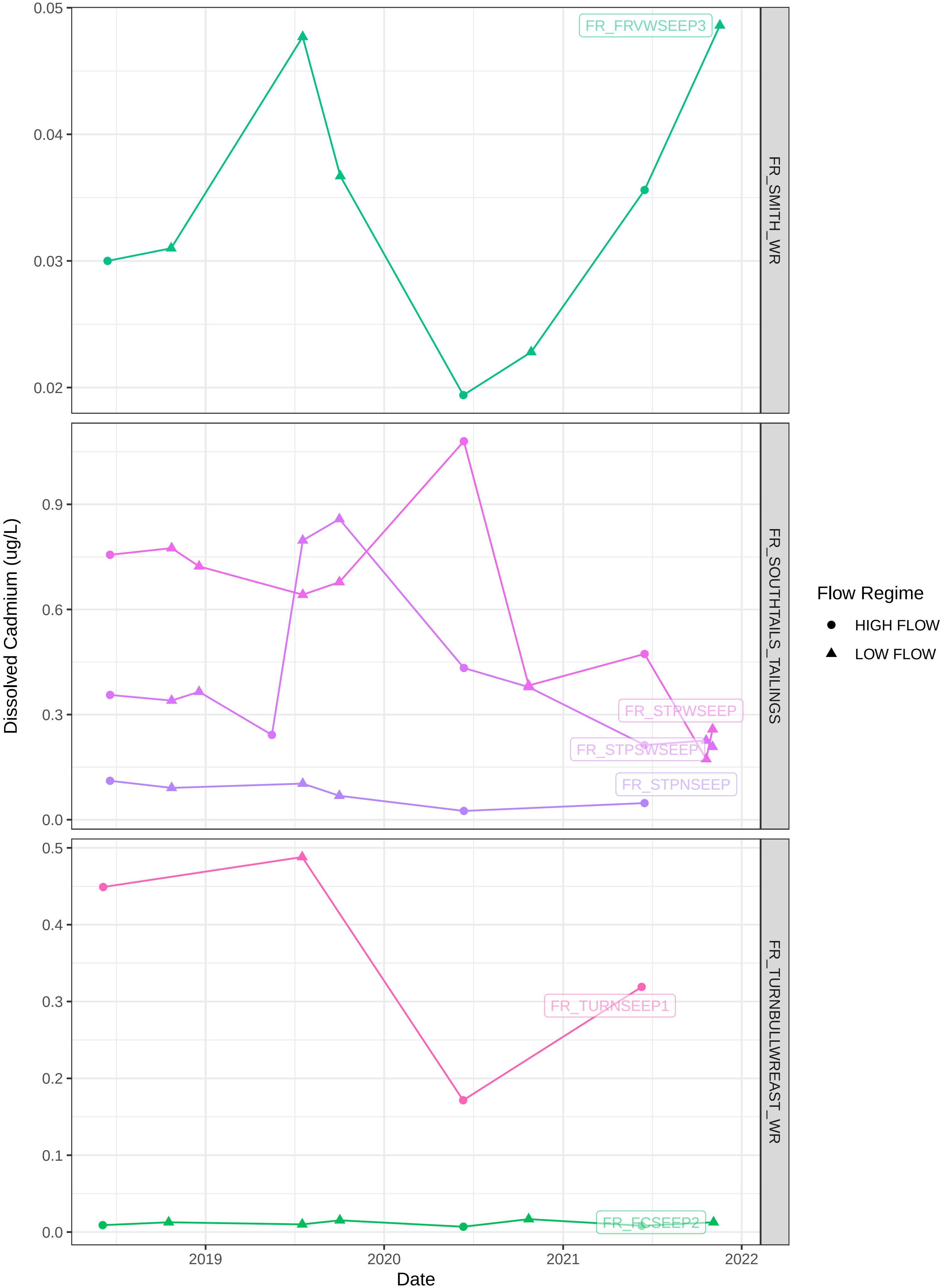

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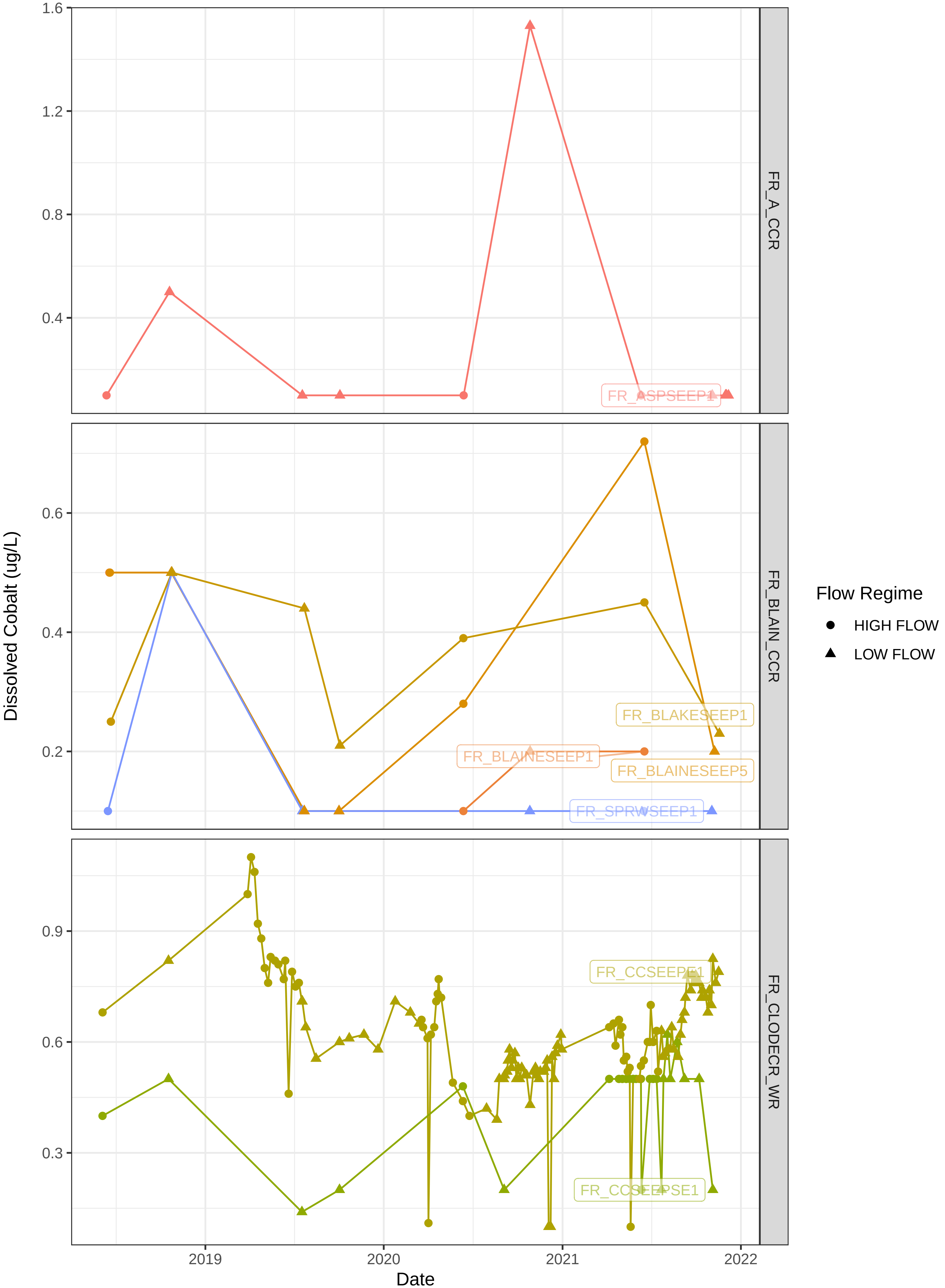

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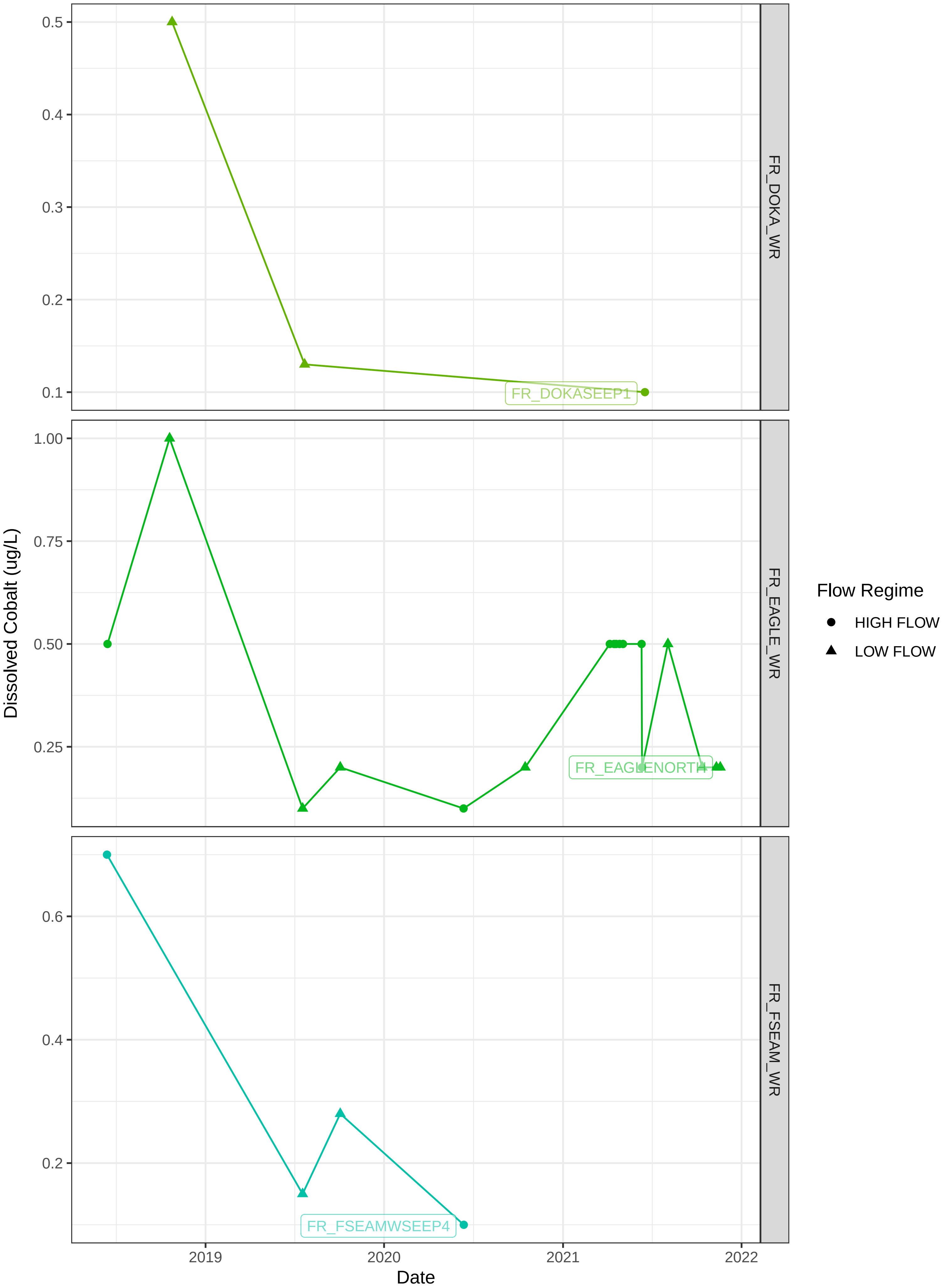

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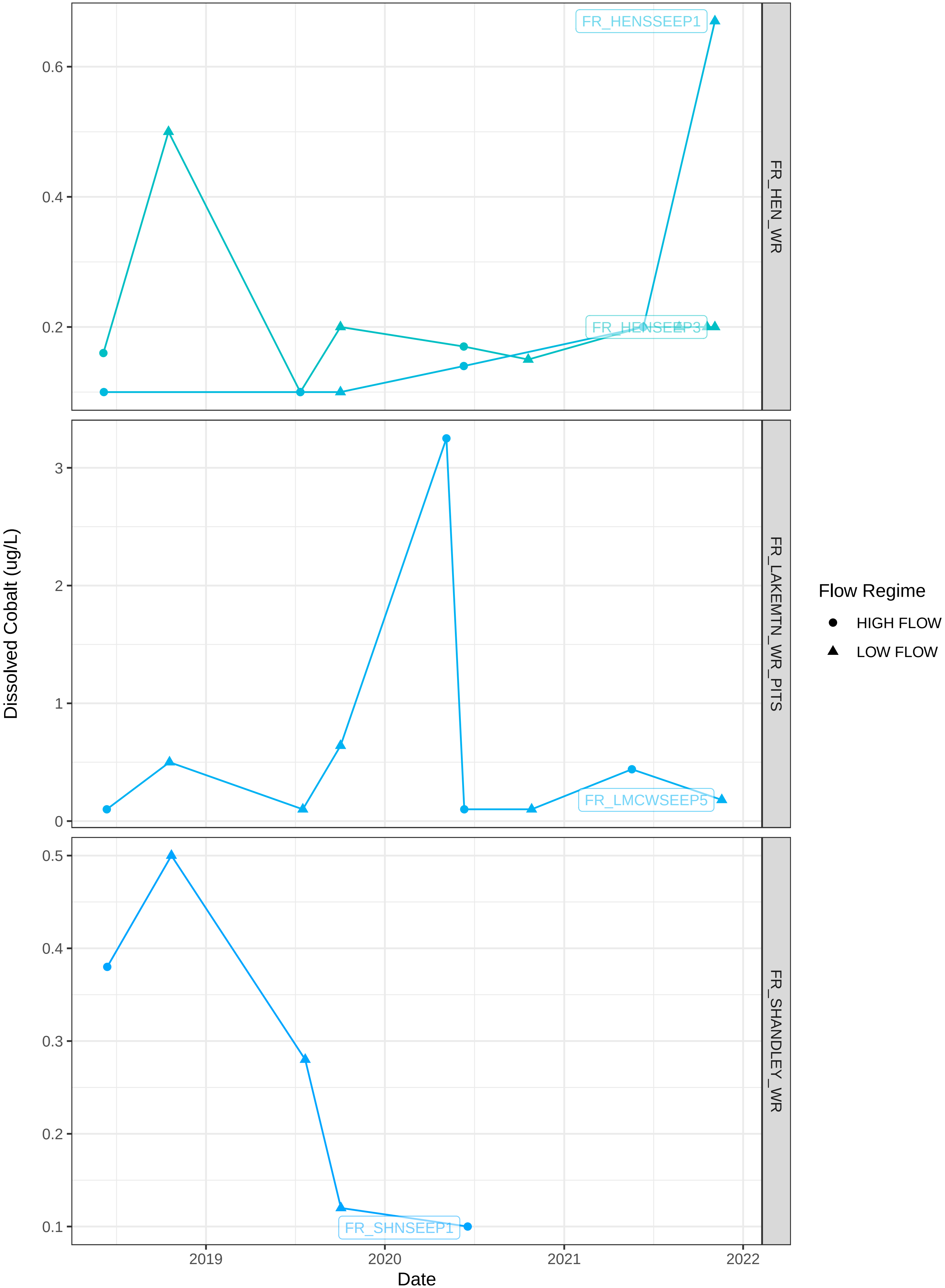

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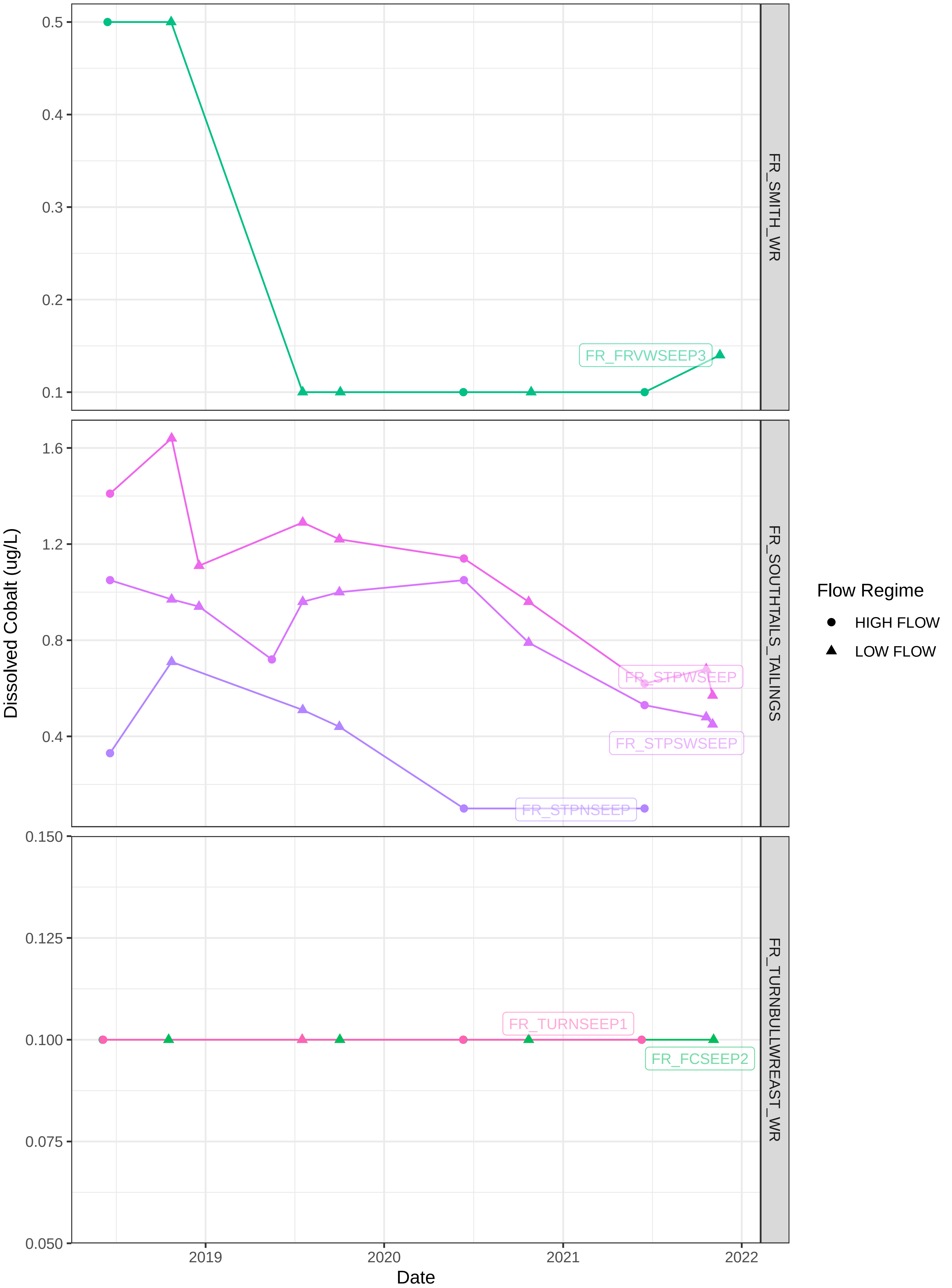

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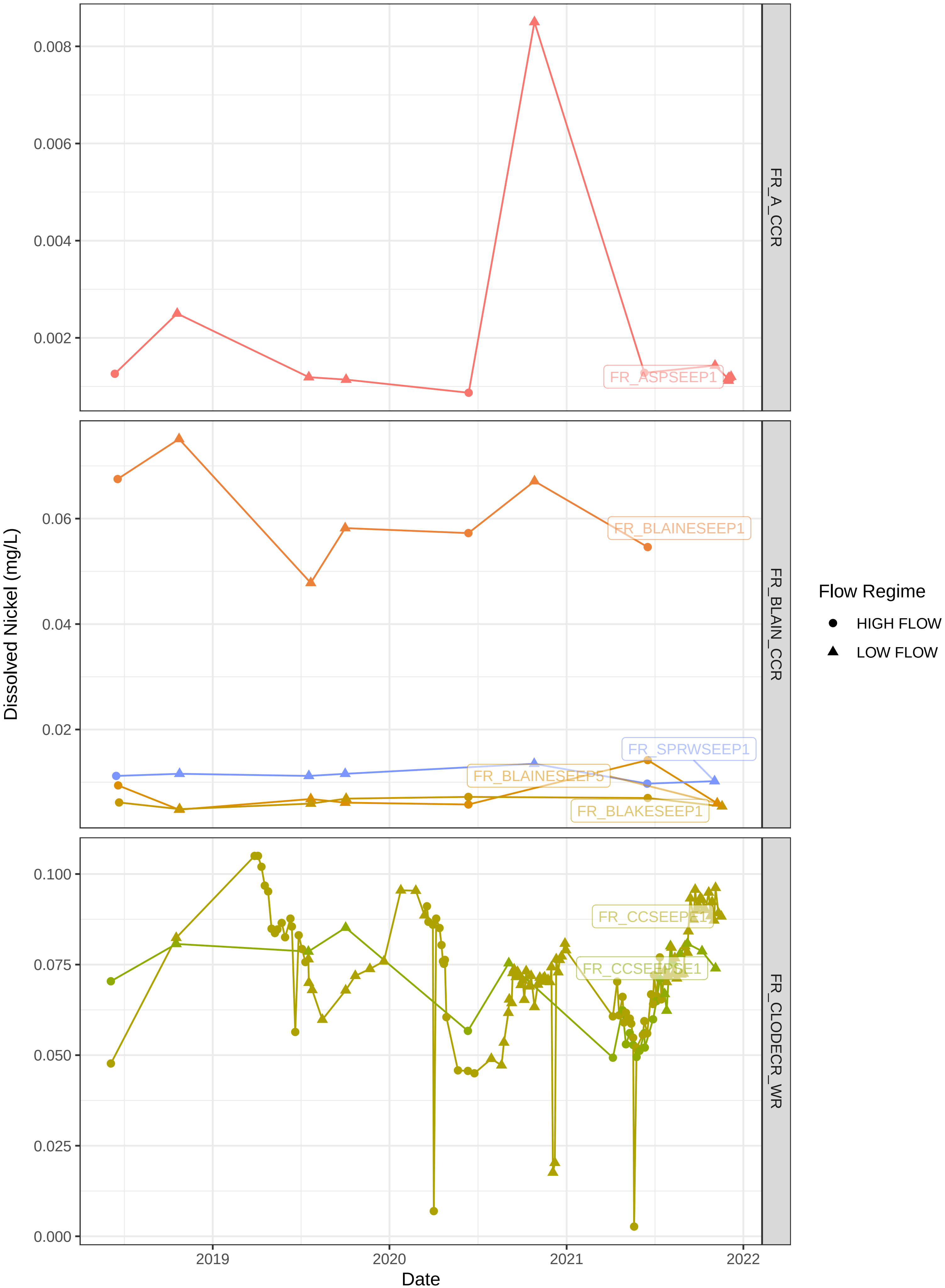

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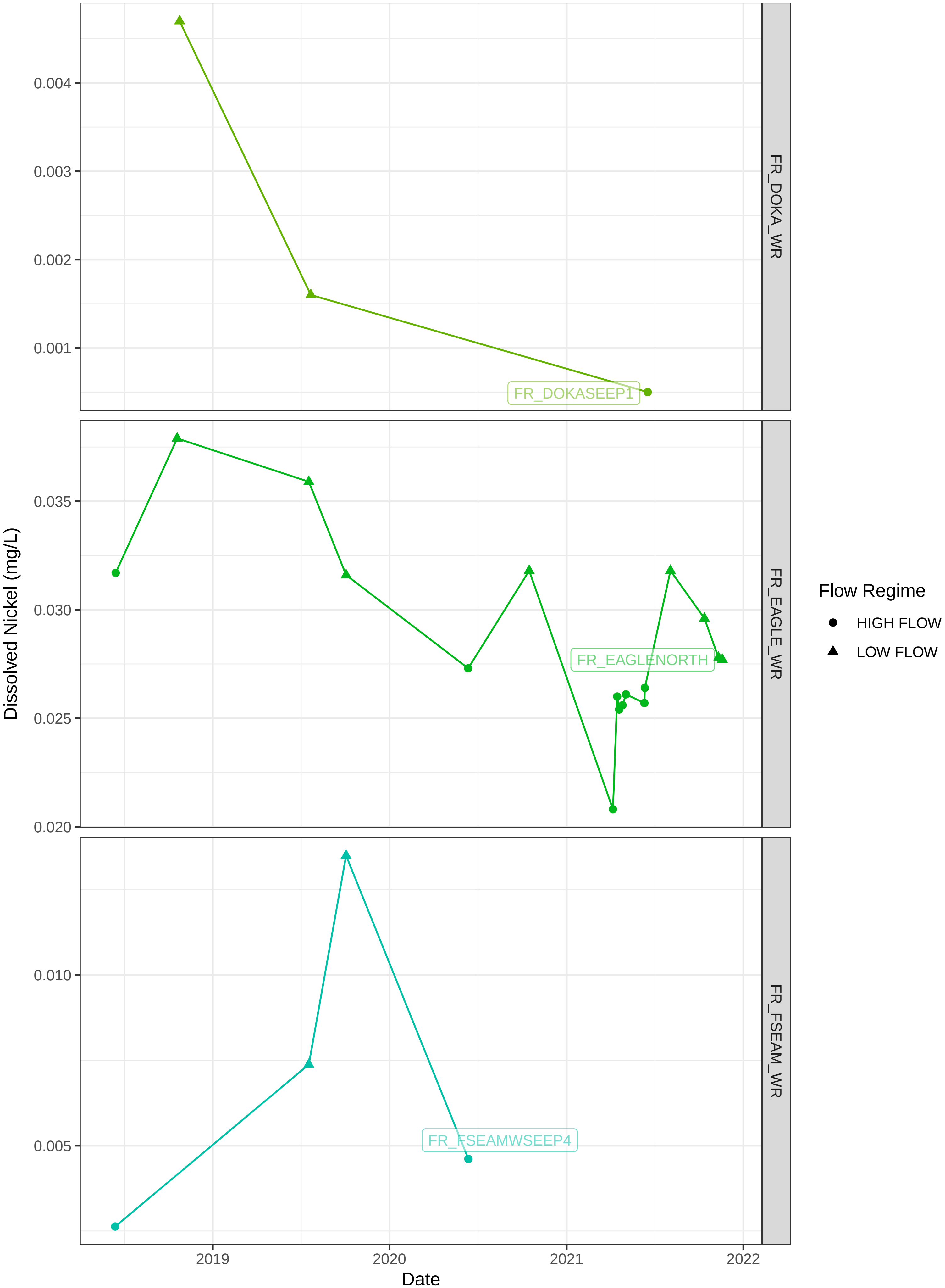

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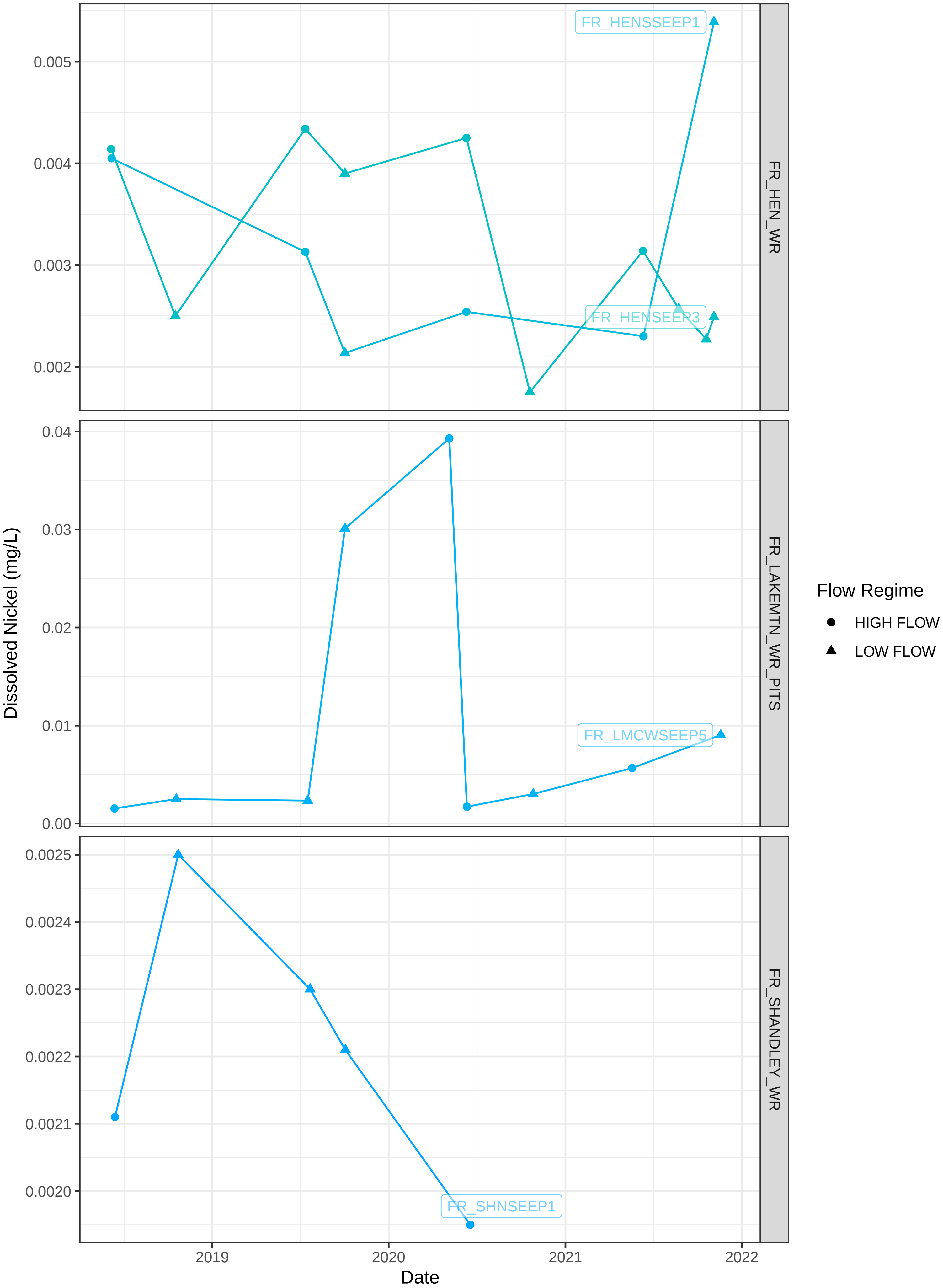

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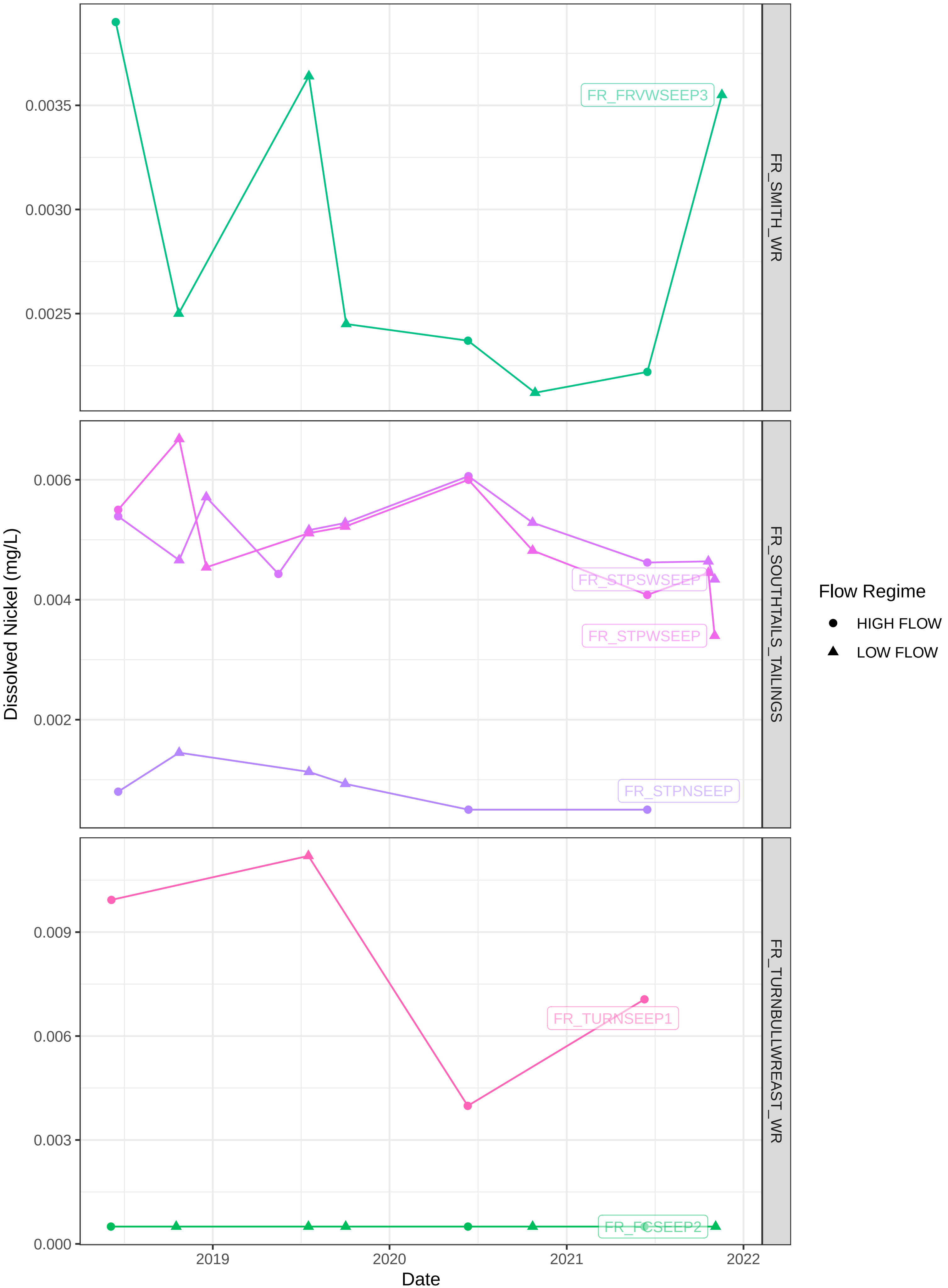

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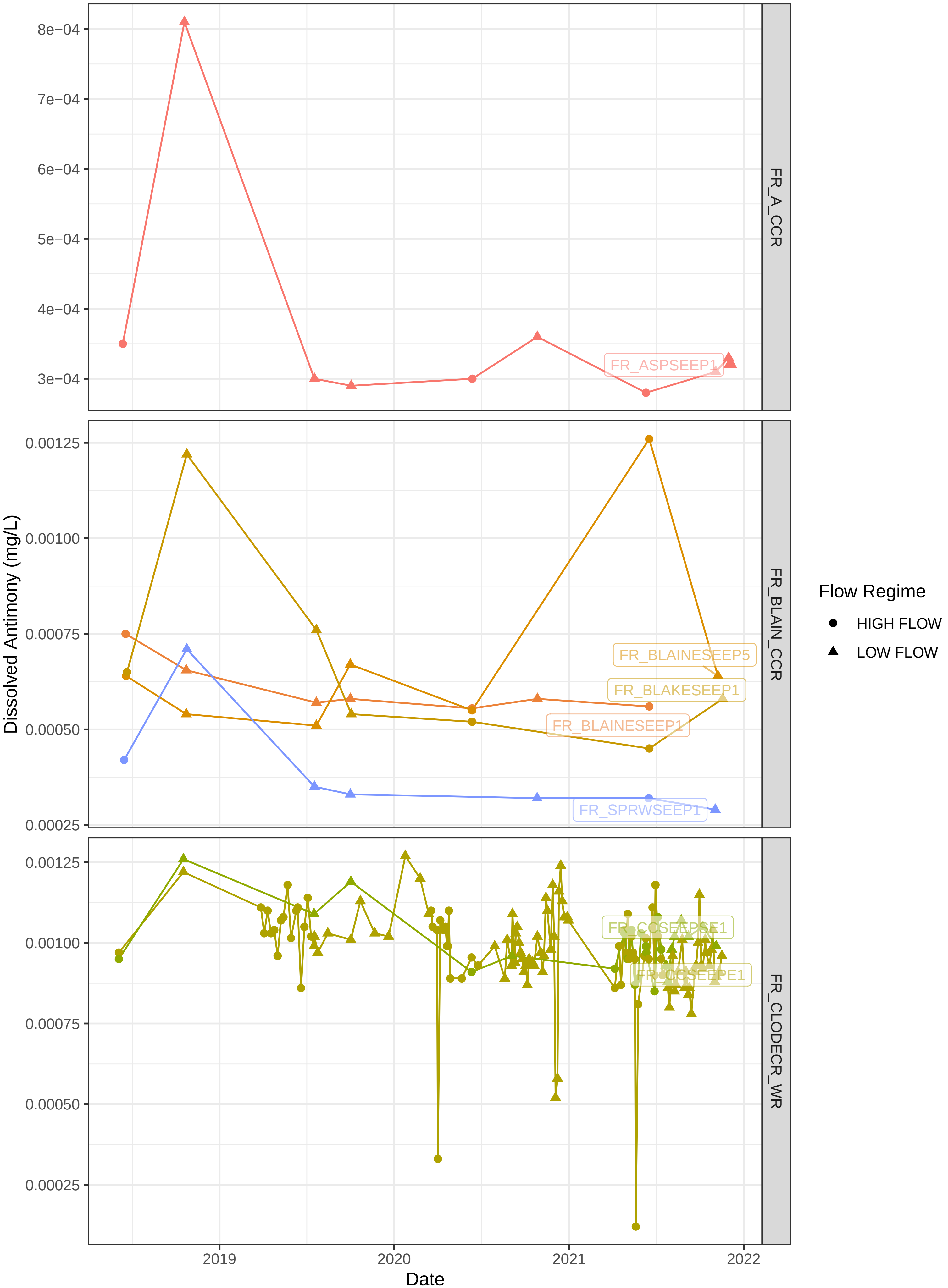

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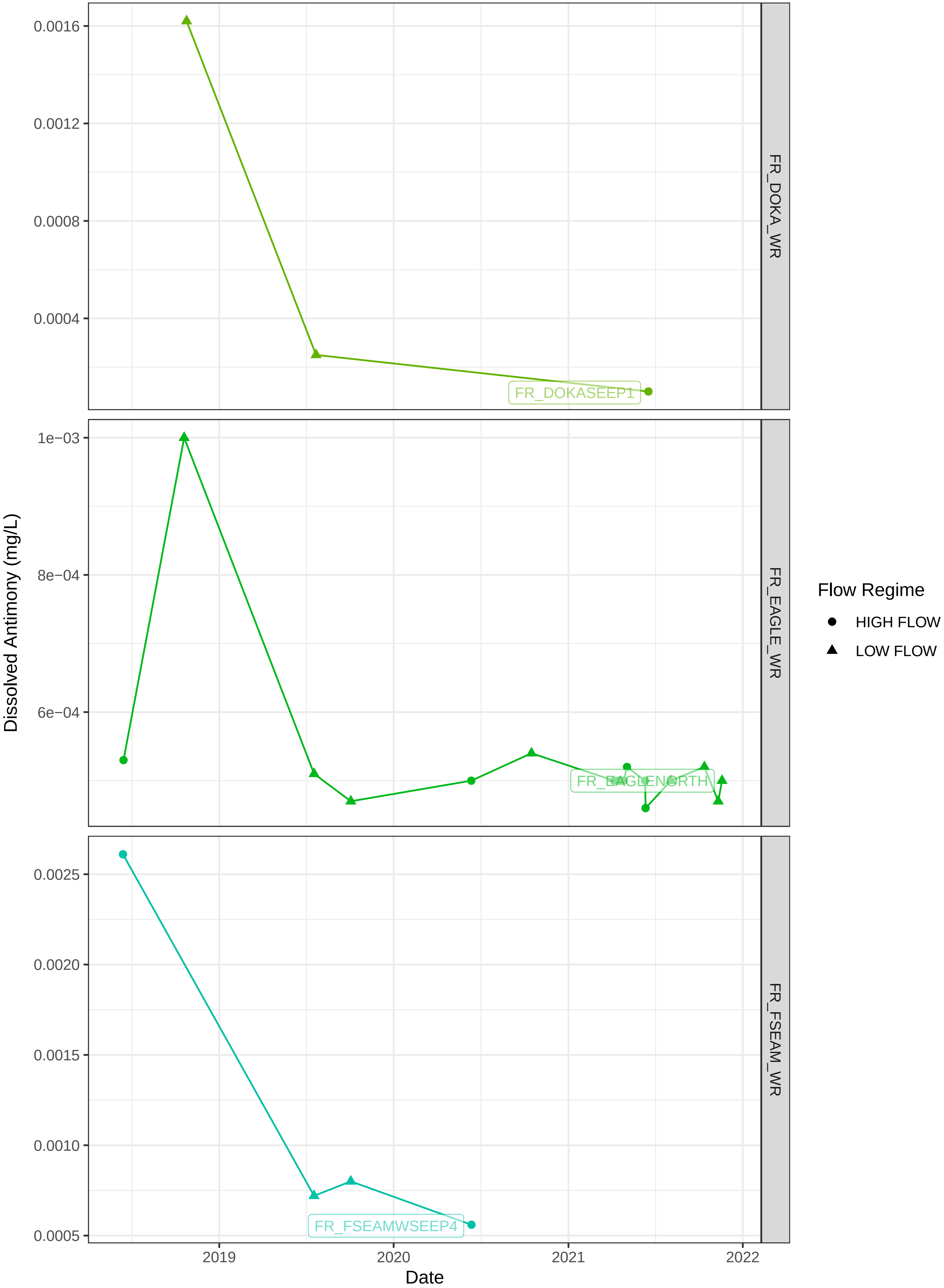

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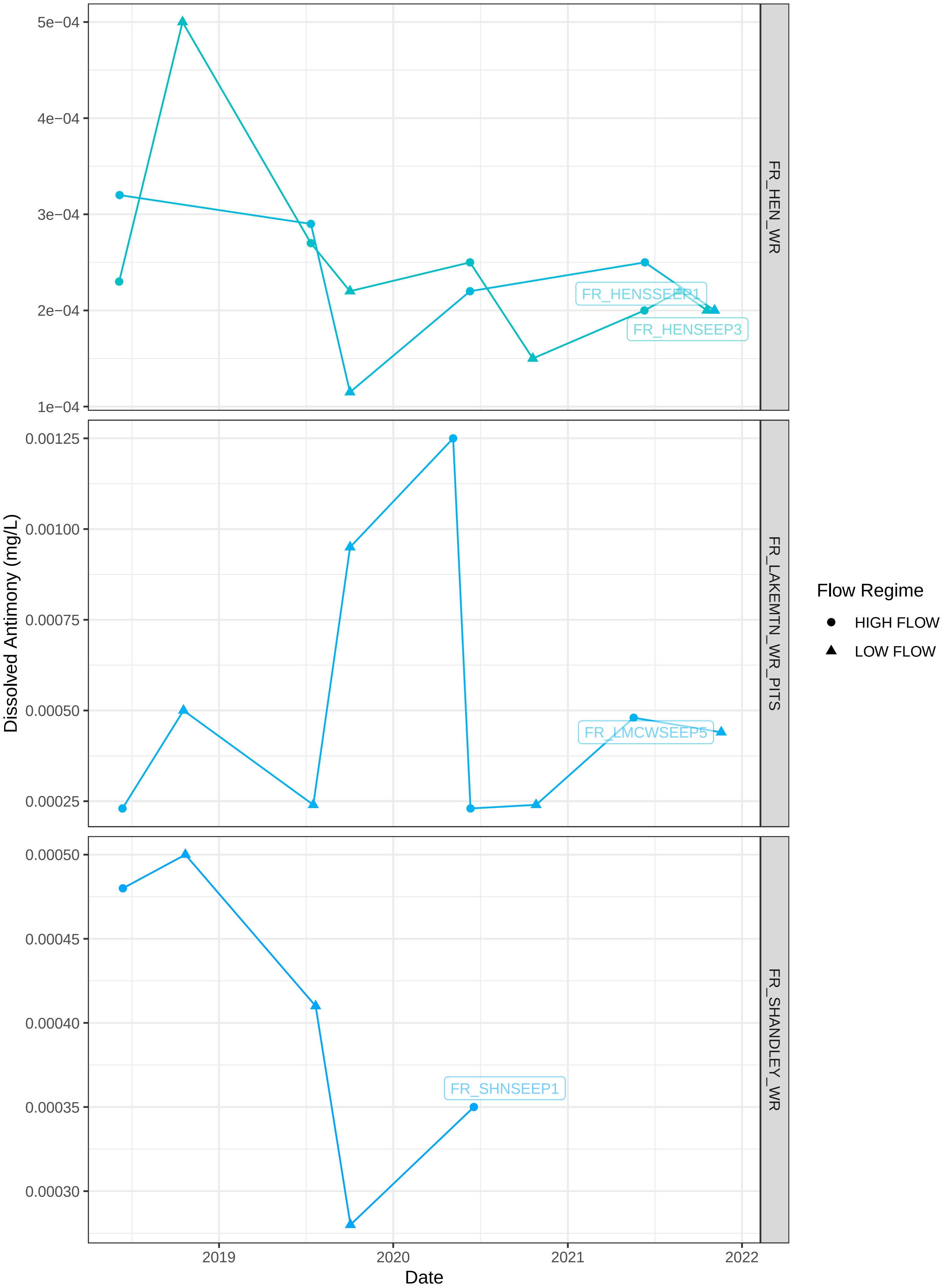

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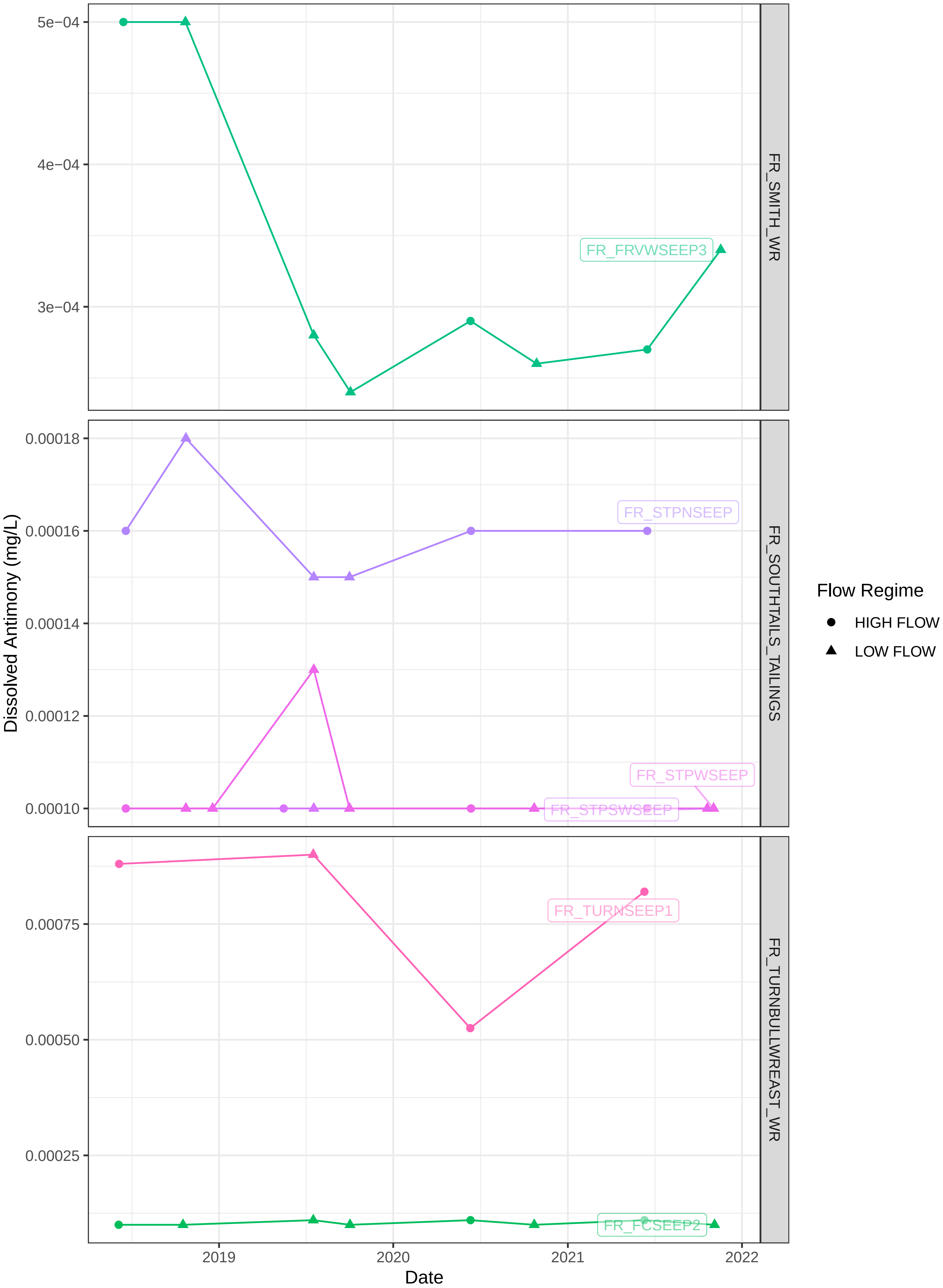

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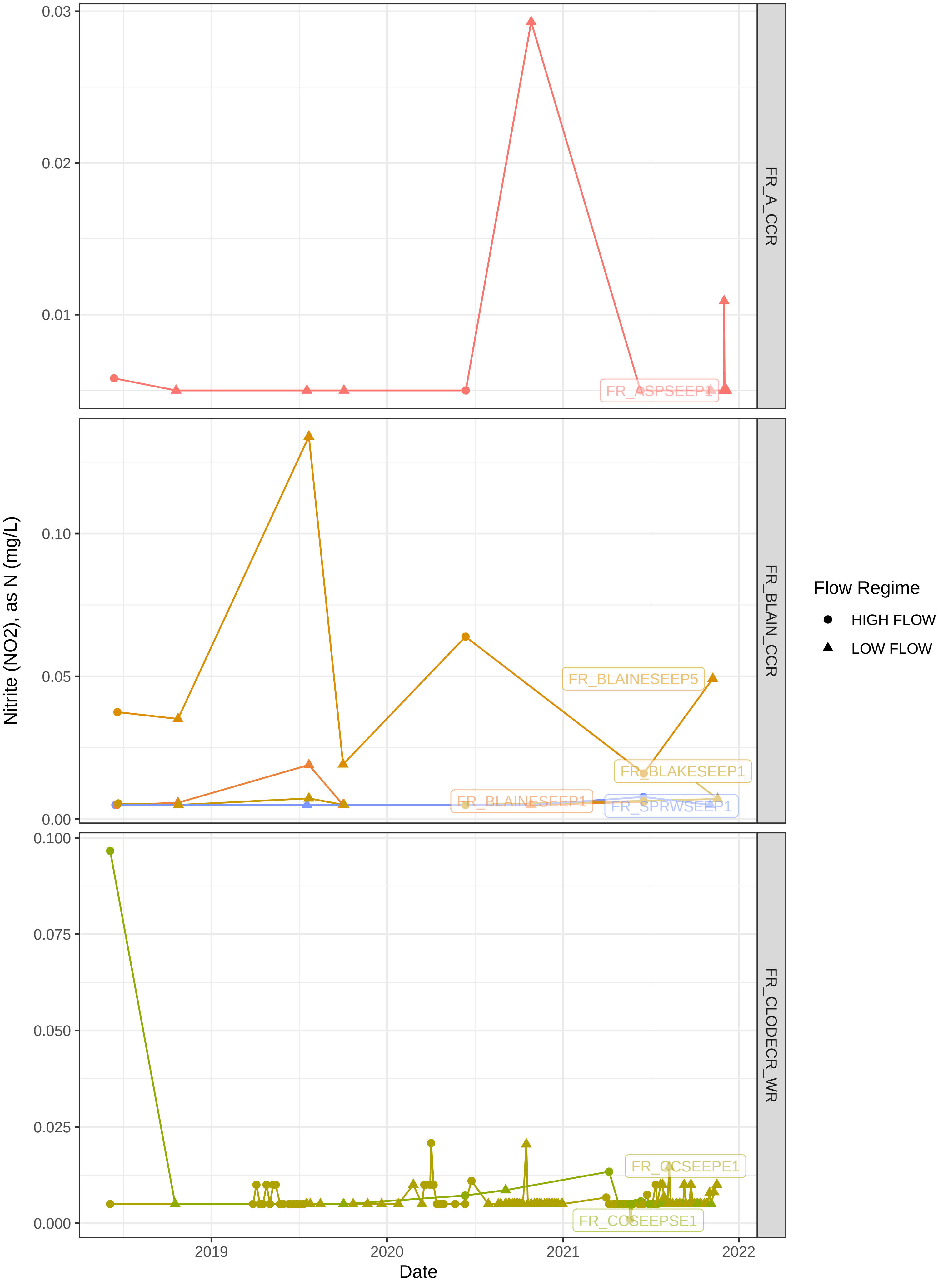

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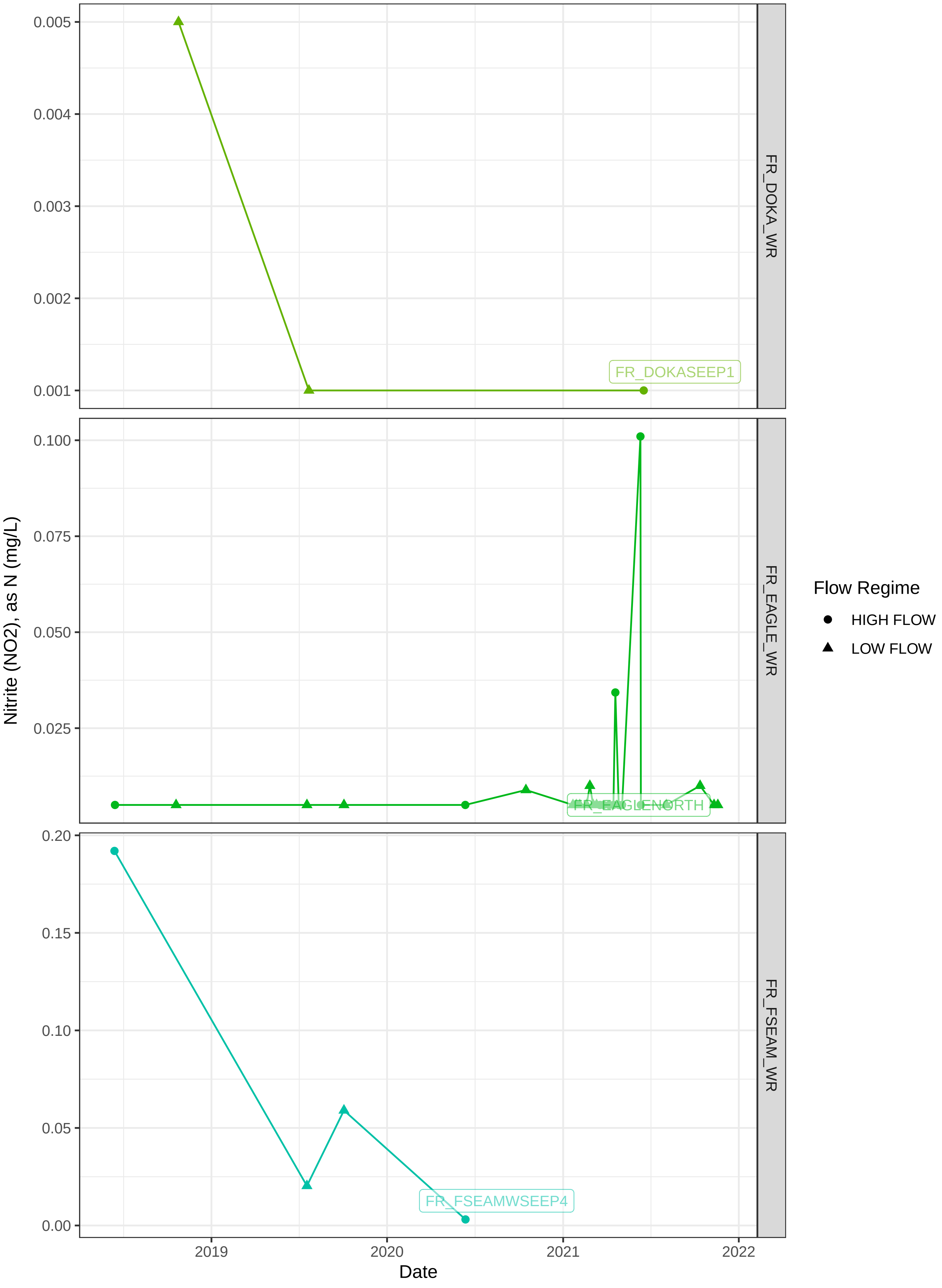

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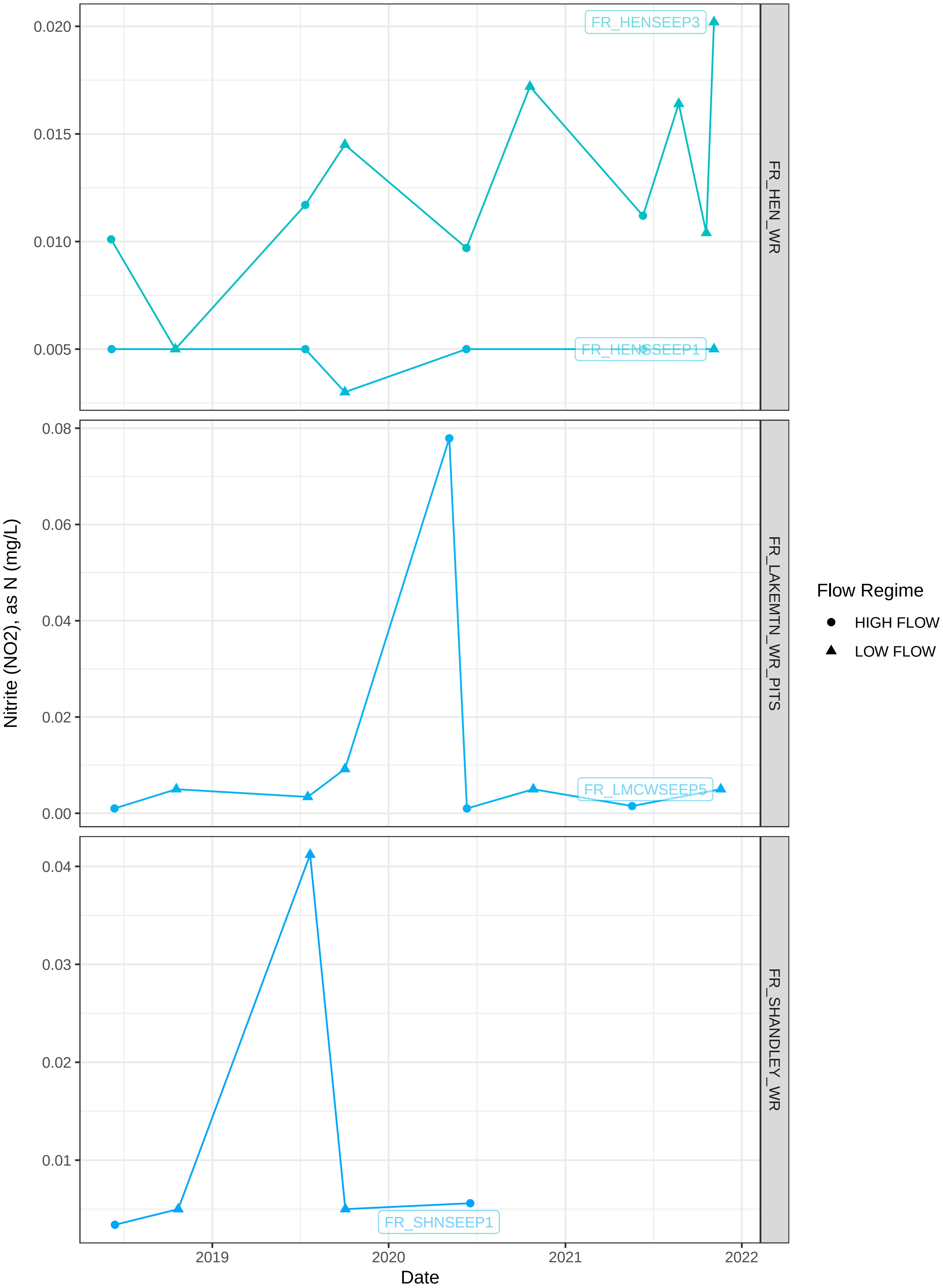

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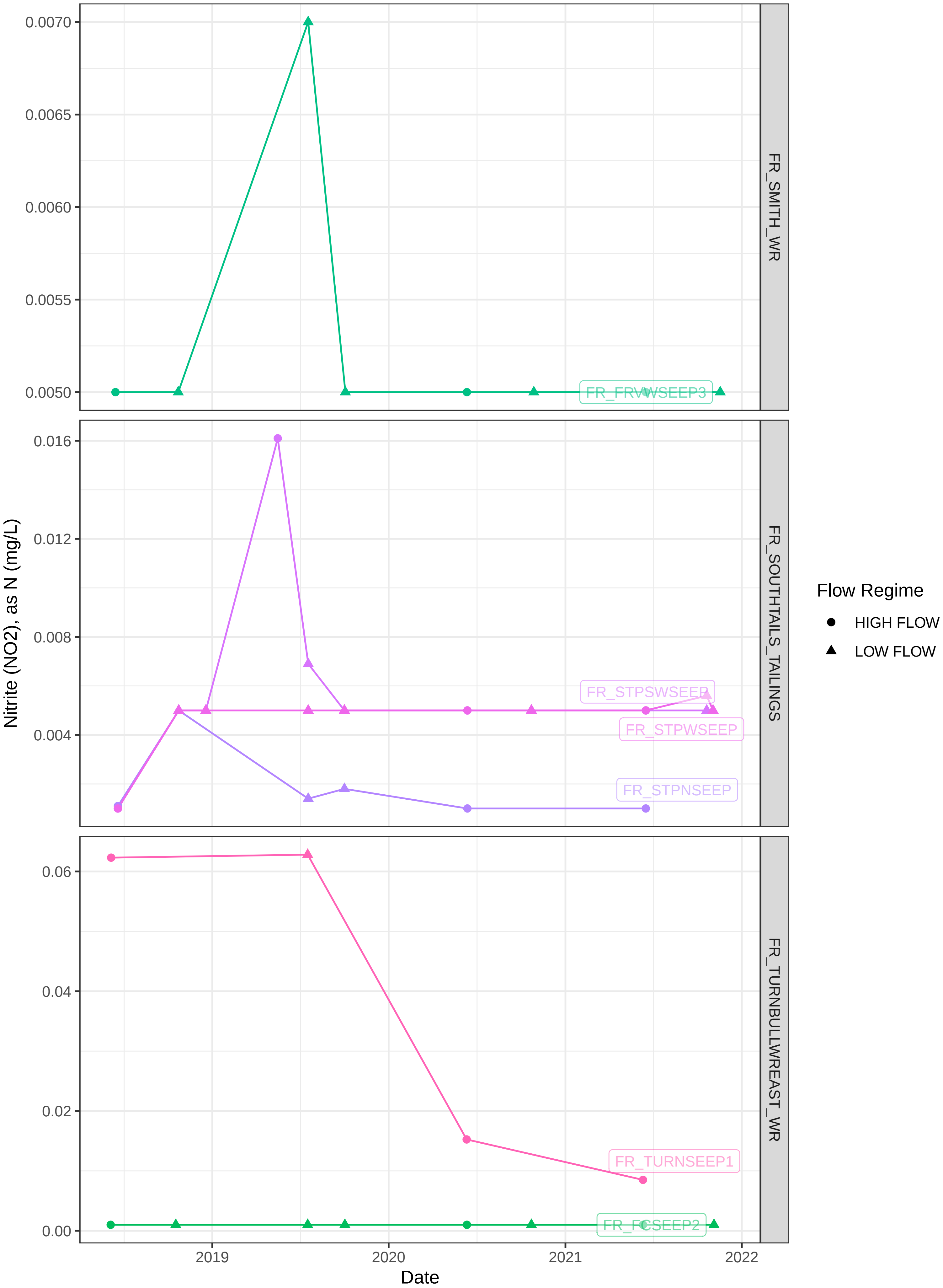

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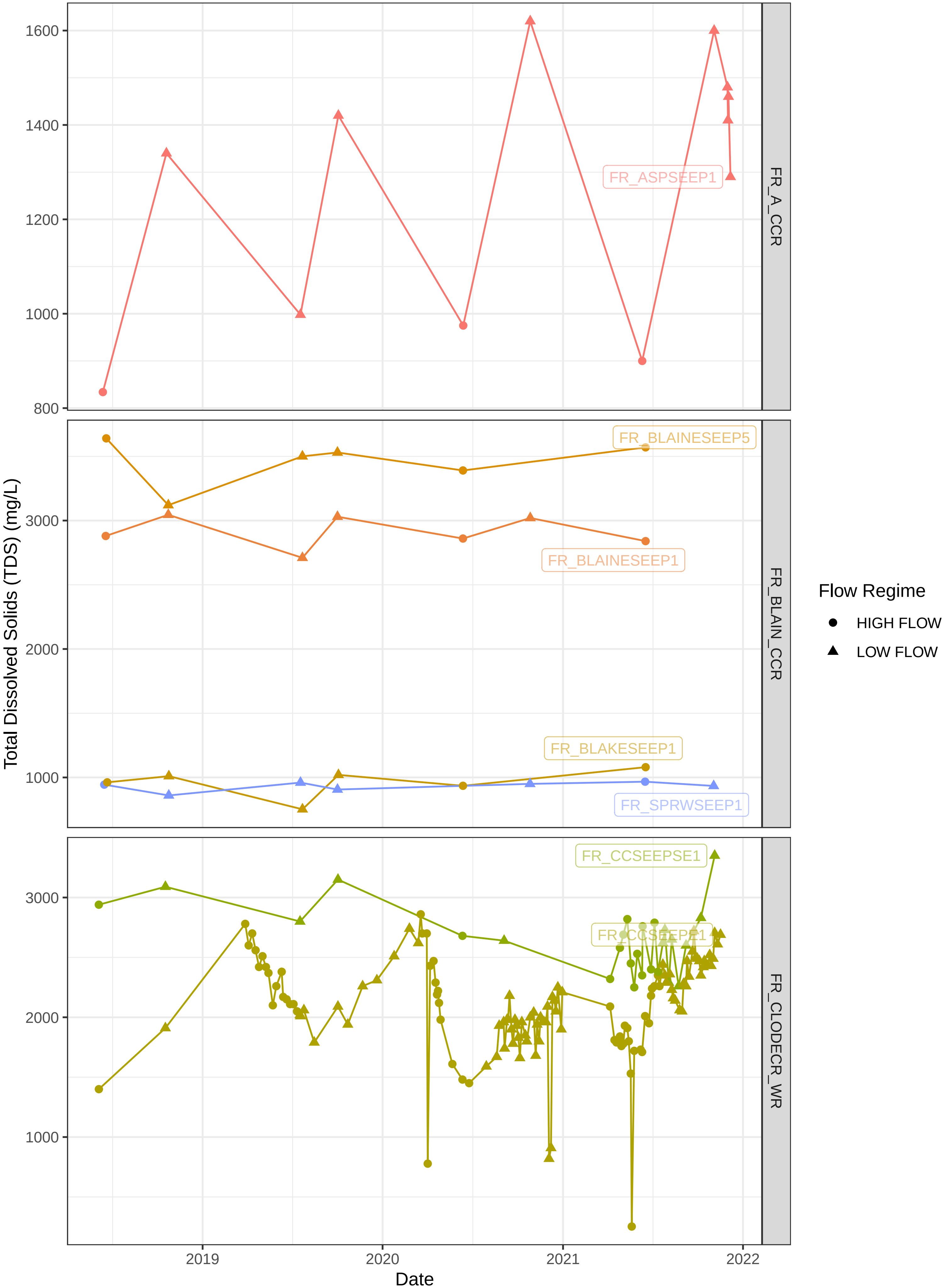

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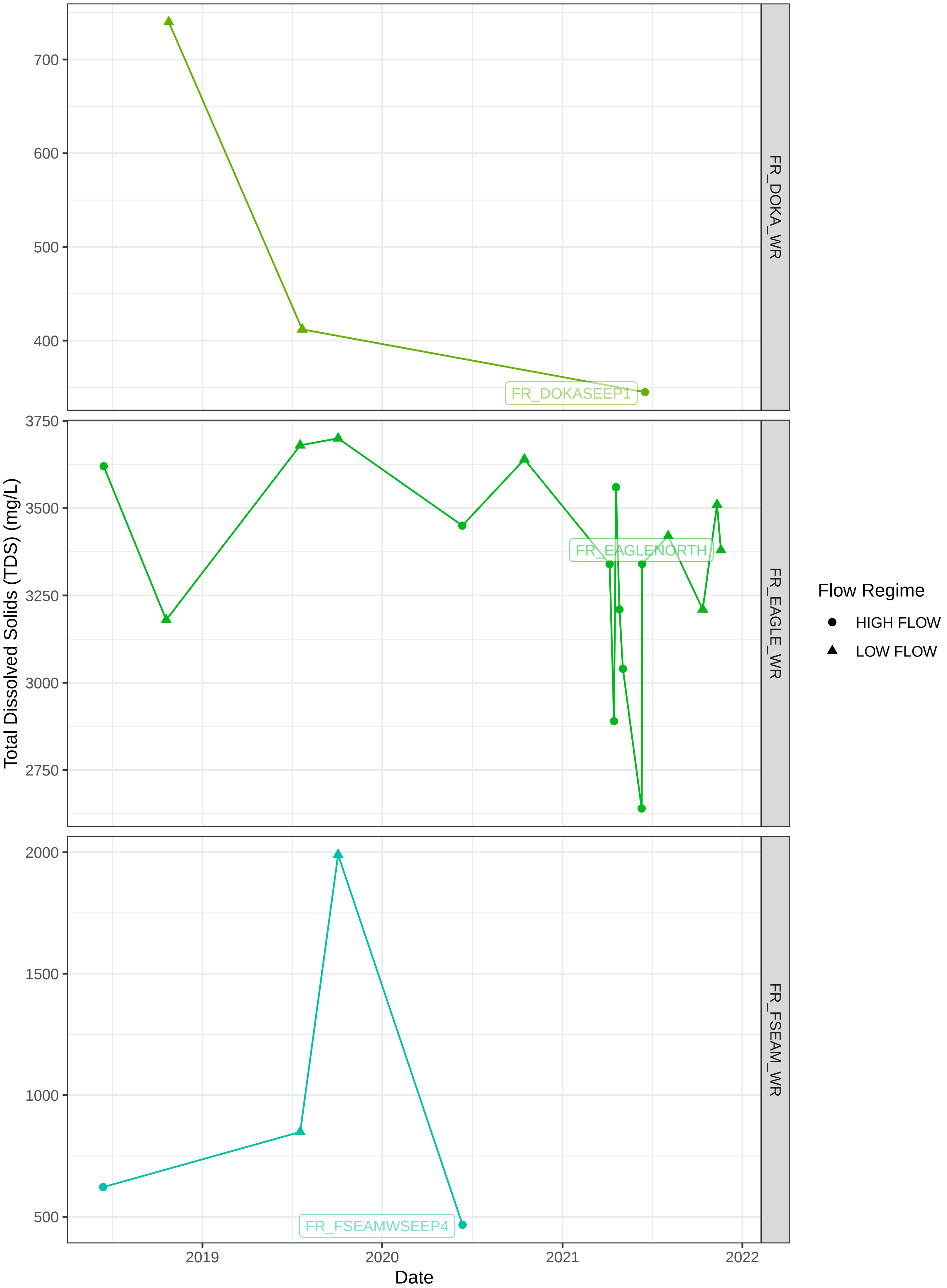

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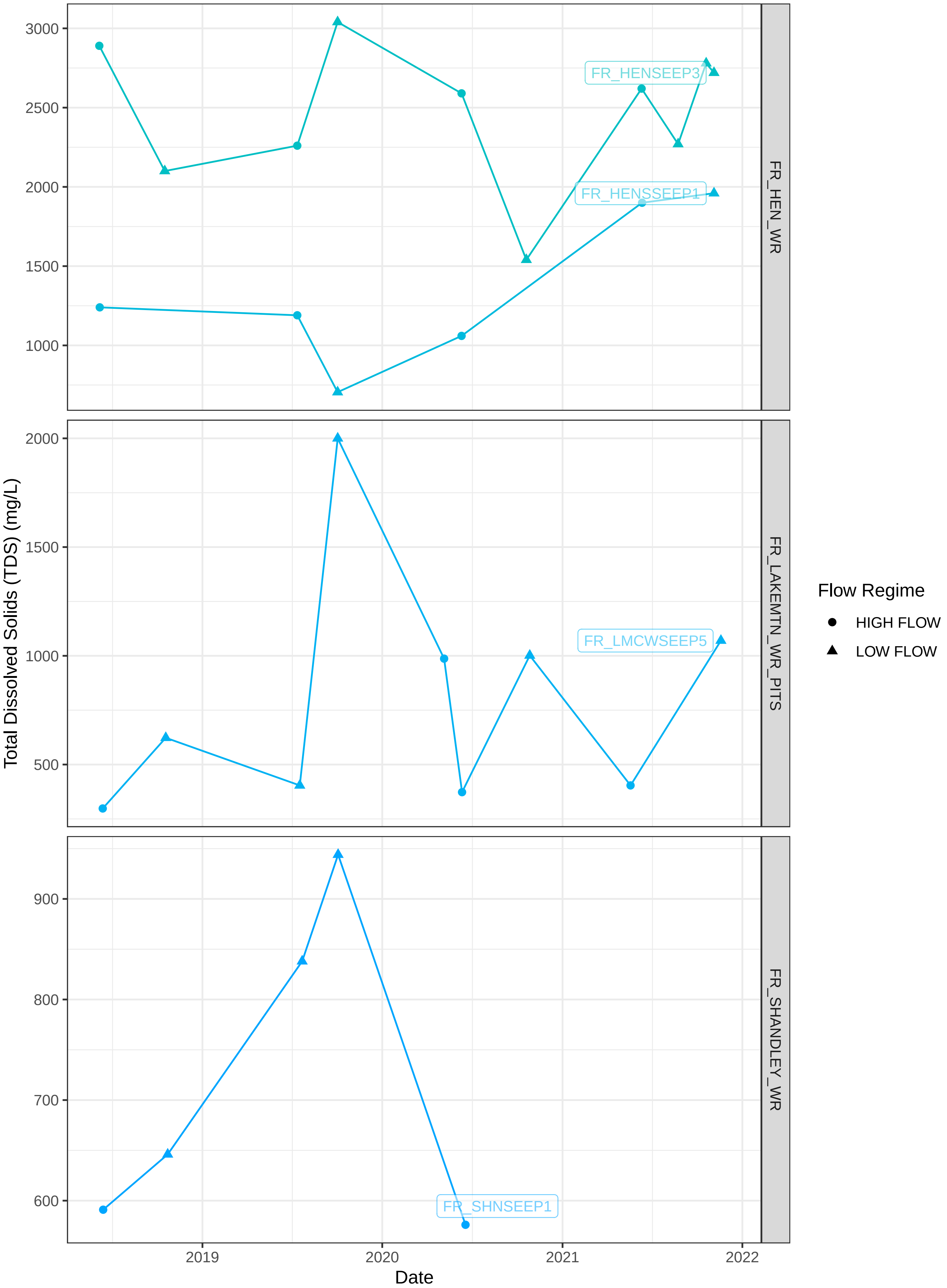

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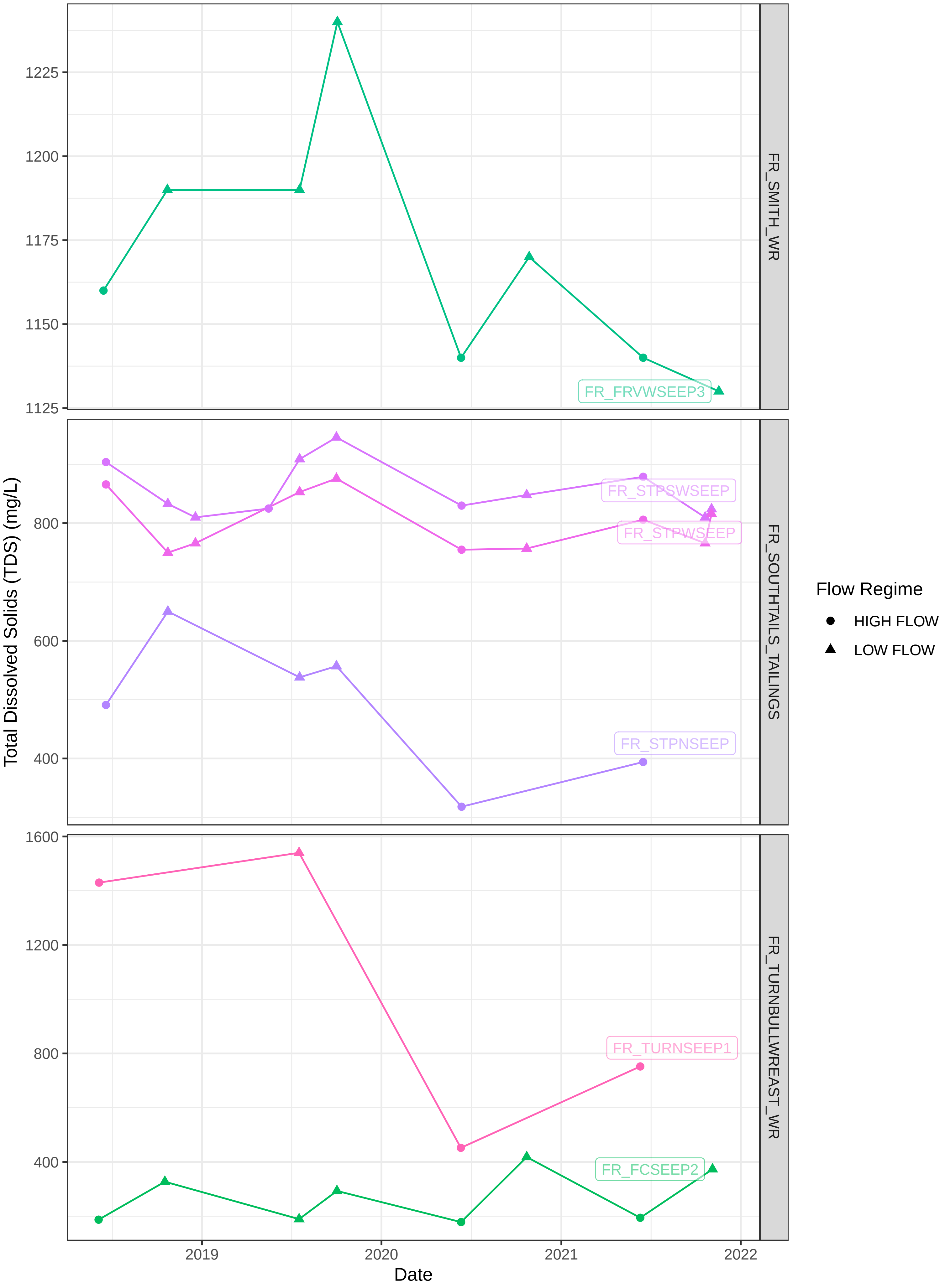

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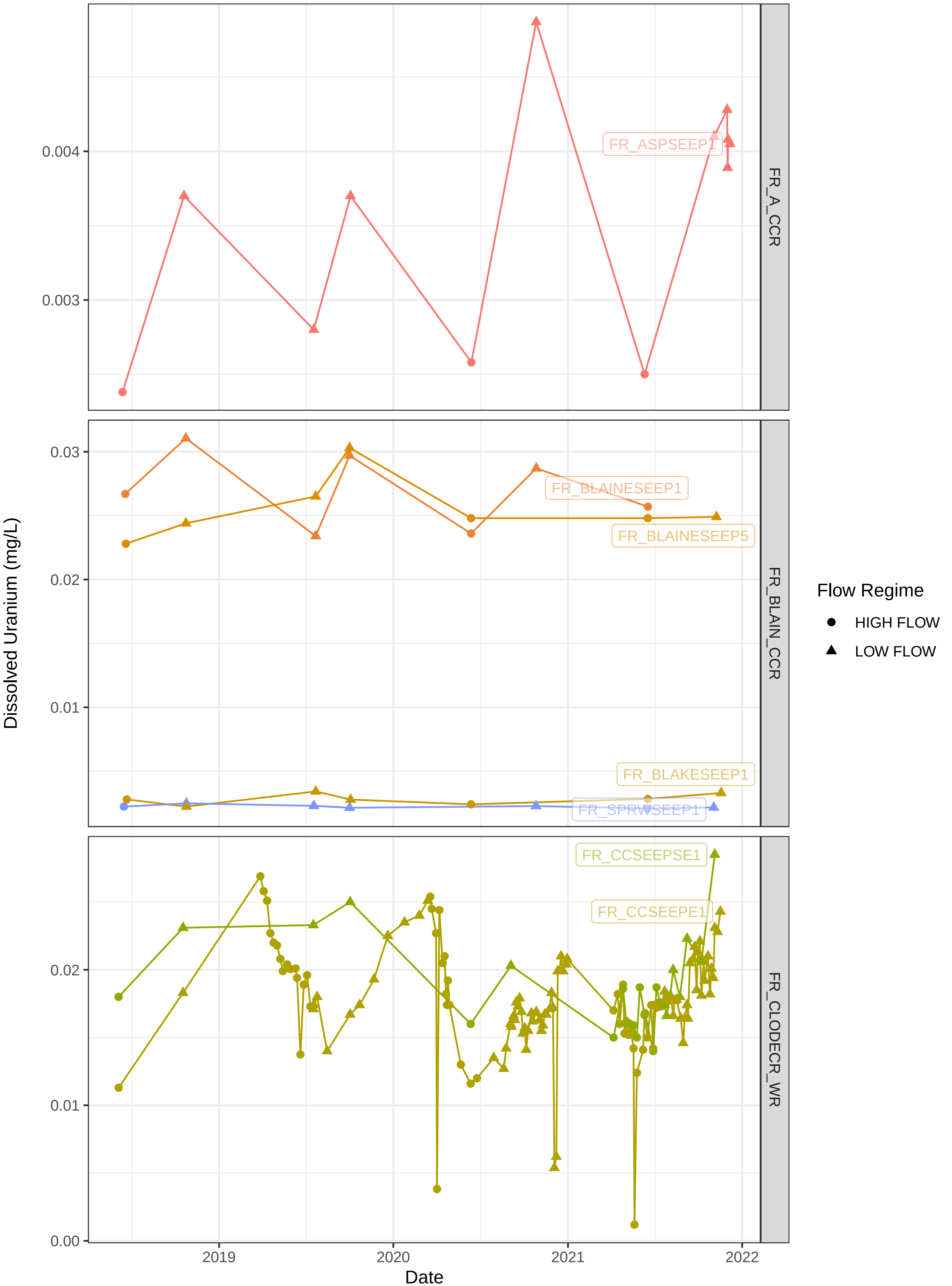

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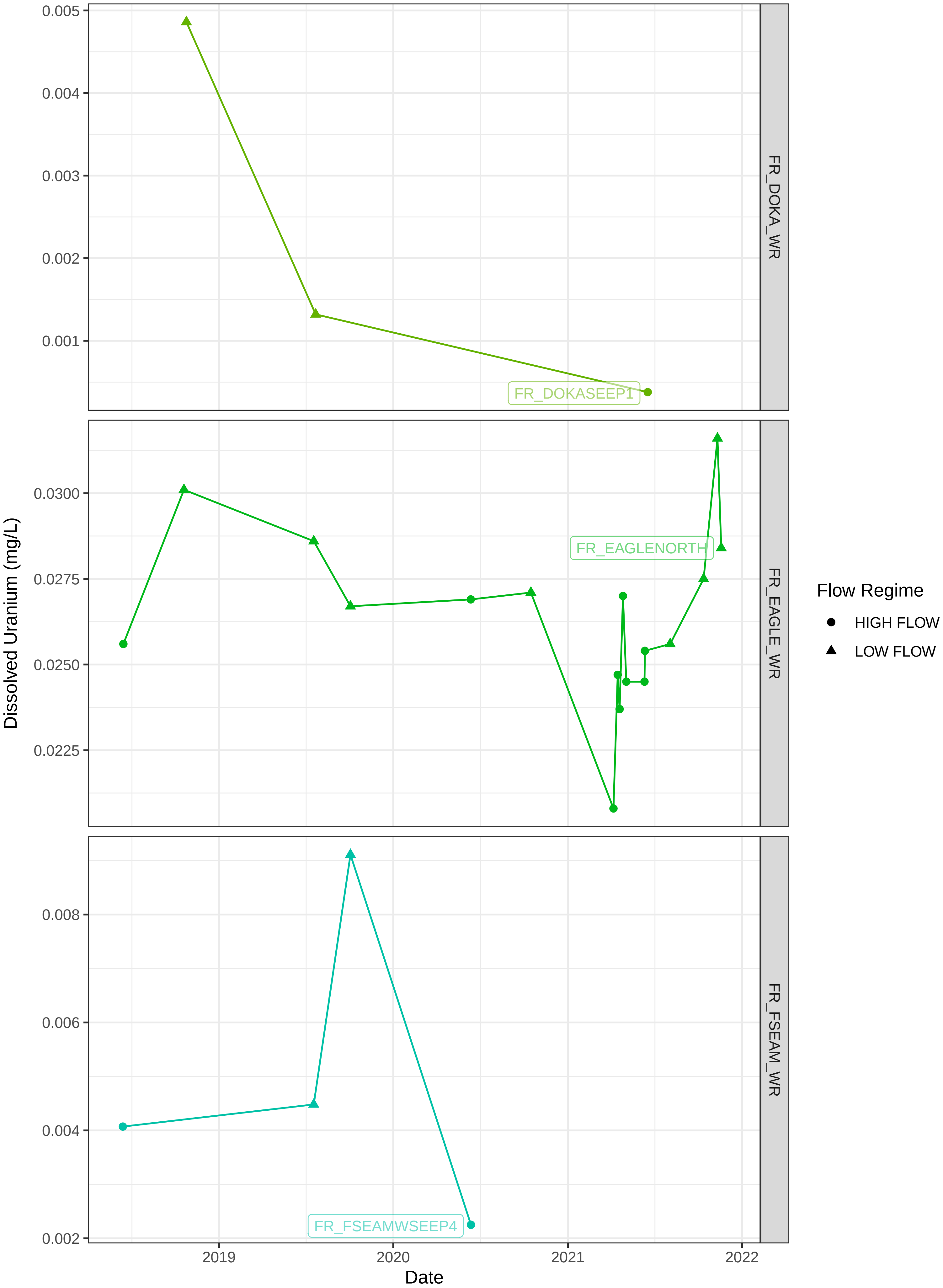

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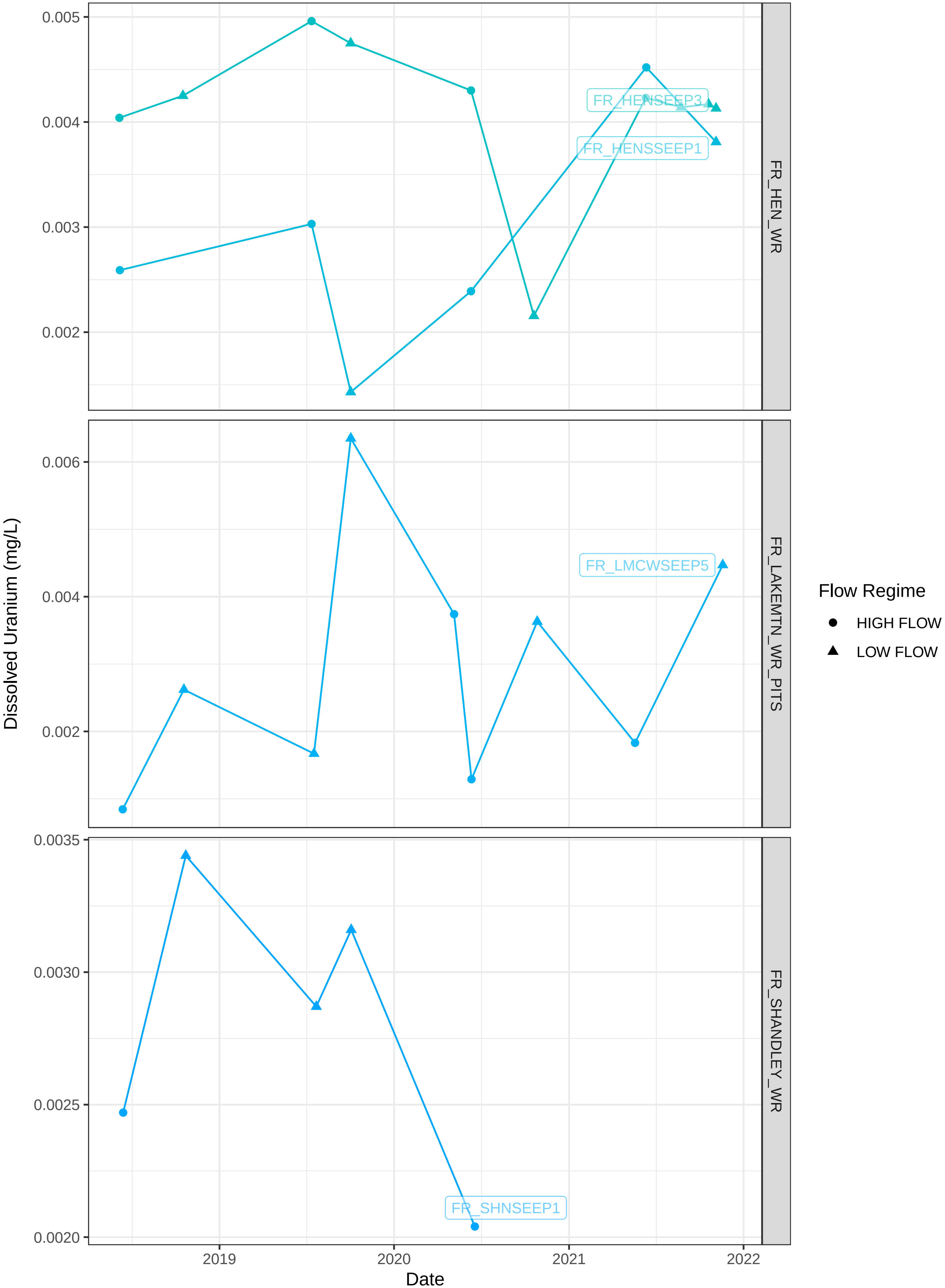

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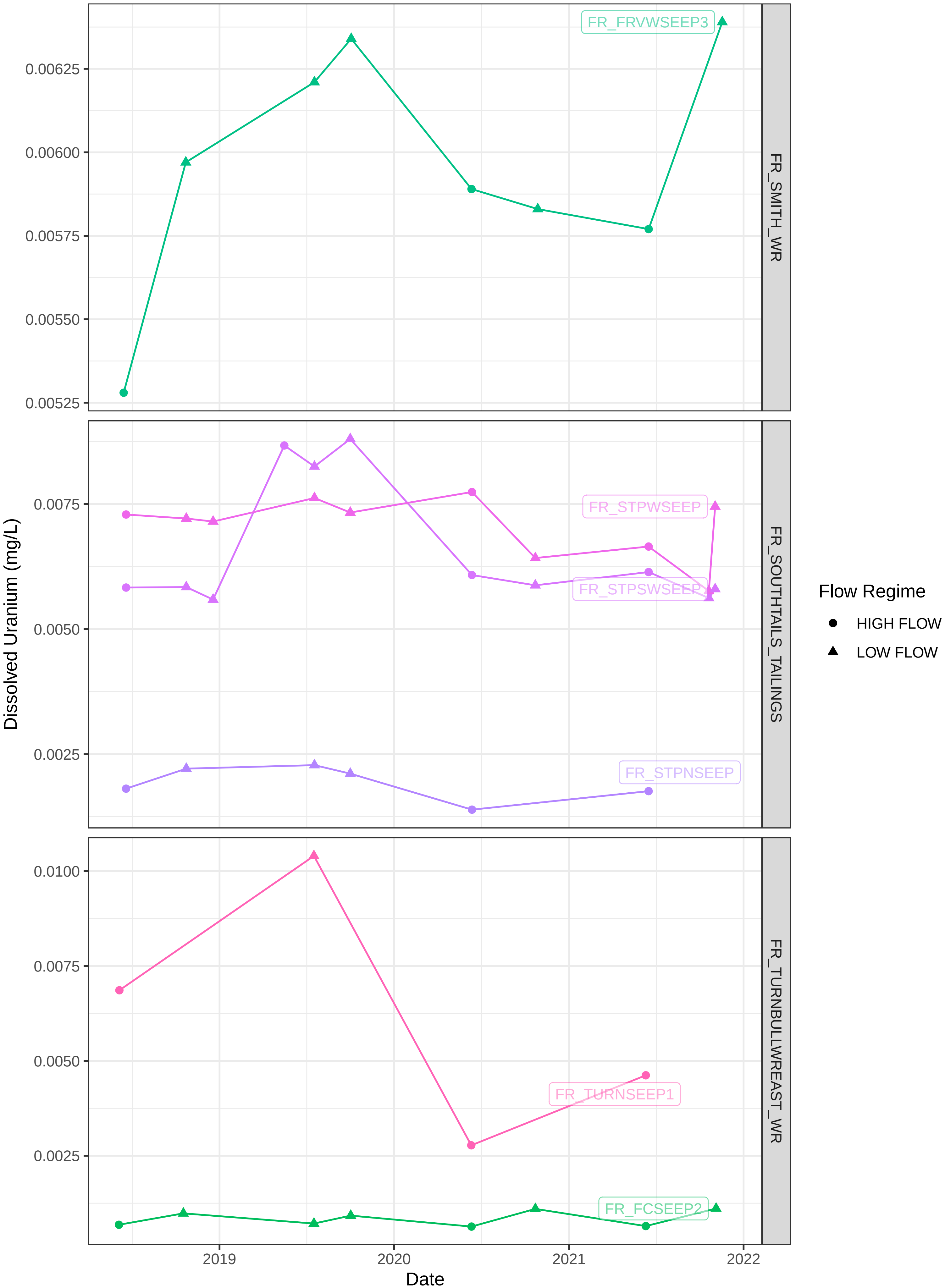

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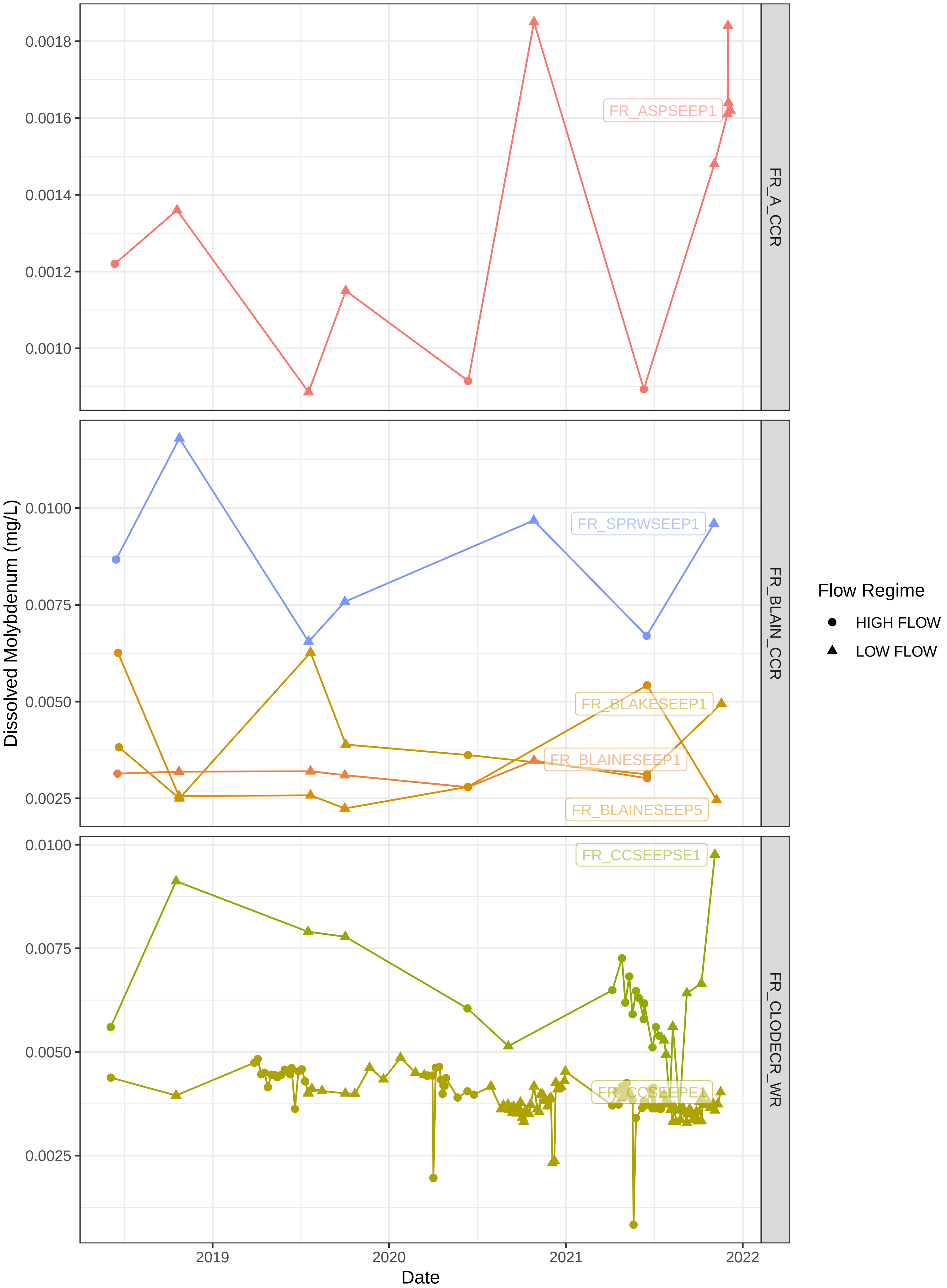

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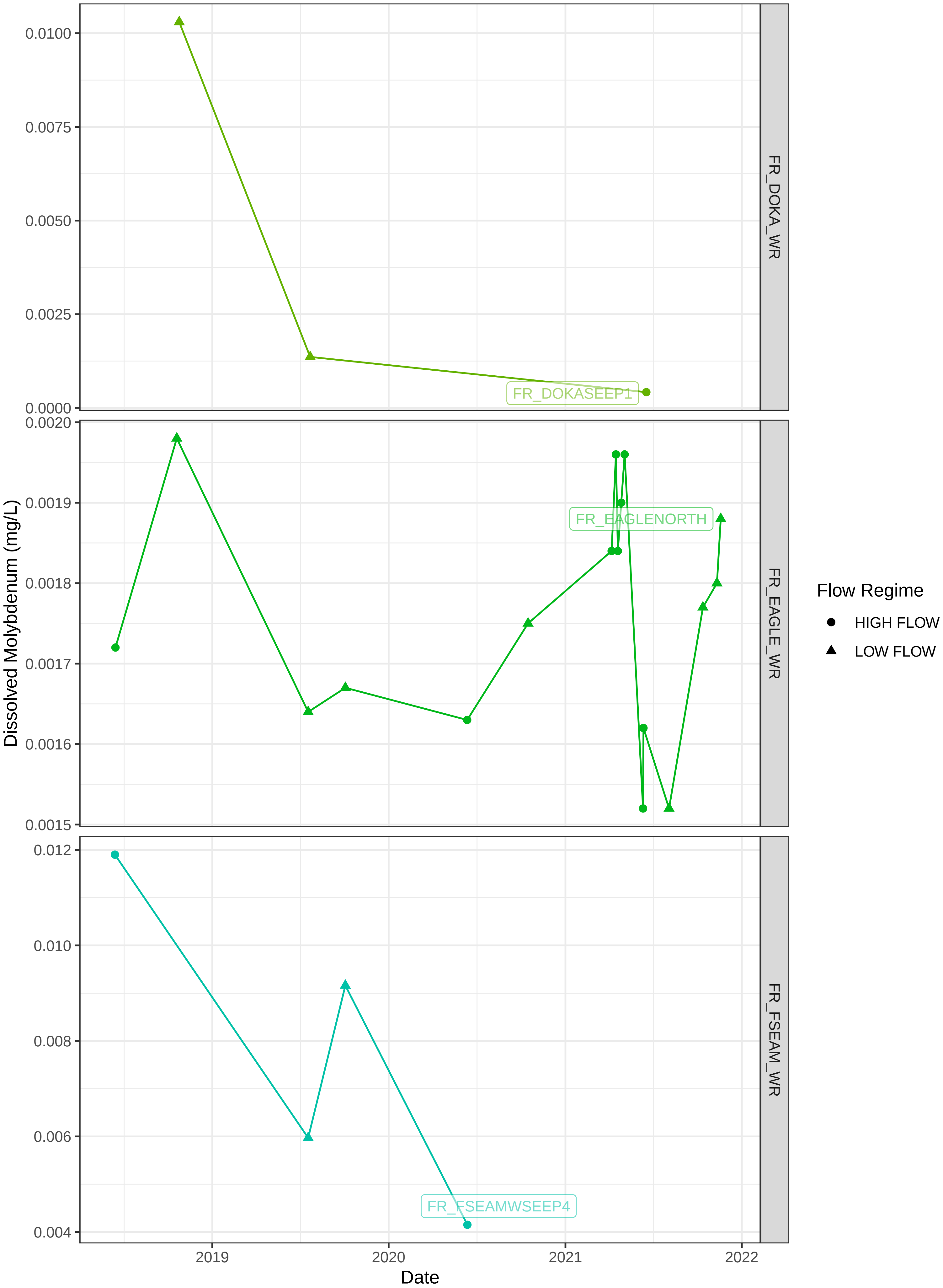

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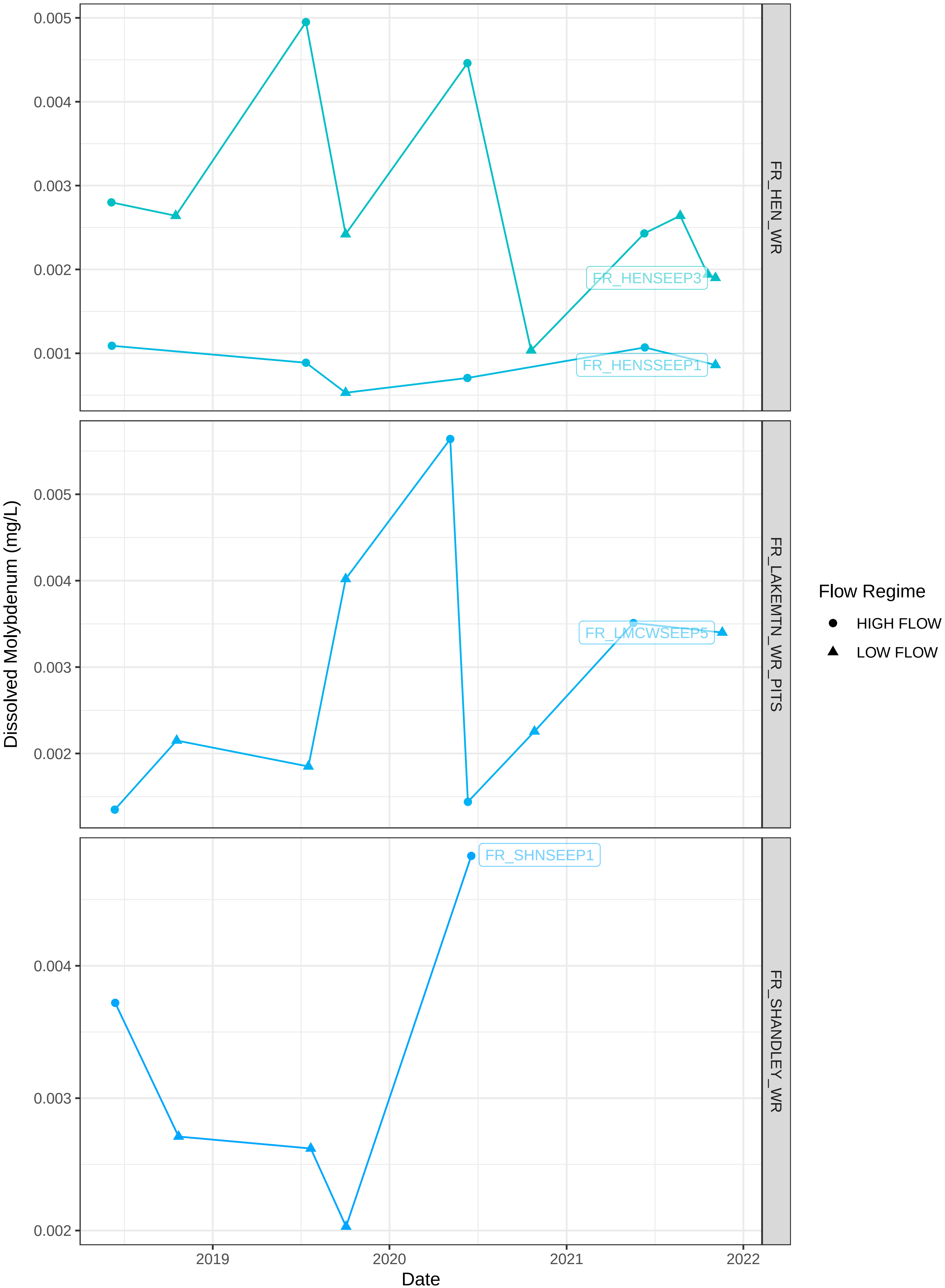

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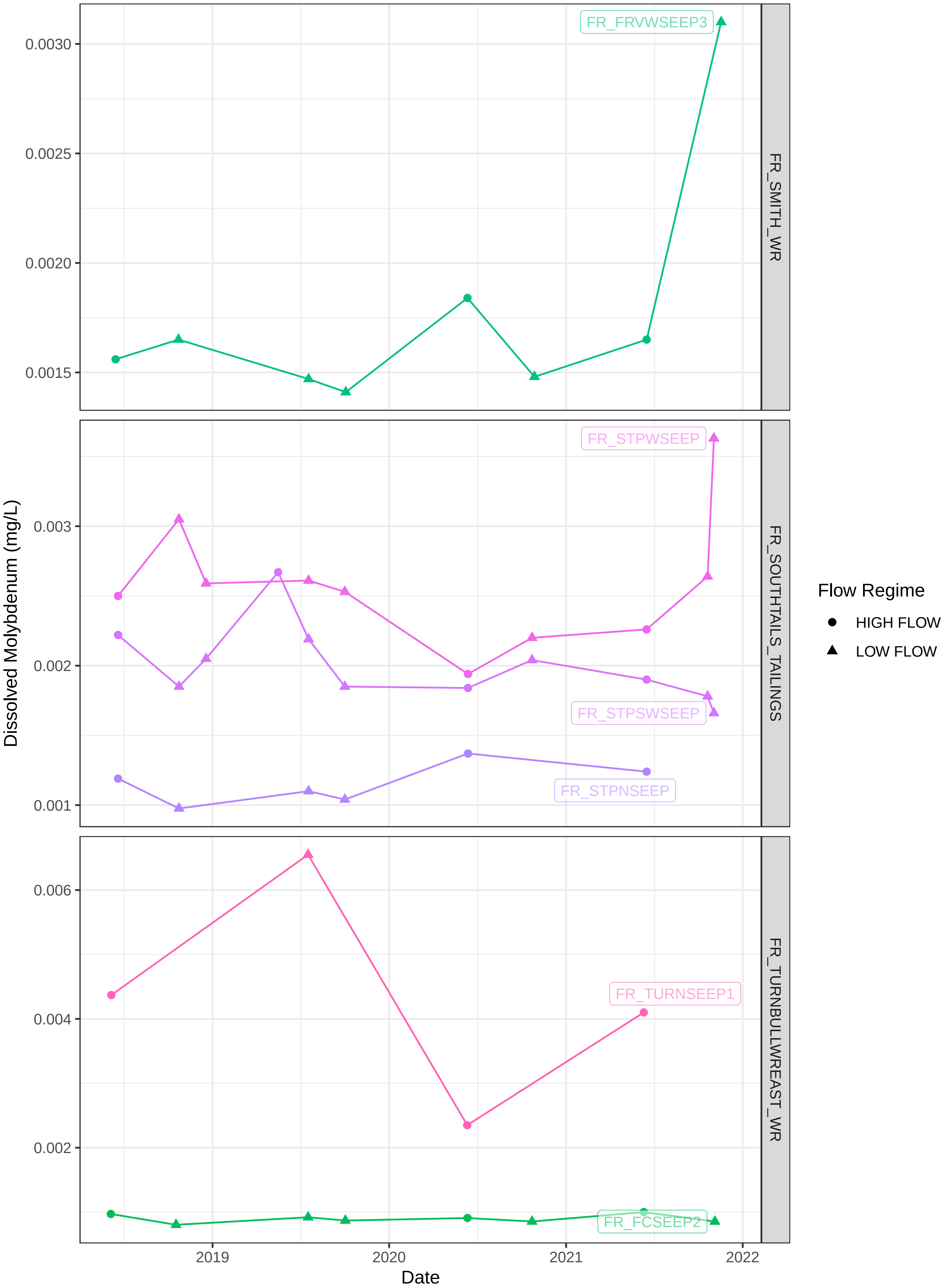

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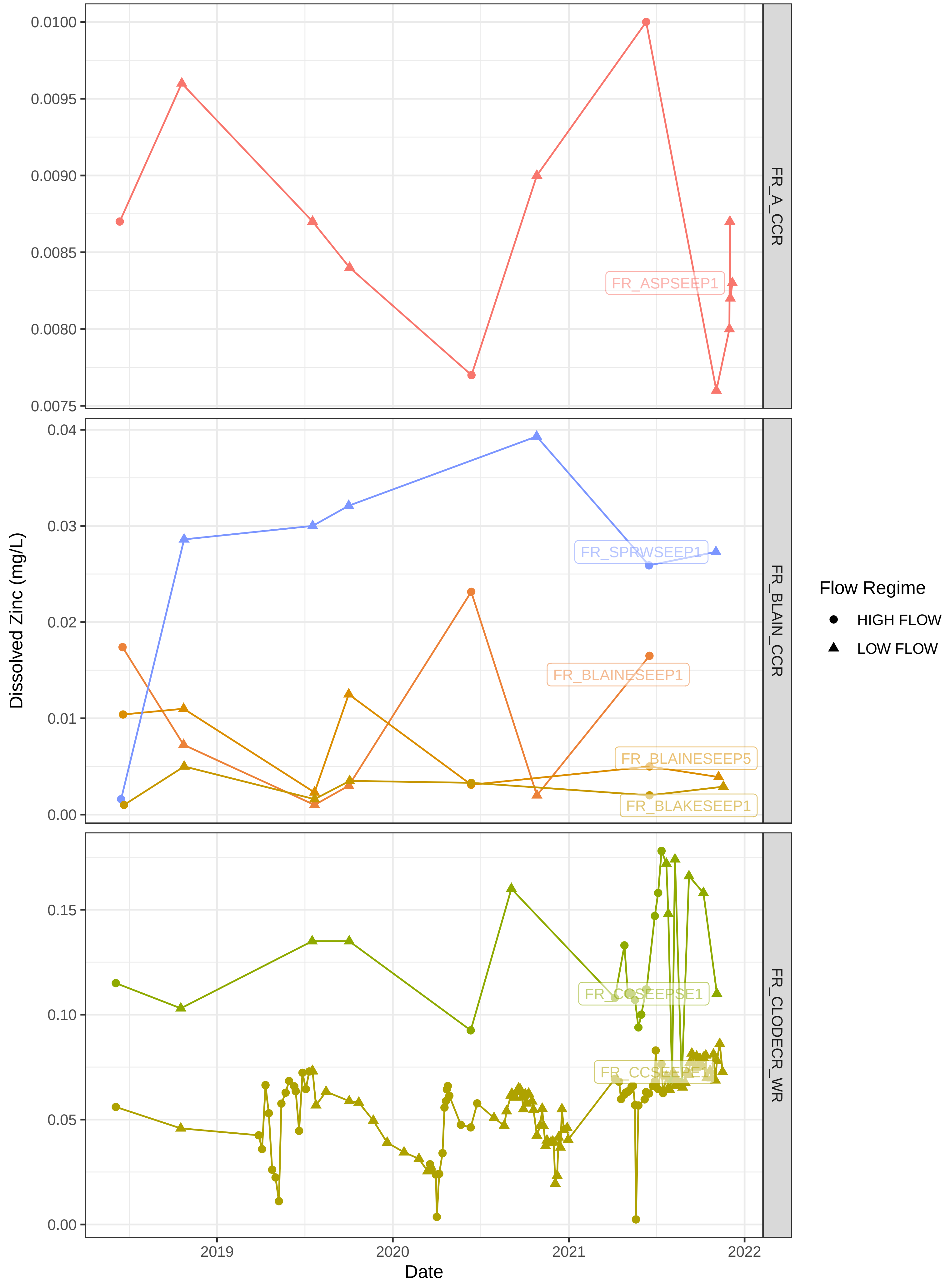

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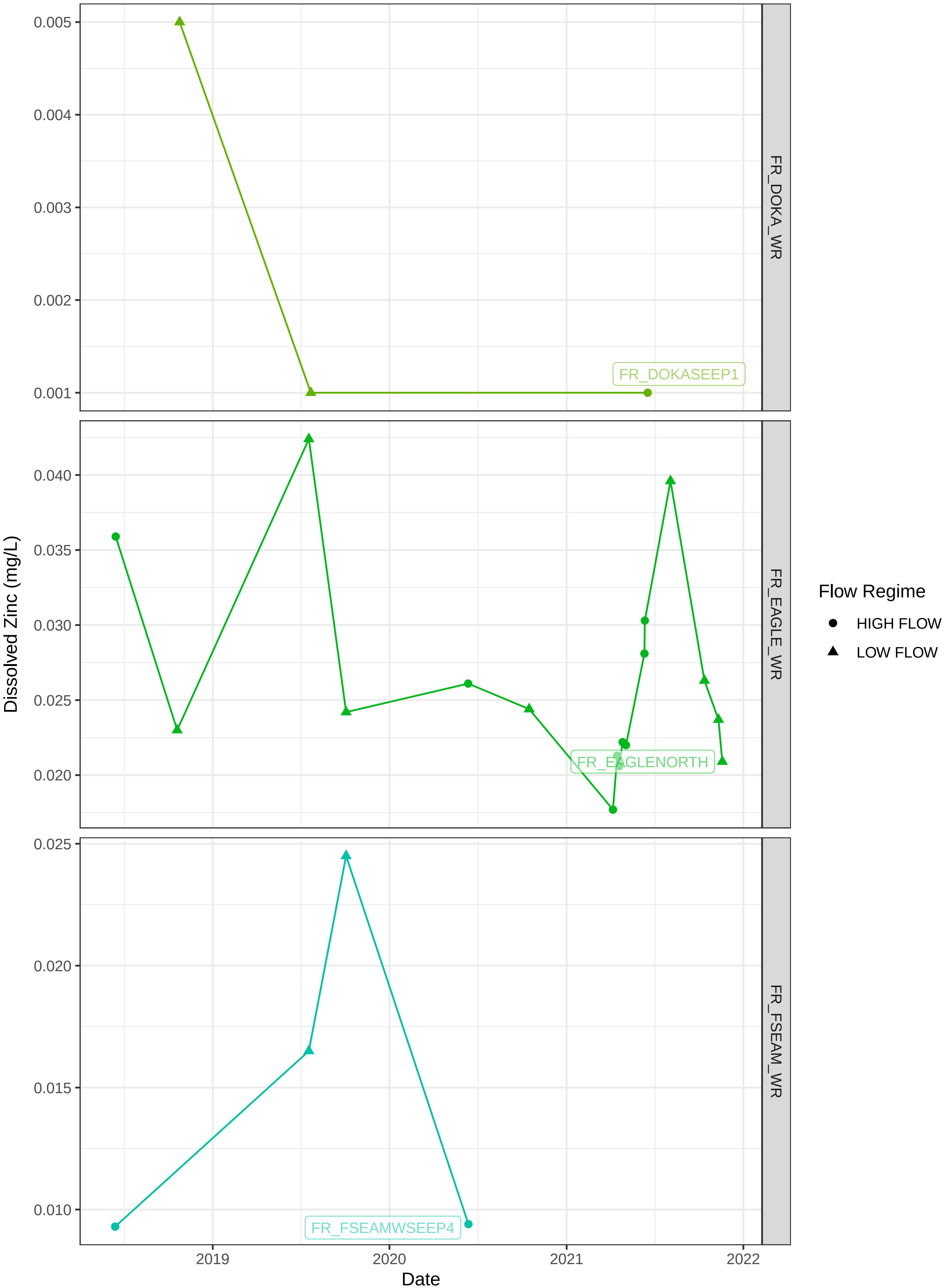

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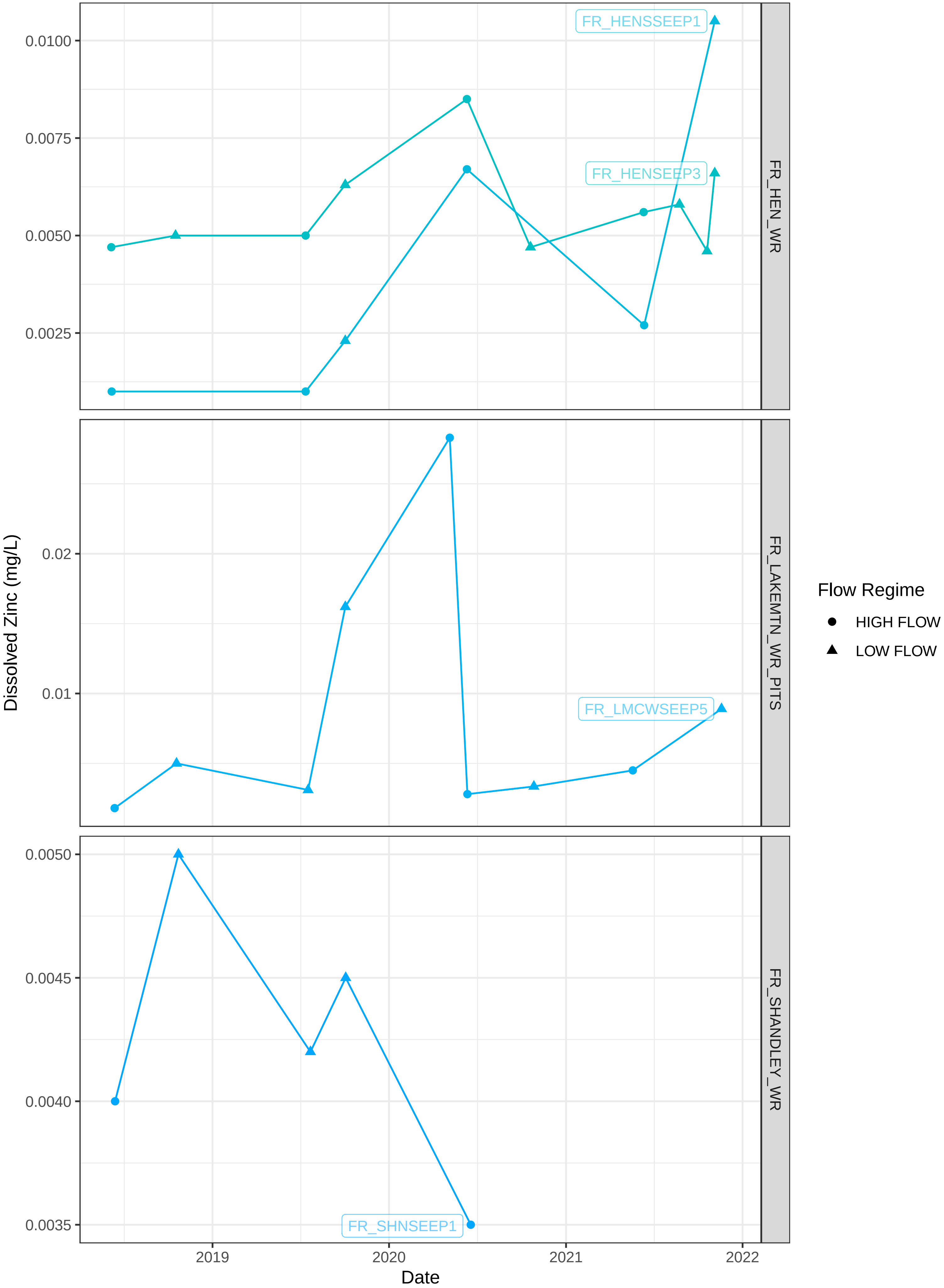

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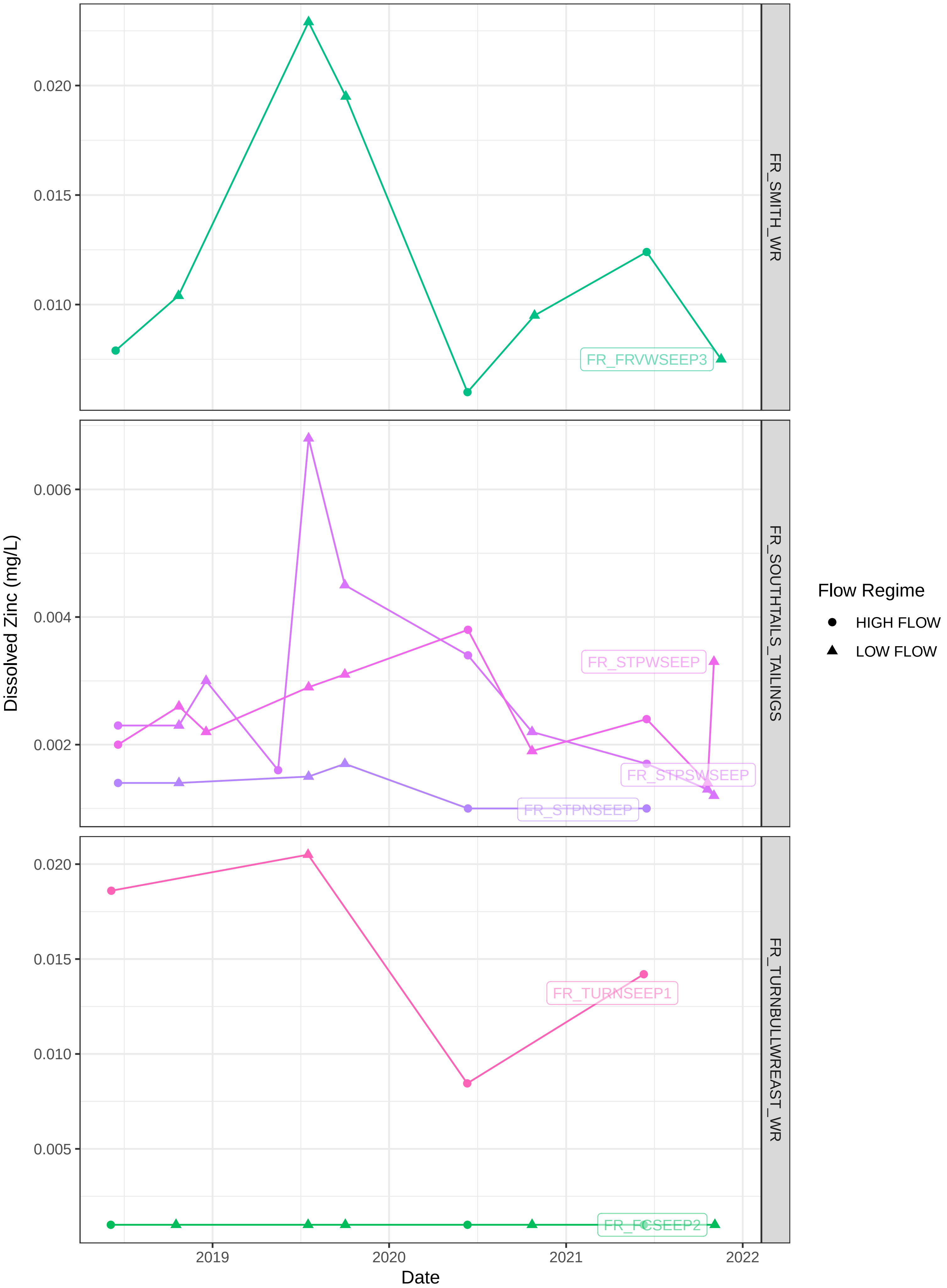

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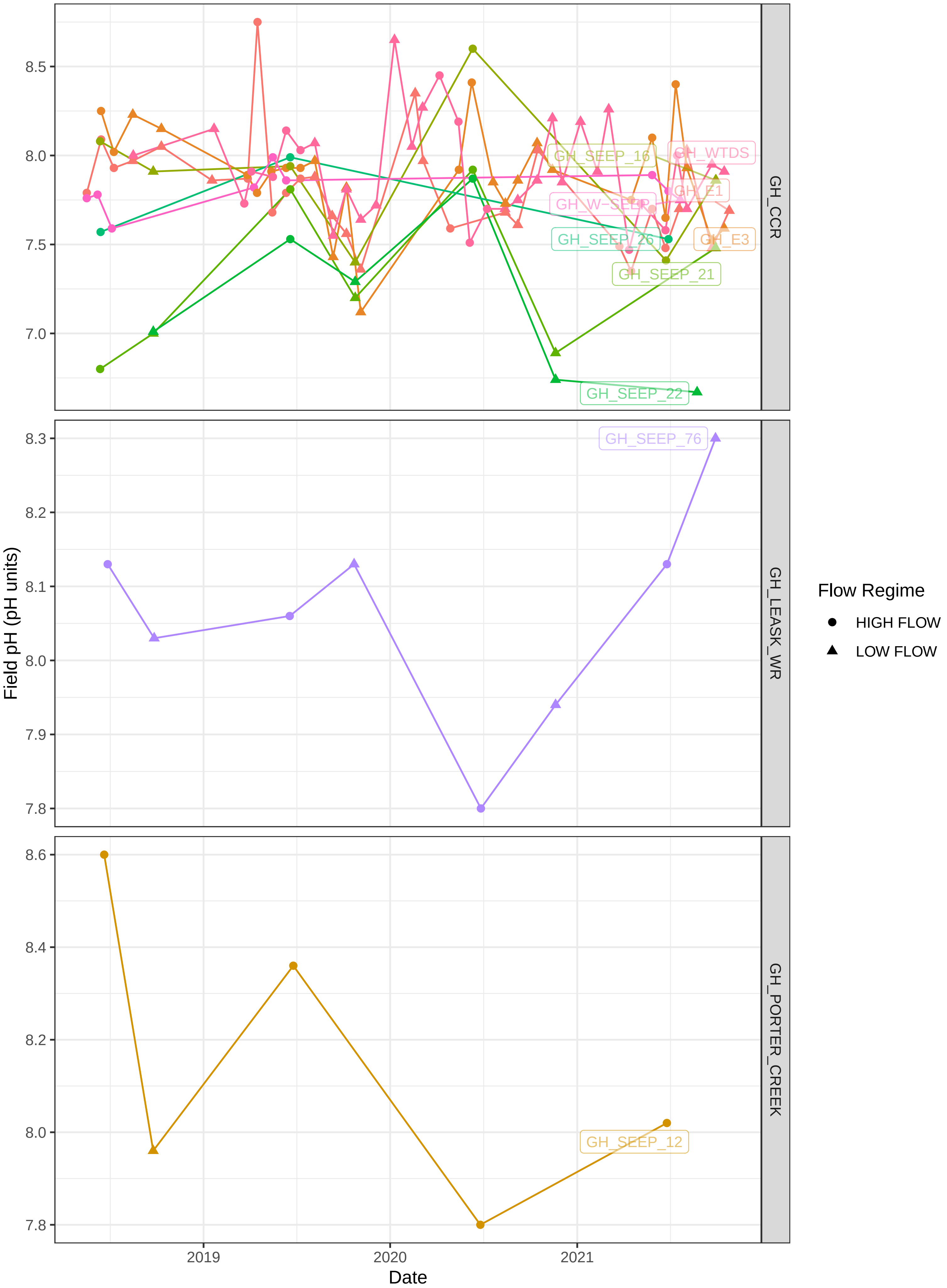

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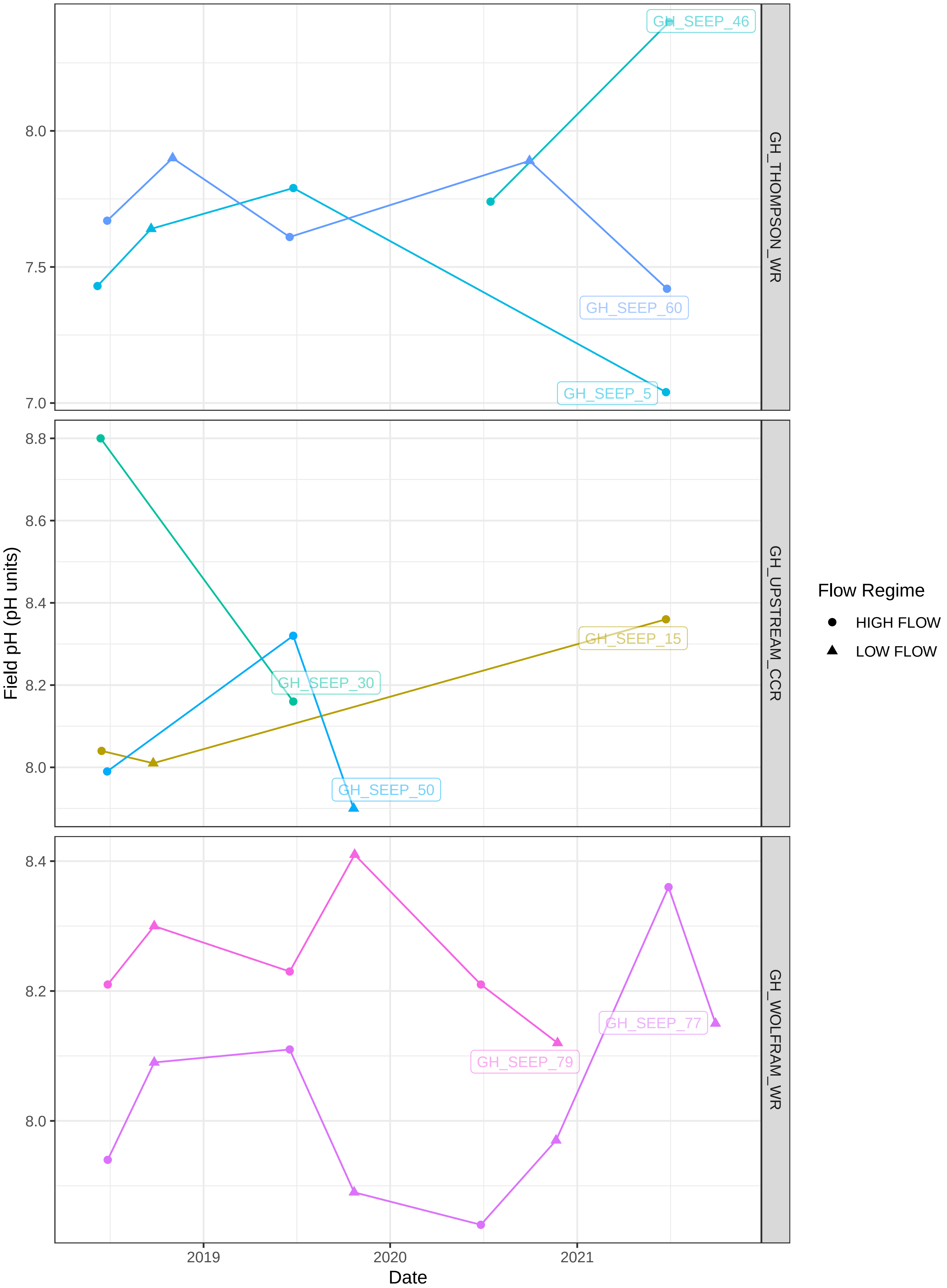

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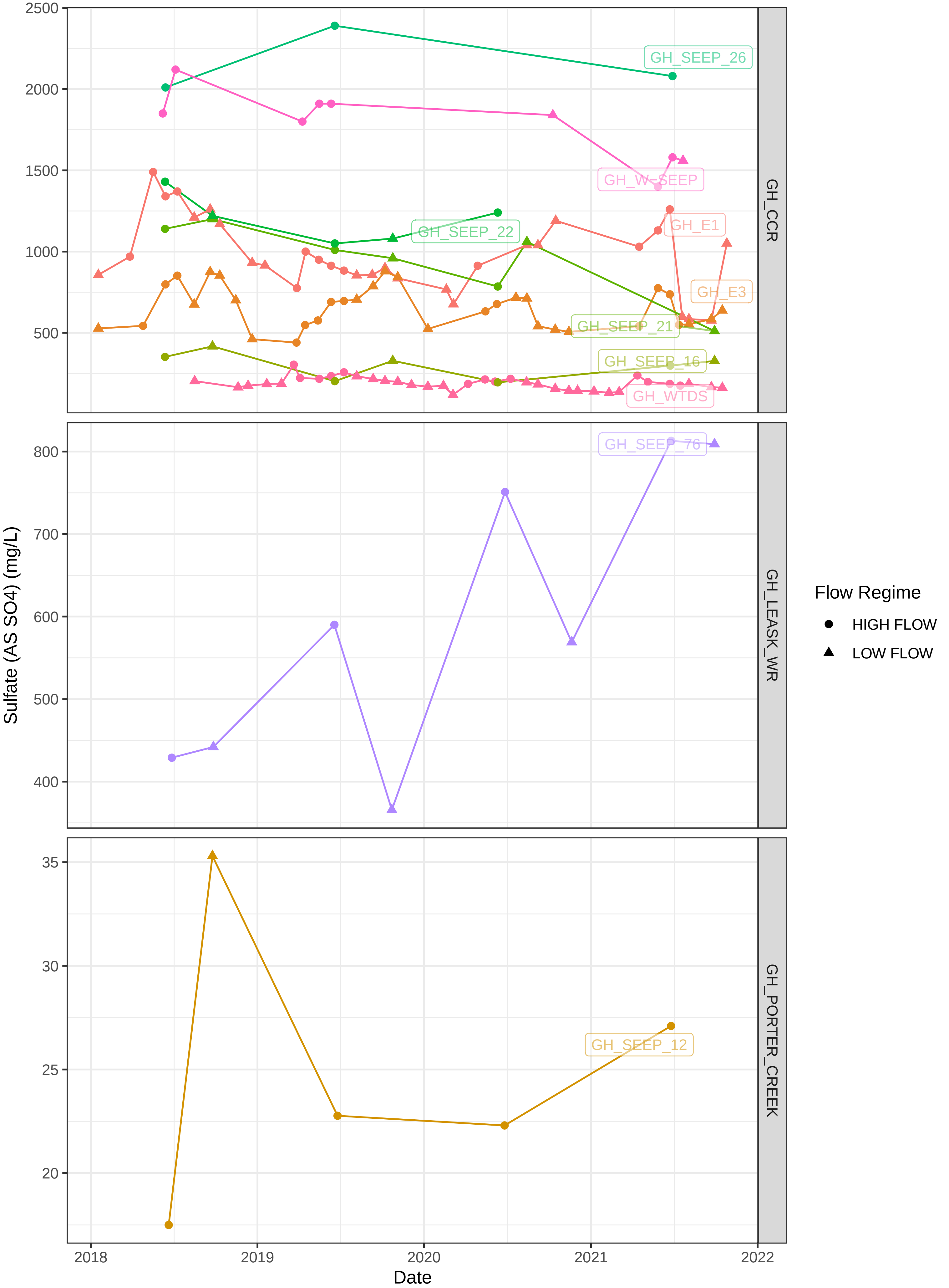

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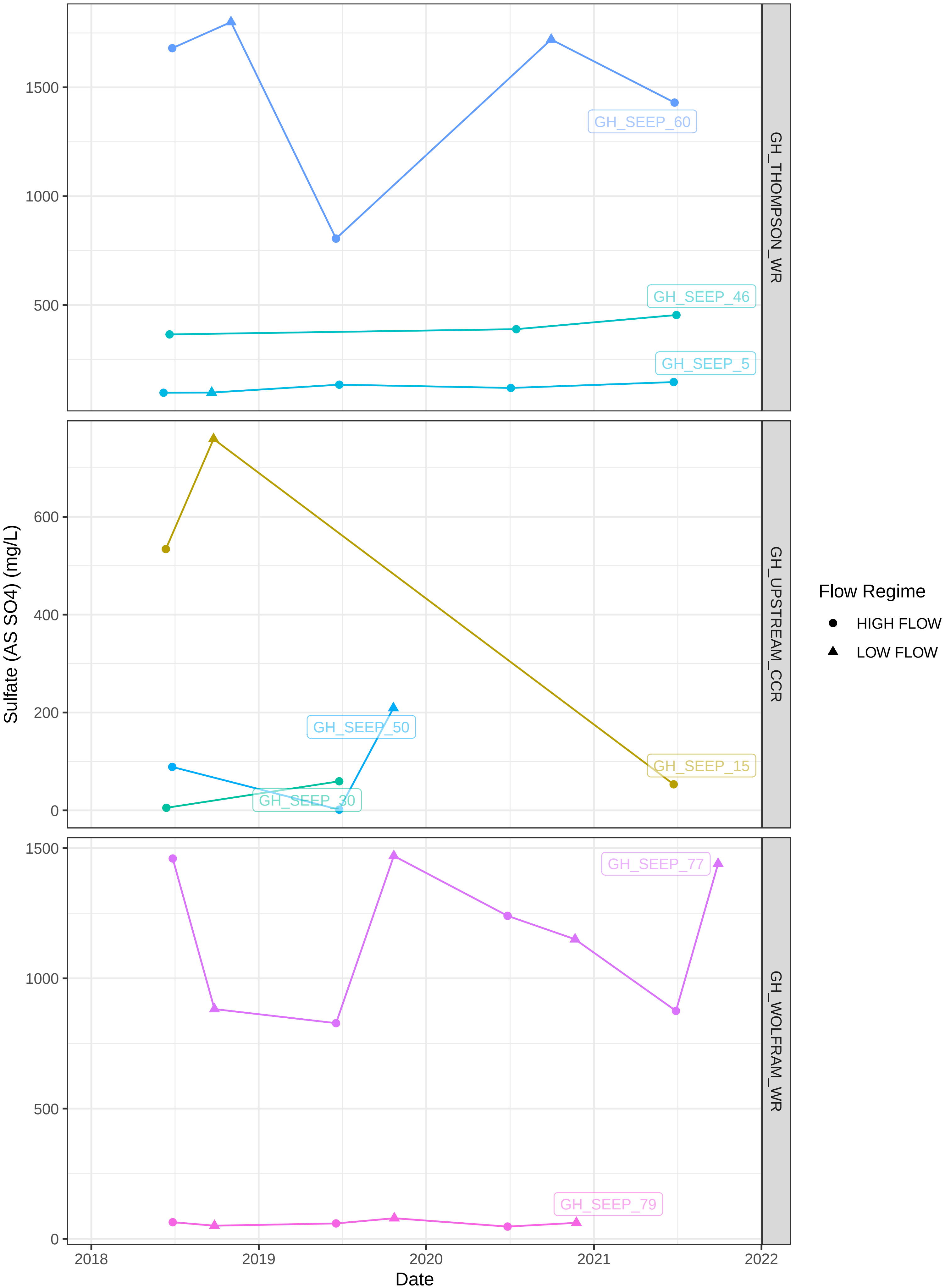

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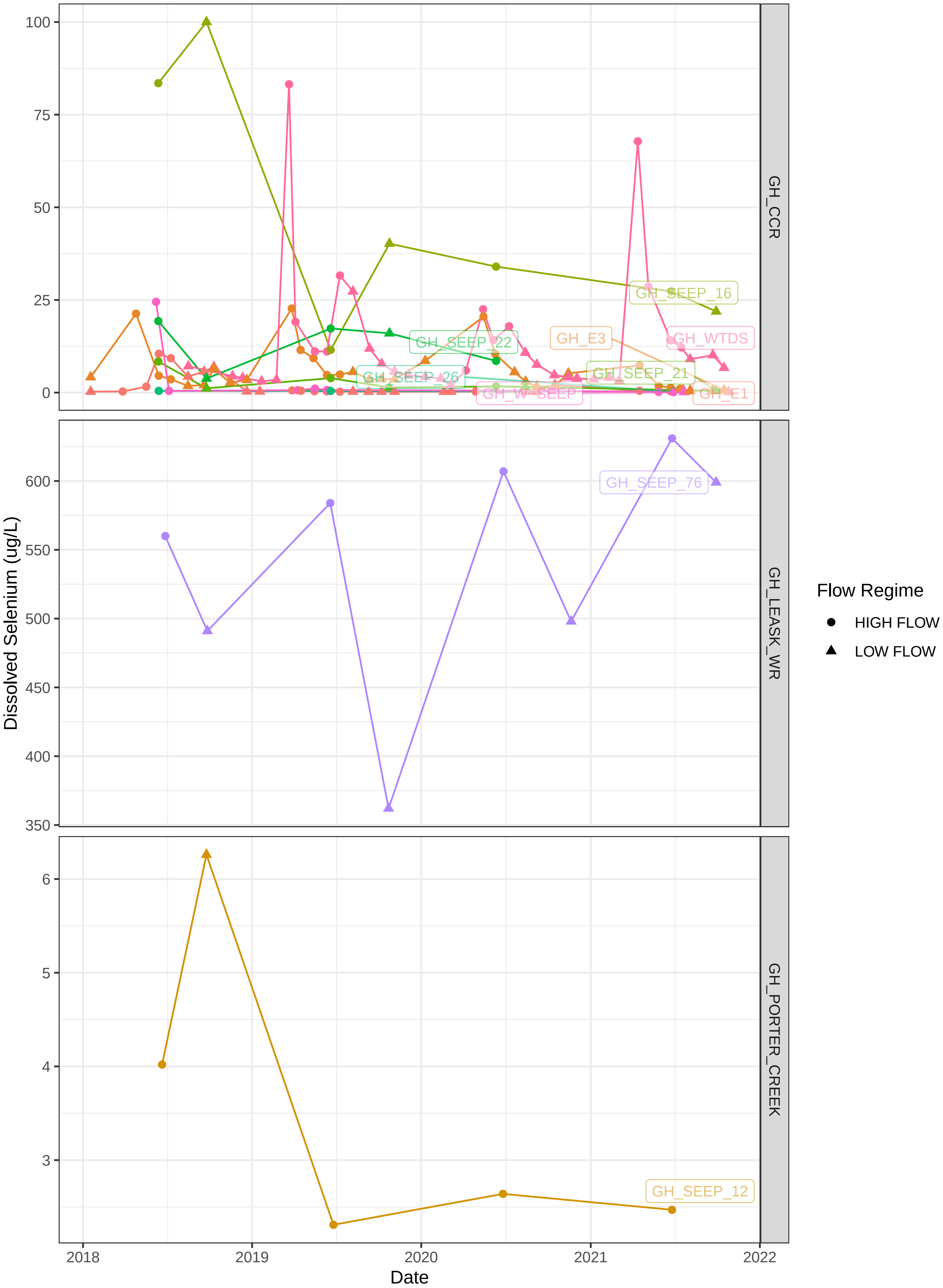

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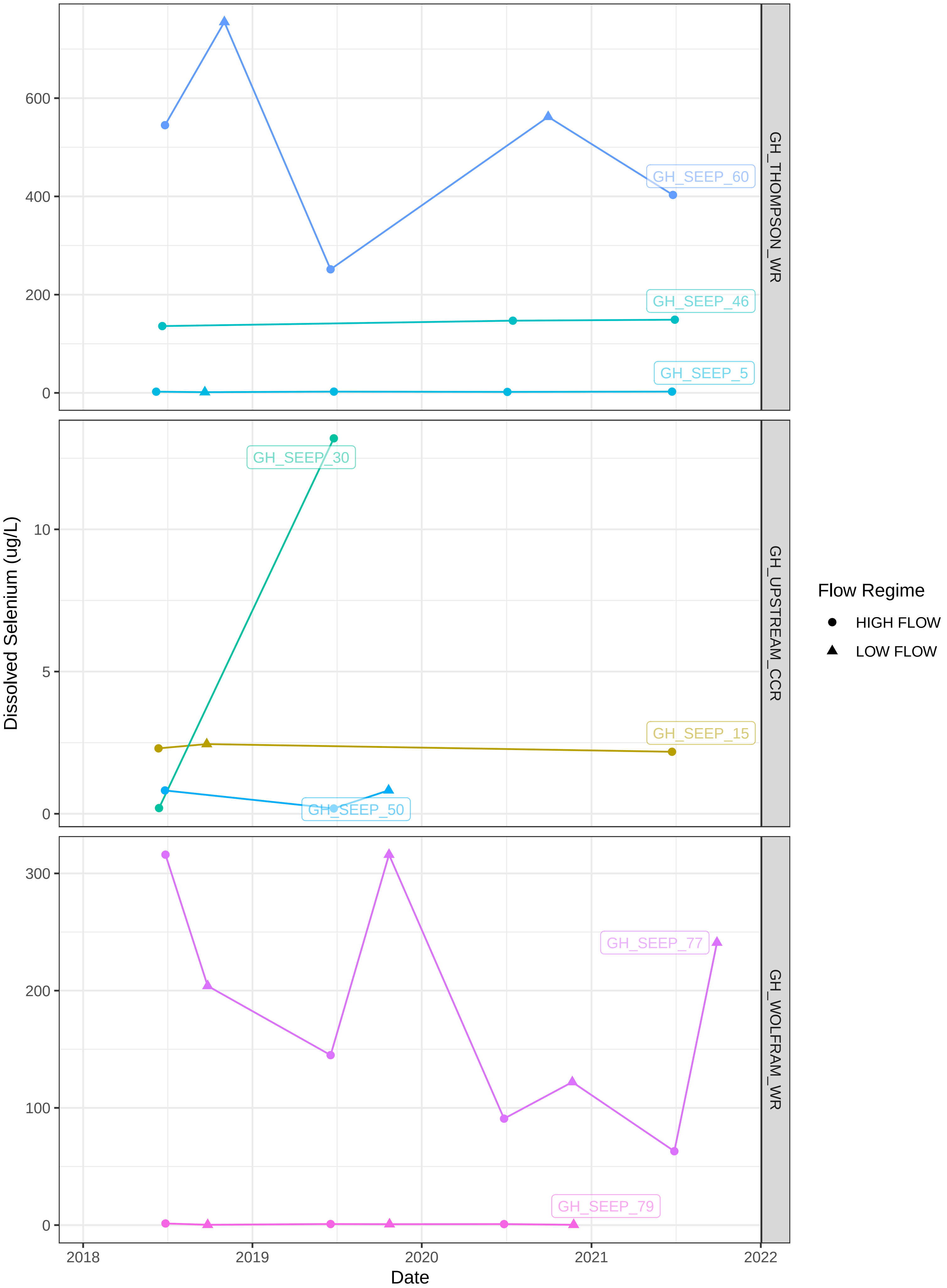

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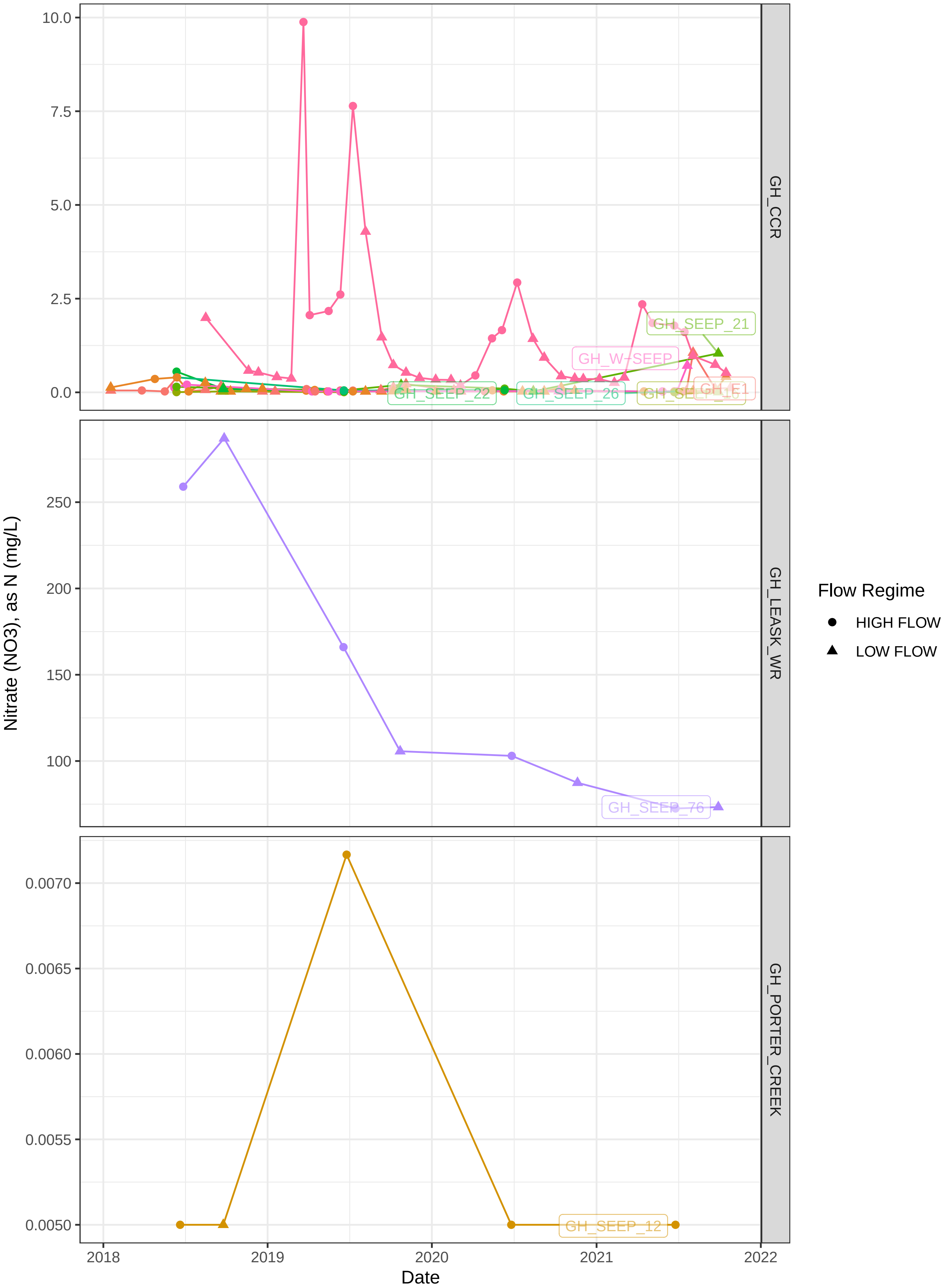

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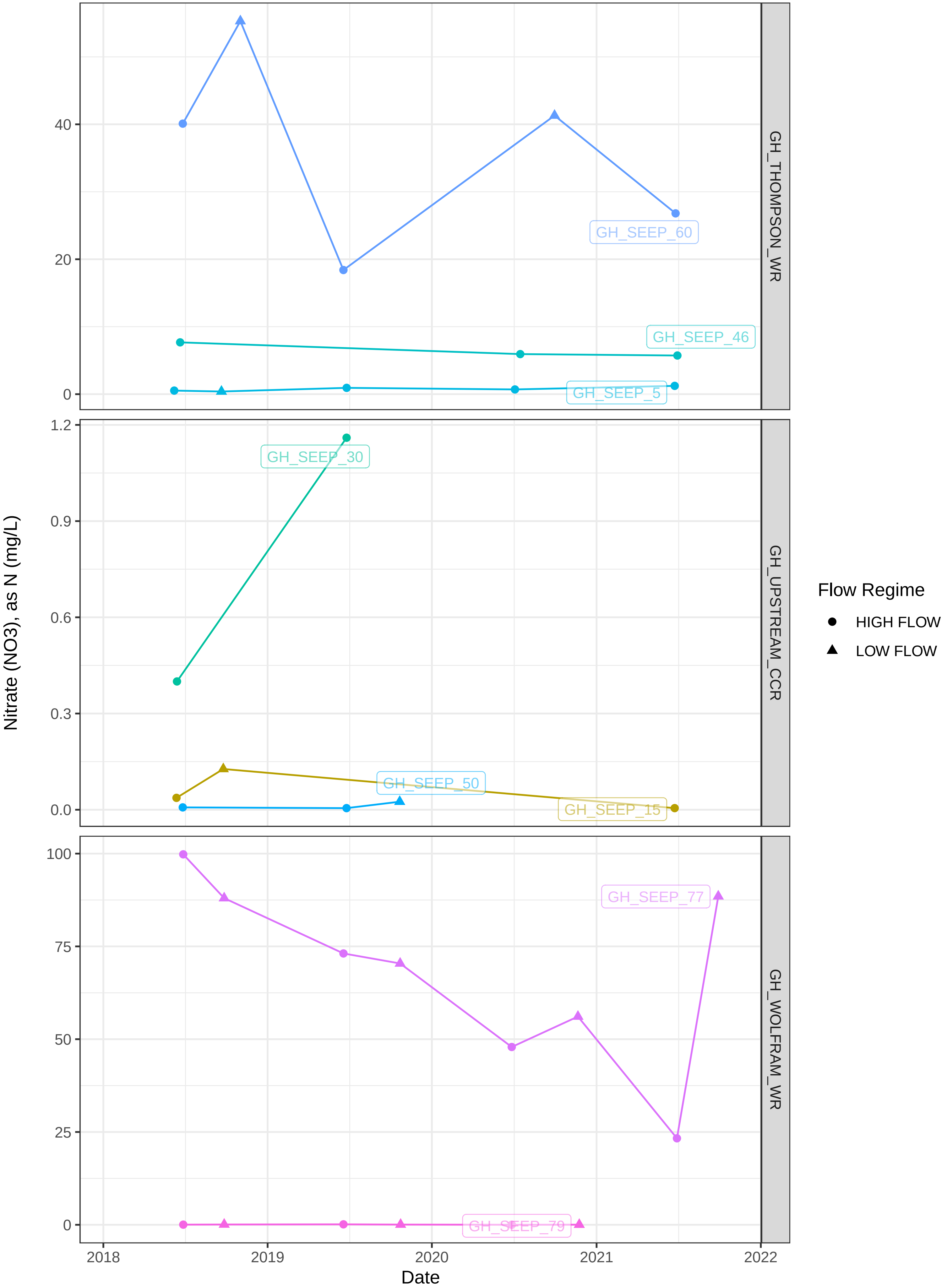

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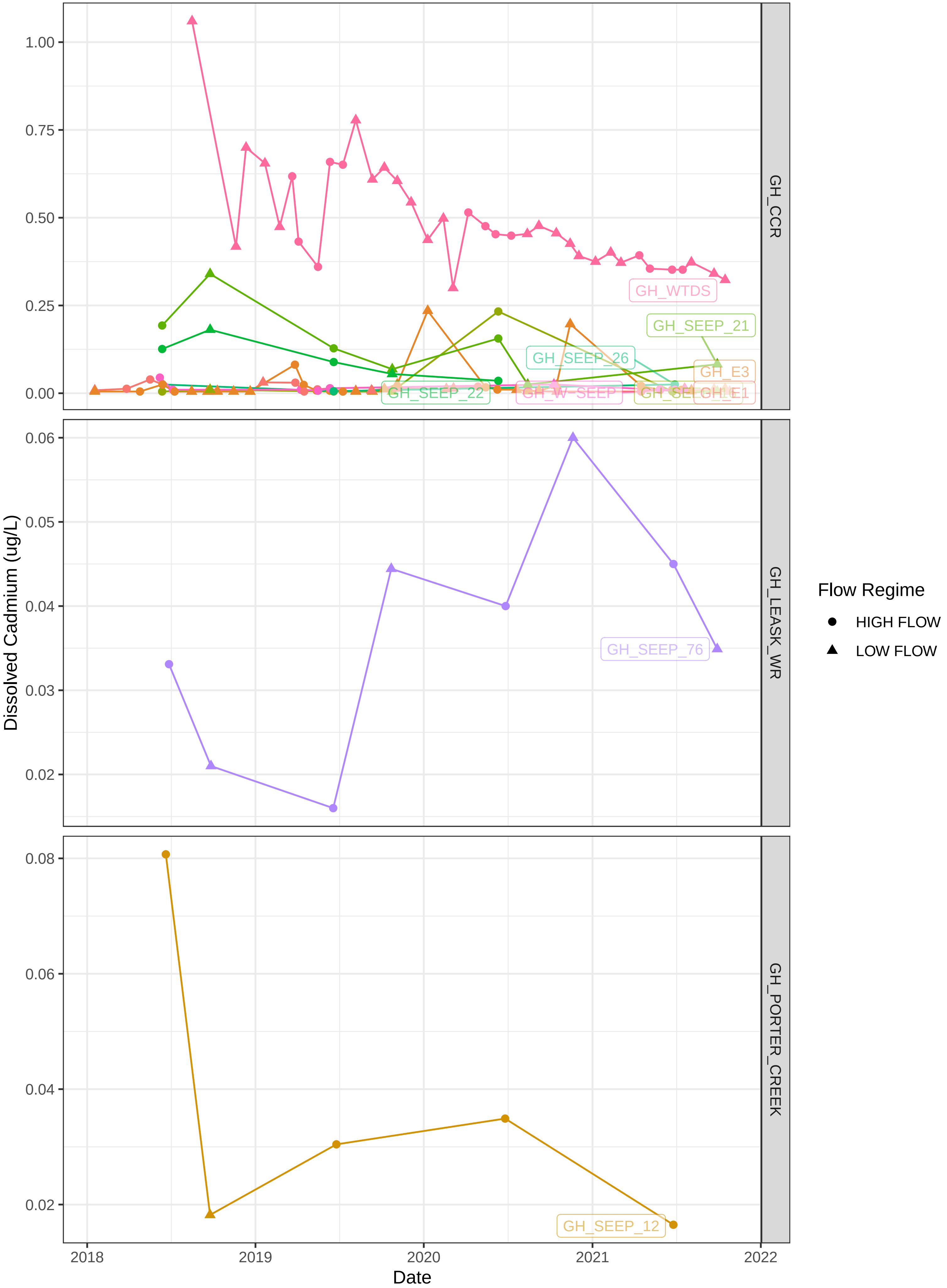

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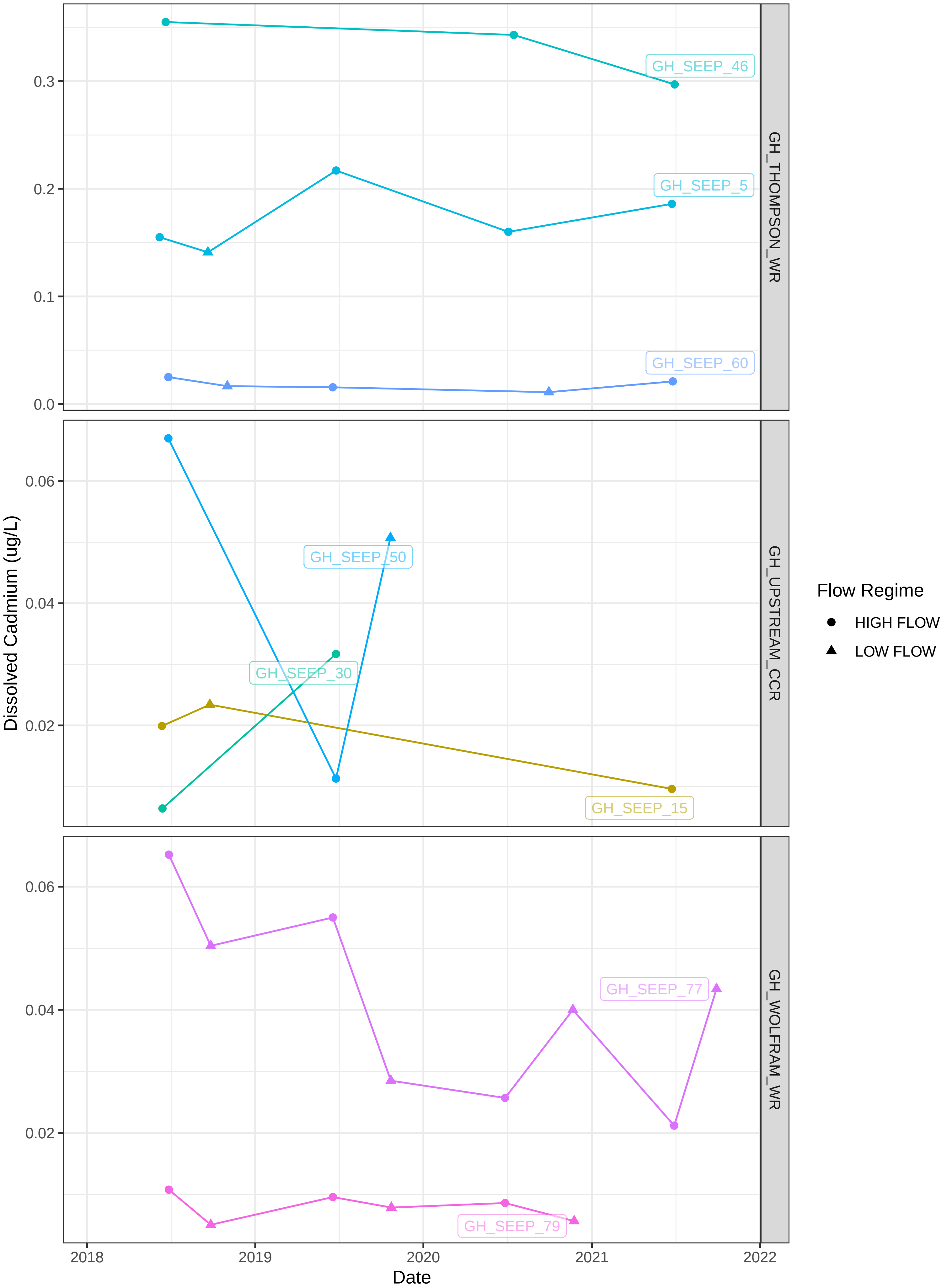

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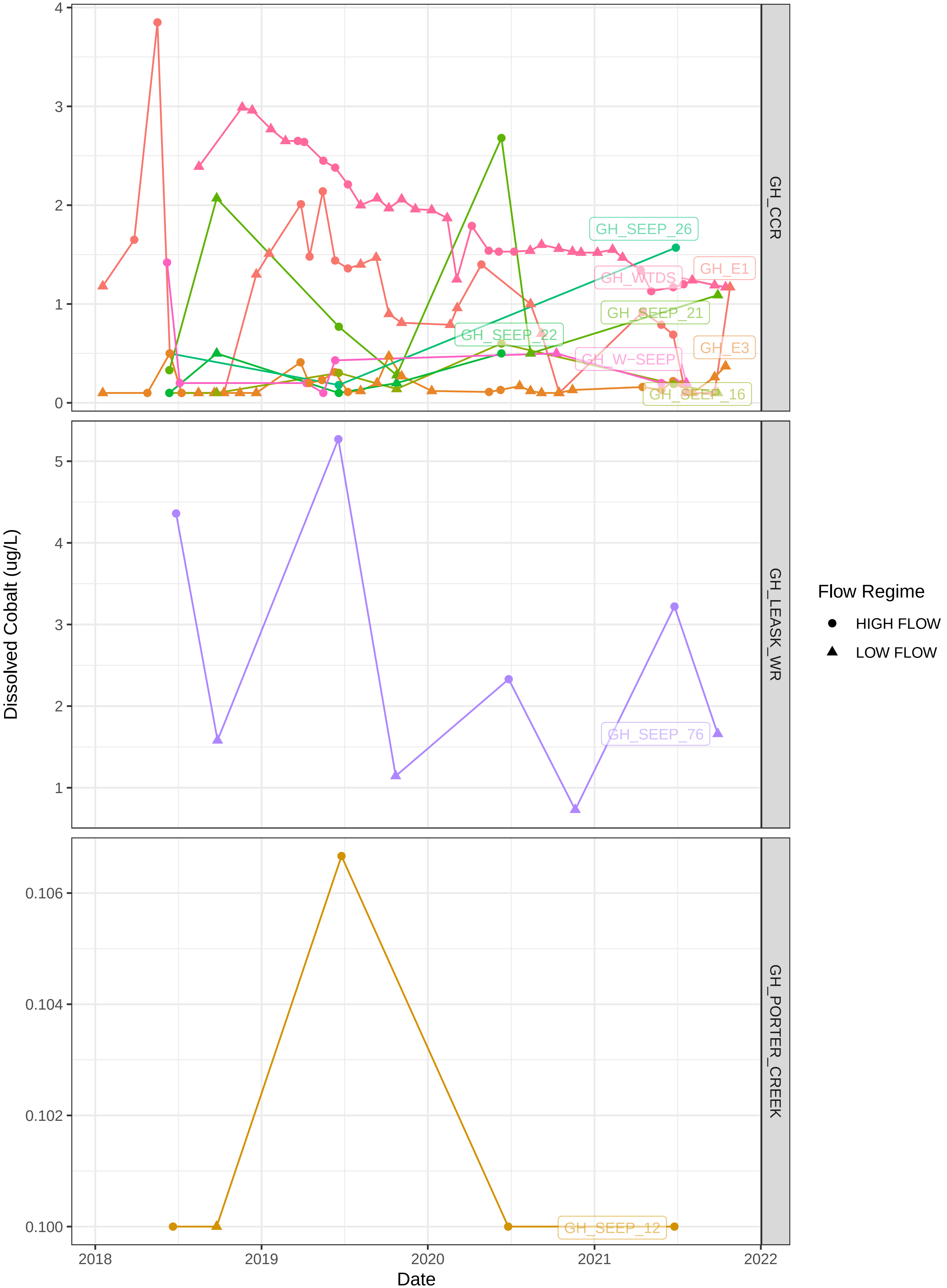

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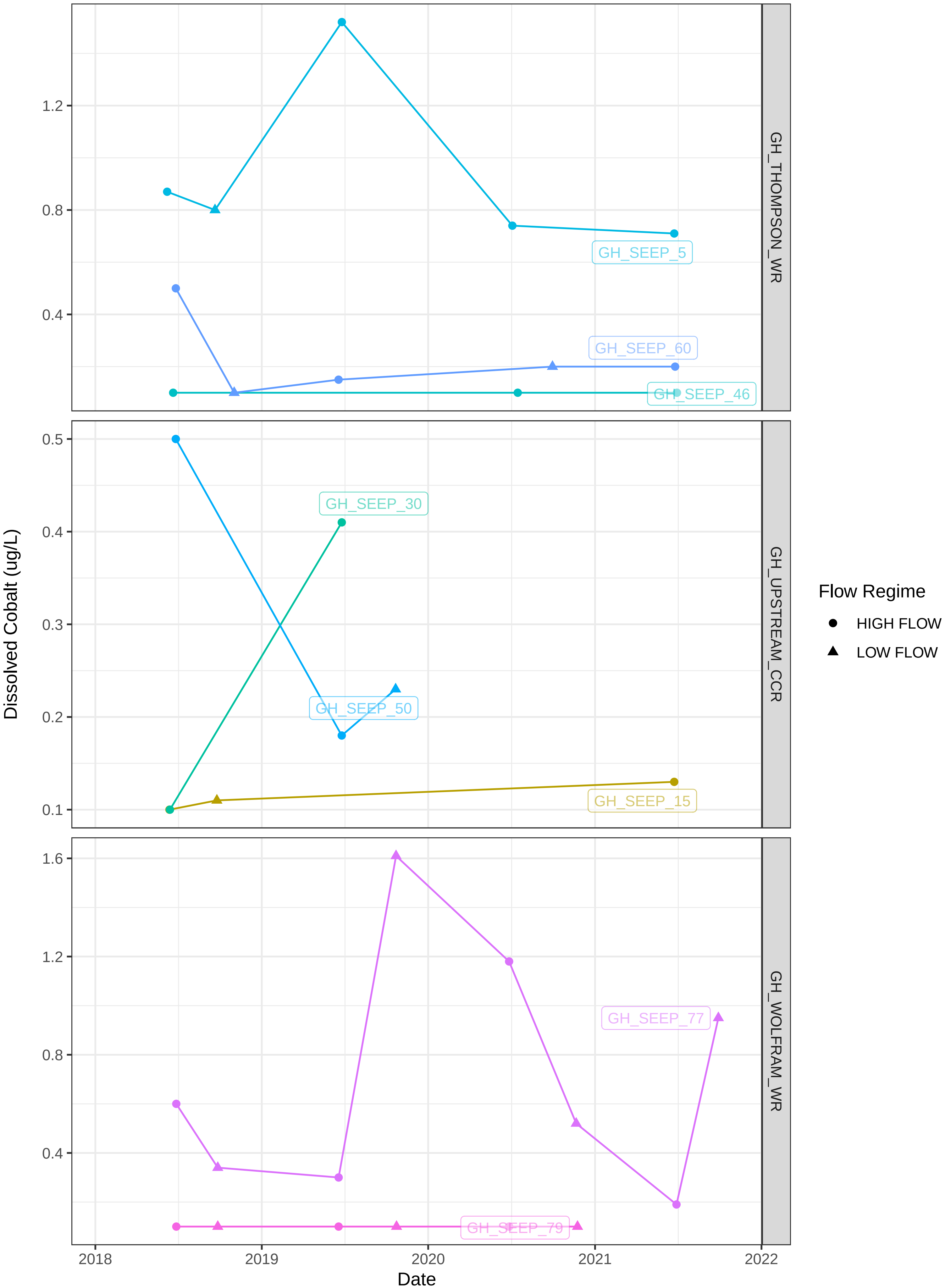

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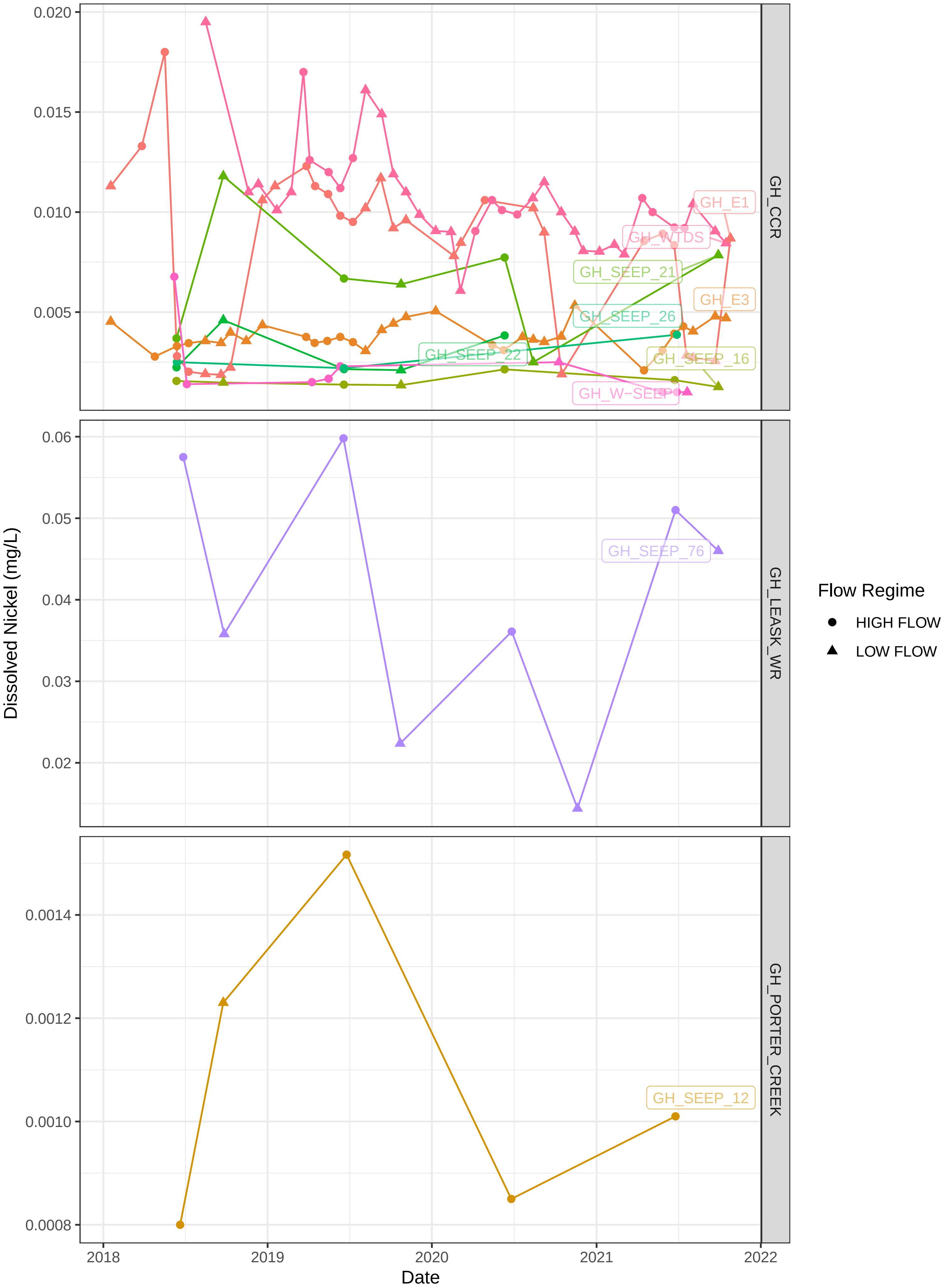

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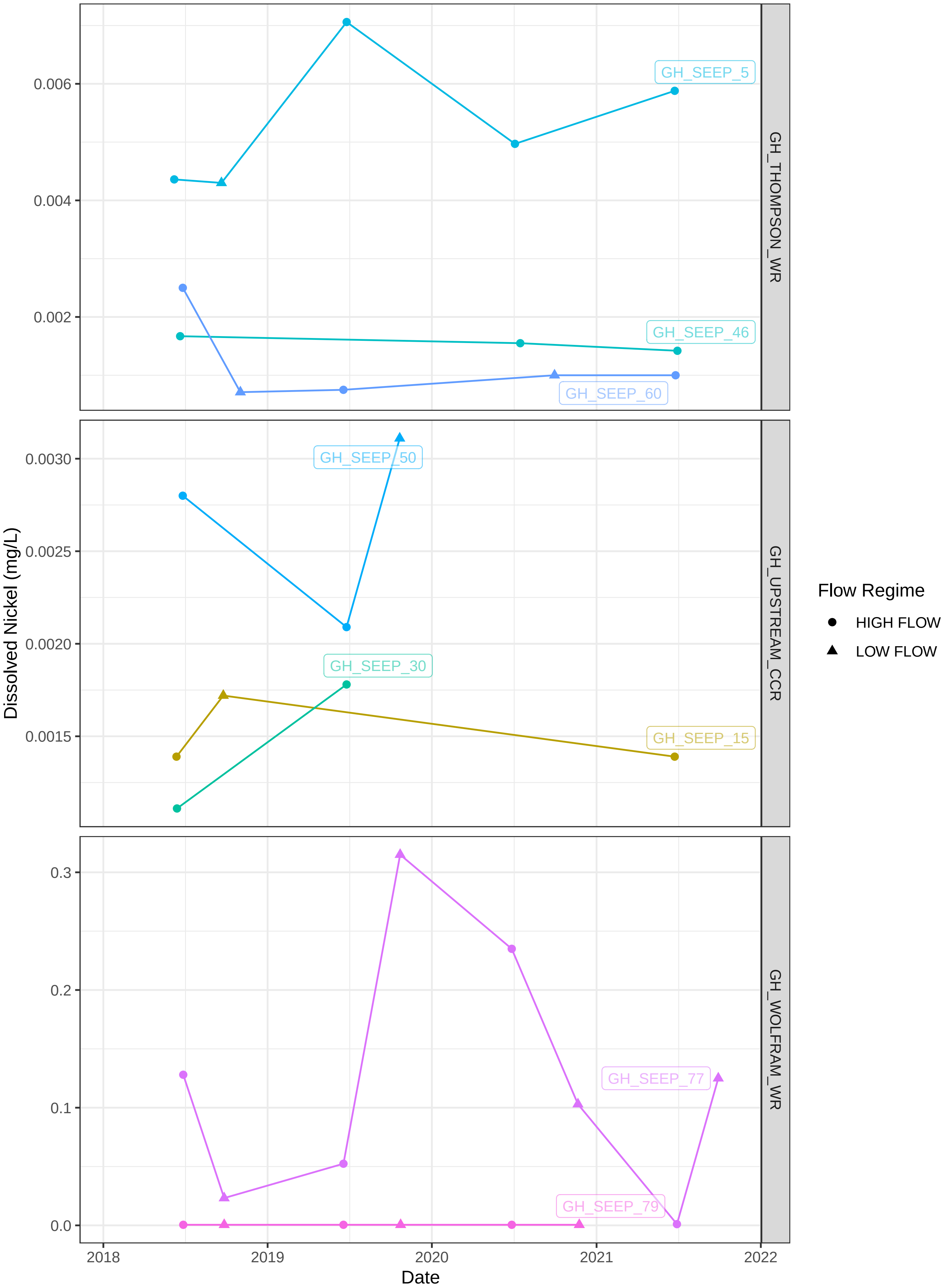

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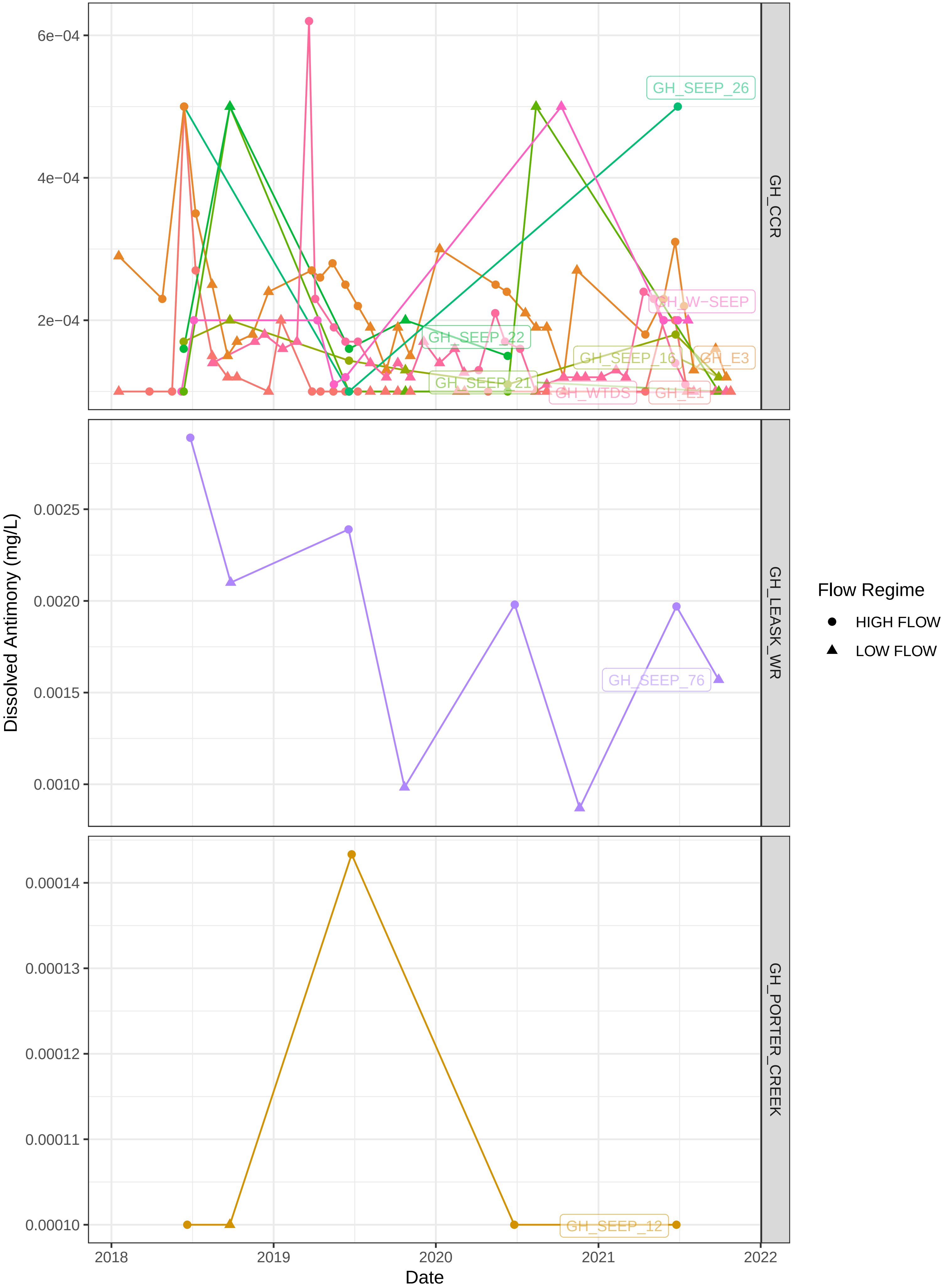

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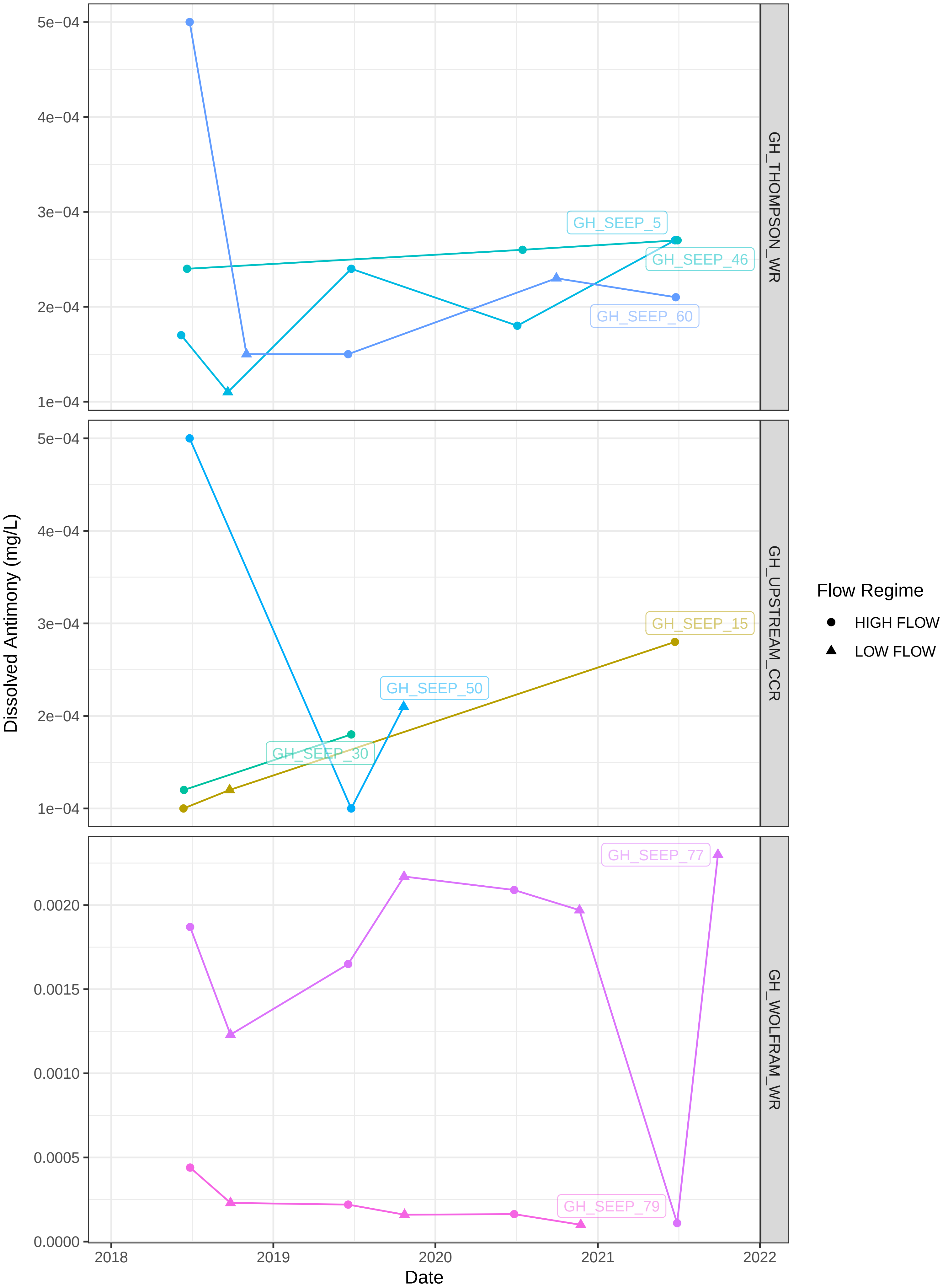

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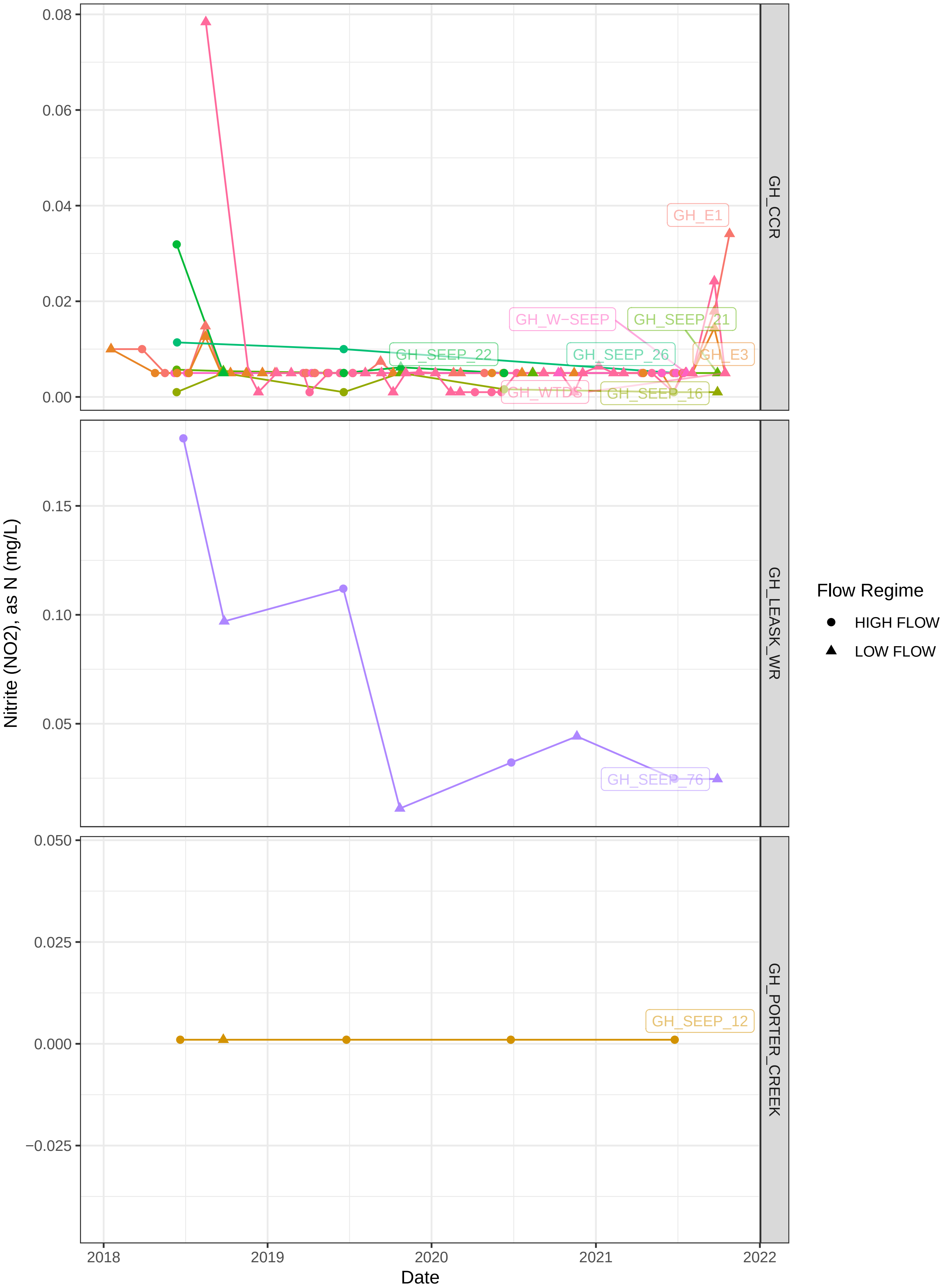

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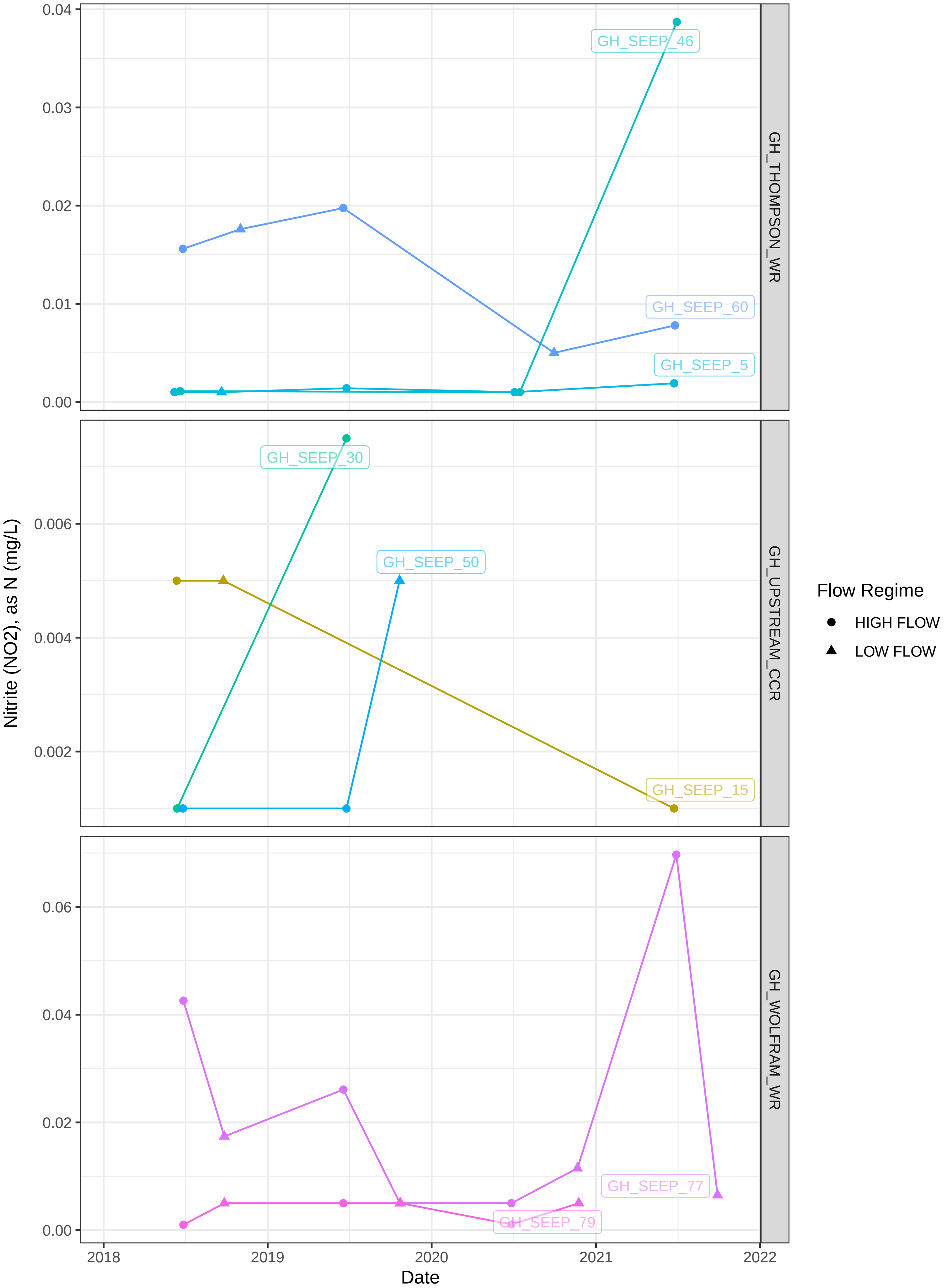

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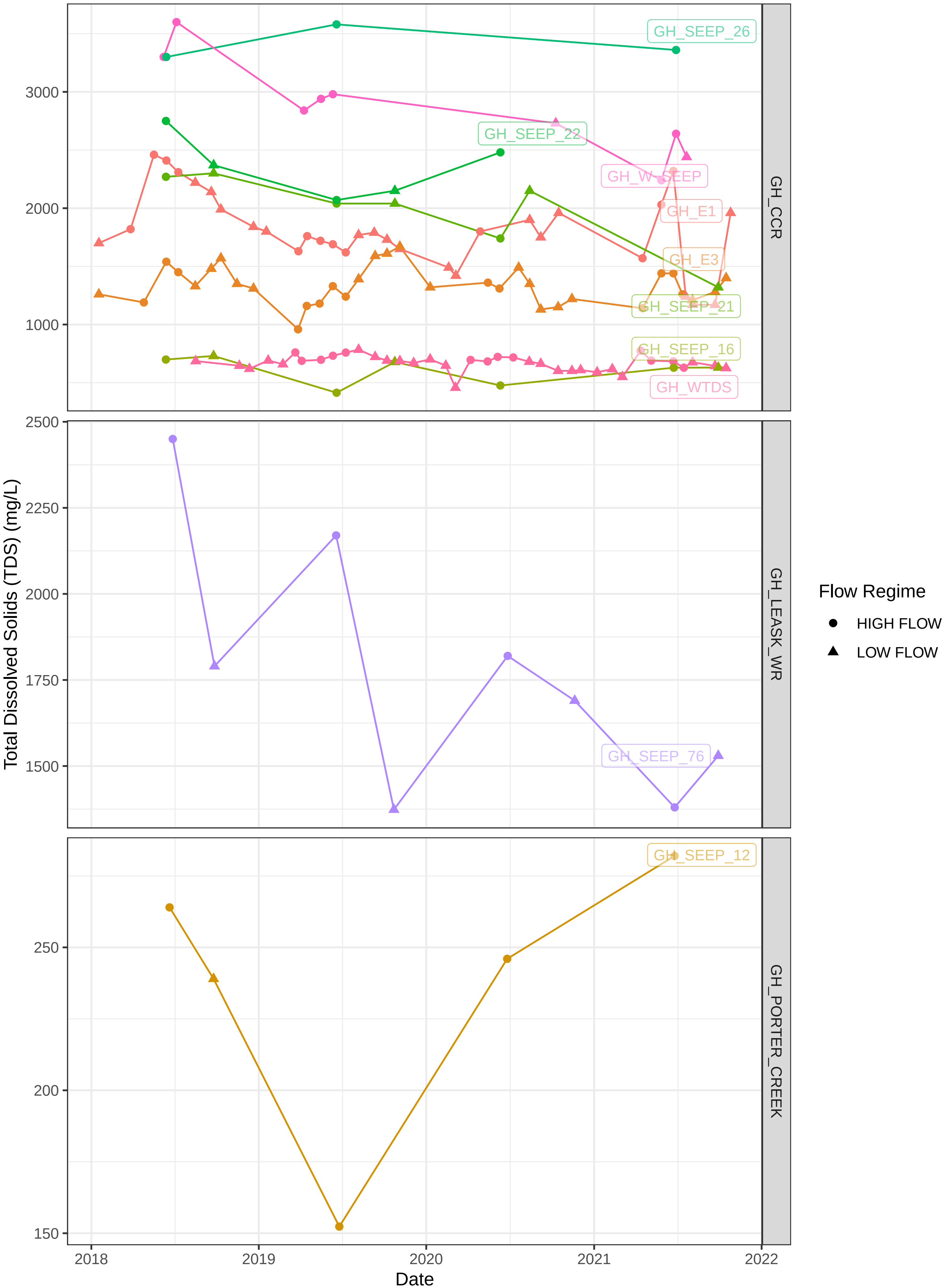

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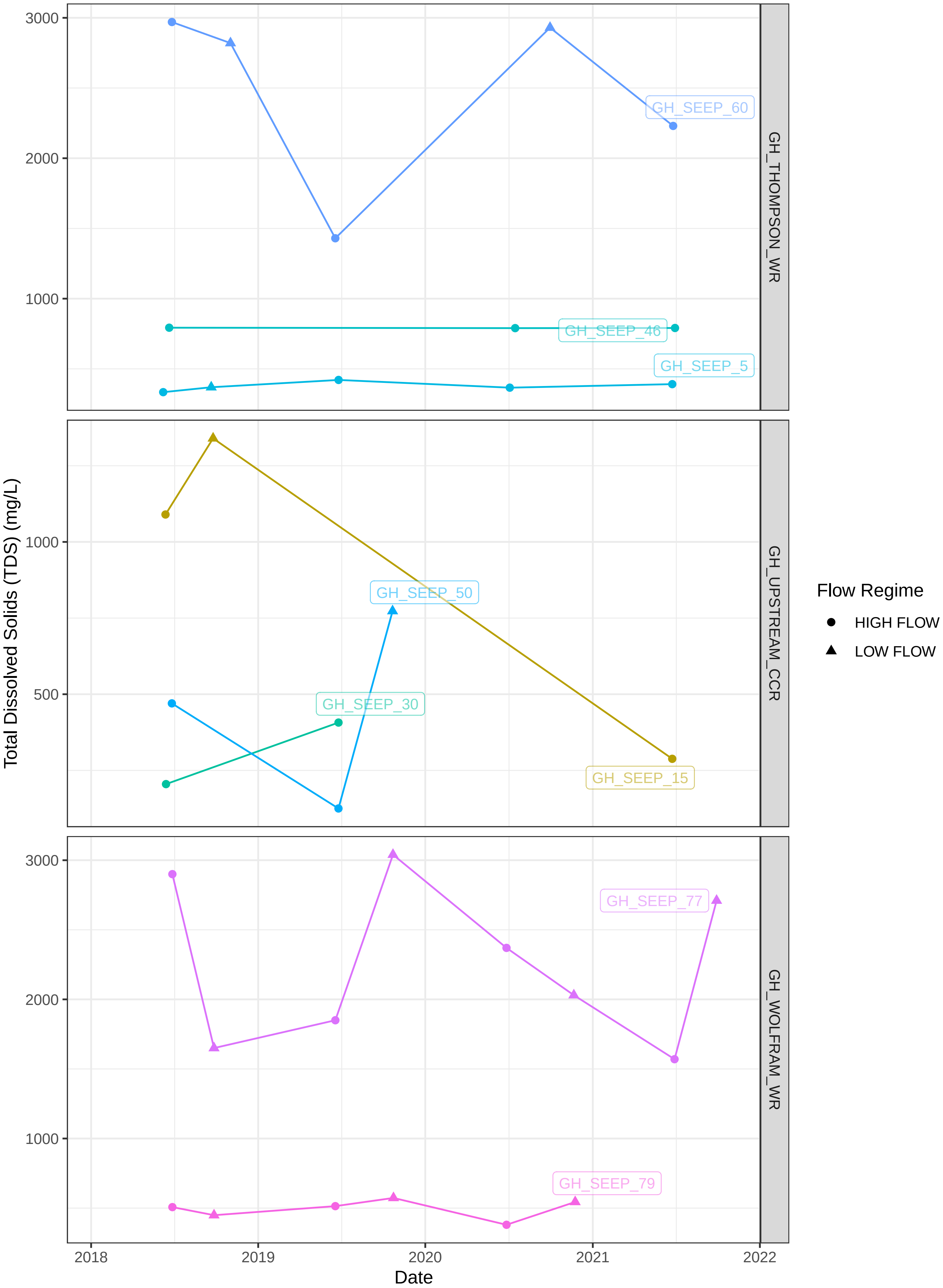

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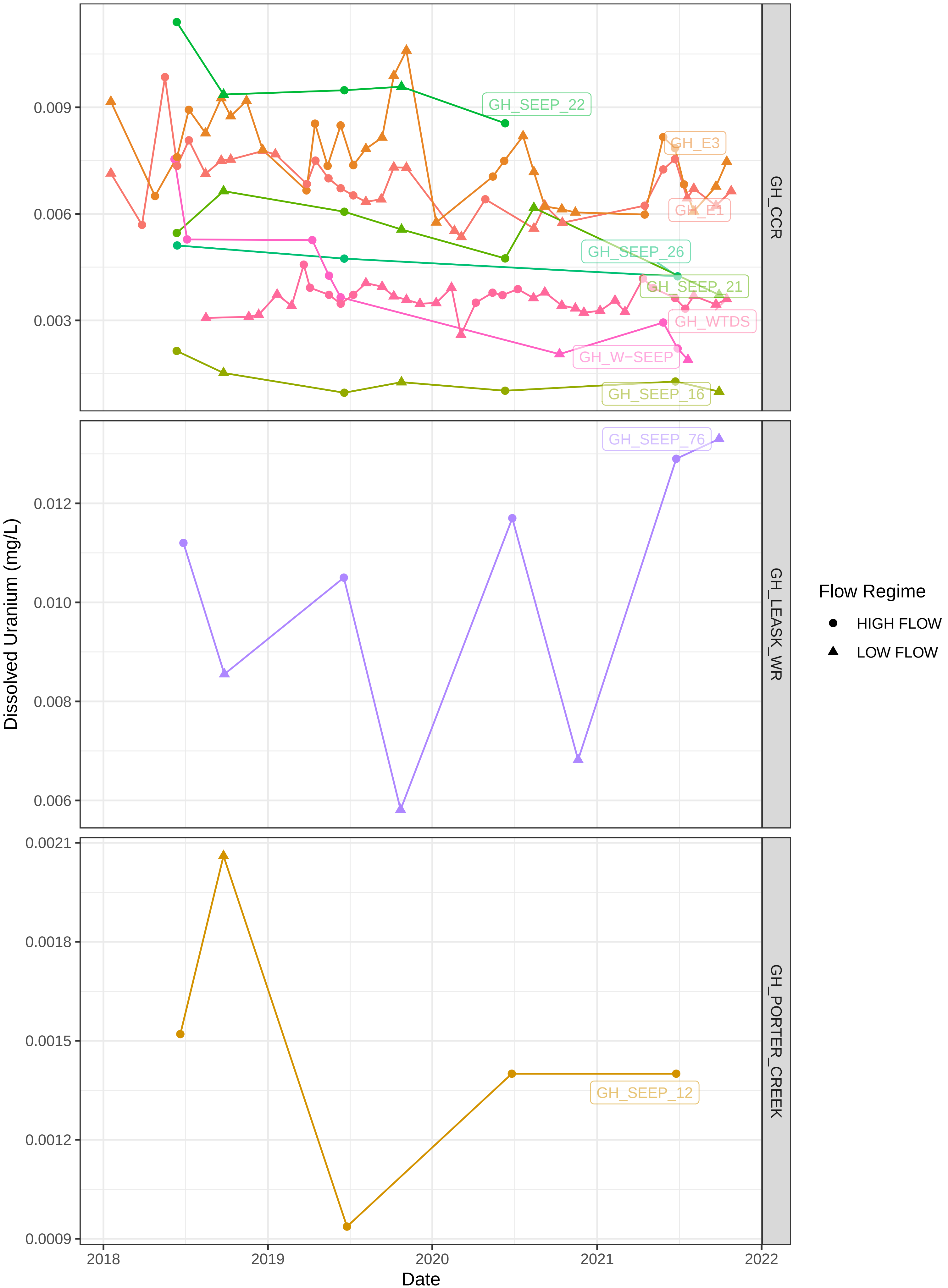

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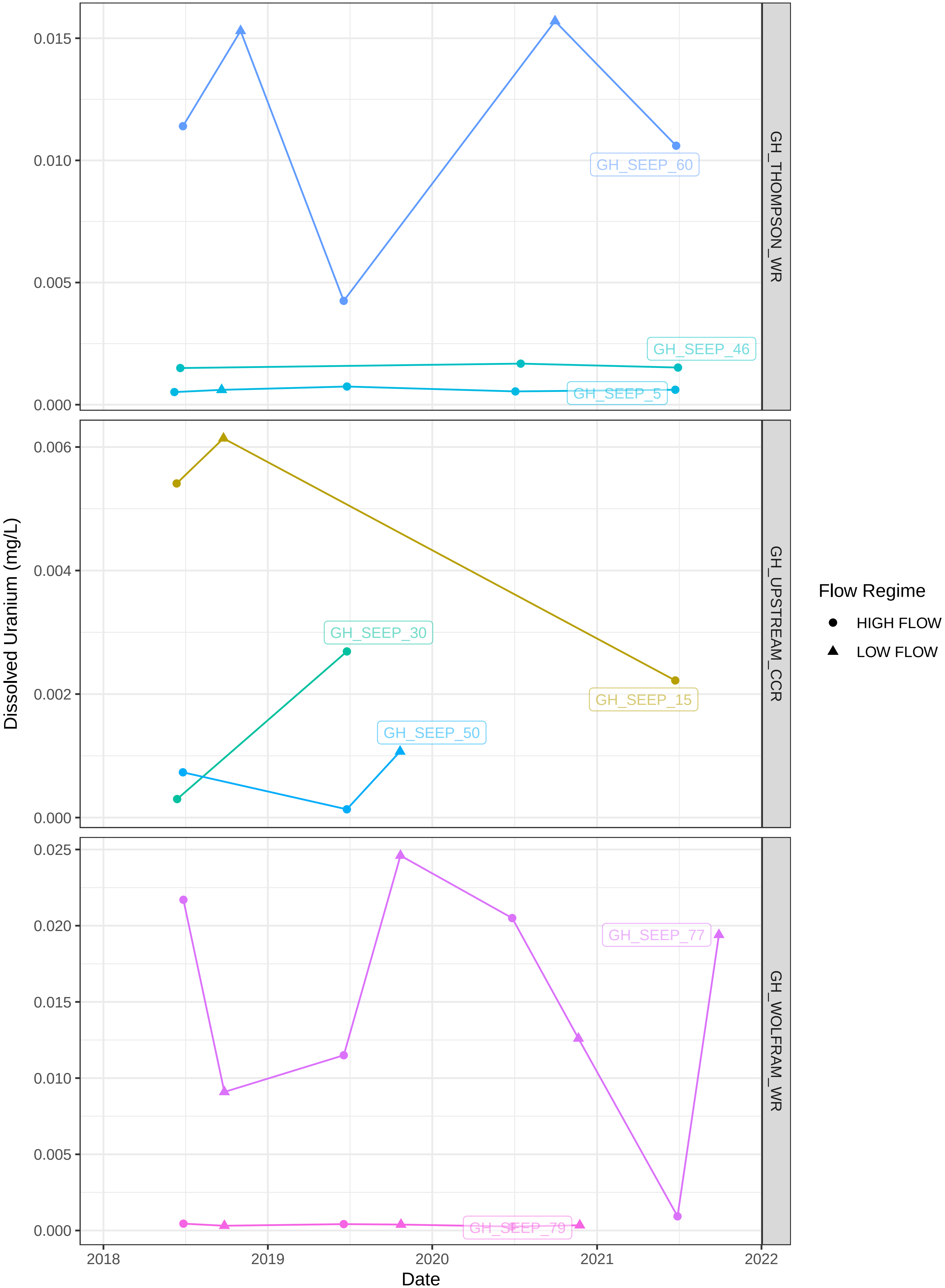

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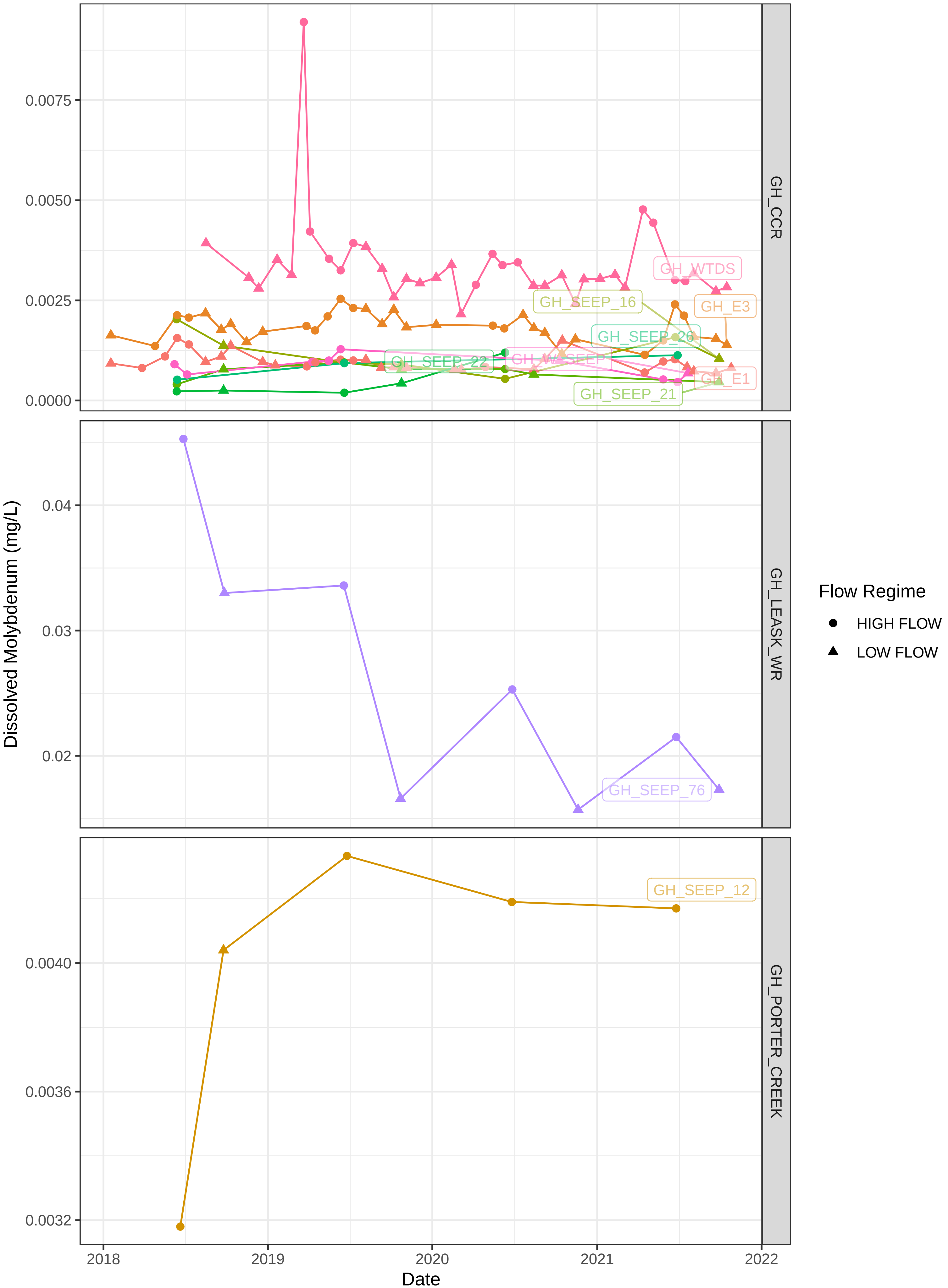

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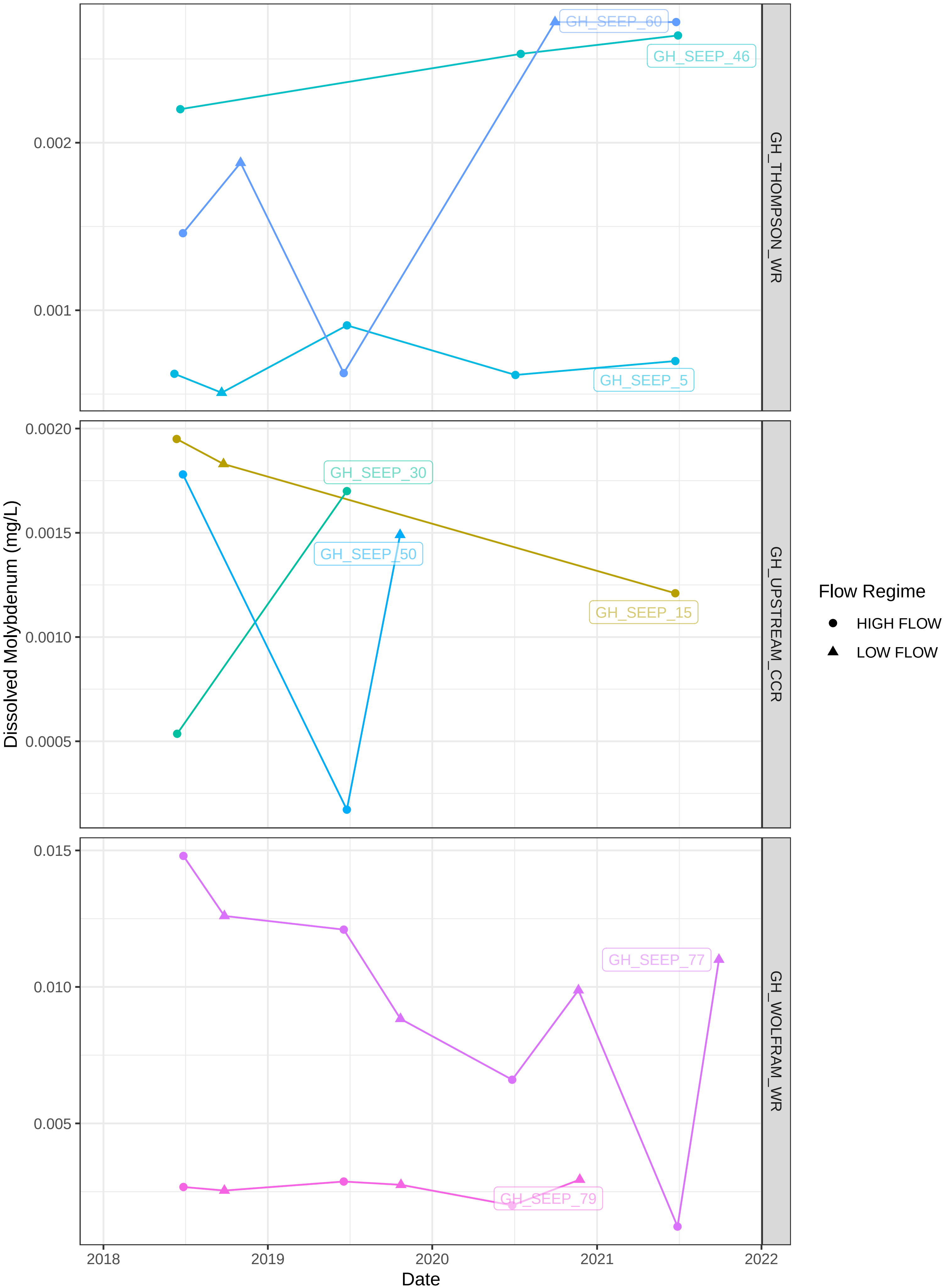

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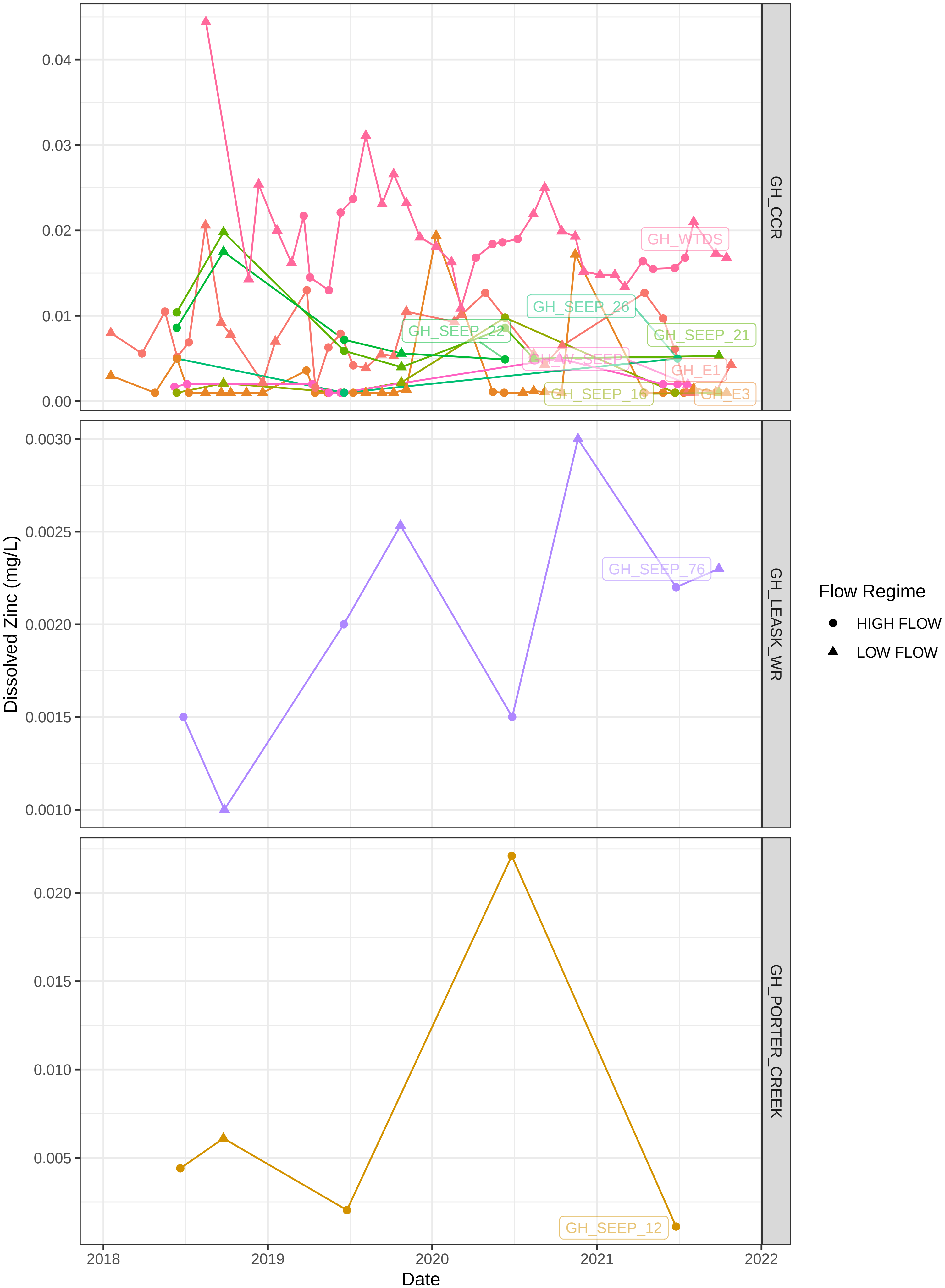

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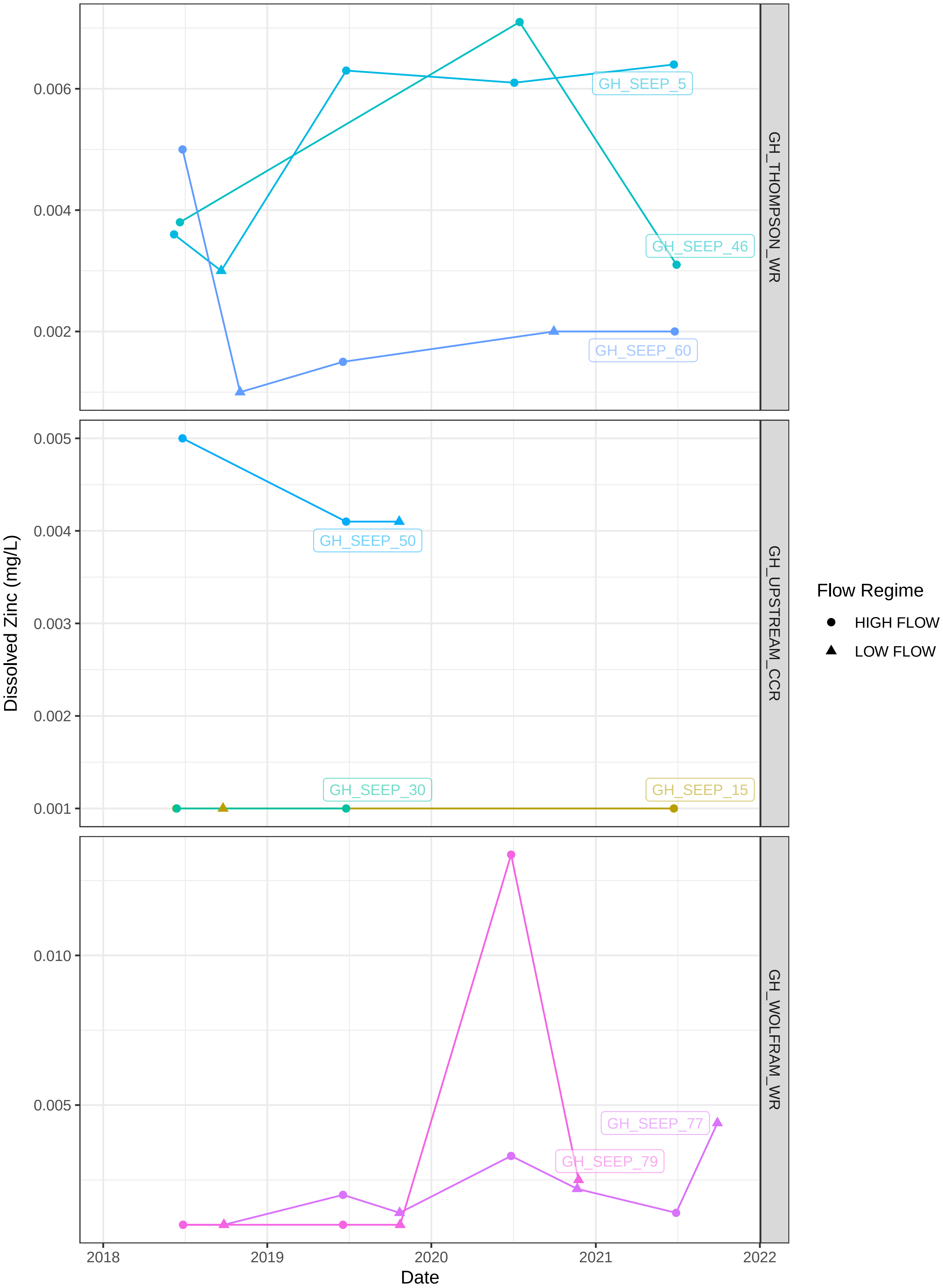

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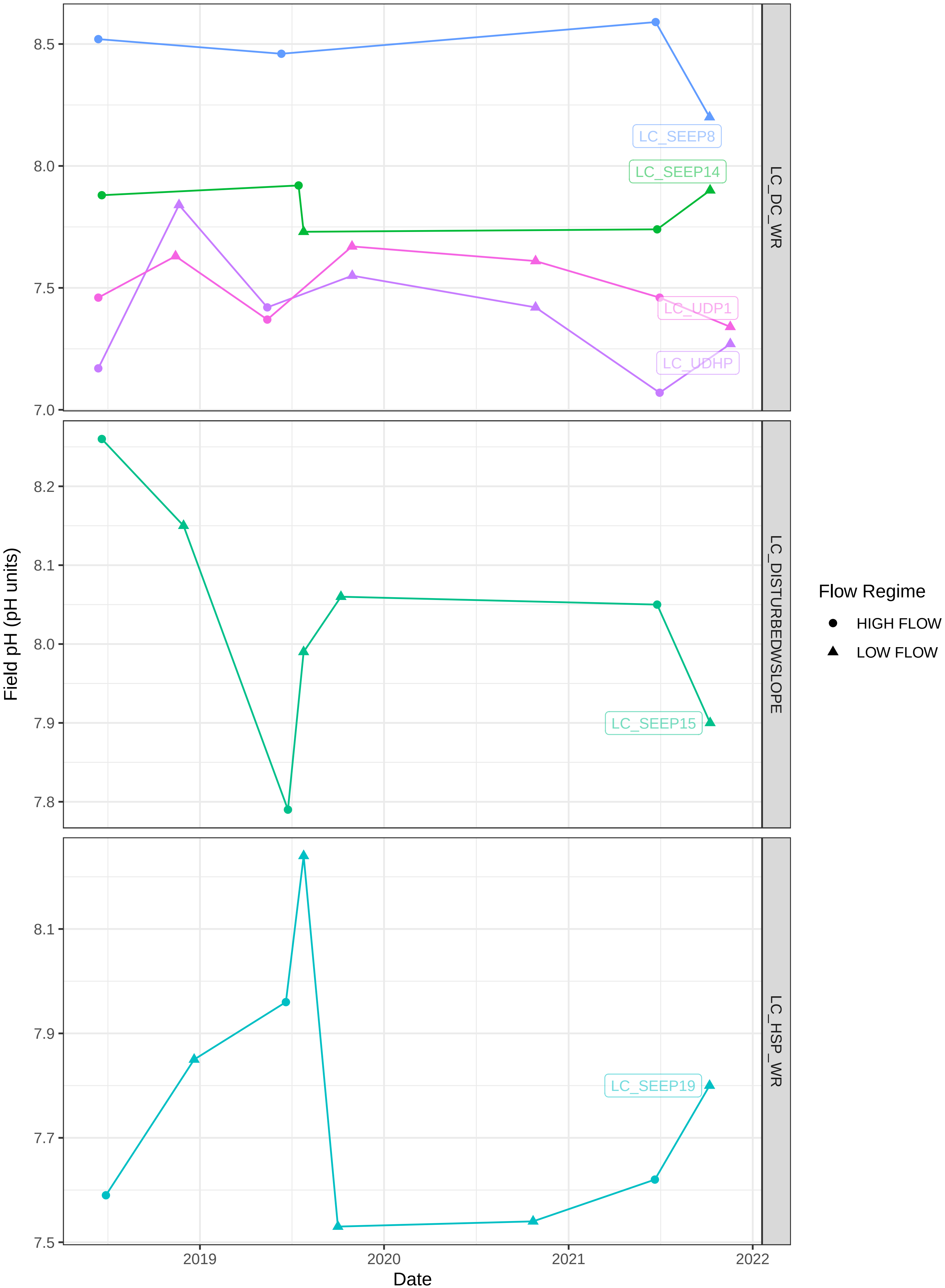

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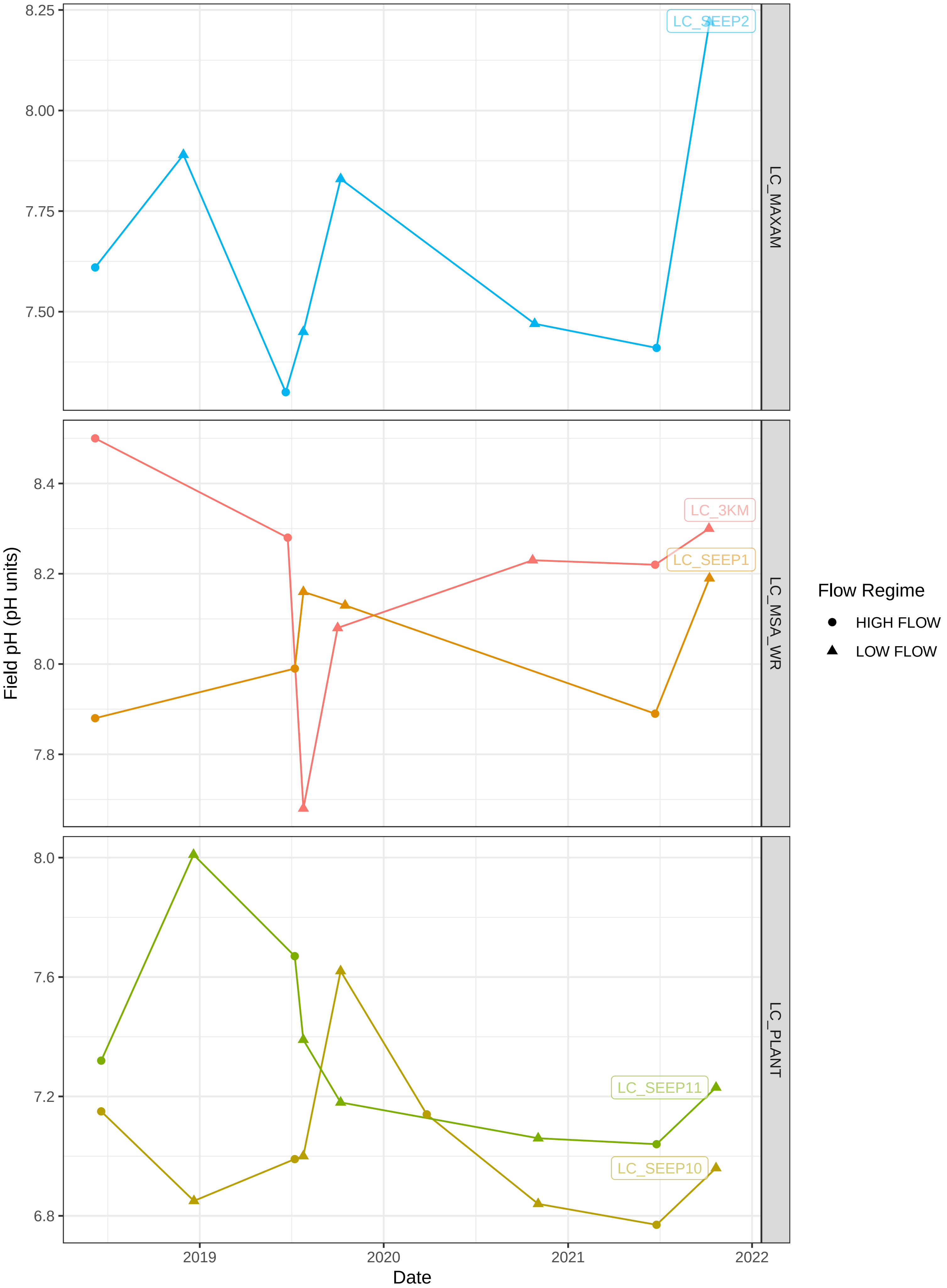

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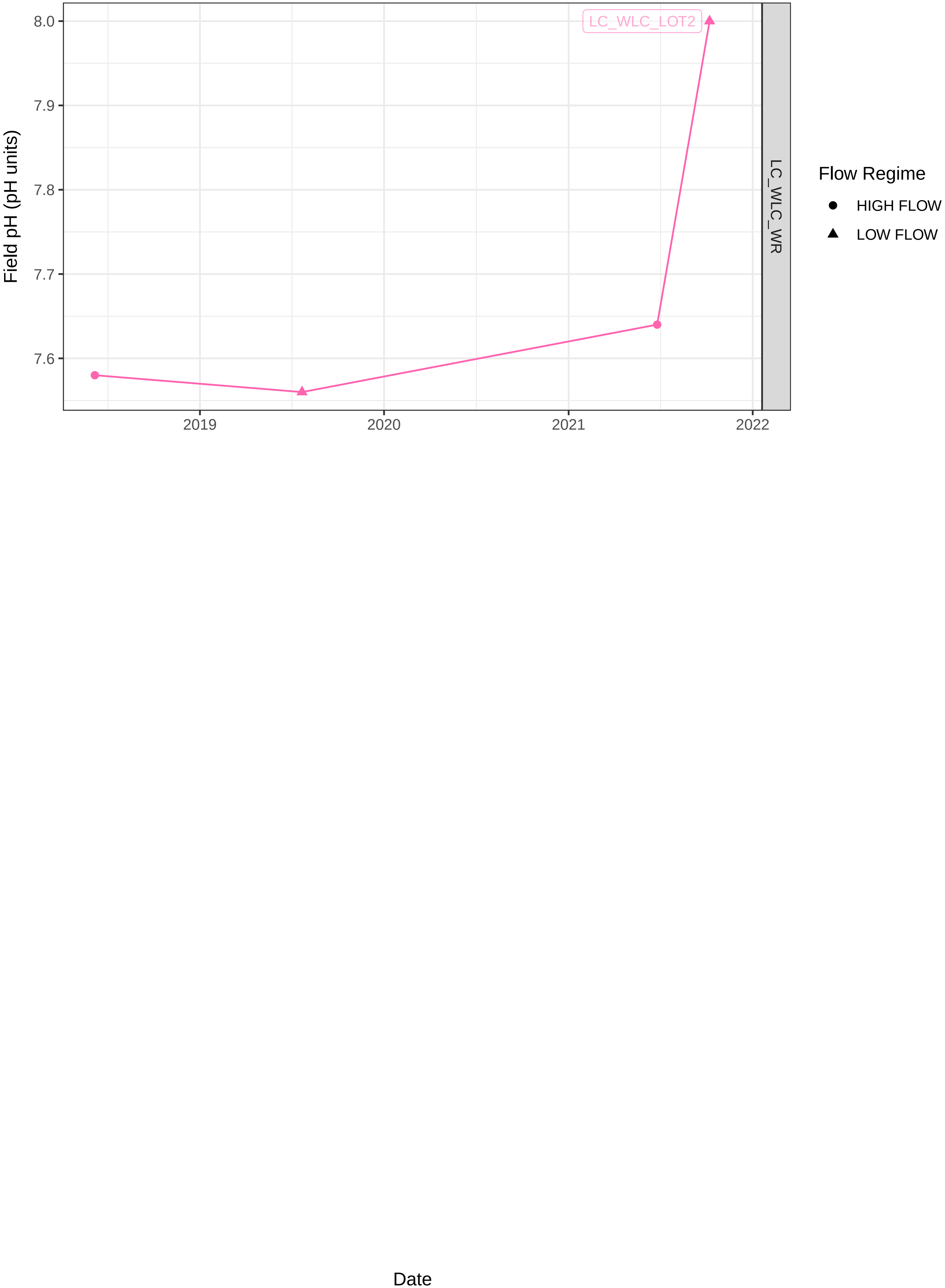

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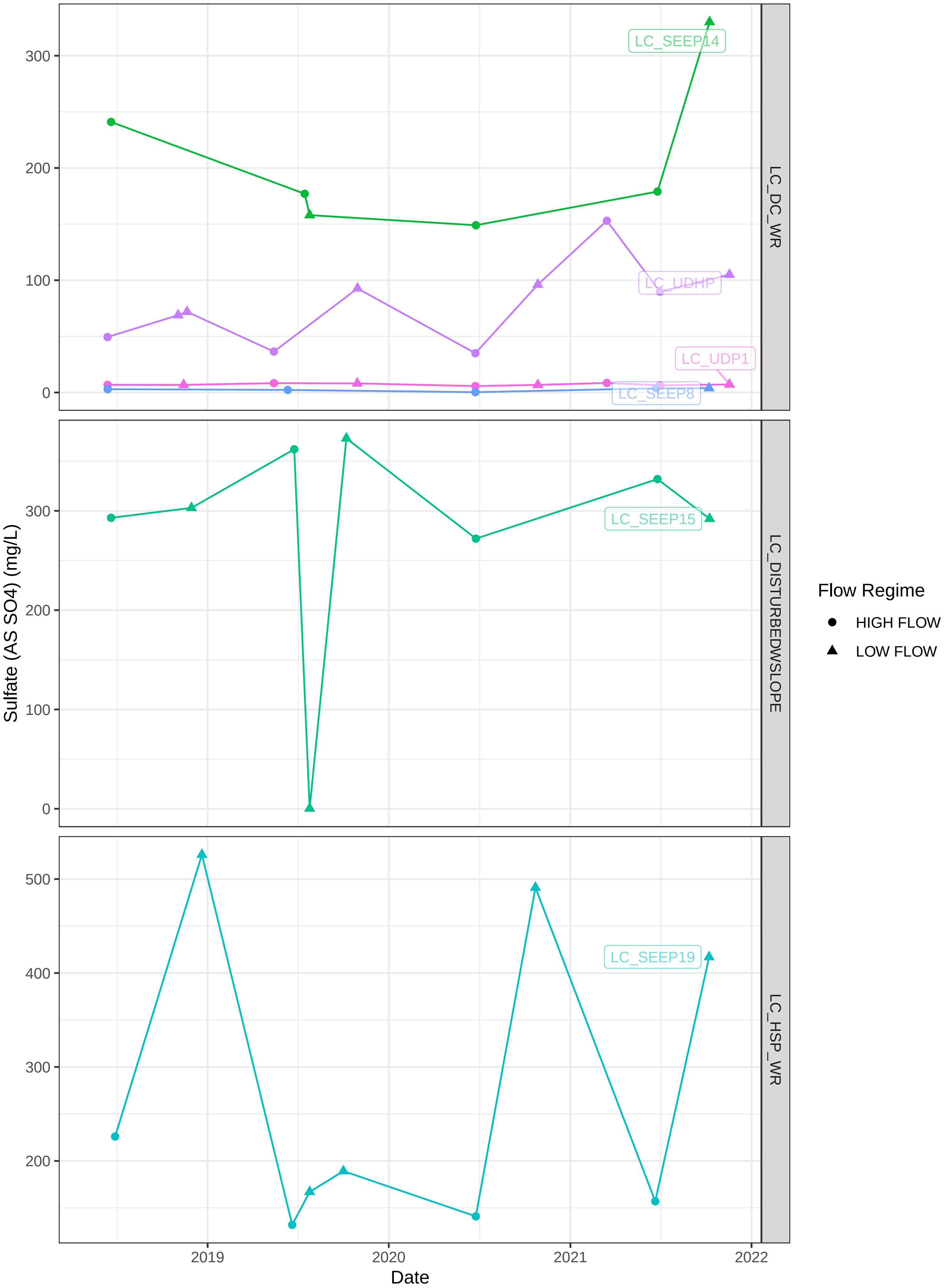

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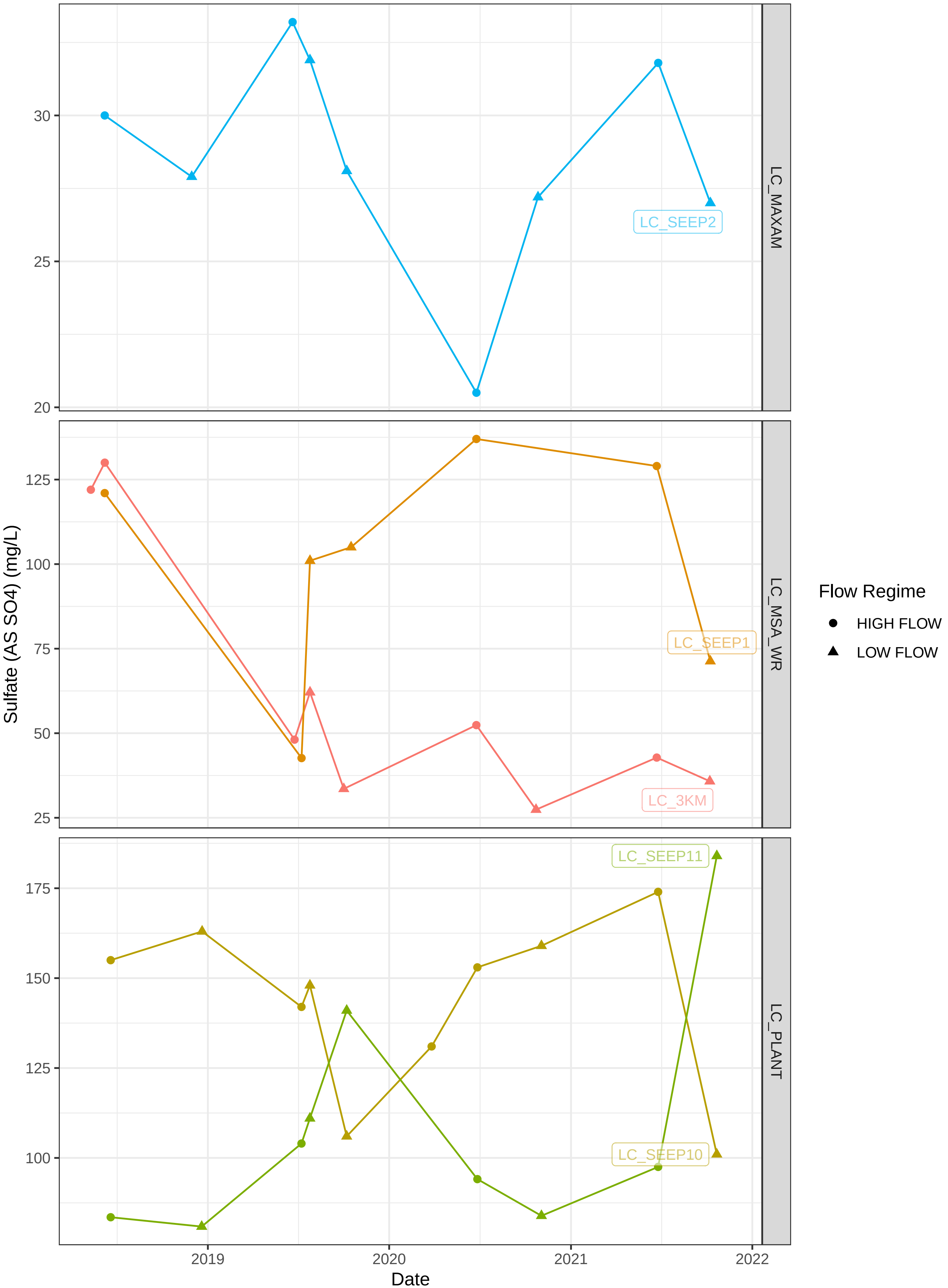

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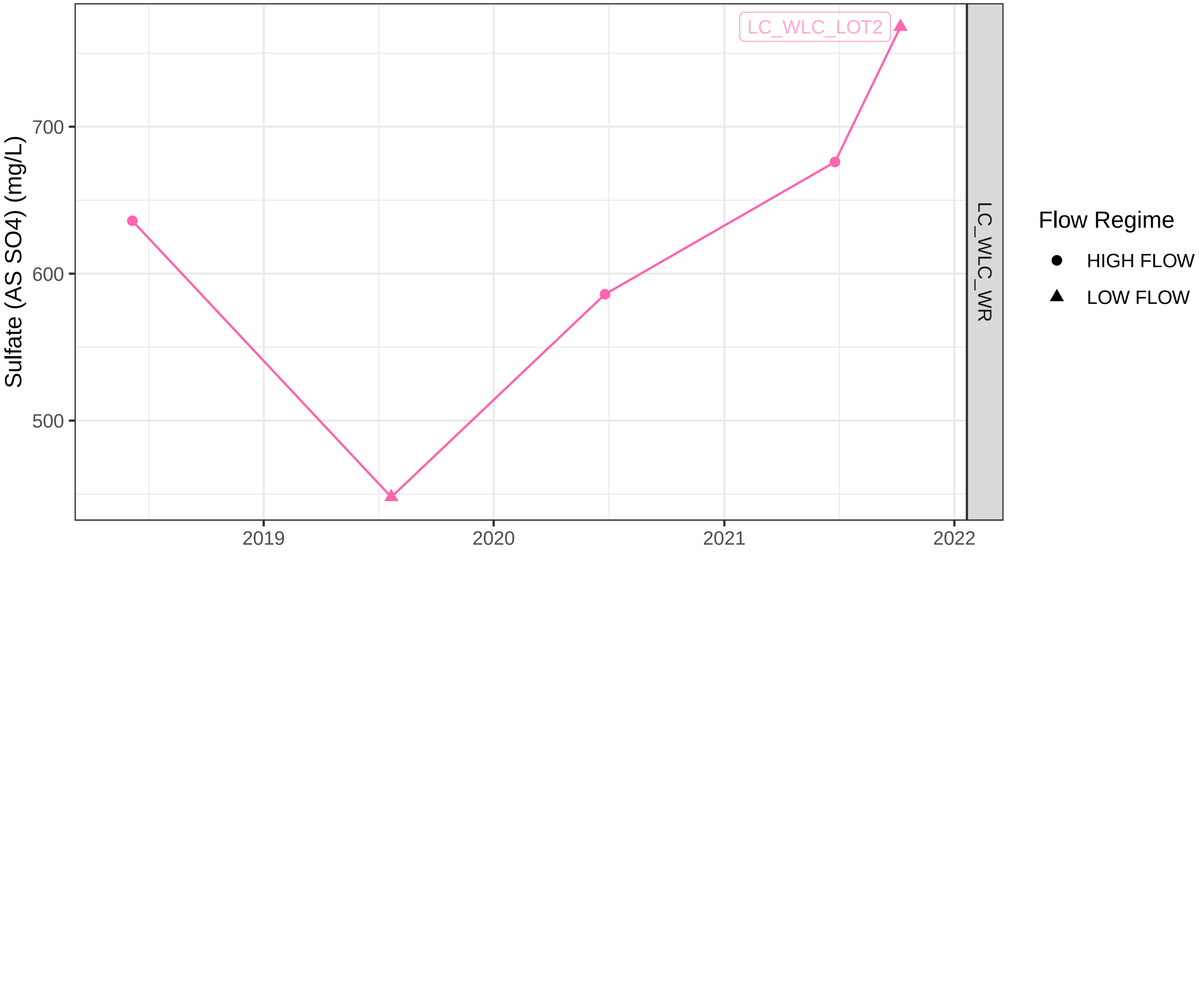

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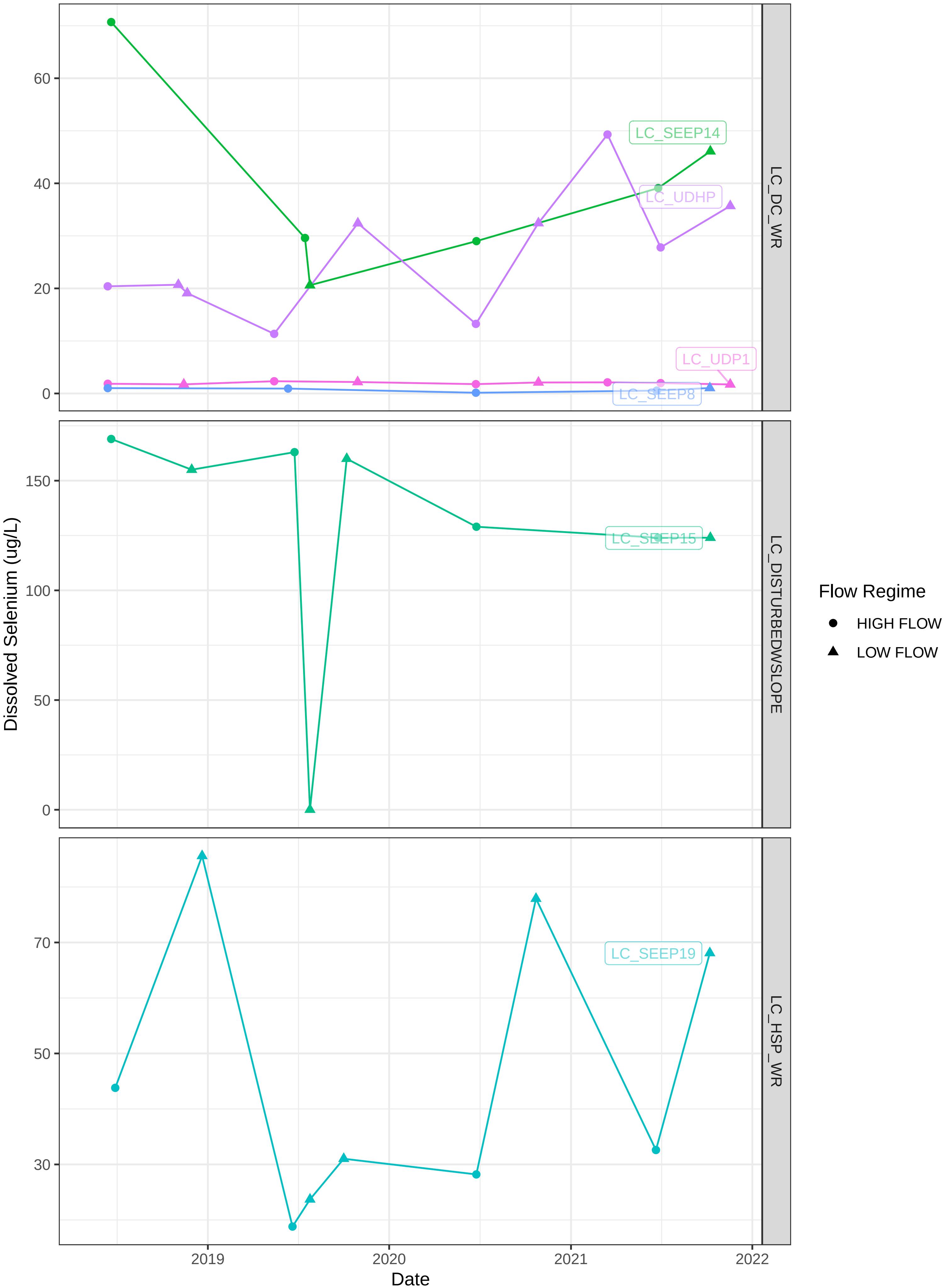

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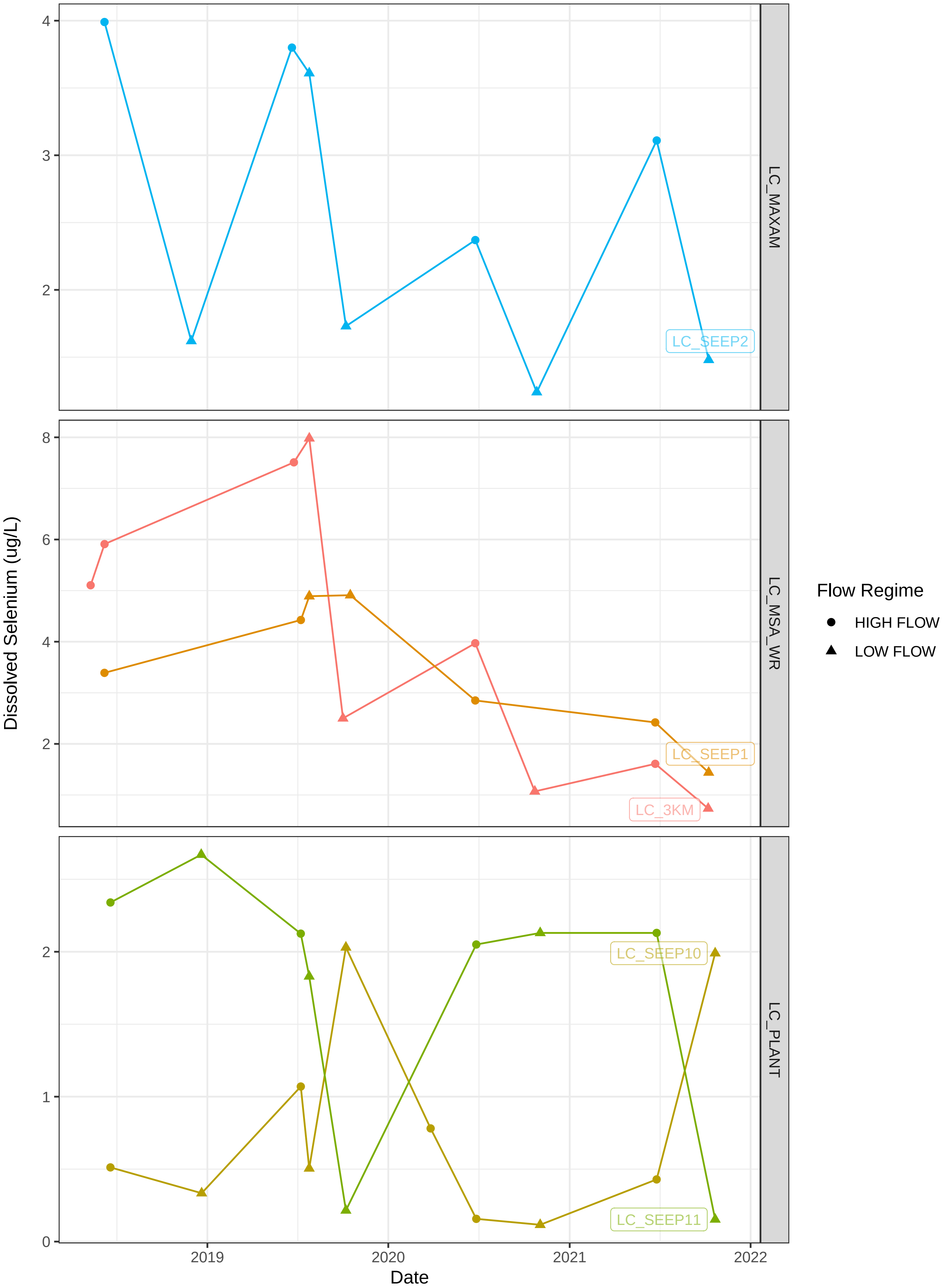

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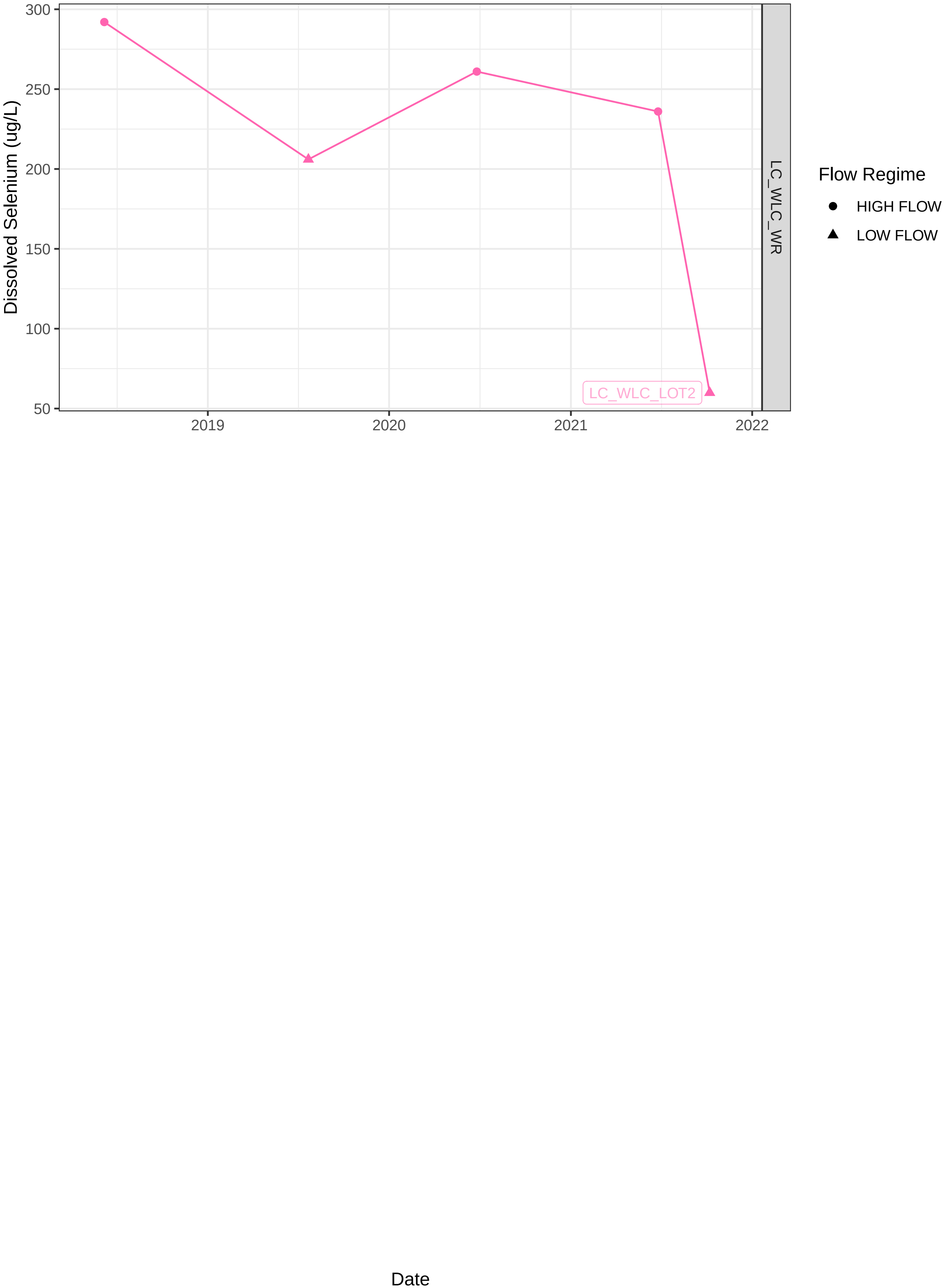

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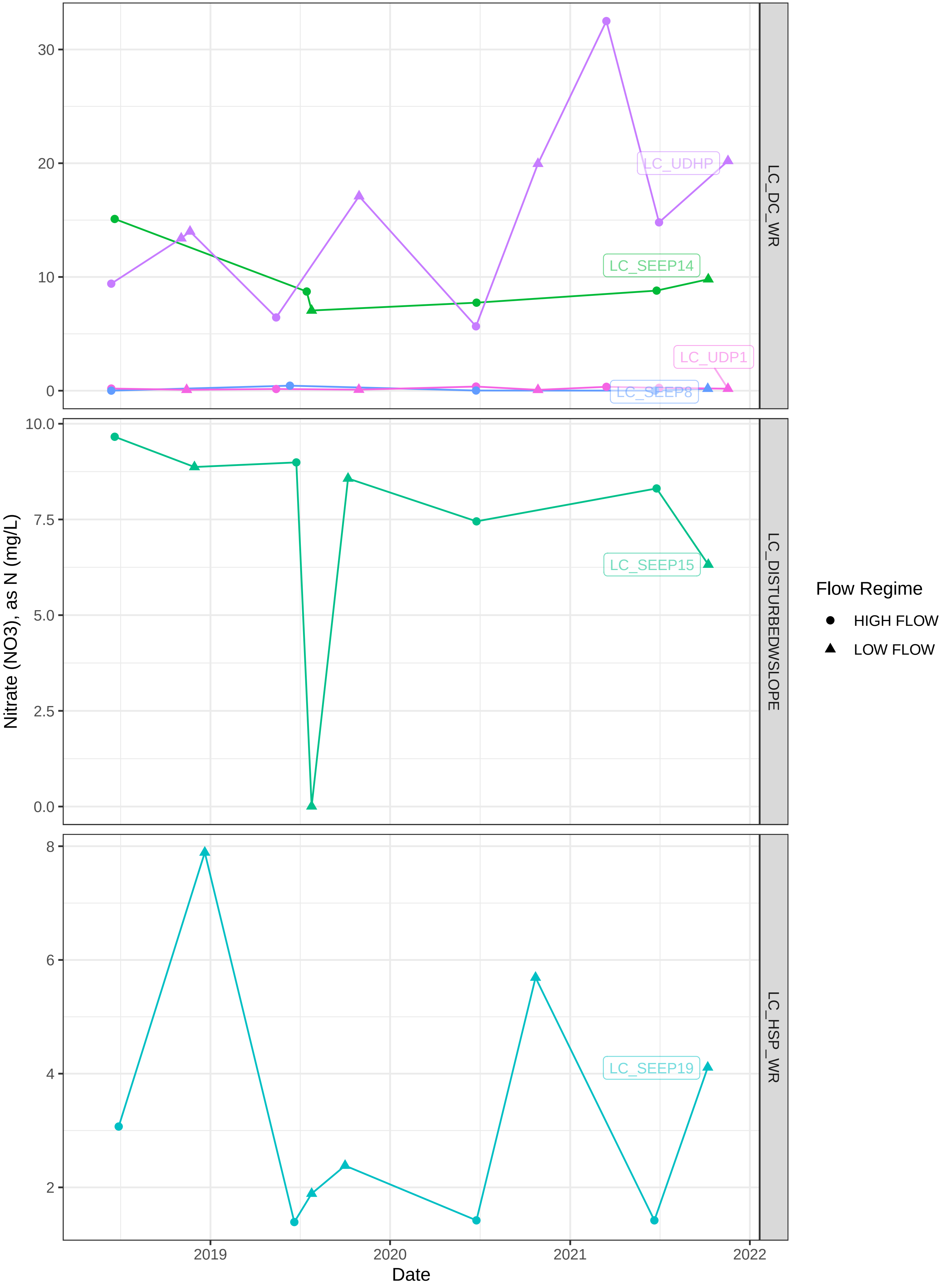

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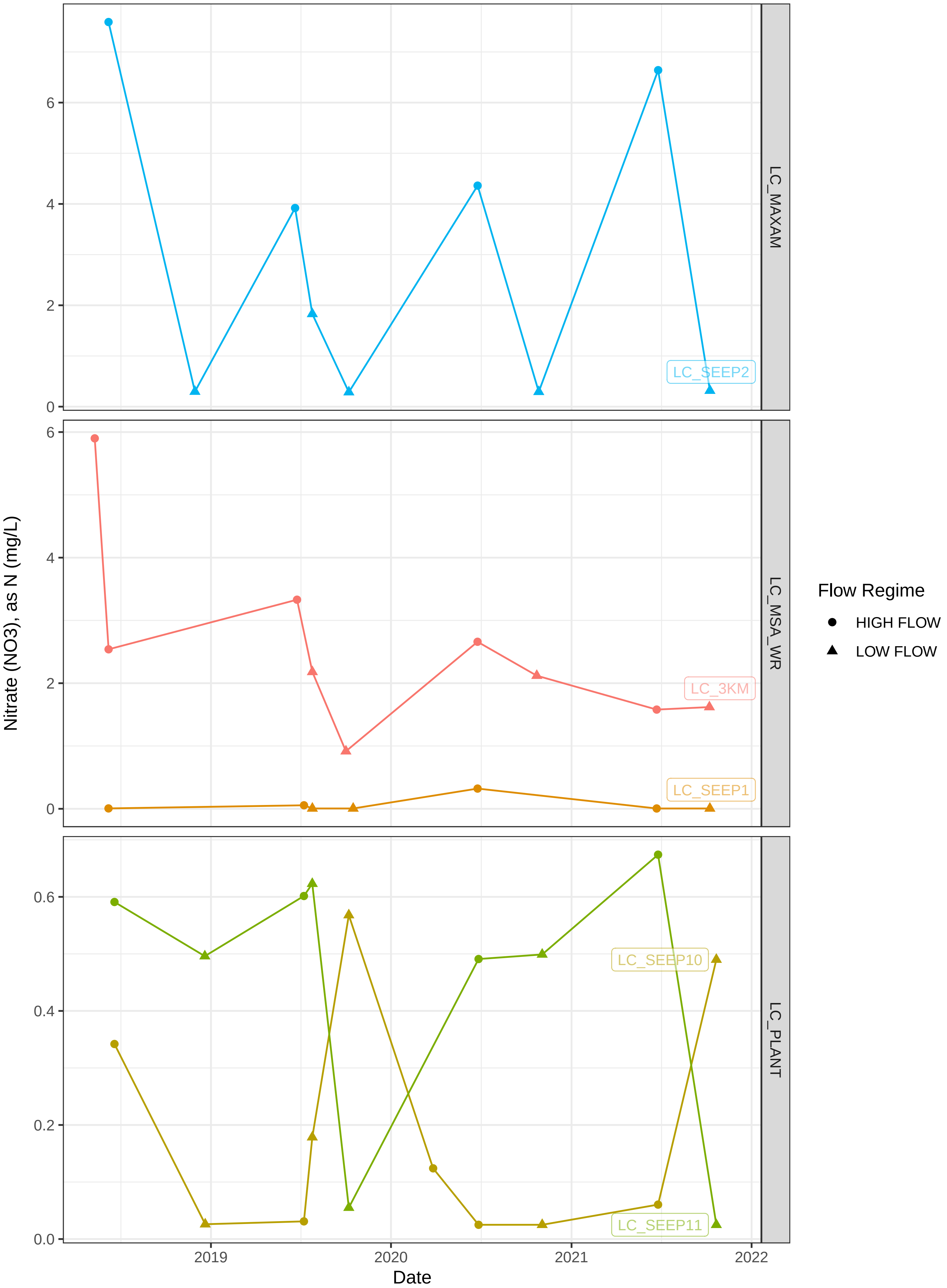

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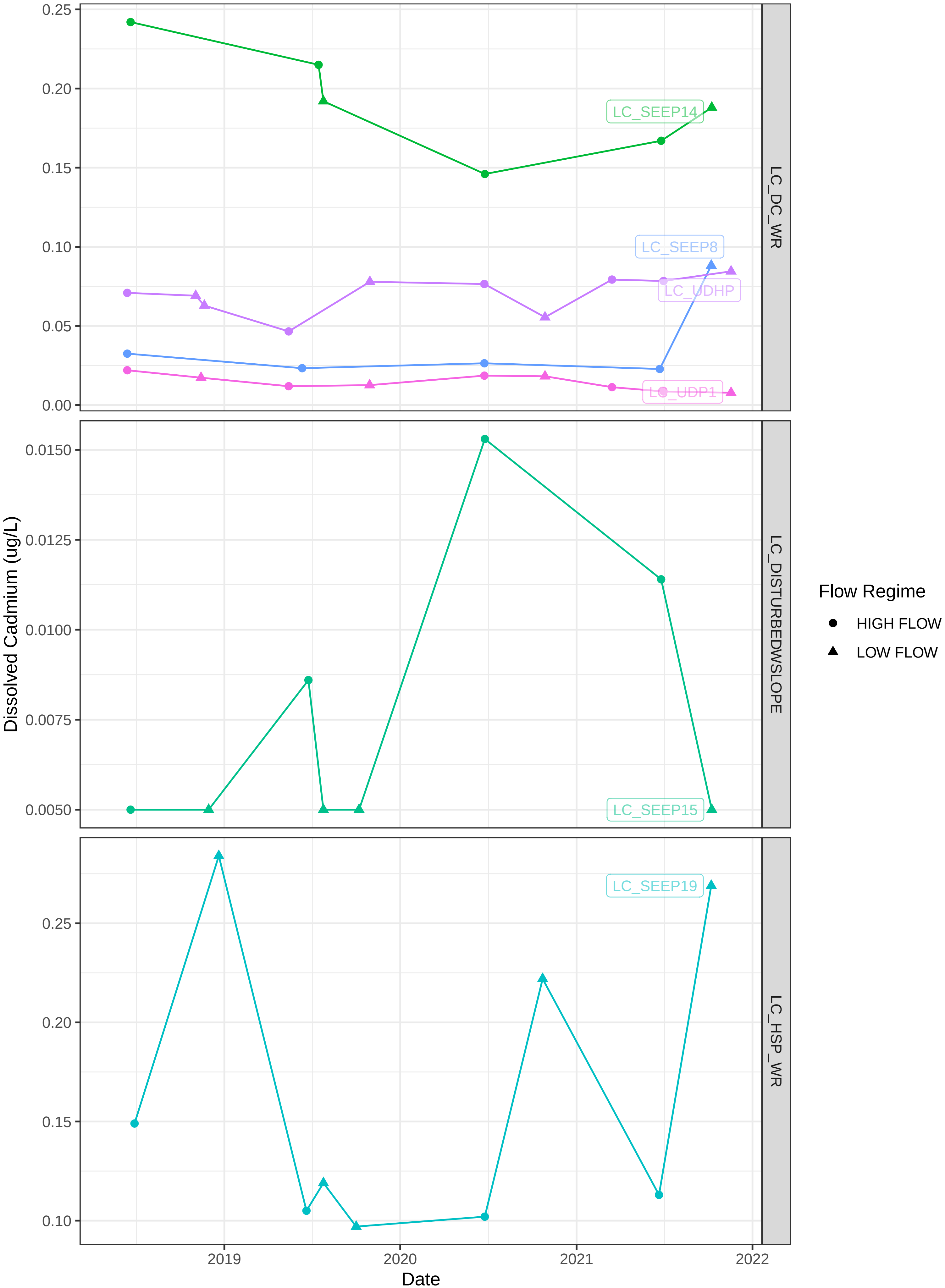

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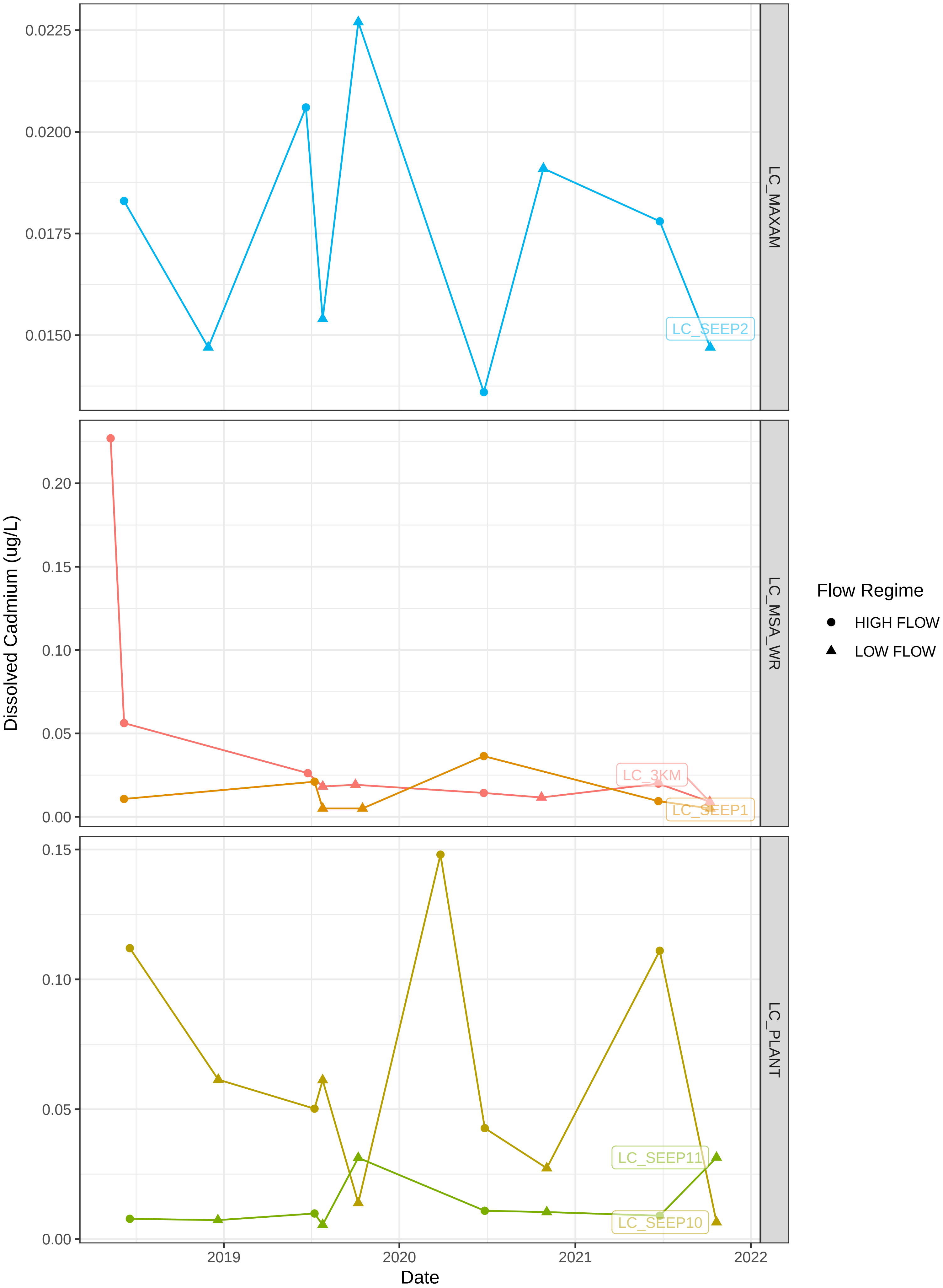

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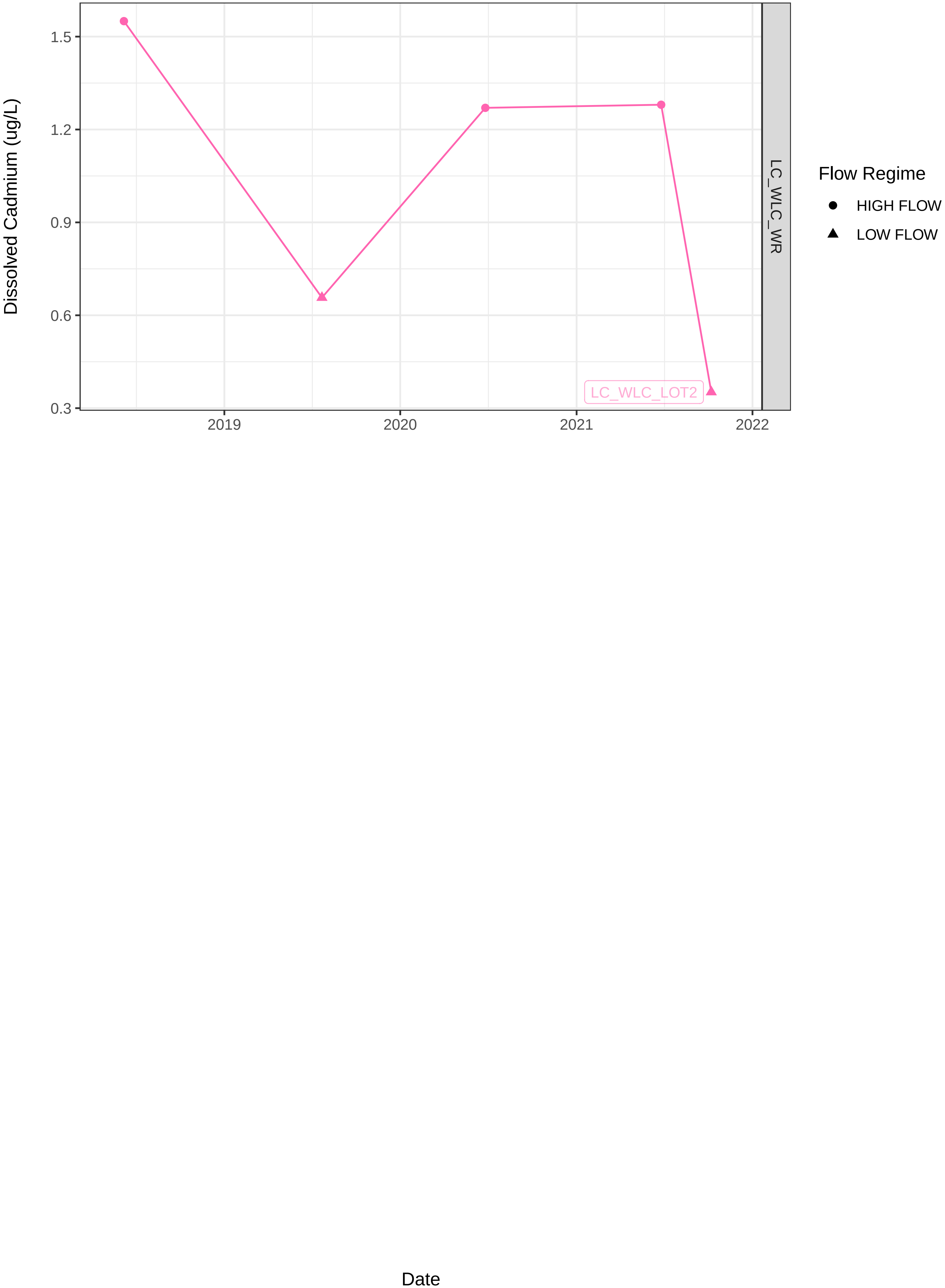

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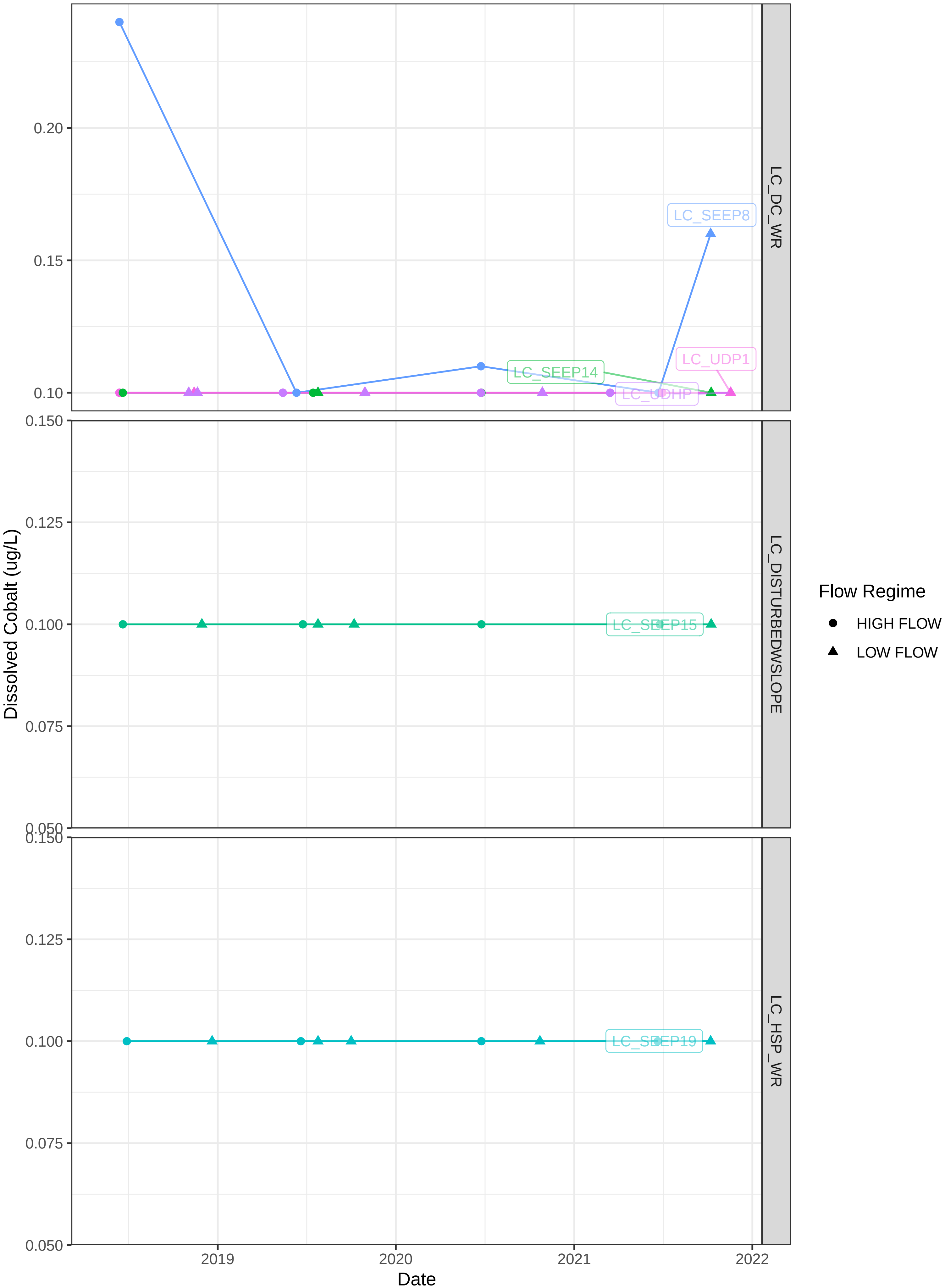

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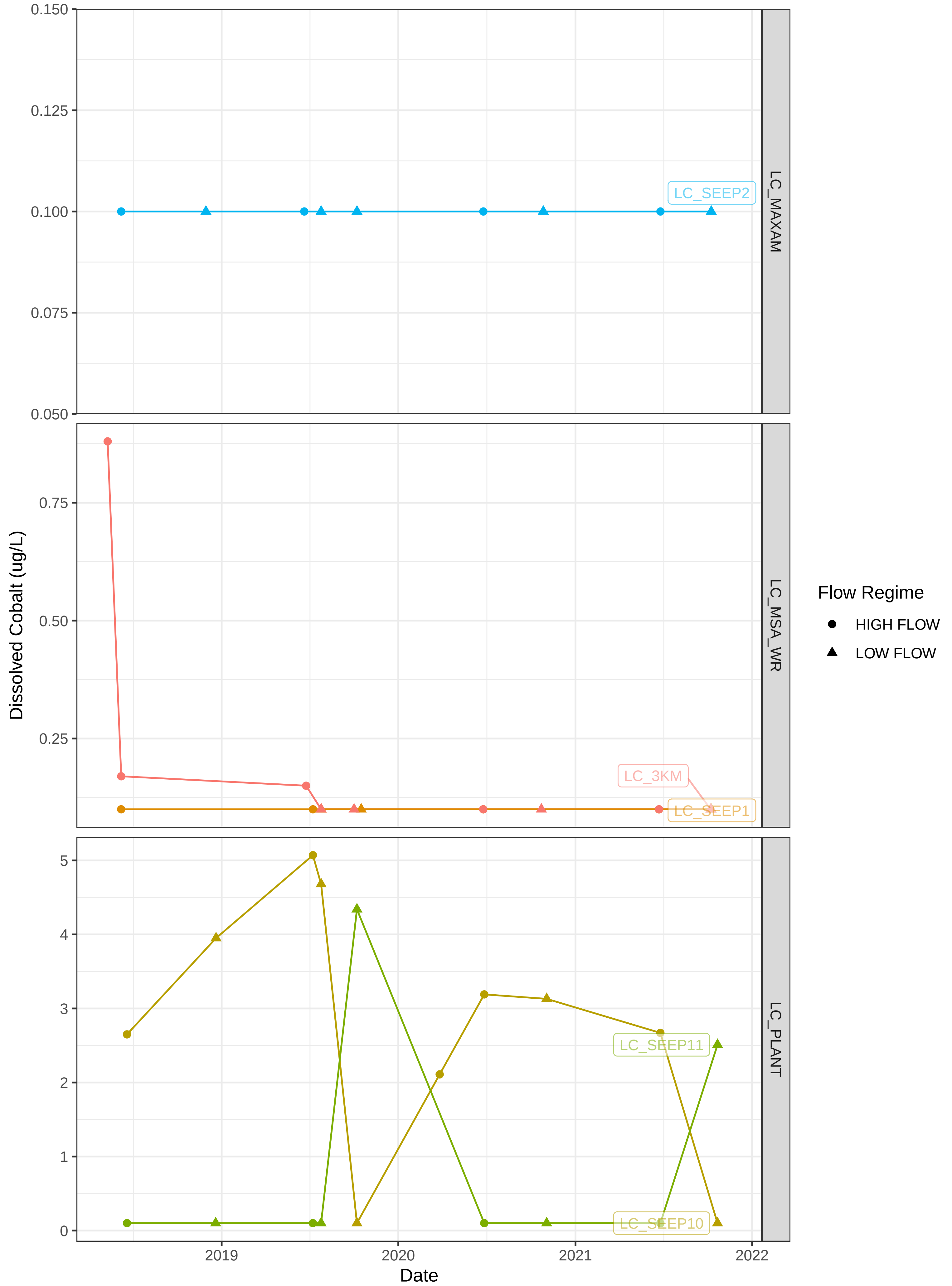

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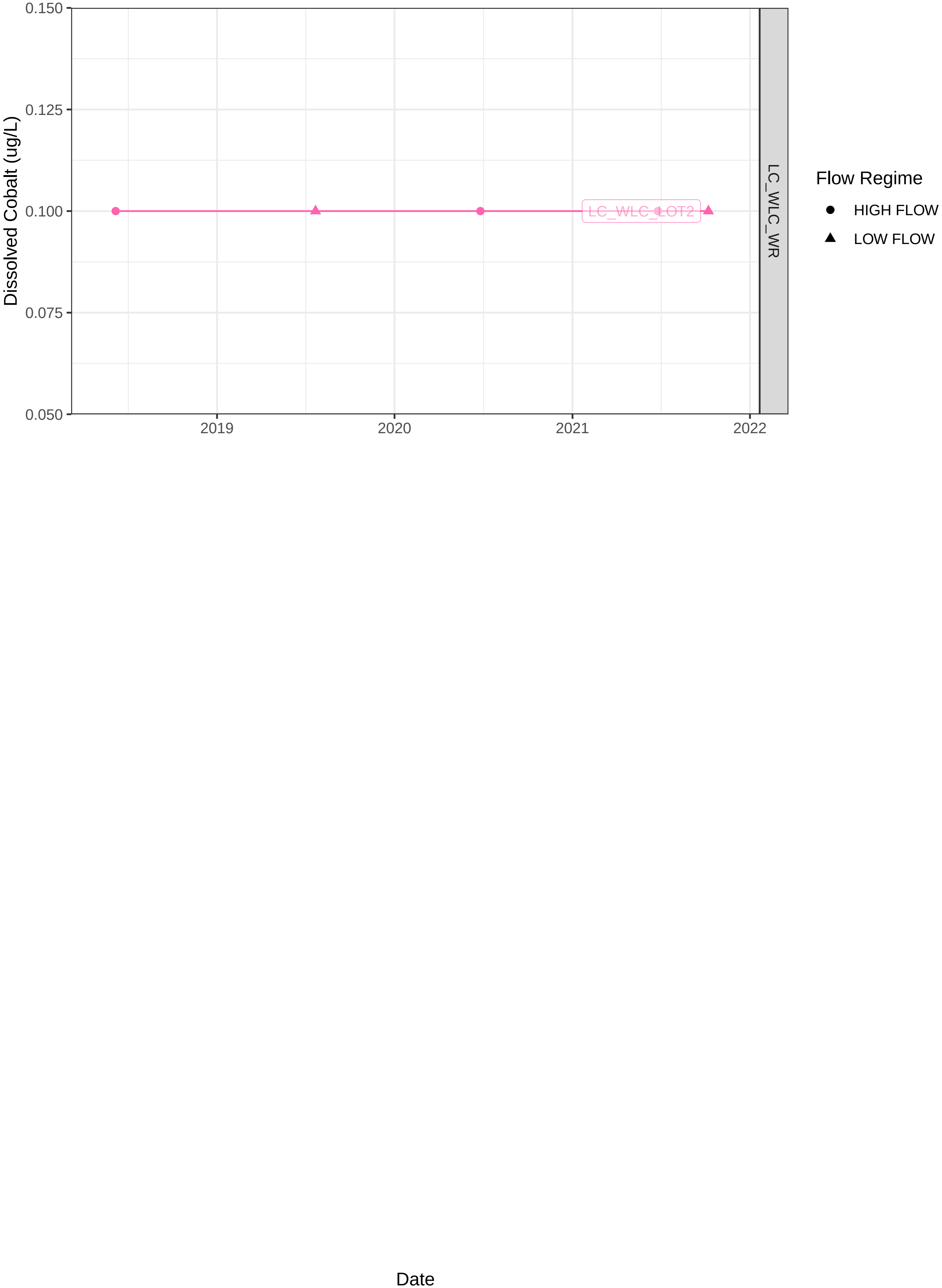

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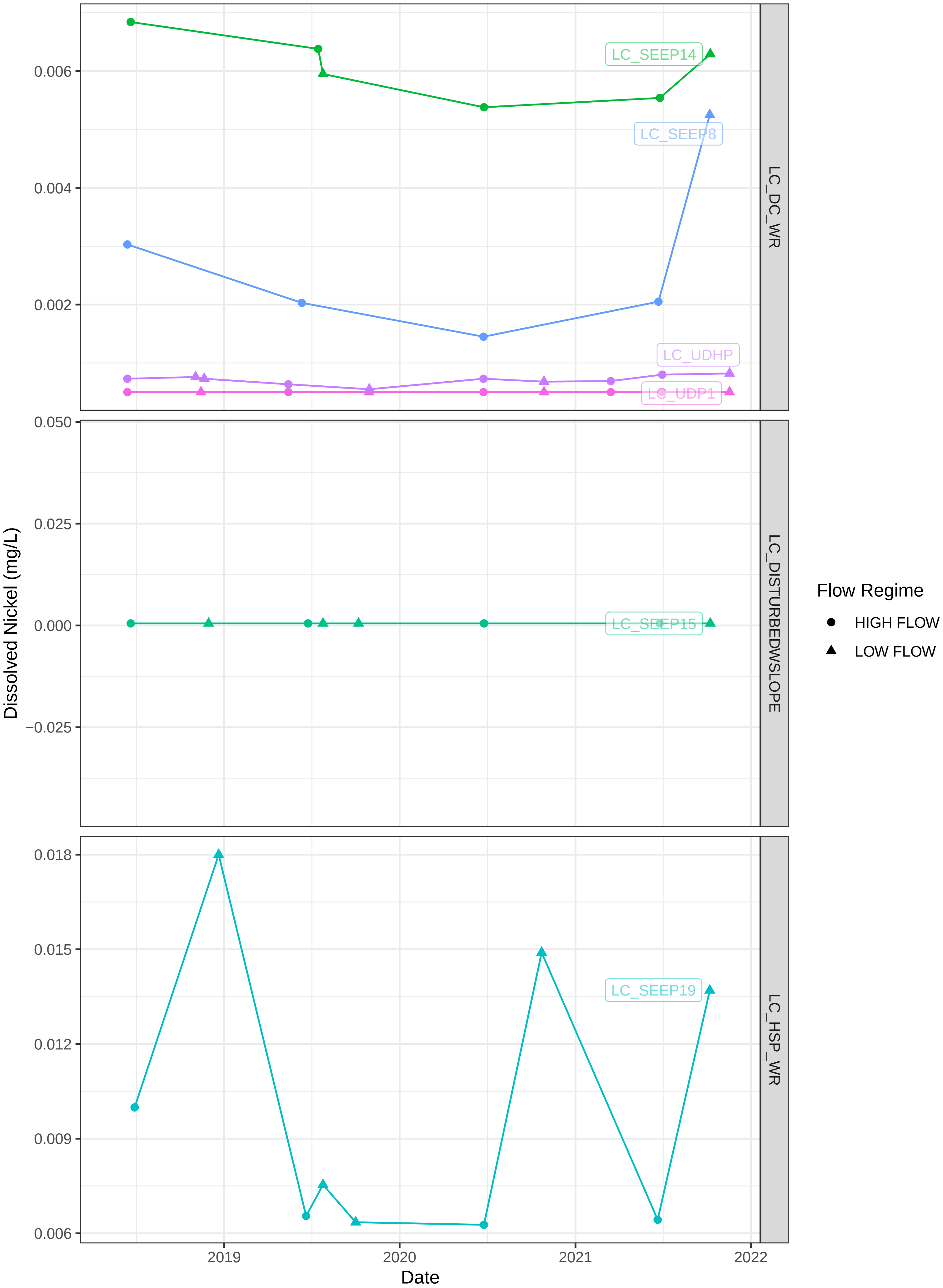

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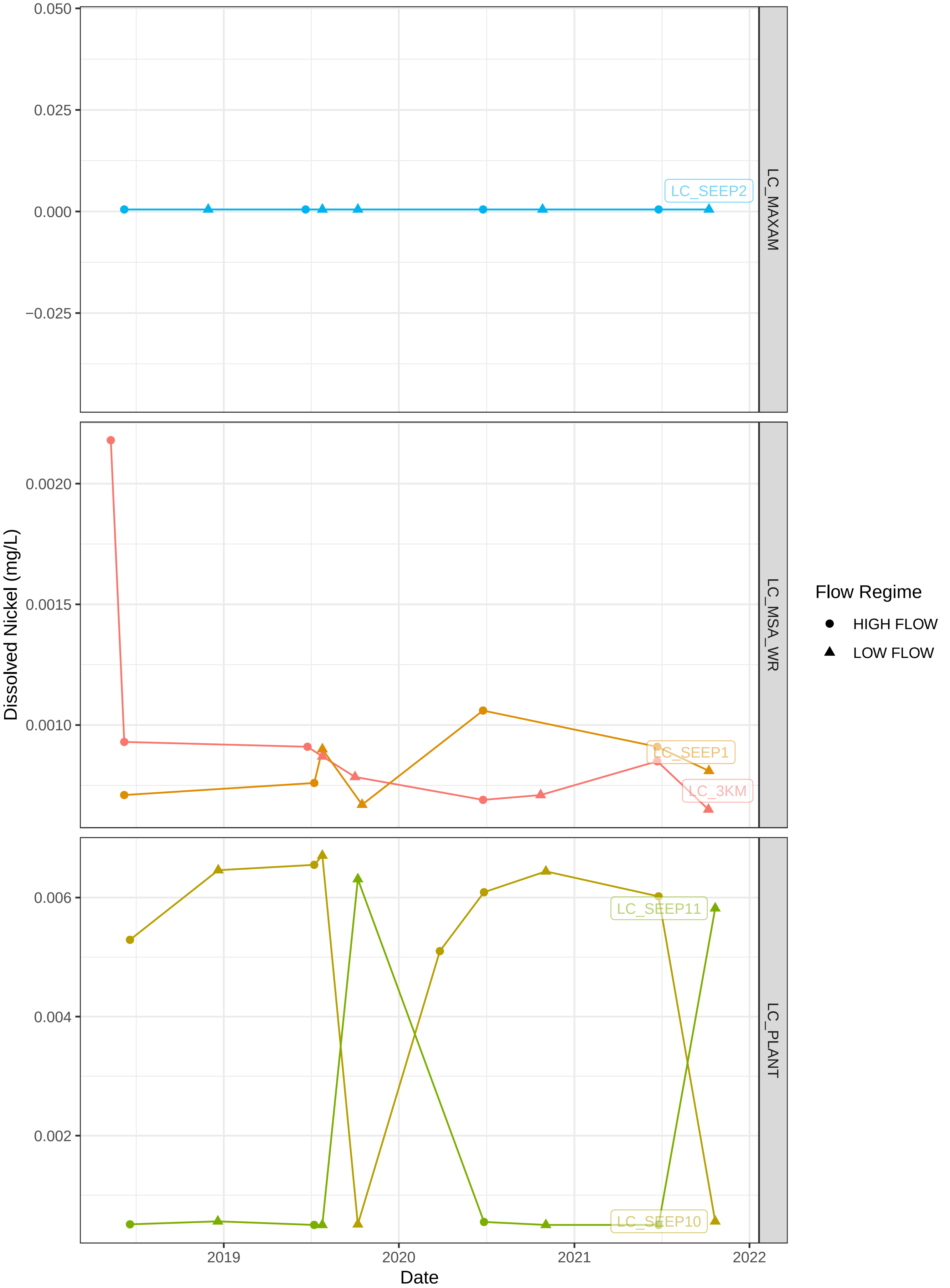

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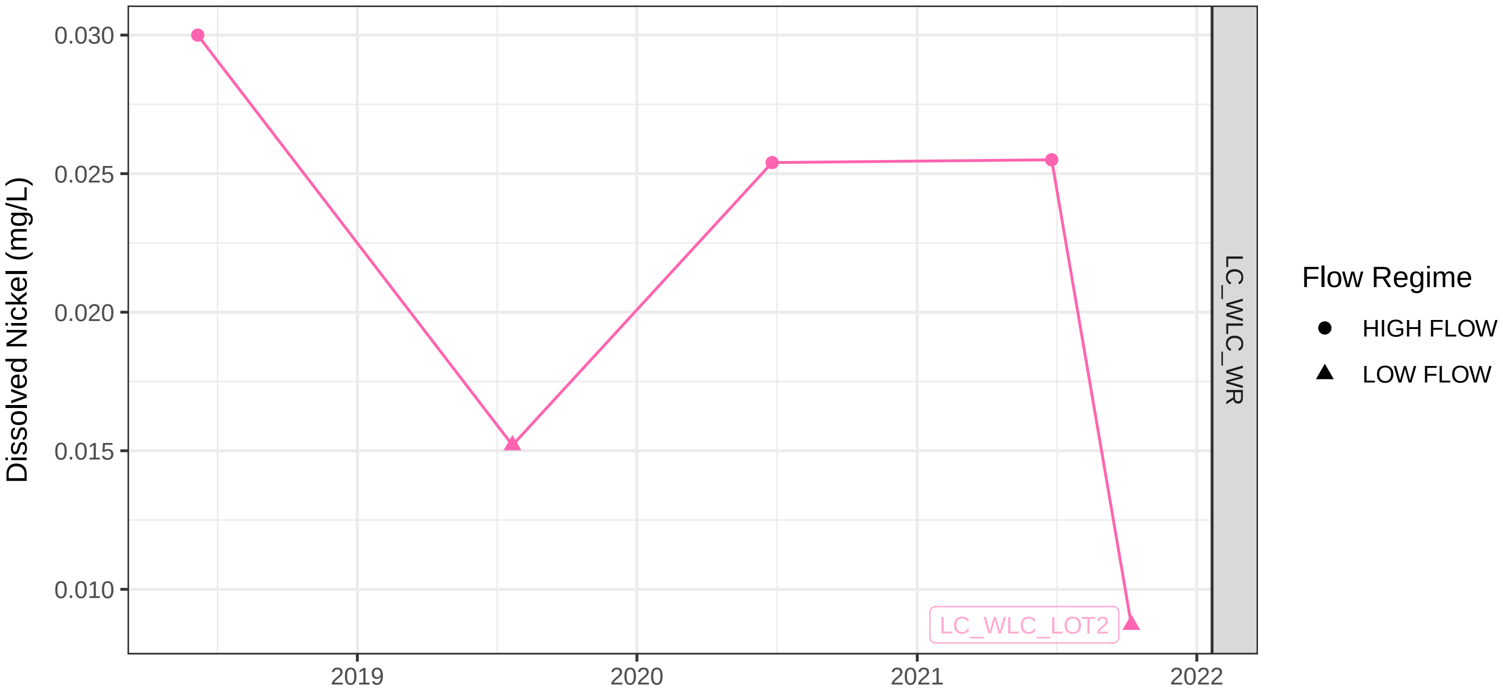

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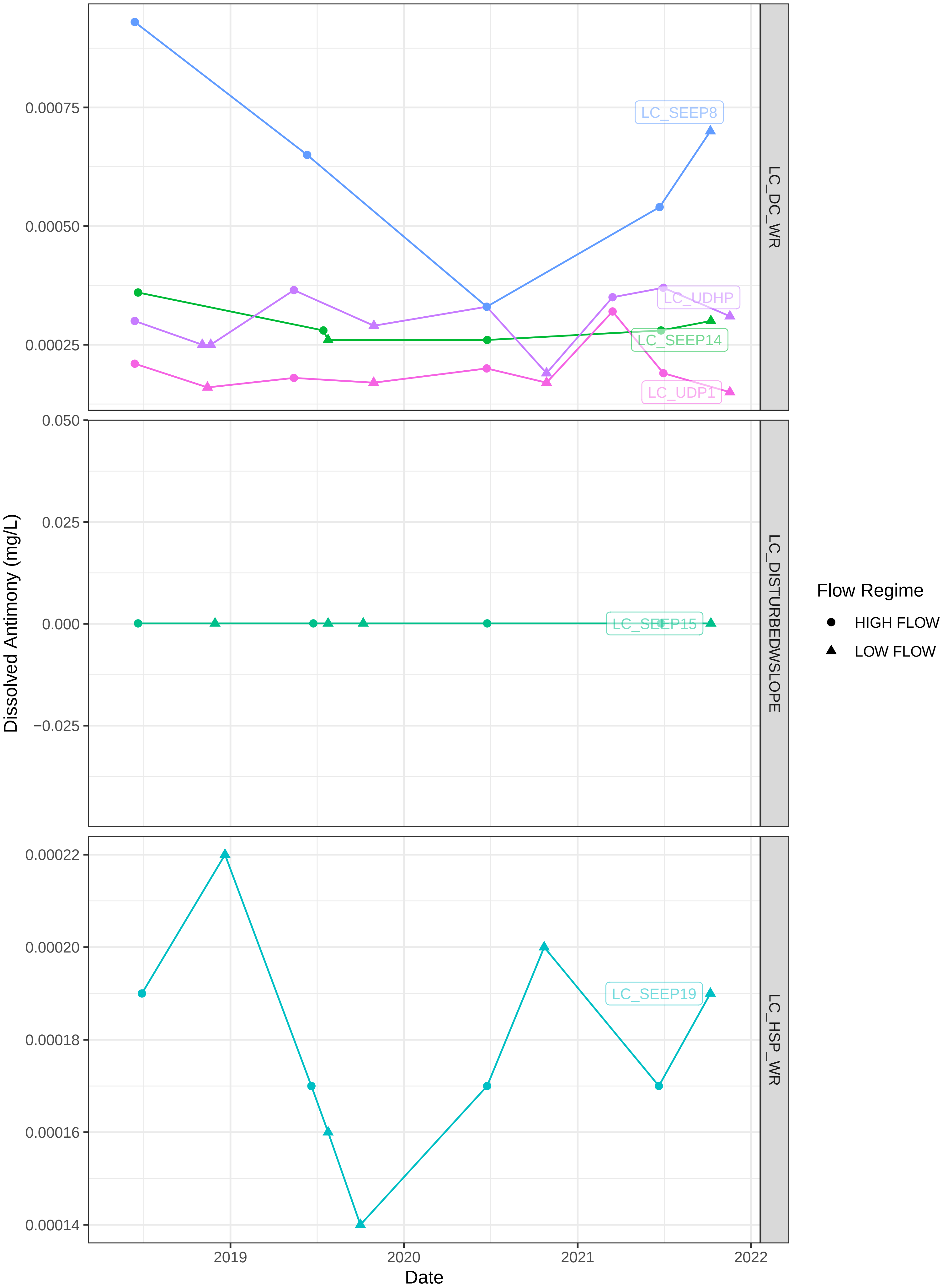

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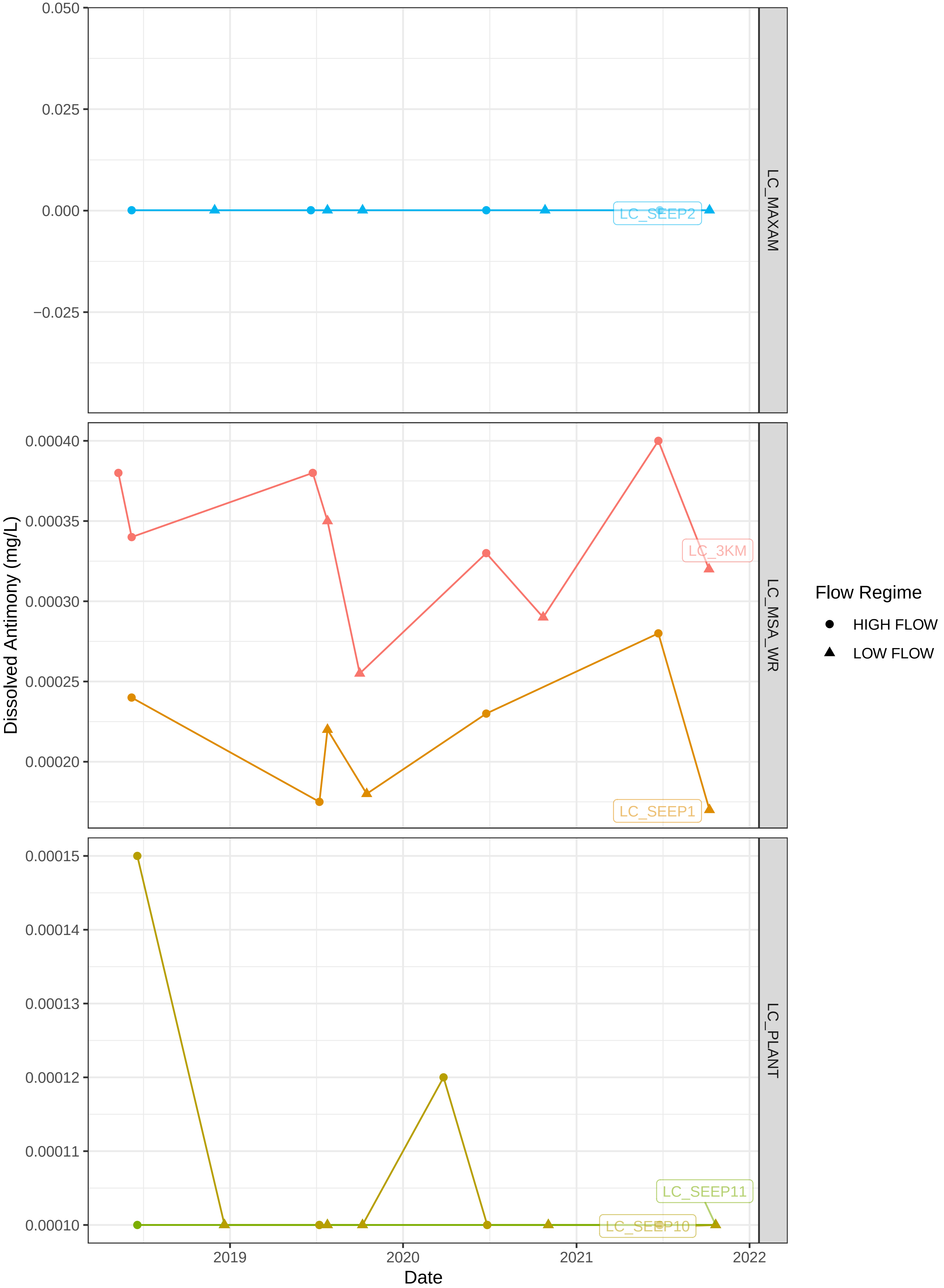

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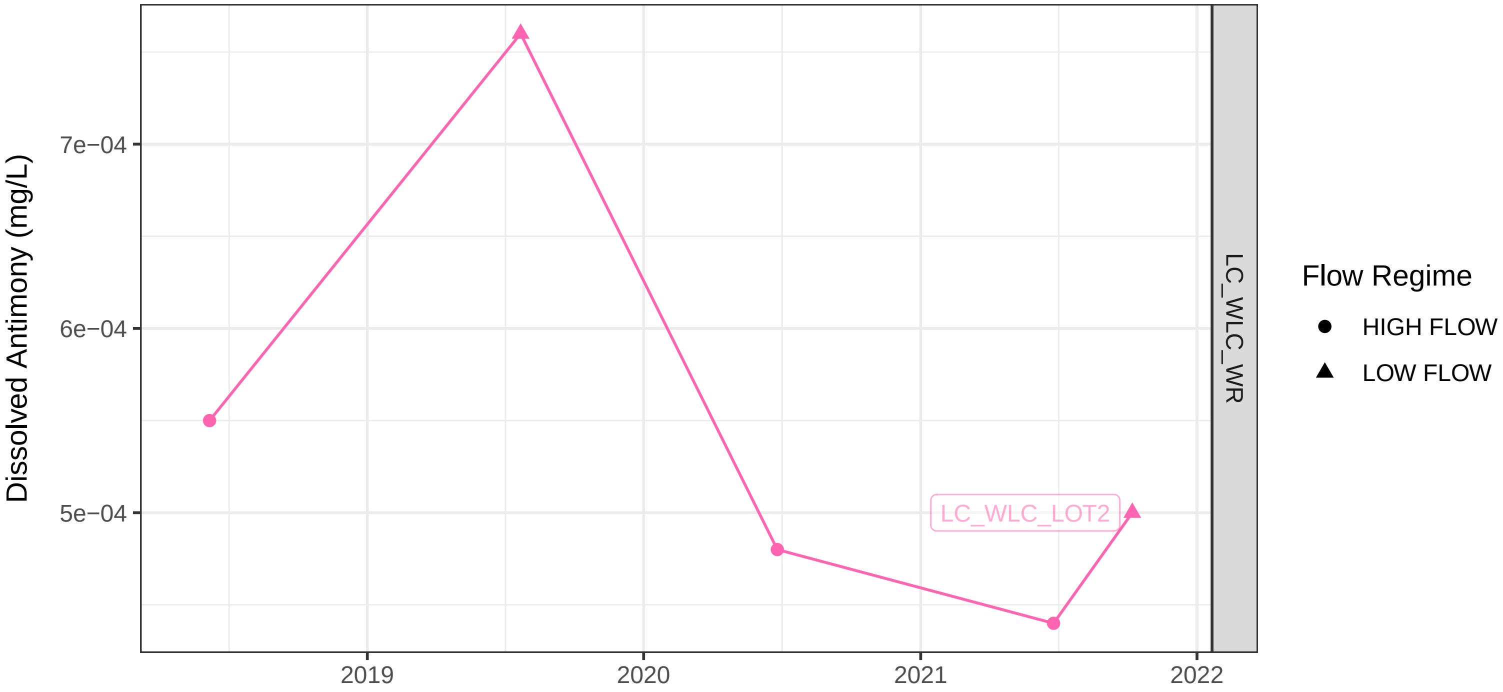

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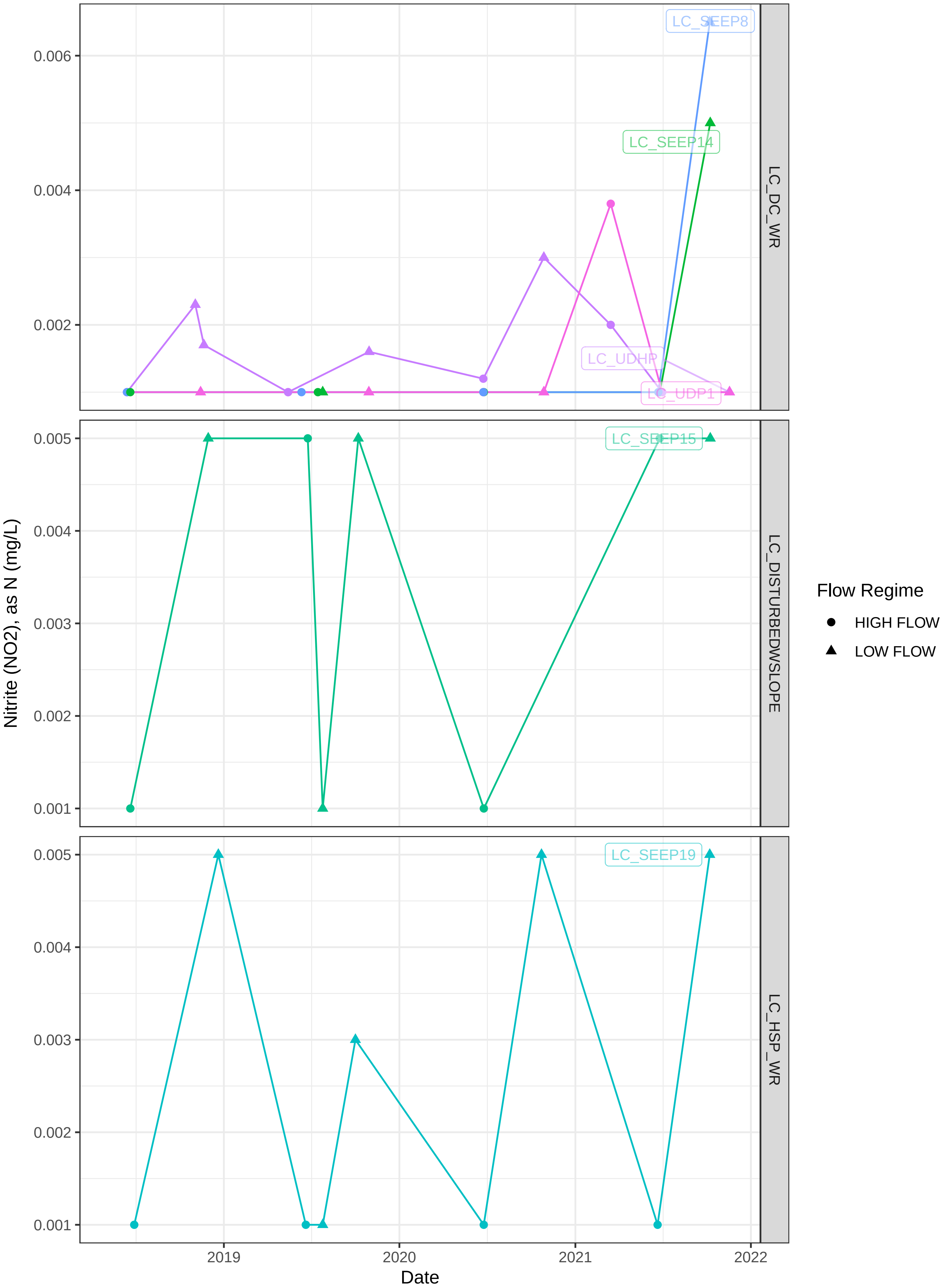

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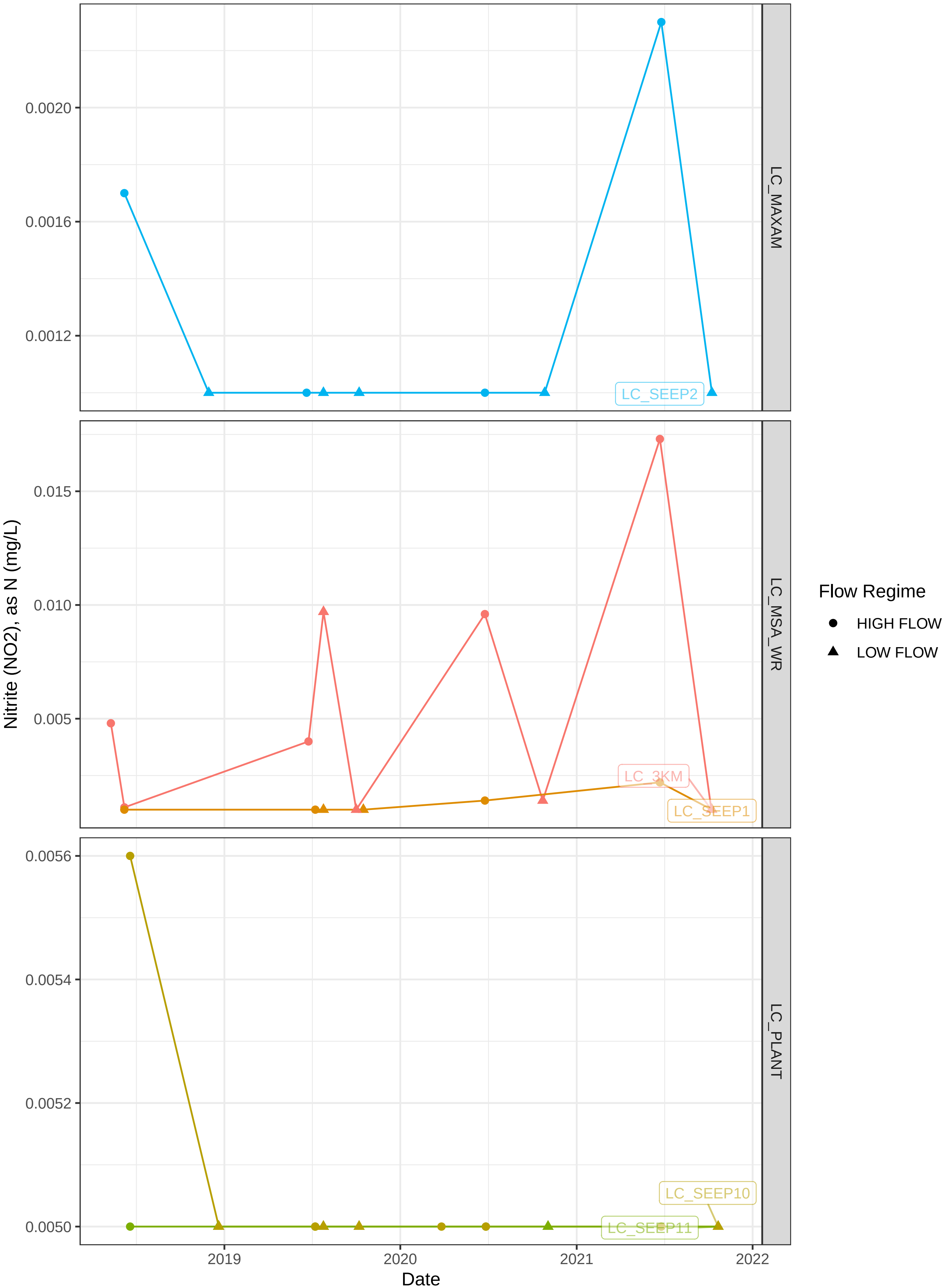

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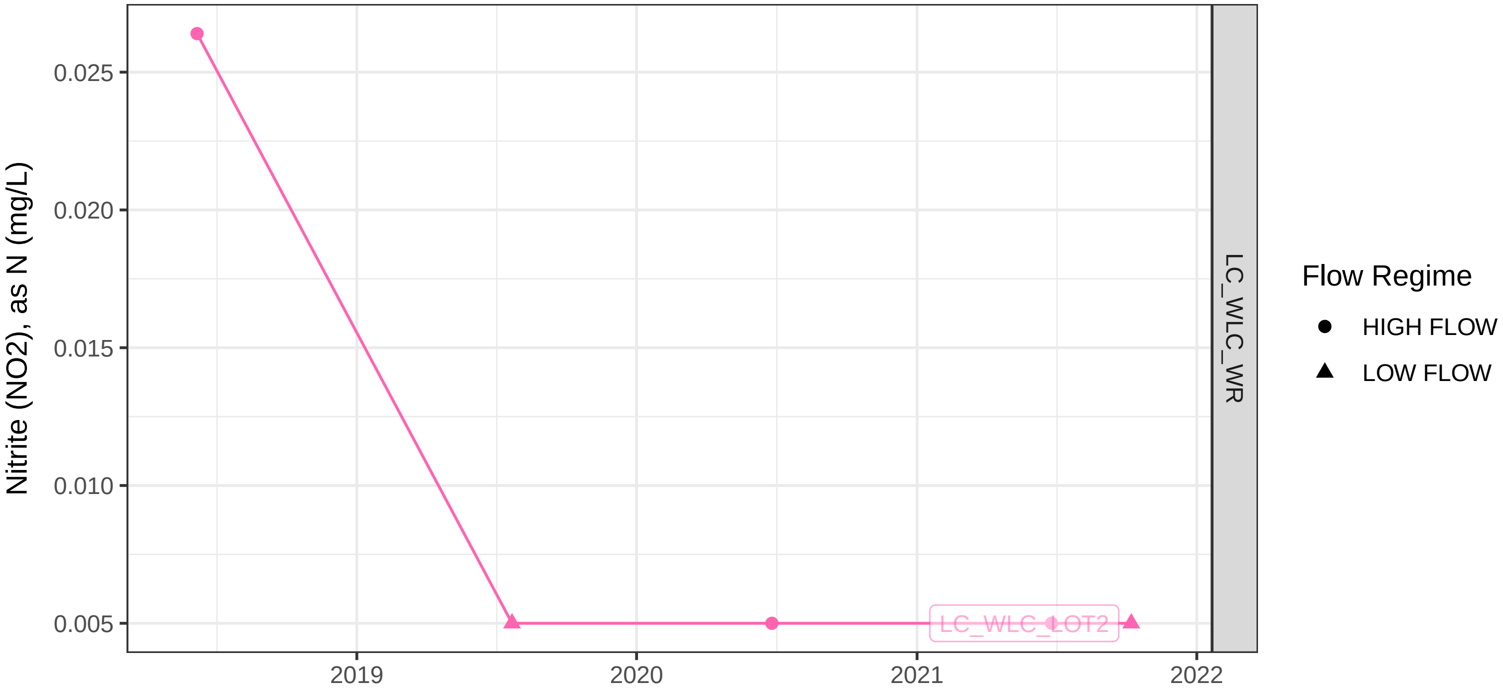

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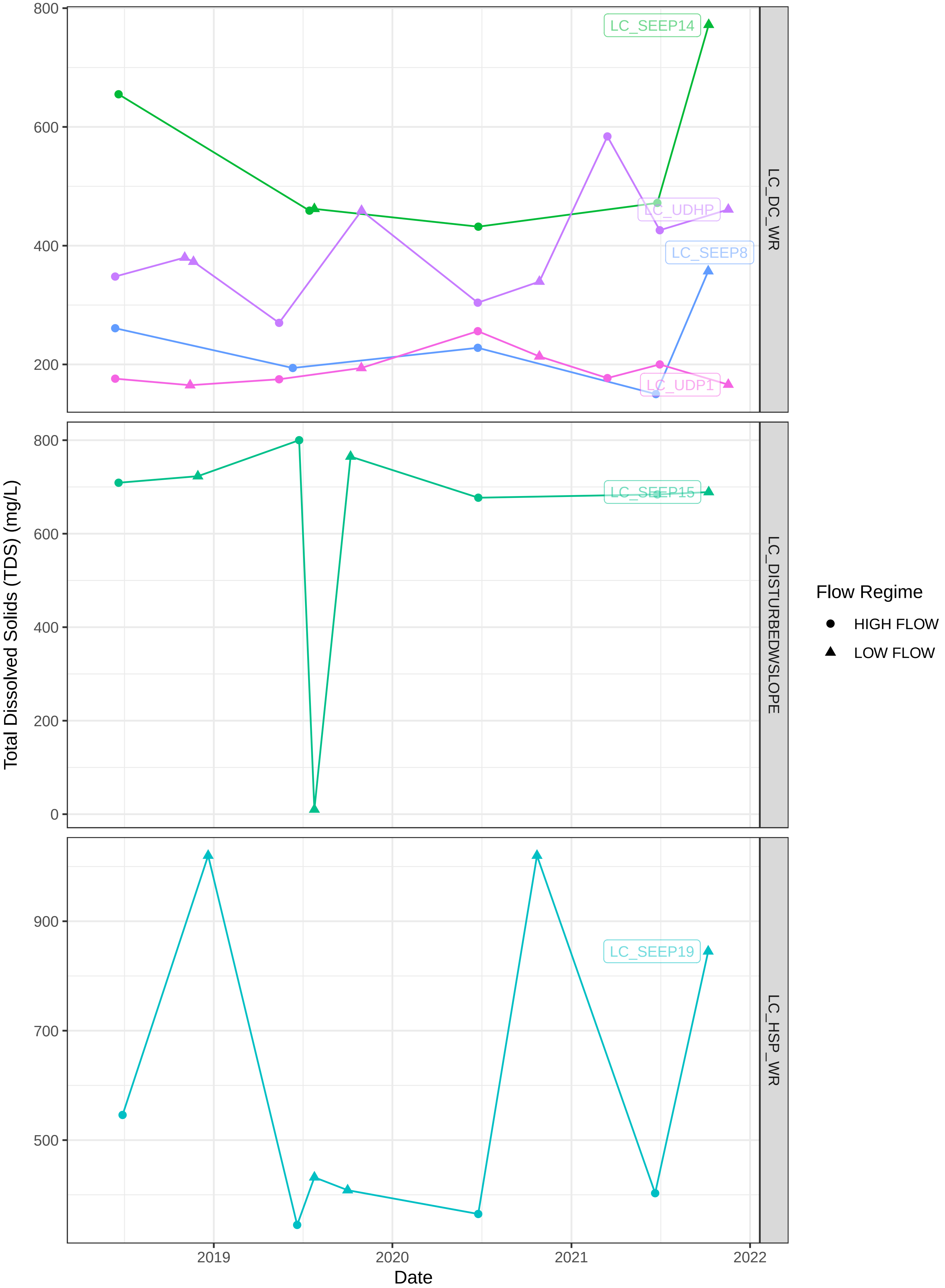

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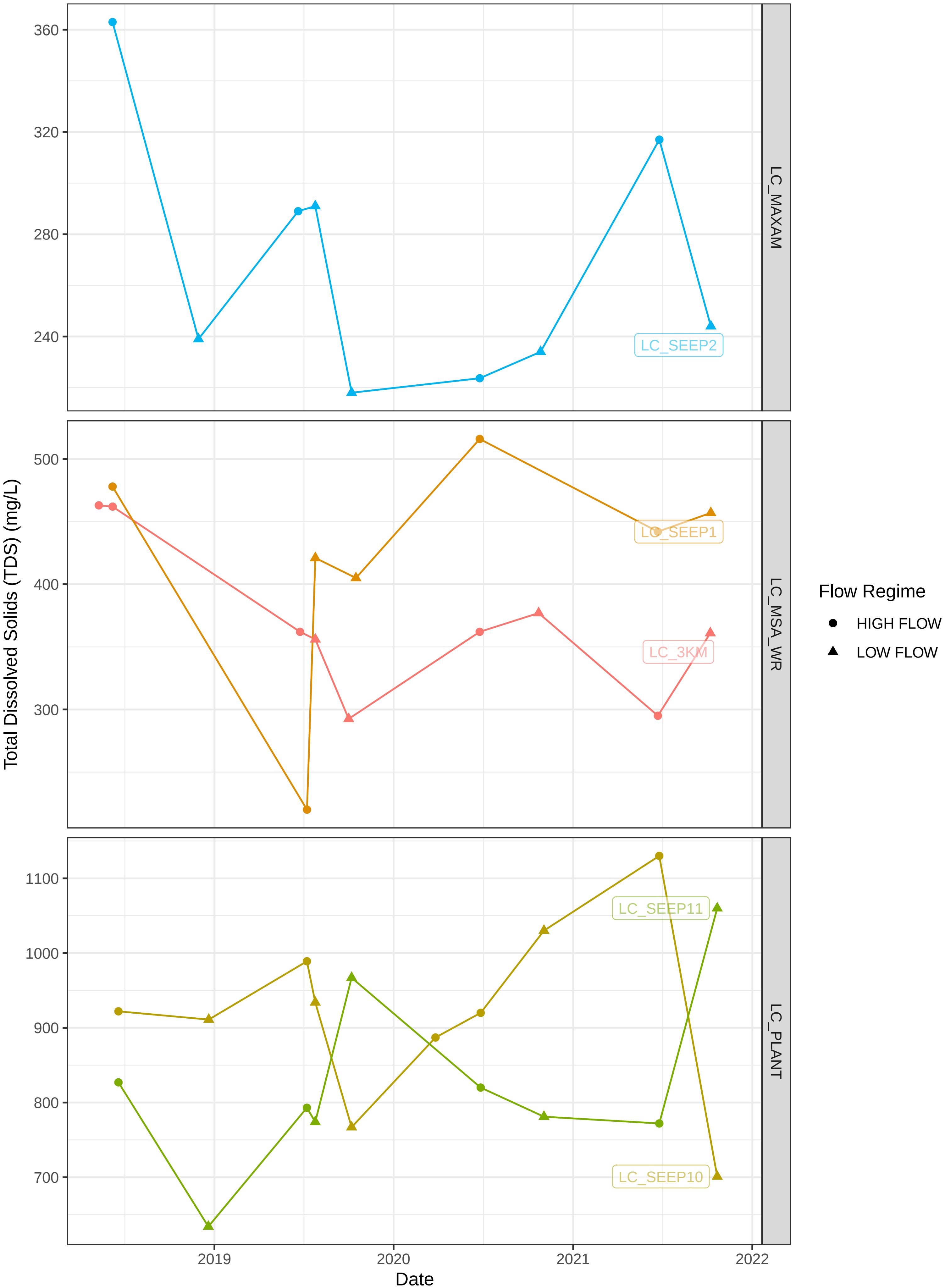

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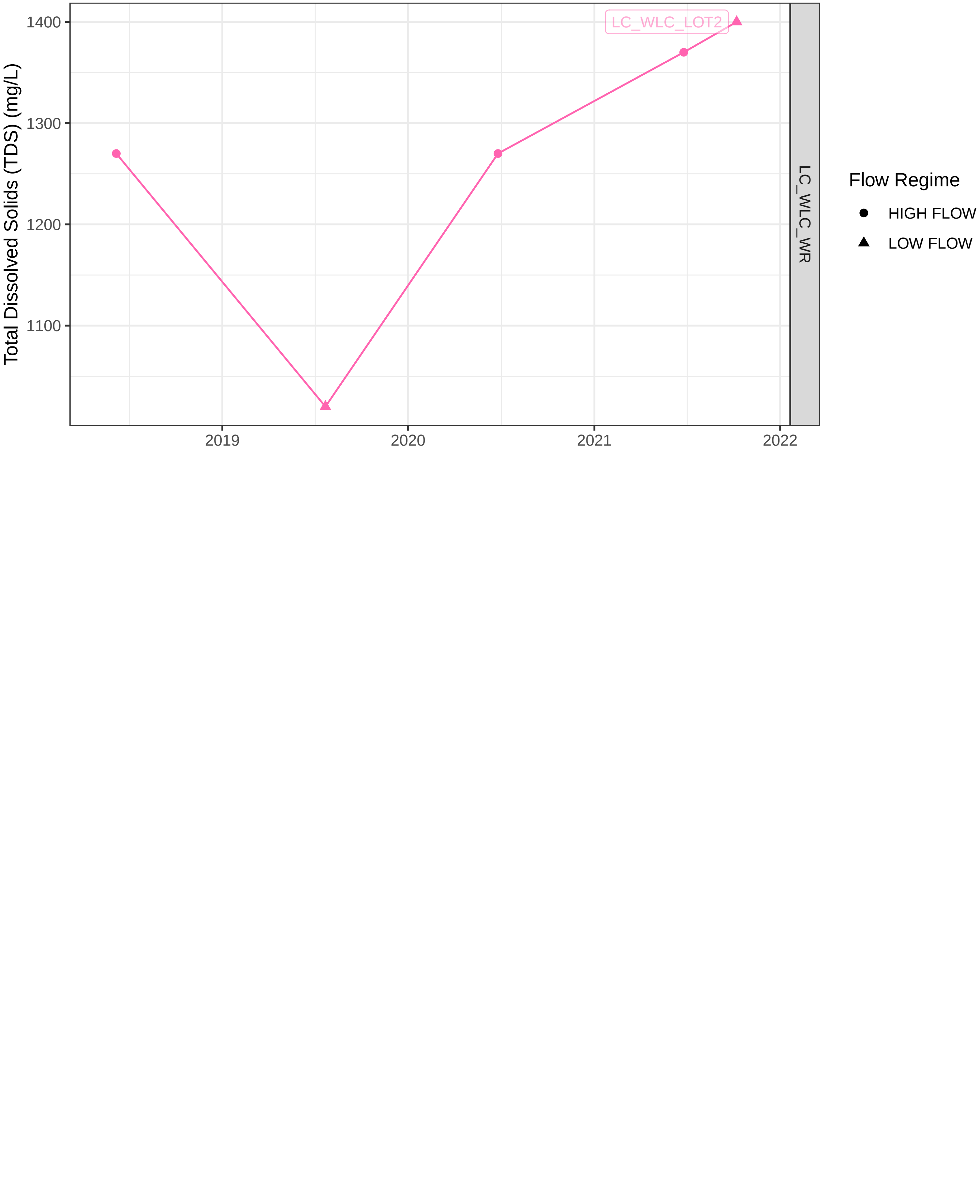

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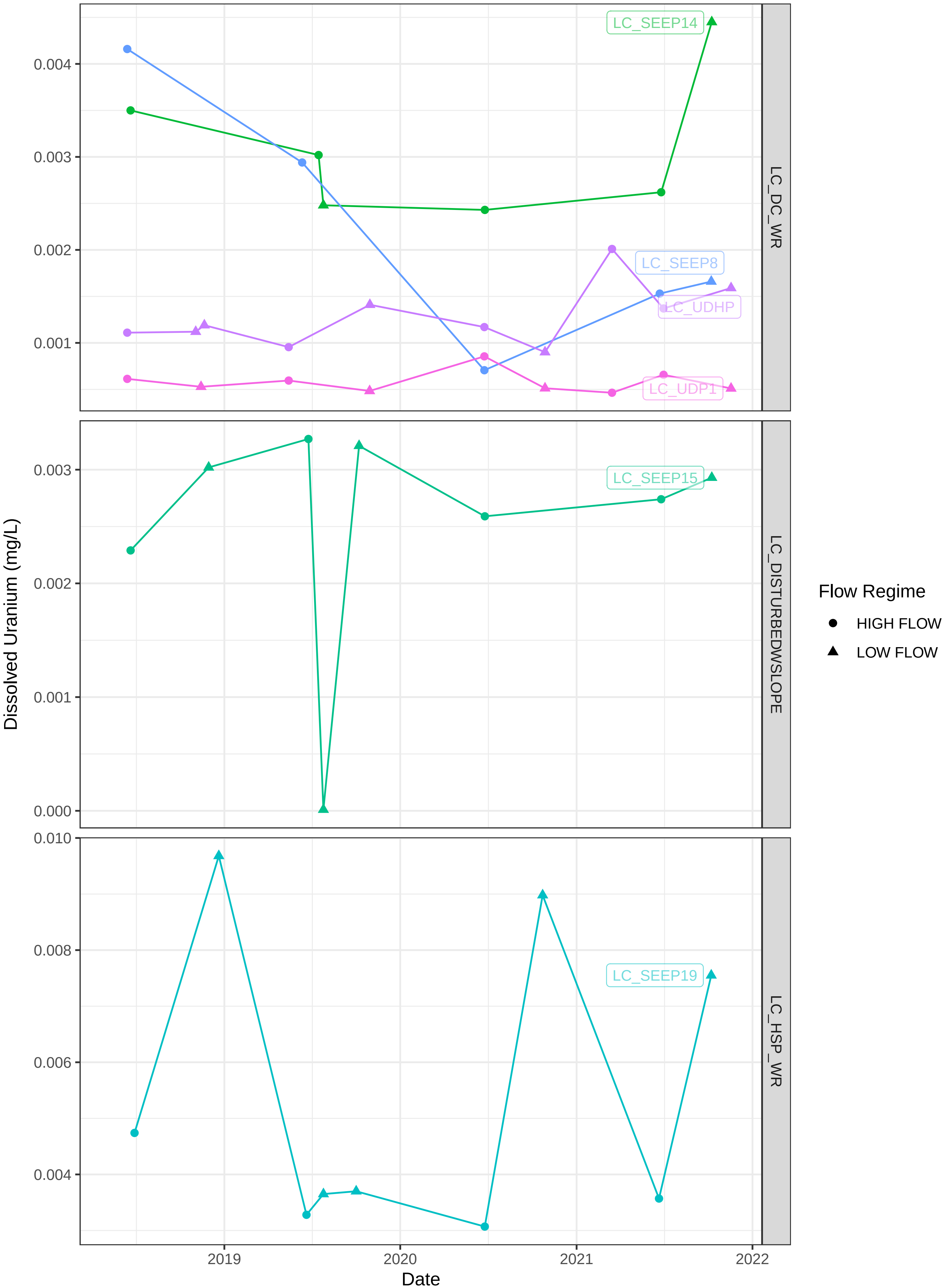

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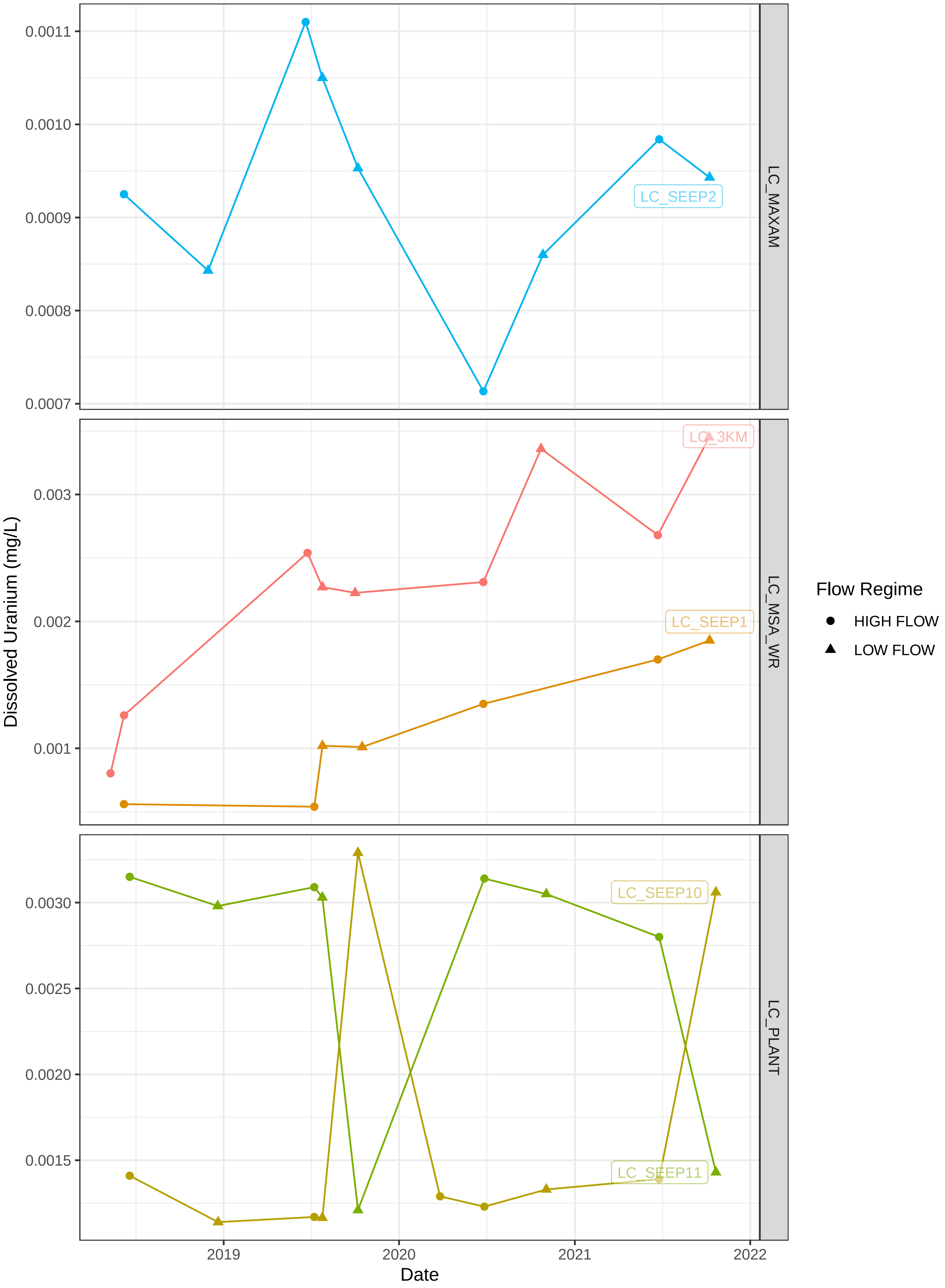

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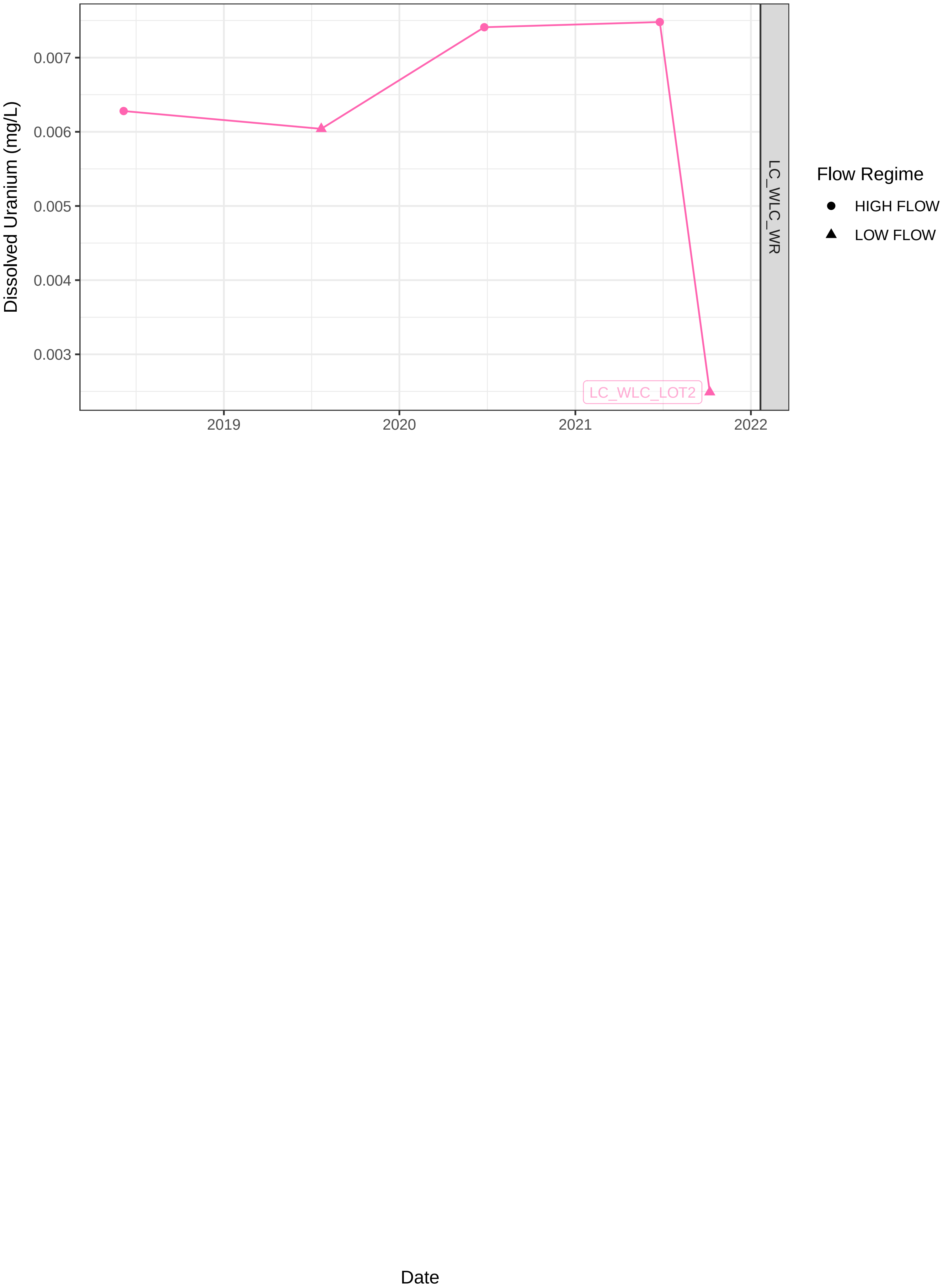

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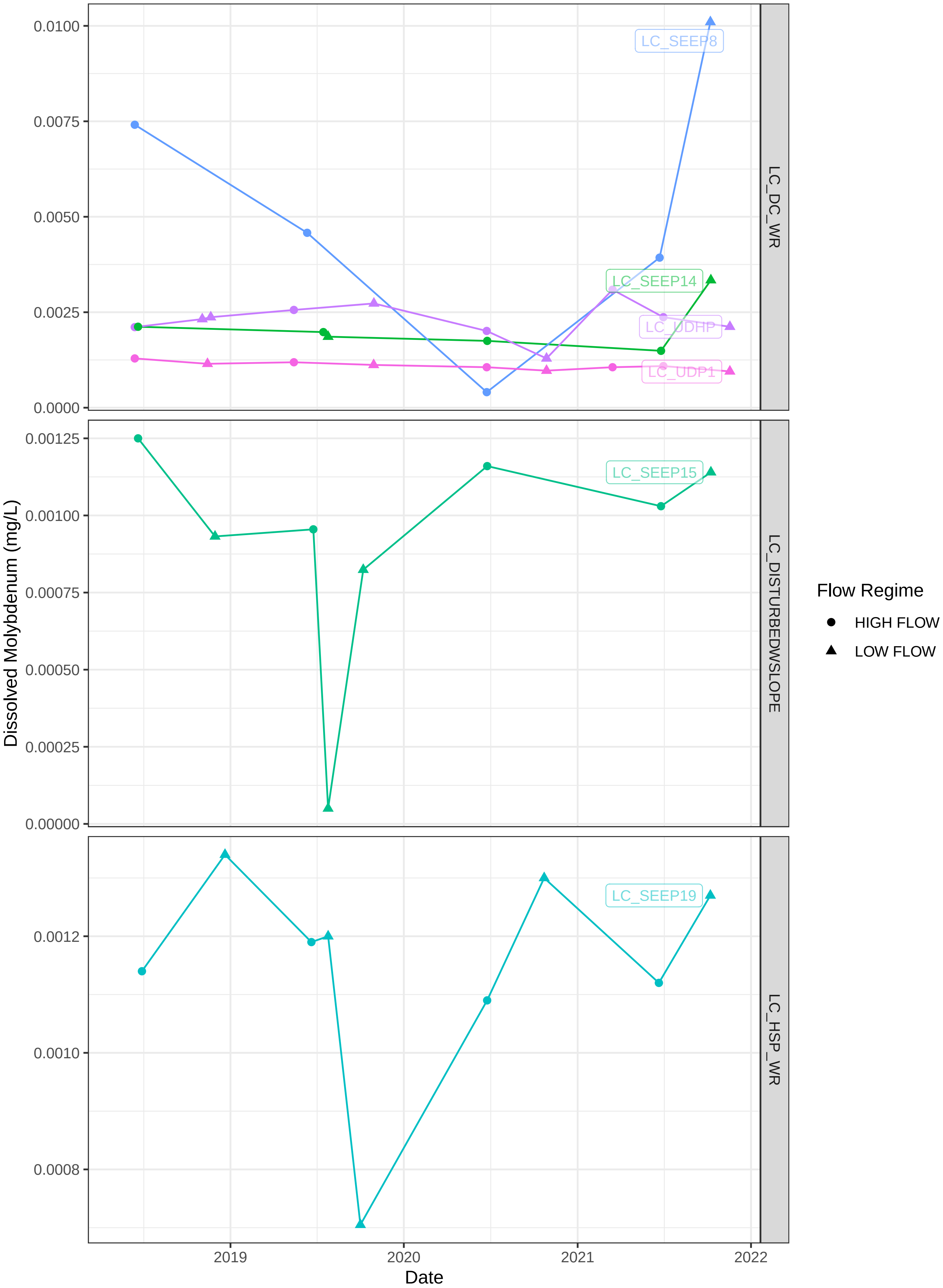

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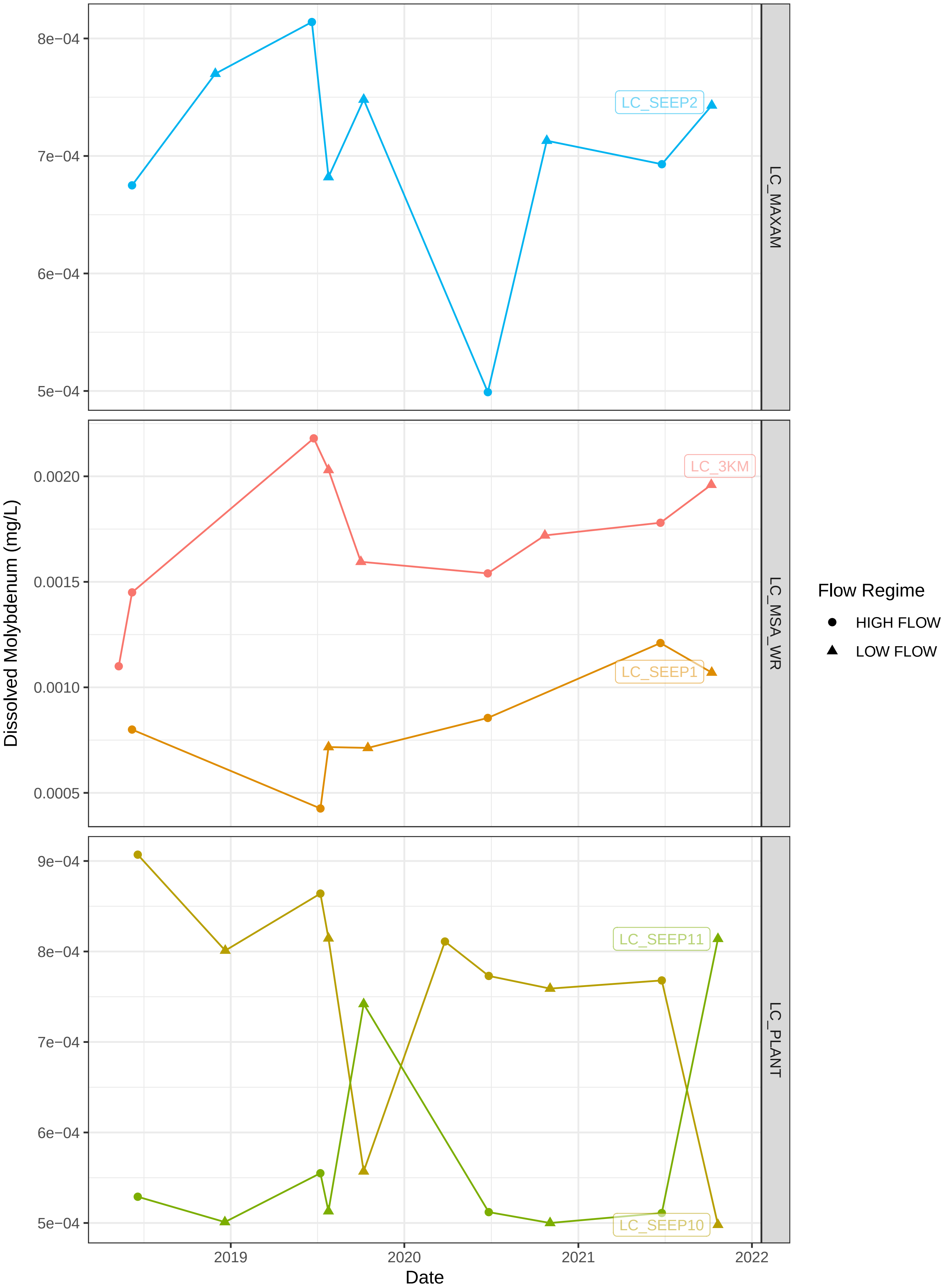

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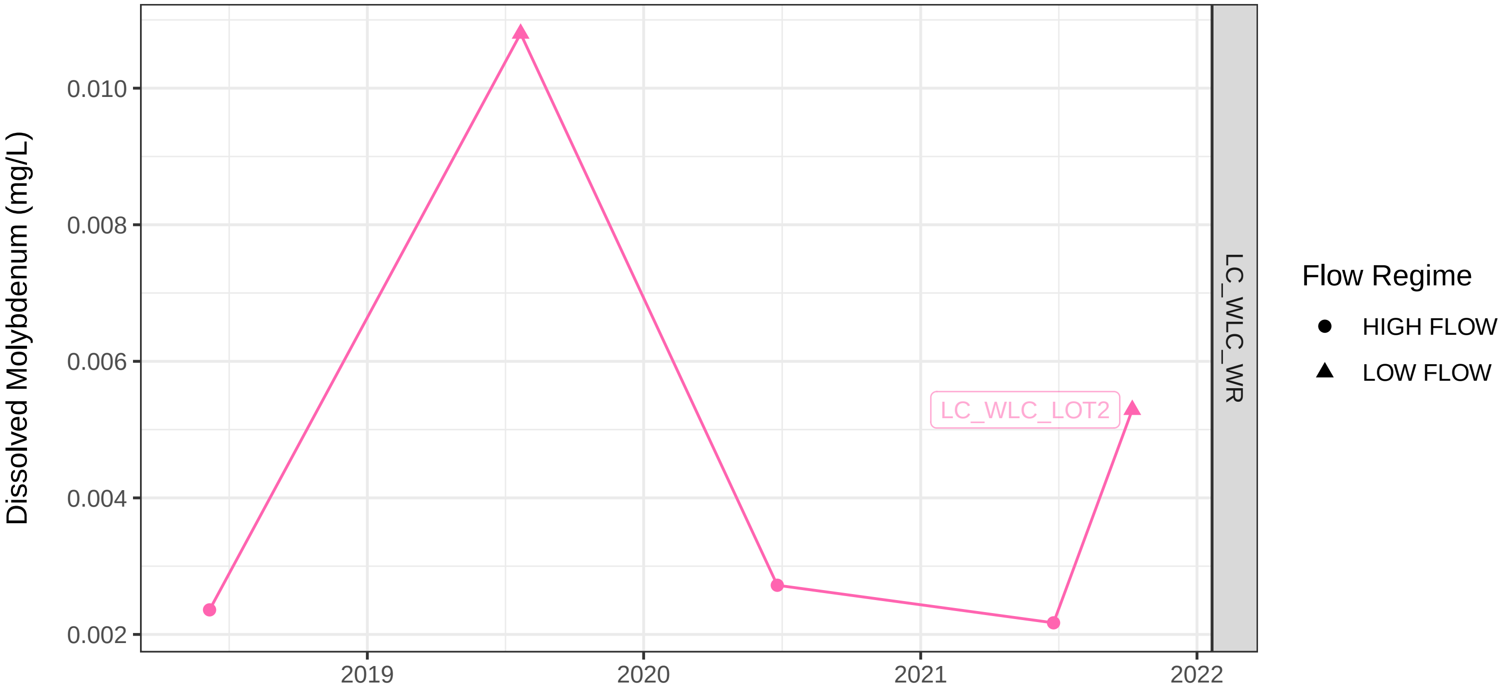

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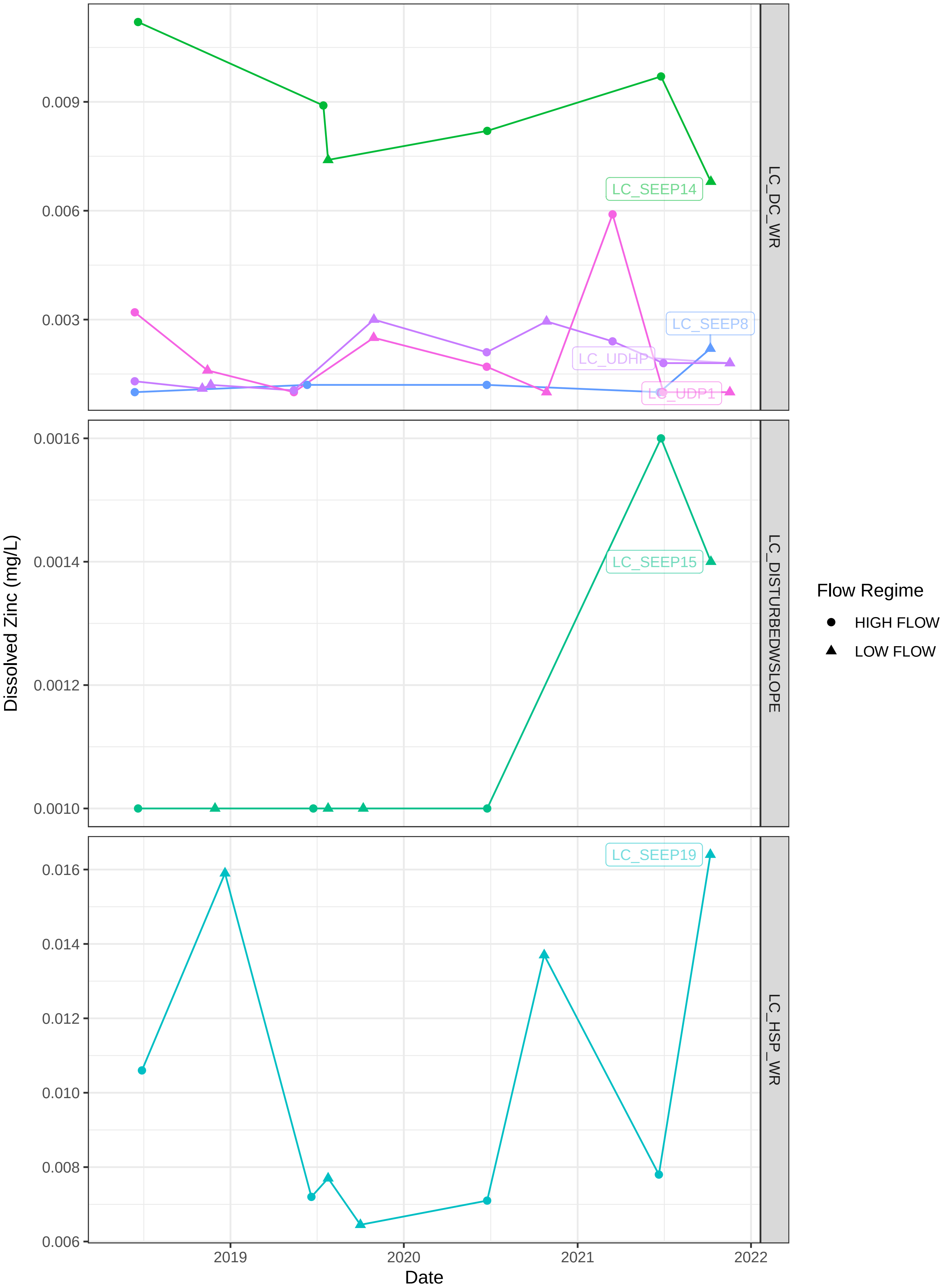

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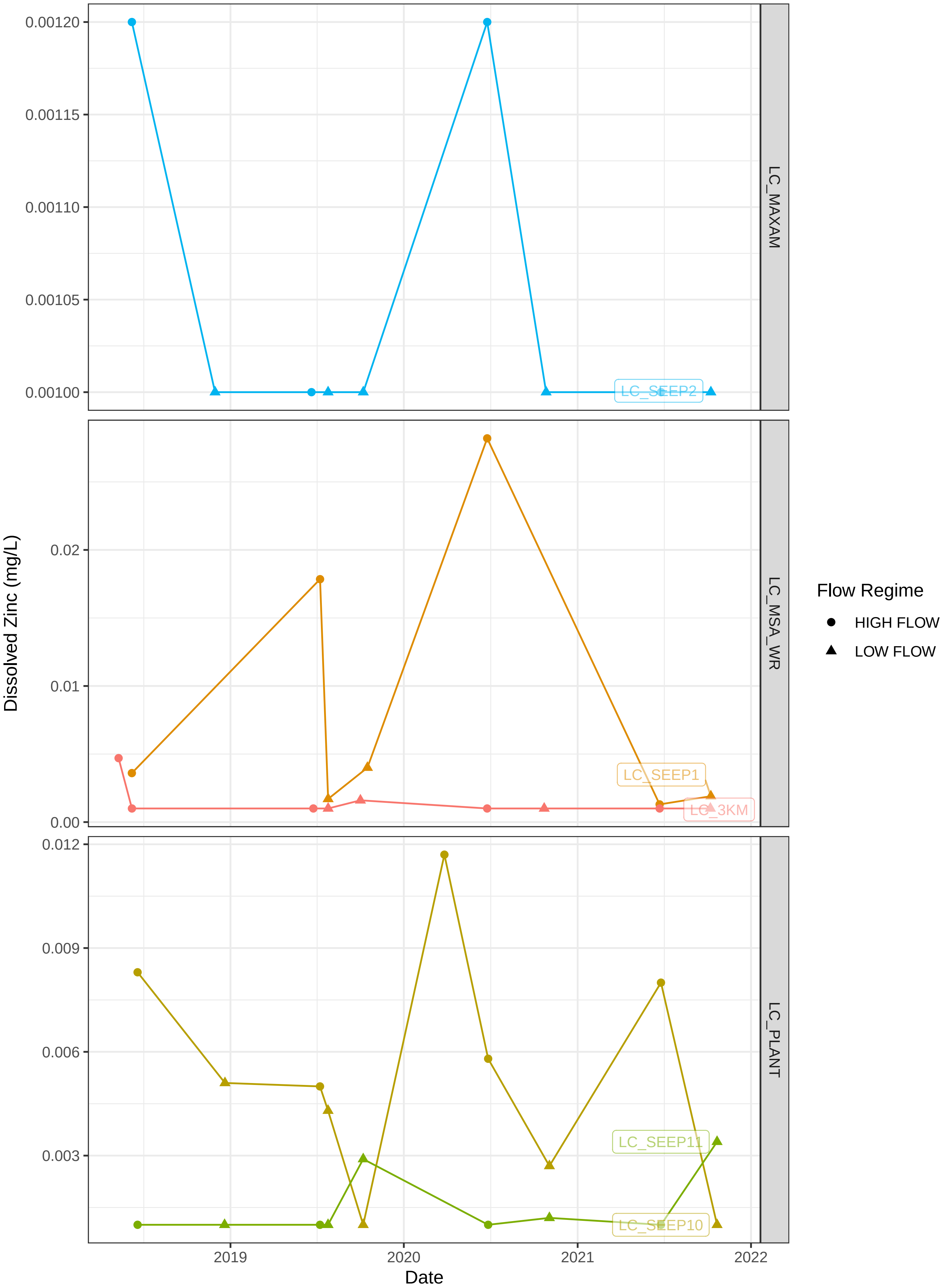

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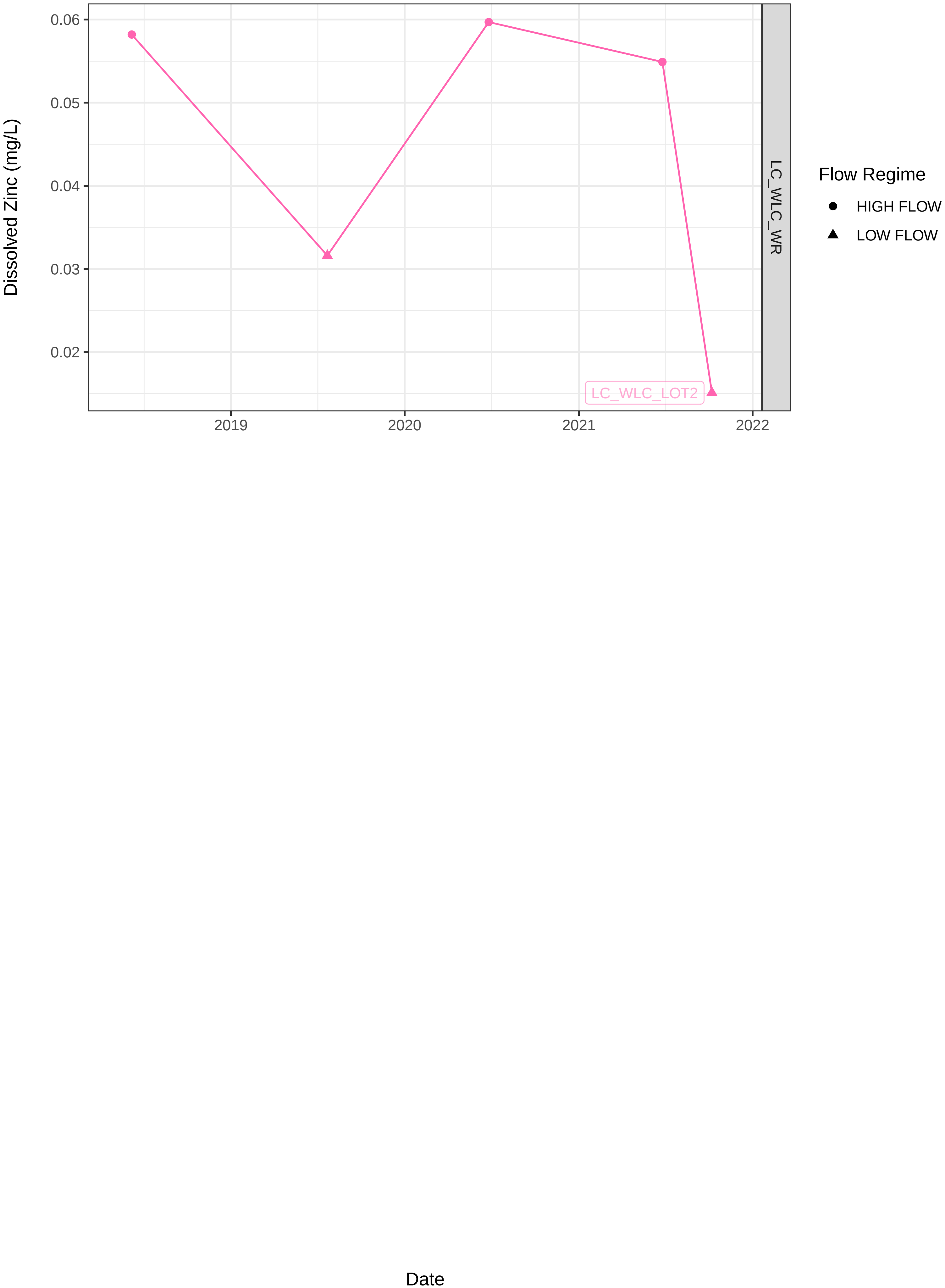

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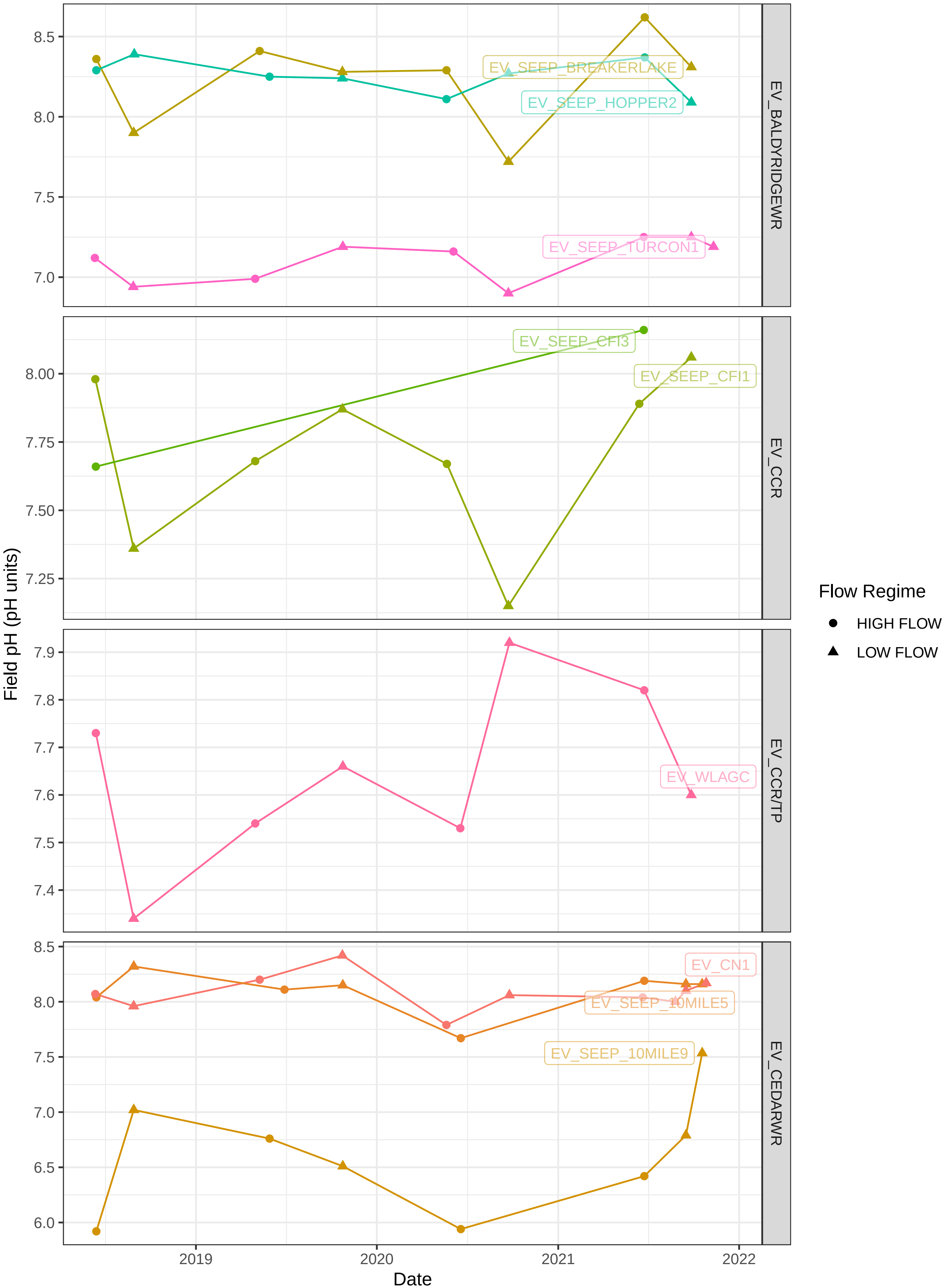

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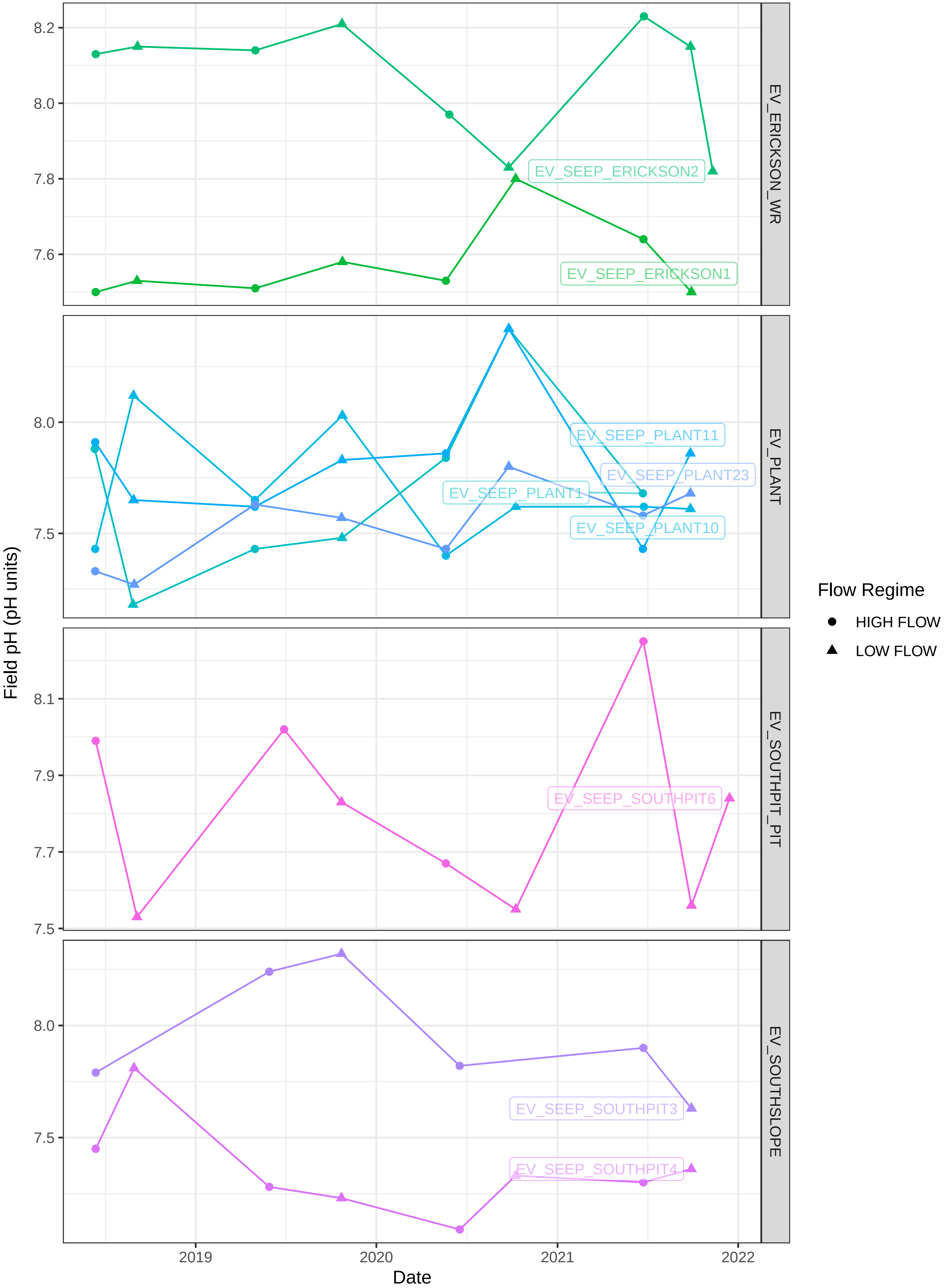

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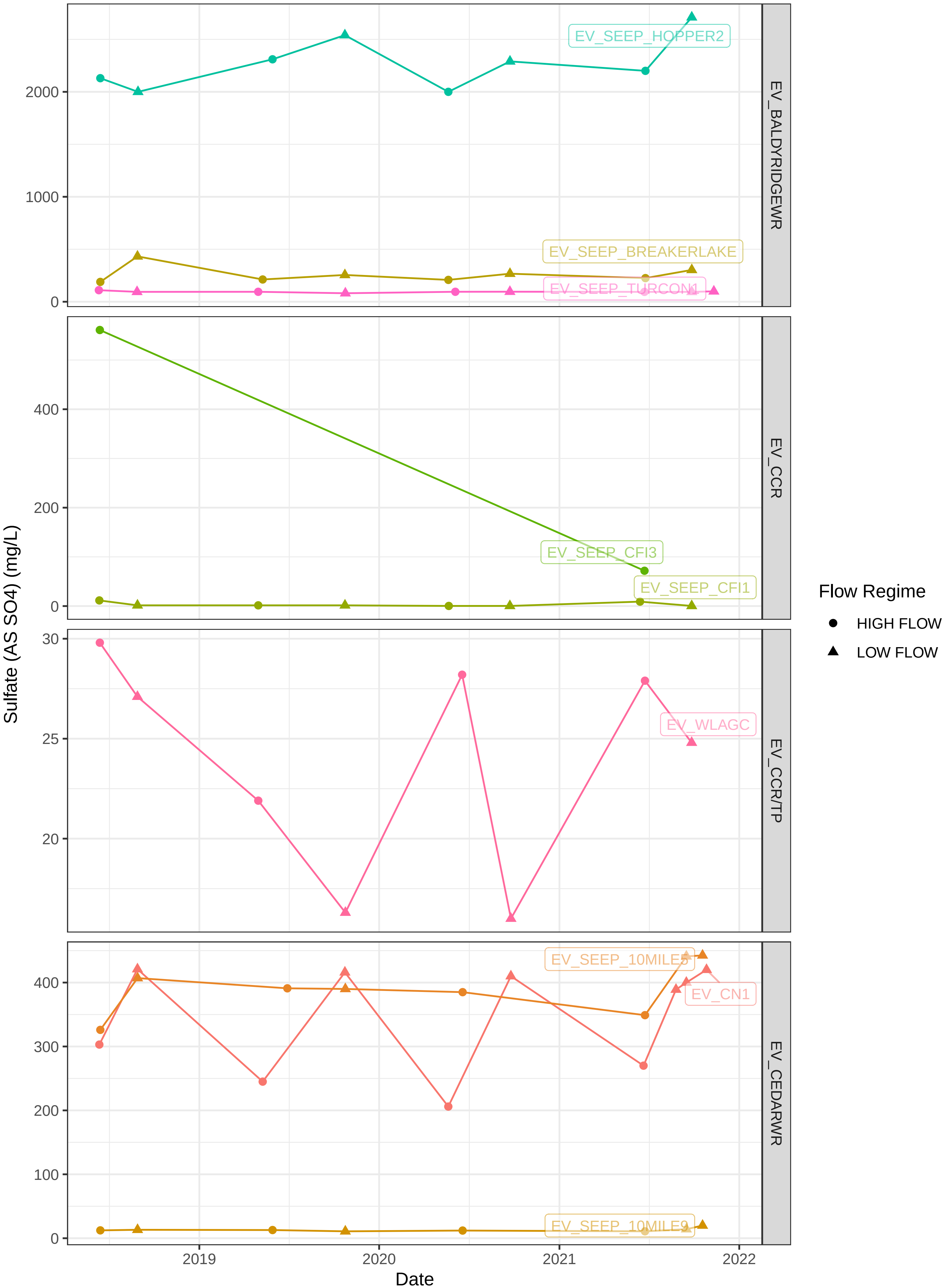

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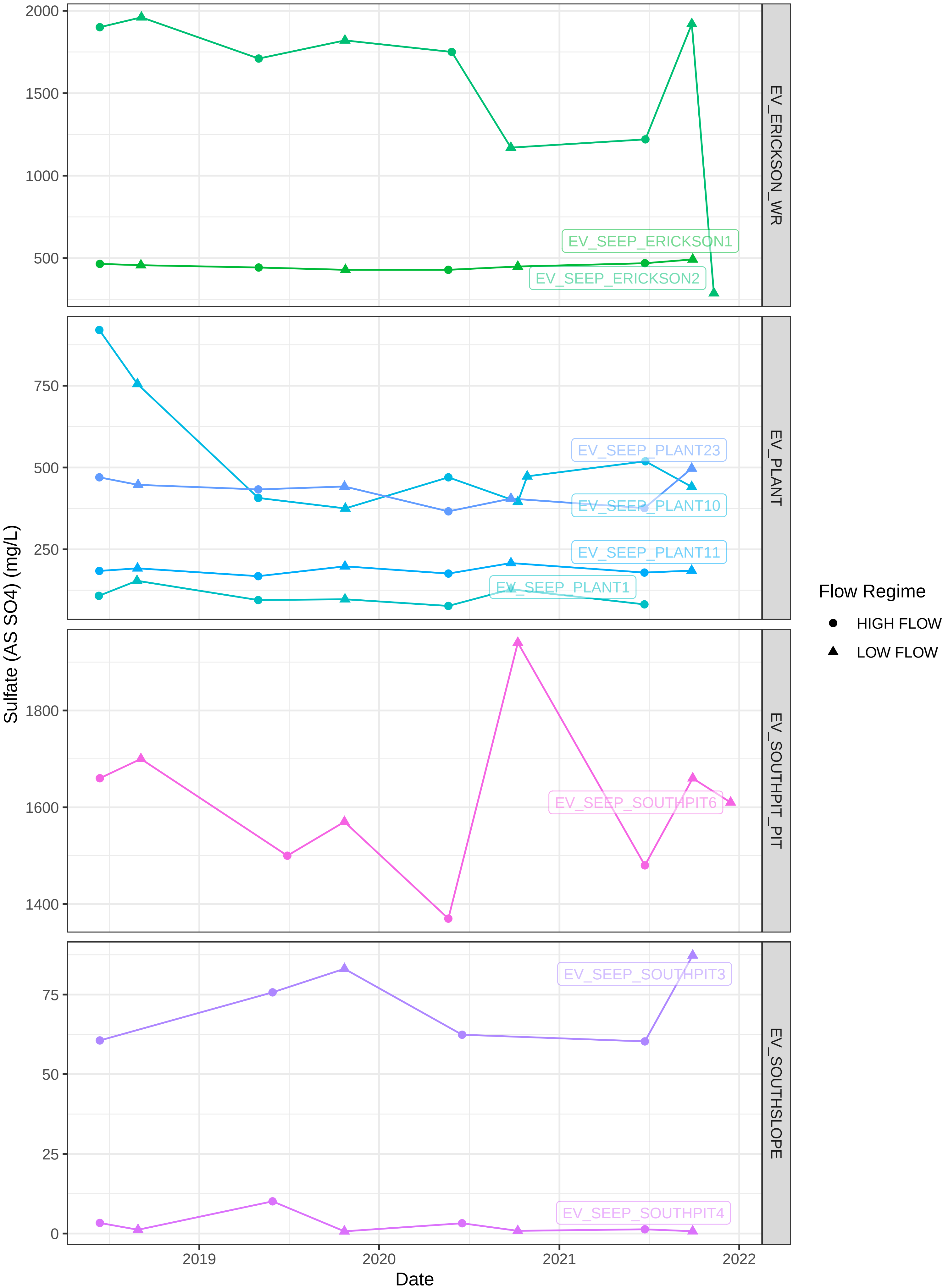

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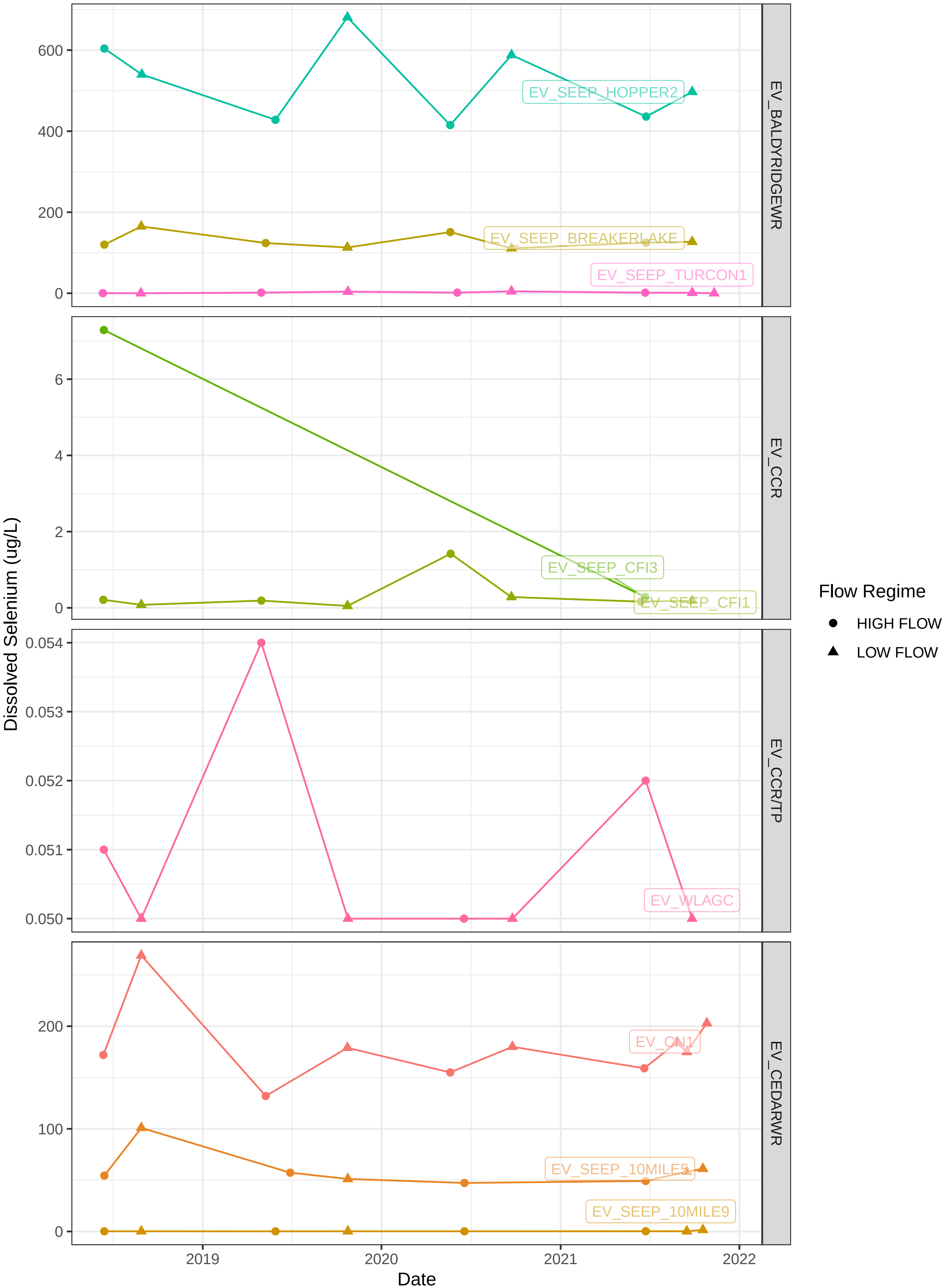

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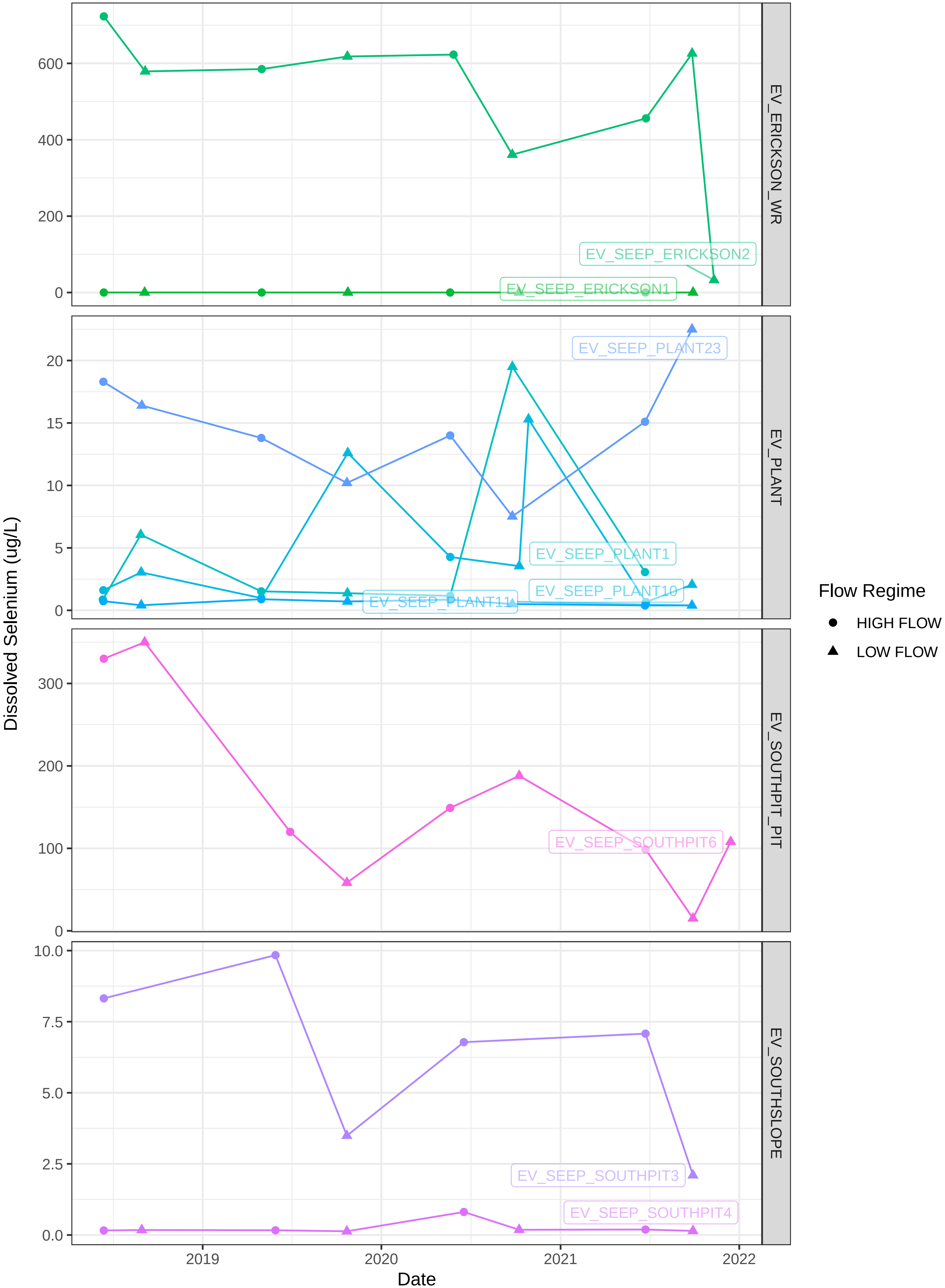

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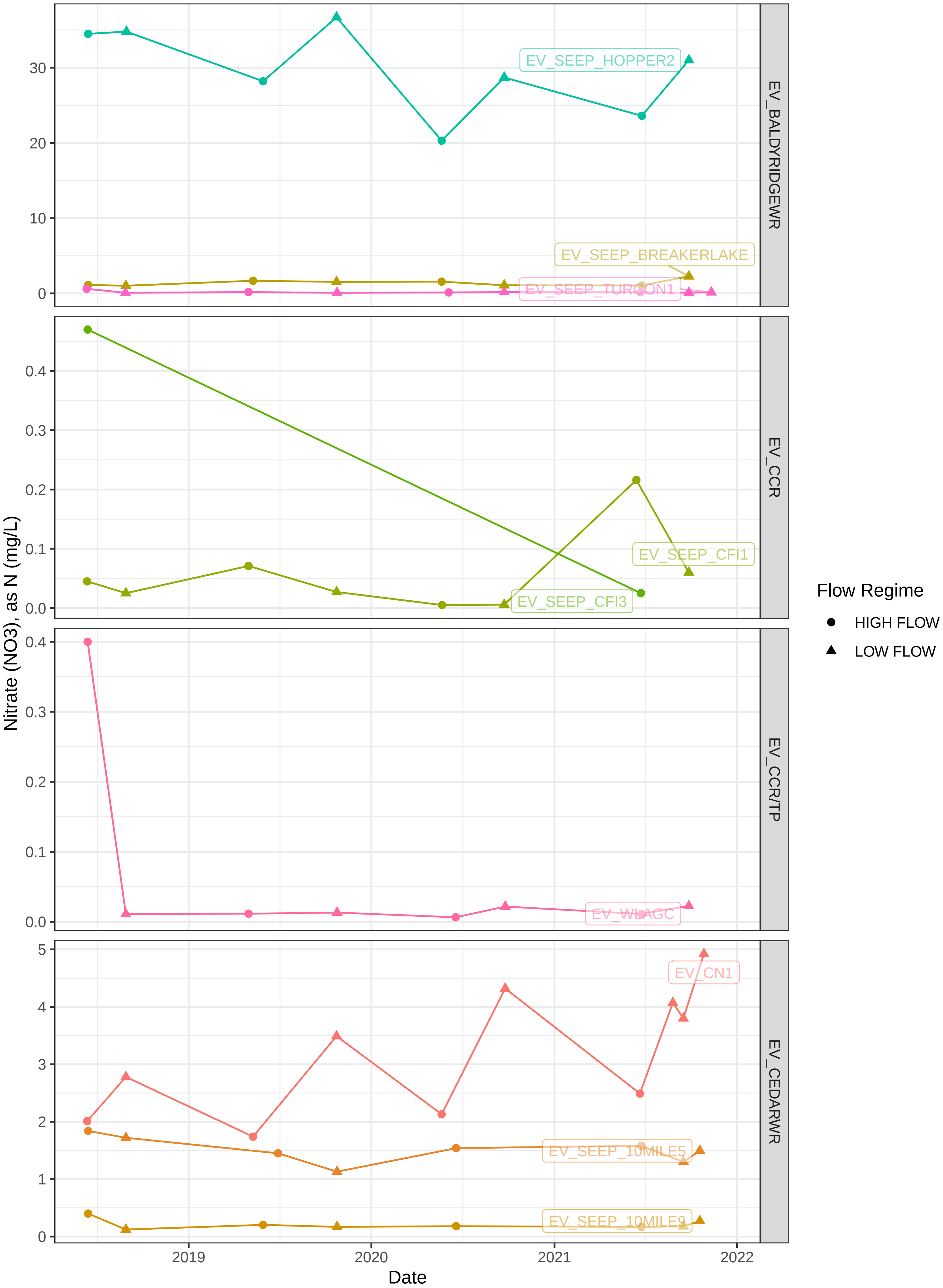

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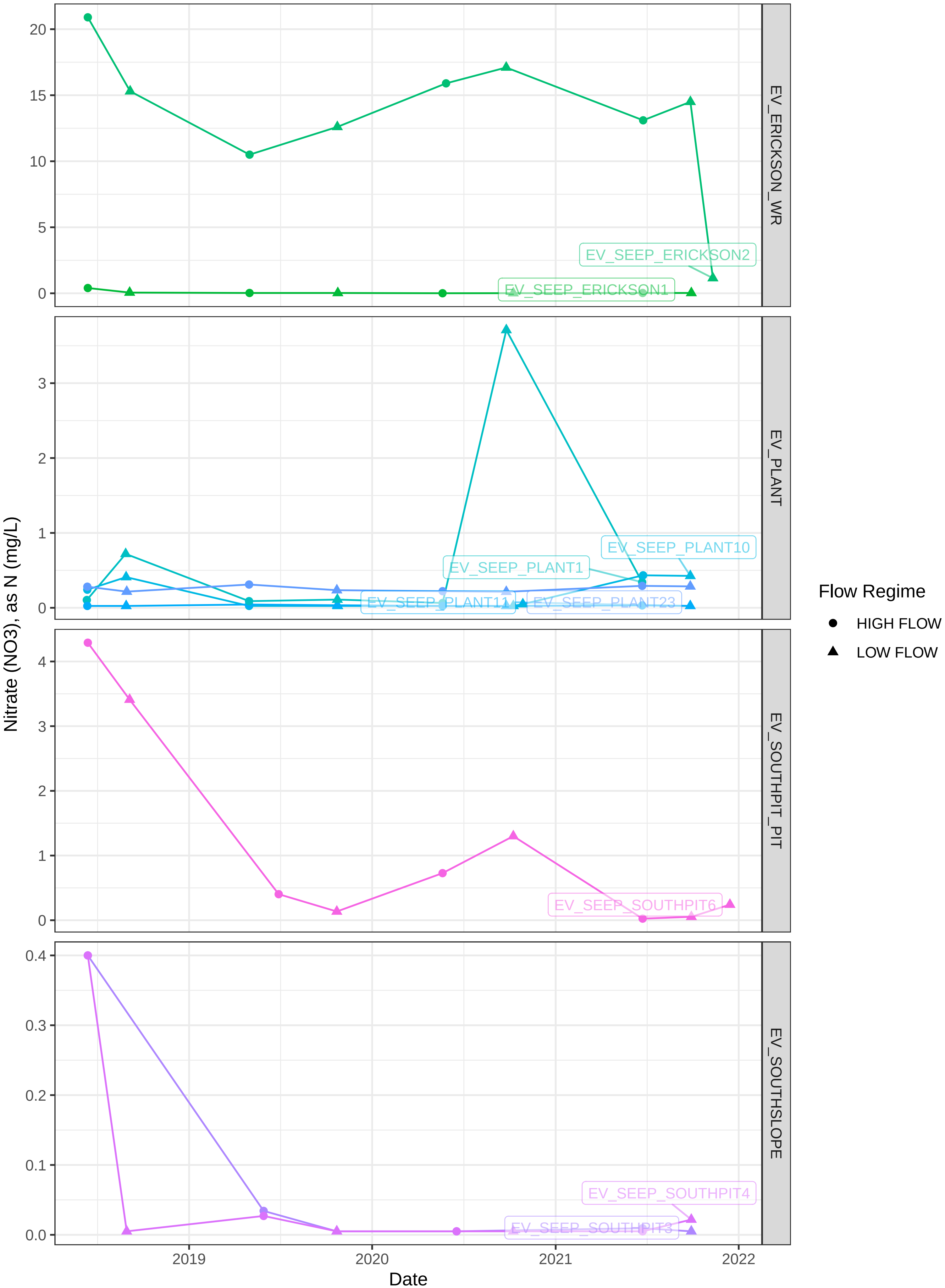

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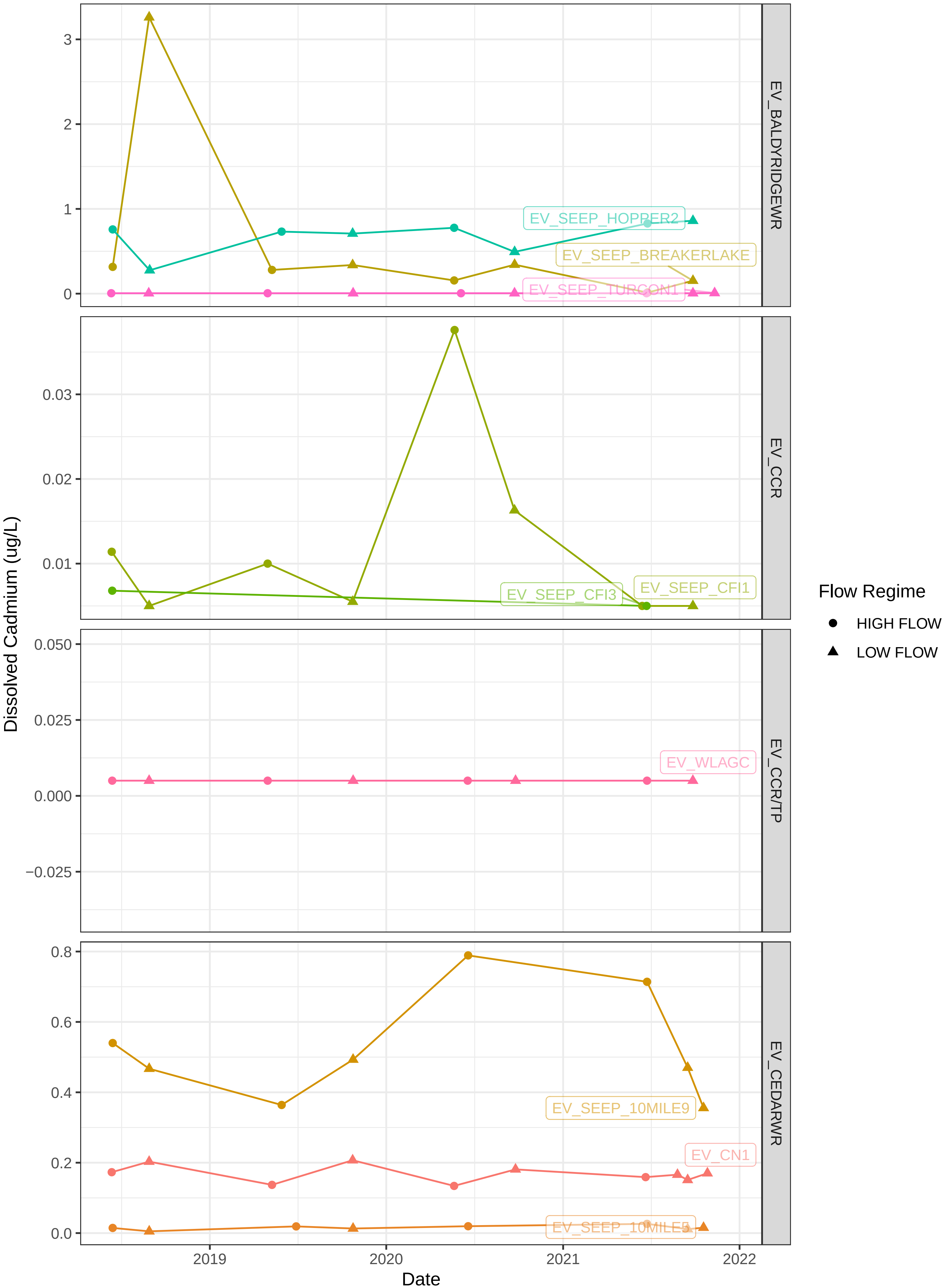

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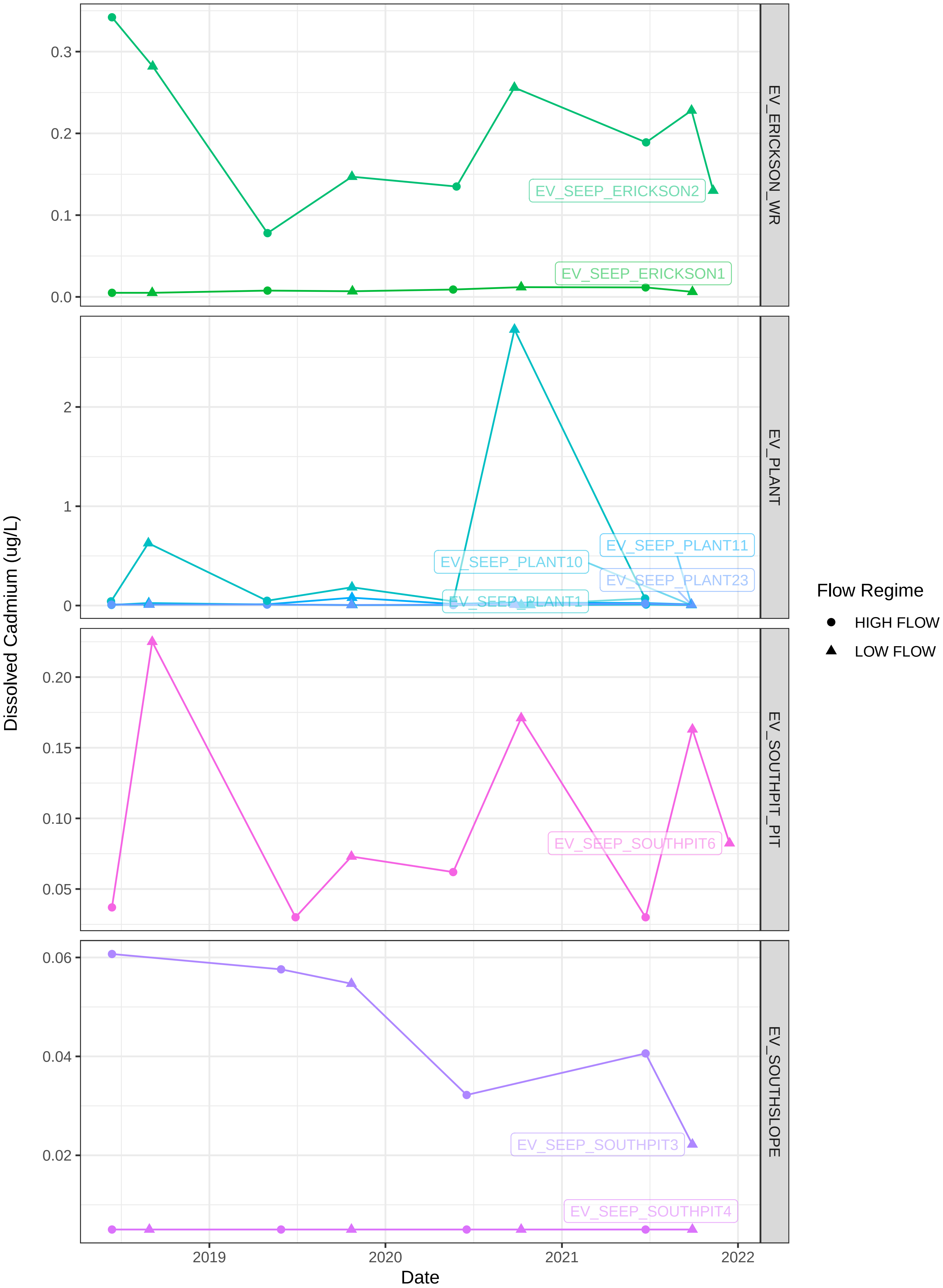

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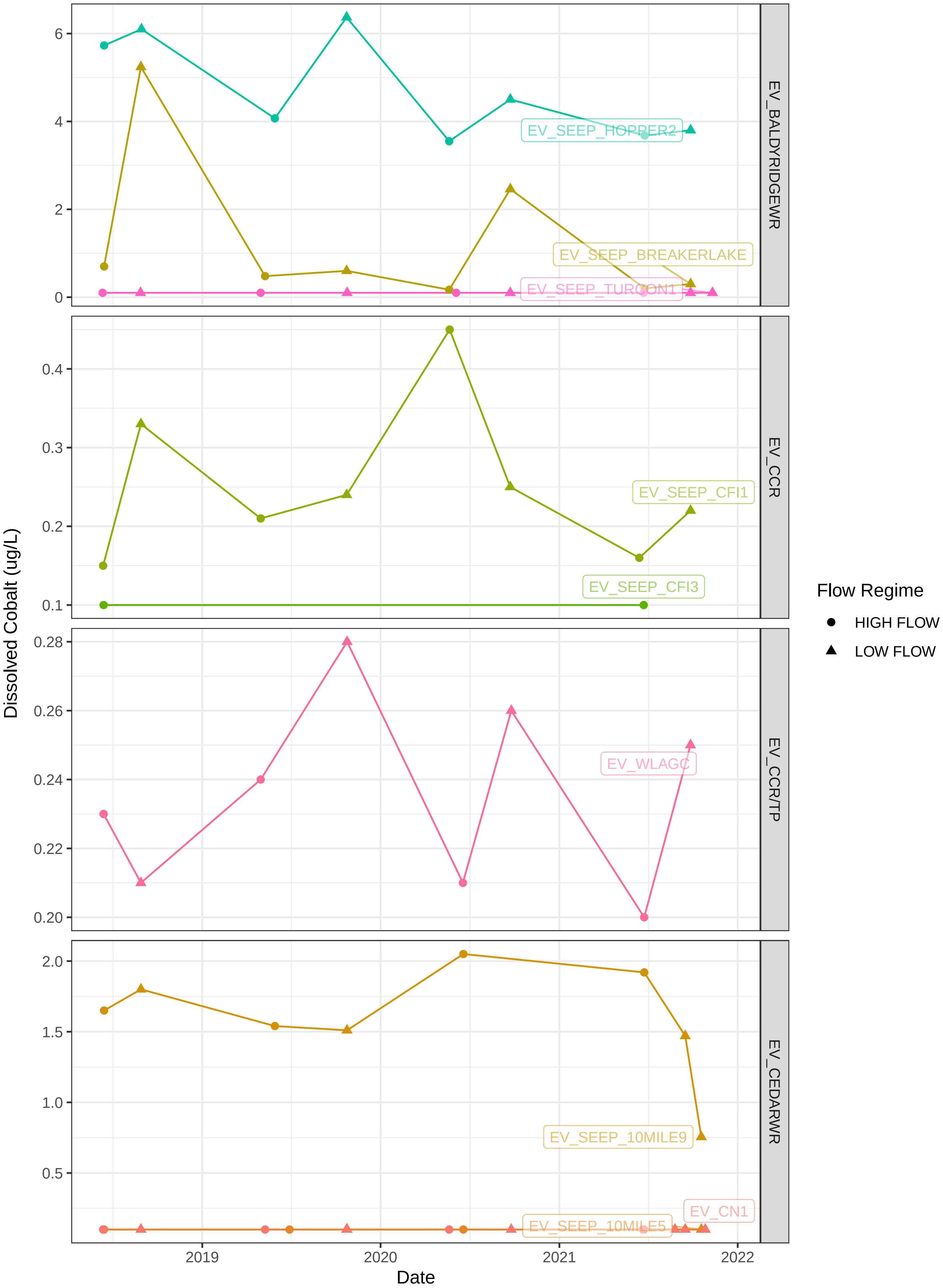

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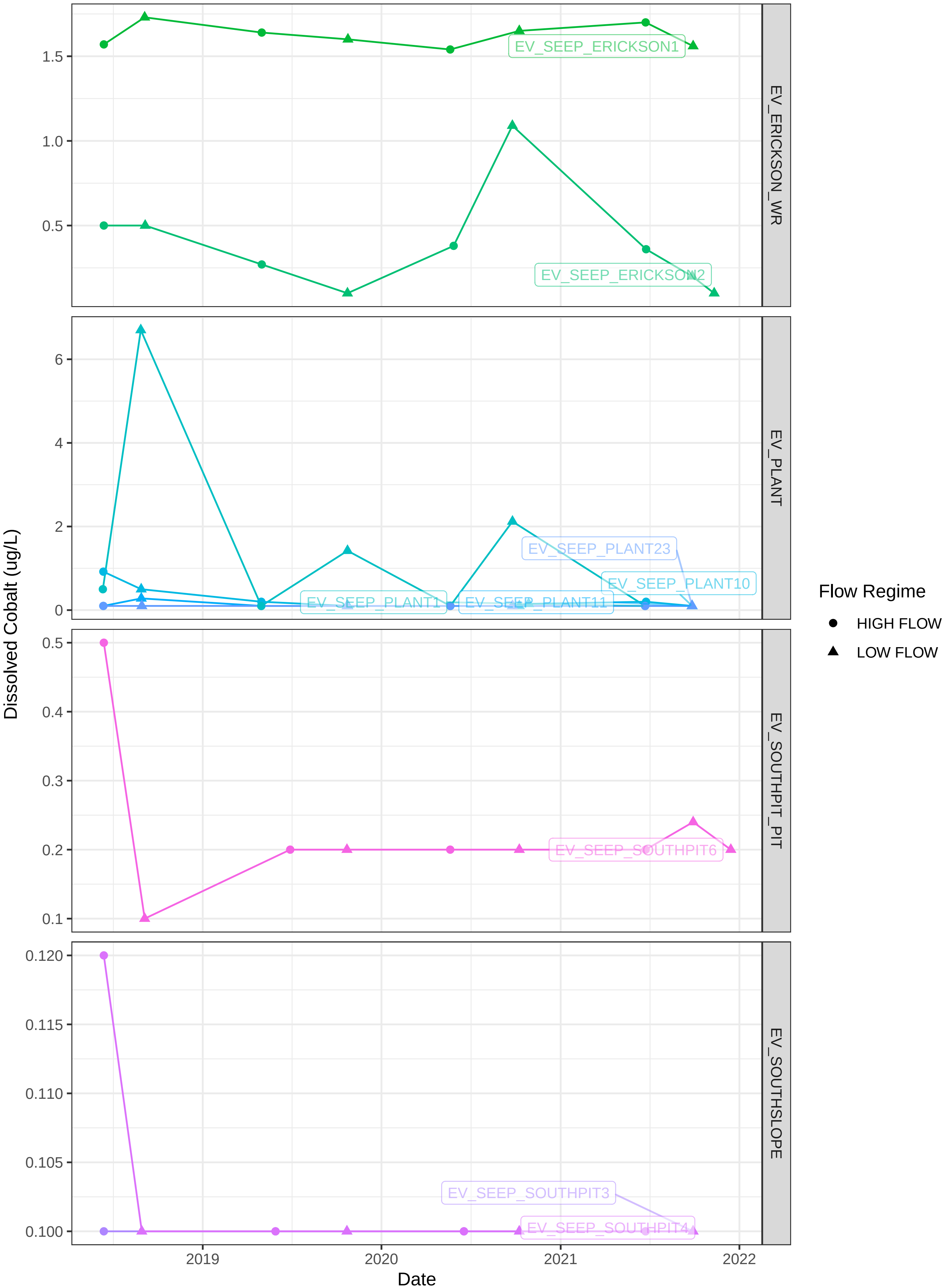

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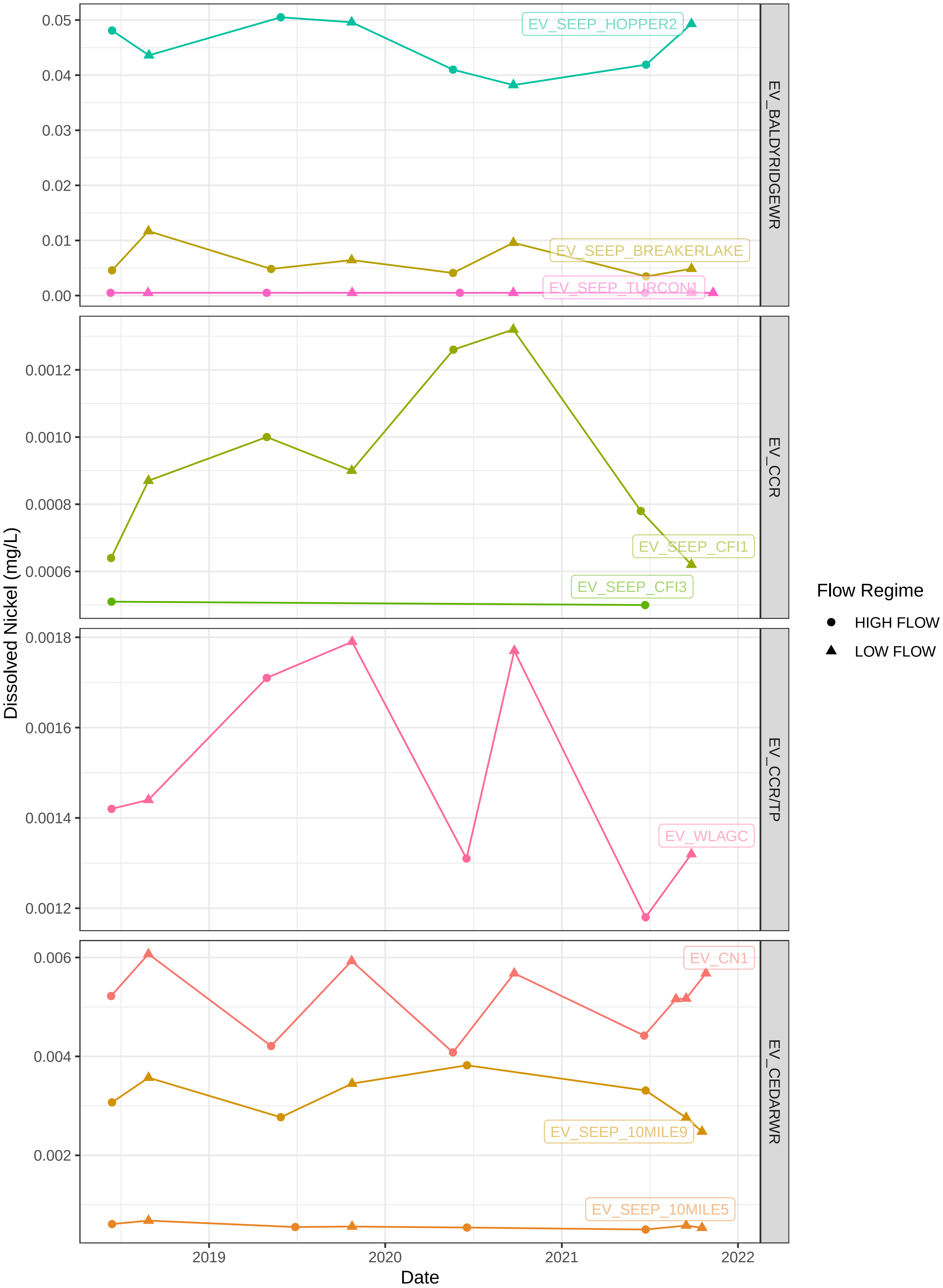

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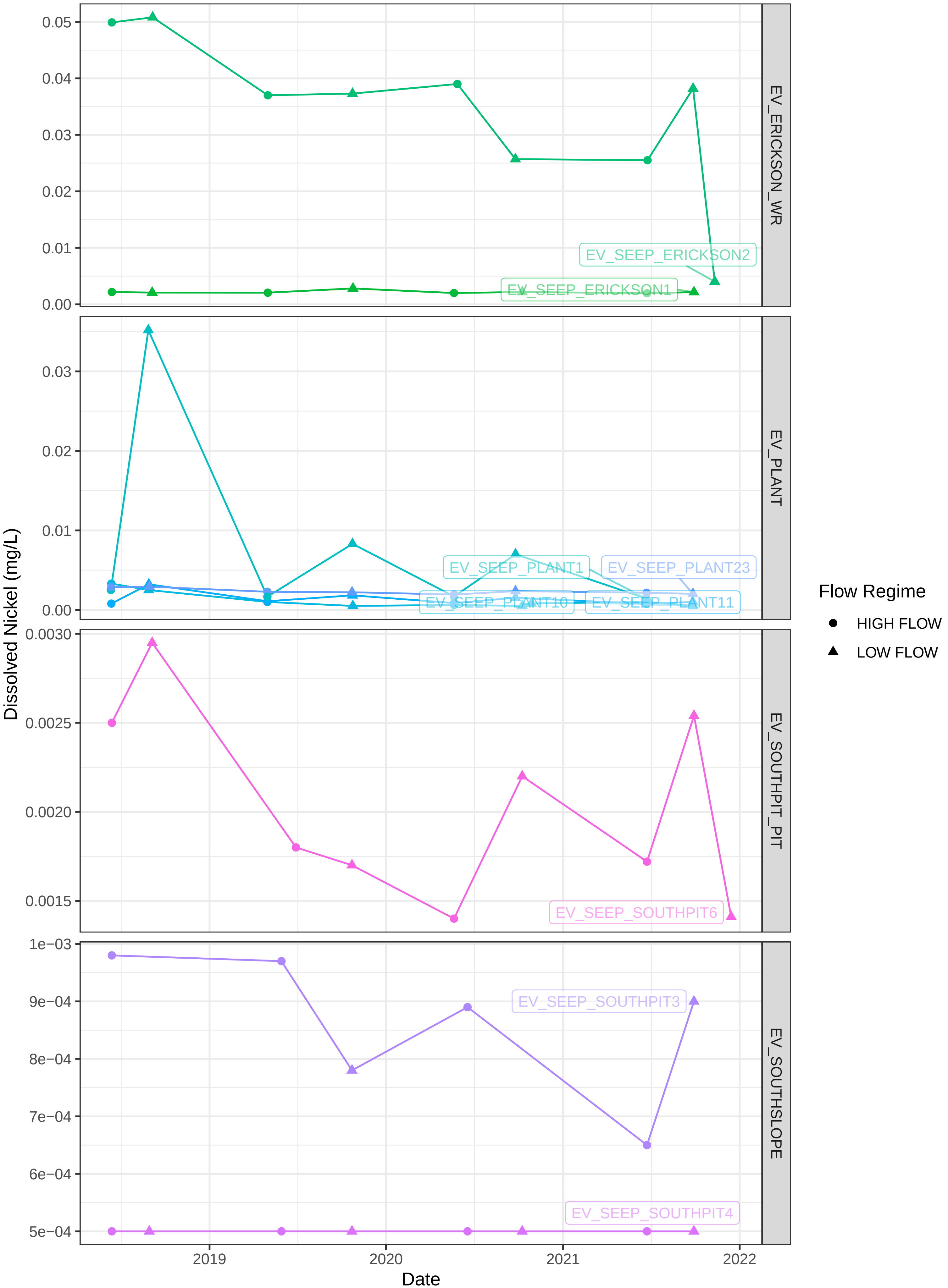

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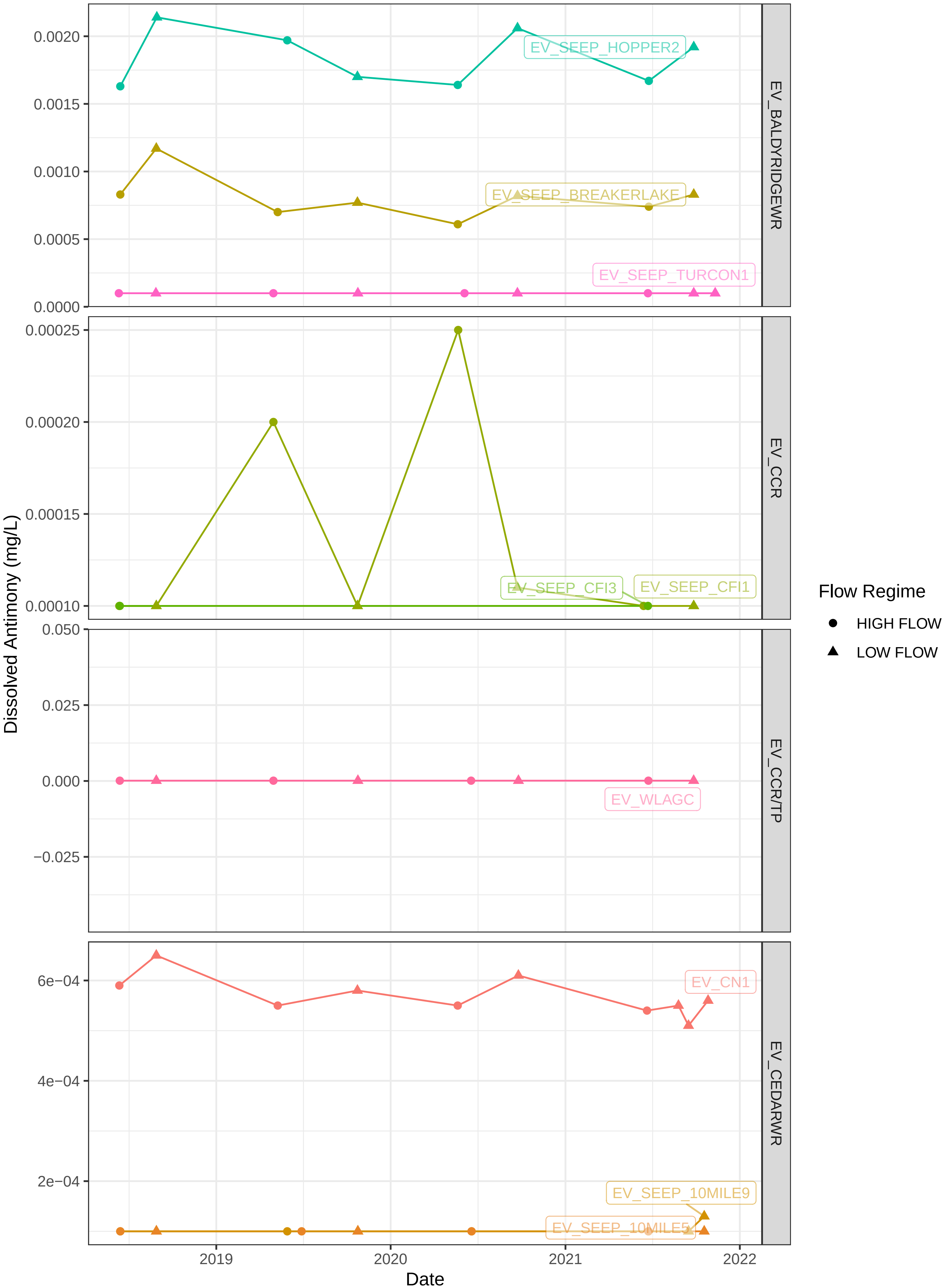

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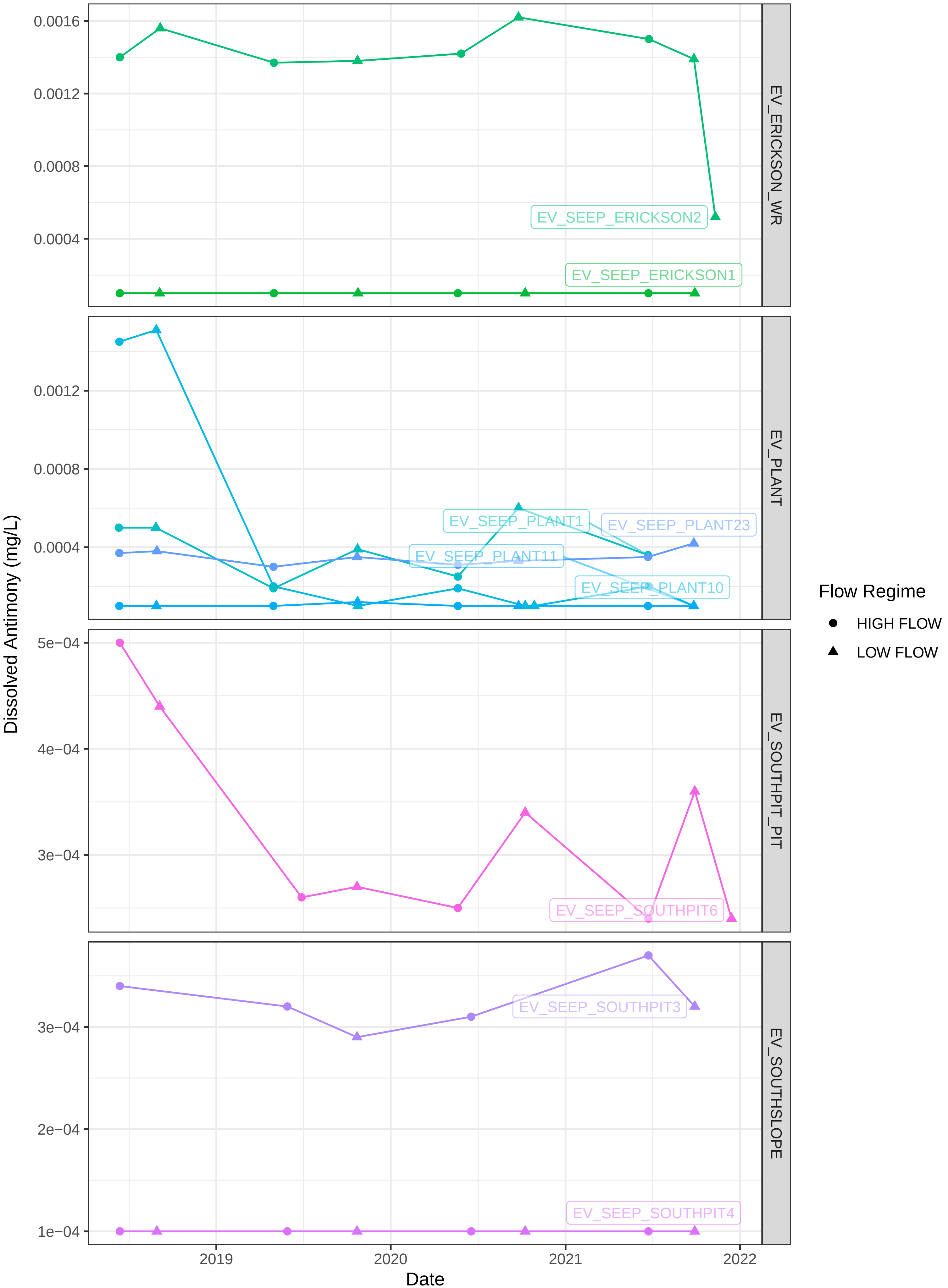

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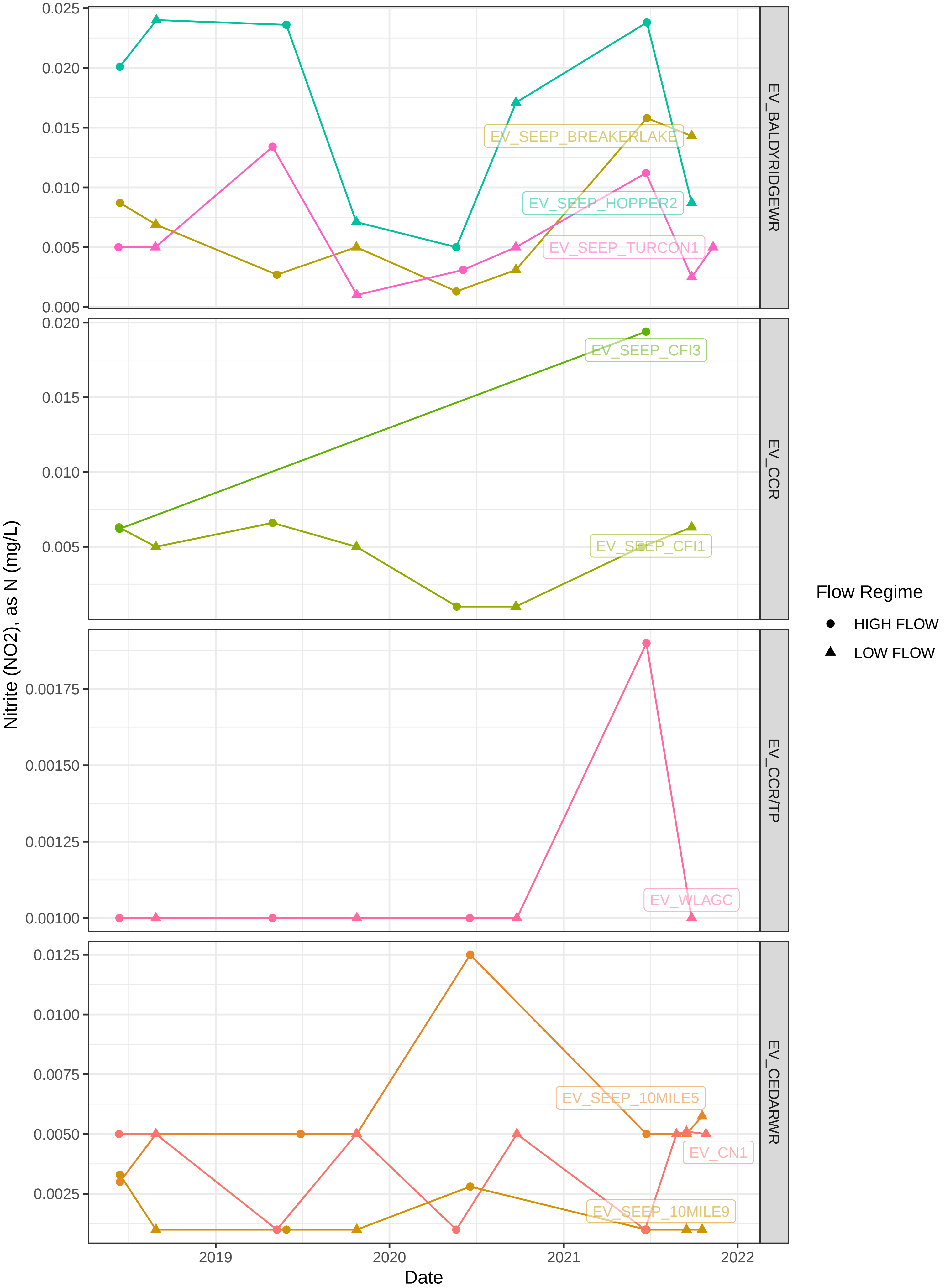

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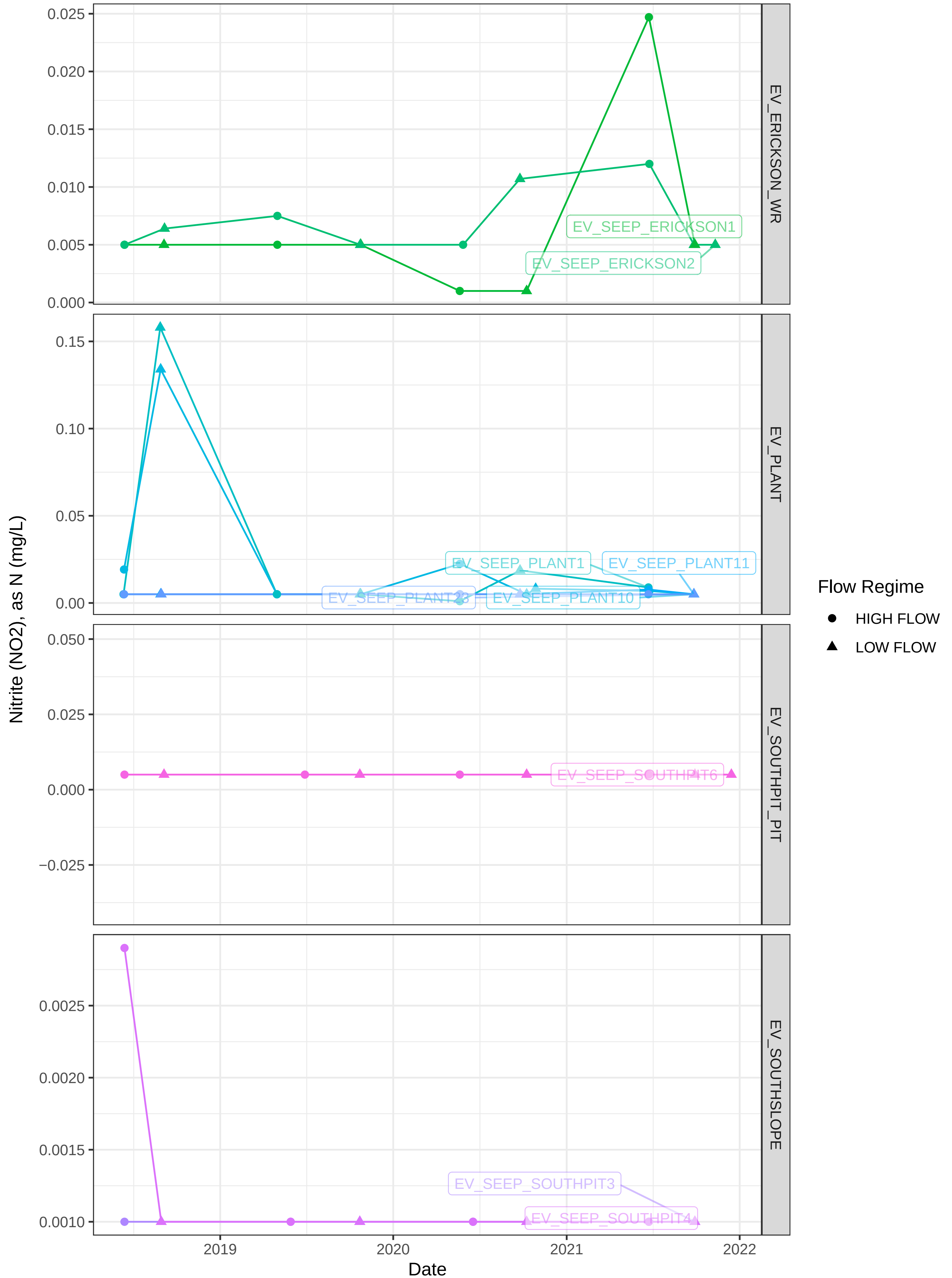

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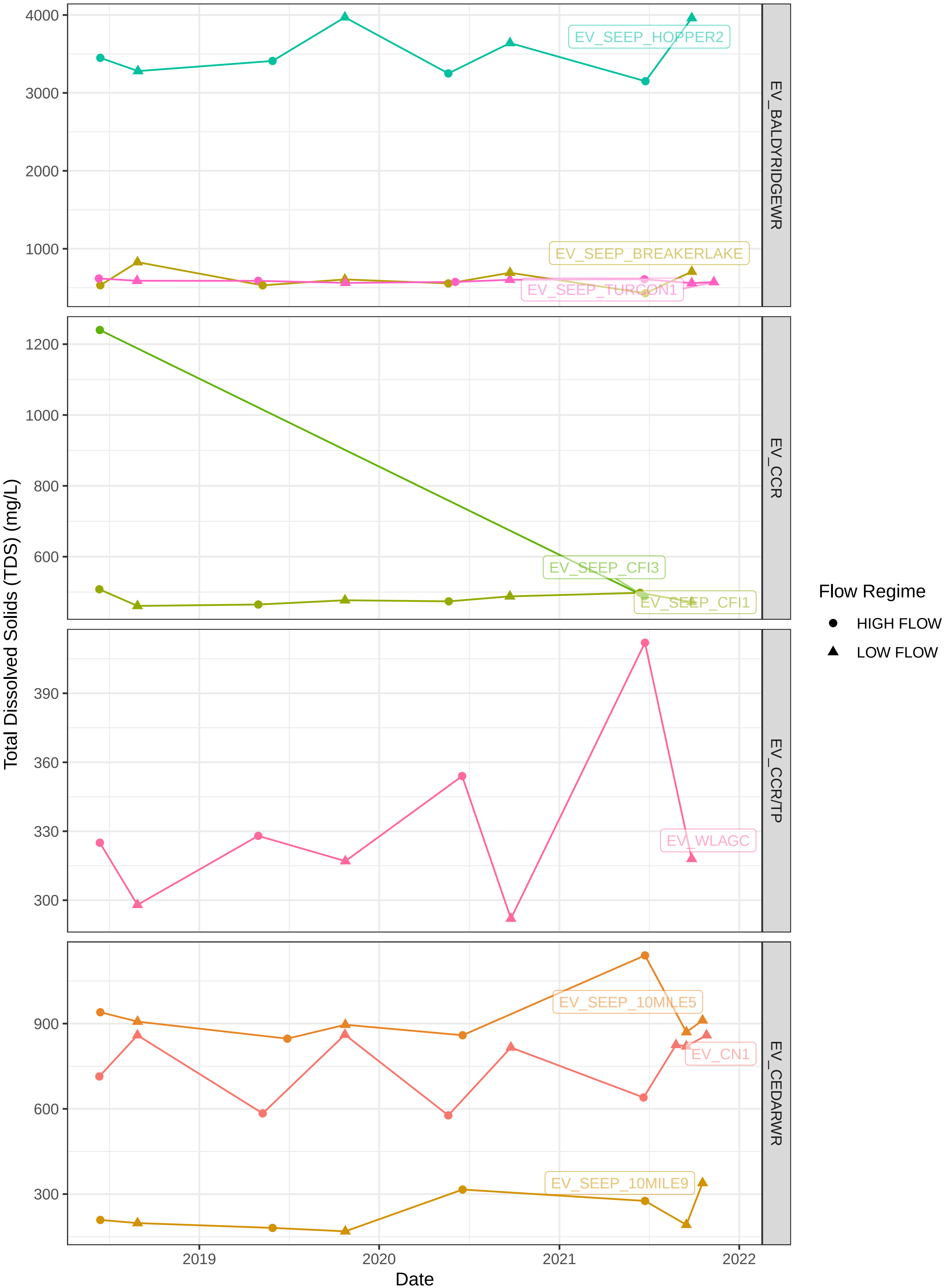

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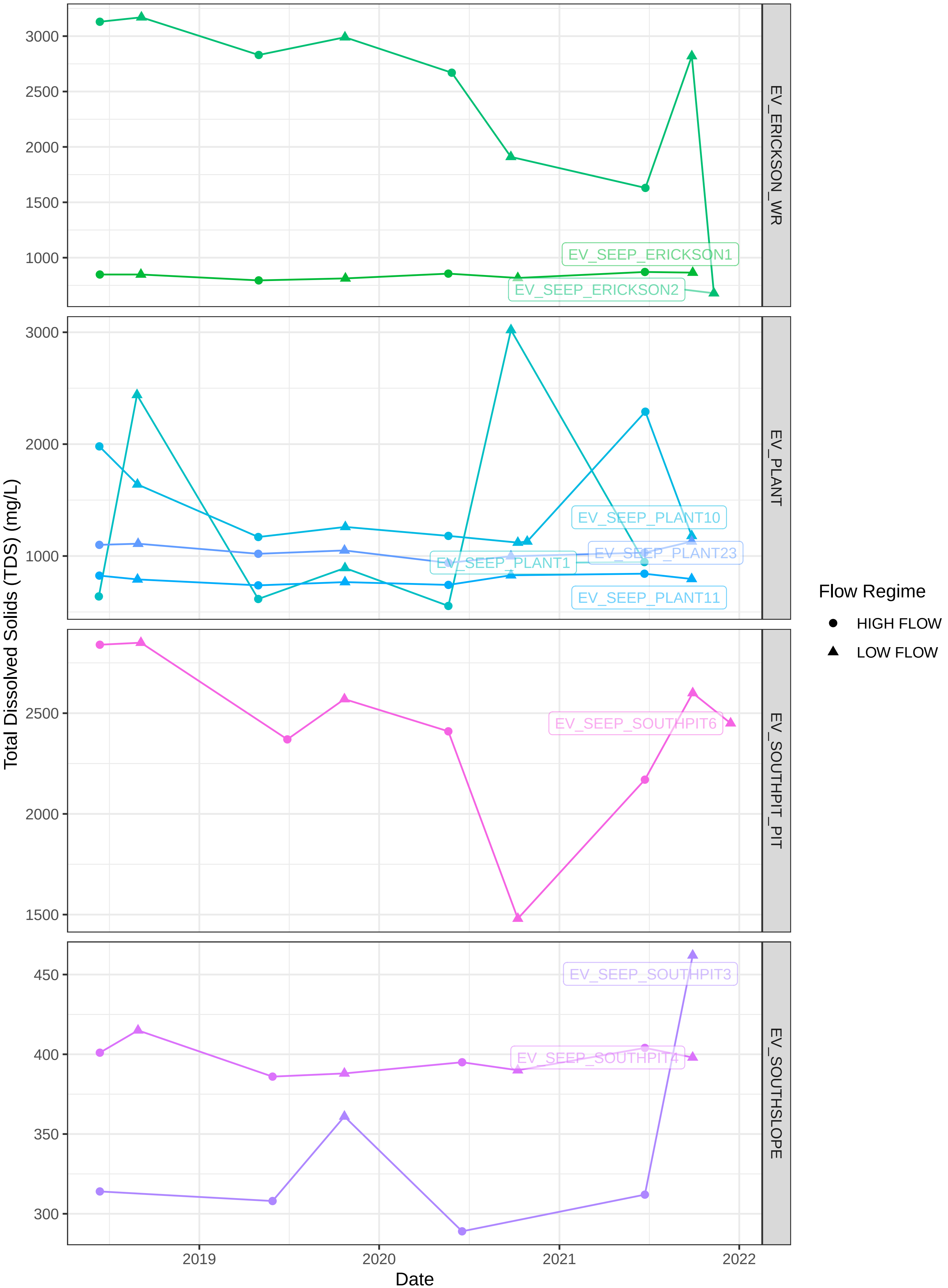

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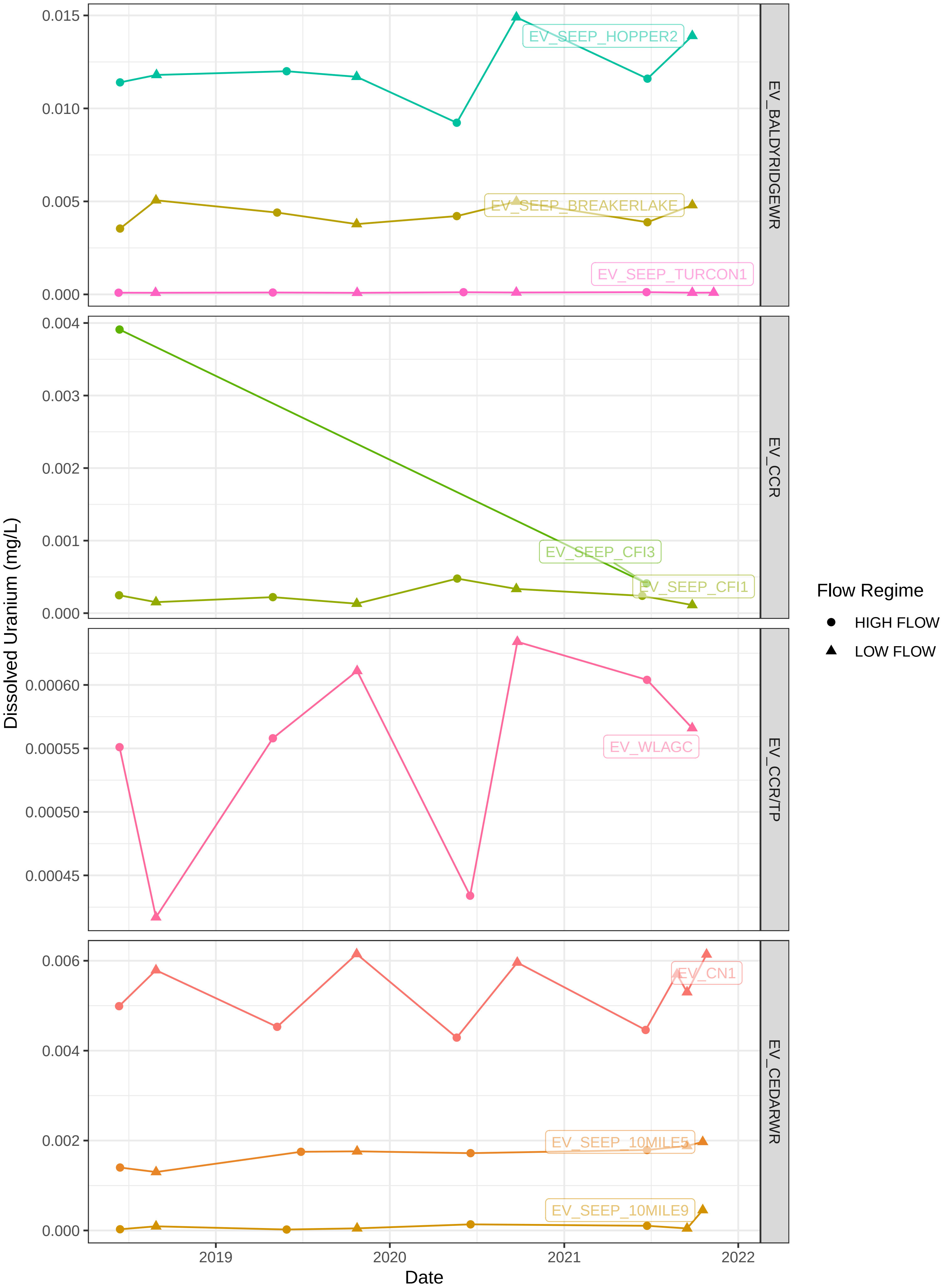

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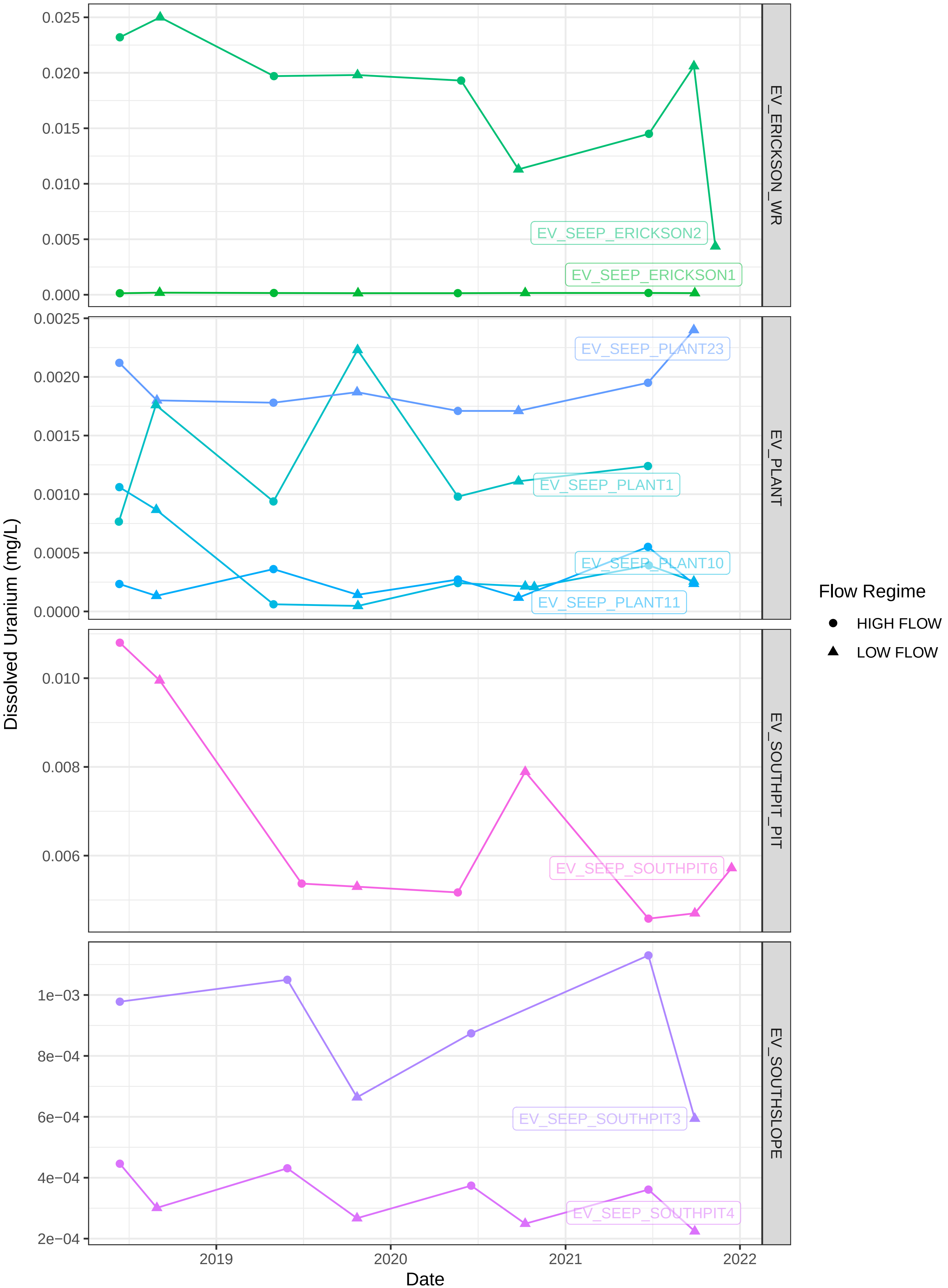

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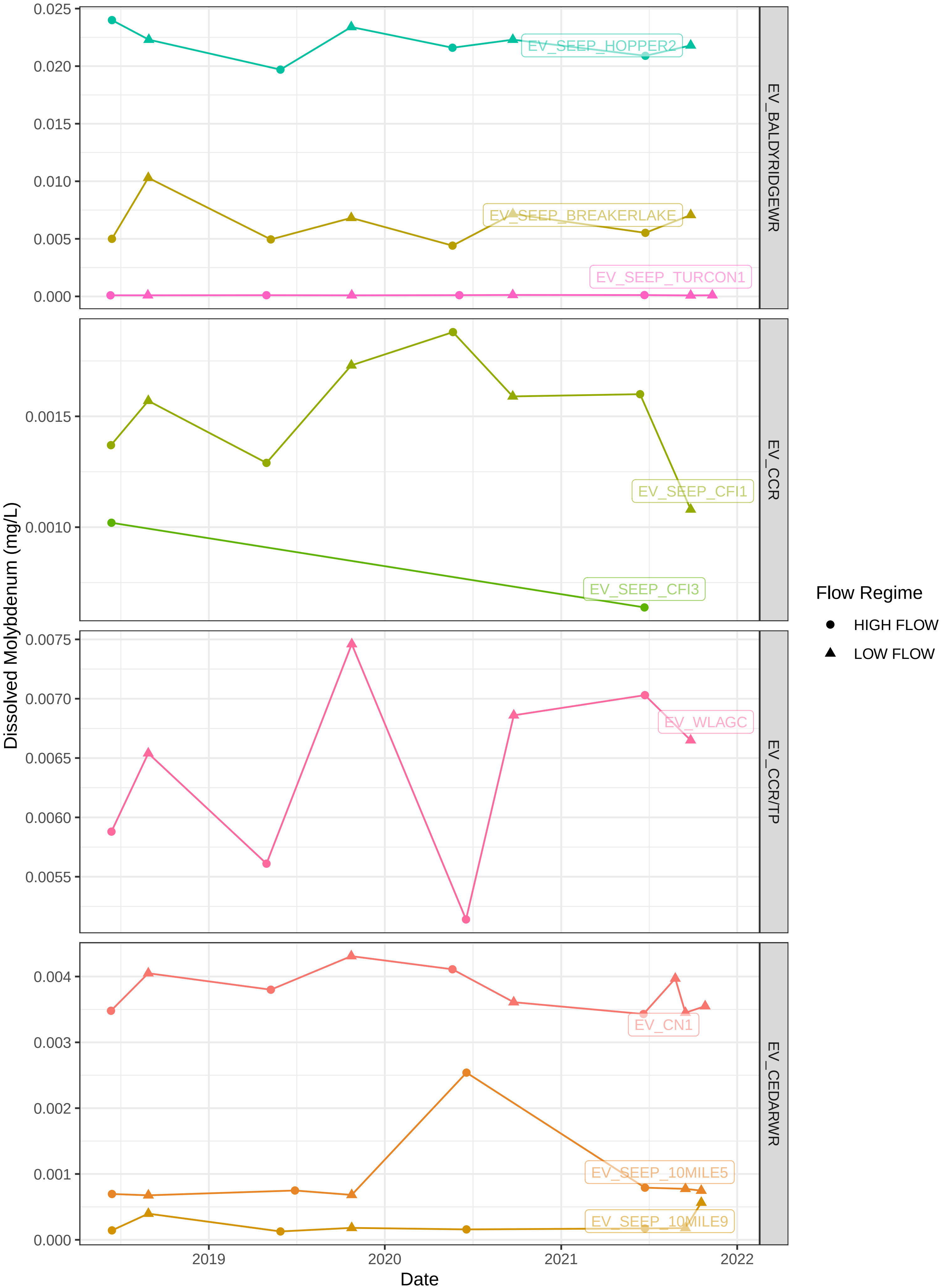

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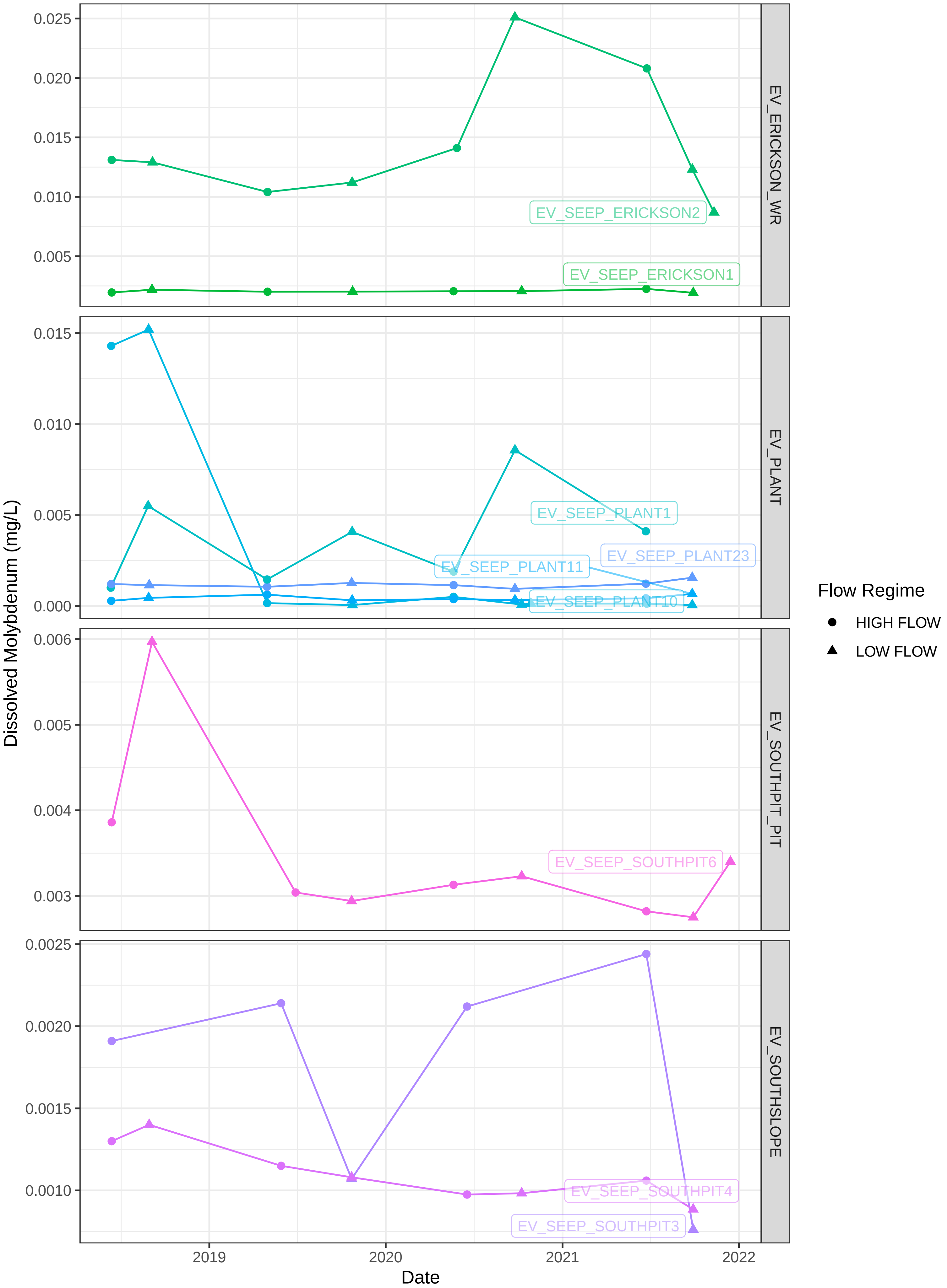

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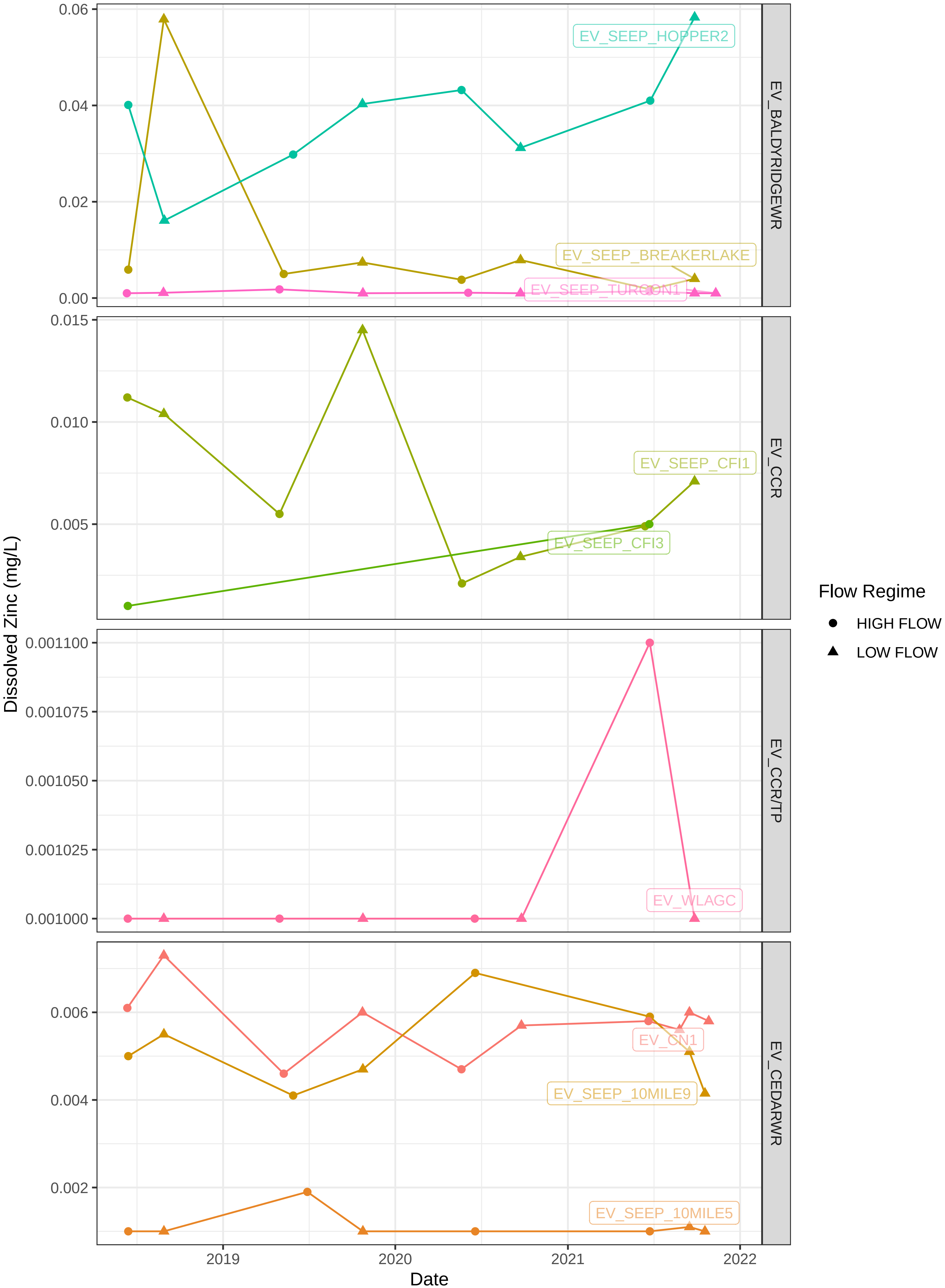

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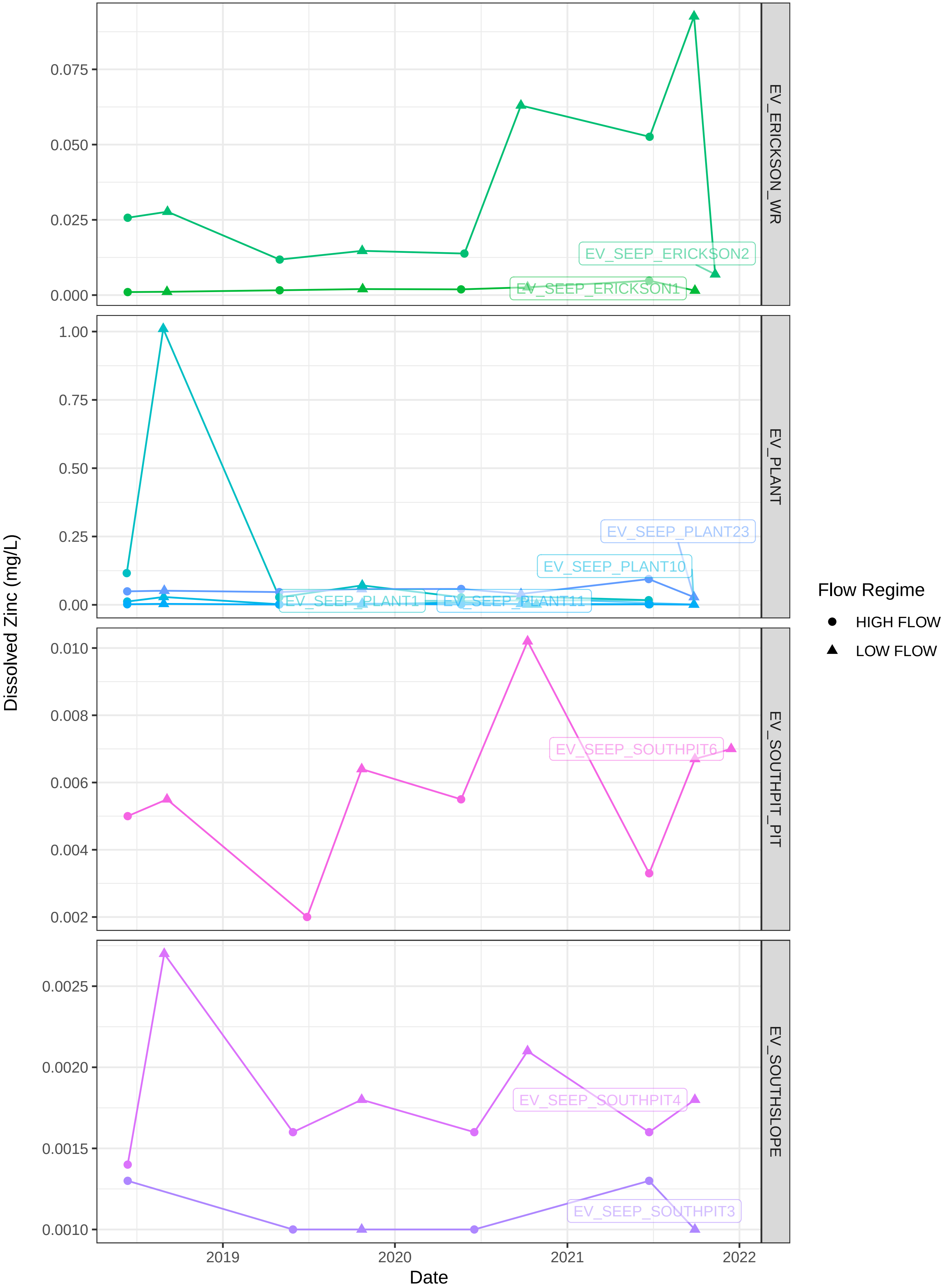

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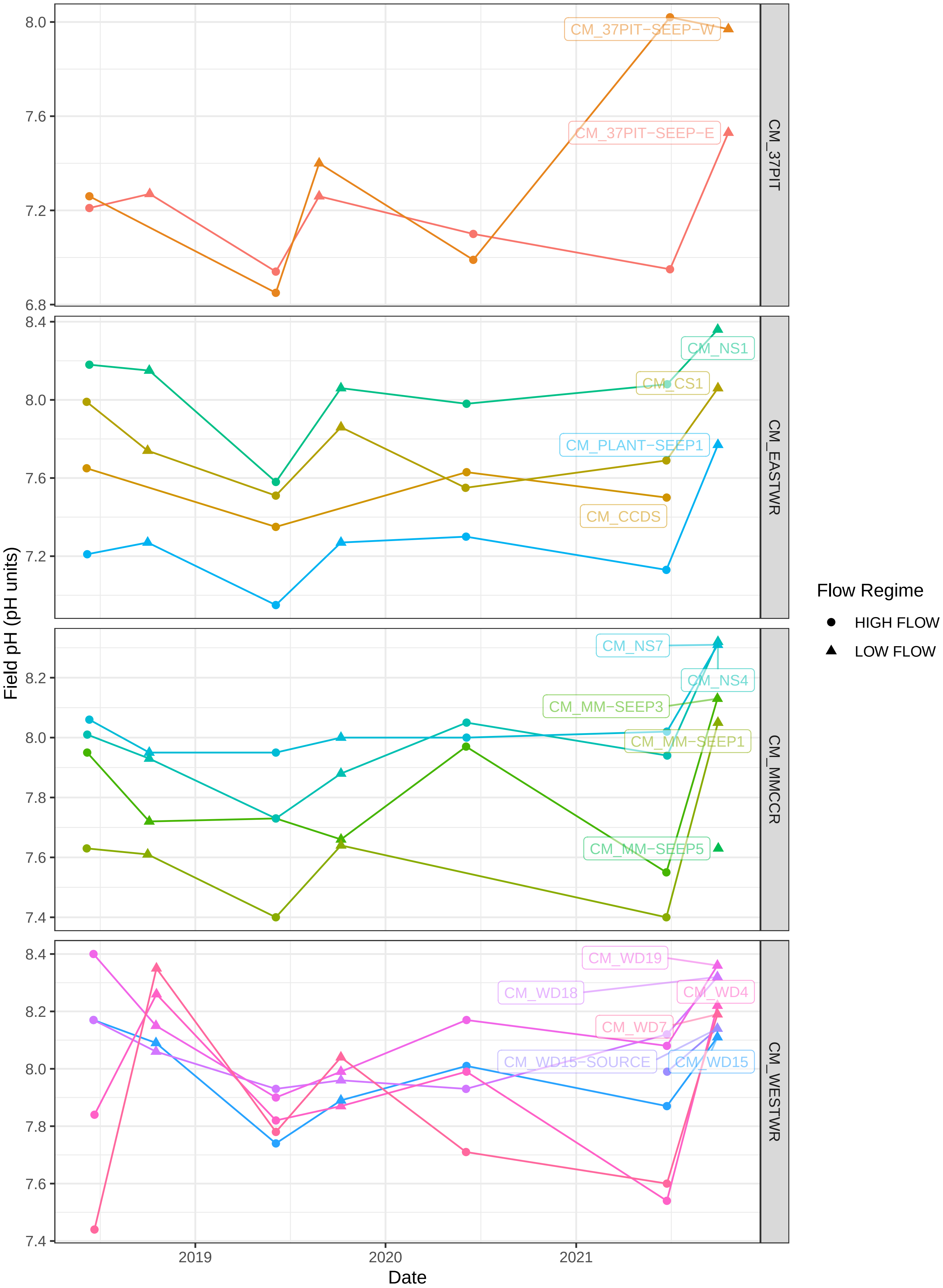

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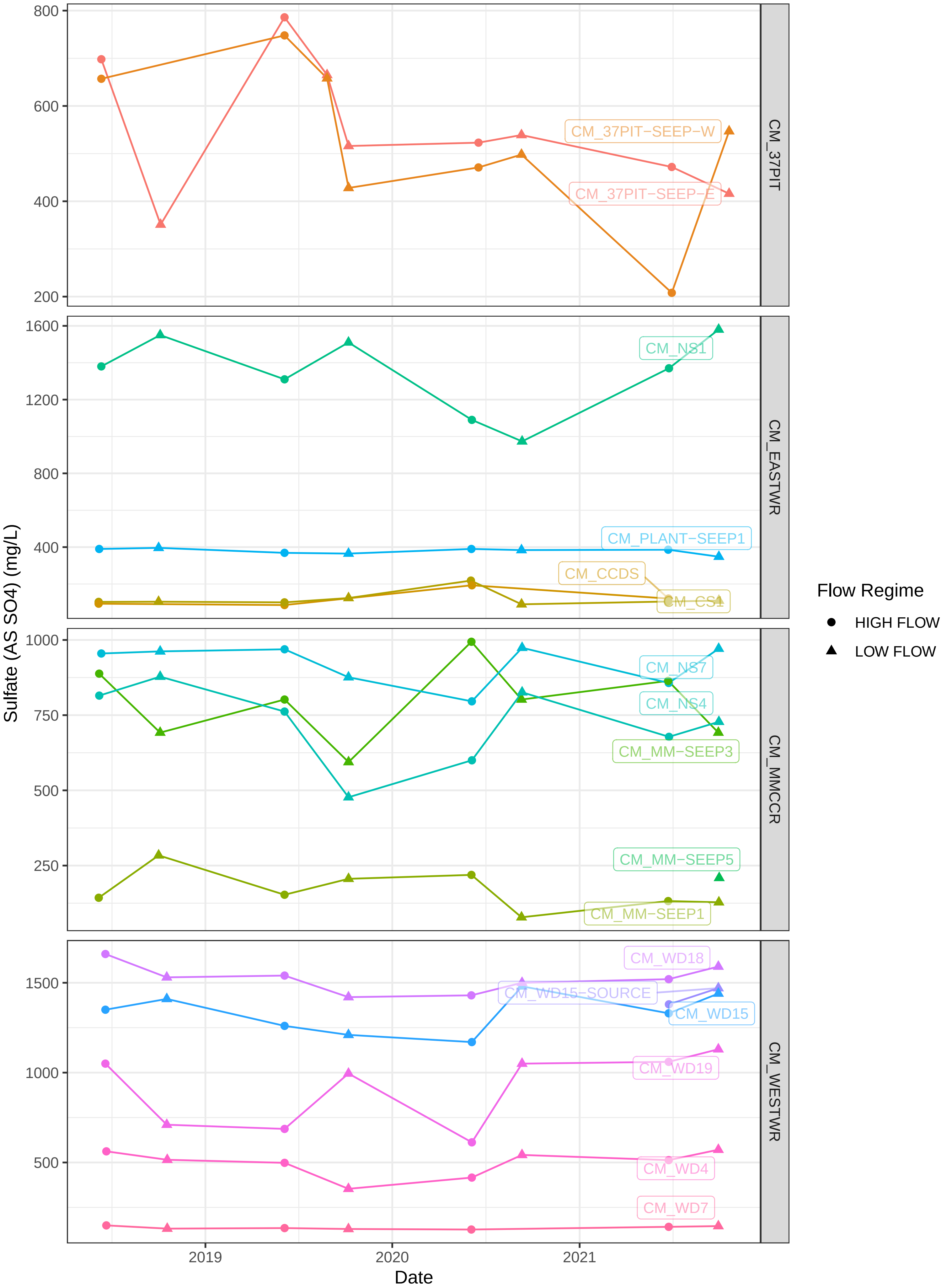

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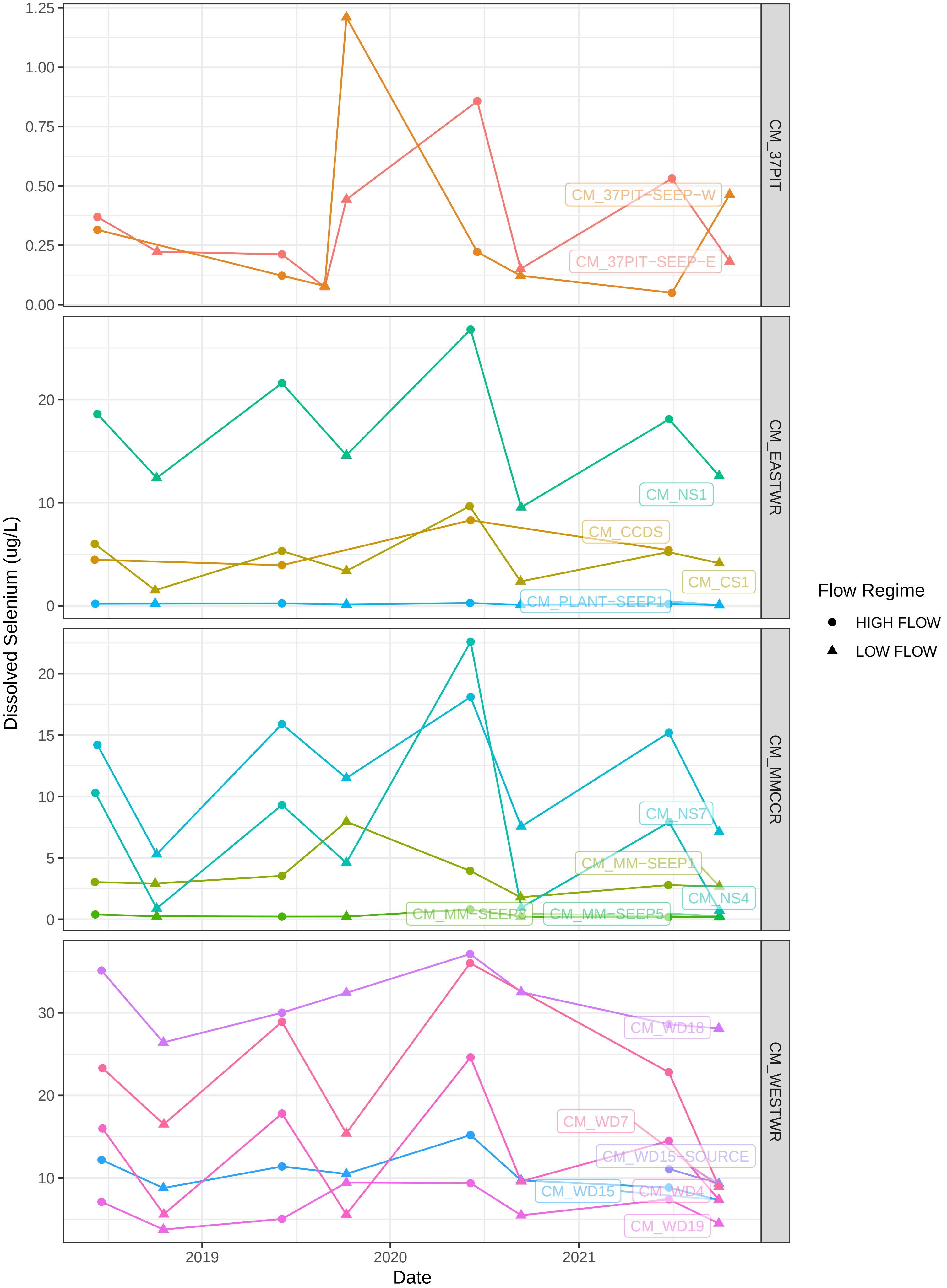

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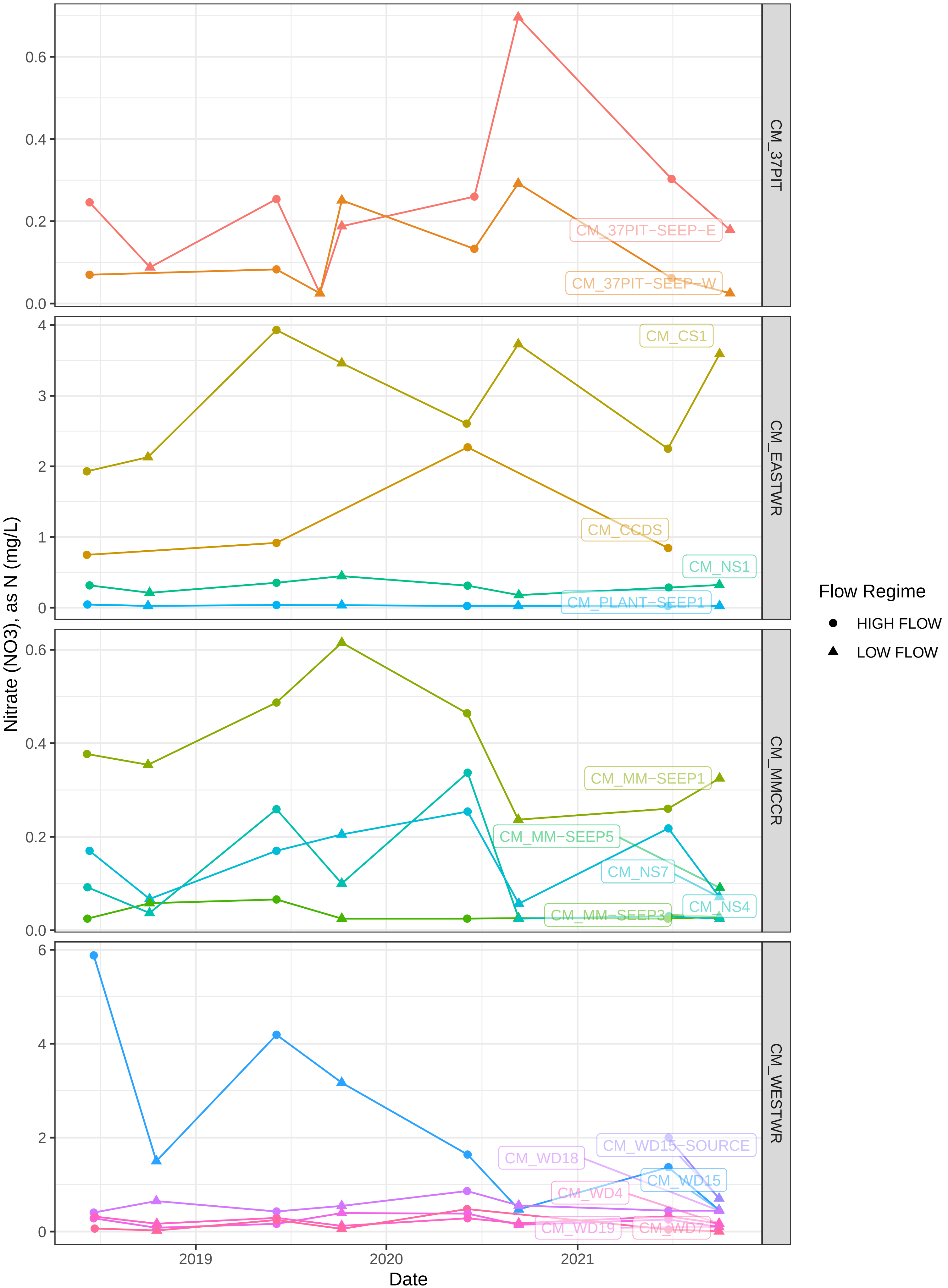

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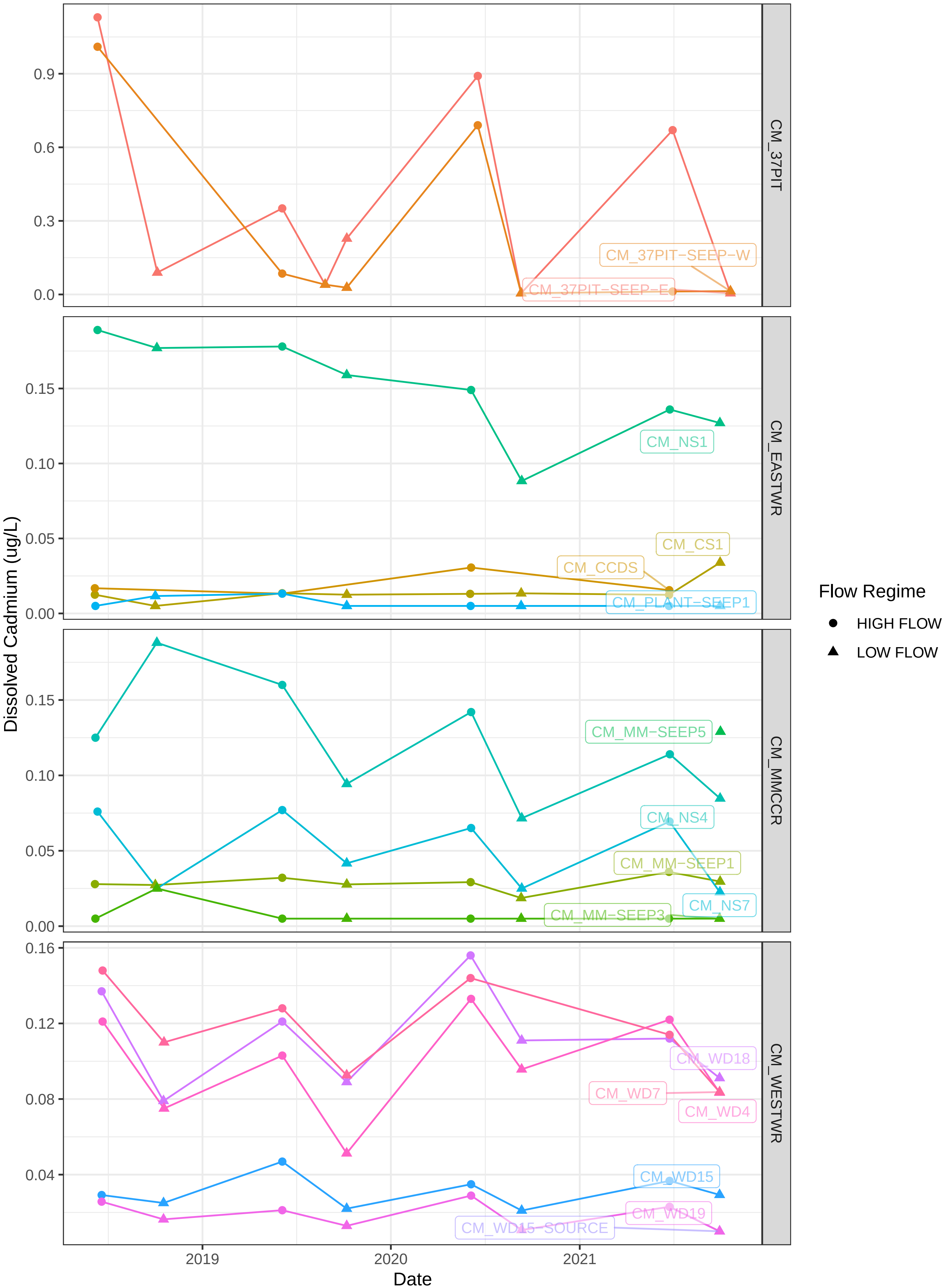

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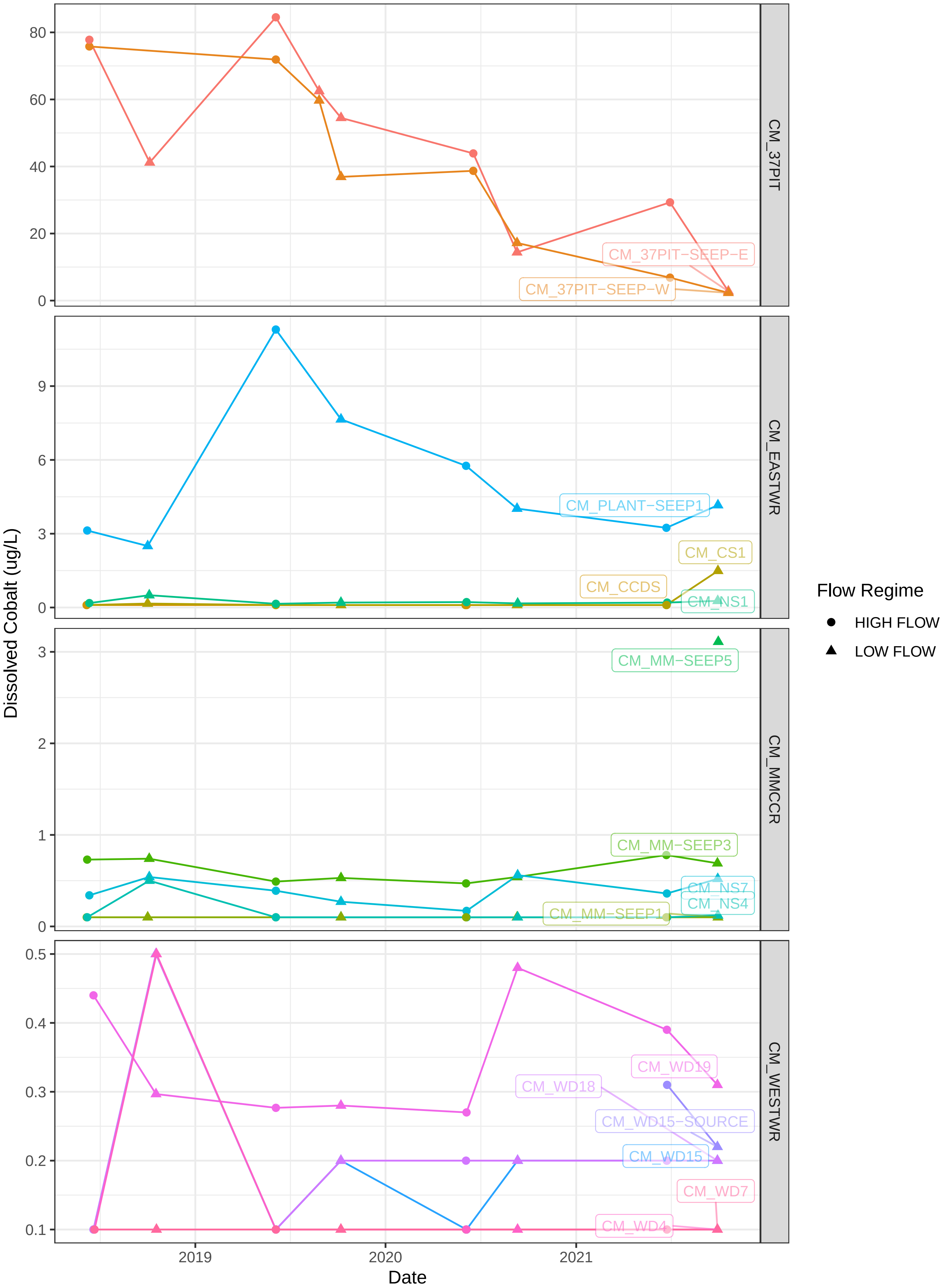

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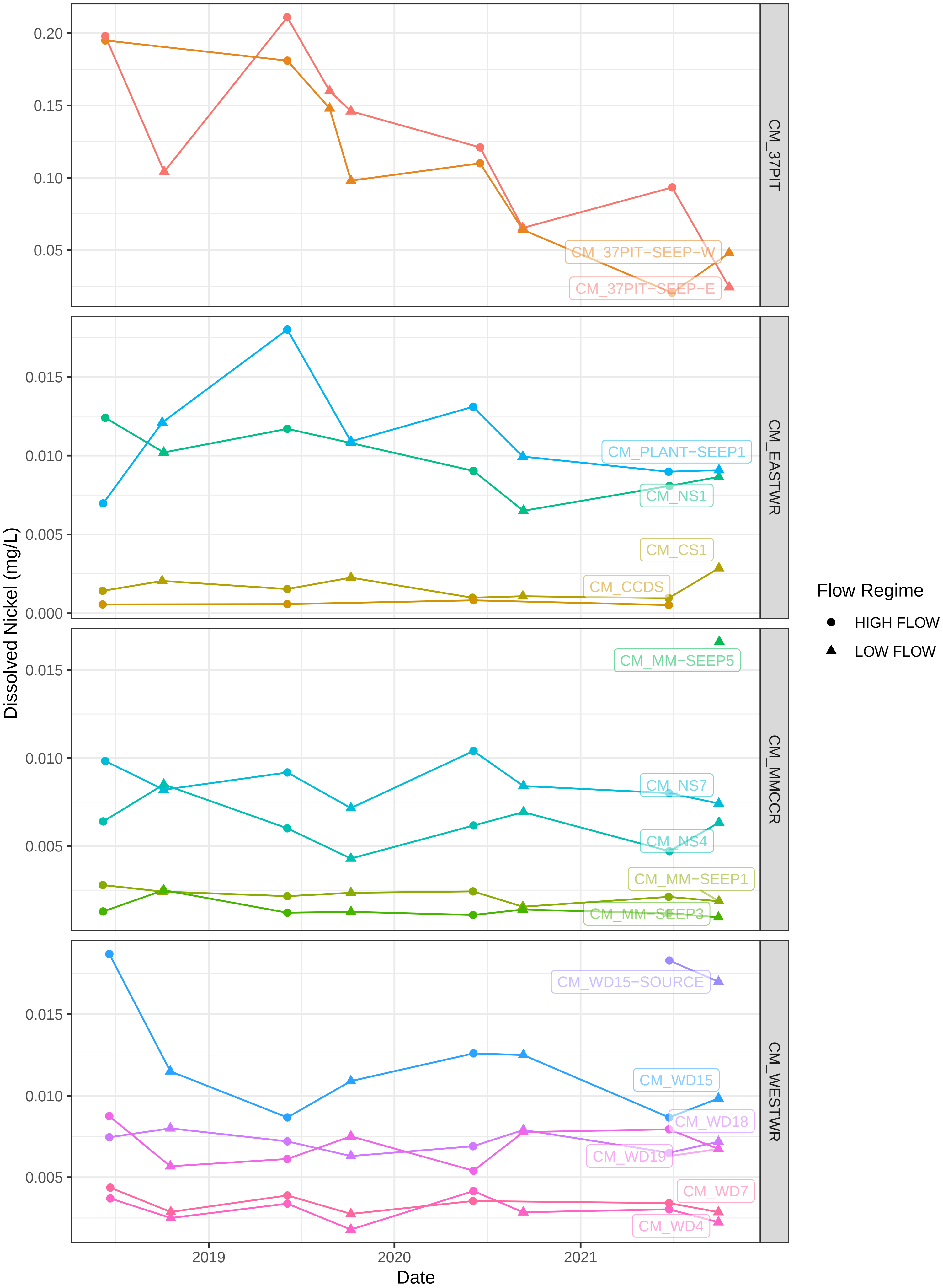

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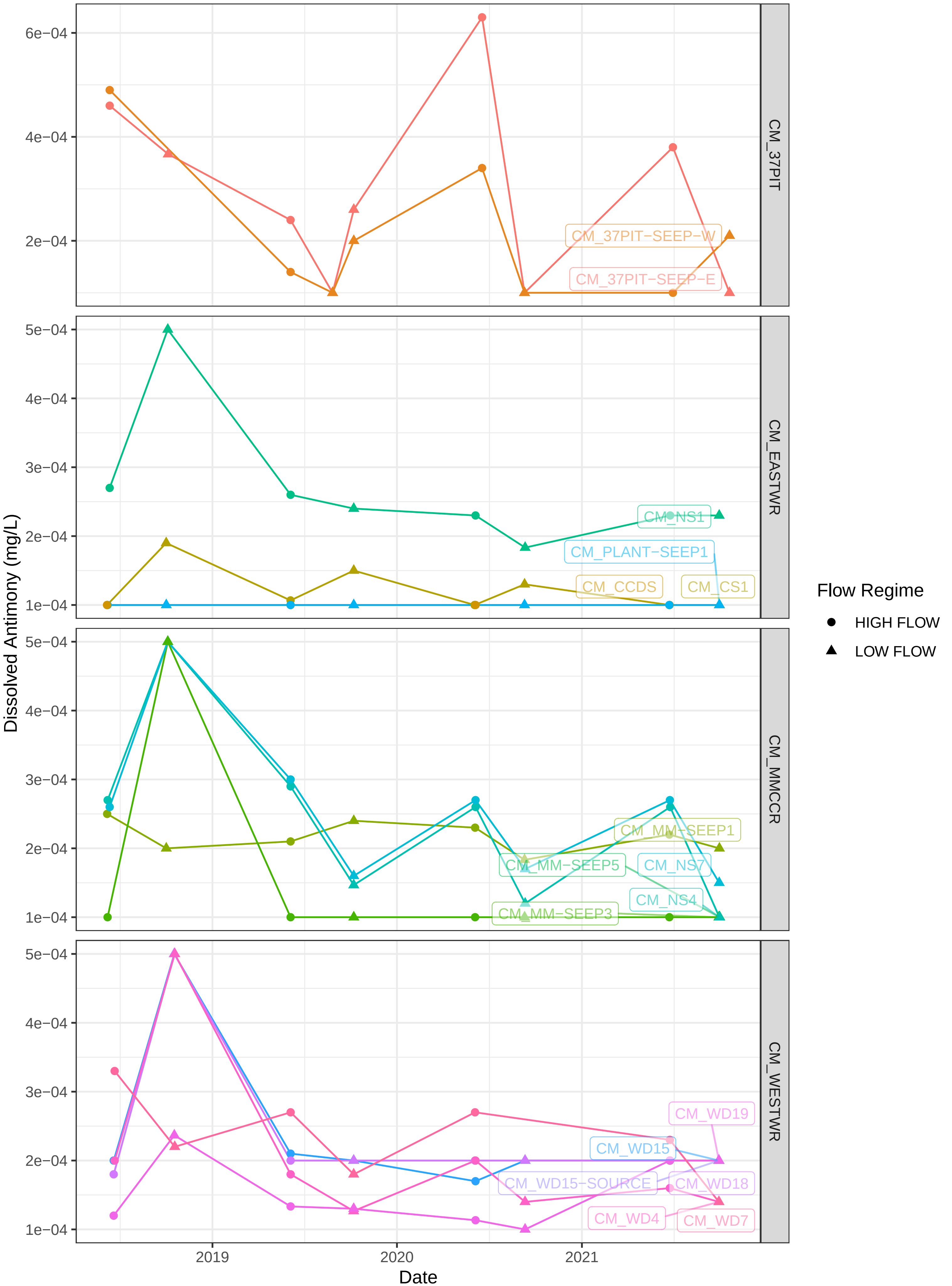

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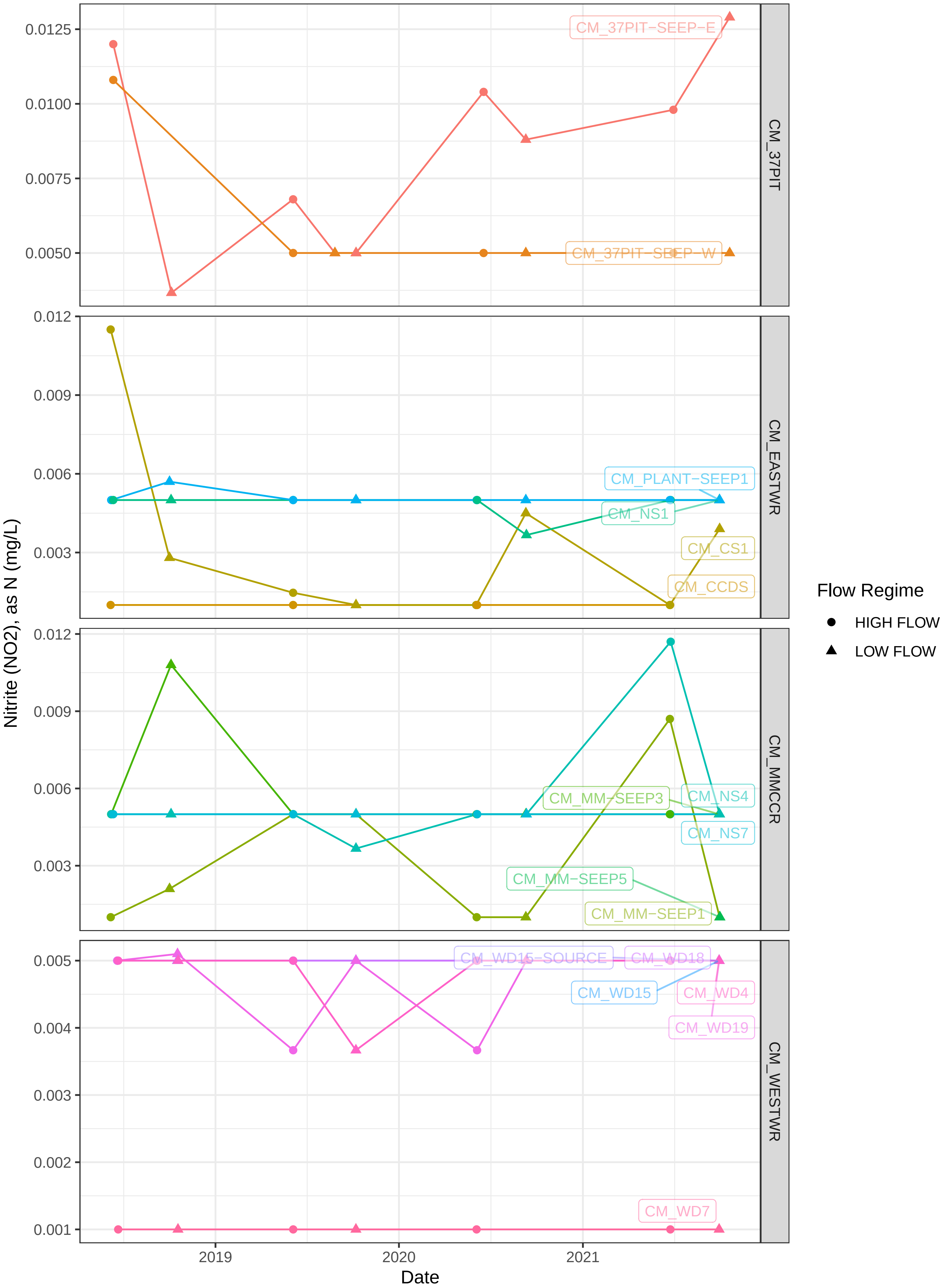

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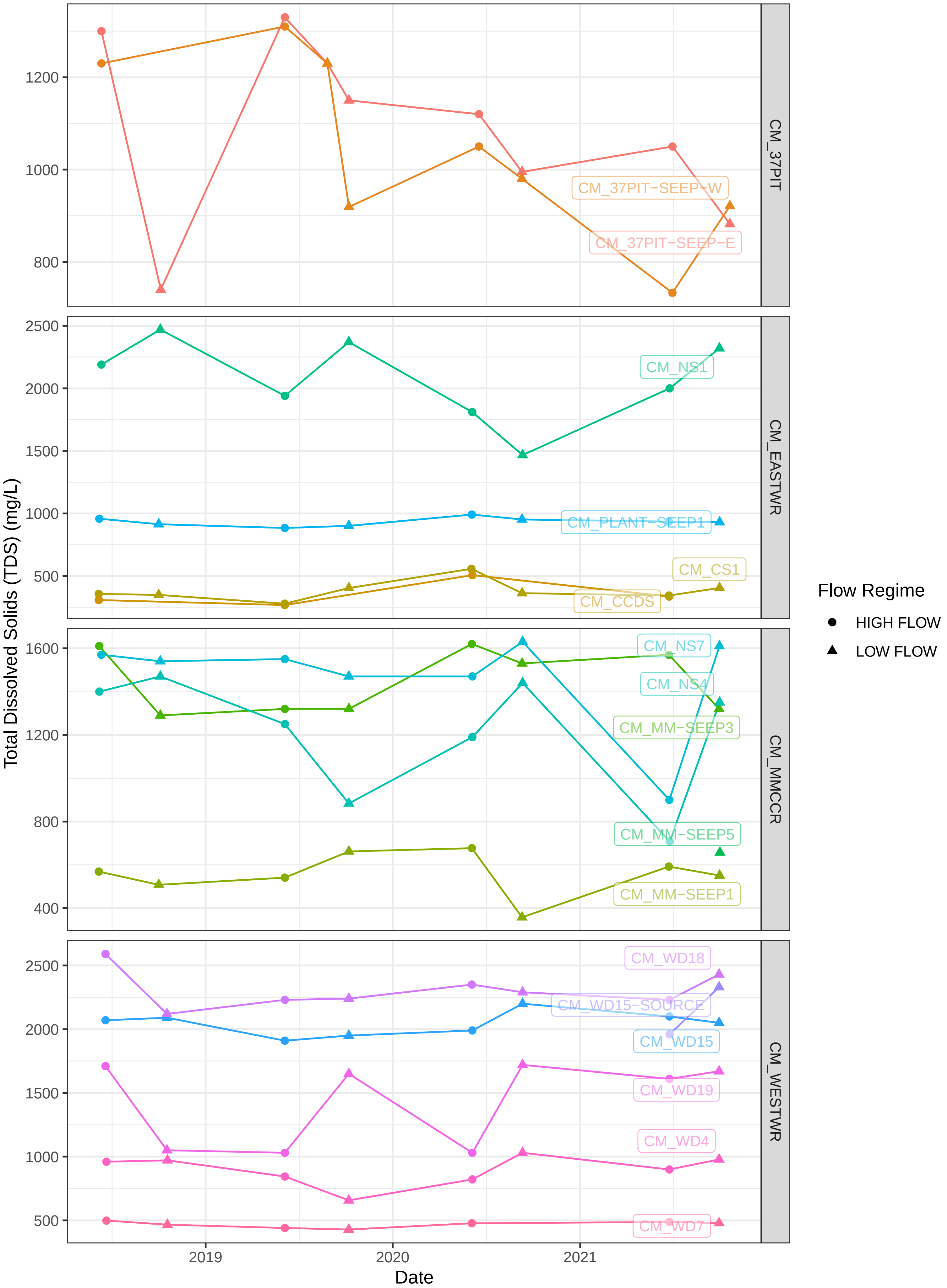

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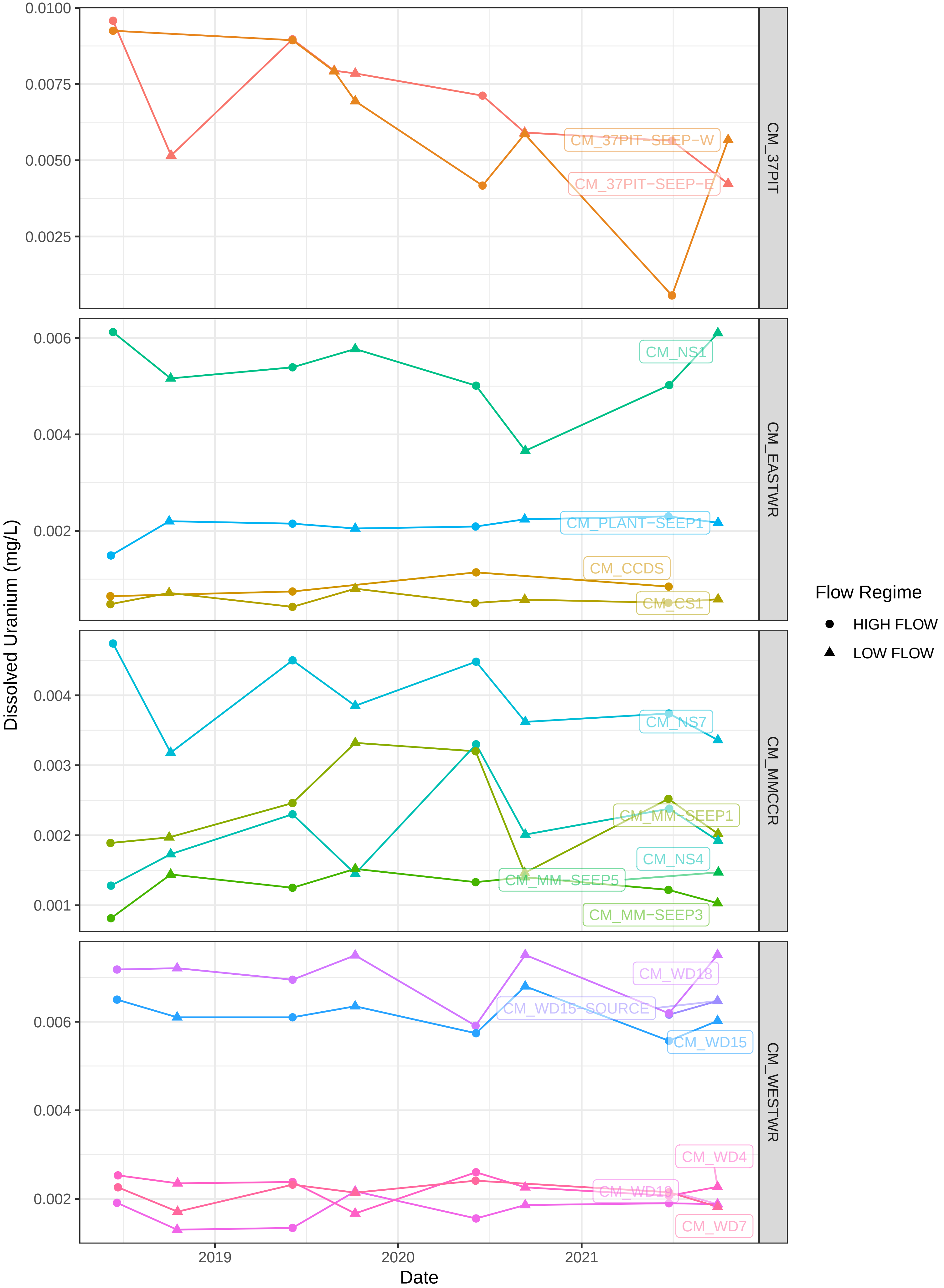

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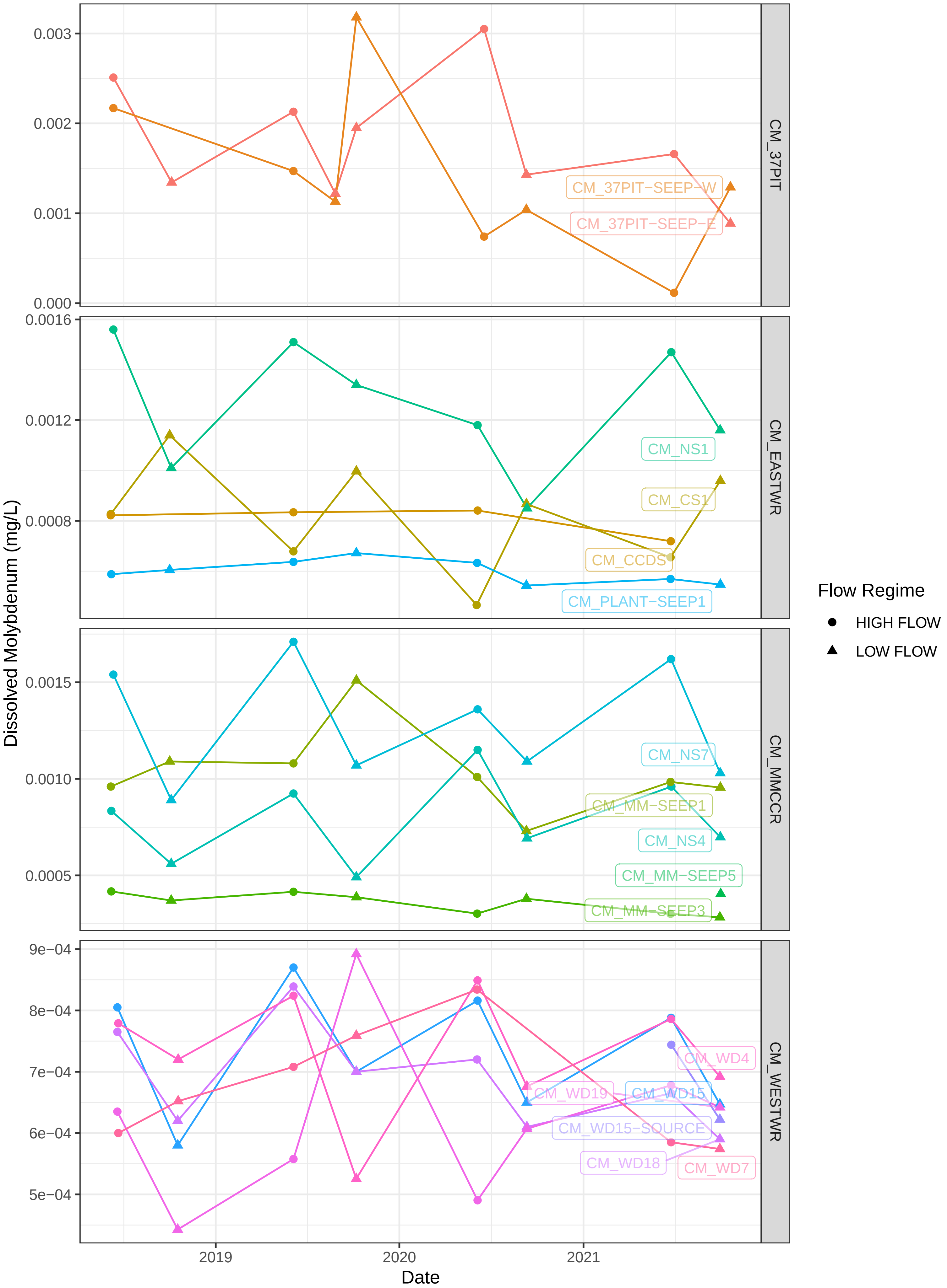

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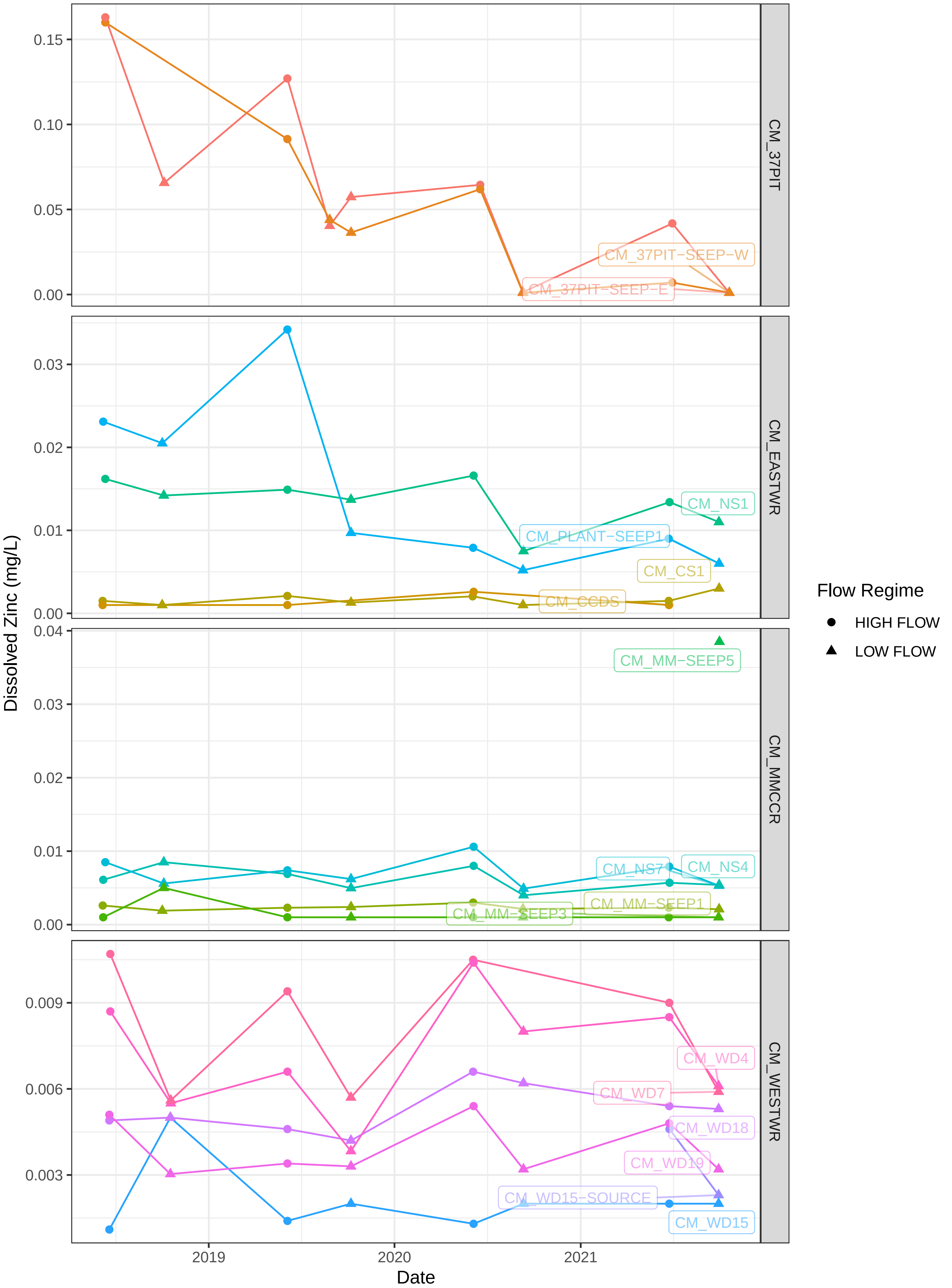
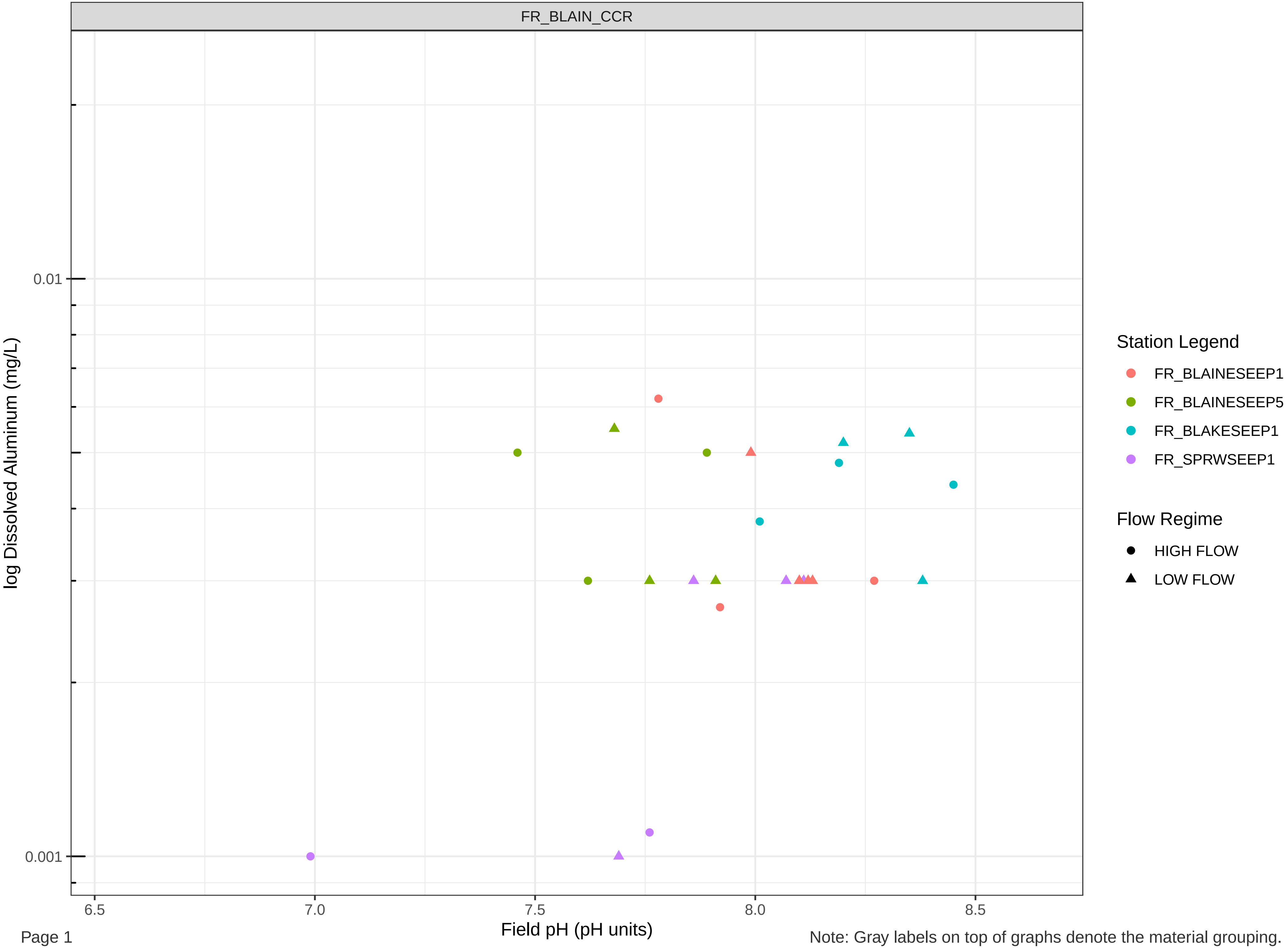


Note: Gray labels on right of graphs denote the material grouping.

Appendix B Metals versus field pH Cross Plots



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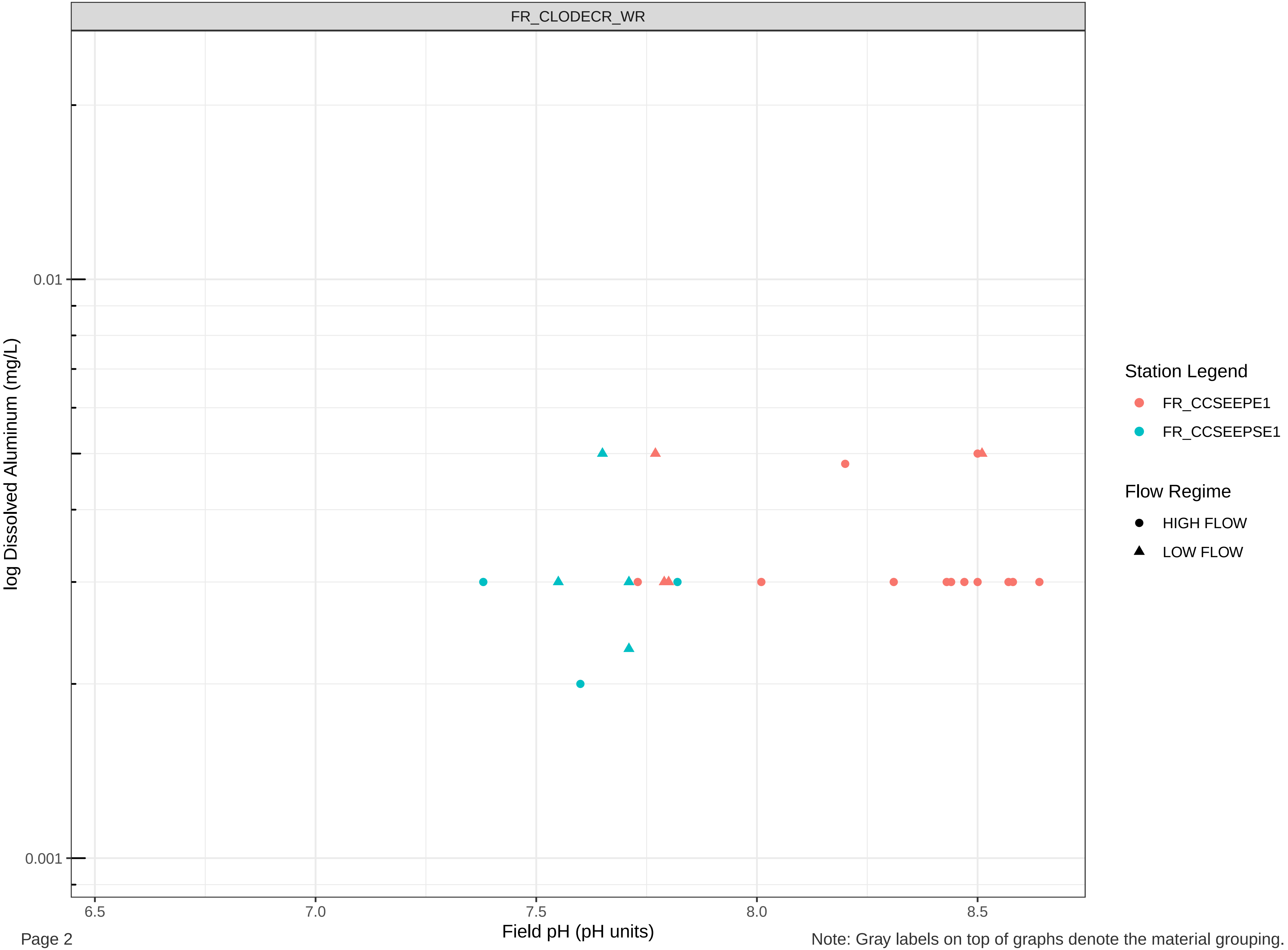

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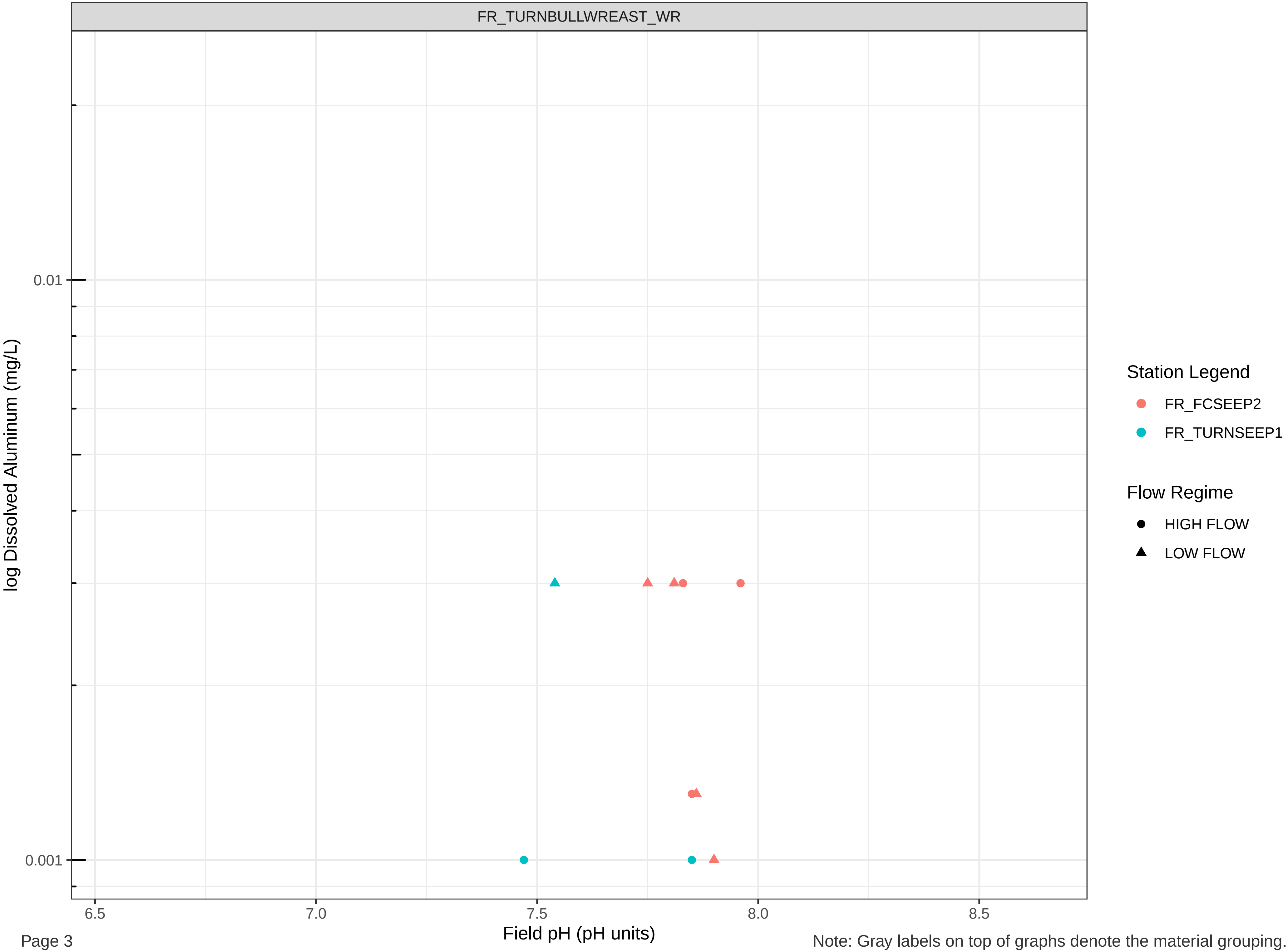
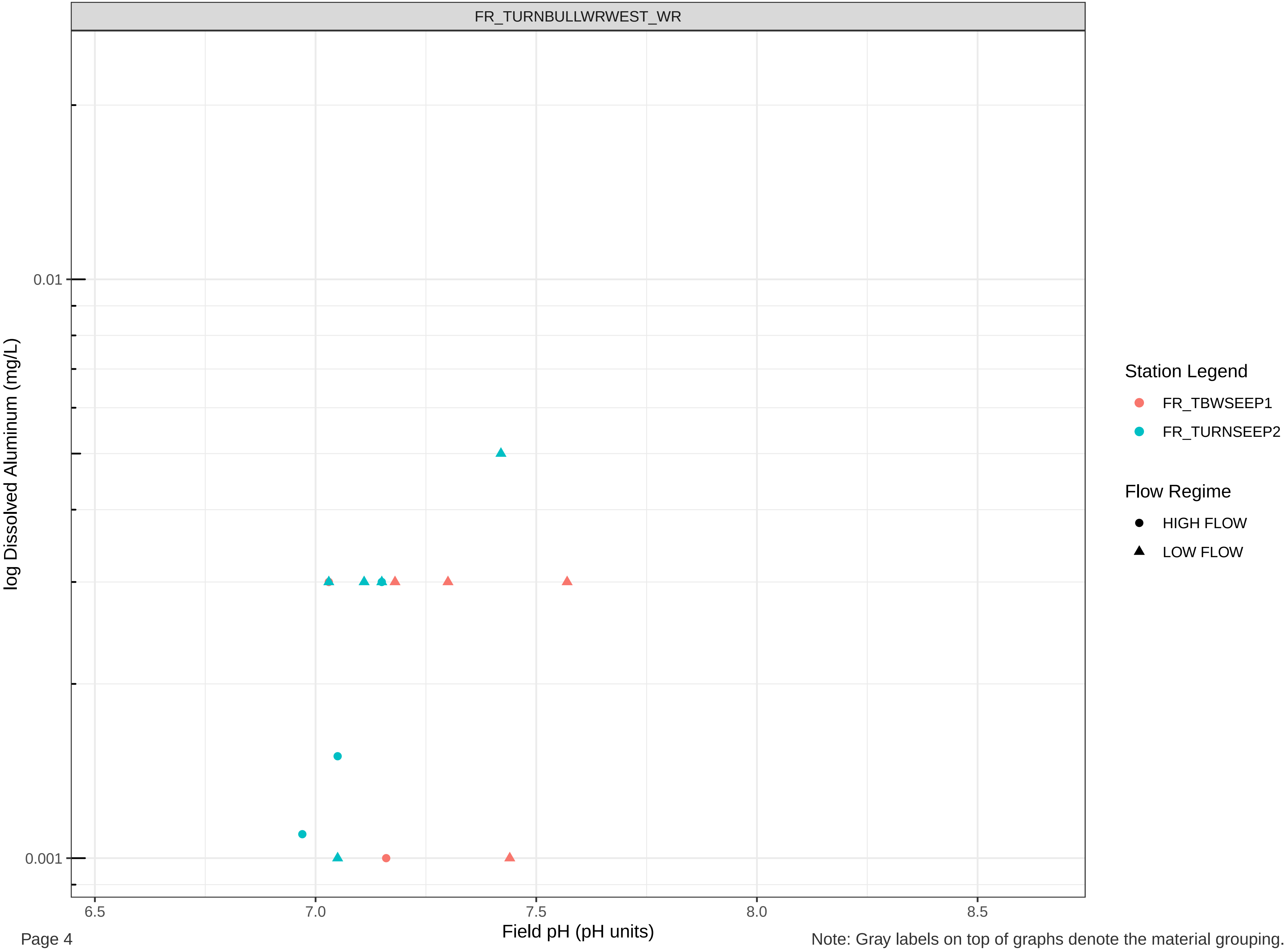

FR_TURNBULLWREAST_WR
0.01
0.001
log Dissolved Aluminum (mg/L)
6.5
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
FR_FCSEEP2
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



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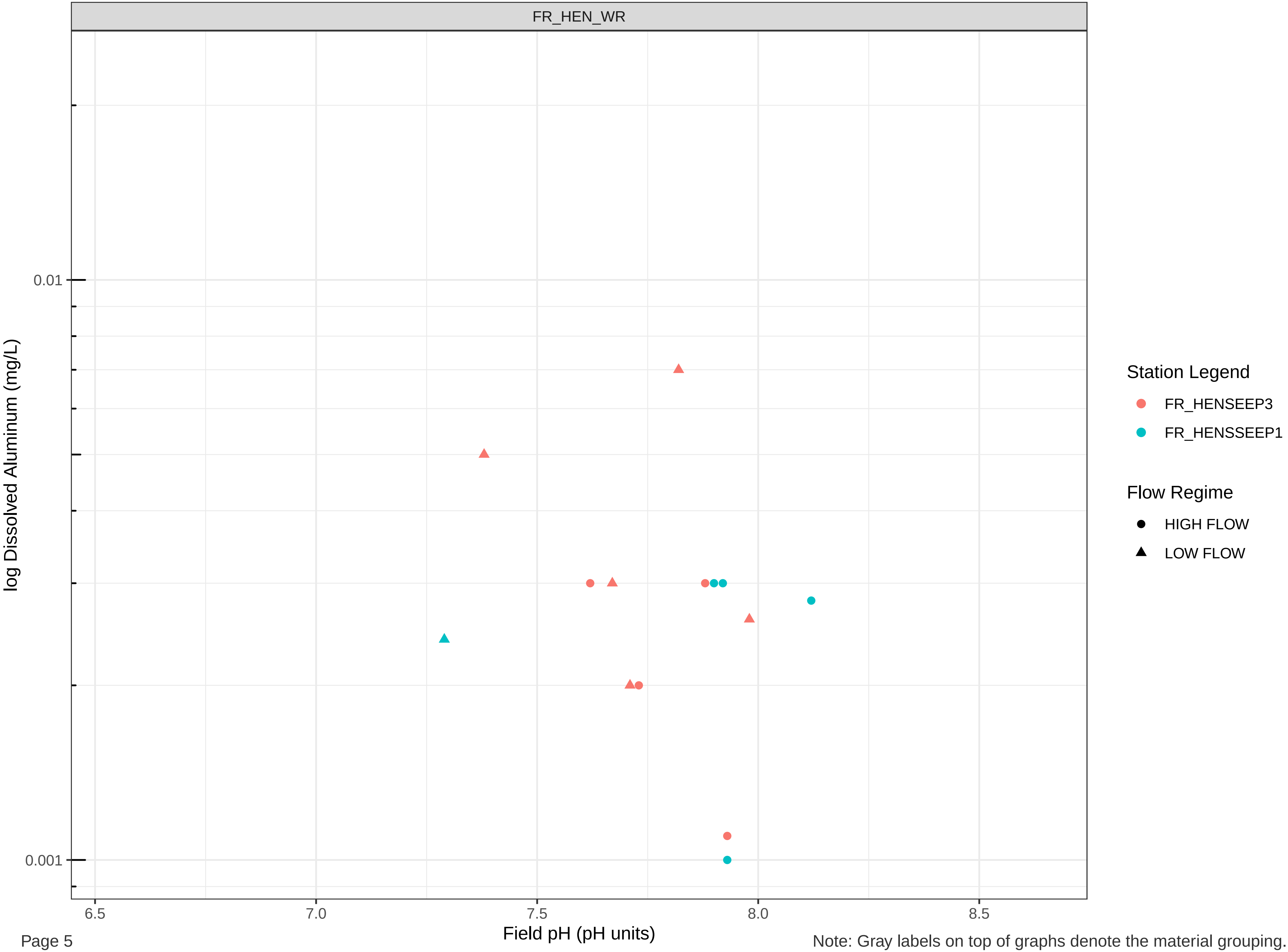

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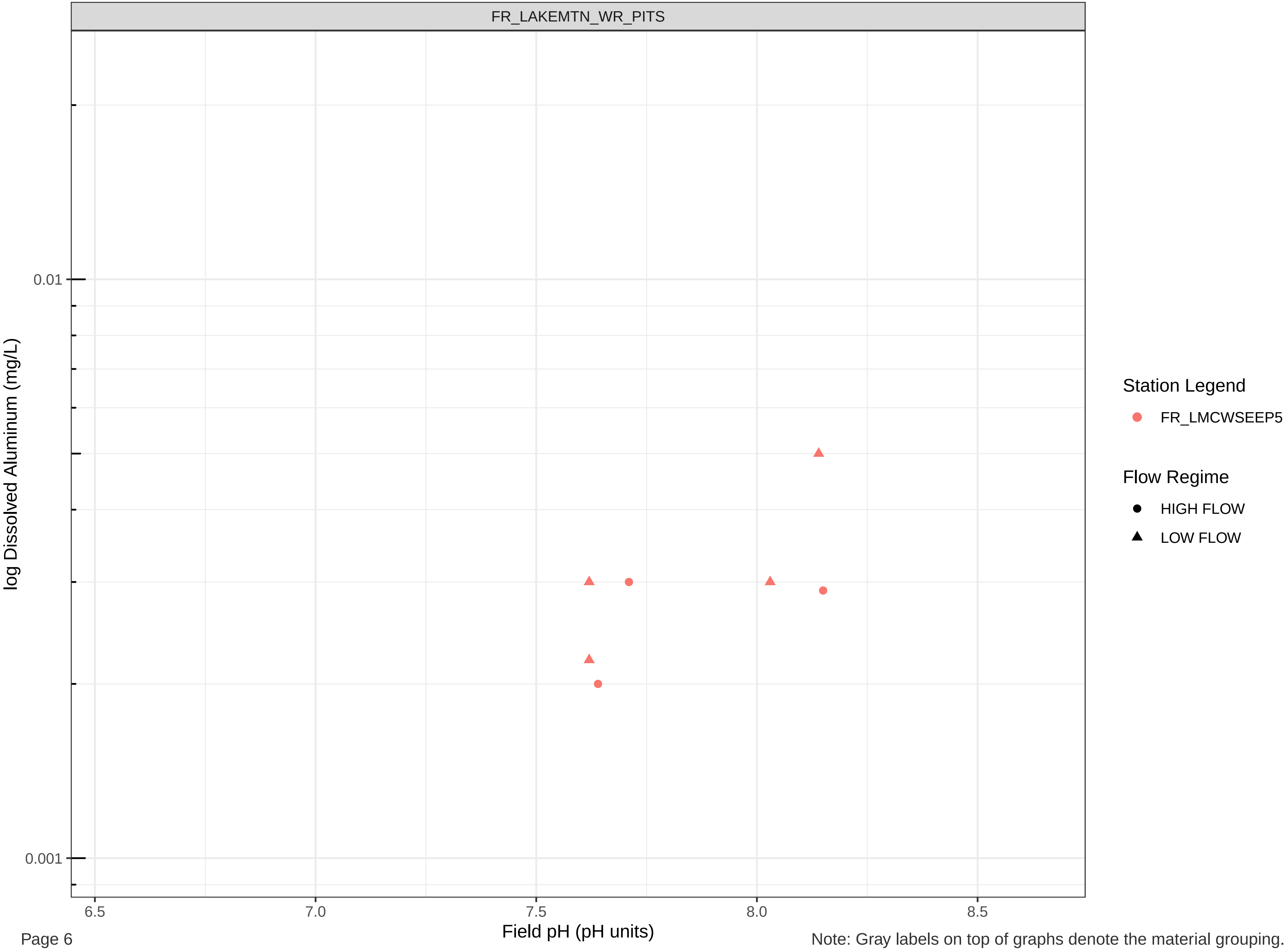

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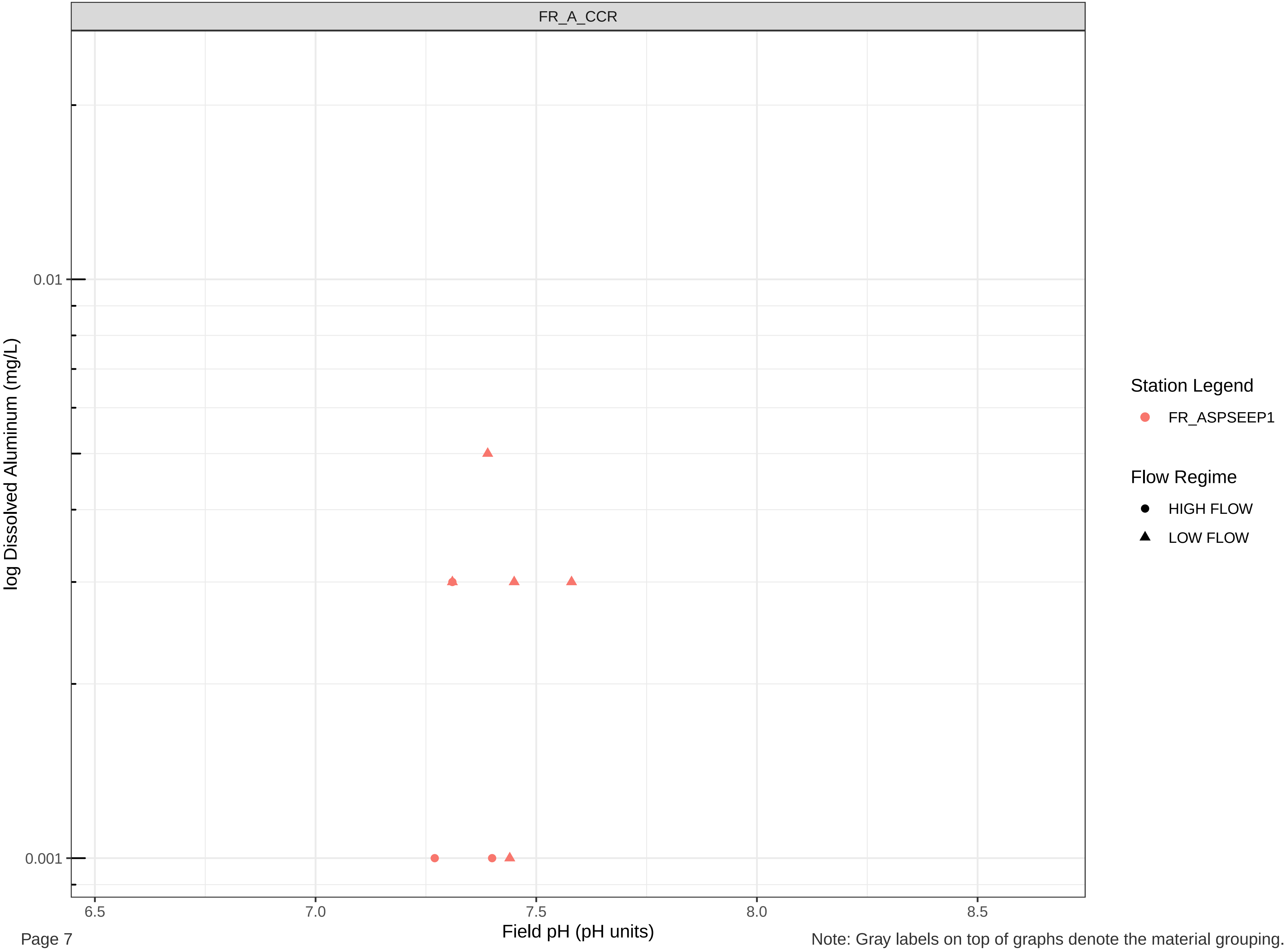

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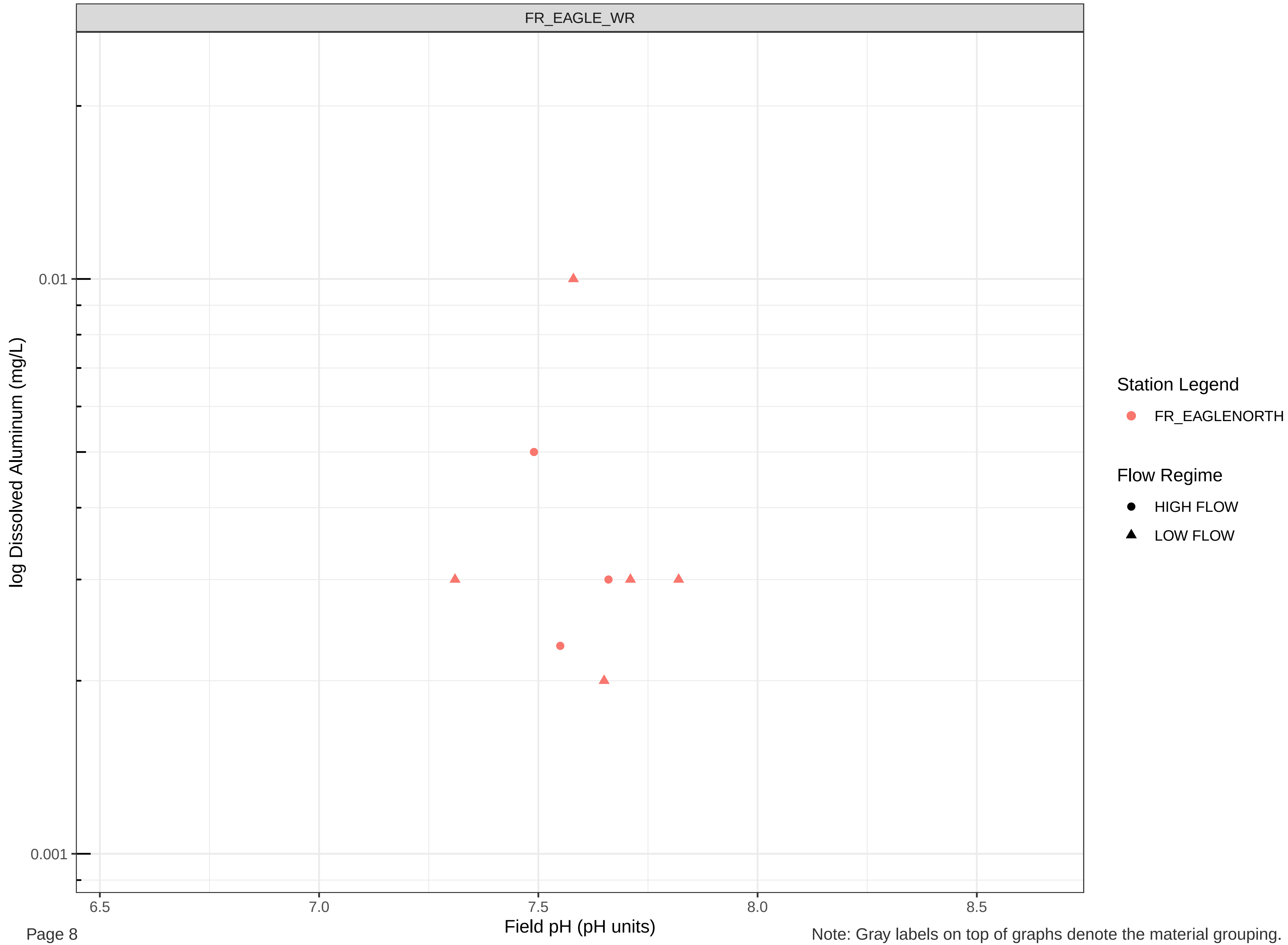

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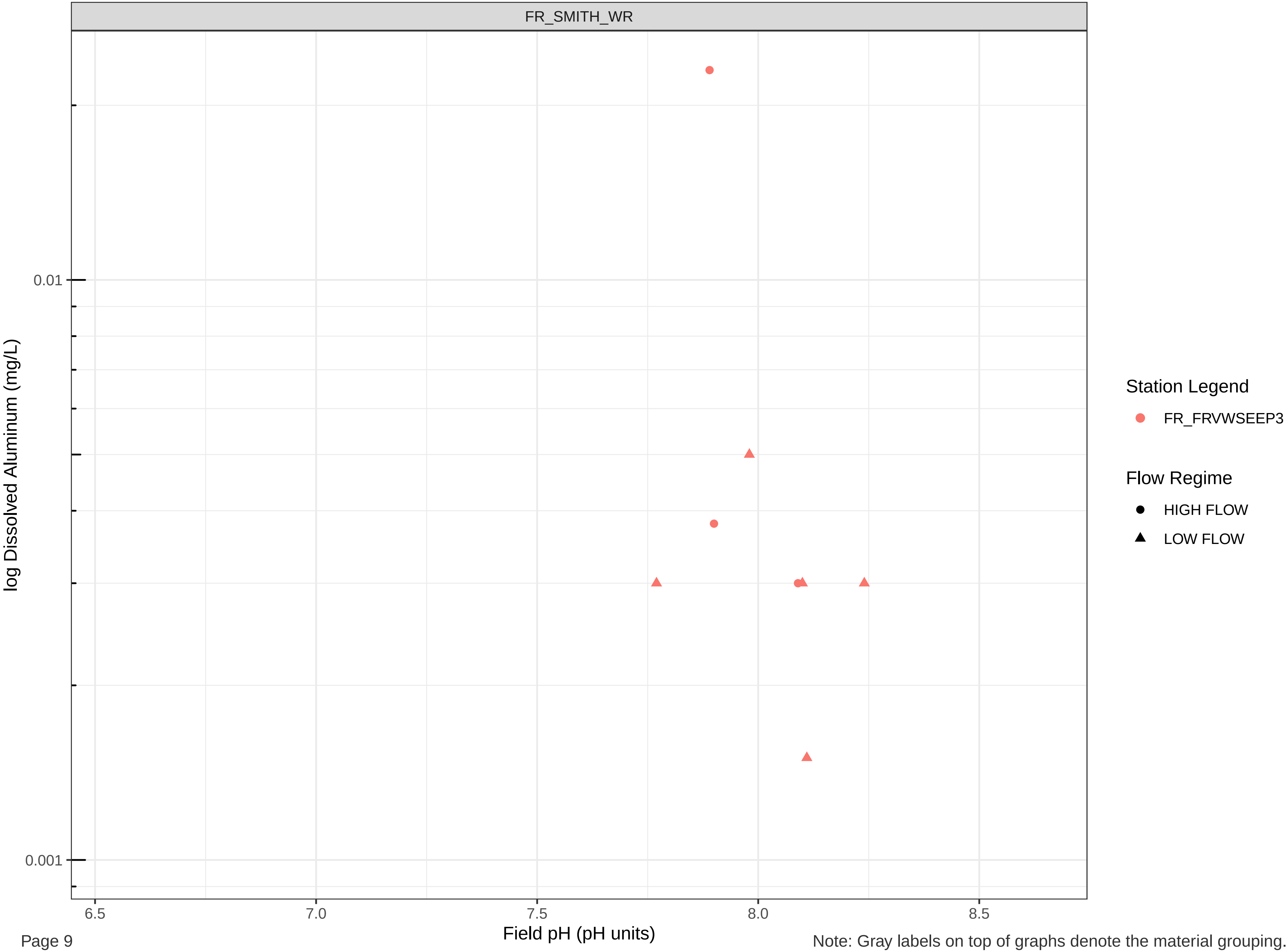

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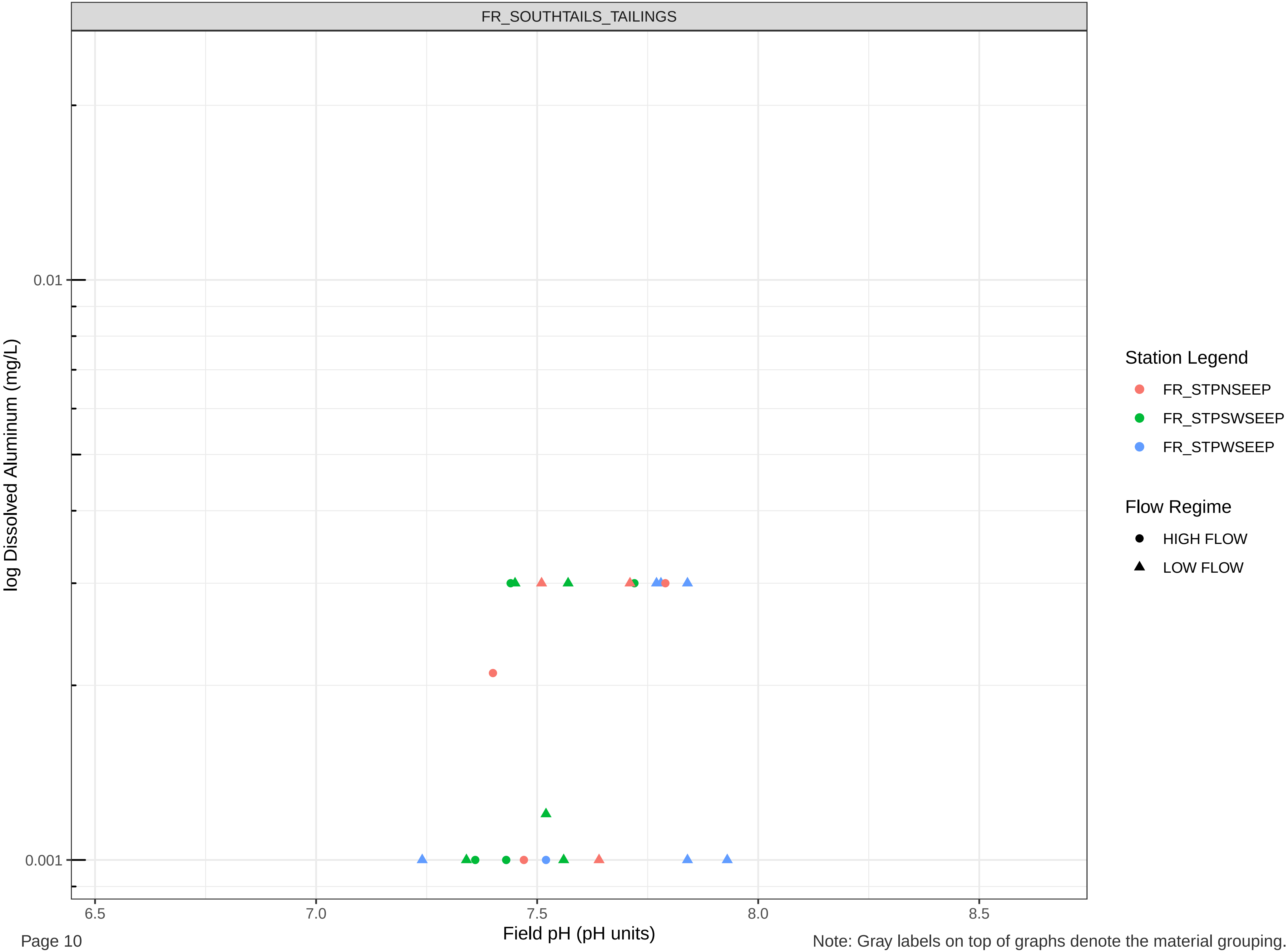

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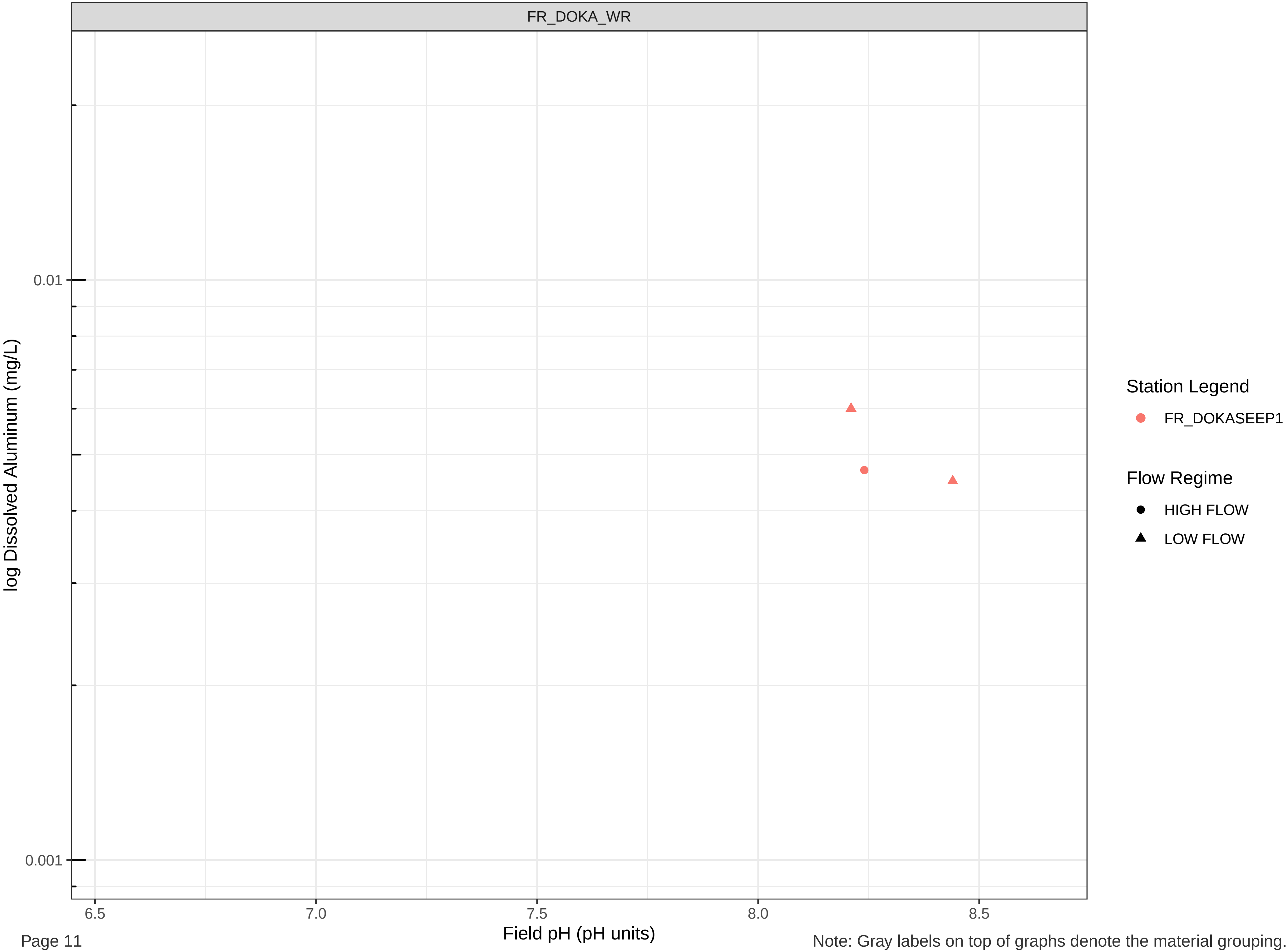

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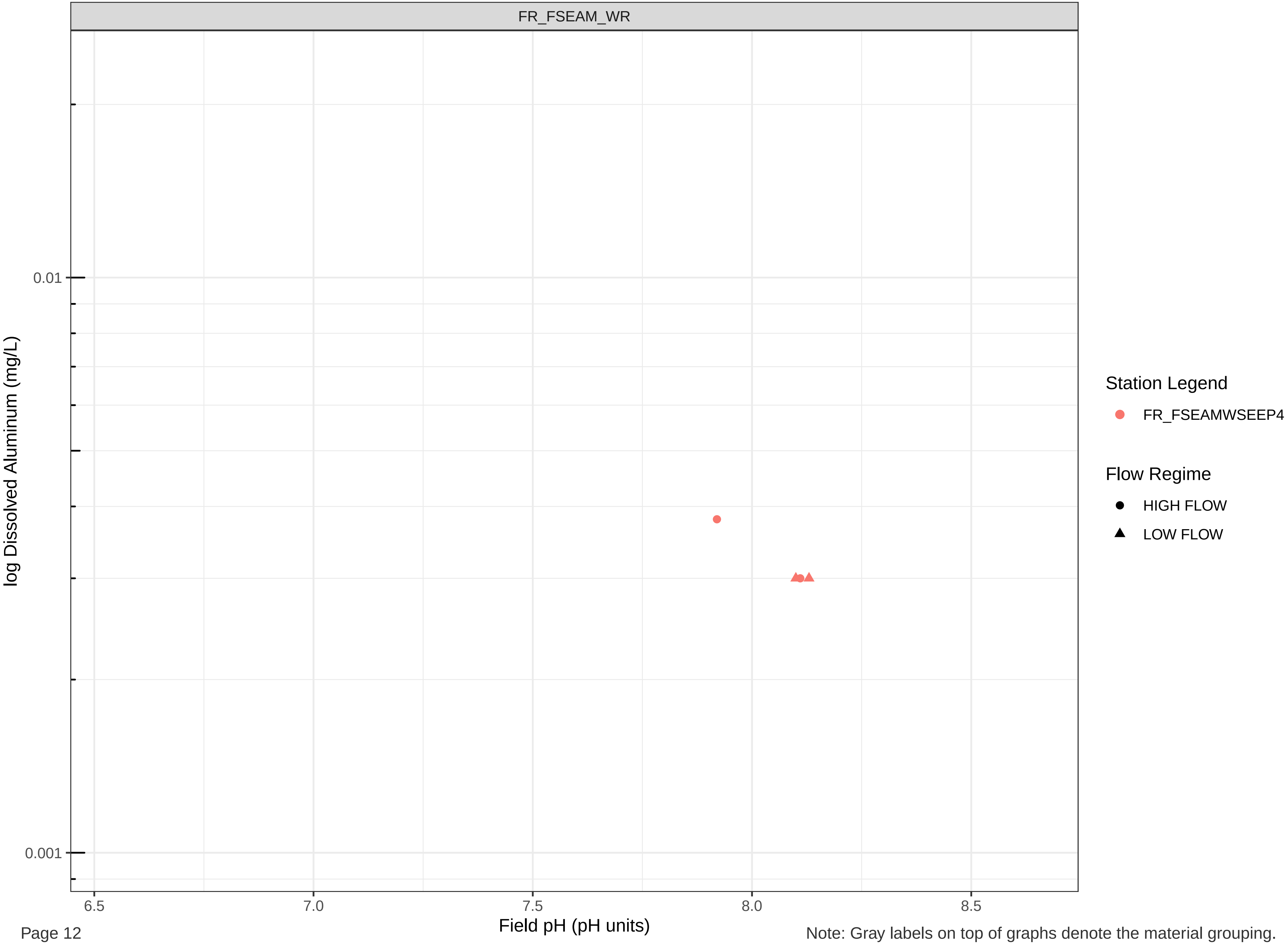

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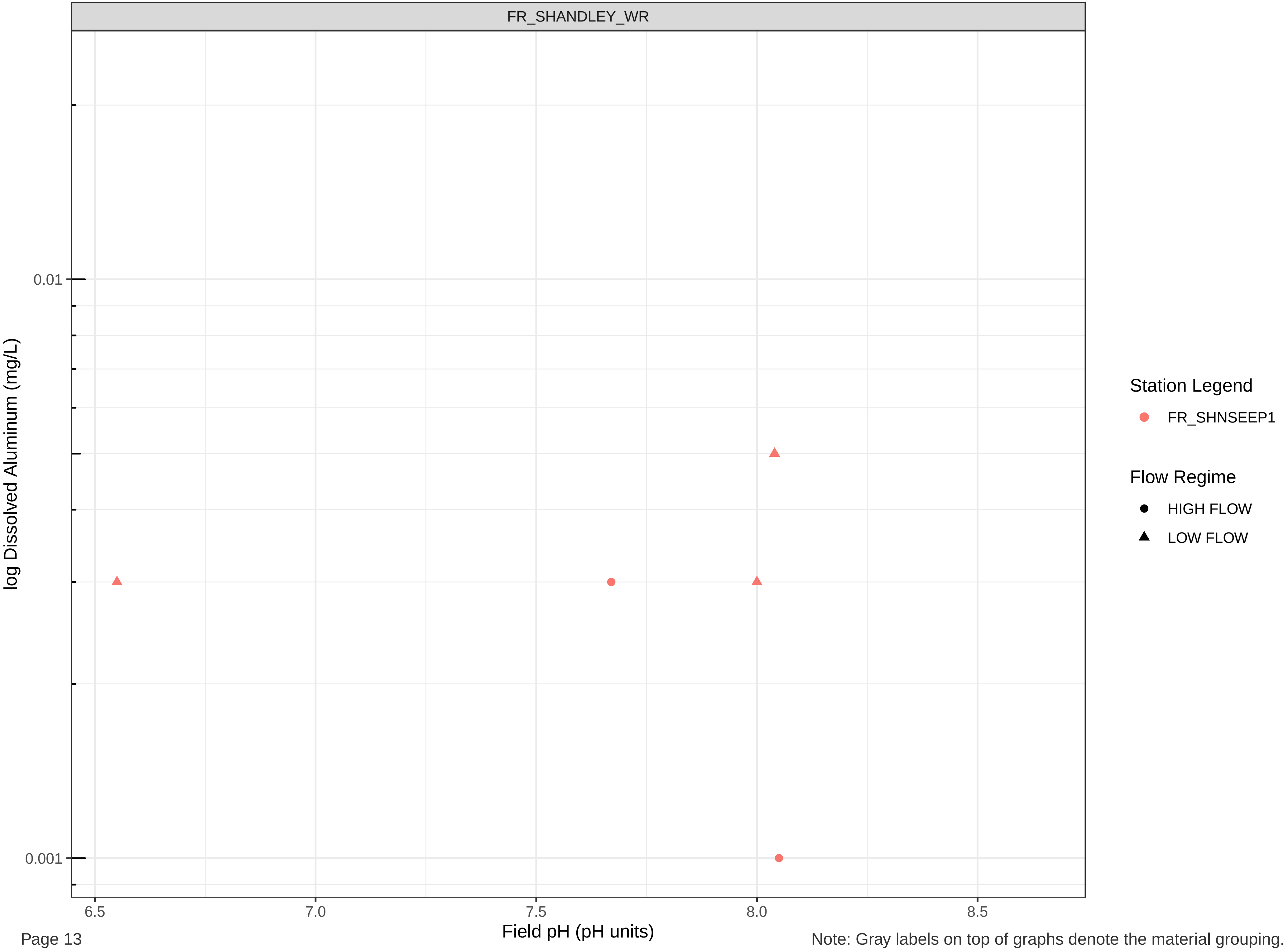

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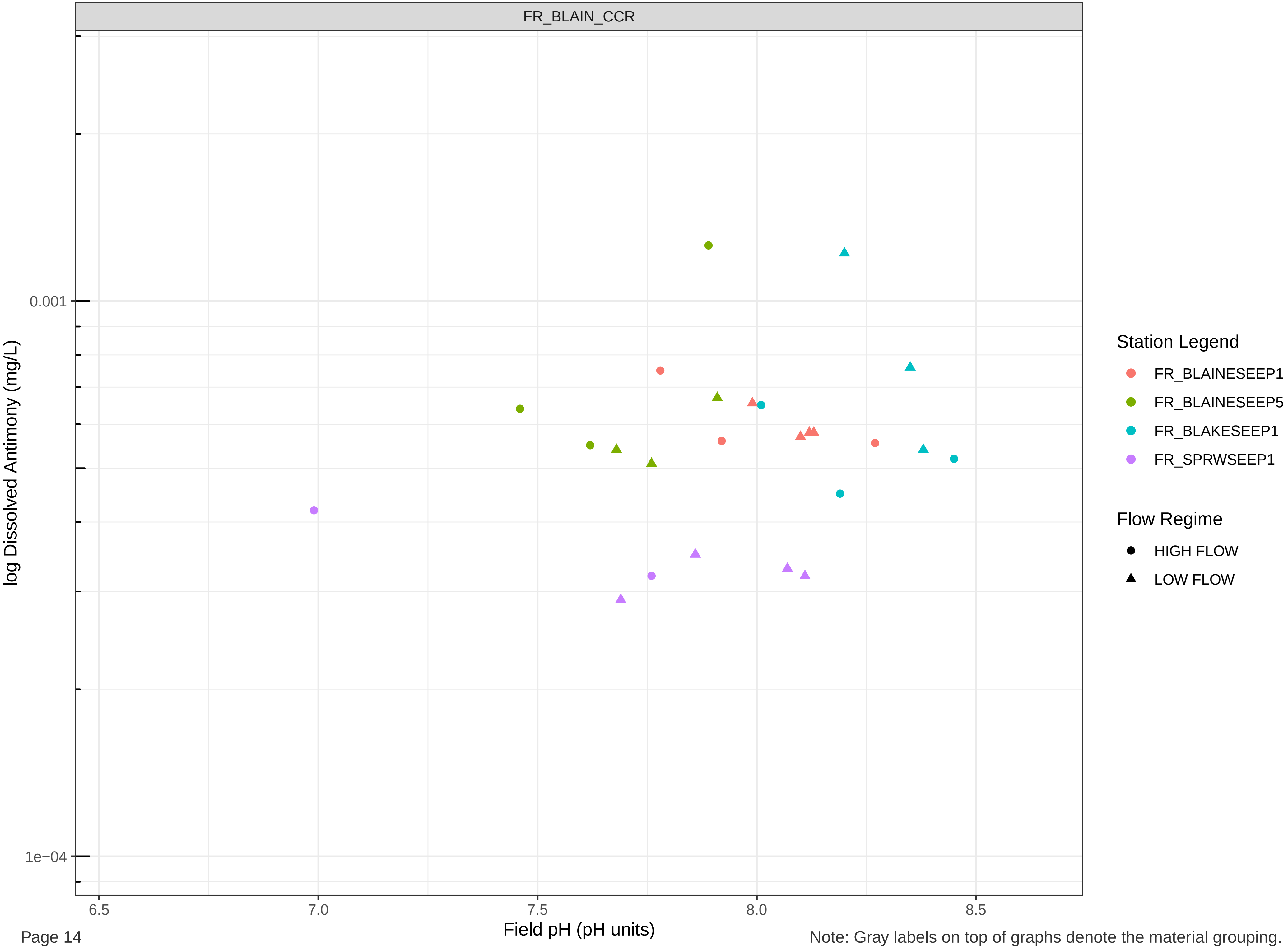

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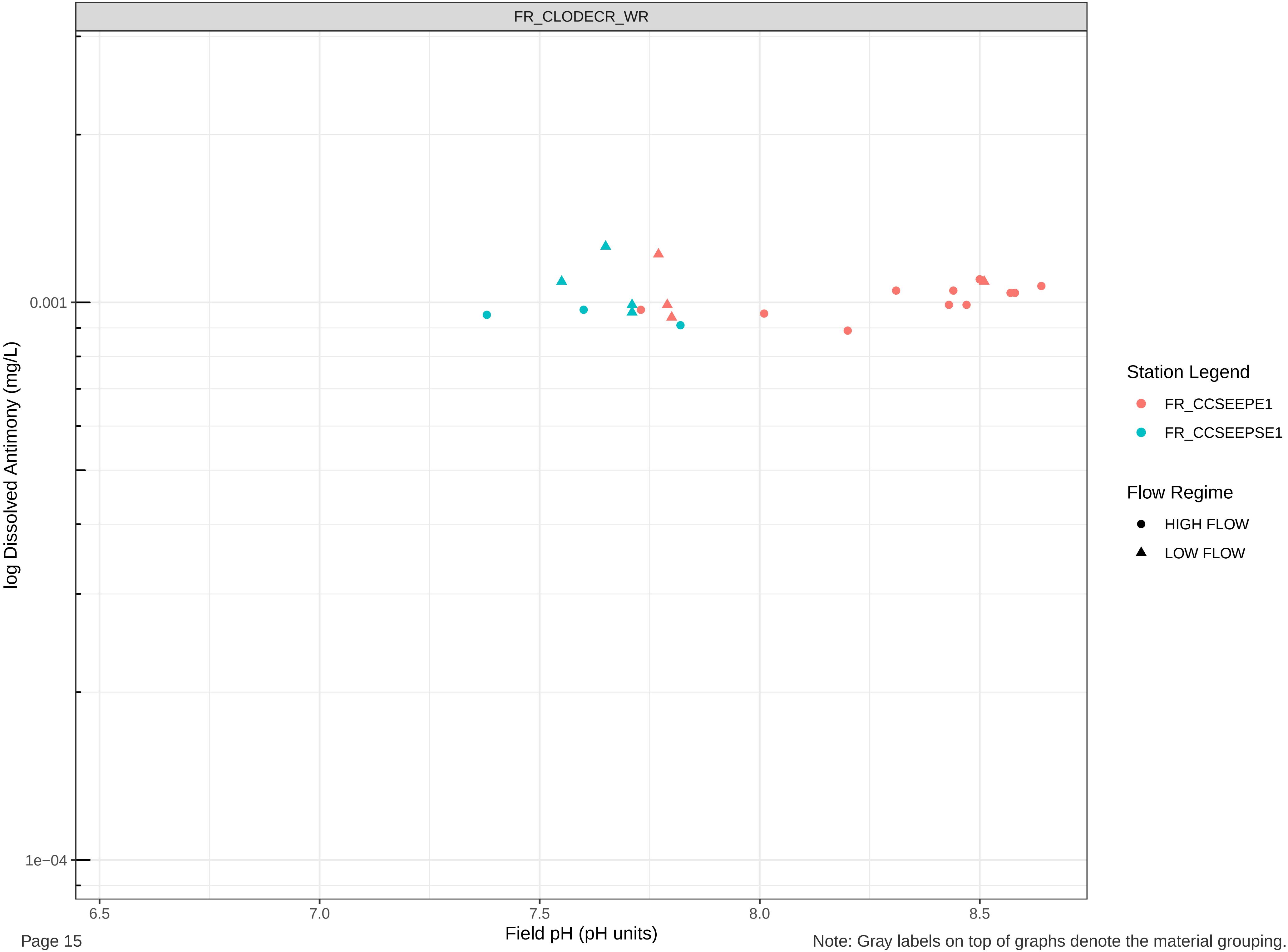

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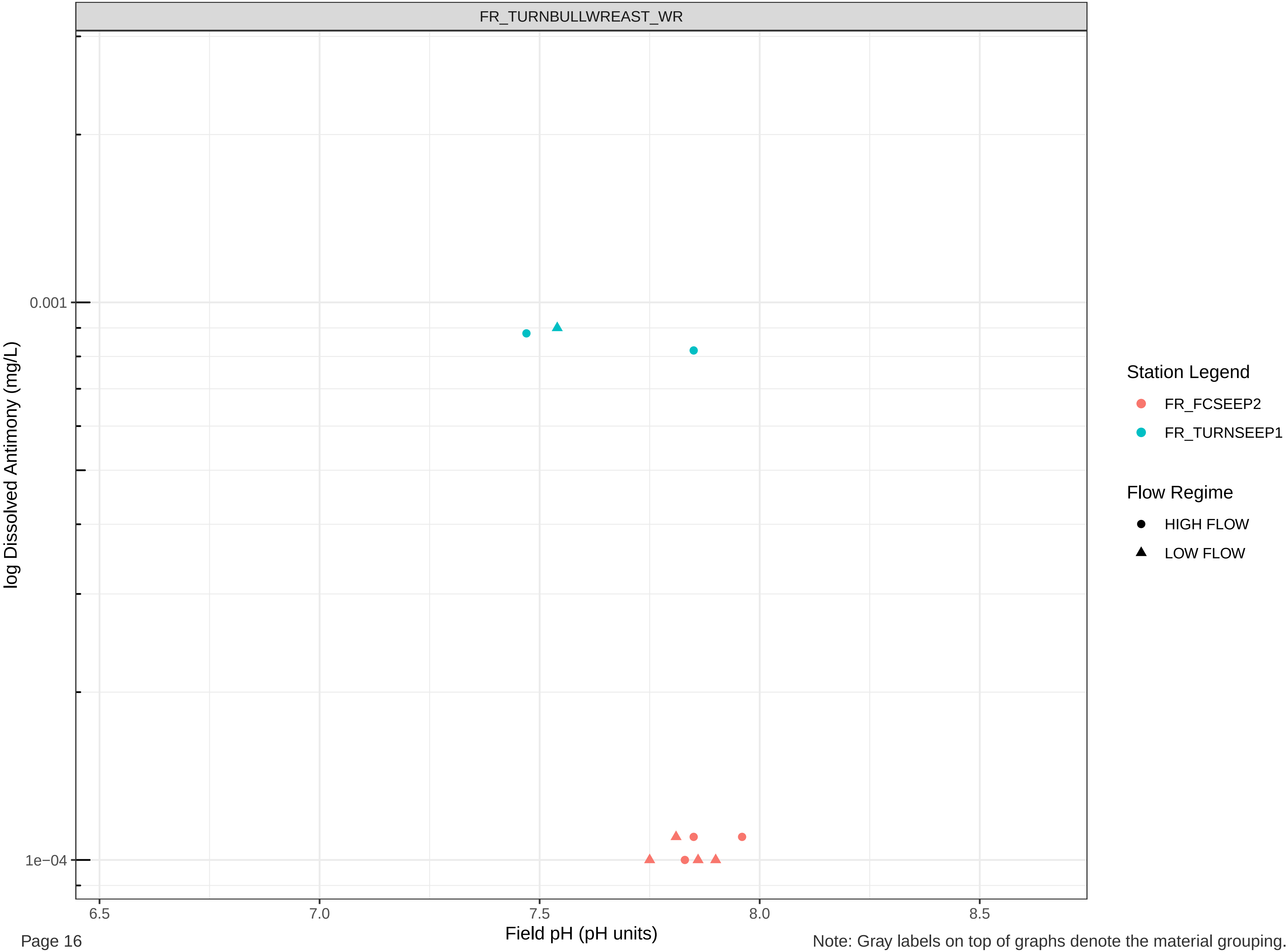

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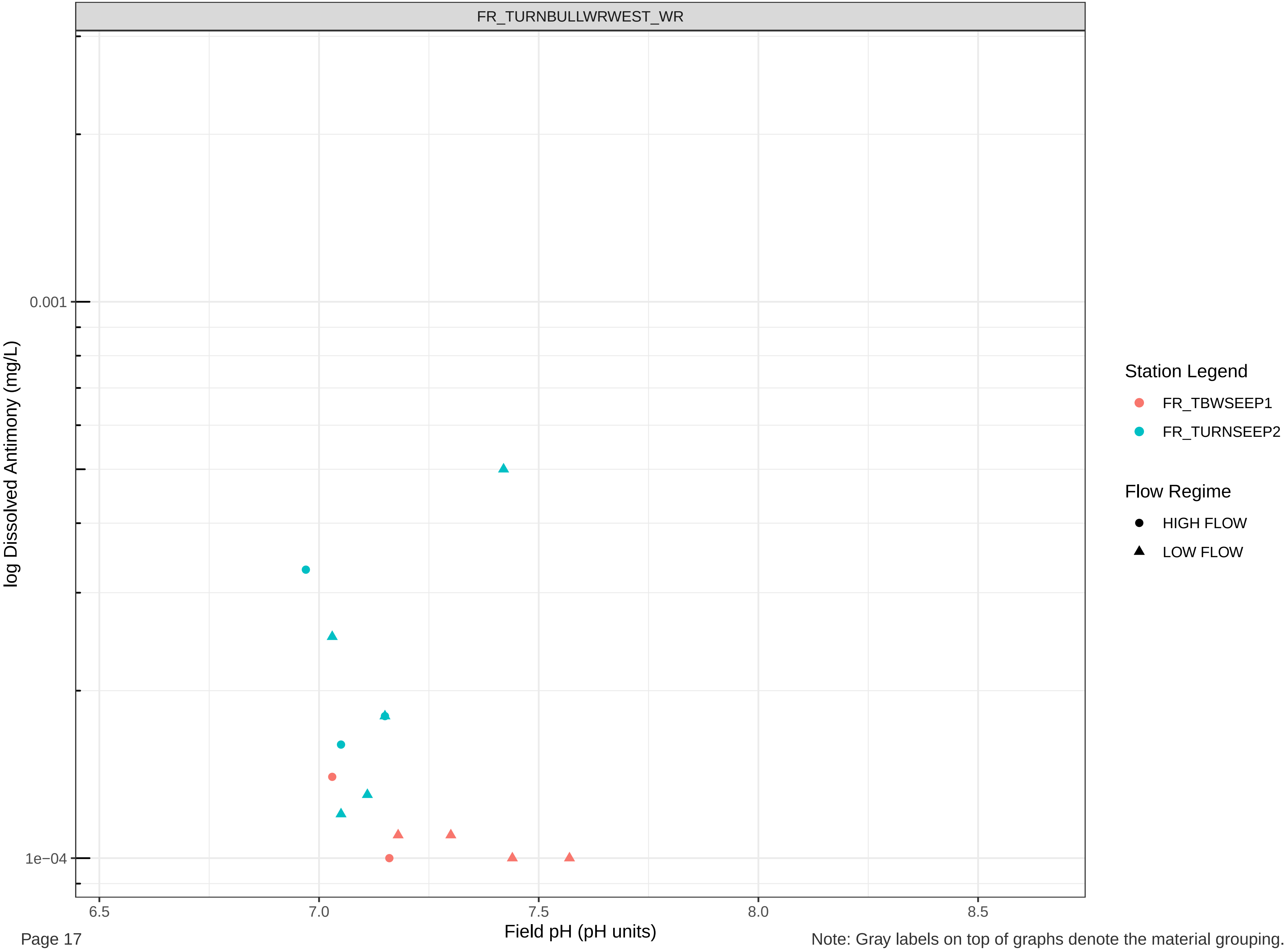

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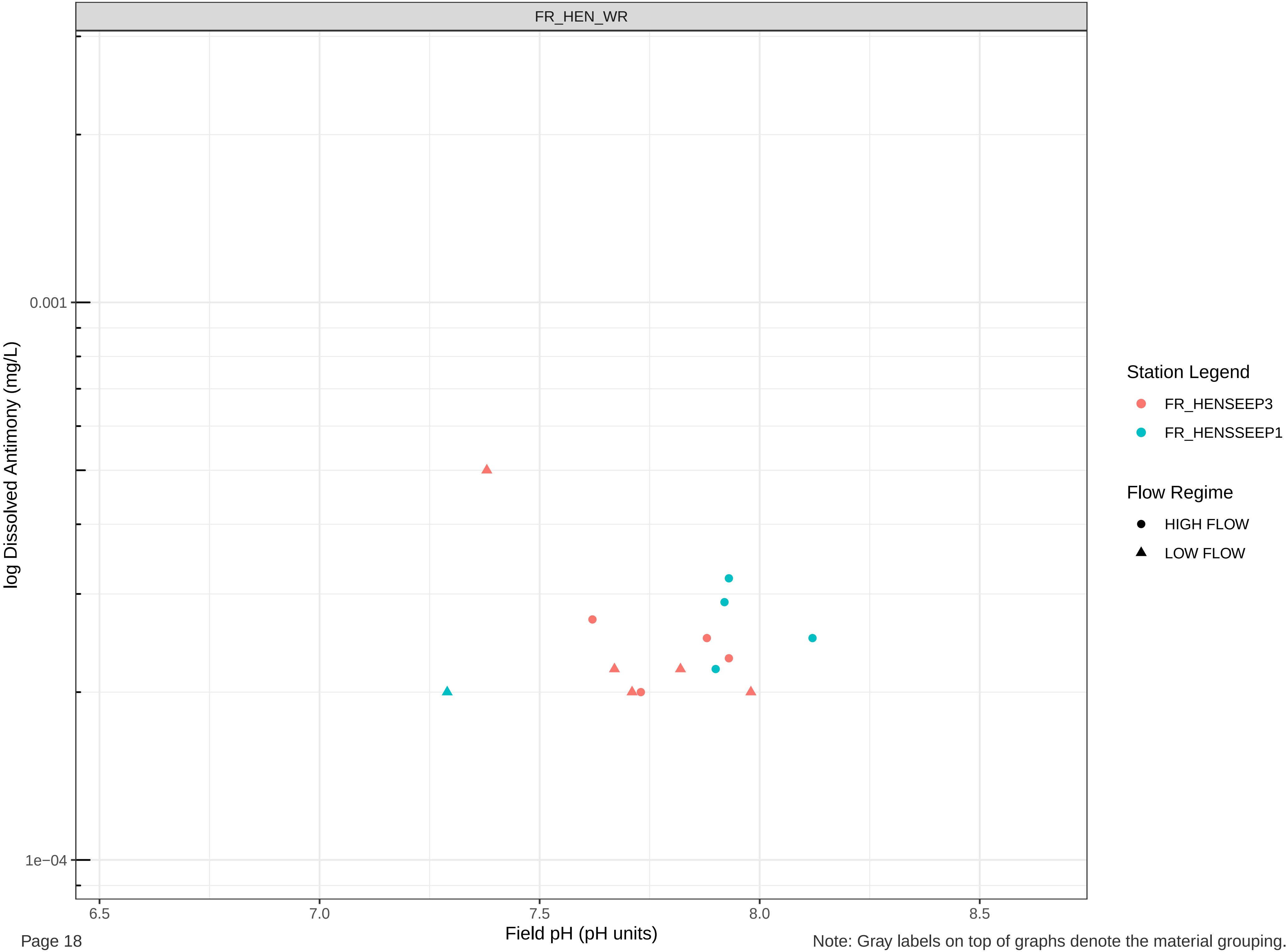

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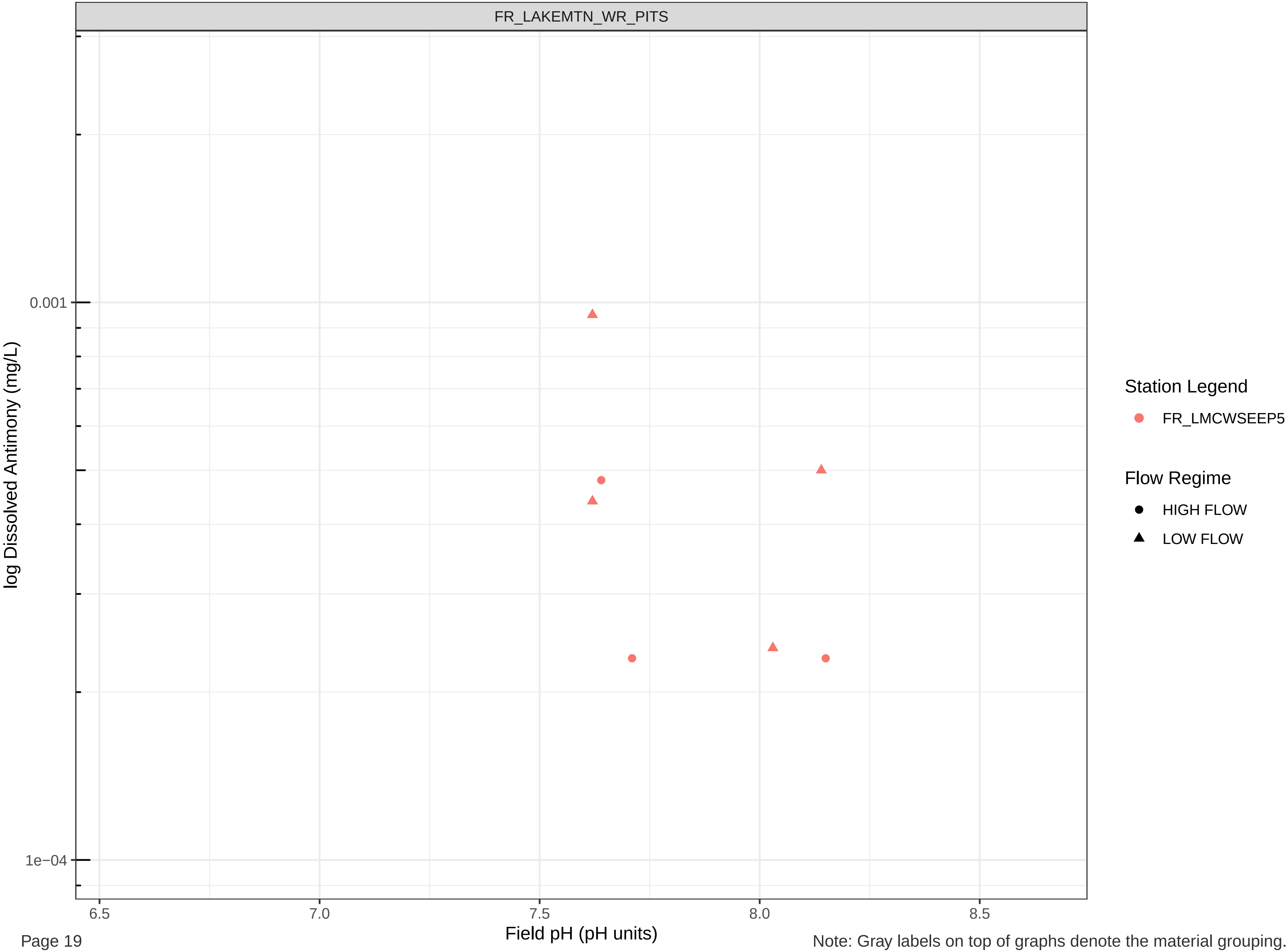

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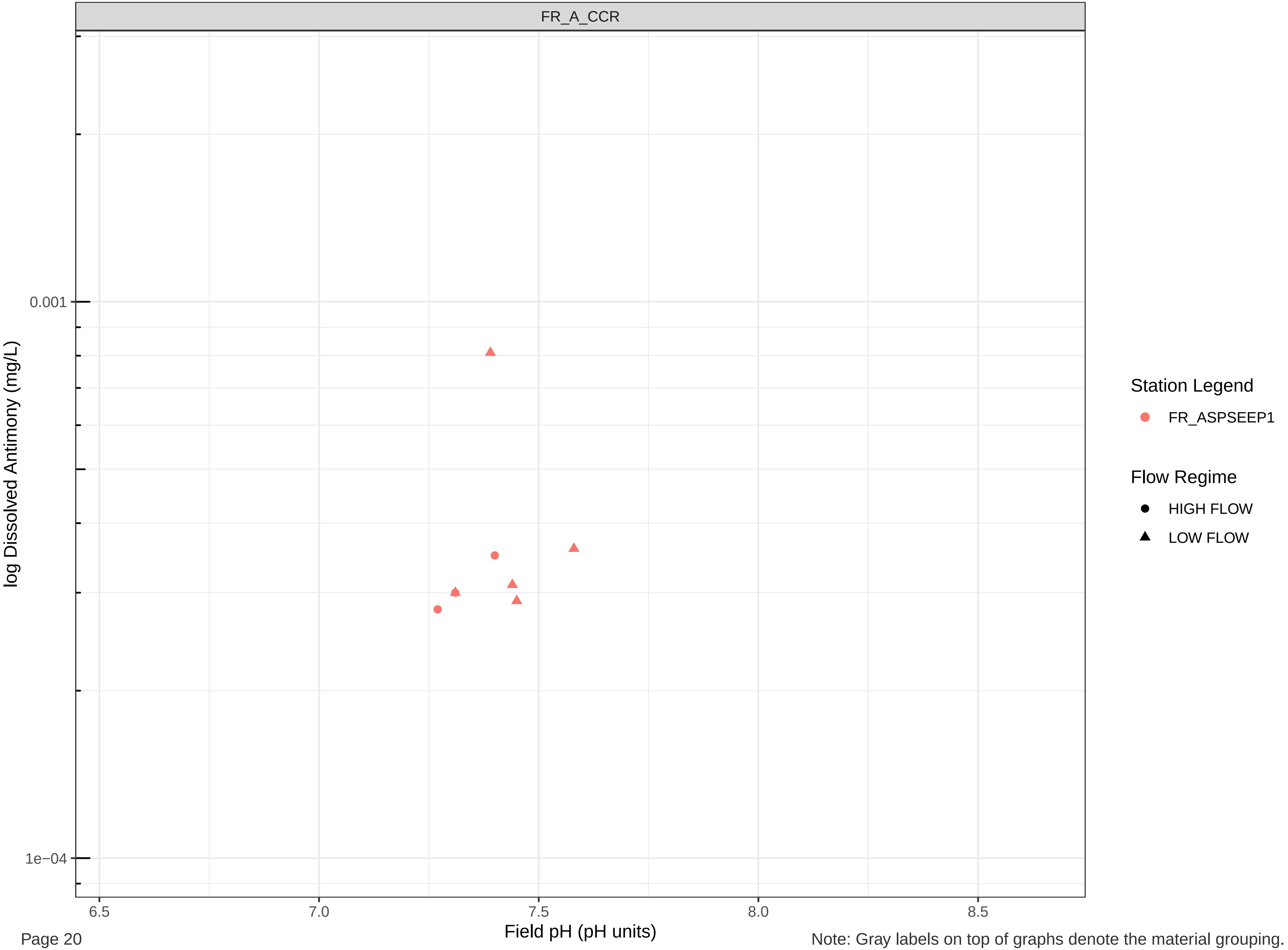

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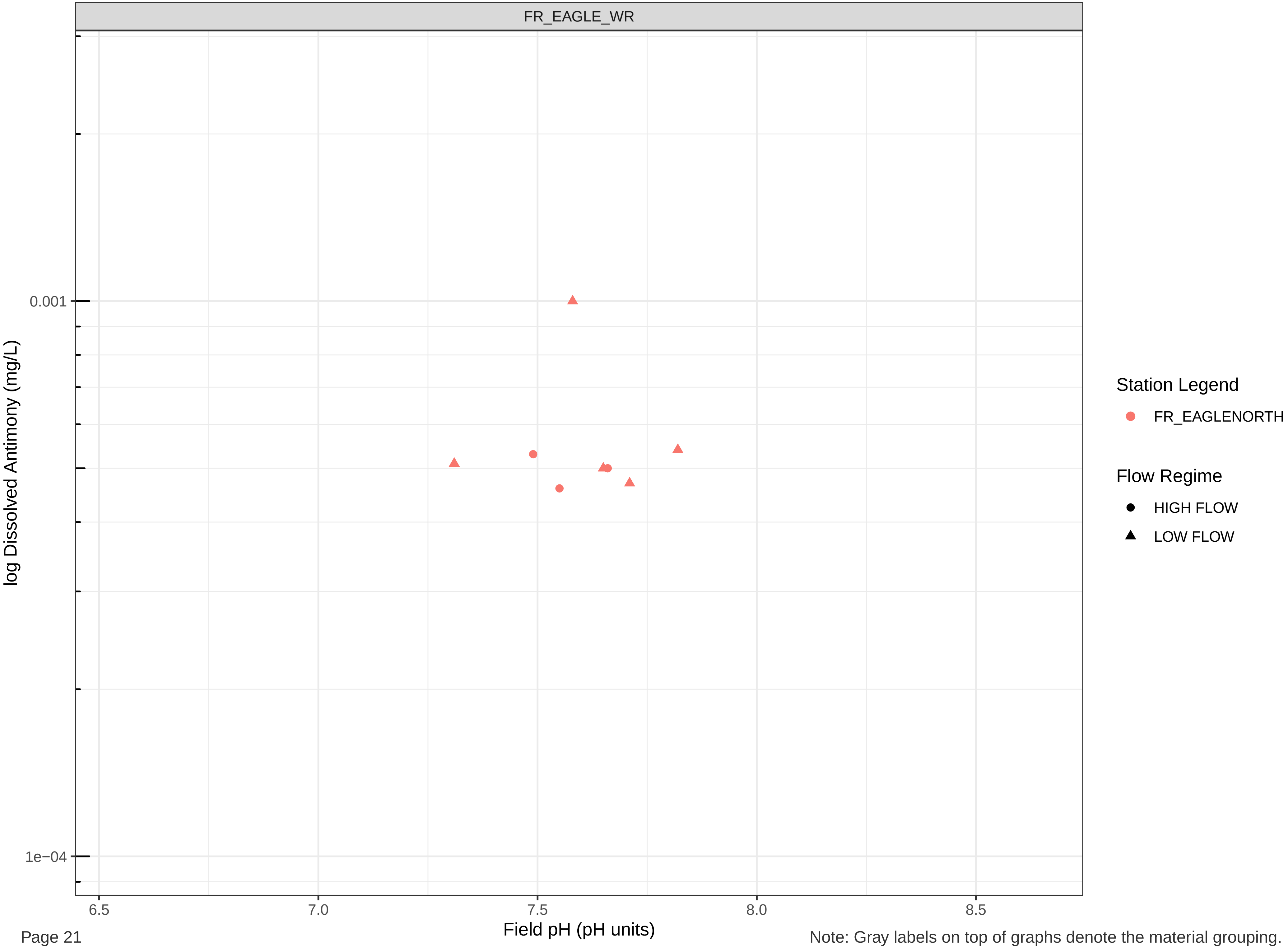

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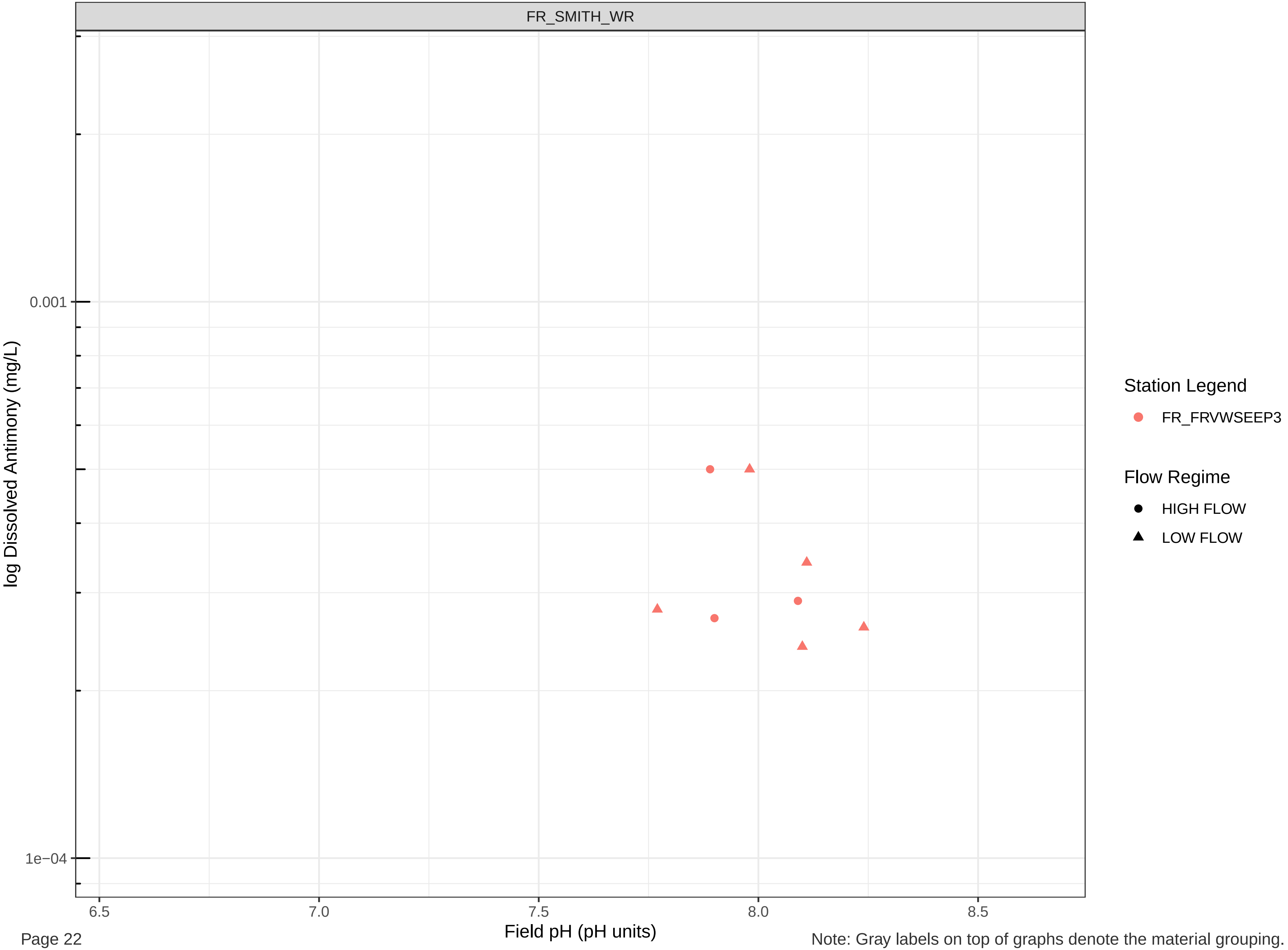

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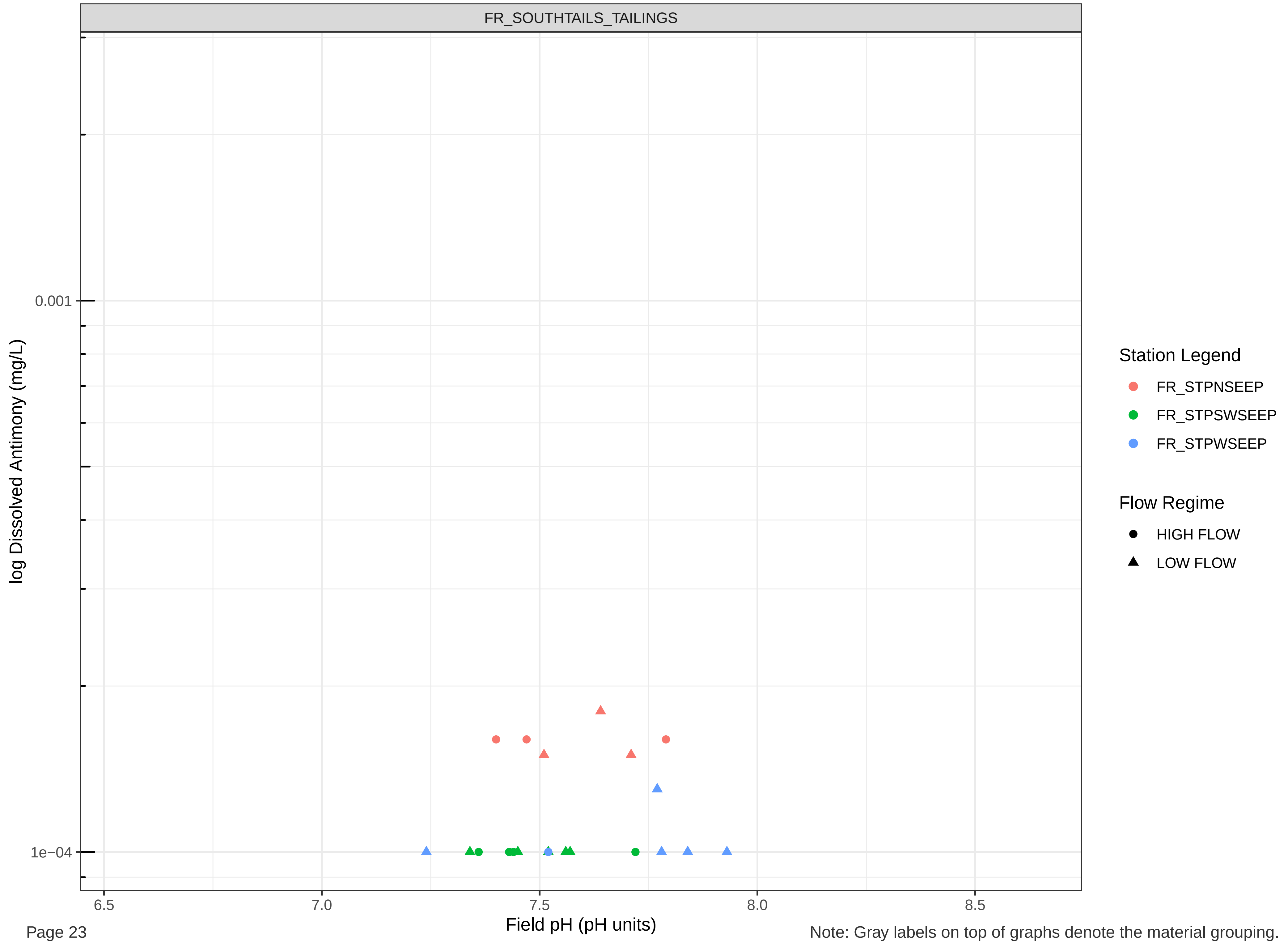

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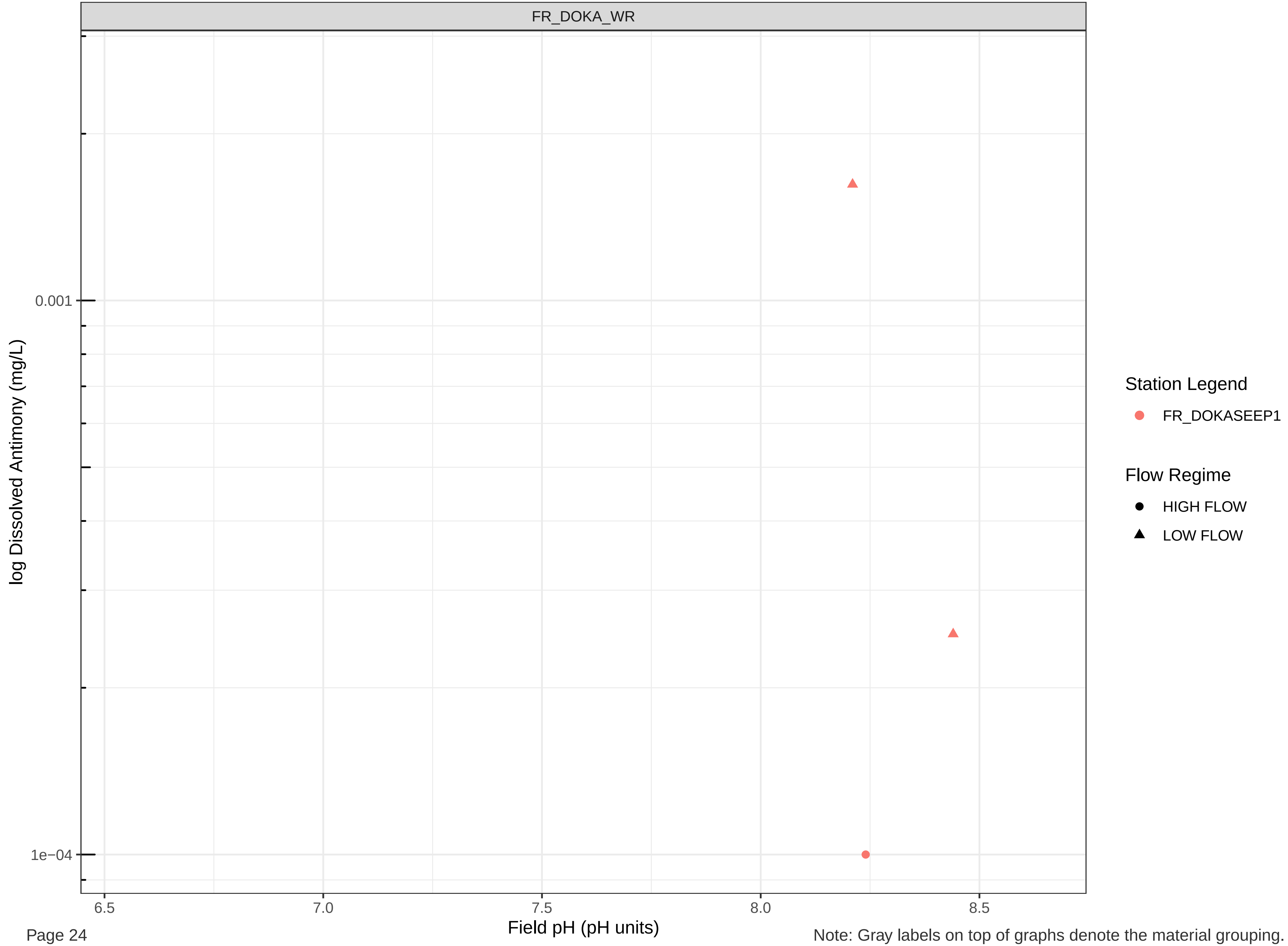

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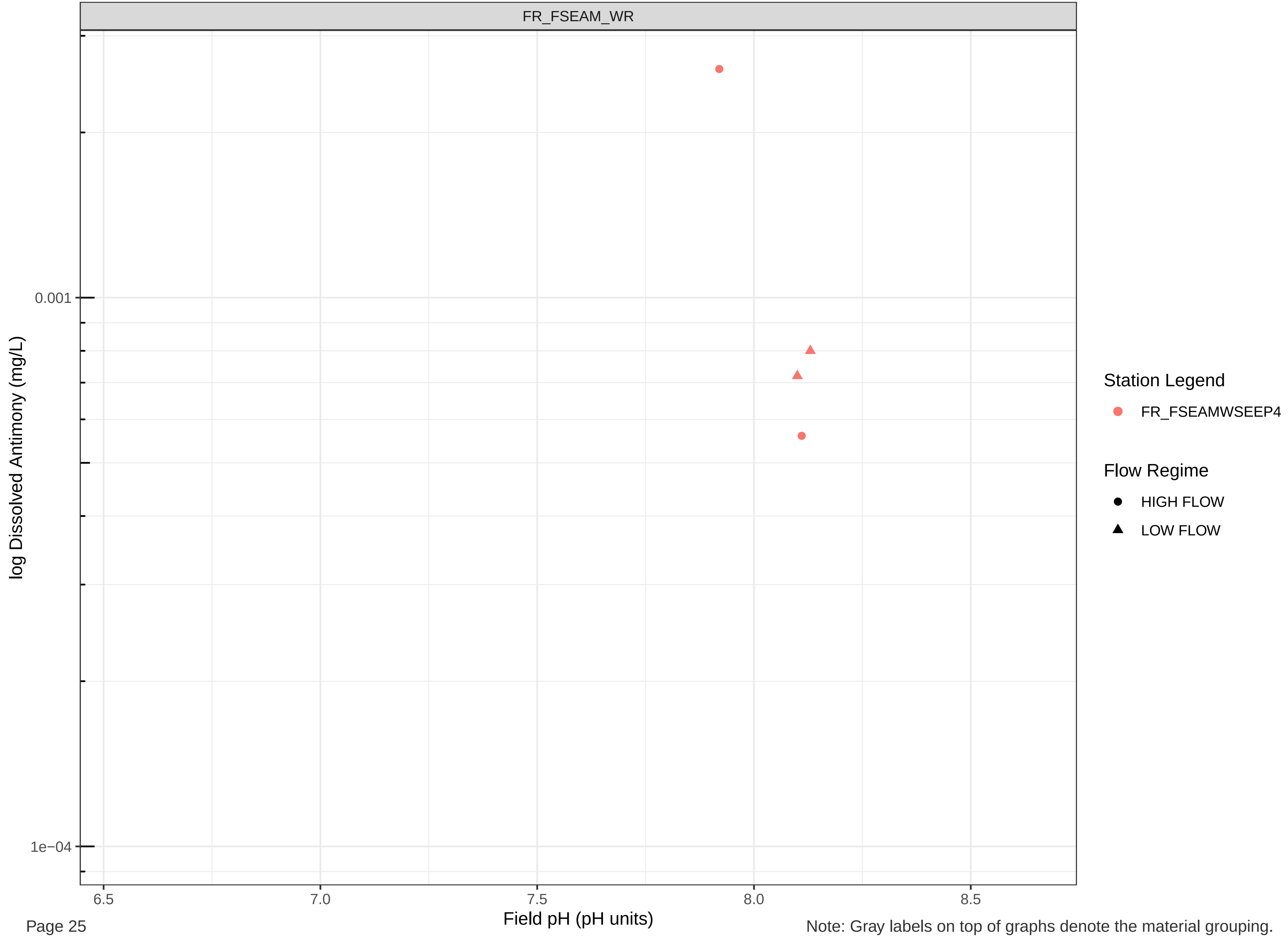

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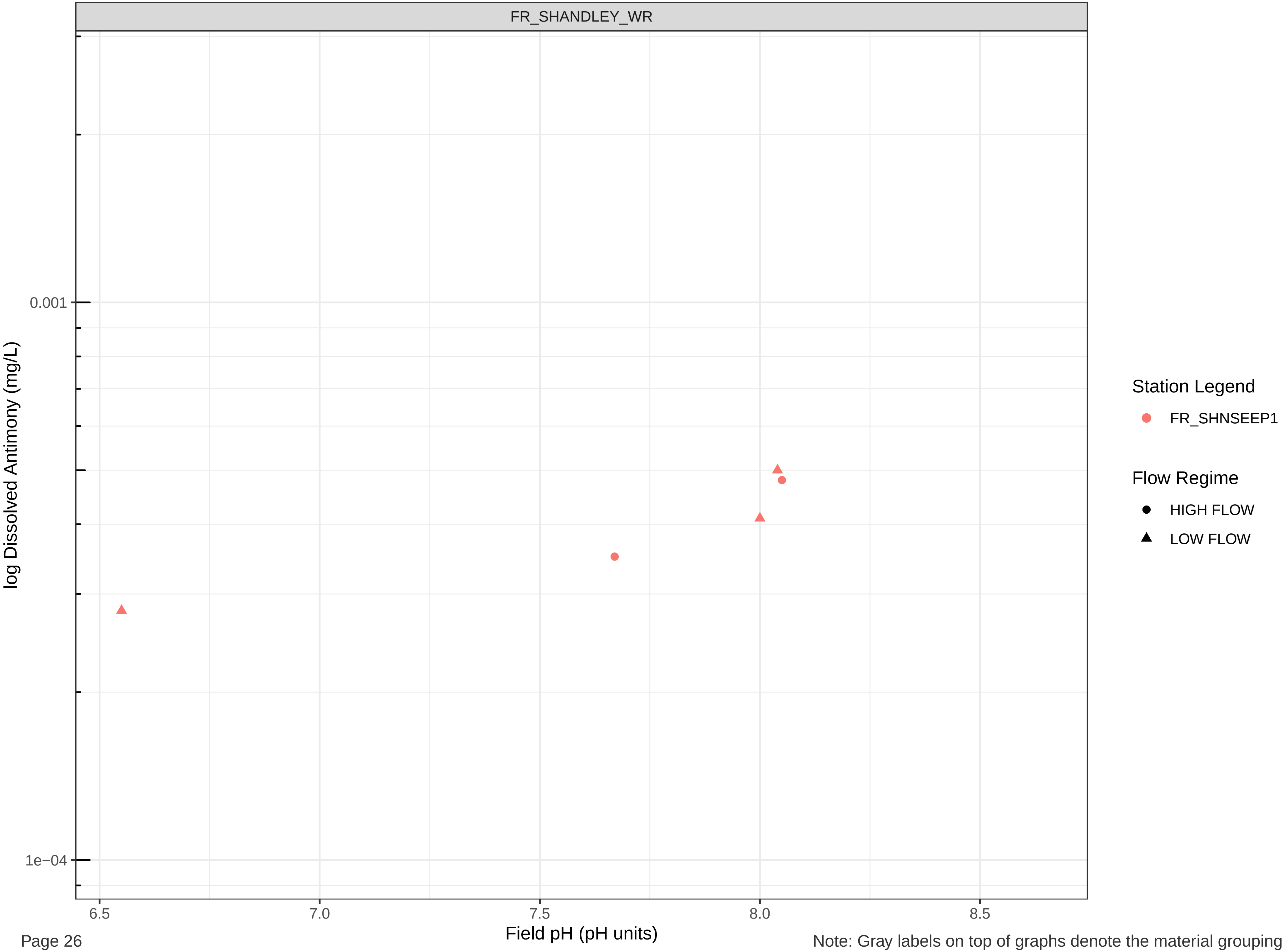

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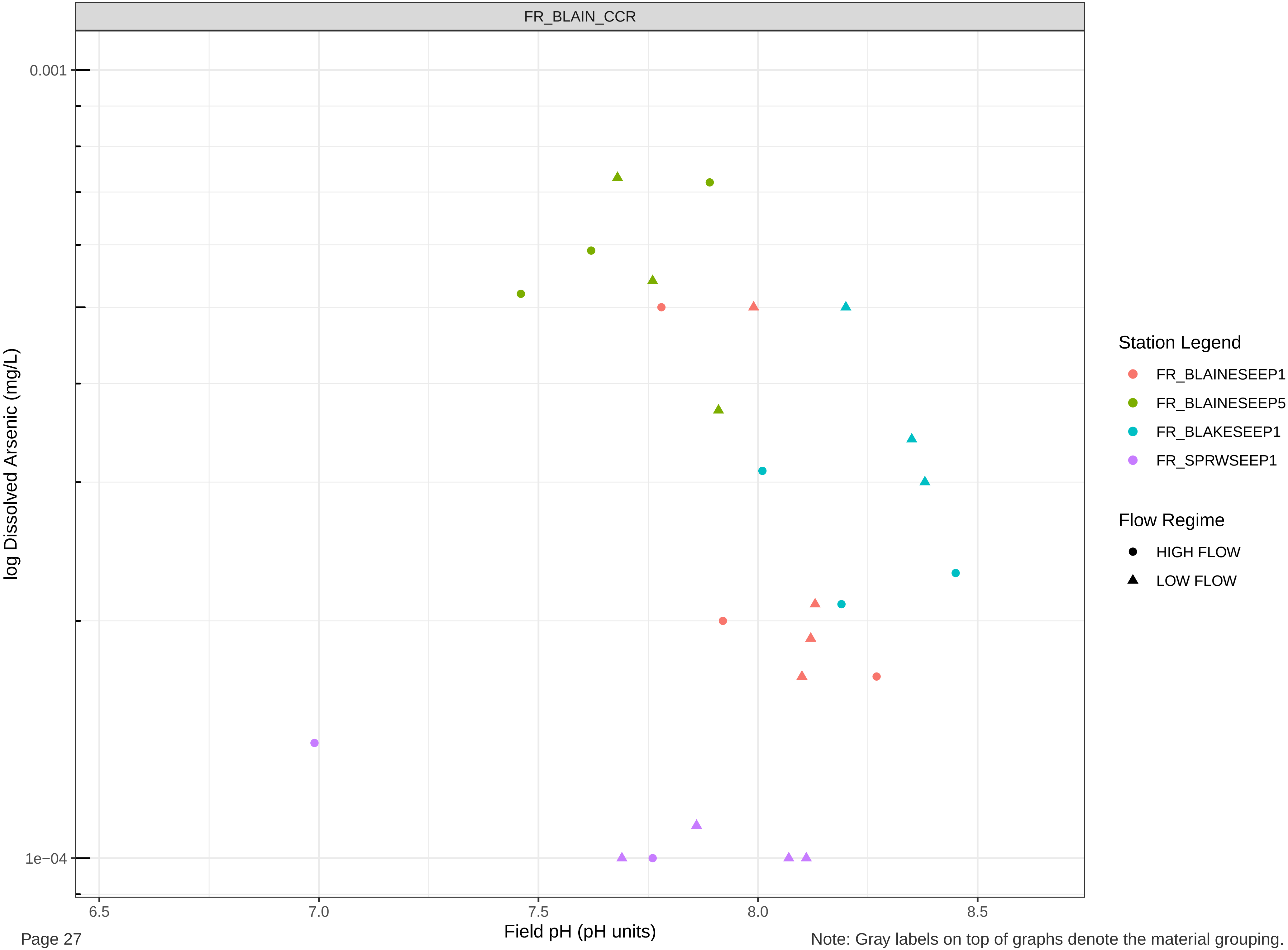

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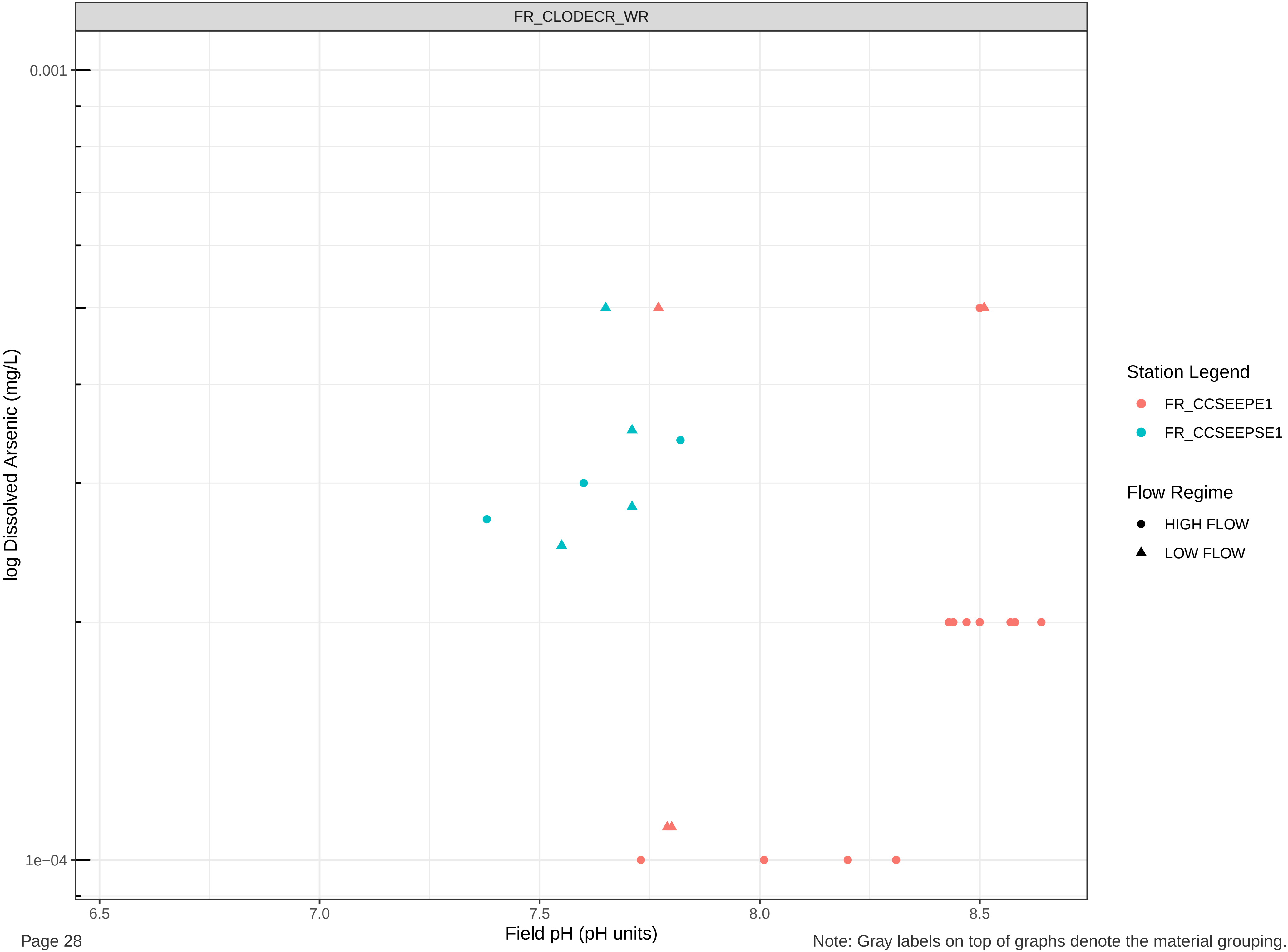

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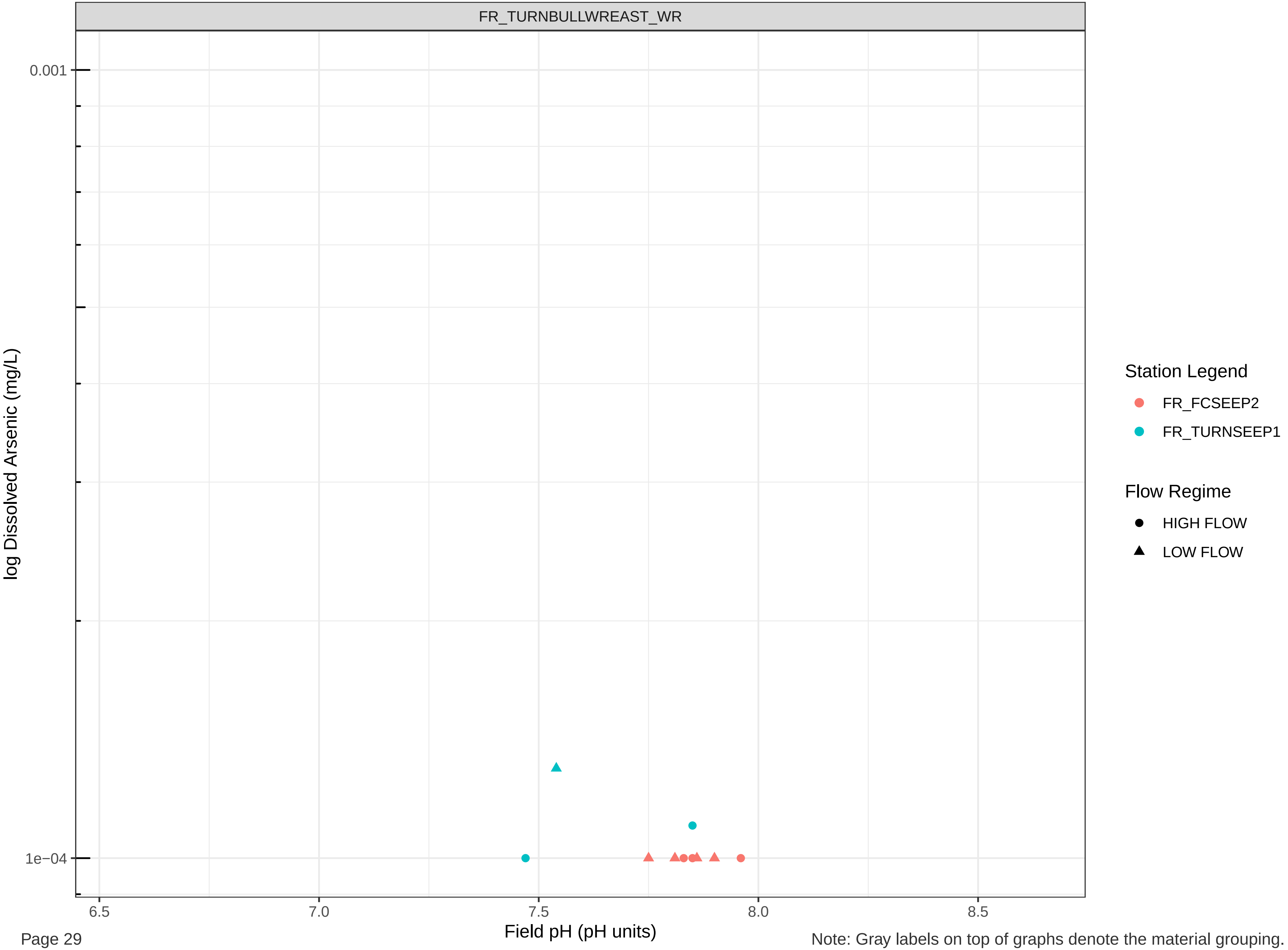

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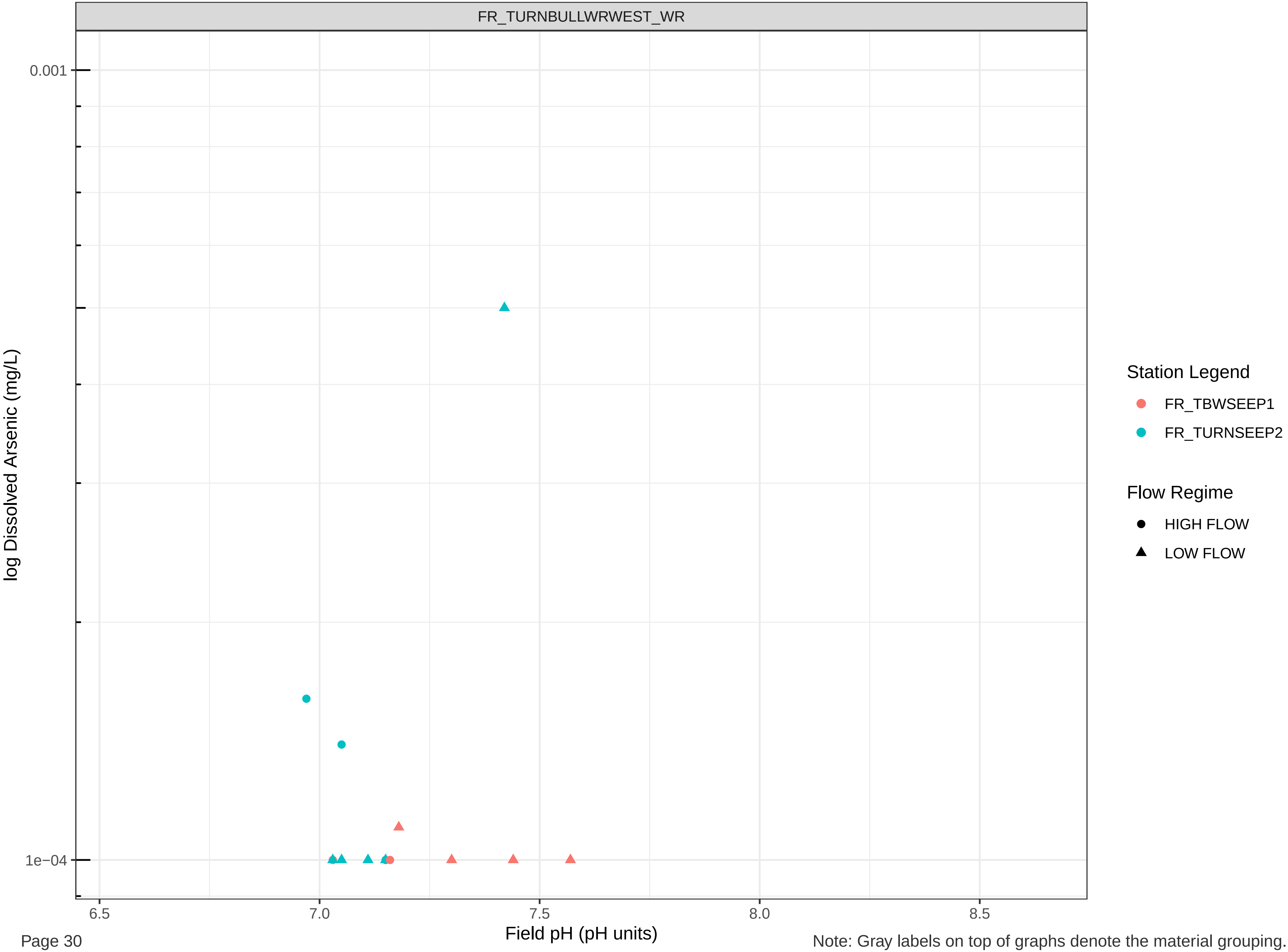

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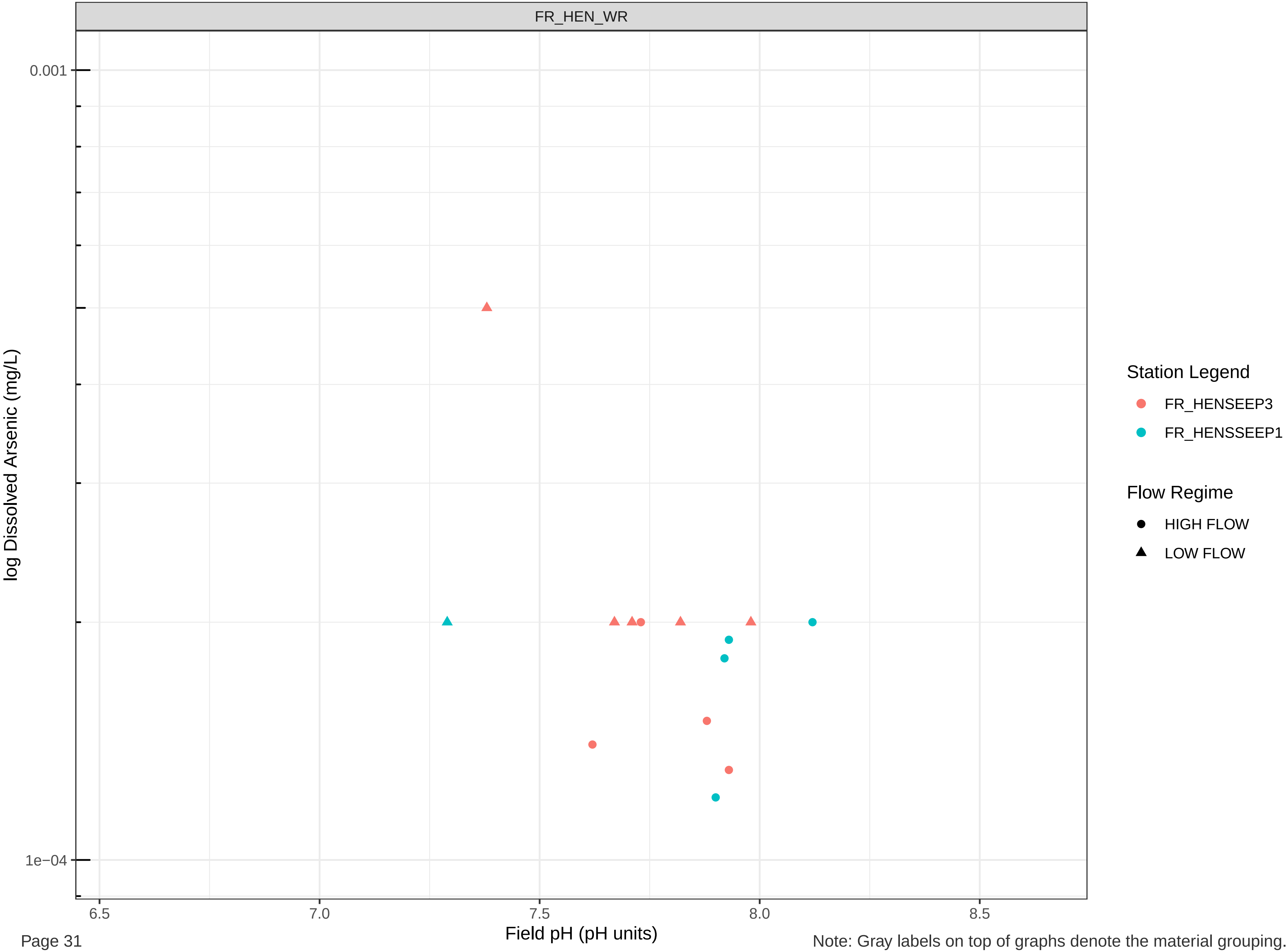

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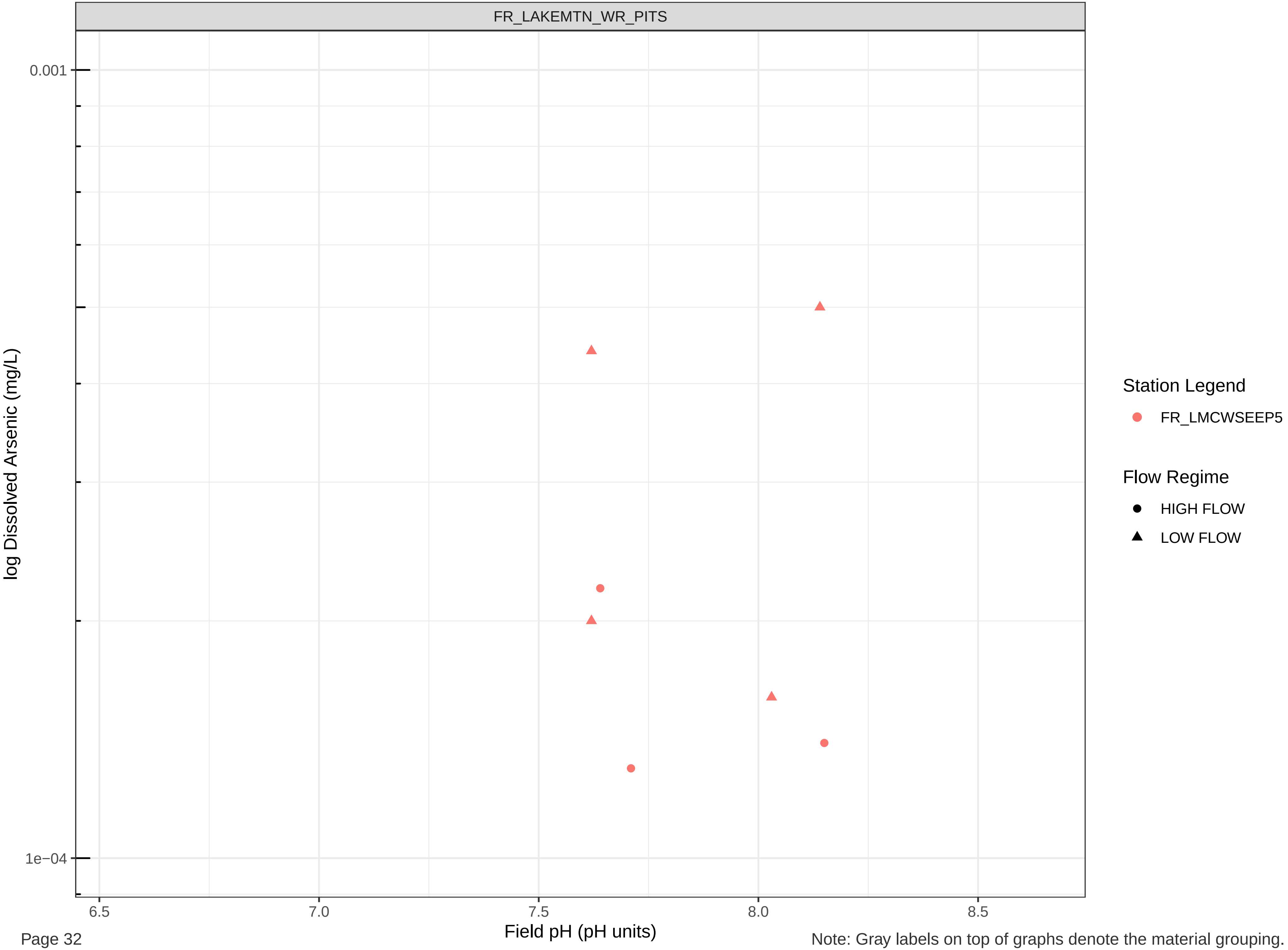

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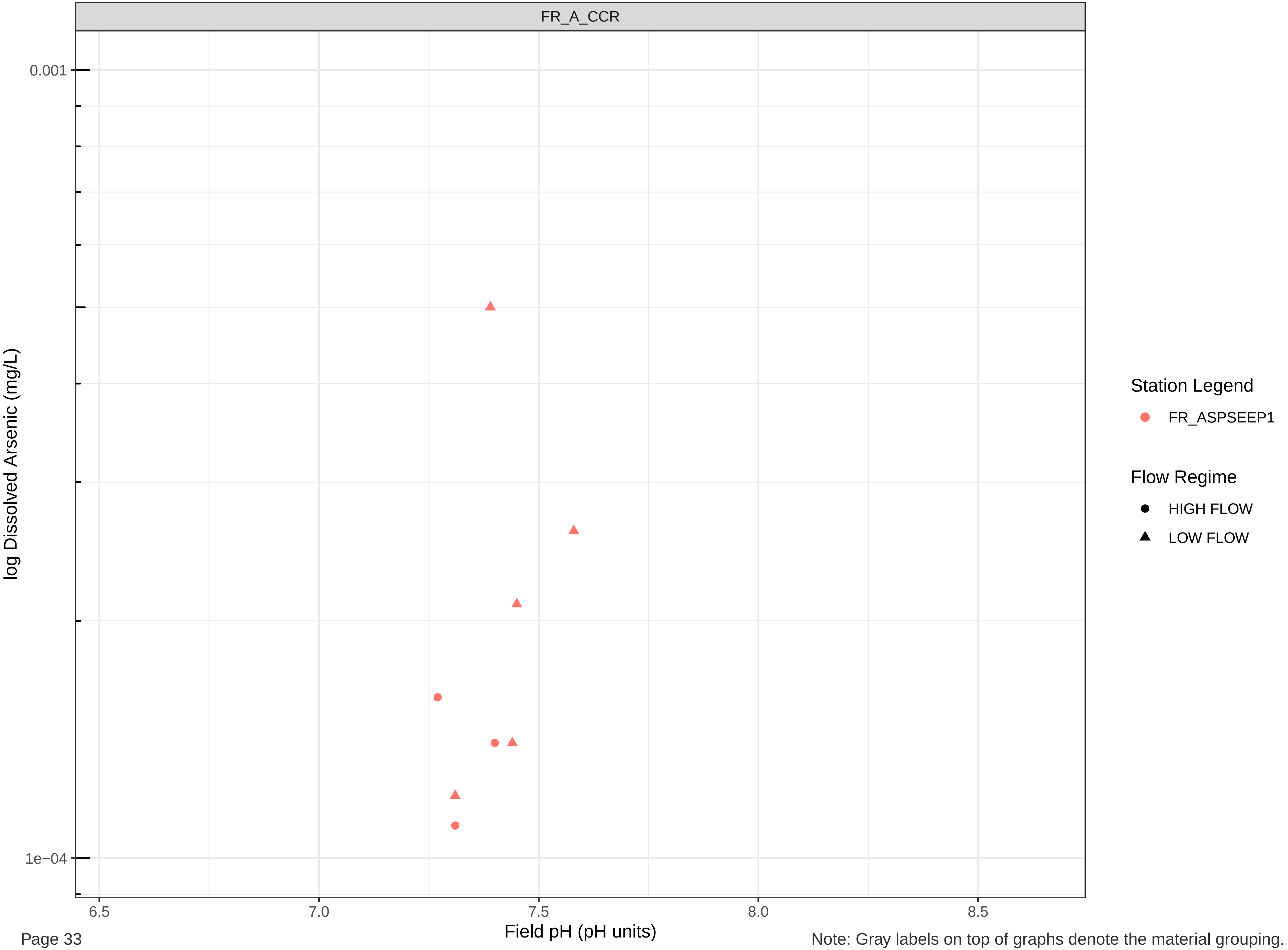

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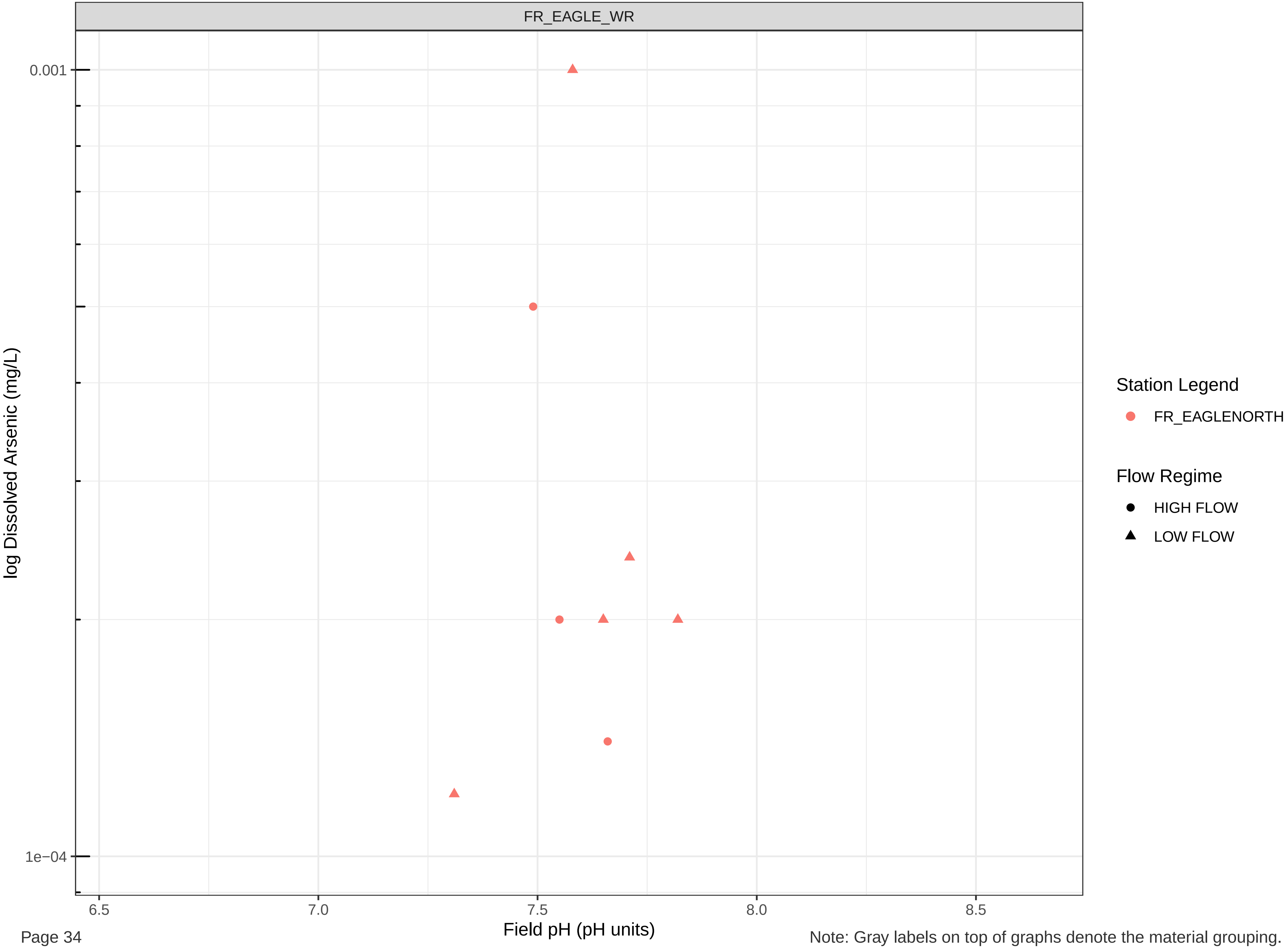

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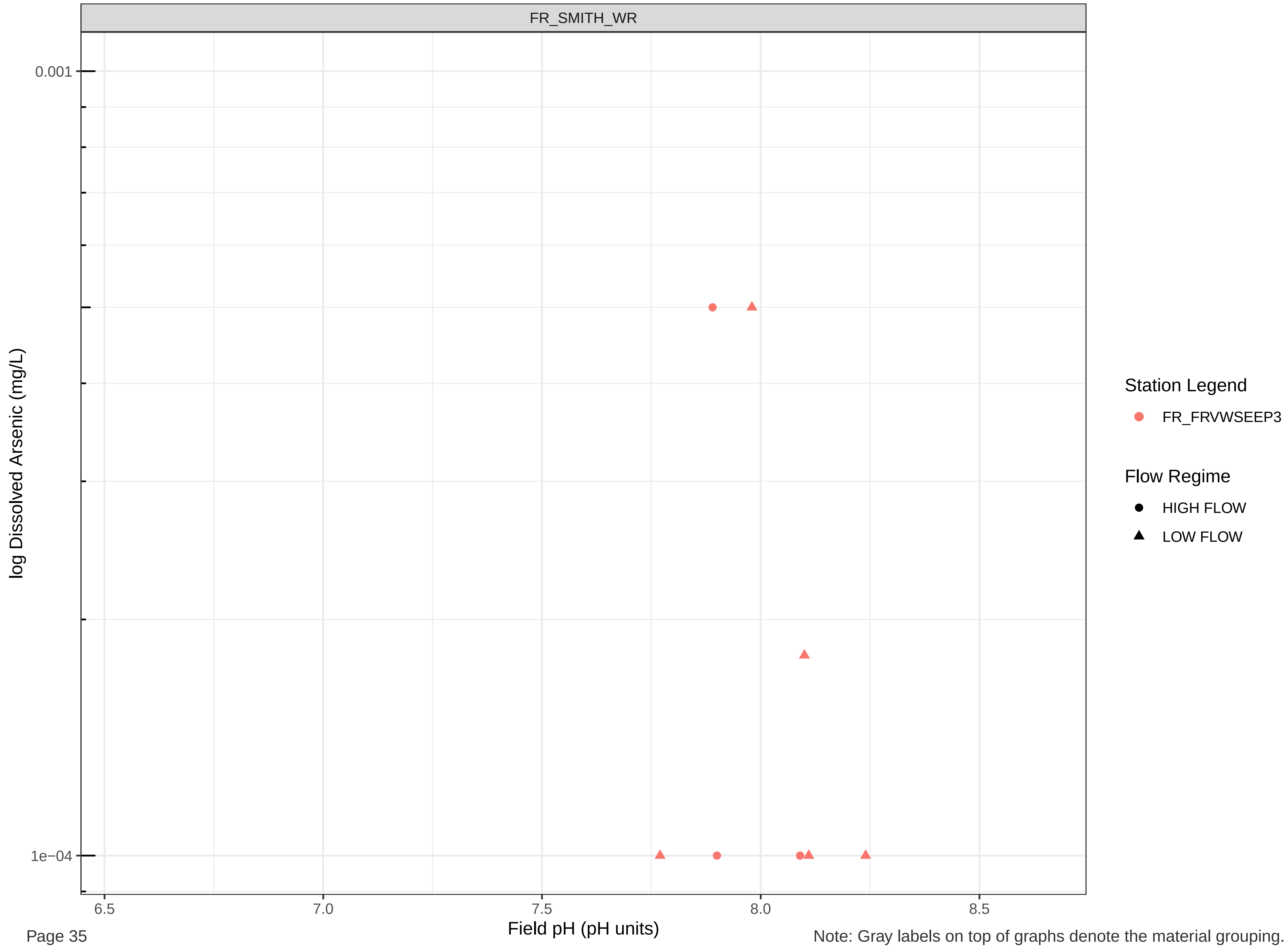

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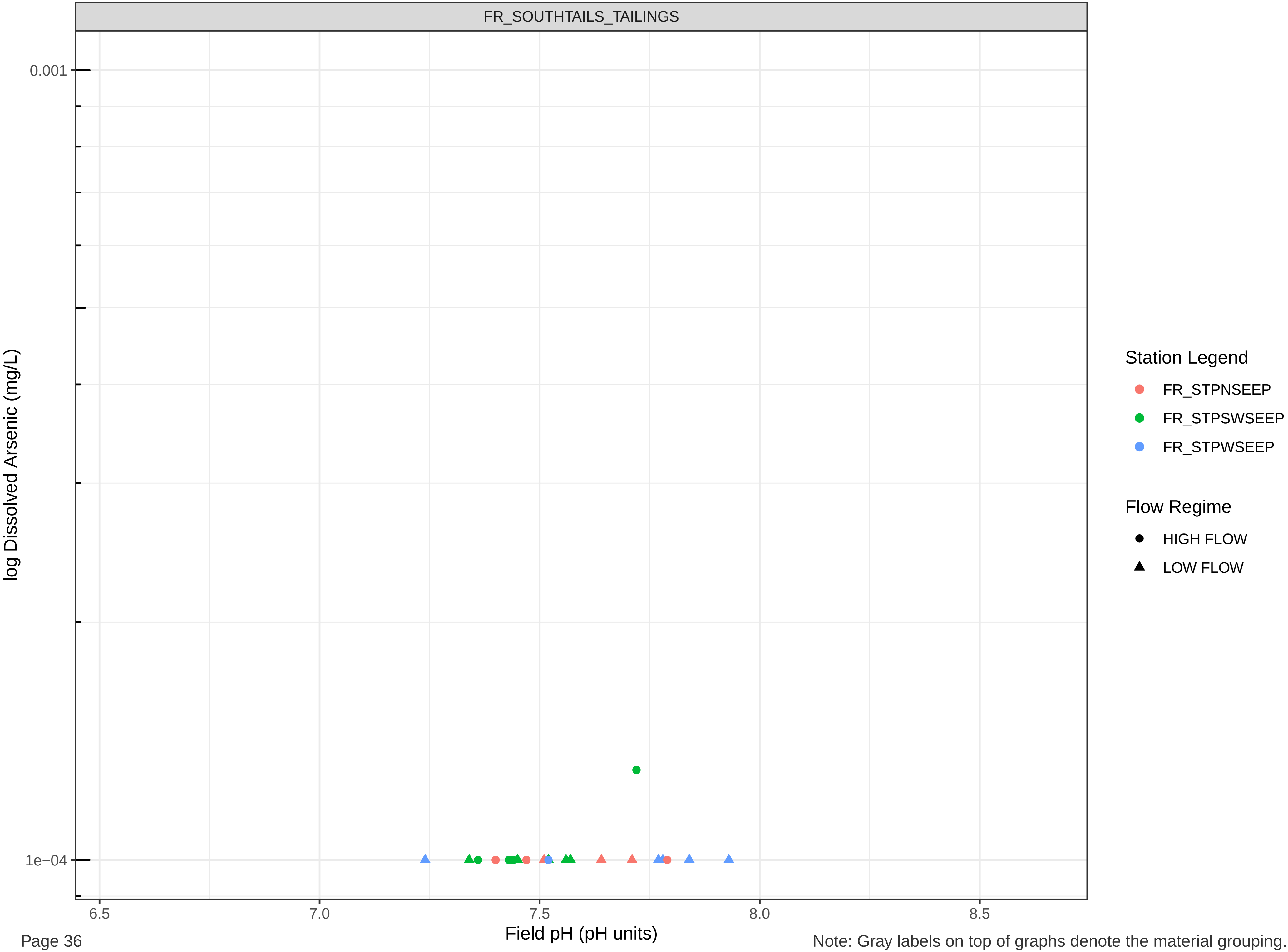

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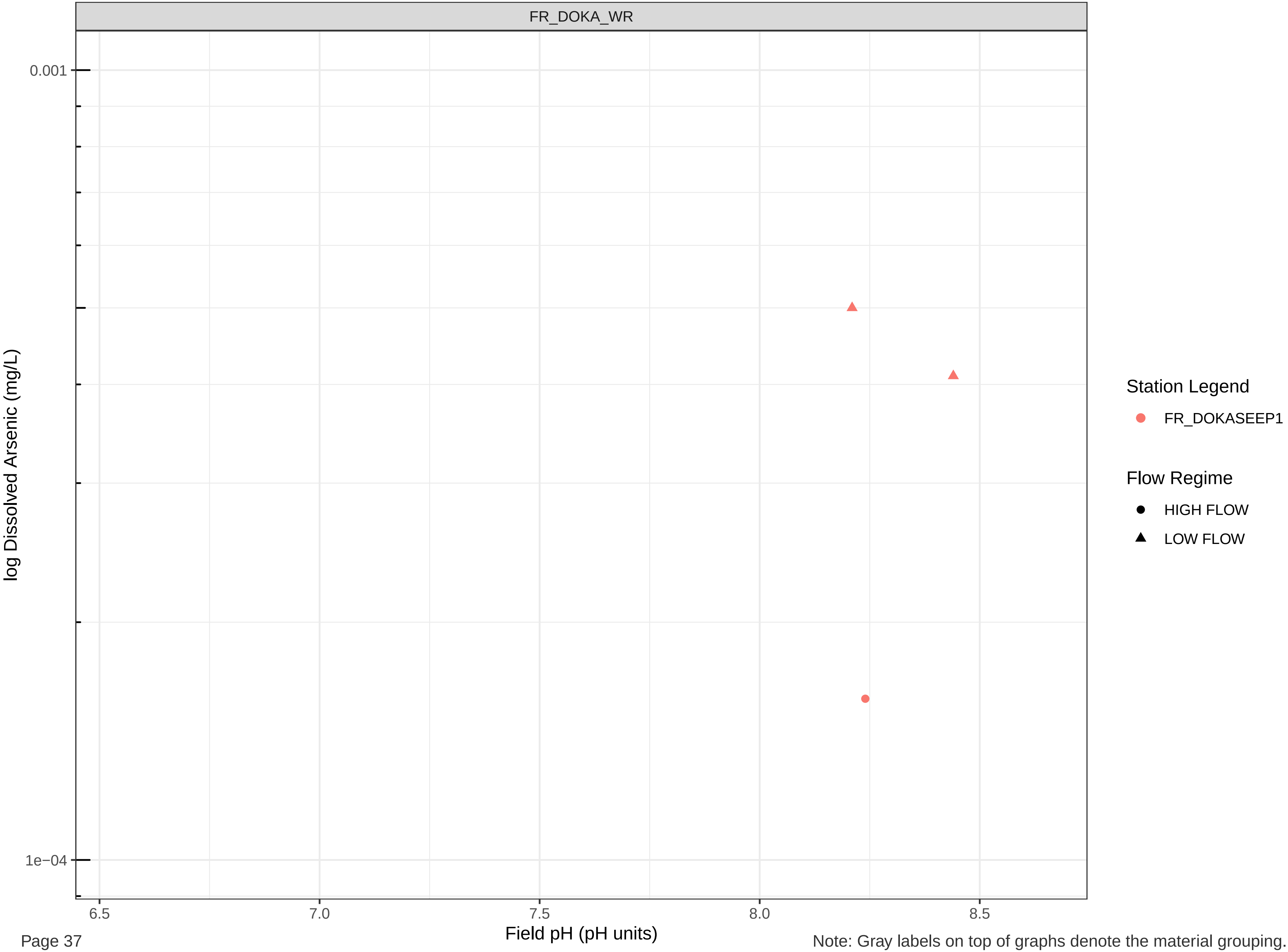

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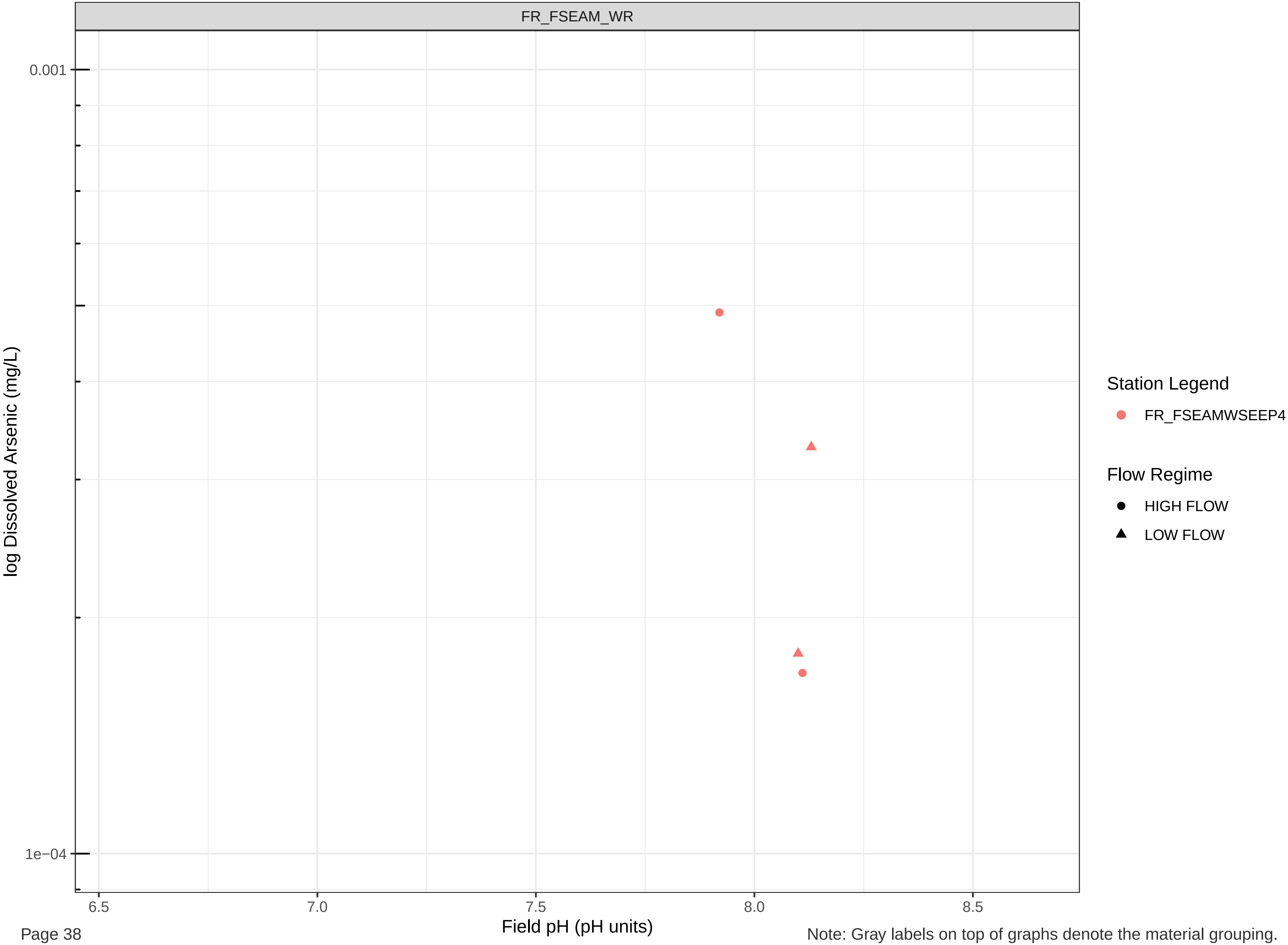

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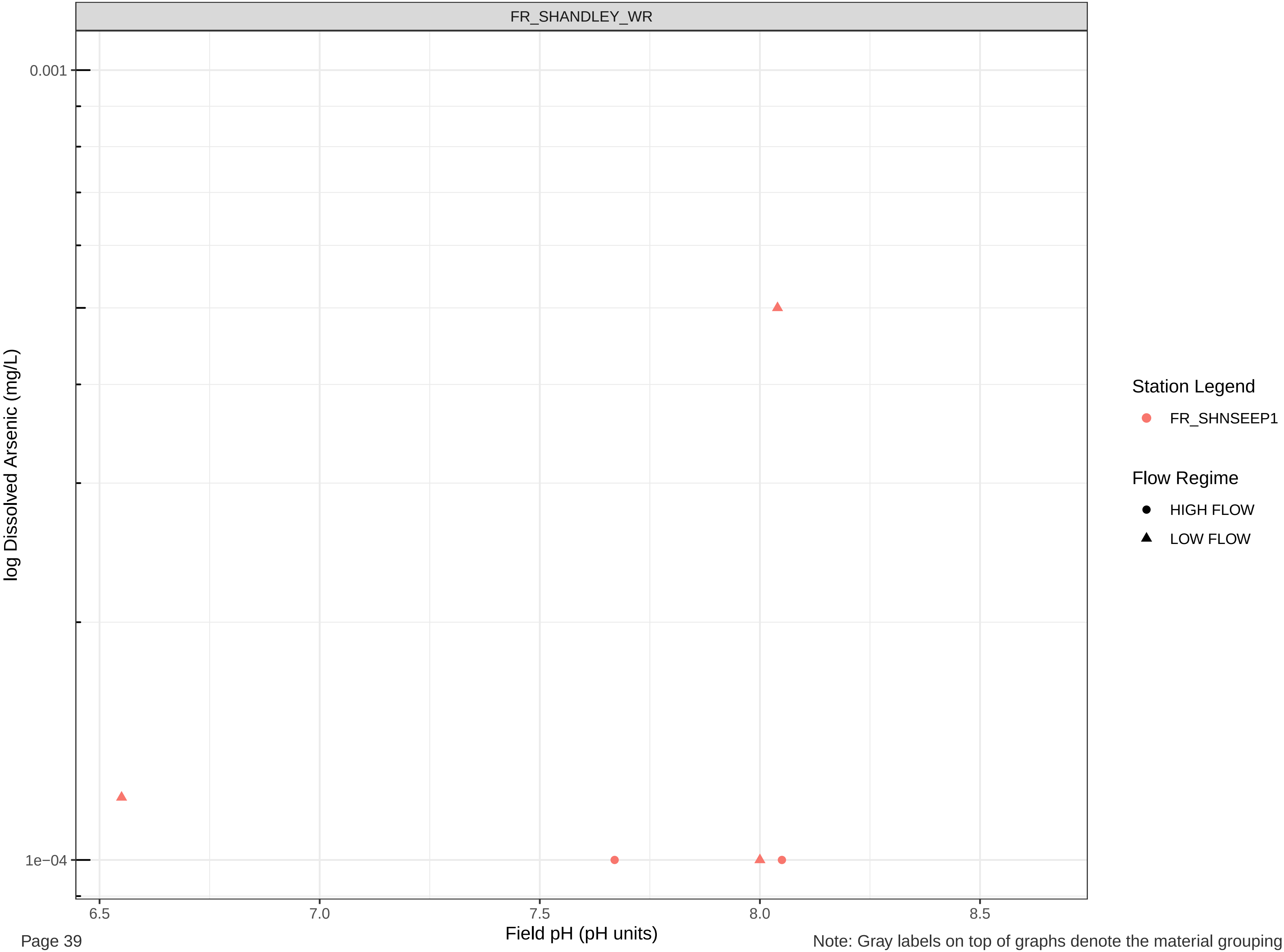

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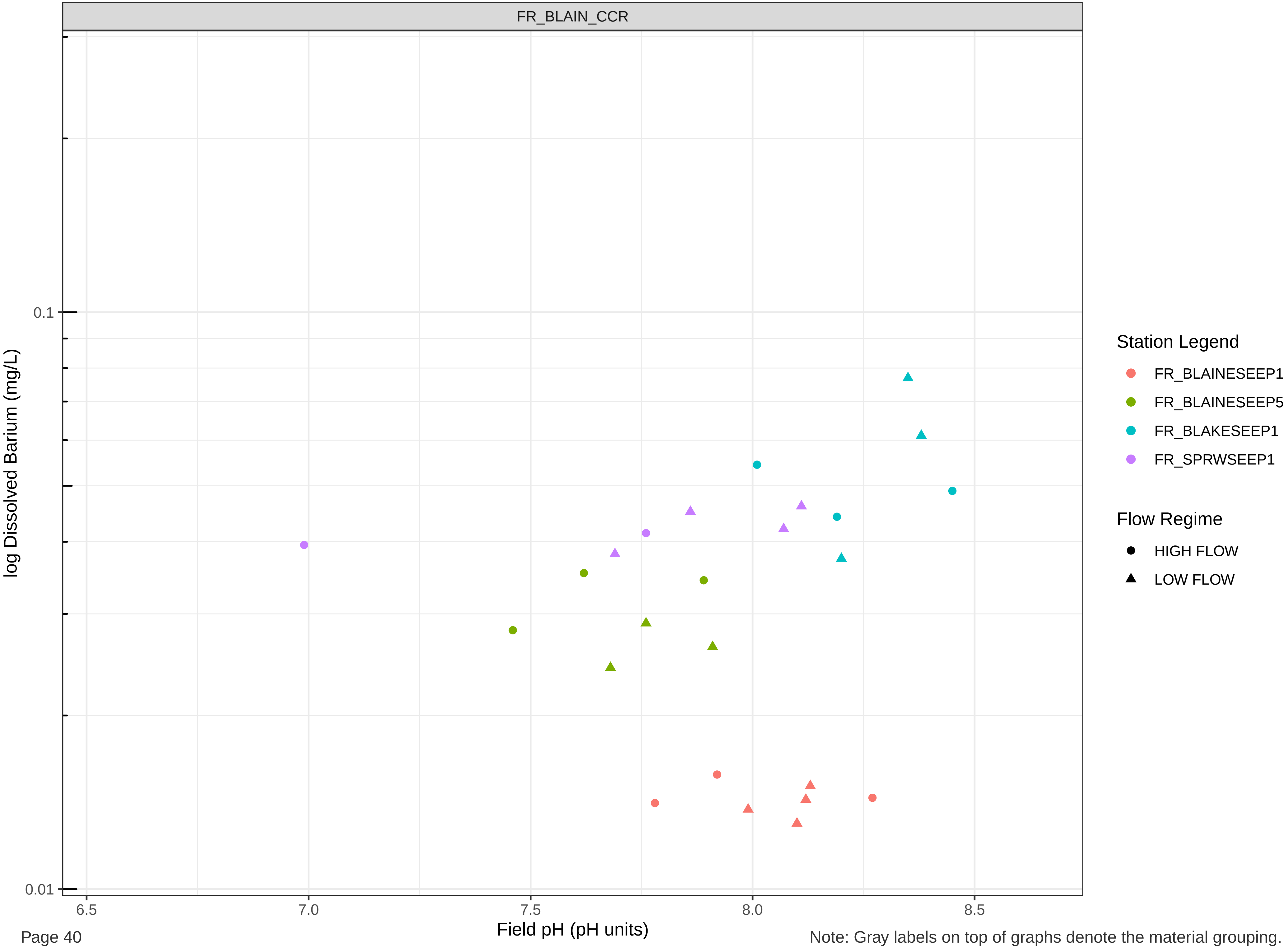

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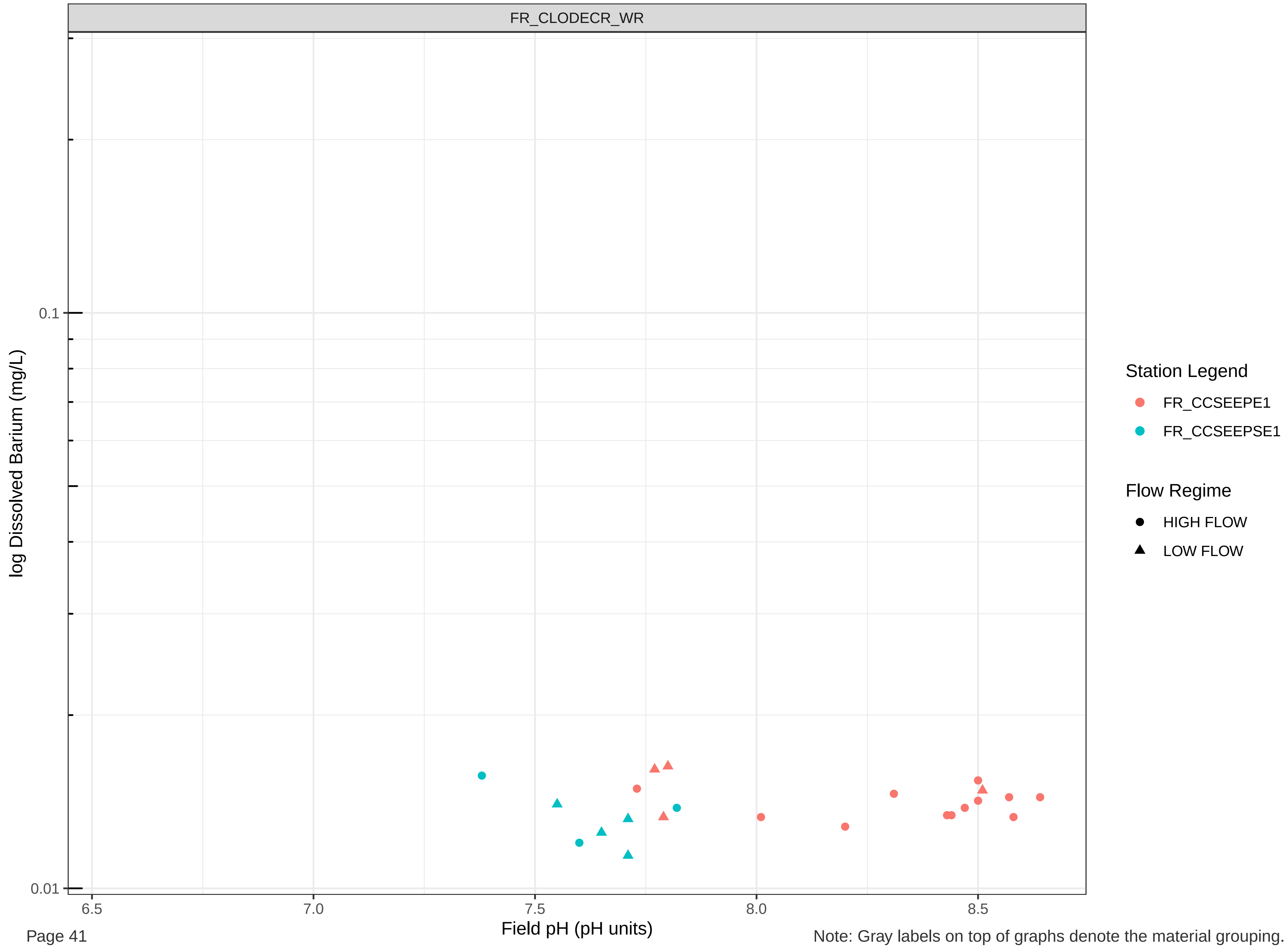

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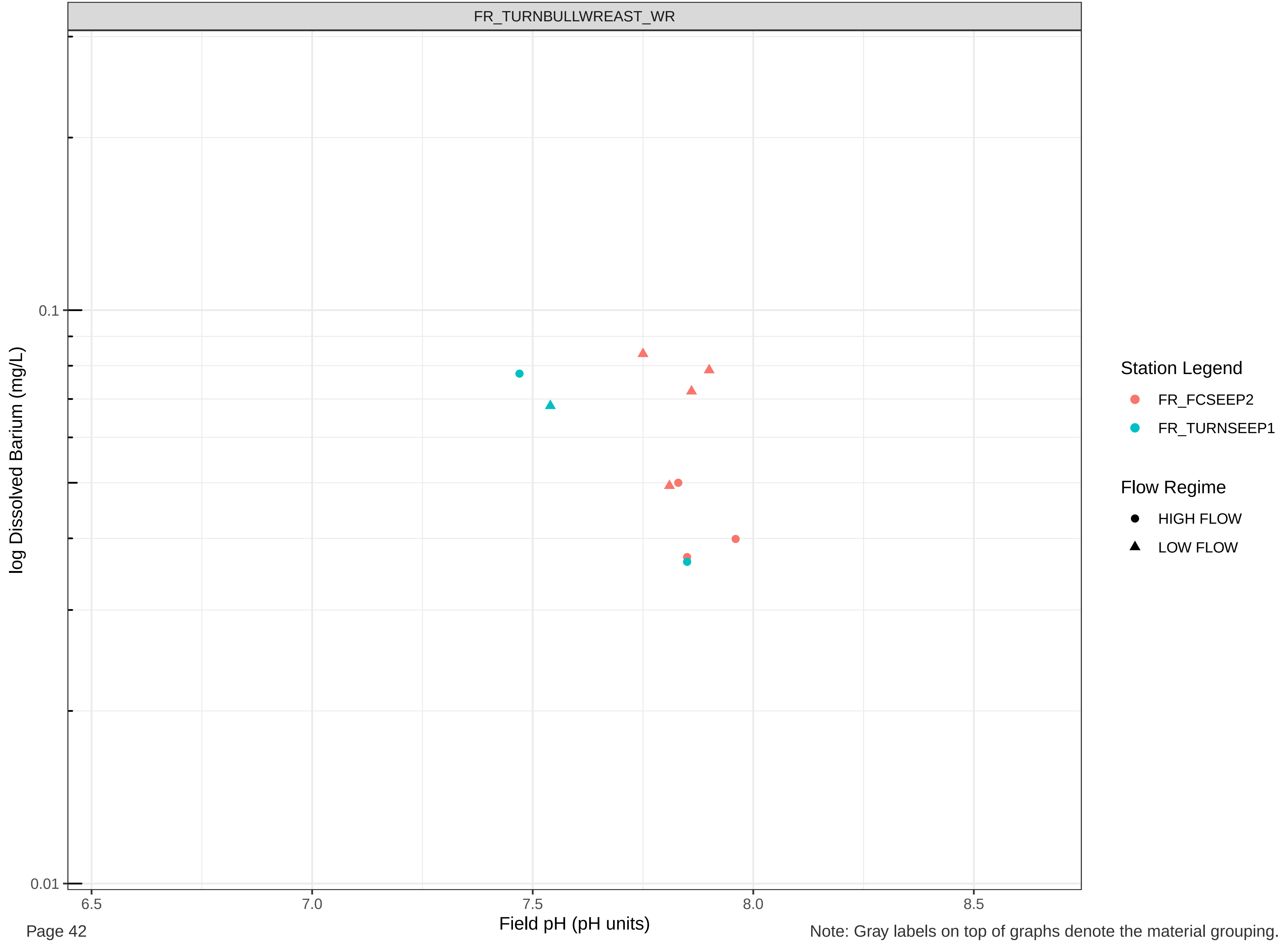

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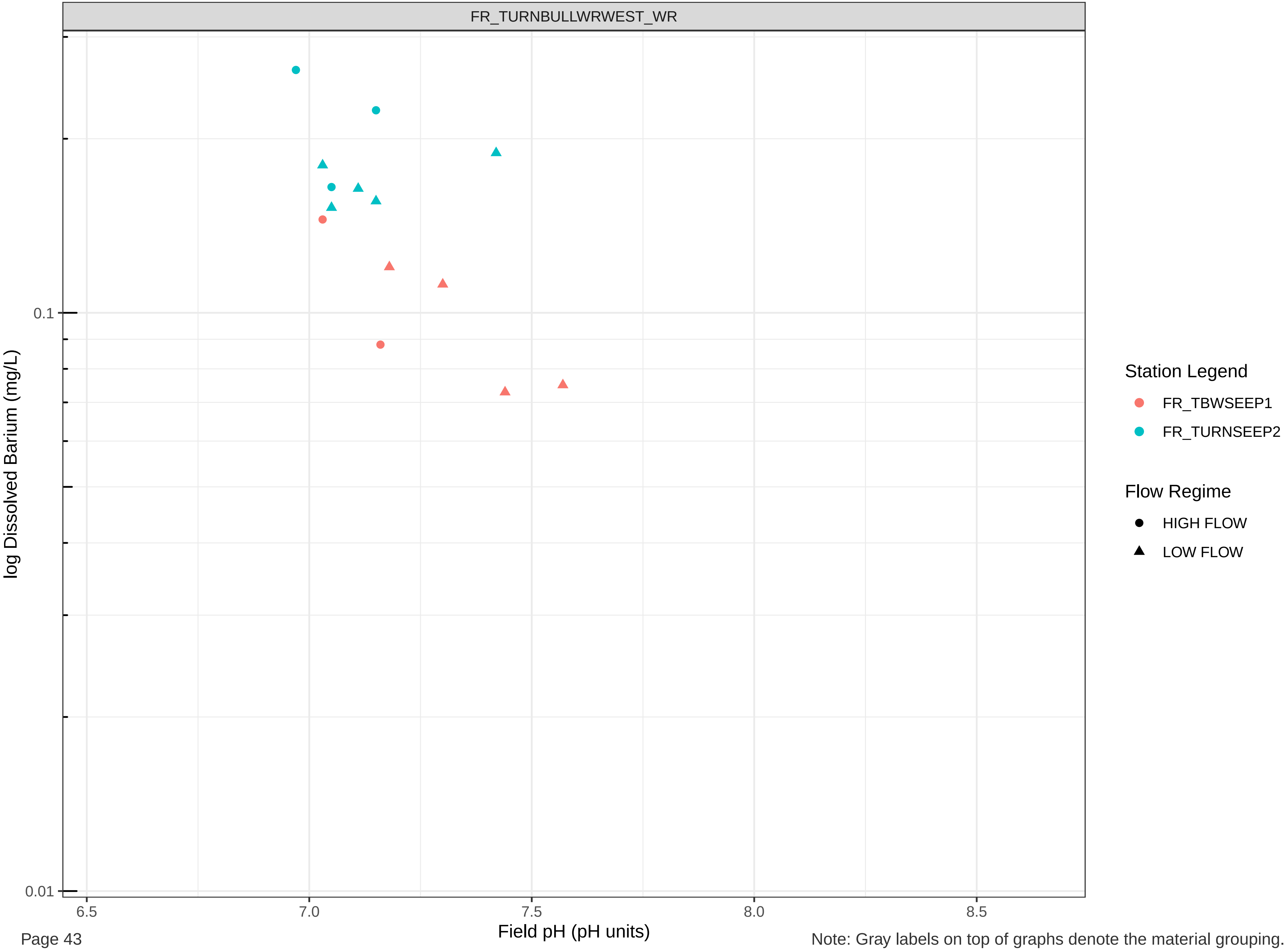

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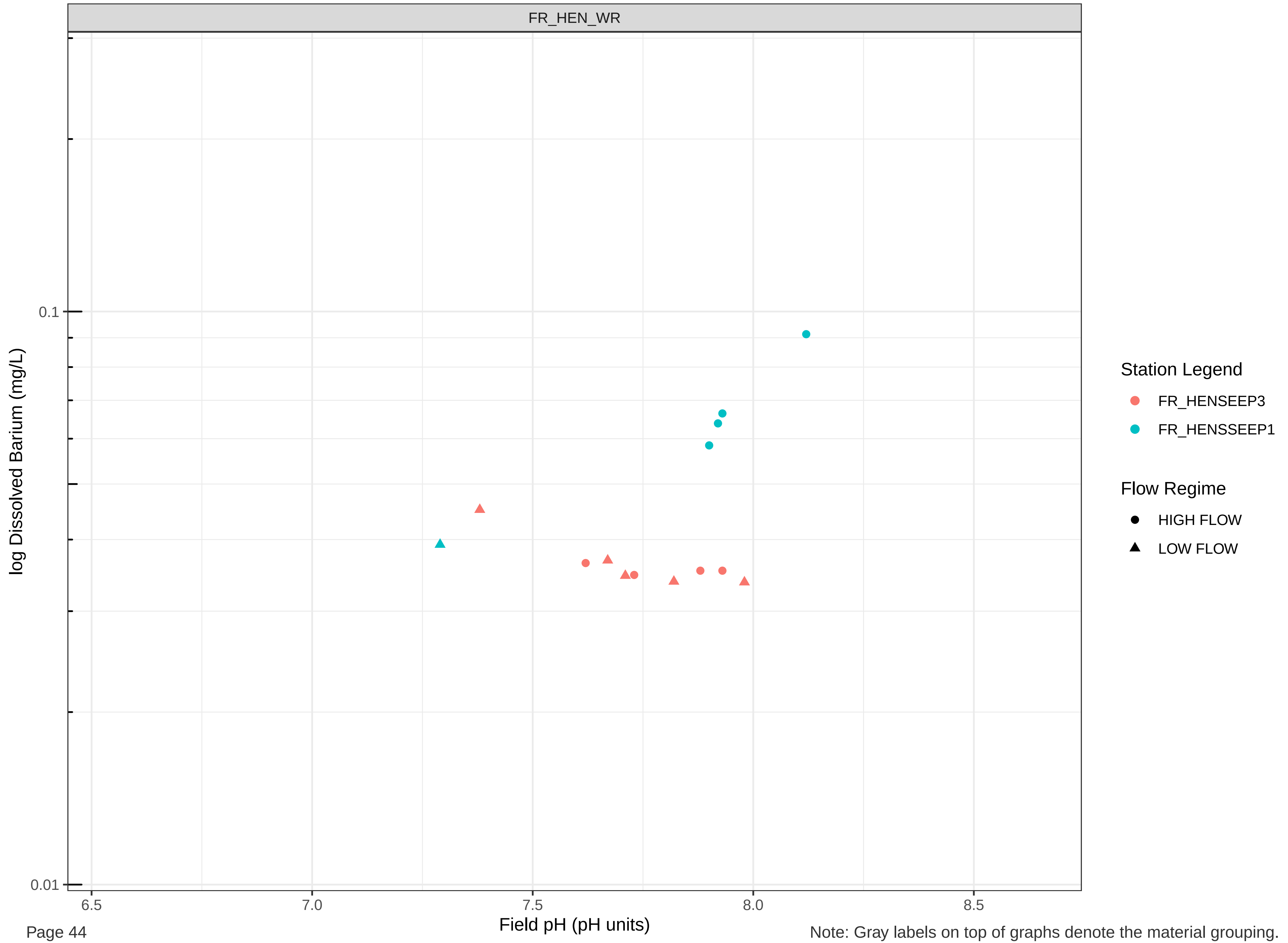

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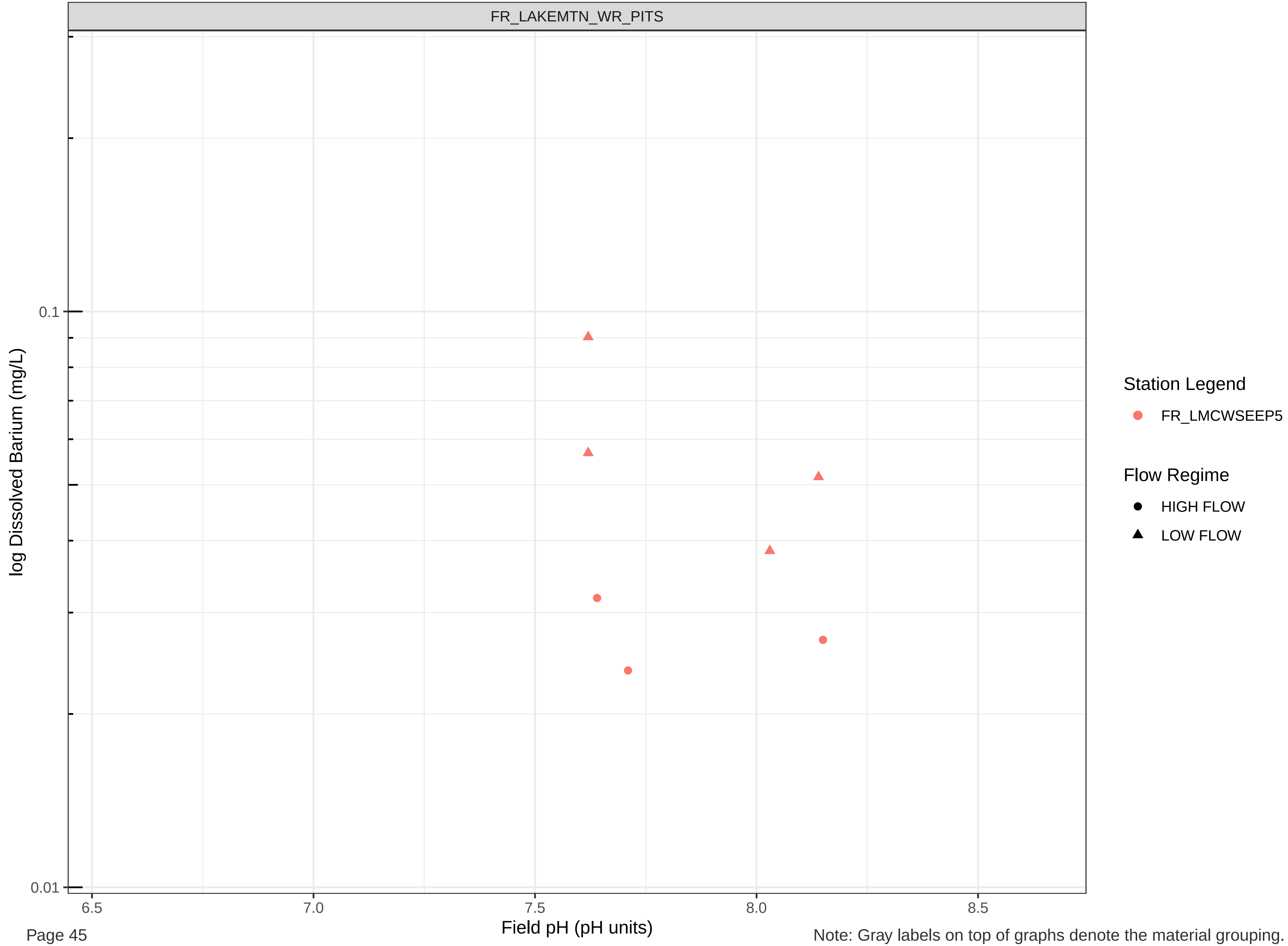

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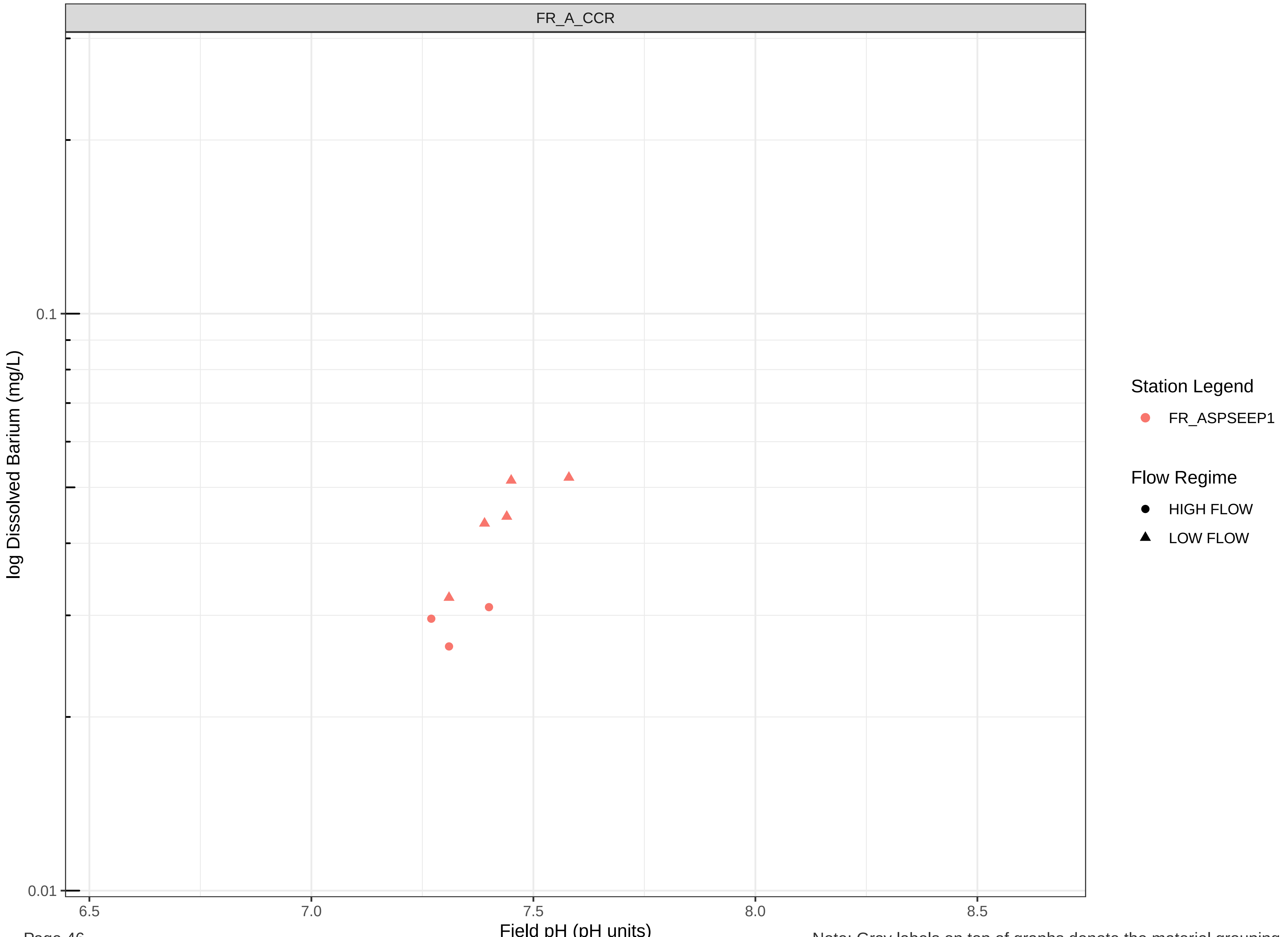

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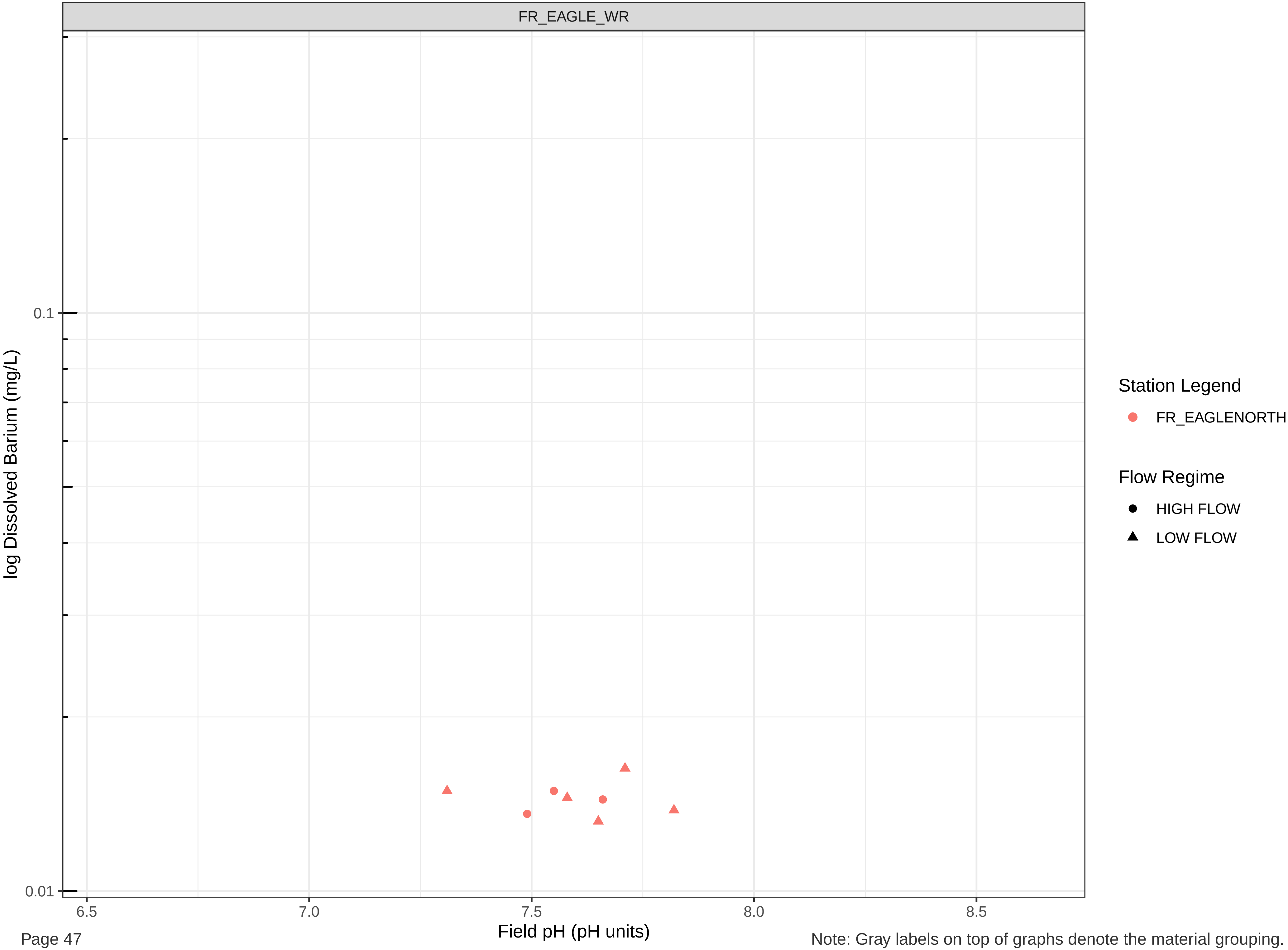

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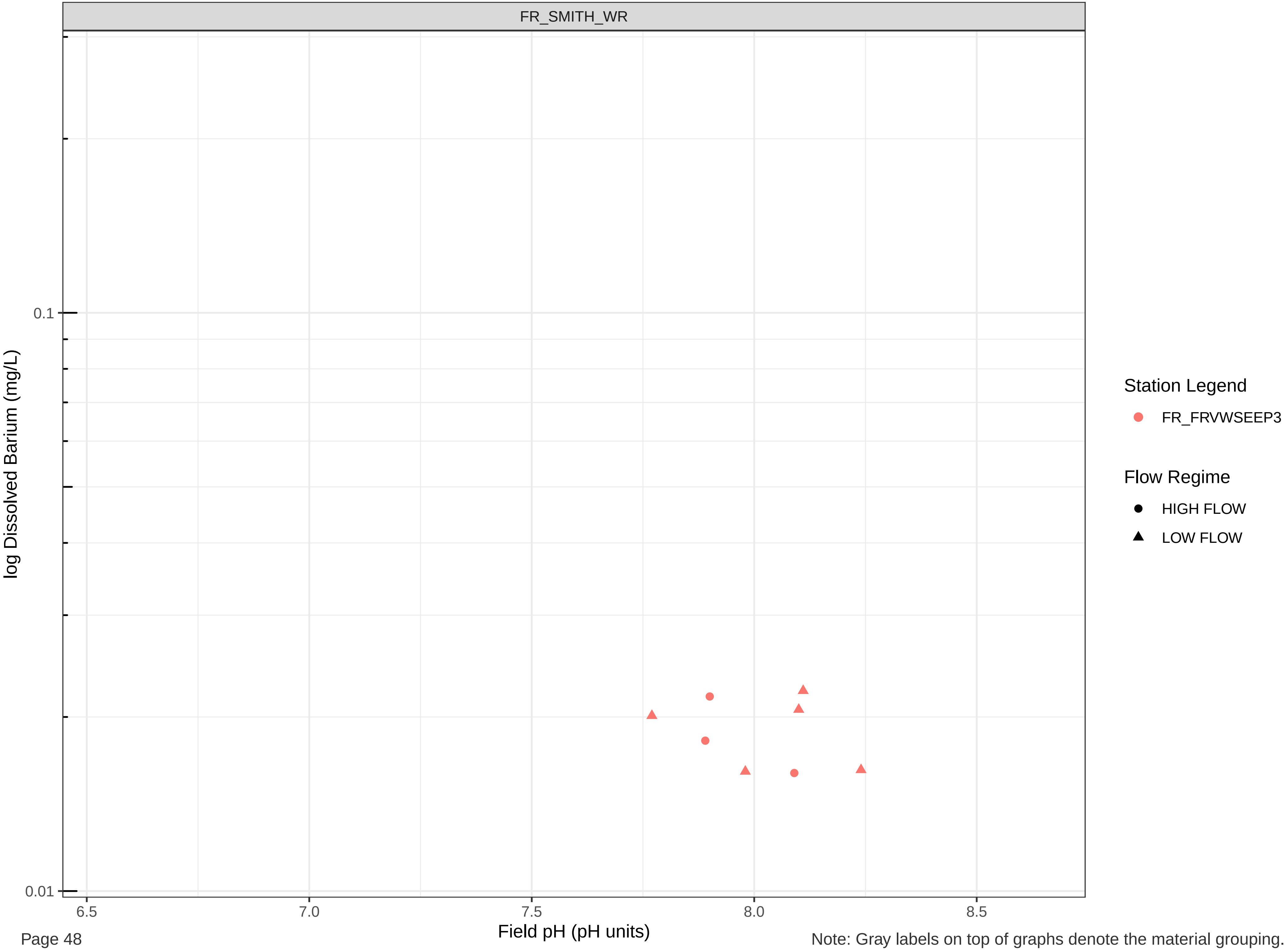

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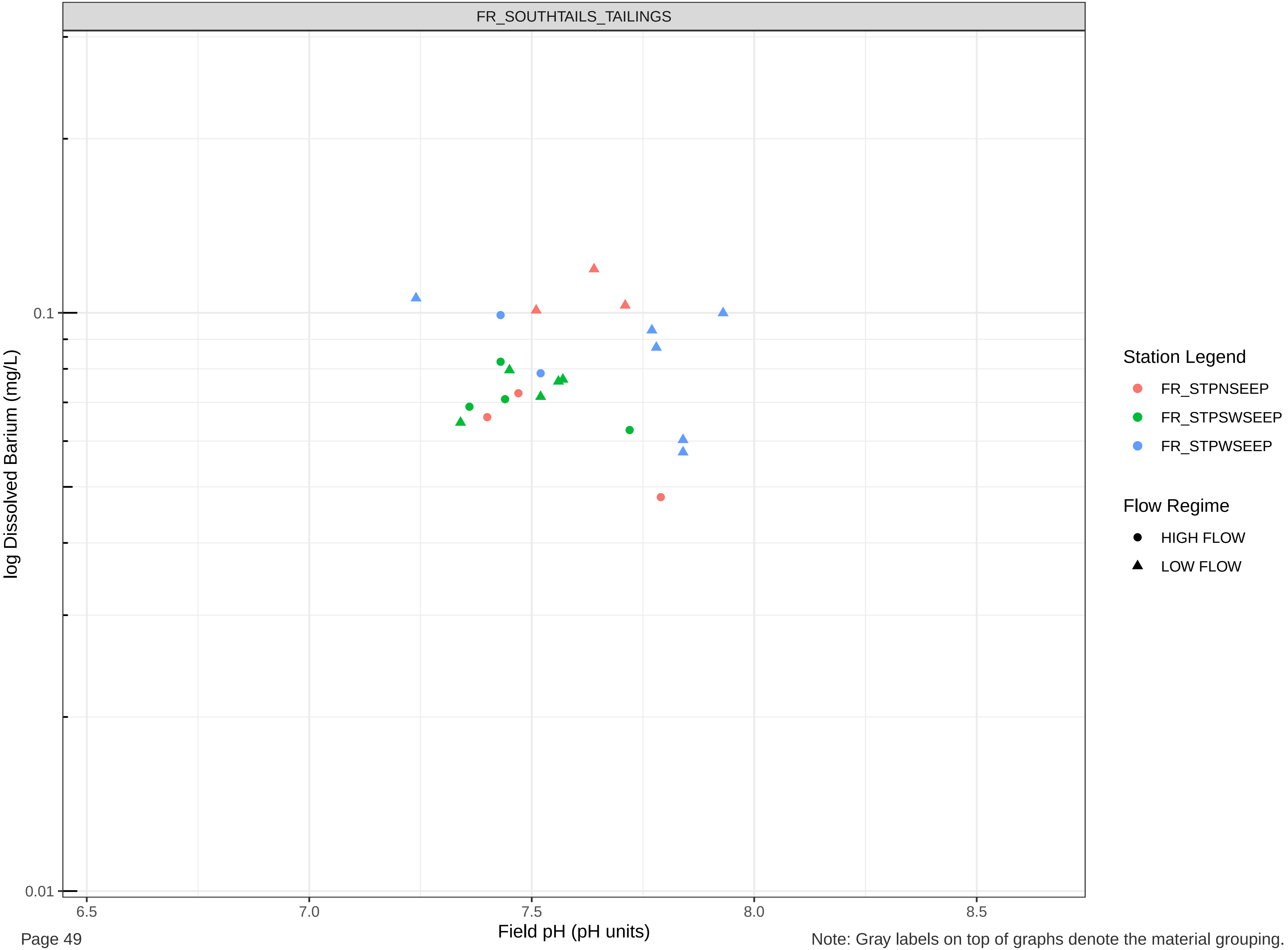

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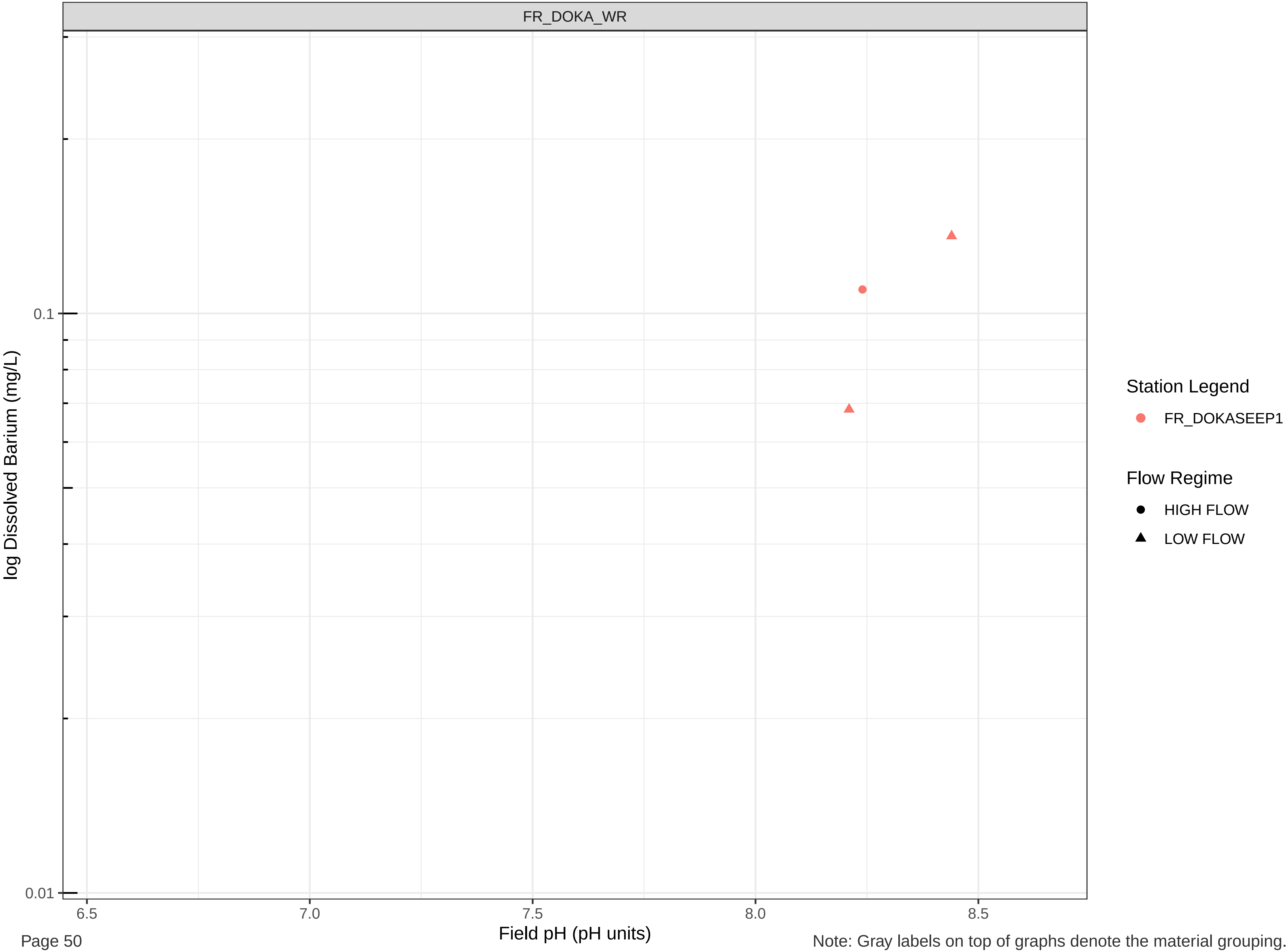

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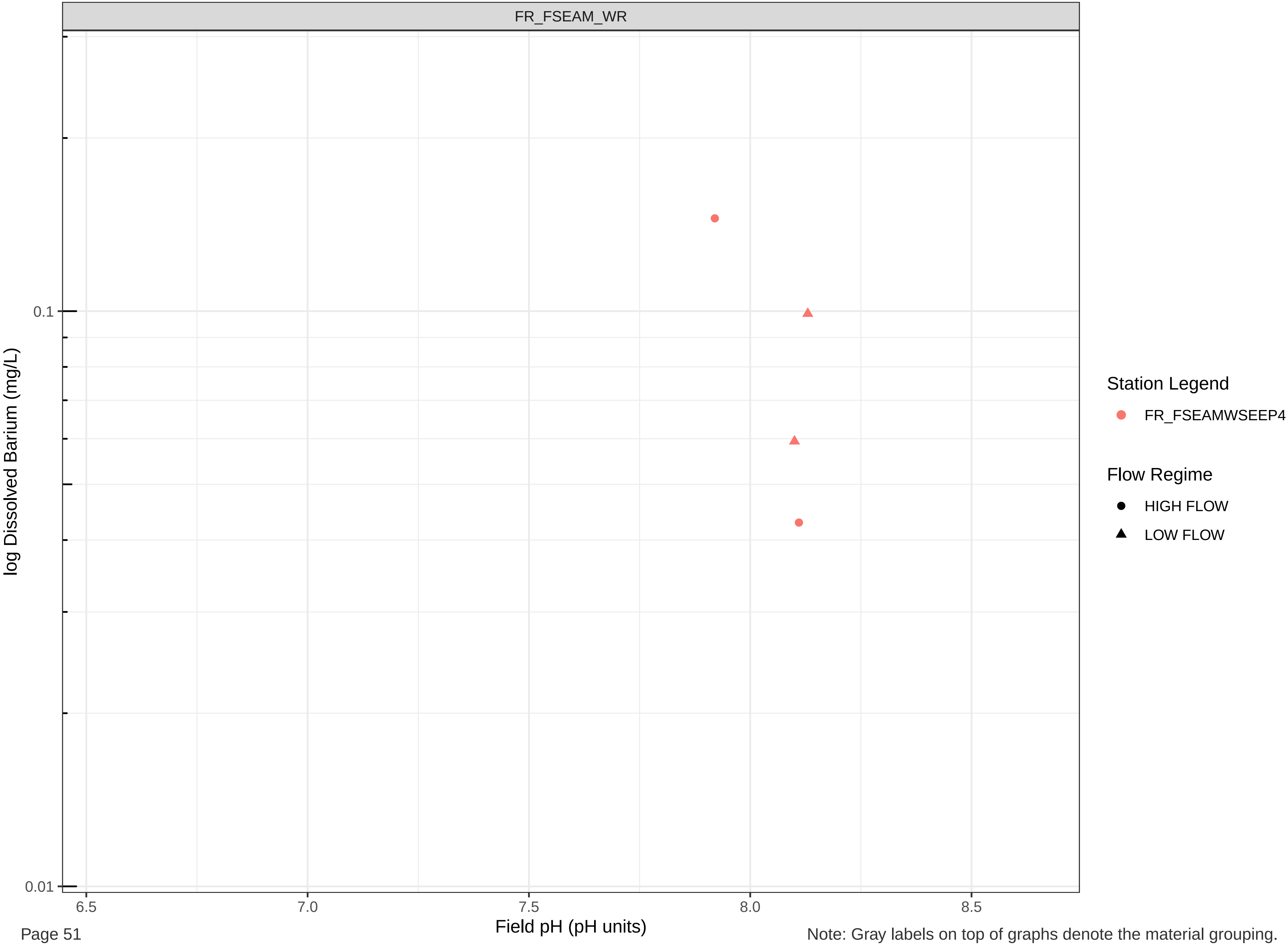

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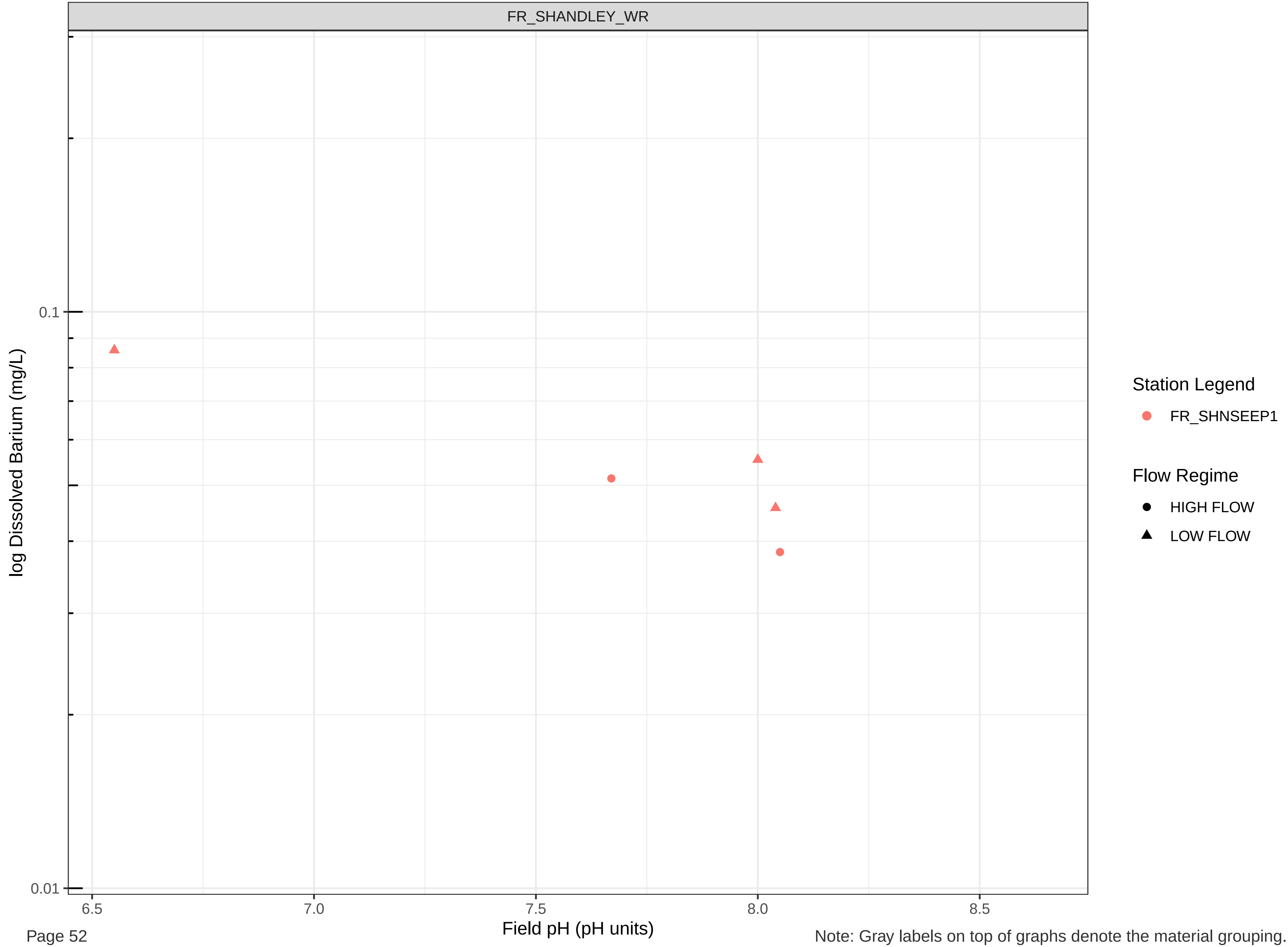

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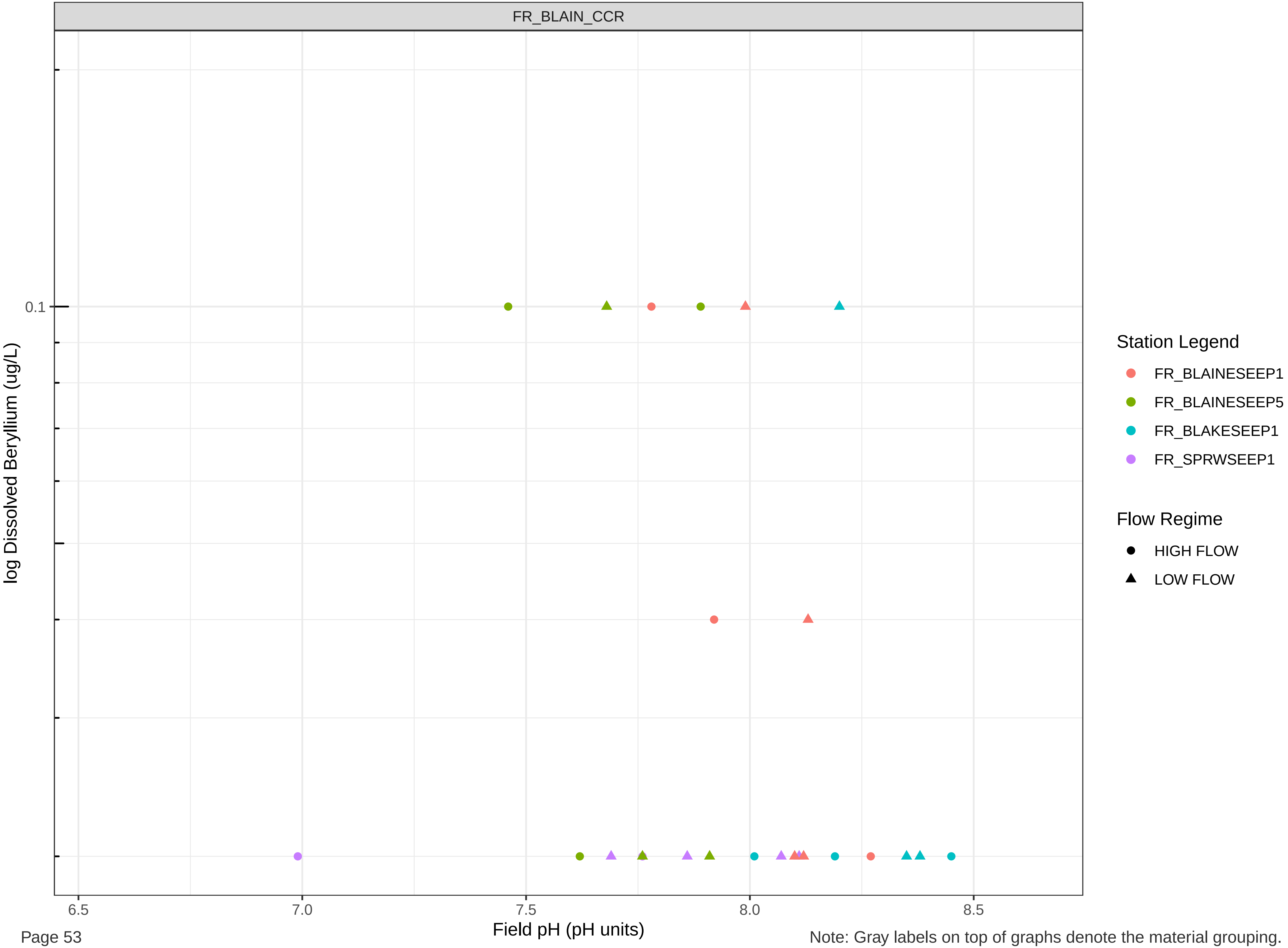

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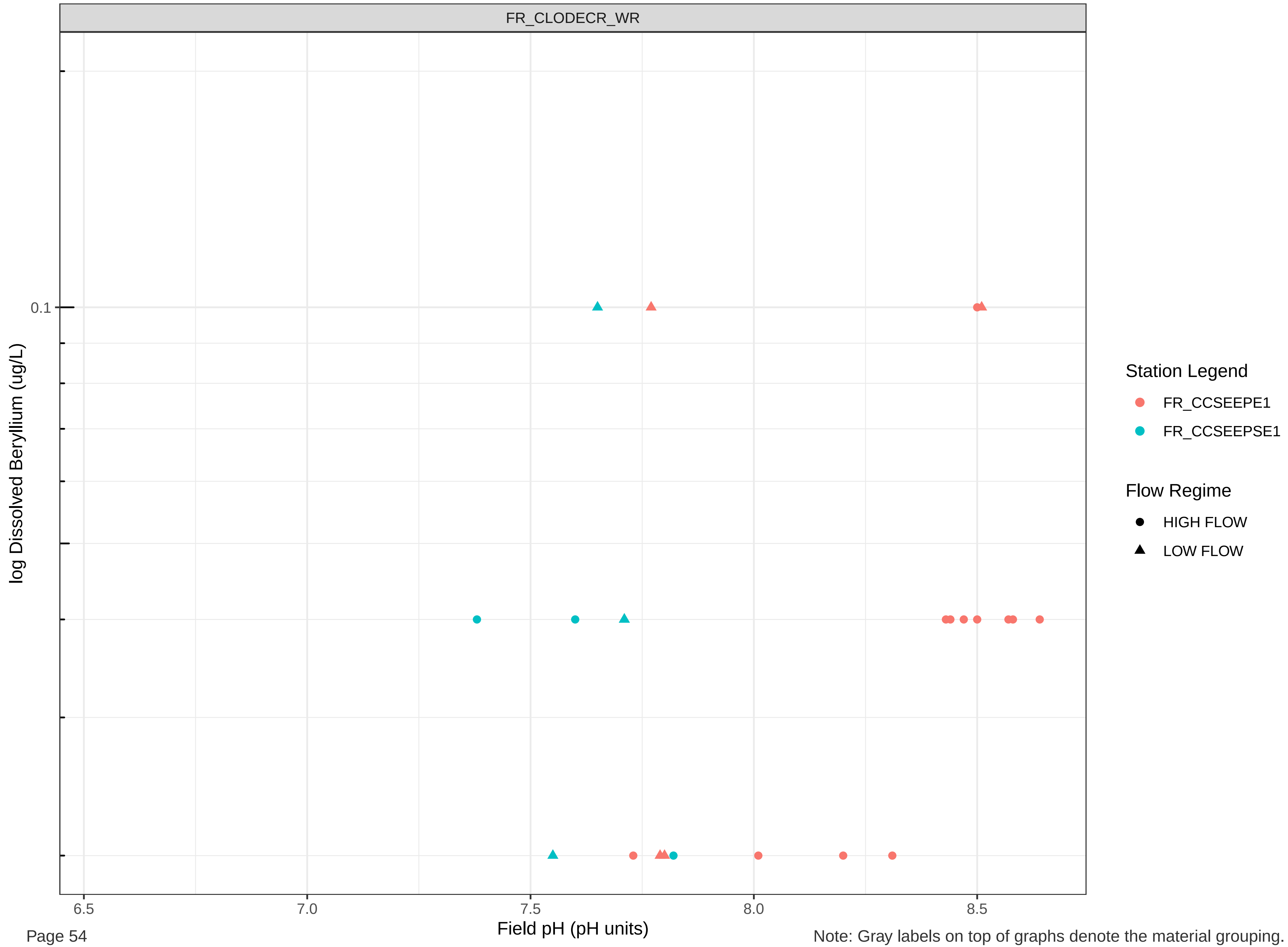

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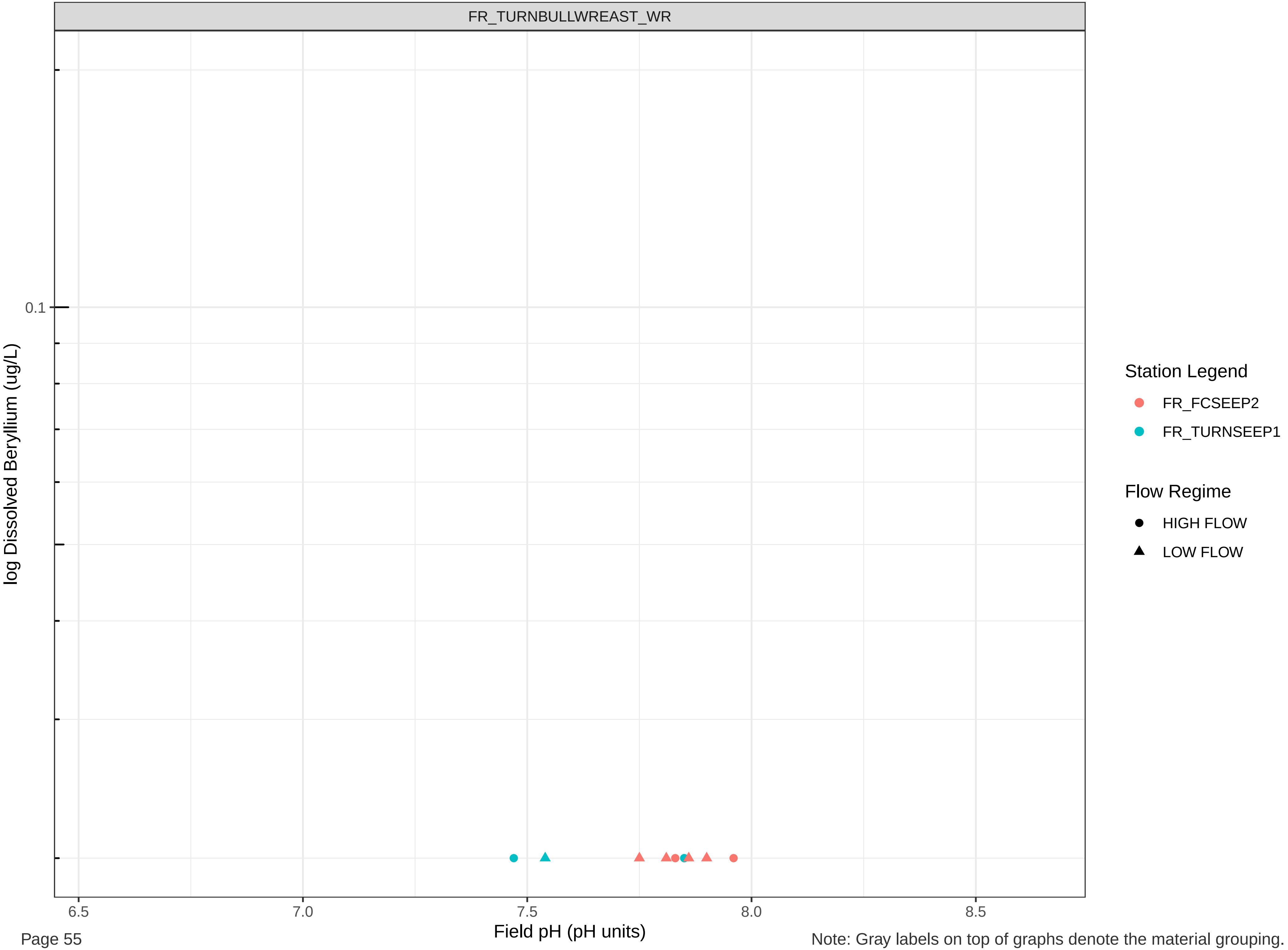

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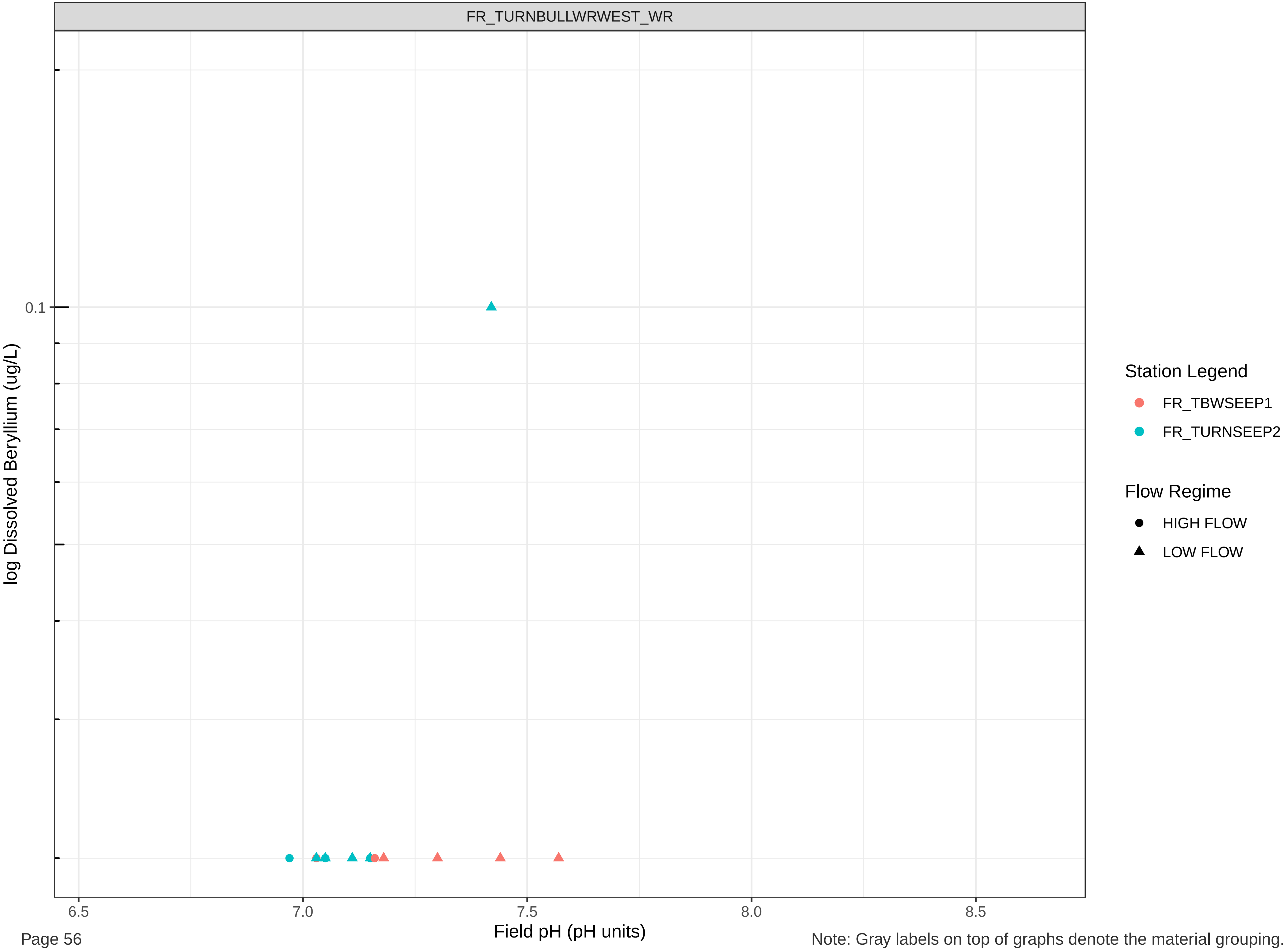

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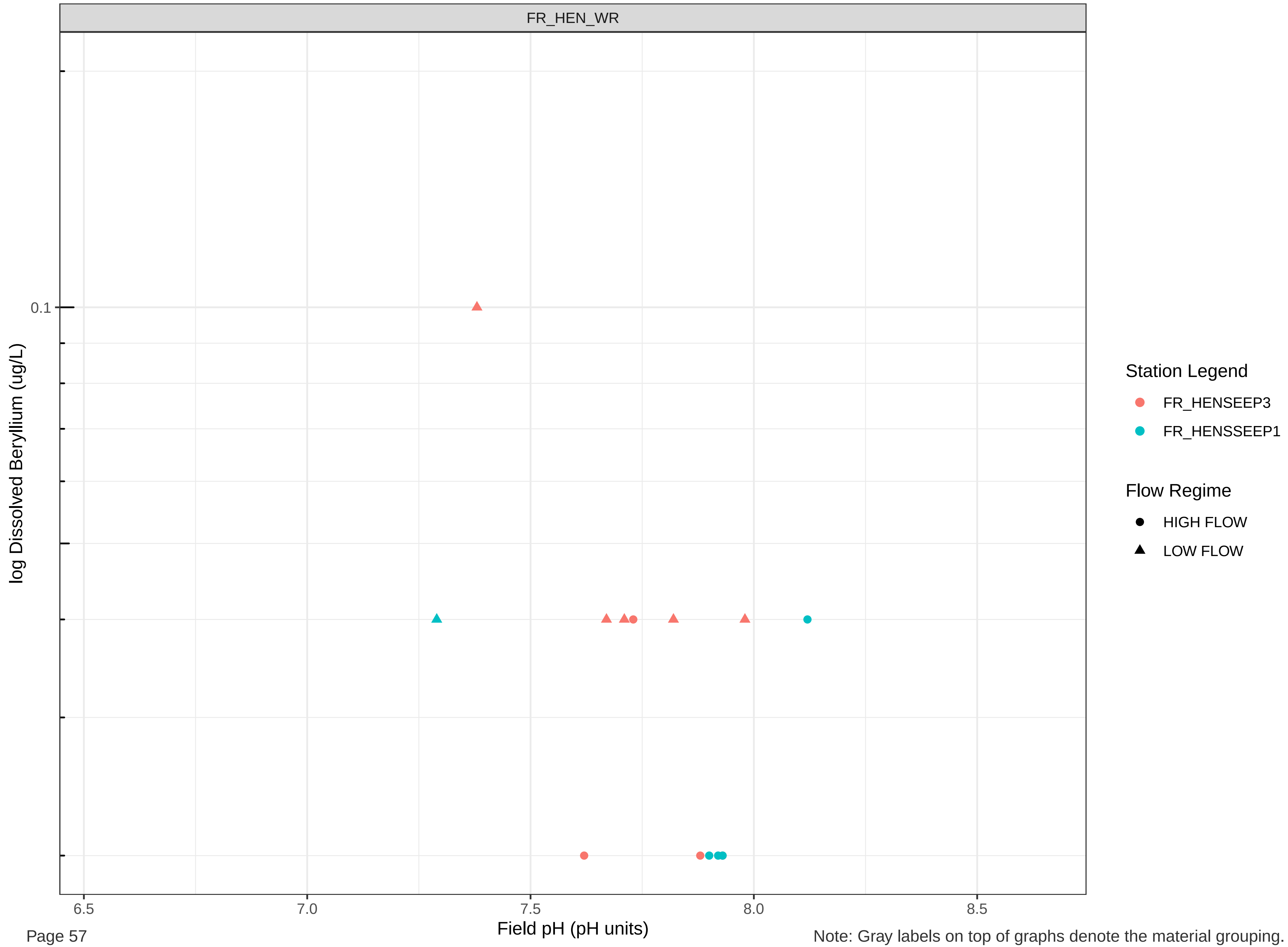

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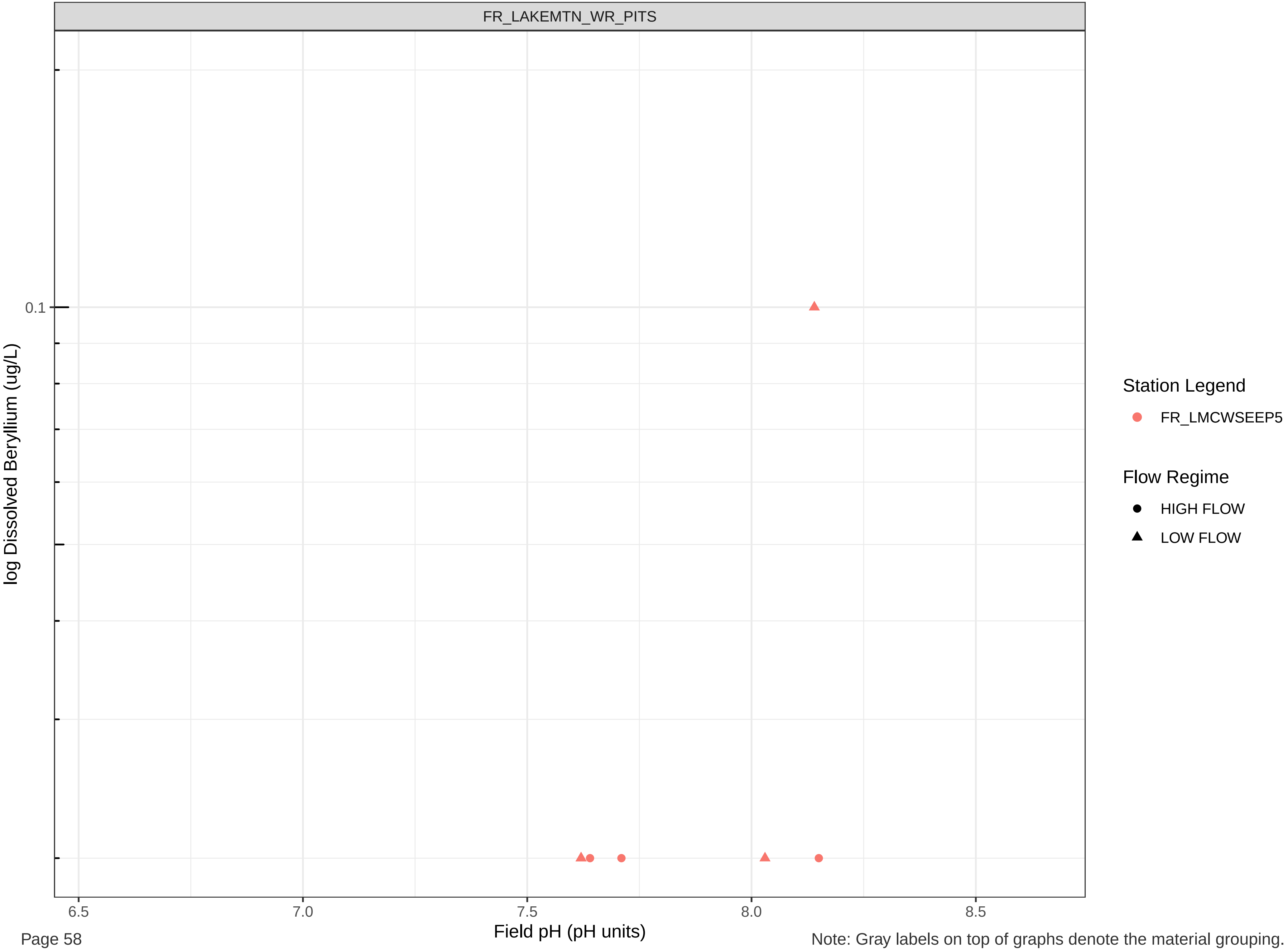

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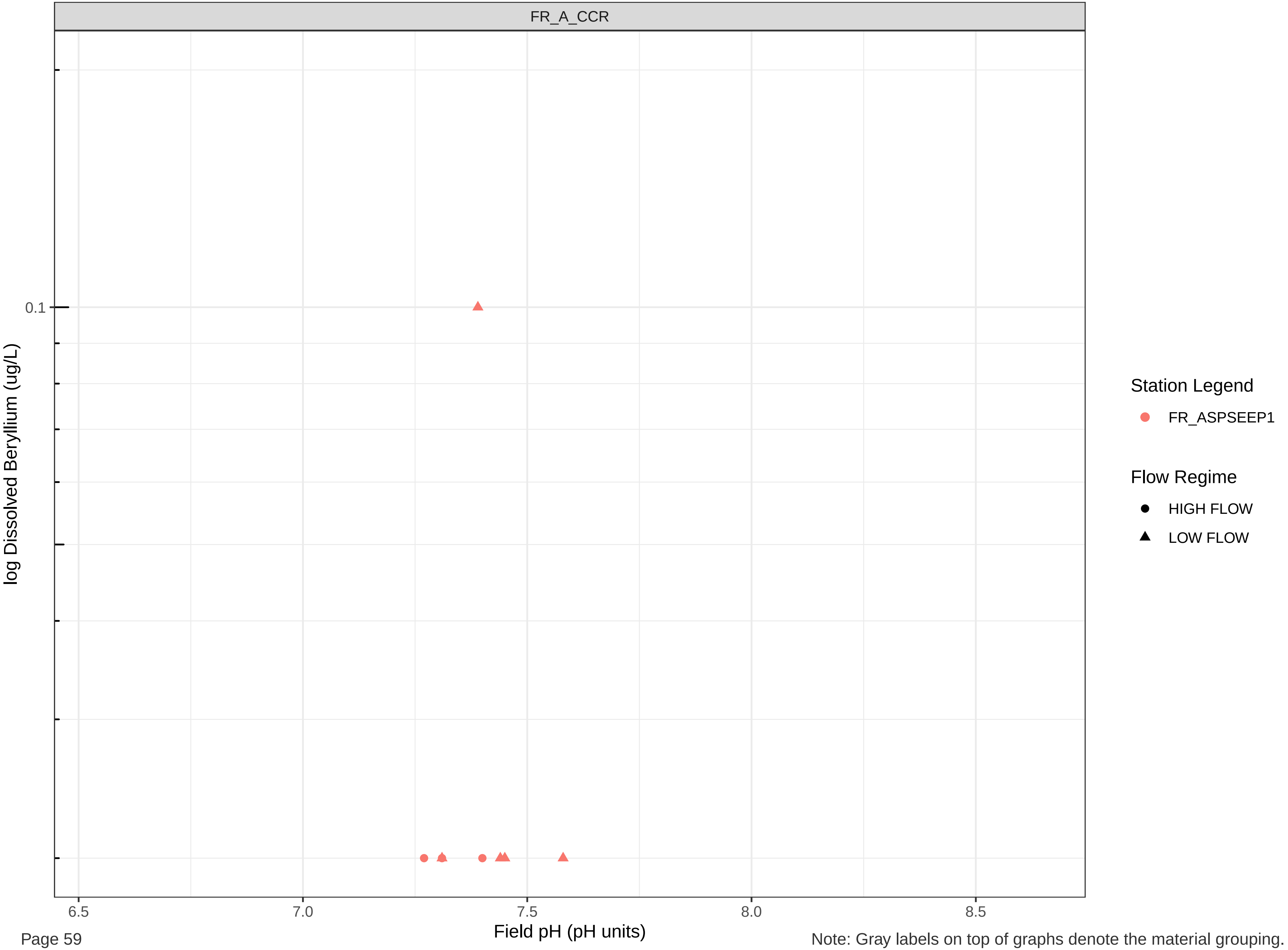

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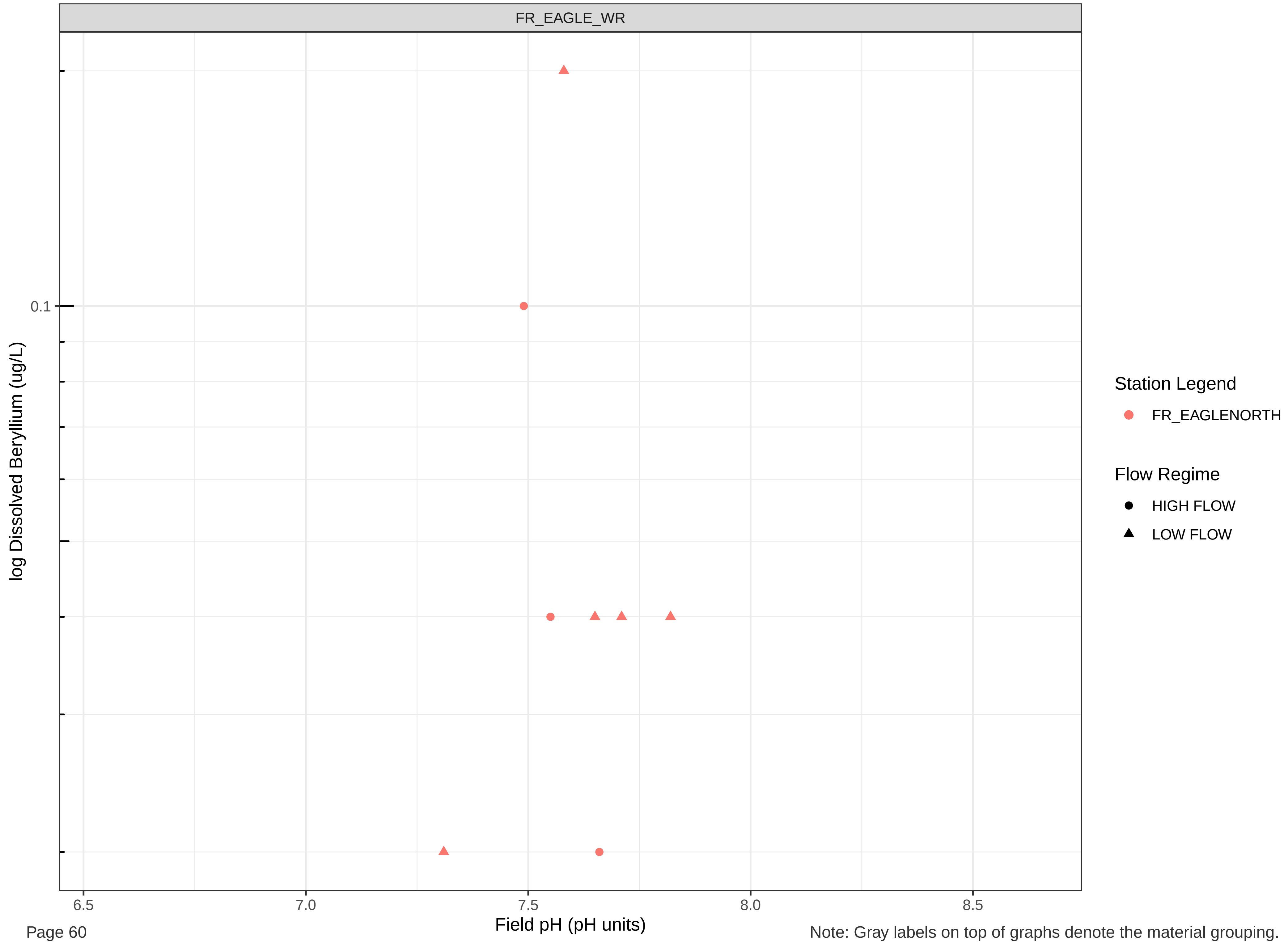

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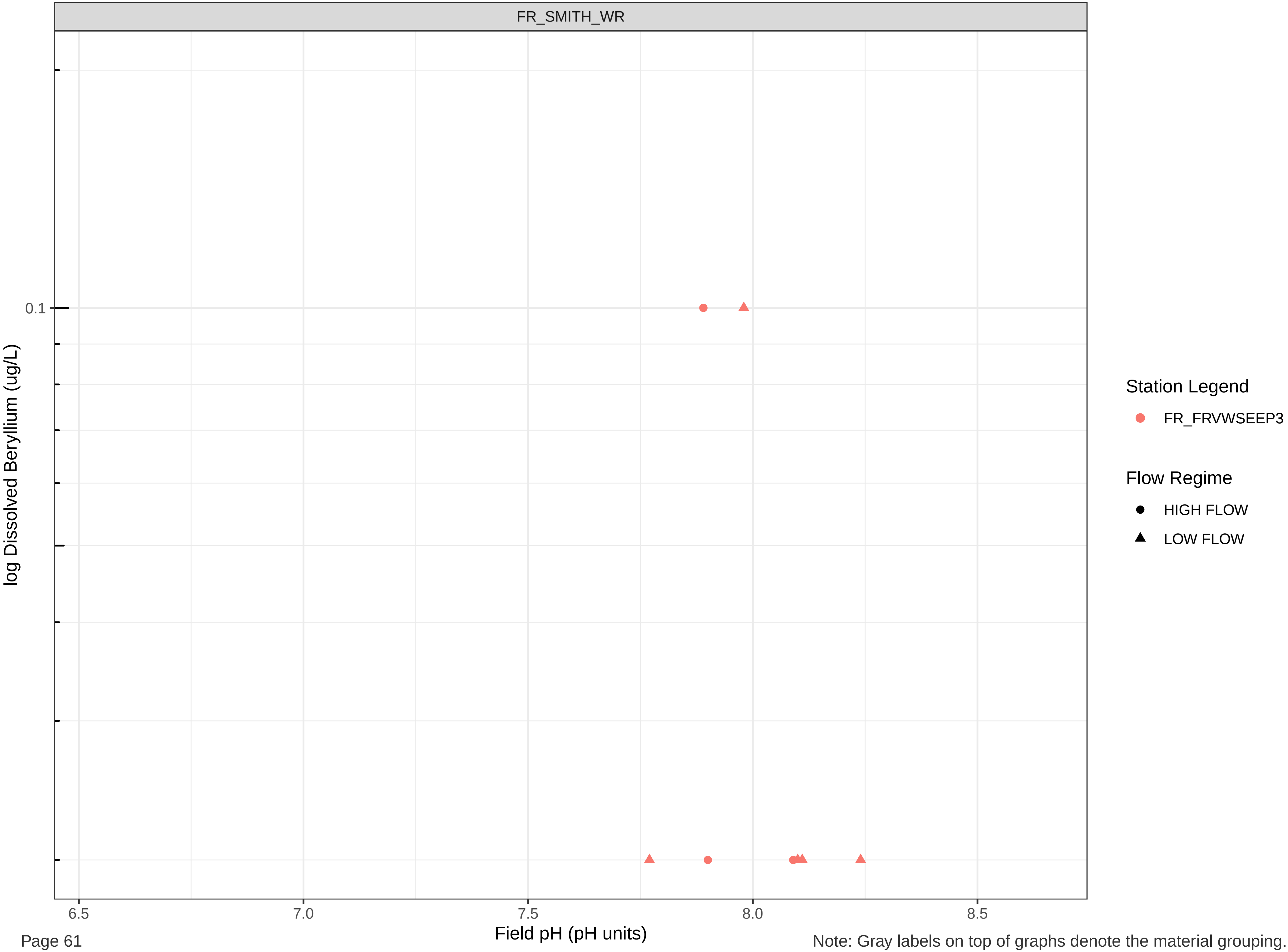

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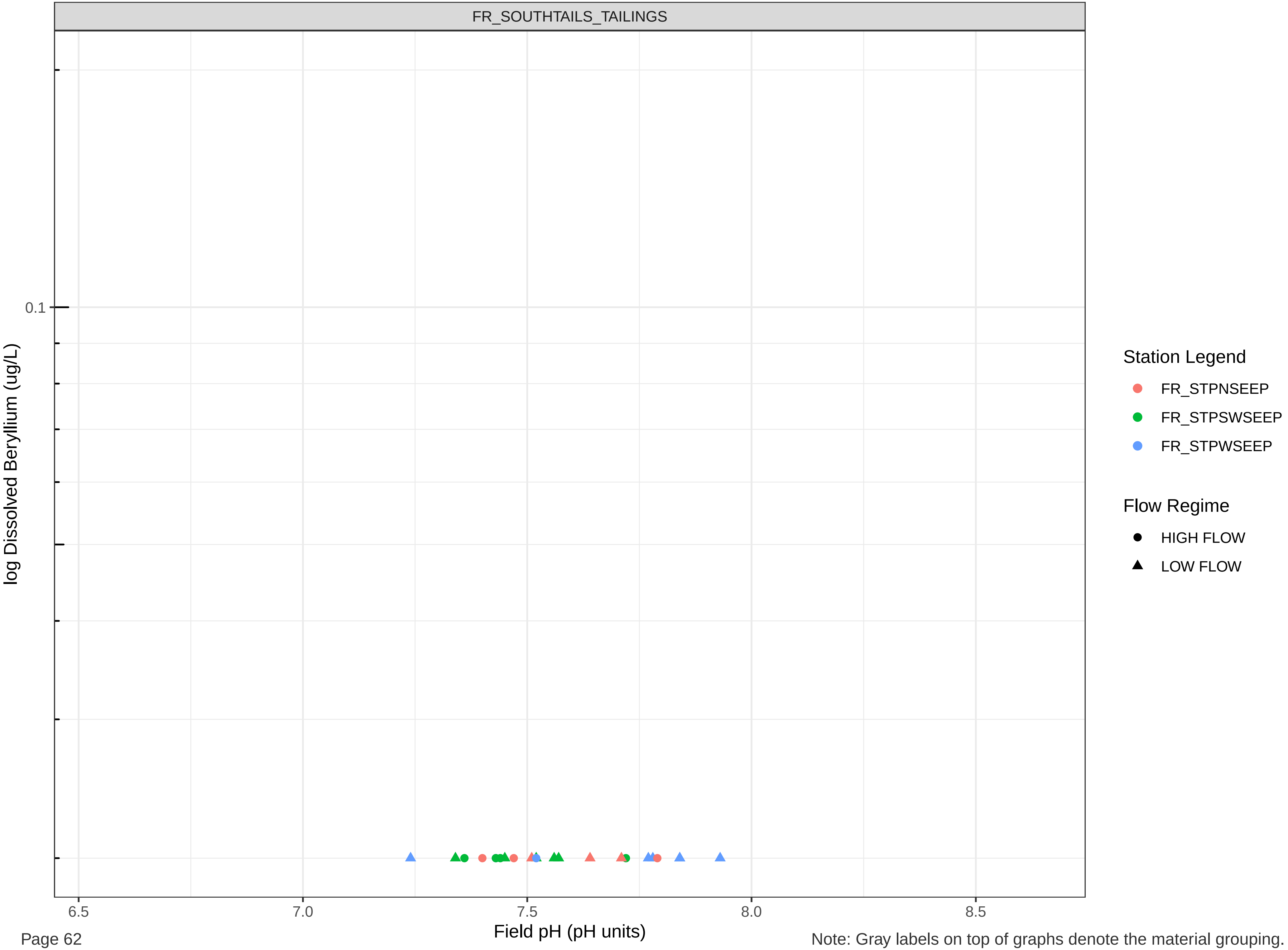

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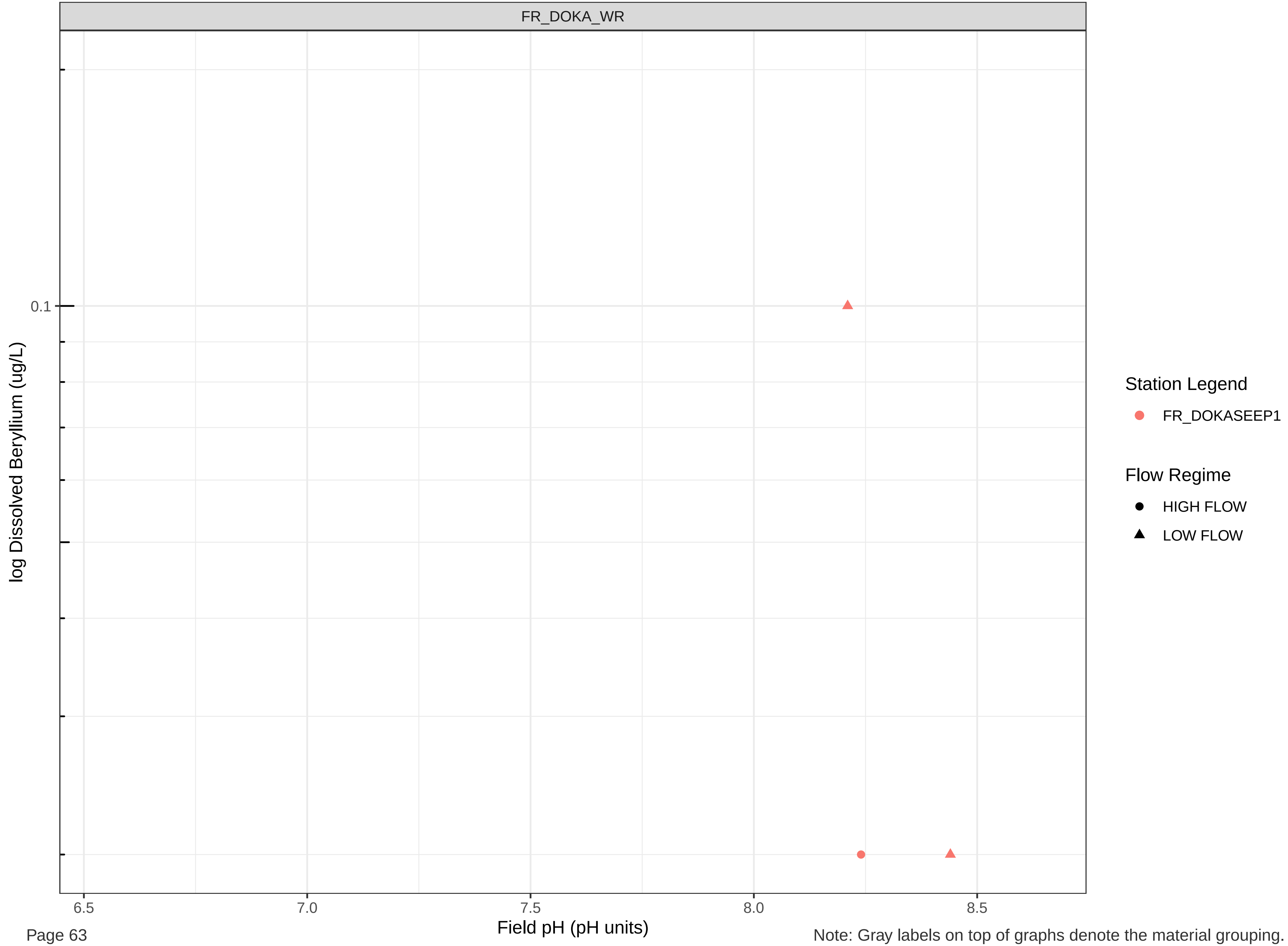

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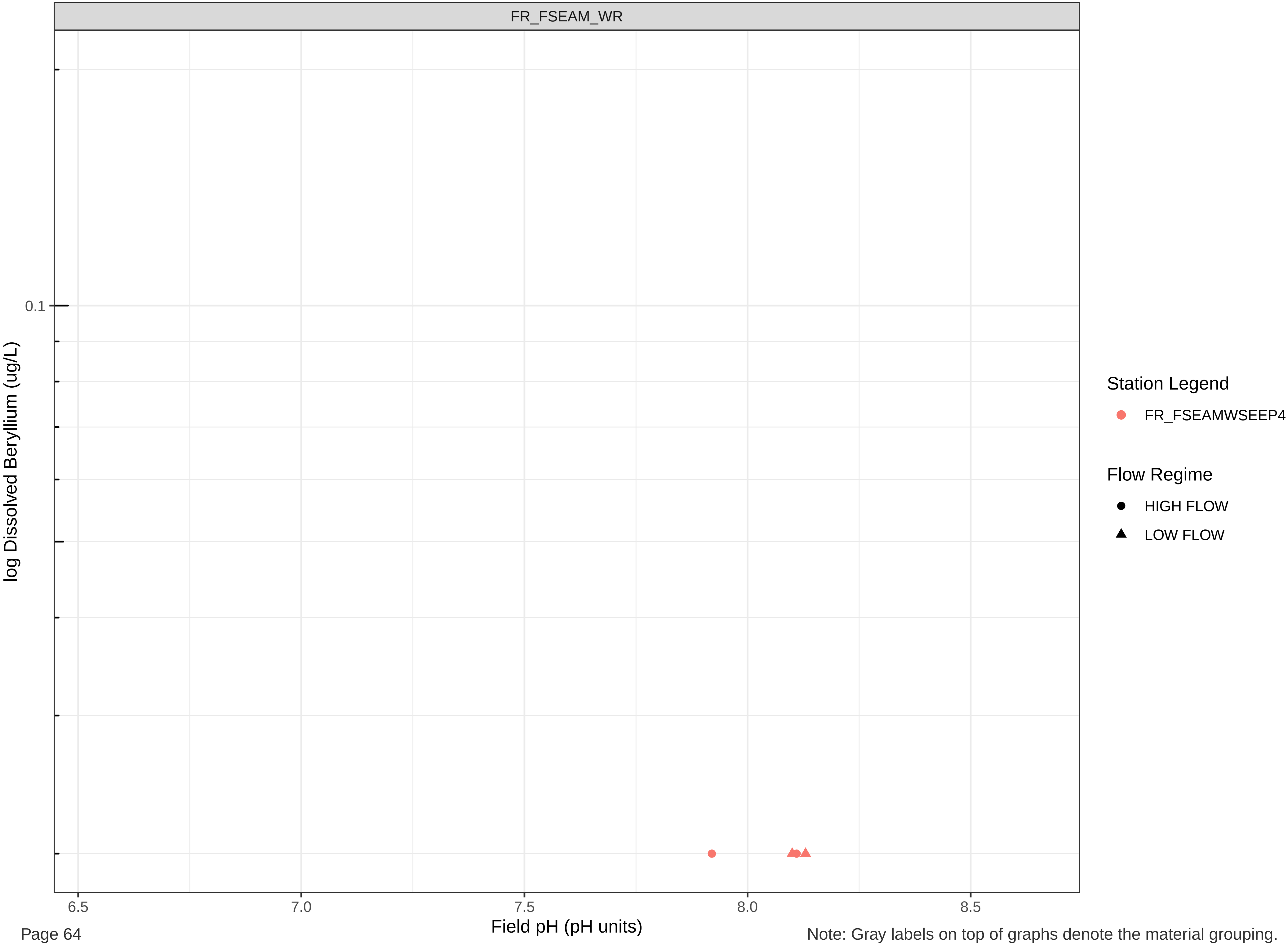

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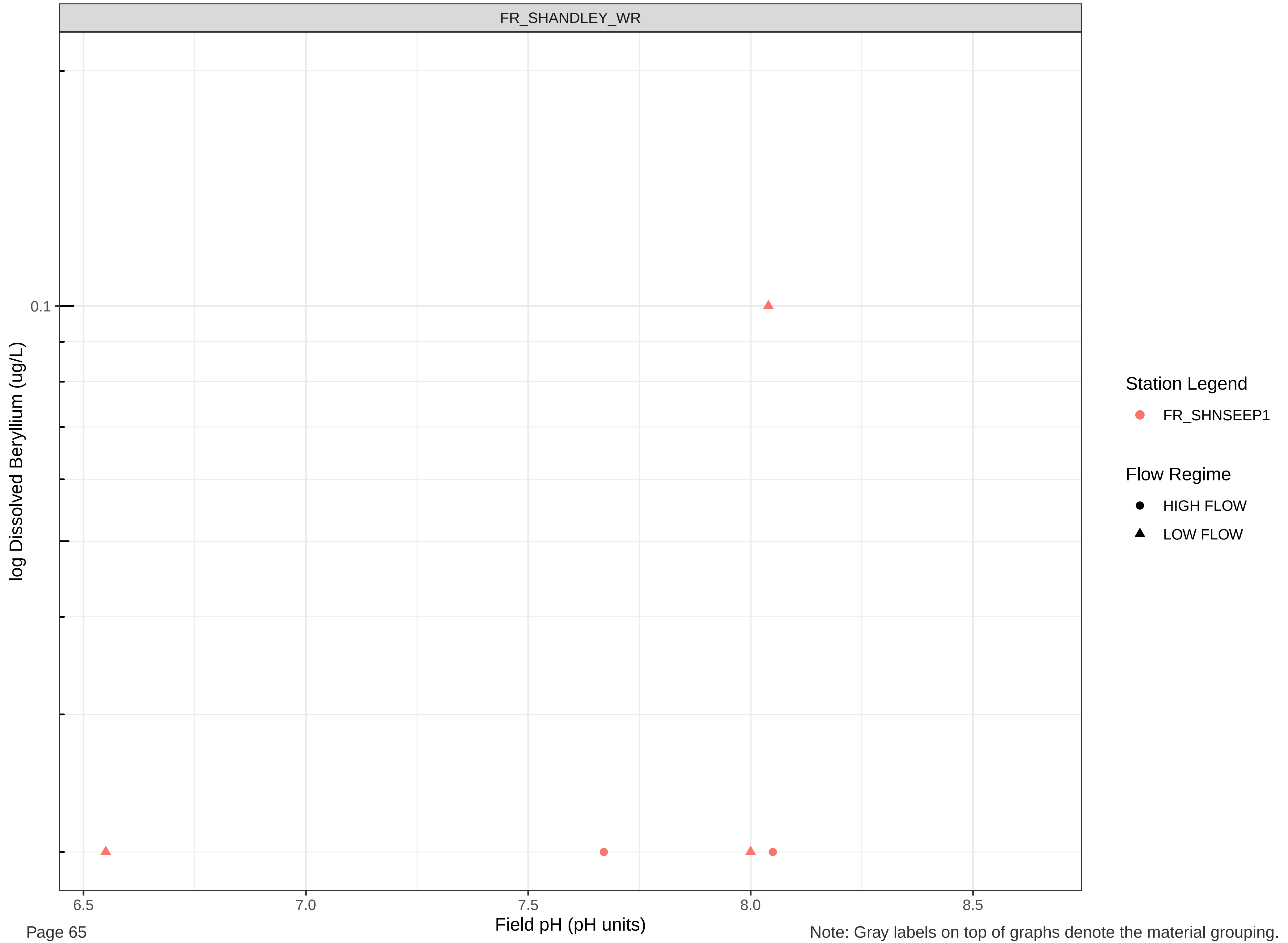

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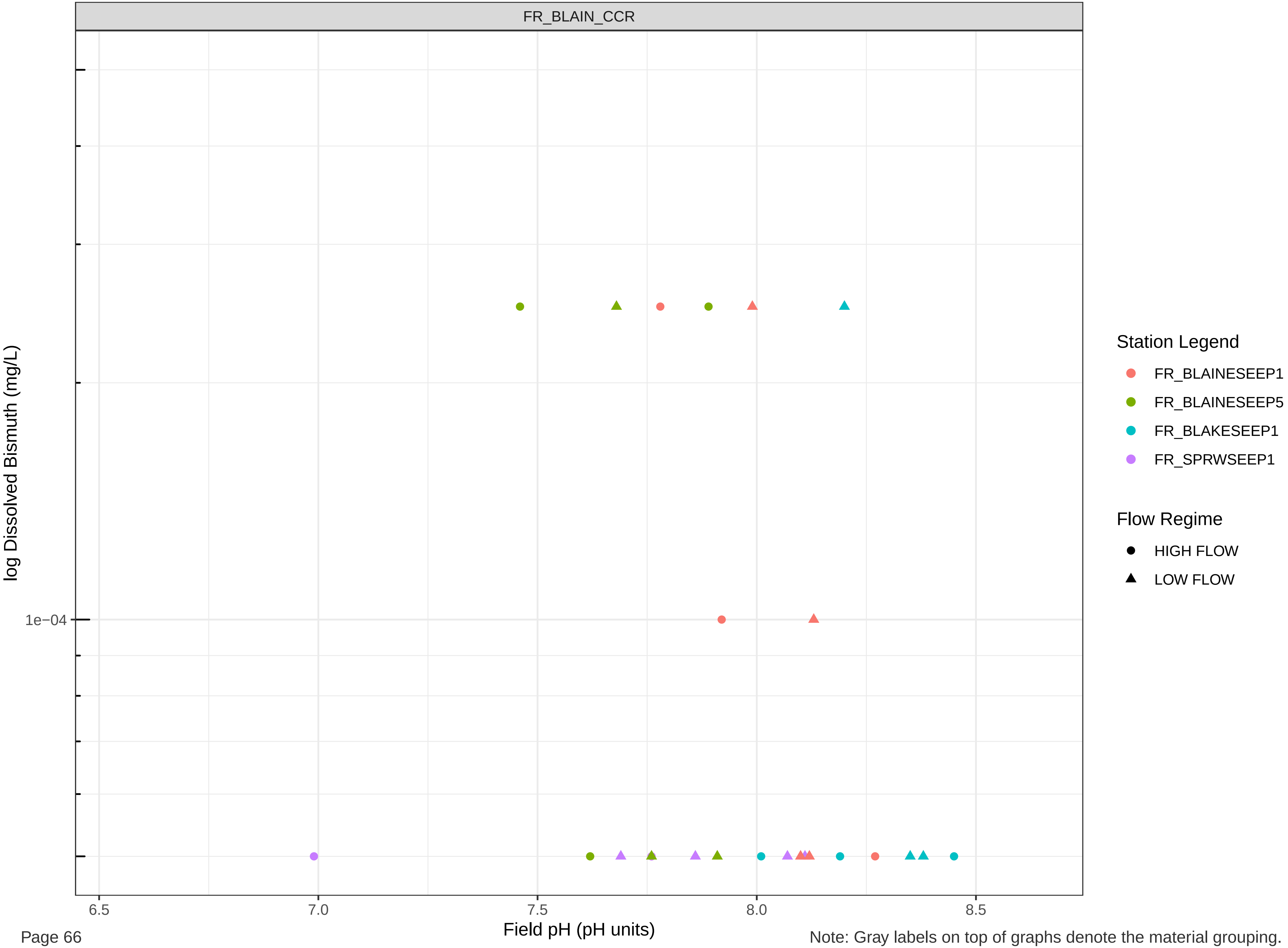

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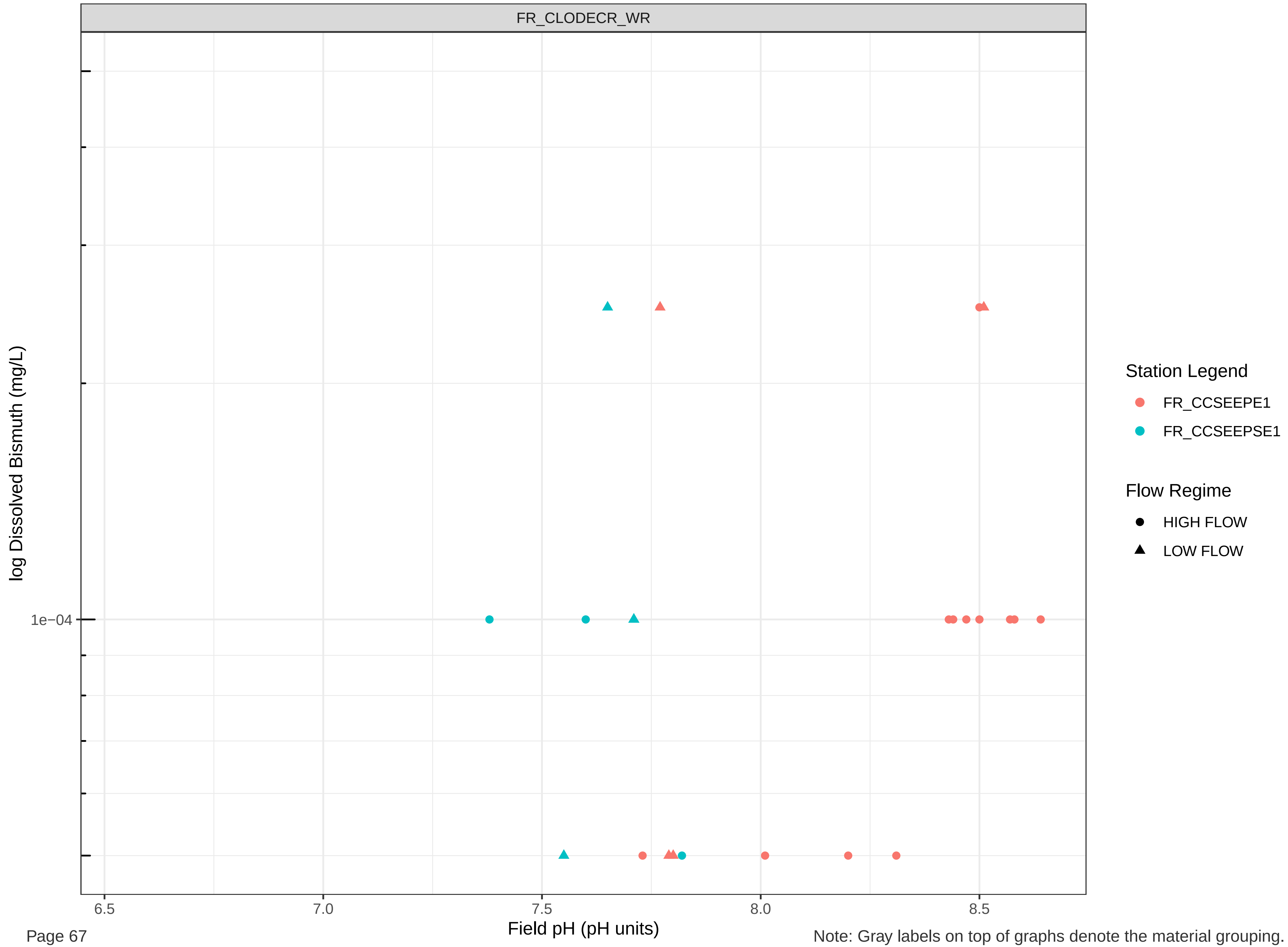

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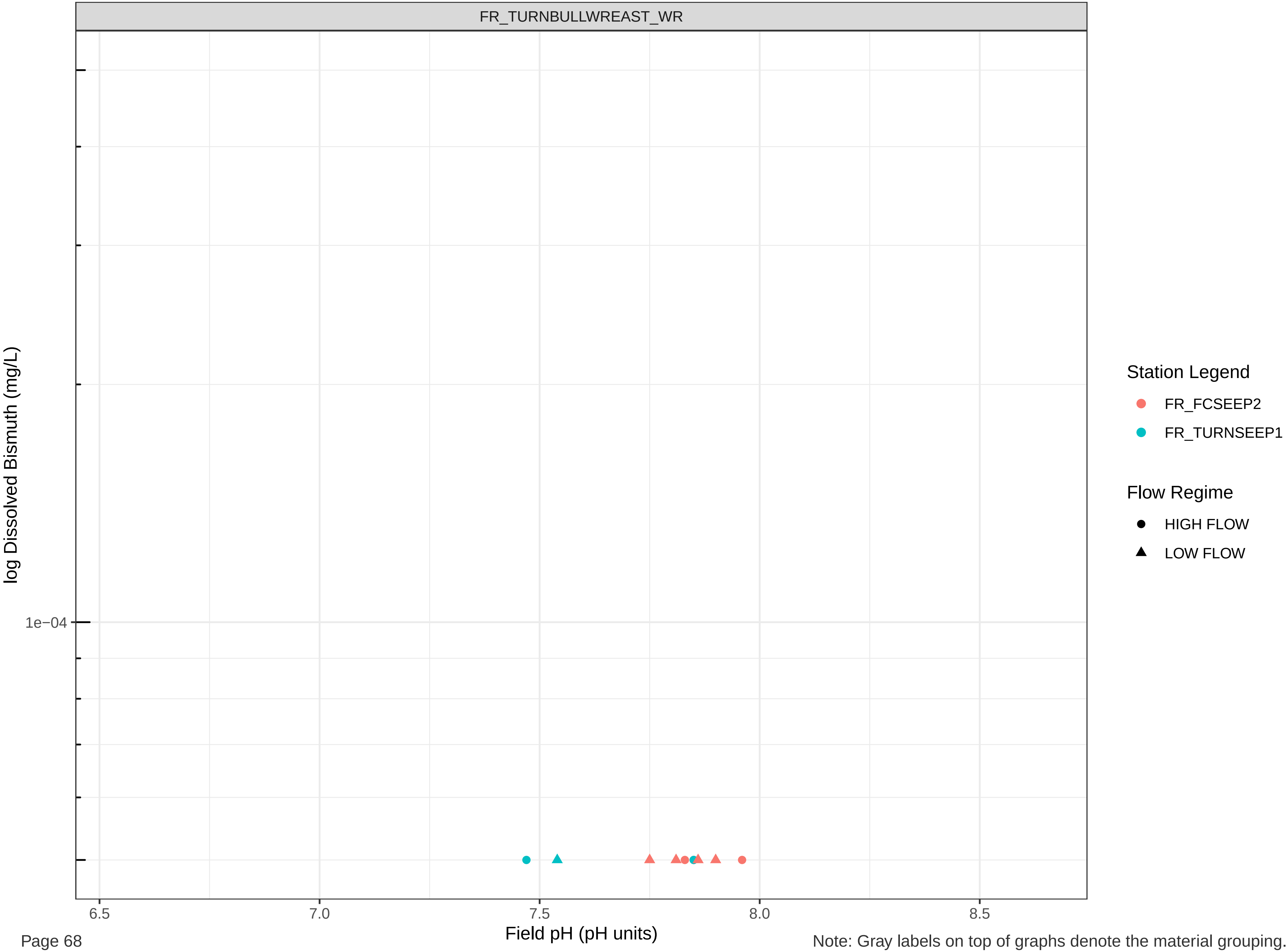

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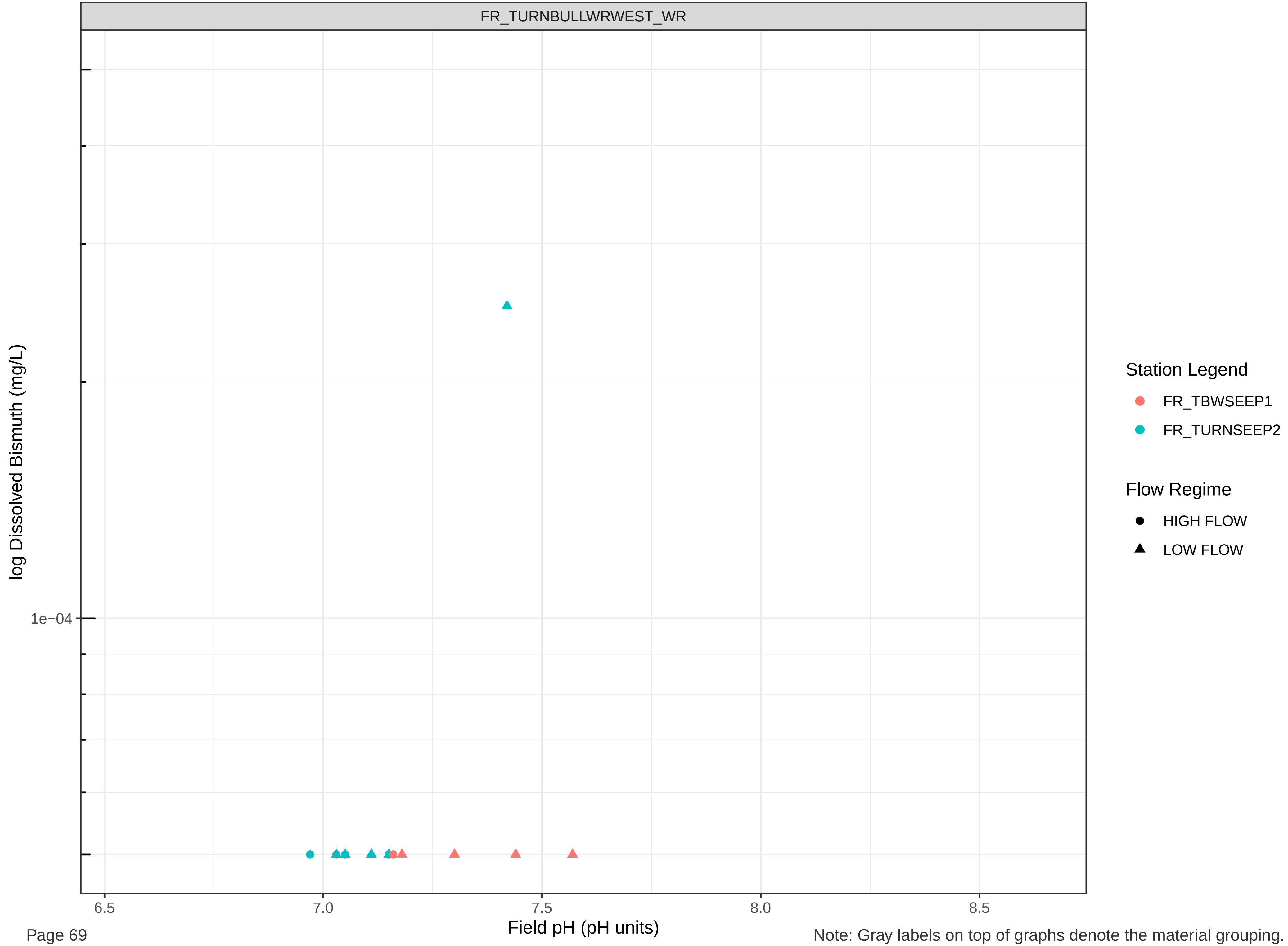

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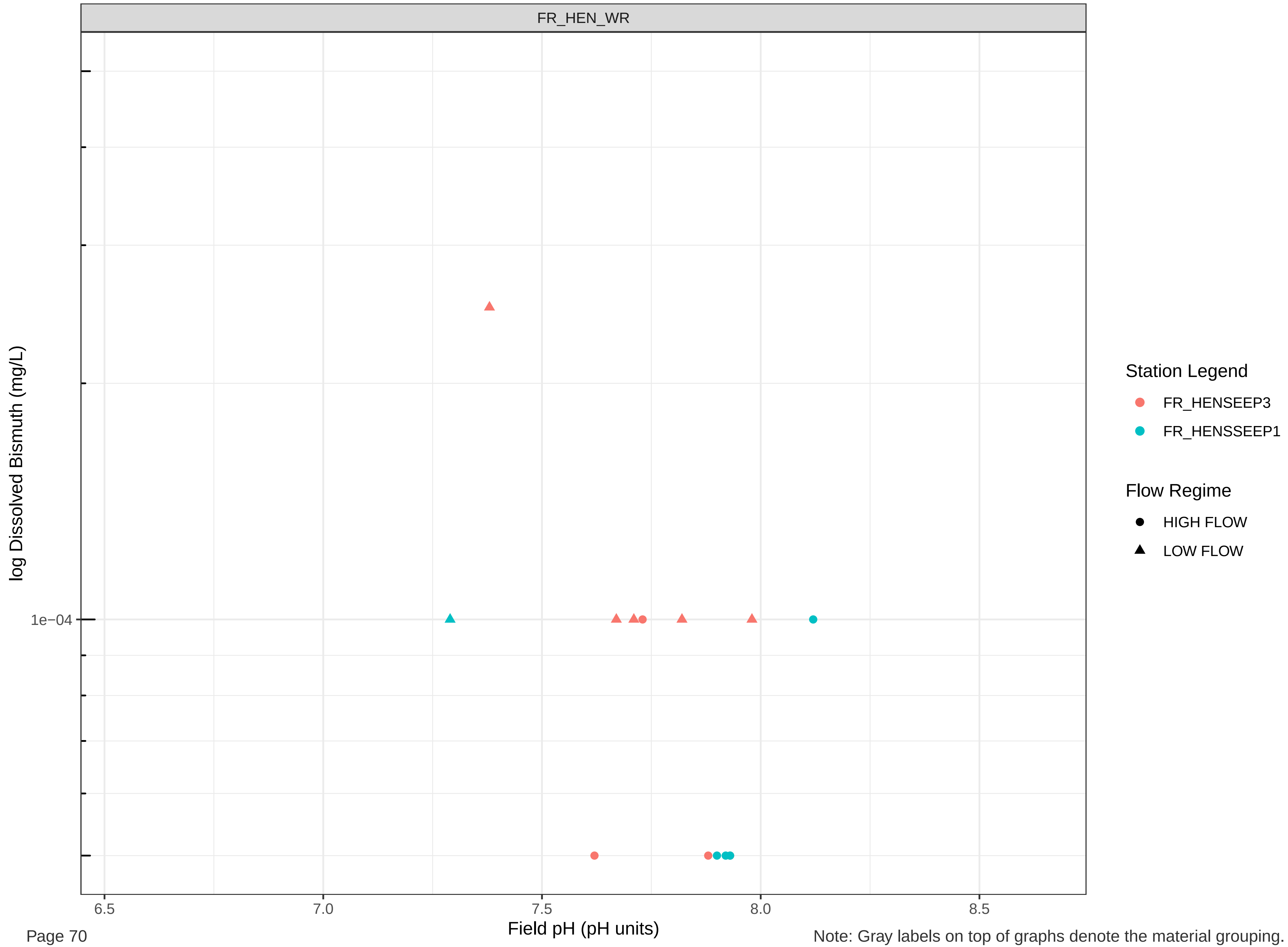

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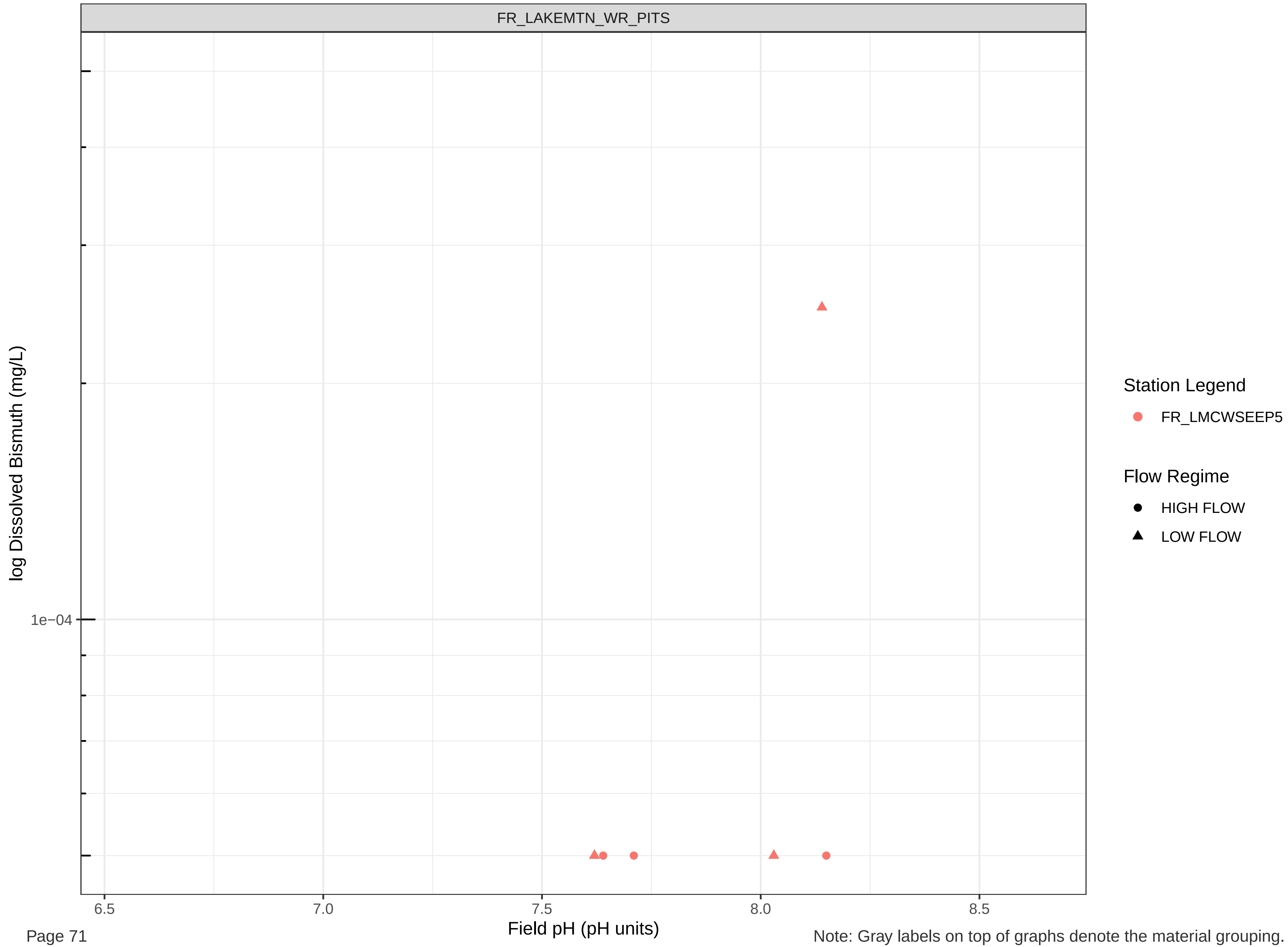

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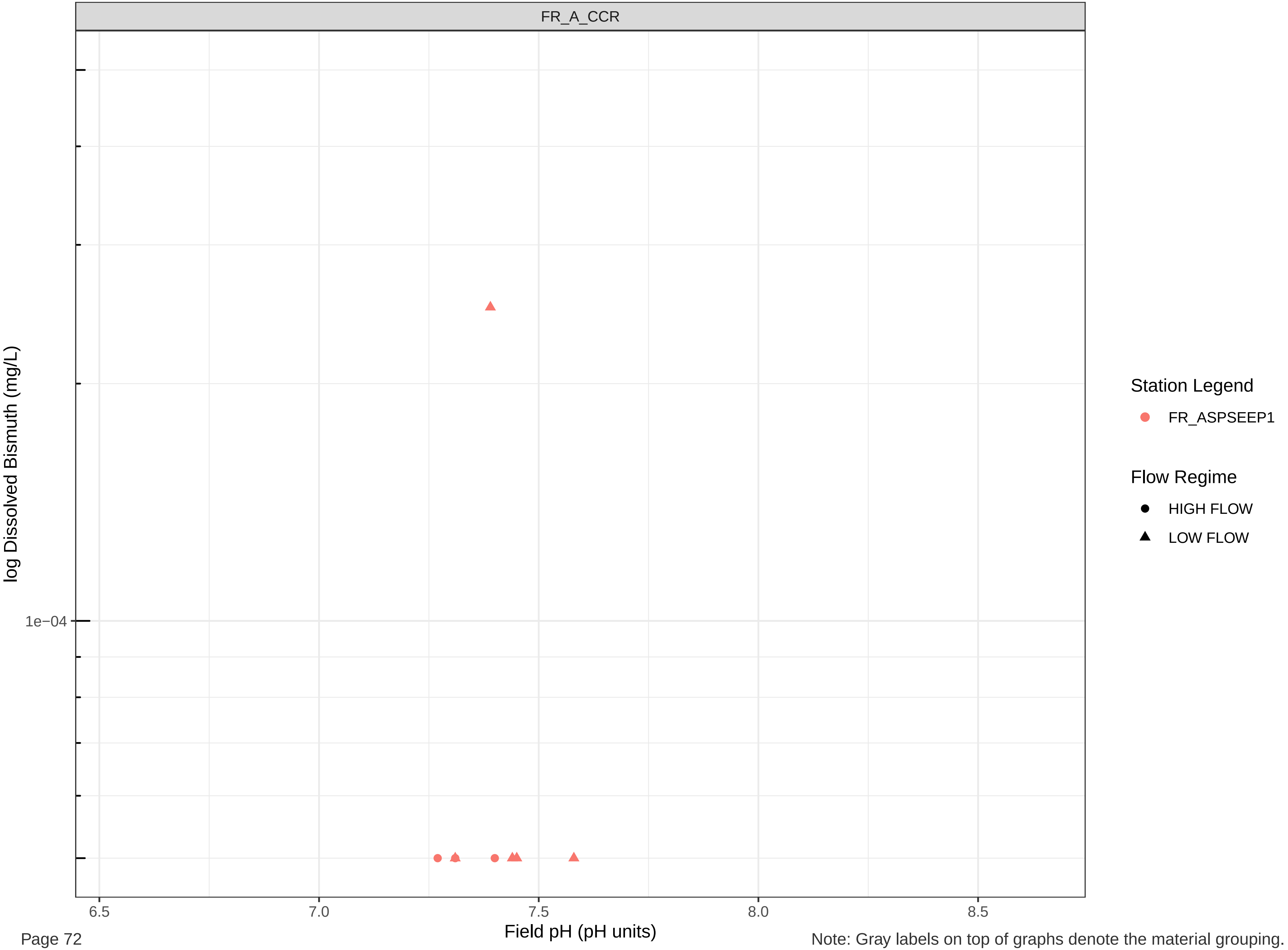

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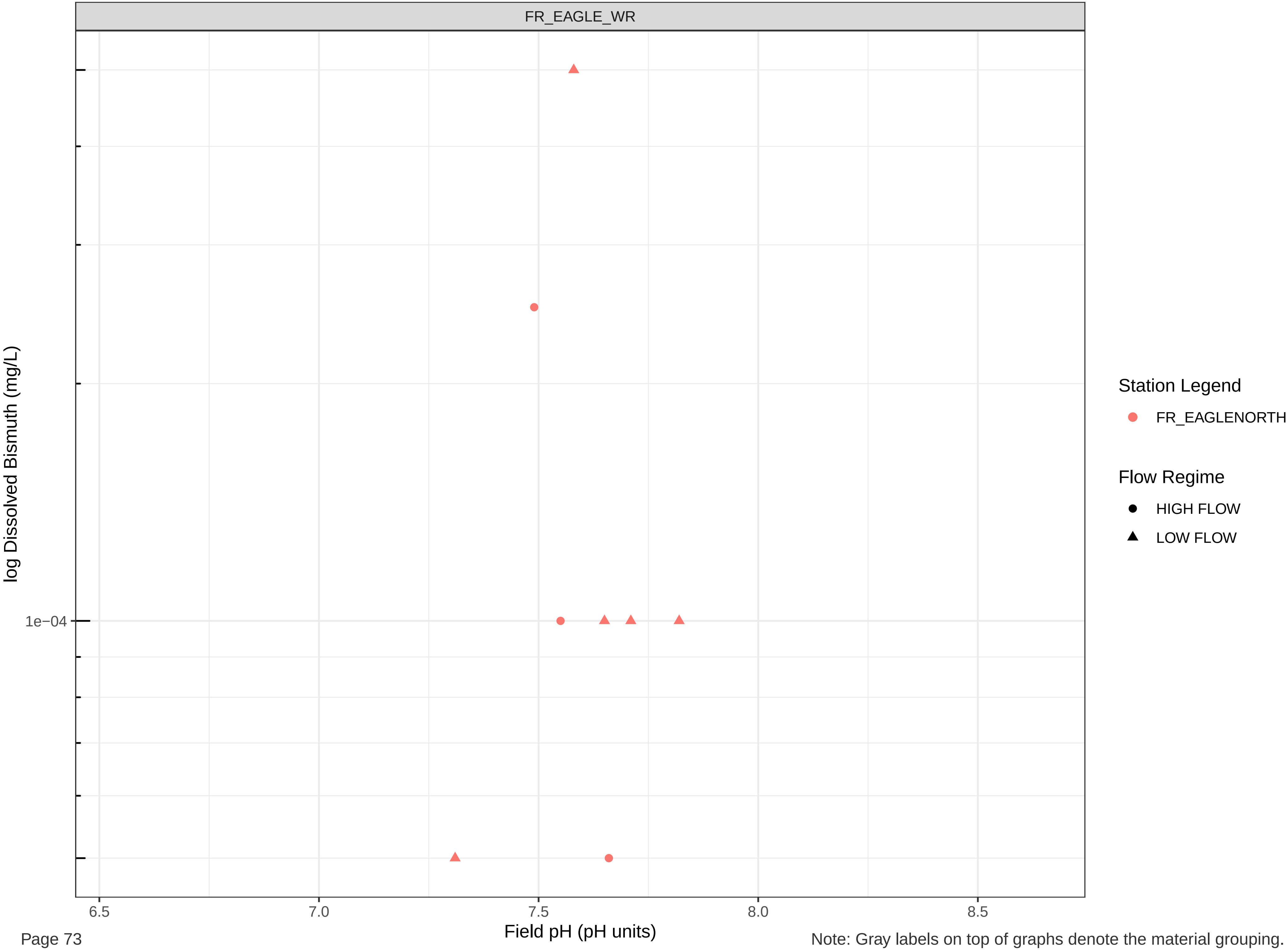

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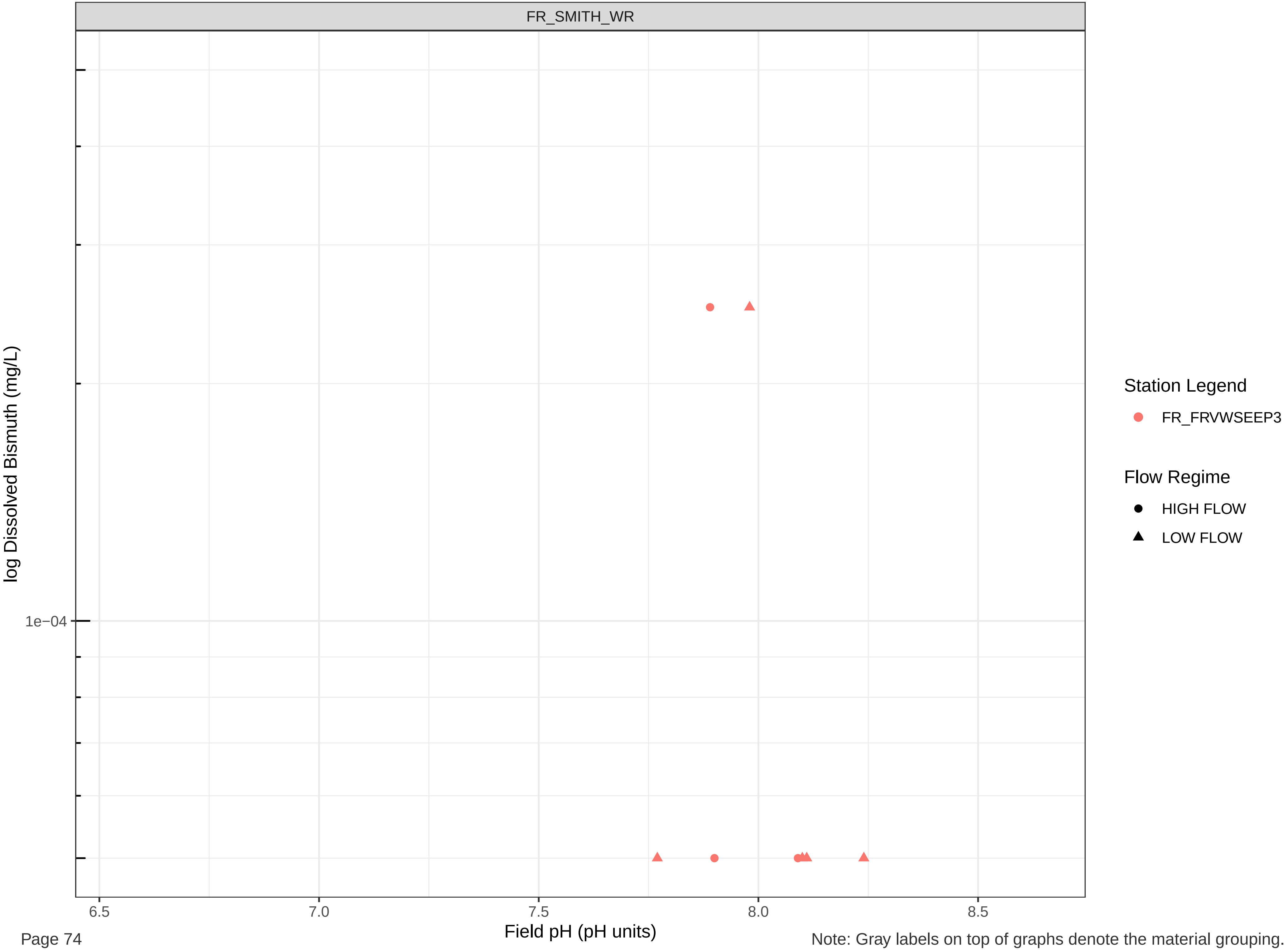

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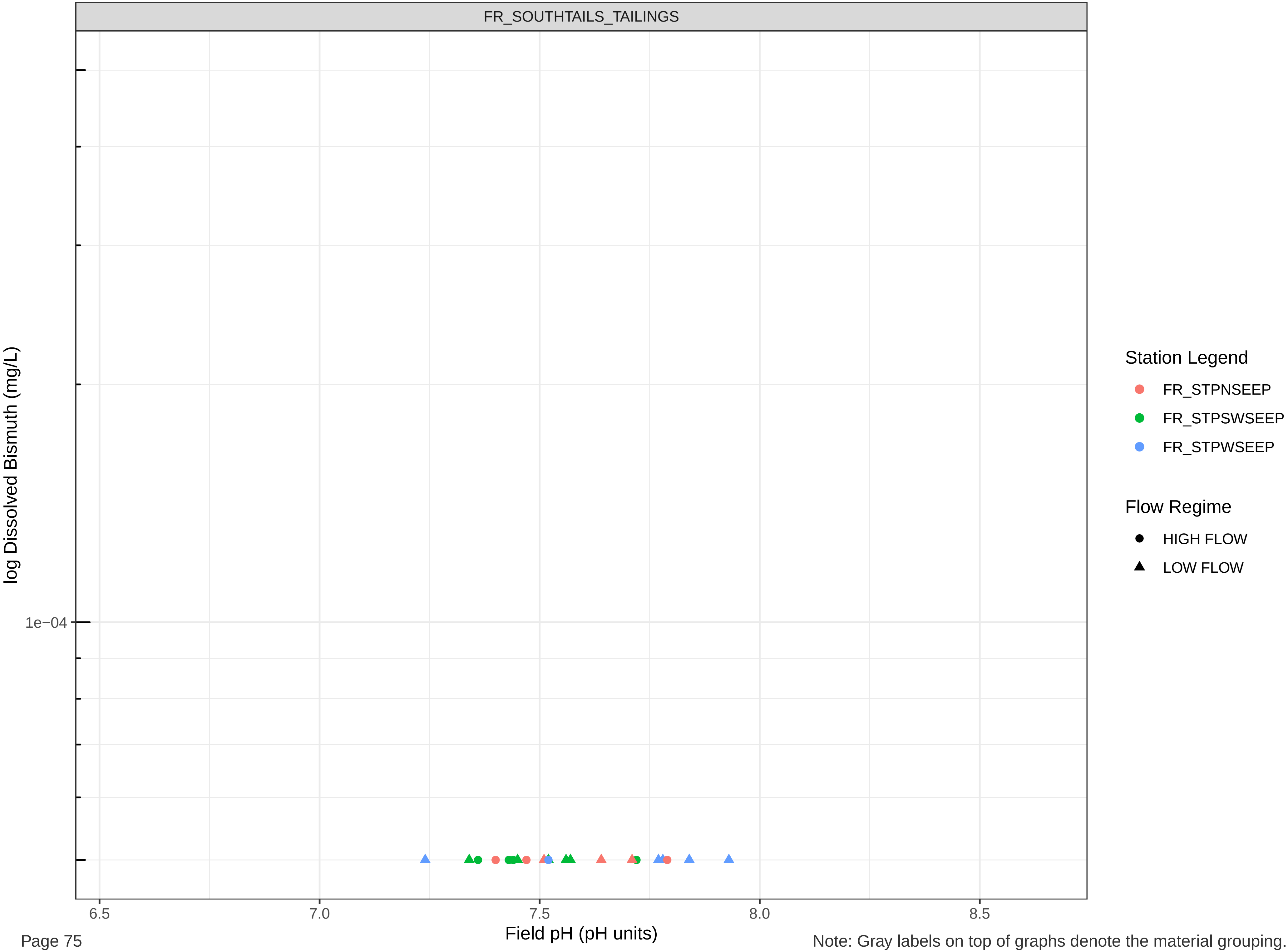

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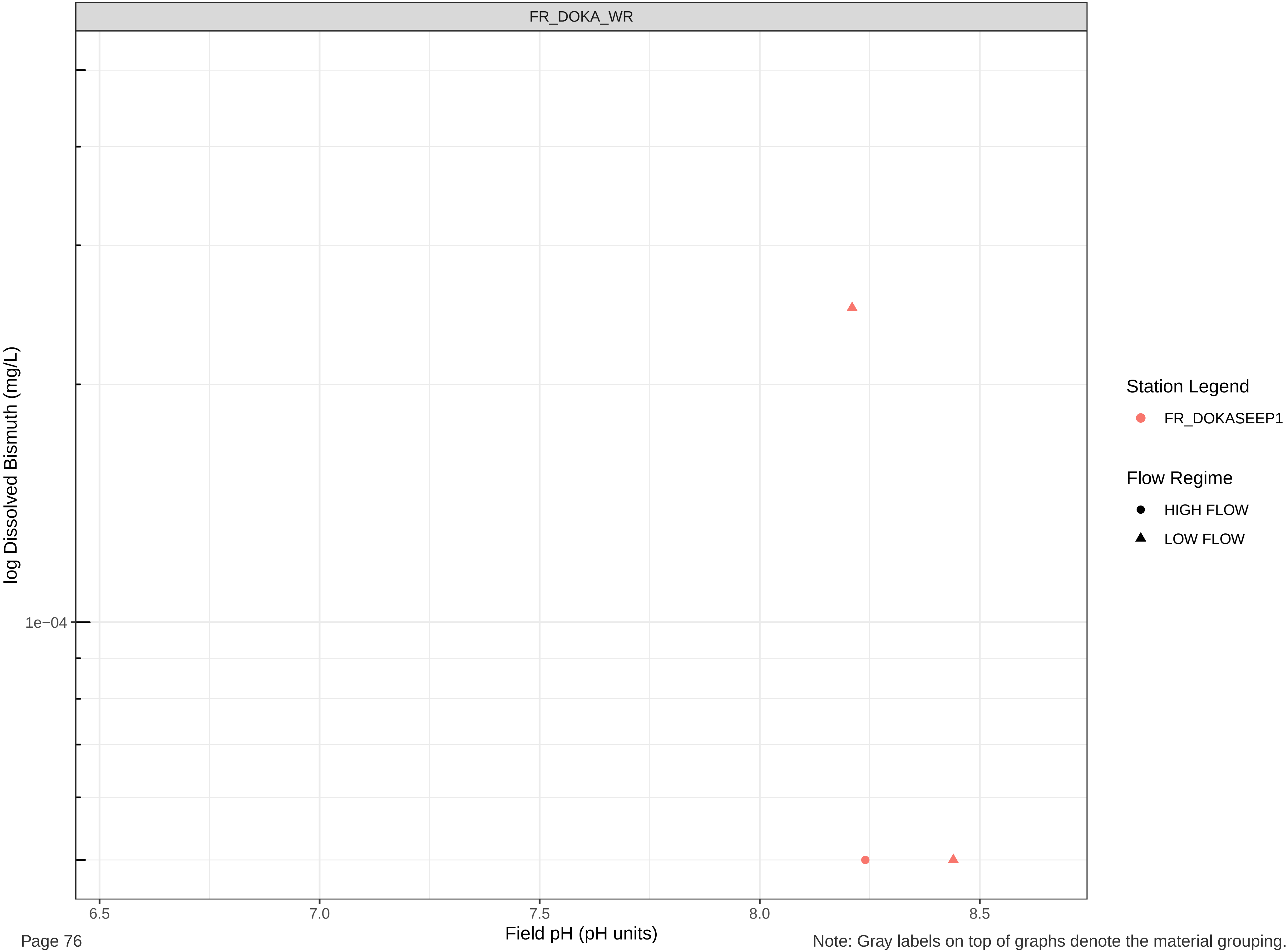

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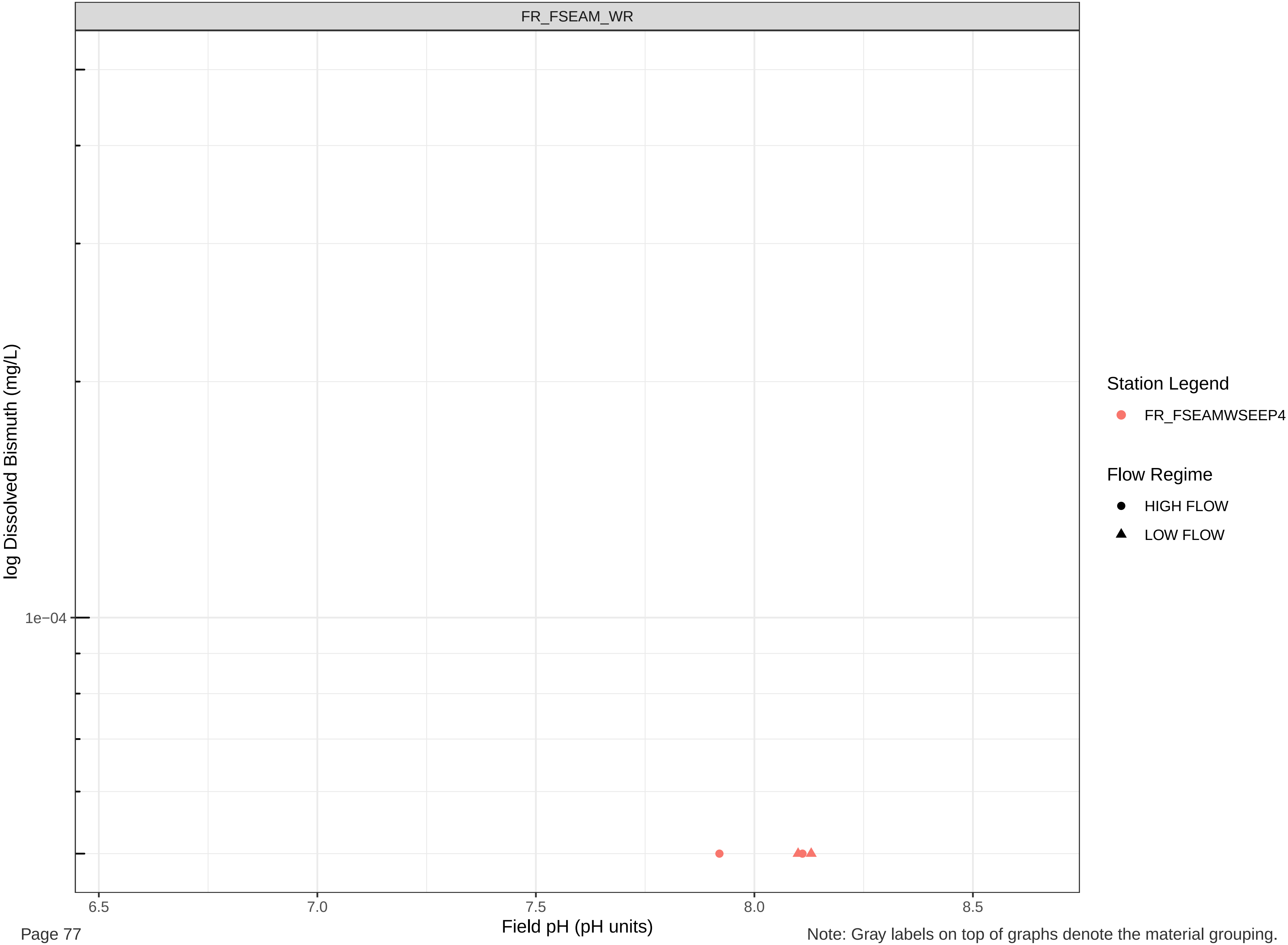

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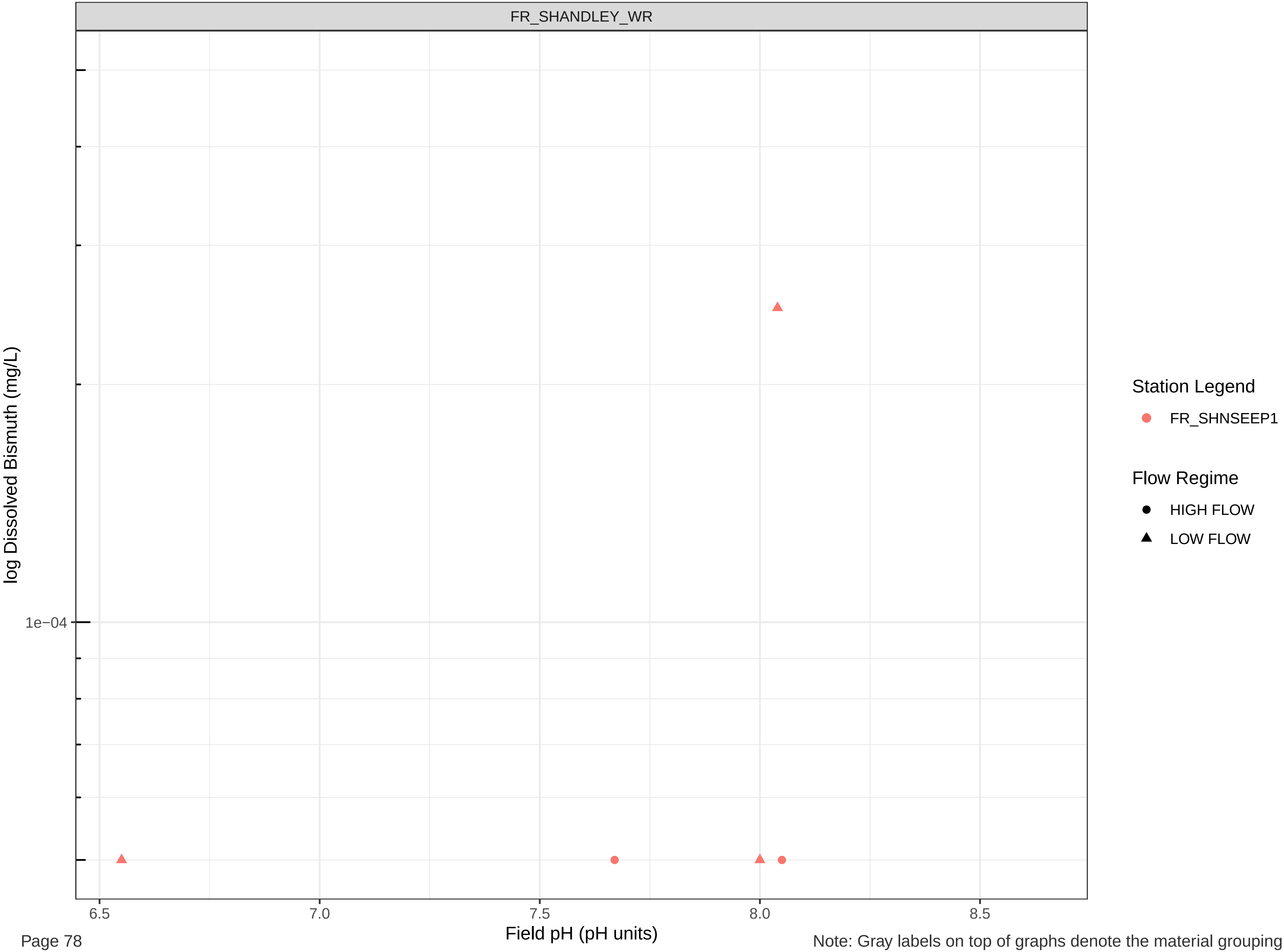

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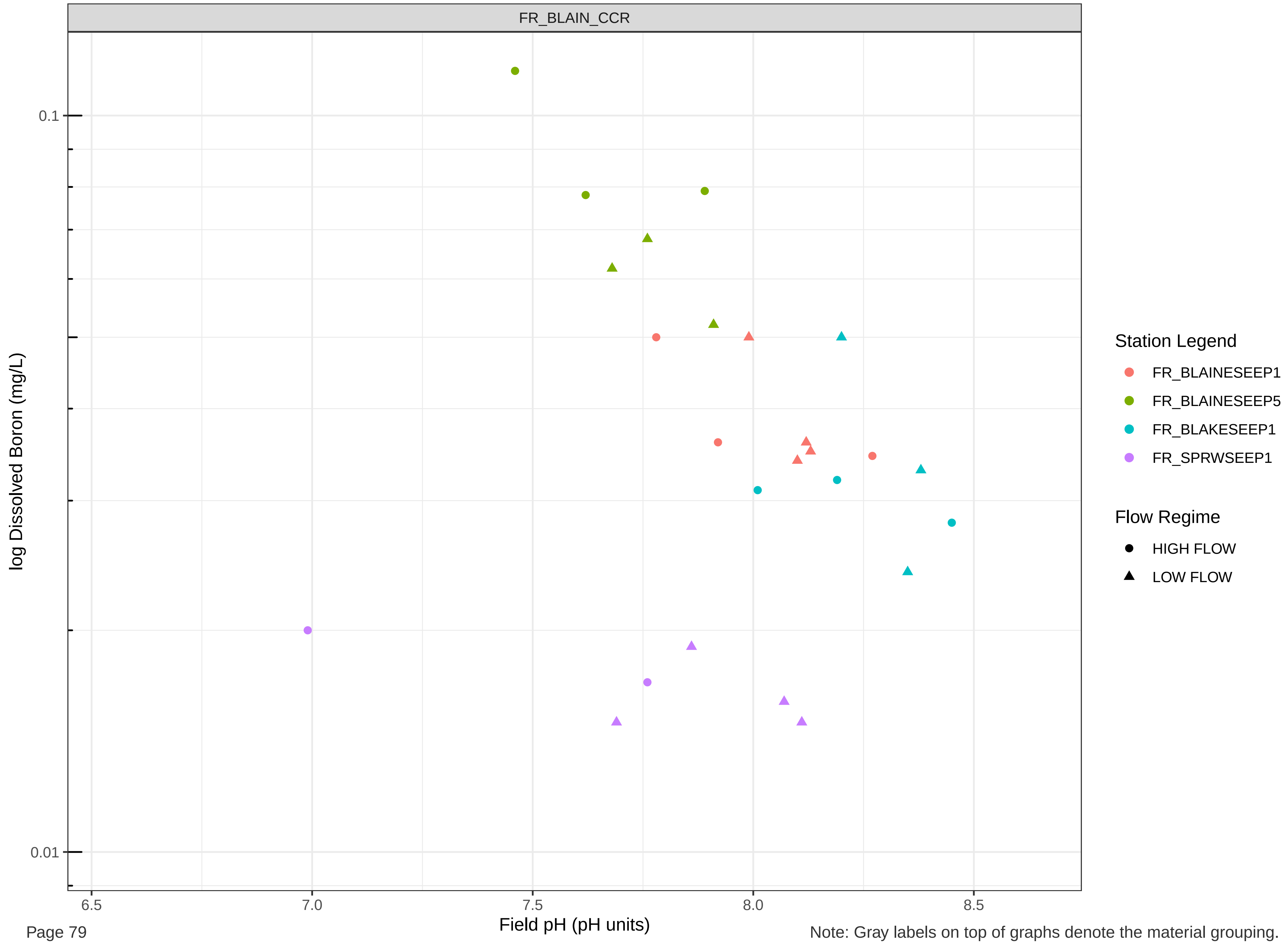

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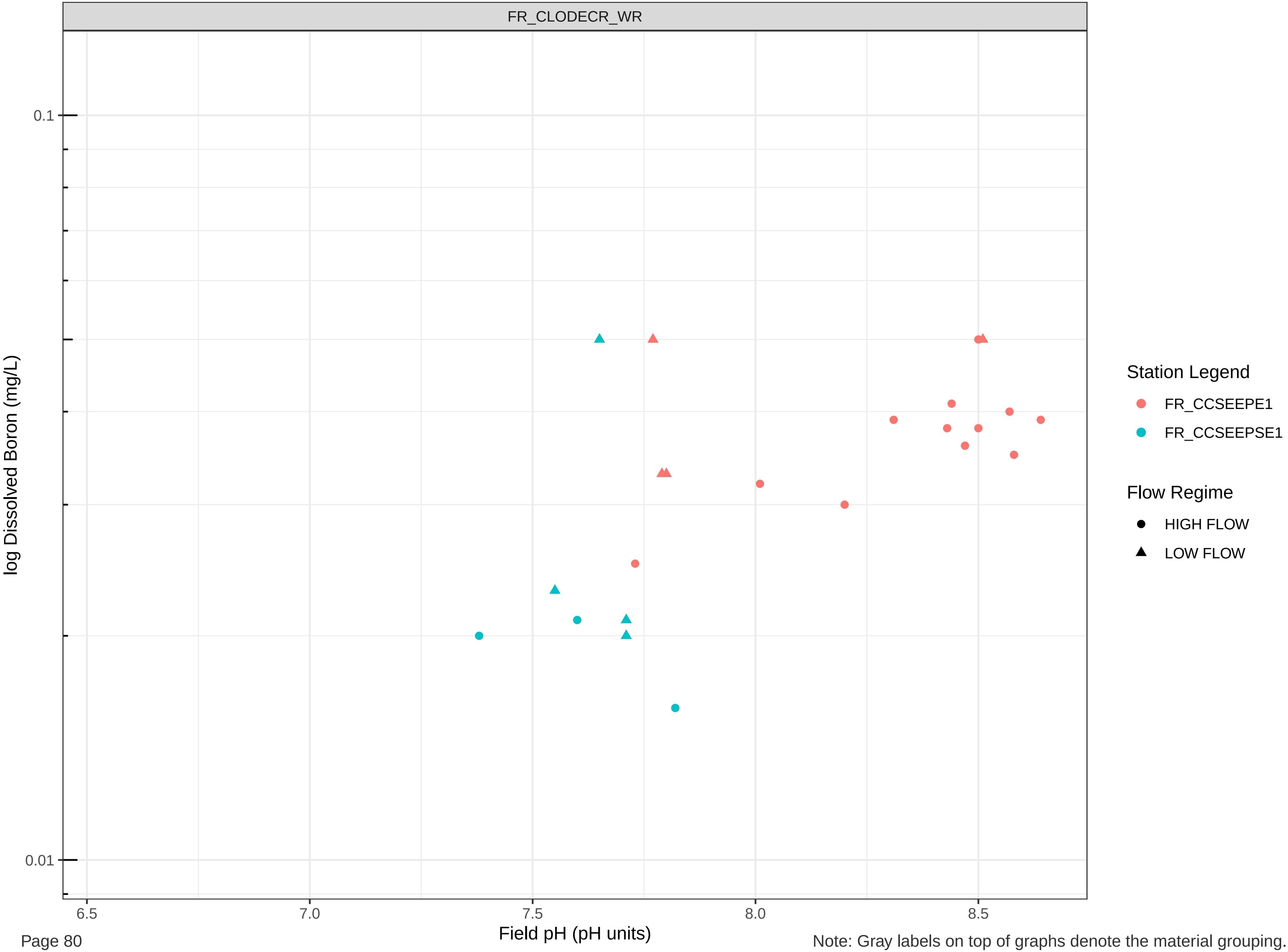

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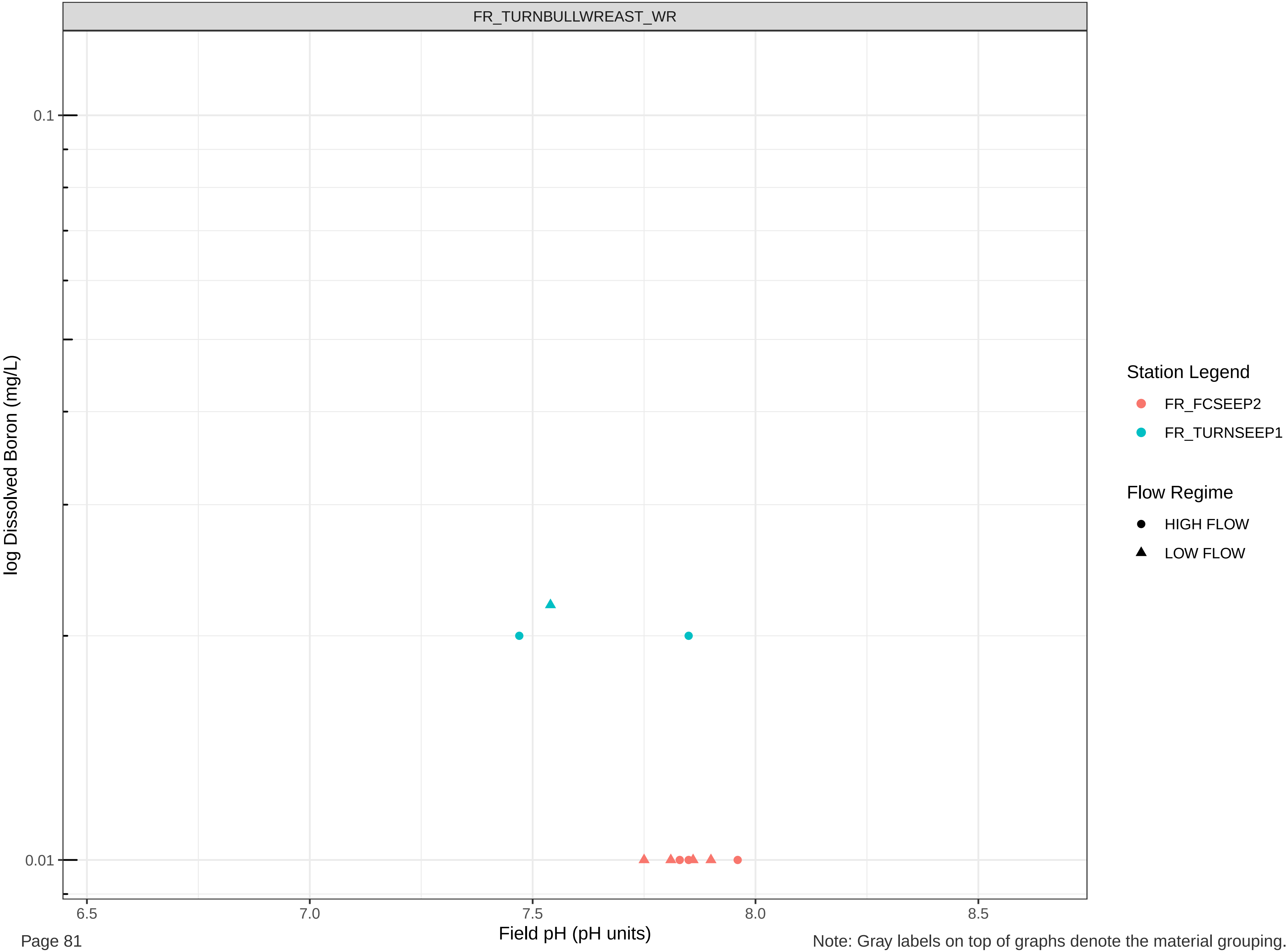

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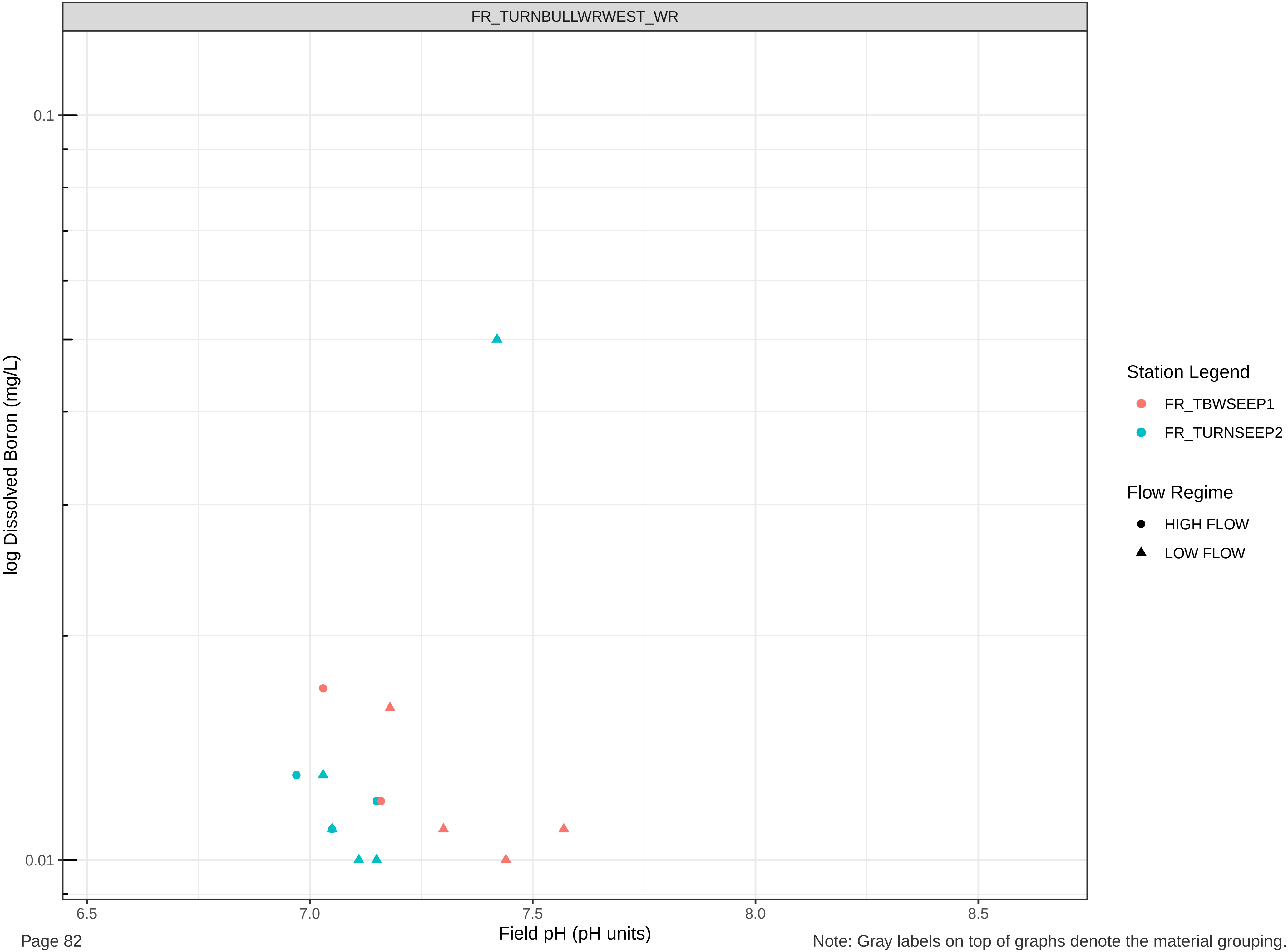

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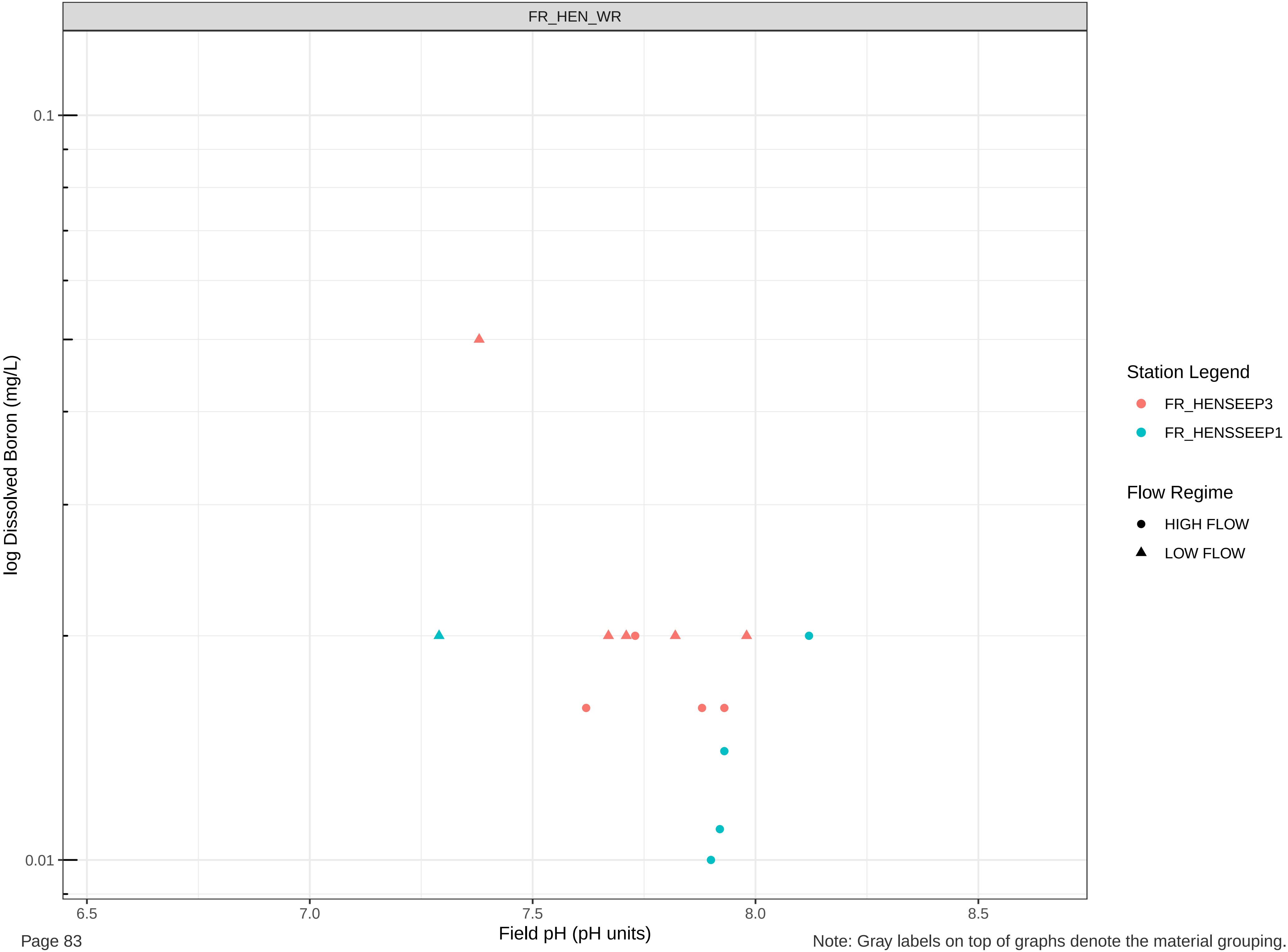

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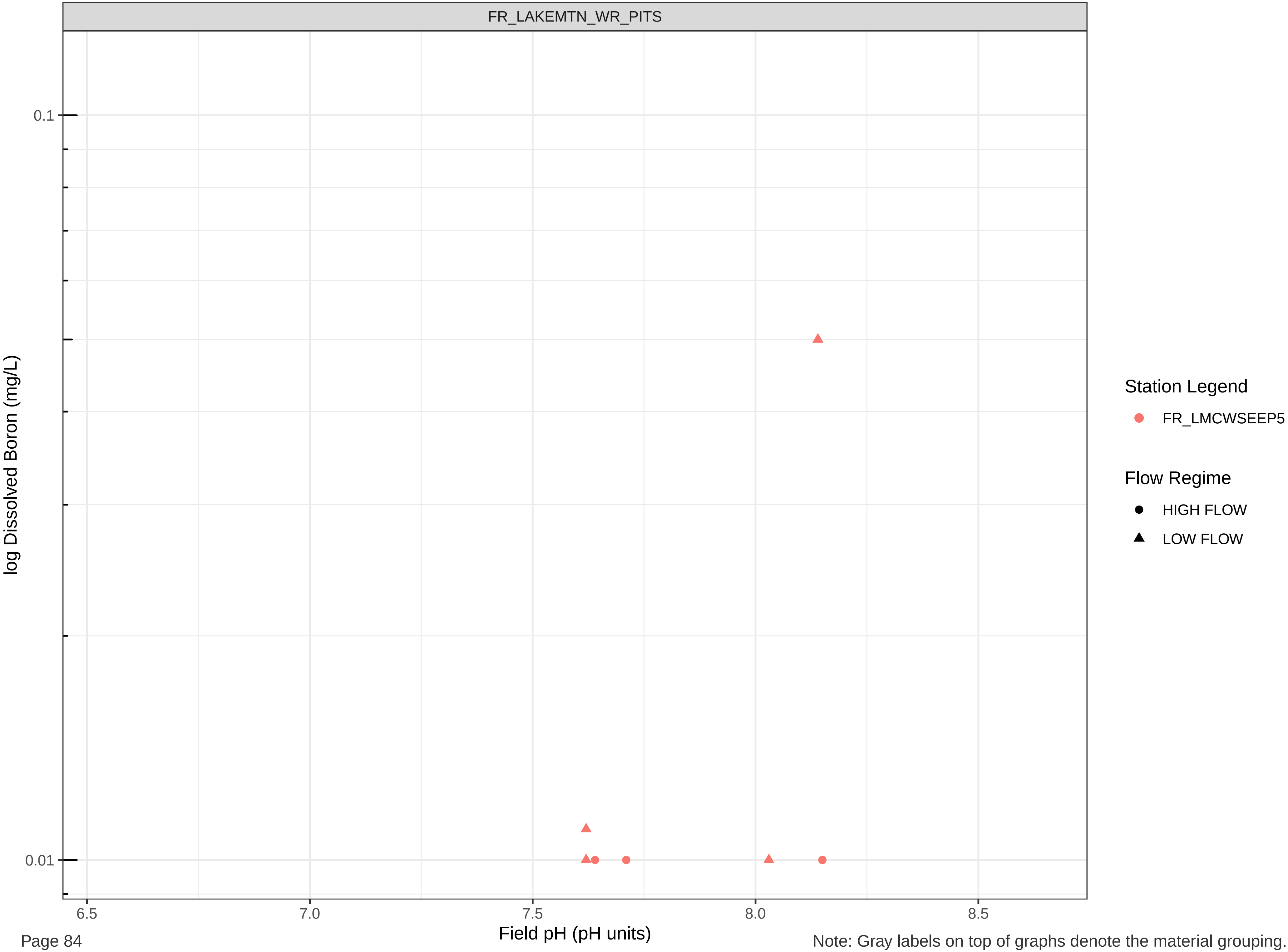

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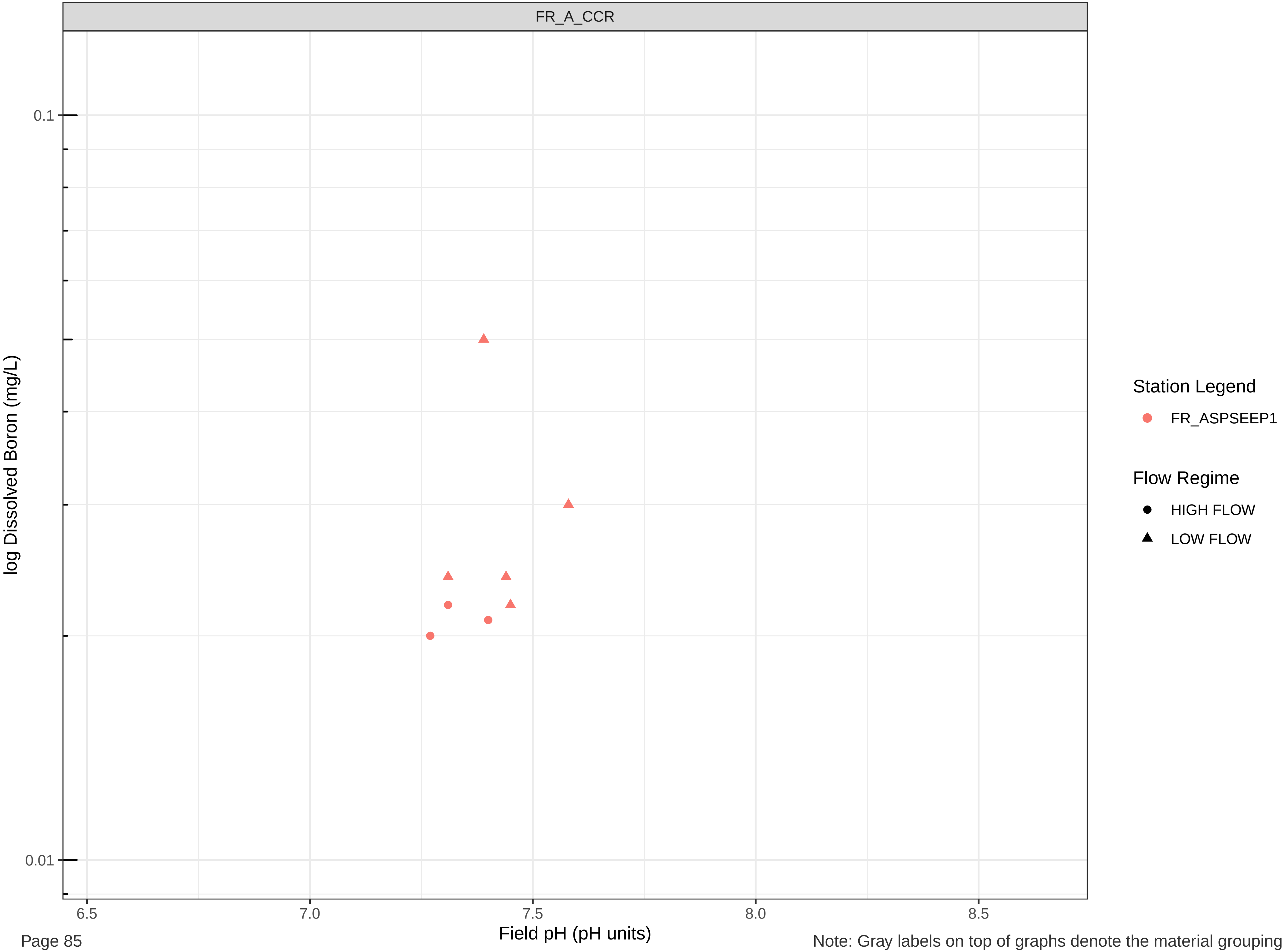

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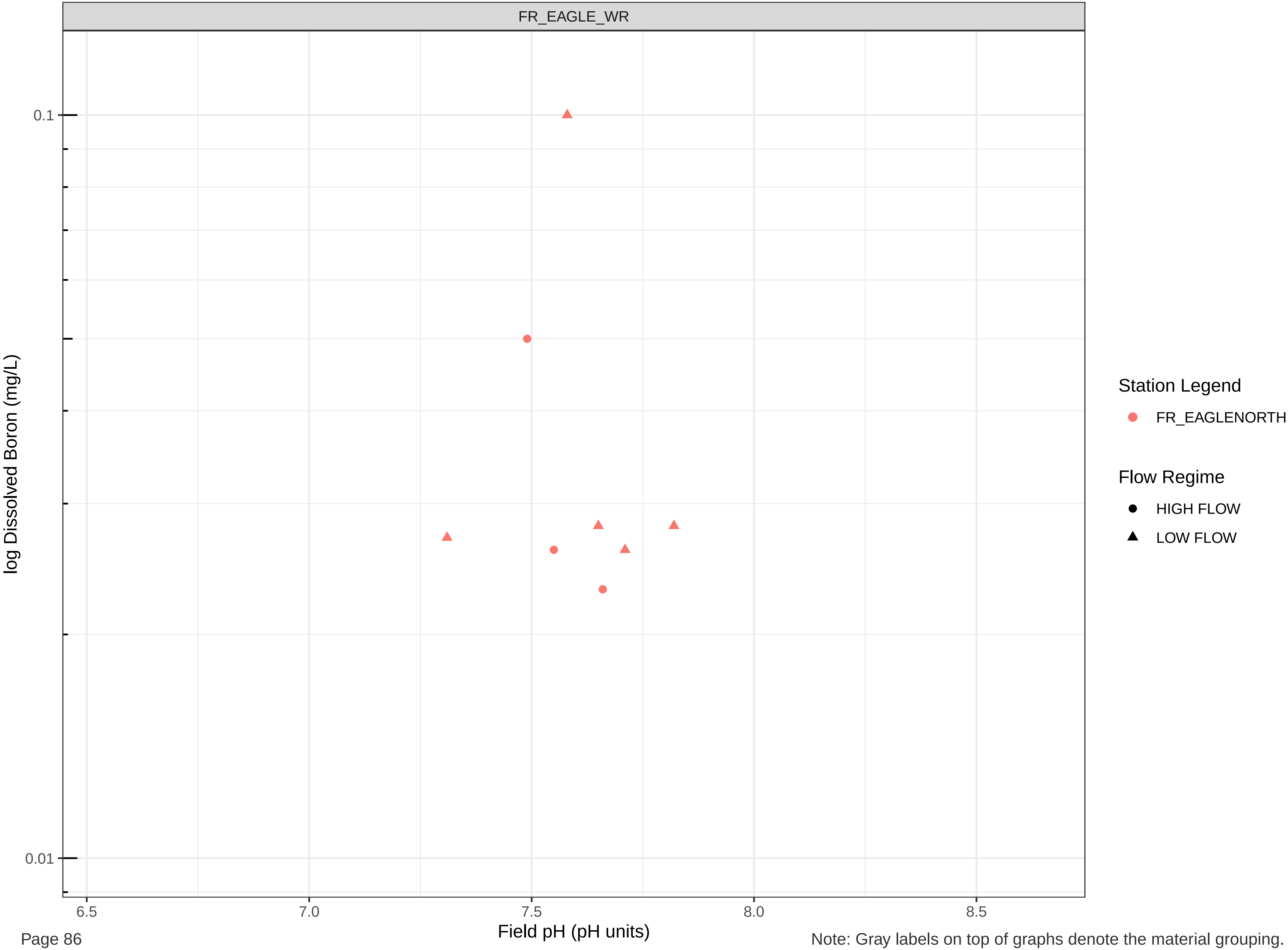

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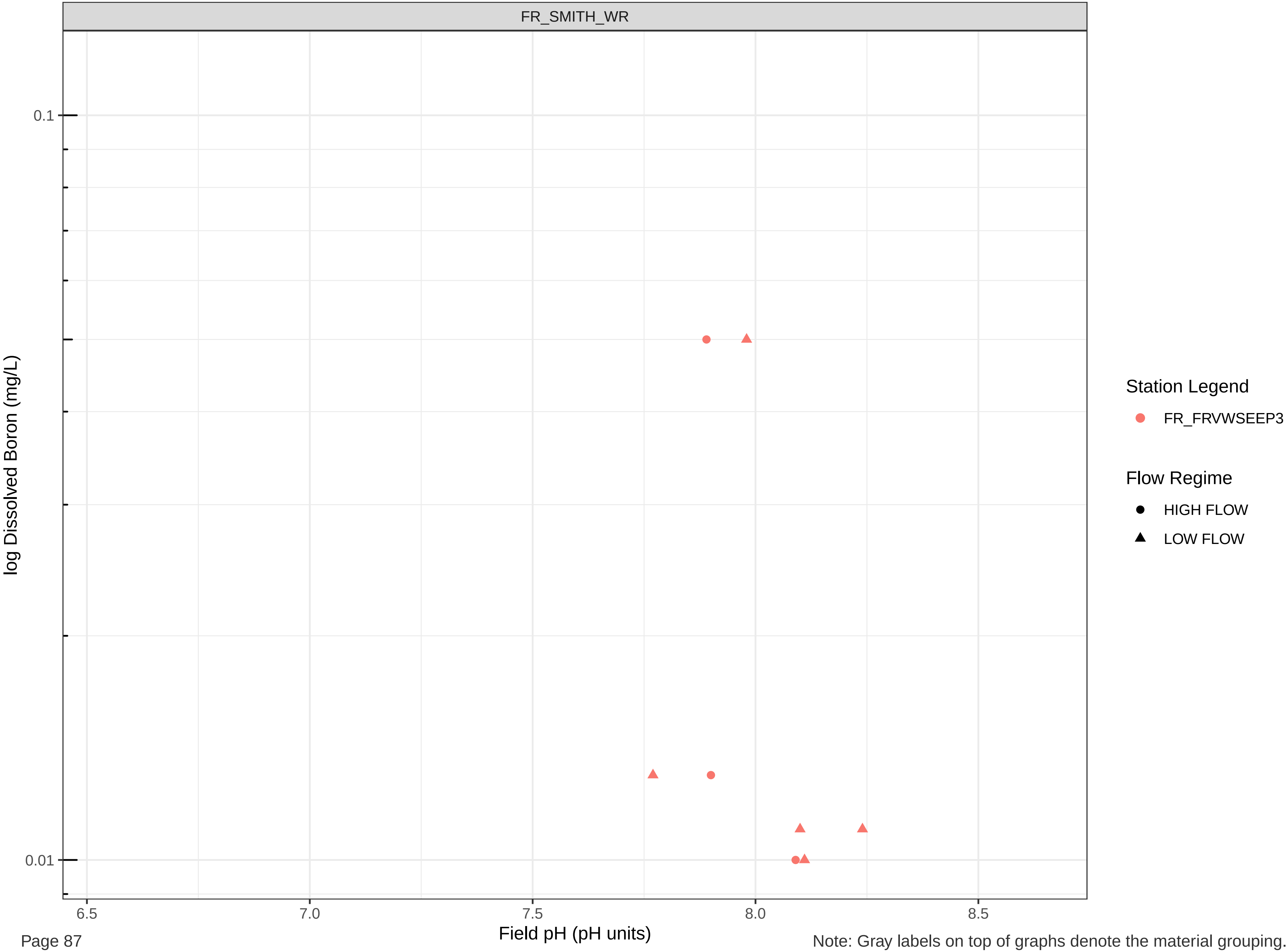

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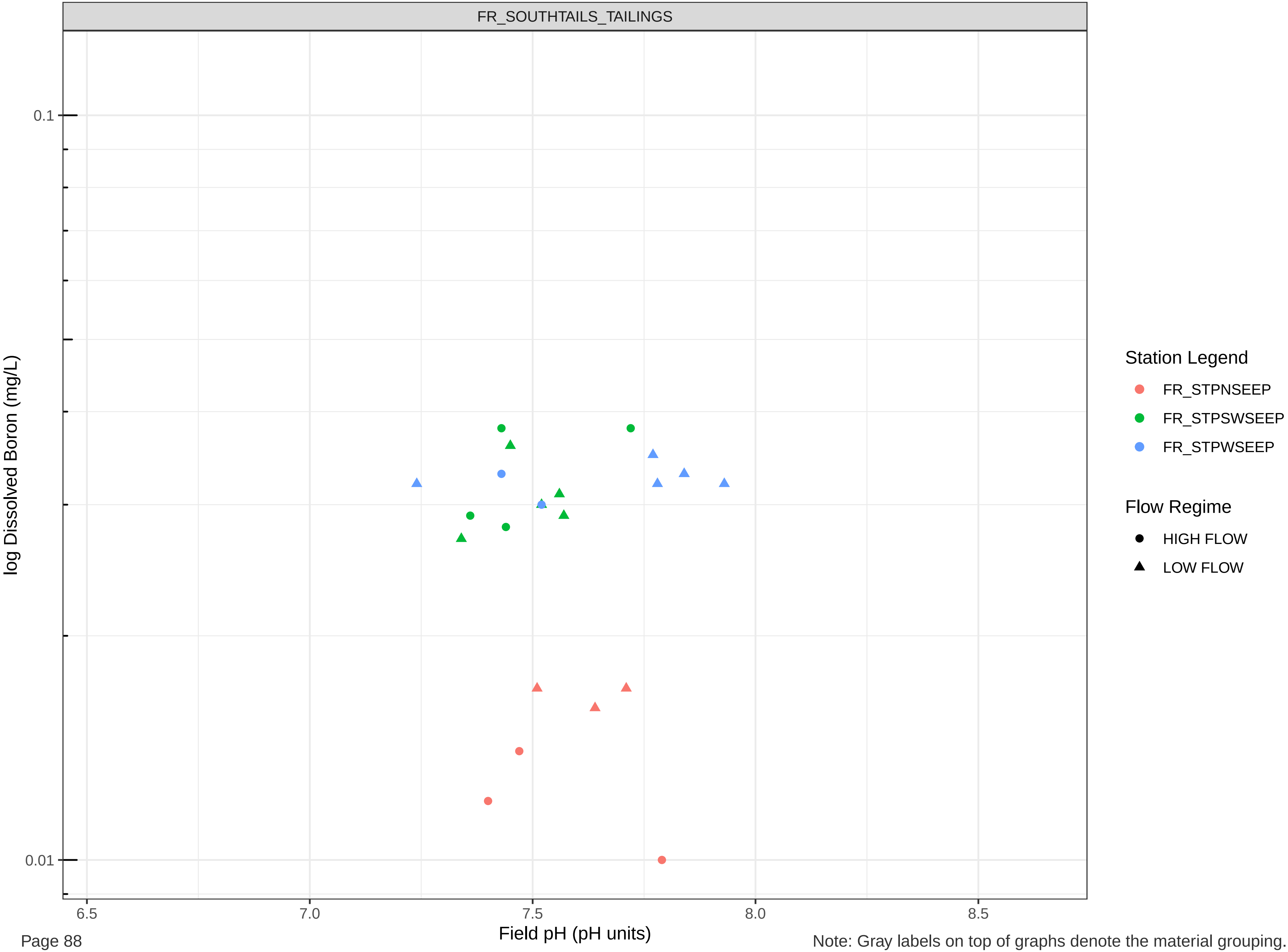

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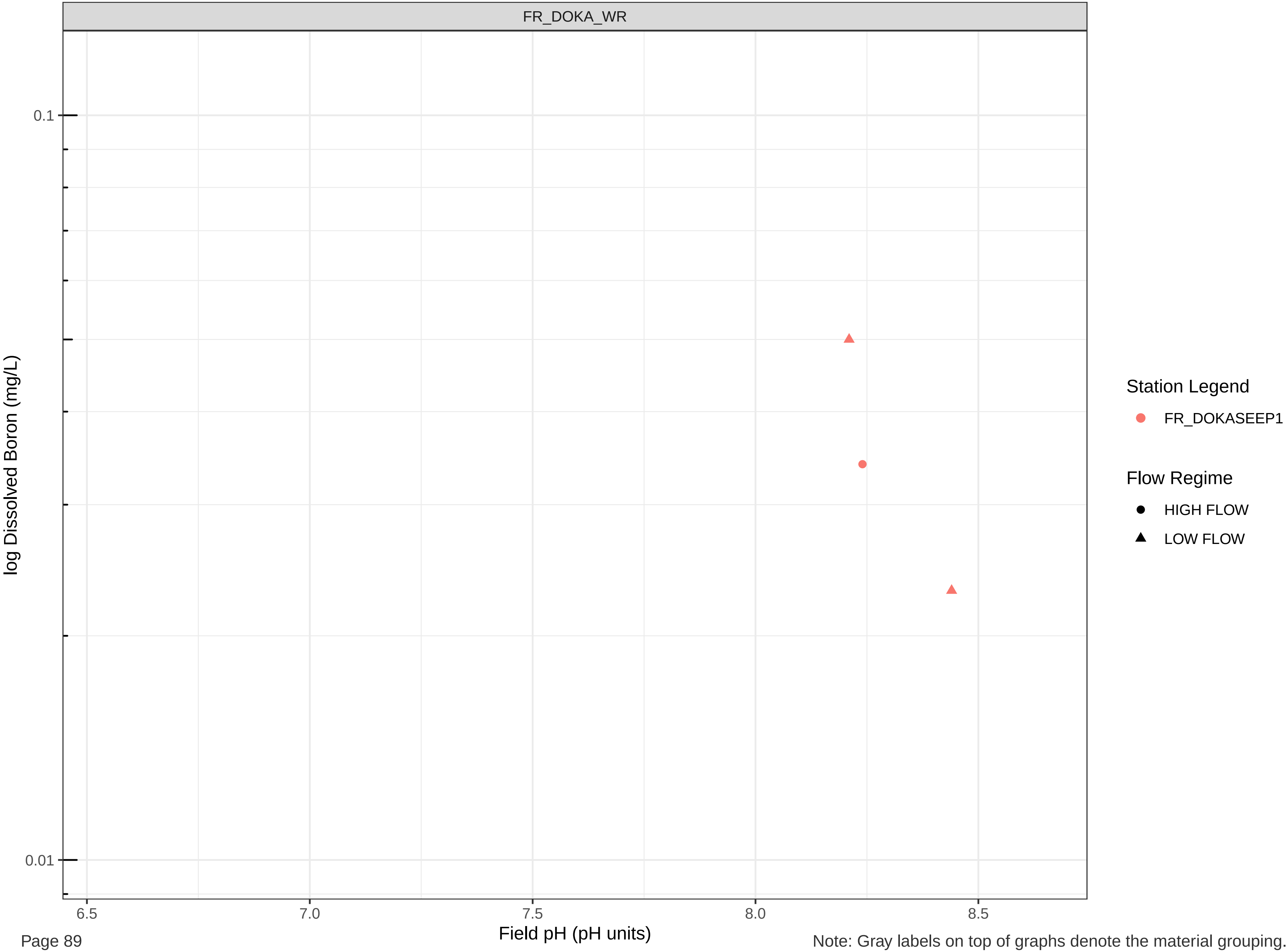

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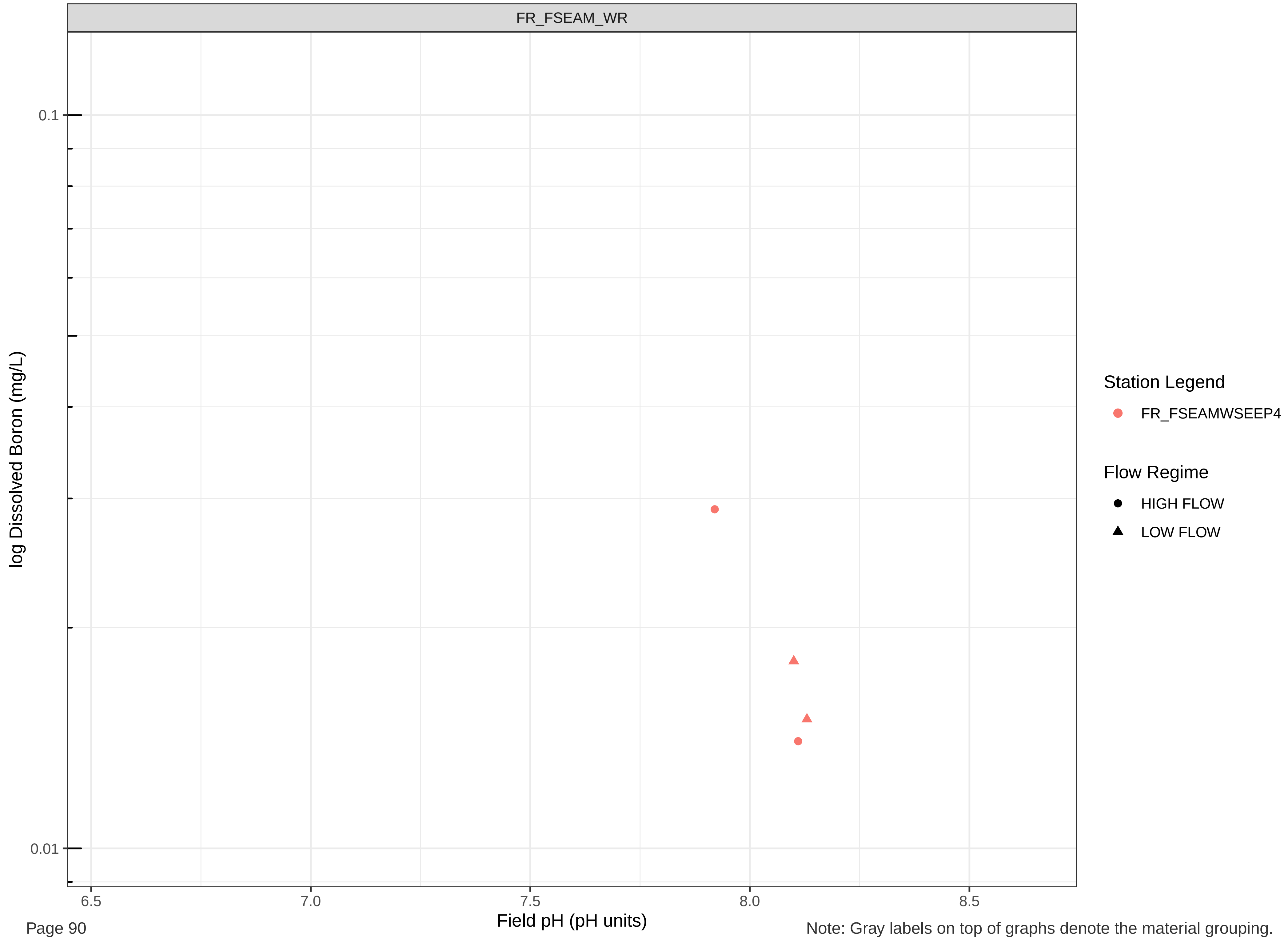

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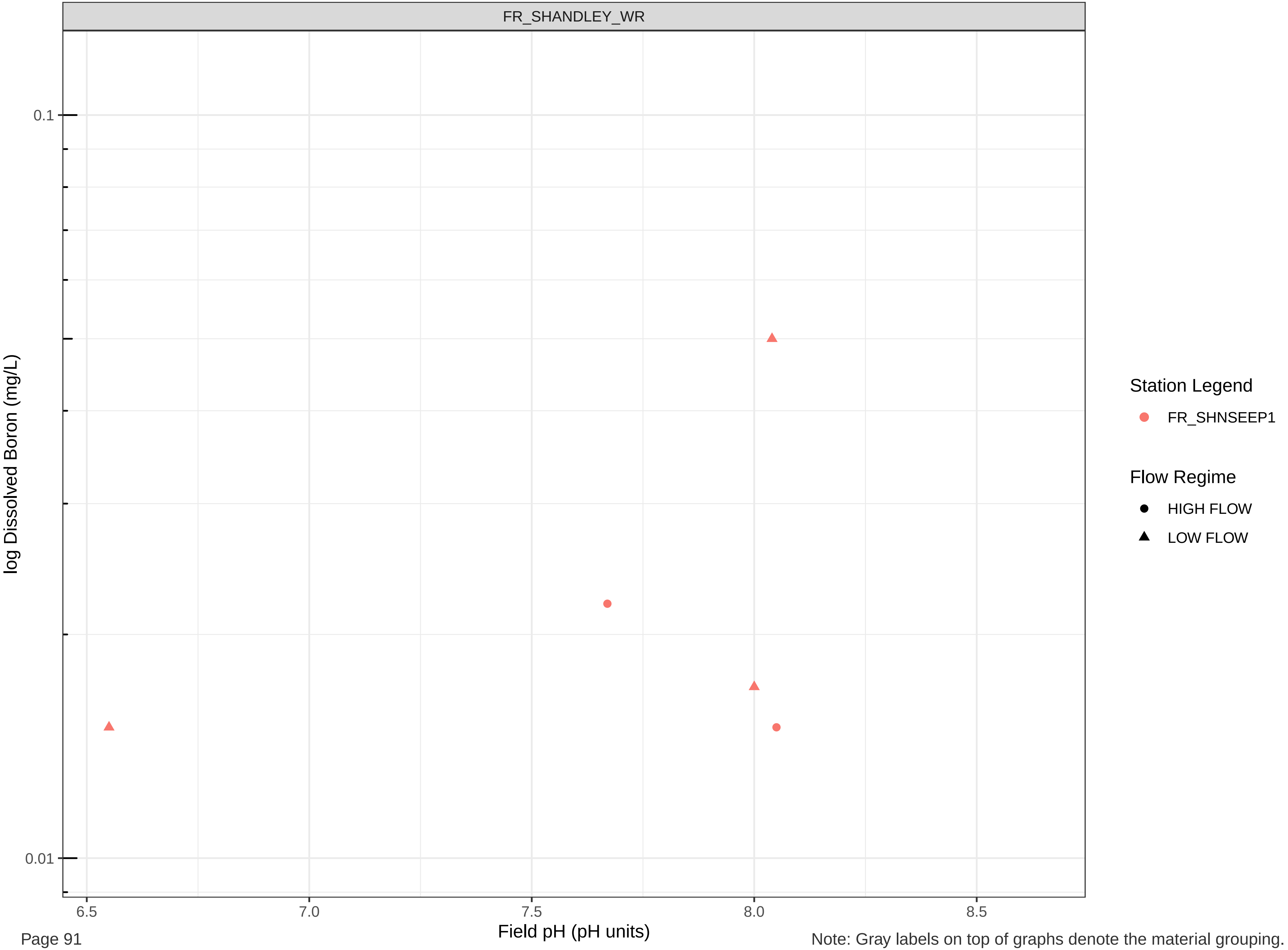

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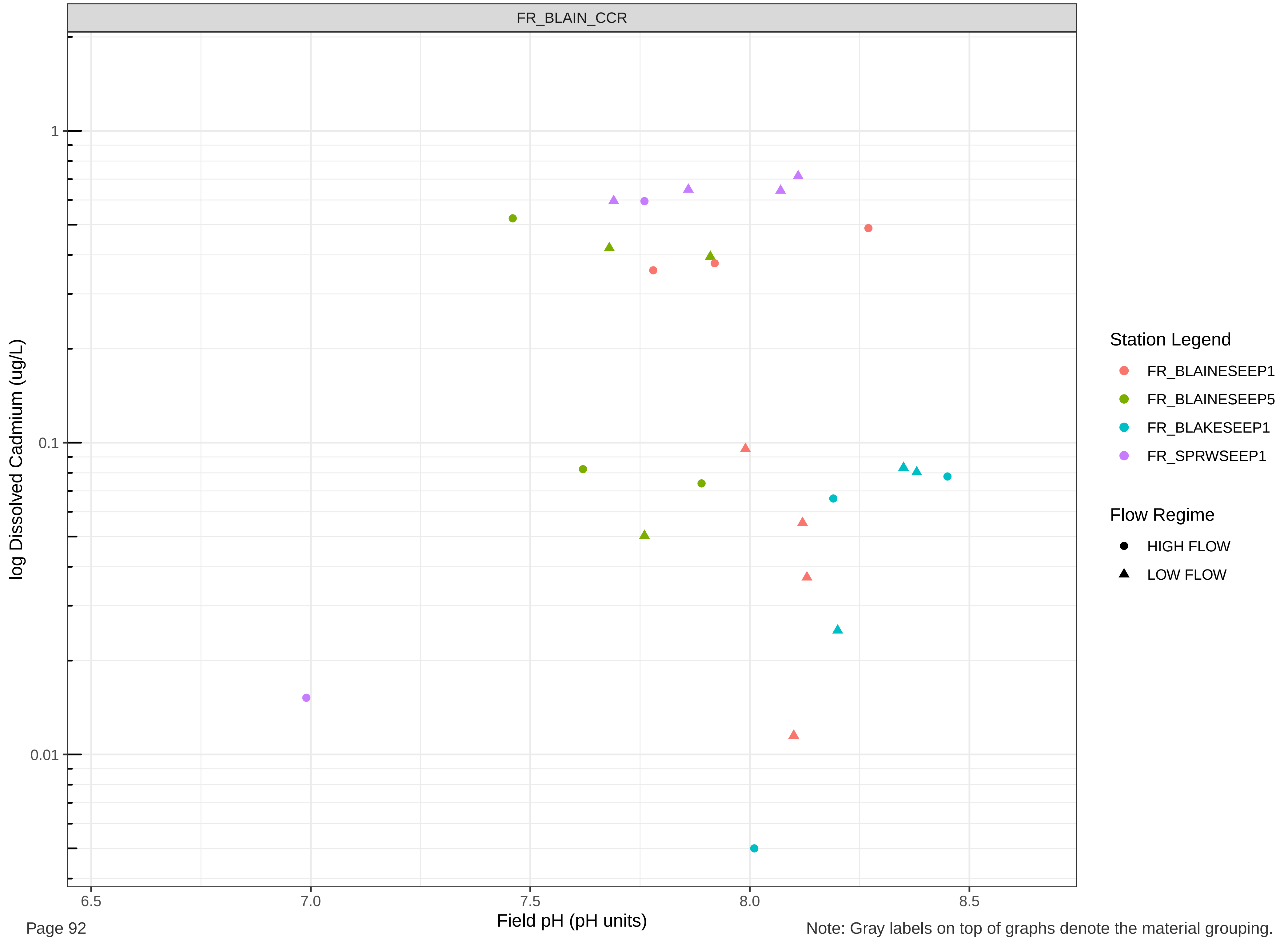

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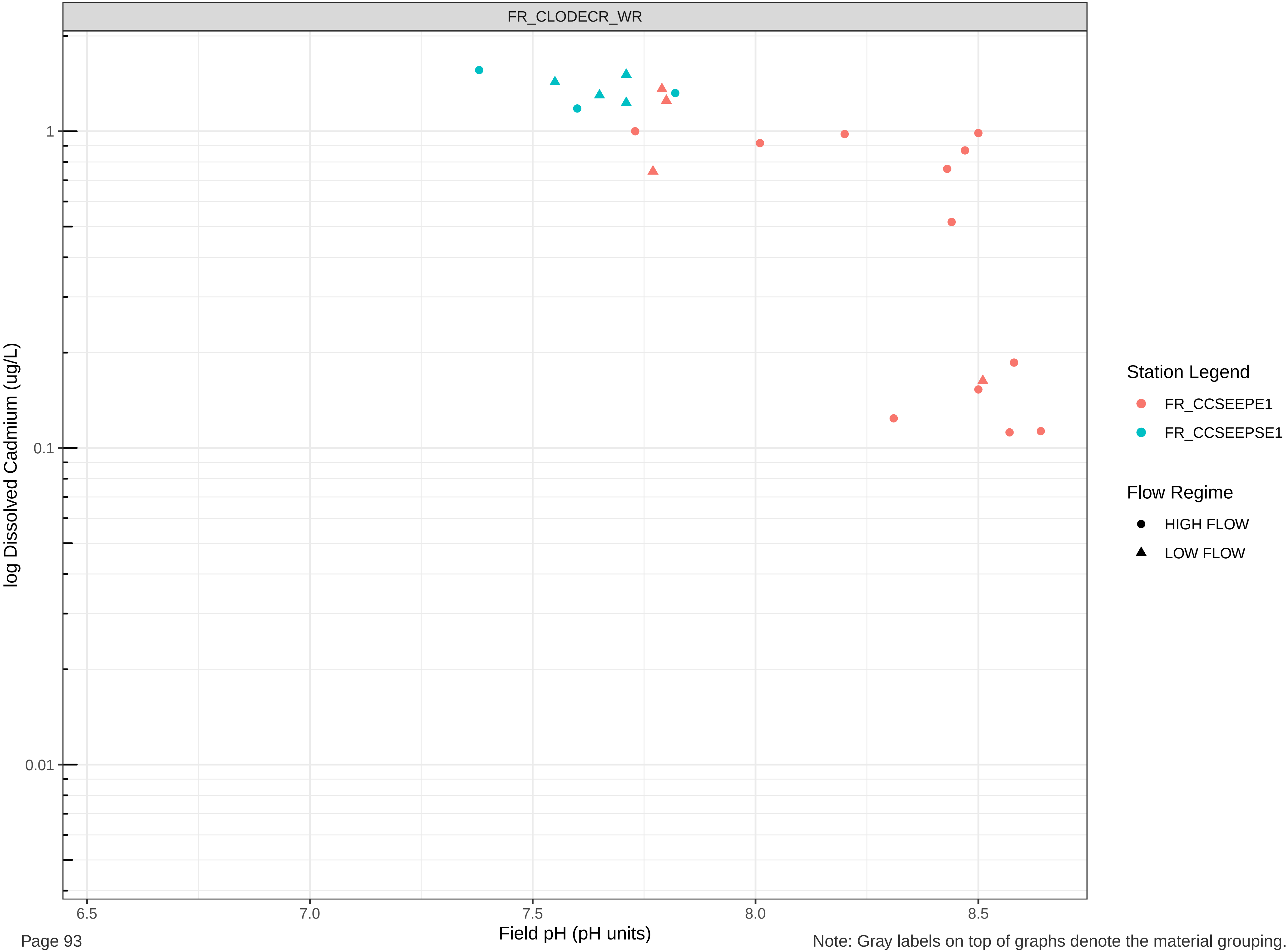

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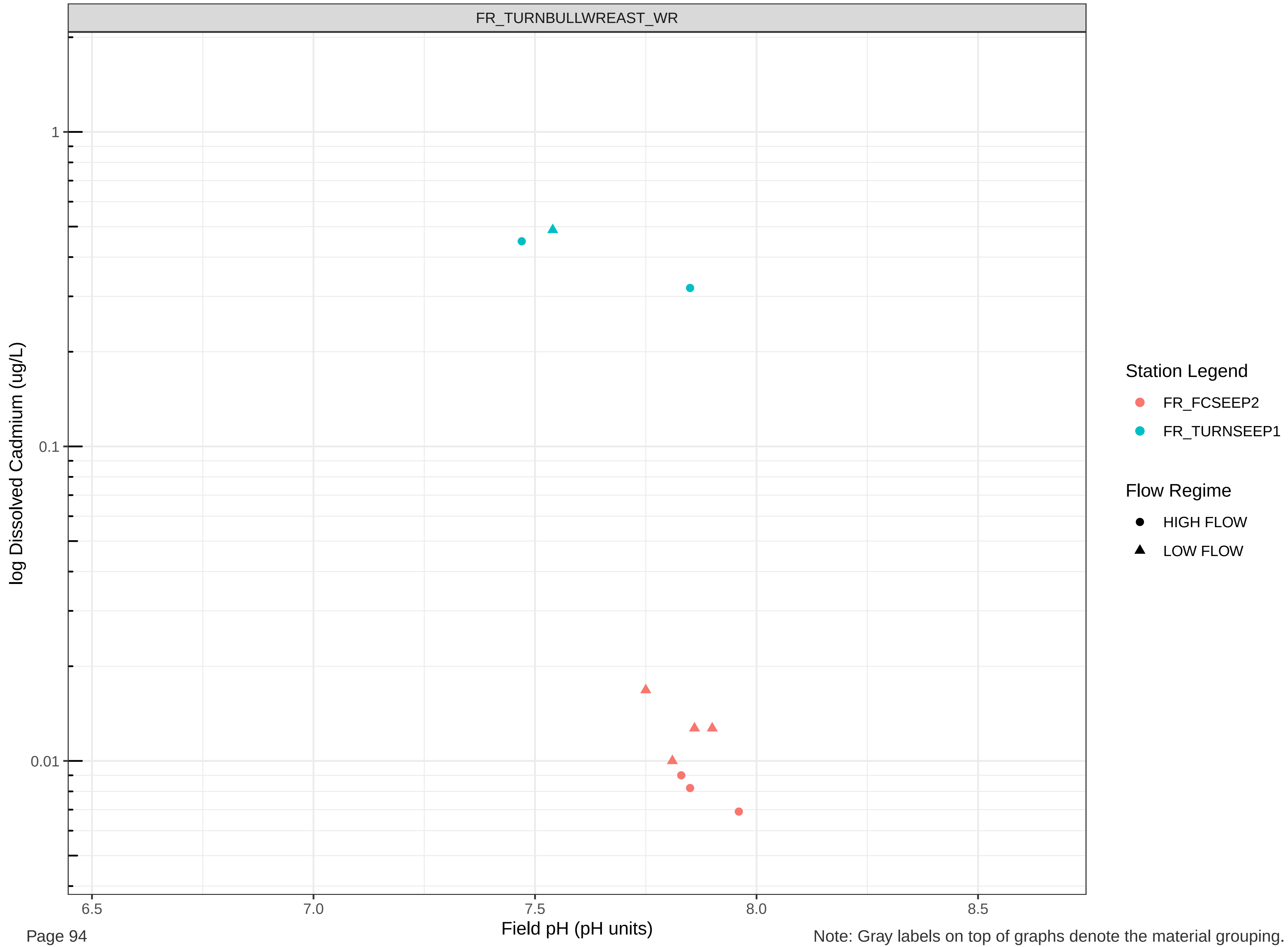

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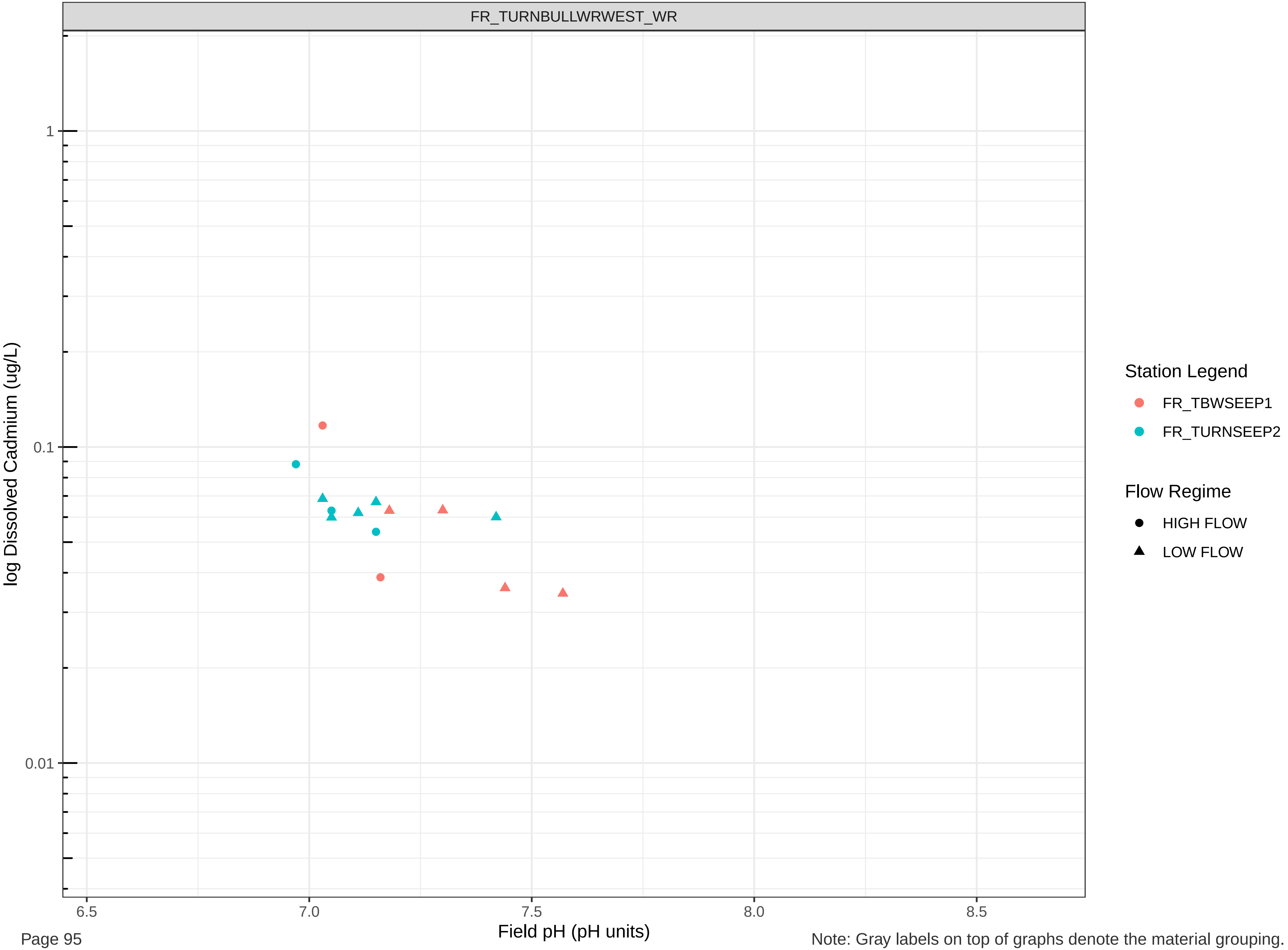

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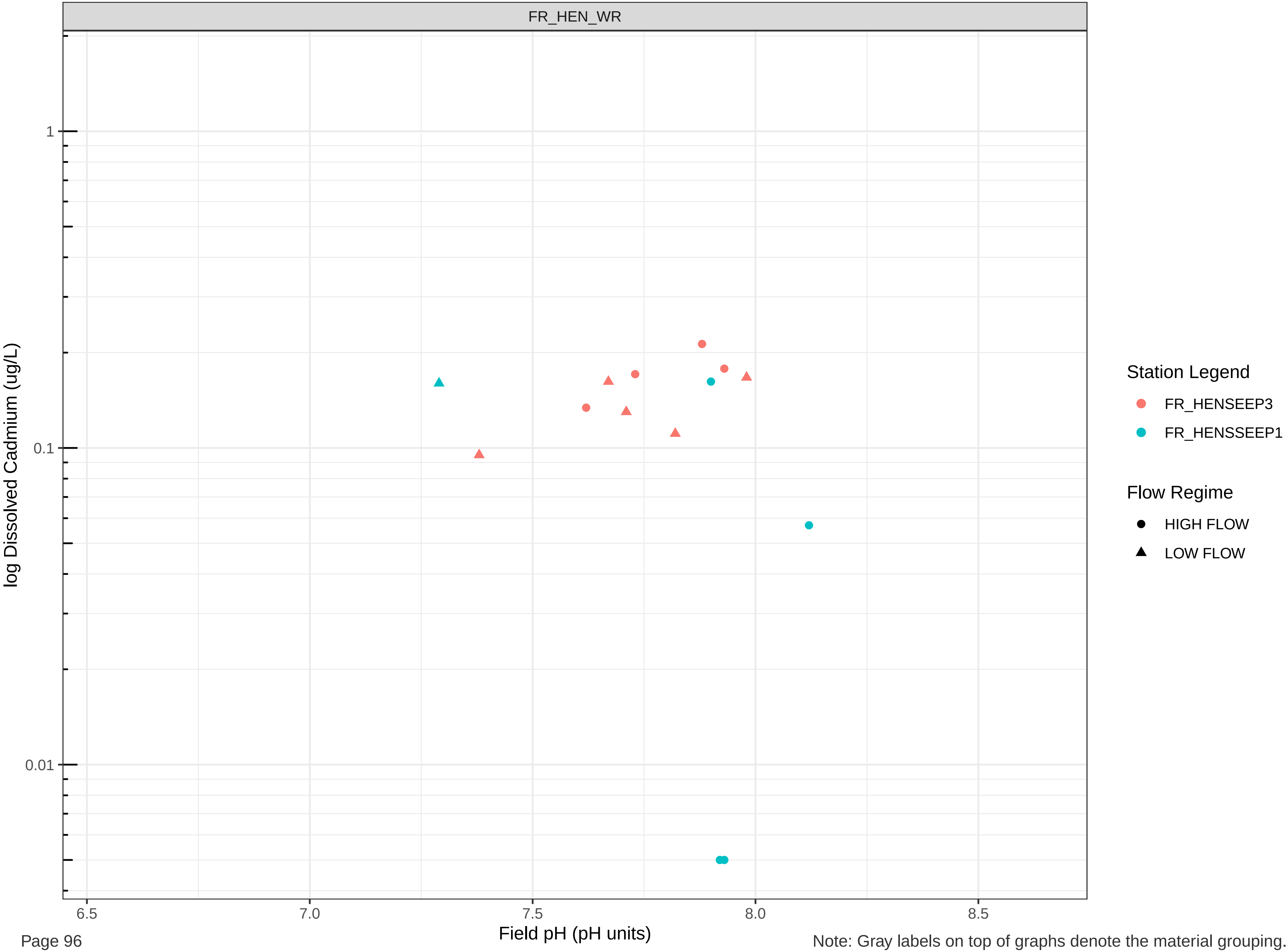

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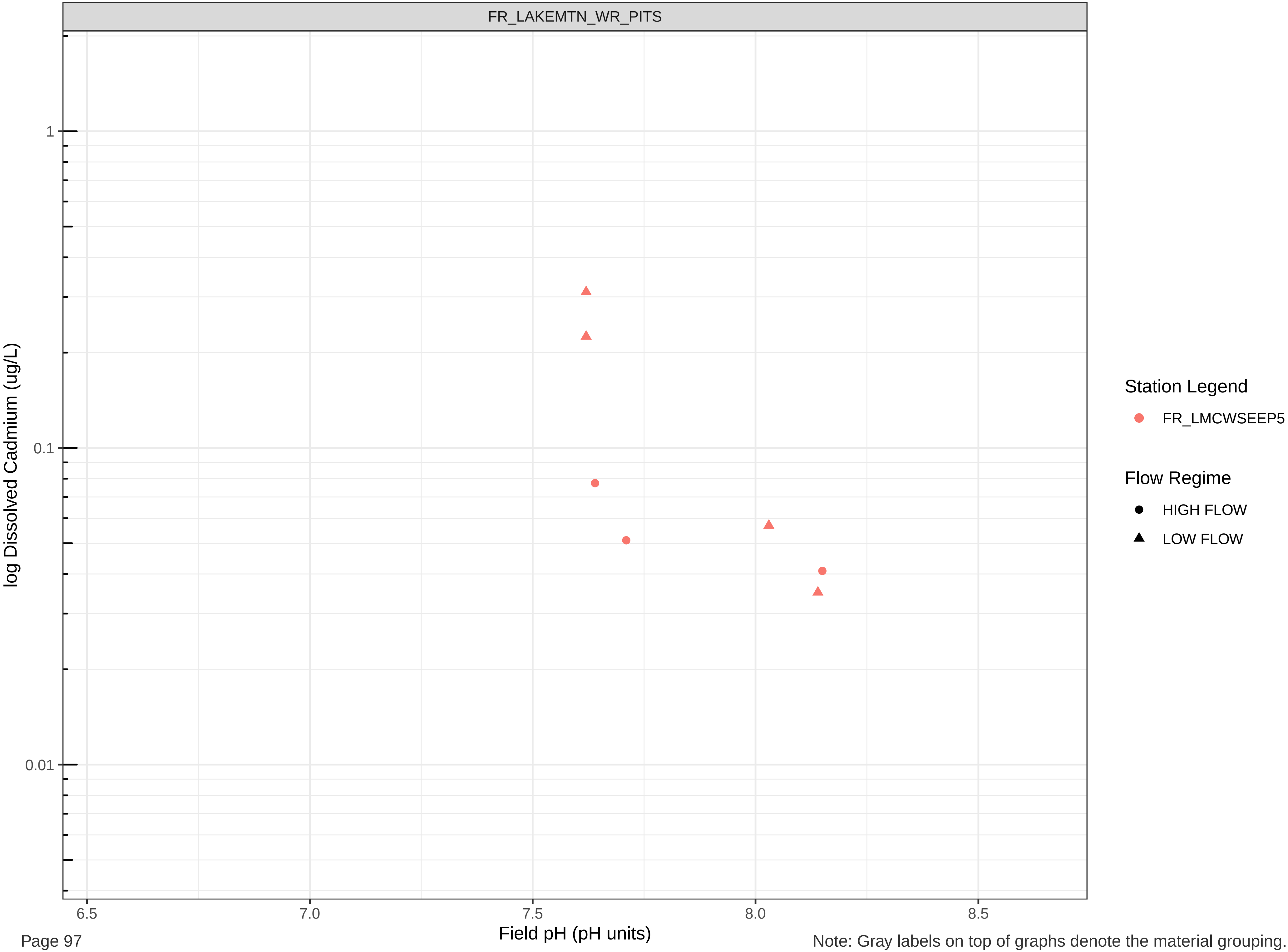

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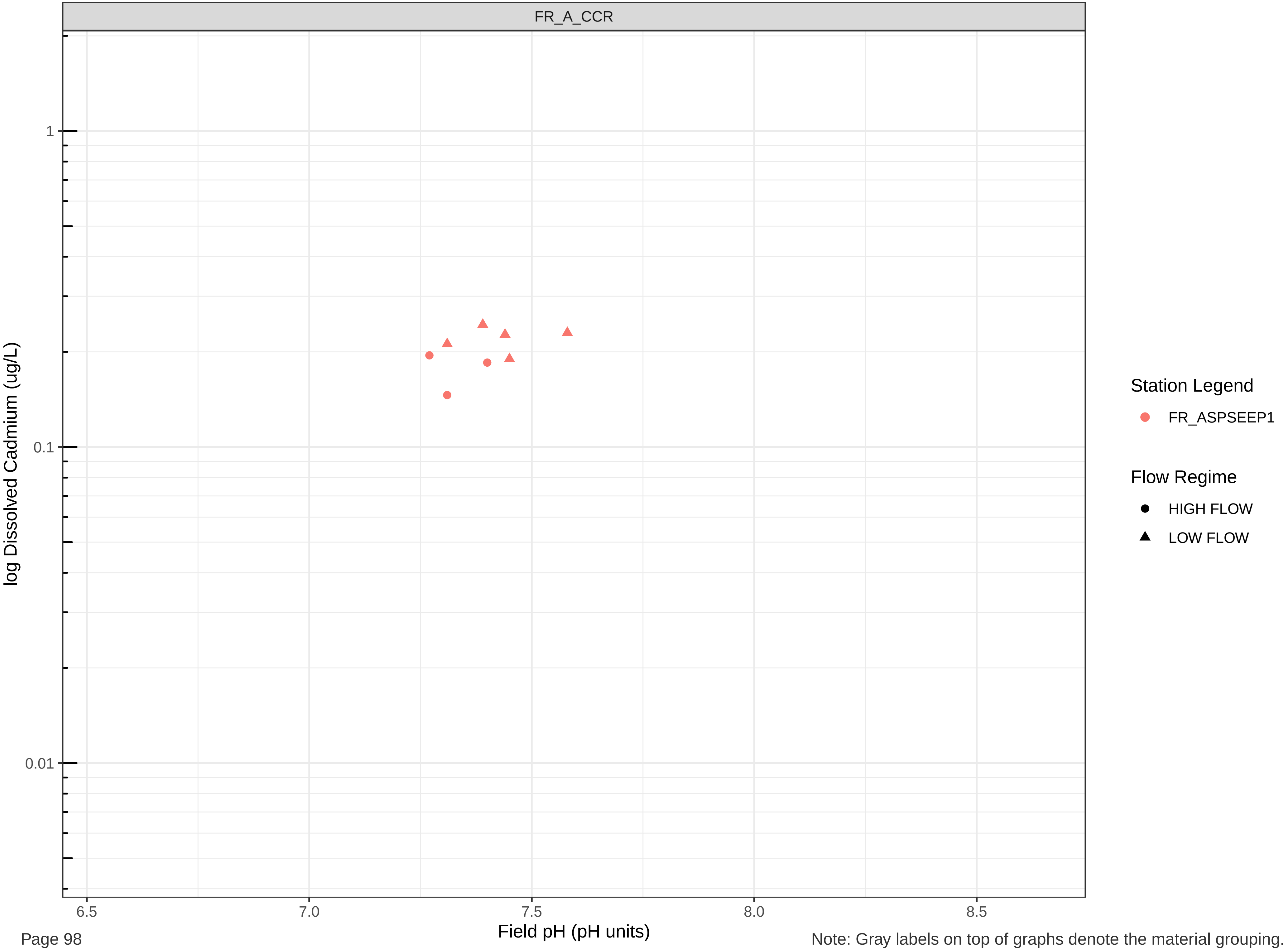

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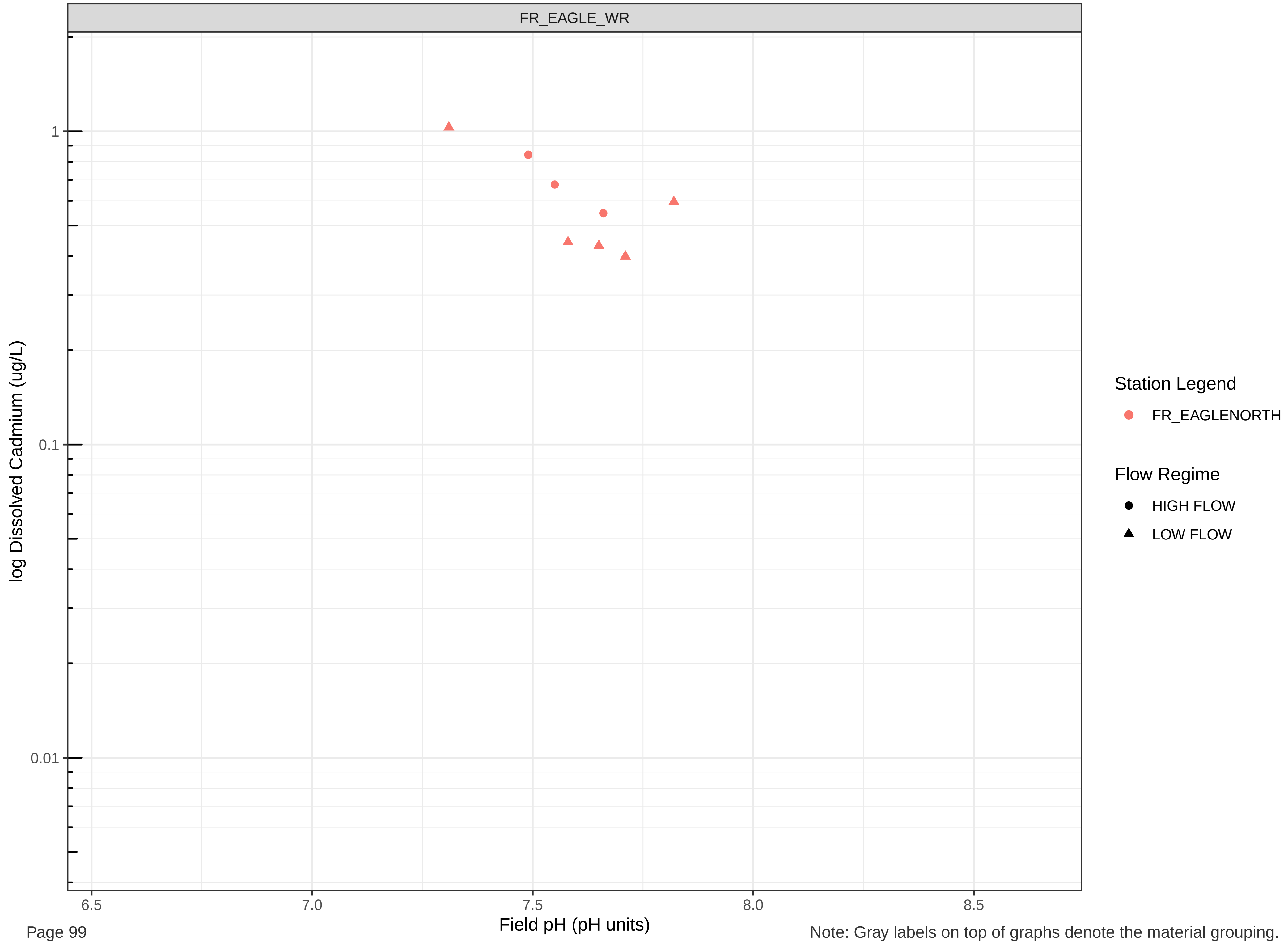

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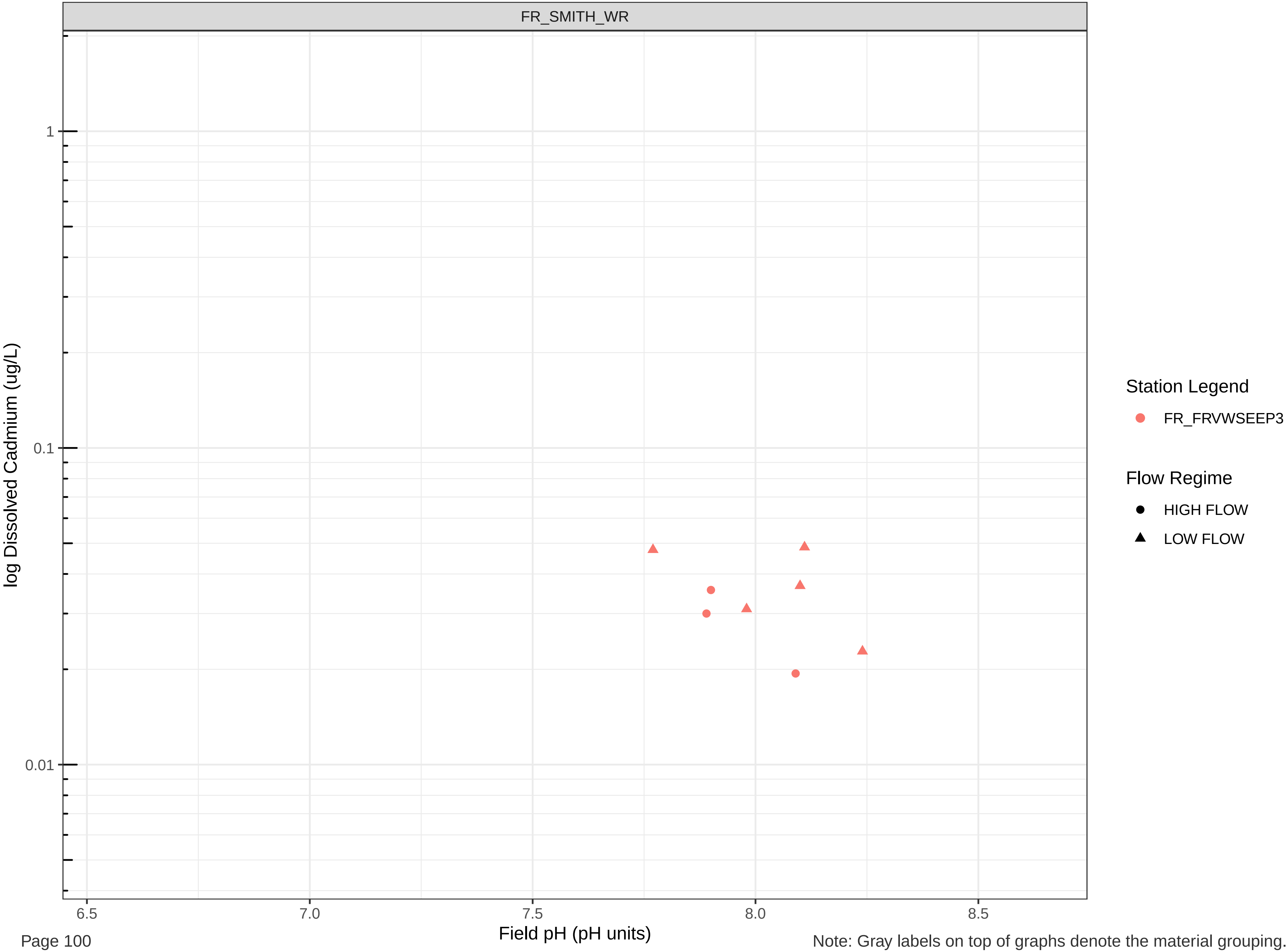

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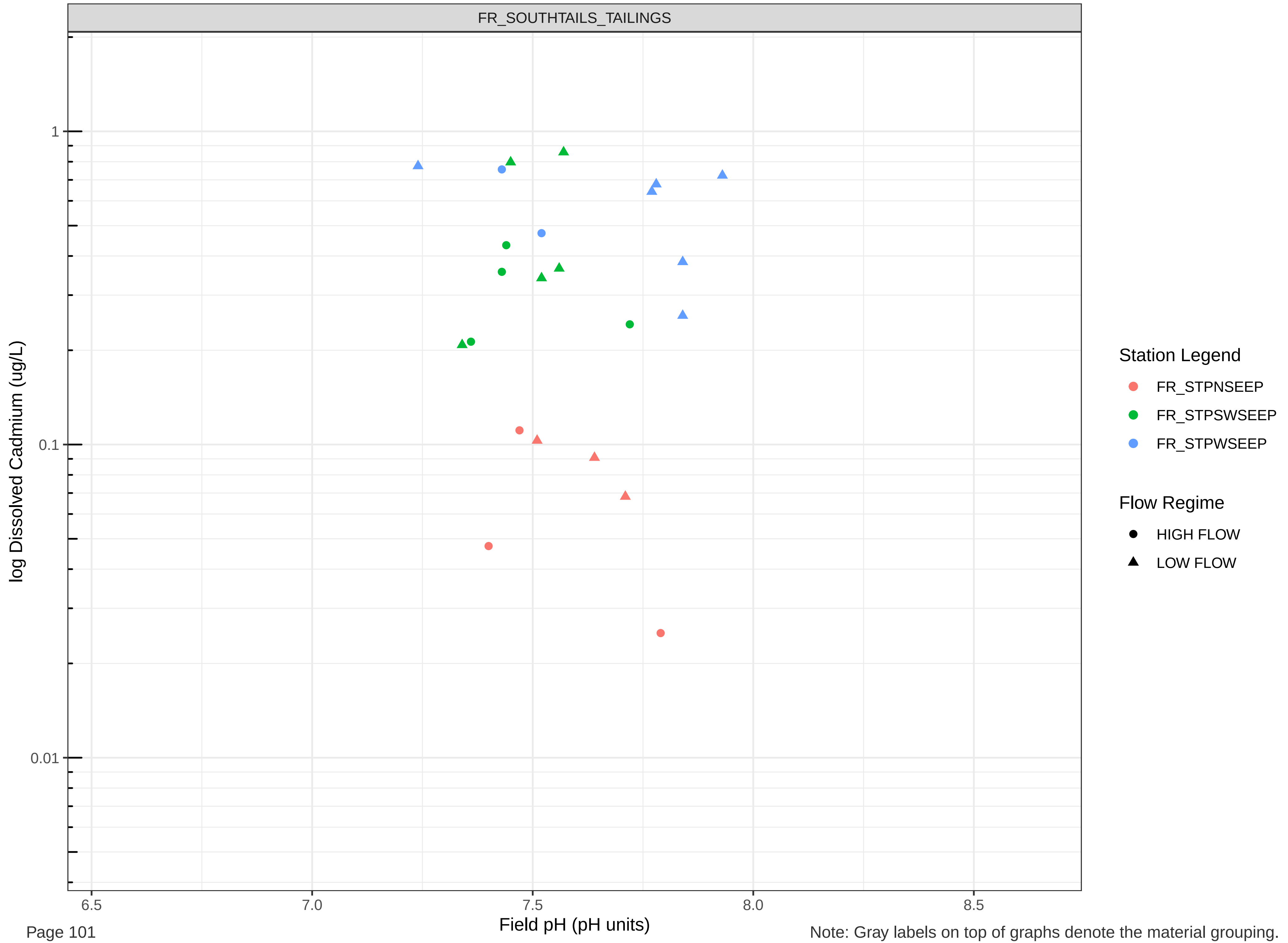

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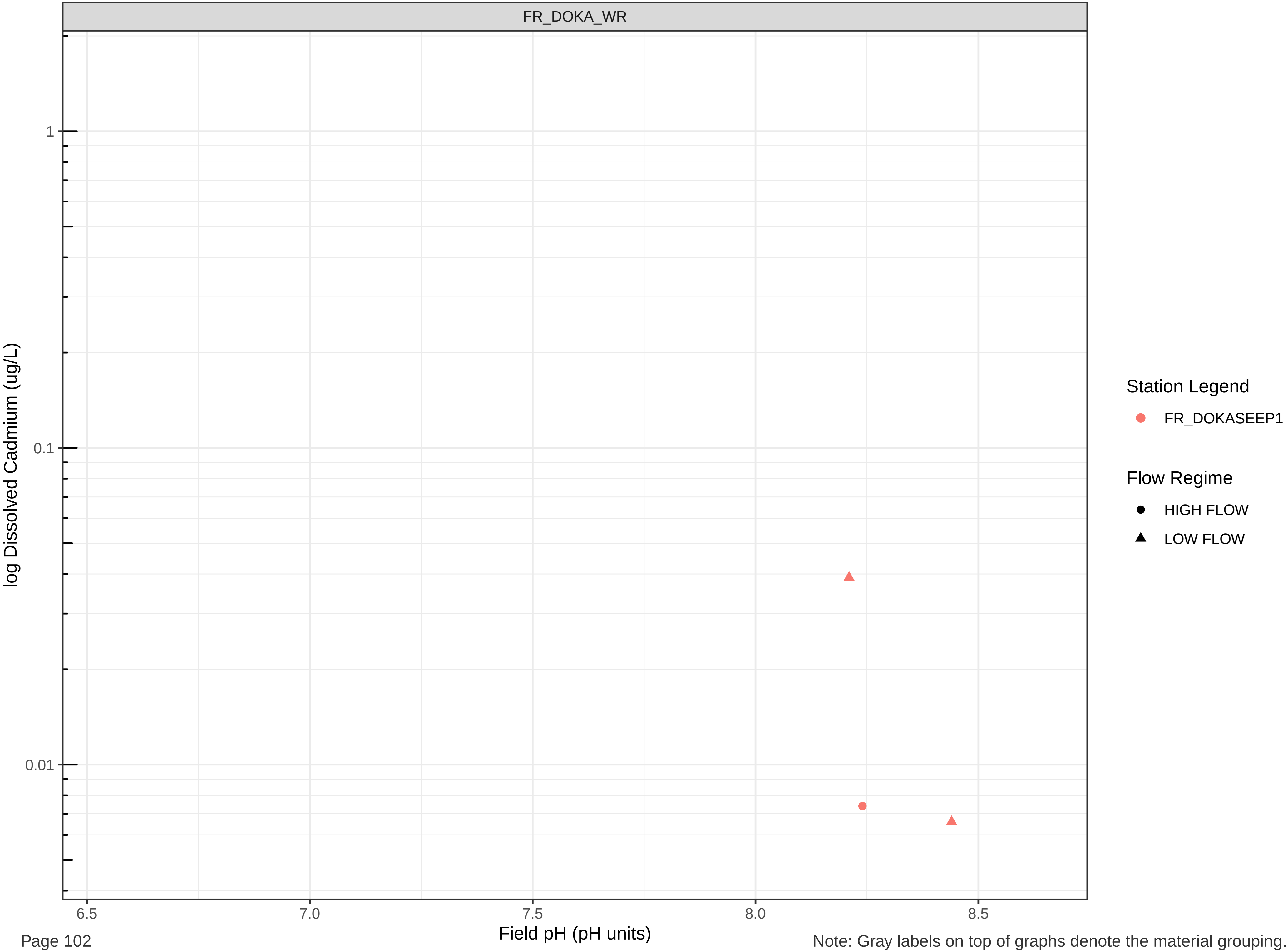

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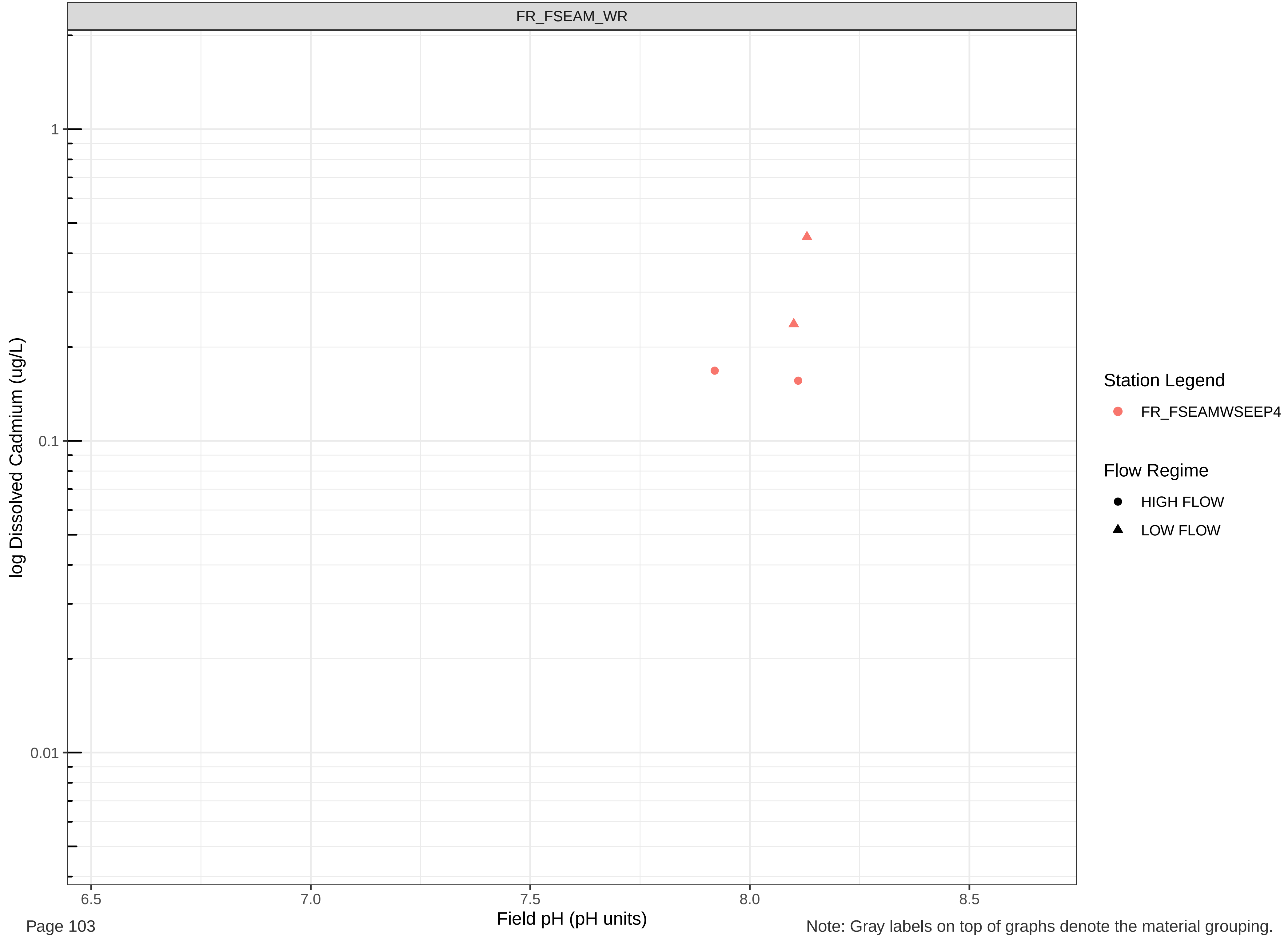

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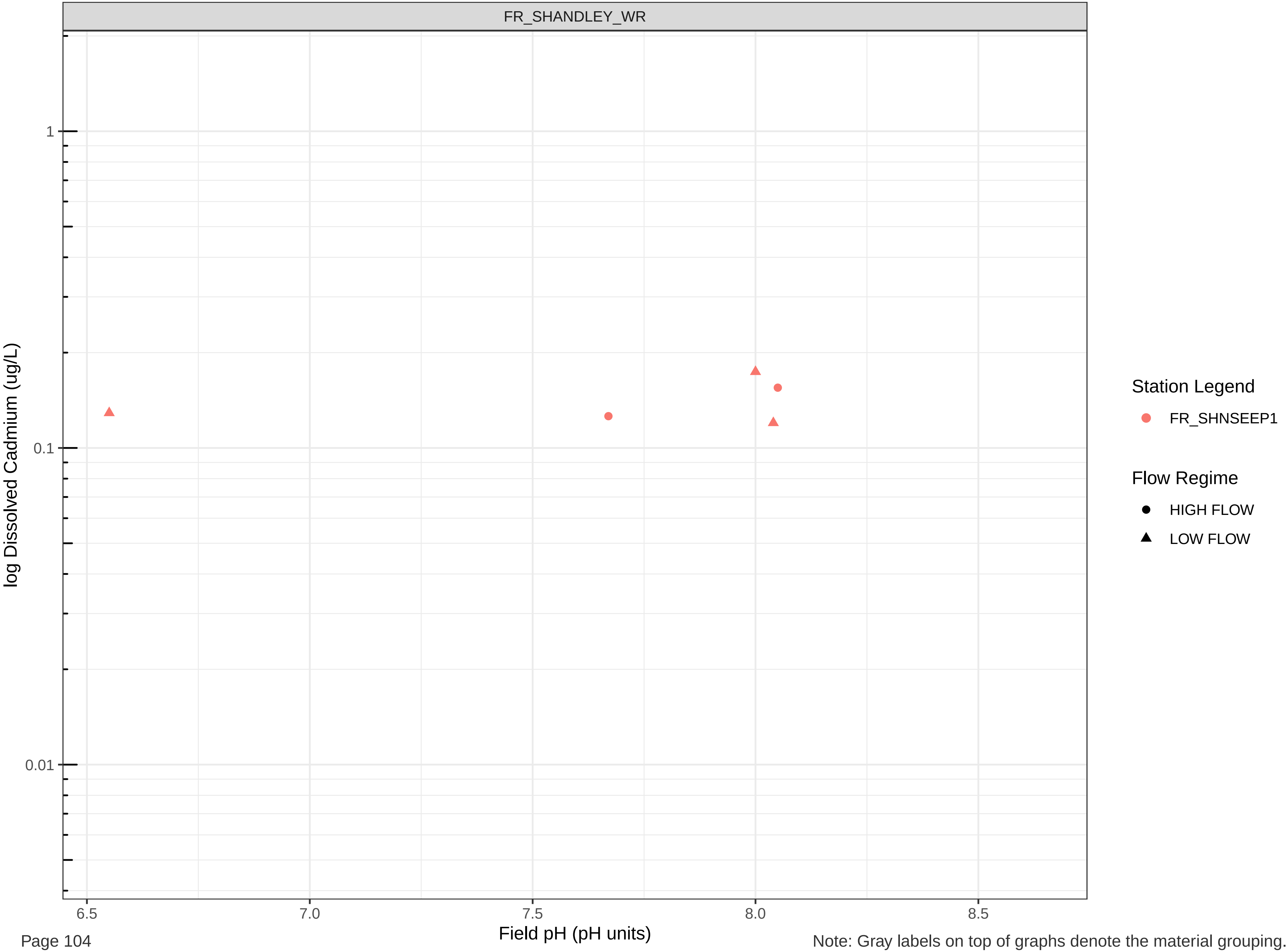

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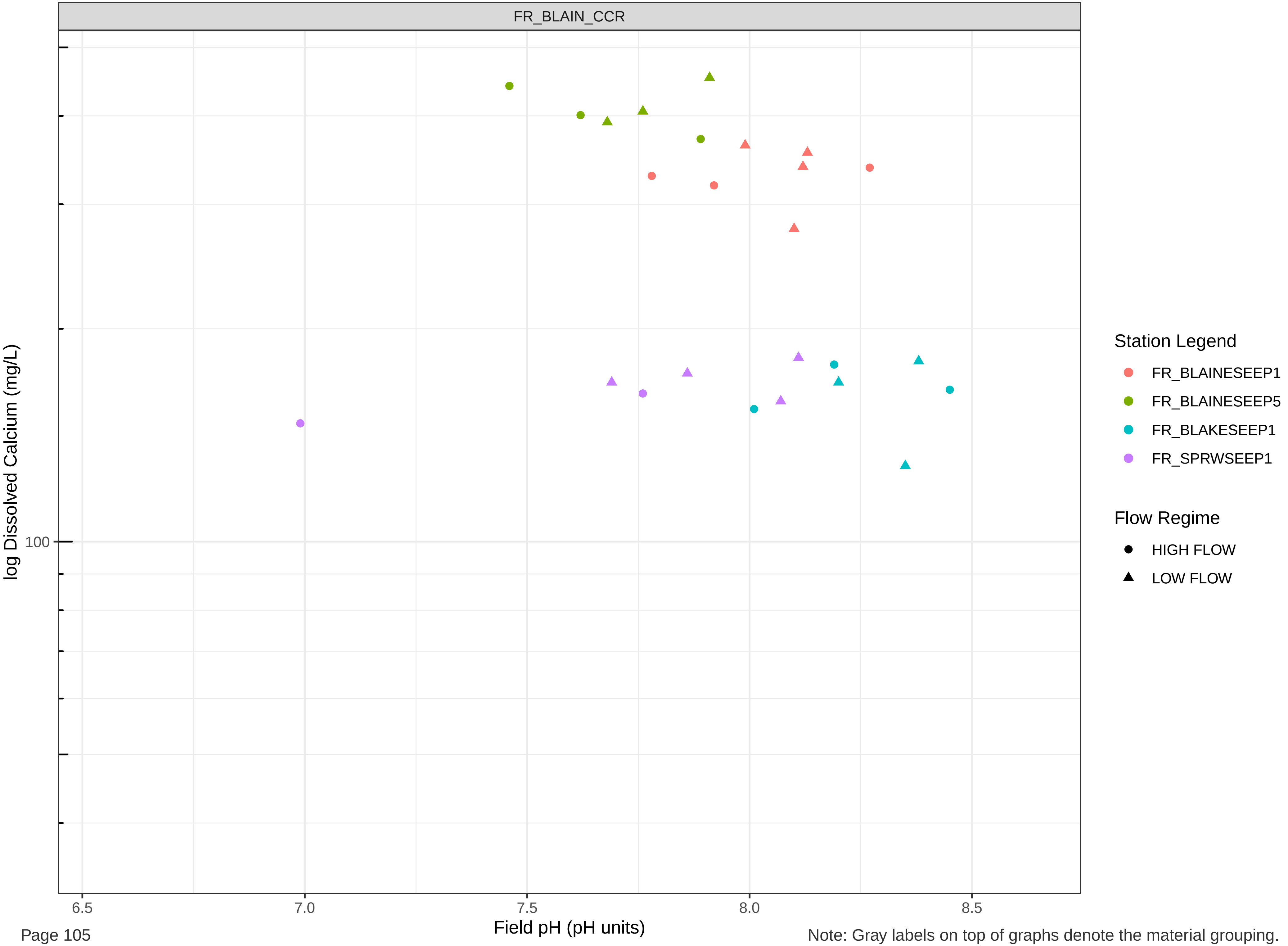

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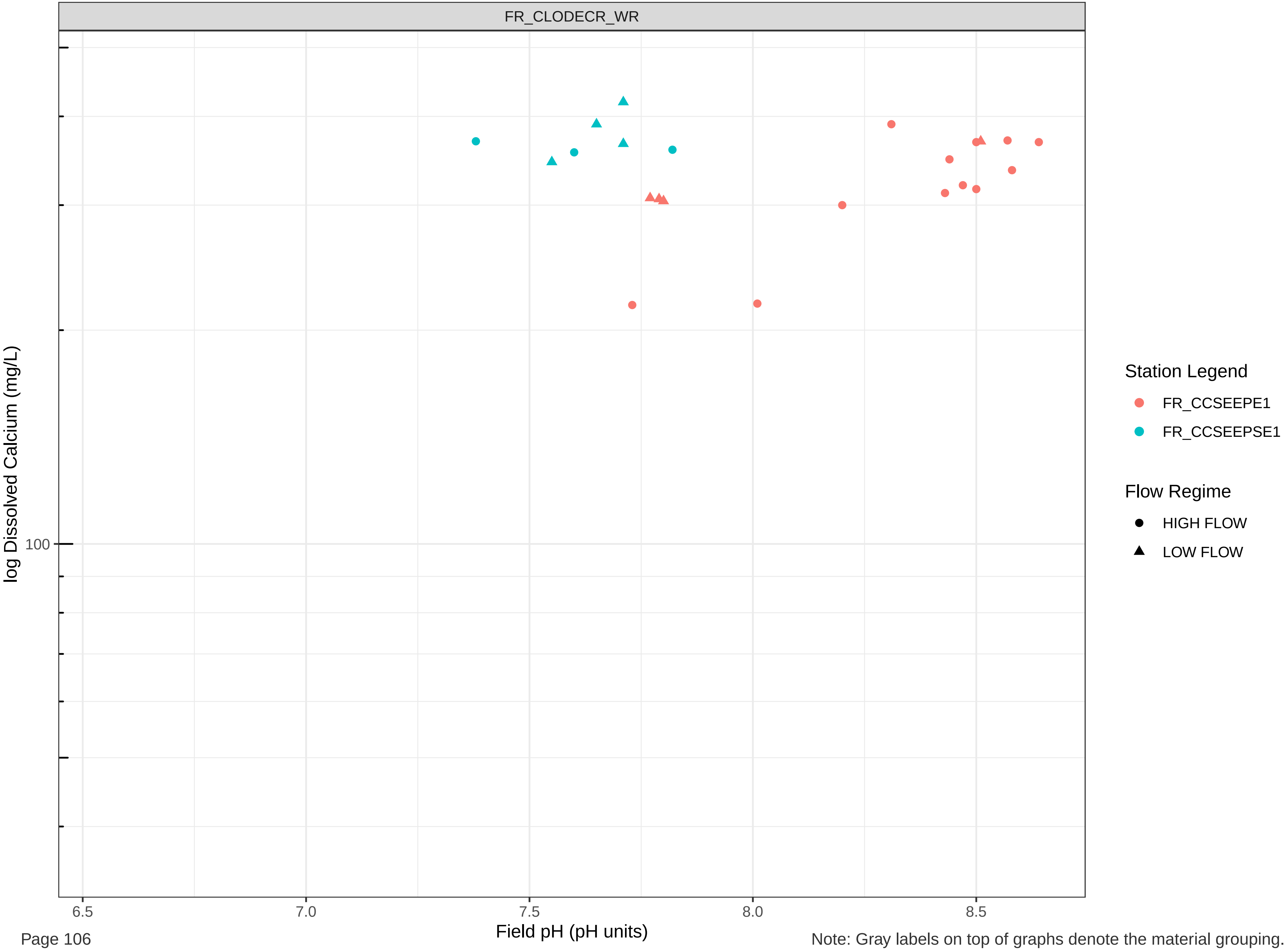

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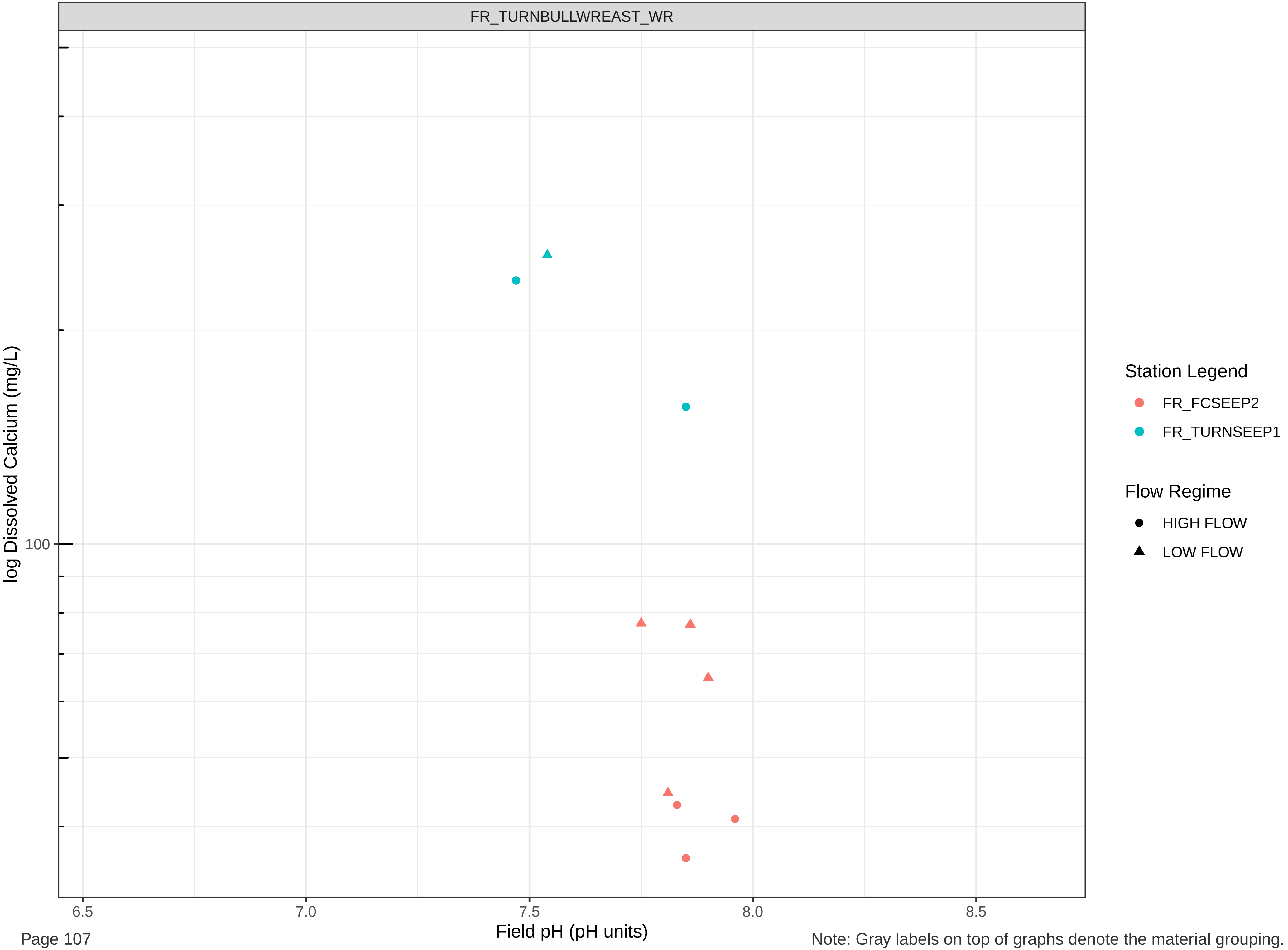

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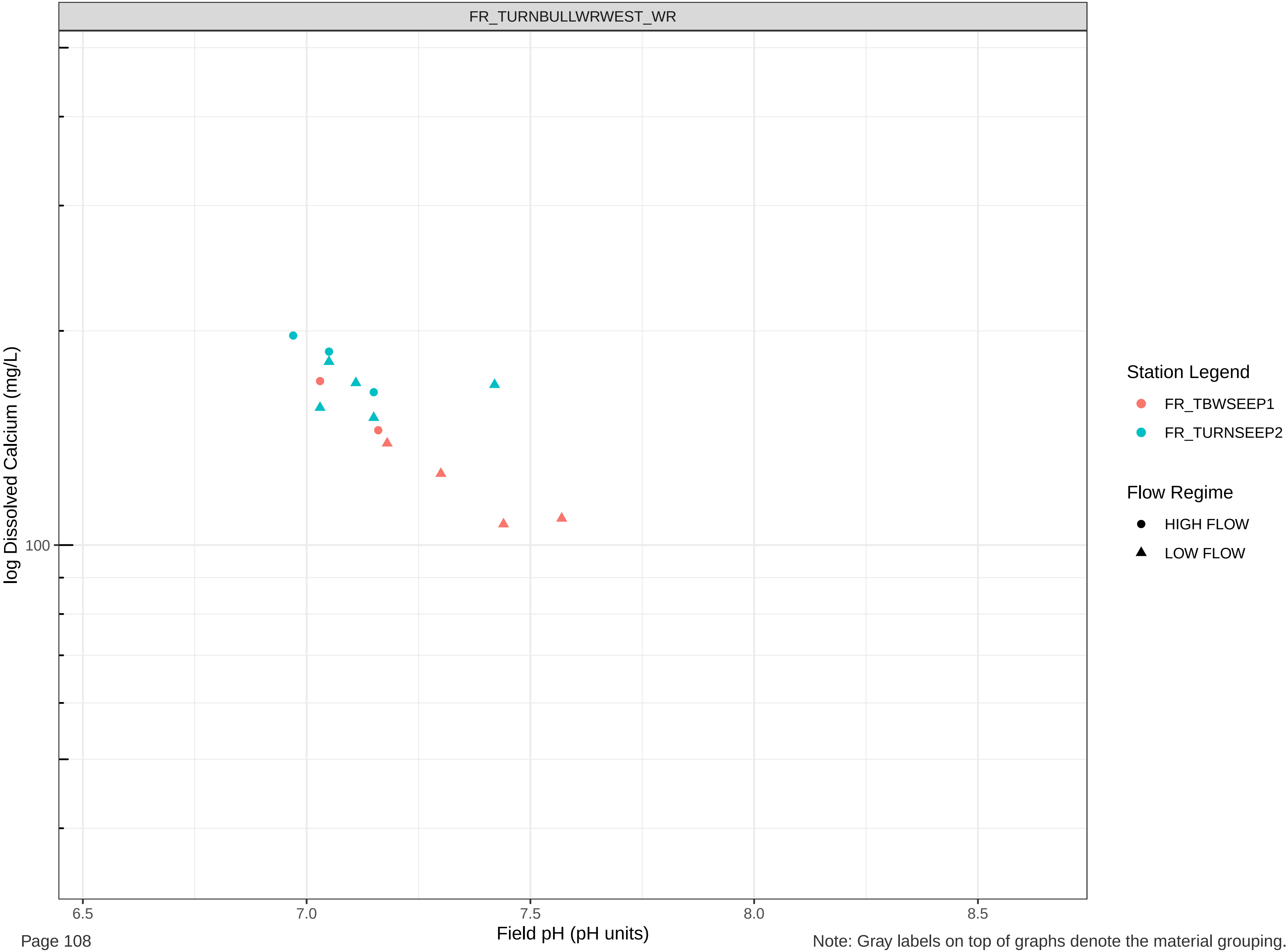
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100
6.5
7.0
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8.0
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Station Legend
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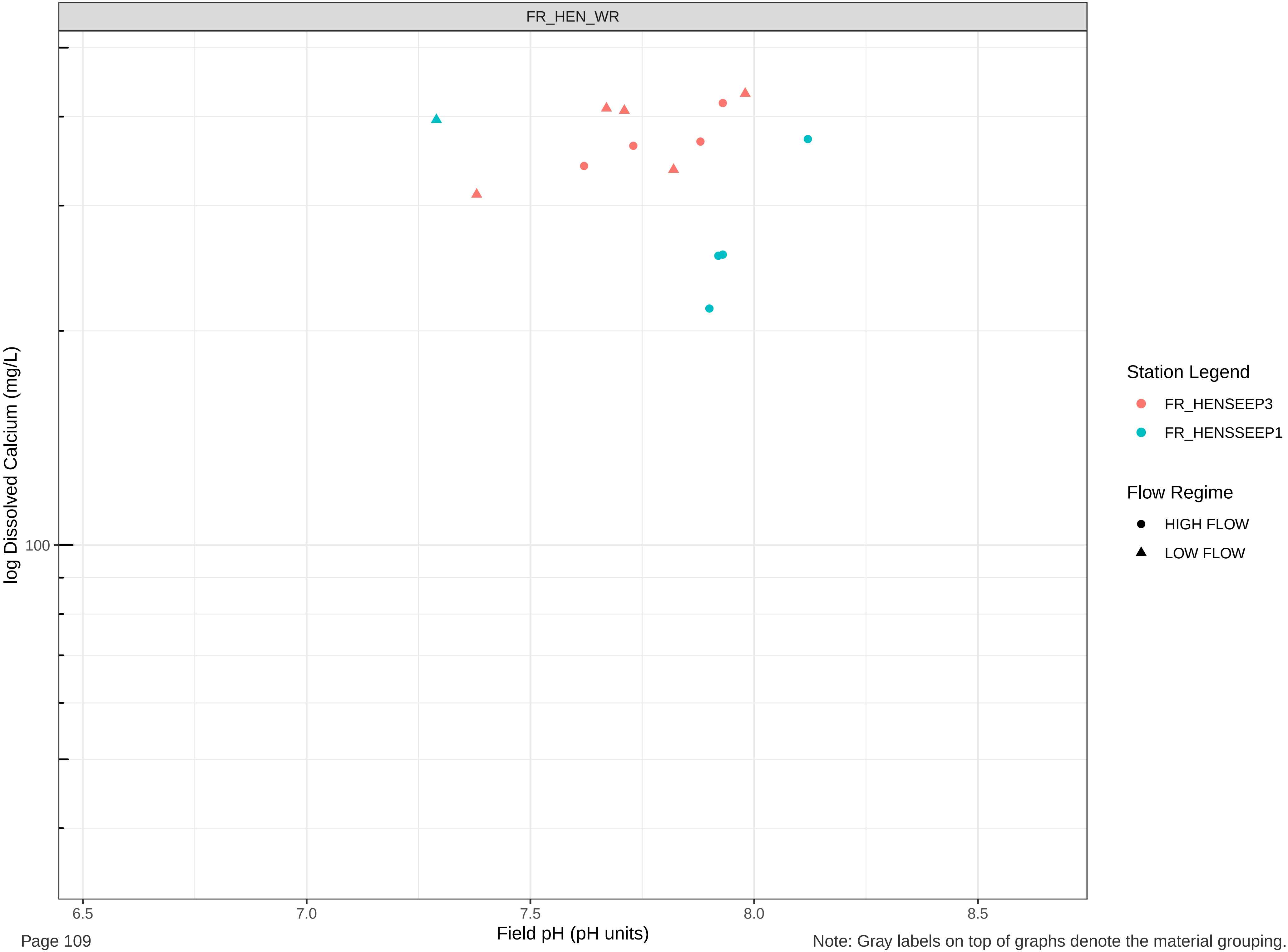
Flow Regime
HIGH FLOW
LOW FLOW



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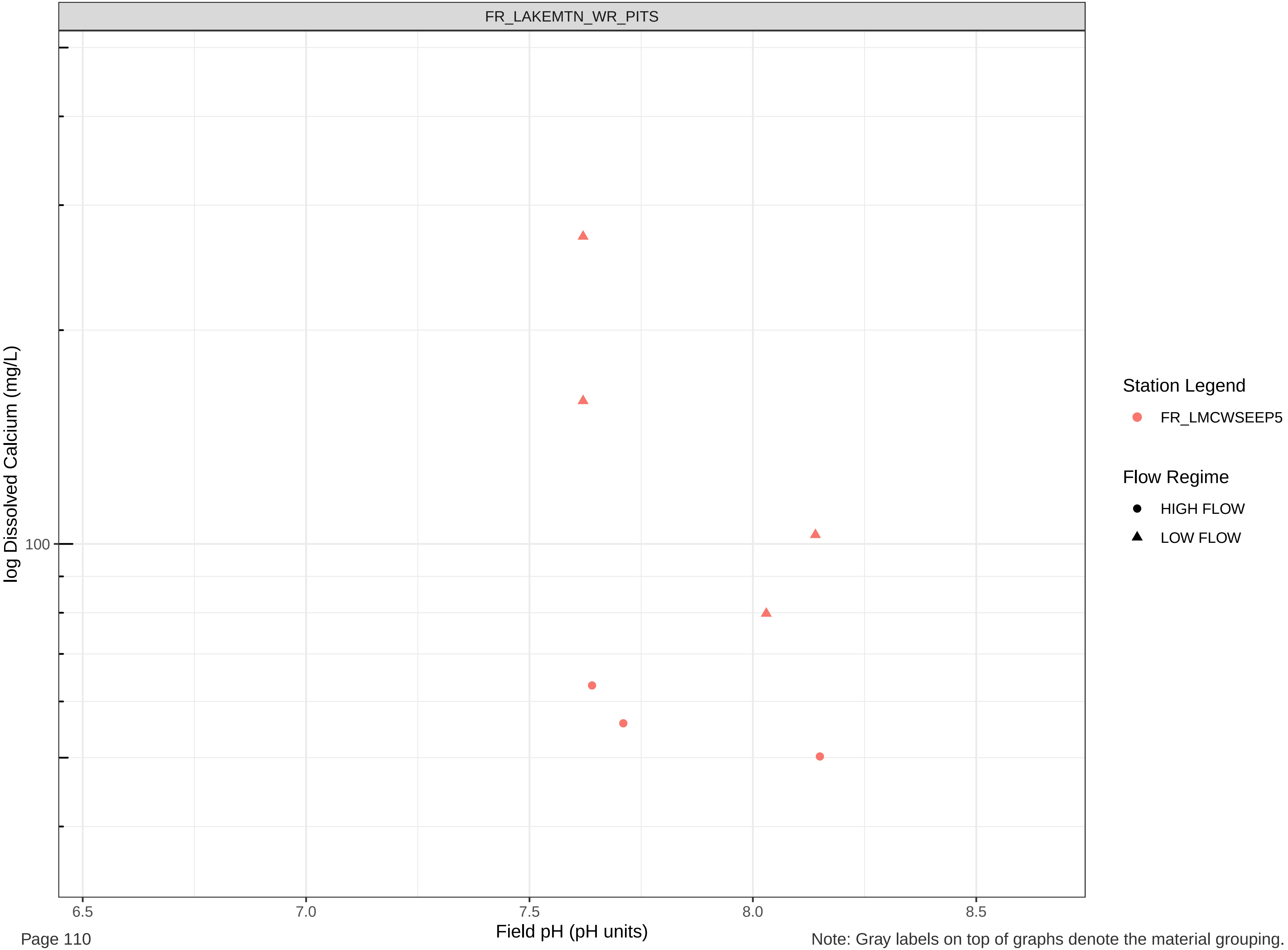

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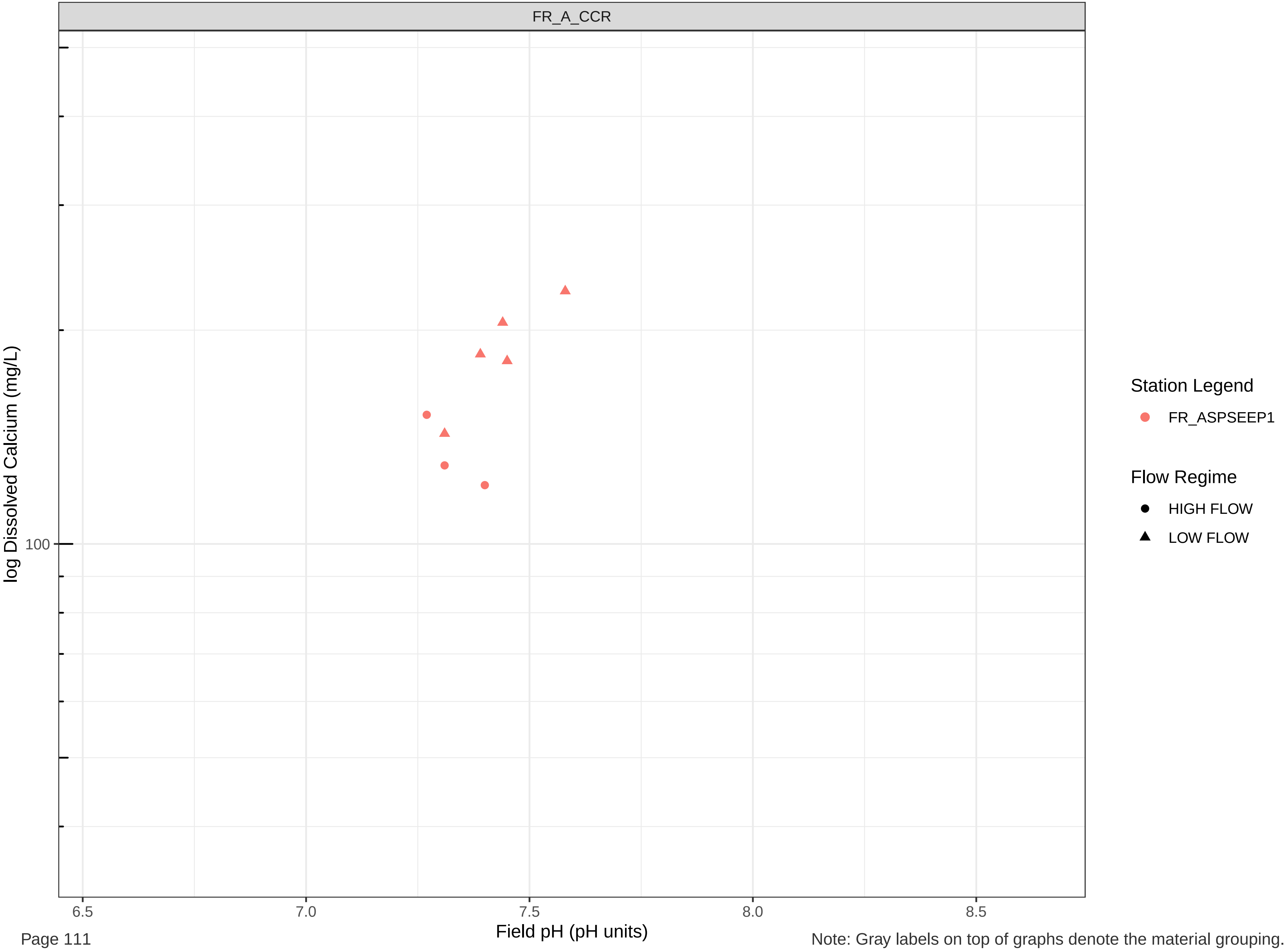

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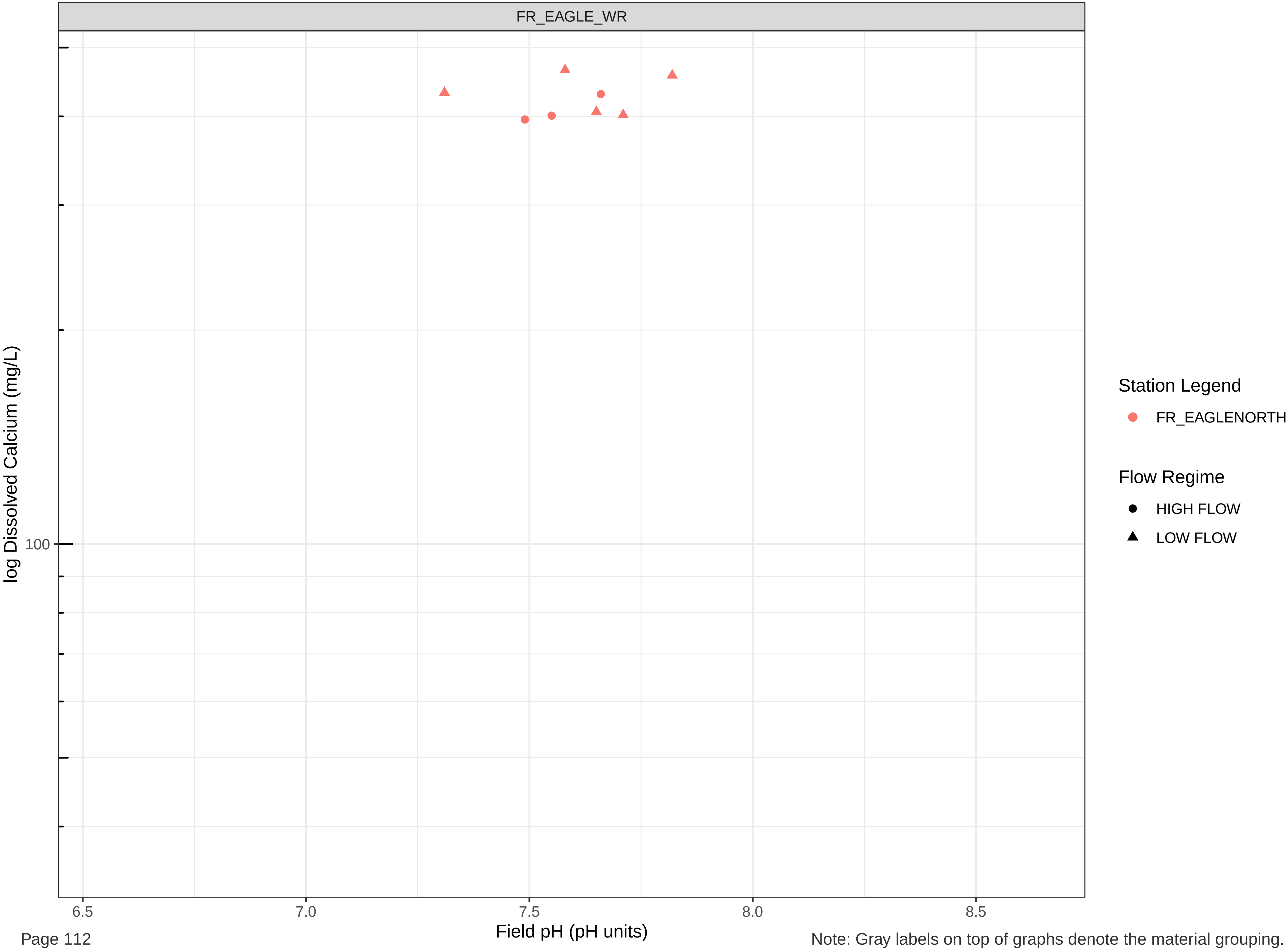

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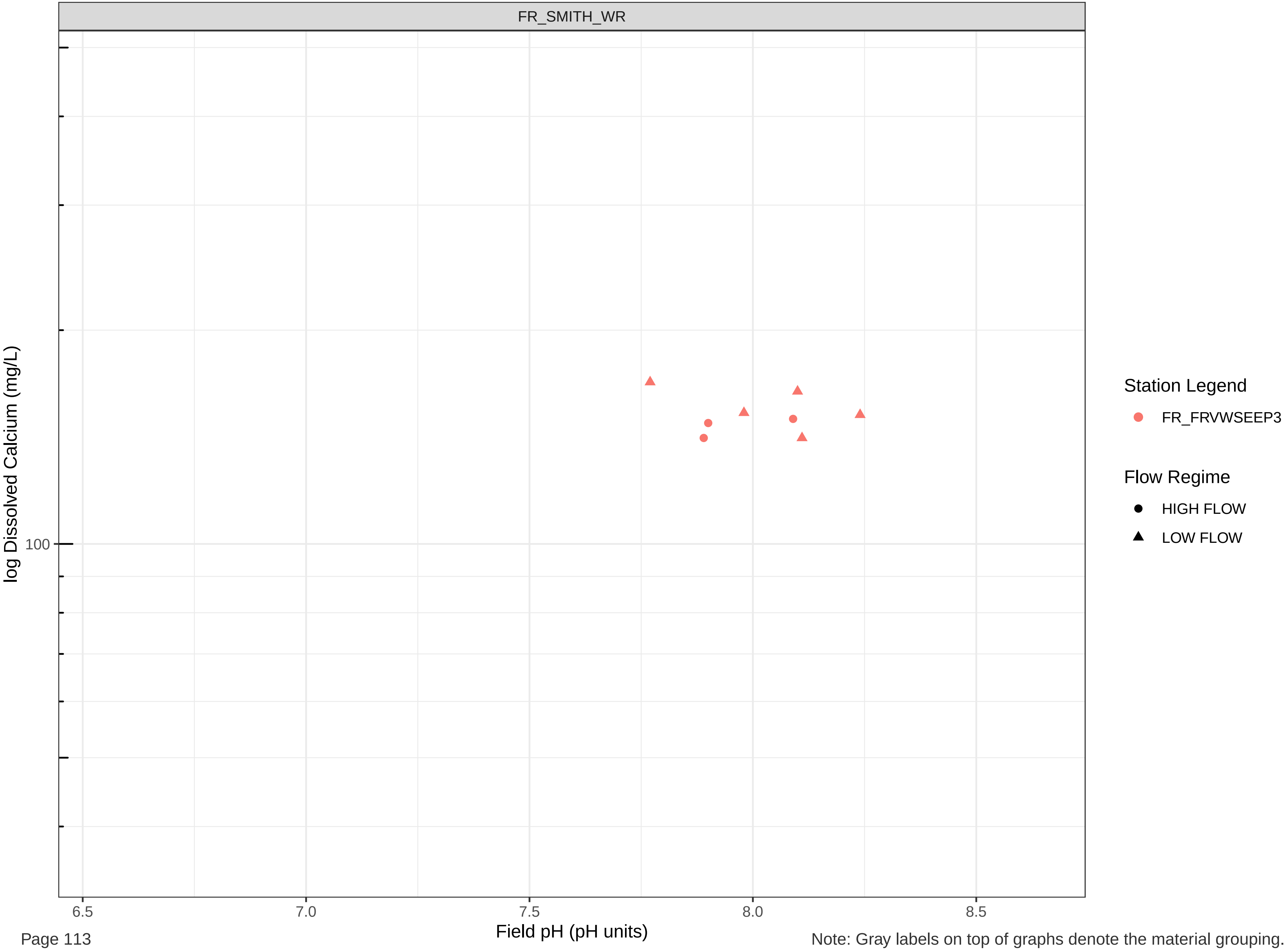

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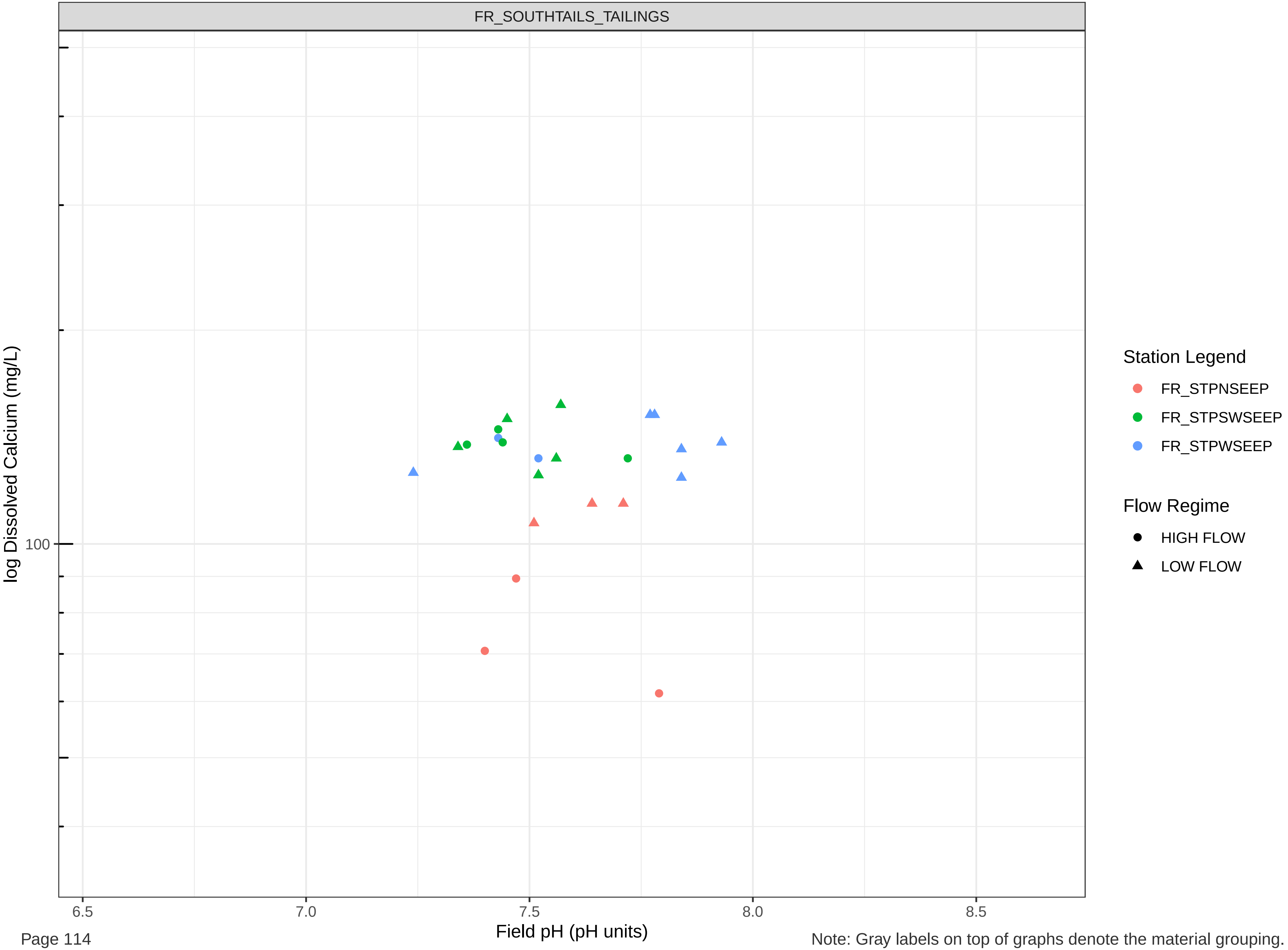

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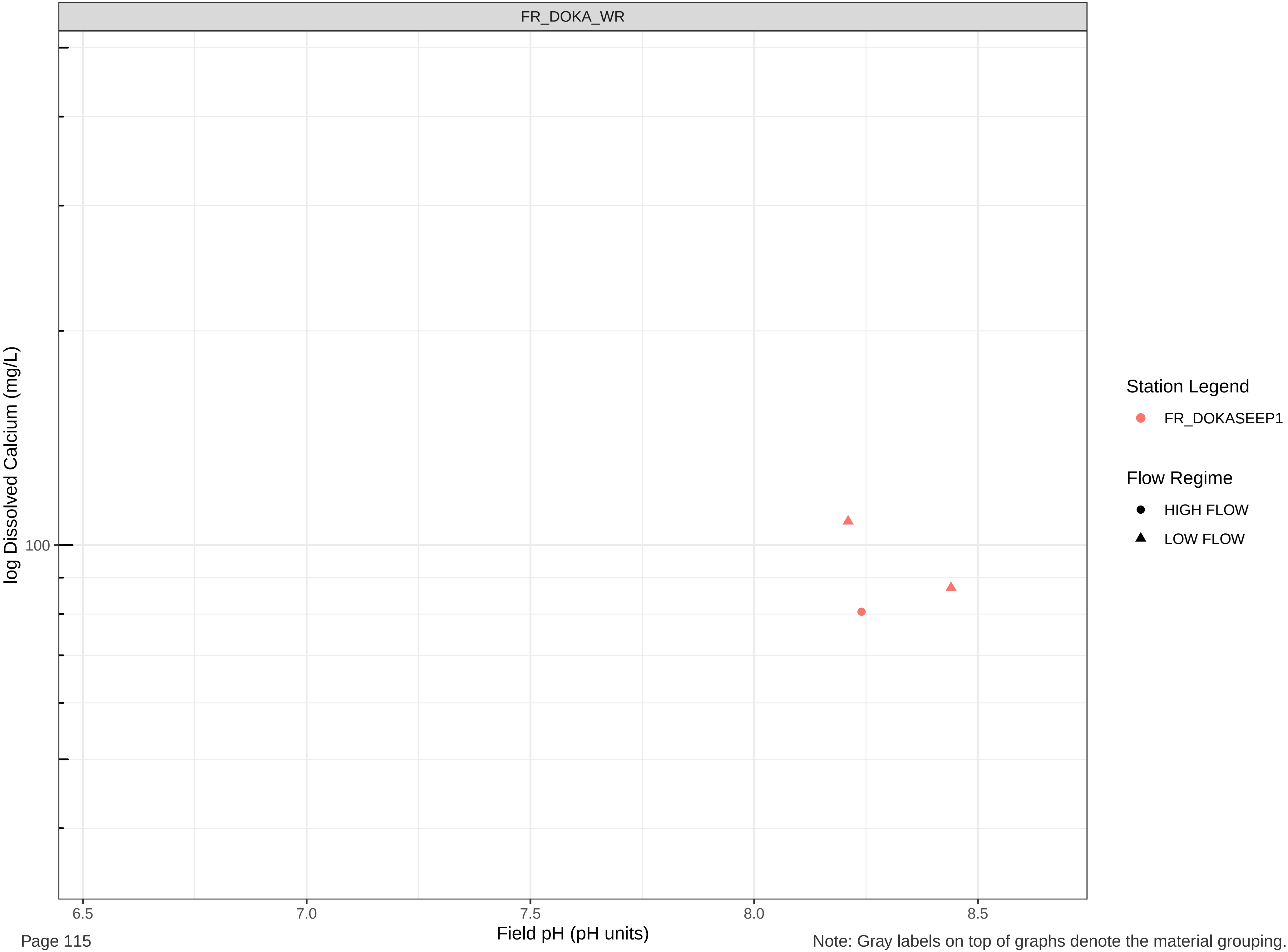

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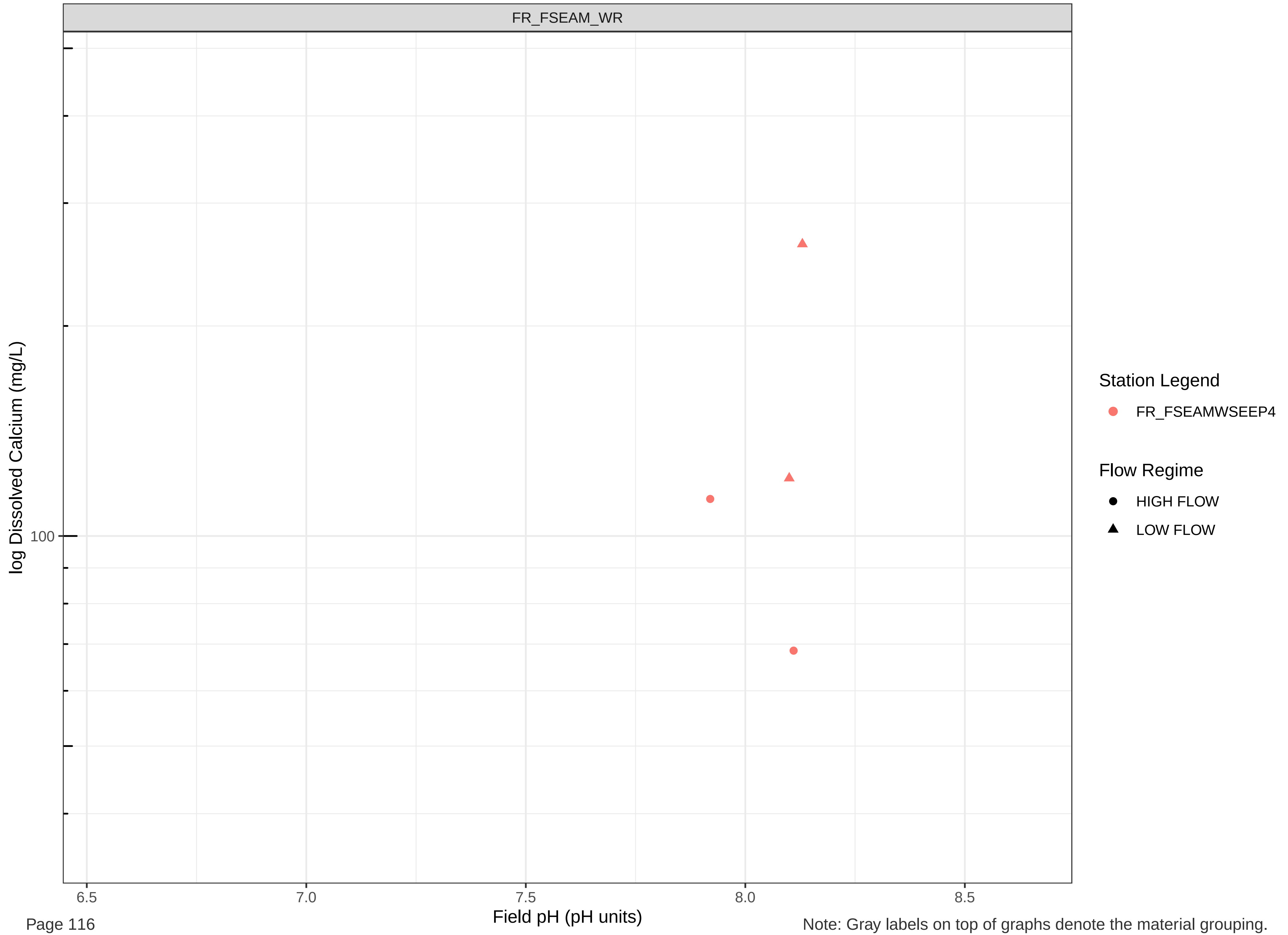

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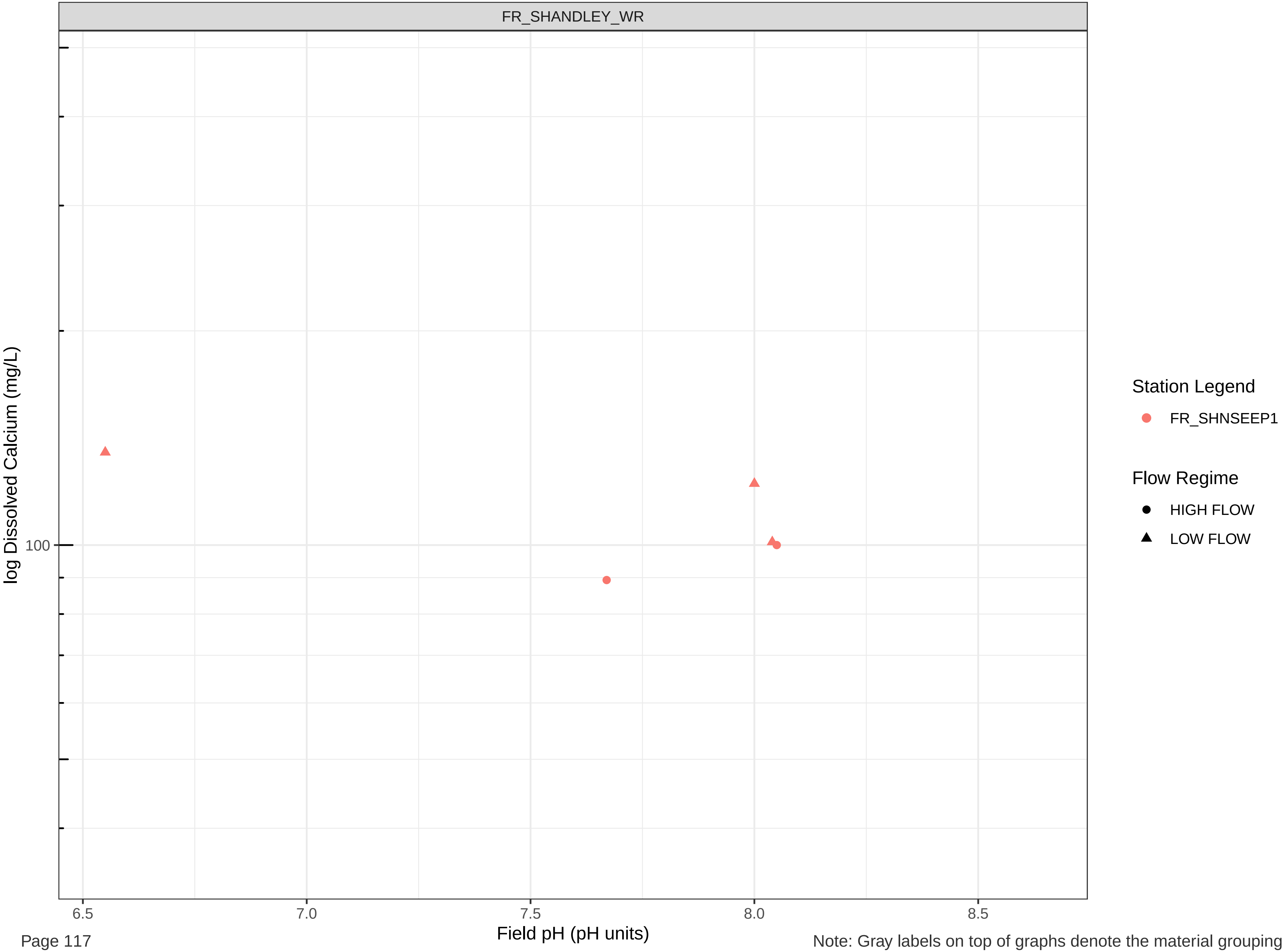

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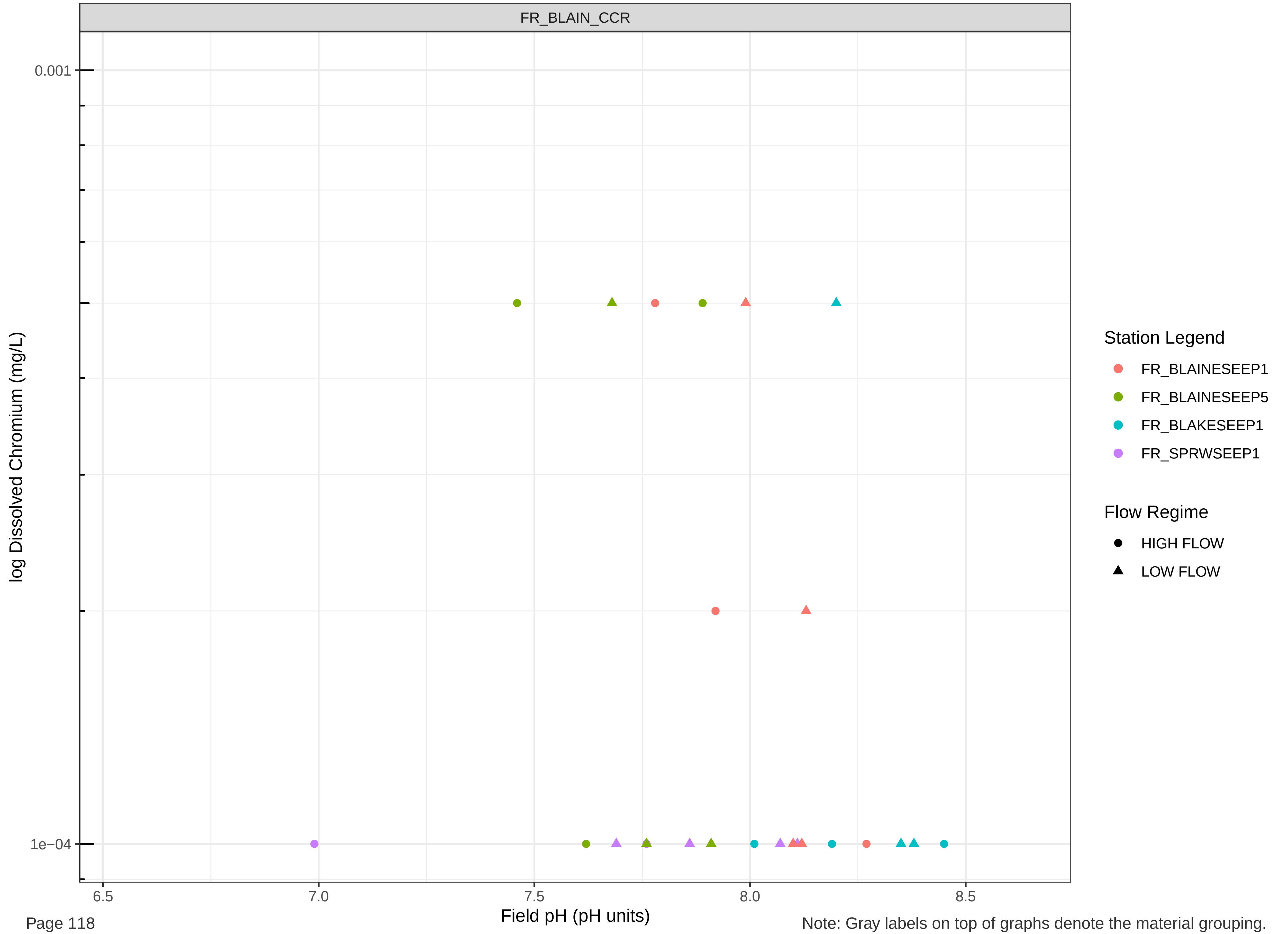

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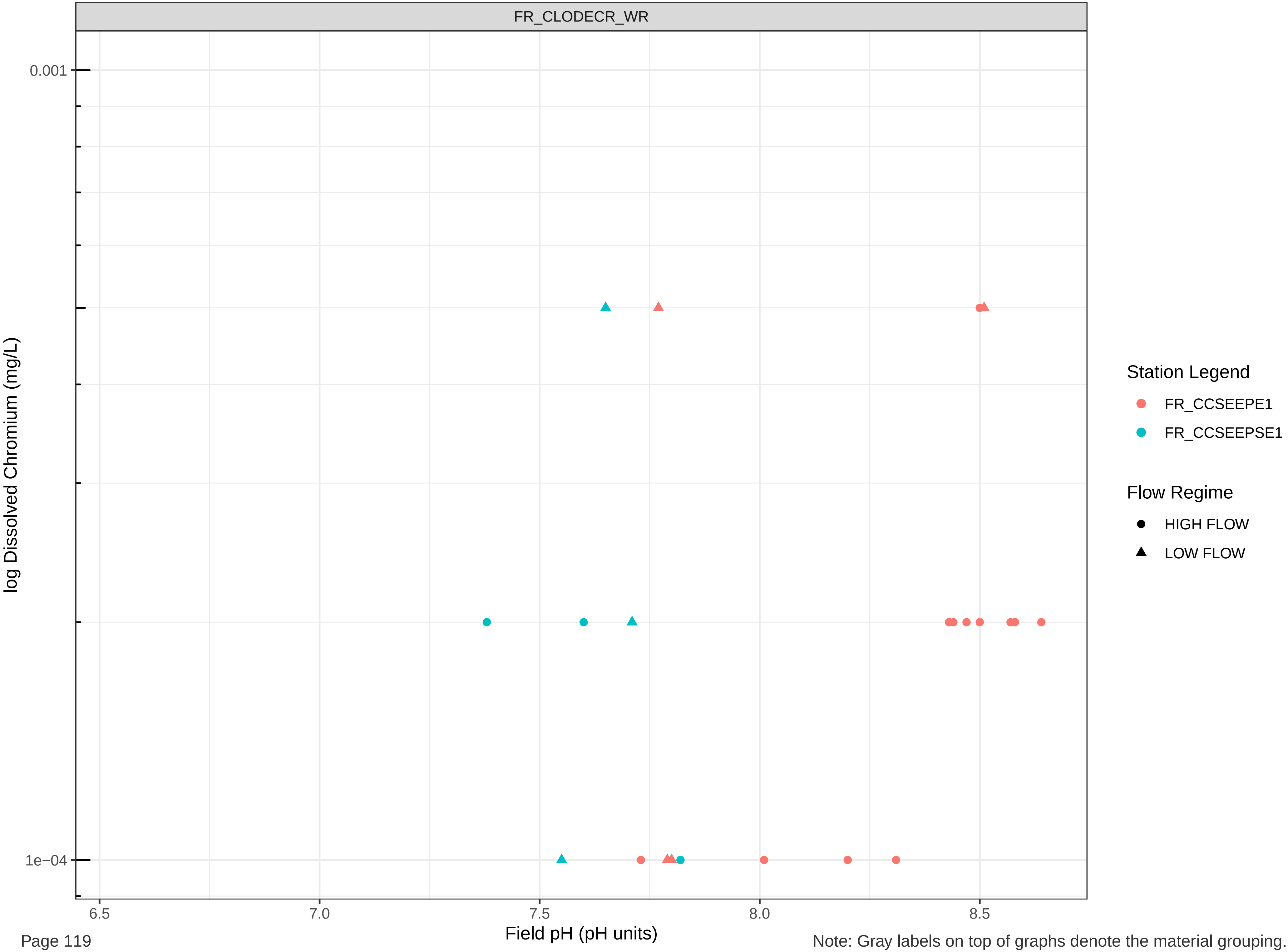

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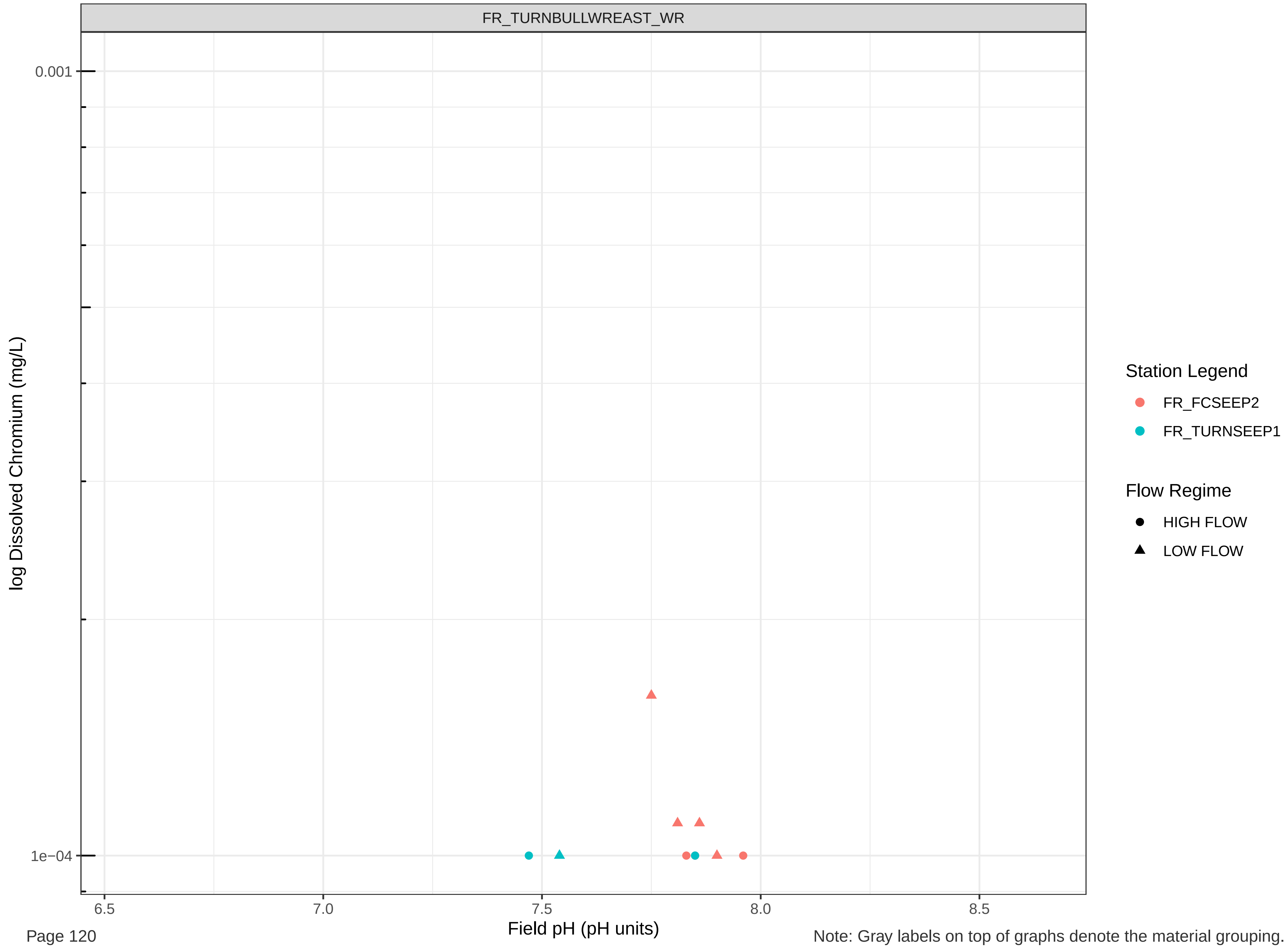

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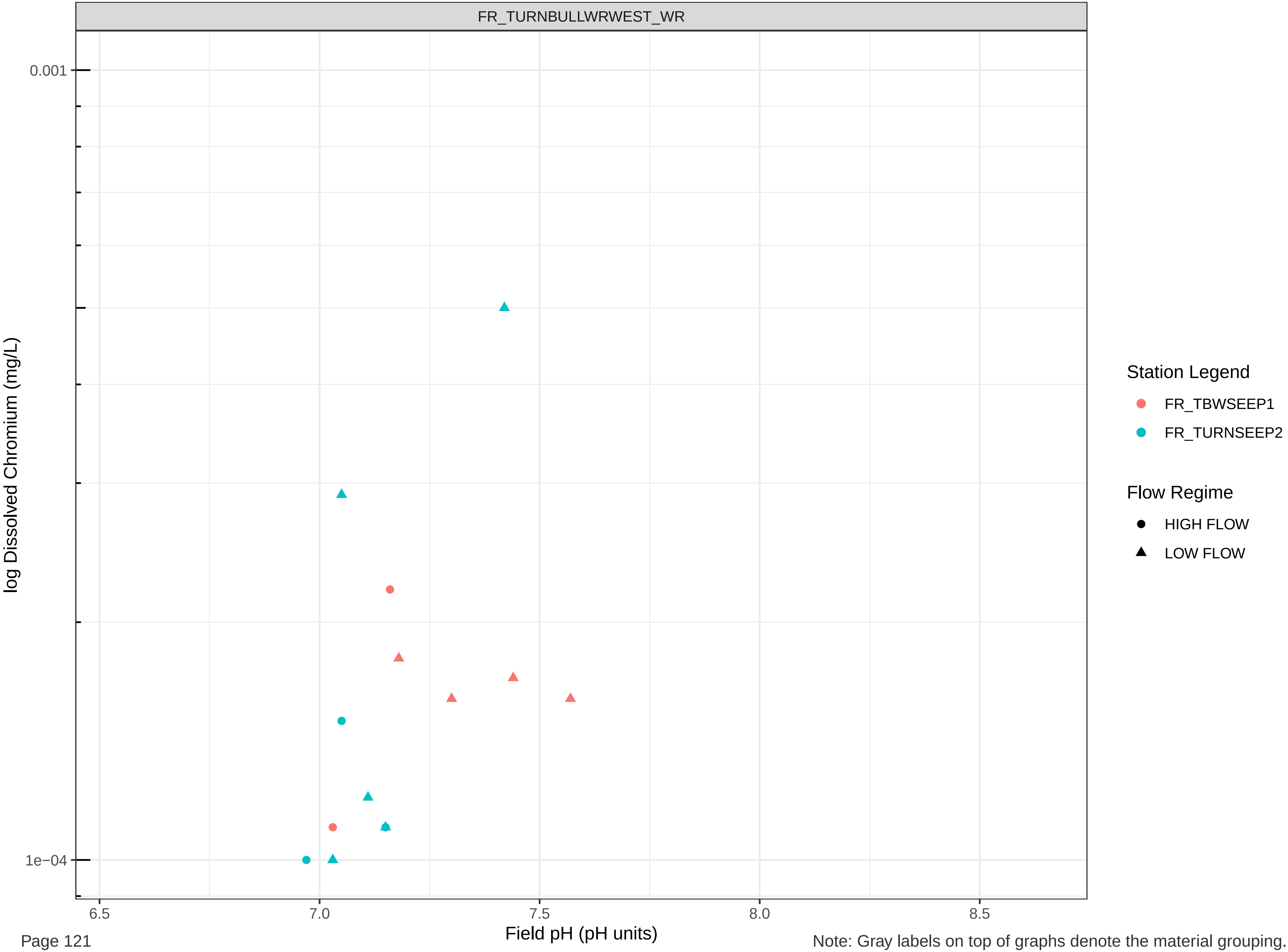

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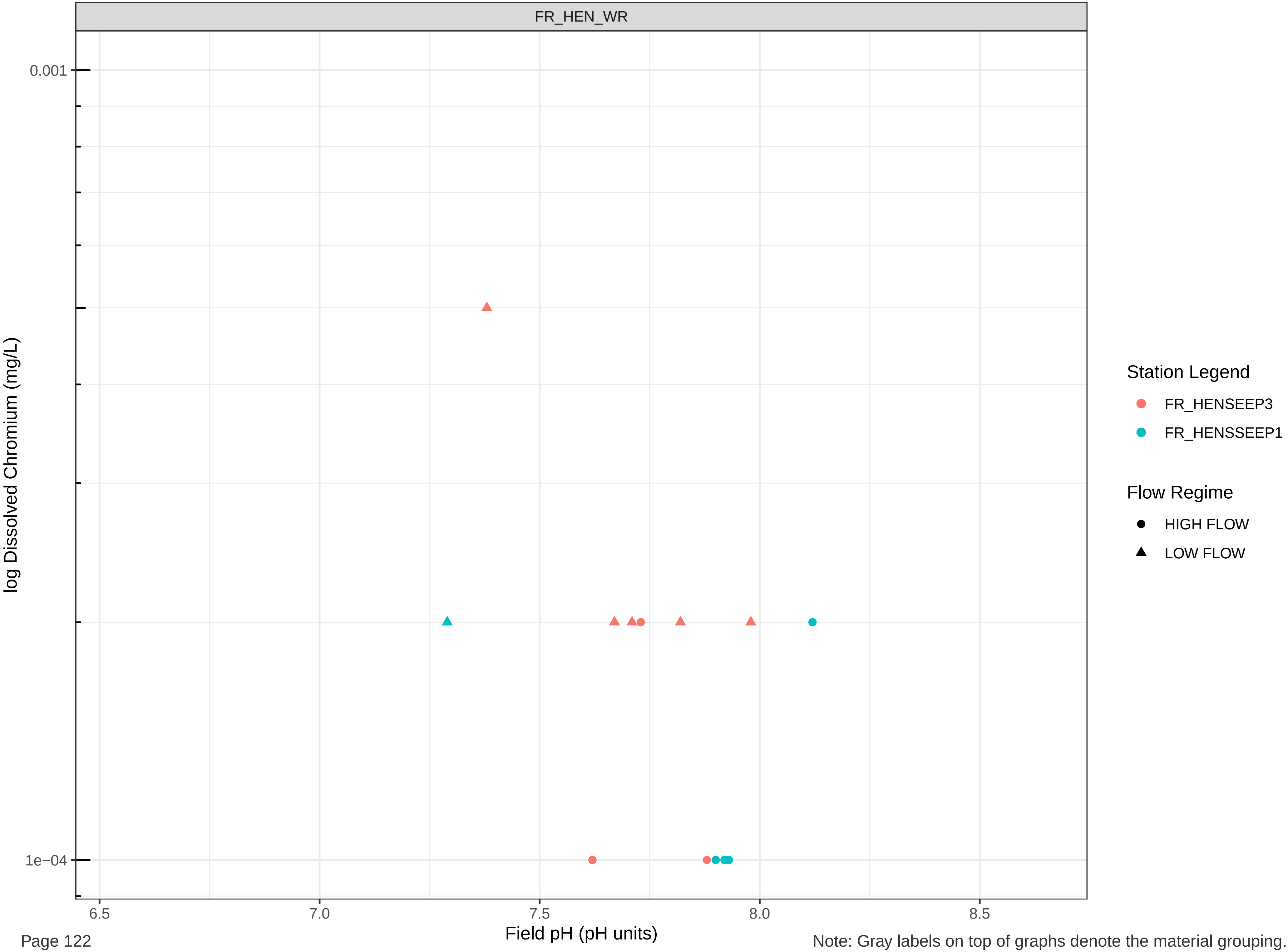

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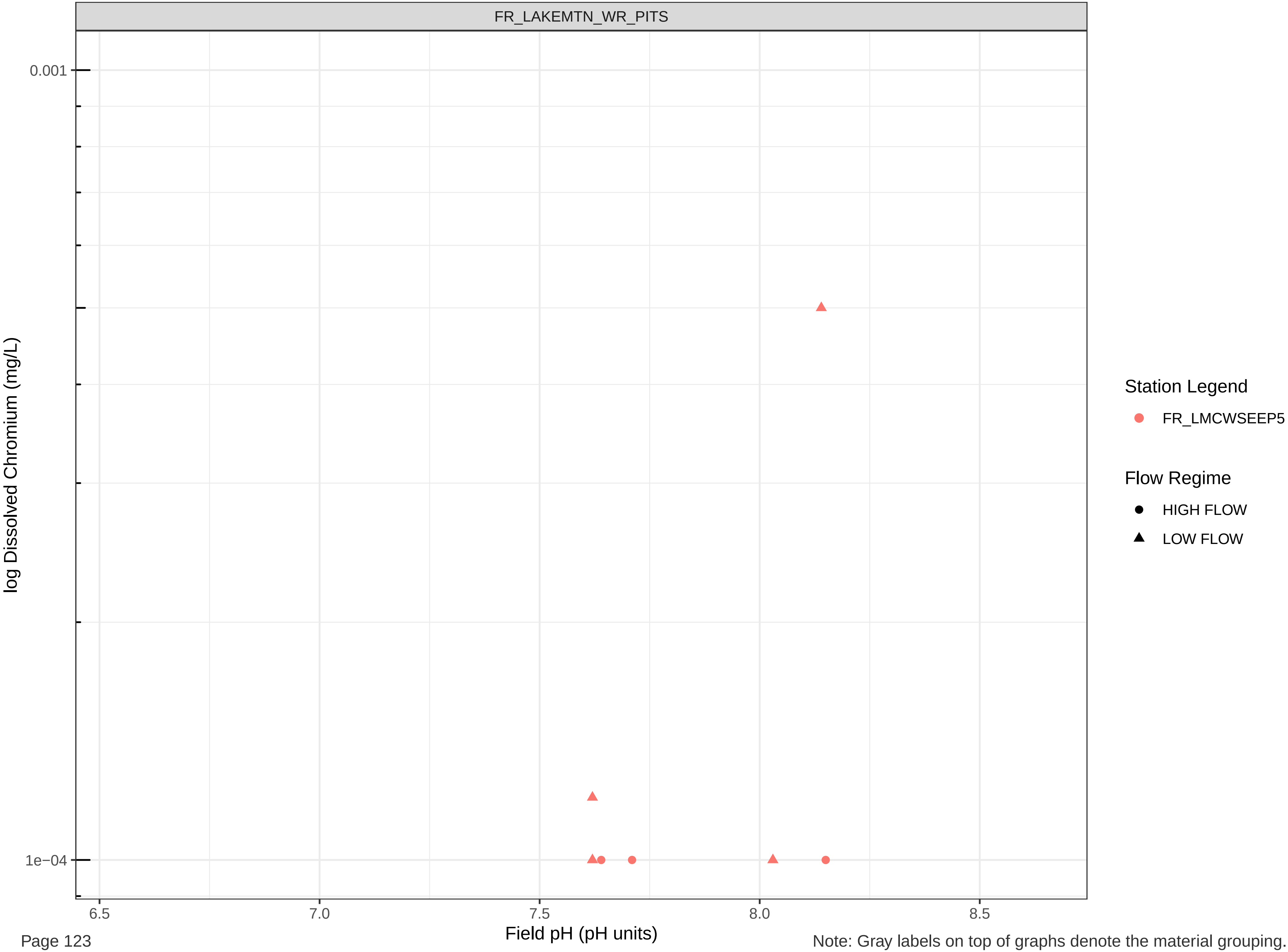

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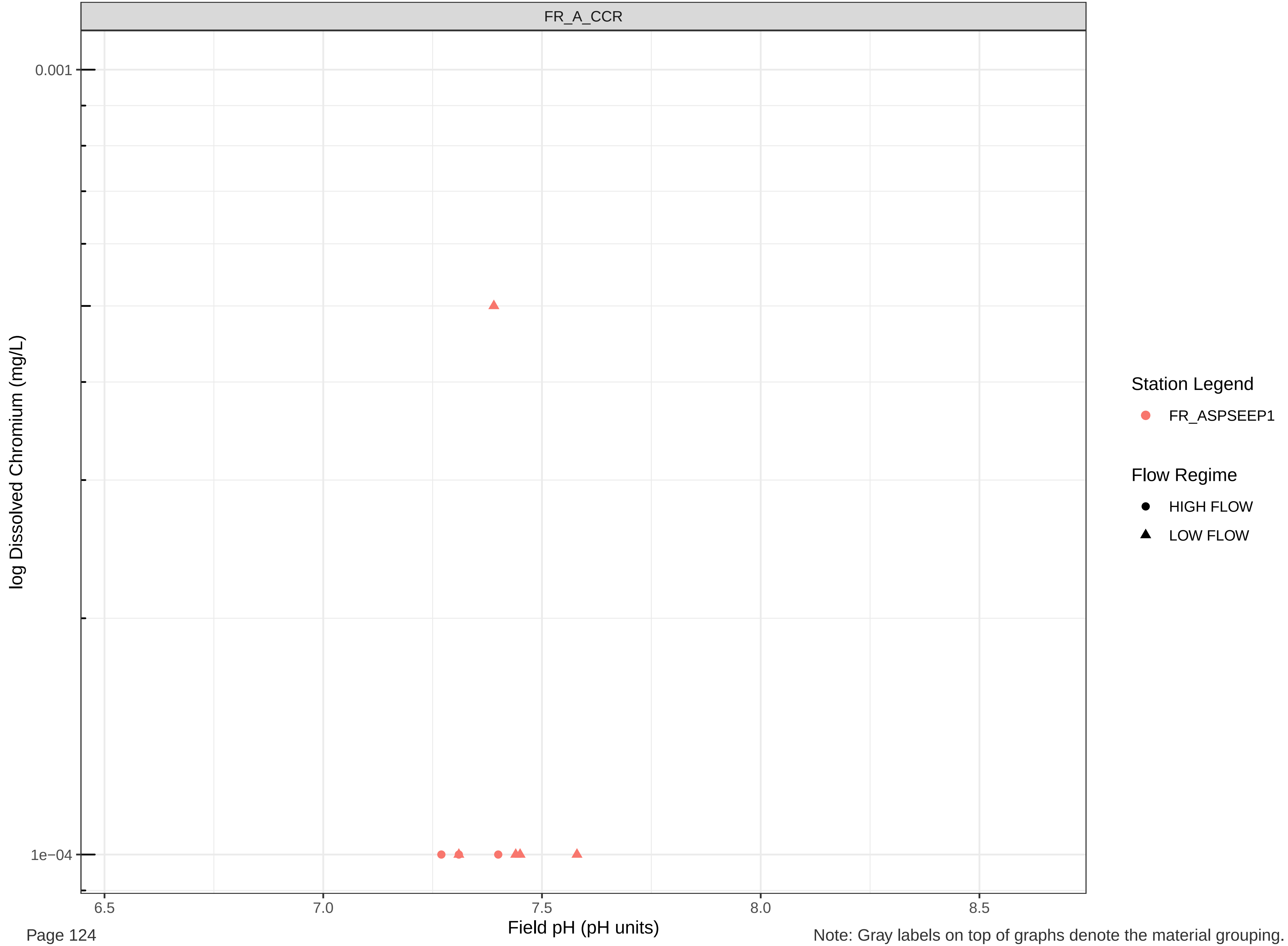

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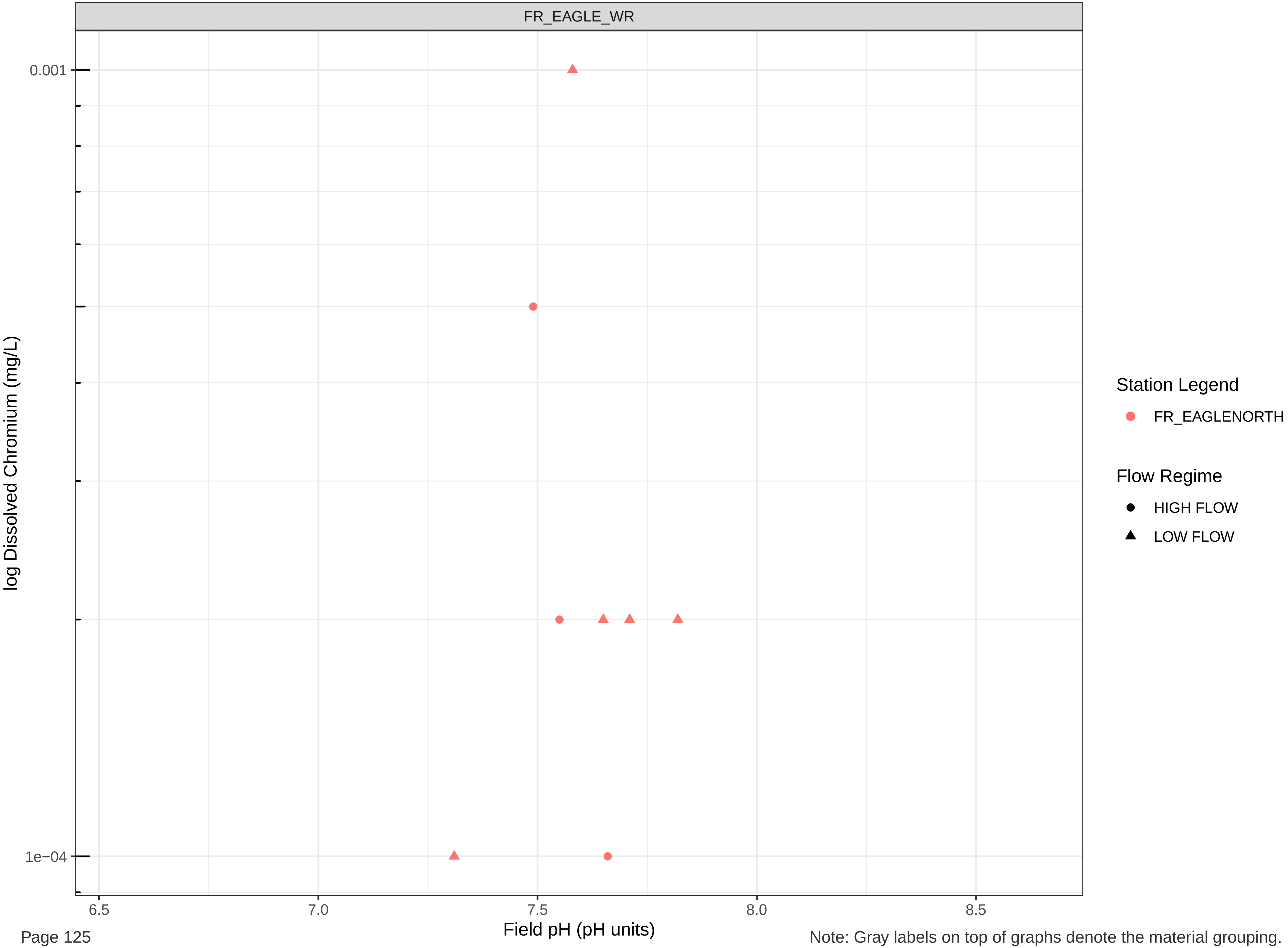

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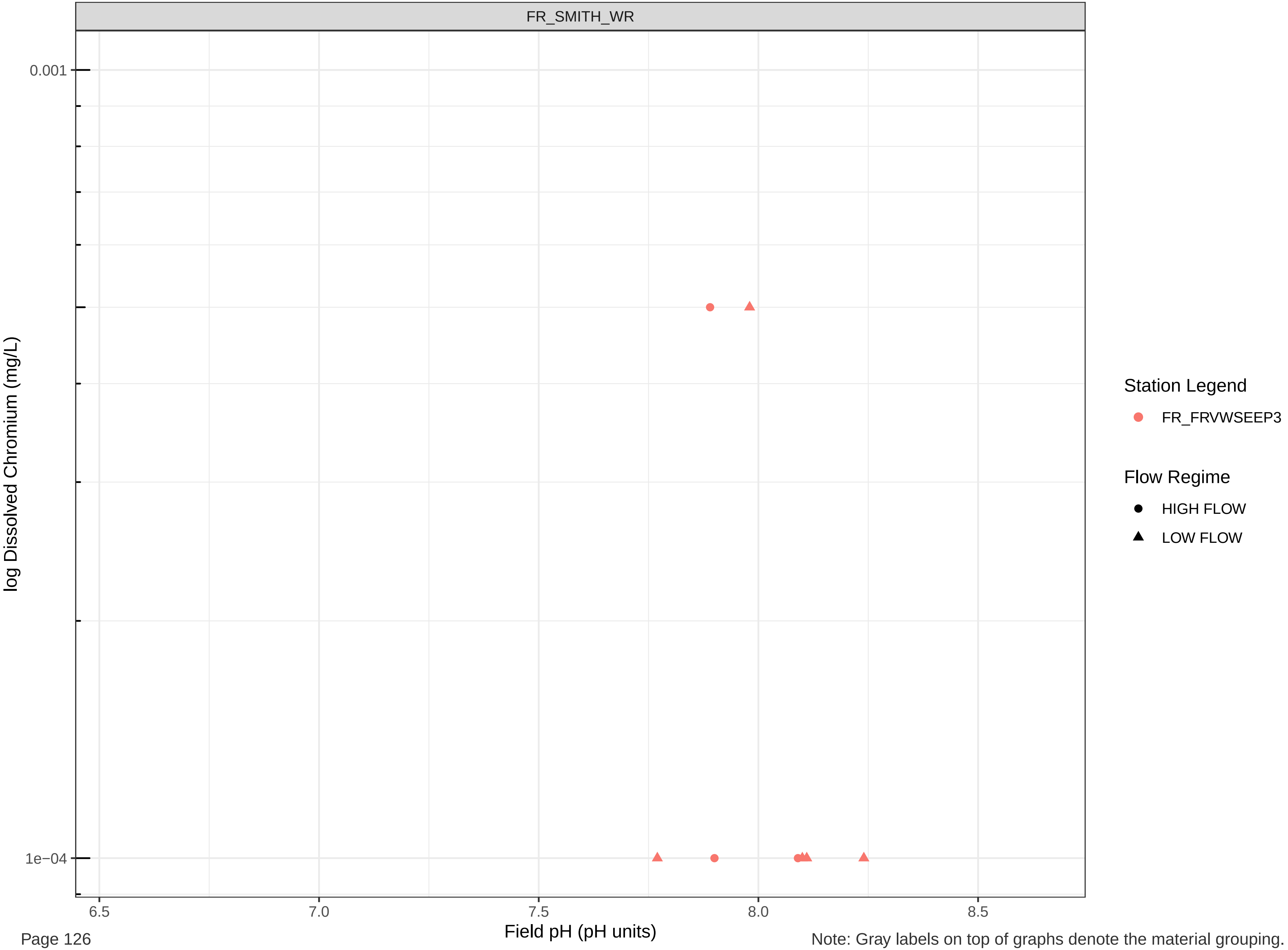

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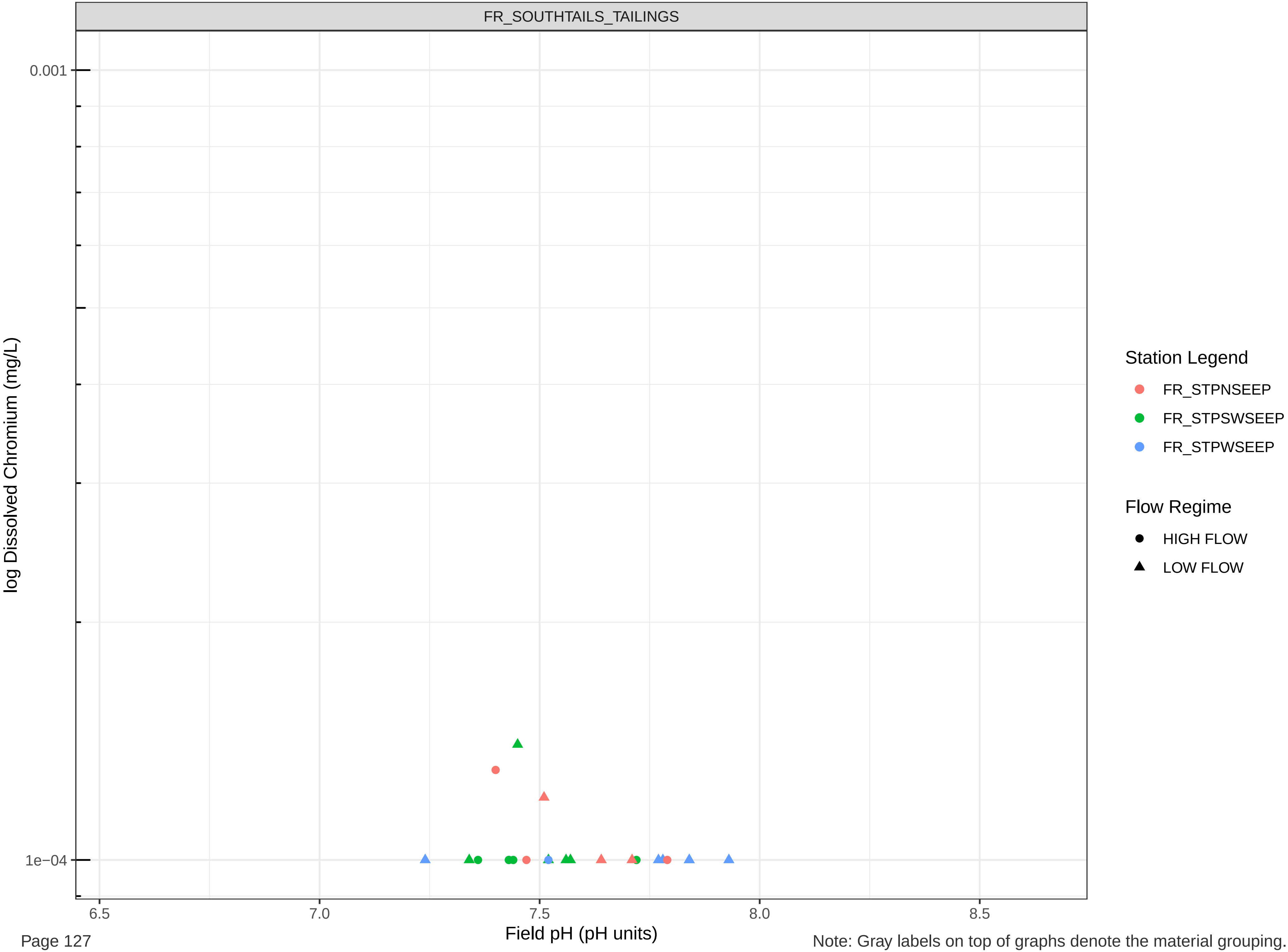

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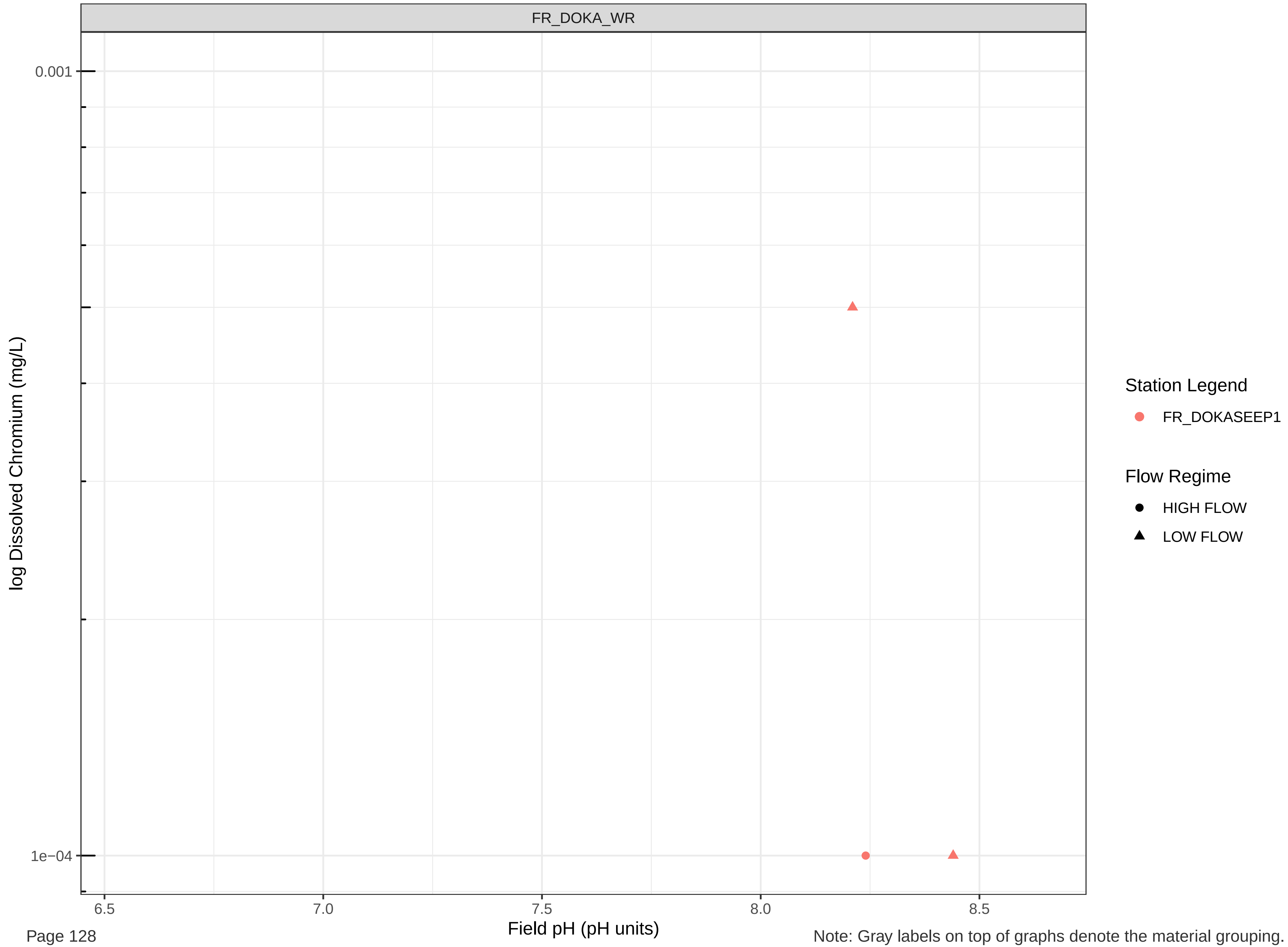

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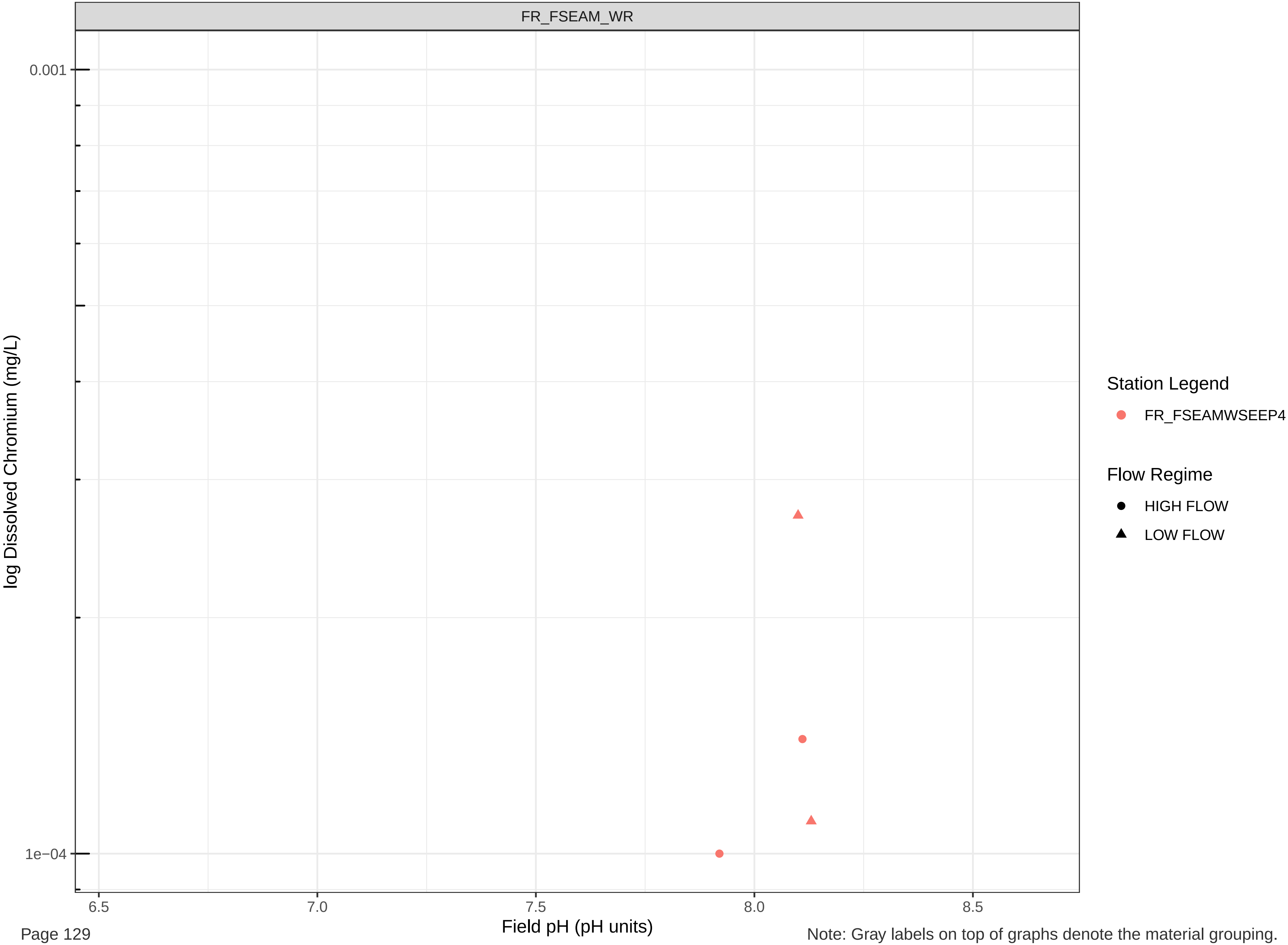

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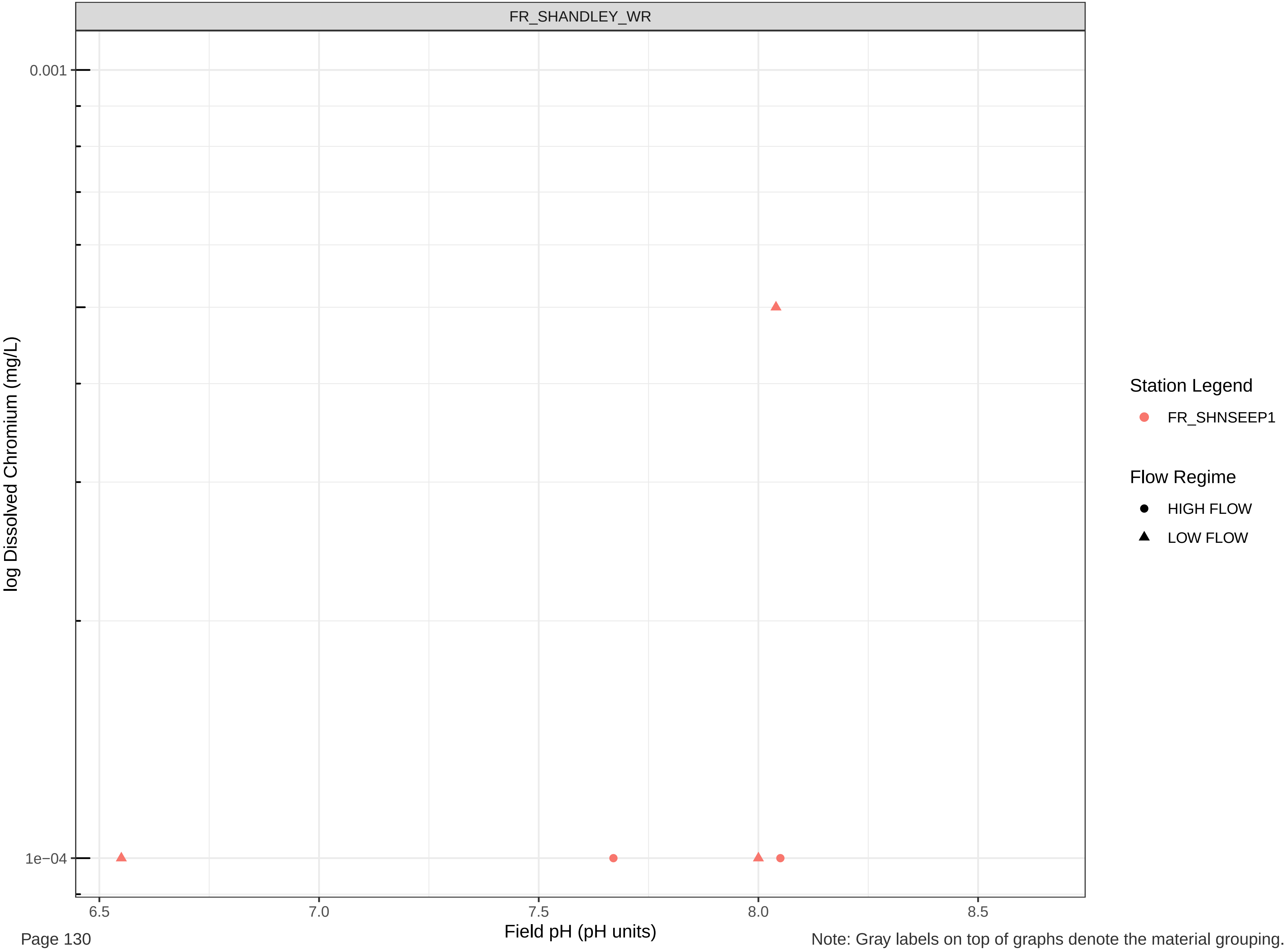

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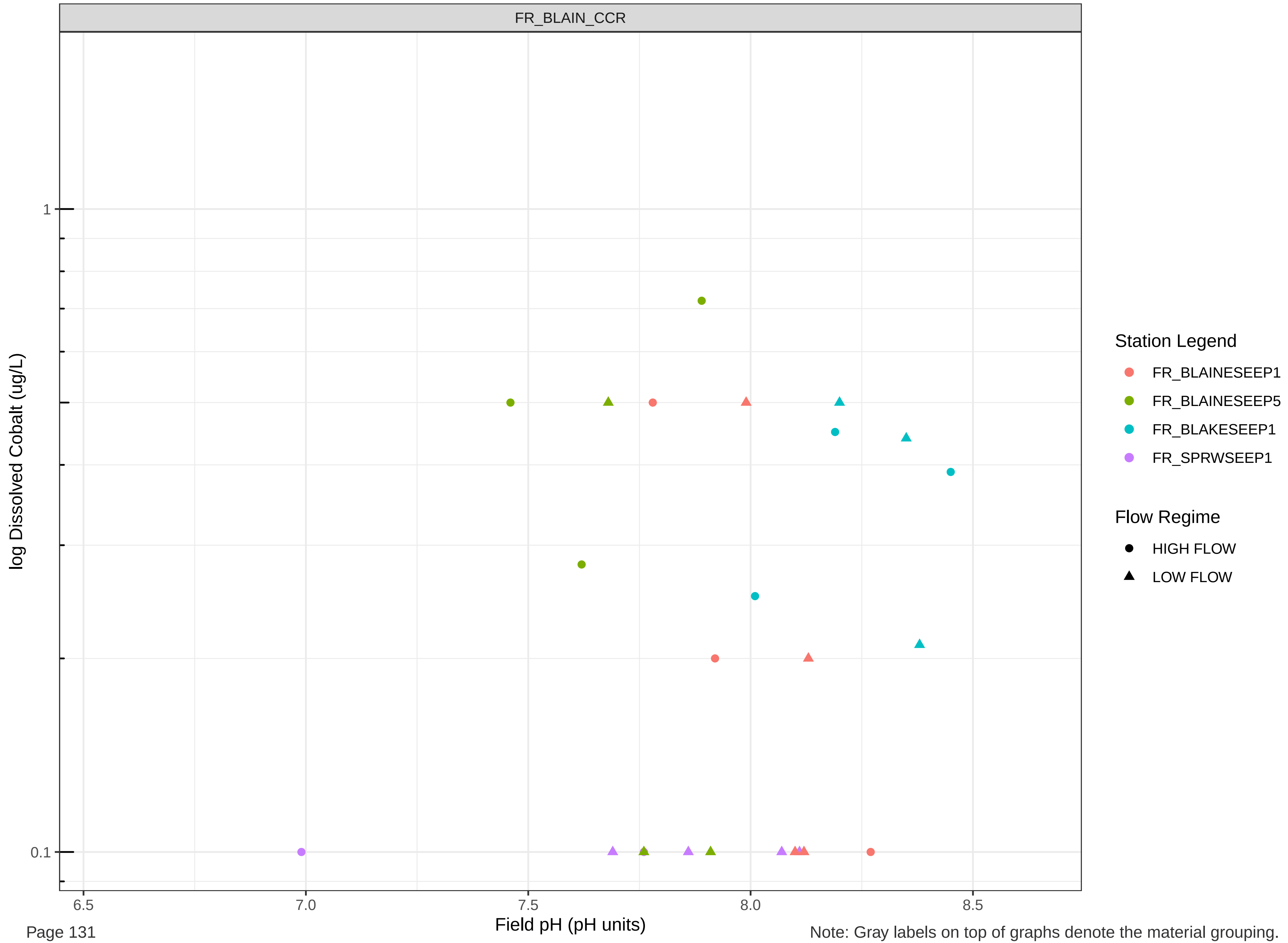

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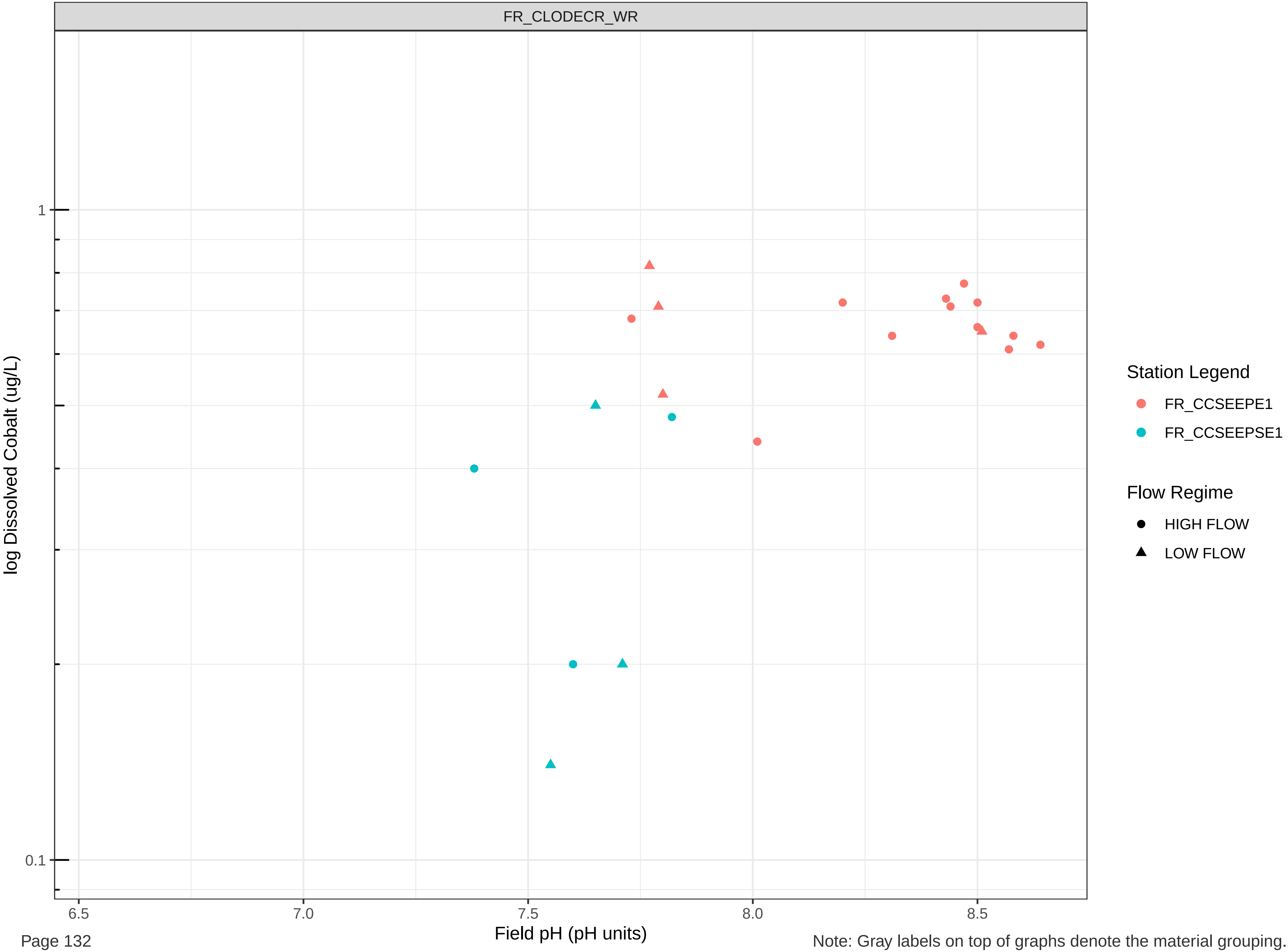

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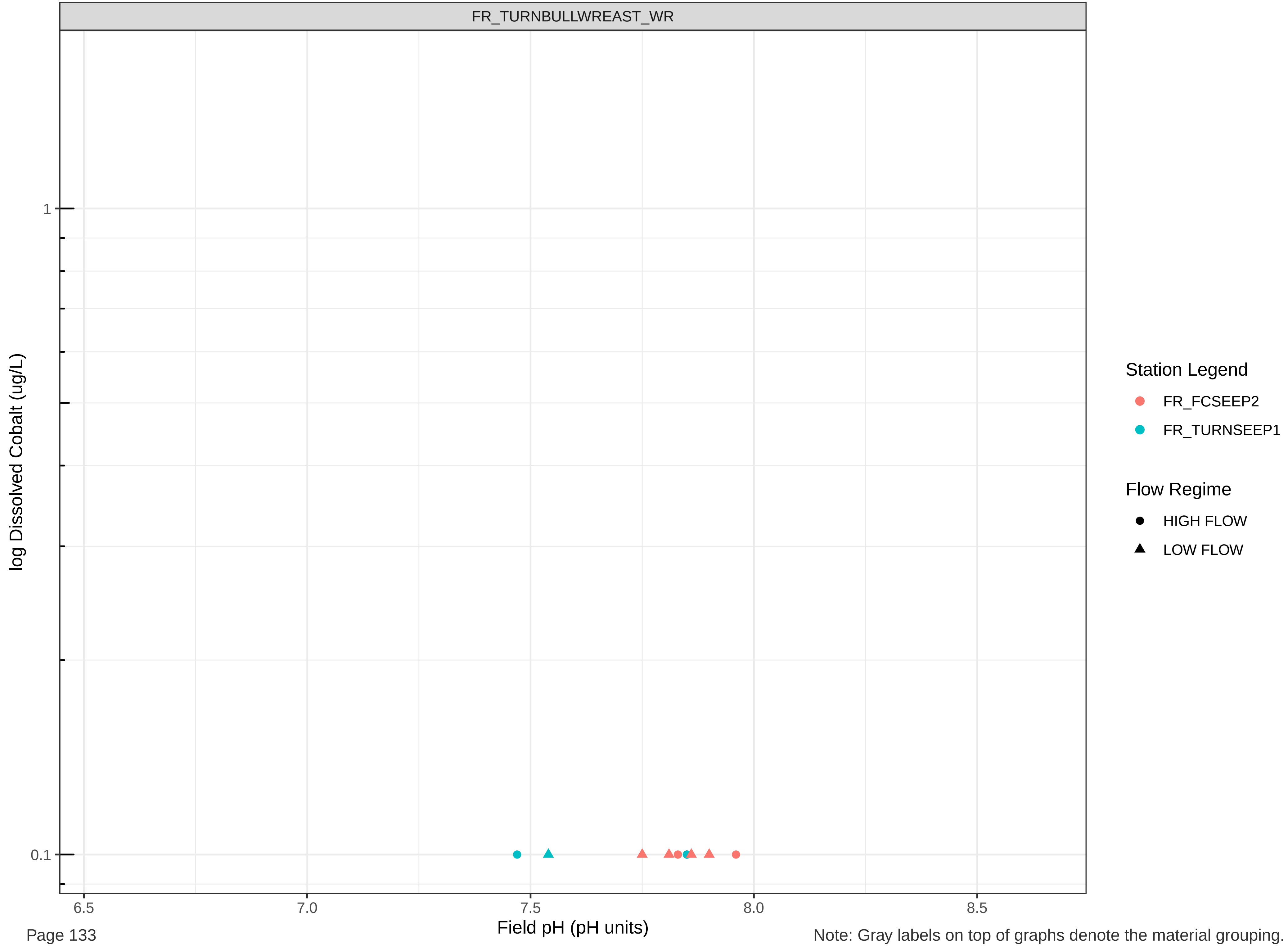

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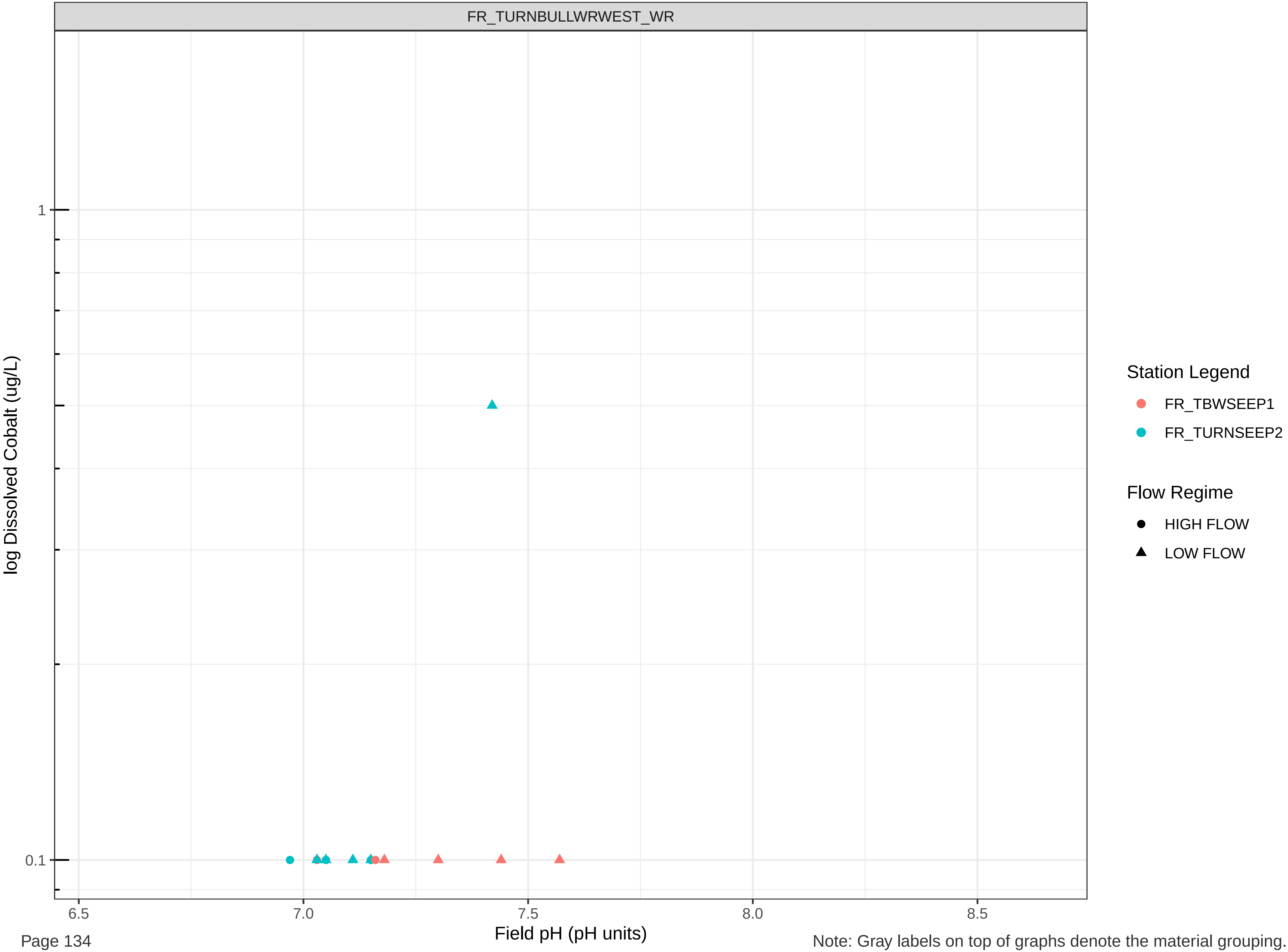

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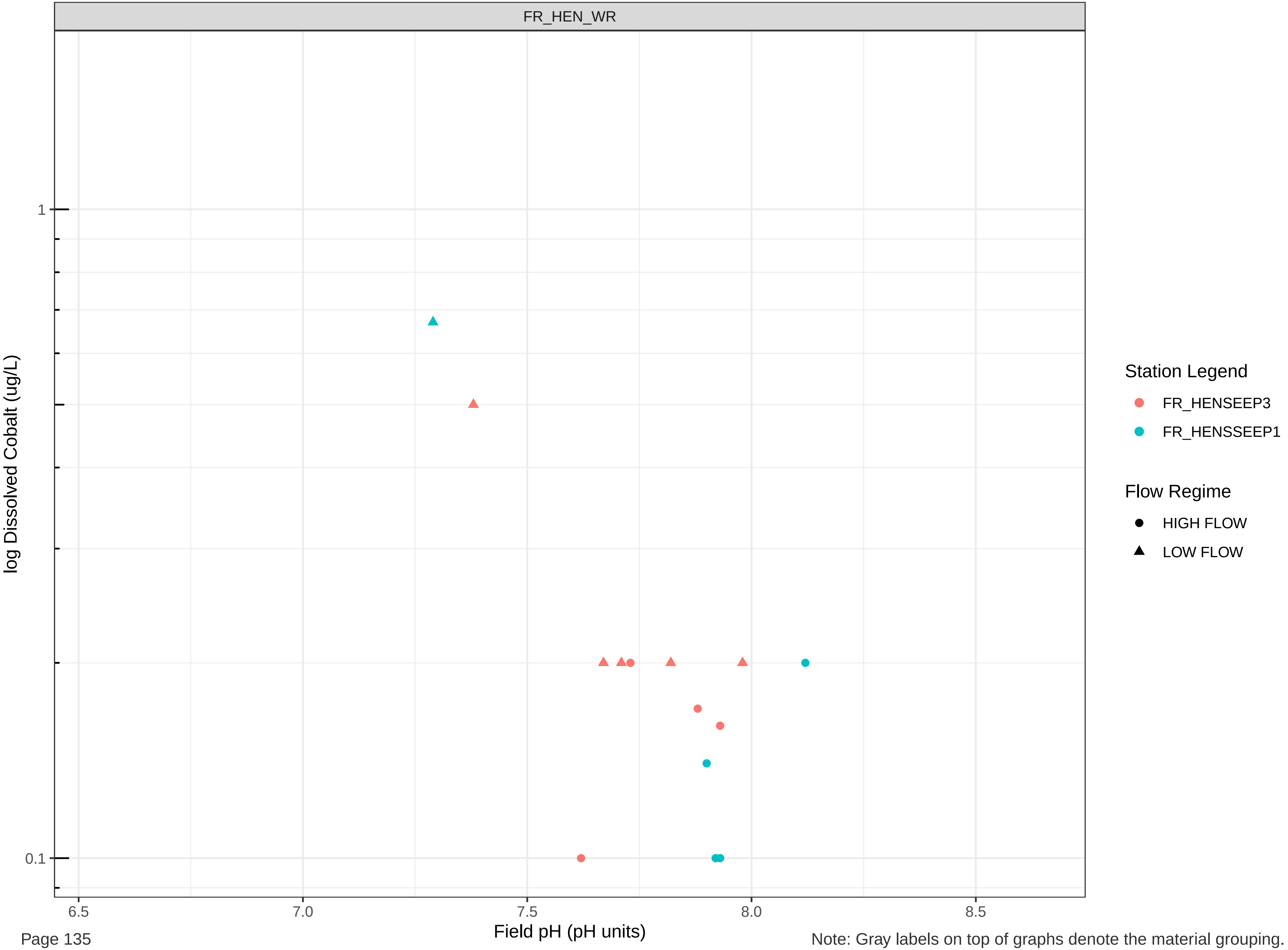

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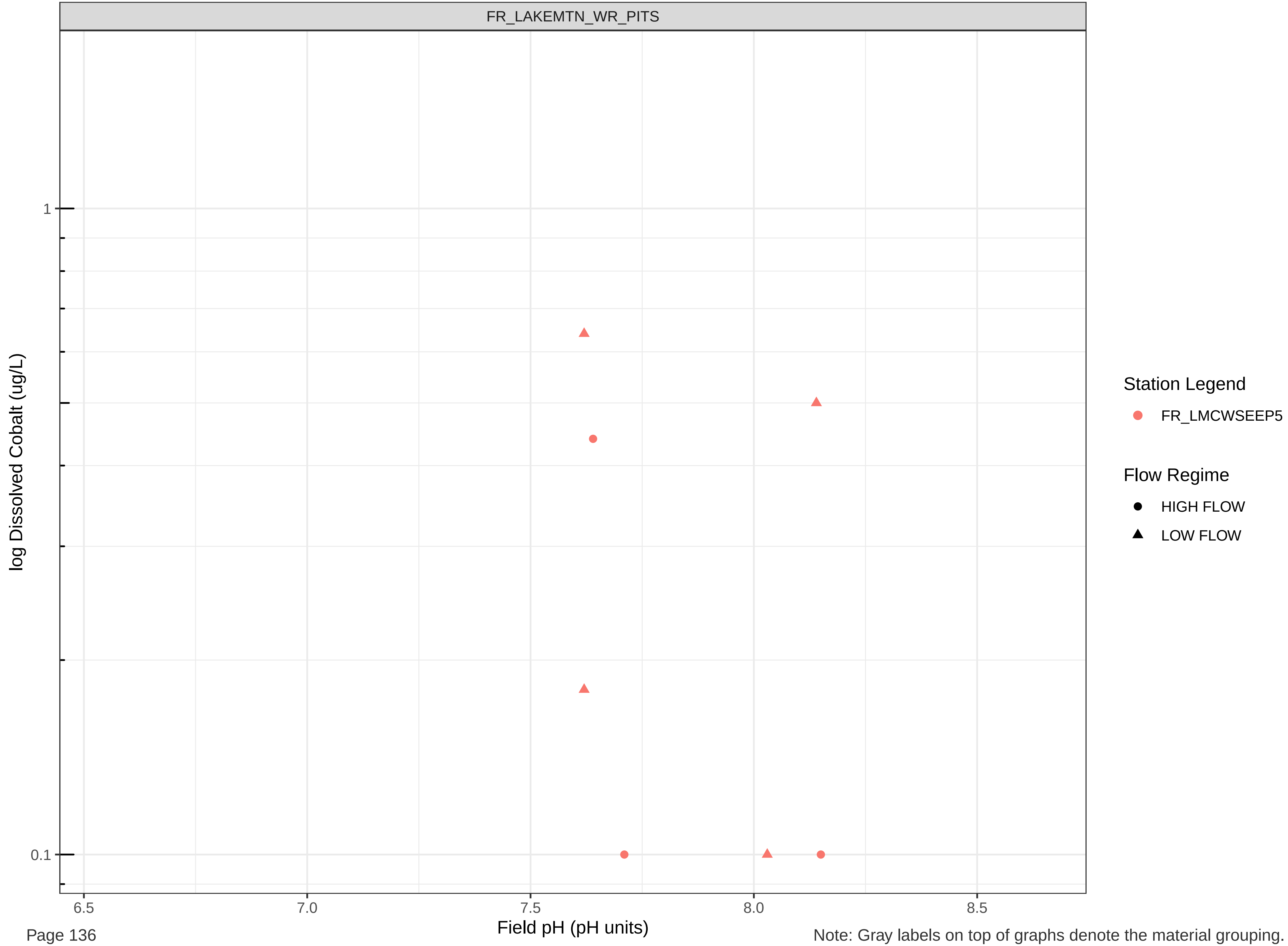

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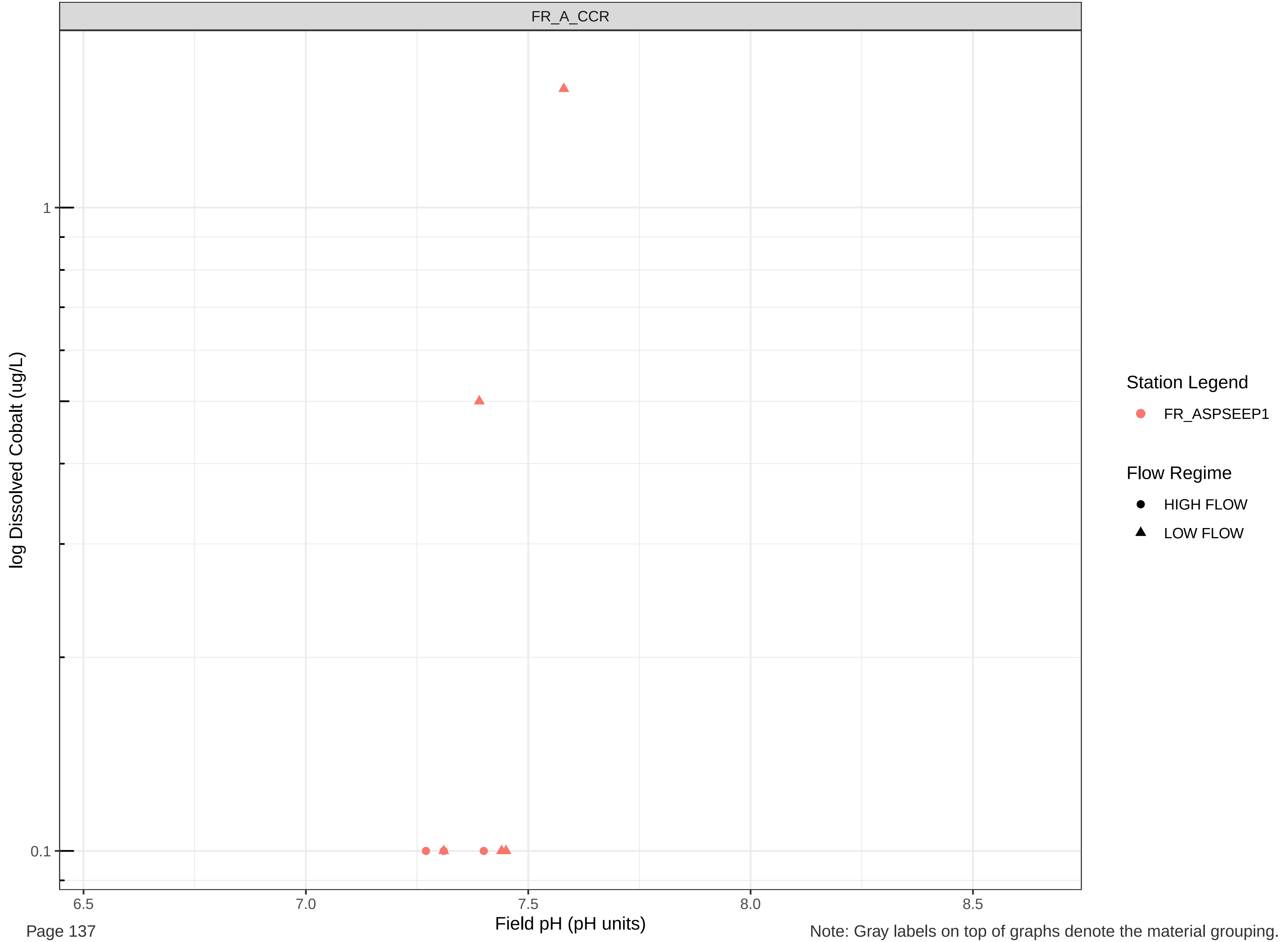

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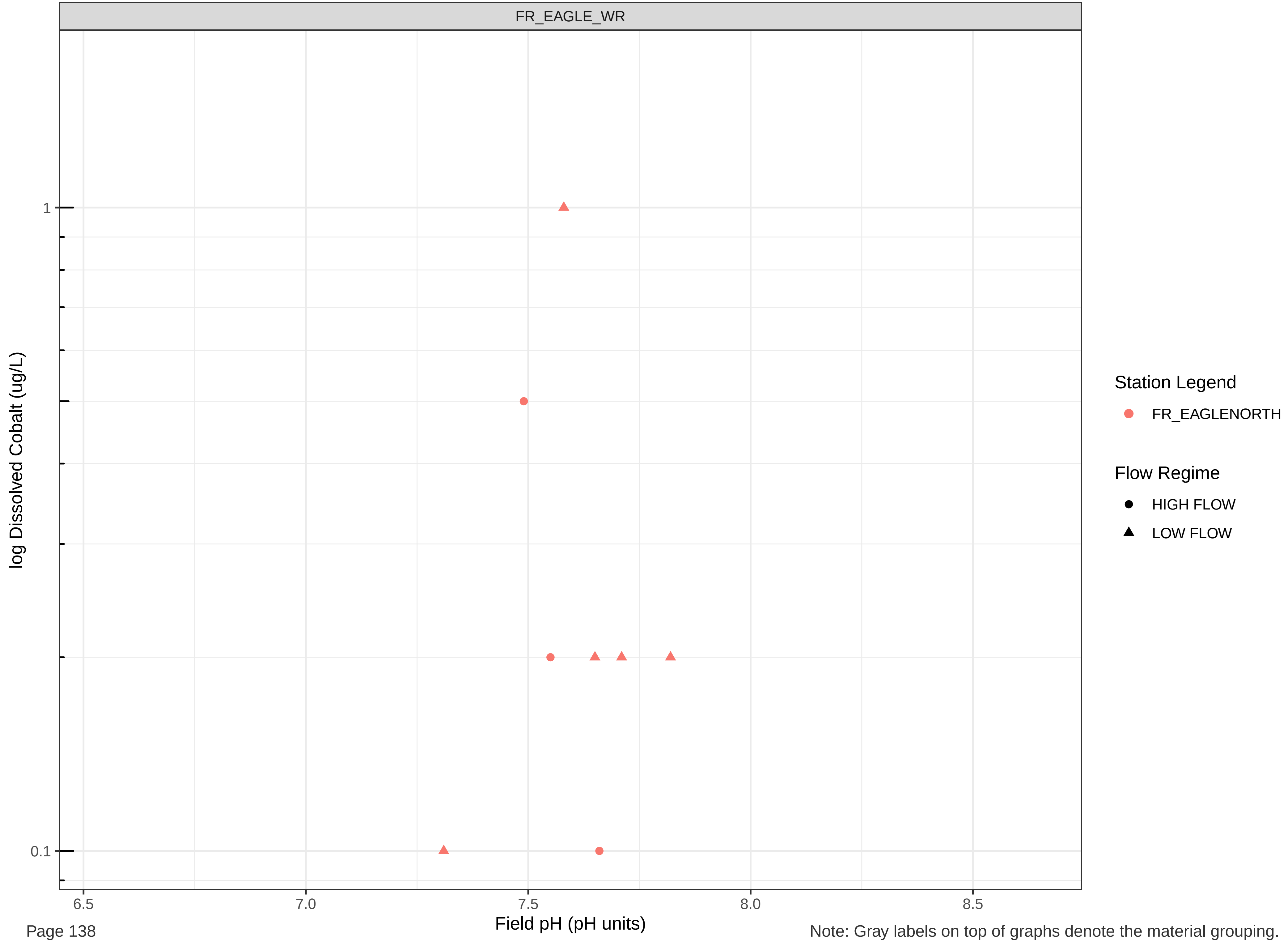

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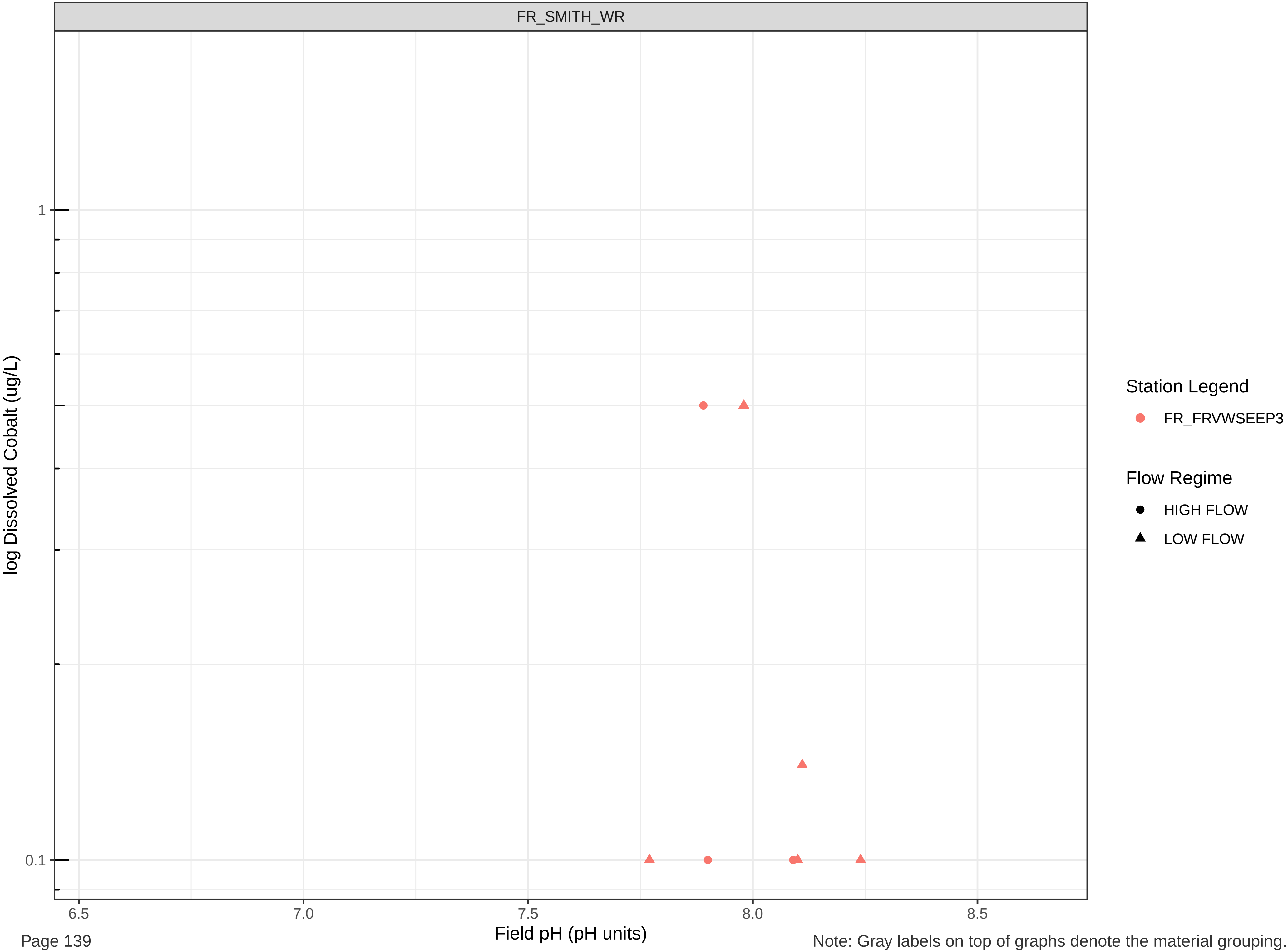

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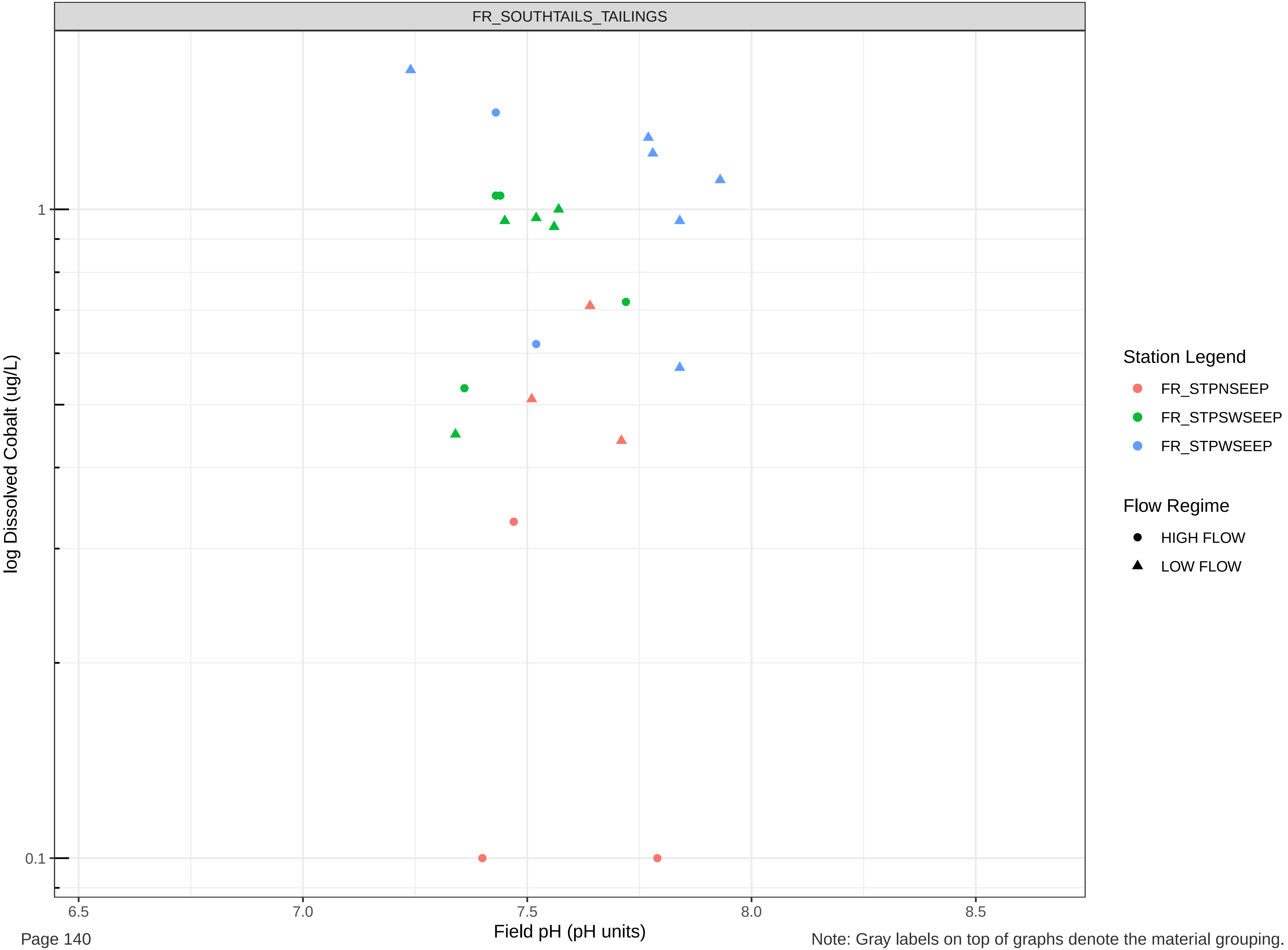

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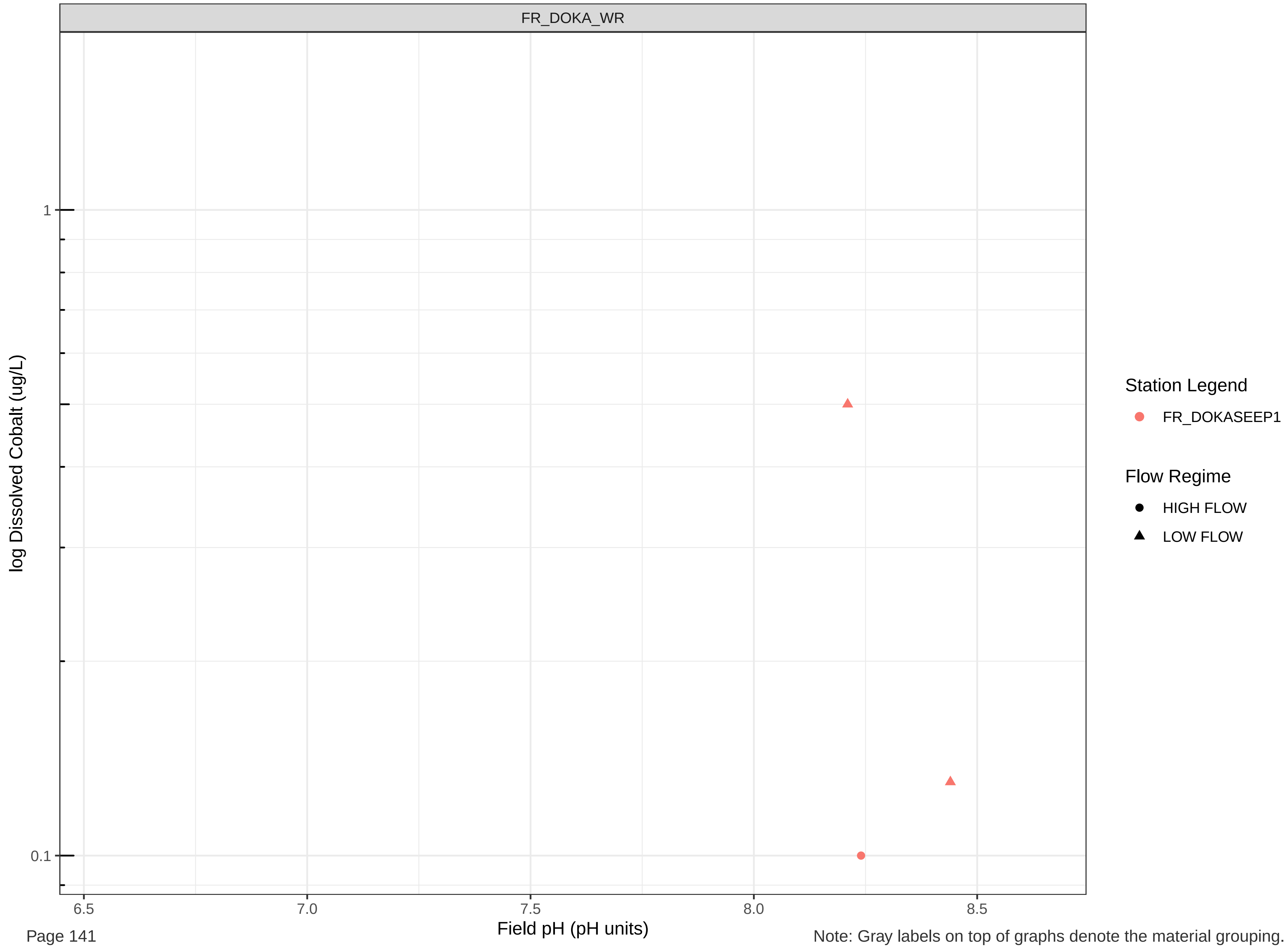

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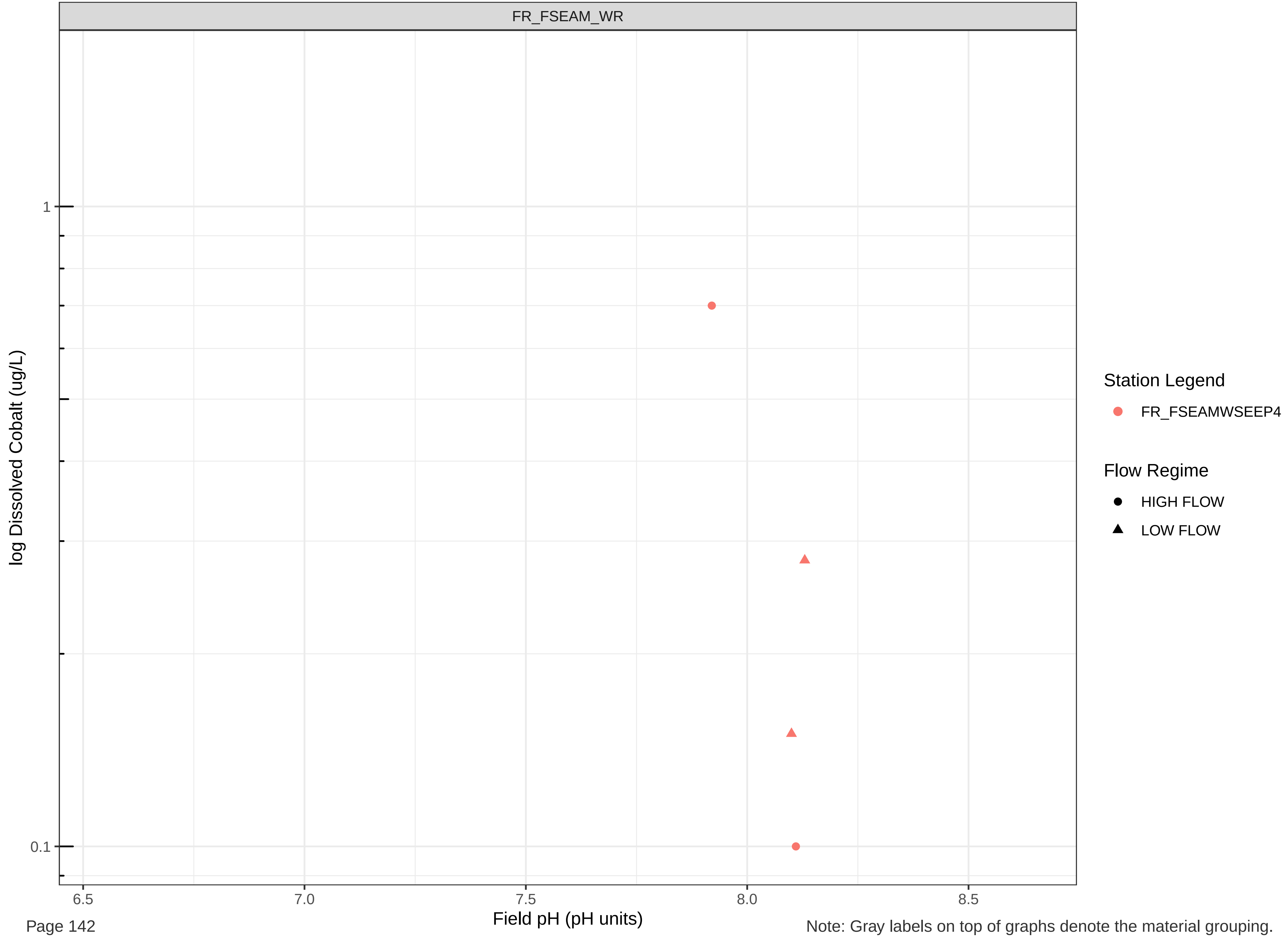

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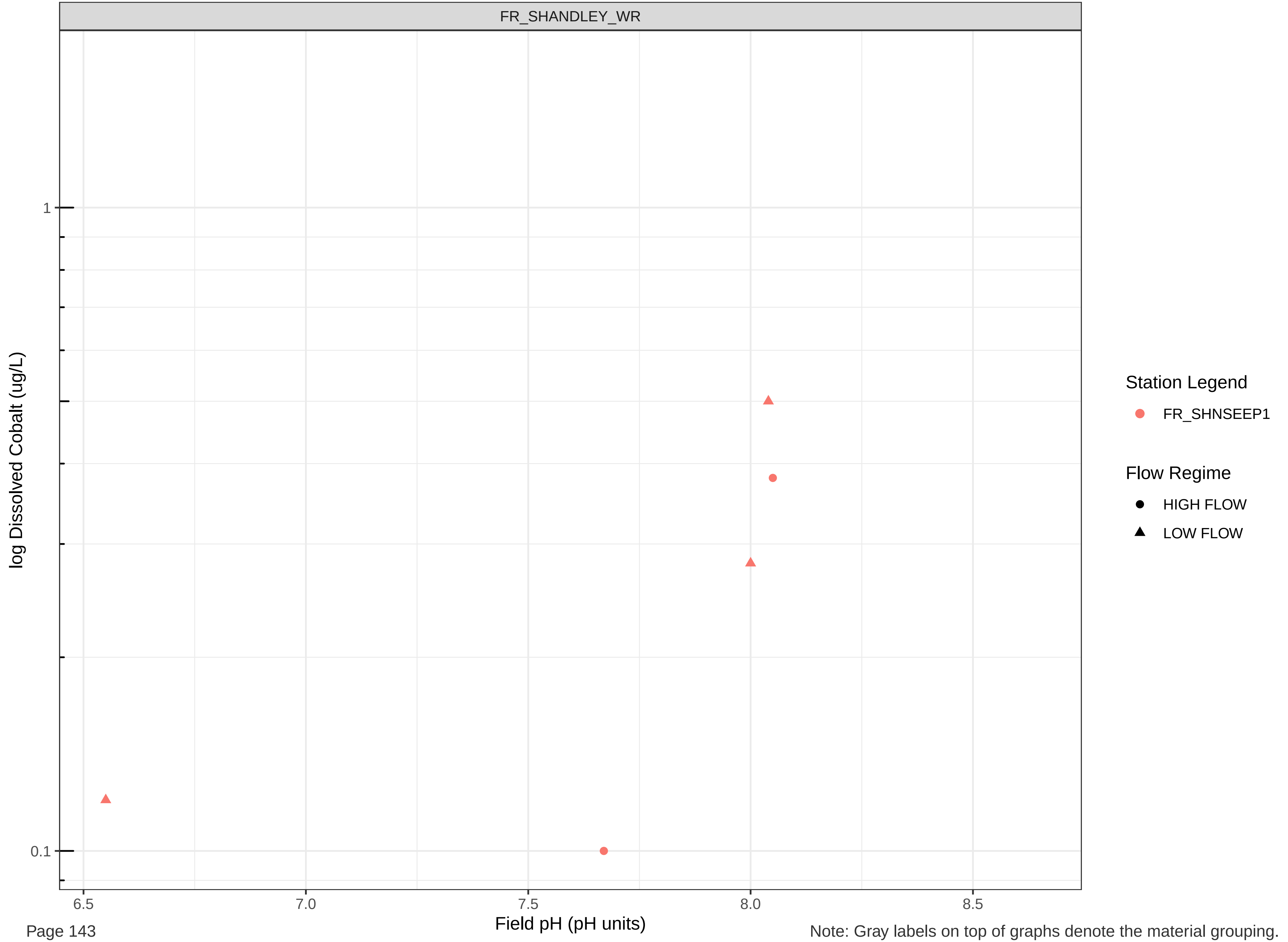

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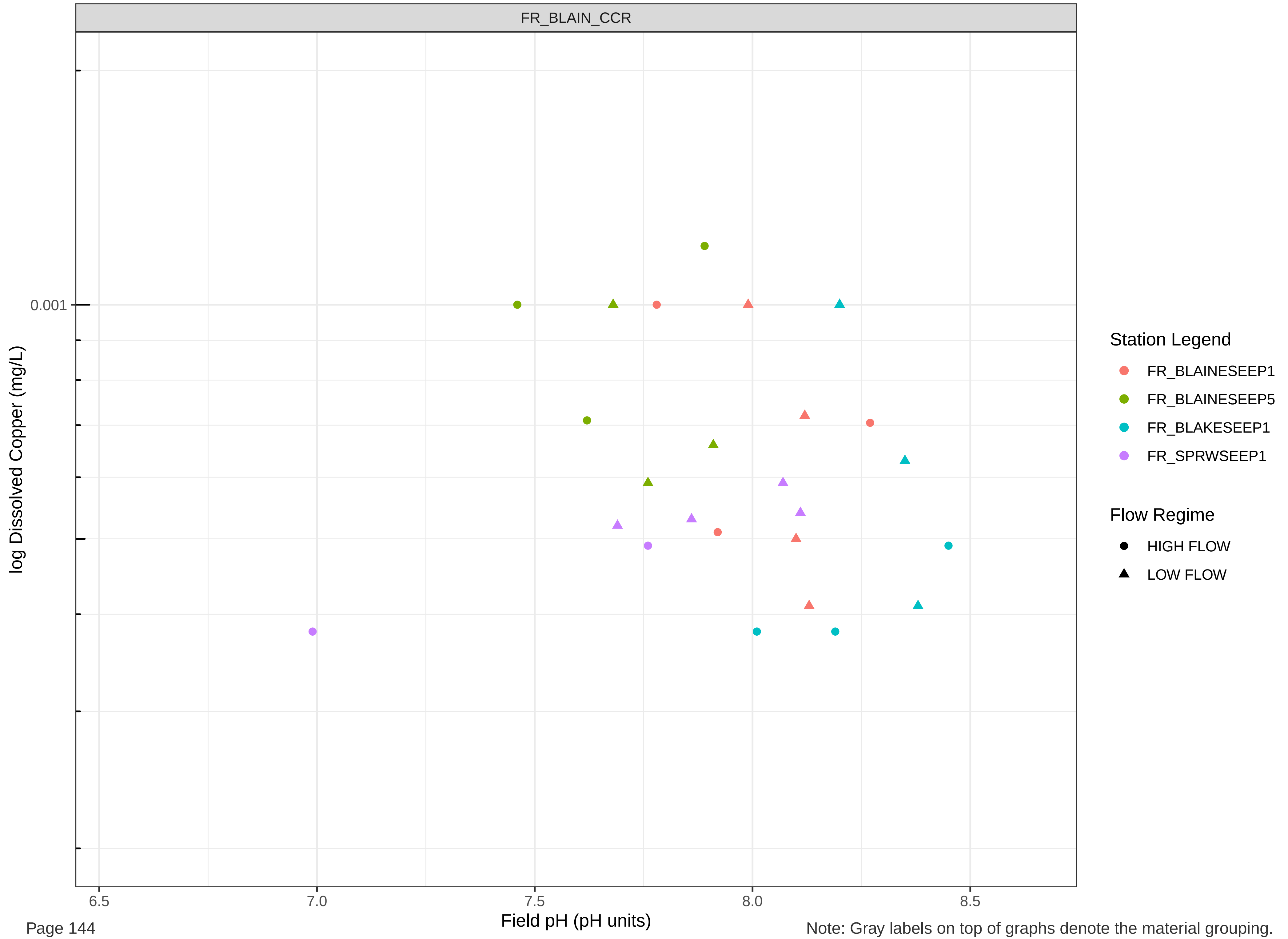

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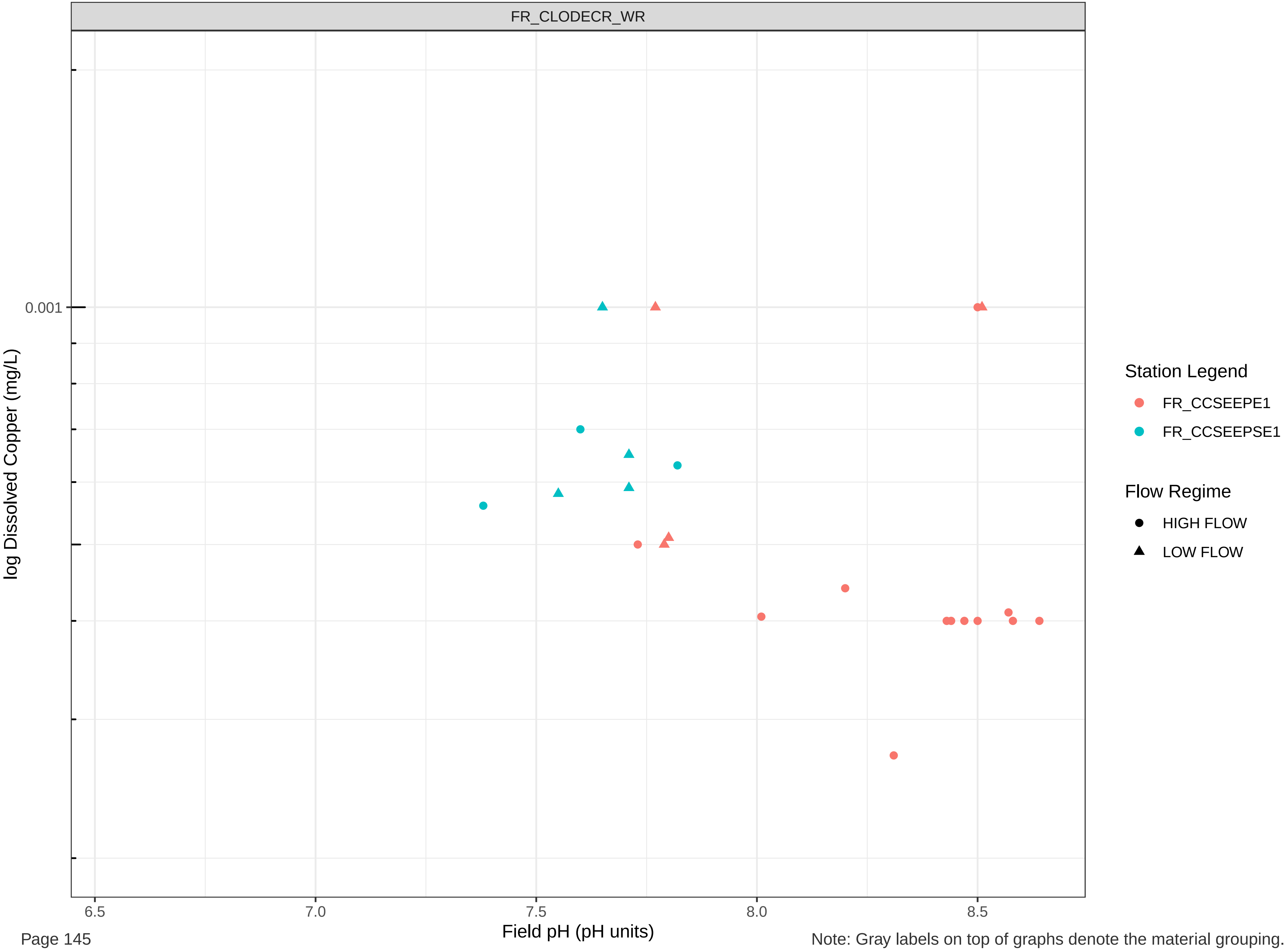

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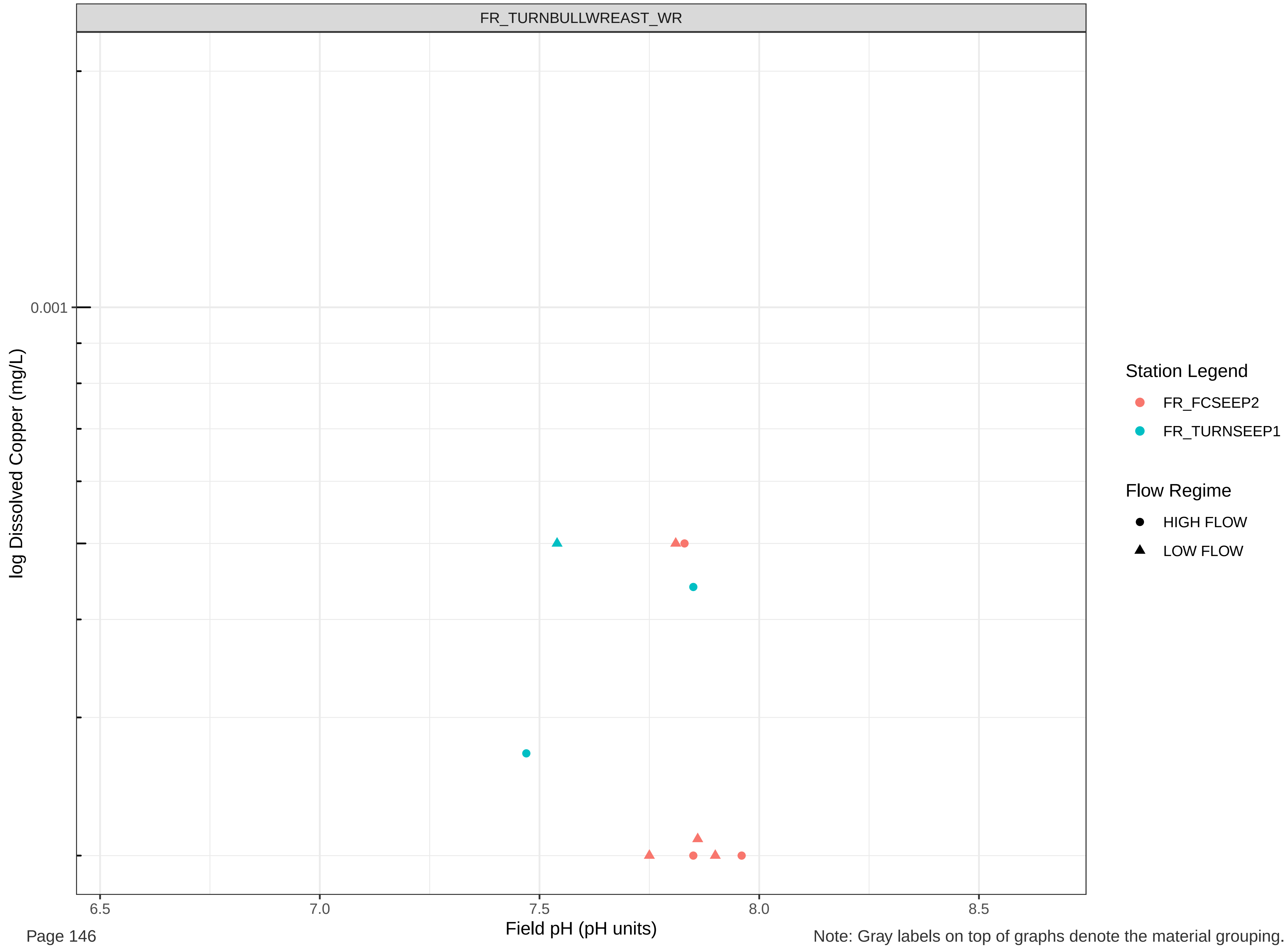

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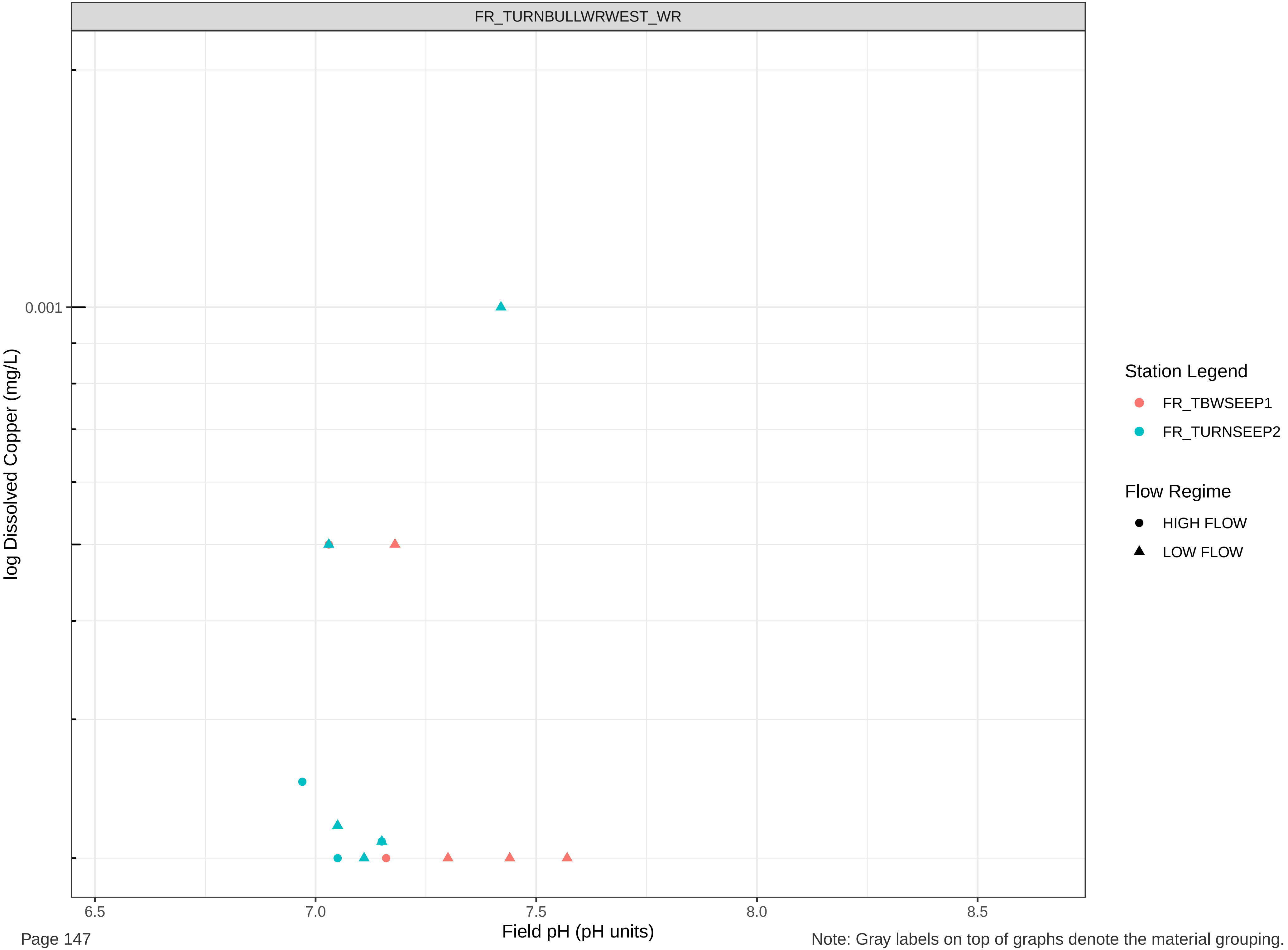

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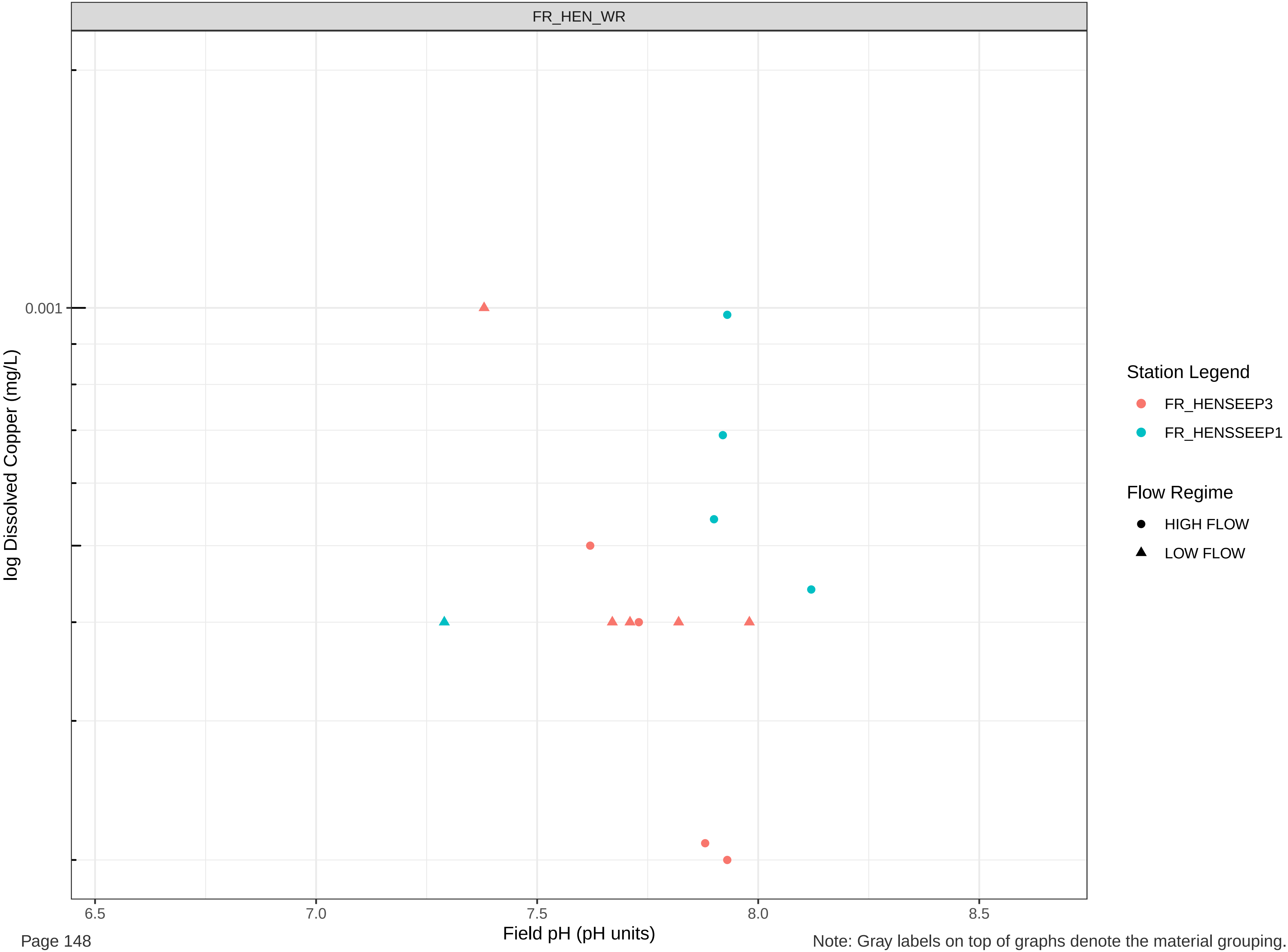

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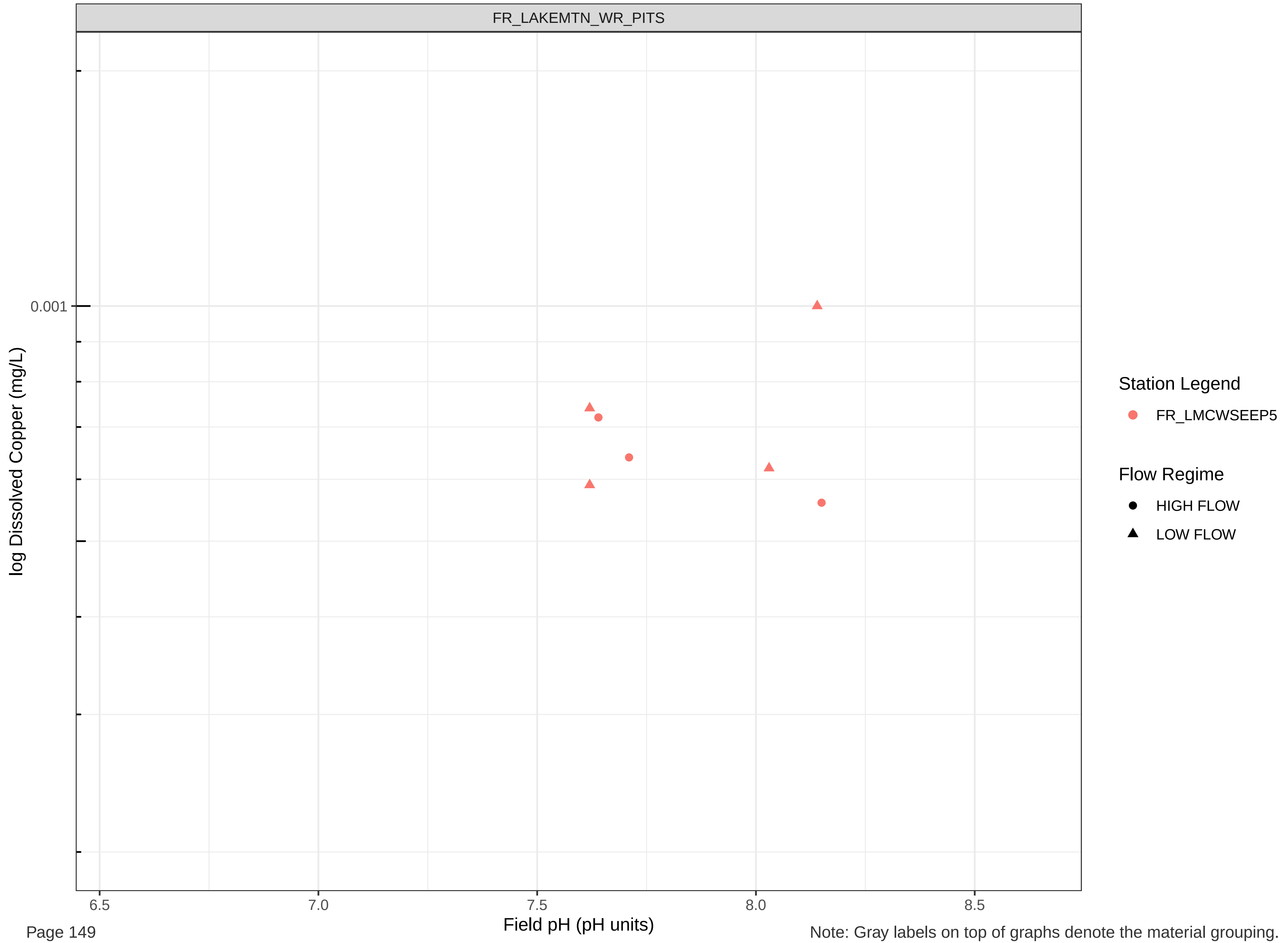

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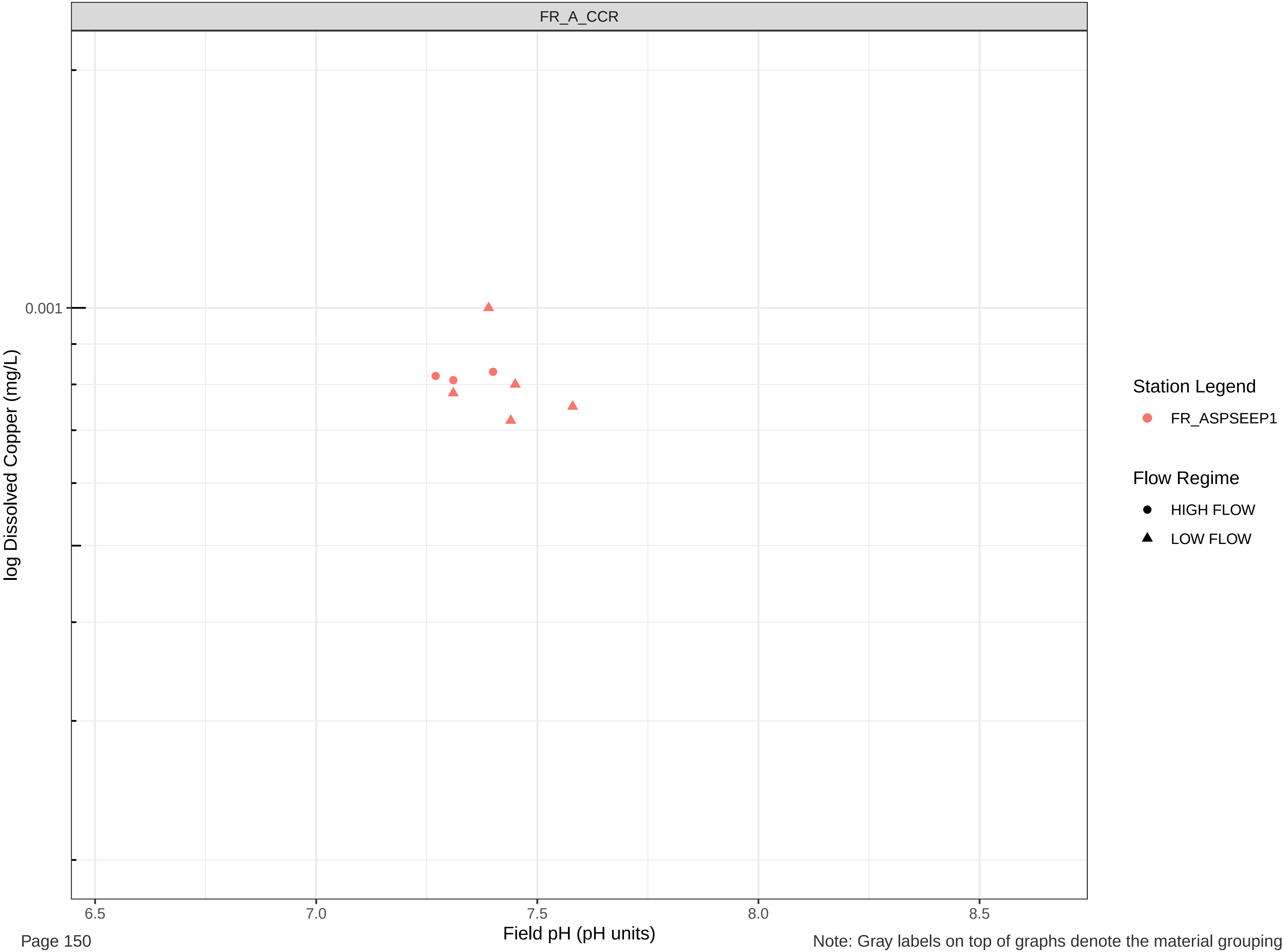

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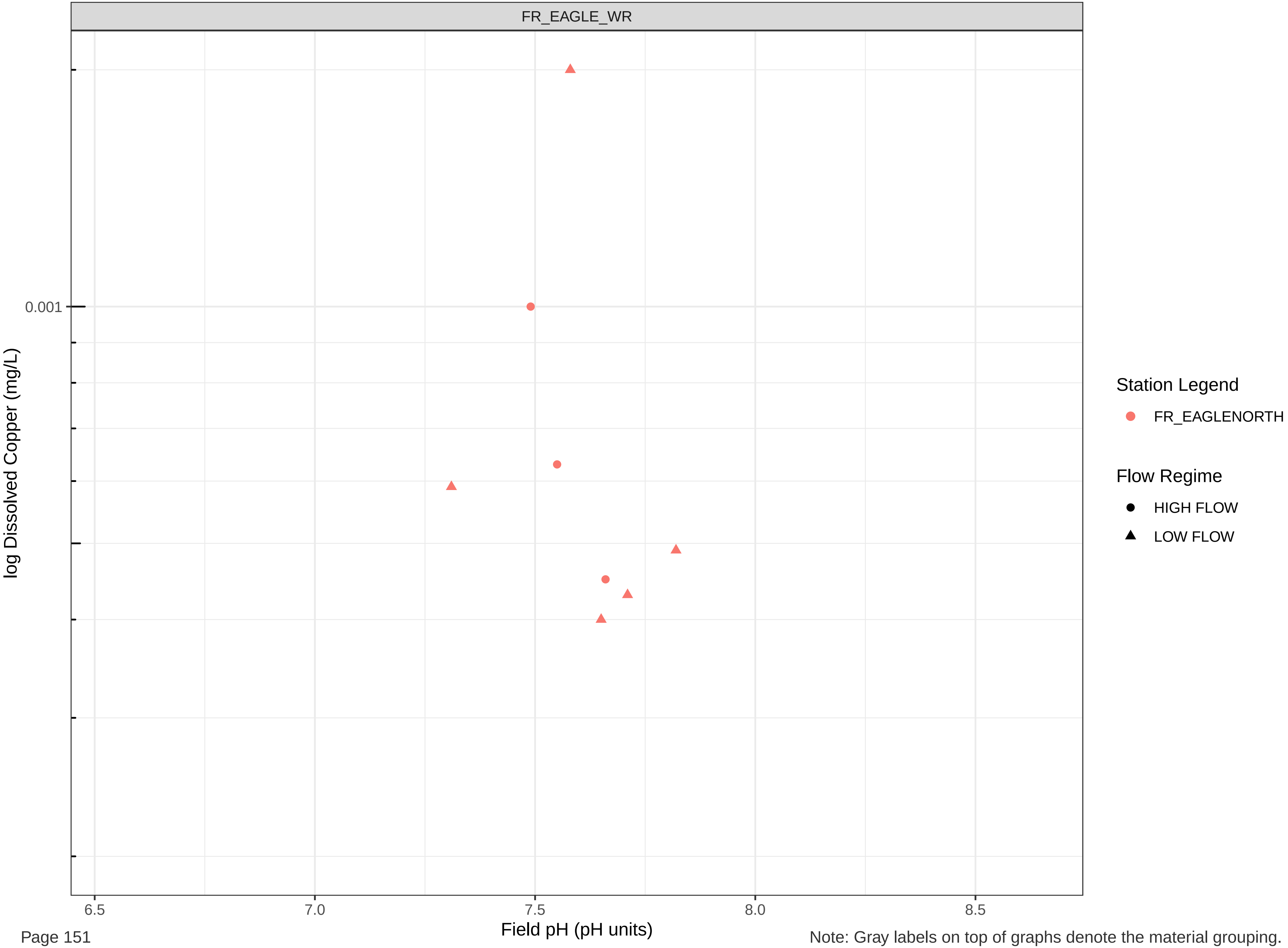

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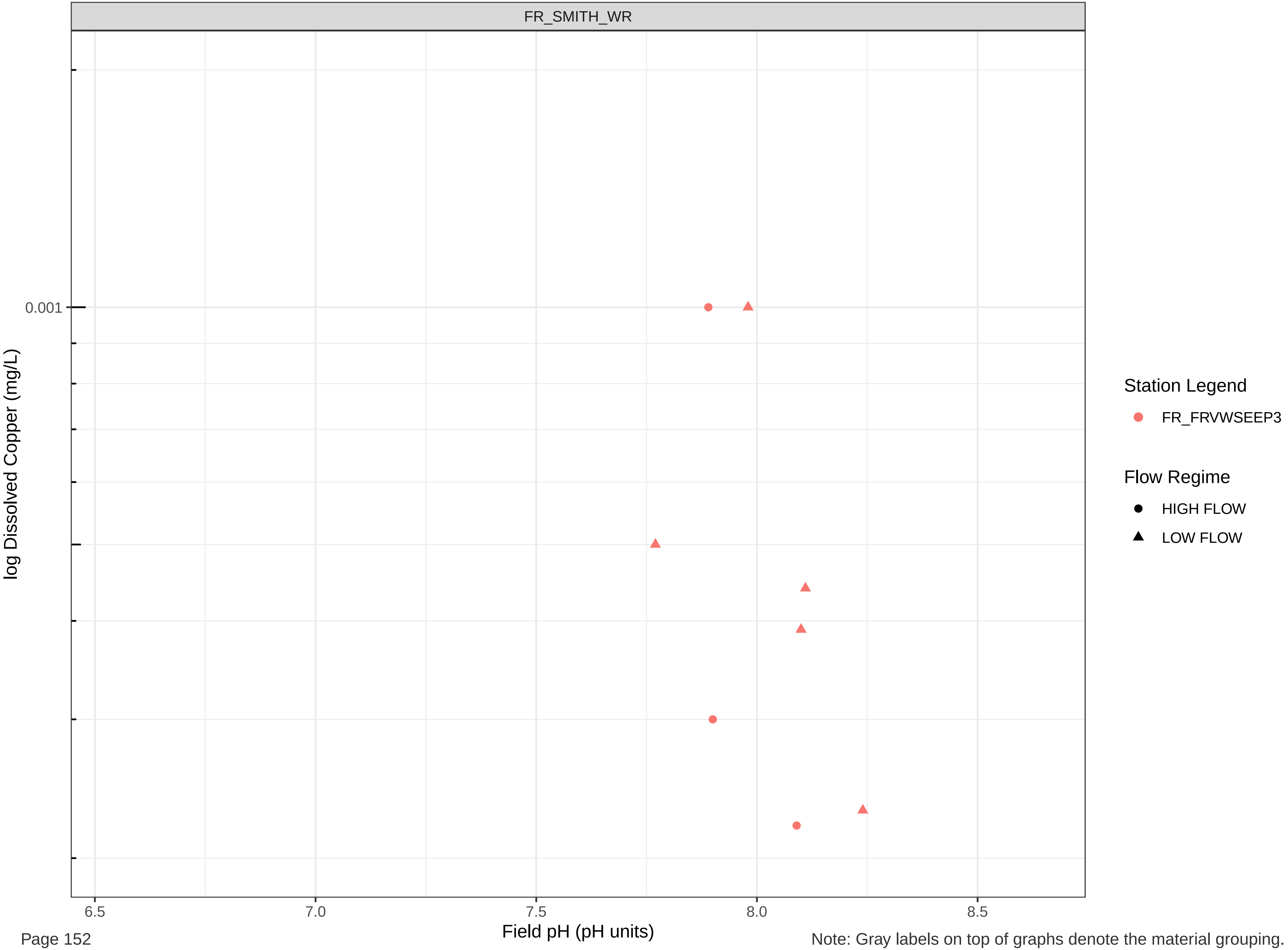

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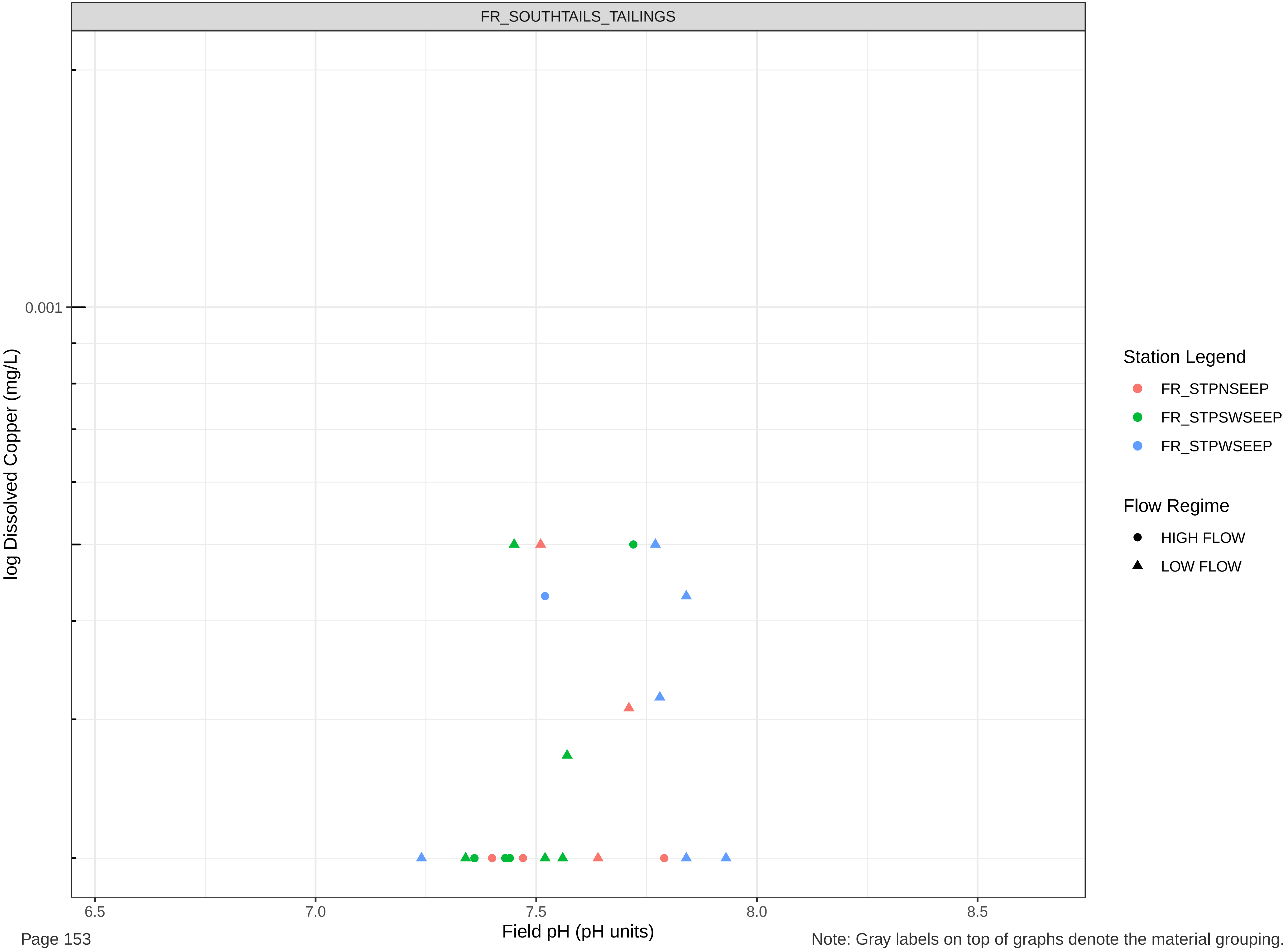

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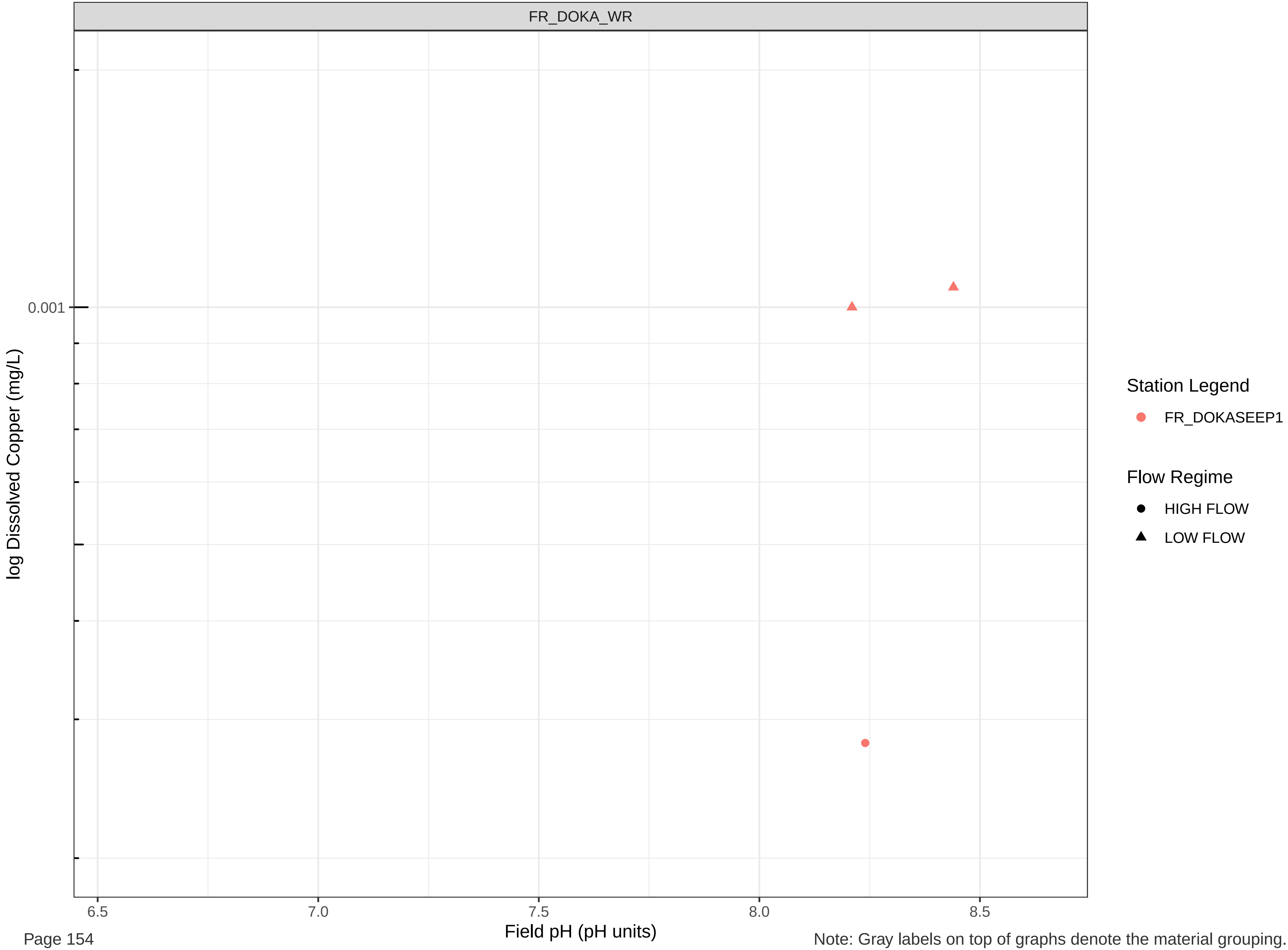

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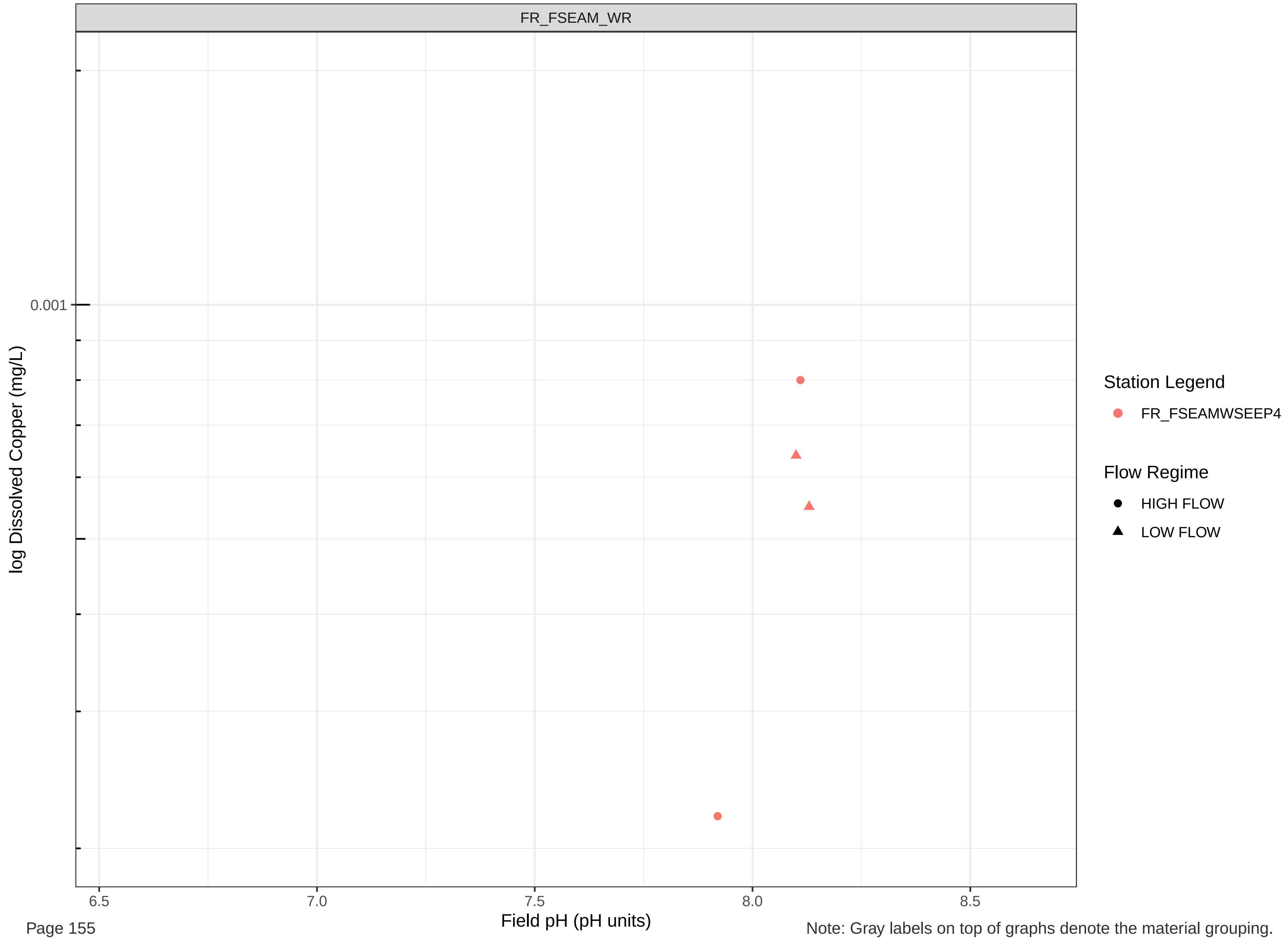

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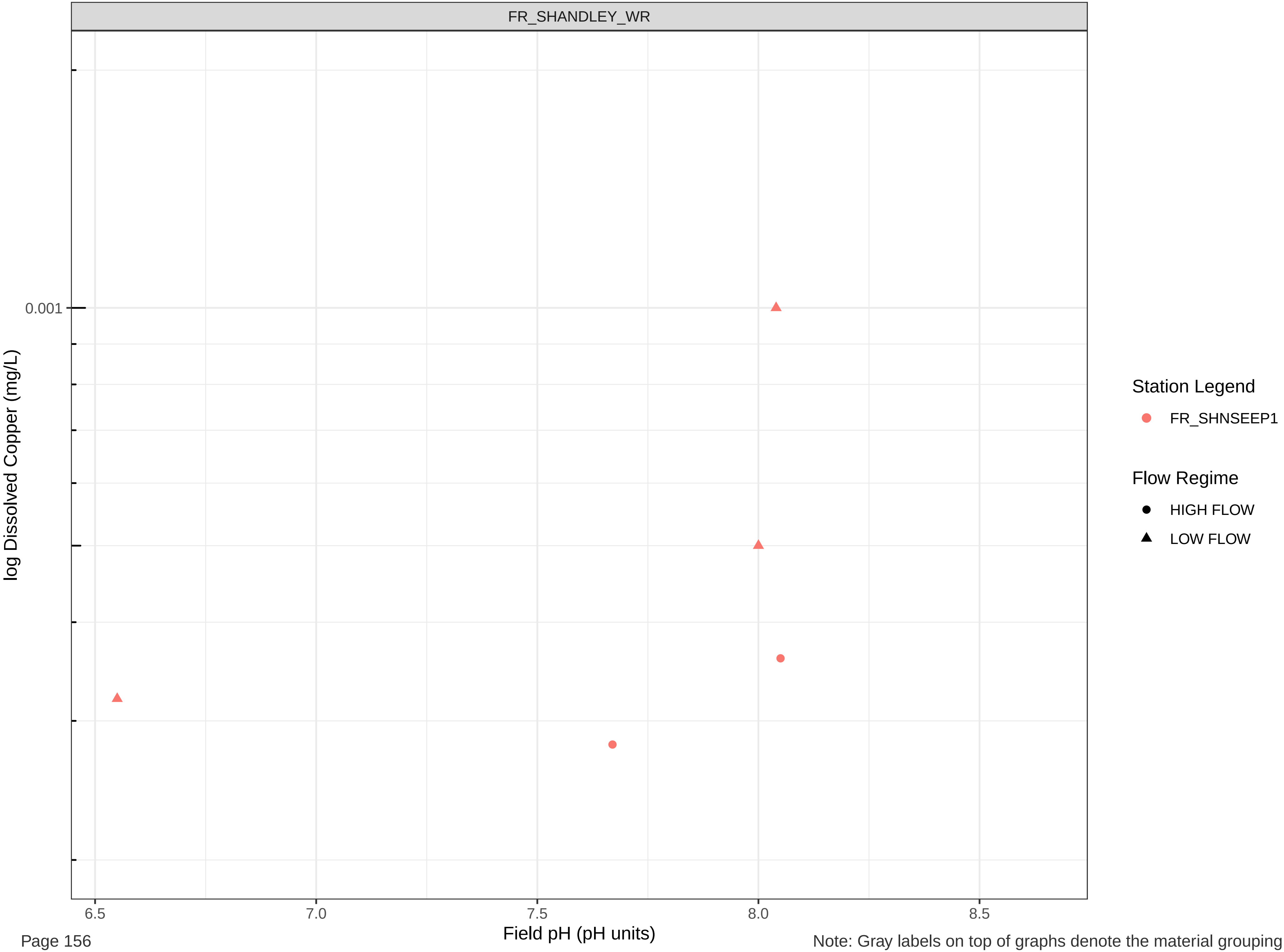

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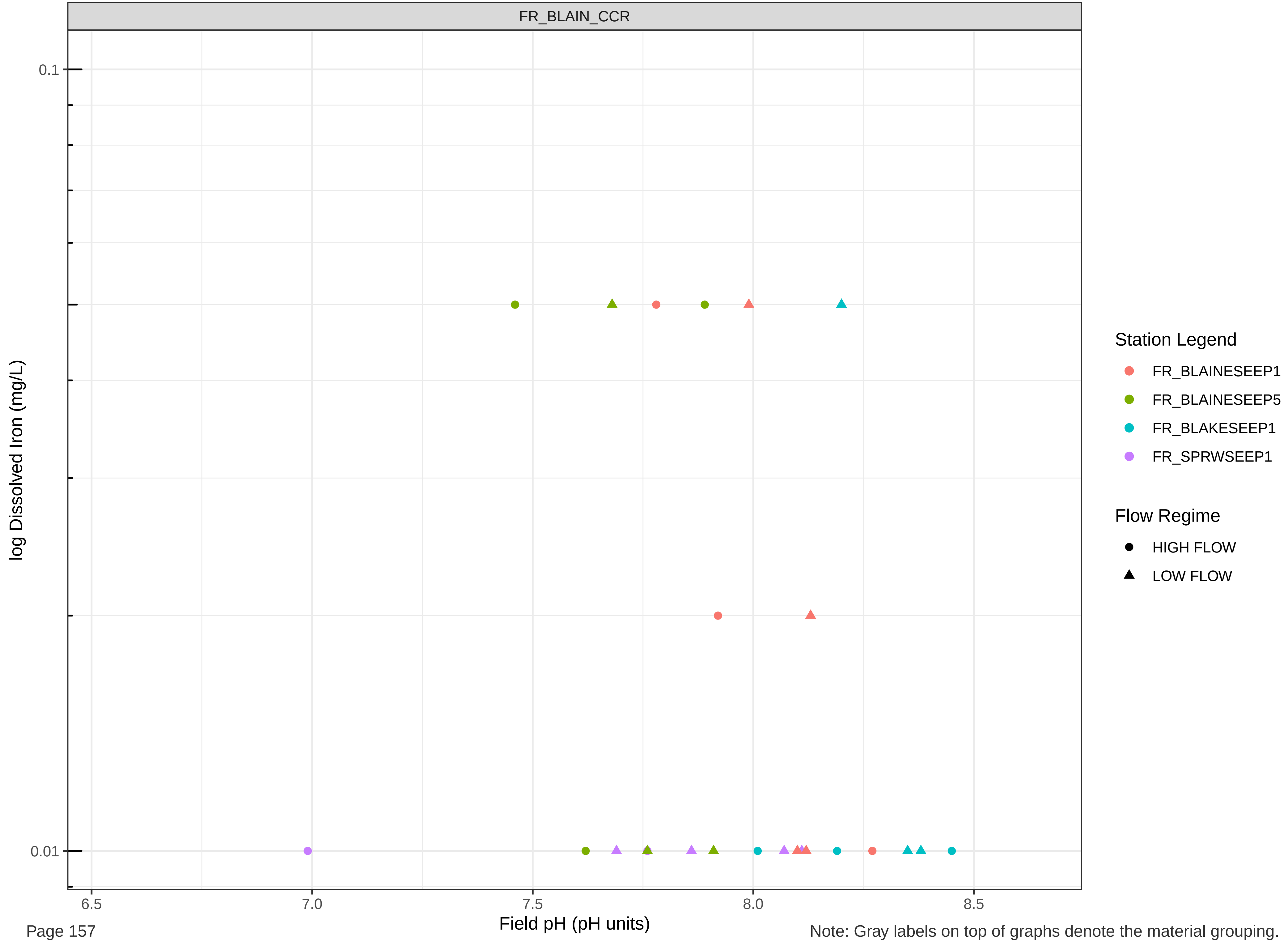

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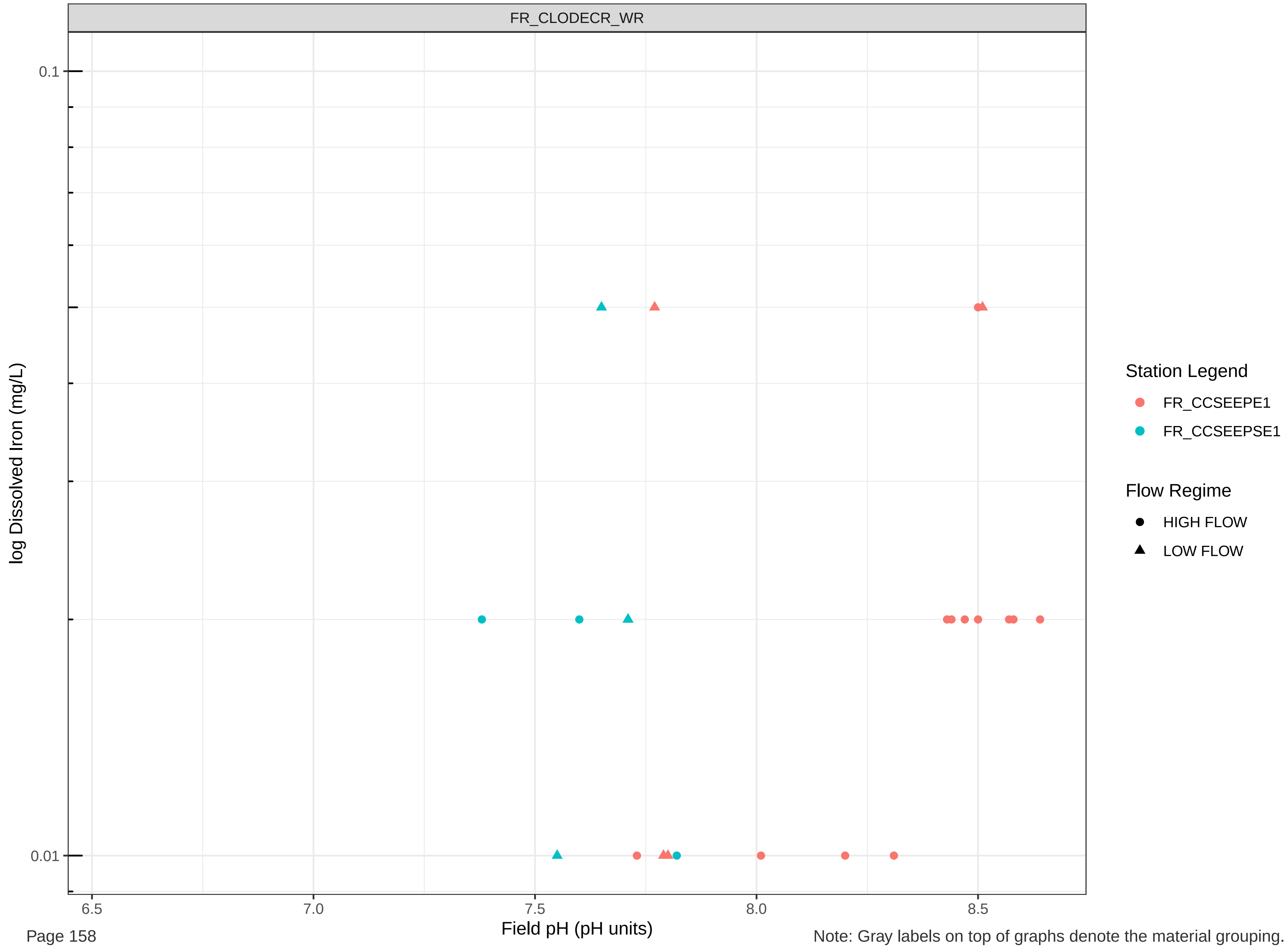

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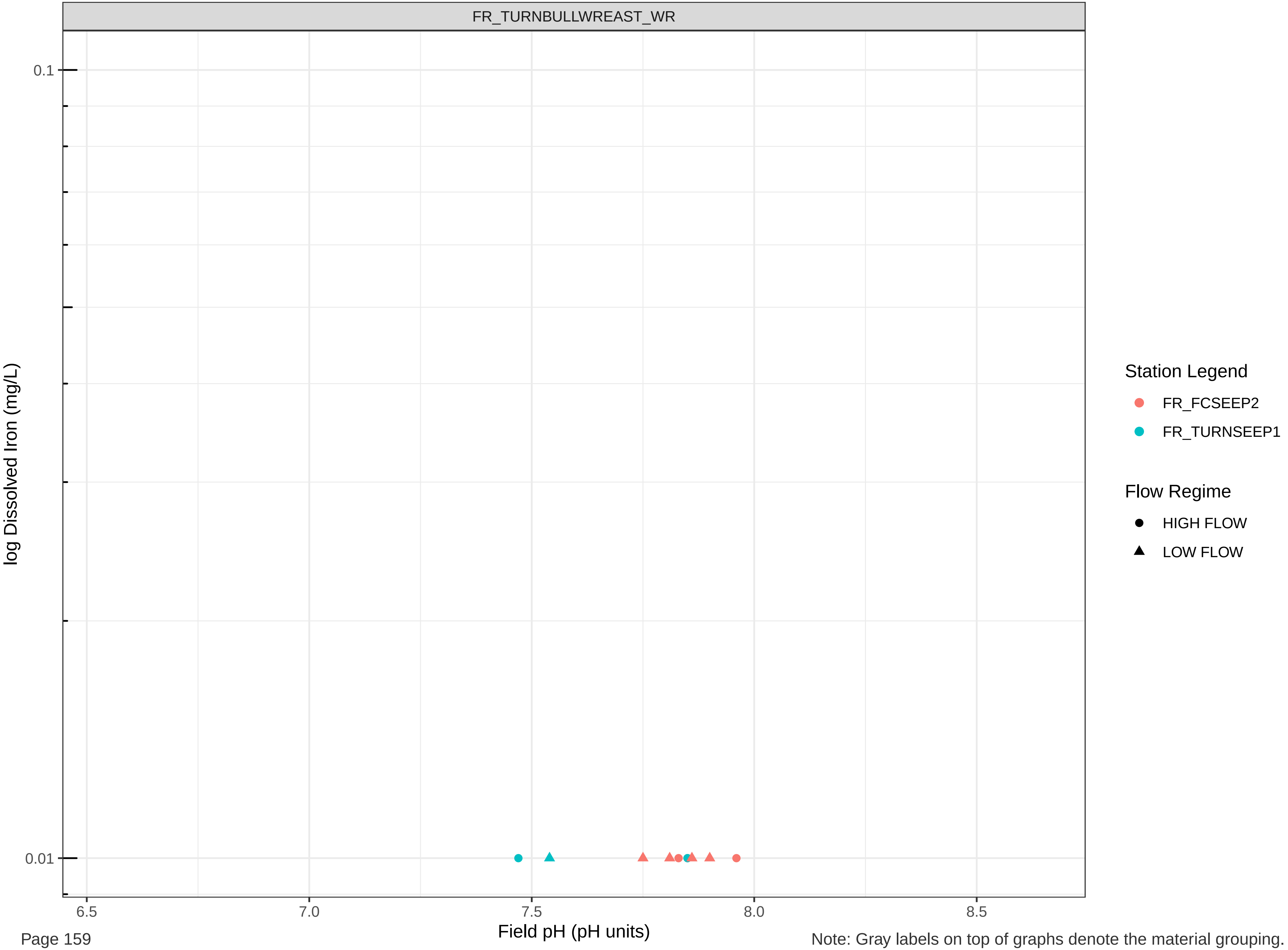

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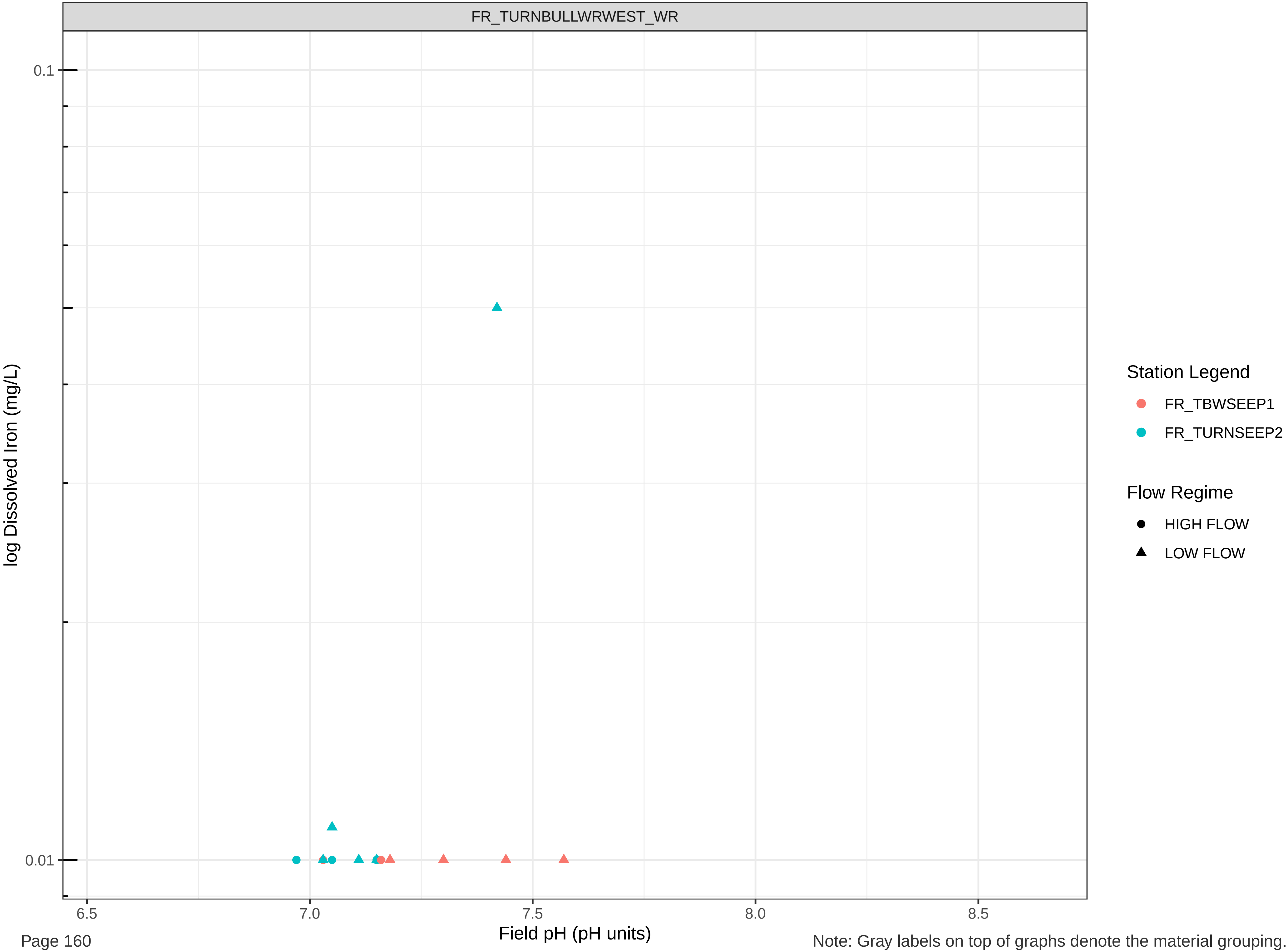

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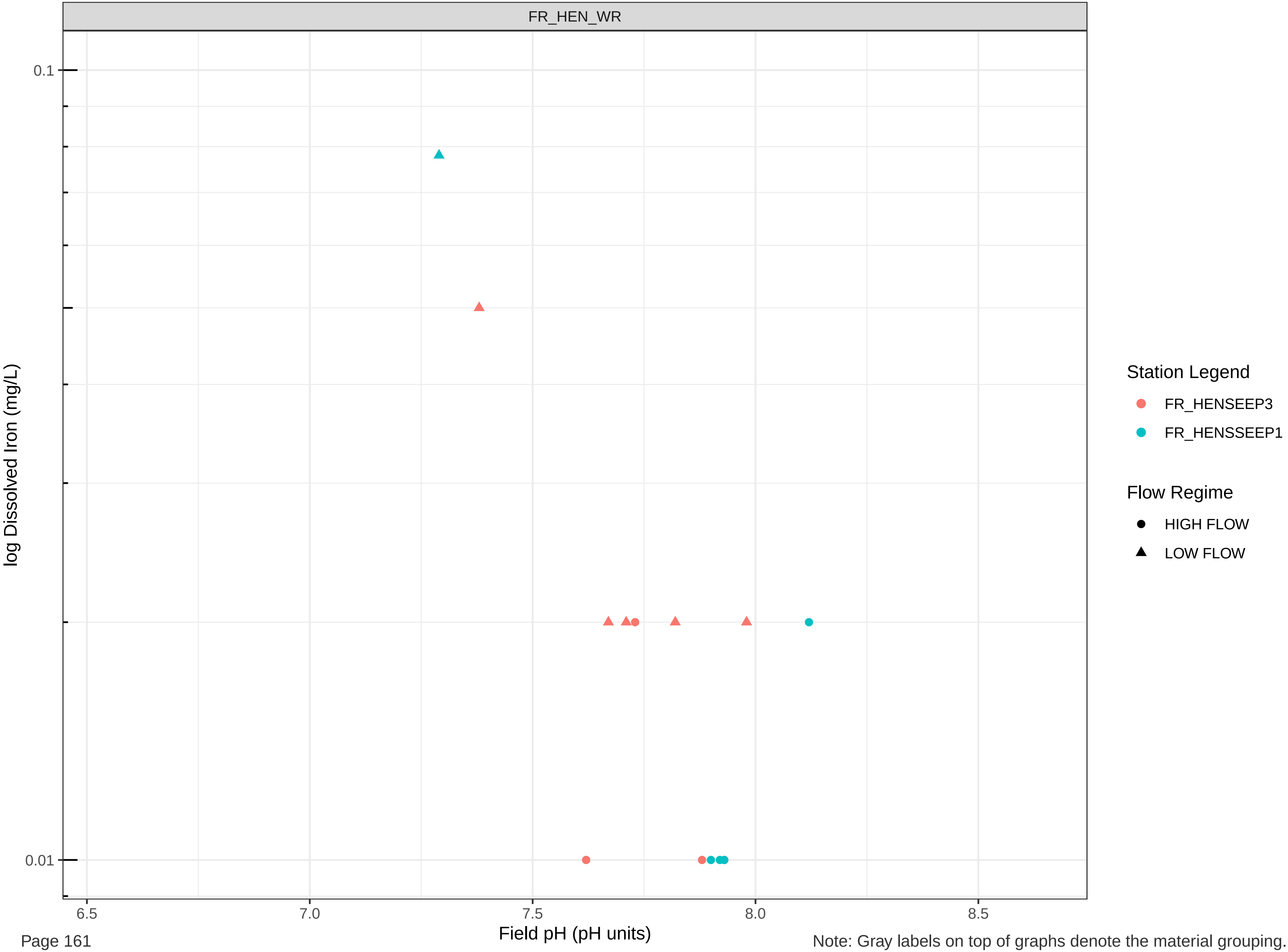

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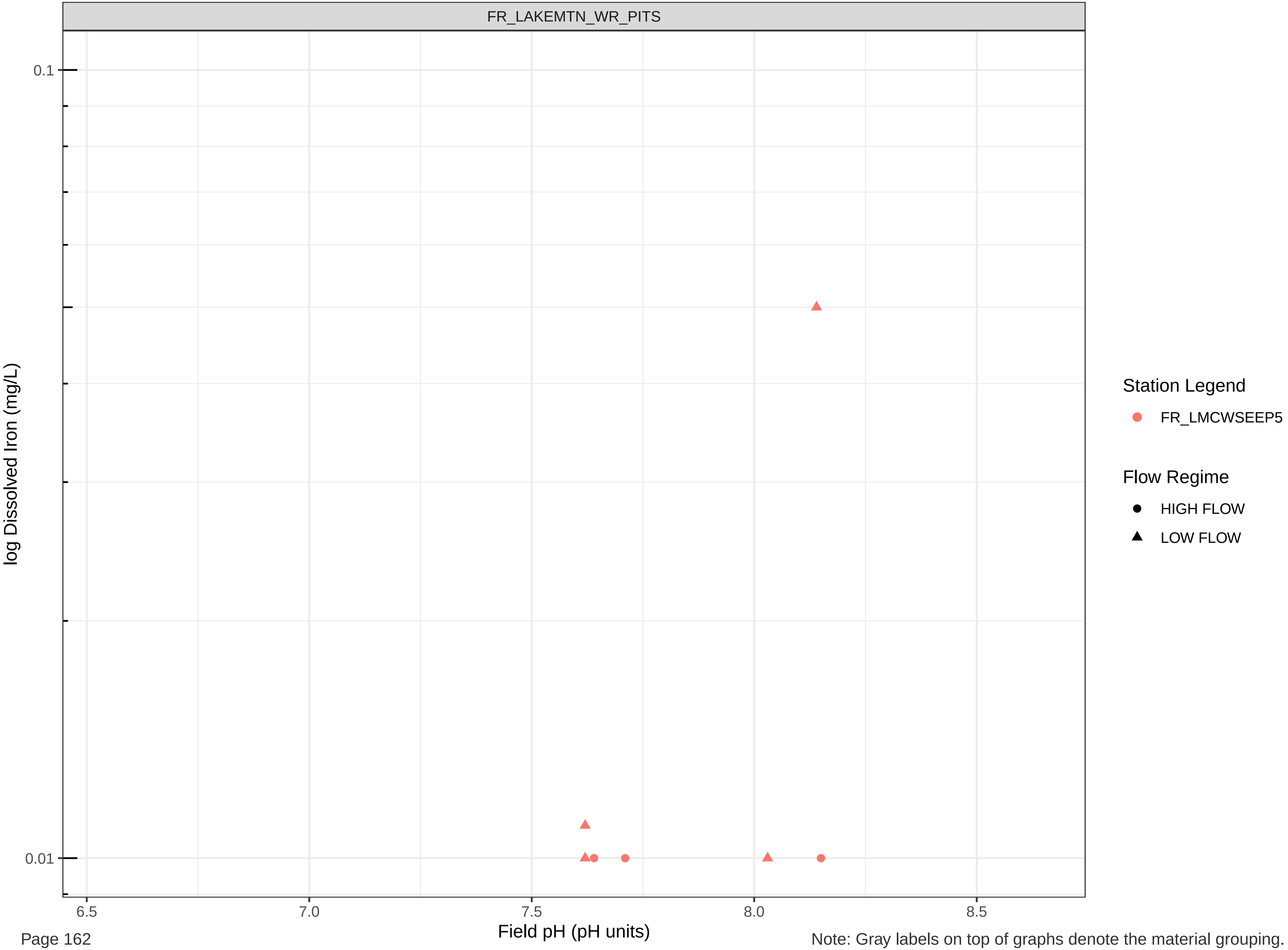

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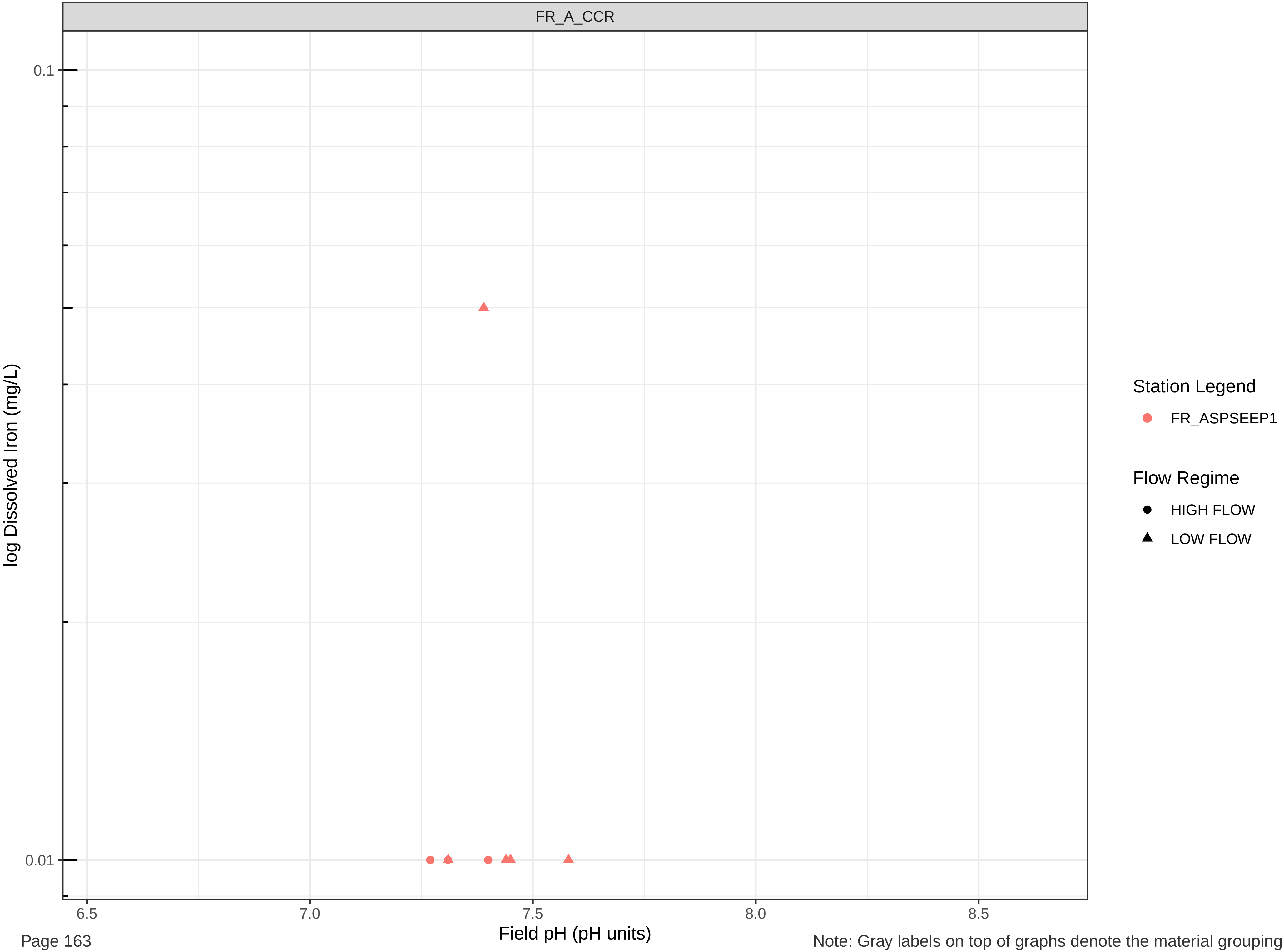

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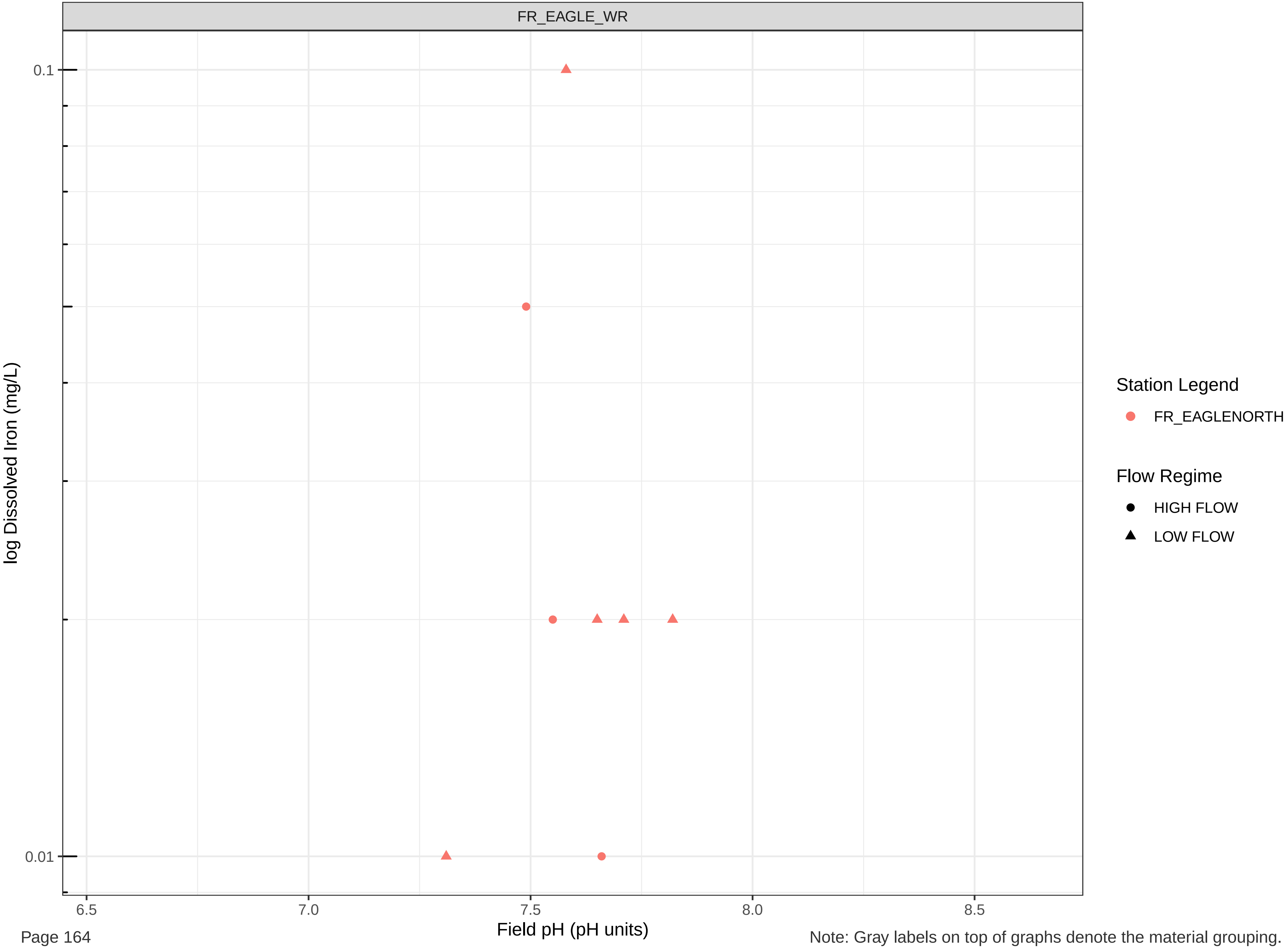

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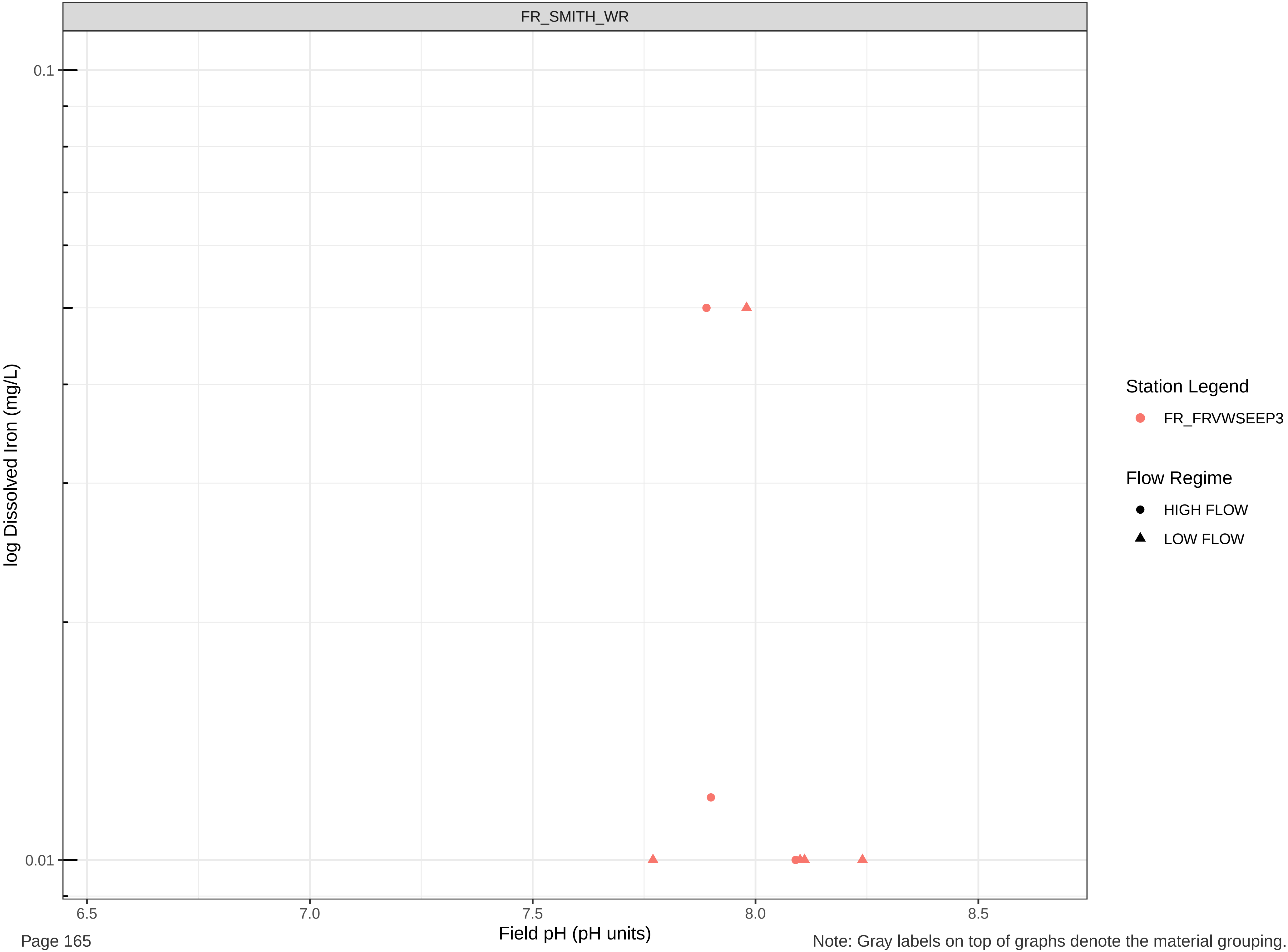

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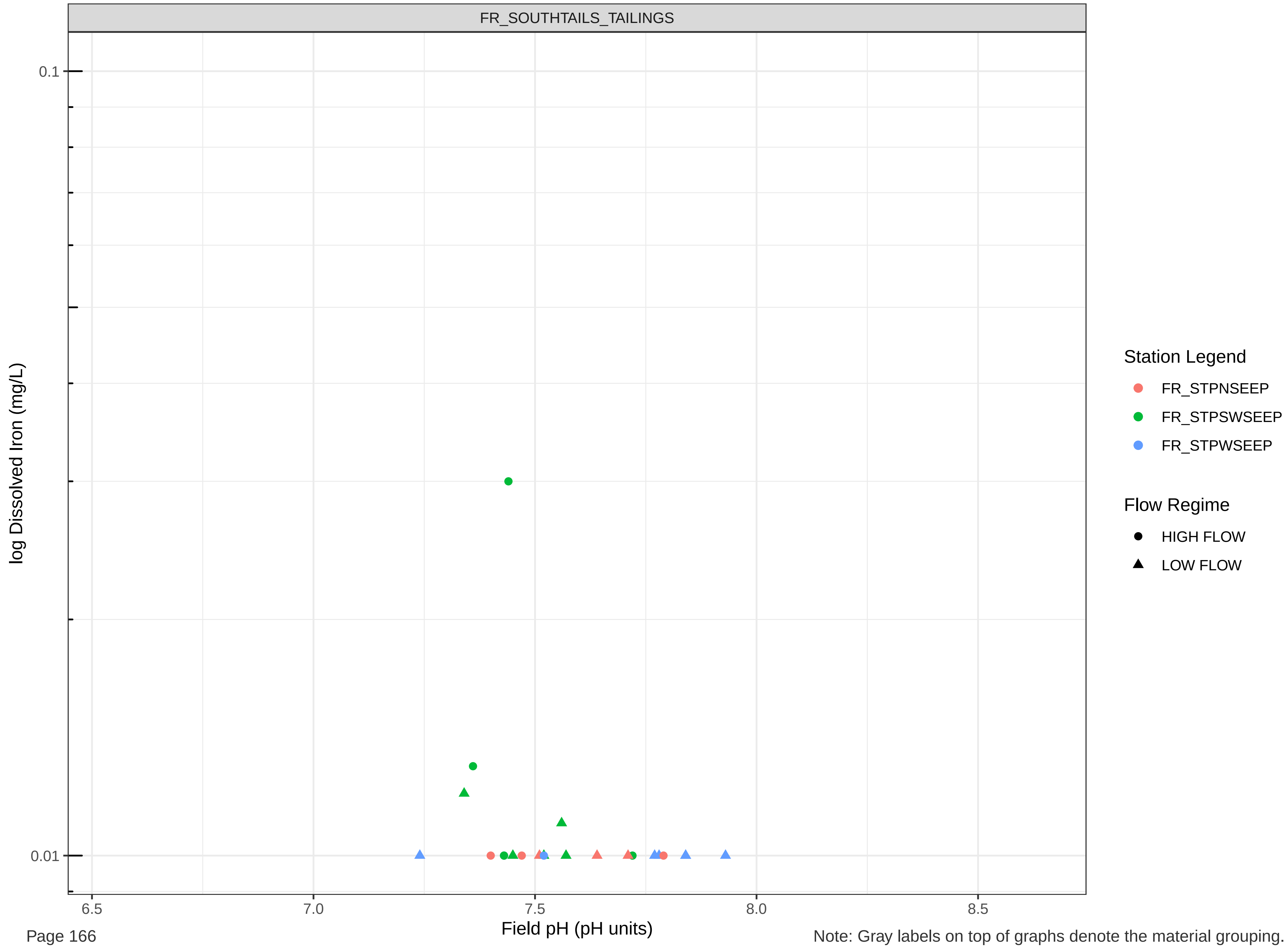

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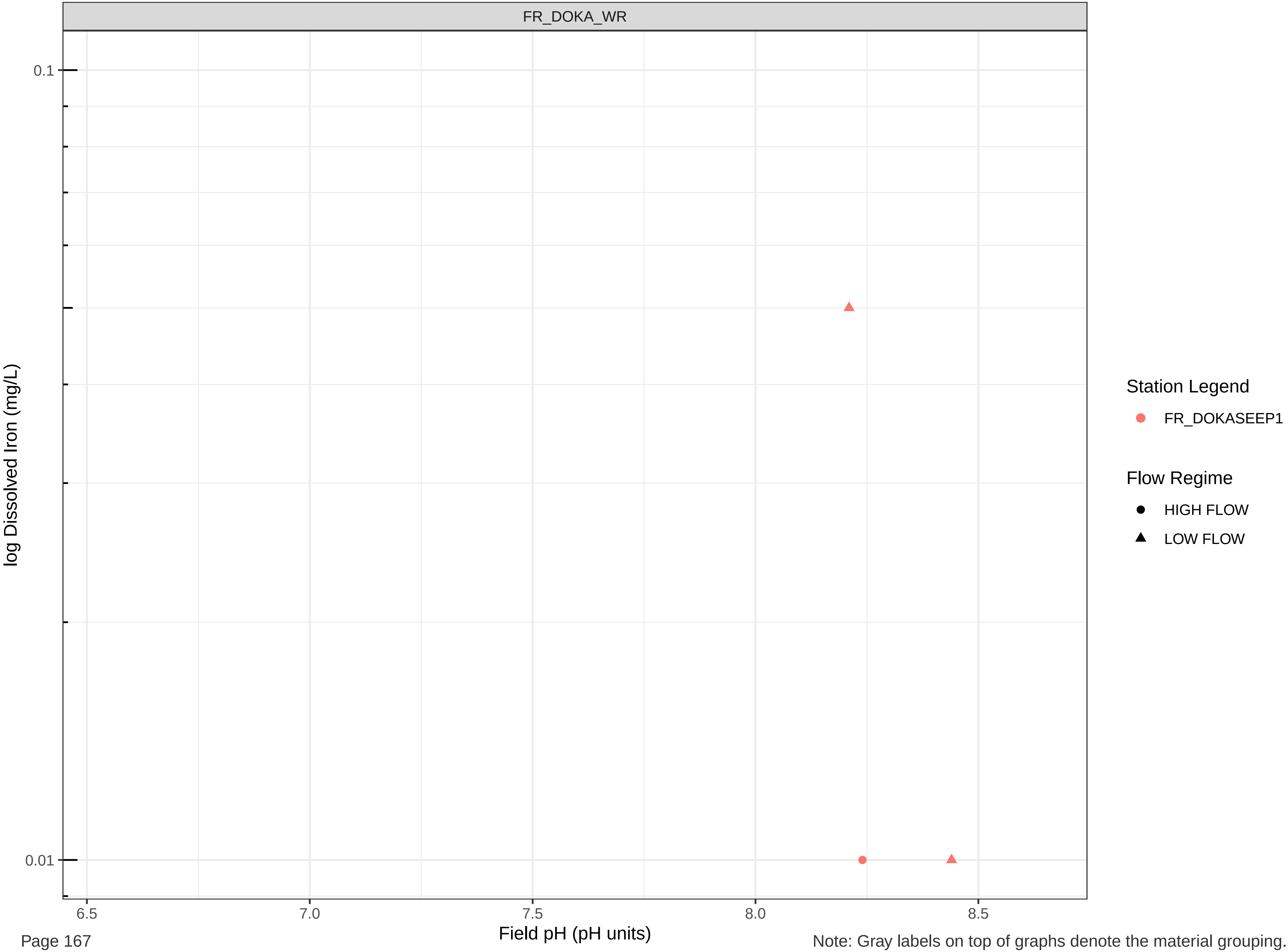

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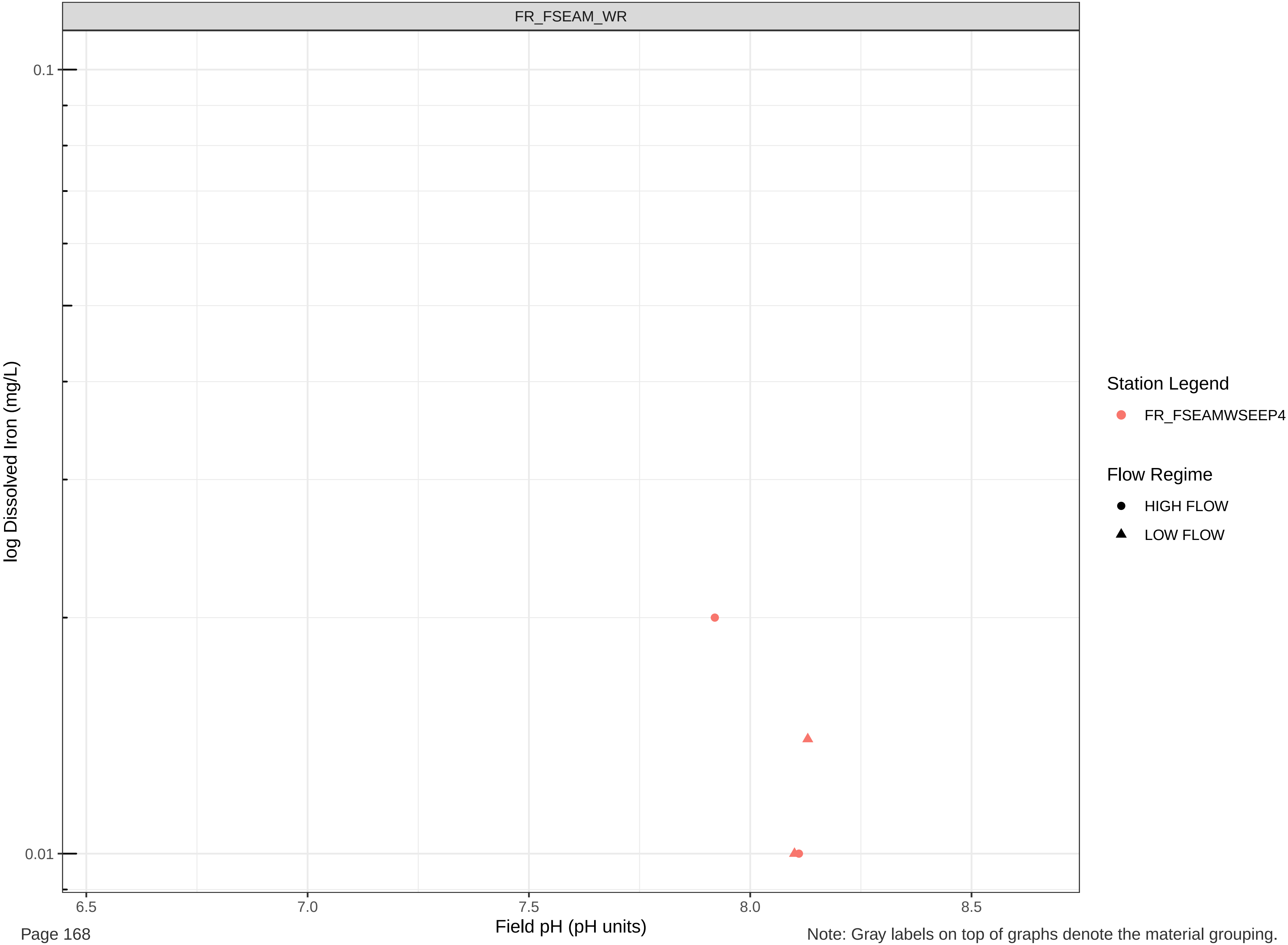

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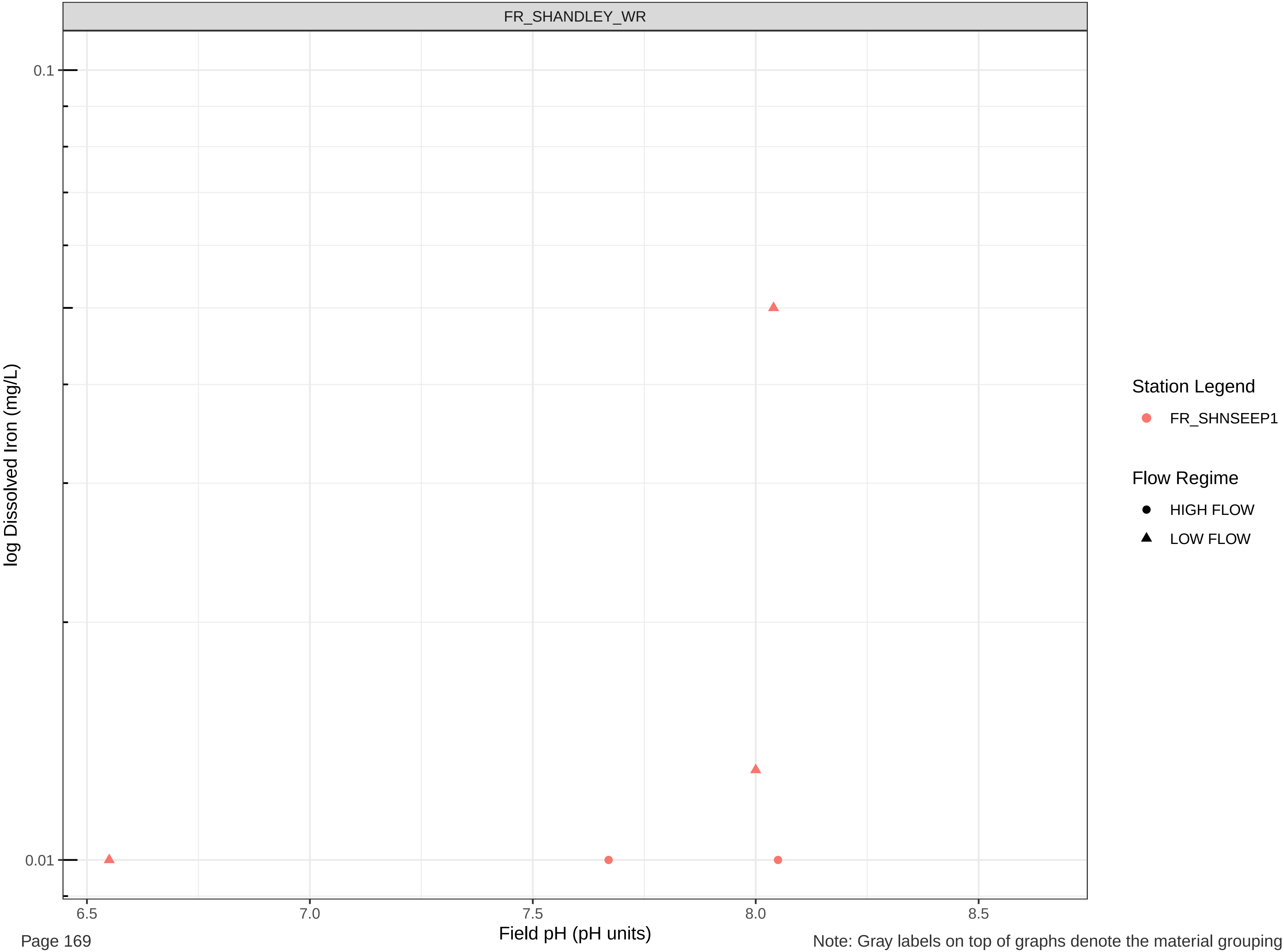

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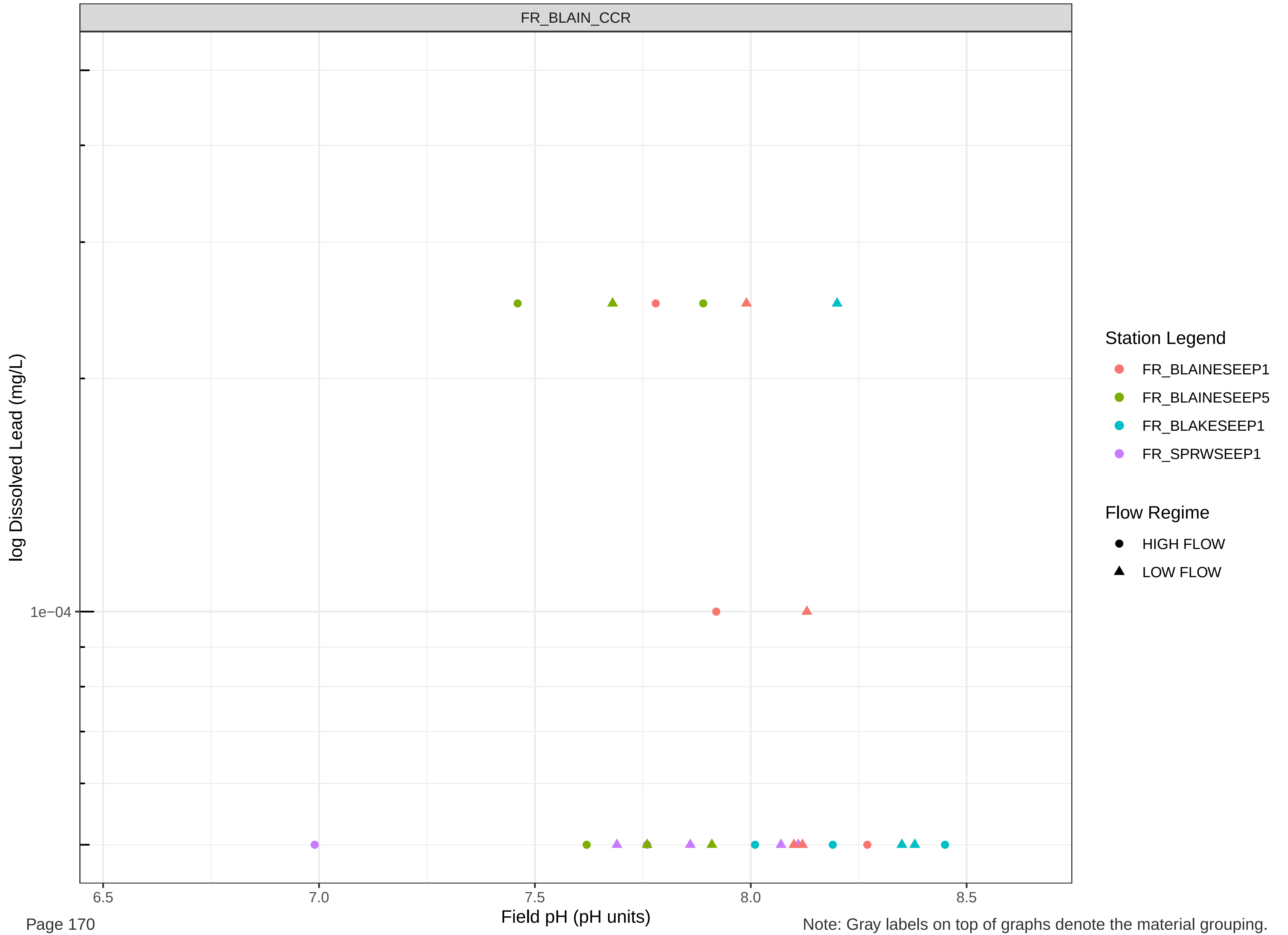

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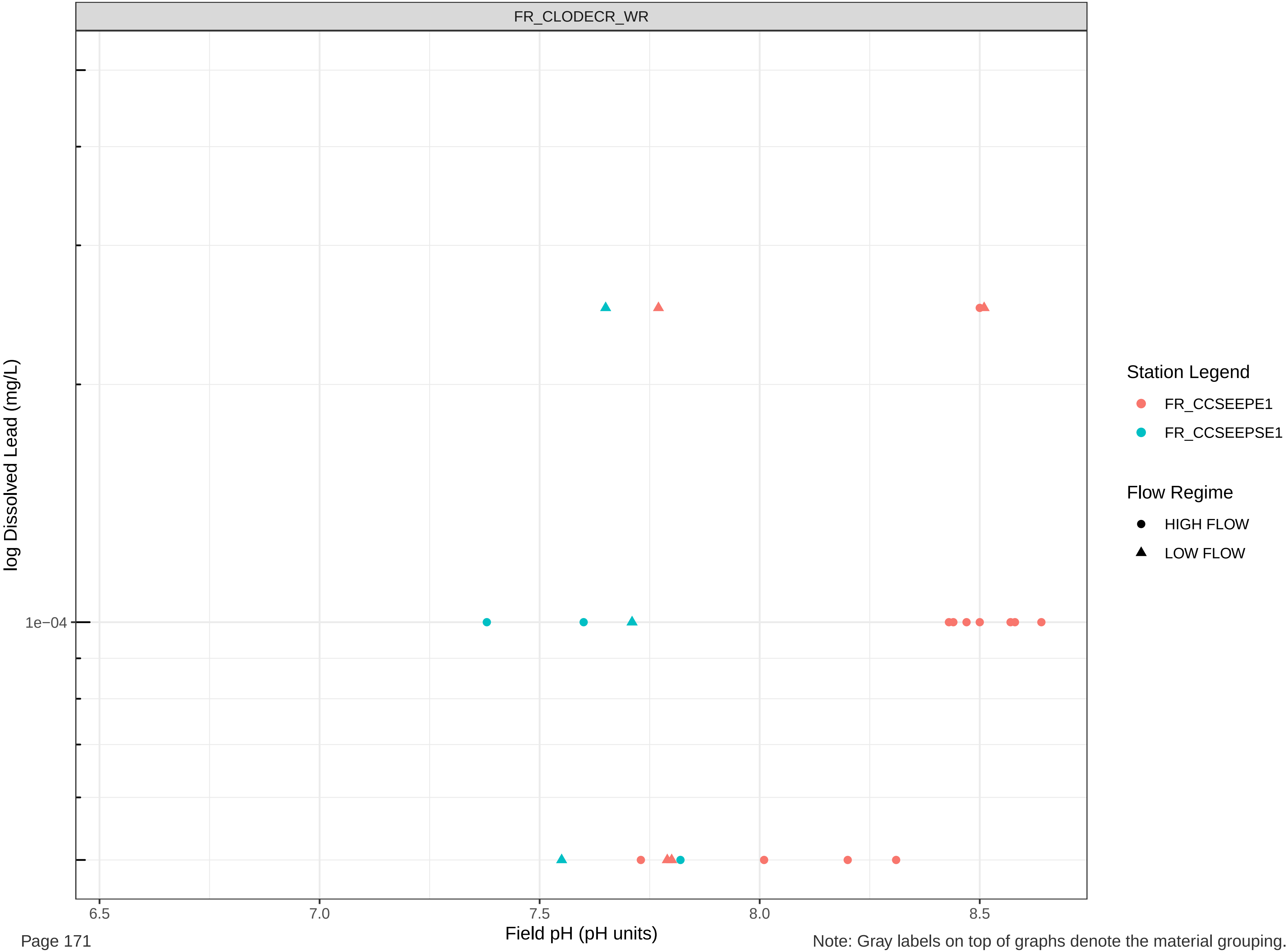

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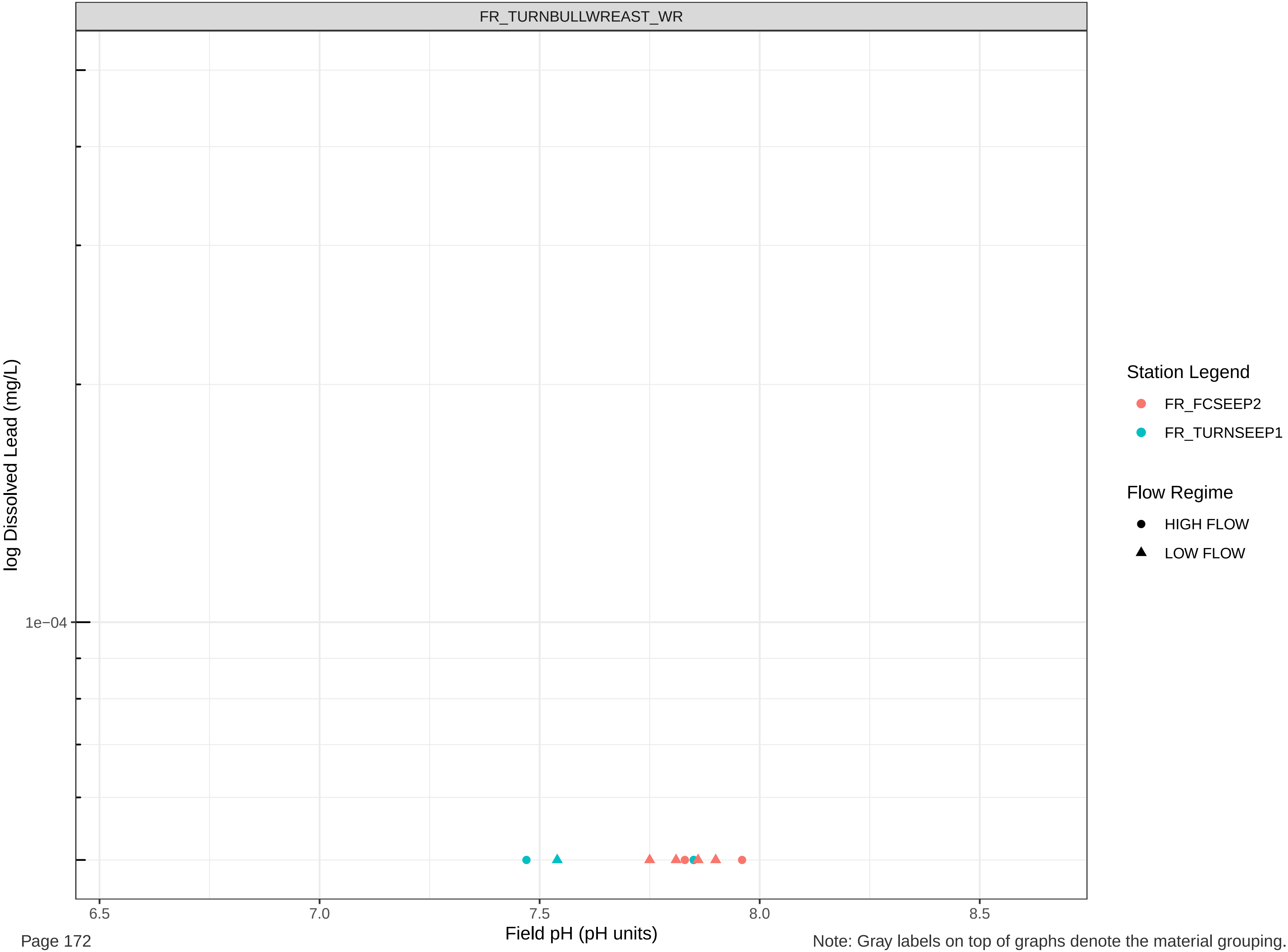

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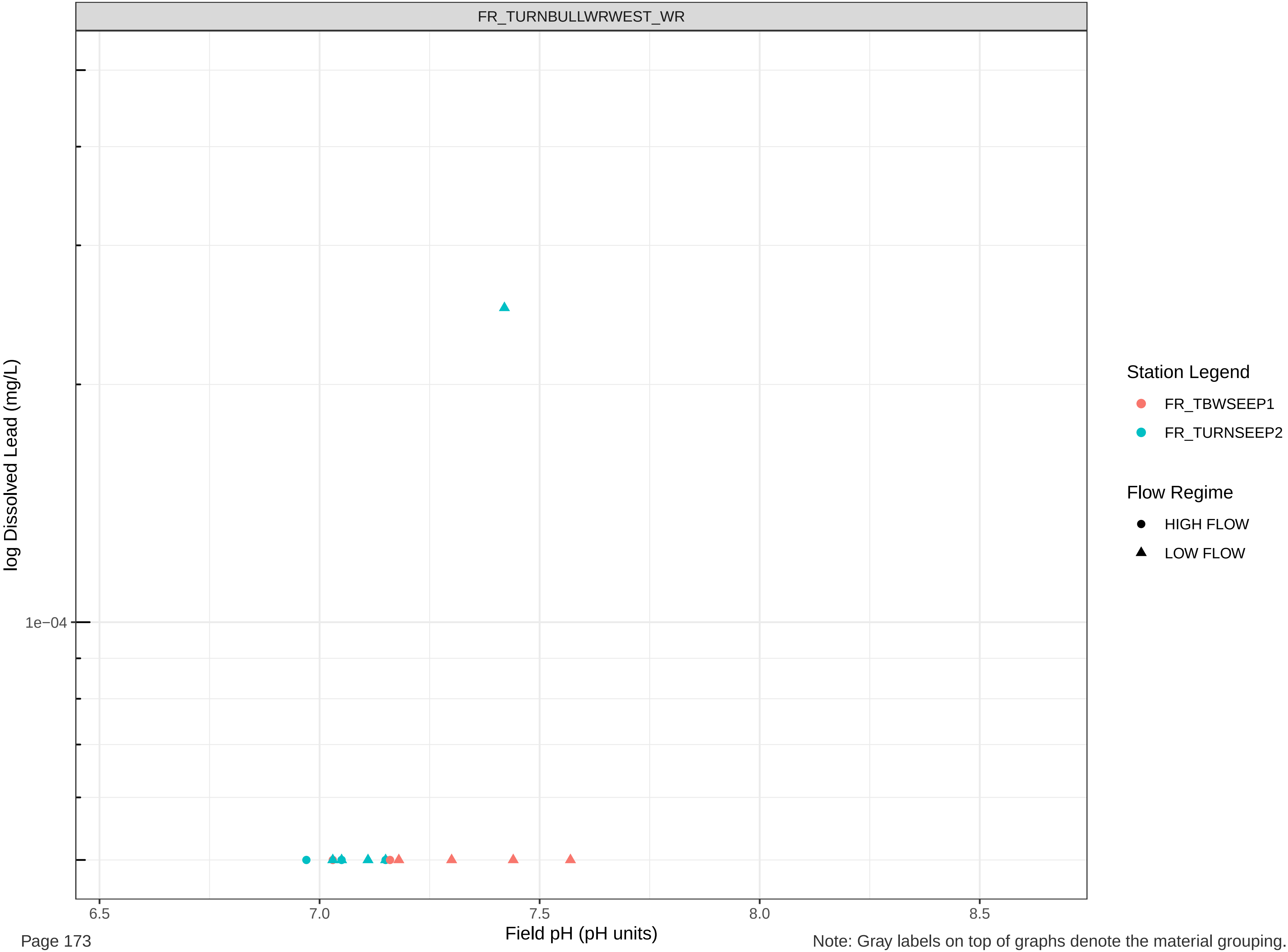

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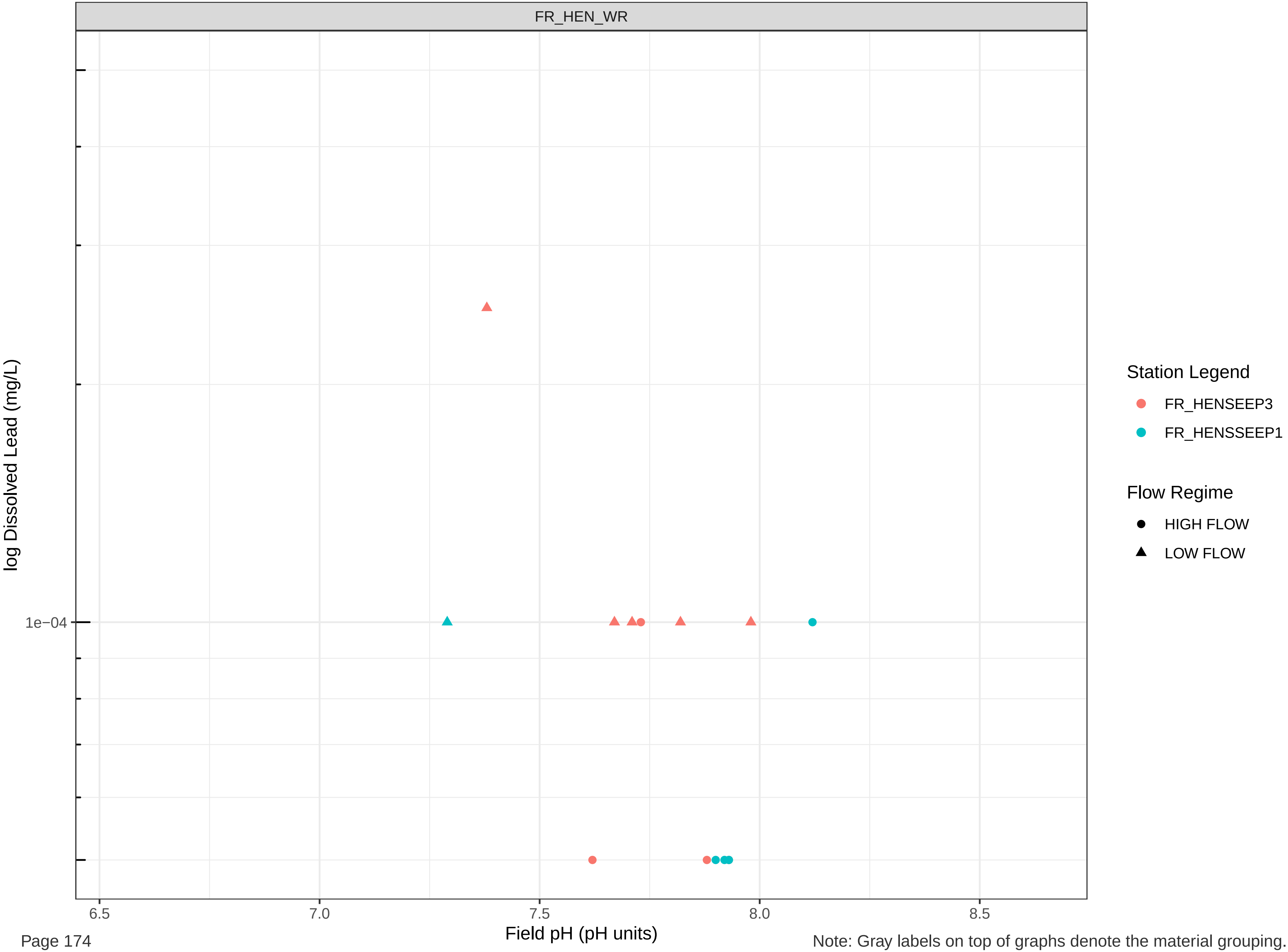

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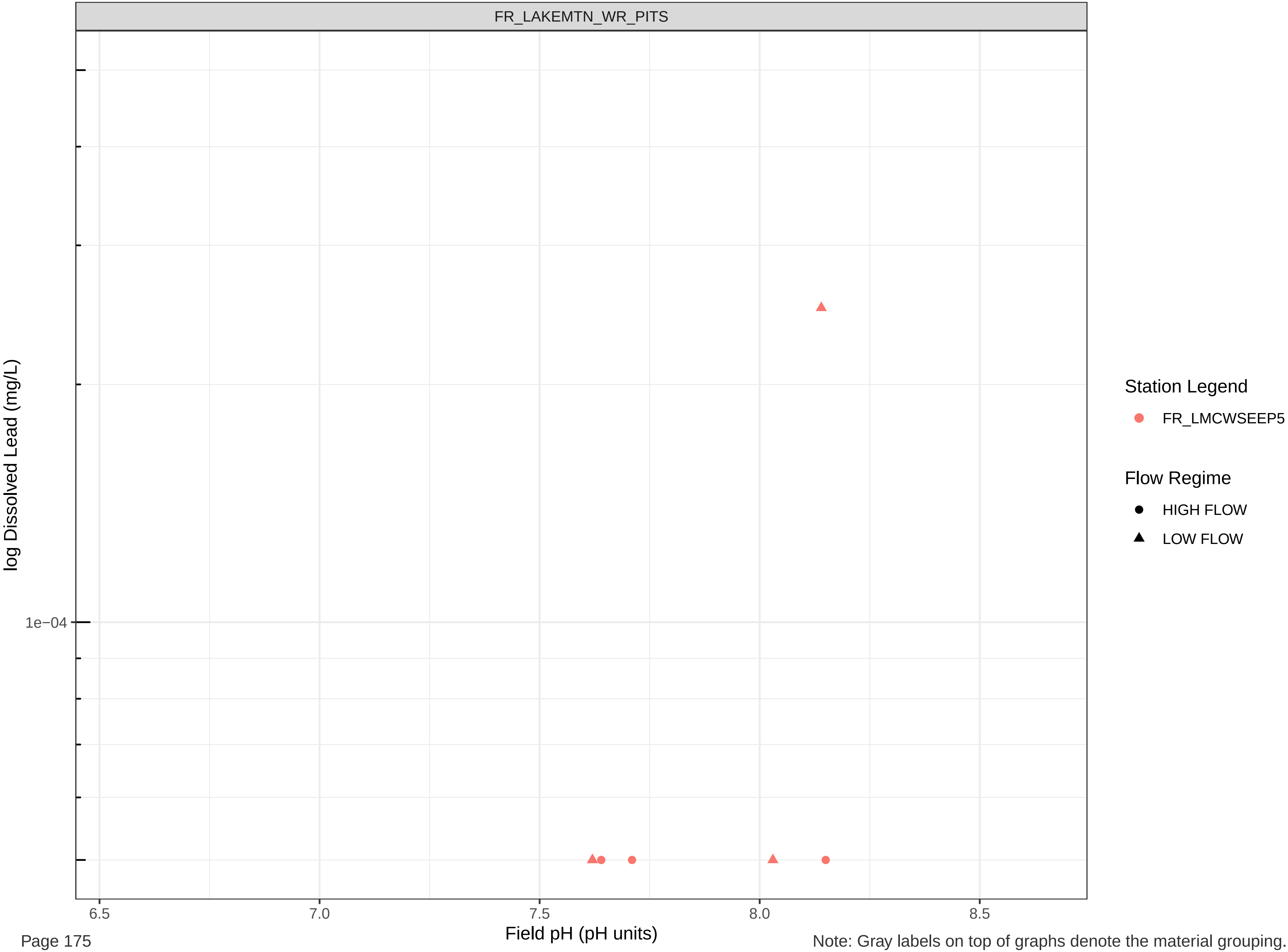
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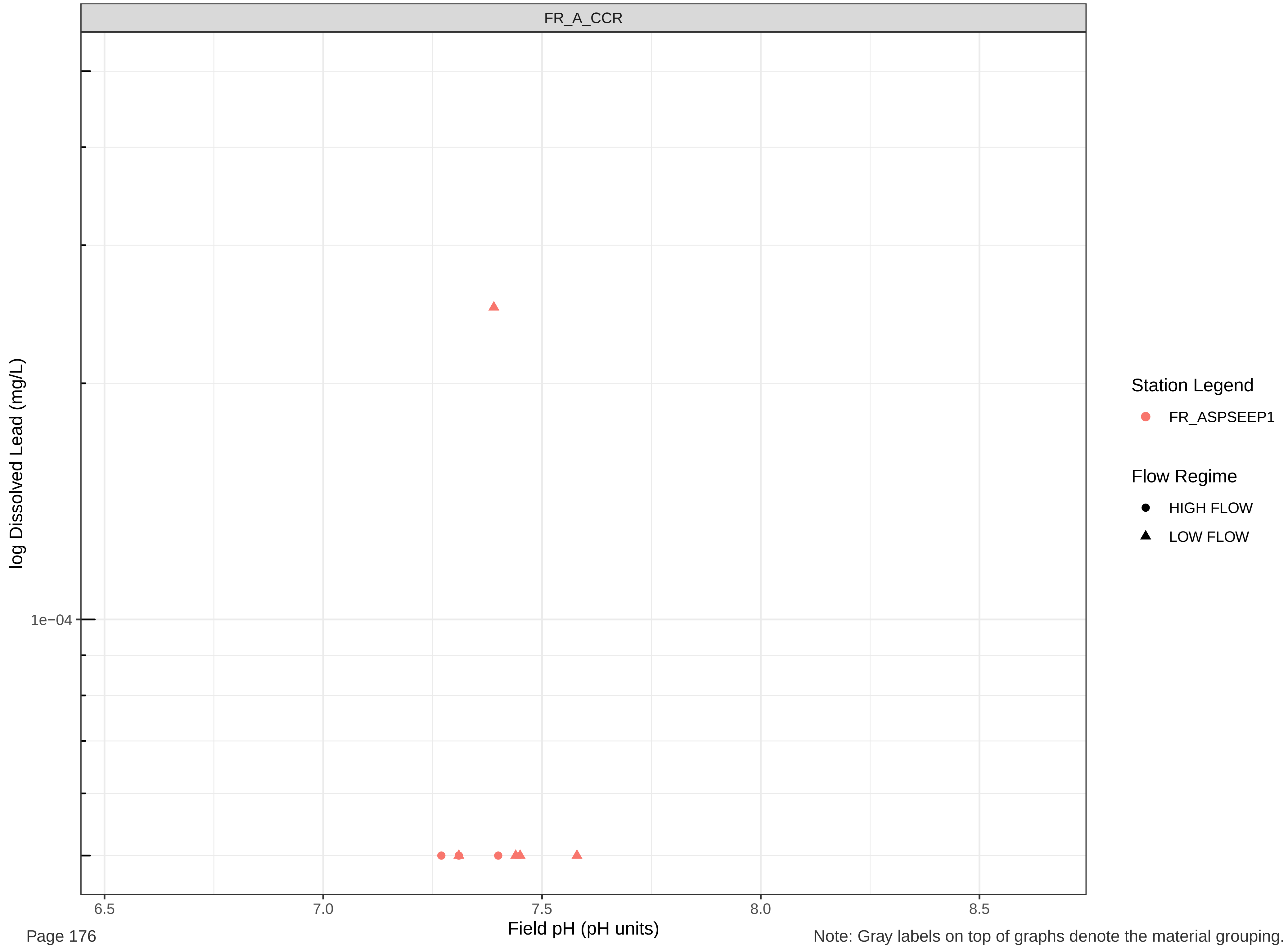

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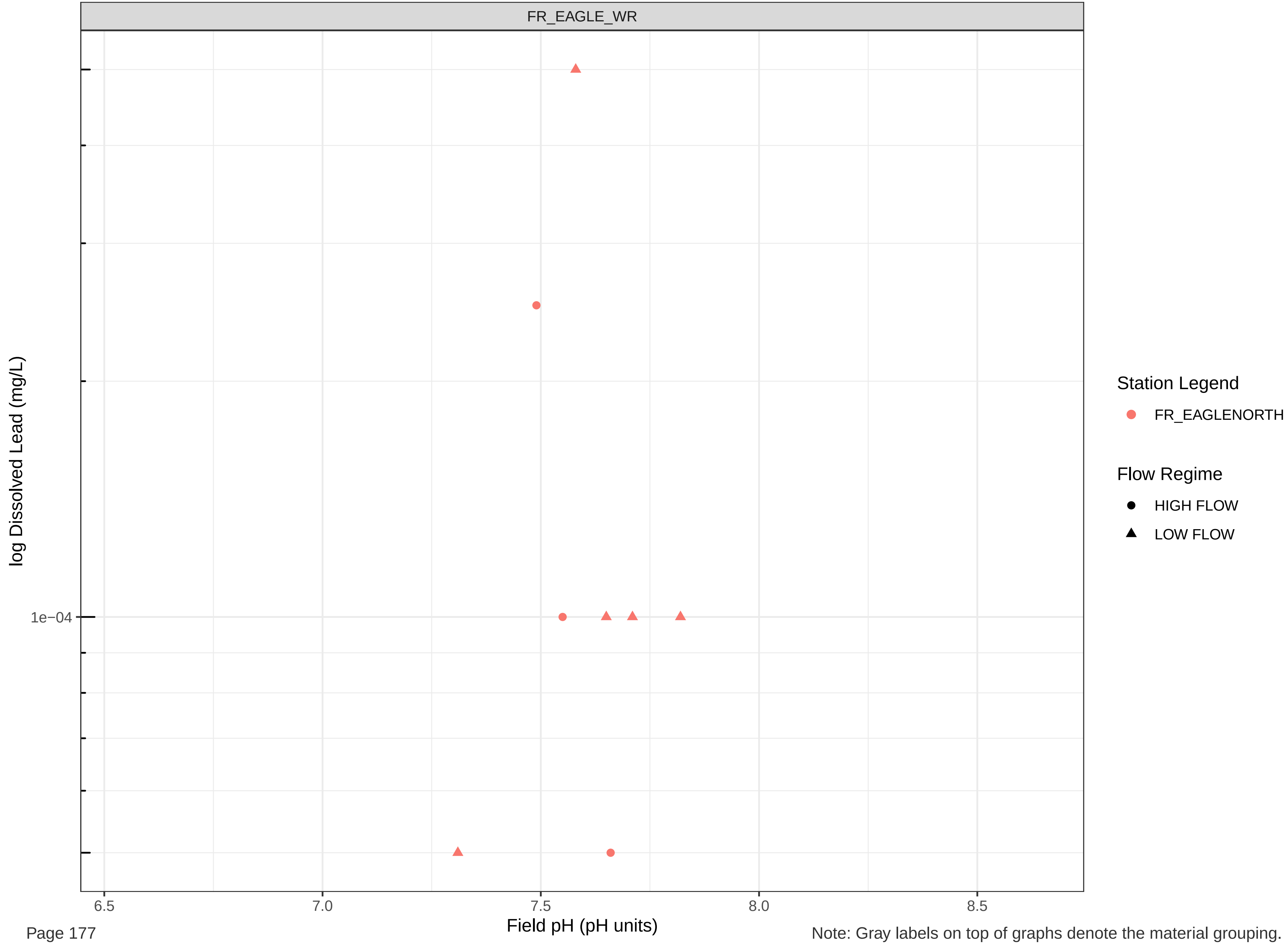

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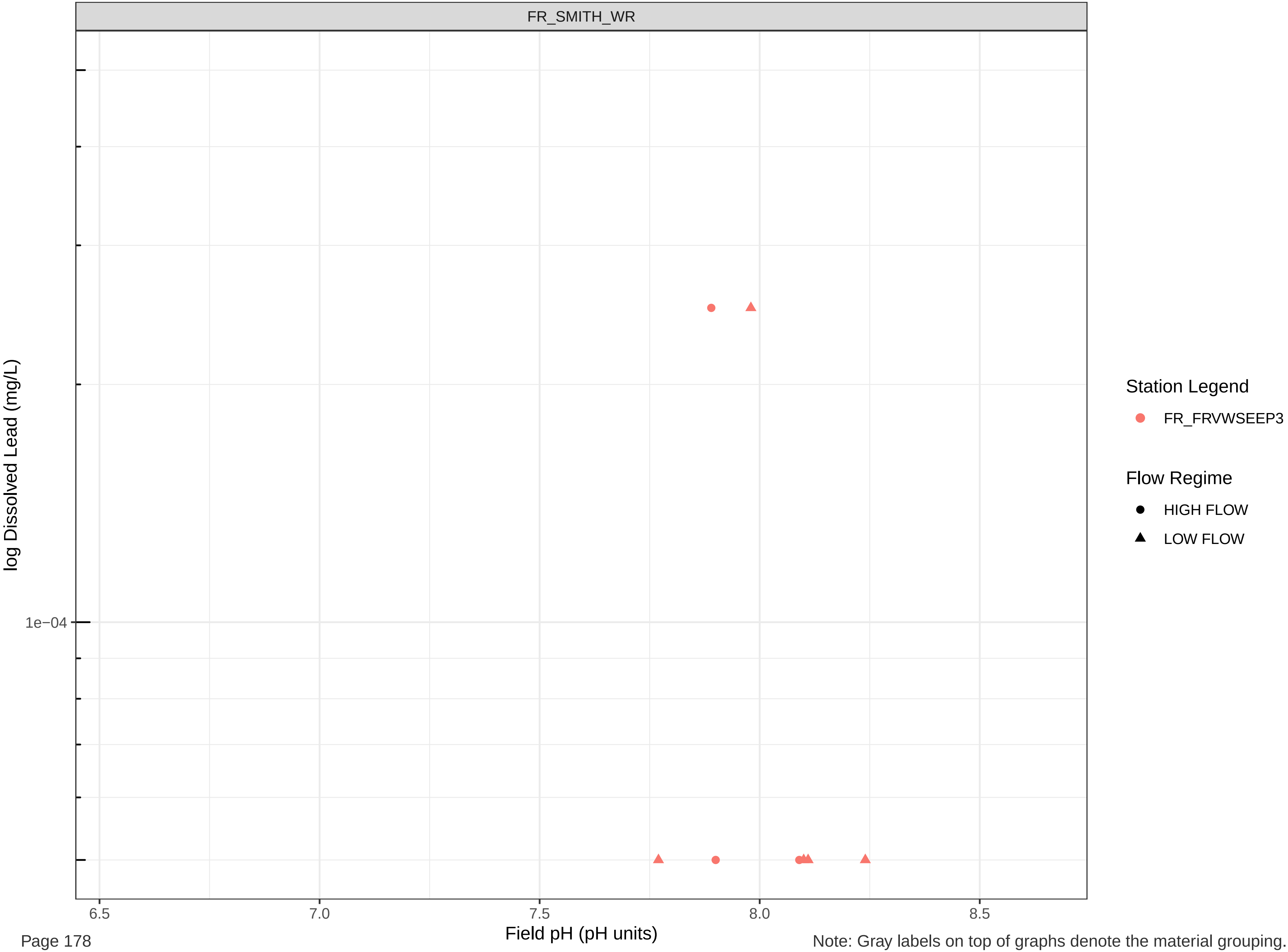

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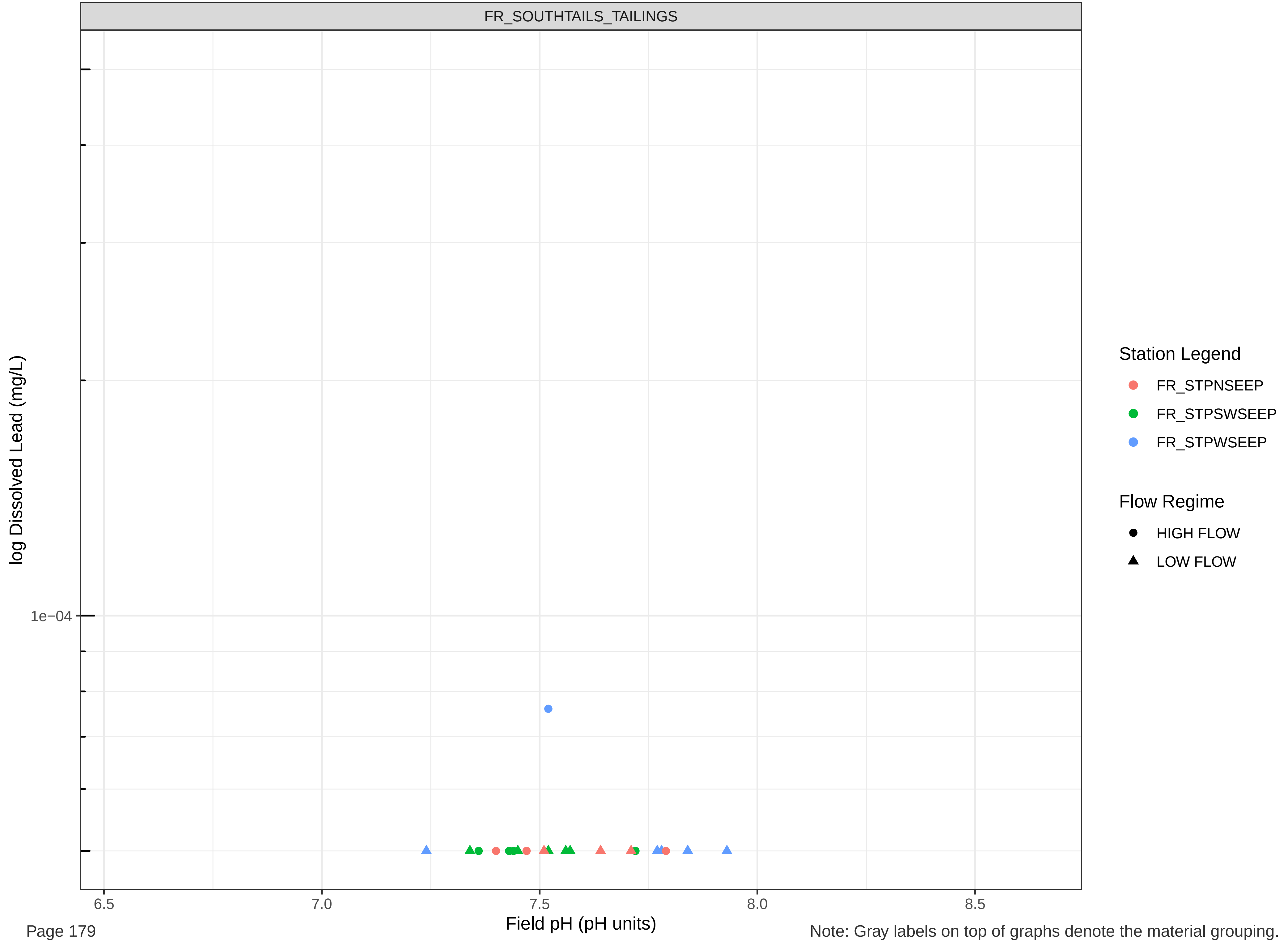

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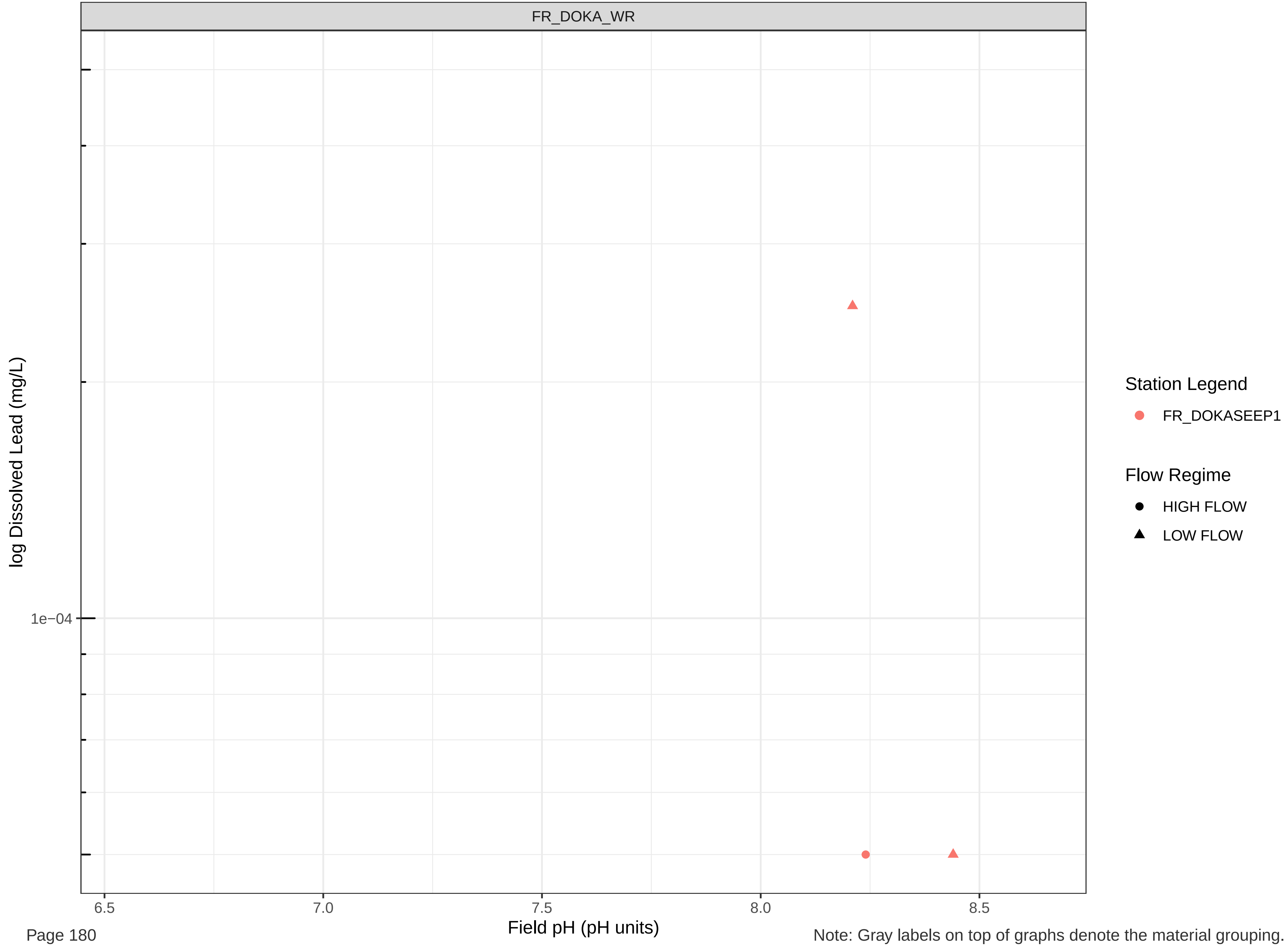

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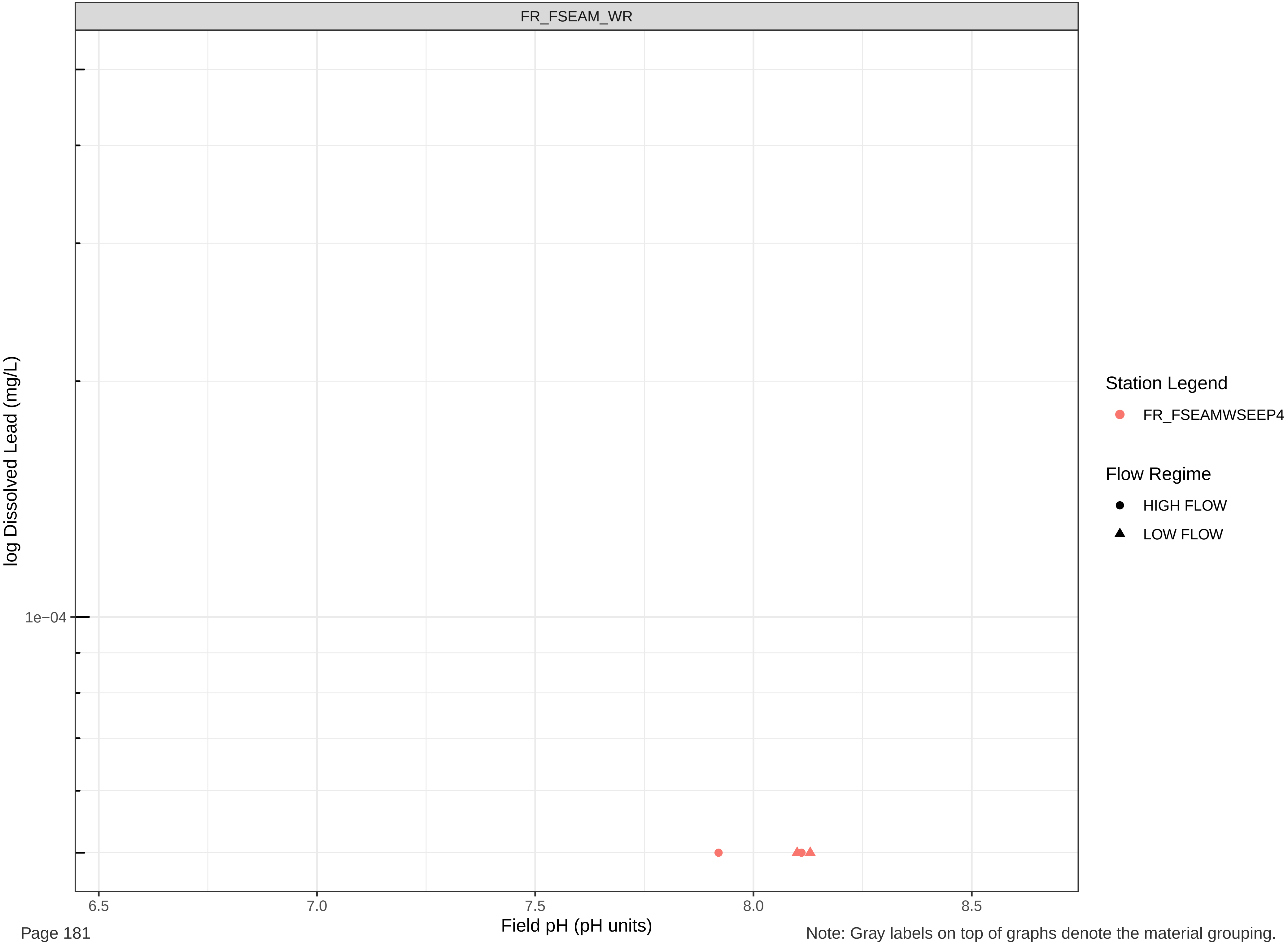

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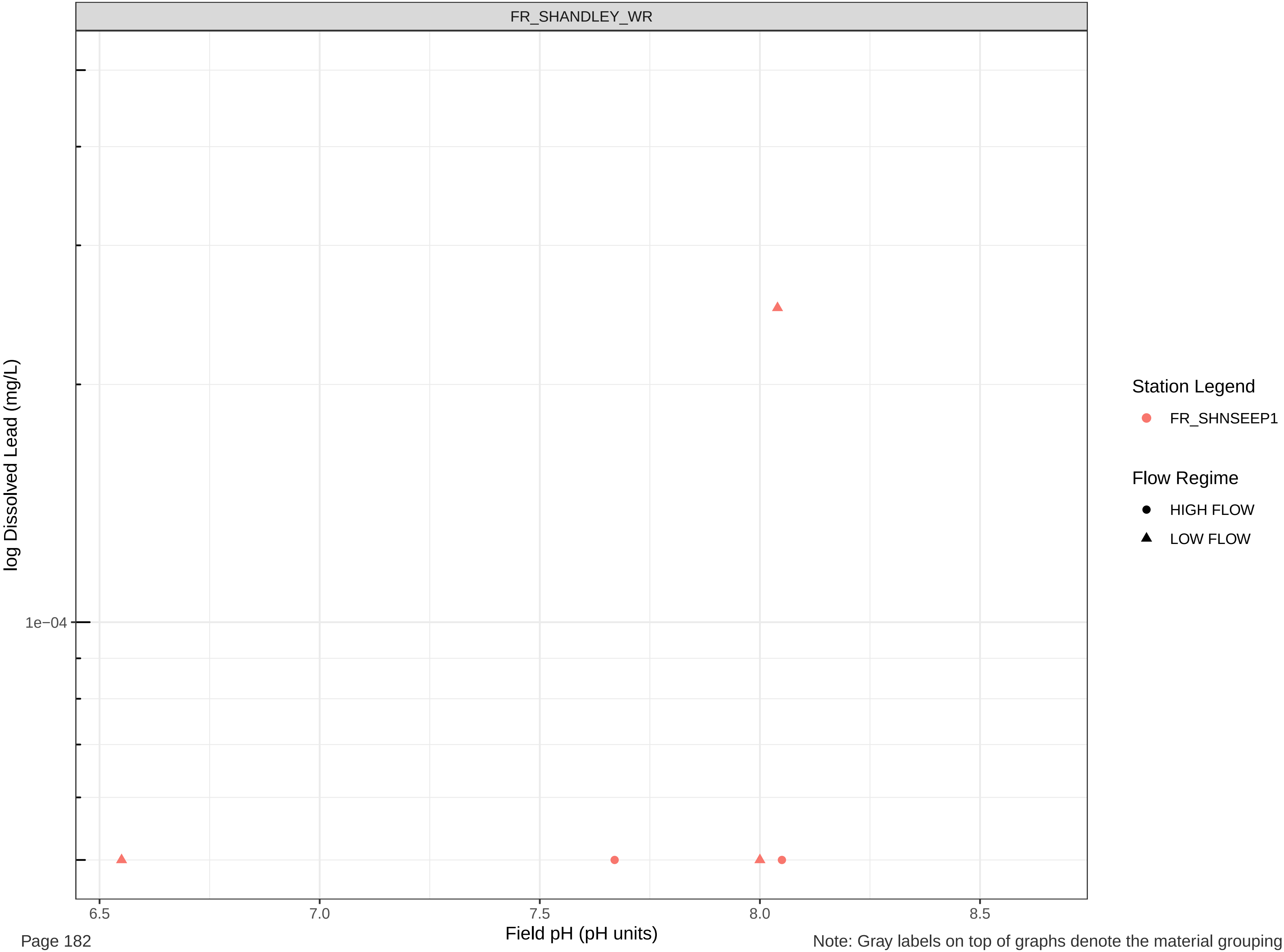

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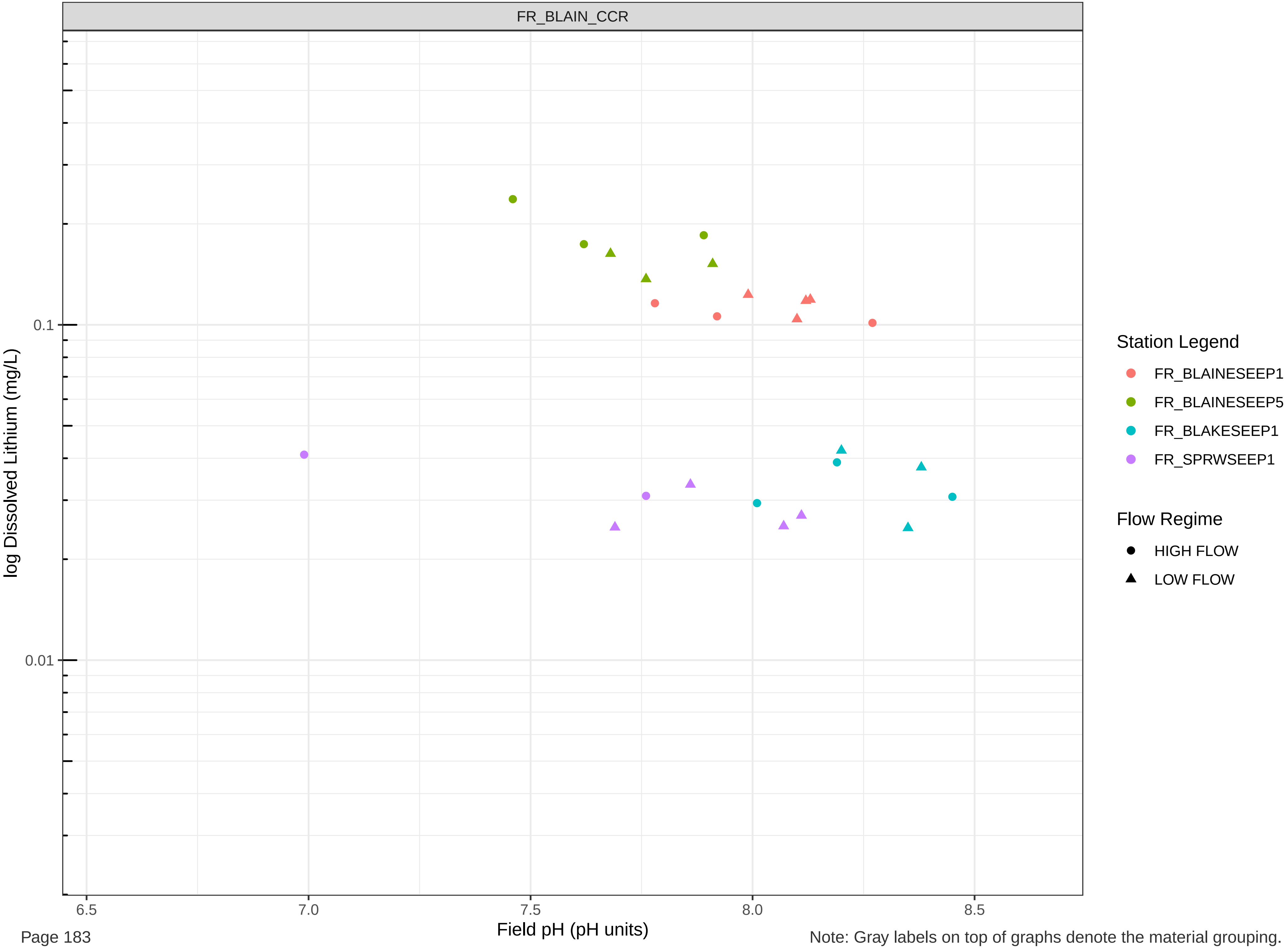
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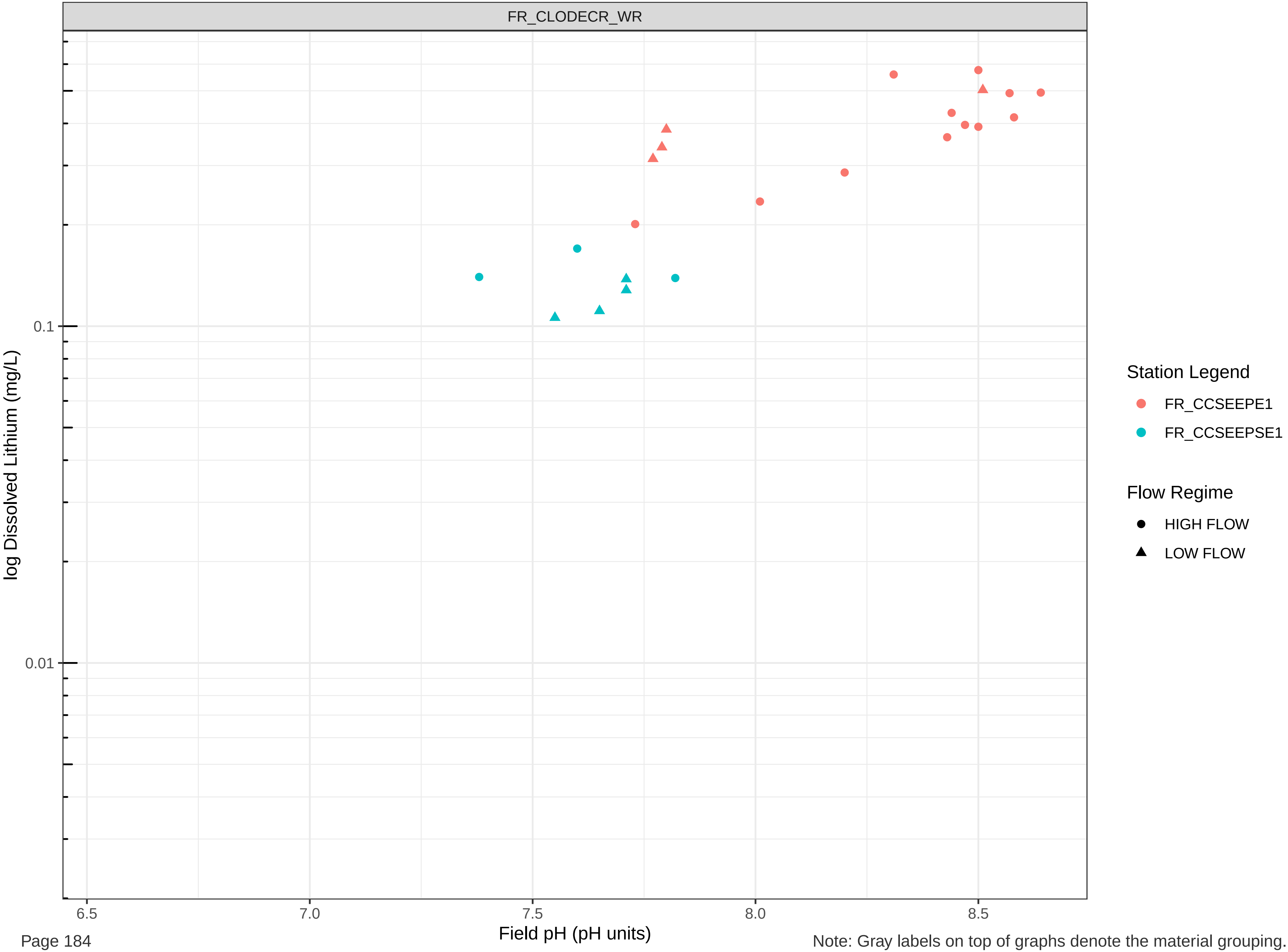
log Dissolved Lithium (mg/L)
0.1
0.01
6.5
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



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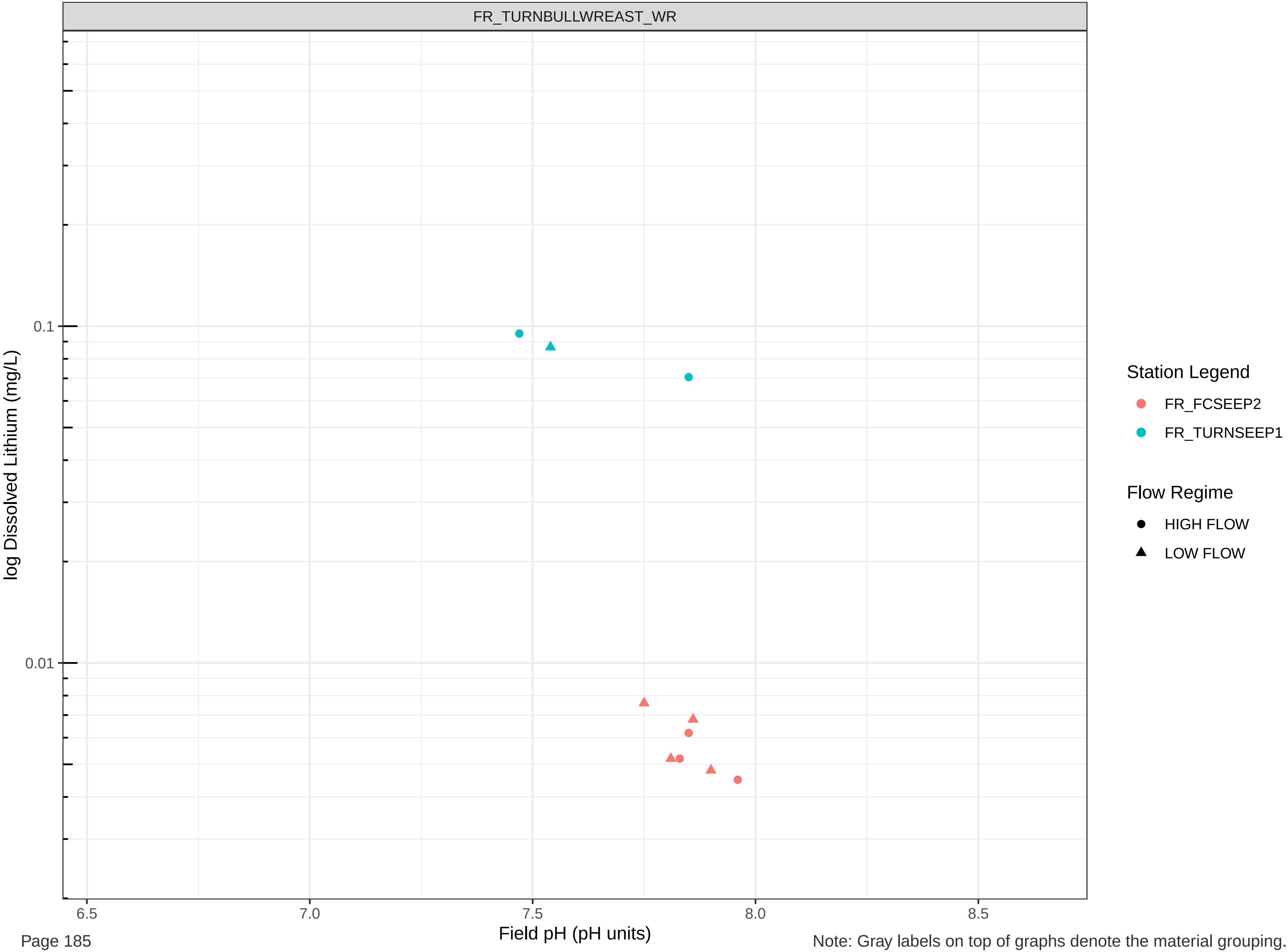

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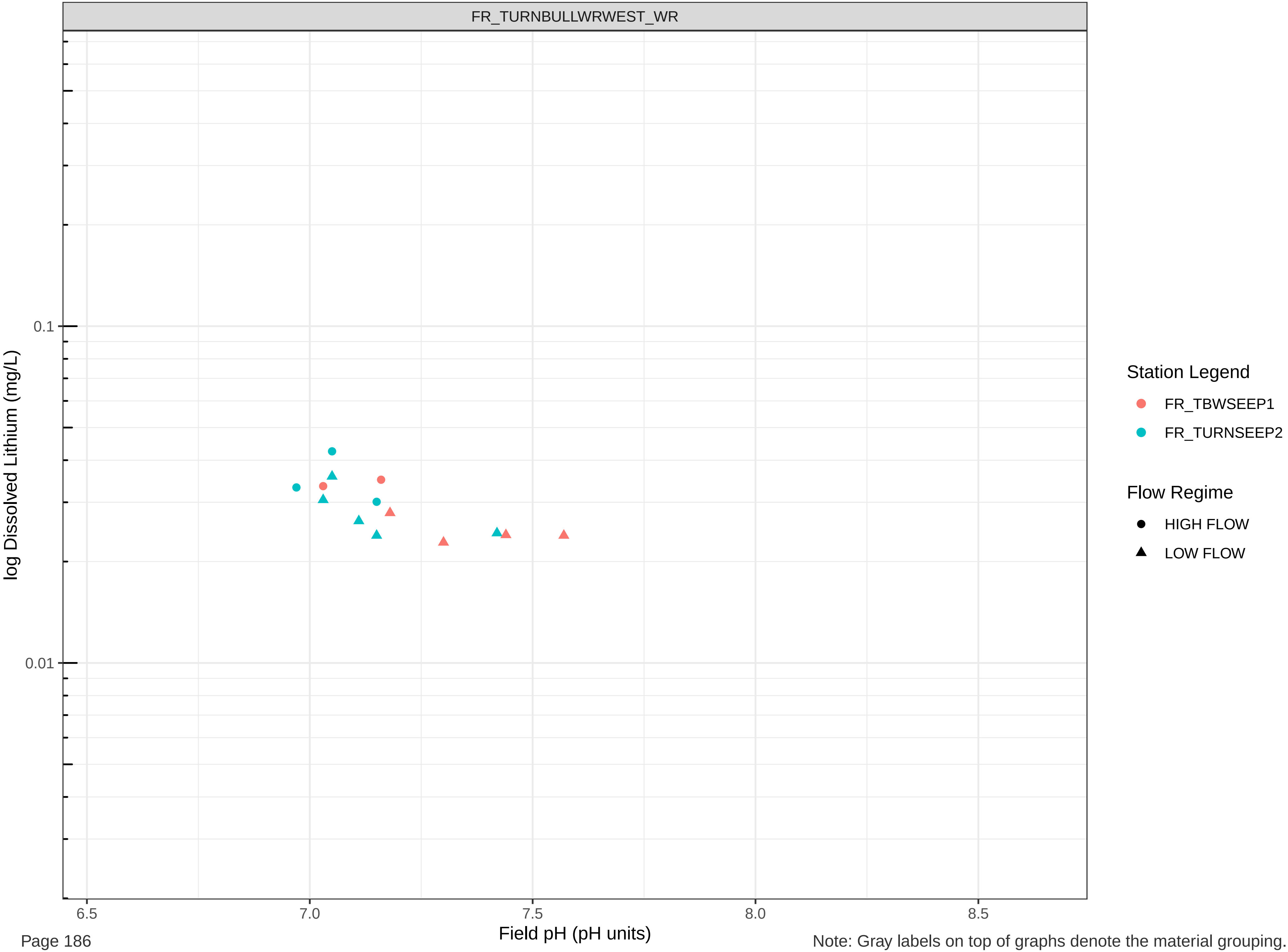

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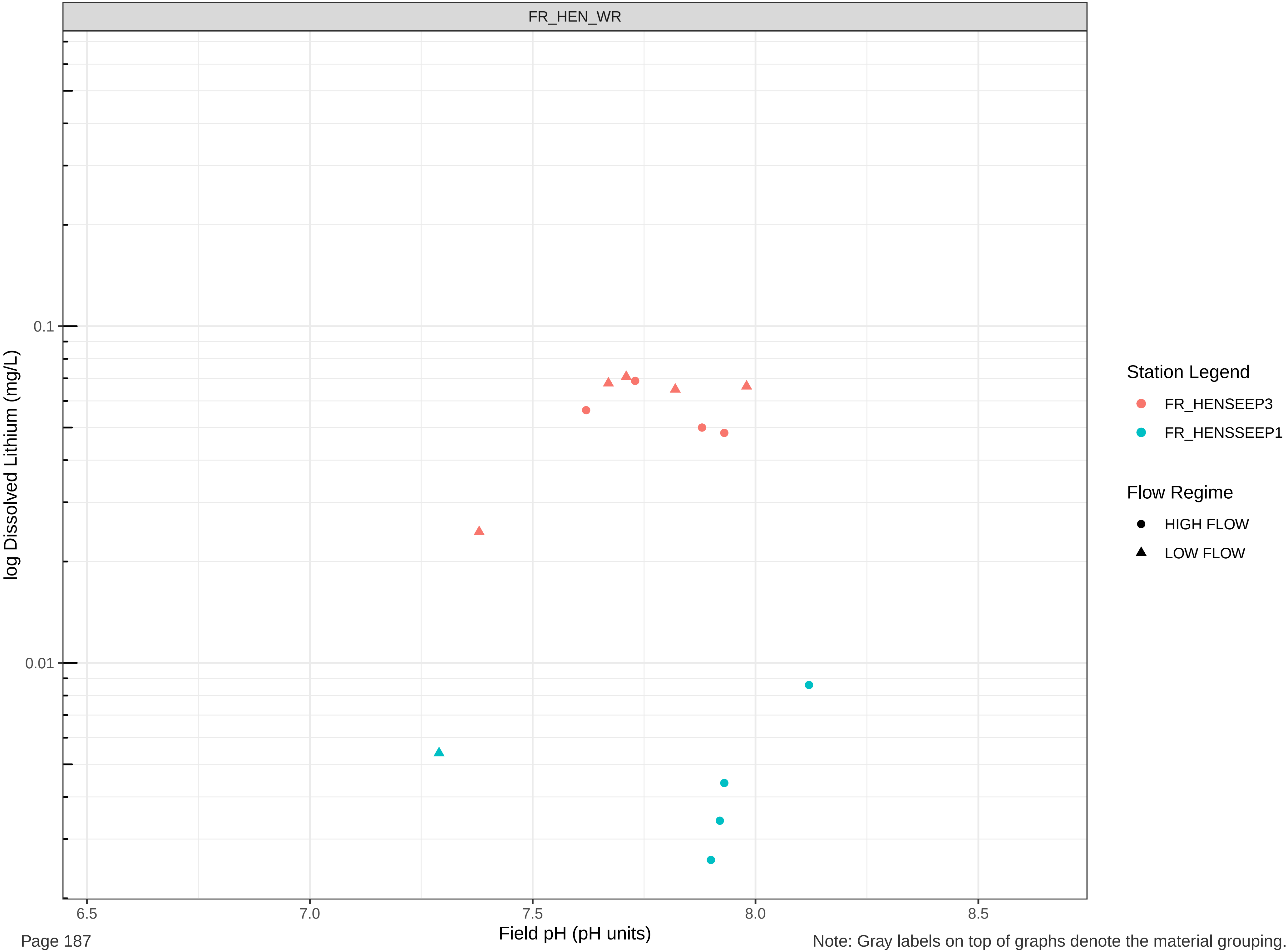

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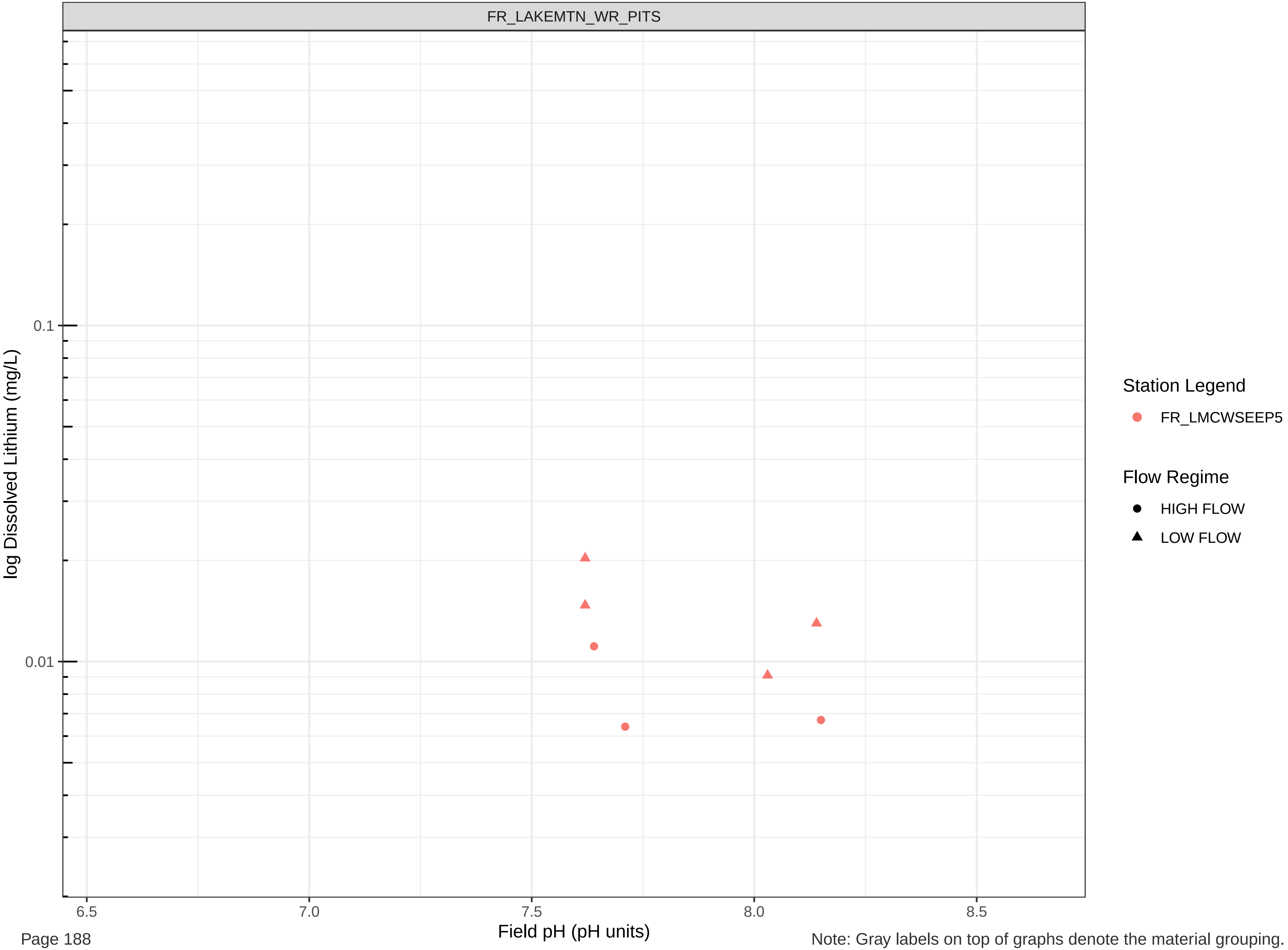

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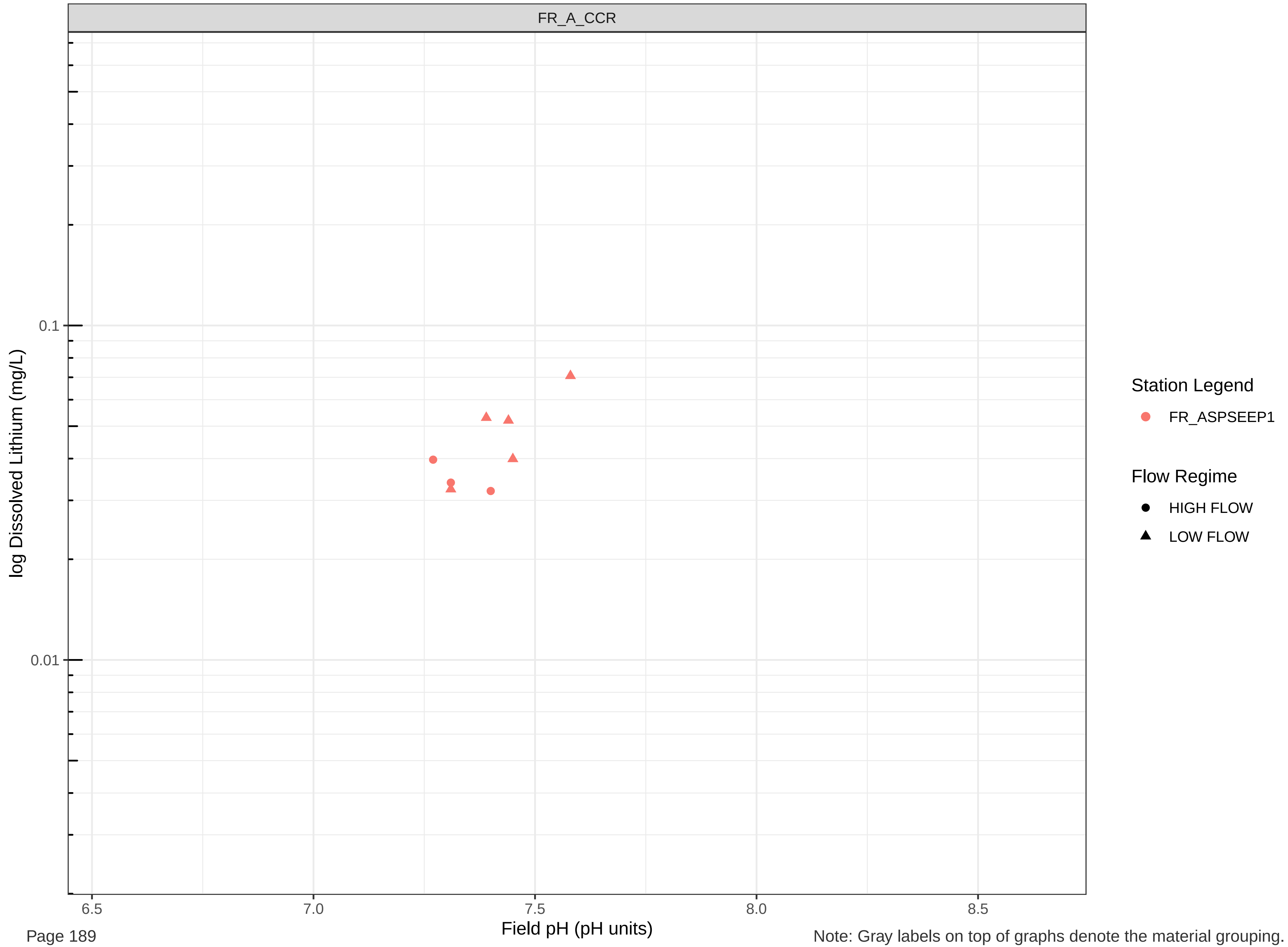

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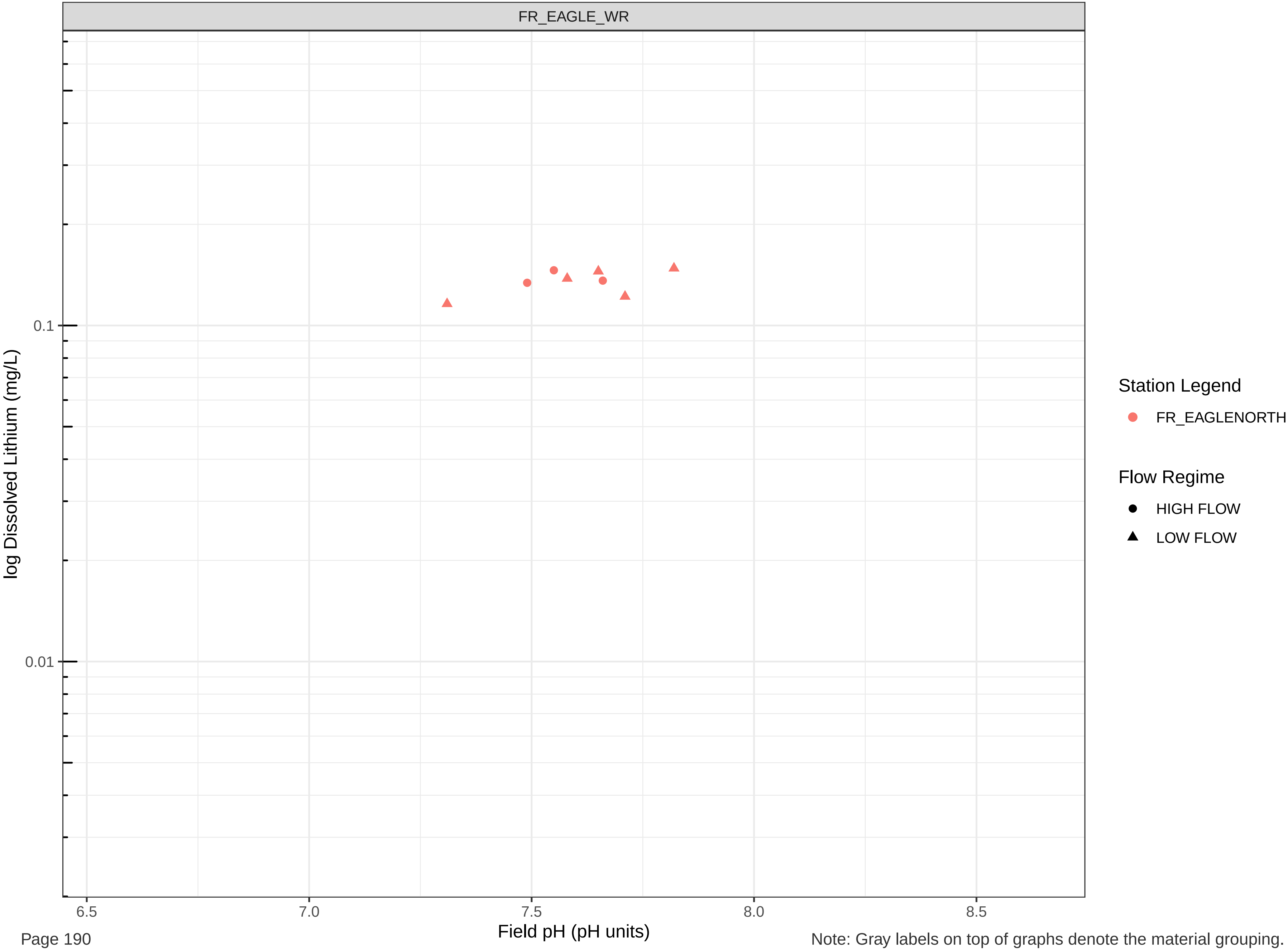

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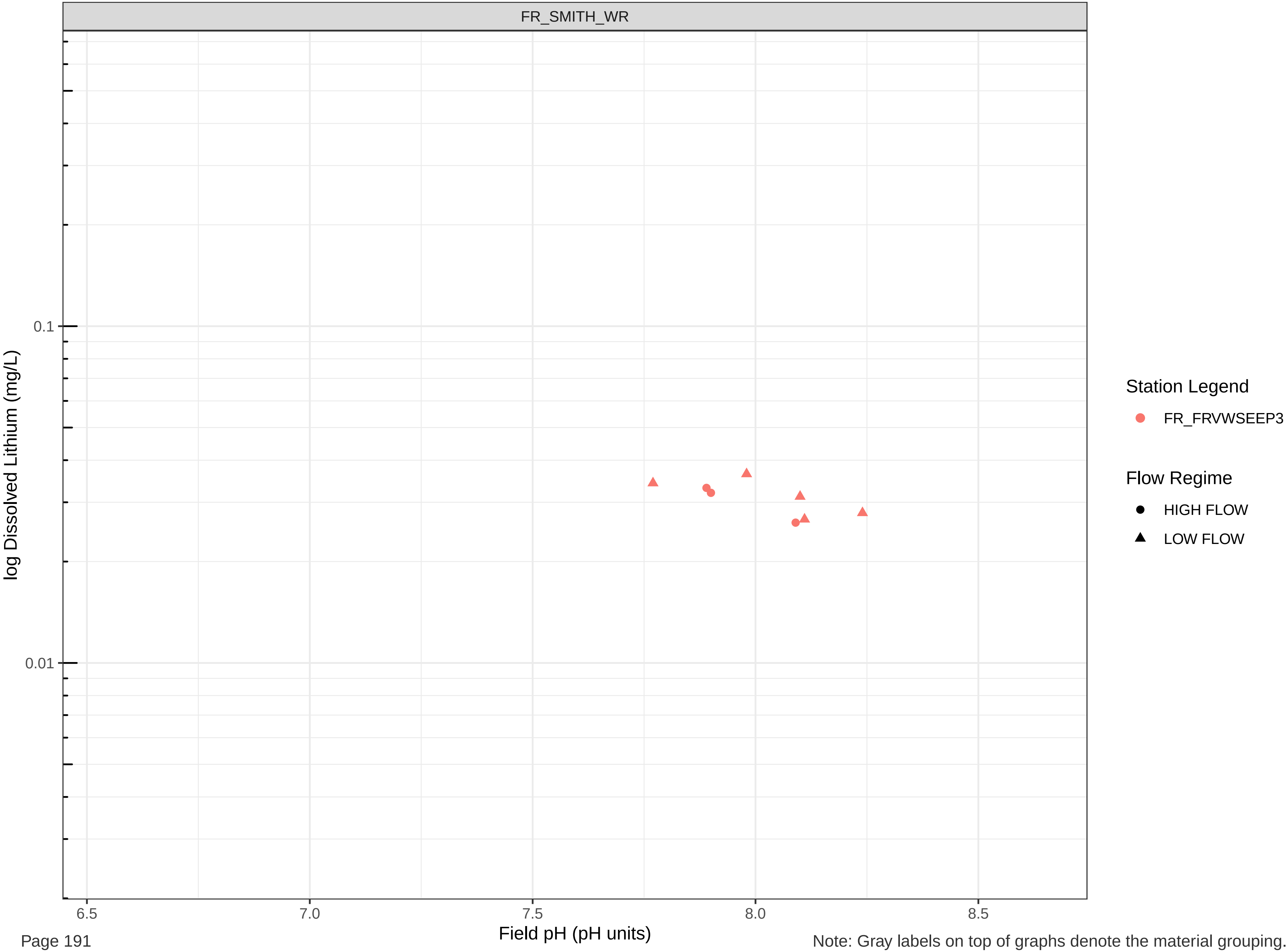

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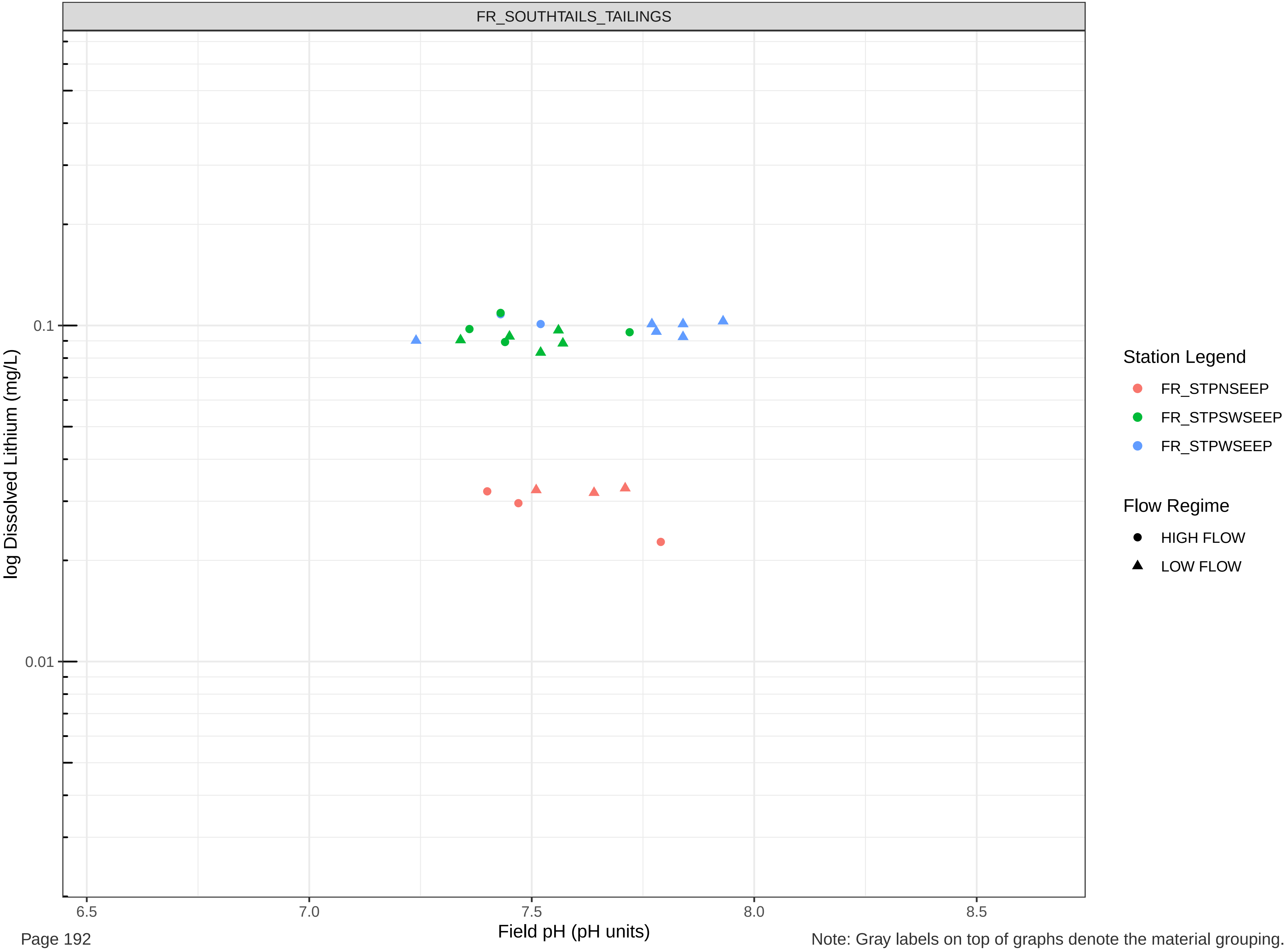

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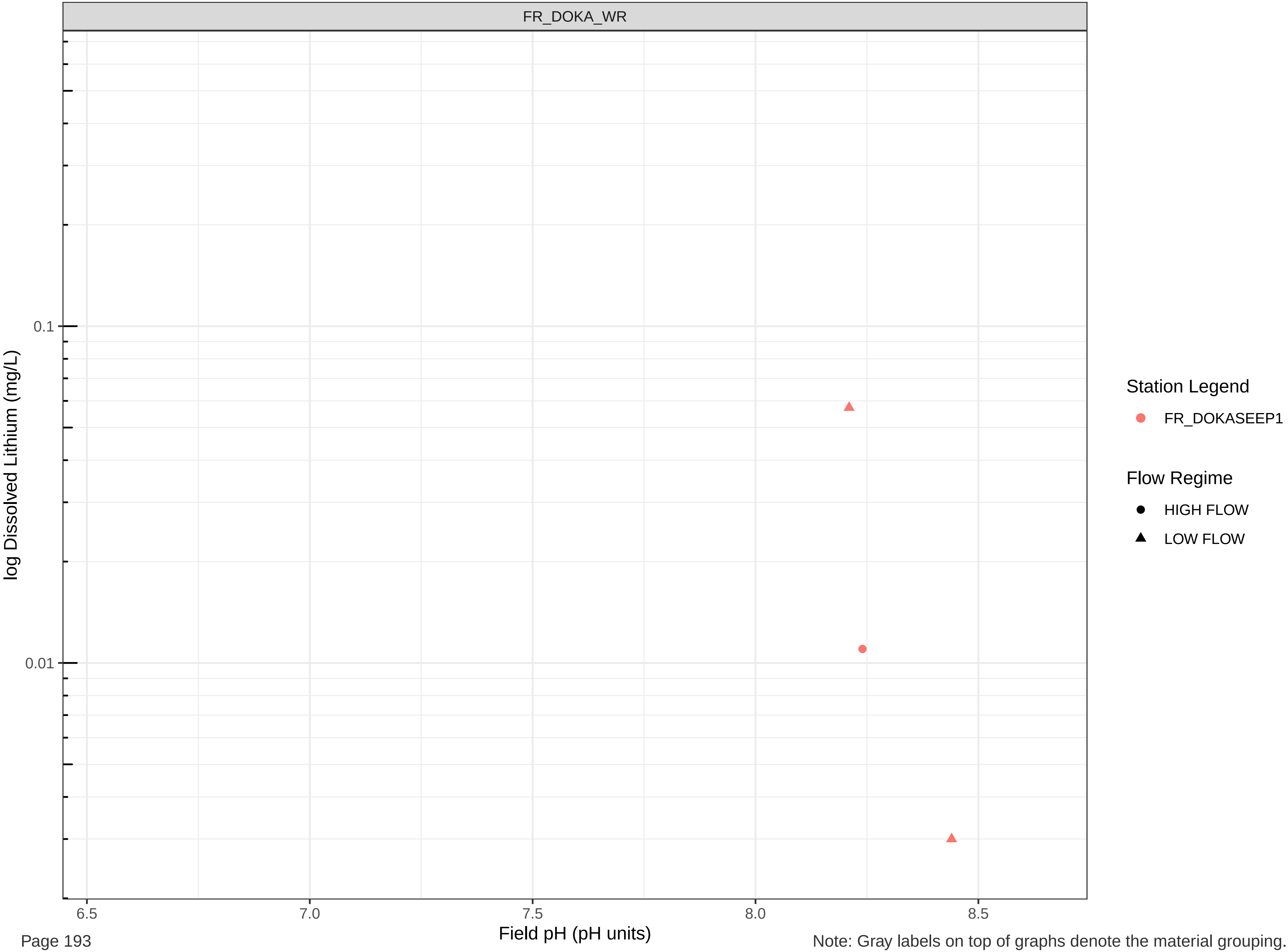

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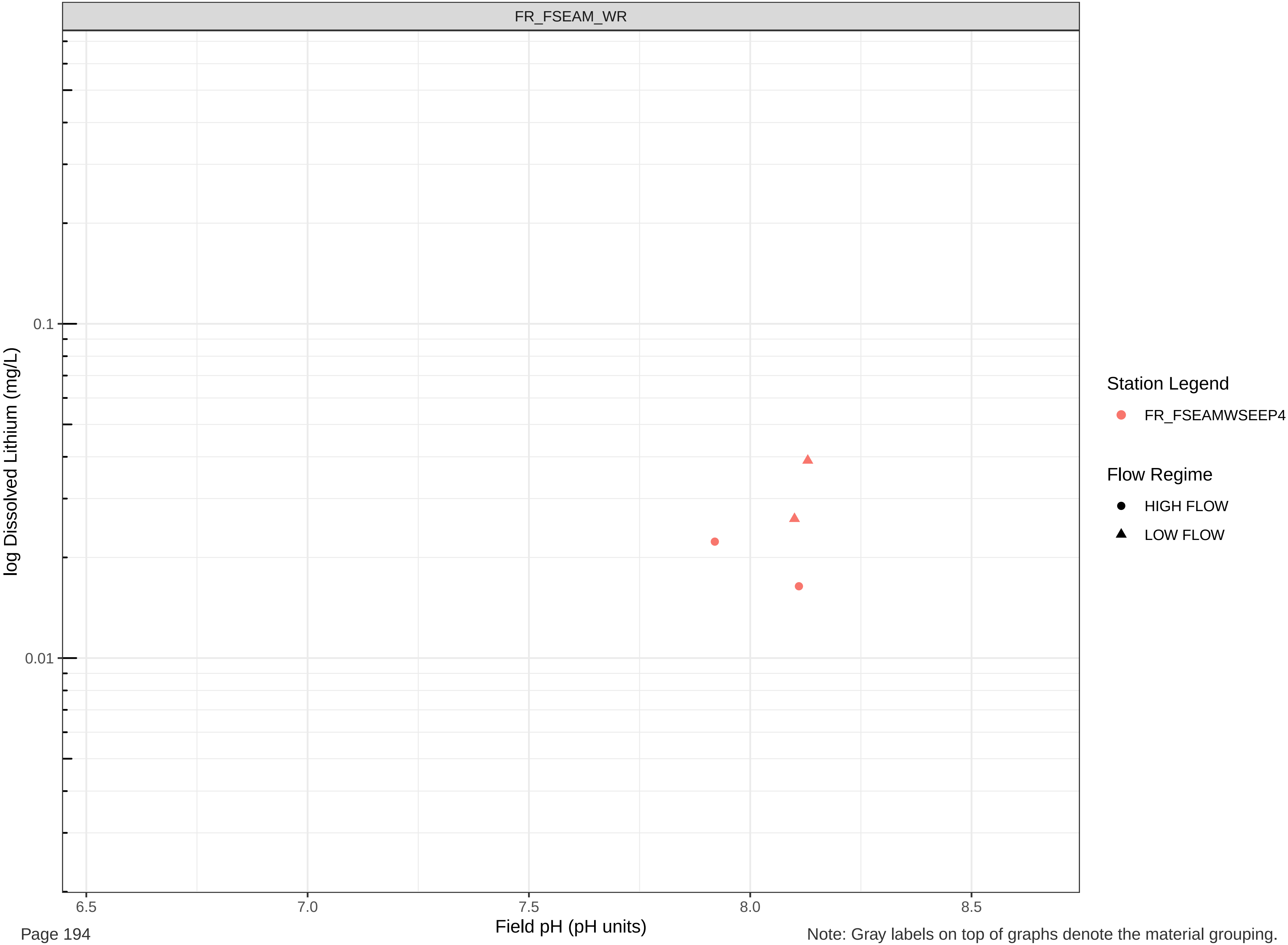

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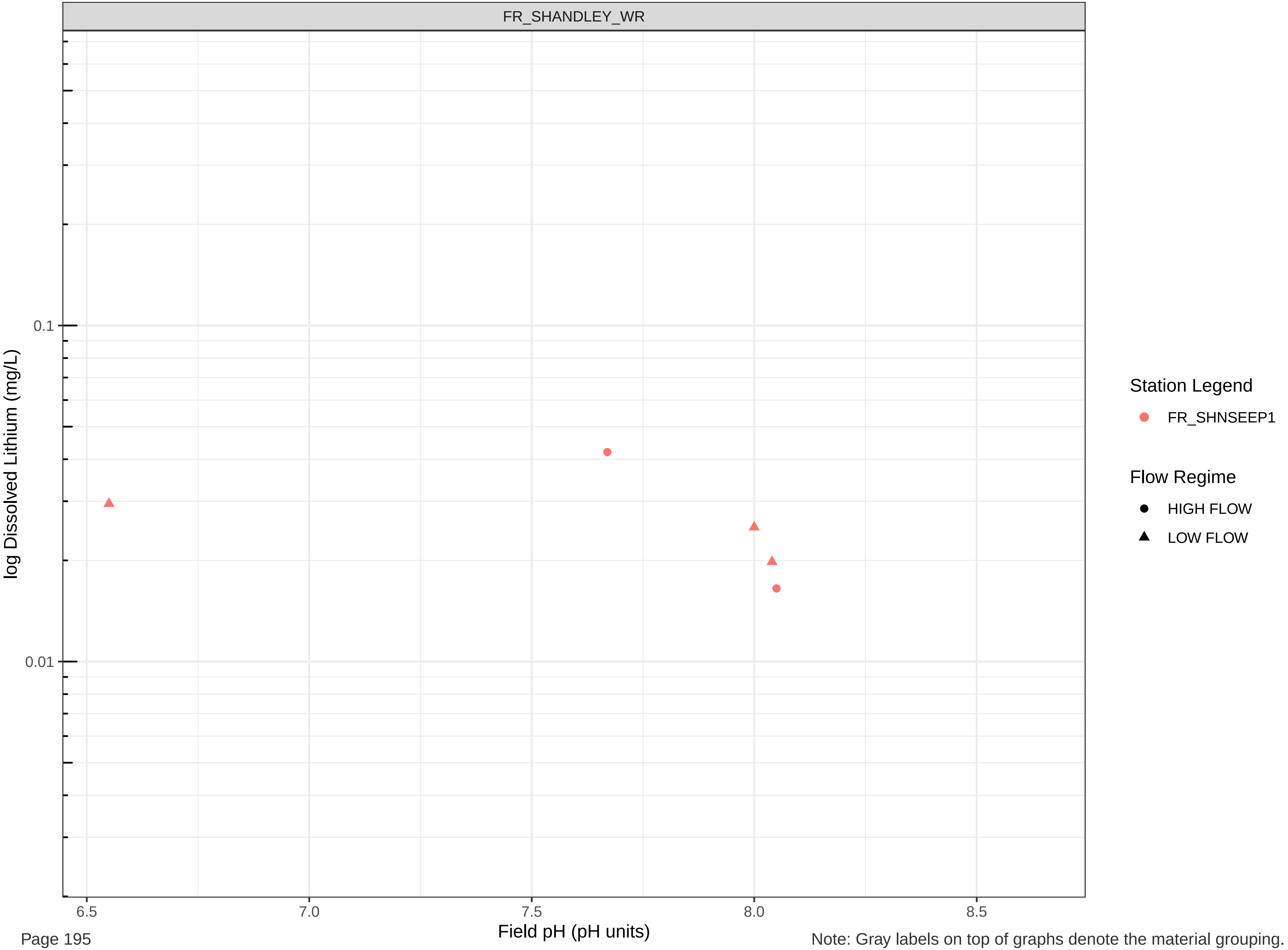

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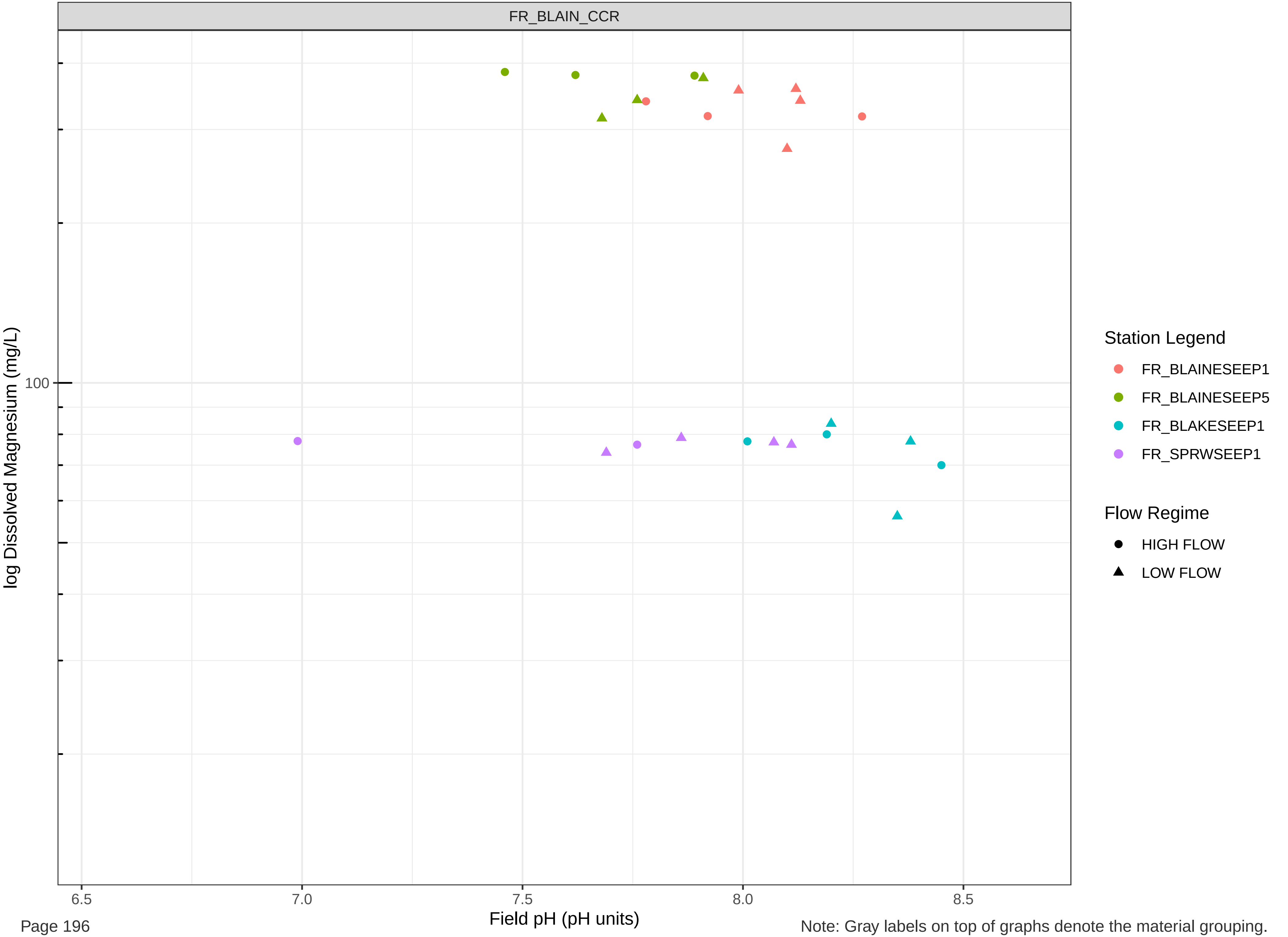

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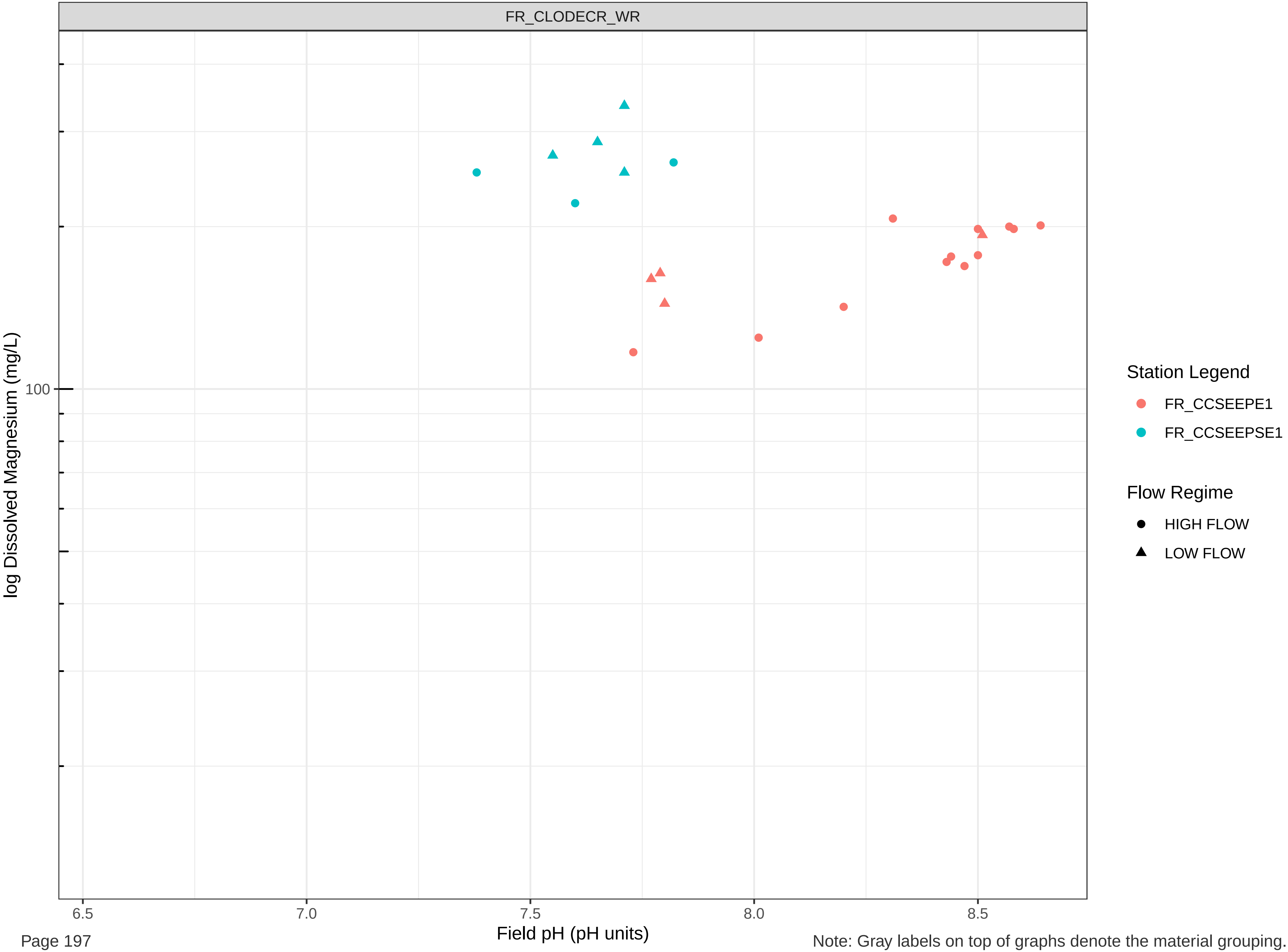

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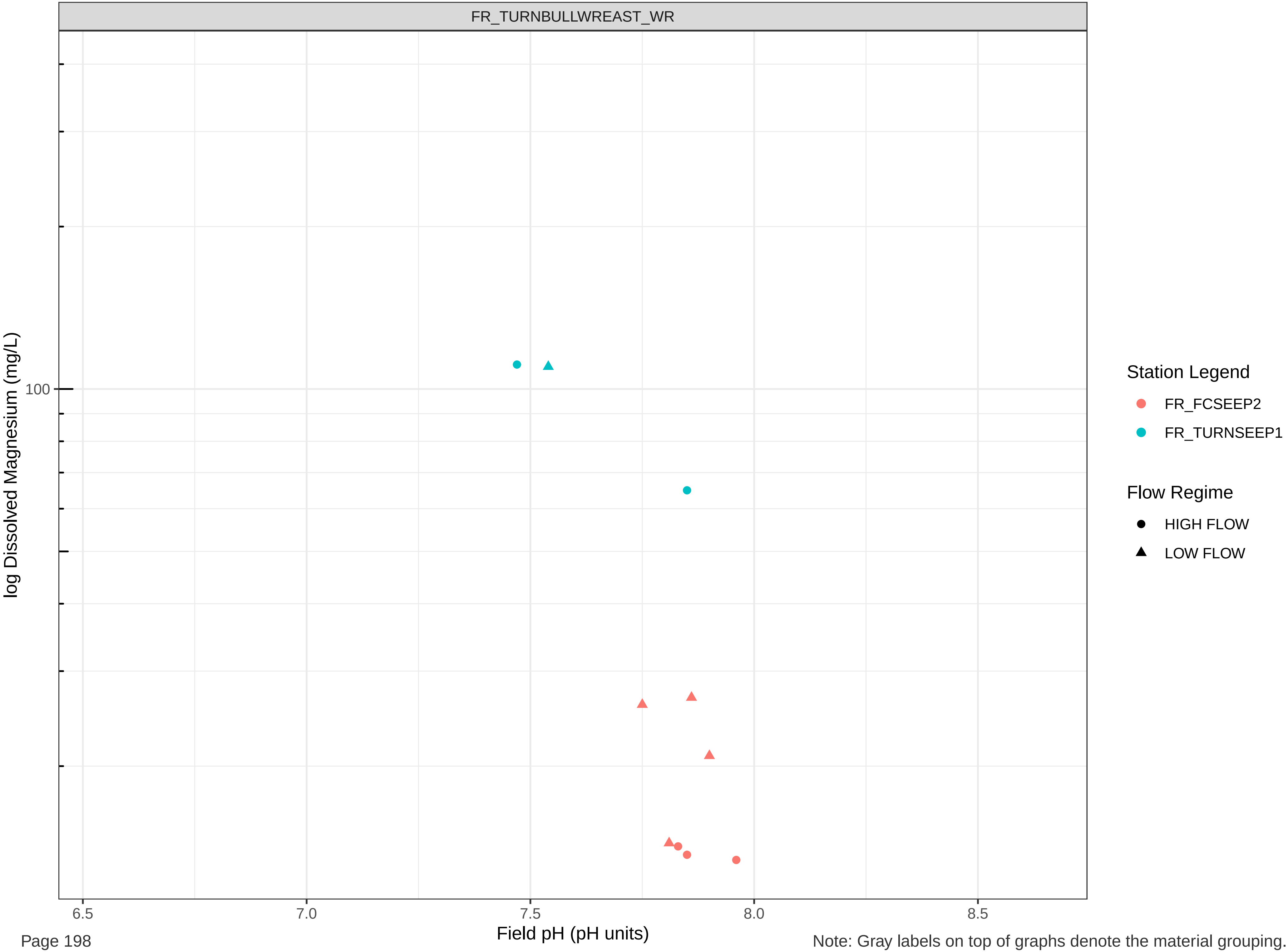

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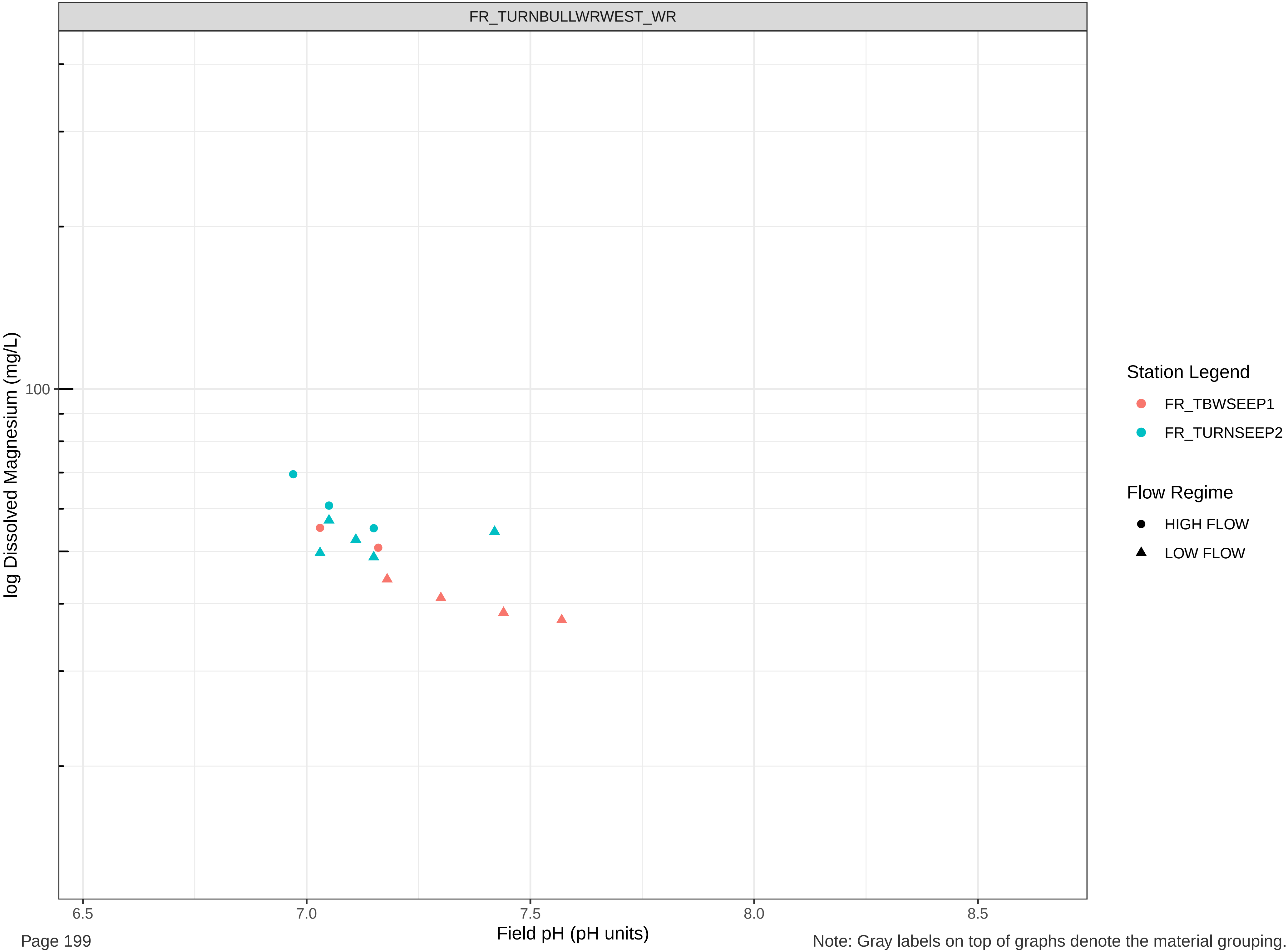

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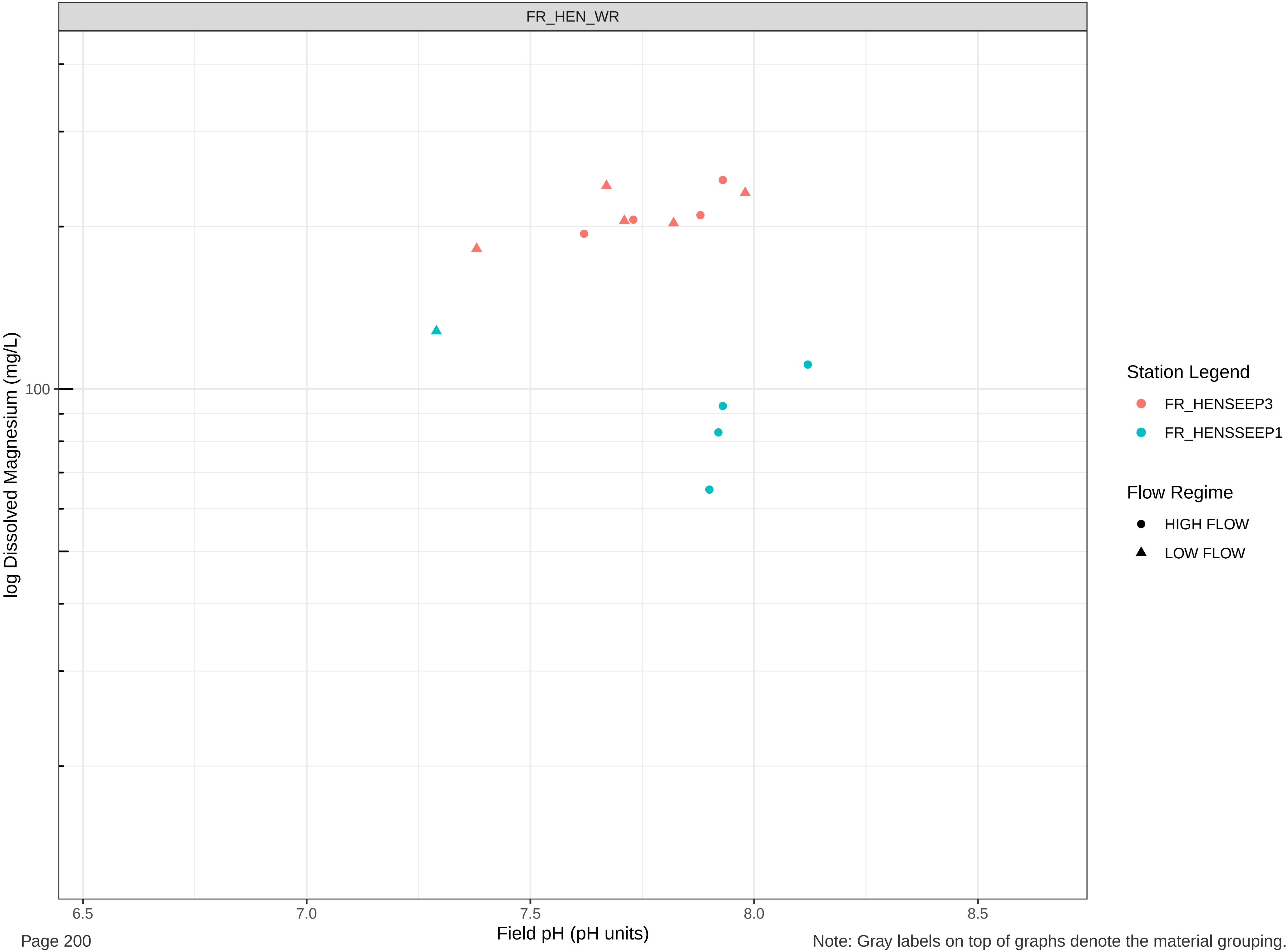

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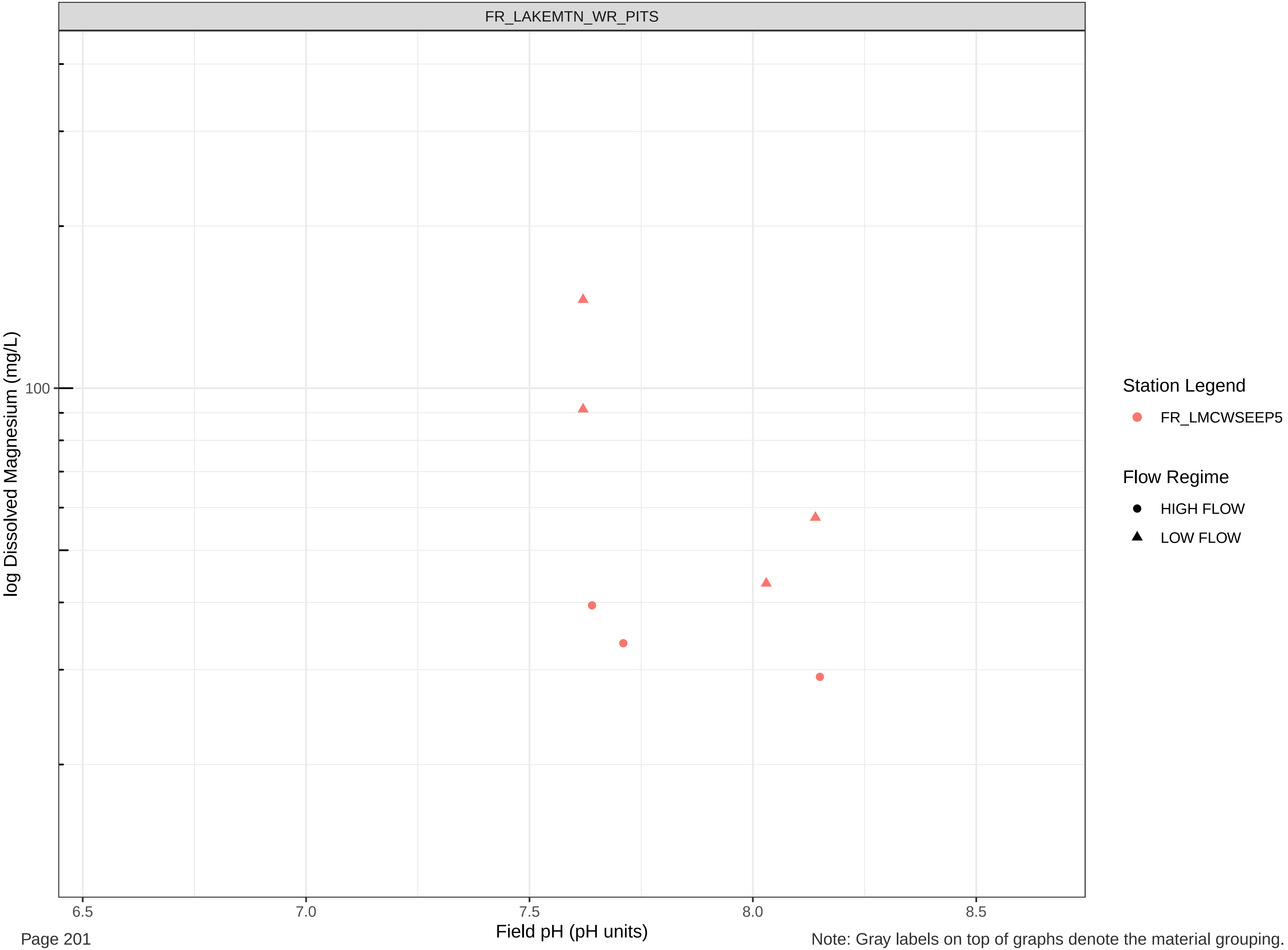

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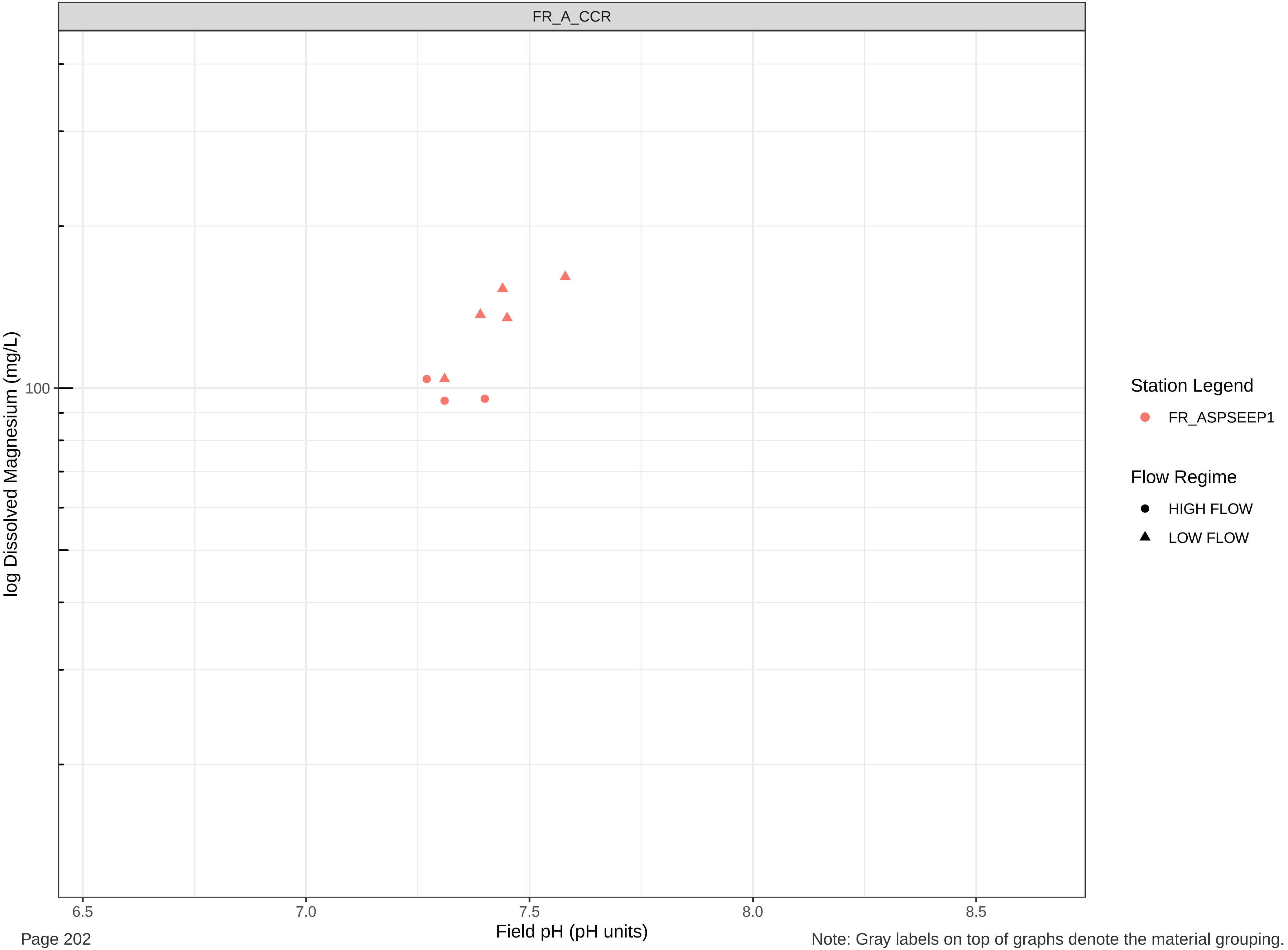

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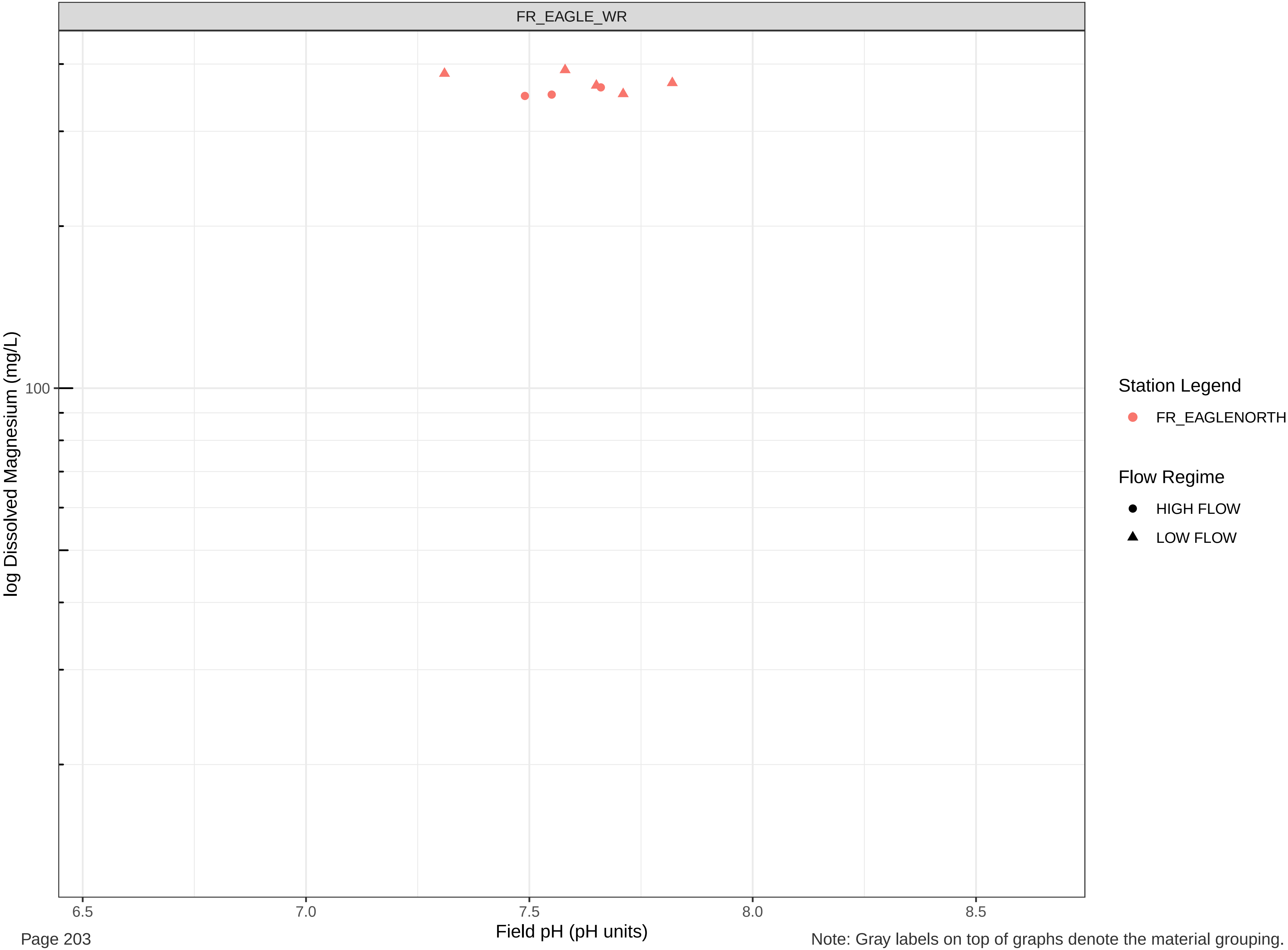

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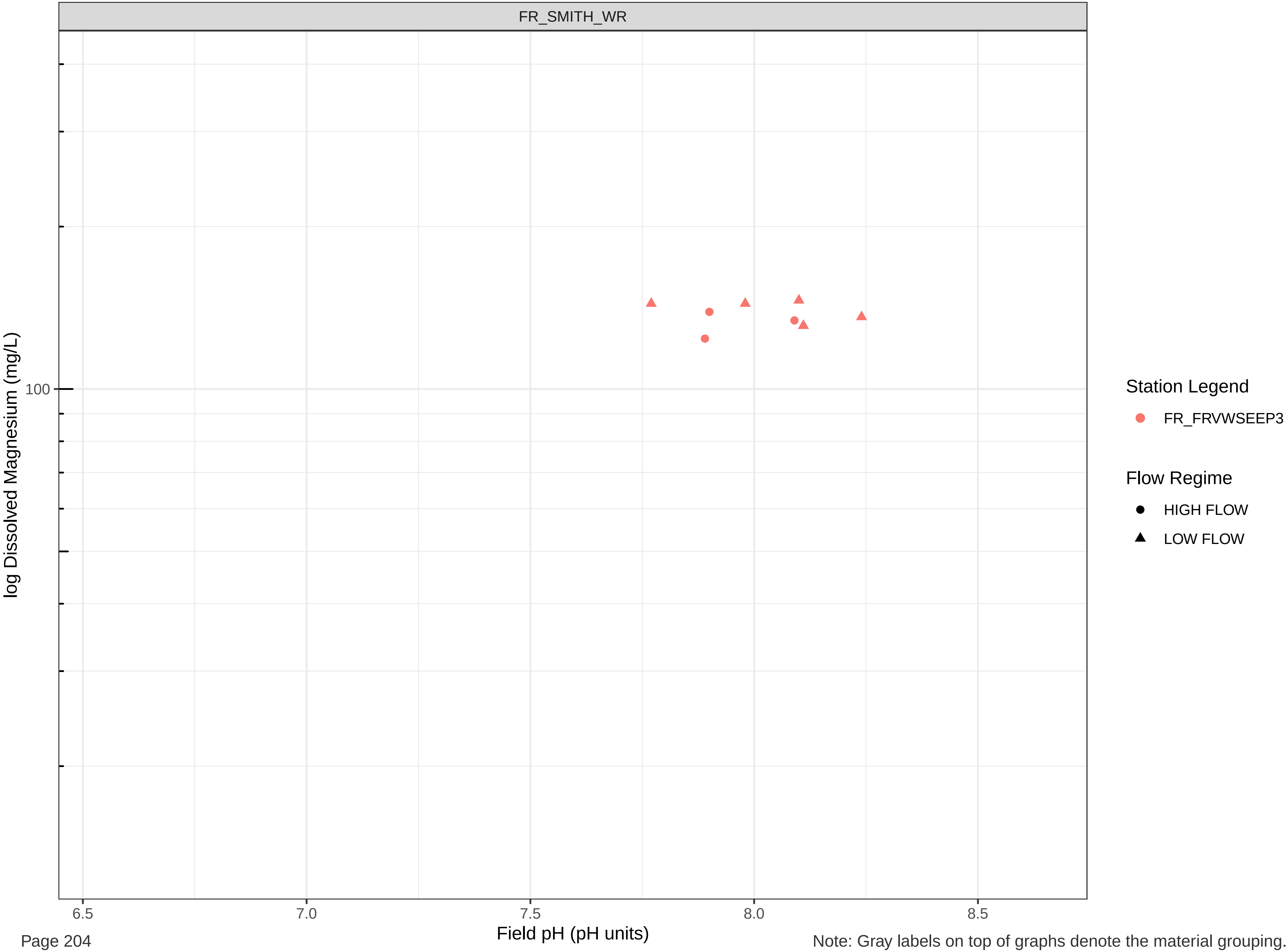

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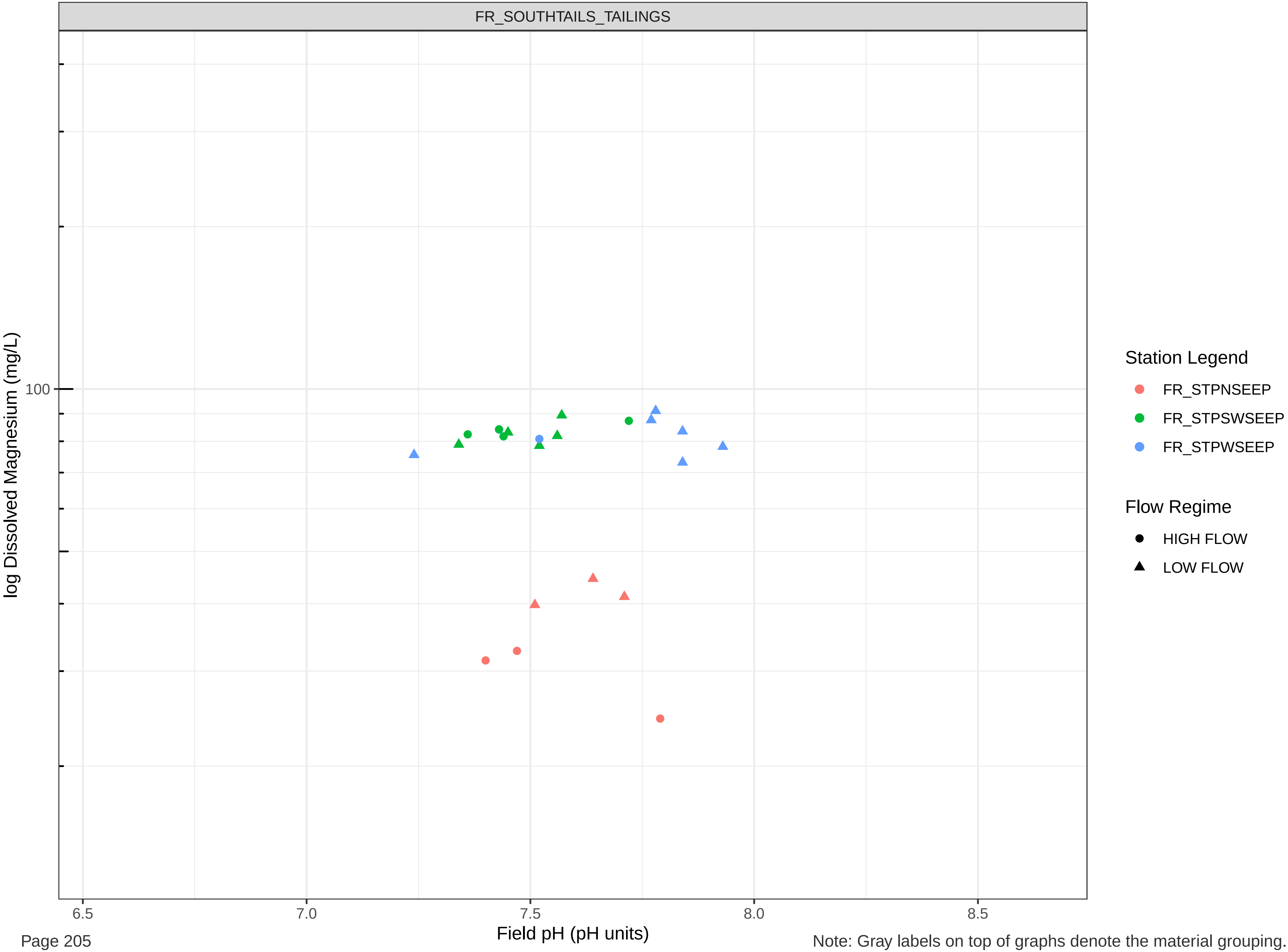

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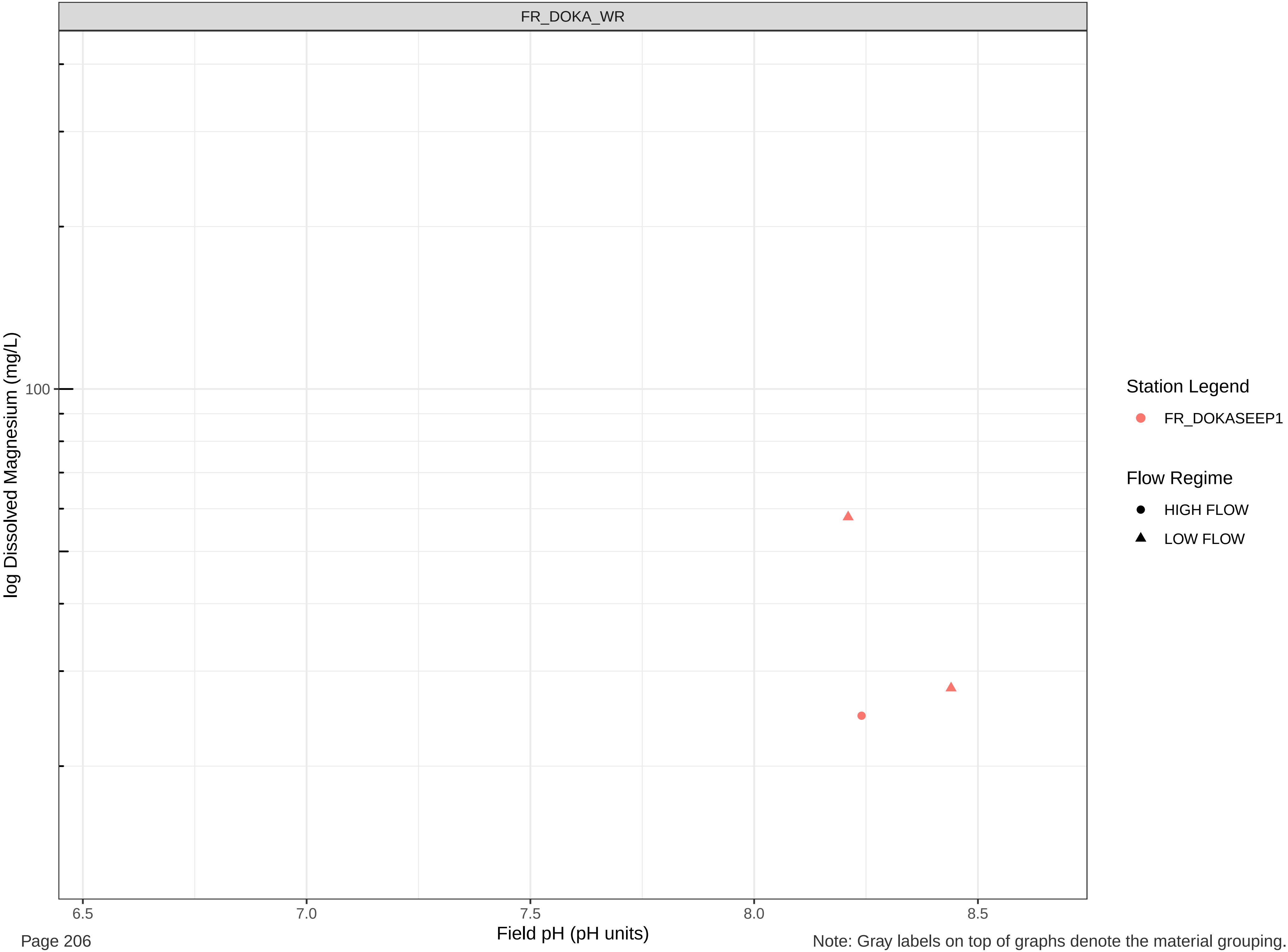

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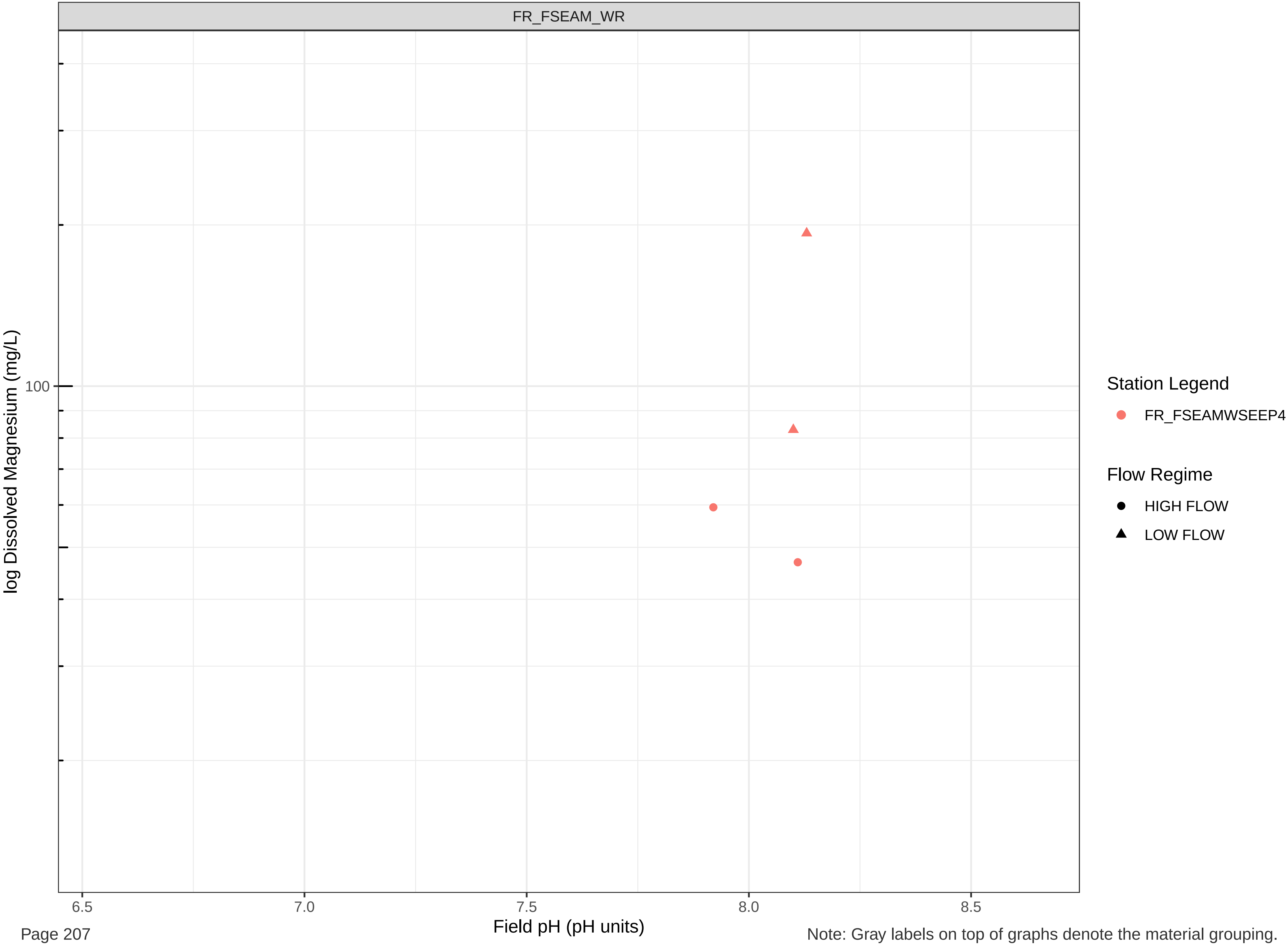

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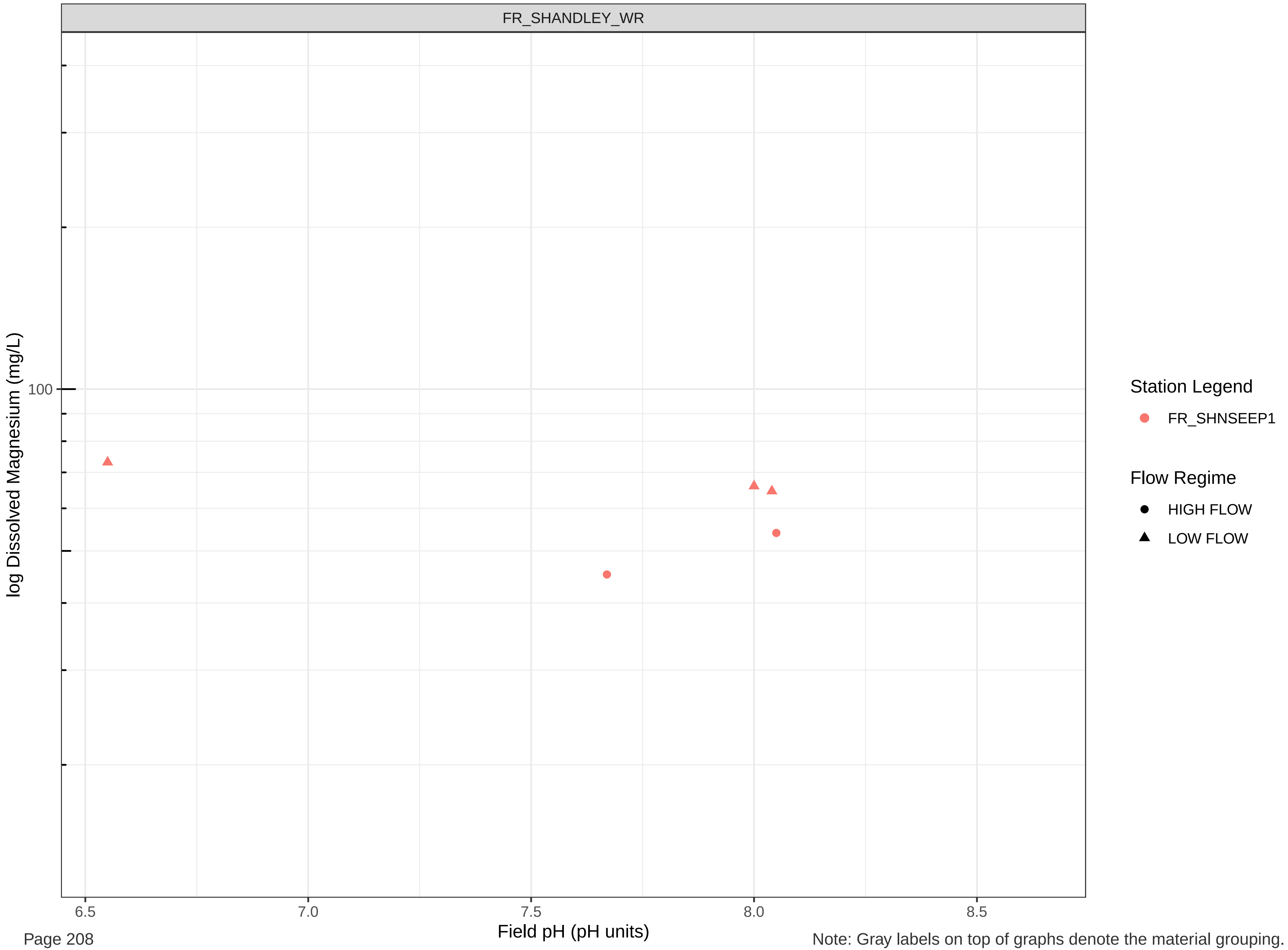

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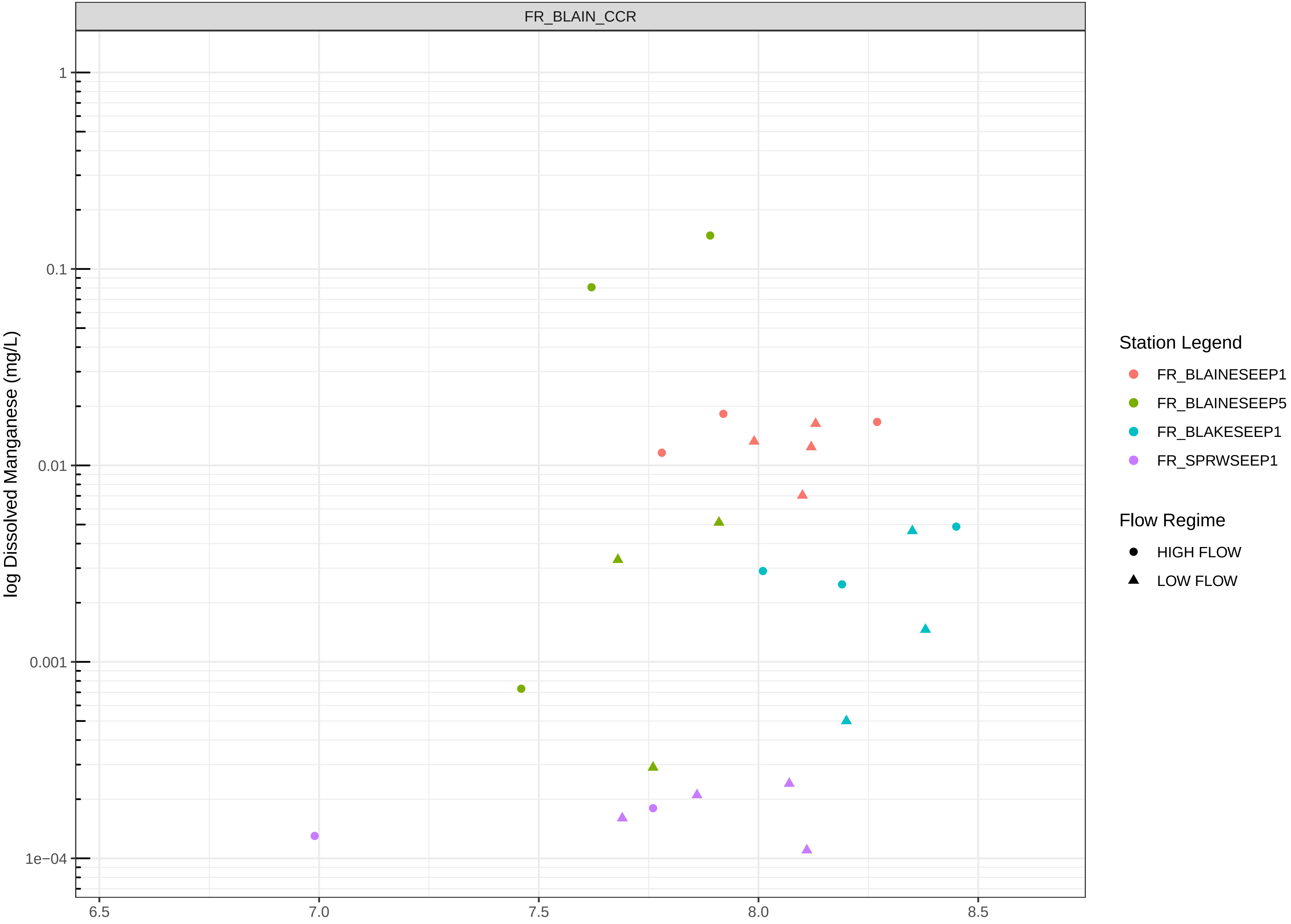

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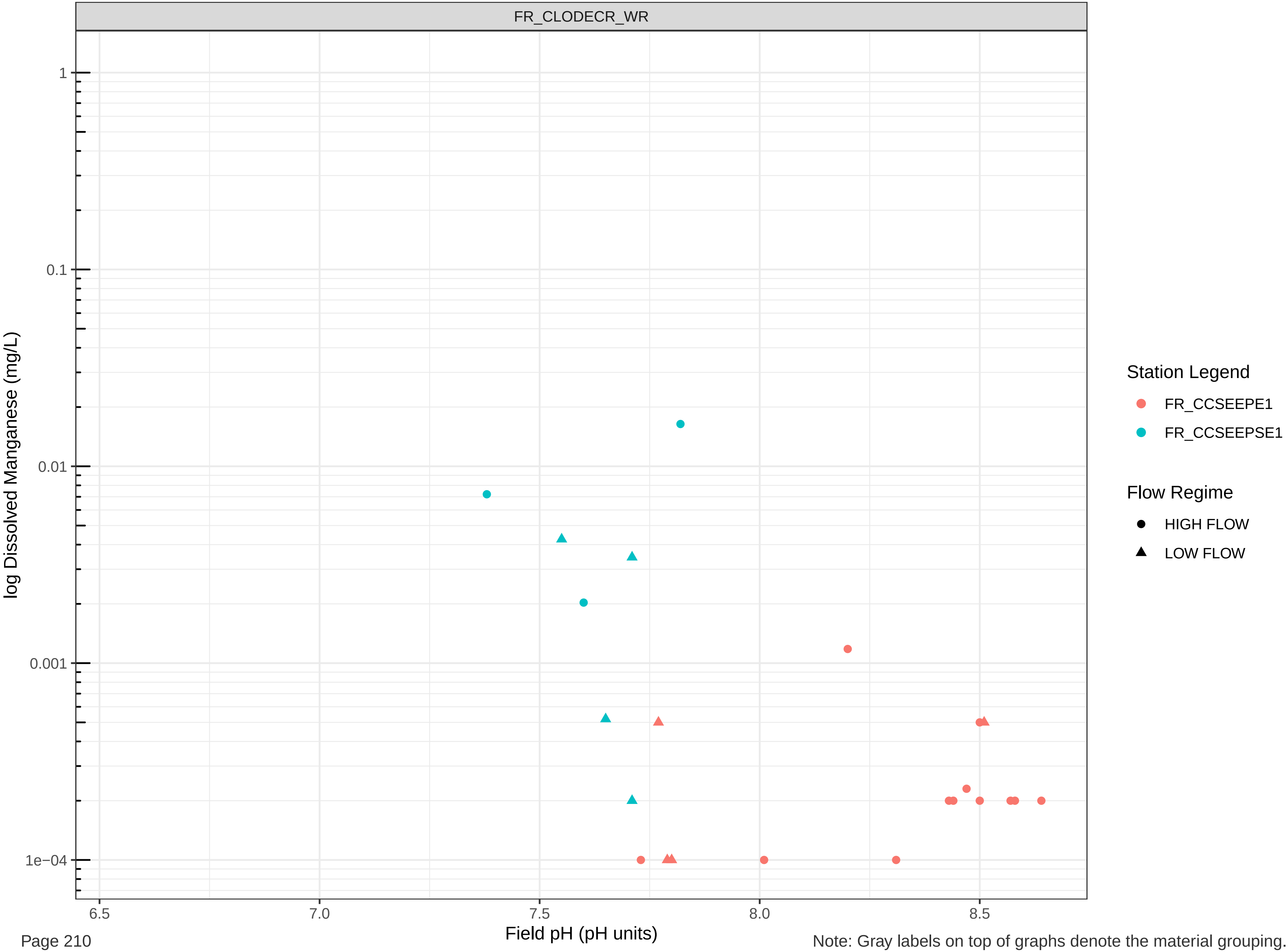

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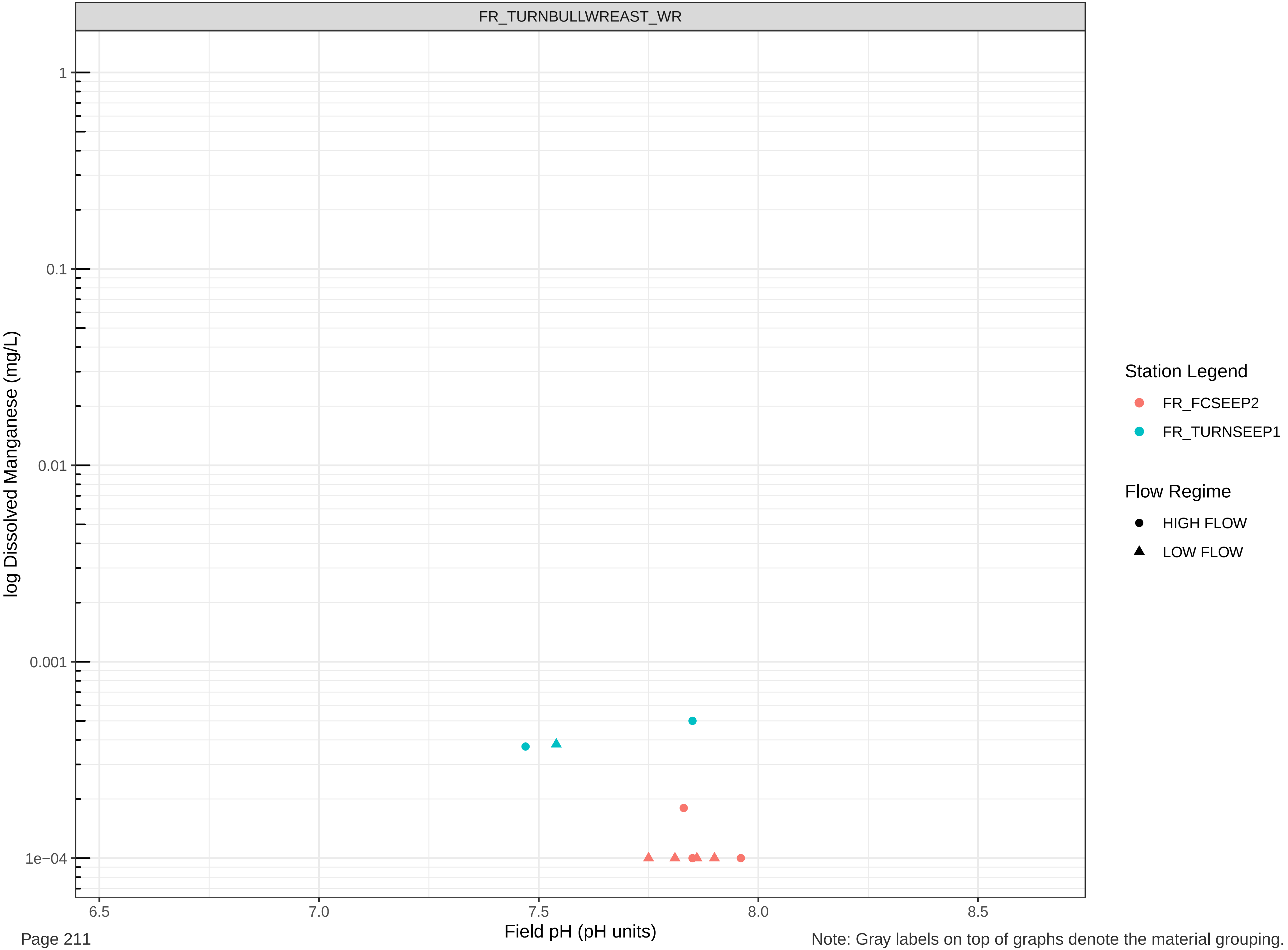

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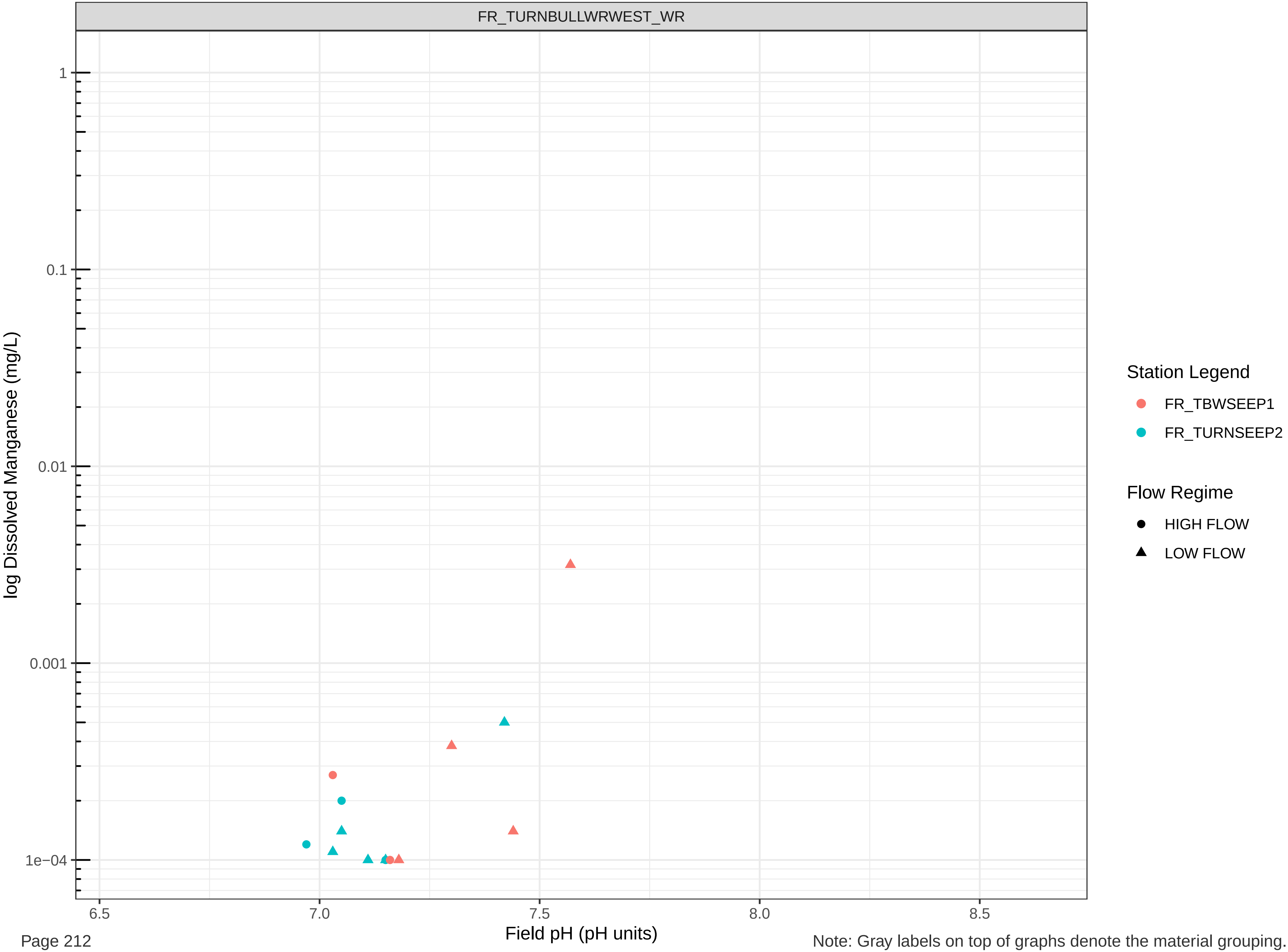

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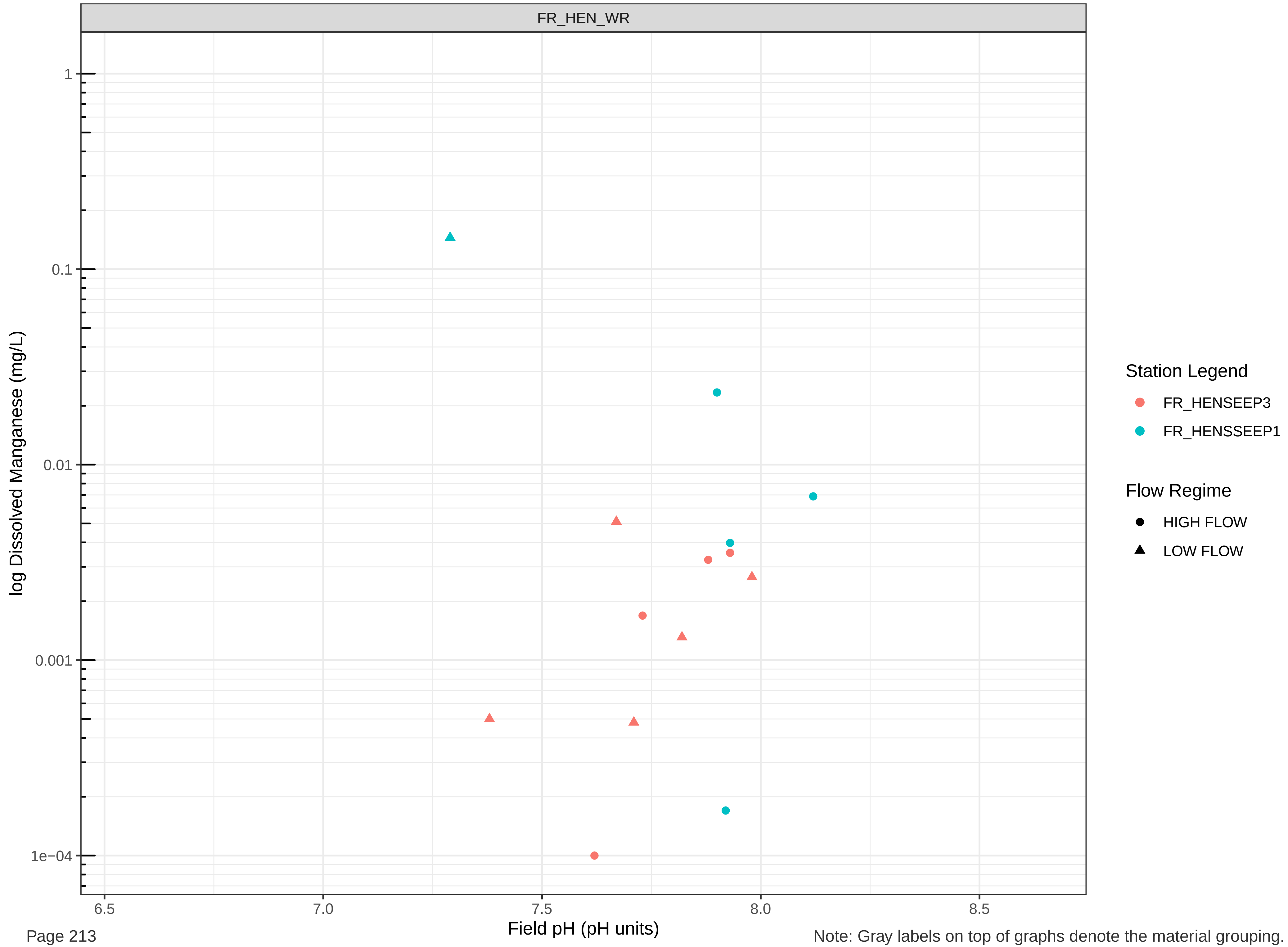

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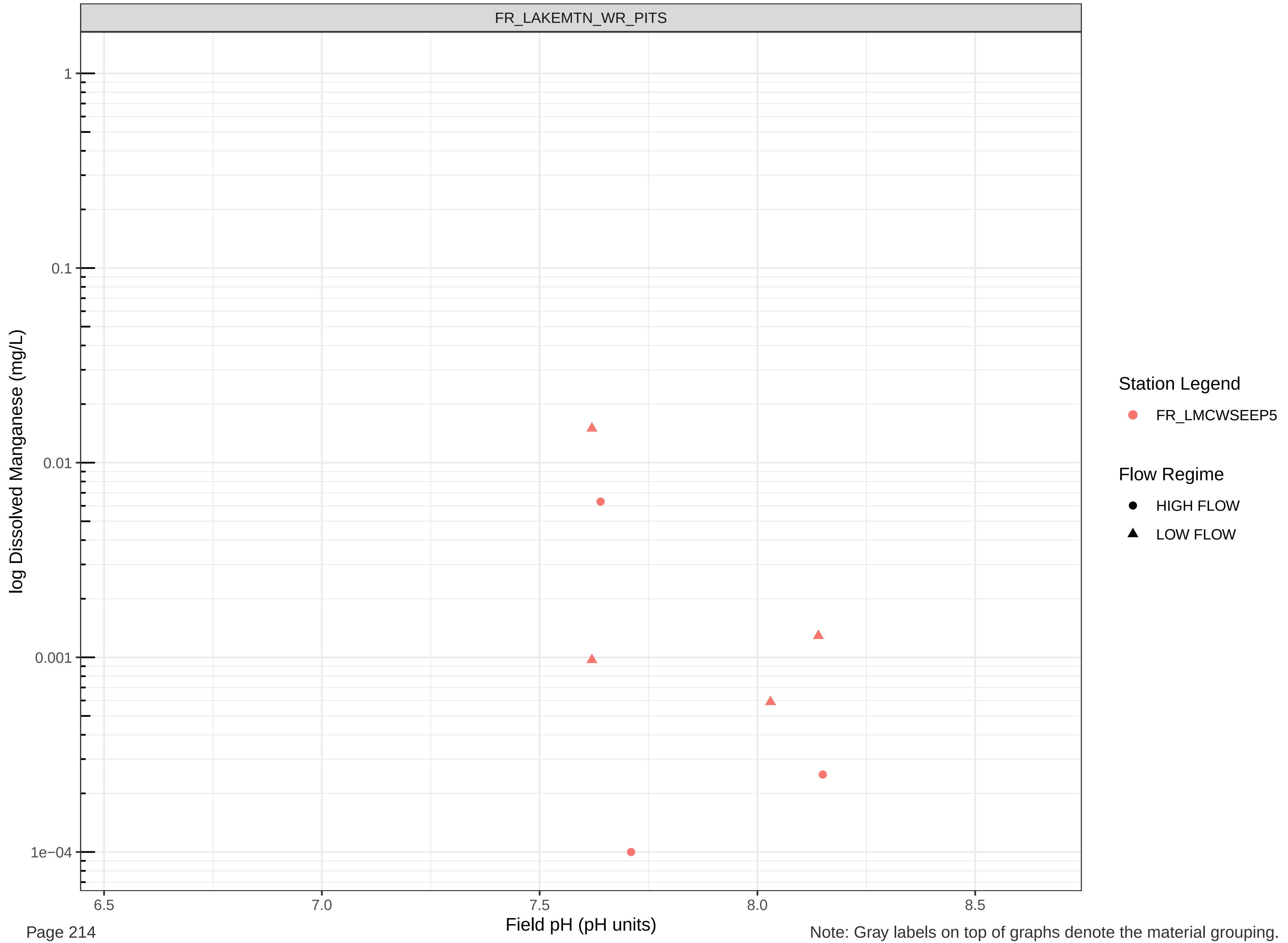

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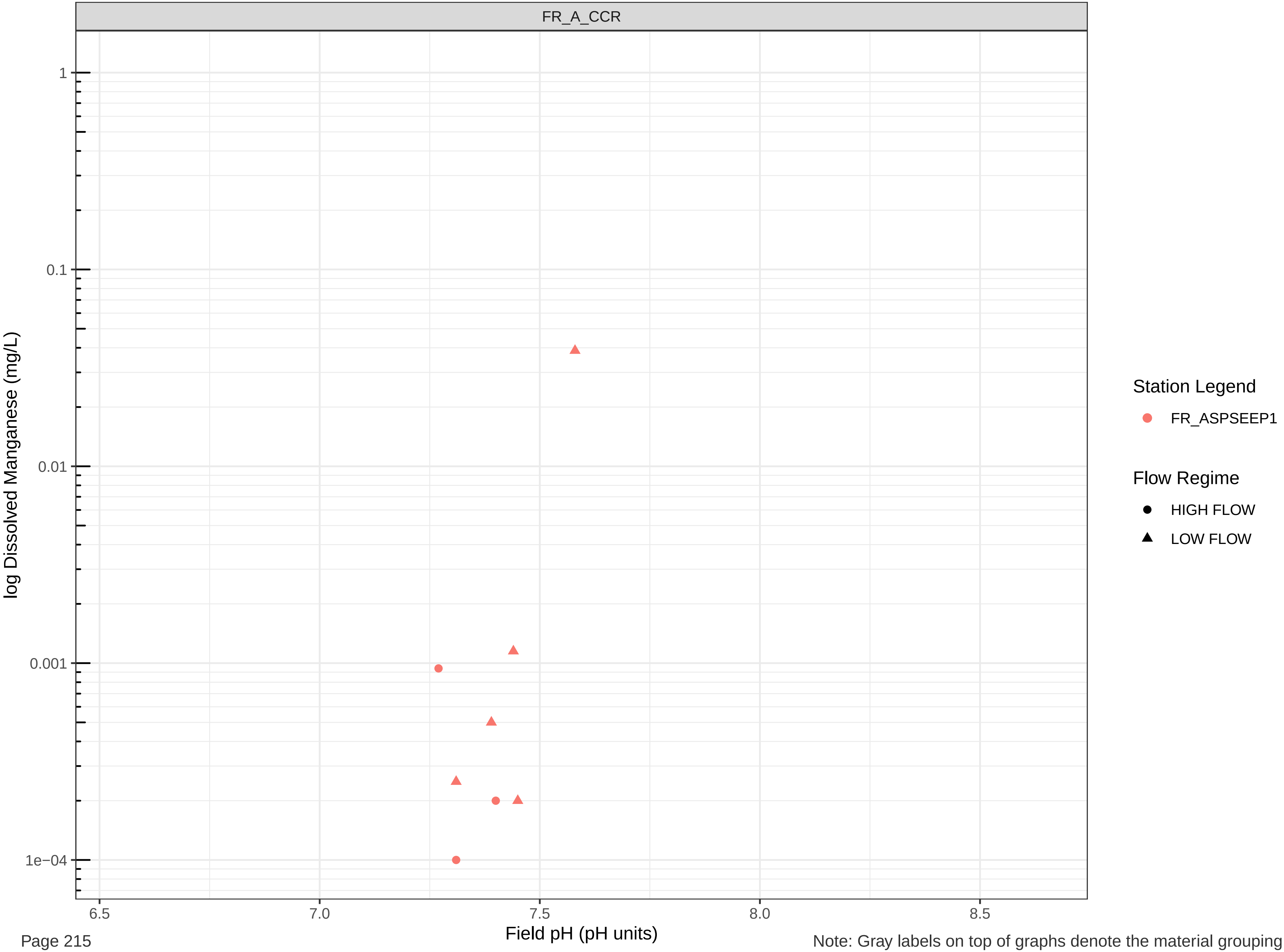

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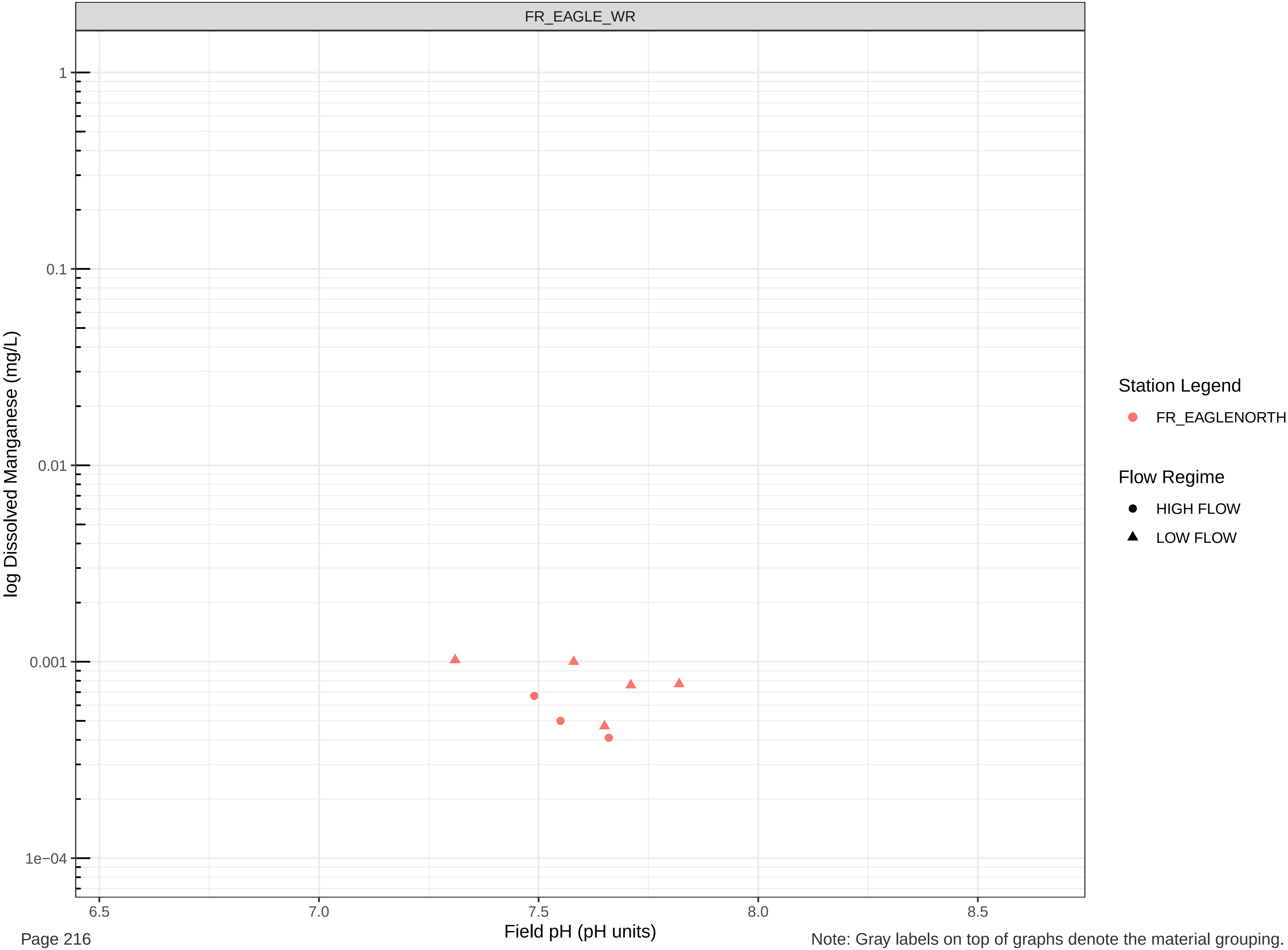

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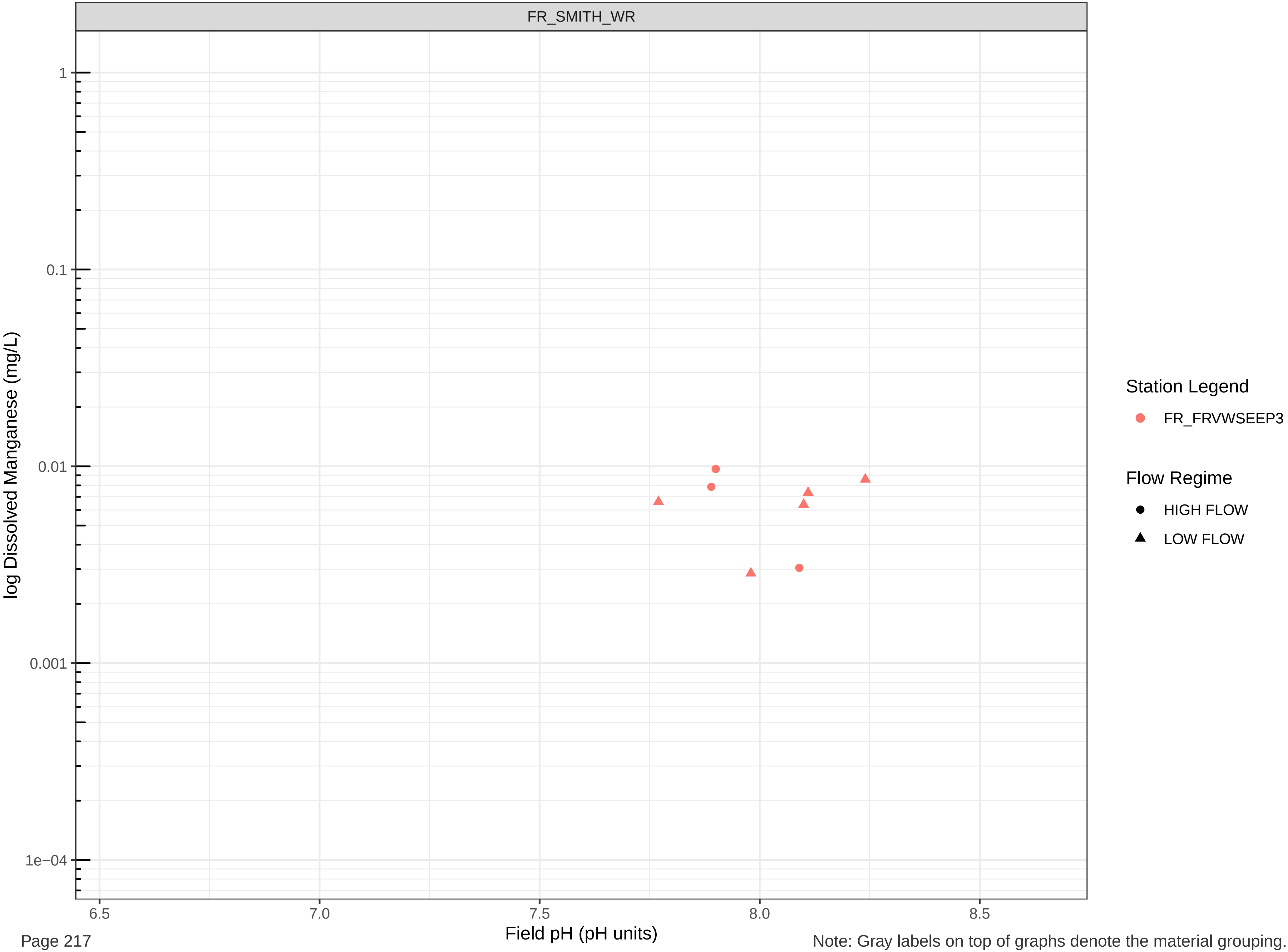

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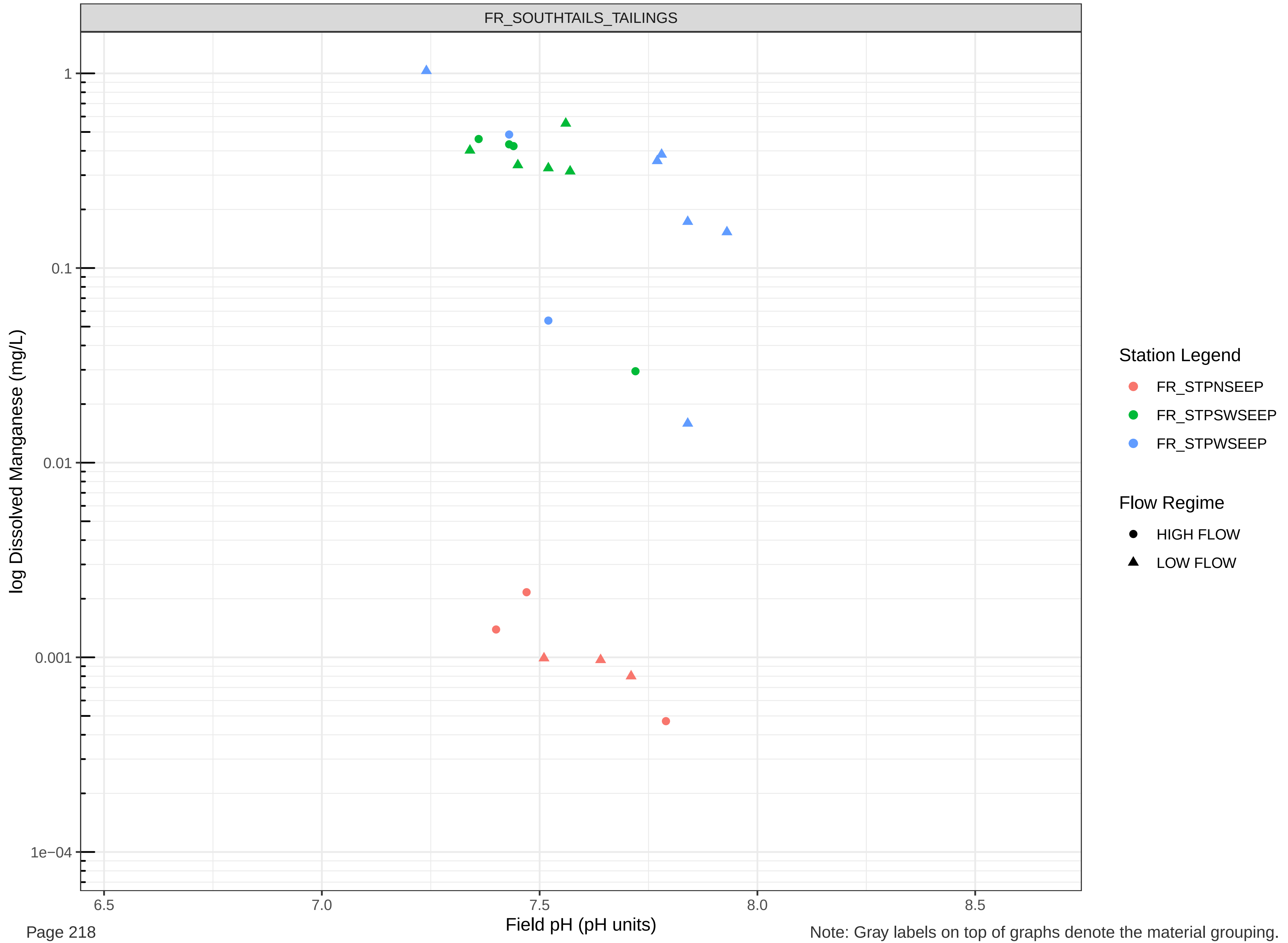

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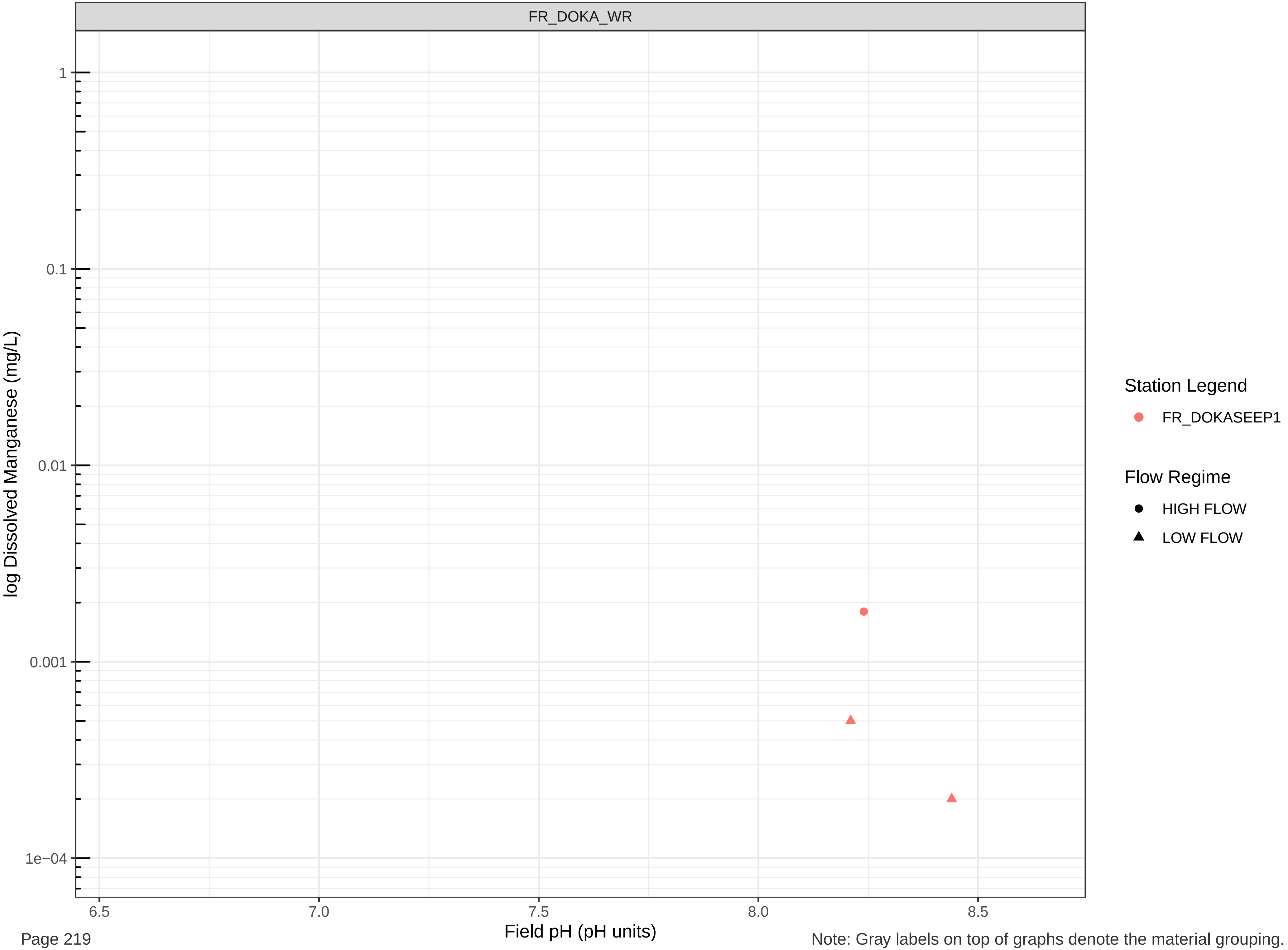

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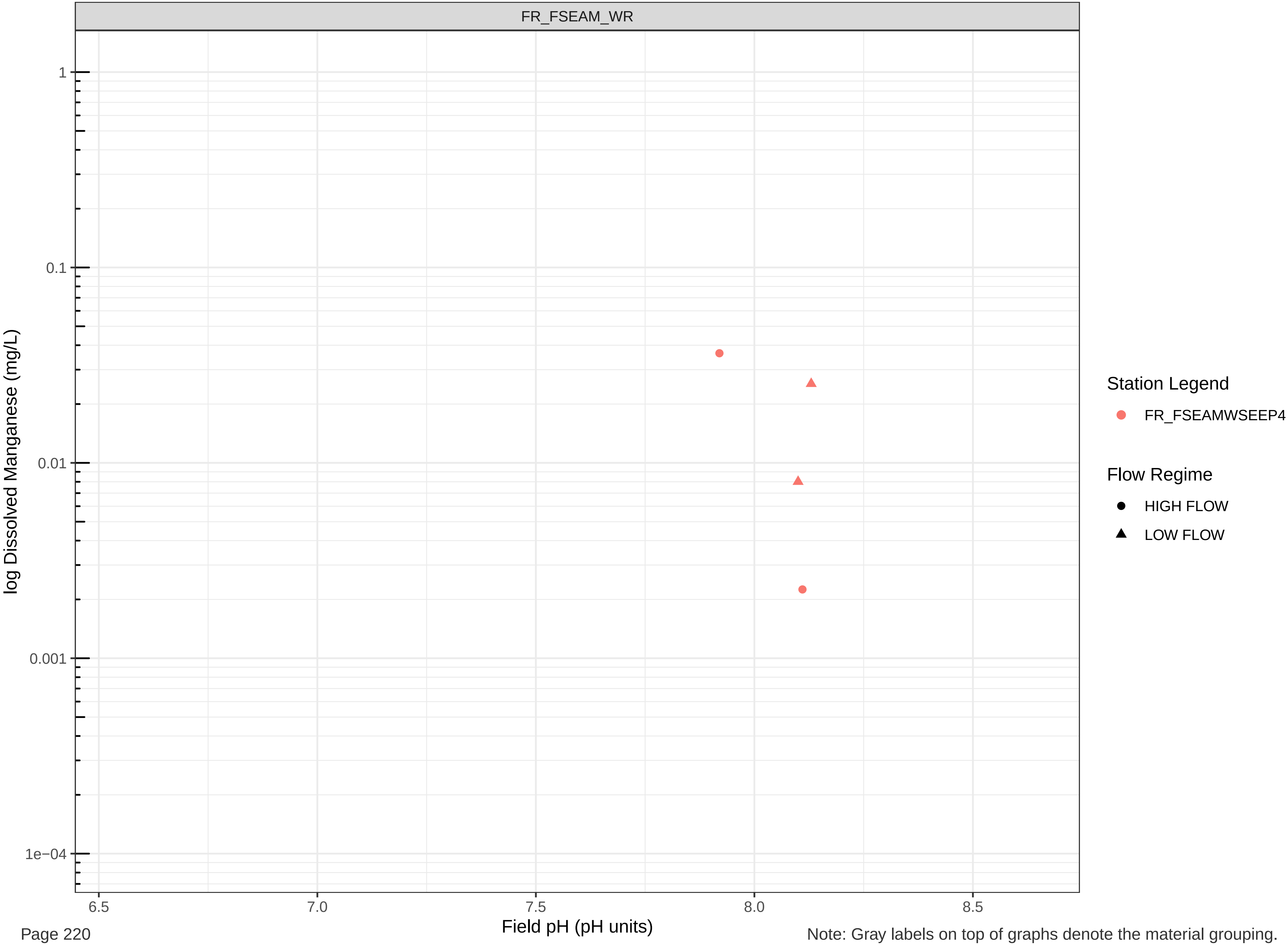

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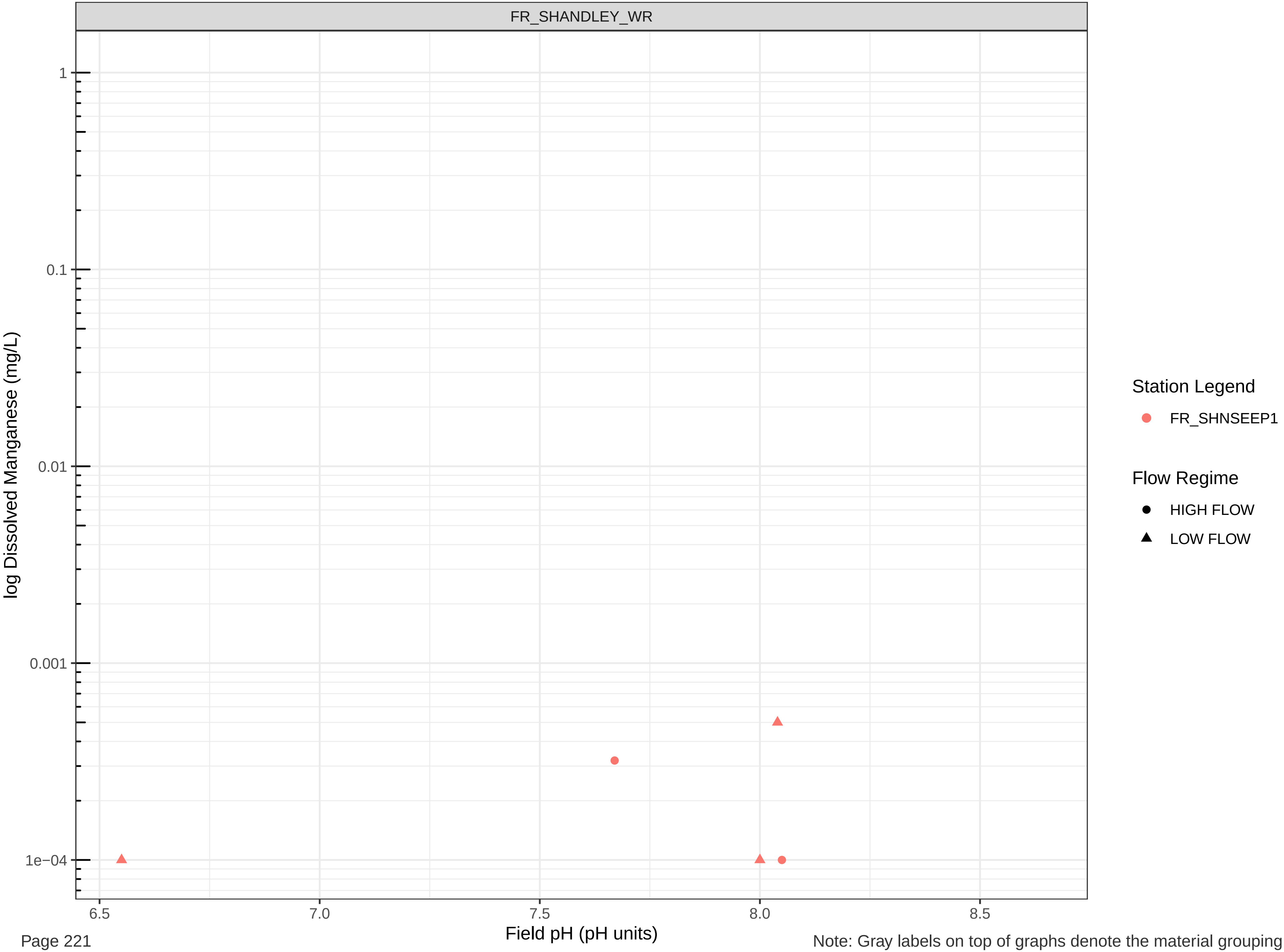

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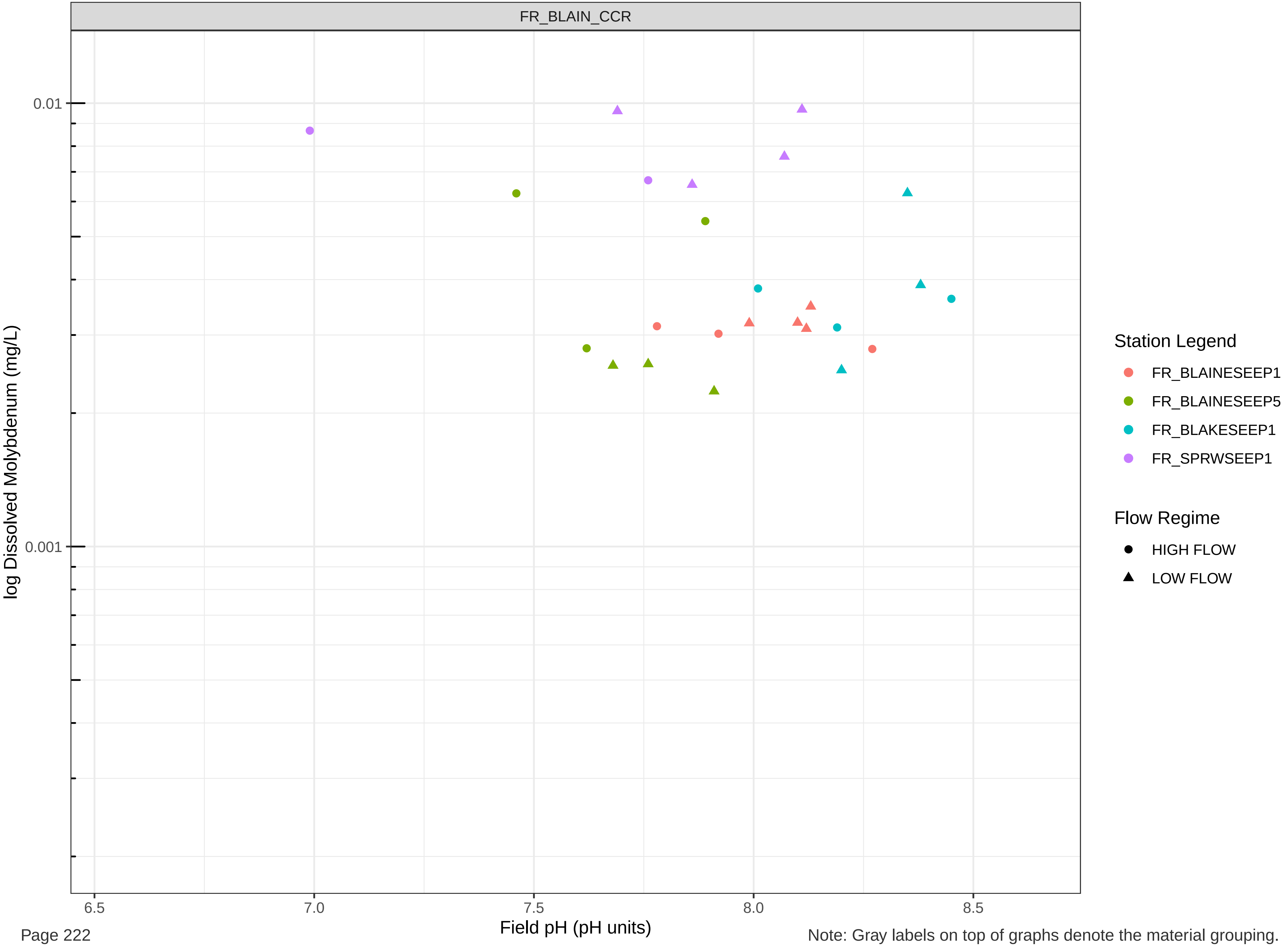

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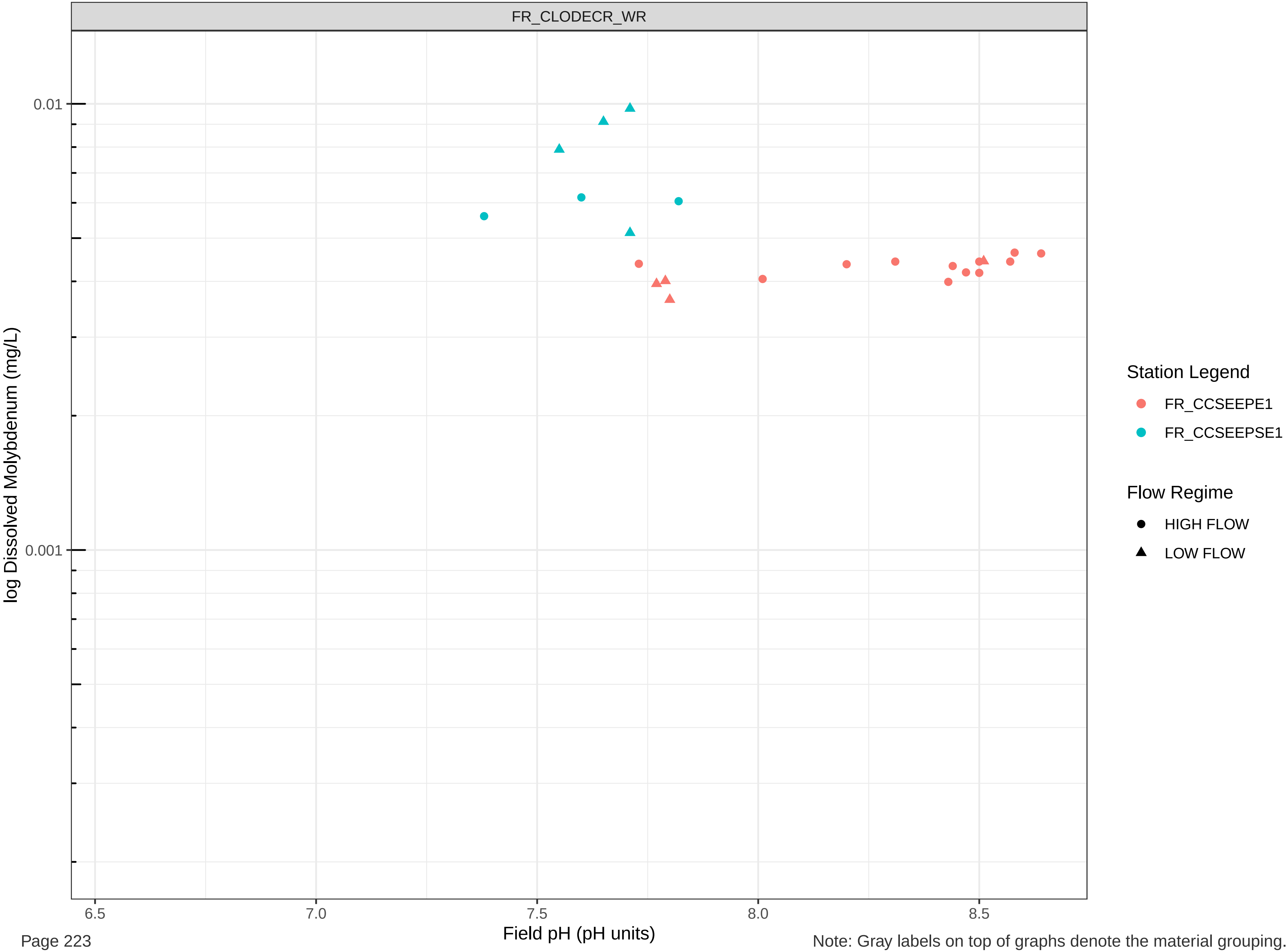

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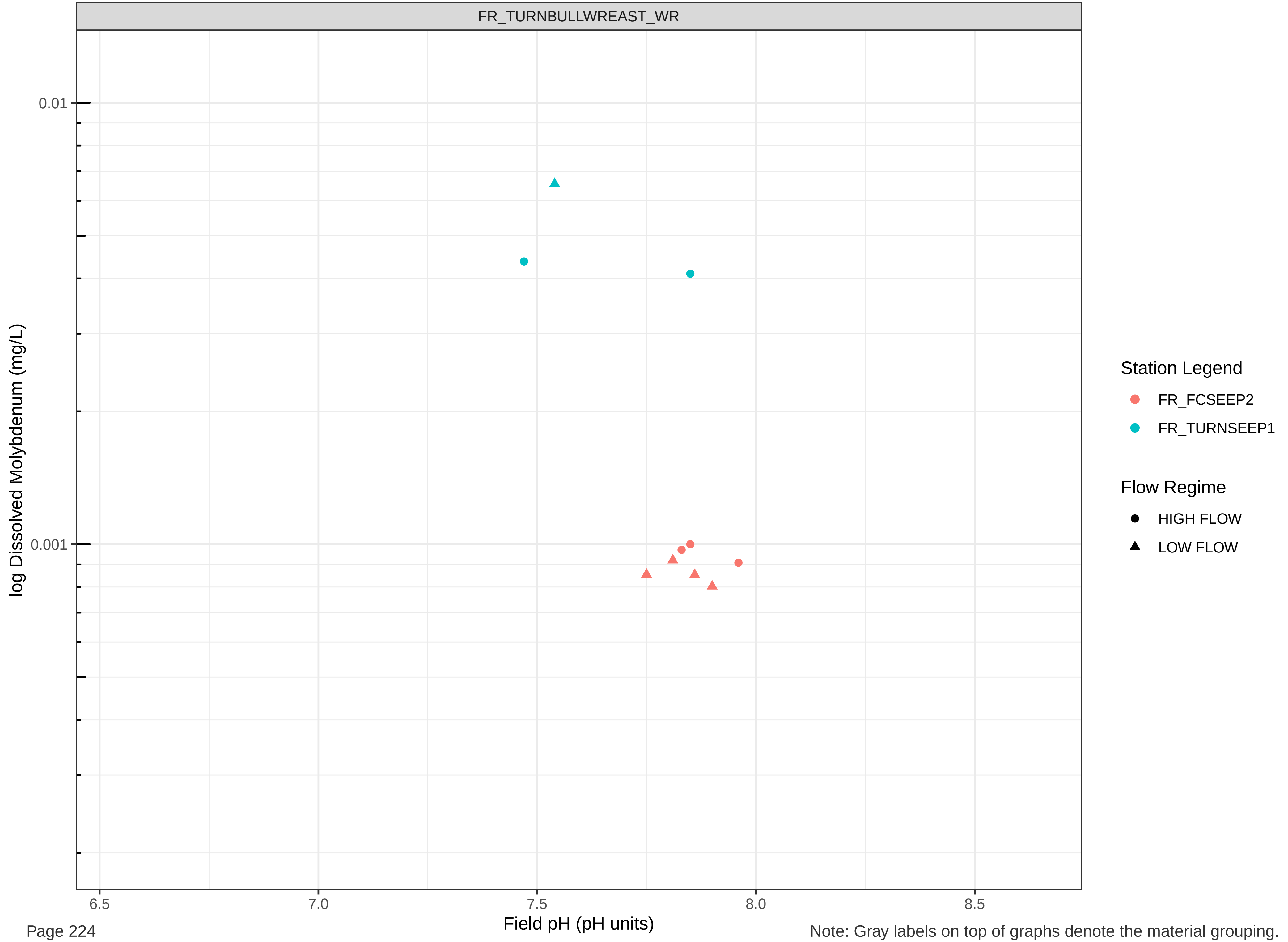

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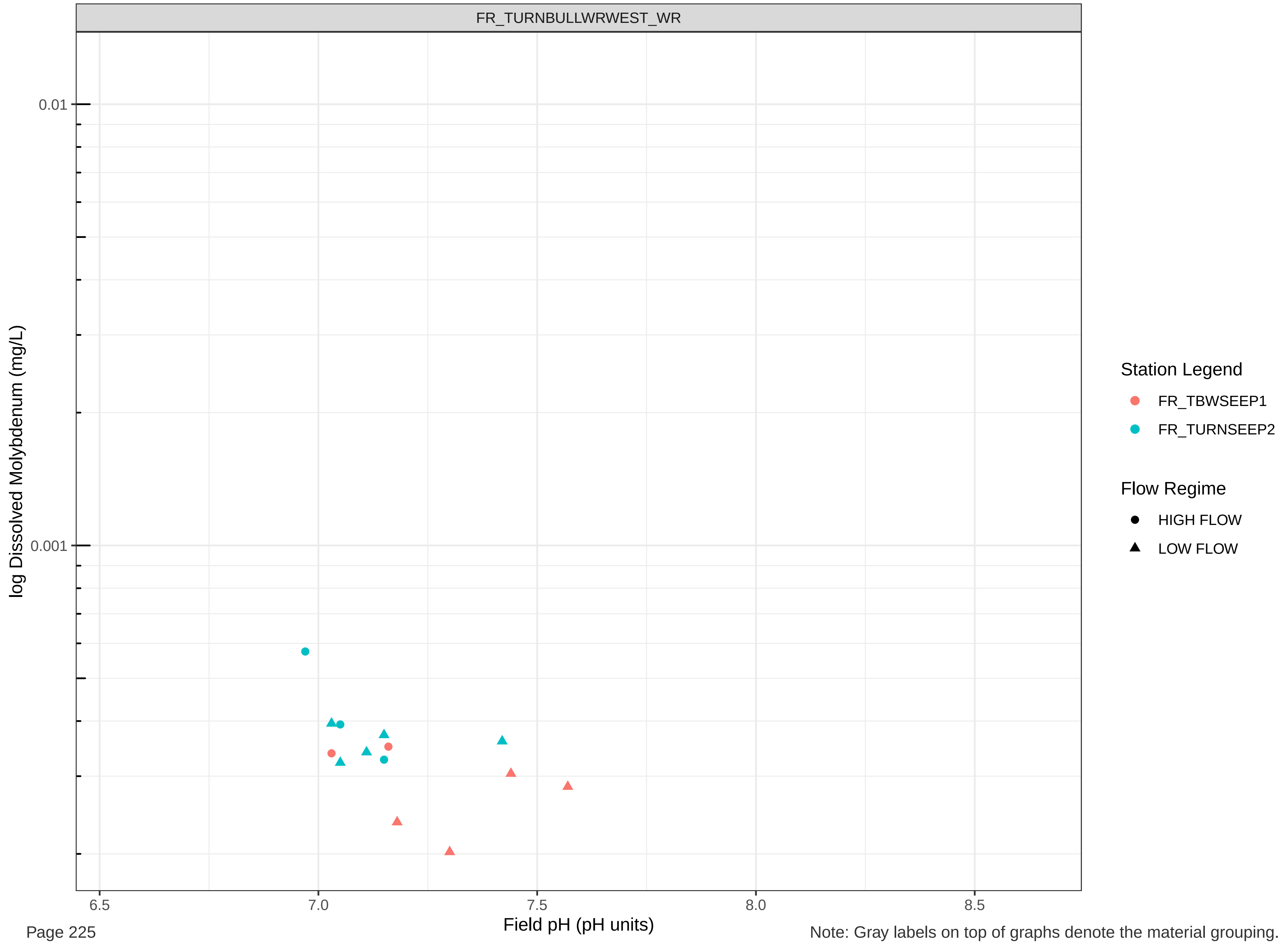

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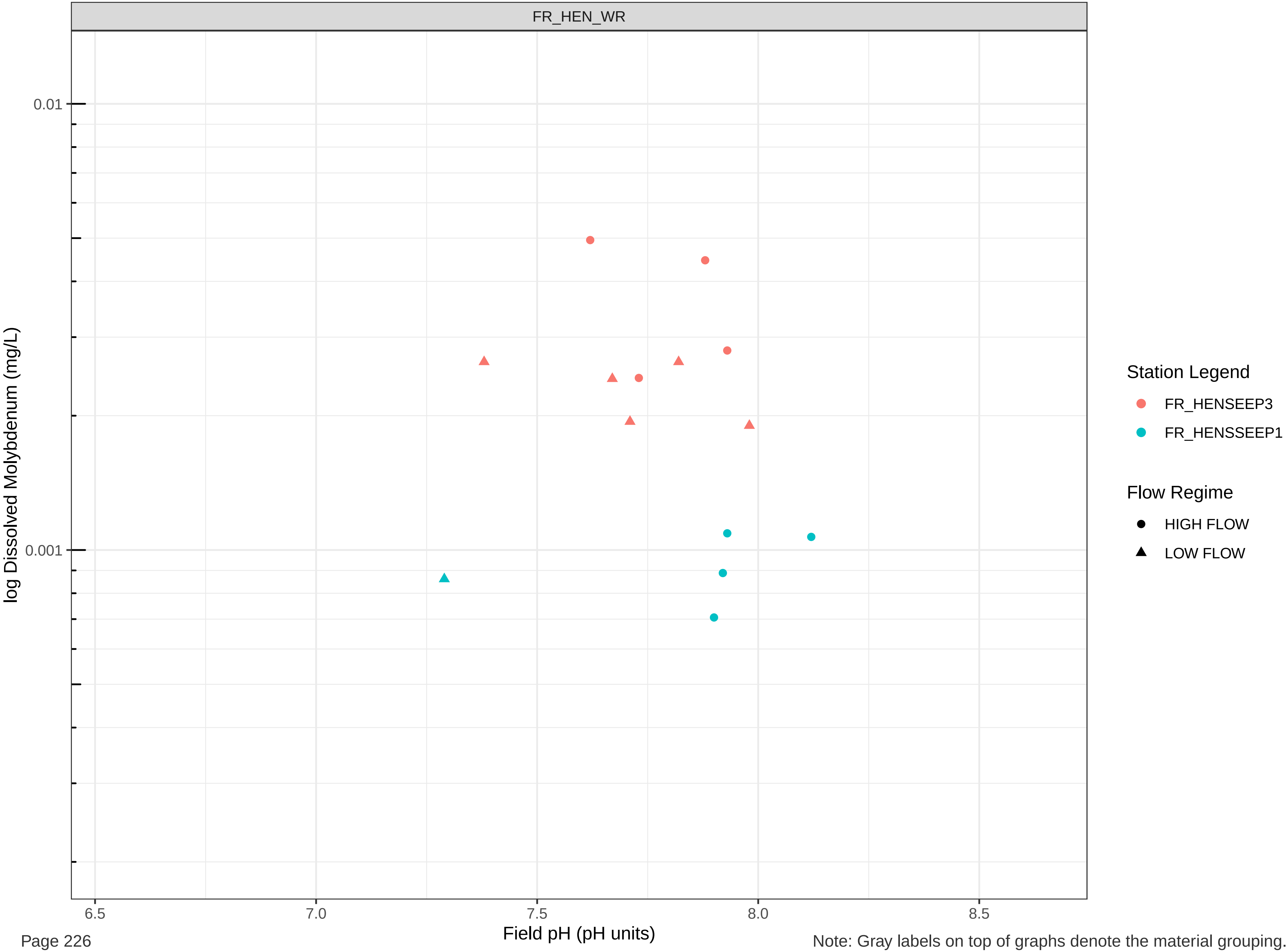

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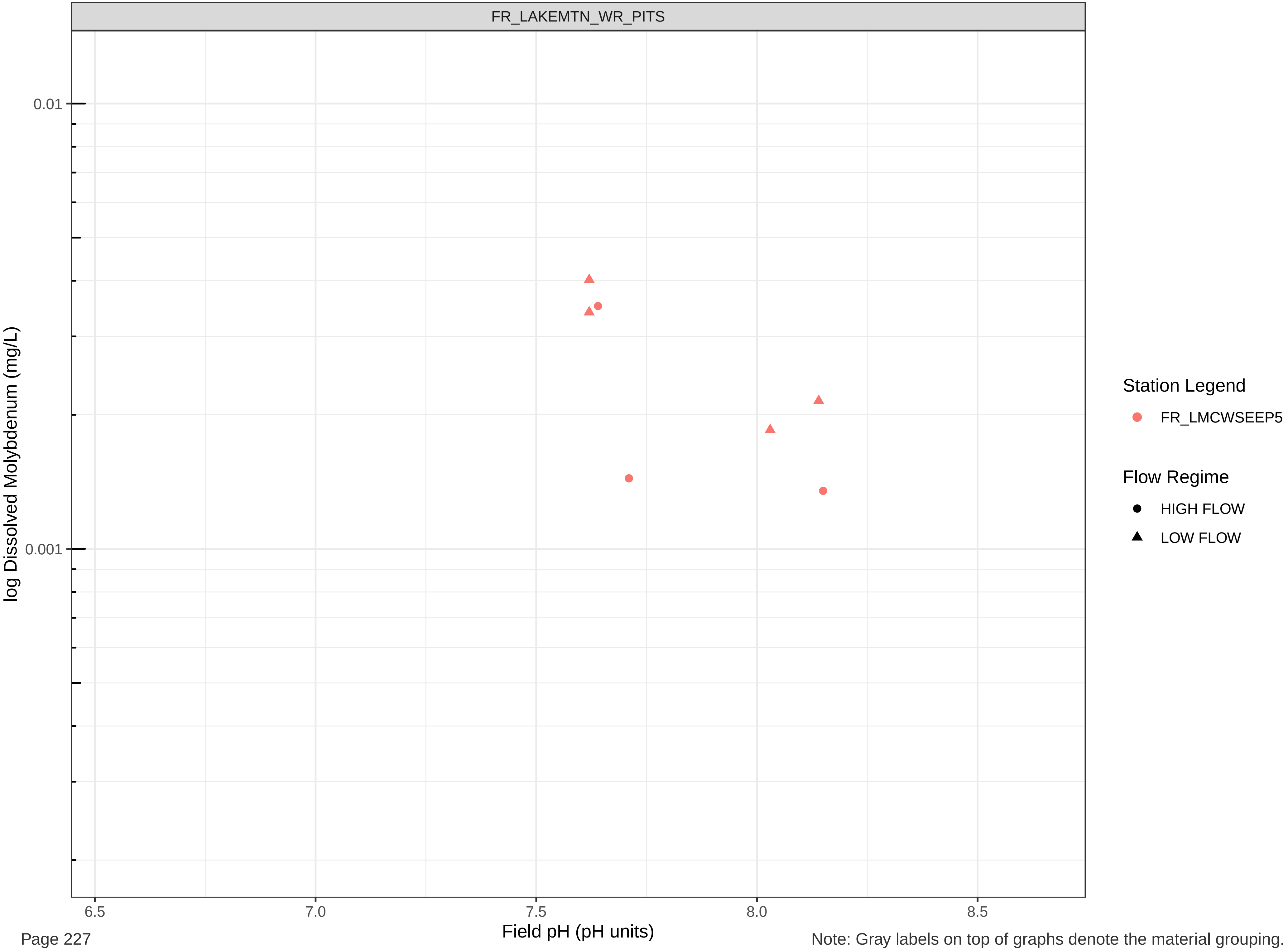

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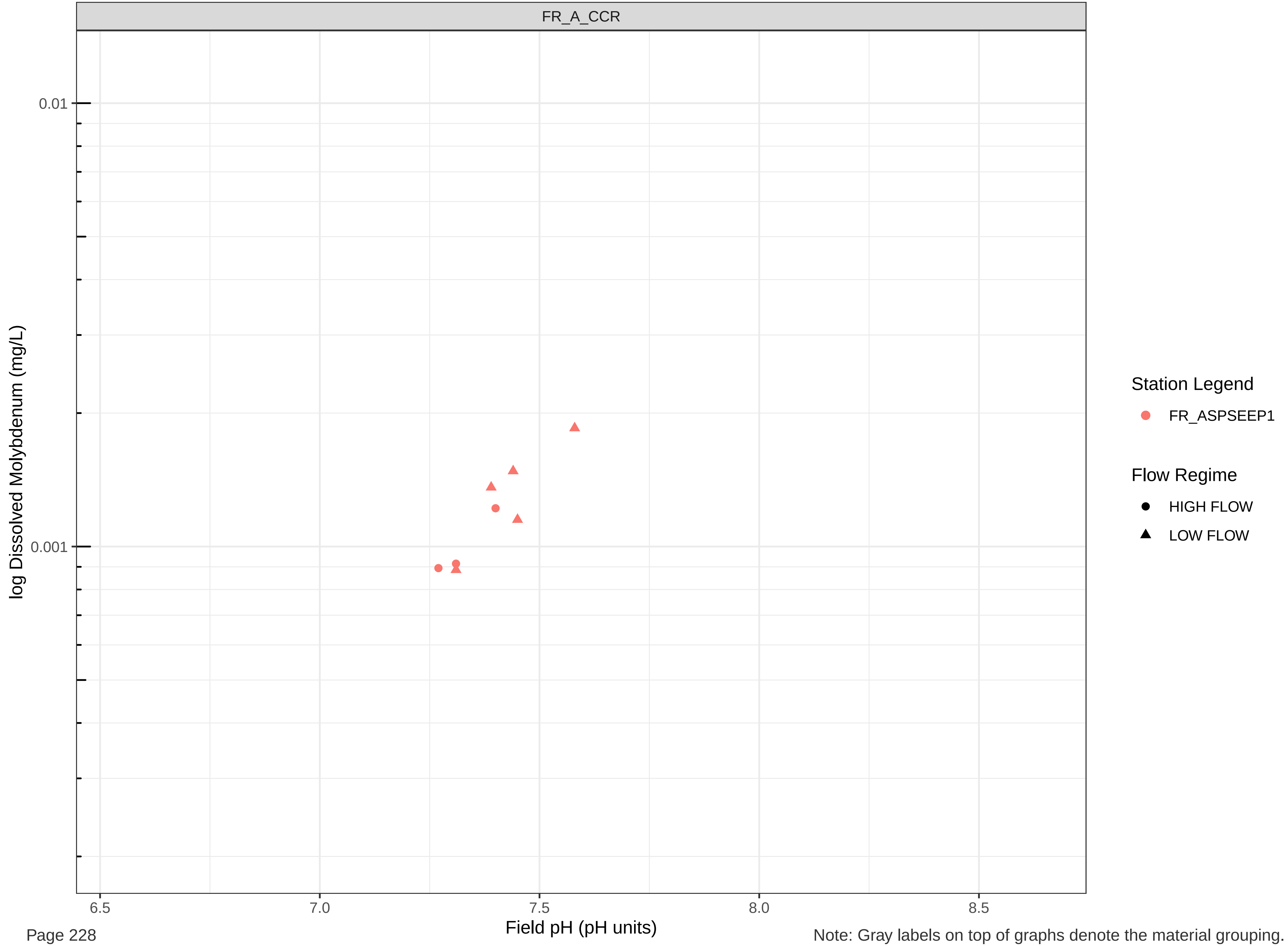

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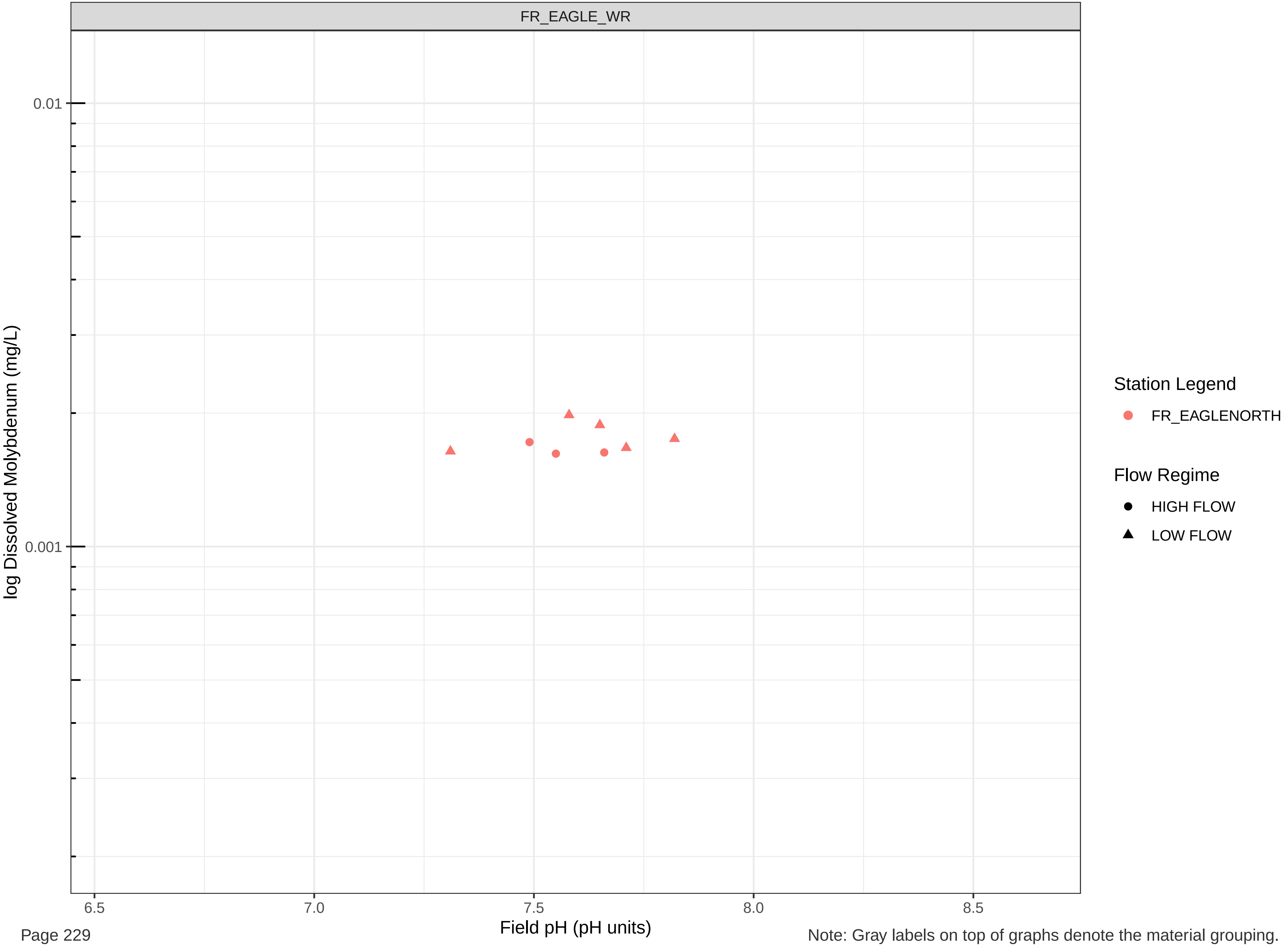

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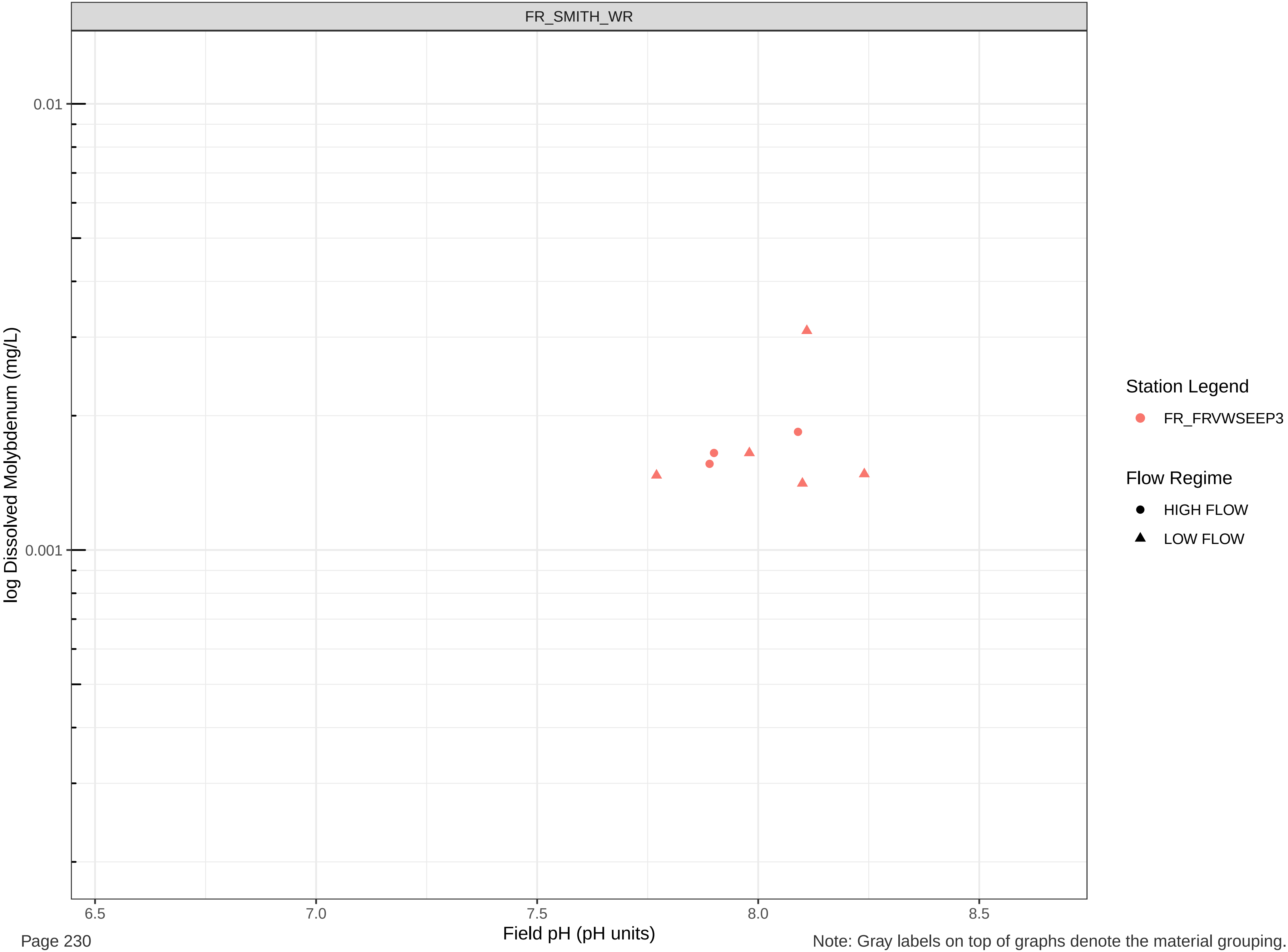

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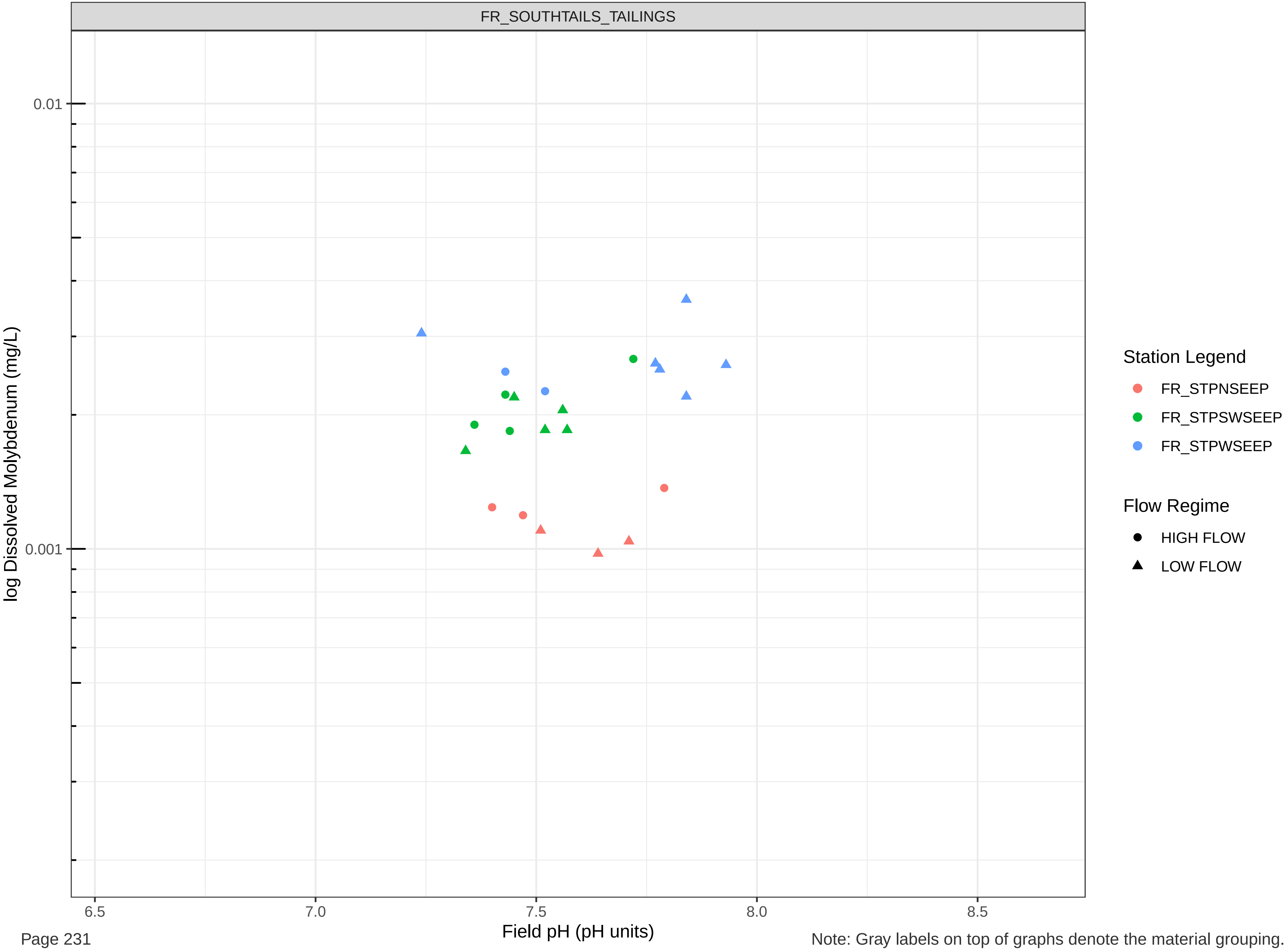

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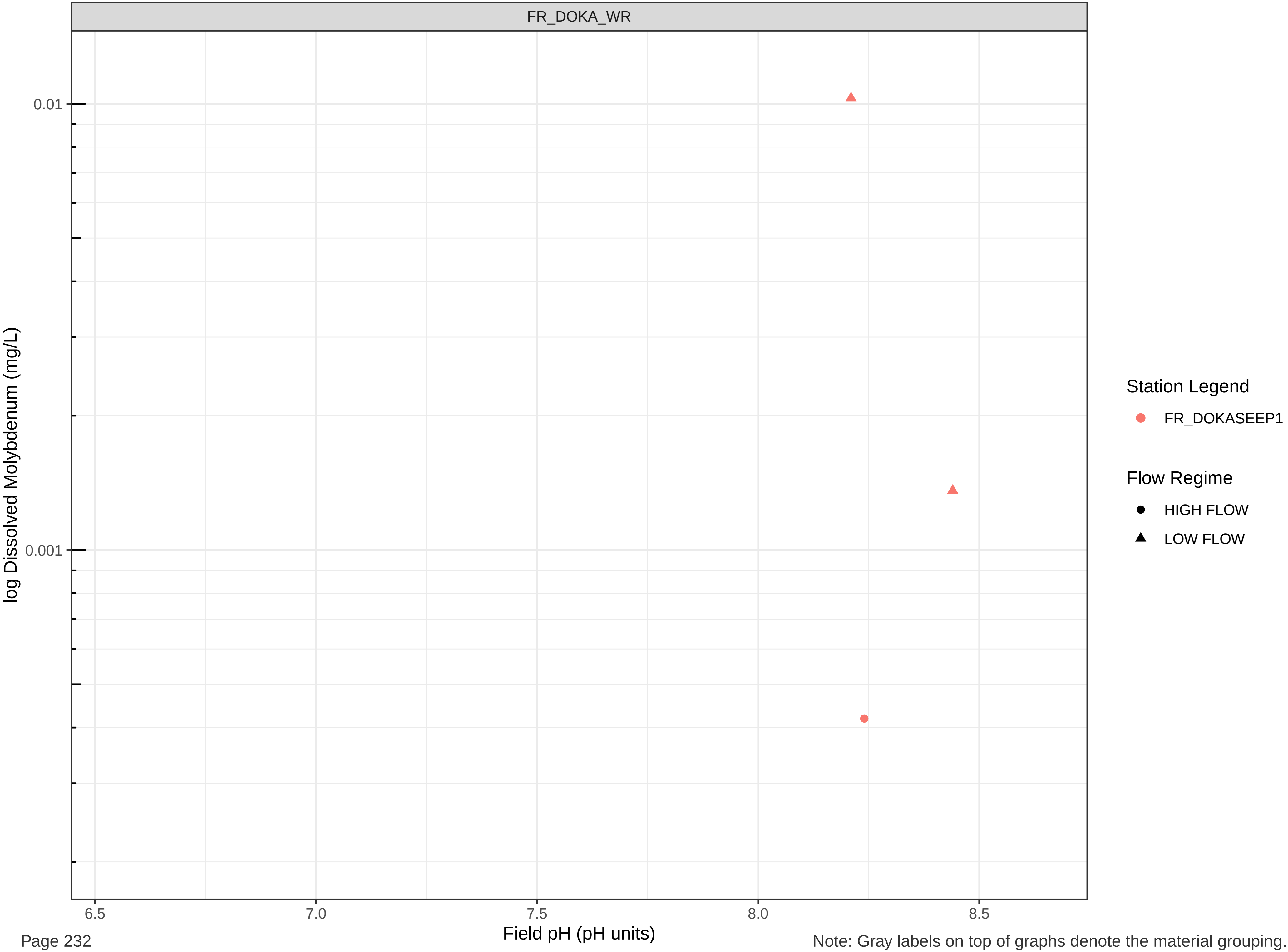

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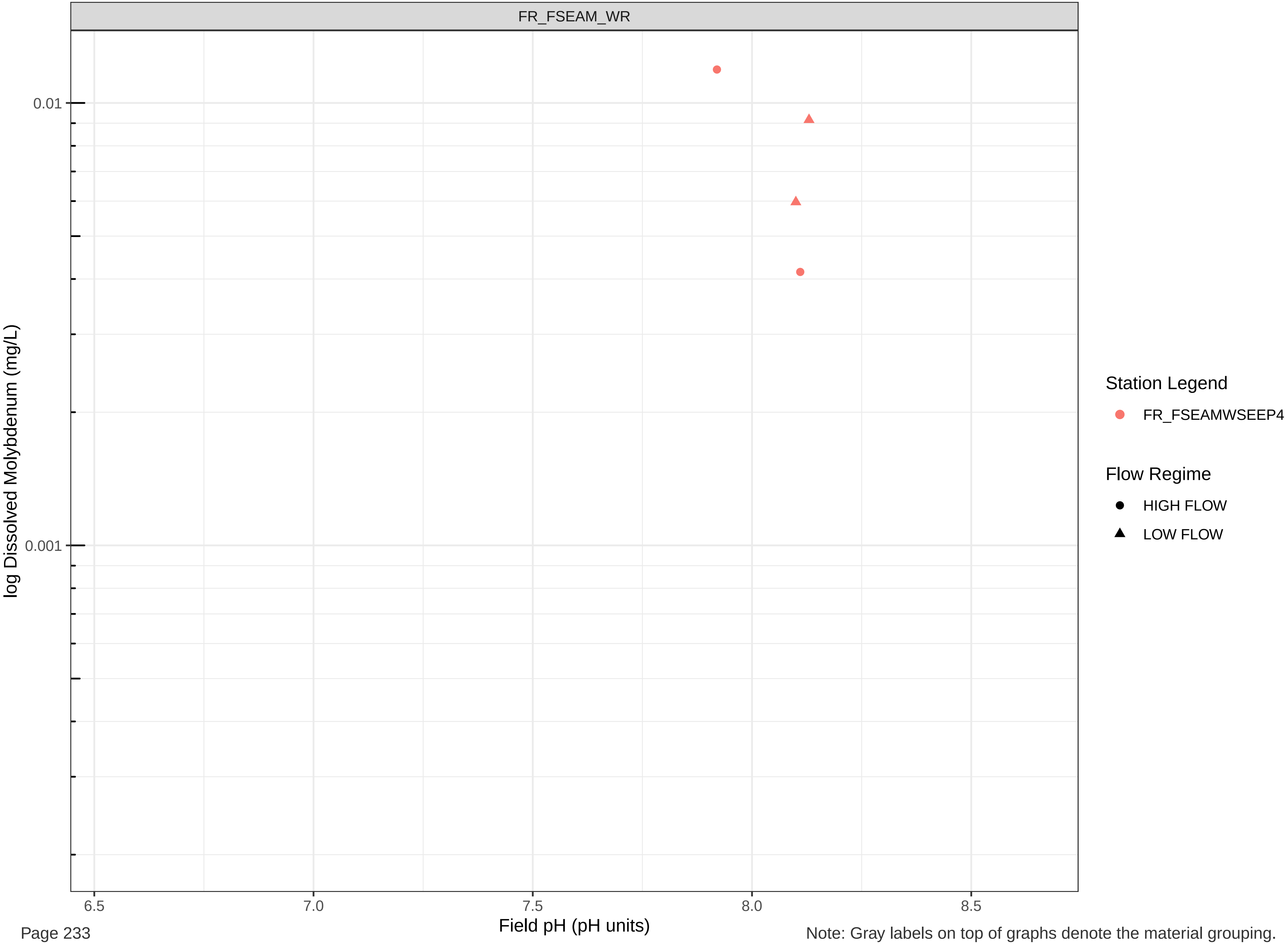

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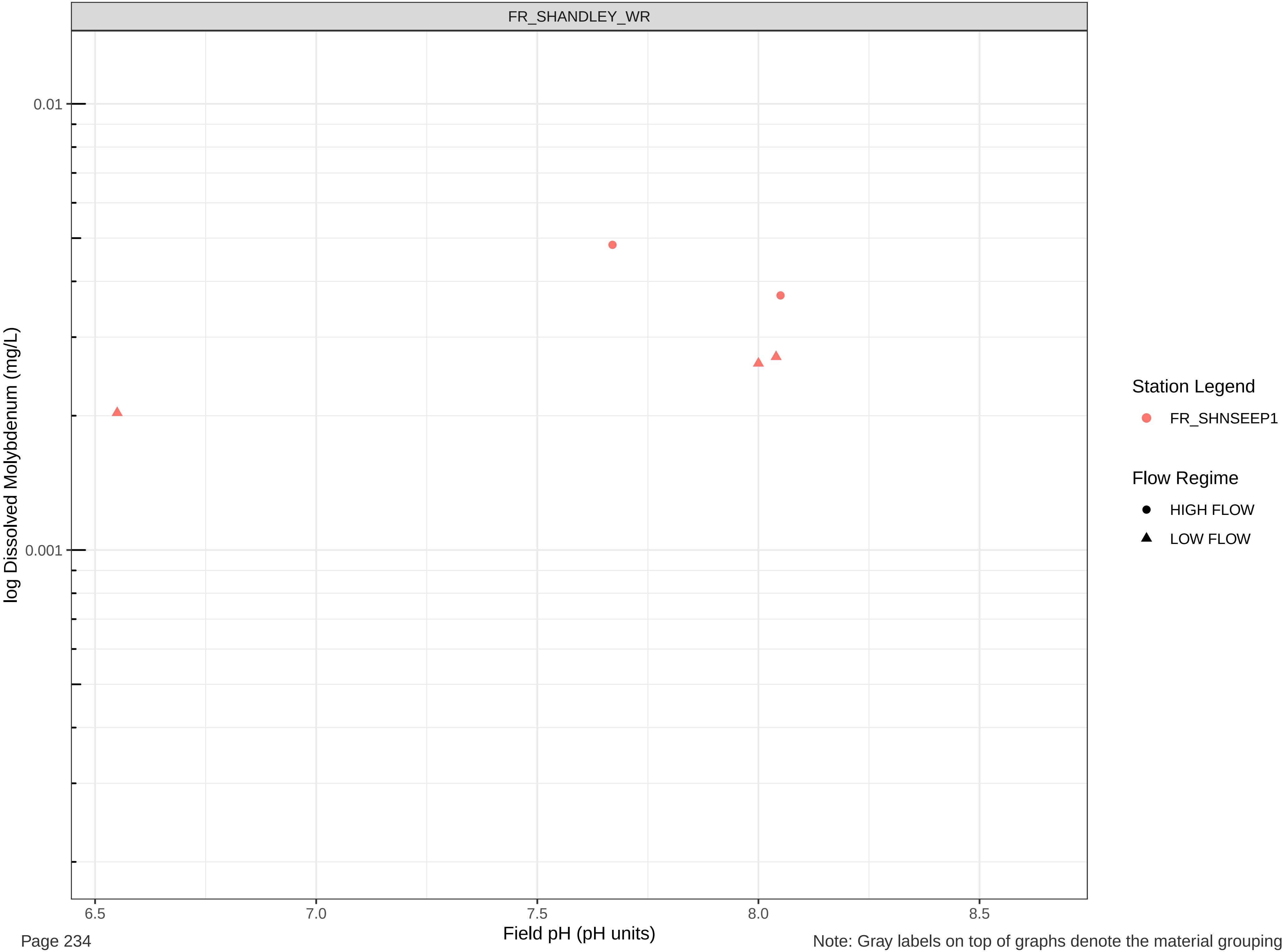

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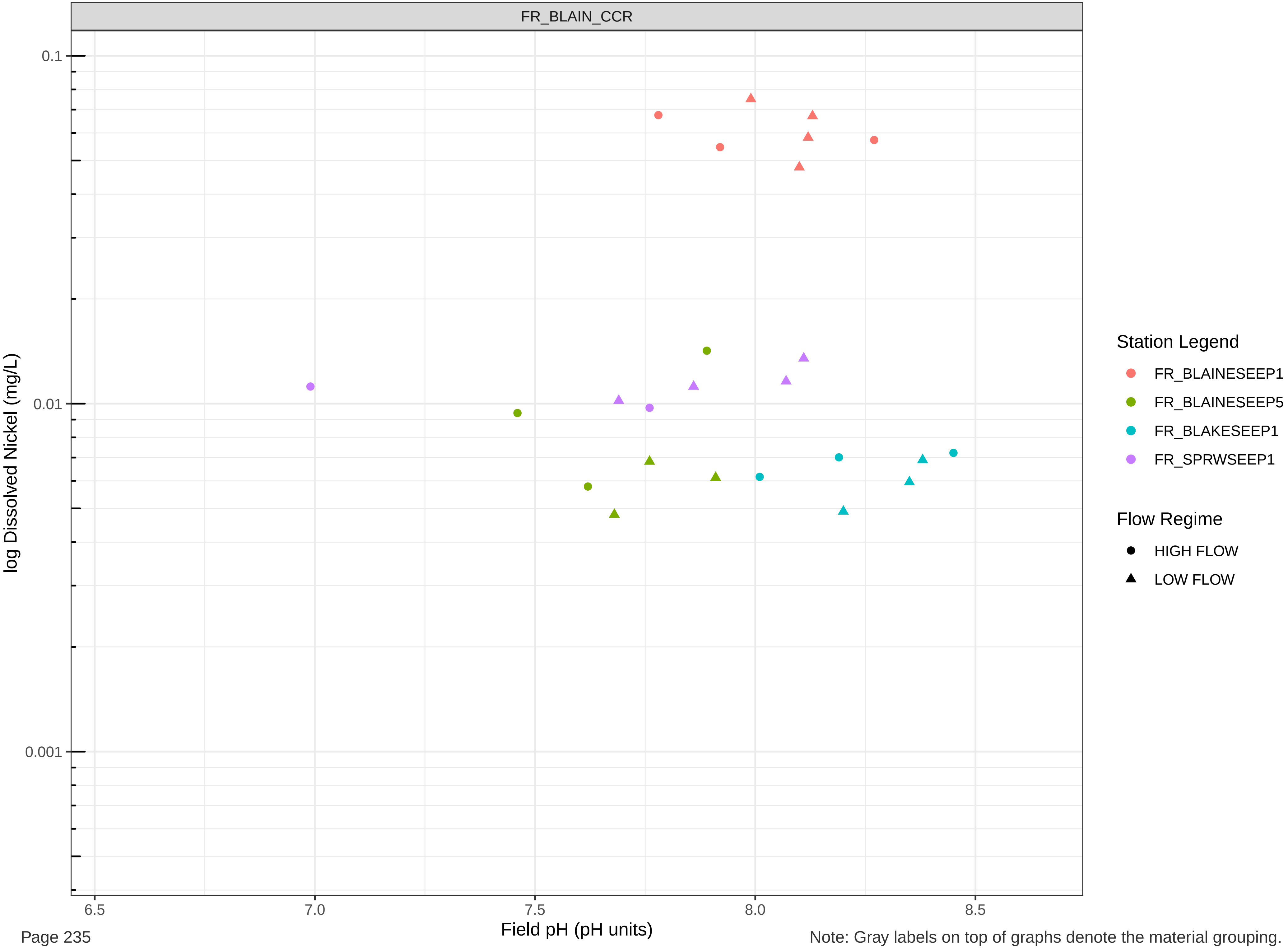

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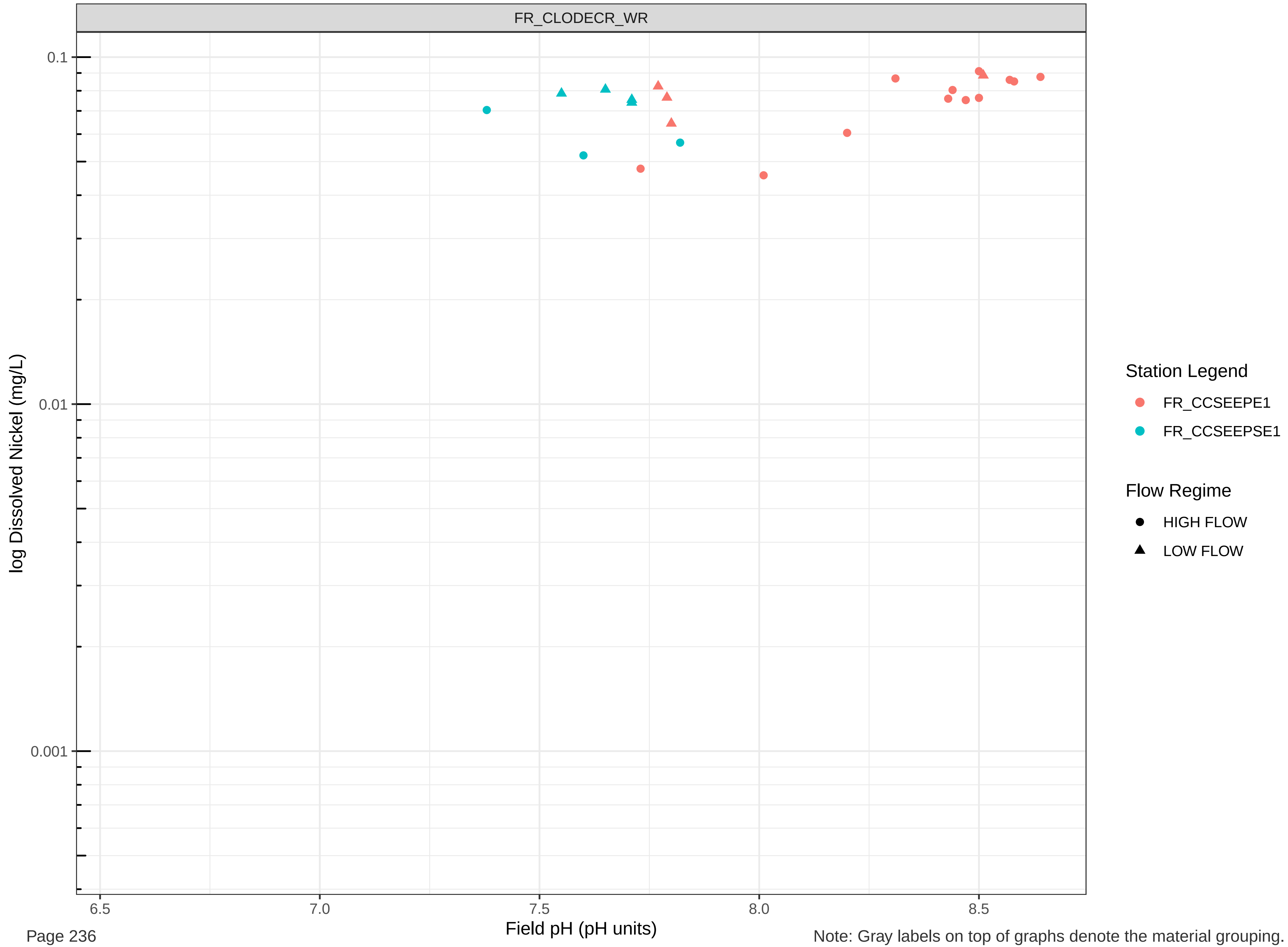

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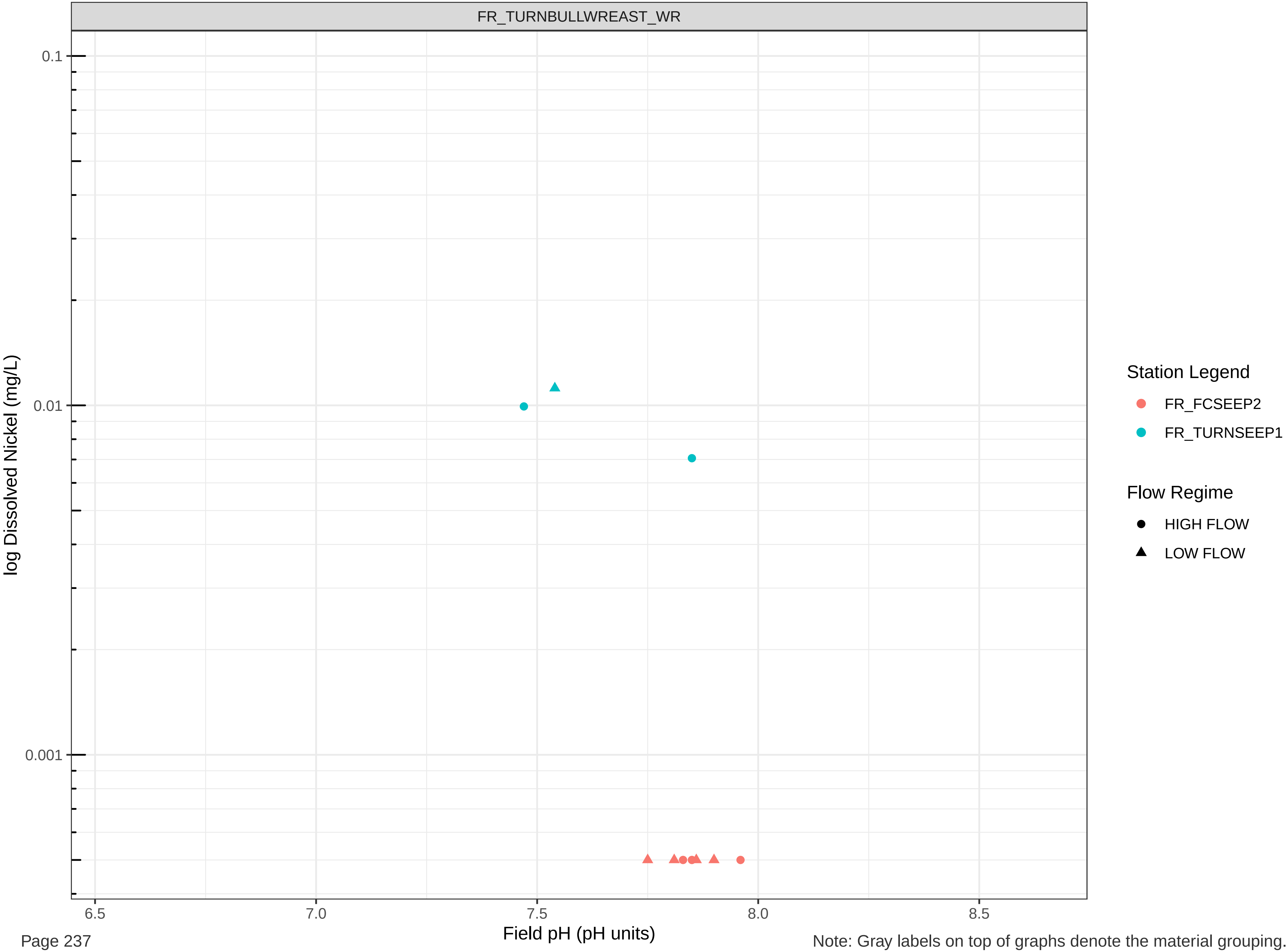

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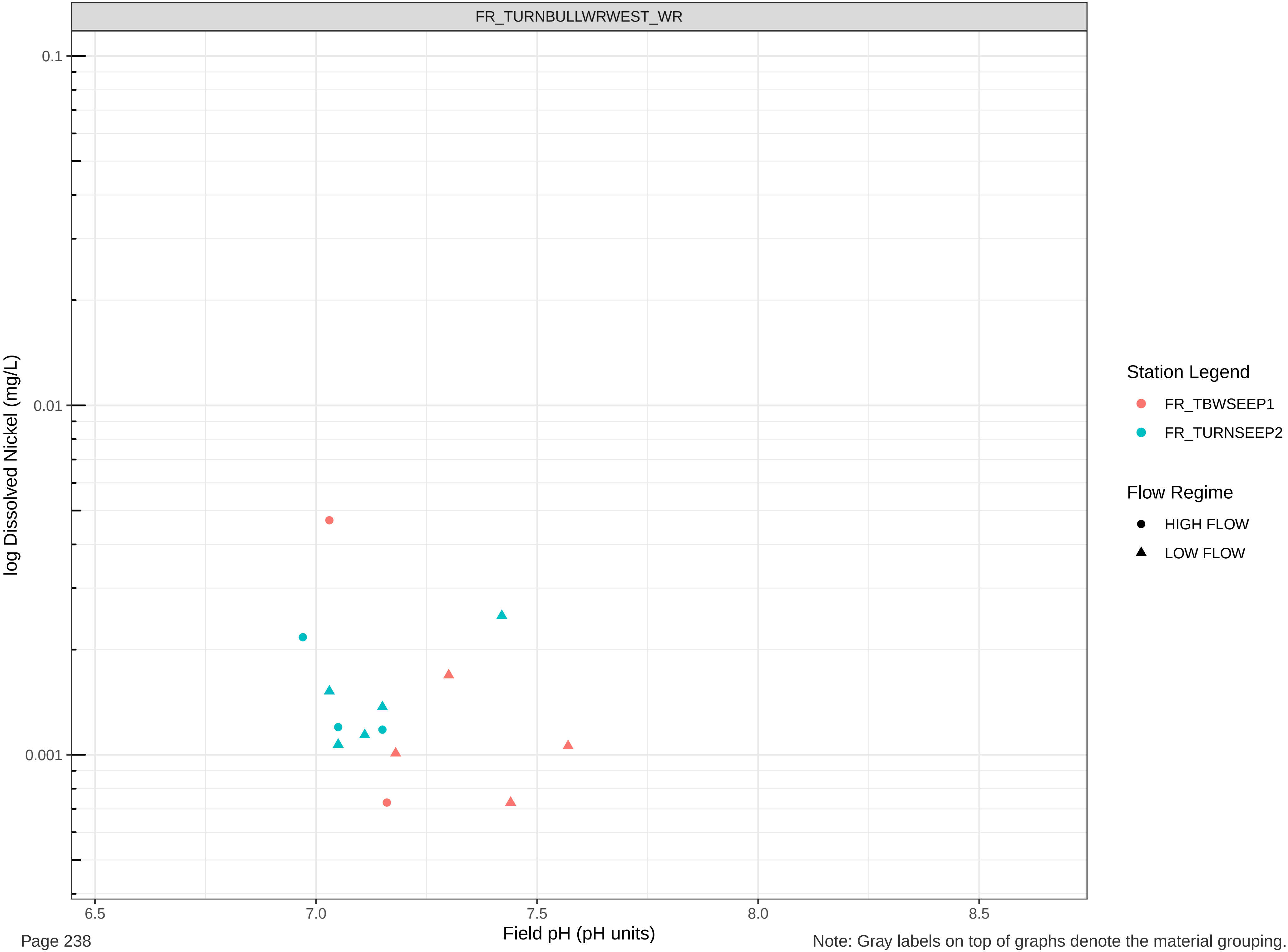

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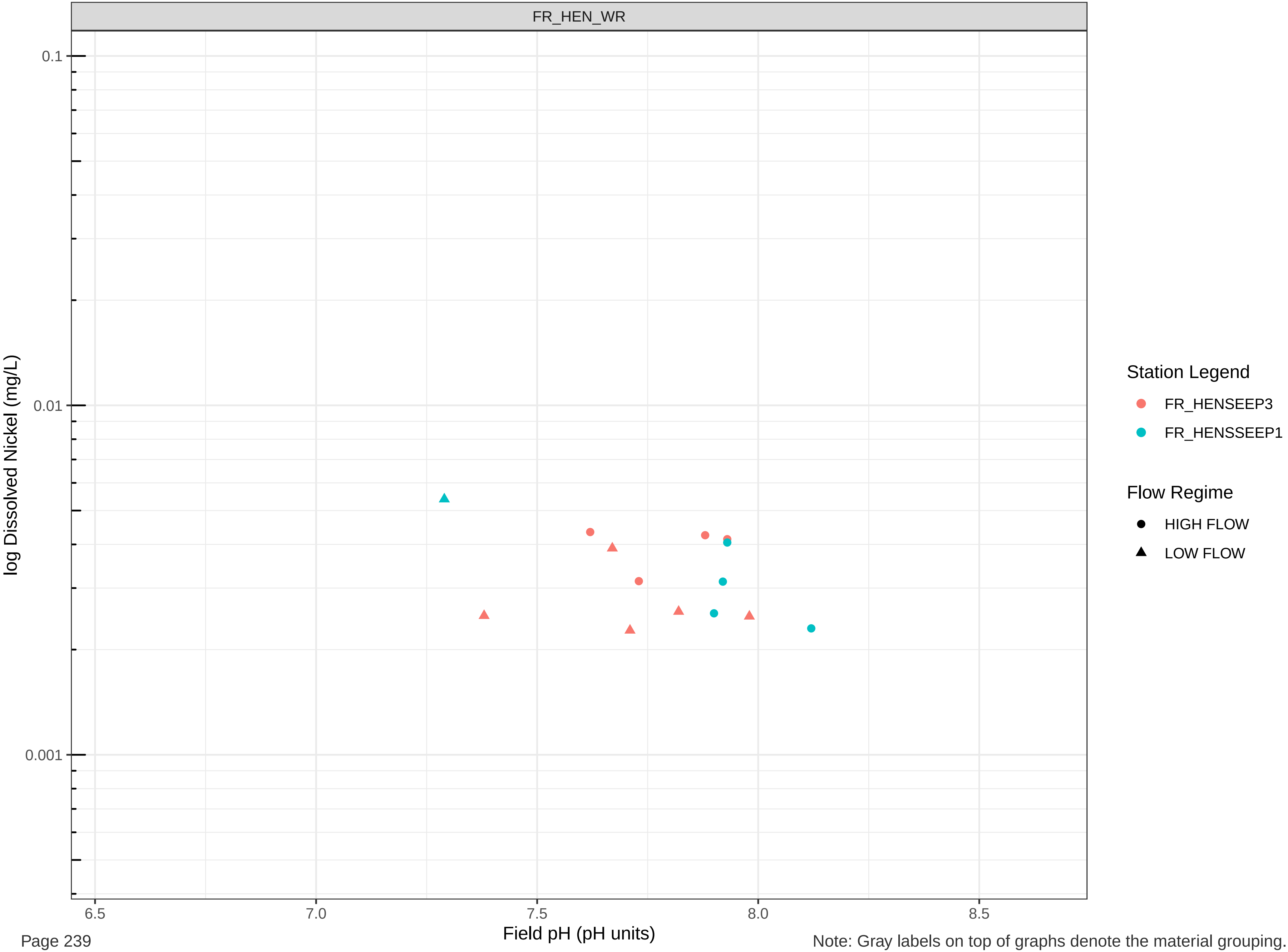

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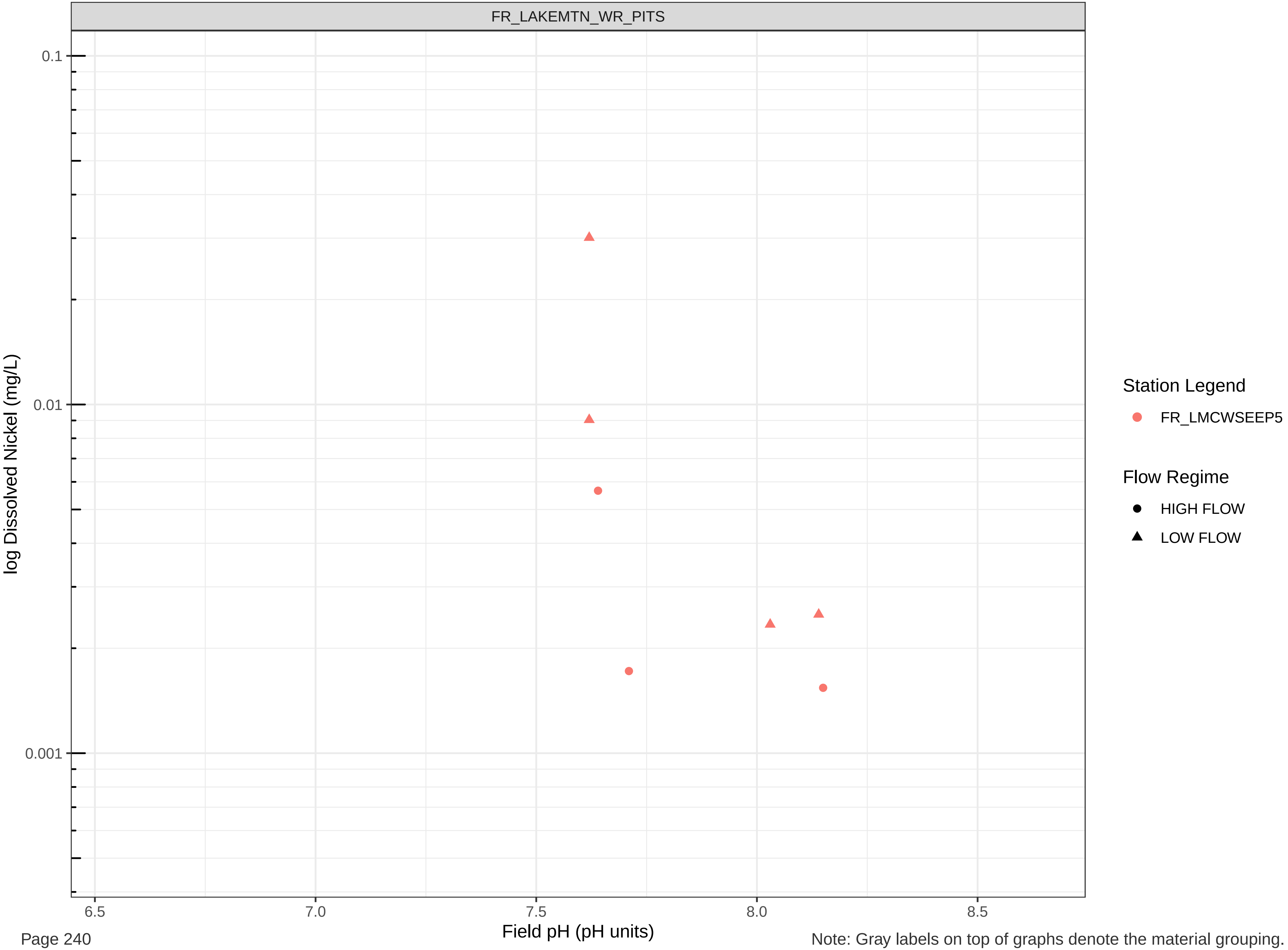

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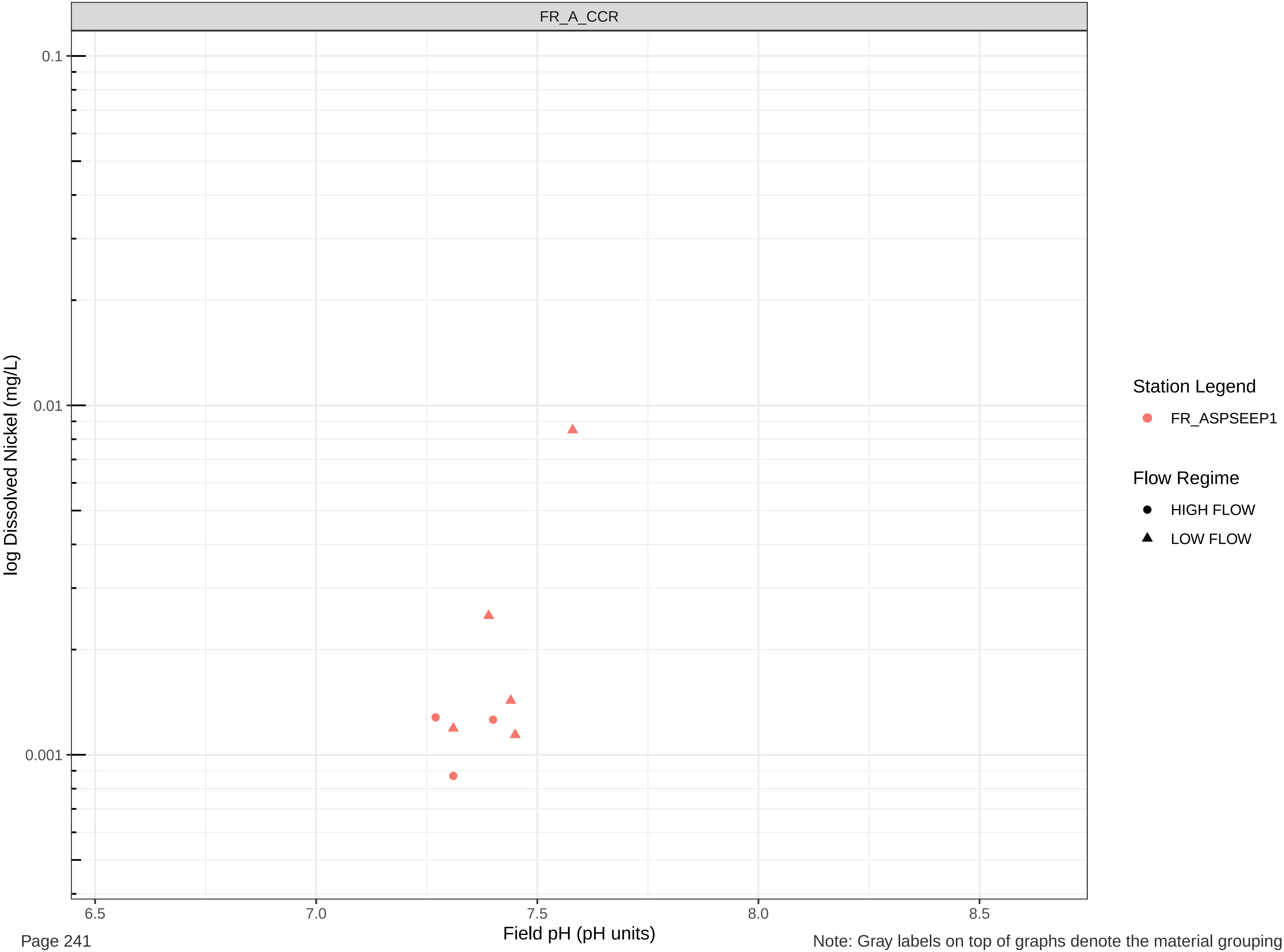

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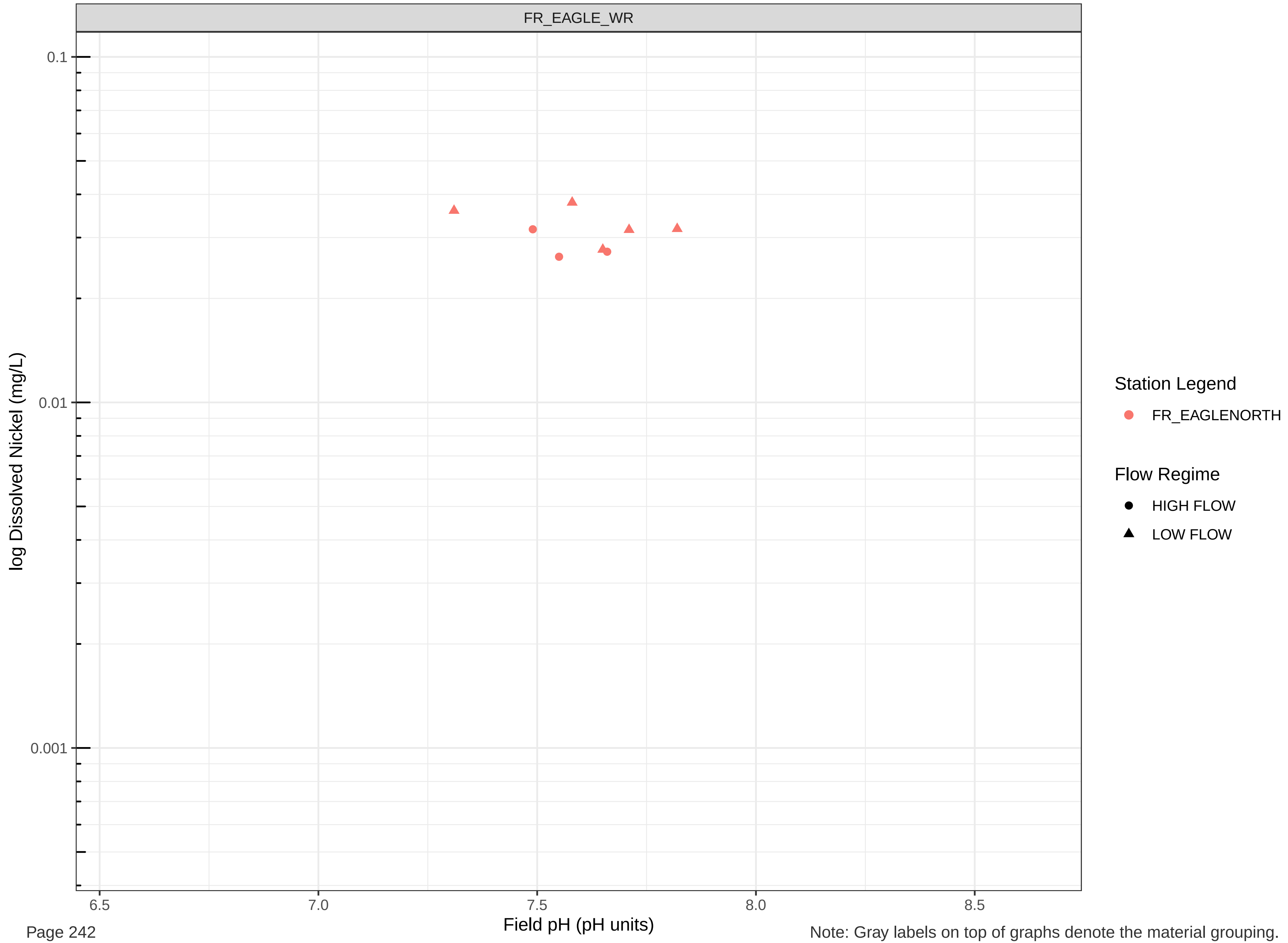

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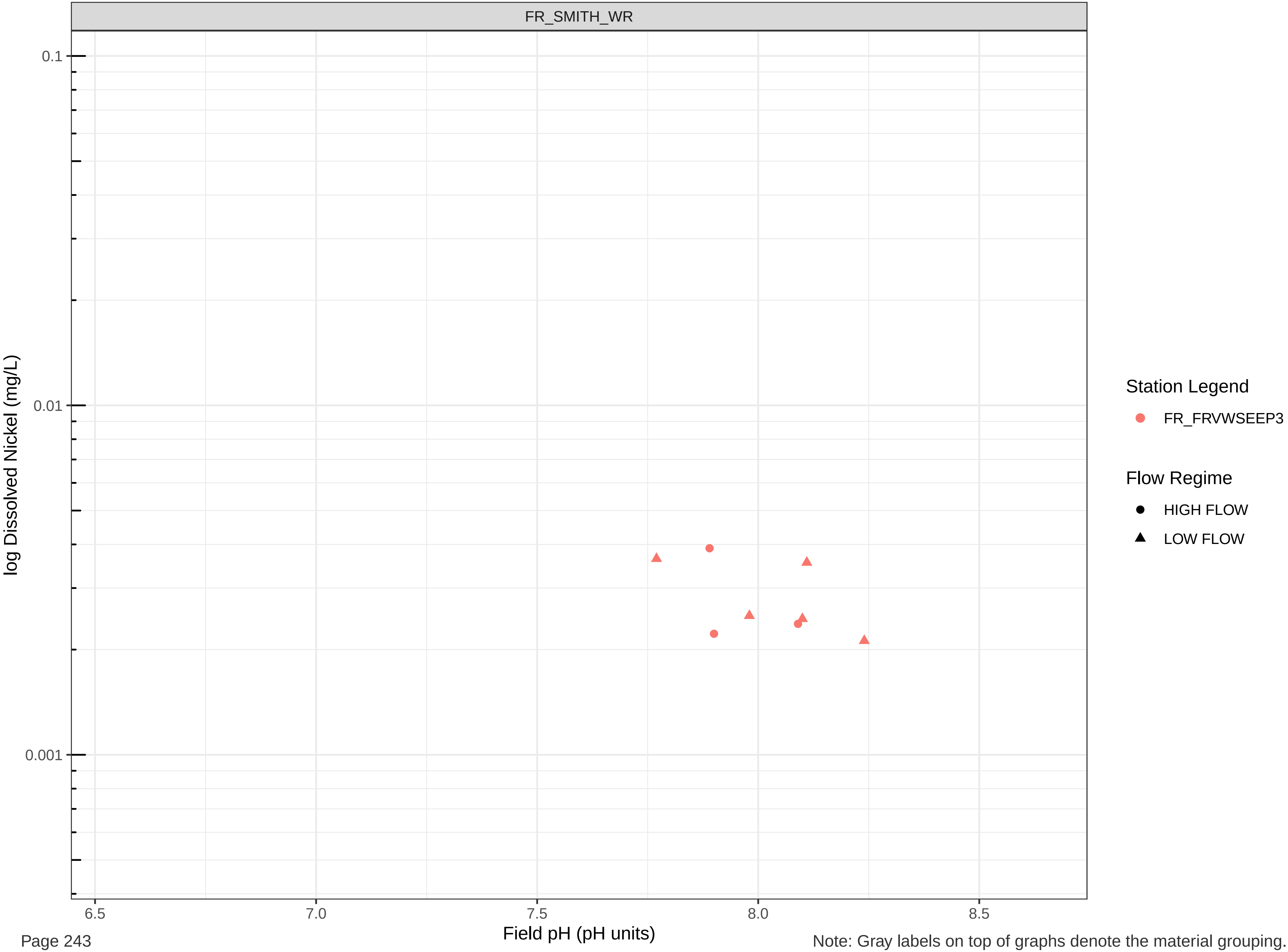

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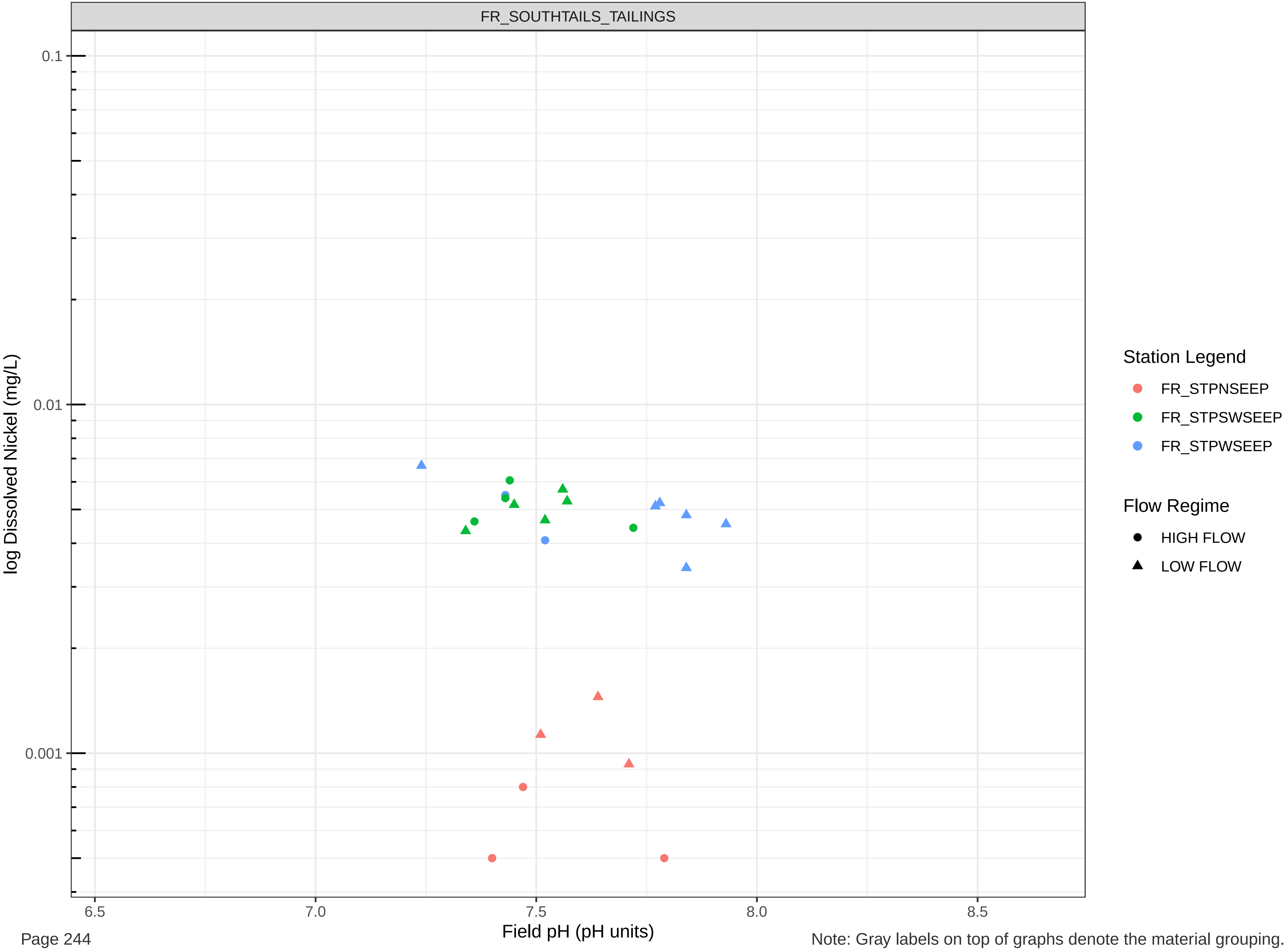

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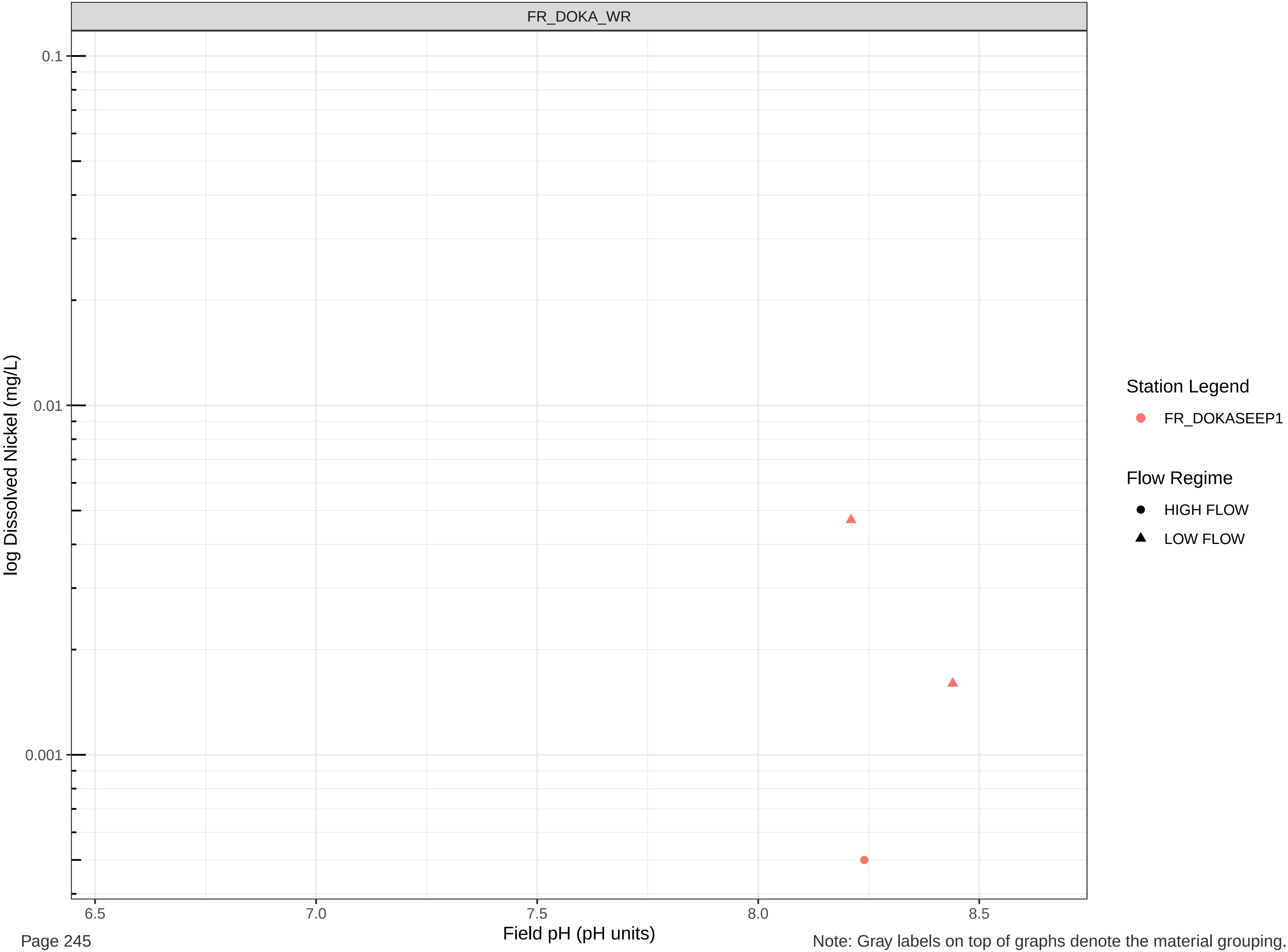

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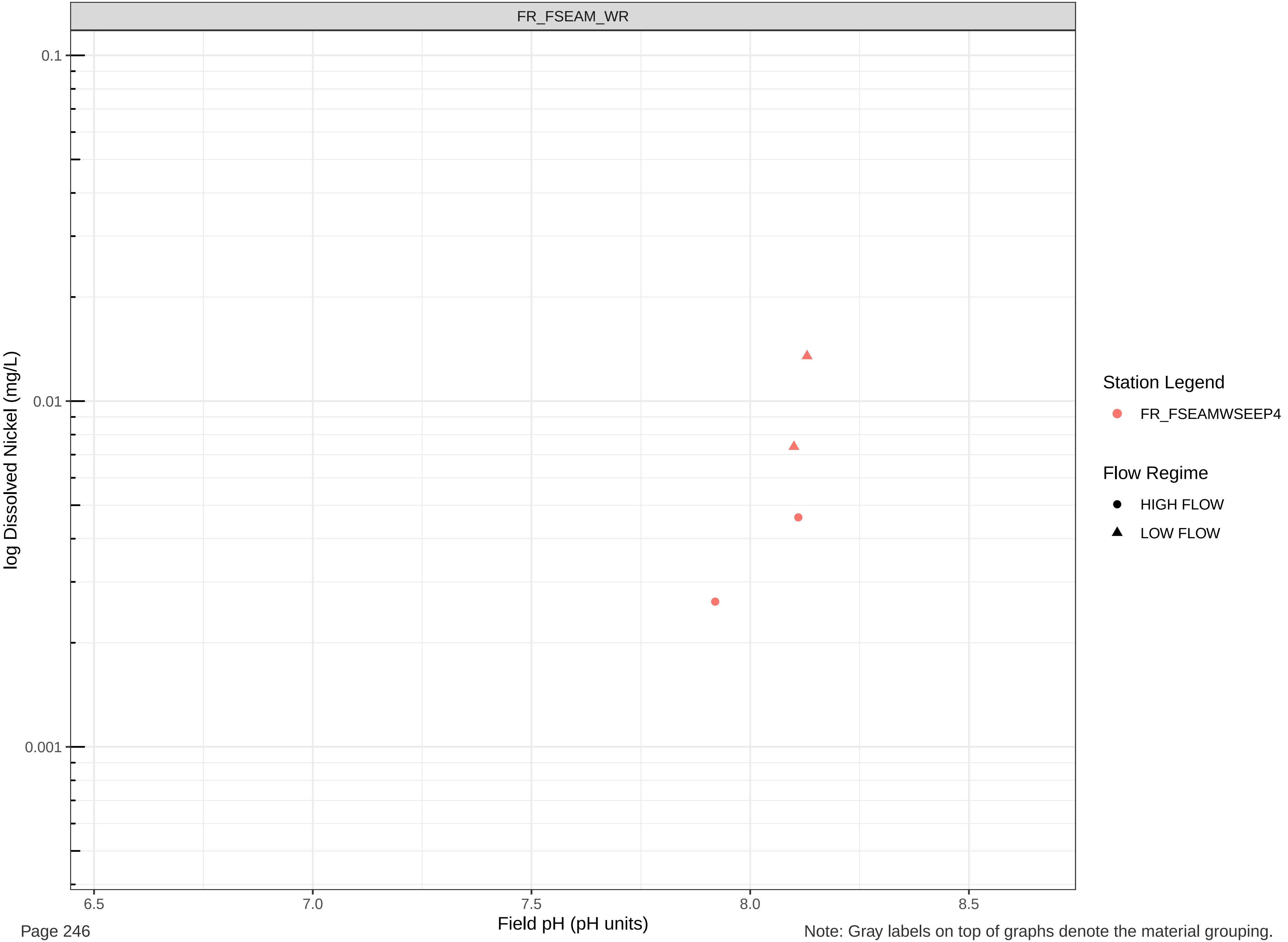

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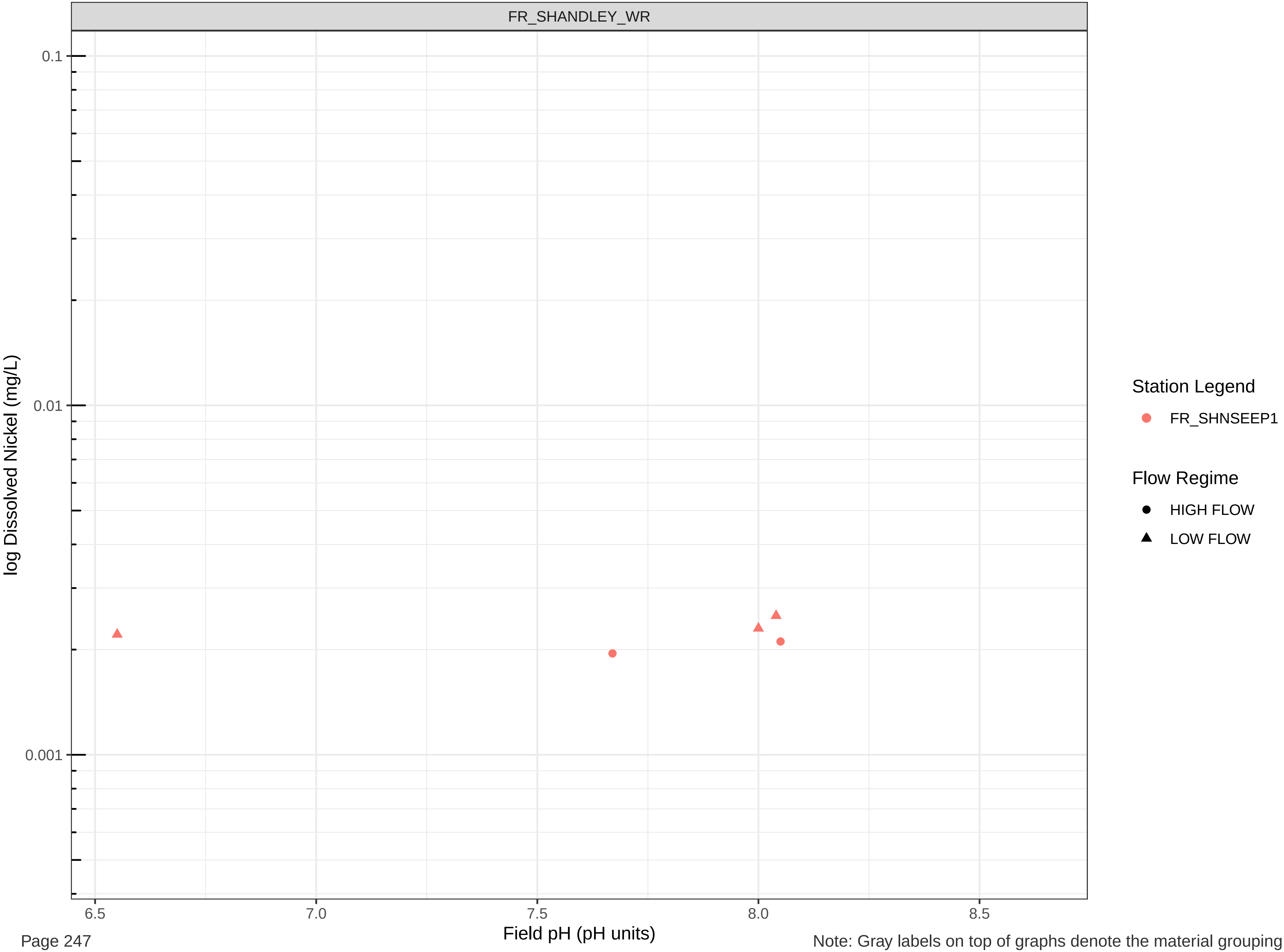

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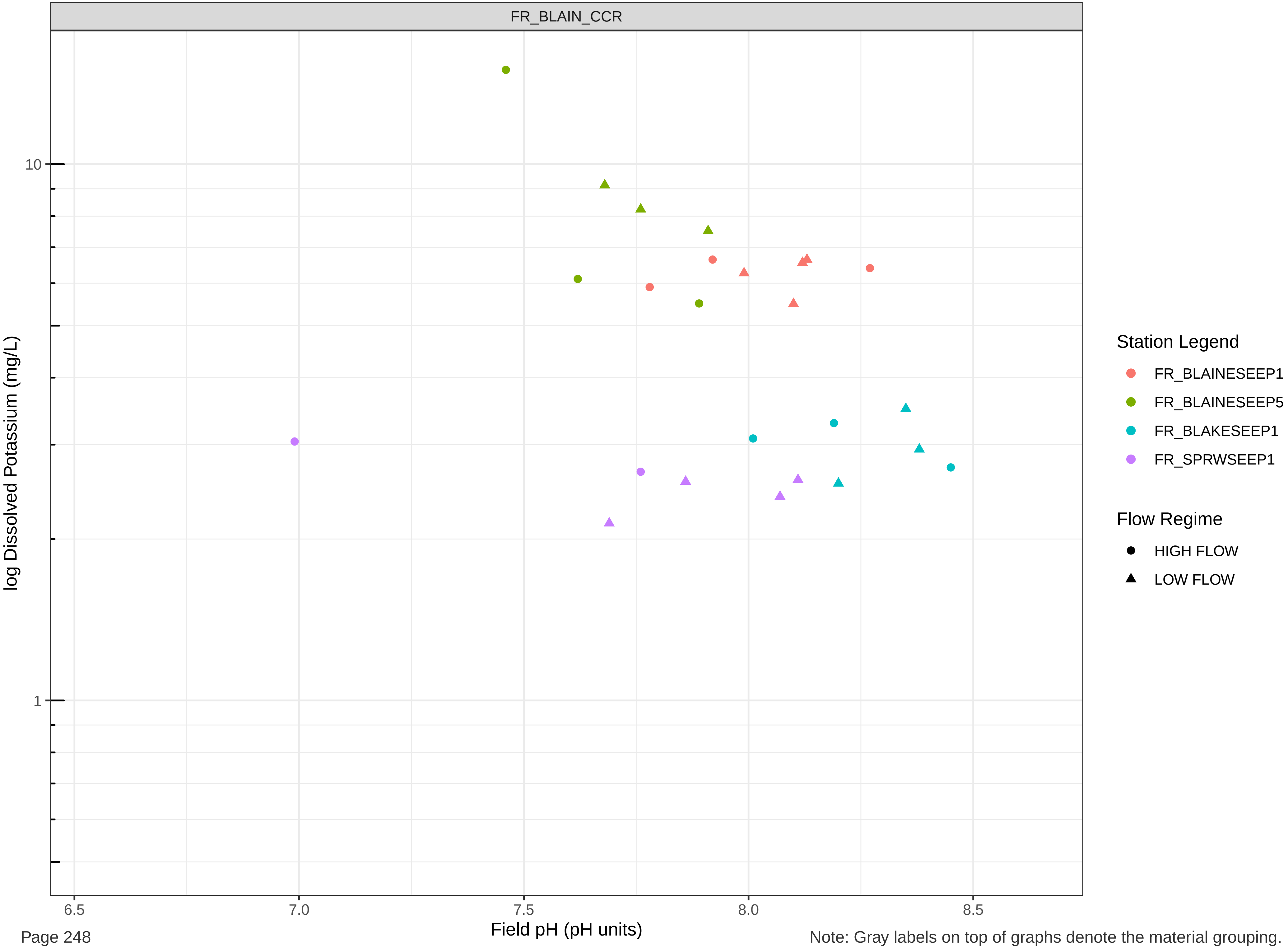

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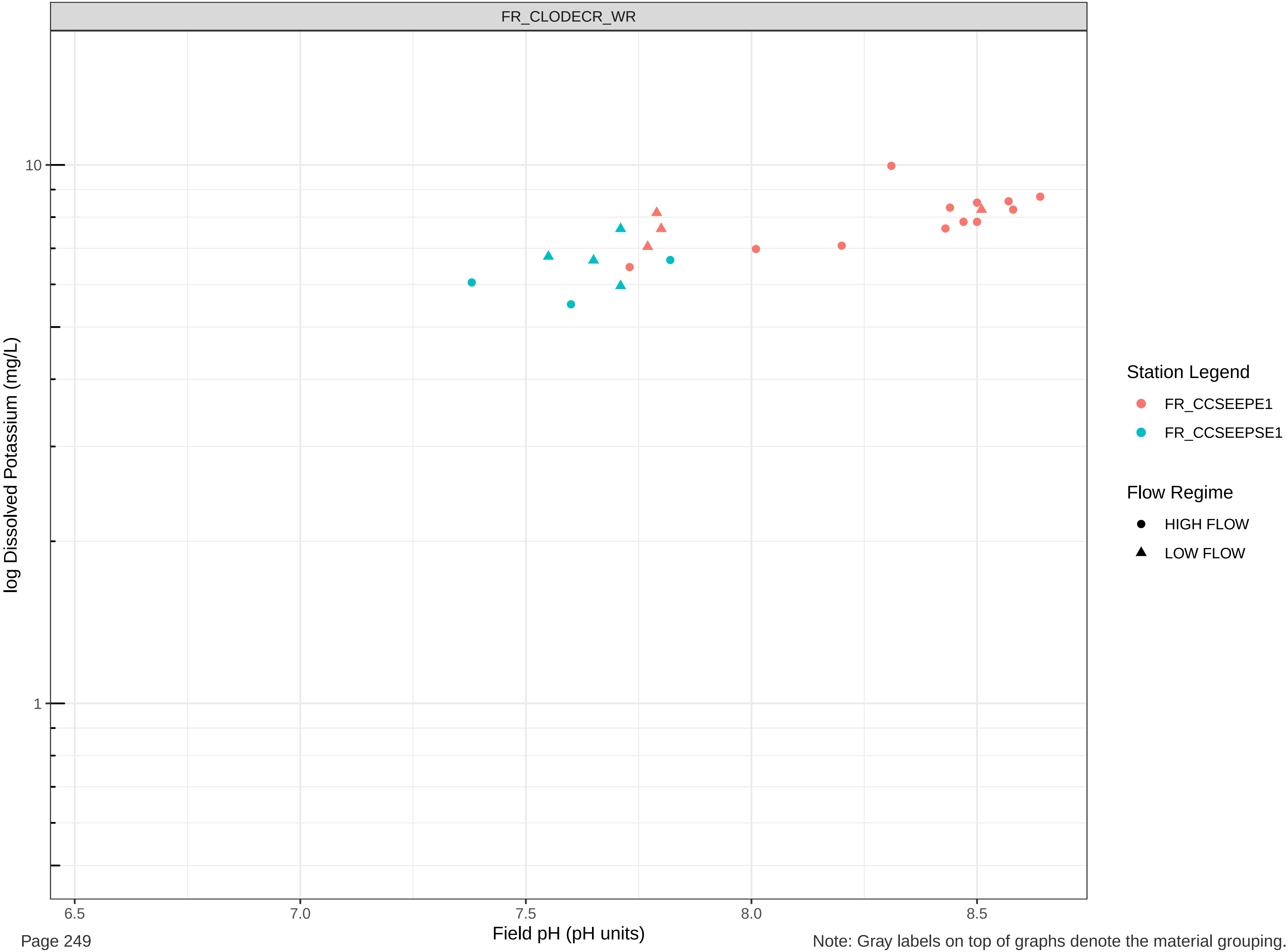

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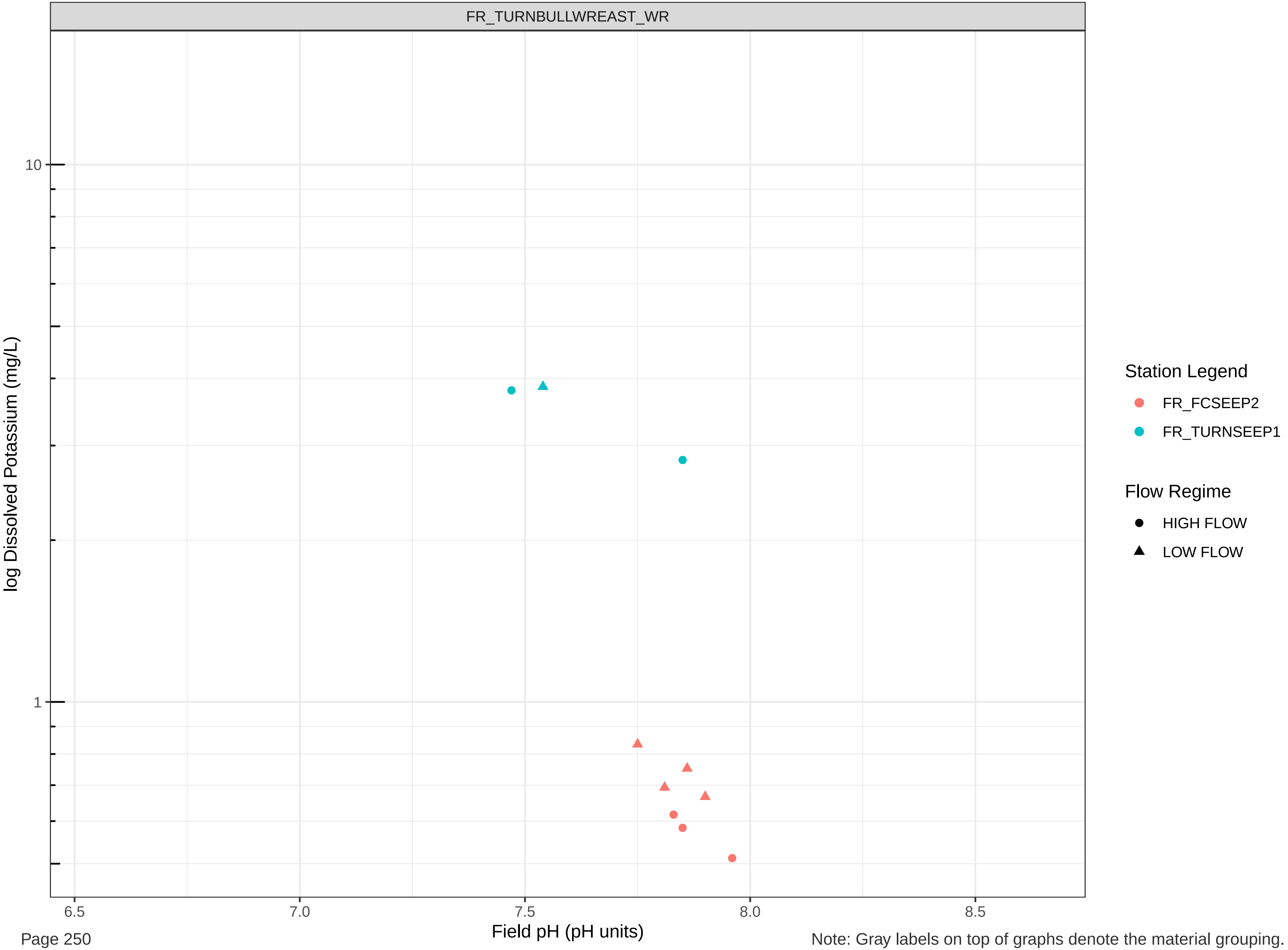

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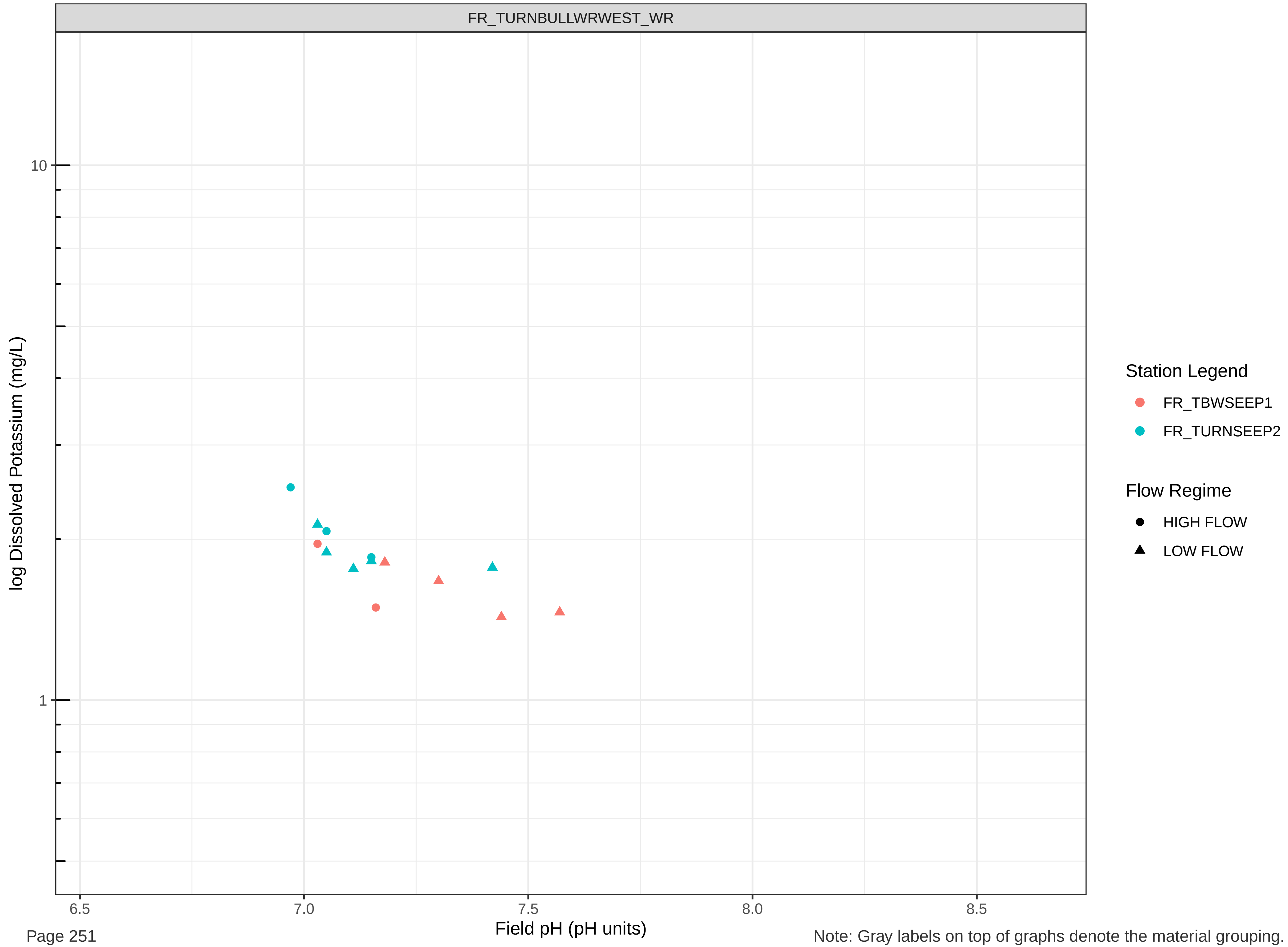

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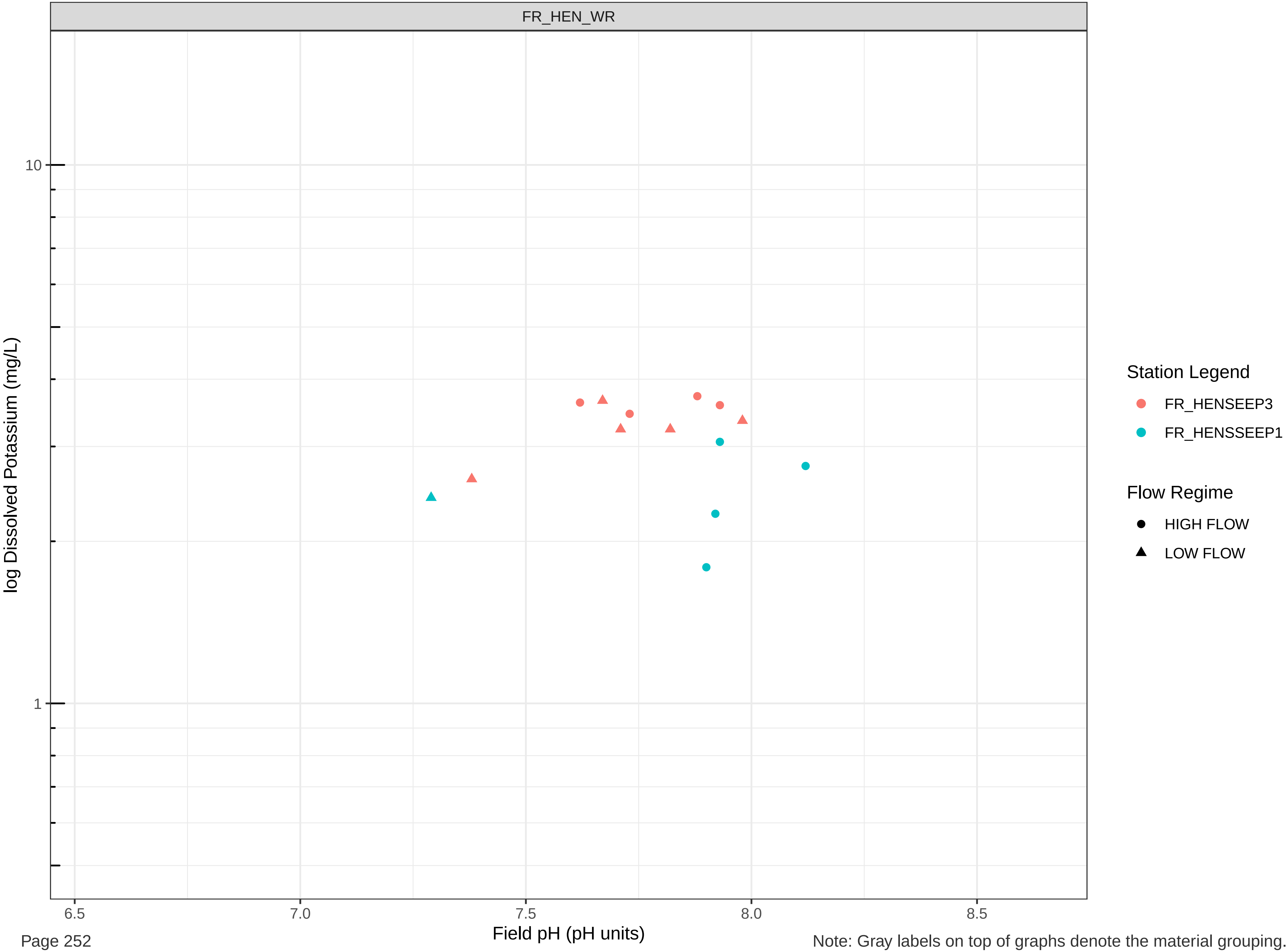

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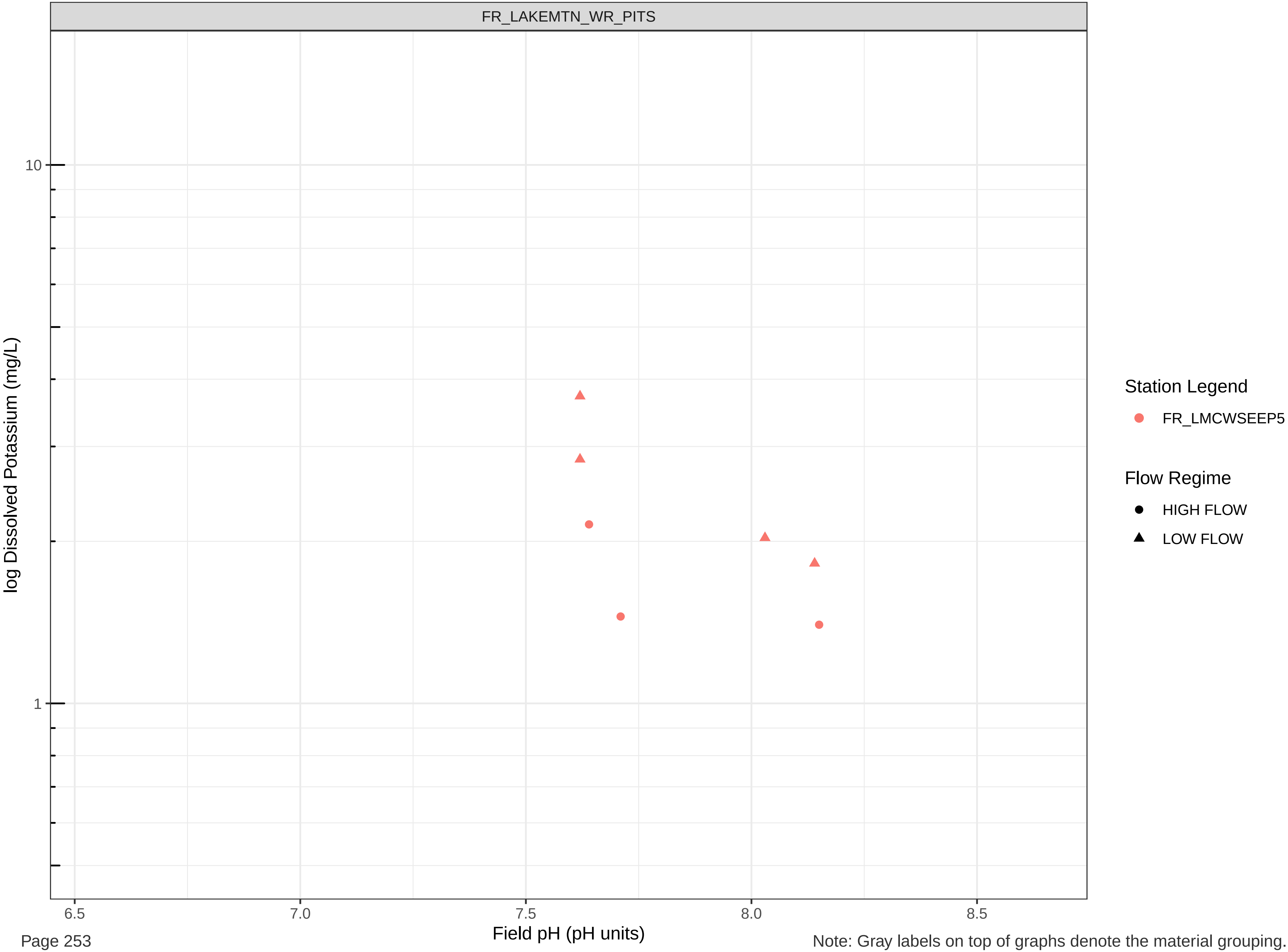

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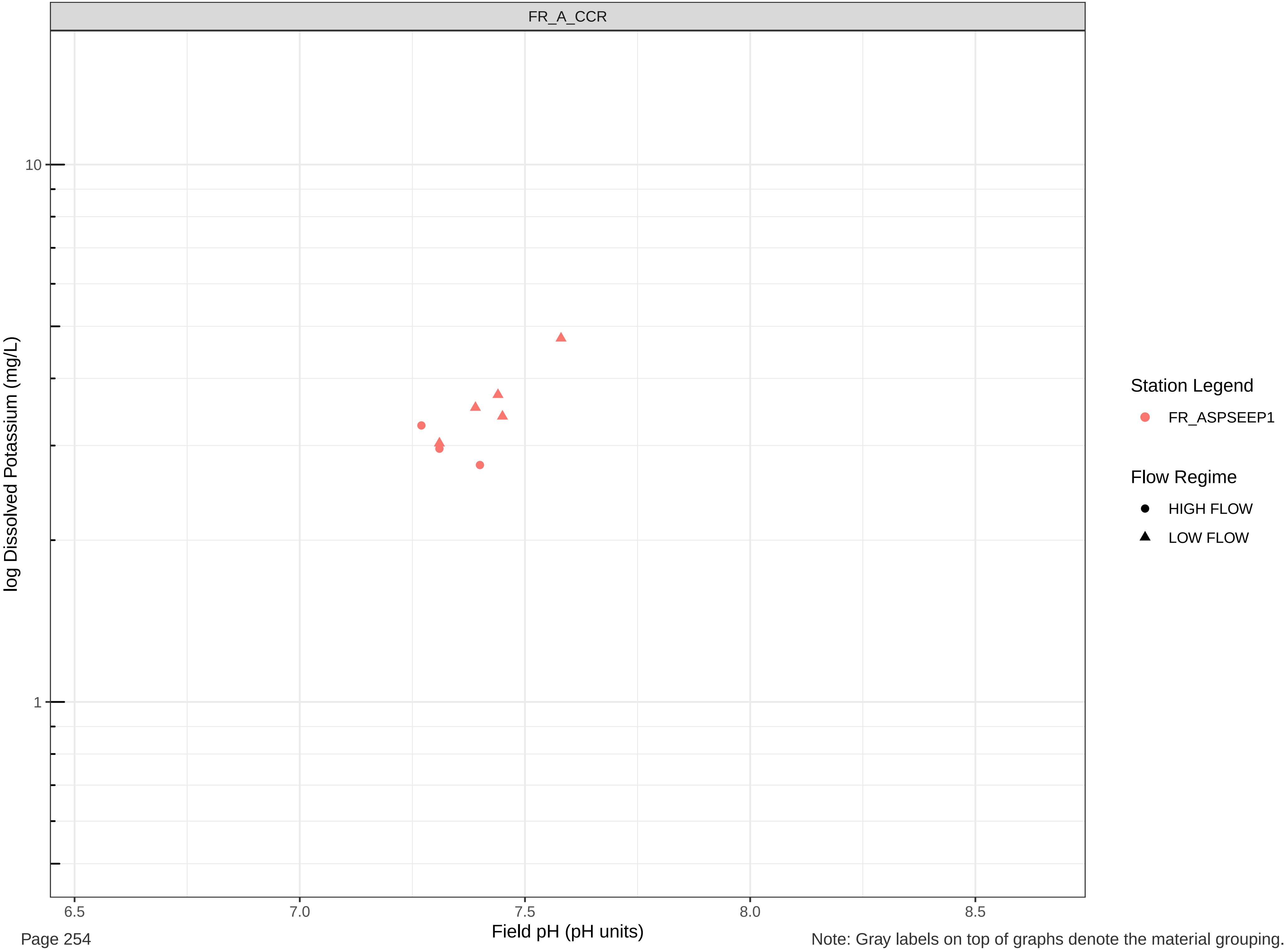

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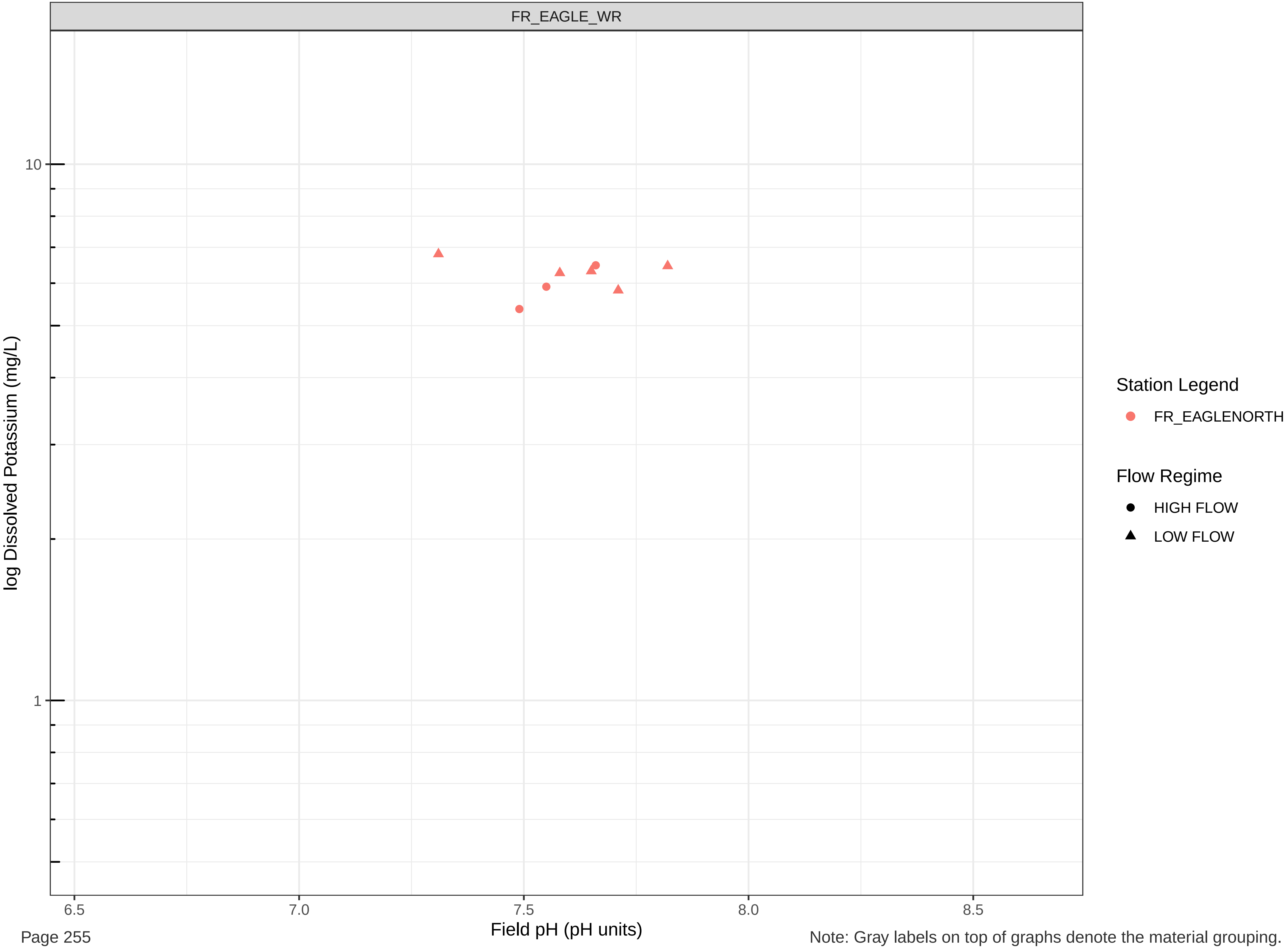

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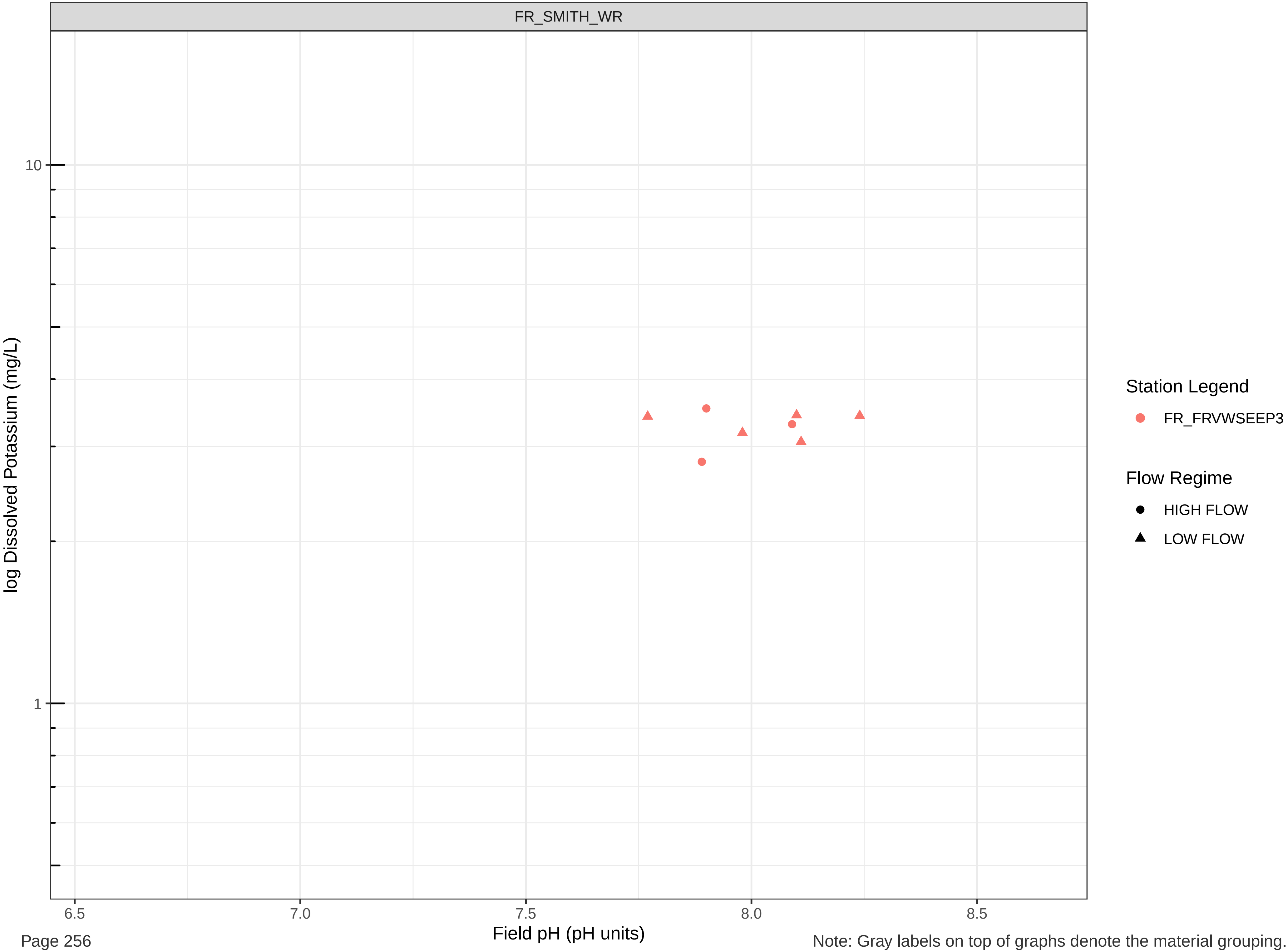

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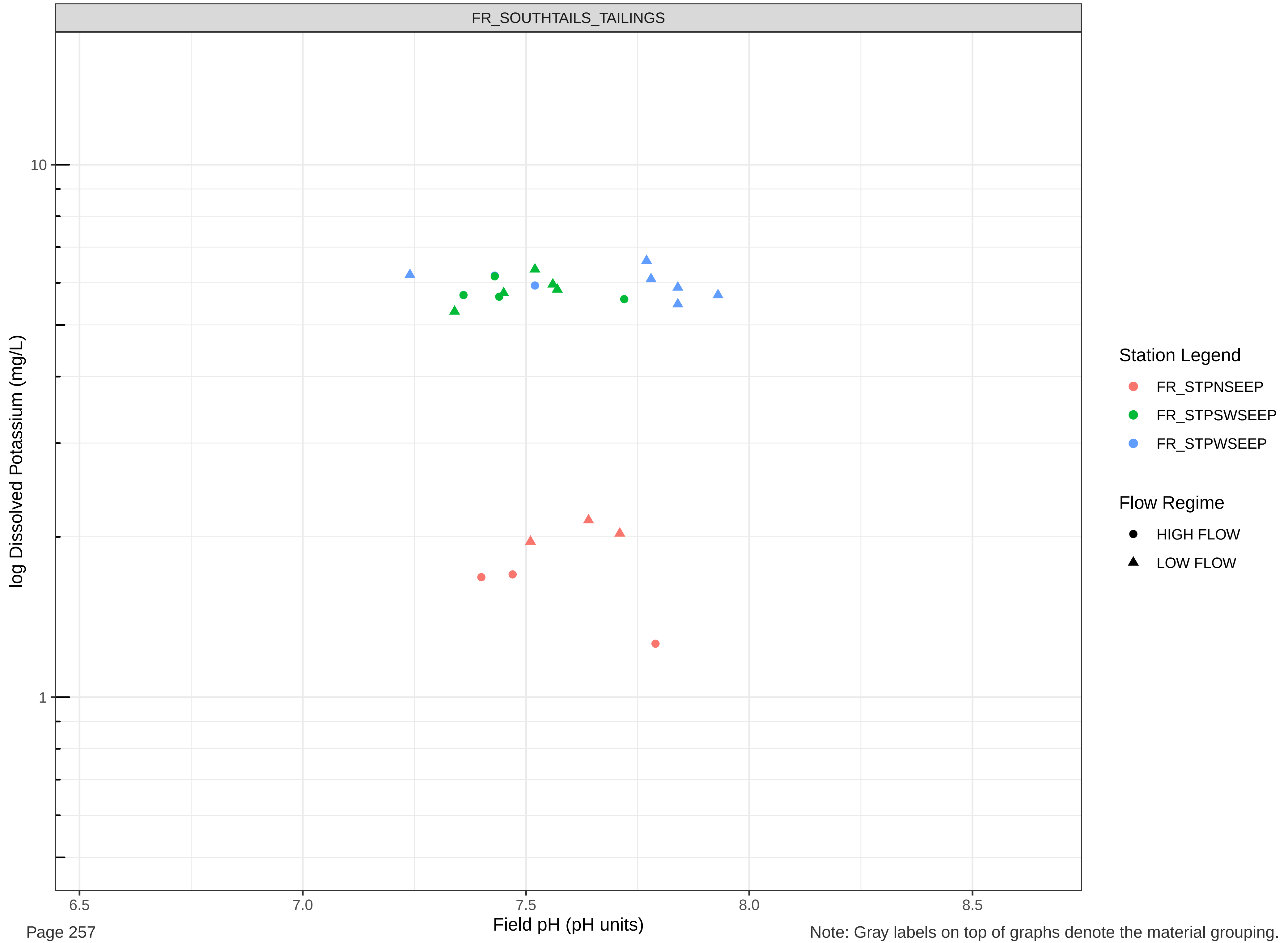

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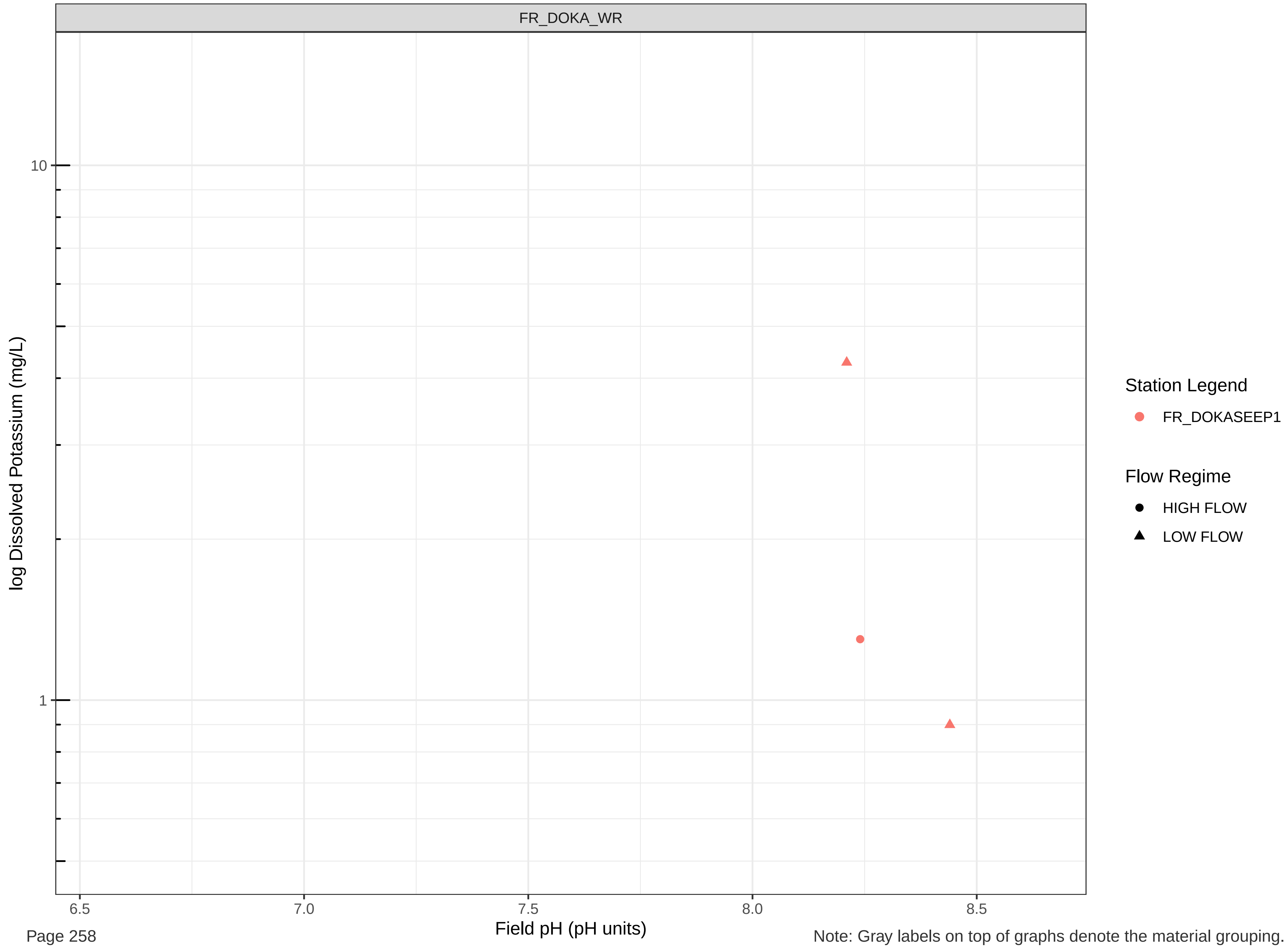
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1
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8.0
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Station Legend
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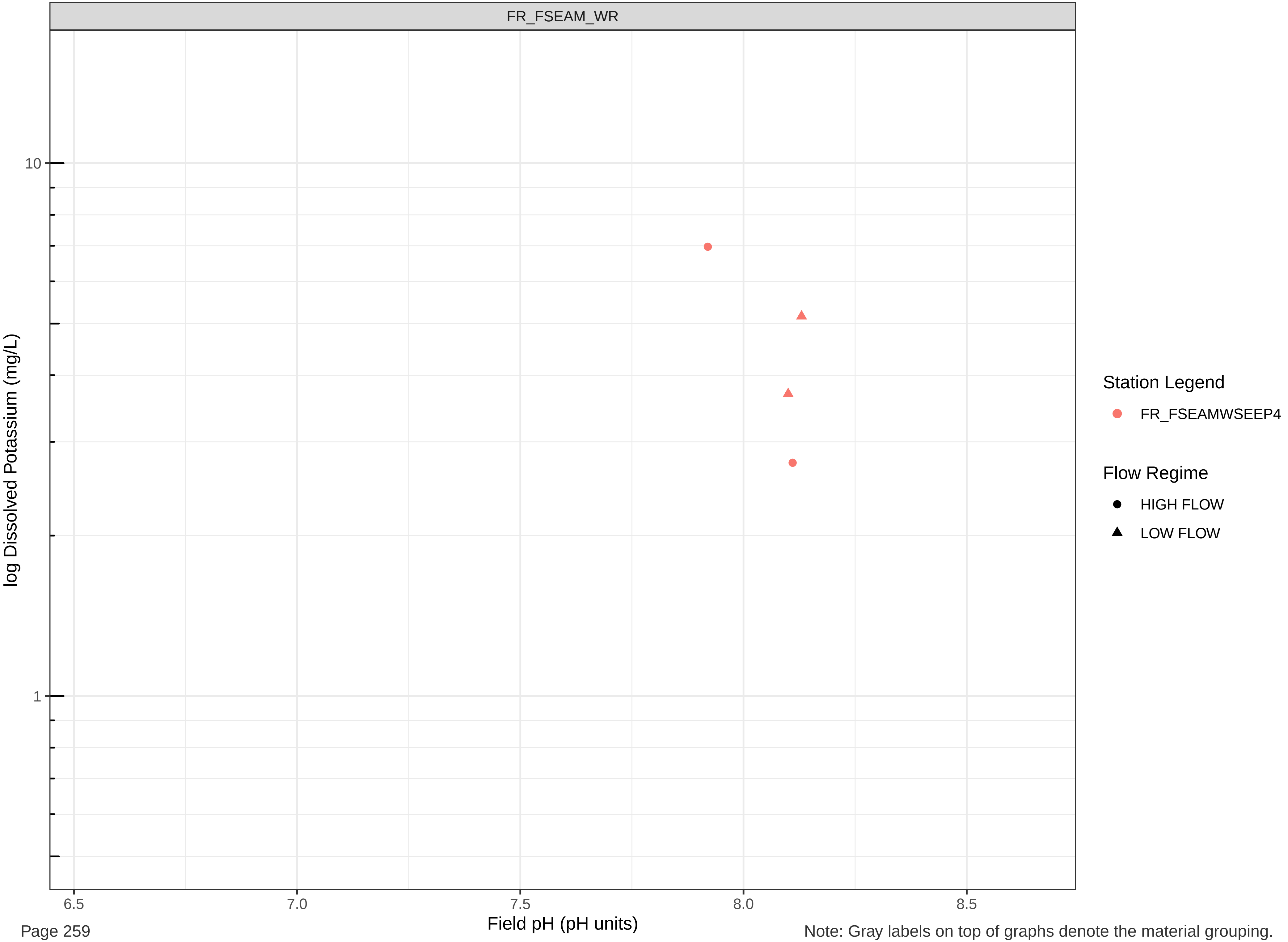
LOW FLOW



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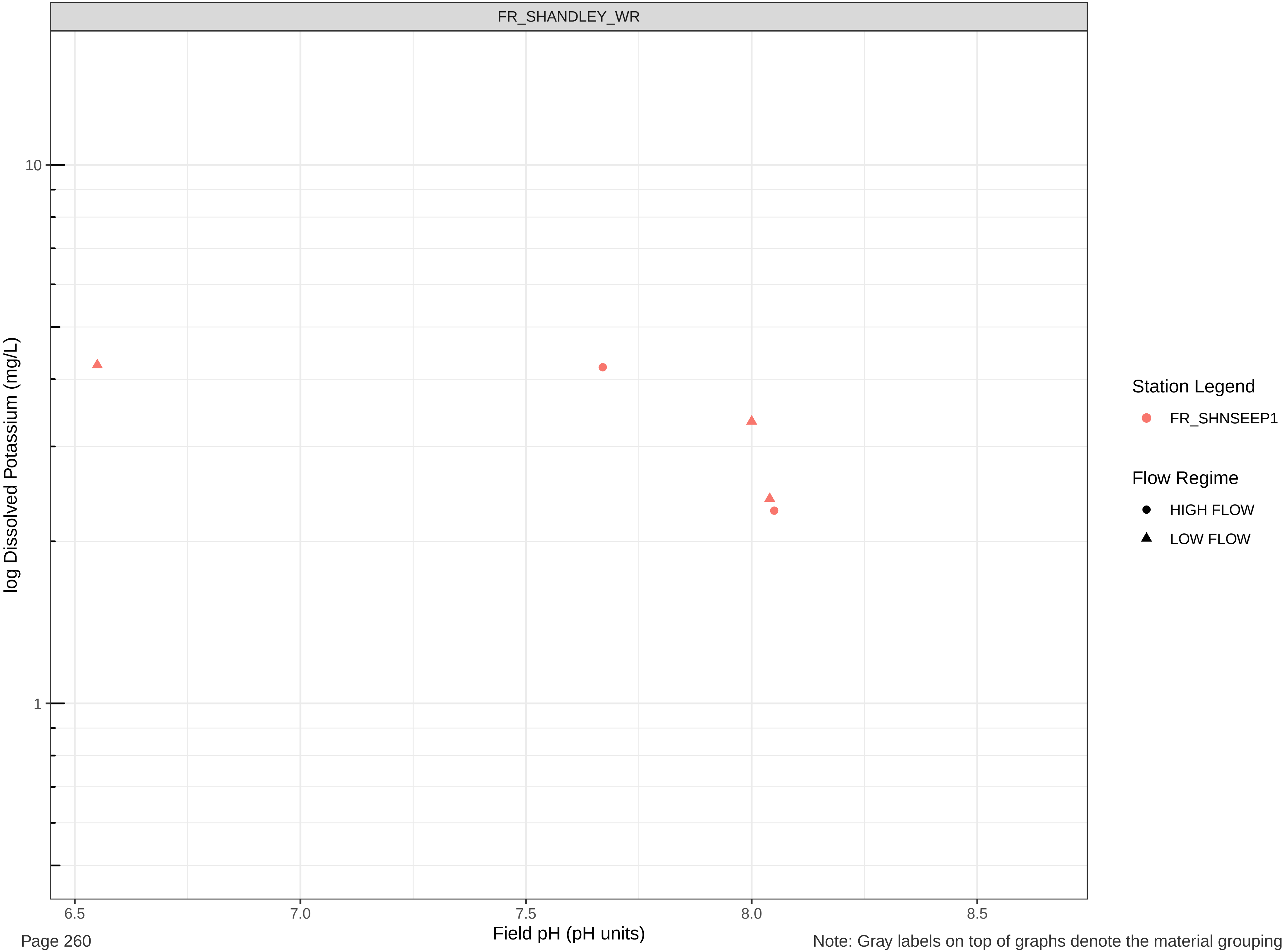

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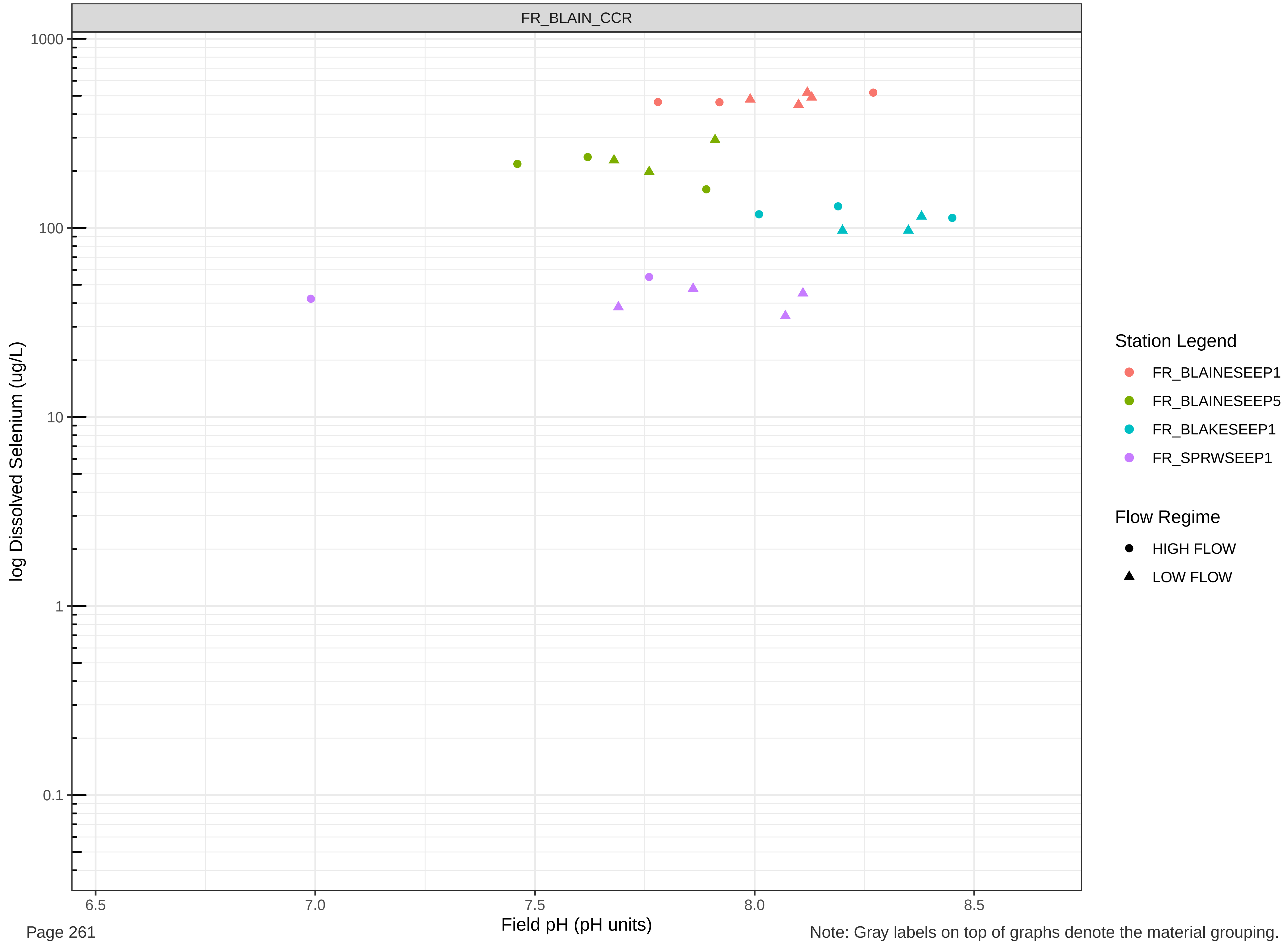

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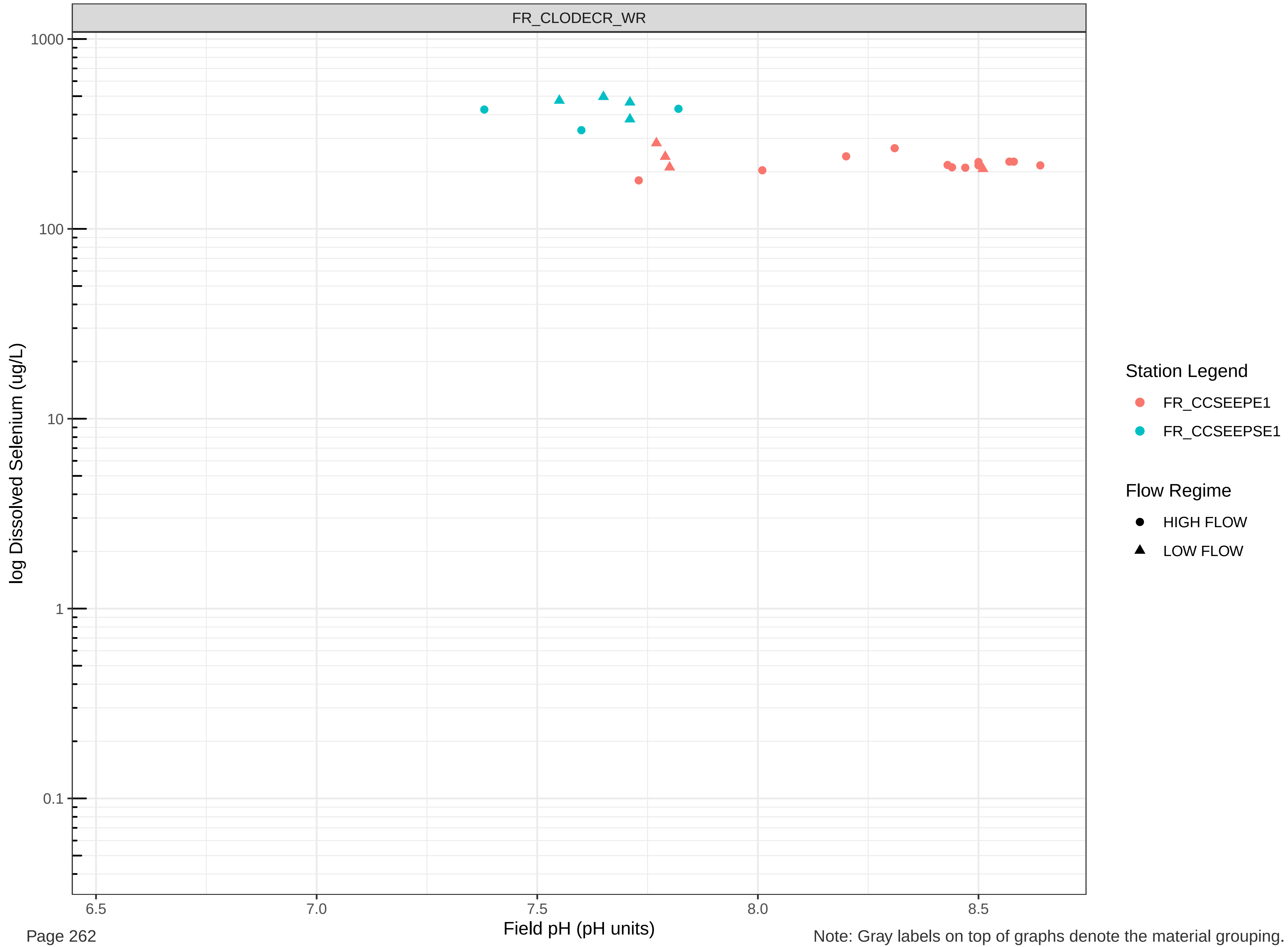

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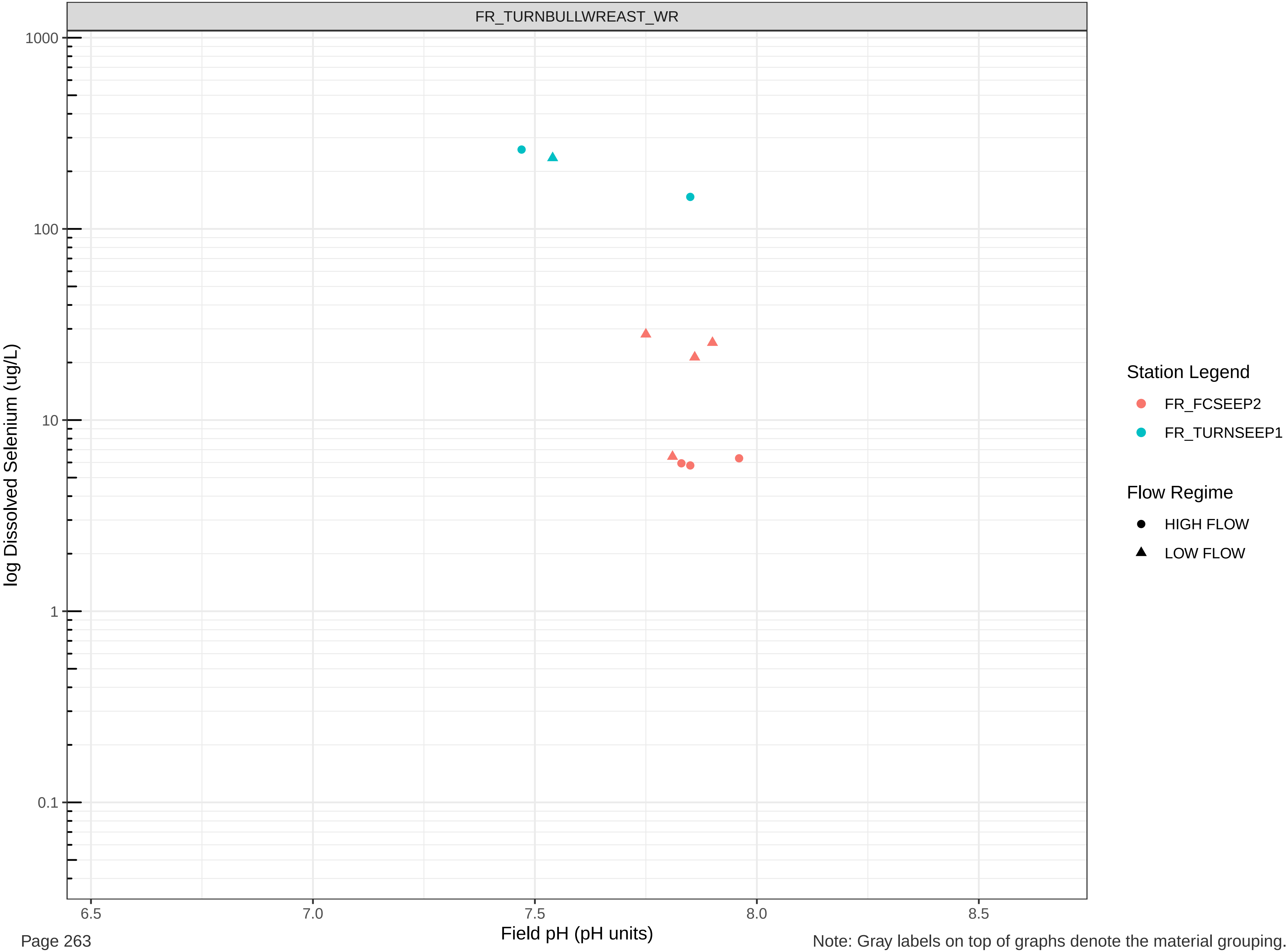

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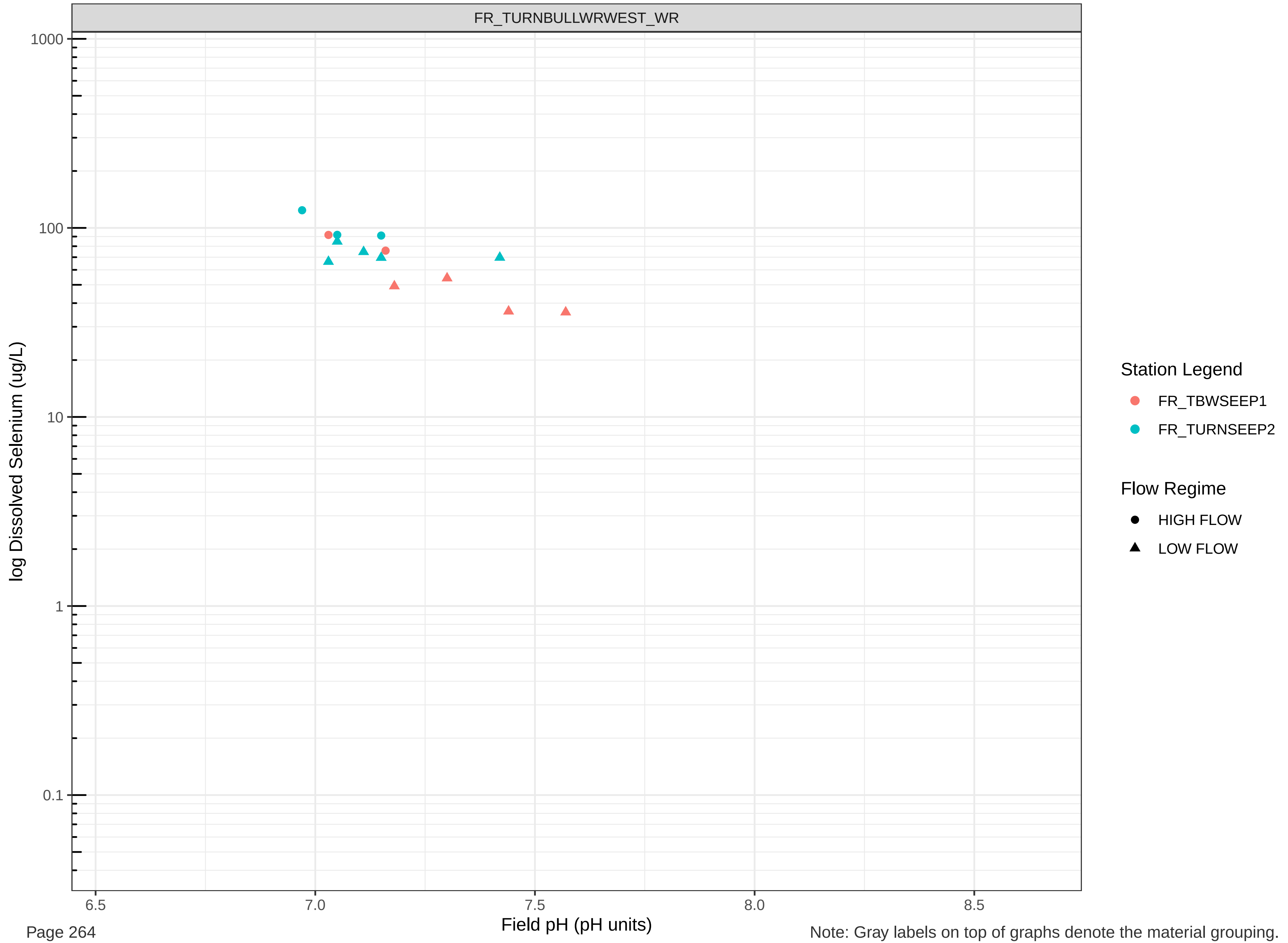

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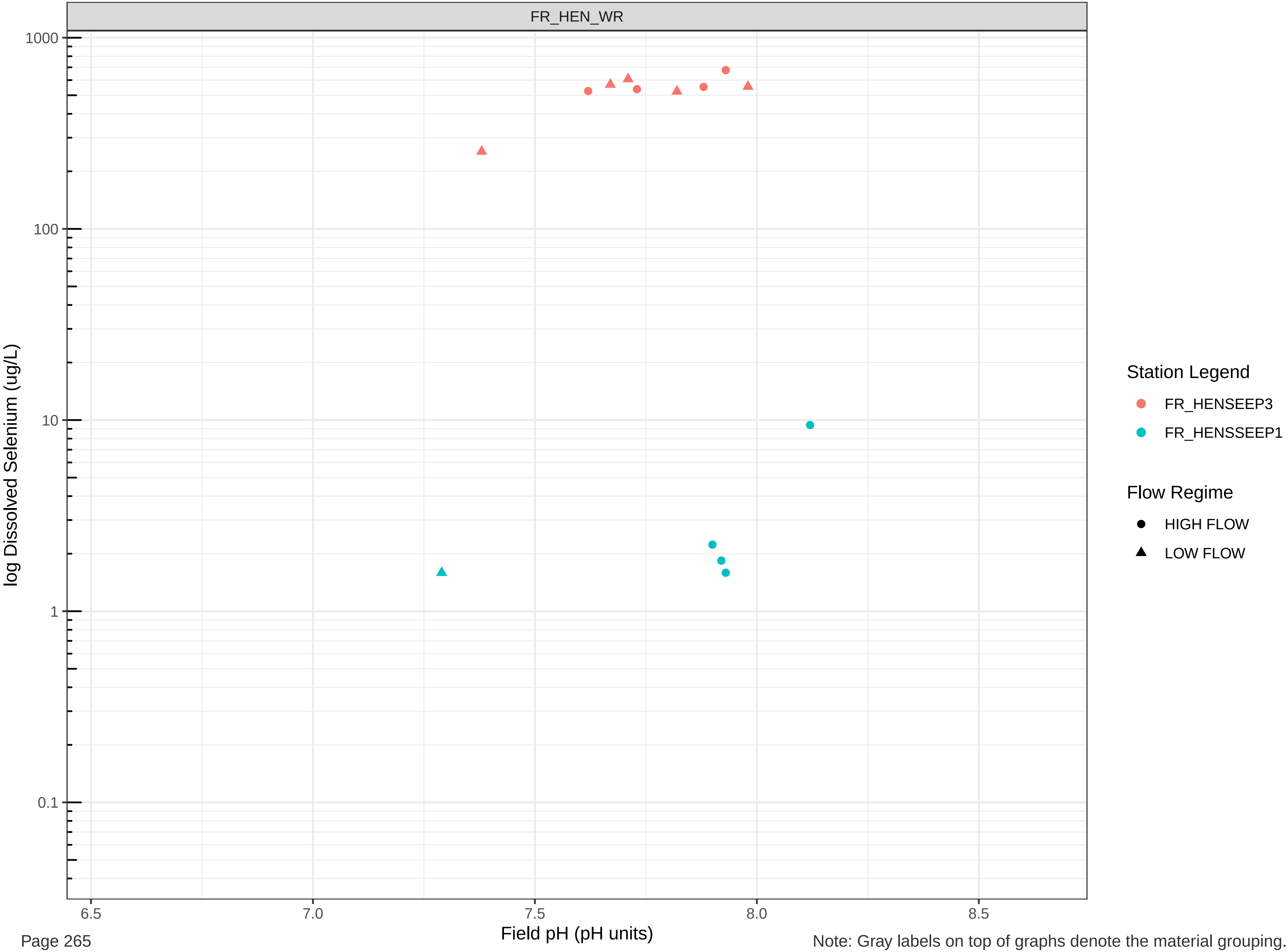

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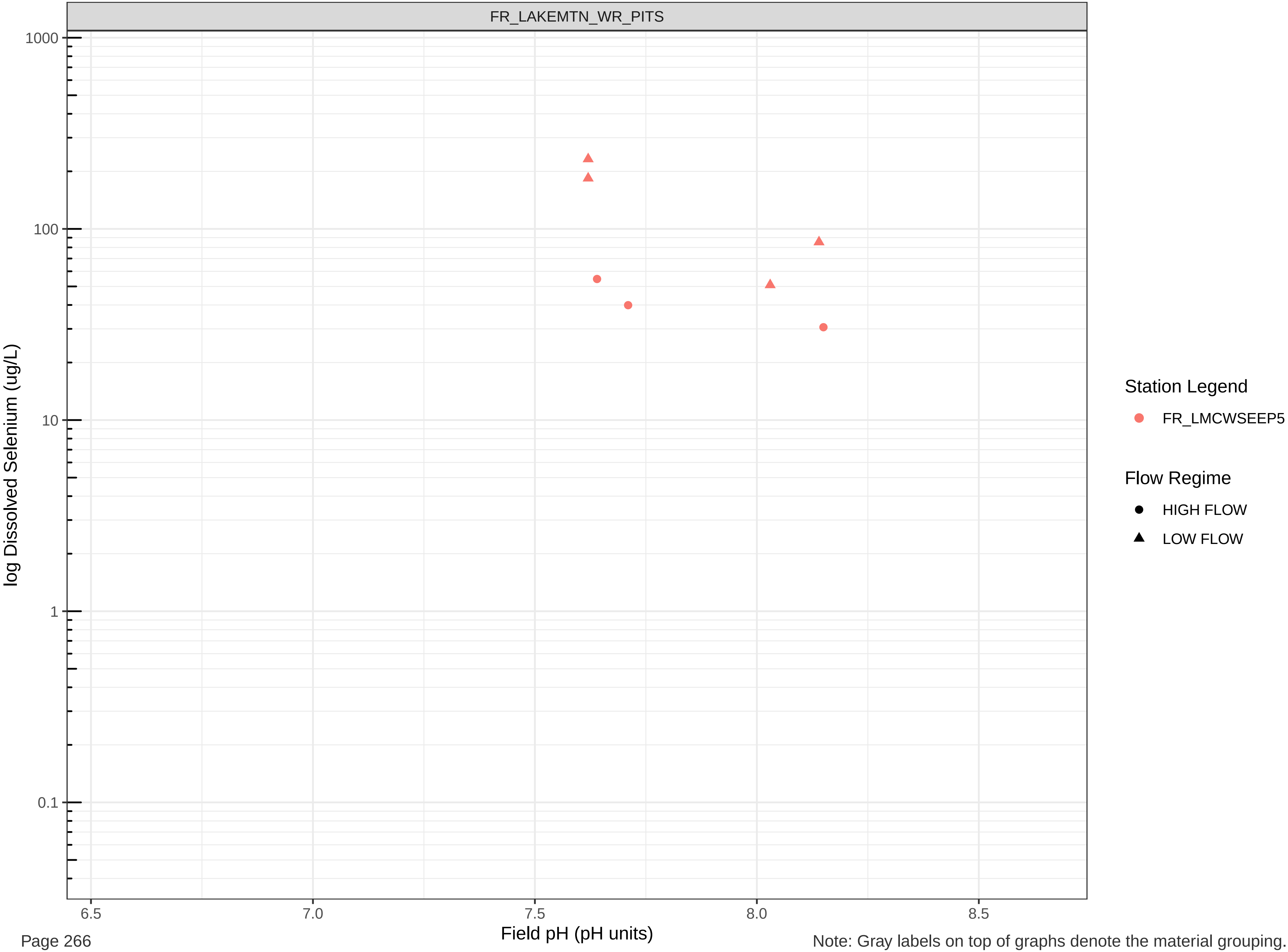

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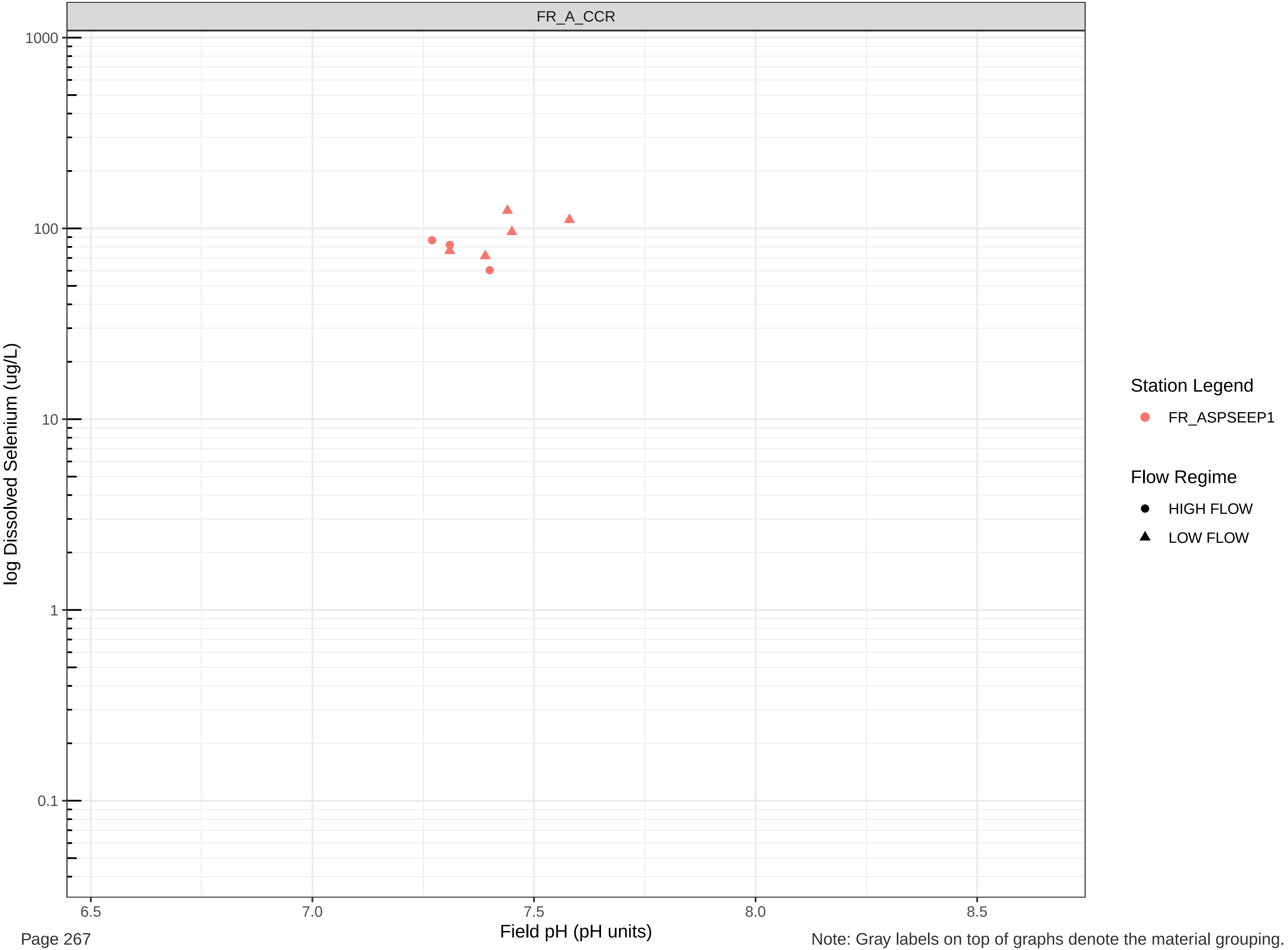

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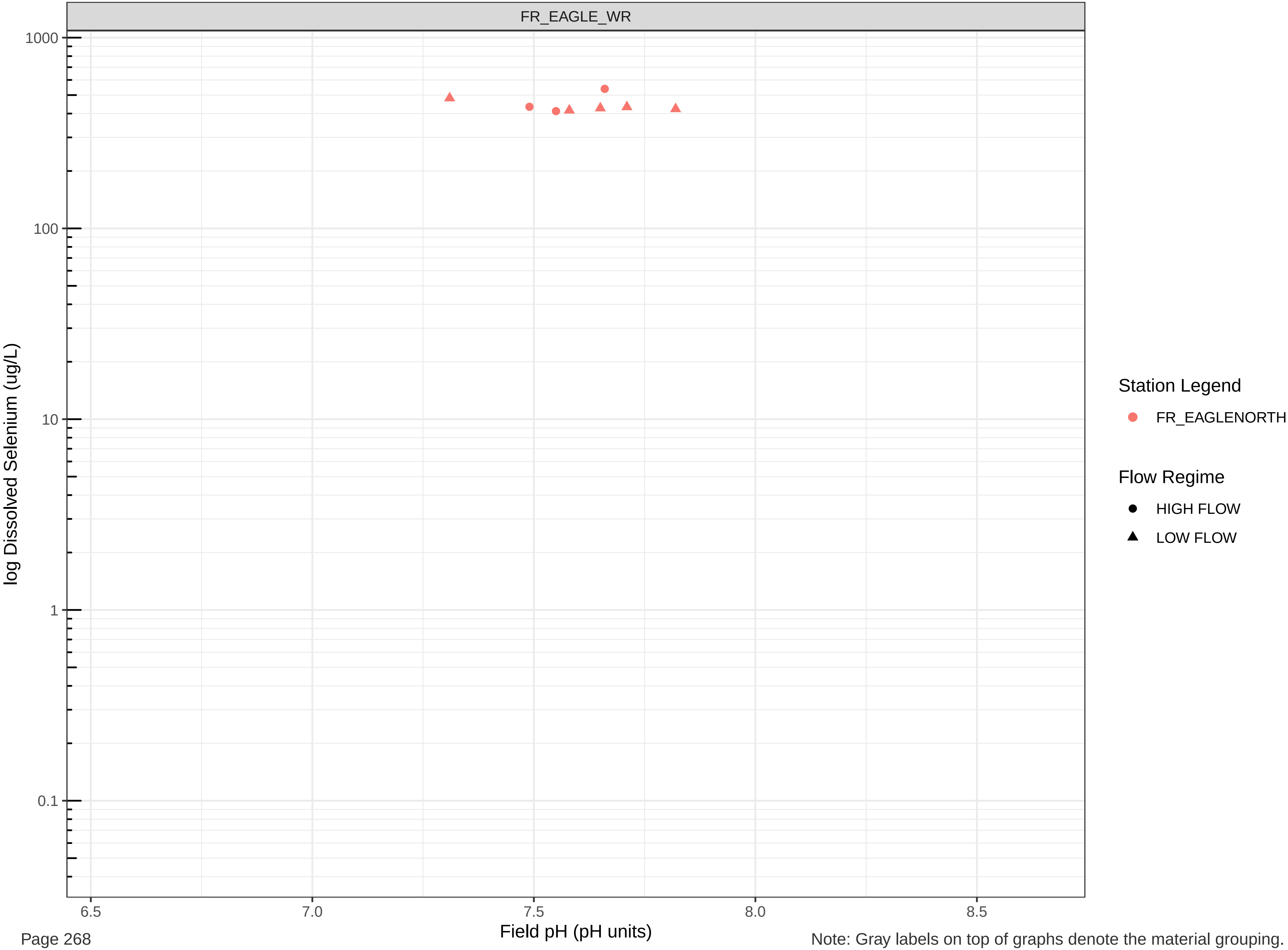

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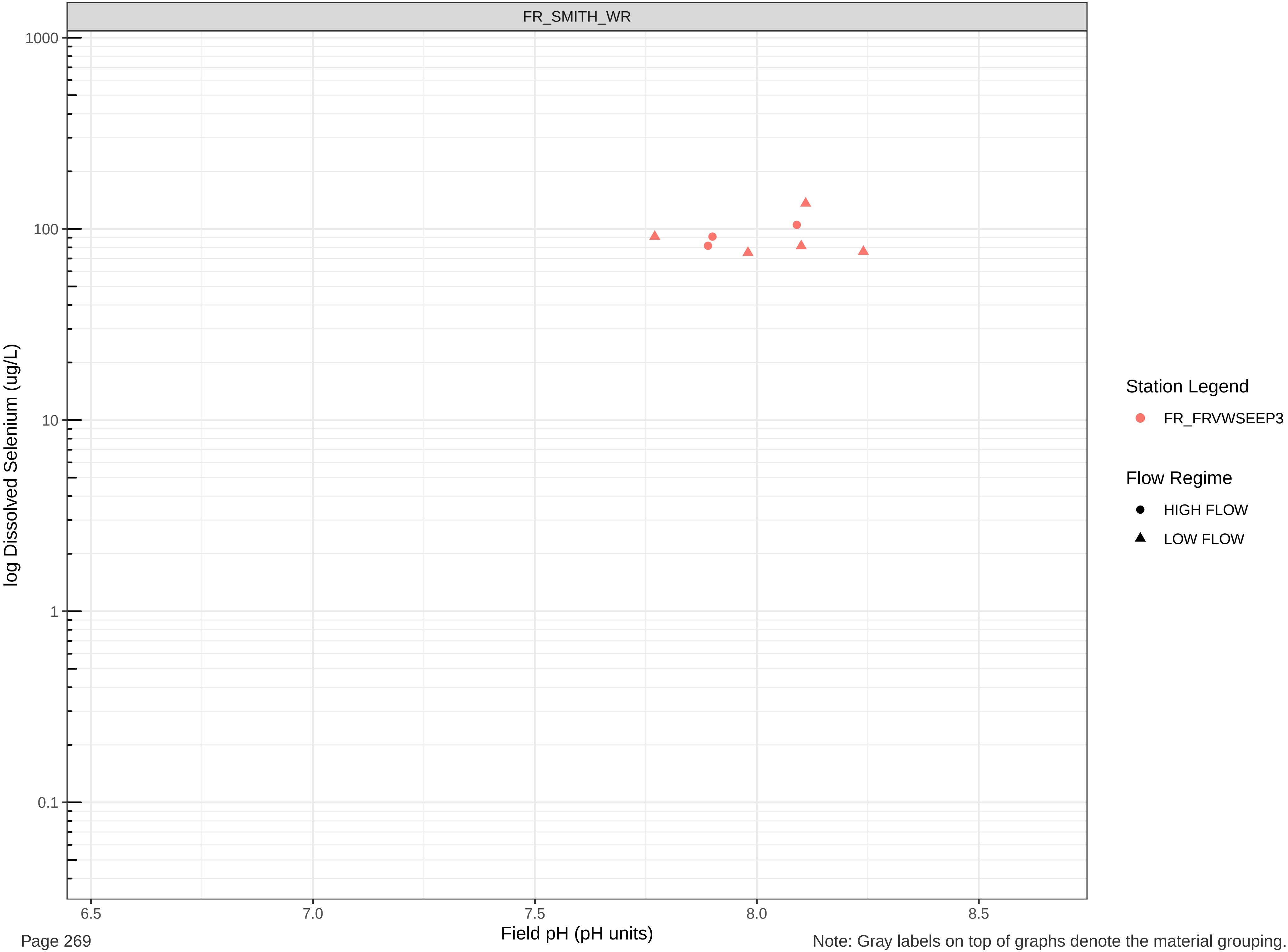

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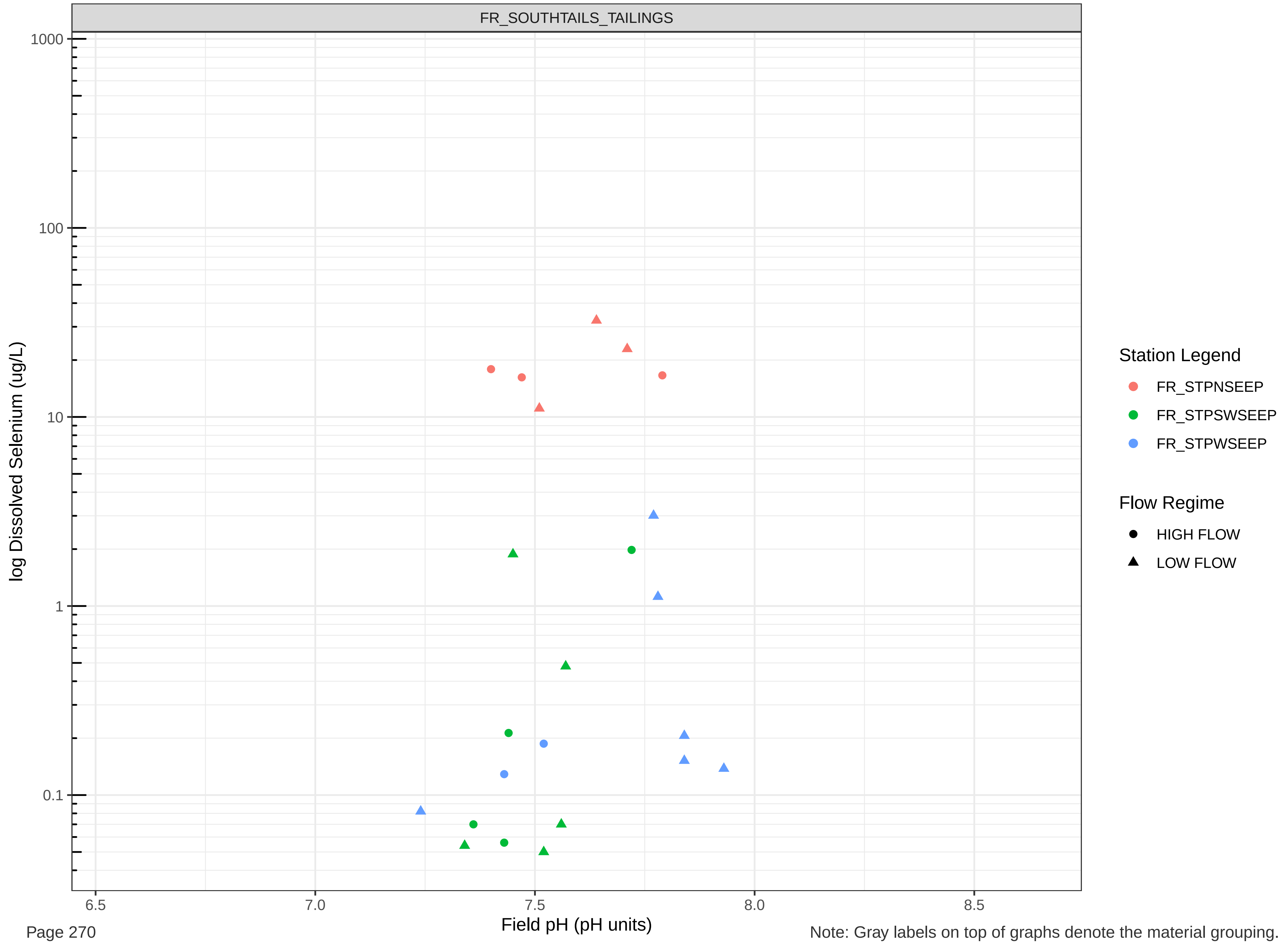

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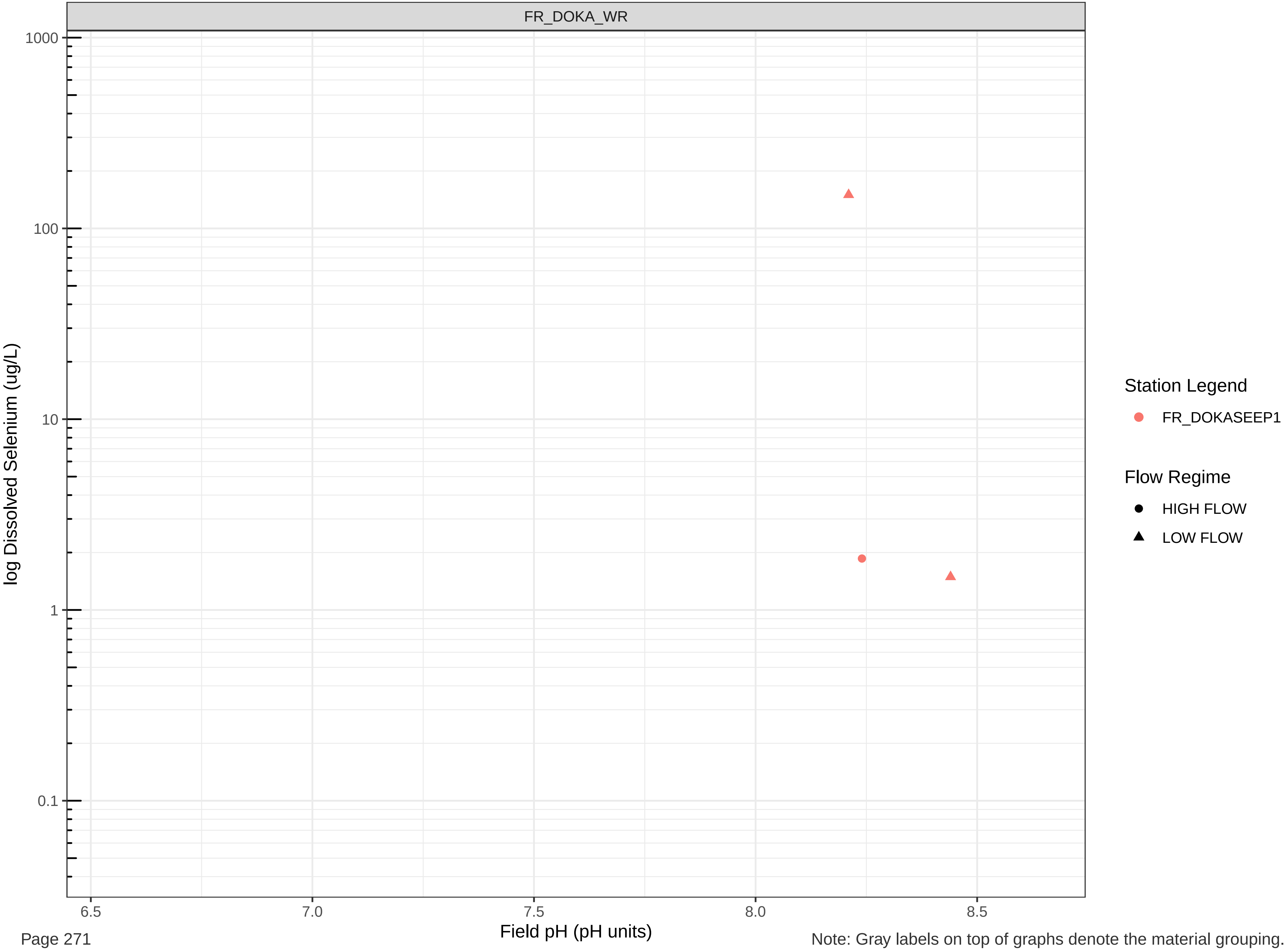

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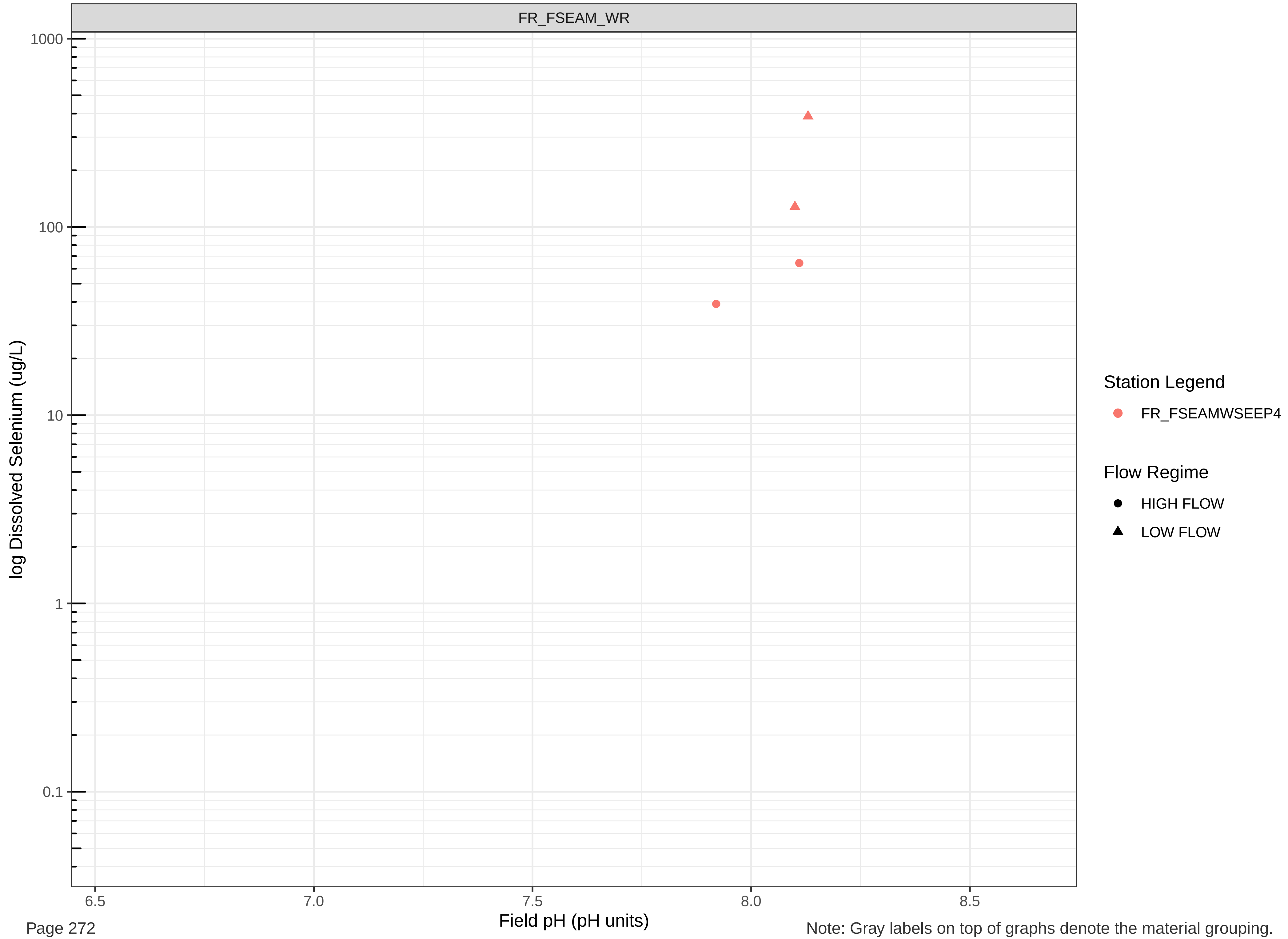

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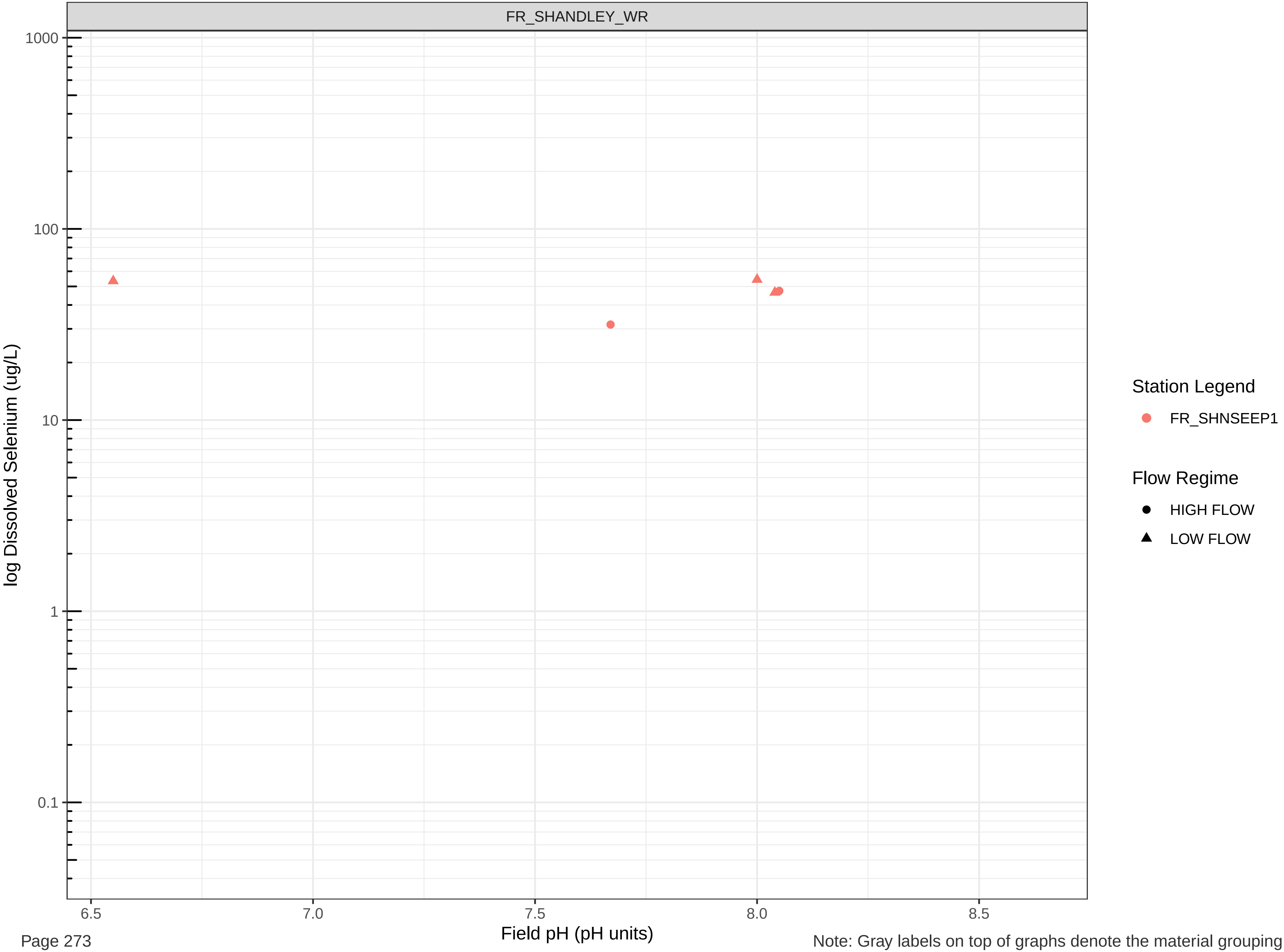

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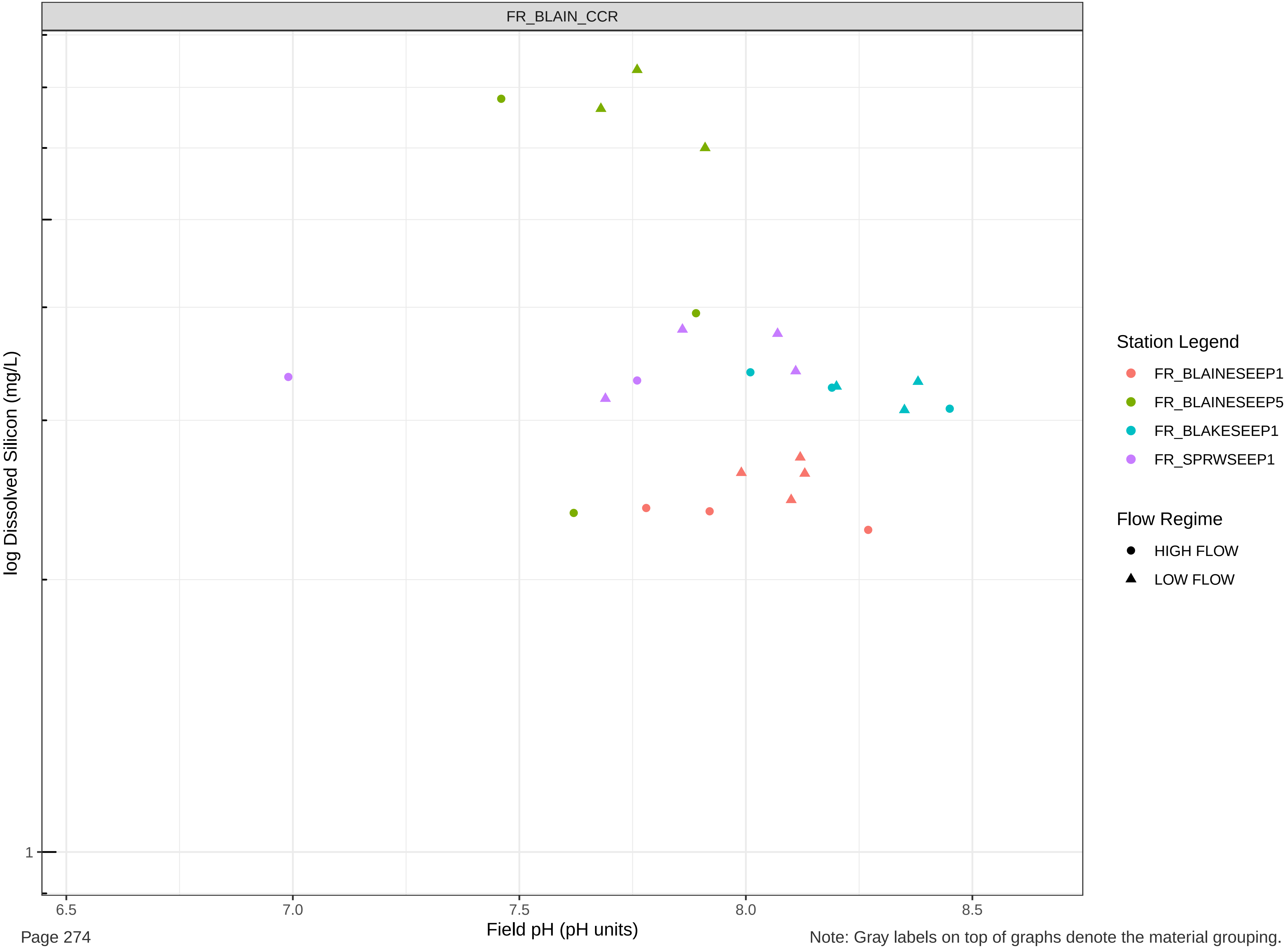

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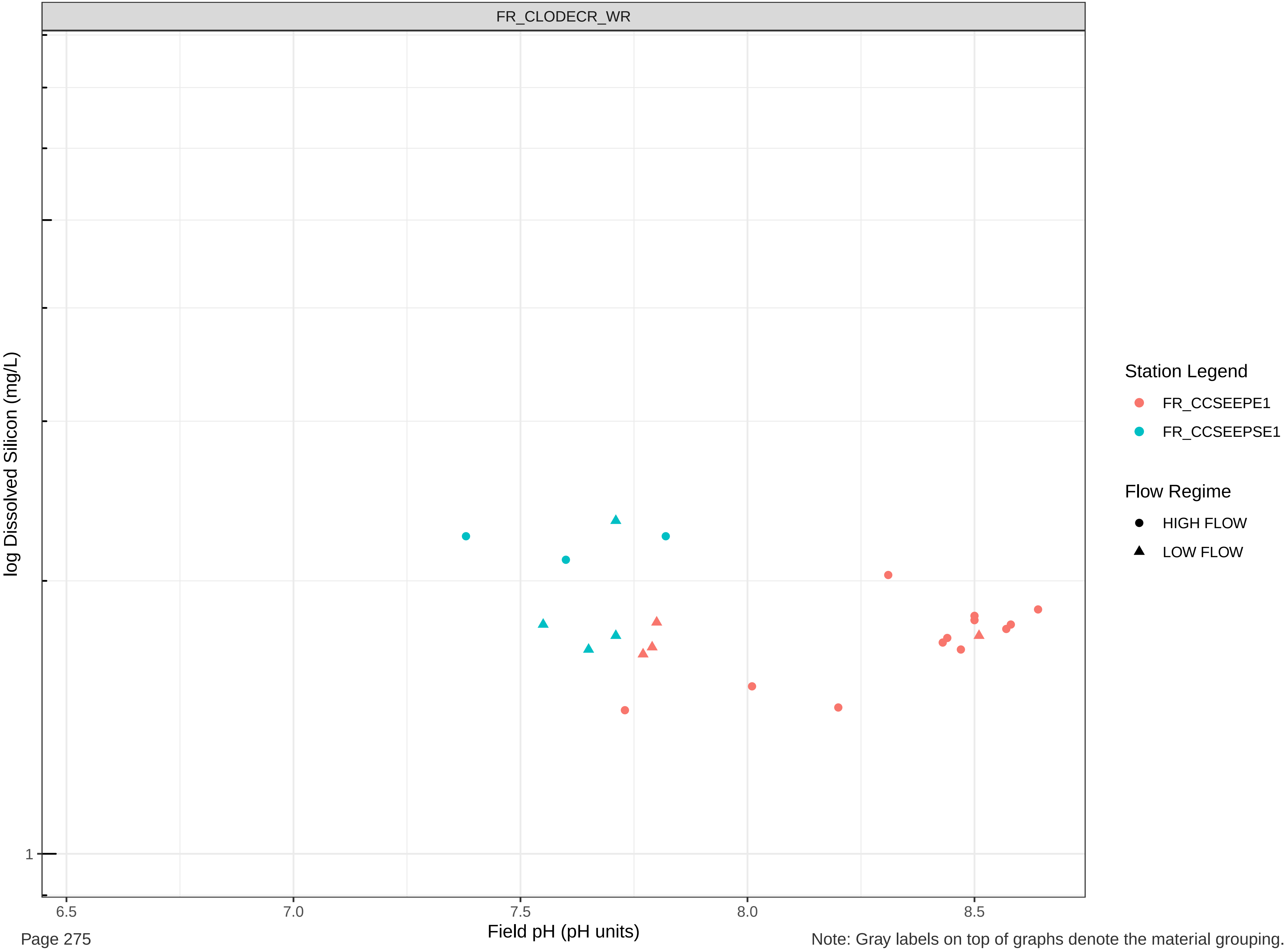

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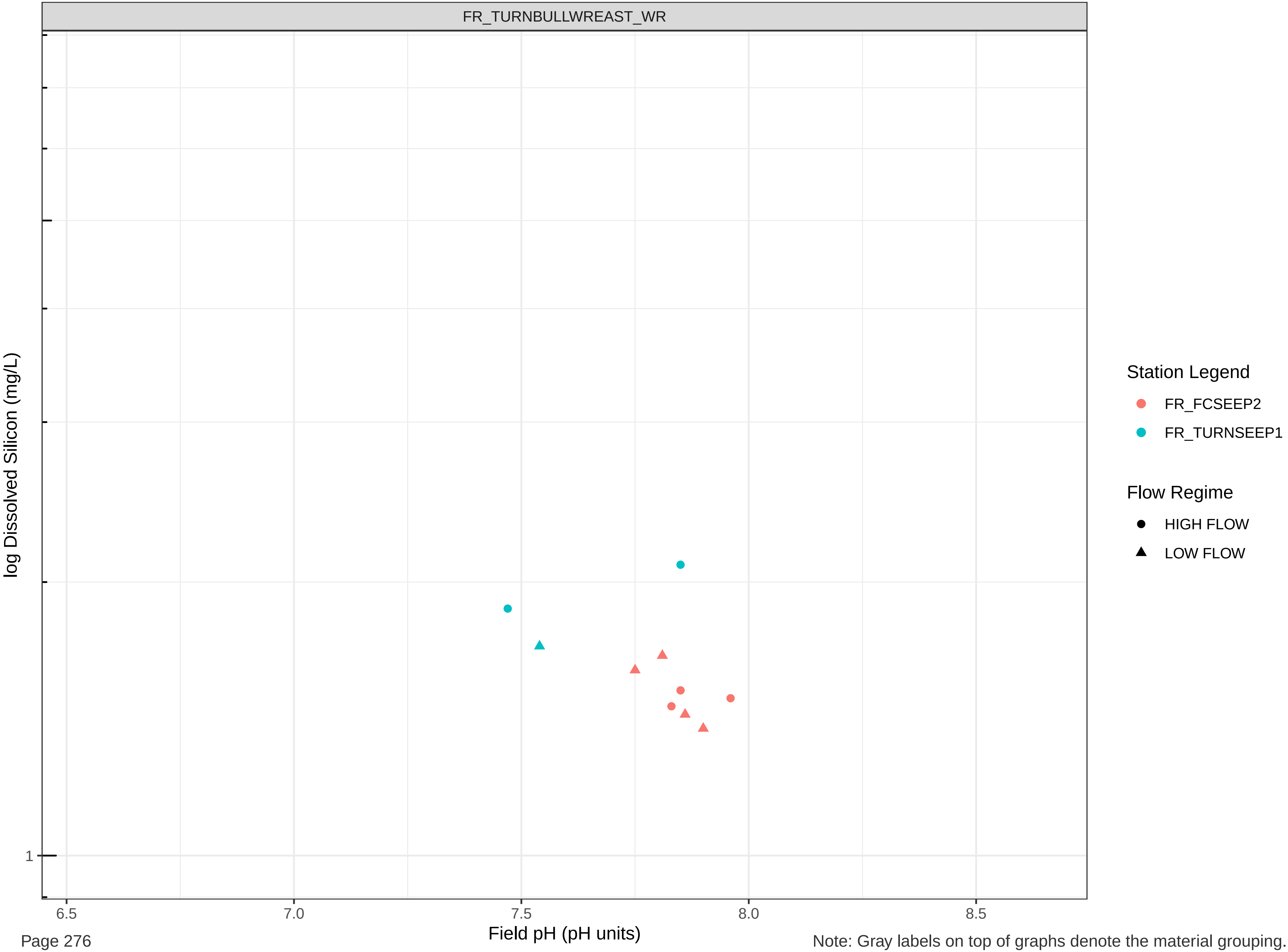

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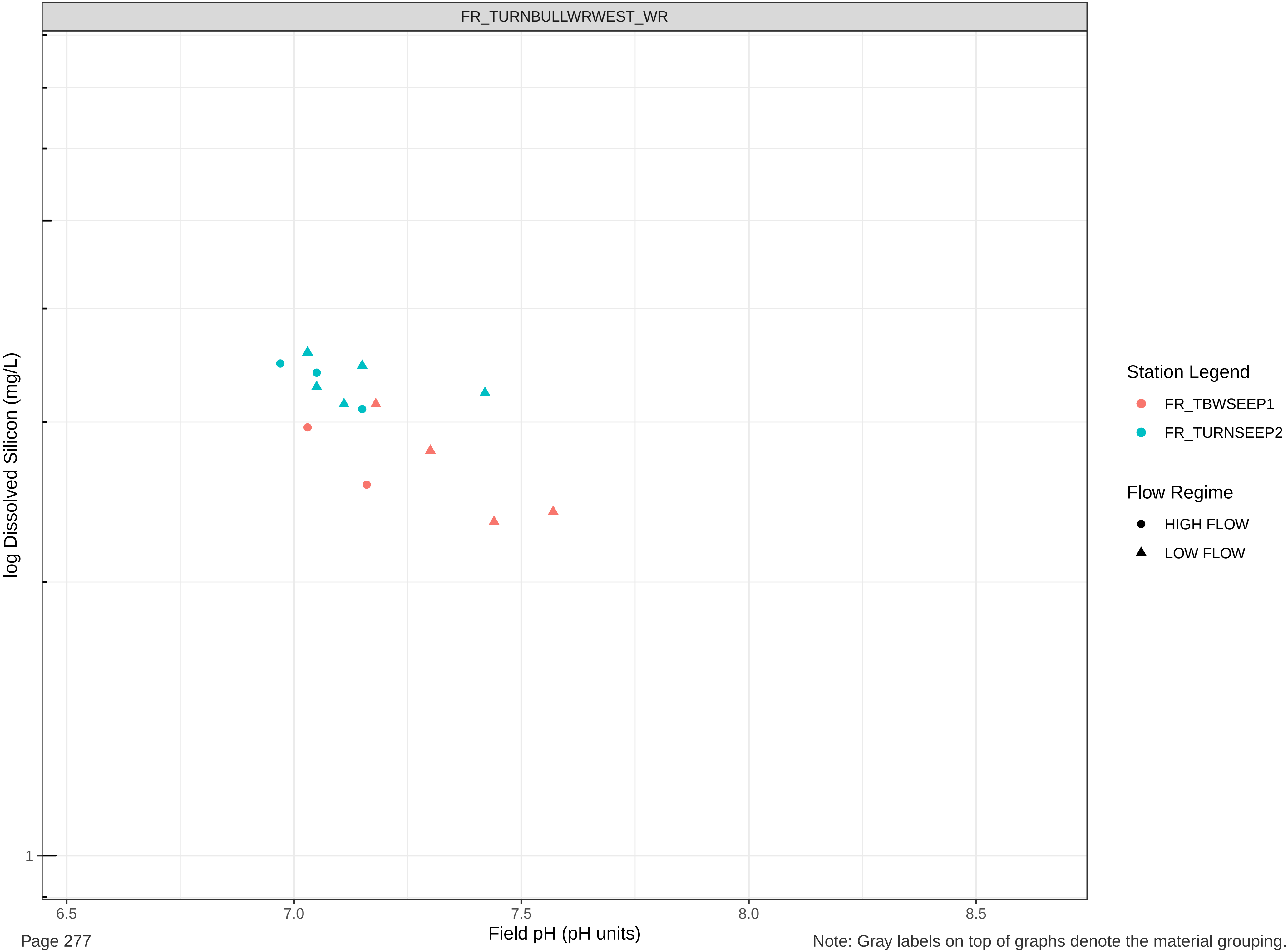

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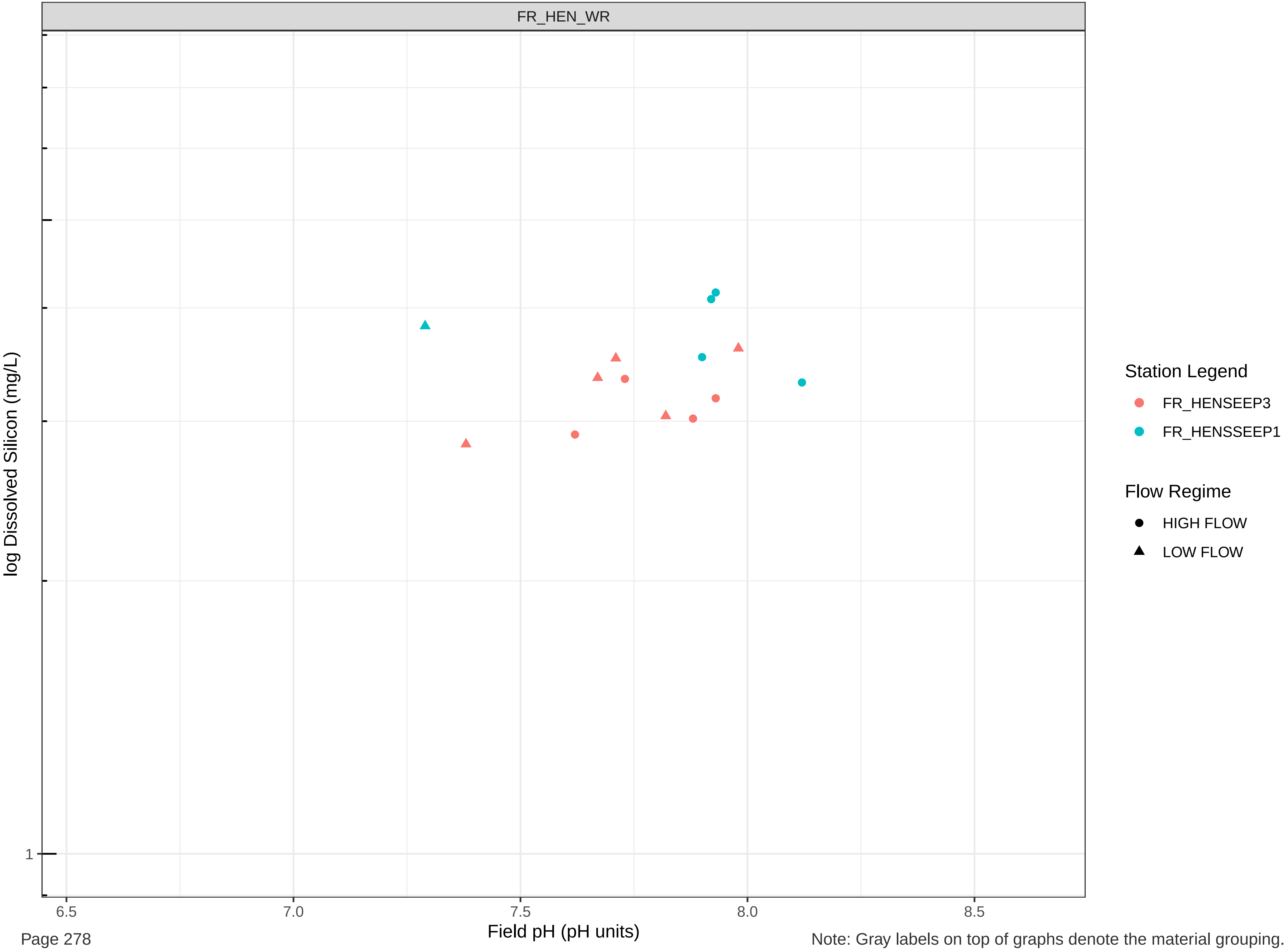

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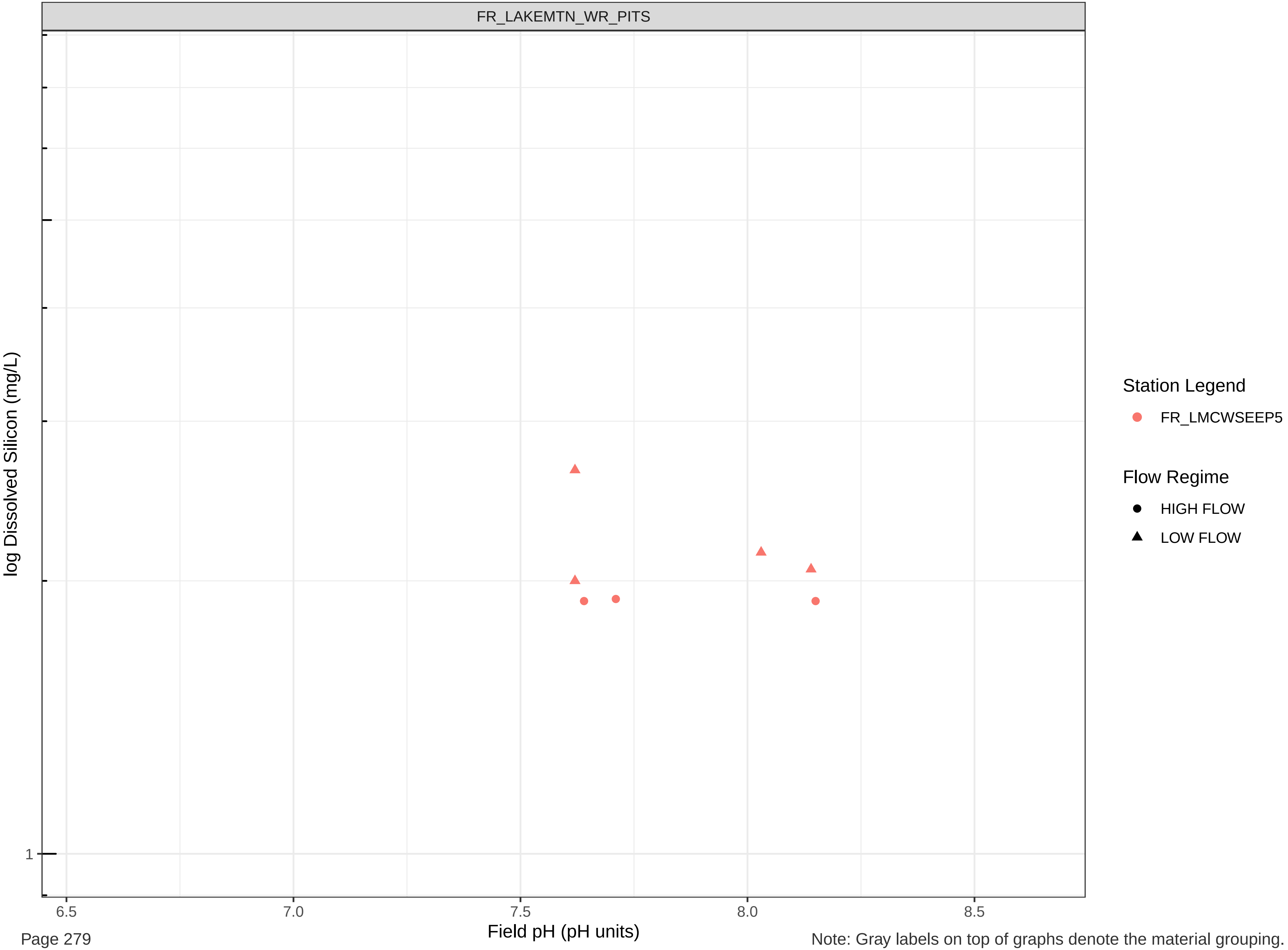

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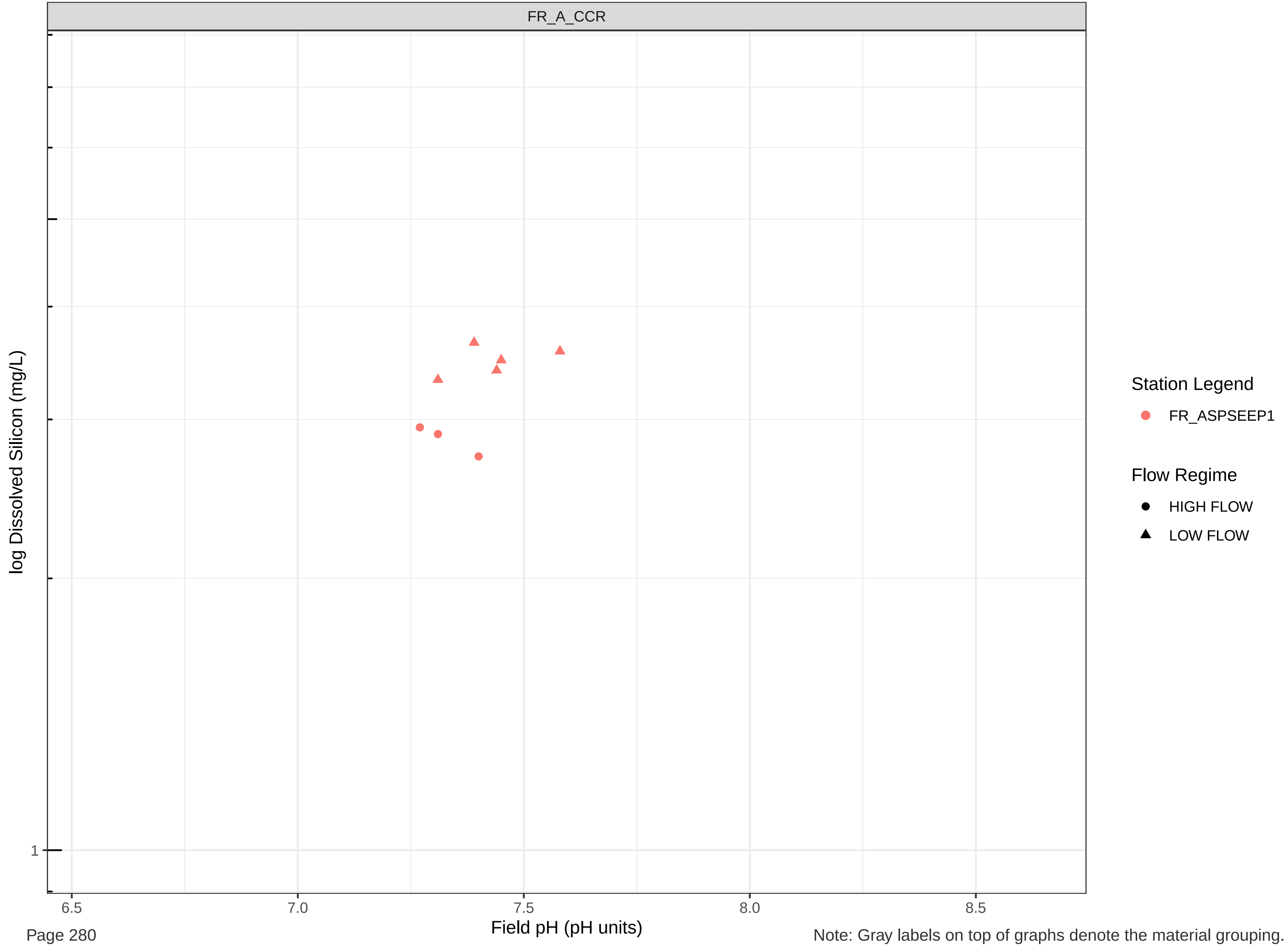

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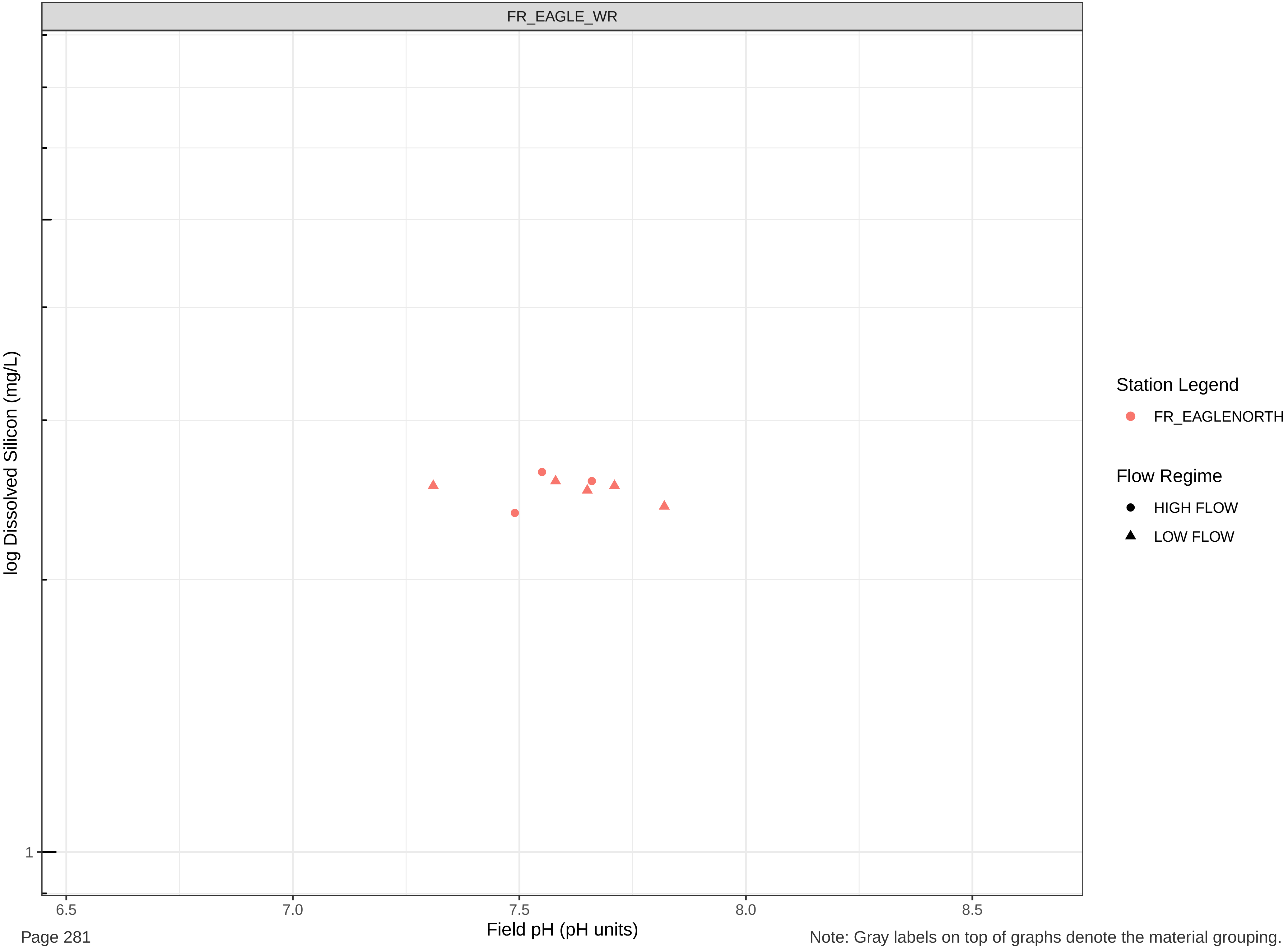

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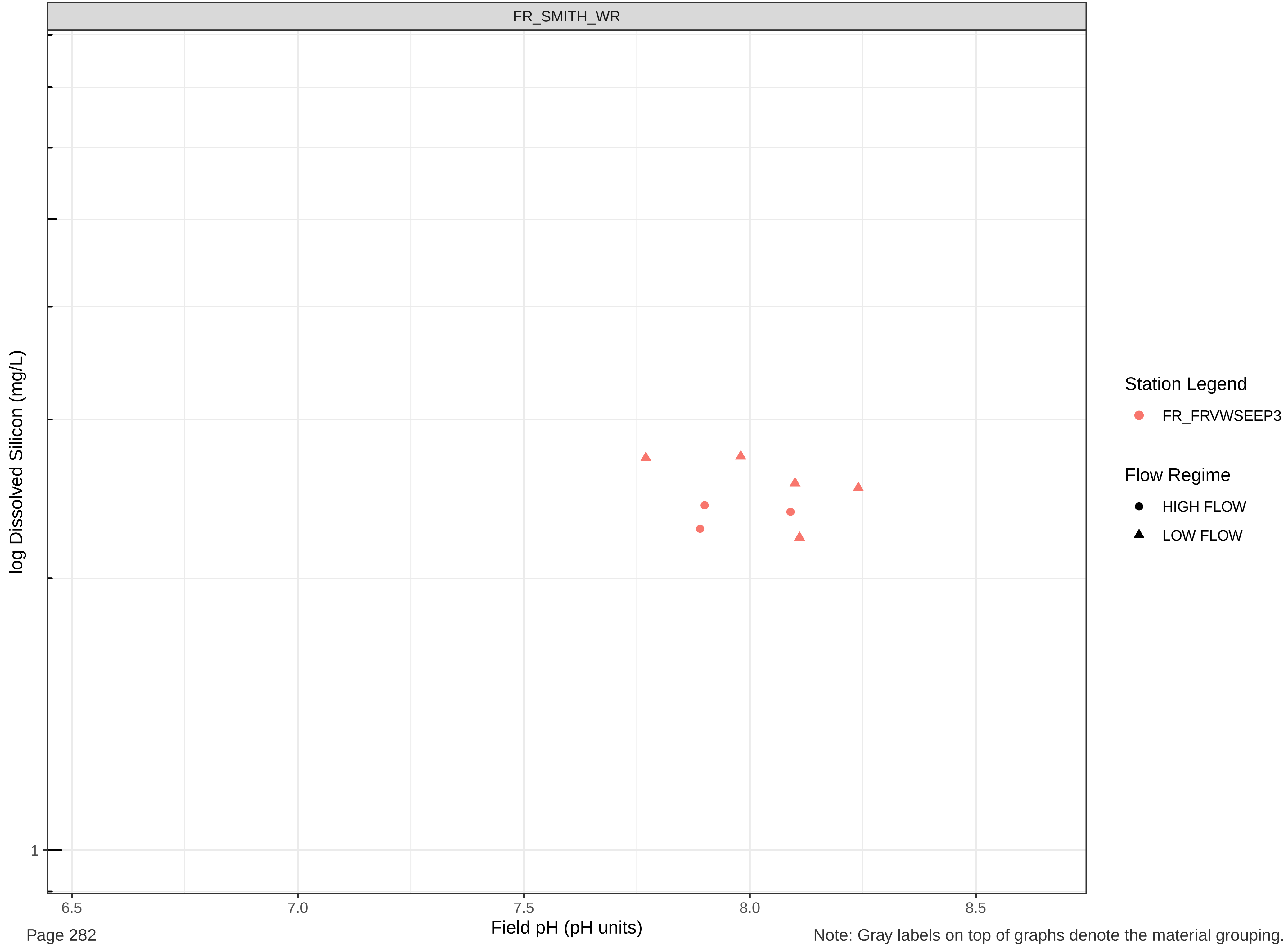

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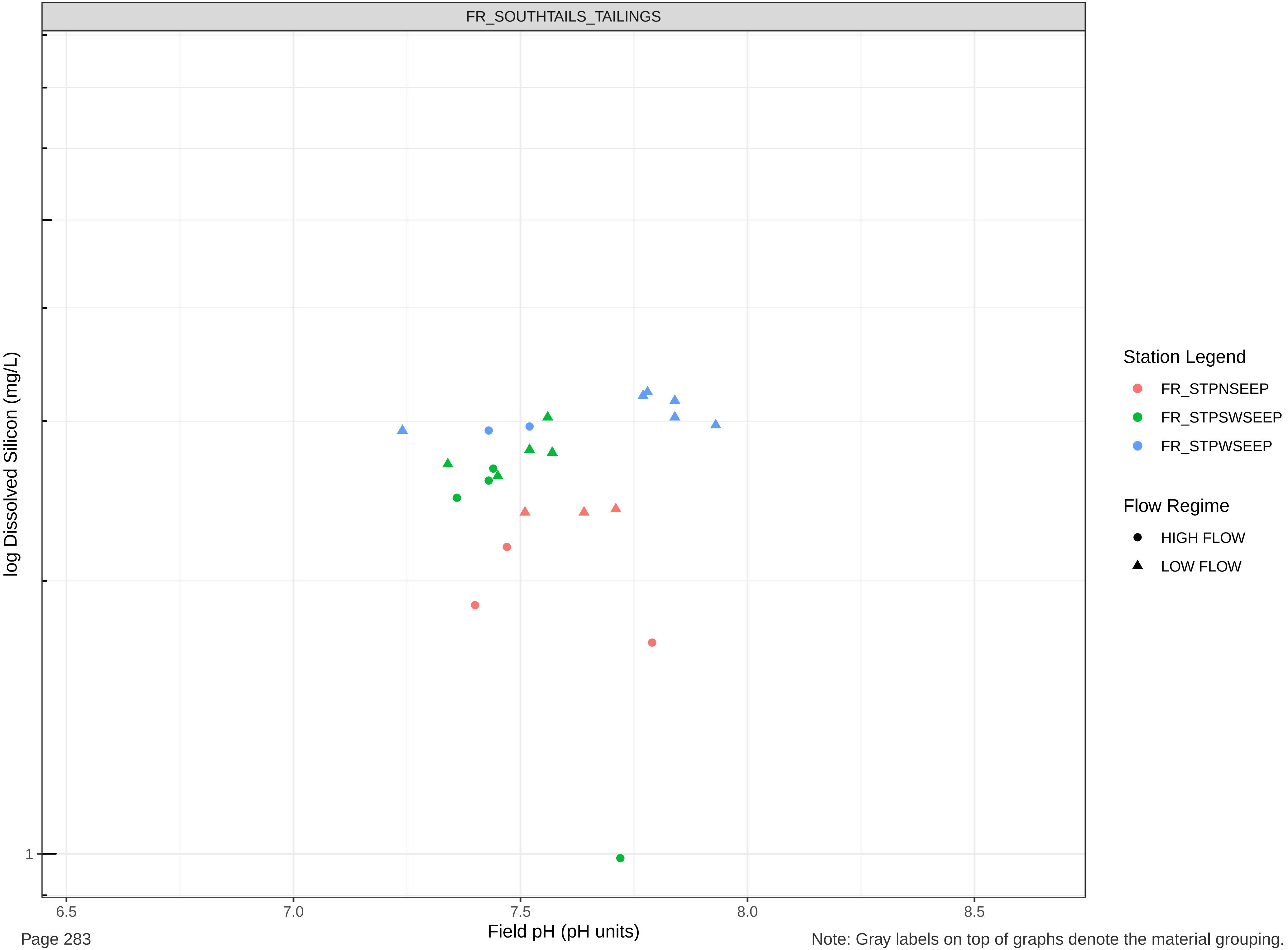

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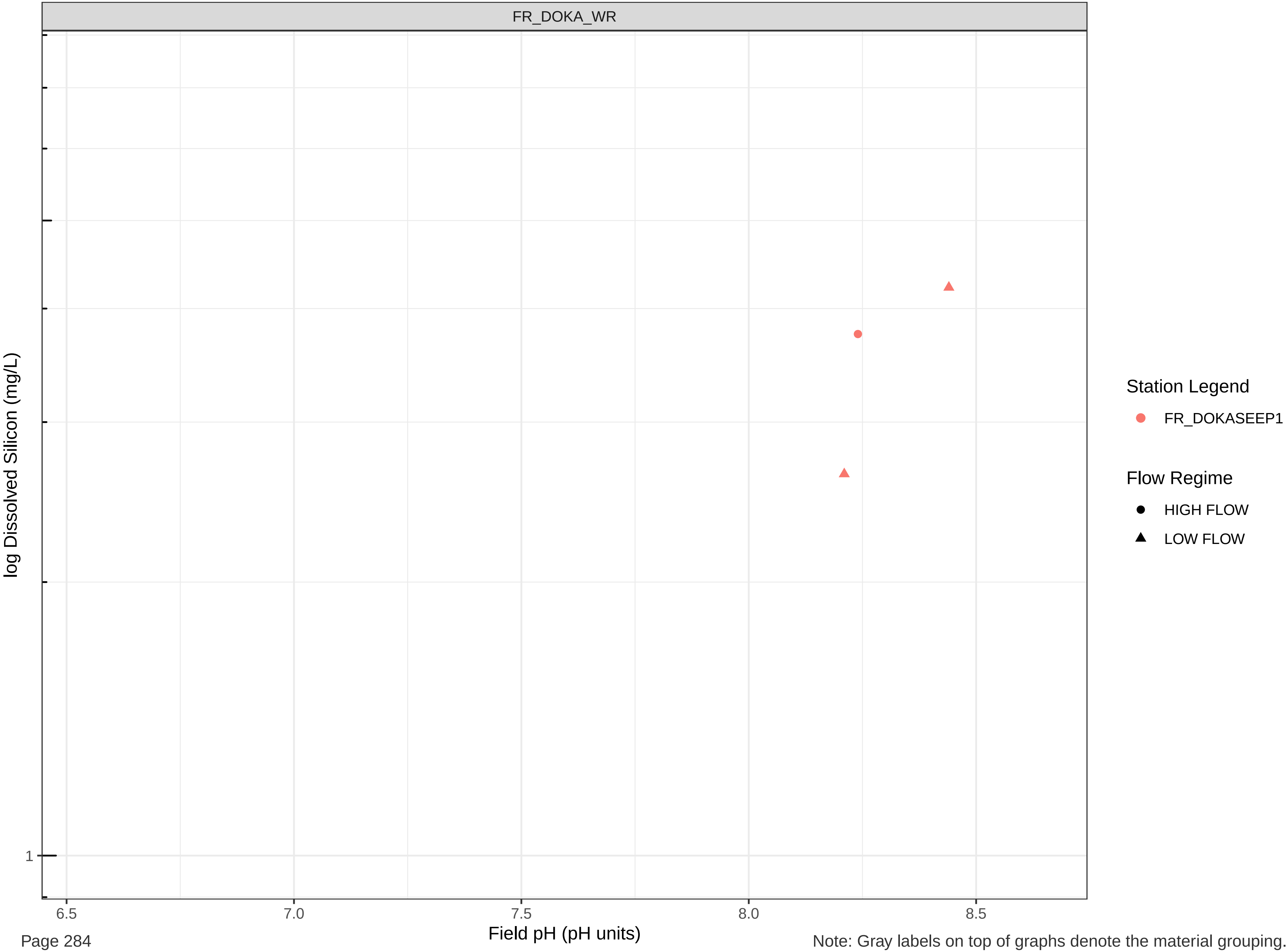

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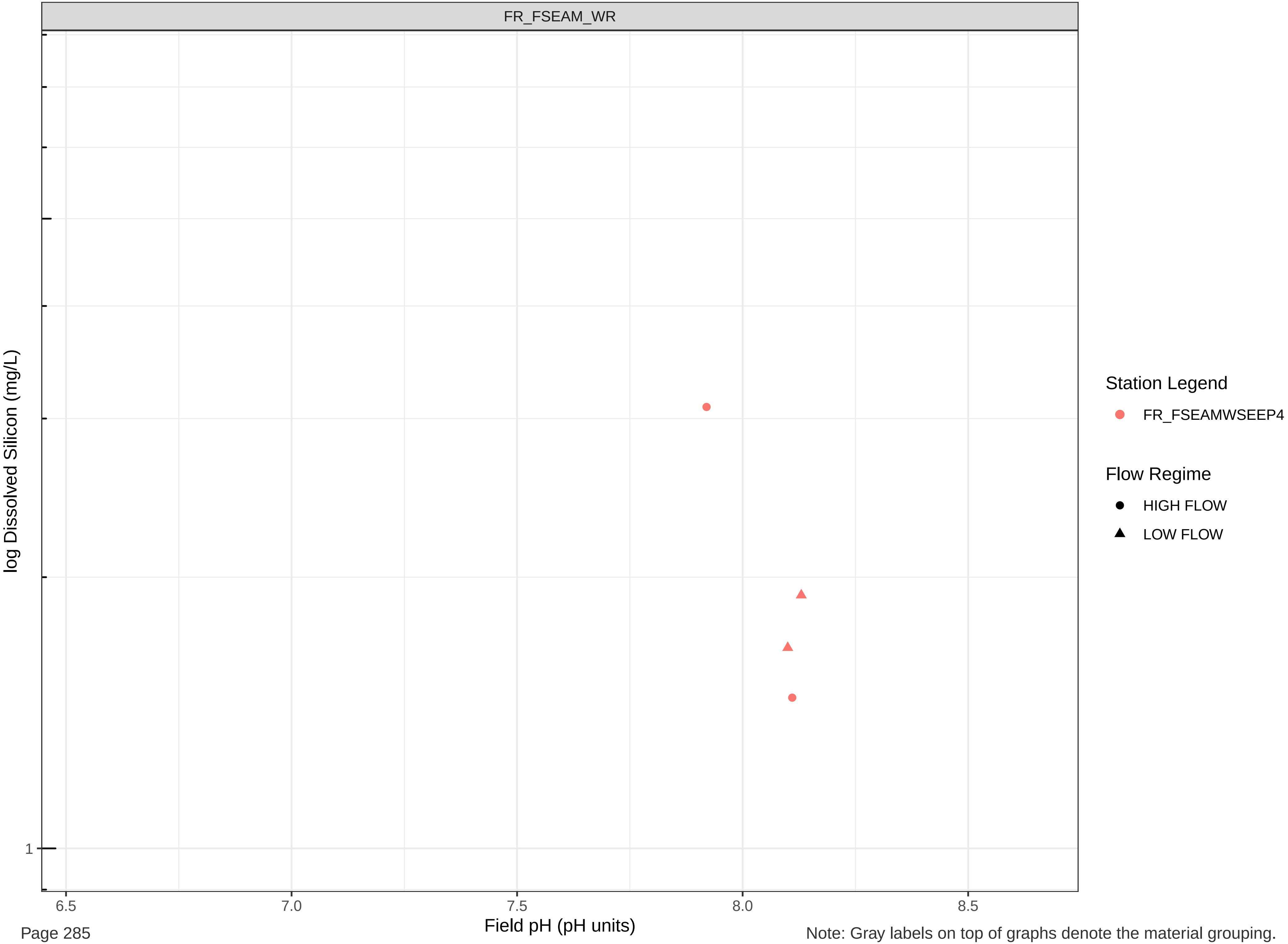

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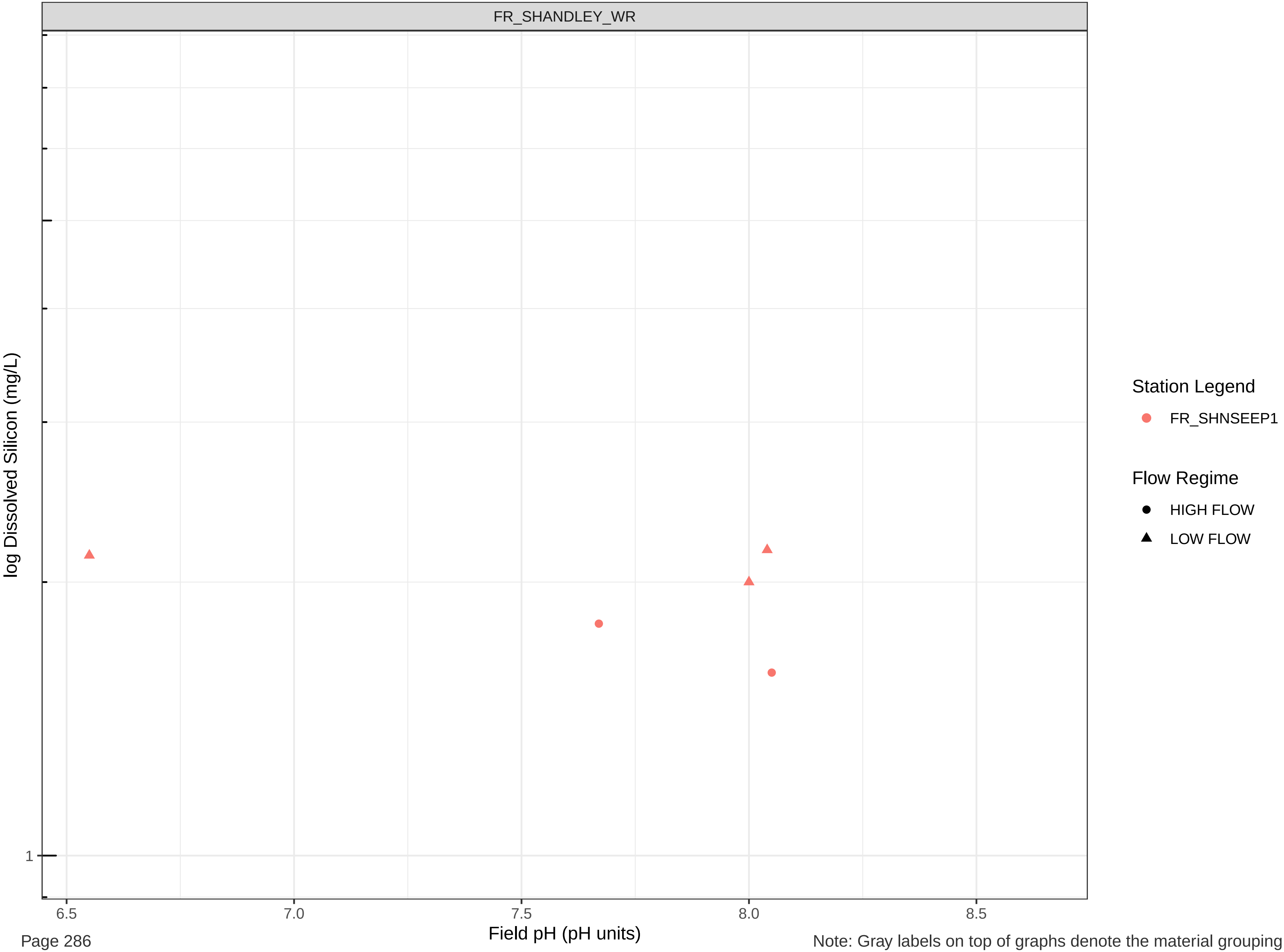

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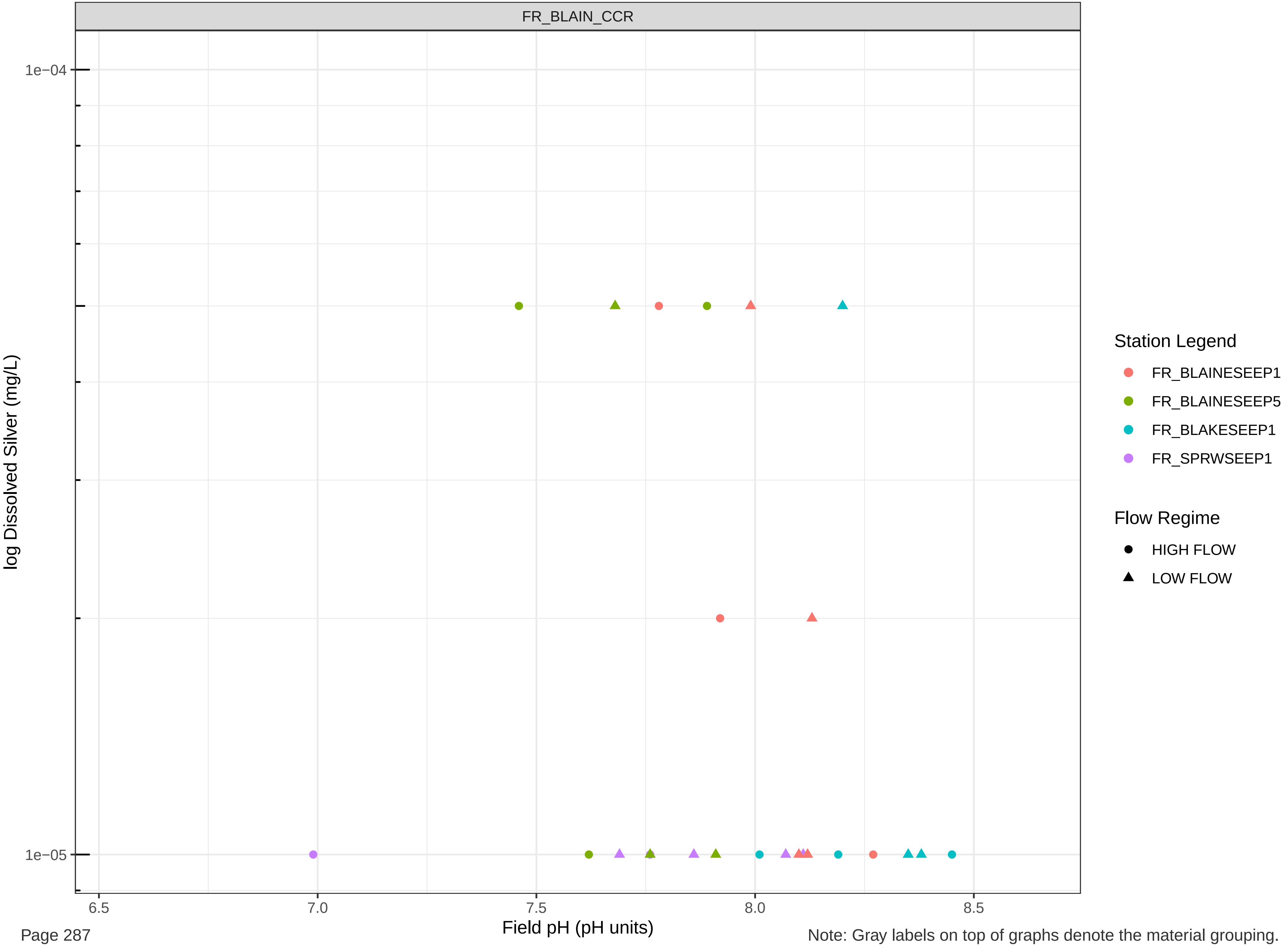

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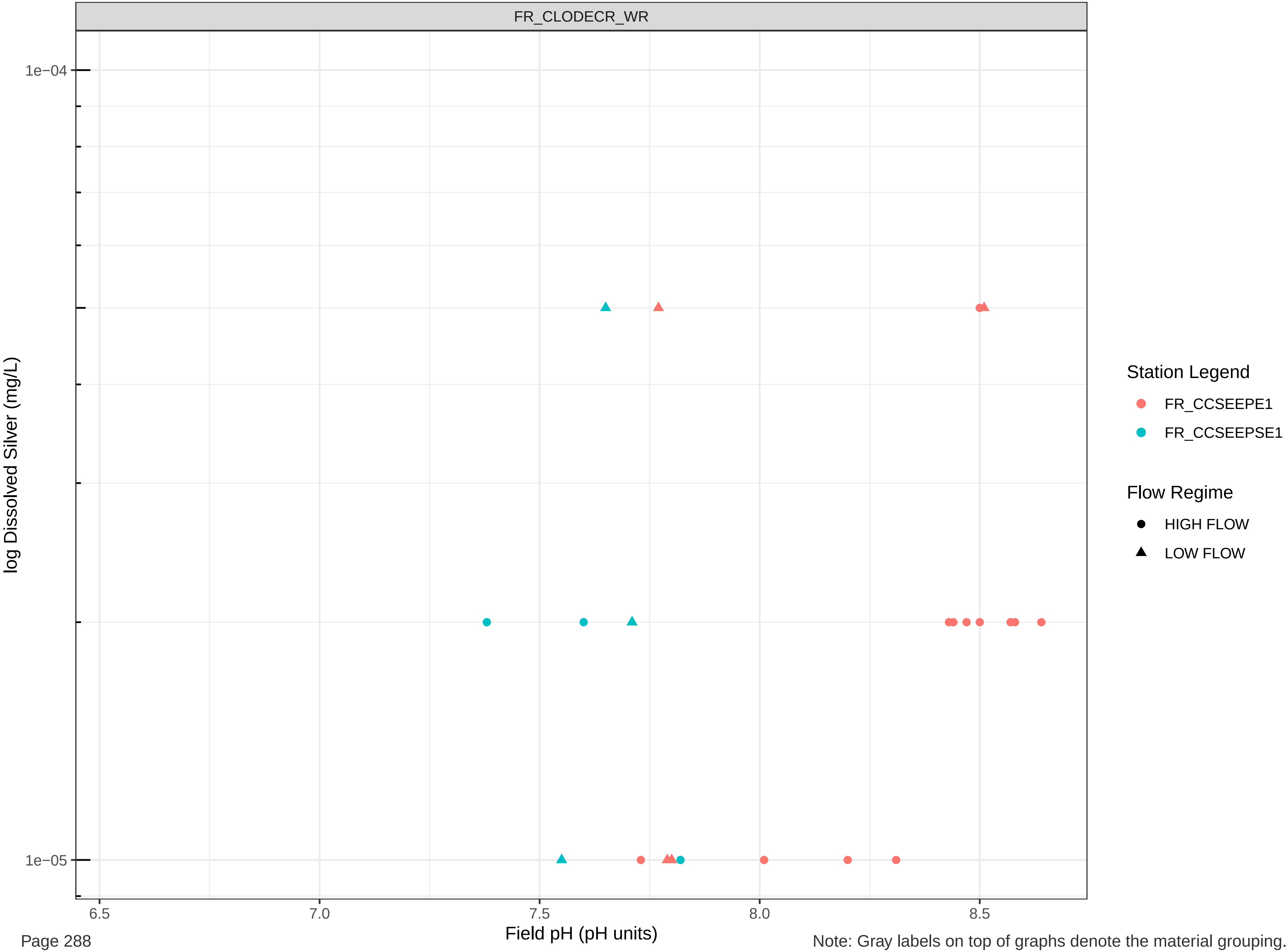

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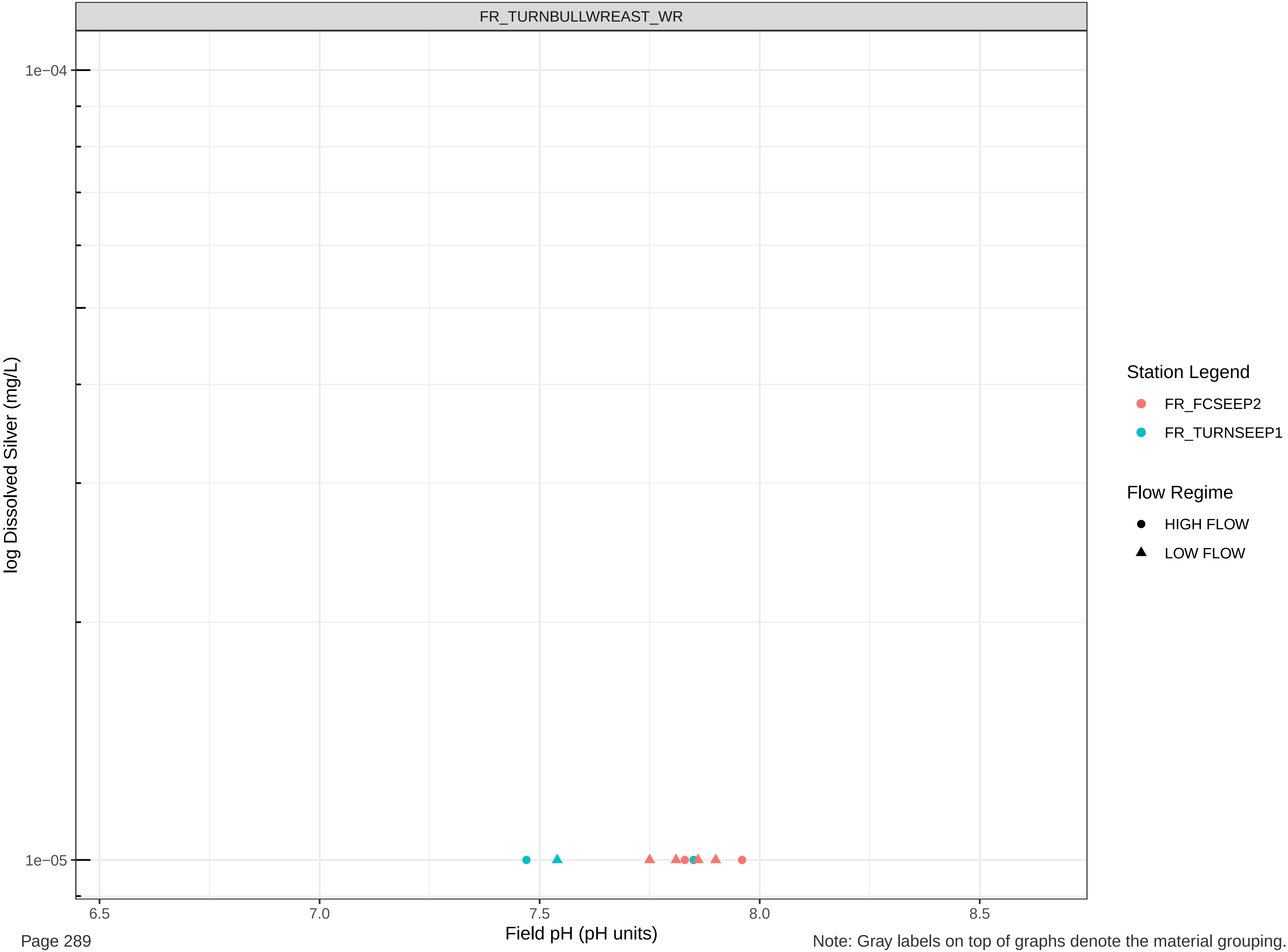

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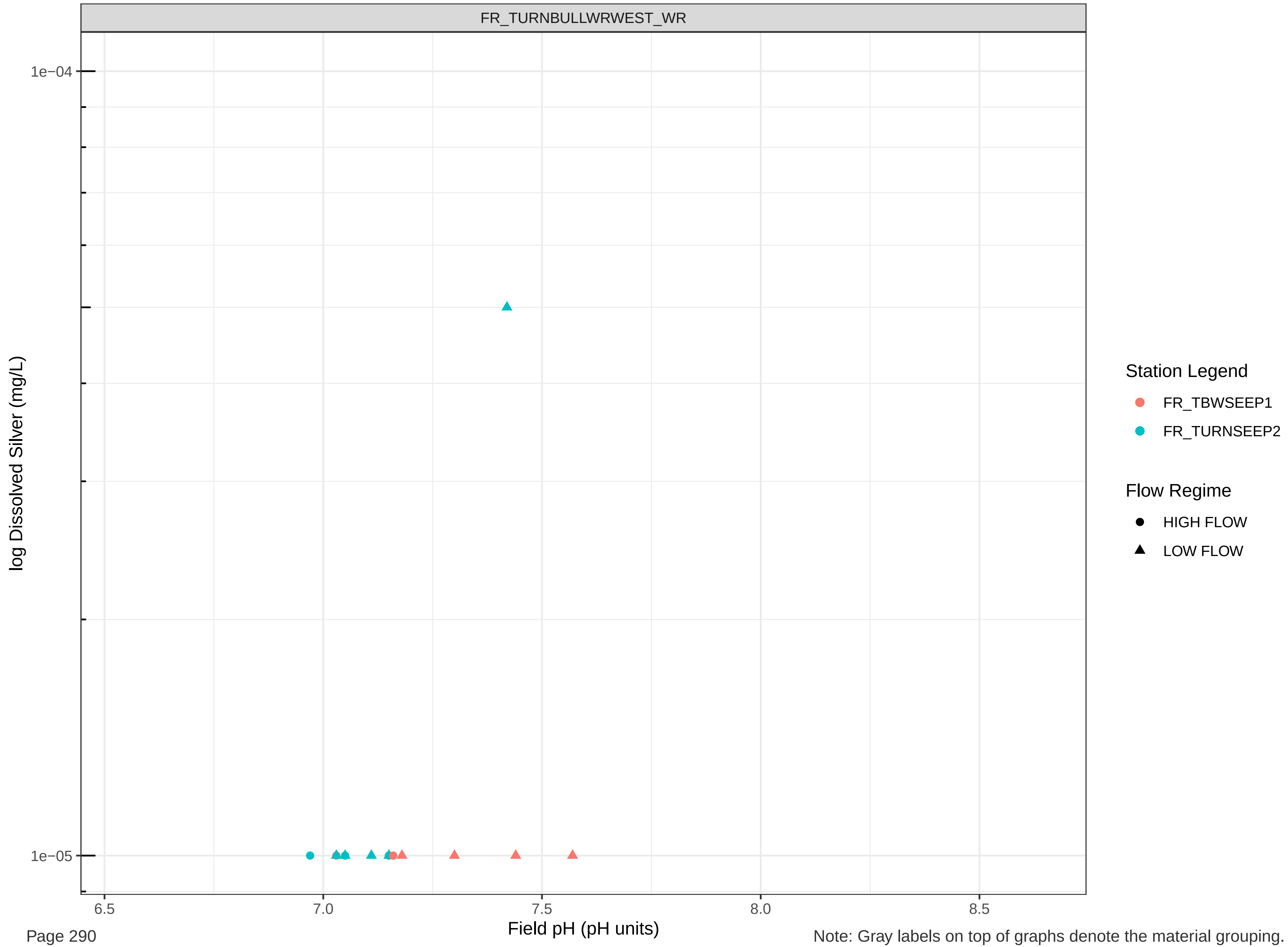

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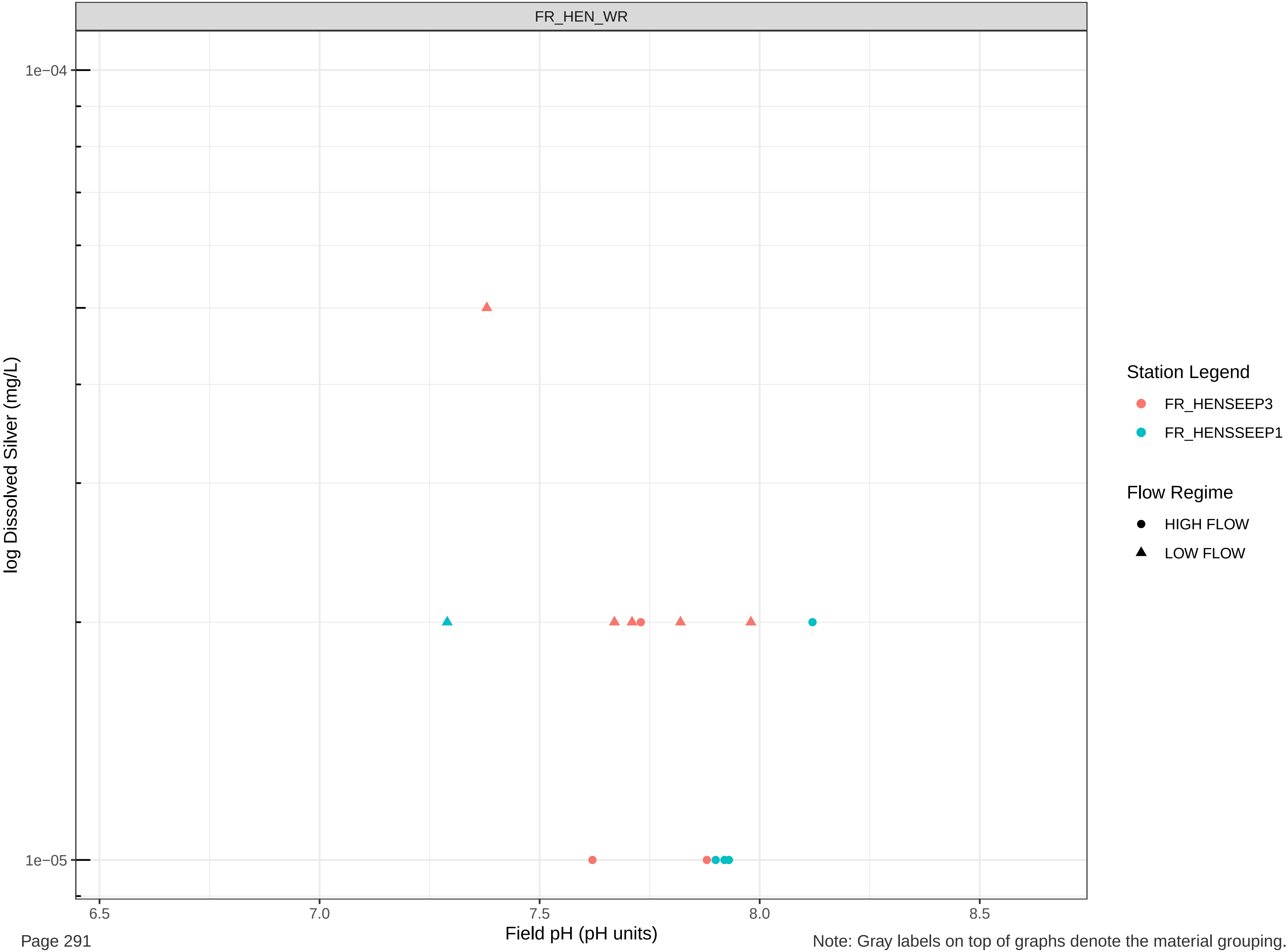

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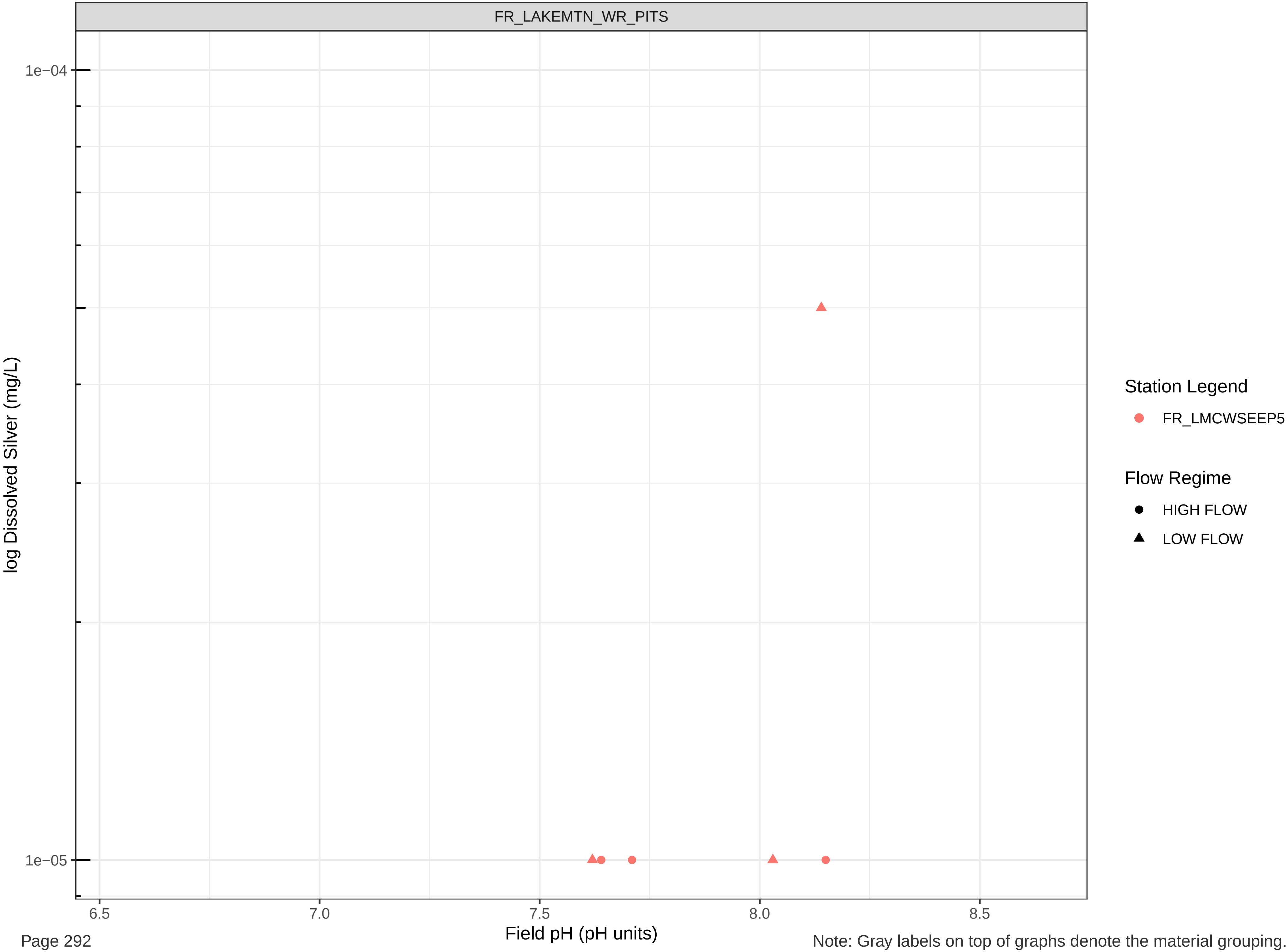

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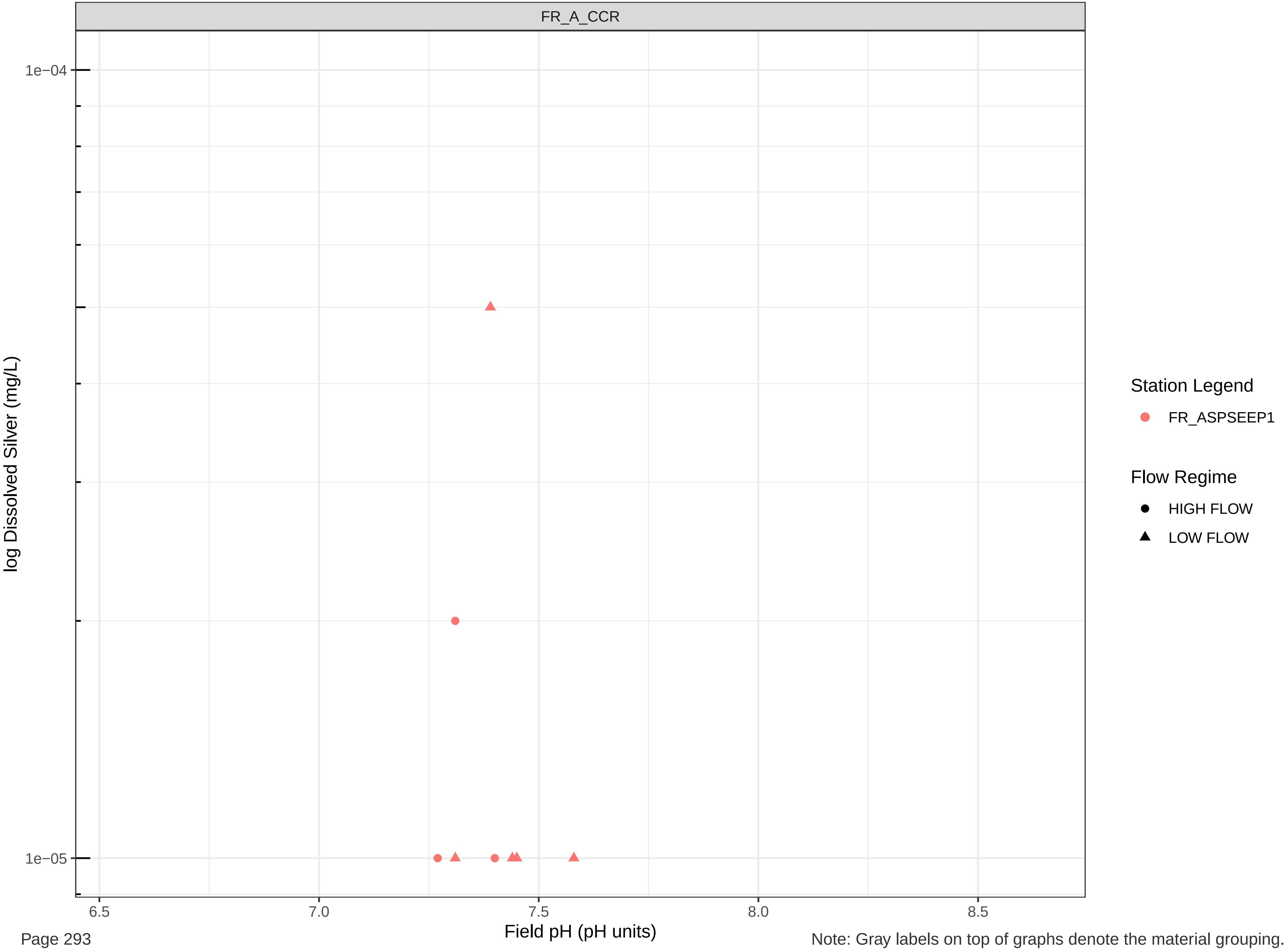

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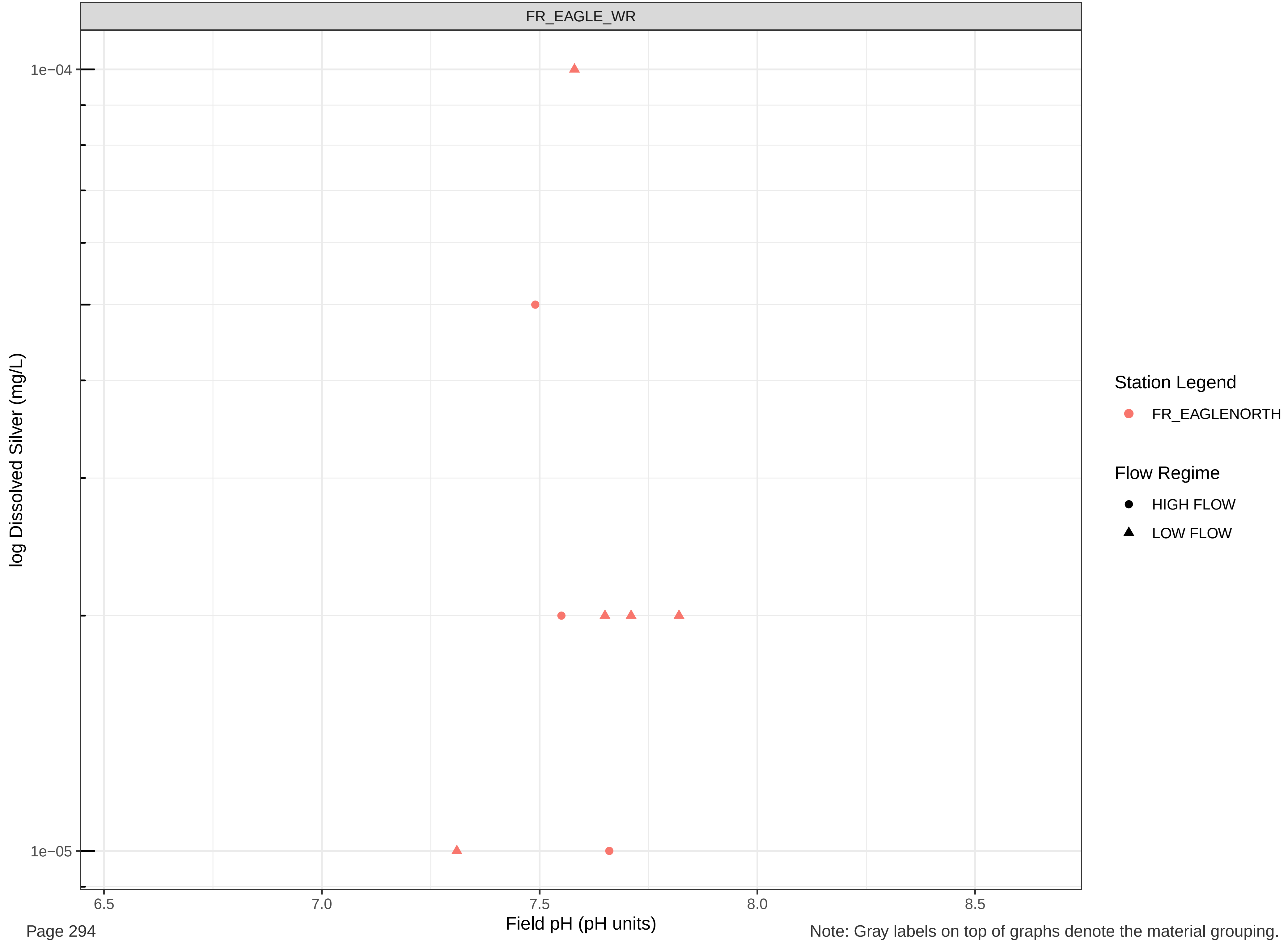

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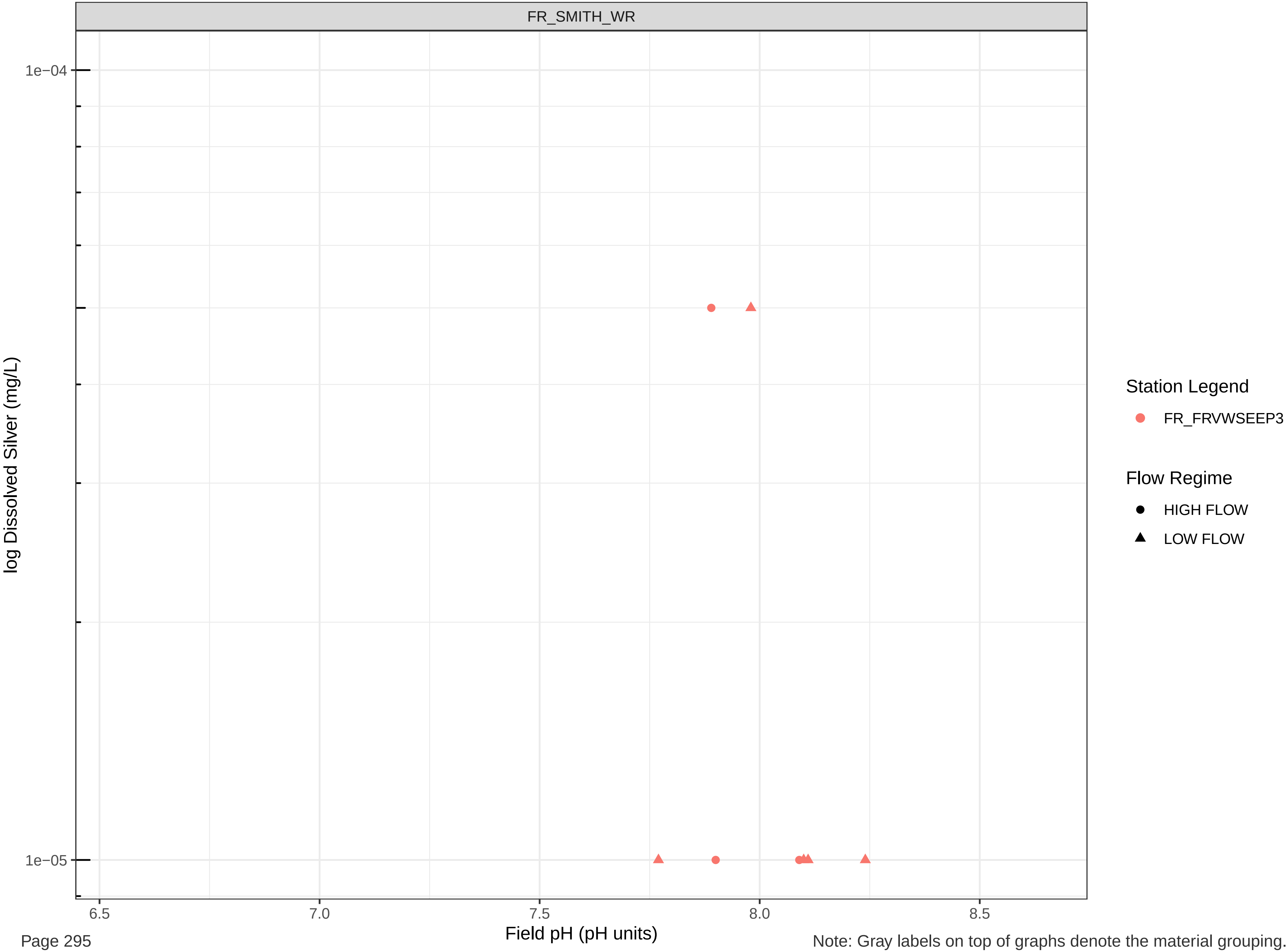

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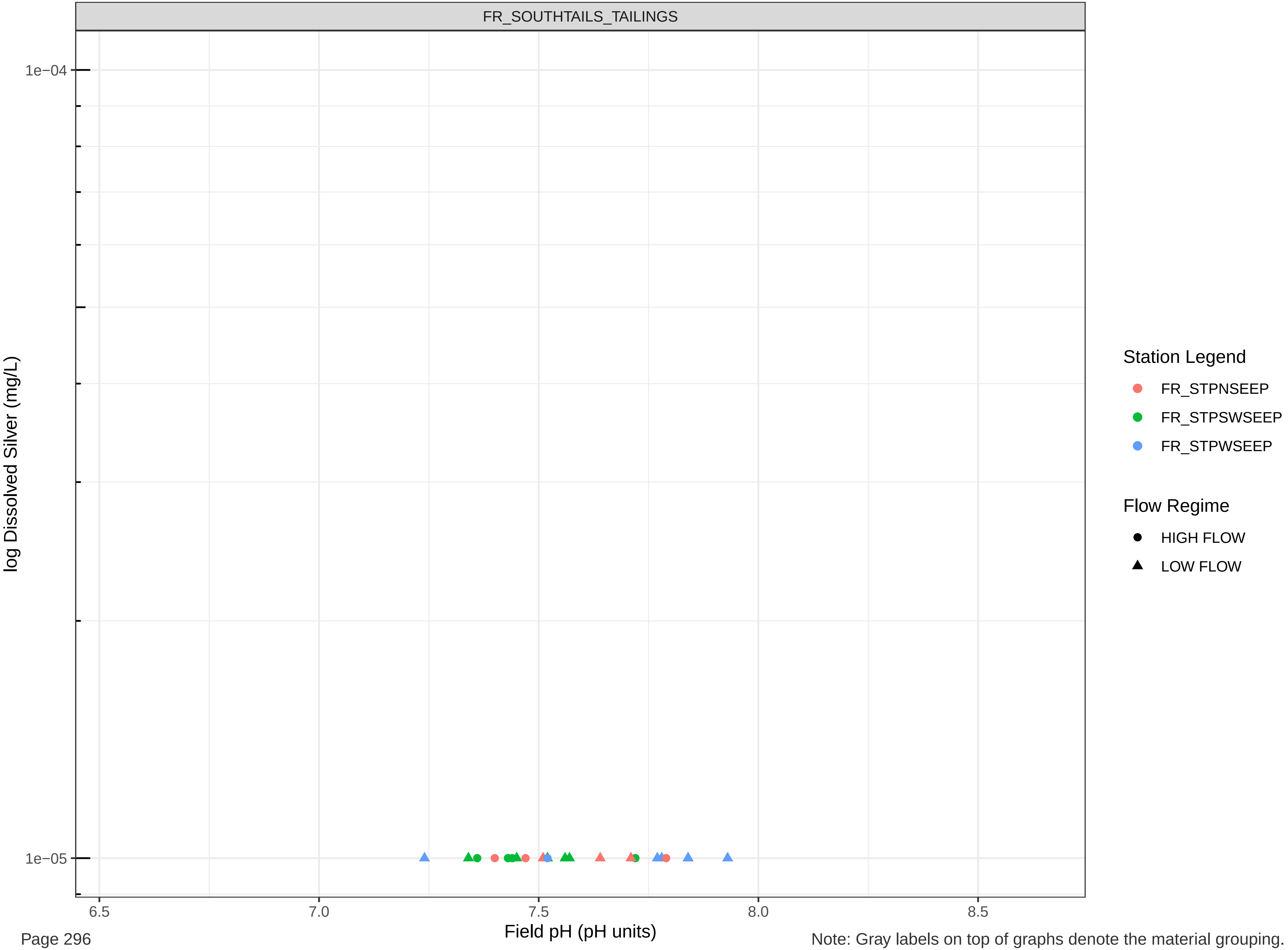

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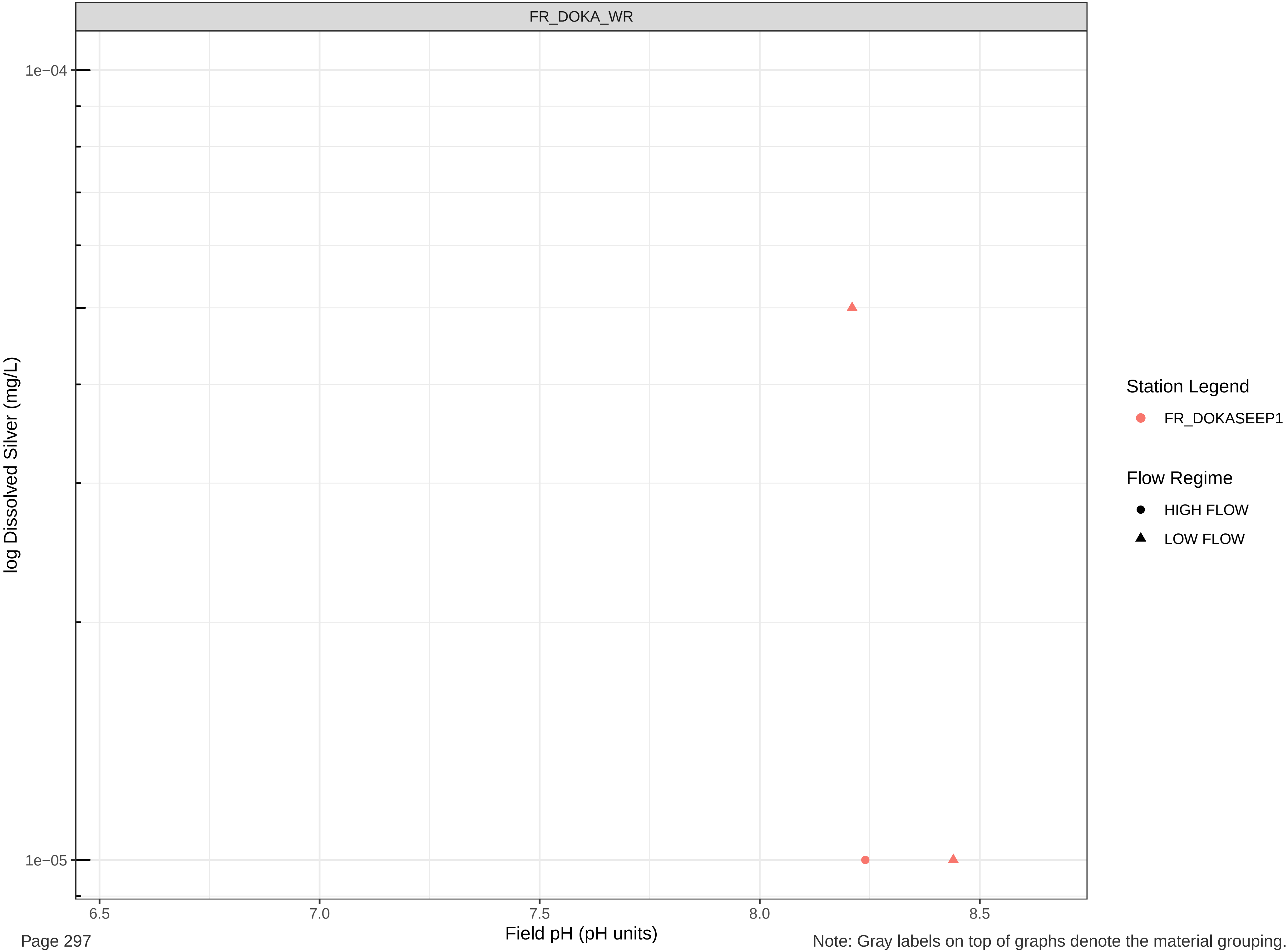

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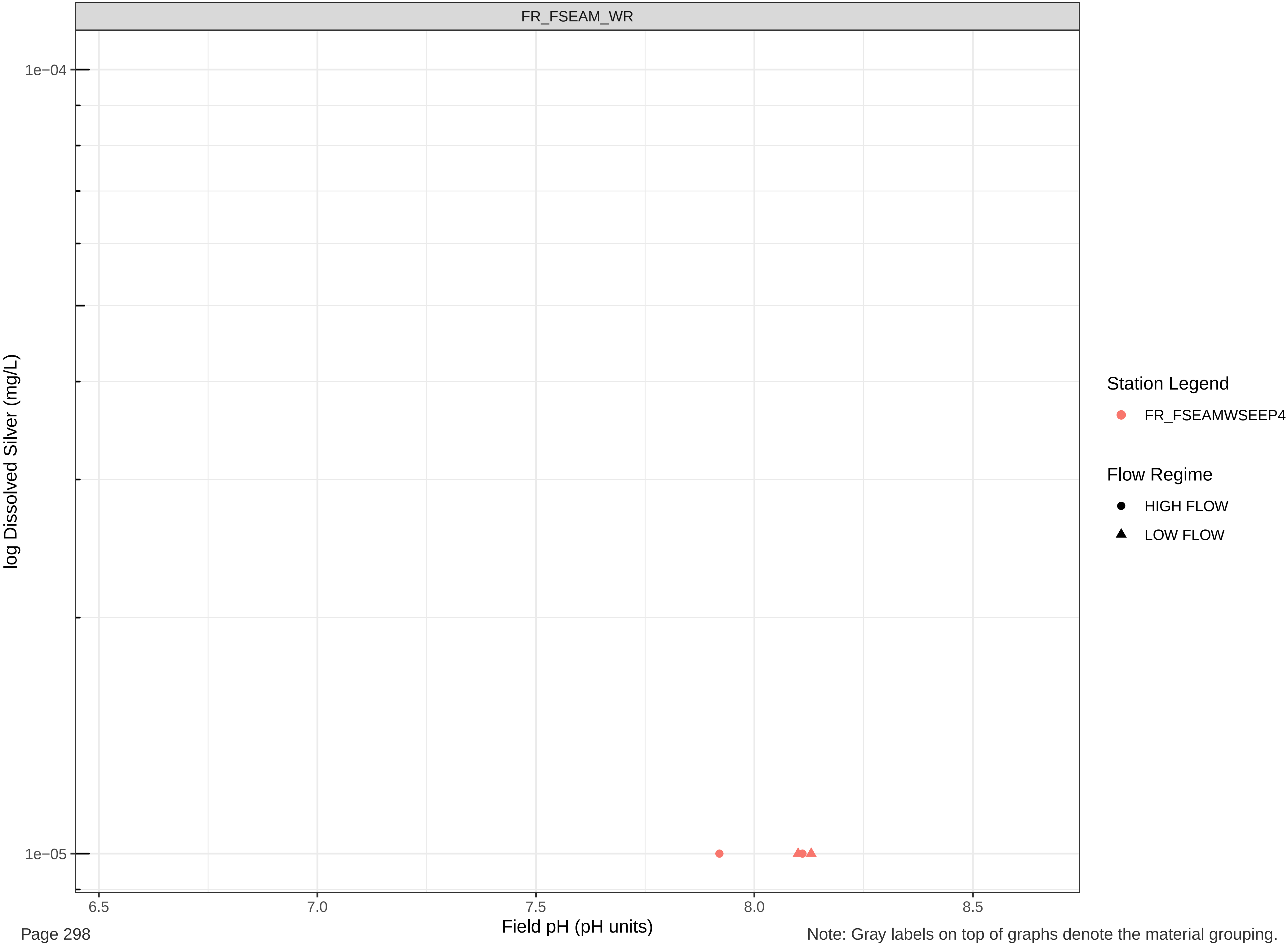

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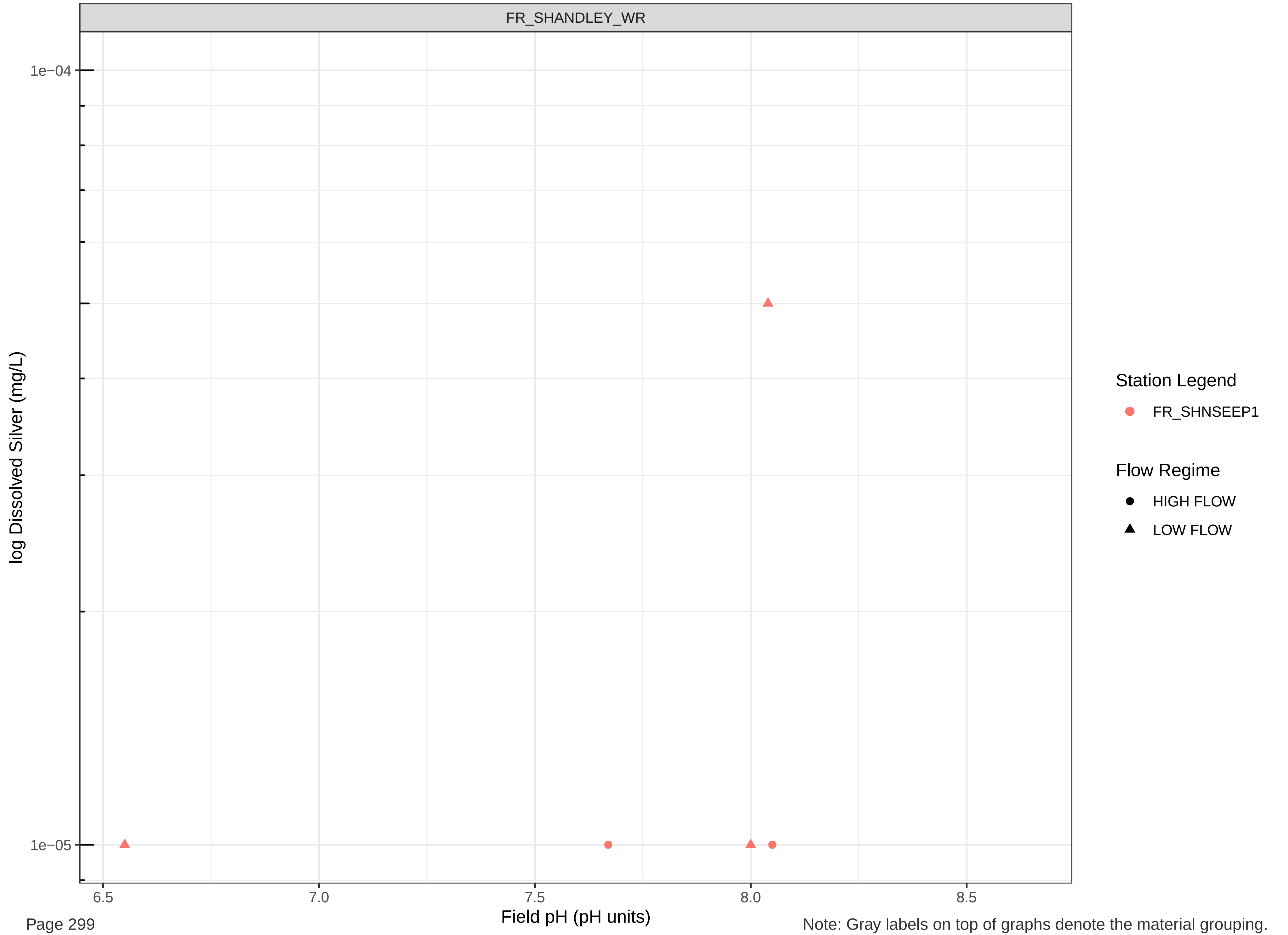

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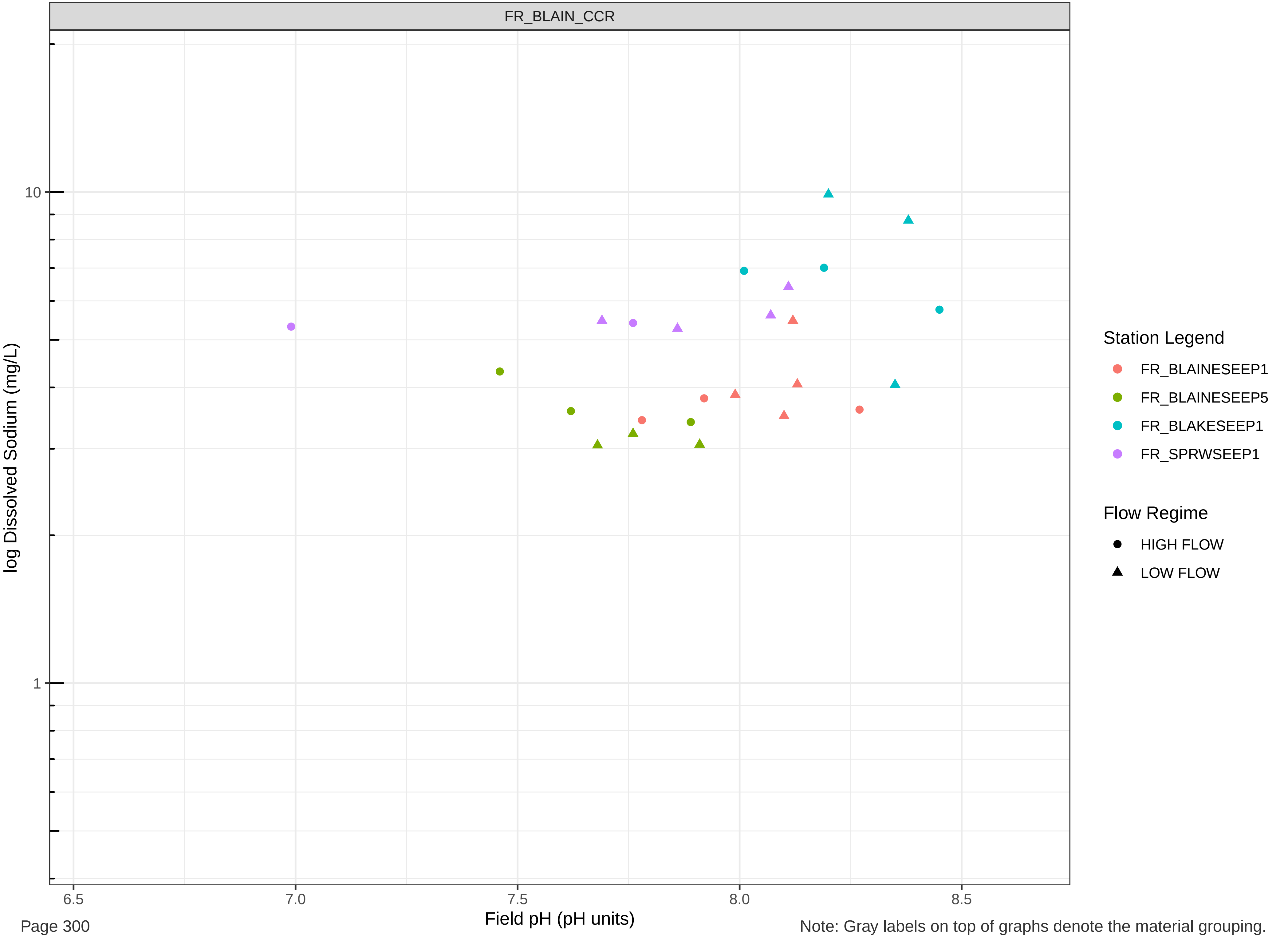

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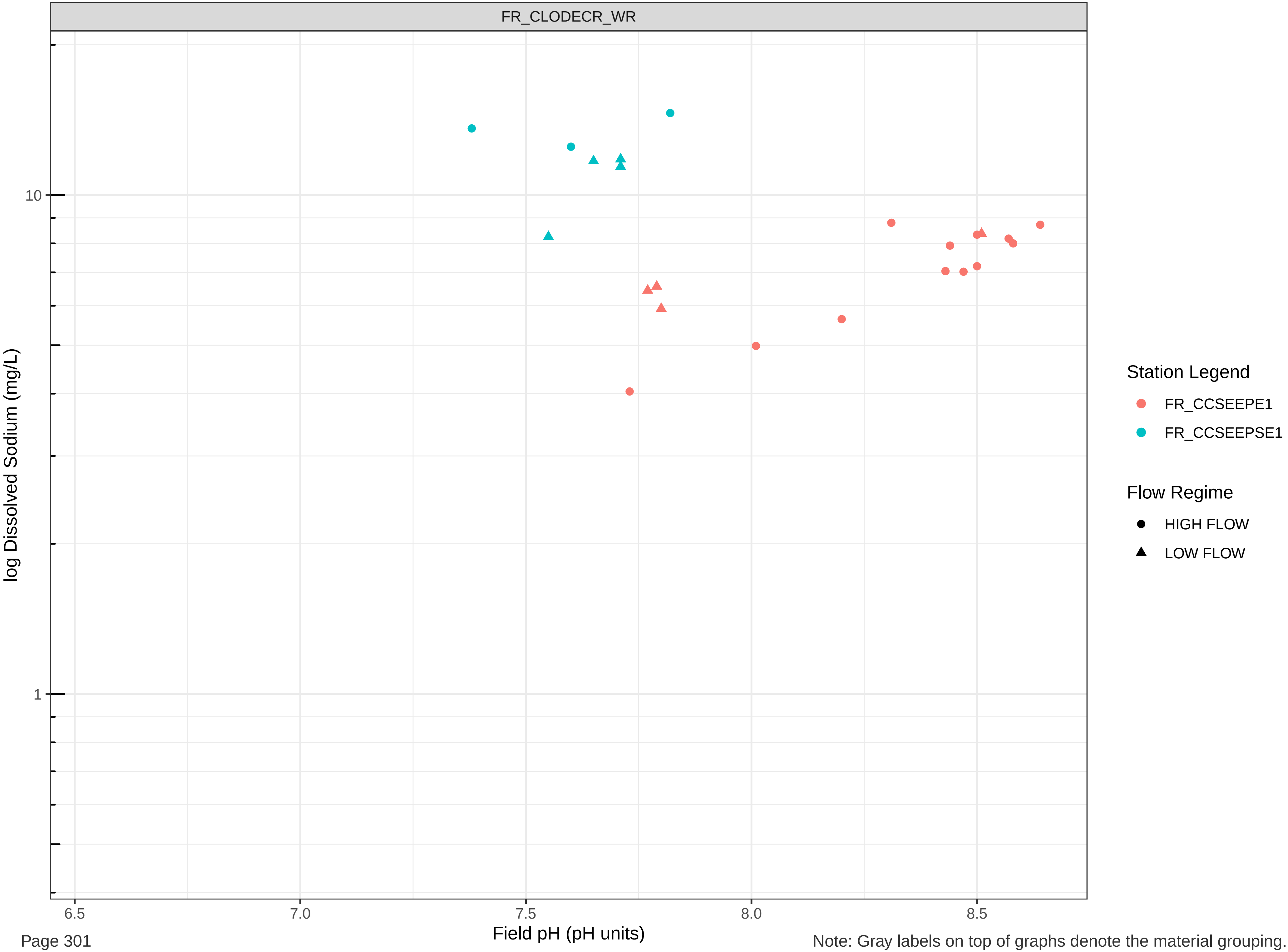

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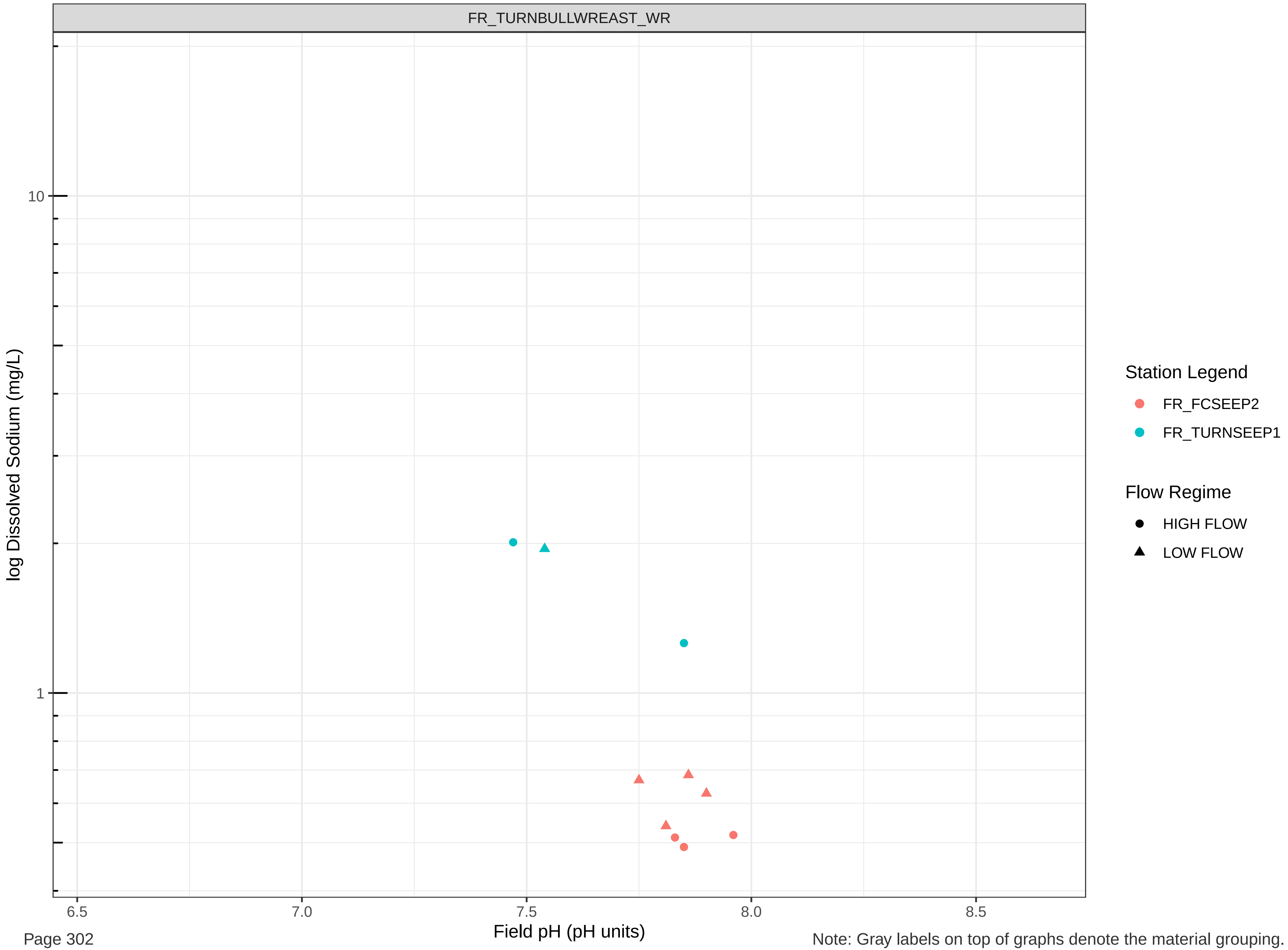

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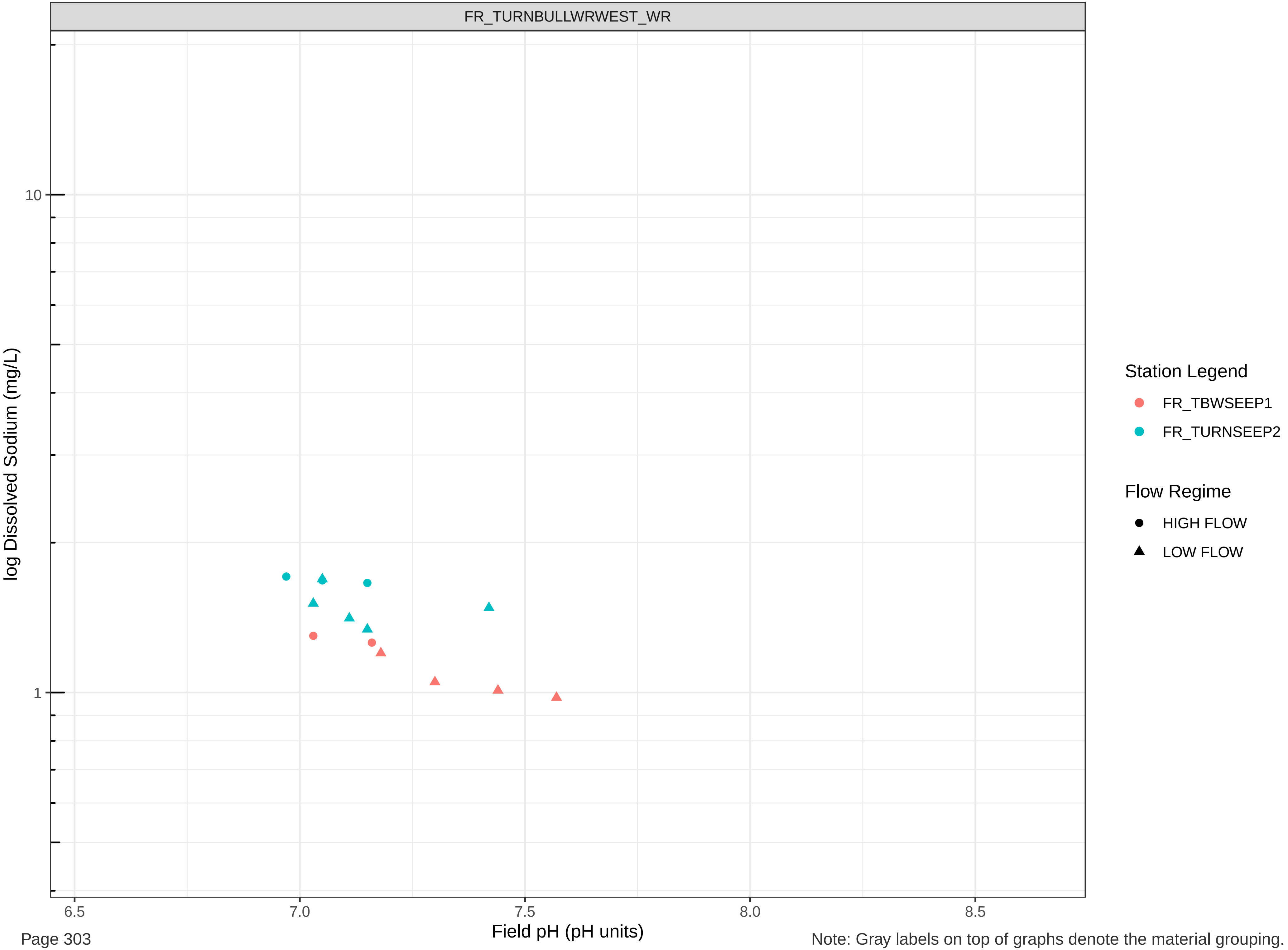

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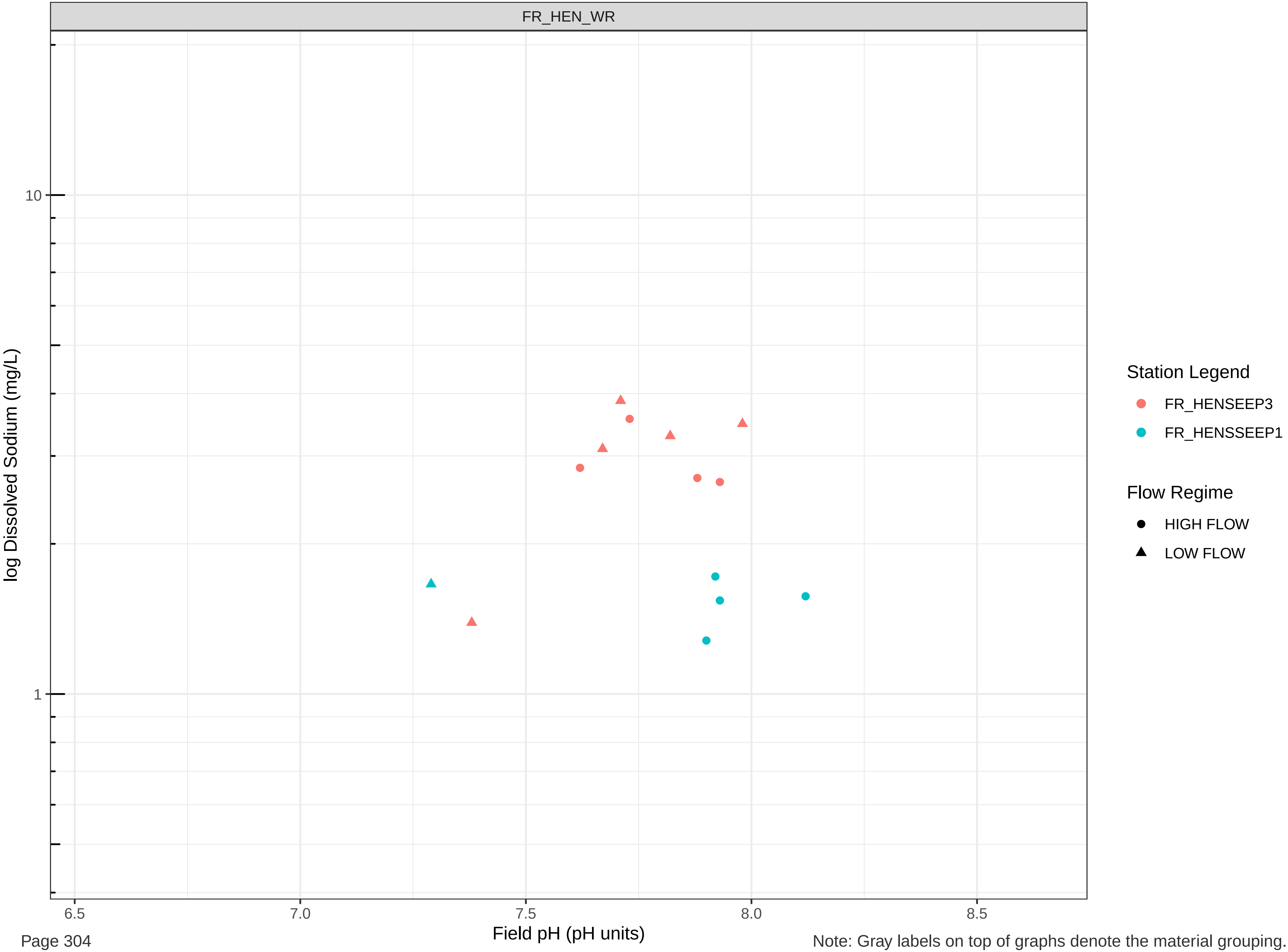

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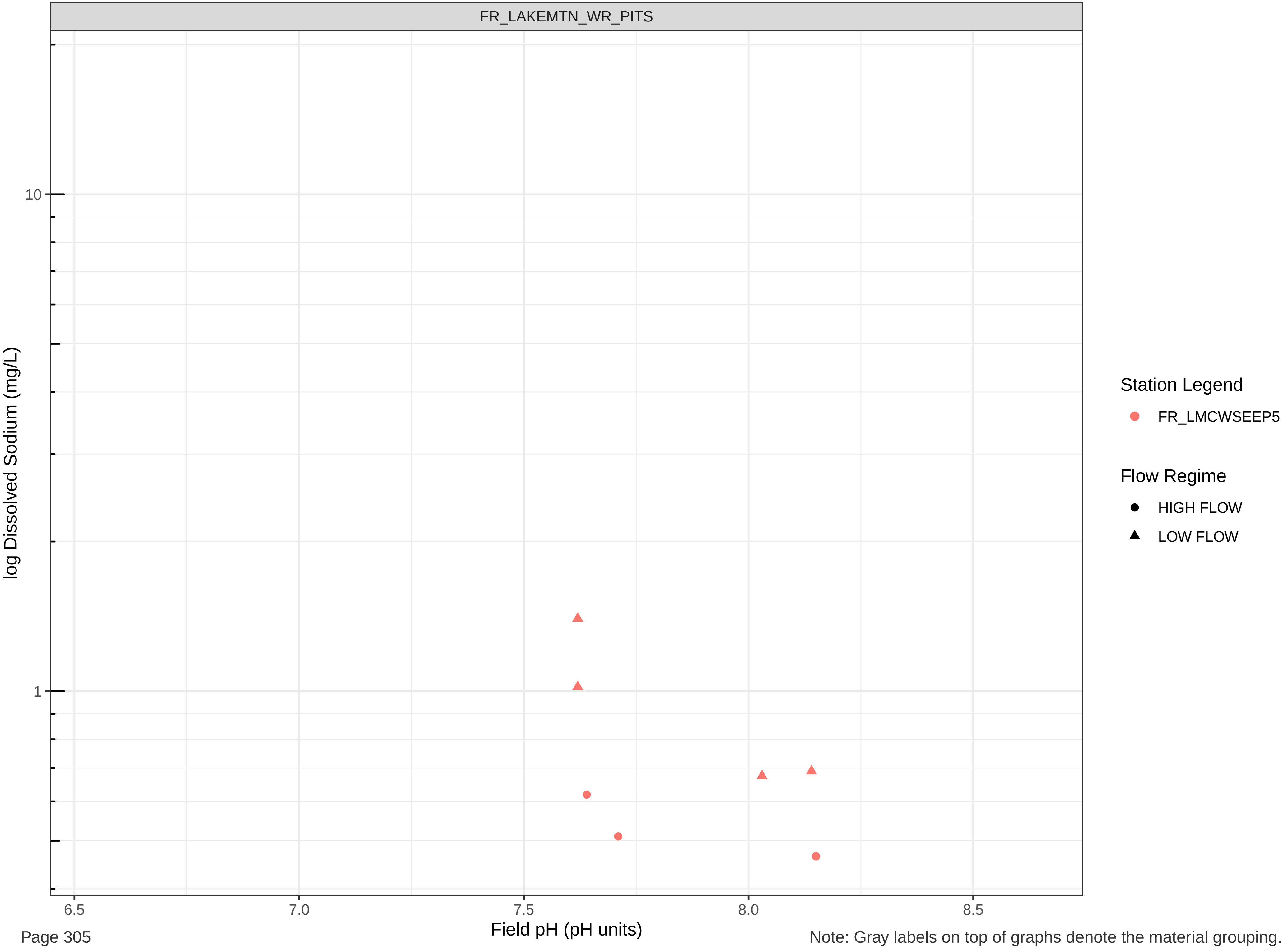

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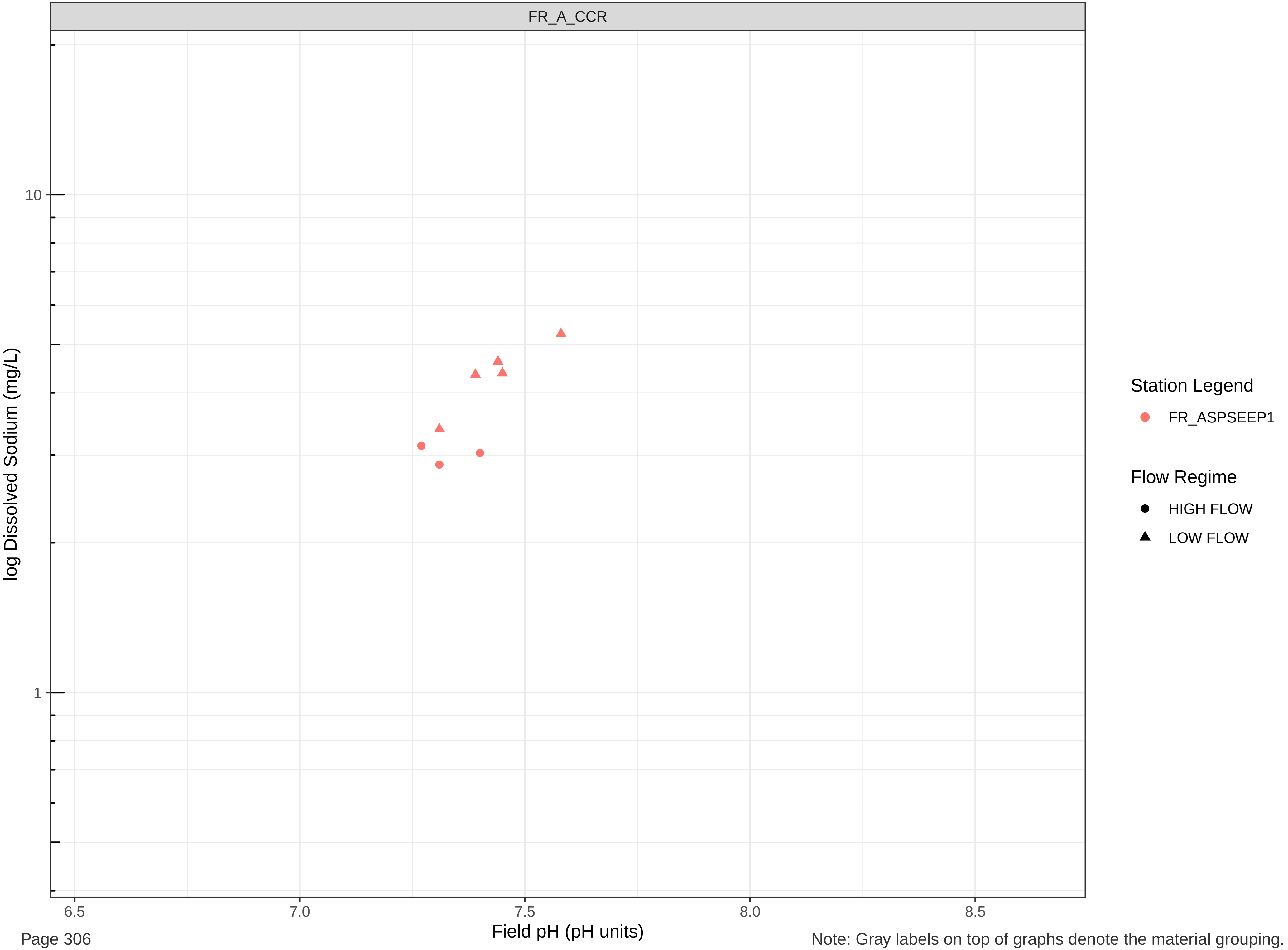

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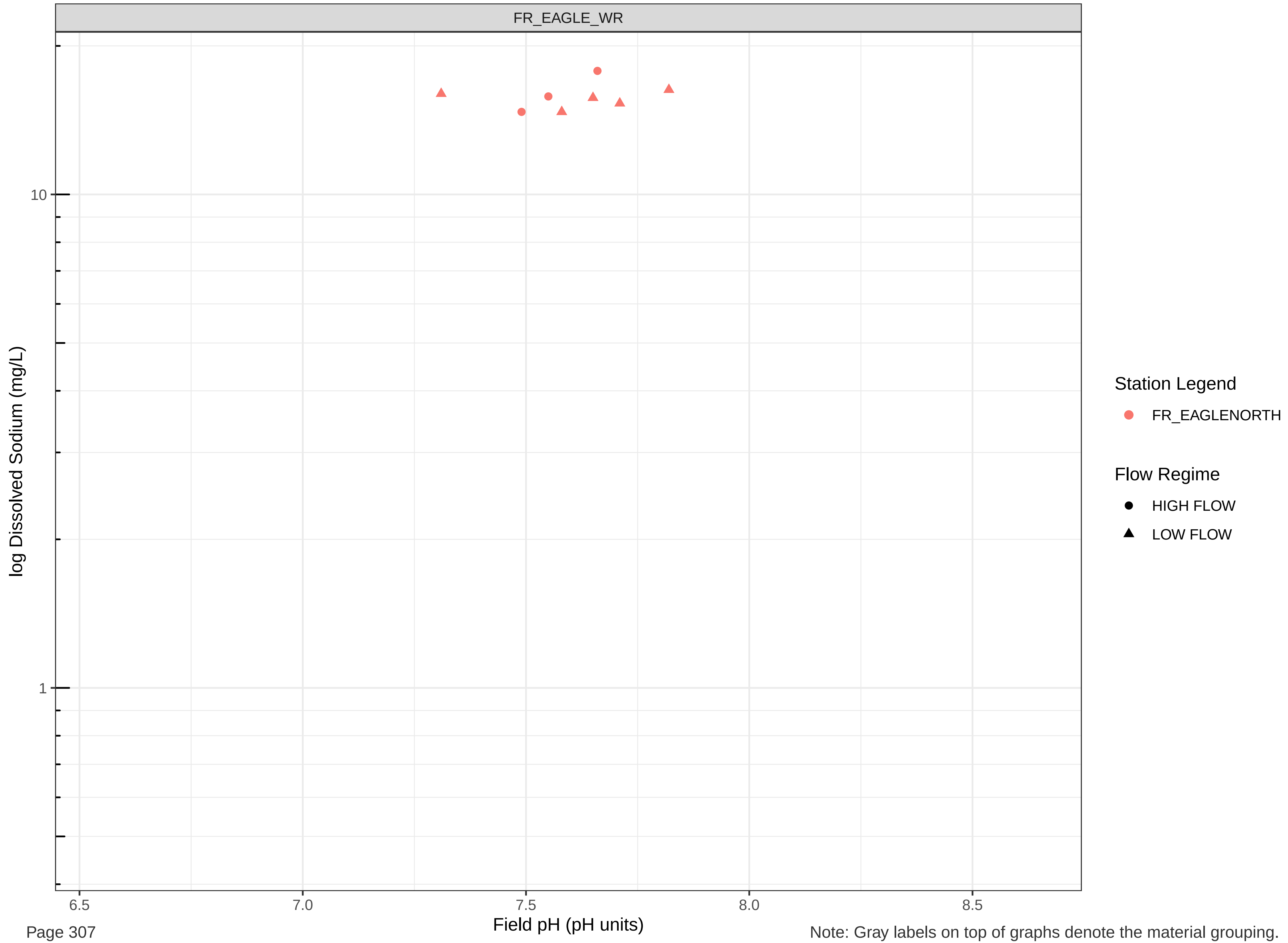

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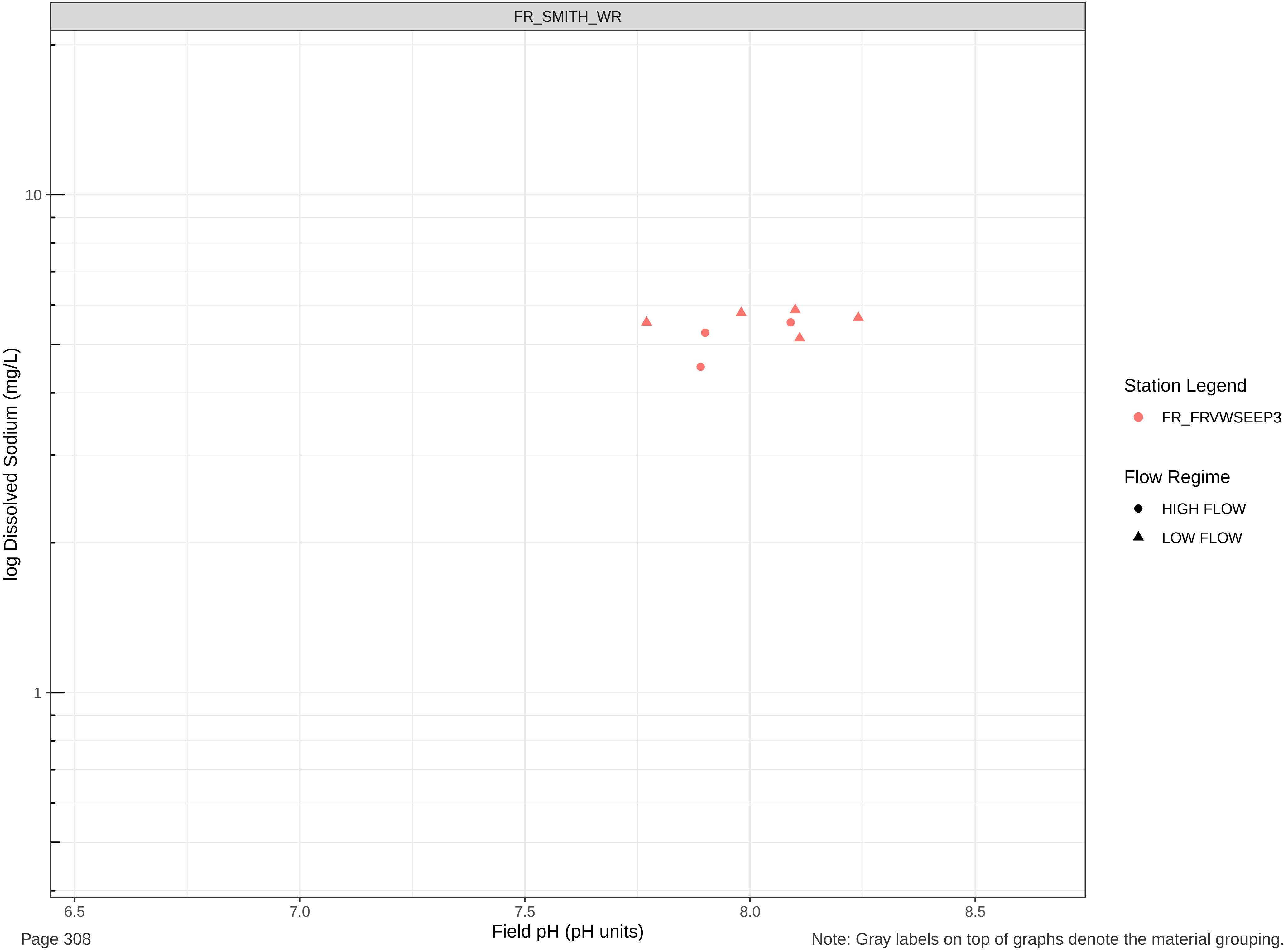

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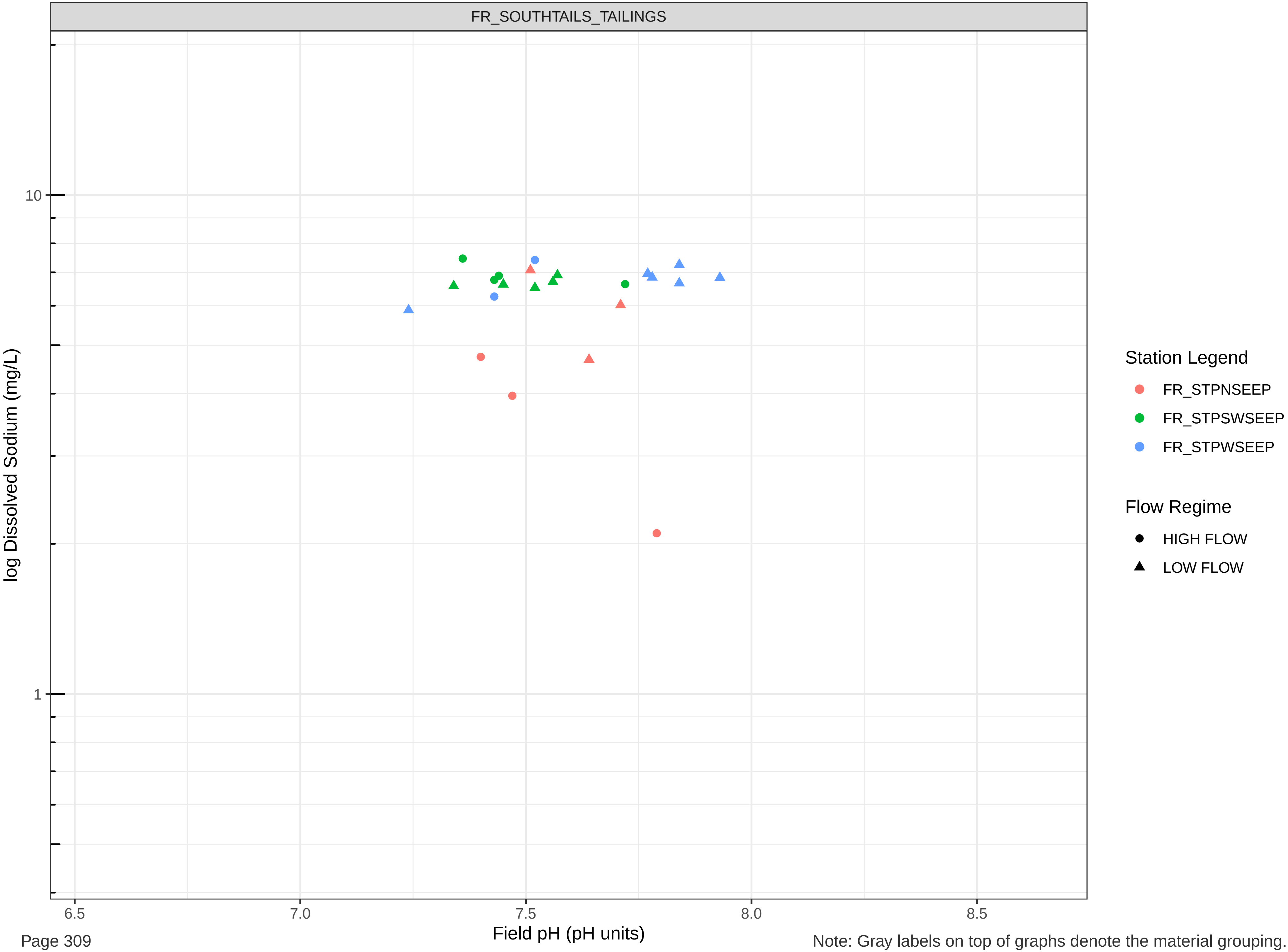

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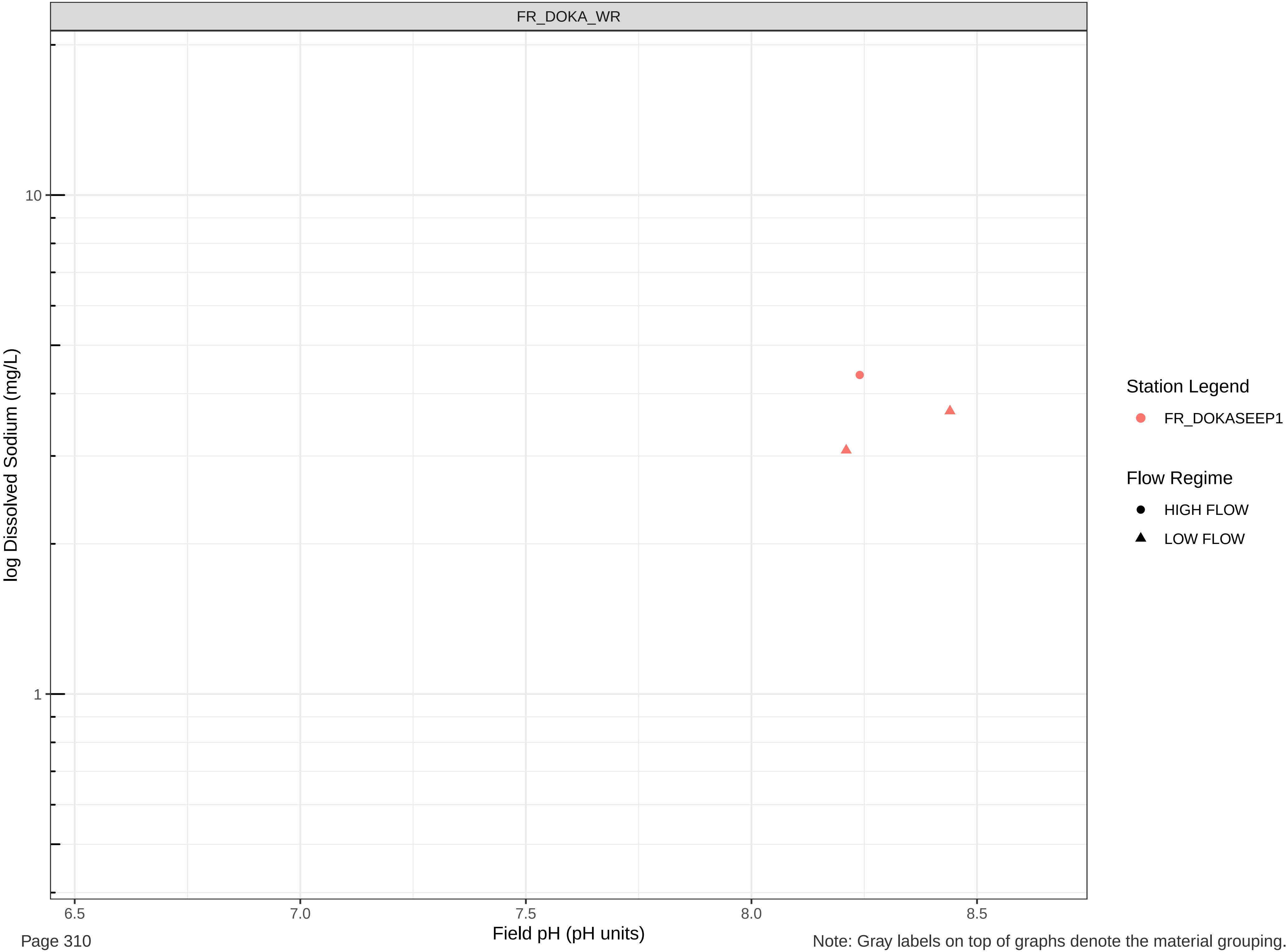

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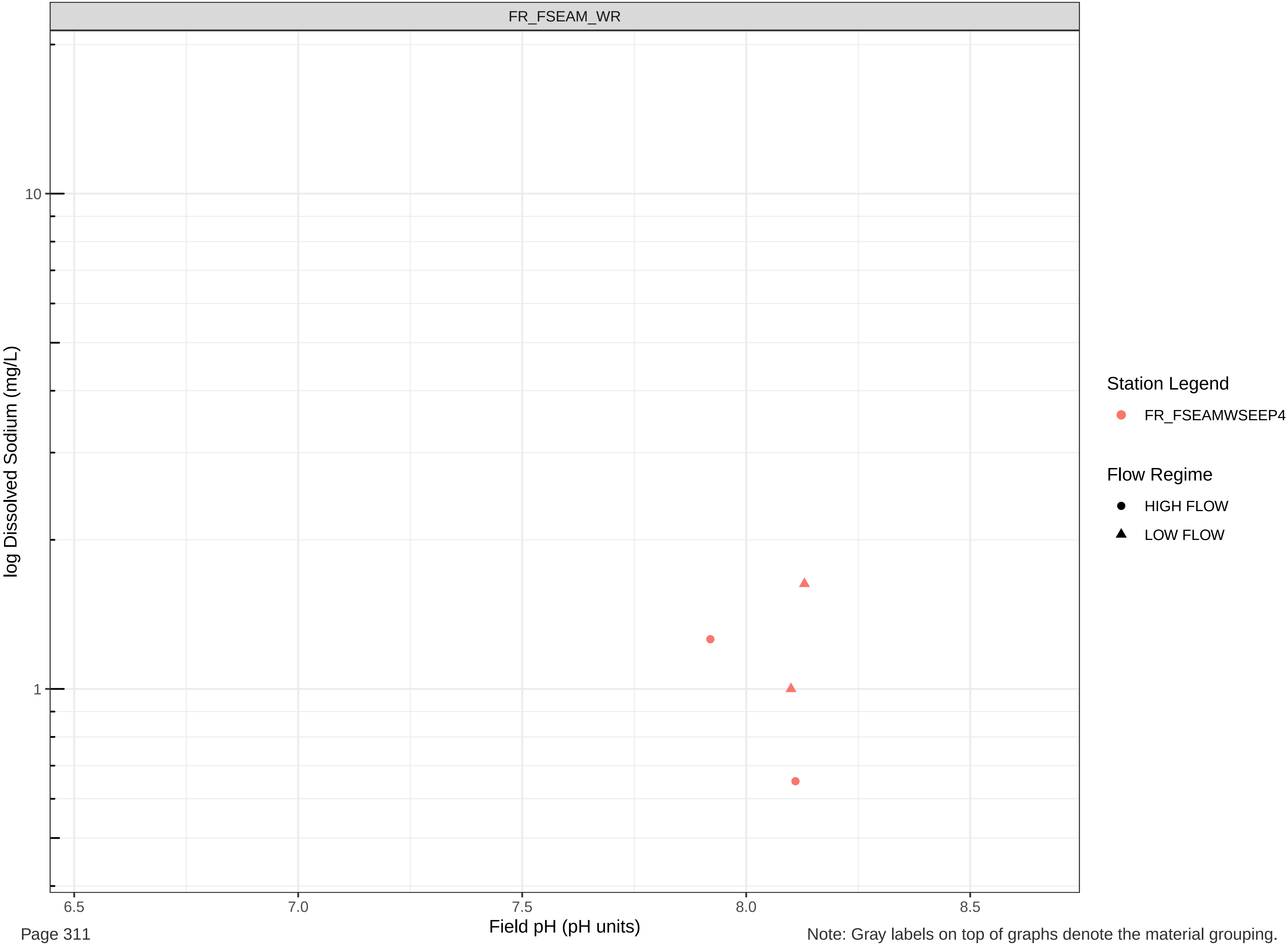

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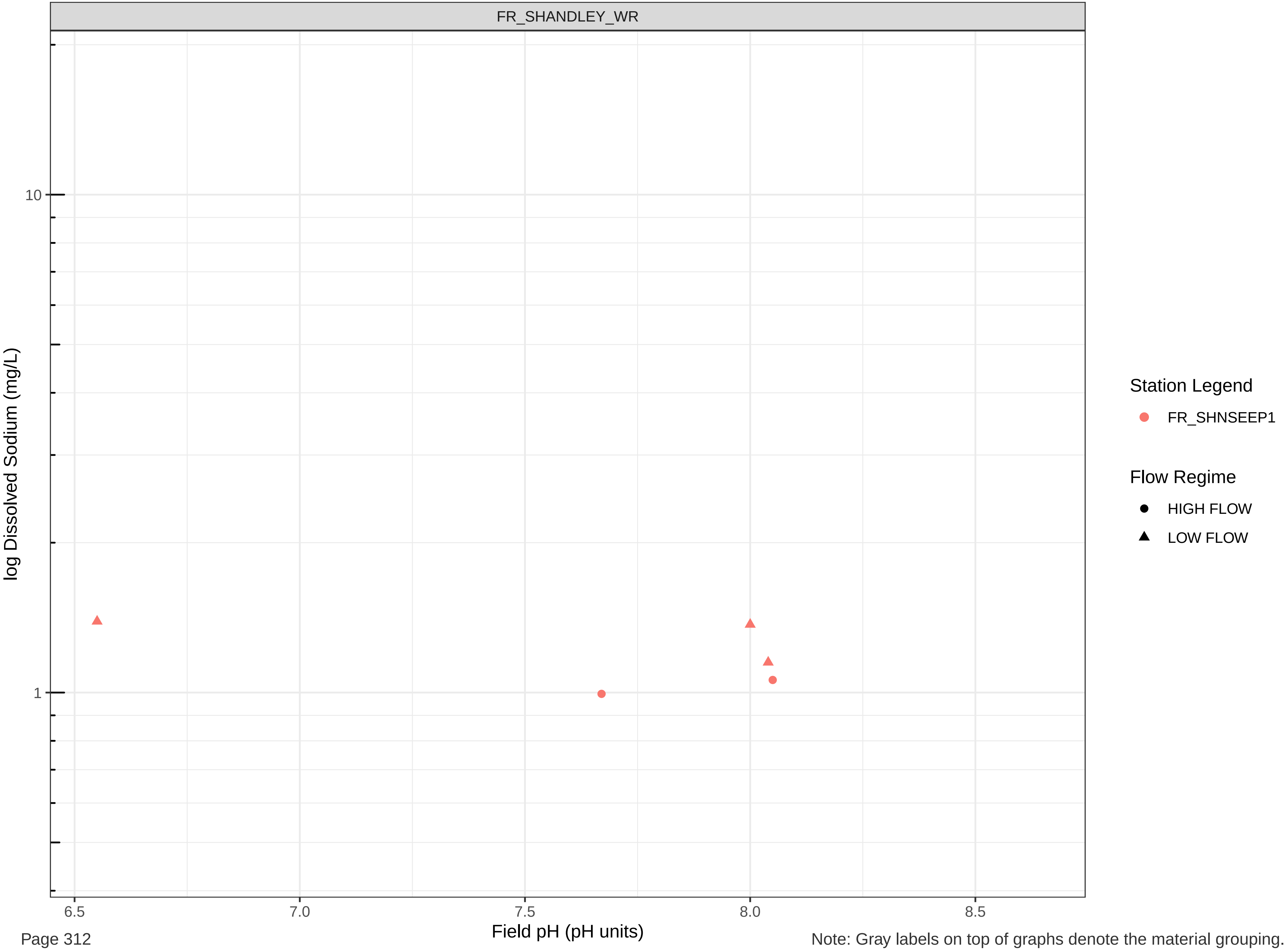

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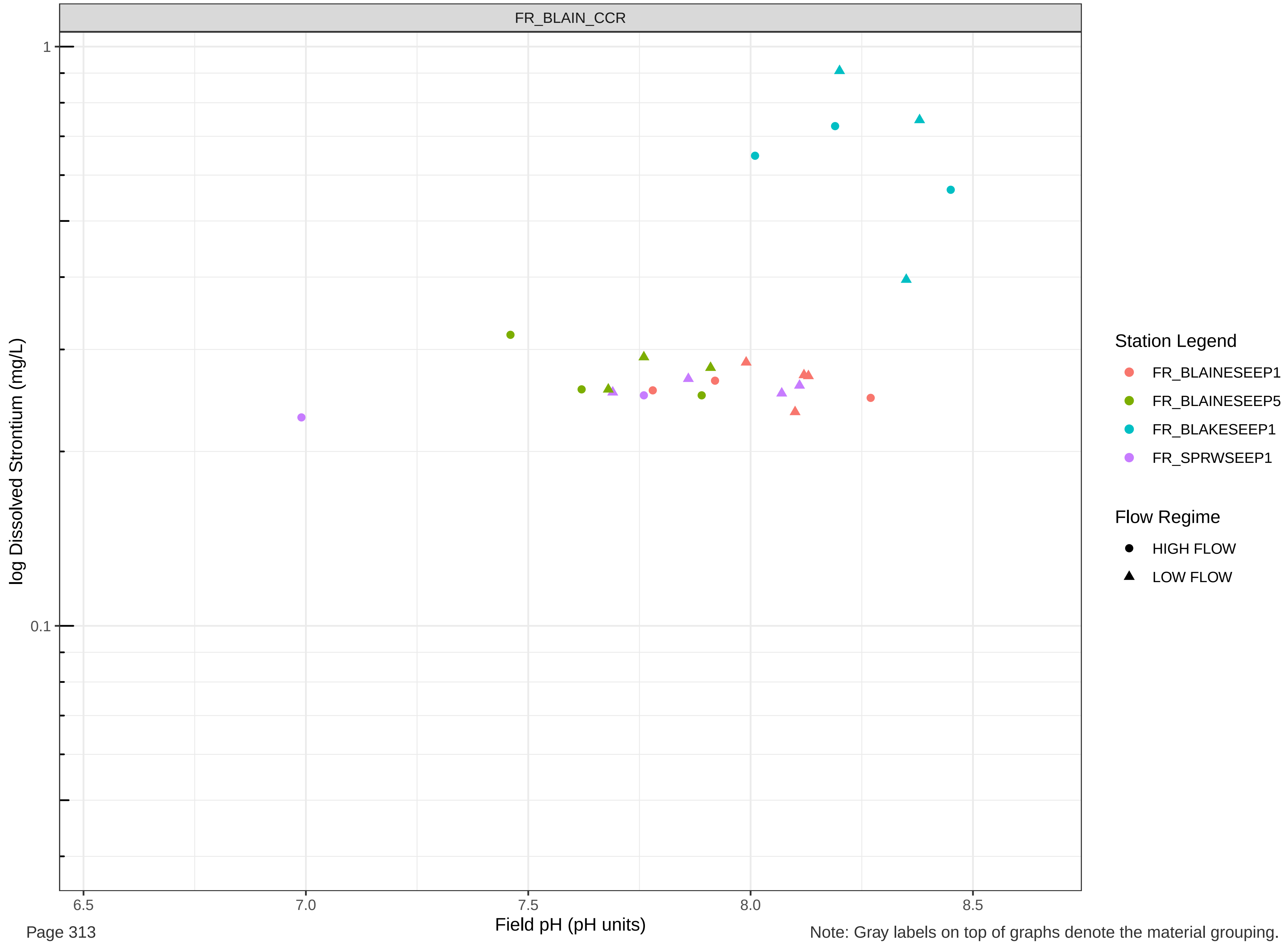

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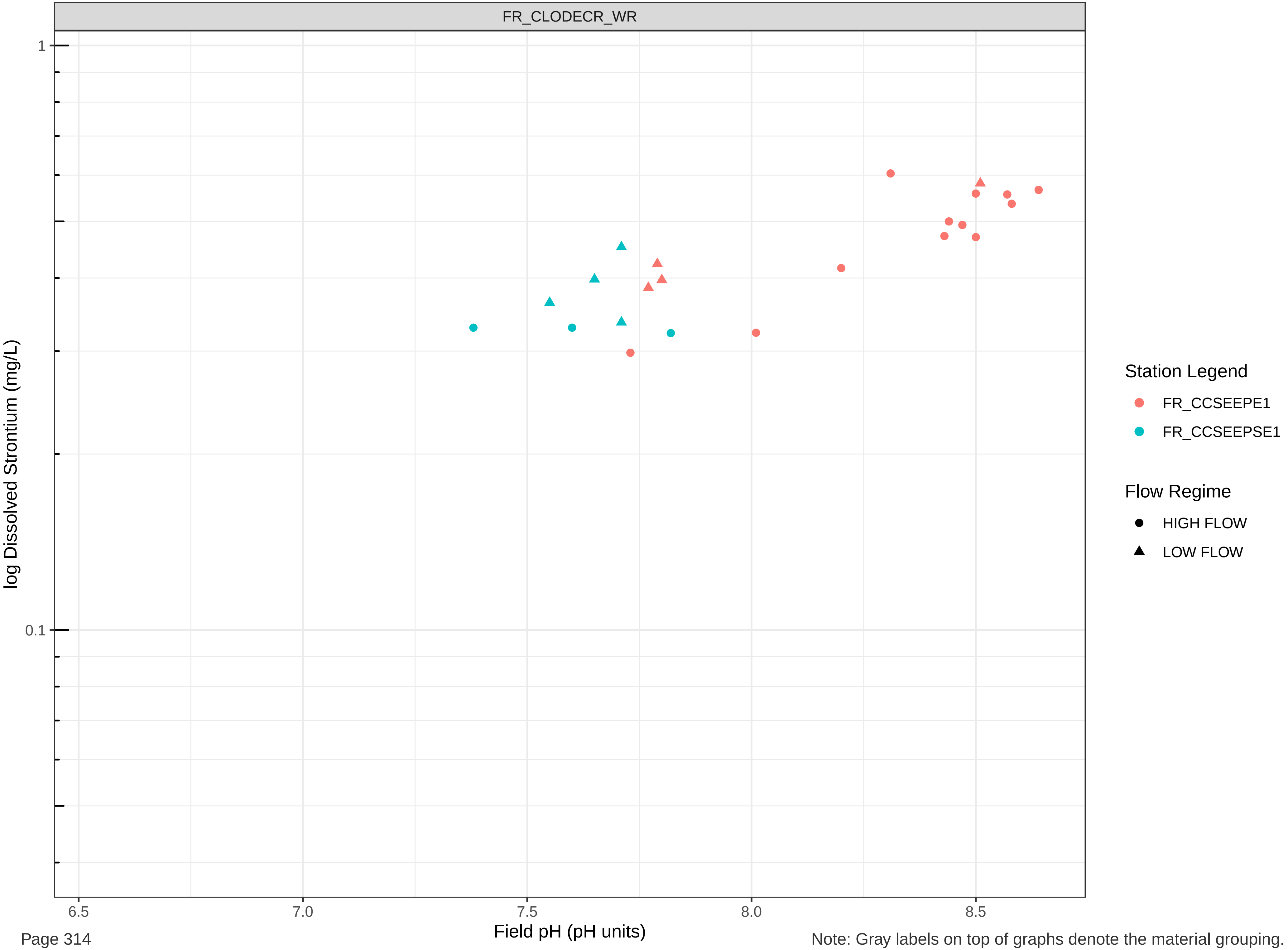

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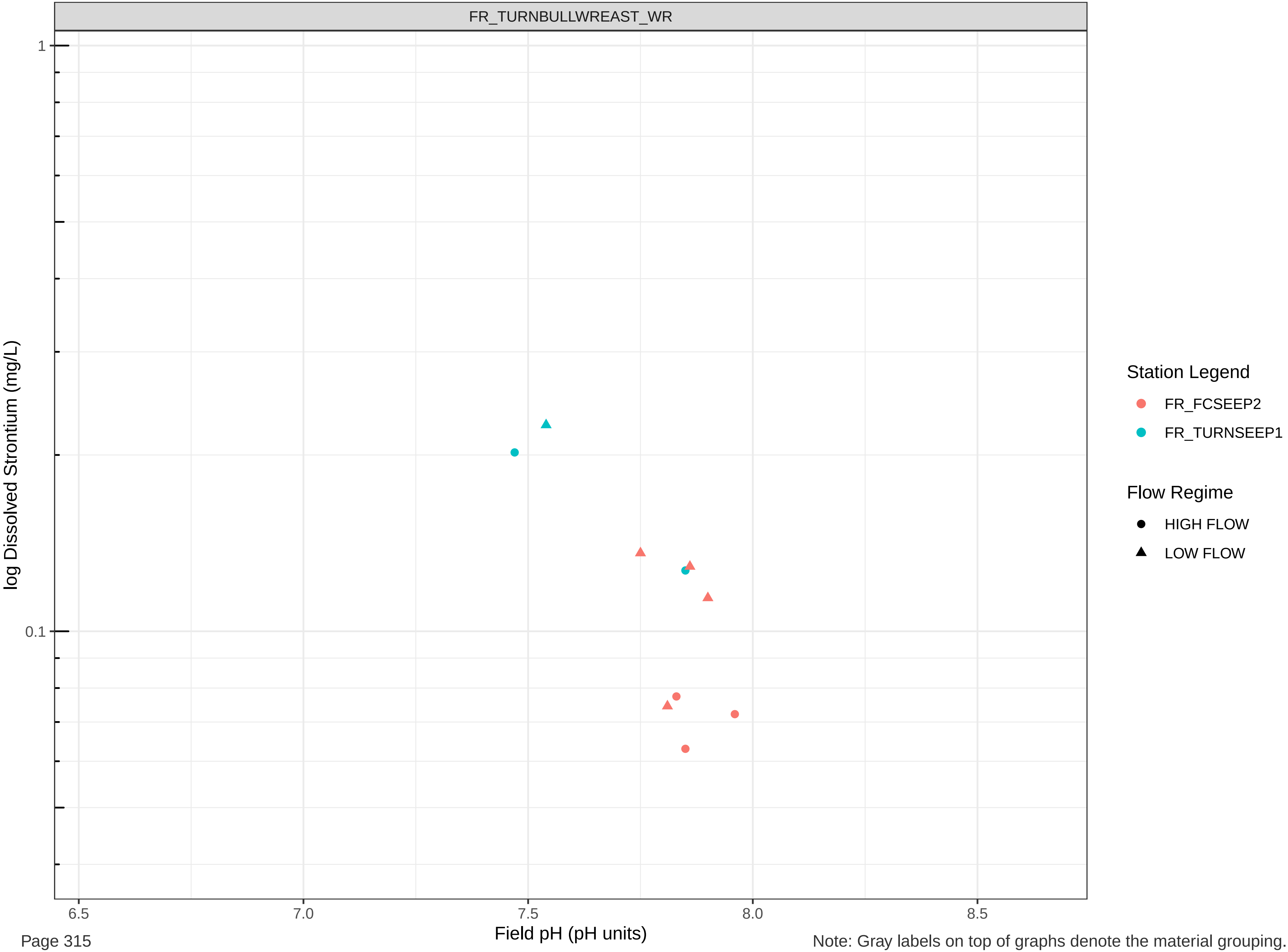

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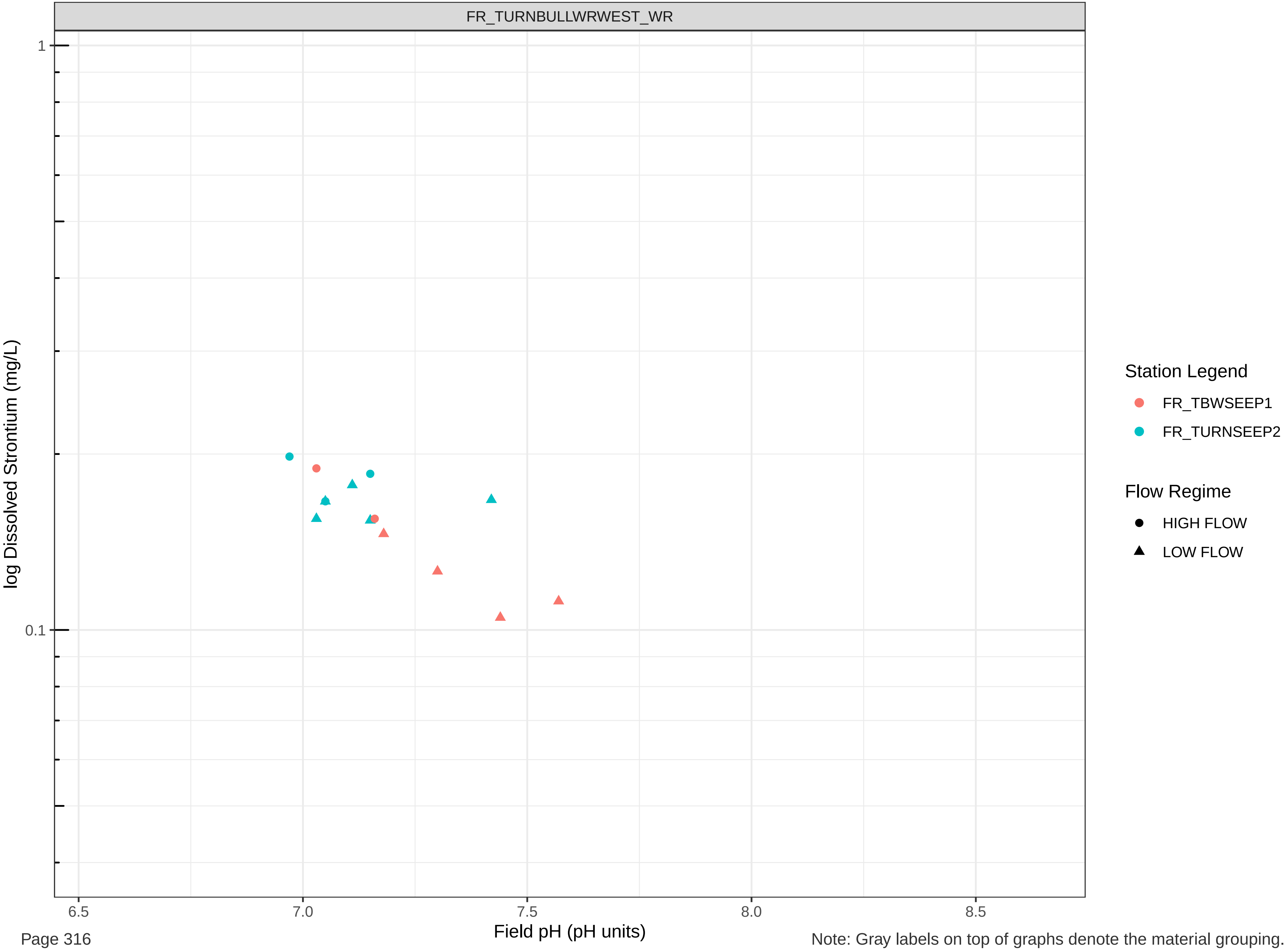

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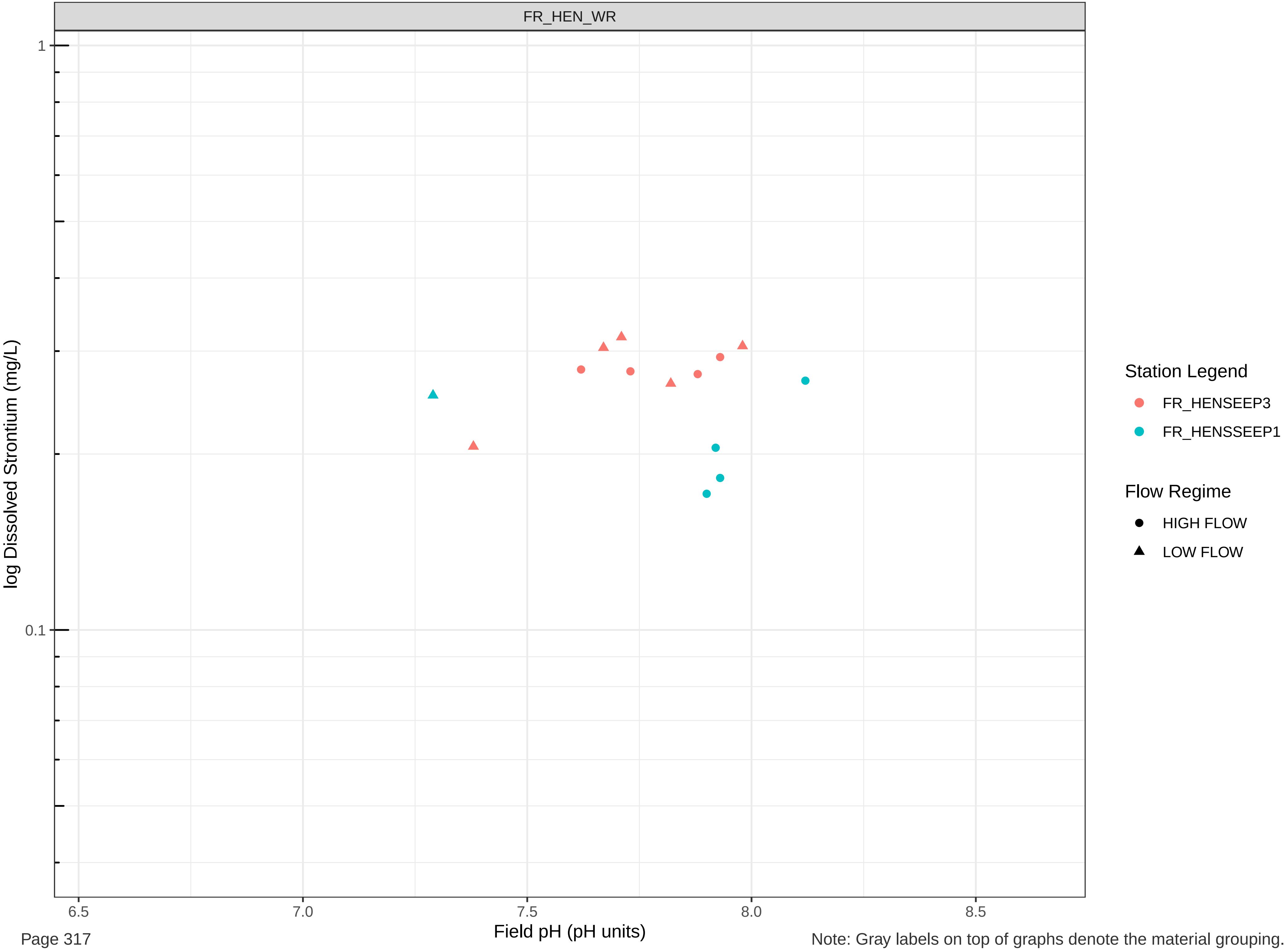

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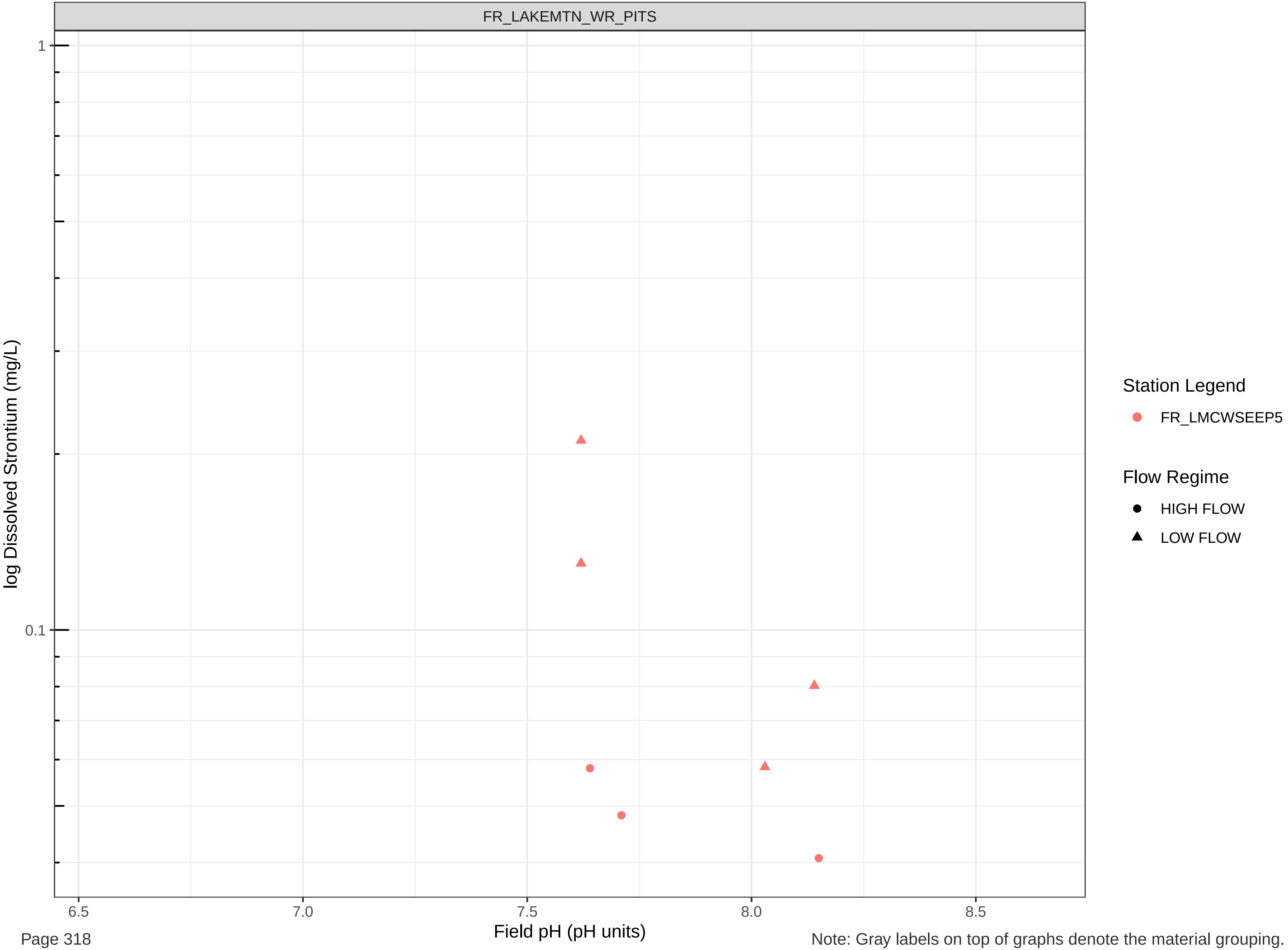

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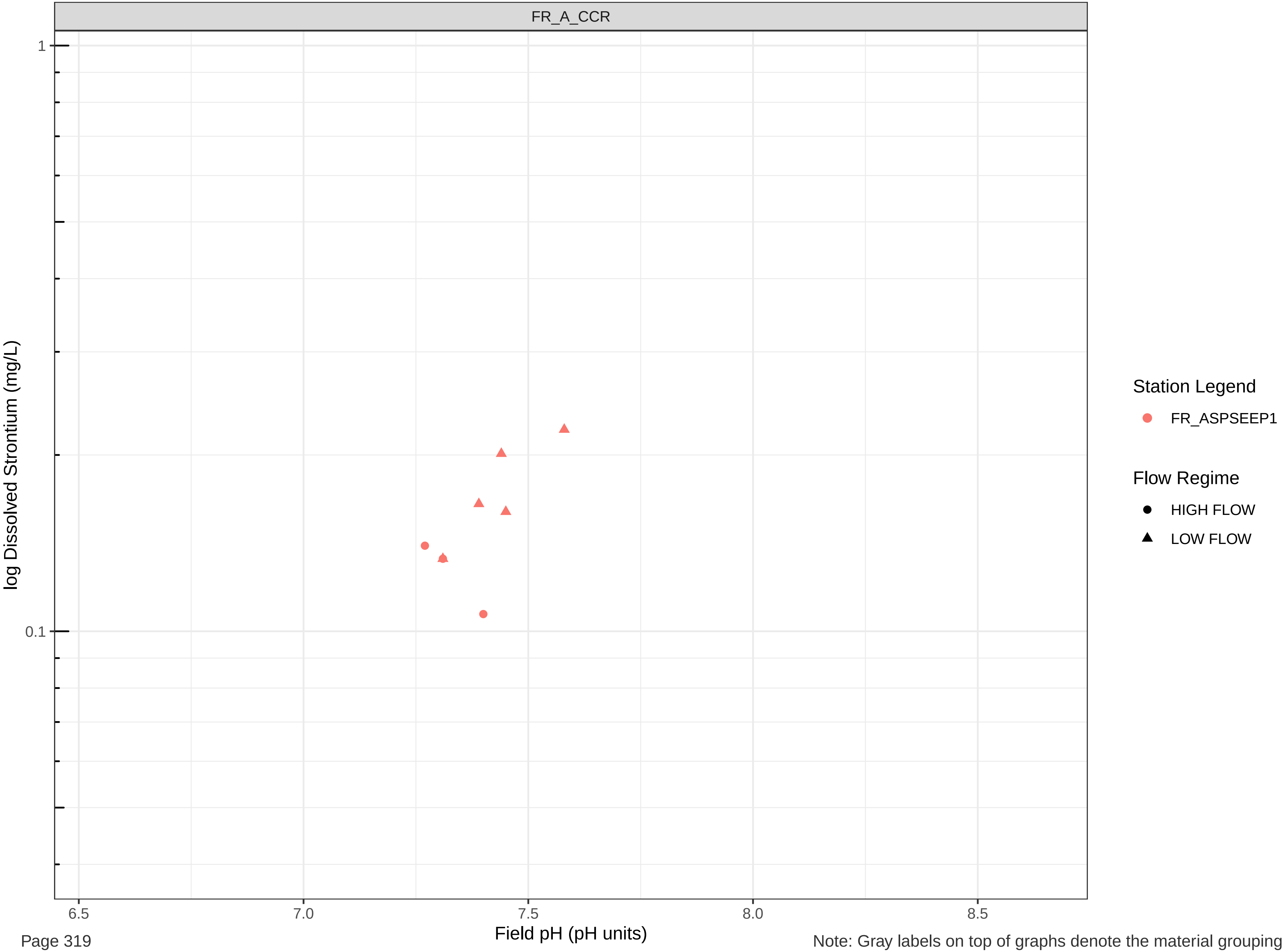

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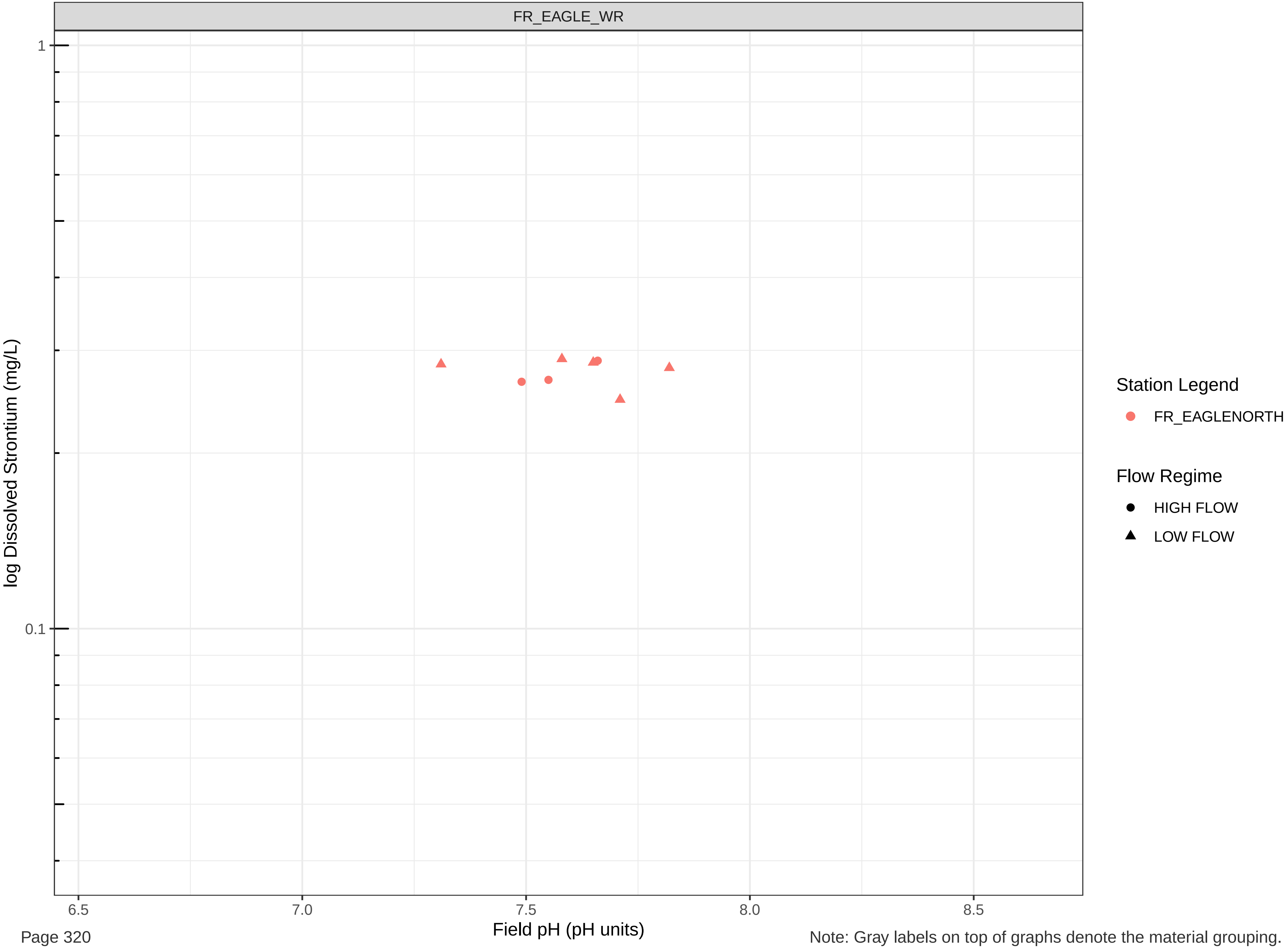

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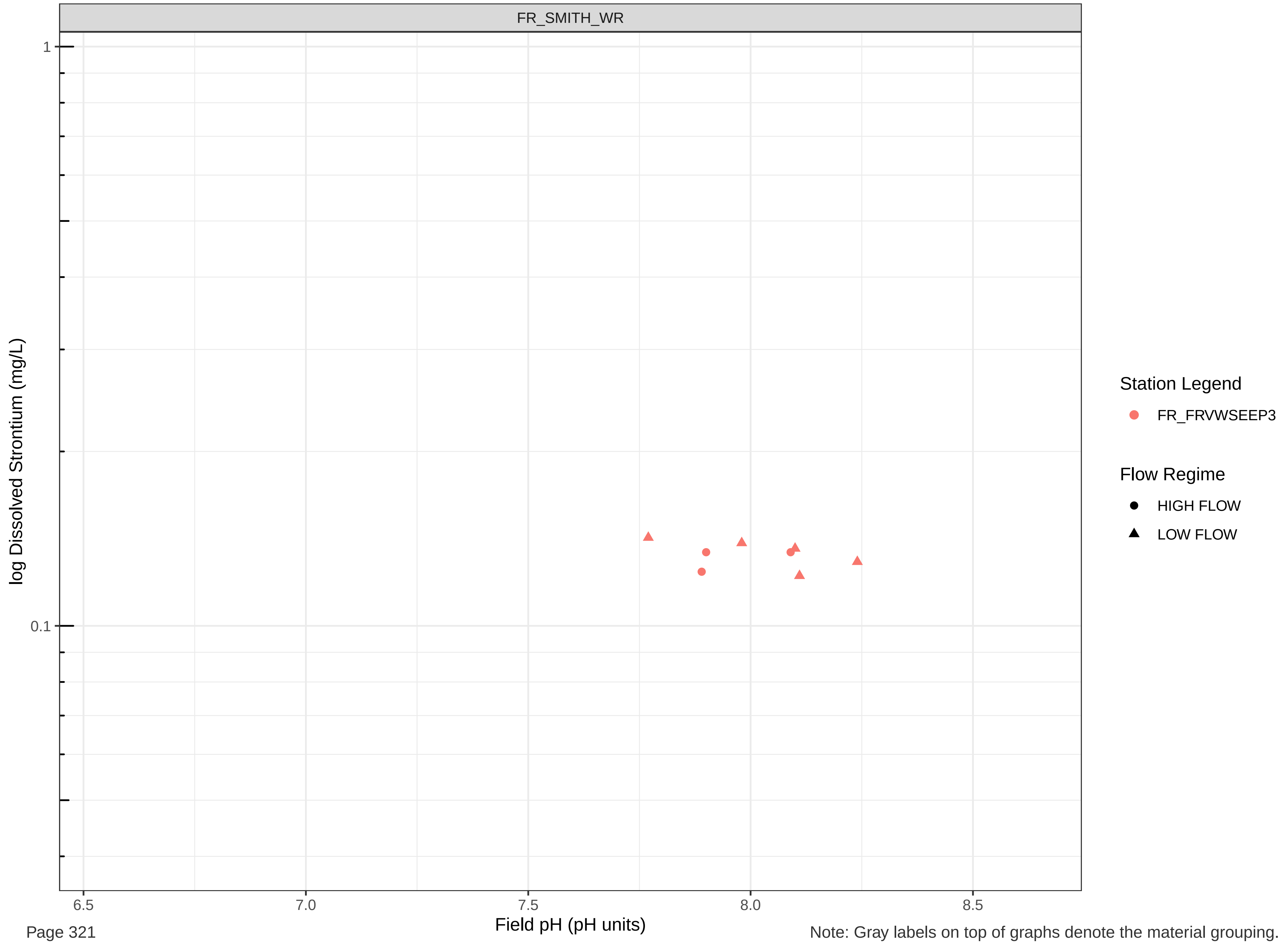

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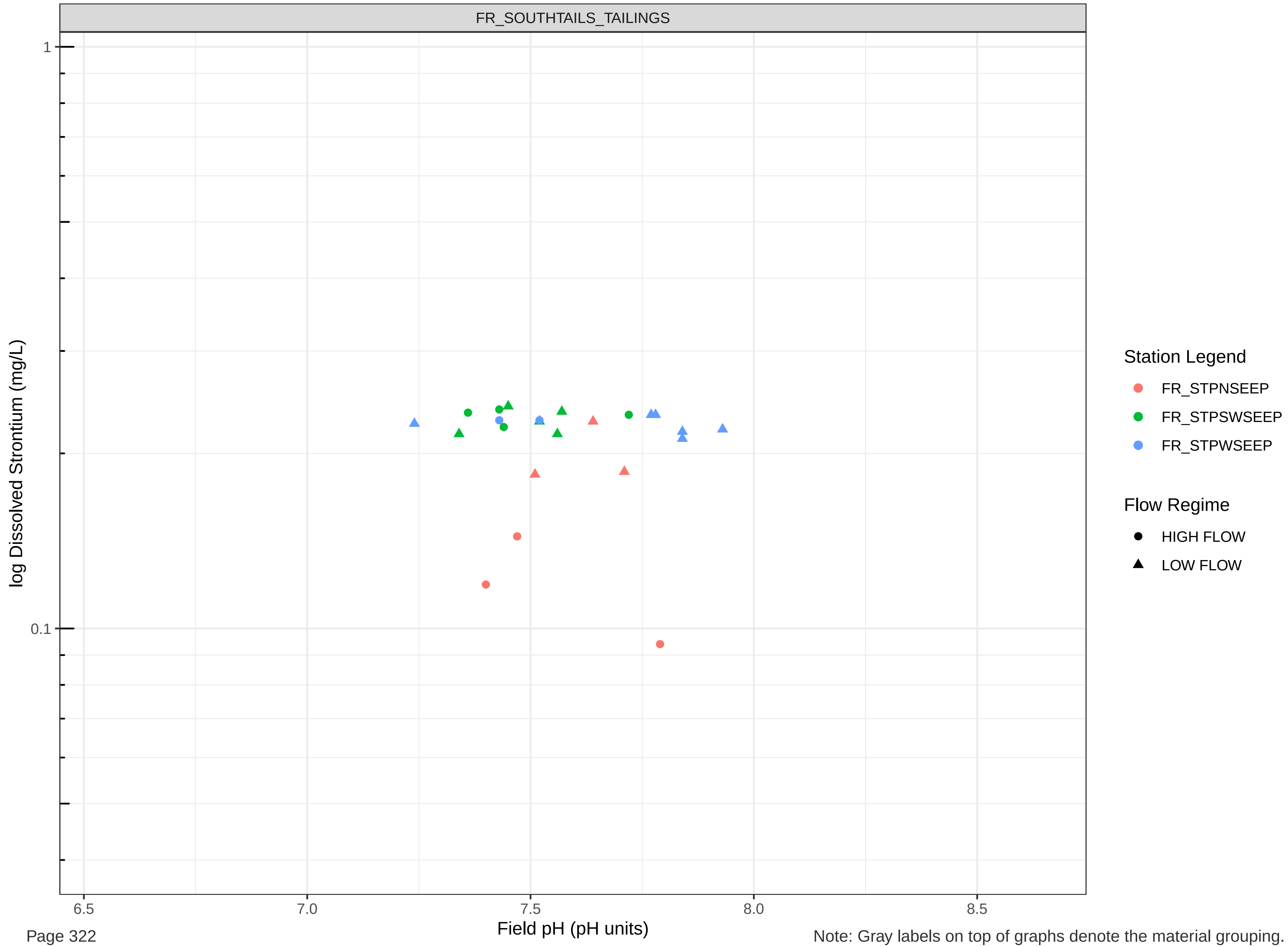

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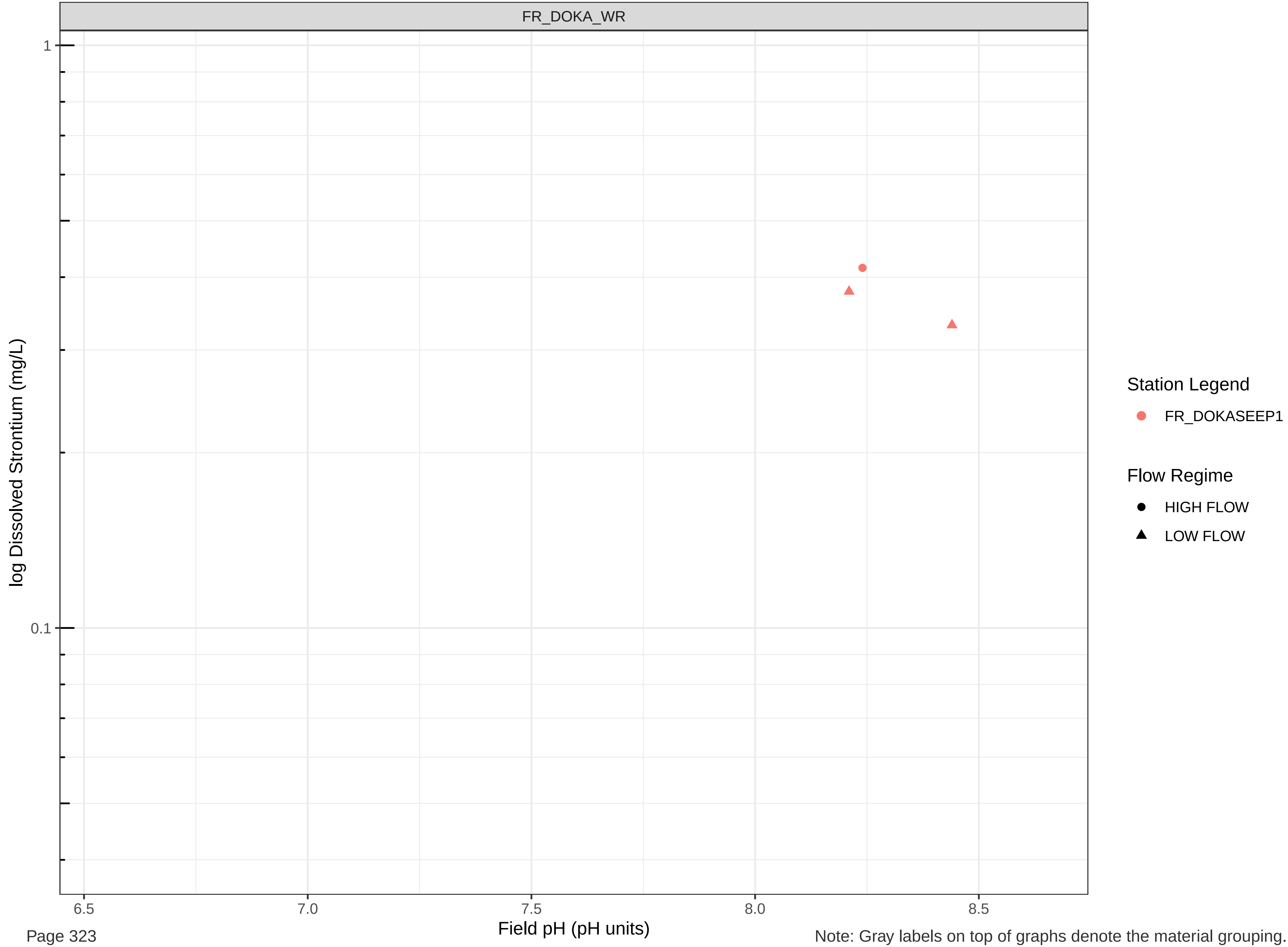

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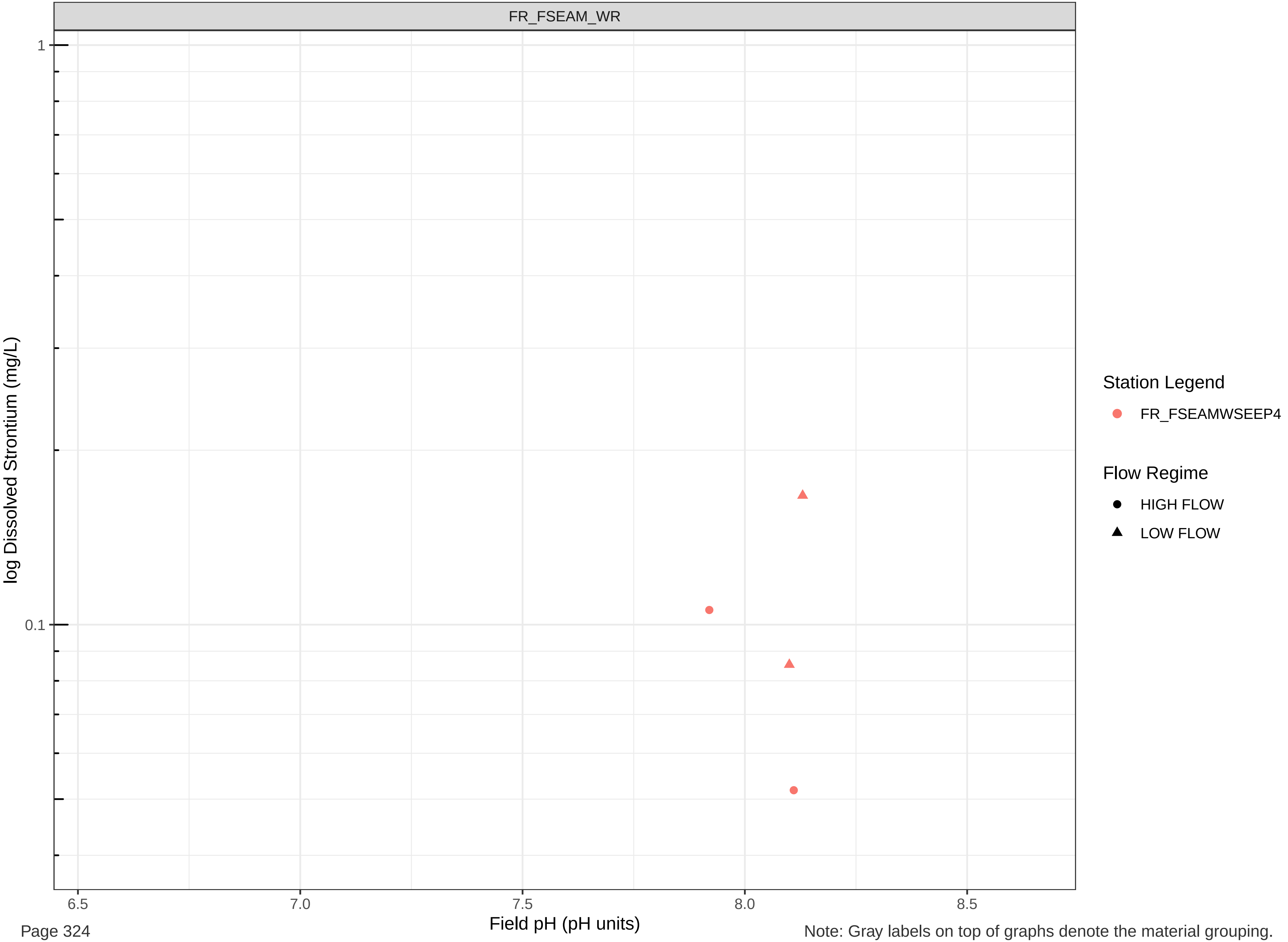

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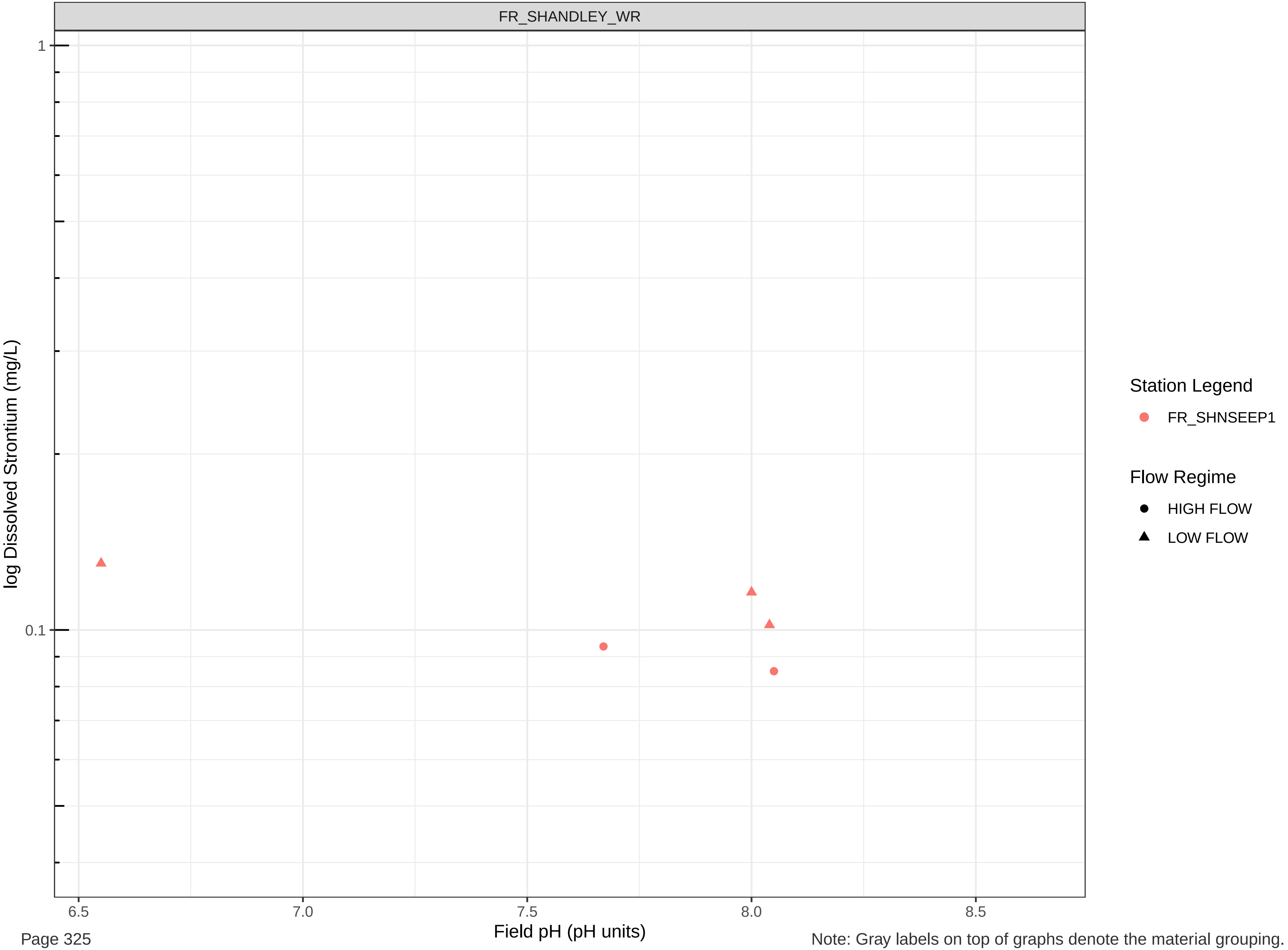

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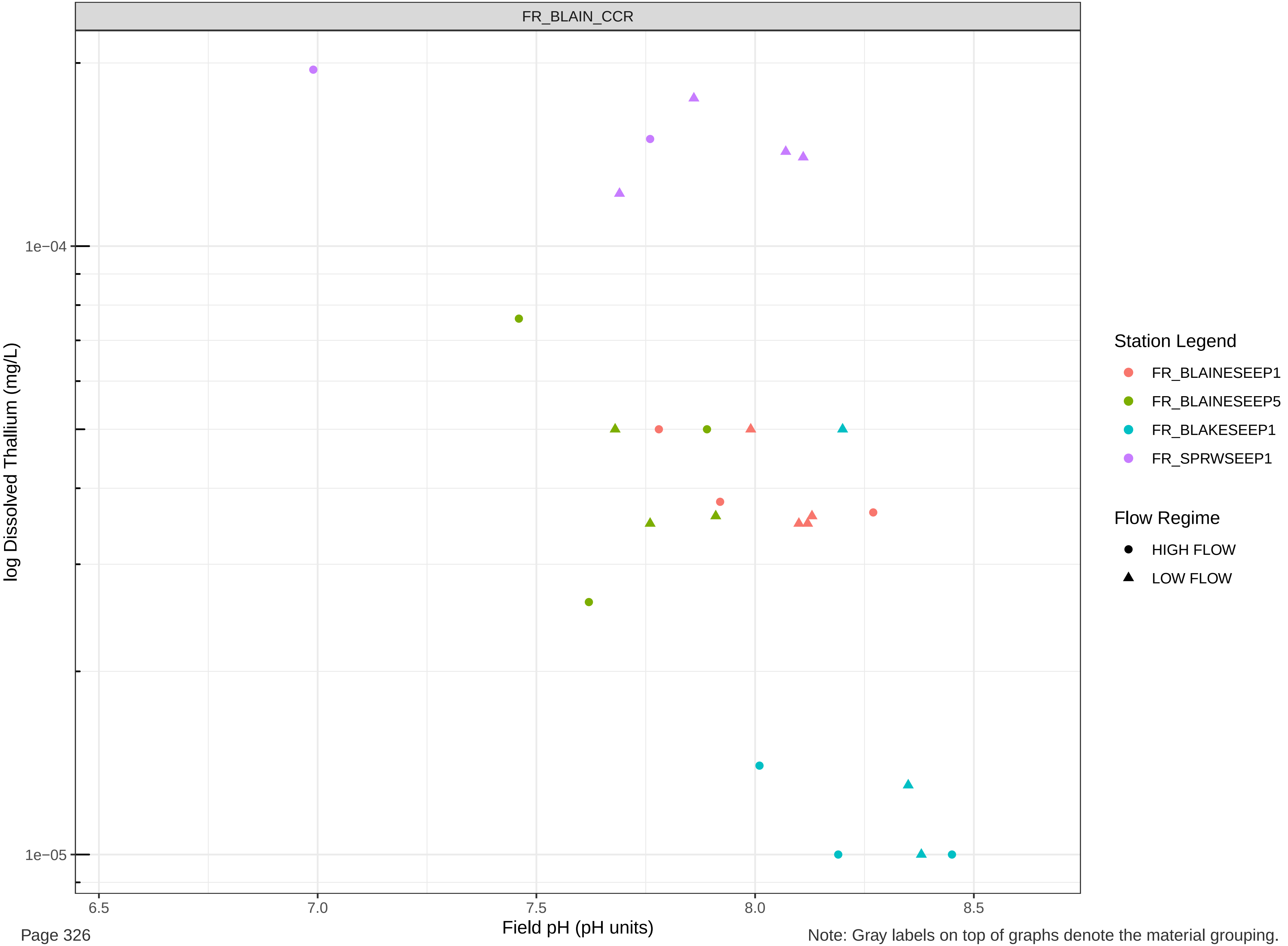

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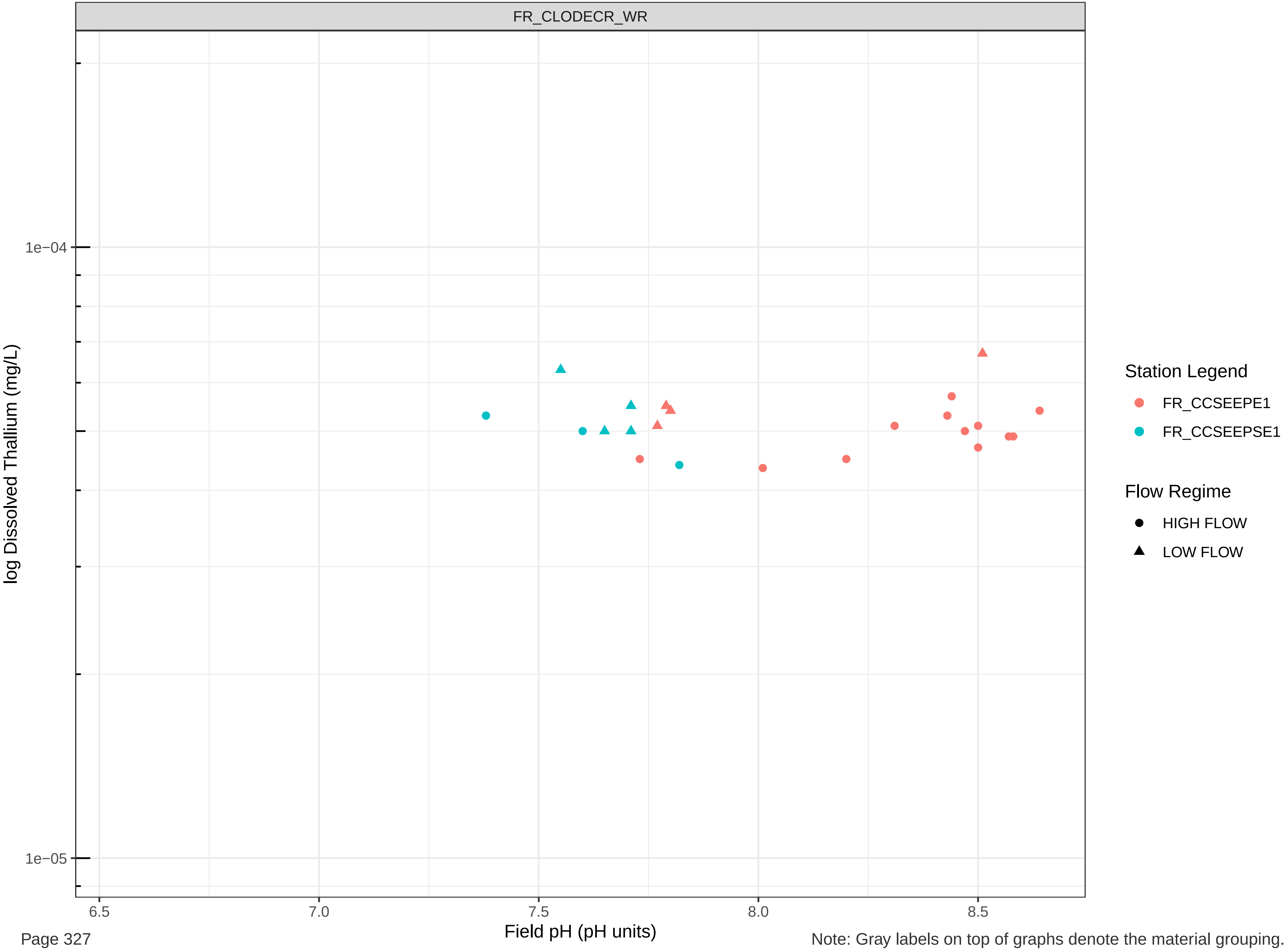

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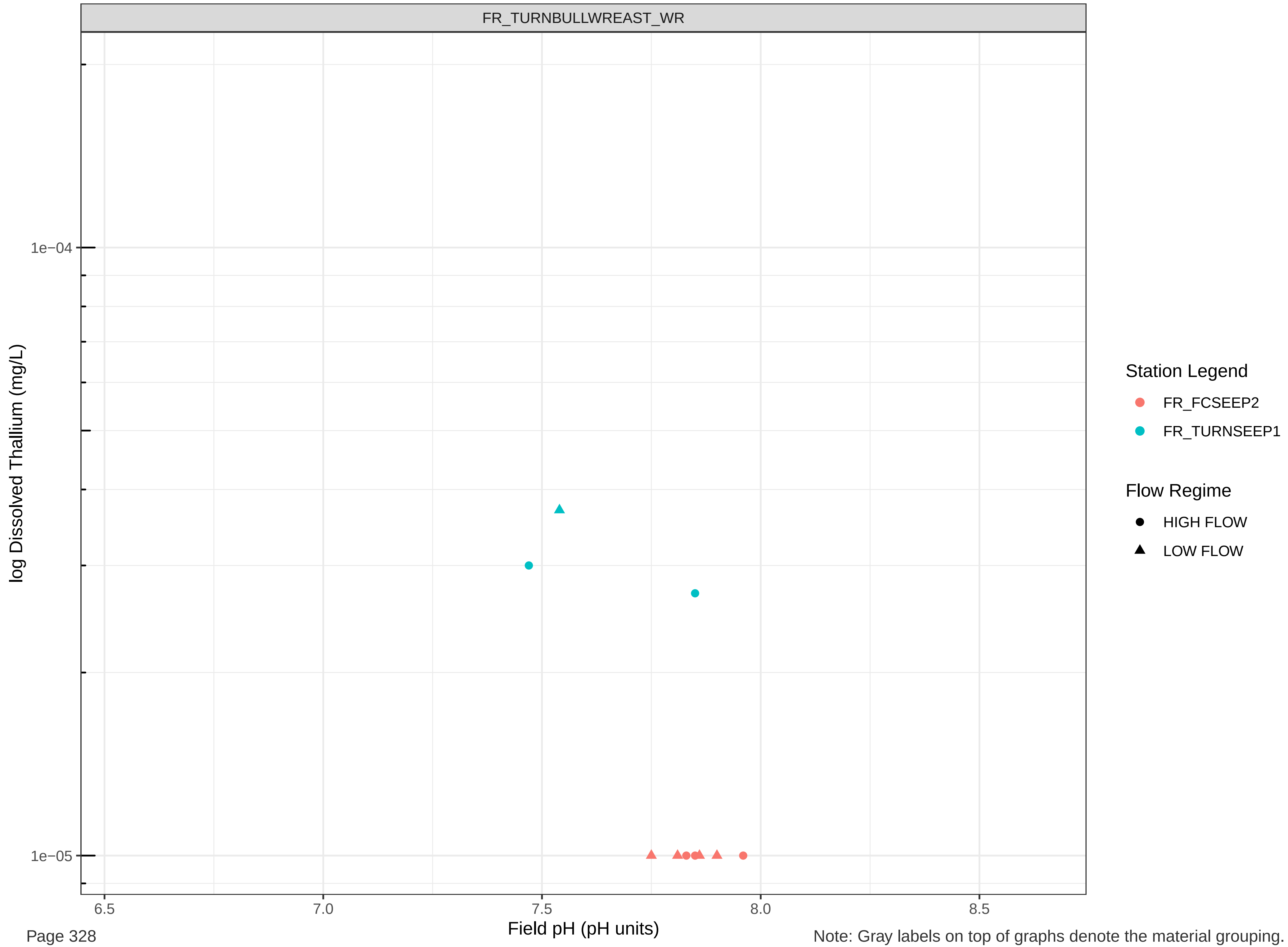

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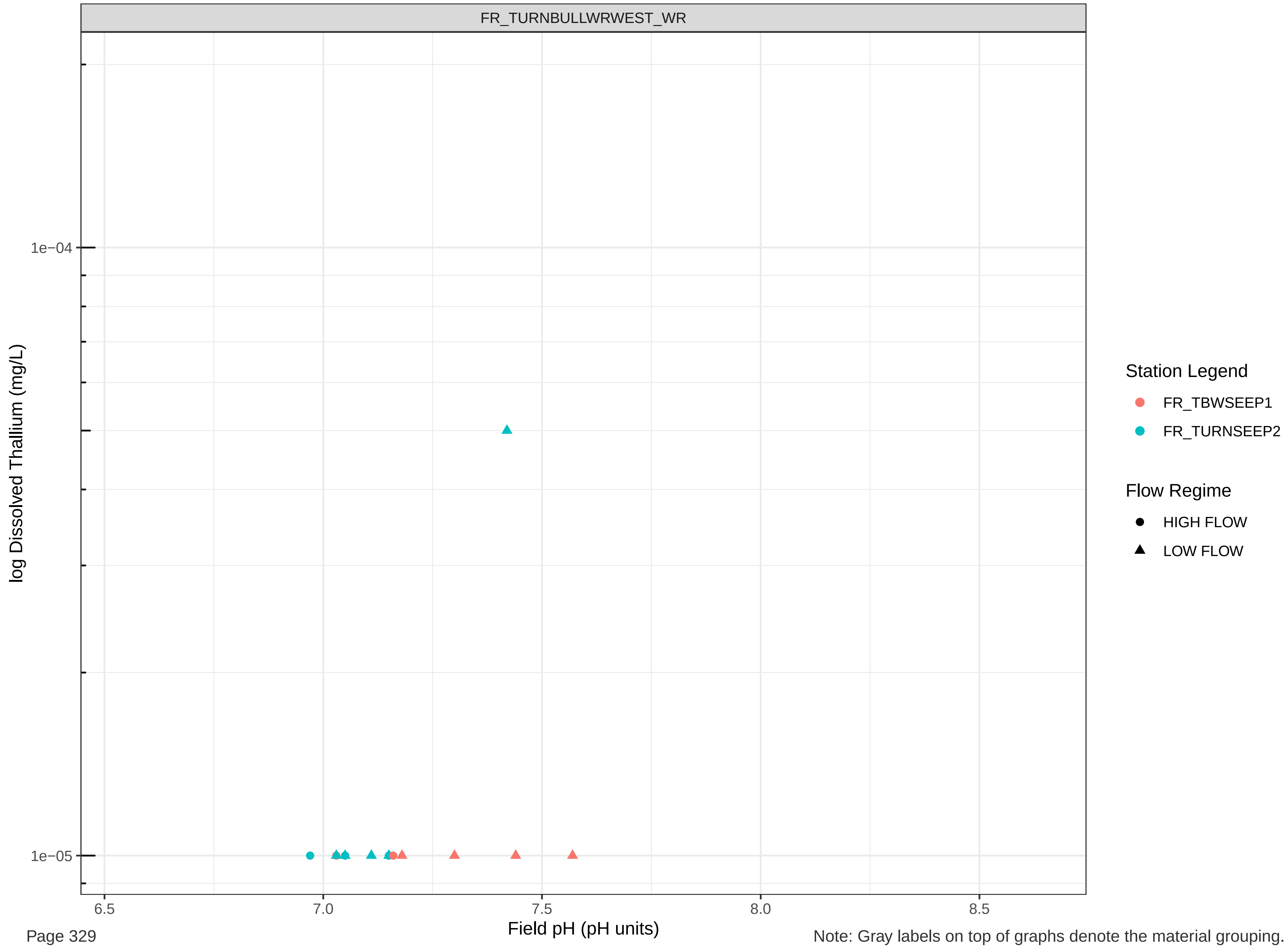

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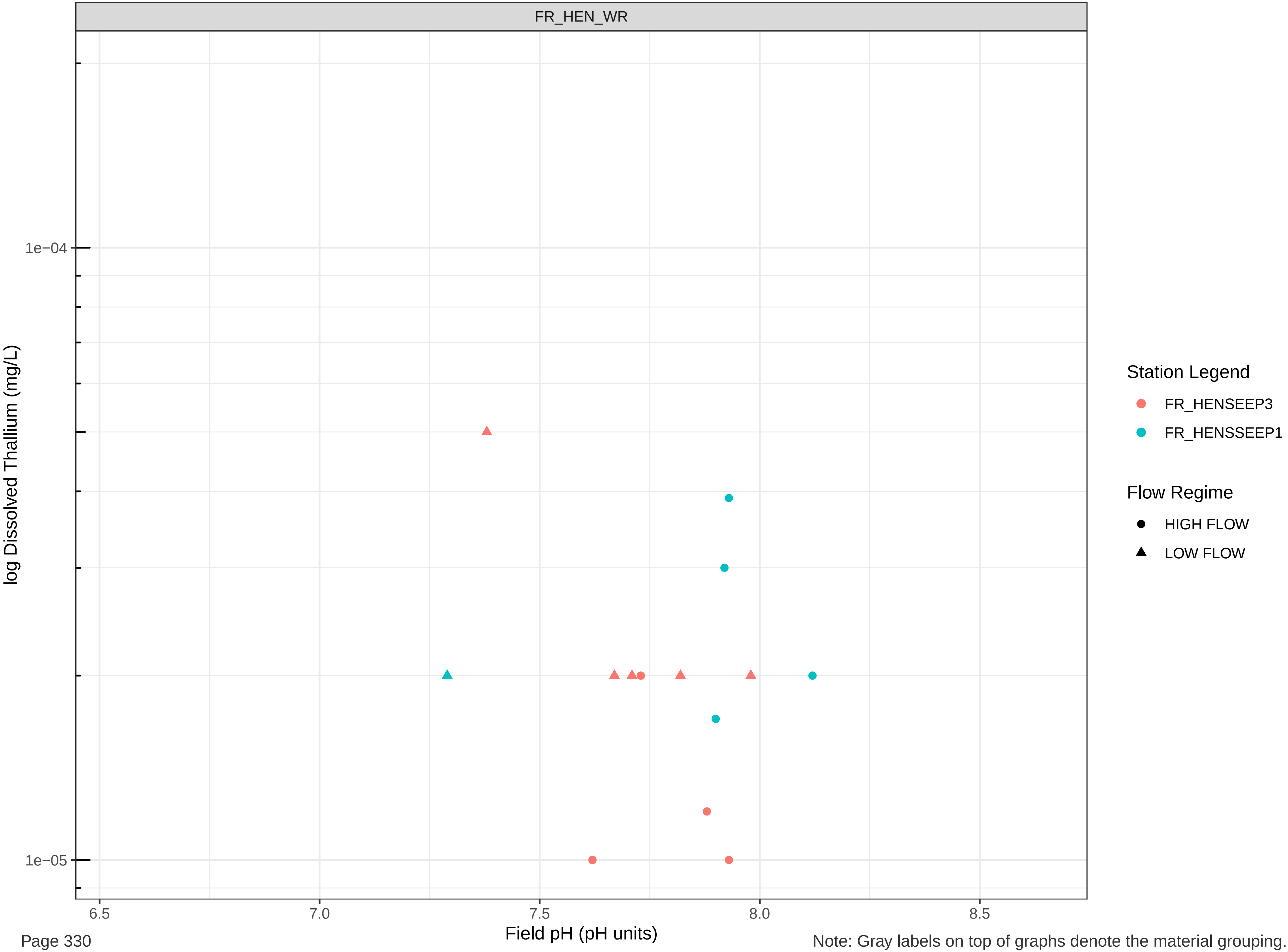

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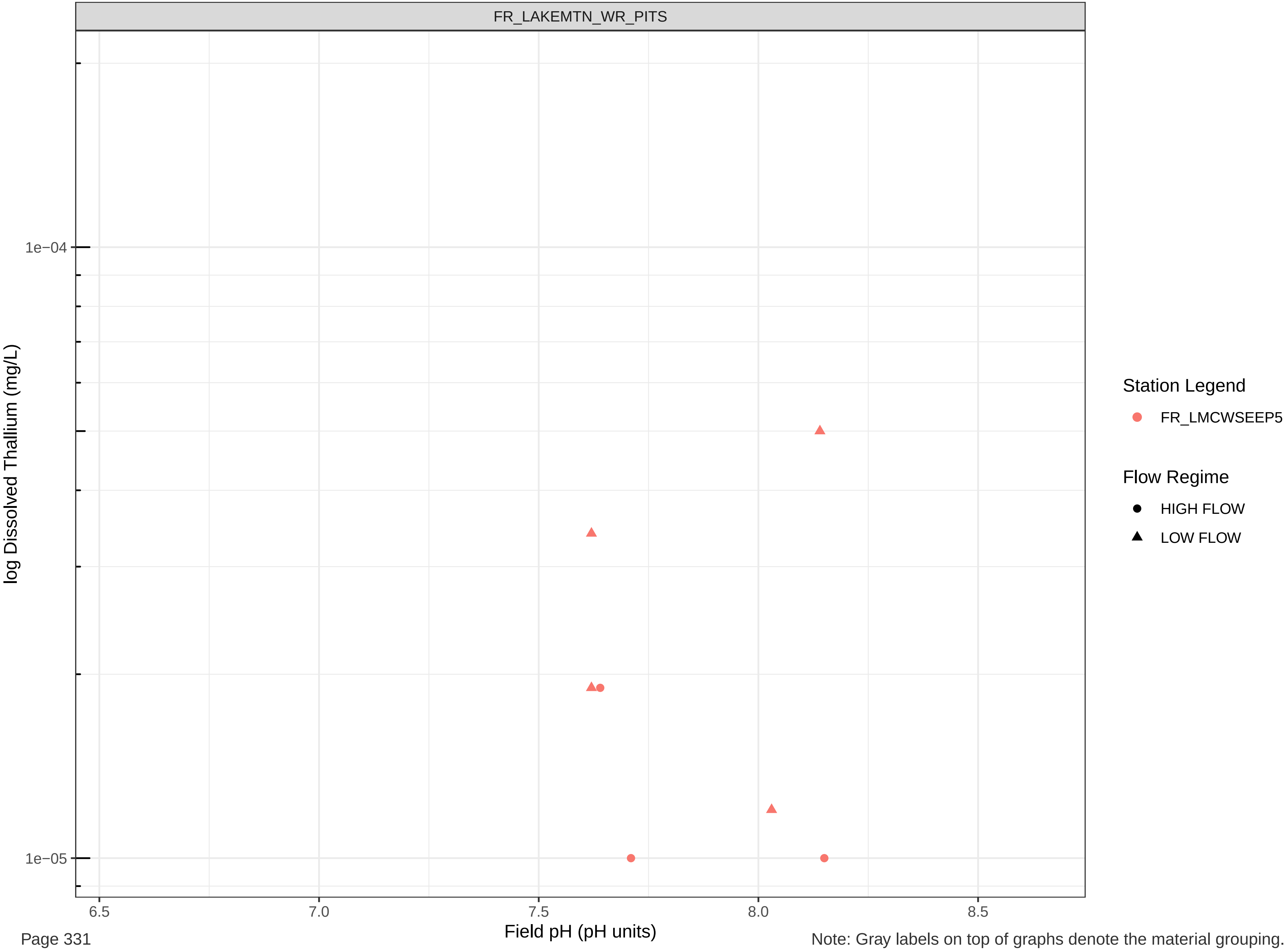

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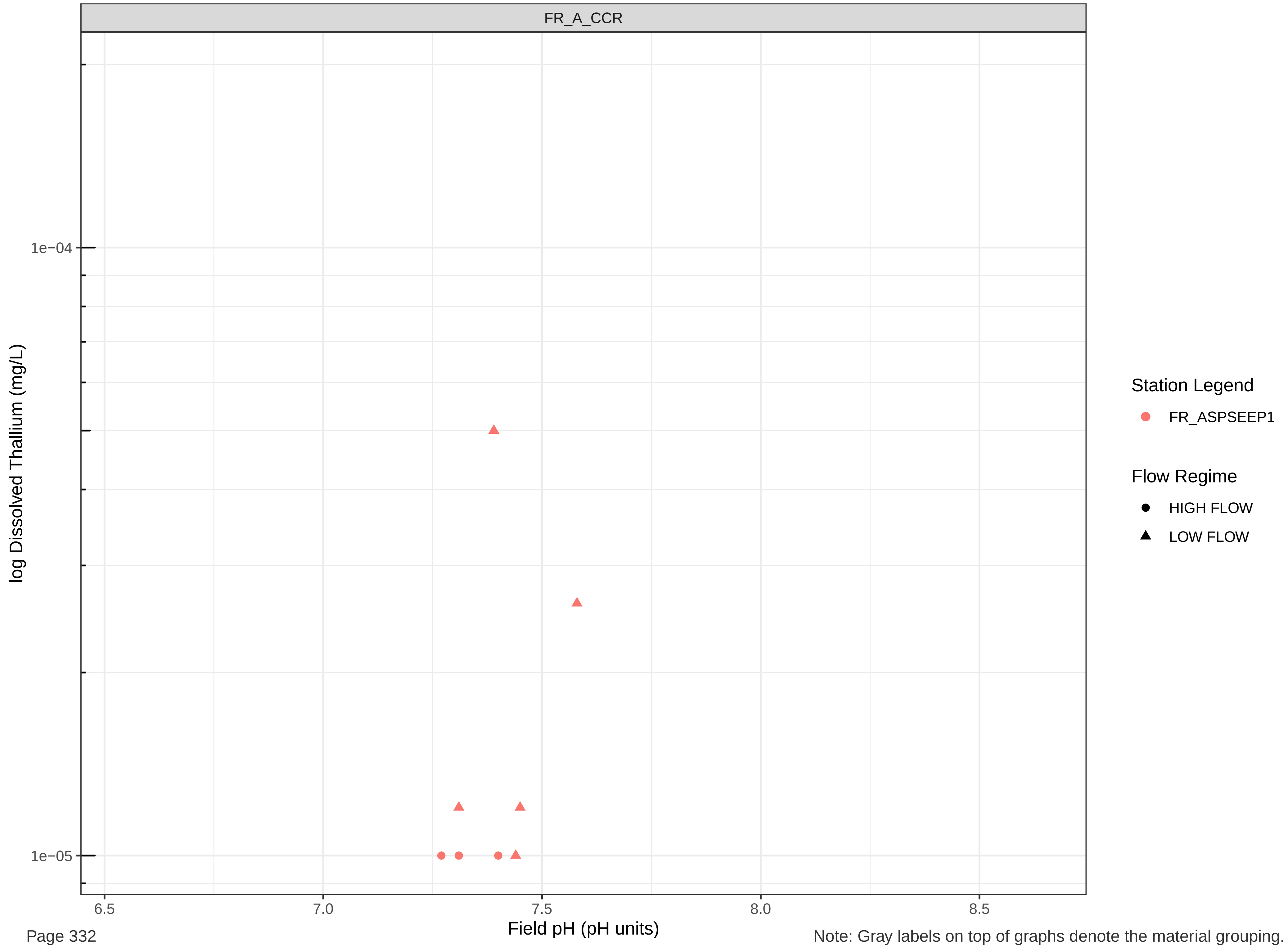

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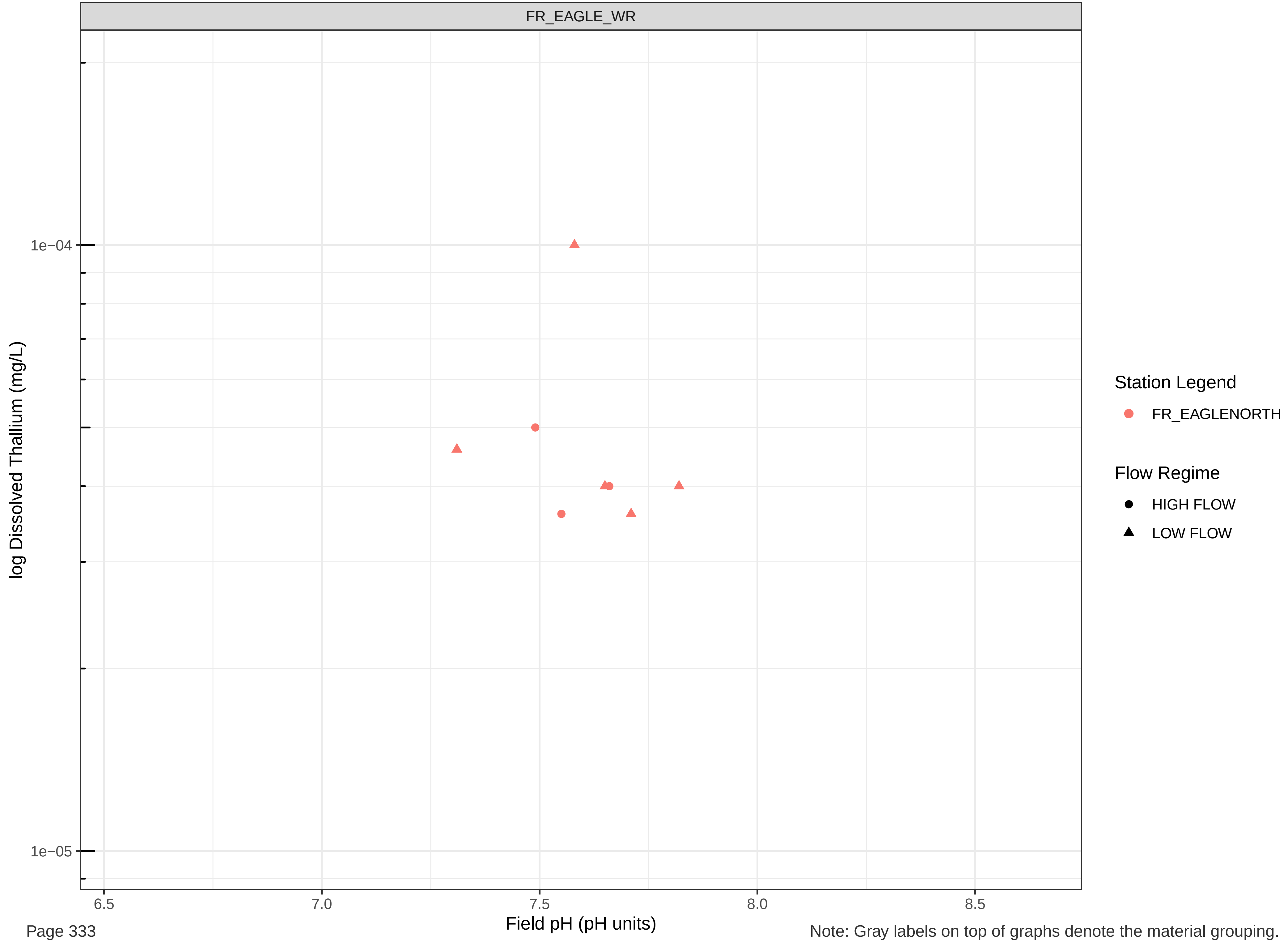

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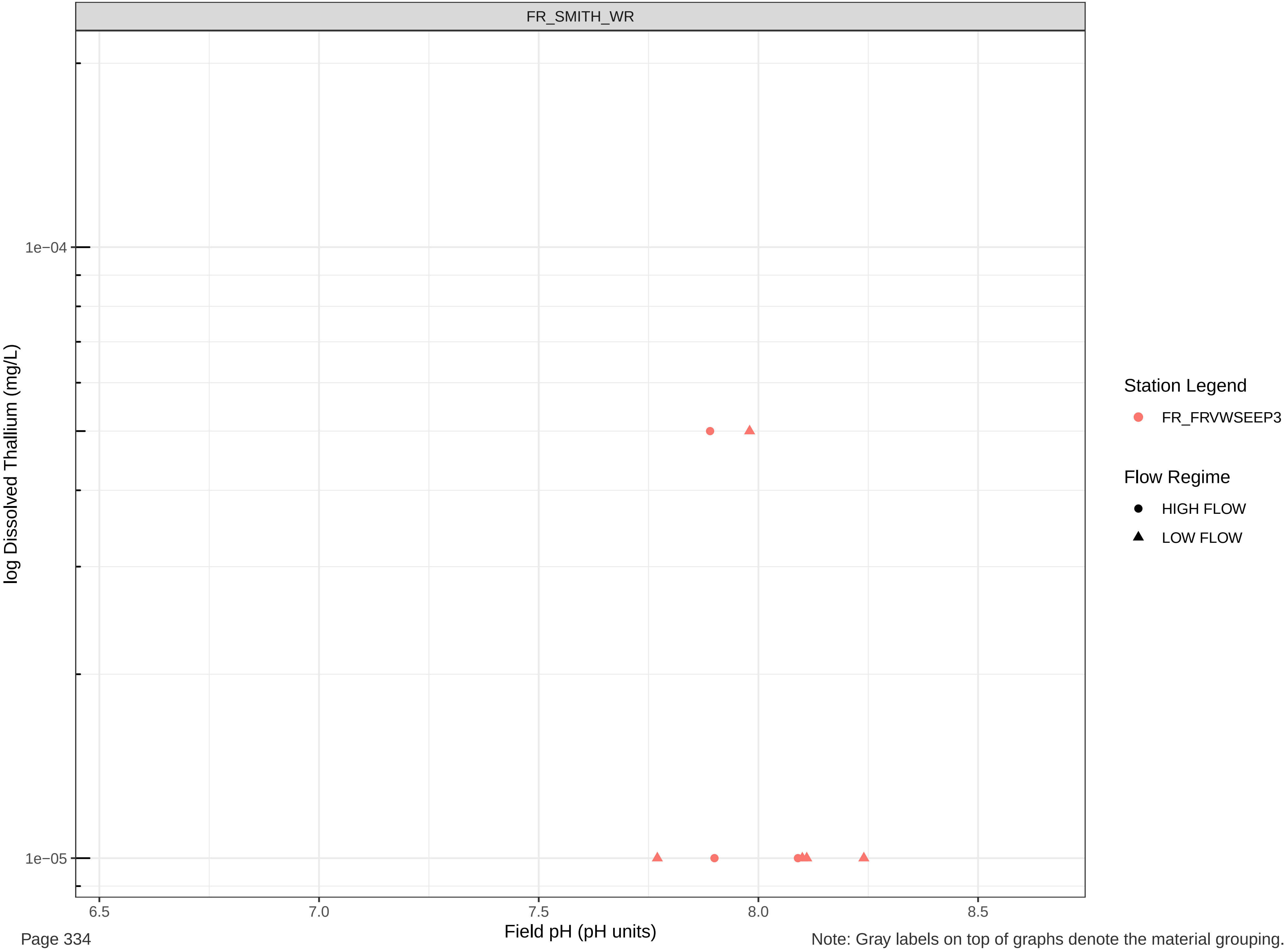

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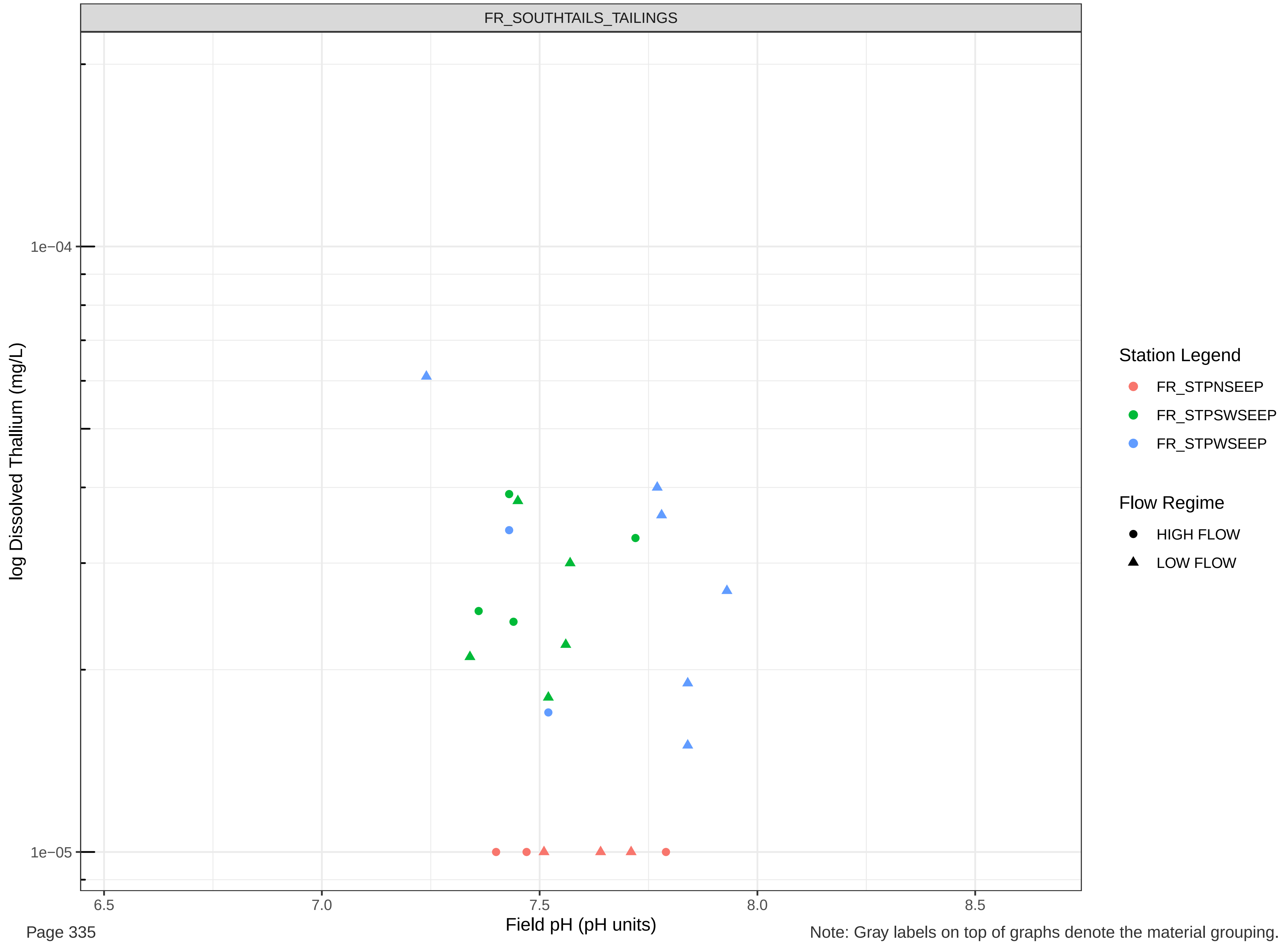

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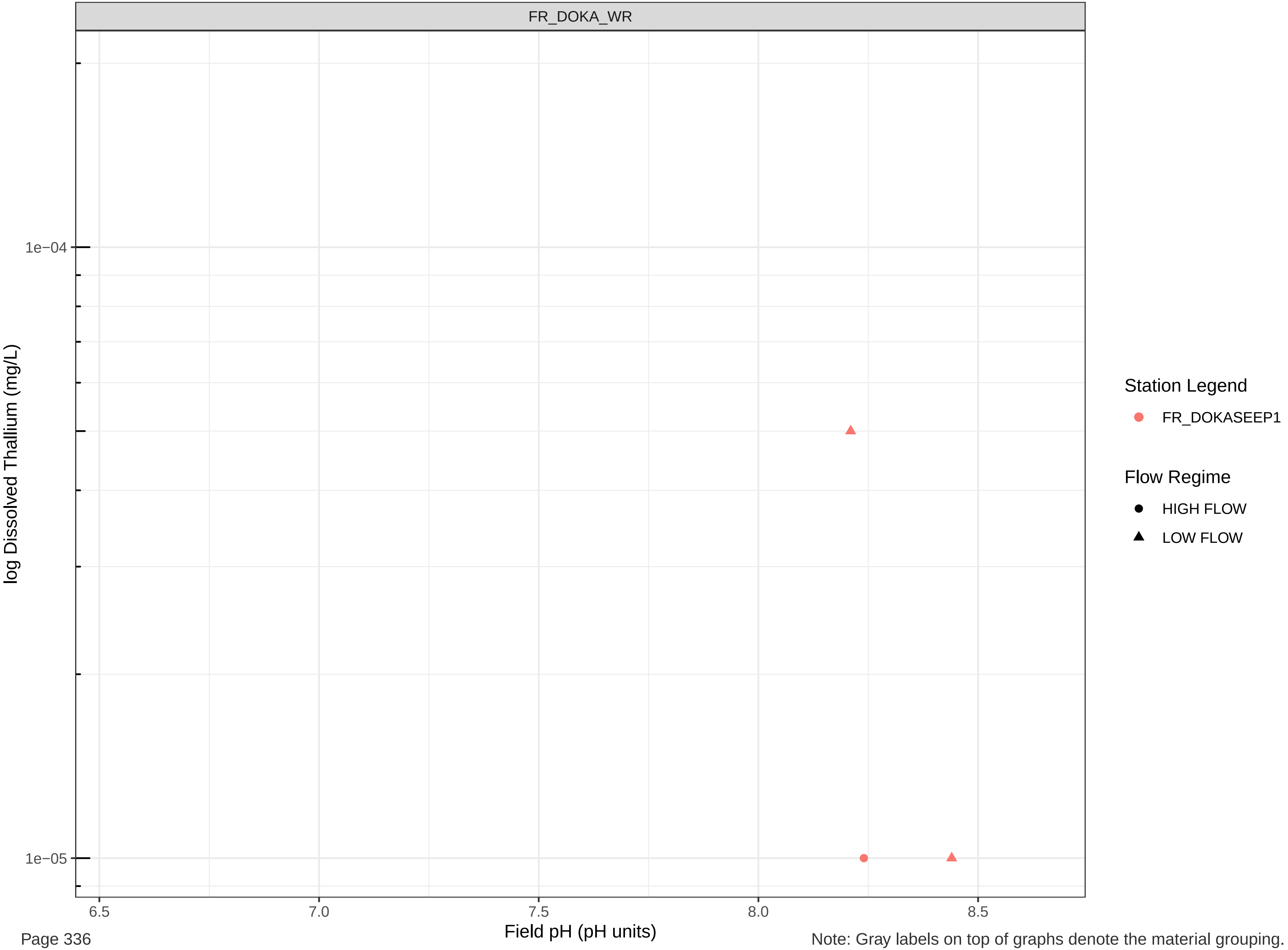

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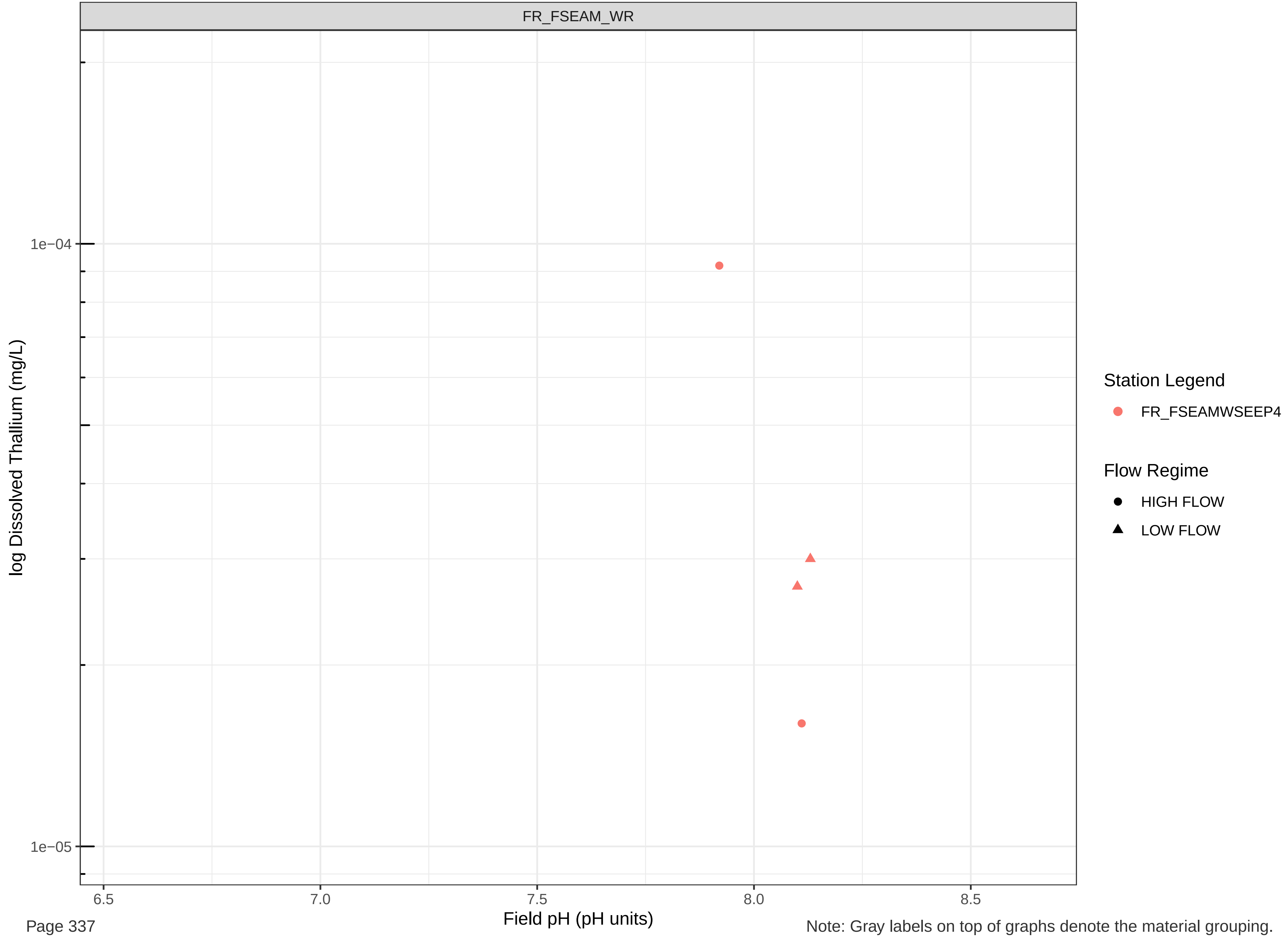

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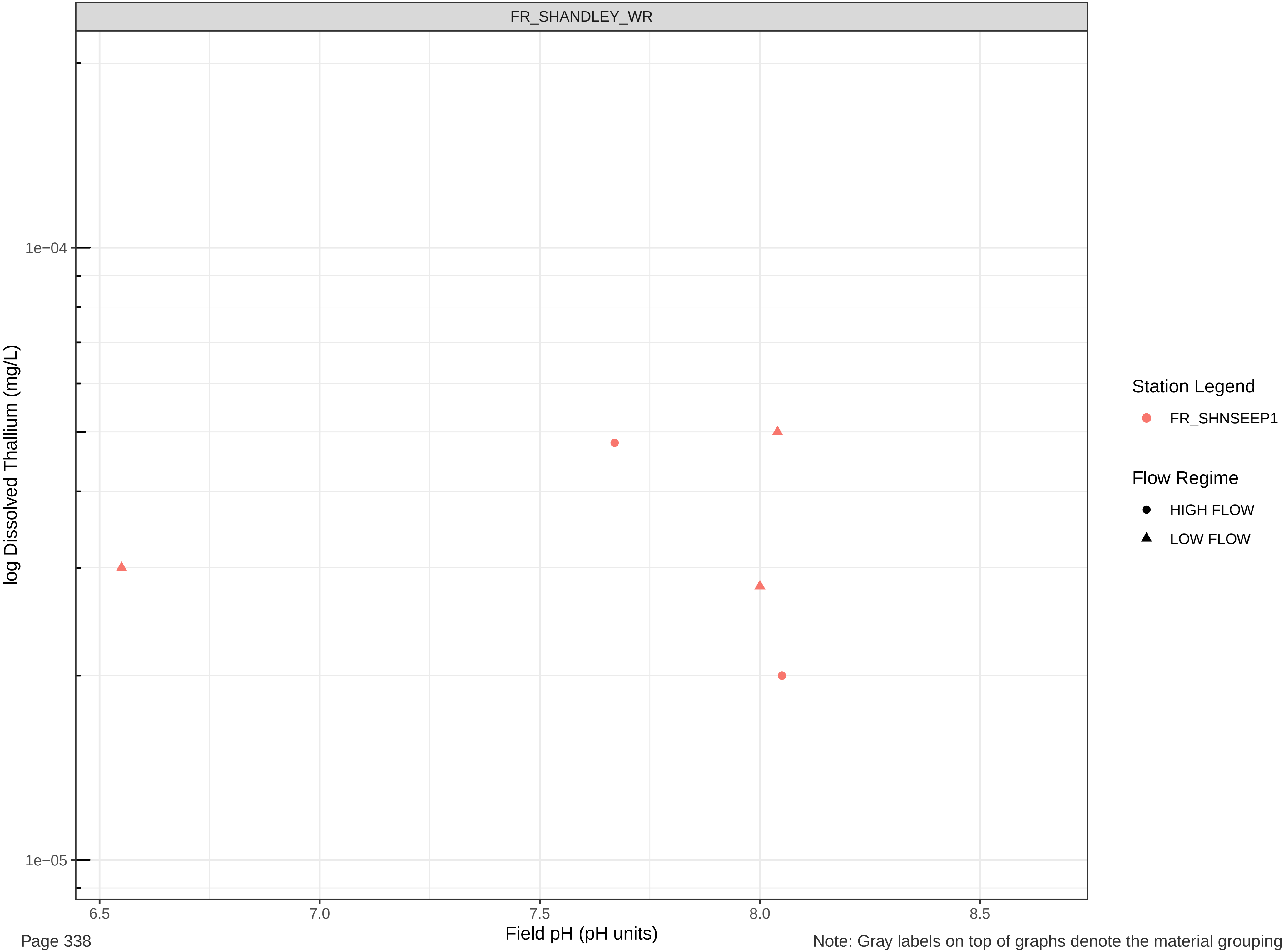

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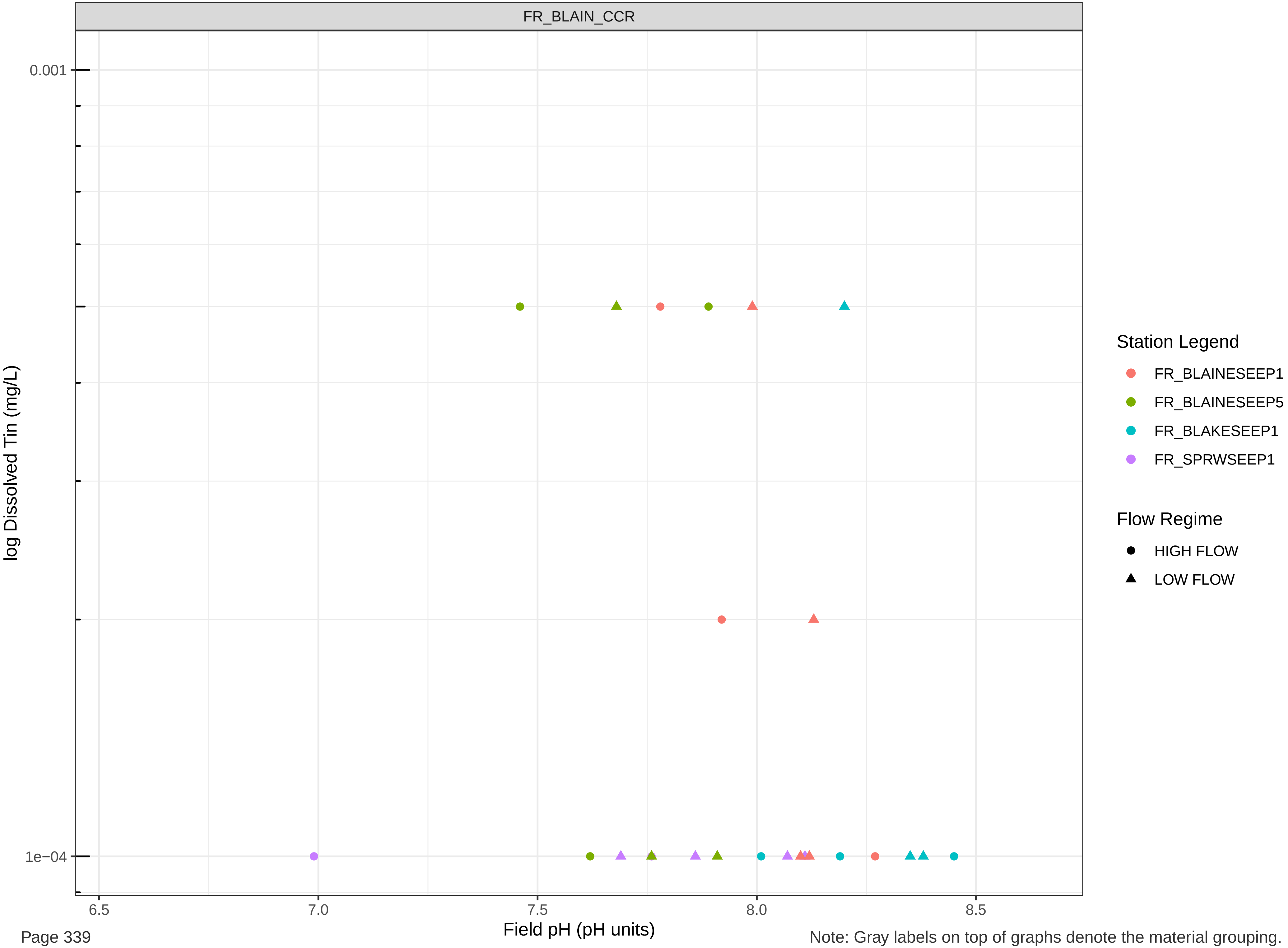

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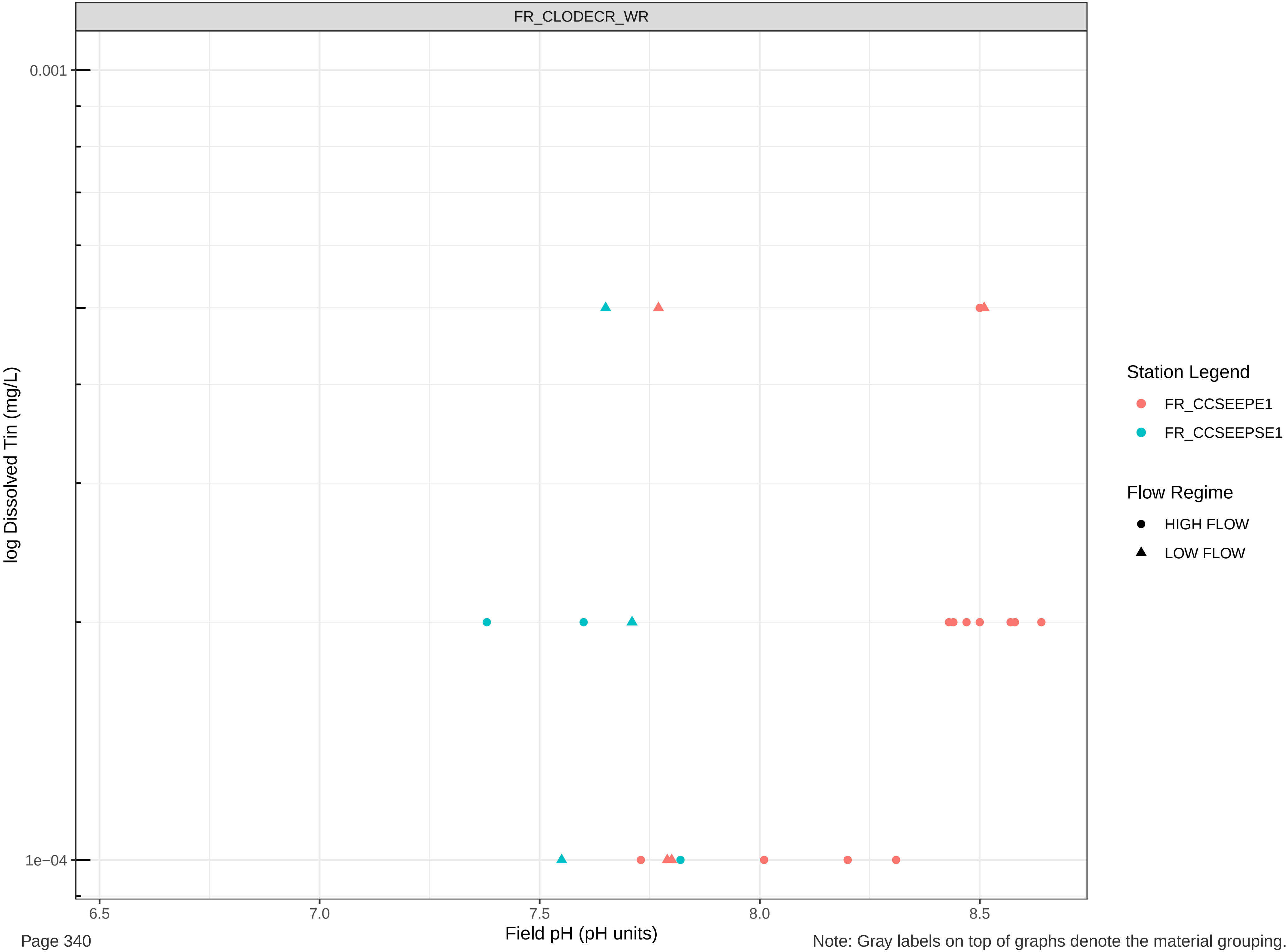

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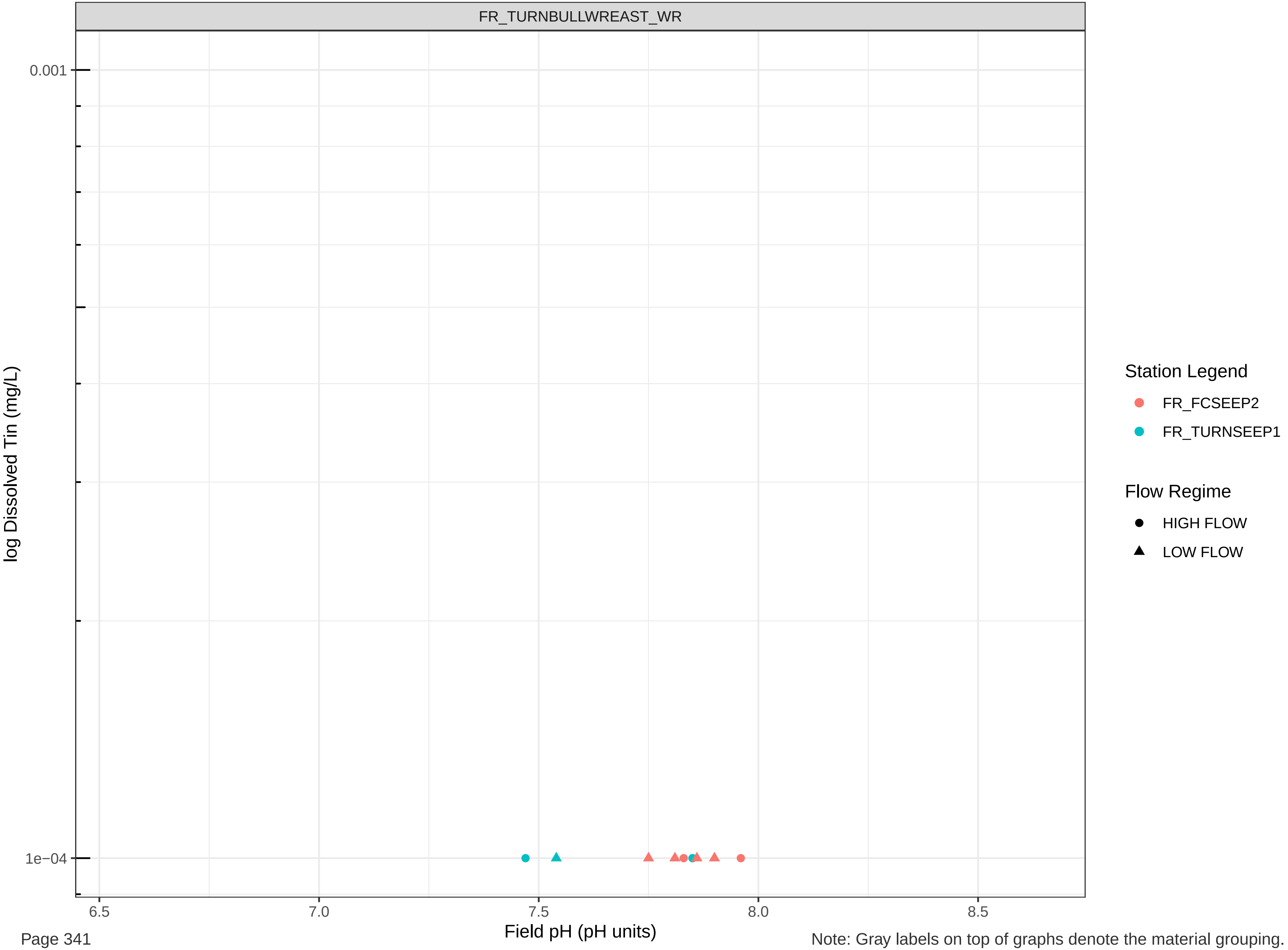

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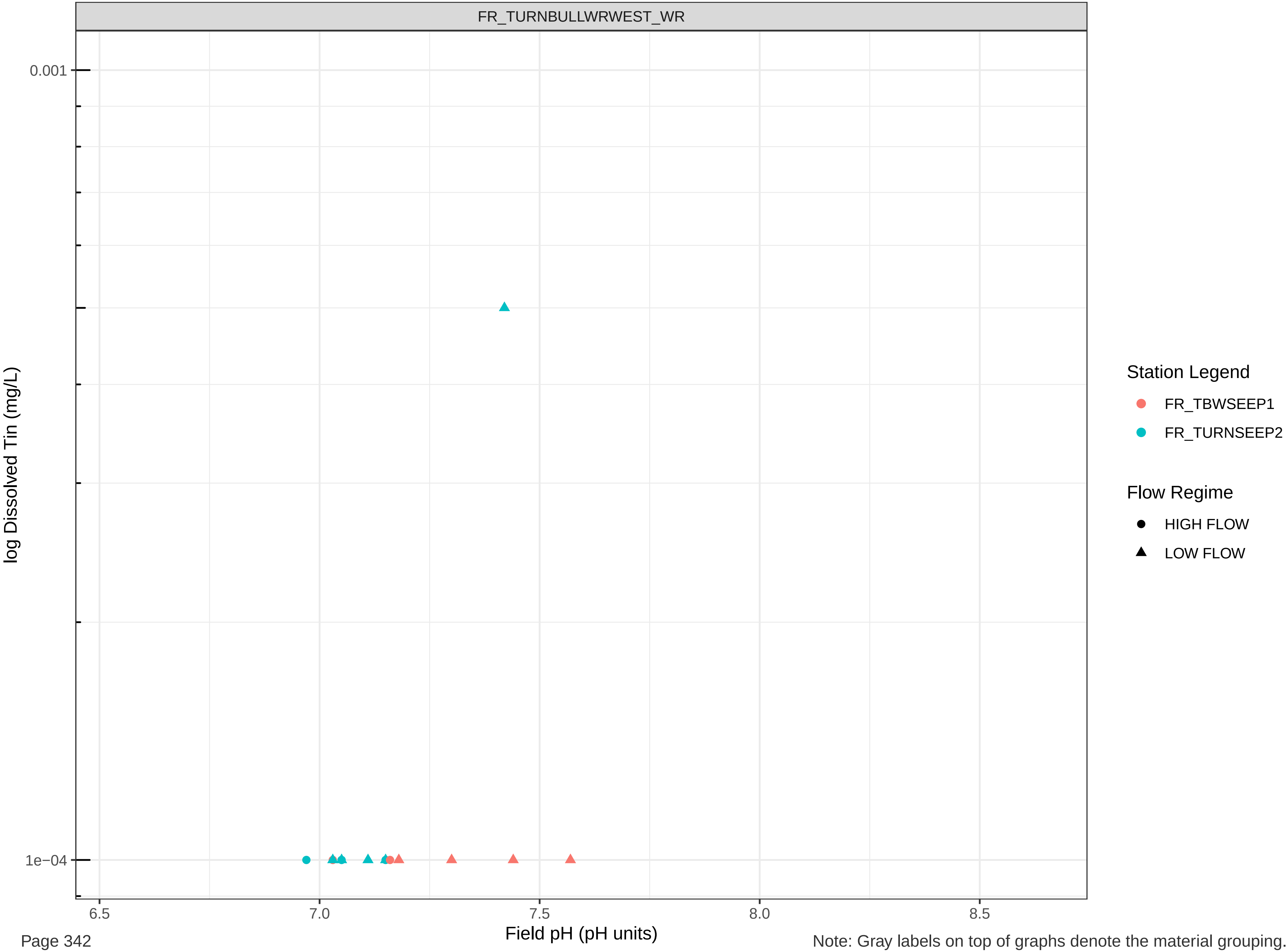

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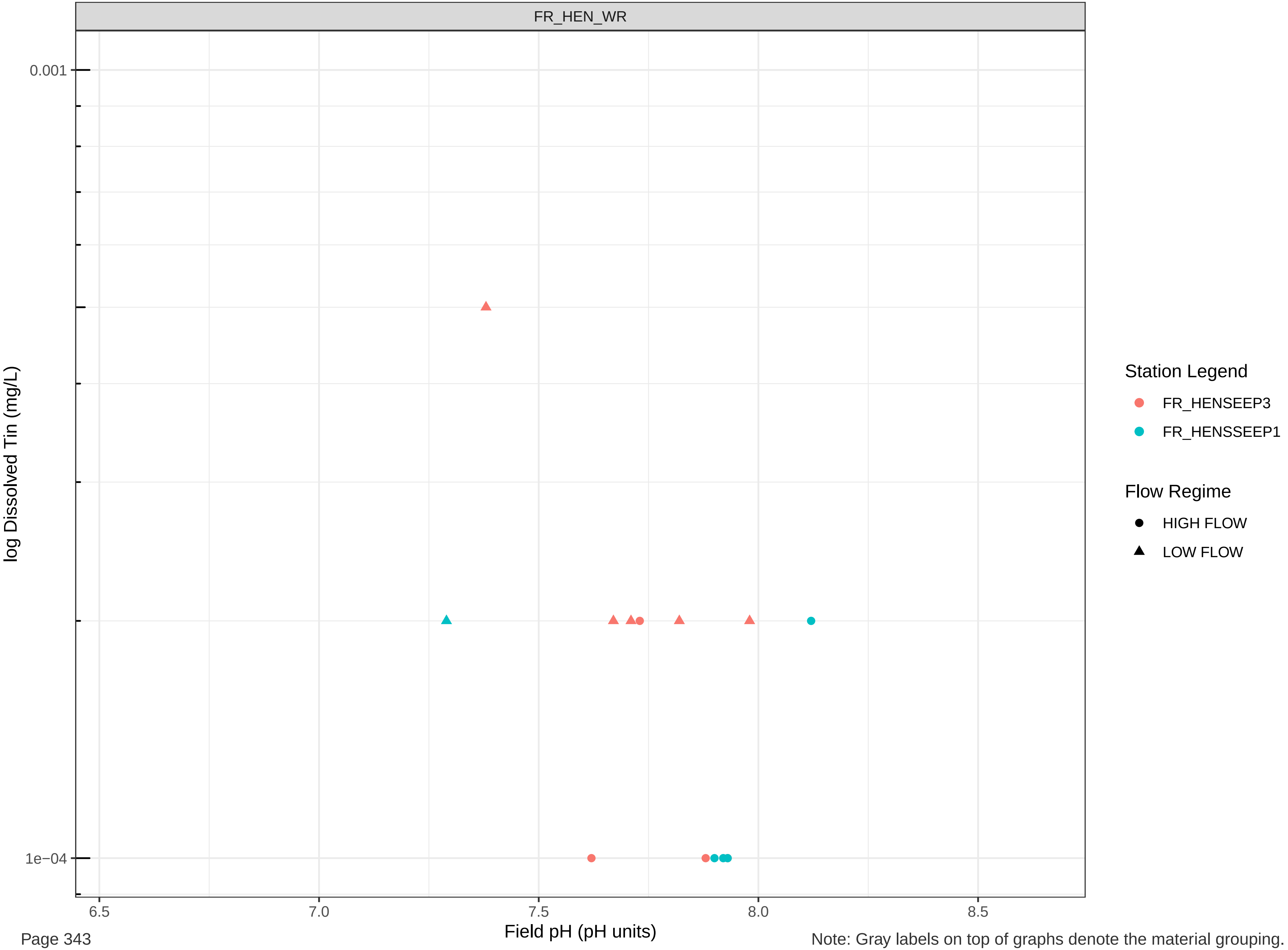

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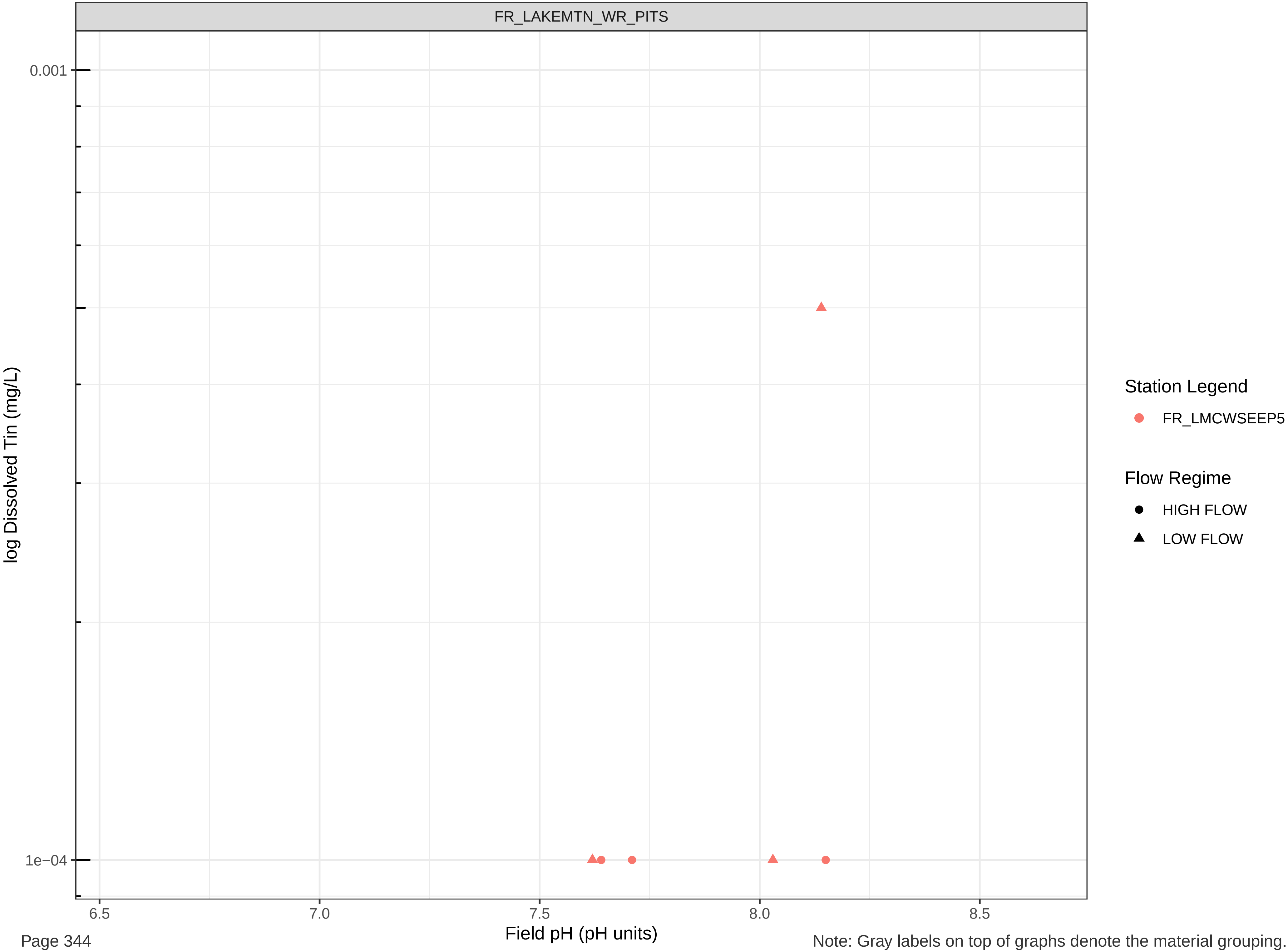

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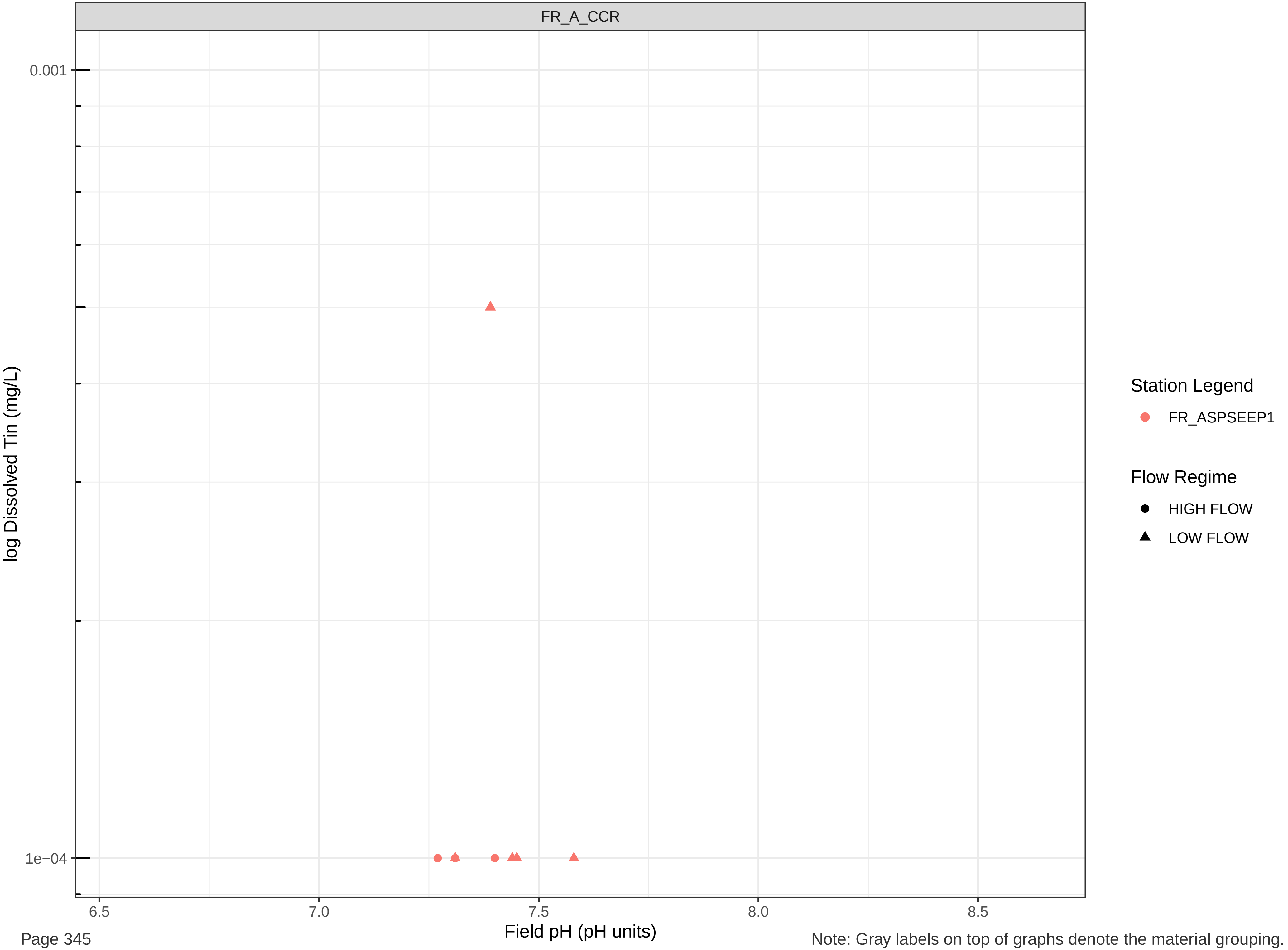

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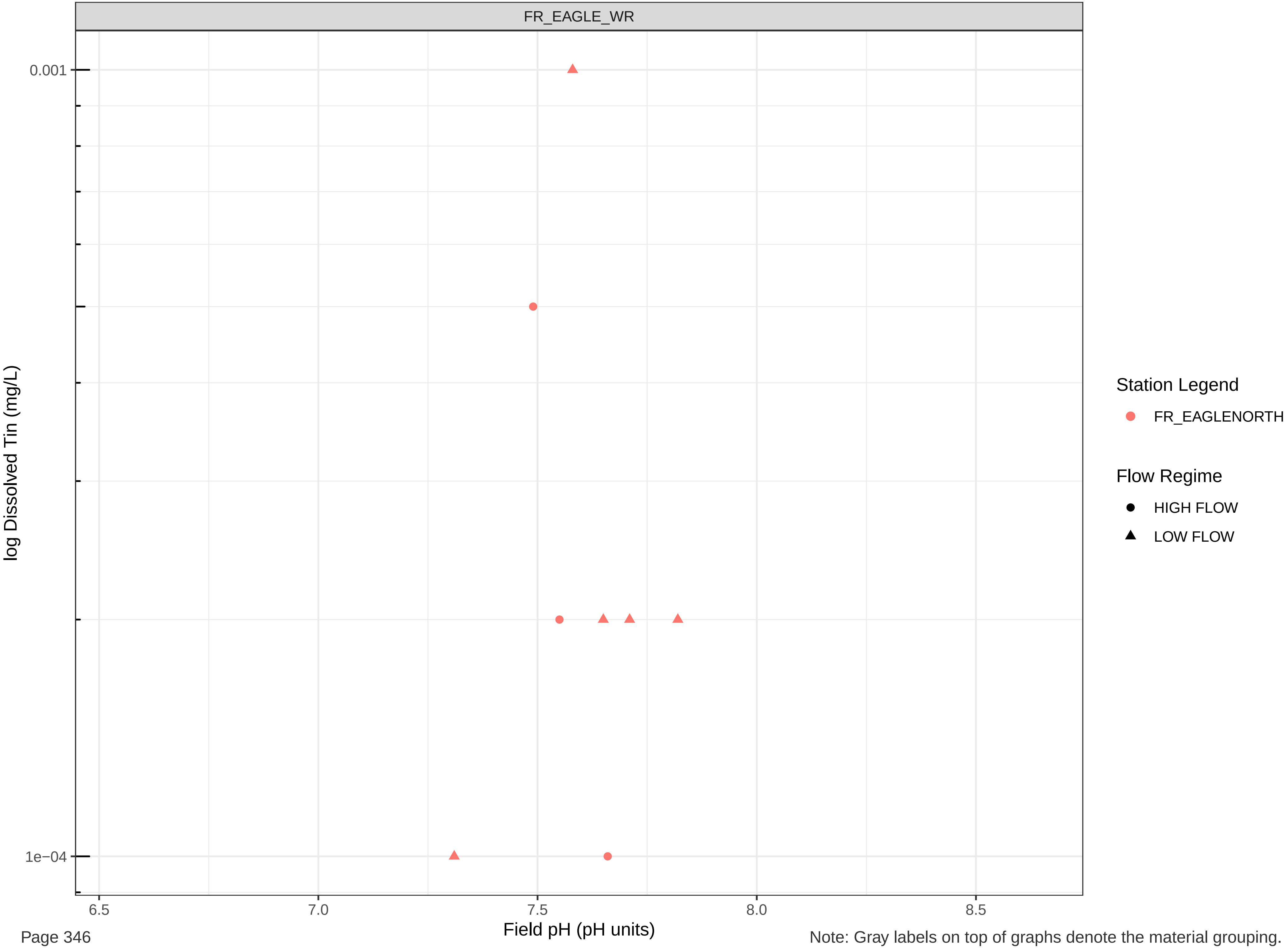

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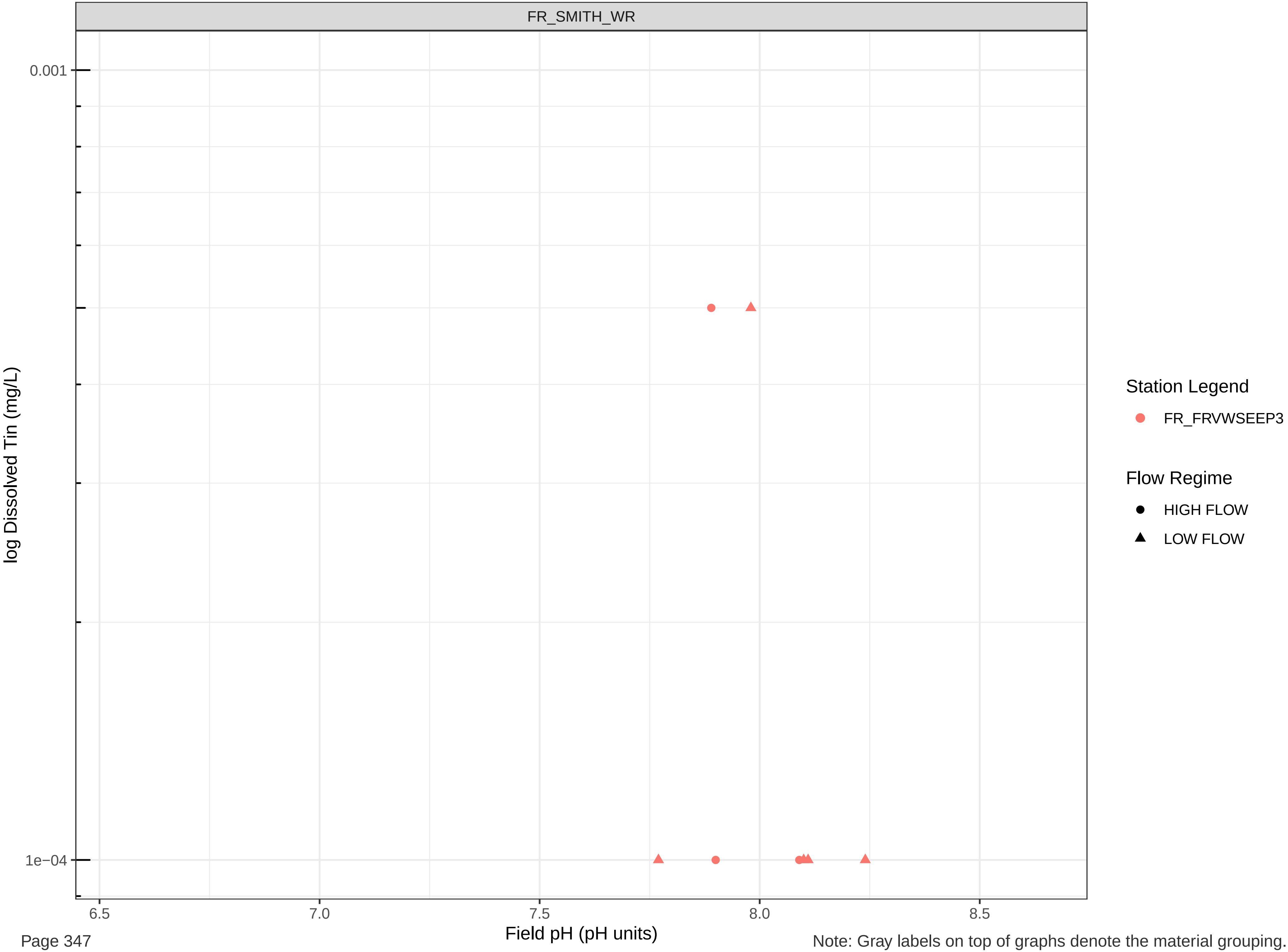

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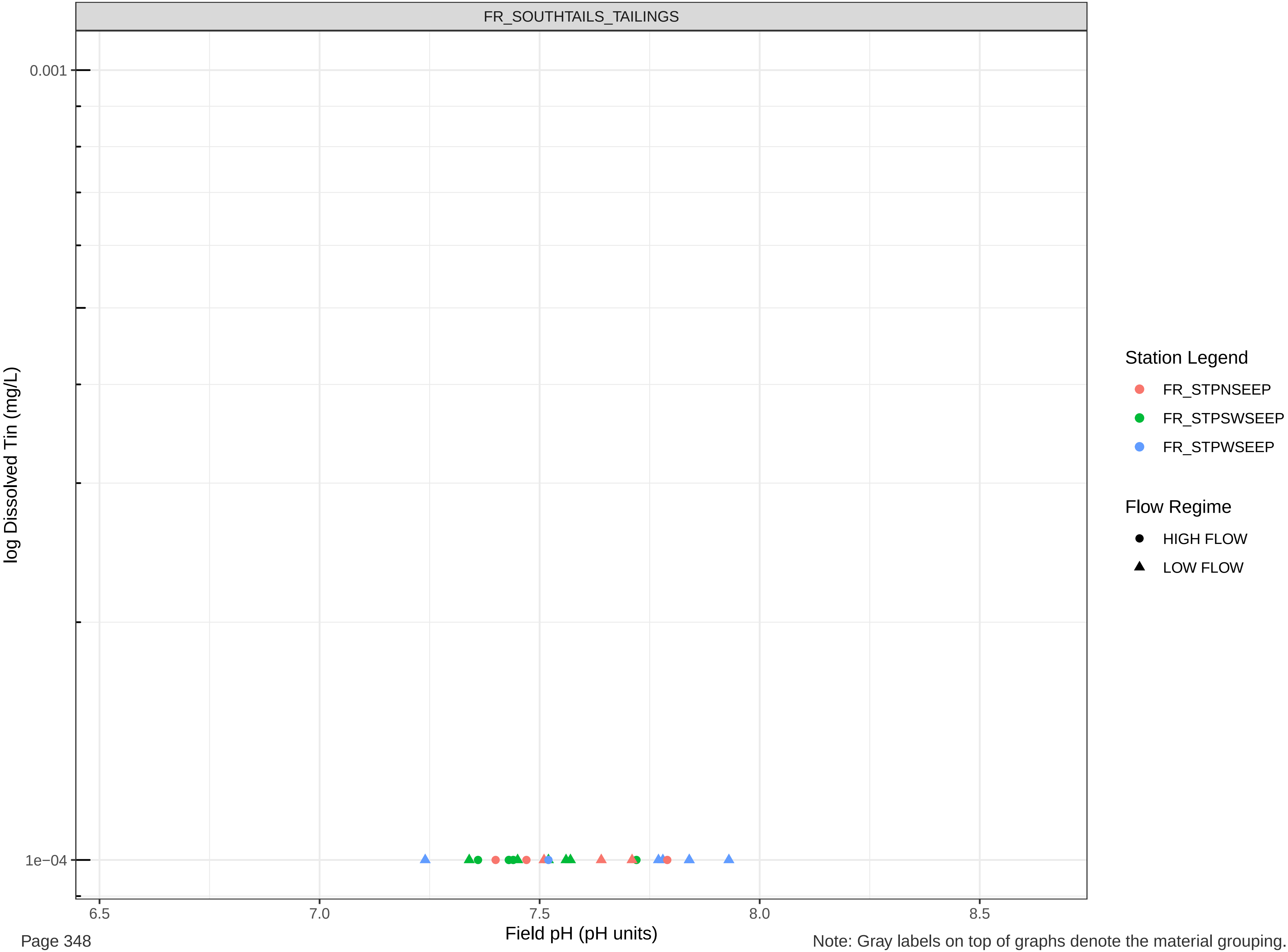

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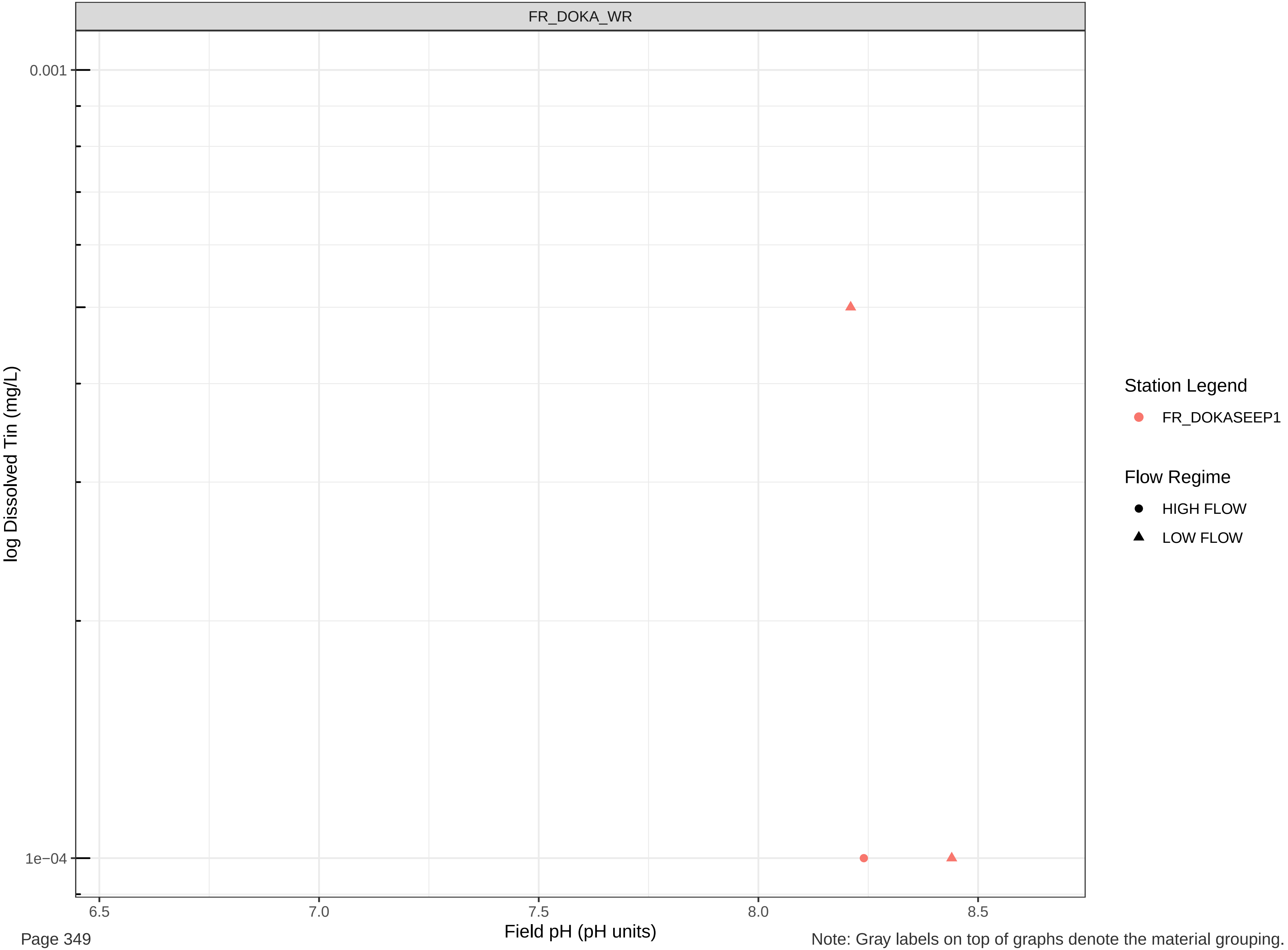

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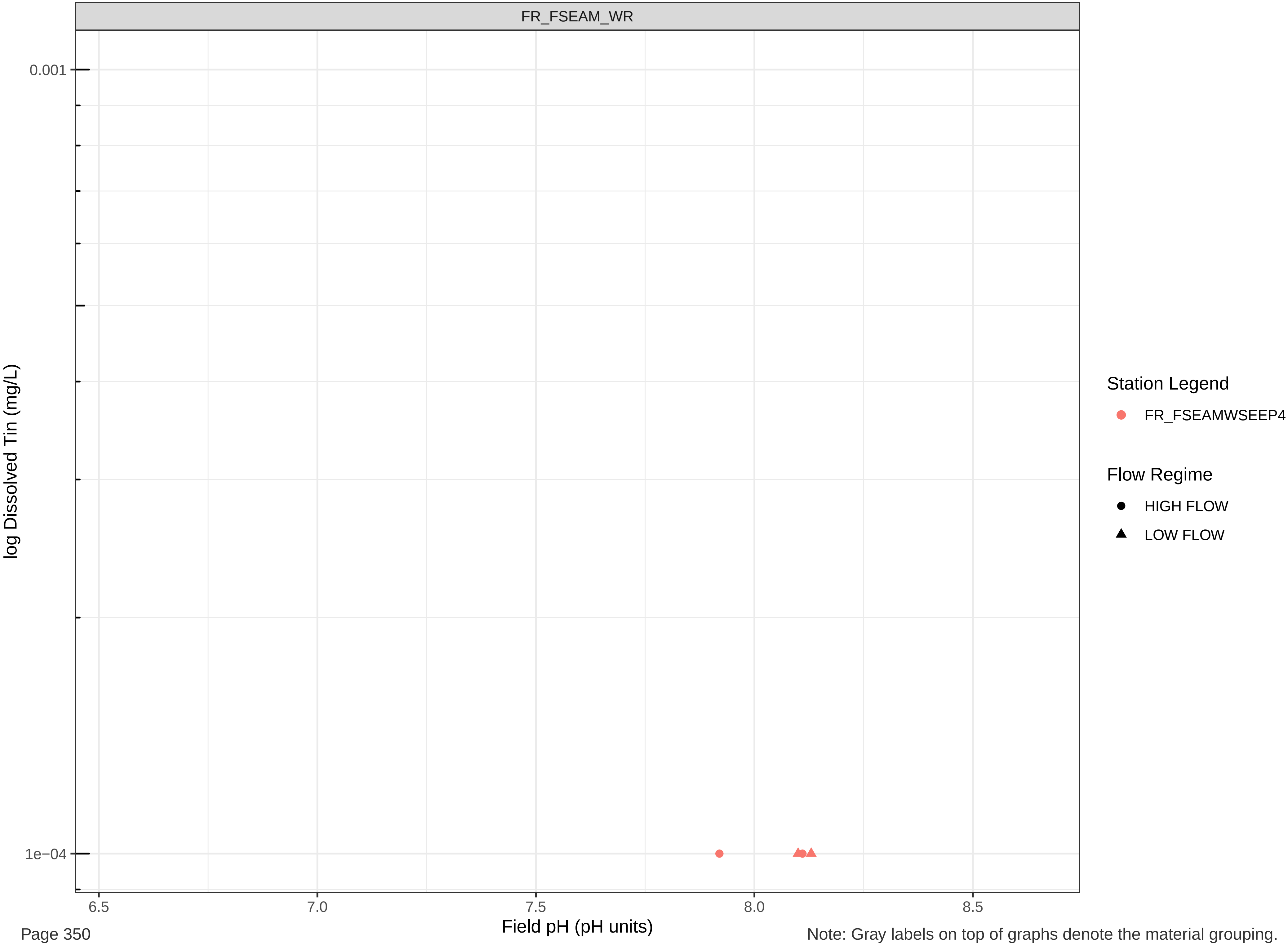

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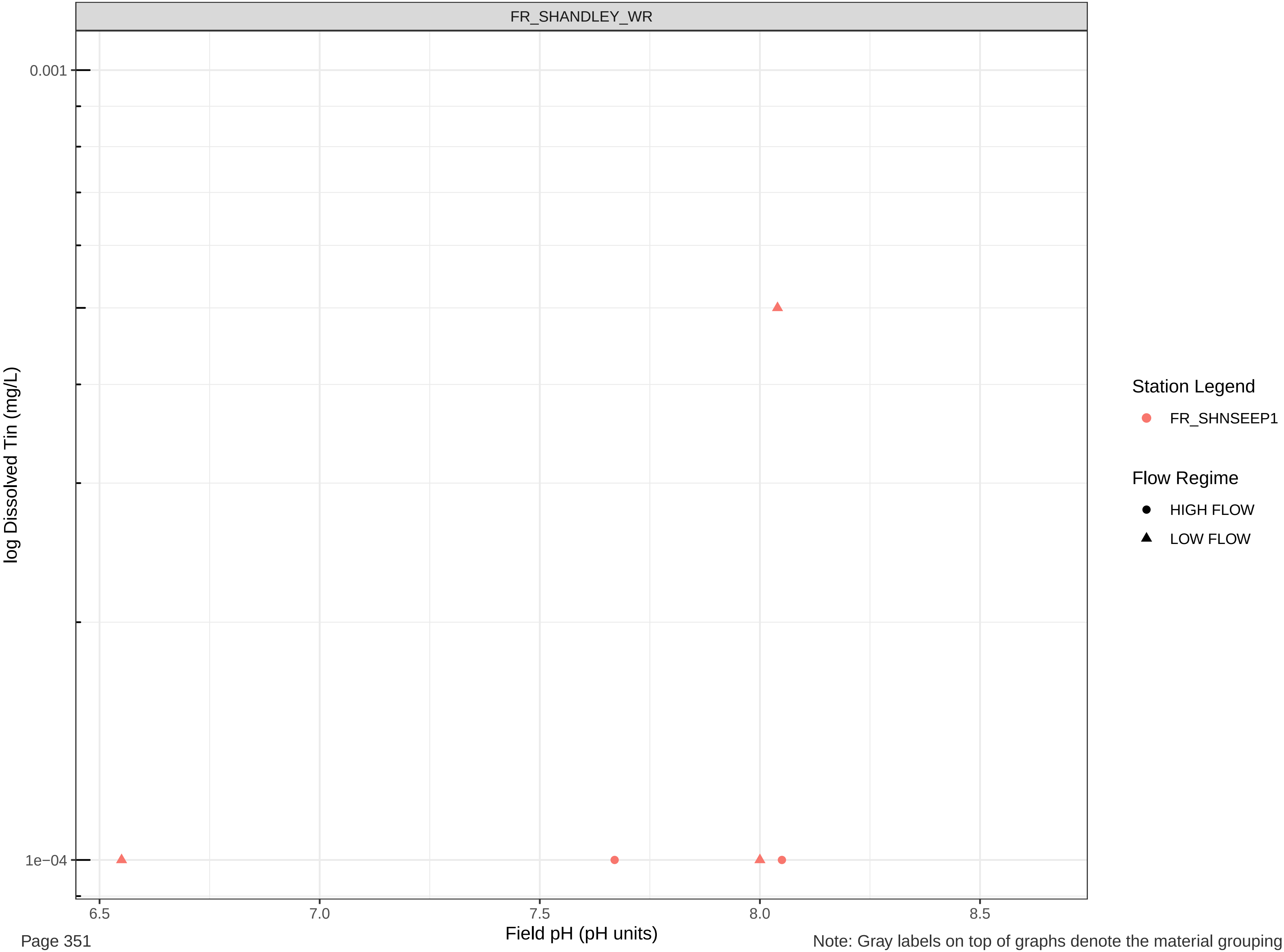

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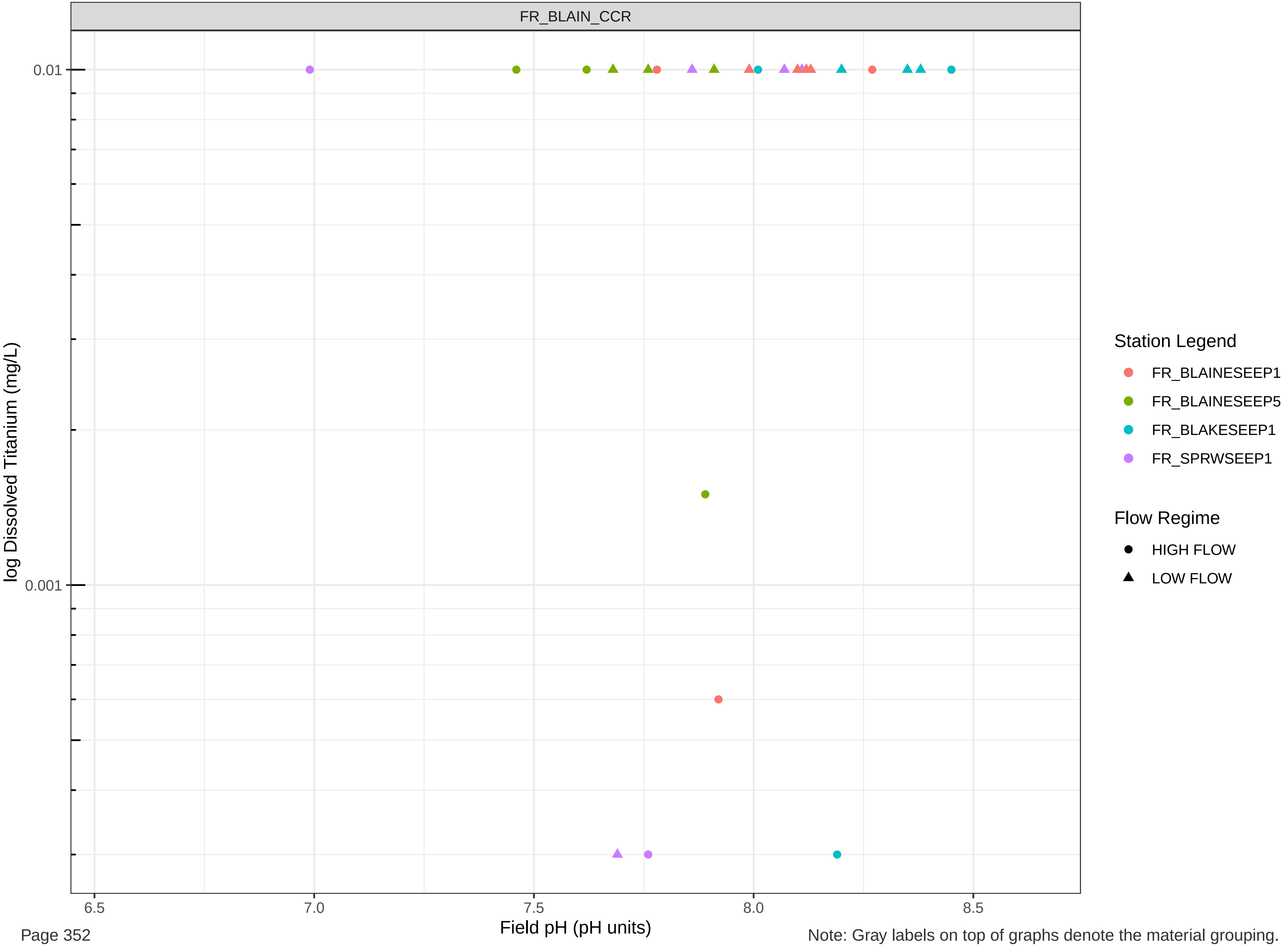

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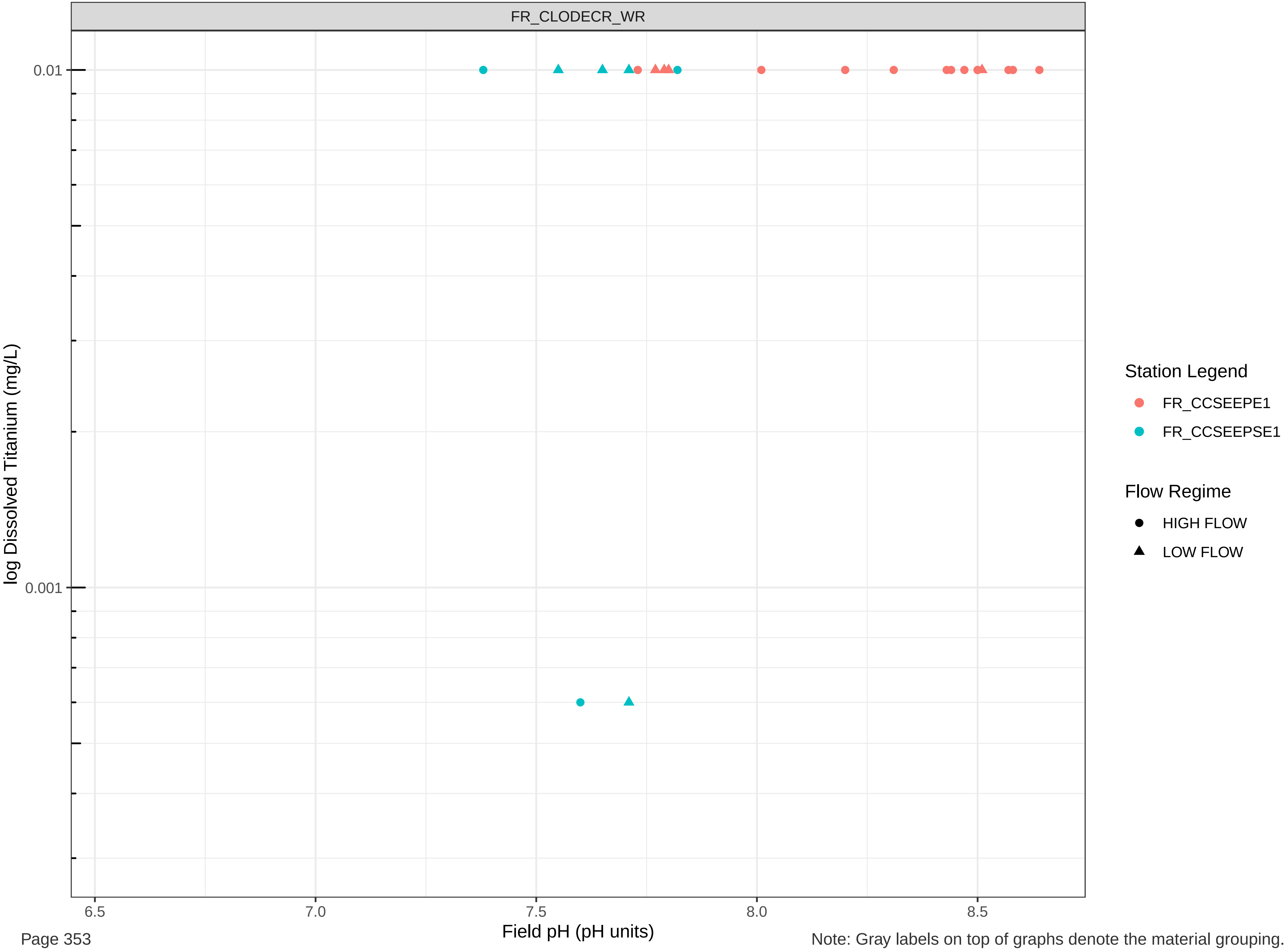

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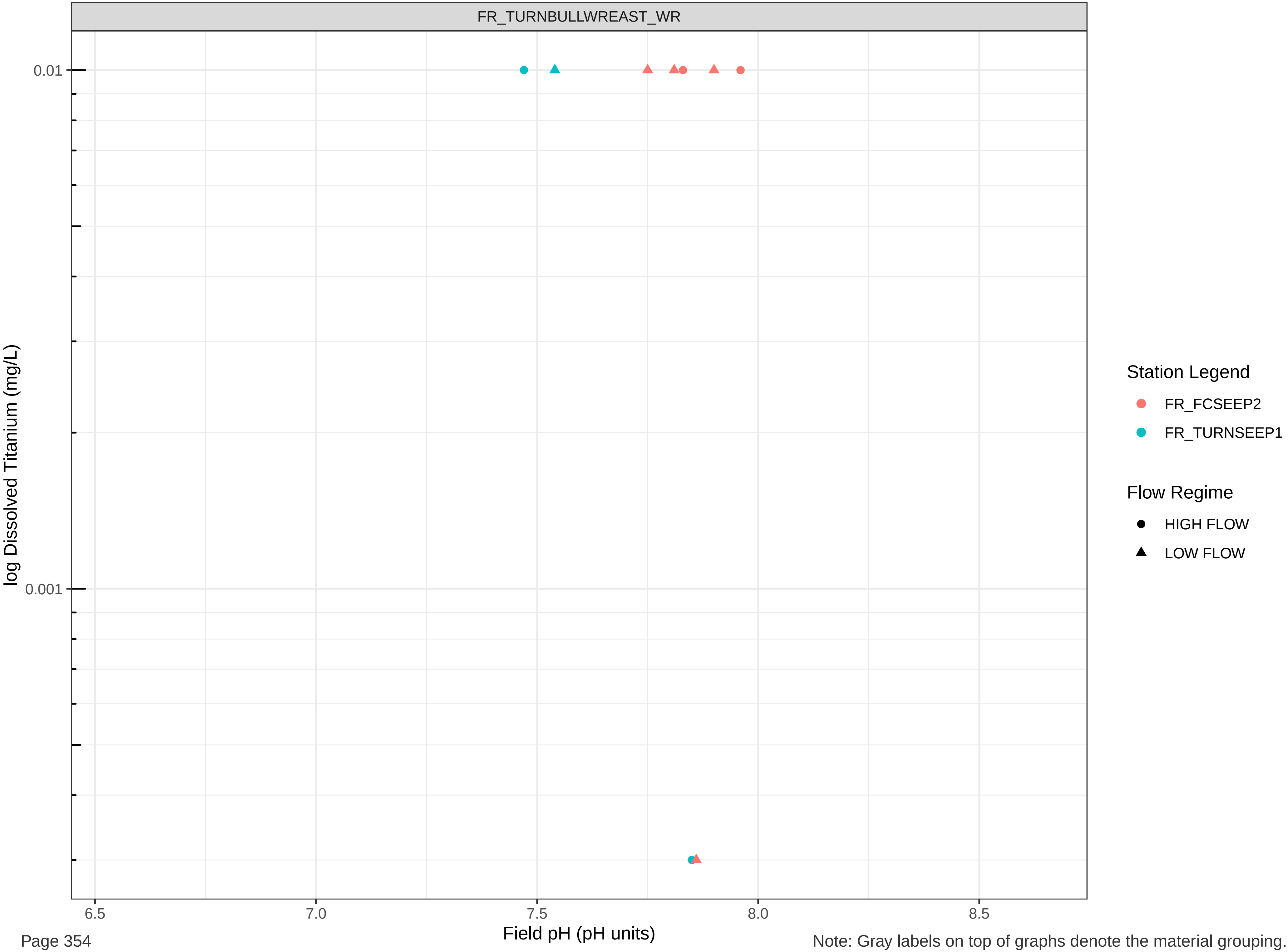

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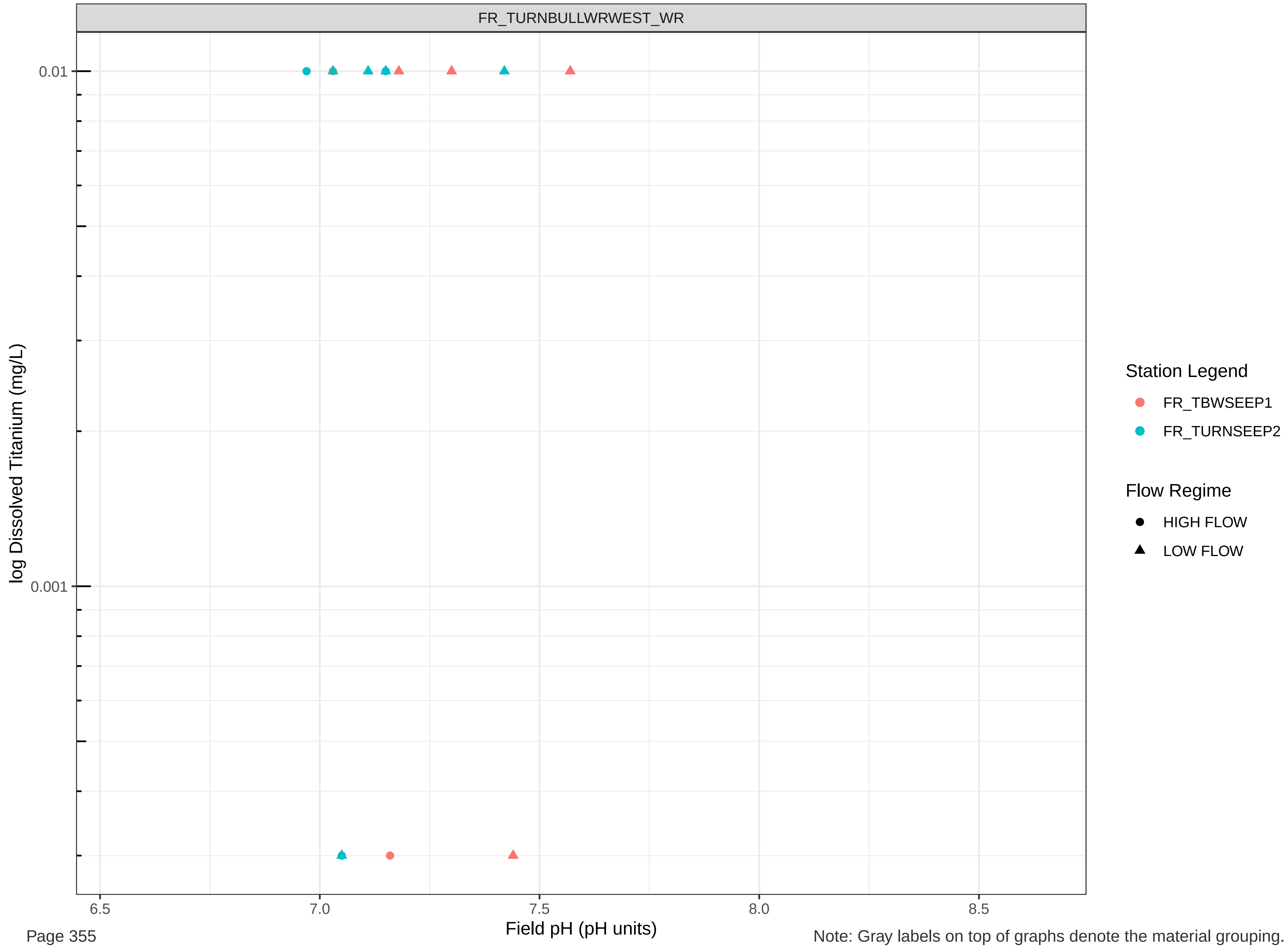

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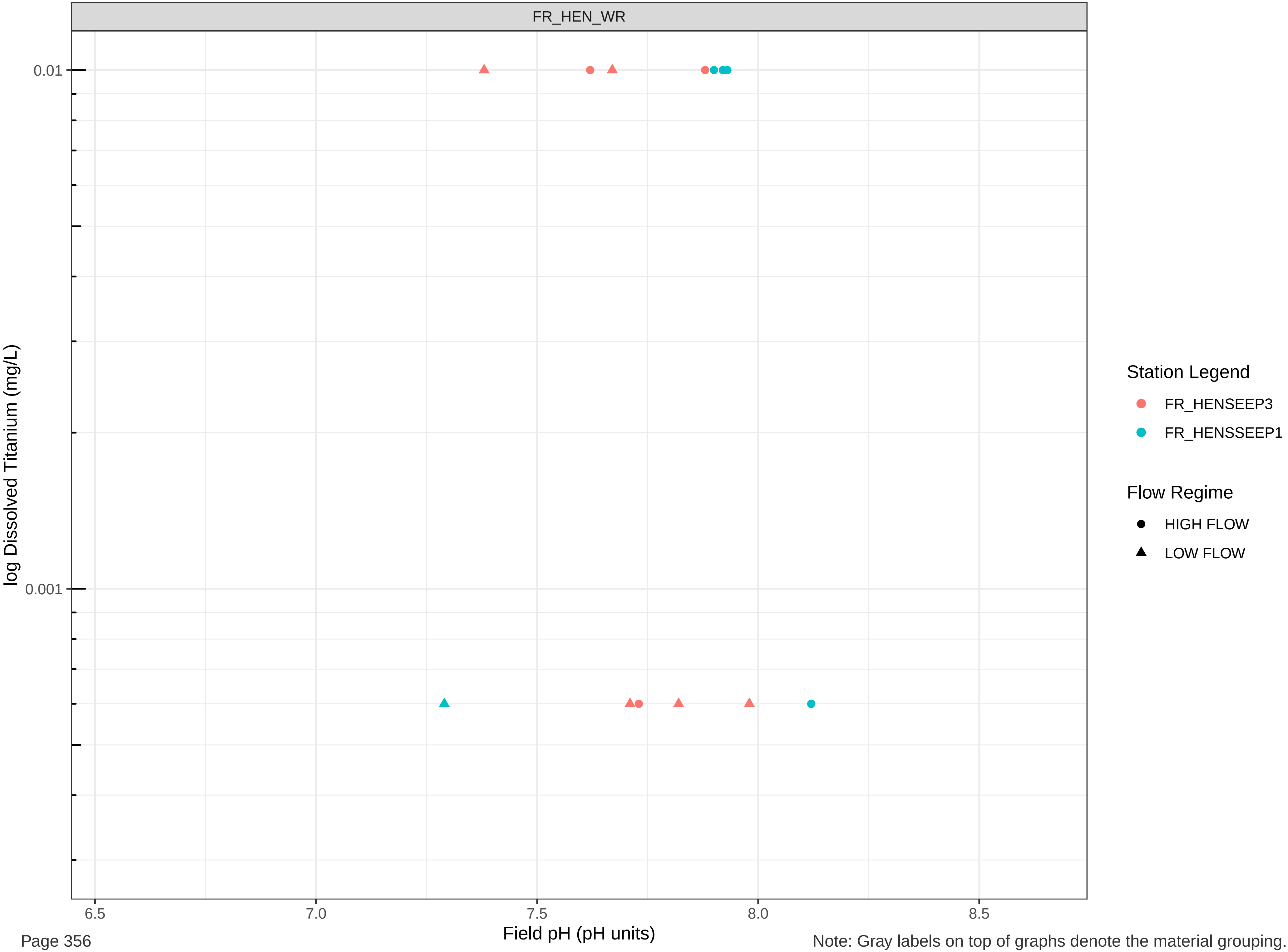

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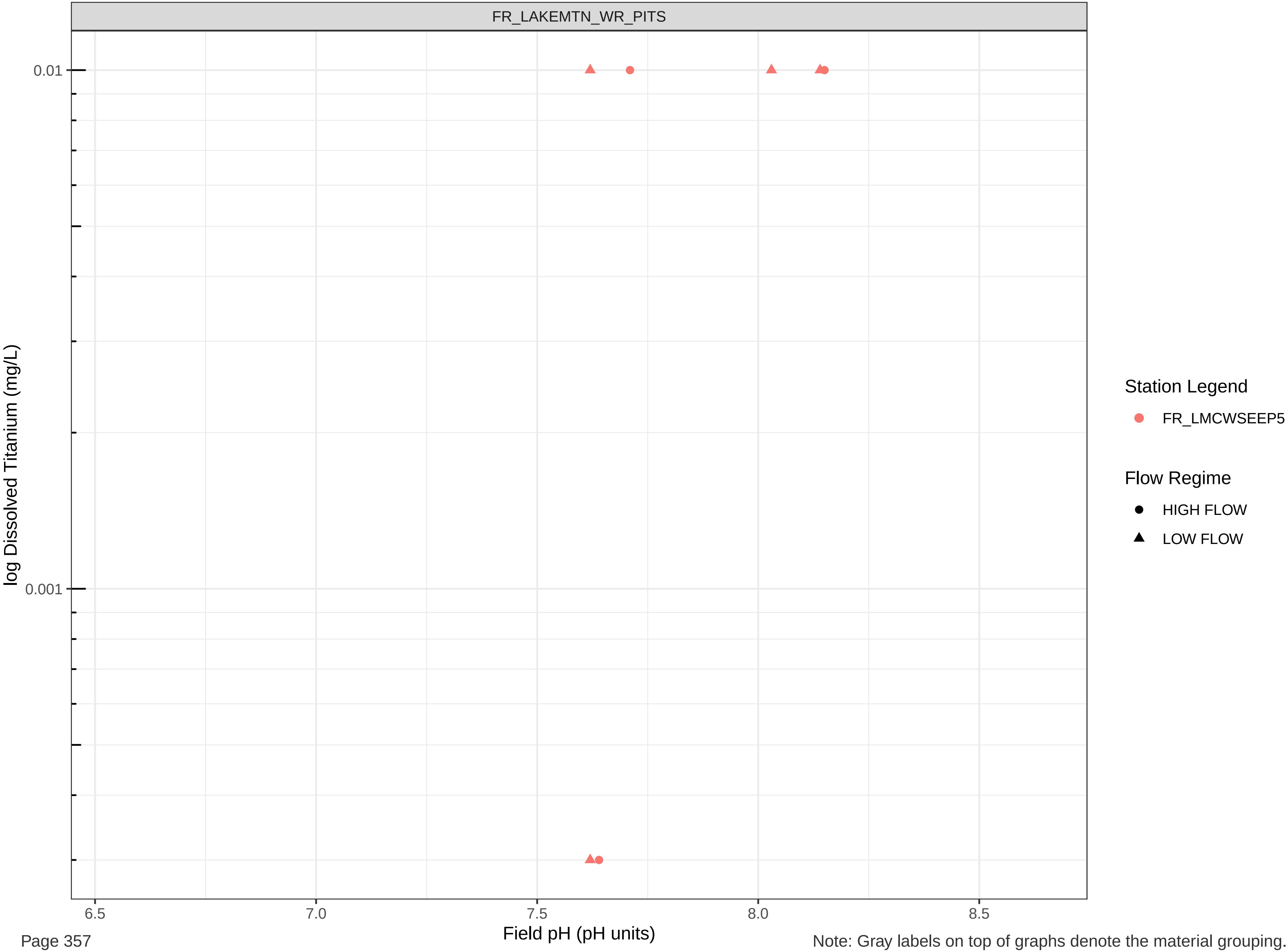

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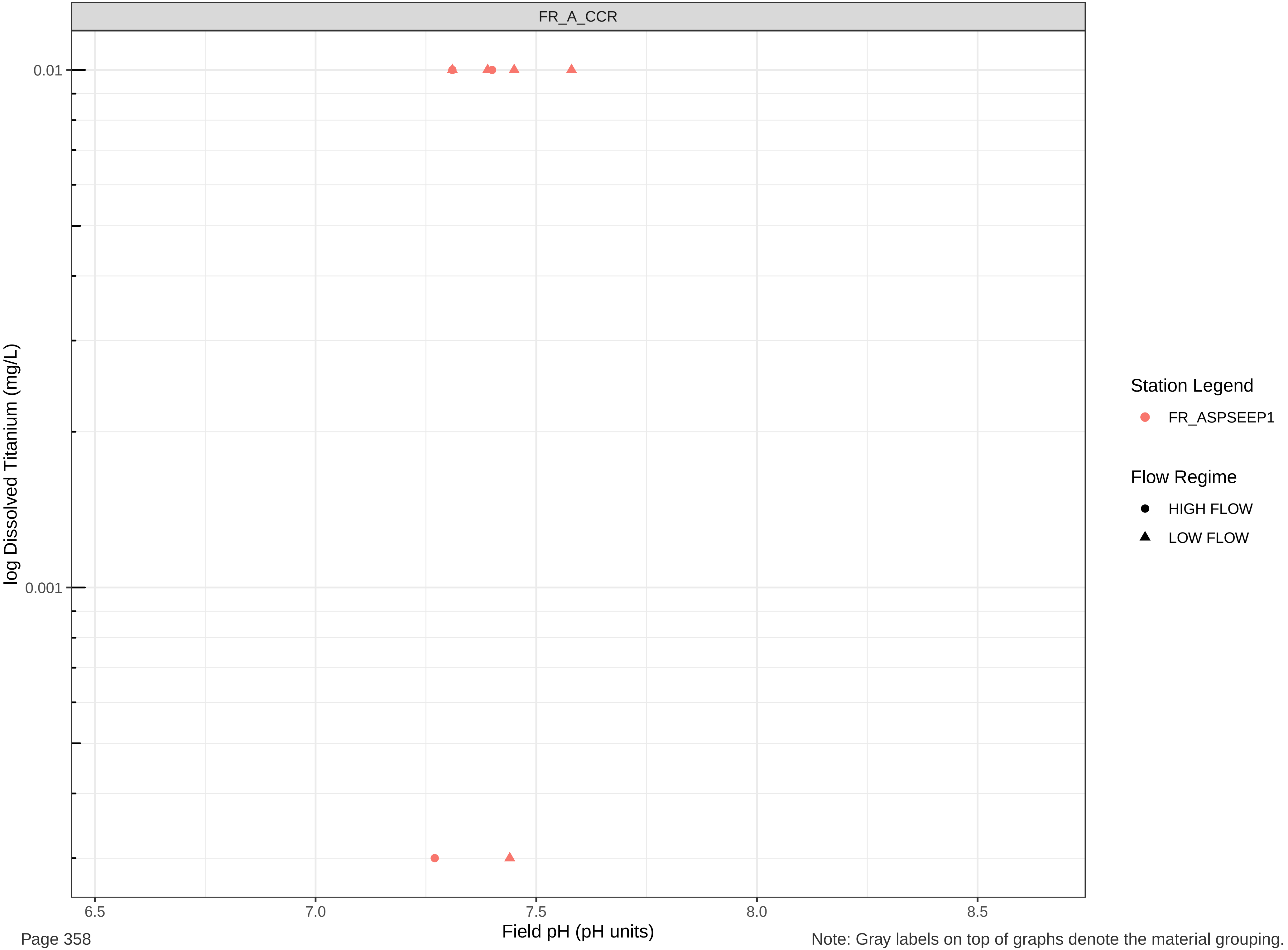

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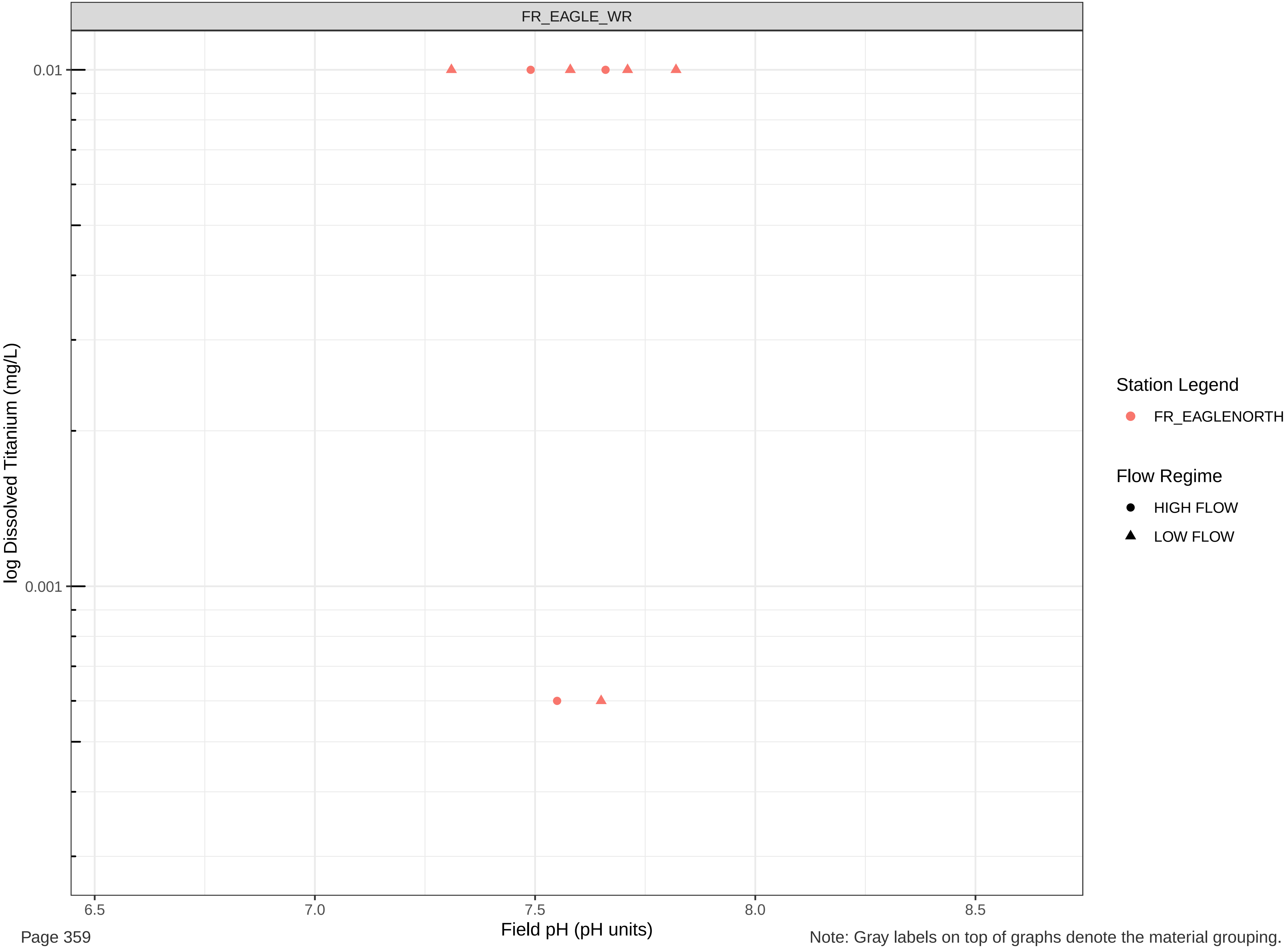

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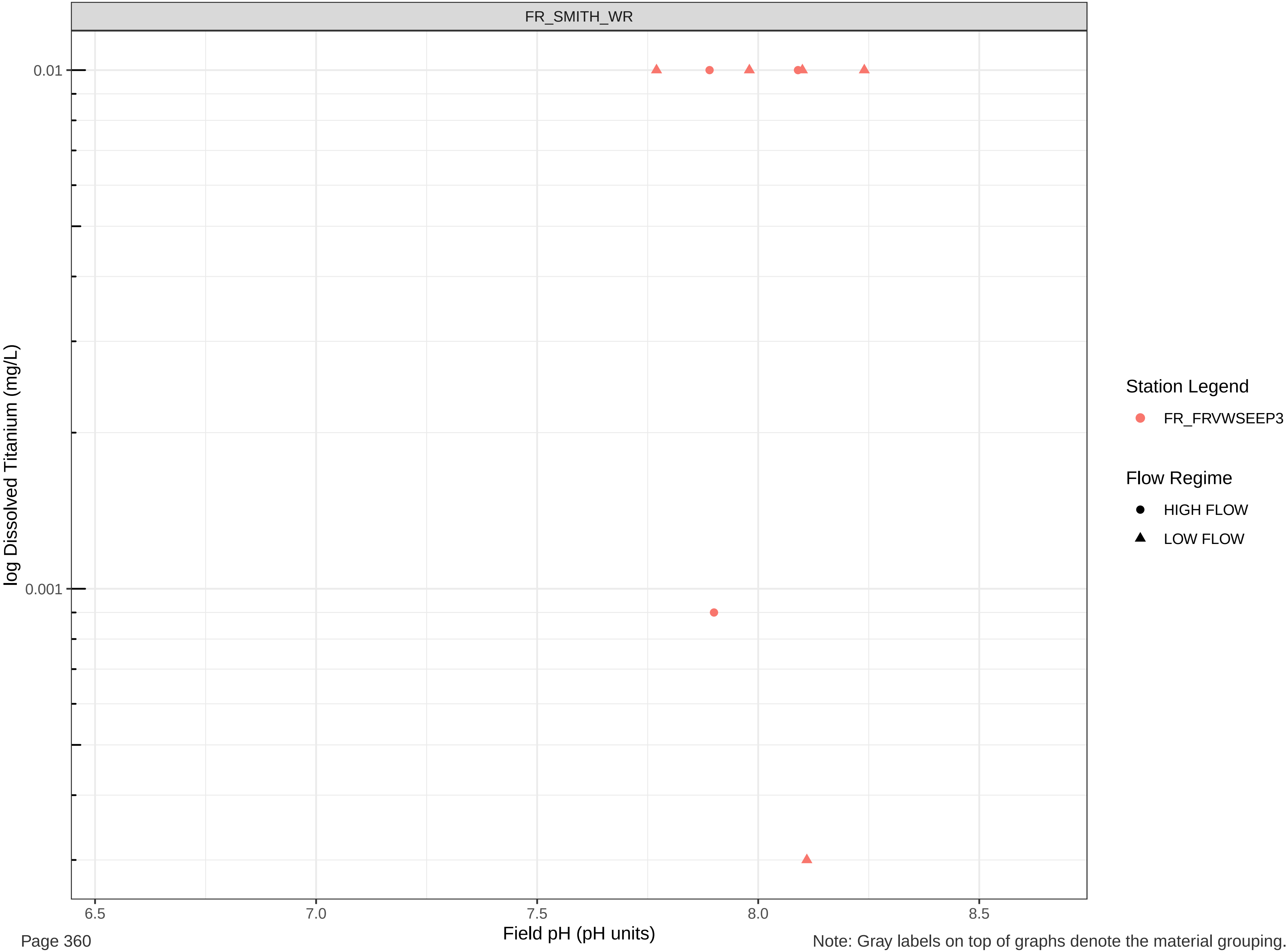

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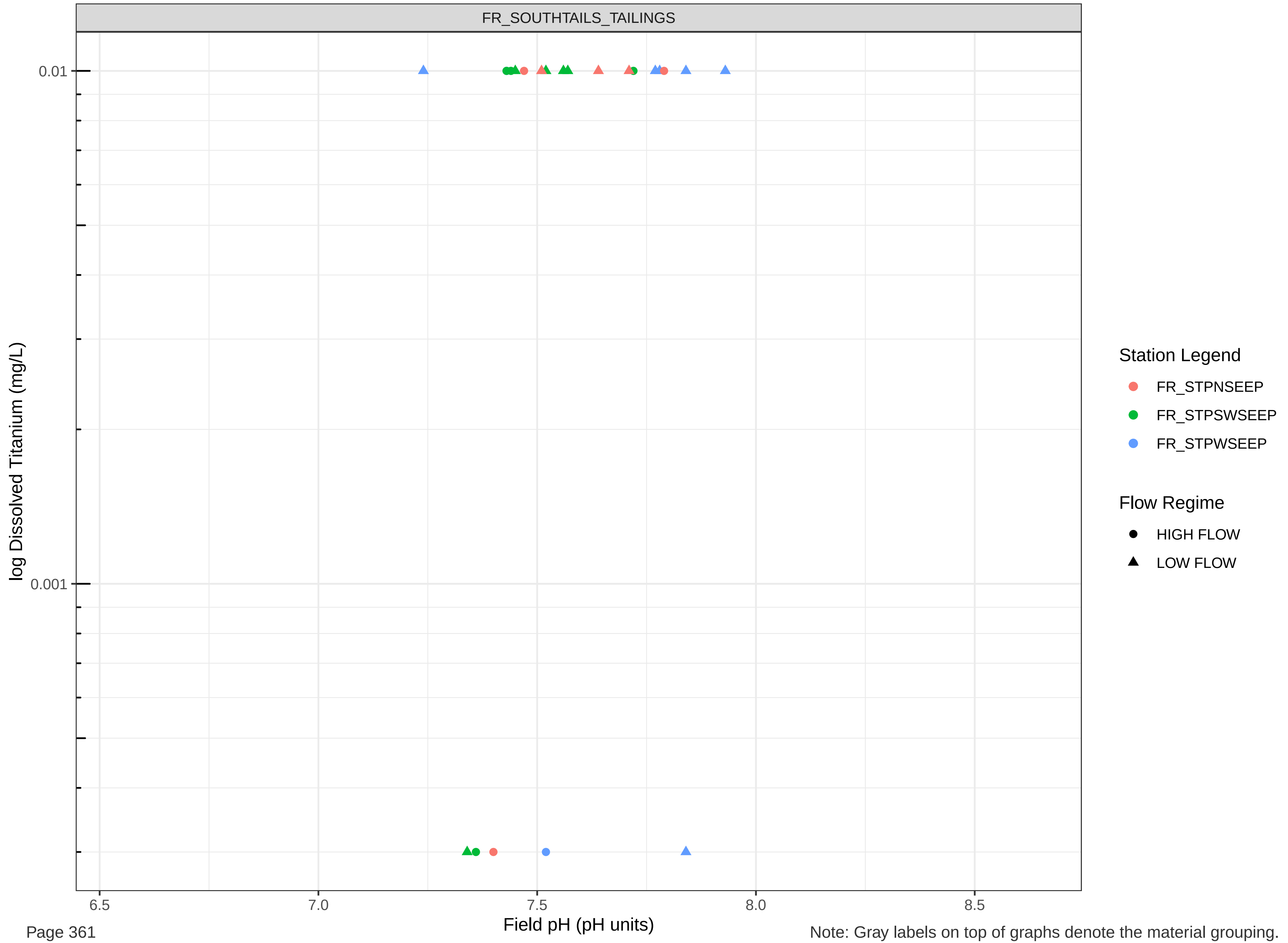

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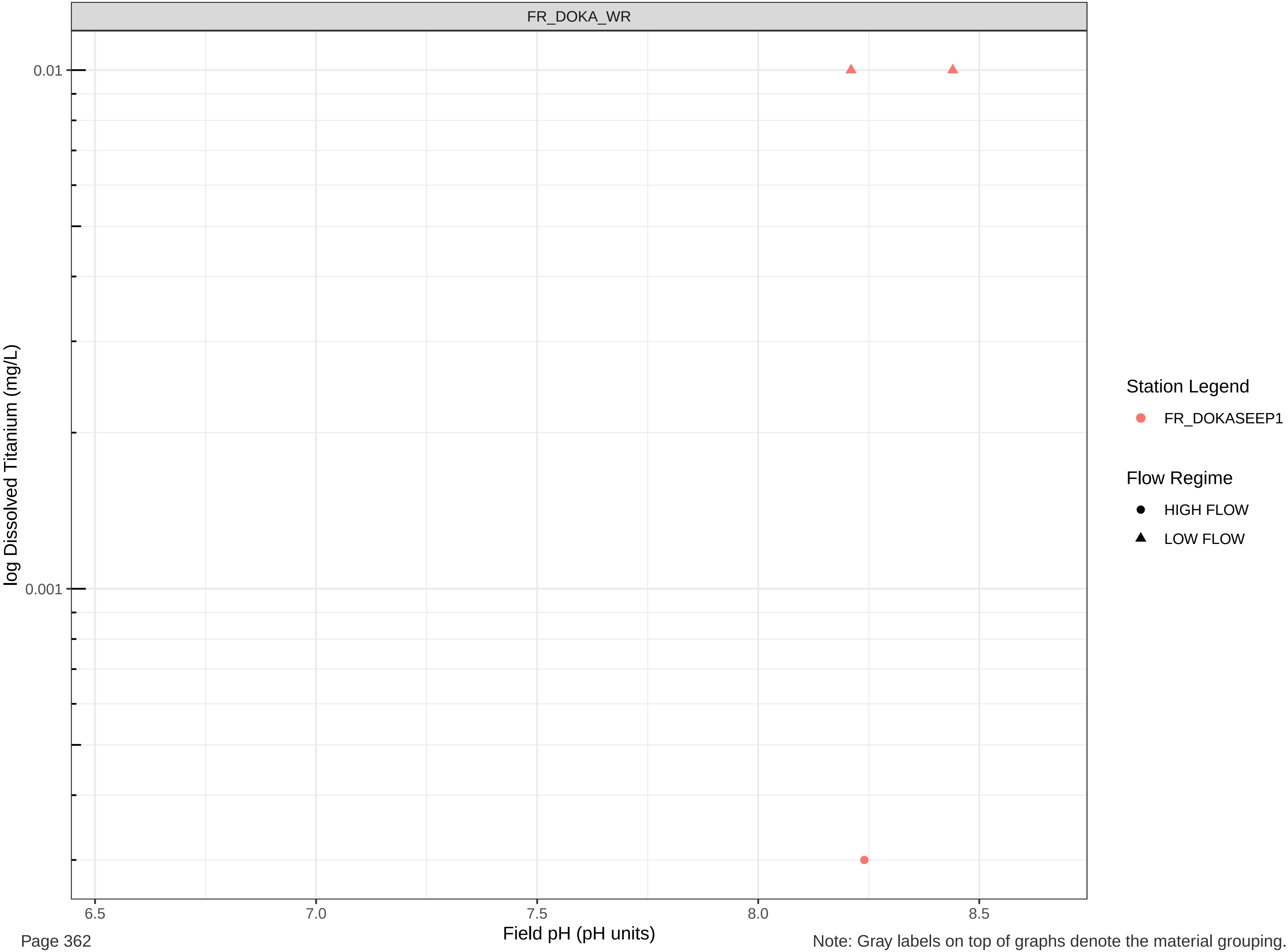

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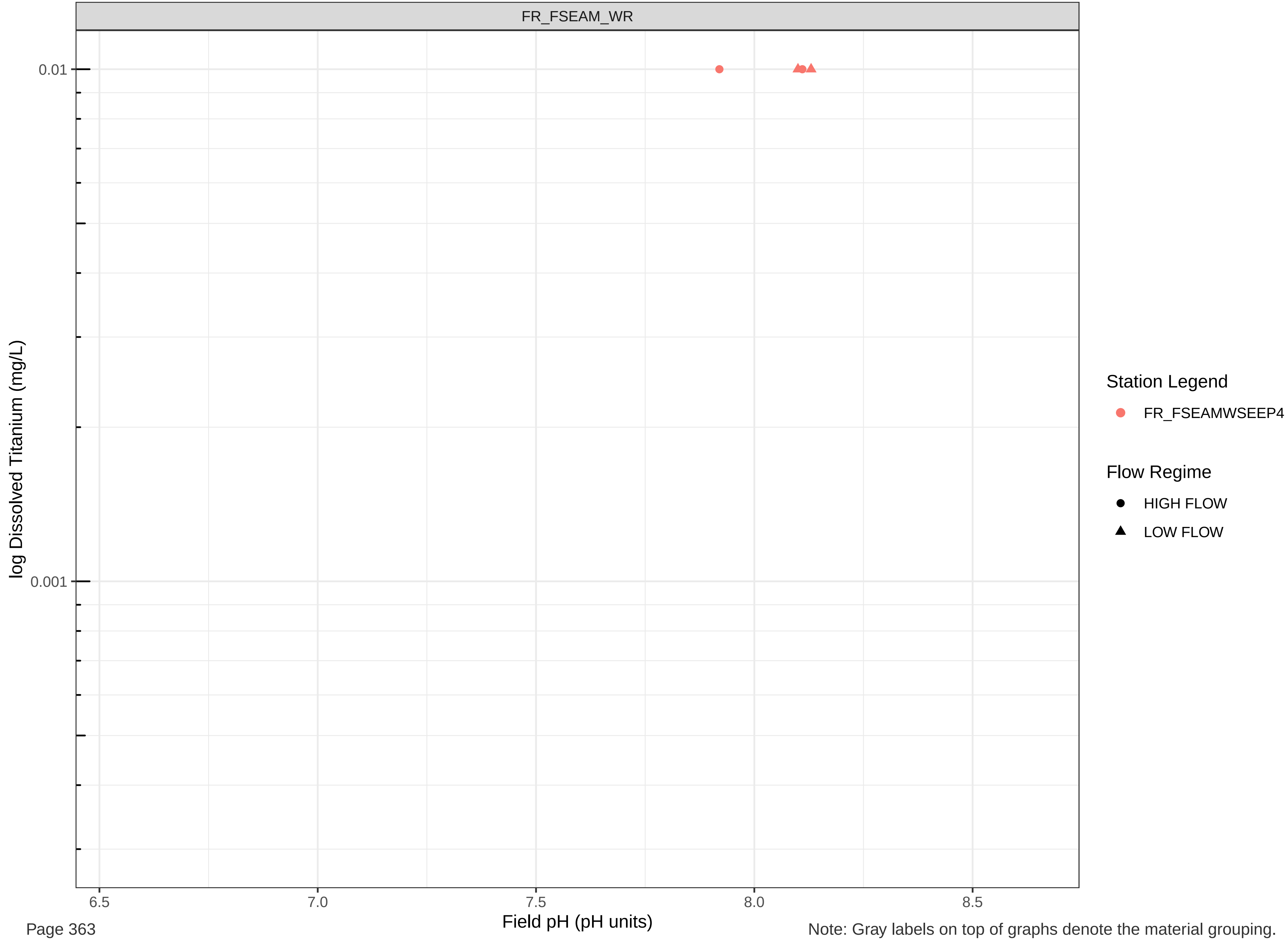

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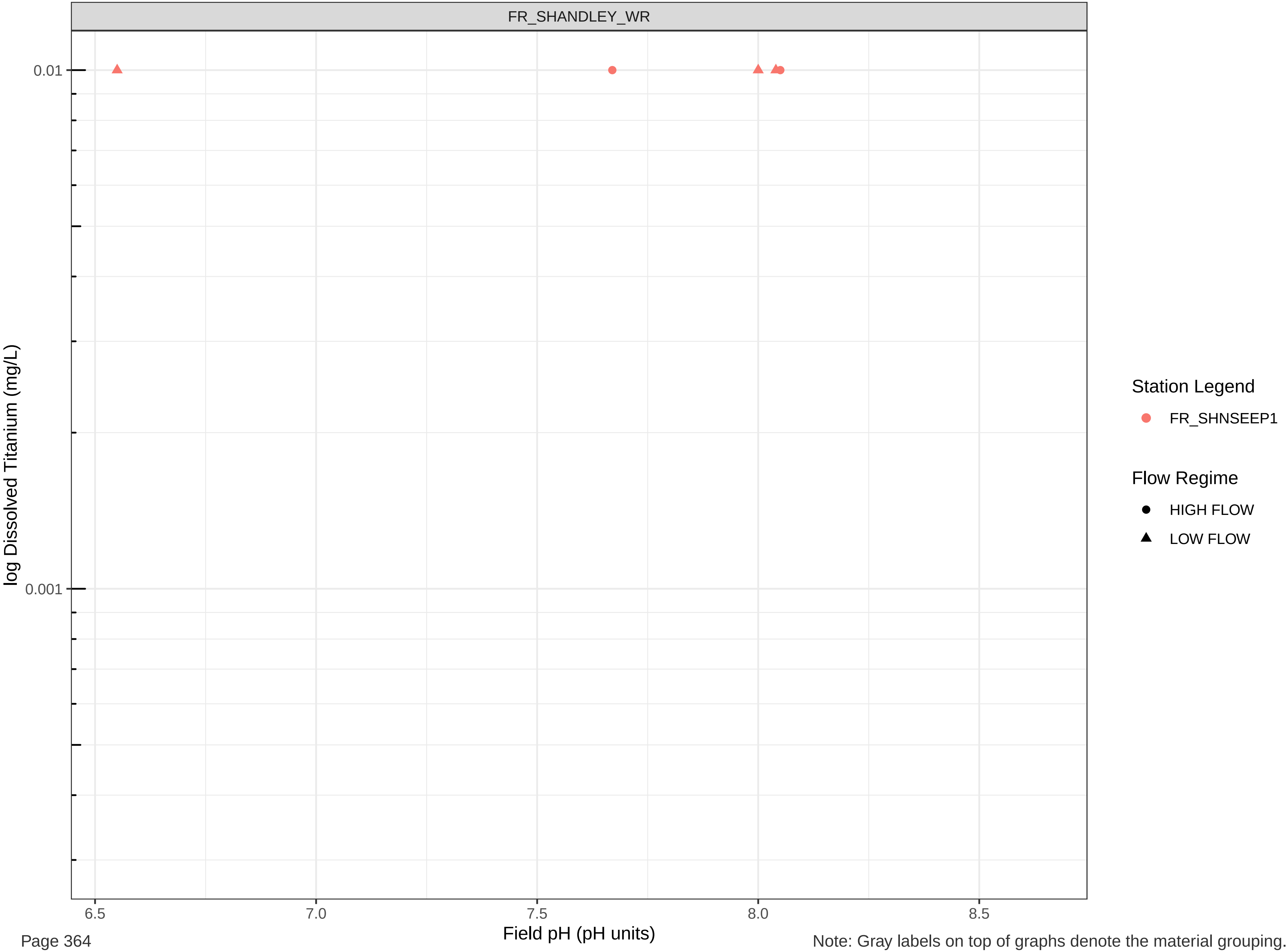
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0.001
log Dissolved Titanium (mg/L)
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7.0
7.5
8.0
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Field pH (pH units)
Station Legend
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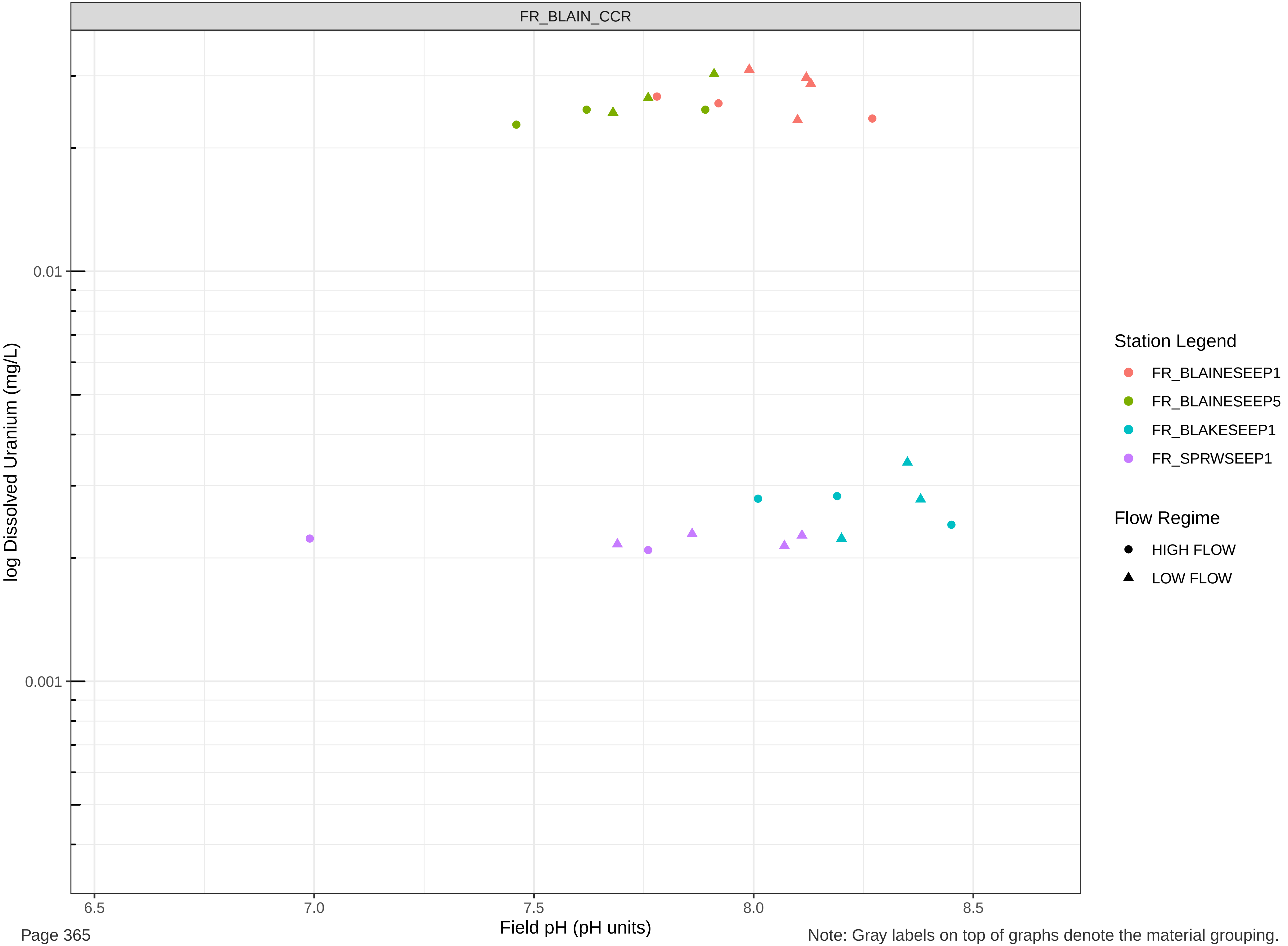
LOW FLOW



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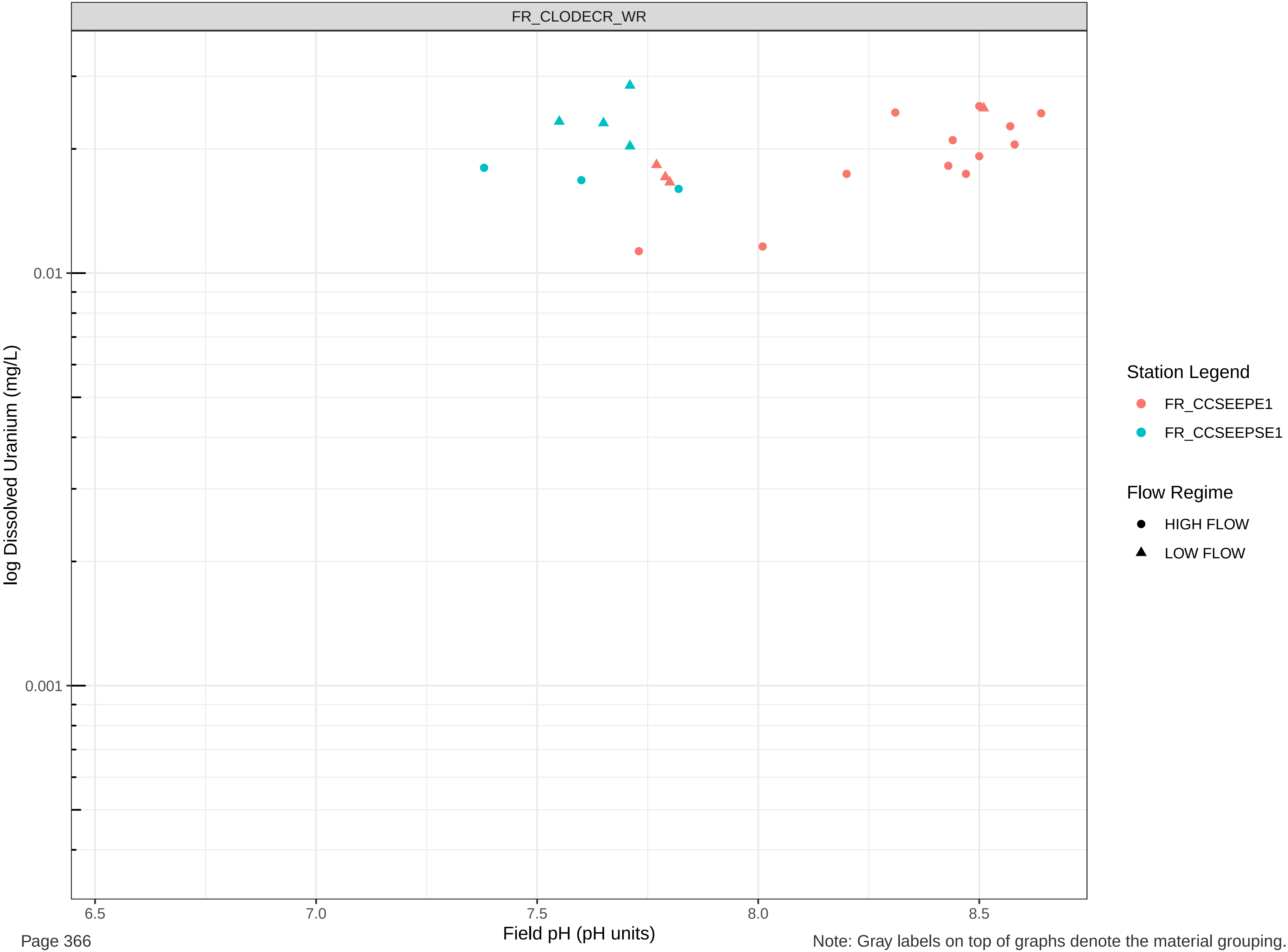

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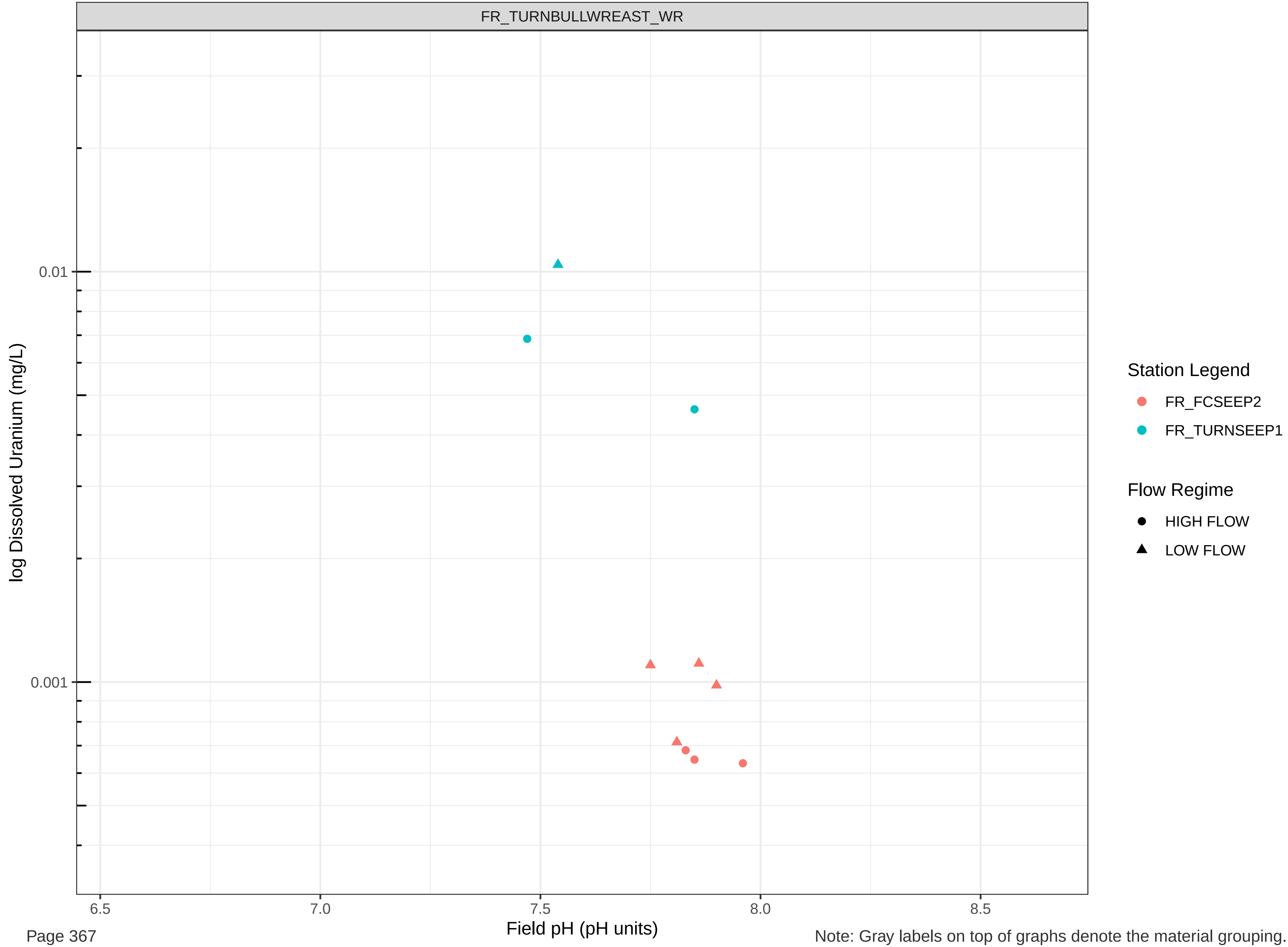
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0.001
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6.5
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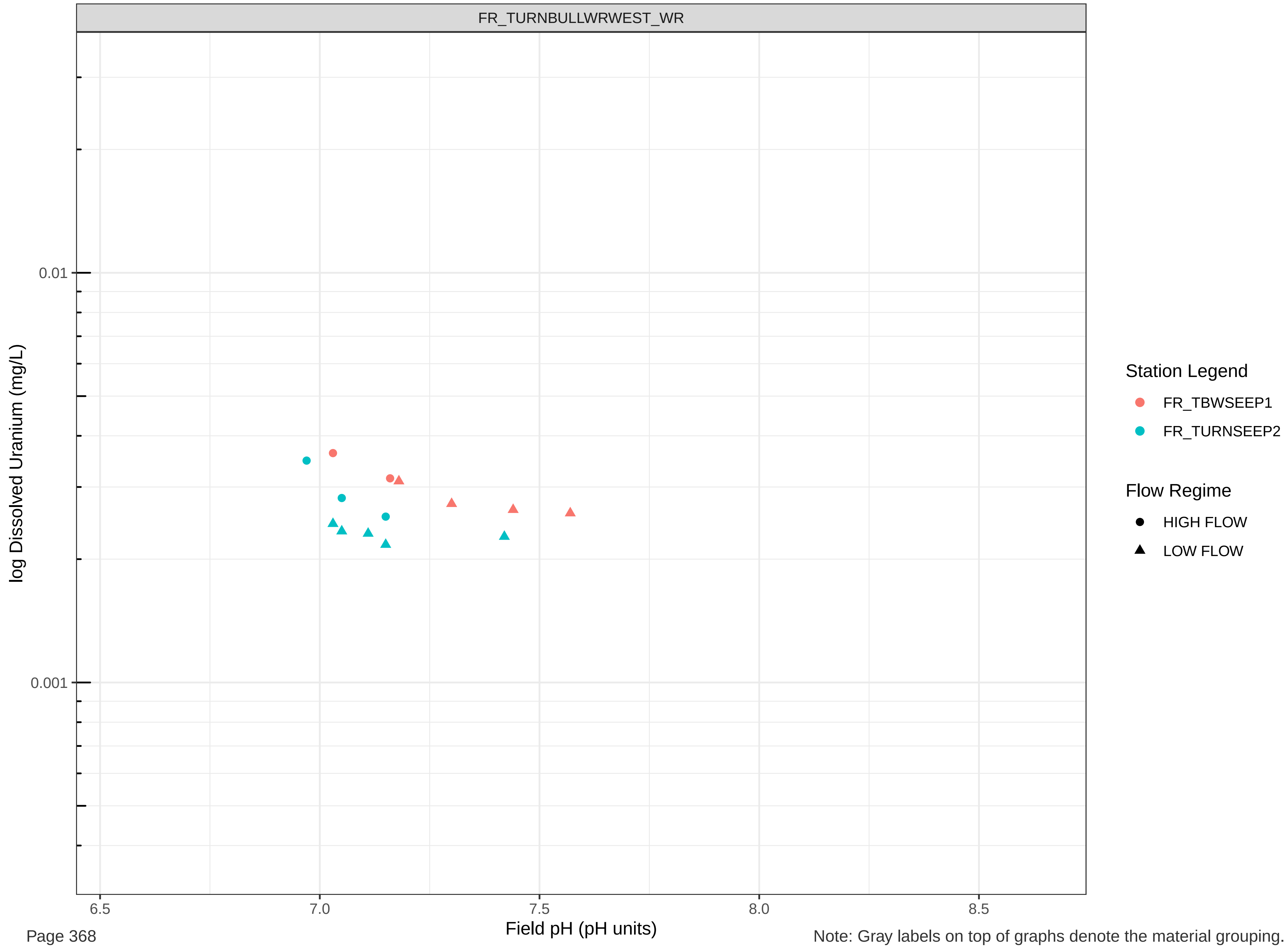

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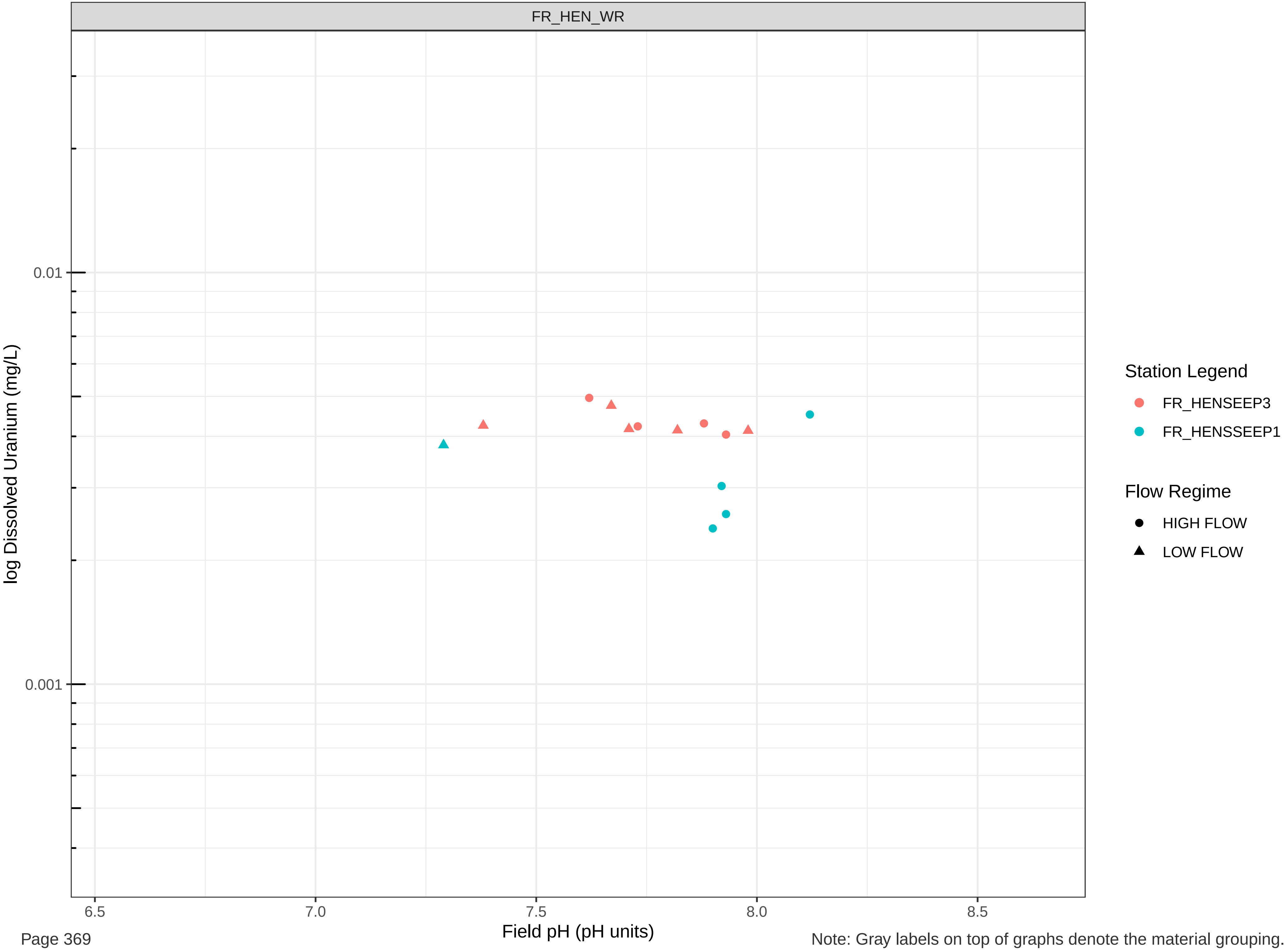

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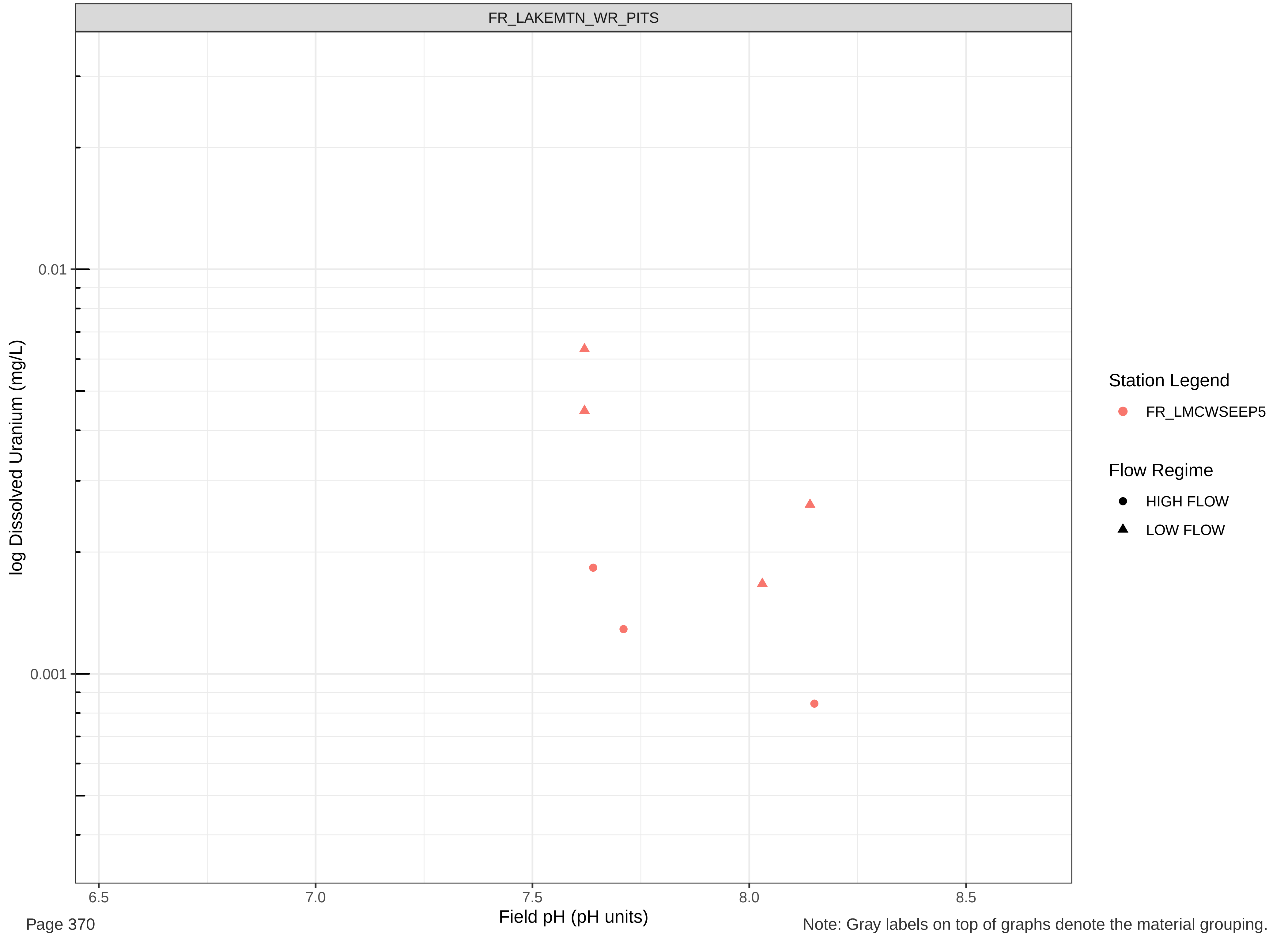

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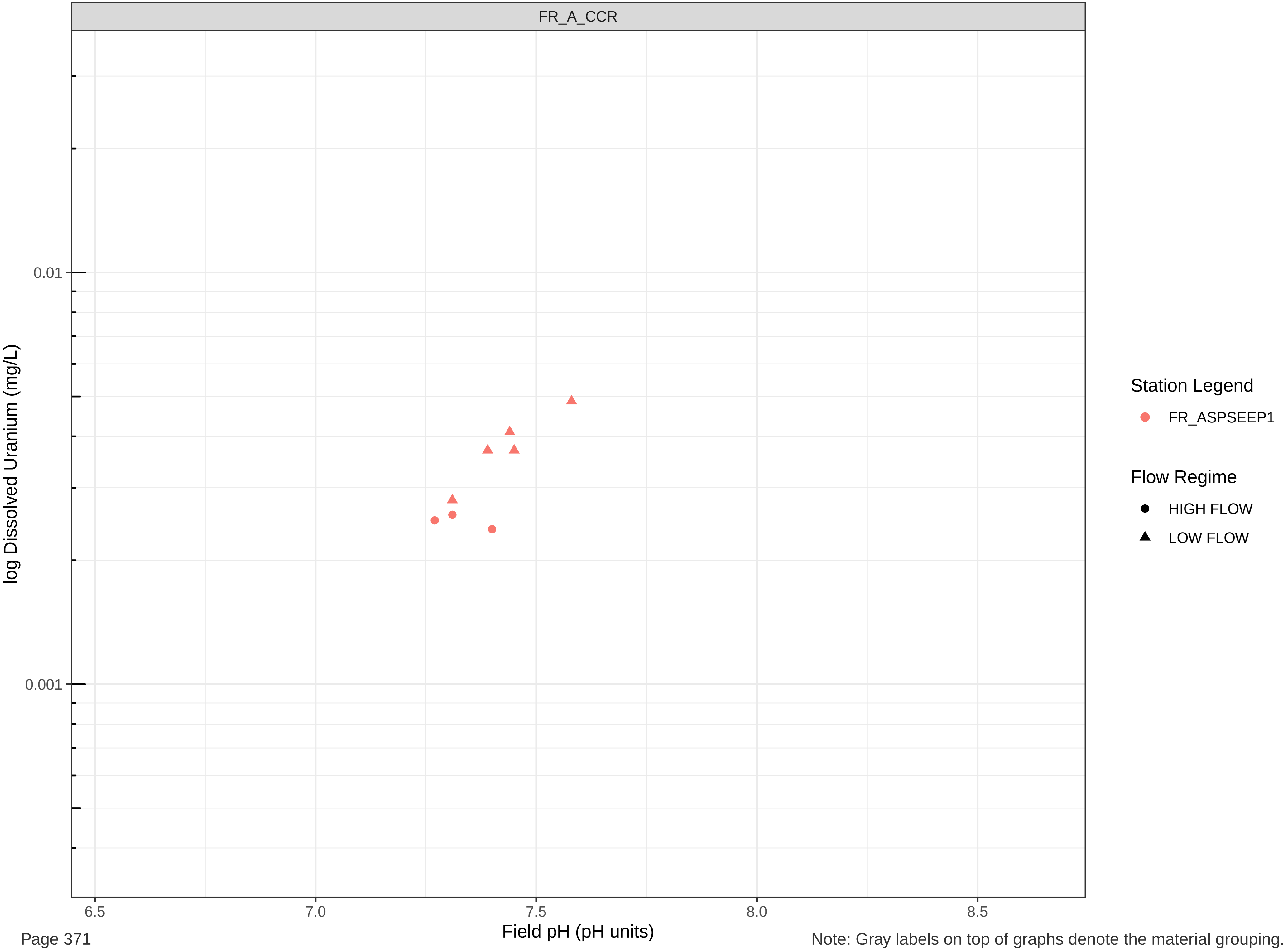

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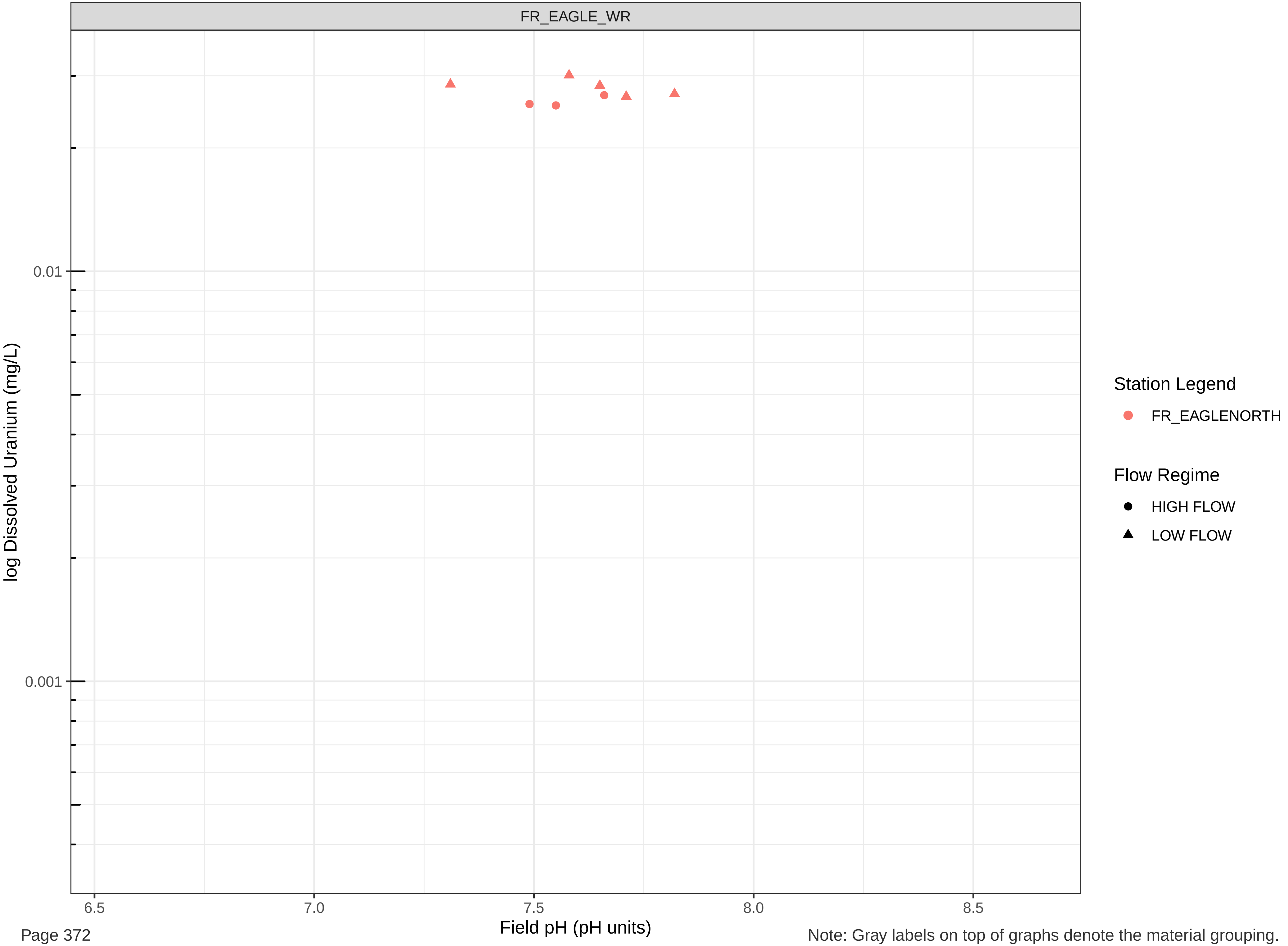

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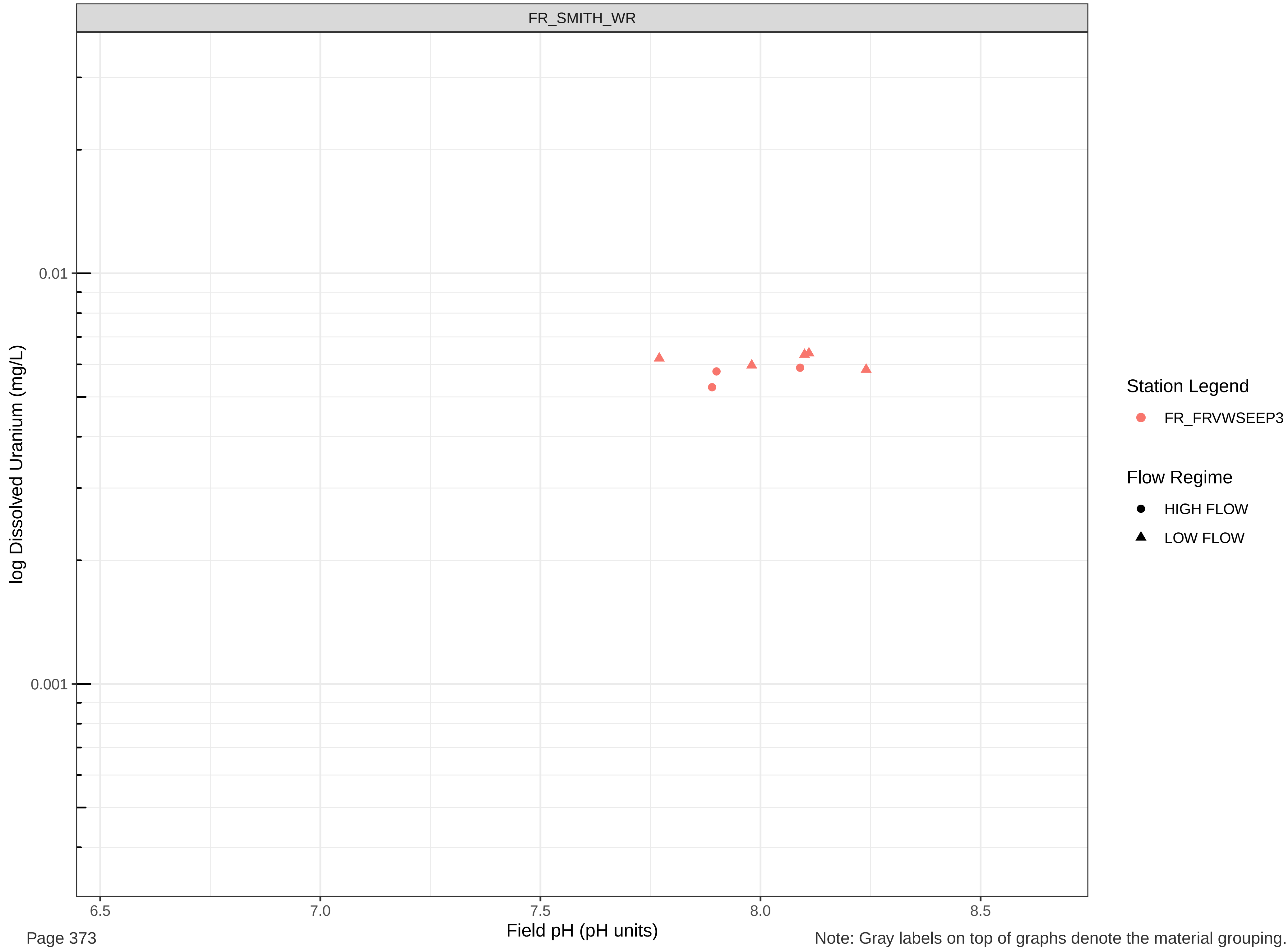

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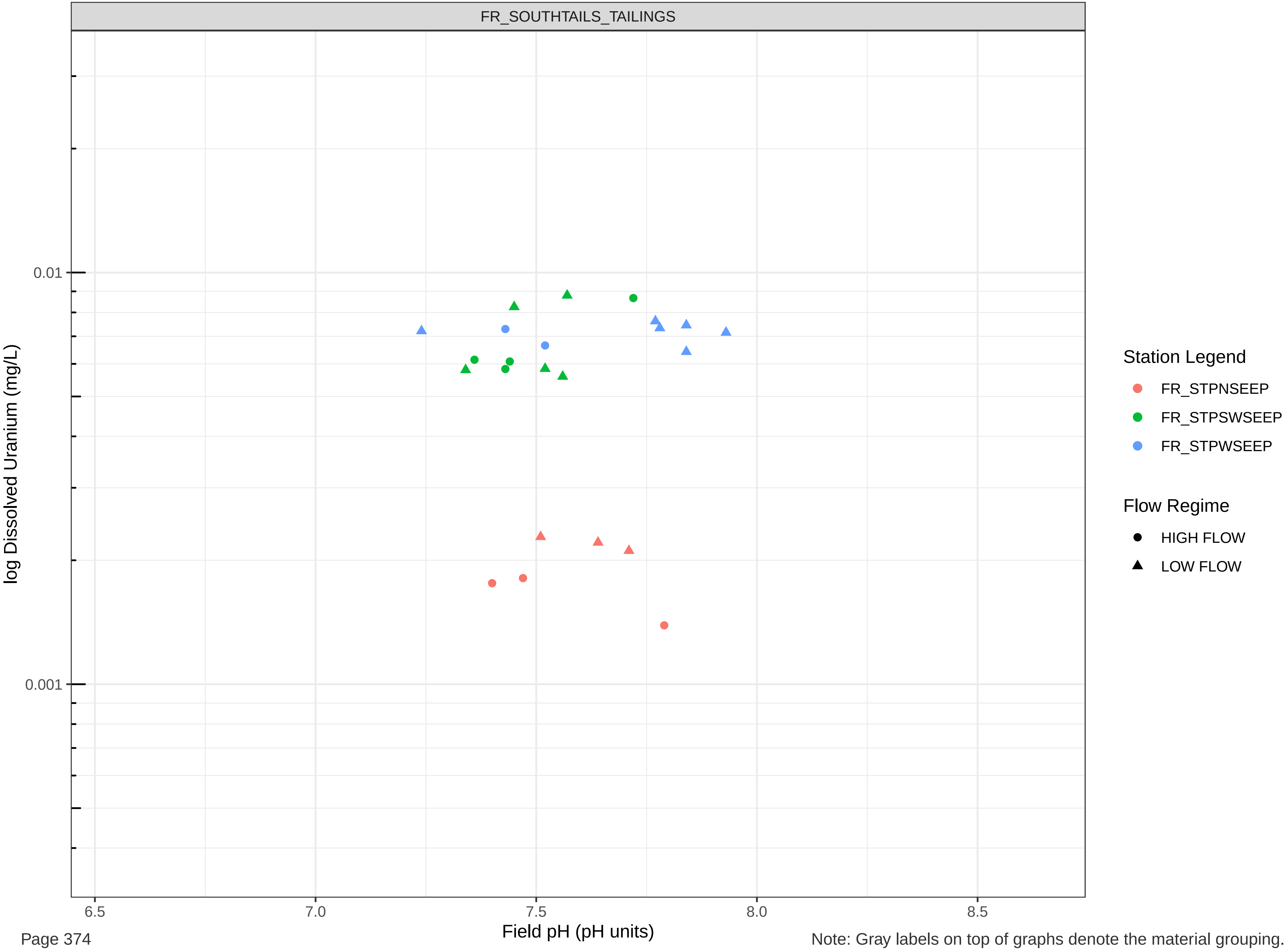

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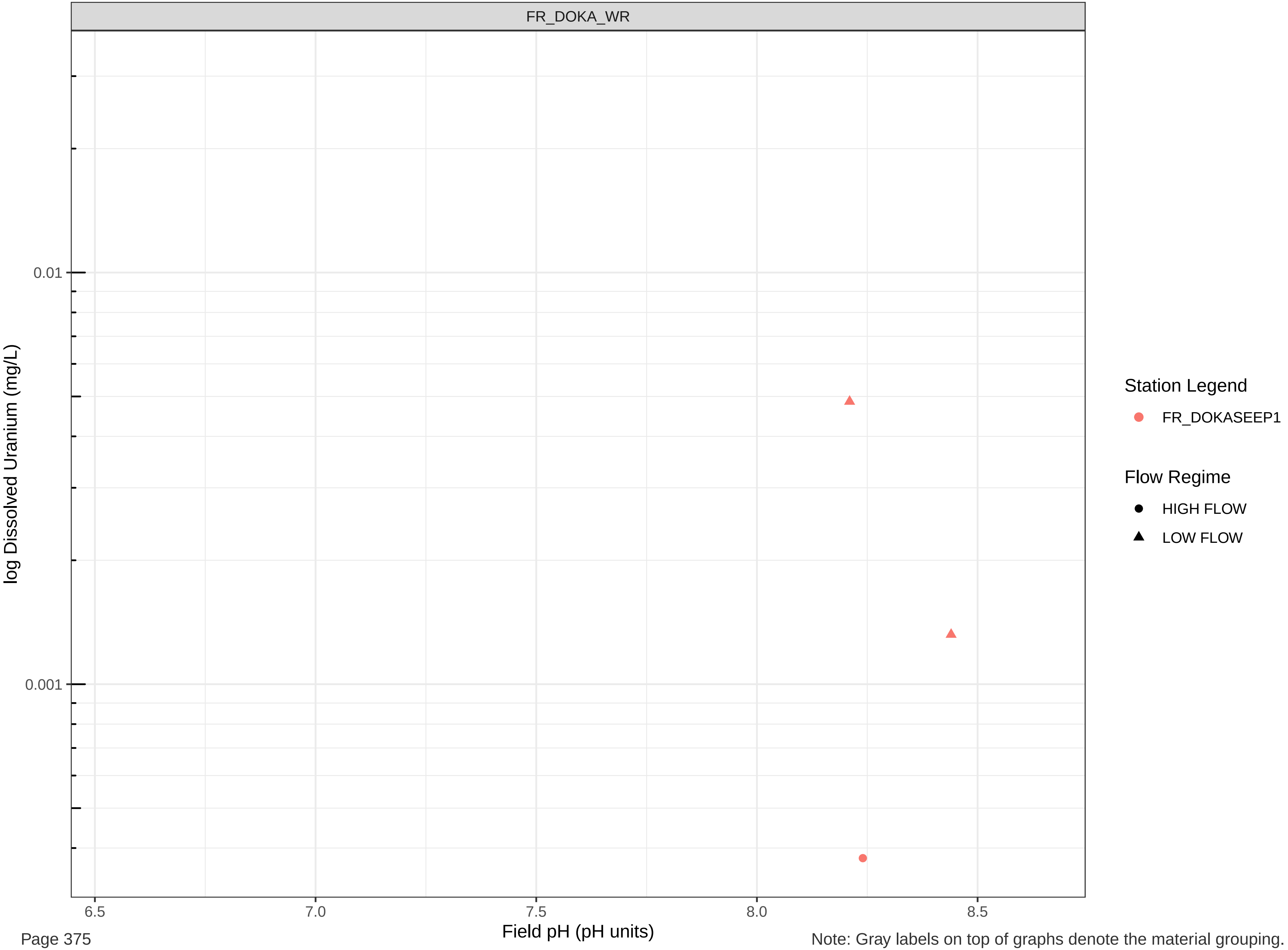

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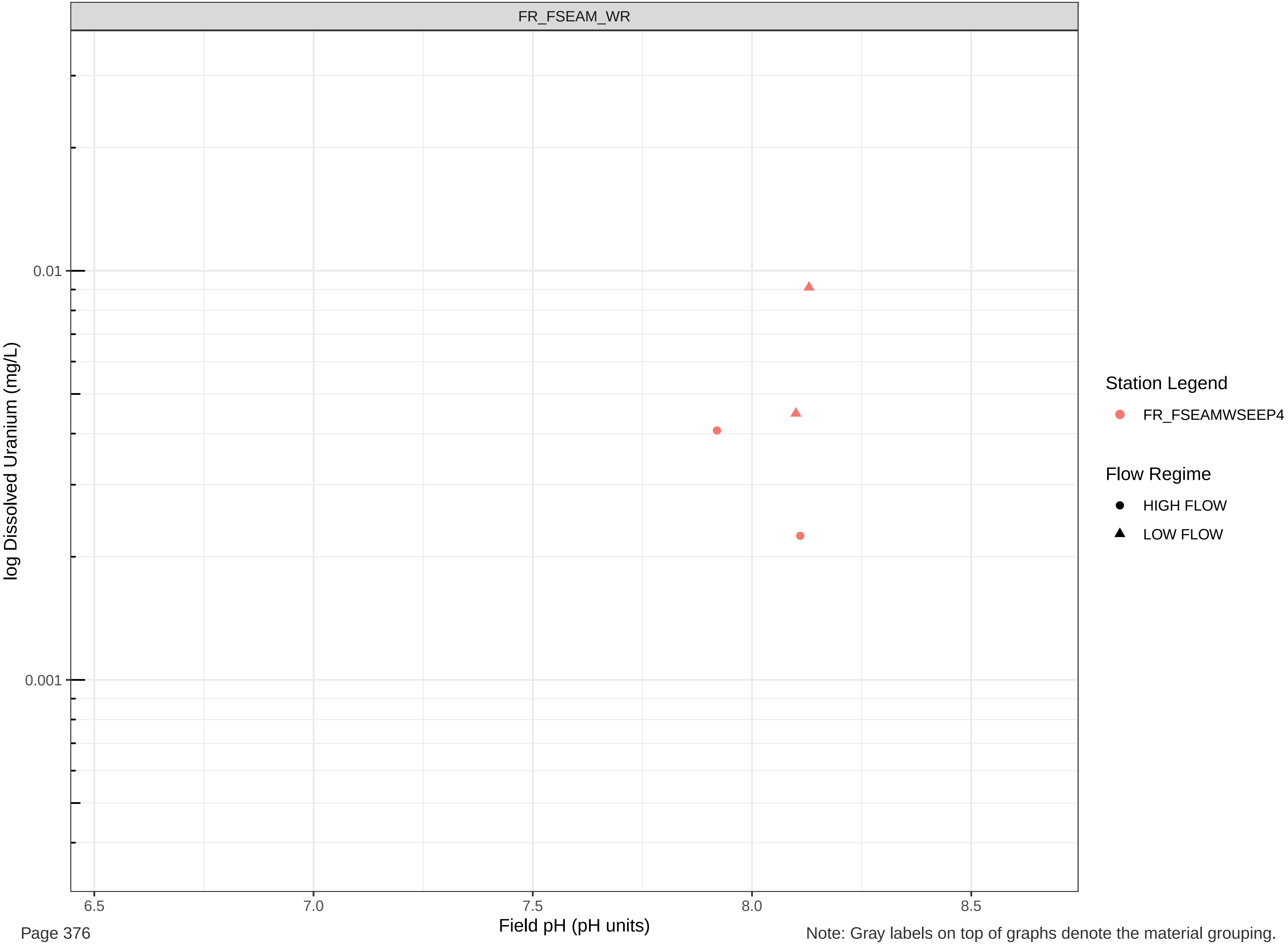

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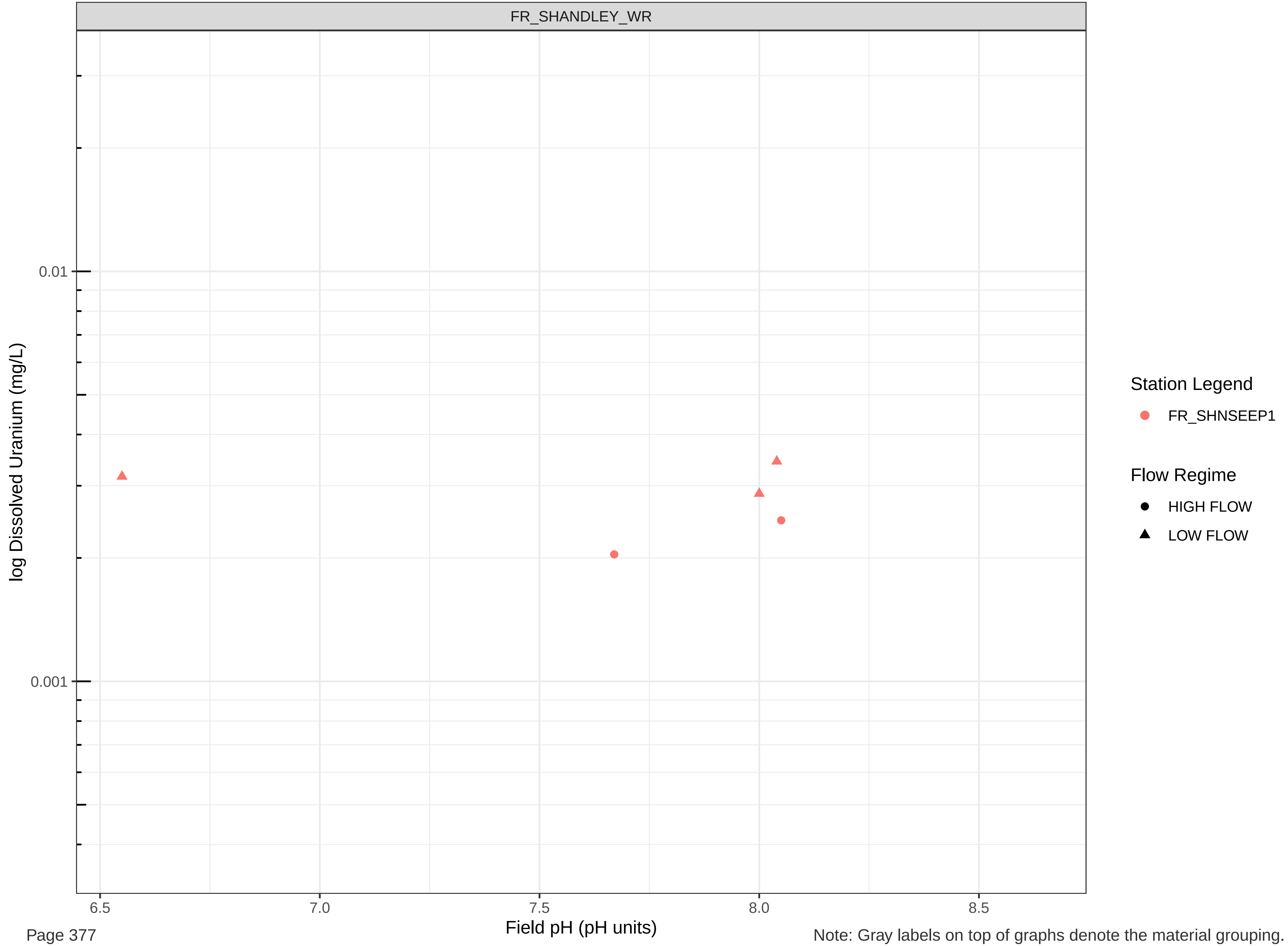

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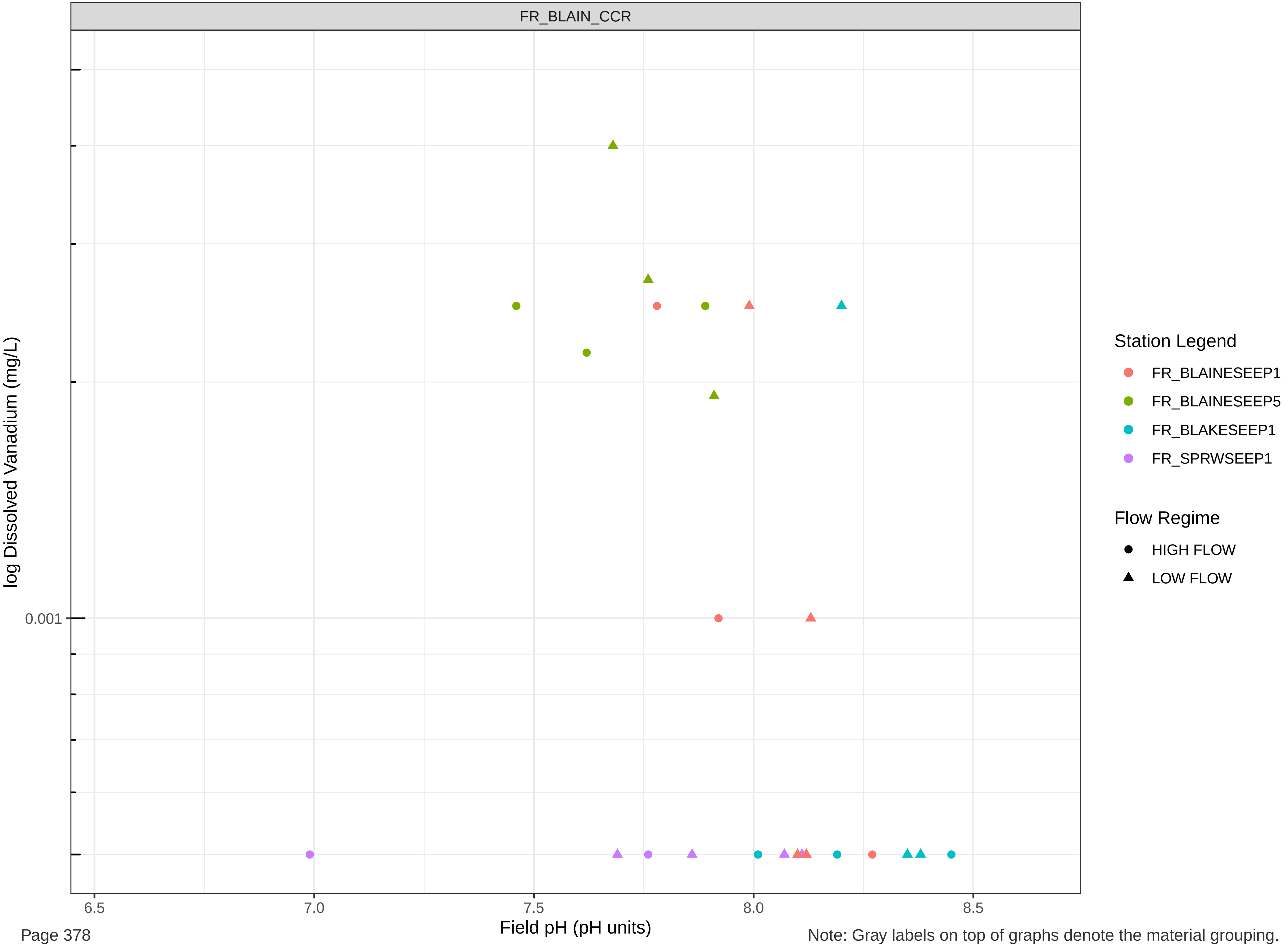

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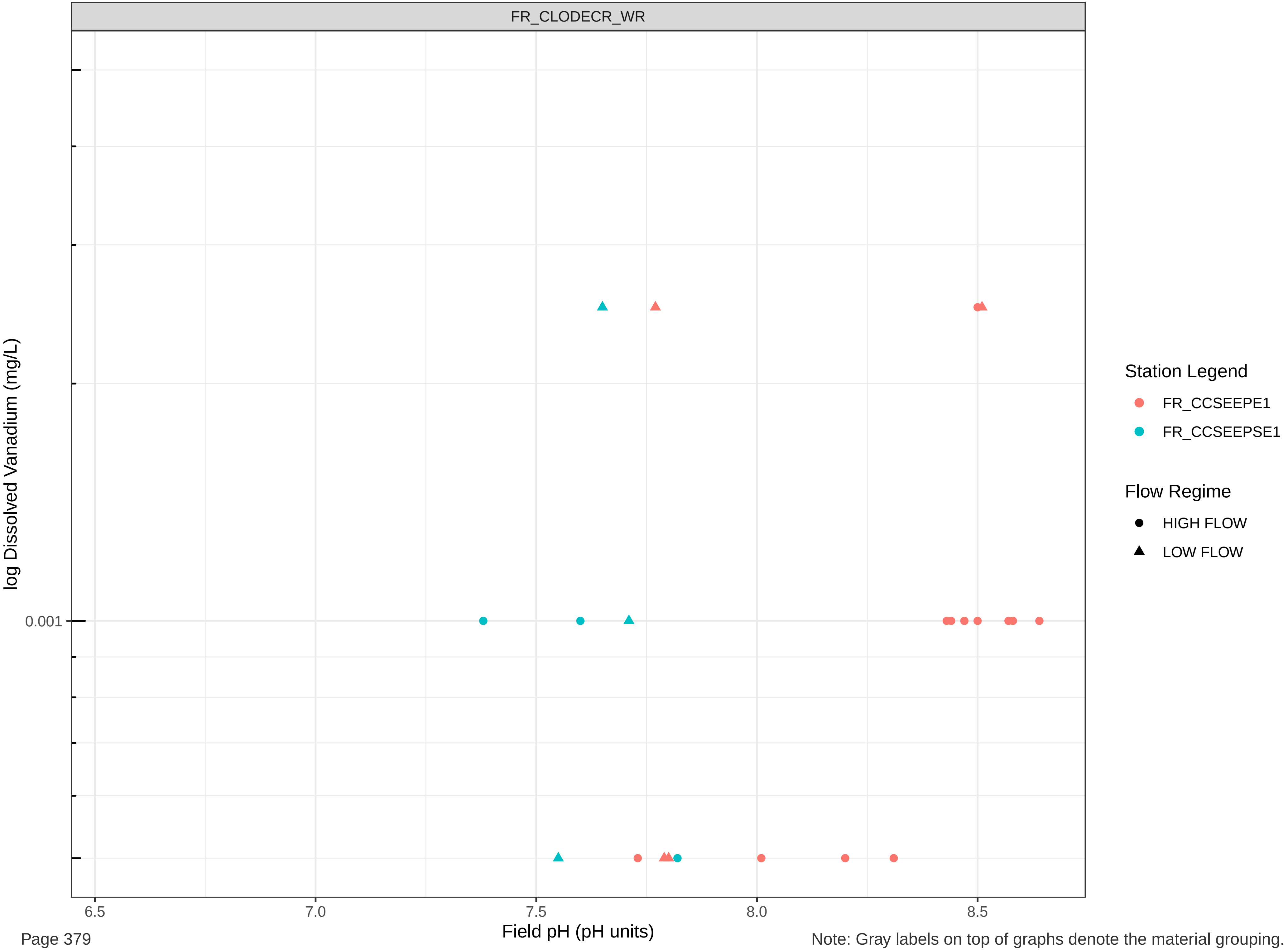

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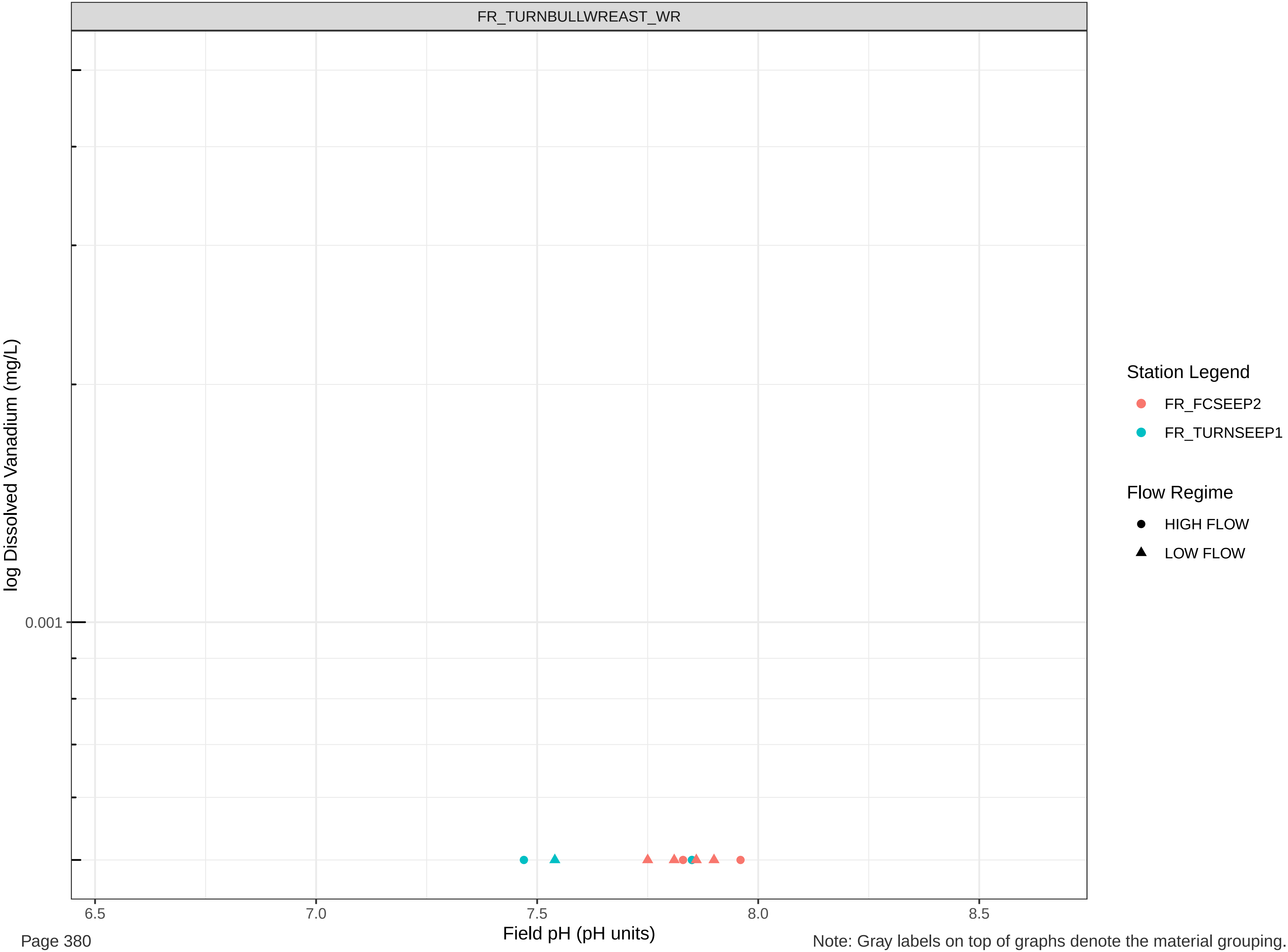

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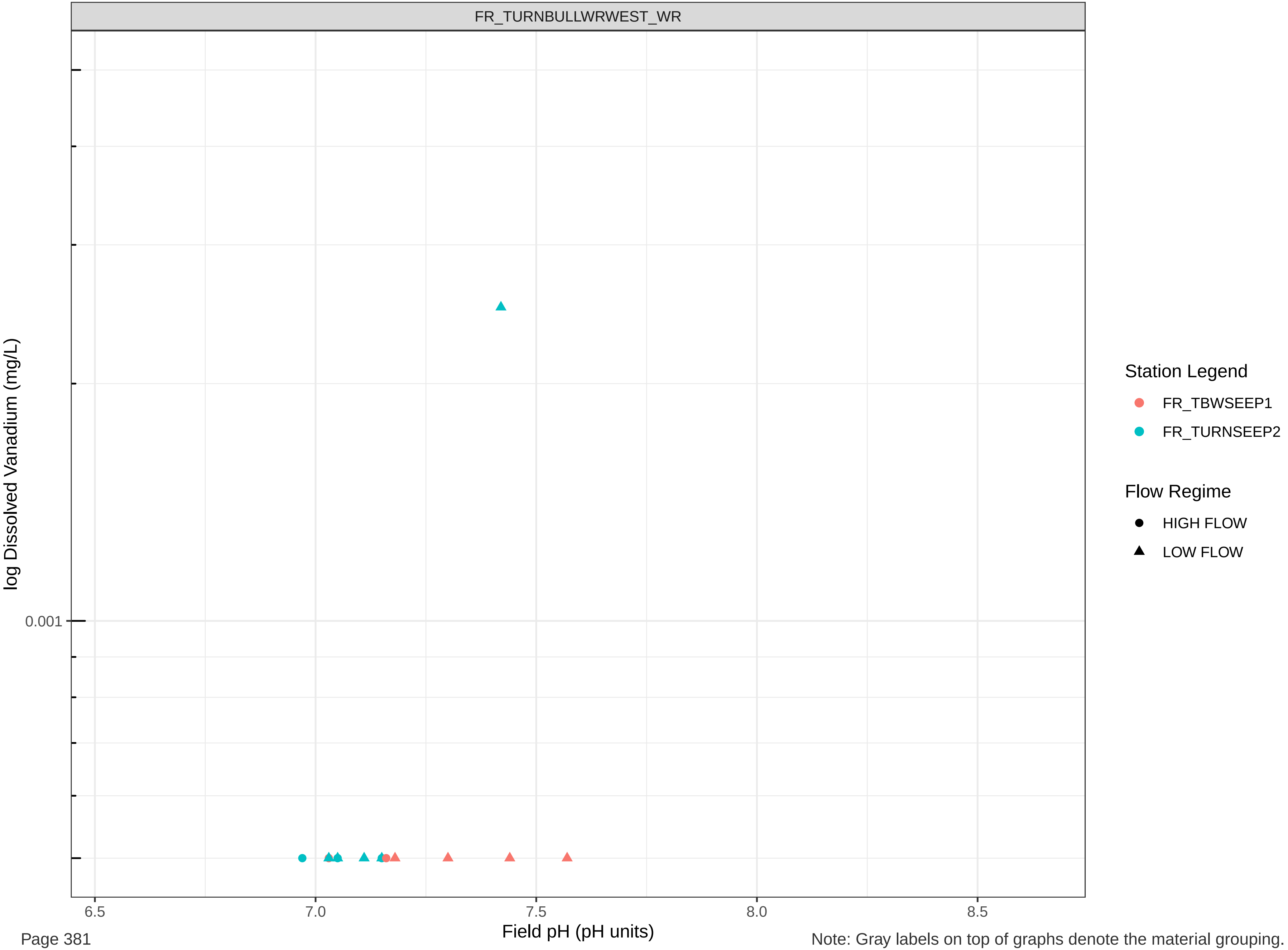

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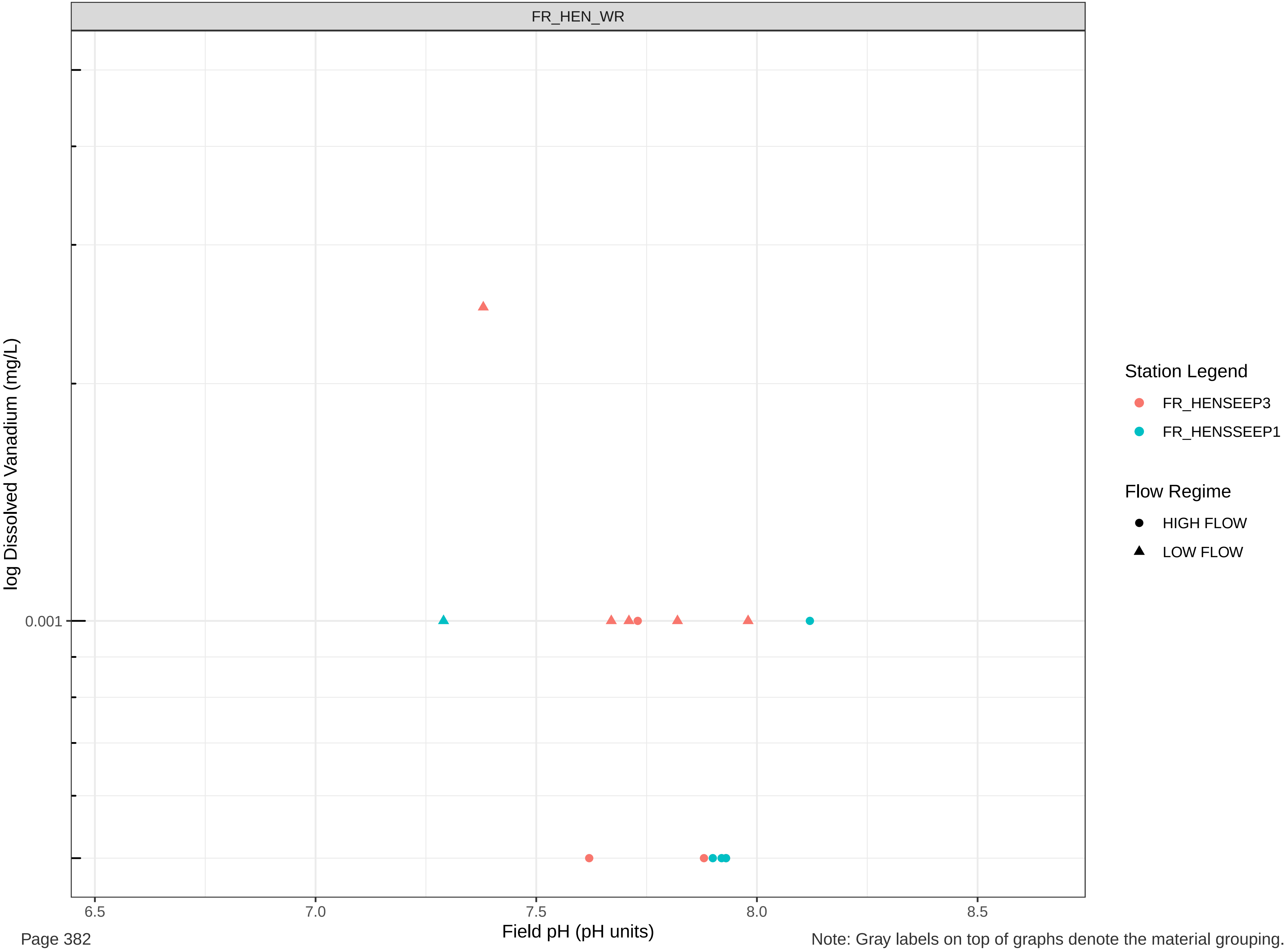

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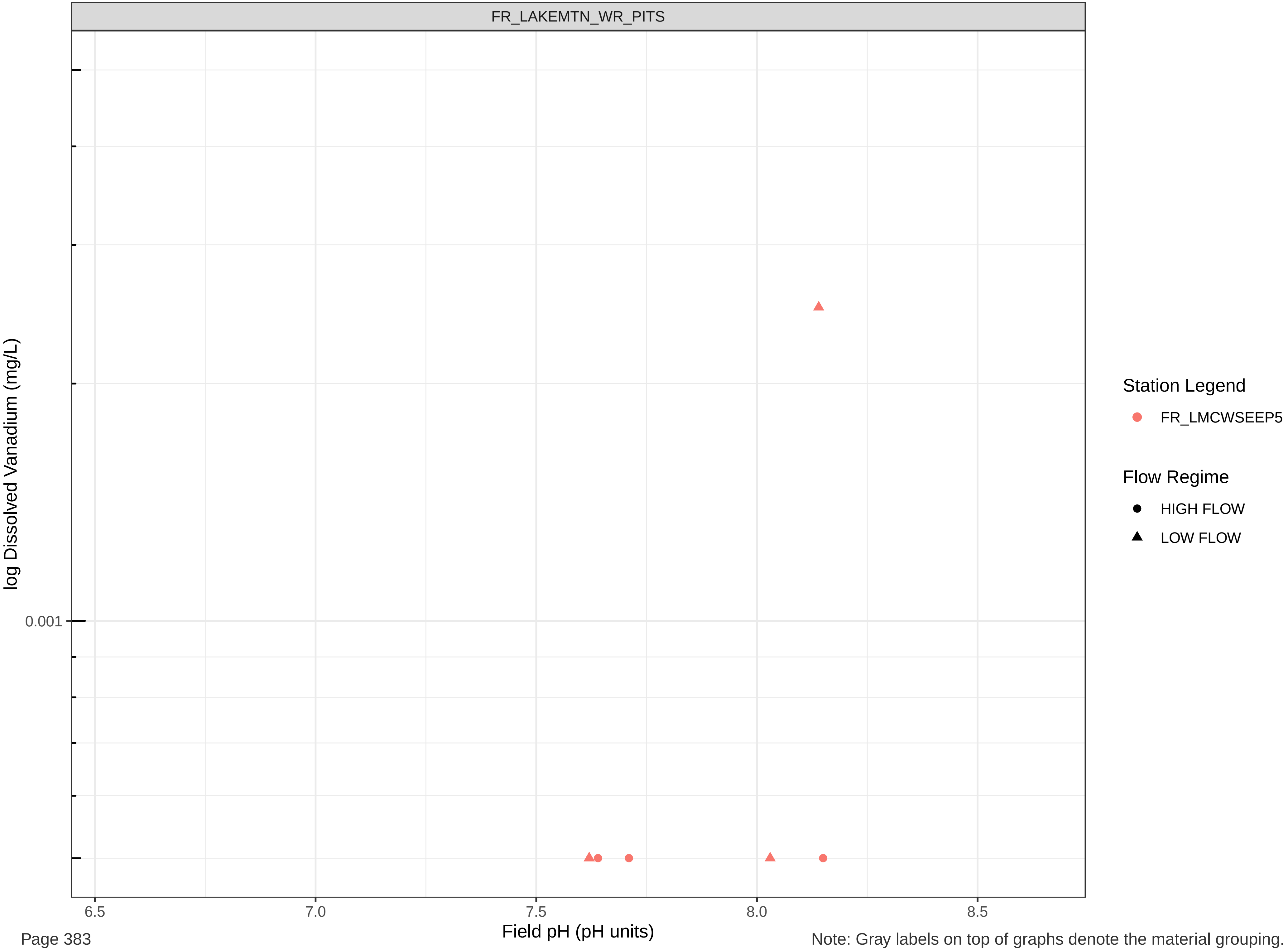

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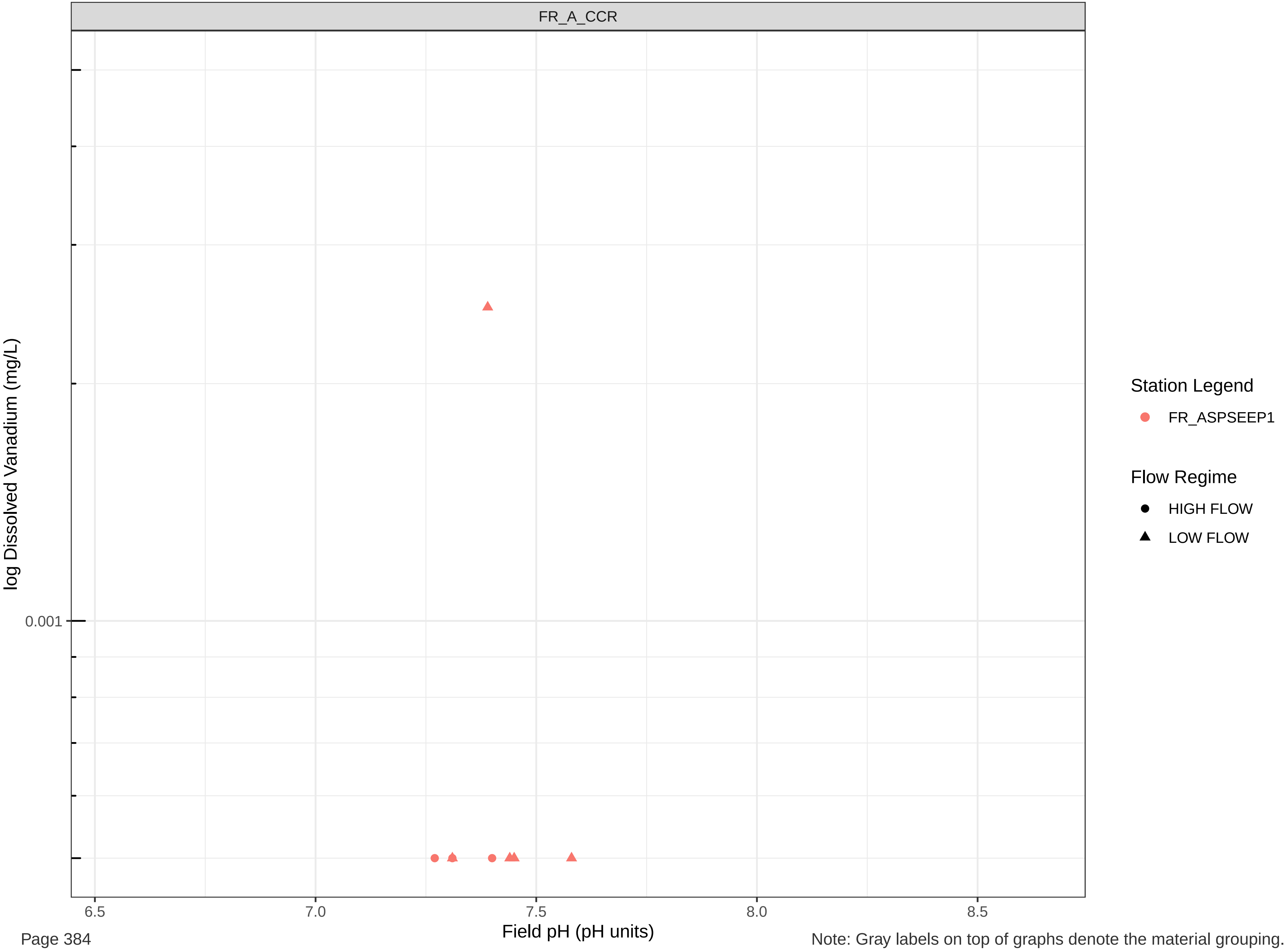

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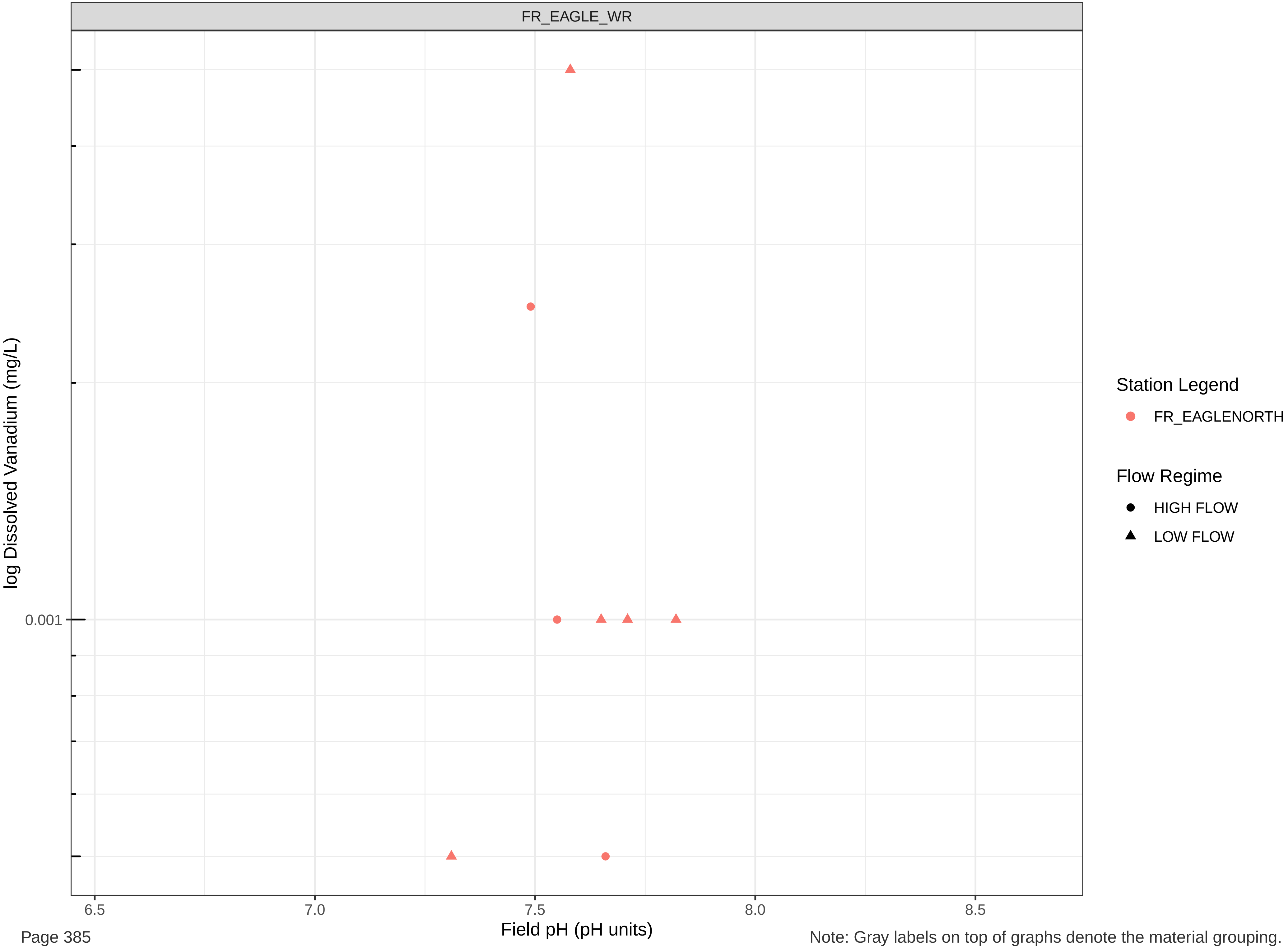

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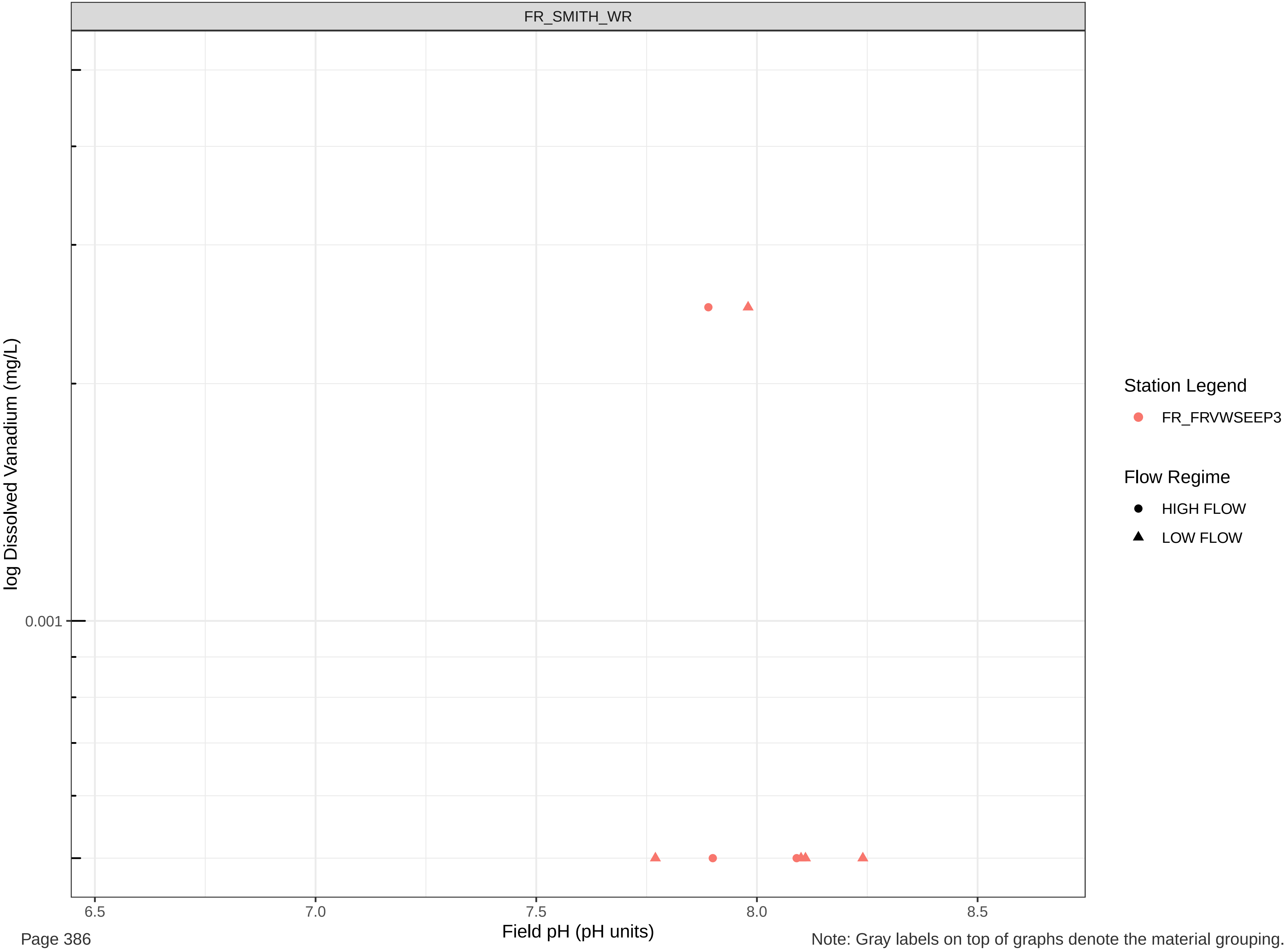
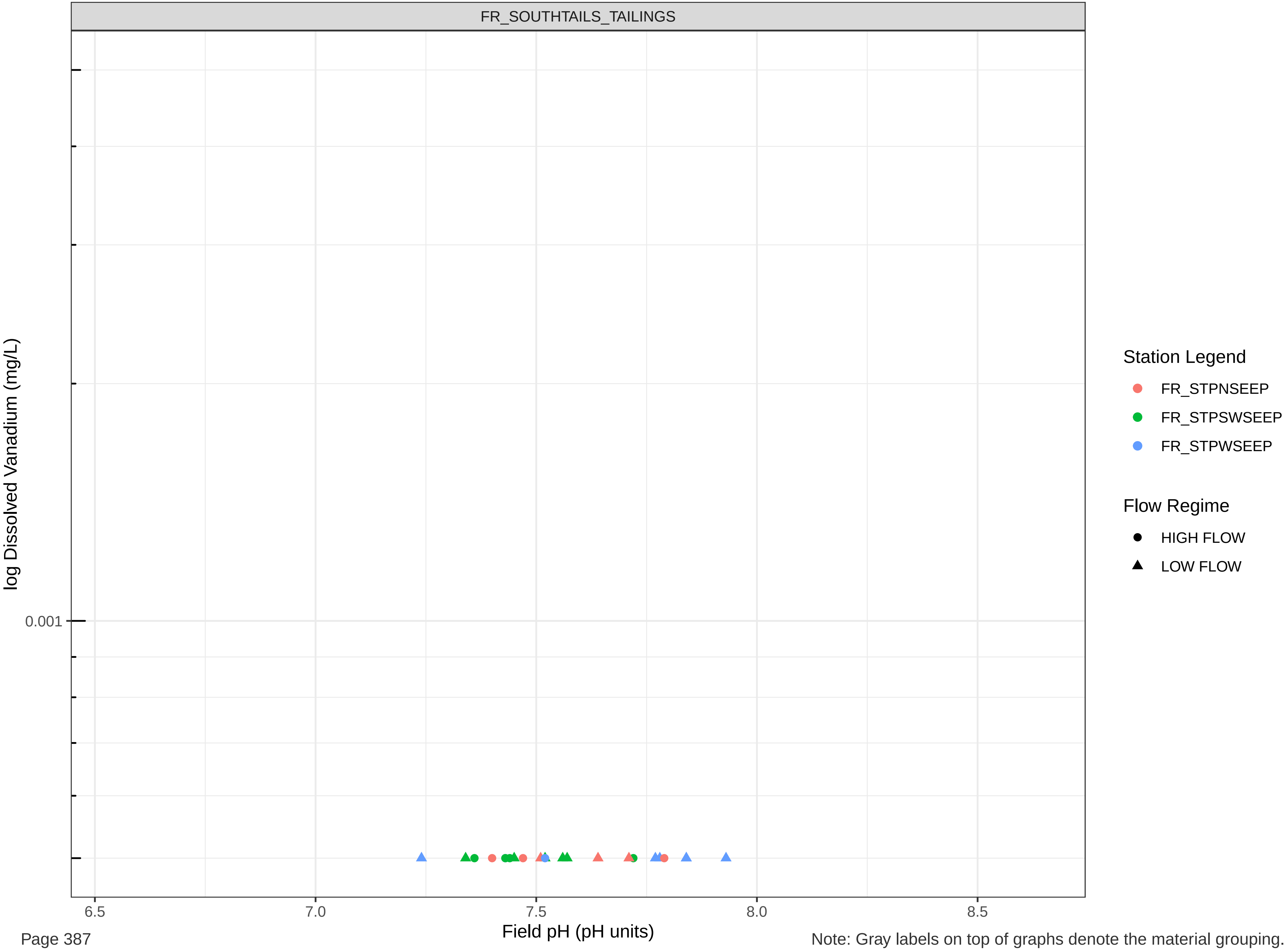

FR_SMITH_WR
log Dissolved Vanadium (mg/L)
0.001
6.5
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
FR_FRVWSEEP3
Flow Regime
HIGH FLOW
LOW FLOW



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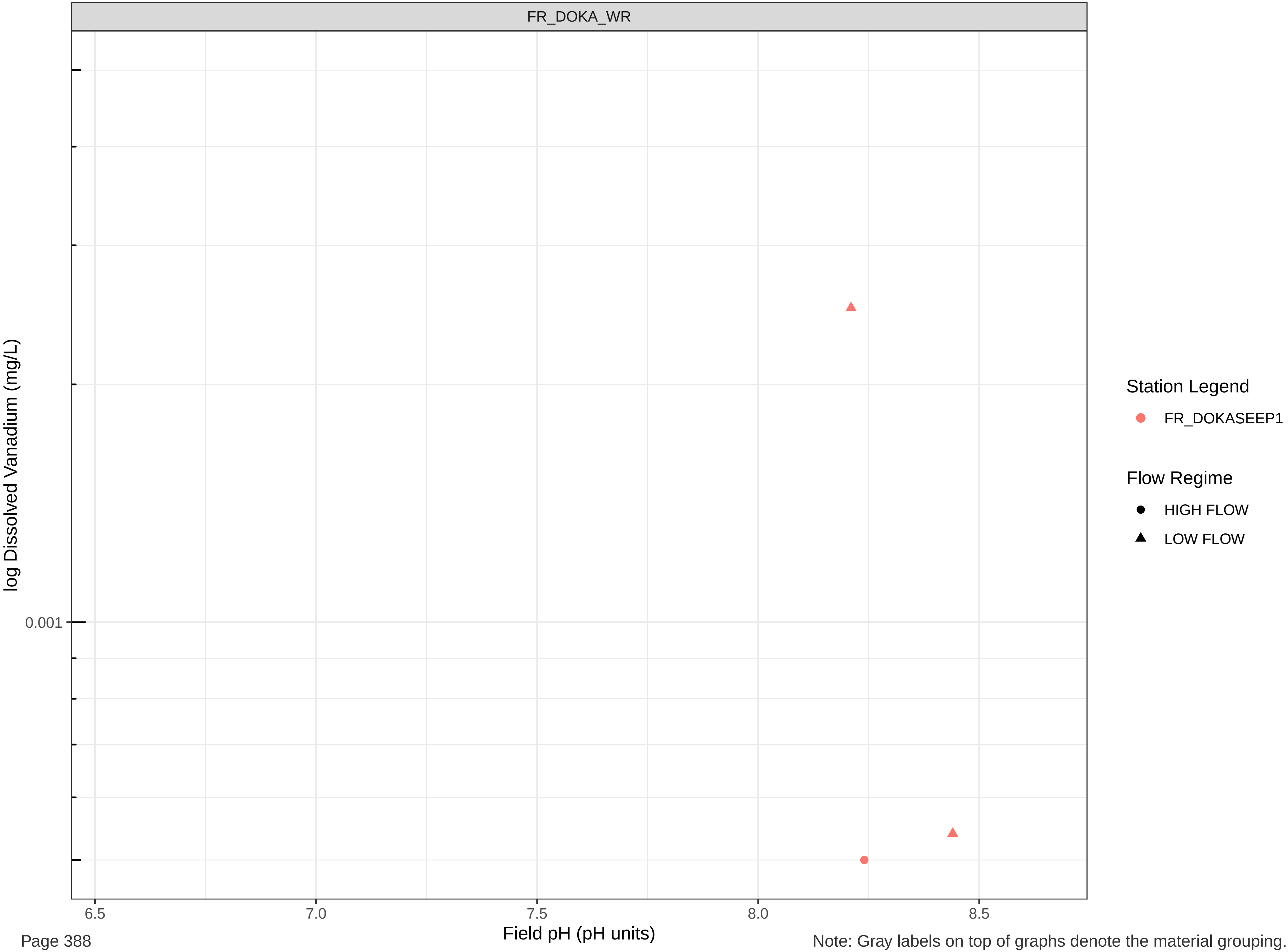

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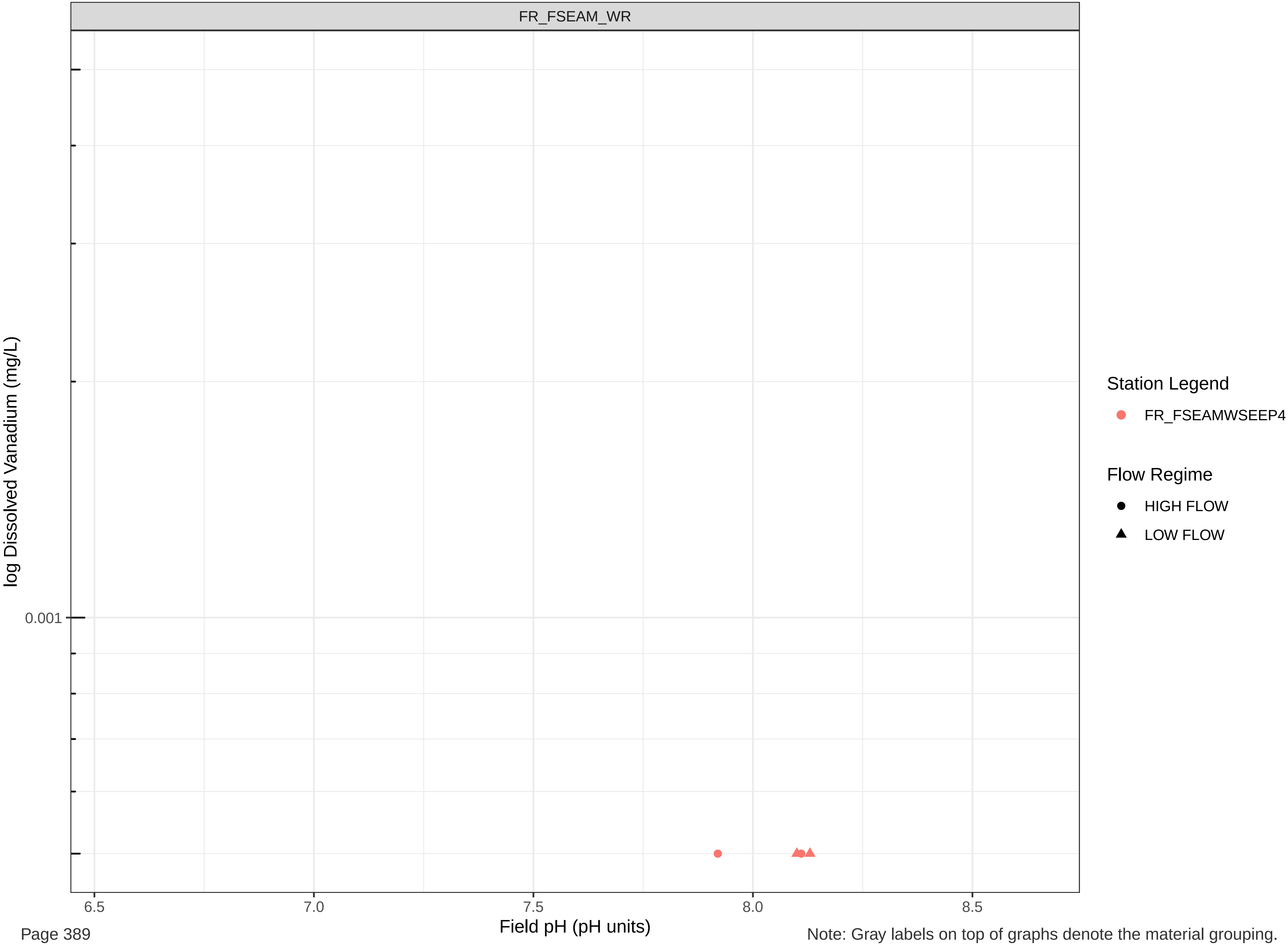

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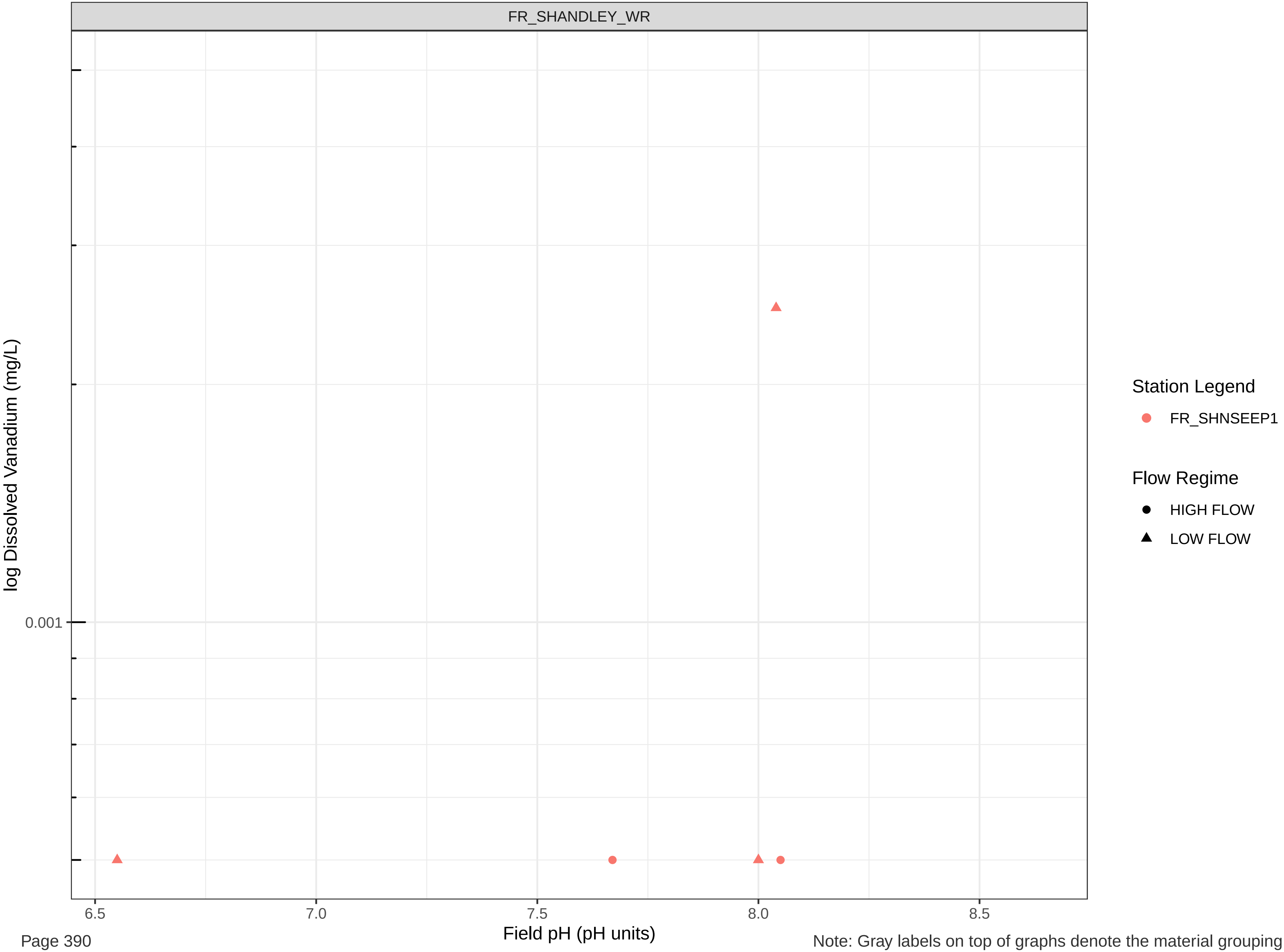

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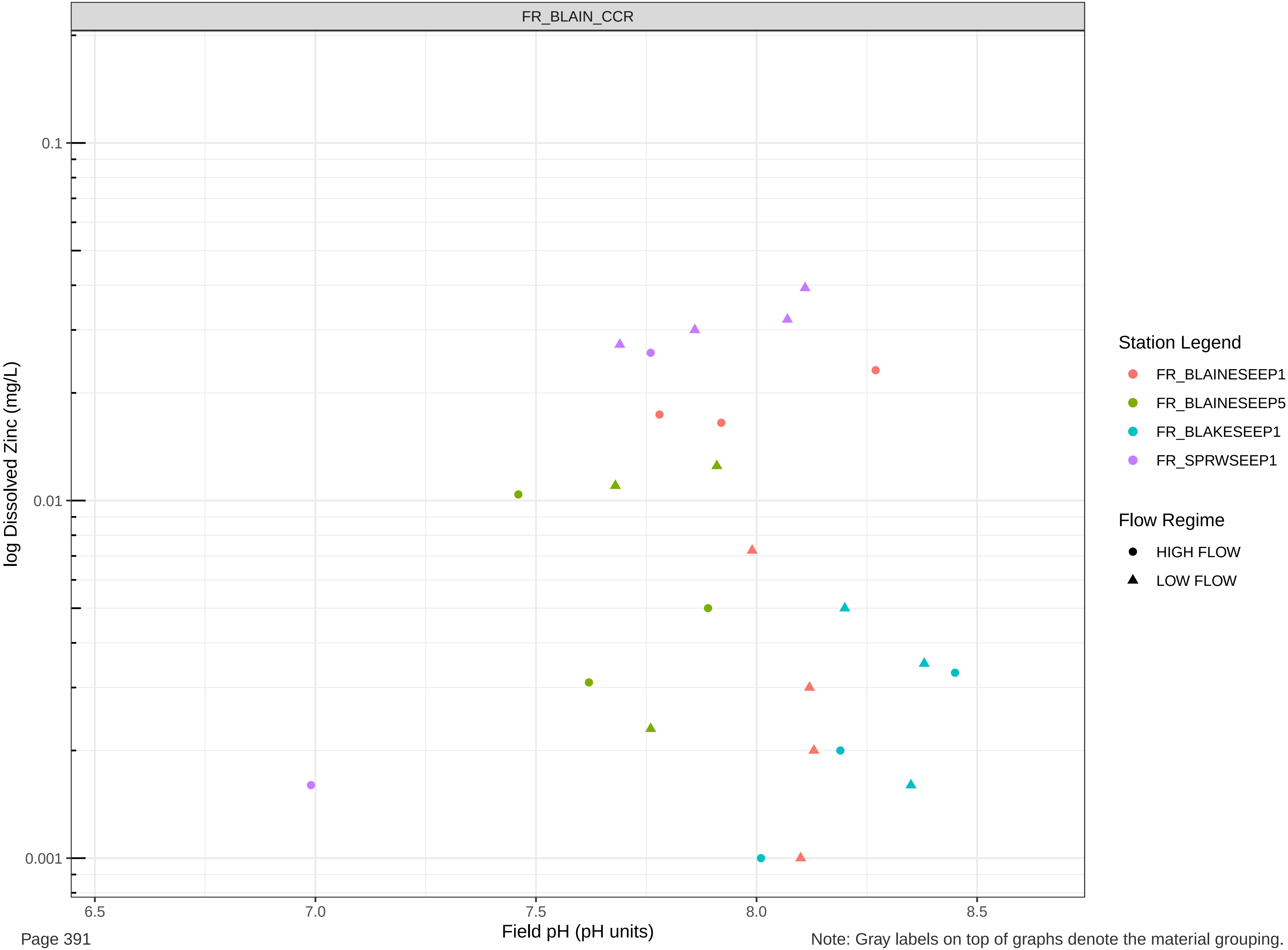

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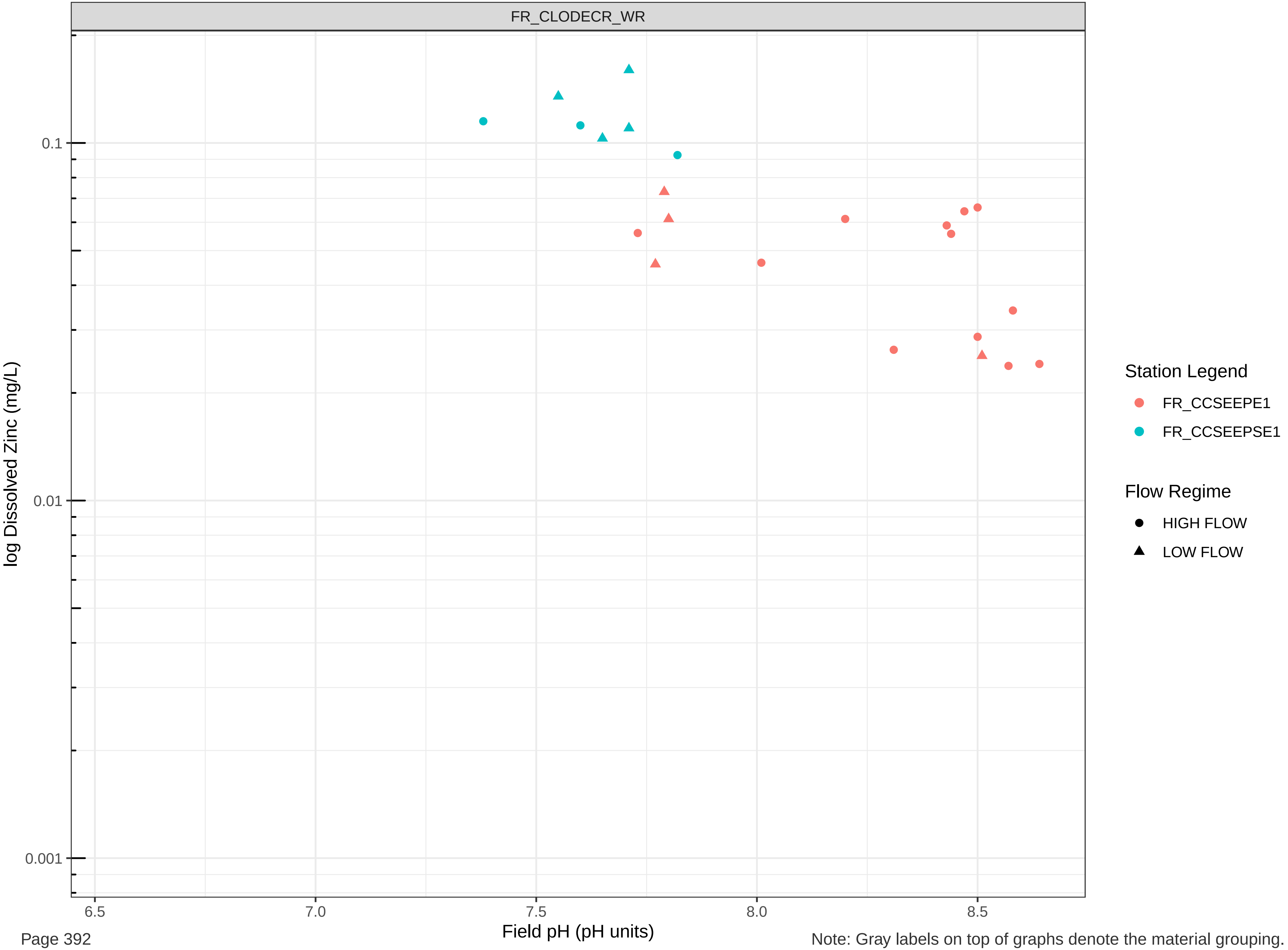

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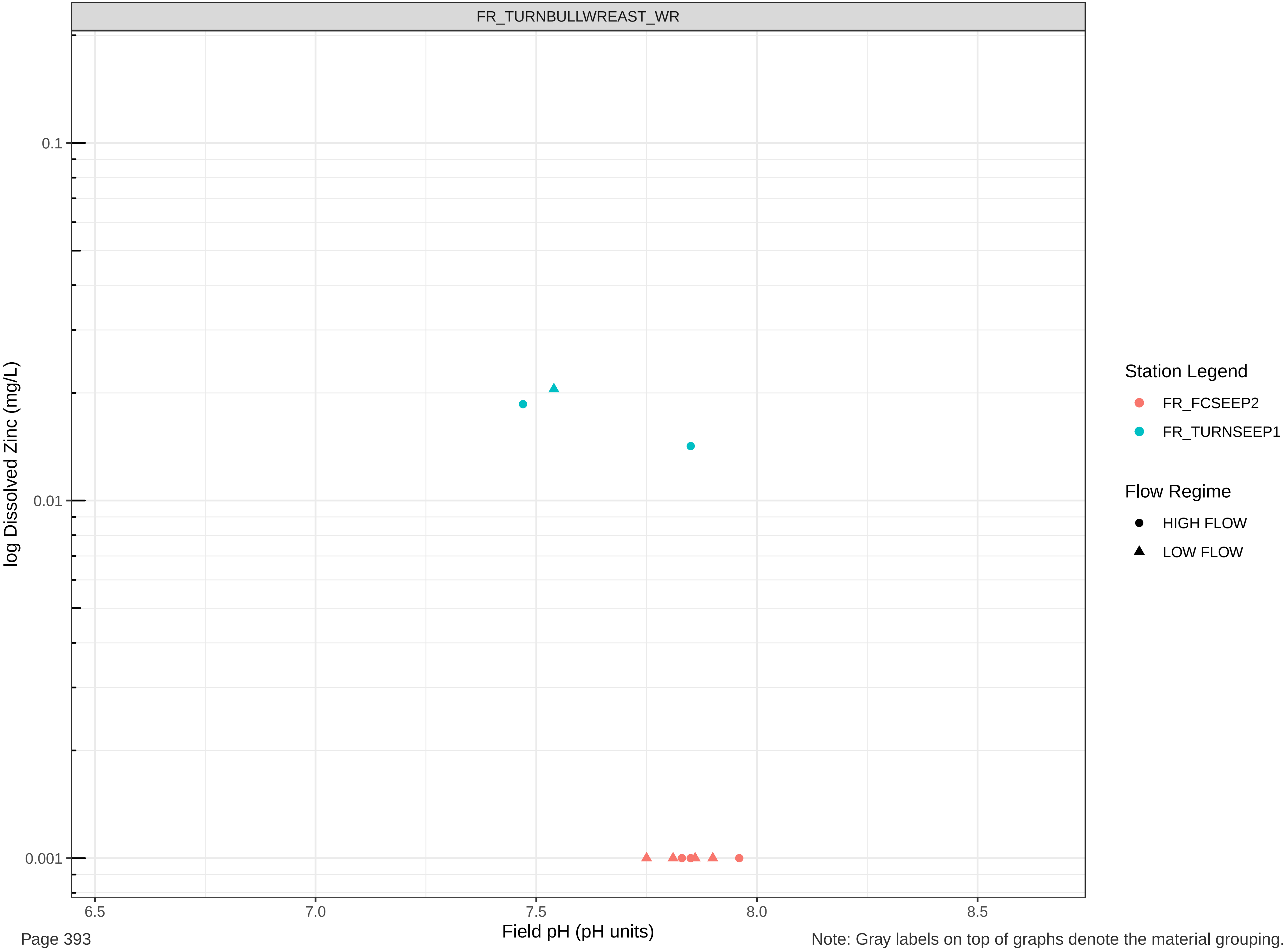
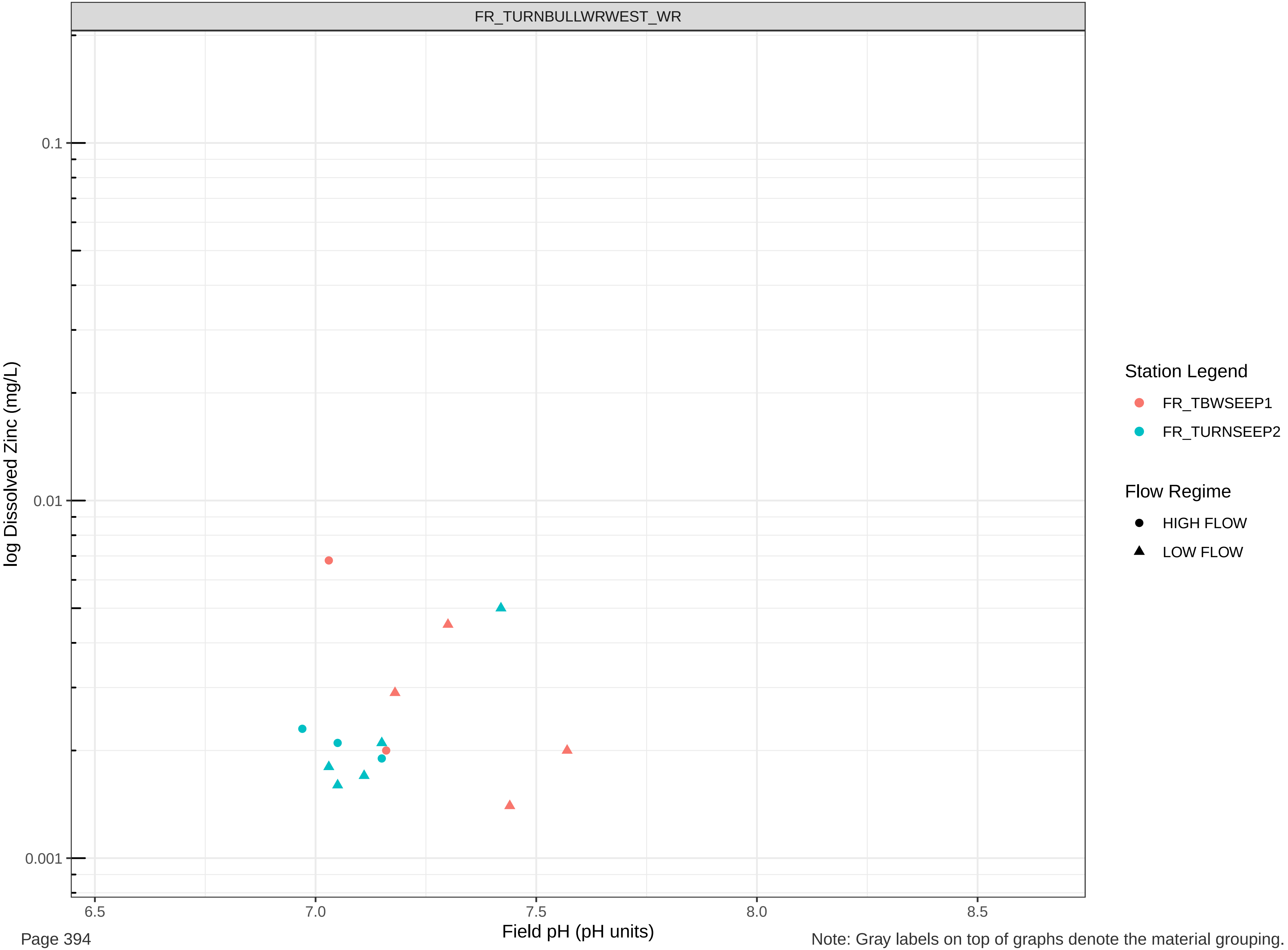

FR_TURNBULLWREAST_WR
log Dissolved Zinc (mg/L)
0.1
0.01
0.001
Field pH (pH units)
6.5
7.0
7.5
8.0
8.5
Station Legend
FR_FCSEEP2
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



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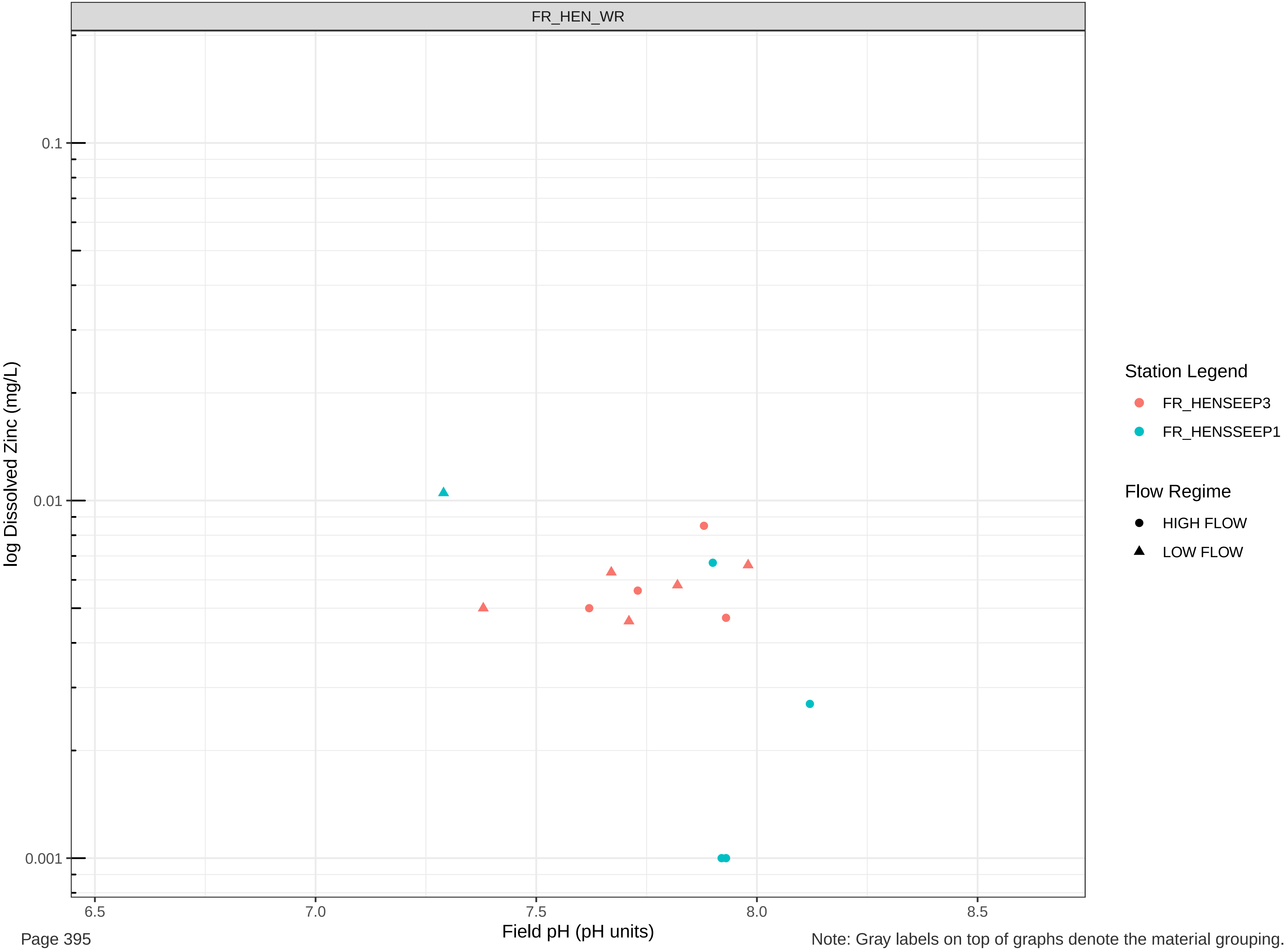

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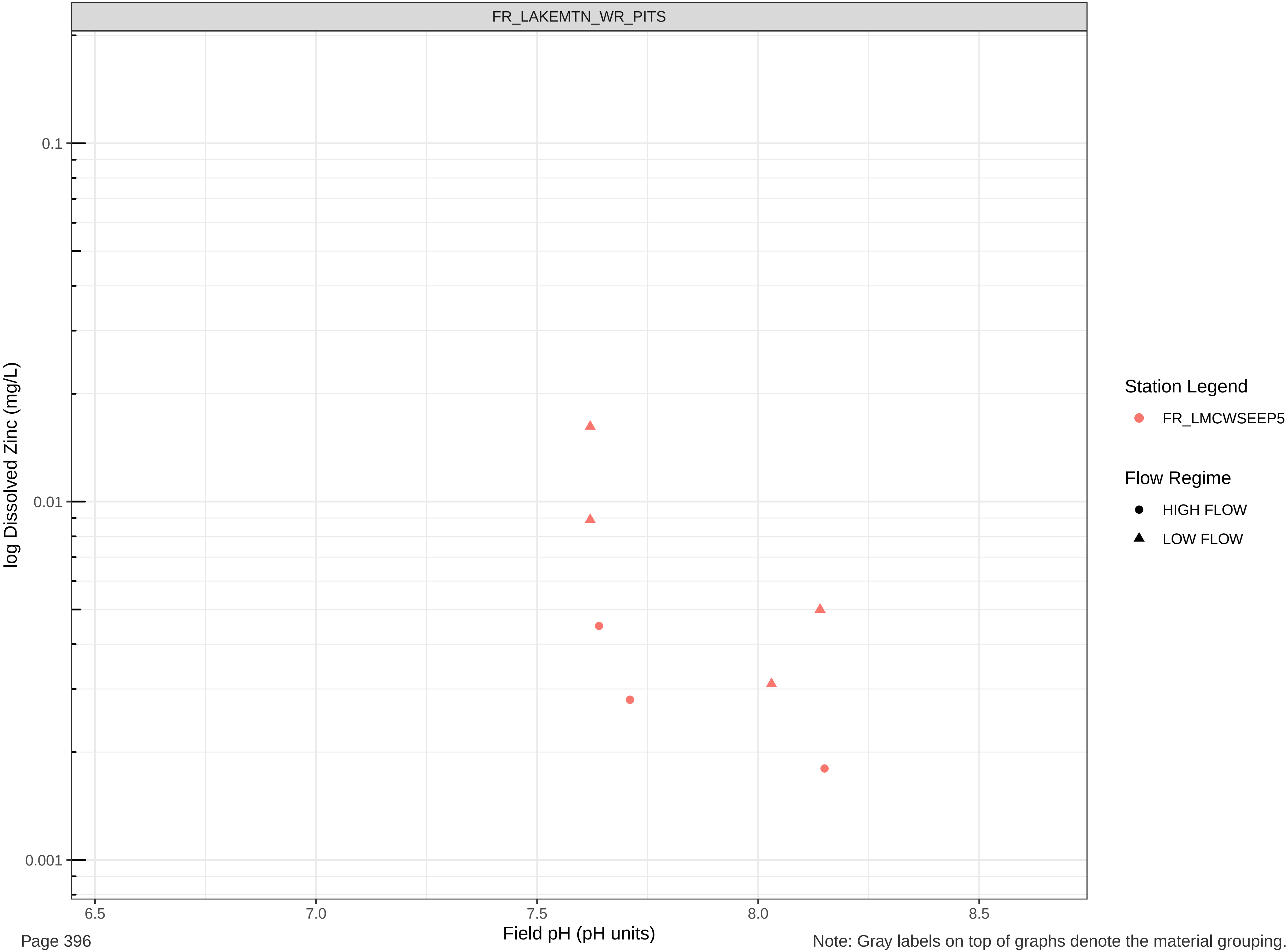

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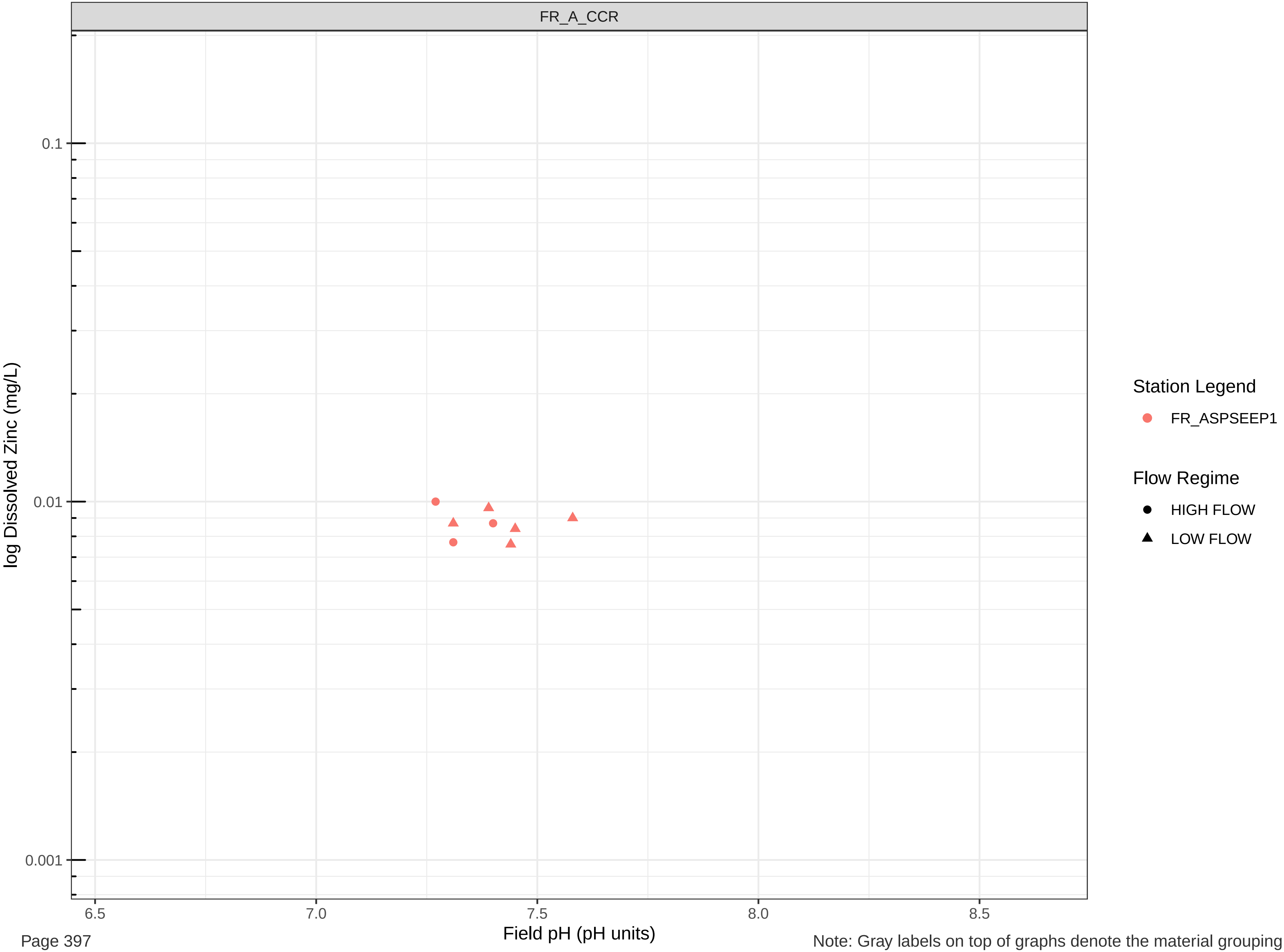

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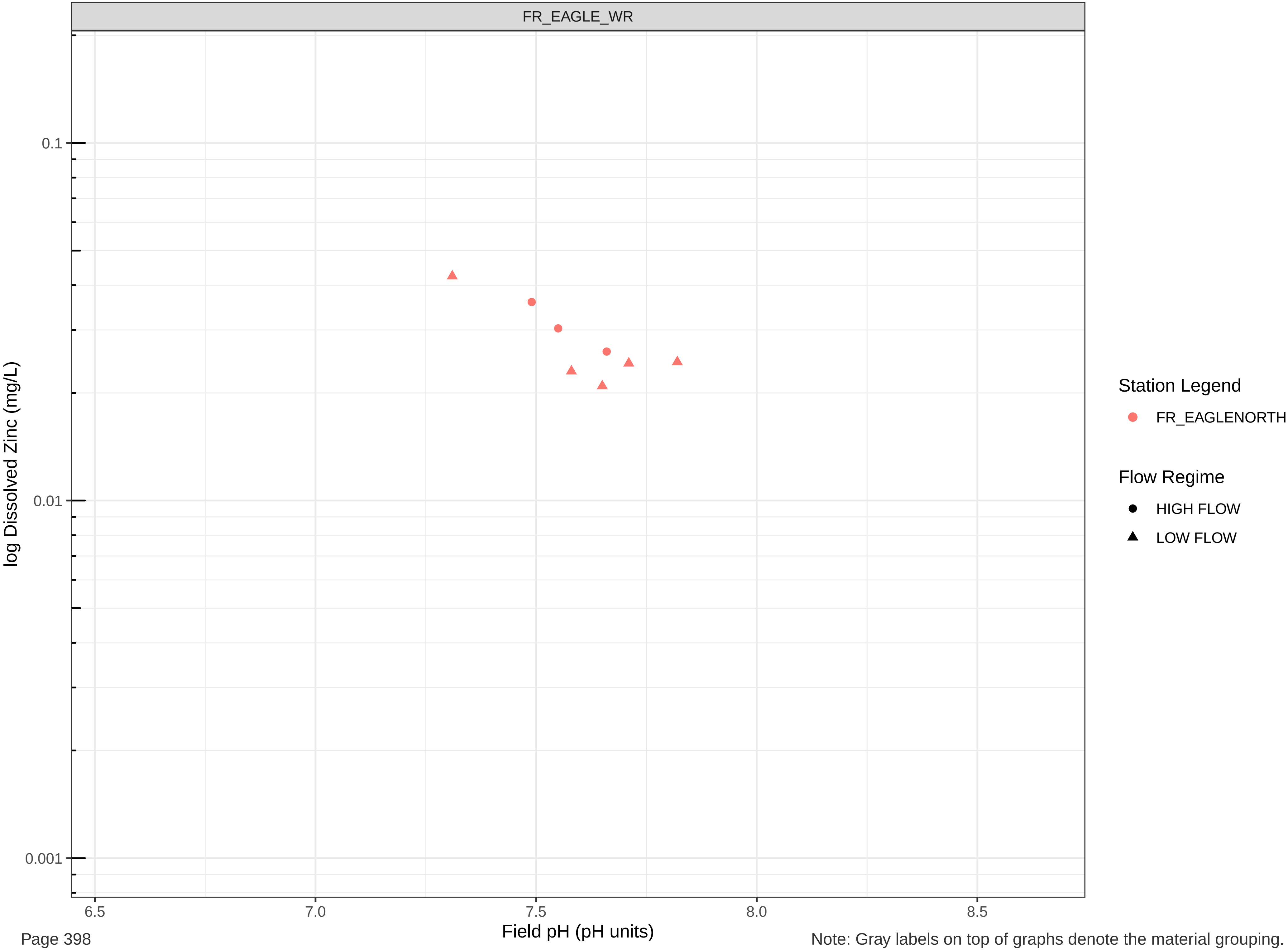

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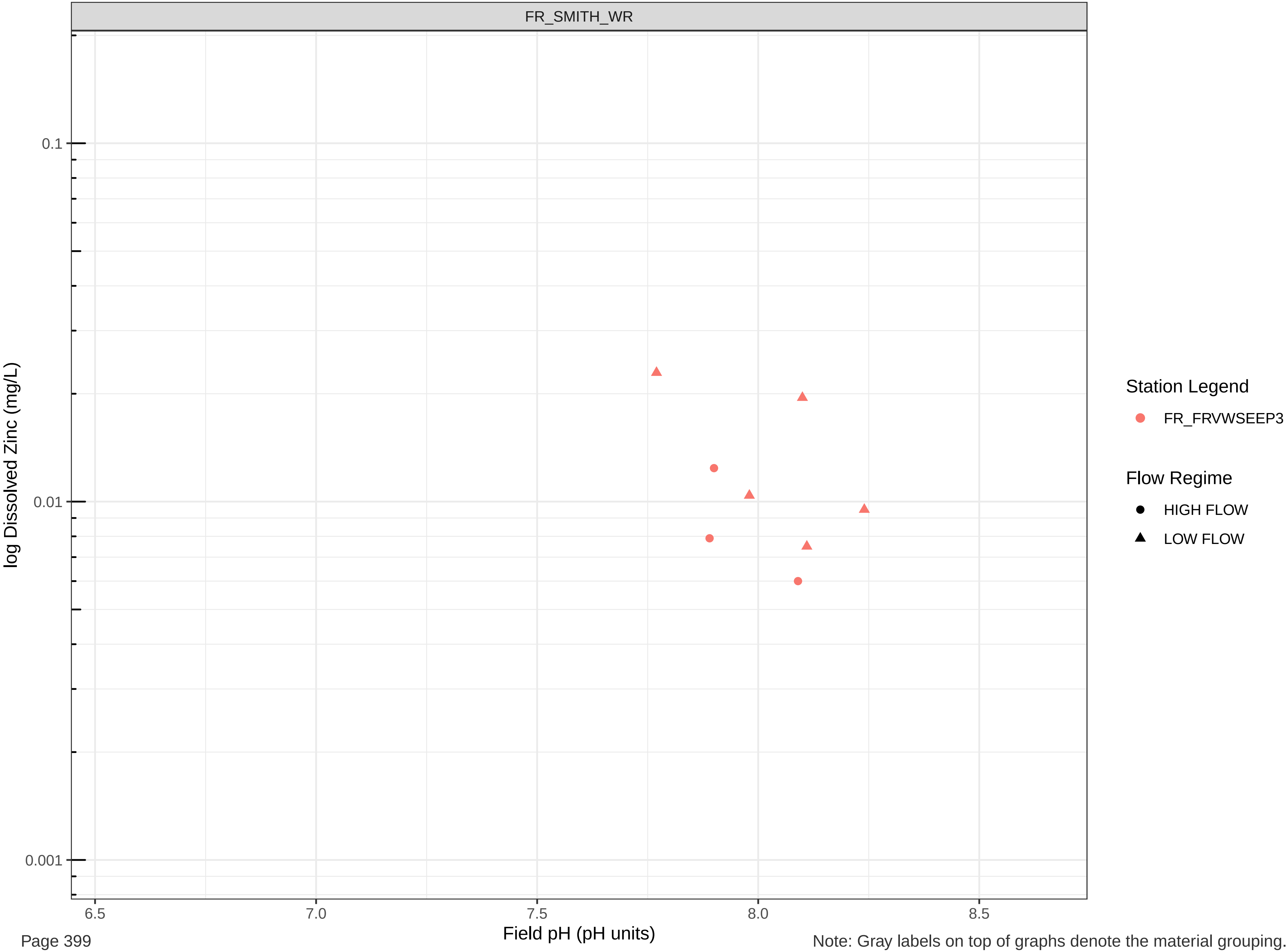

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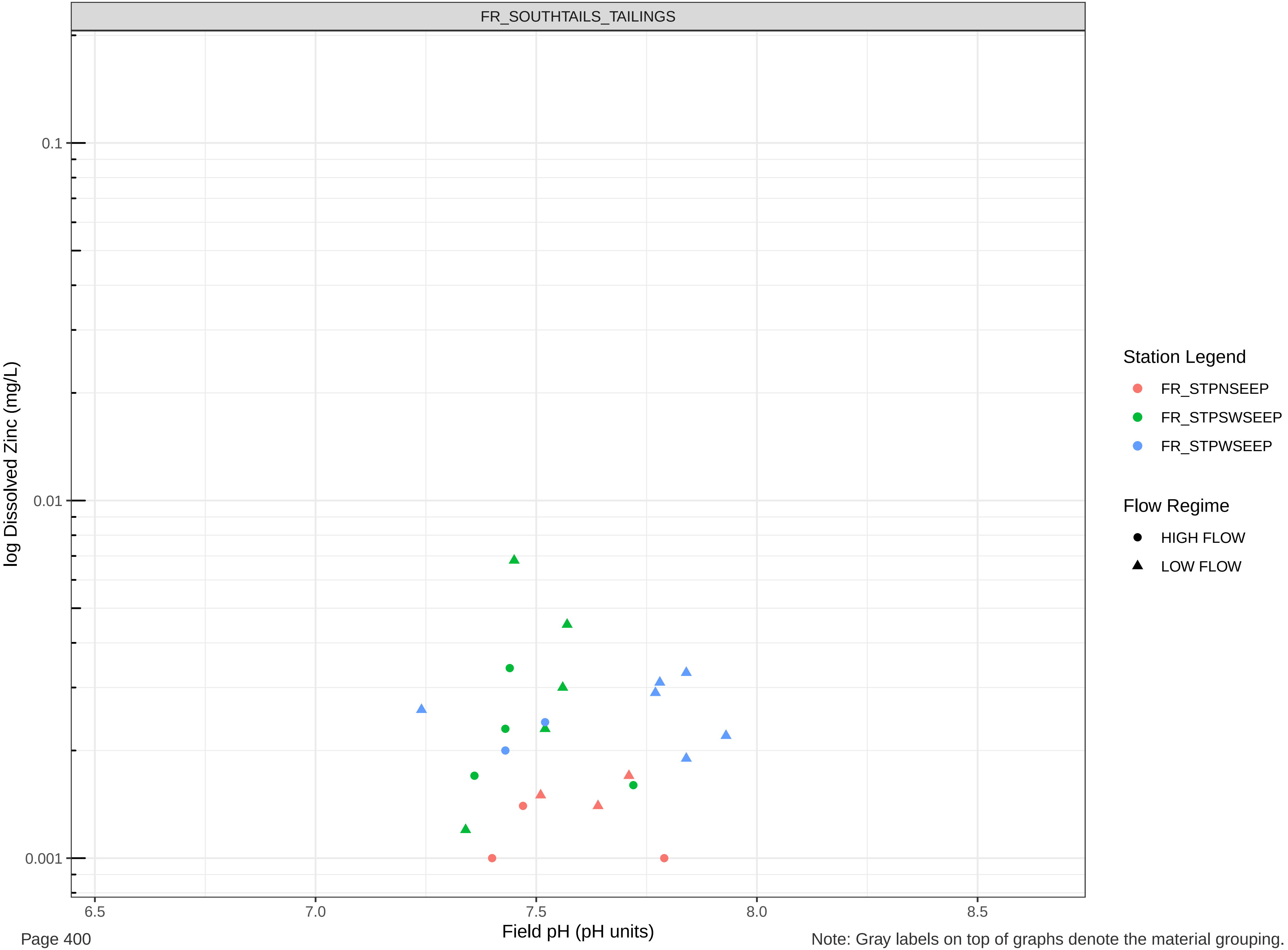

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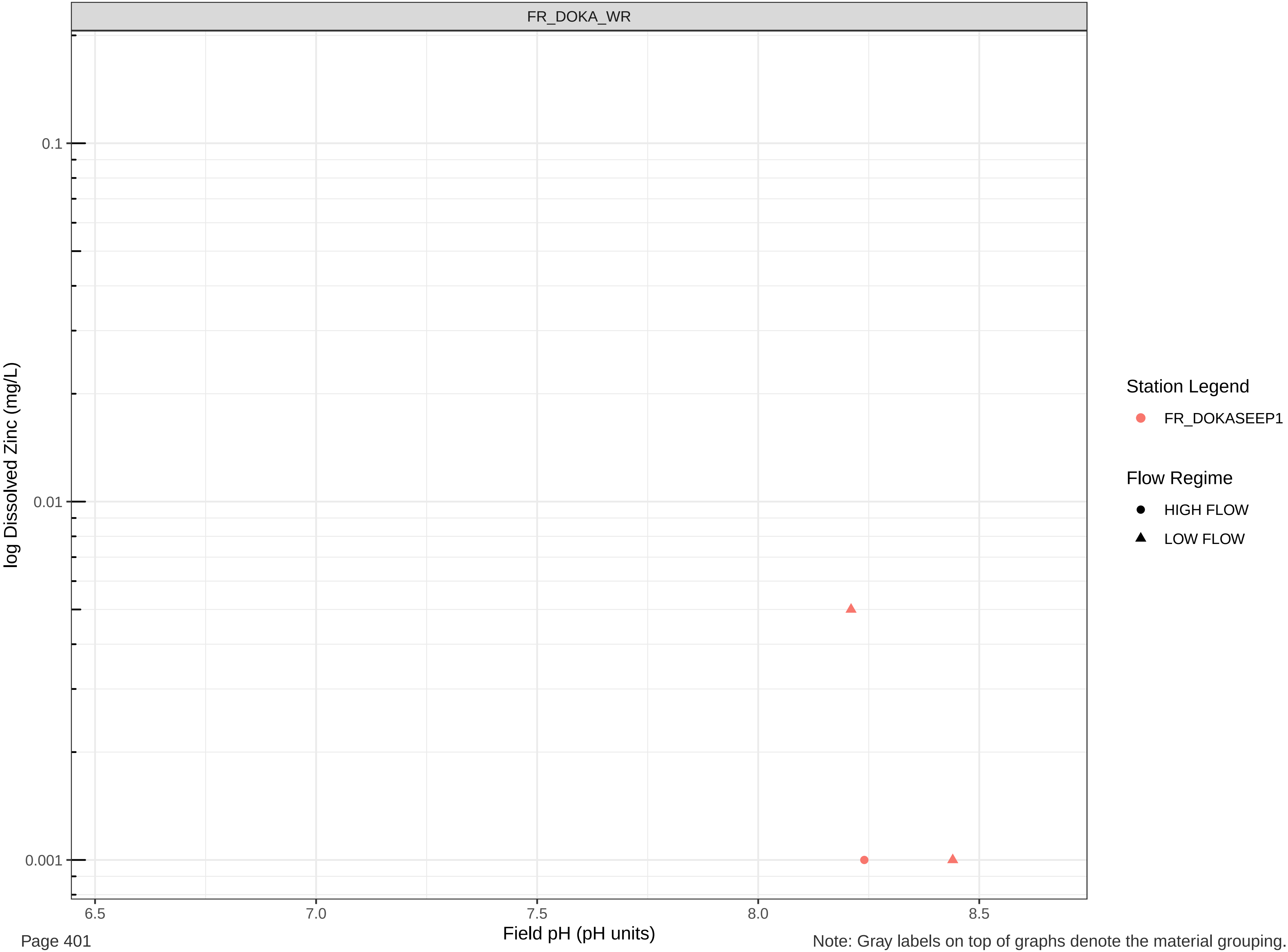

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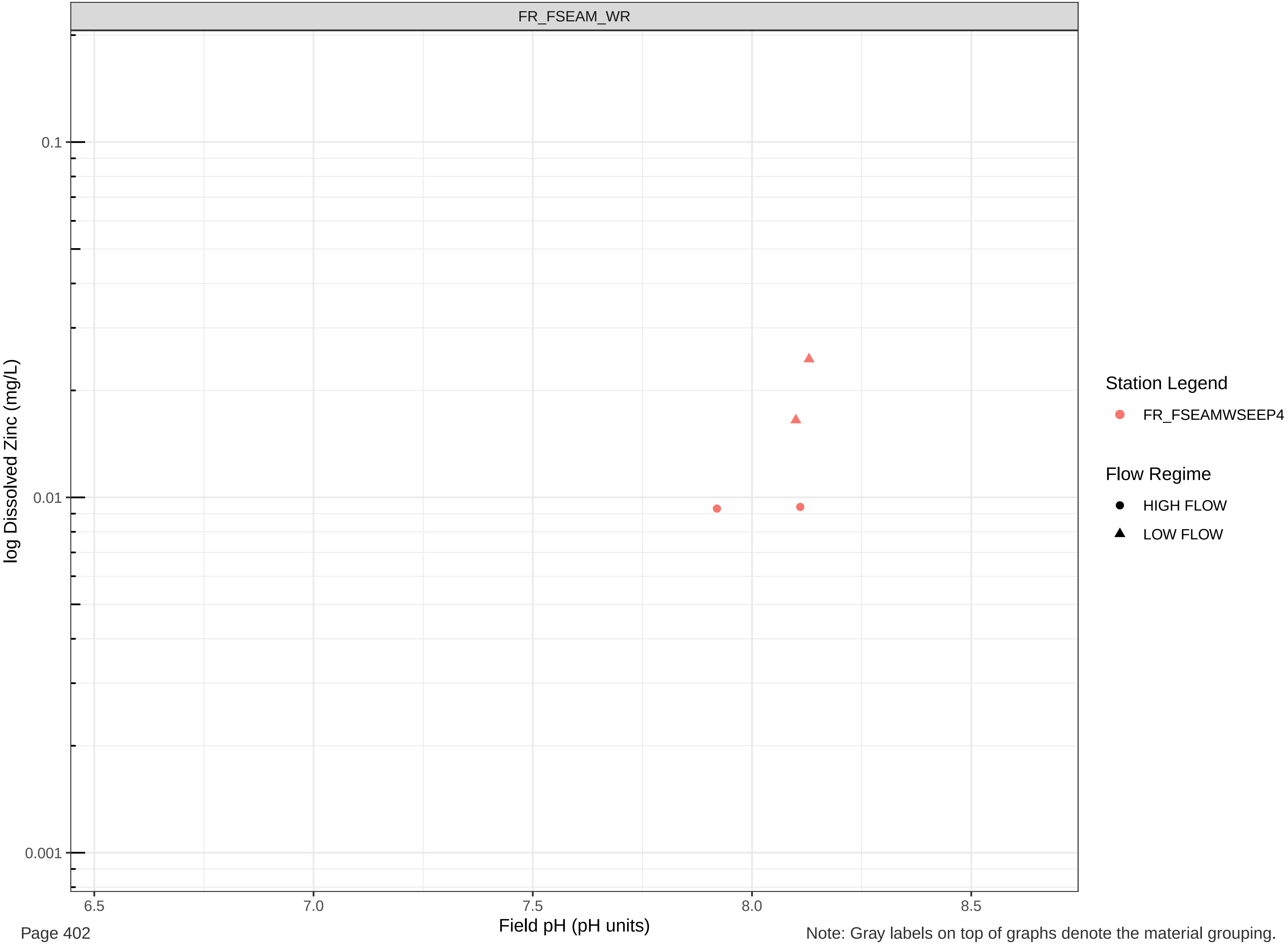
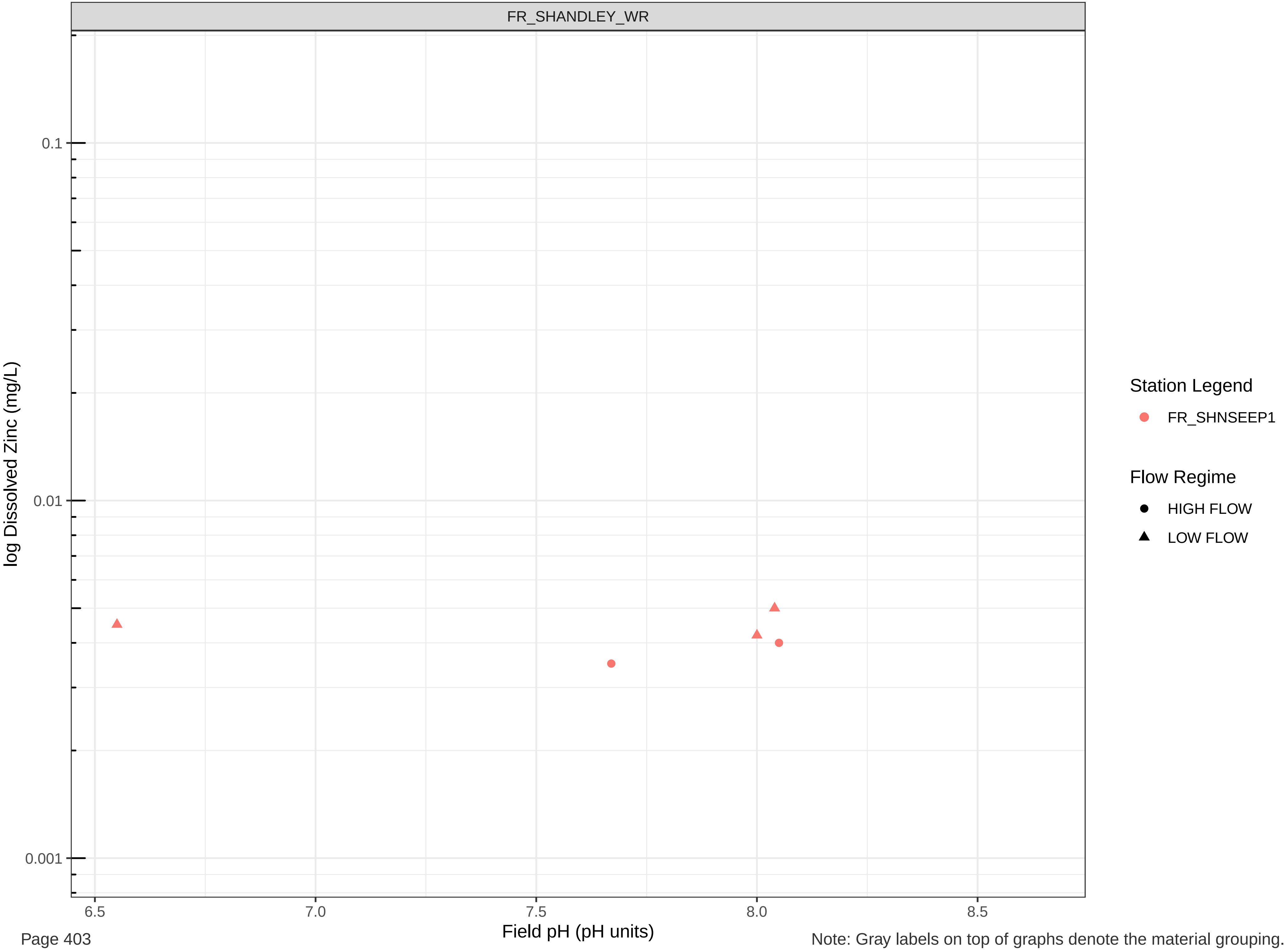


Note: Gray labels on top of graphs denote the material grouping.



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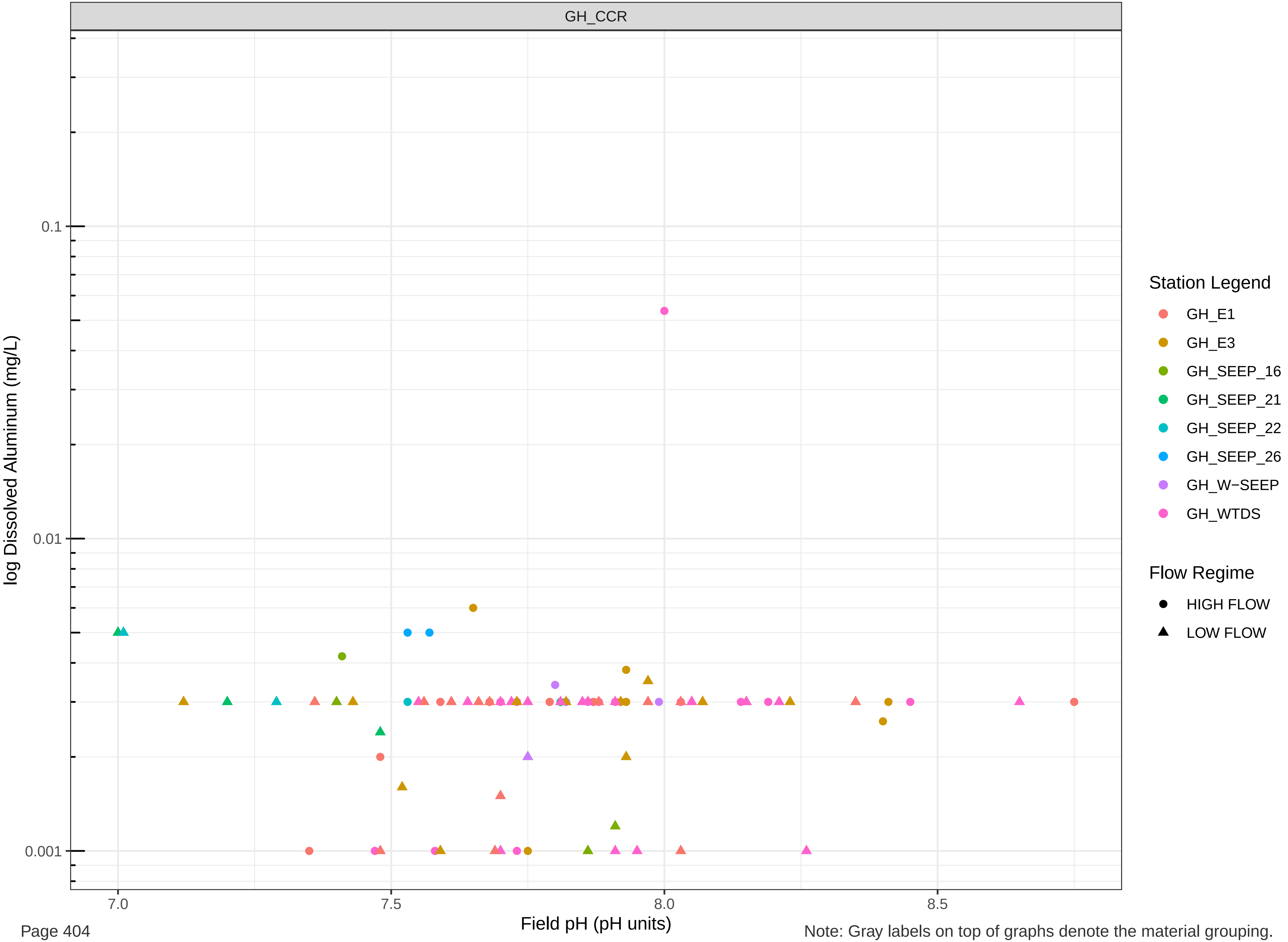

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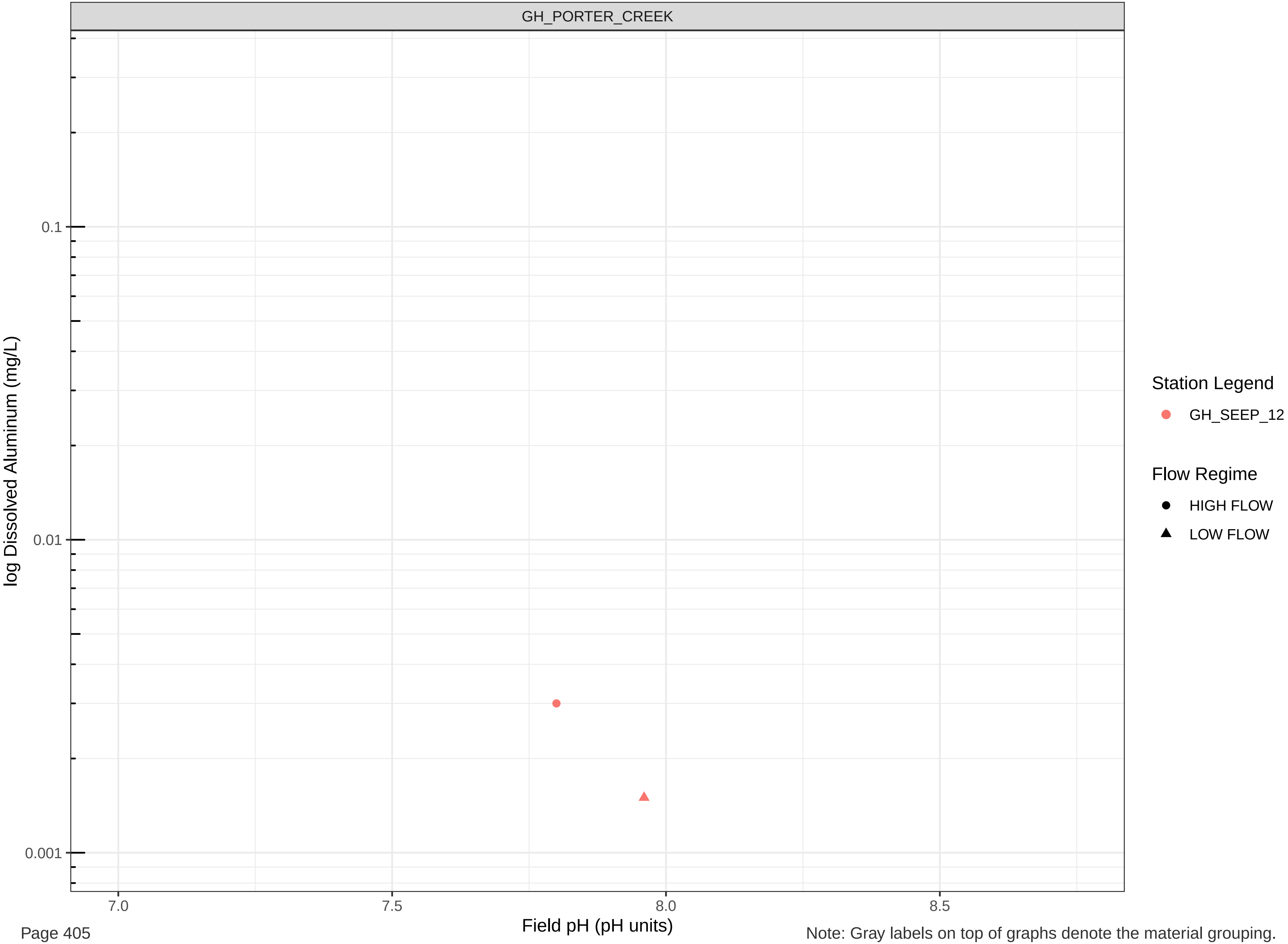

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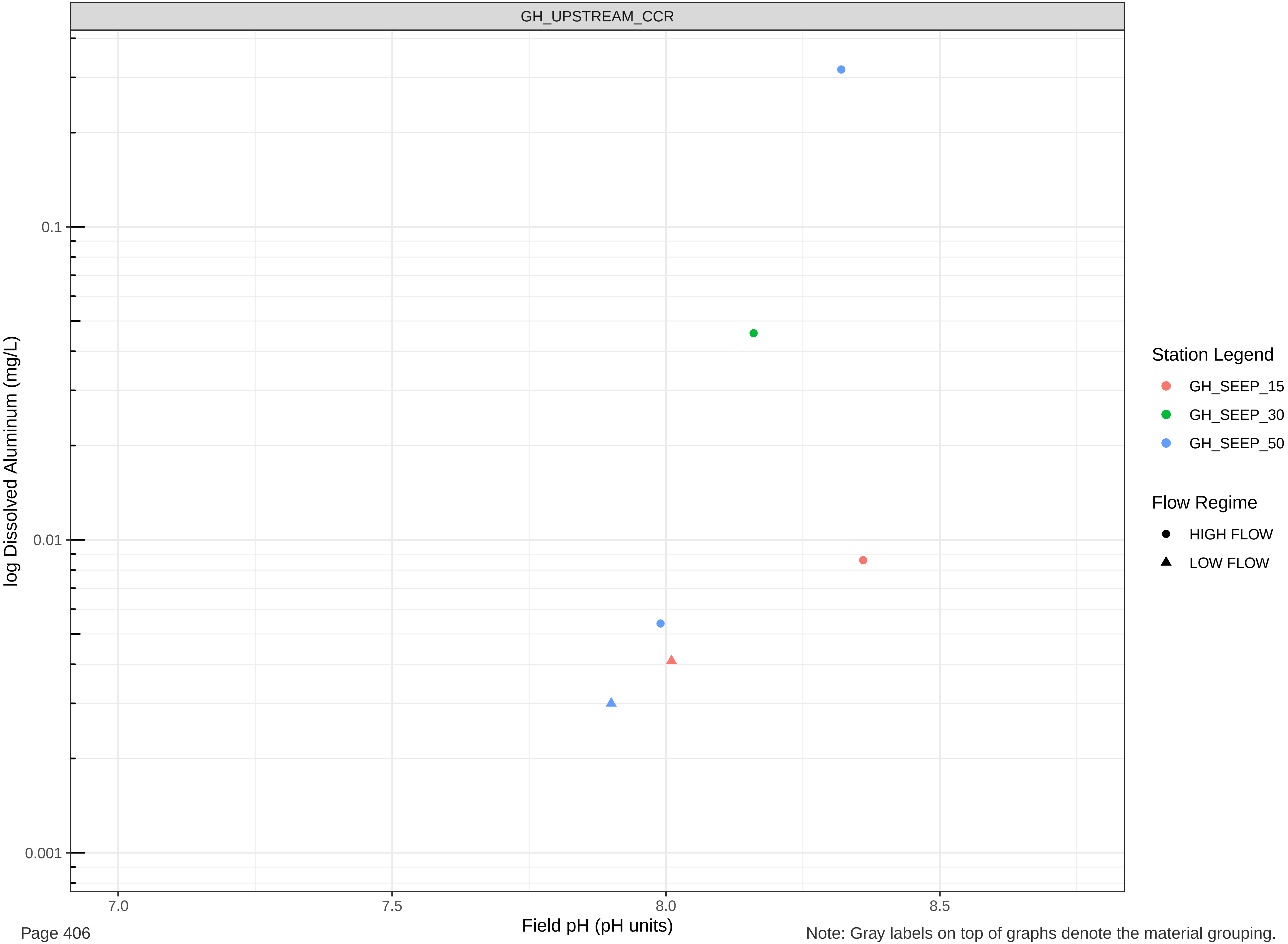
GH_UPSTREAM_CCR
log Dissolved Aluminum (mg/L)
0.1
0.01
0.001
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
GH_SEEP_15
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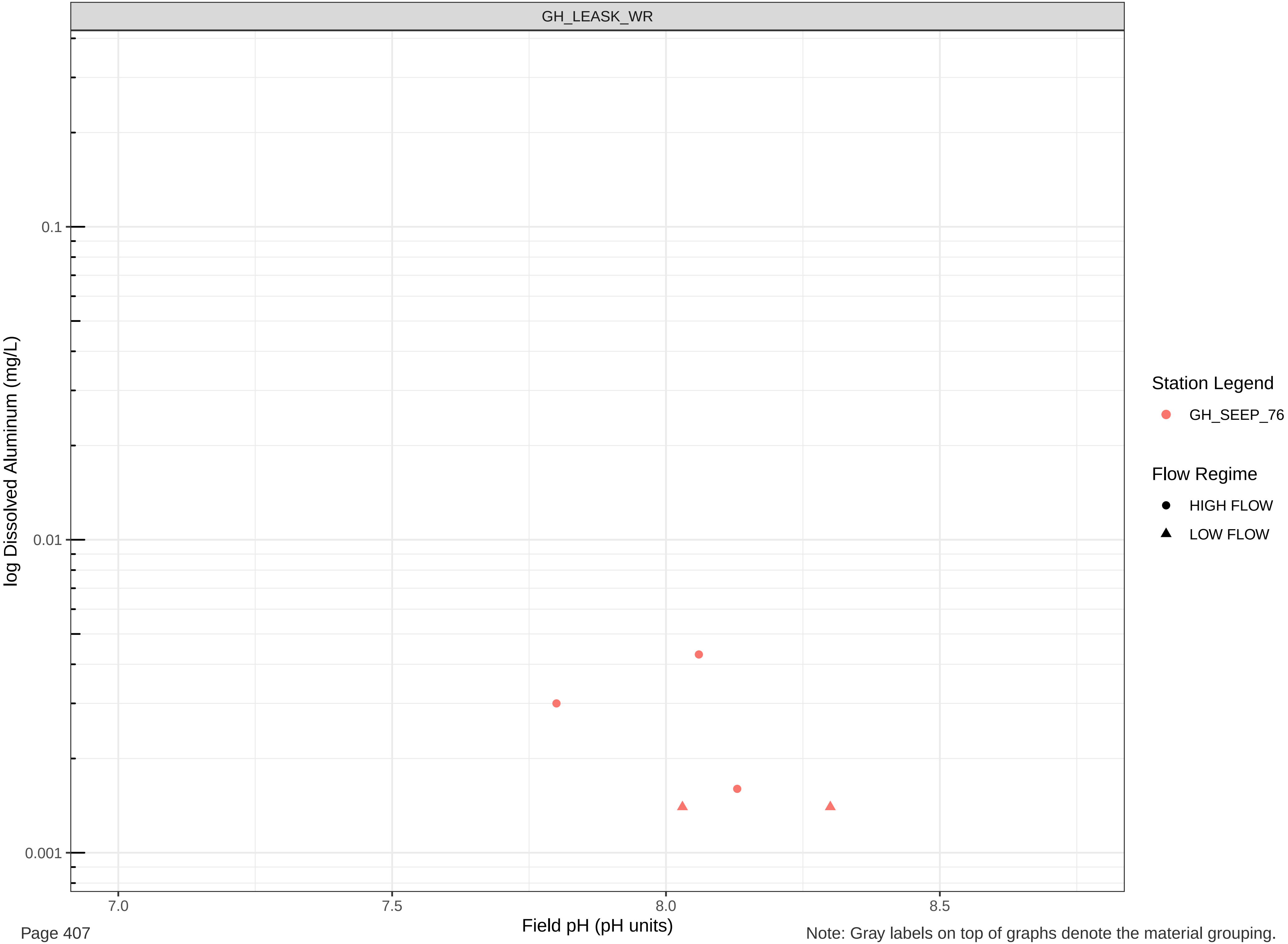
Flow Regime
HIGH FLOW
LOW FLOW



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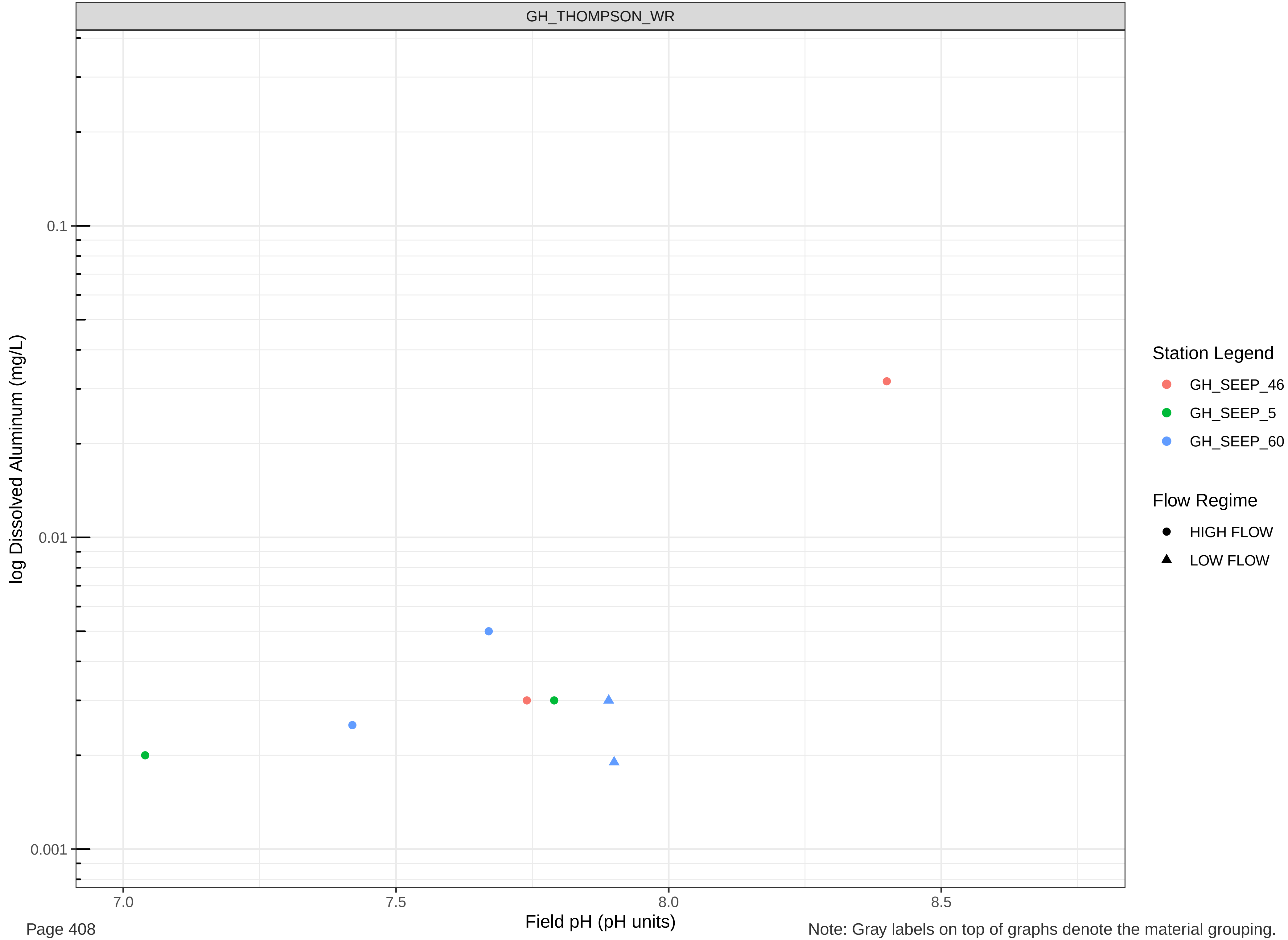

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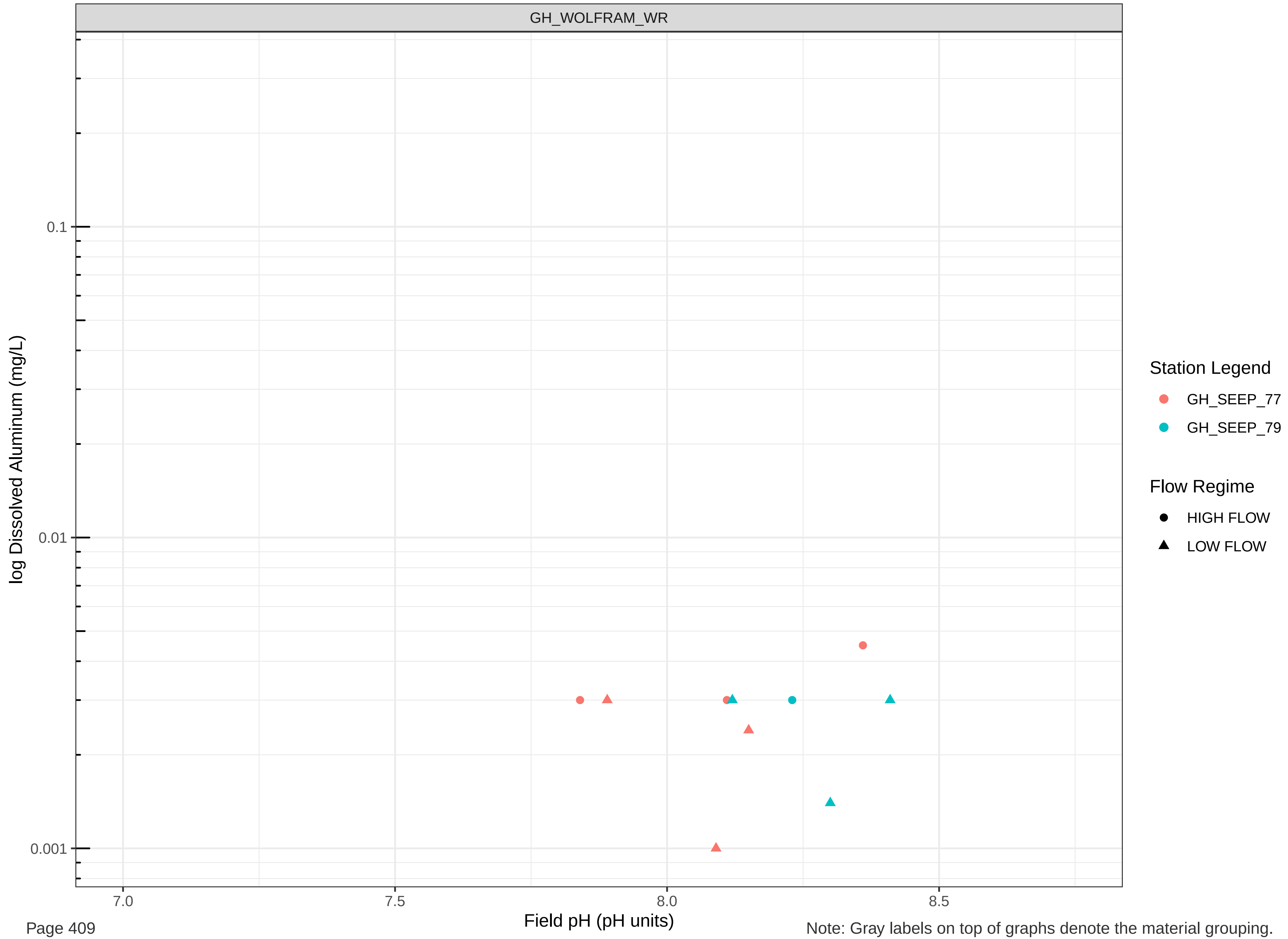

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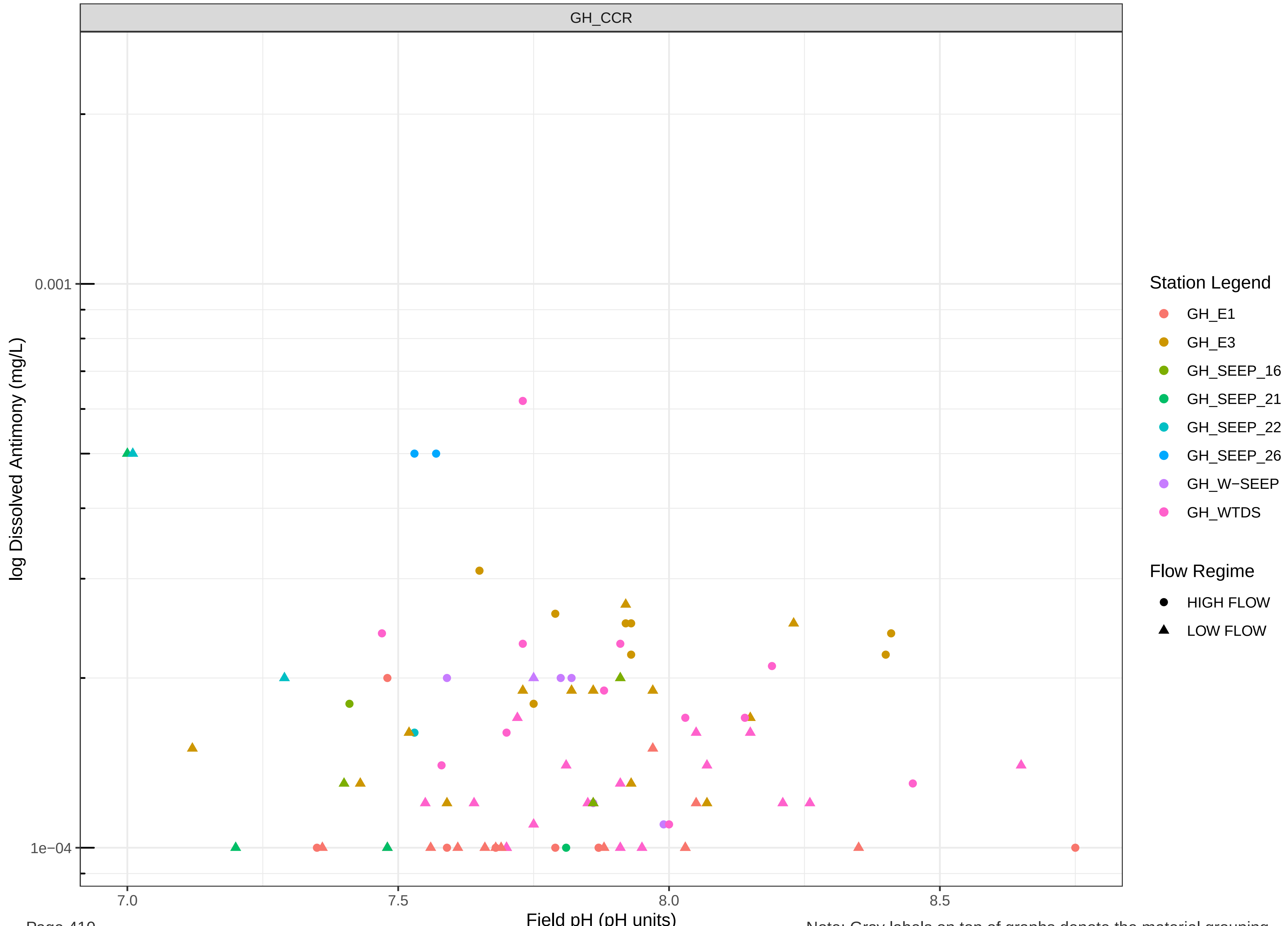

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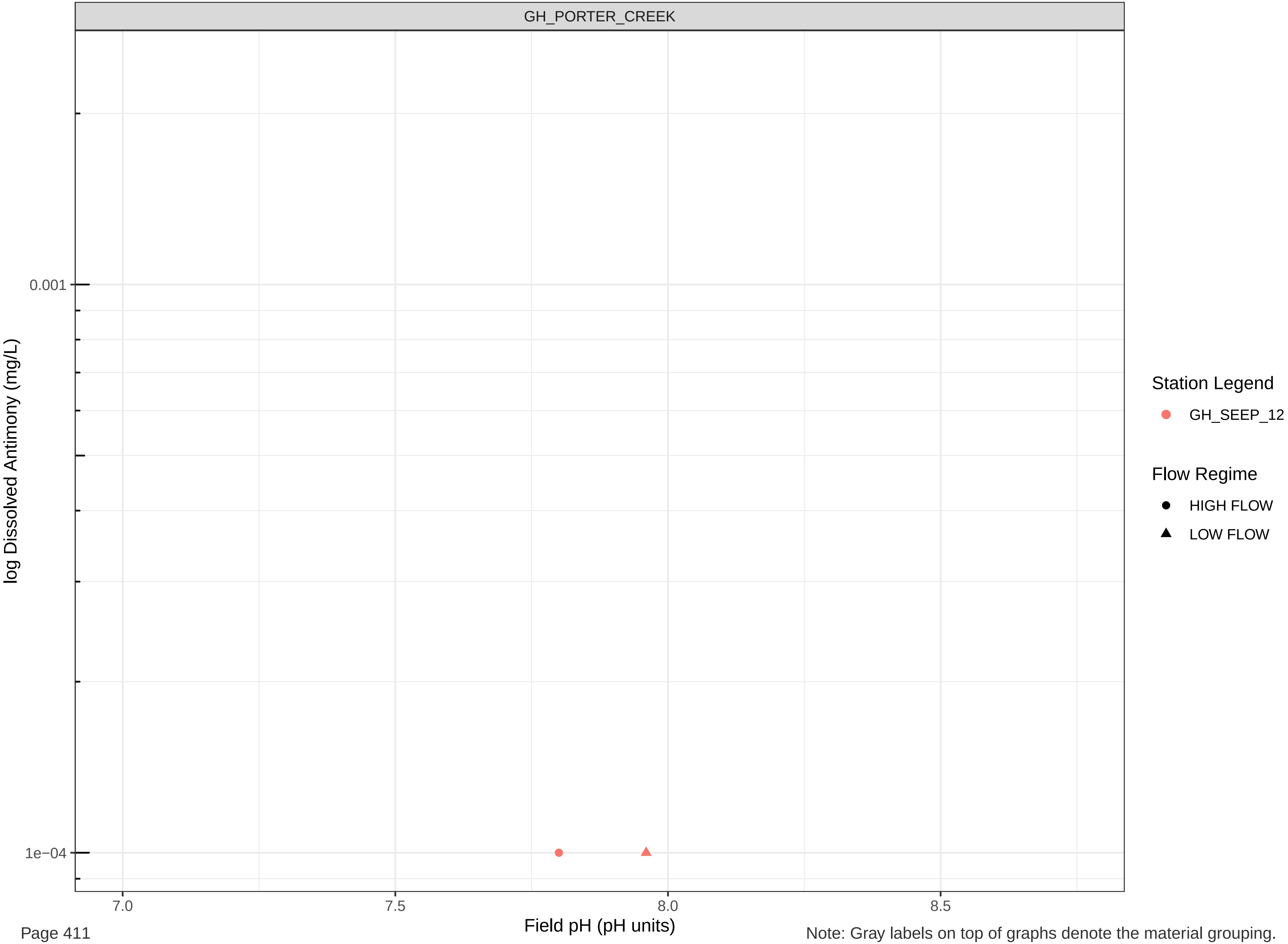

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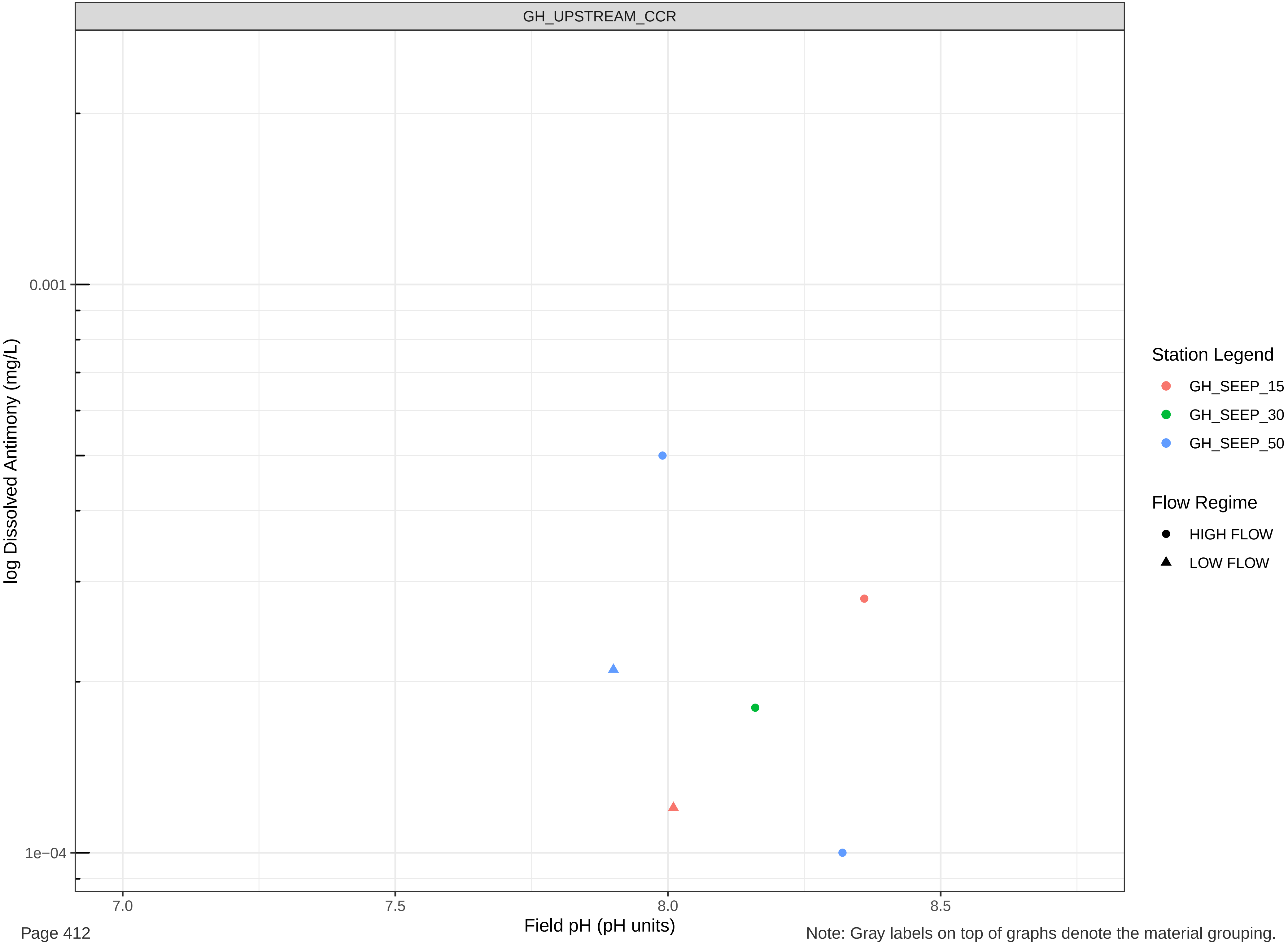

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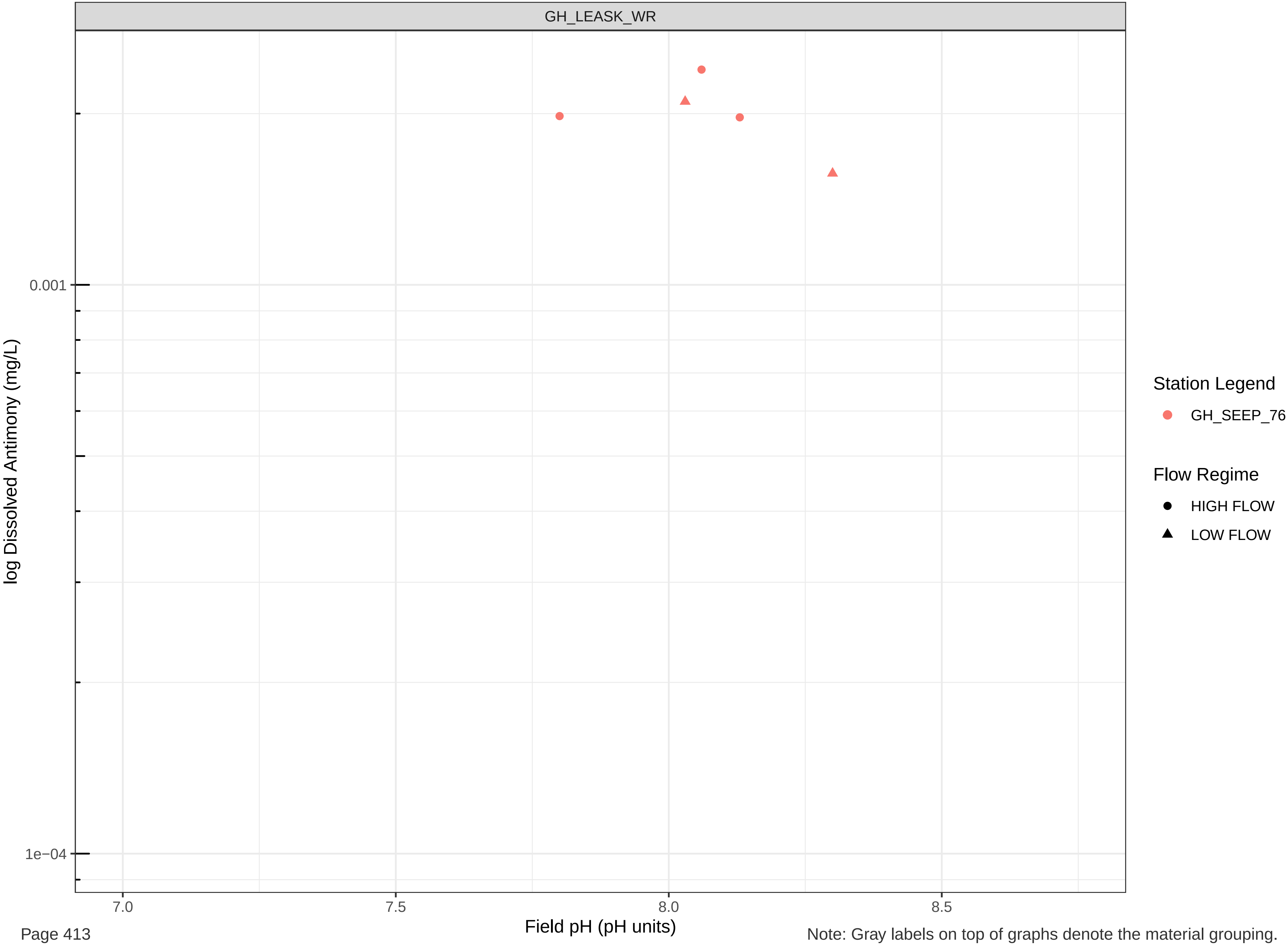

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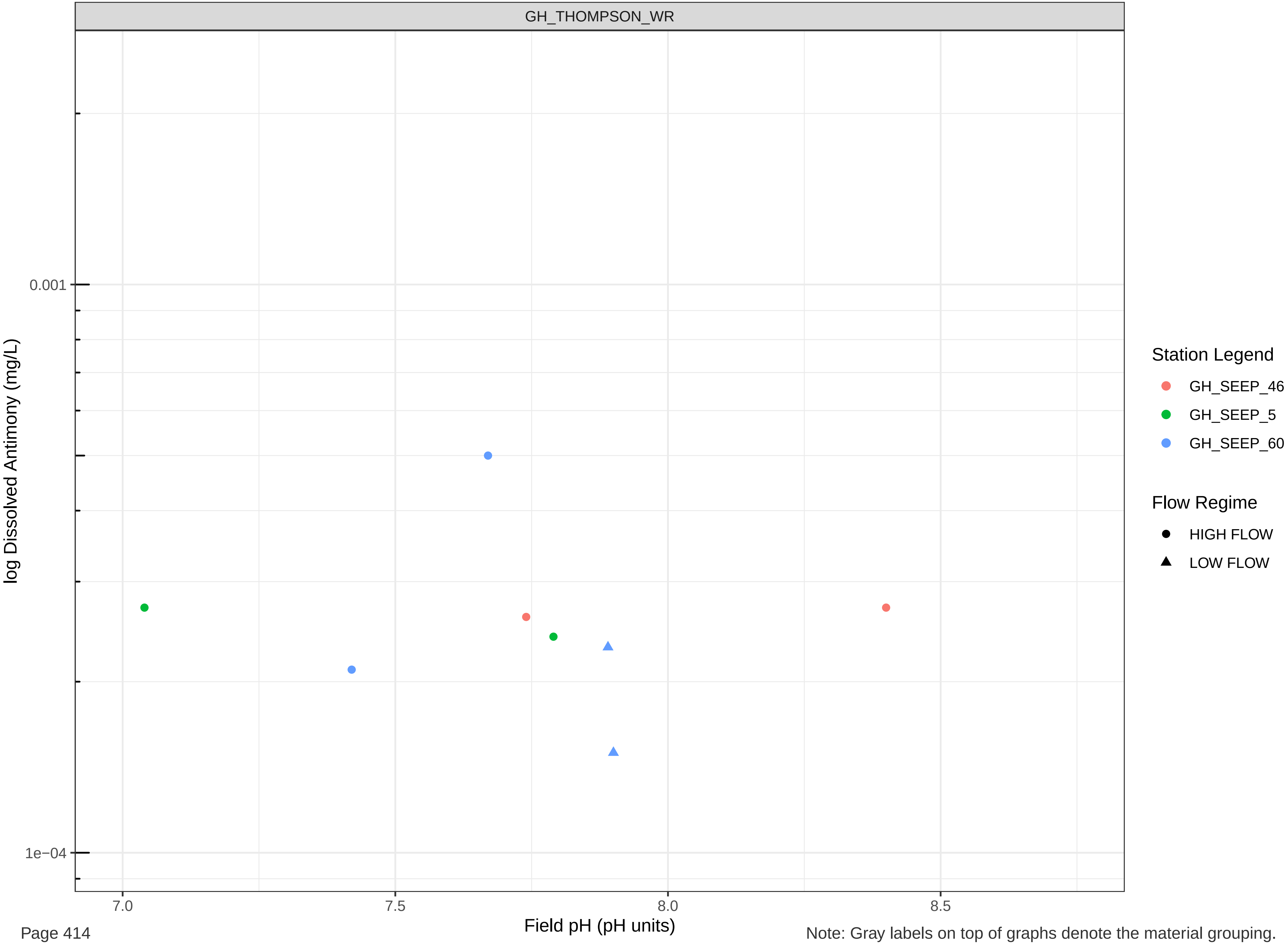

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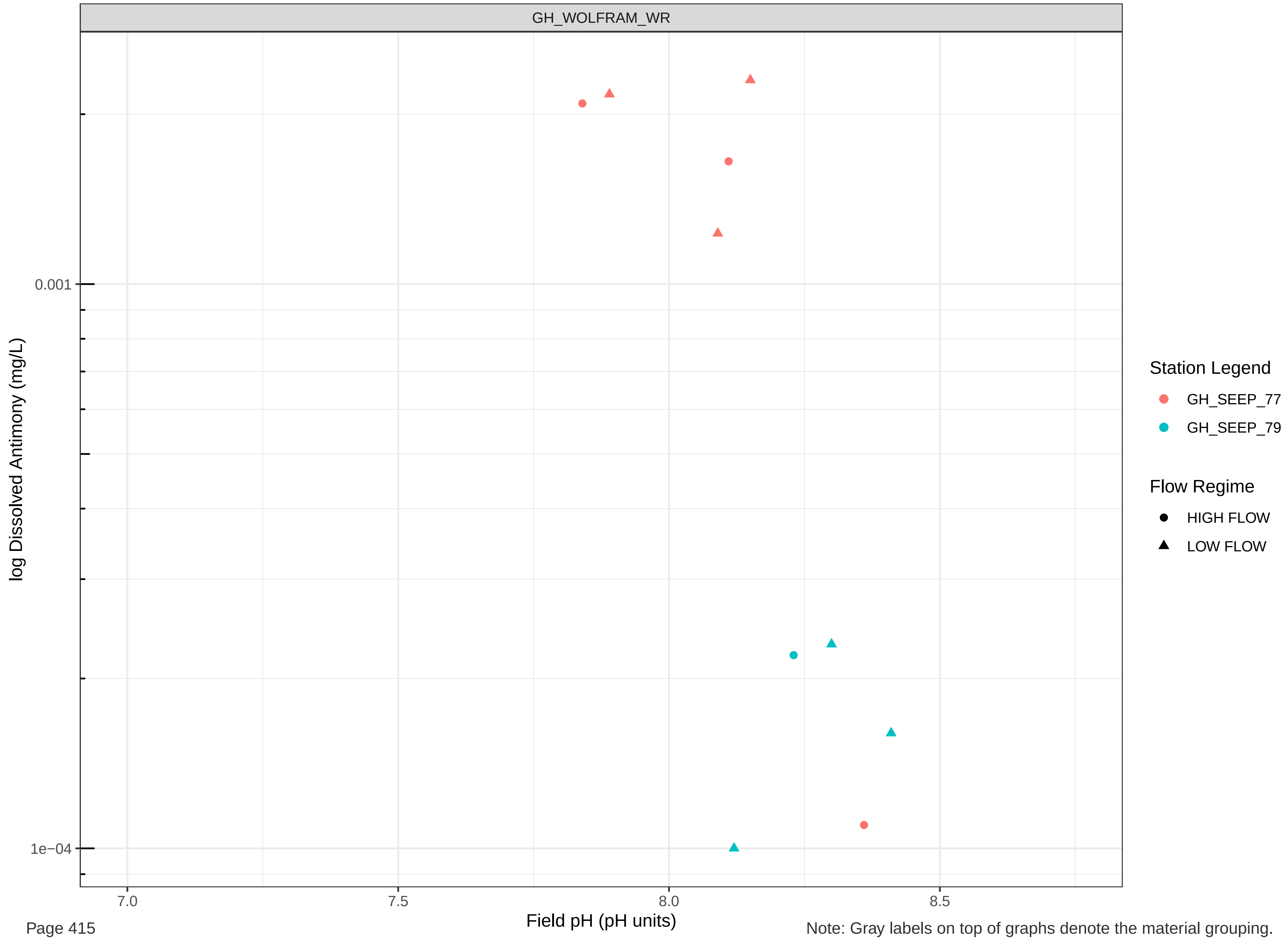

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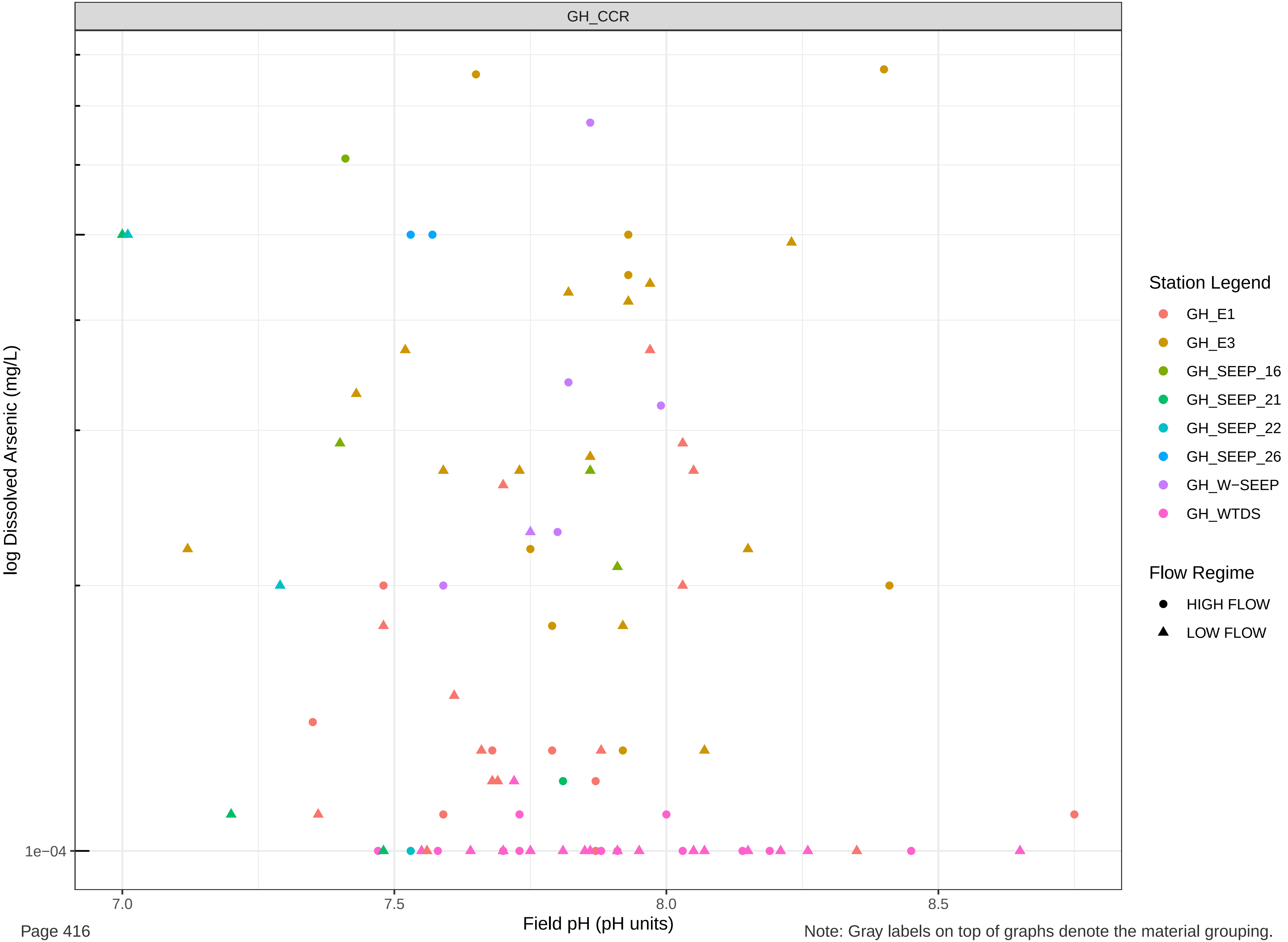

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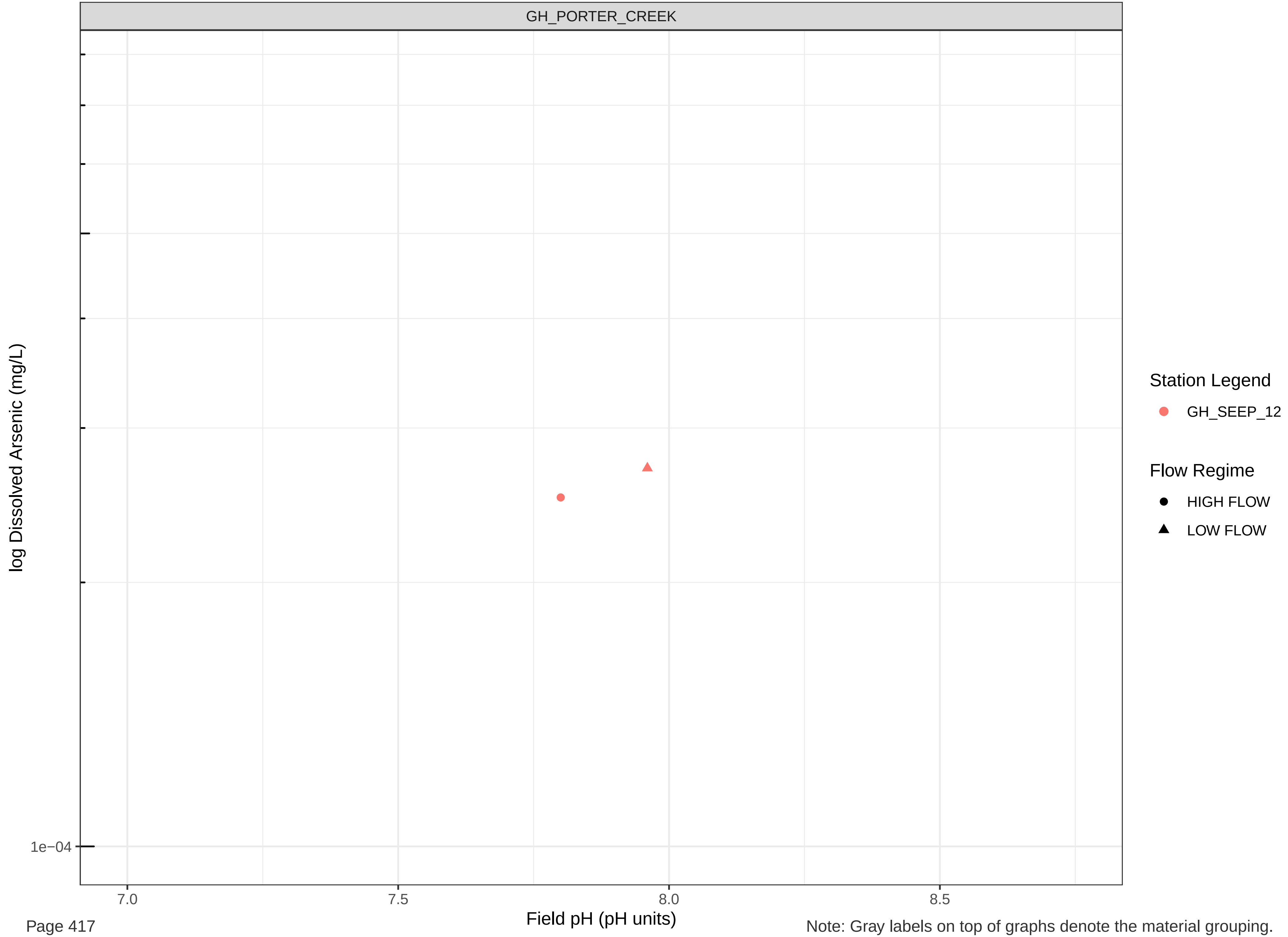

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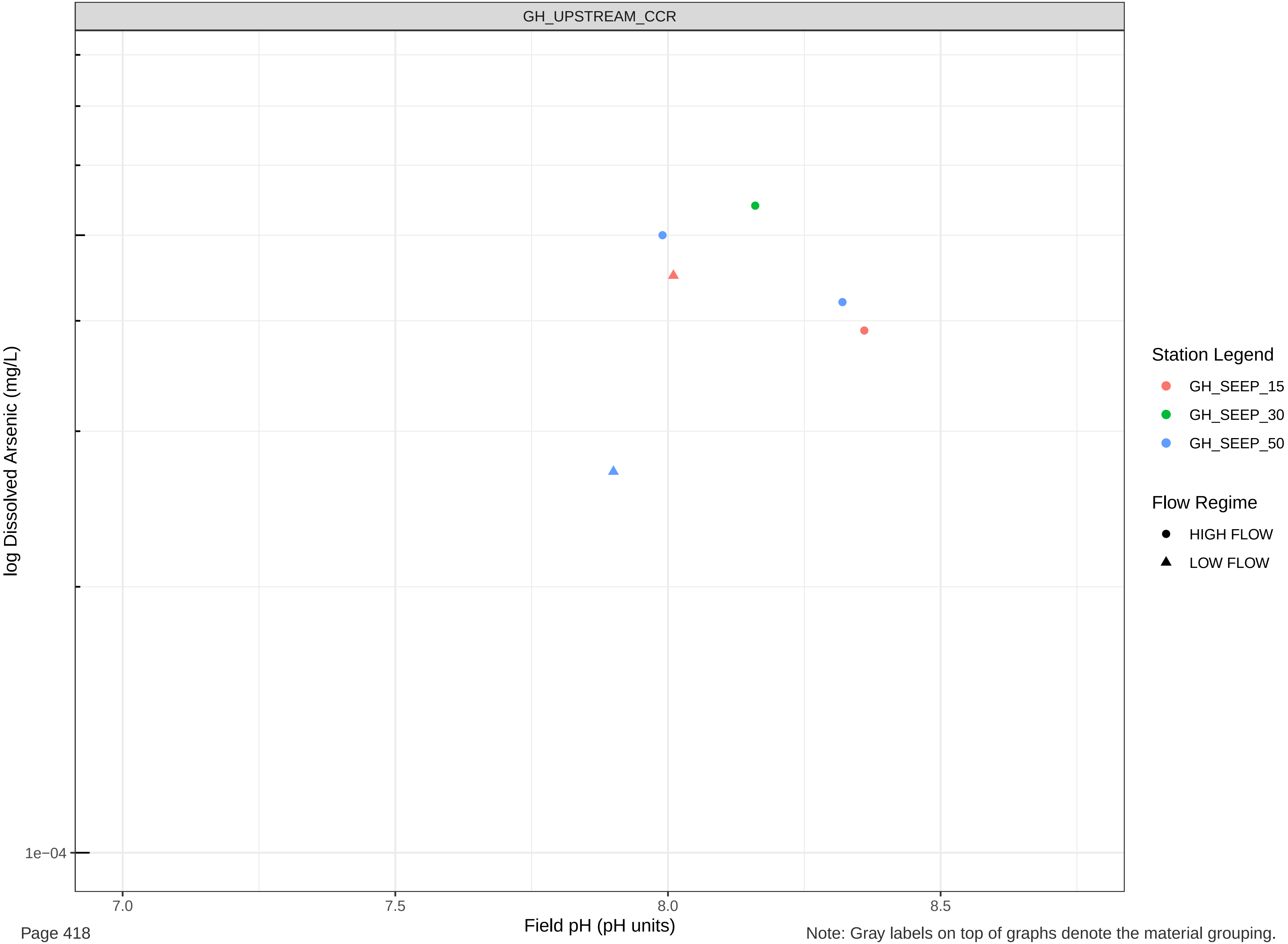

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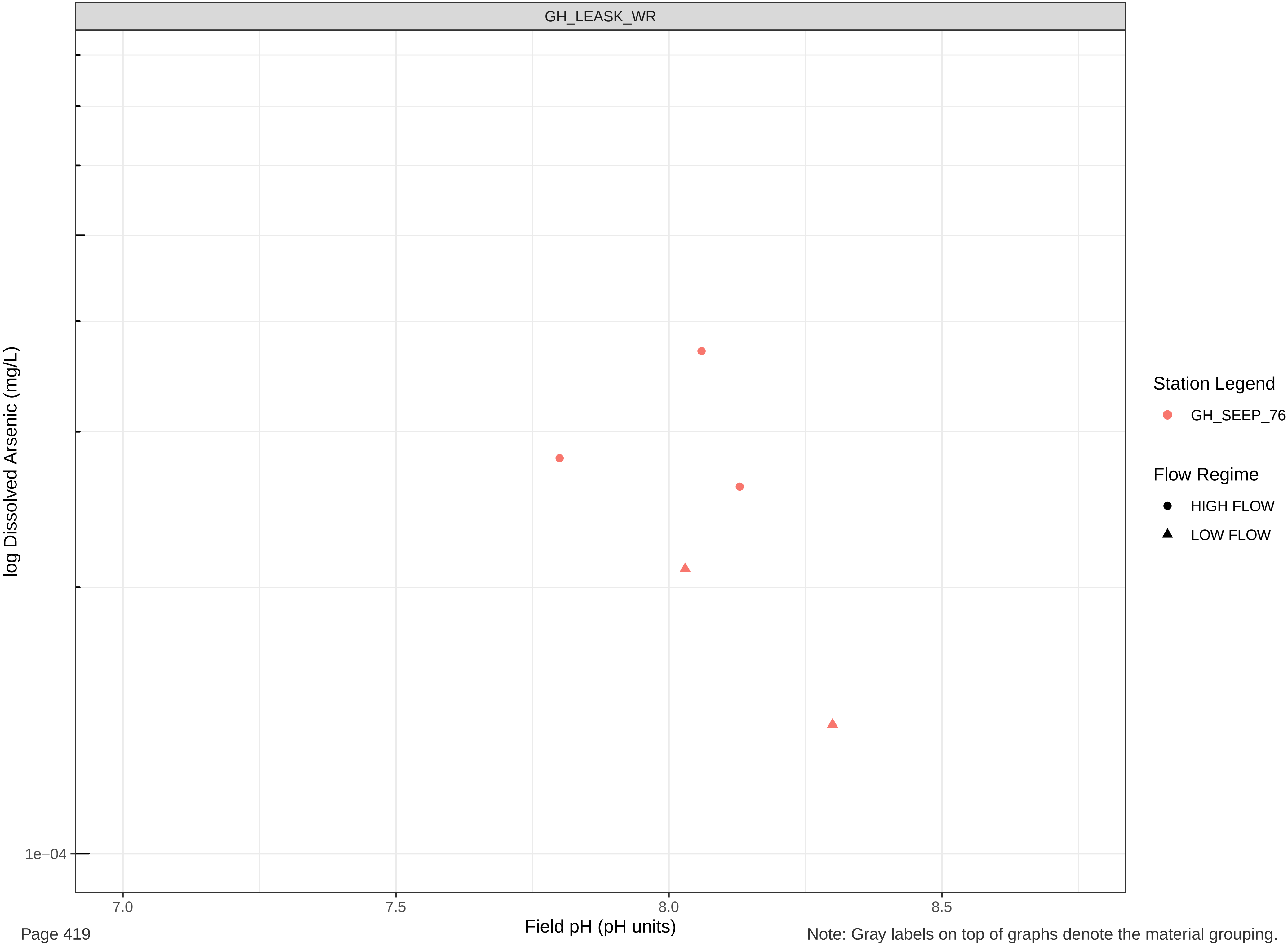

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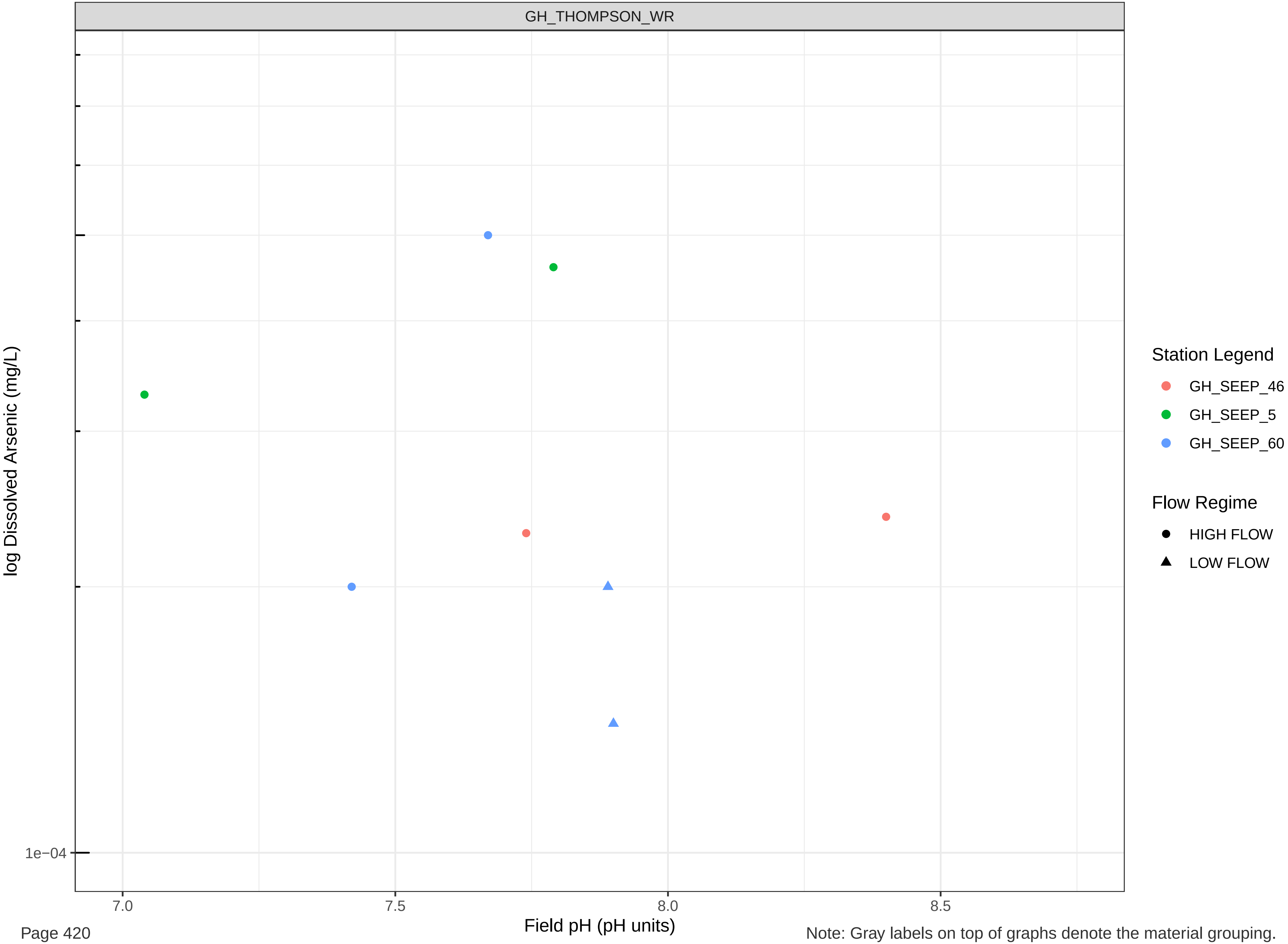

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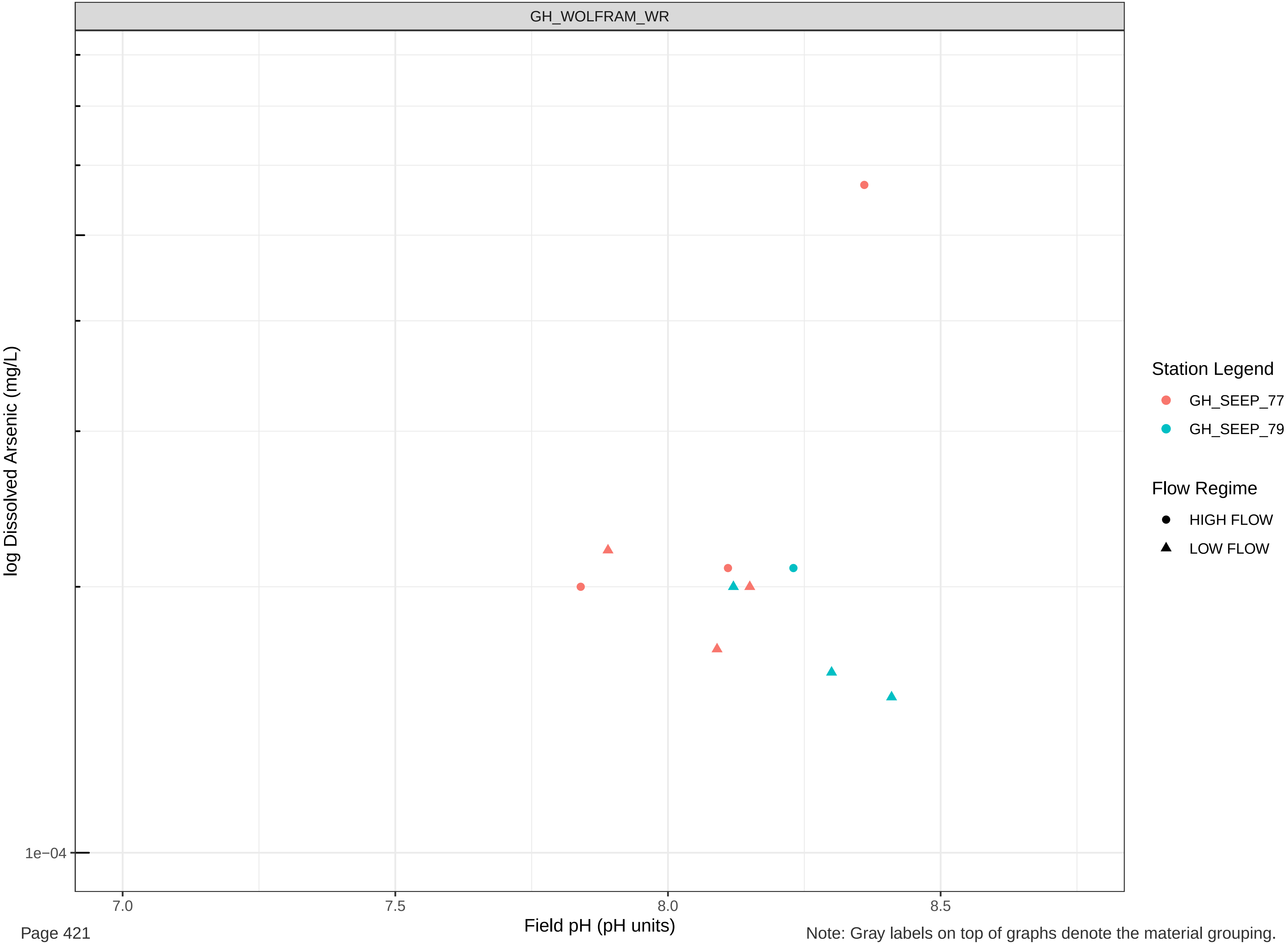

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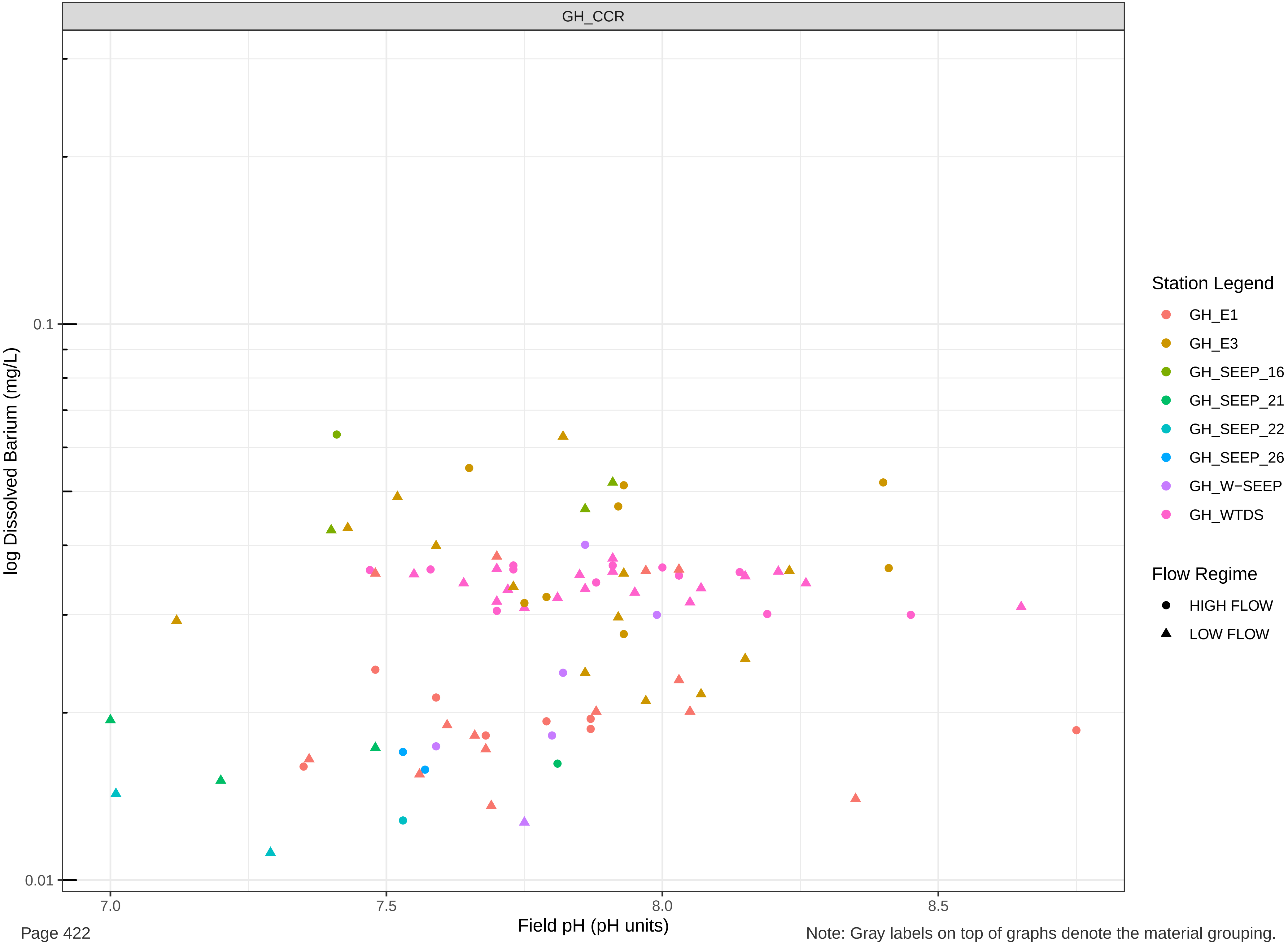

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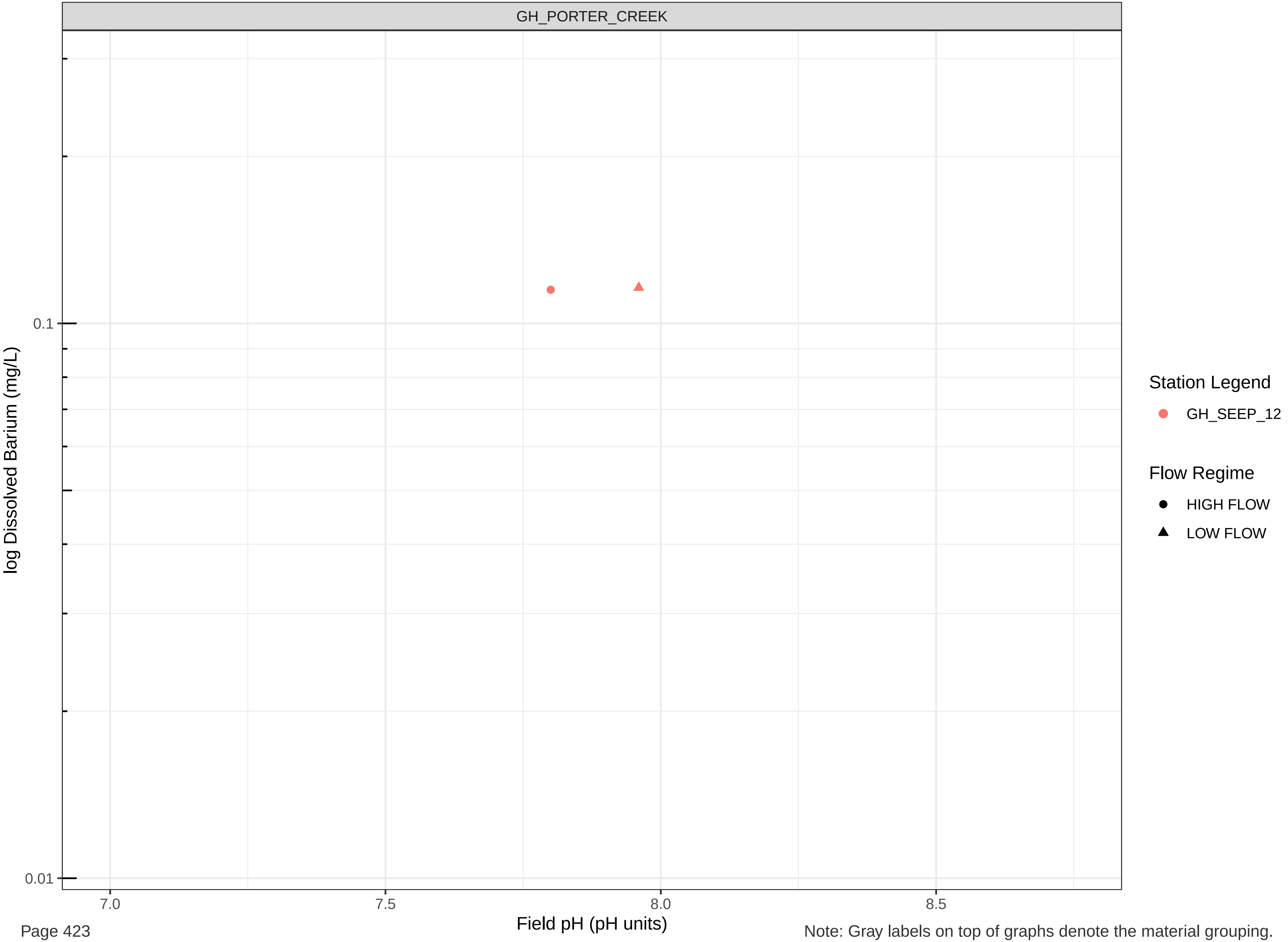

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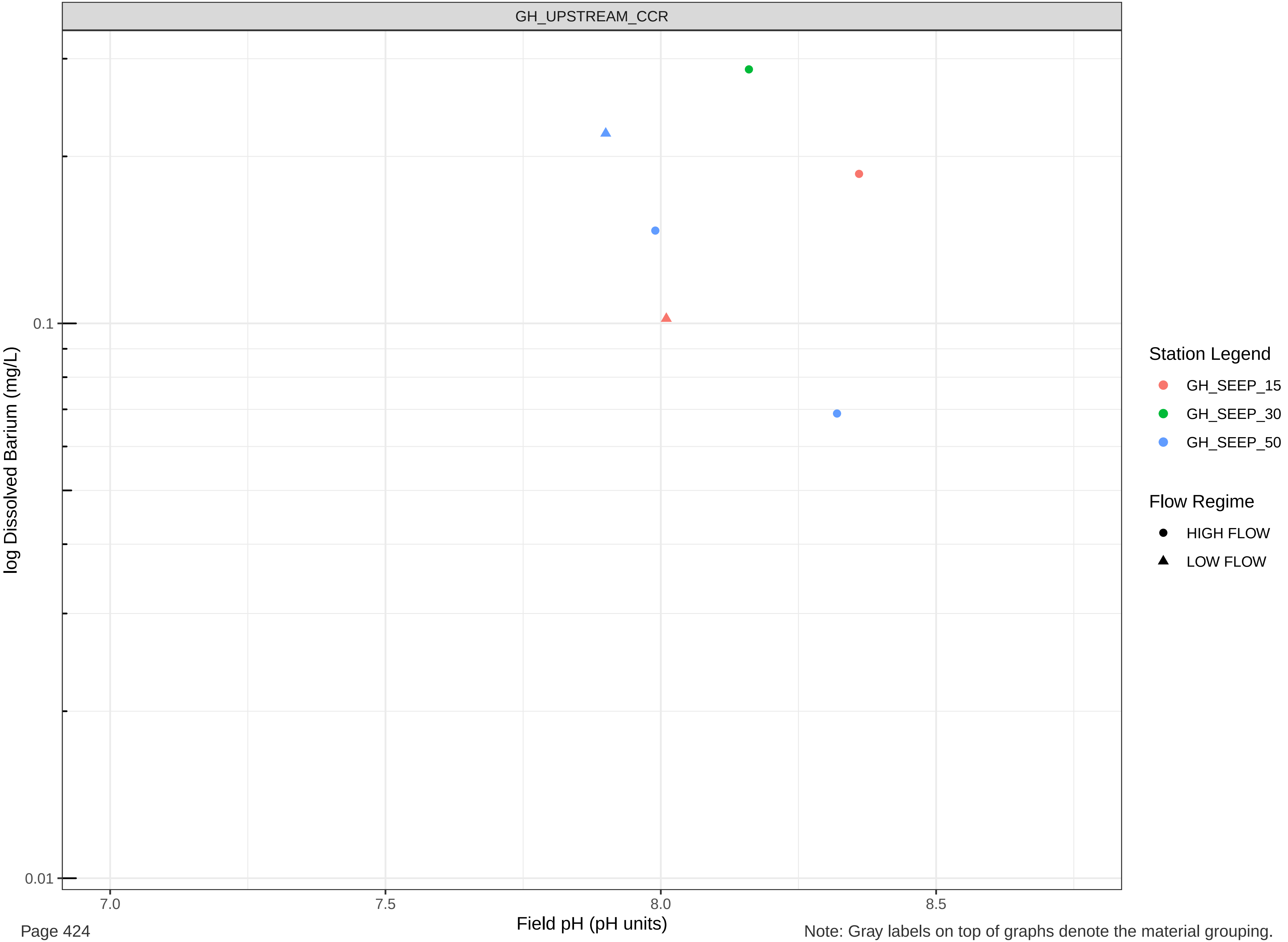

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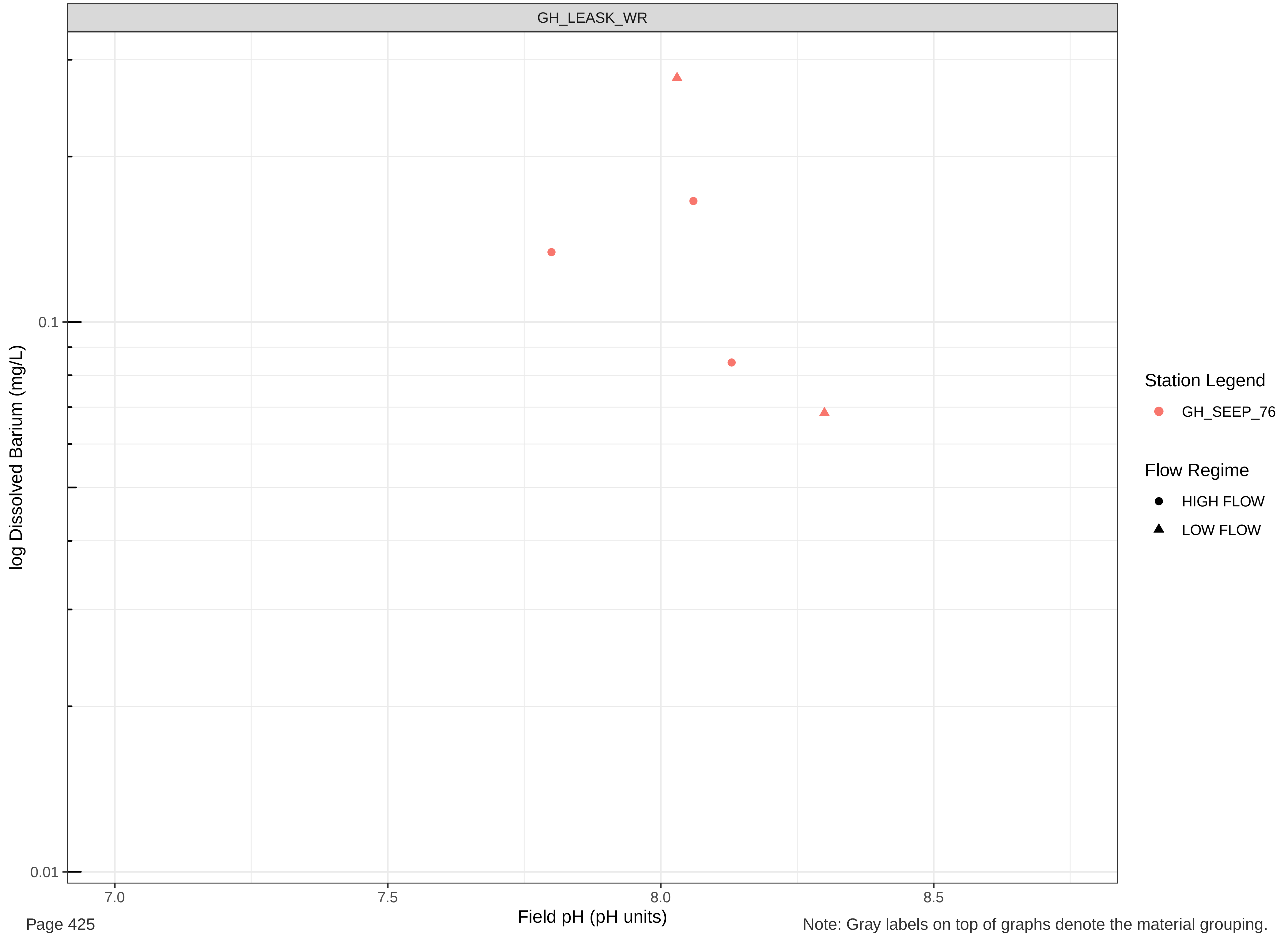

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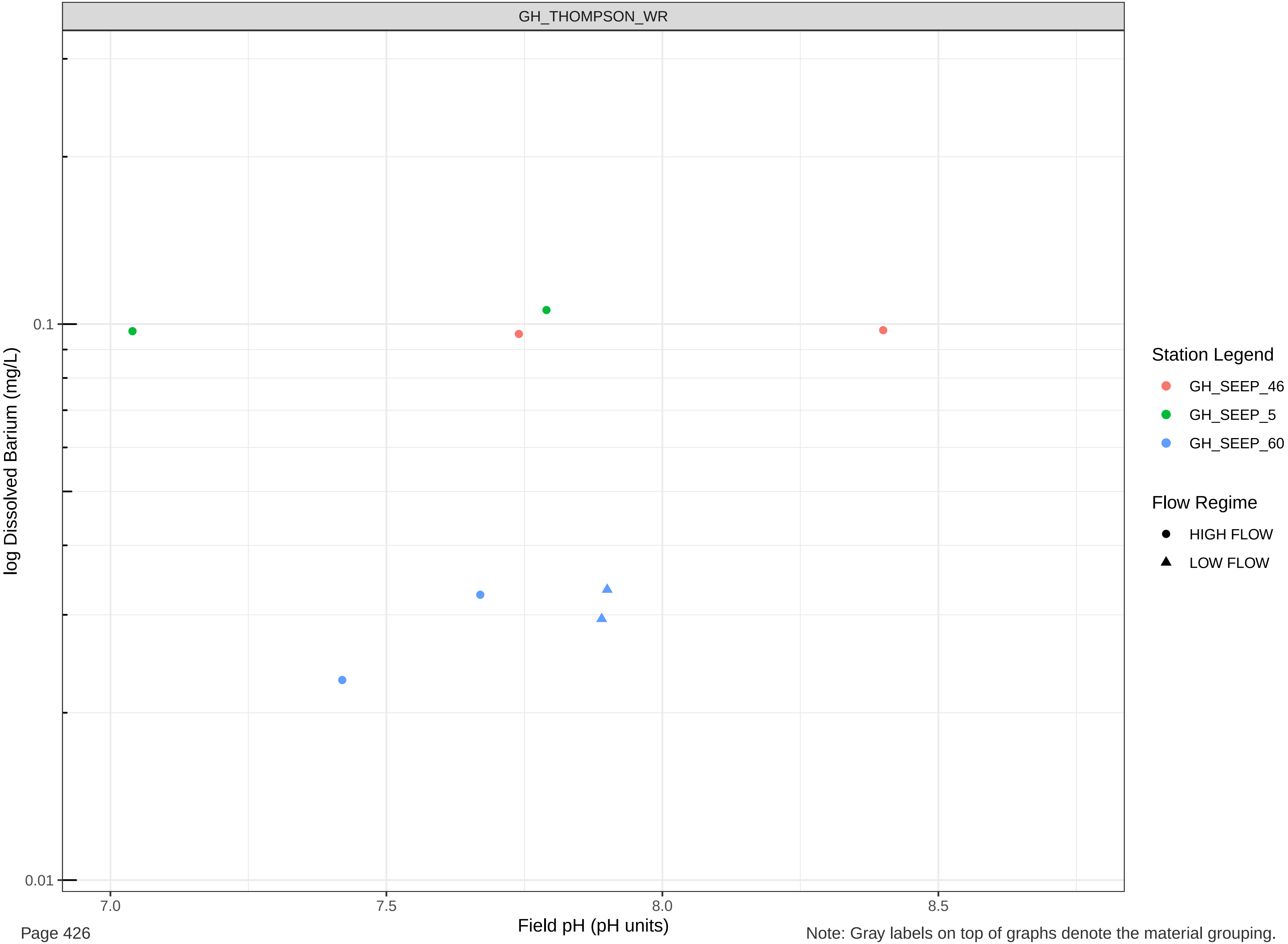

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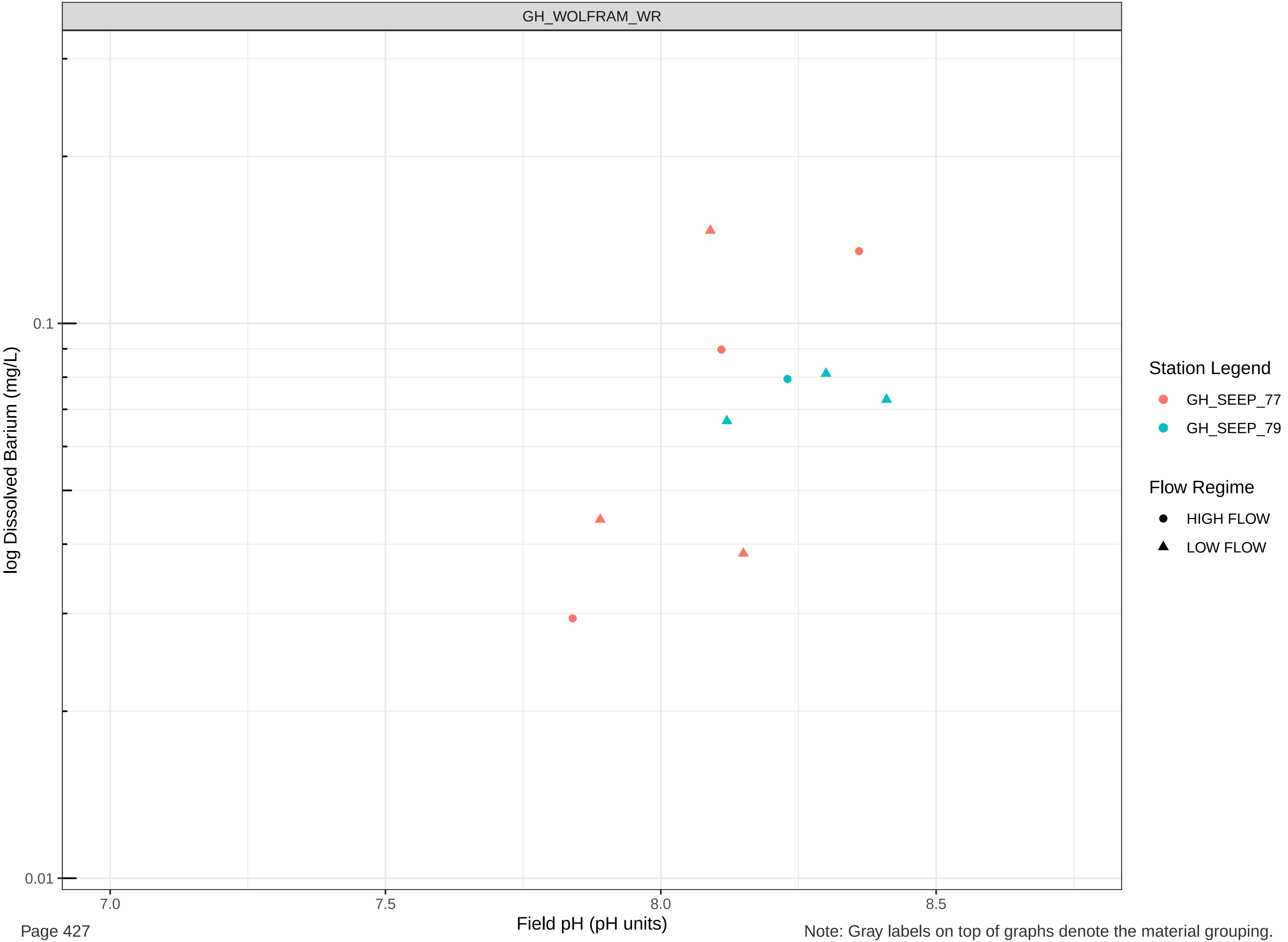

Note: Gray labels on top of graphs denote the material grouping.

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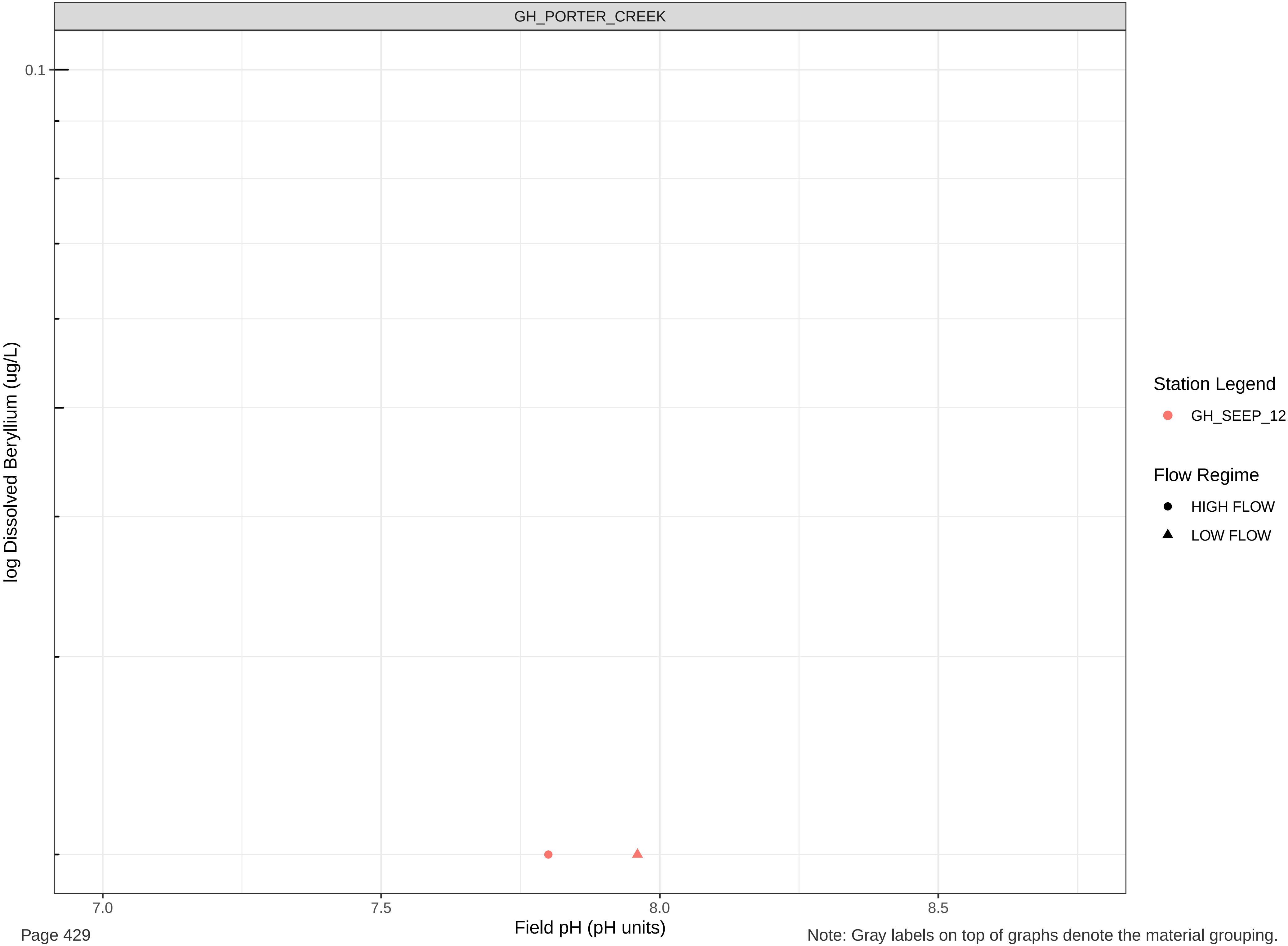

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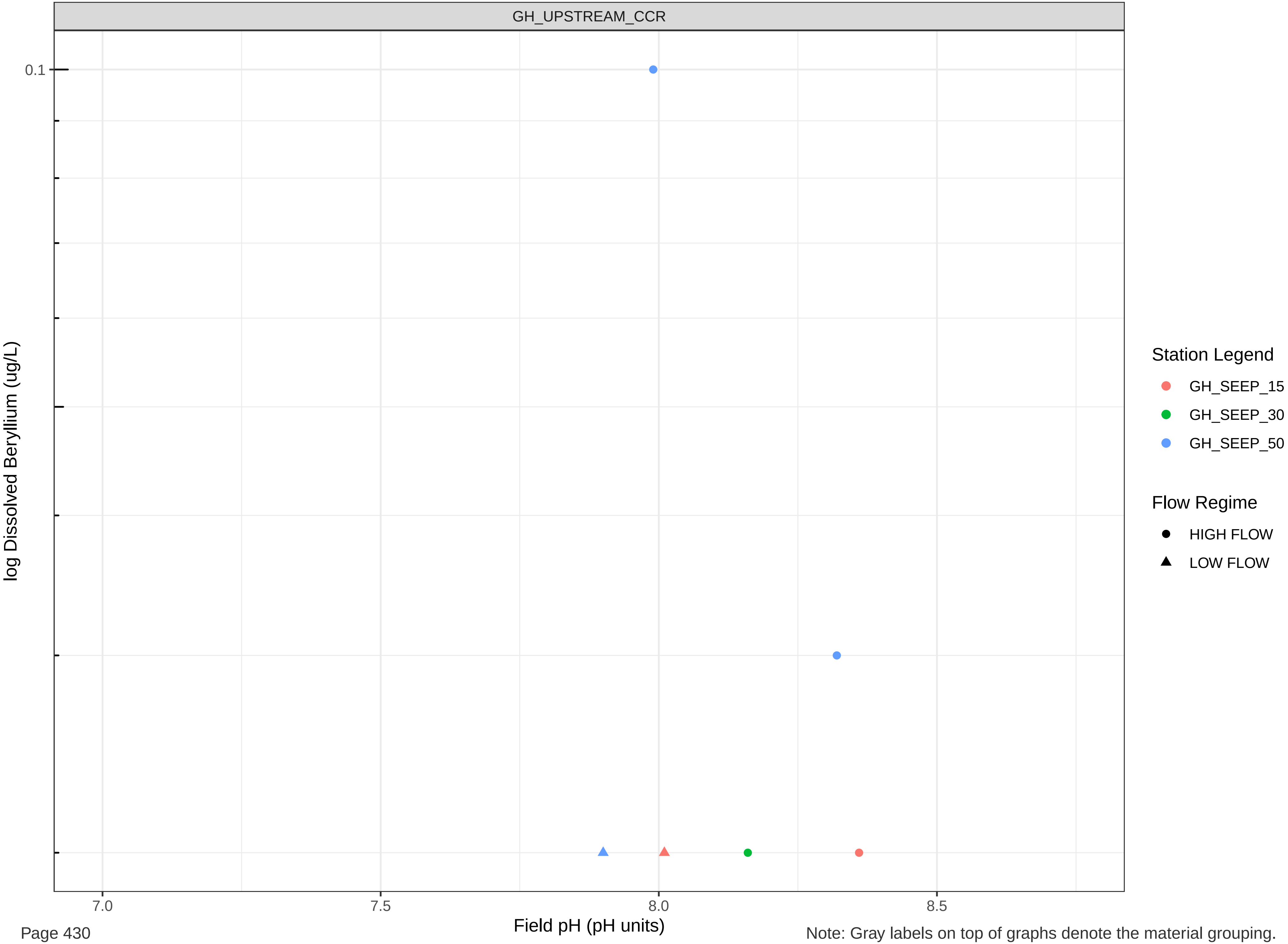

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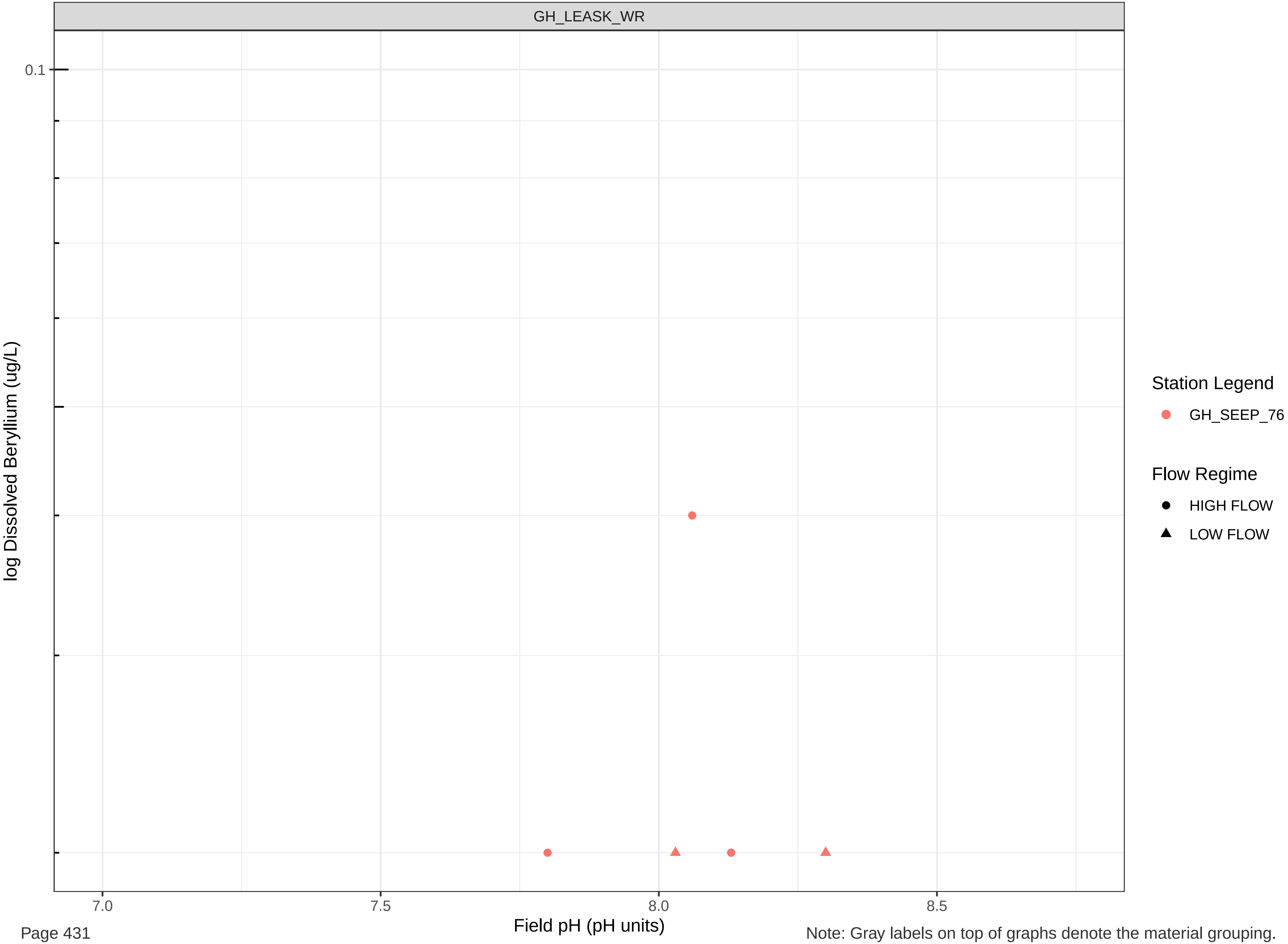

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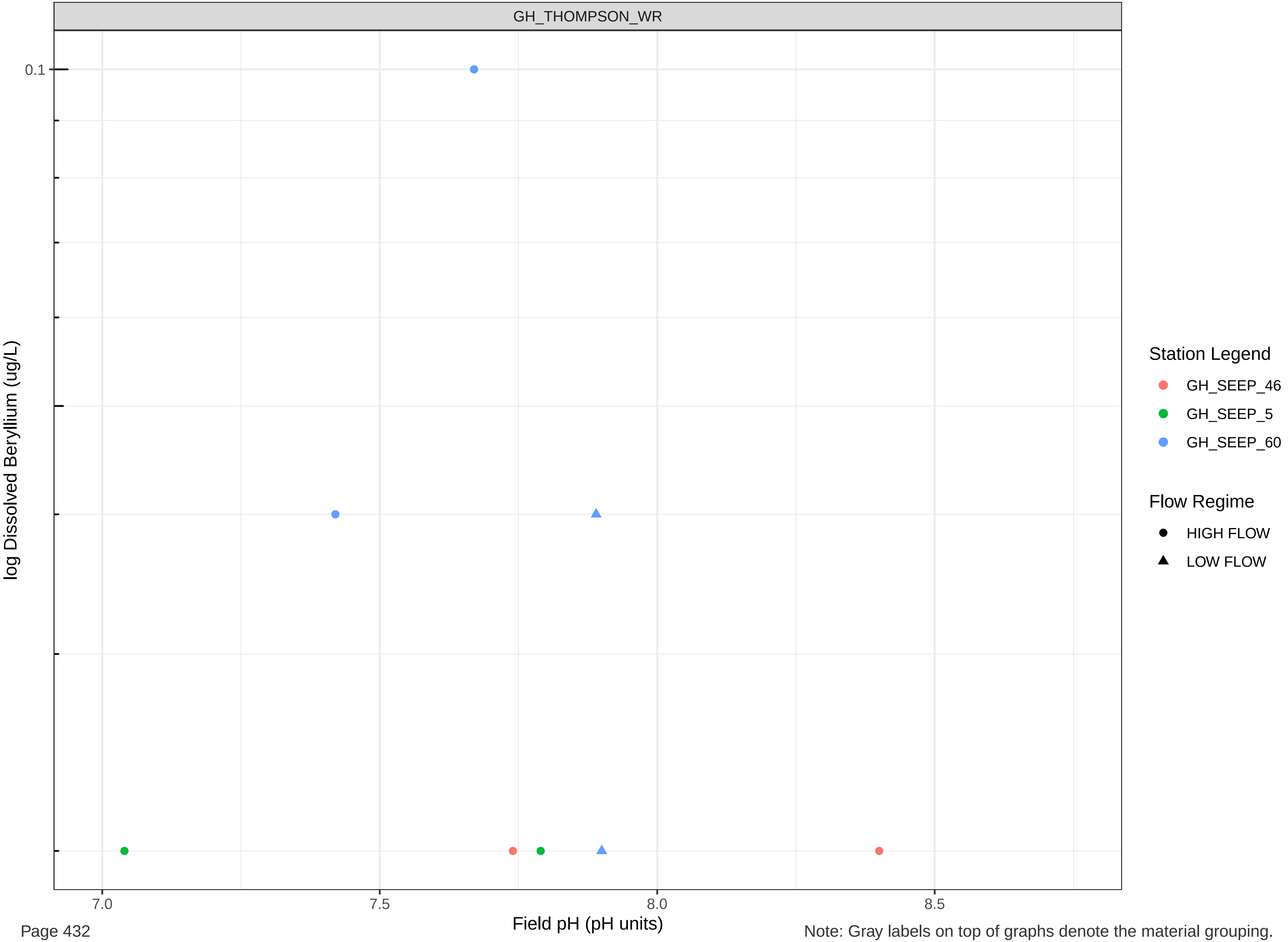

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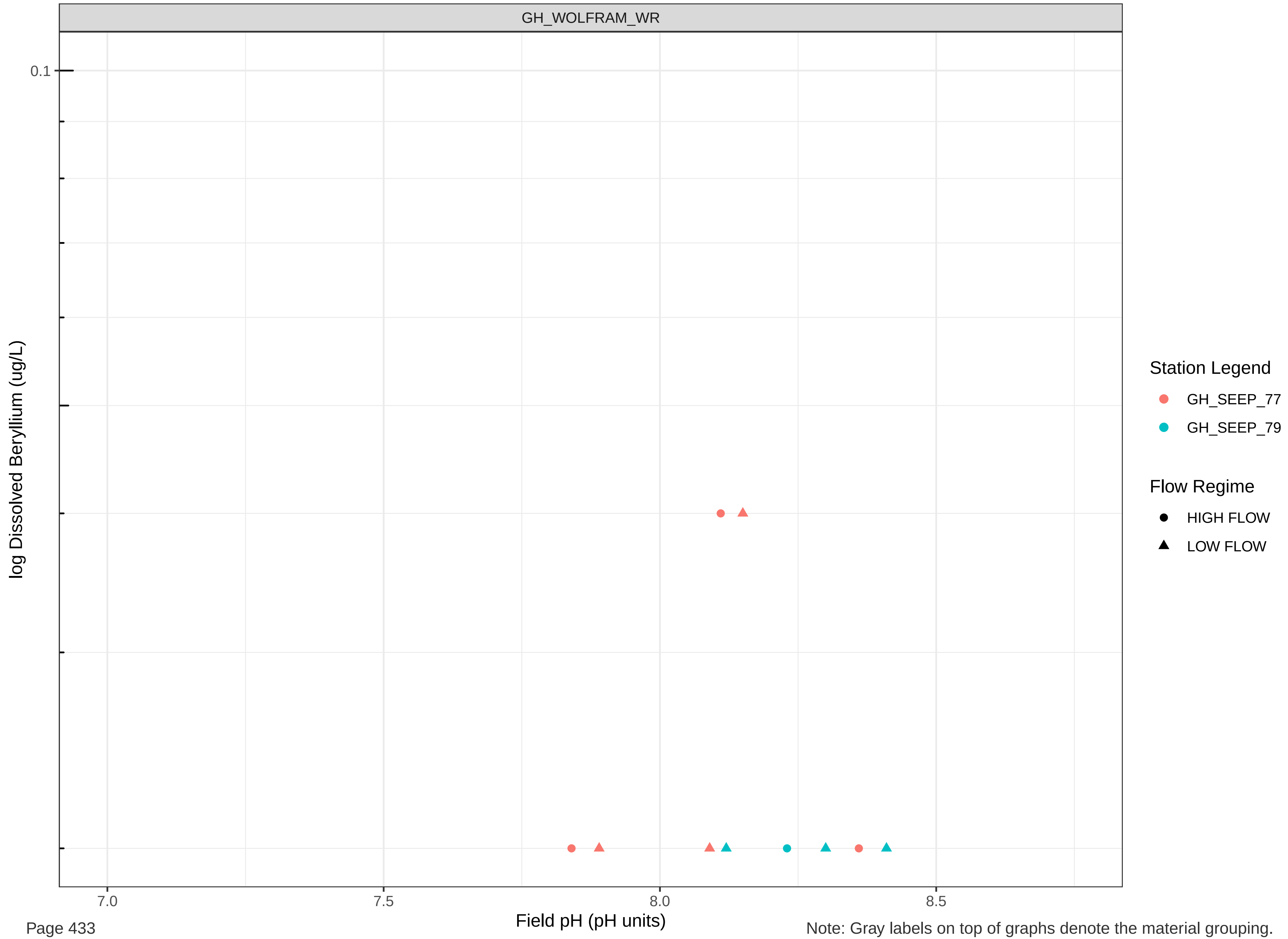

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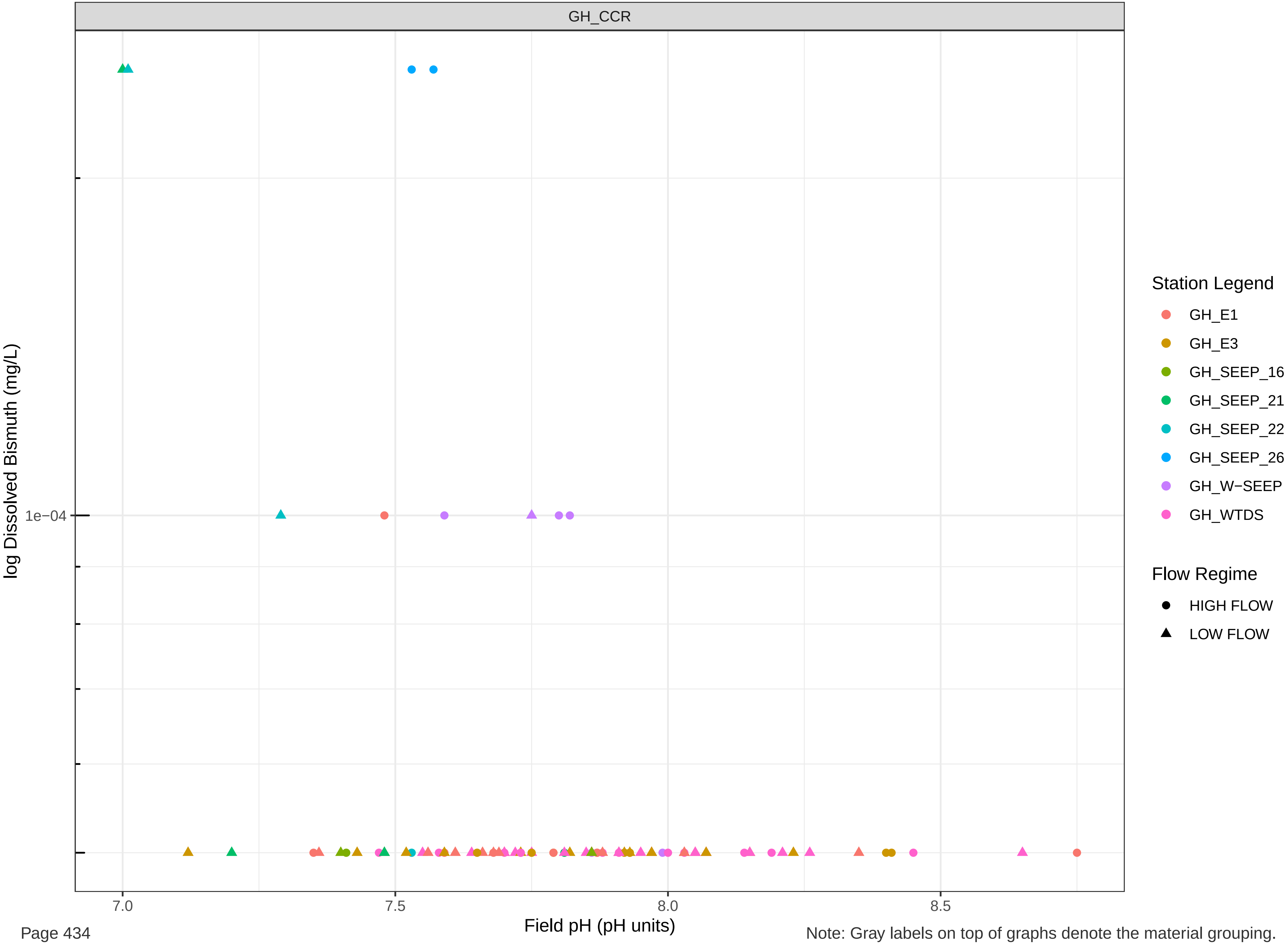

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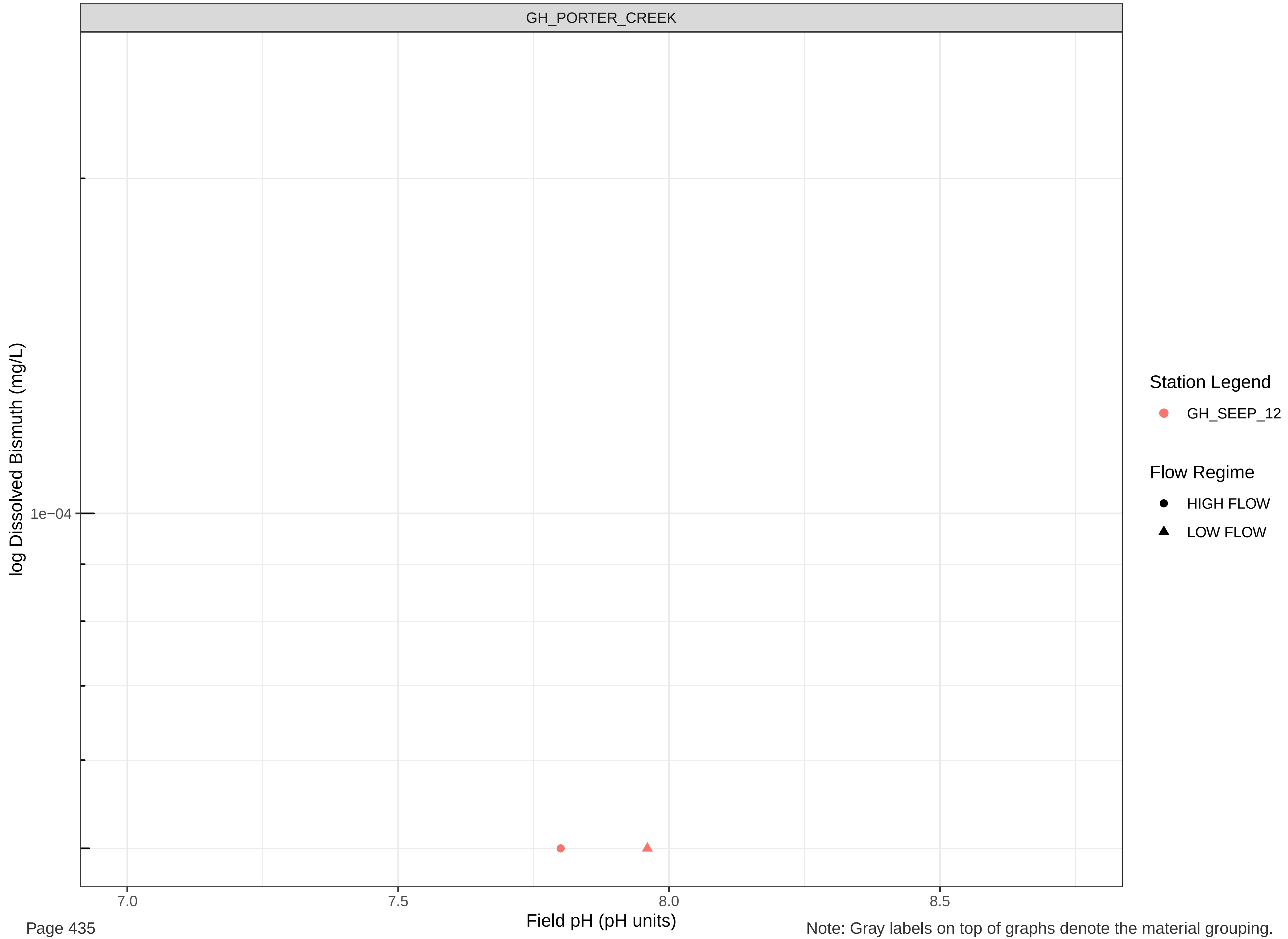

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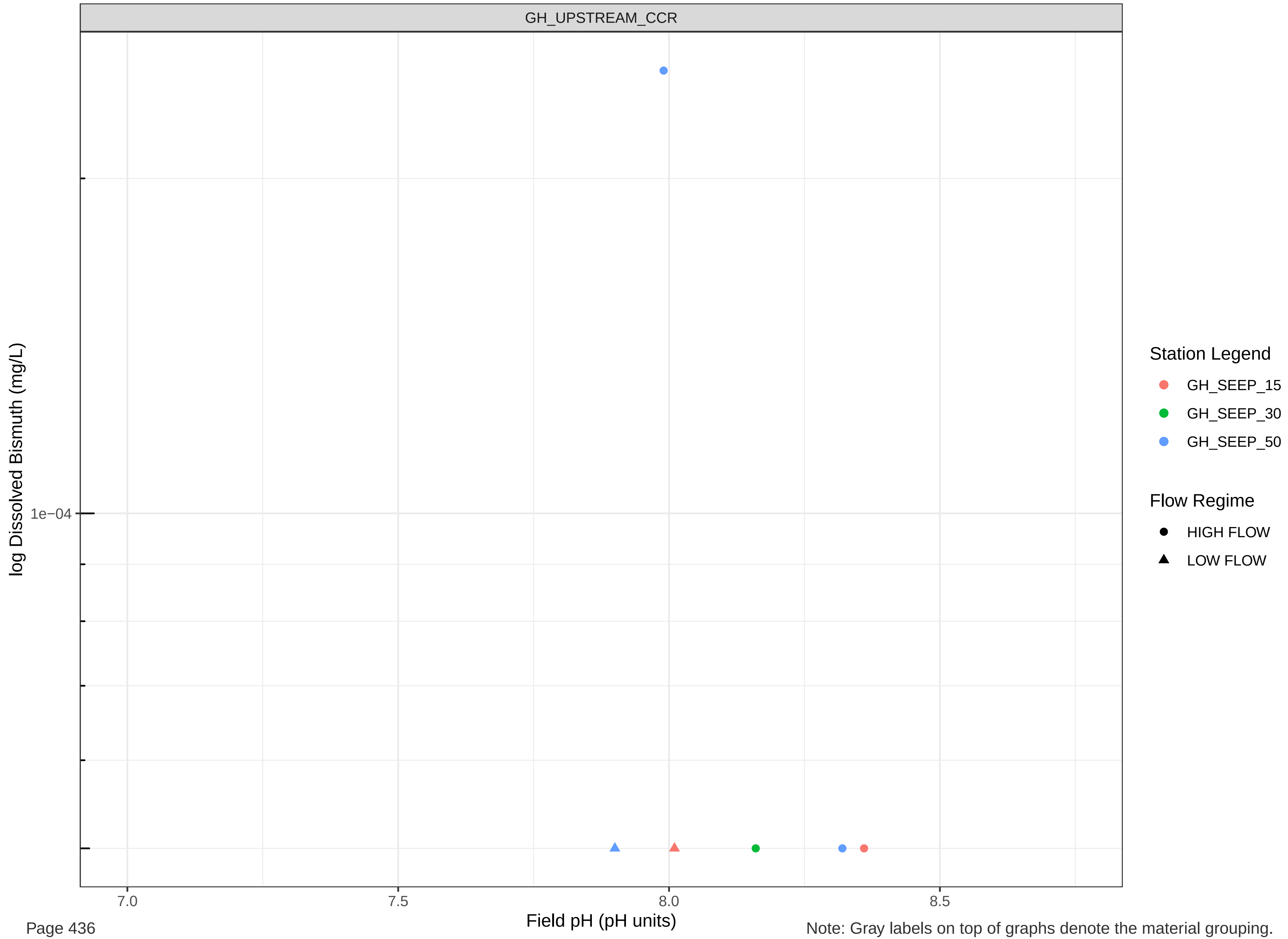

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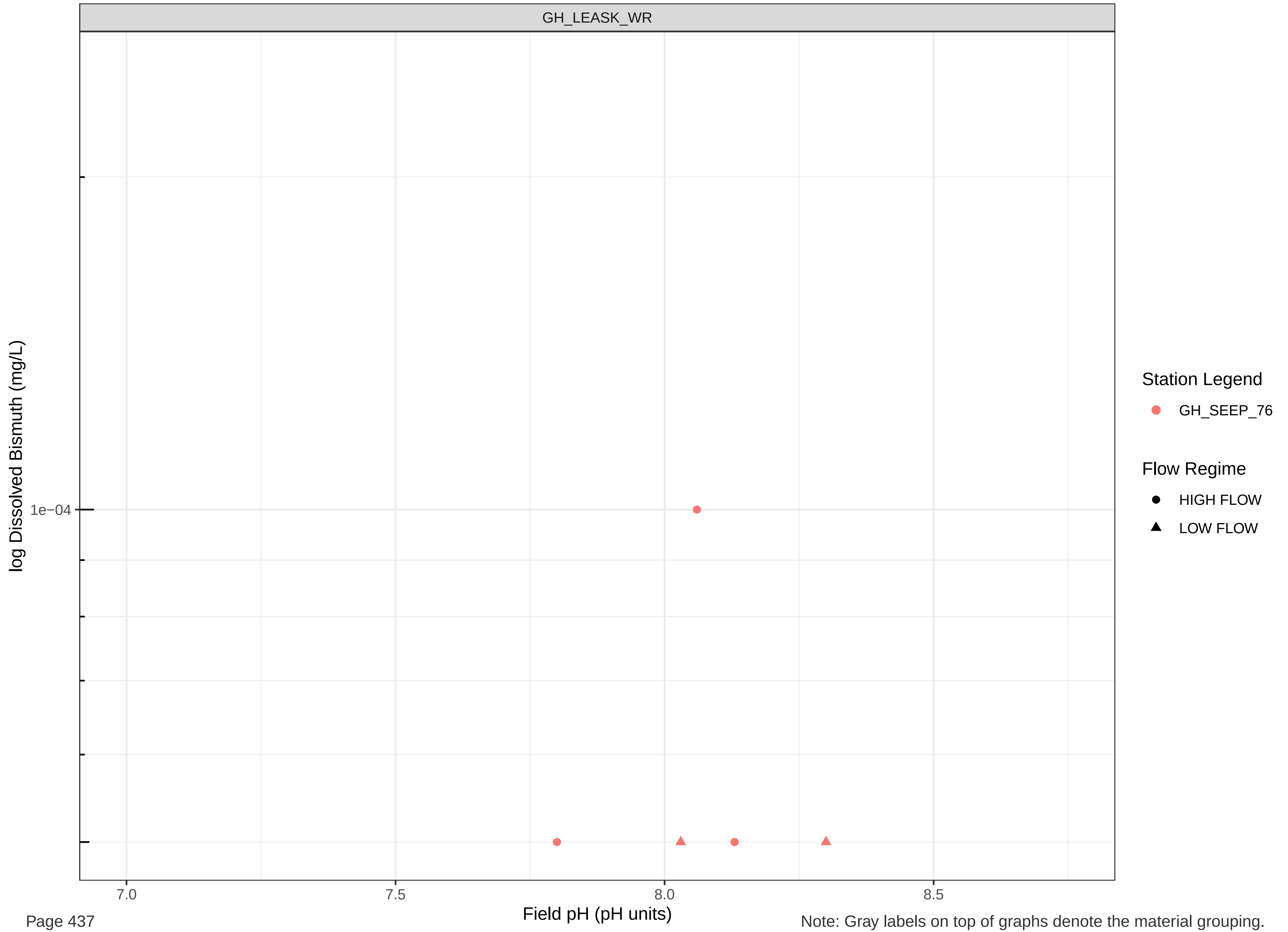

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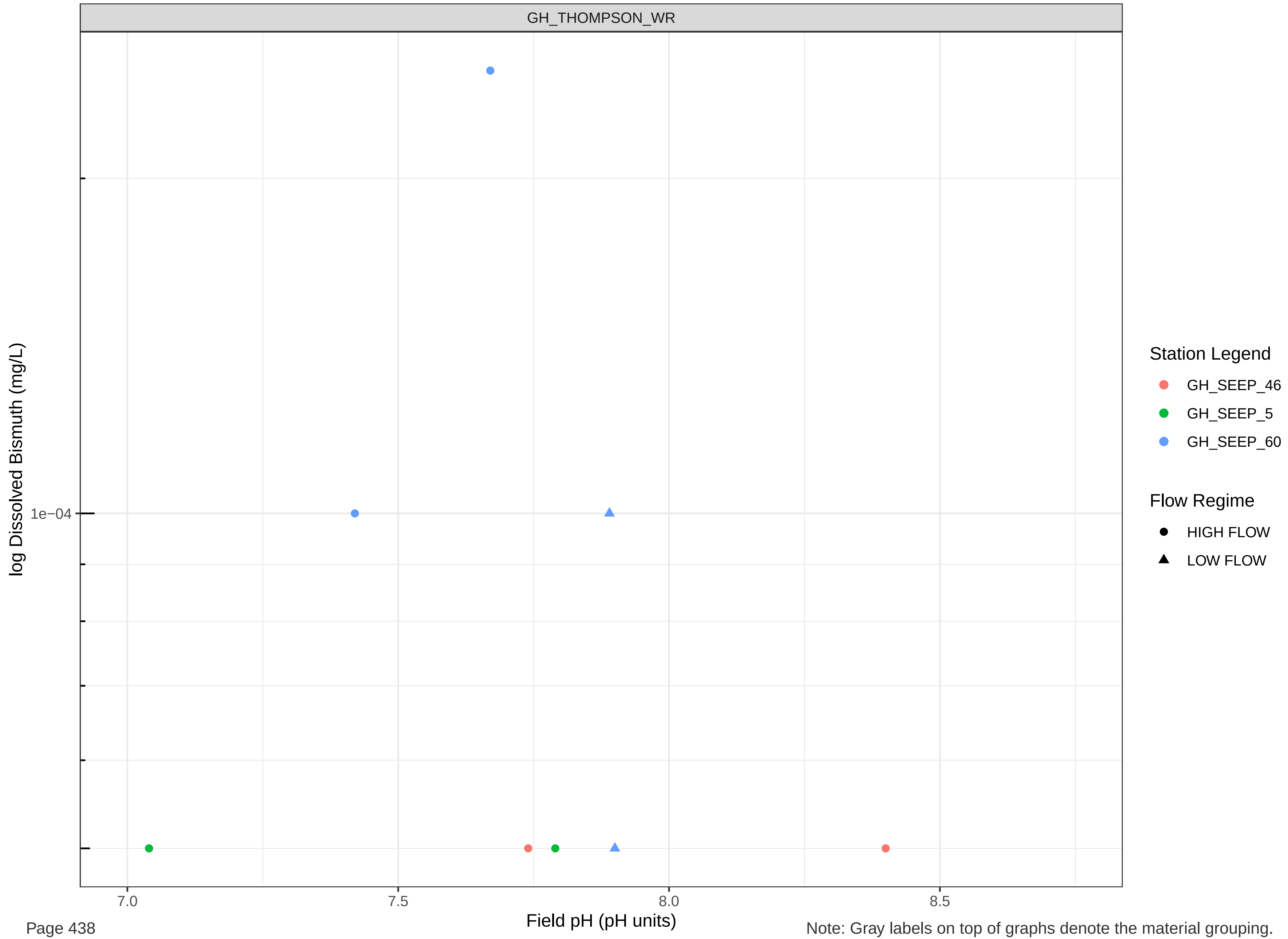

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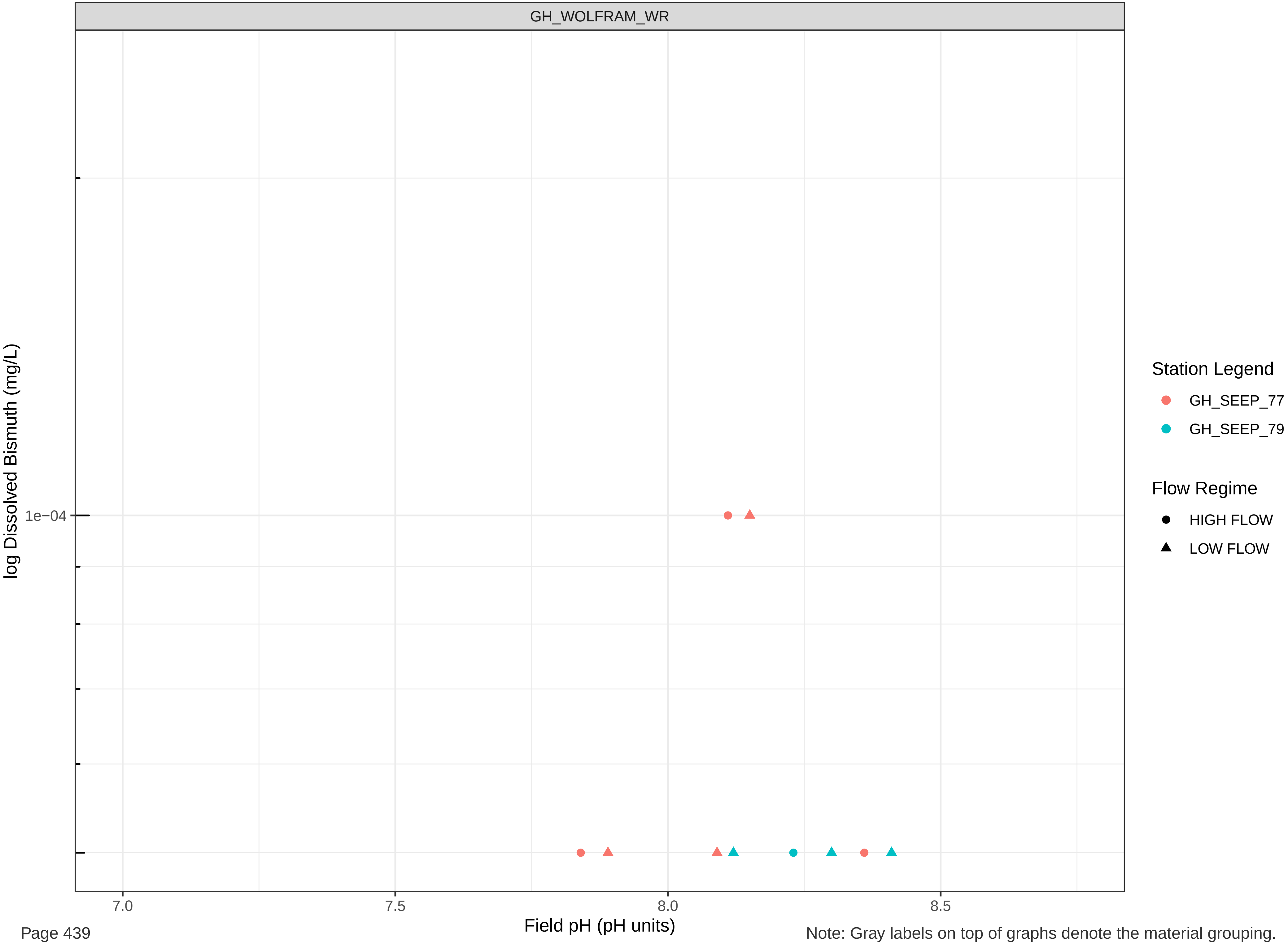

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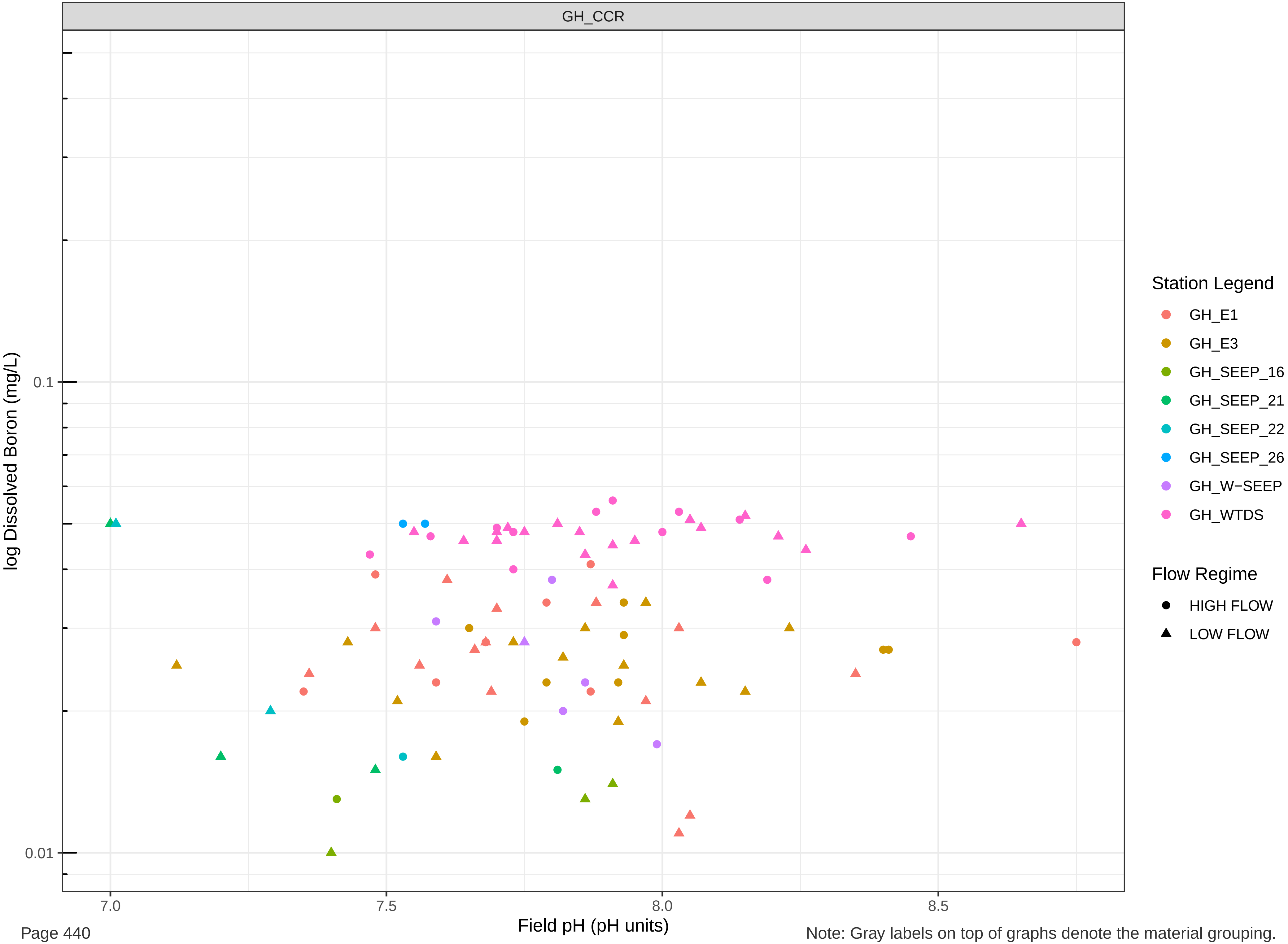

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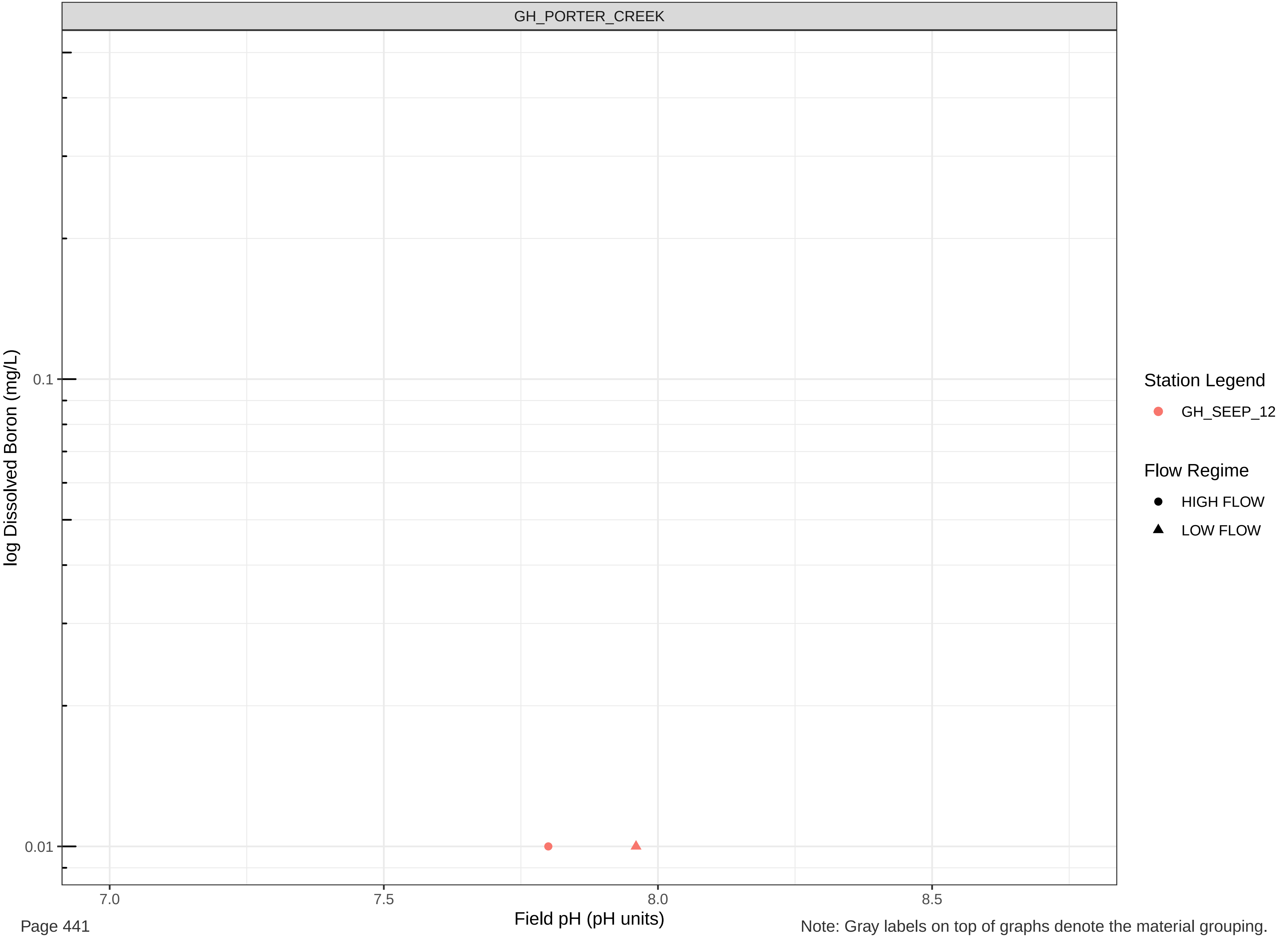

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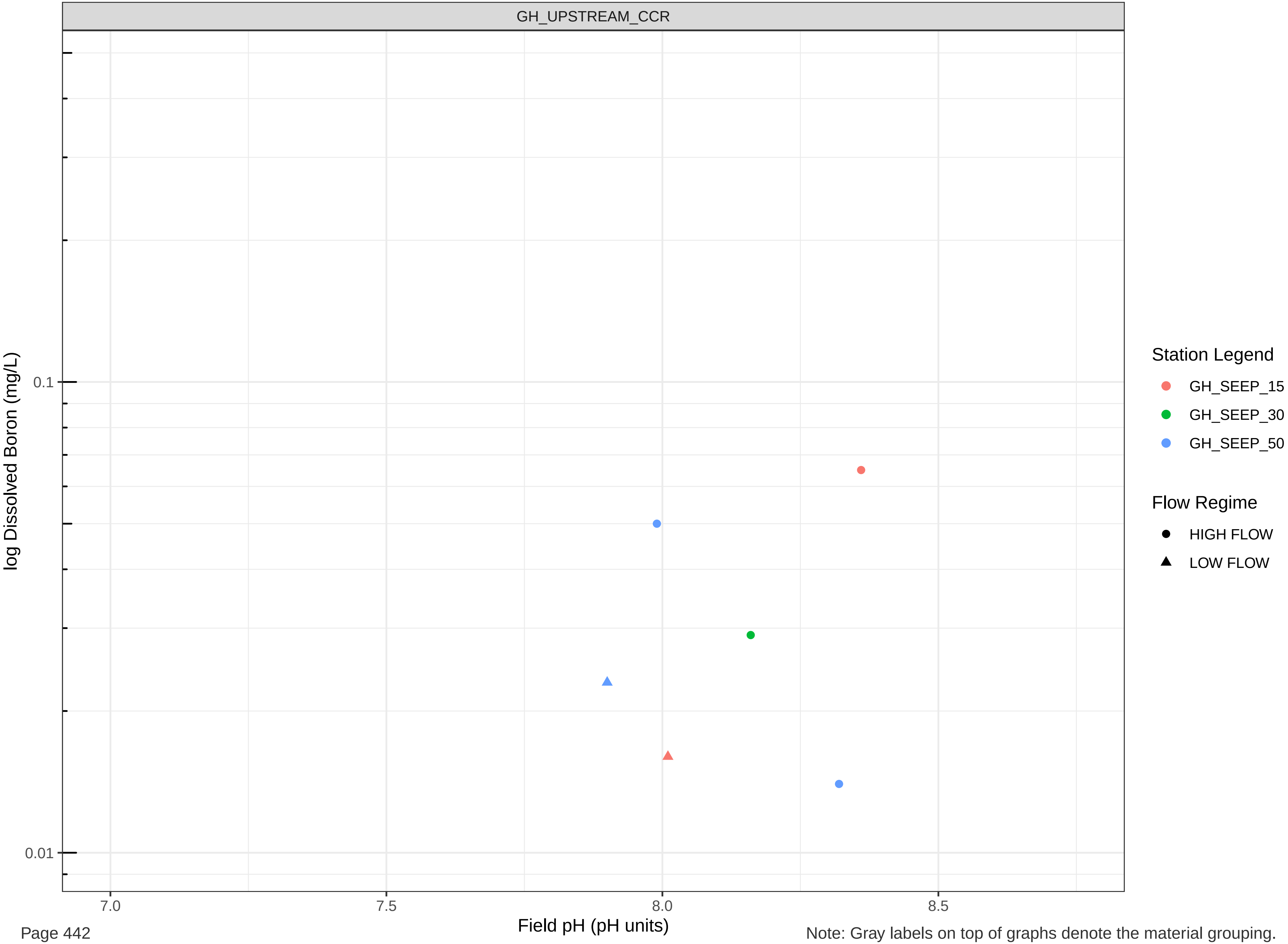

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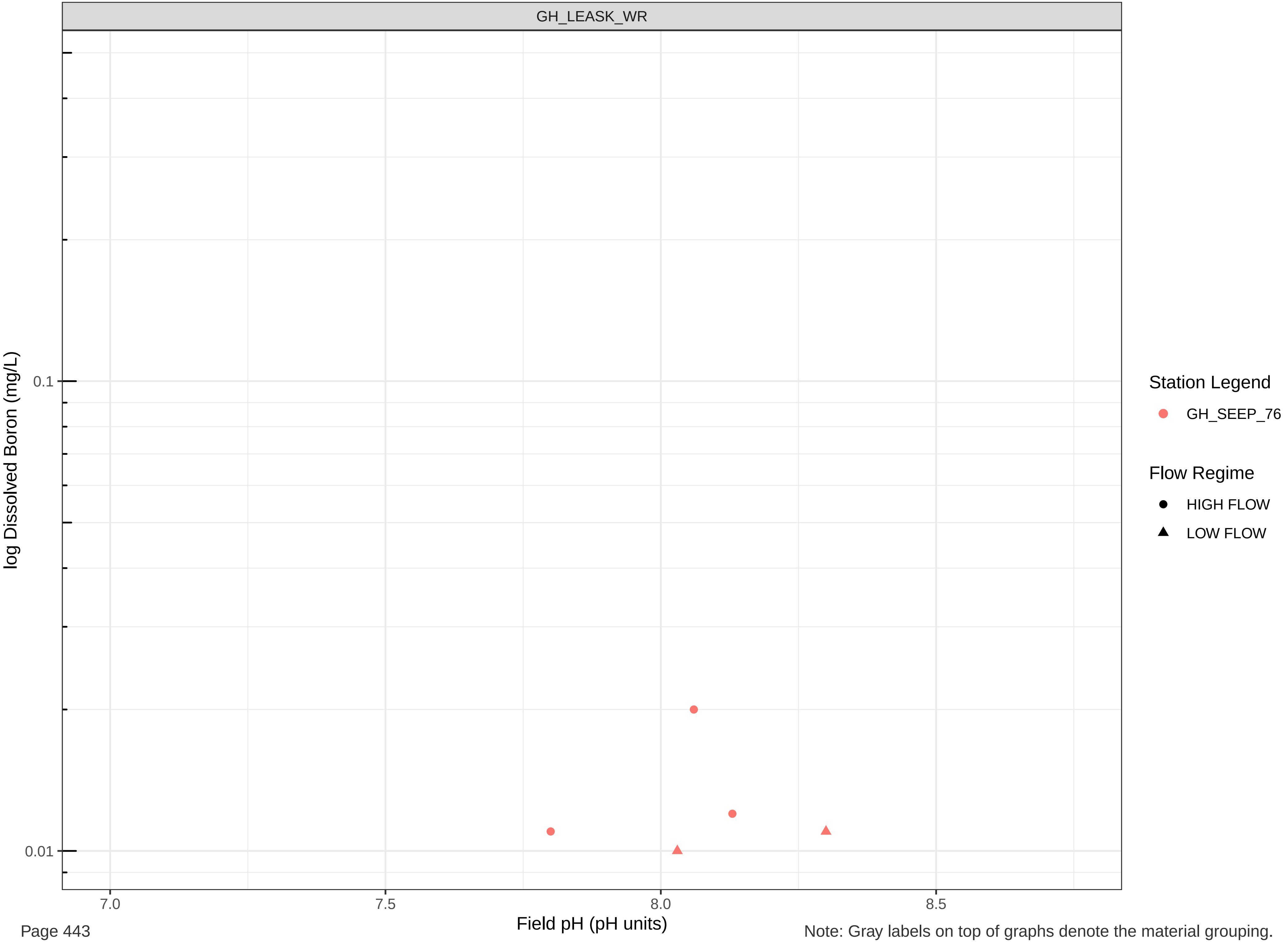

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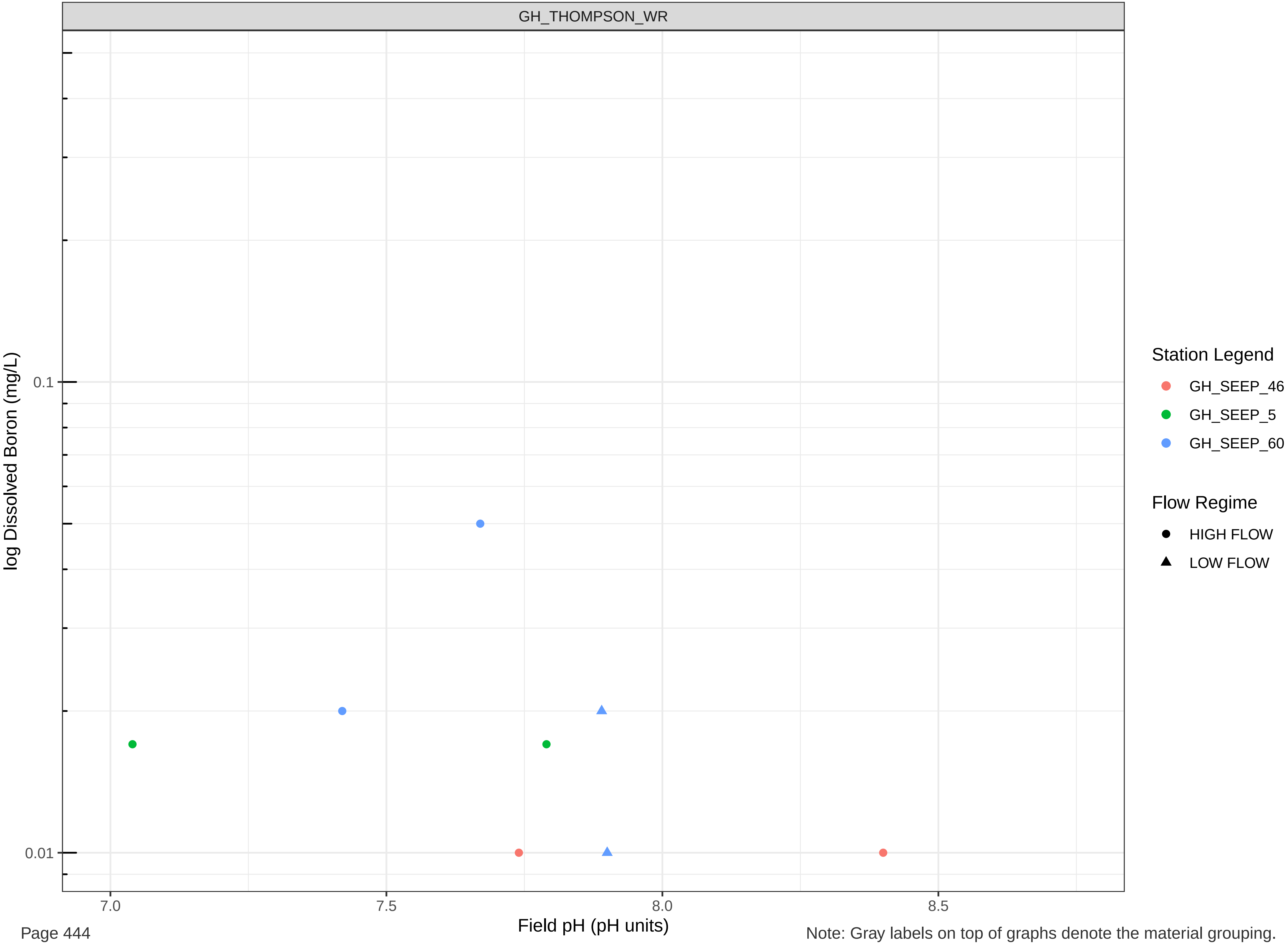

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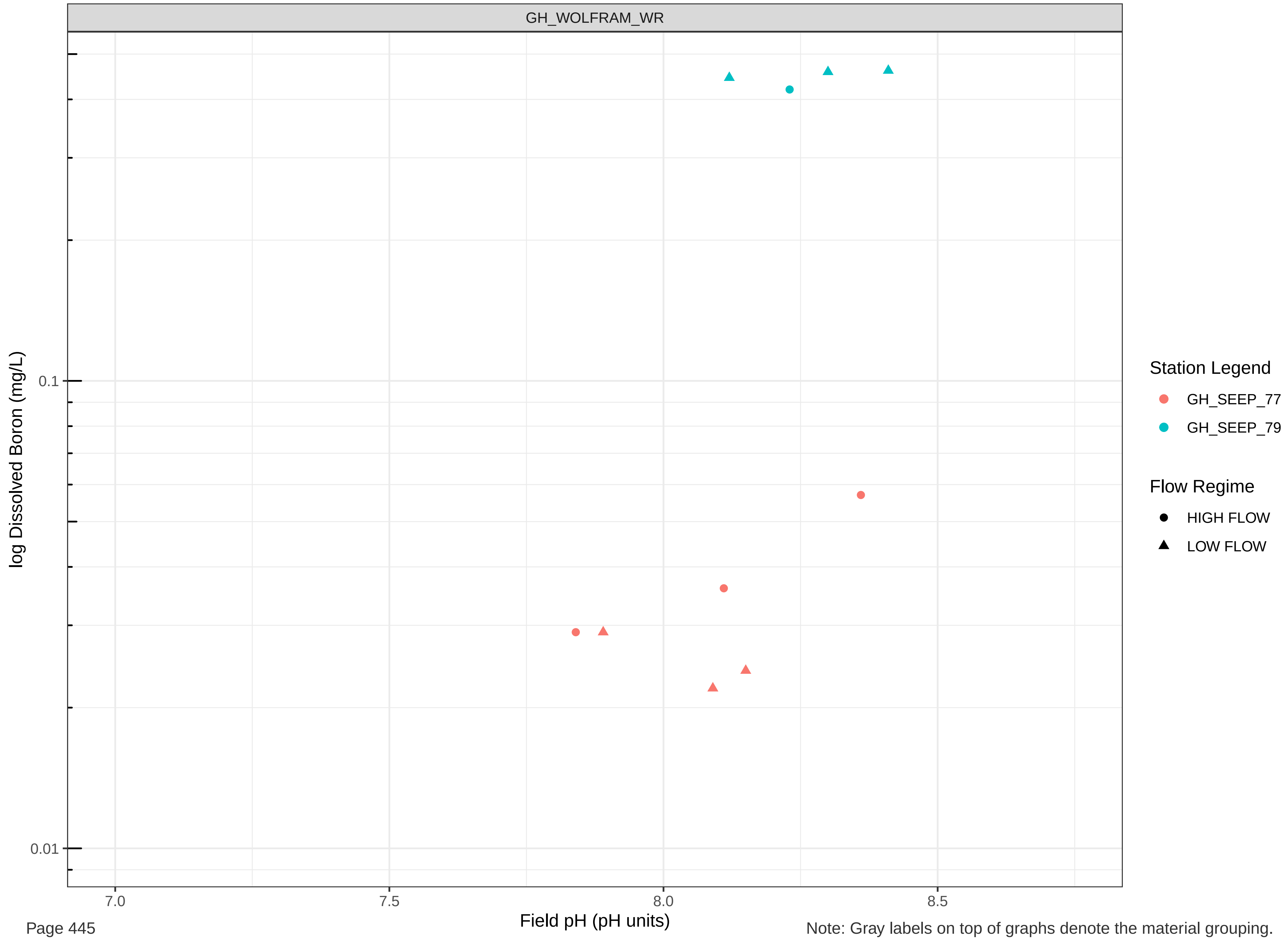

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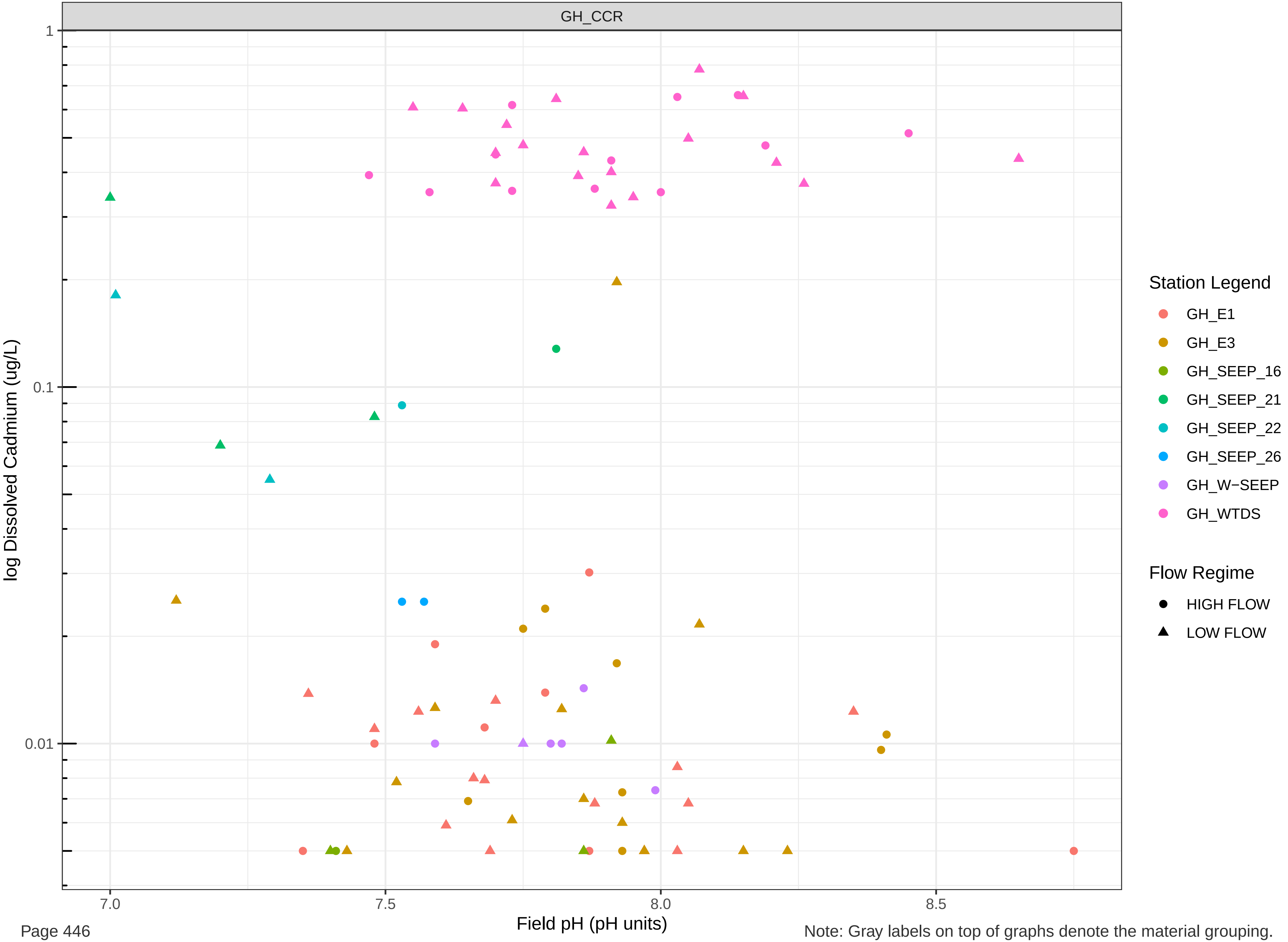

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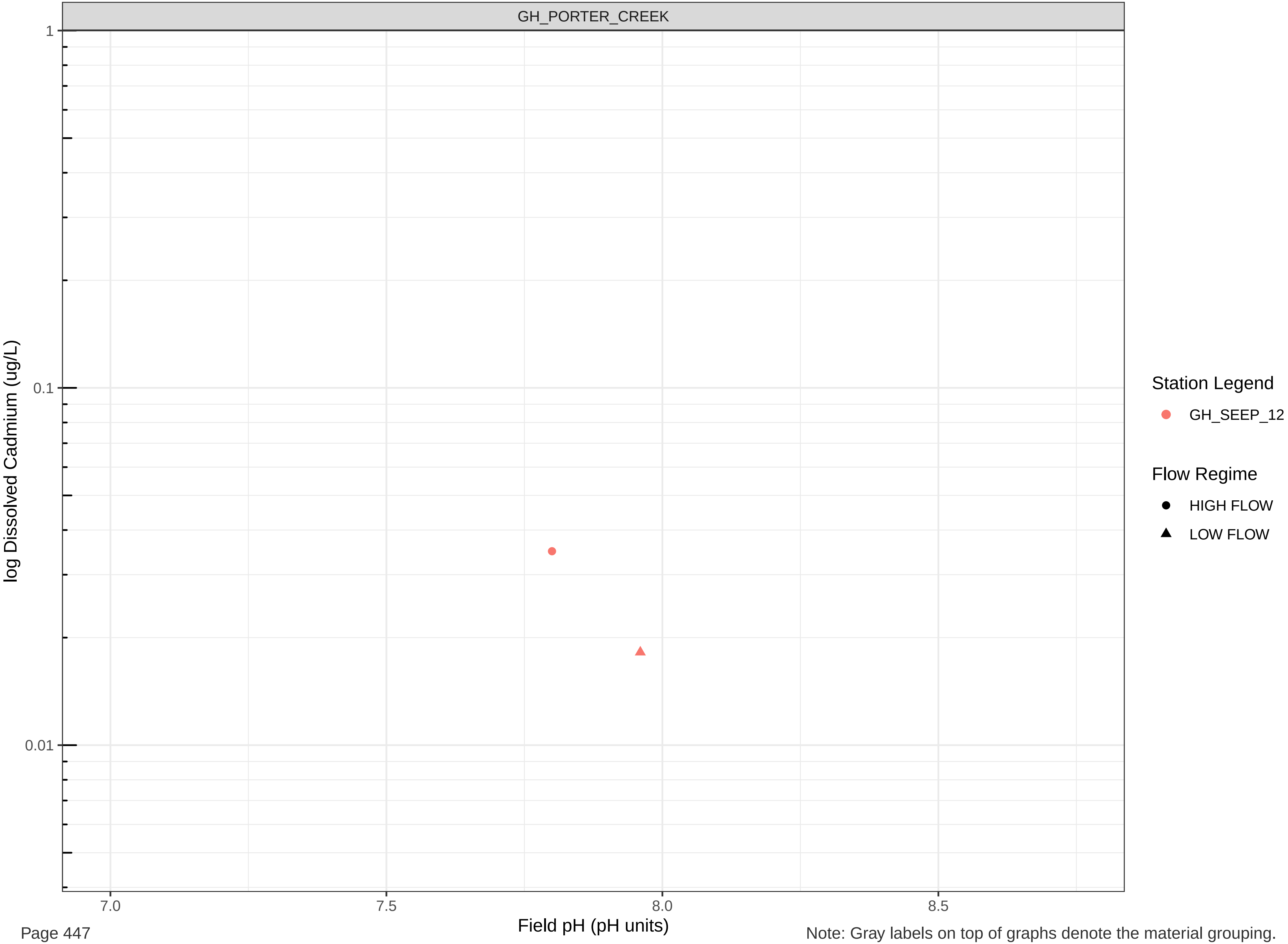

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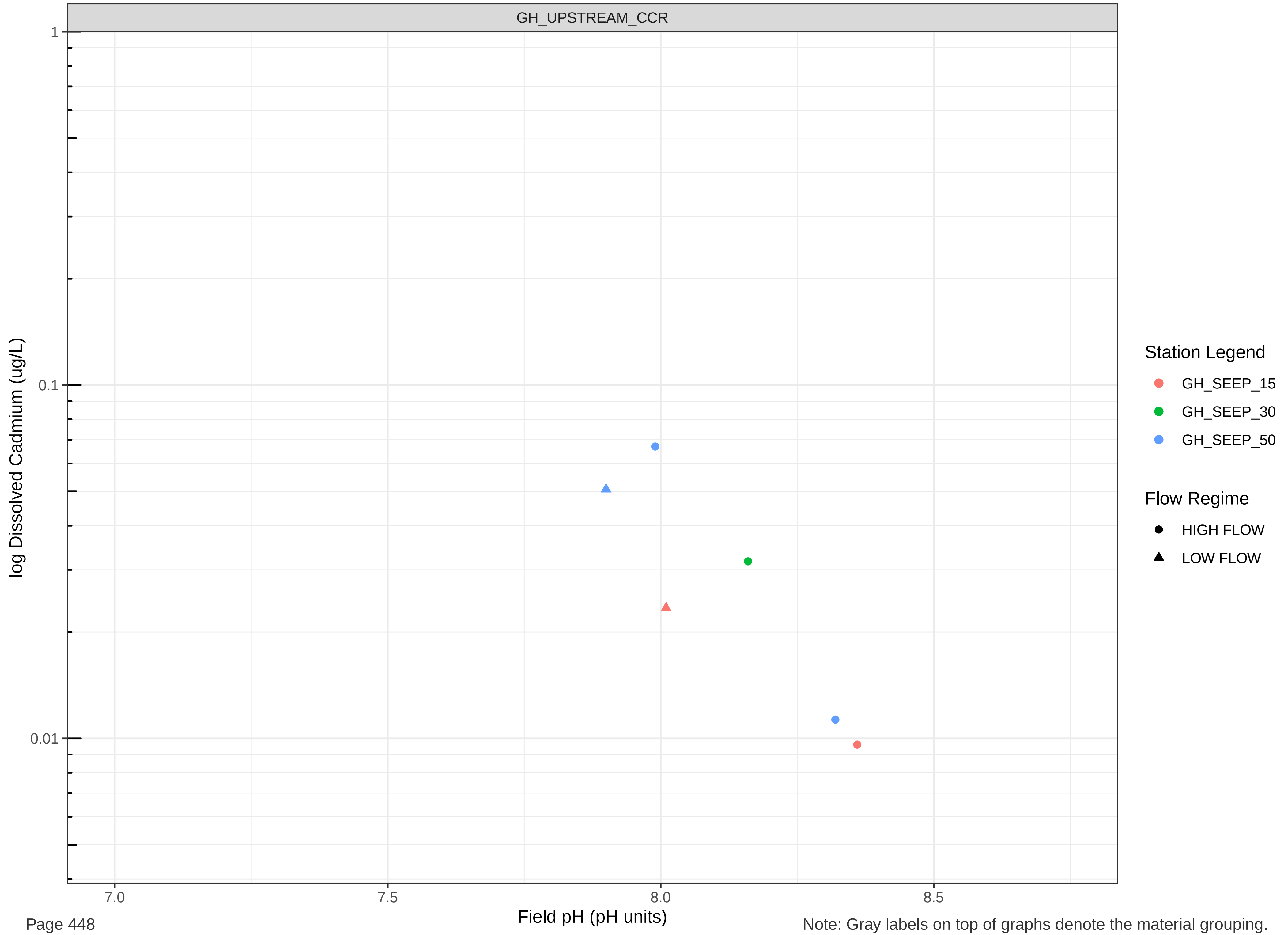

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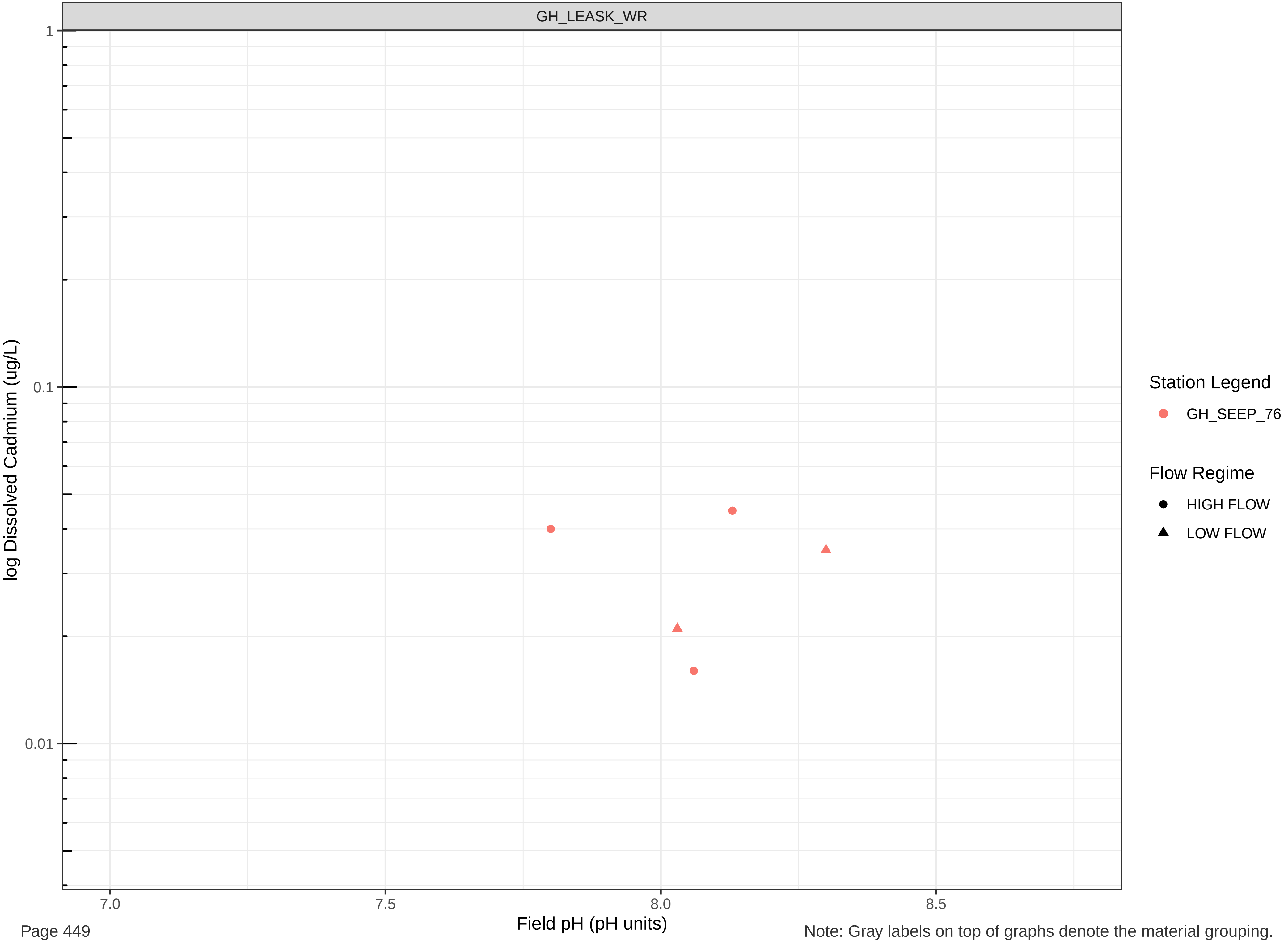

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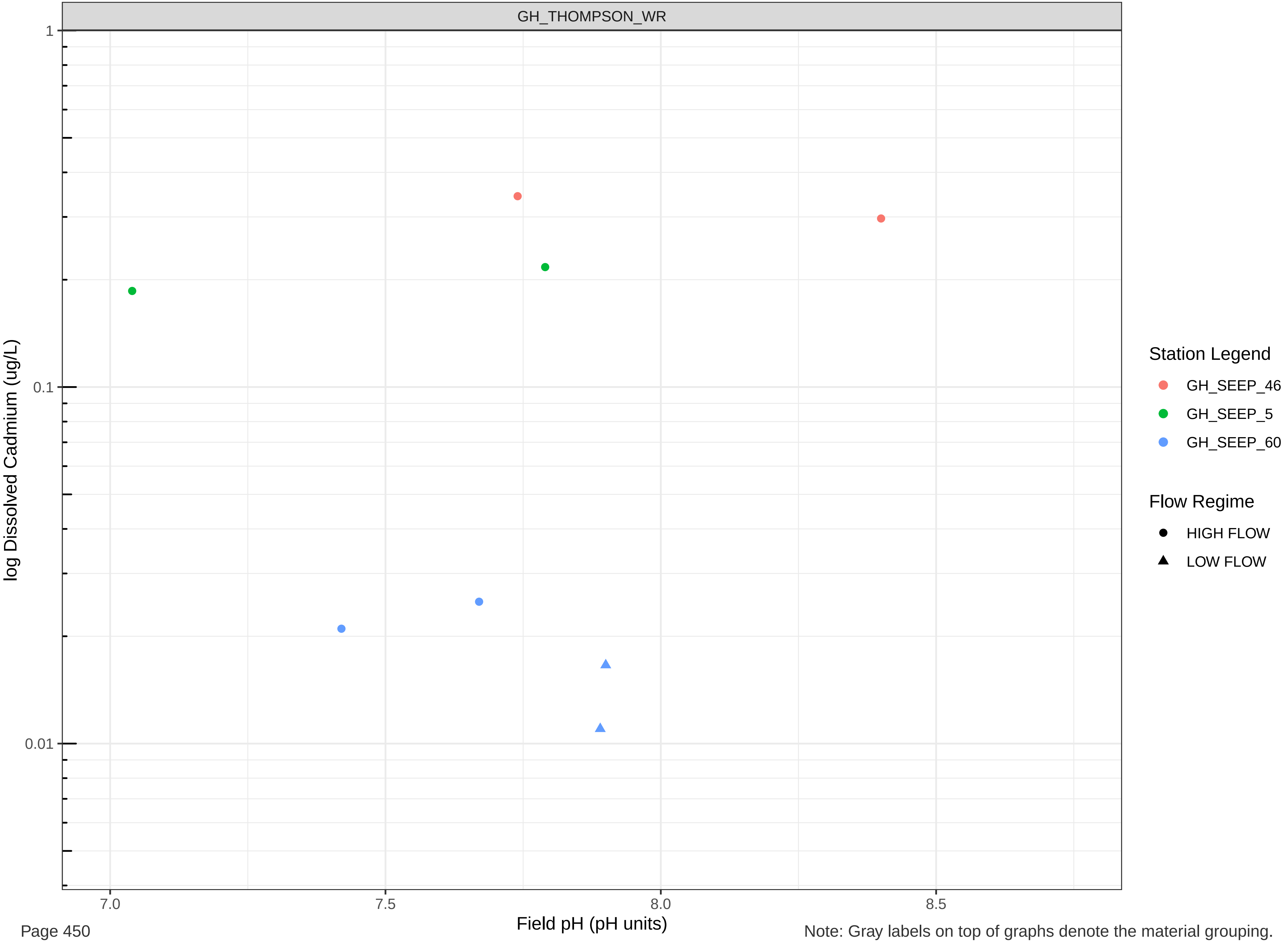

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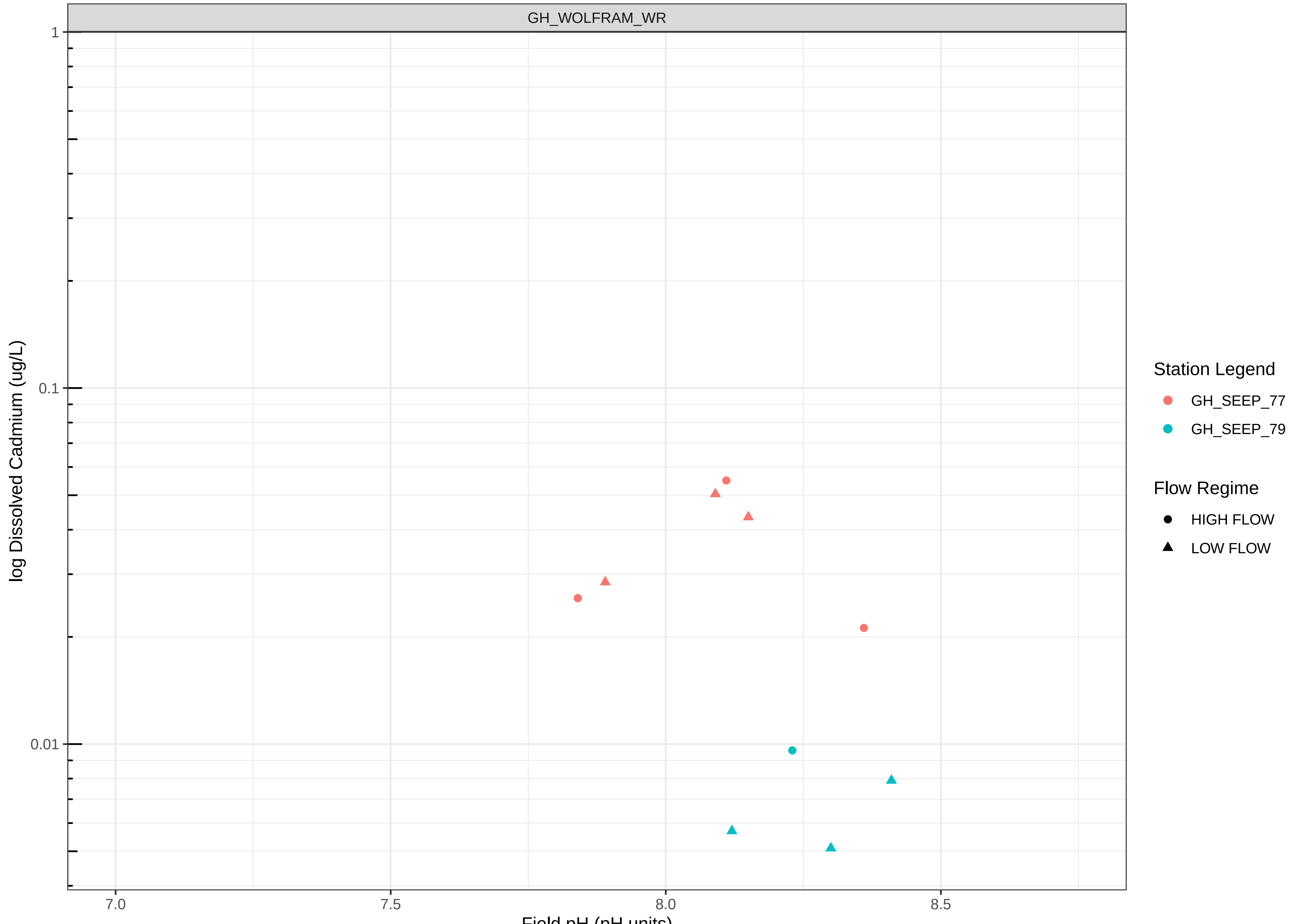

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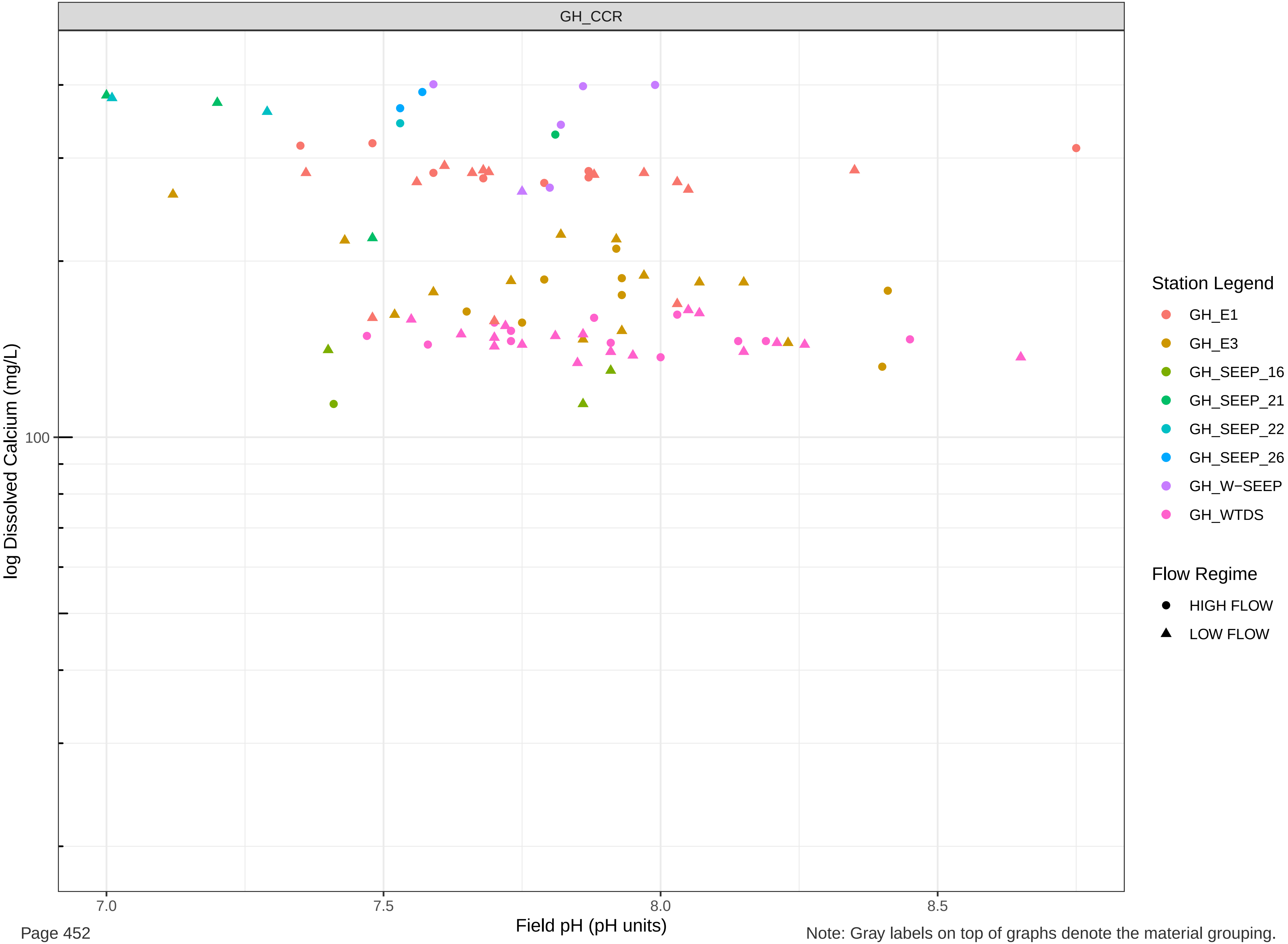

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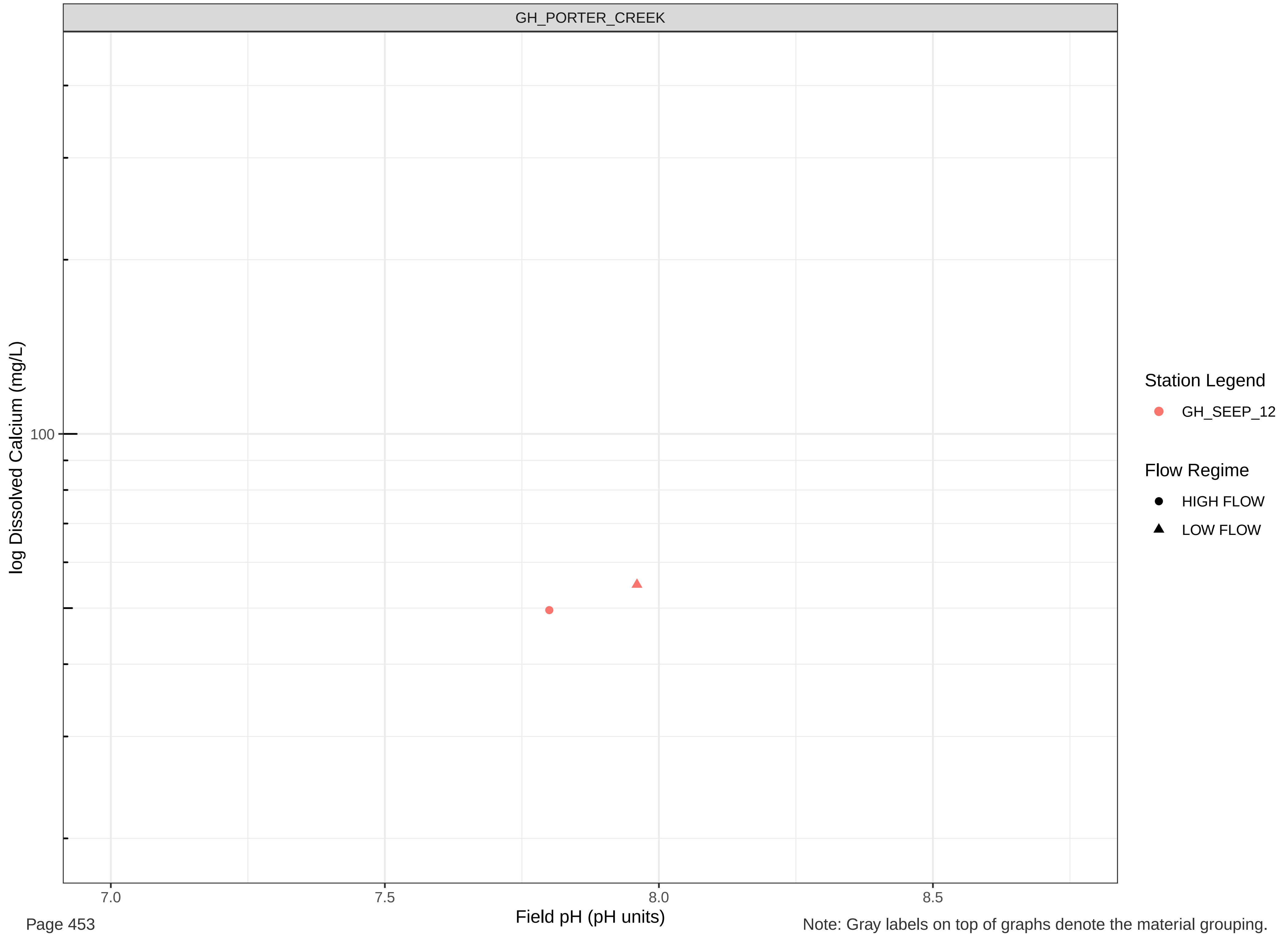

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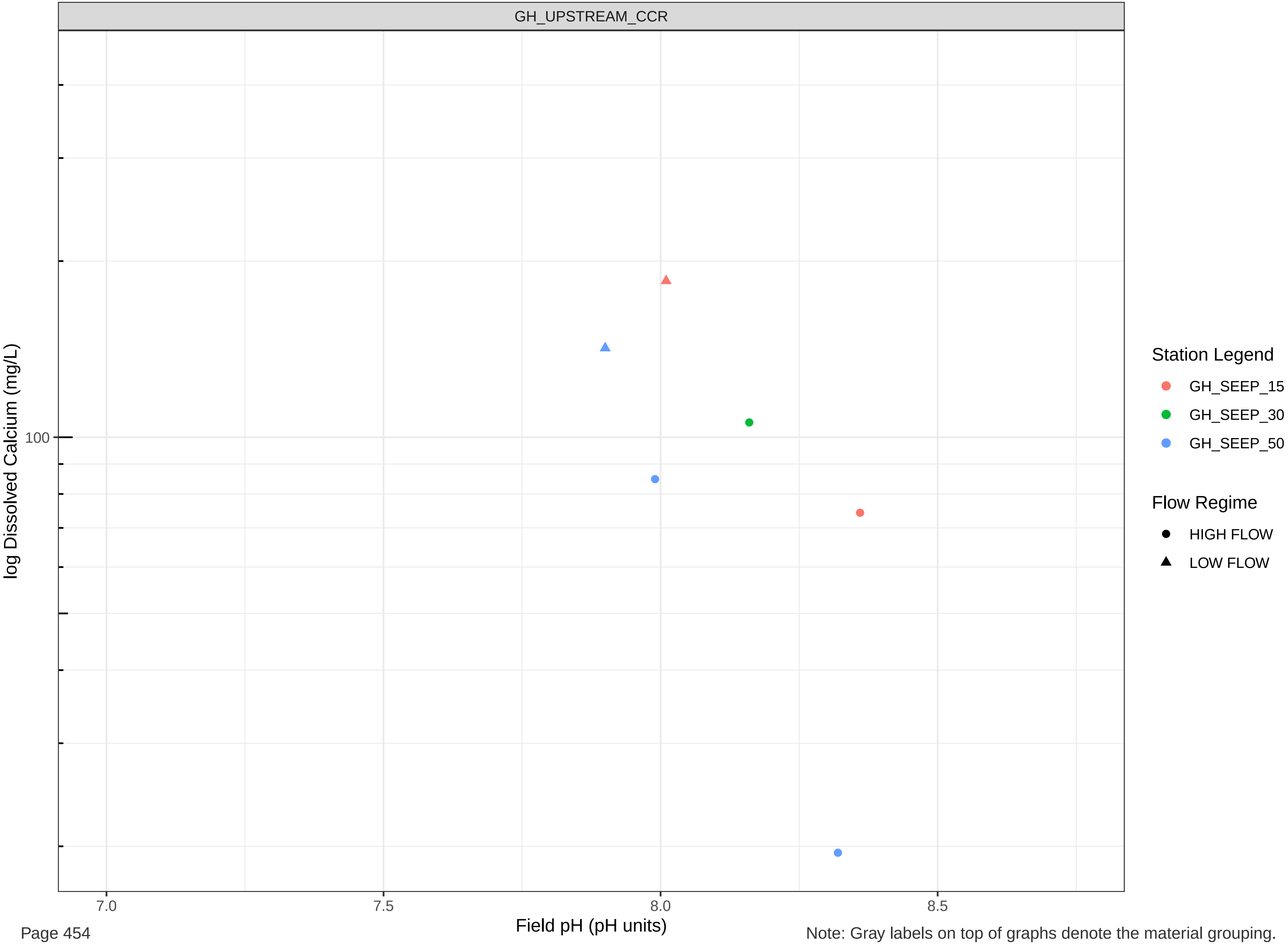

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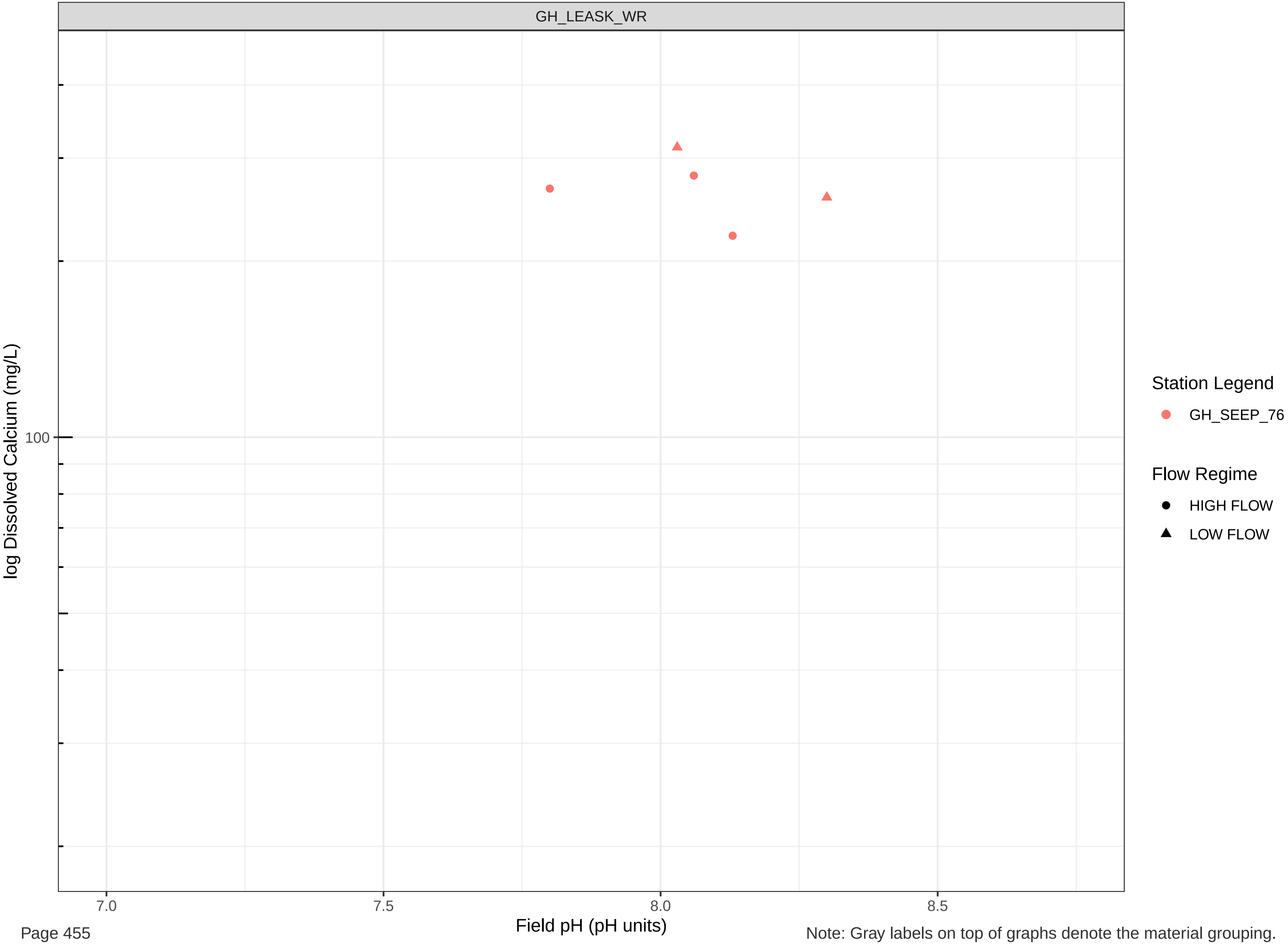

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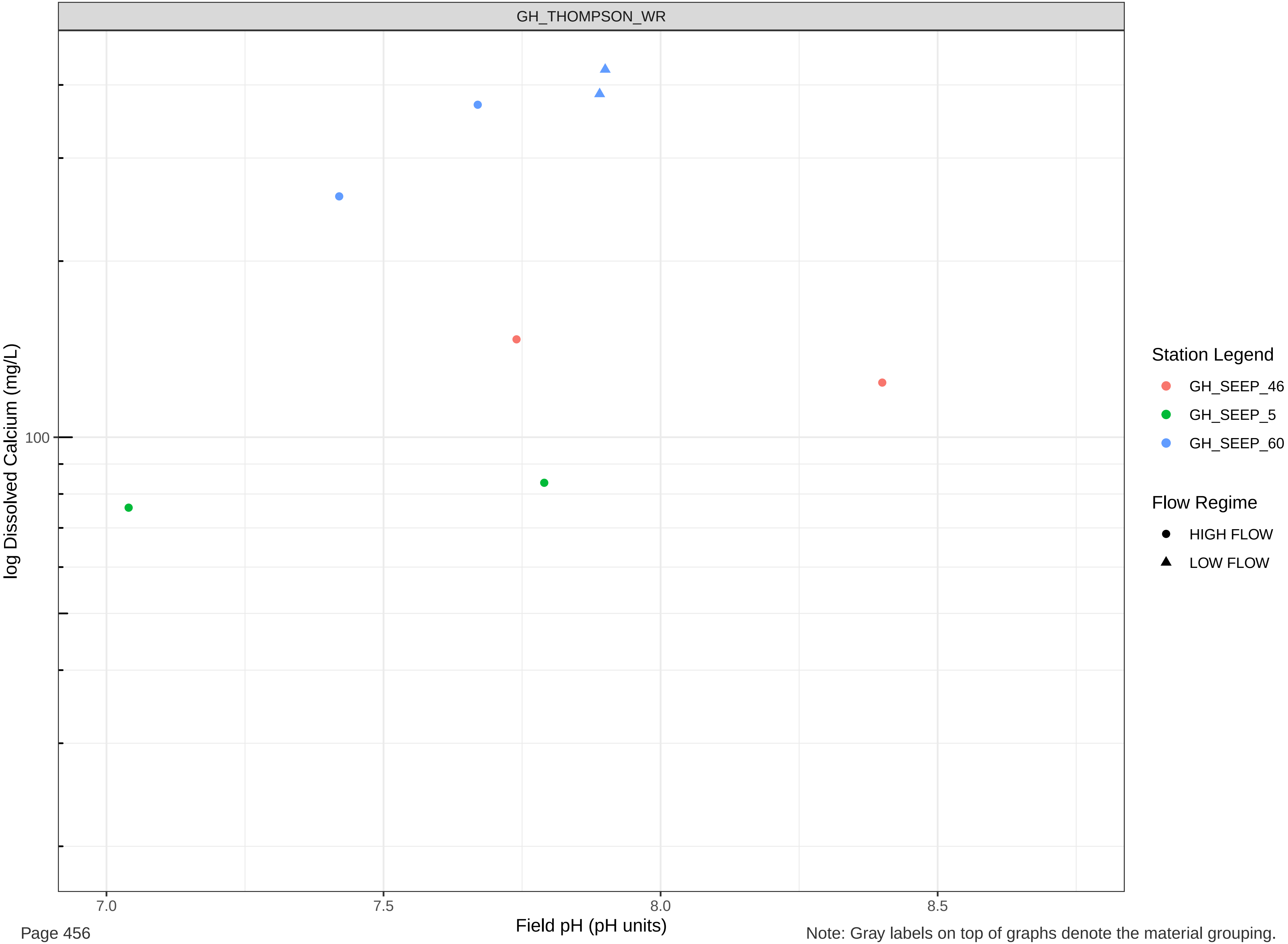

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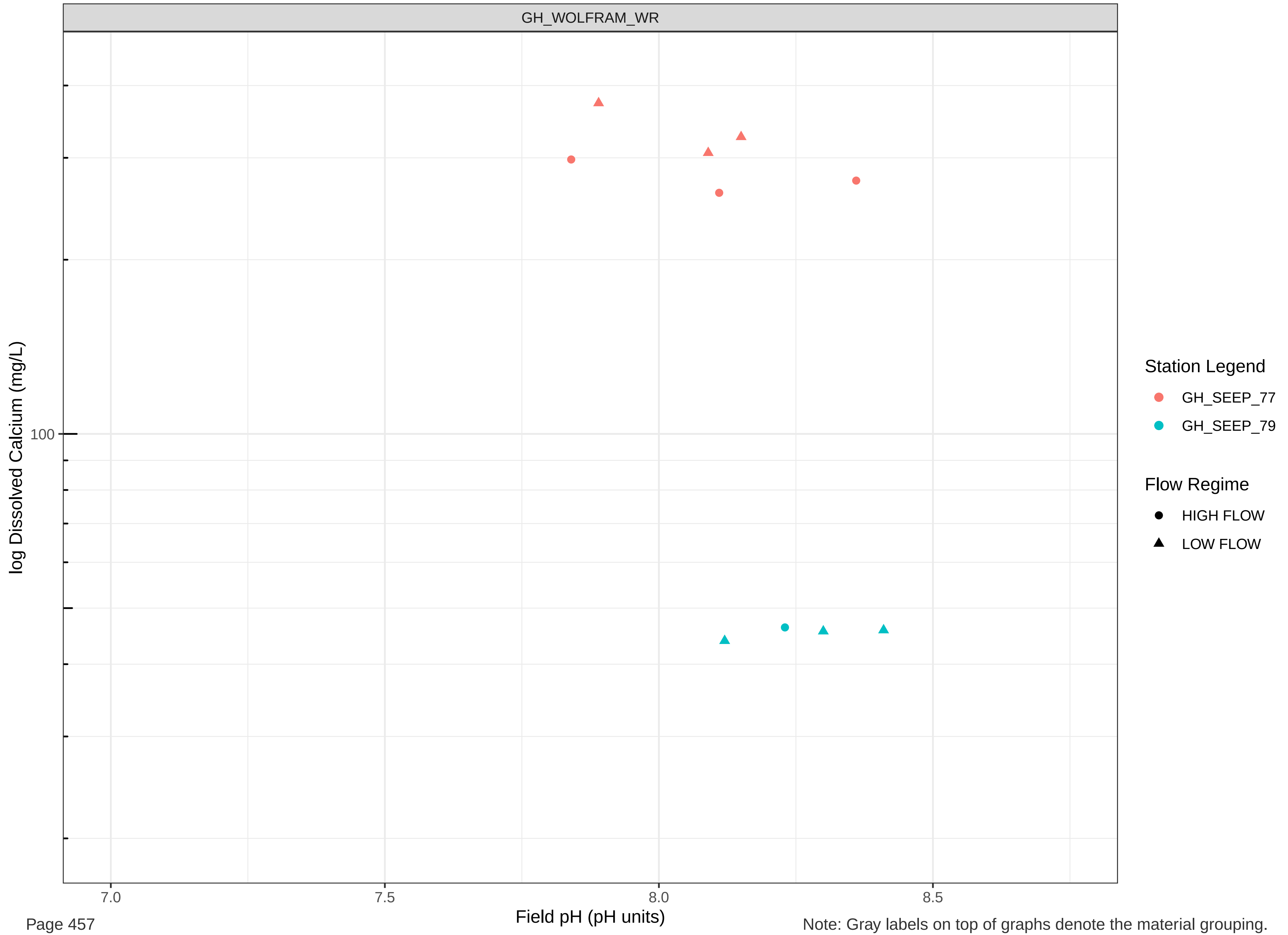

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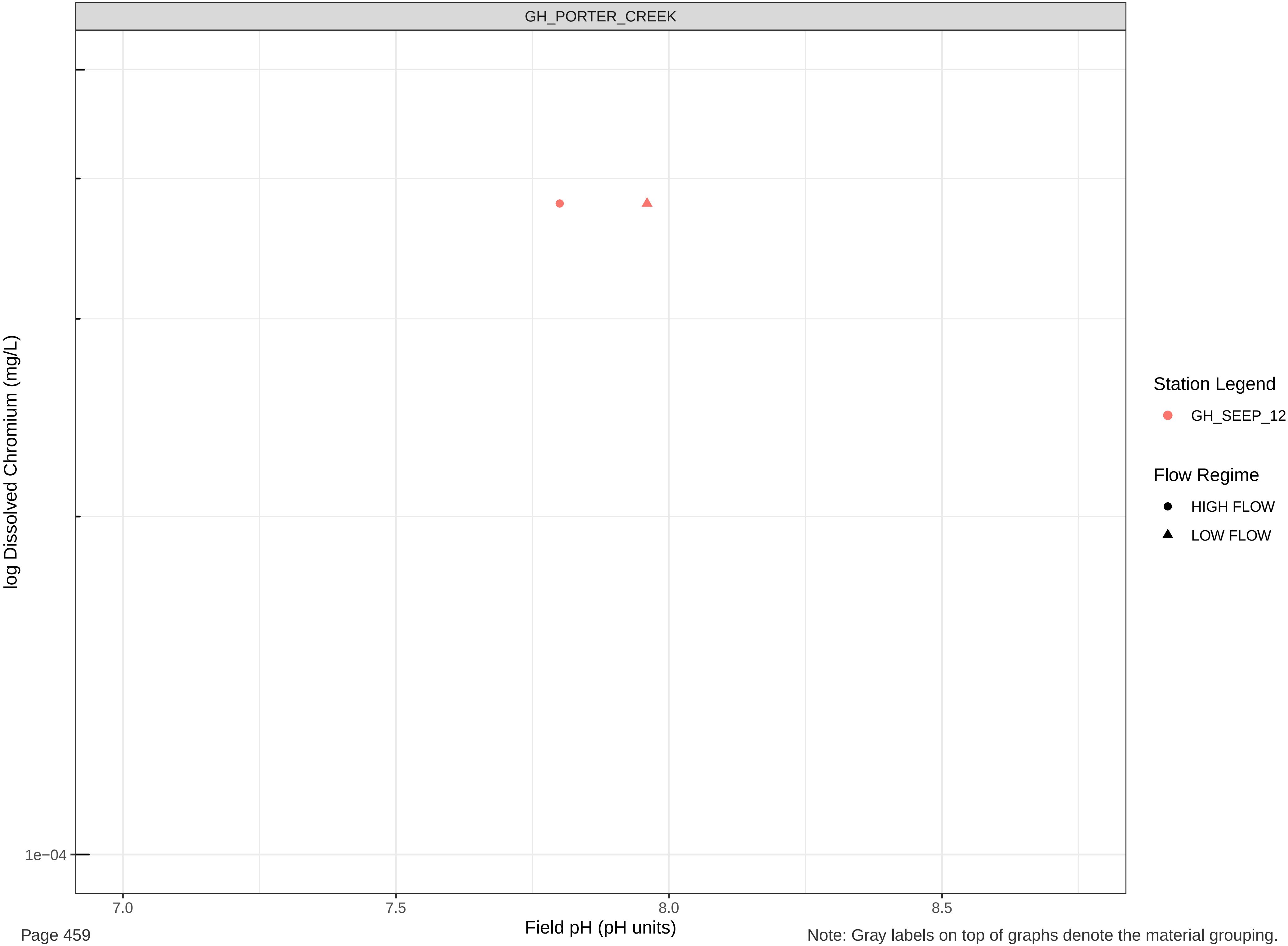

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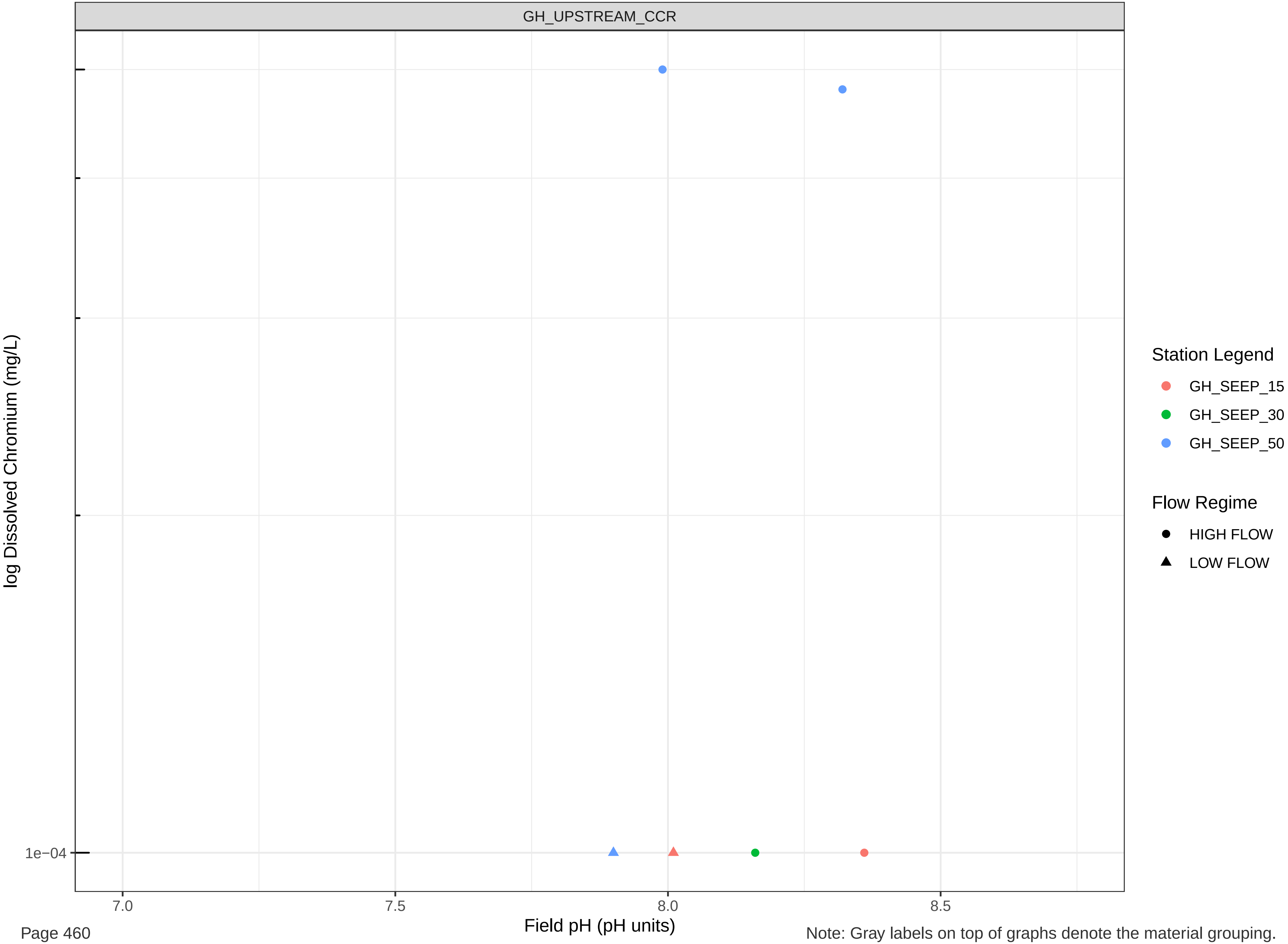

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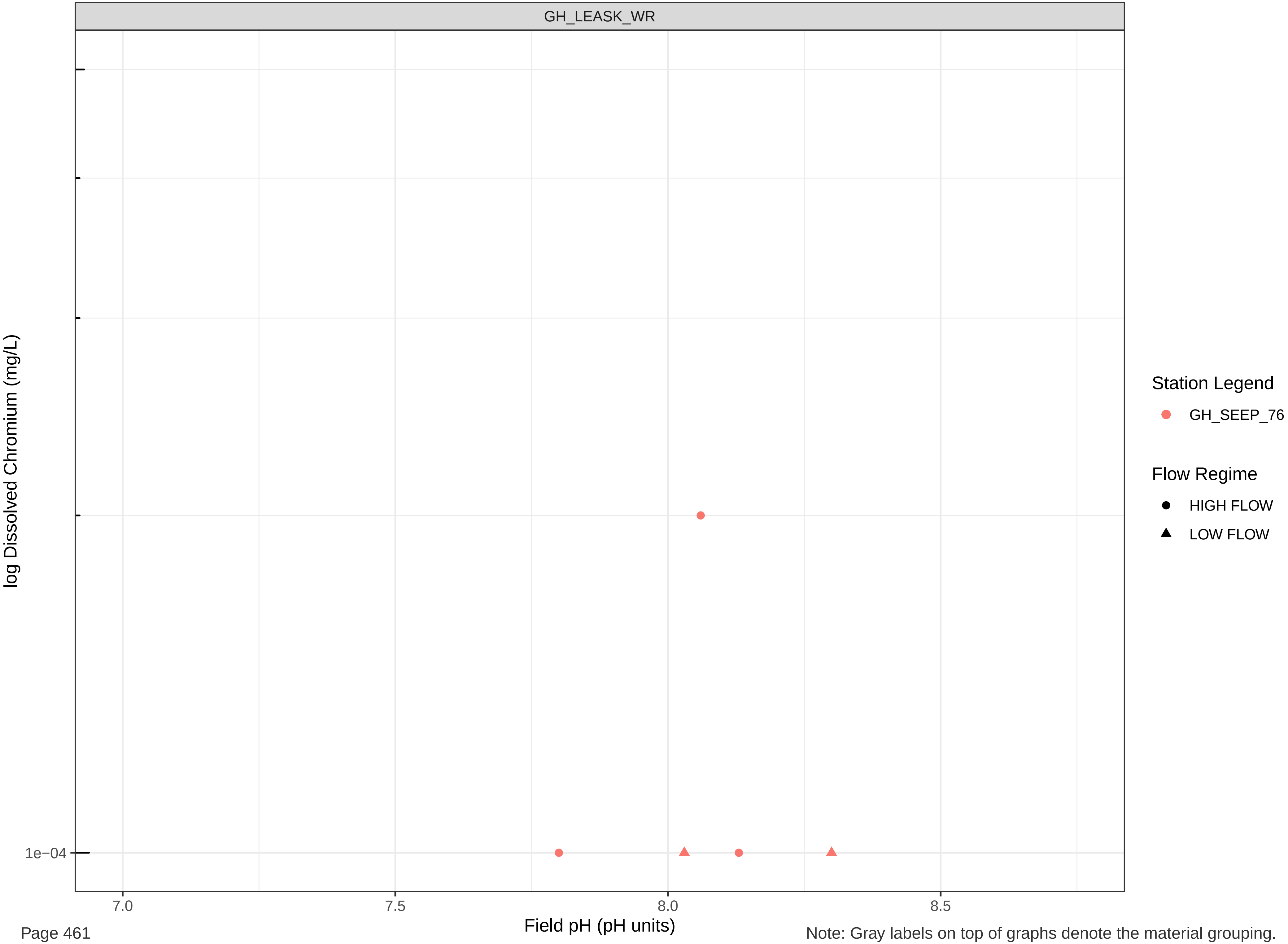

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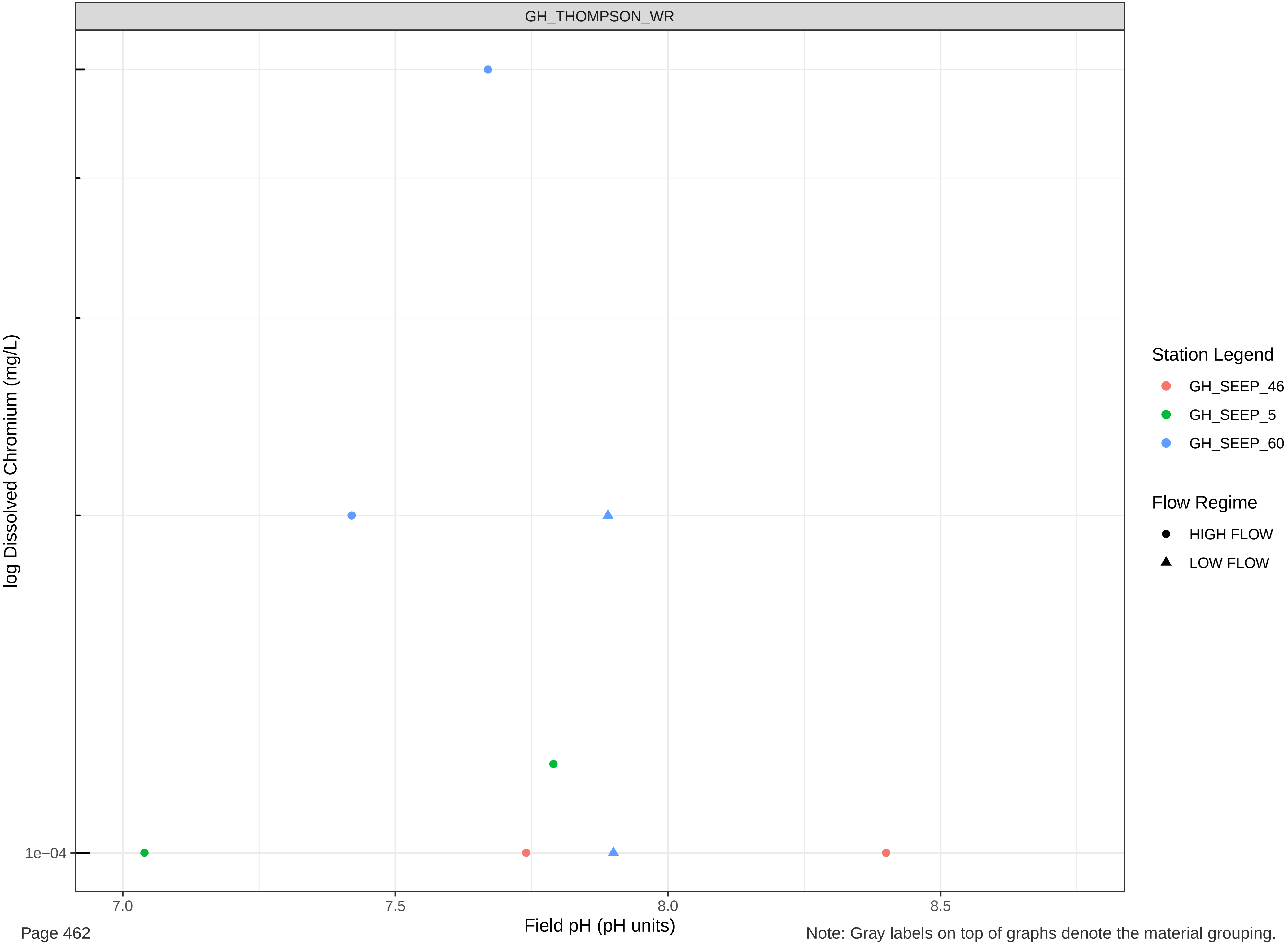

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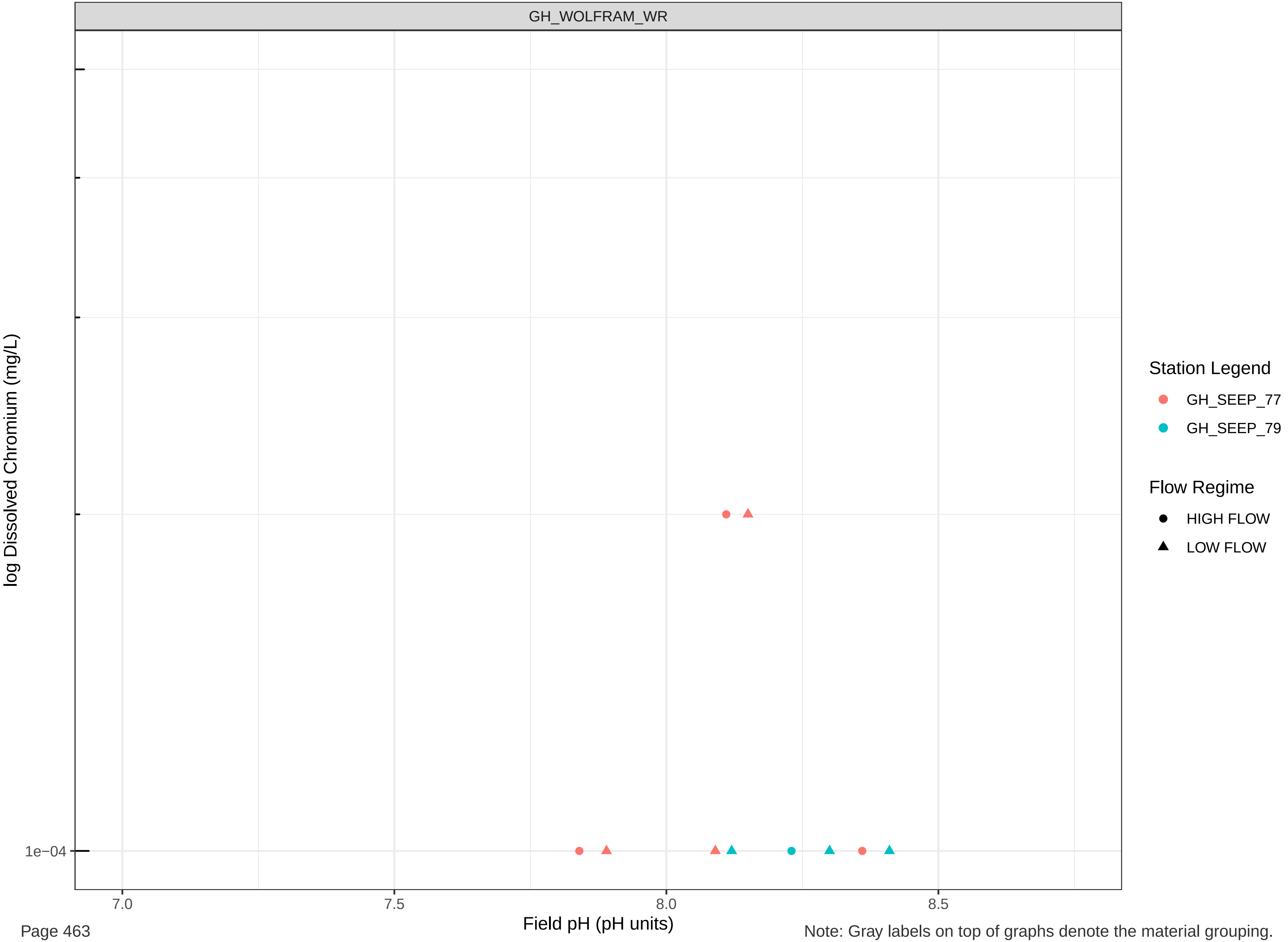

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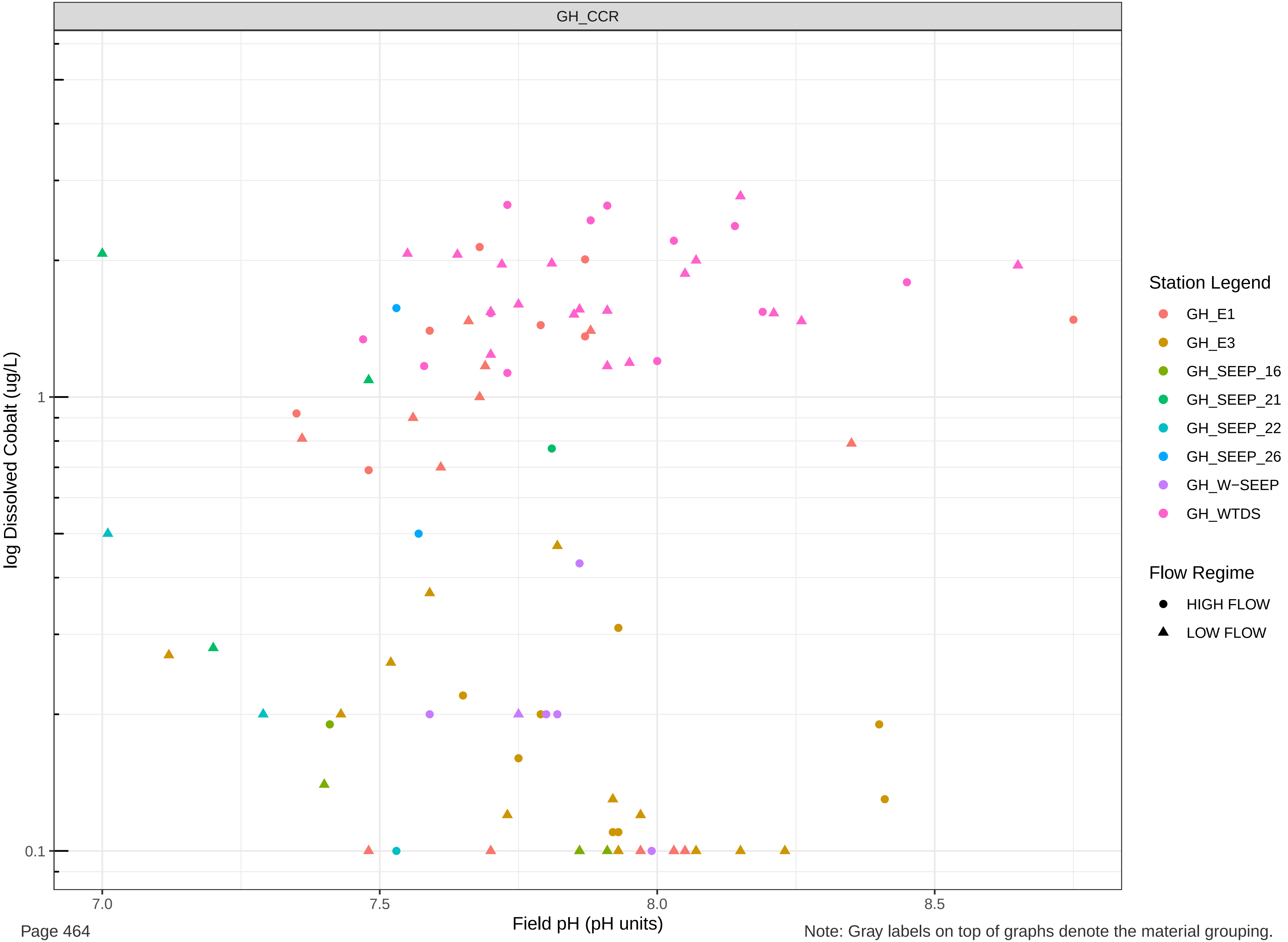

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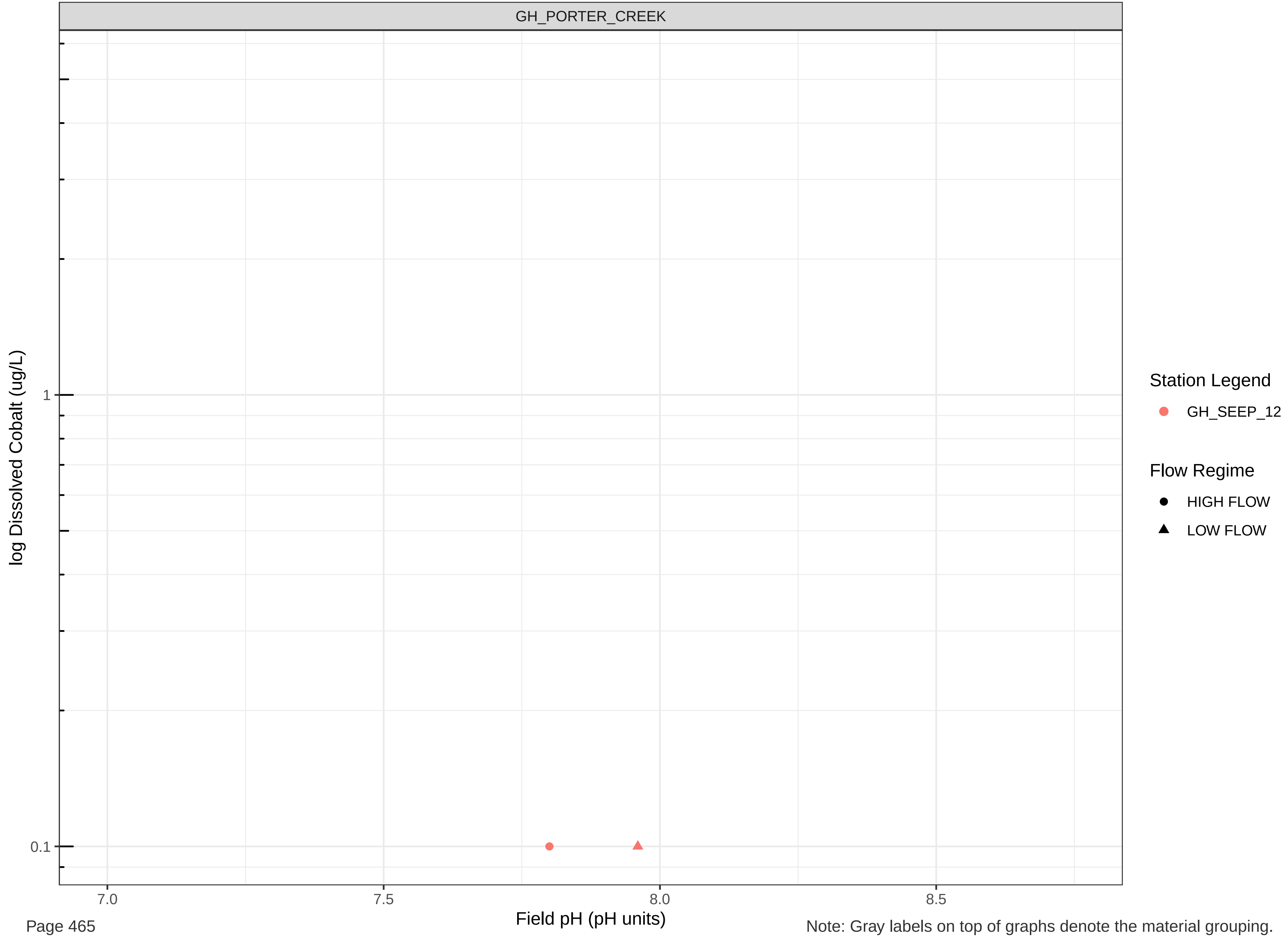

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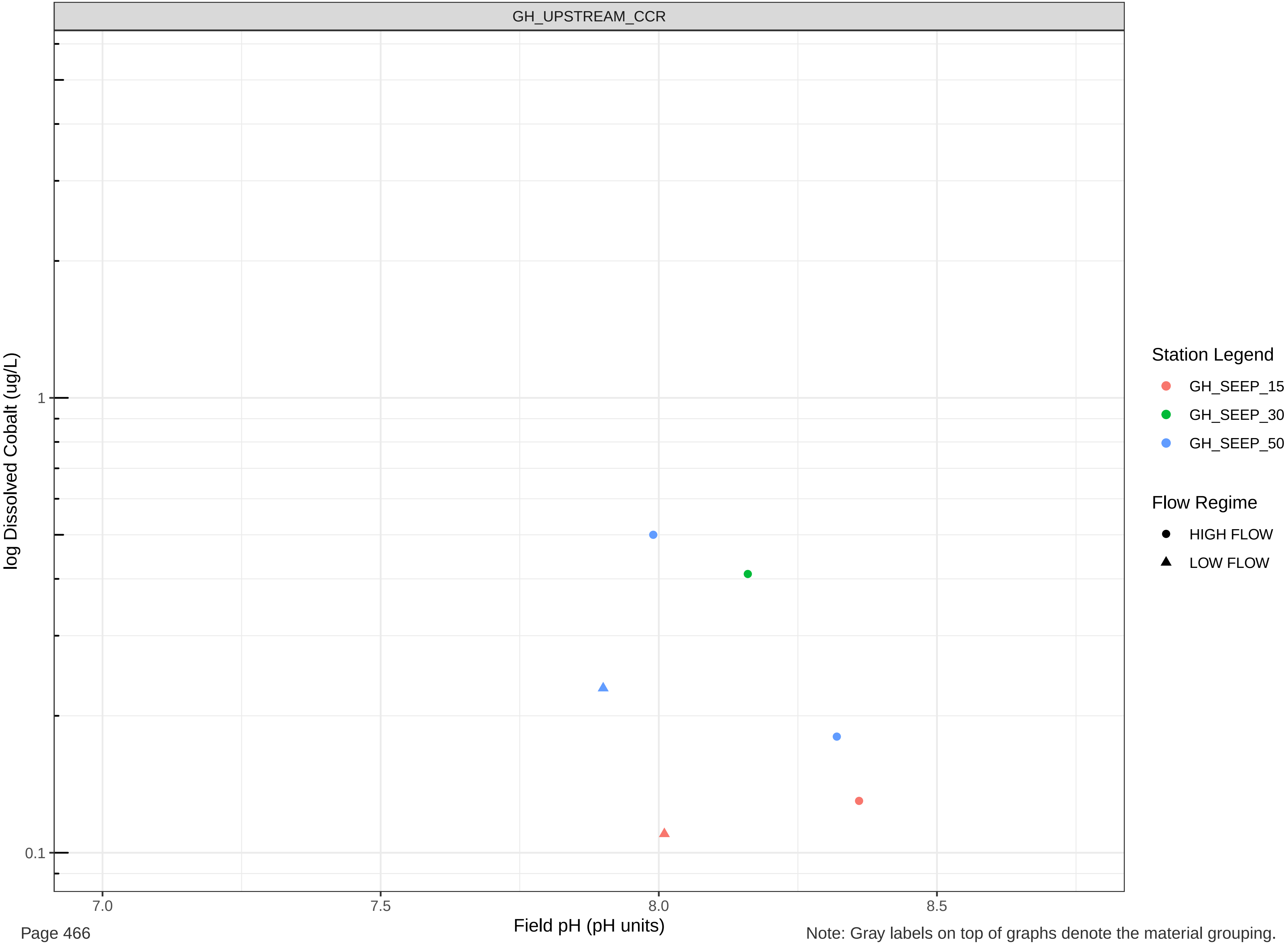

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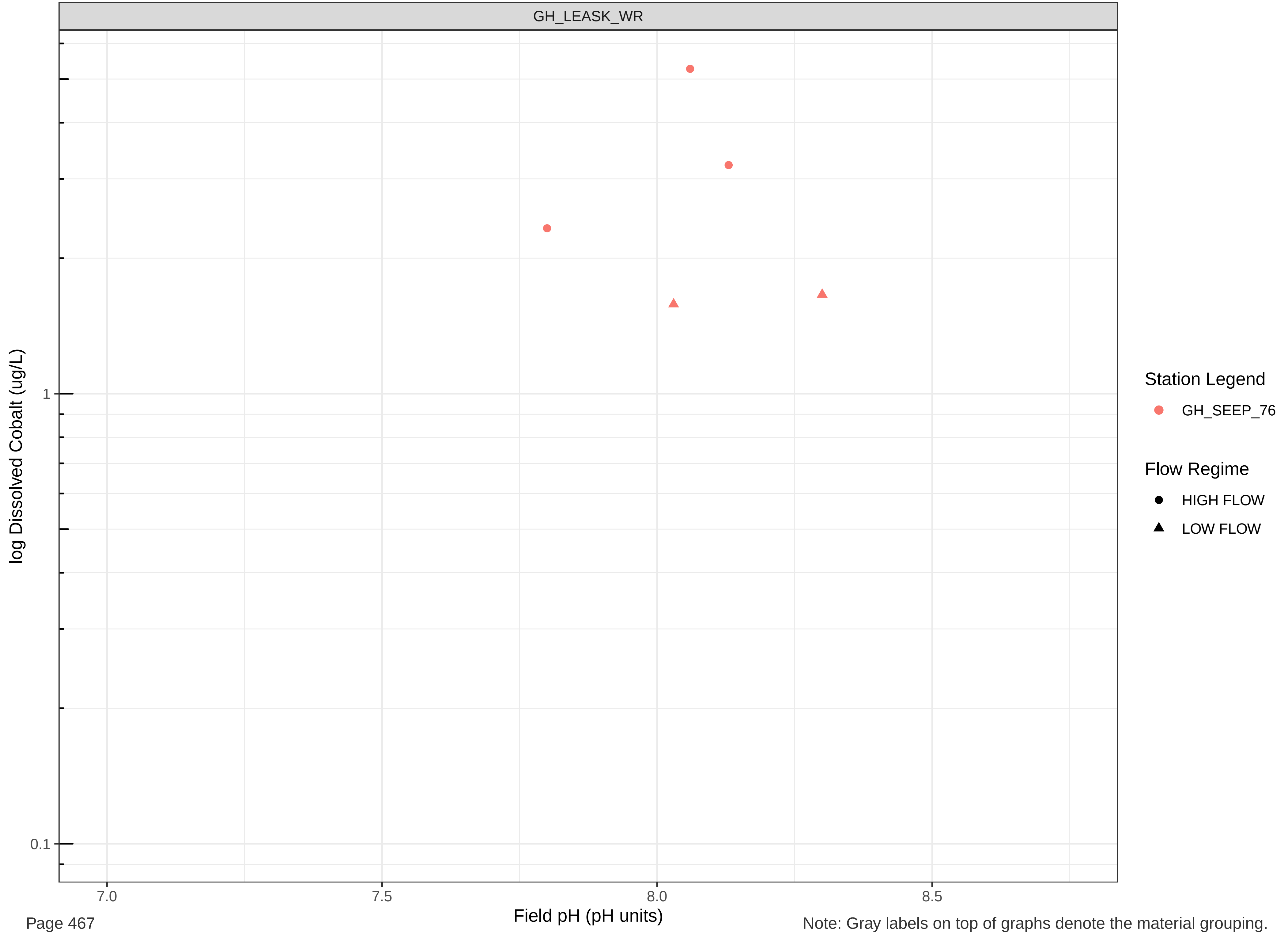

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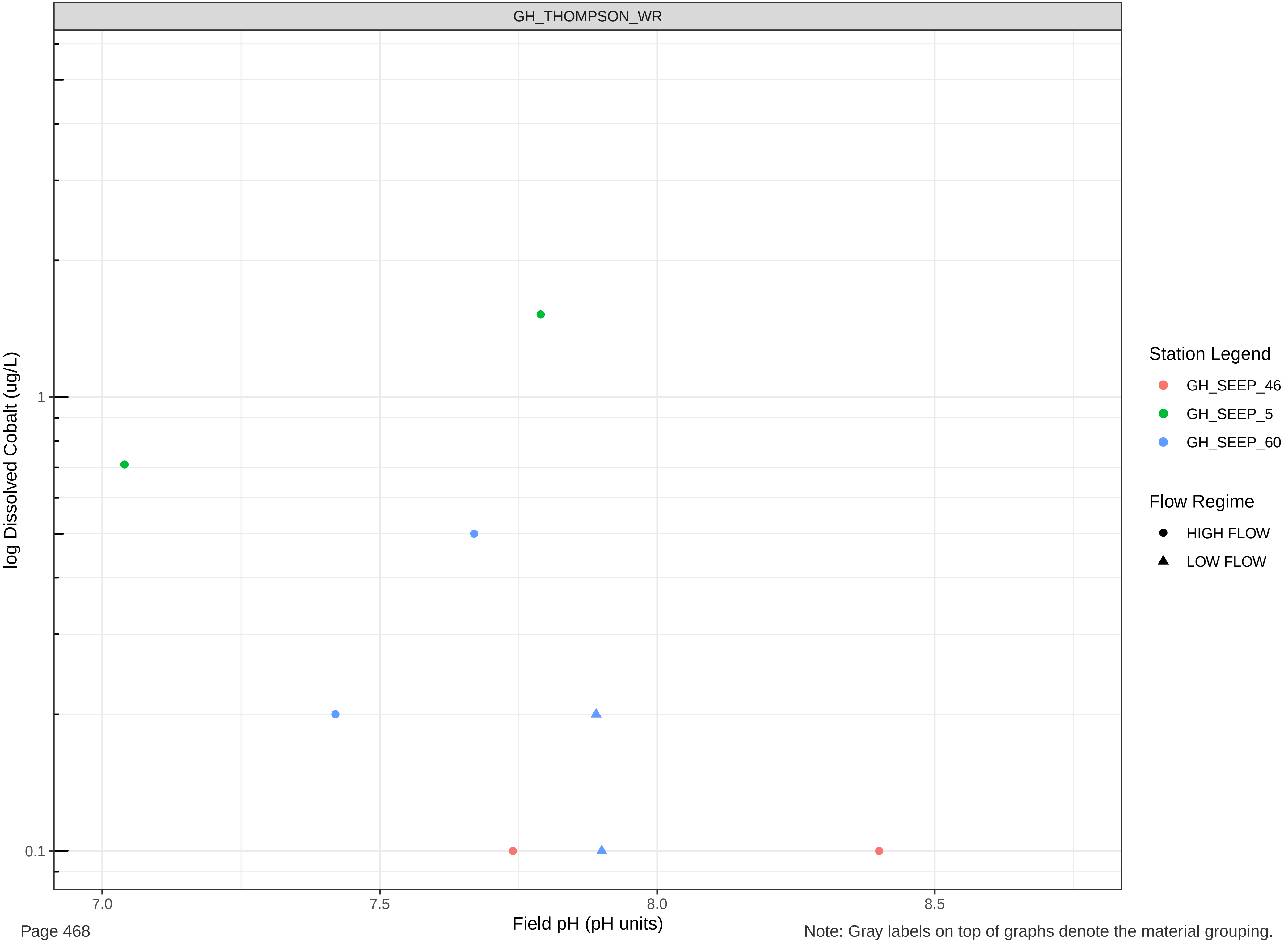

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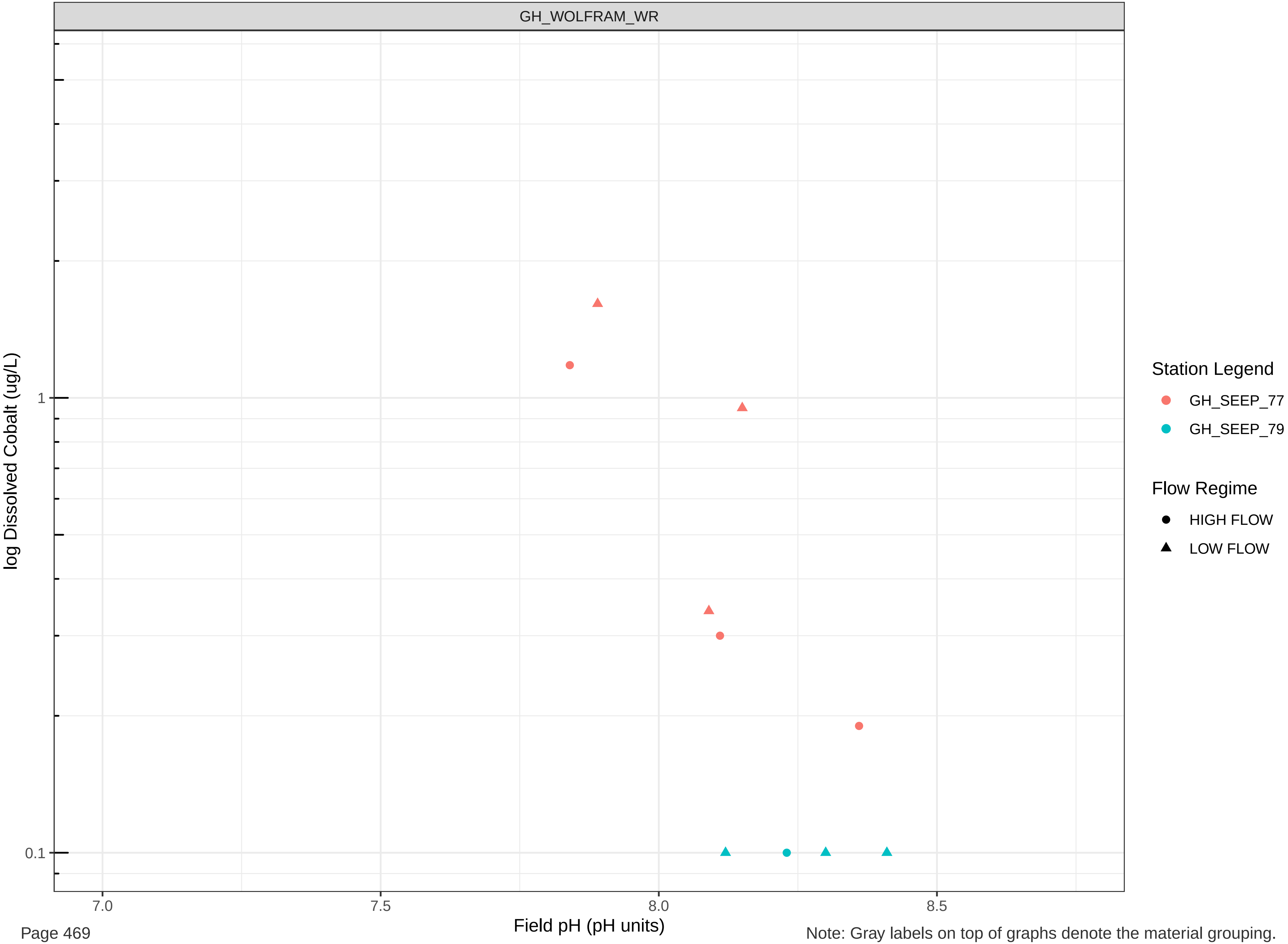

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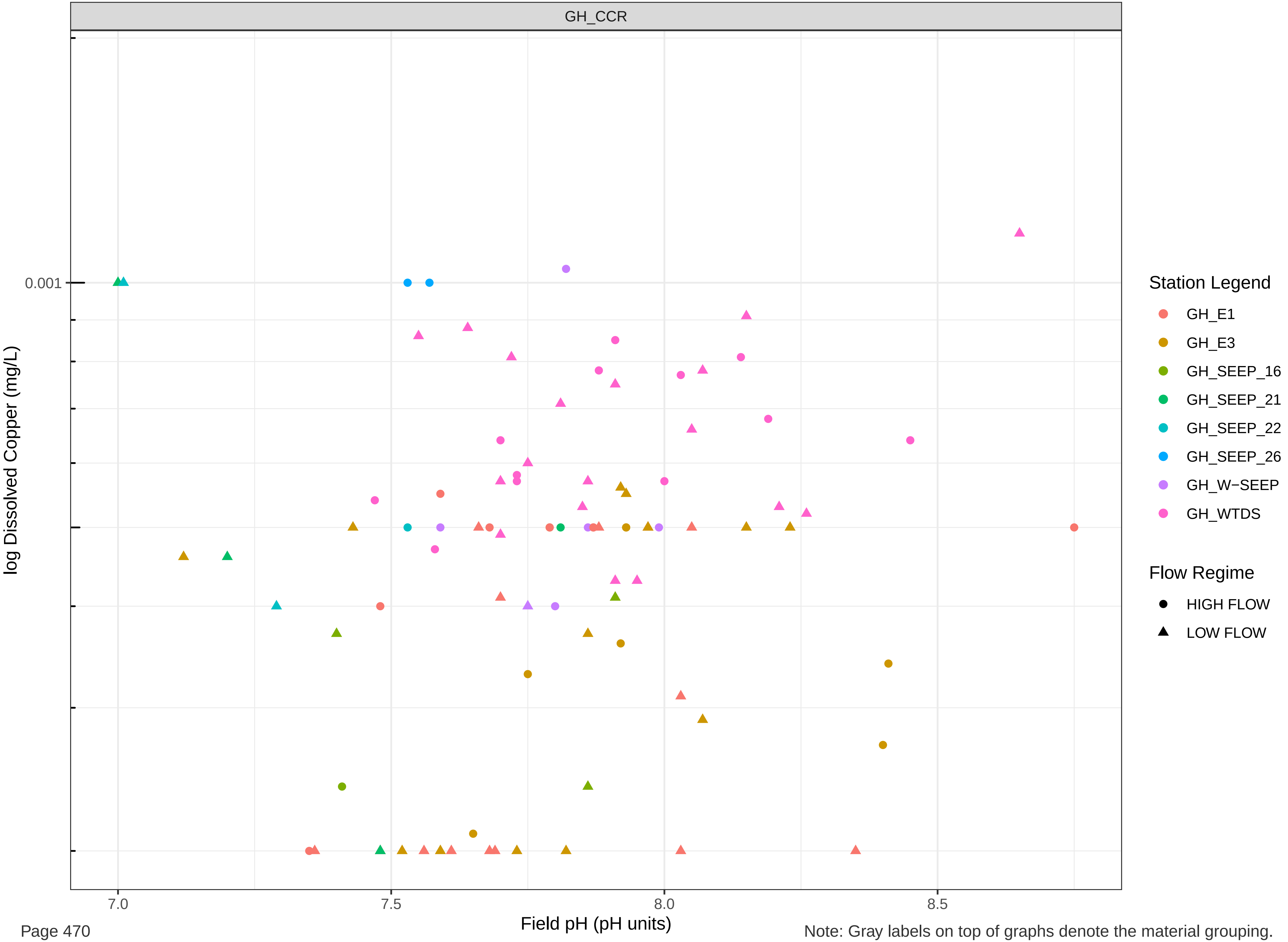

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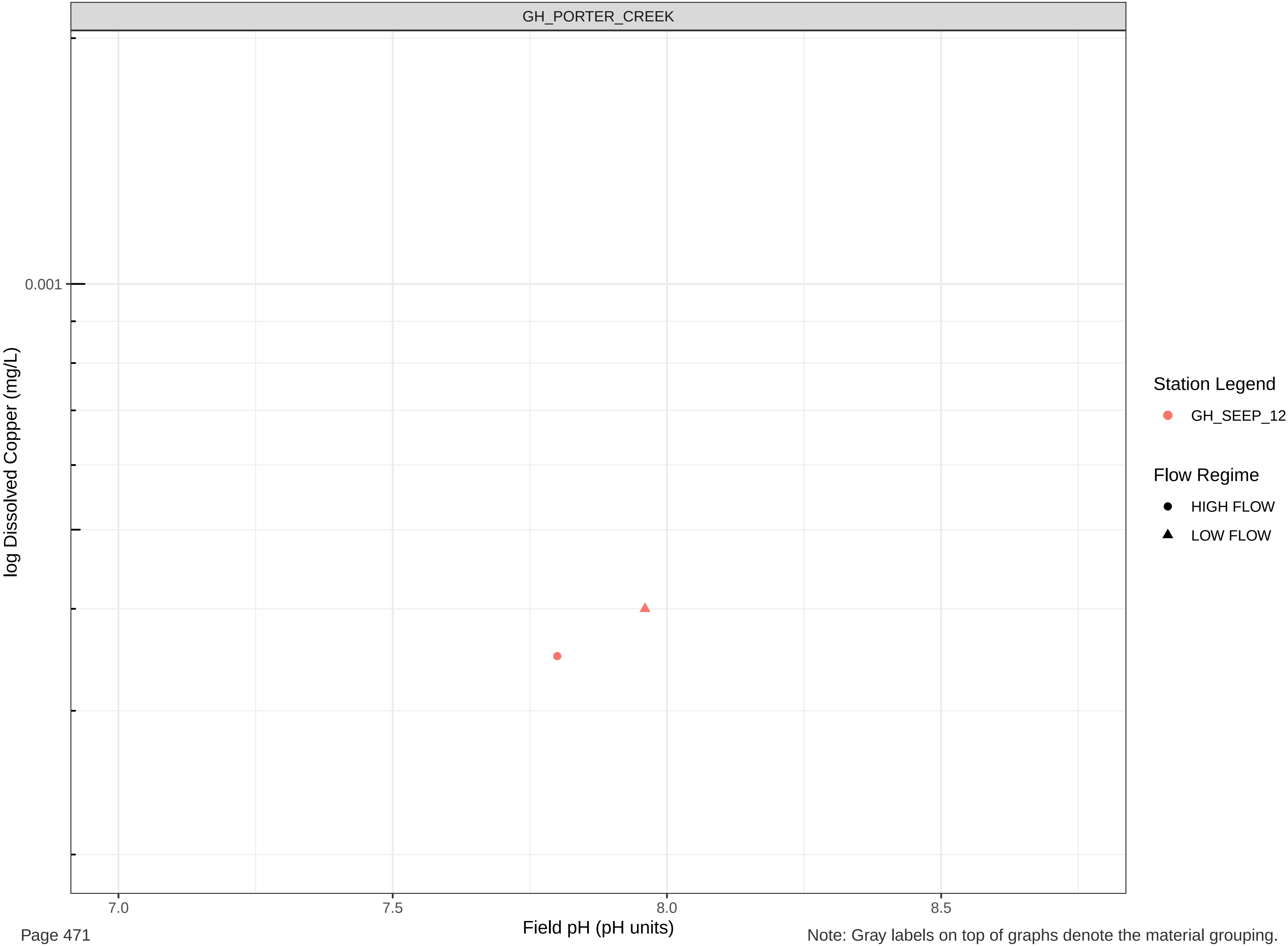

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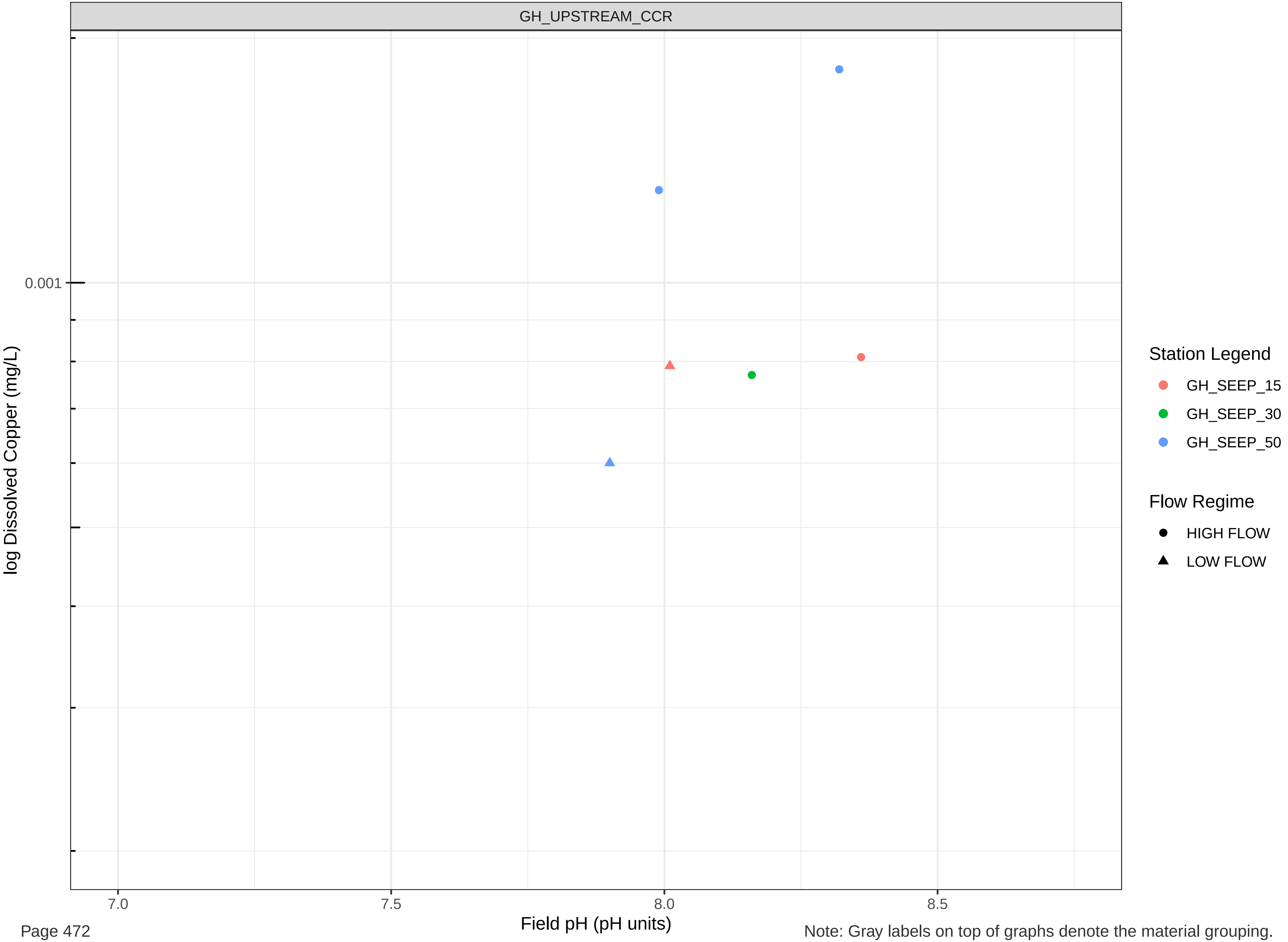

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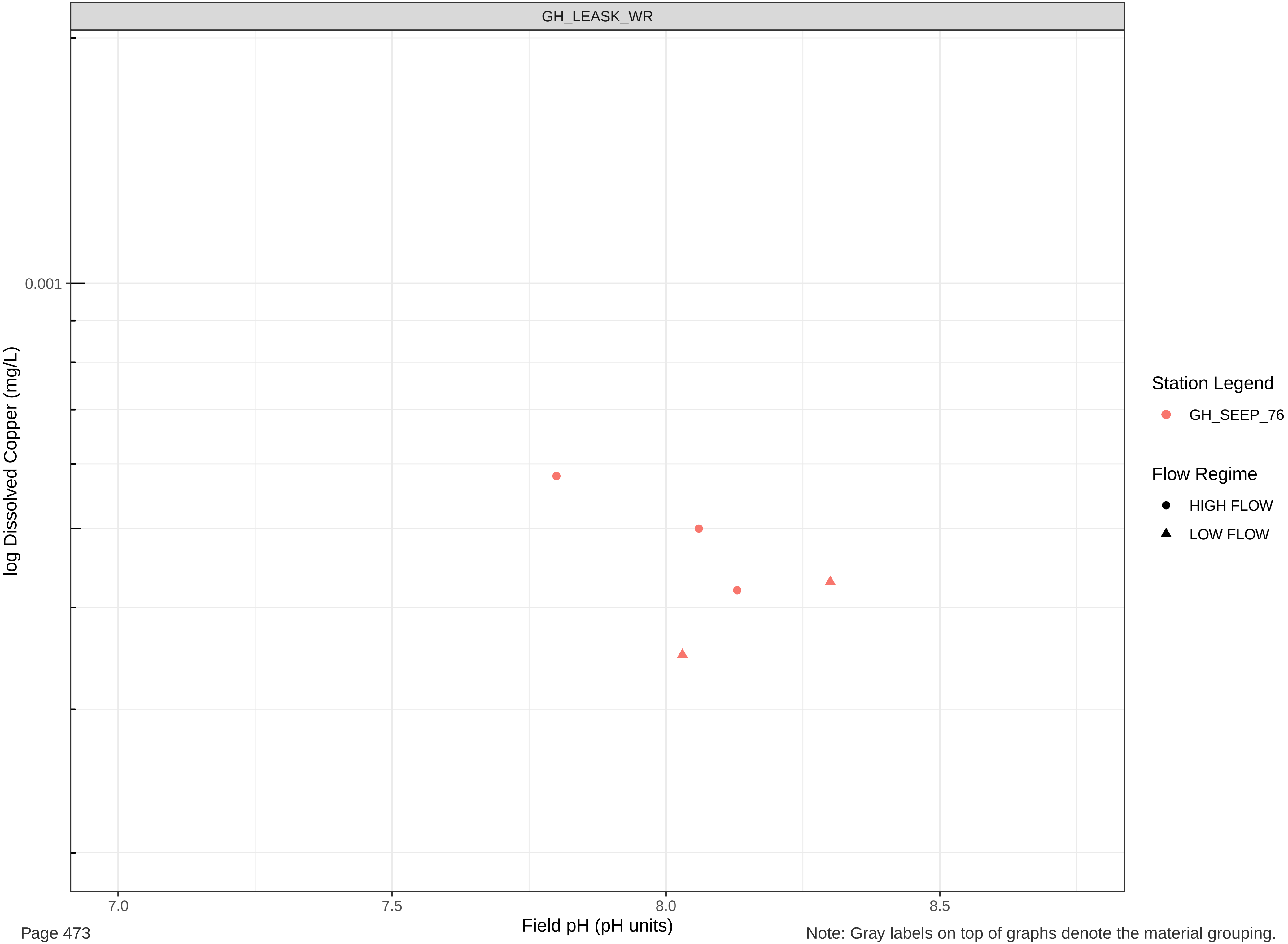

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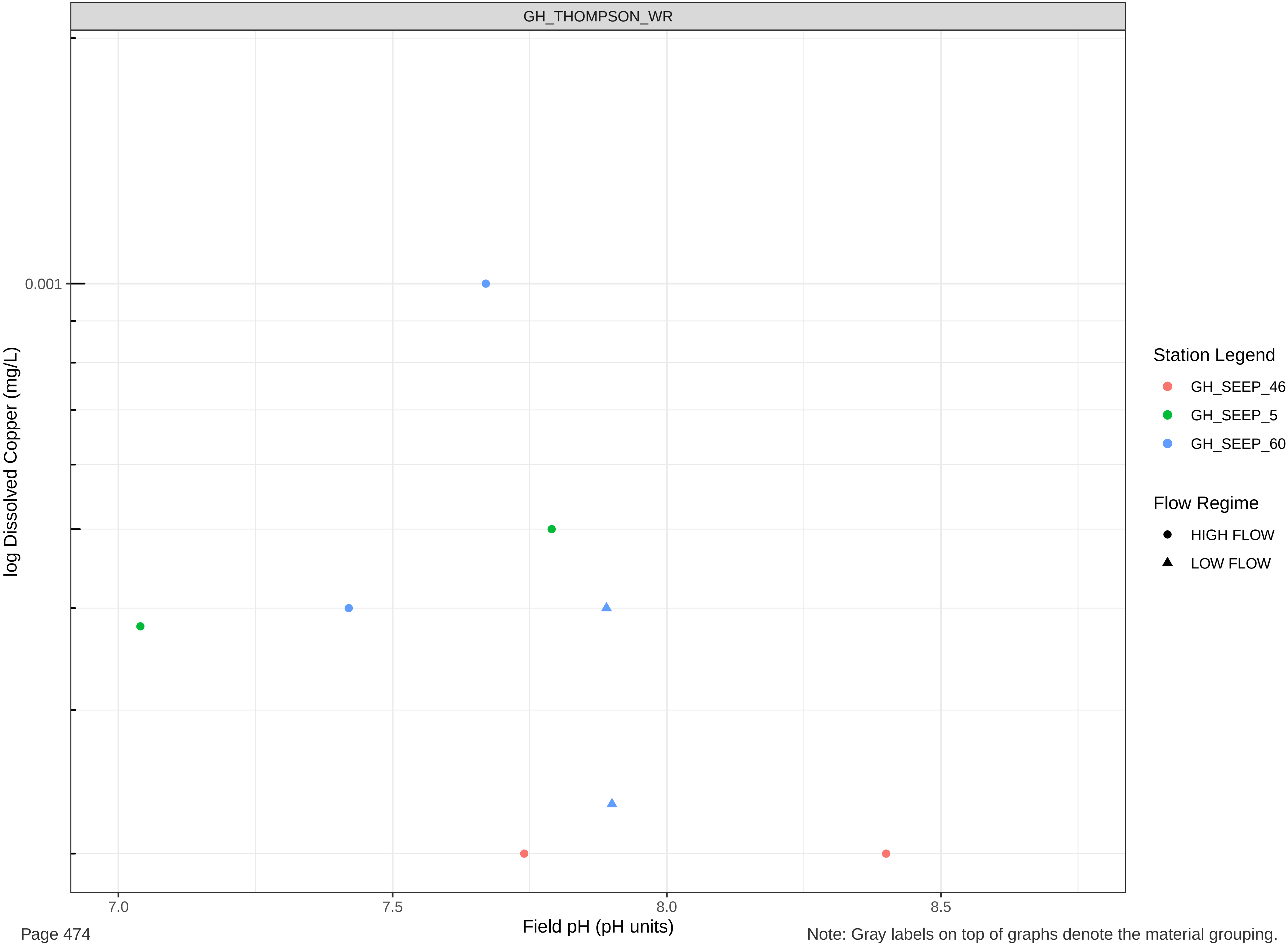

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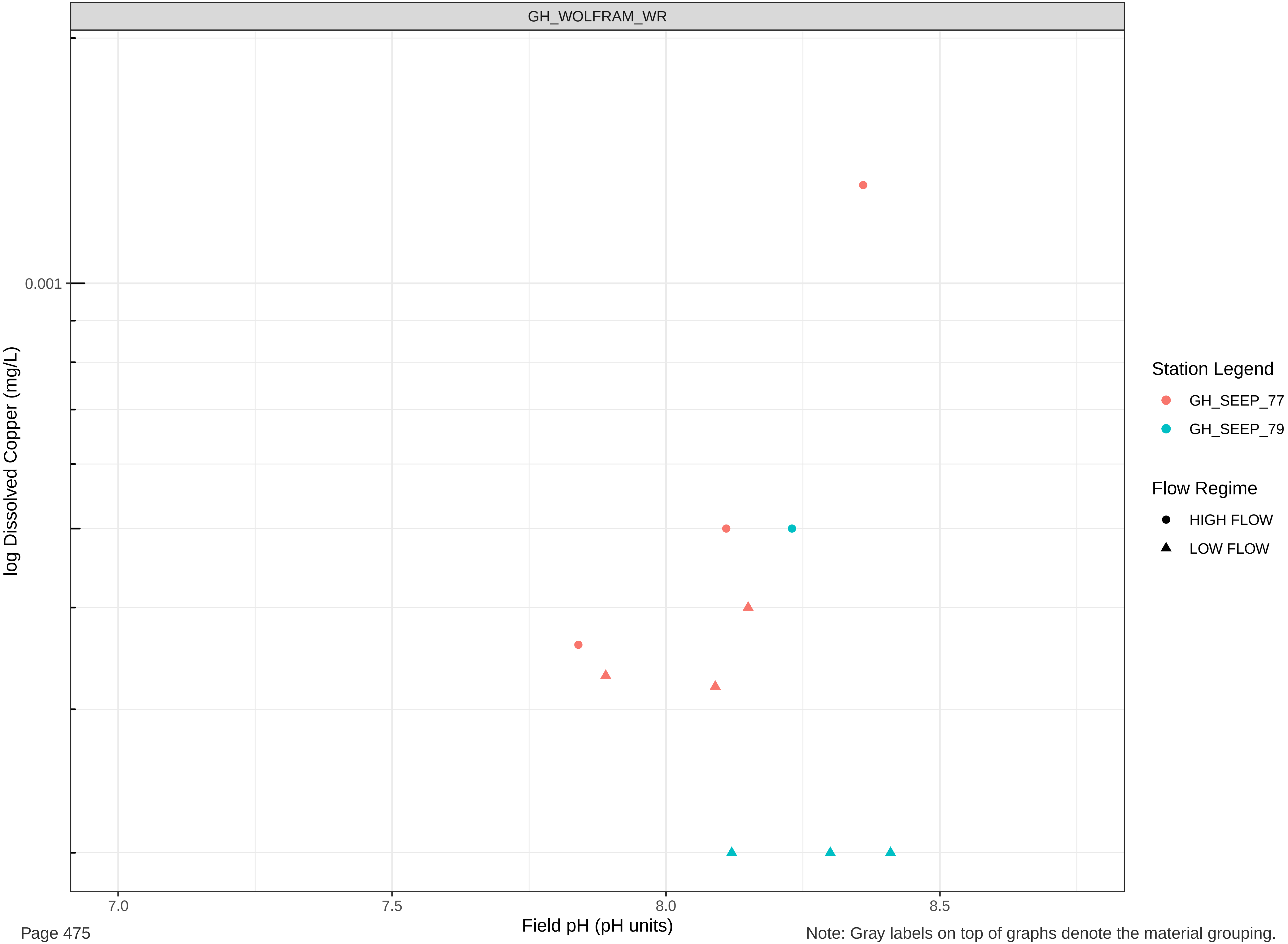

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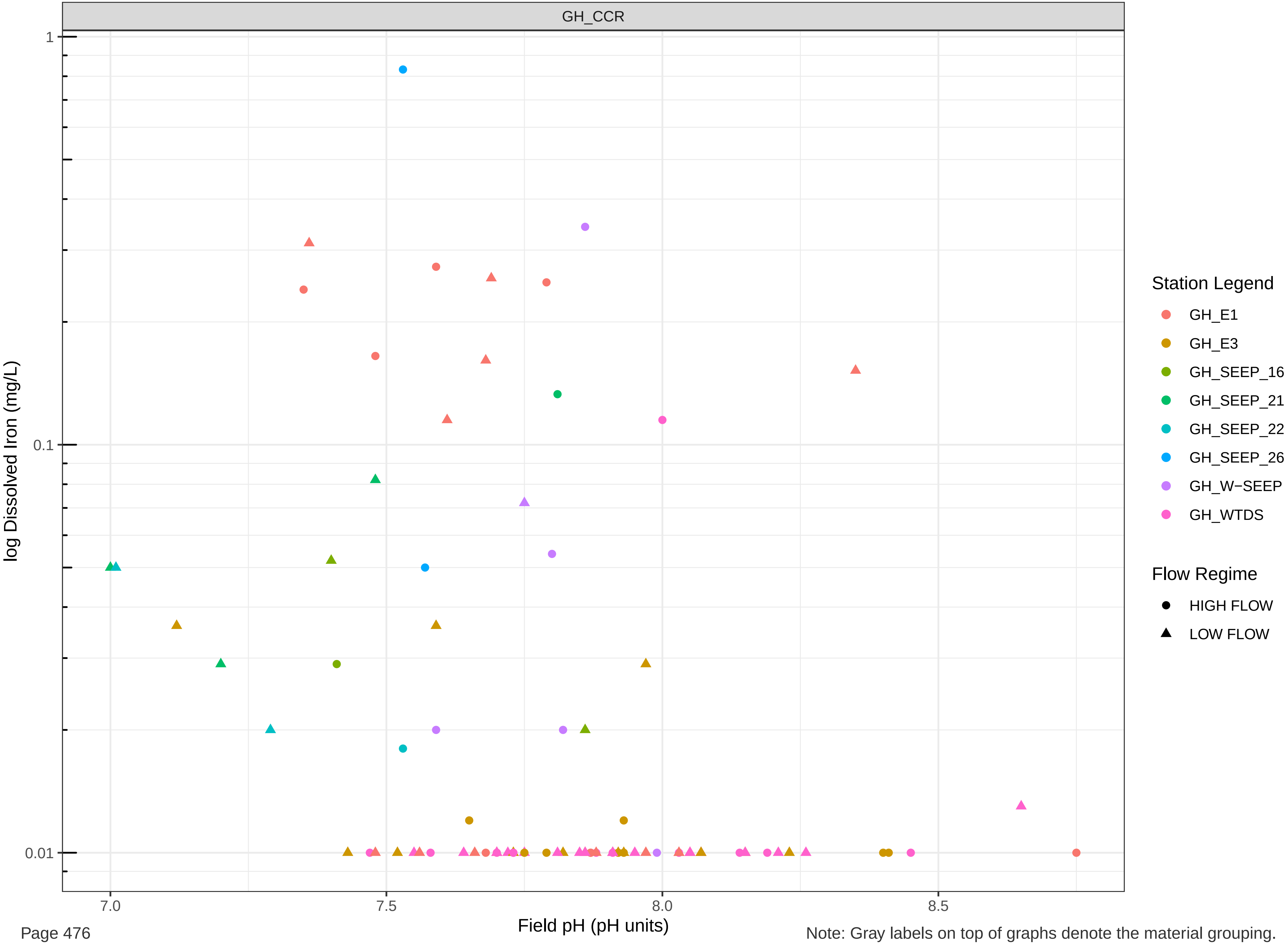

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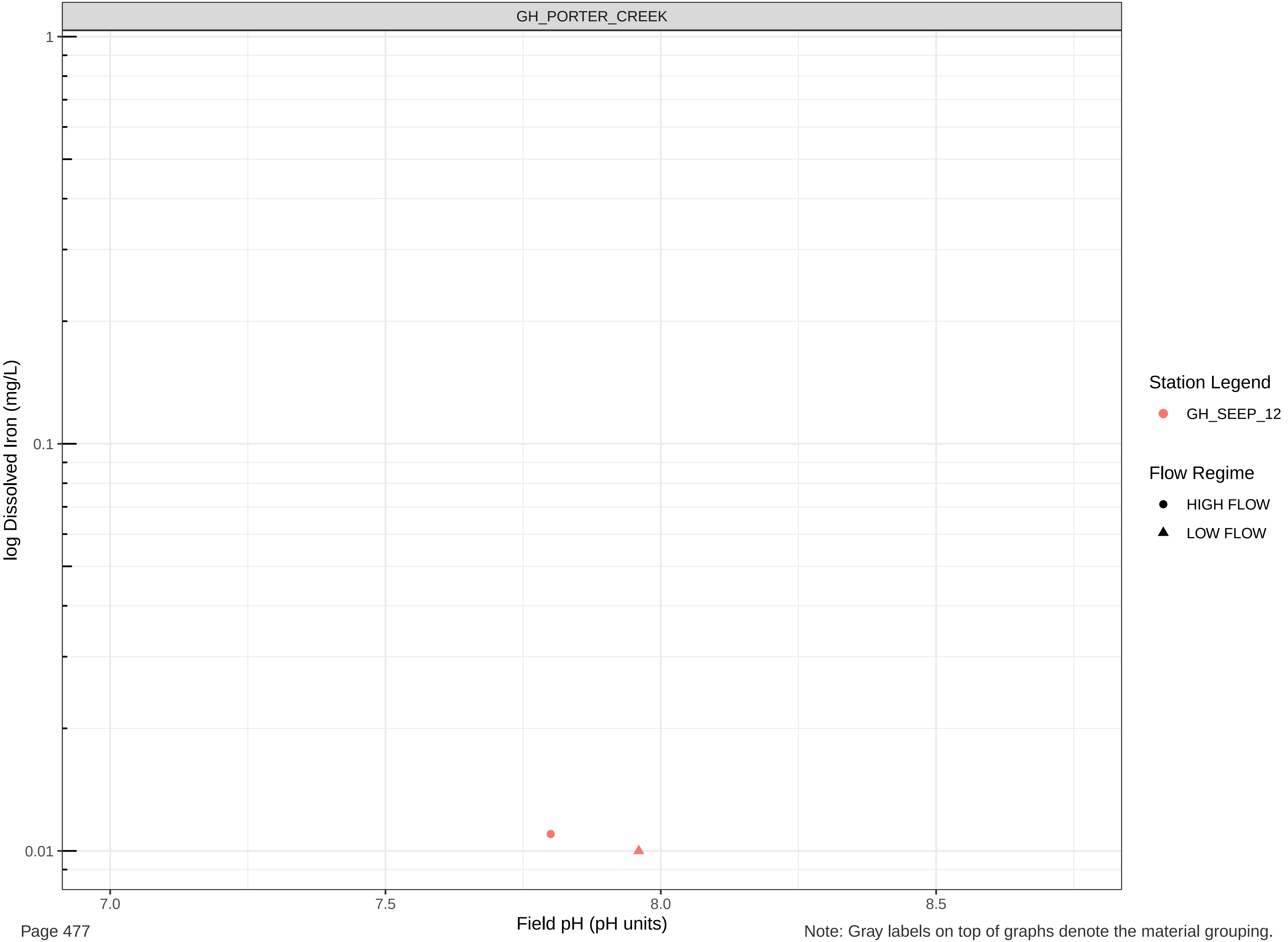

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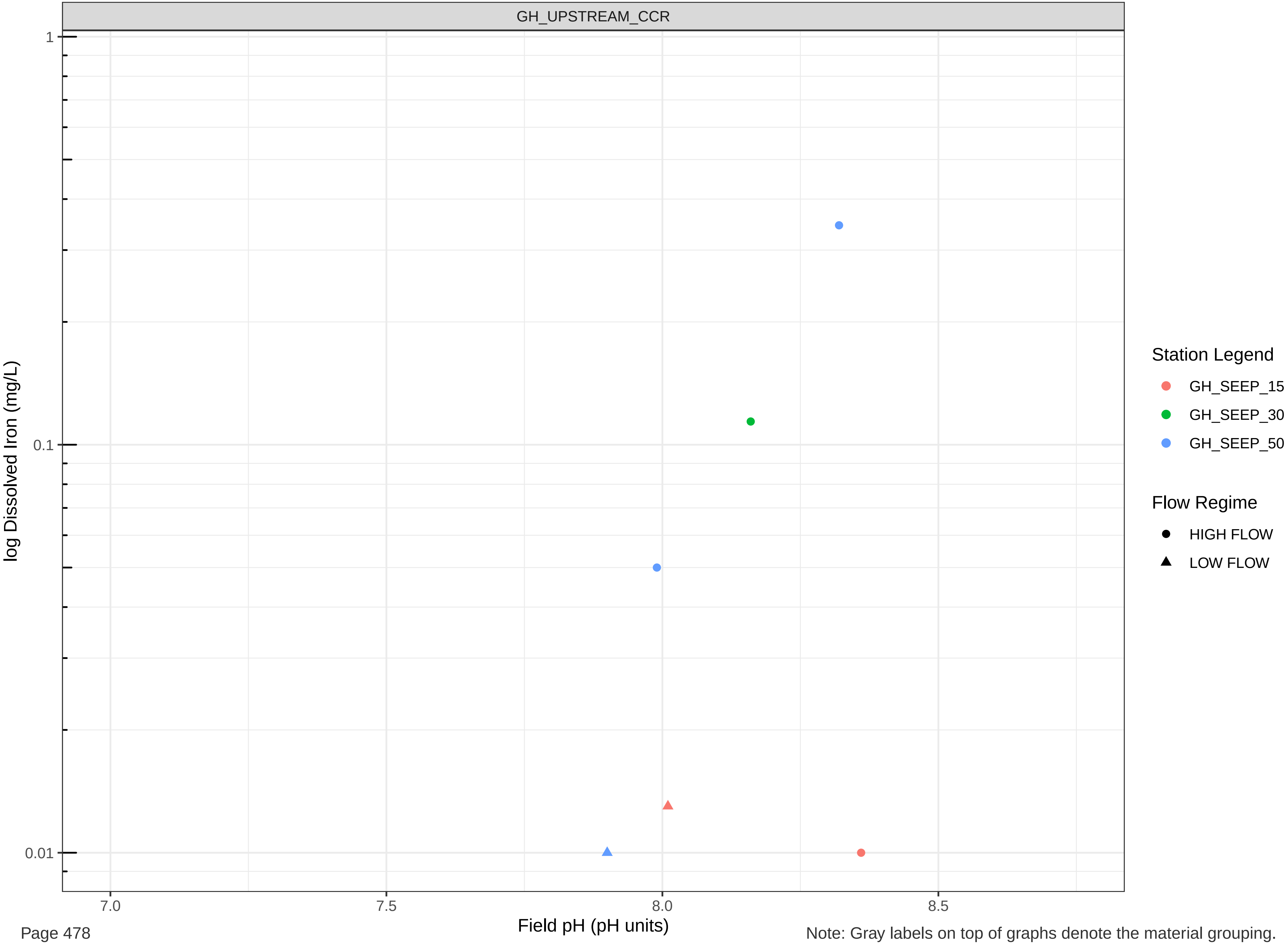

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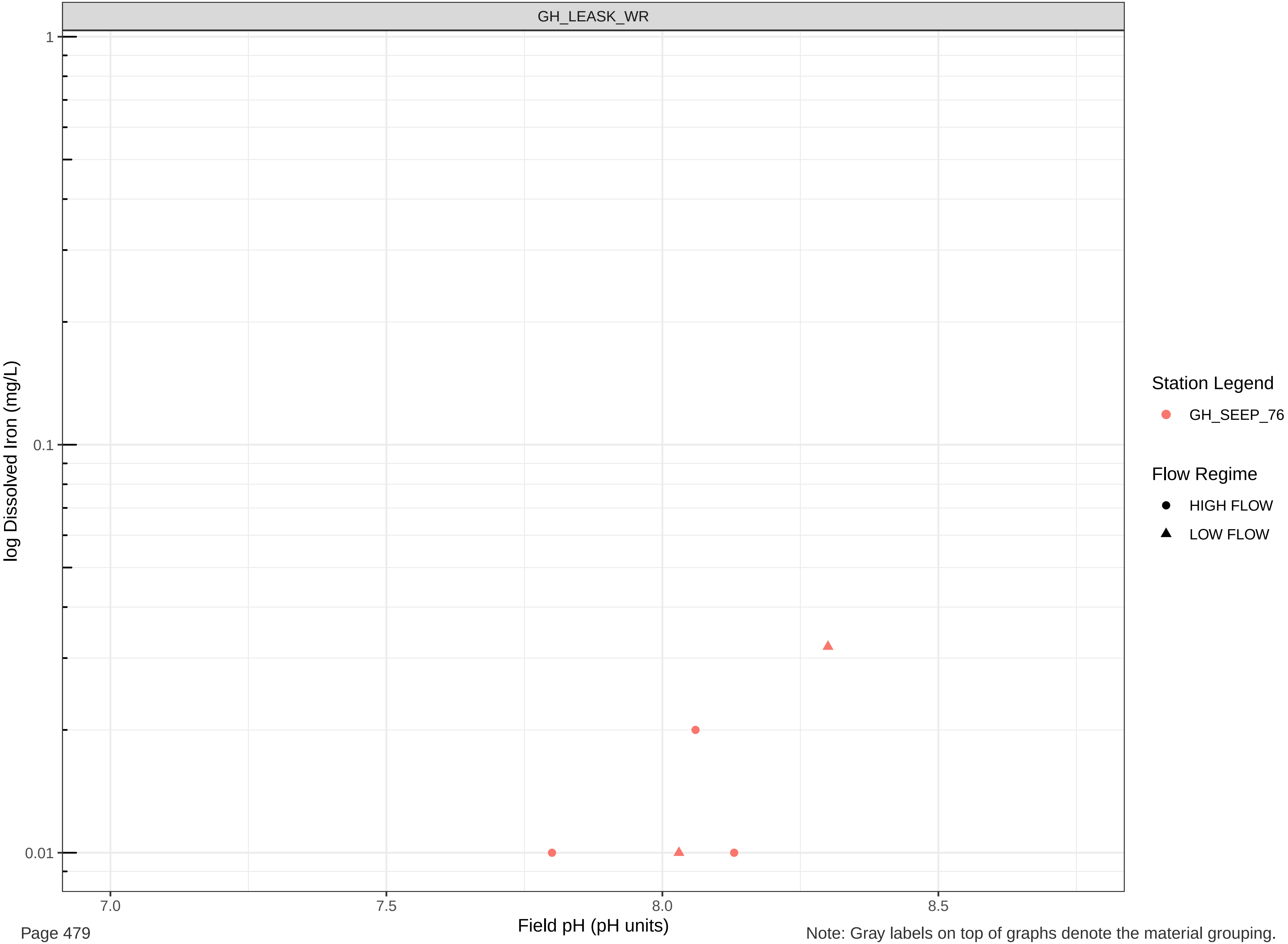

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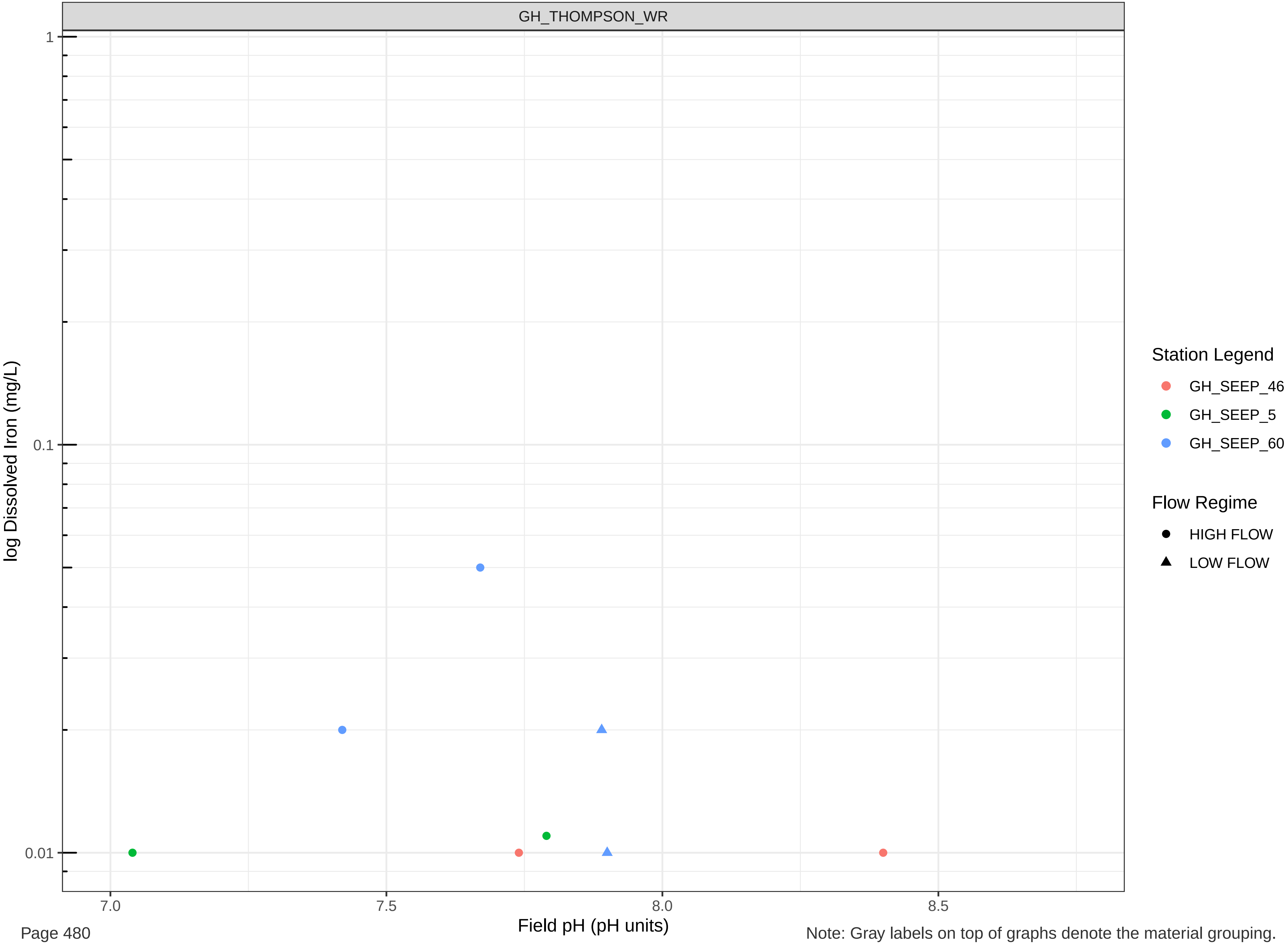
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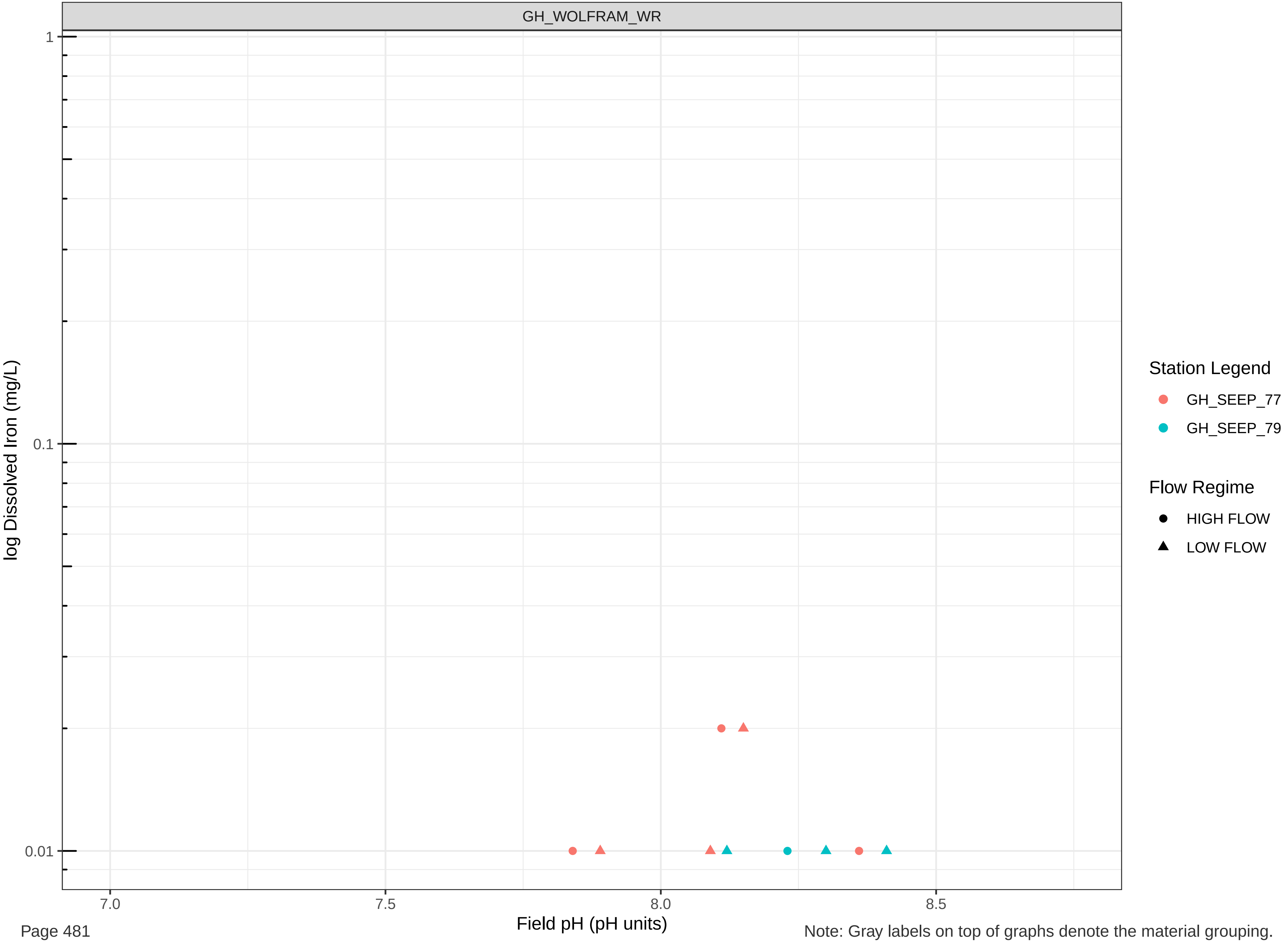
LOW FLOW



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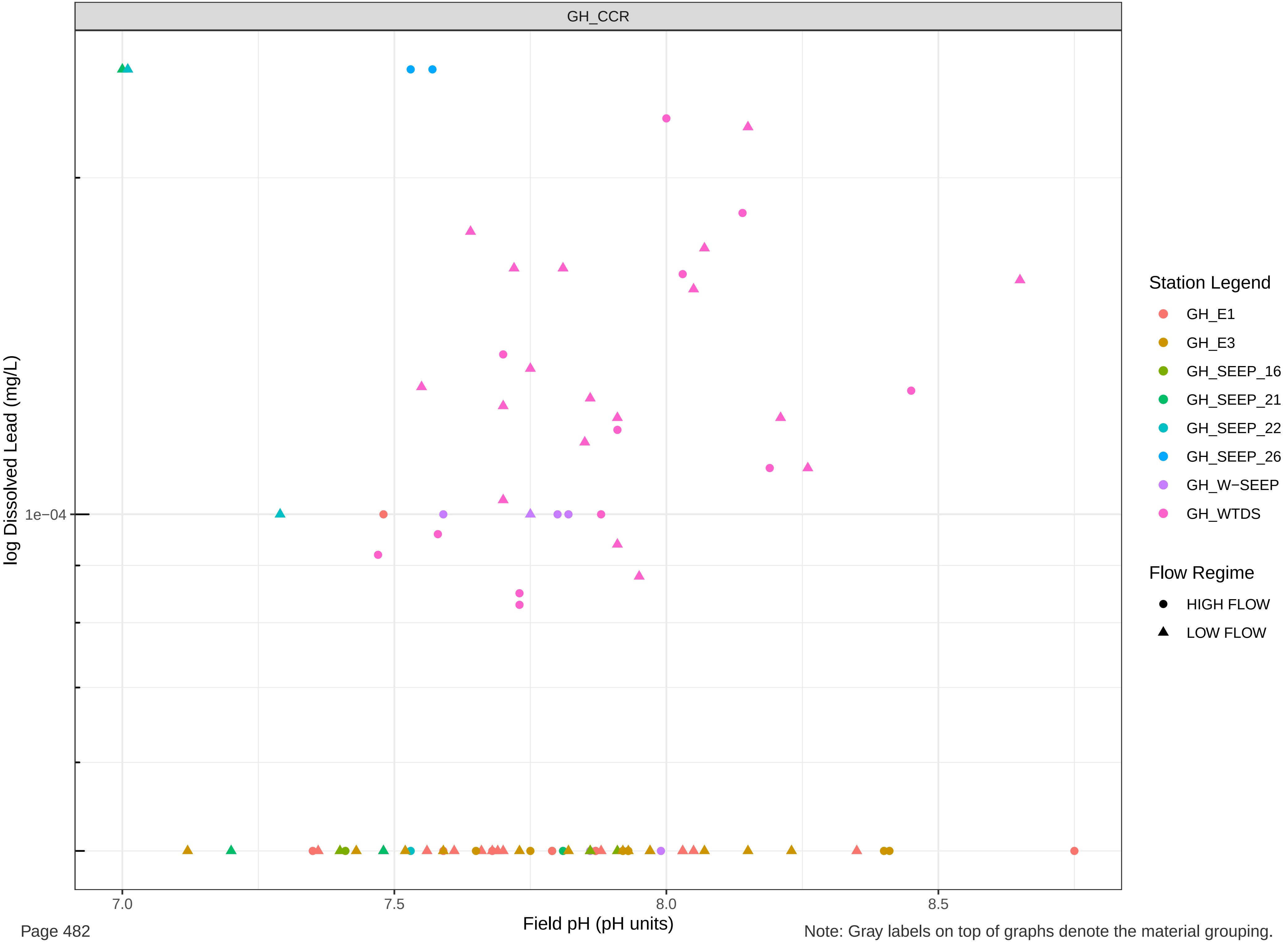

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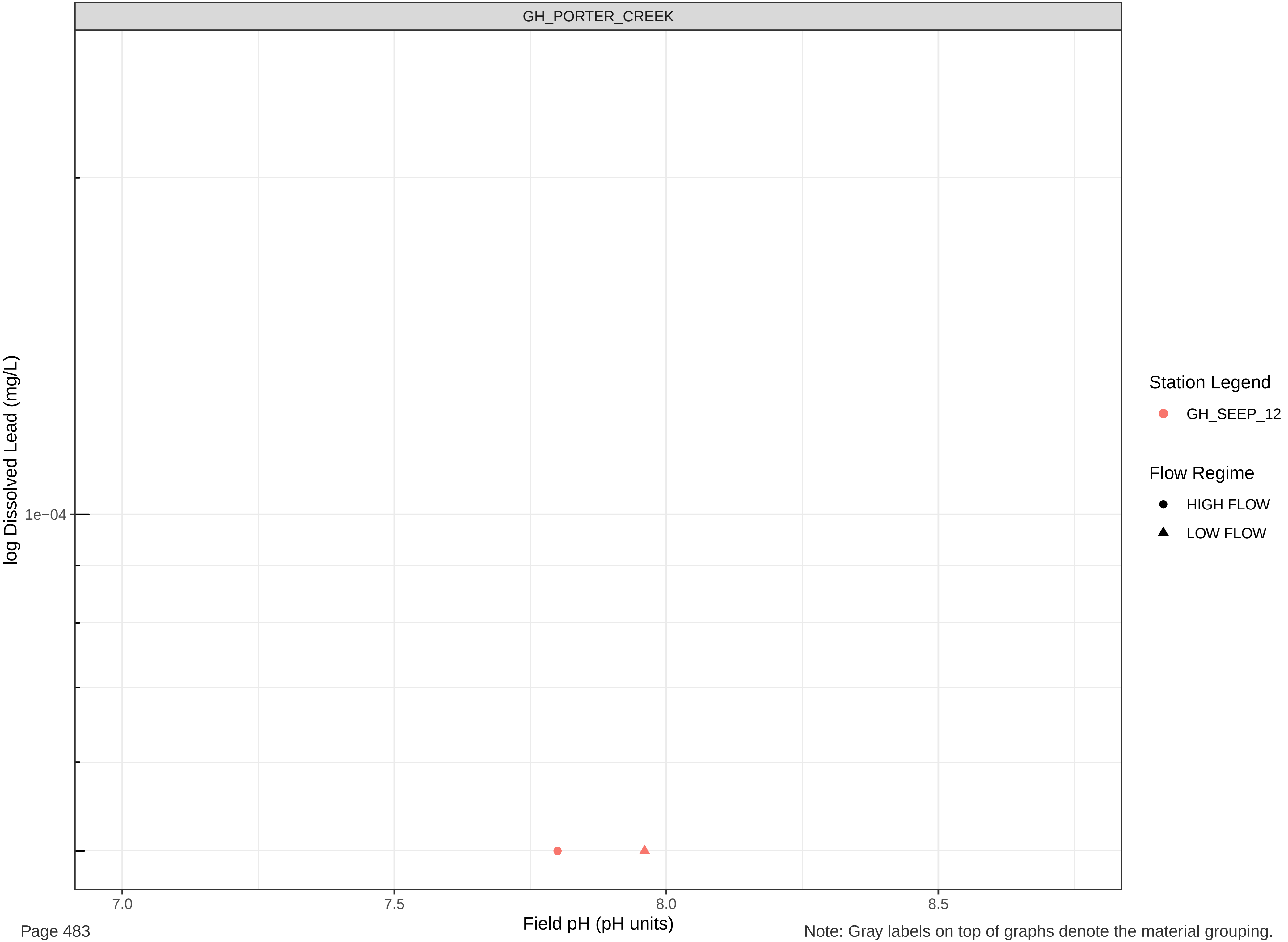

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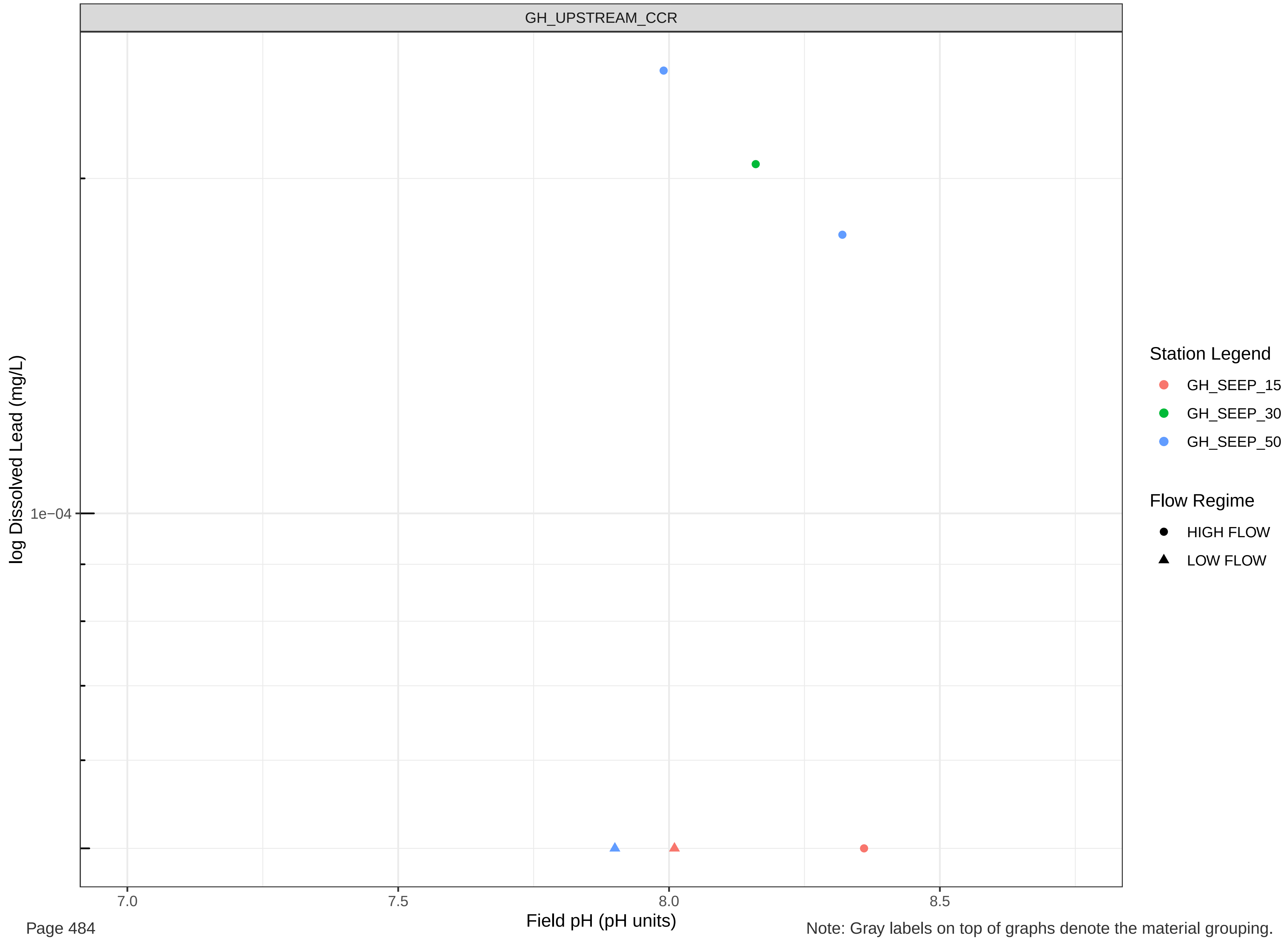

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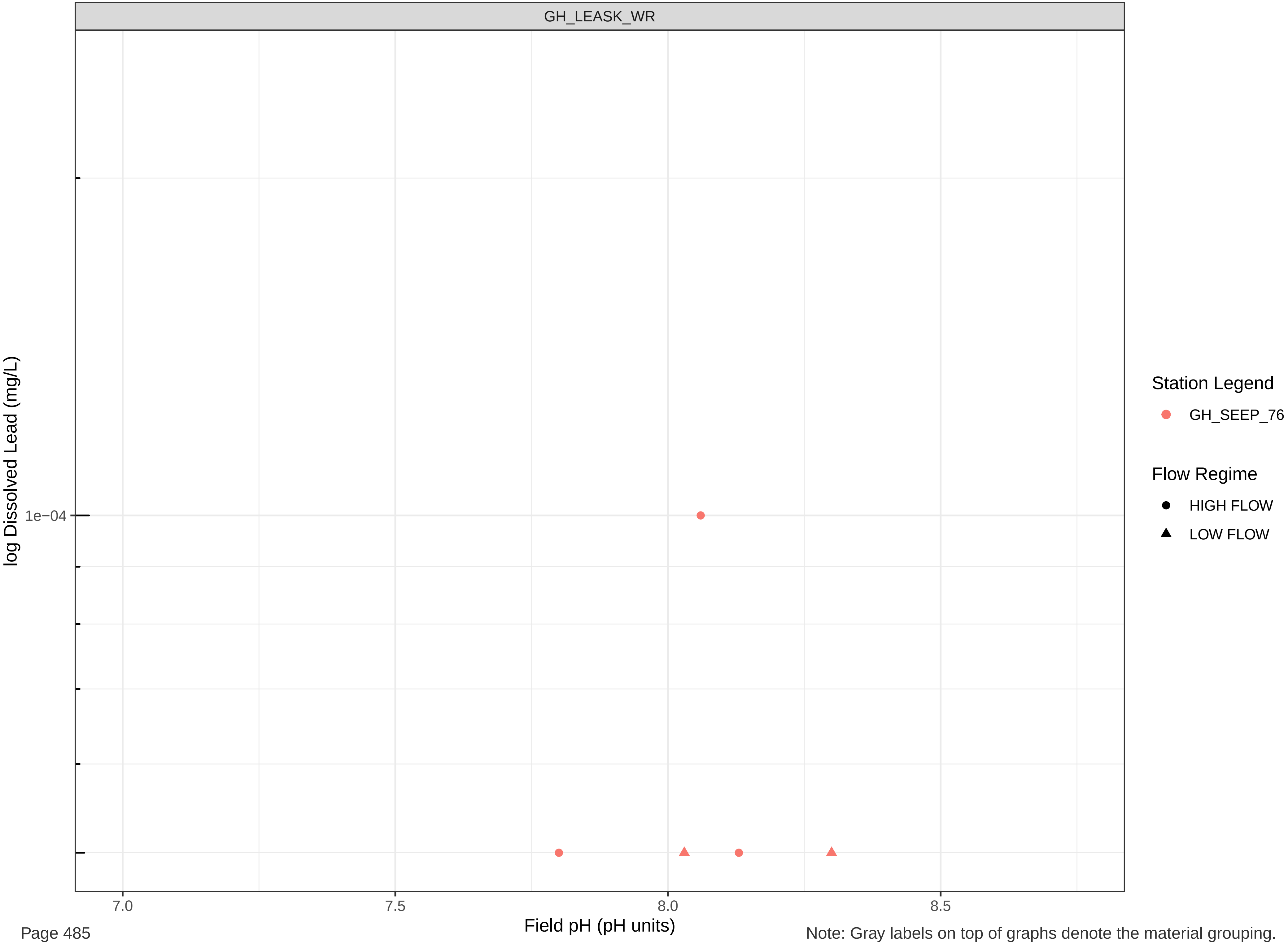

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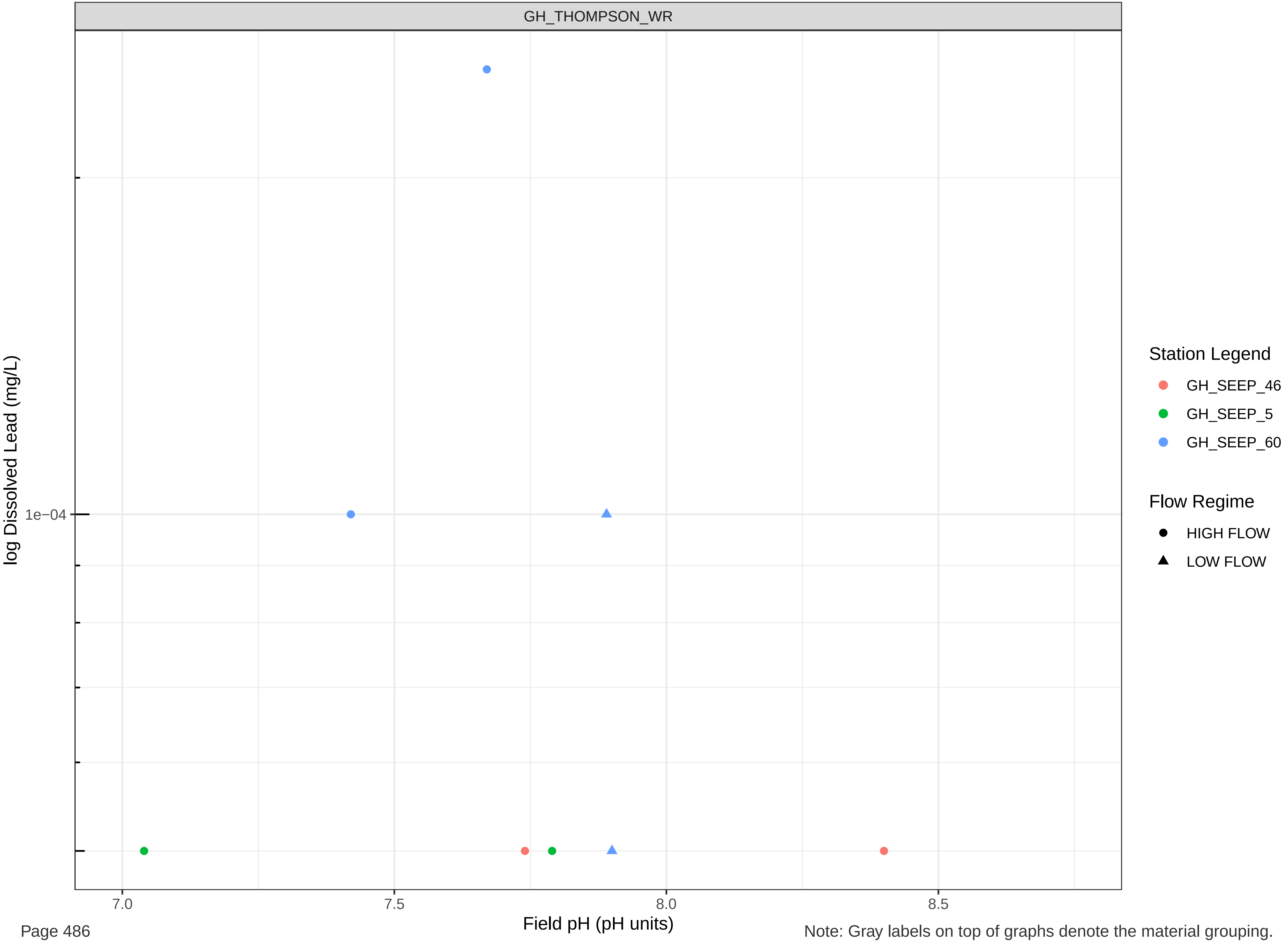

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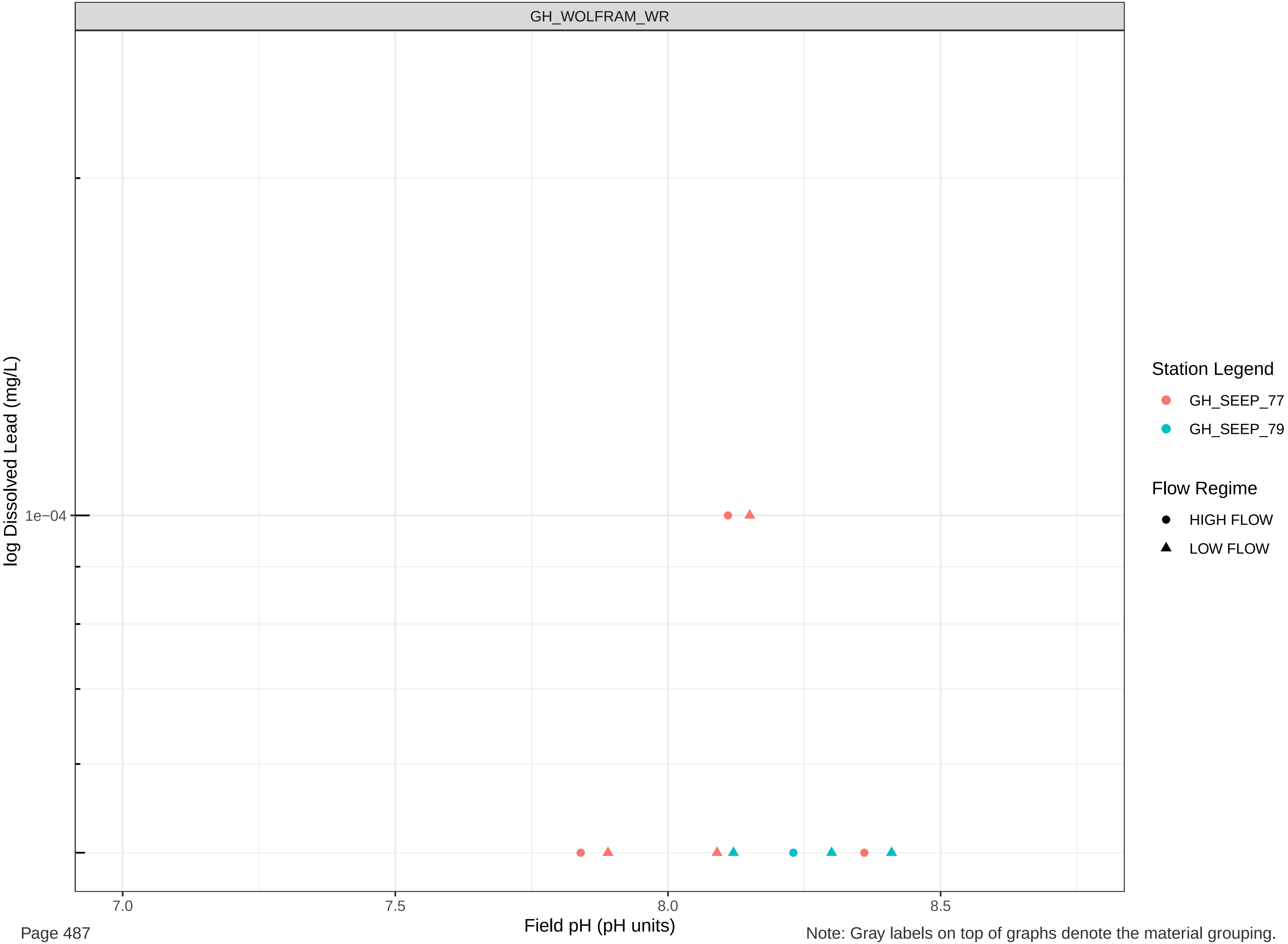
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Station Legend
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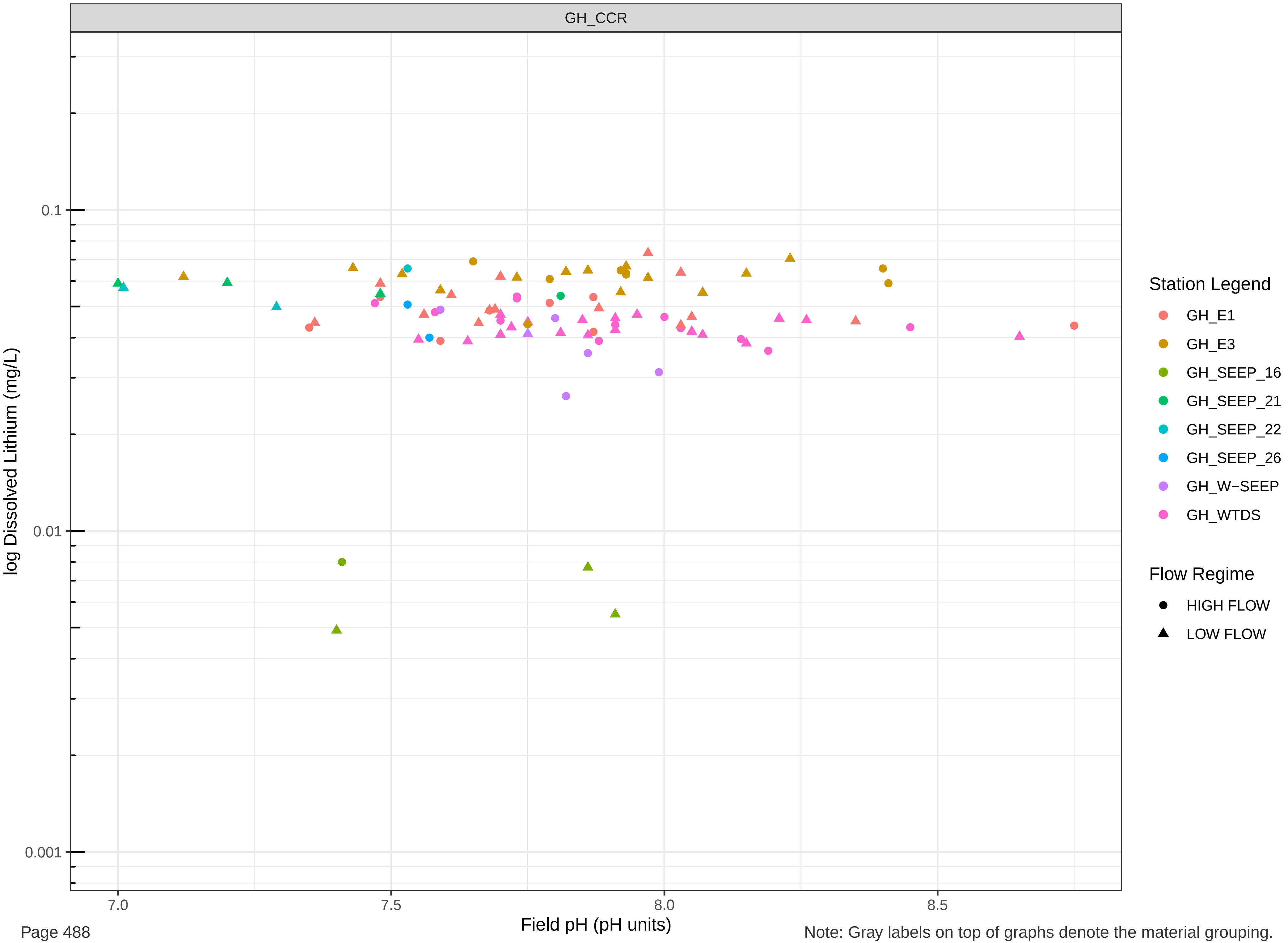

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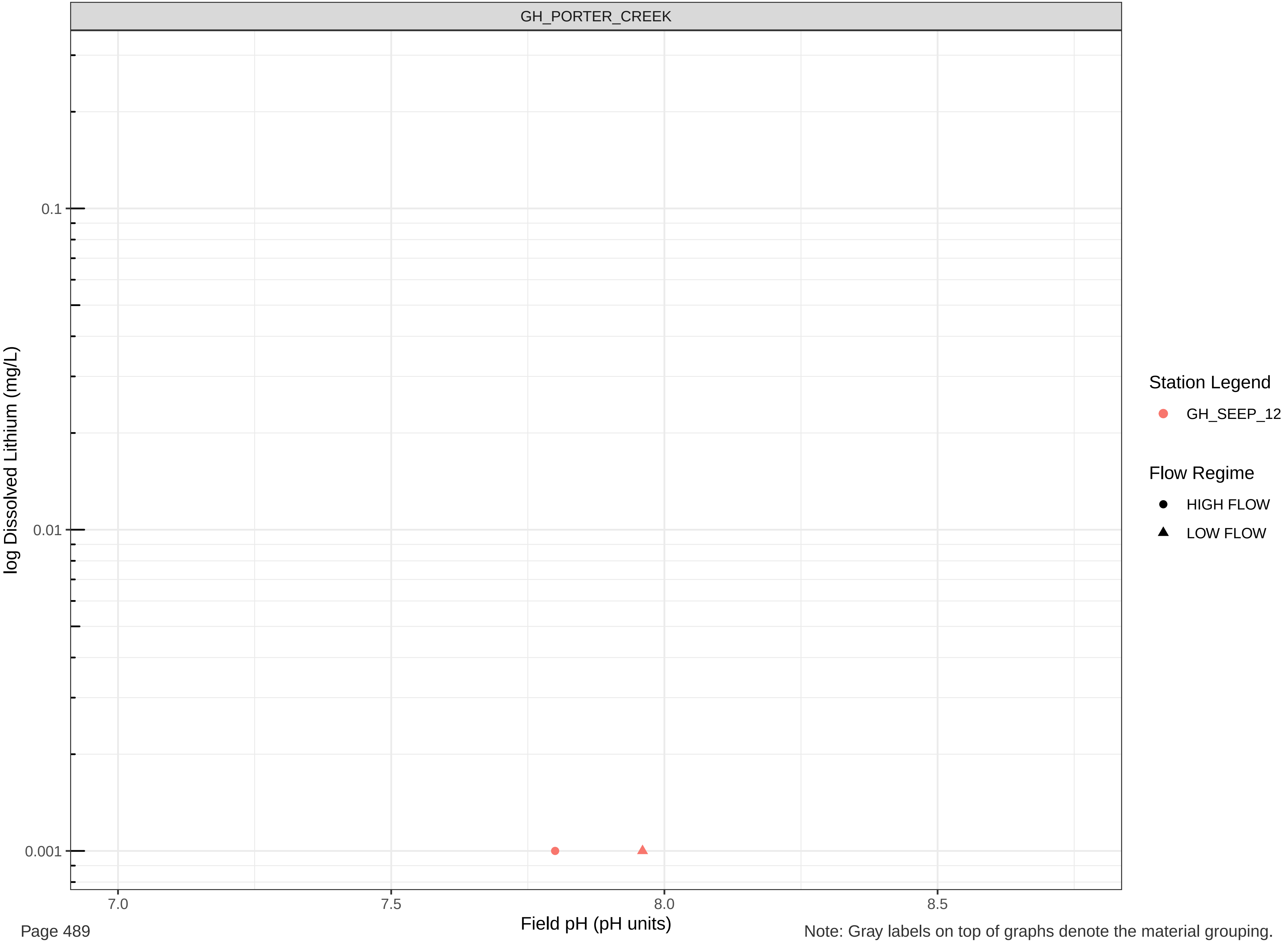

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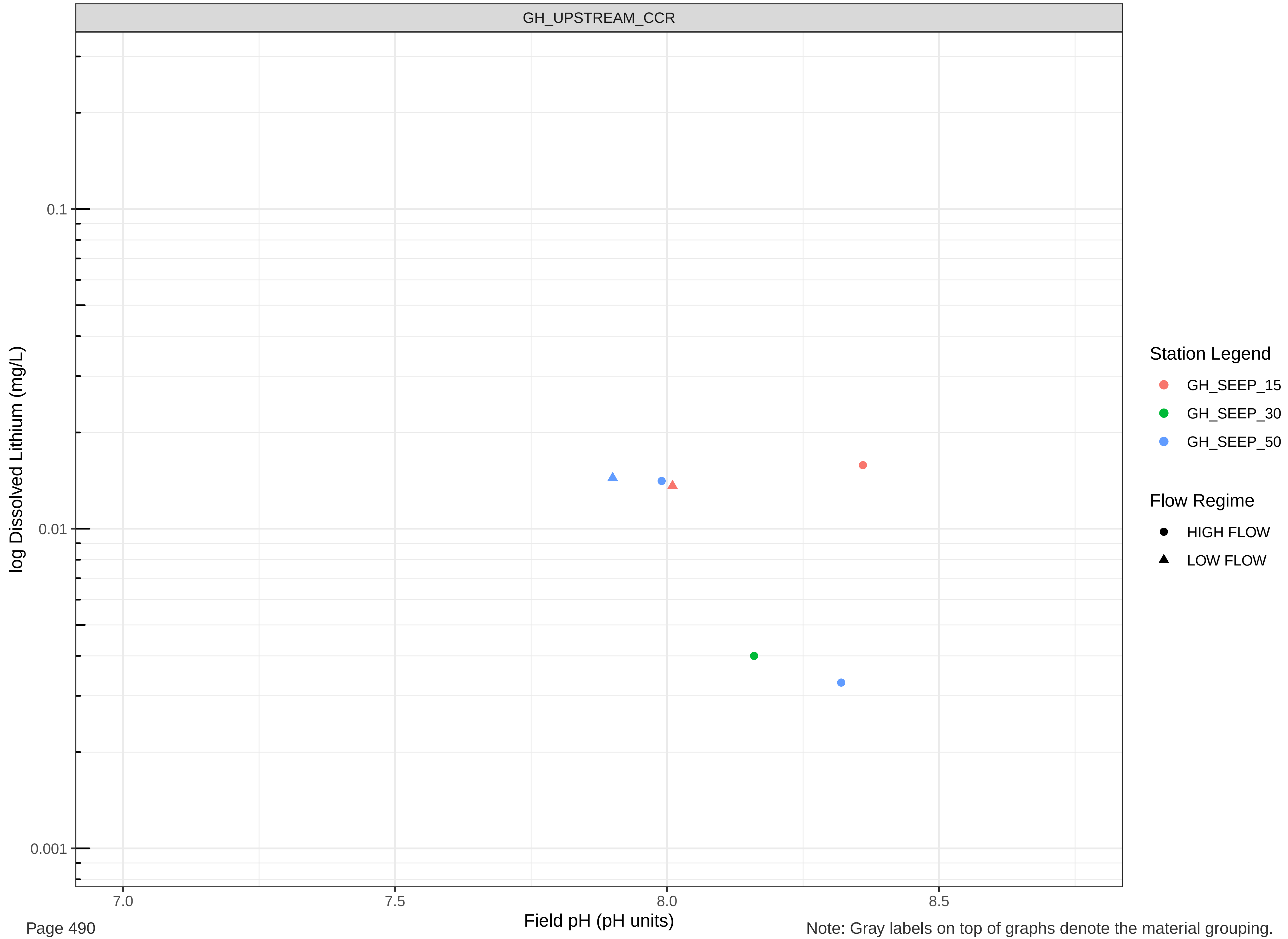

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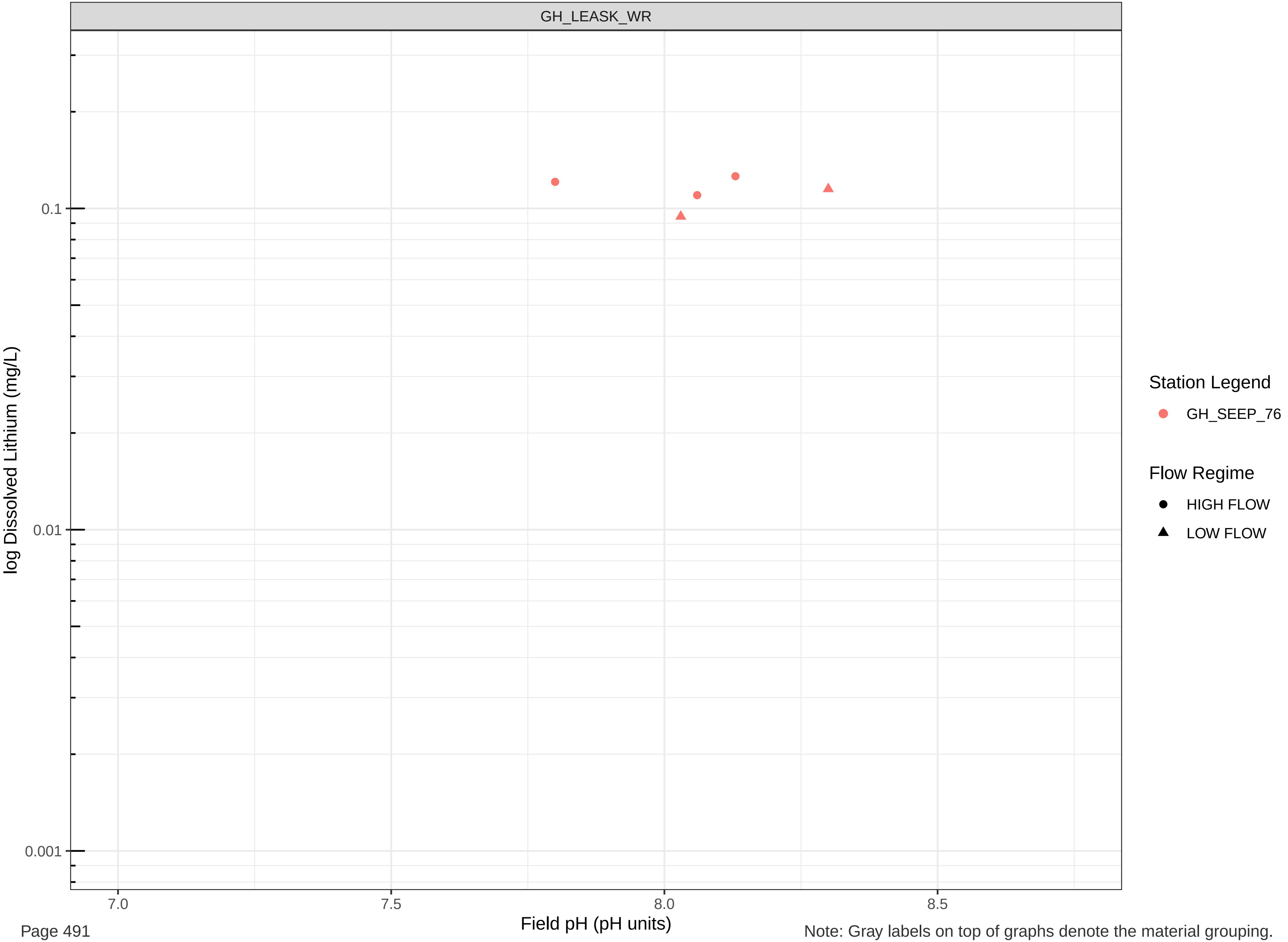

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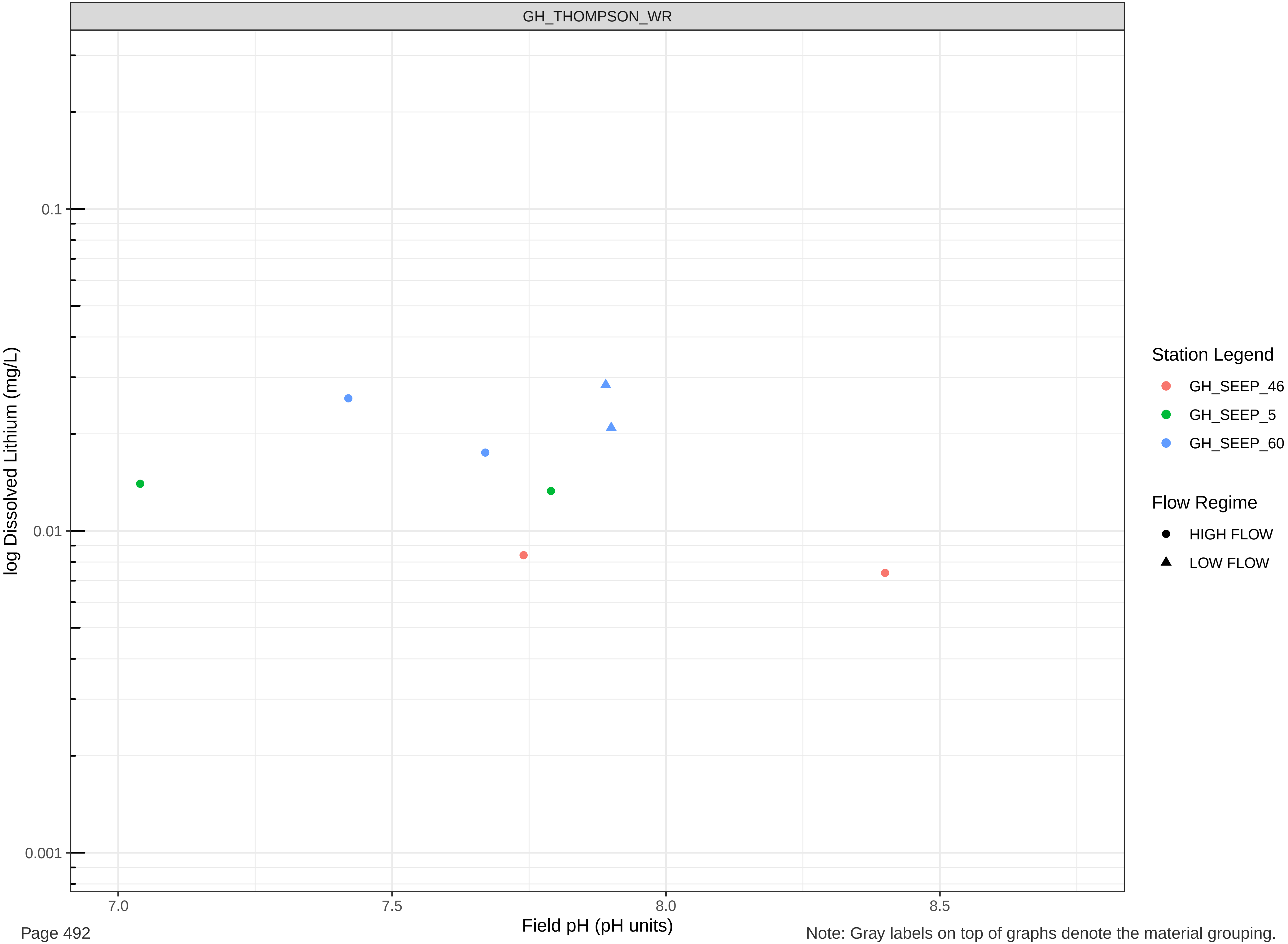

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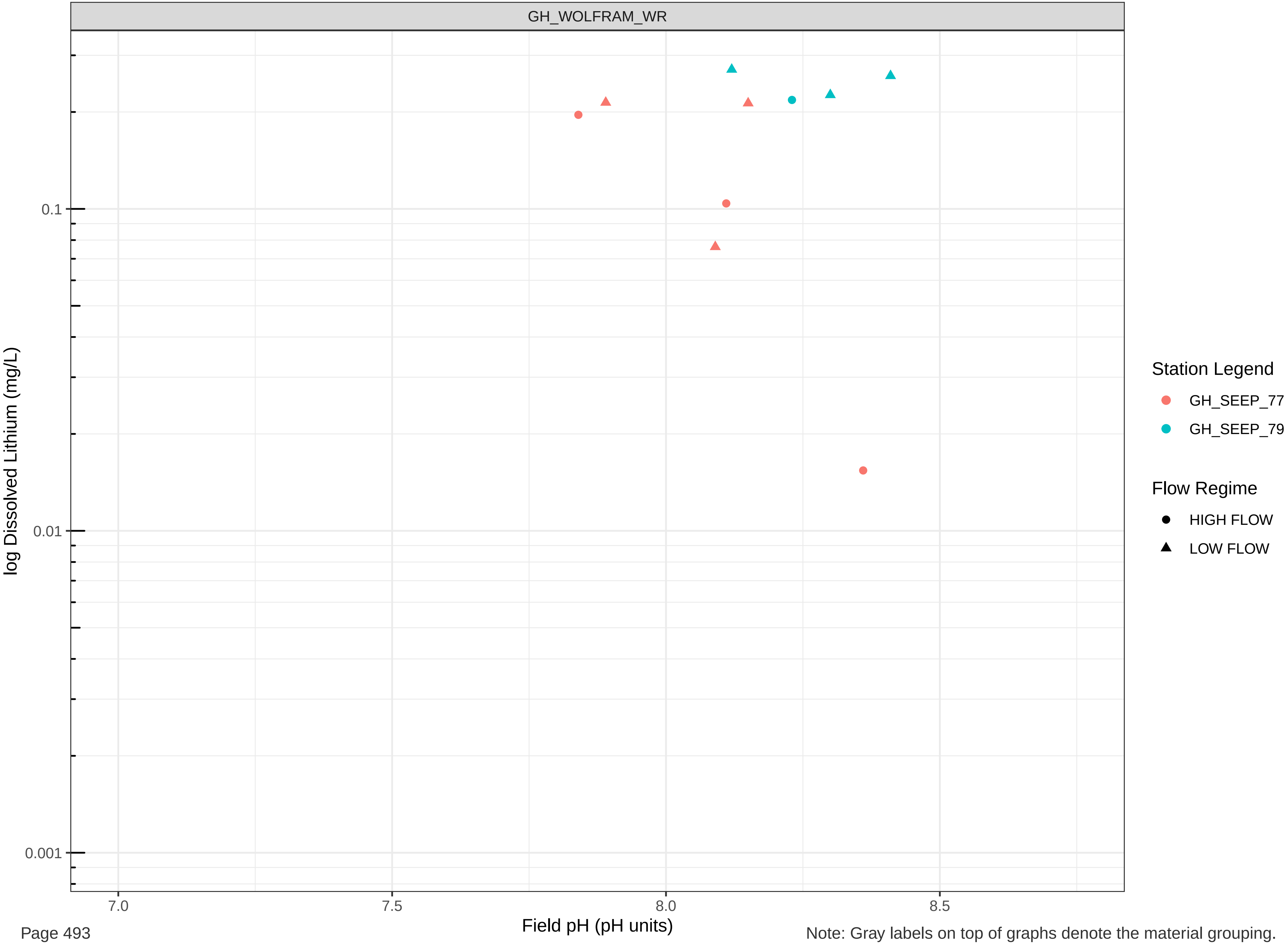

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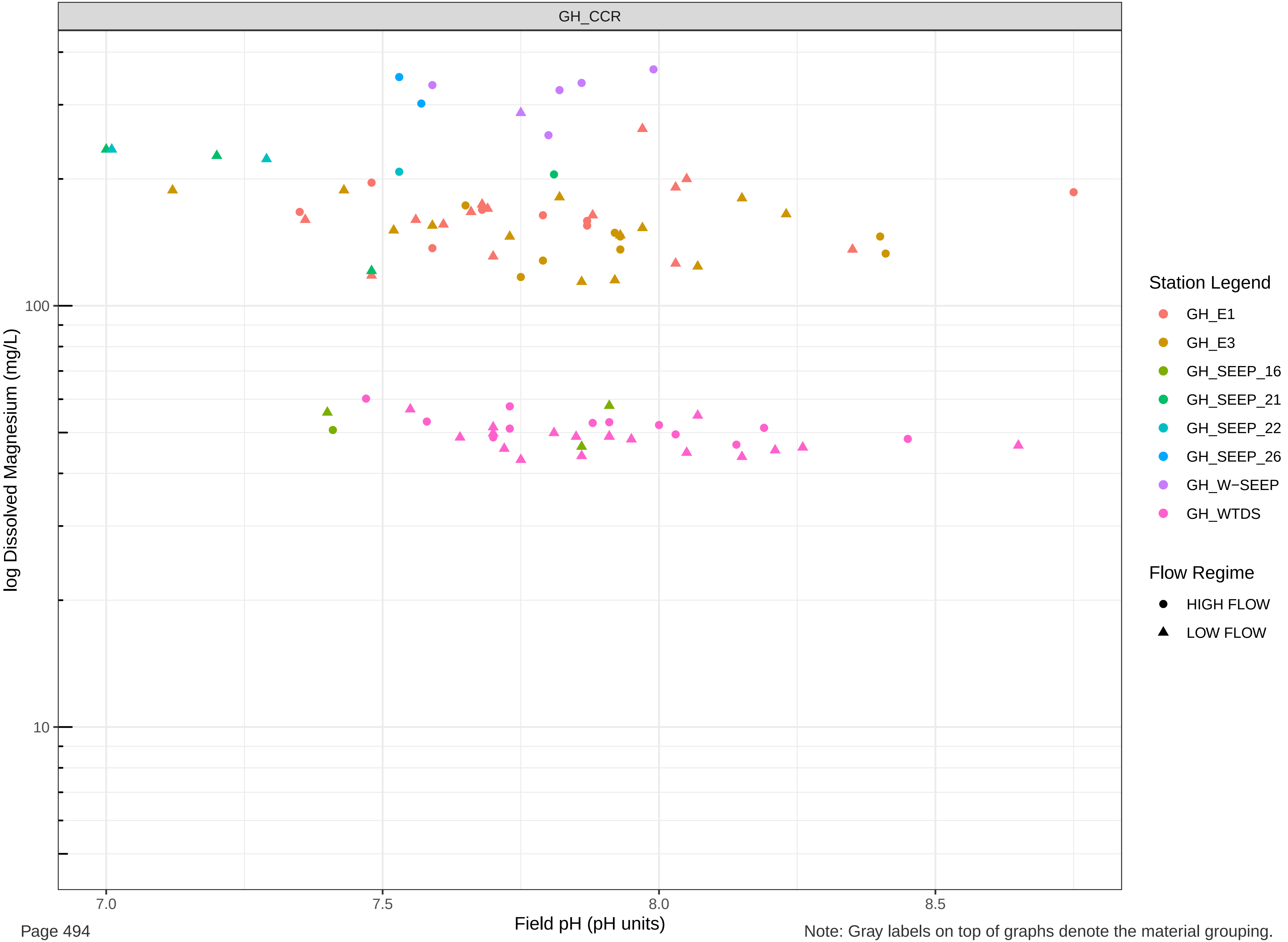

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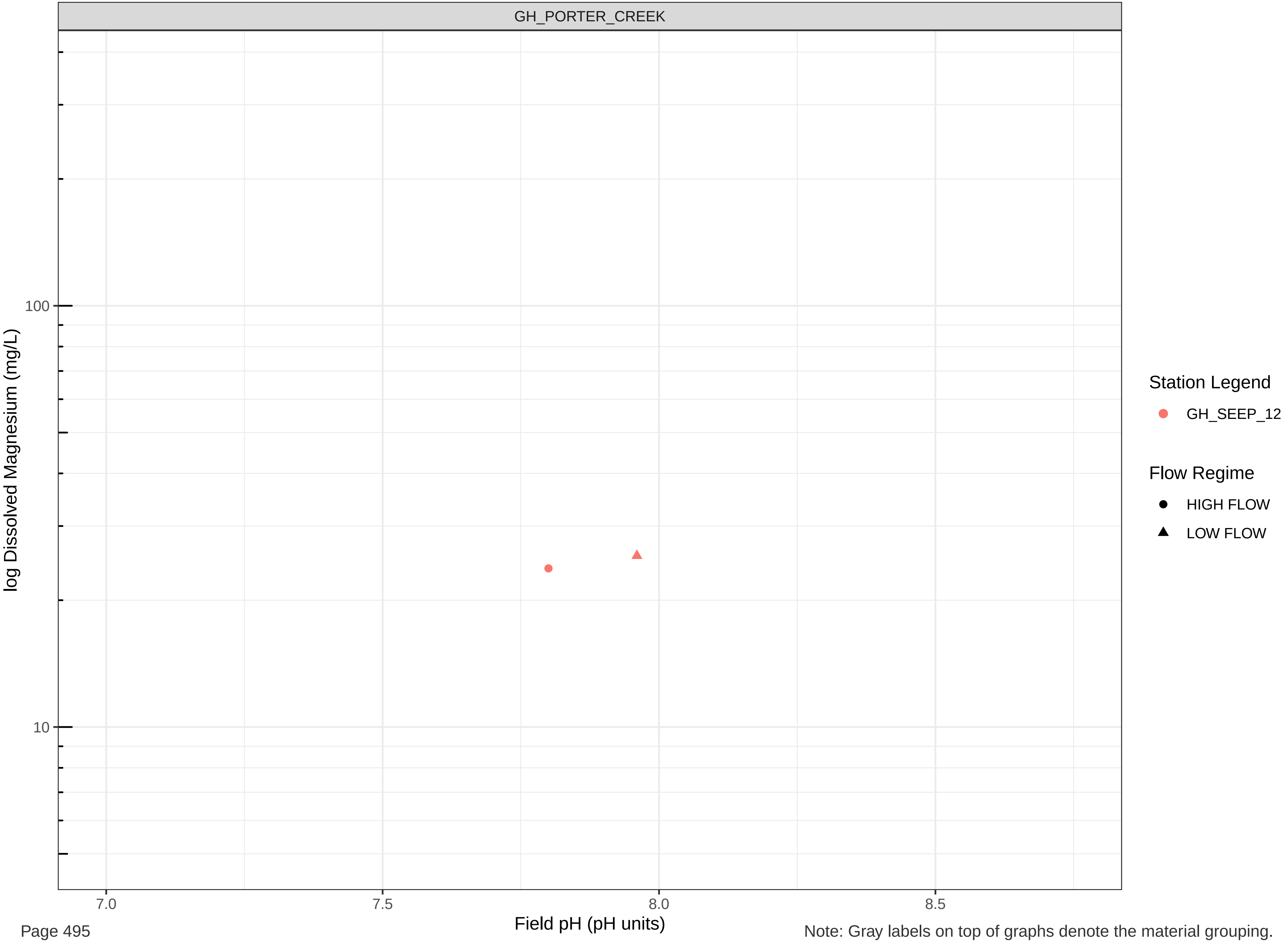

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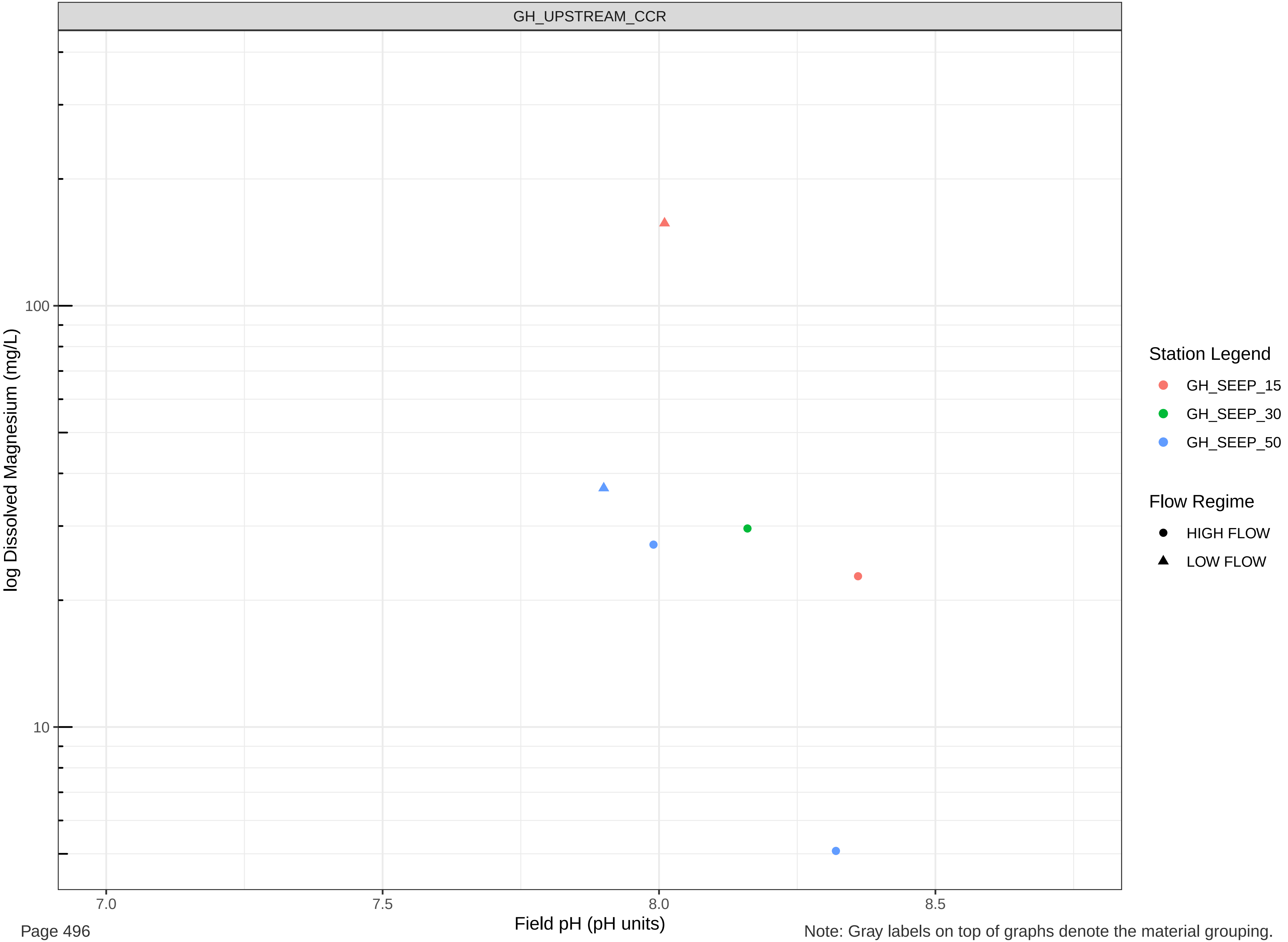

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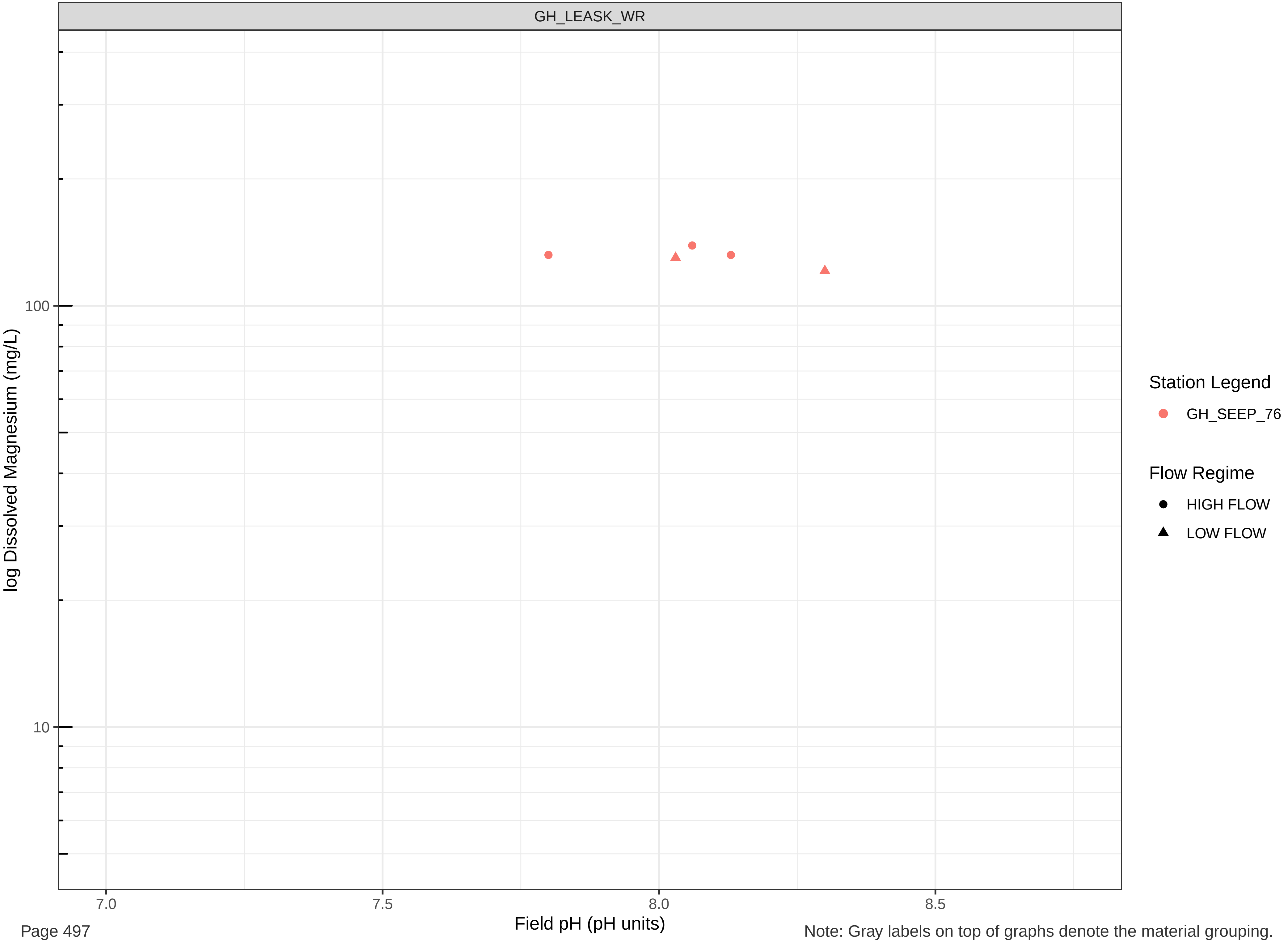

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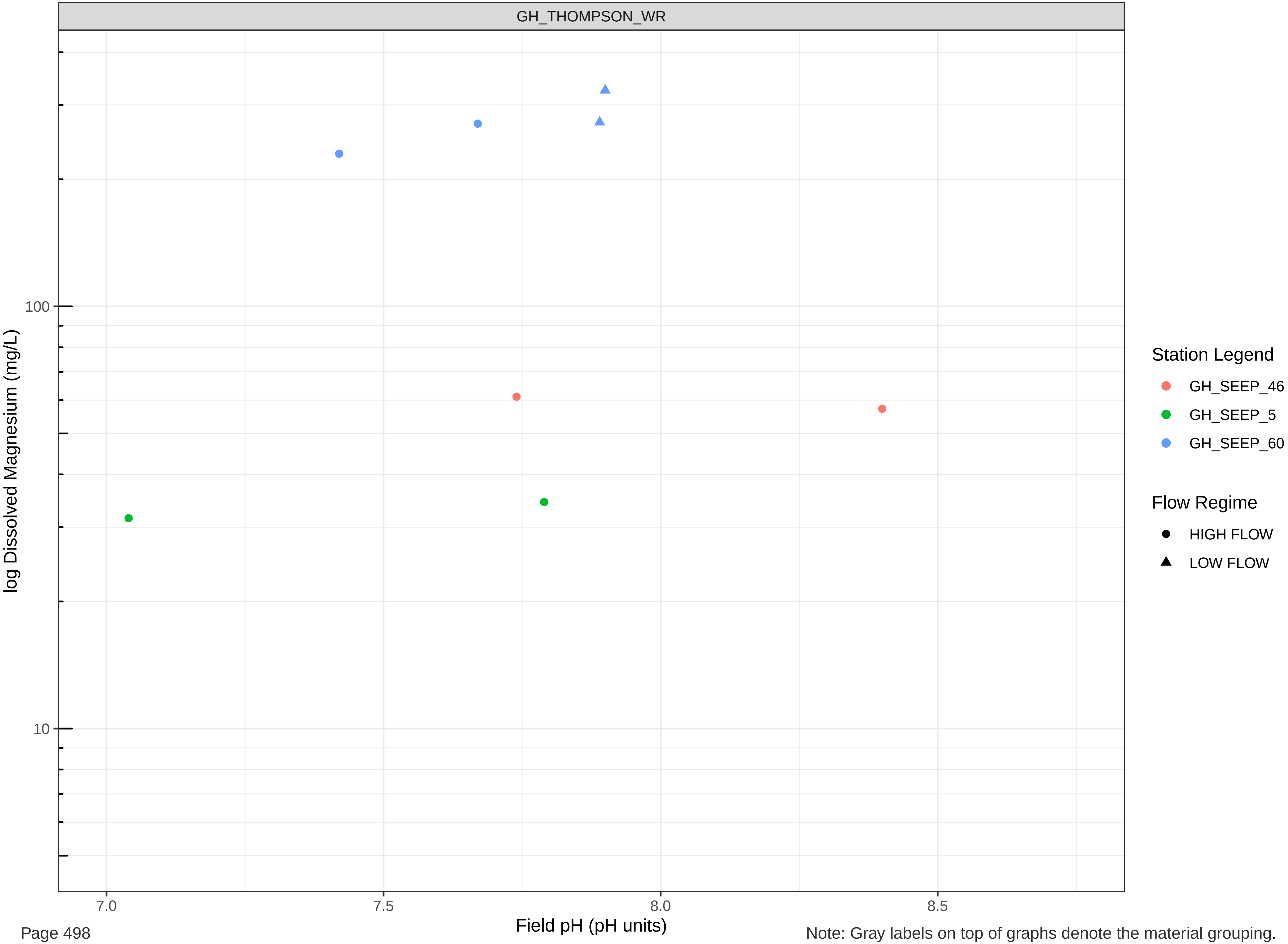

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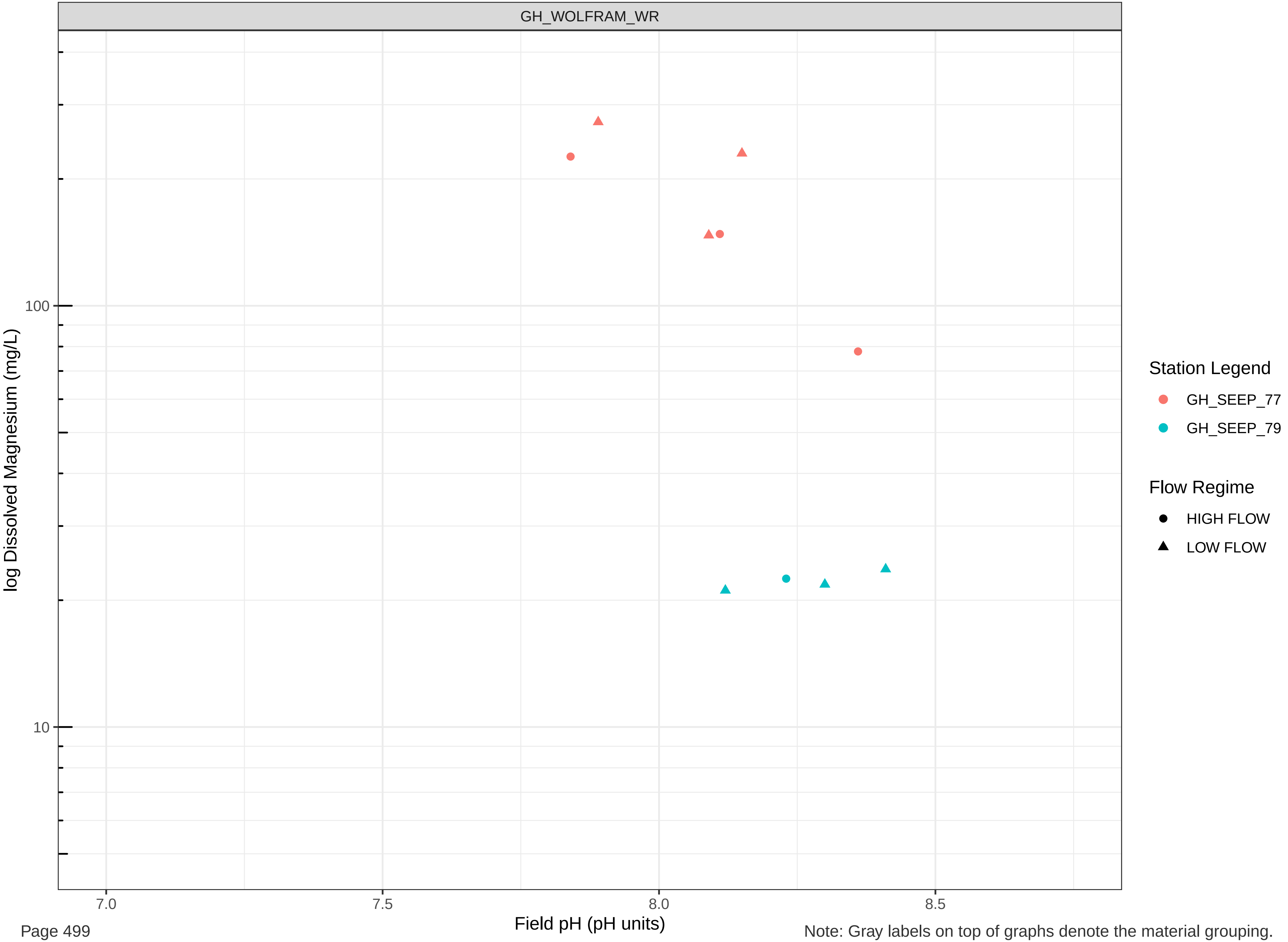

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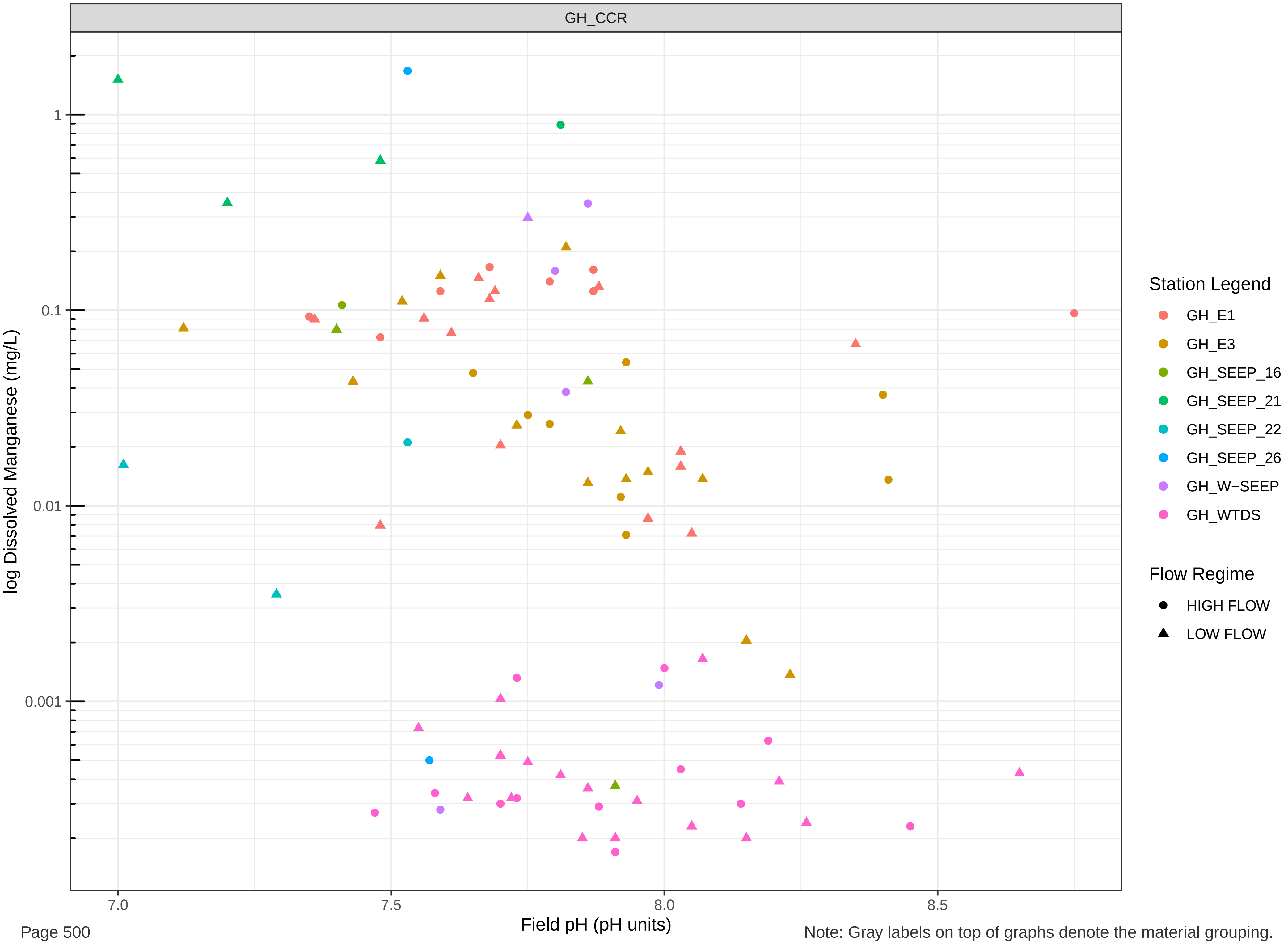

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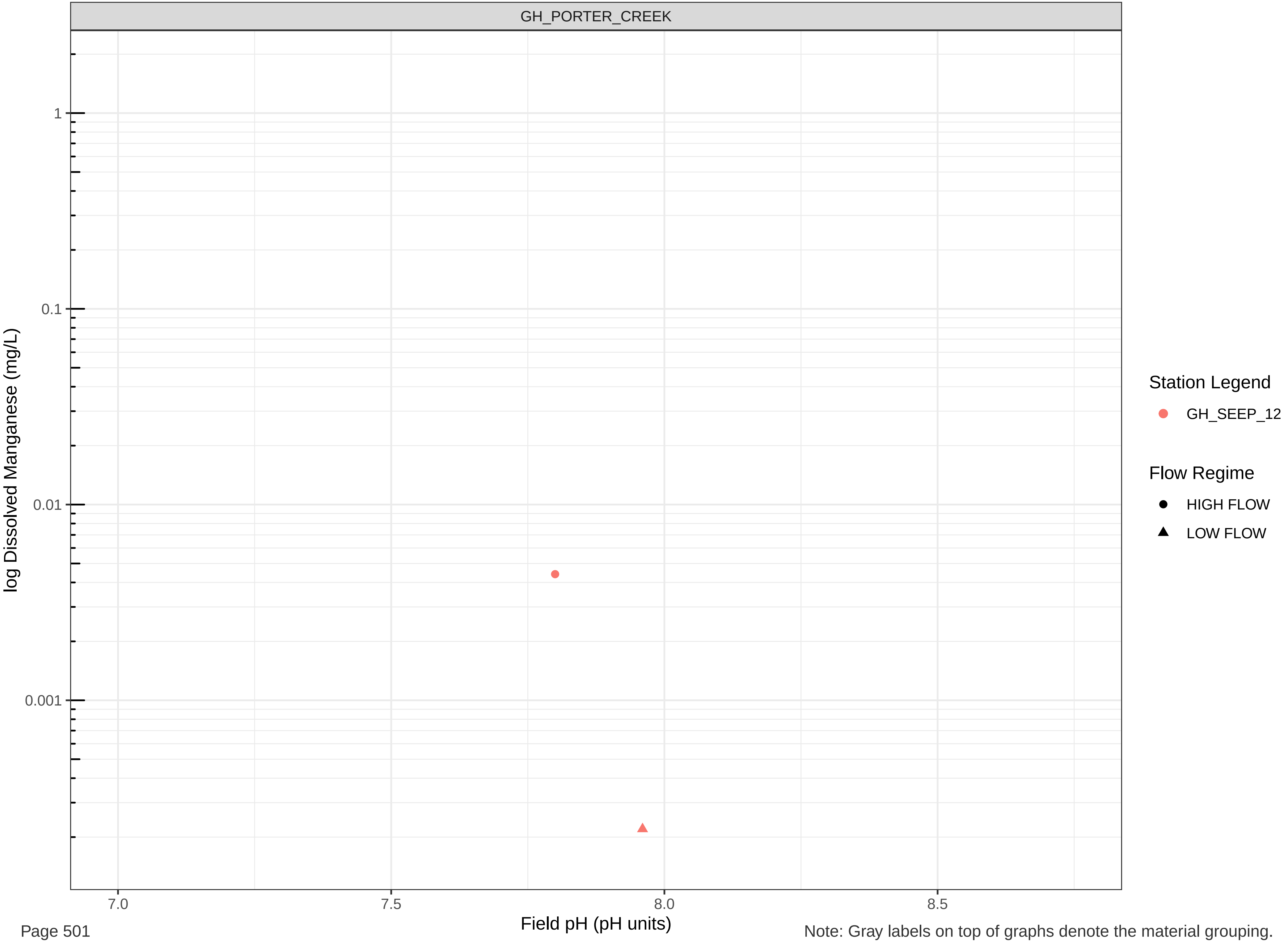

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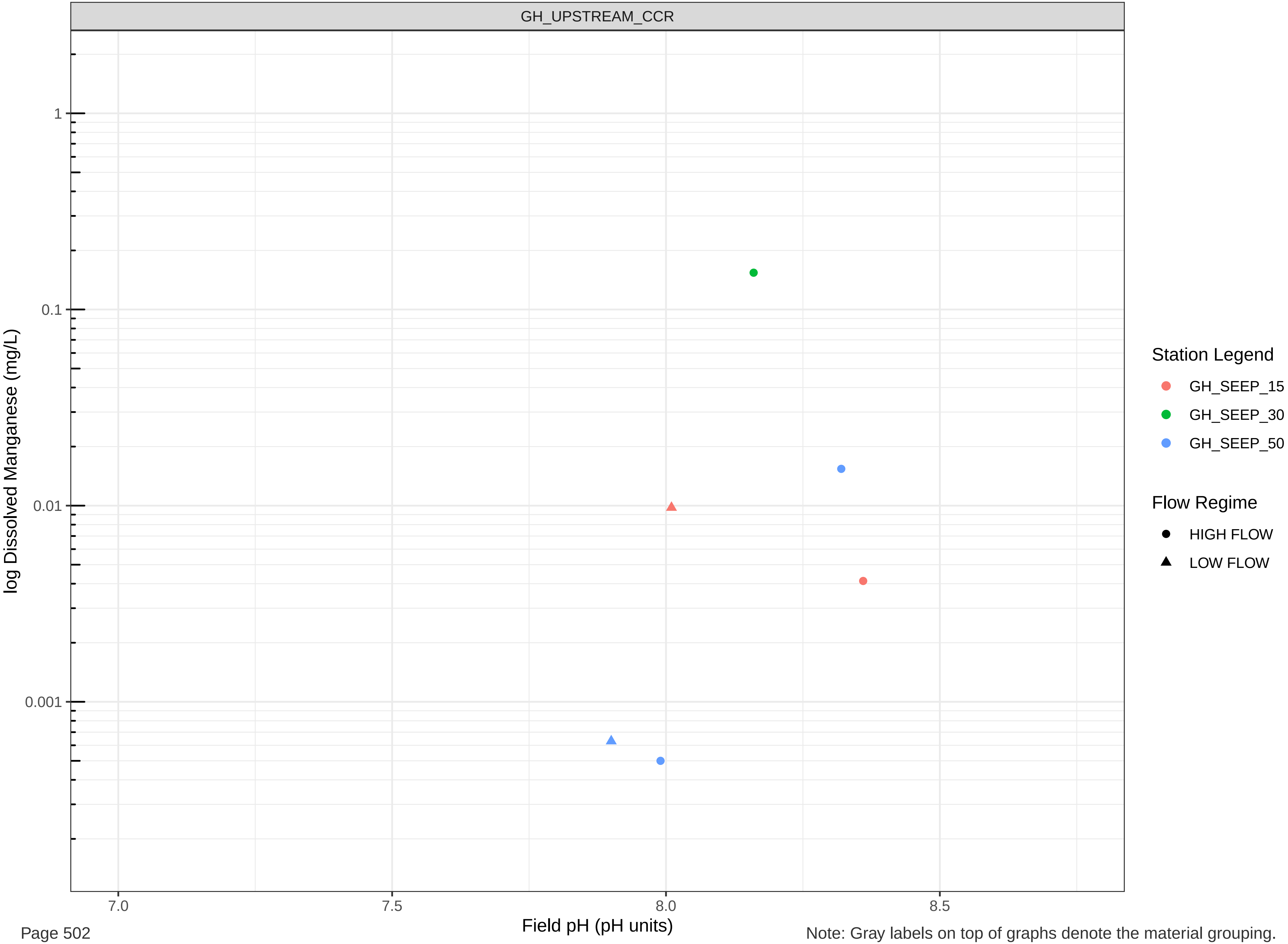

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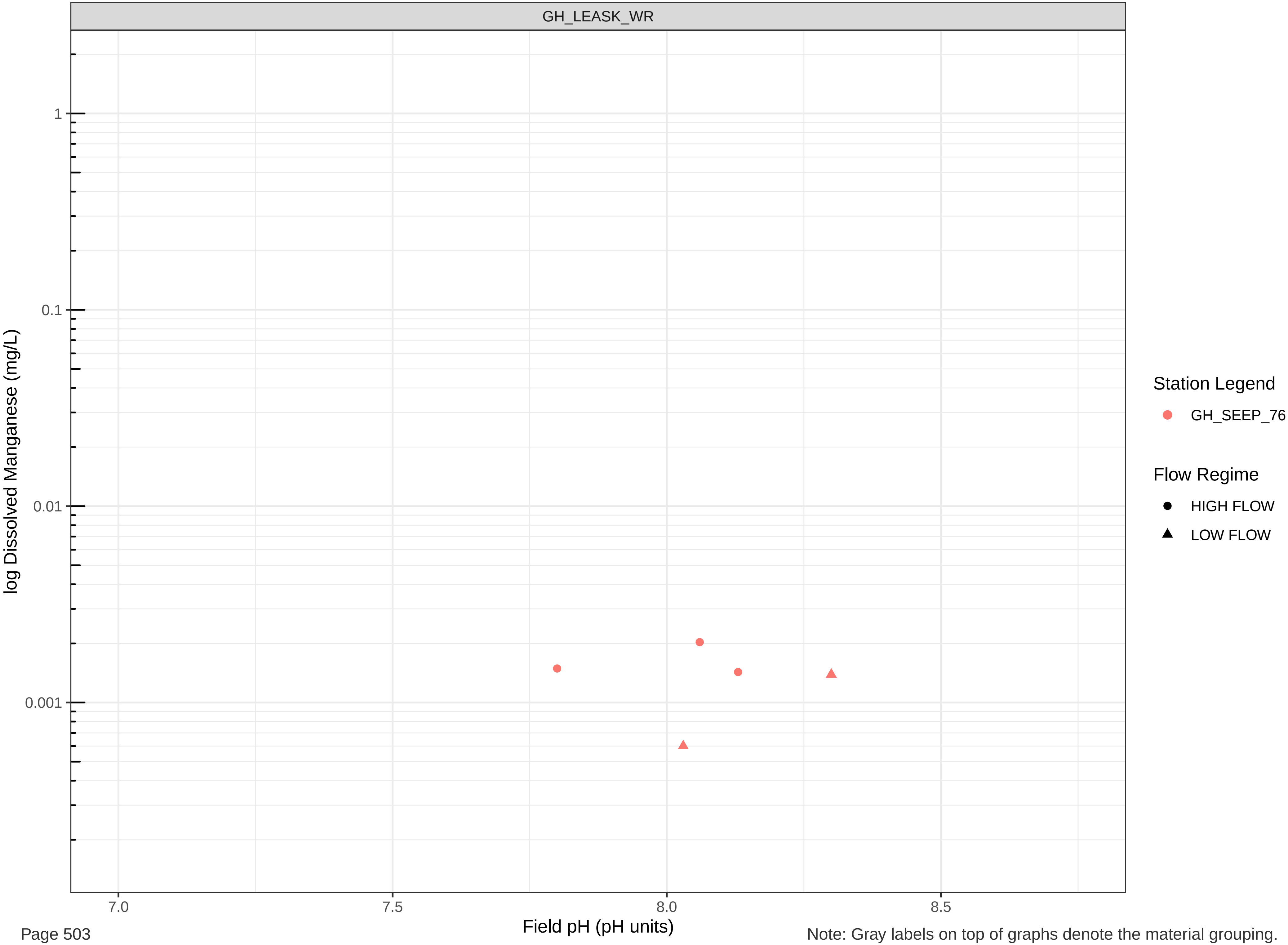

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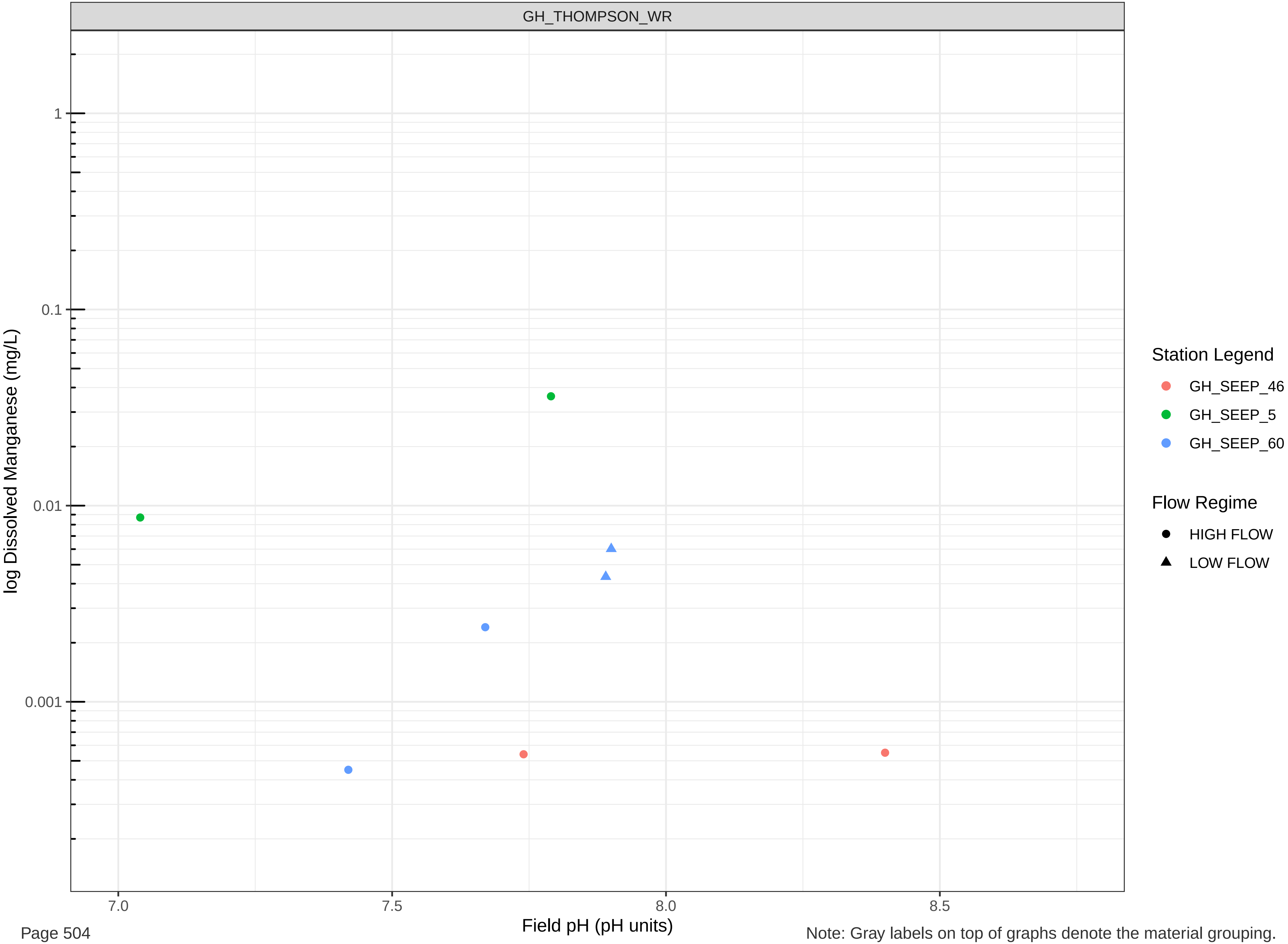

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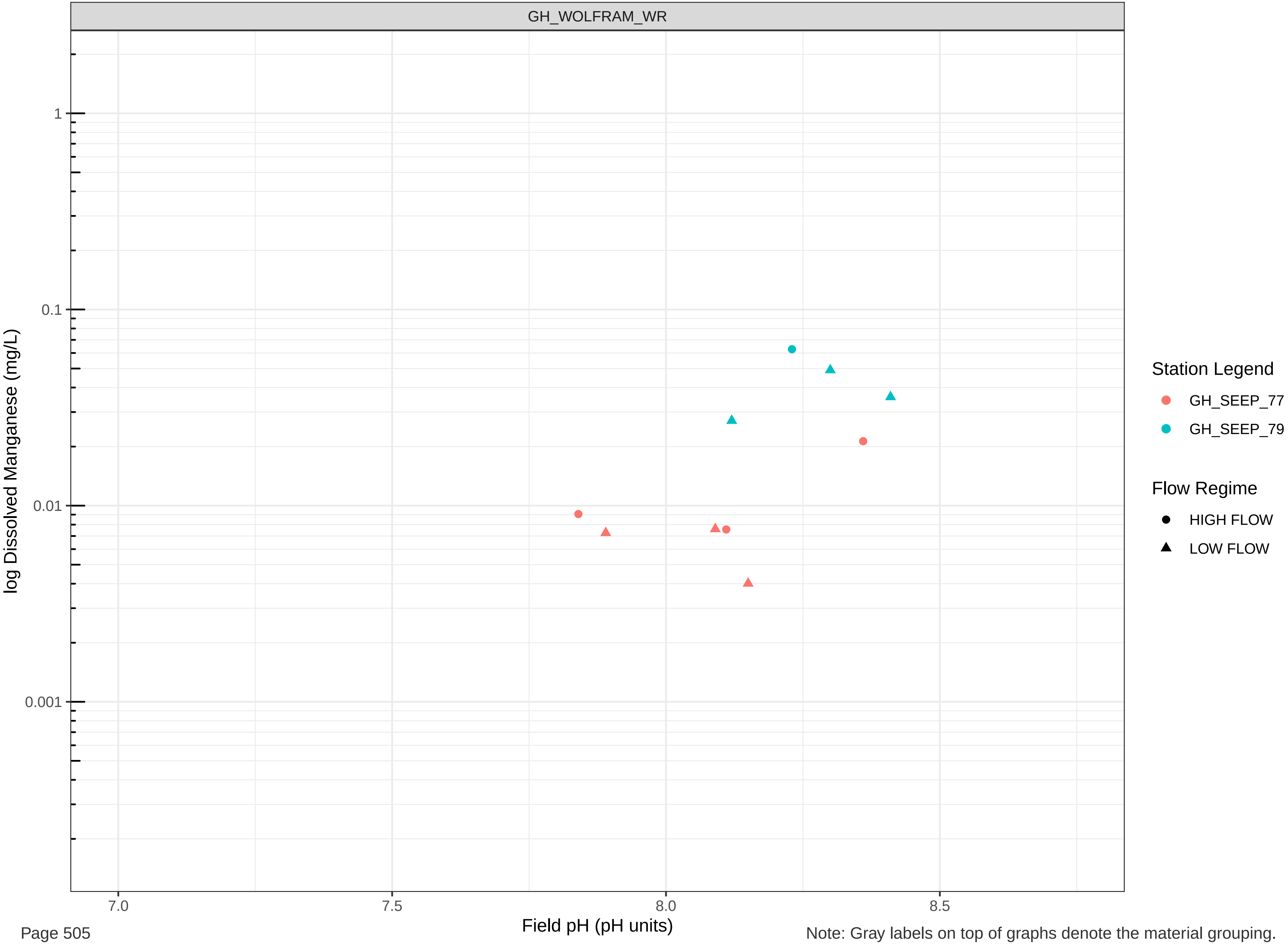

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0.001
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Field pH (pH units)
Station Legend
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GH_SEEP_79
Flow Regime
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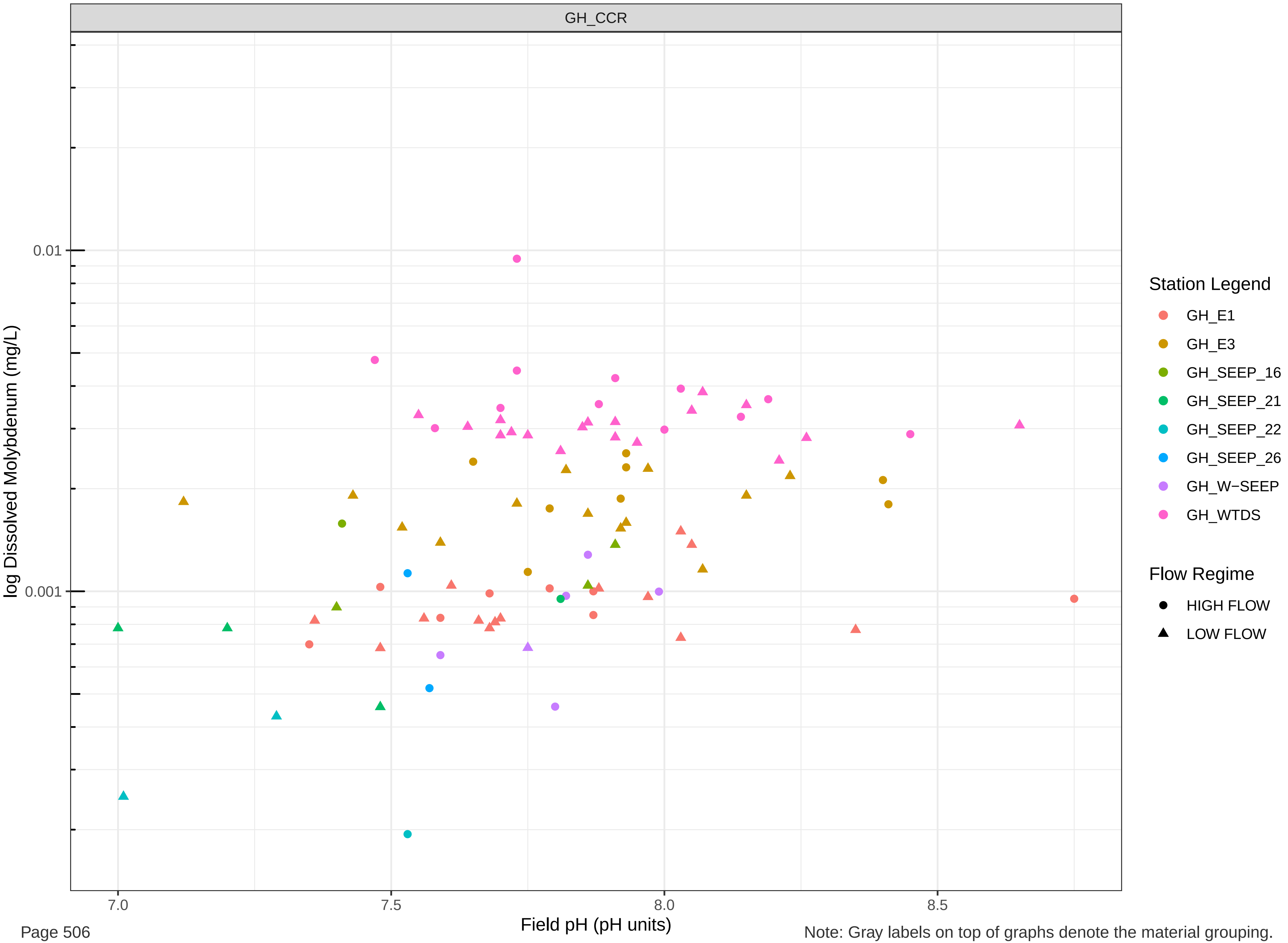

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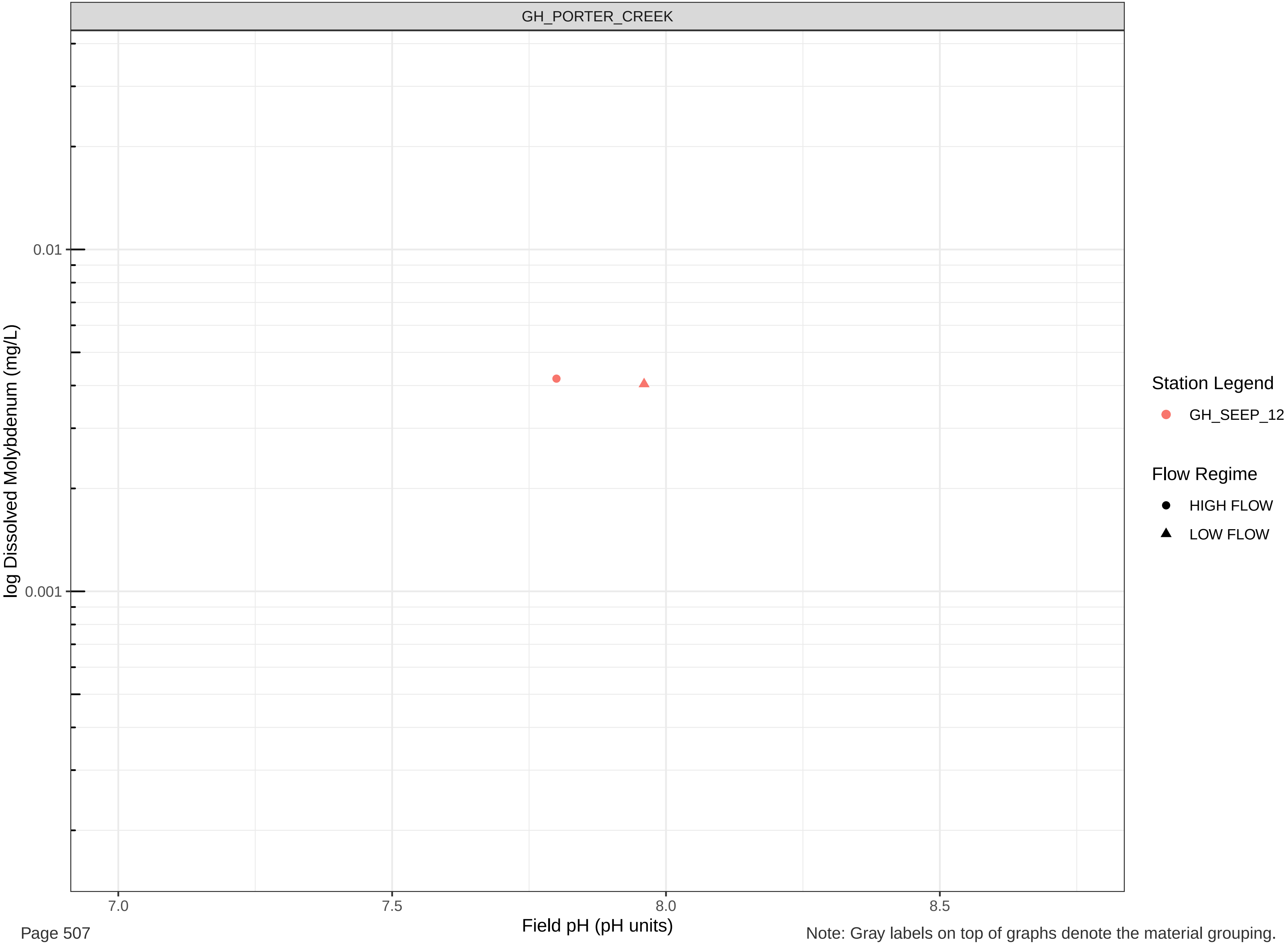

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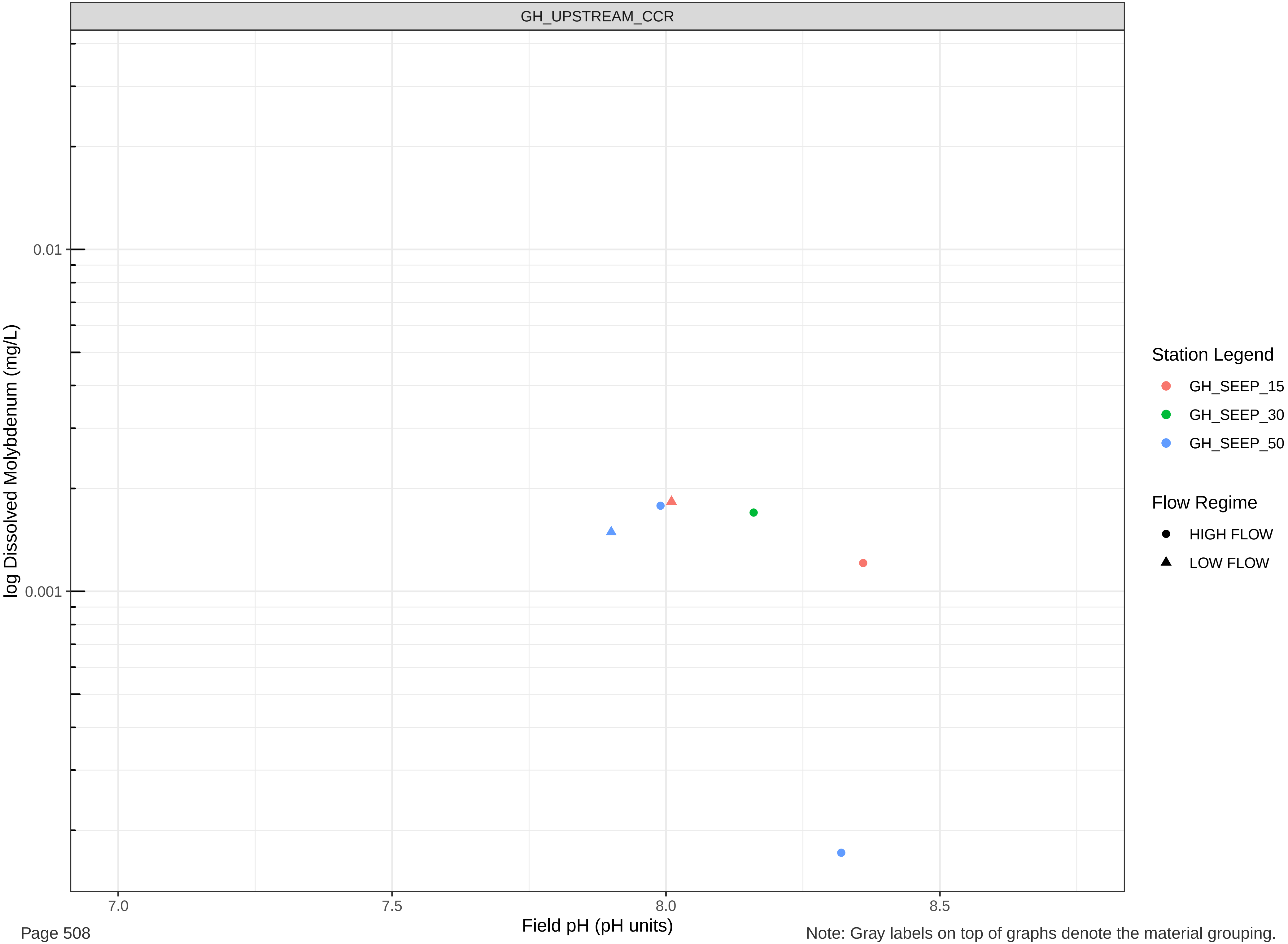

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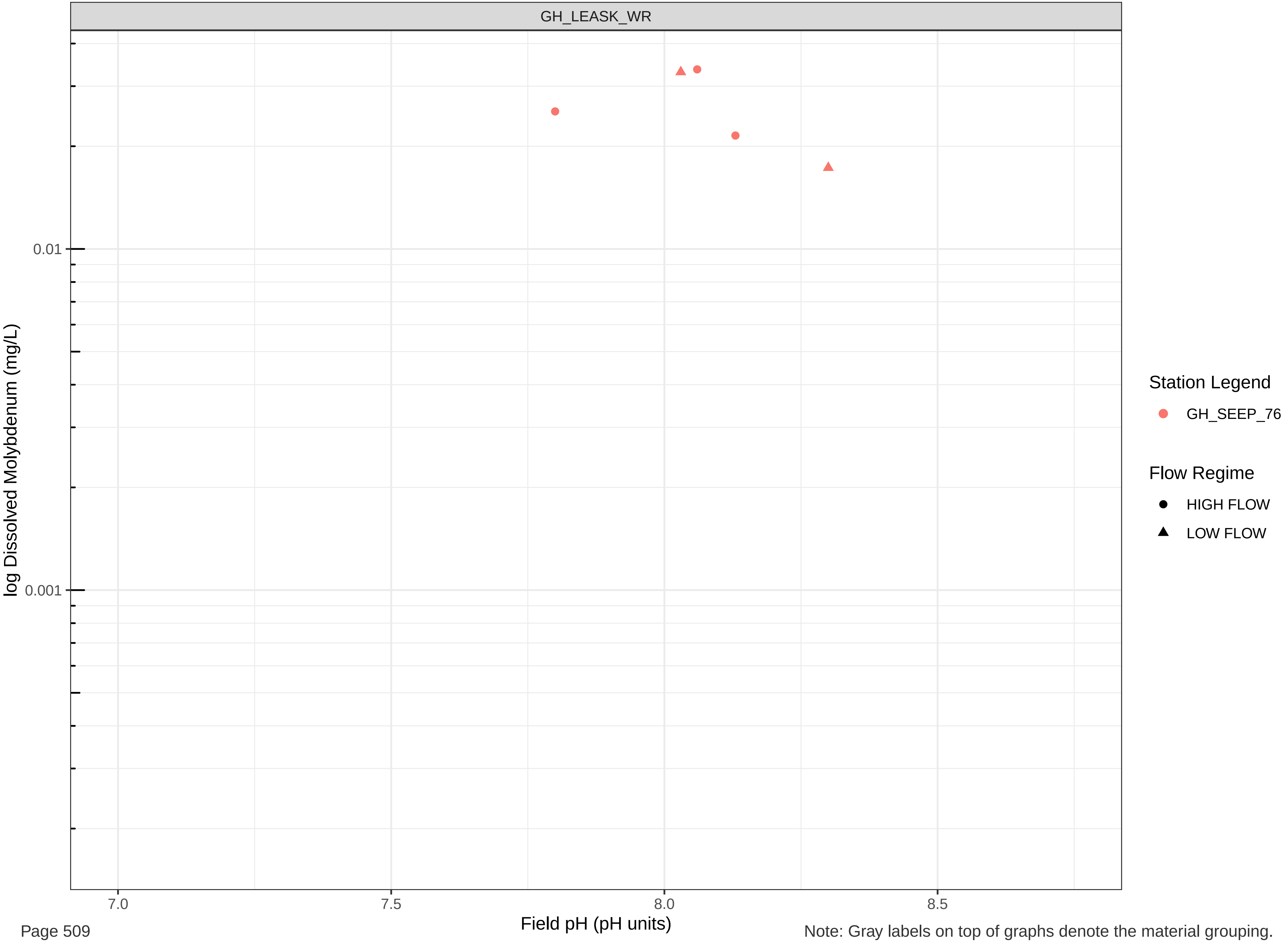

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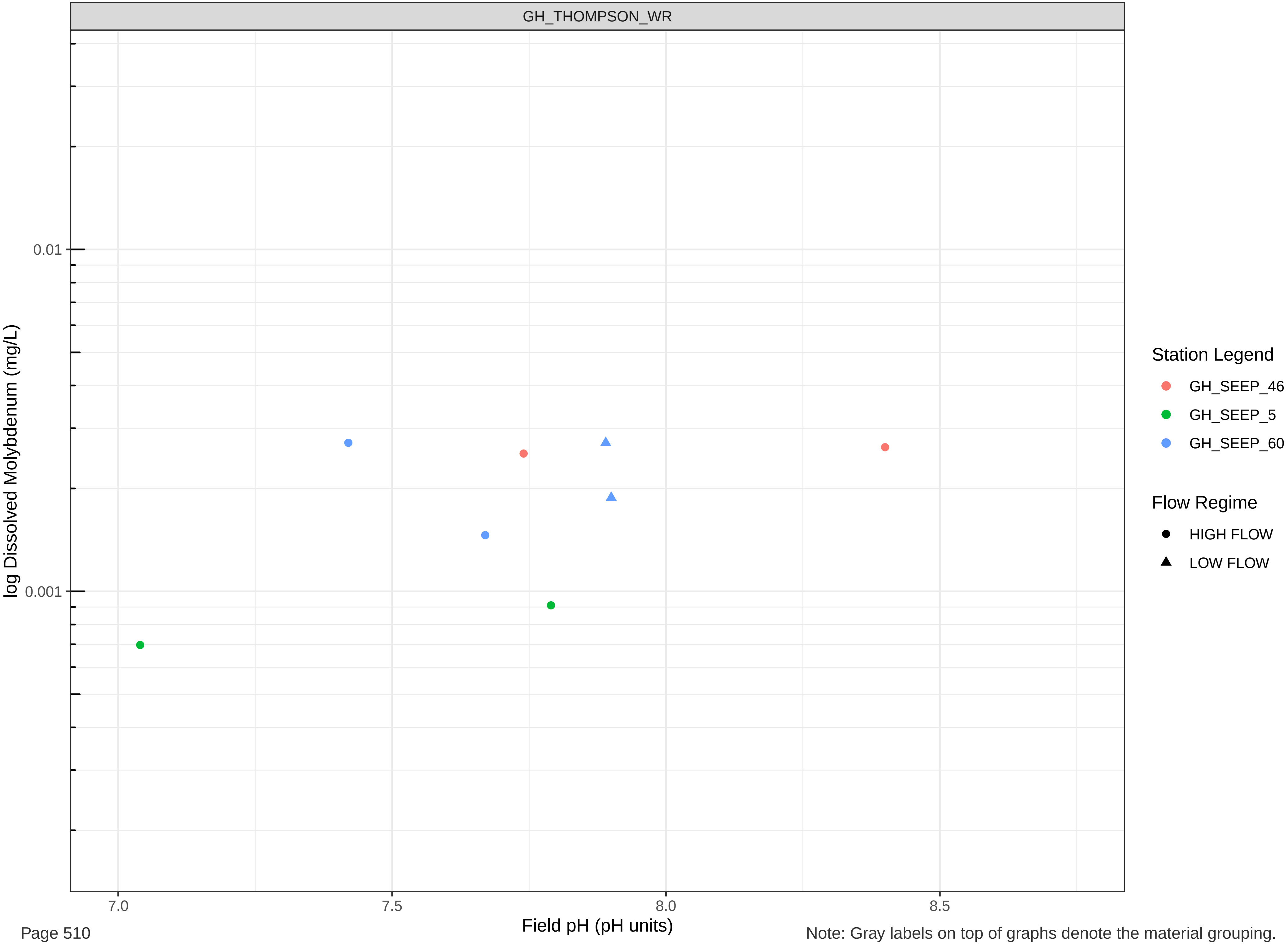

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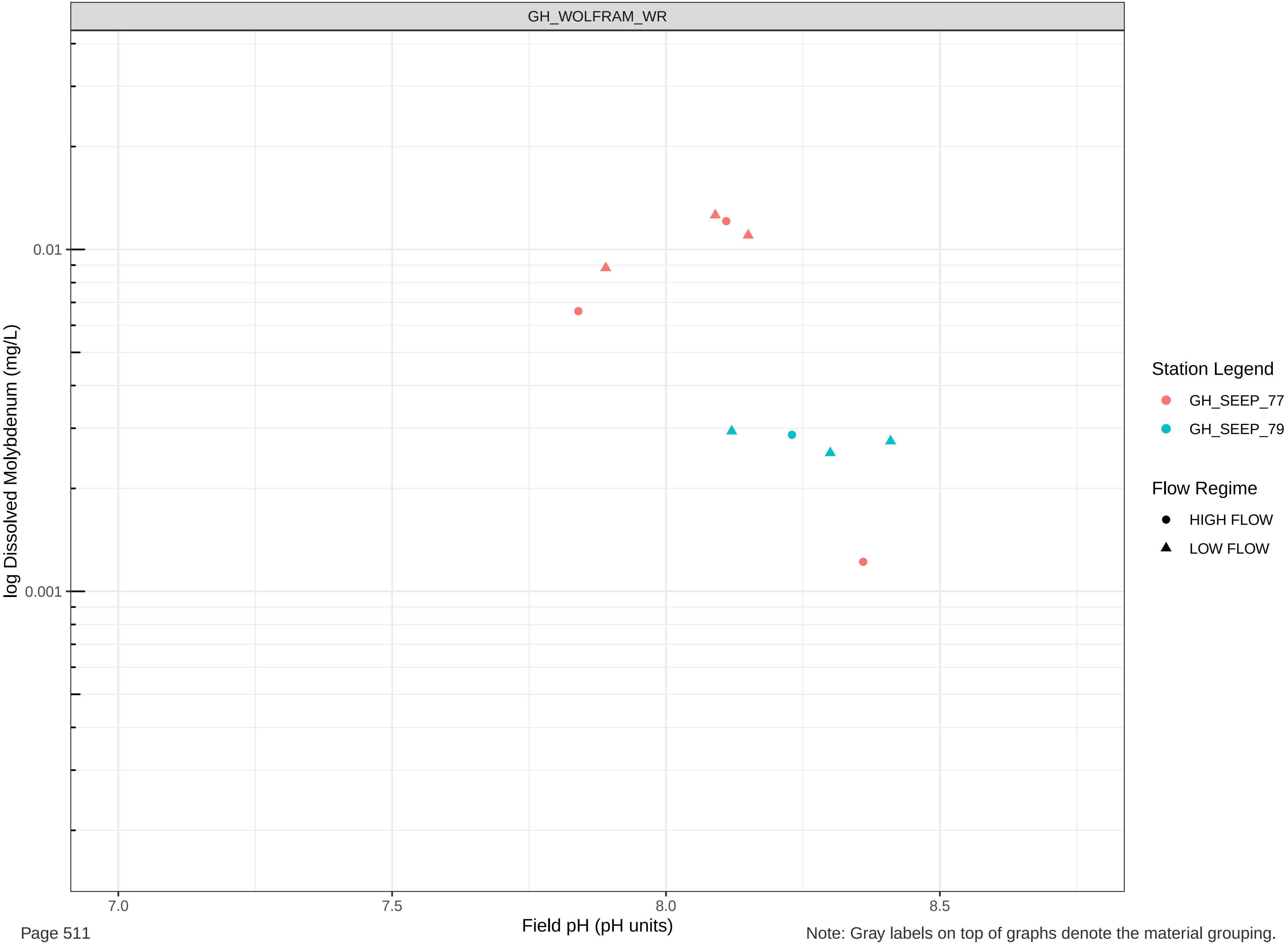

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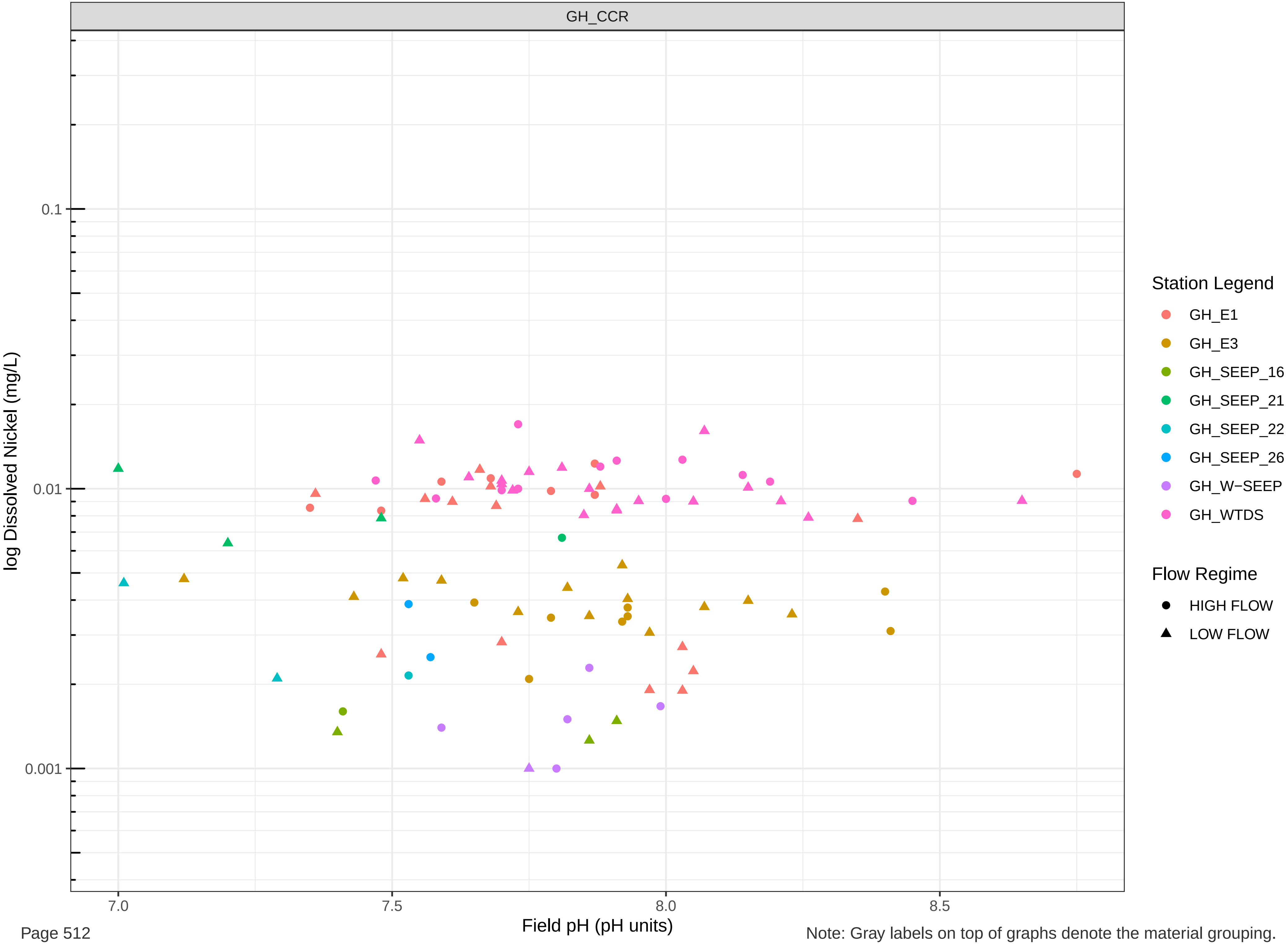

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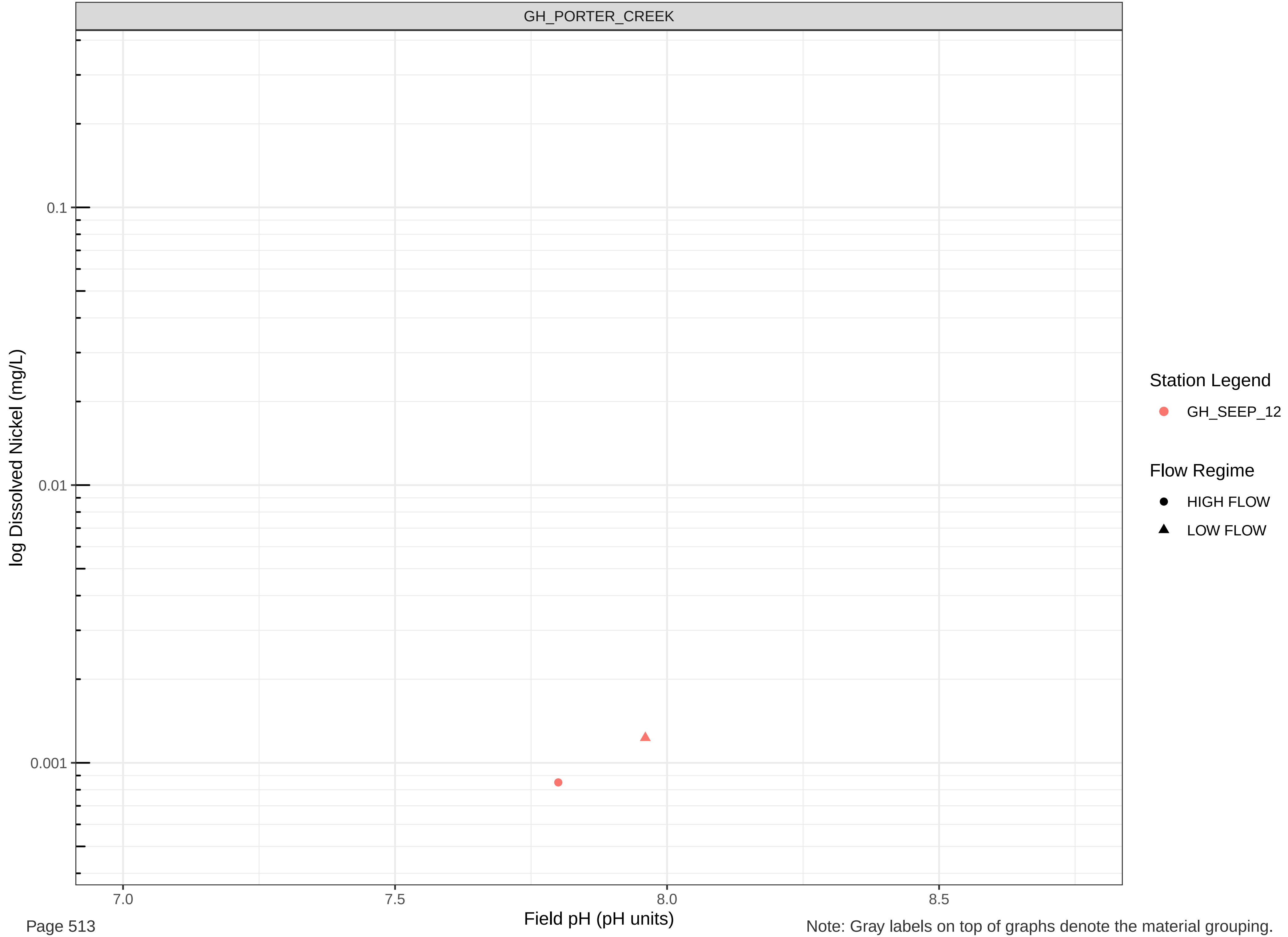

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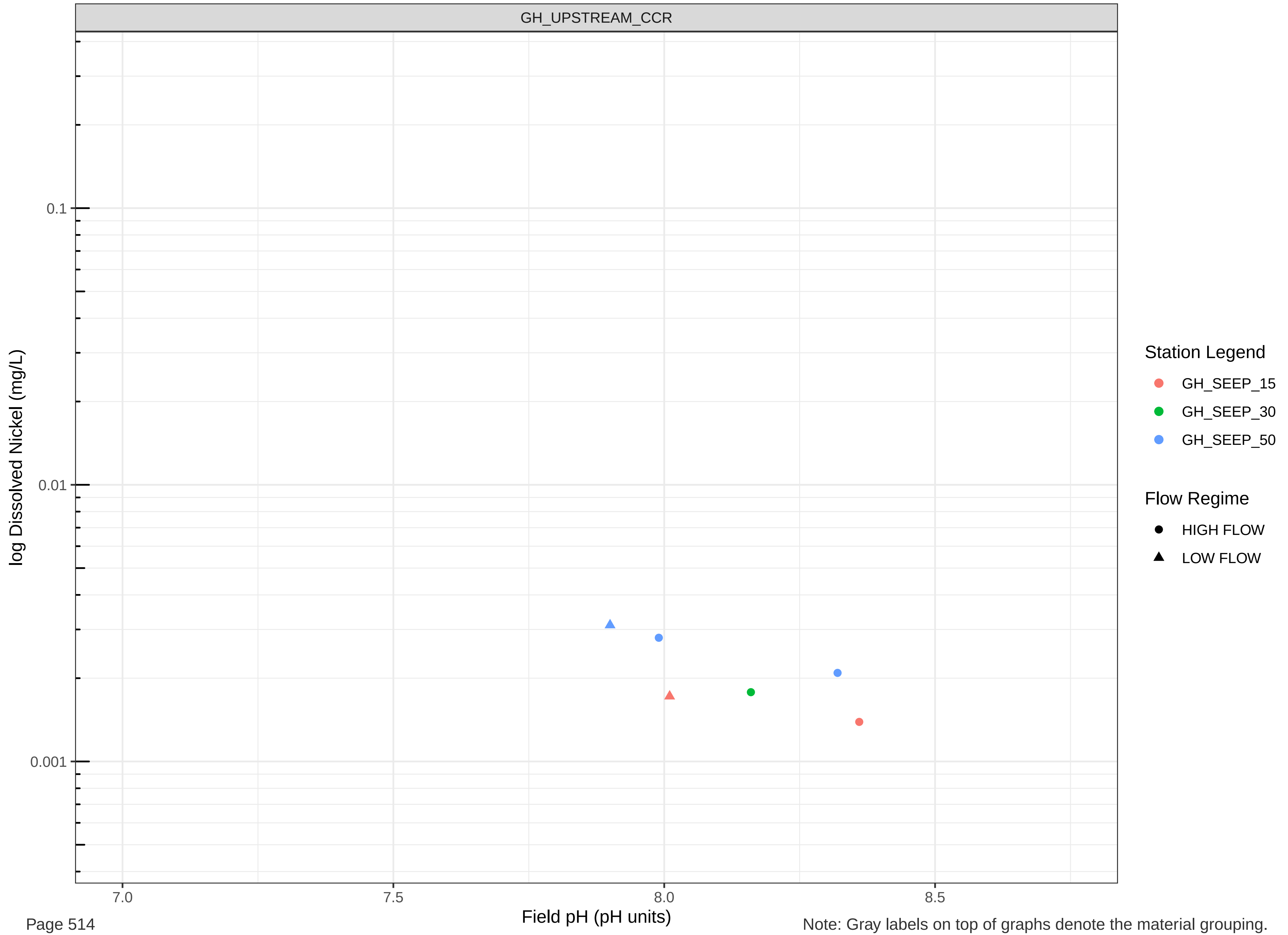

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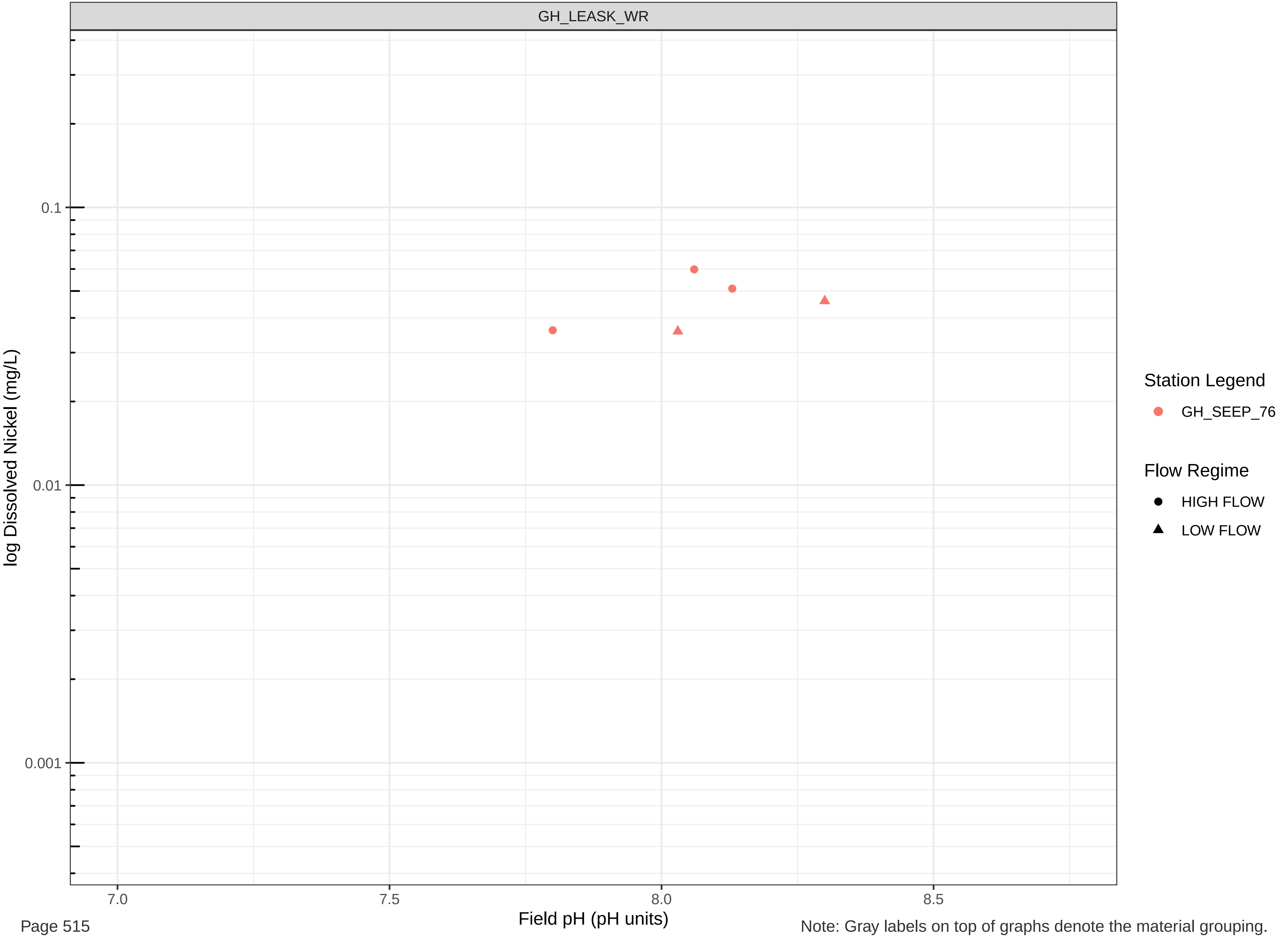

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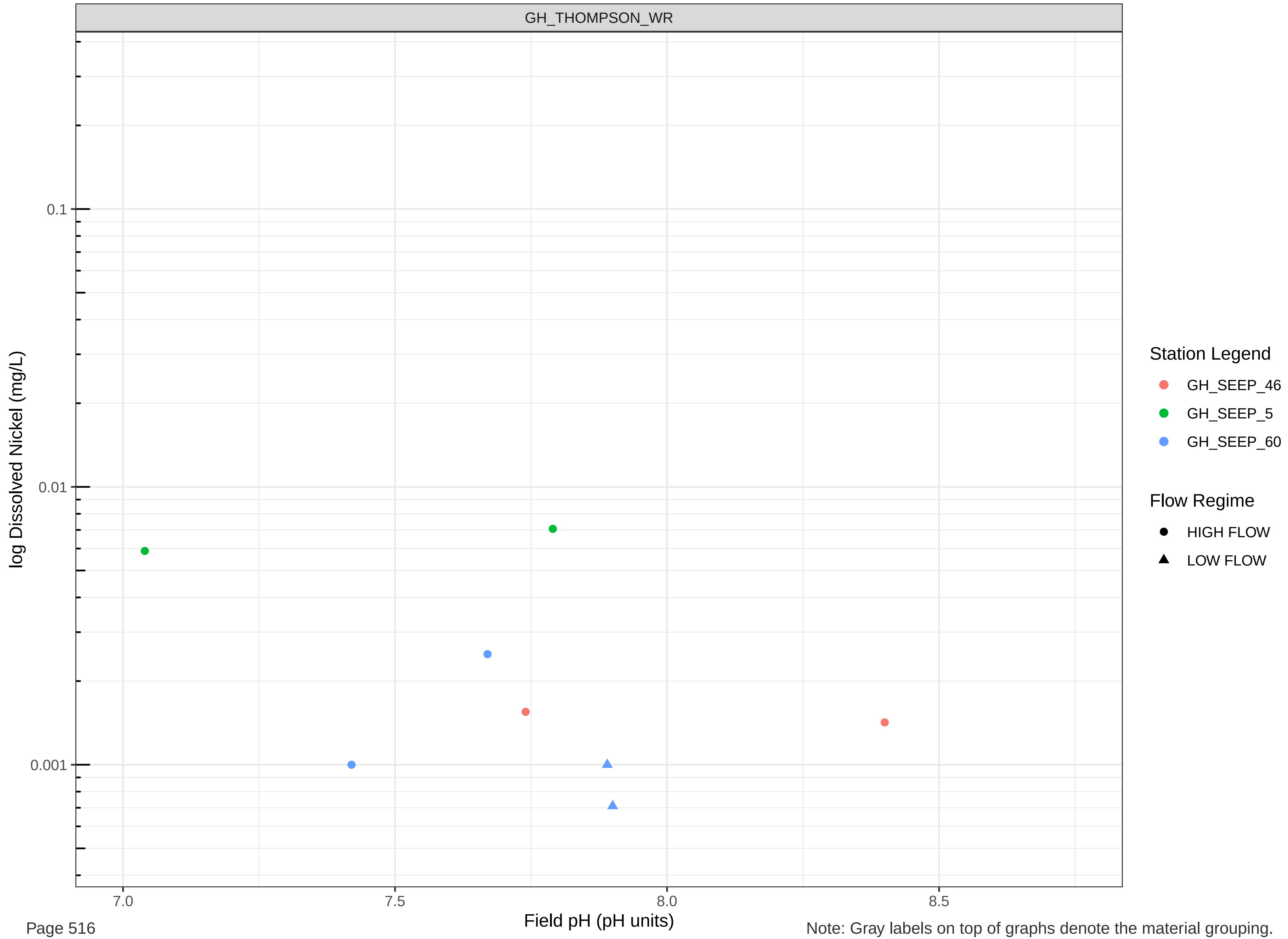

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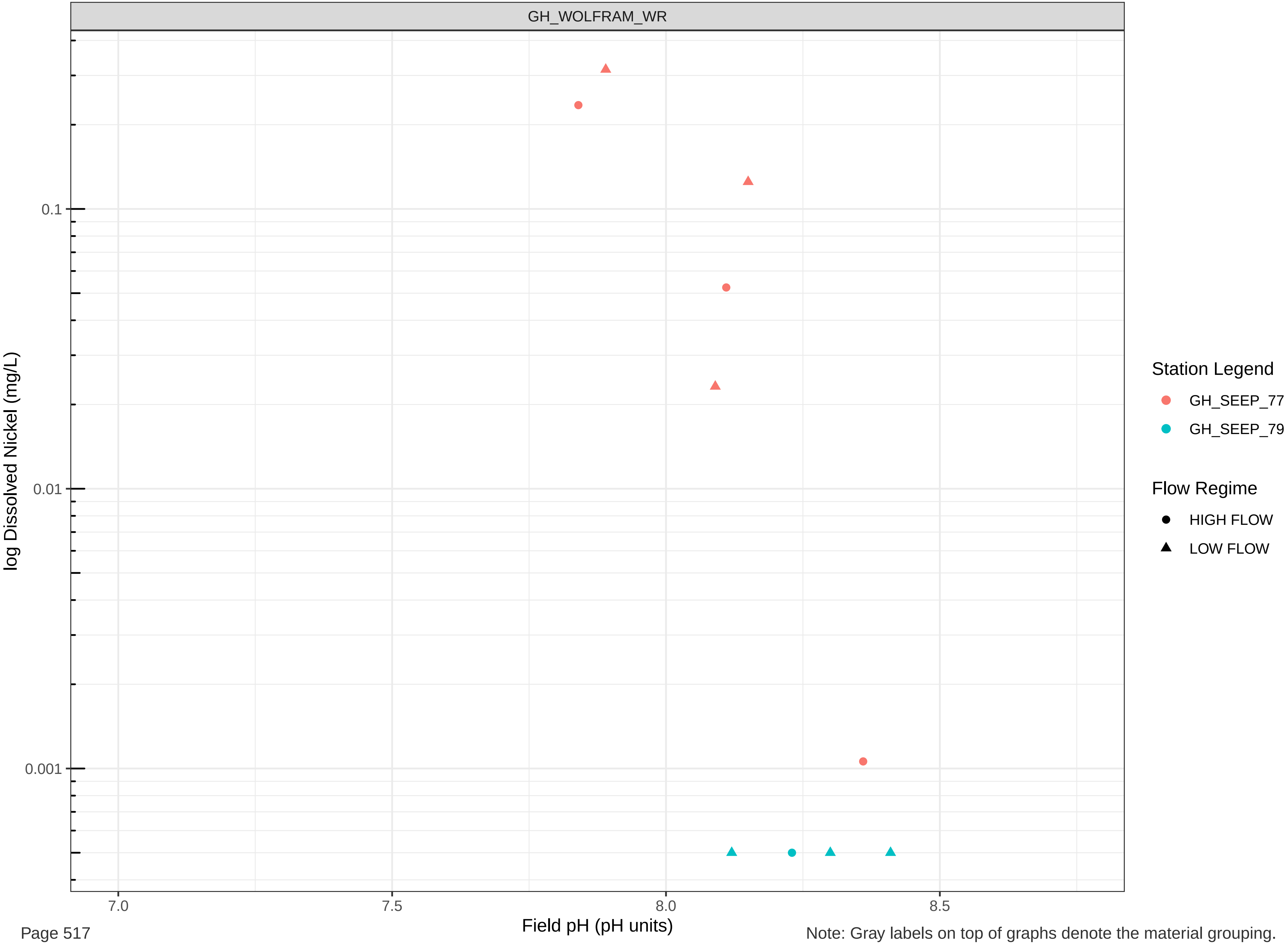

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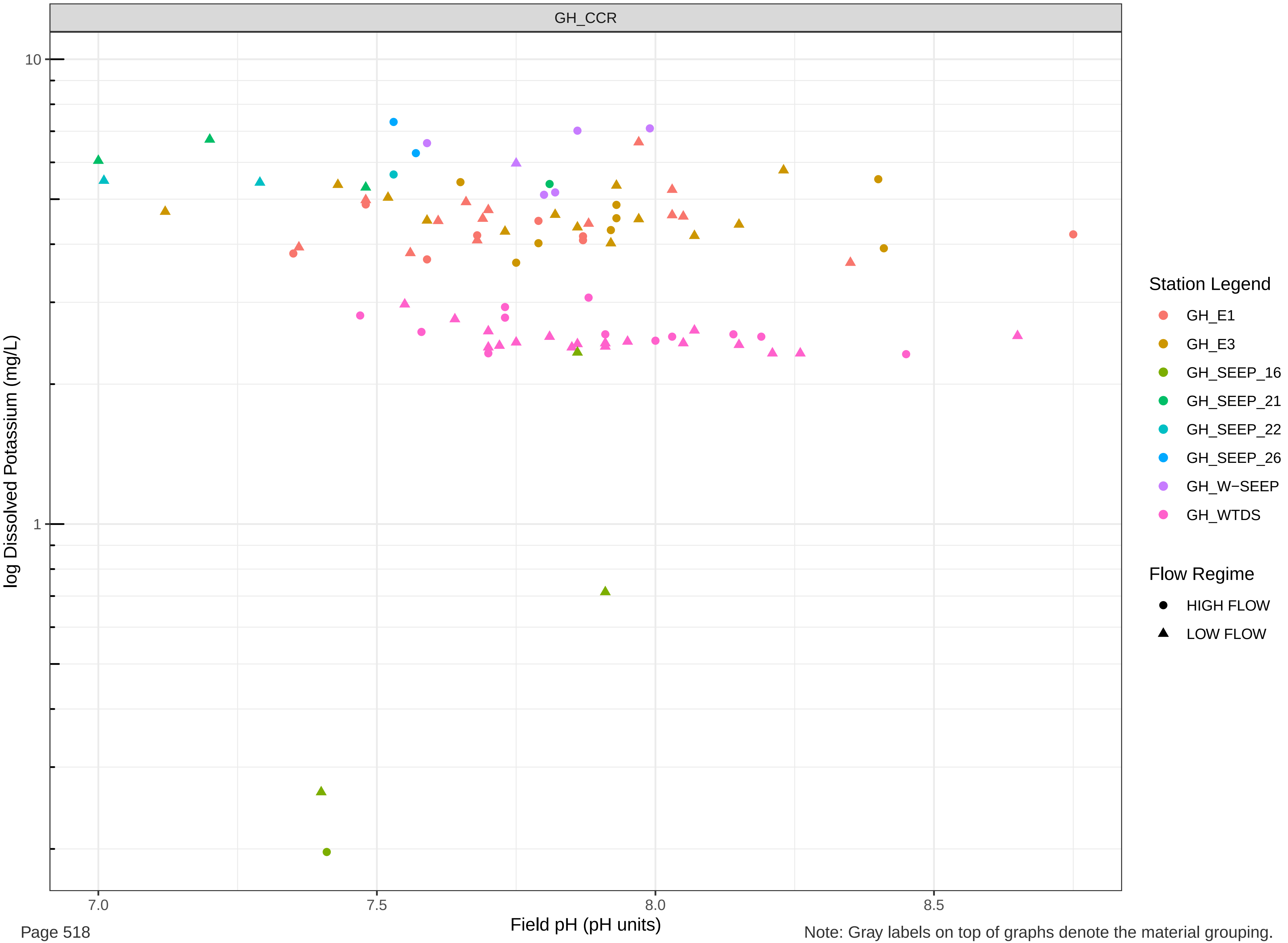

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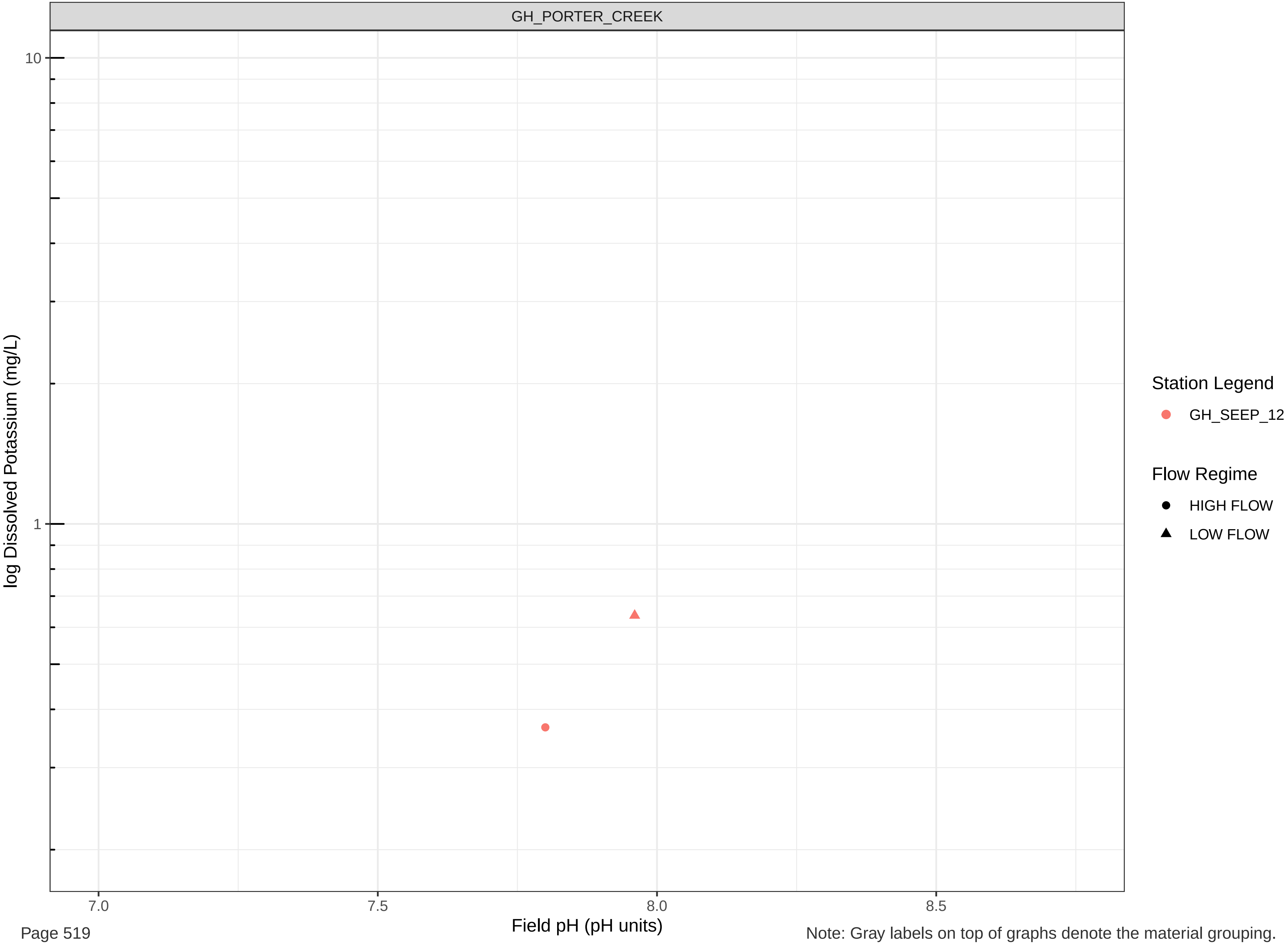

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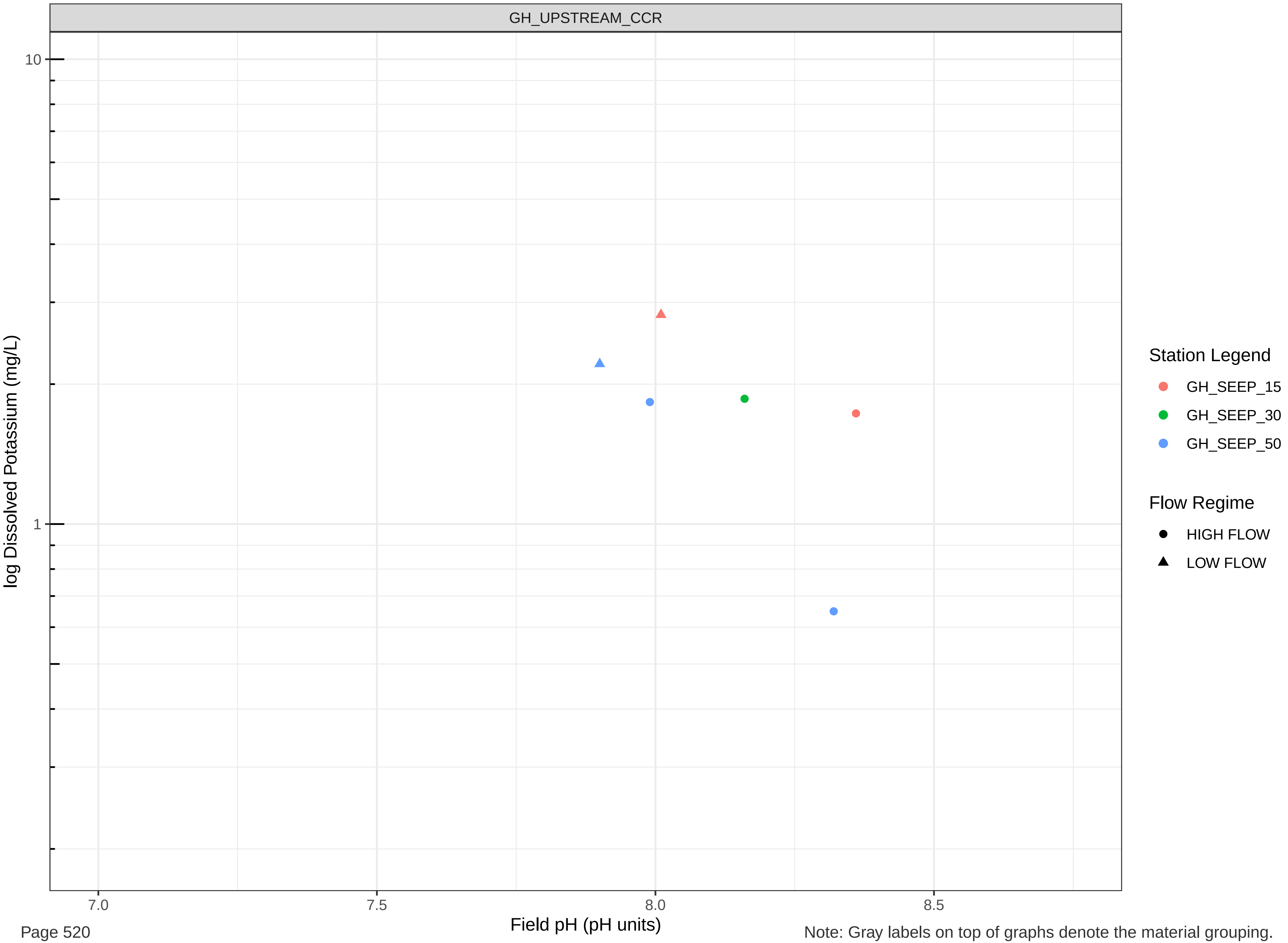

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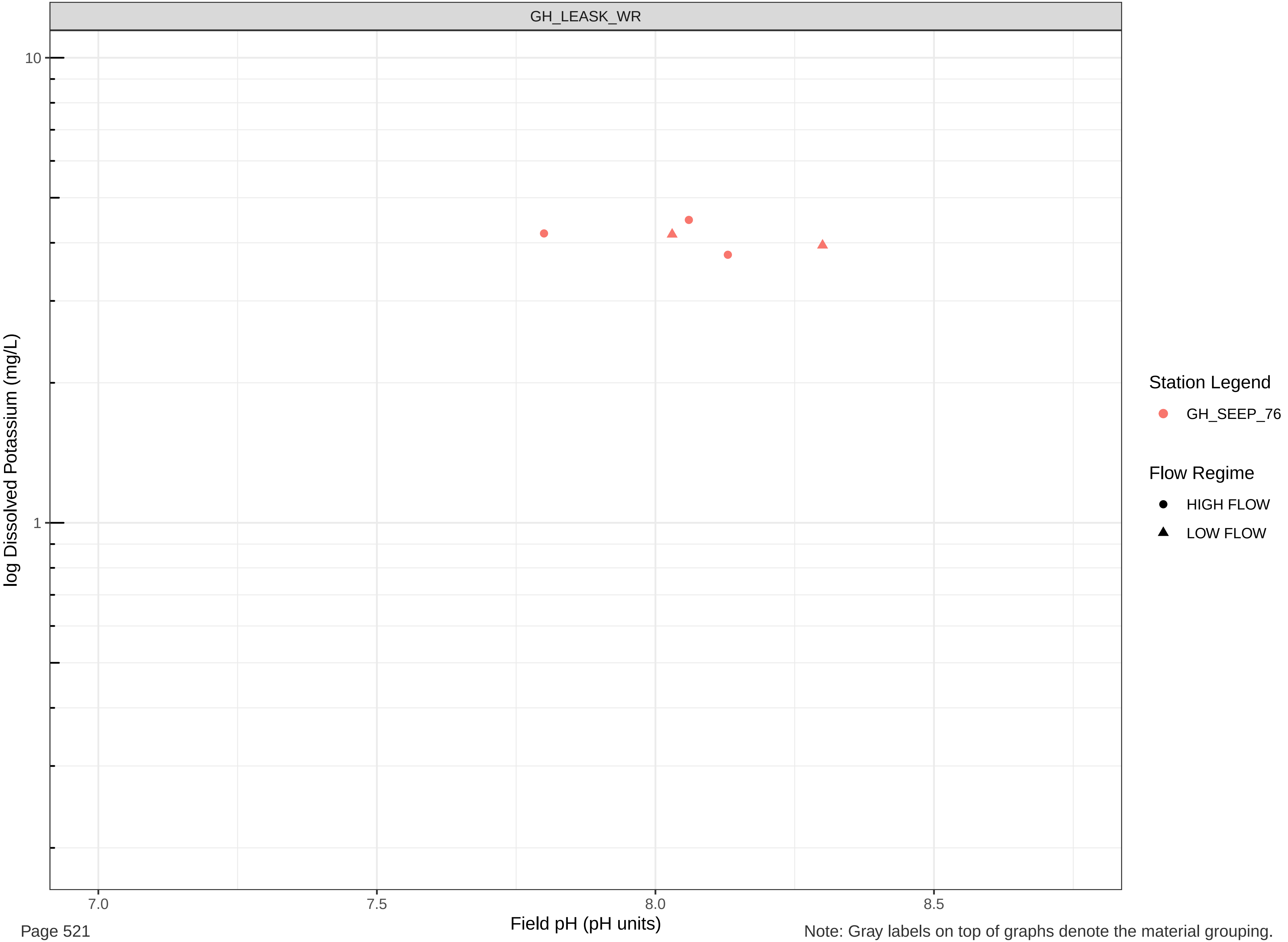

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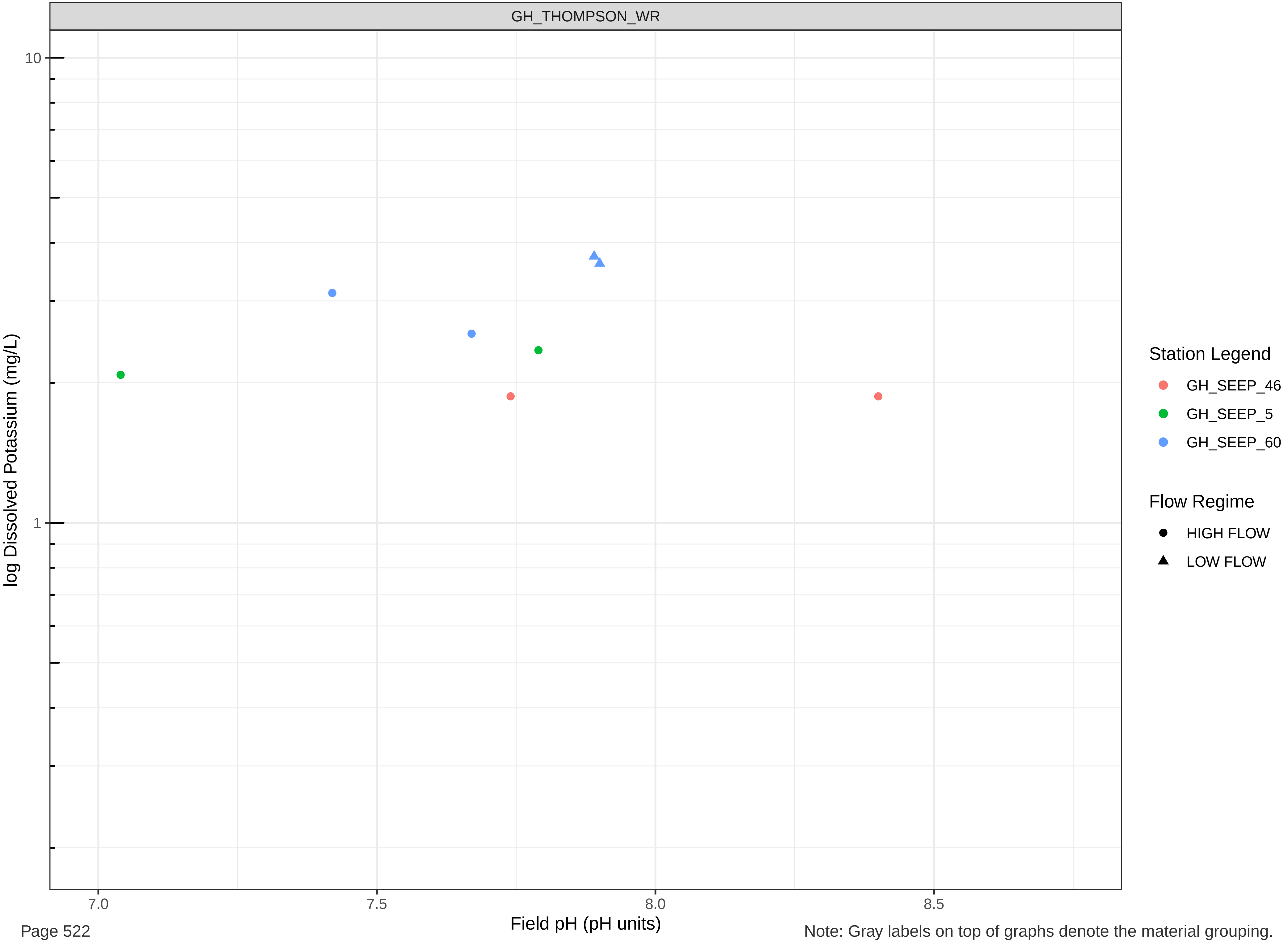

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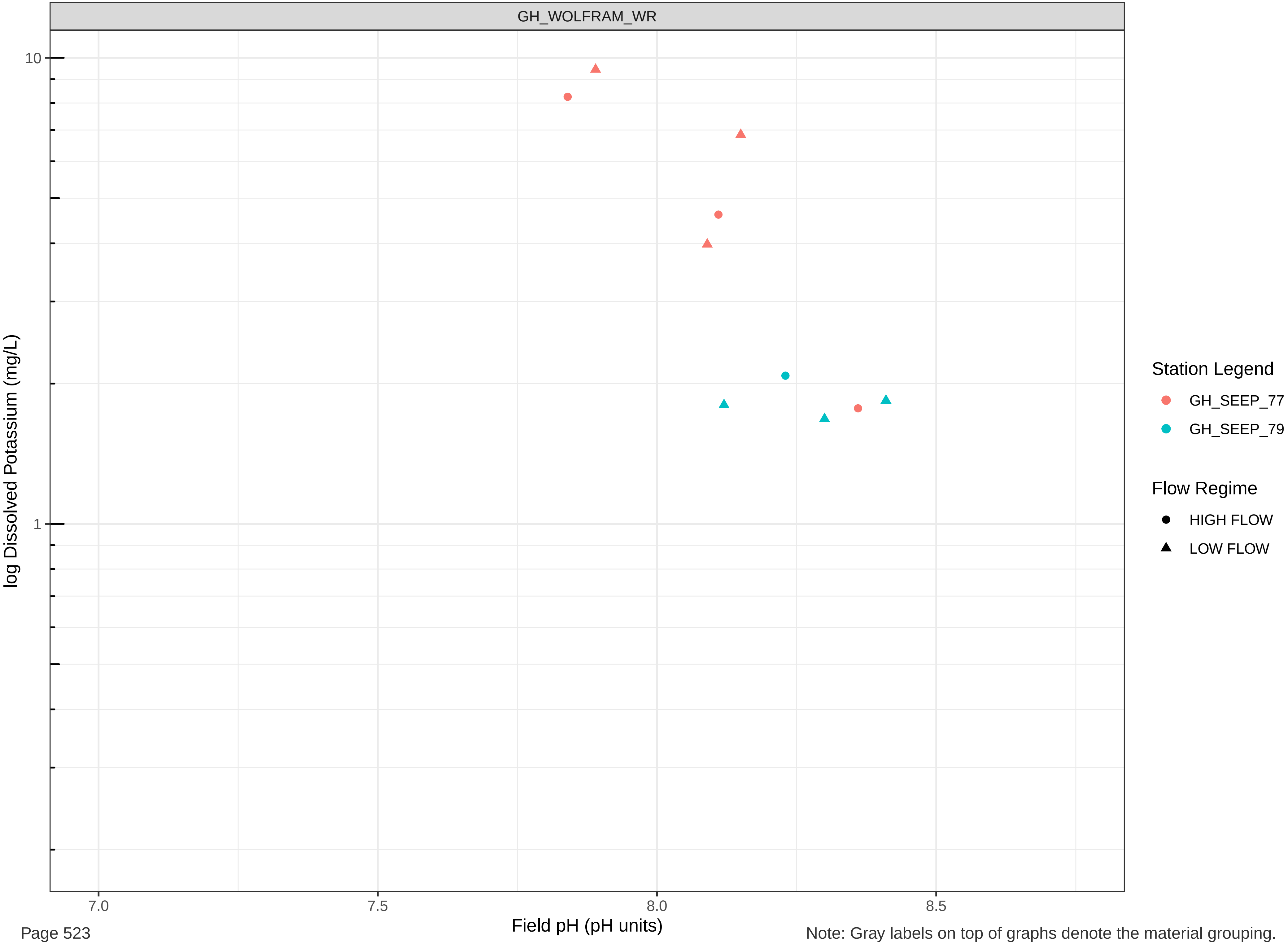

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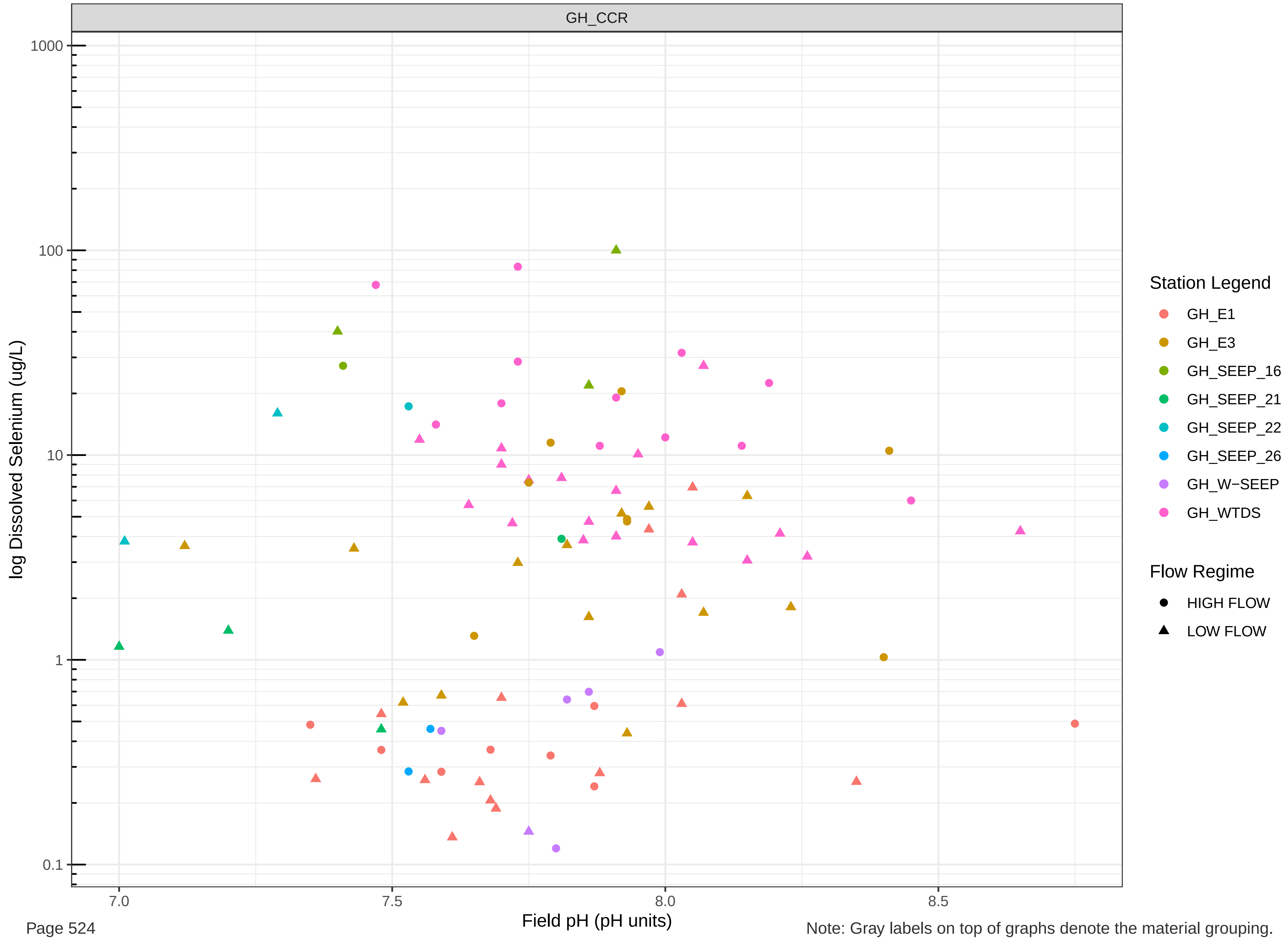

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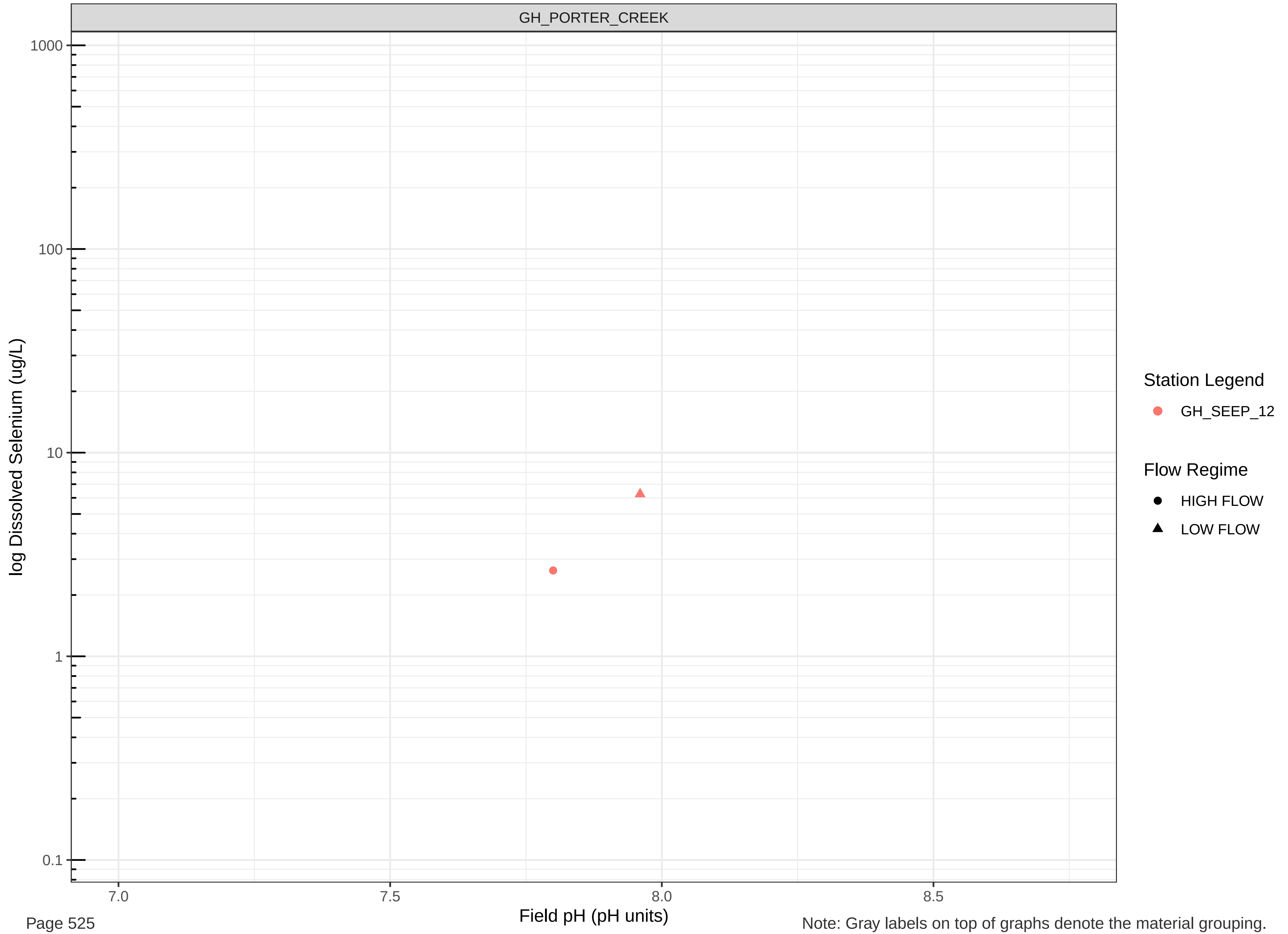

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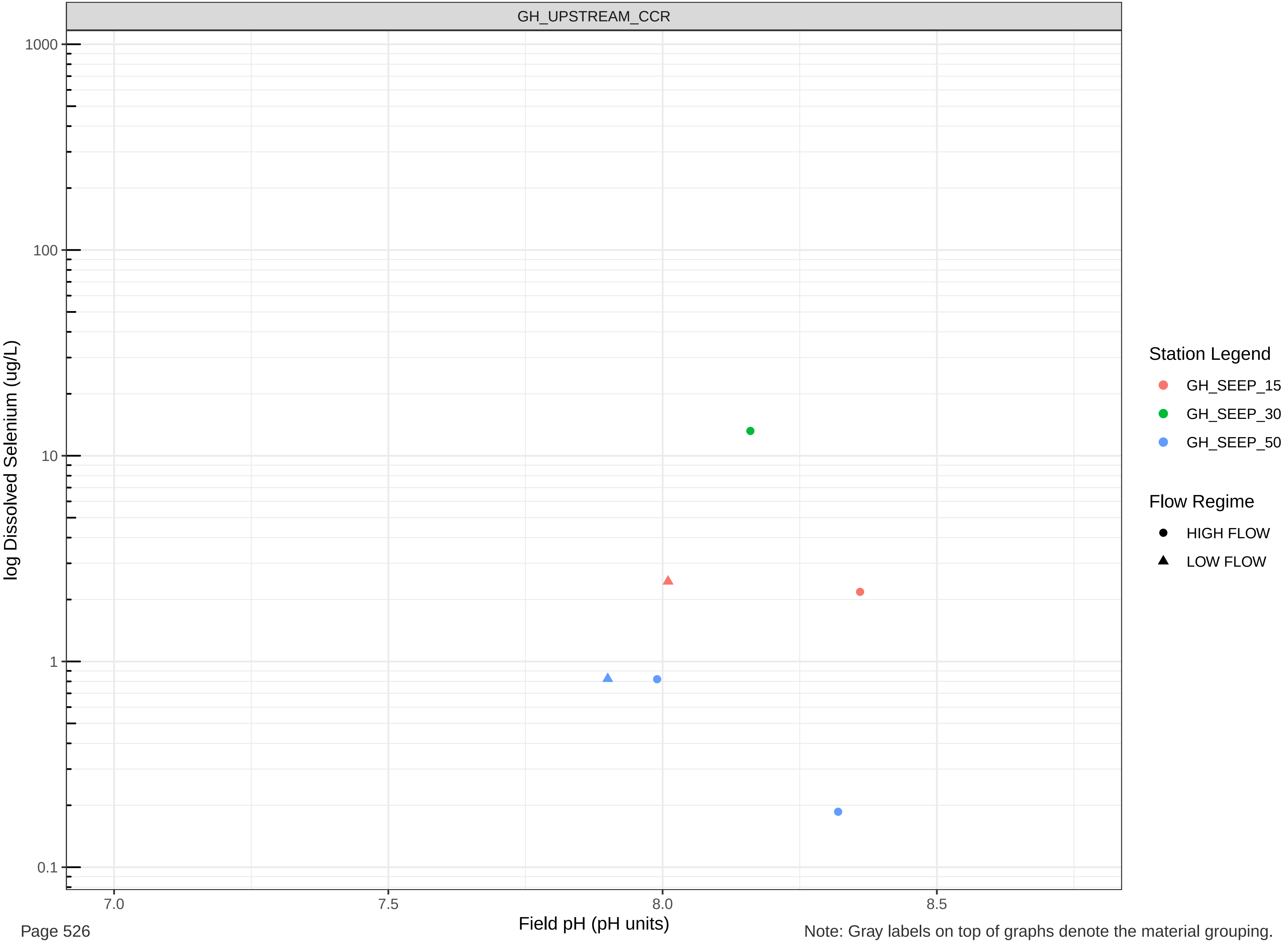

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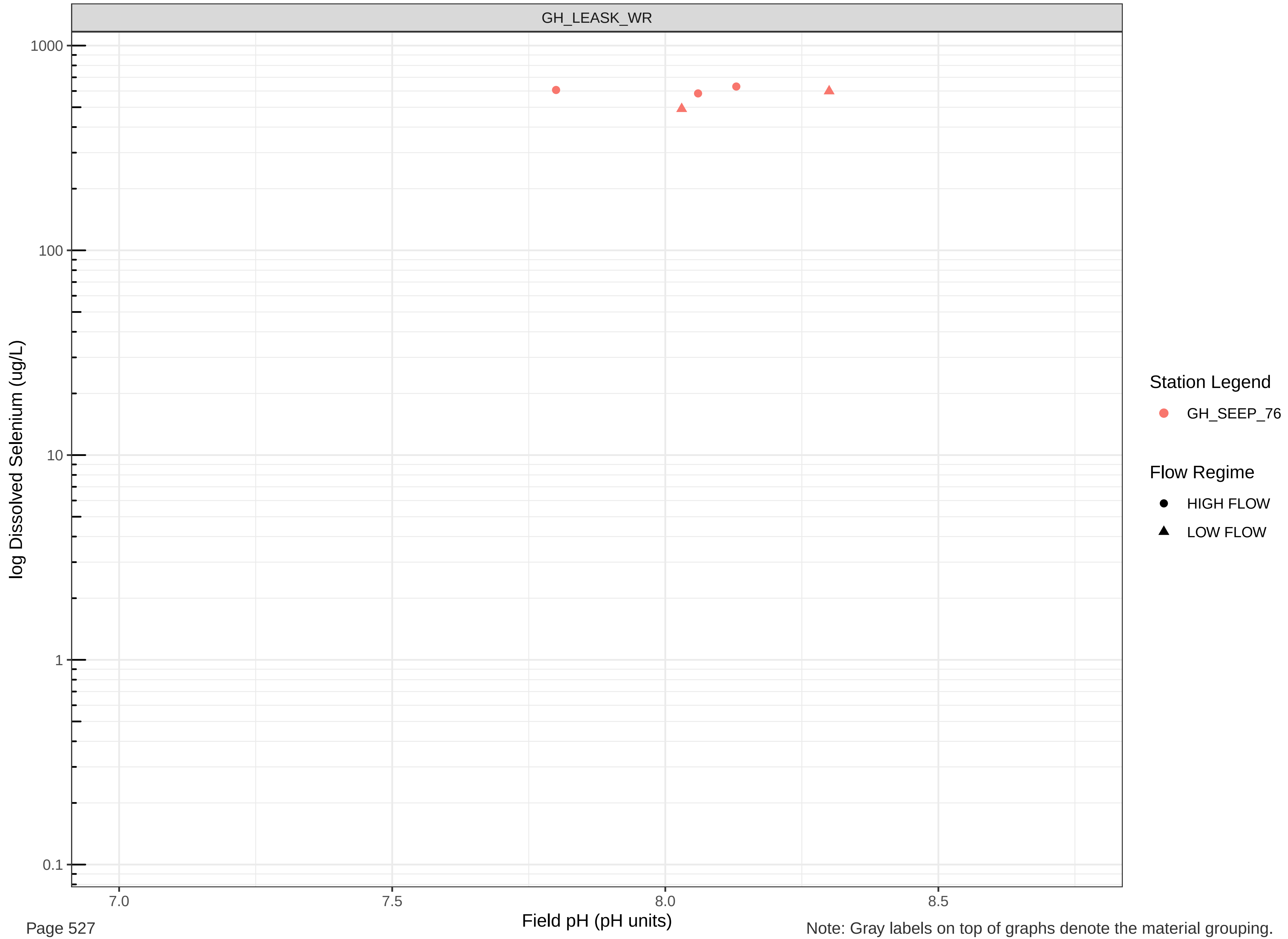

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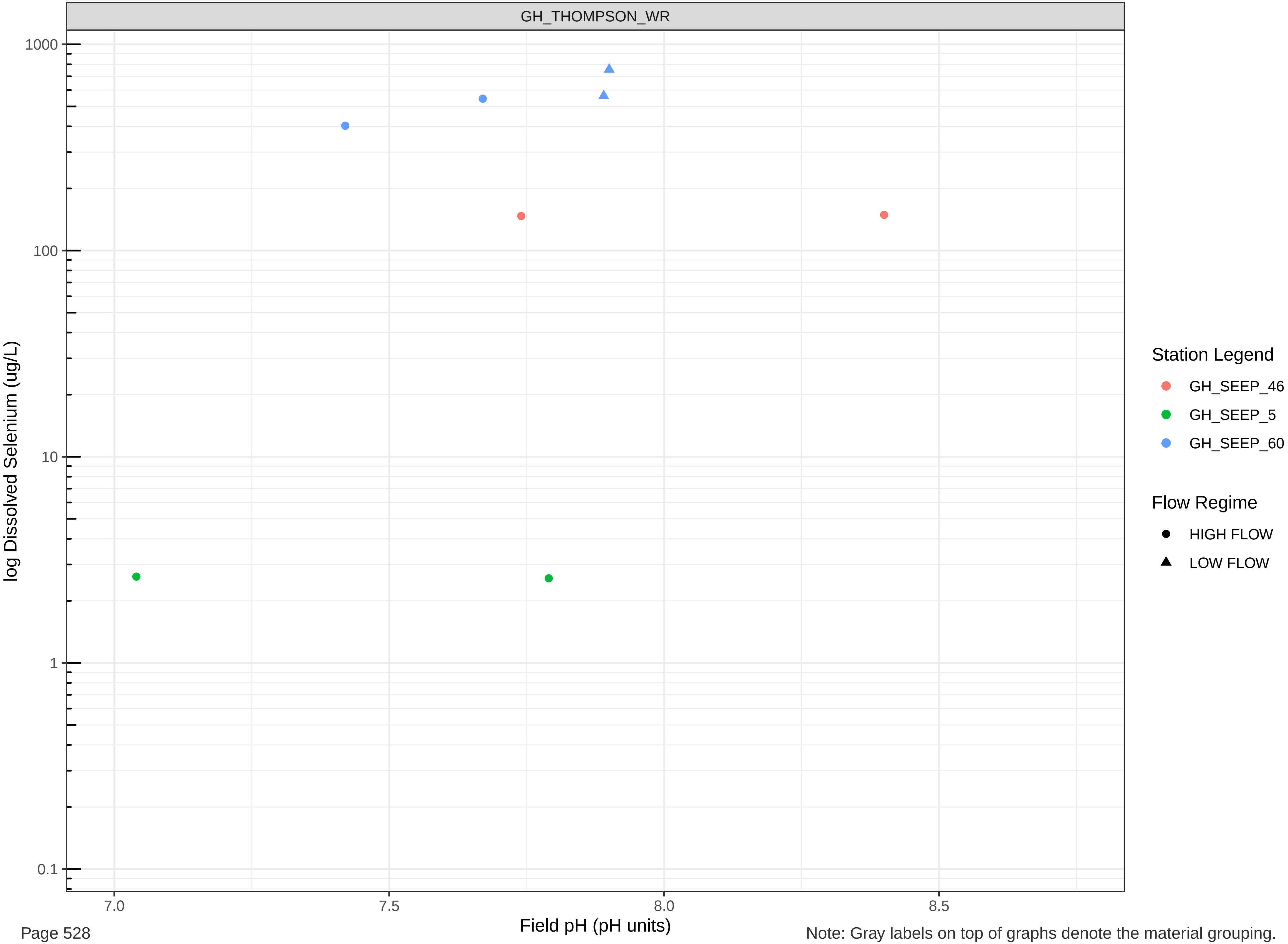

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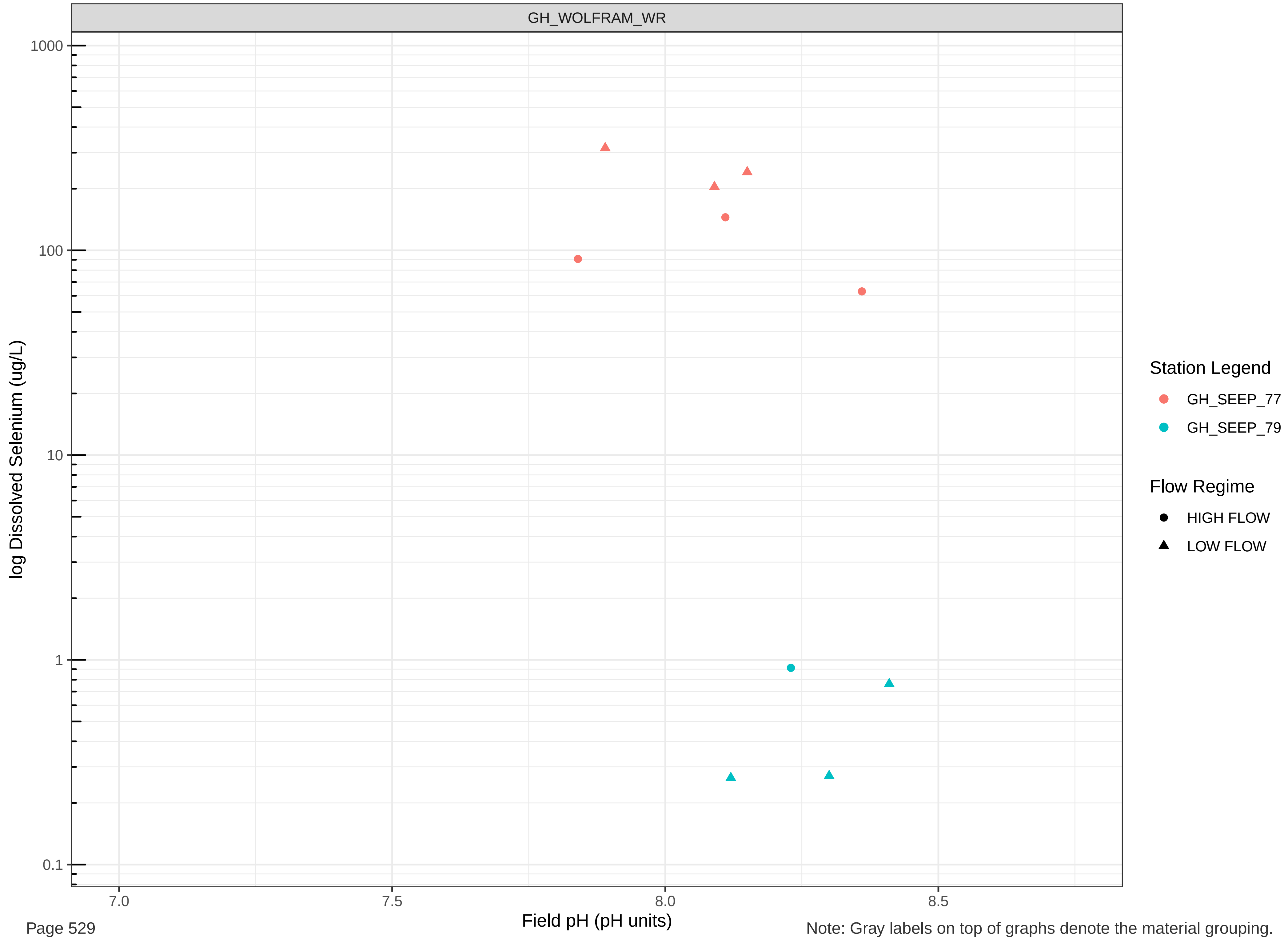

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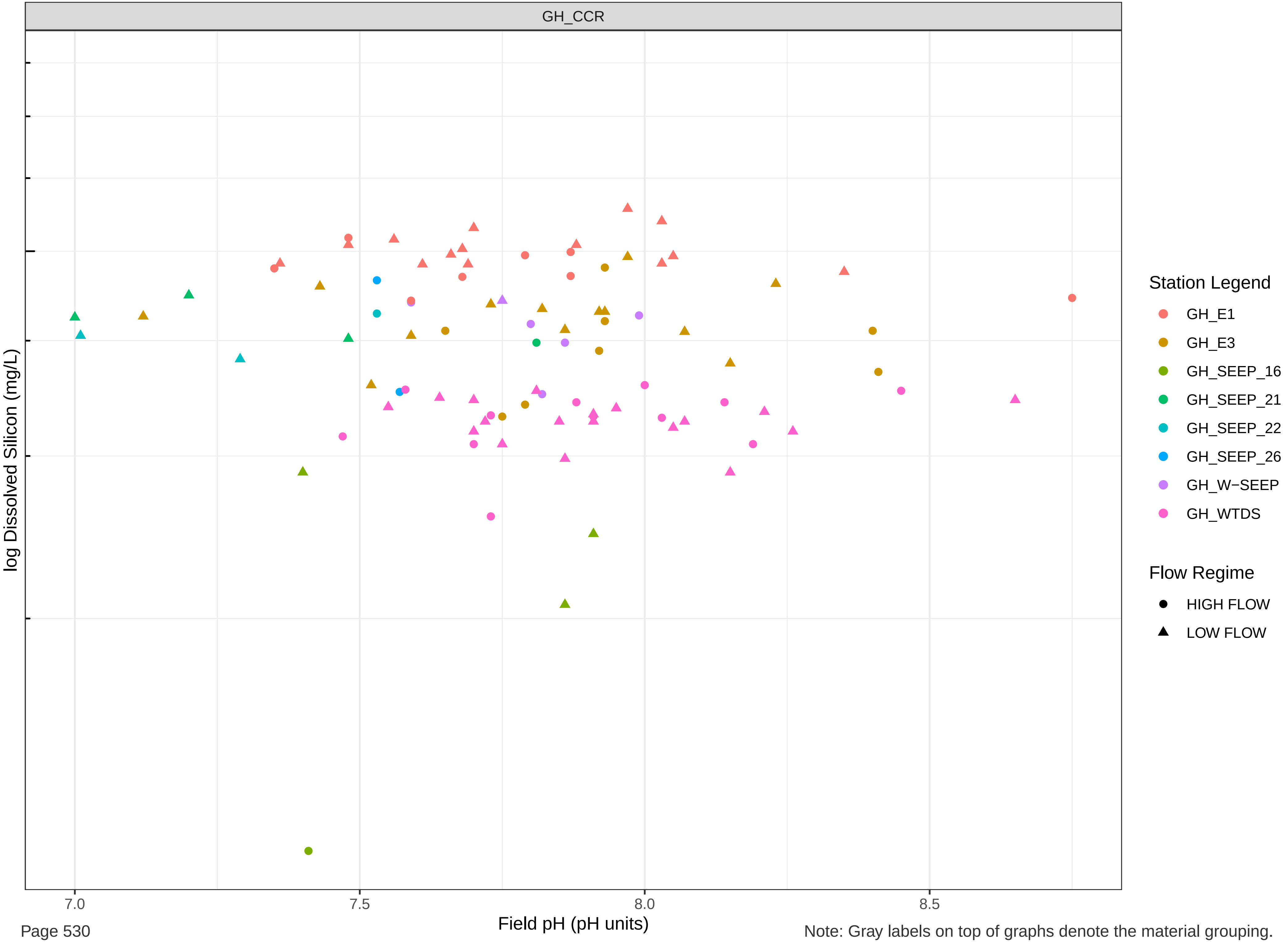

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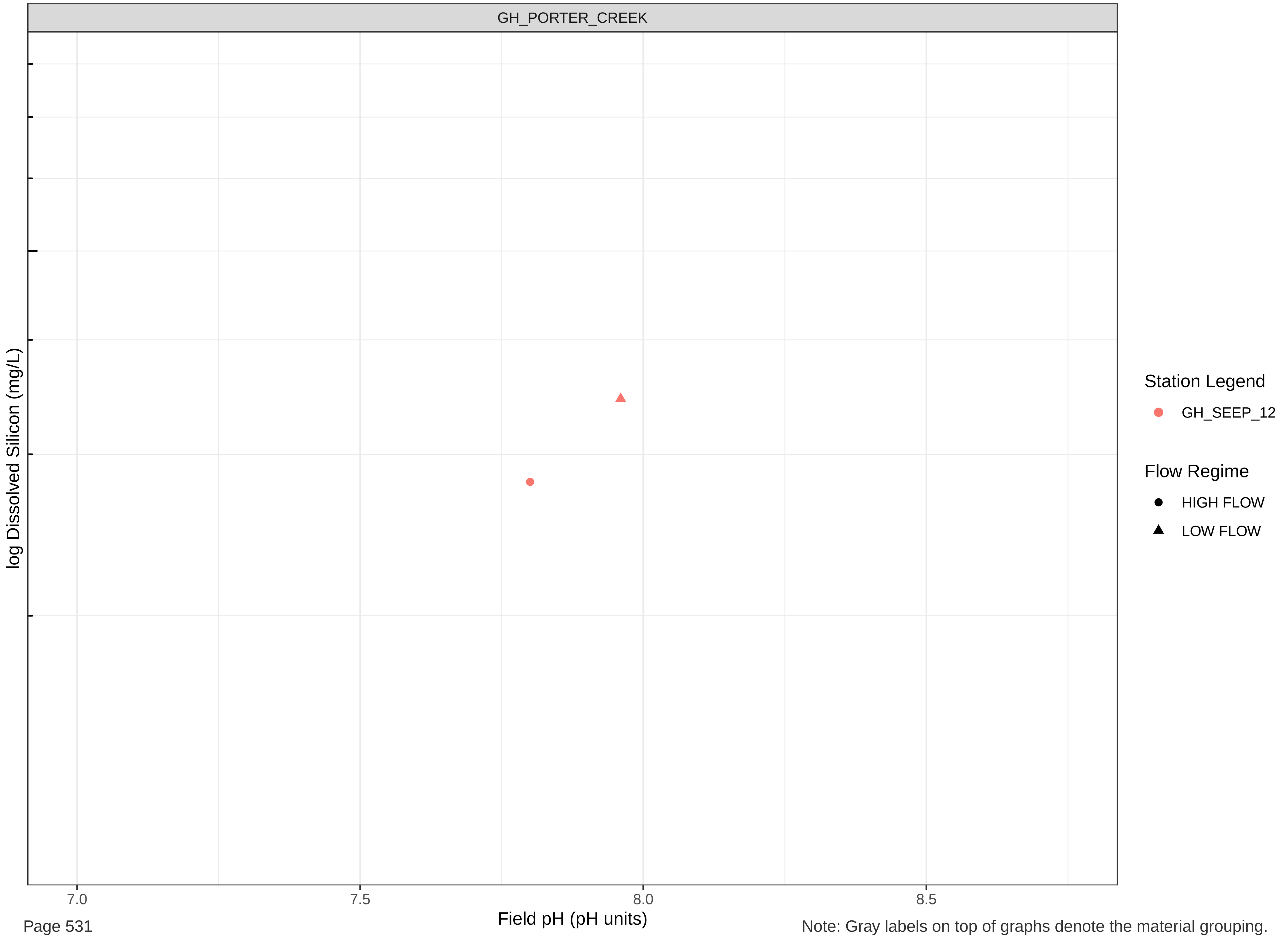

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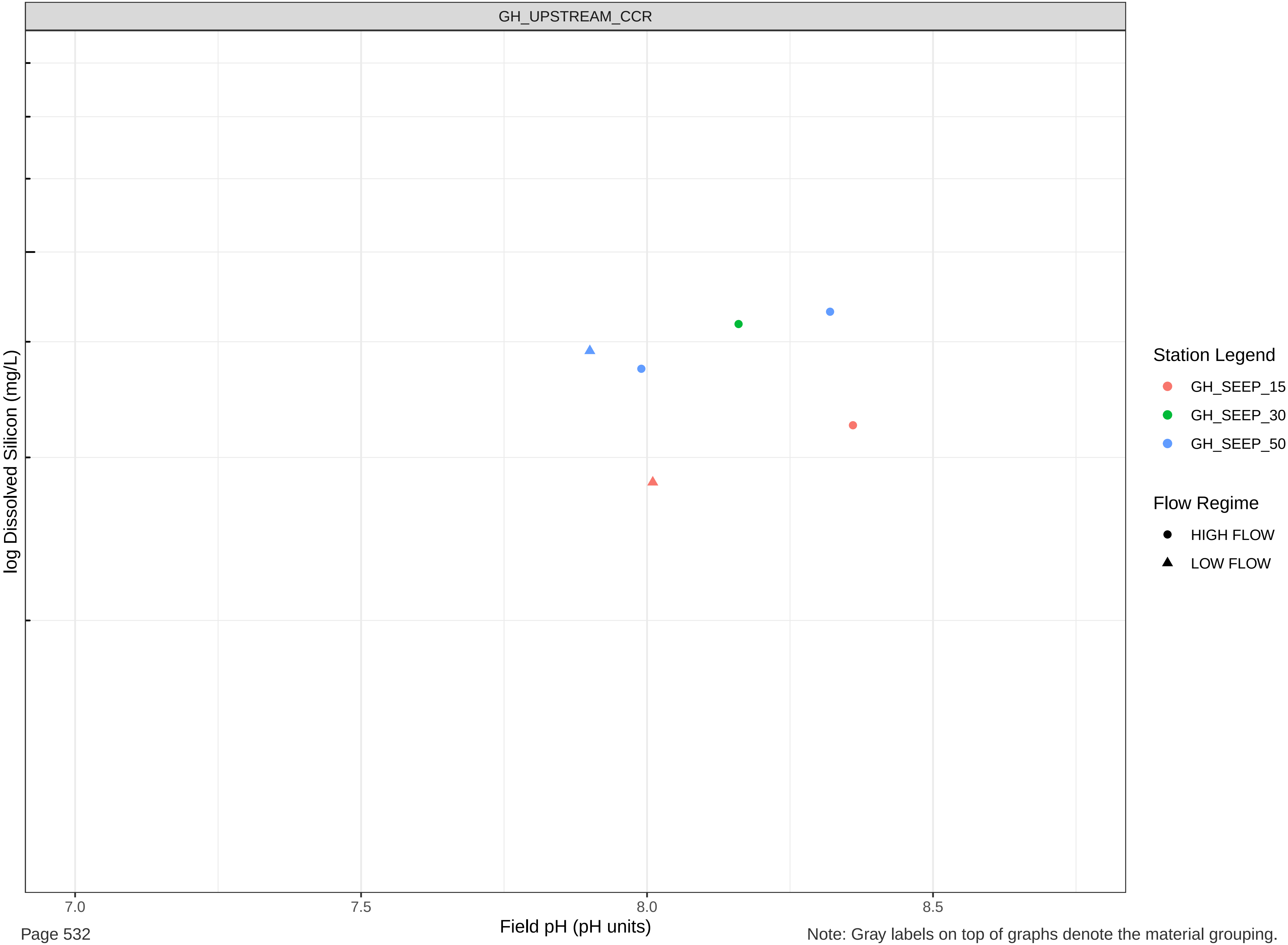

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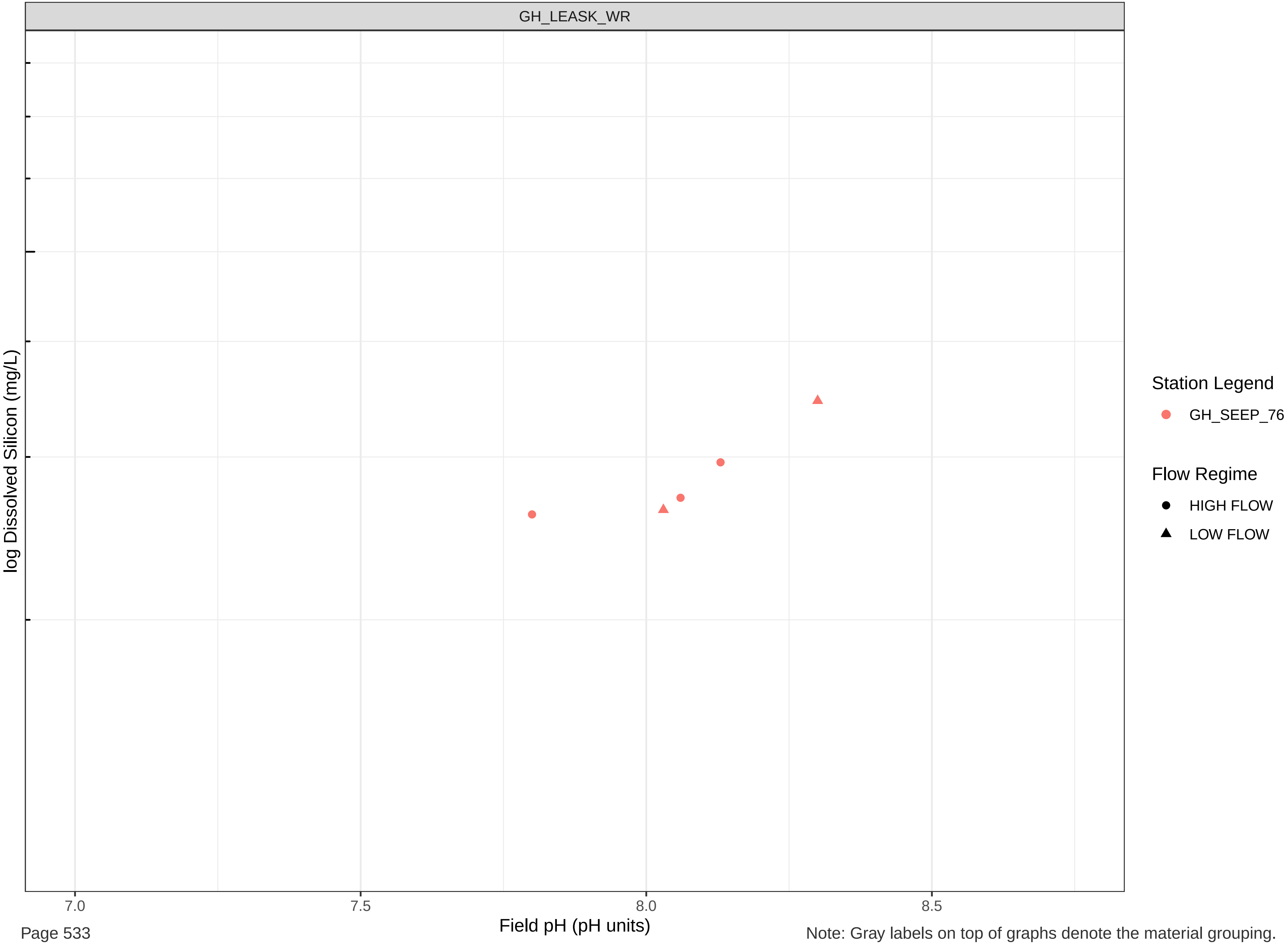

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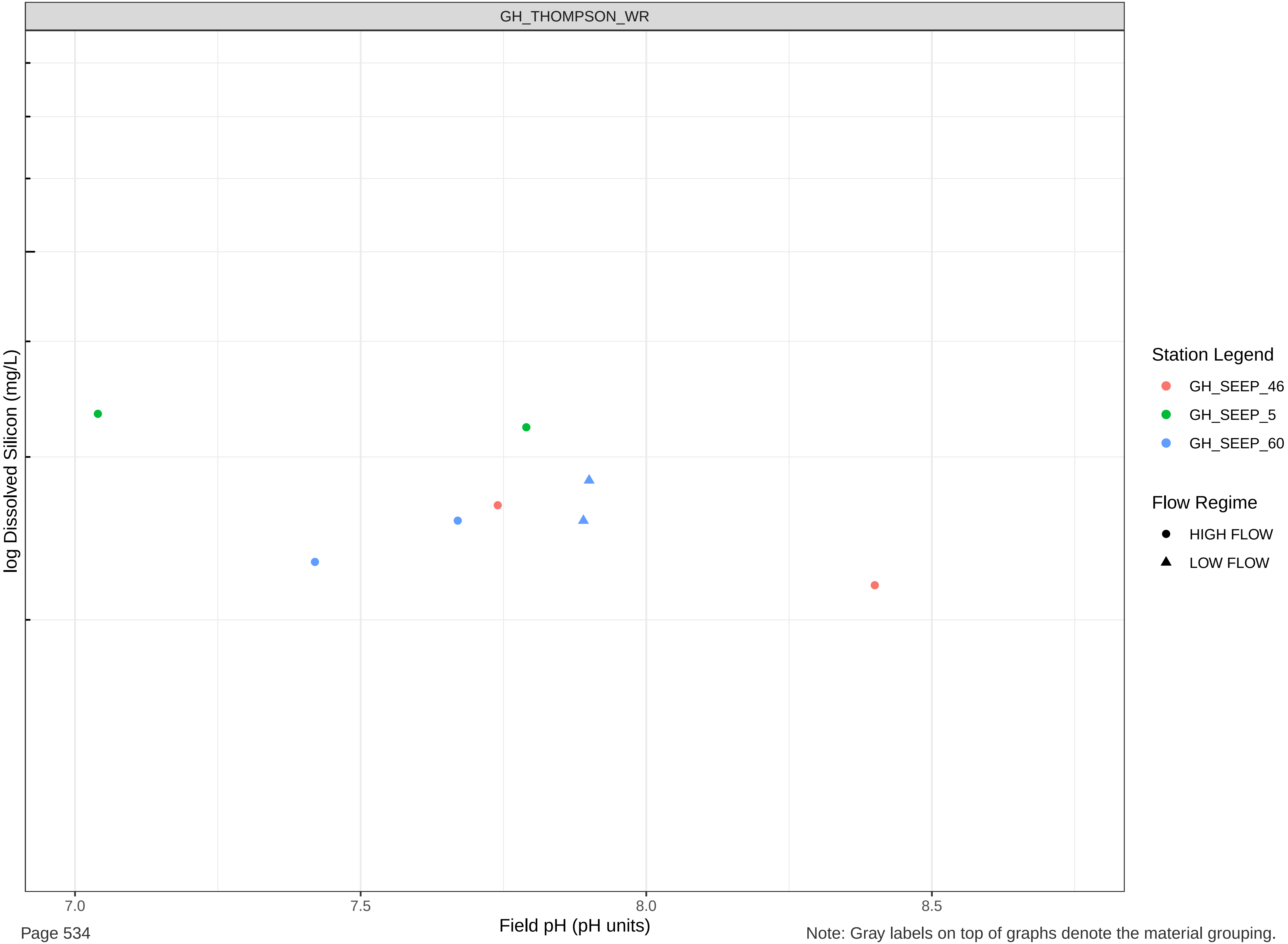

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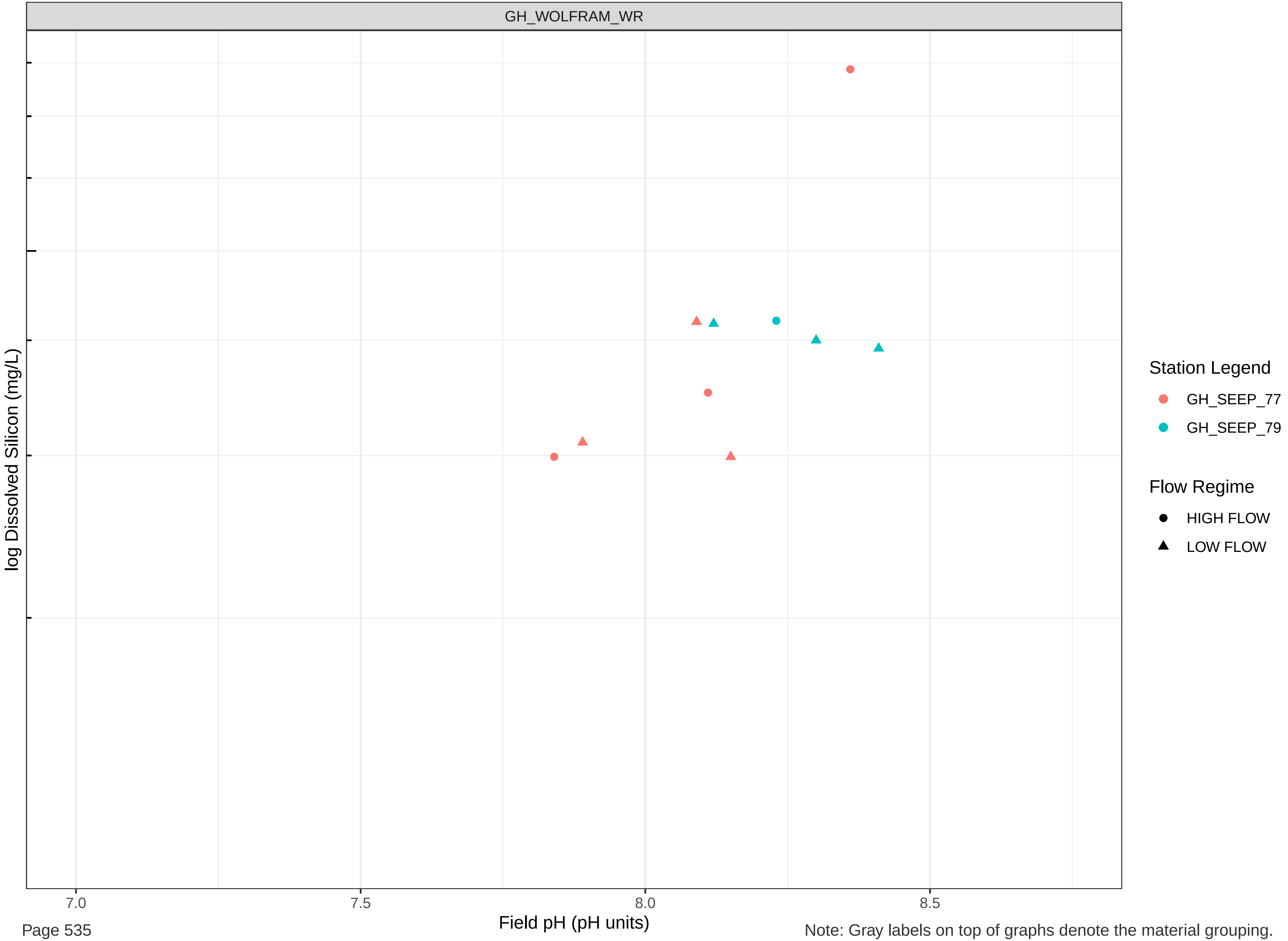

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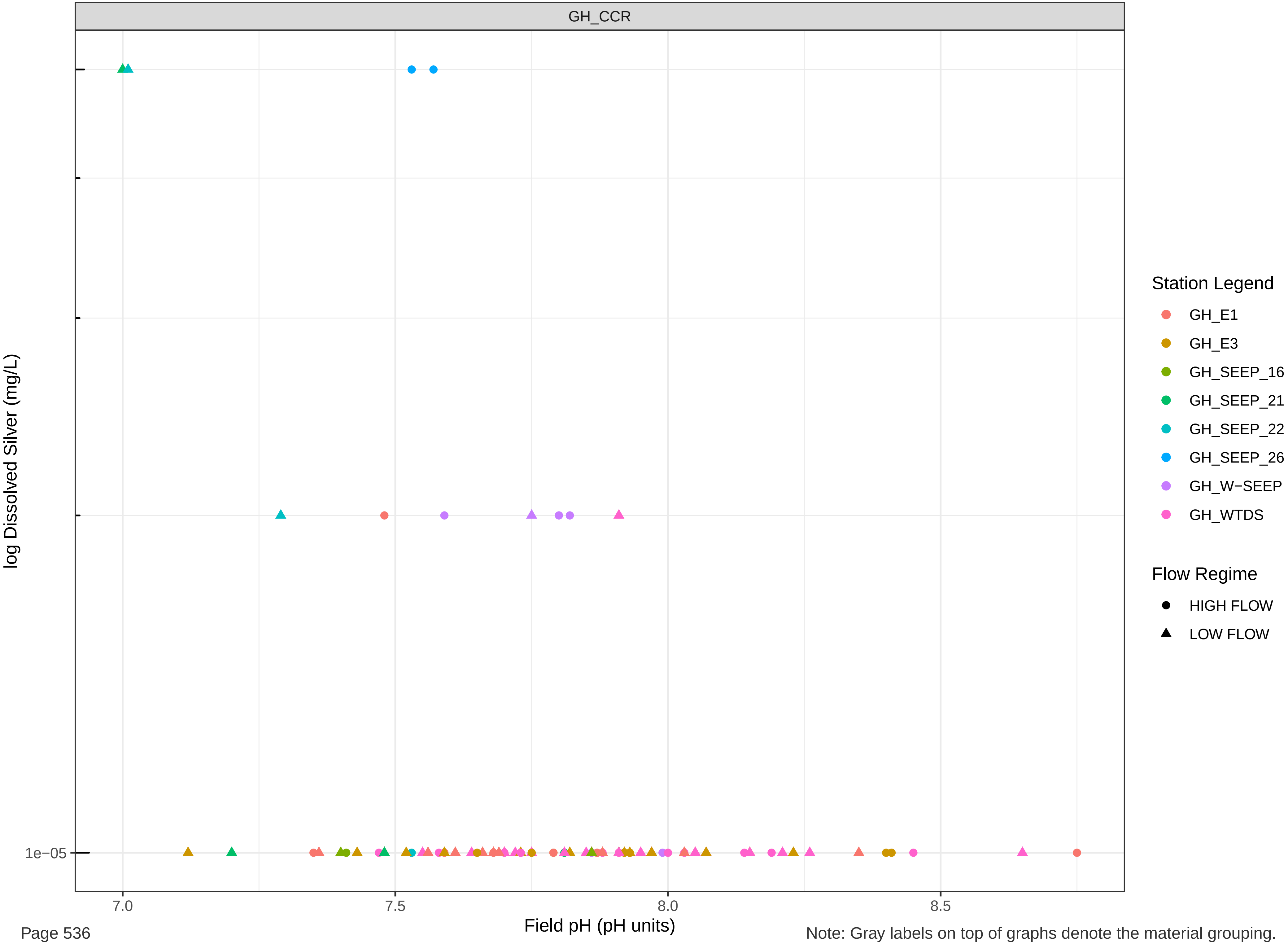

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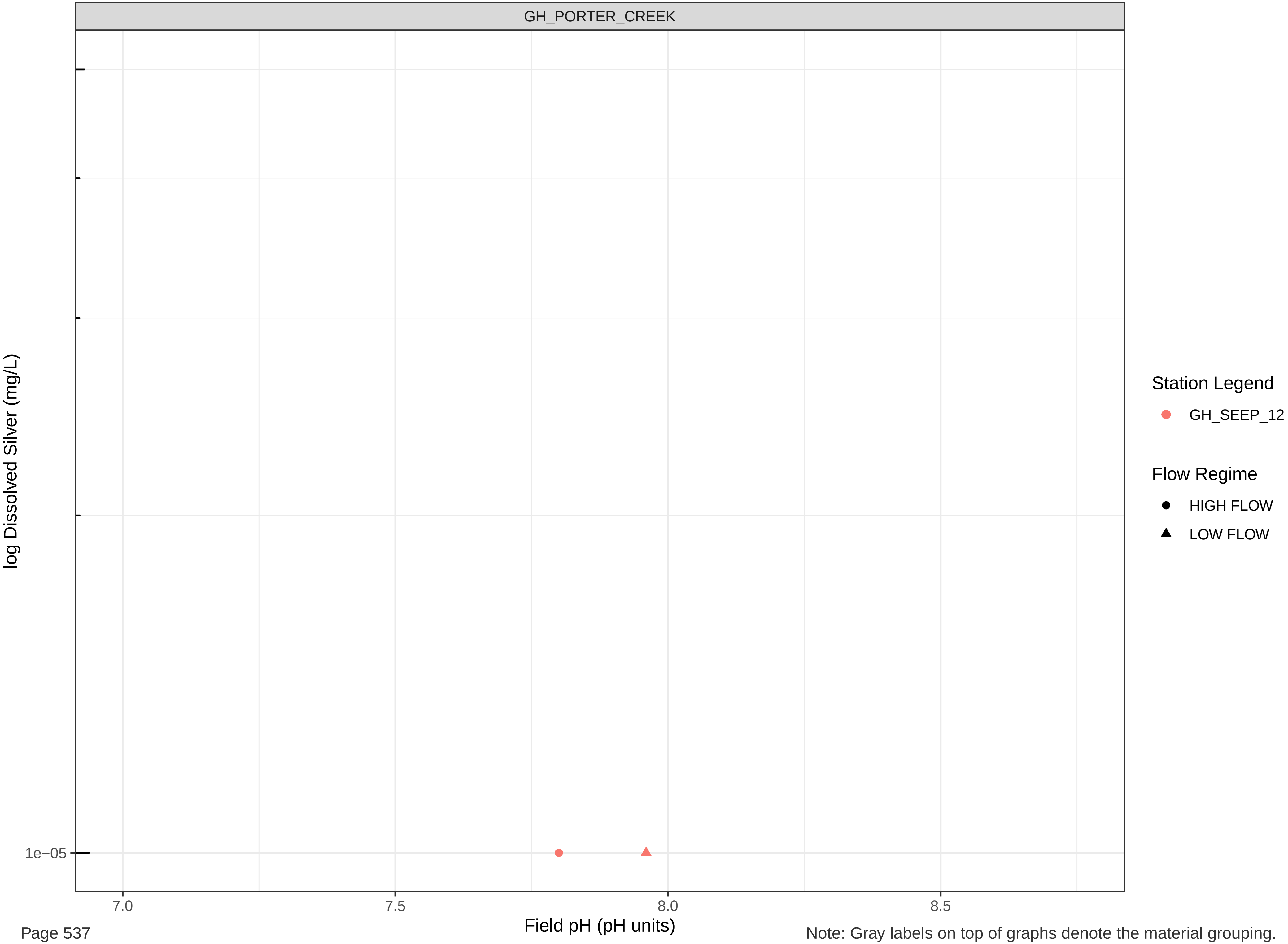

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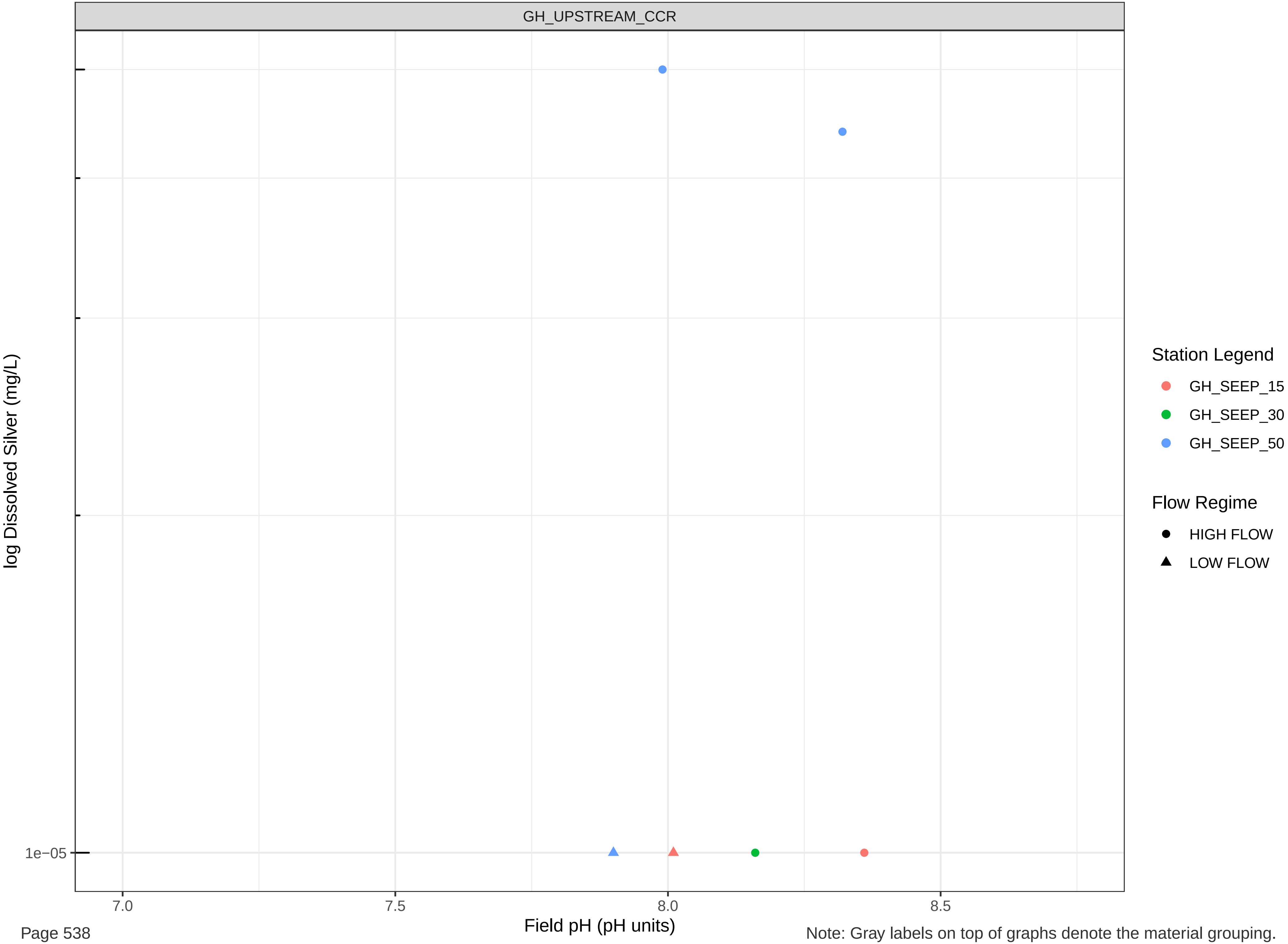

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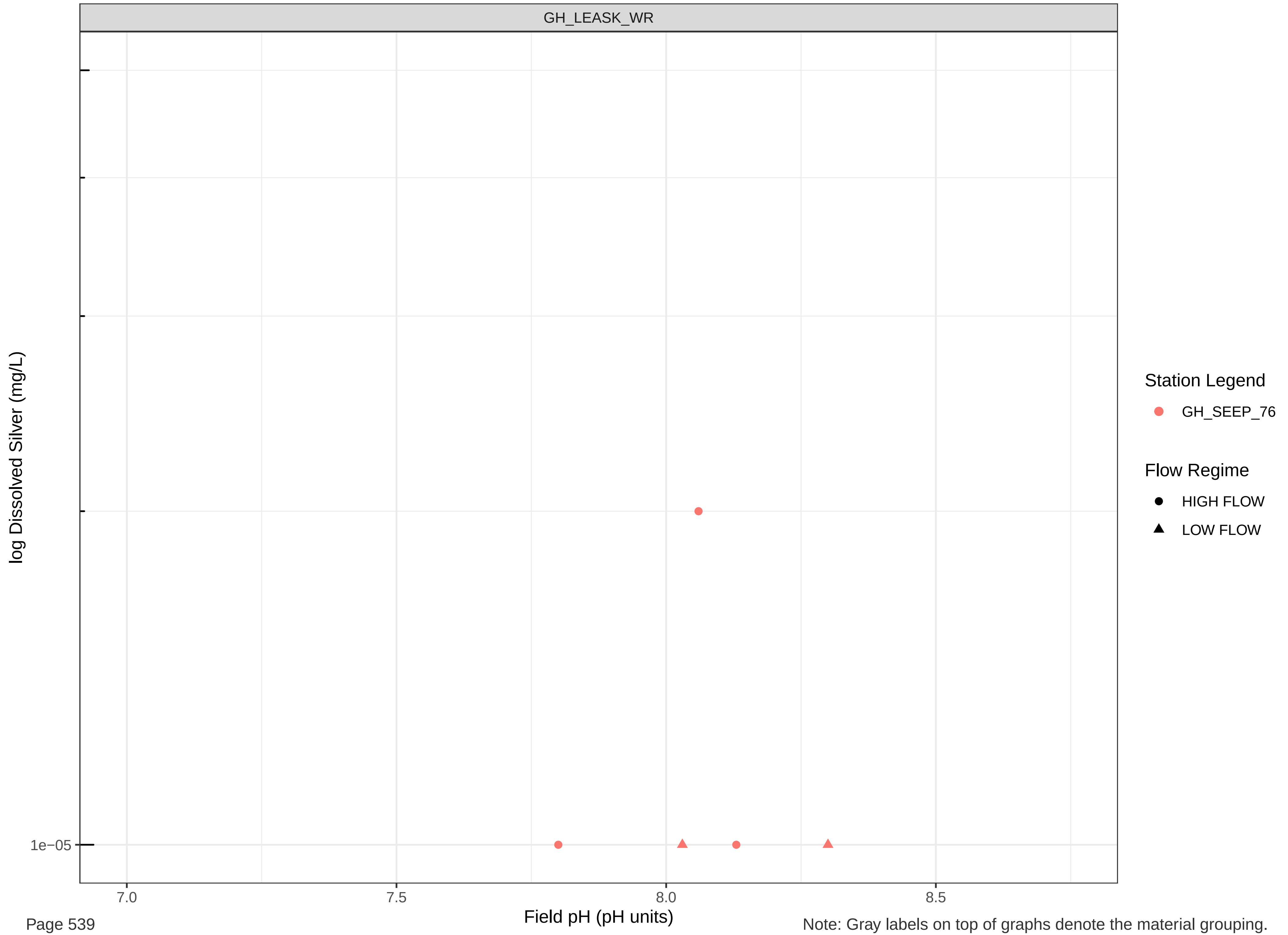

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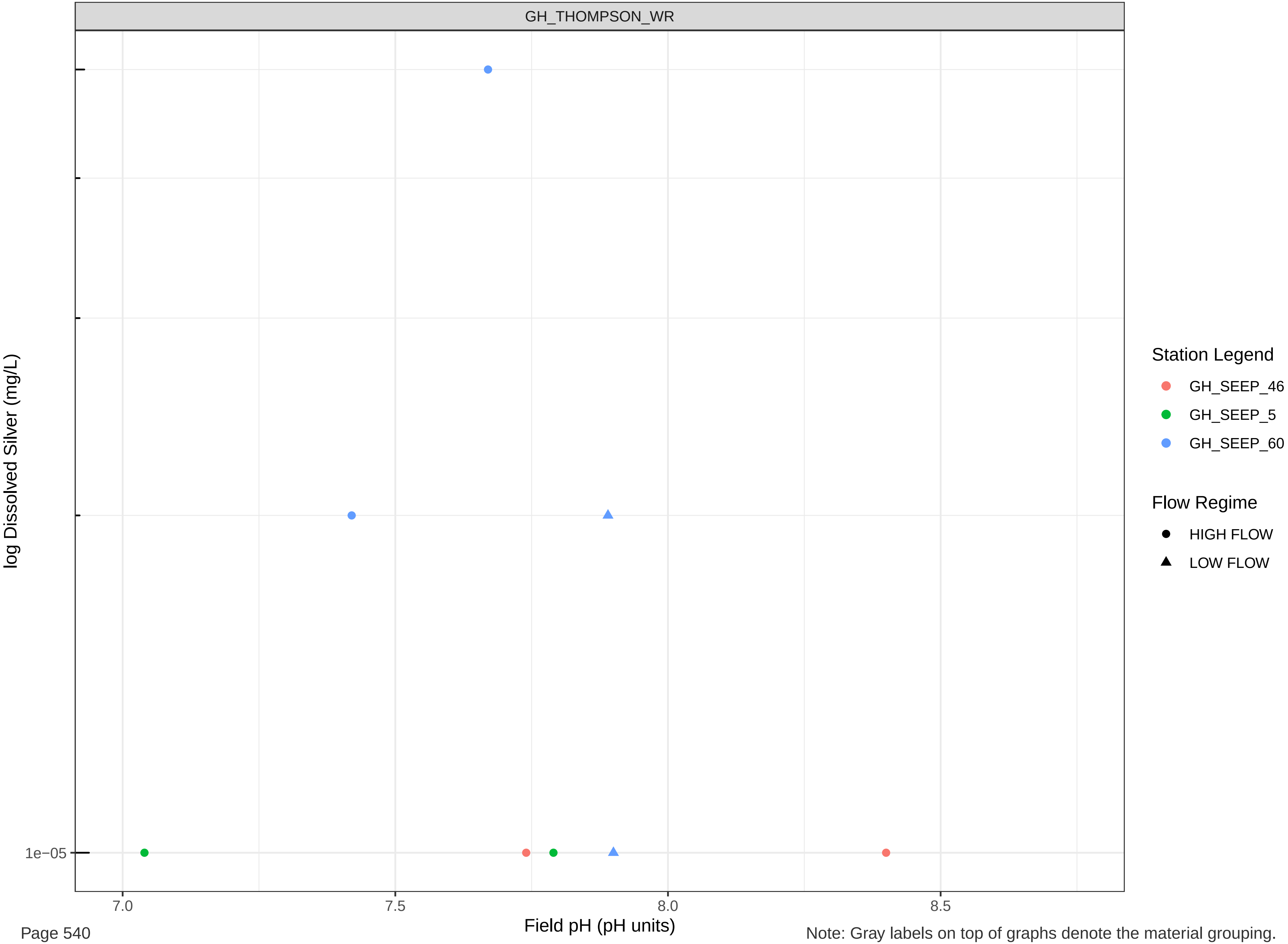

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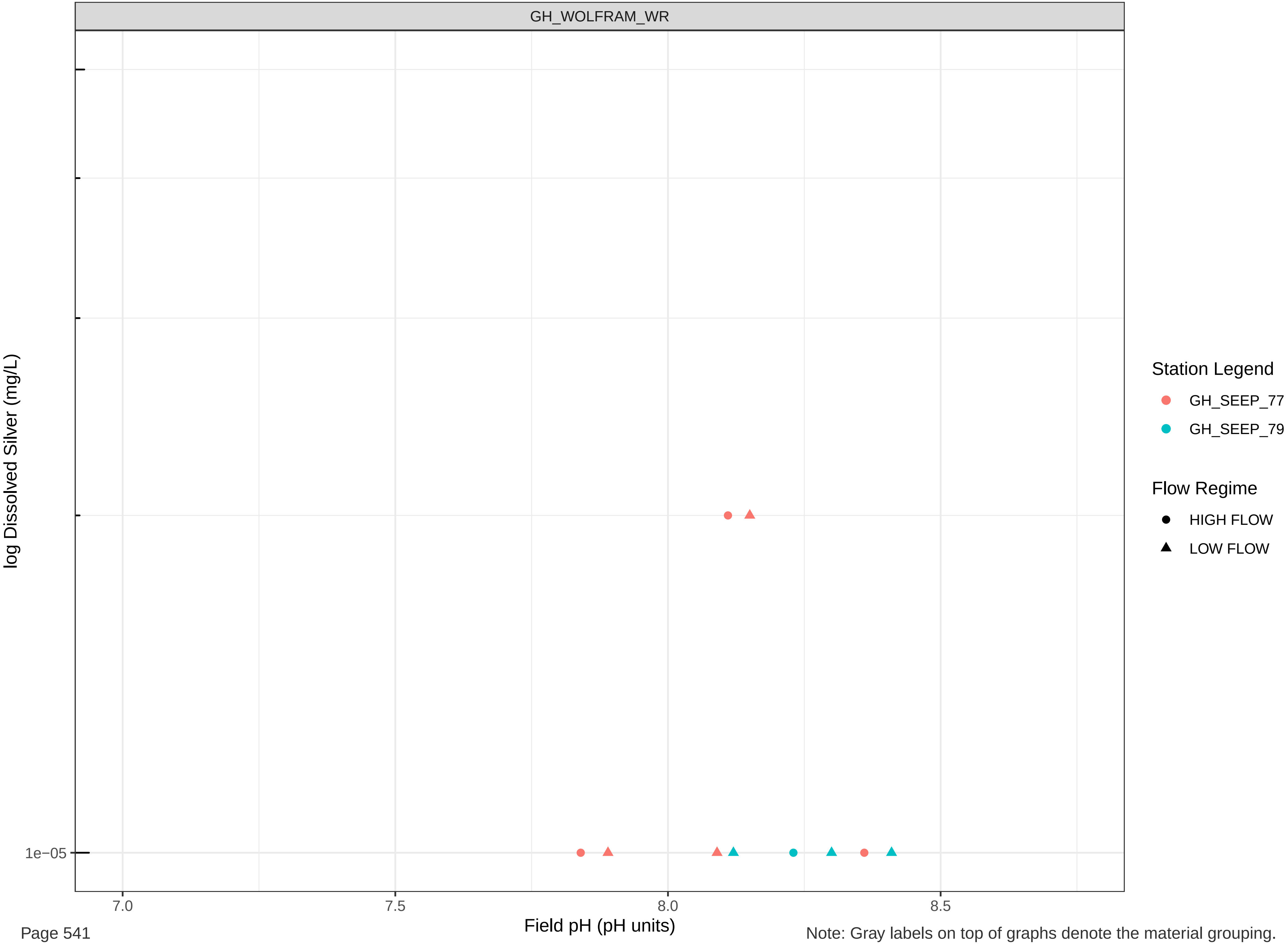

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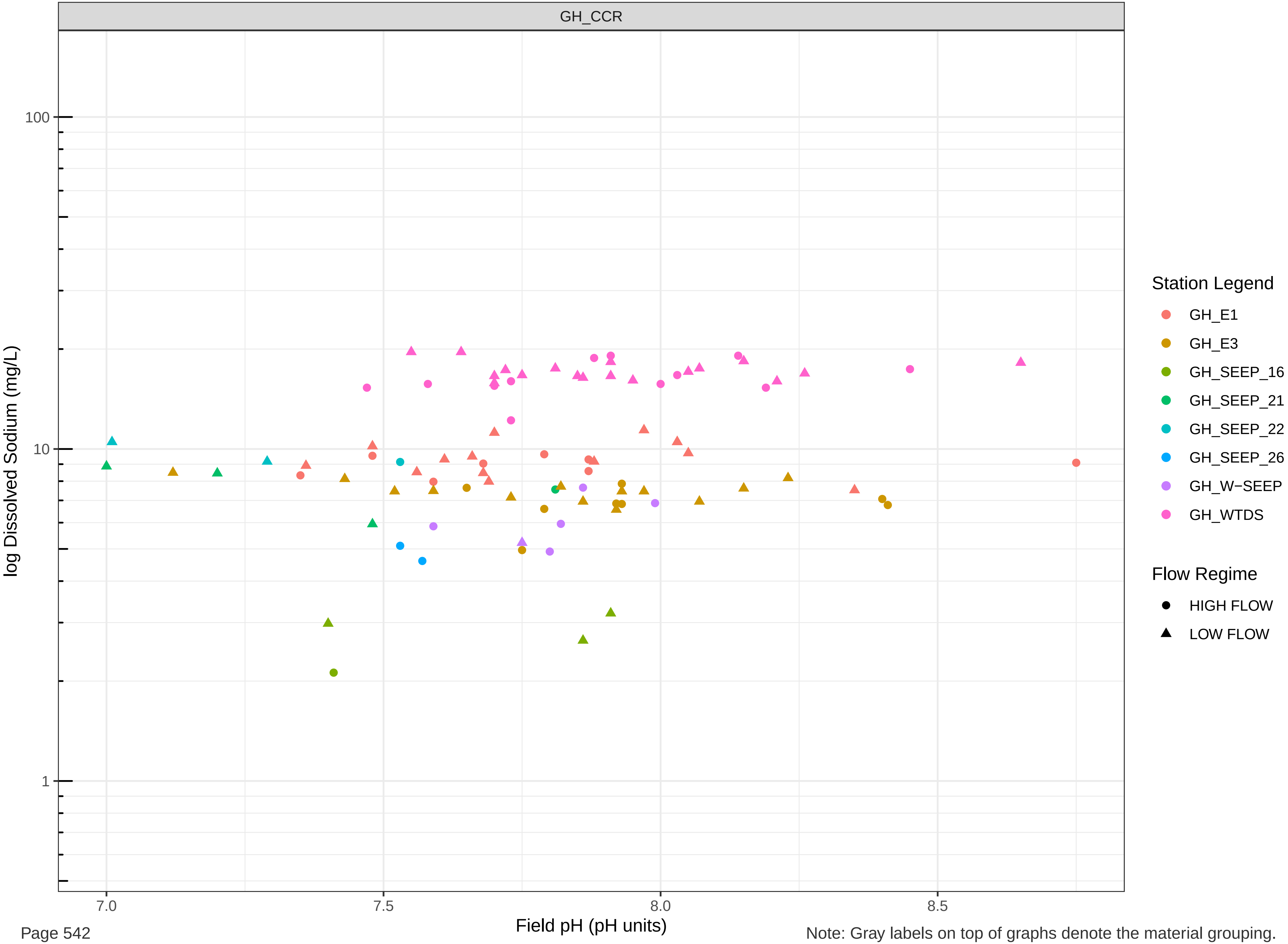

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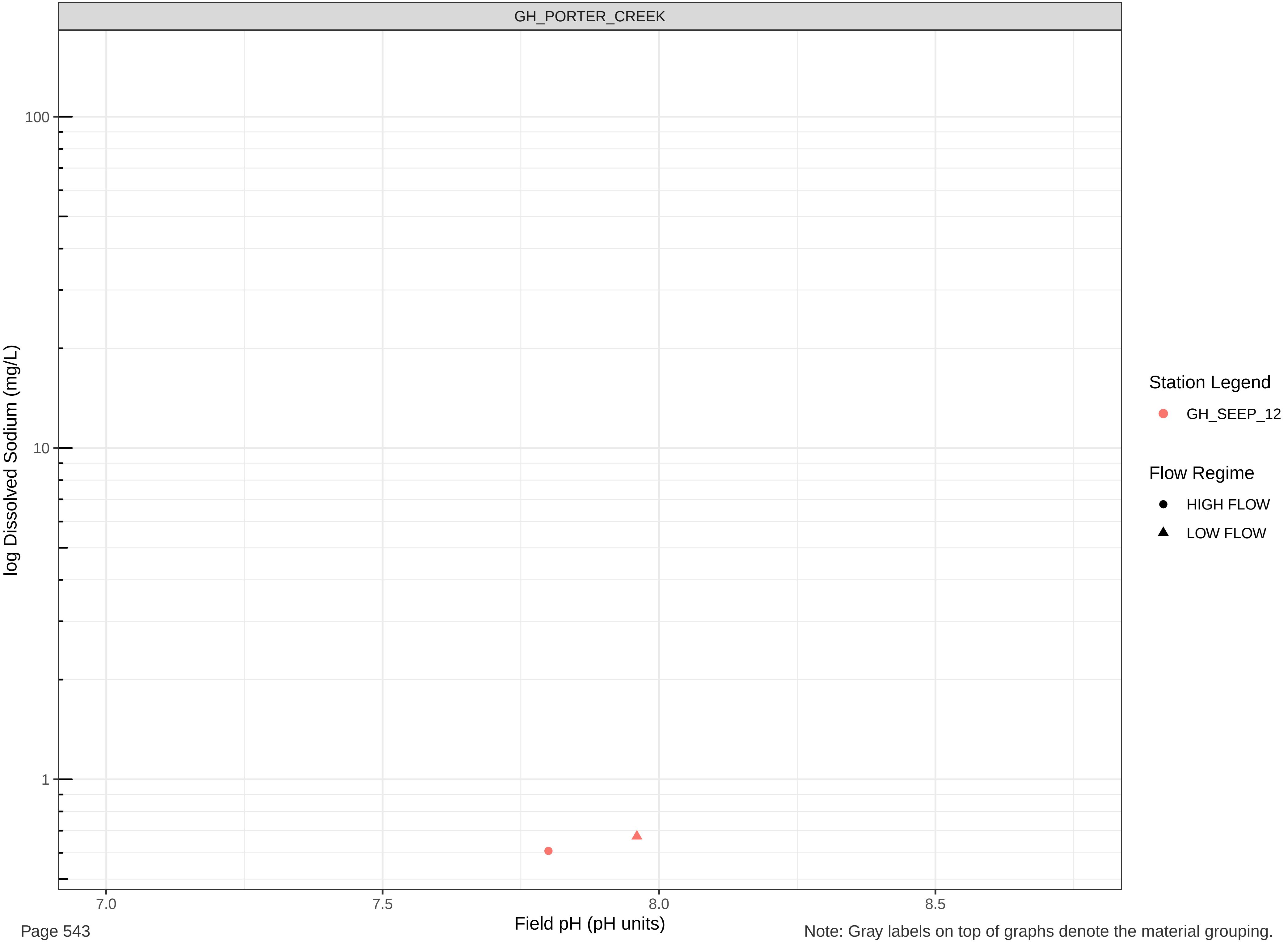

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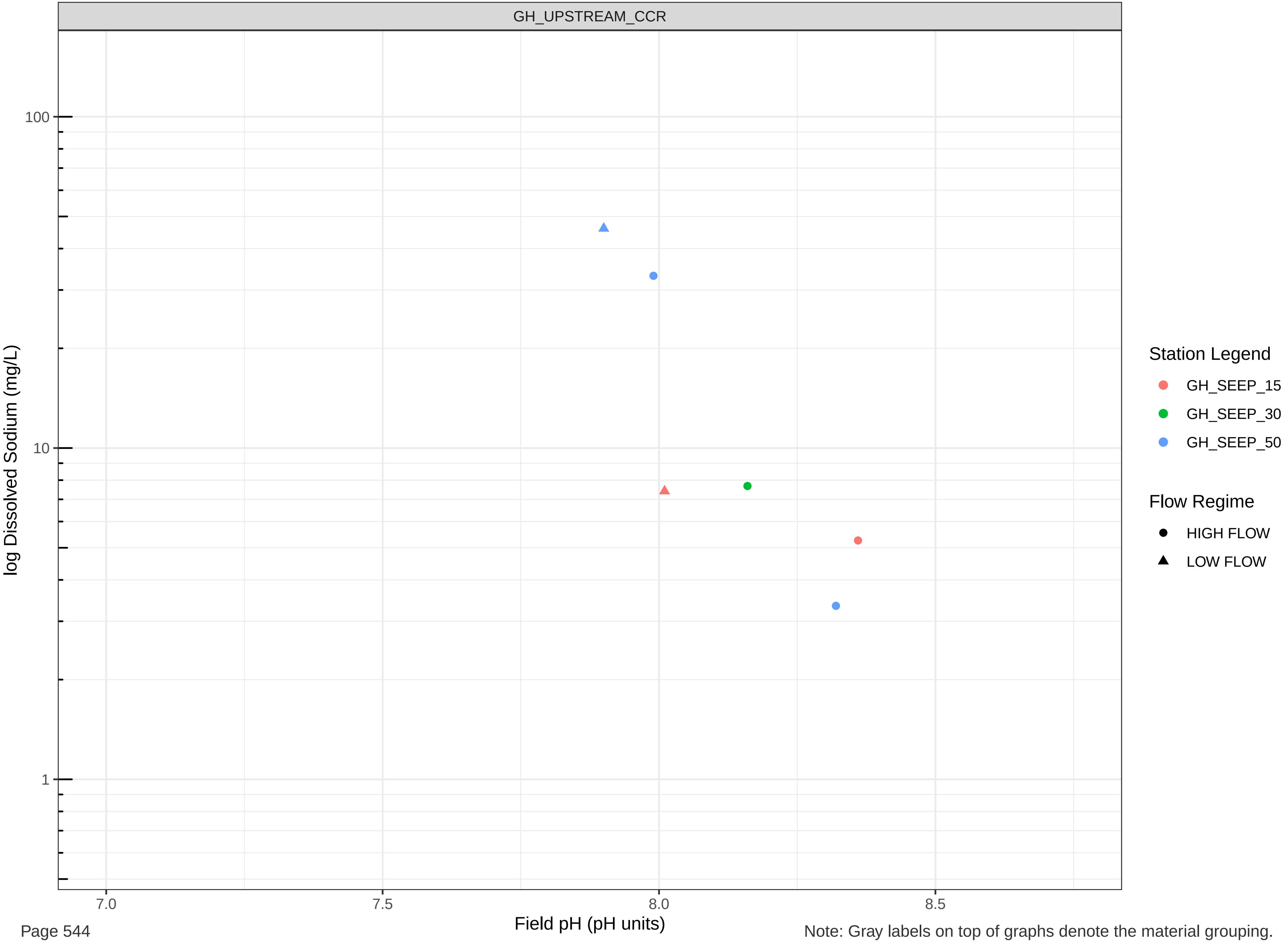

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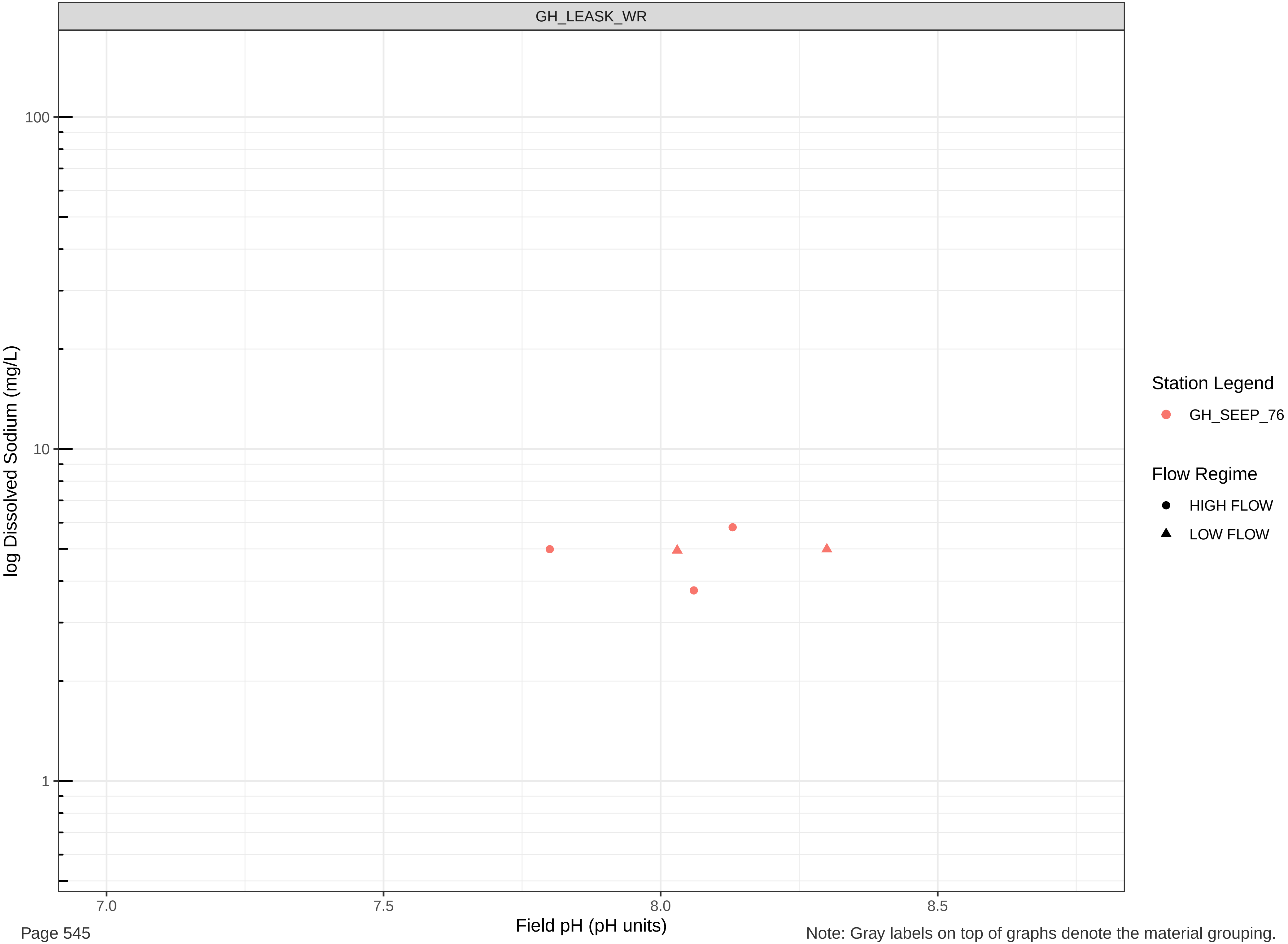

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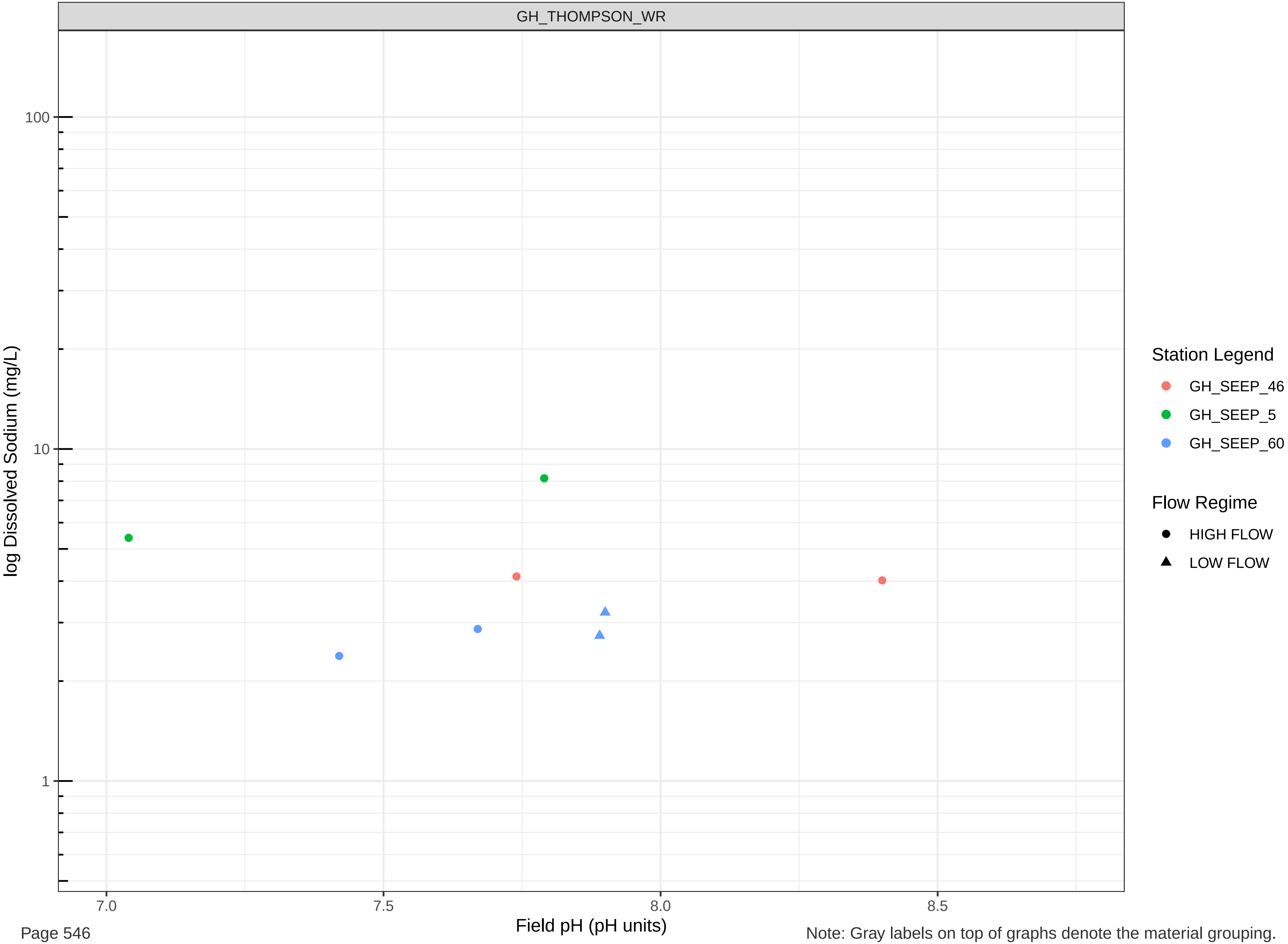

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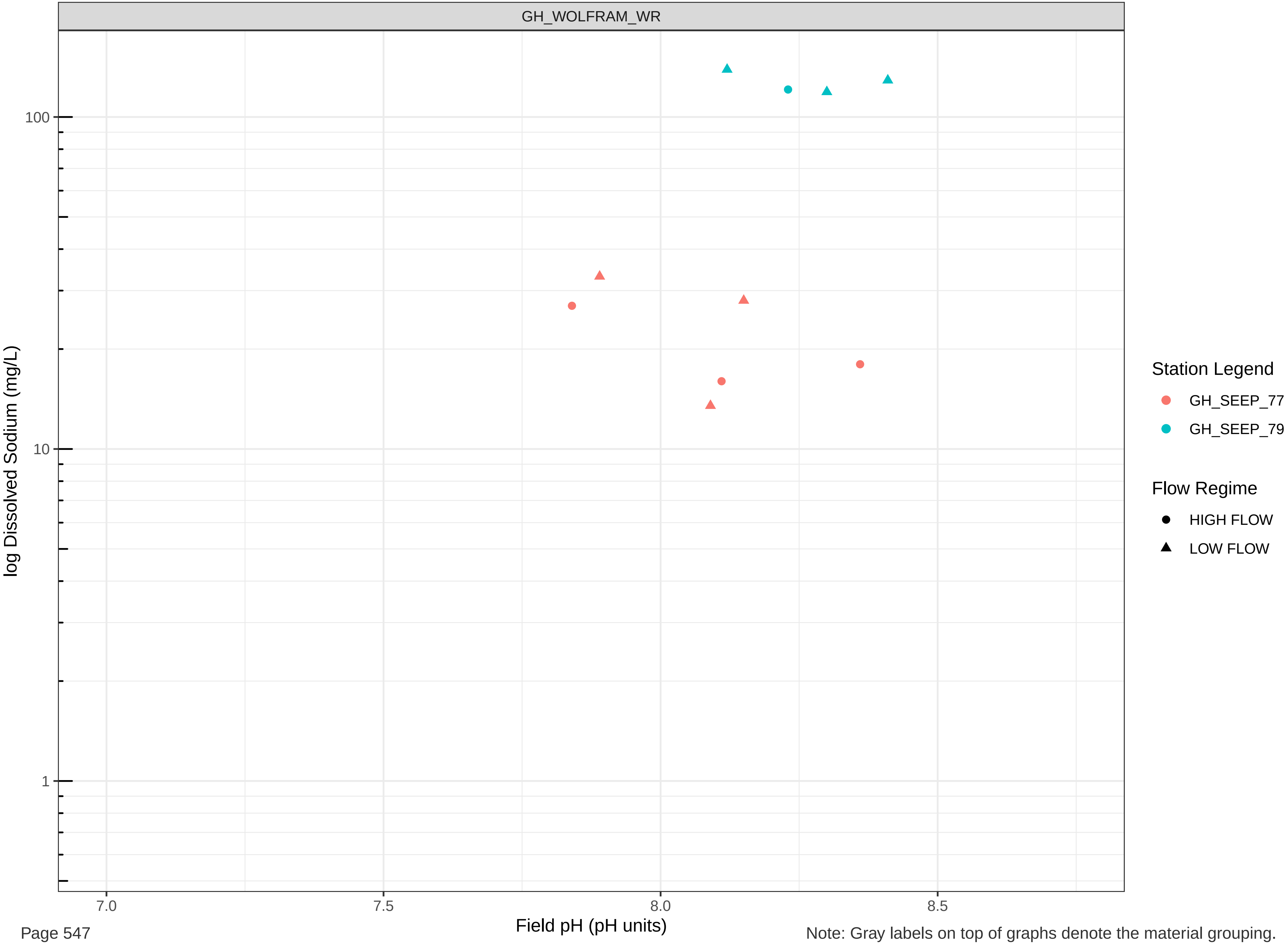

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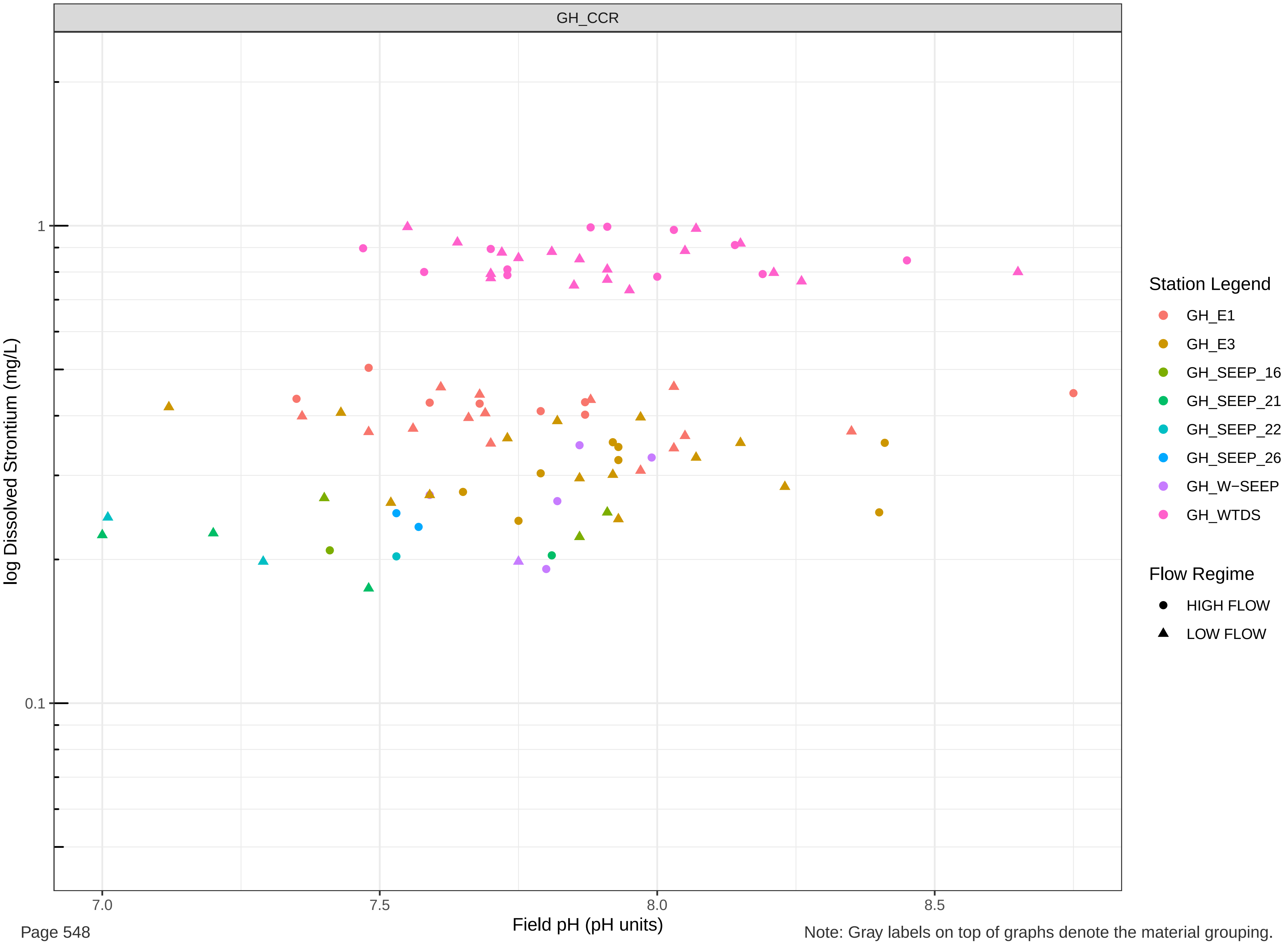

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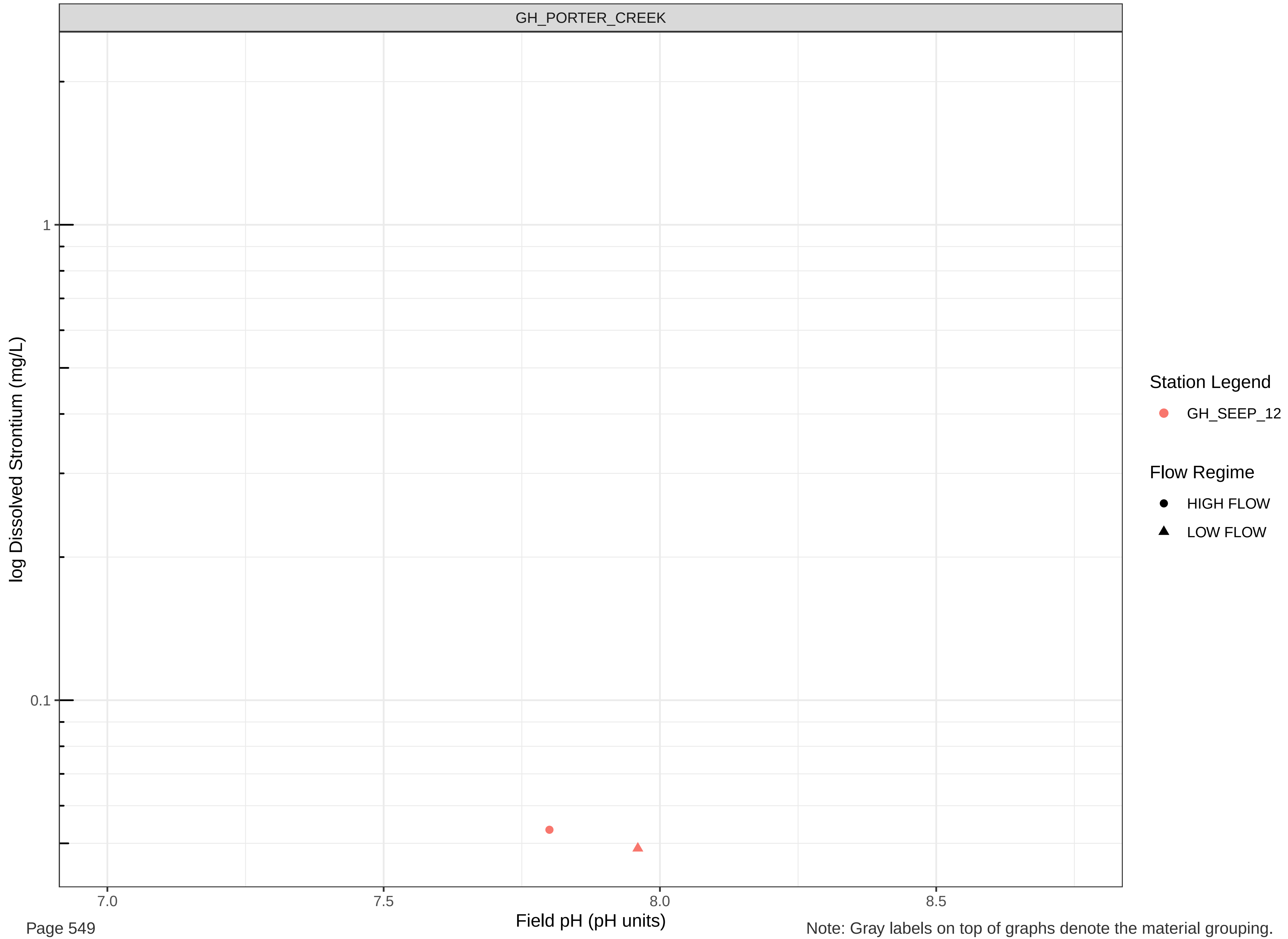

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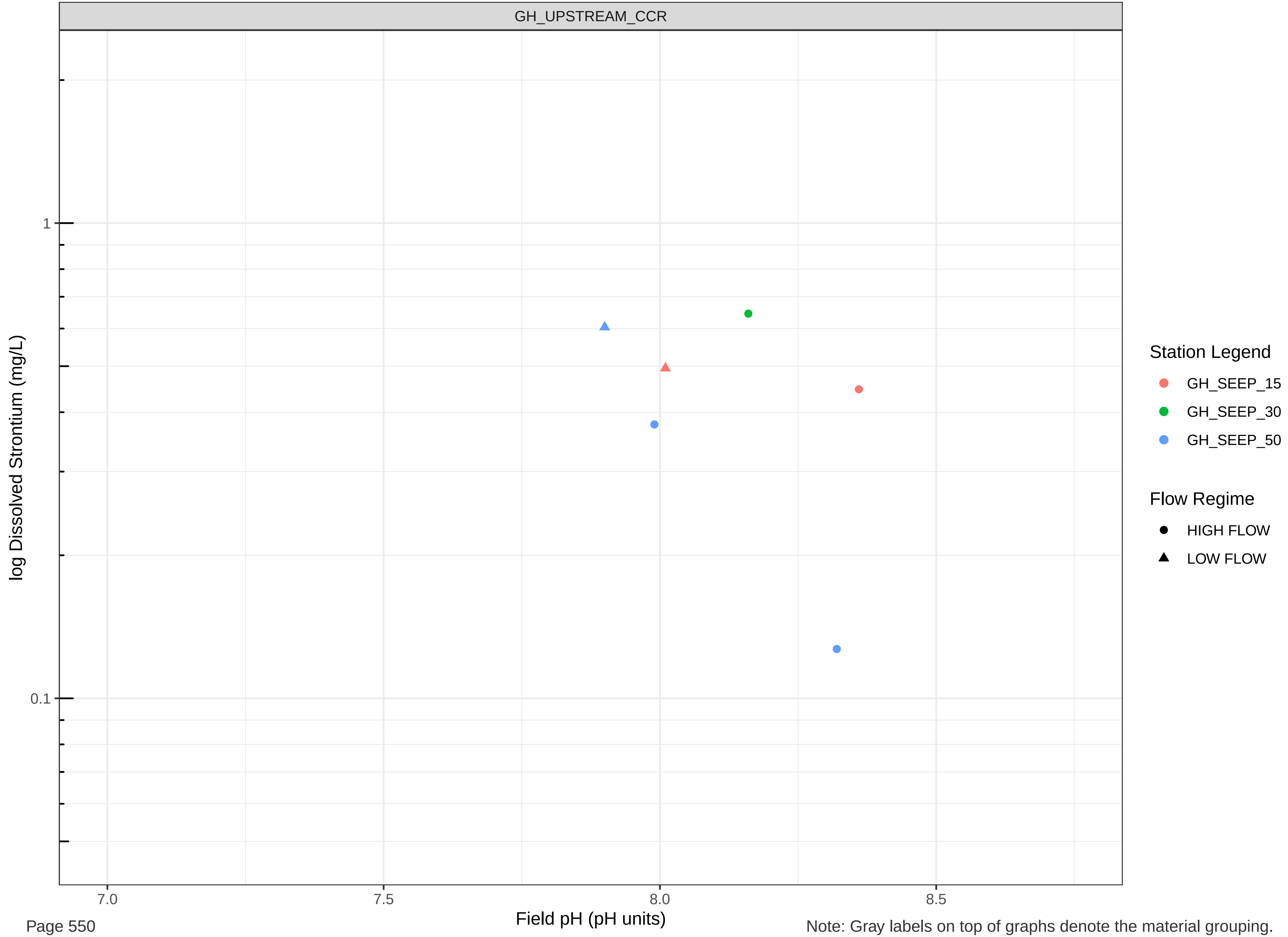

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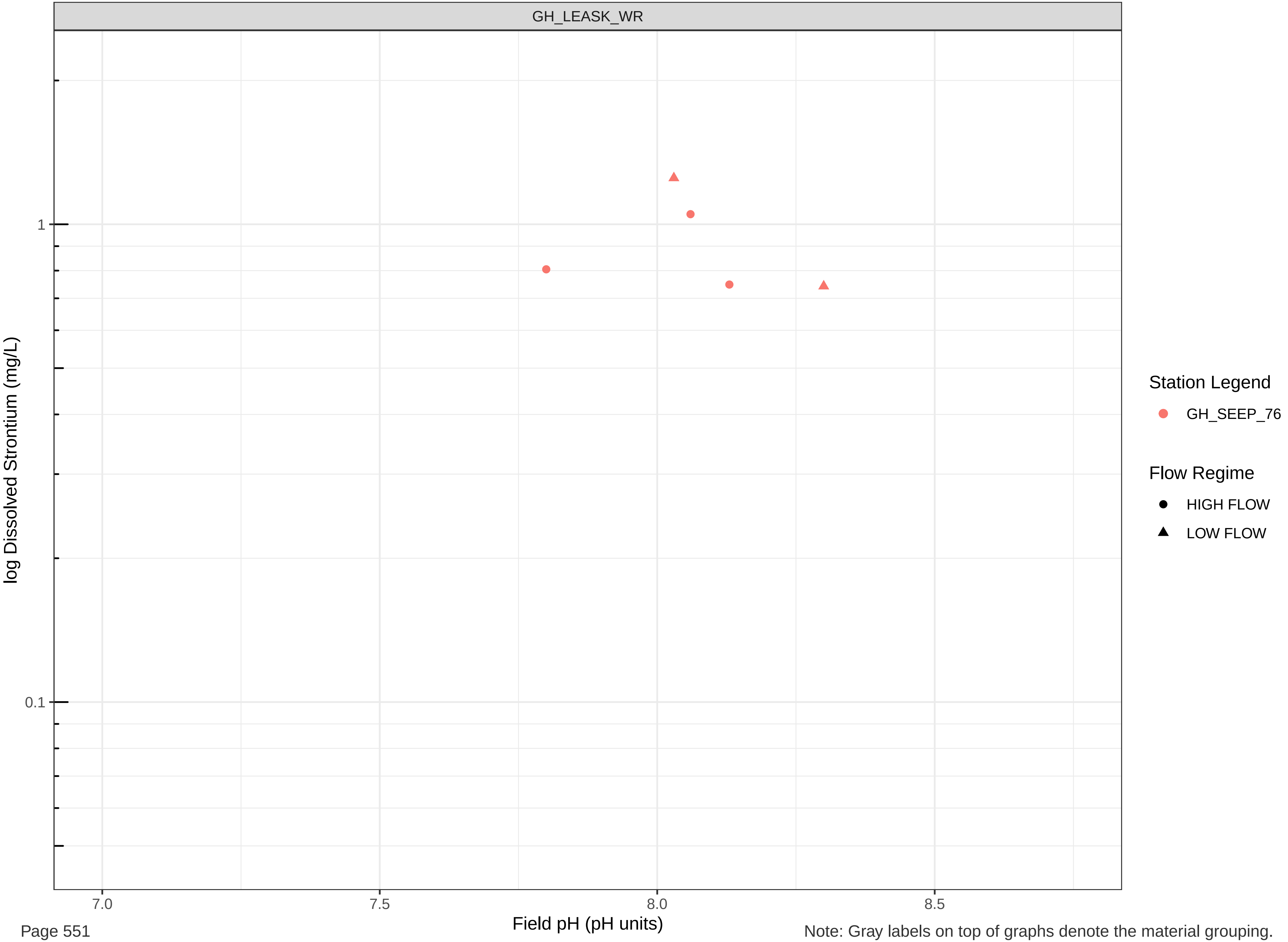

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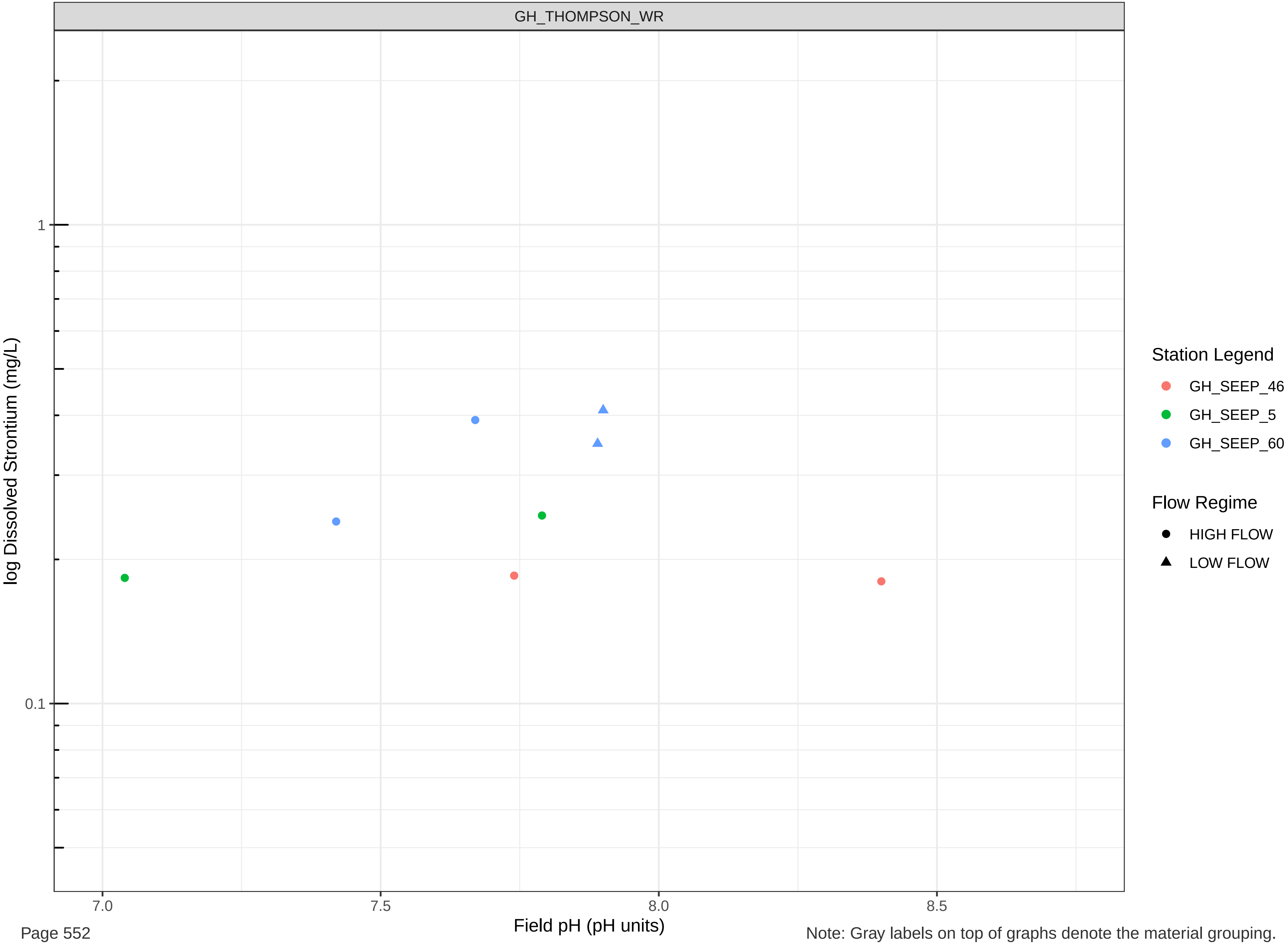

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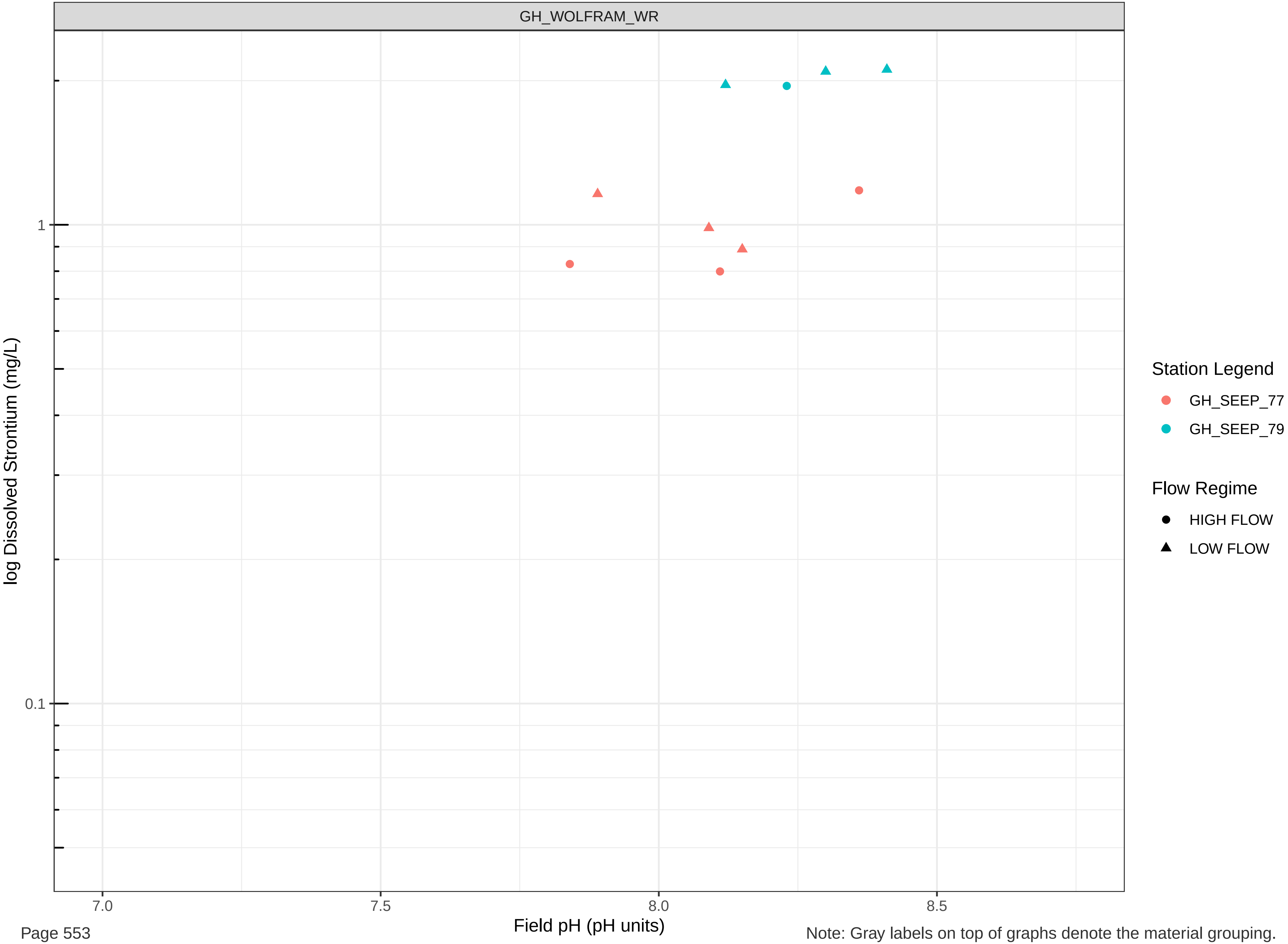

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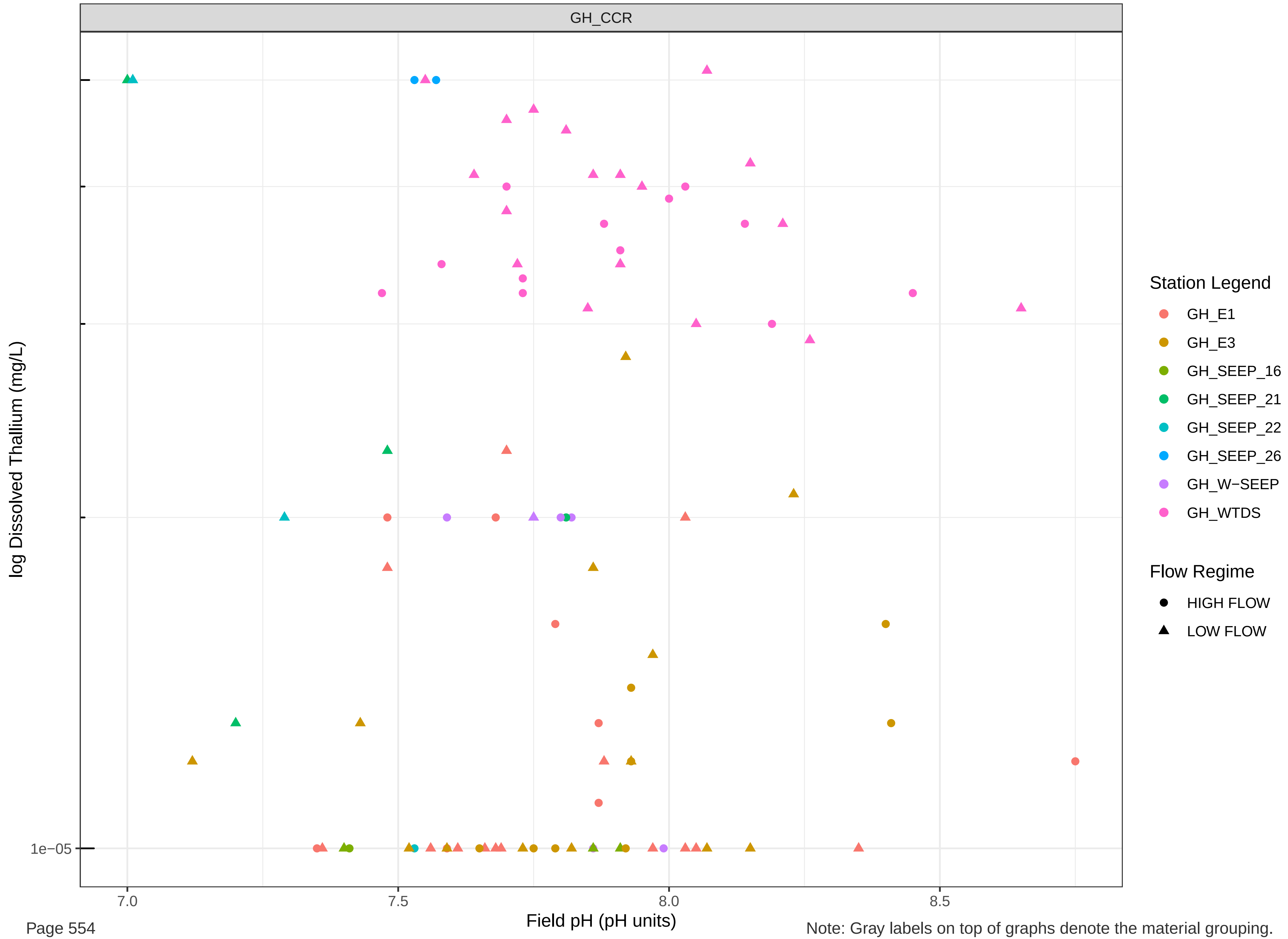

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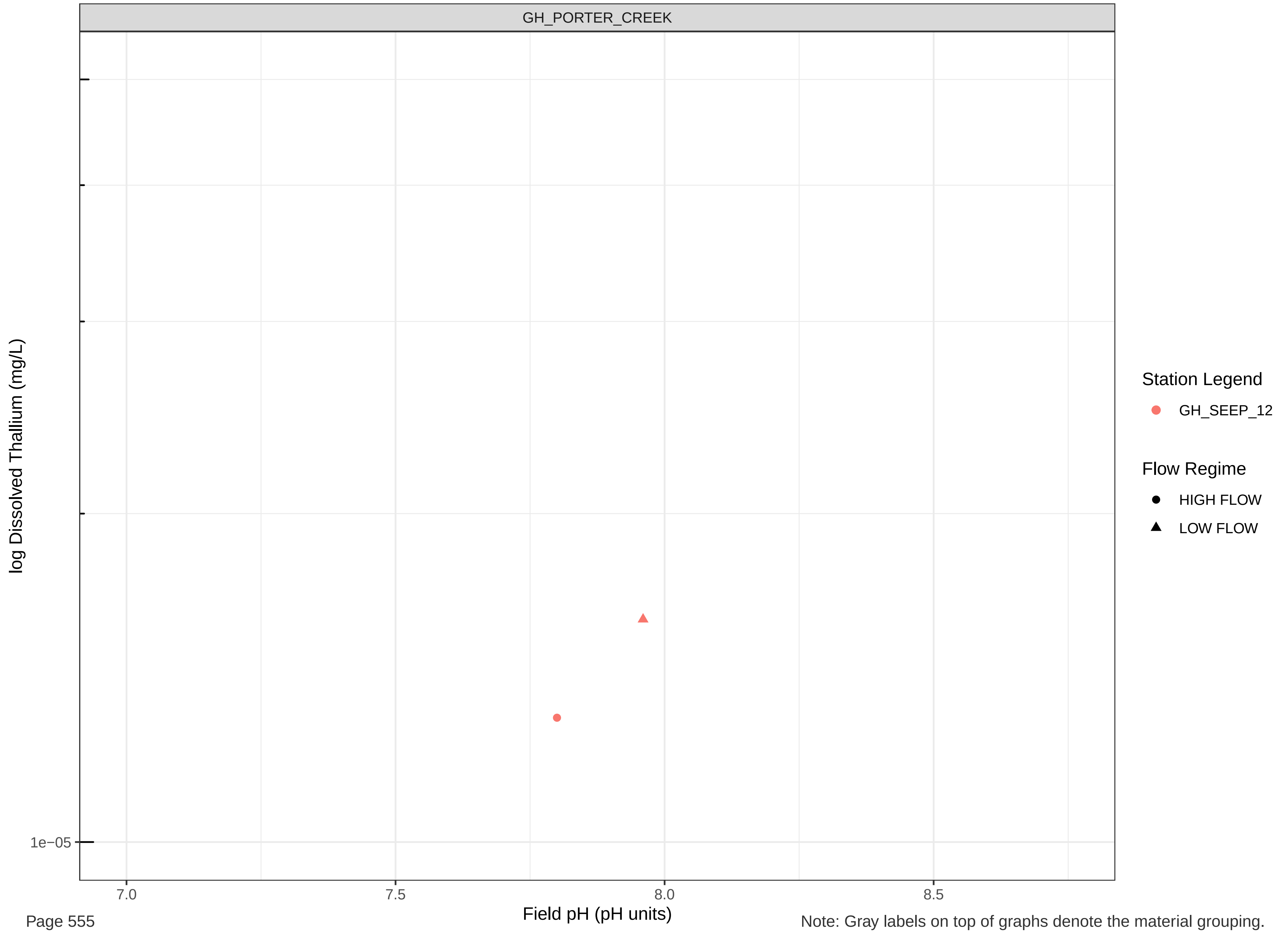

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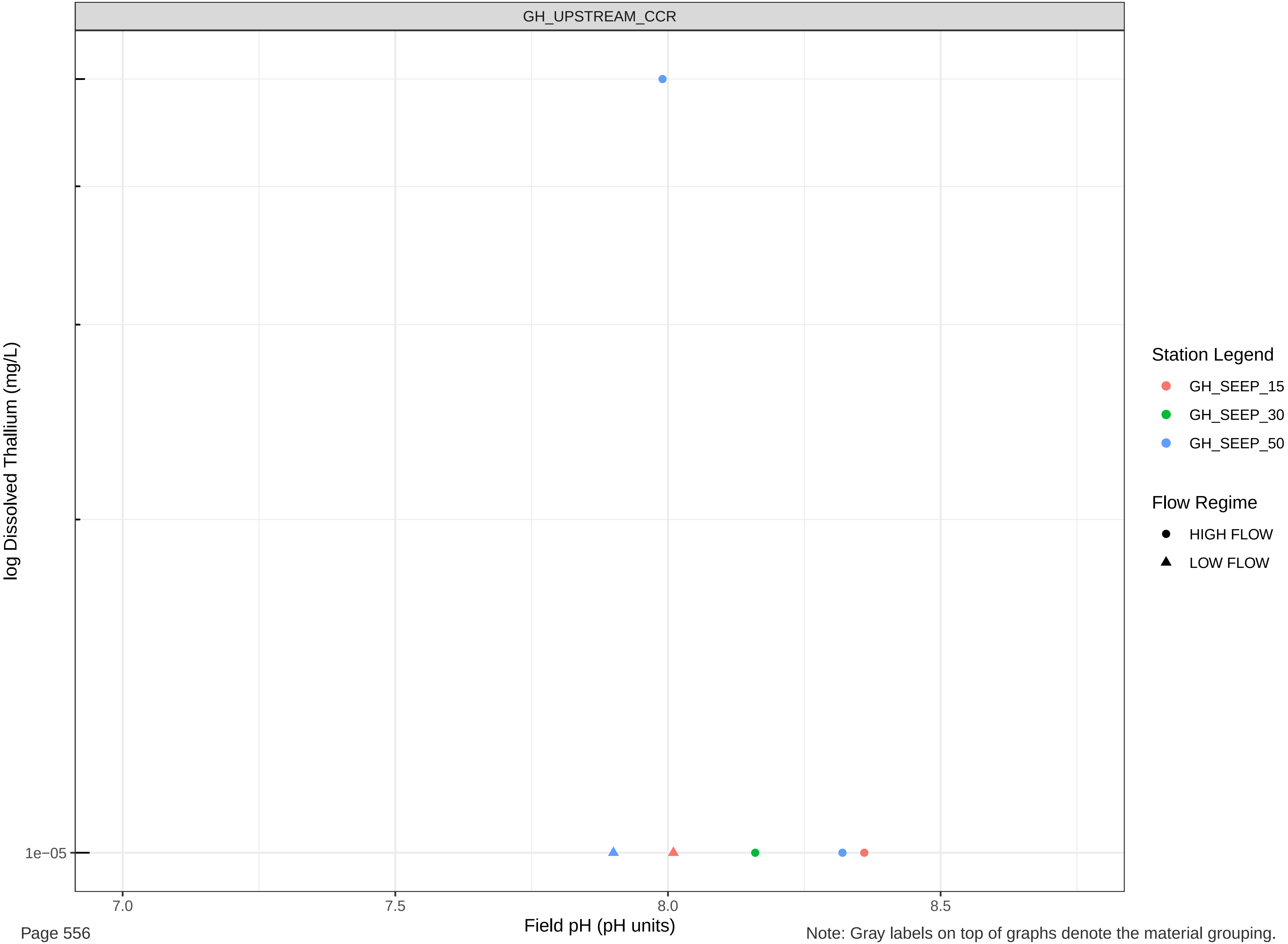

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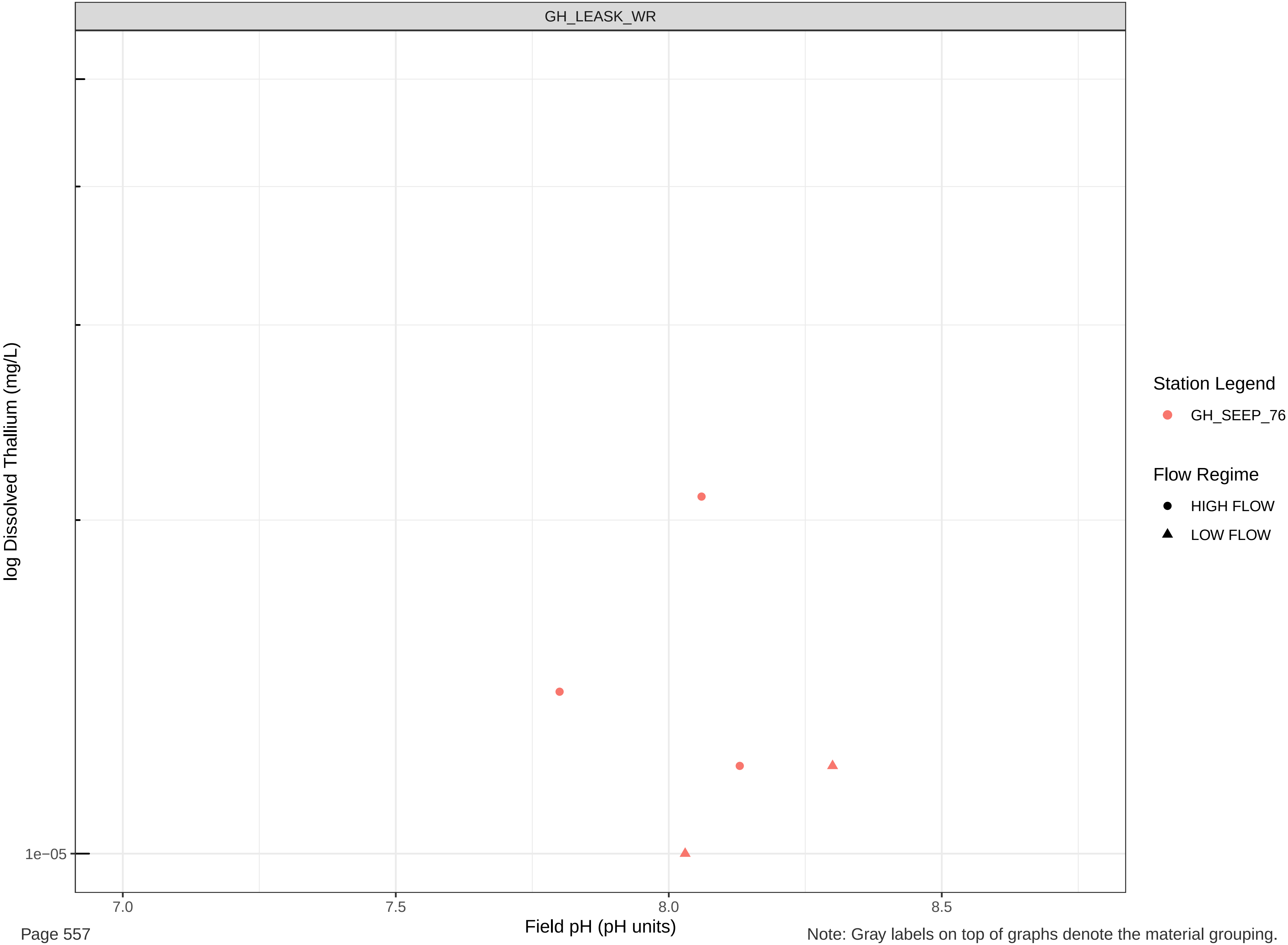

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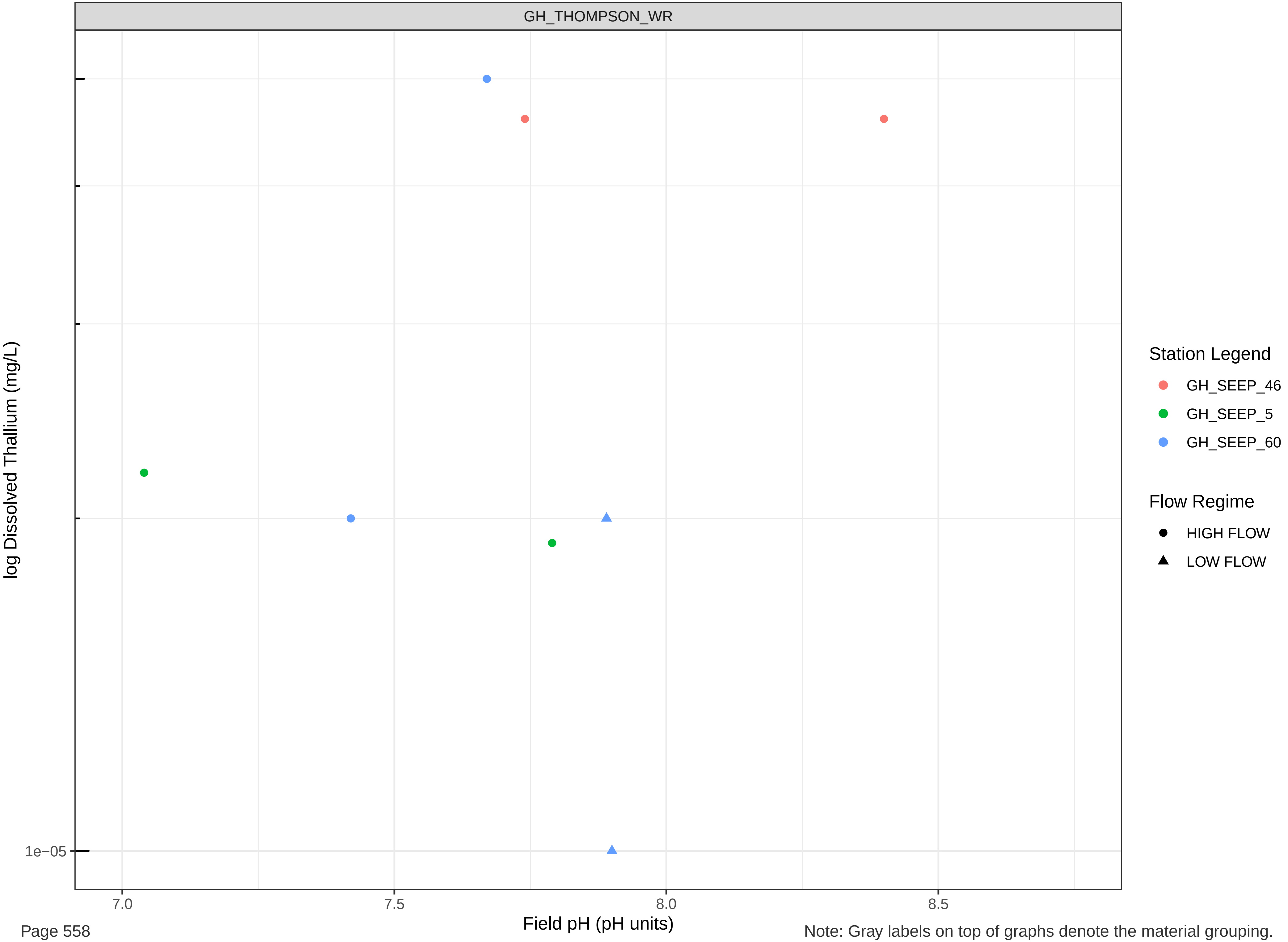

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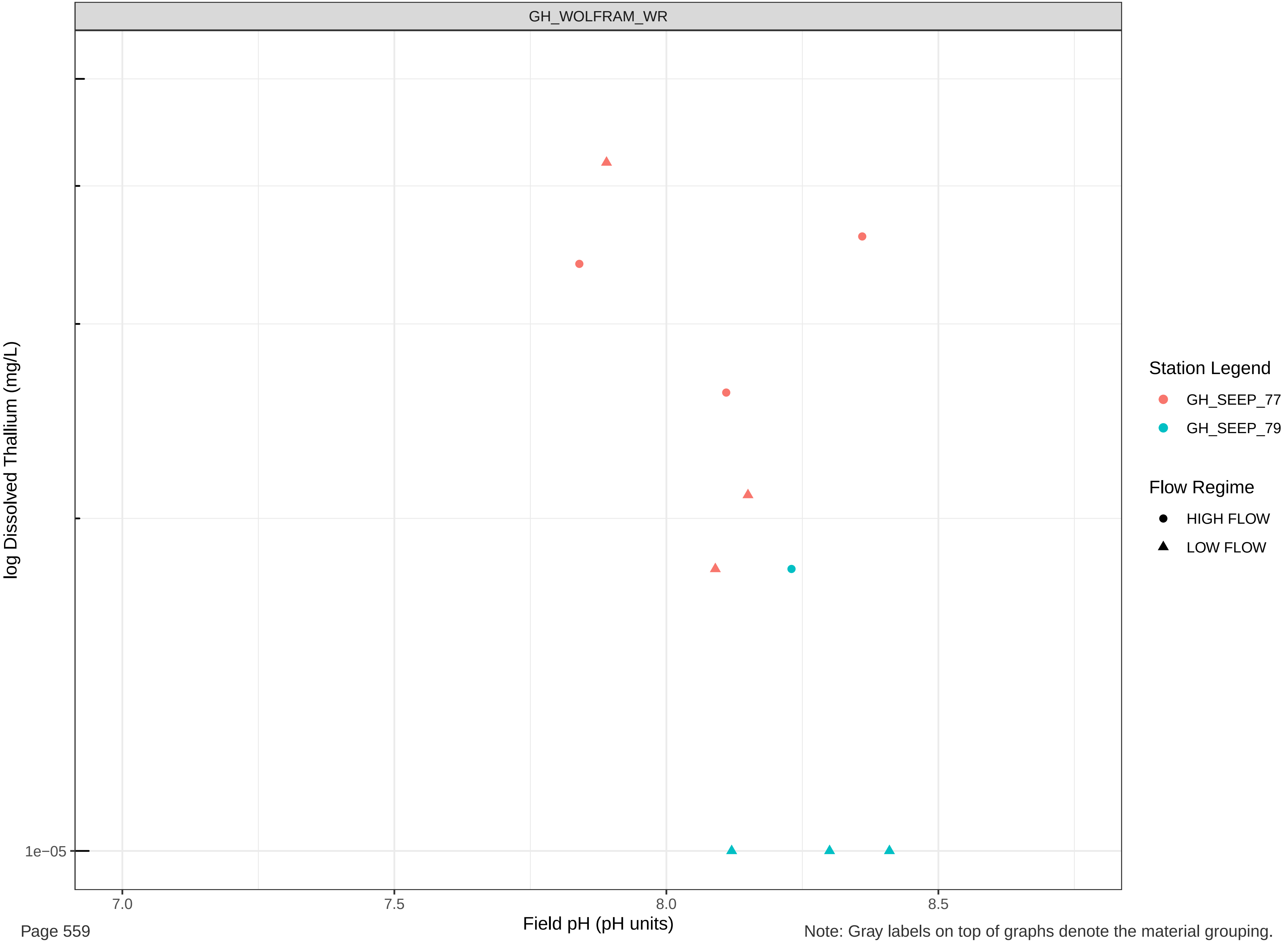

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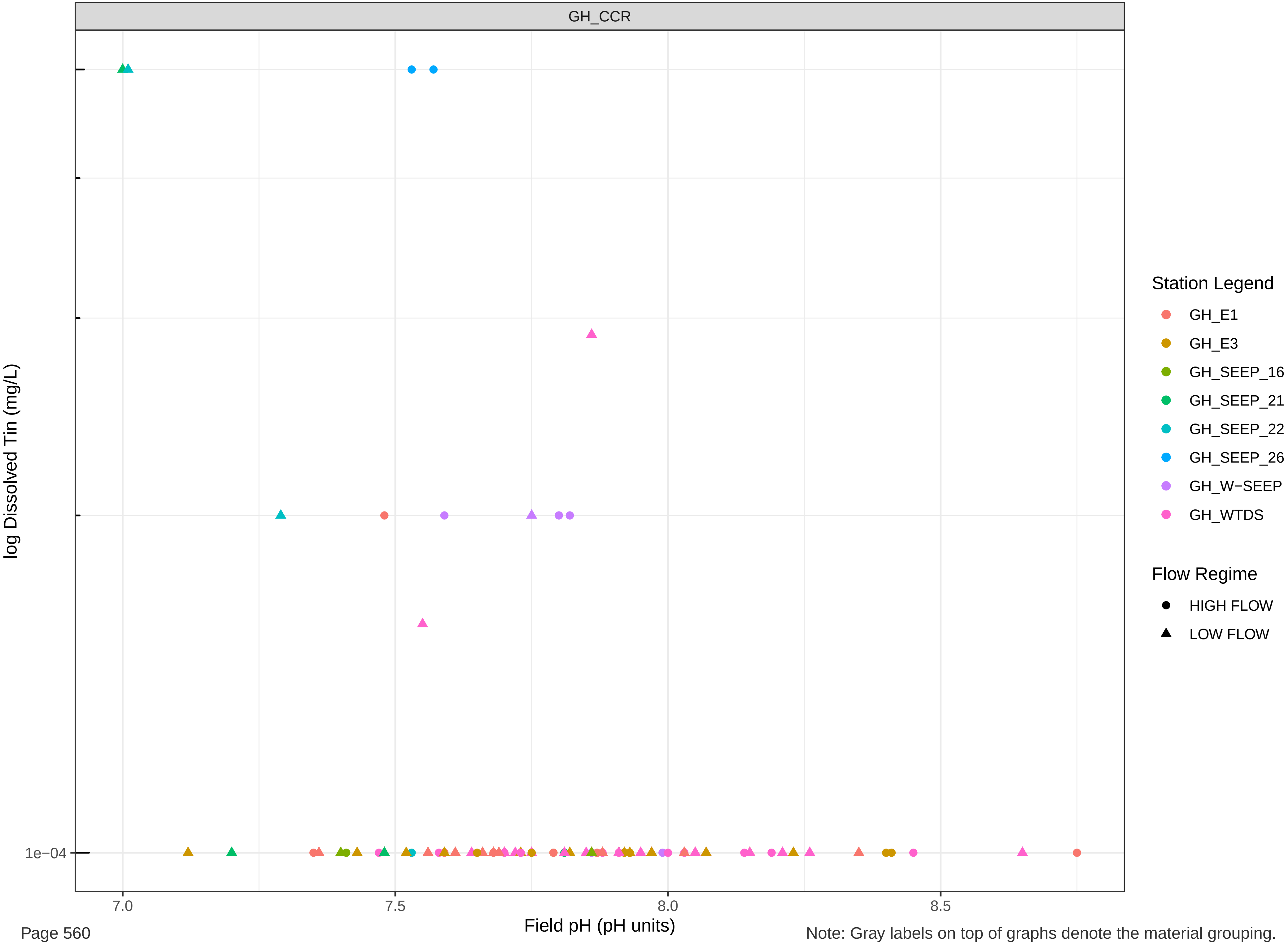

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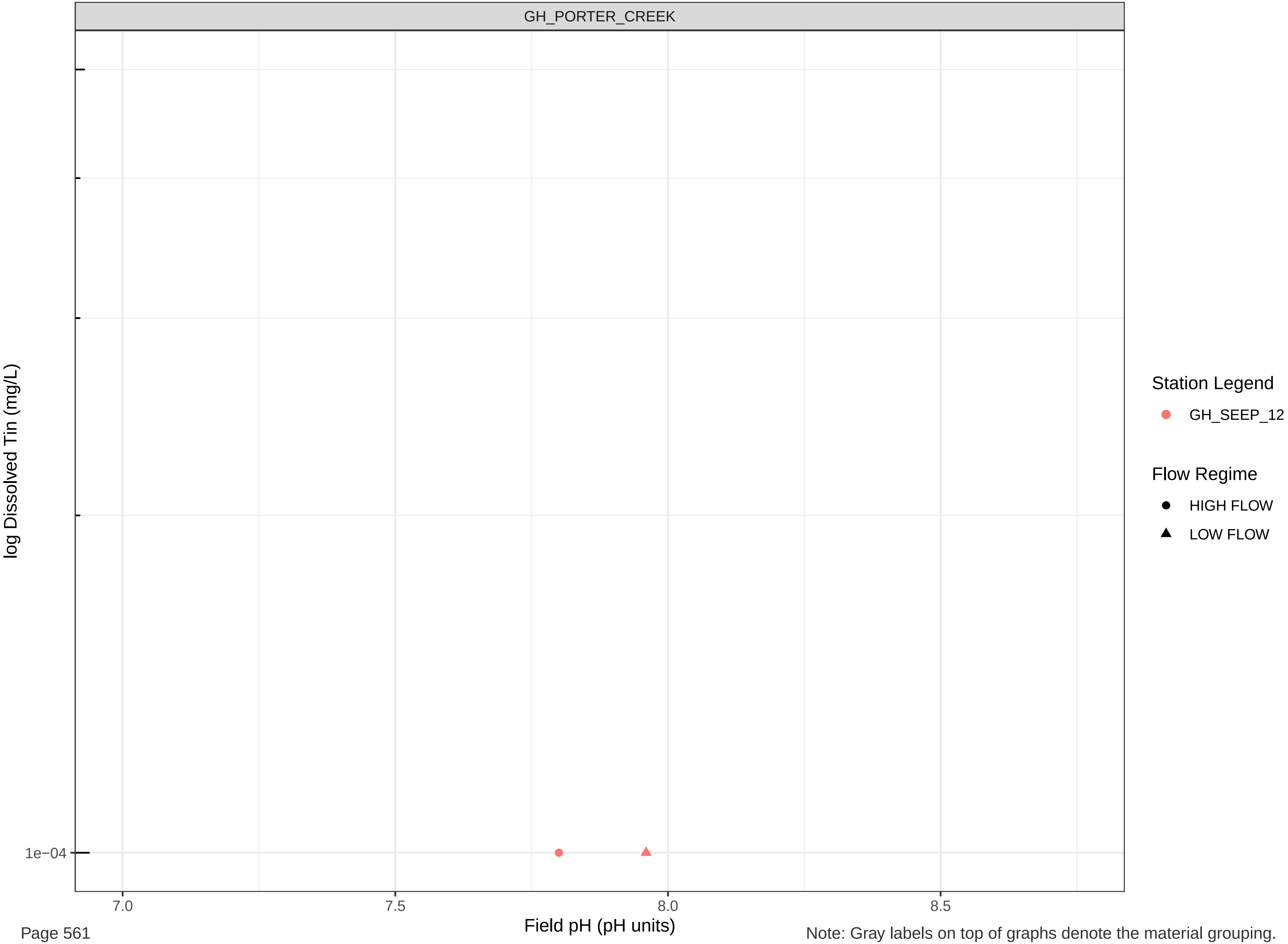

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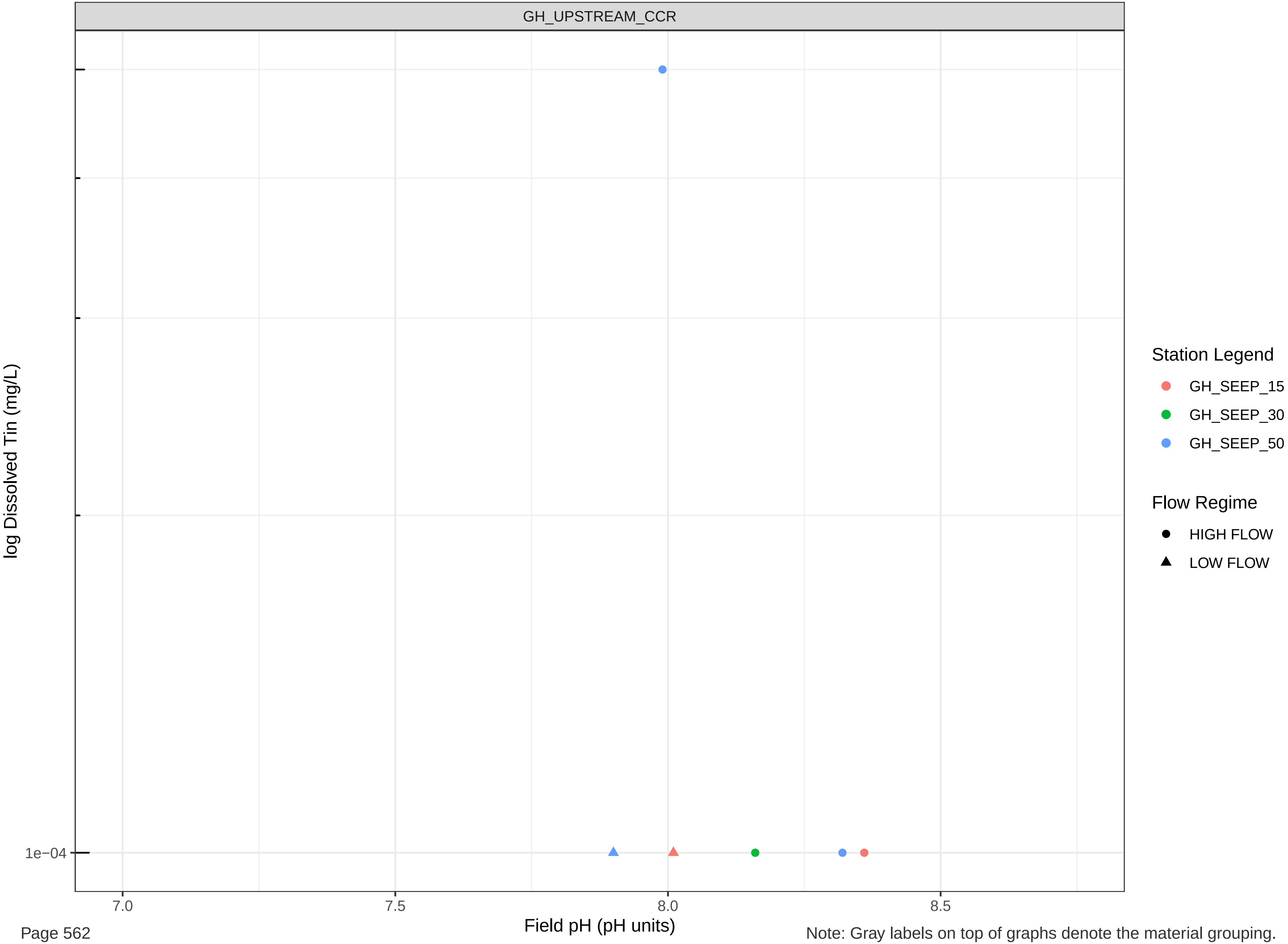

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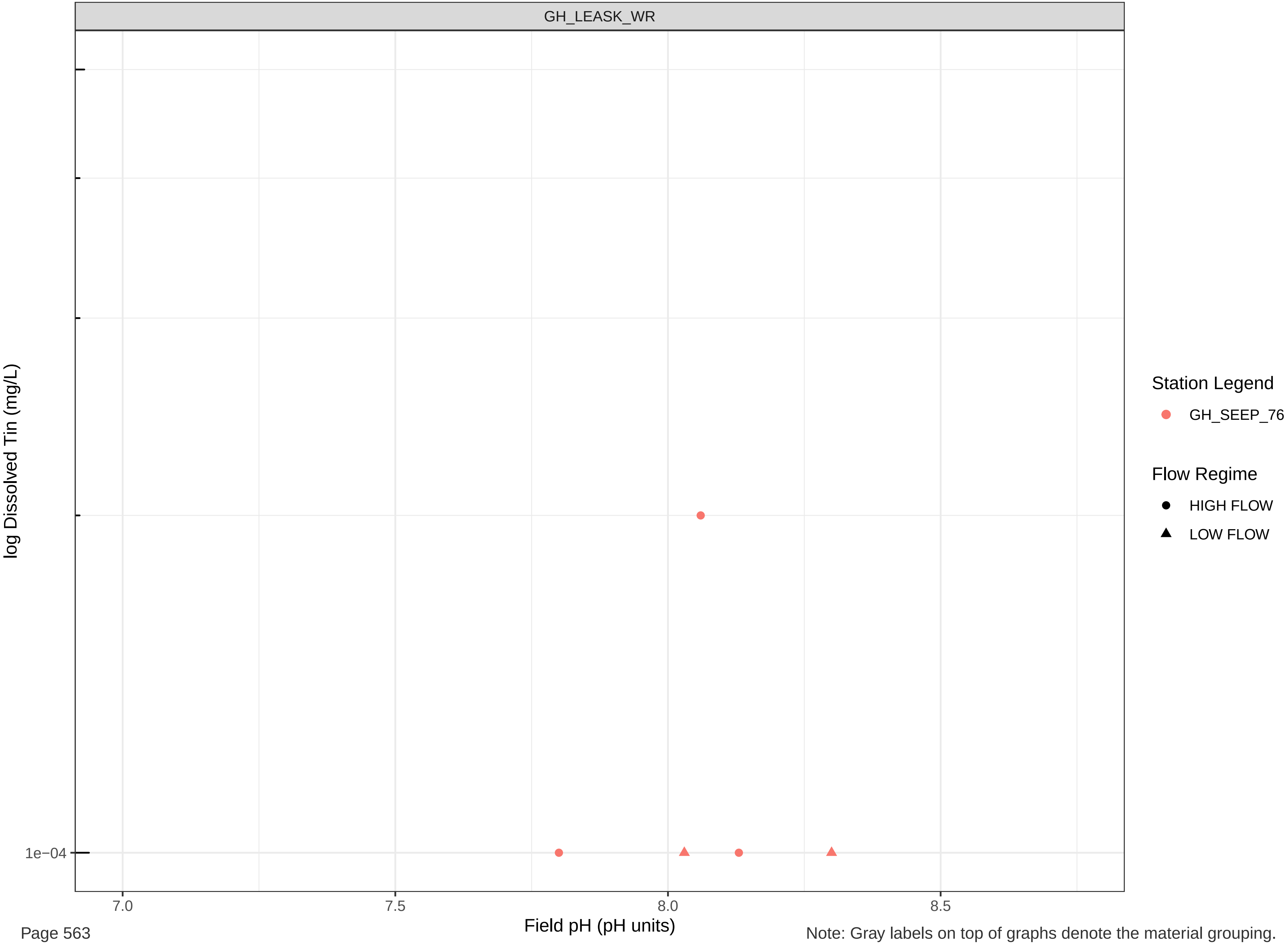

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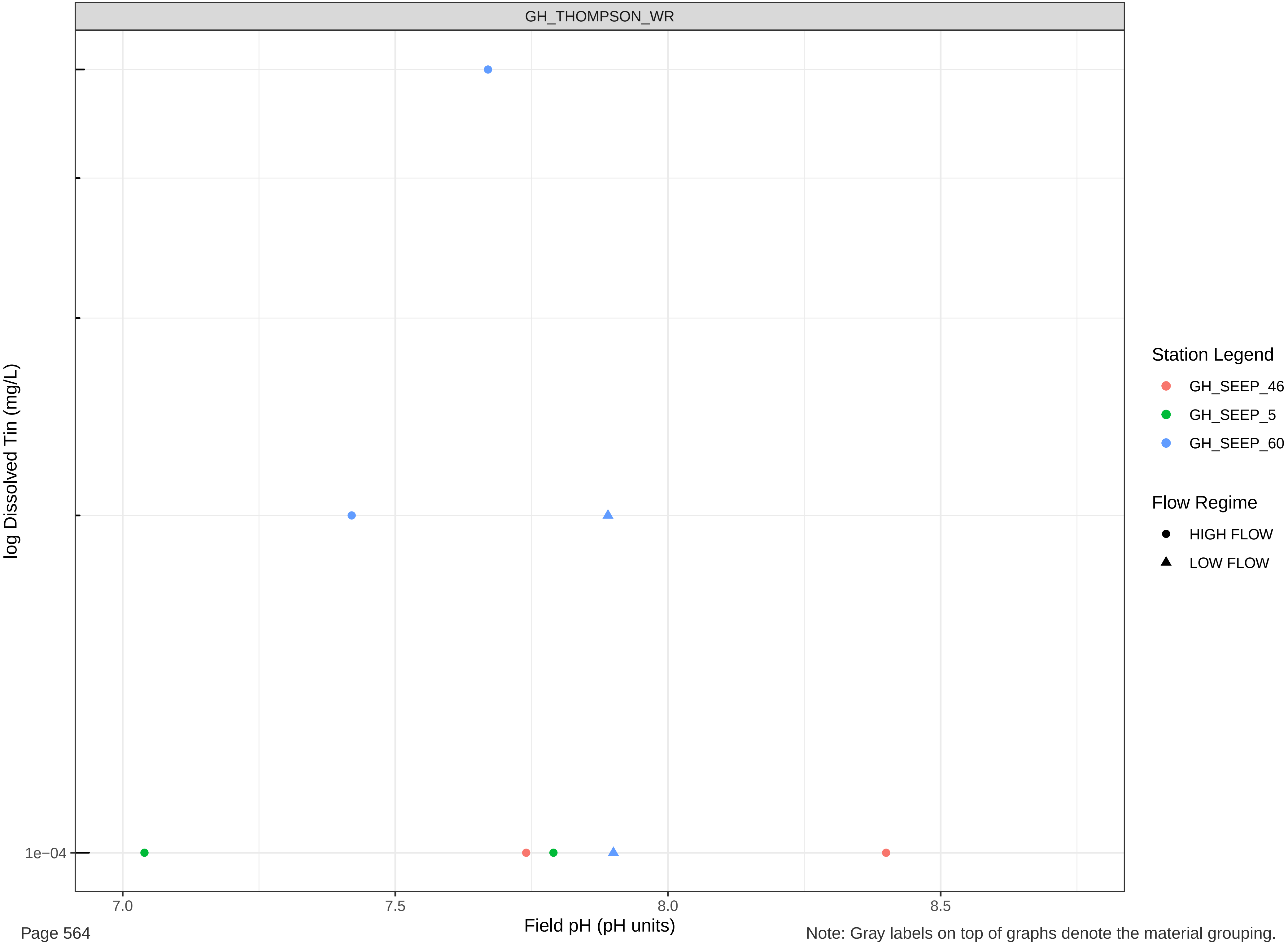

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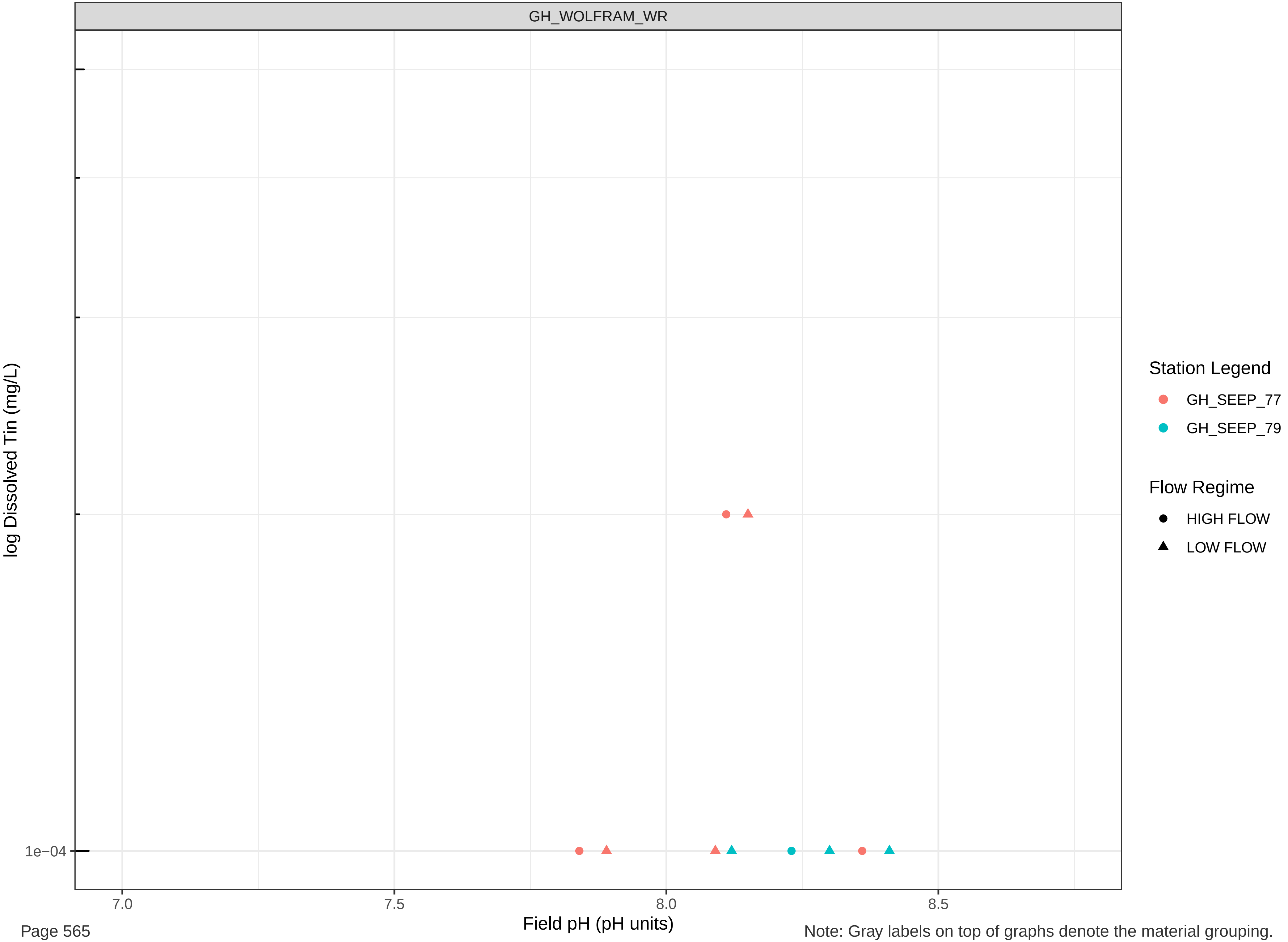

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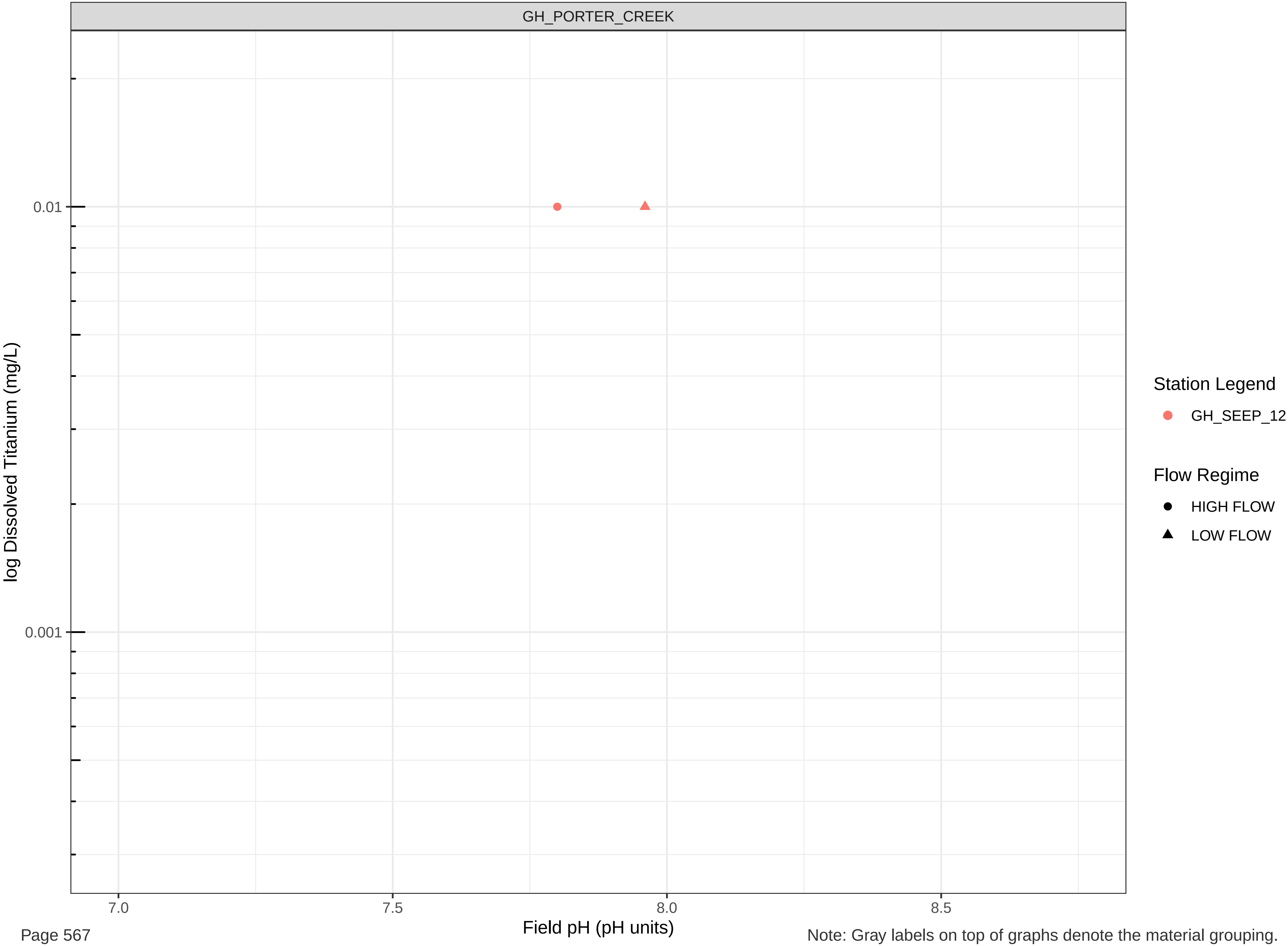

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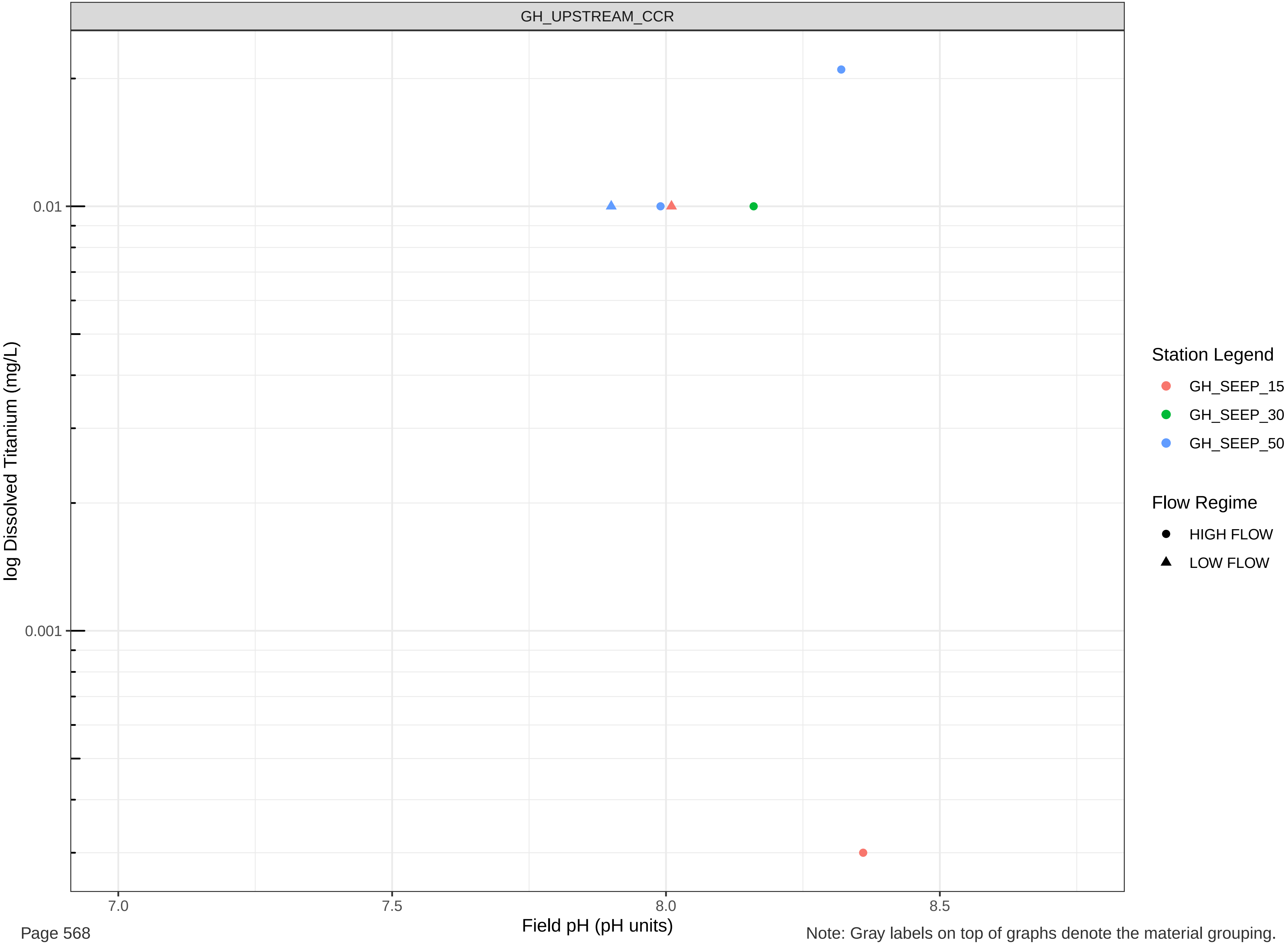

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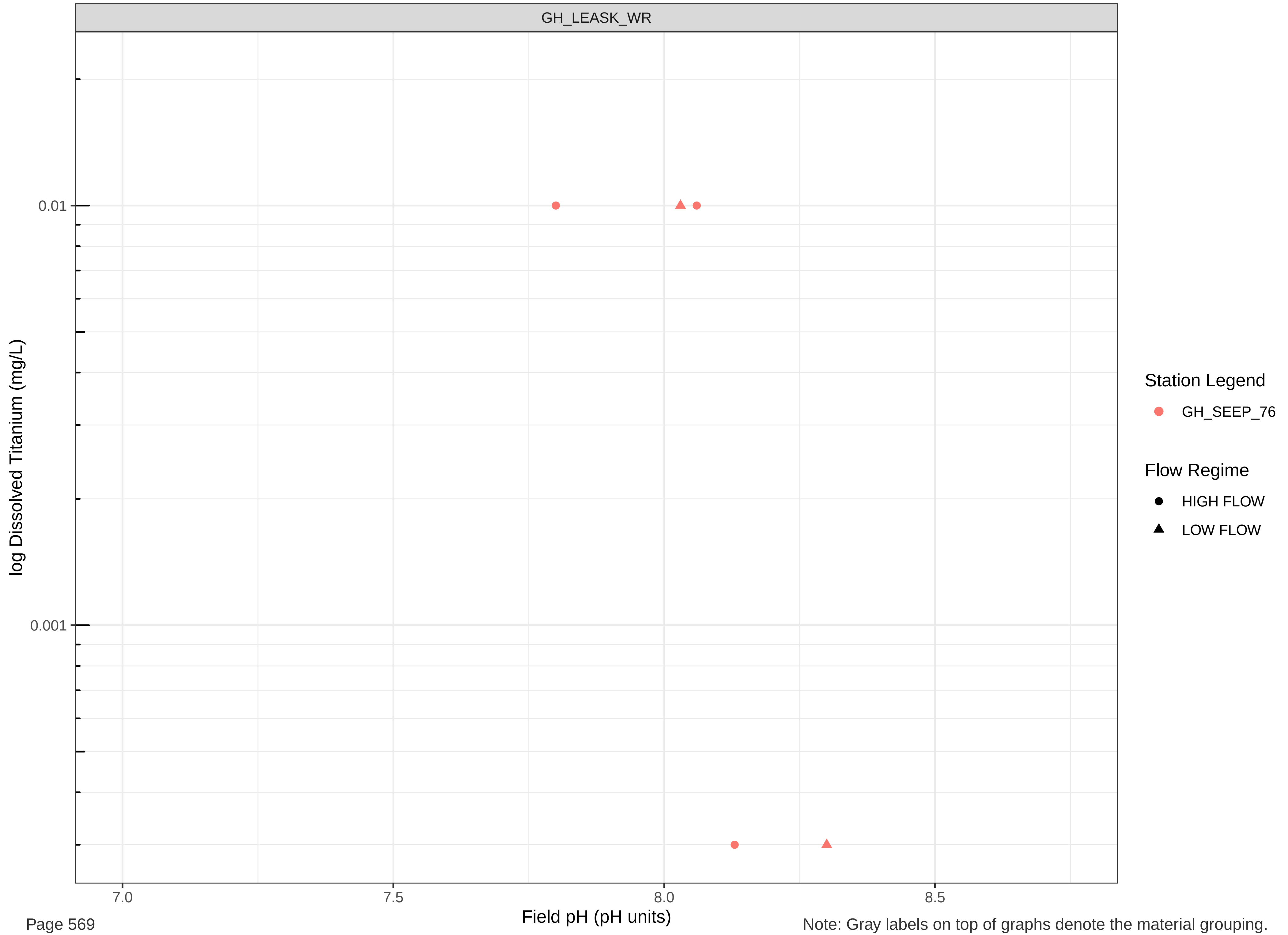

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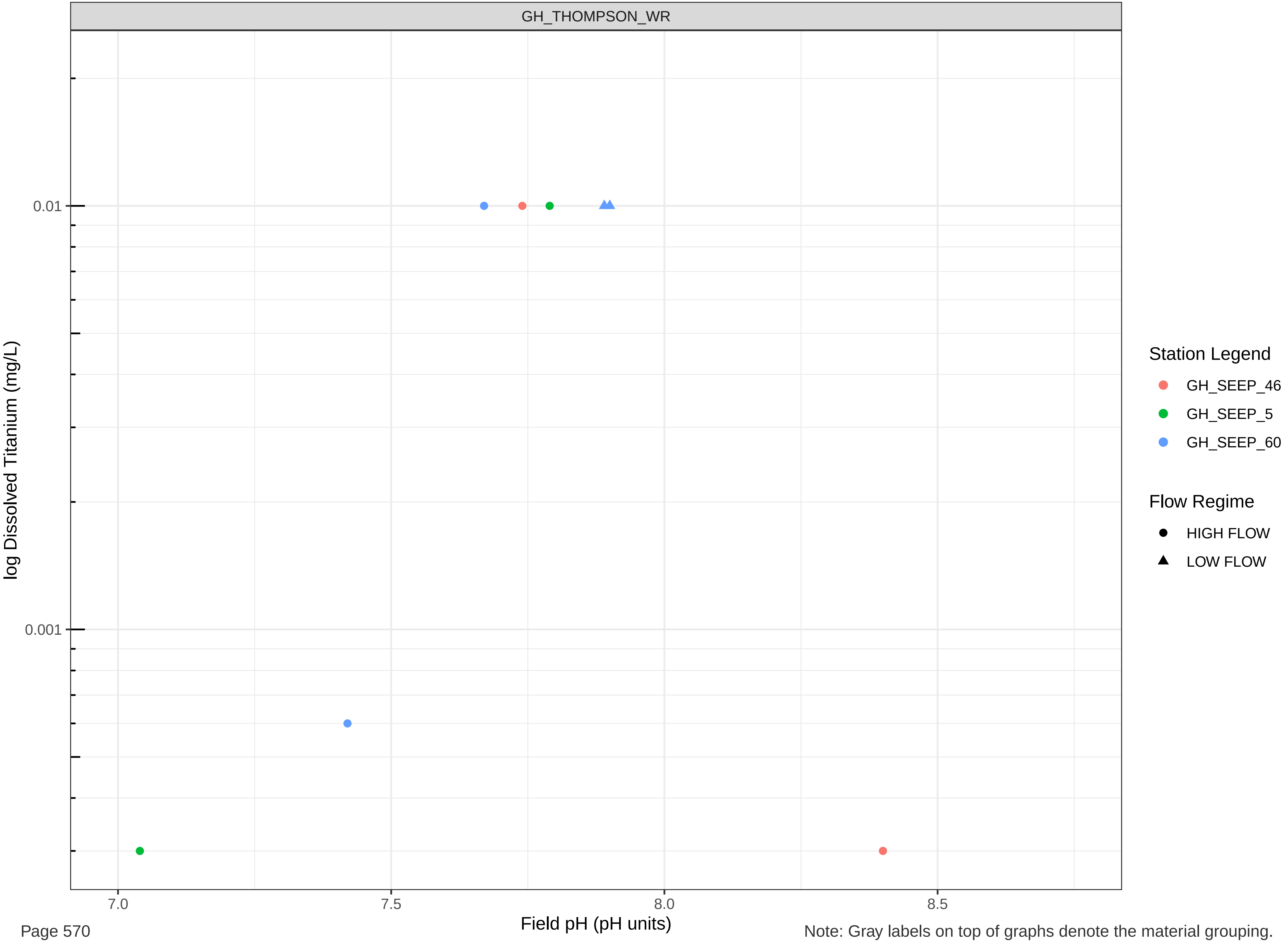

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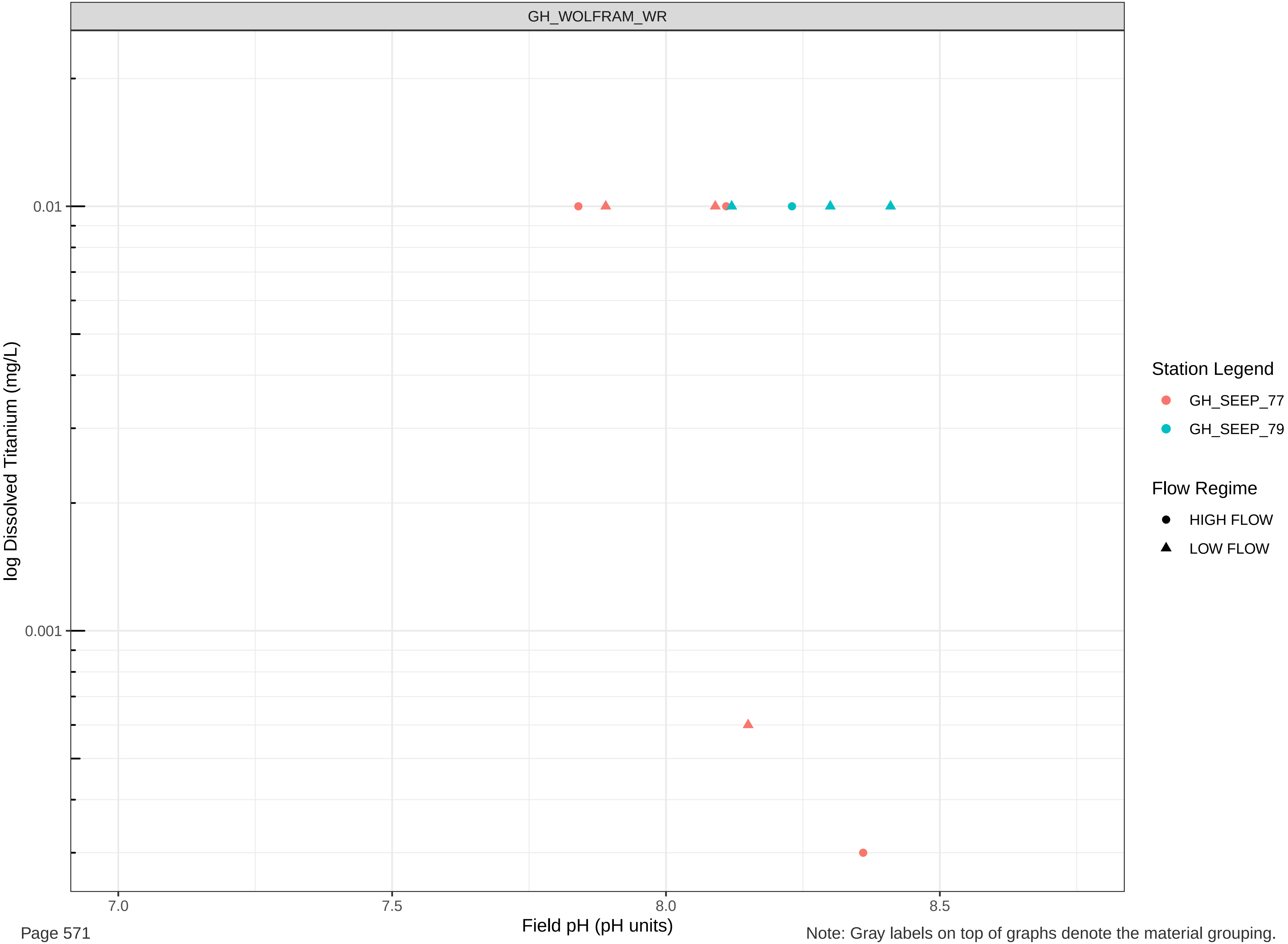

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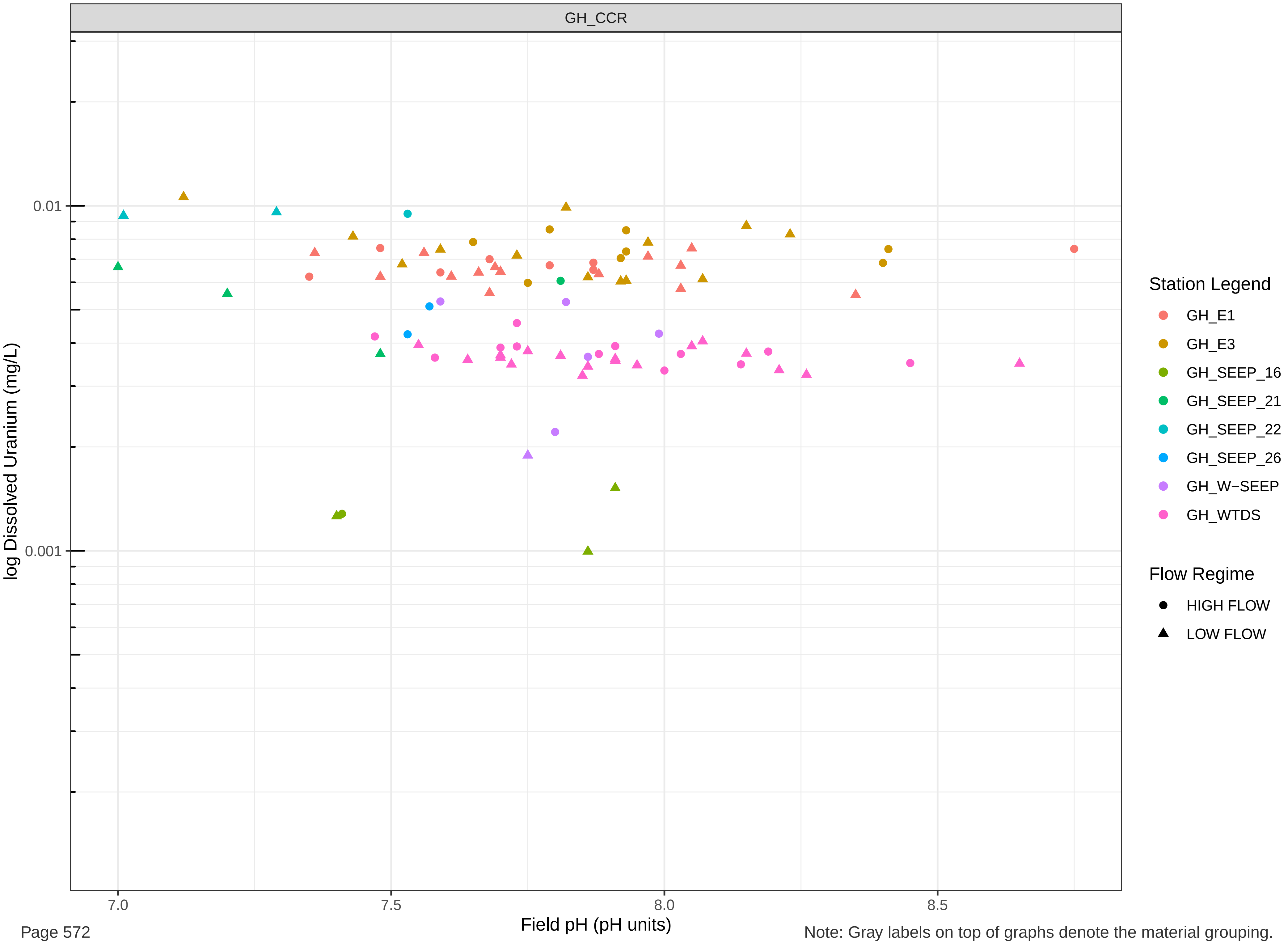

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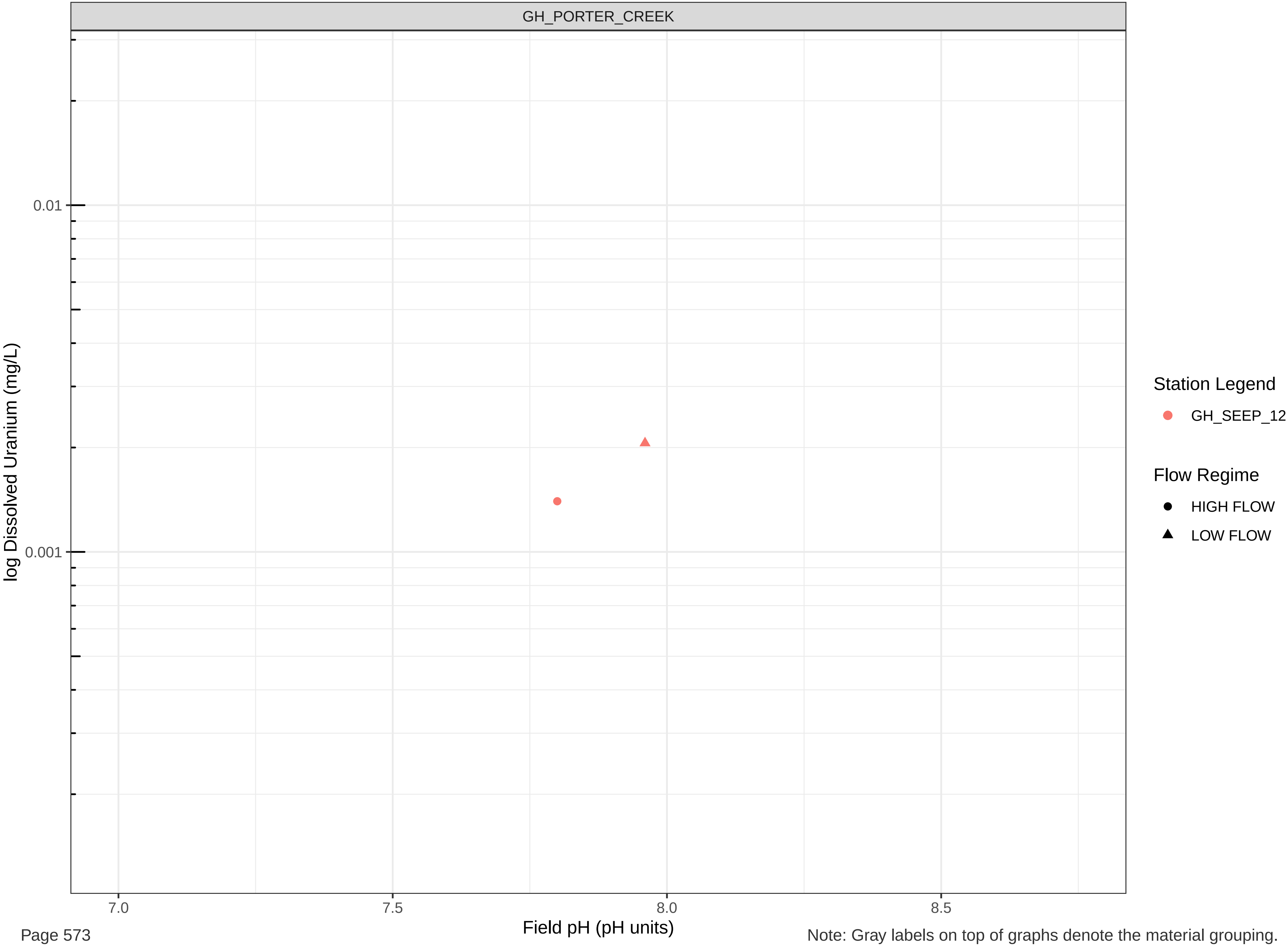

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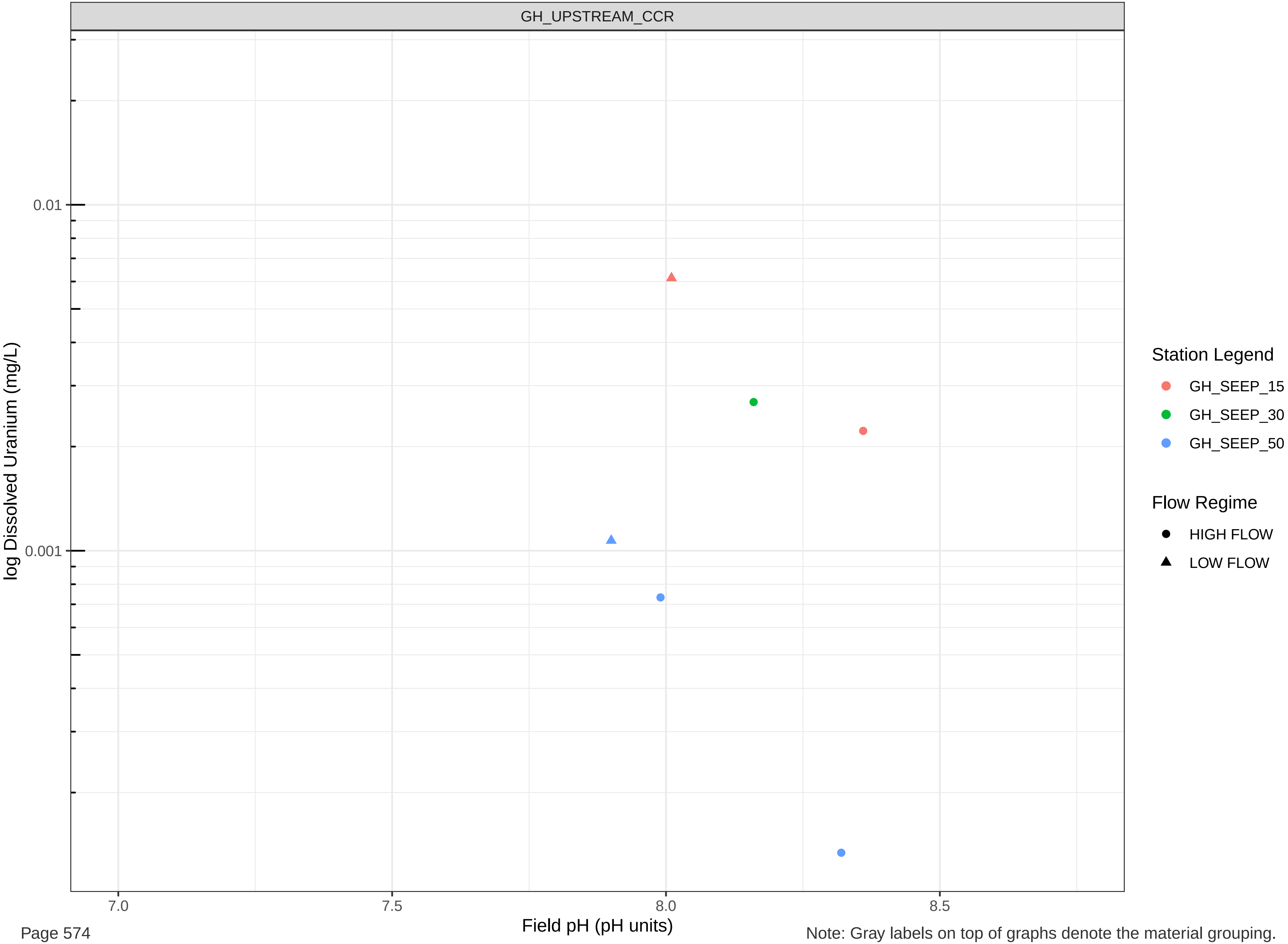

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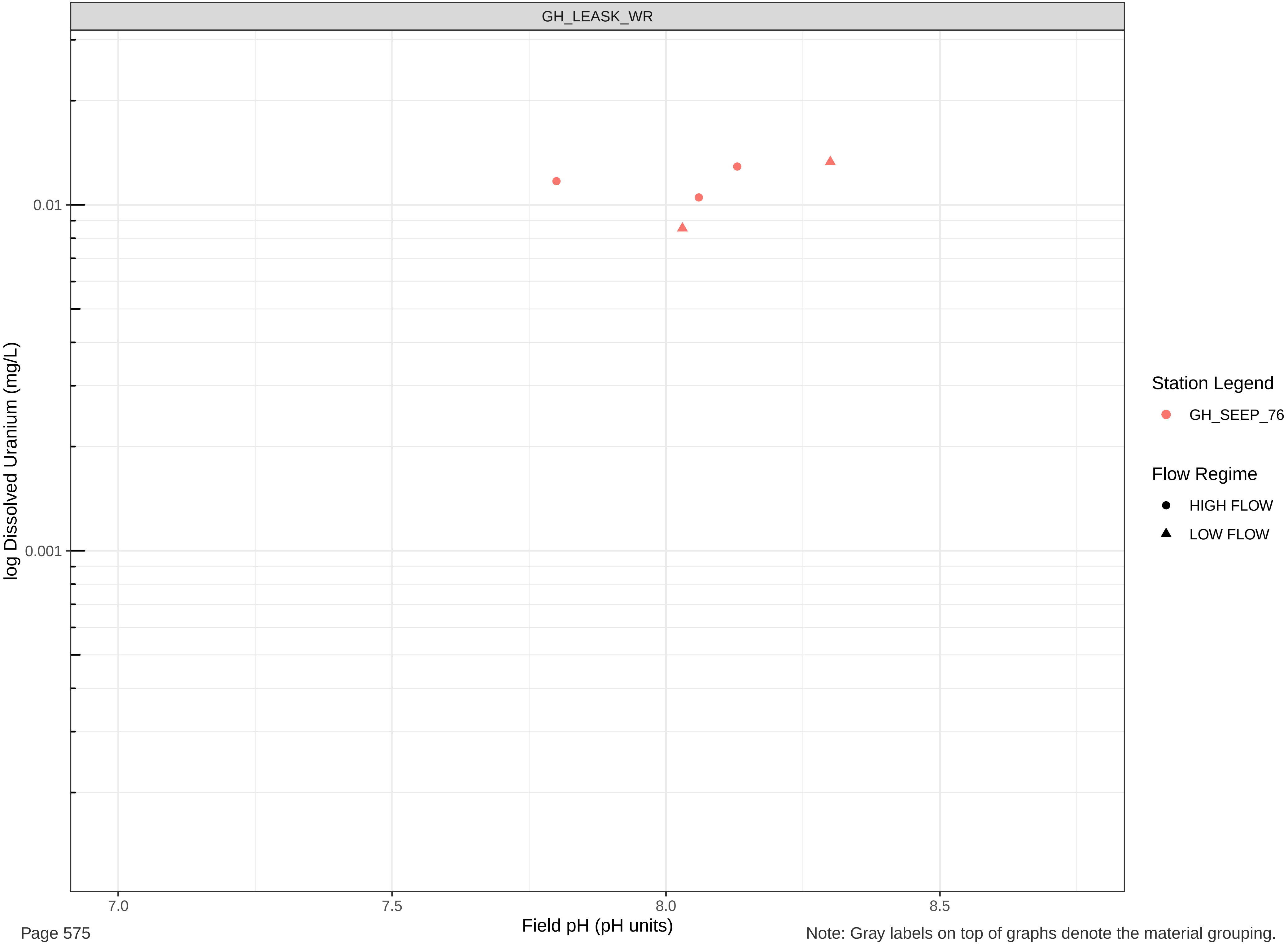

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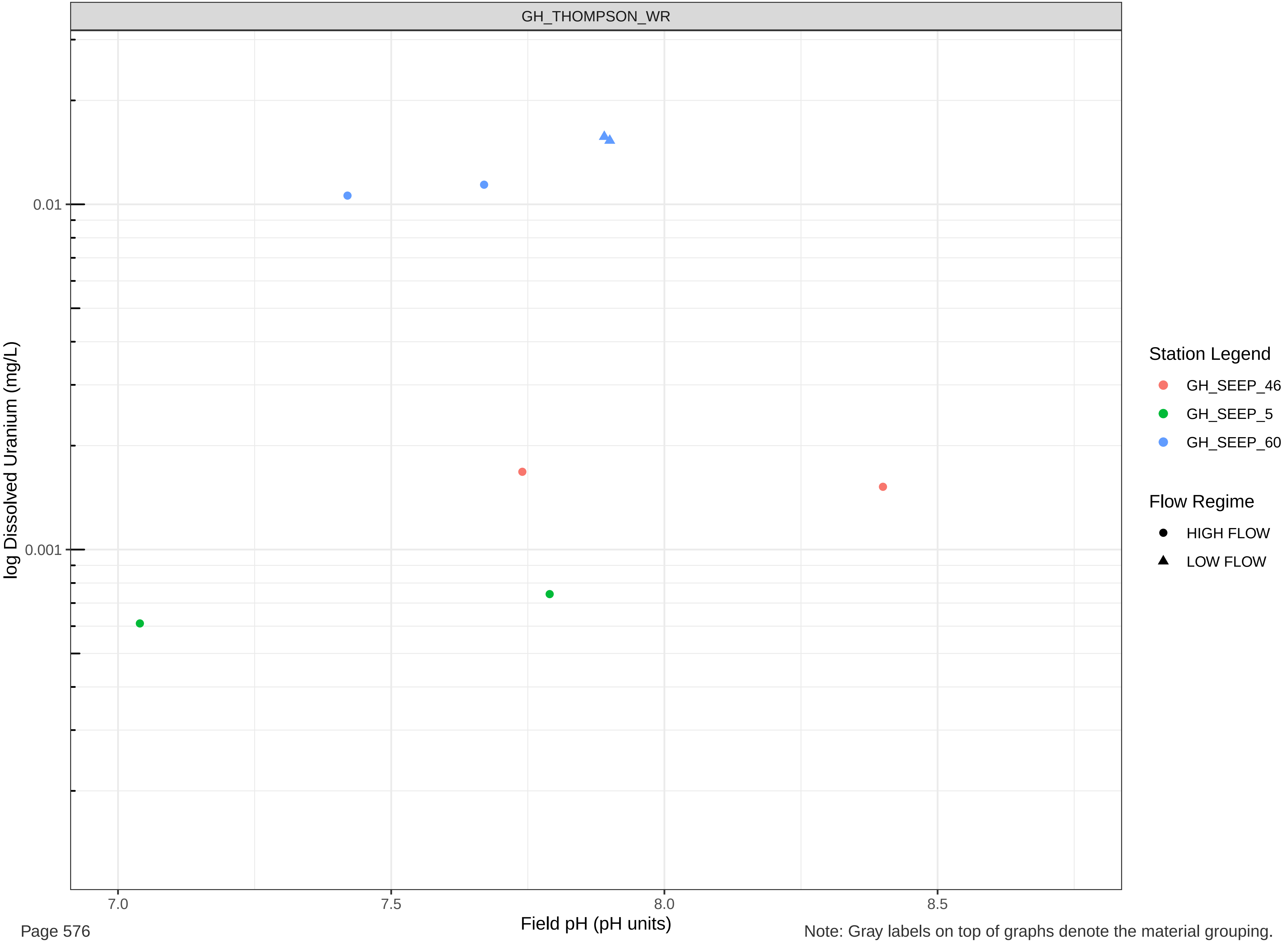

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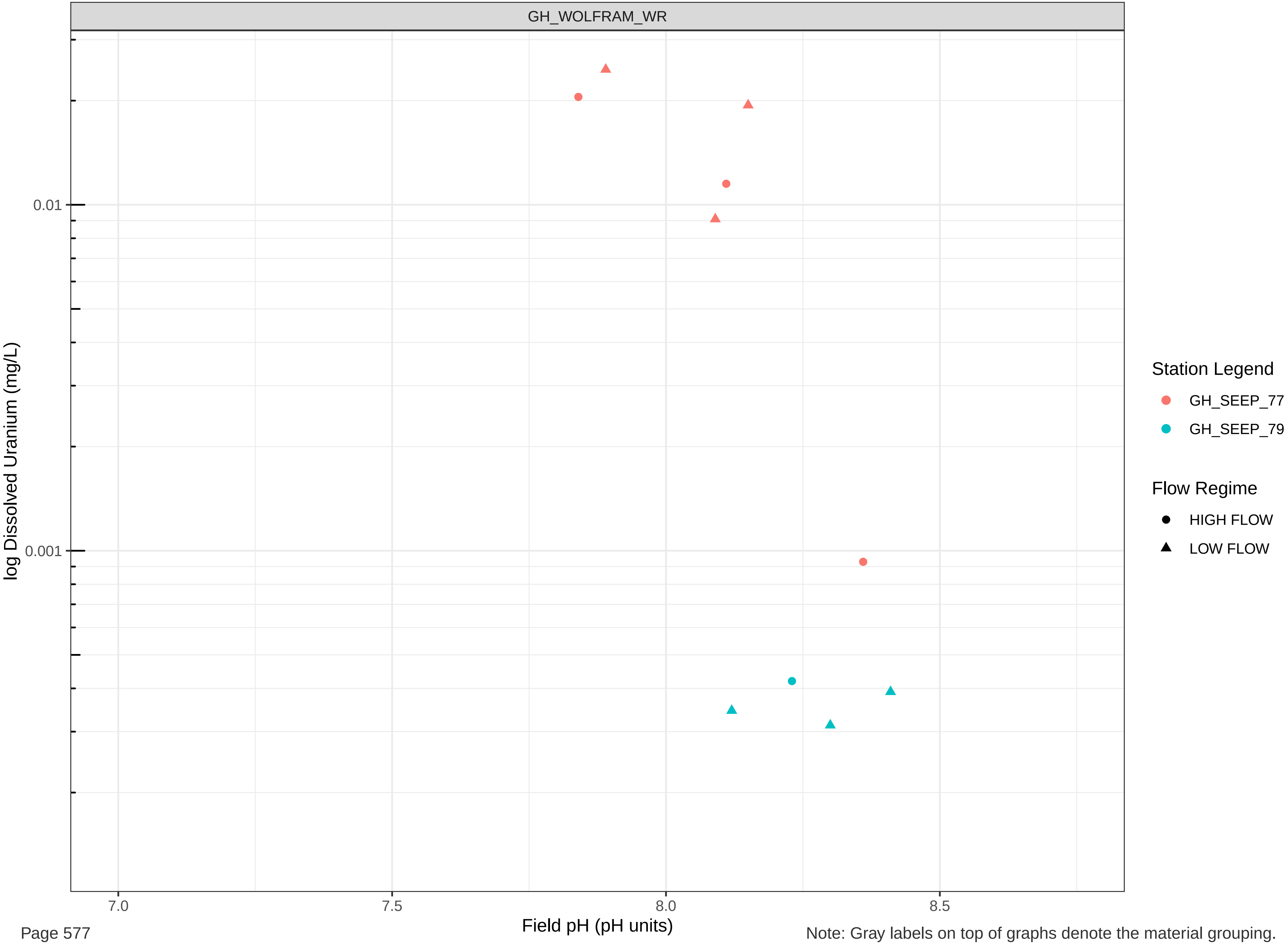

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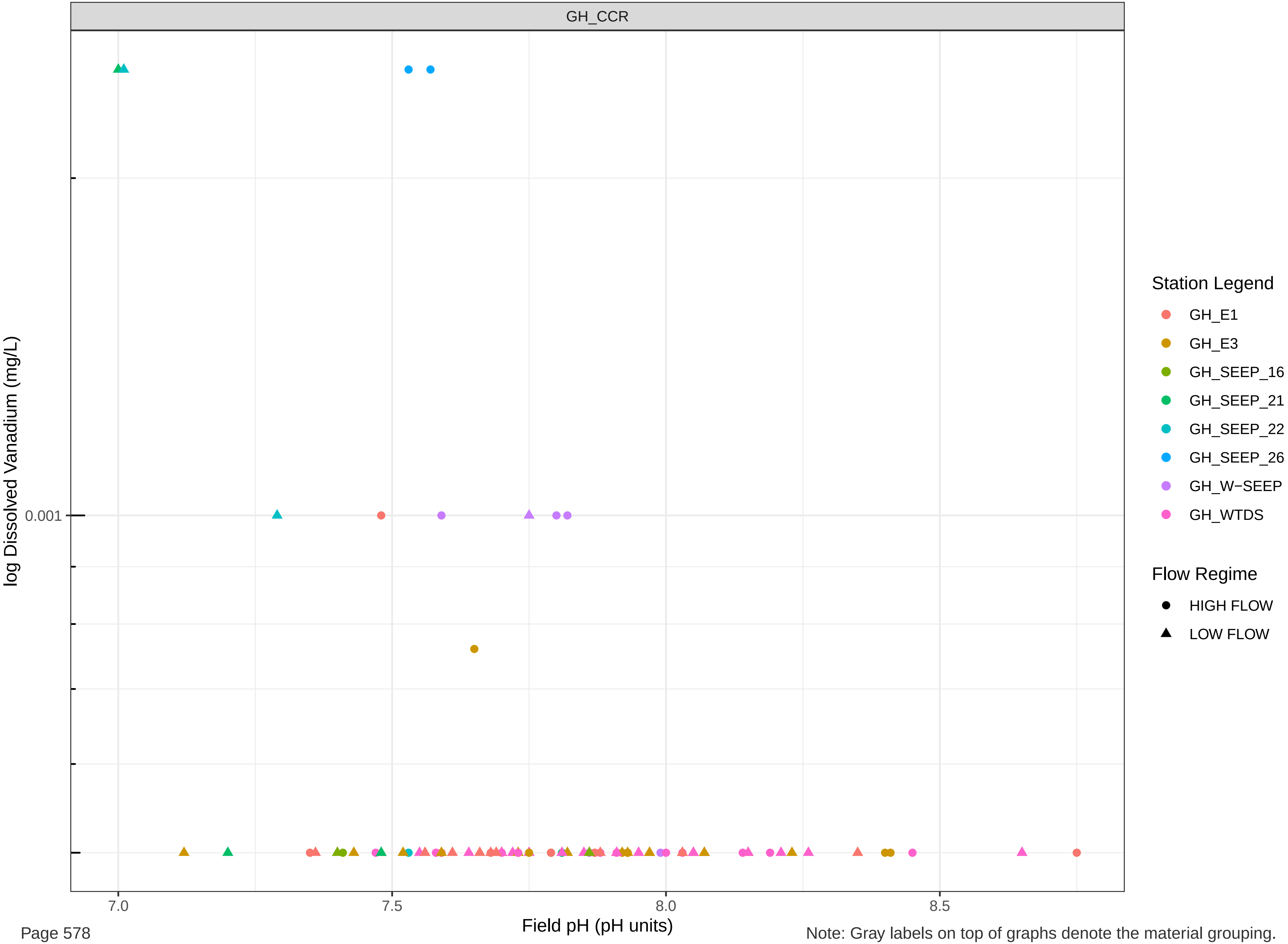

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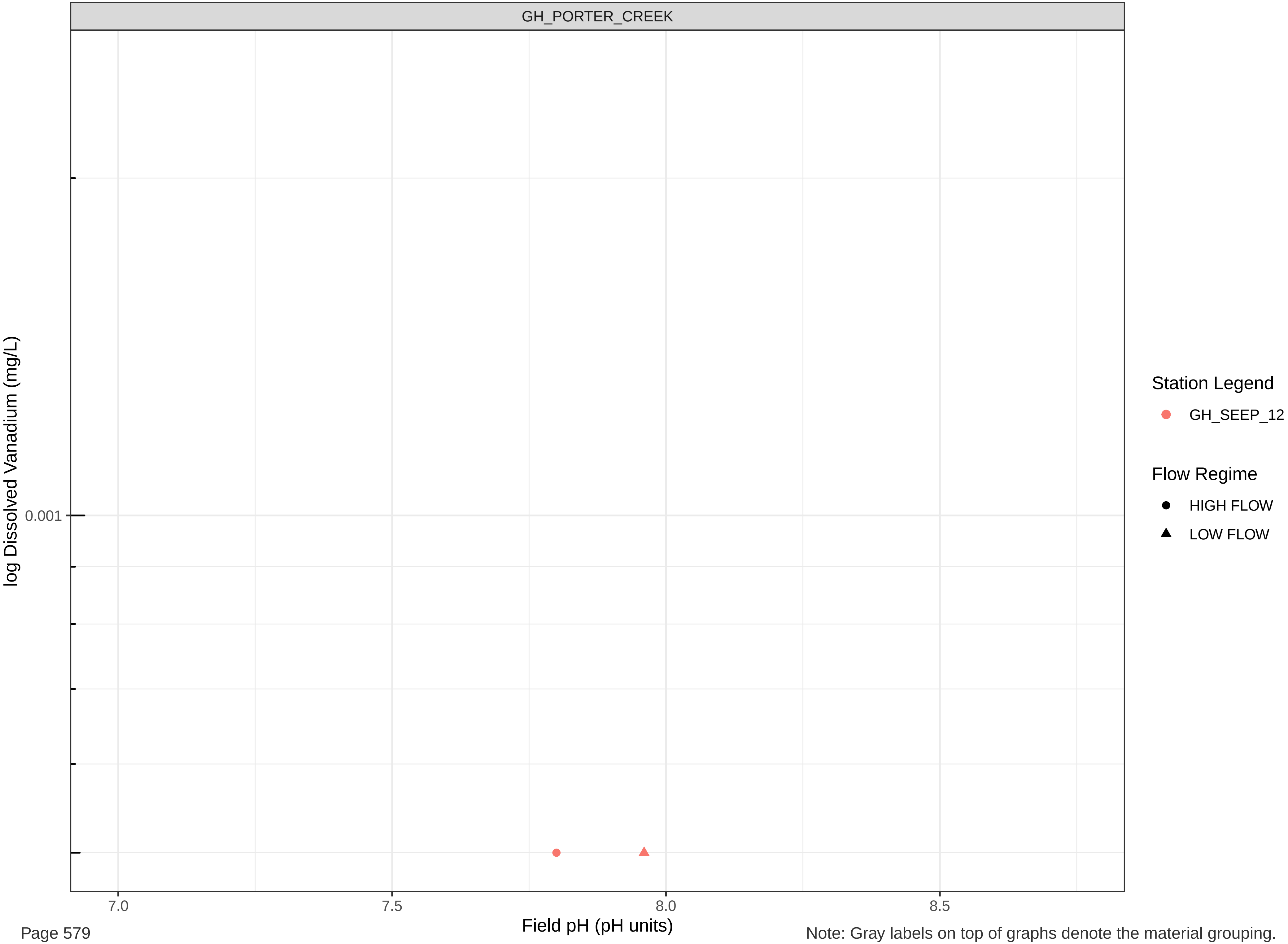

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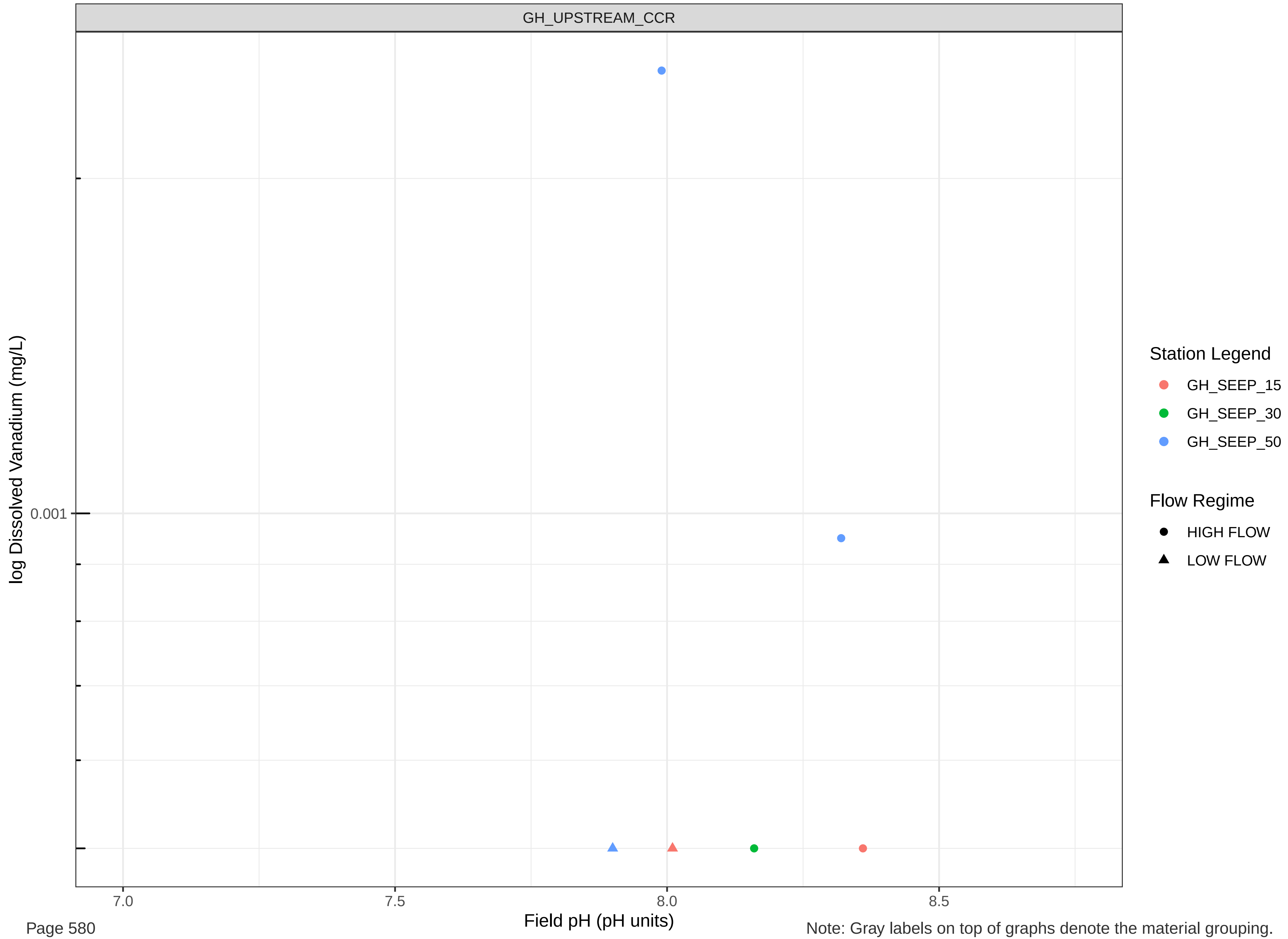

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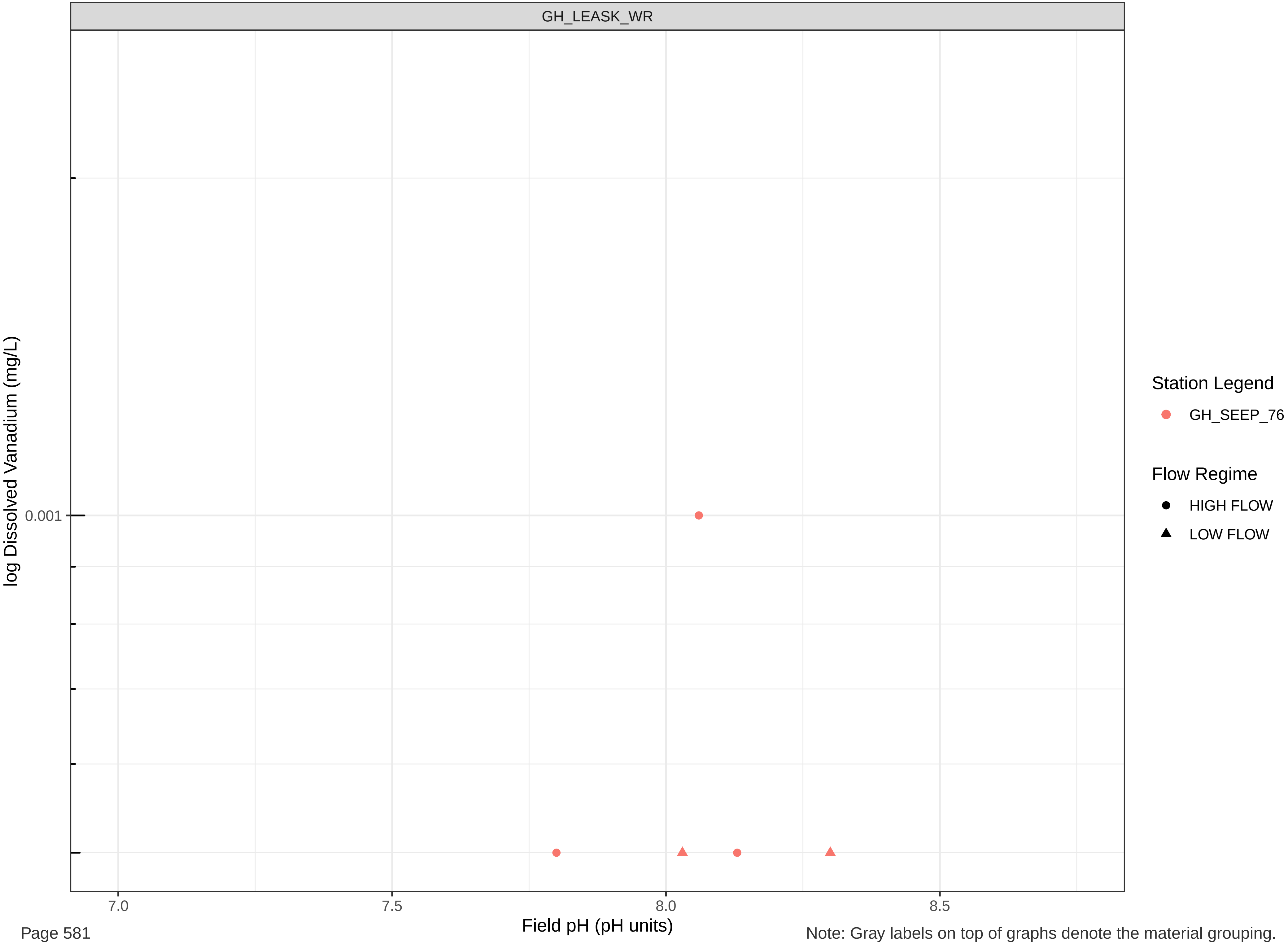

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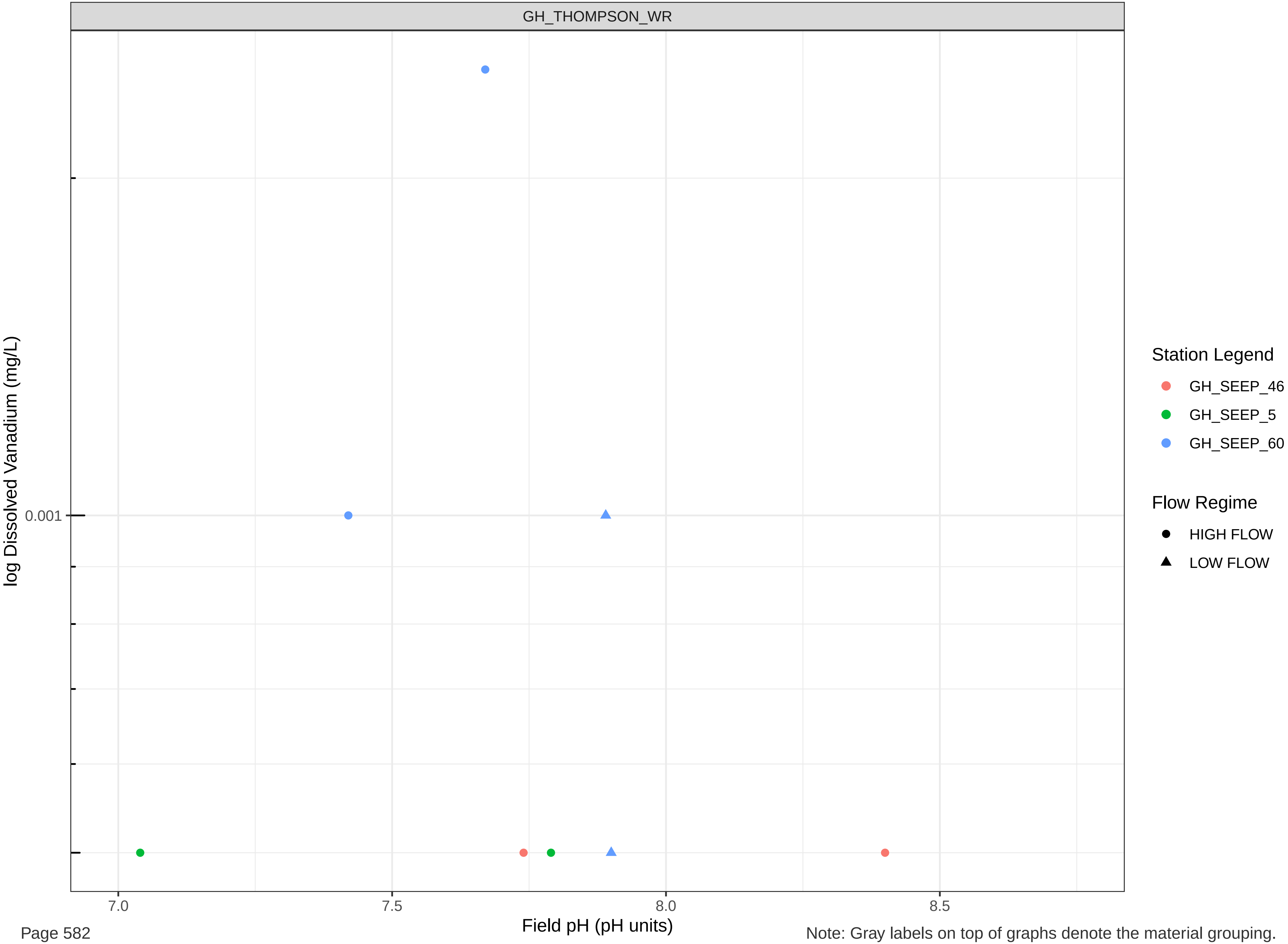

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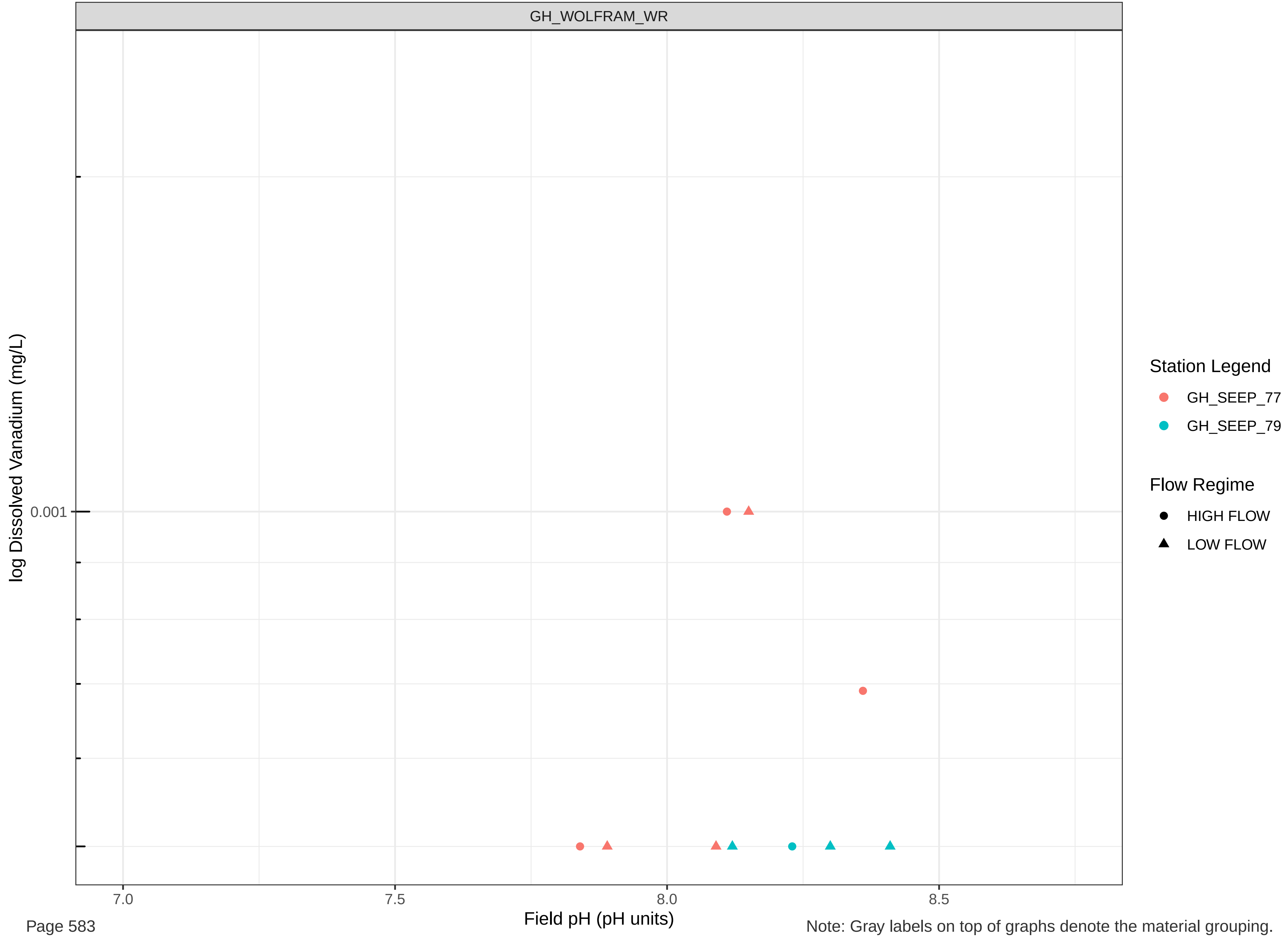

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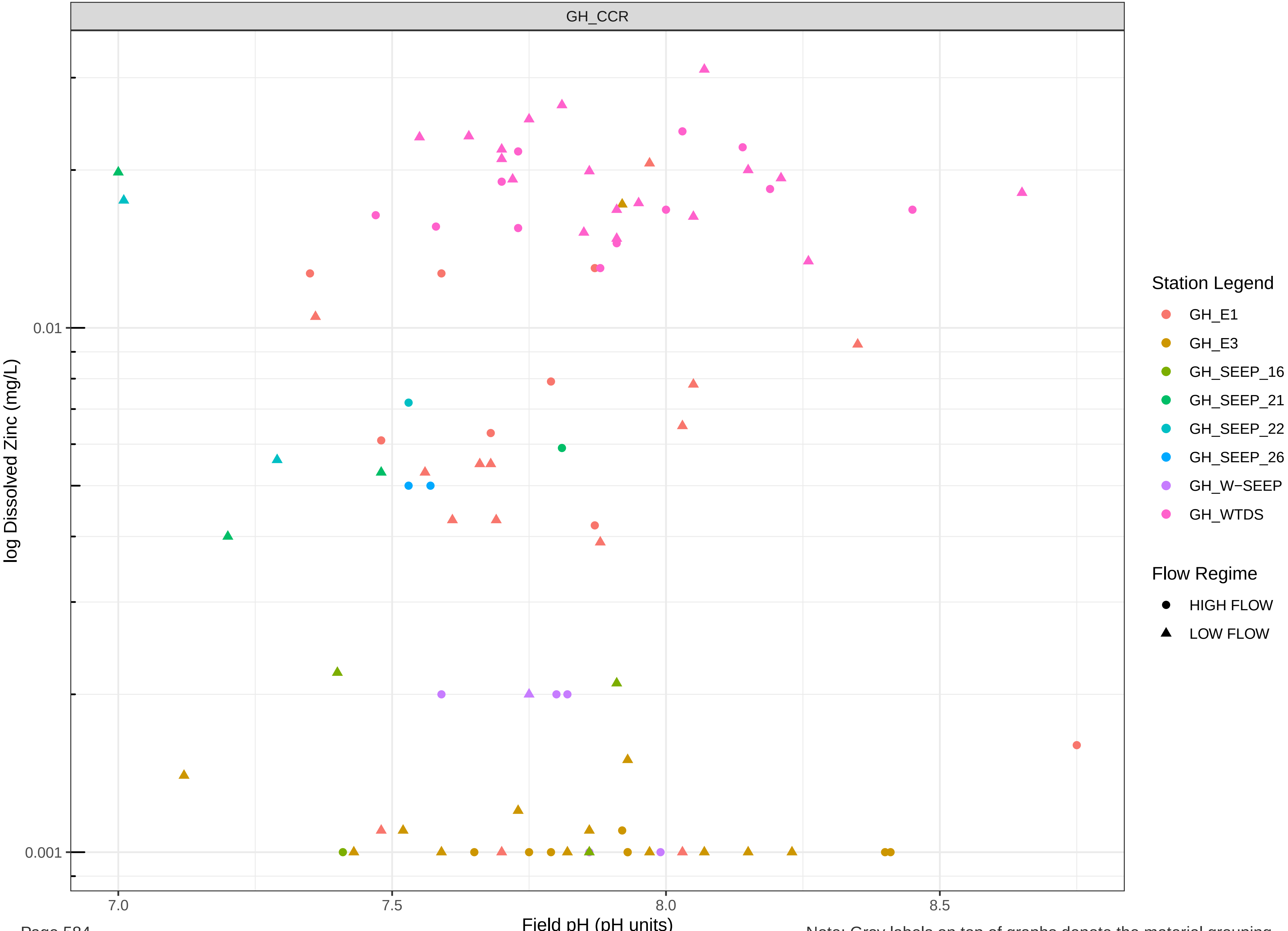

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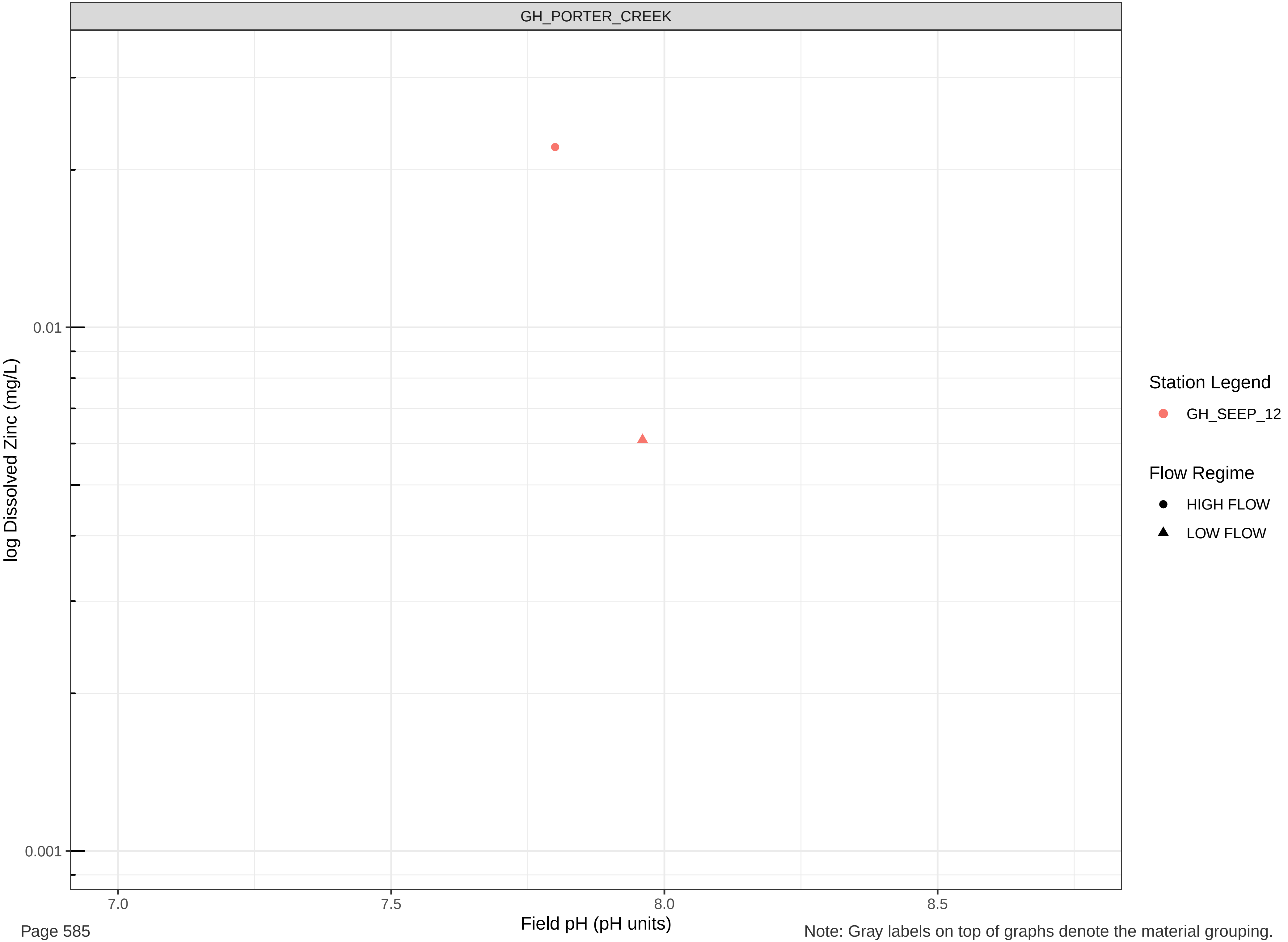

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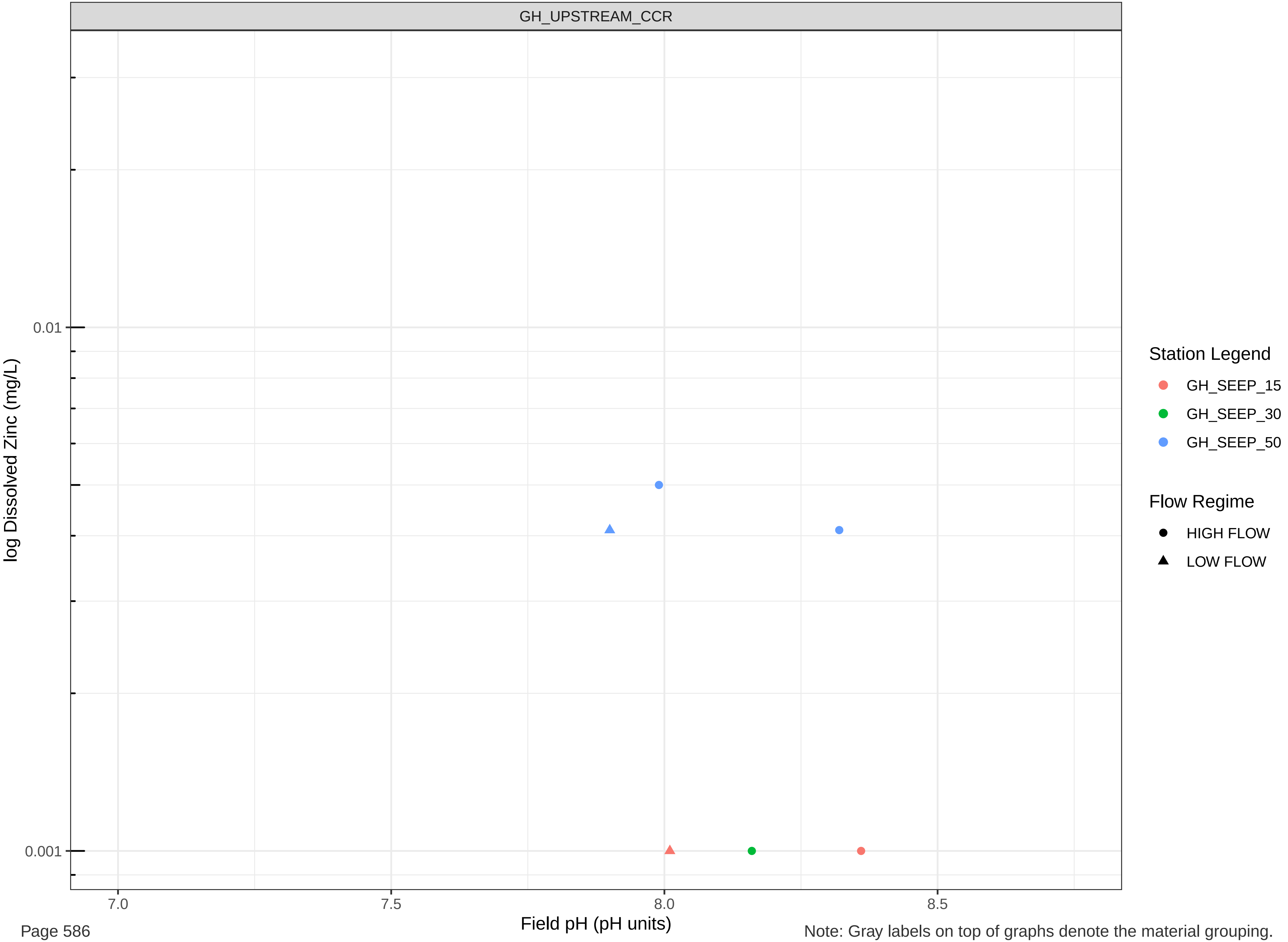

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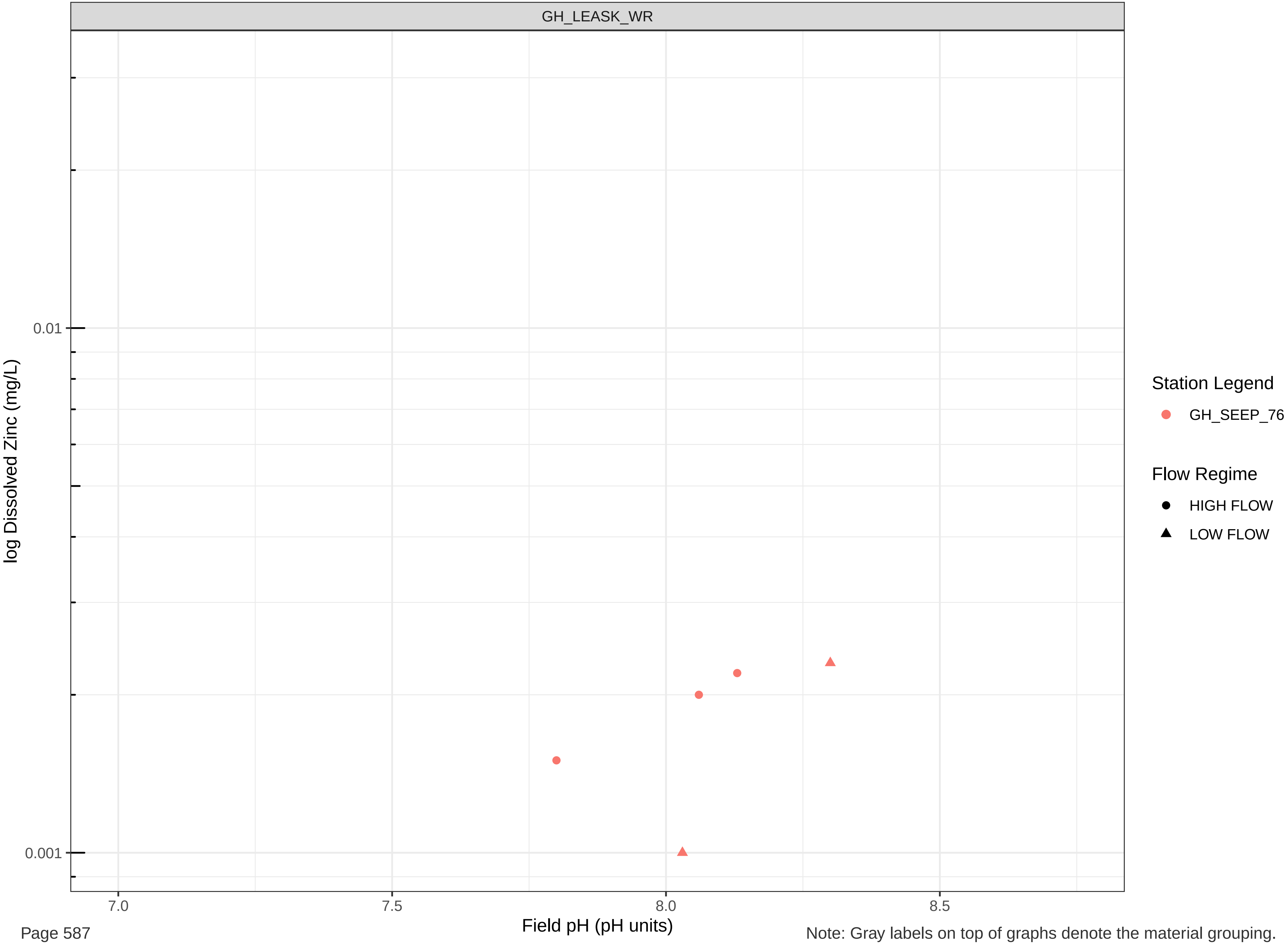

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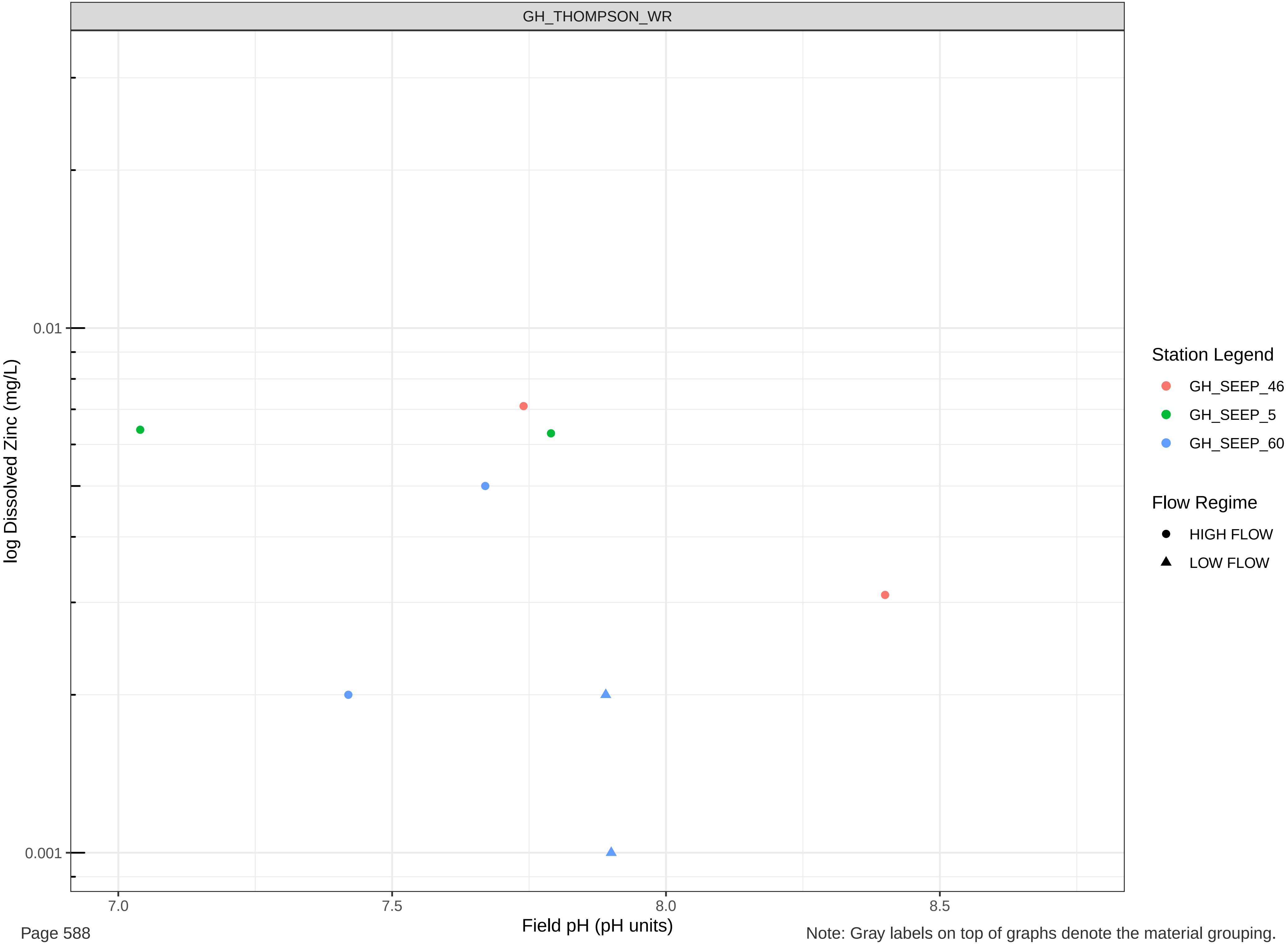

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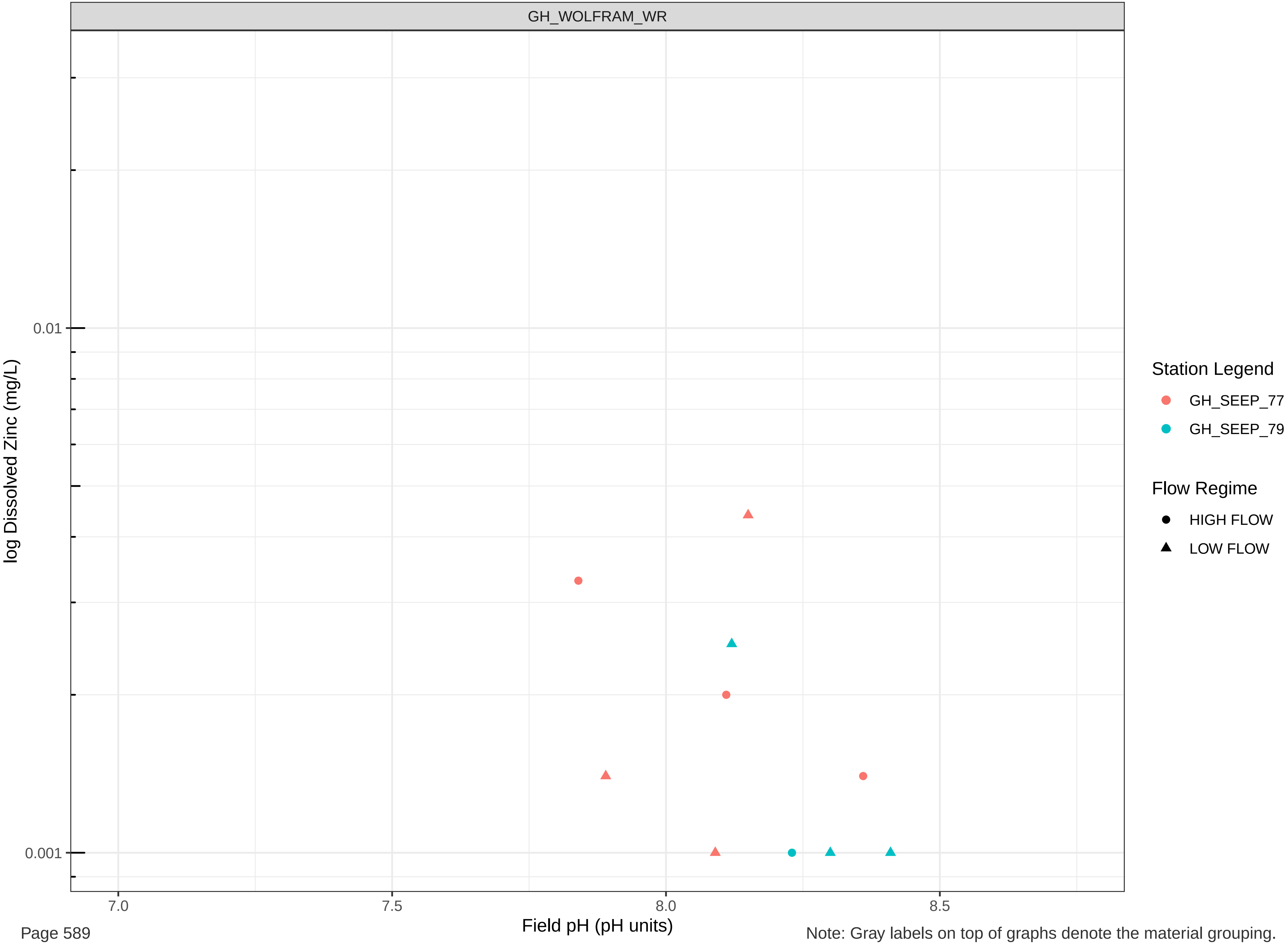

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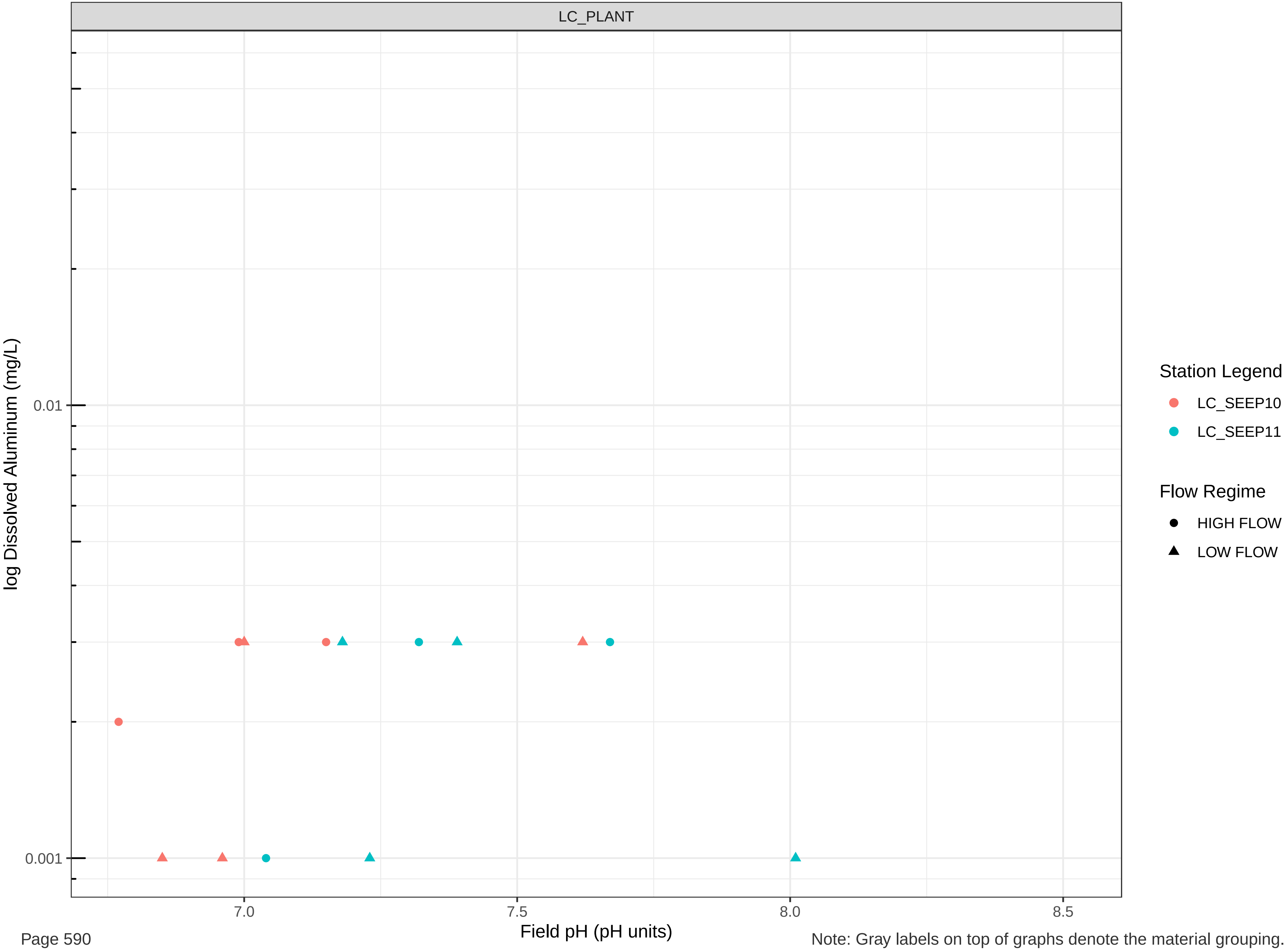

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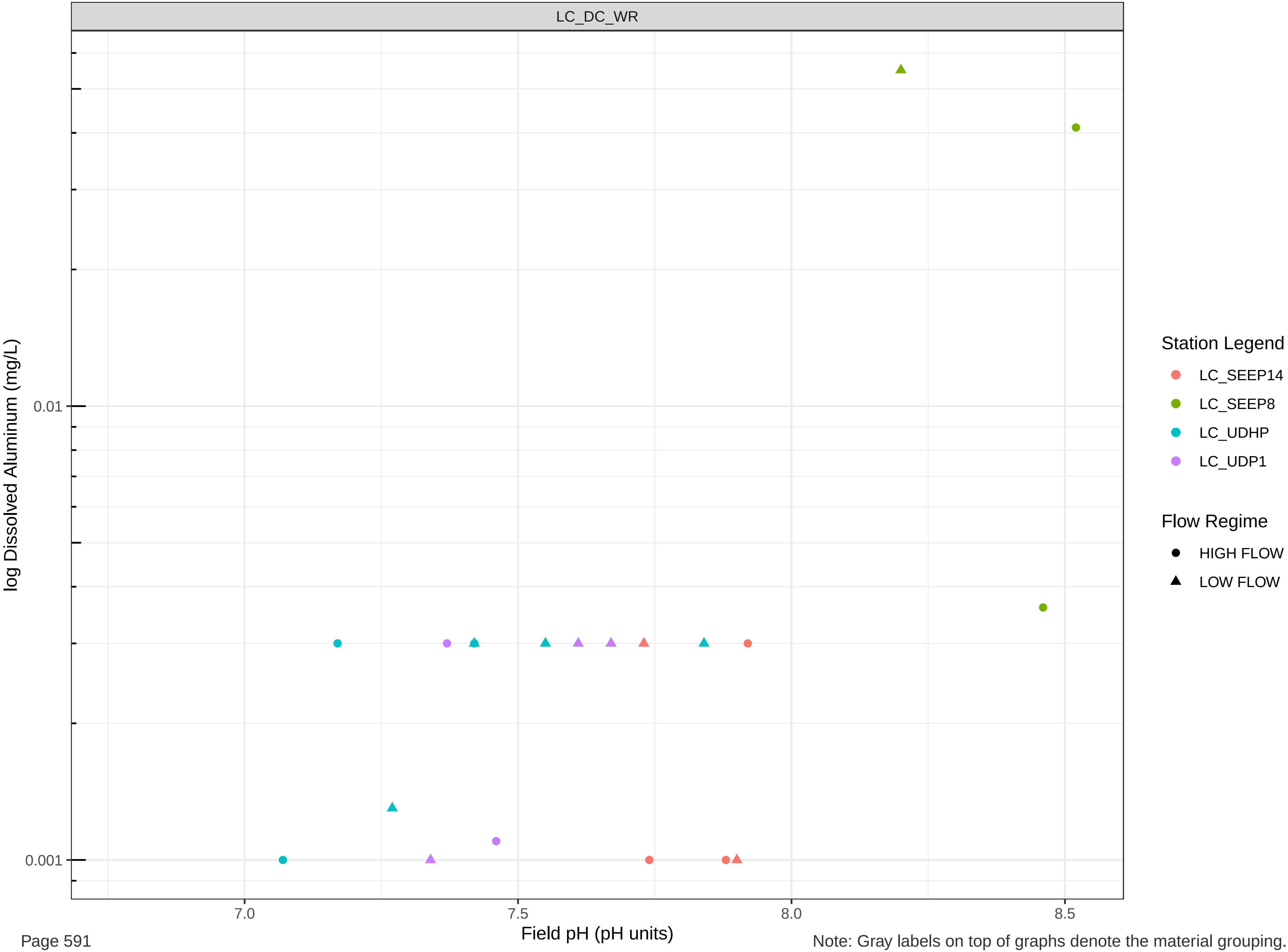

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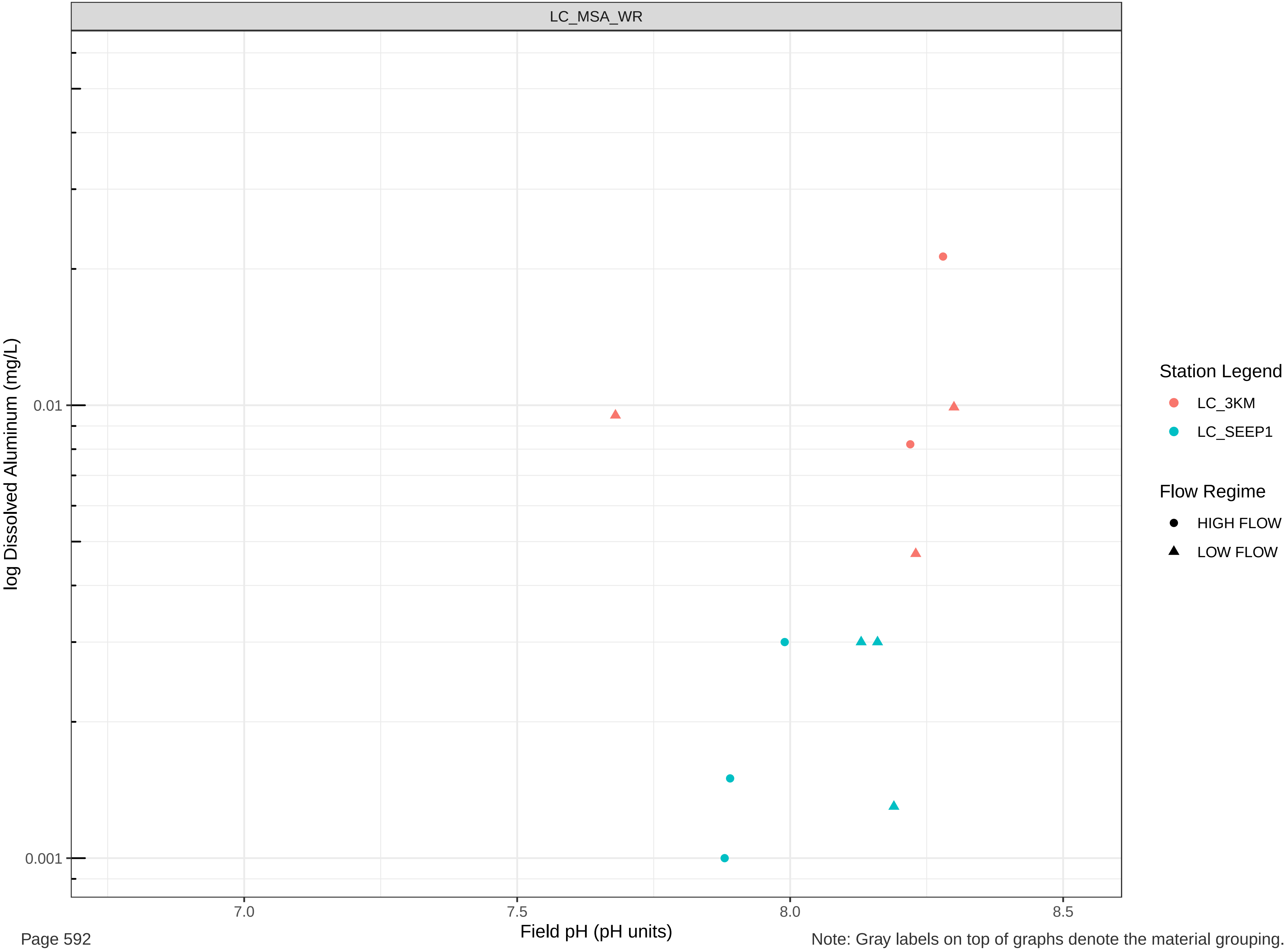

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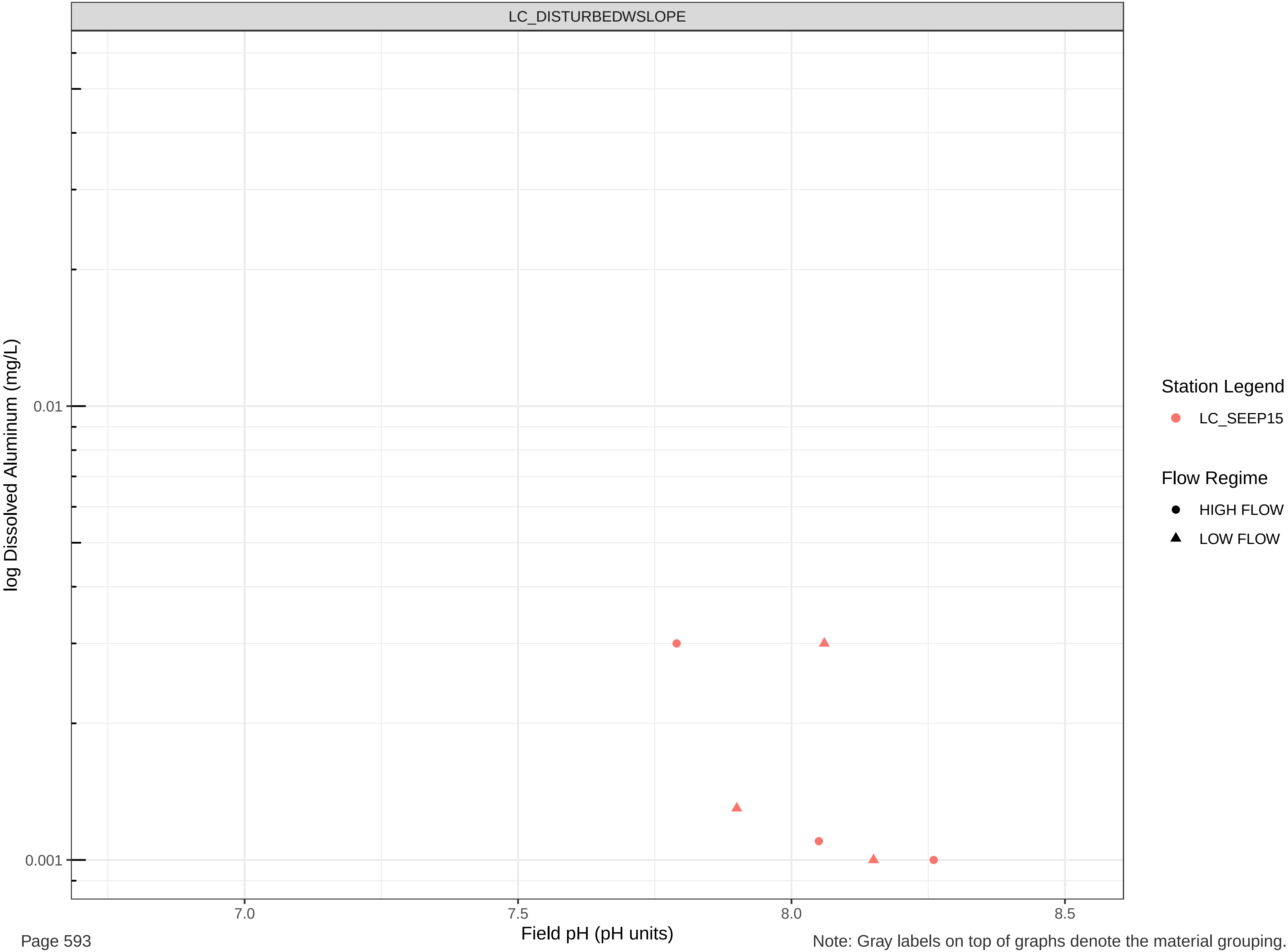

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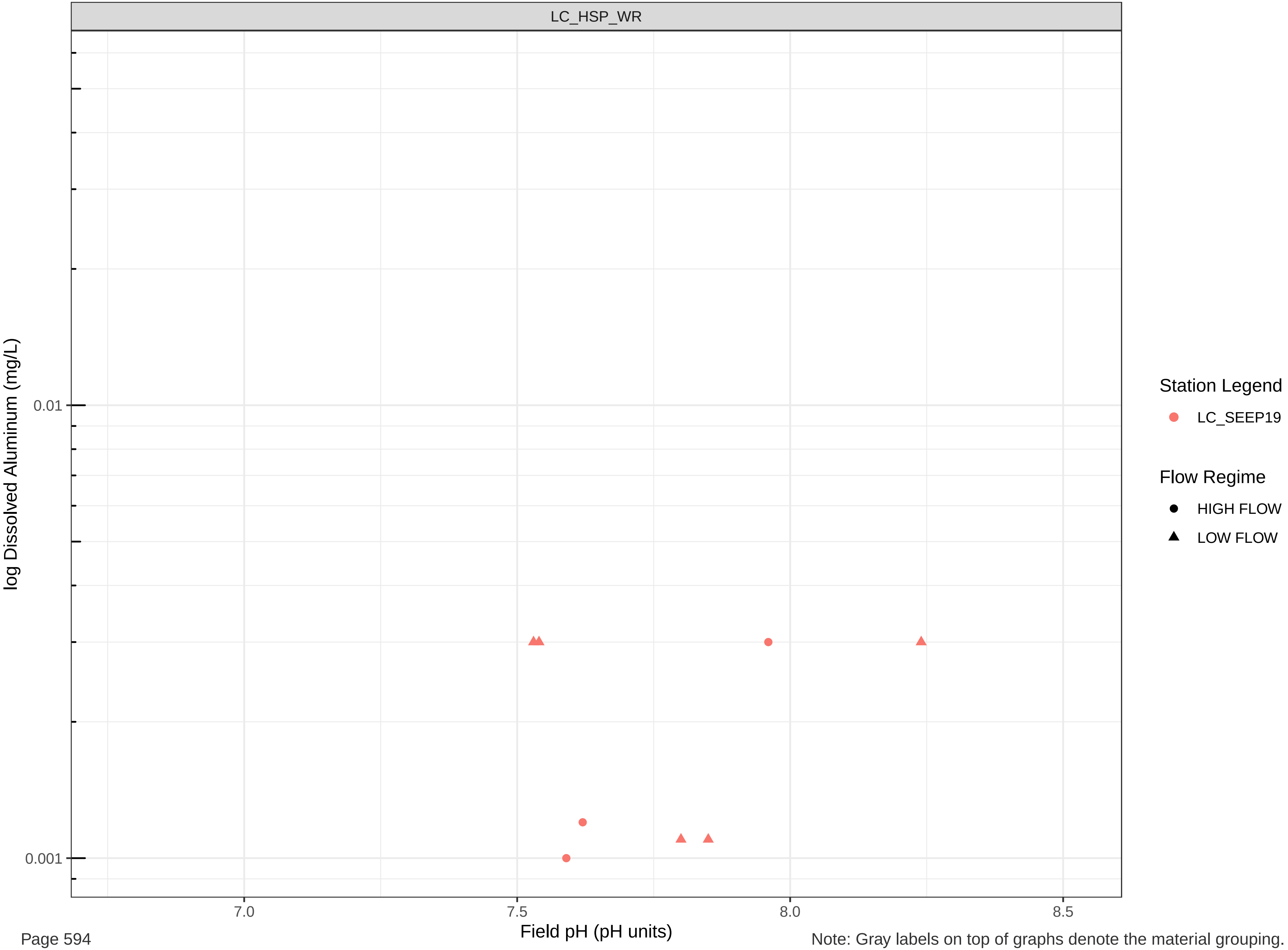

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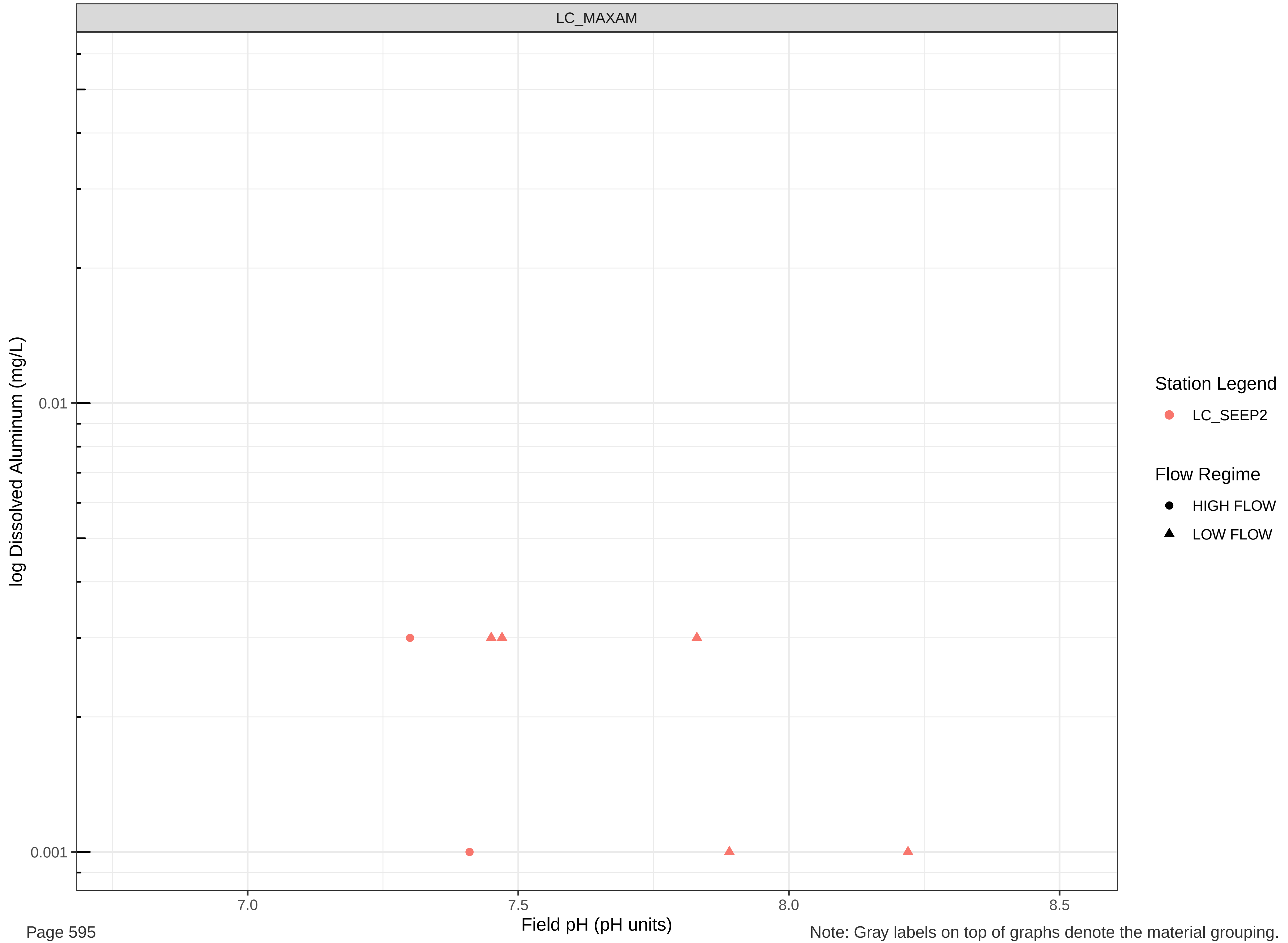

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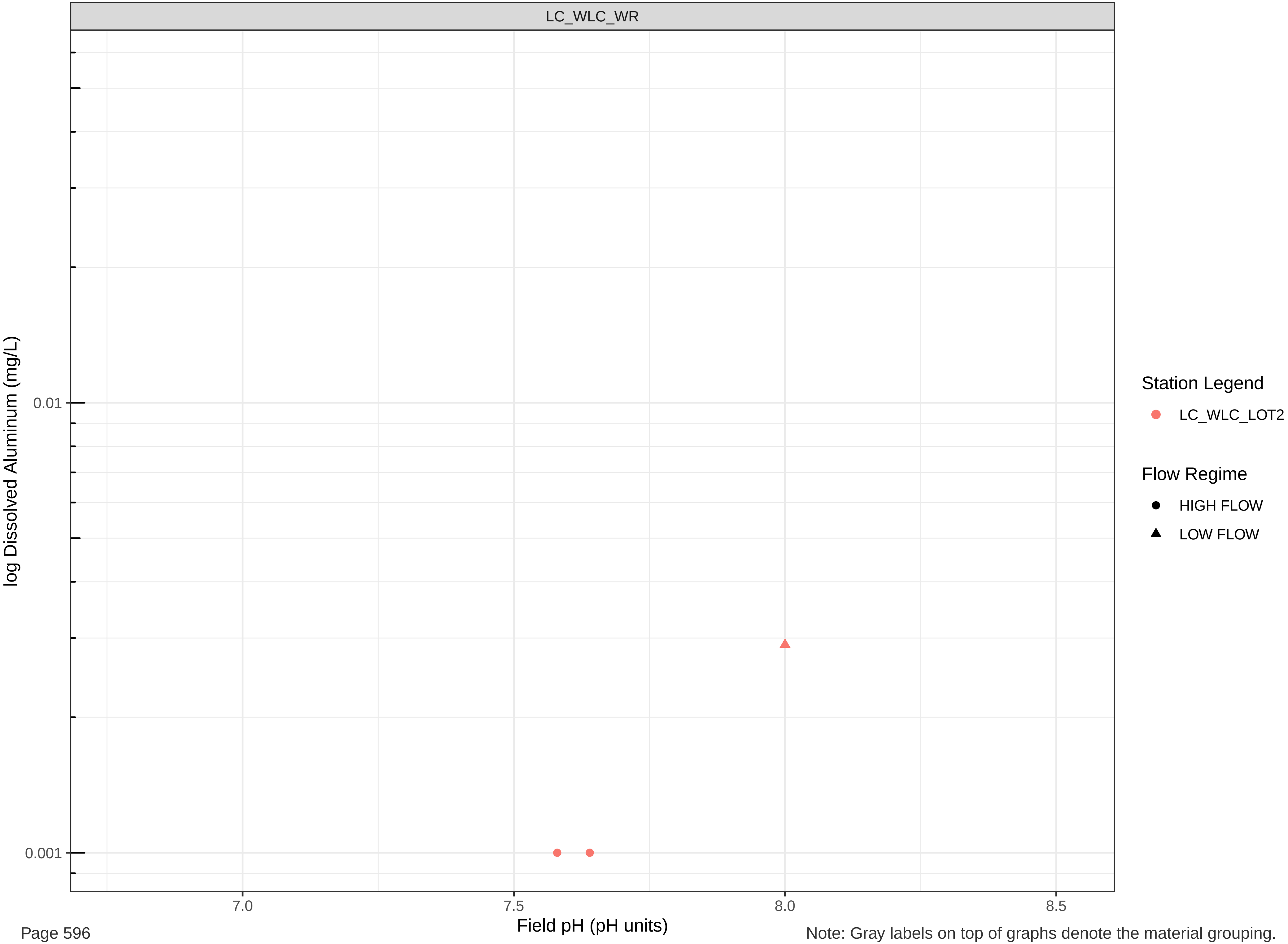

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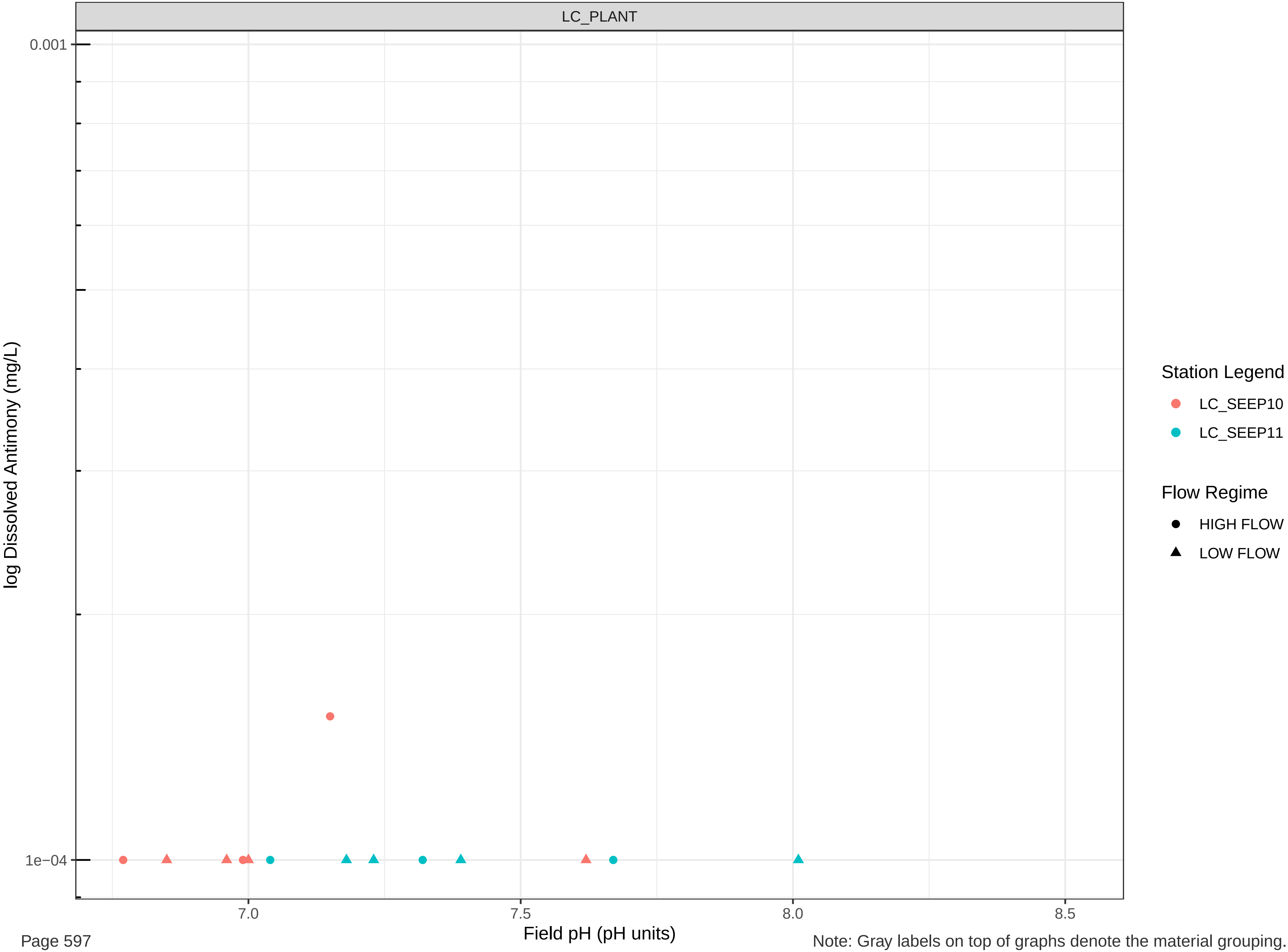

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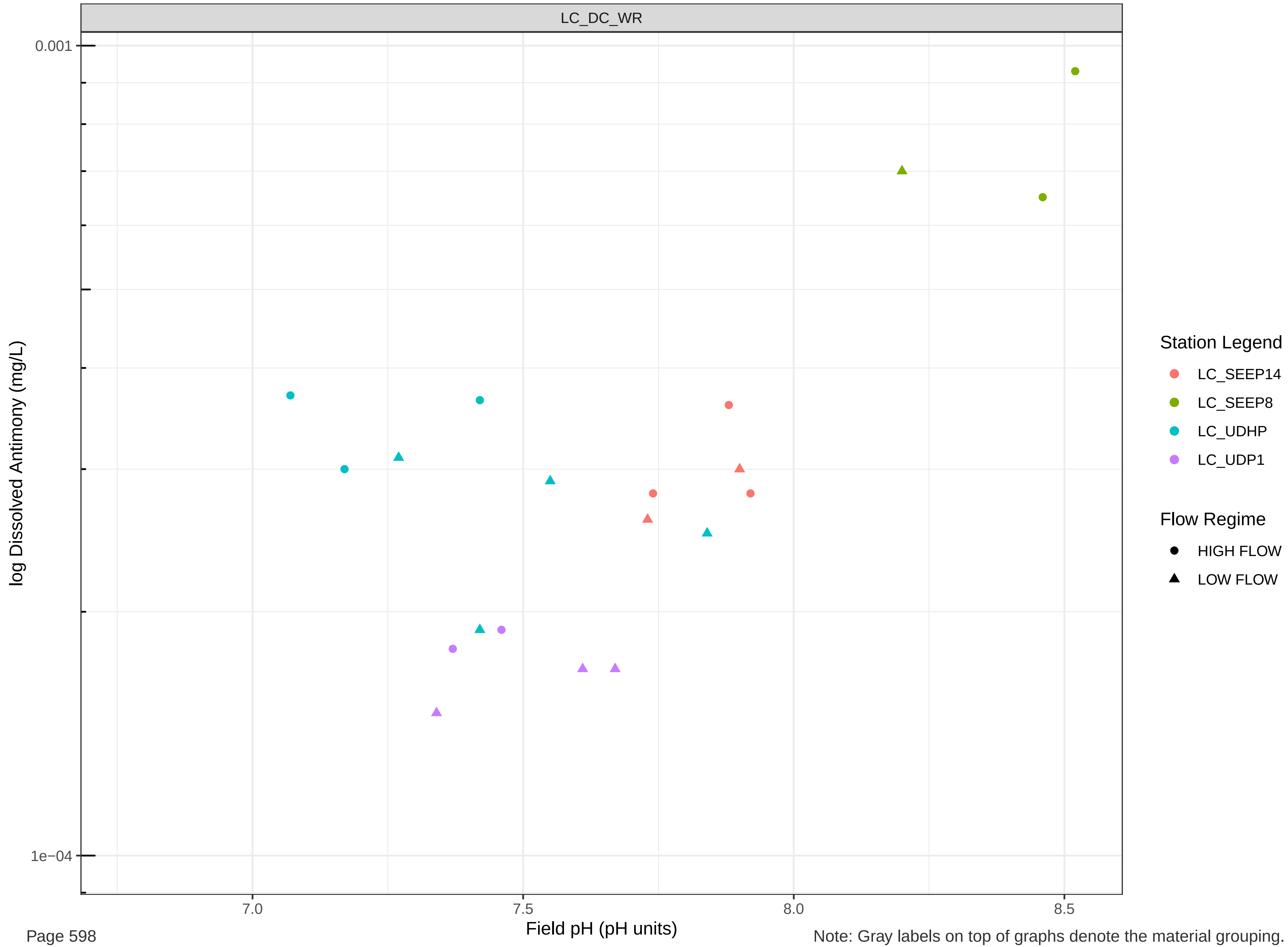

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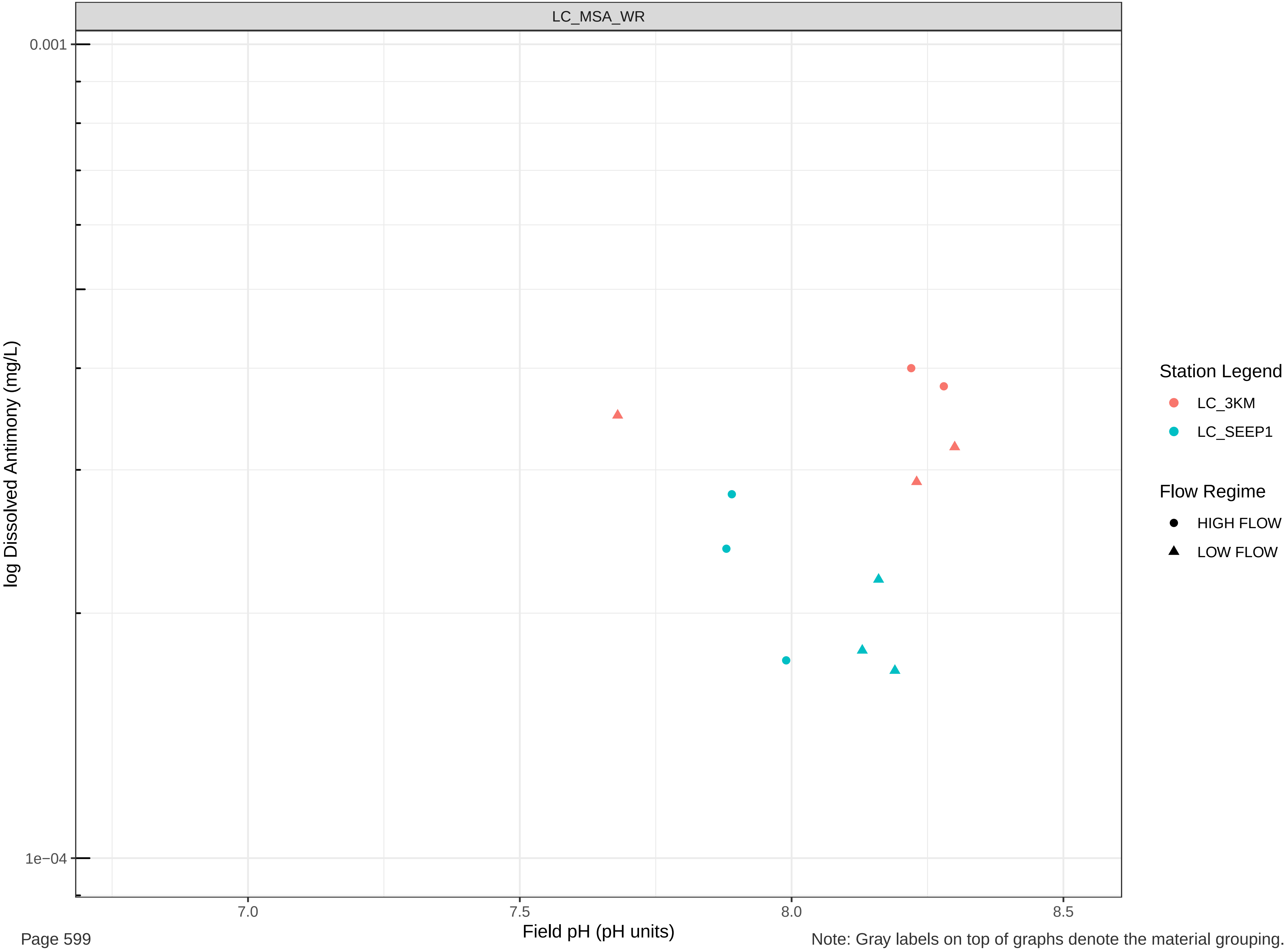

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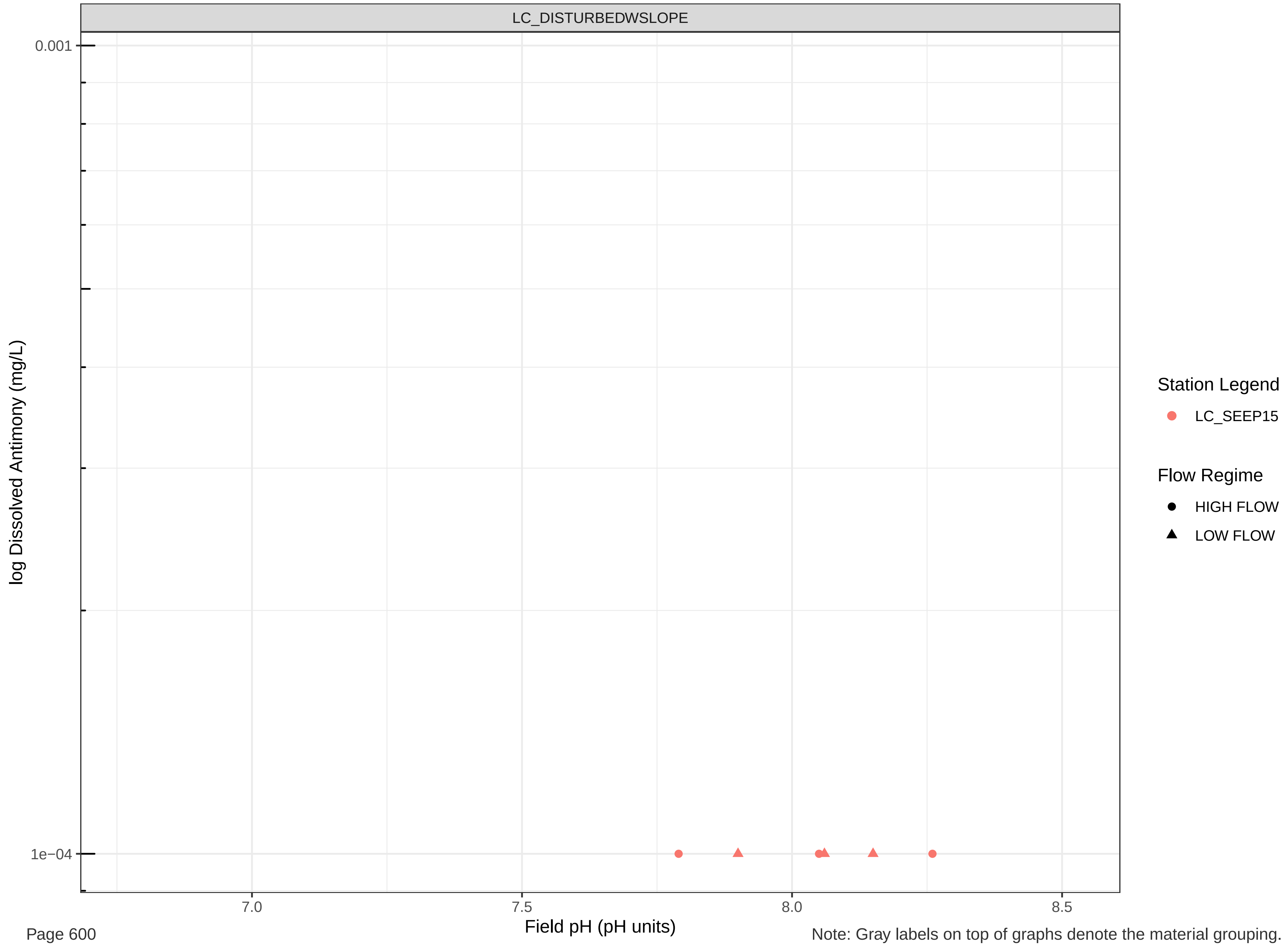

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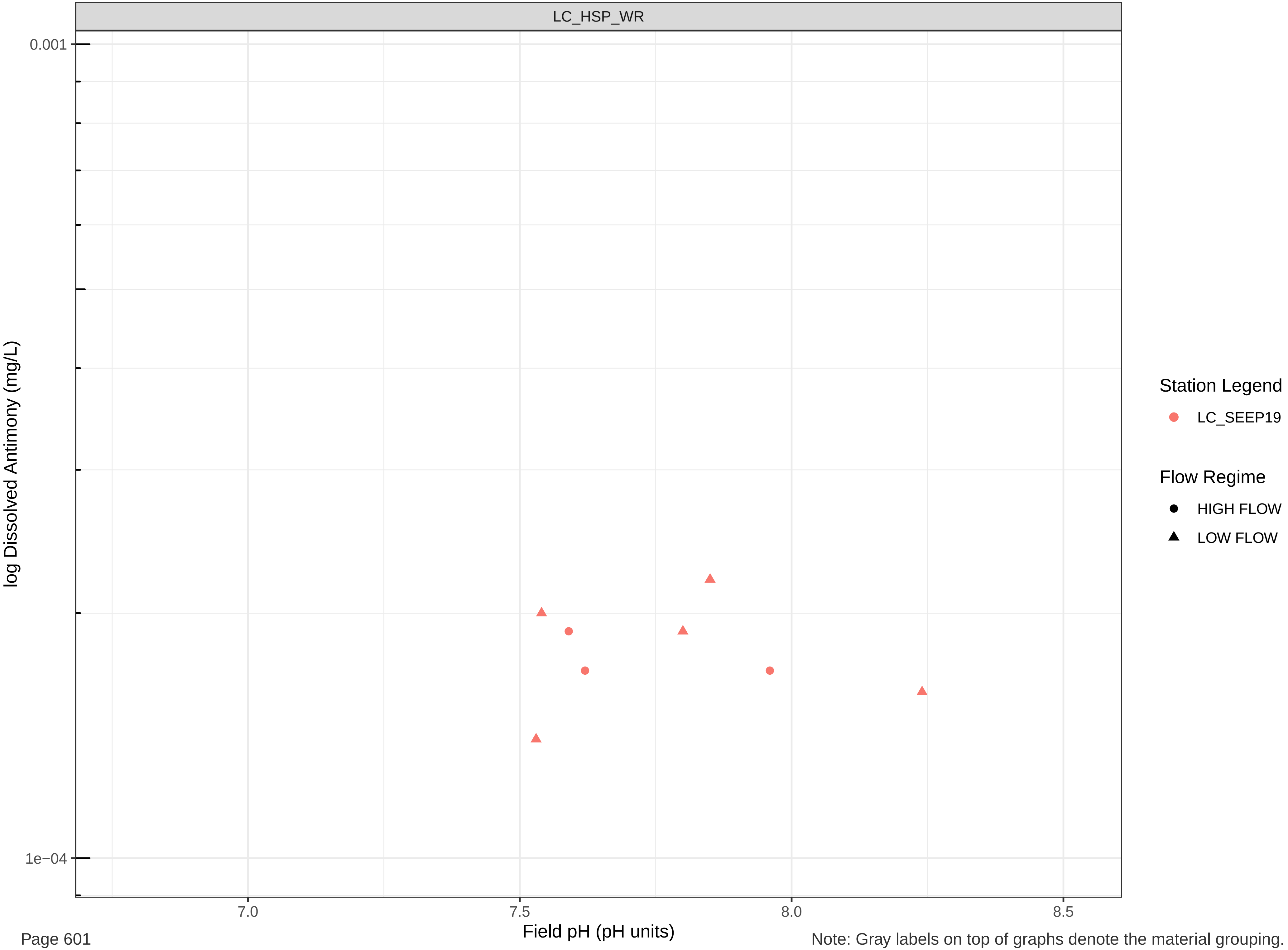

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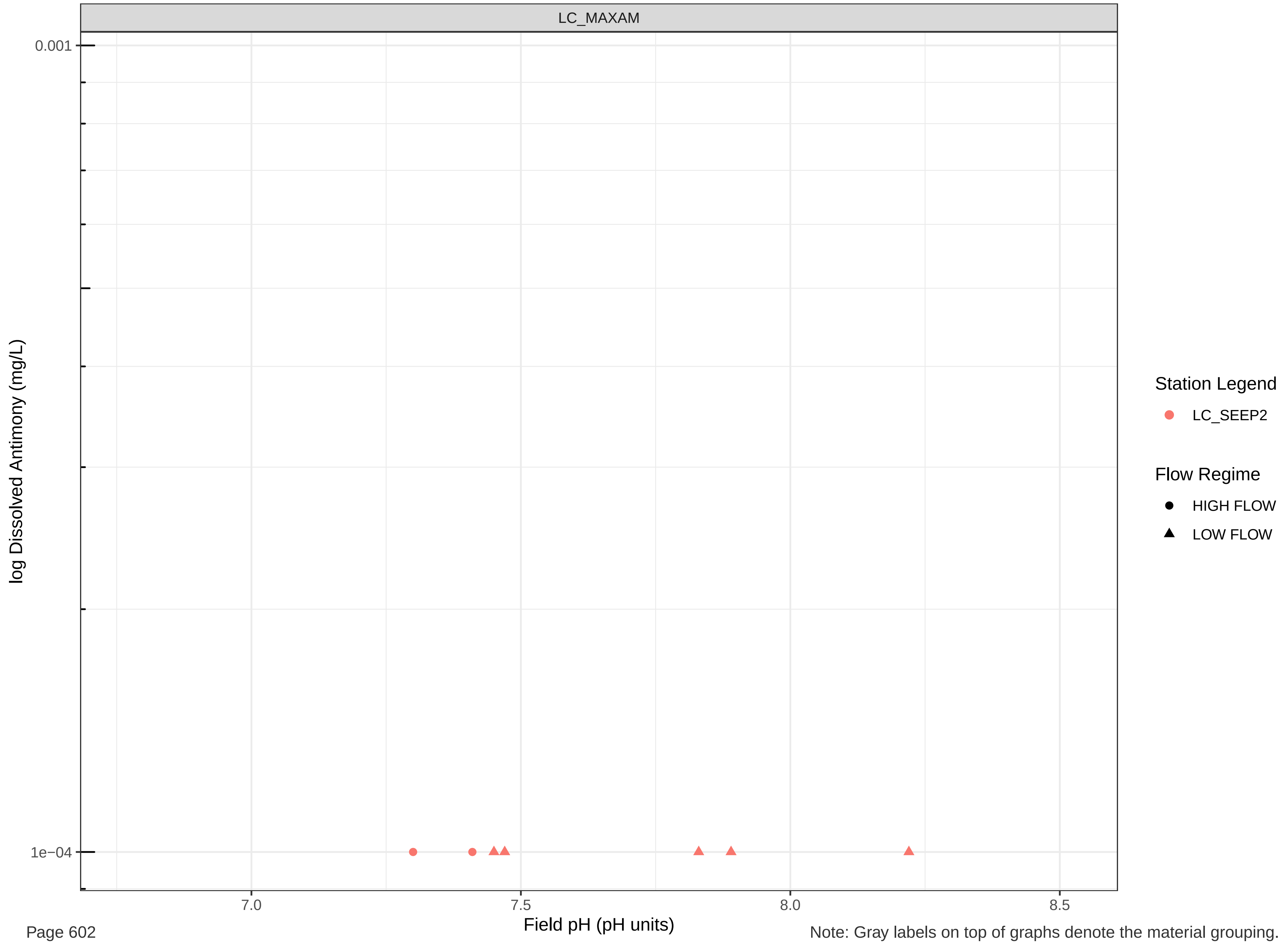

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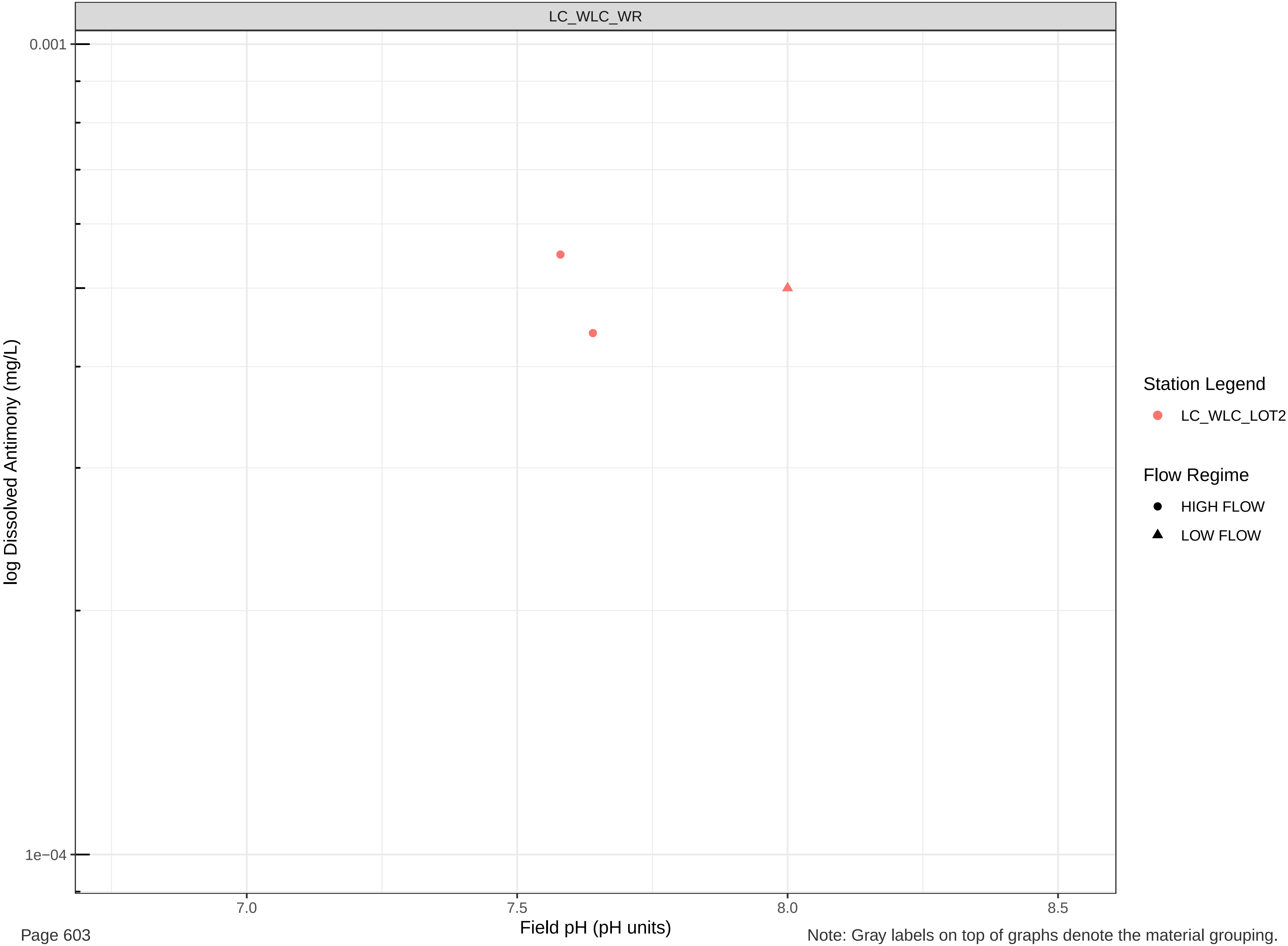

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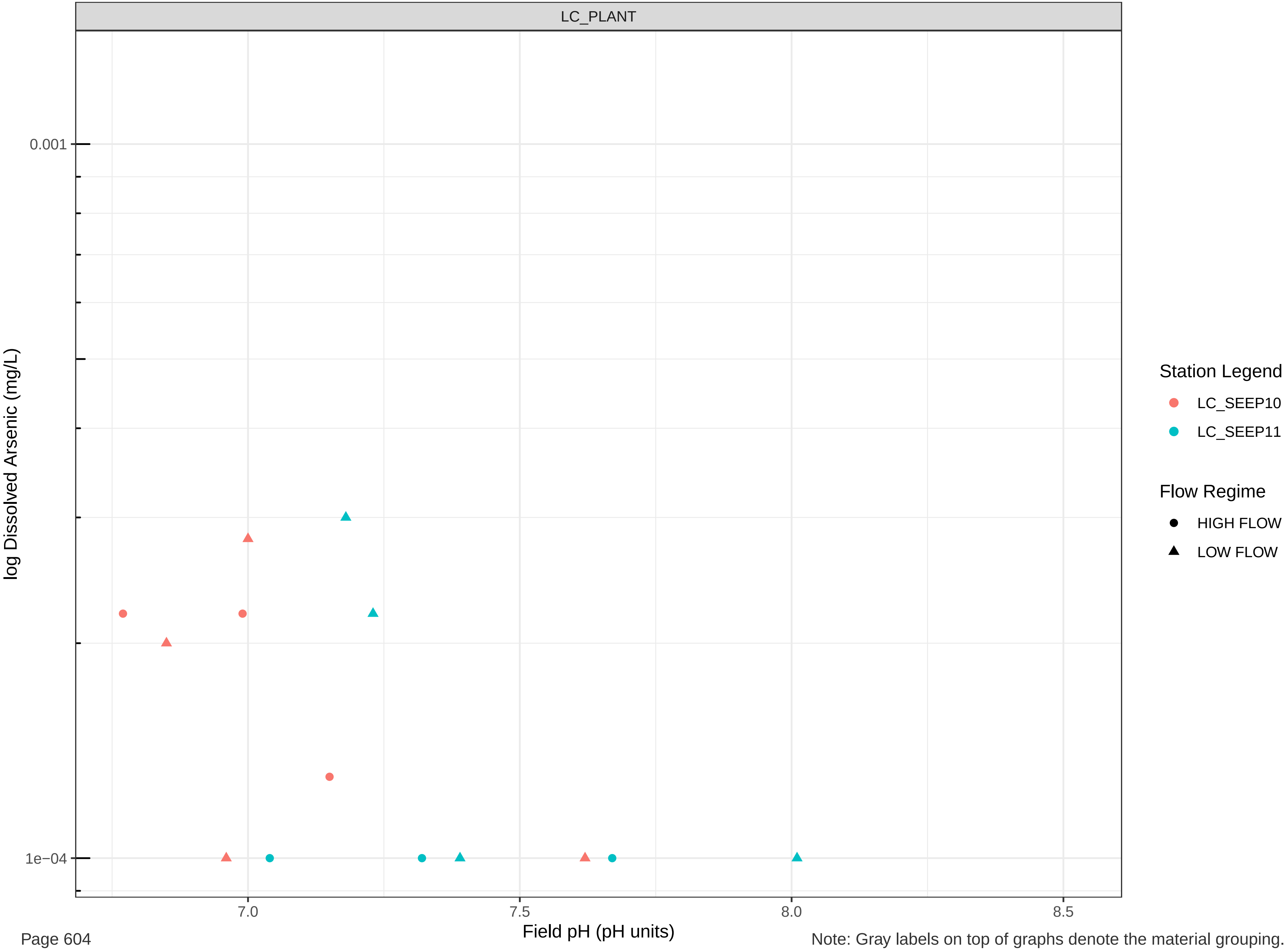

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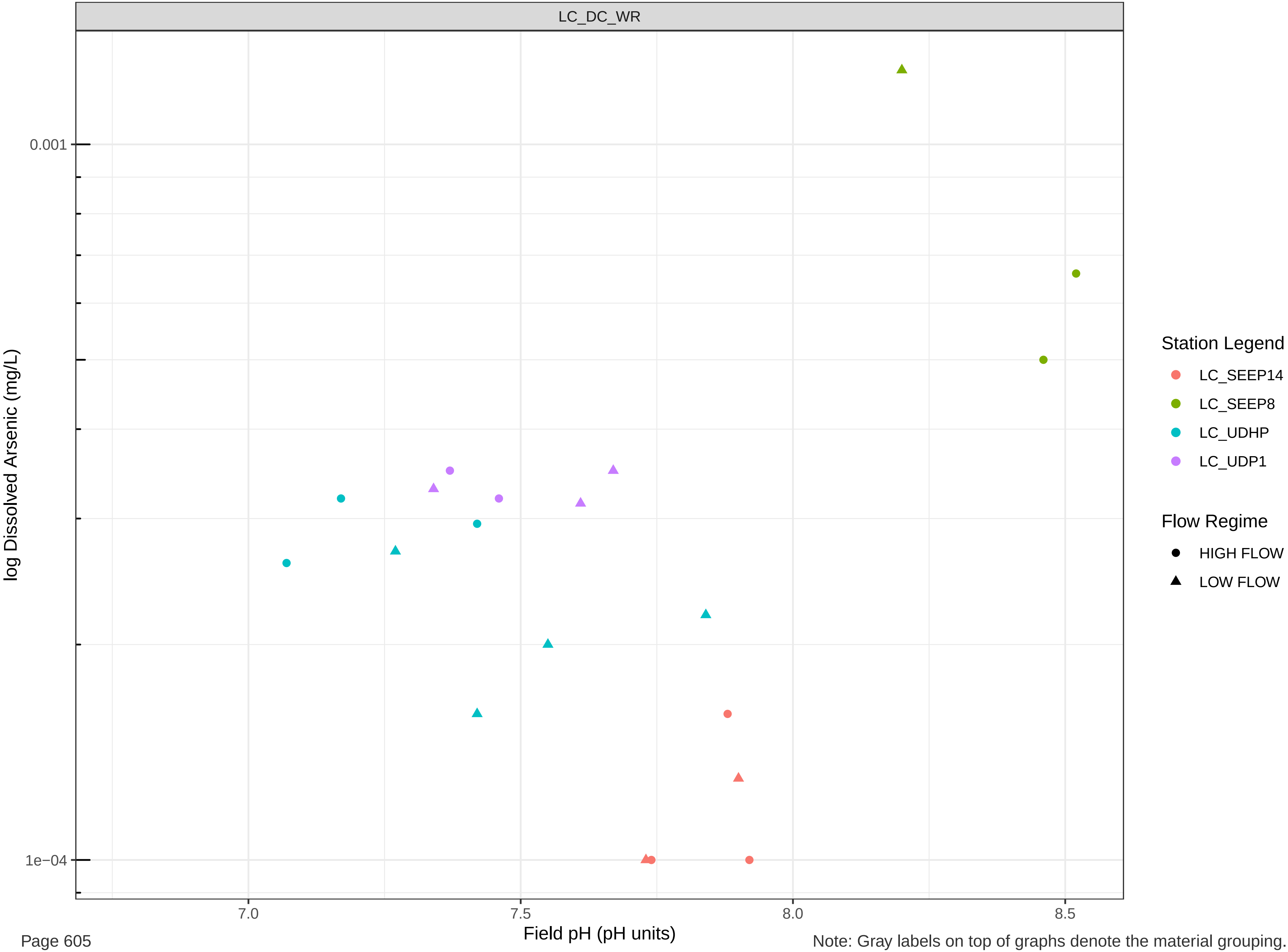

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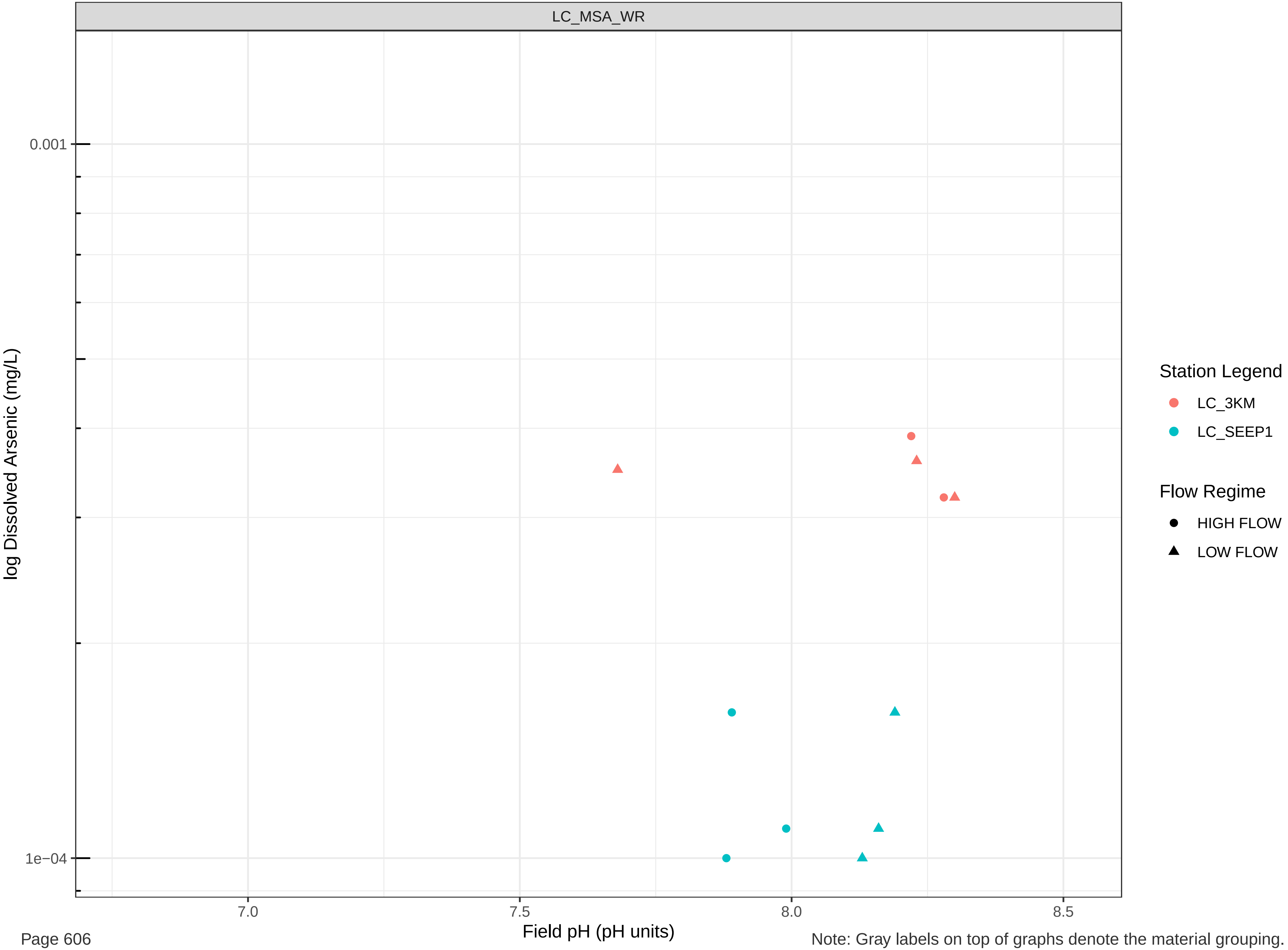

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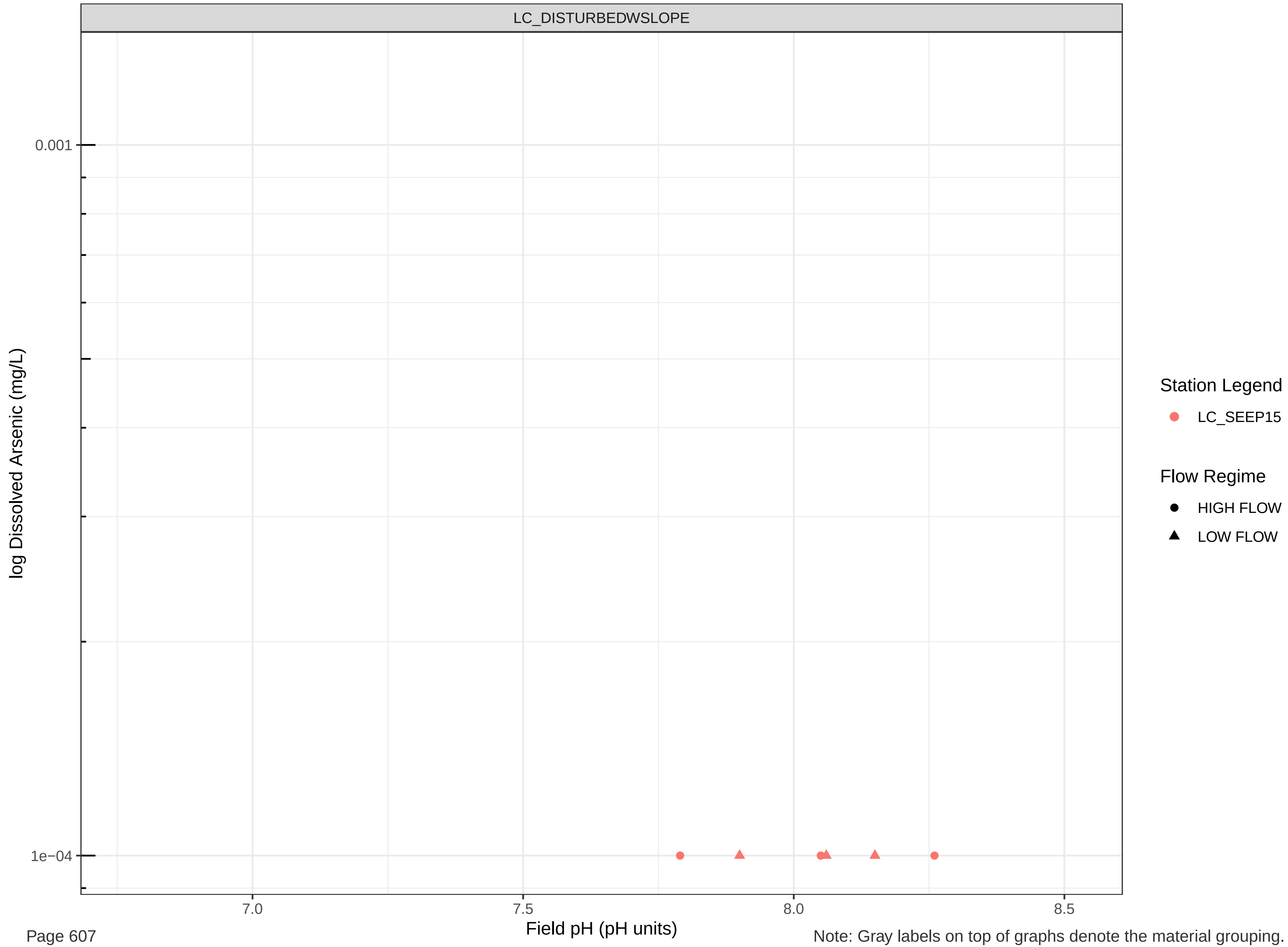

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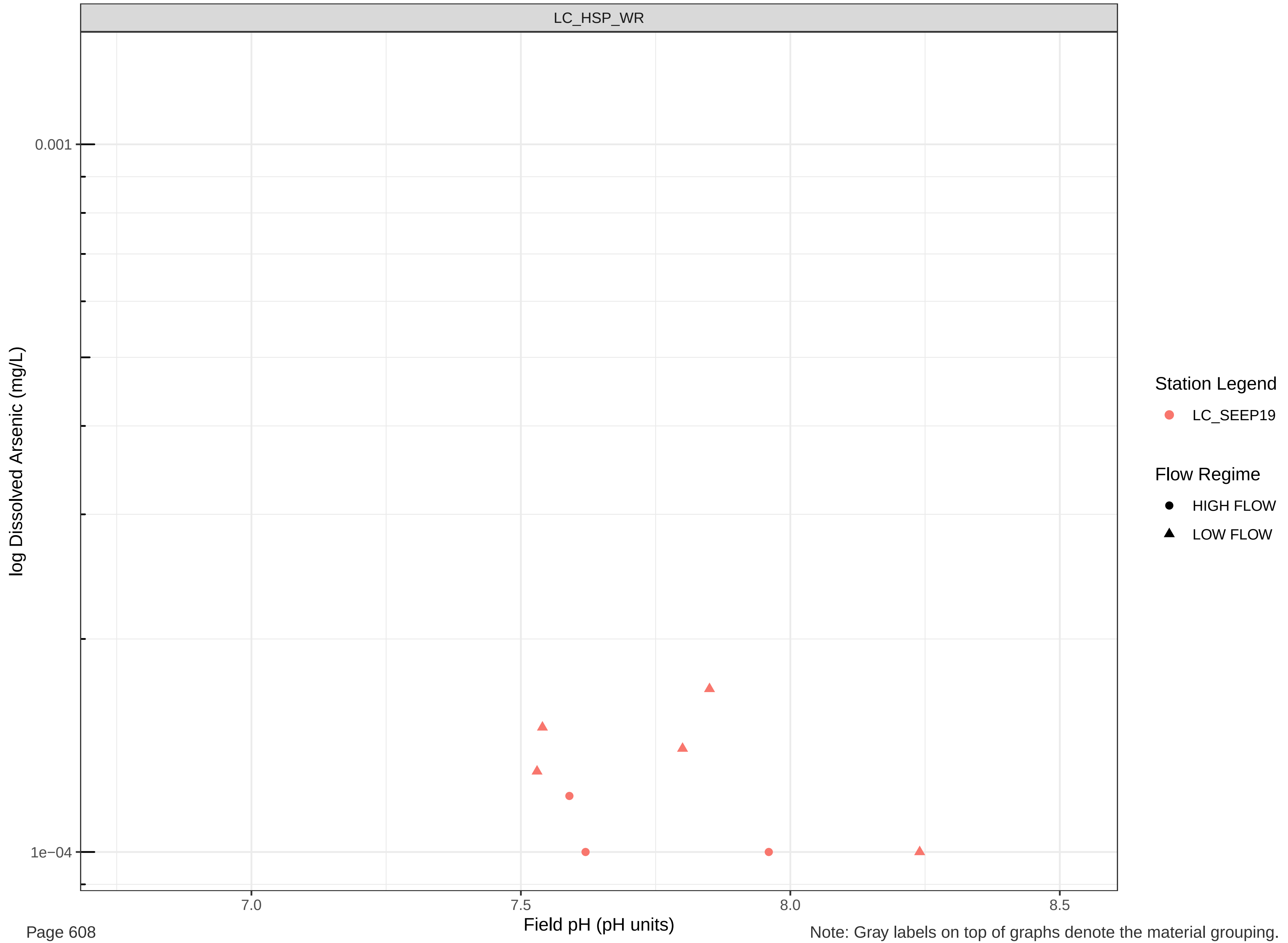

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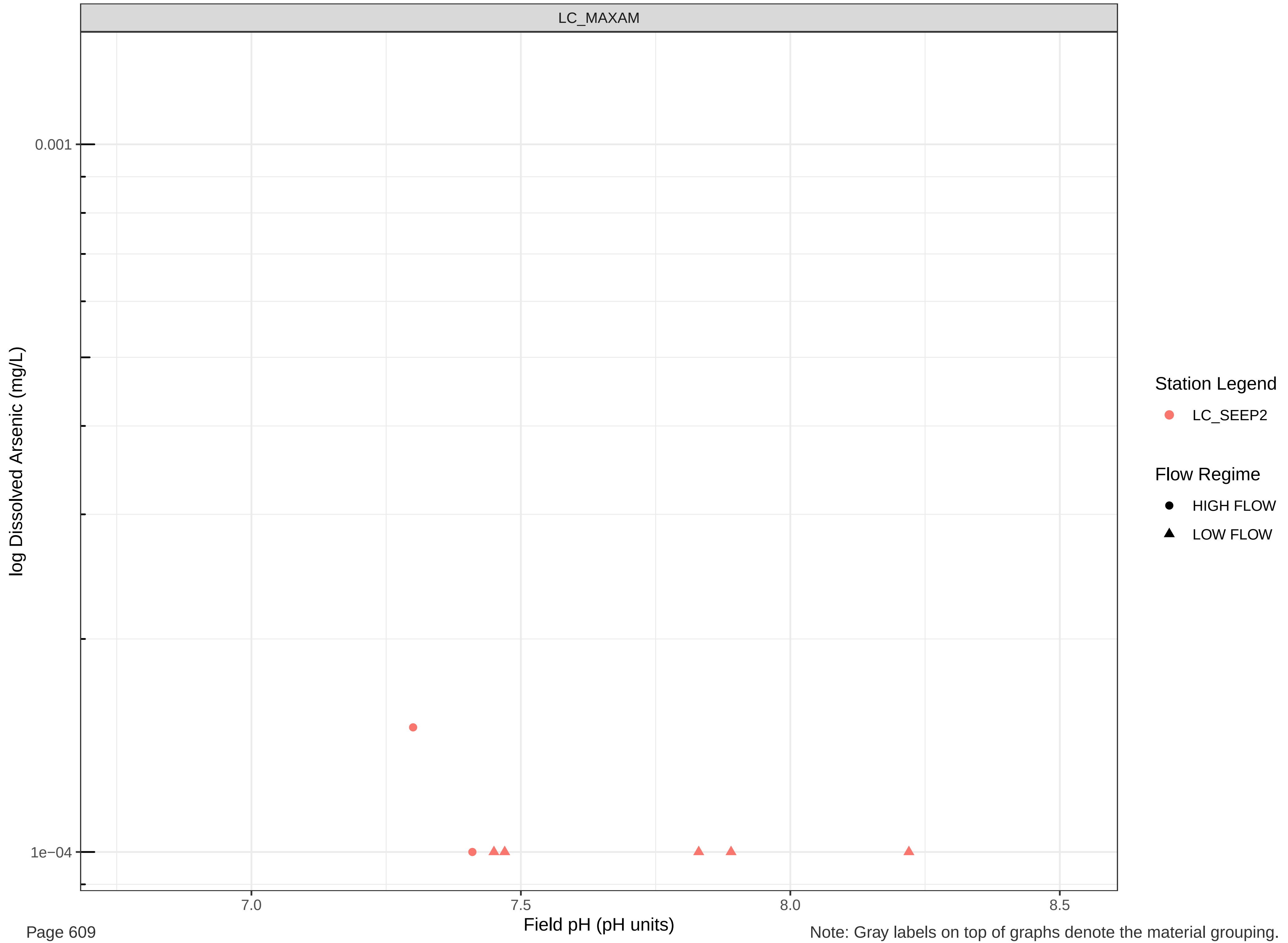

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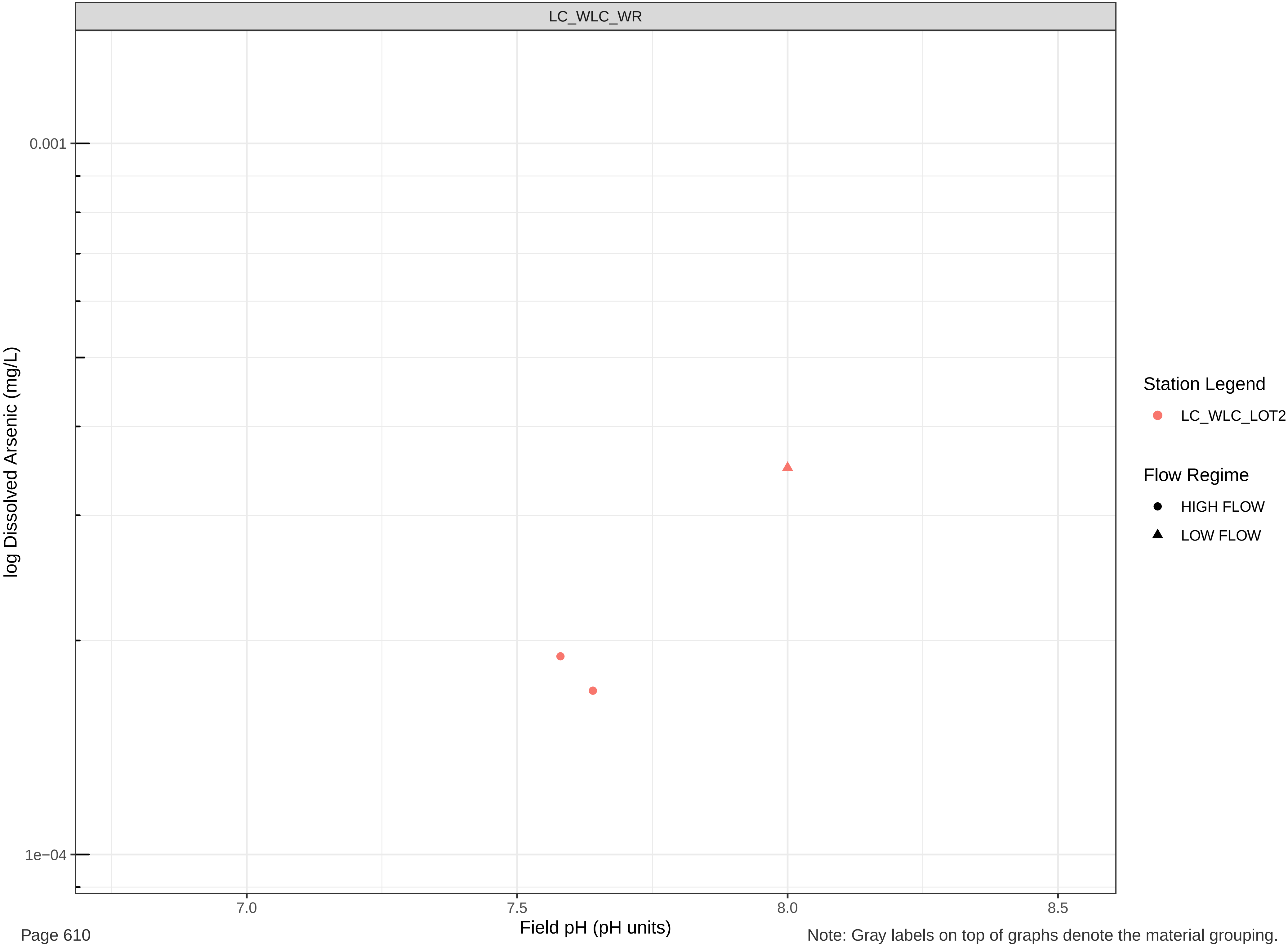

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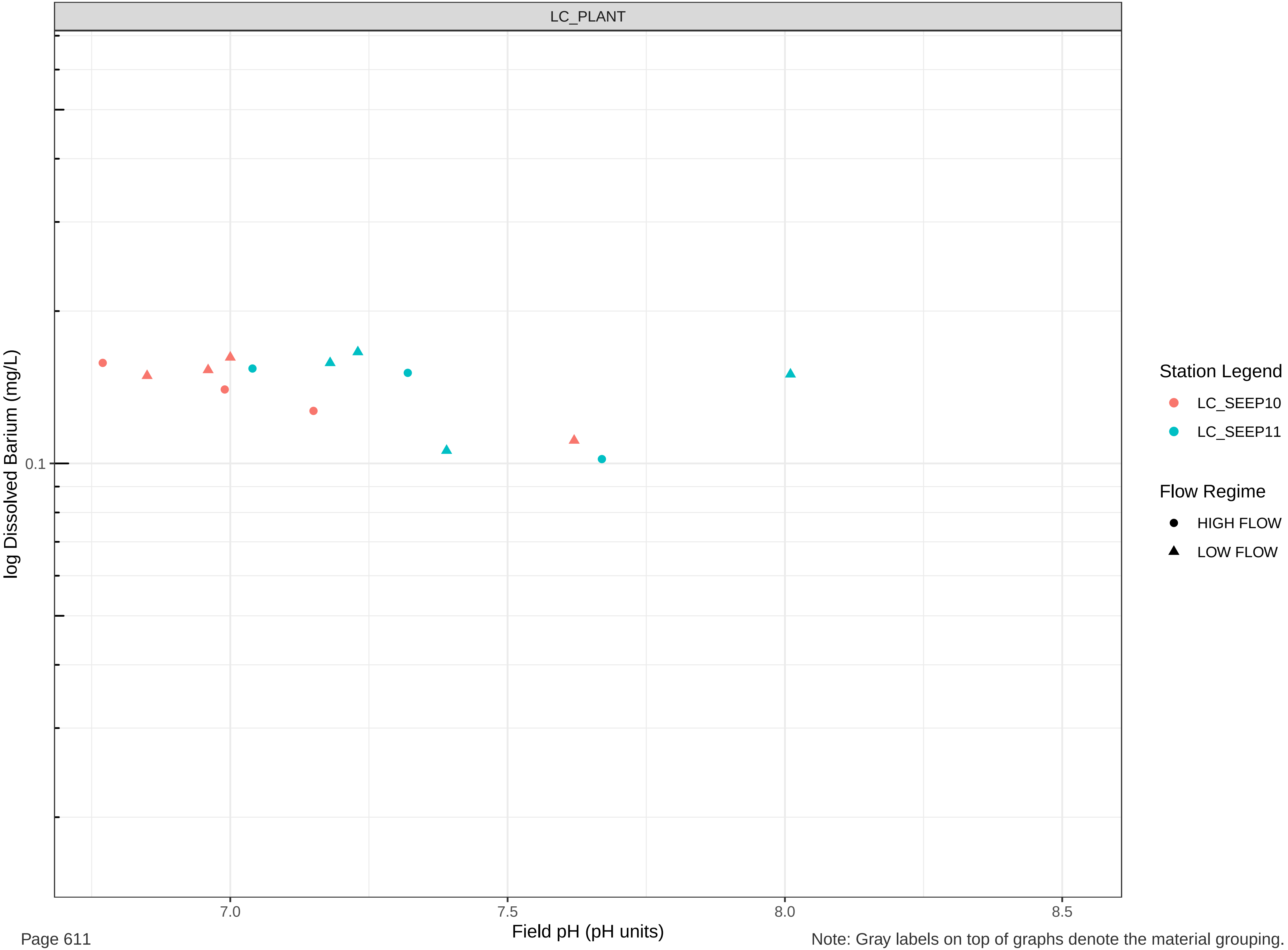

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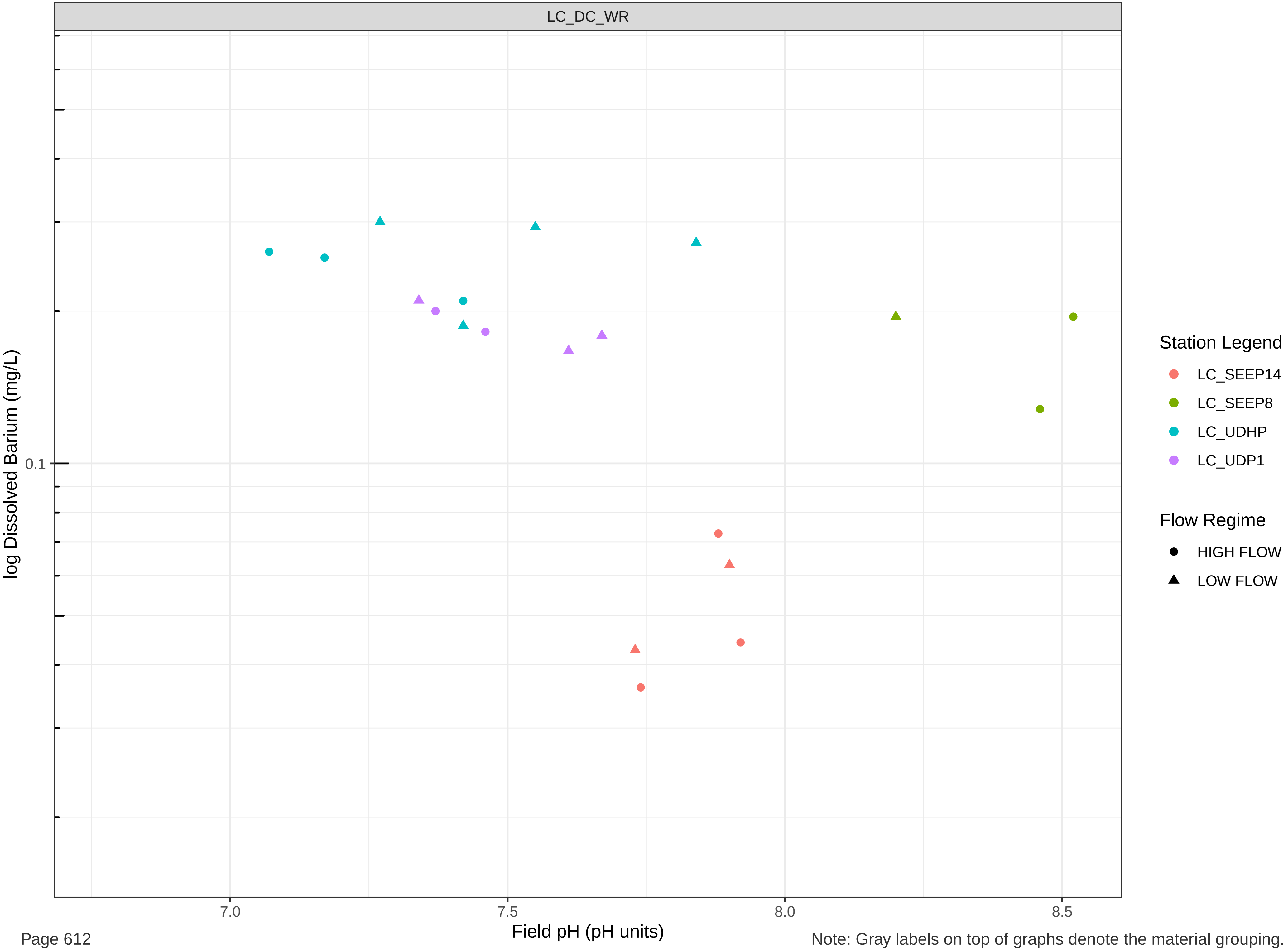

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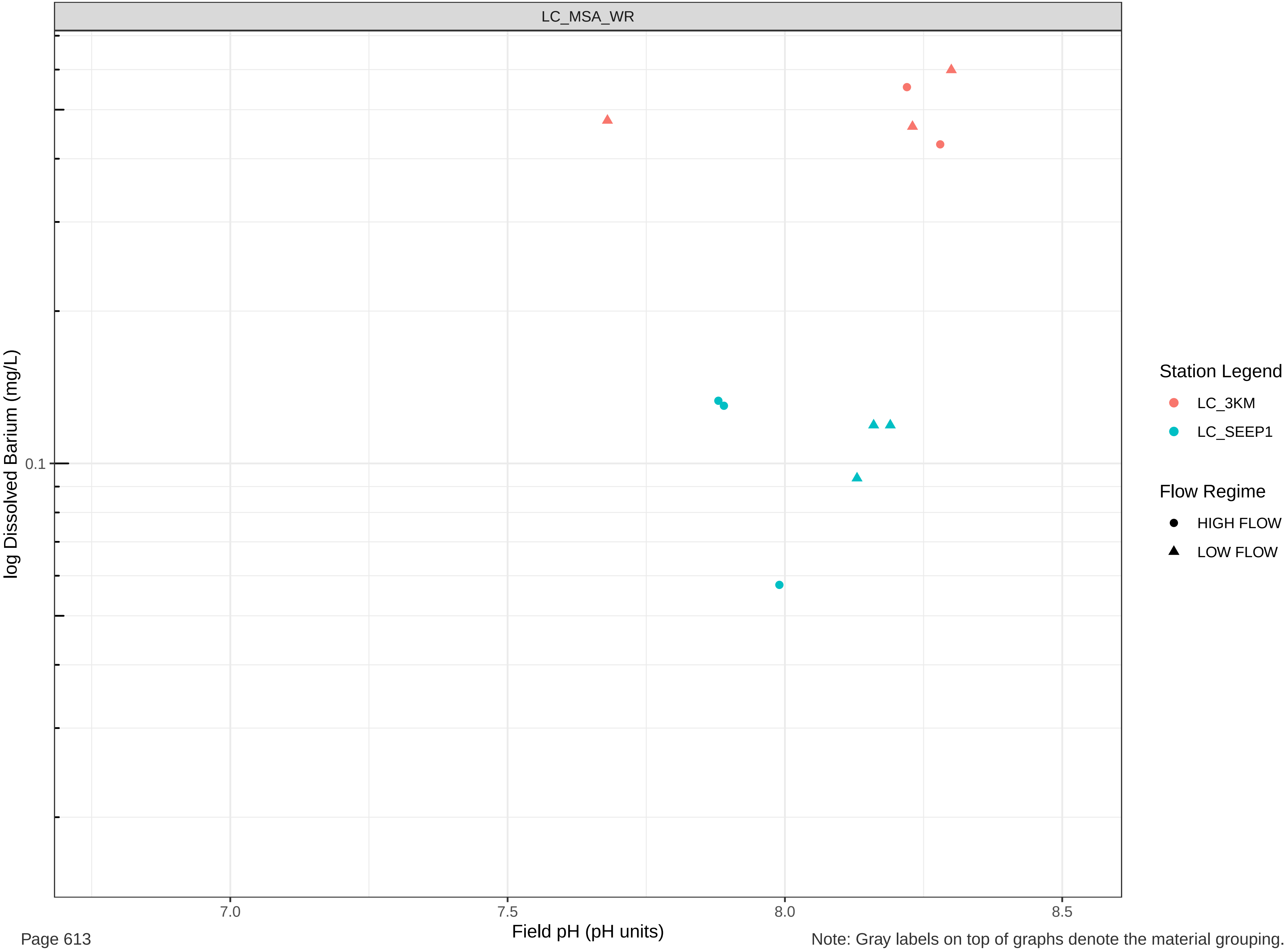

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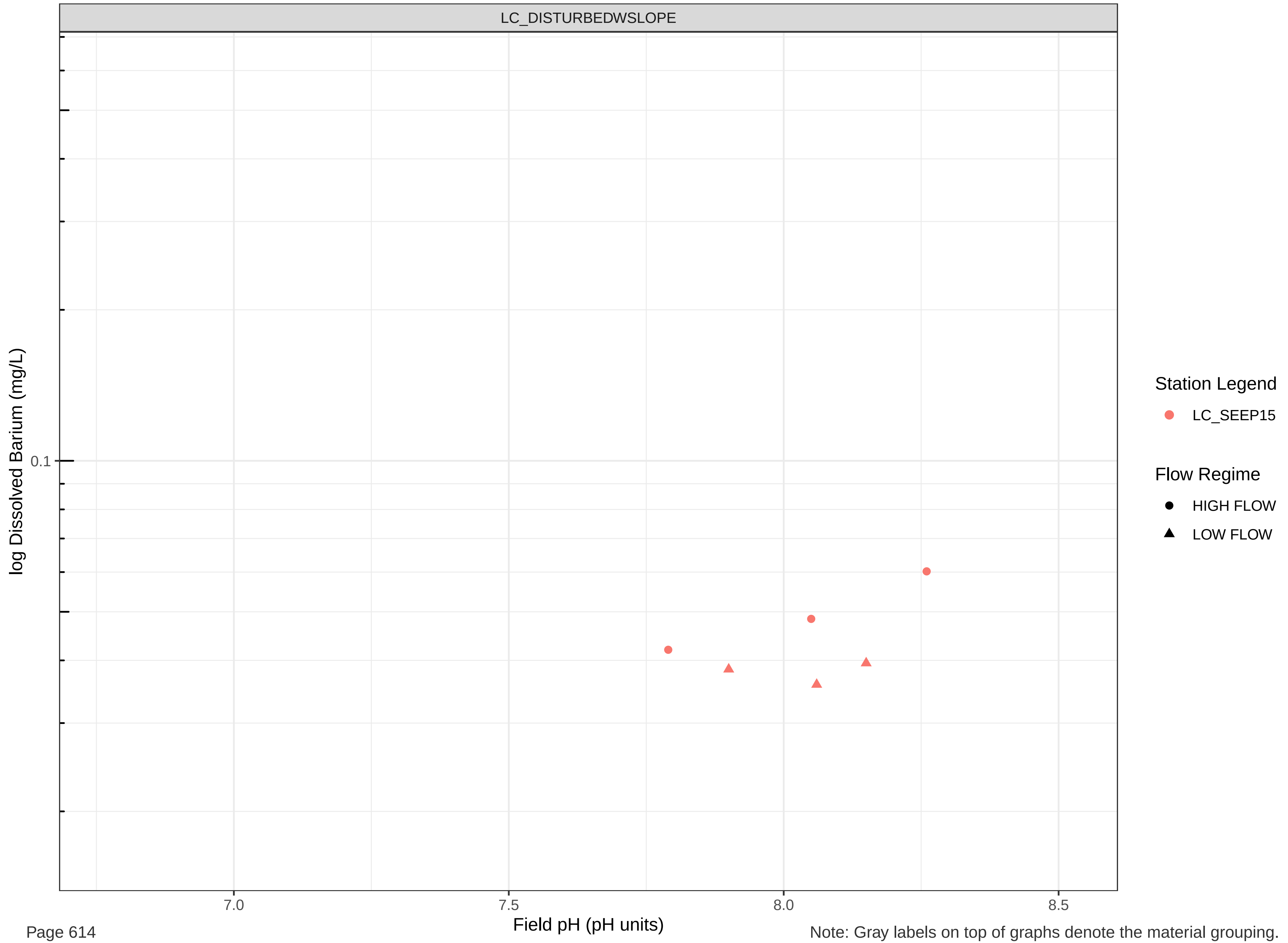

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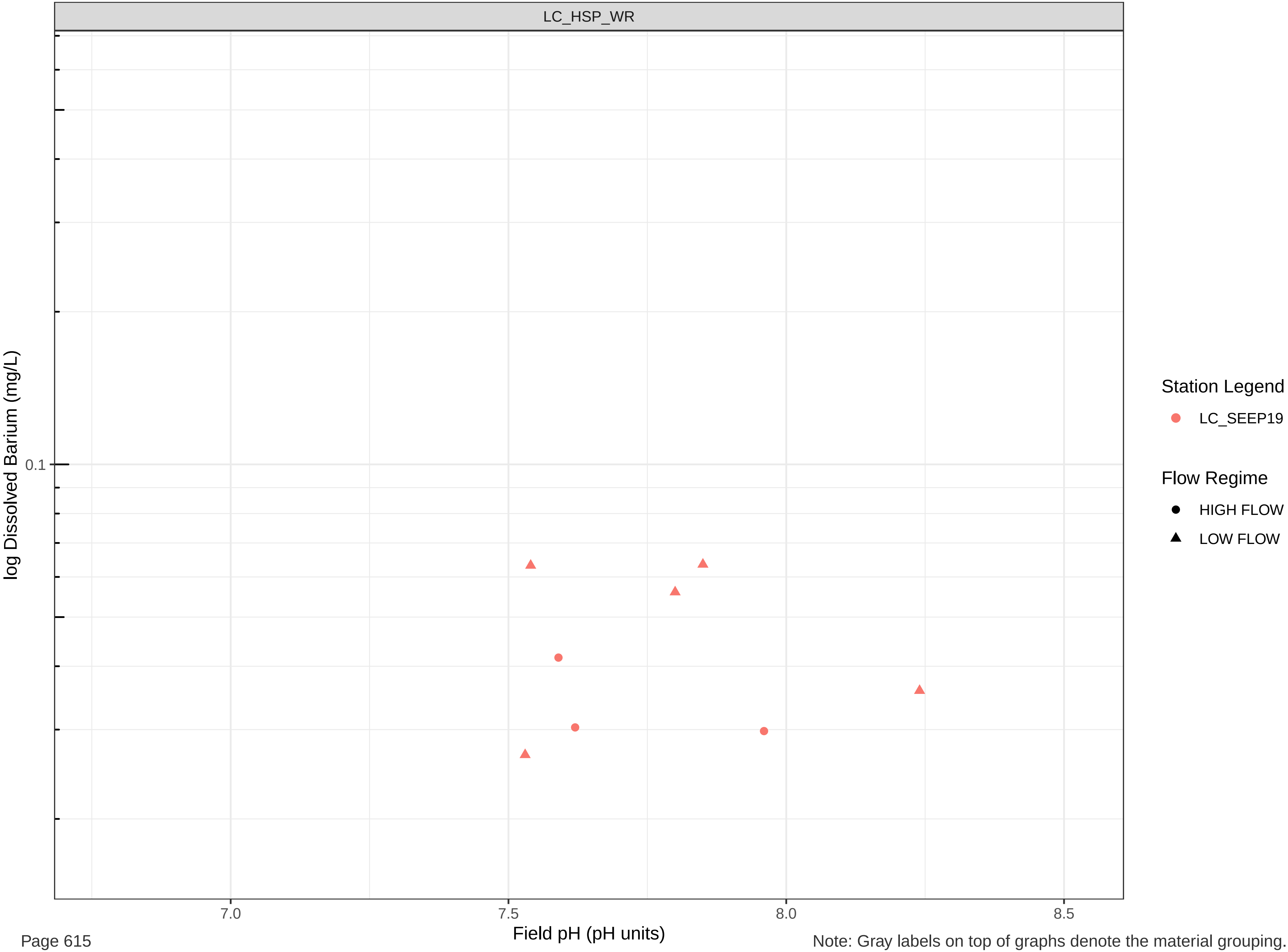

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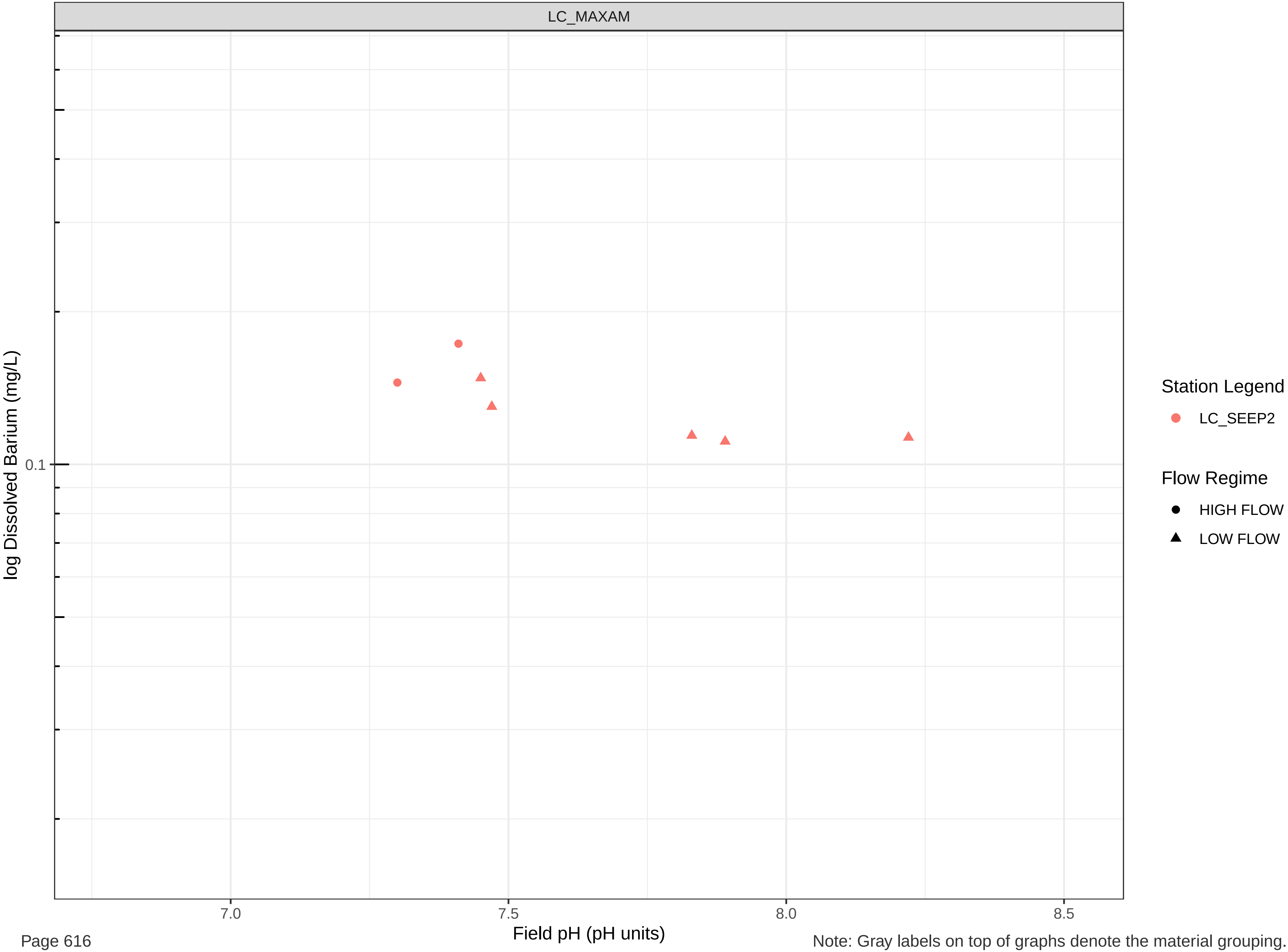

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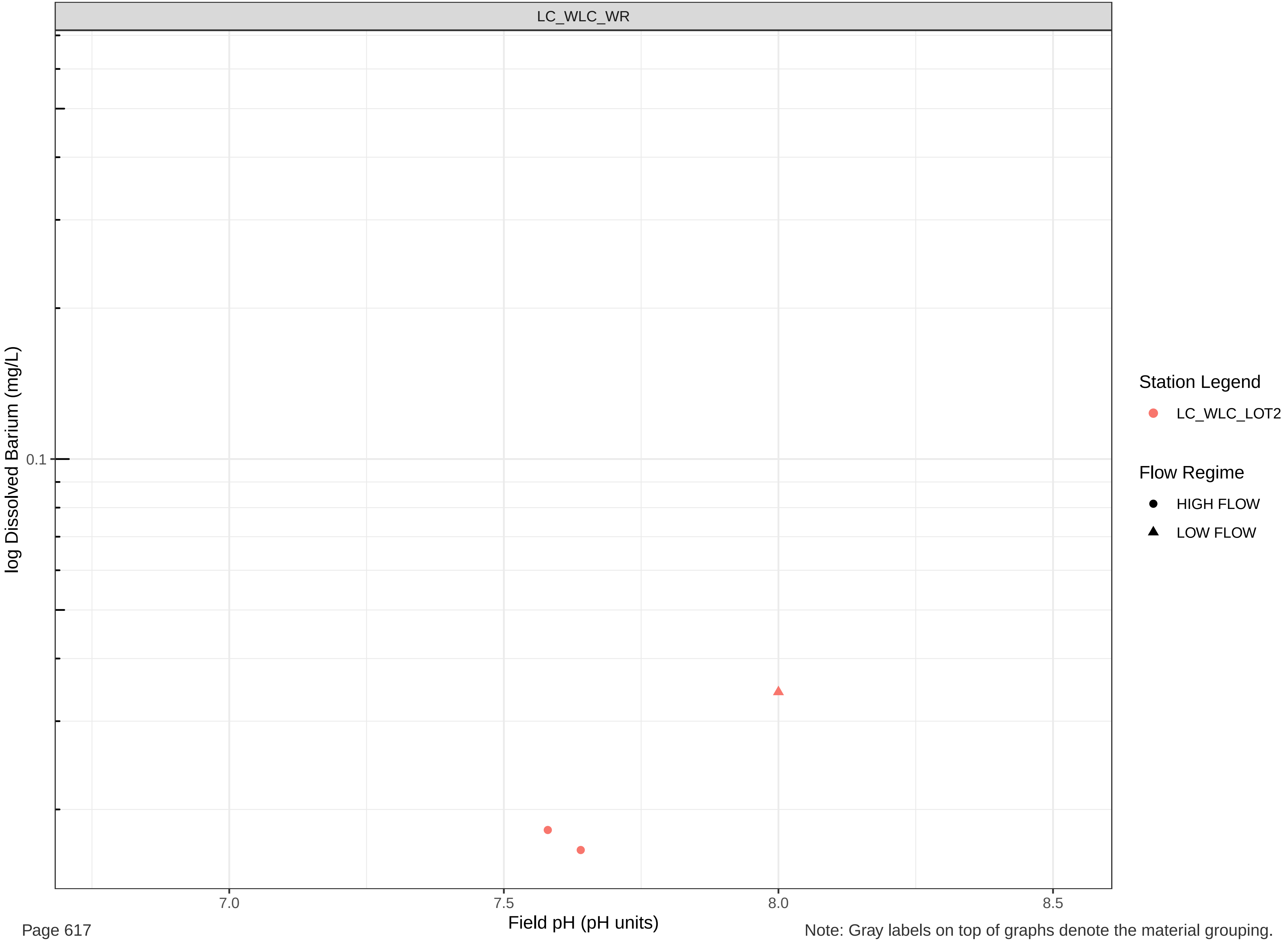

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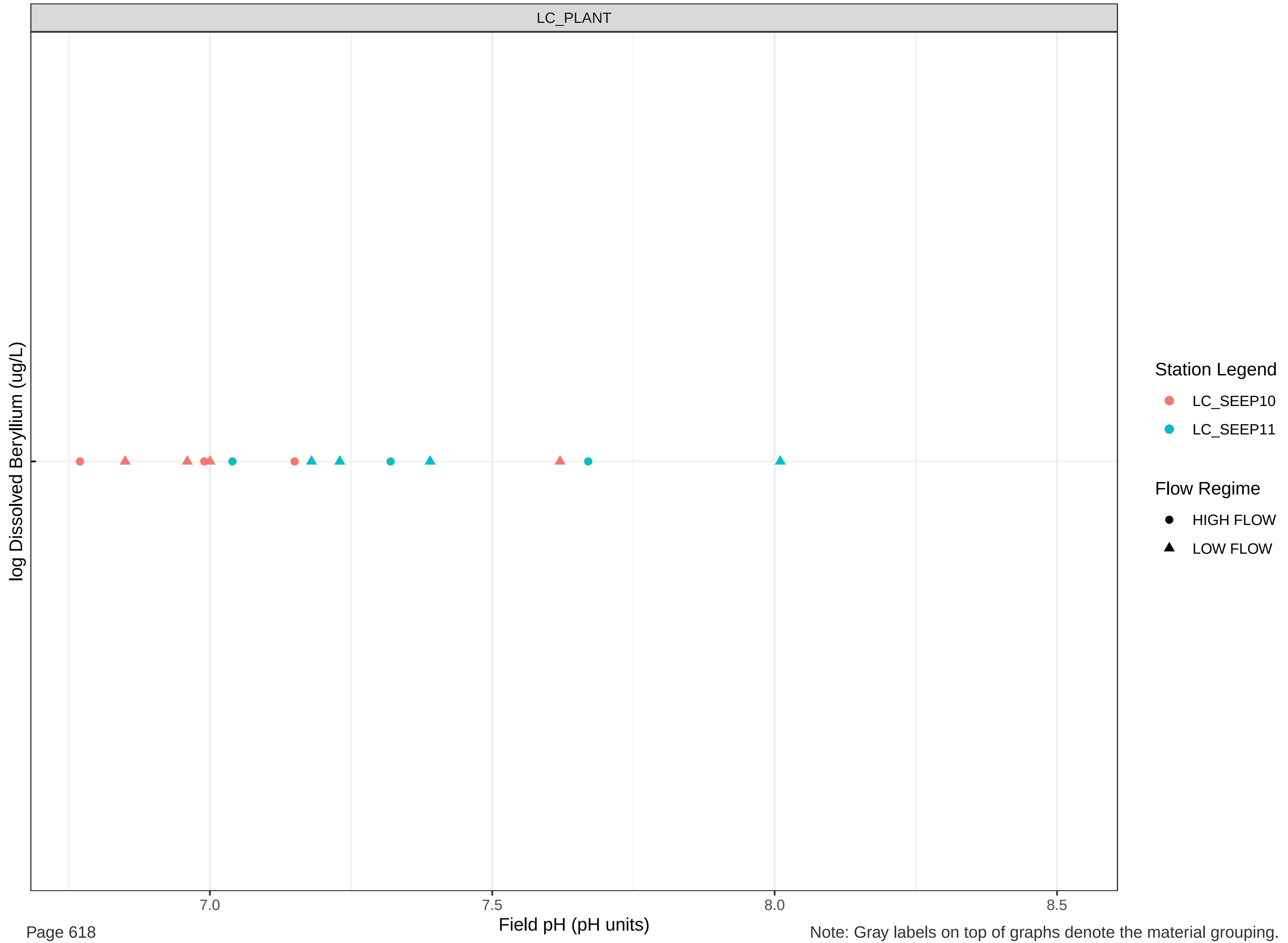

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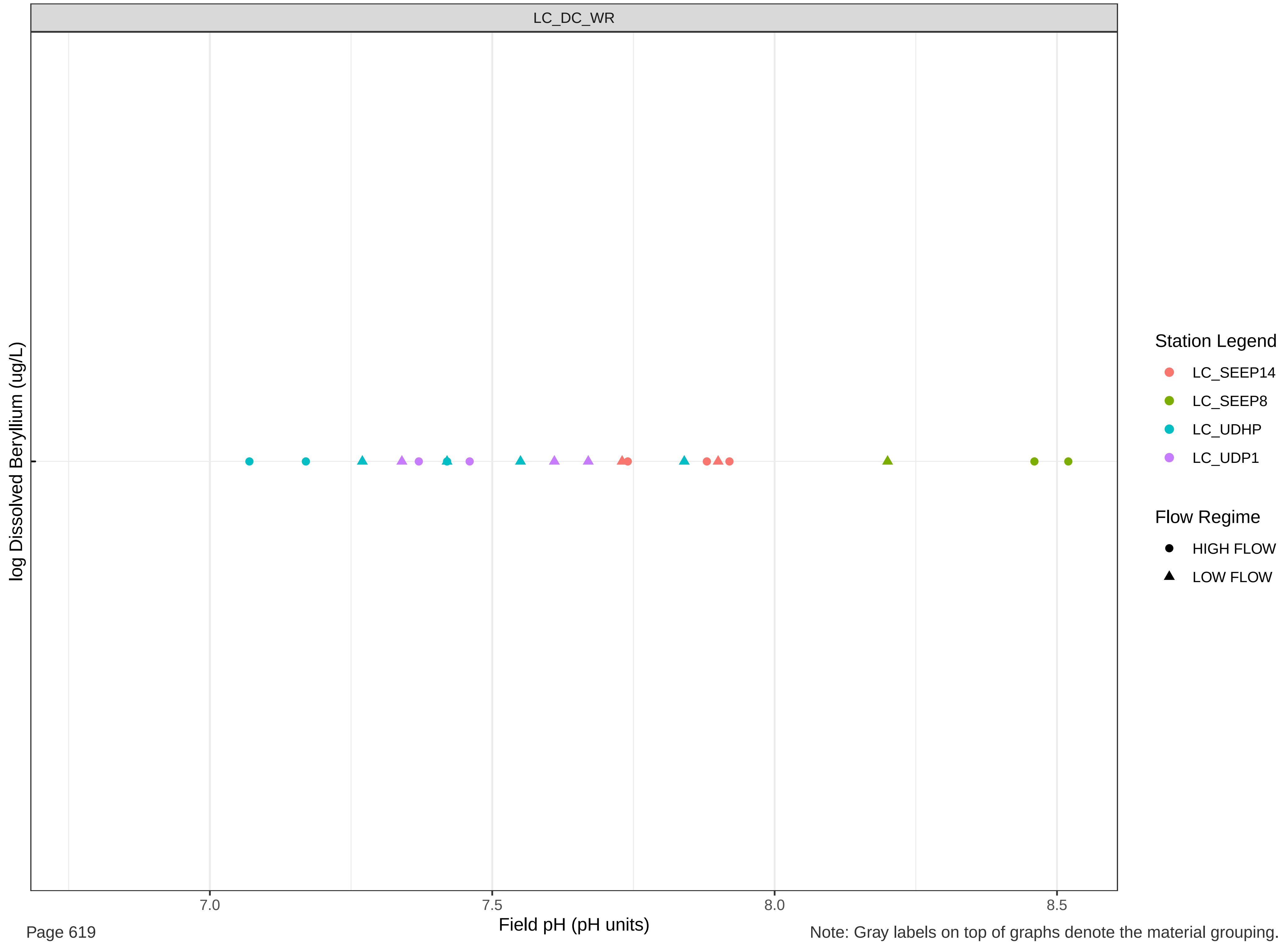

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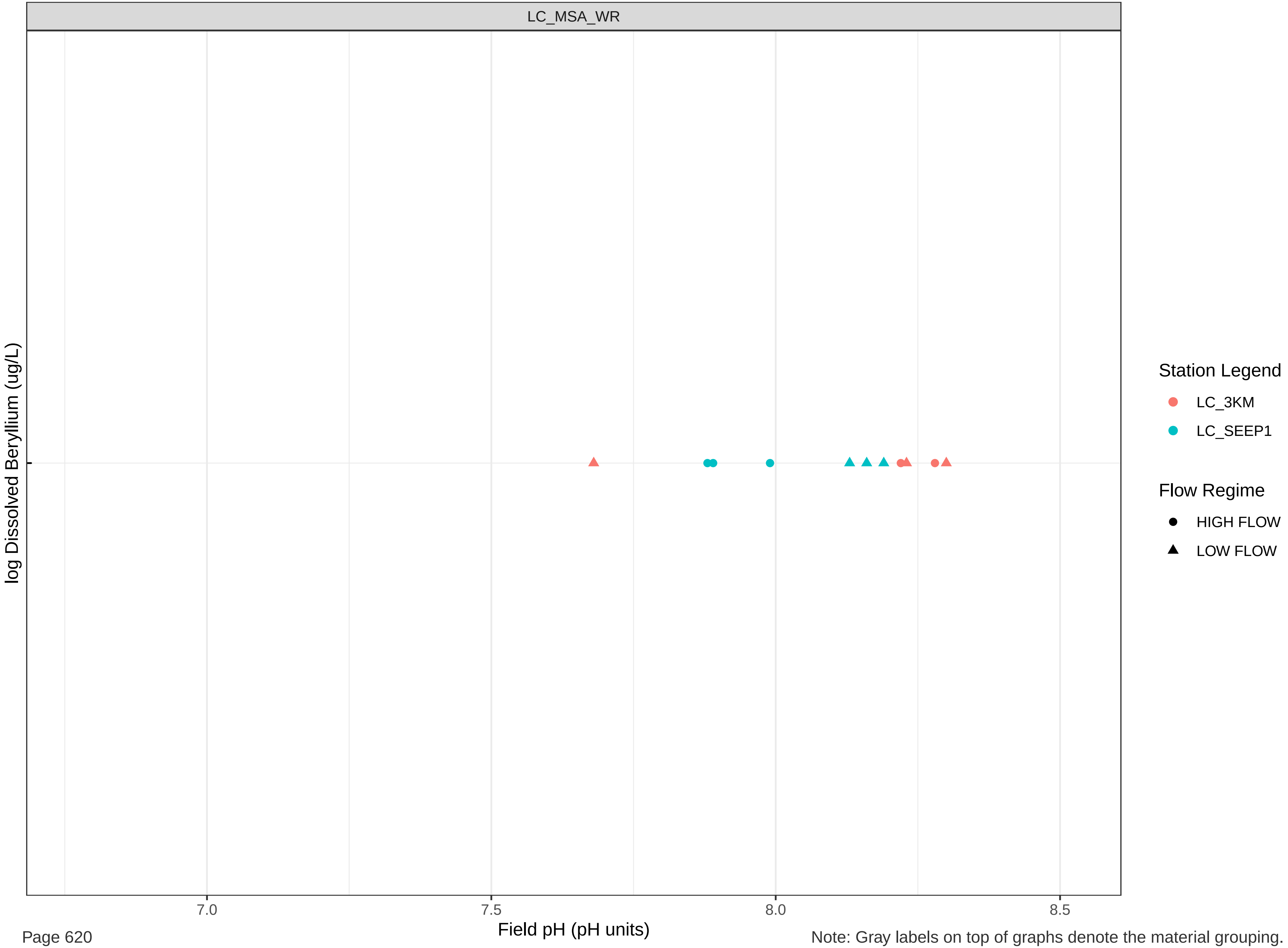

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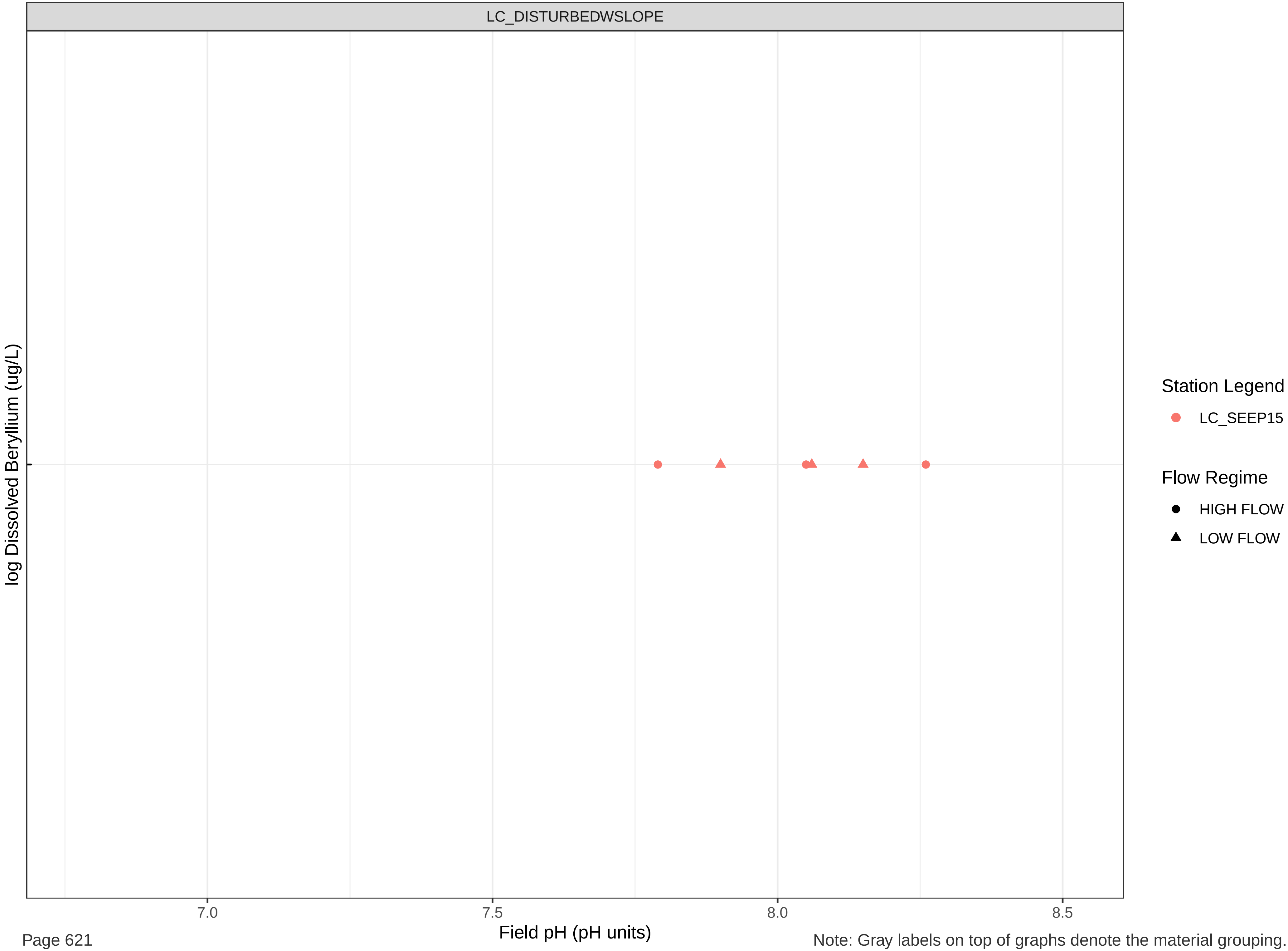

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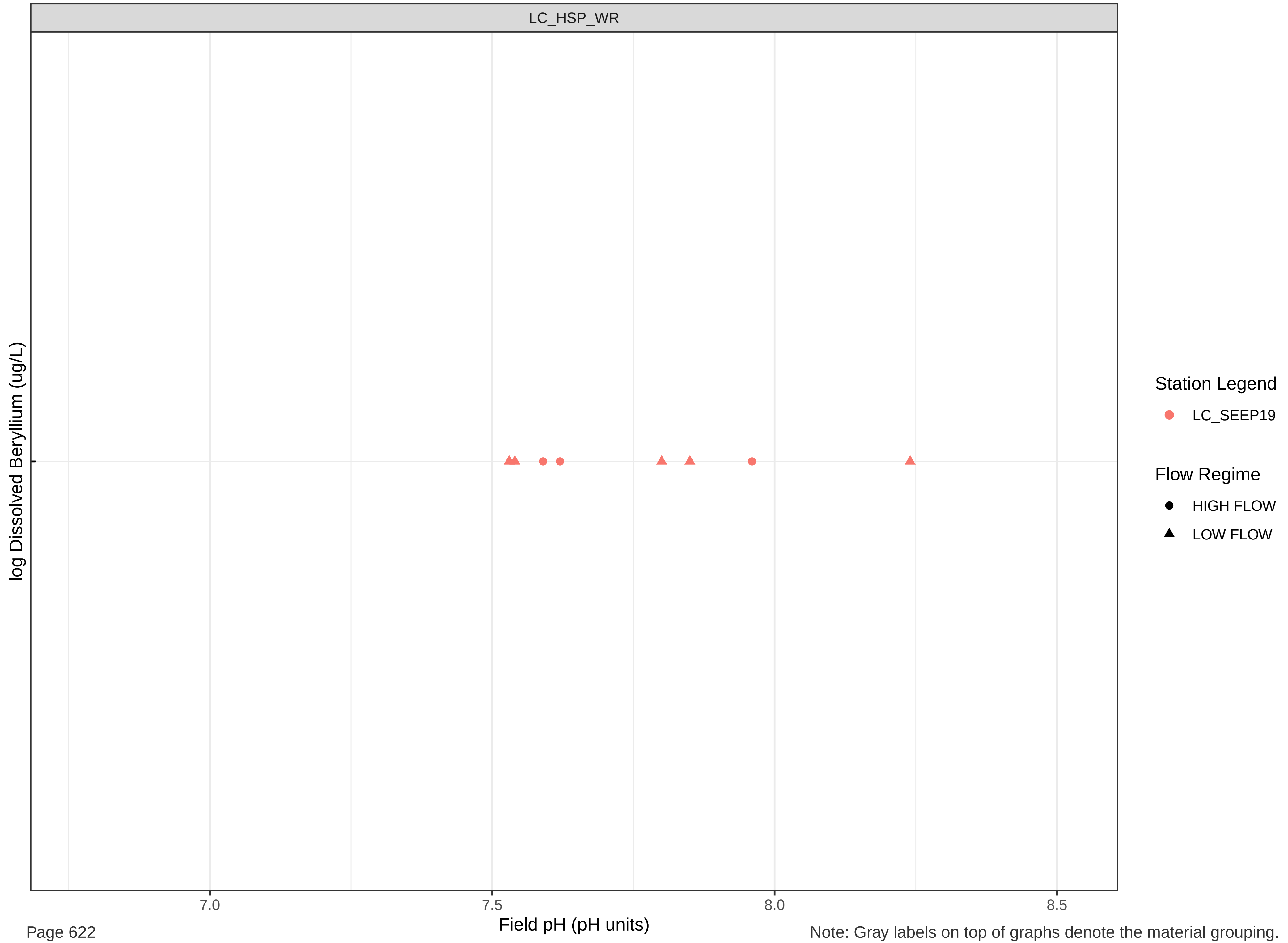

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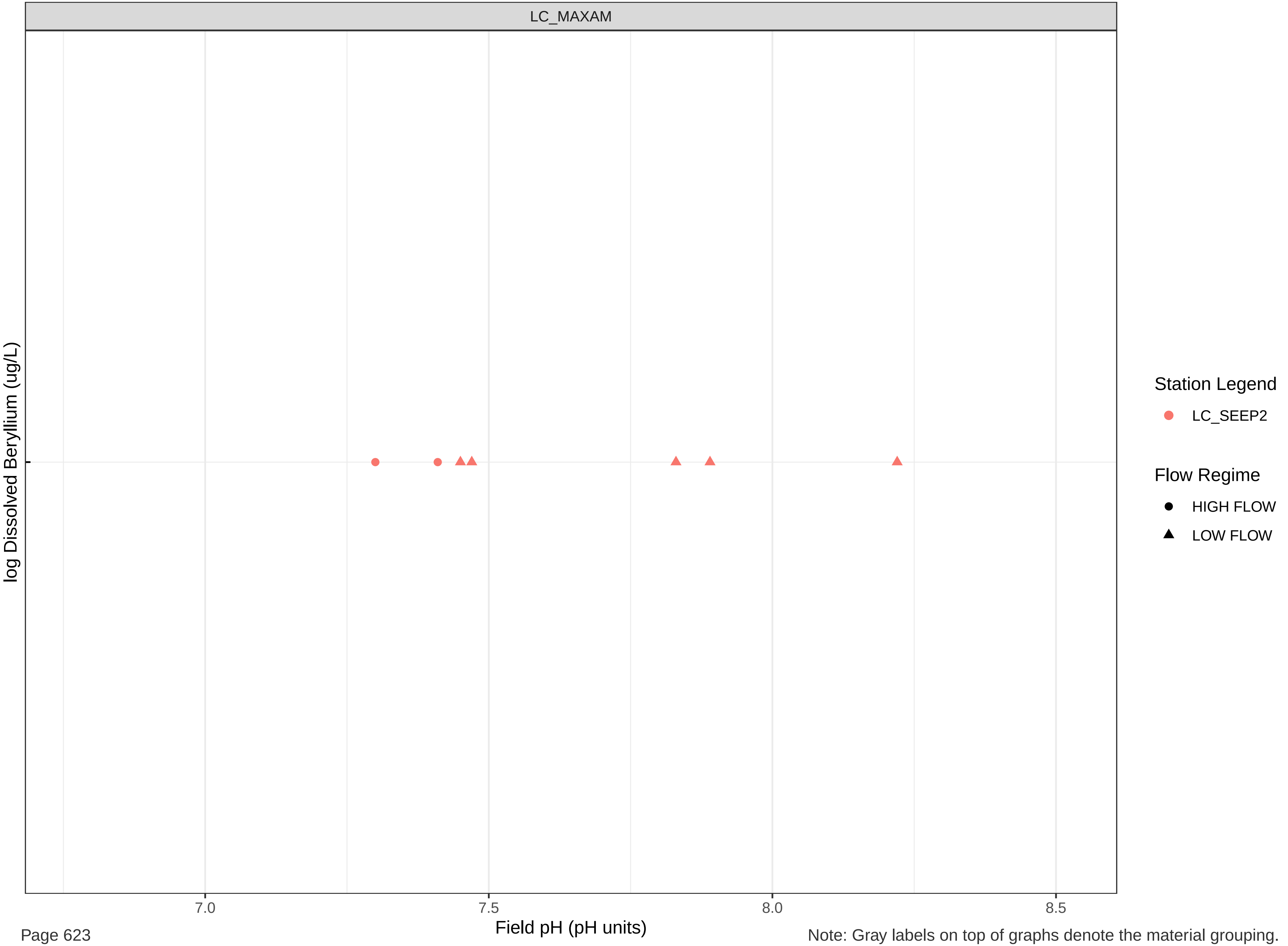

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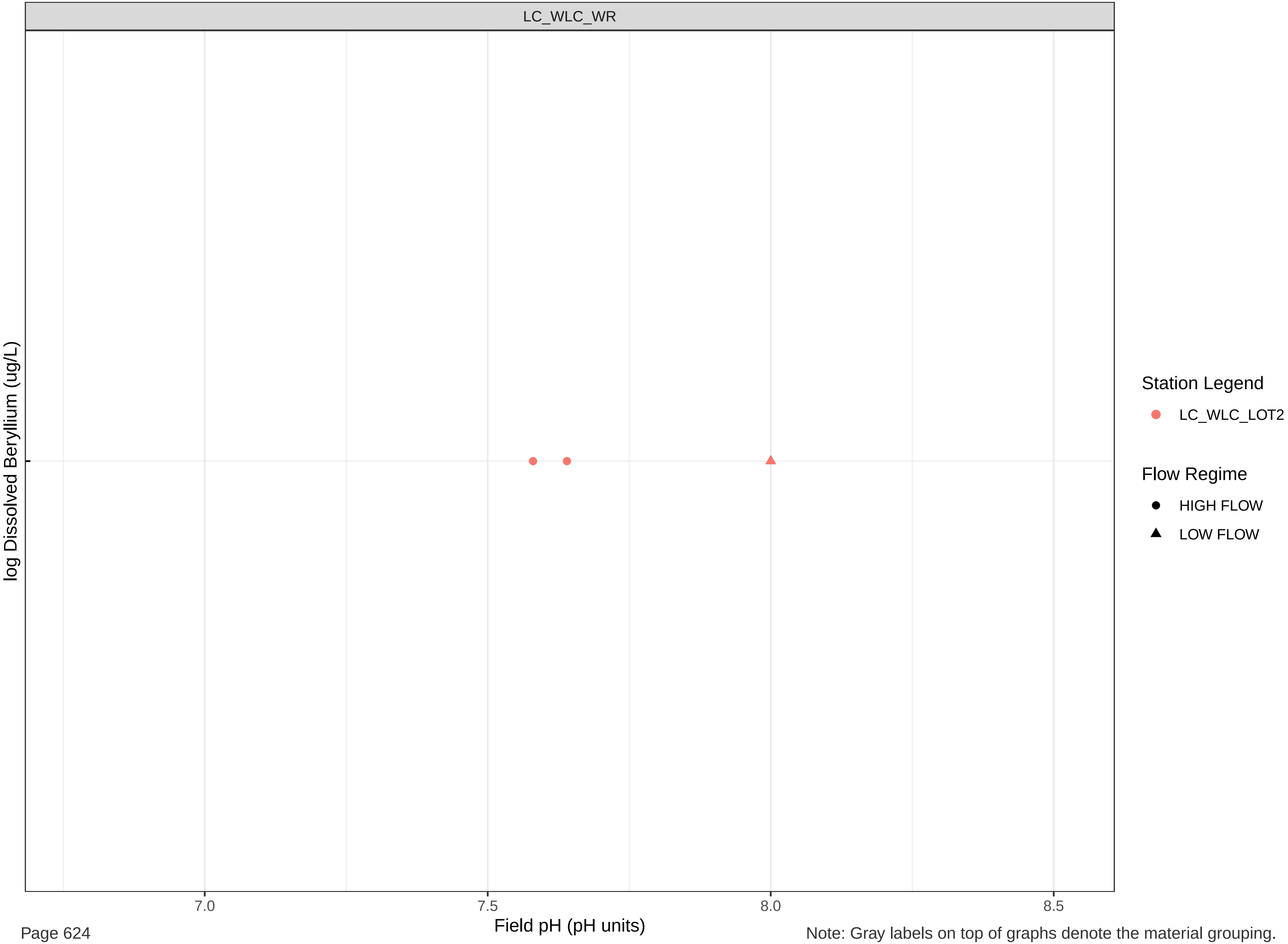

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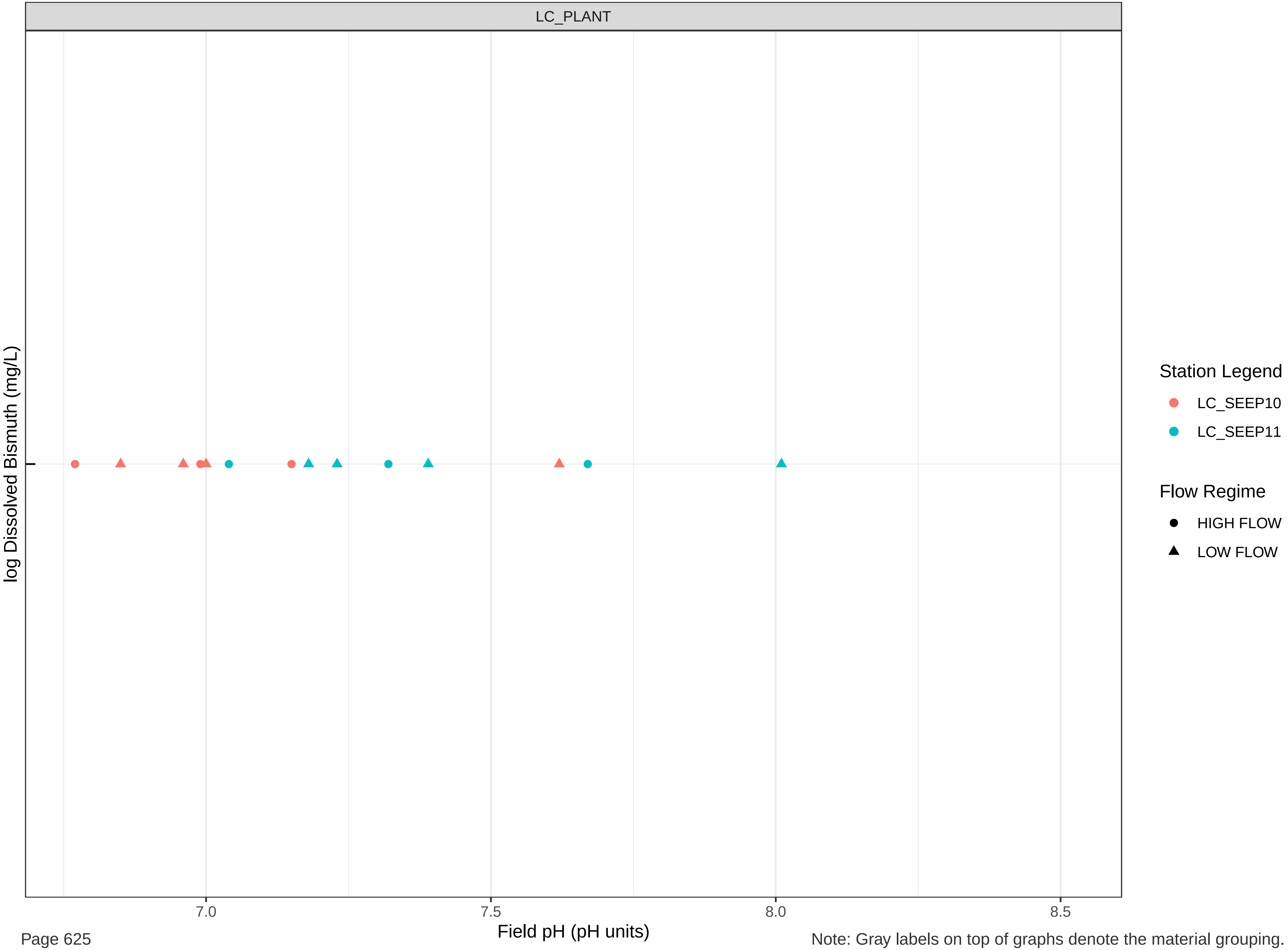

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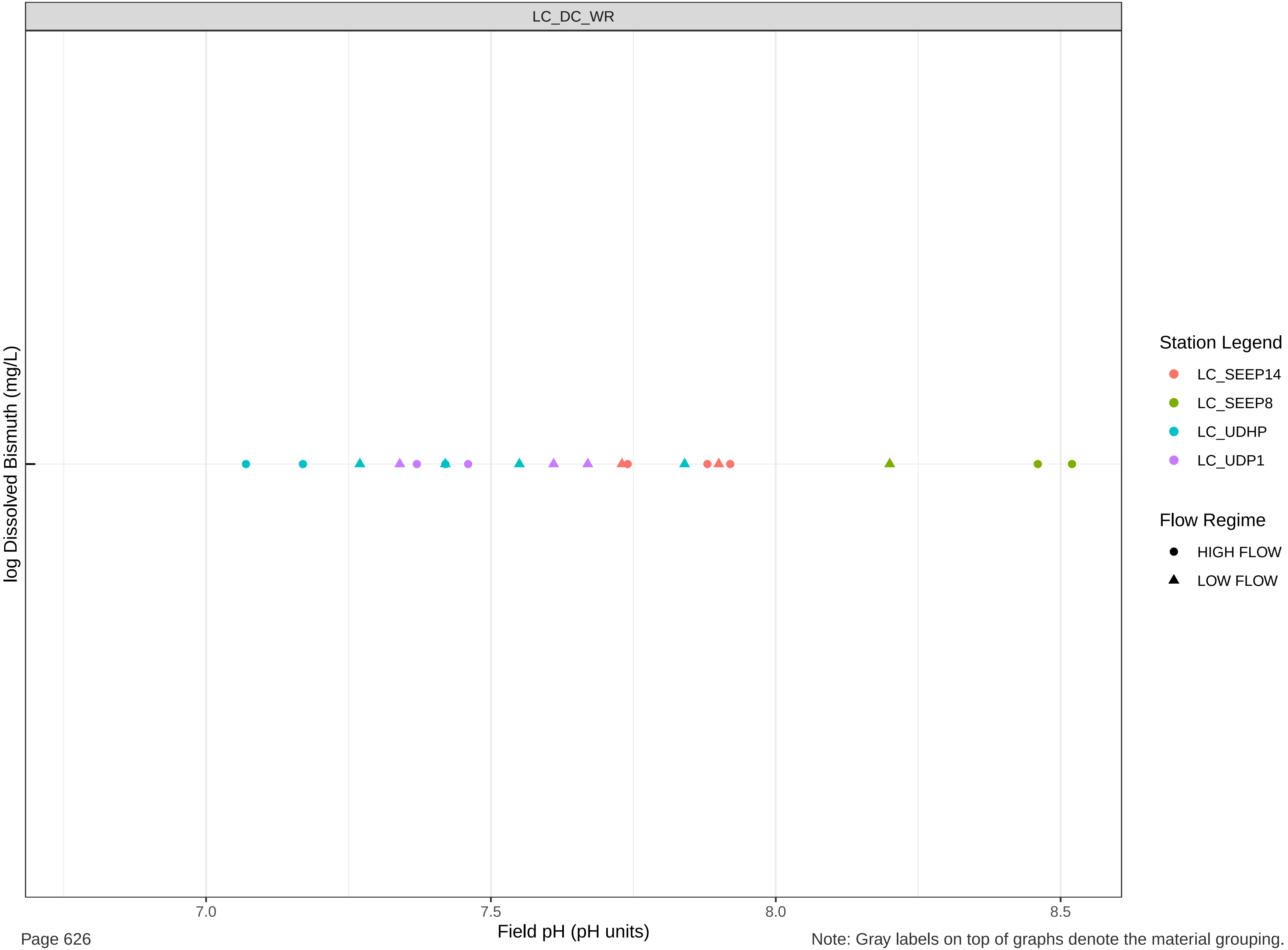

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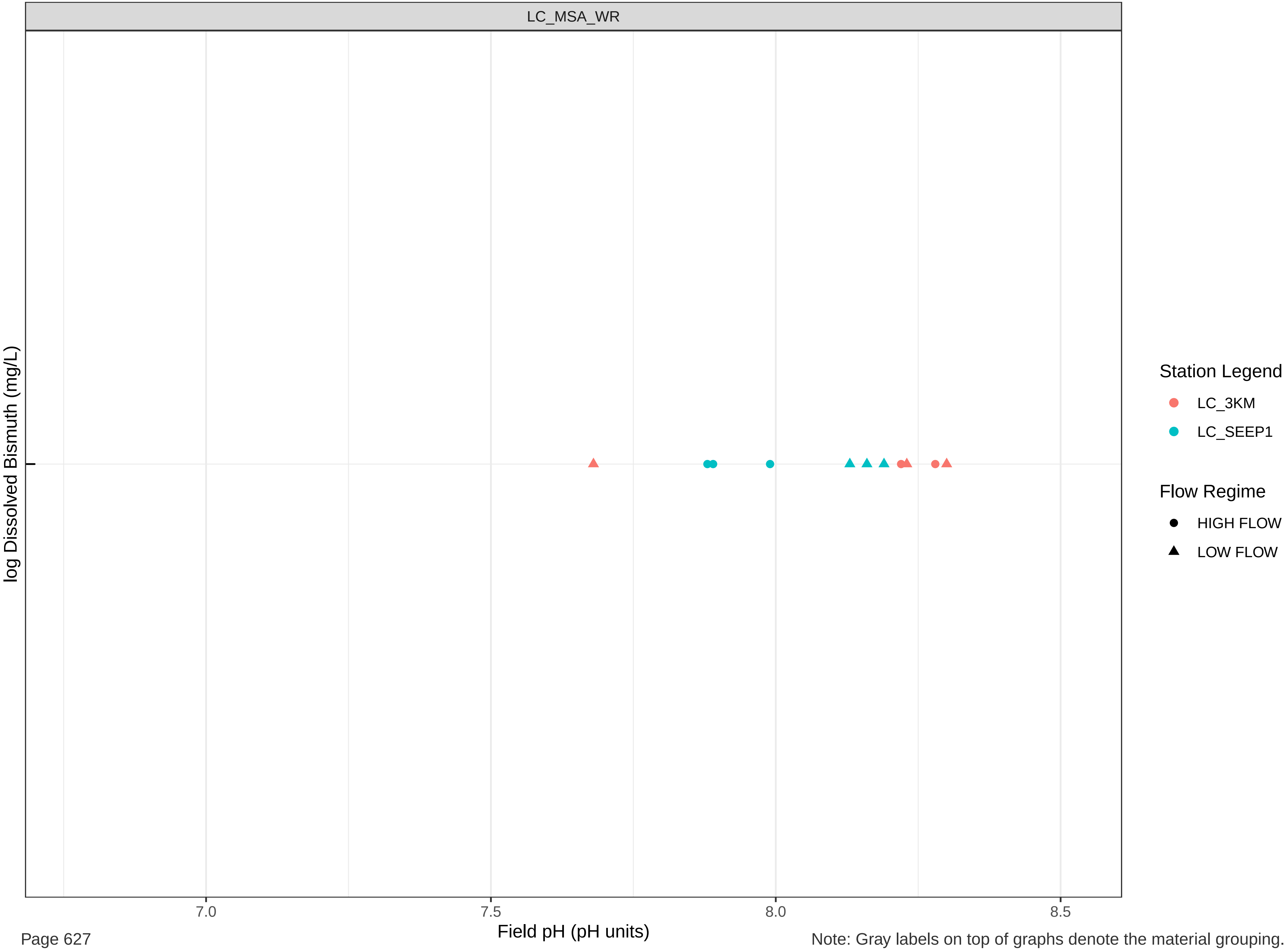

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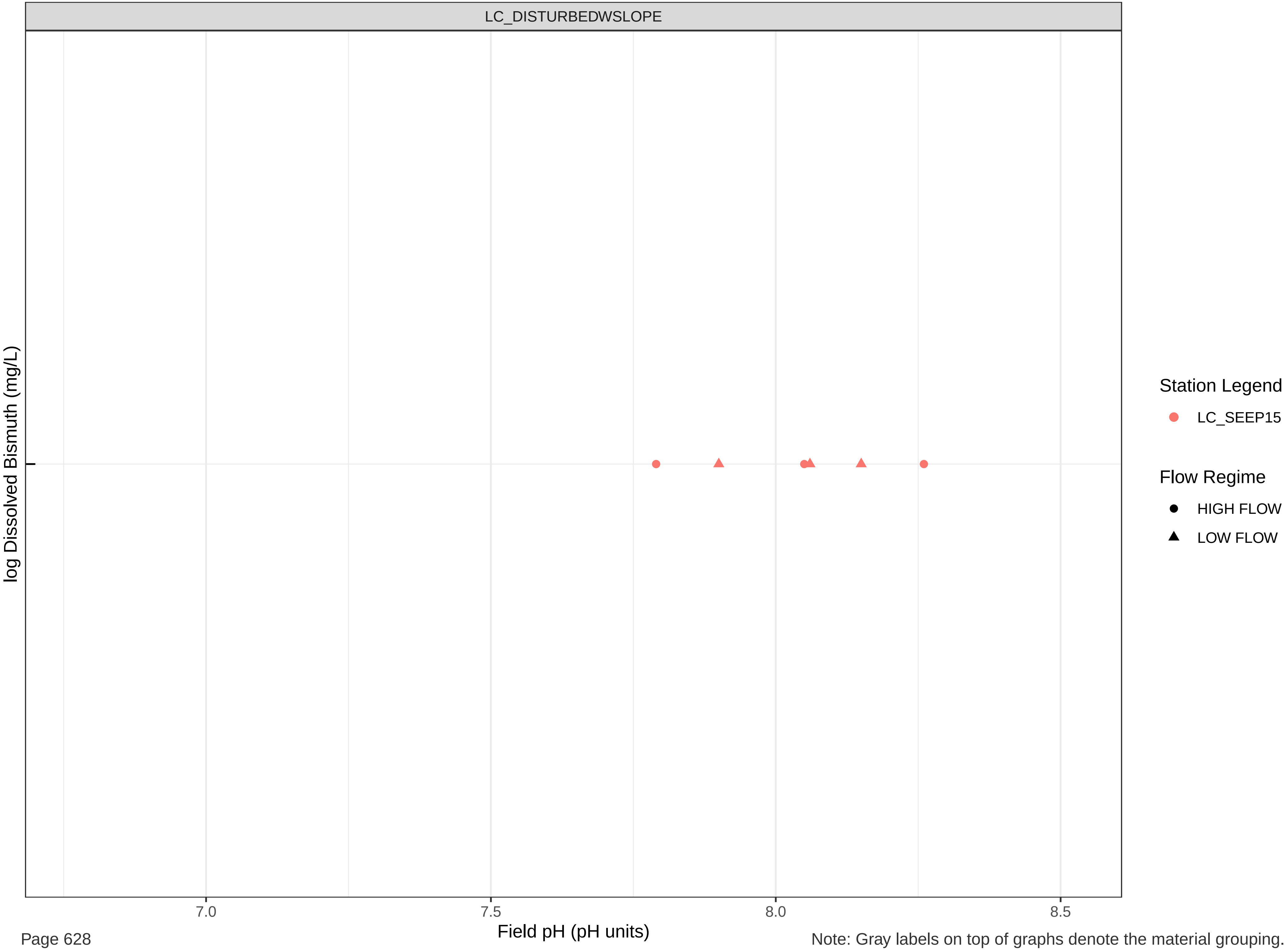

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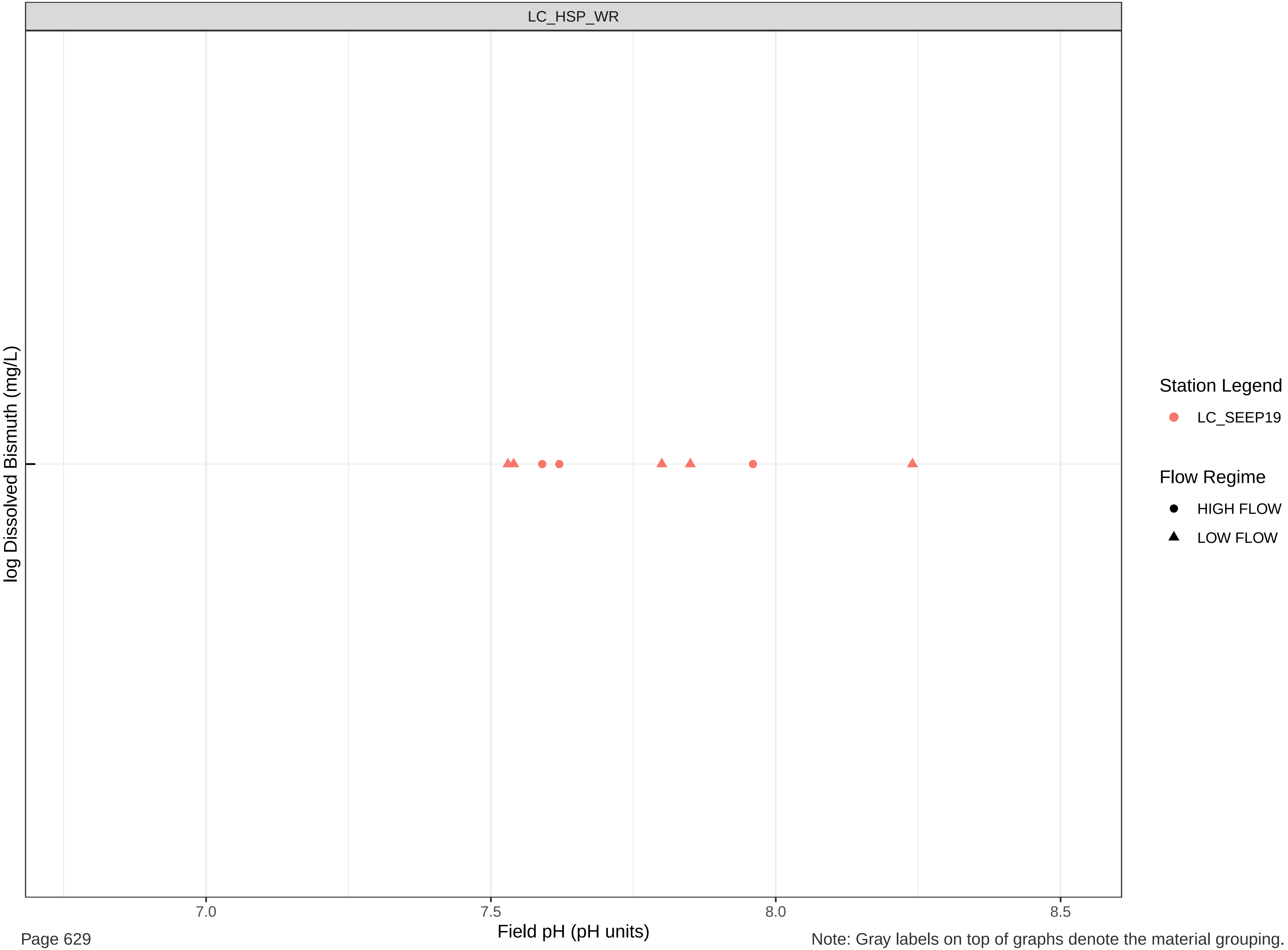

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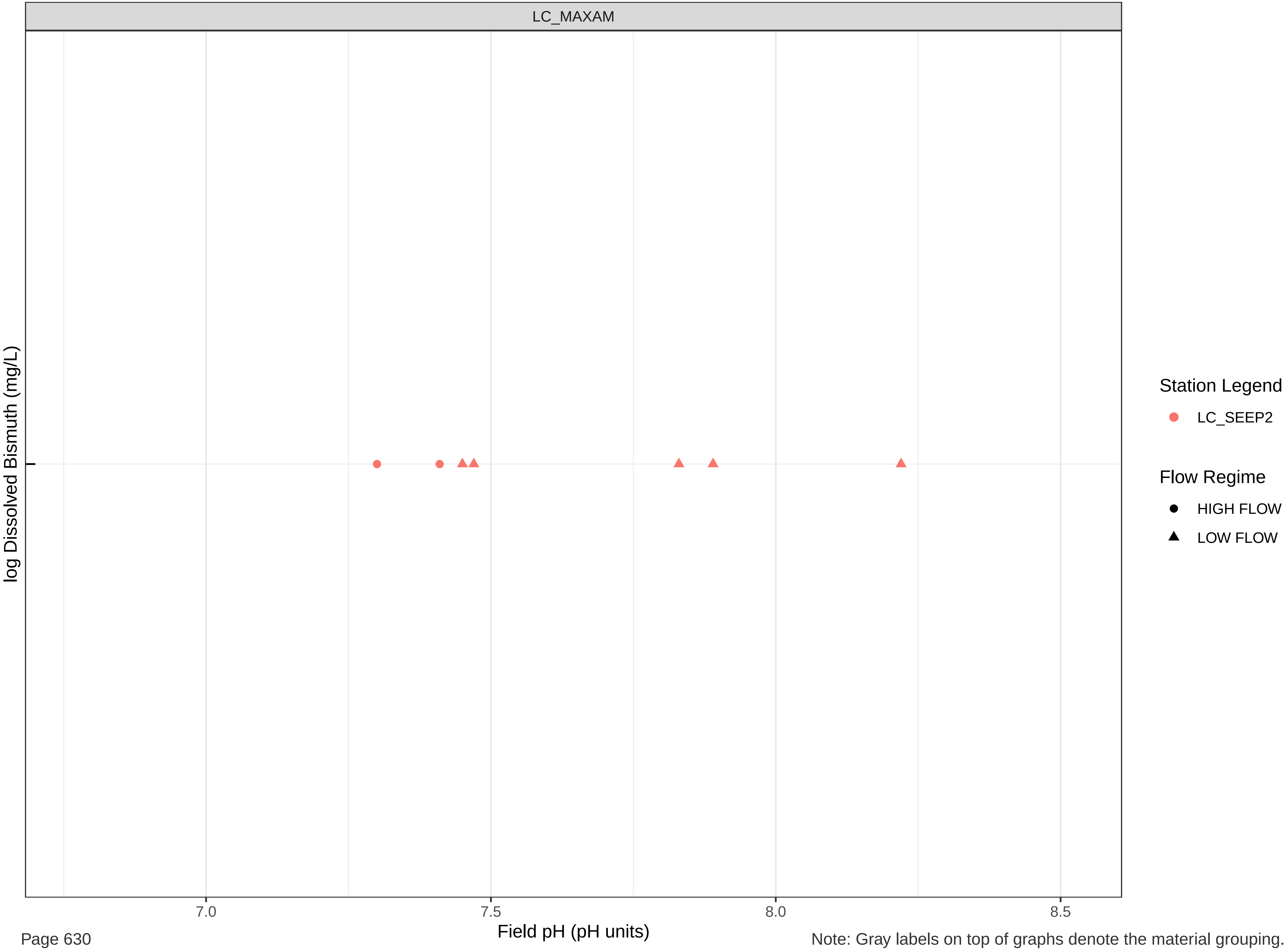

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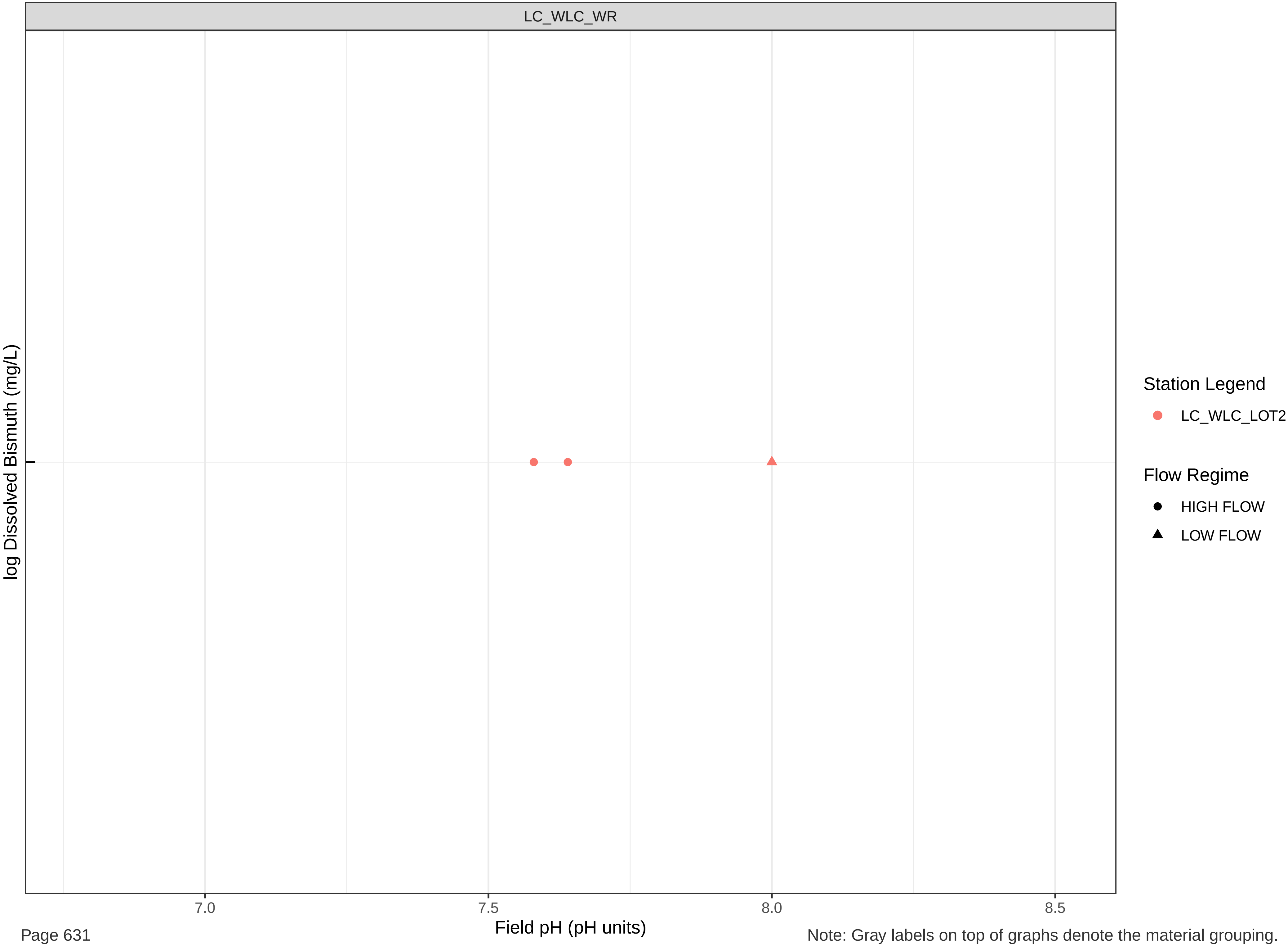

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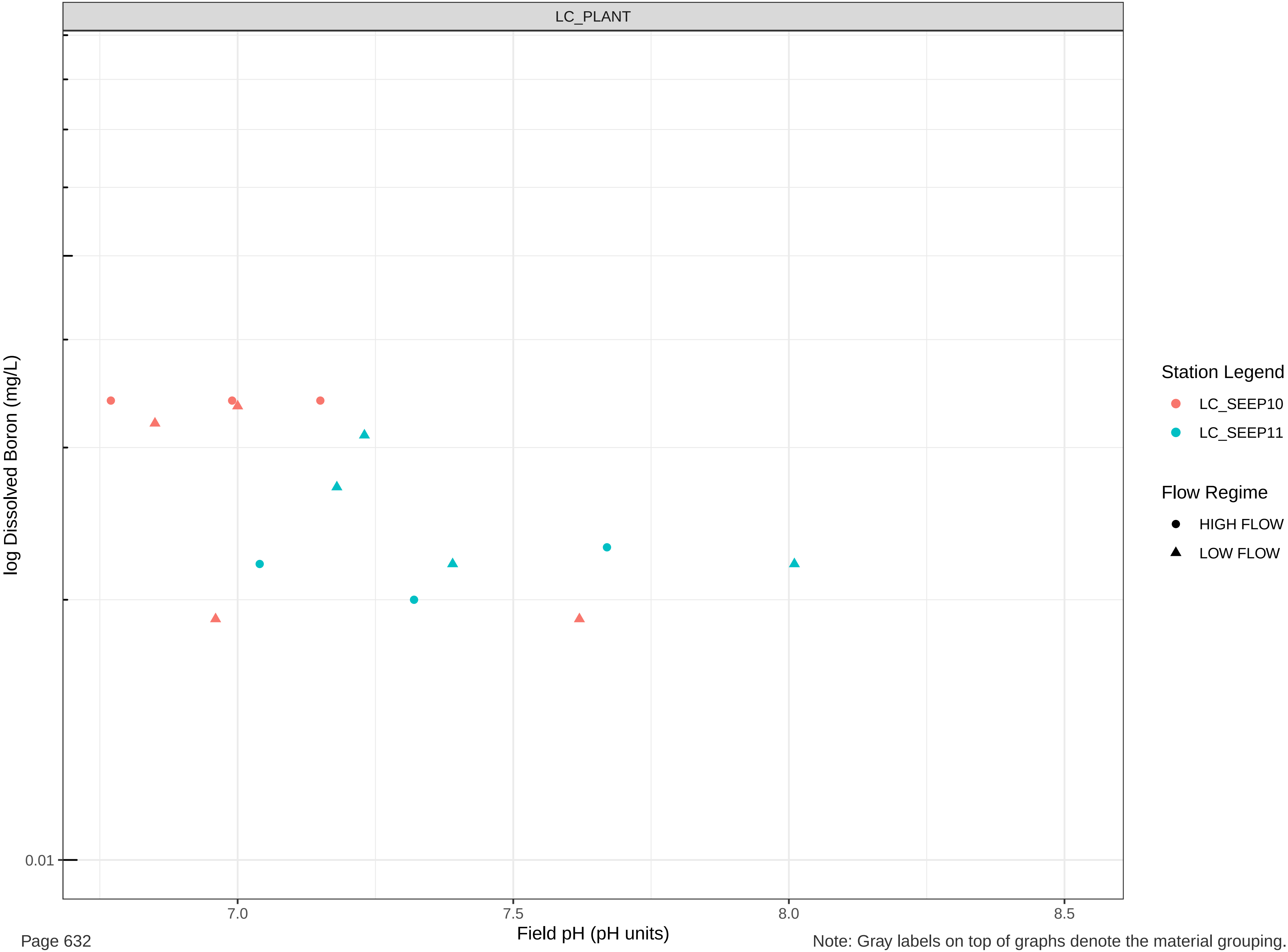

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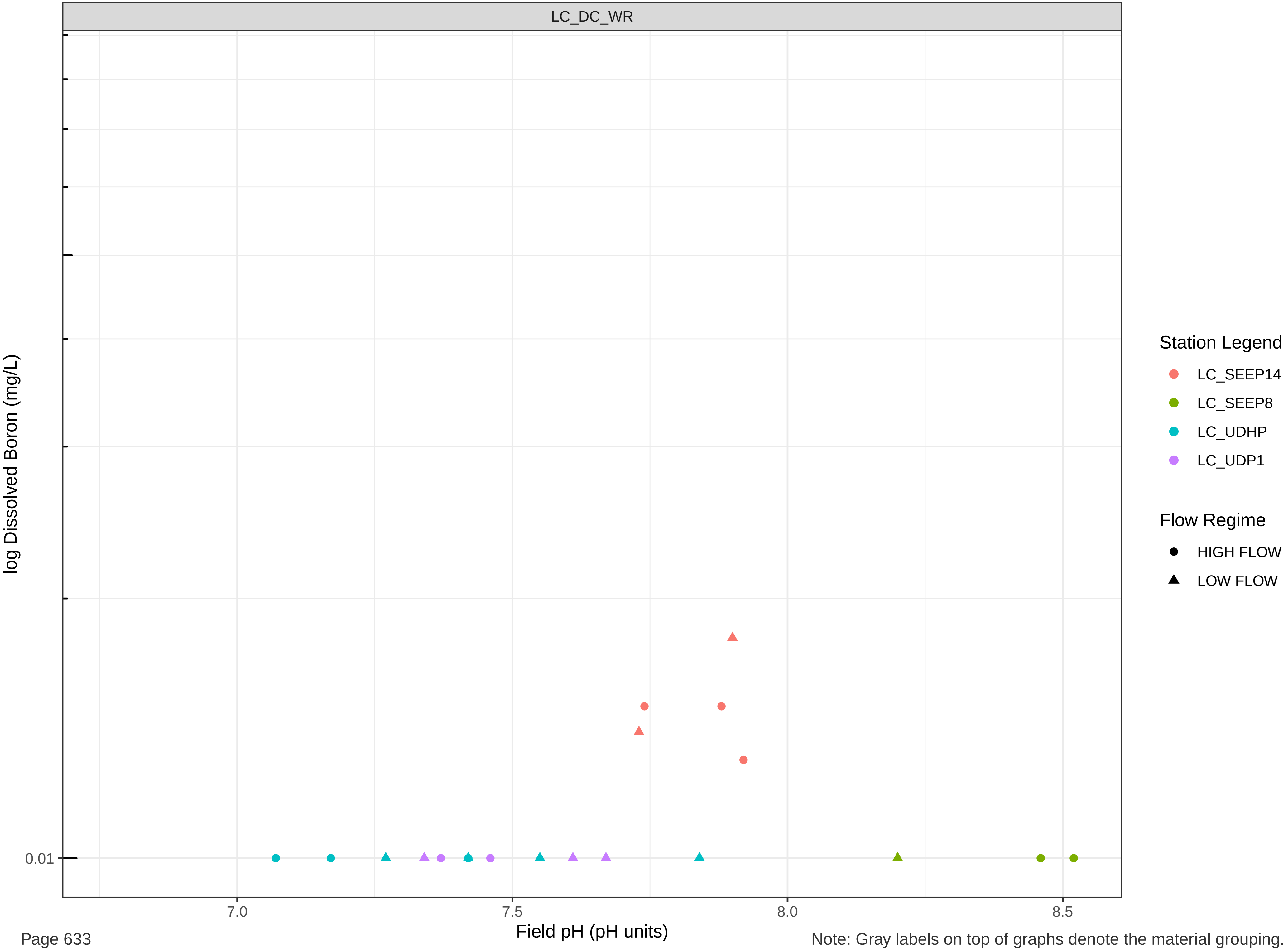

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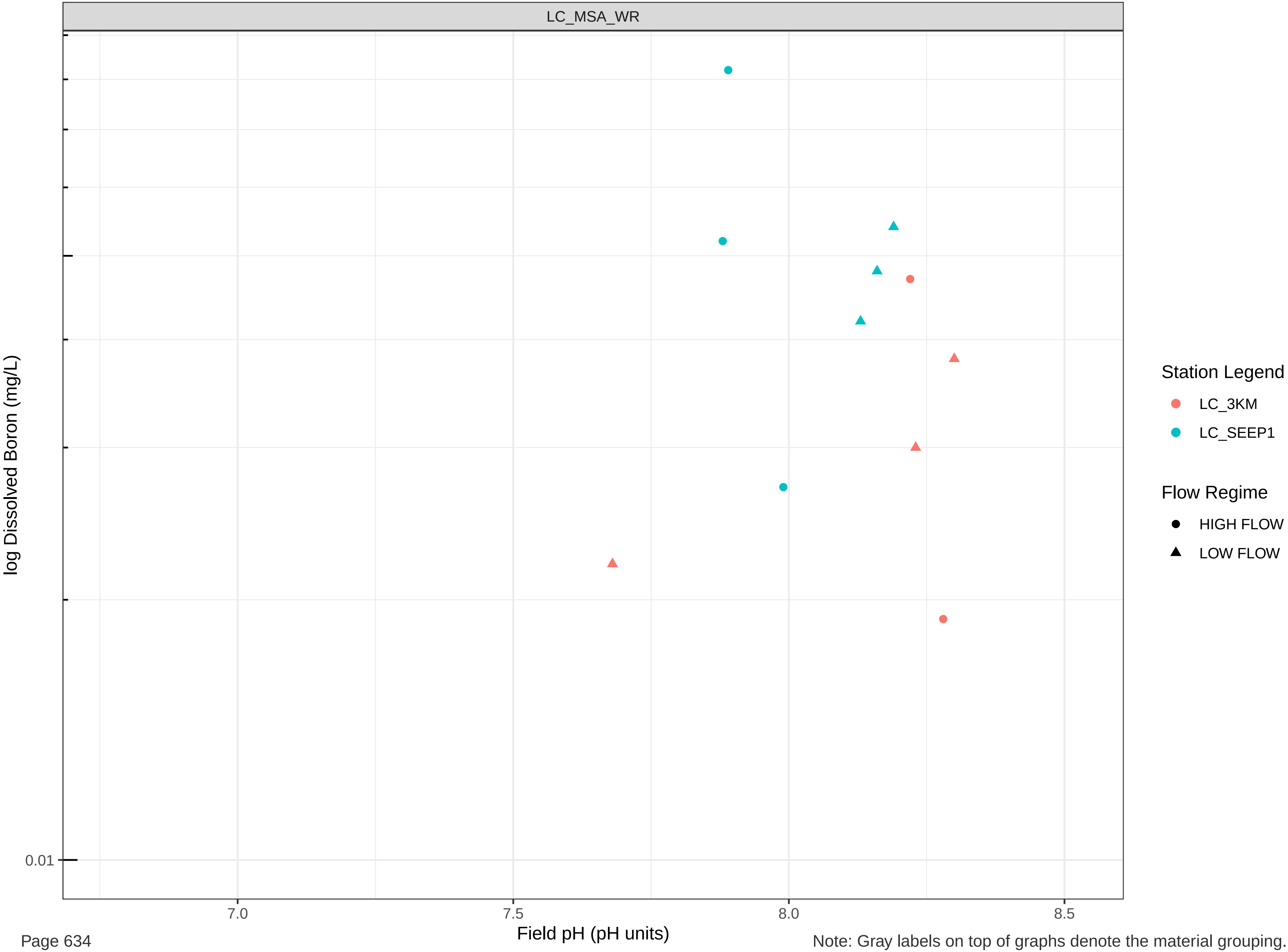

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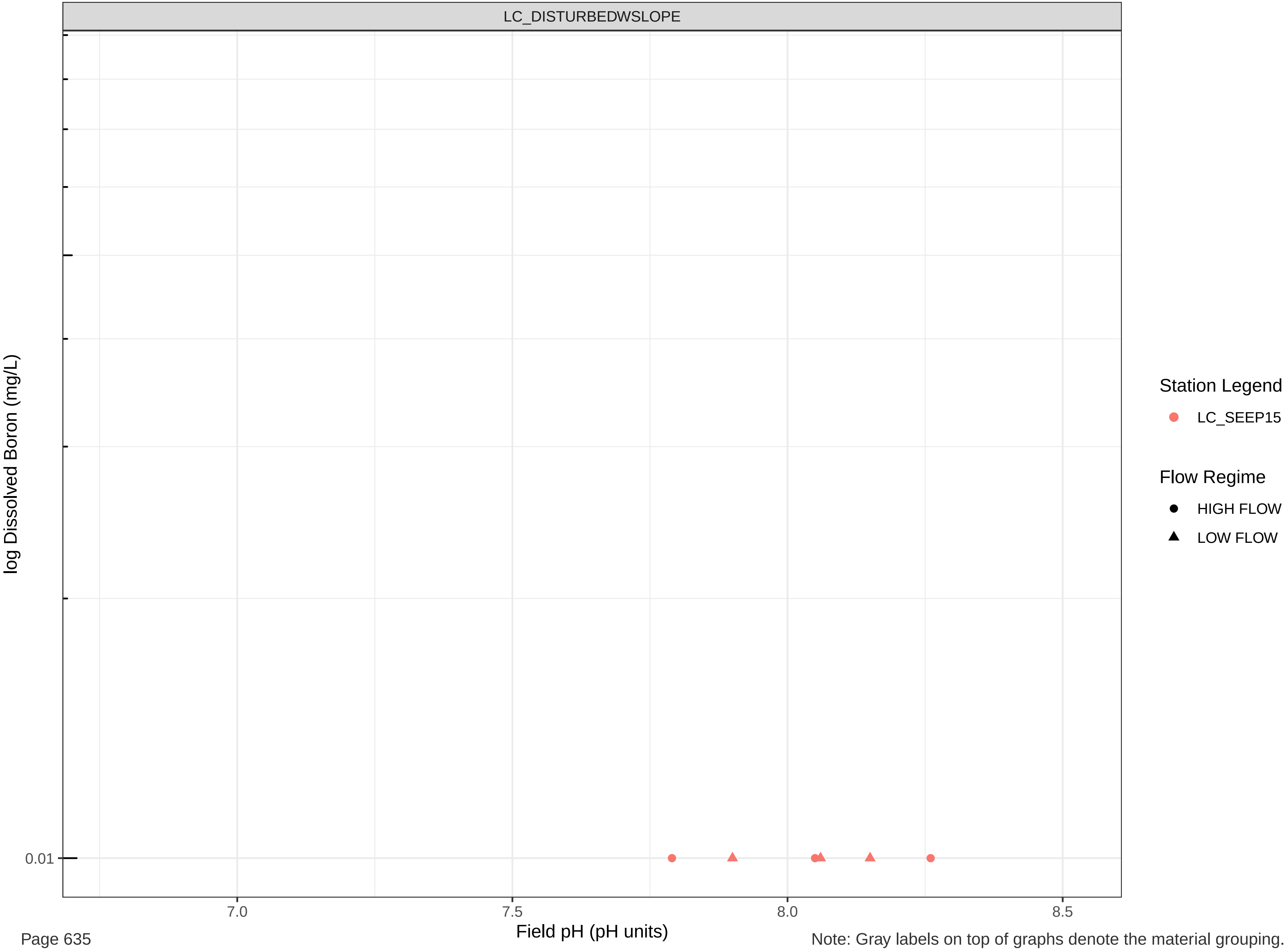

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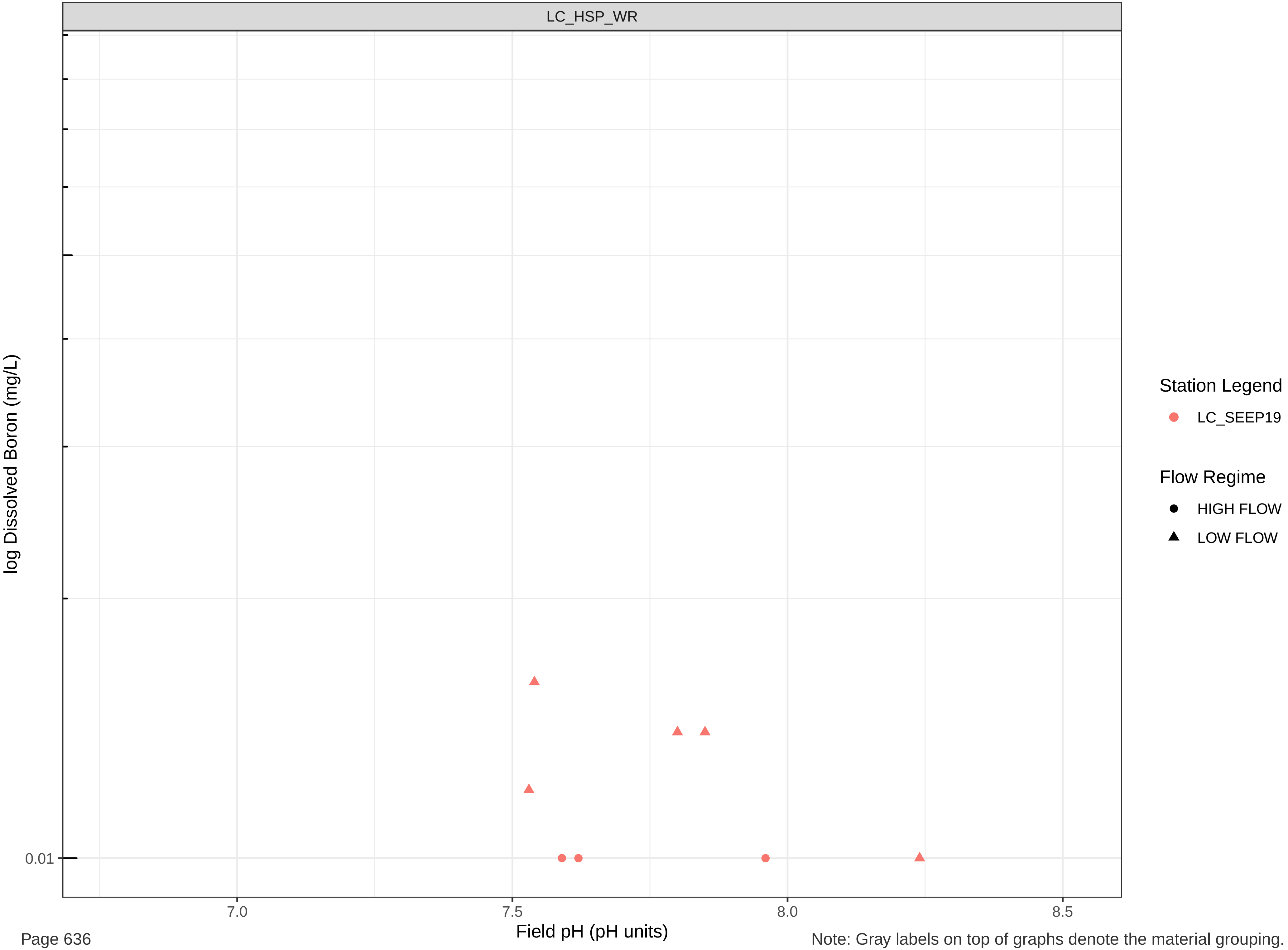

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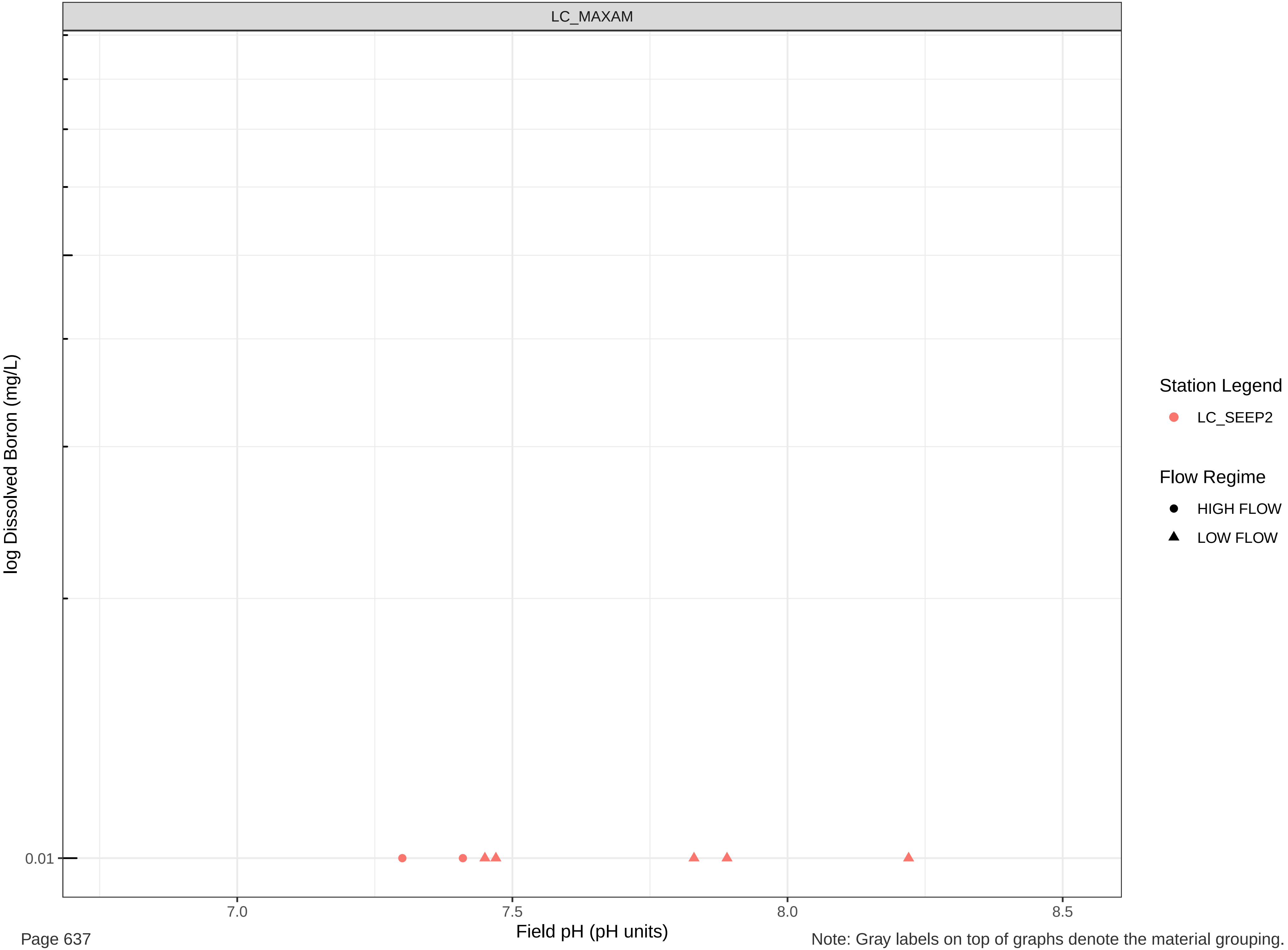

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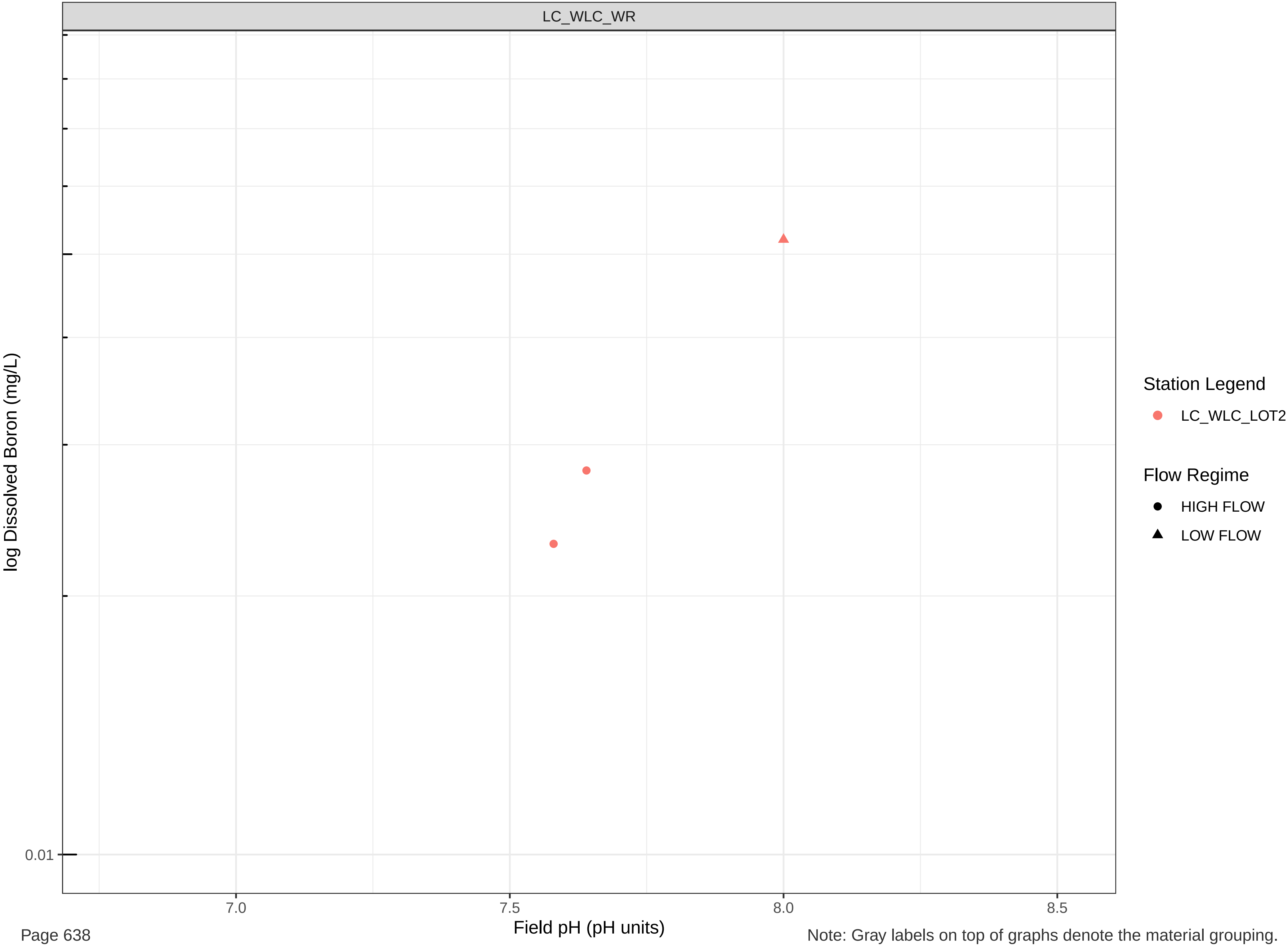

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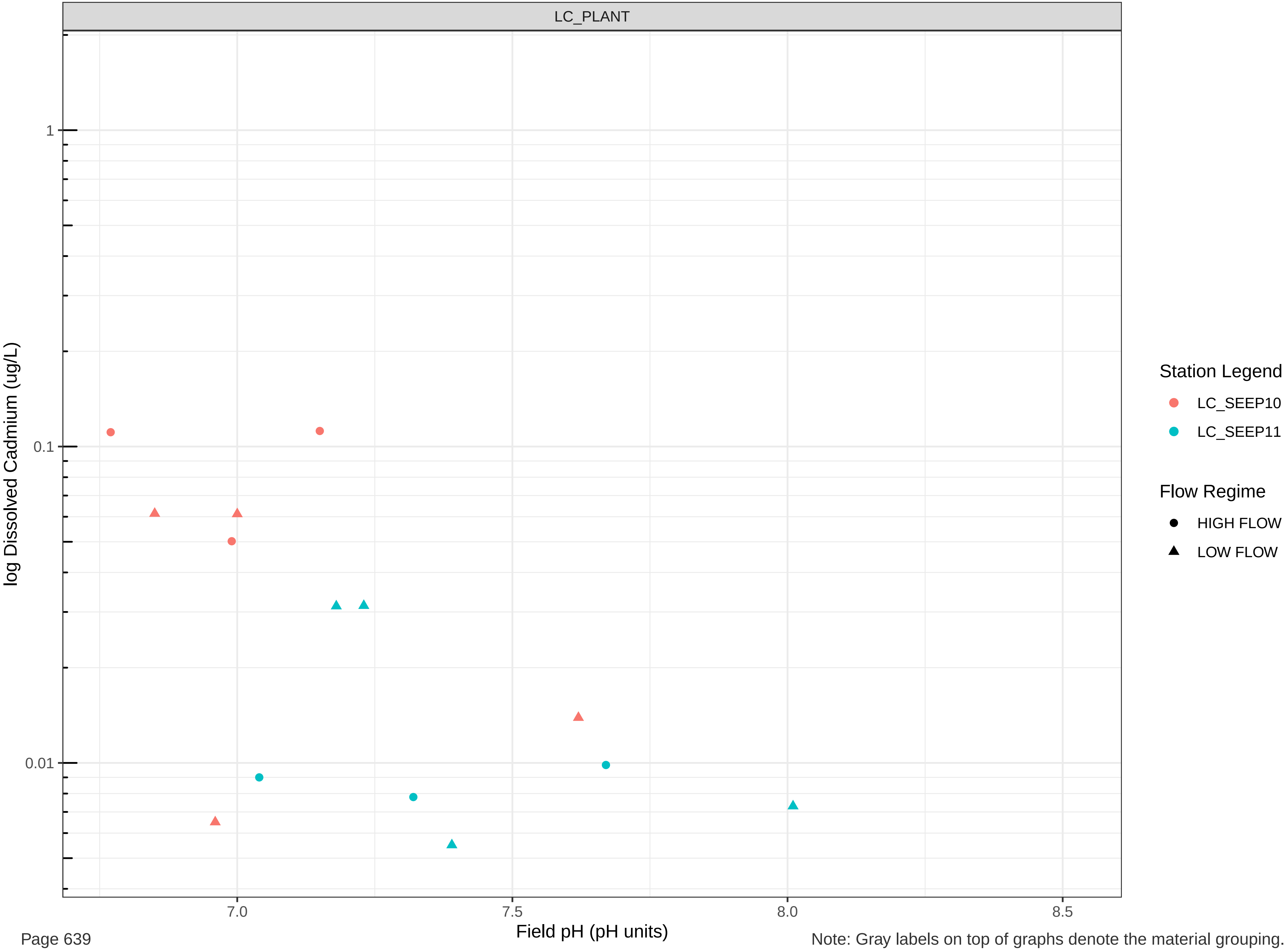

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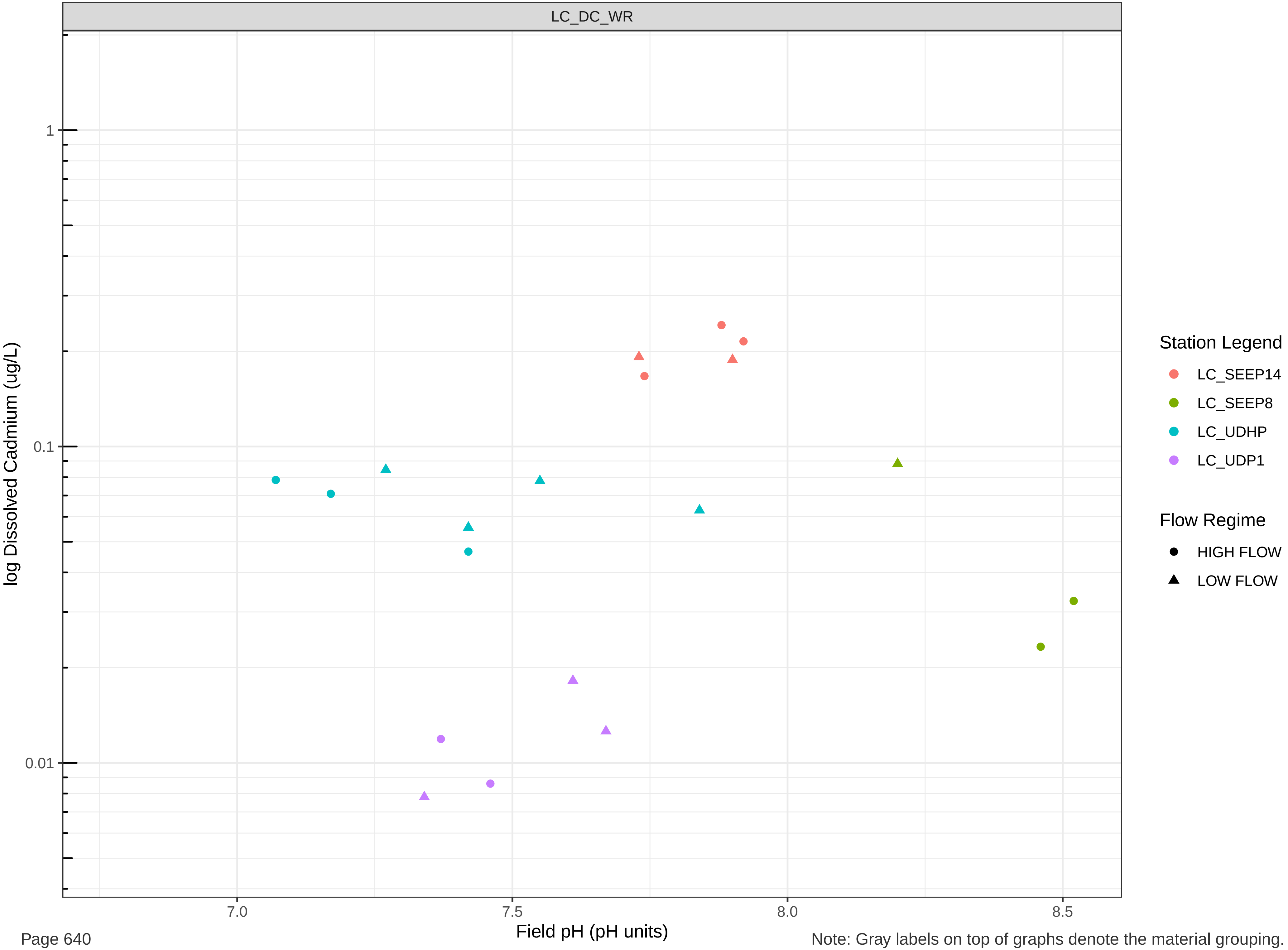

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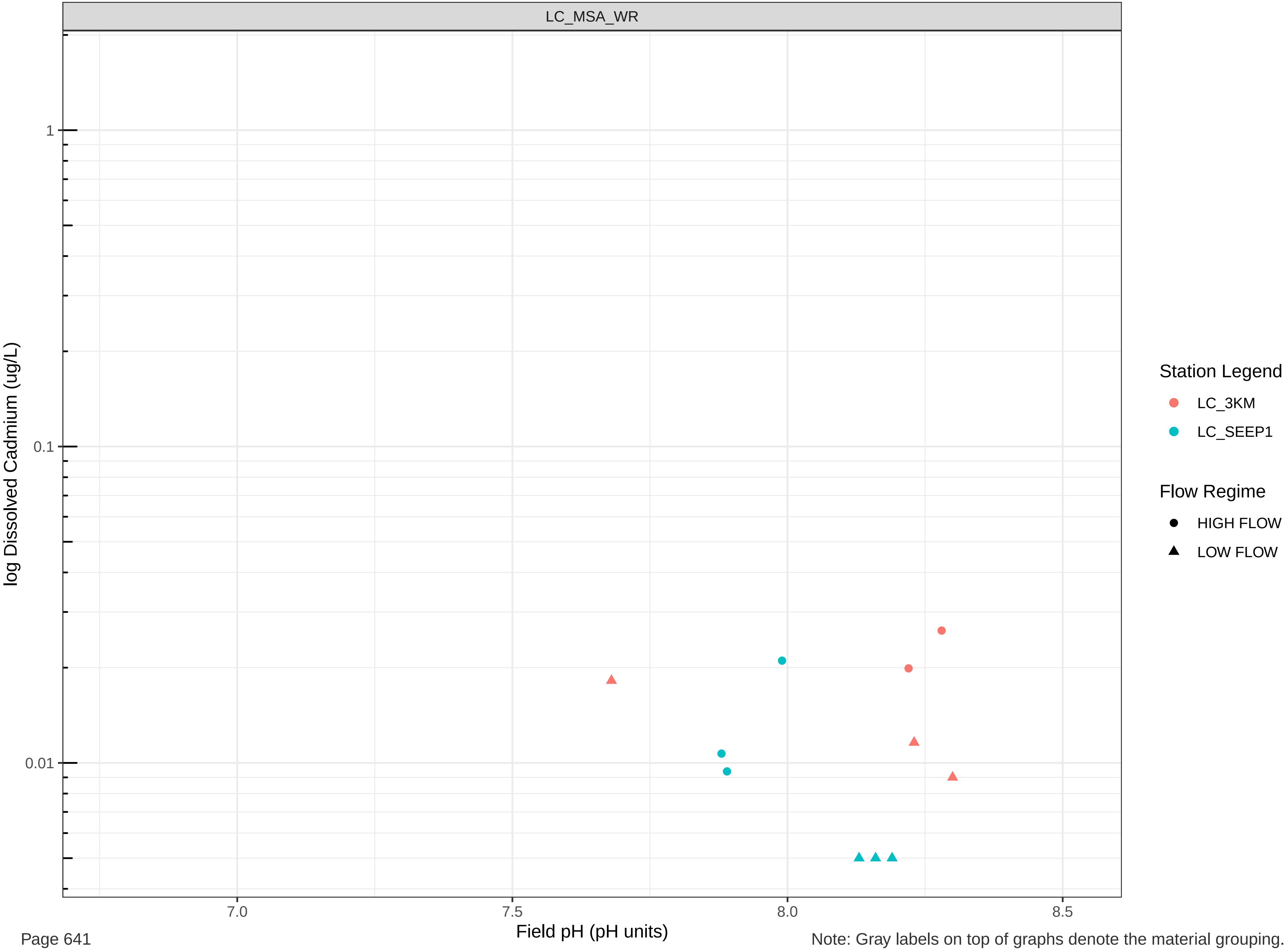

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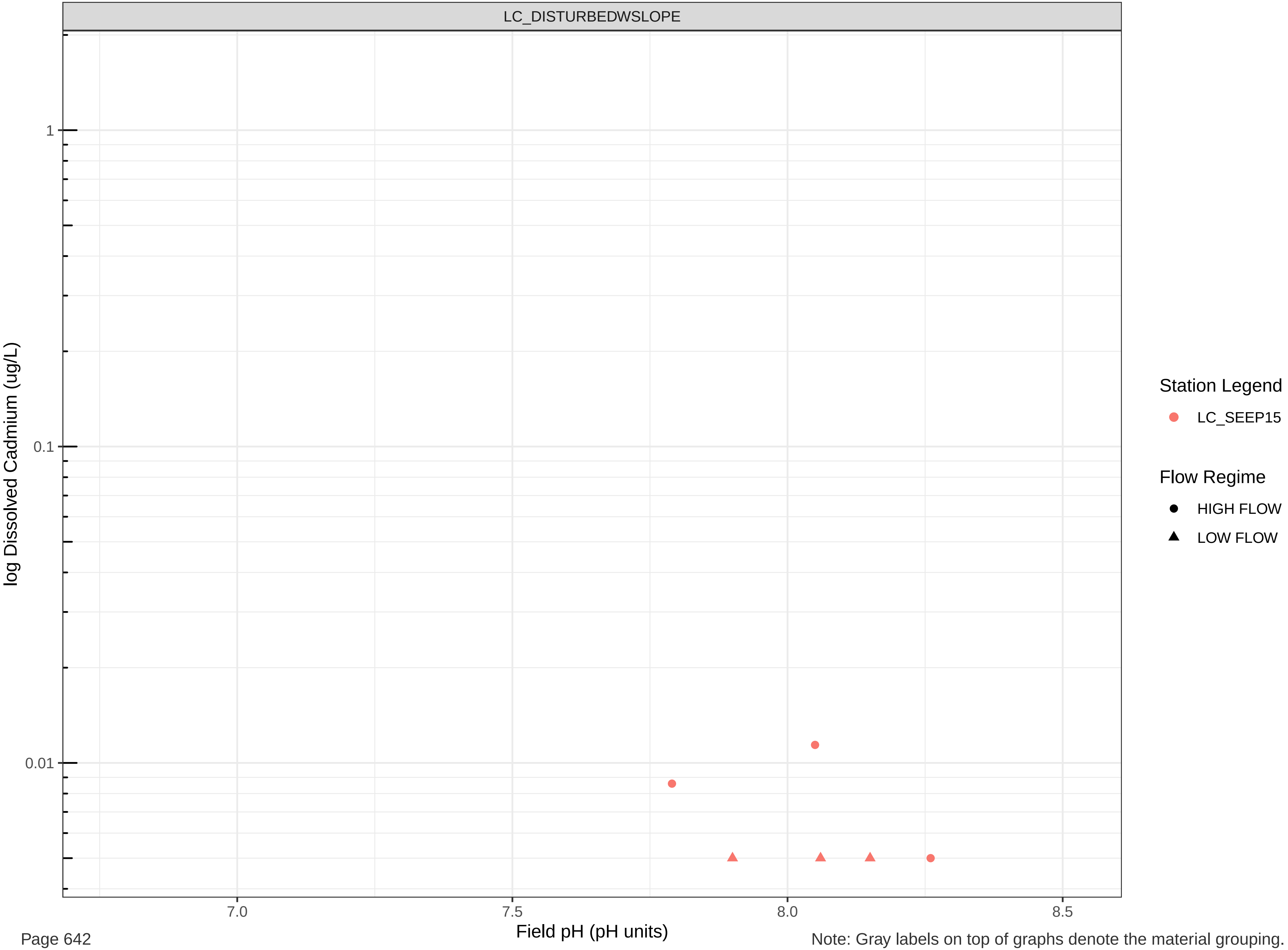

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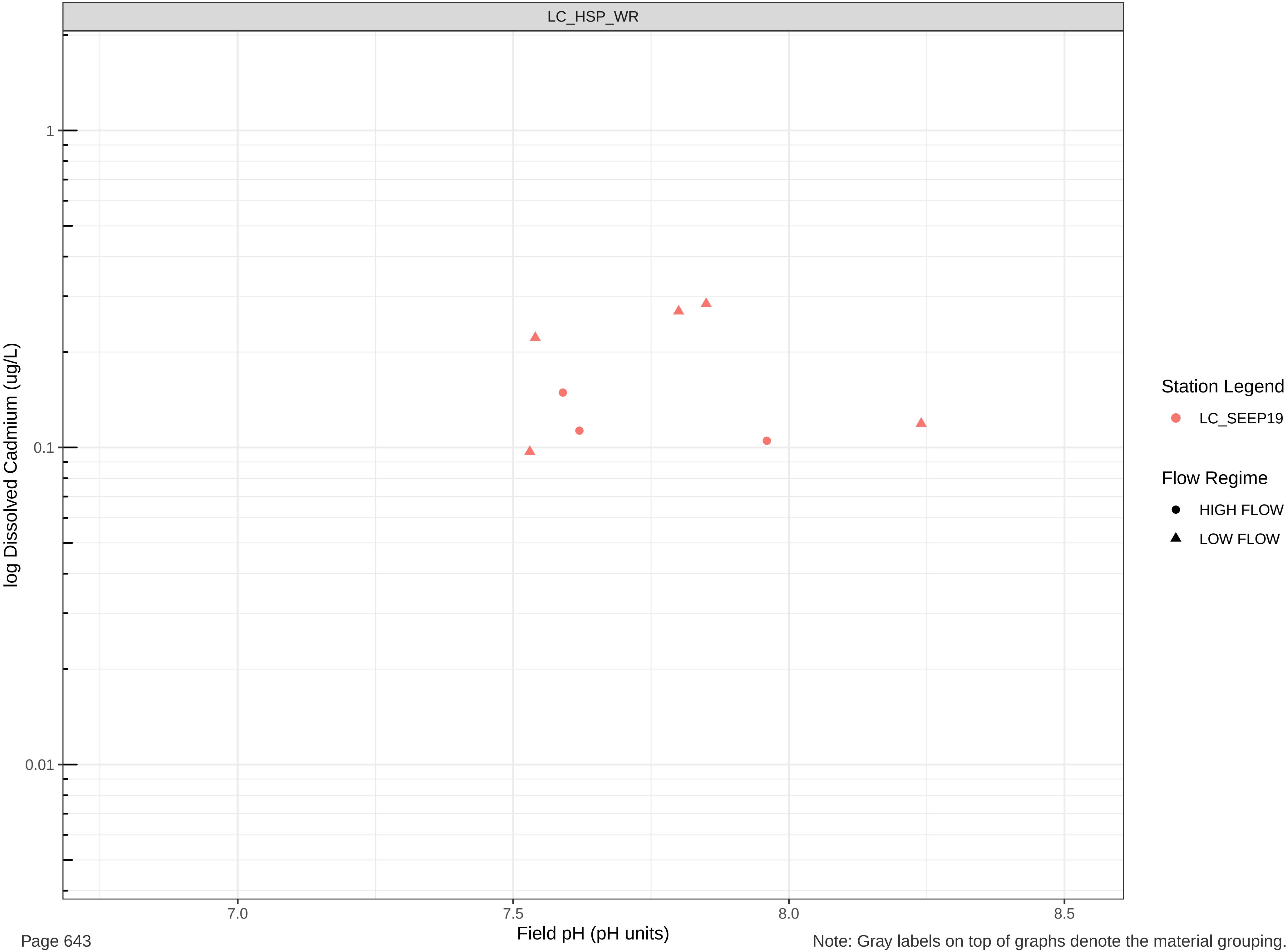

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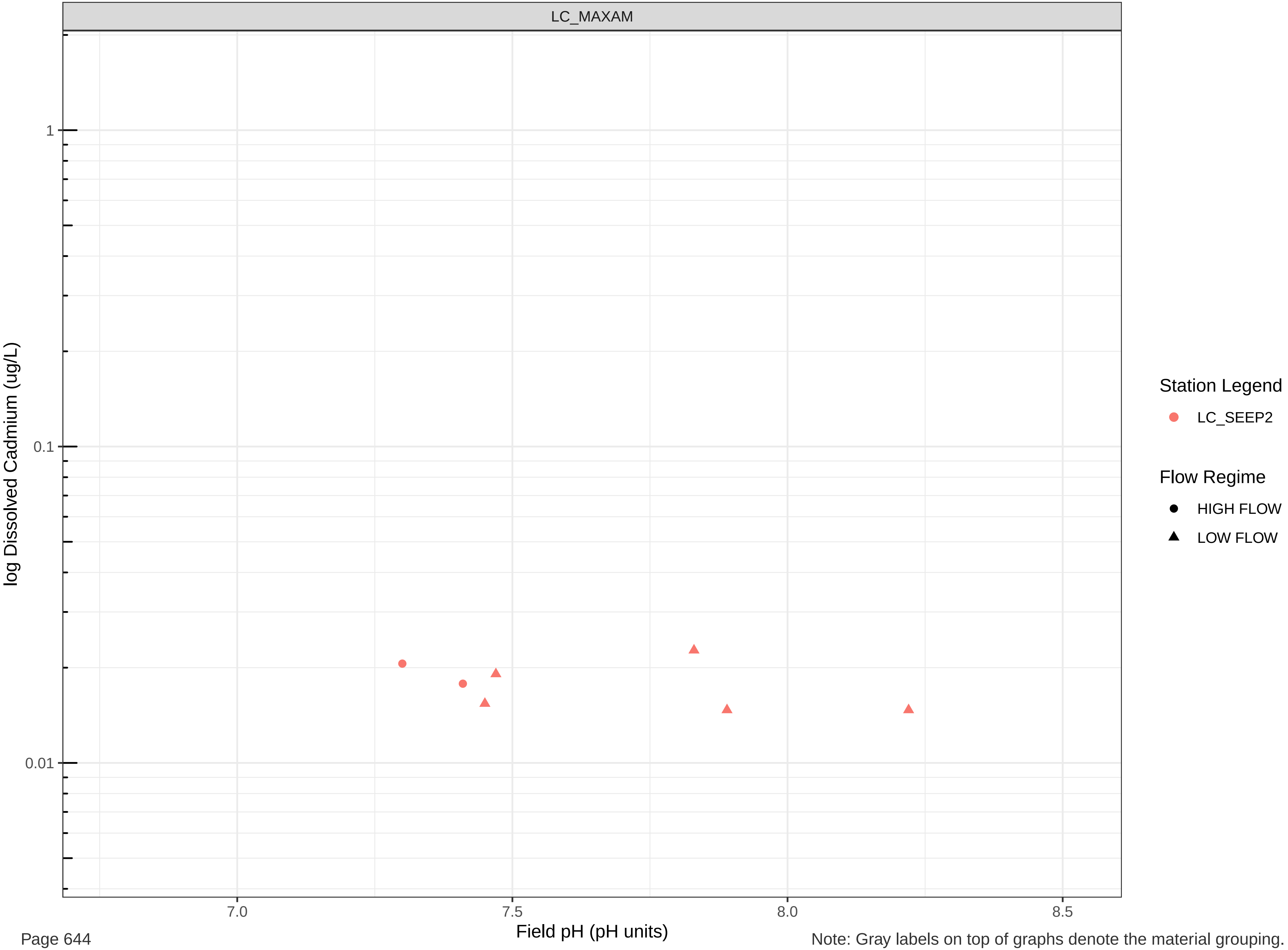

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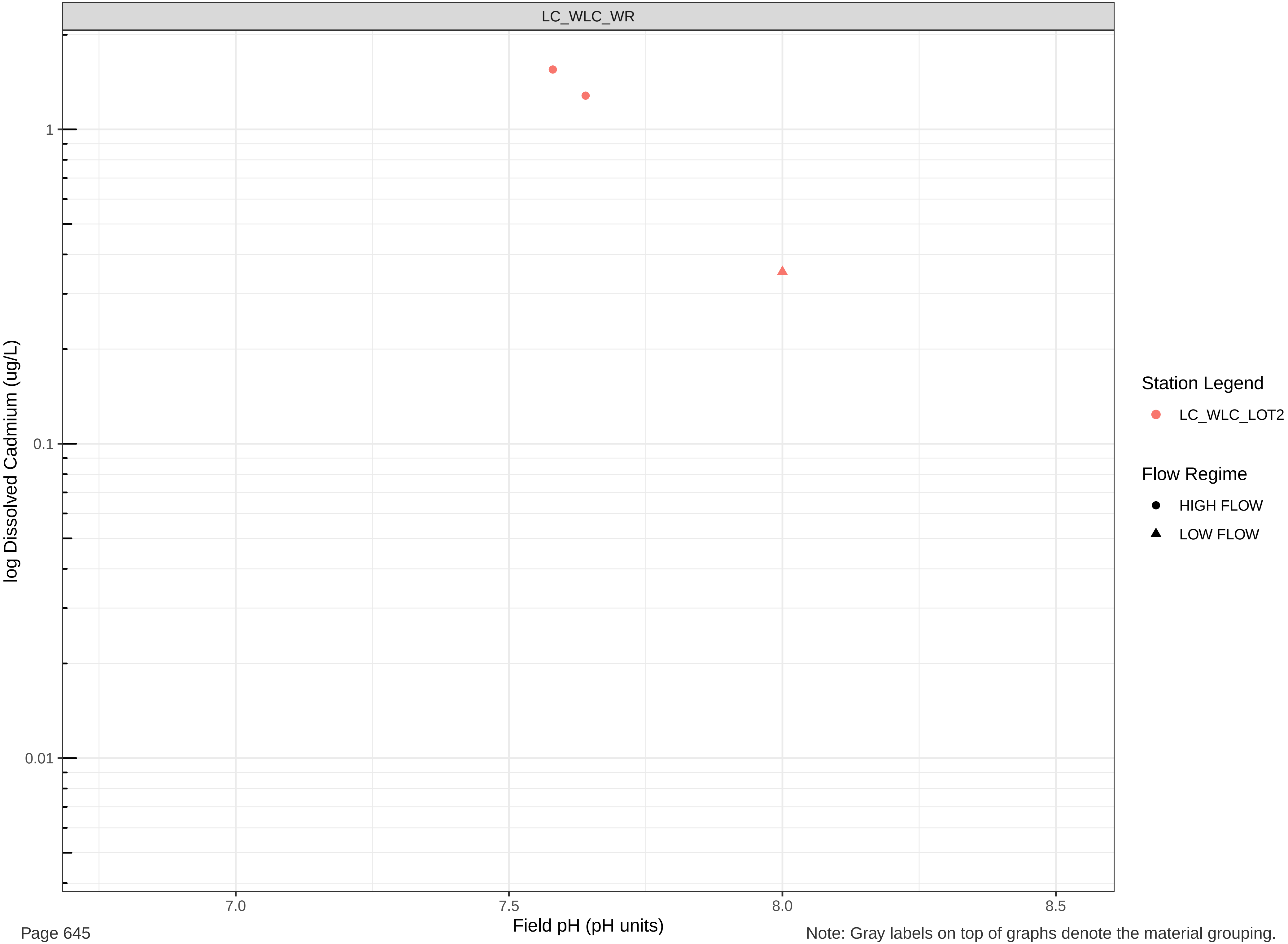

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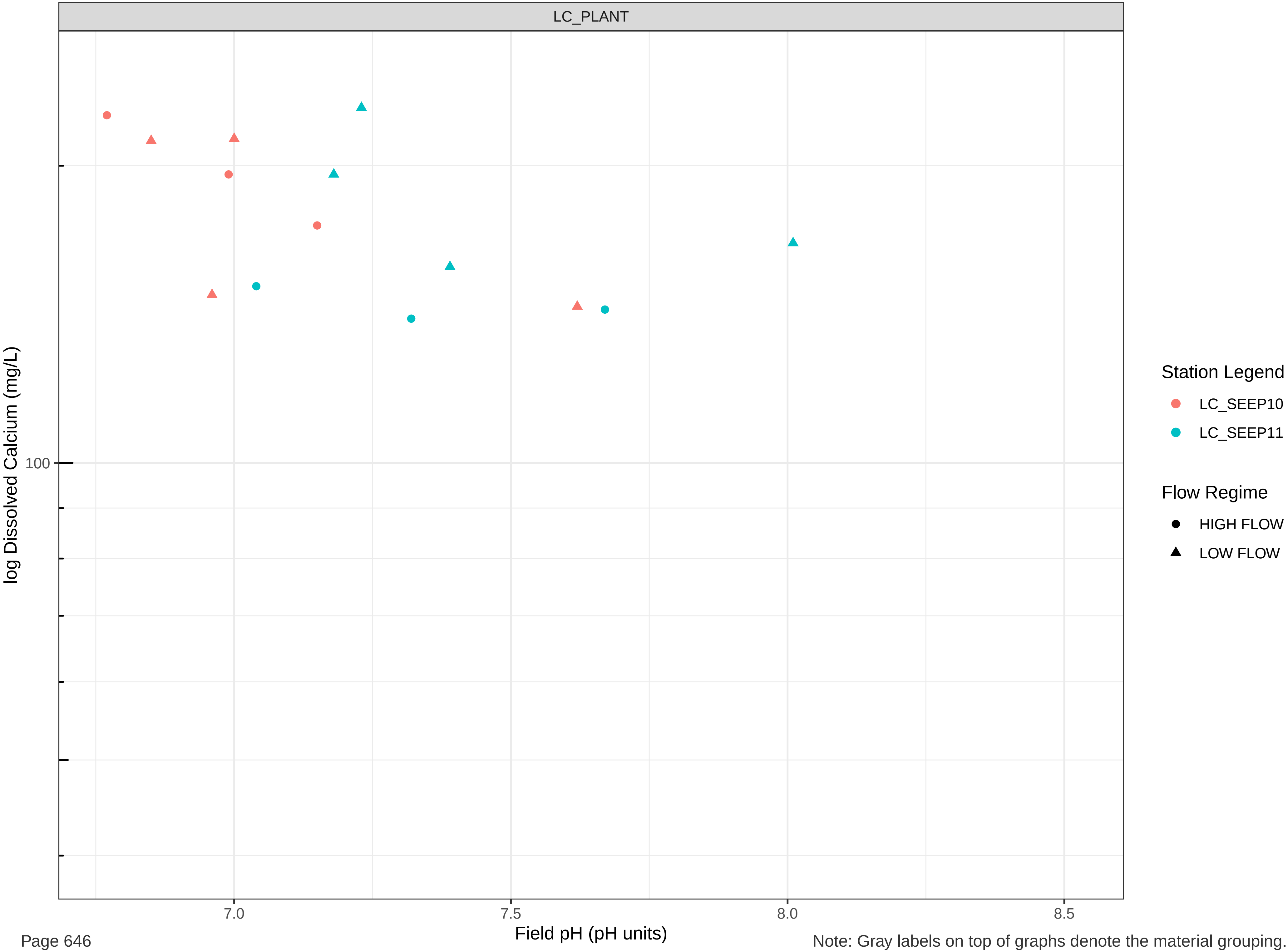

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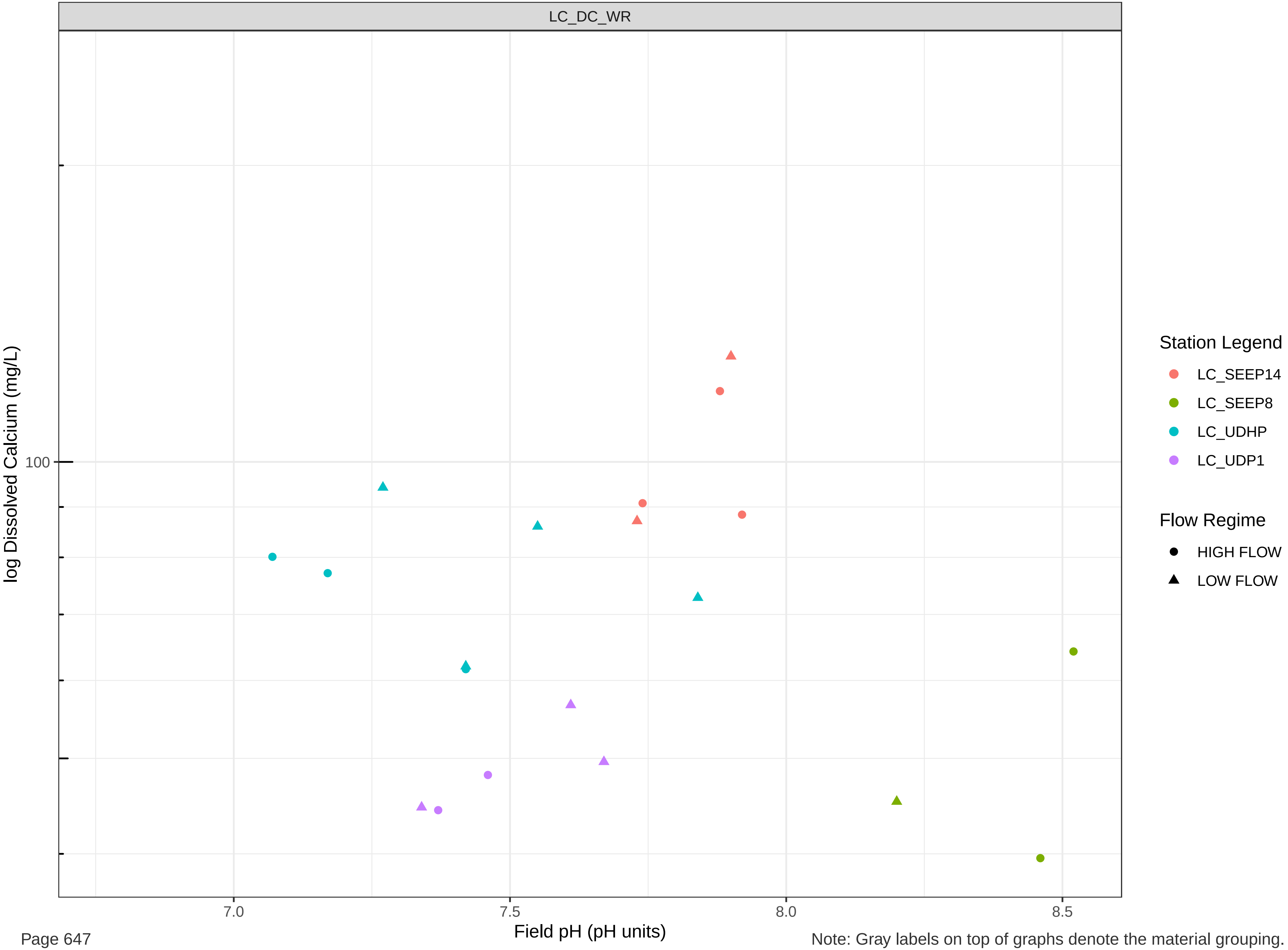

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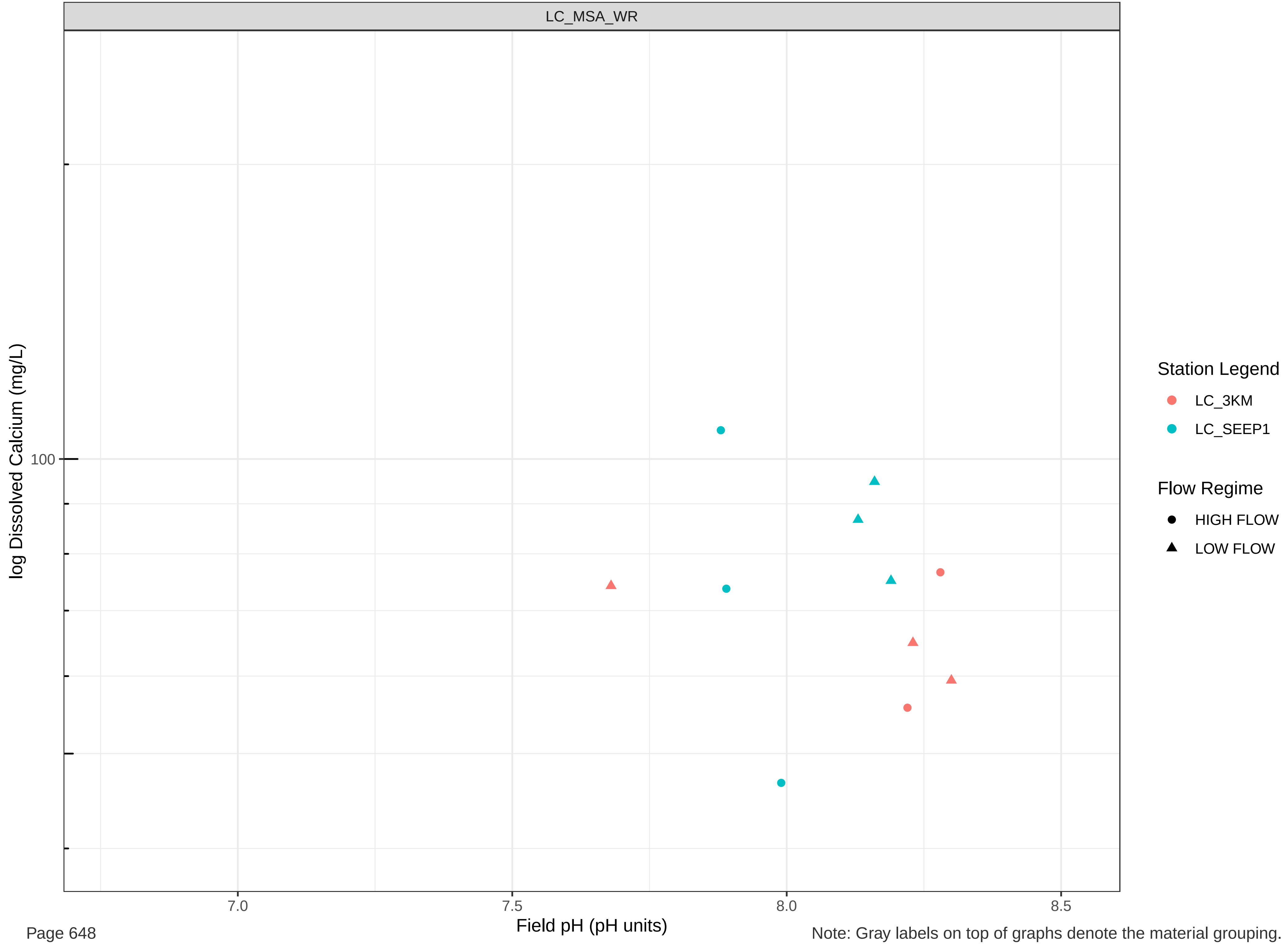

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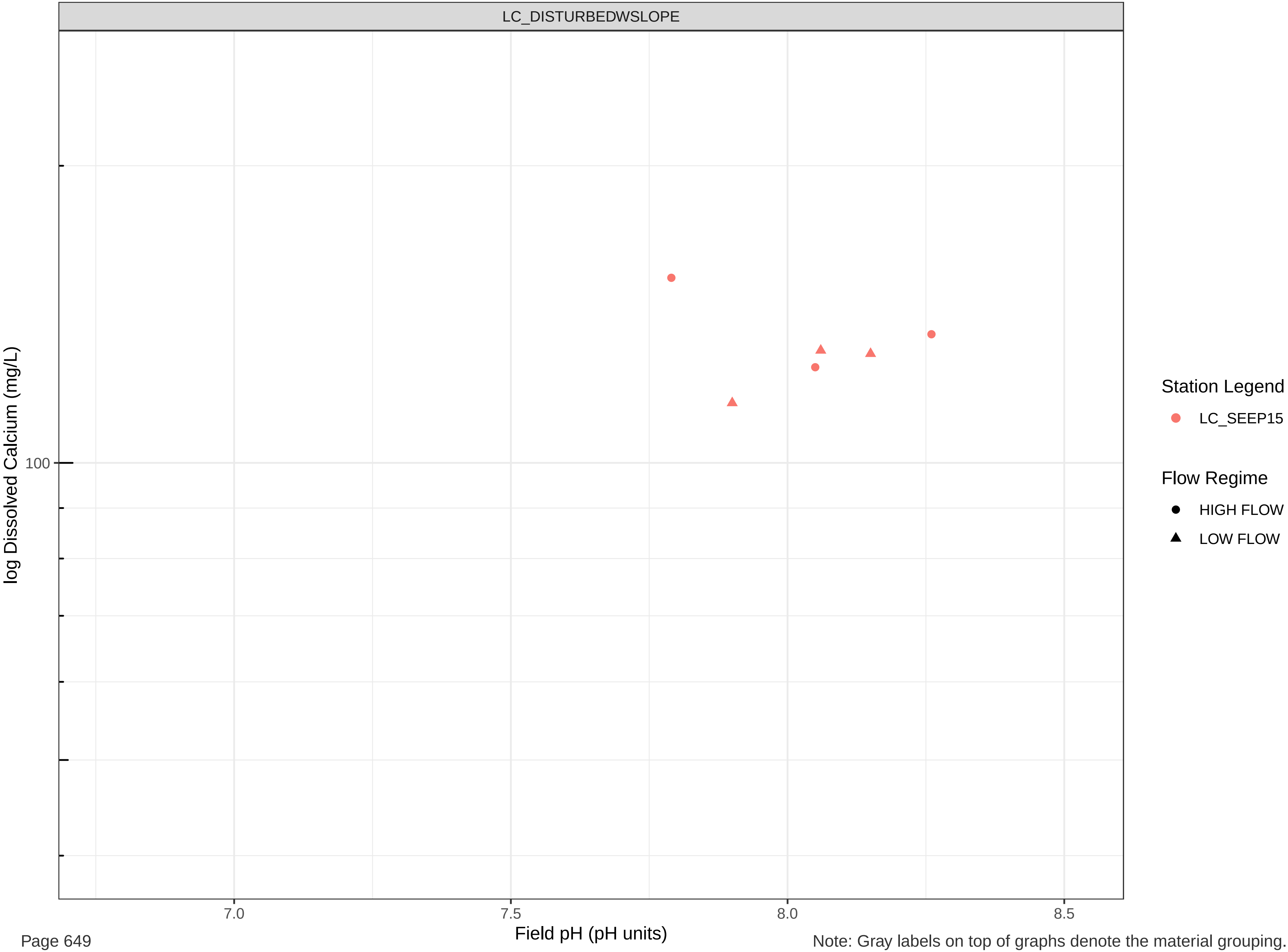

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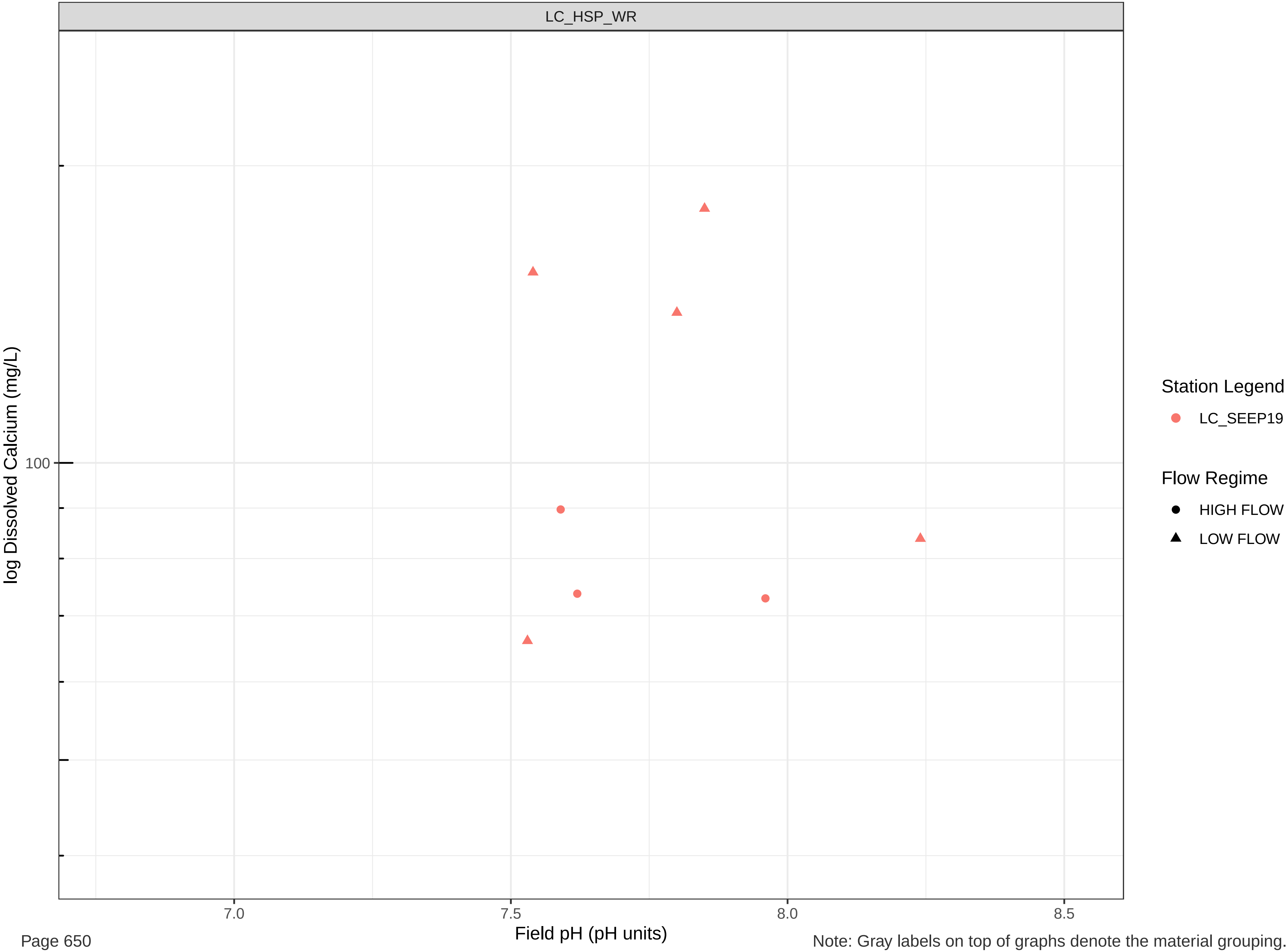

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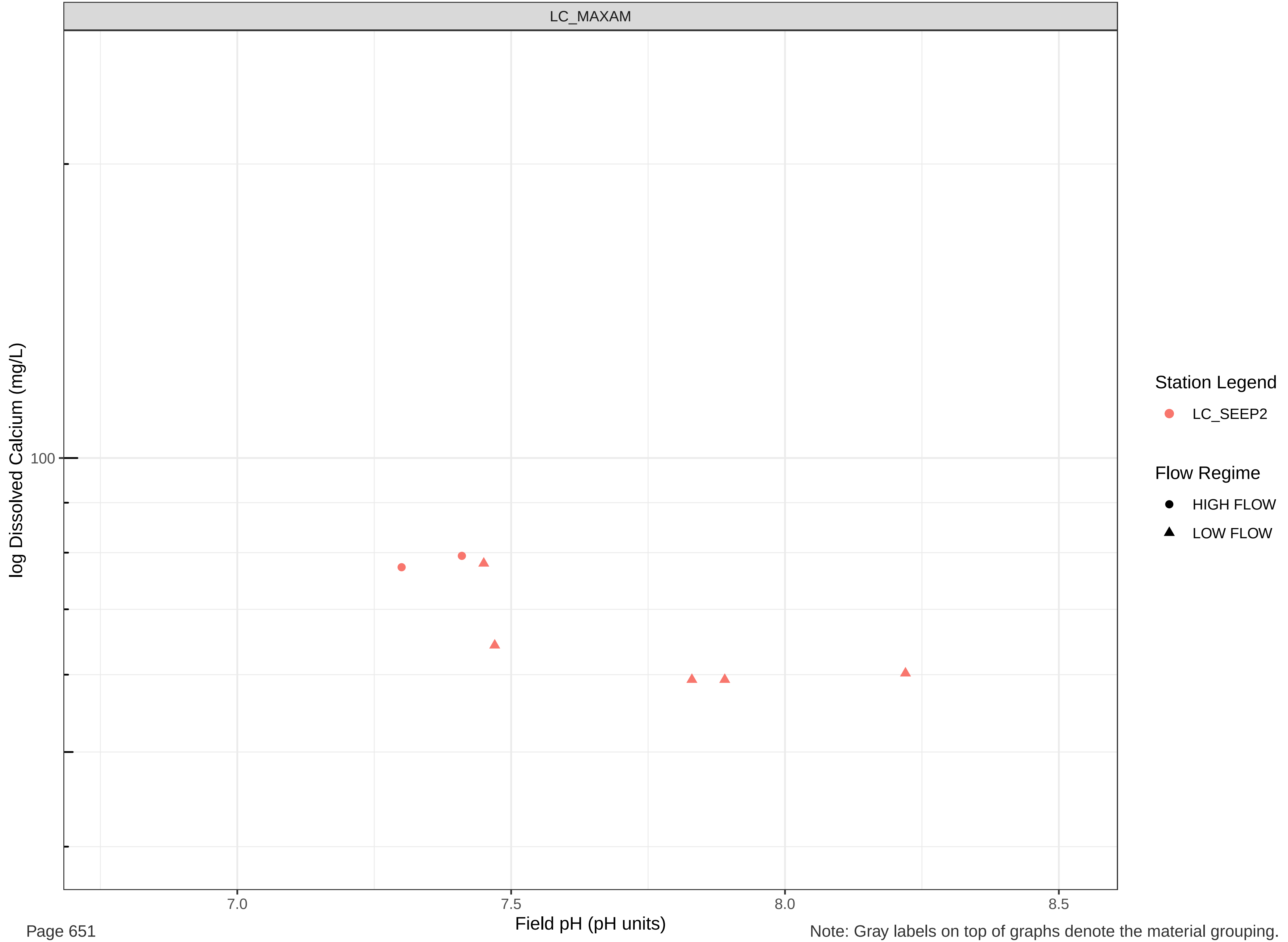

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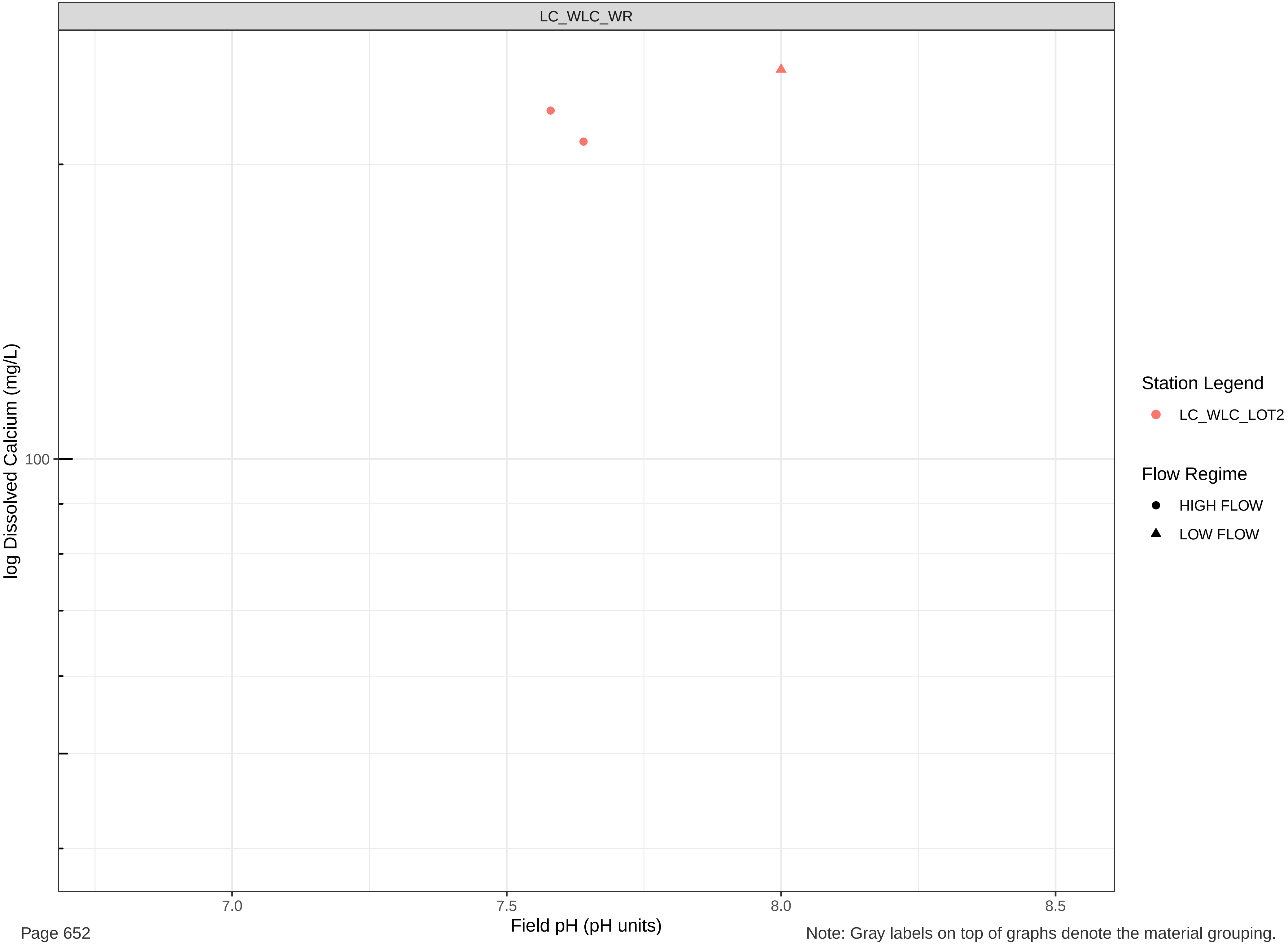

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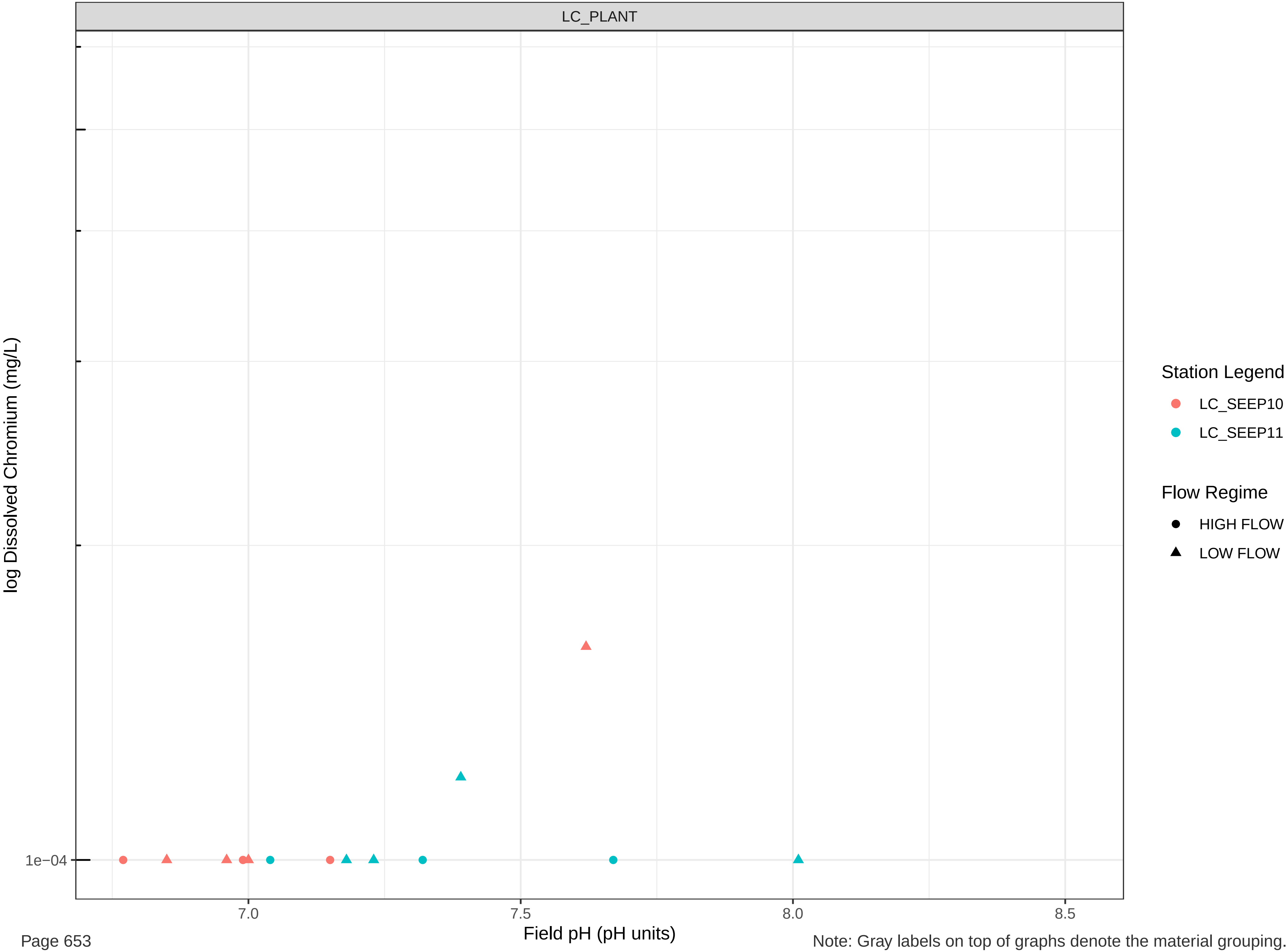

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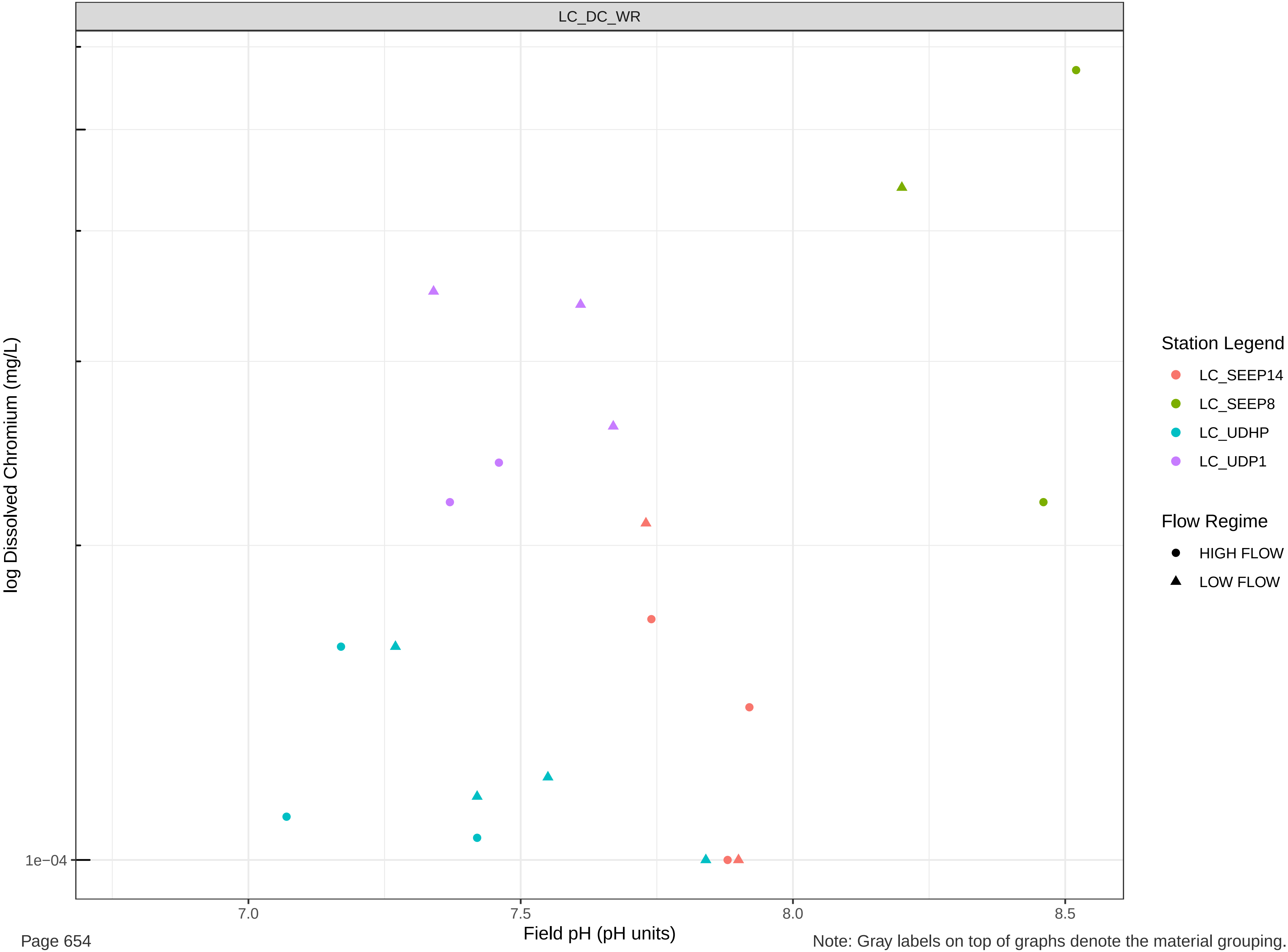

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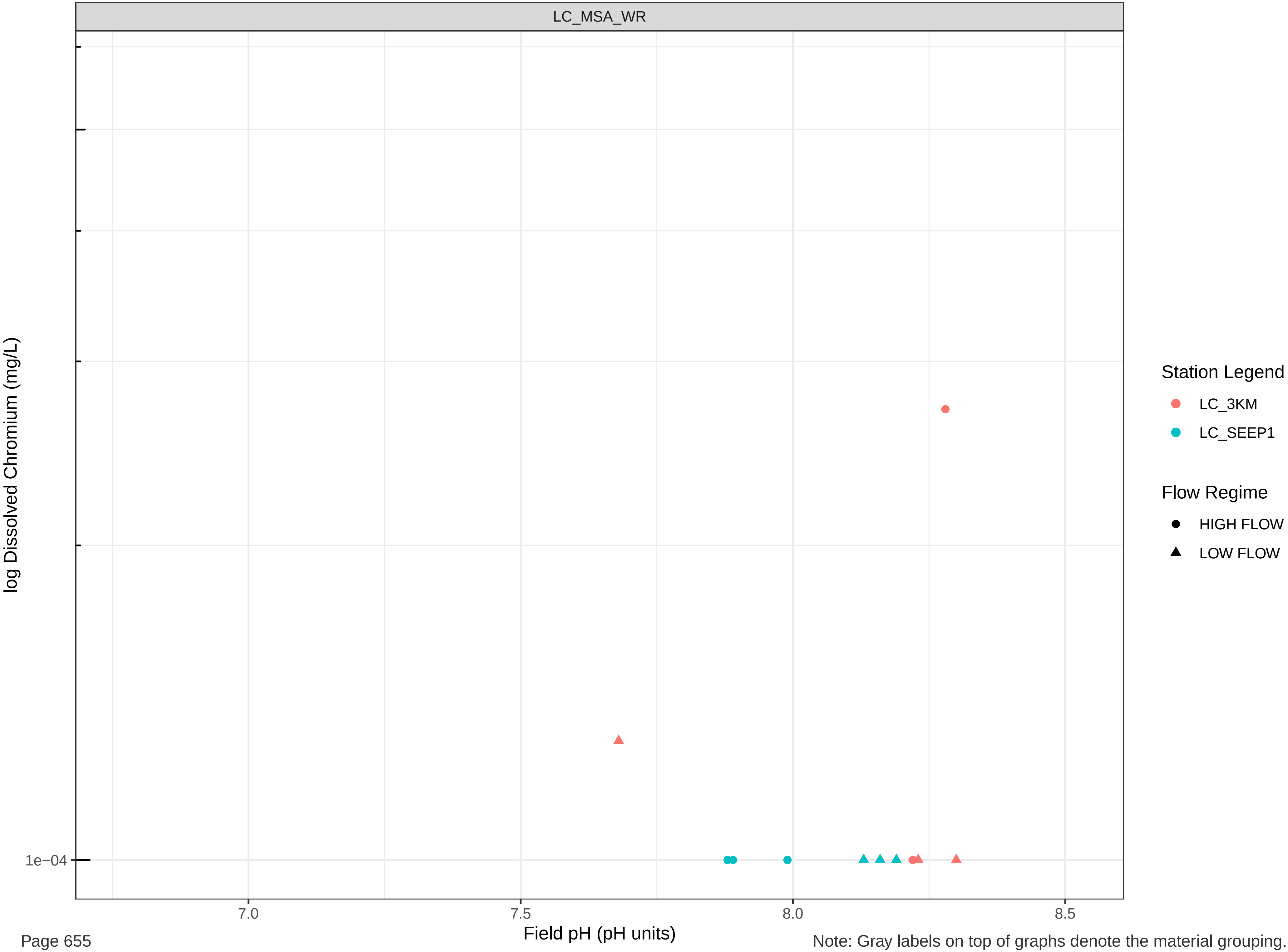

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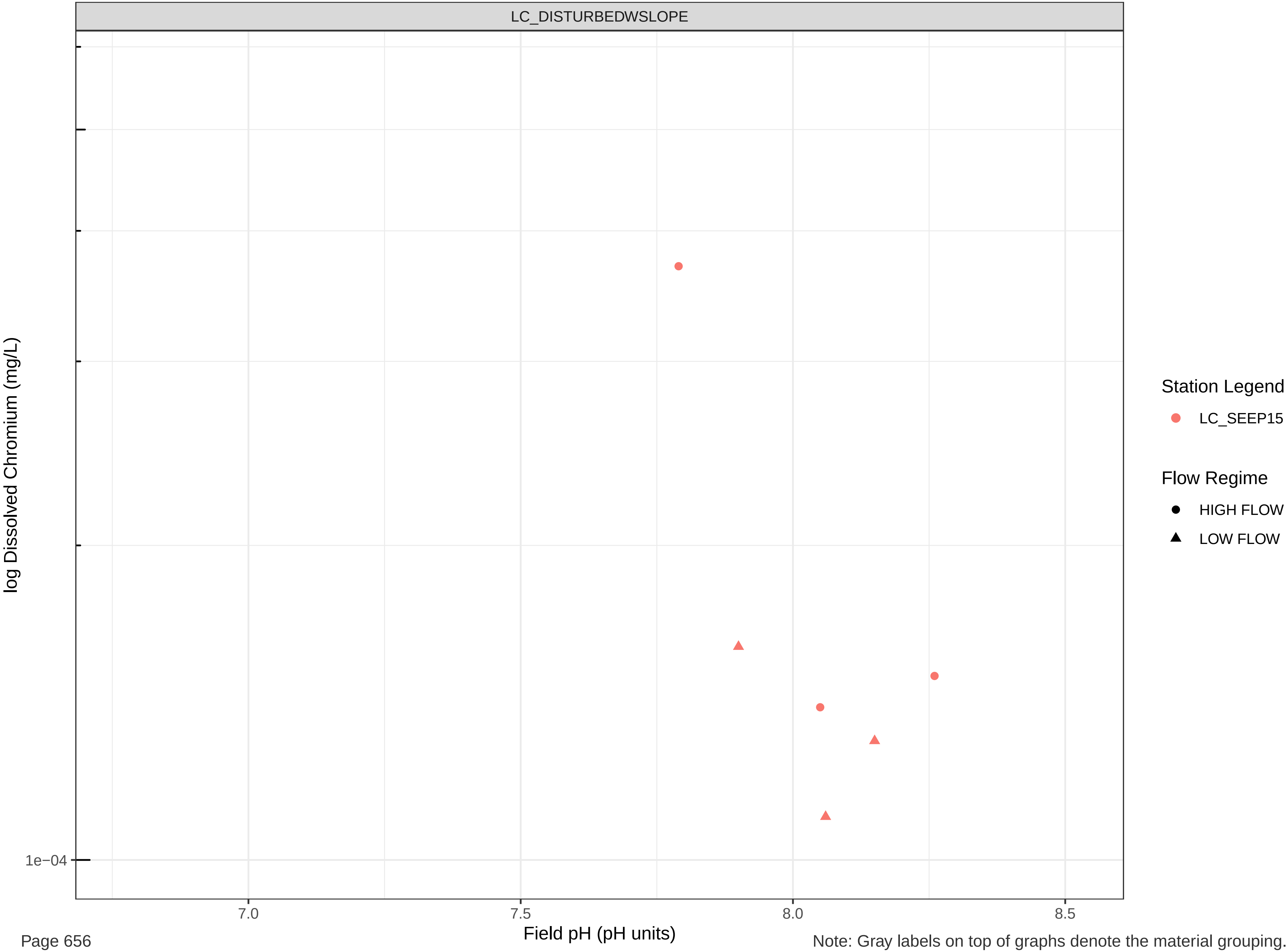

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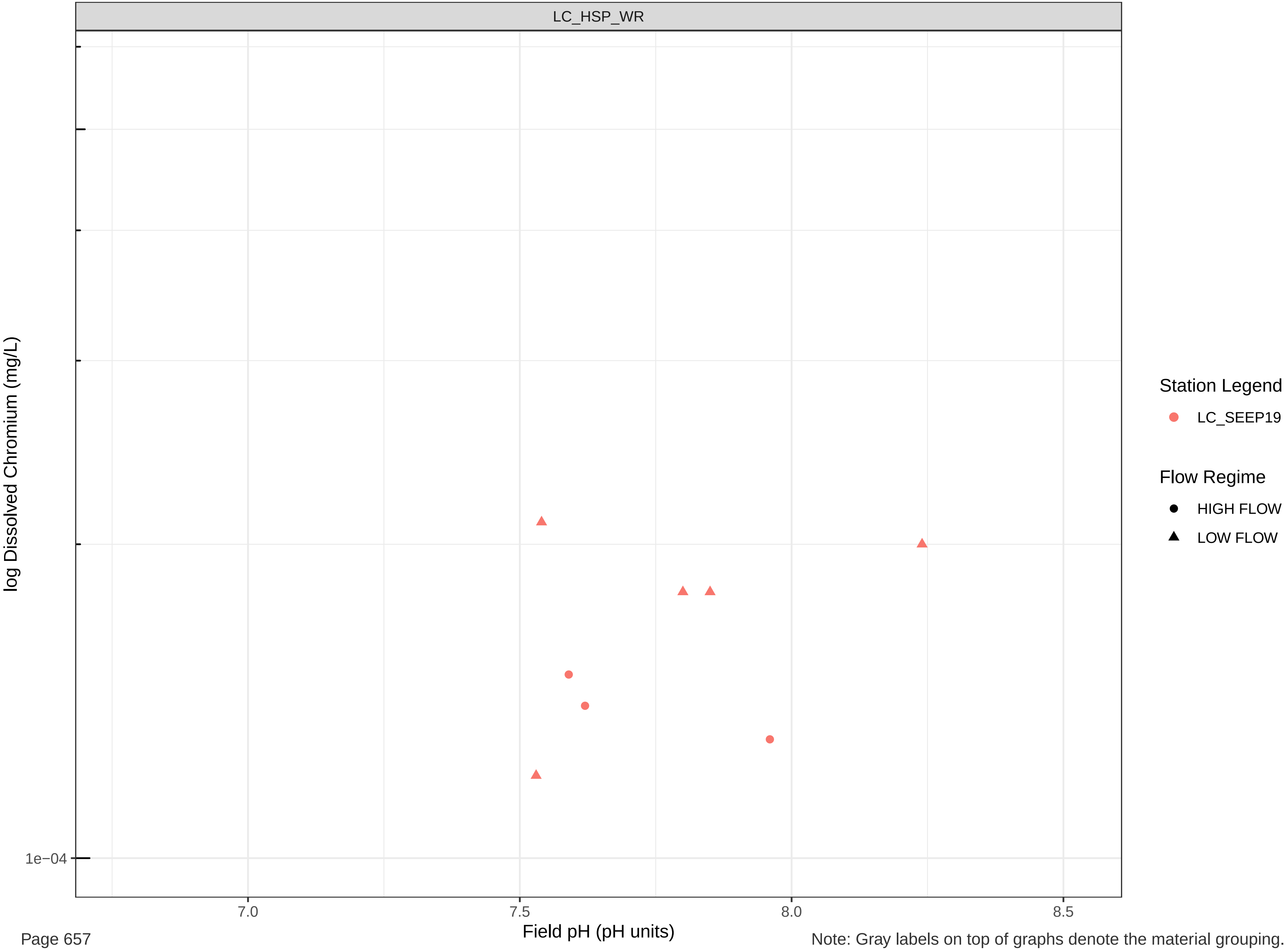

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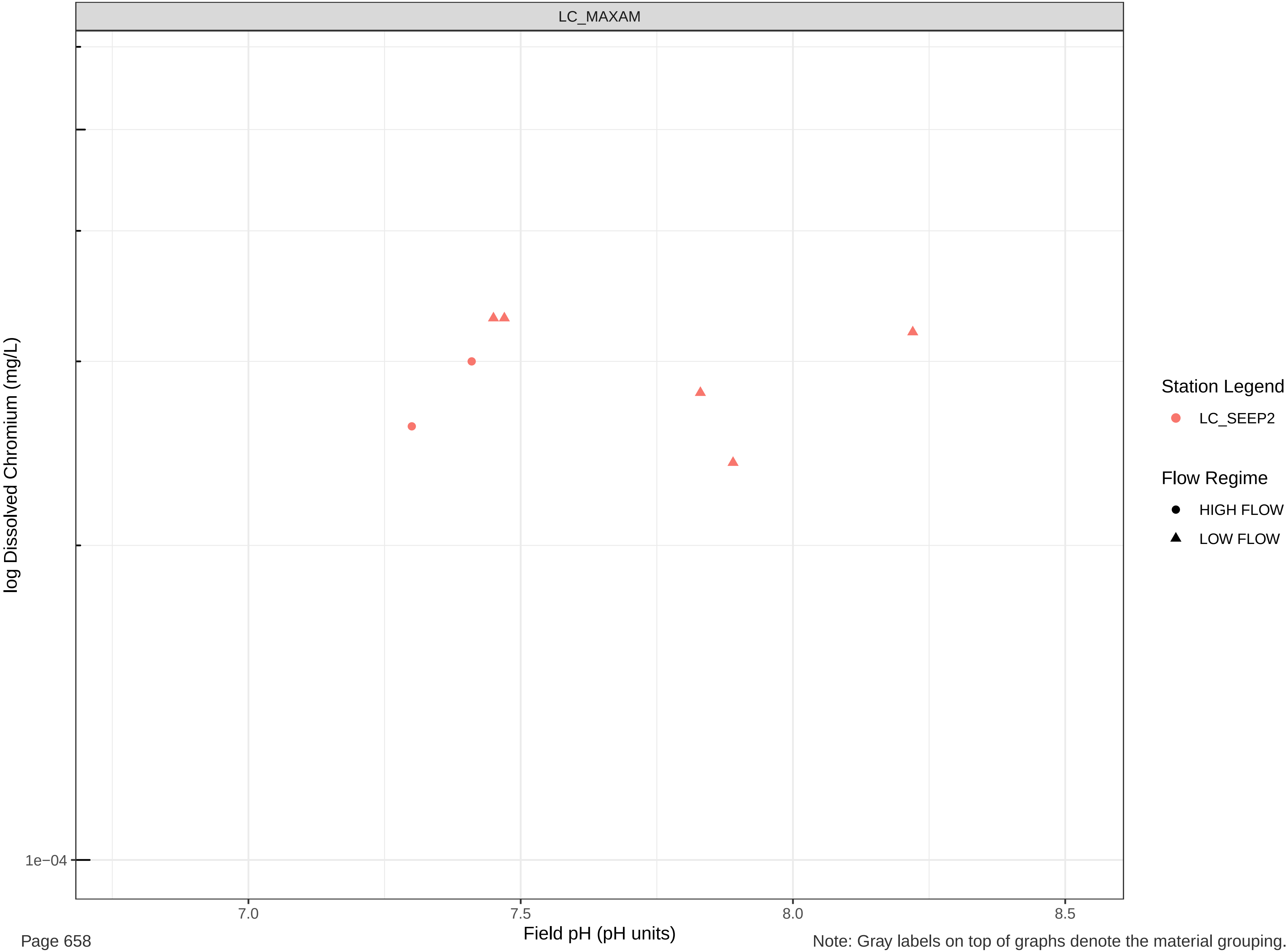

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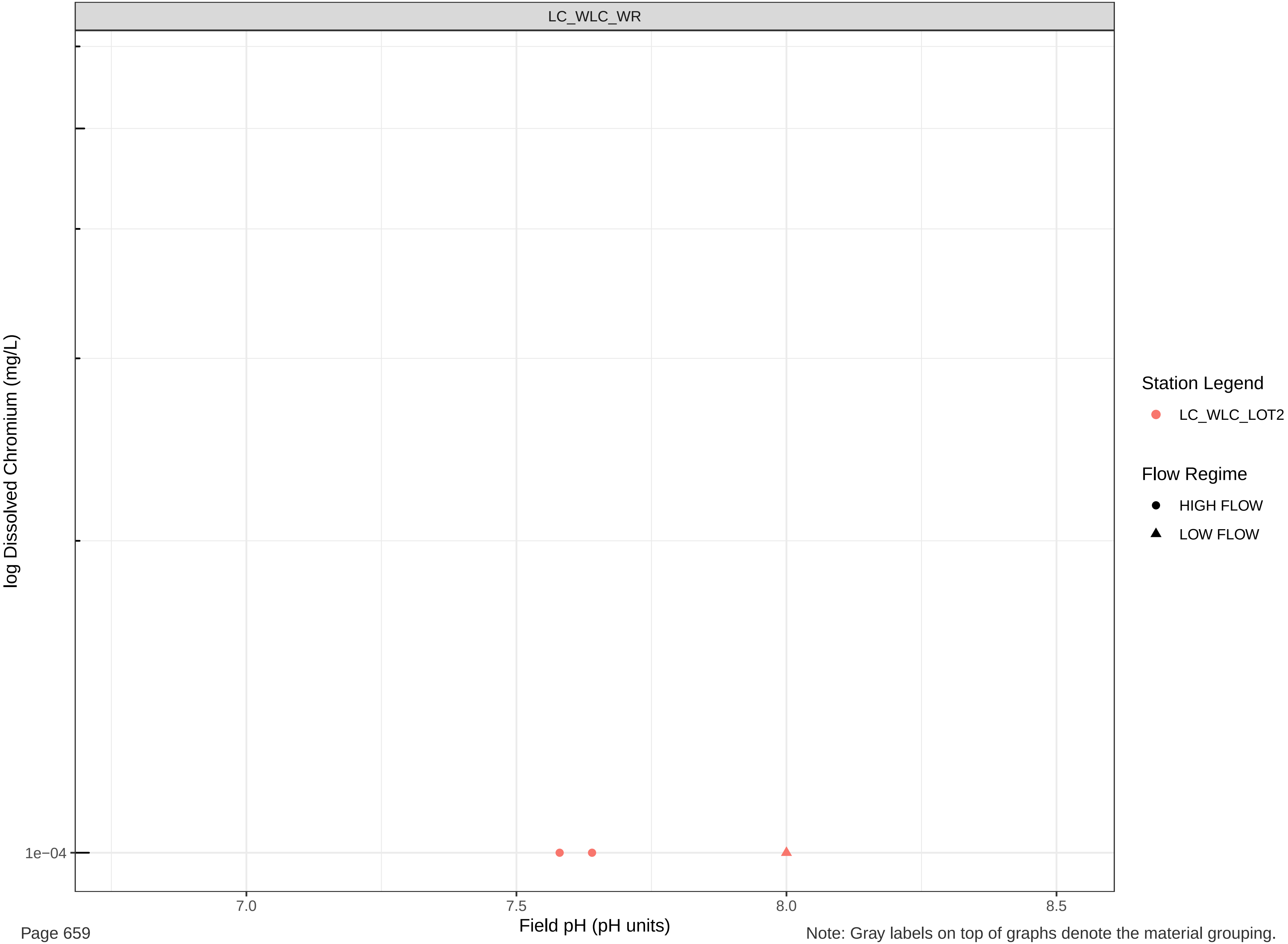

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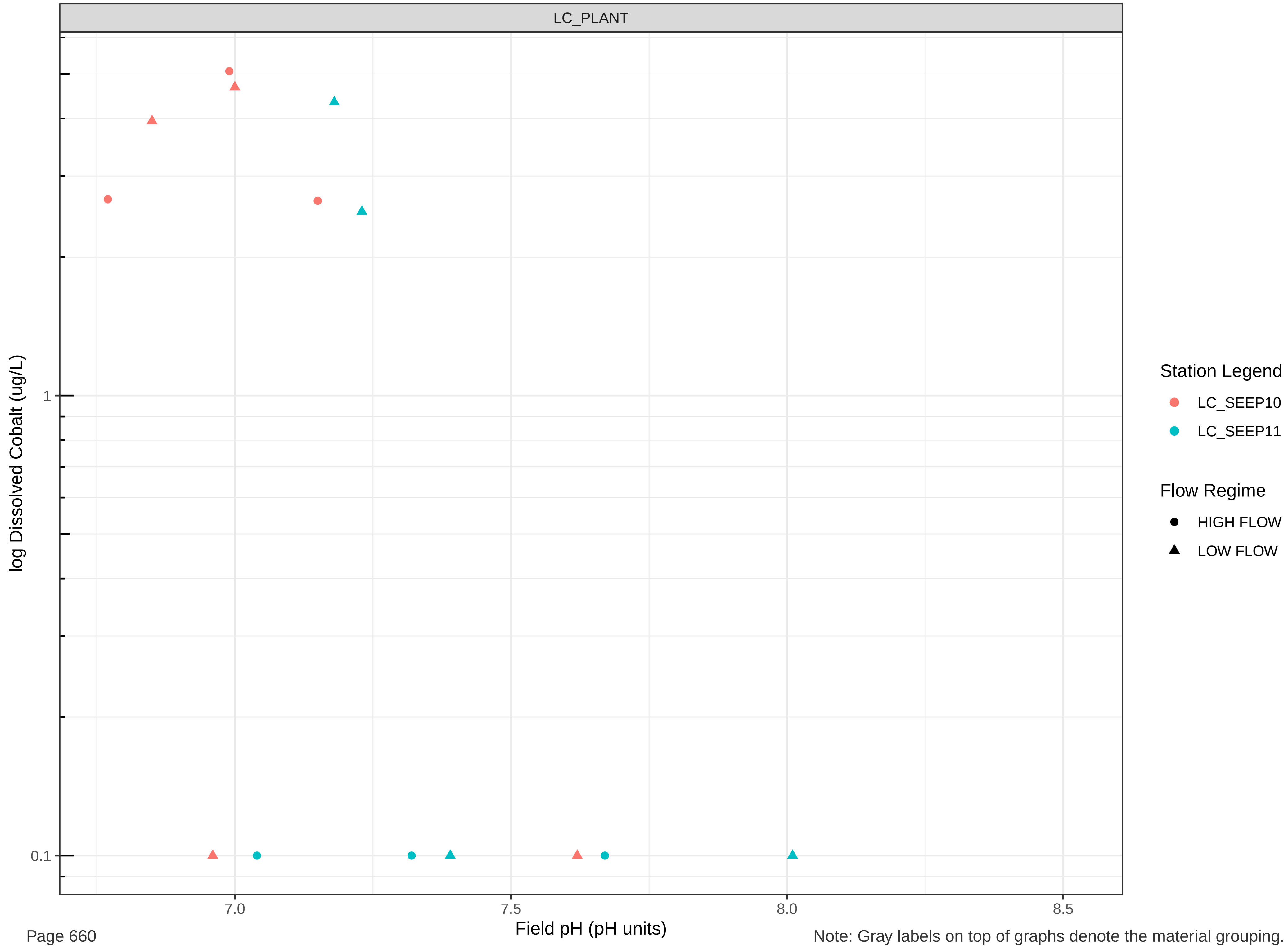

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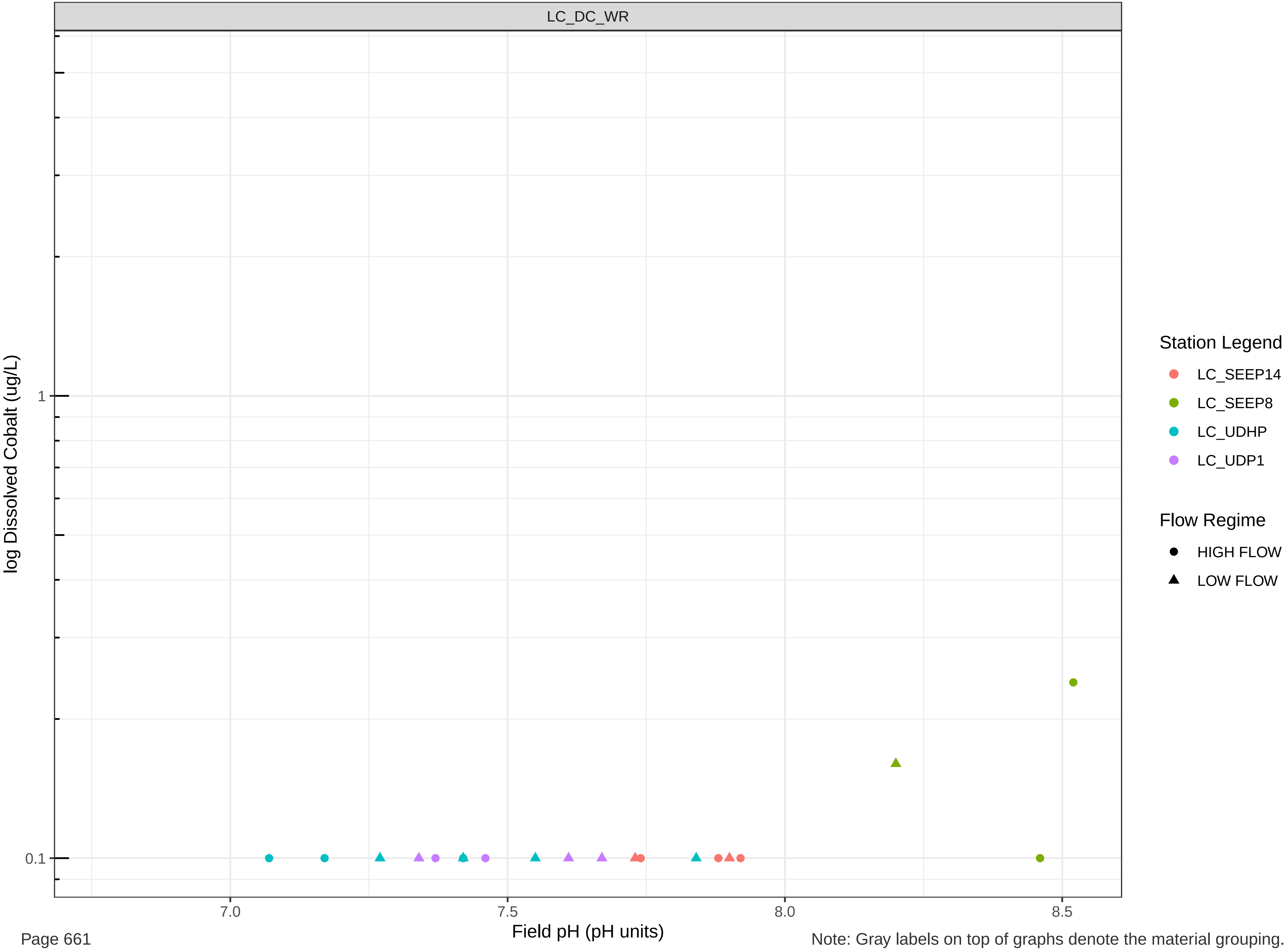

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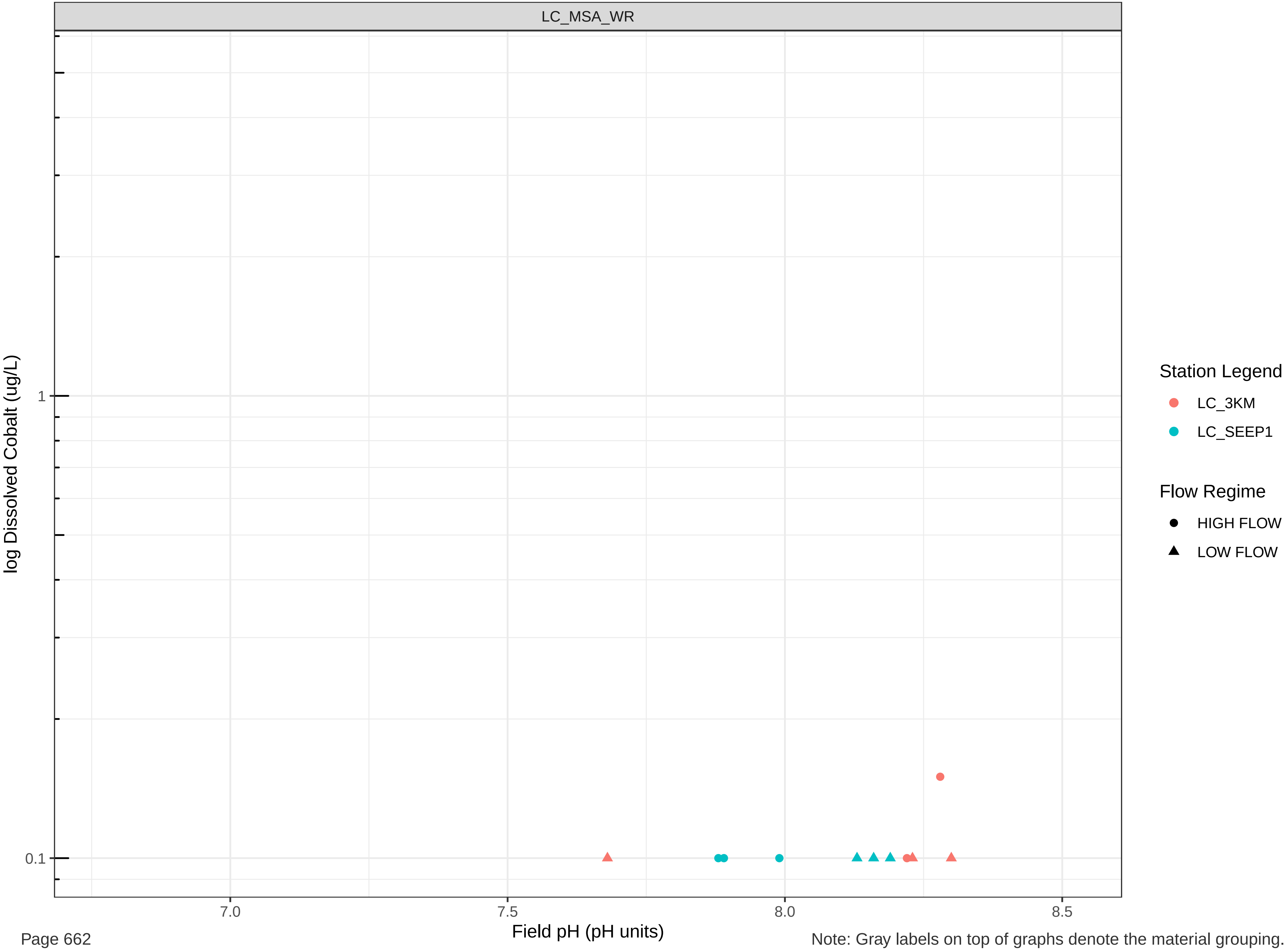

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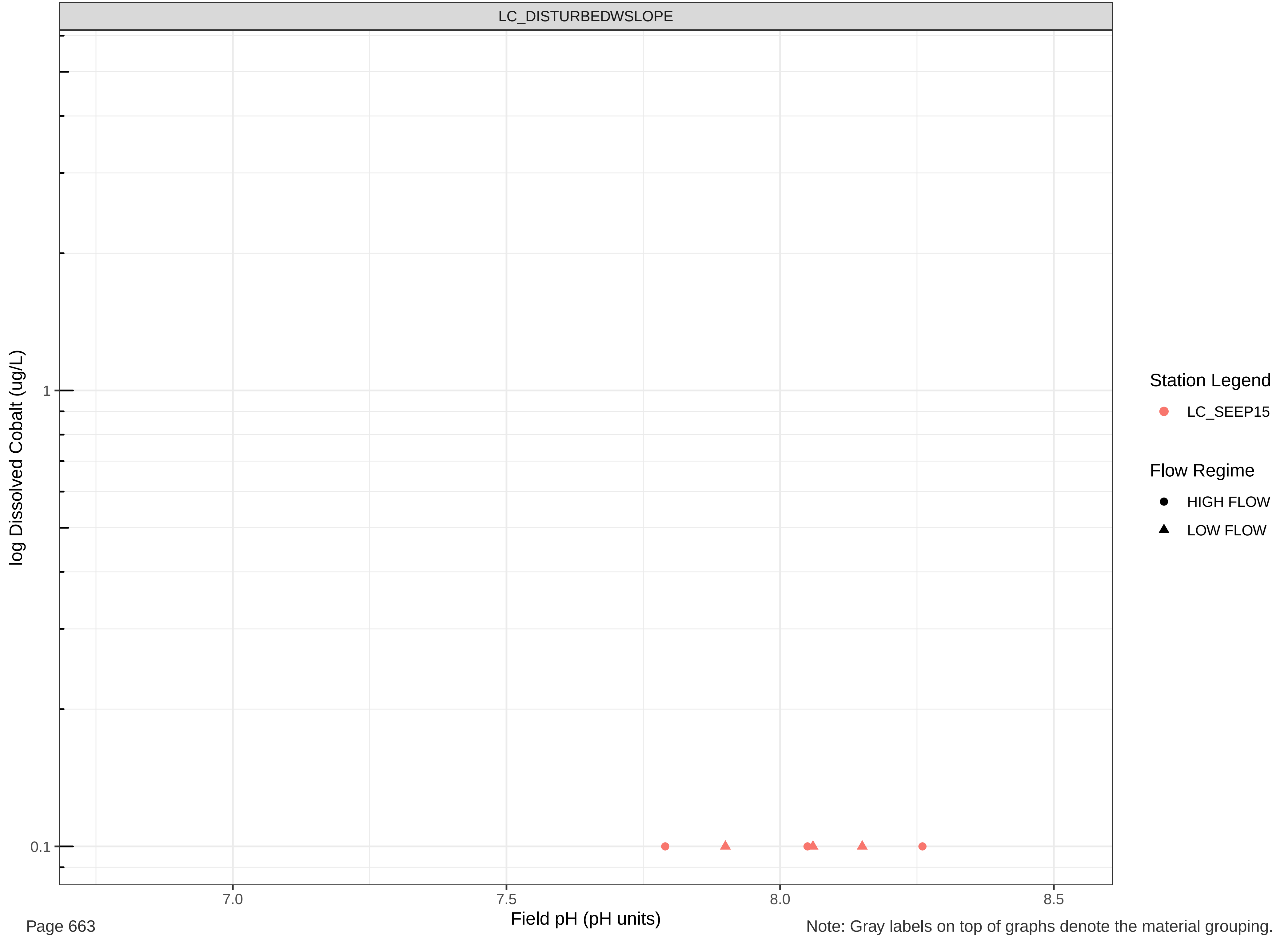

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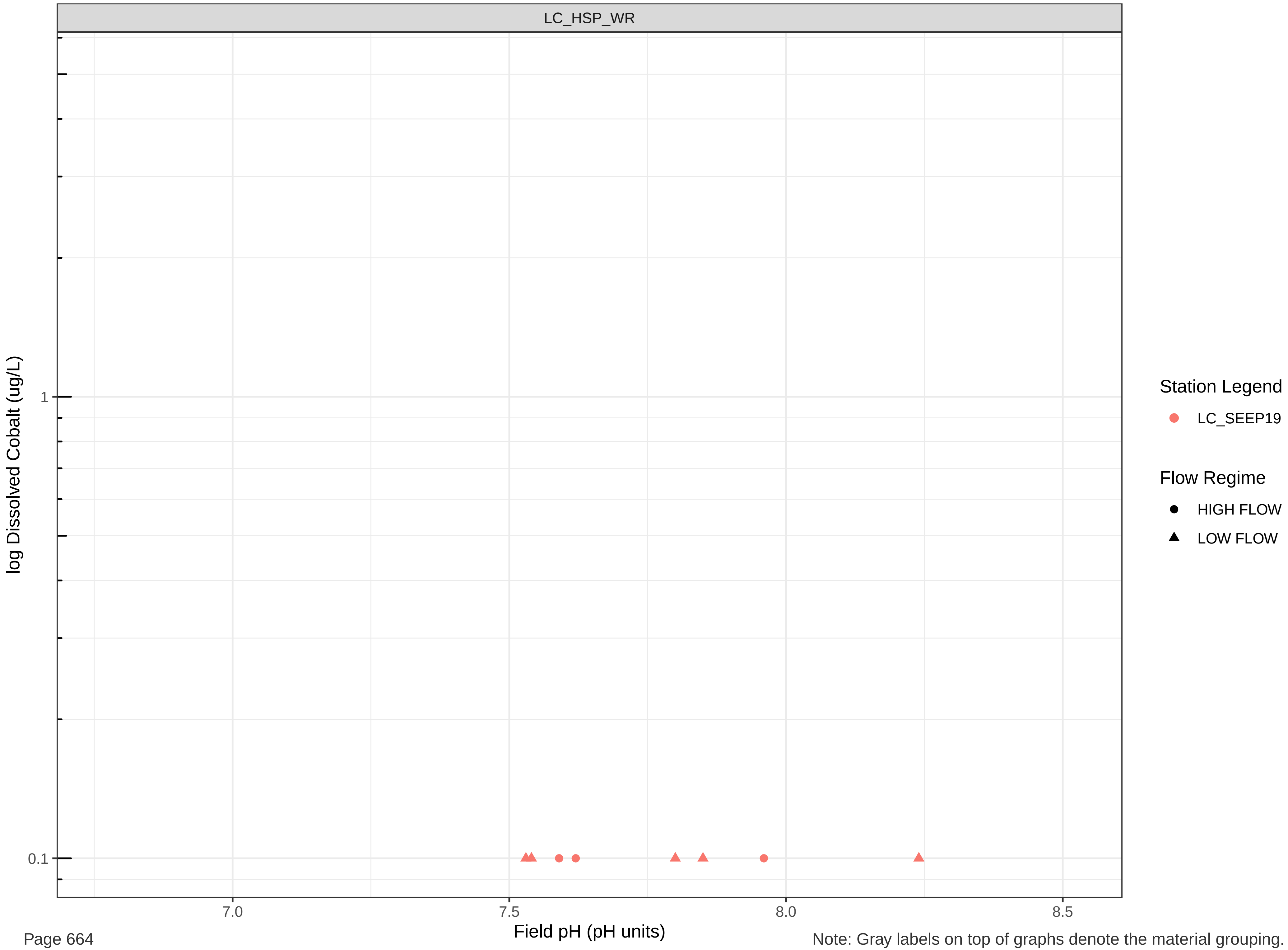

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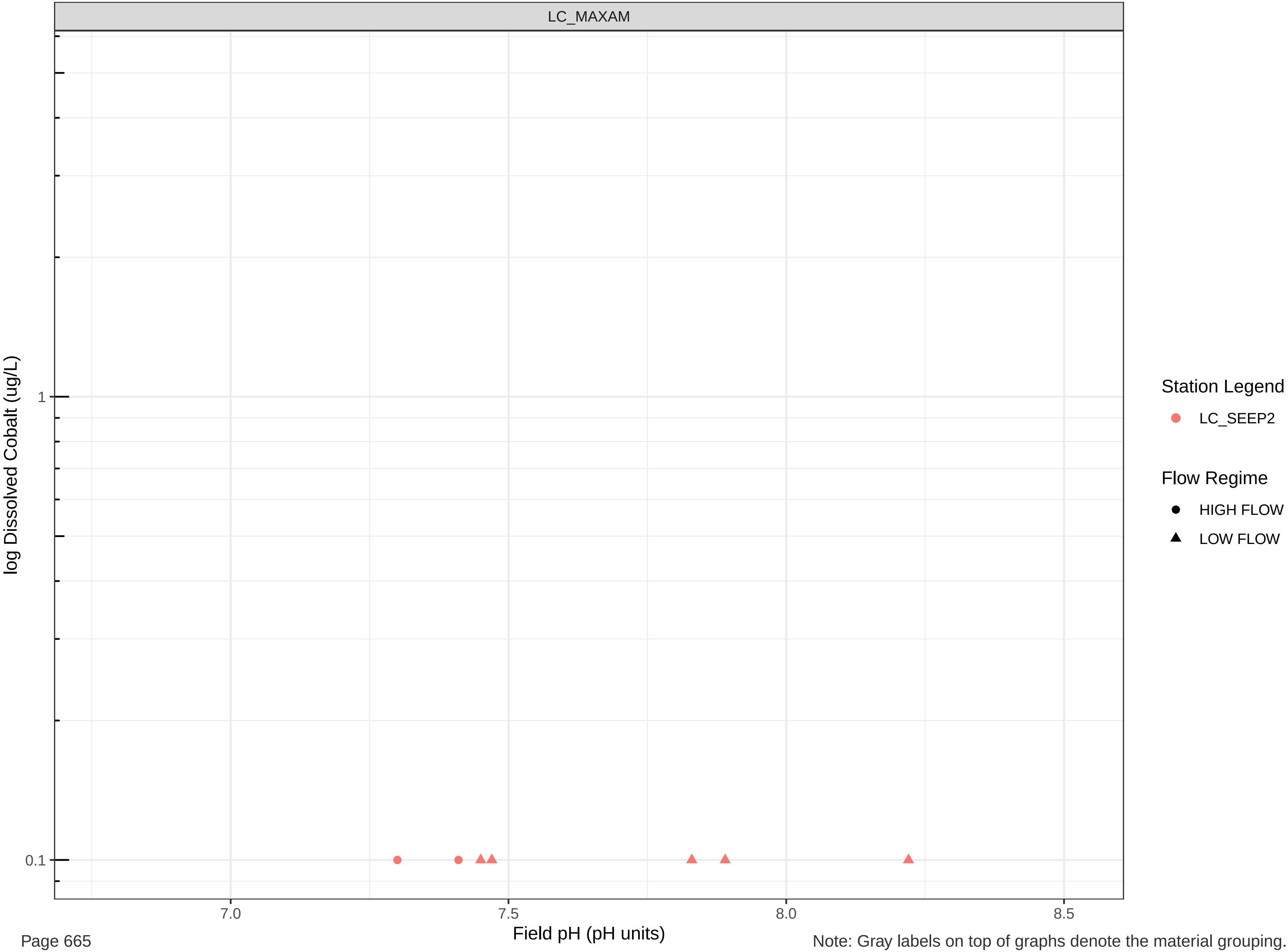

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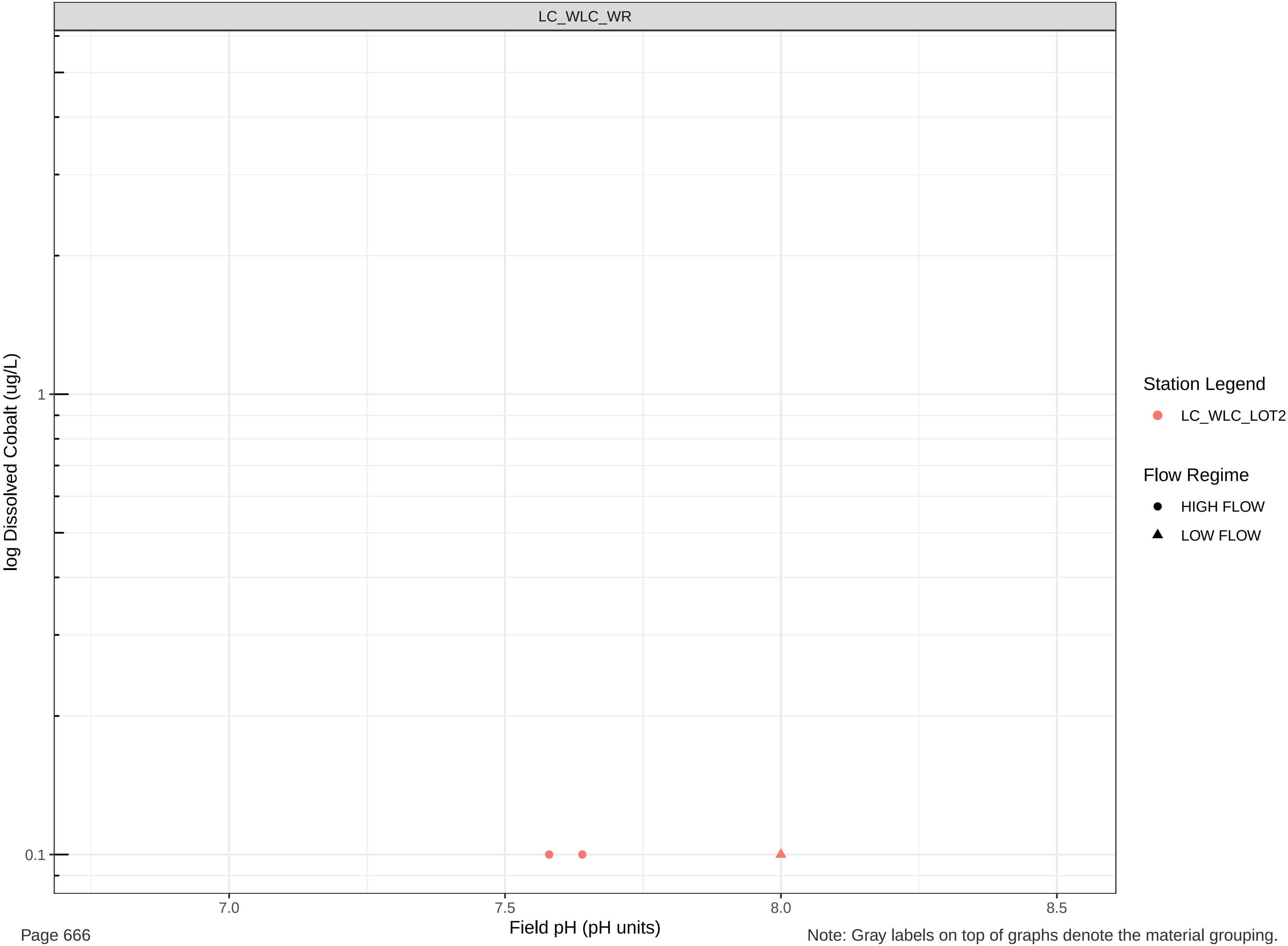

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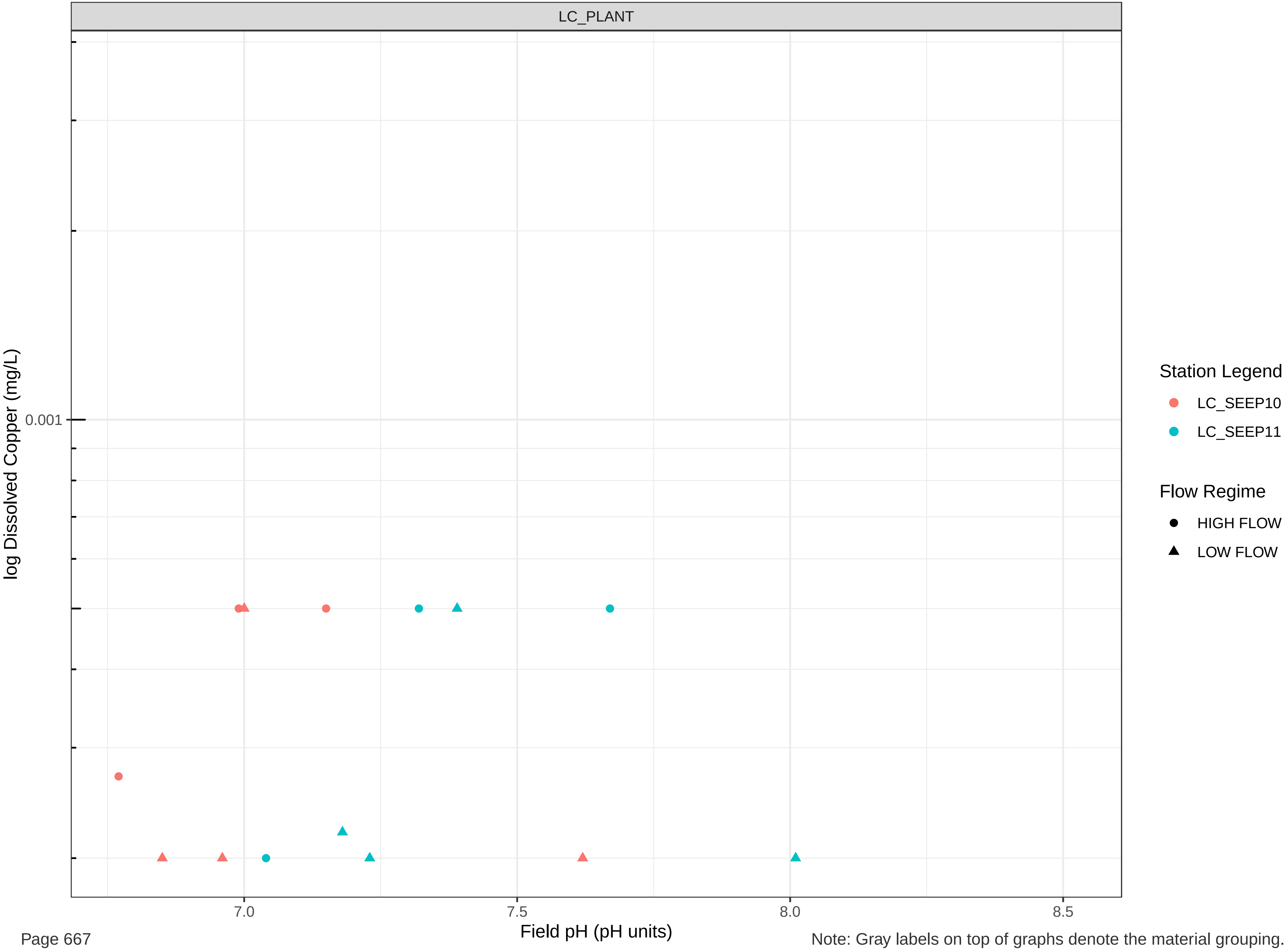

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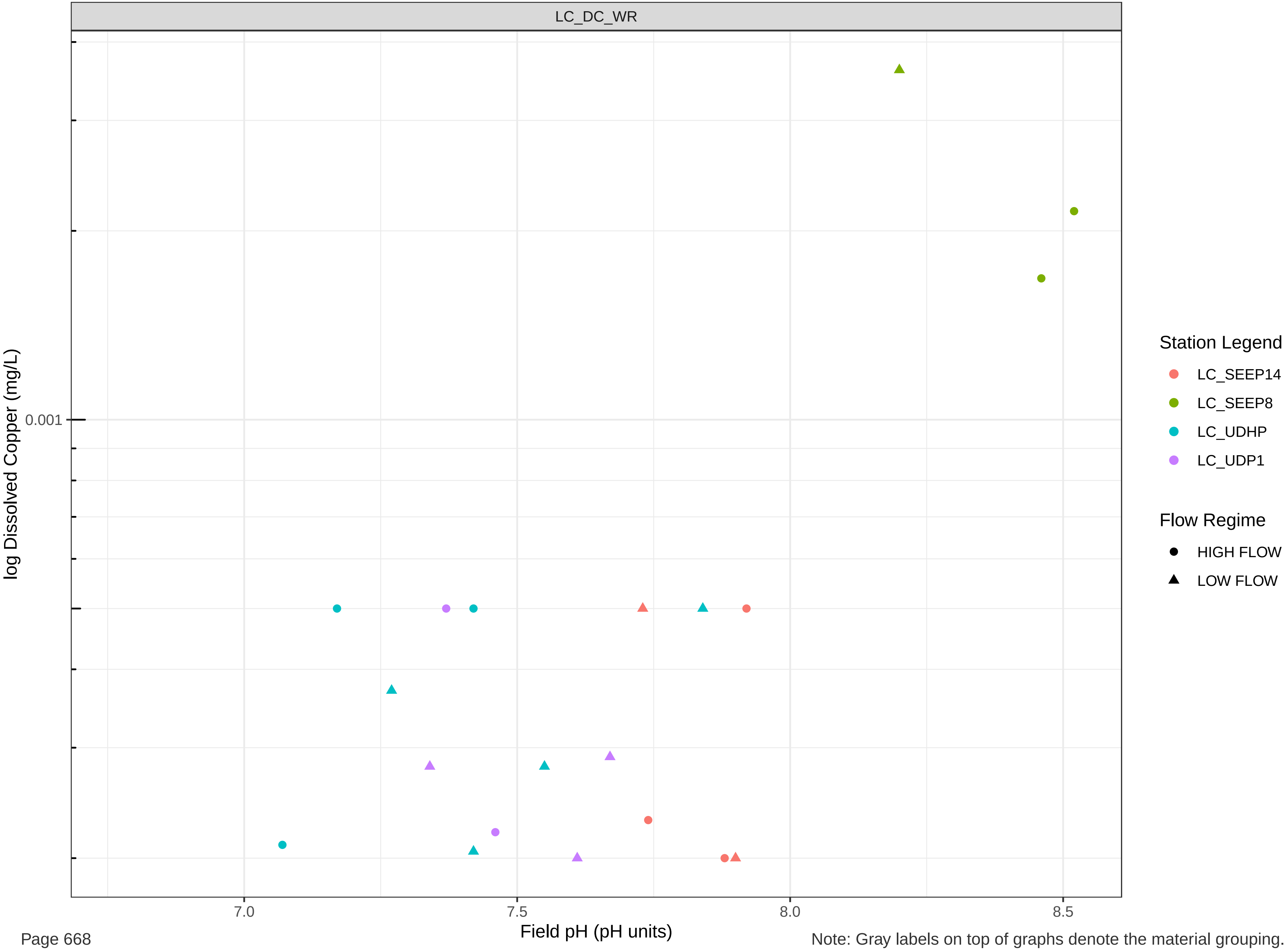

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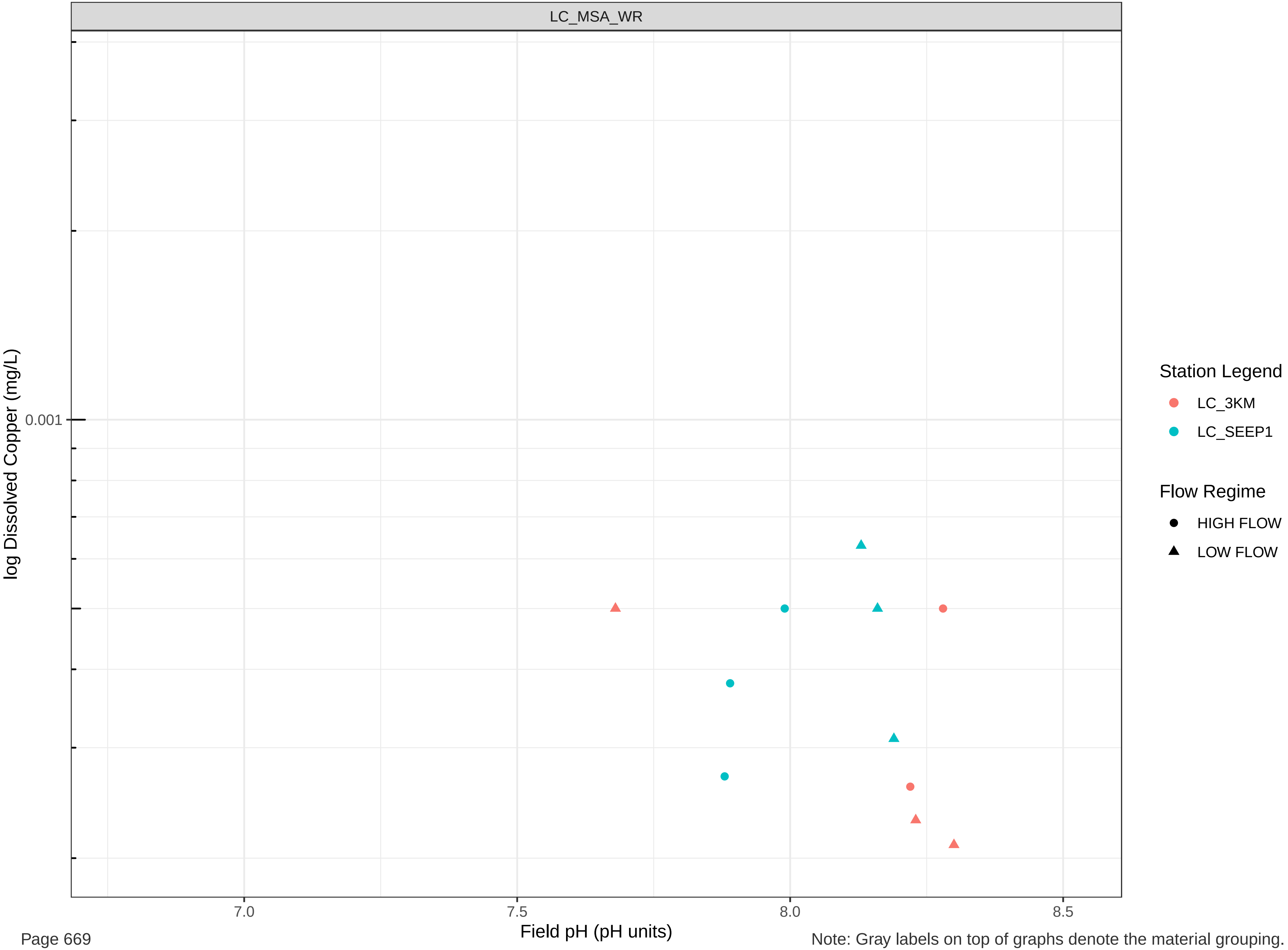

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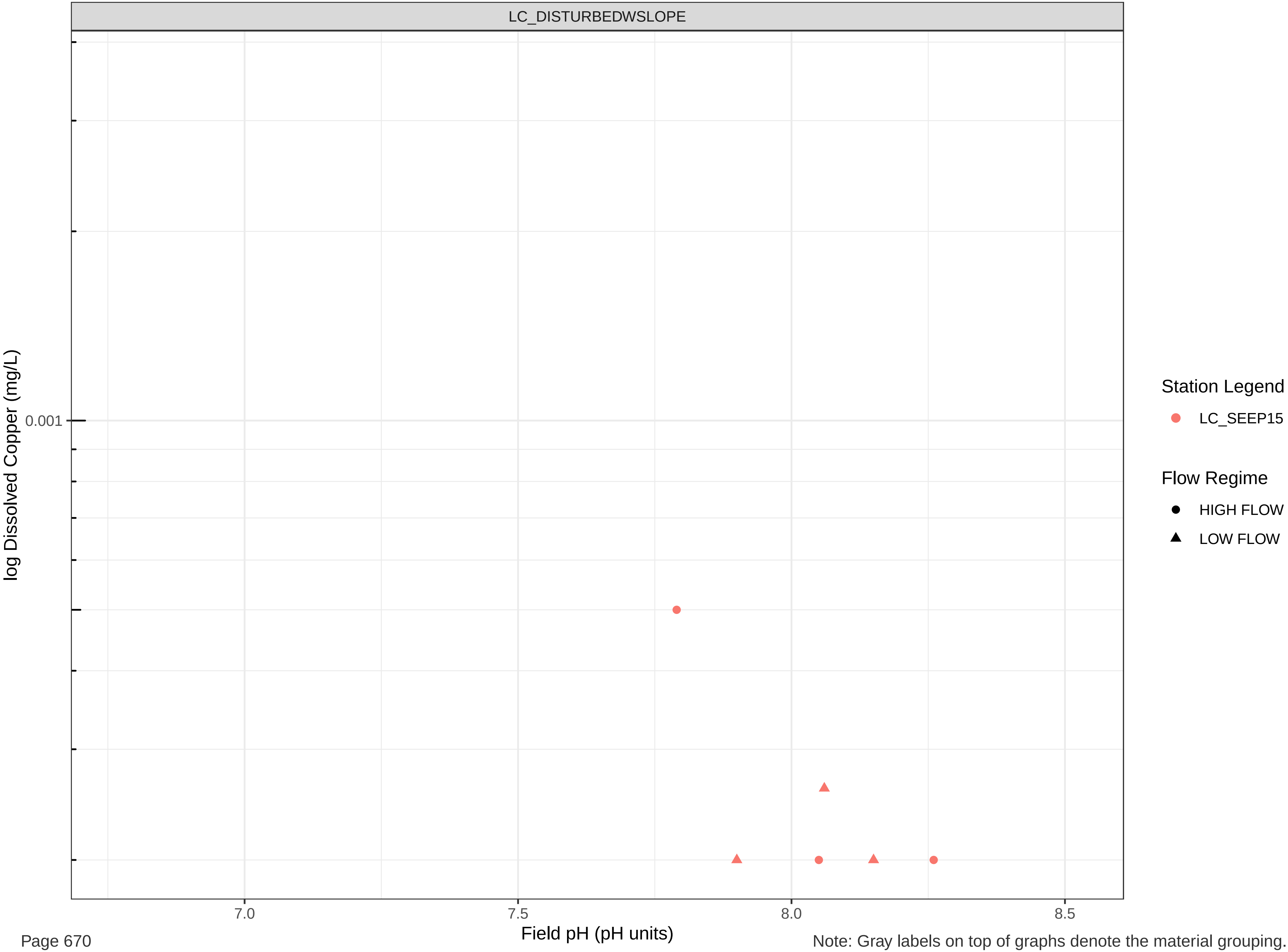

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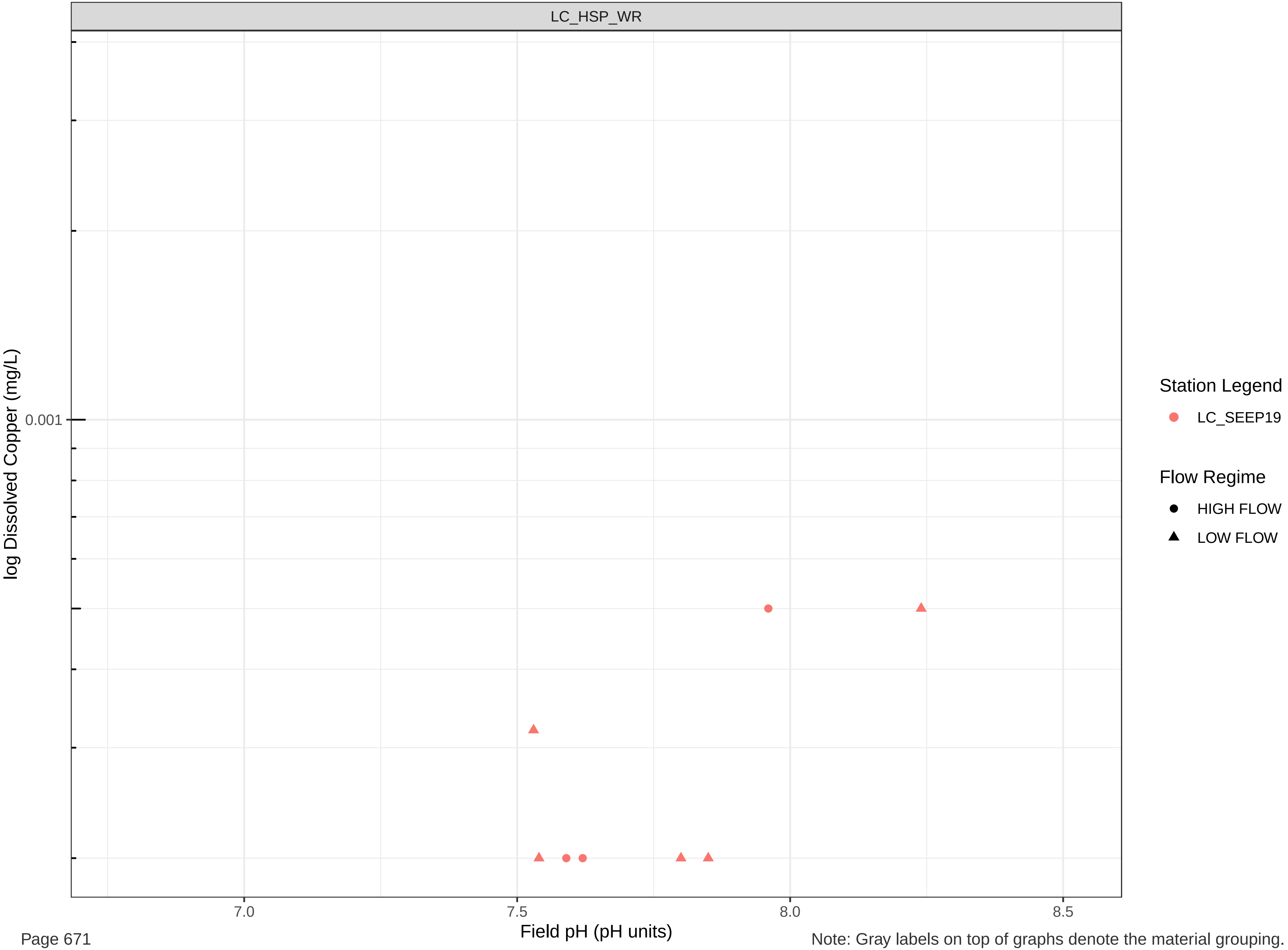

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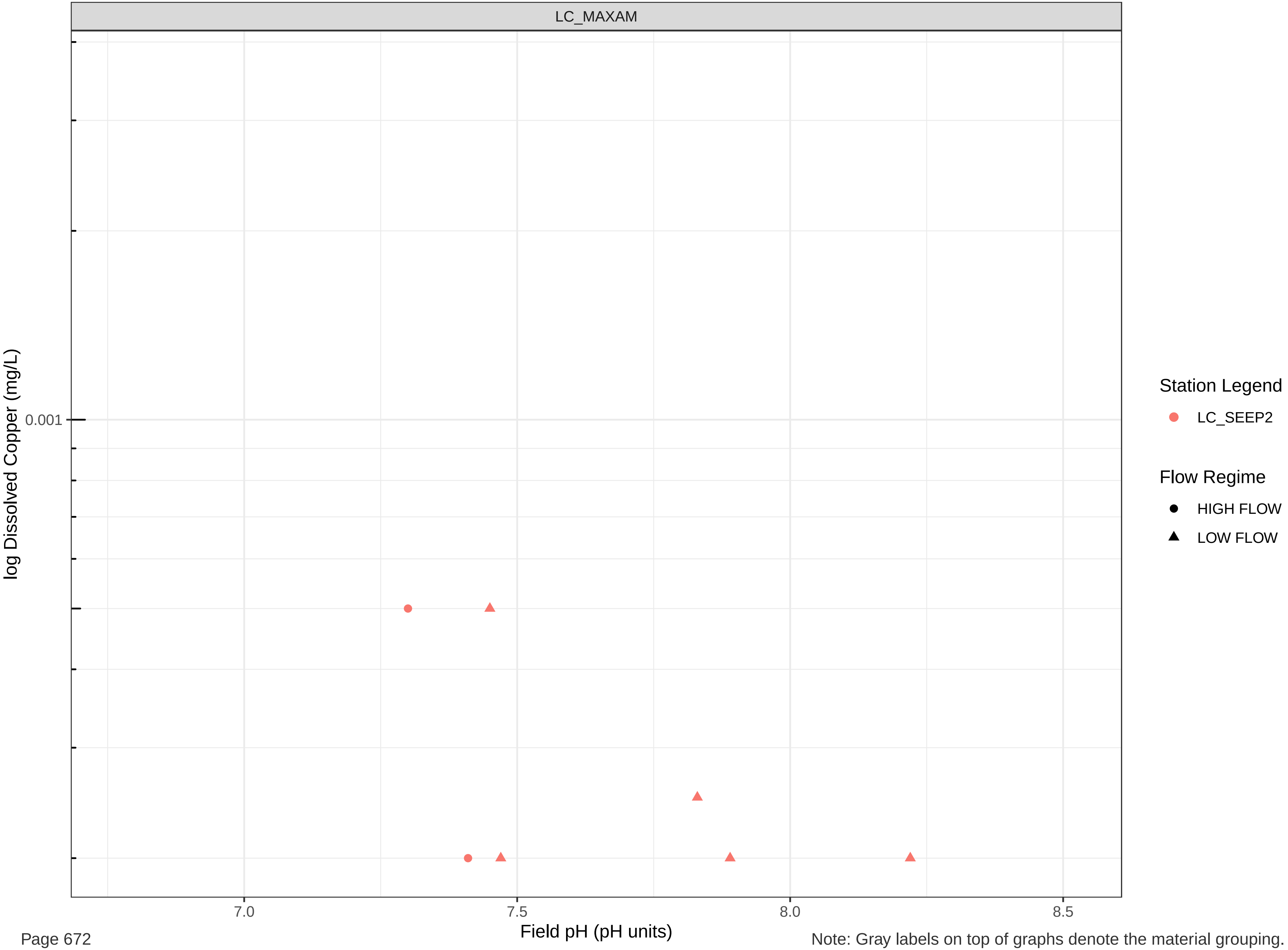
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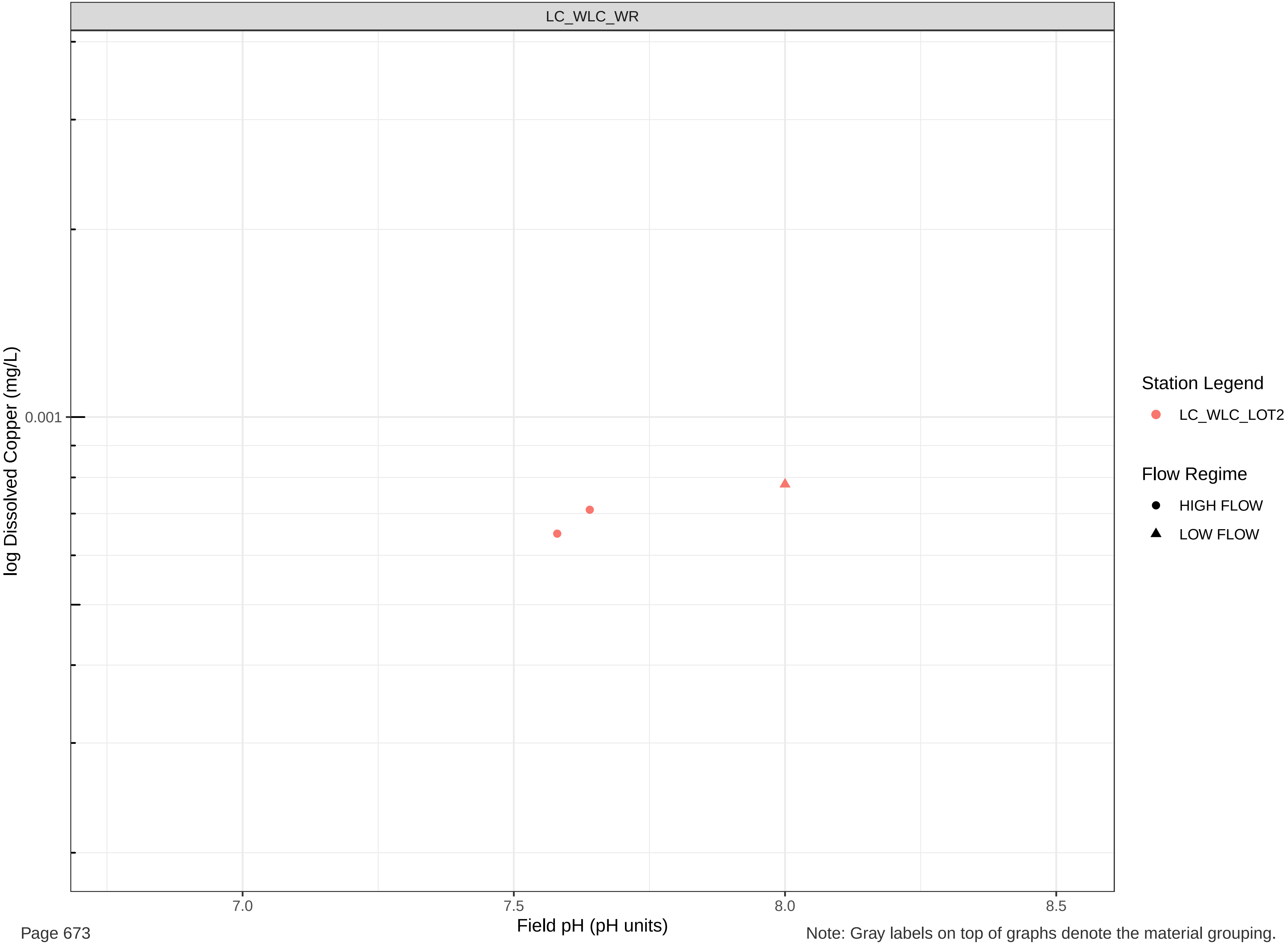
0.001
log Dissolved Copper (mg/L)
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
LC_SEEP2
Flow Regime
HIGH FLOW
LOW FLOW



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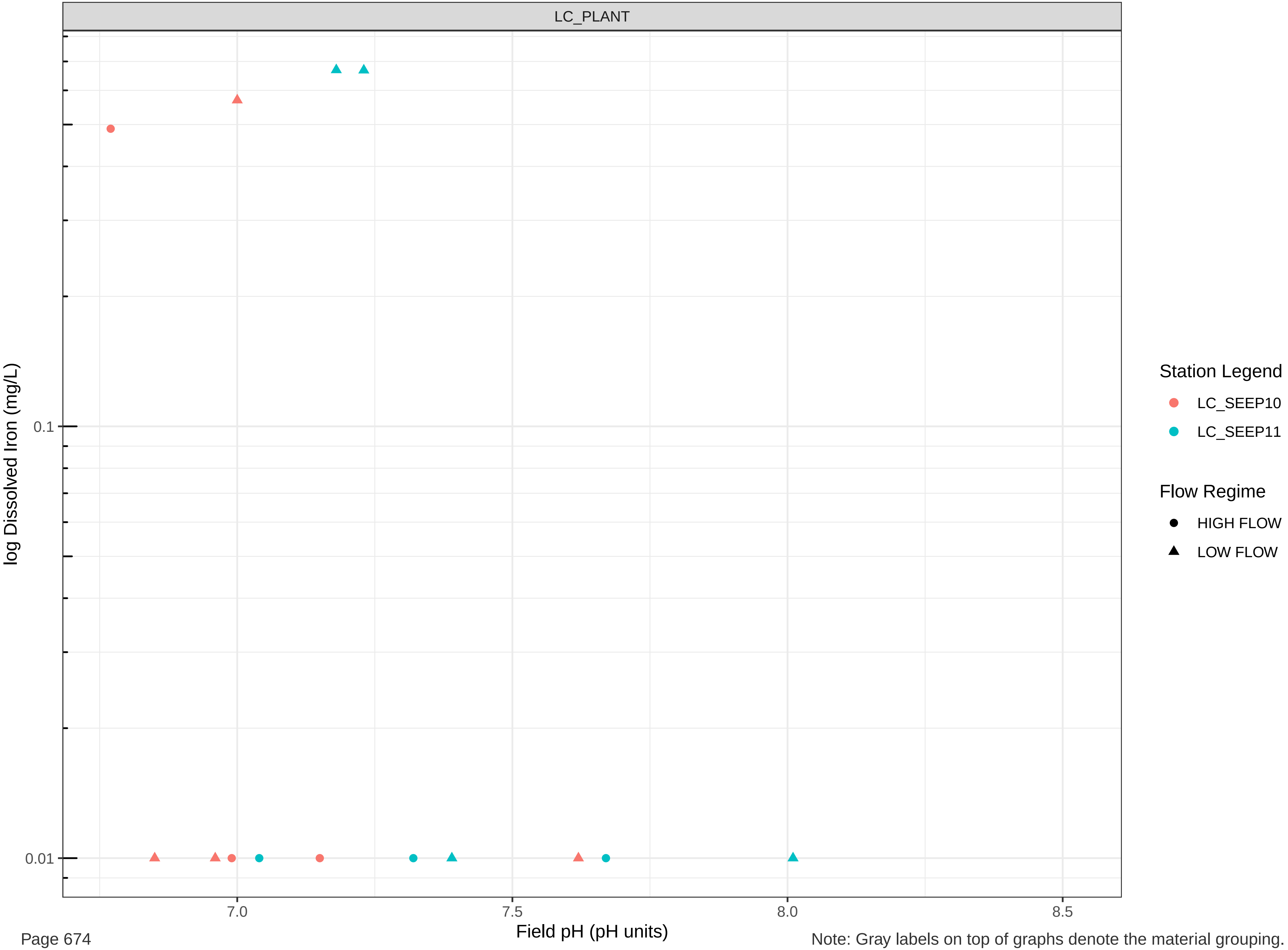

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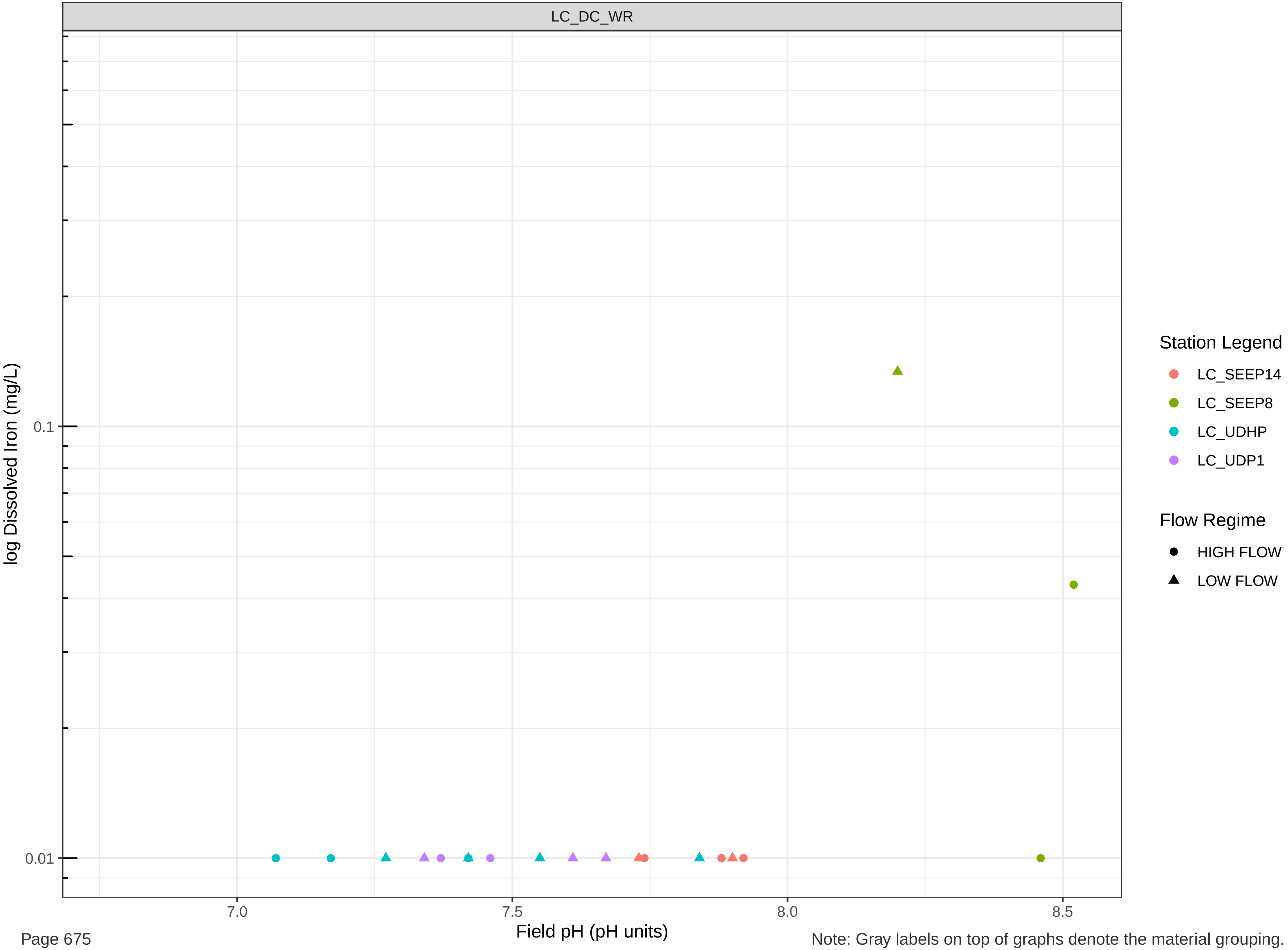

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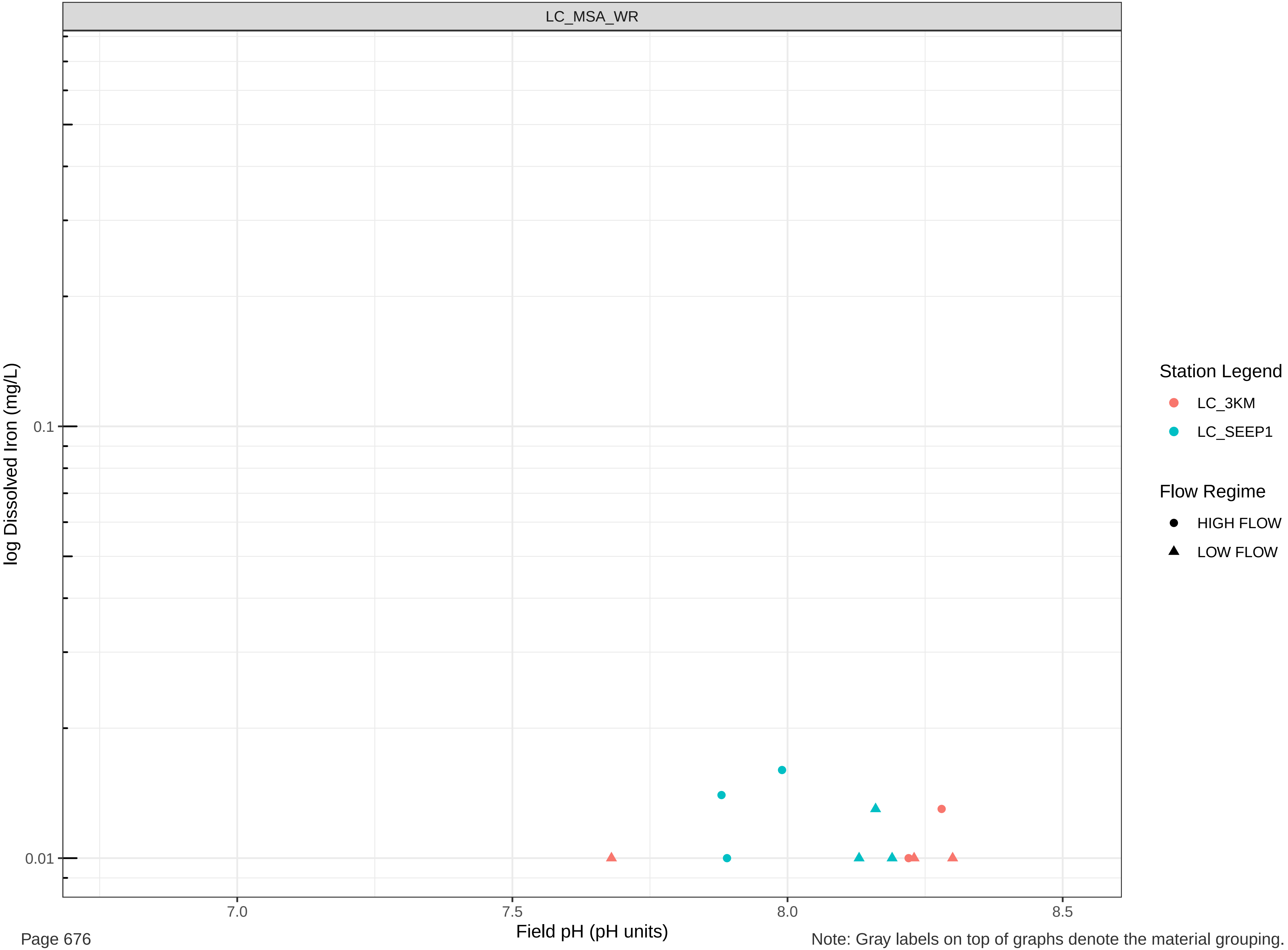

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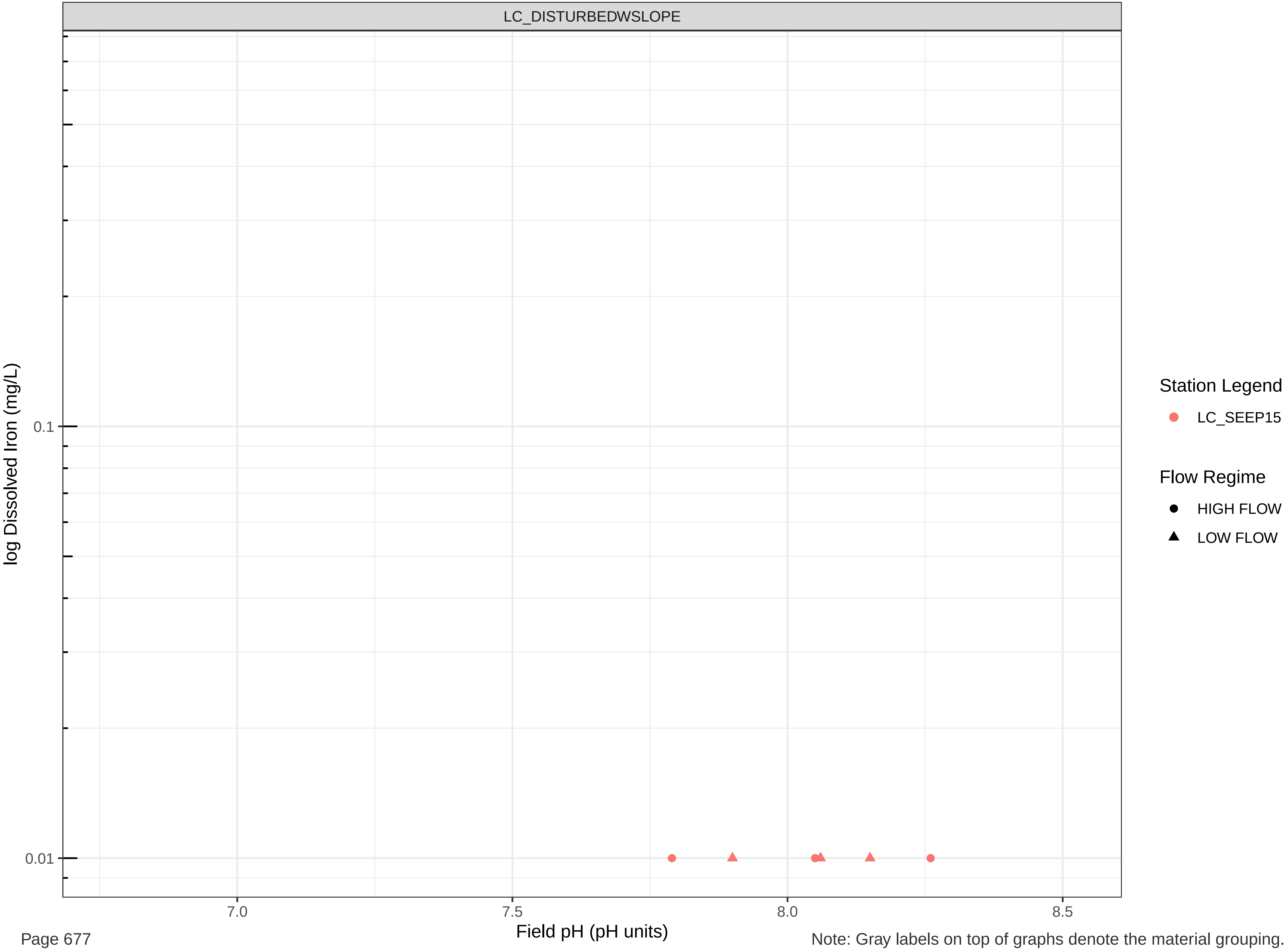

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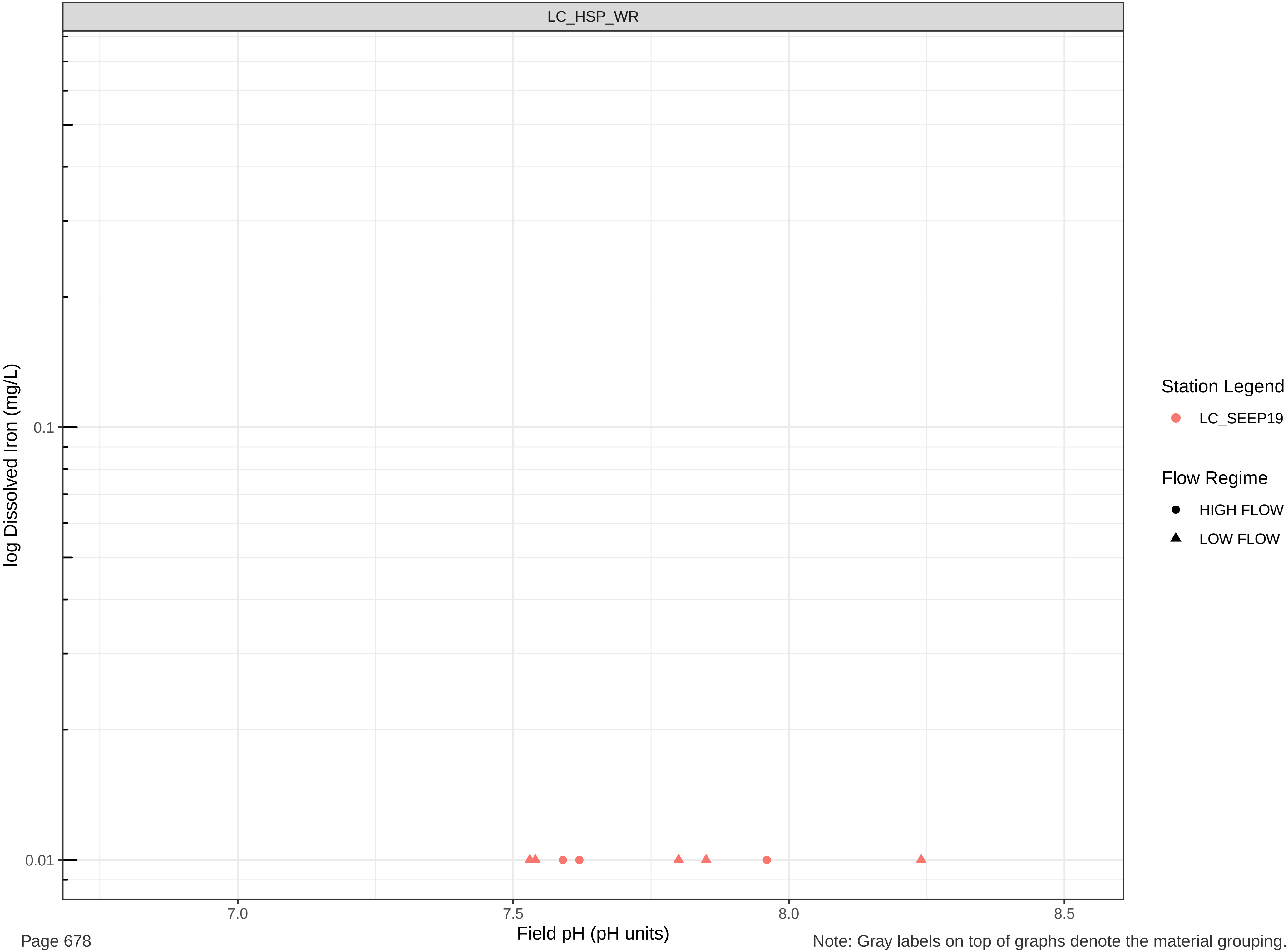

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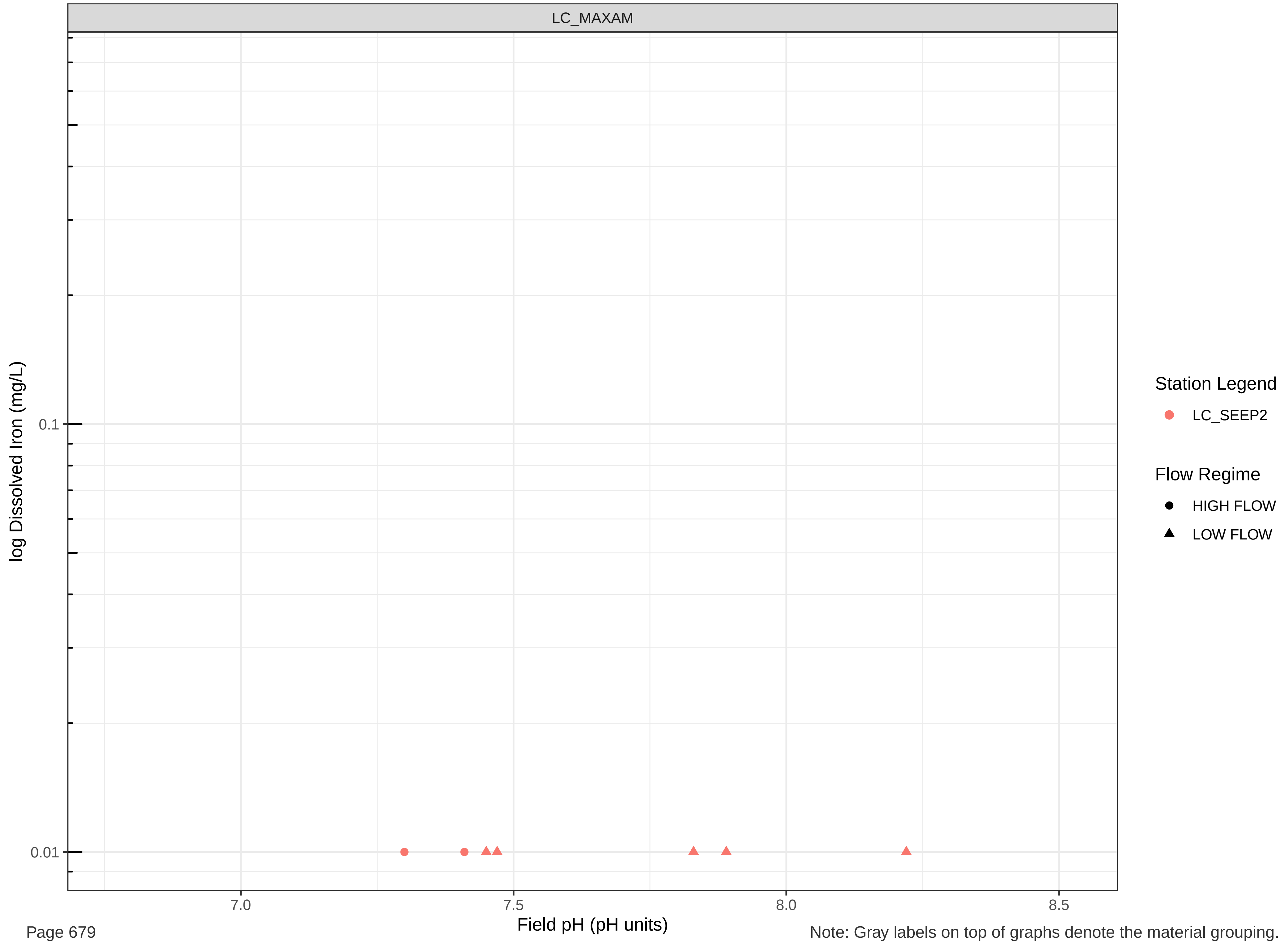

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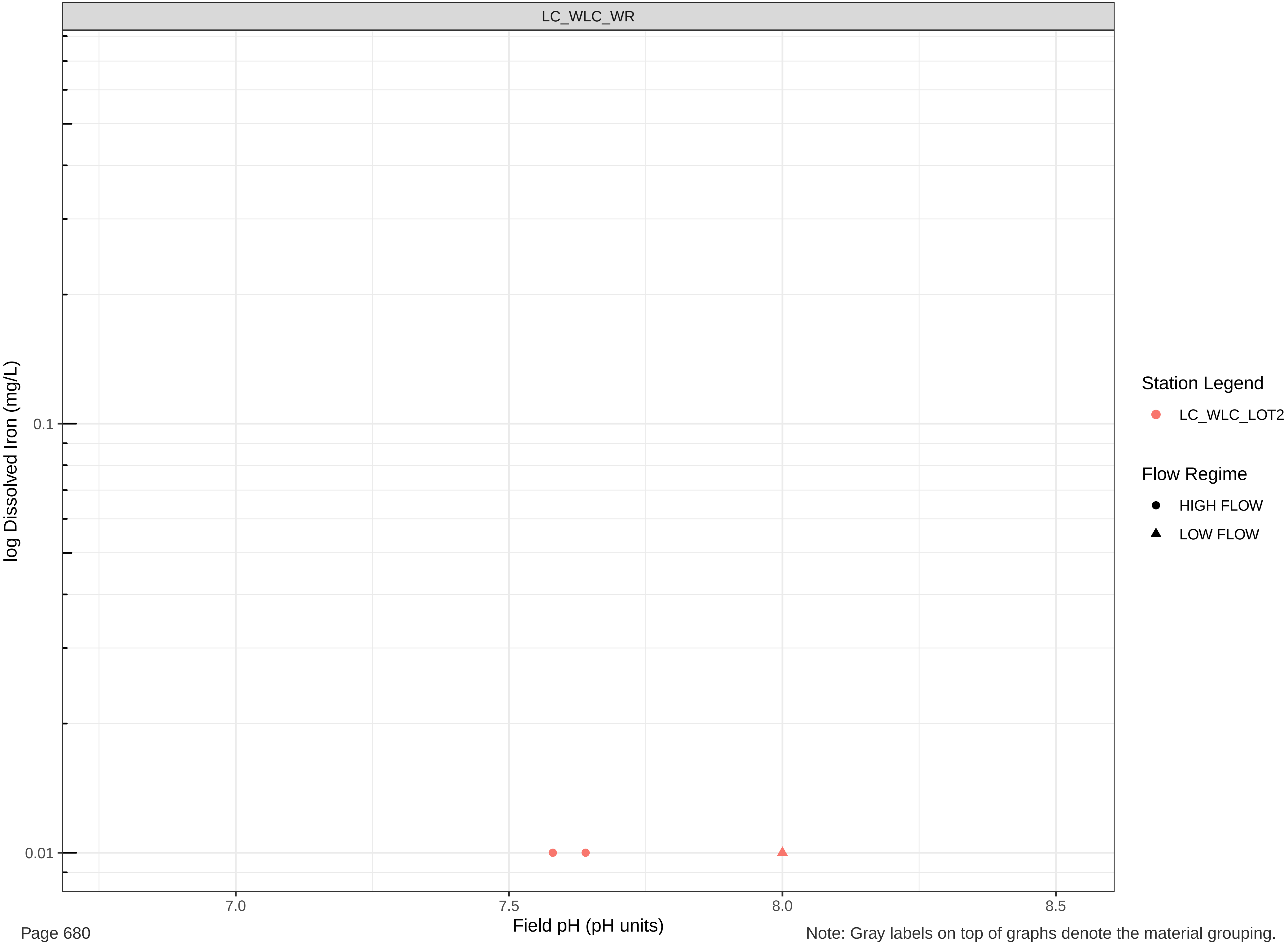

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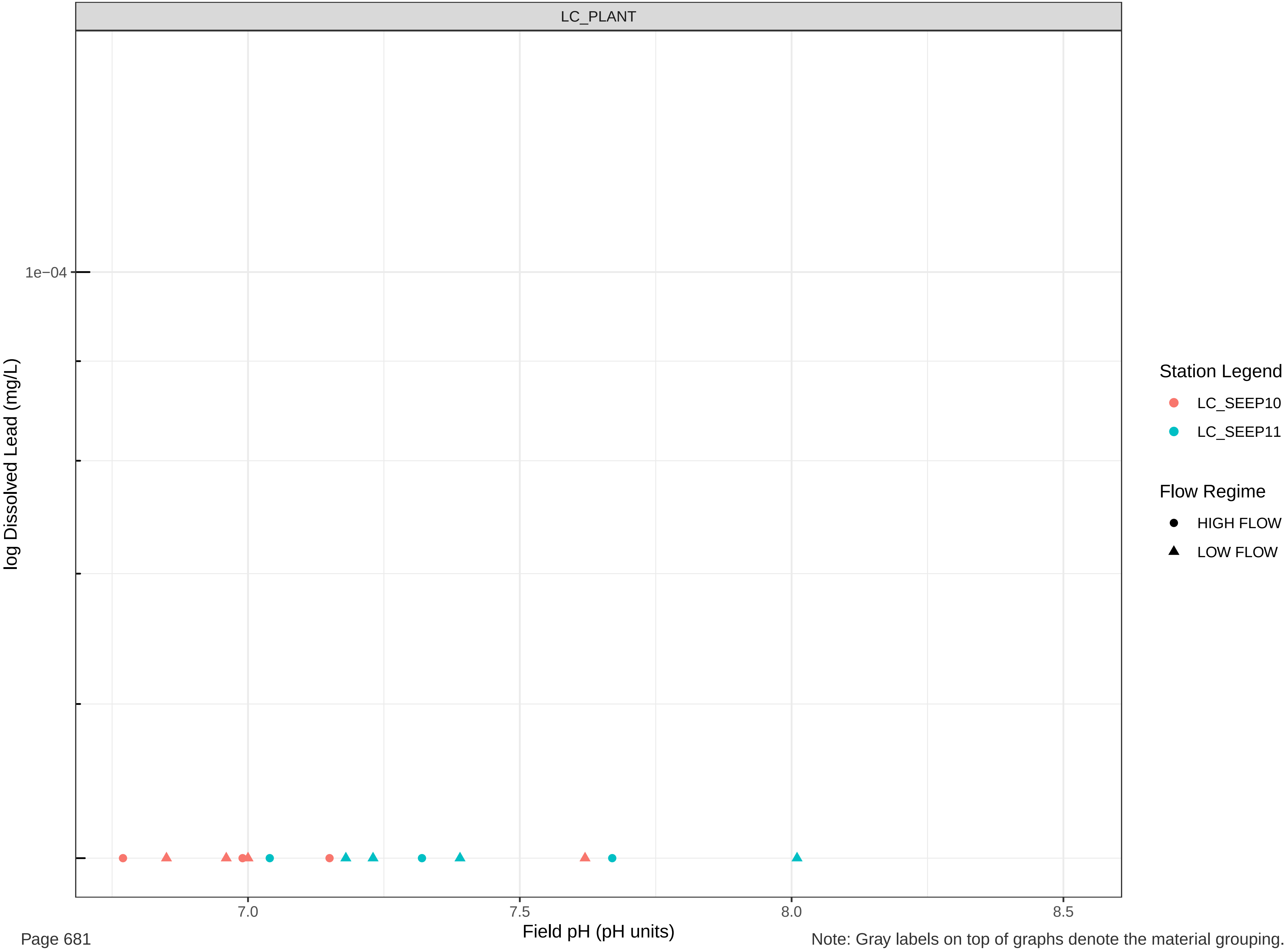

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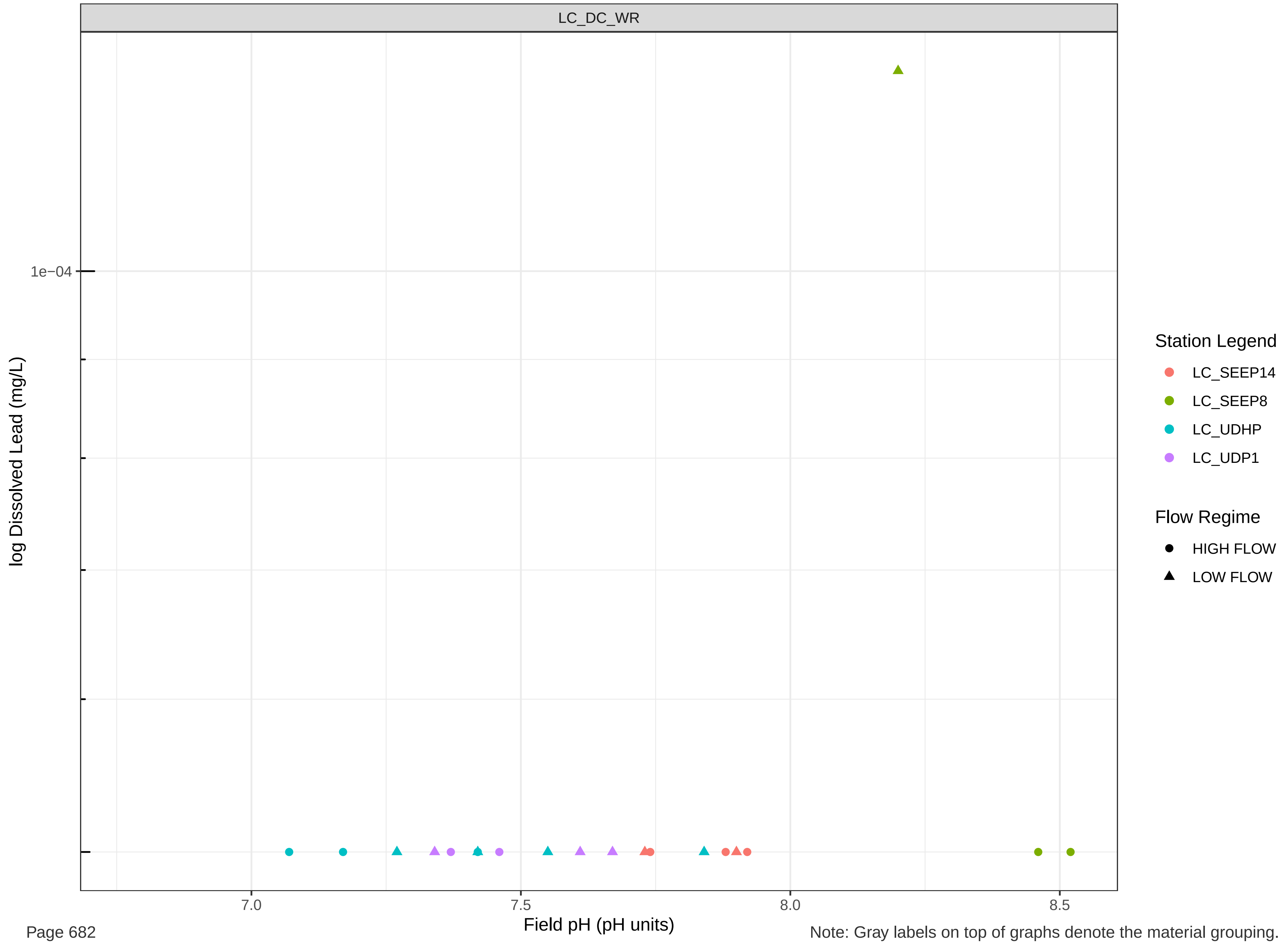

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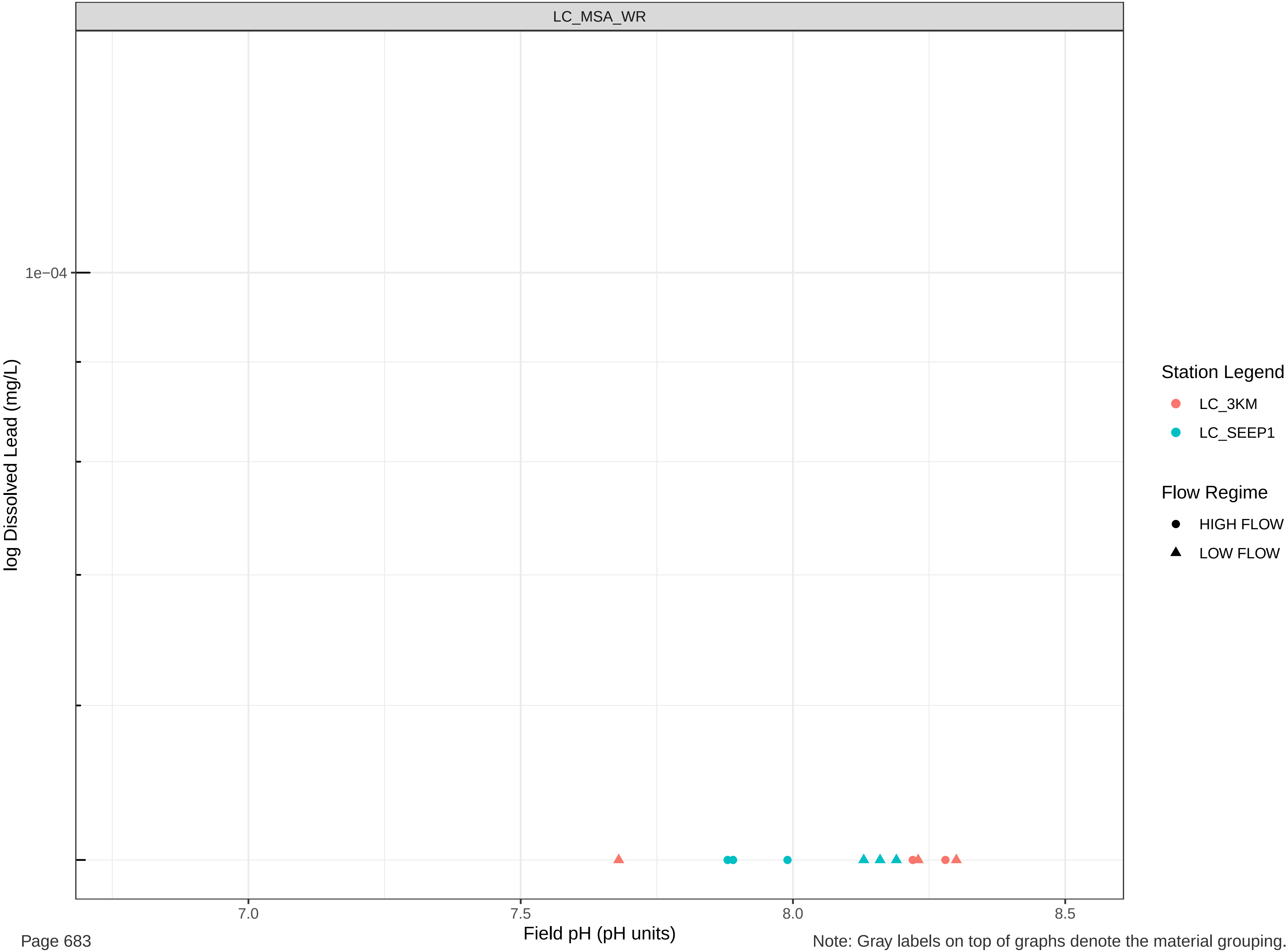

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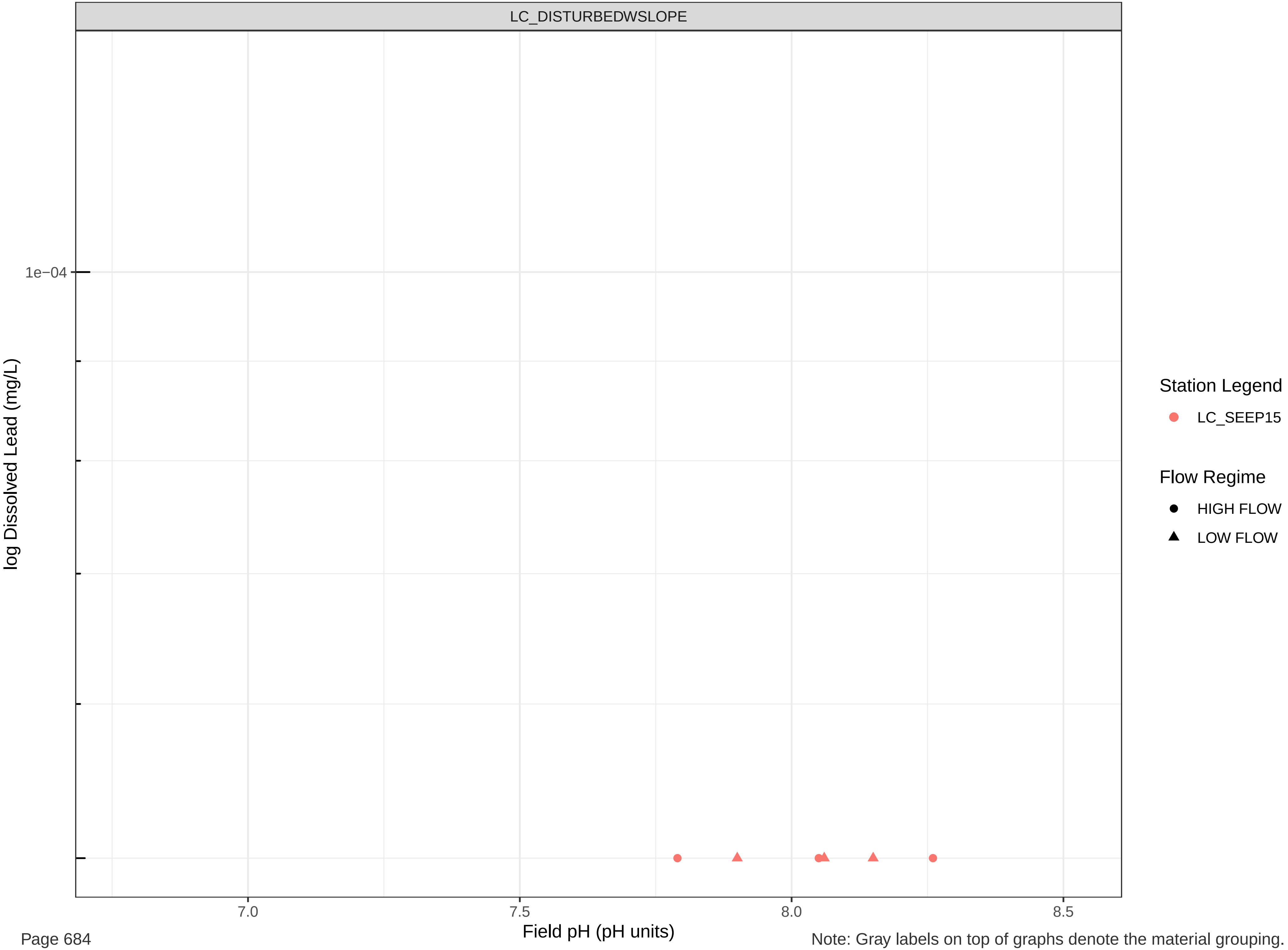

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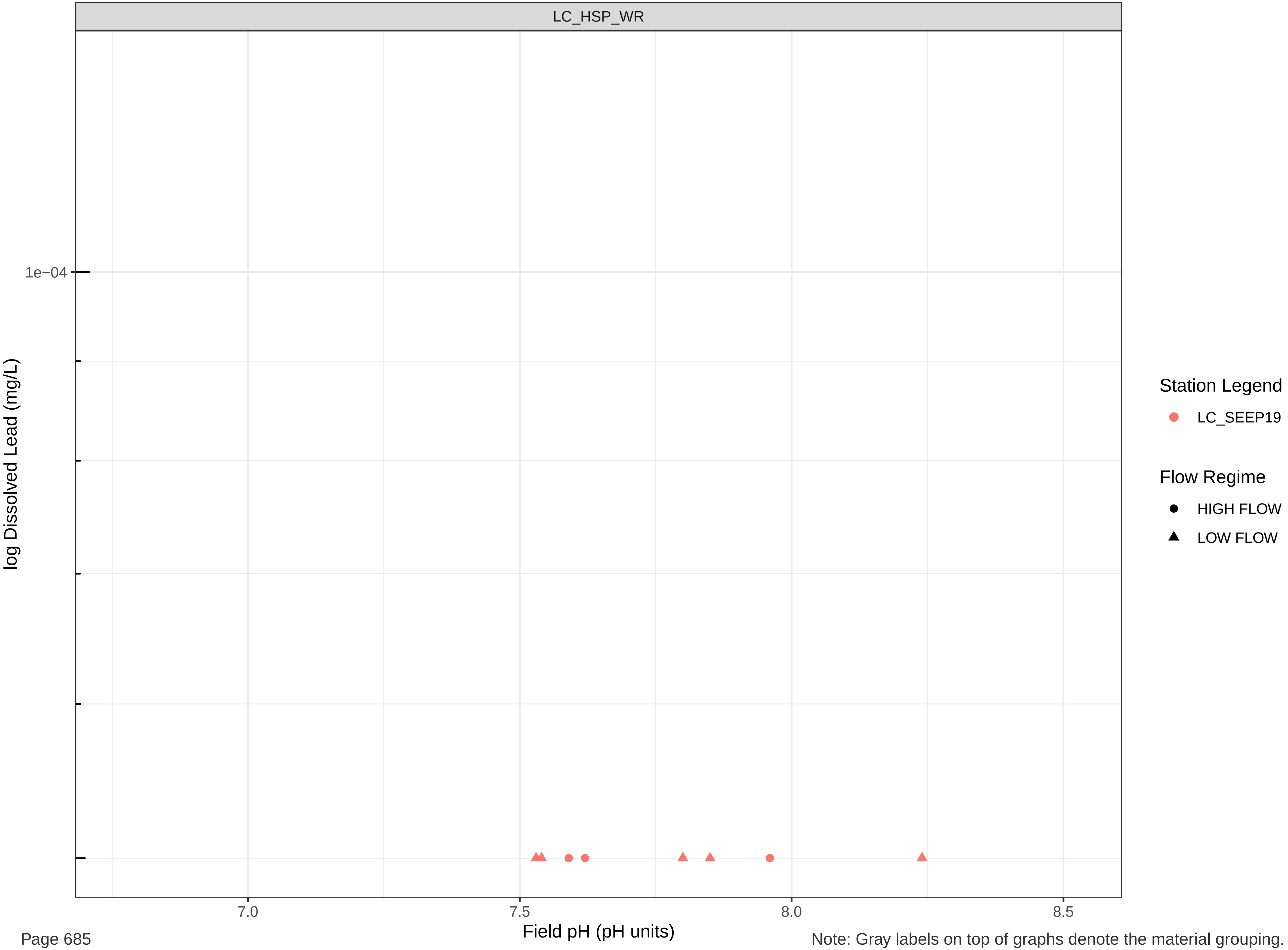

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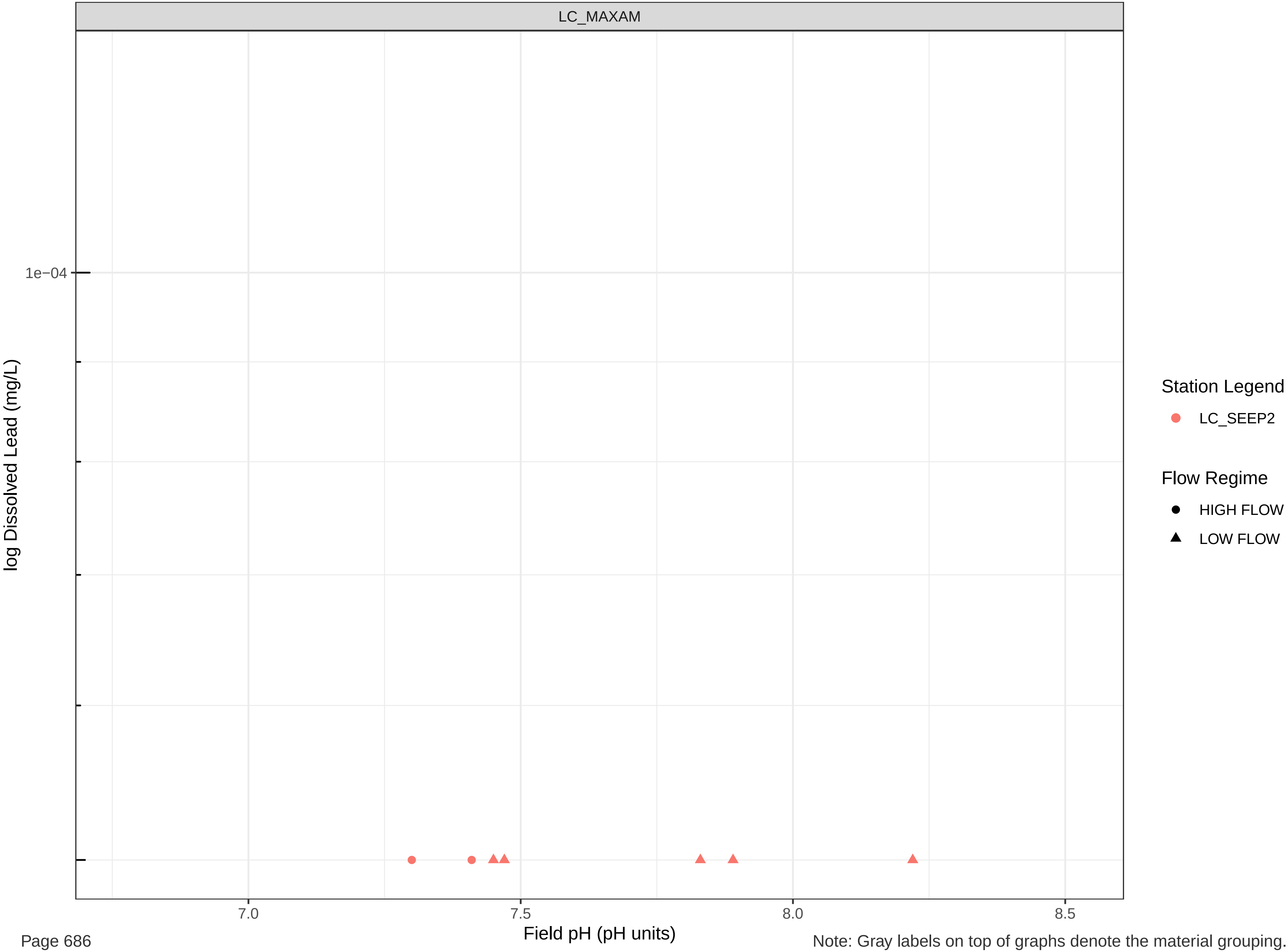

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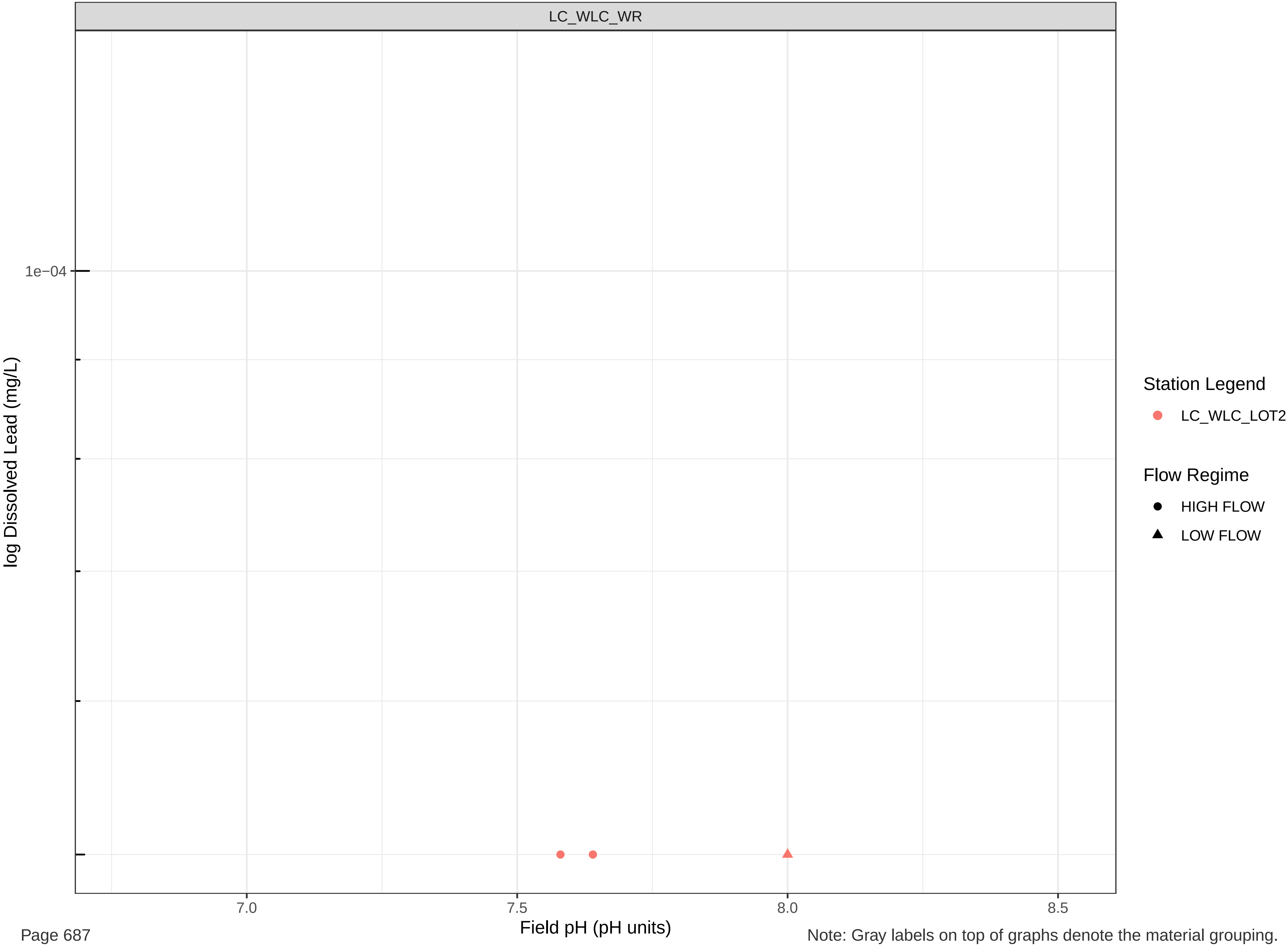

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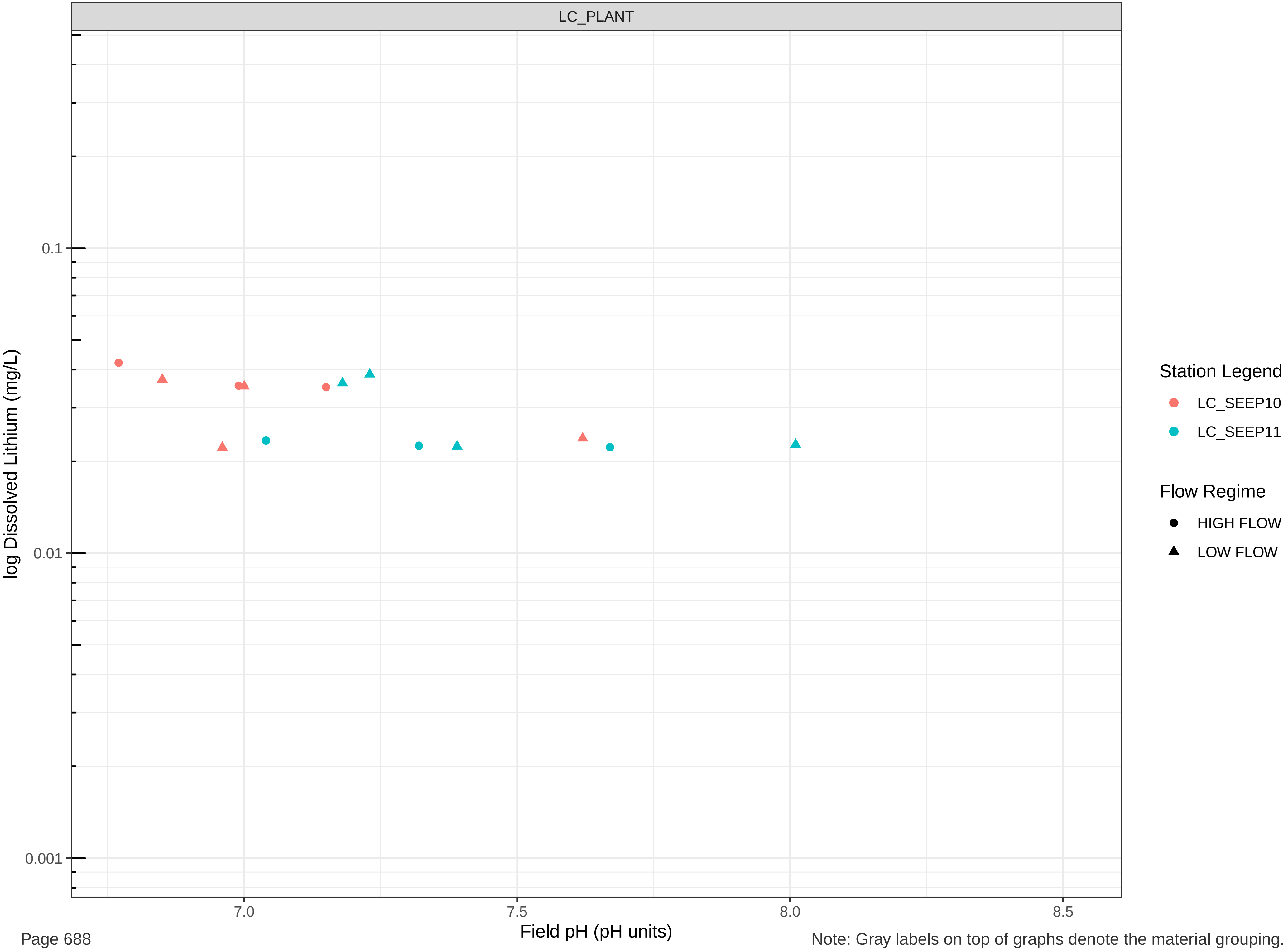

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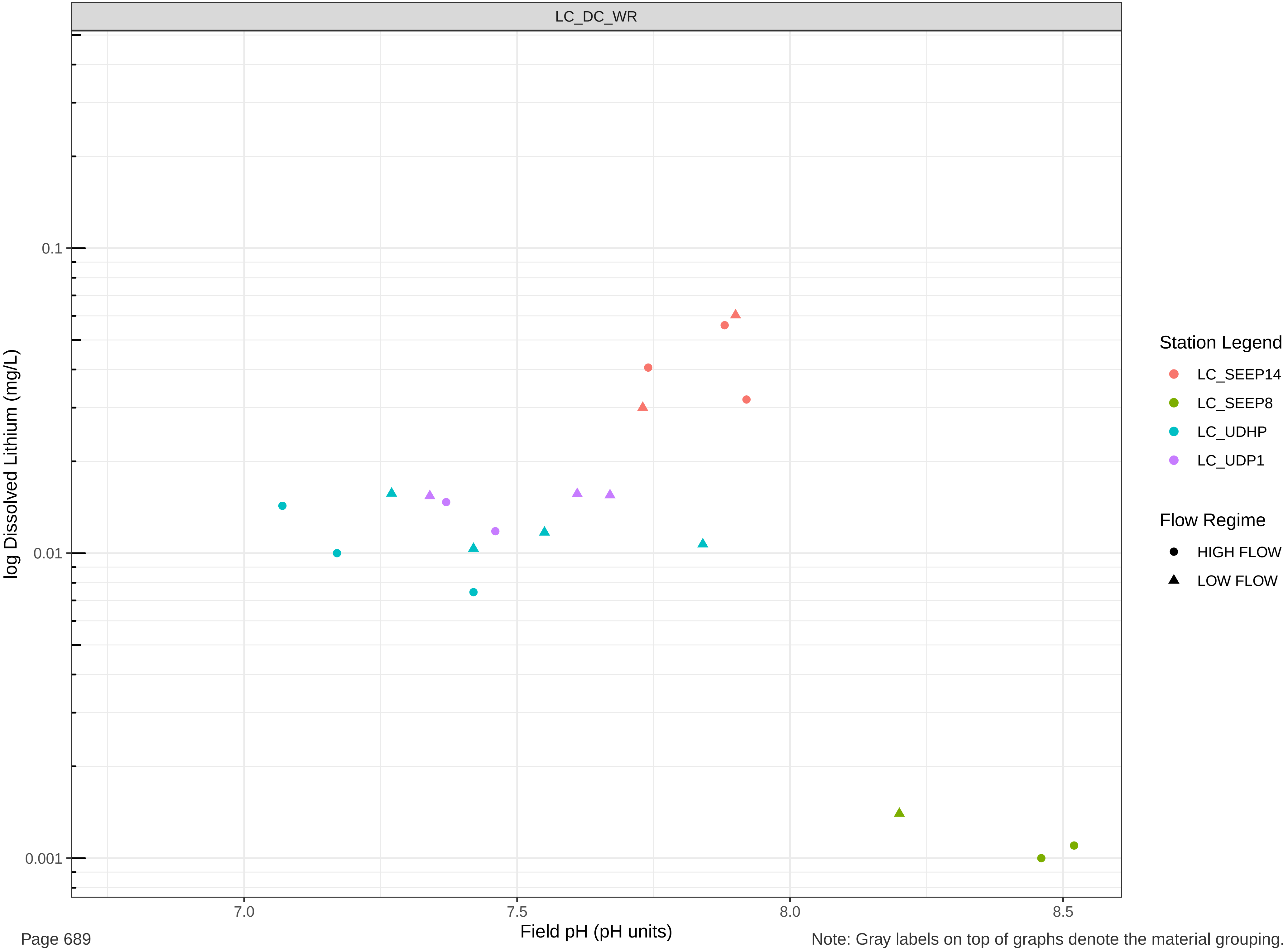

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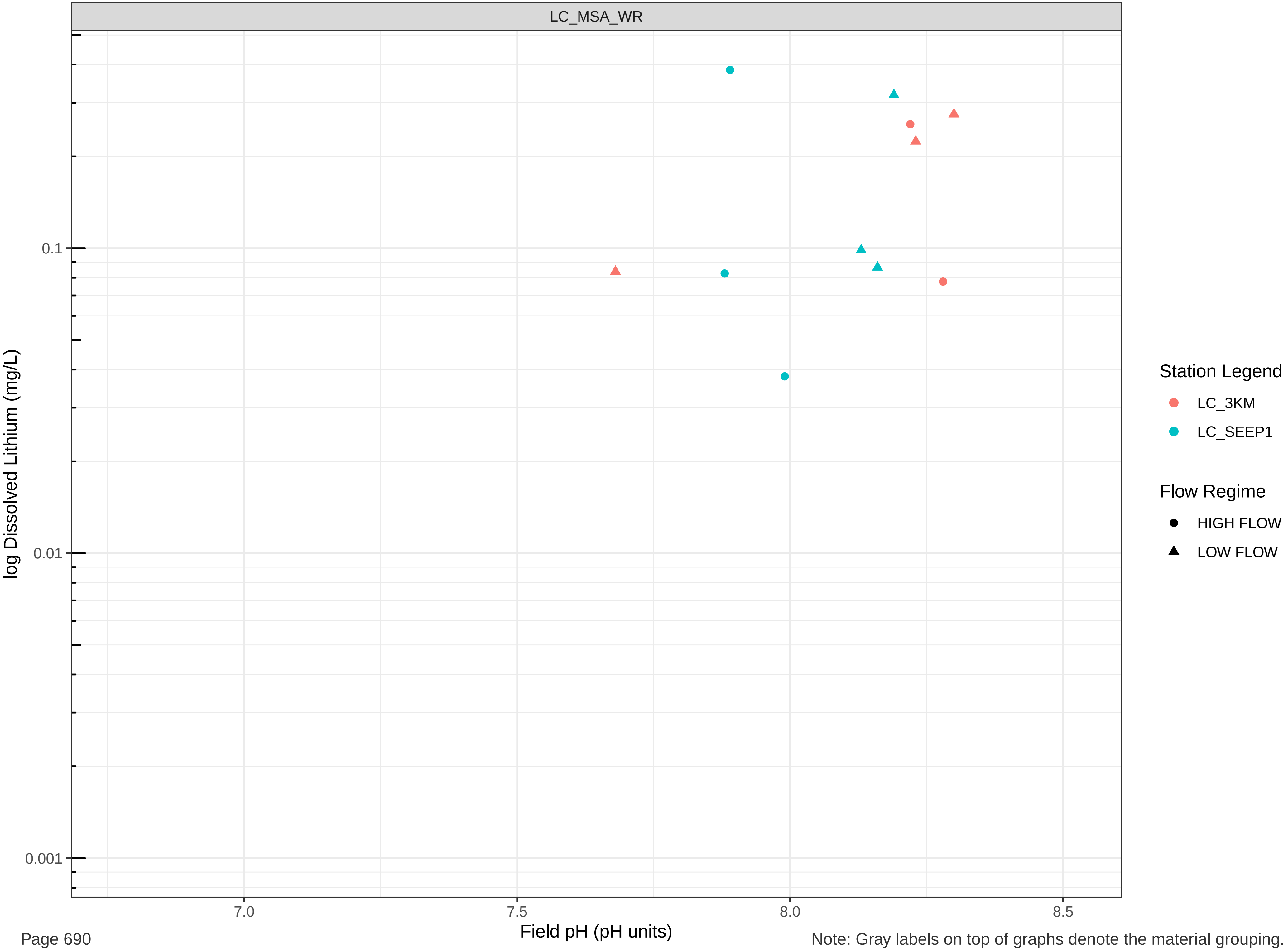

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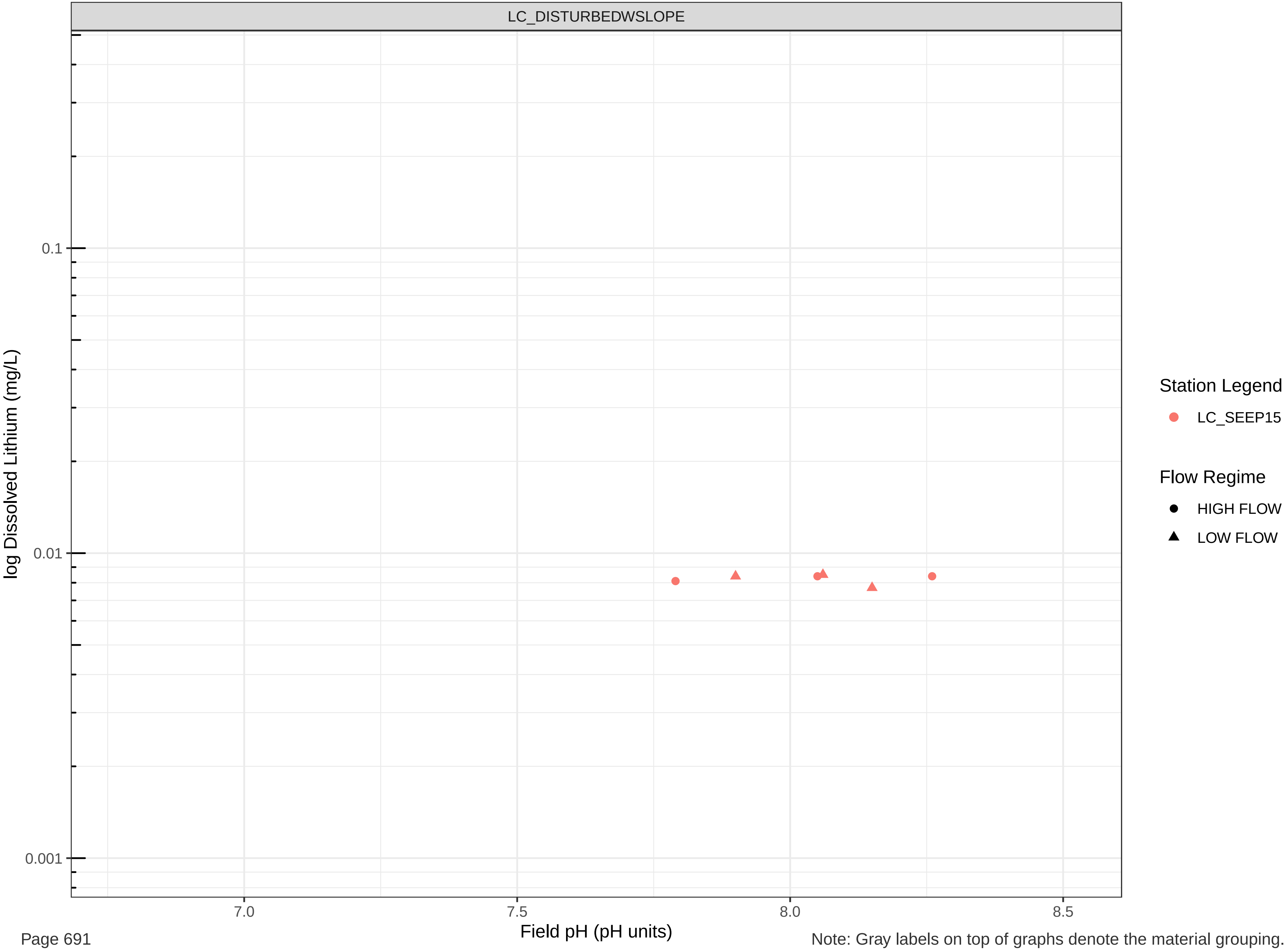

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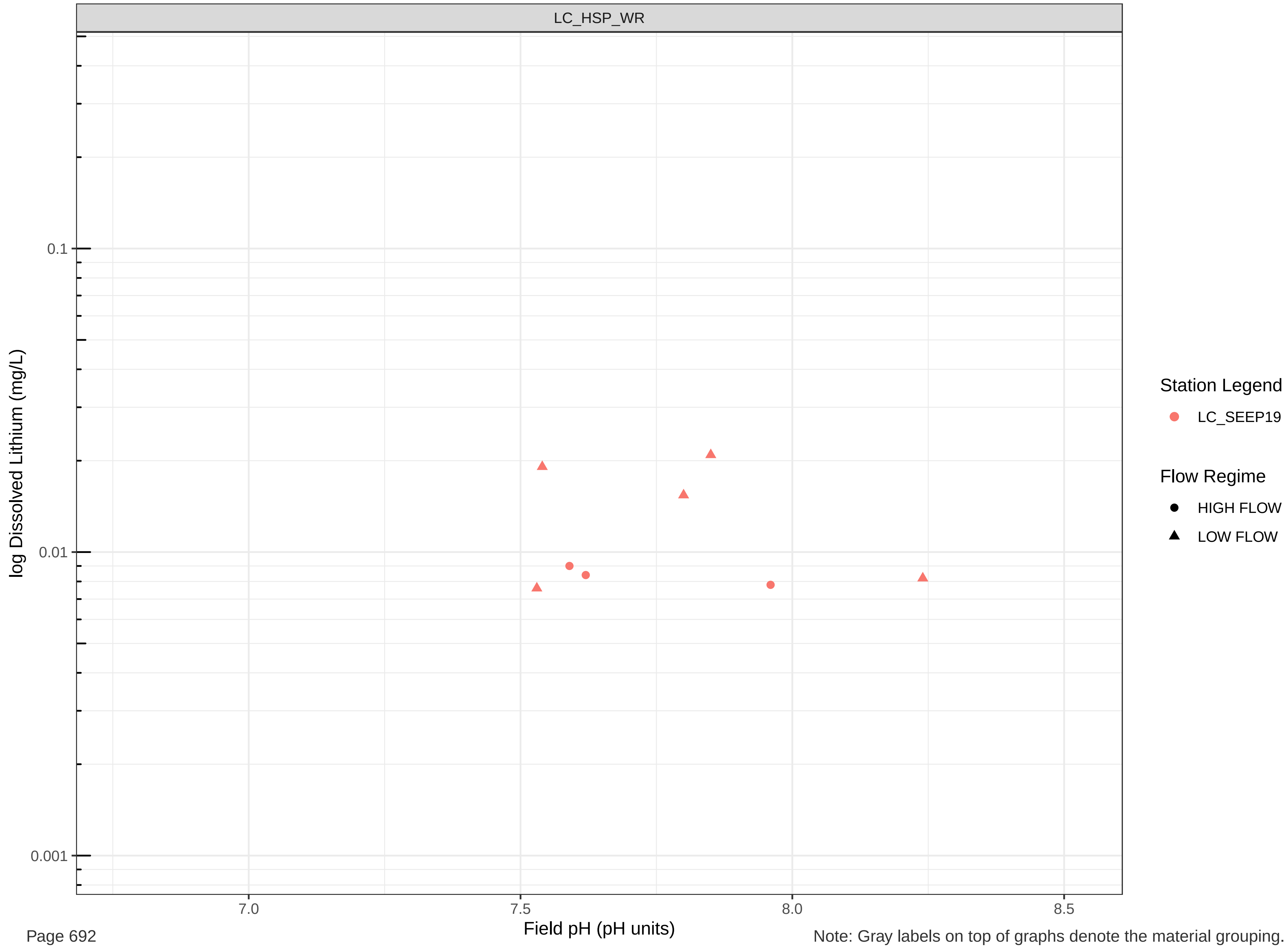

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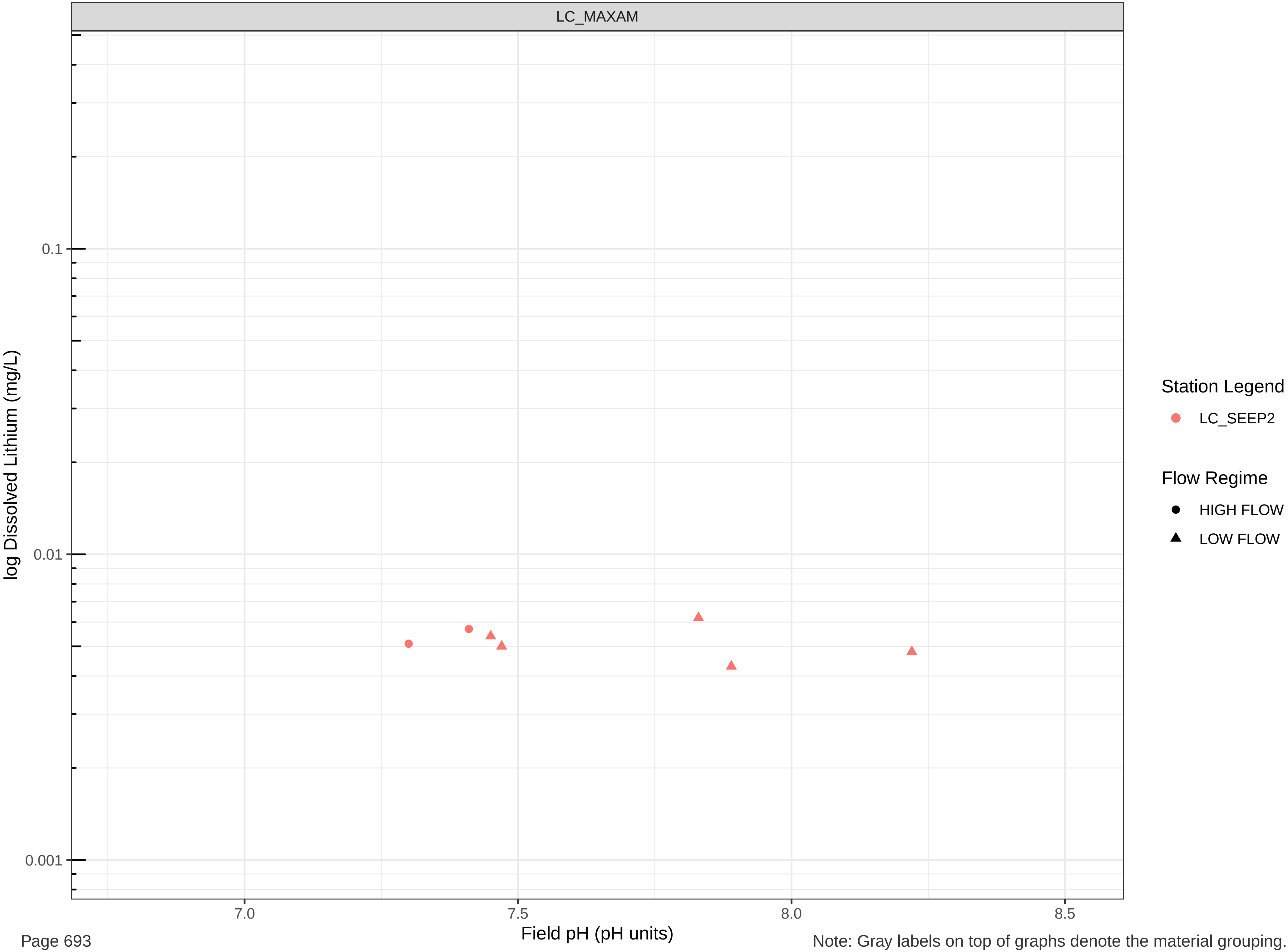

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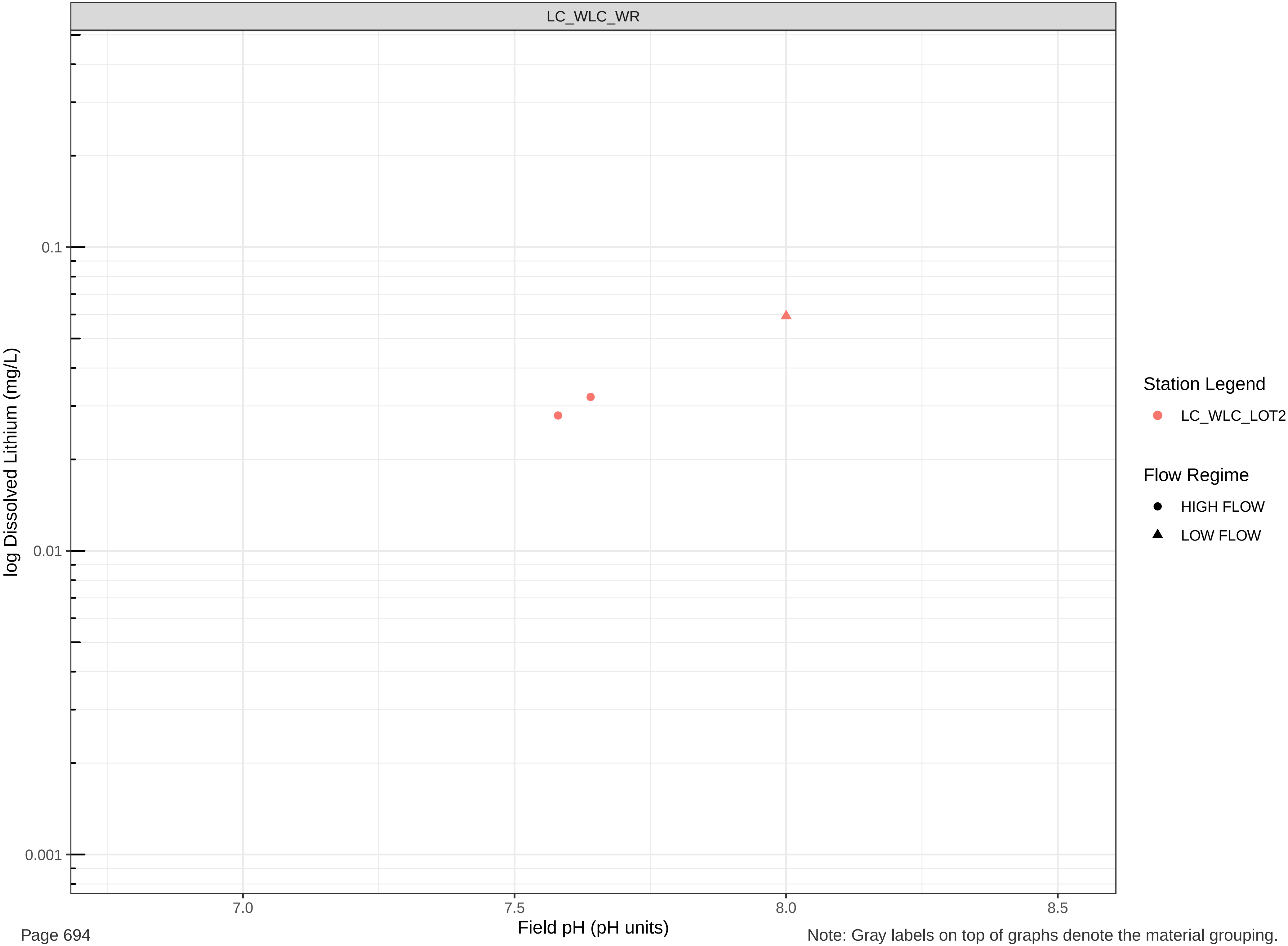

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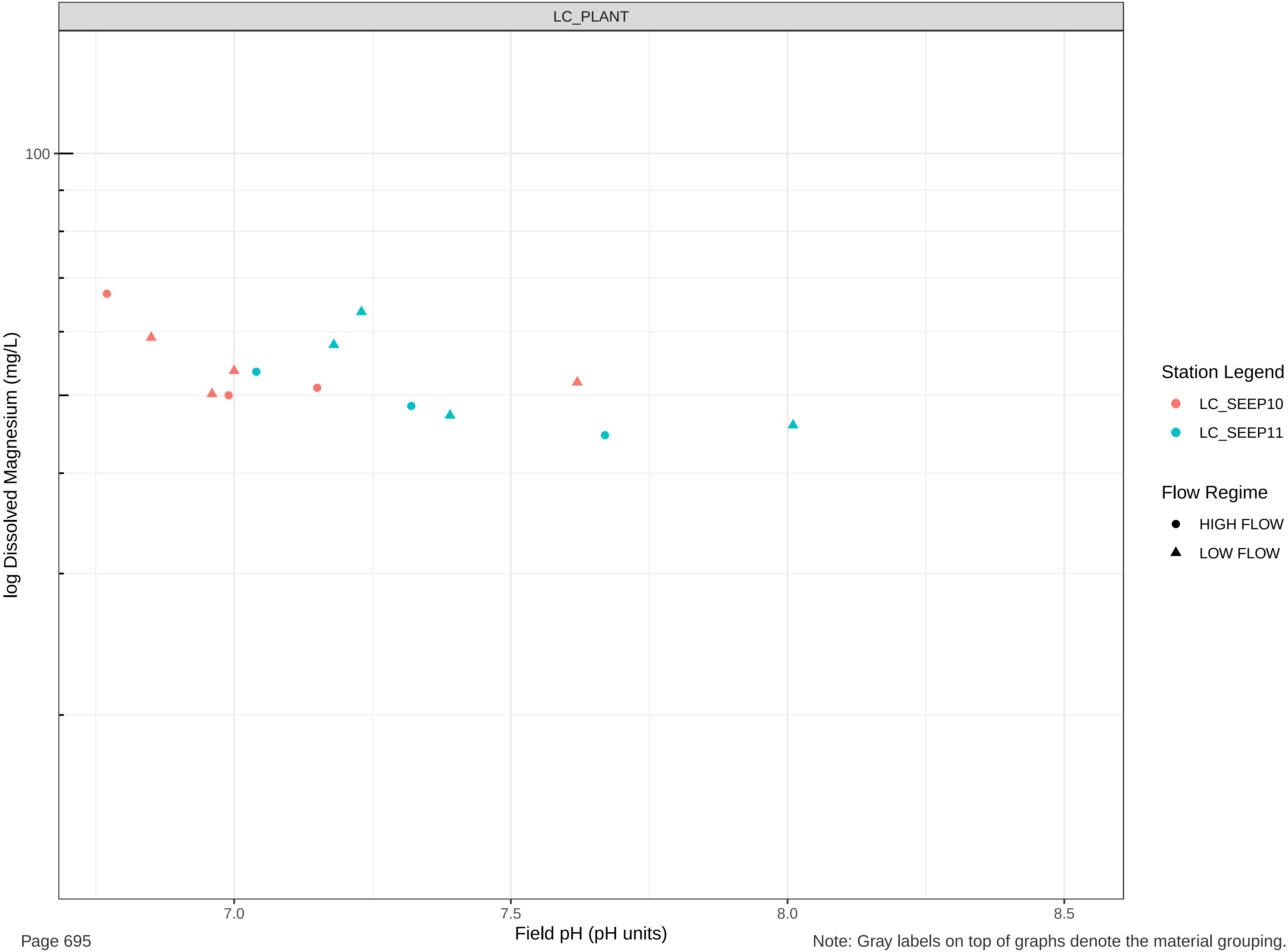

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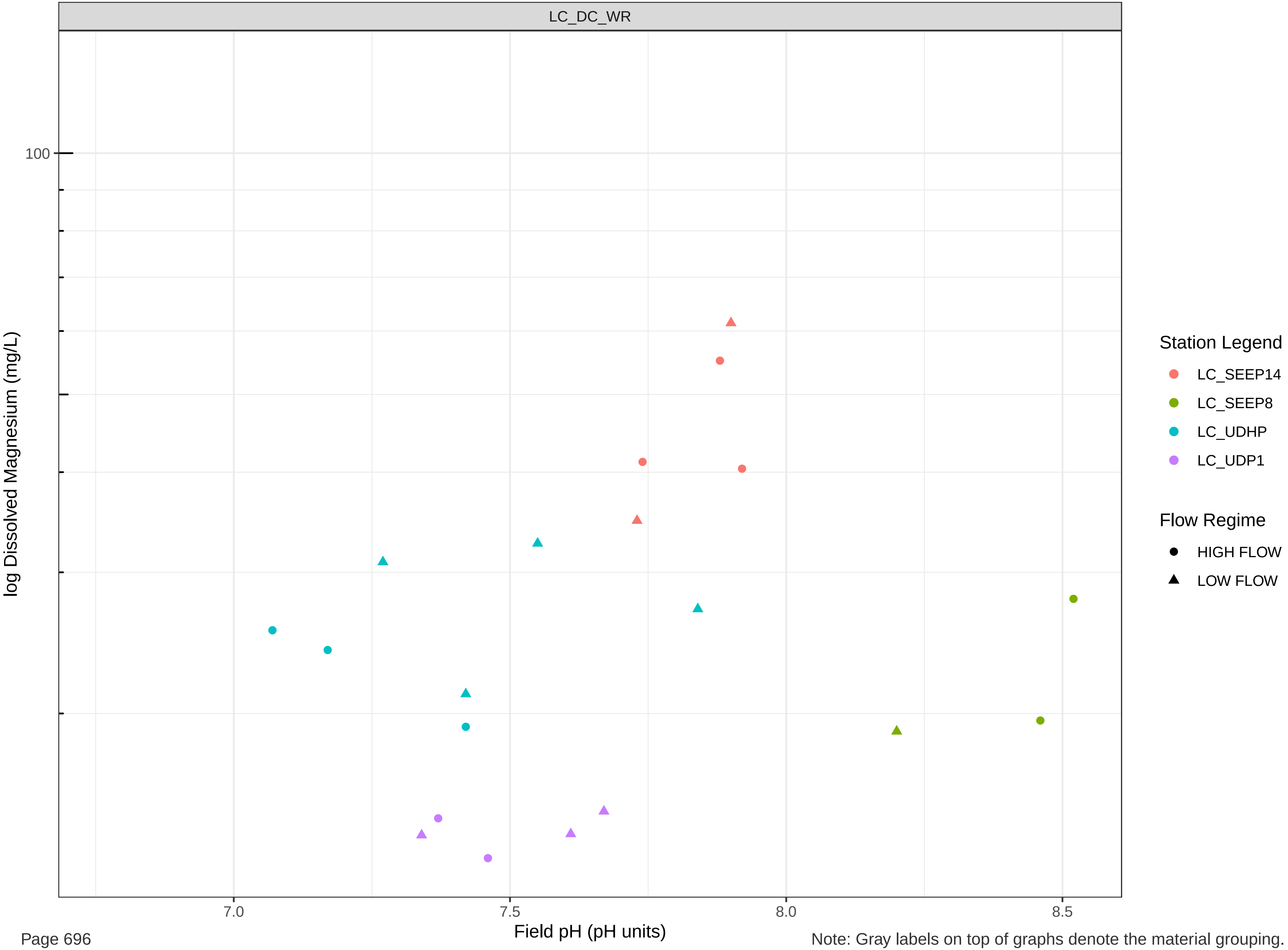

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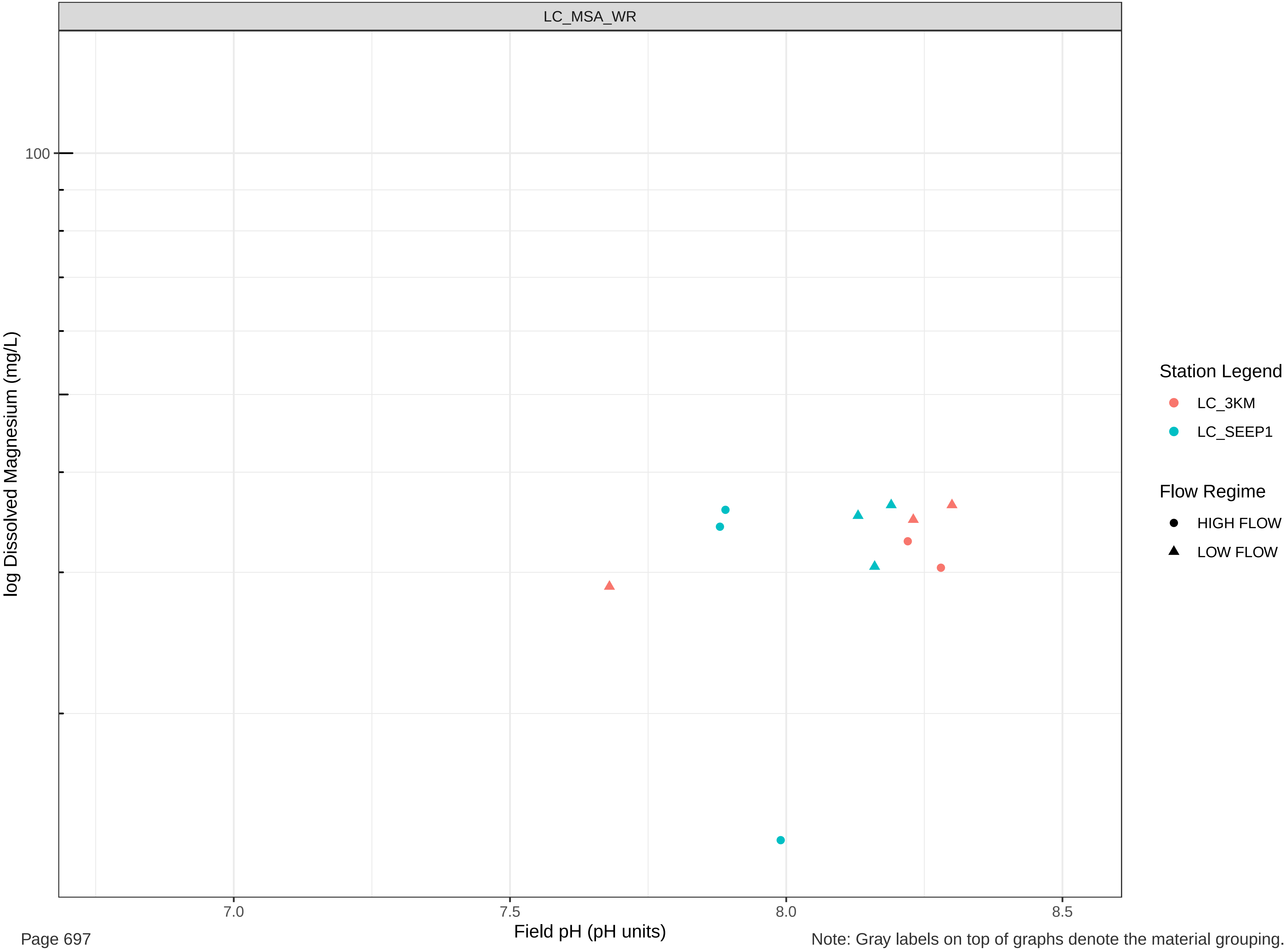

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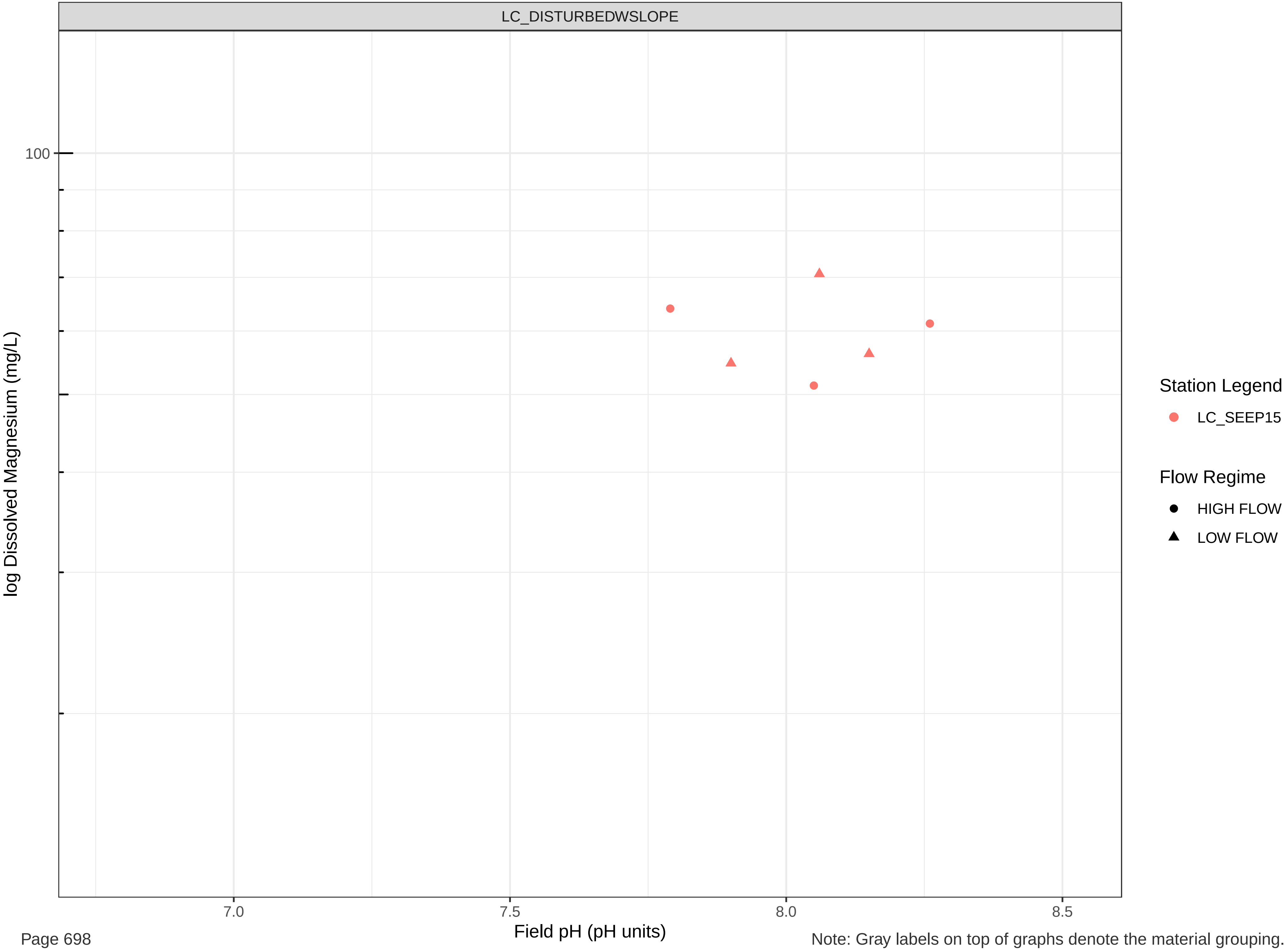

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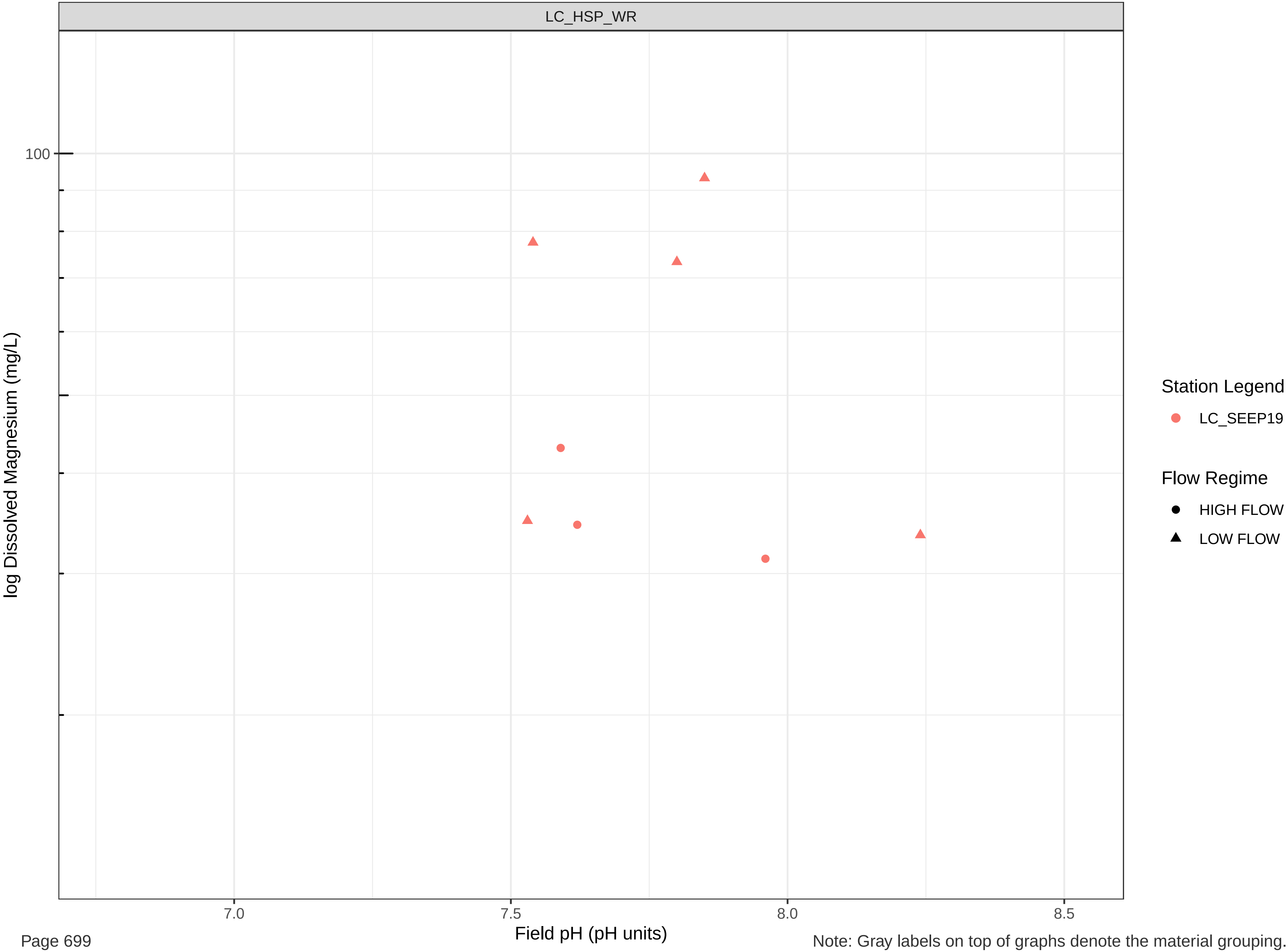

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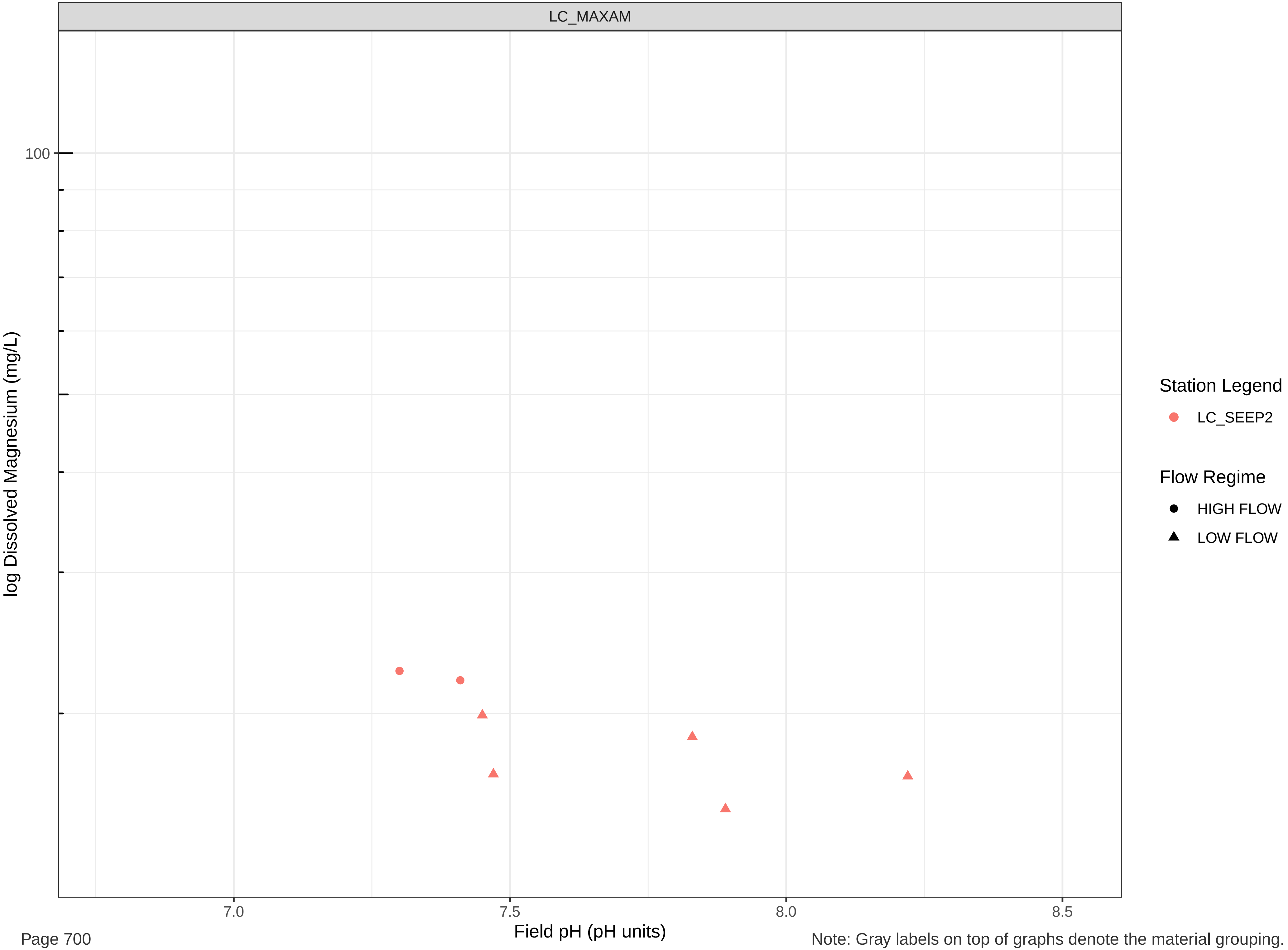

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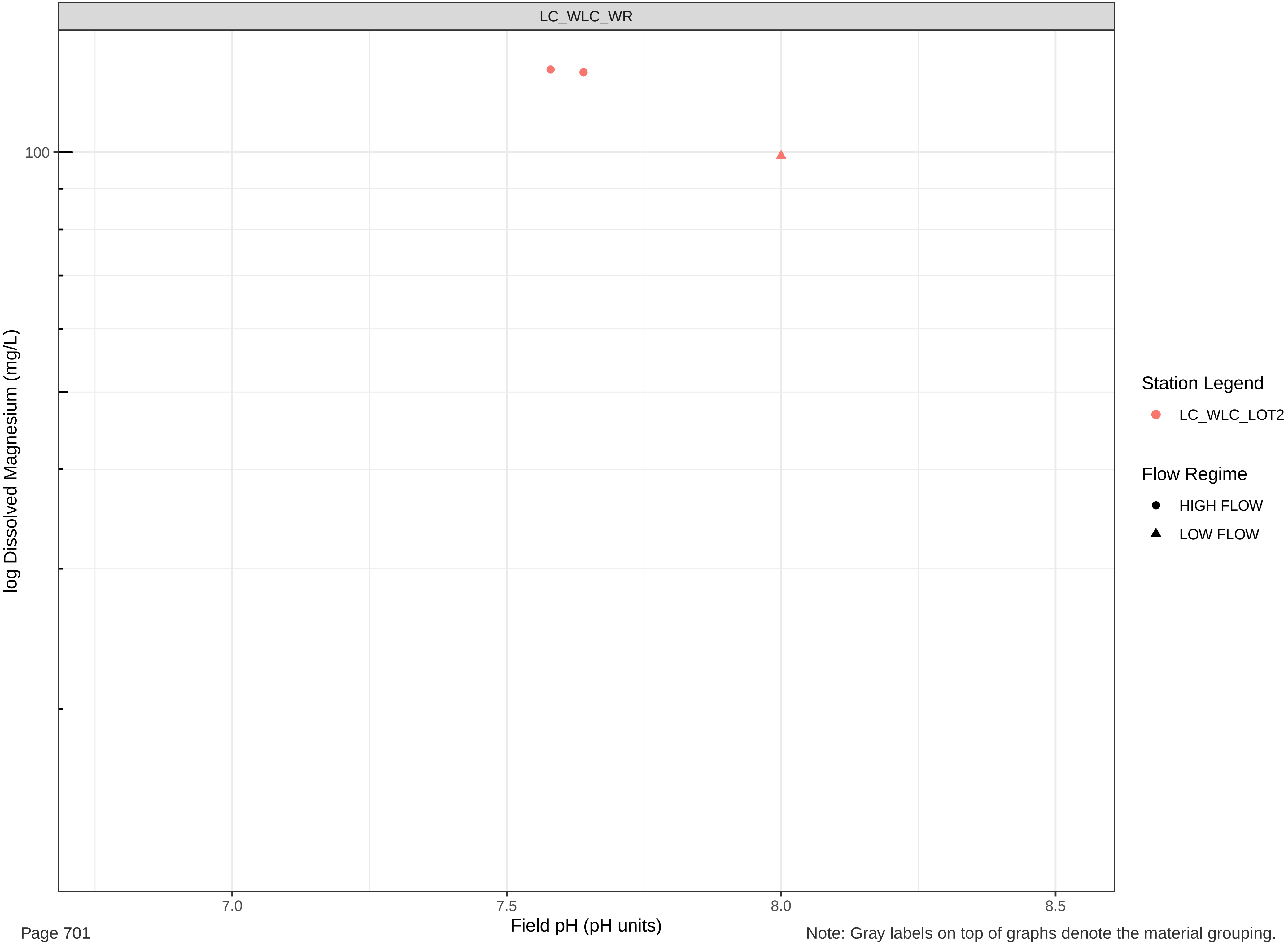

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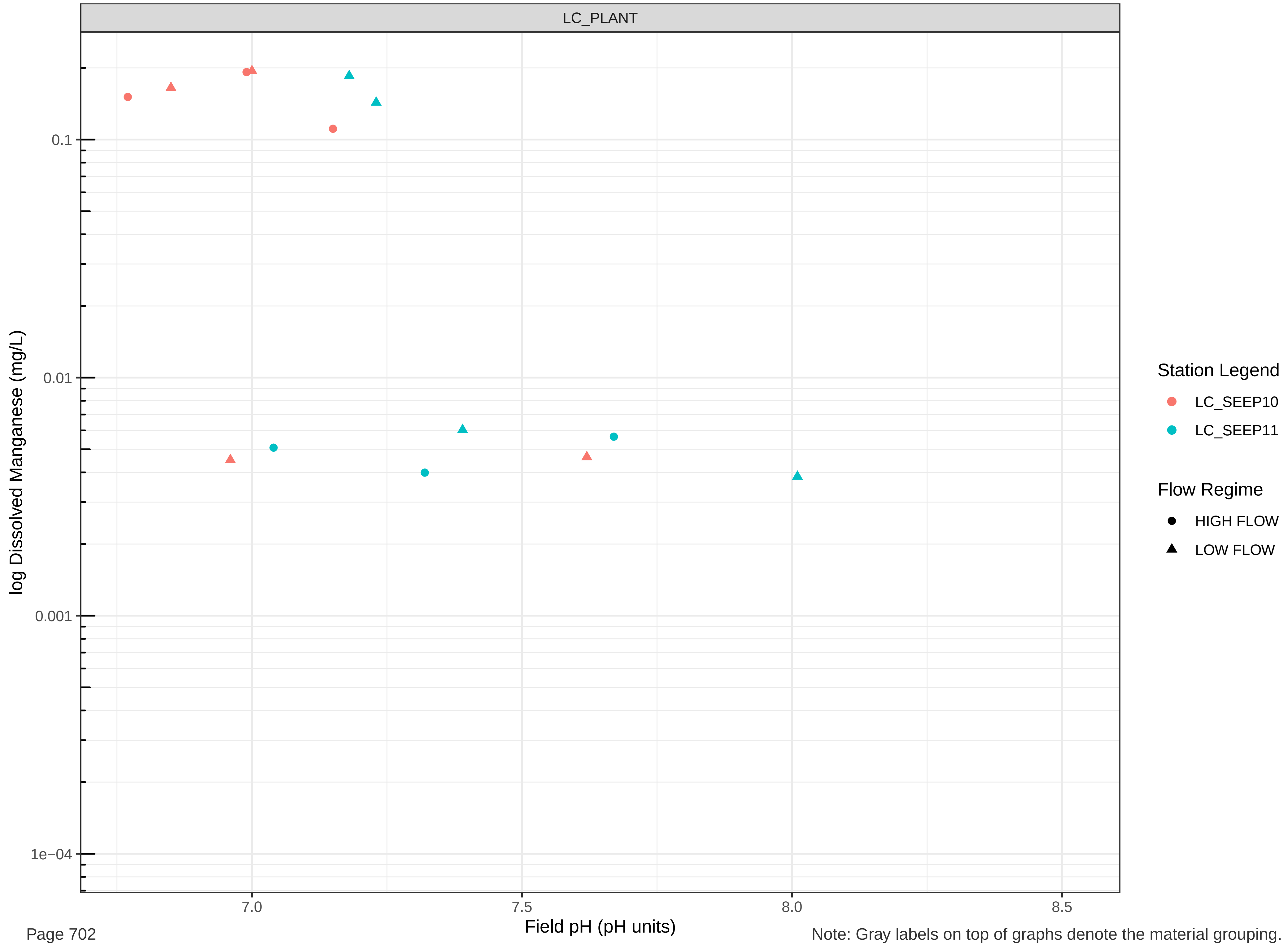

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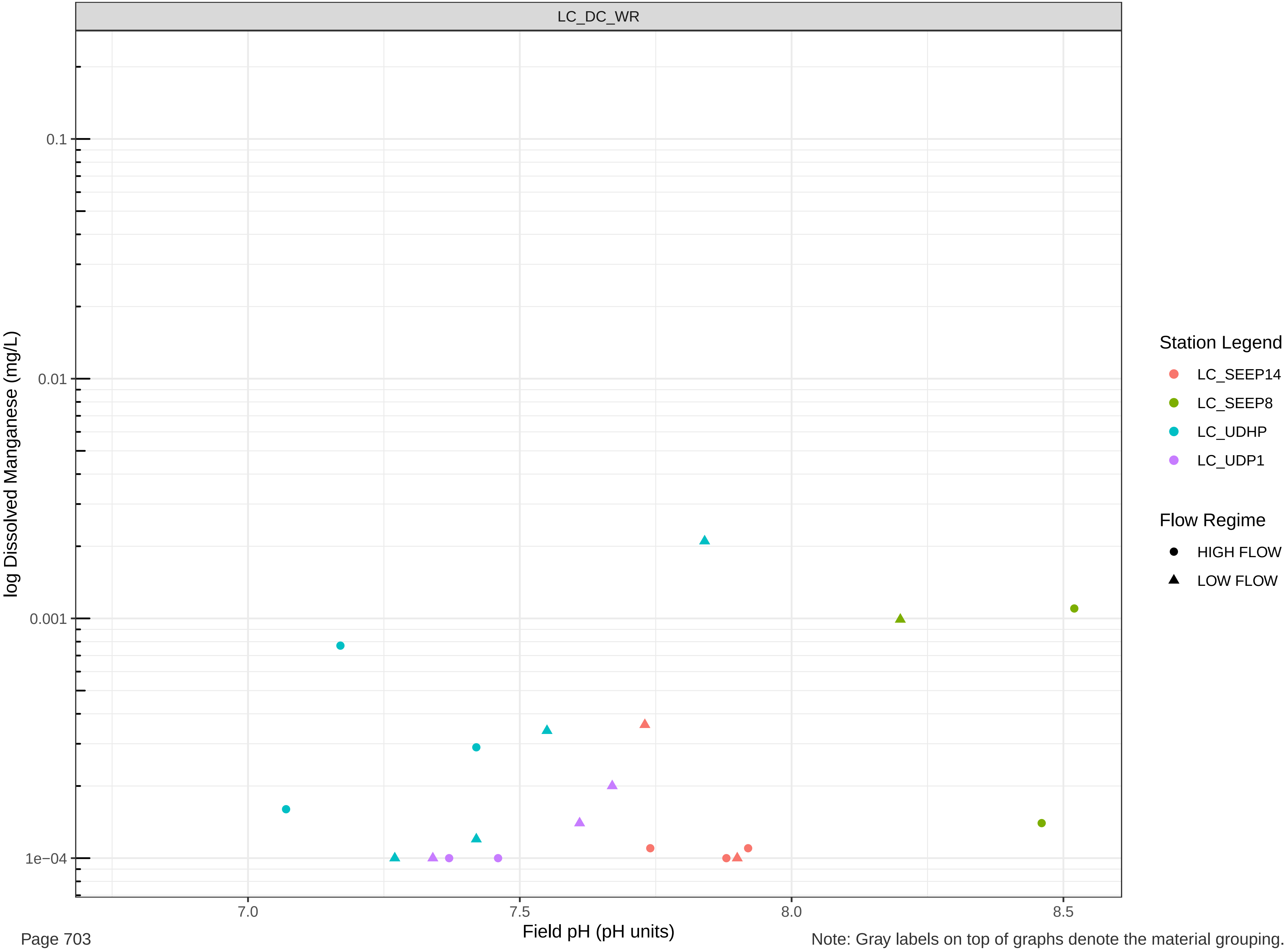

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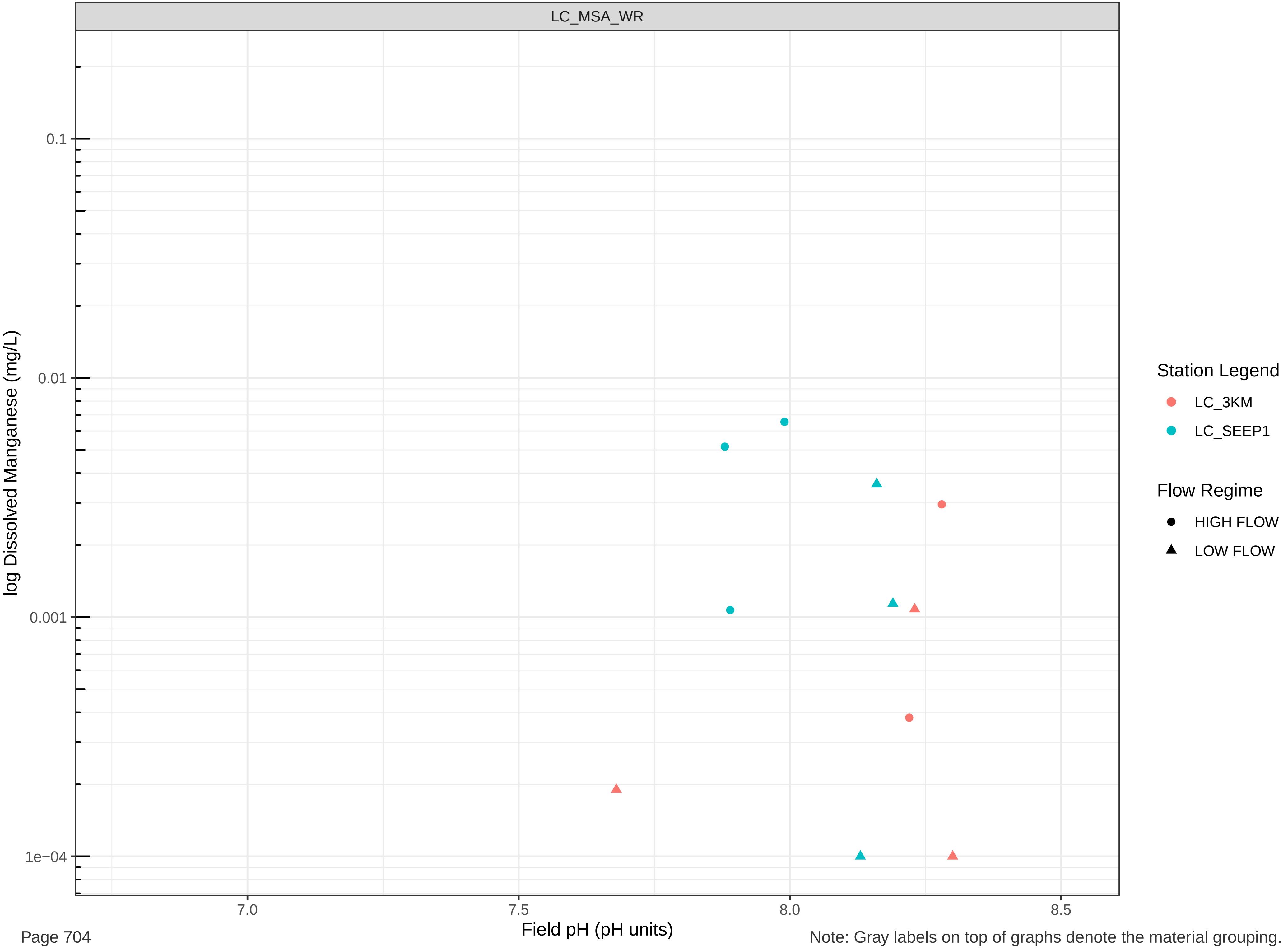

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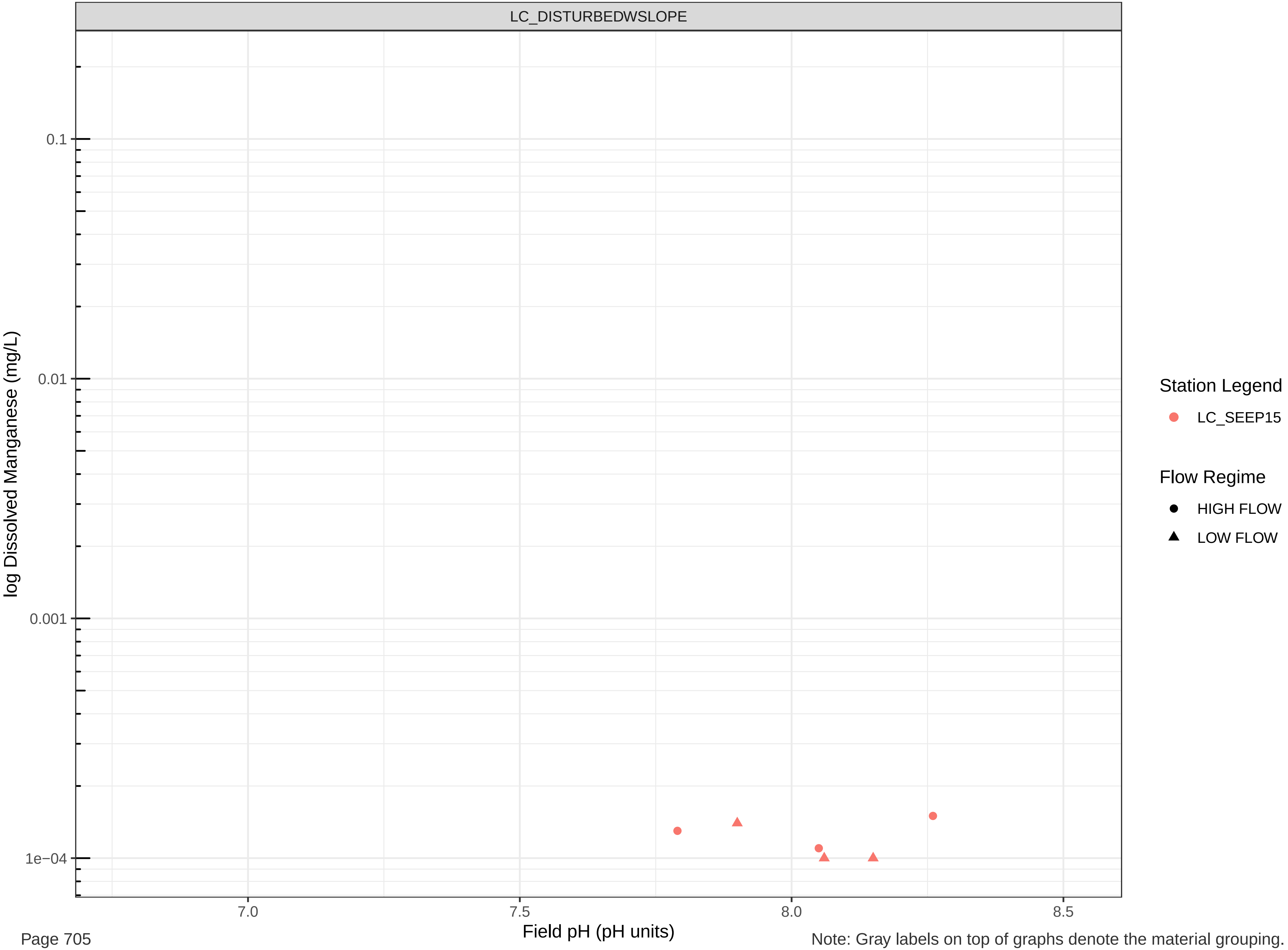

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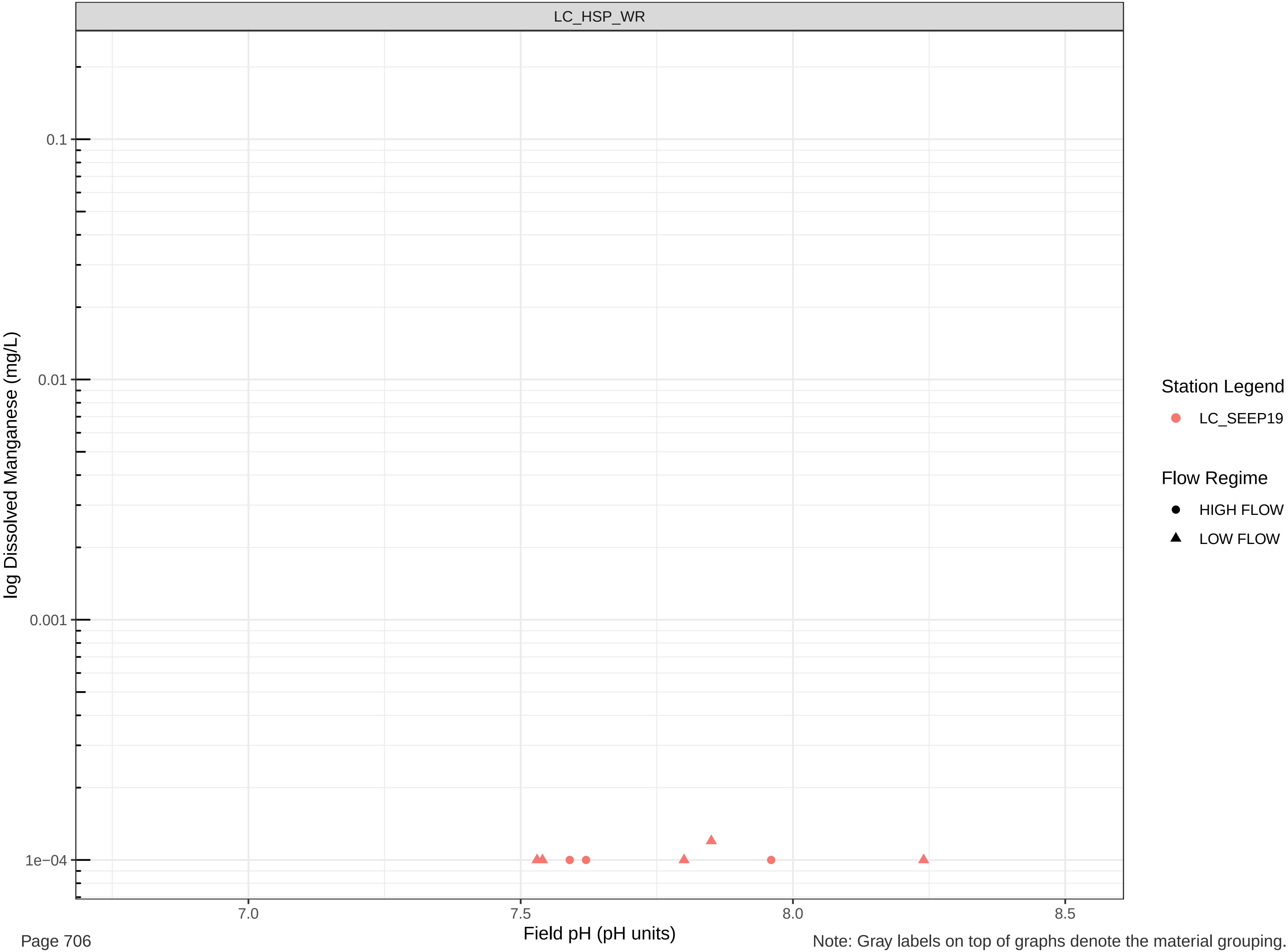

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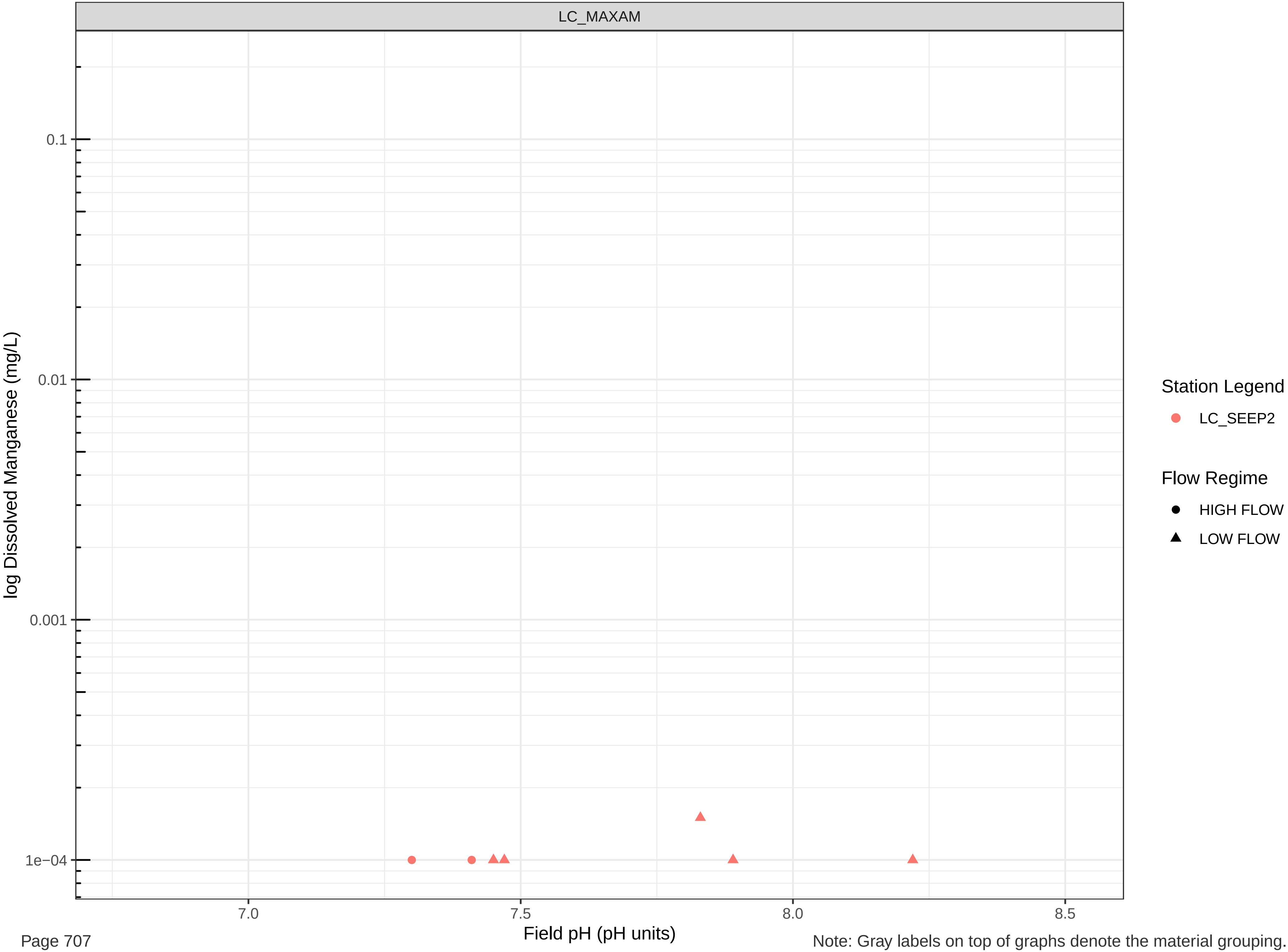
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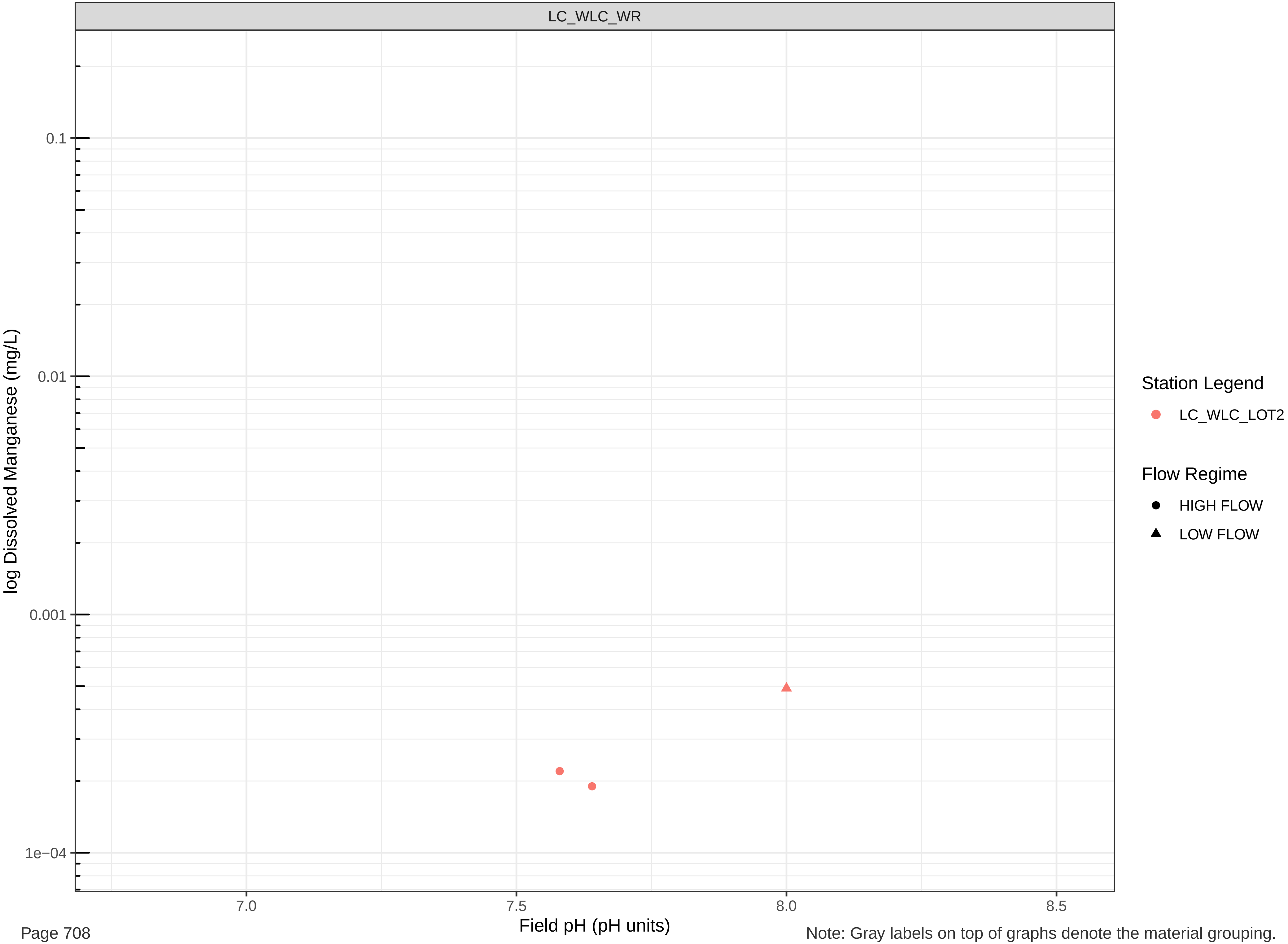
log Dissolved Manganese (mg/L)
0.1
0.01
0.001
1e−04
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
LC_SEEP2
Flow Regime
HIGH FLOW
LOW FLOW



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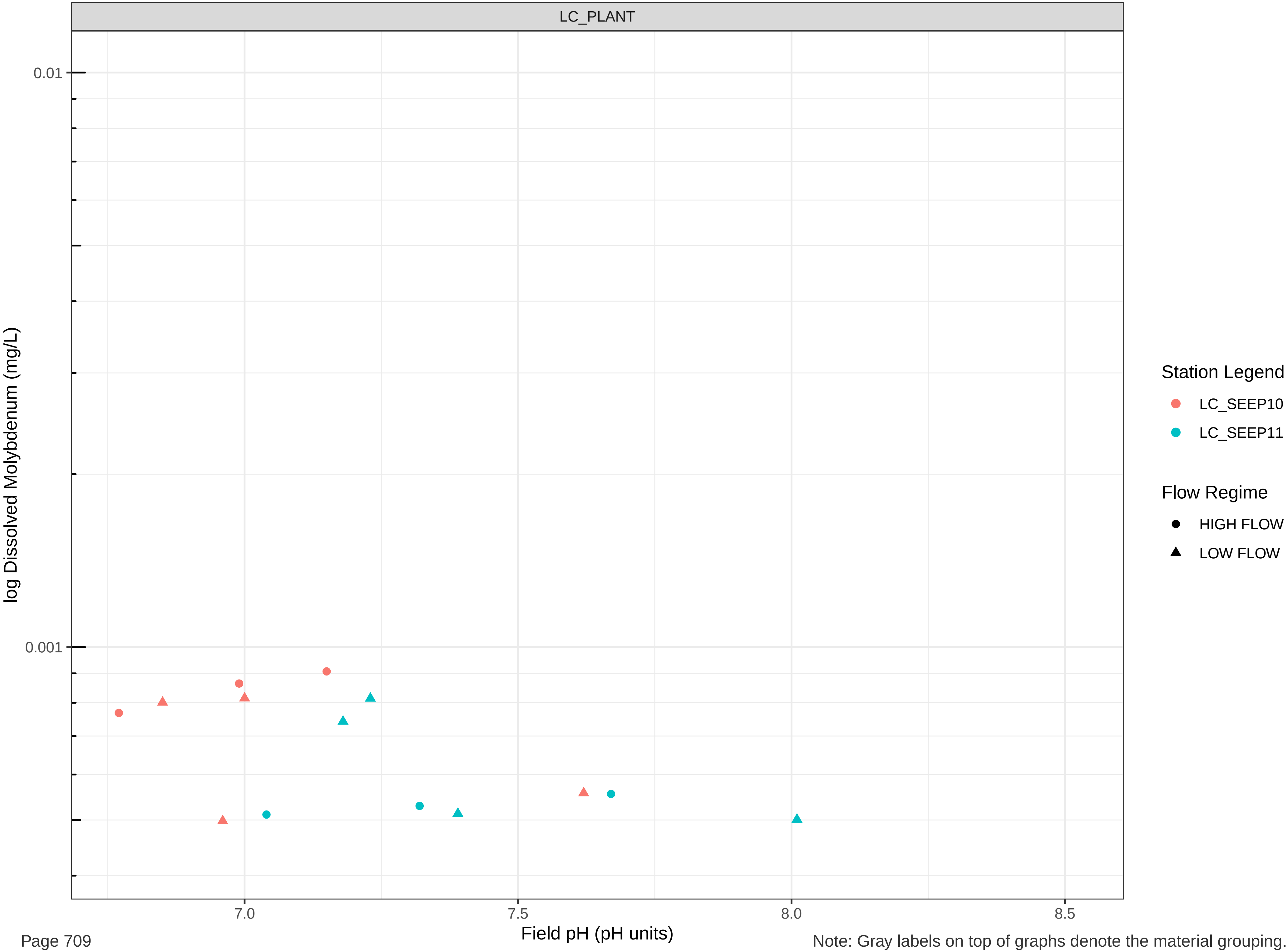

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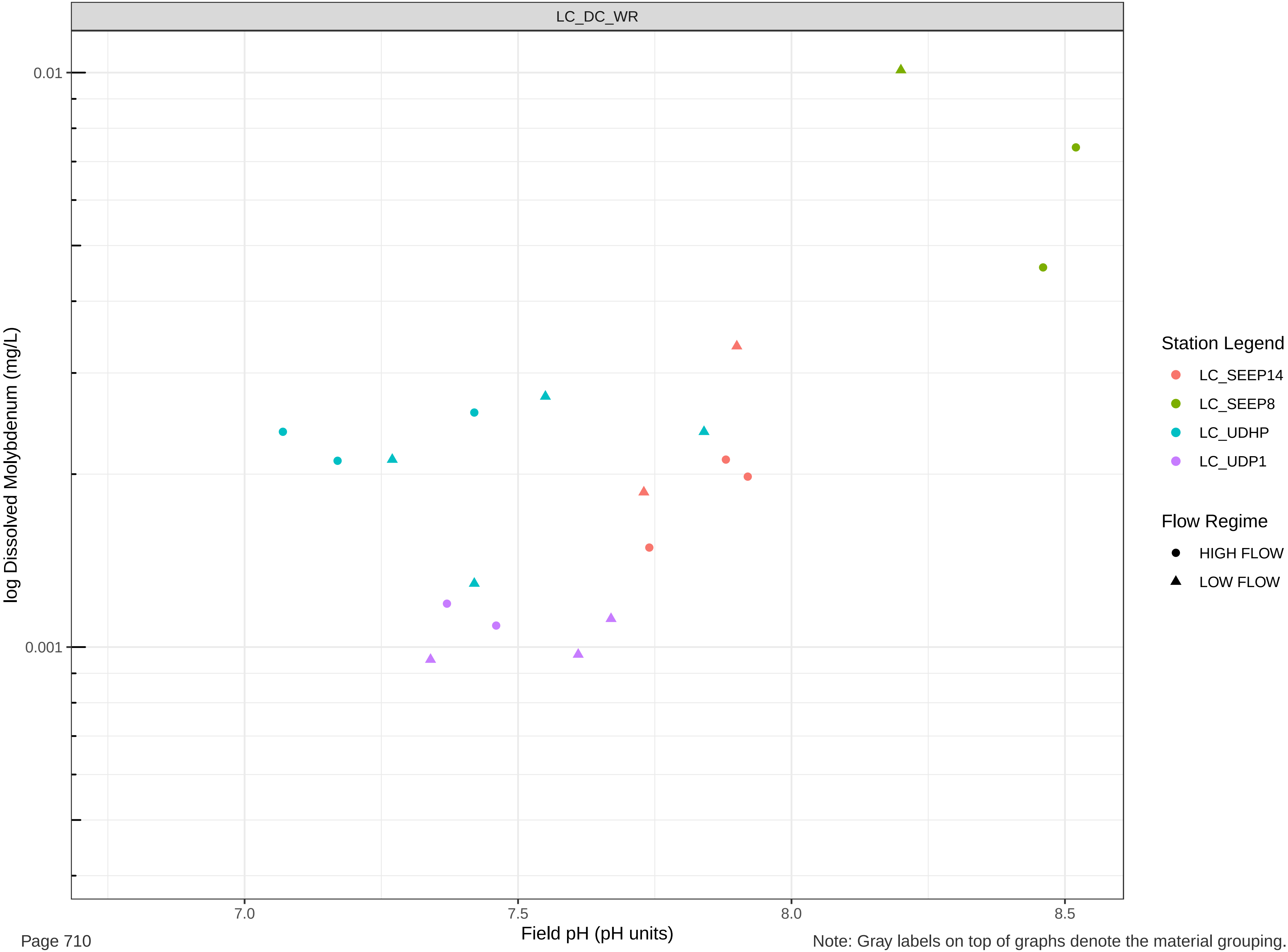

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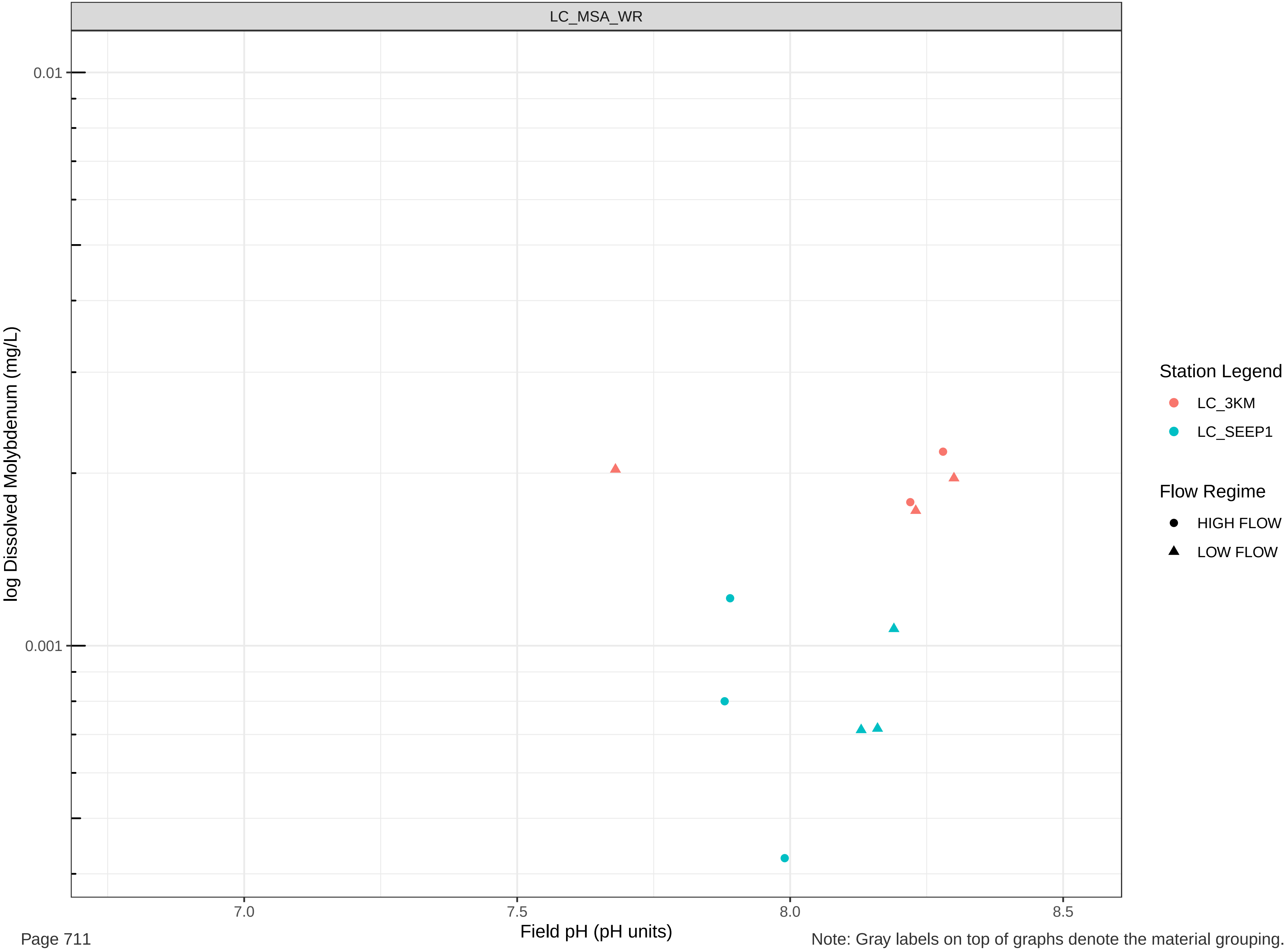

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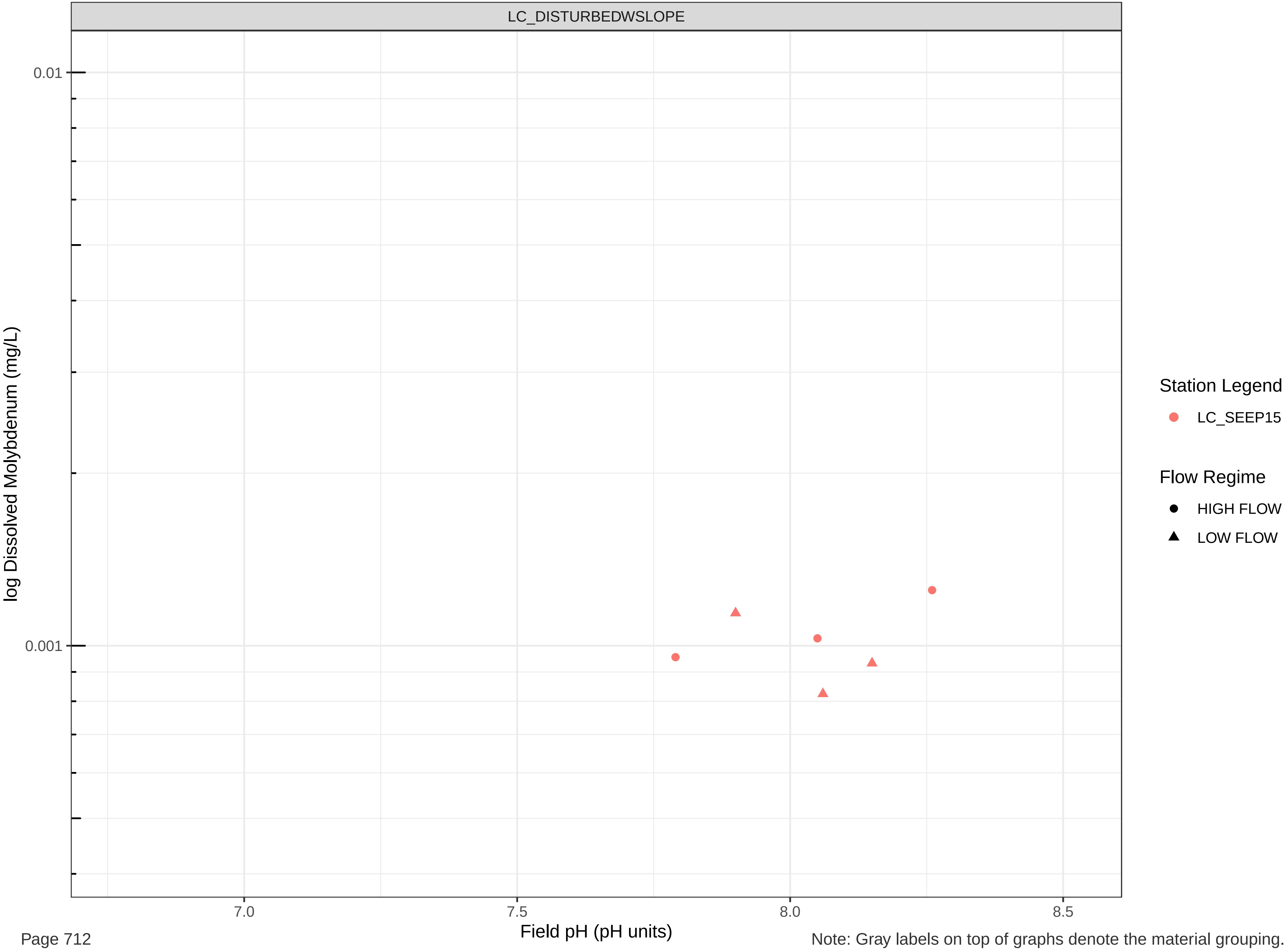

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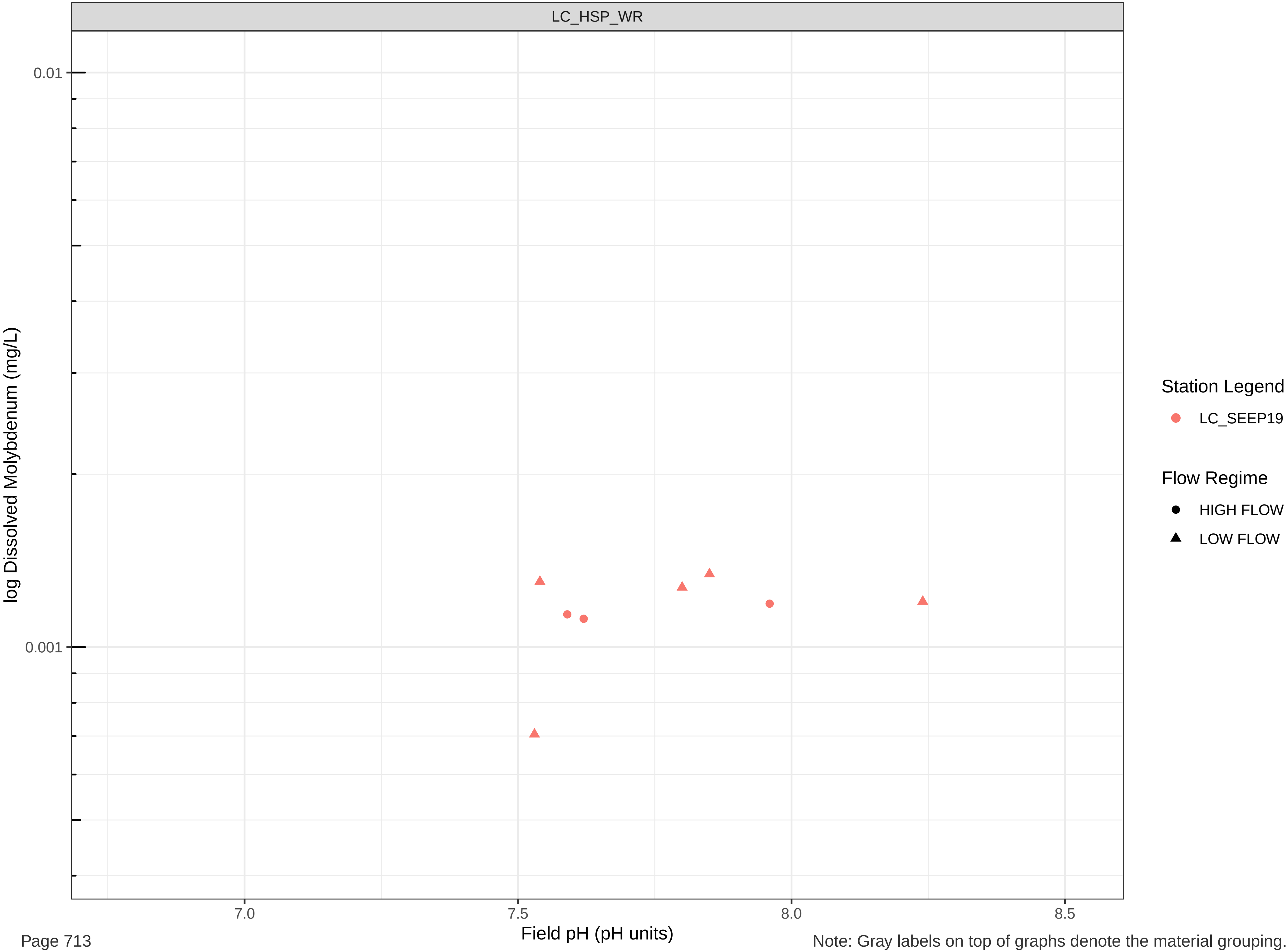

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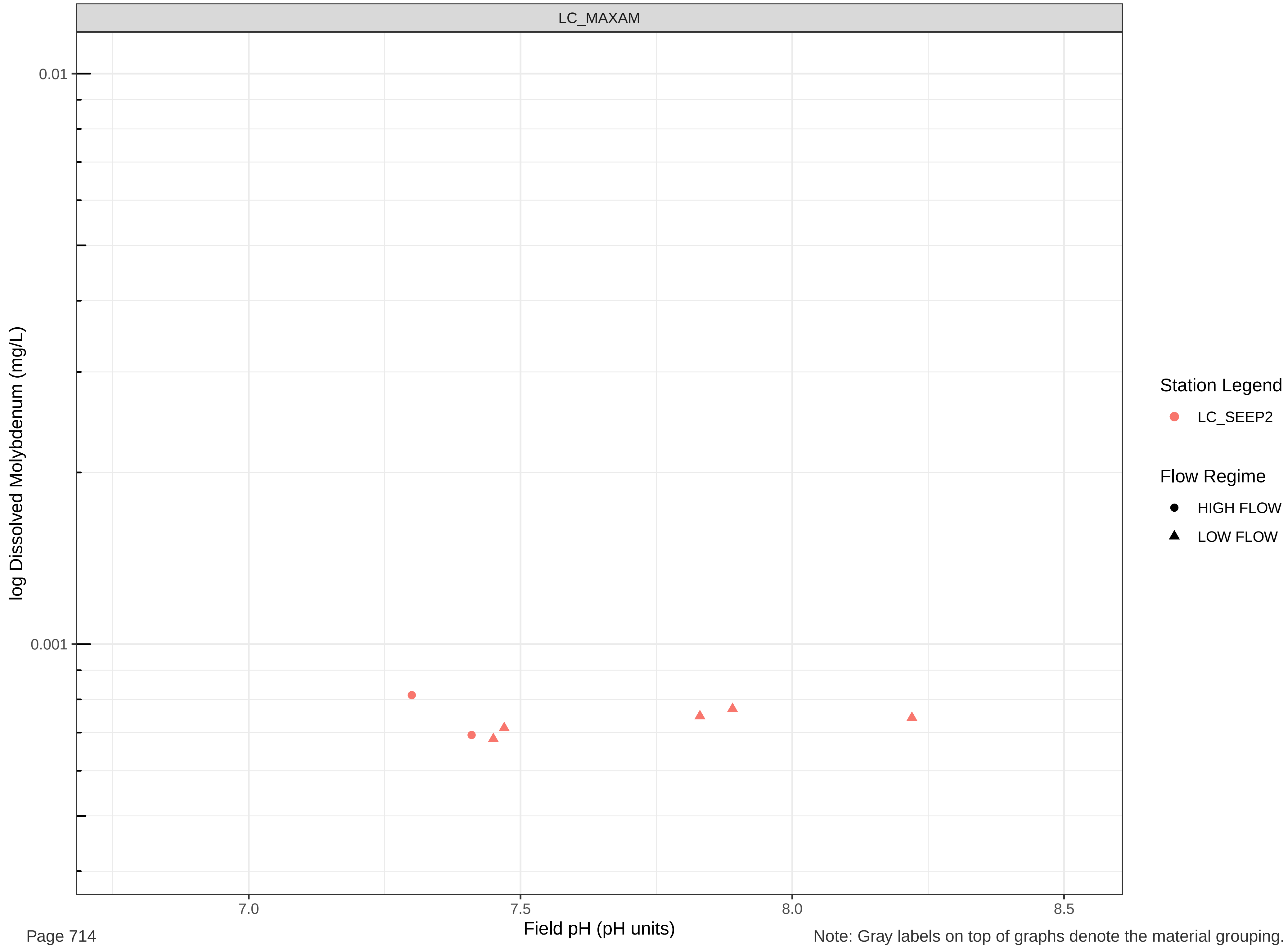

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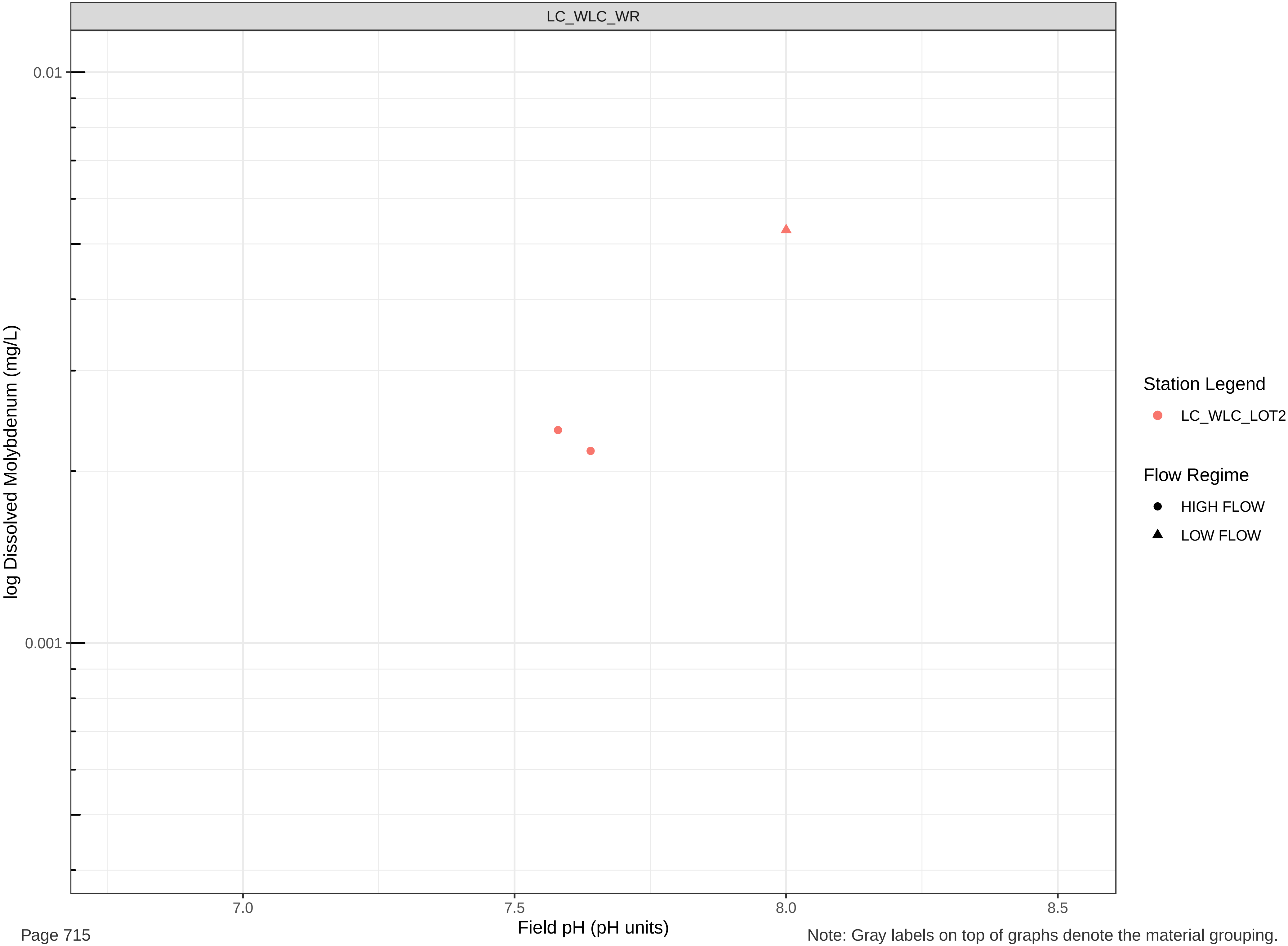

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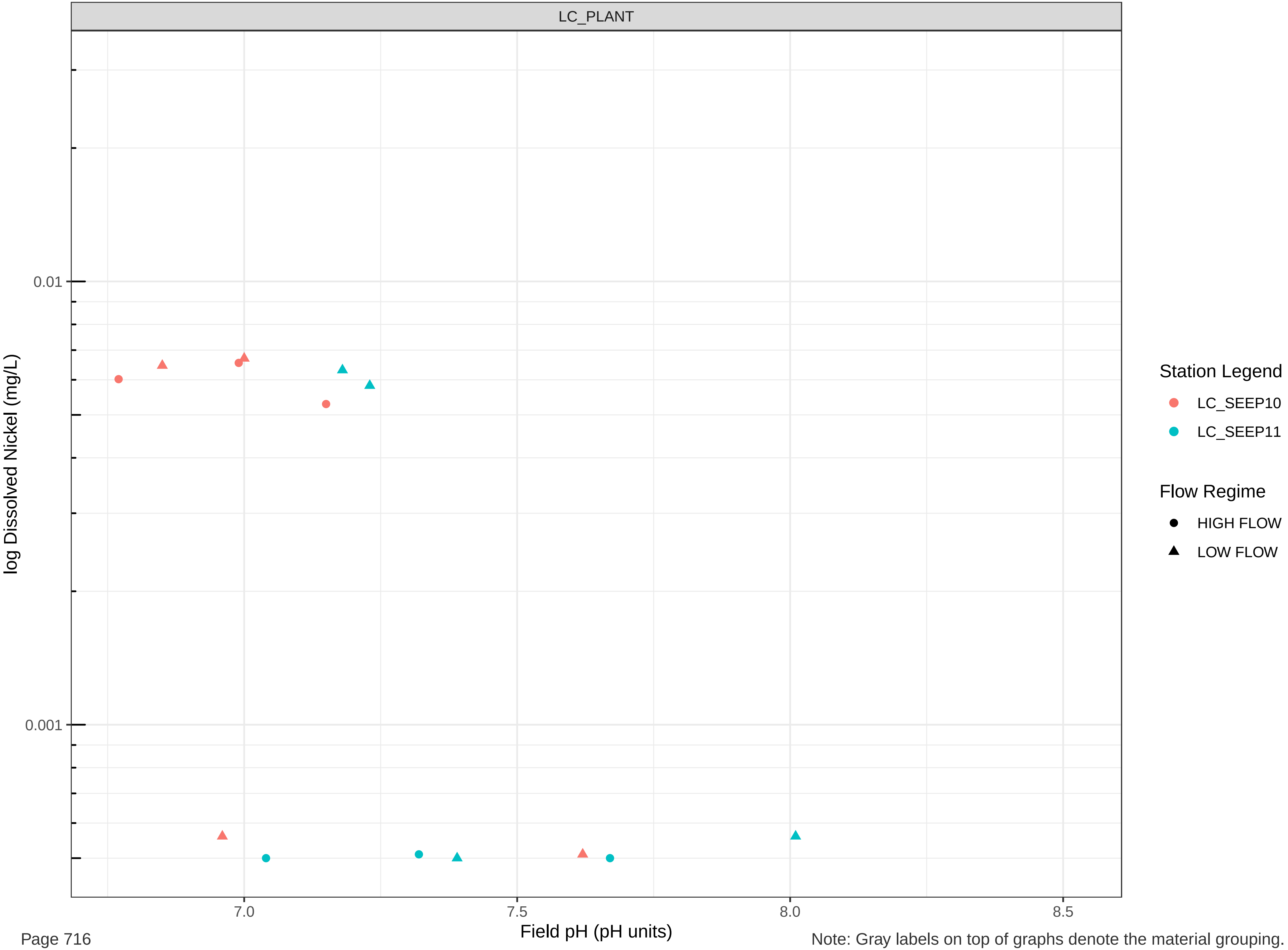

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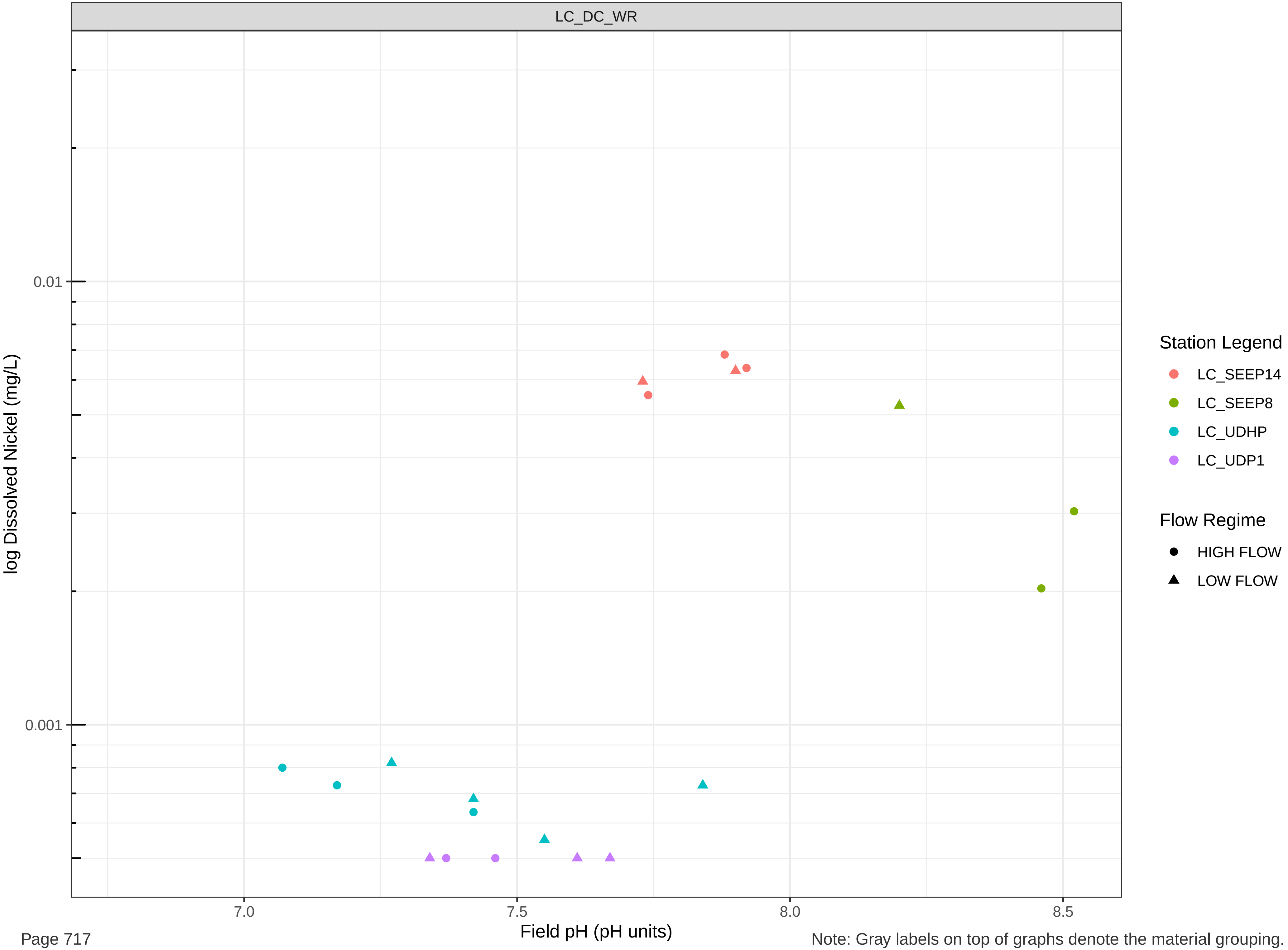

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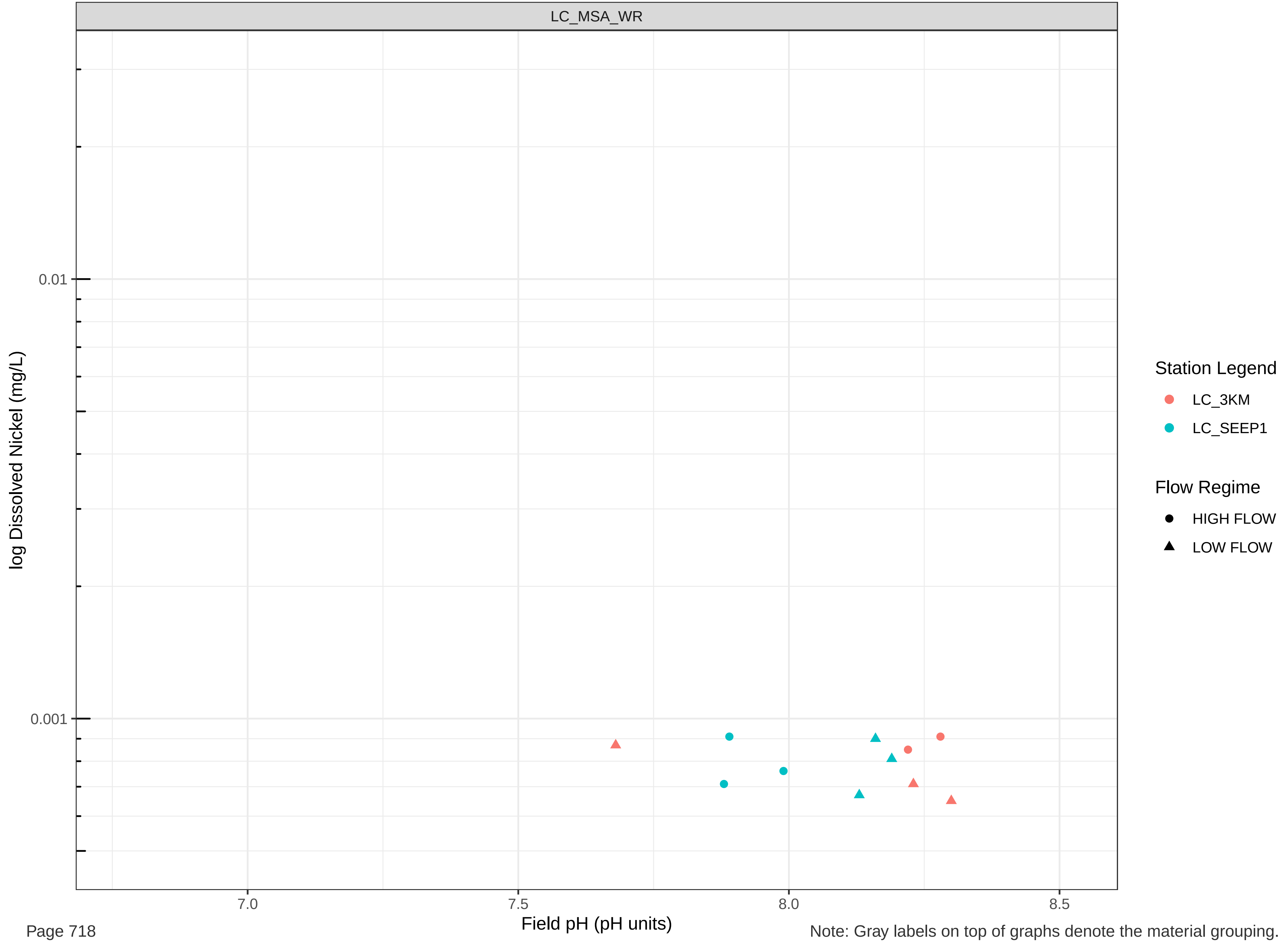

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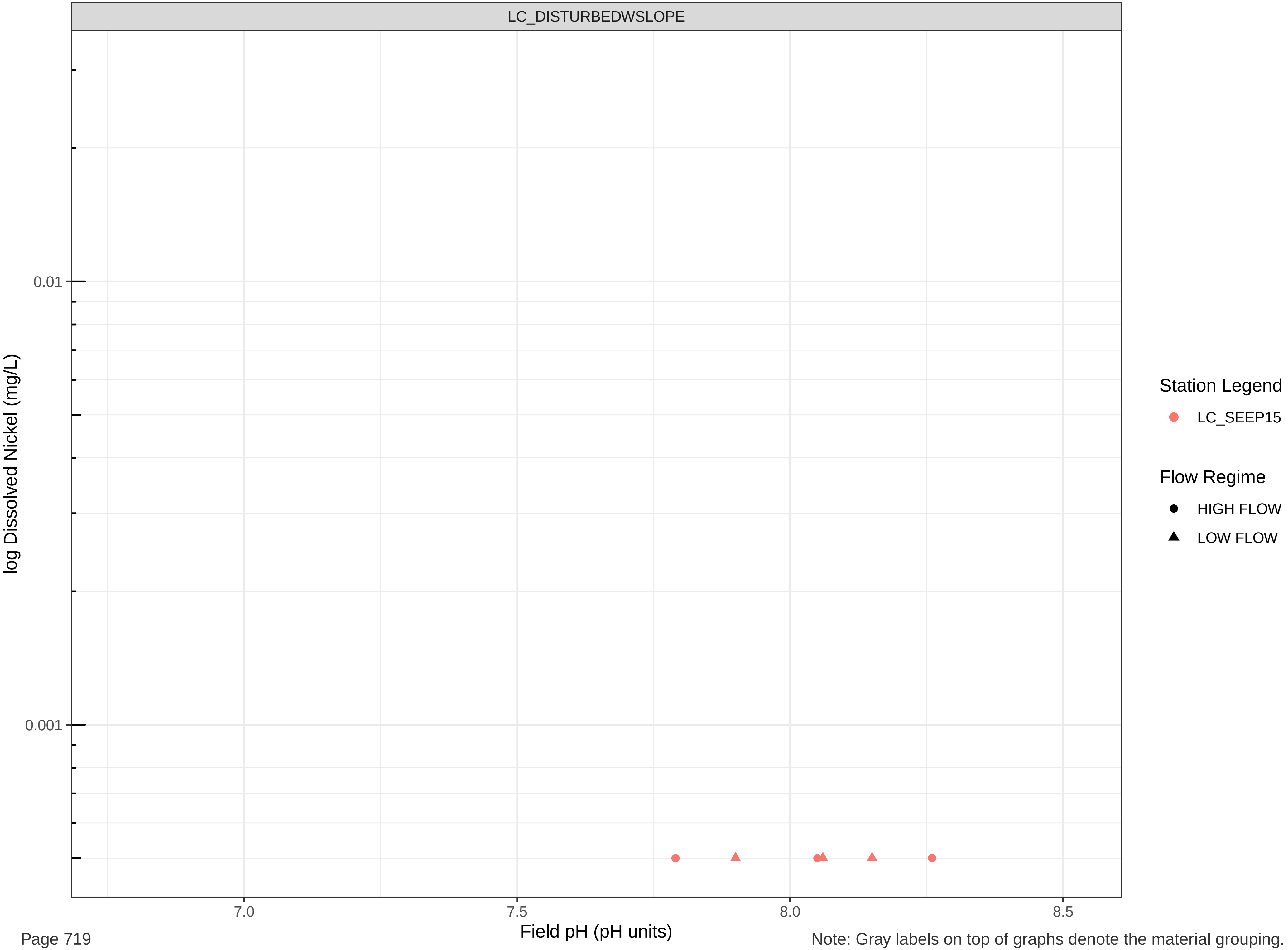

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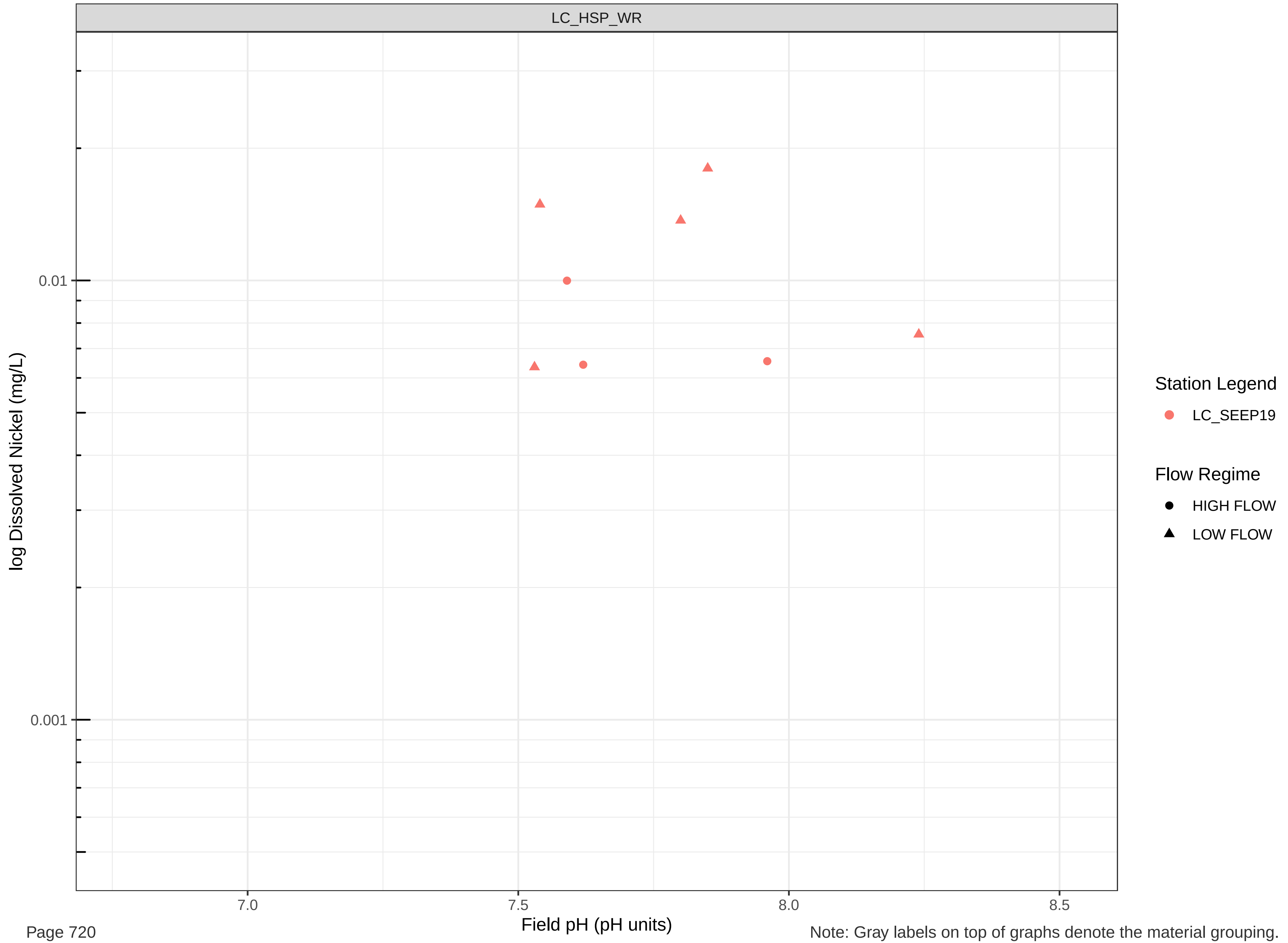

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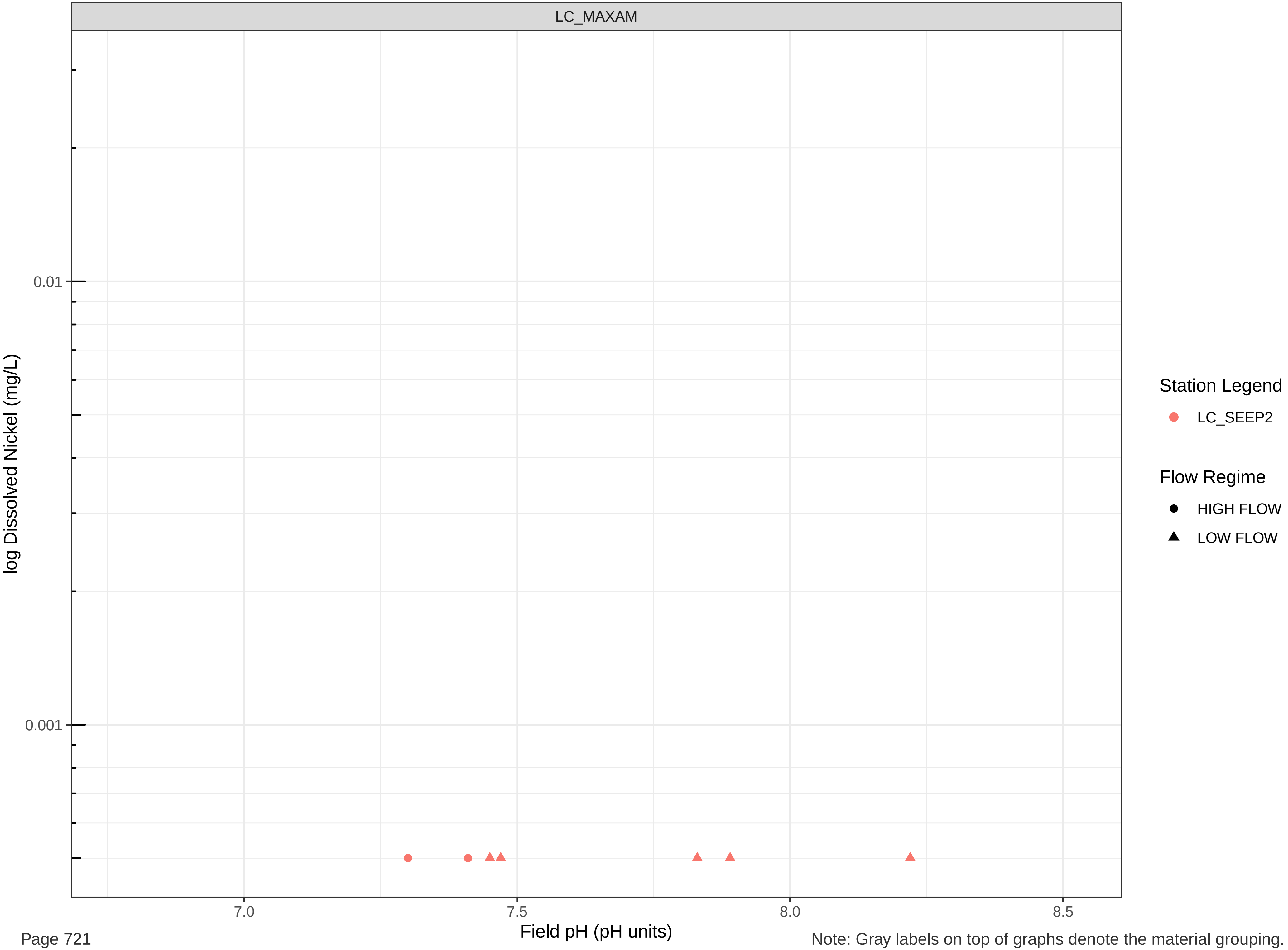

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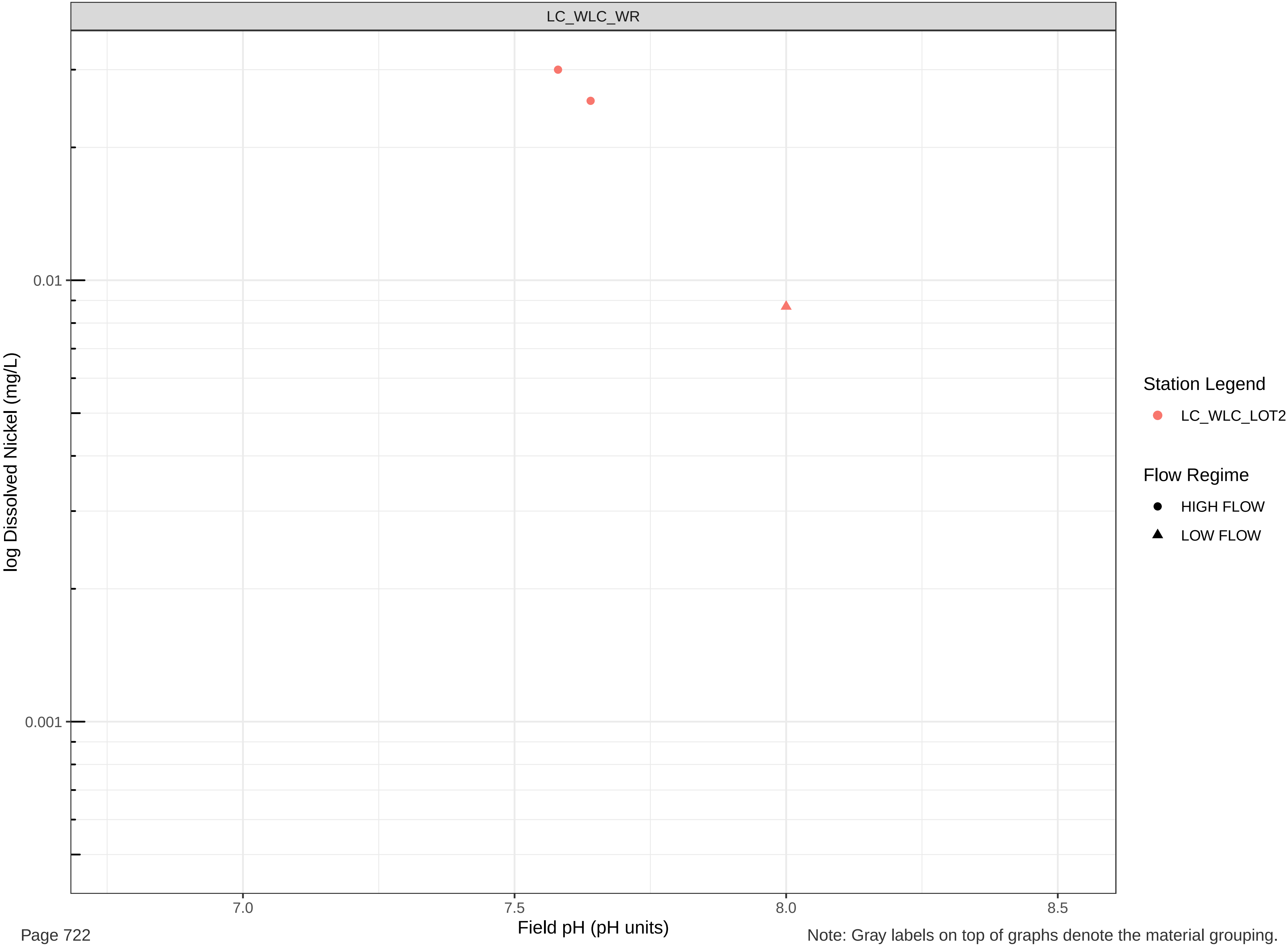

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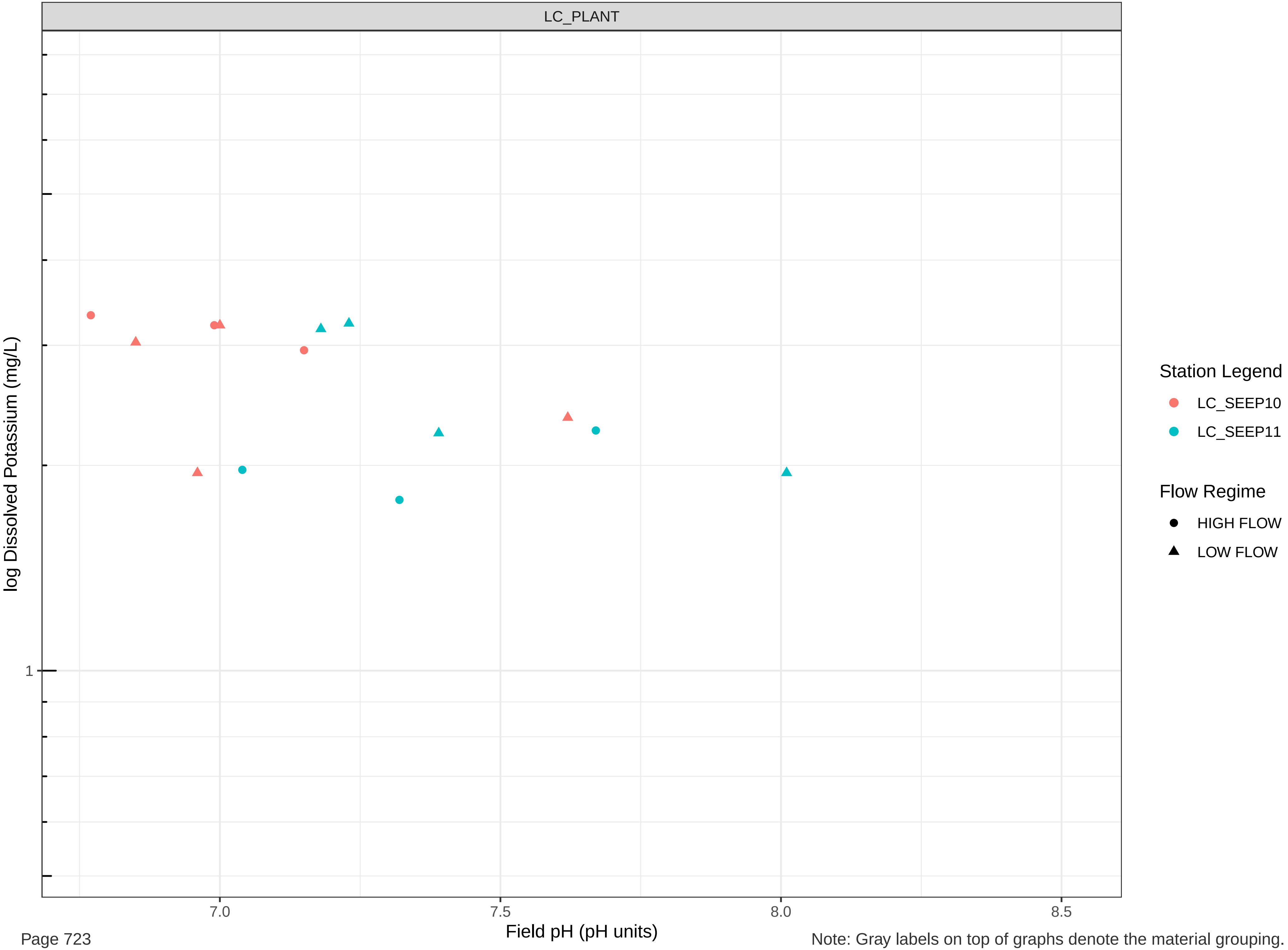

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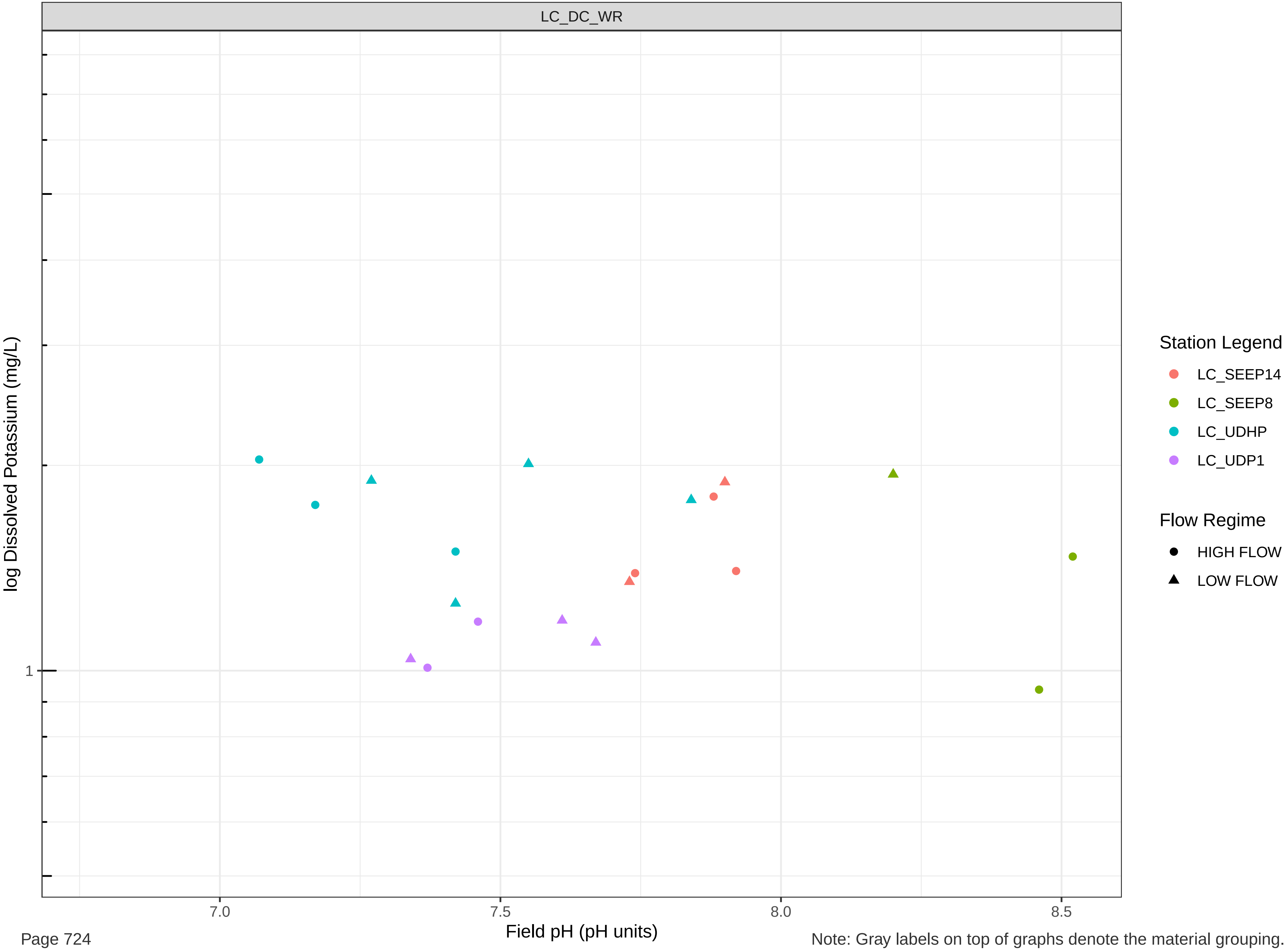

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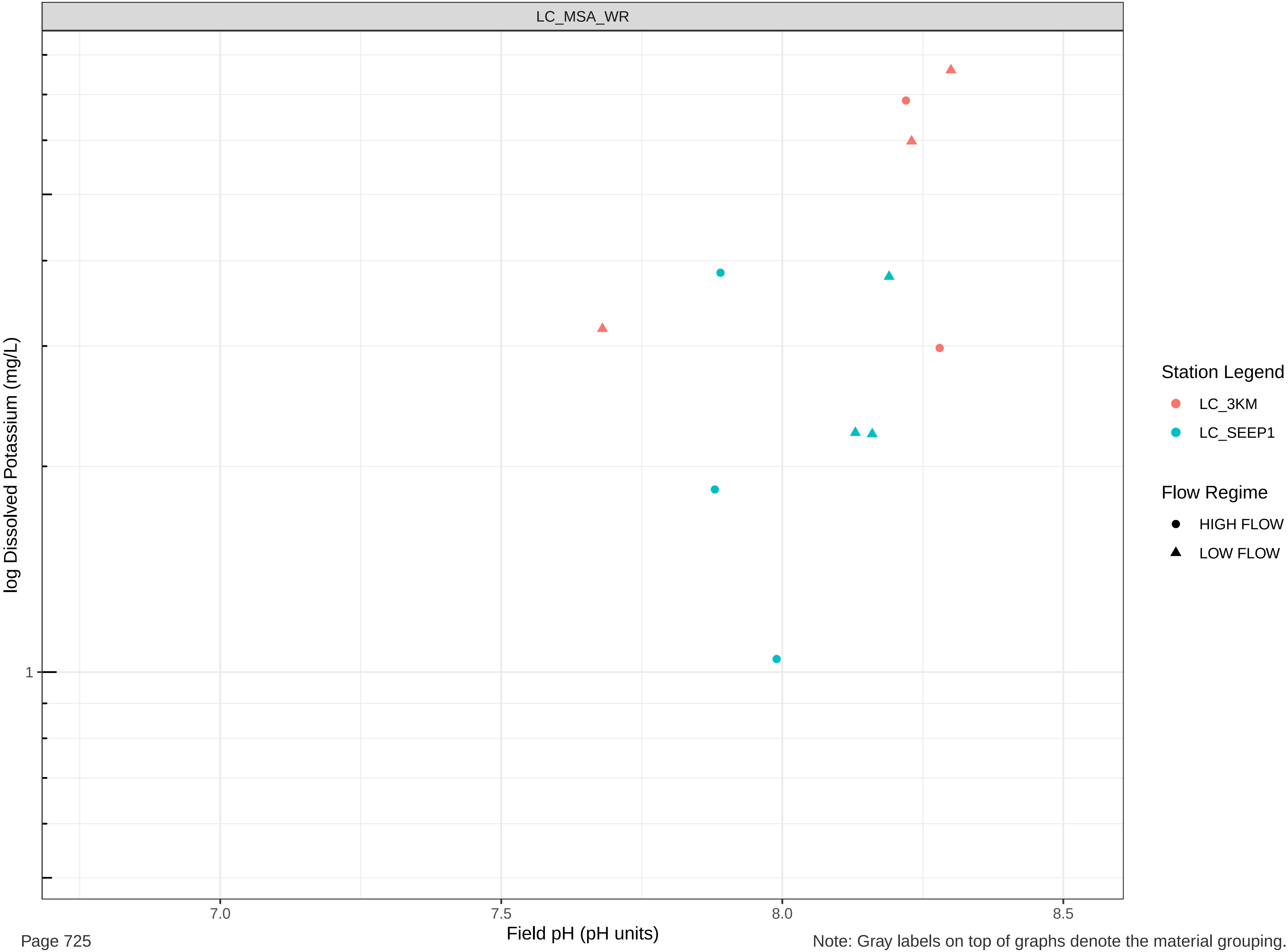
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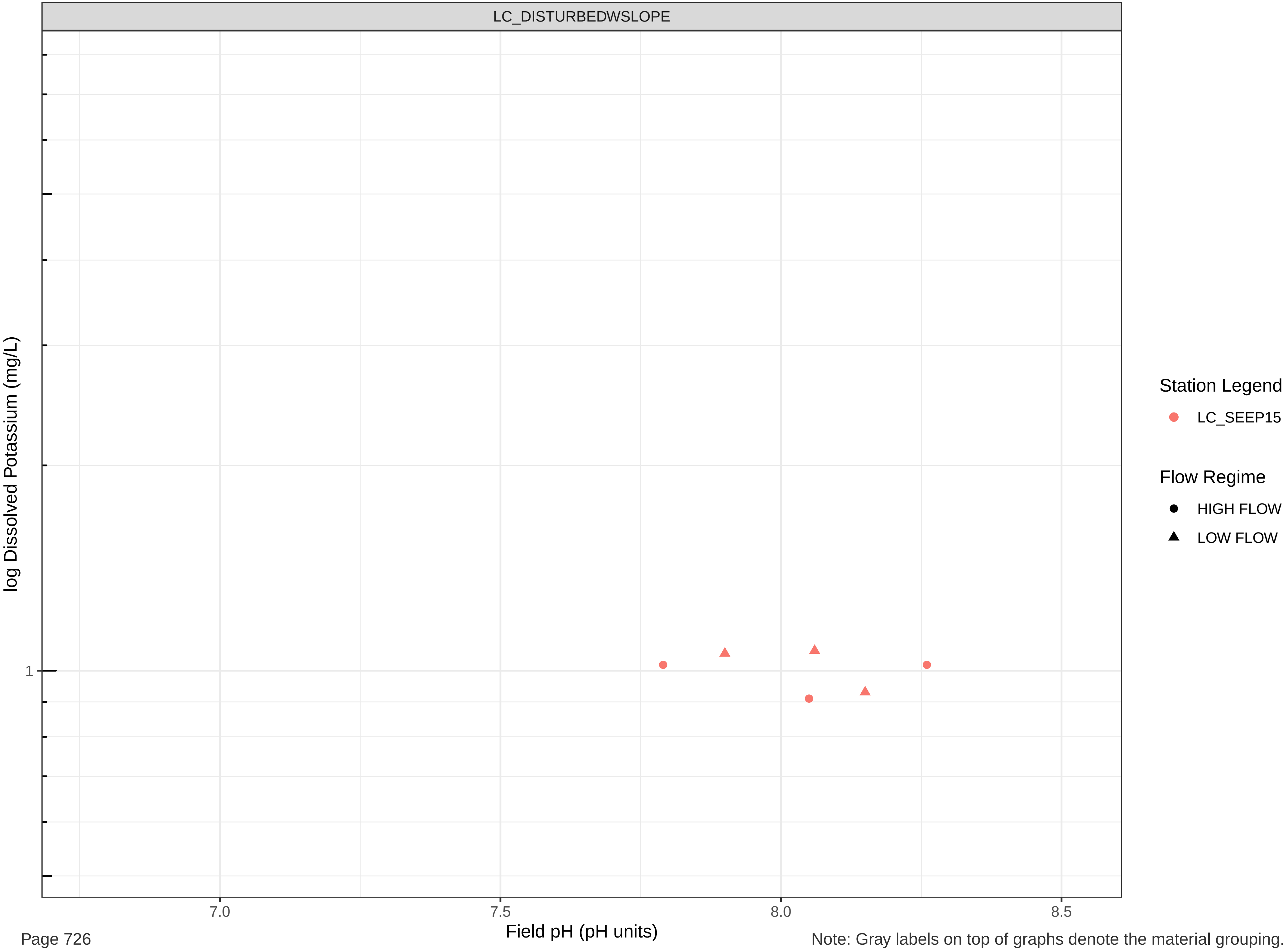
7.0
7.5
8.0
8.5
Field pH (pH units)
Station Legend
LC_3KM
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



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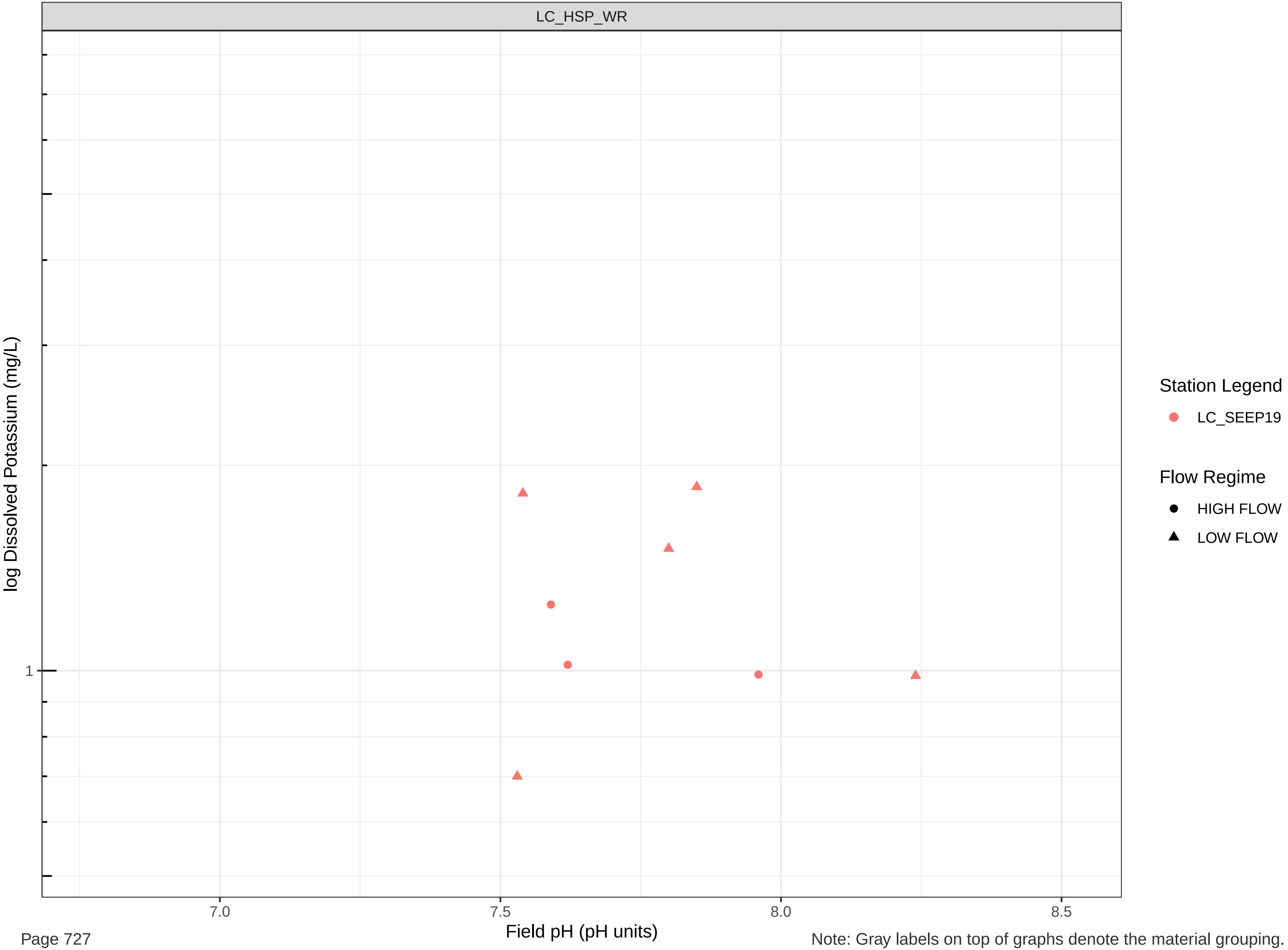

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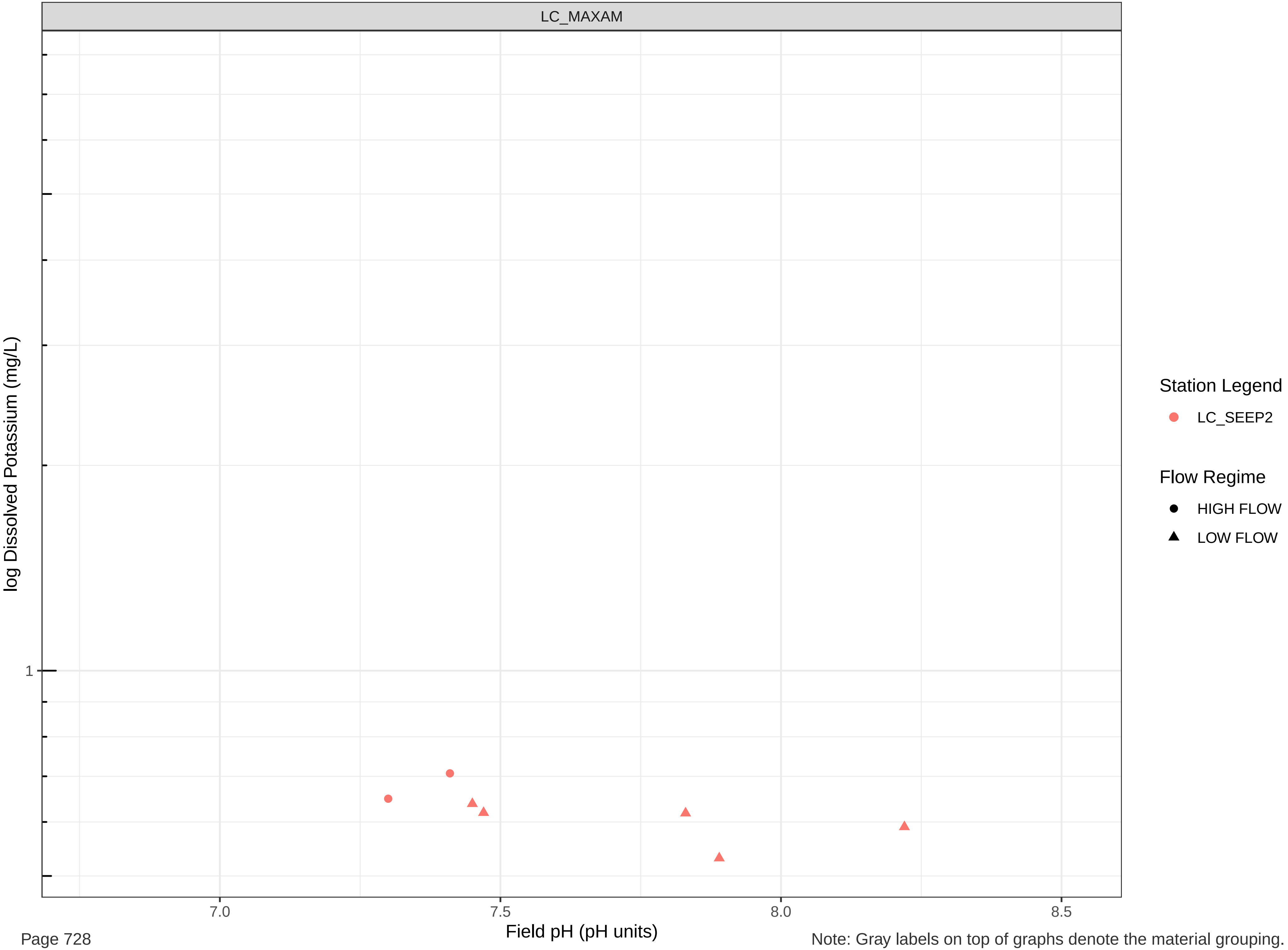

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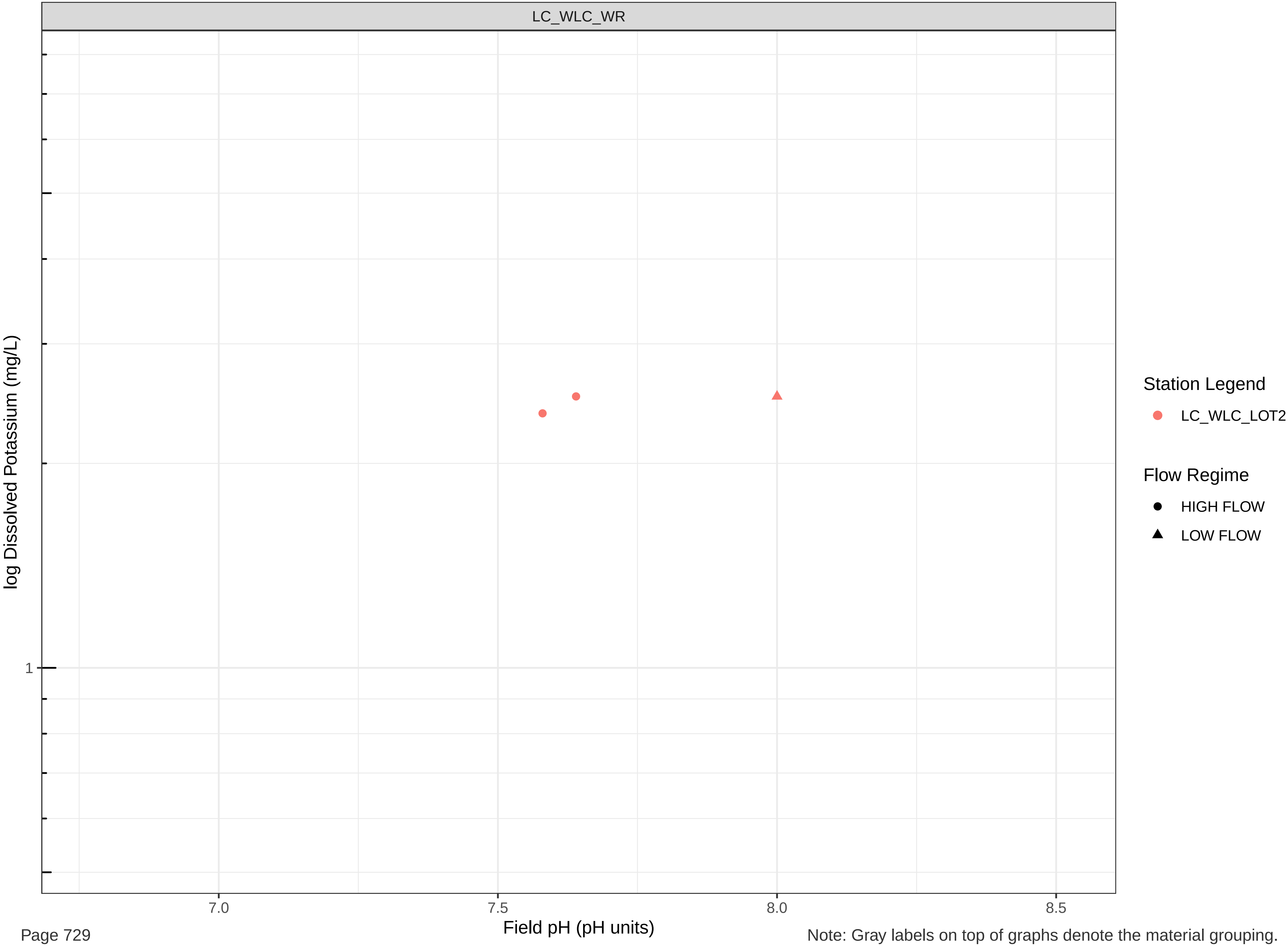

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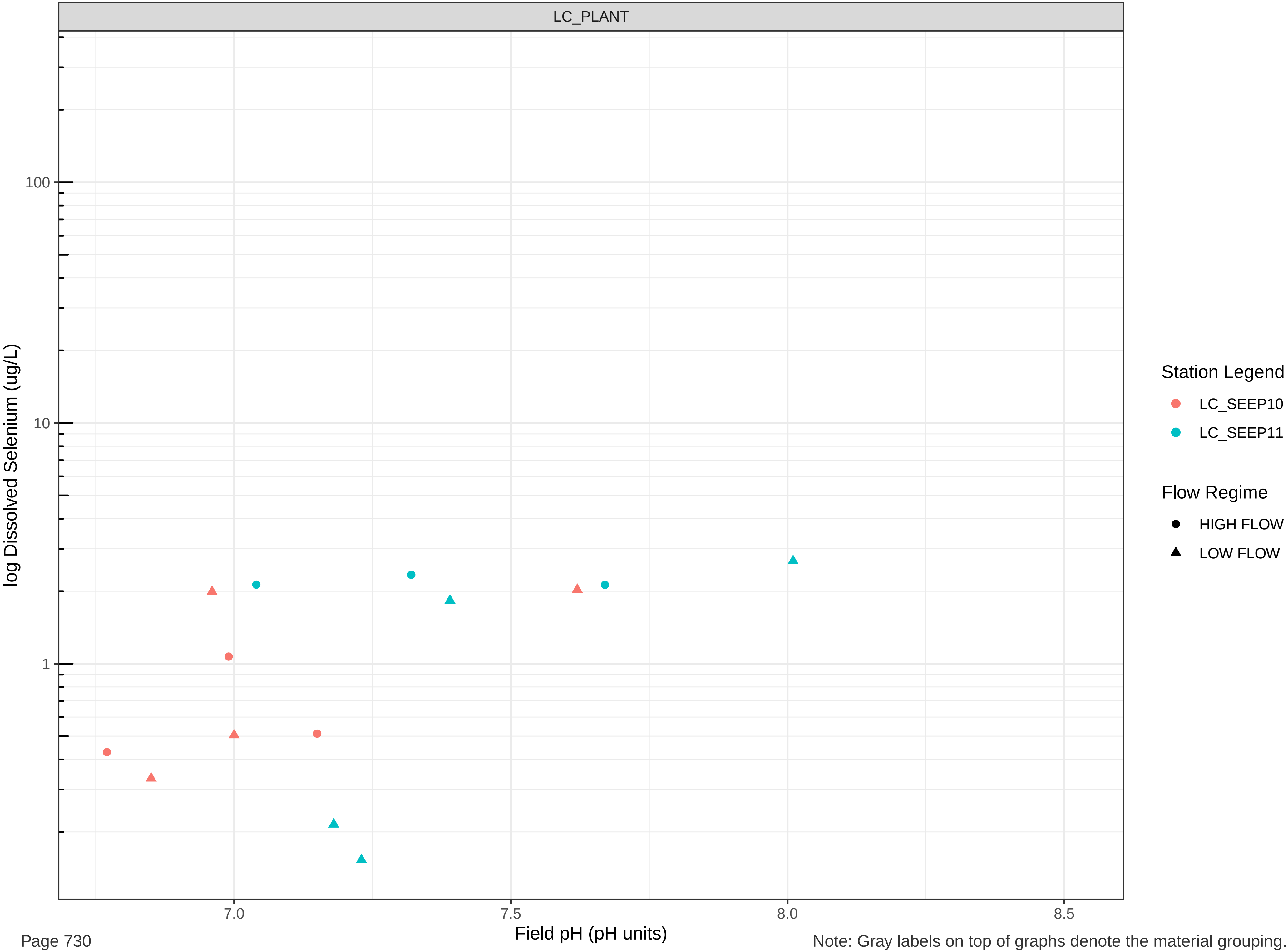

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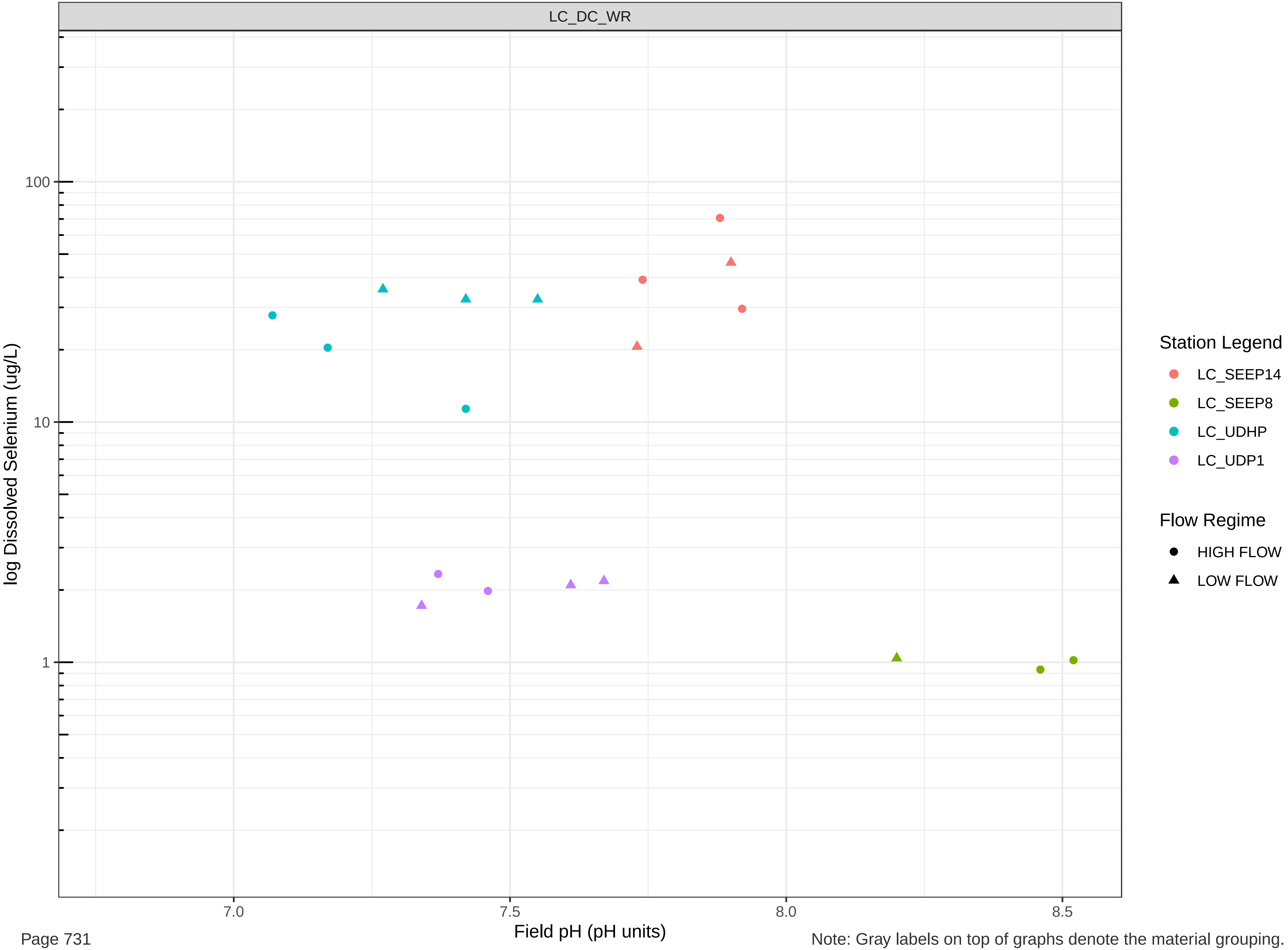

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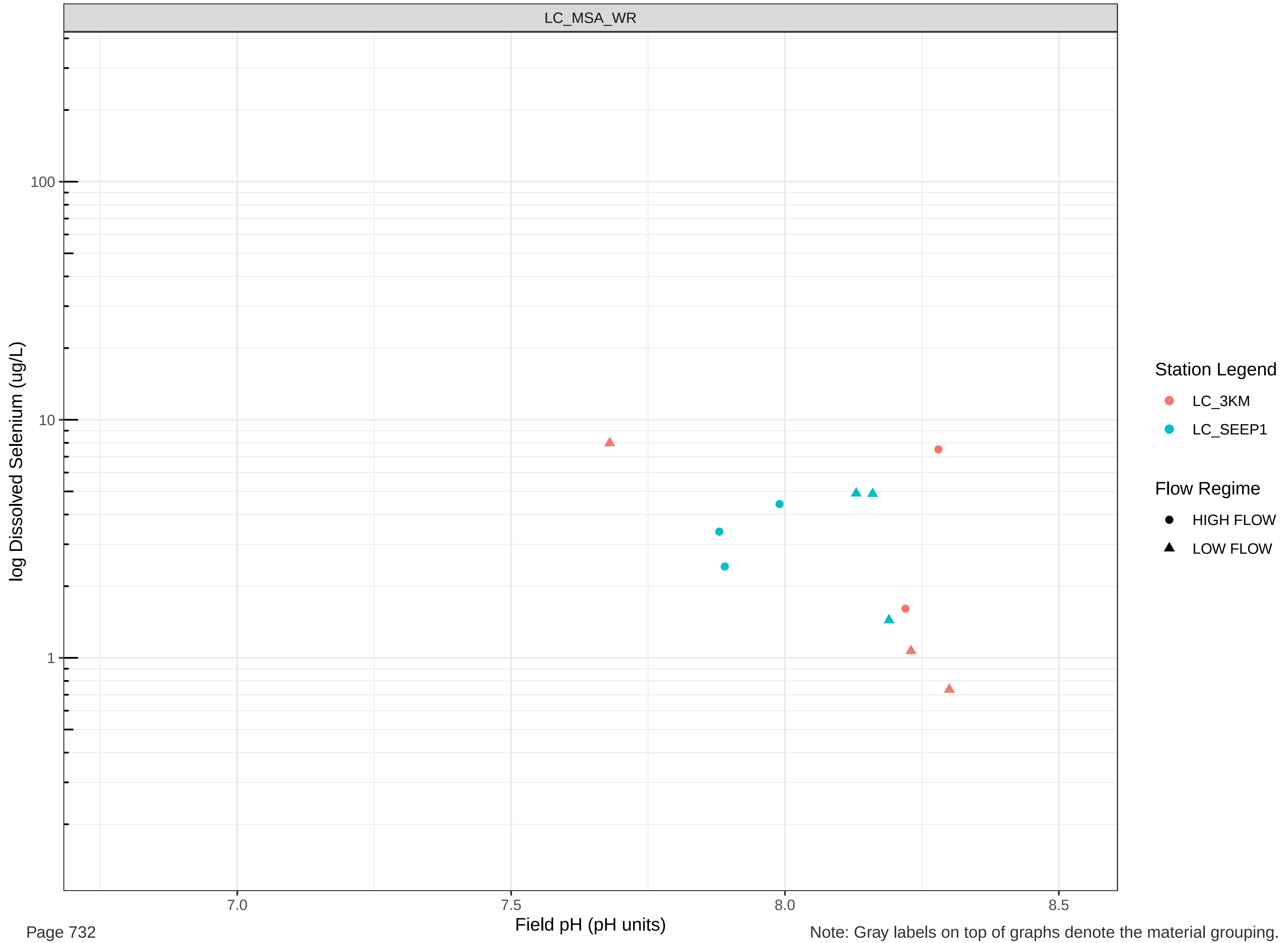

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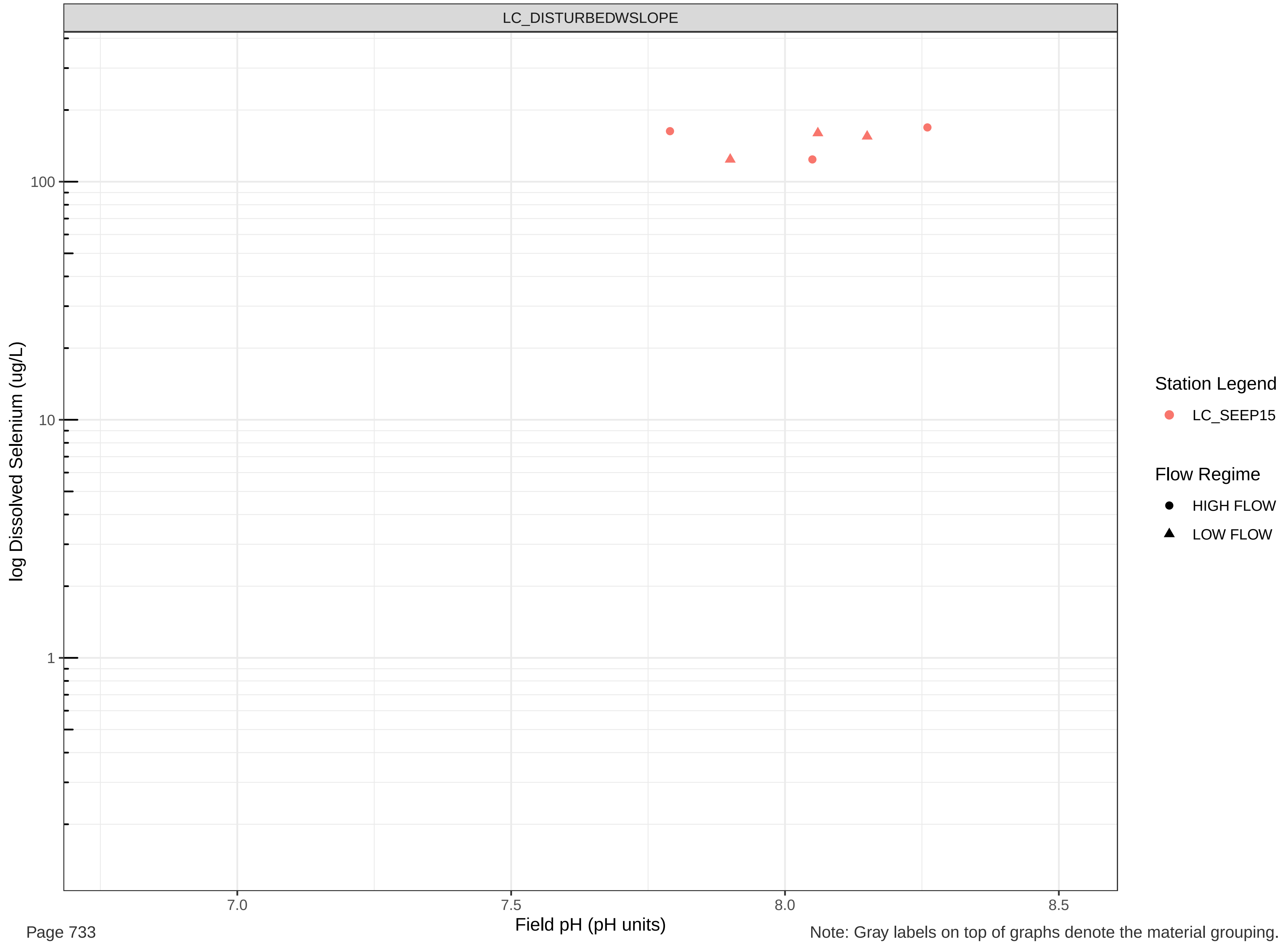

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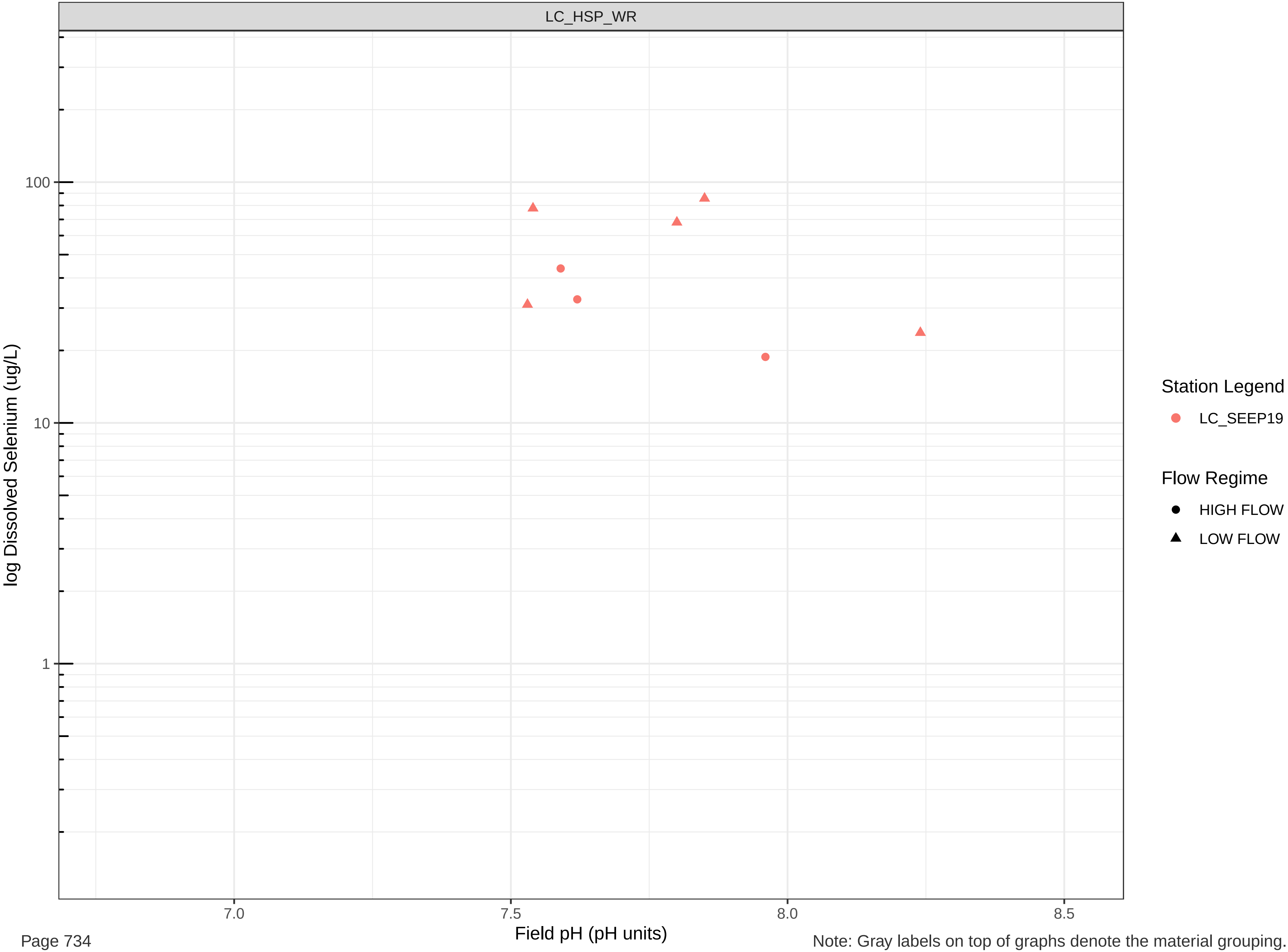

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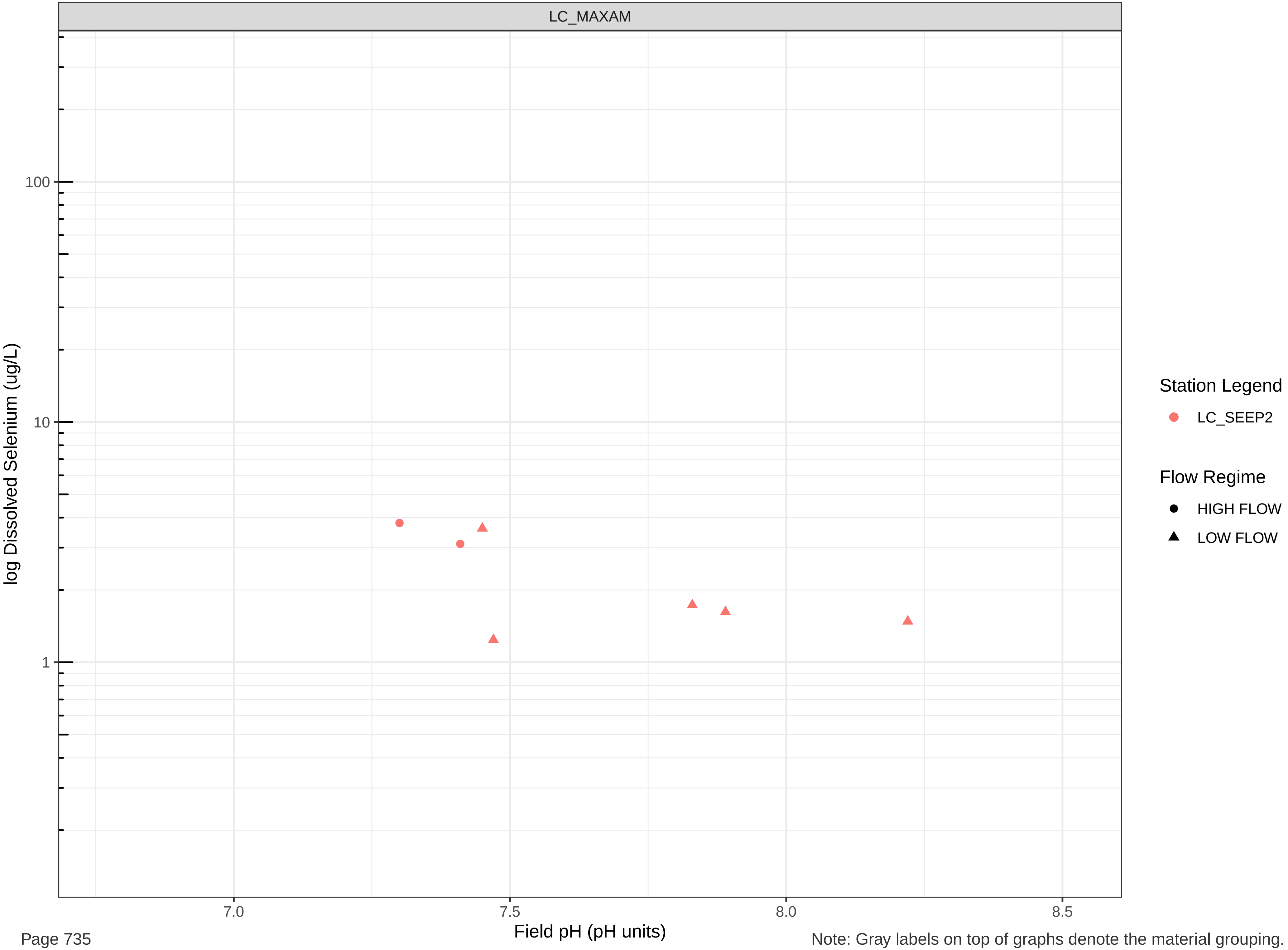

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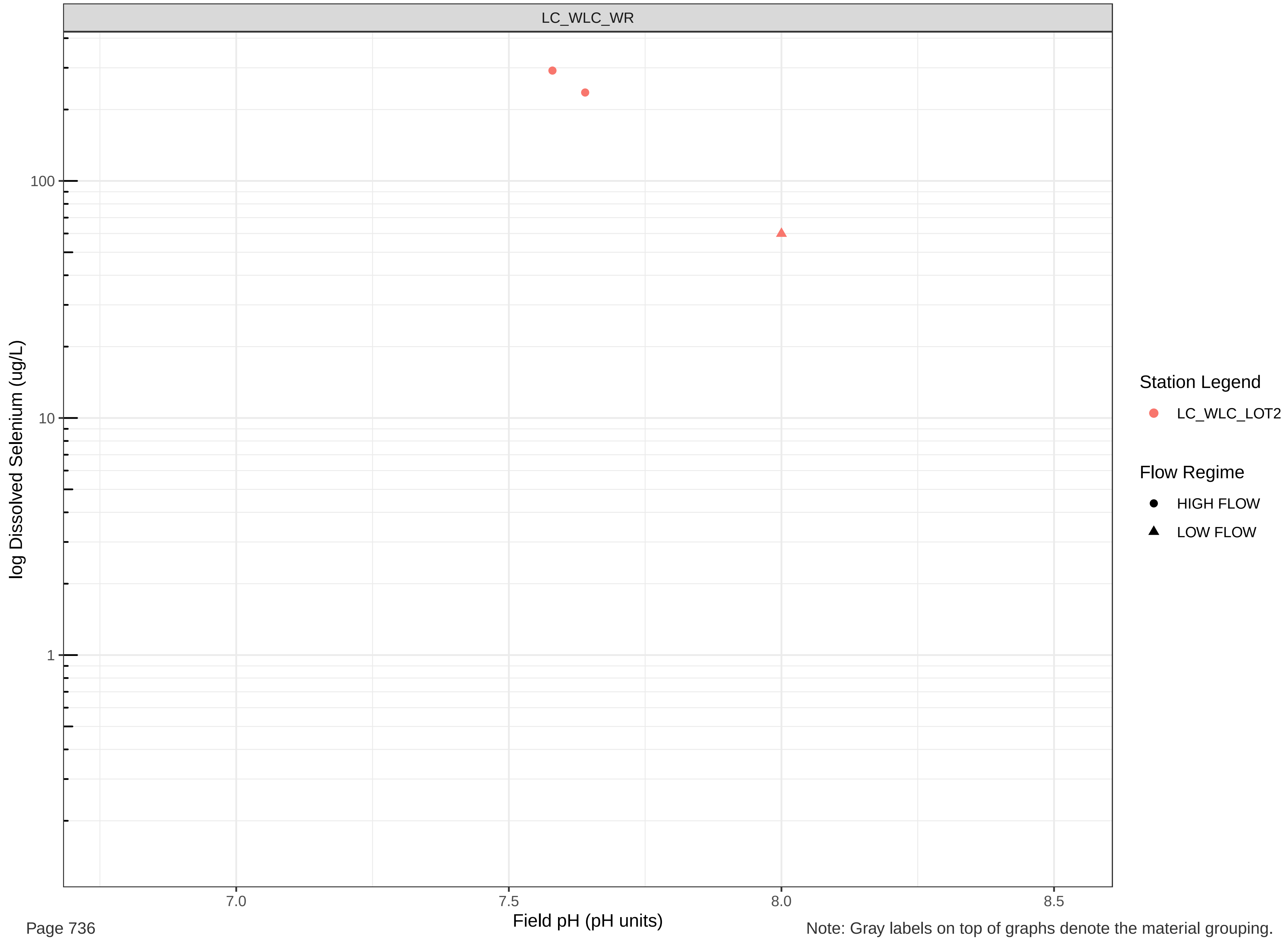

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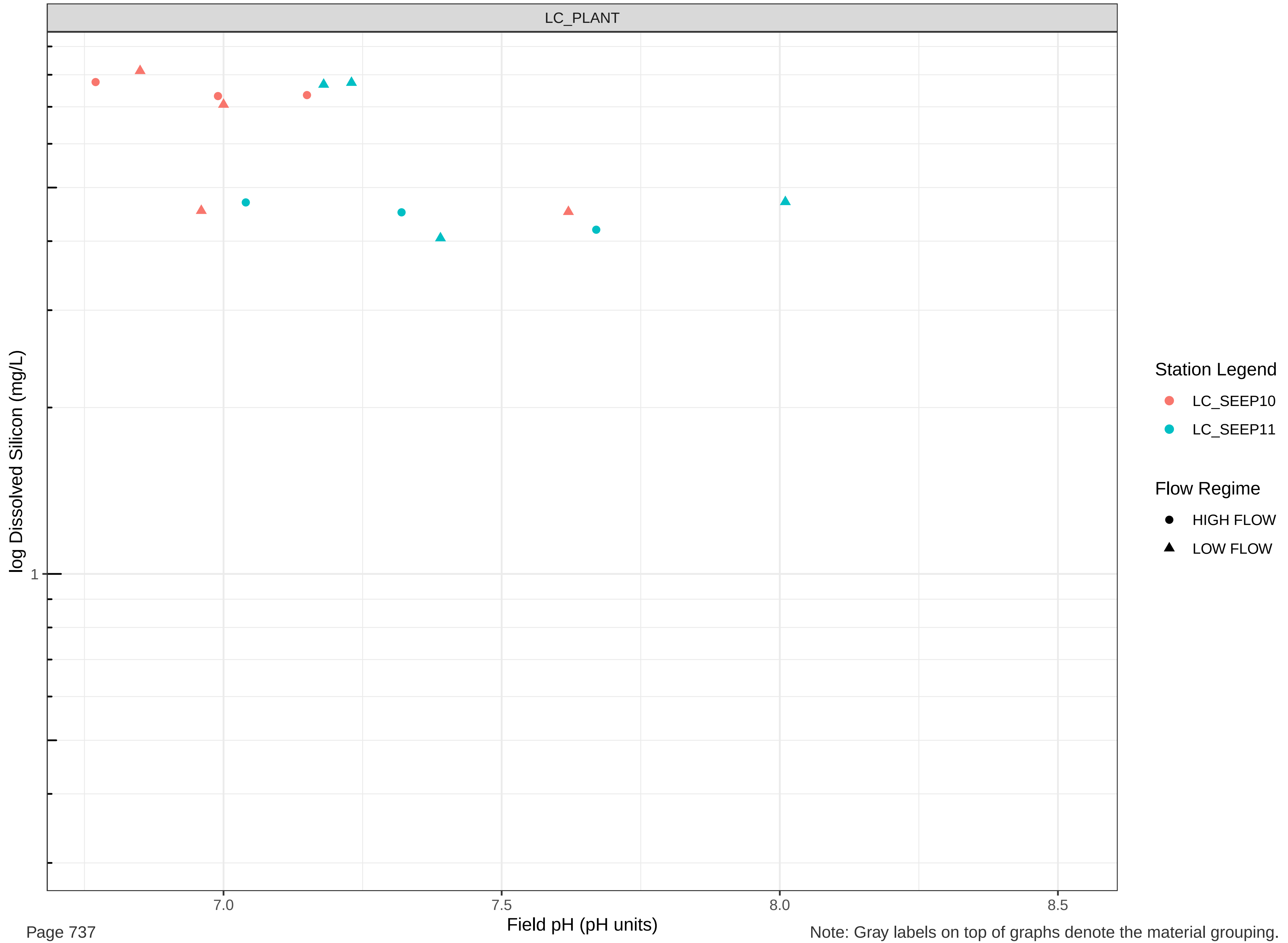

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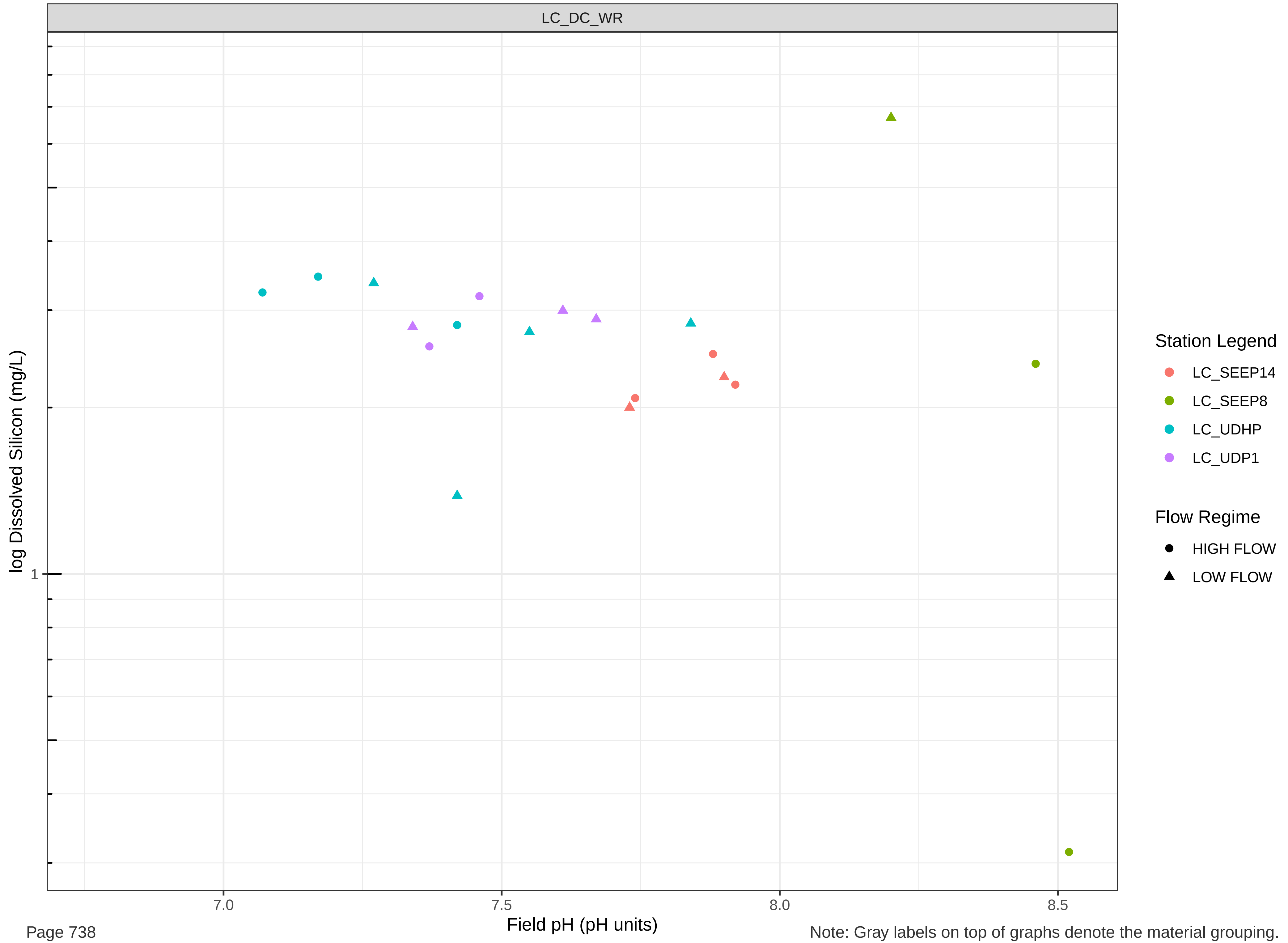

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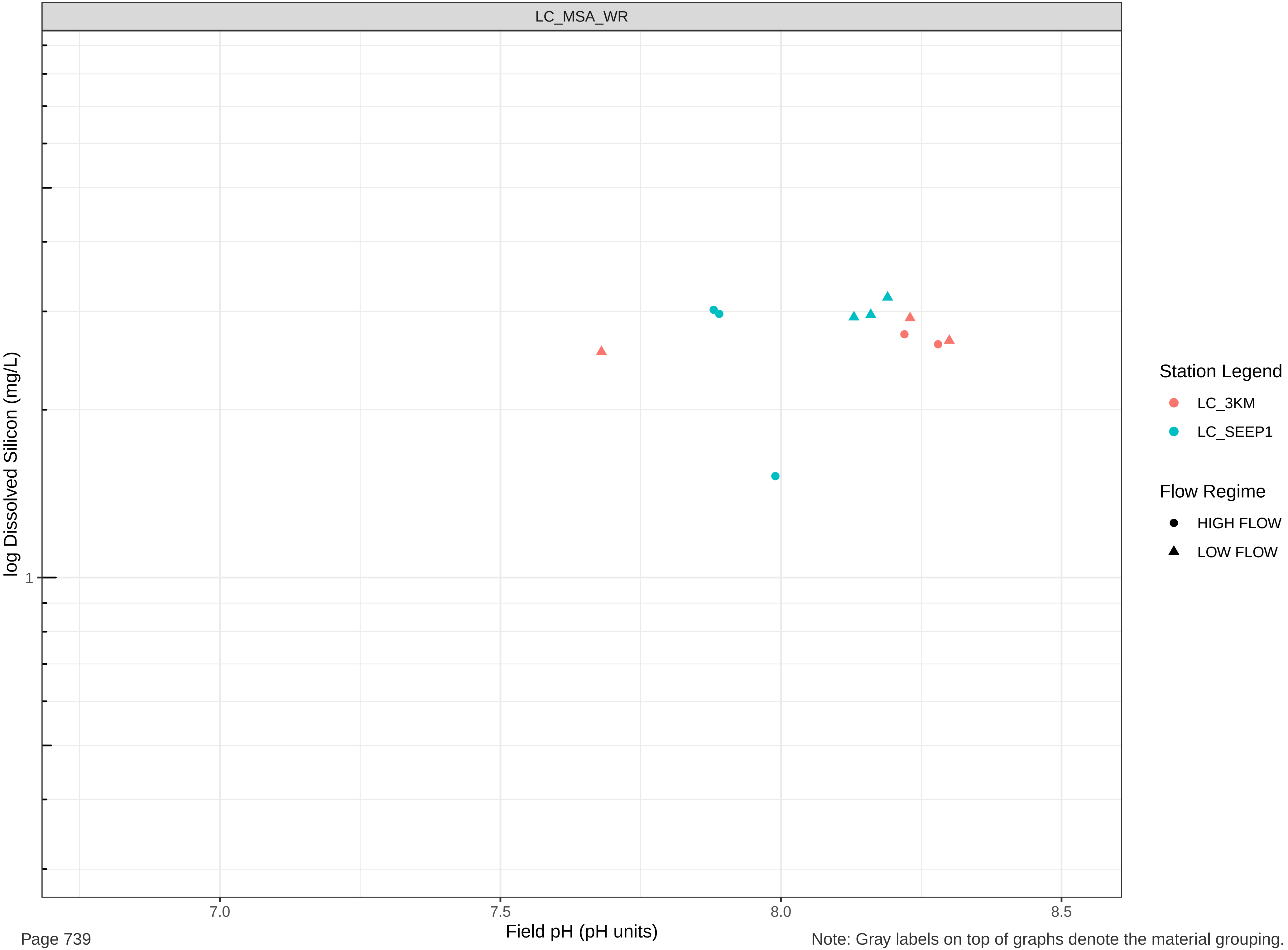

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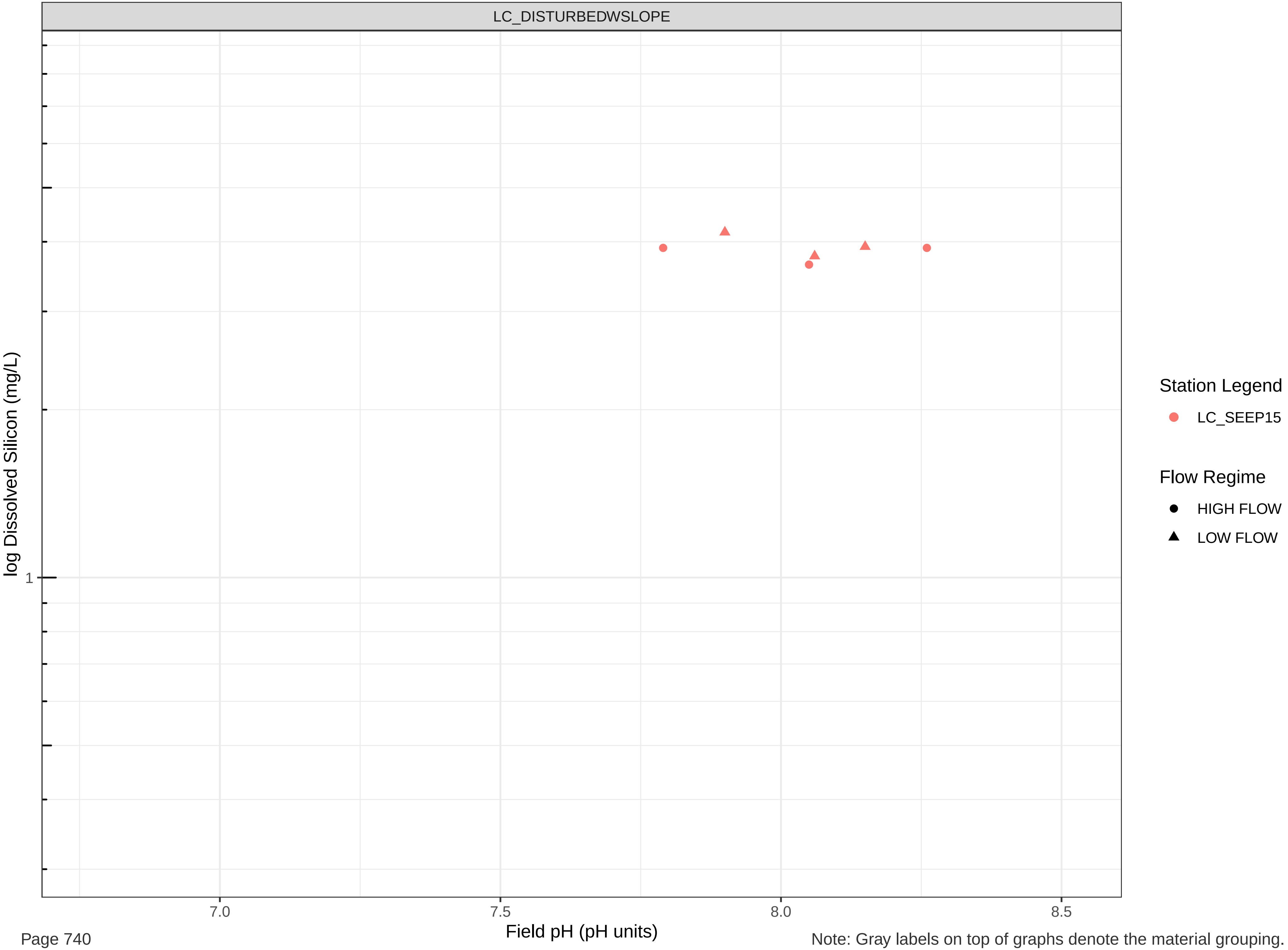

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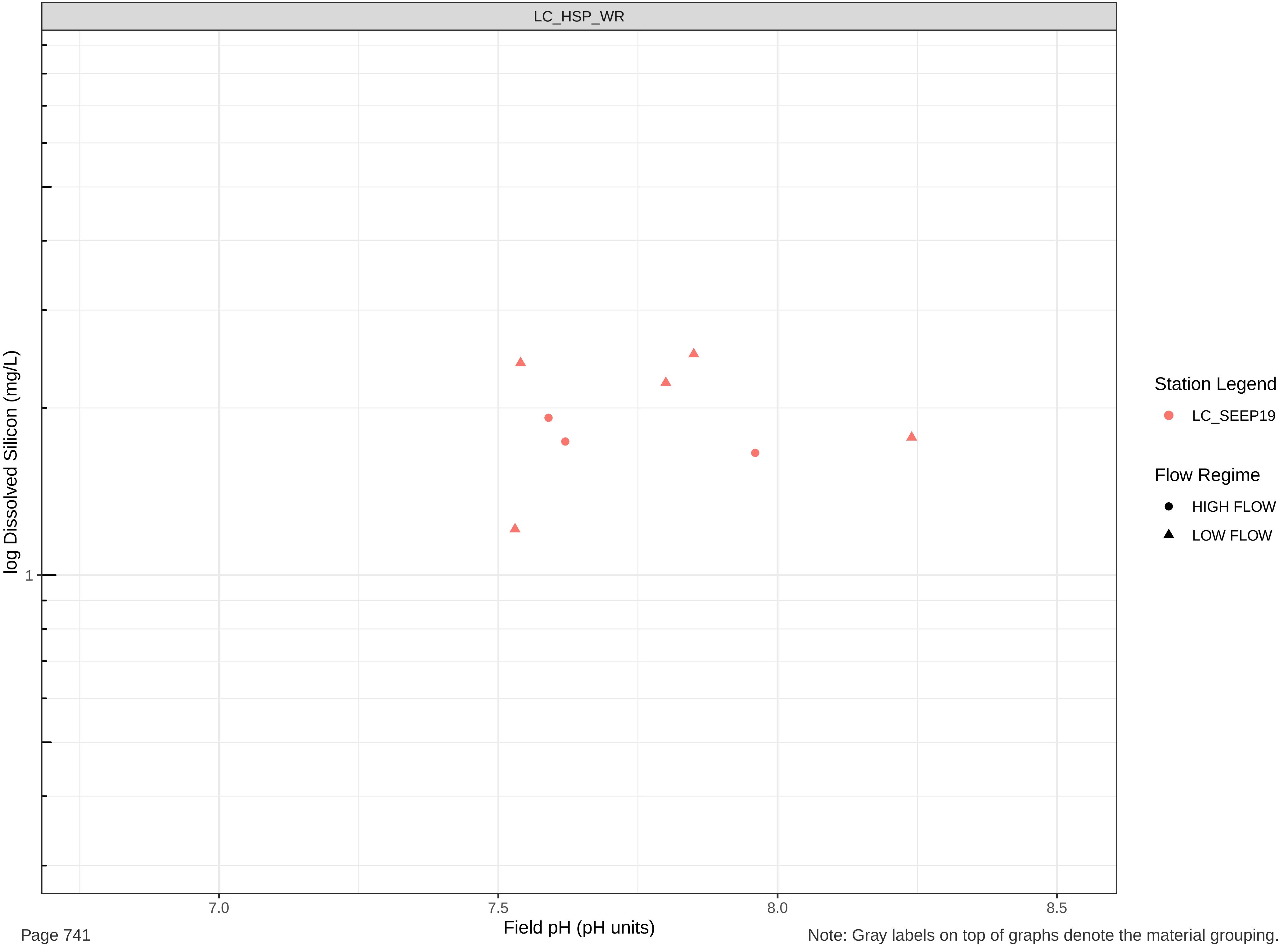

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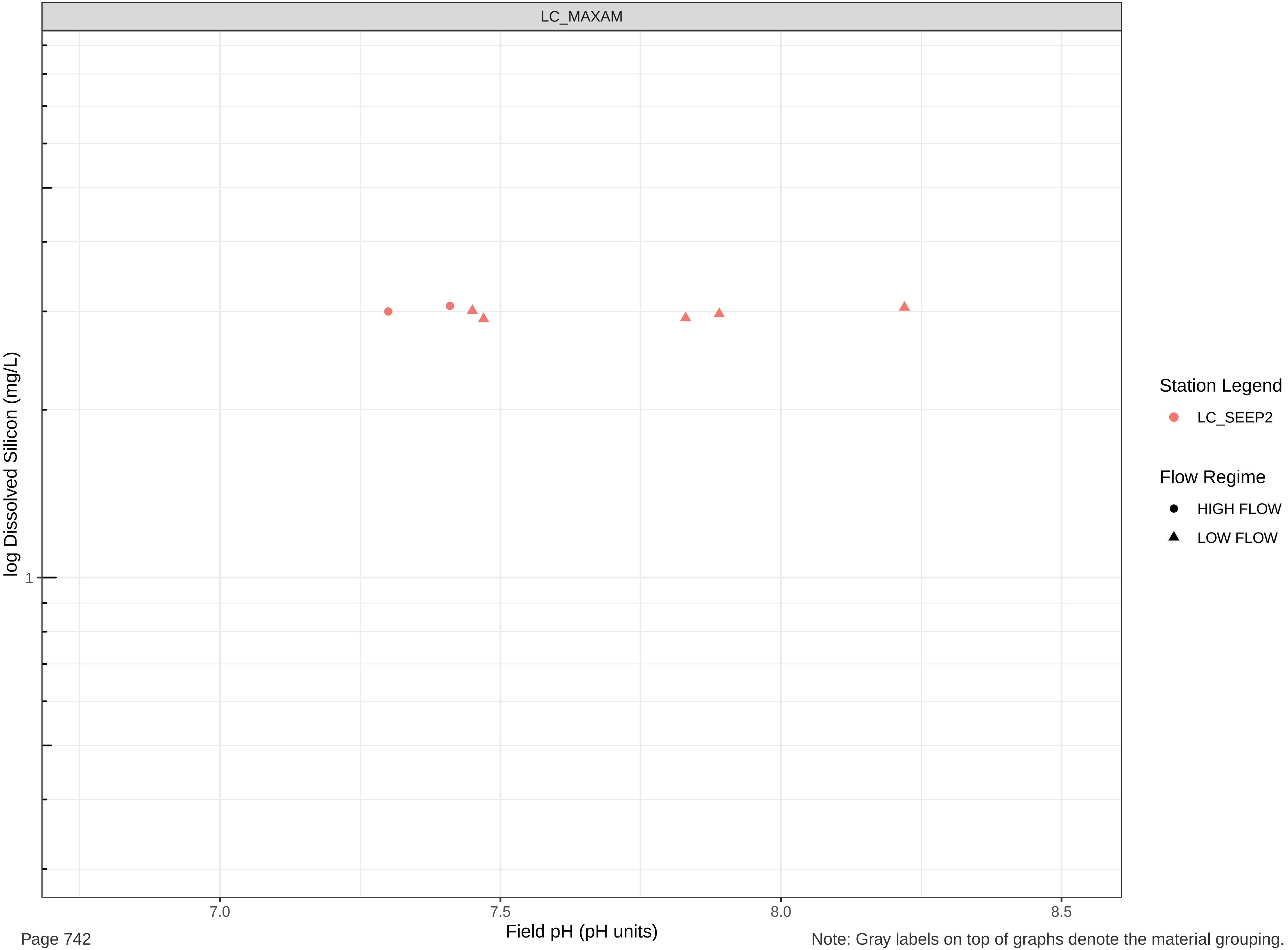

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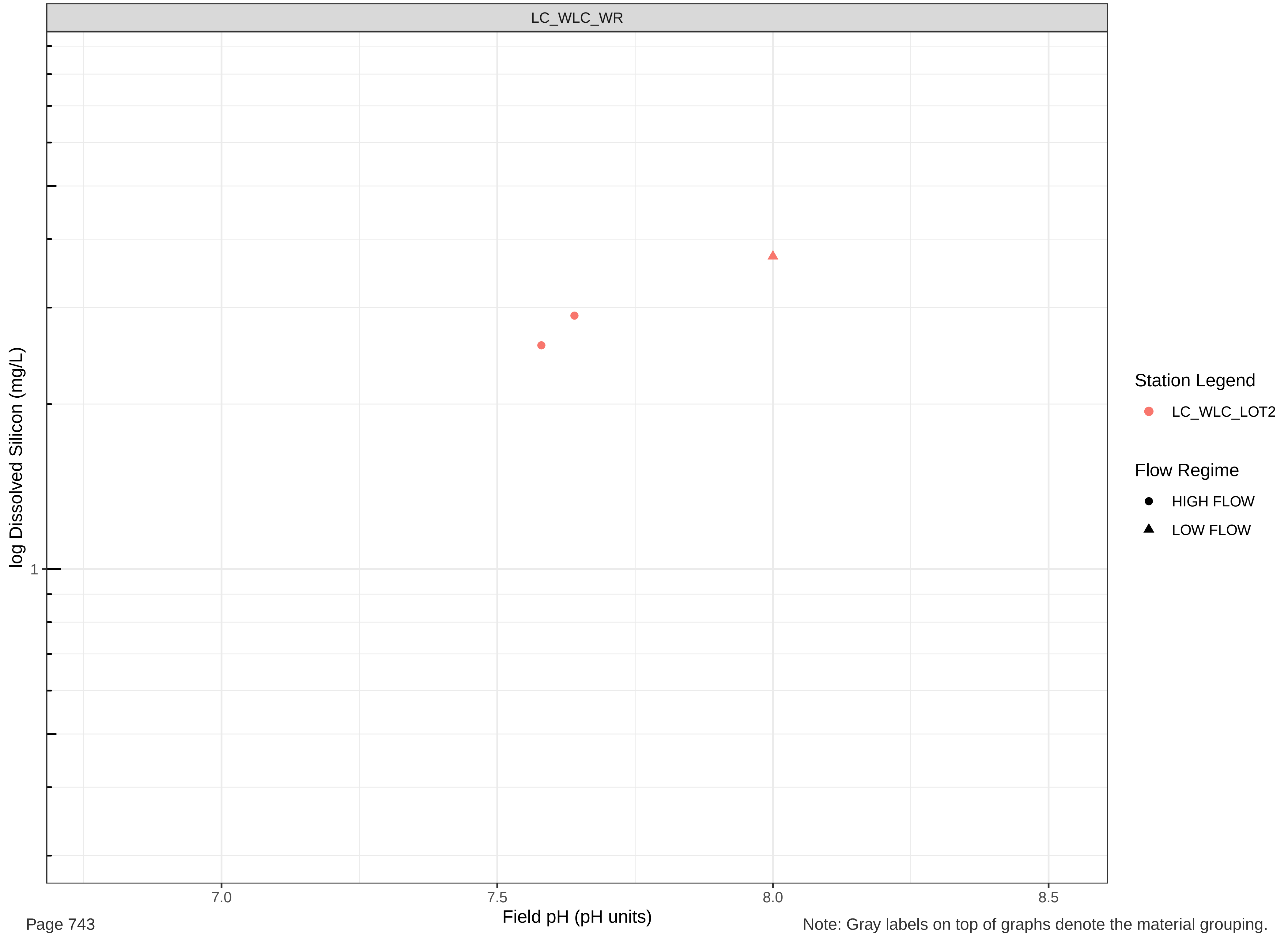

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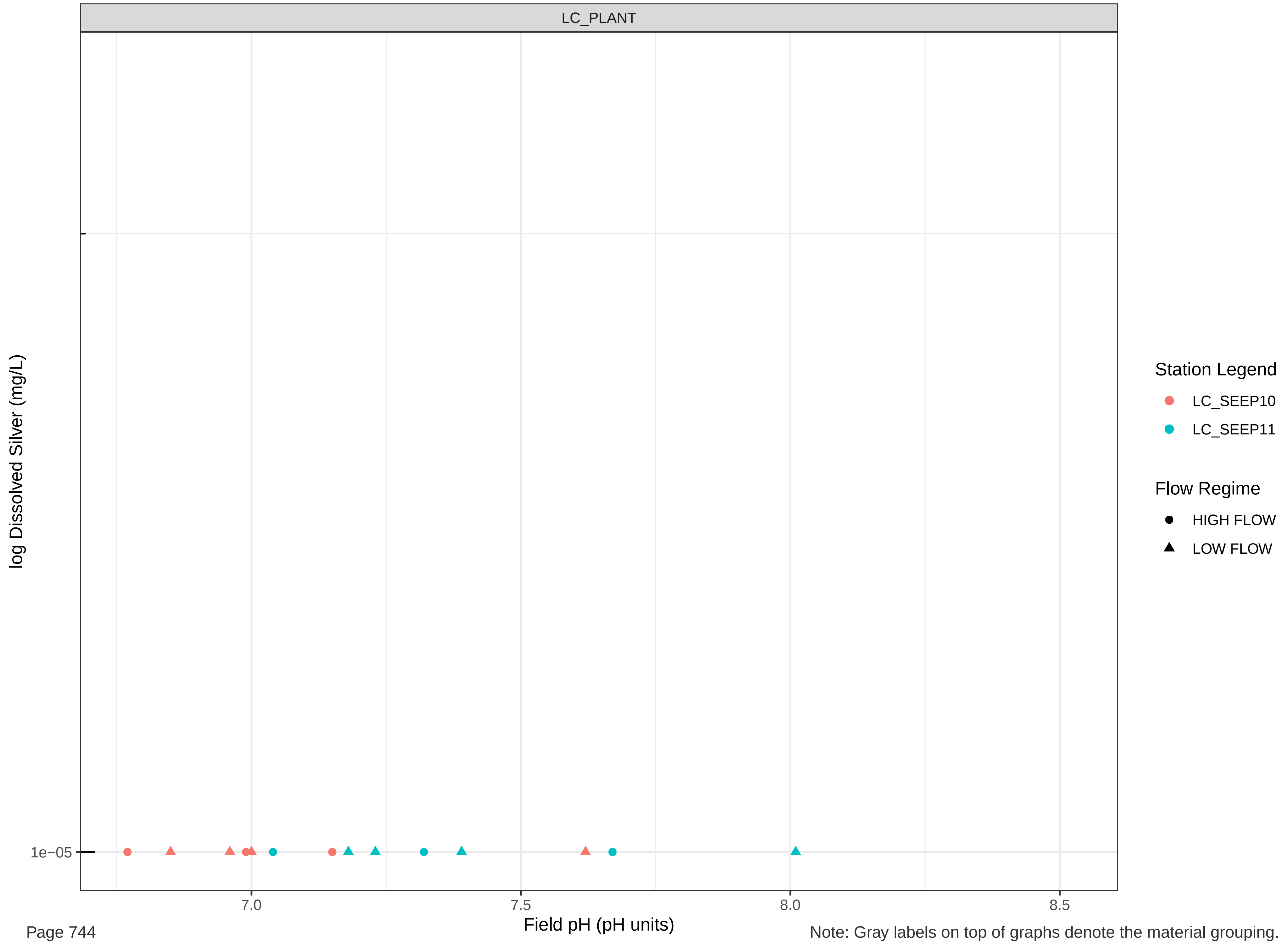

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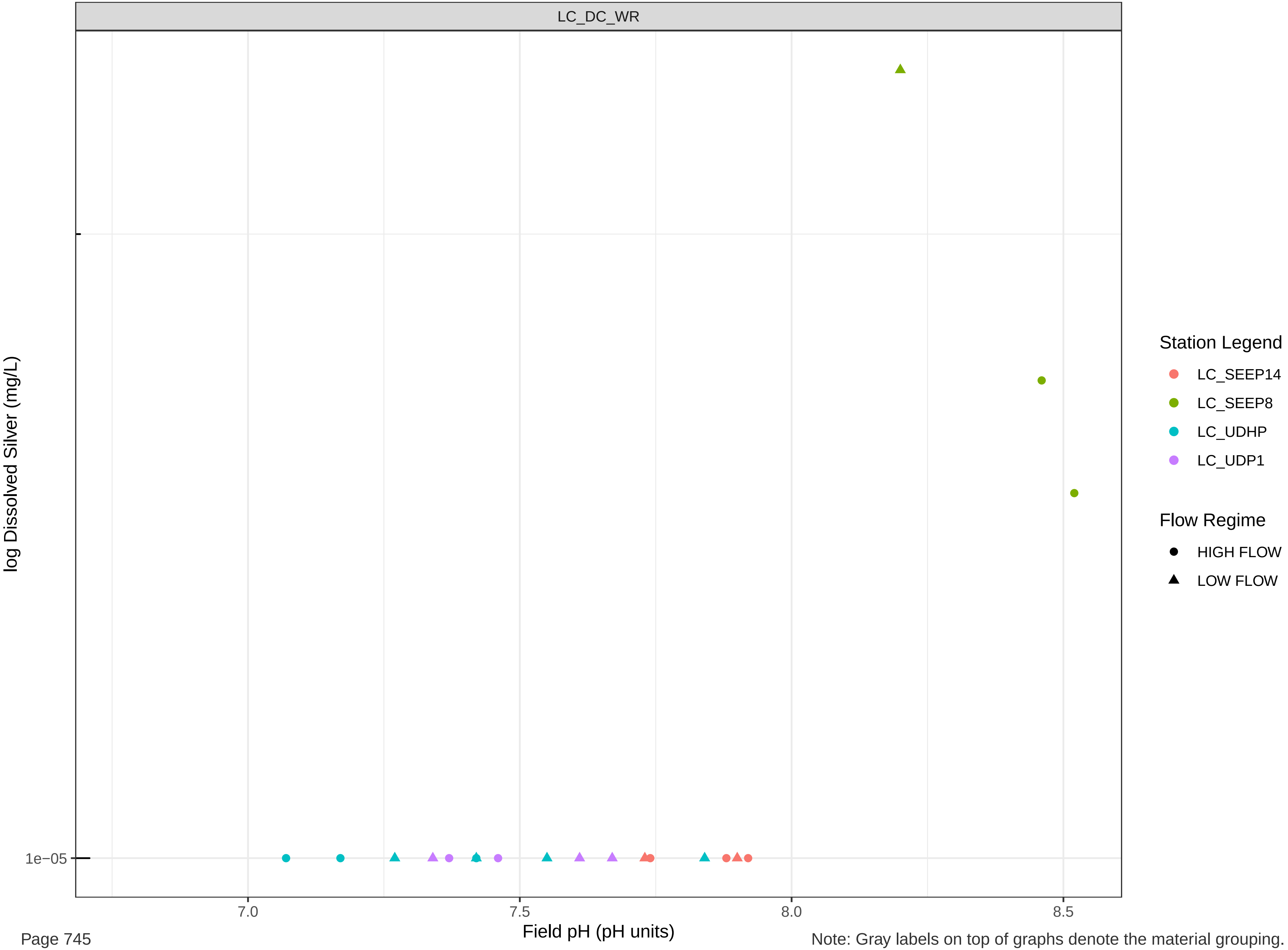

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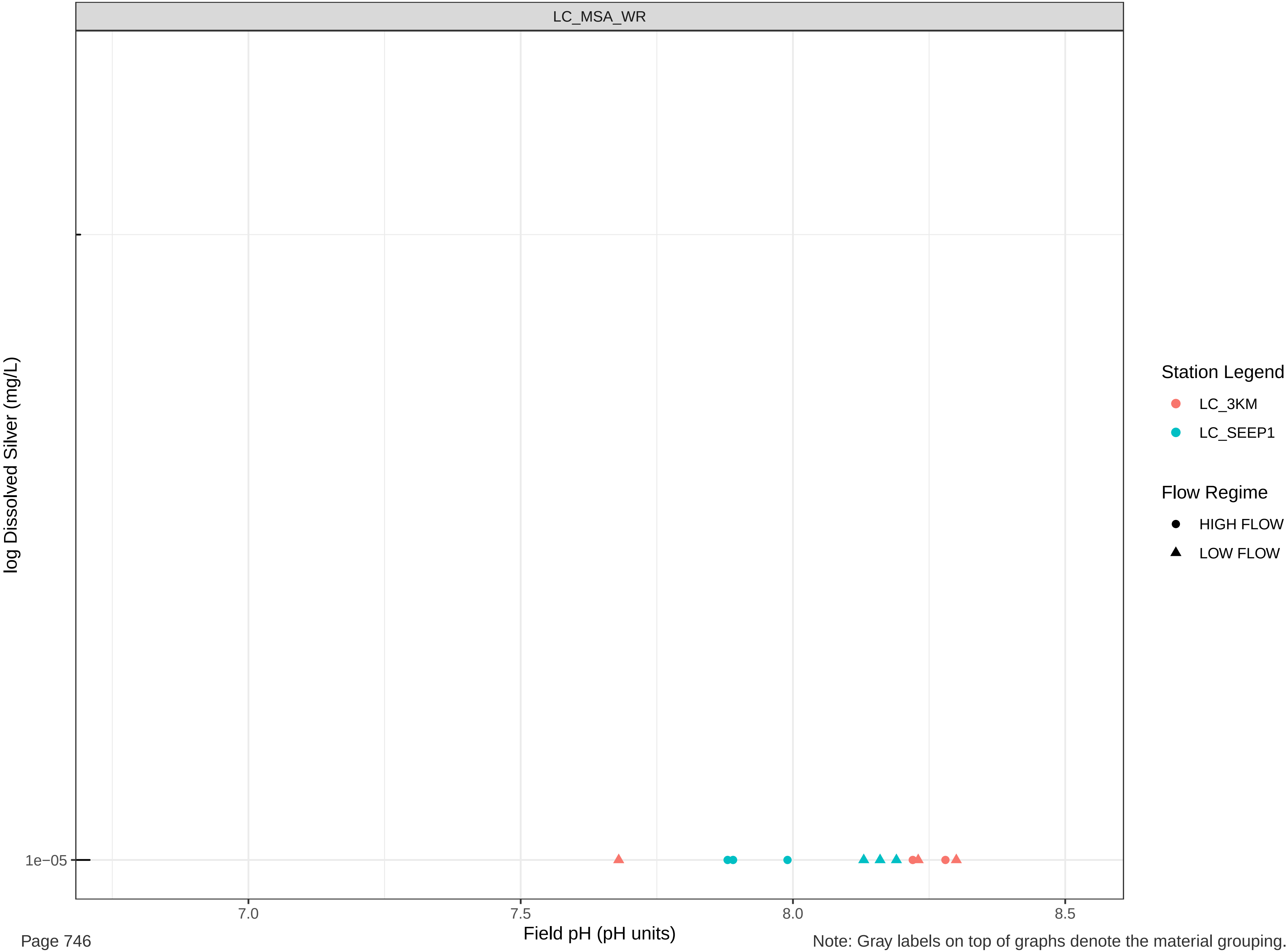

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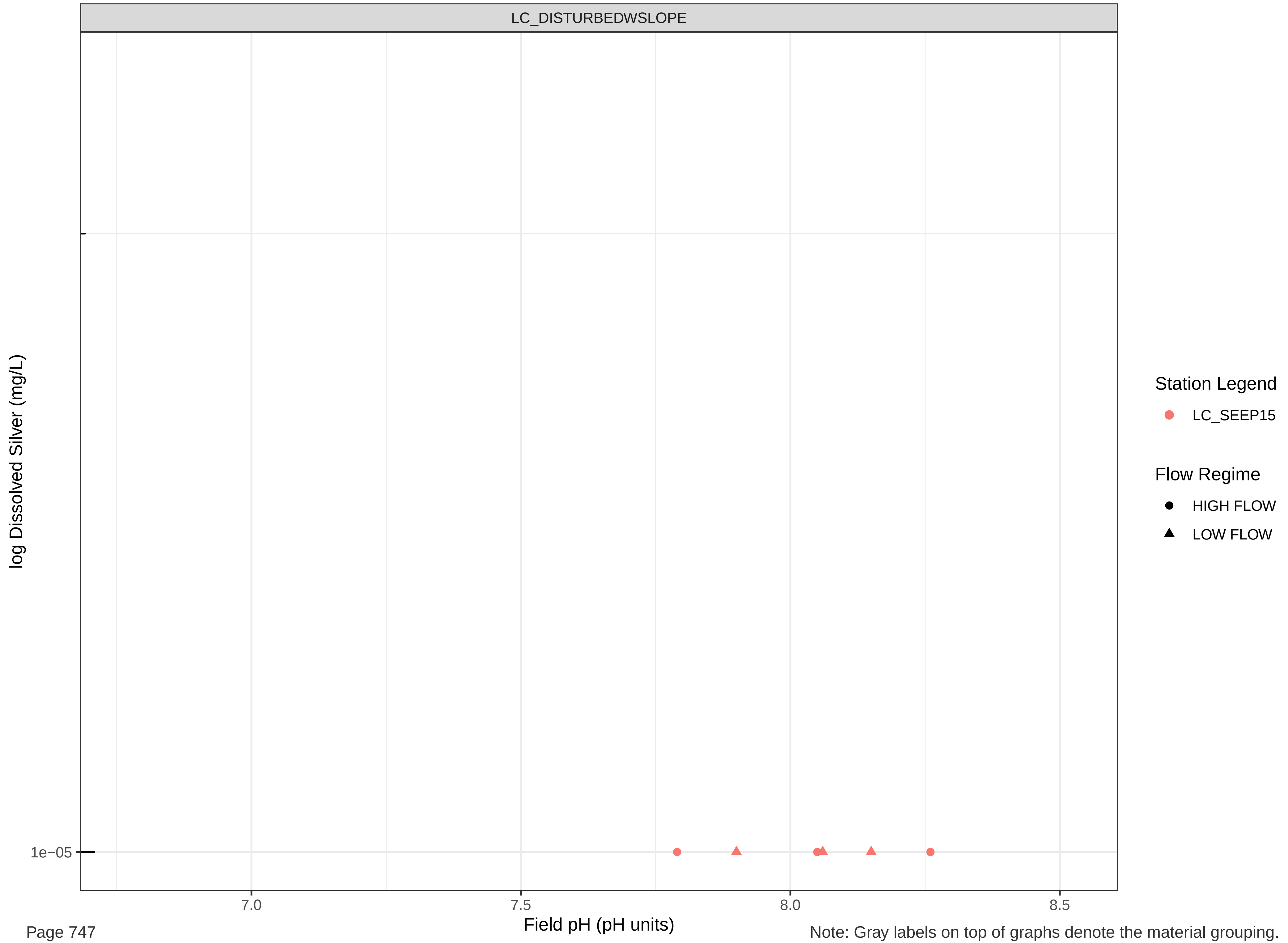

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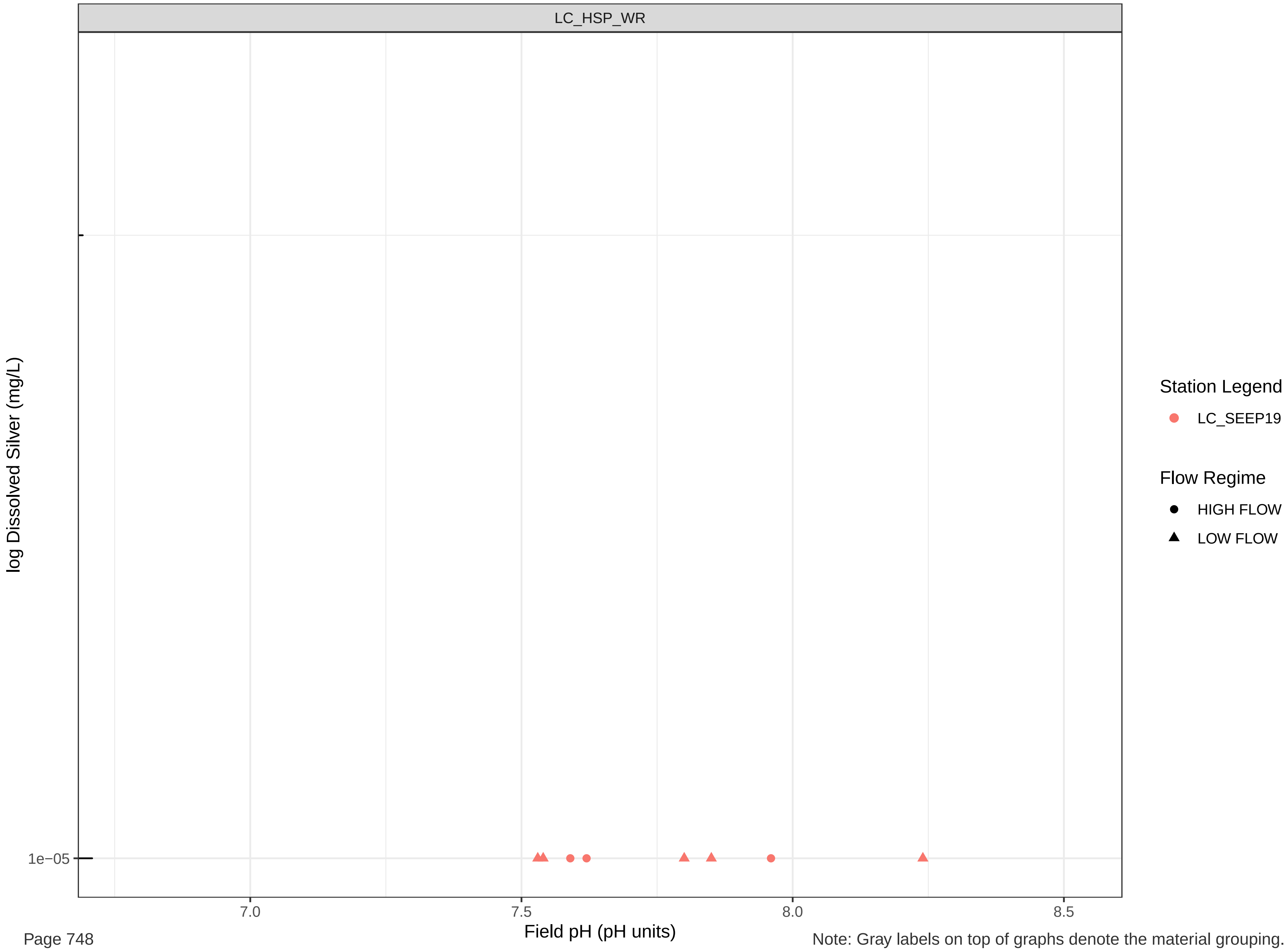

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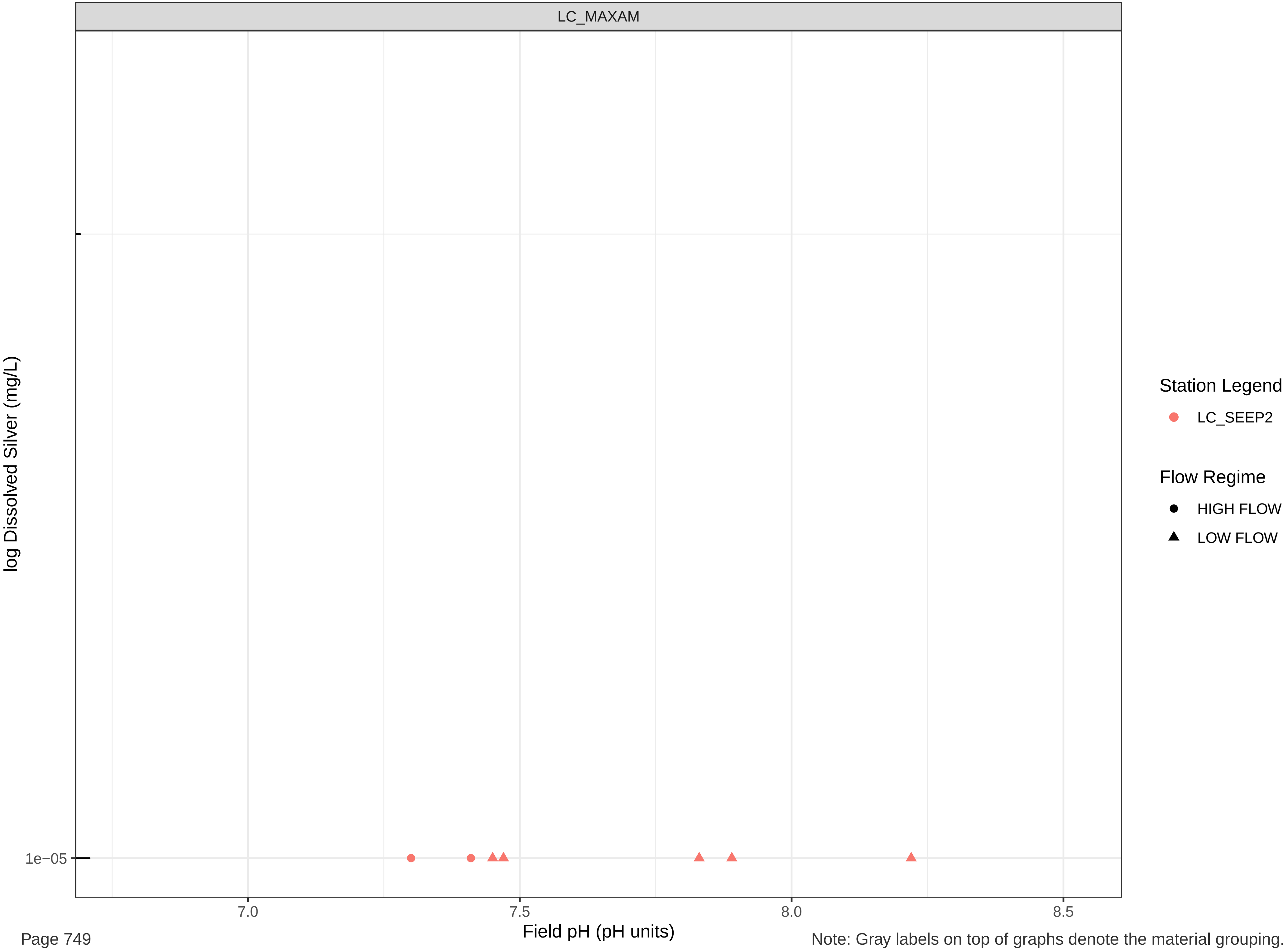

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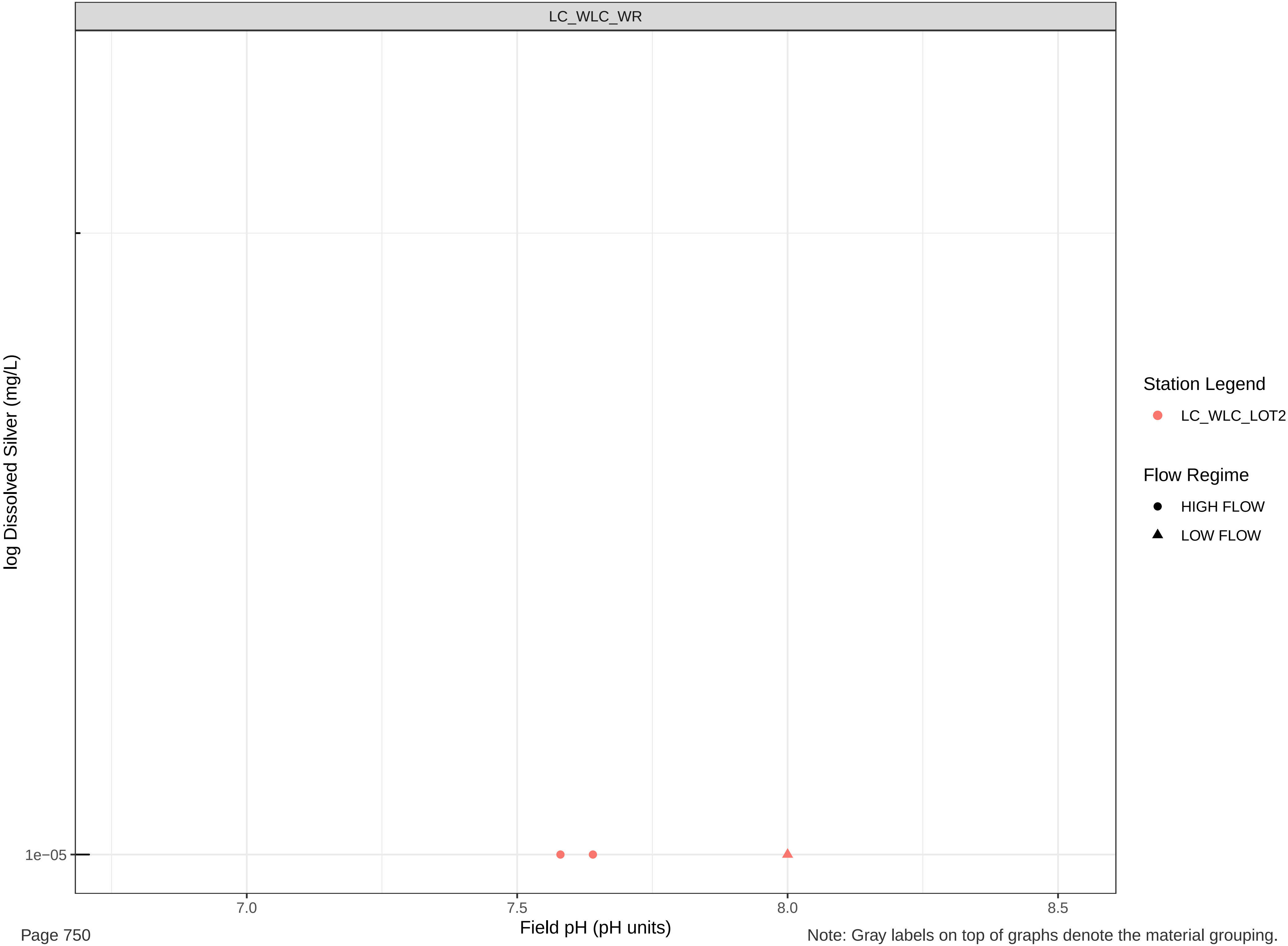

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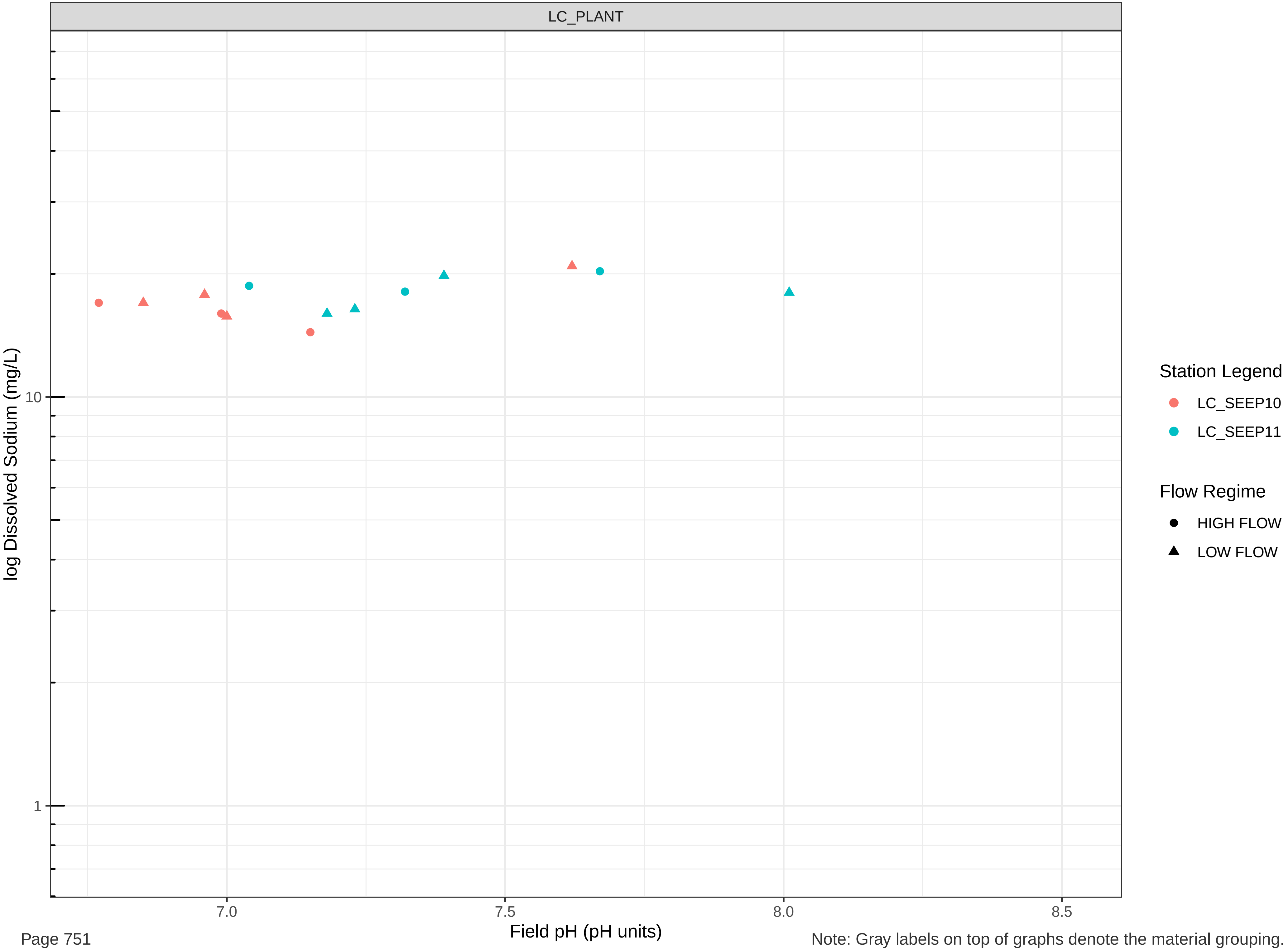

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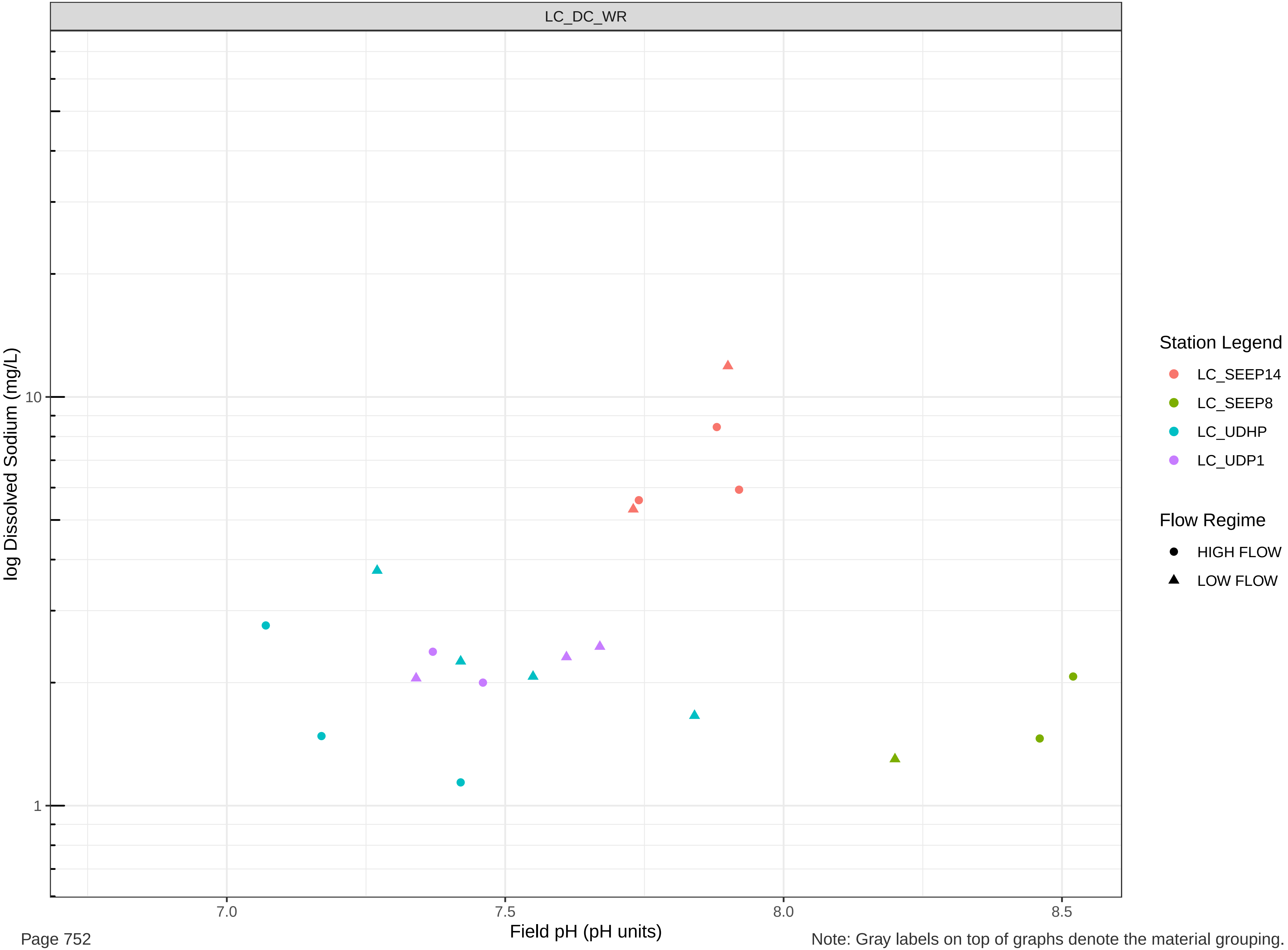

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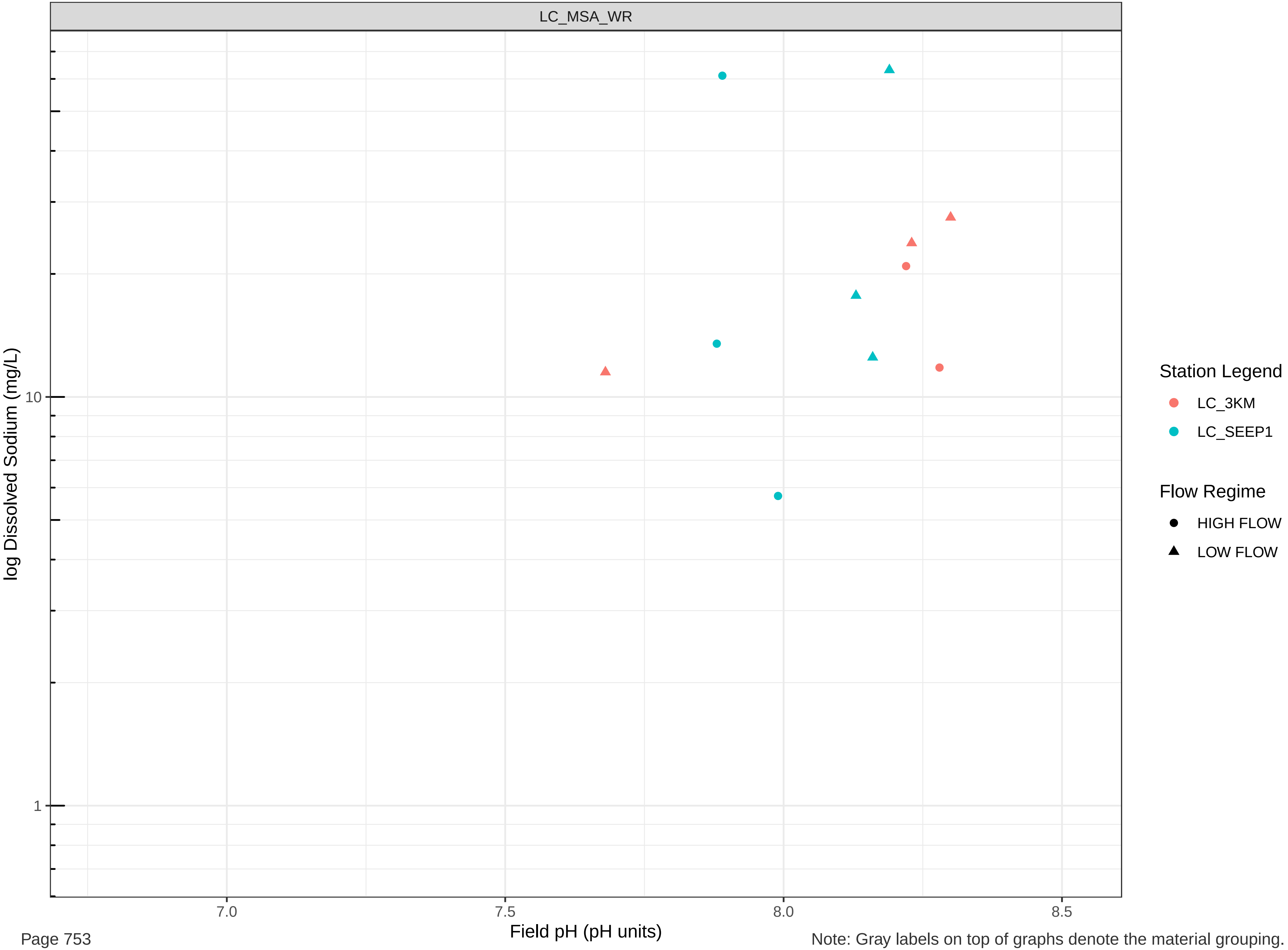

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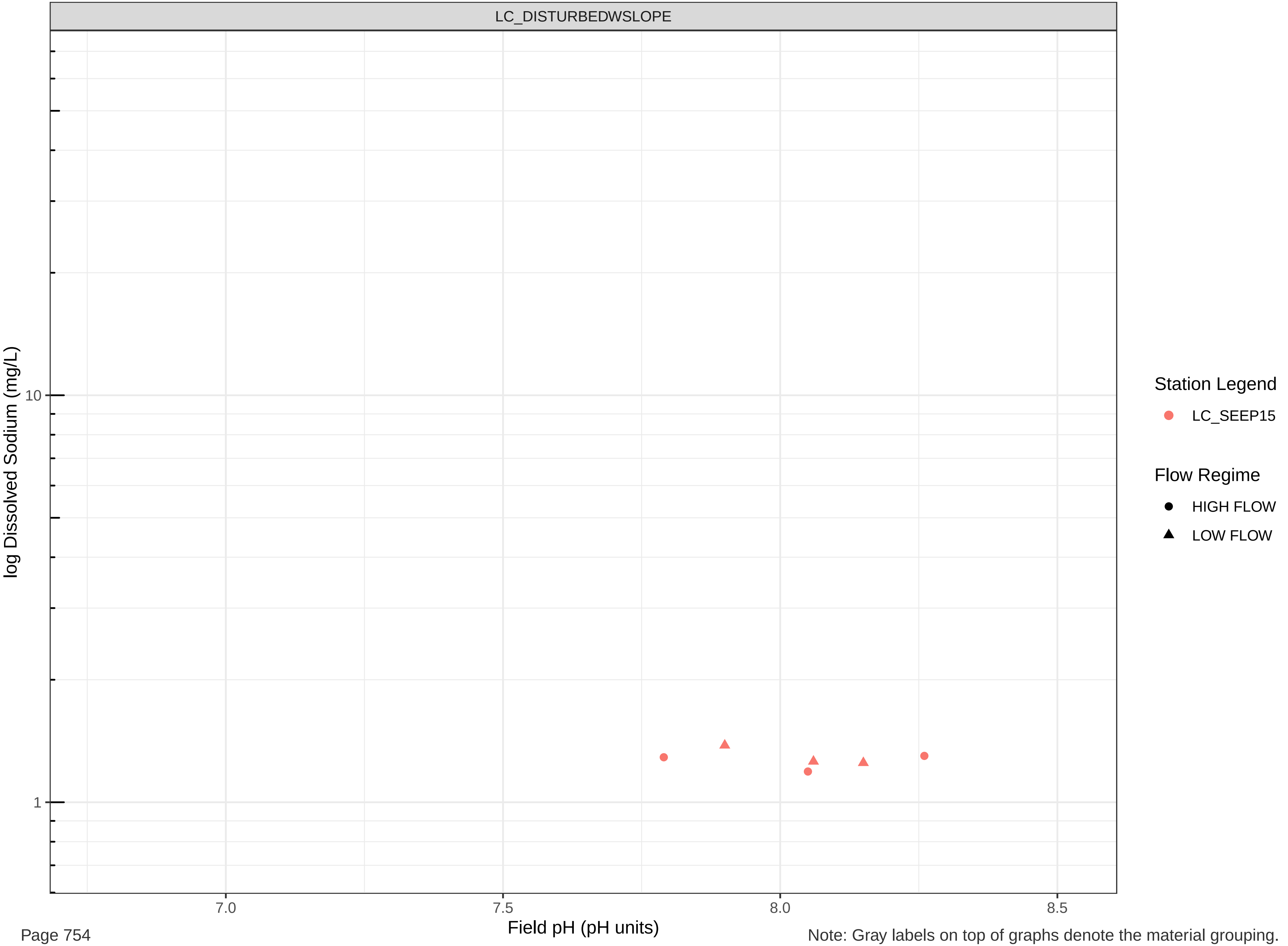

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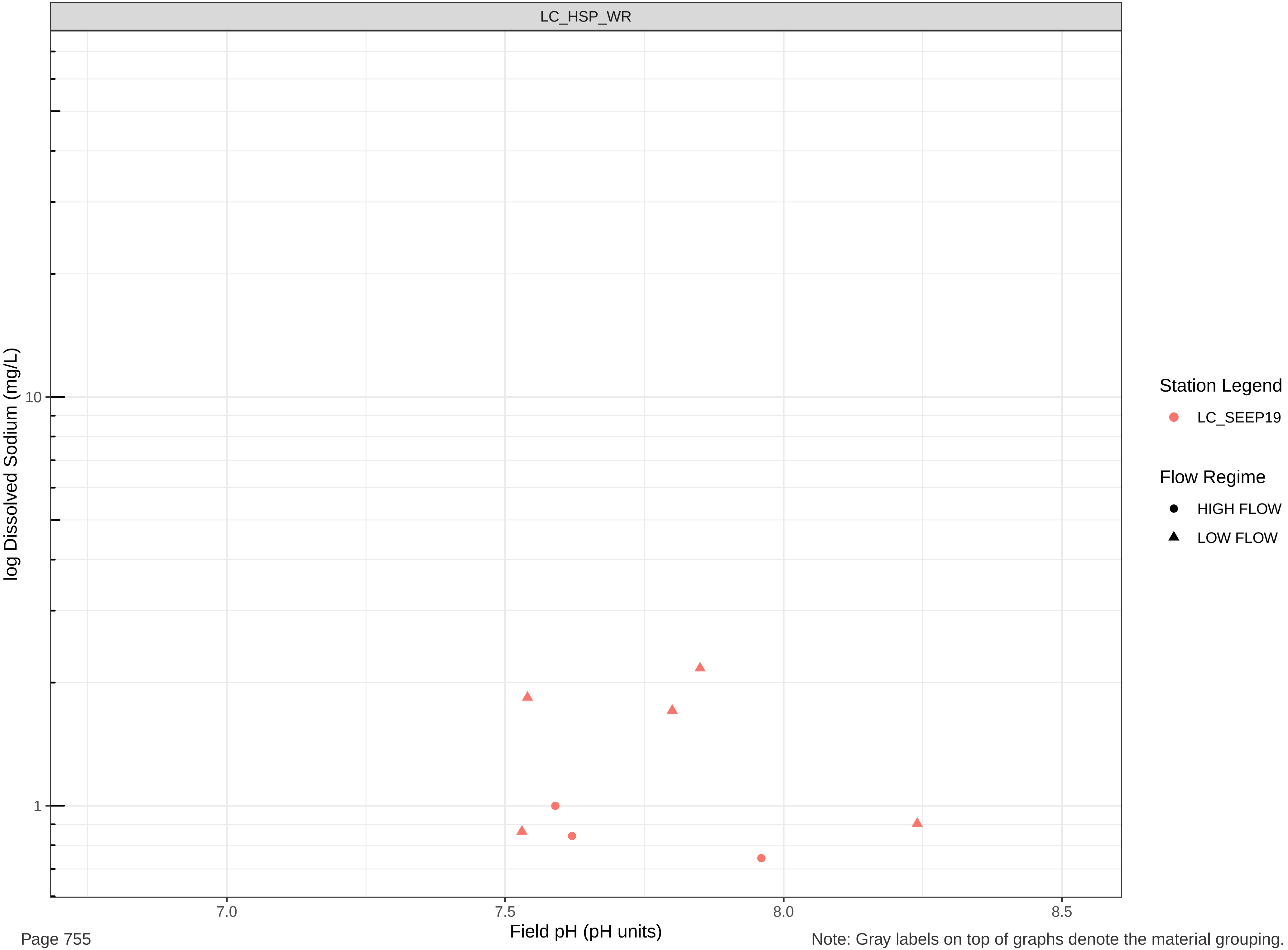

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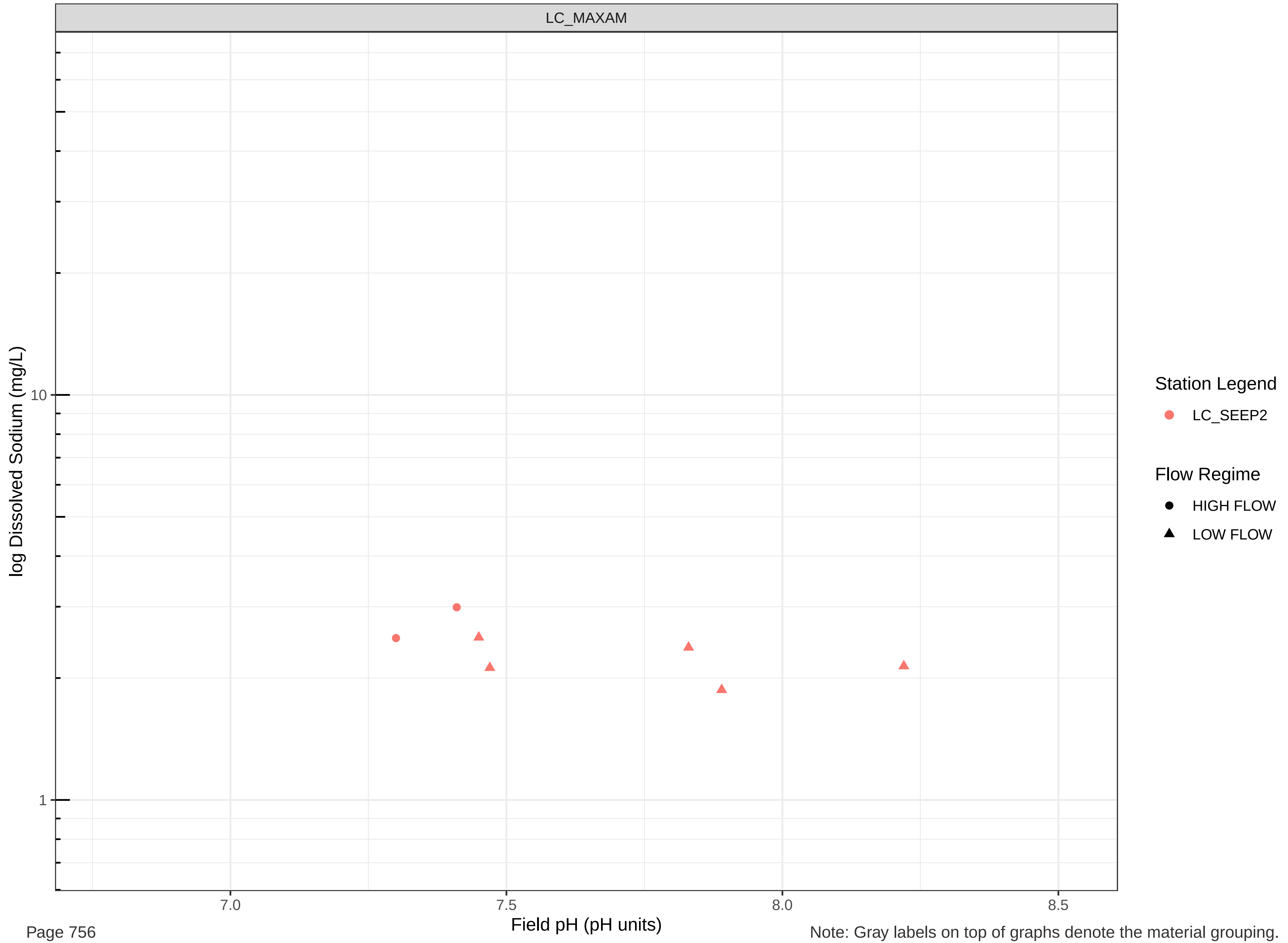

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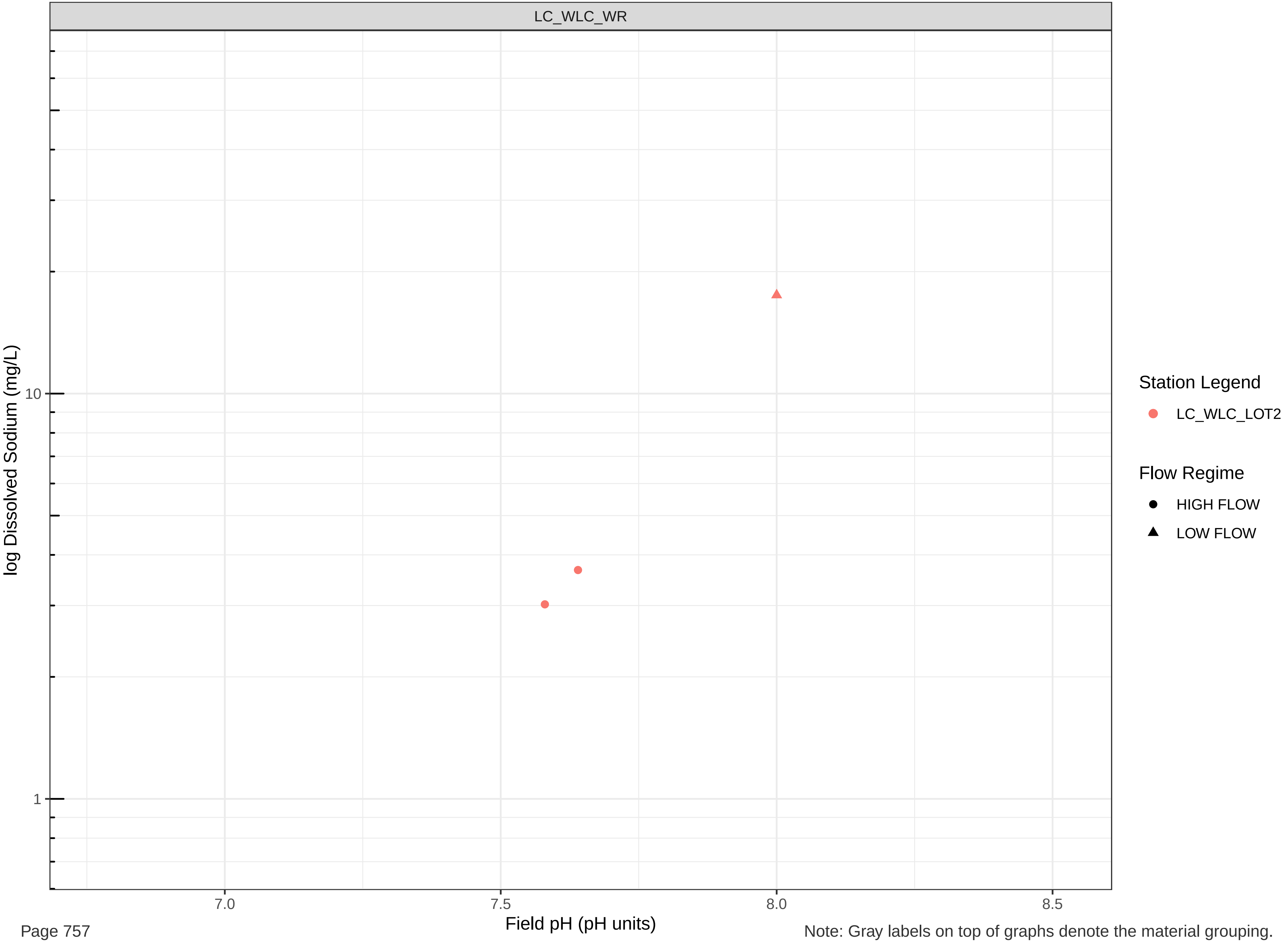

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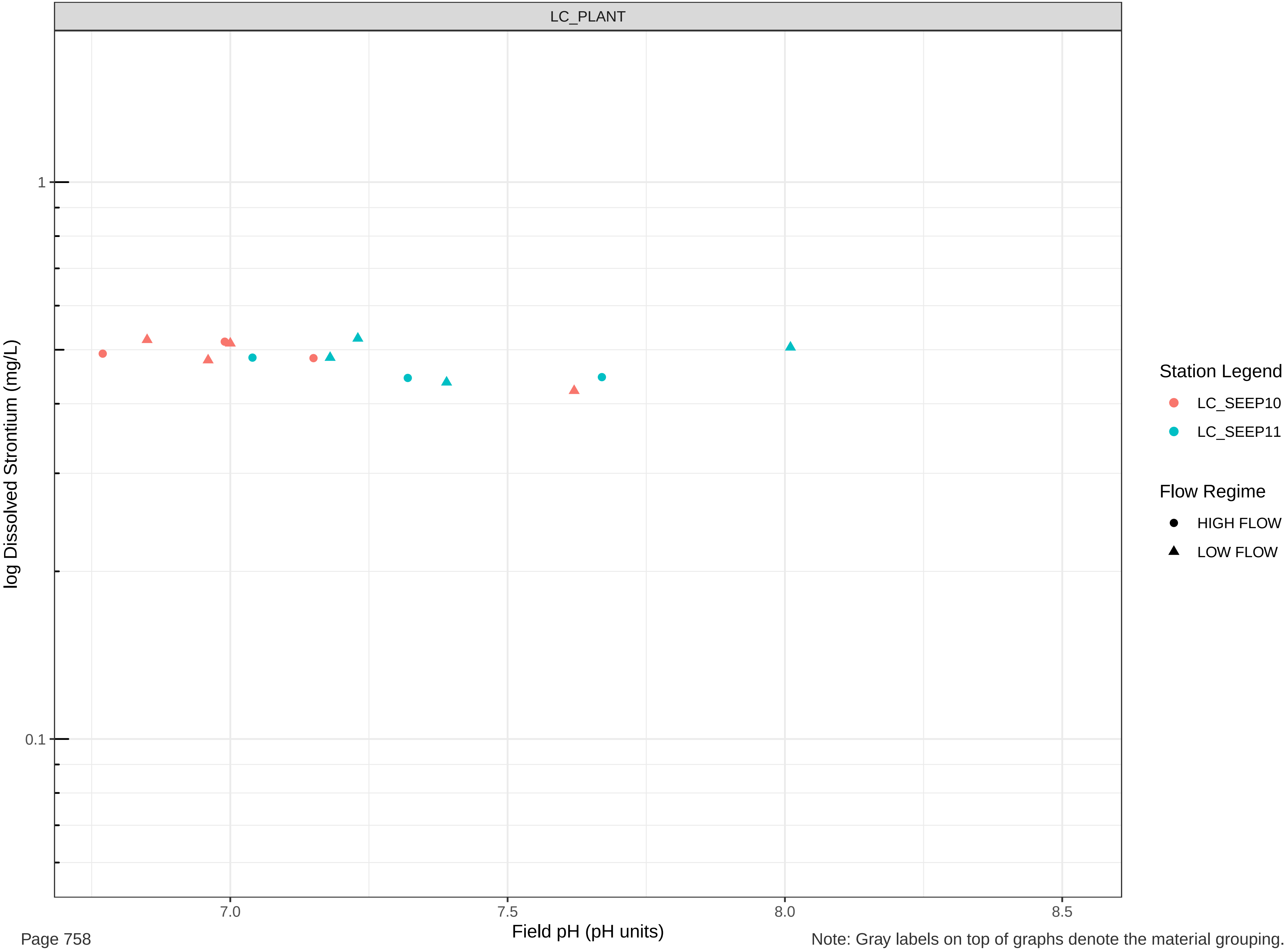

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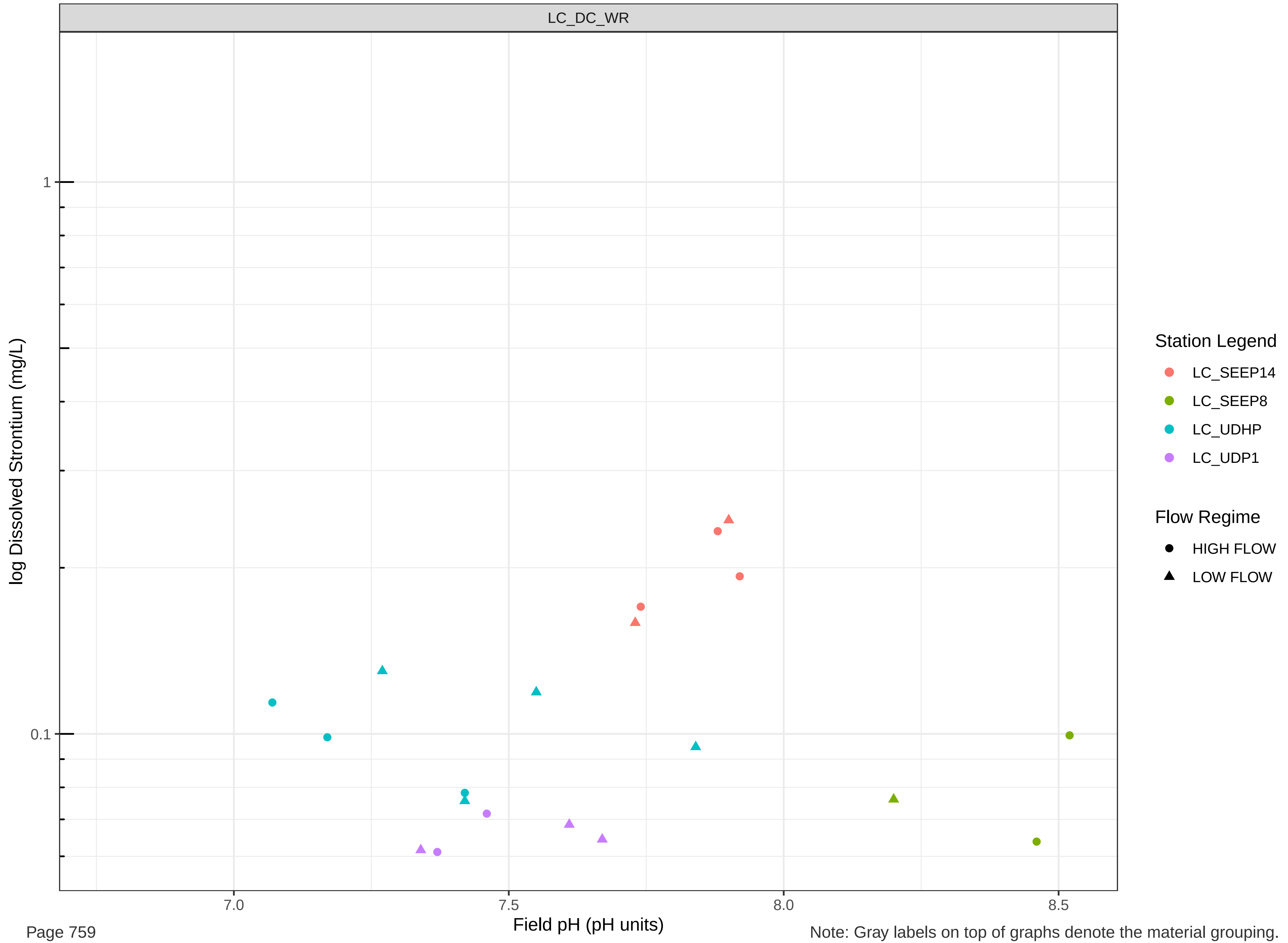

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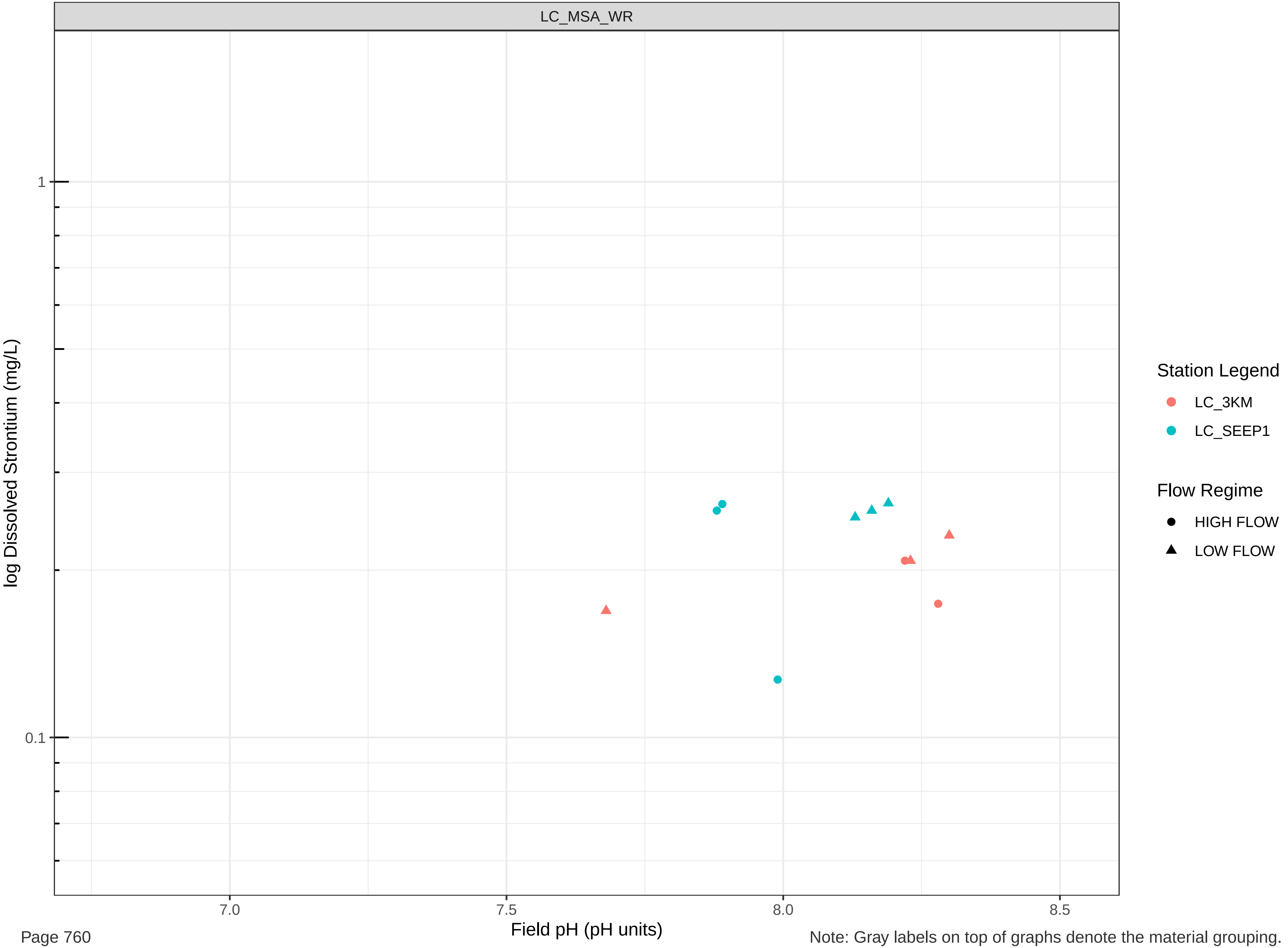

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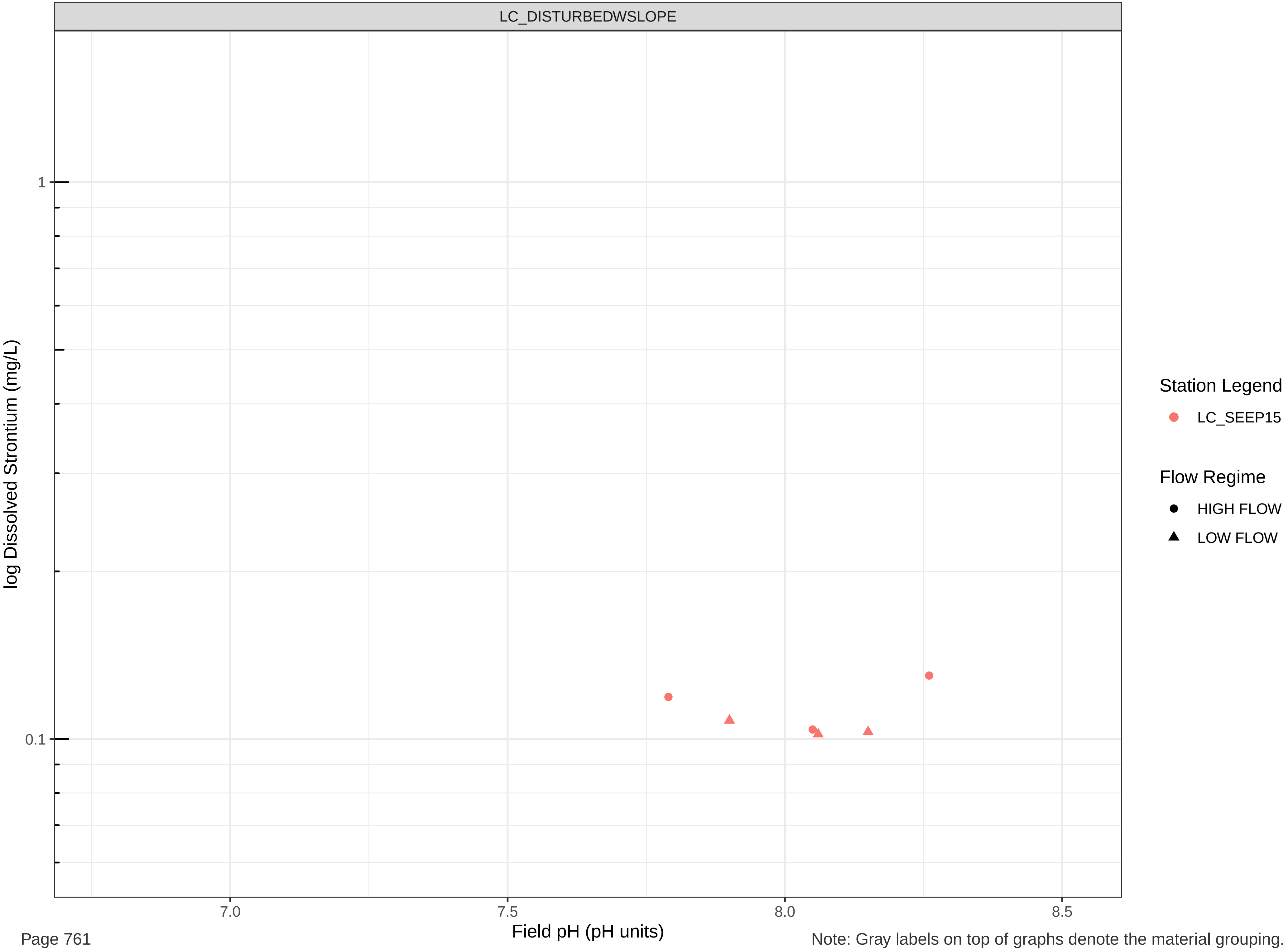

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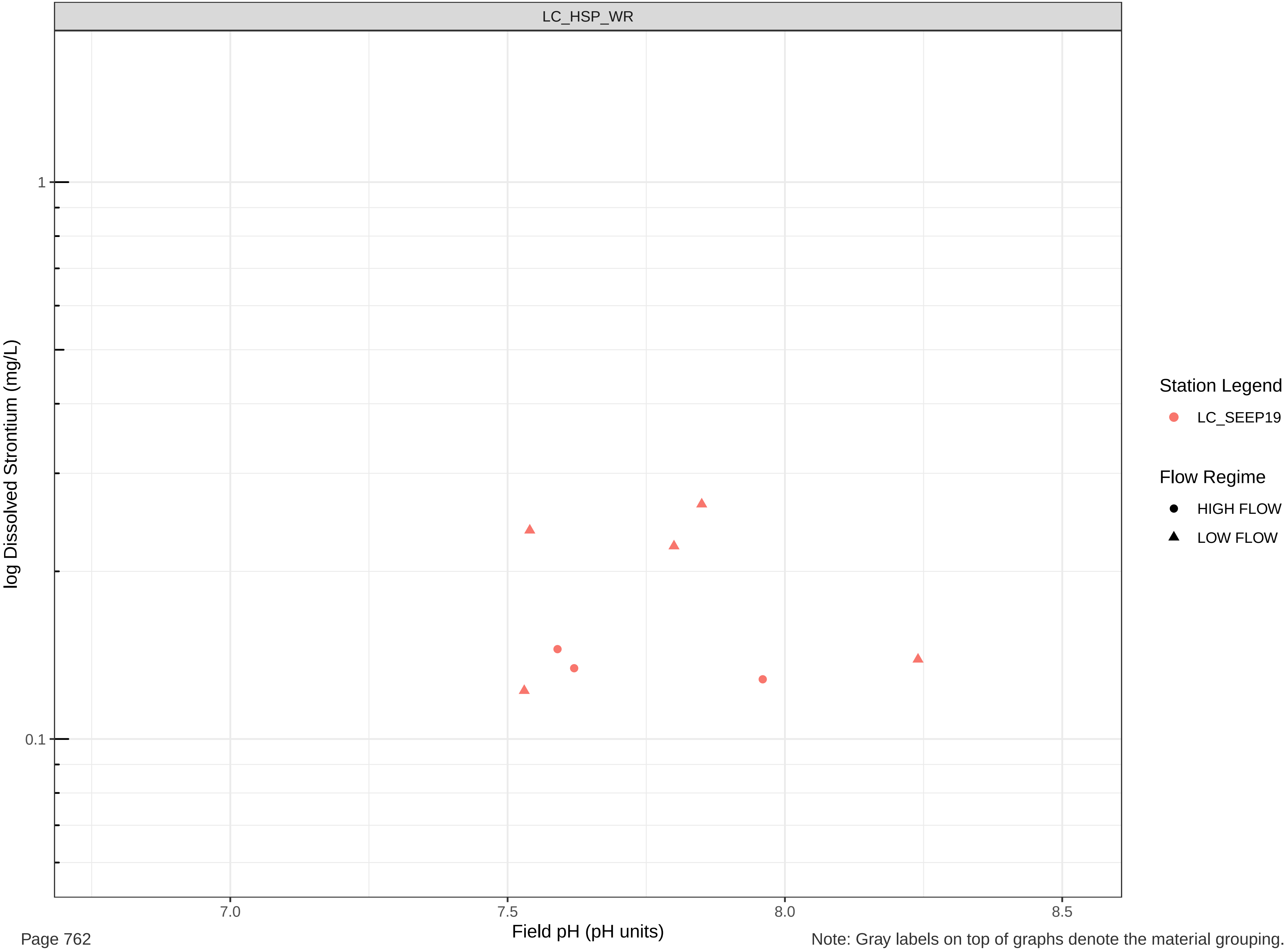

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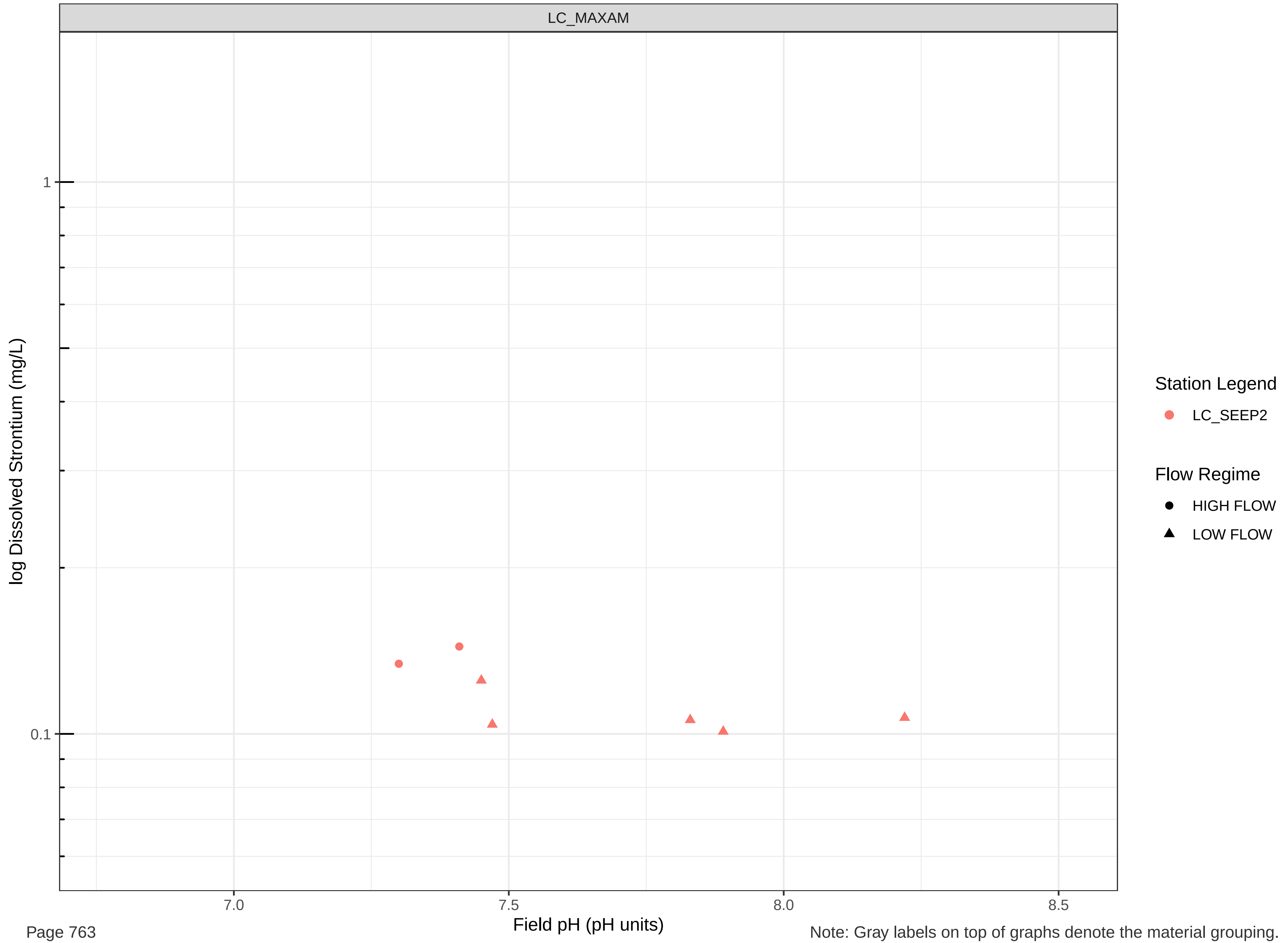

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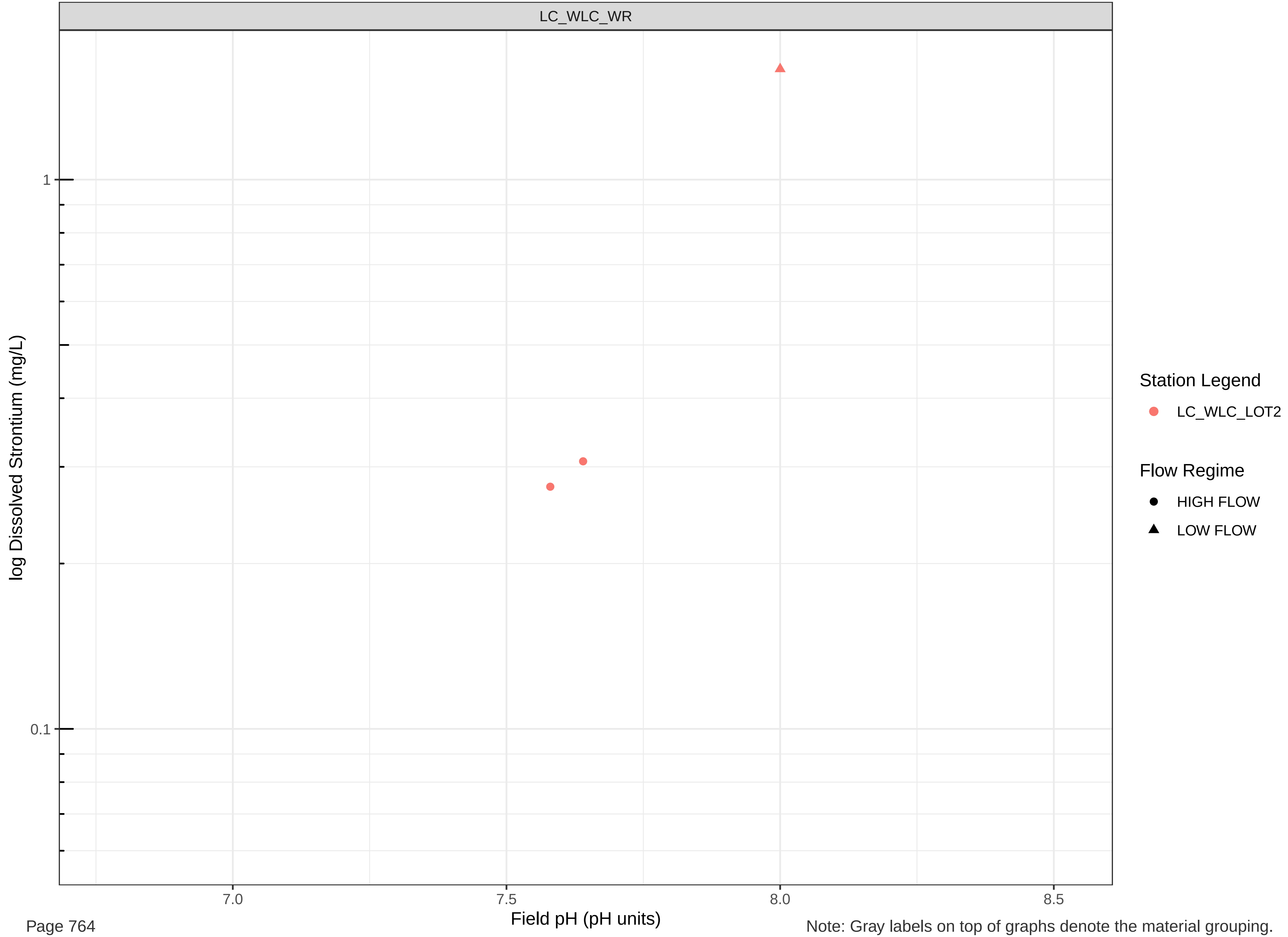

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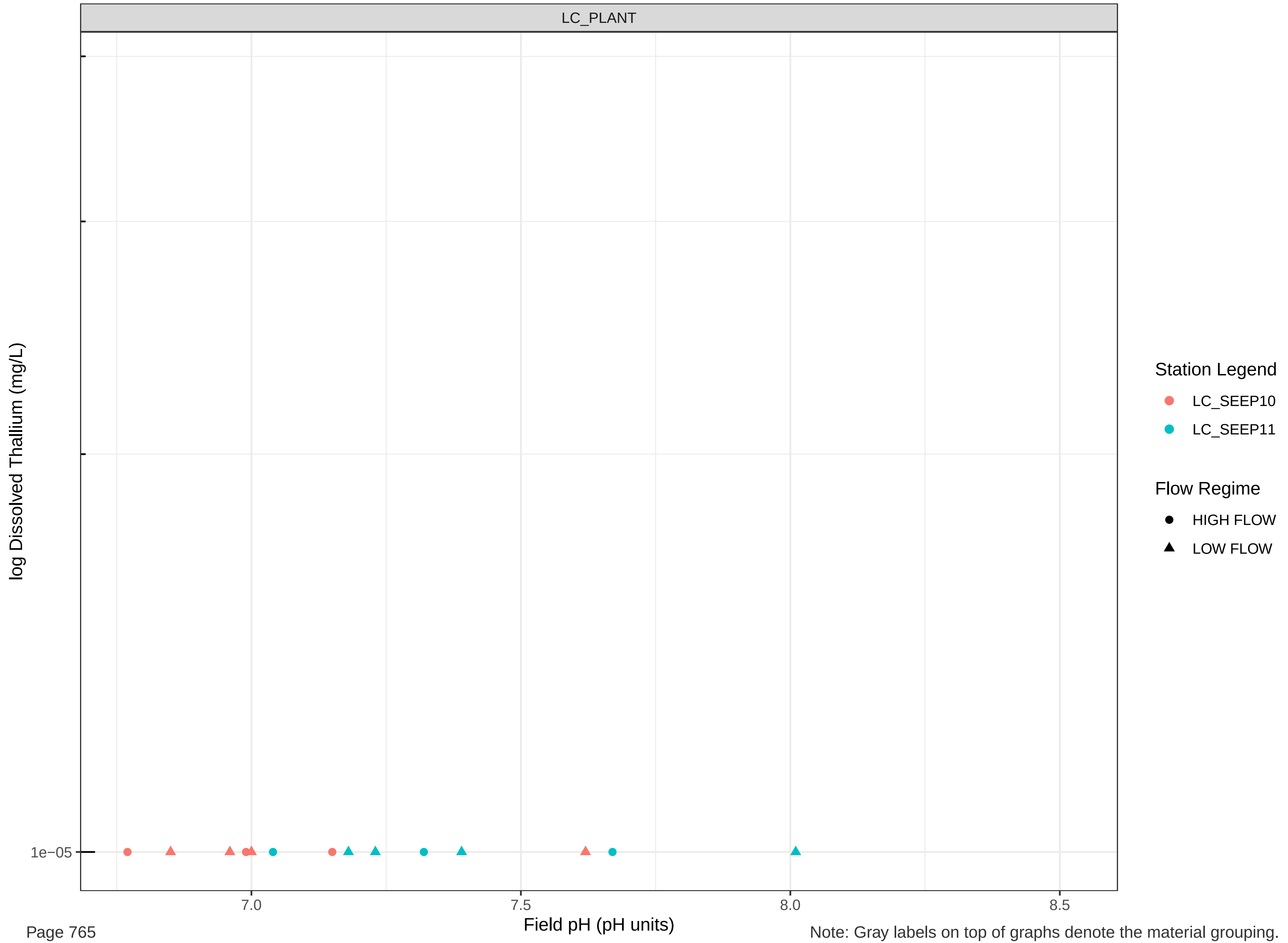

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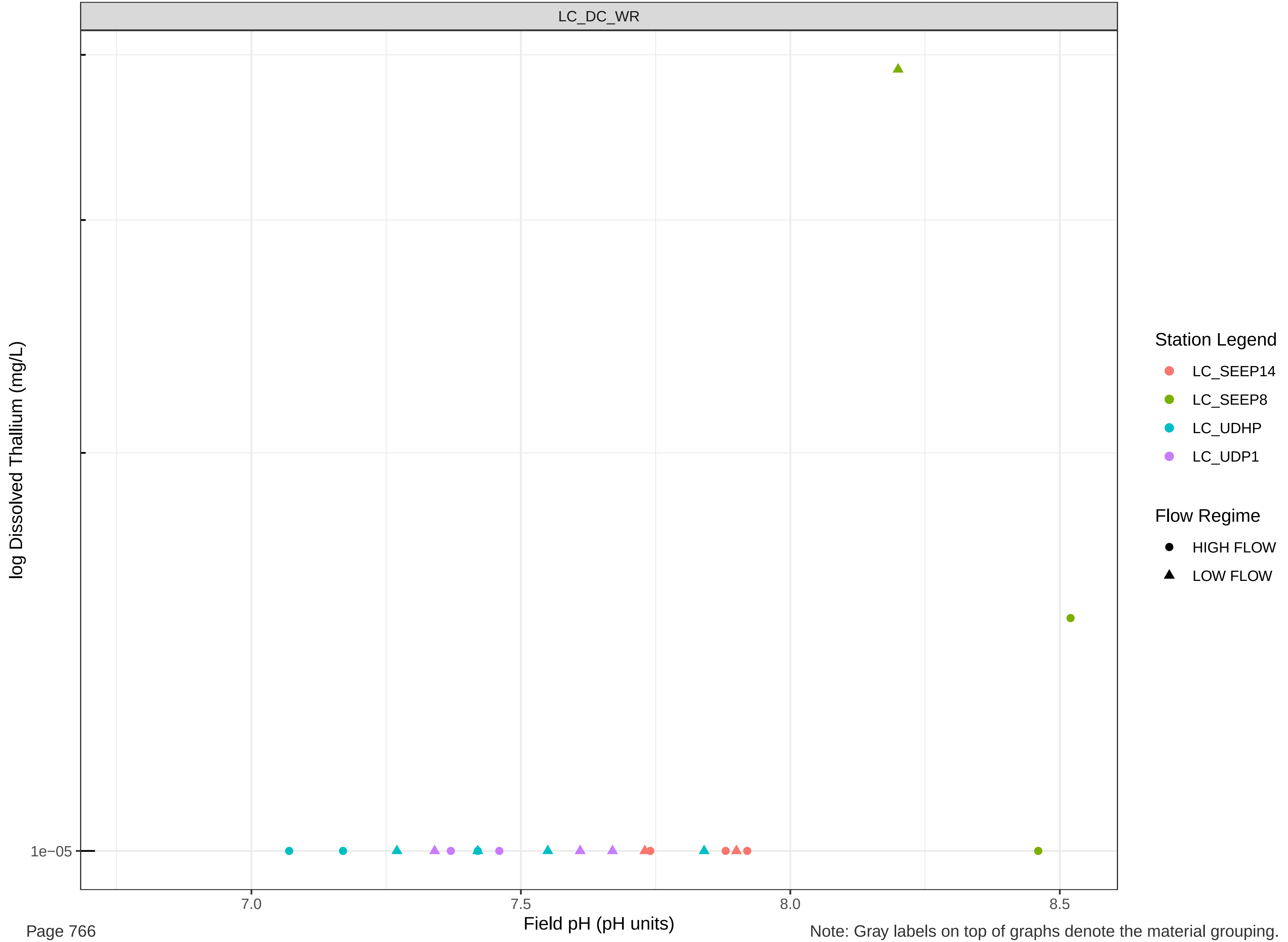

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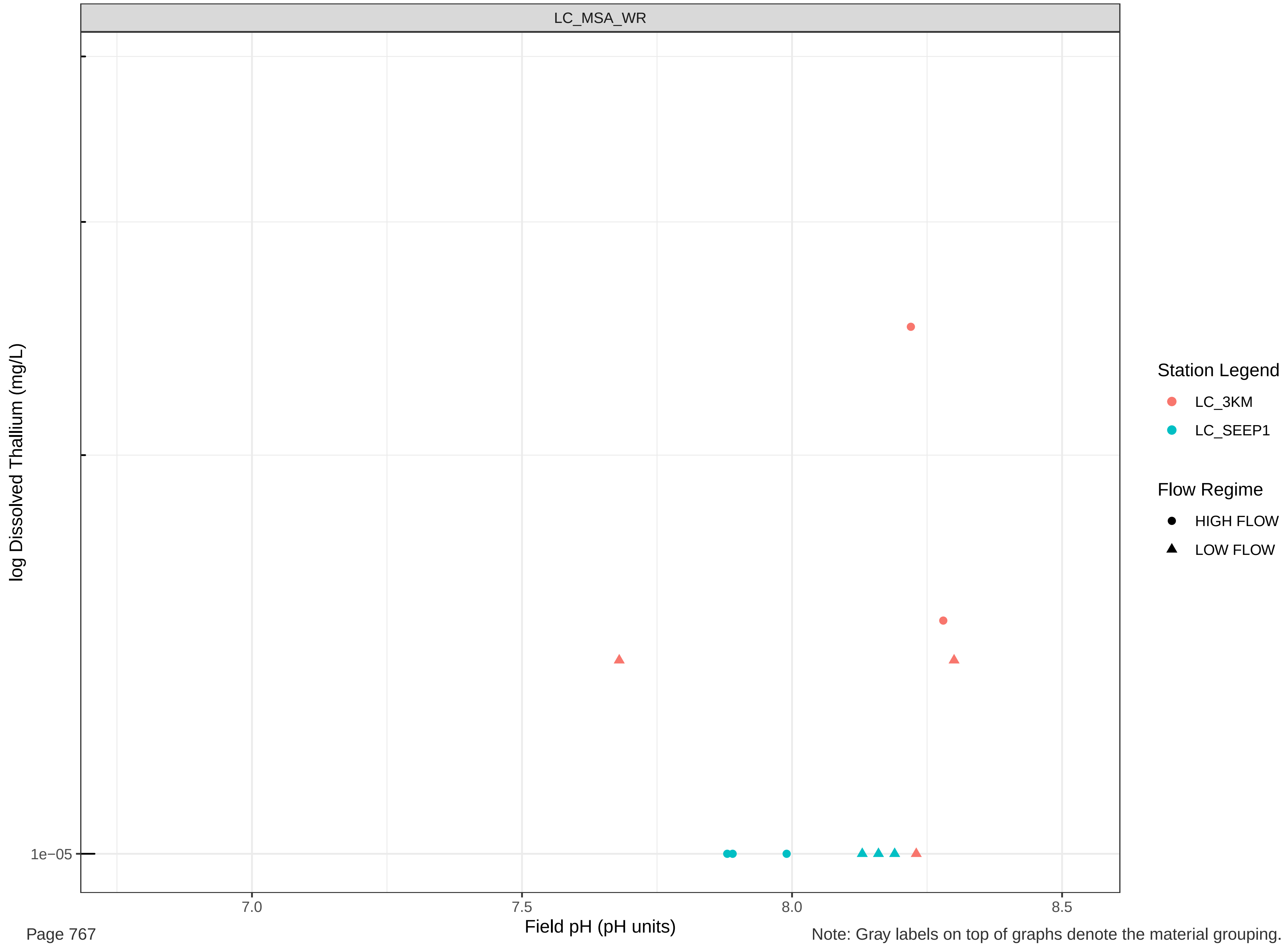

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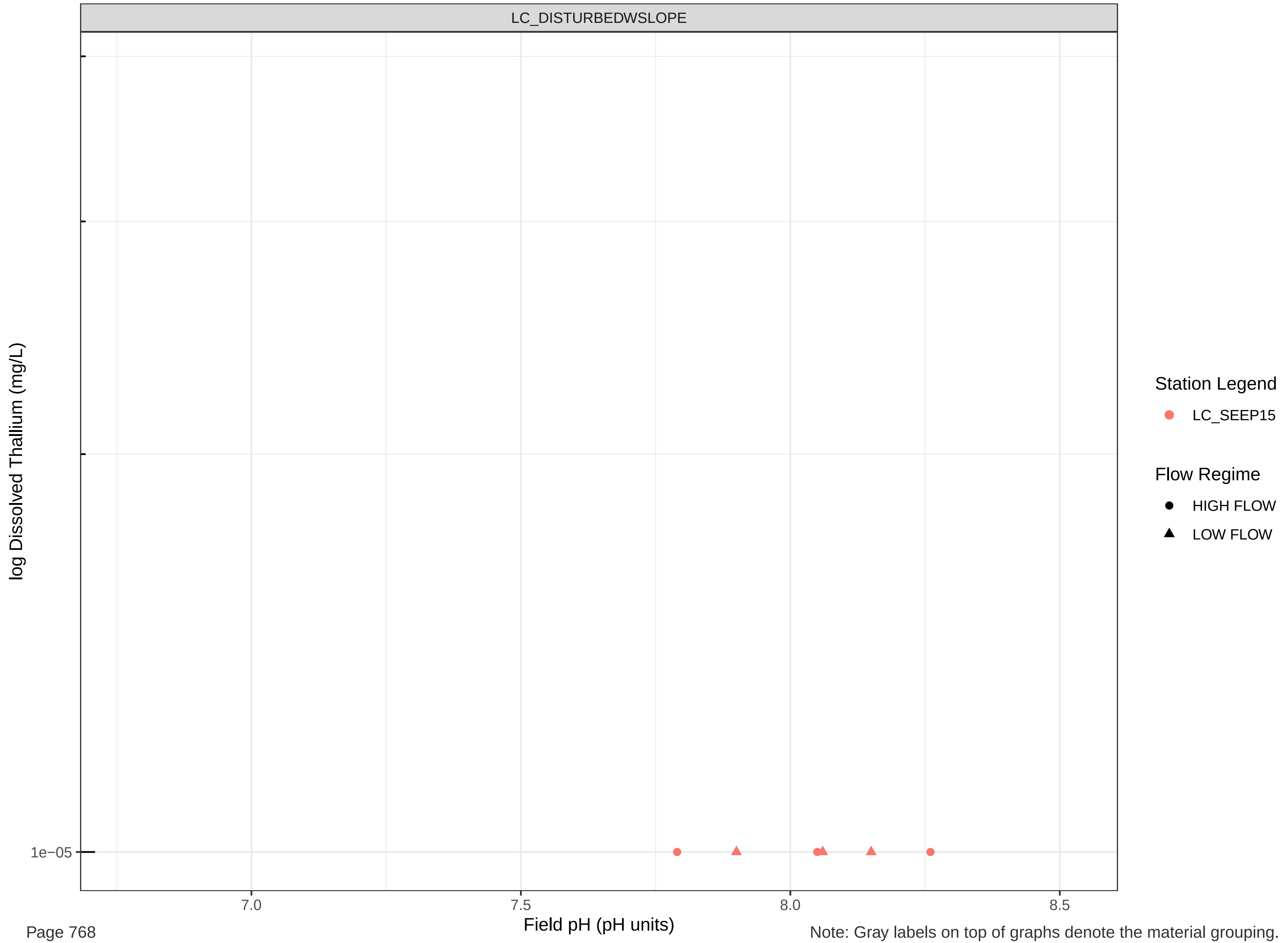

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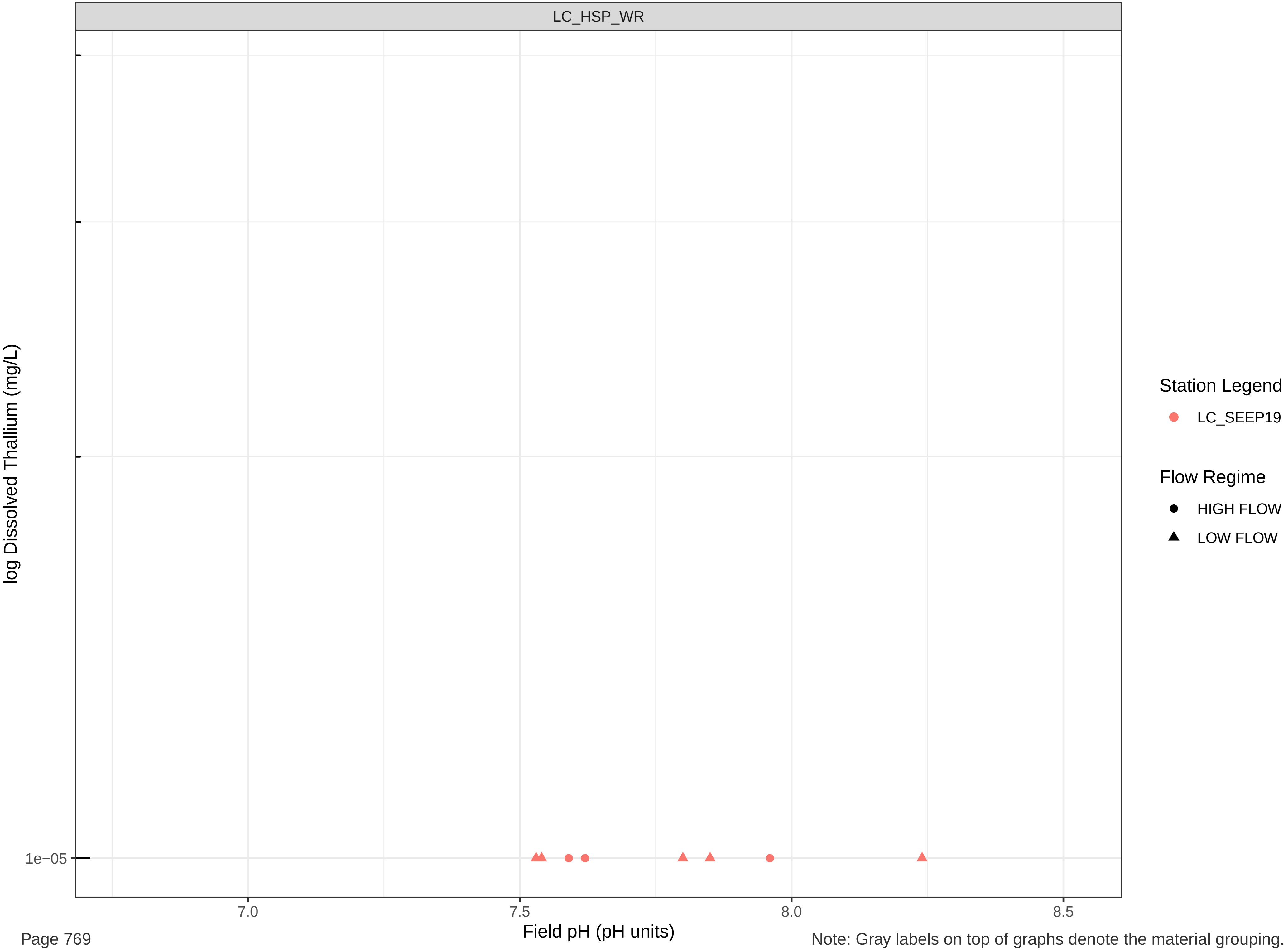

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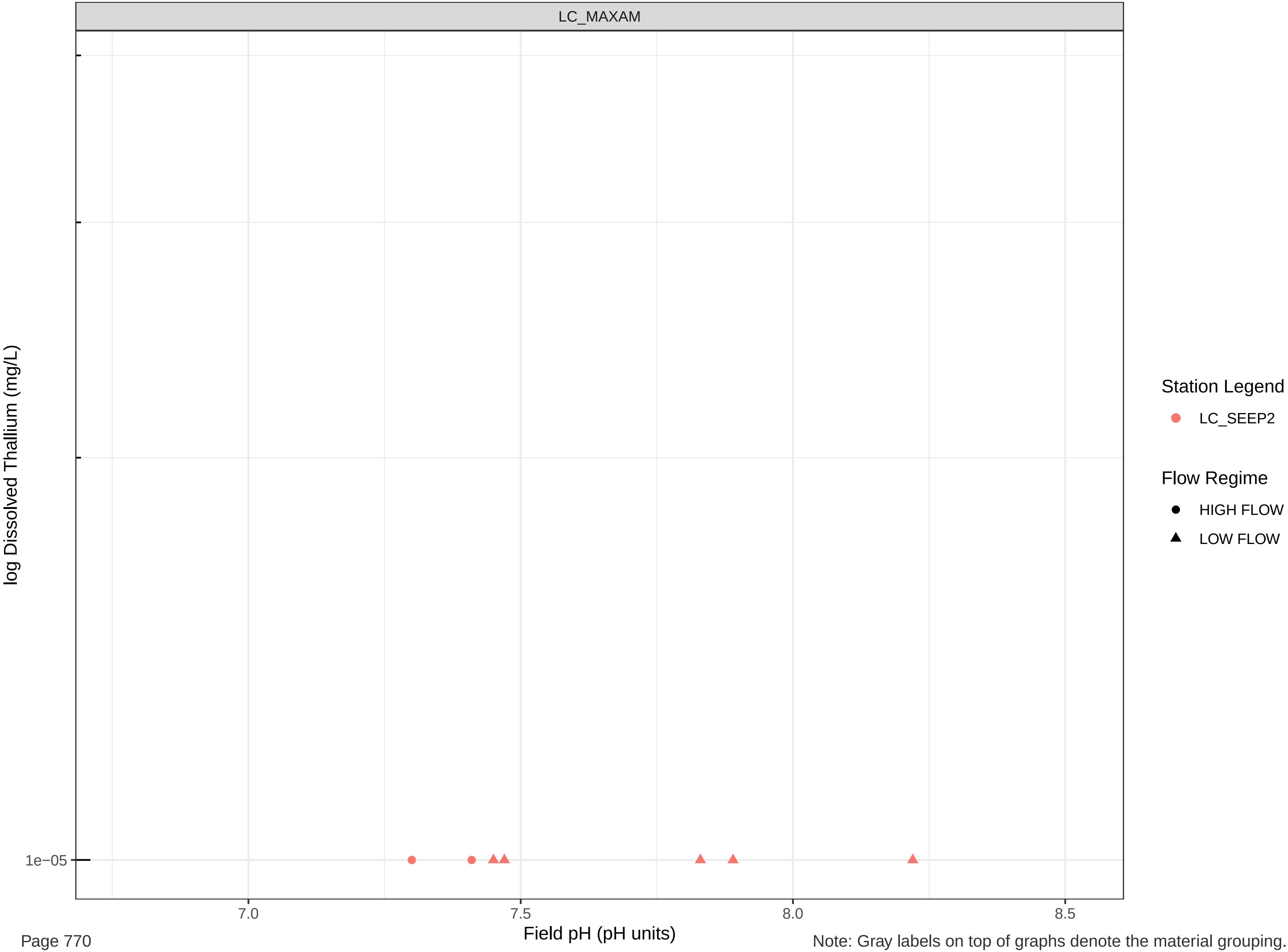

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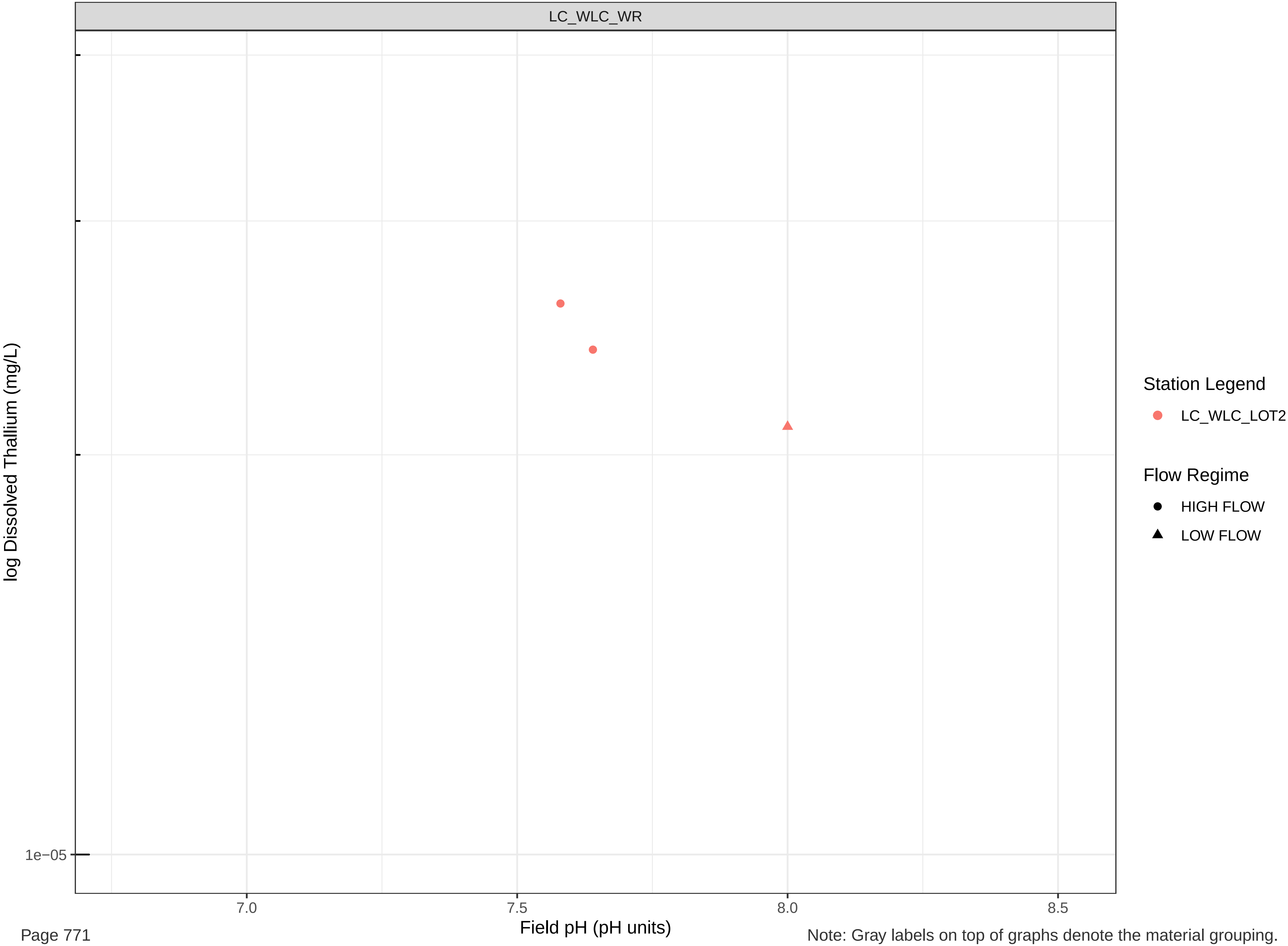

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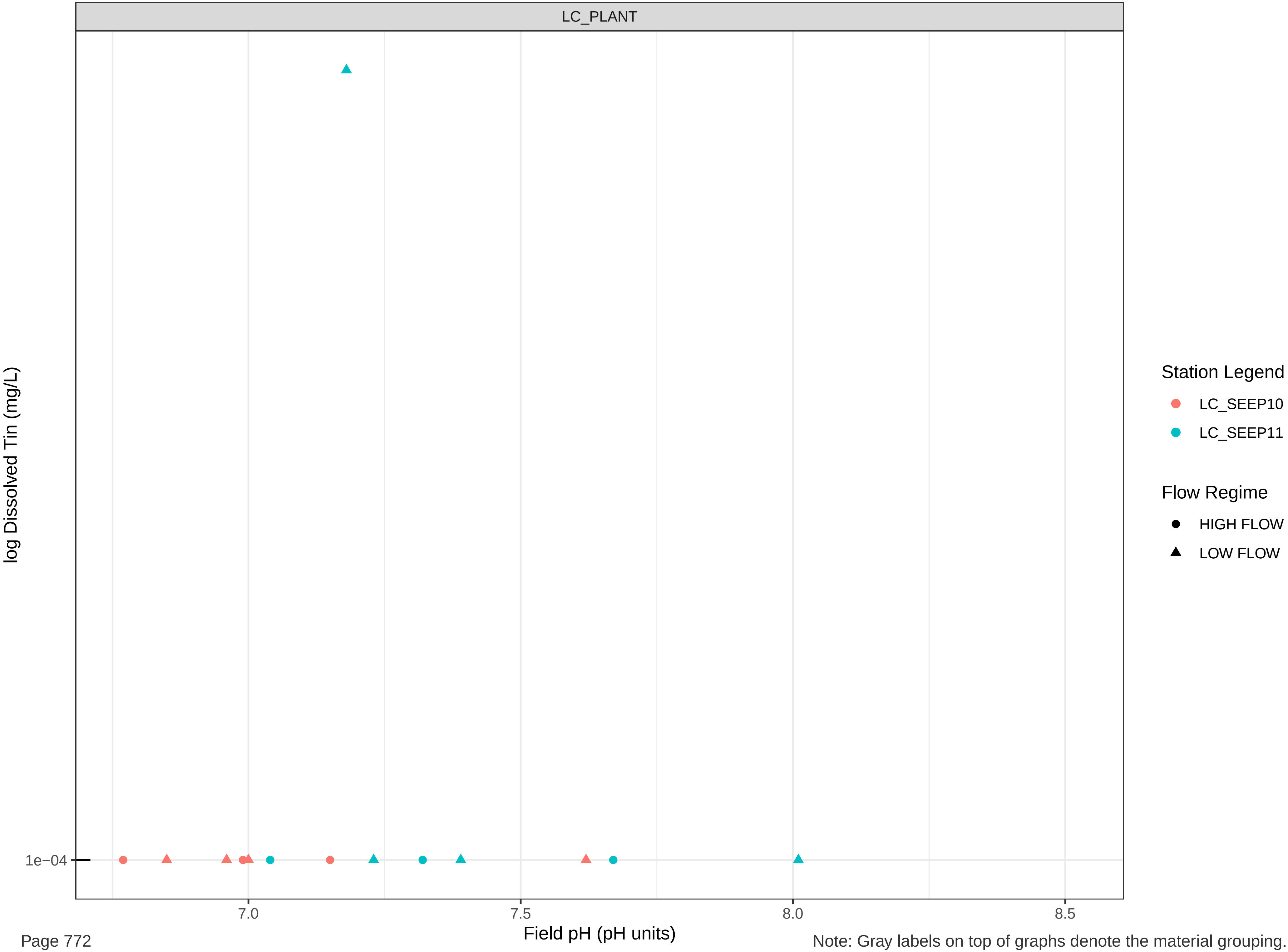

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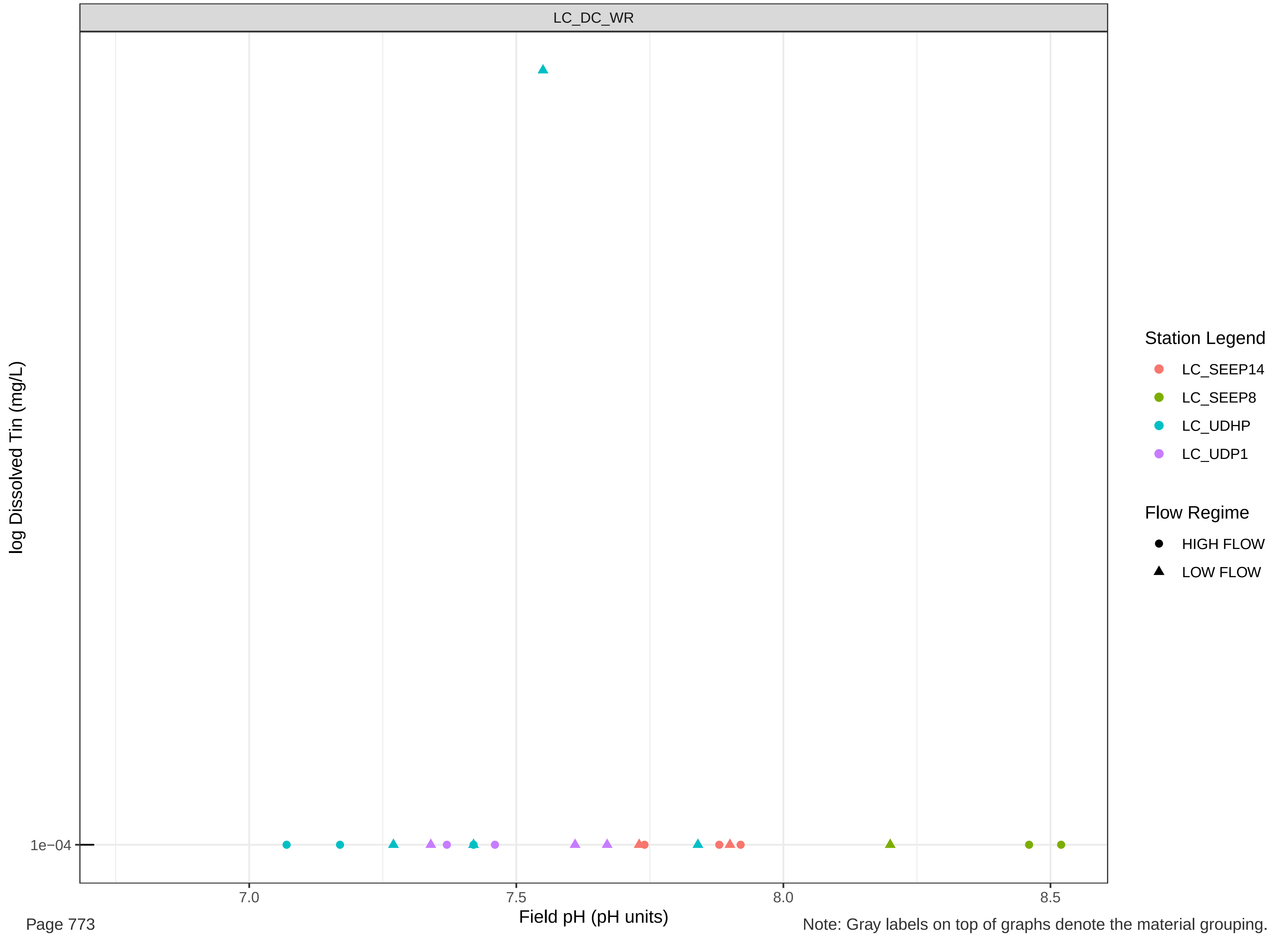

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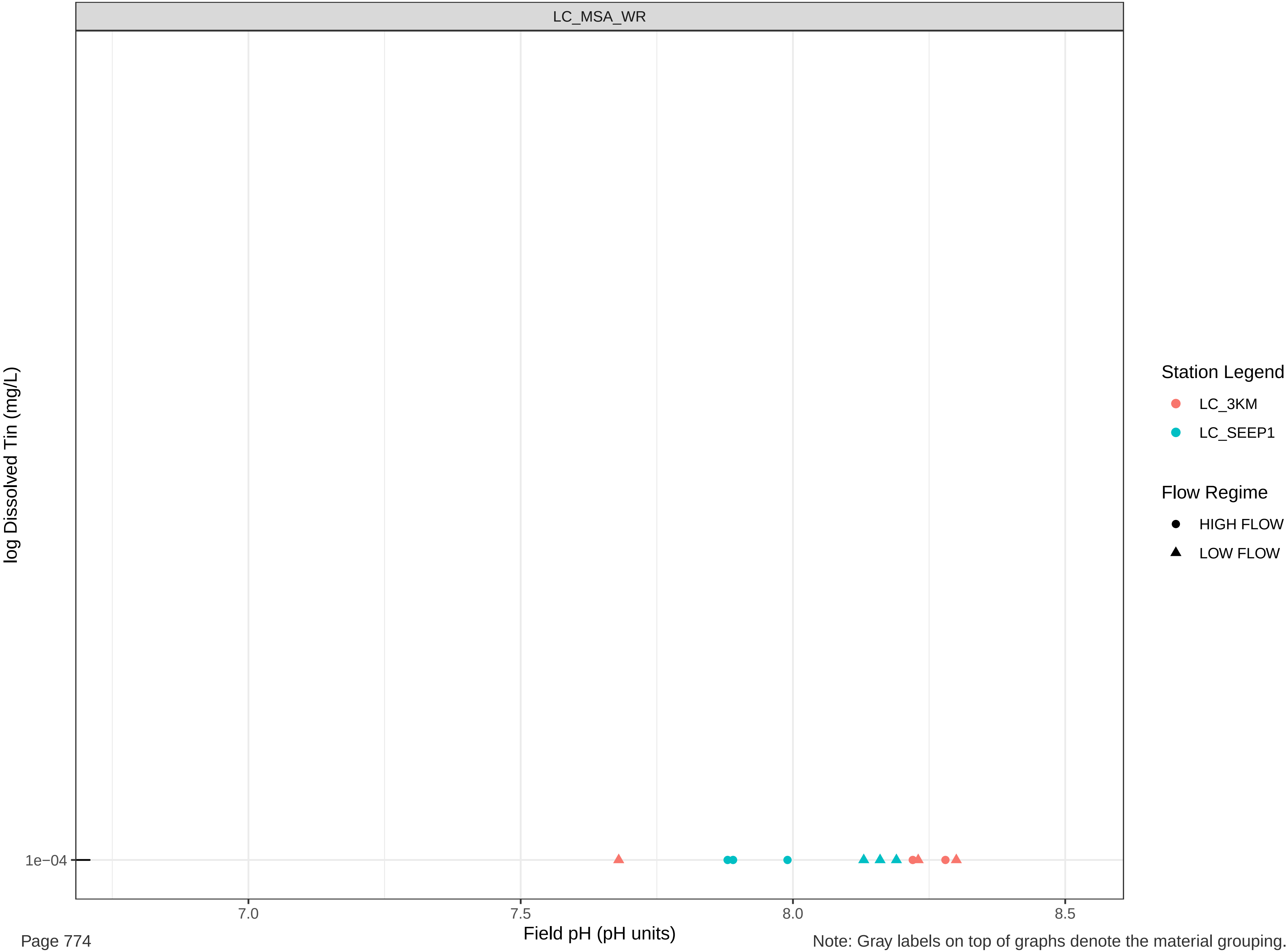

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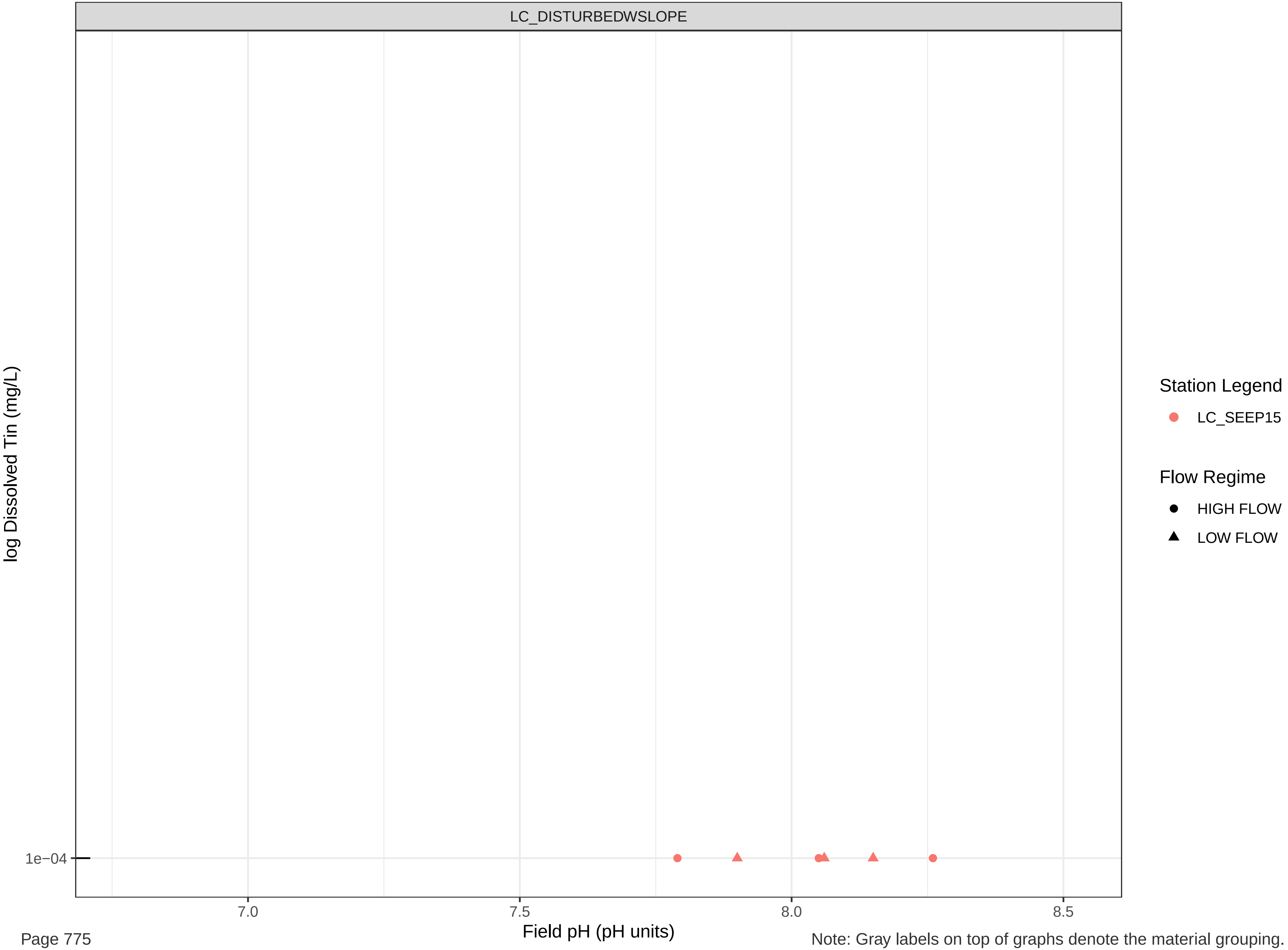
LC_DISTURBEDWSLOPE
log Dissolved Tin (mg/L)
1e−04
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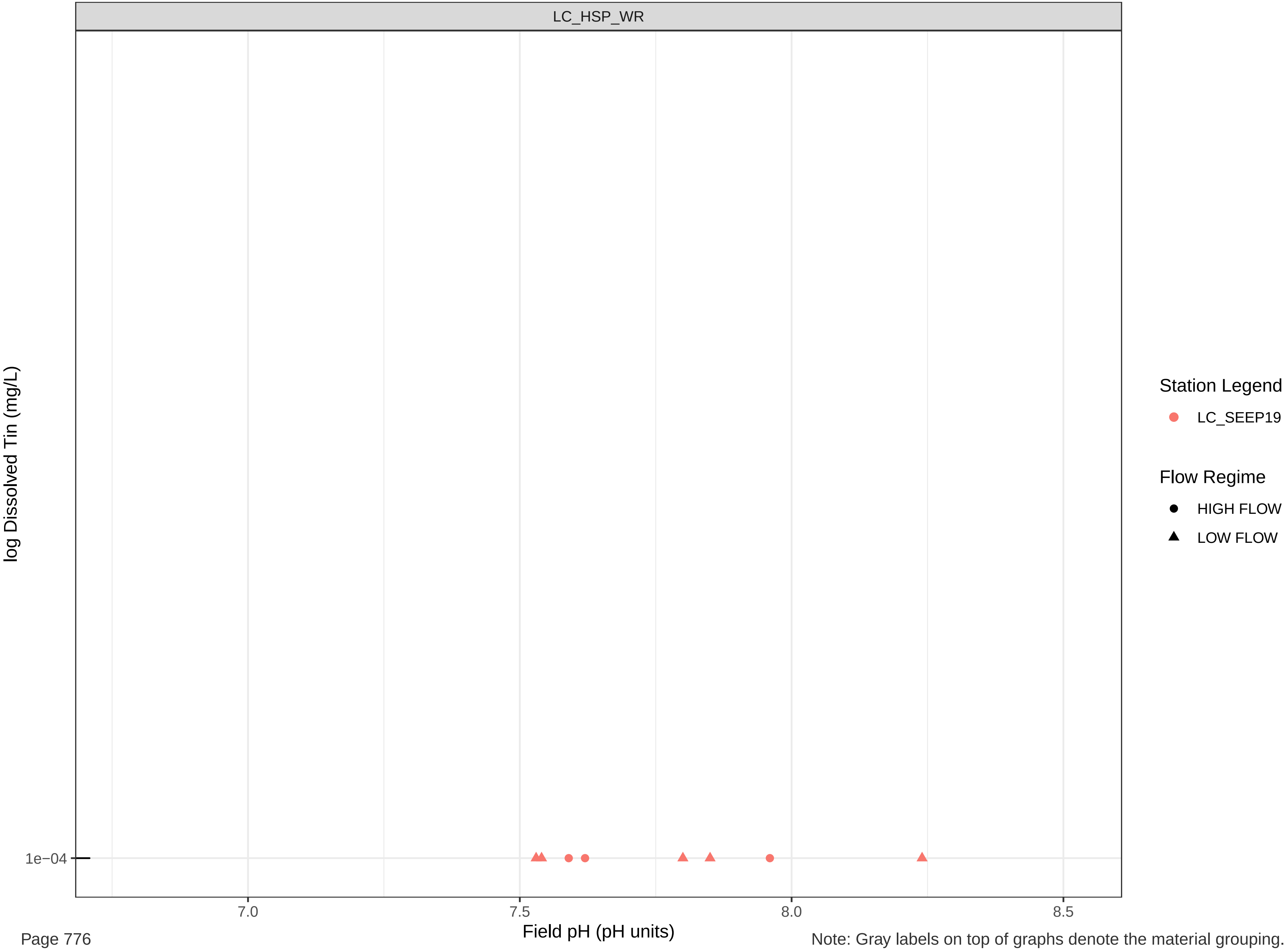
7.5
8.0
8.5
Field pH (pH units)
Station Legend
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



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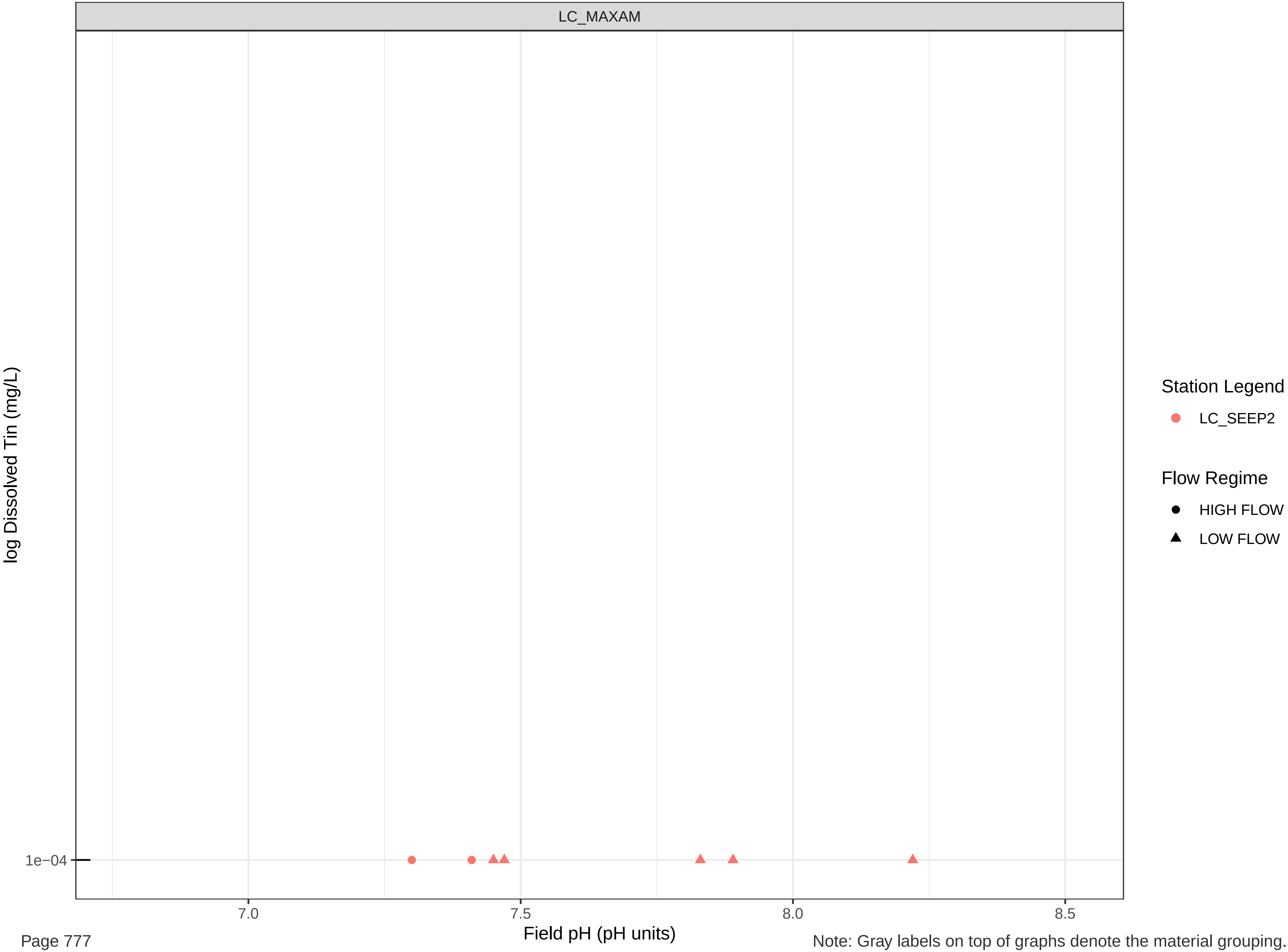

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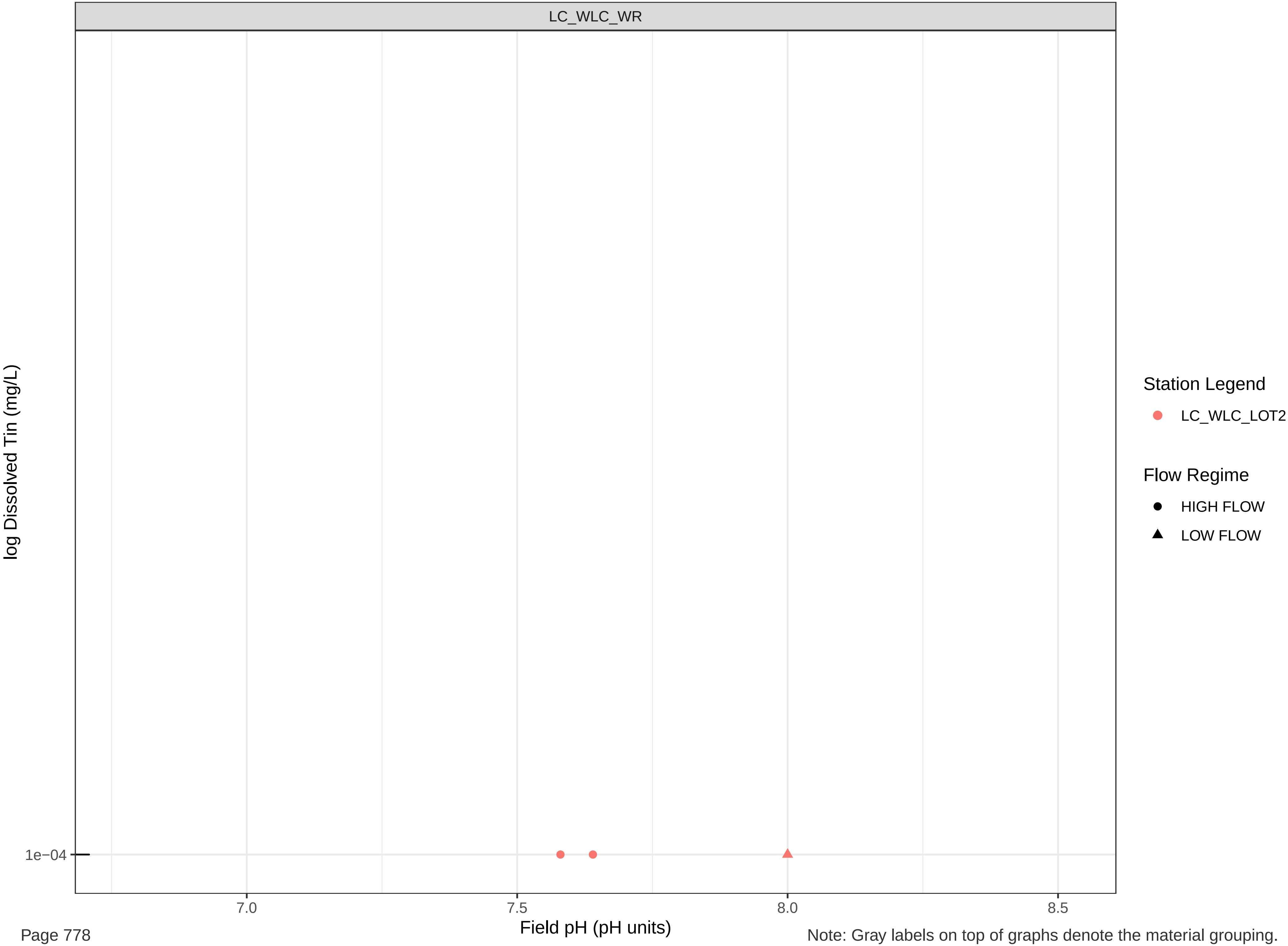

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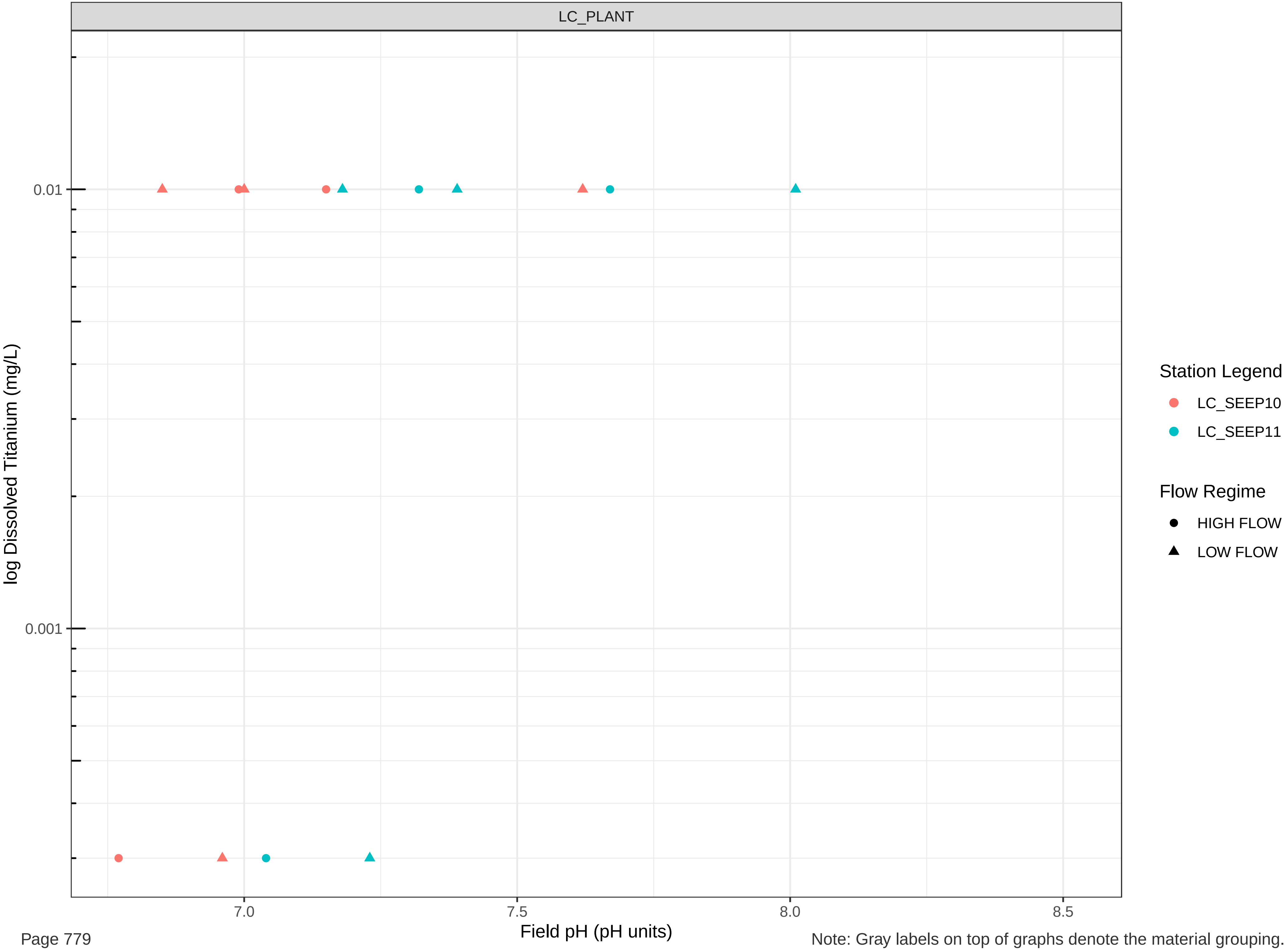

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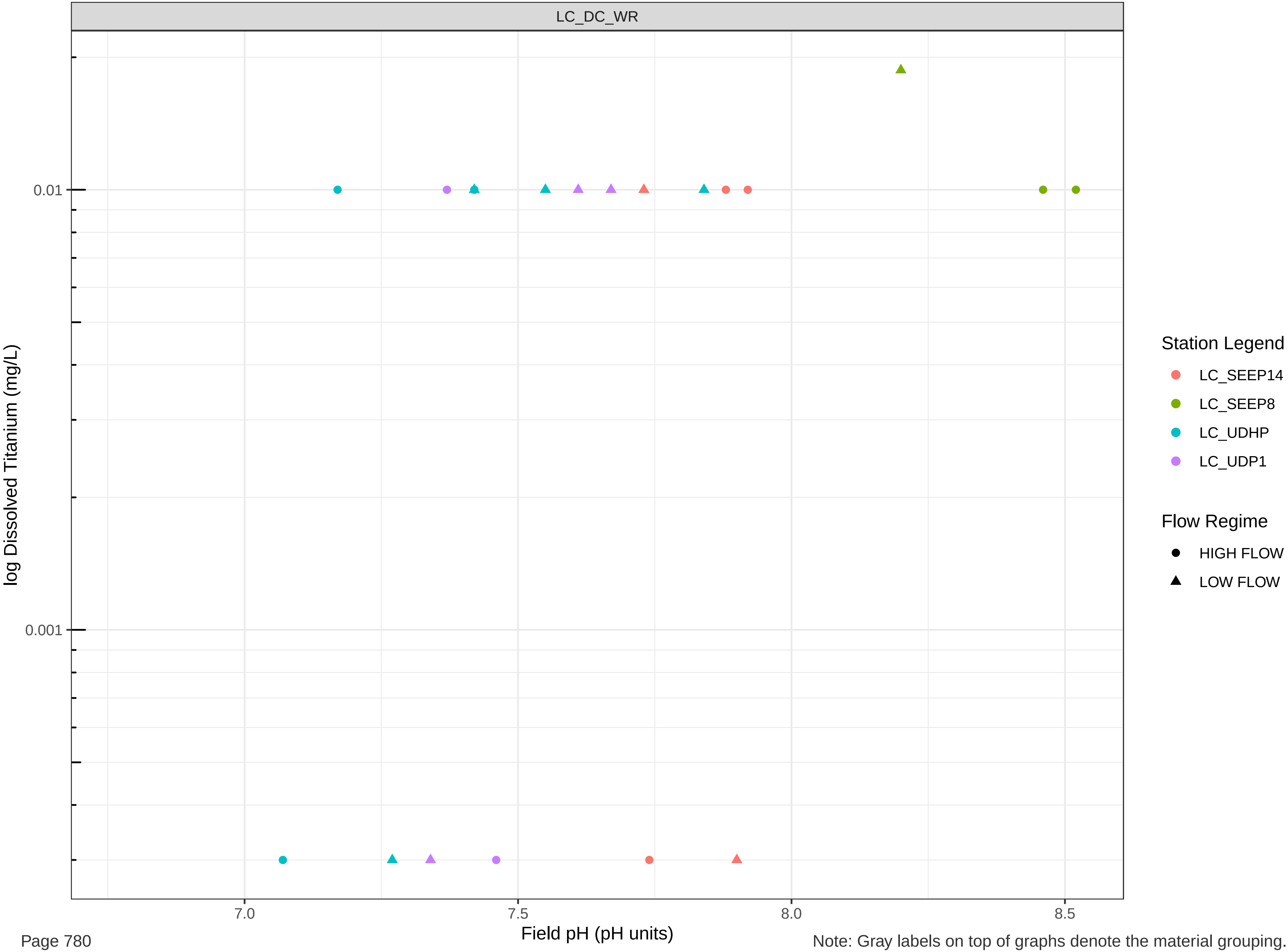

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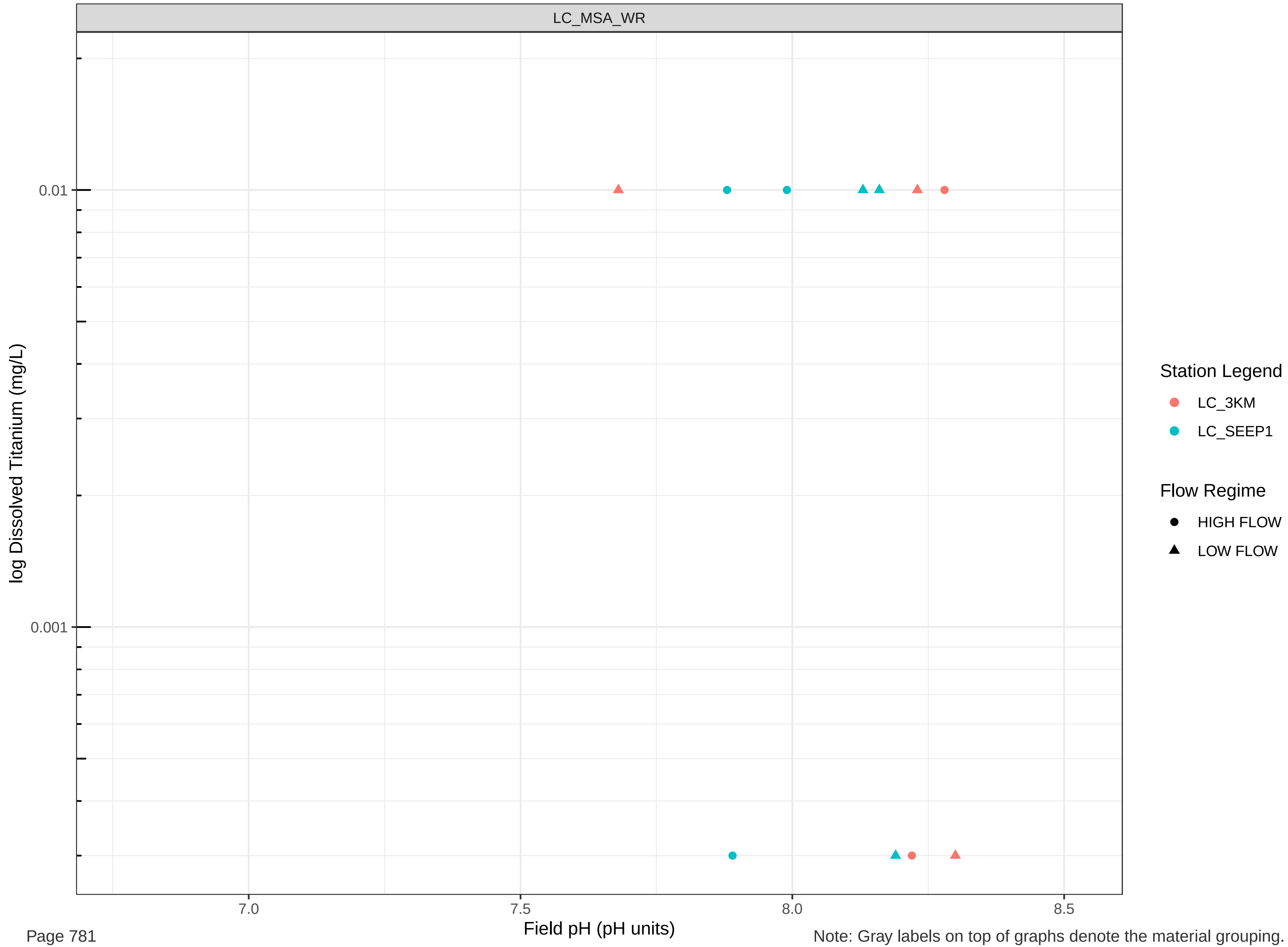

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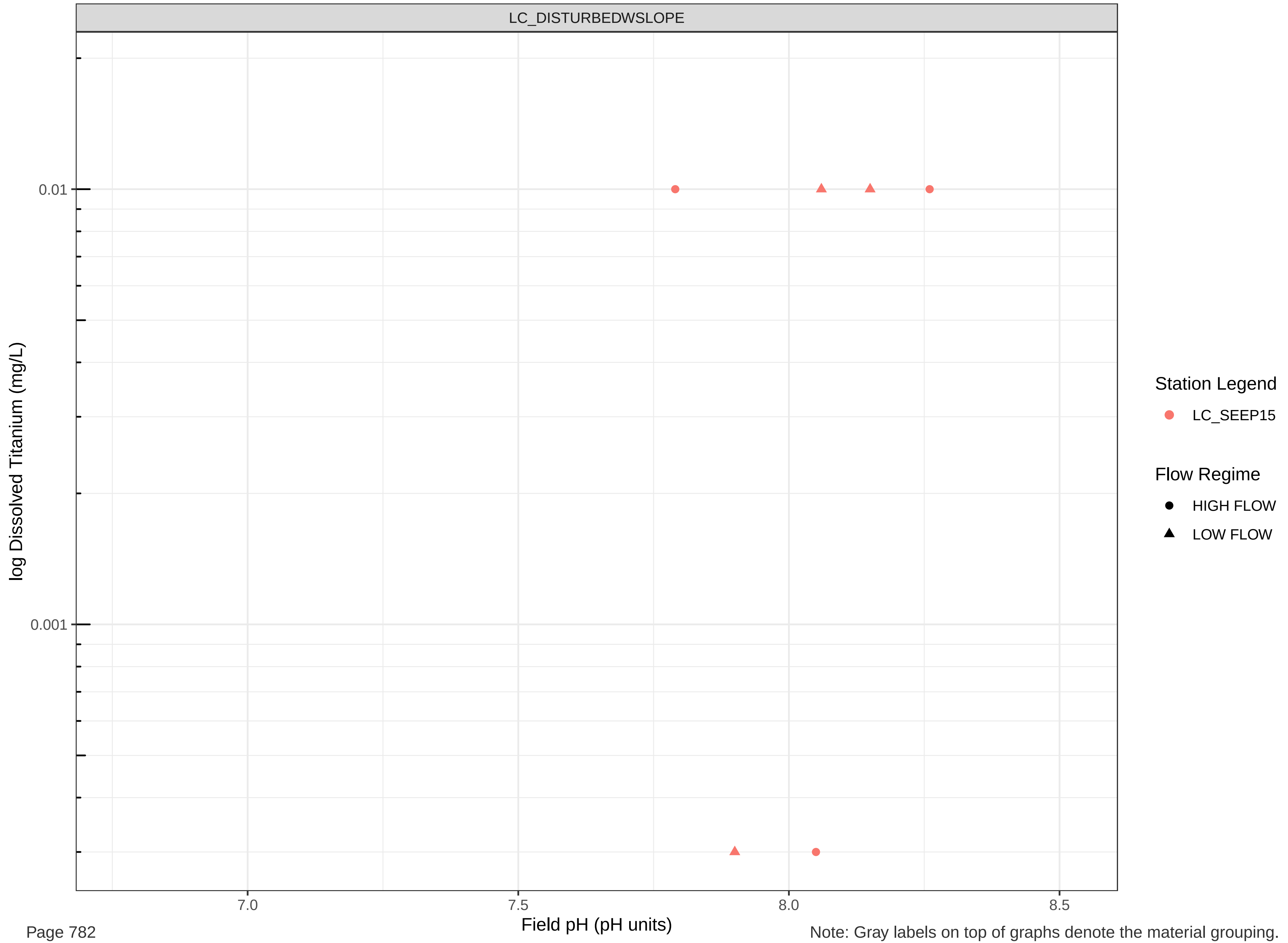

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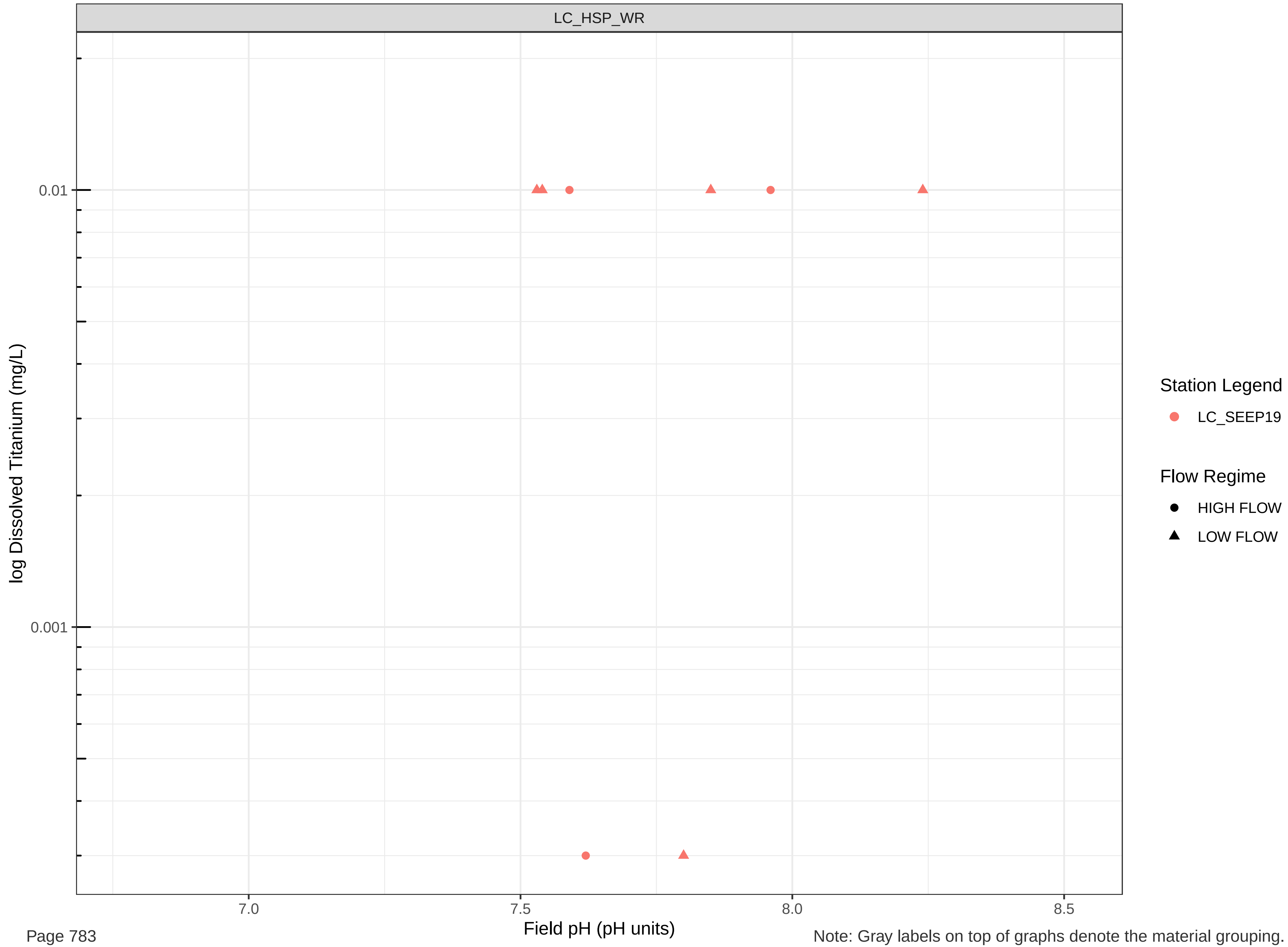

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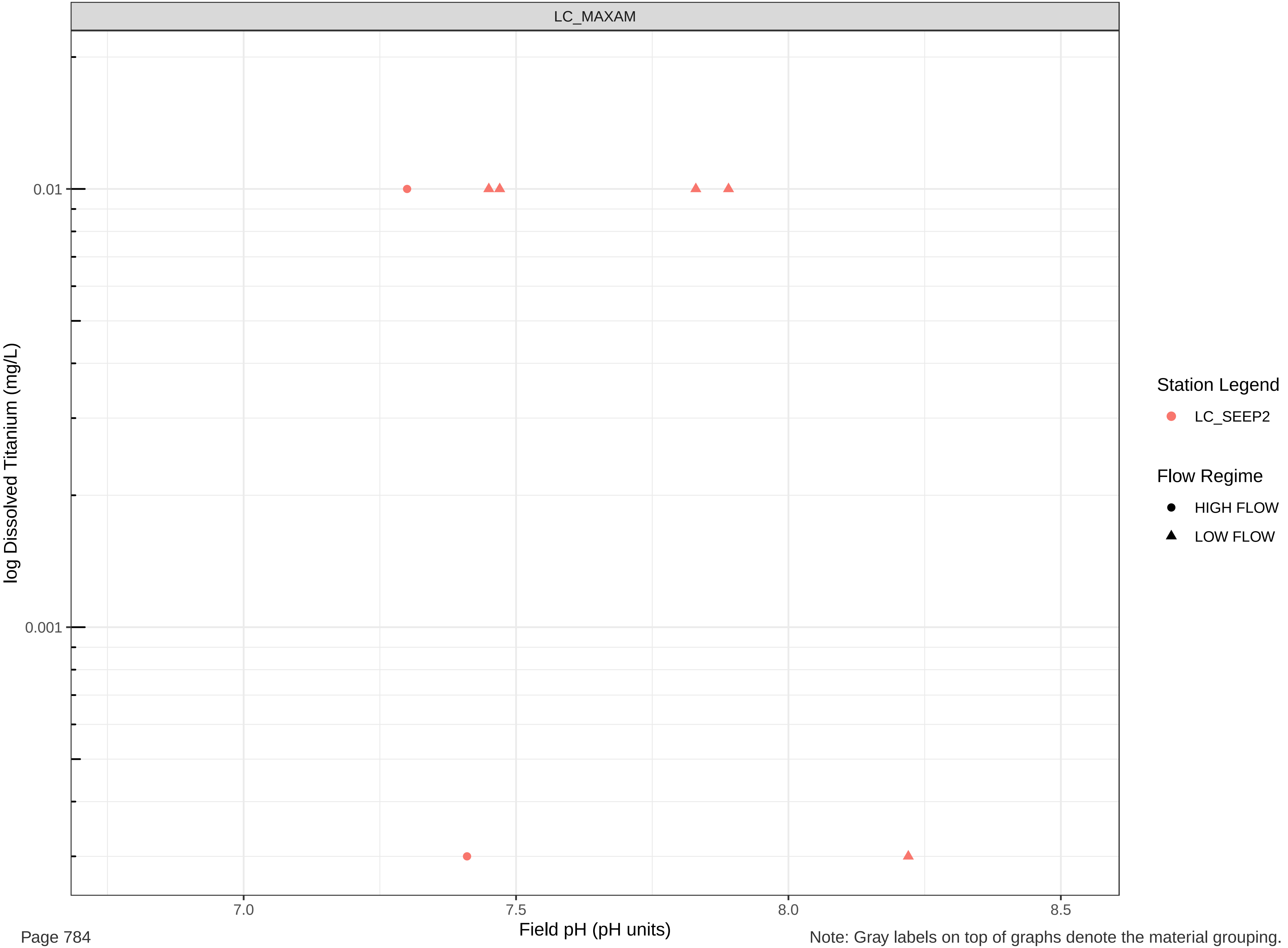

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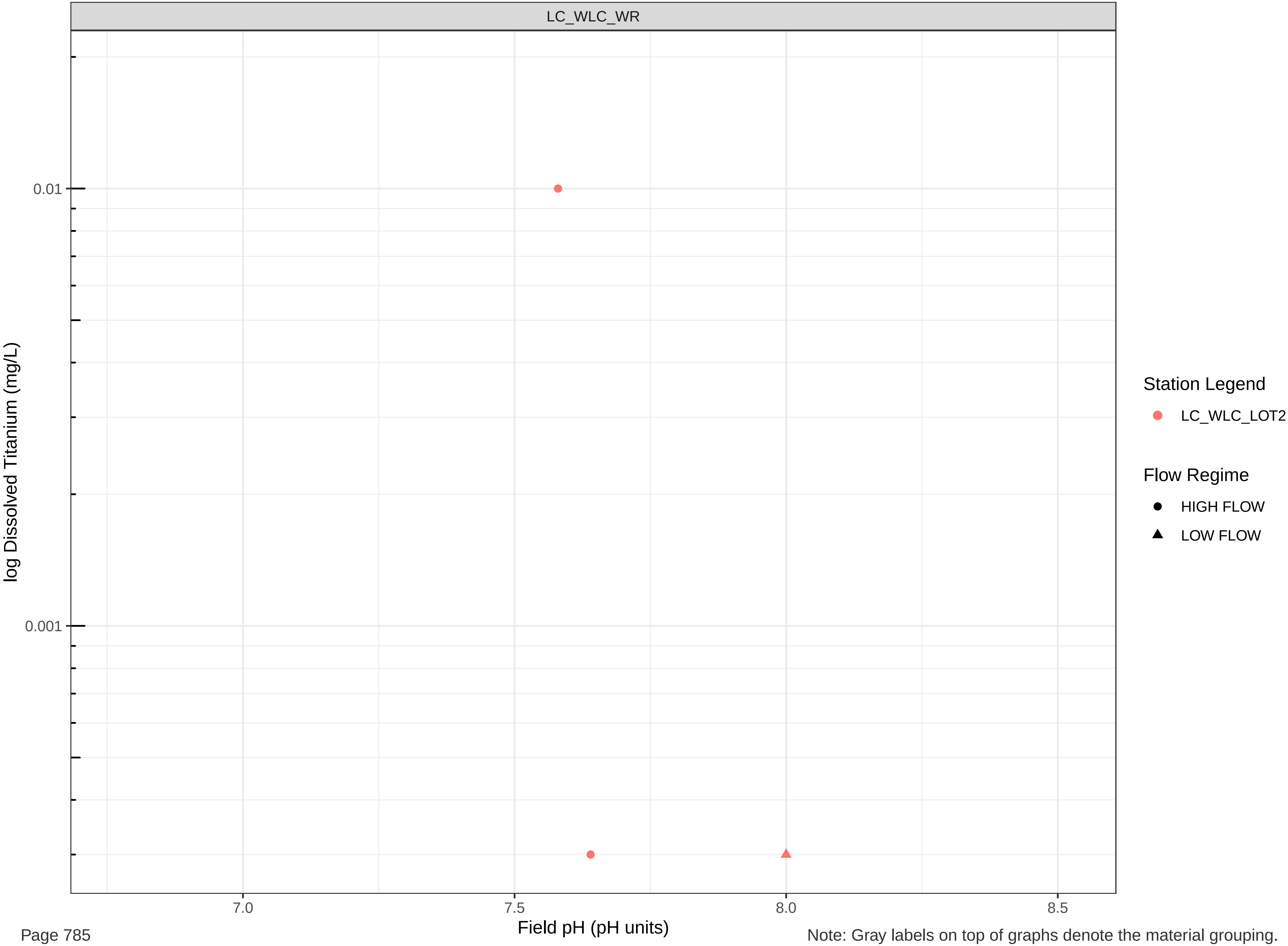

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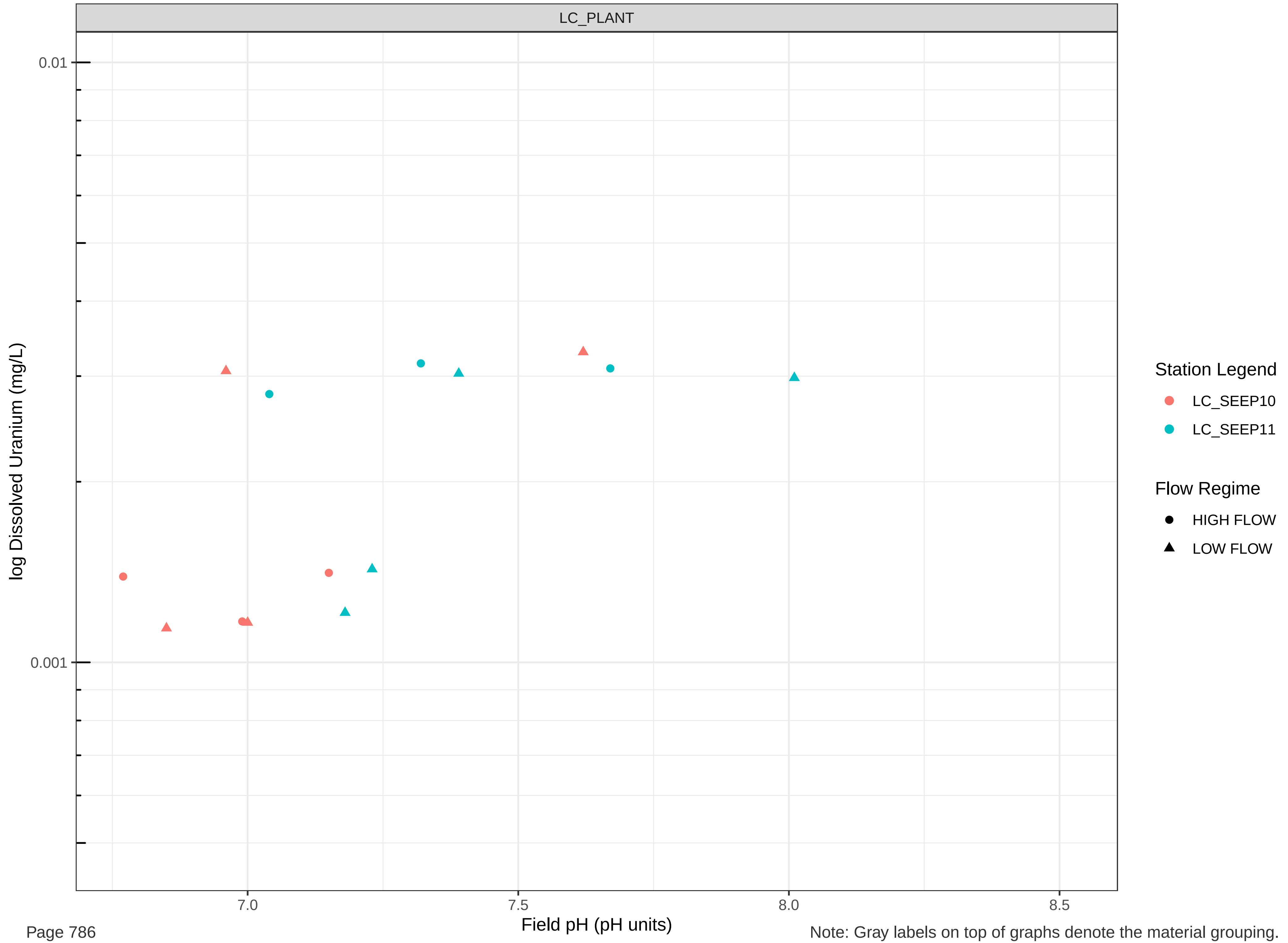

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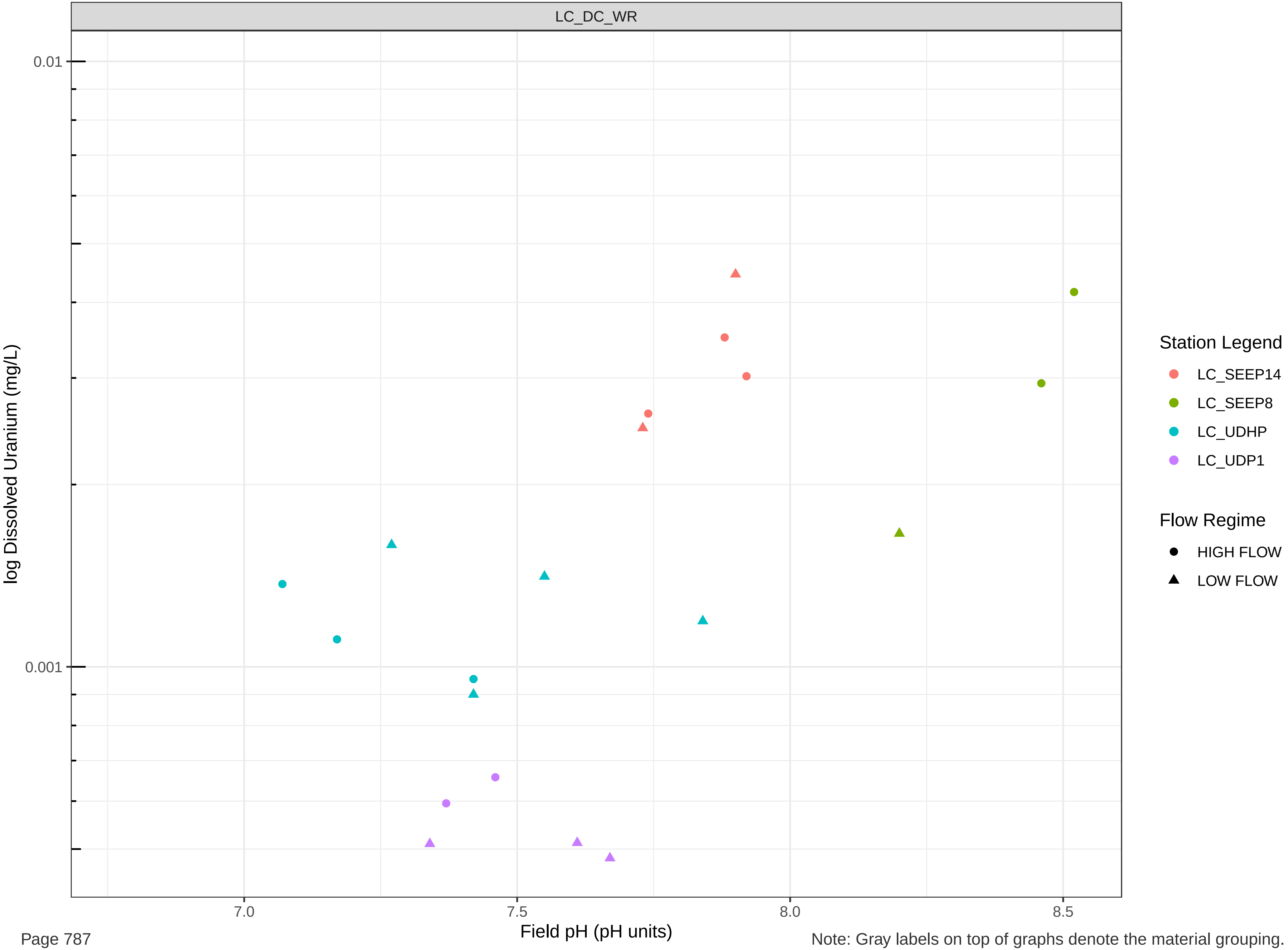

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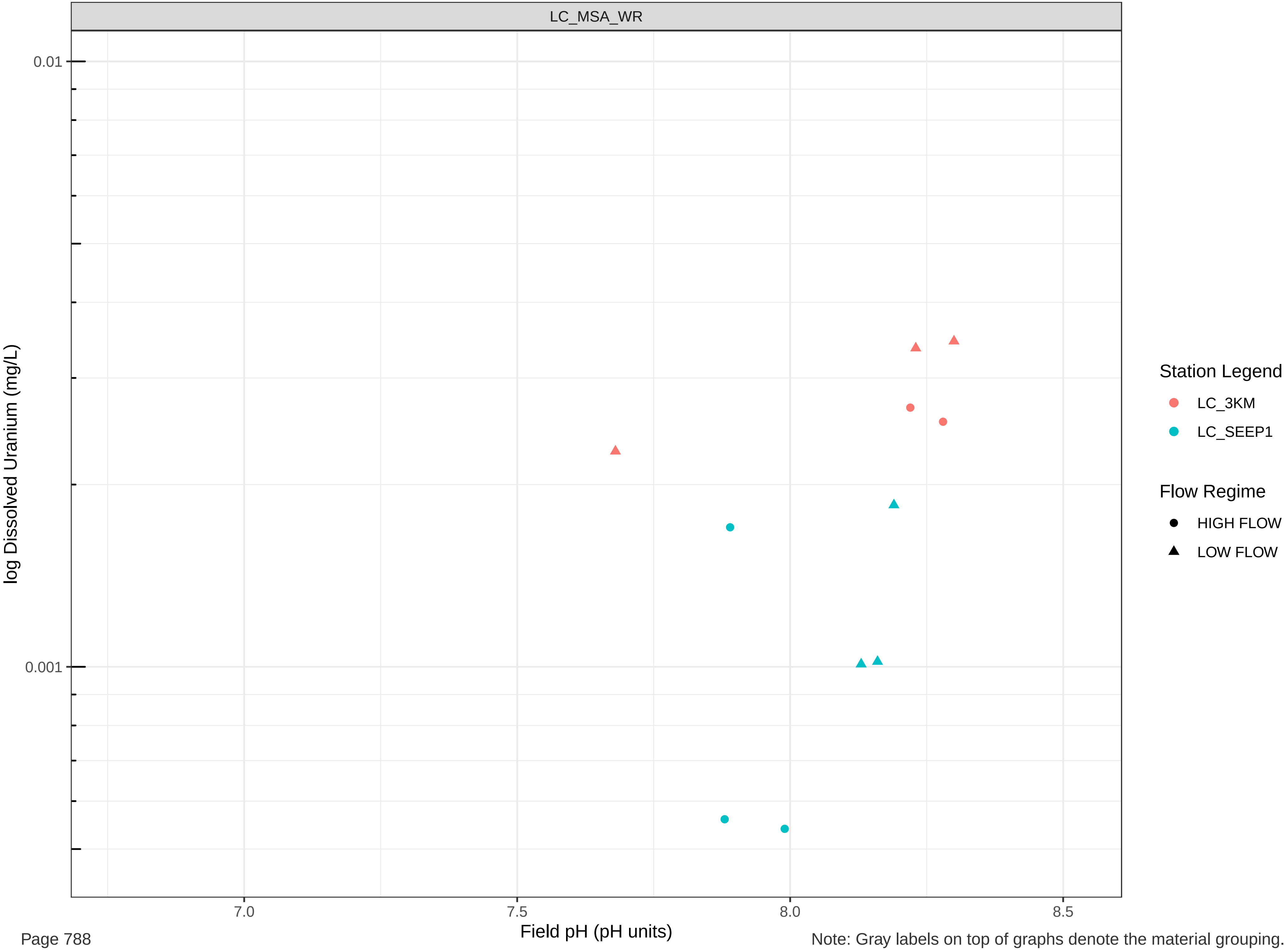

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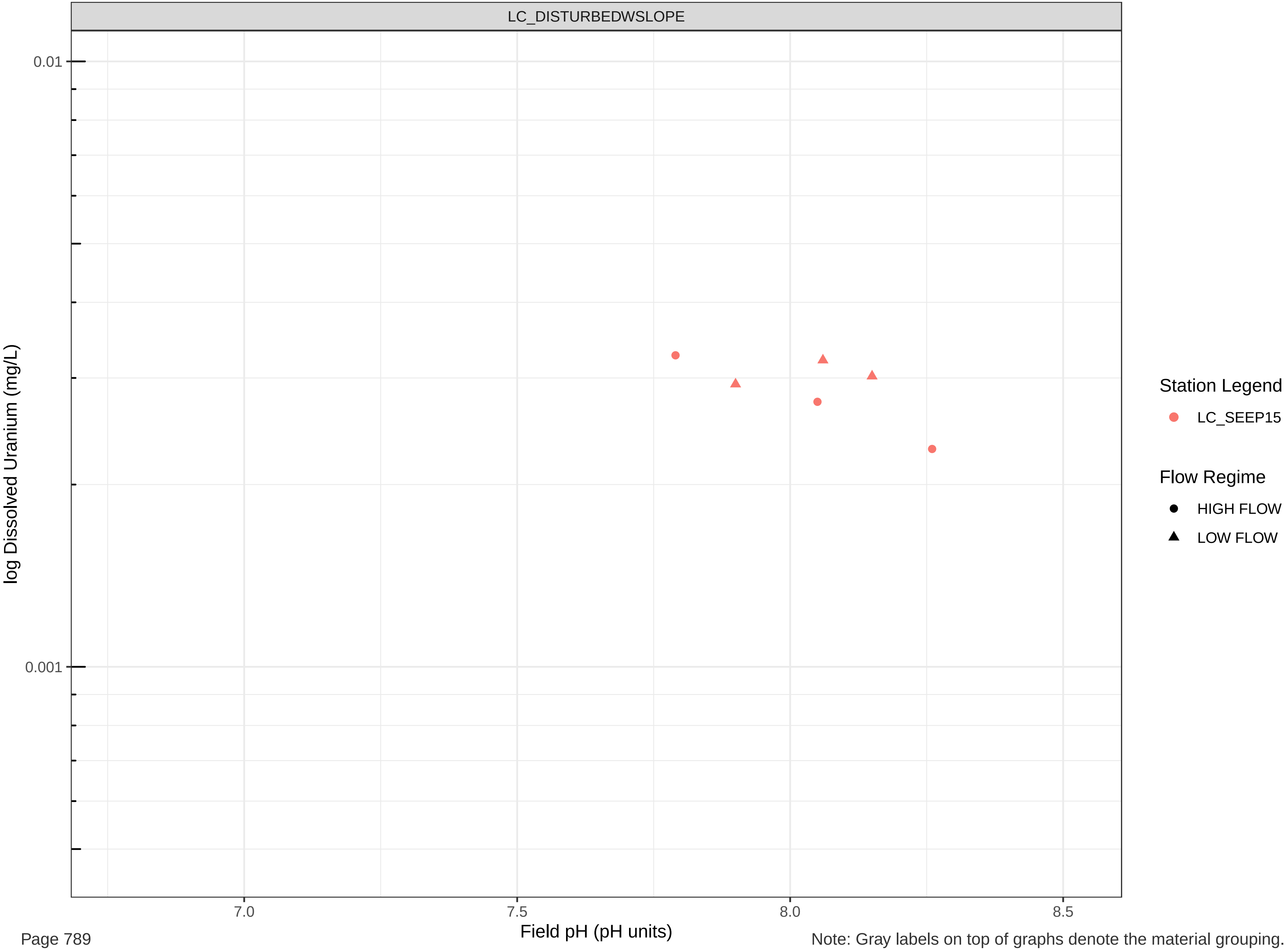

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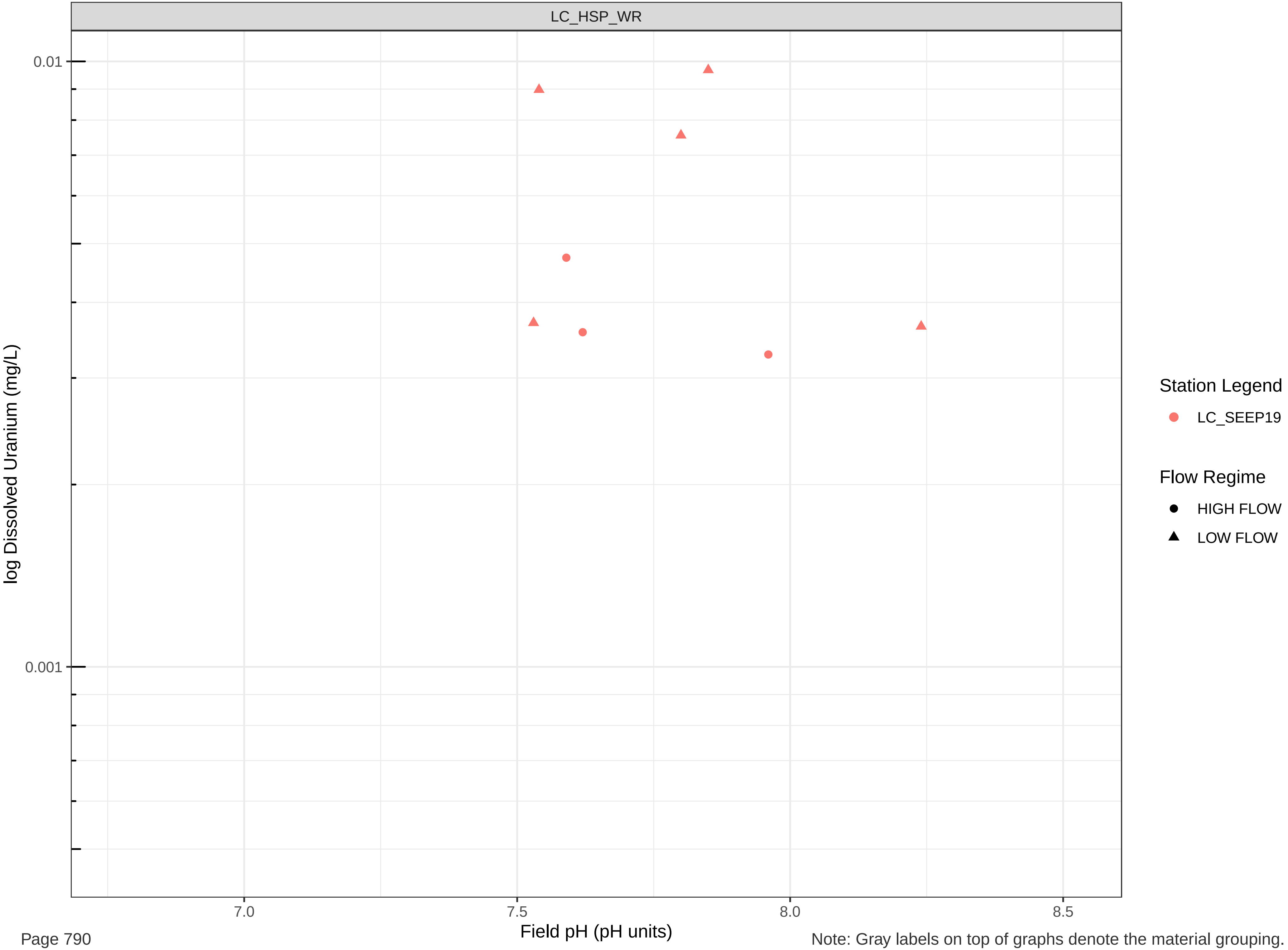

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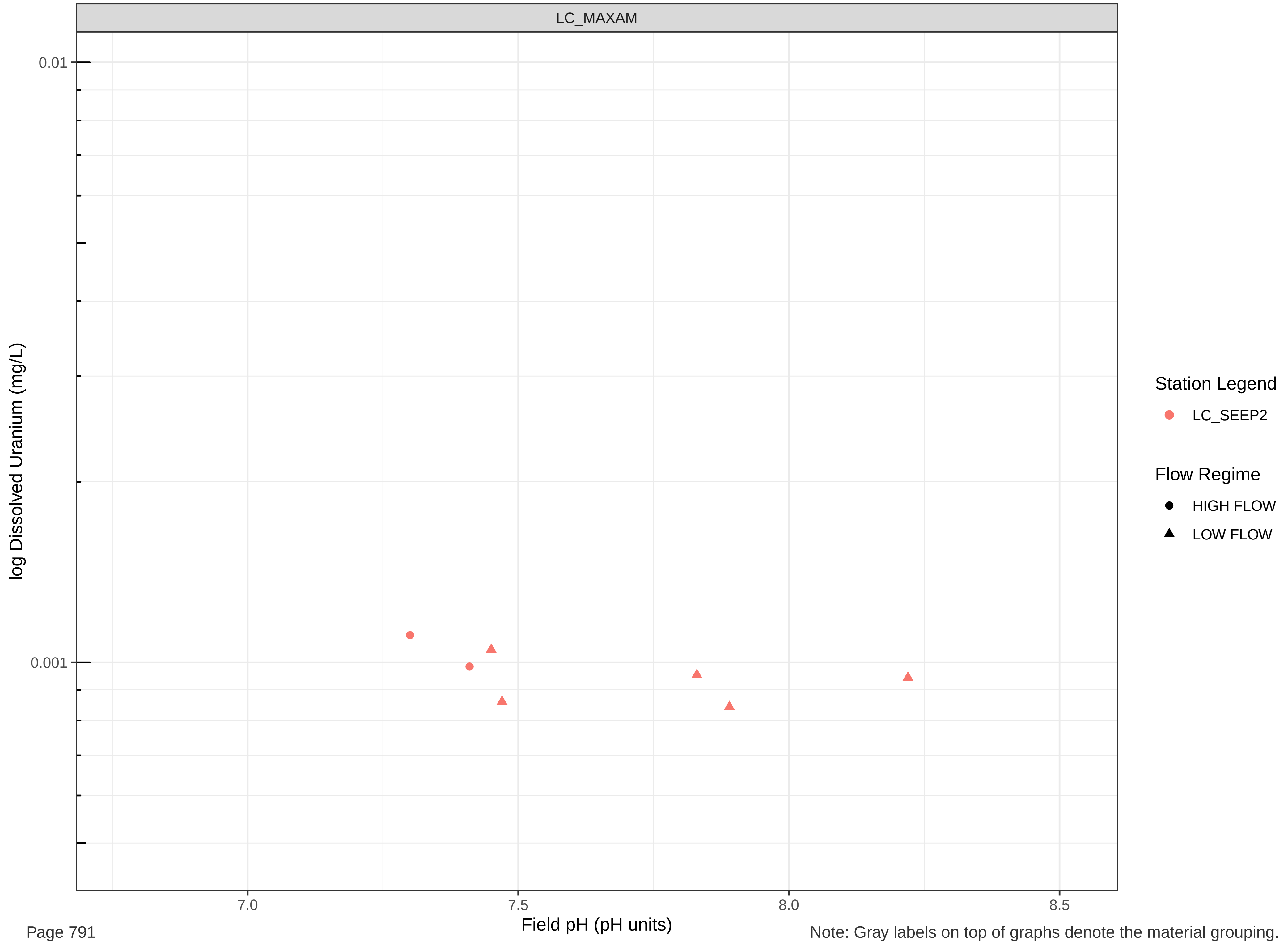

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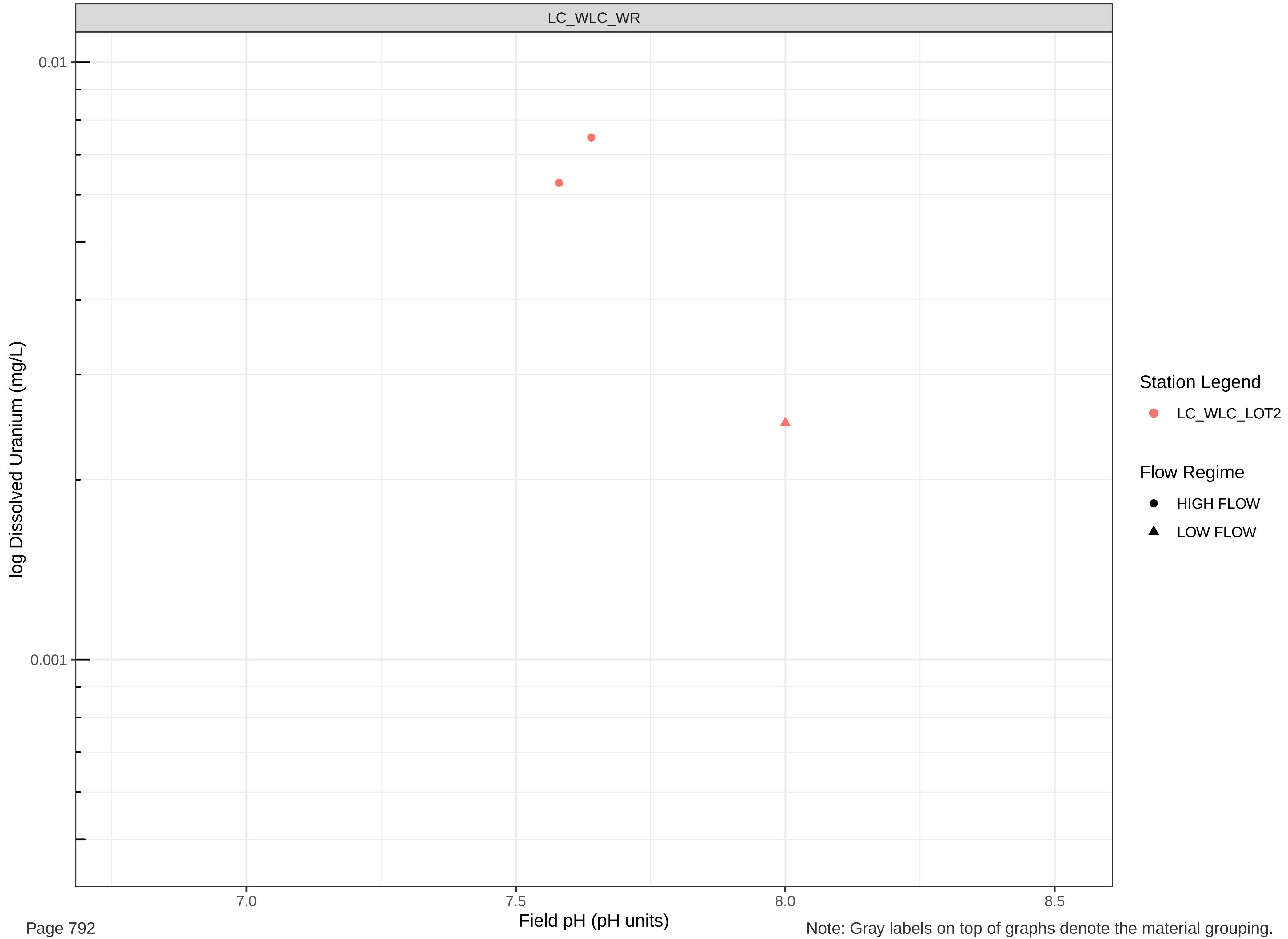

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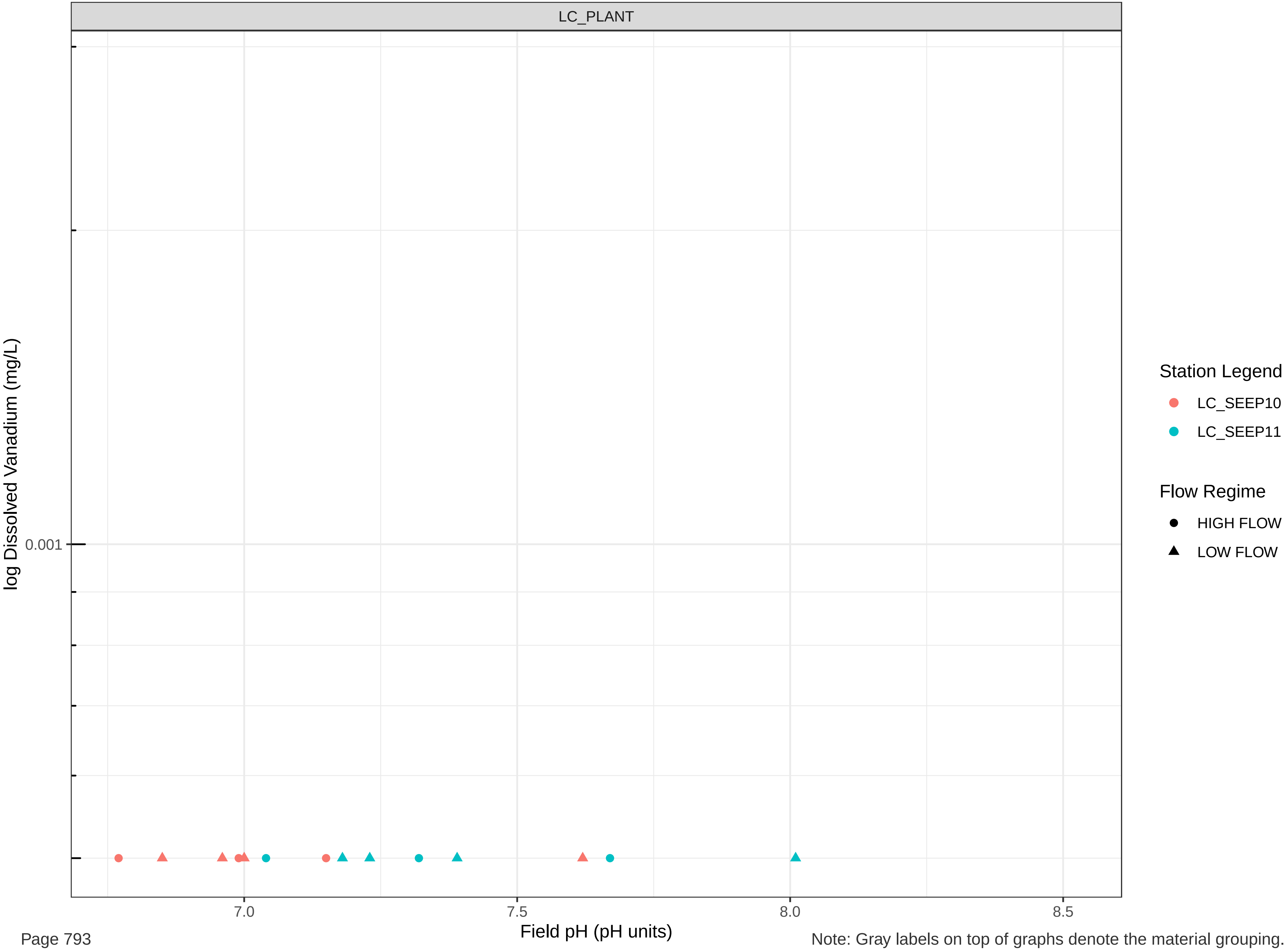

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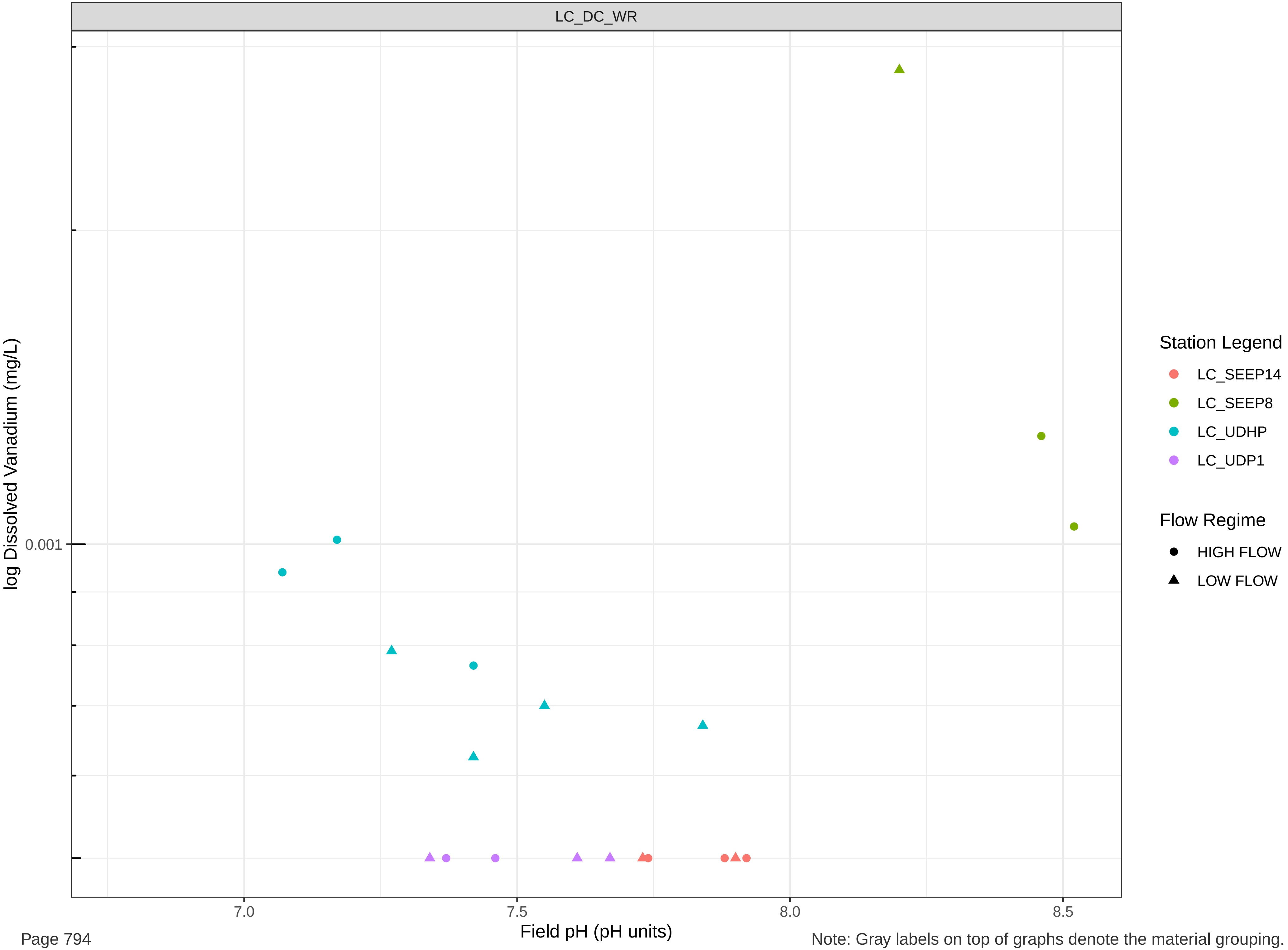

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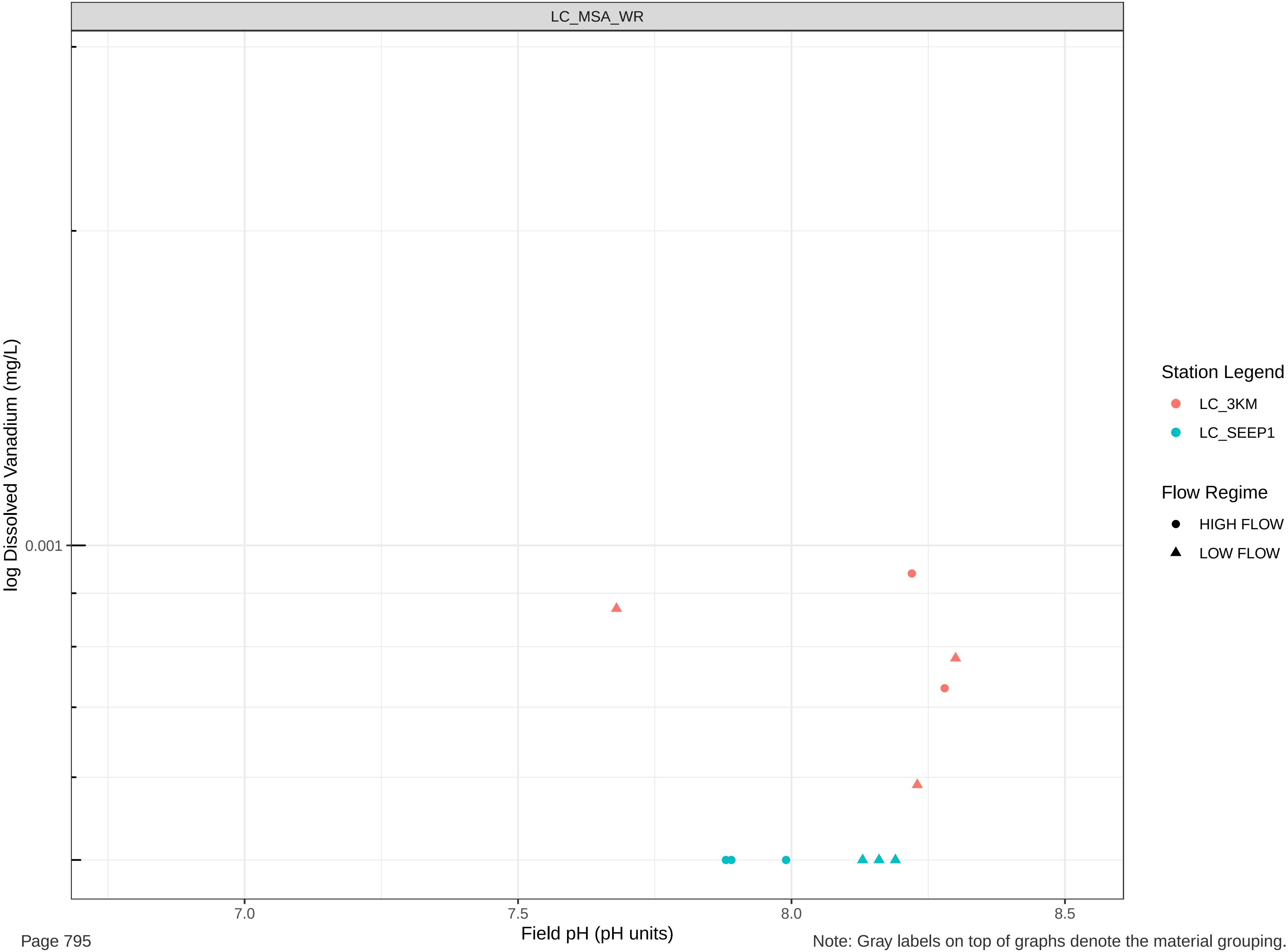

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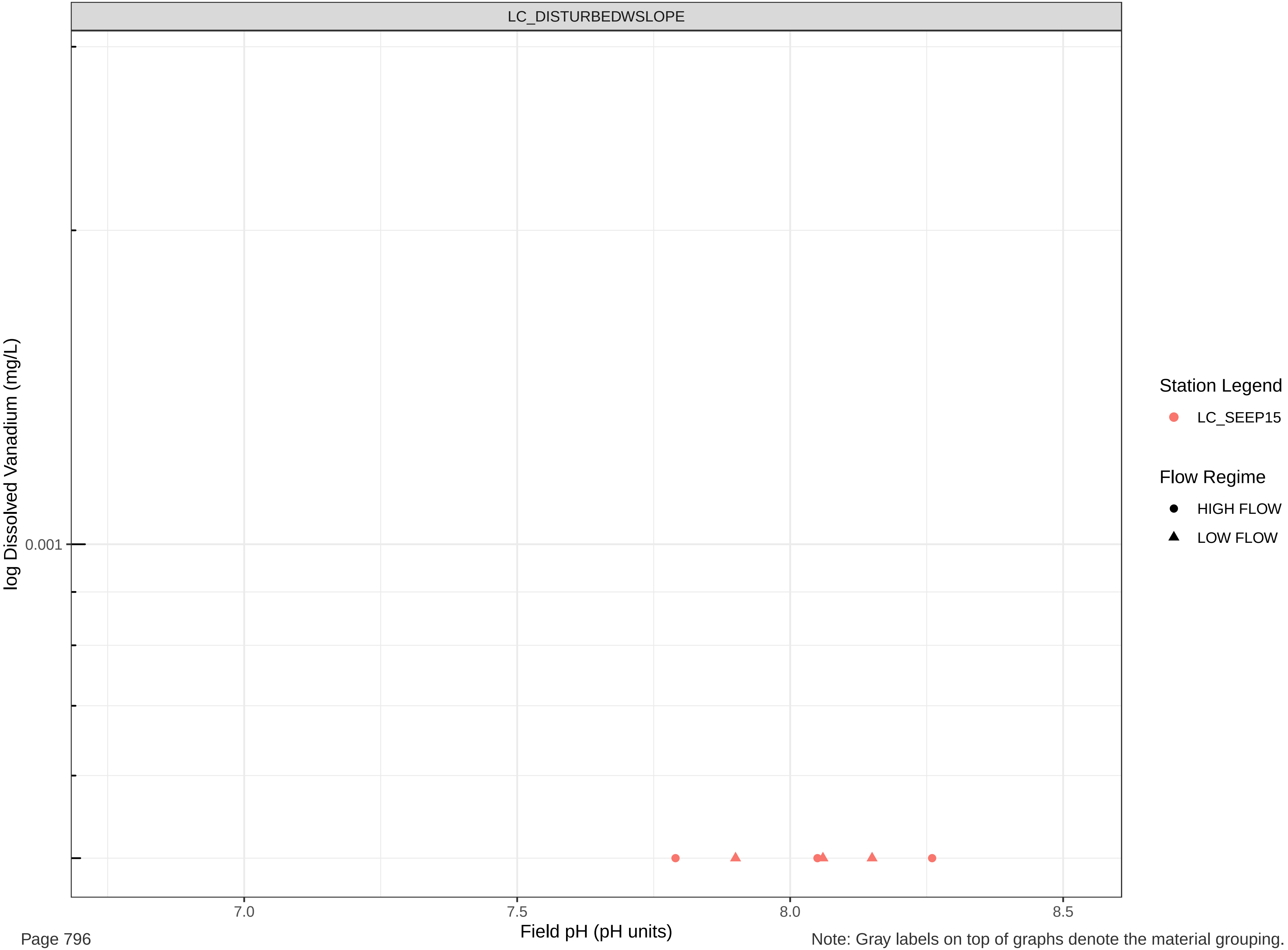

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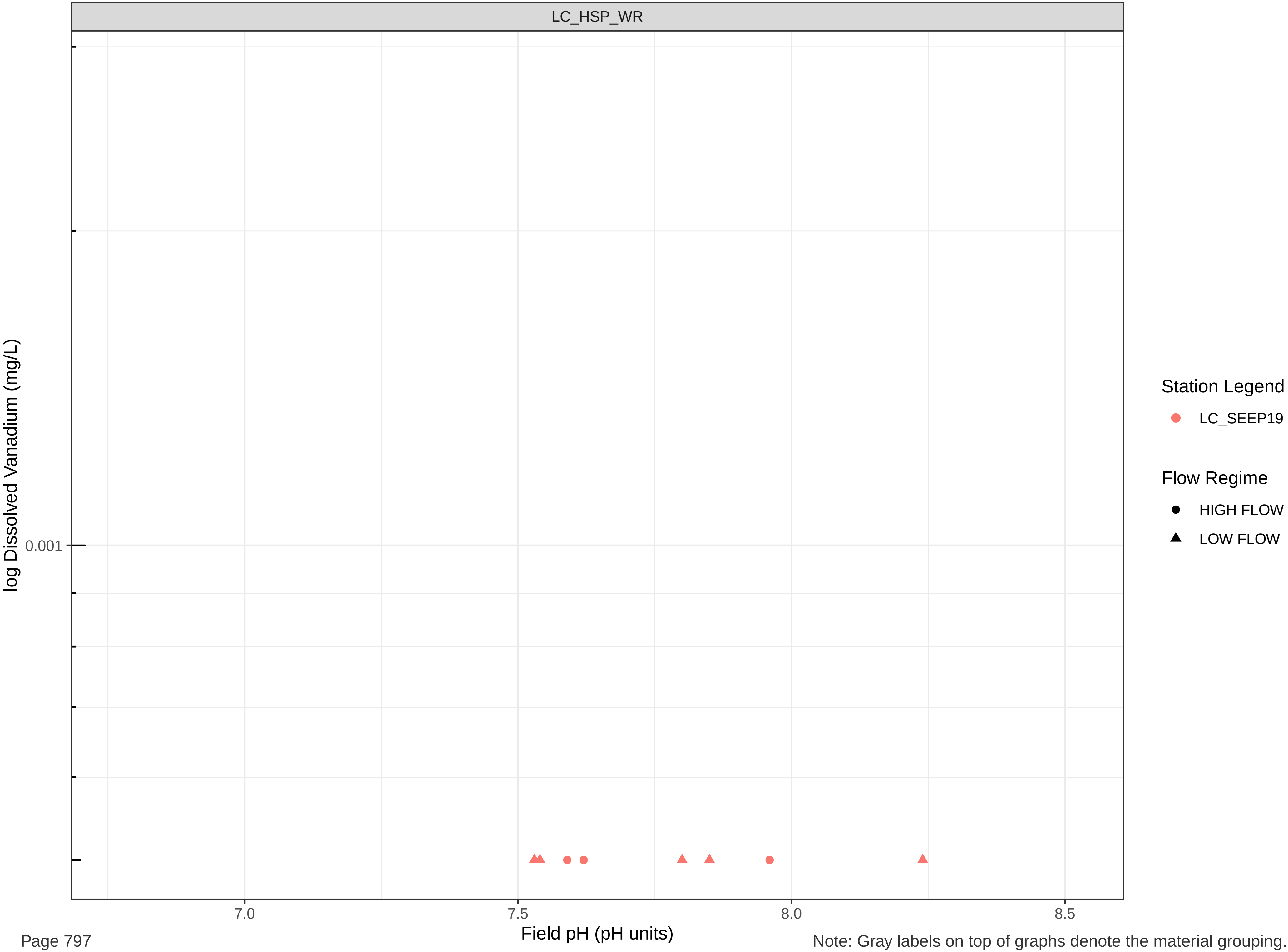

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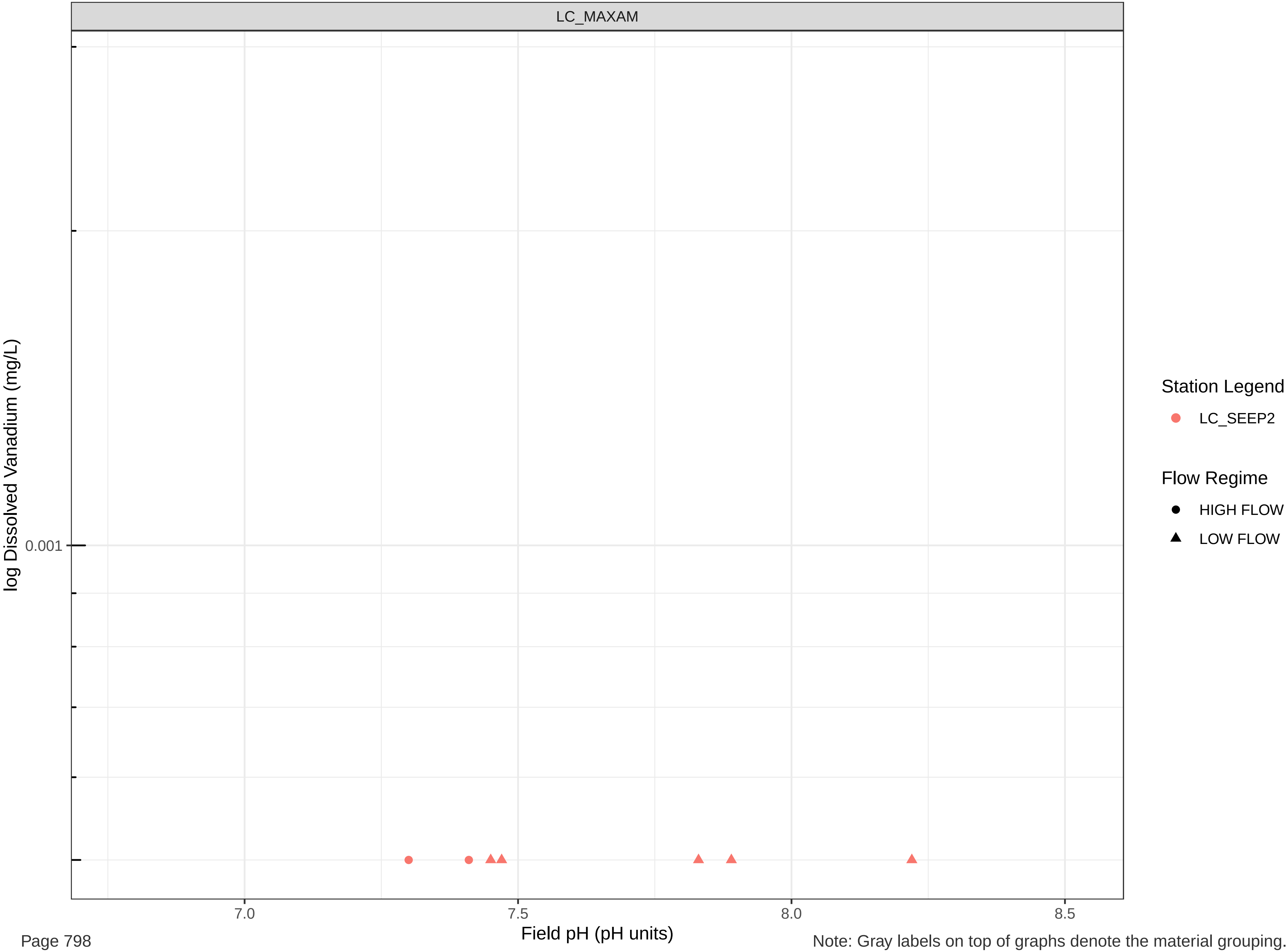

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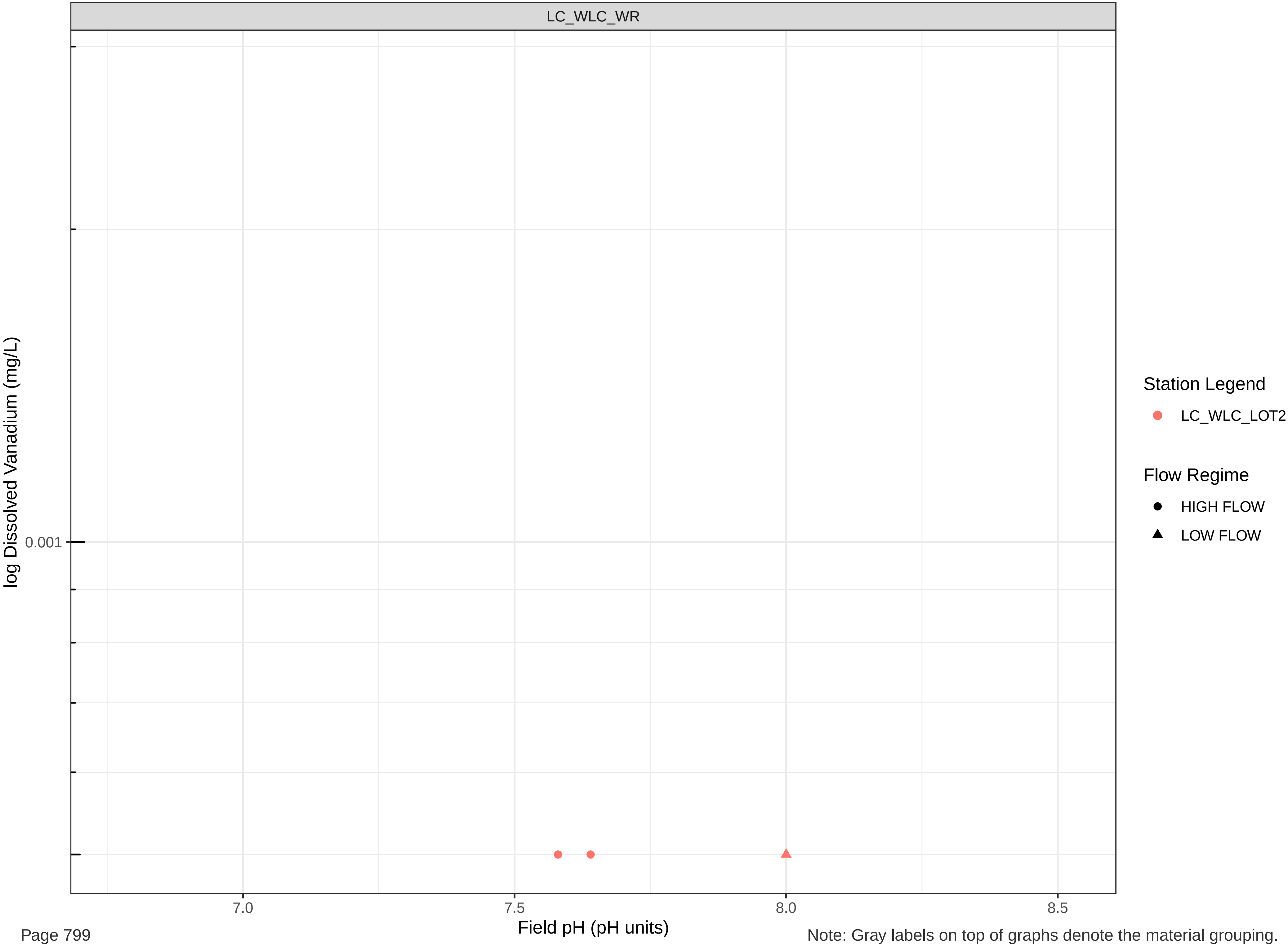

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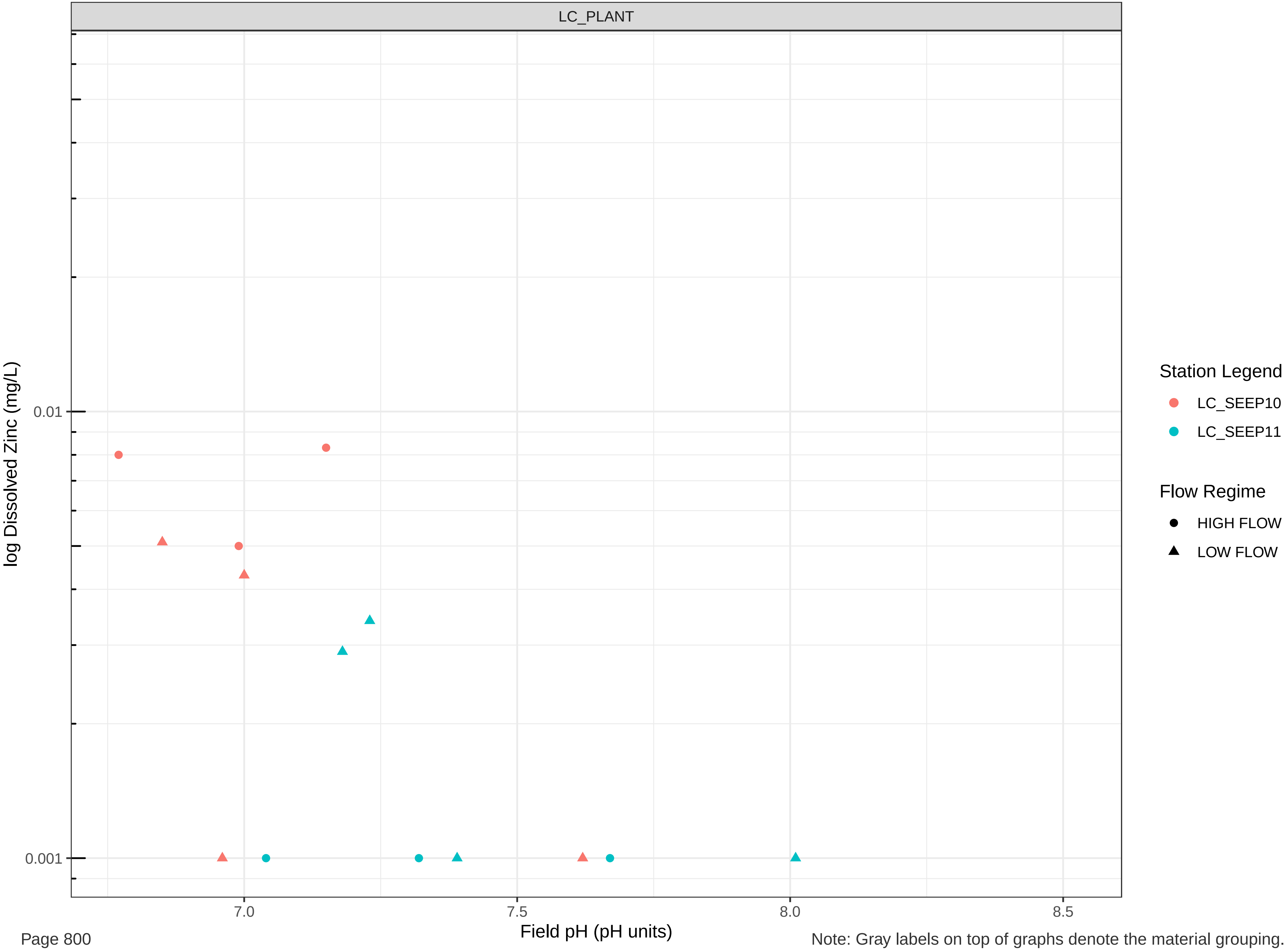

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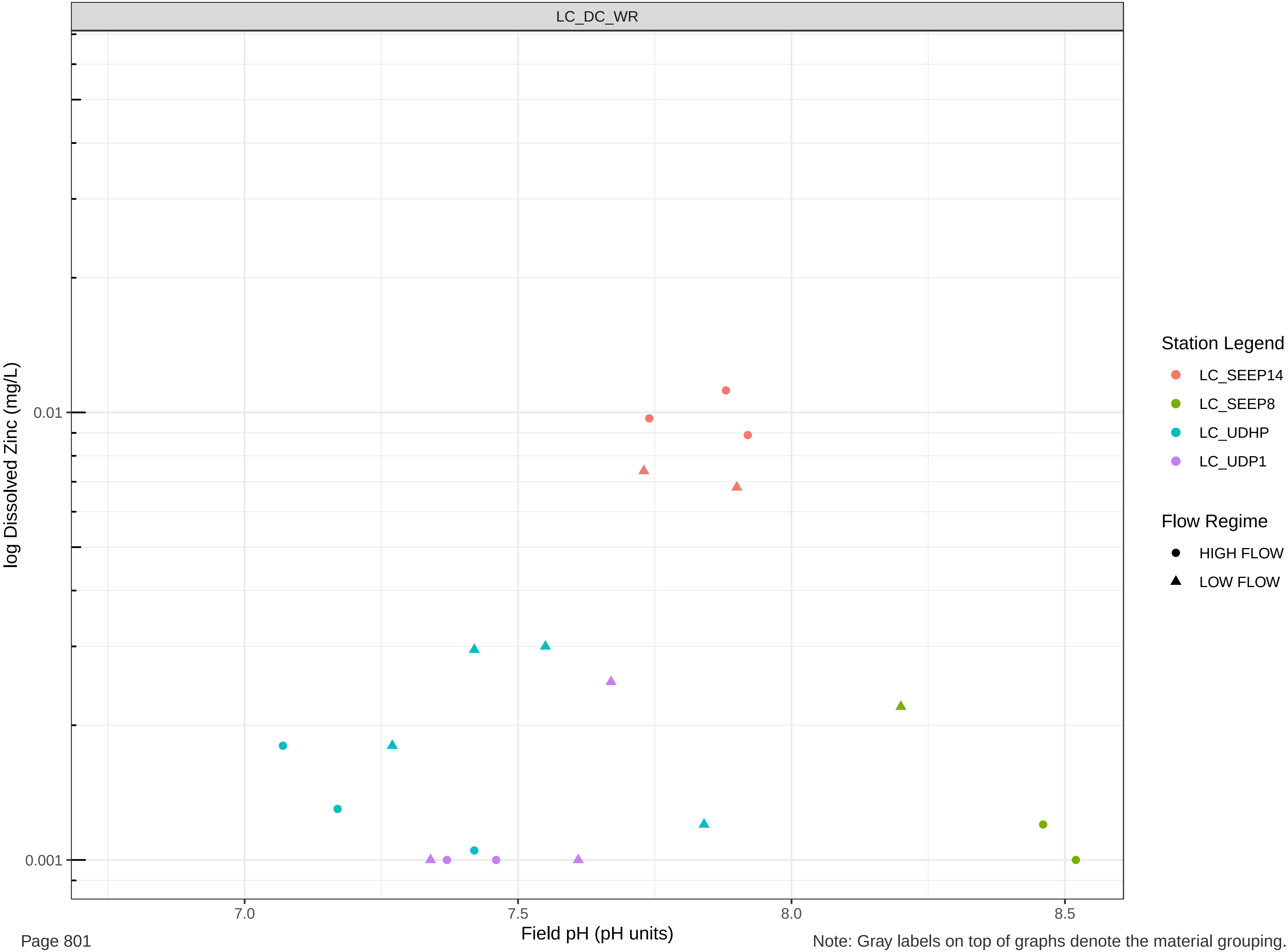

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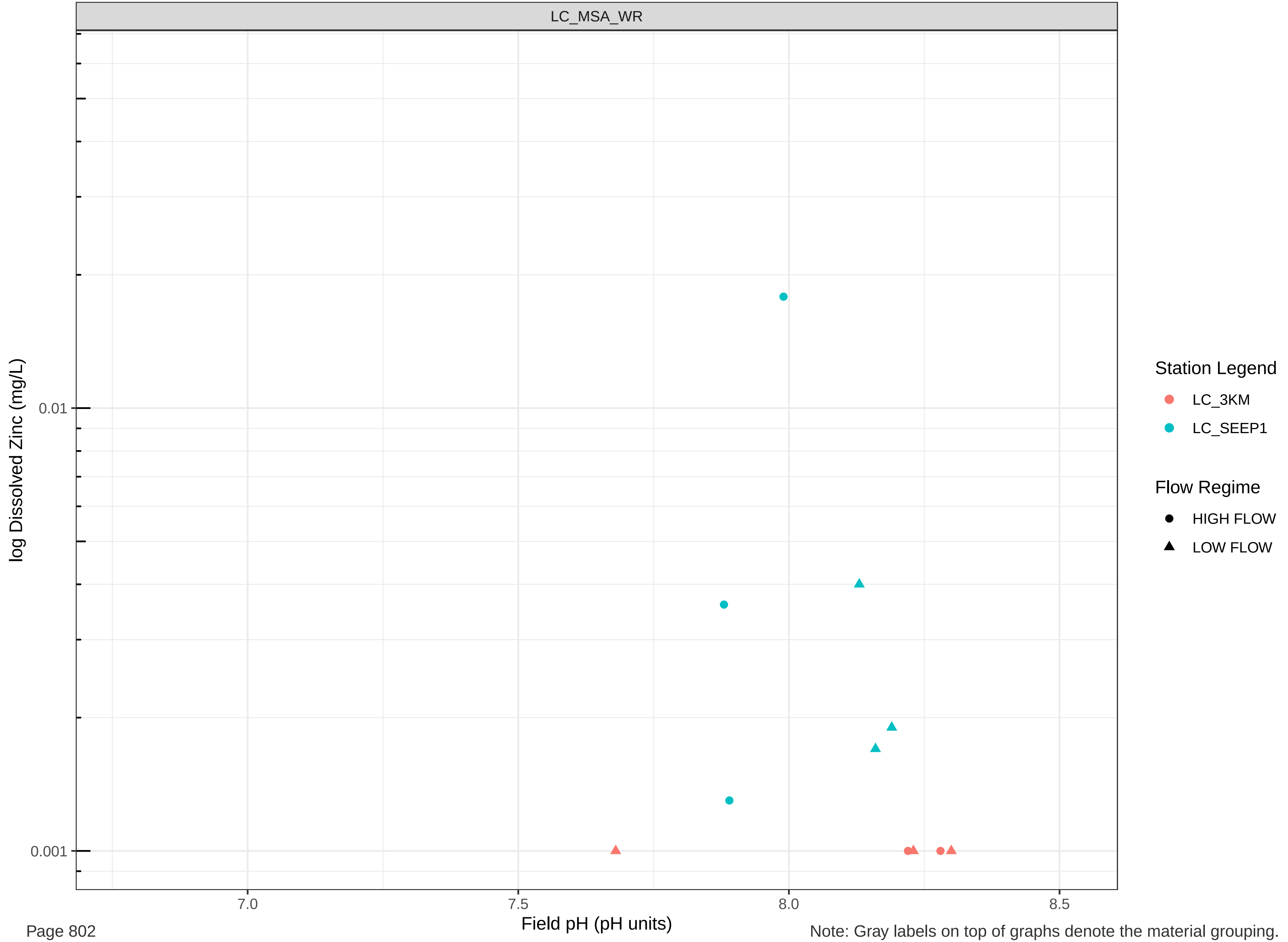

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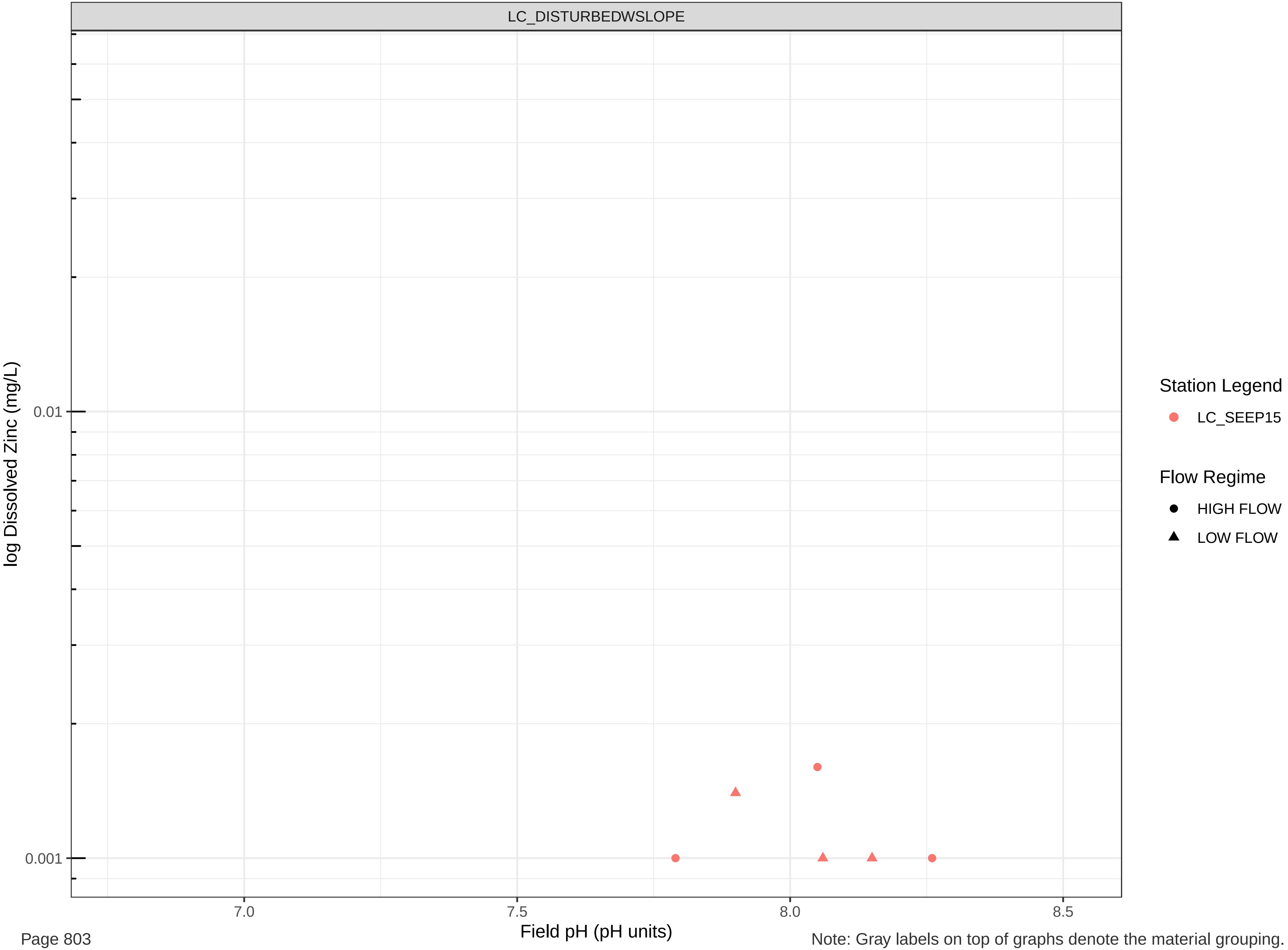

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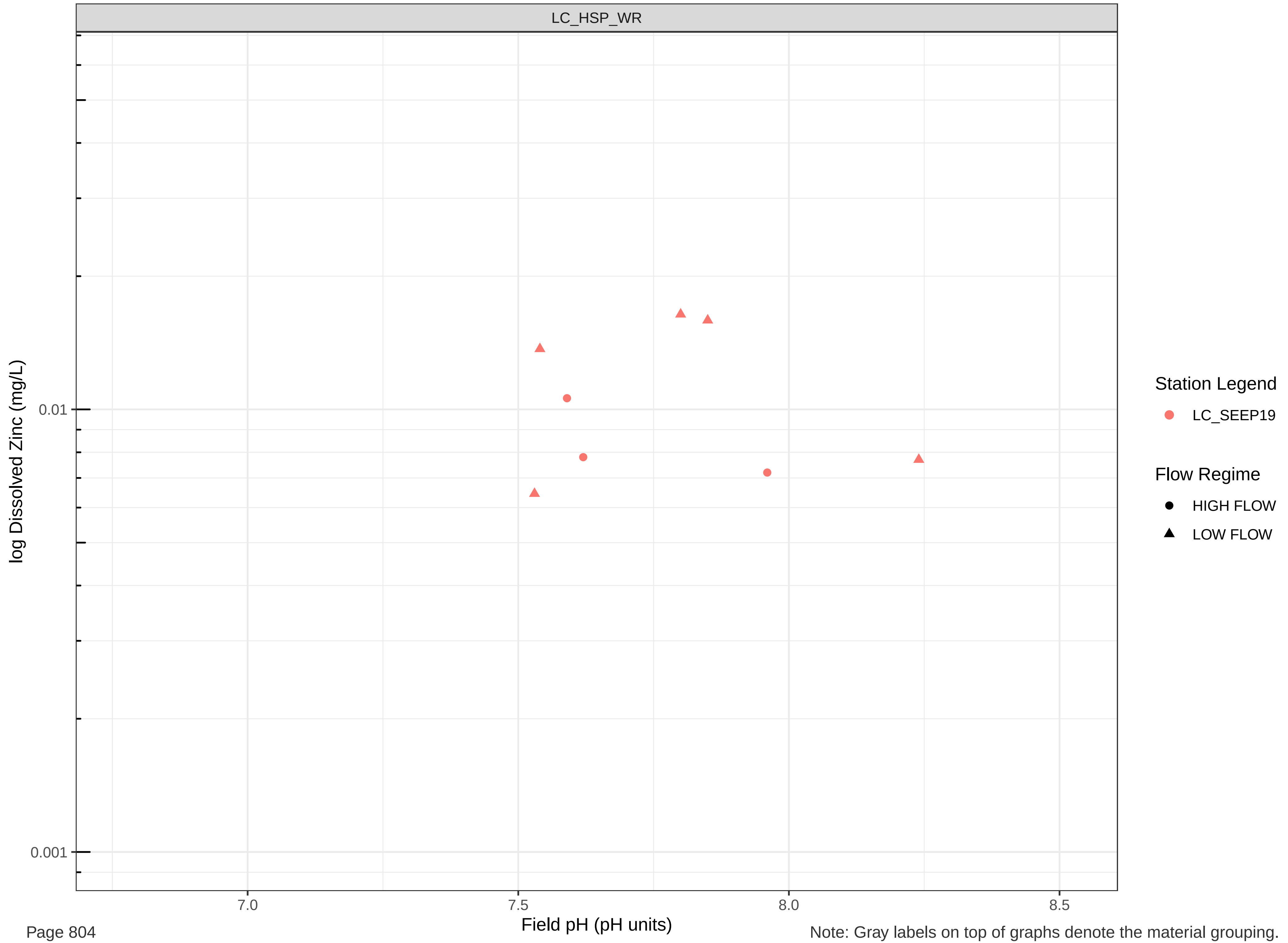

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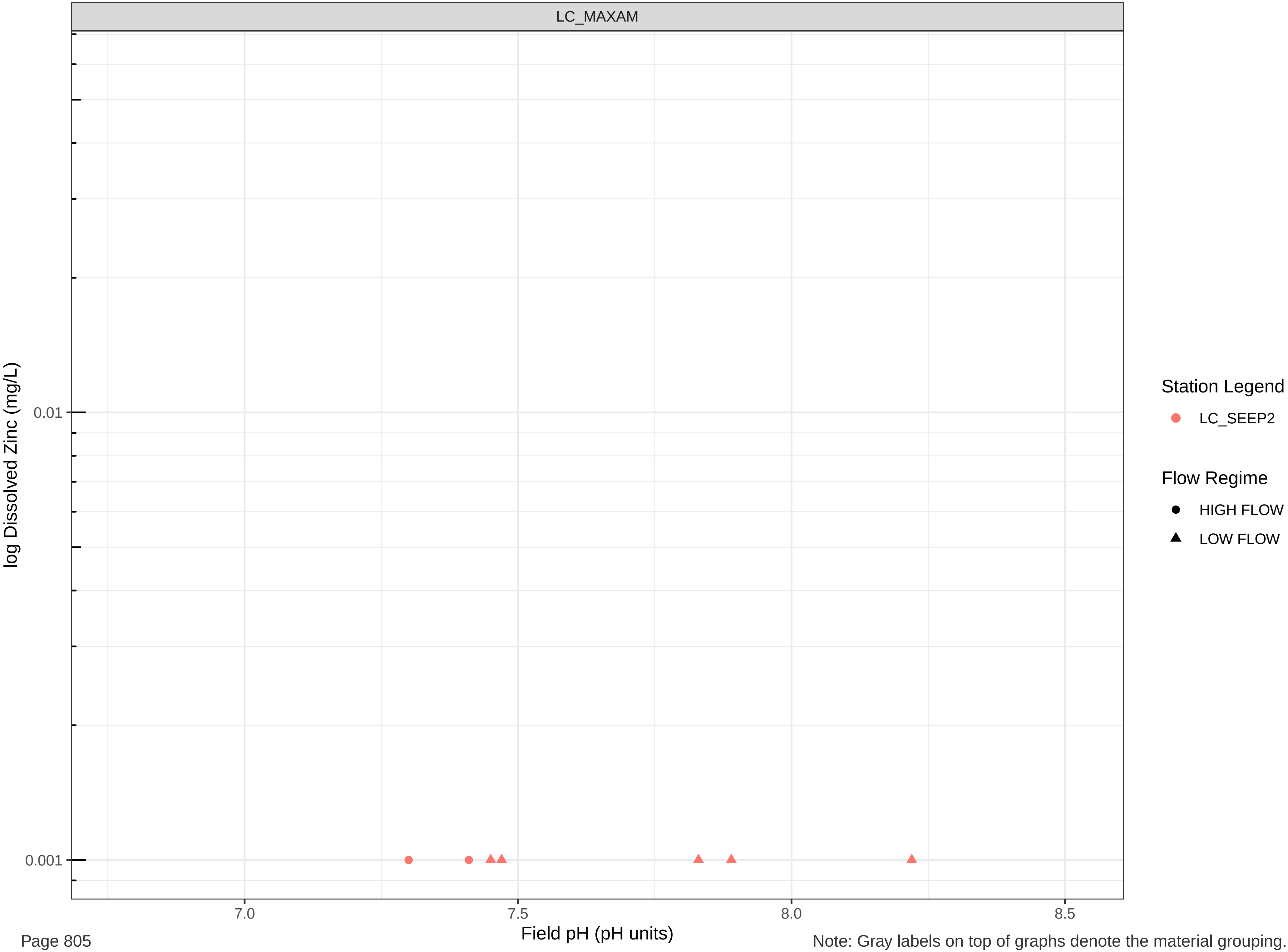

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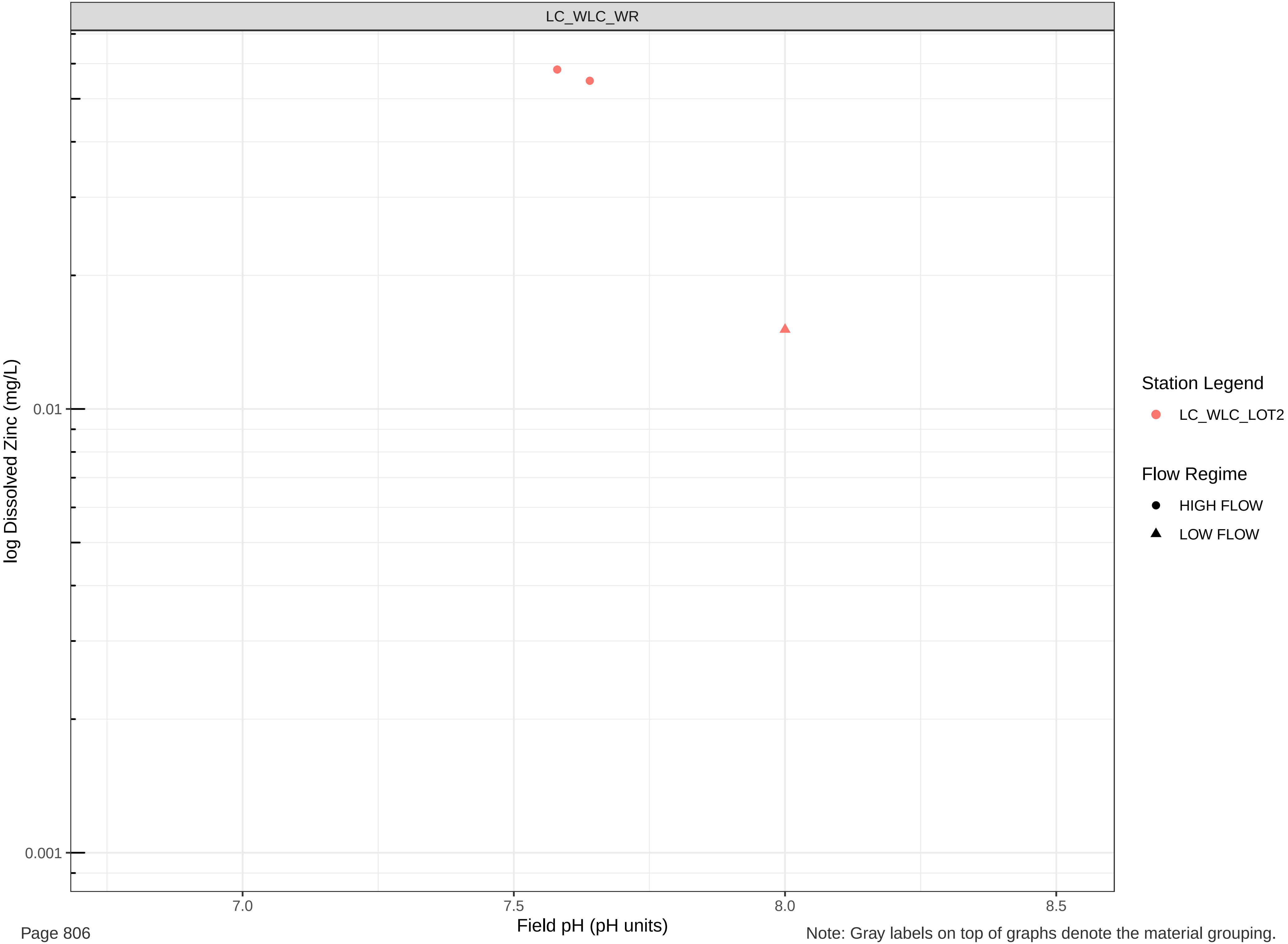

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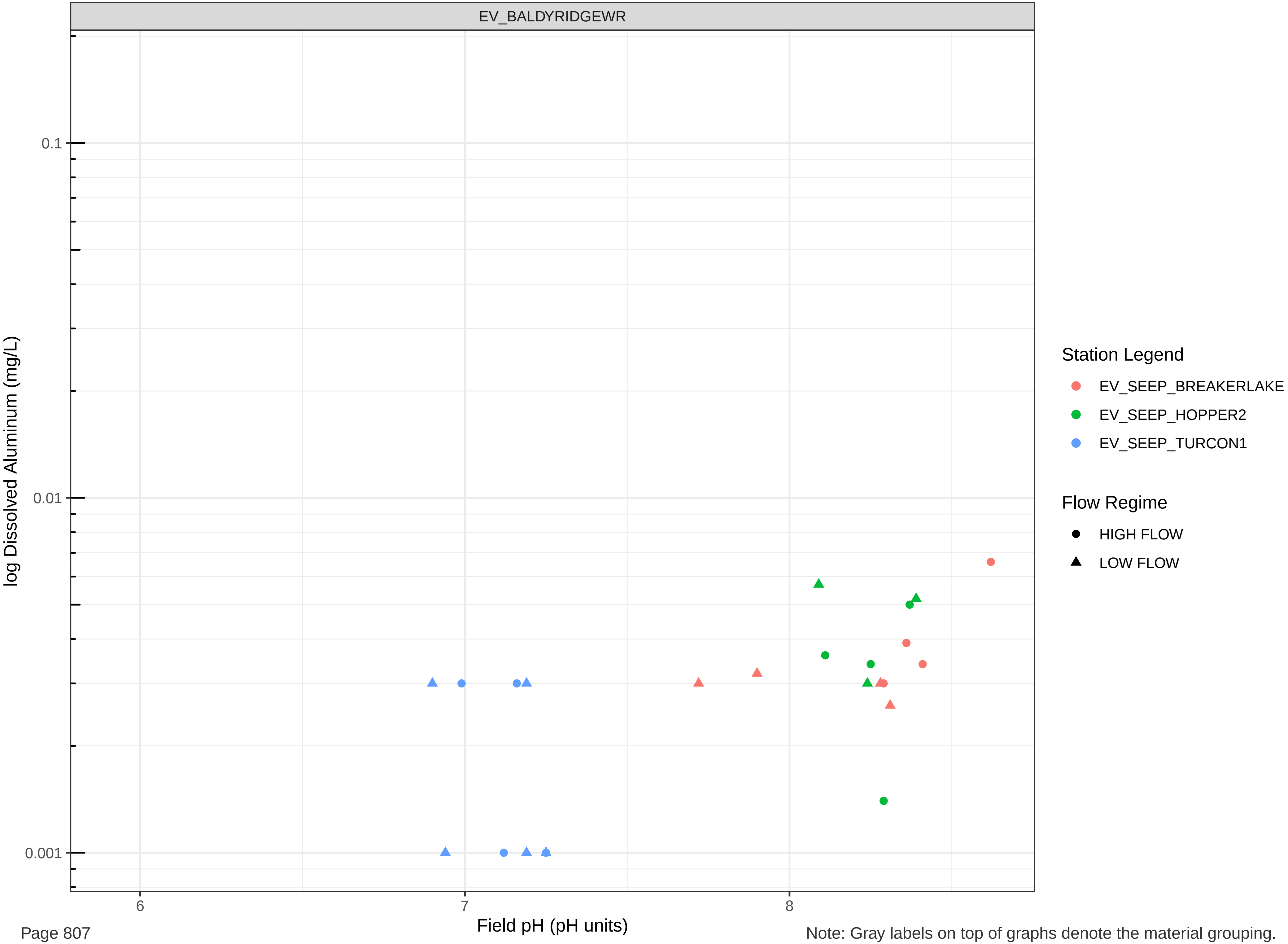

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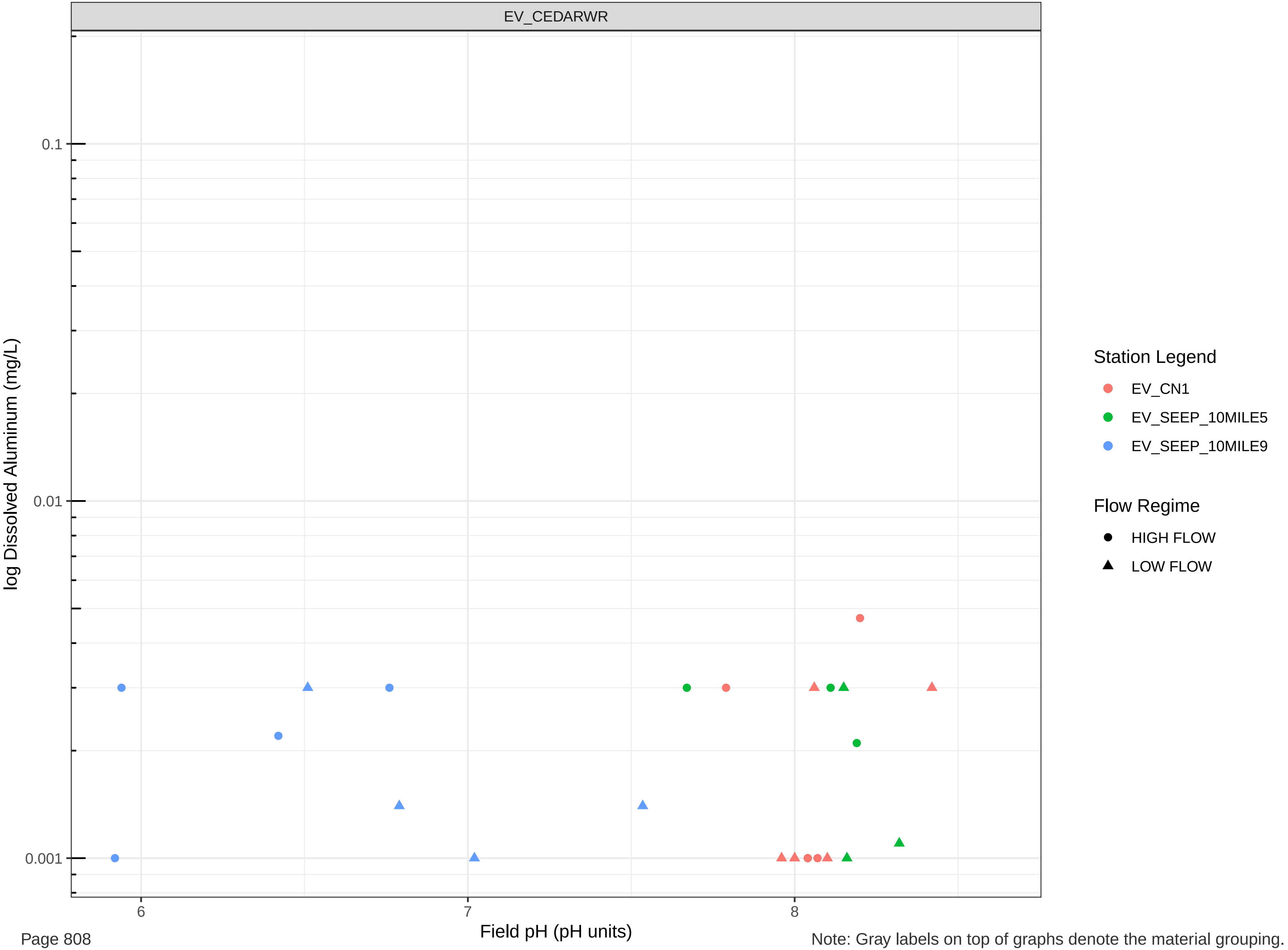

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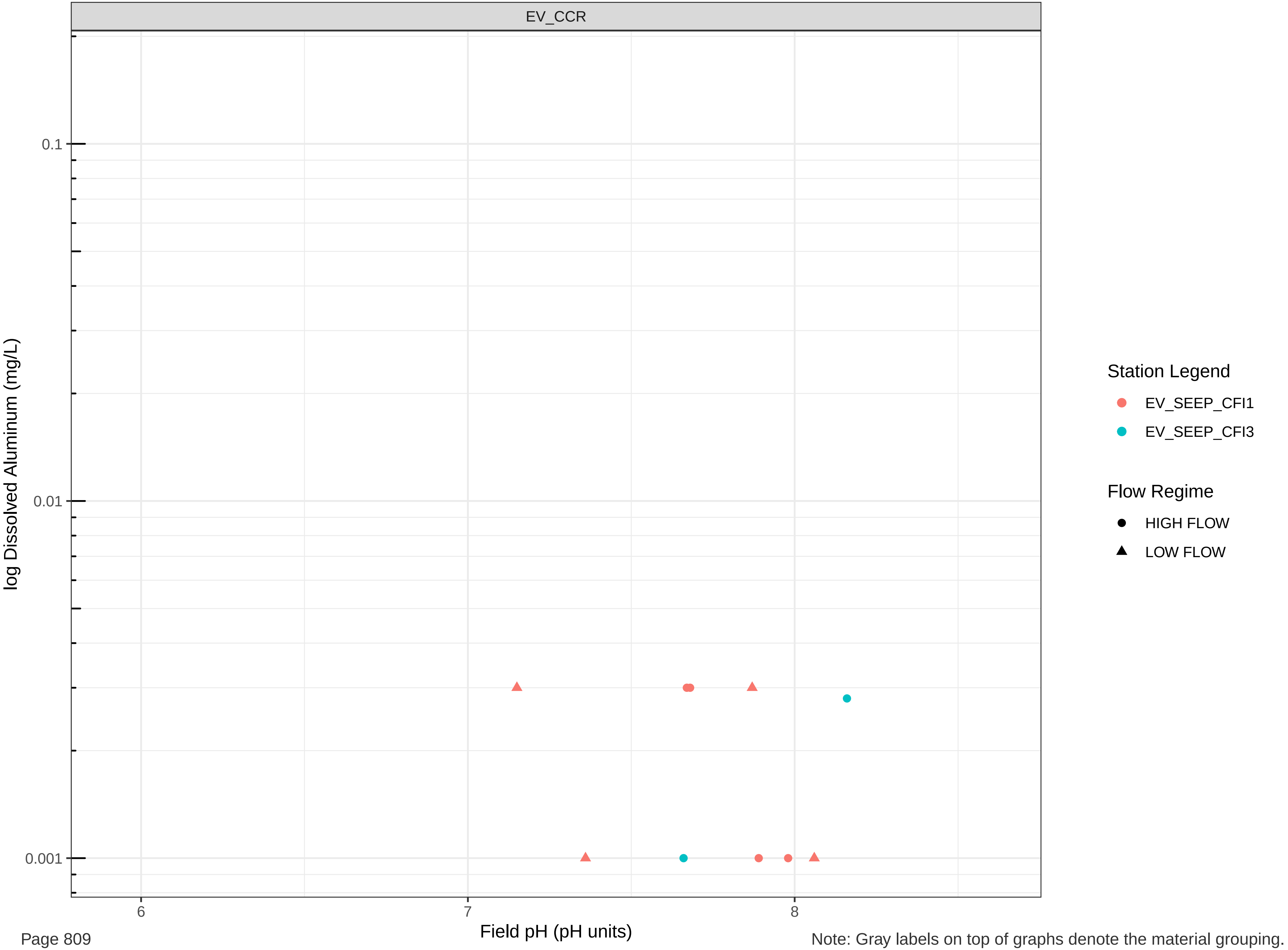

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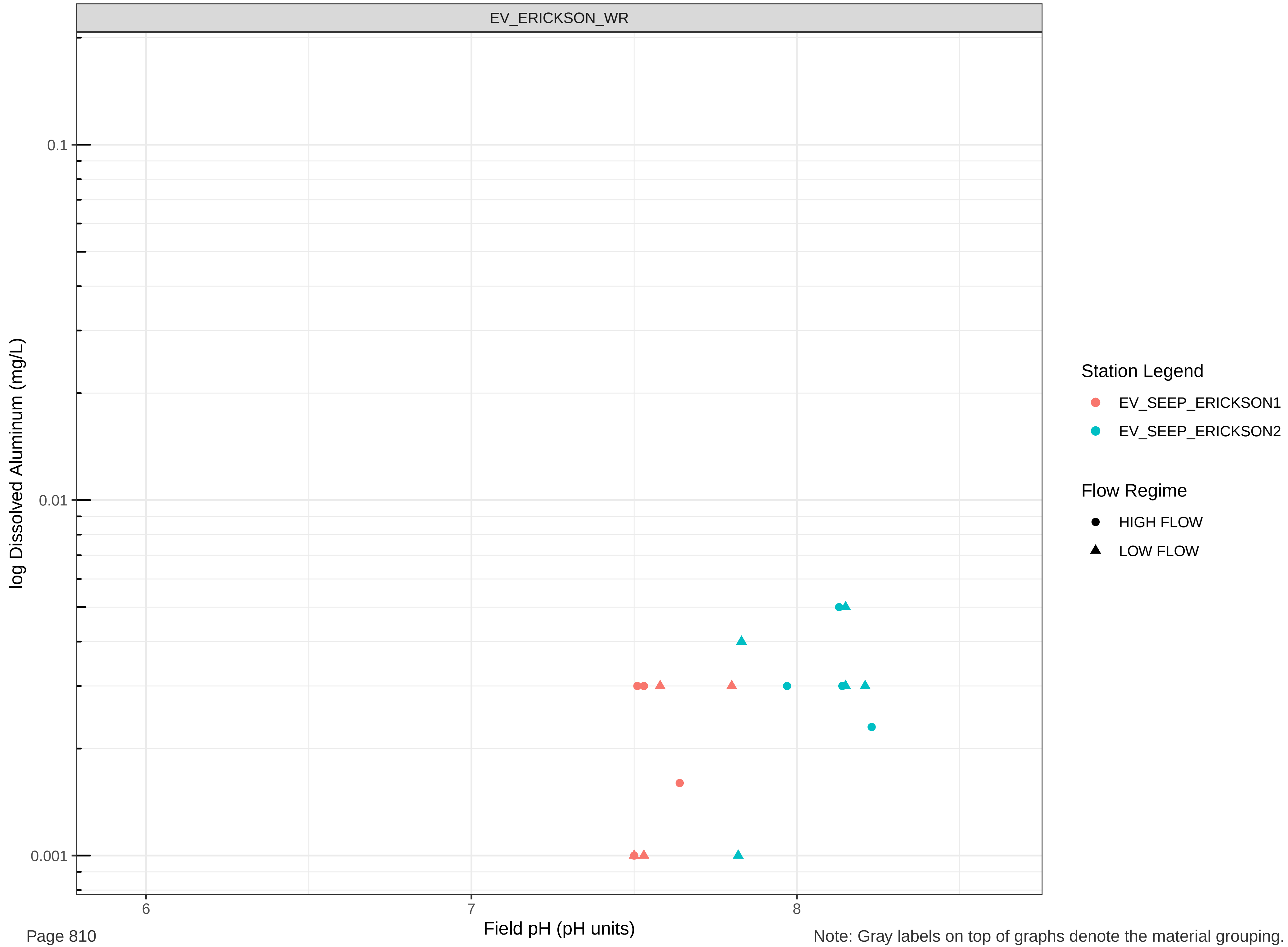

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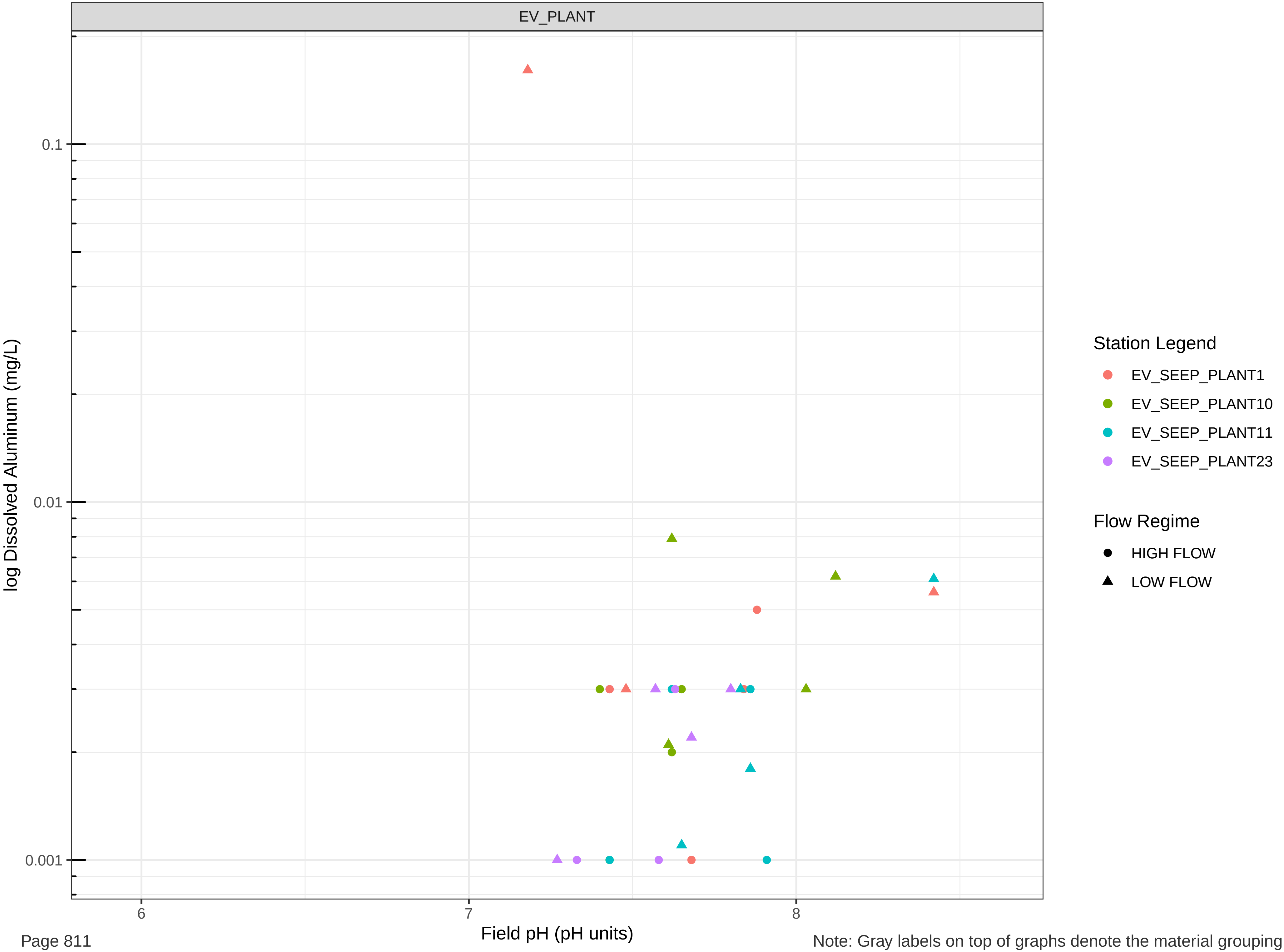

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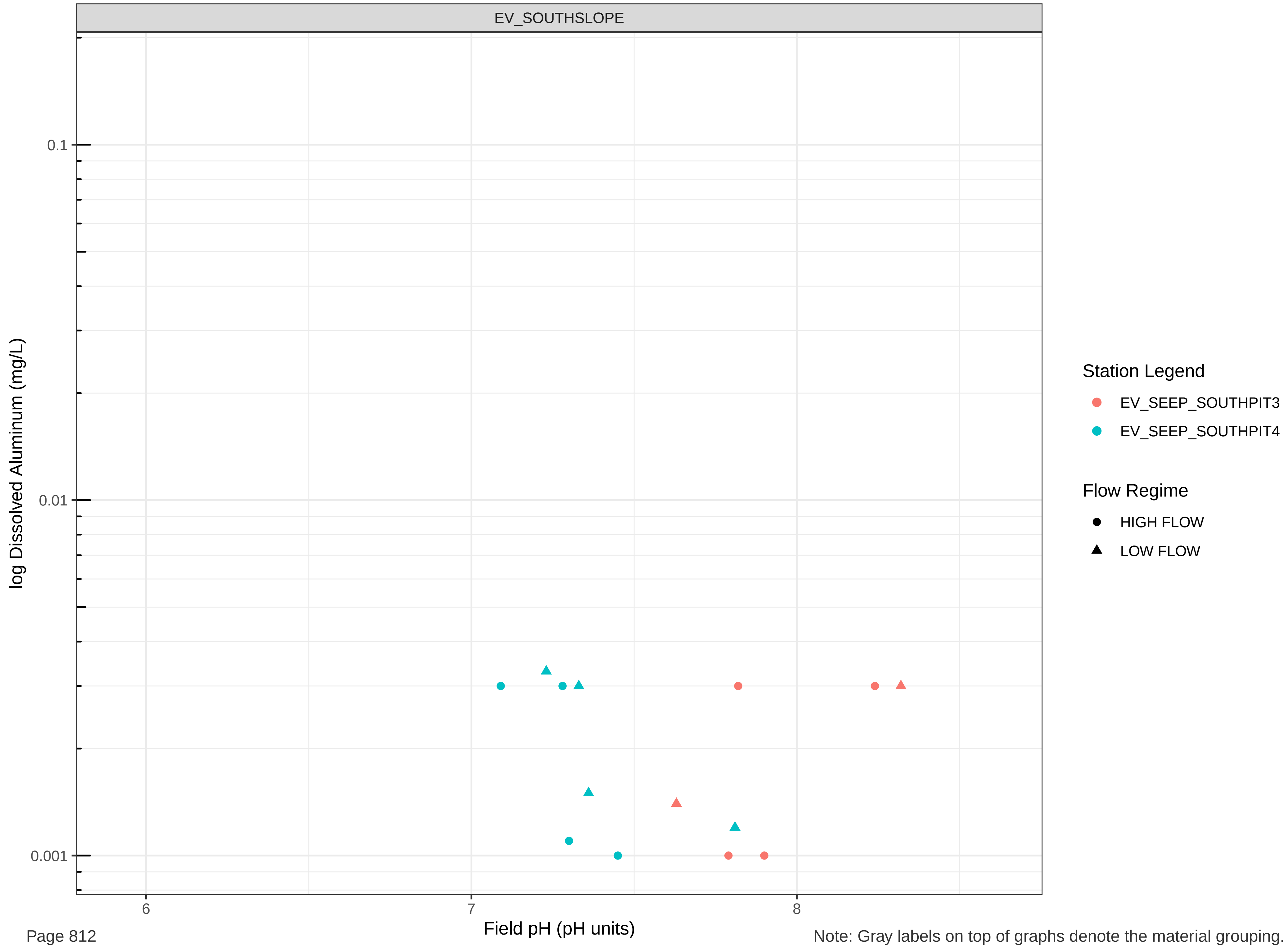

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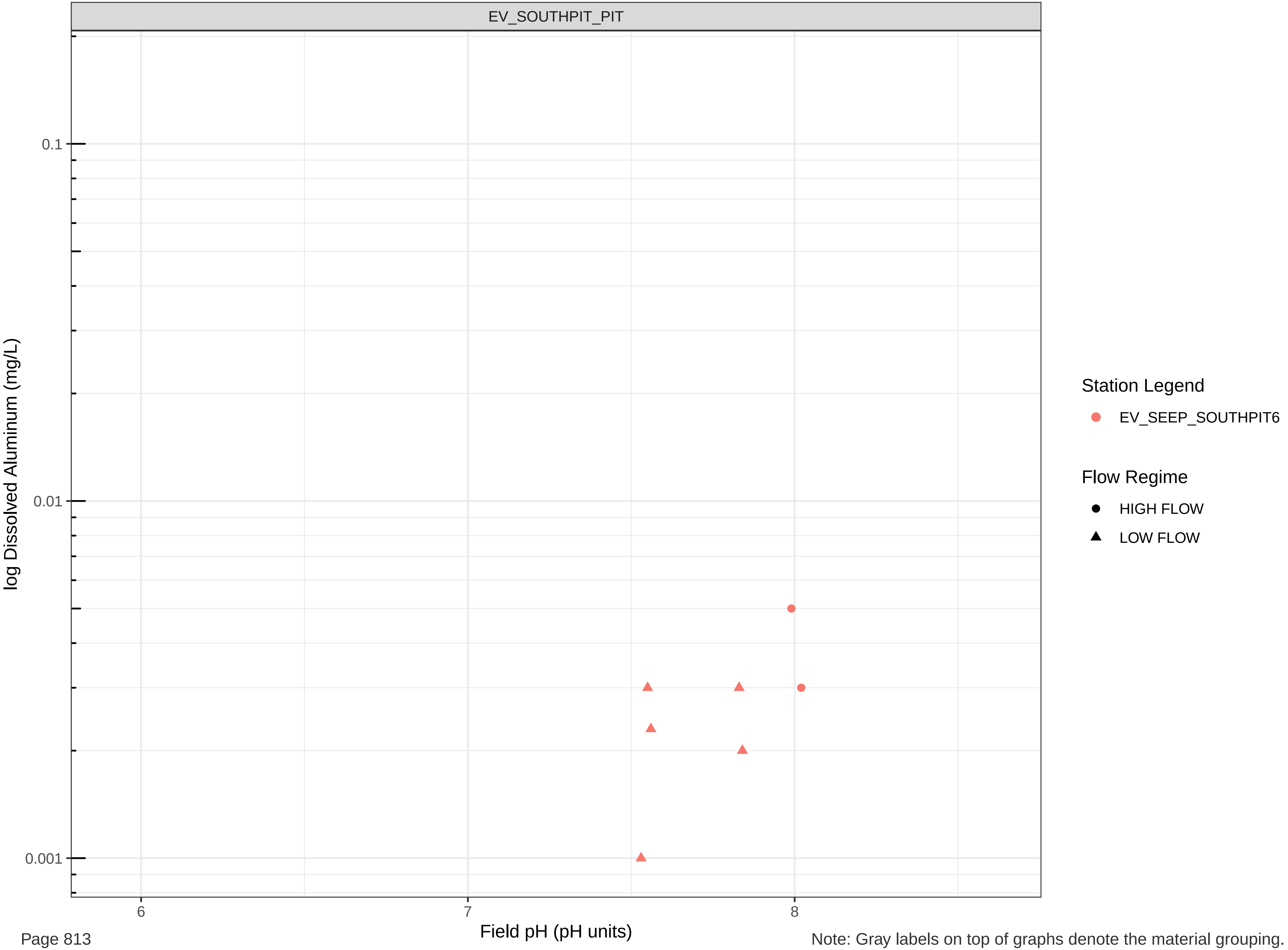

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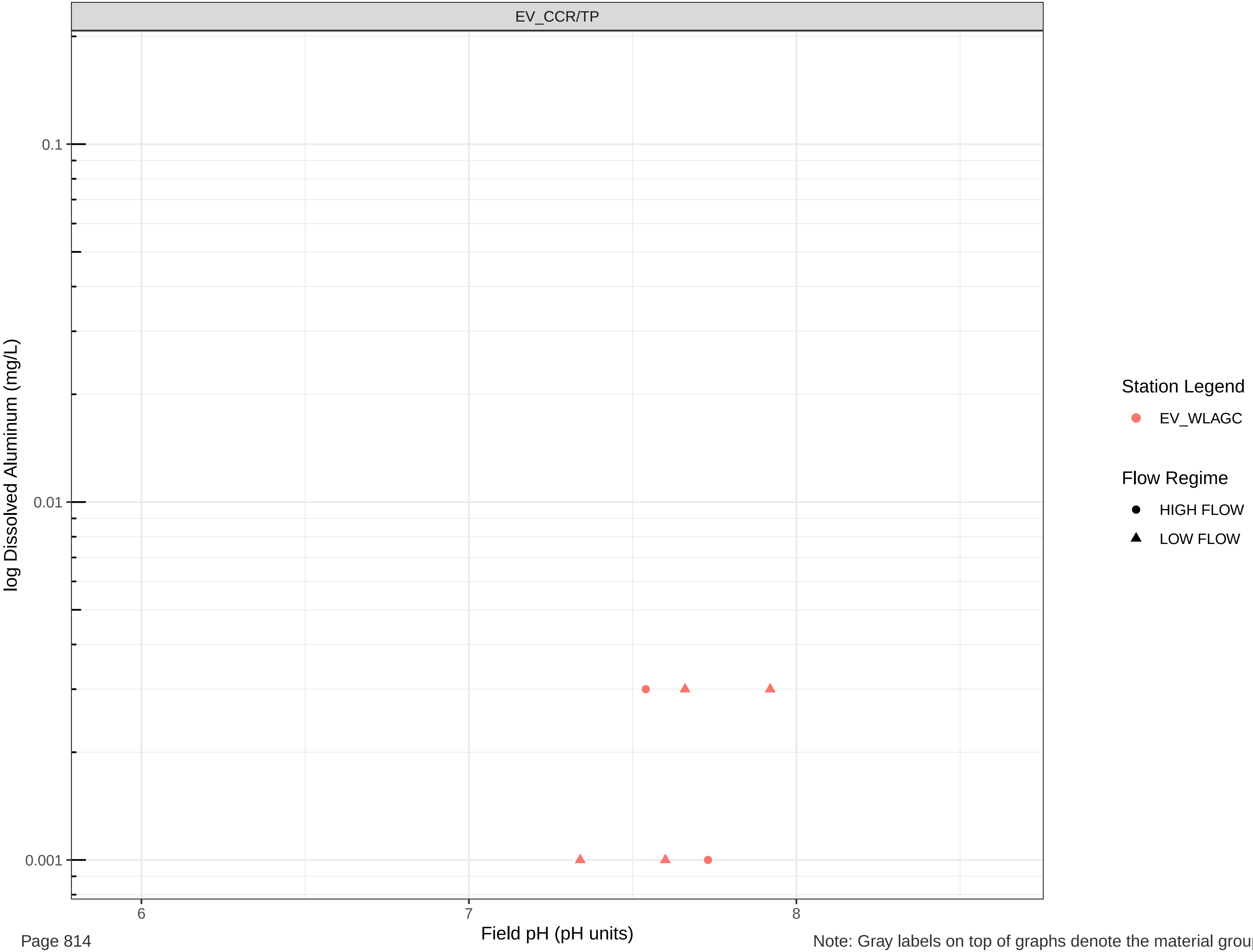

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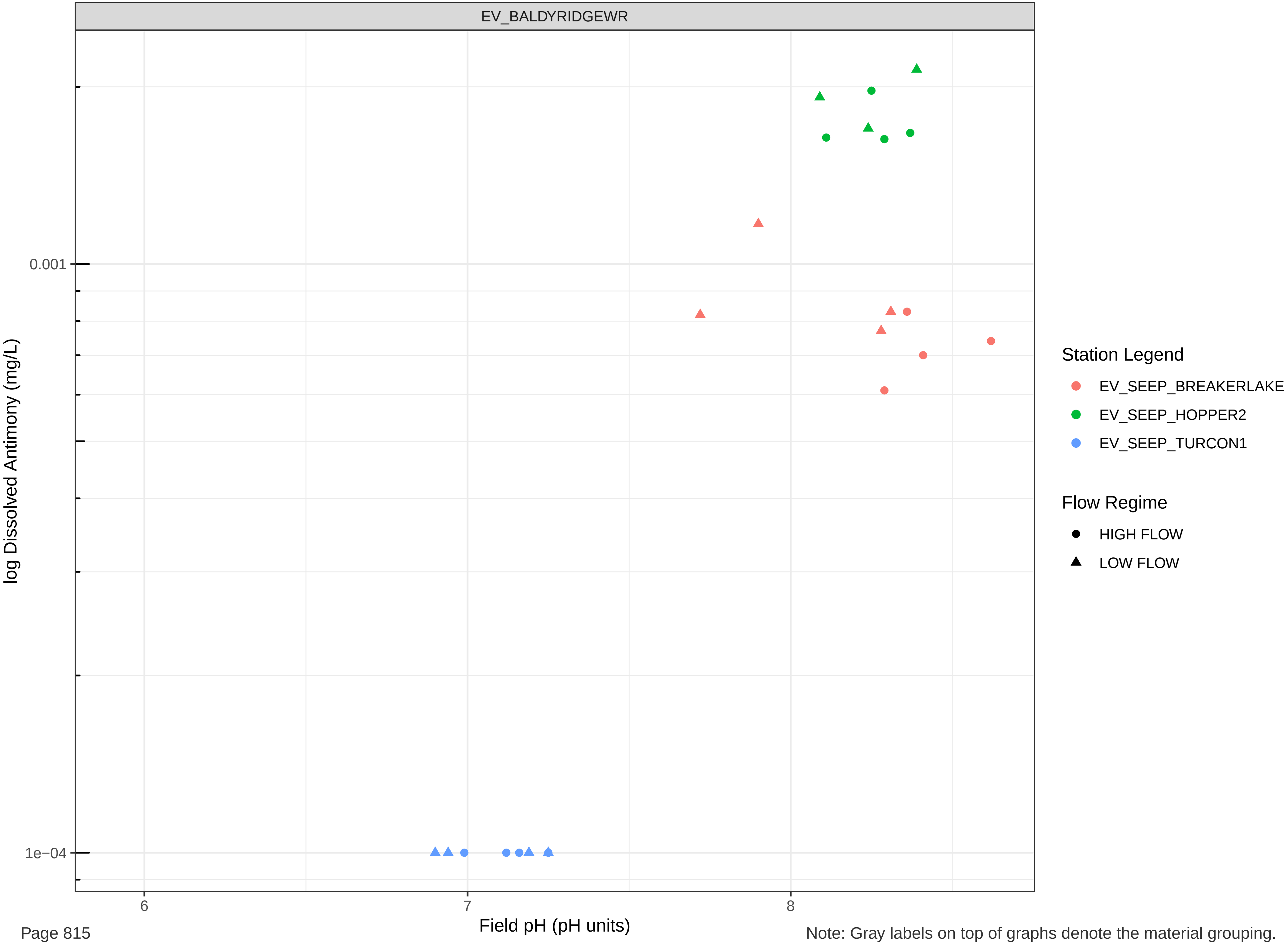

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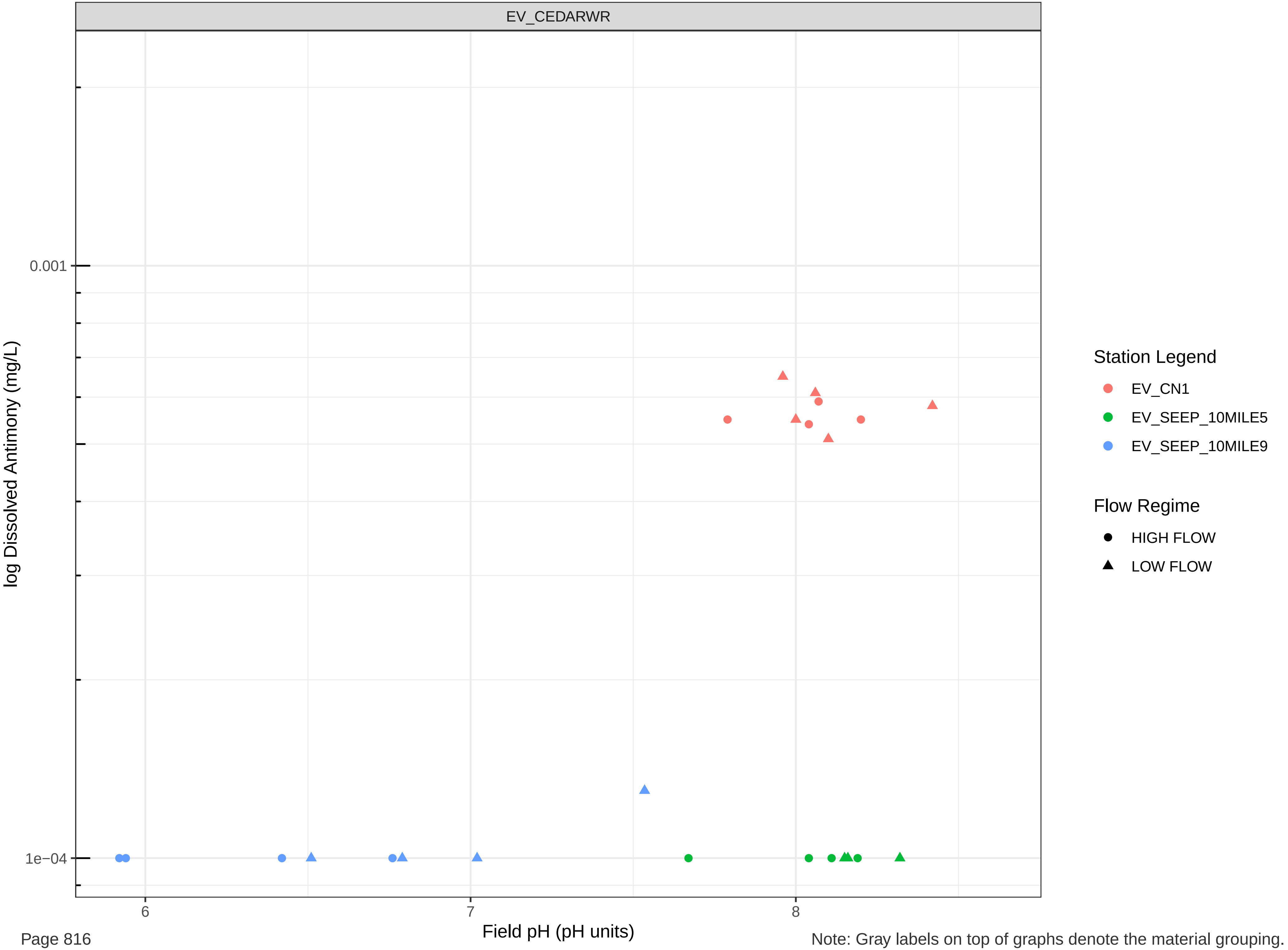

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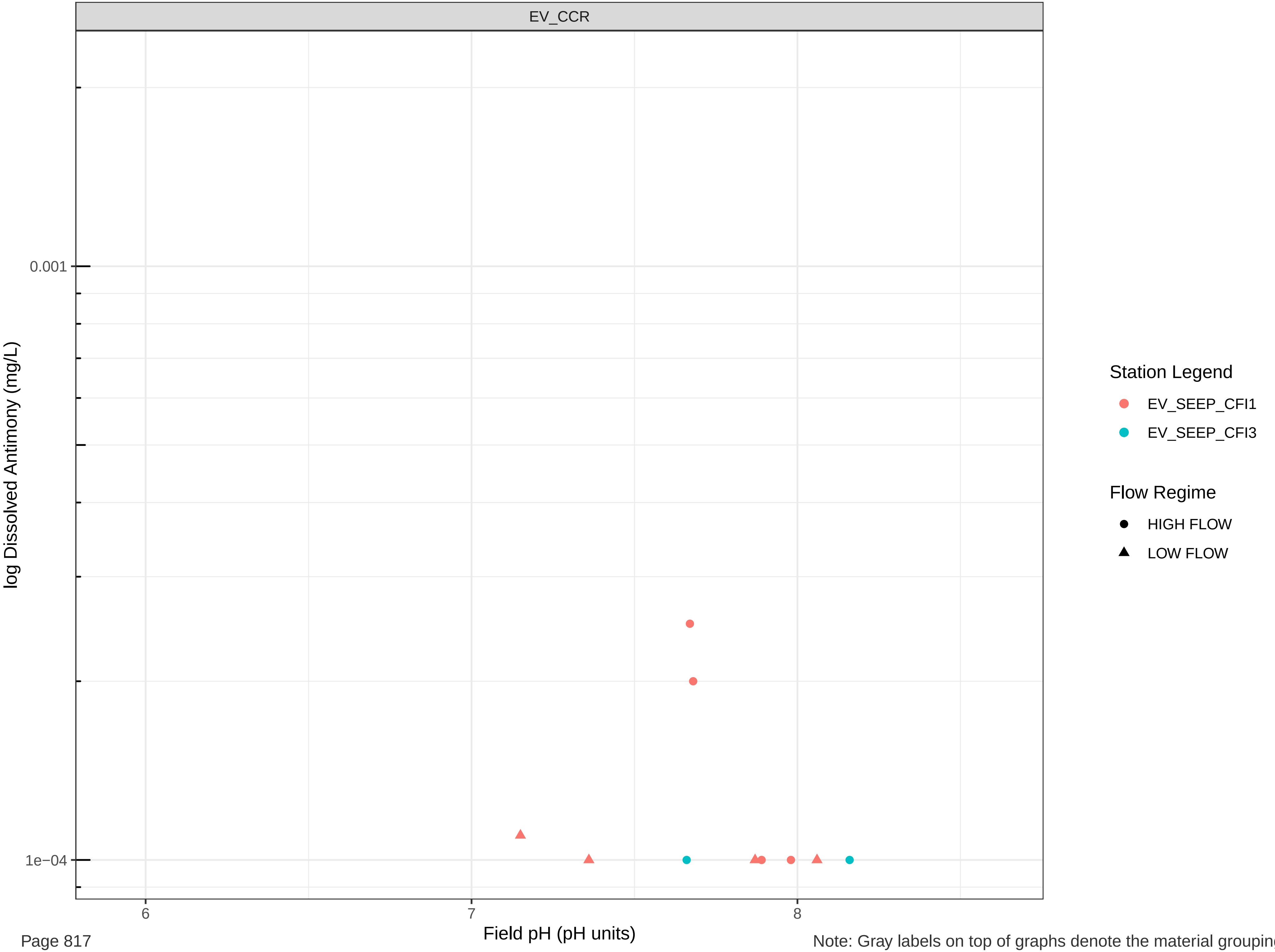

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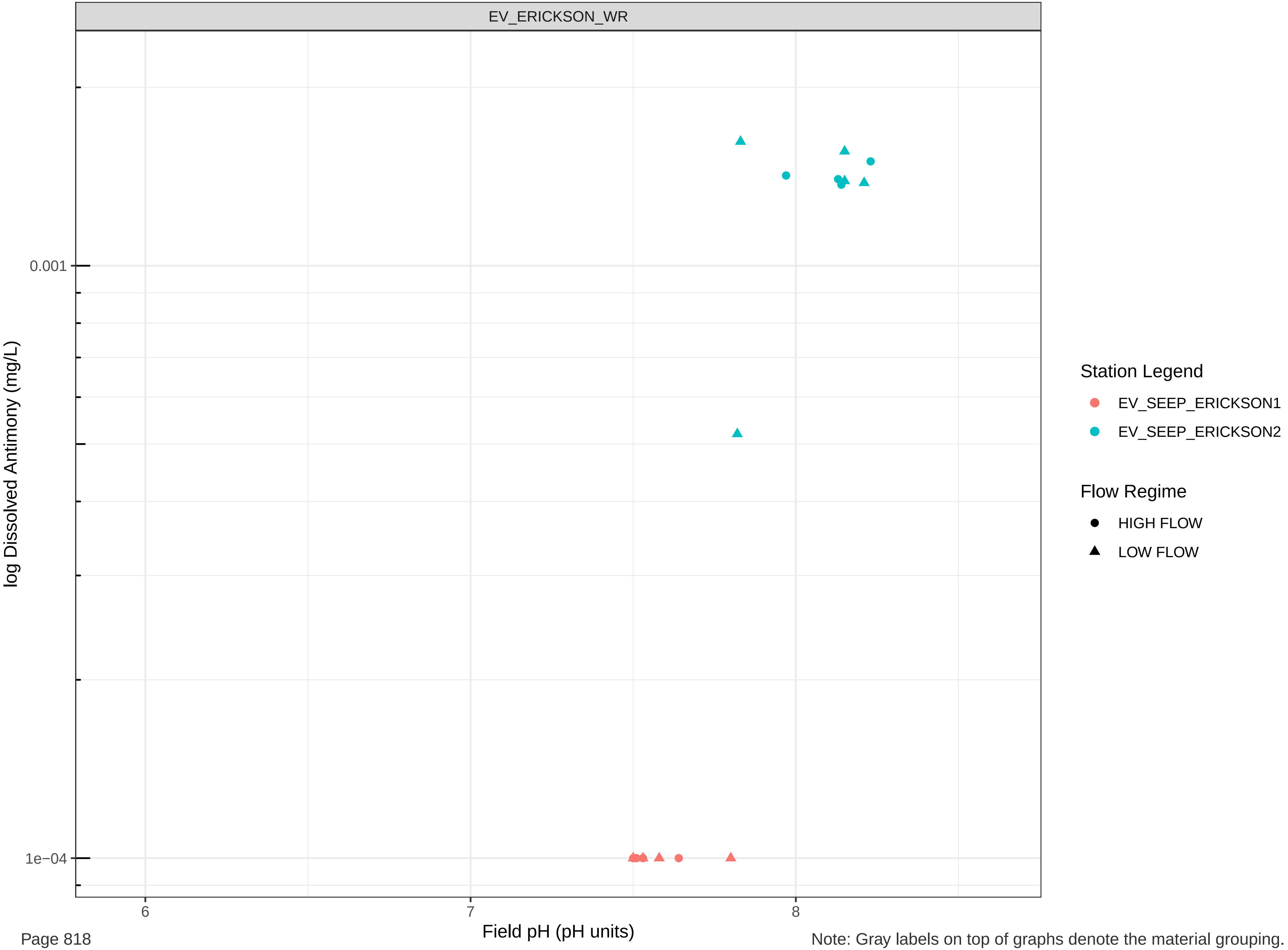

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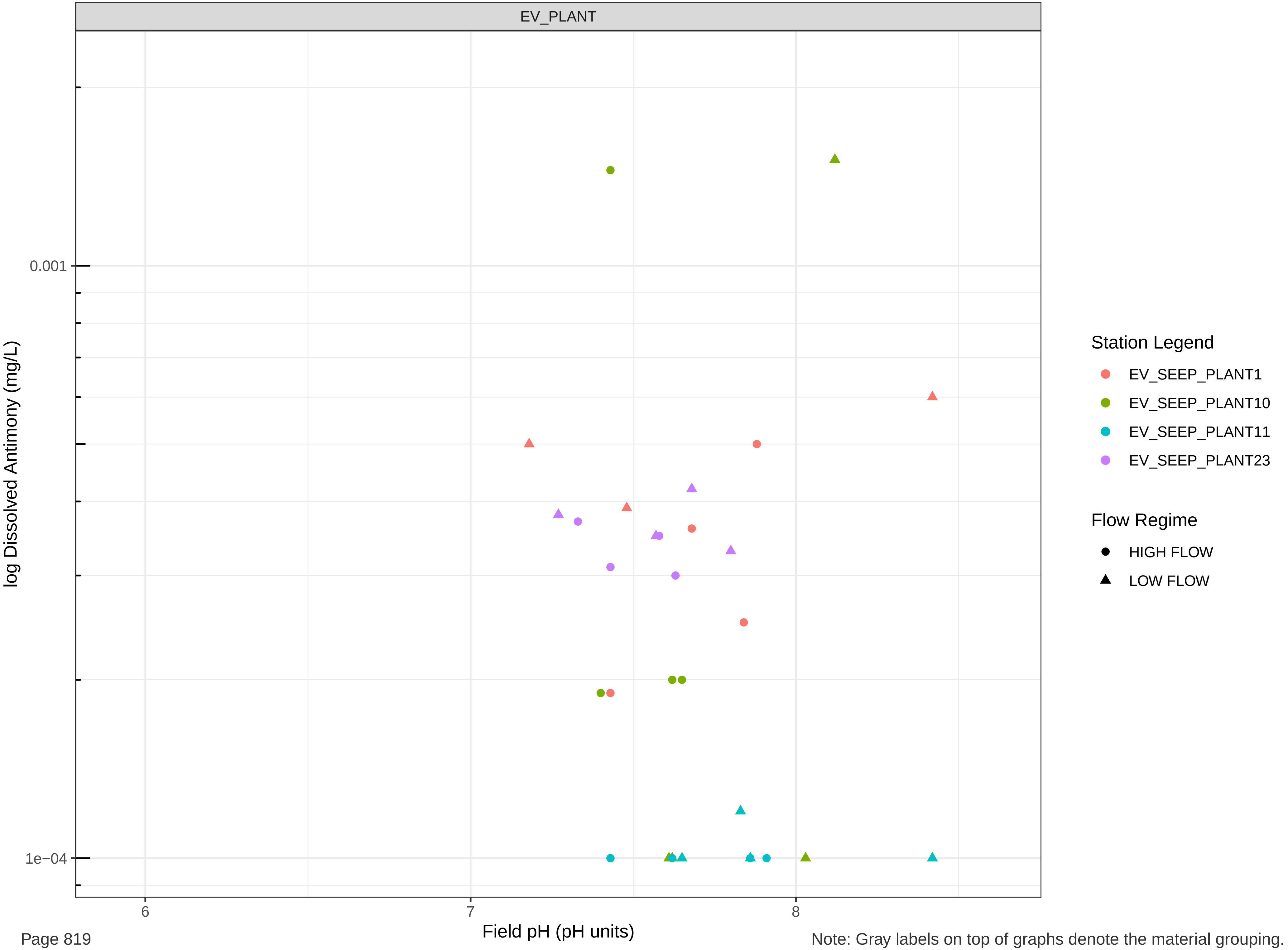

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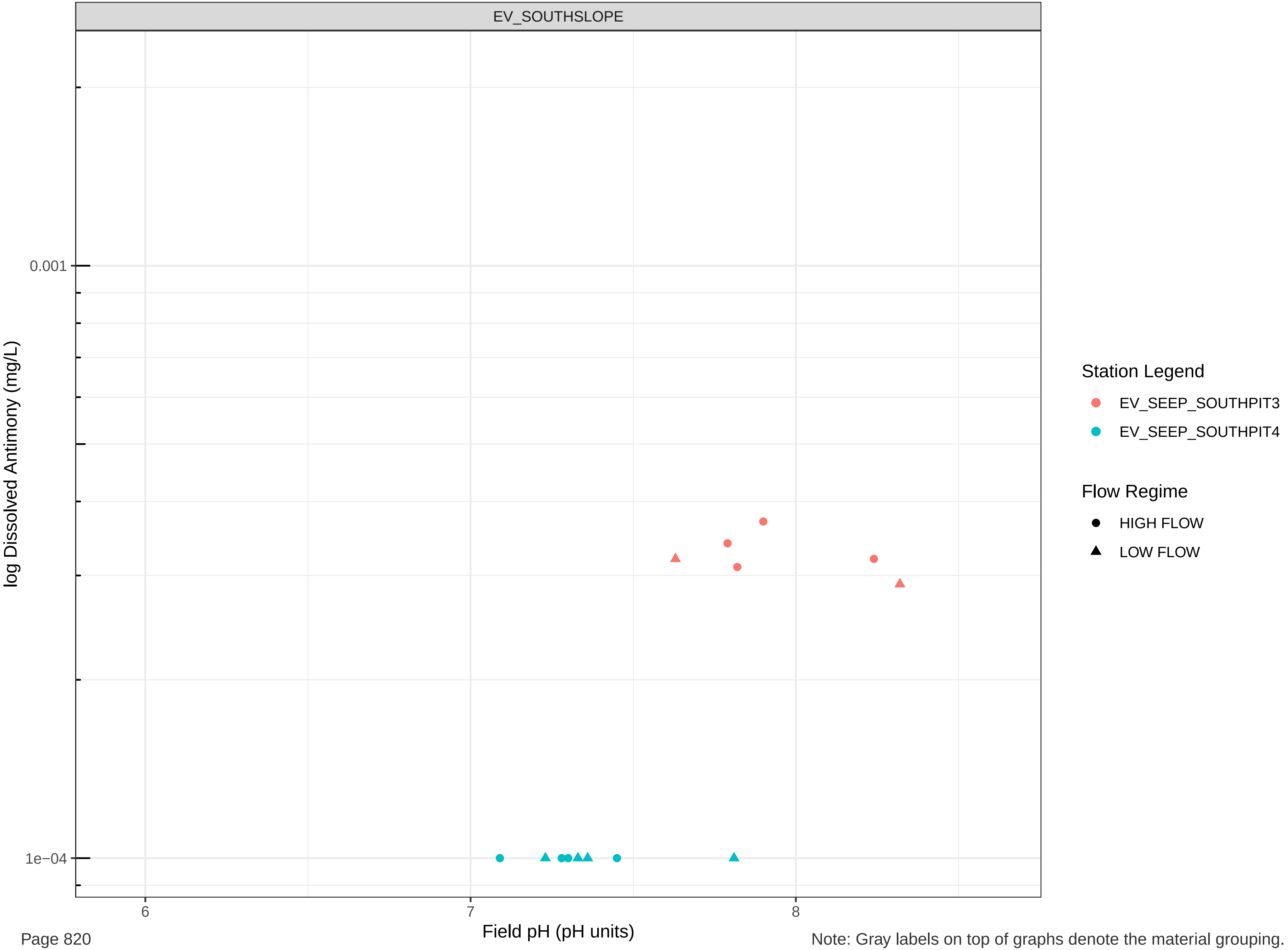

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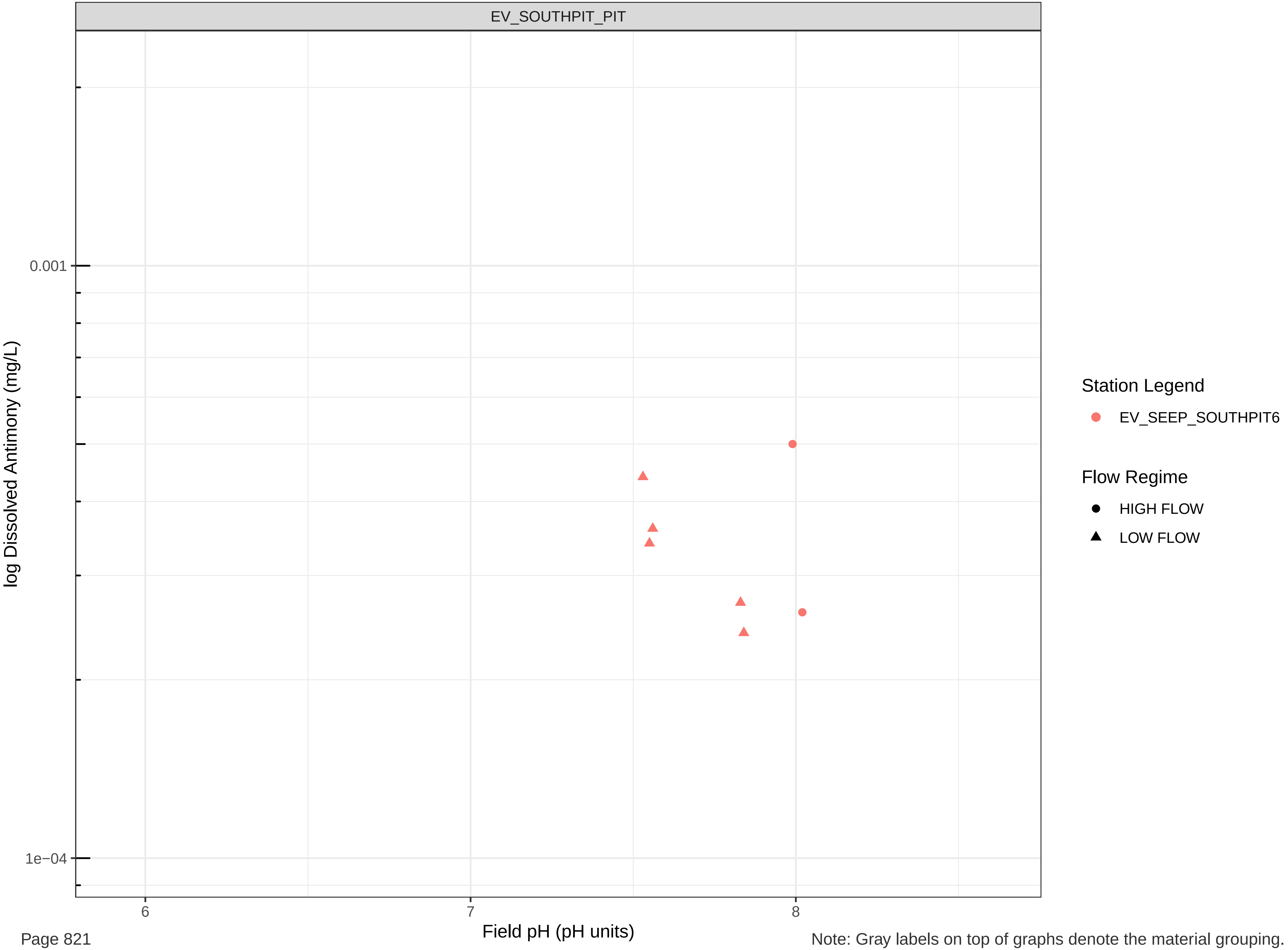

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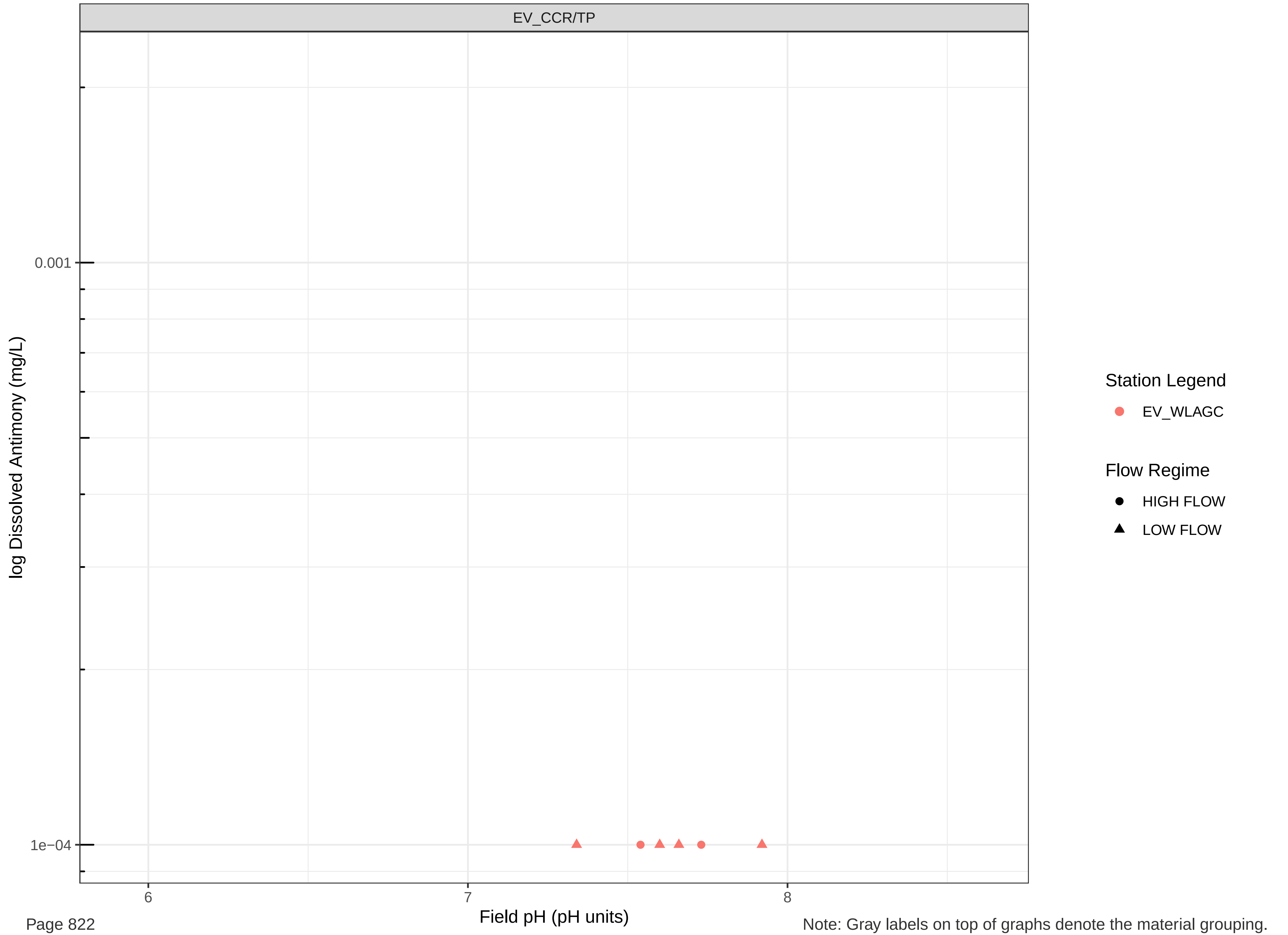

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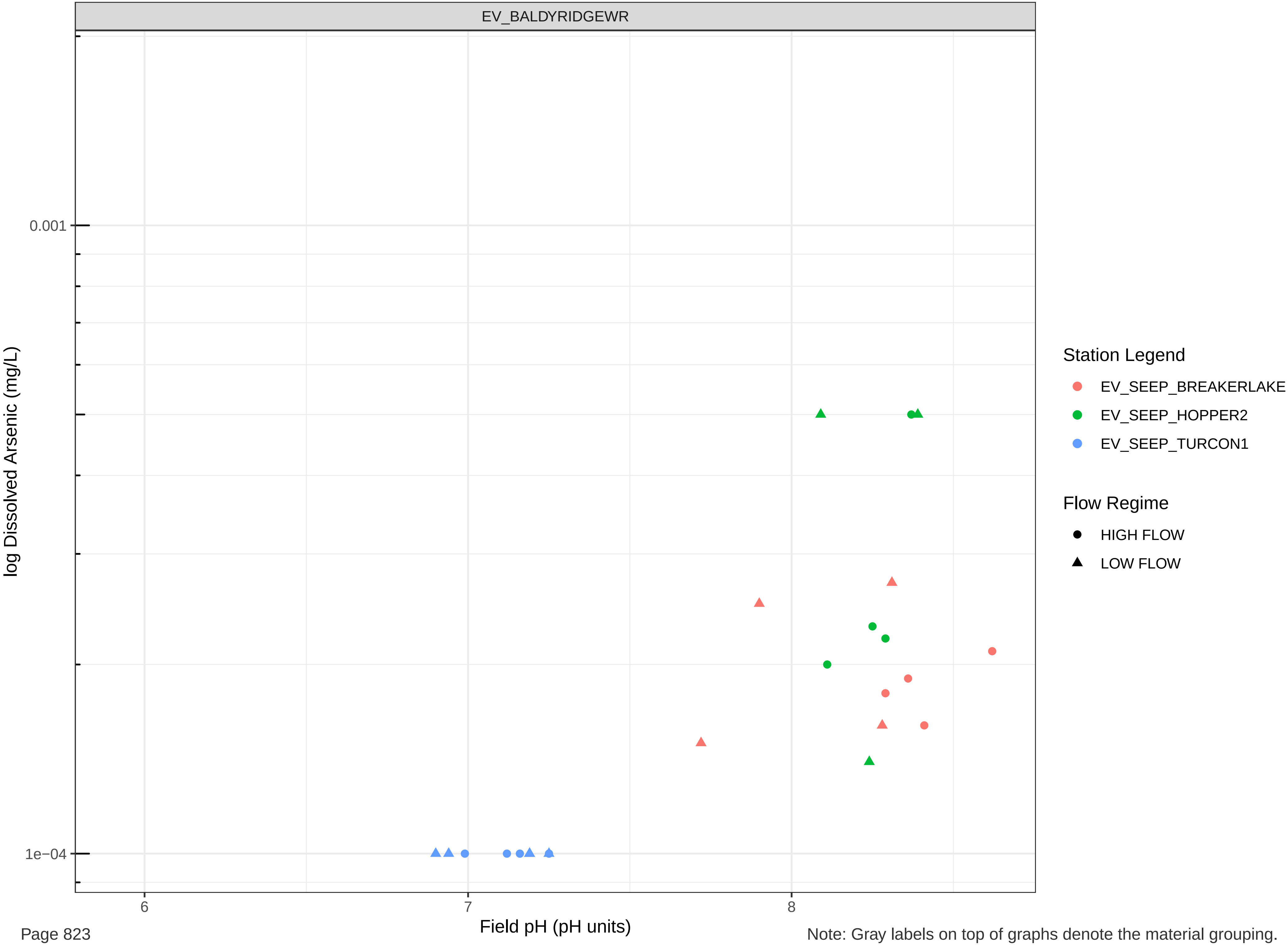

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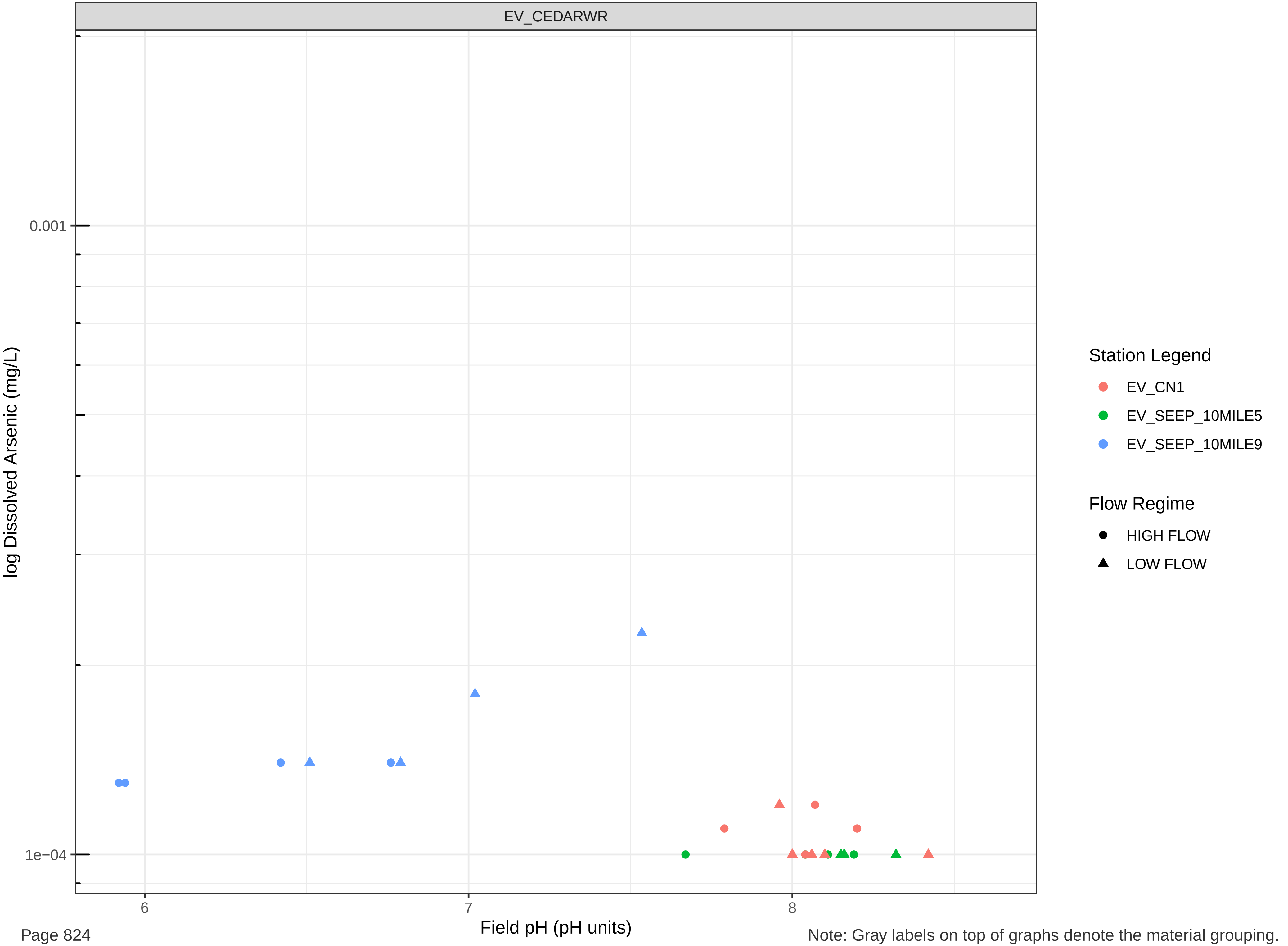

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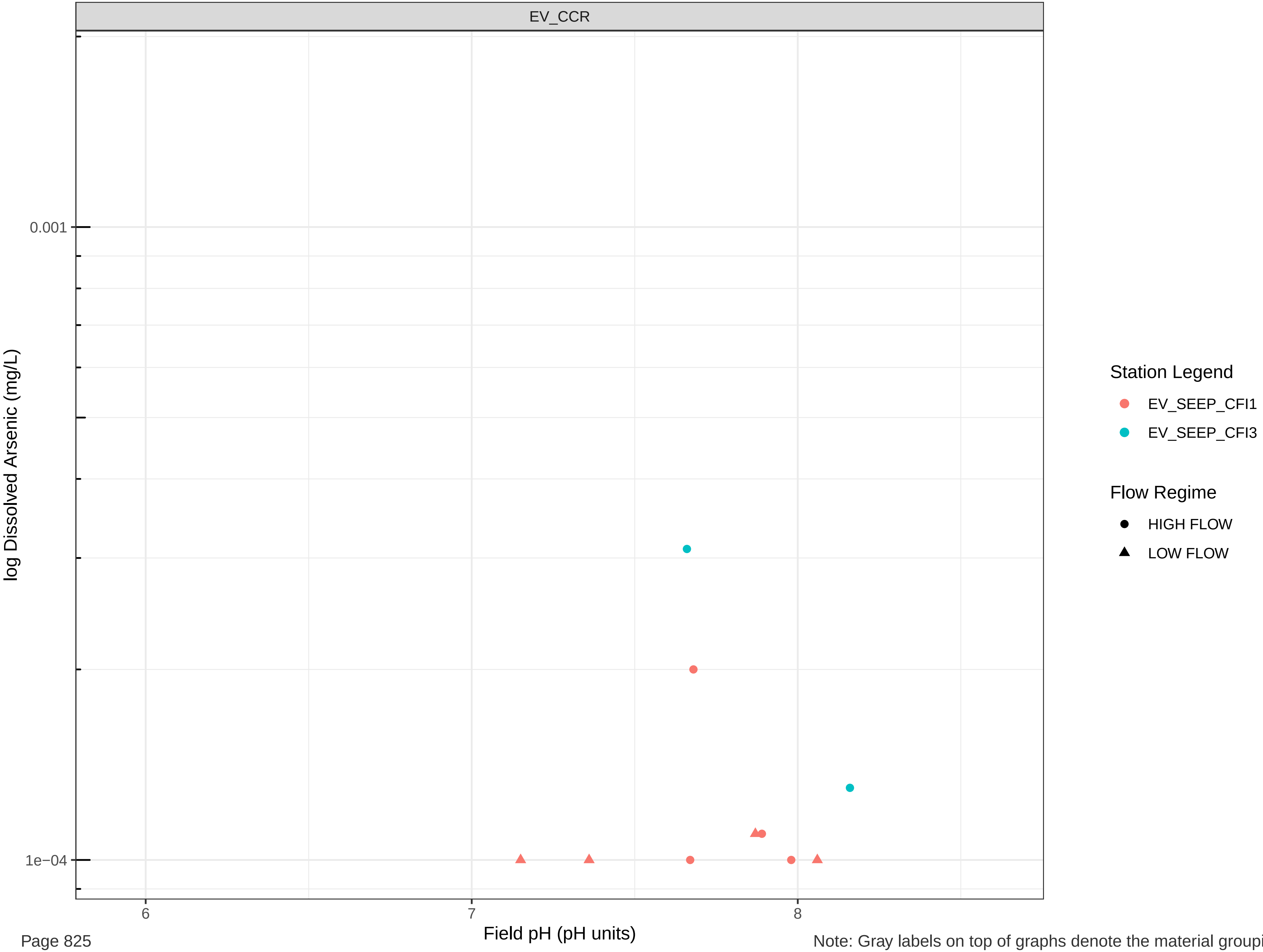

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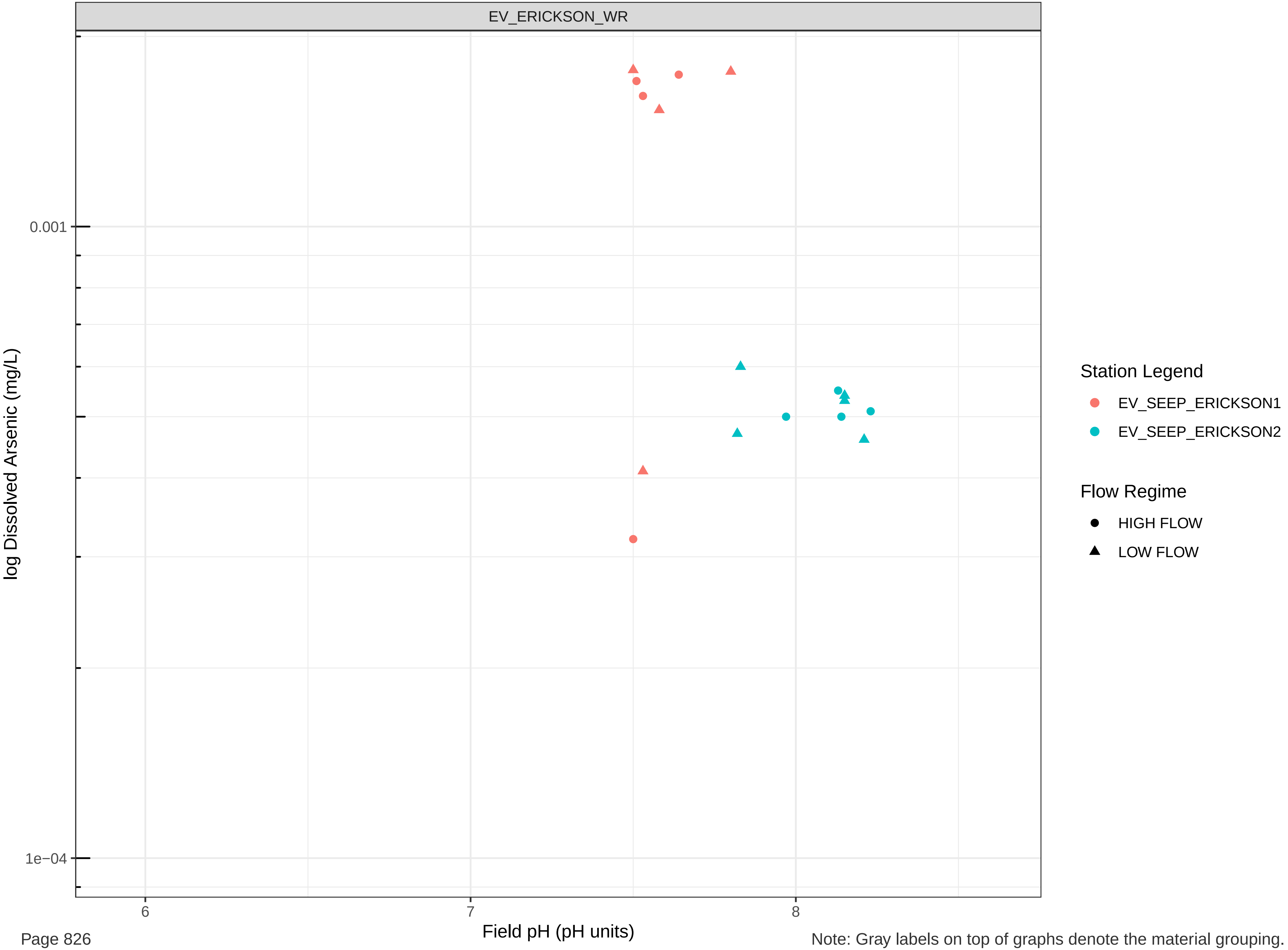

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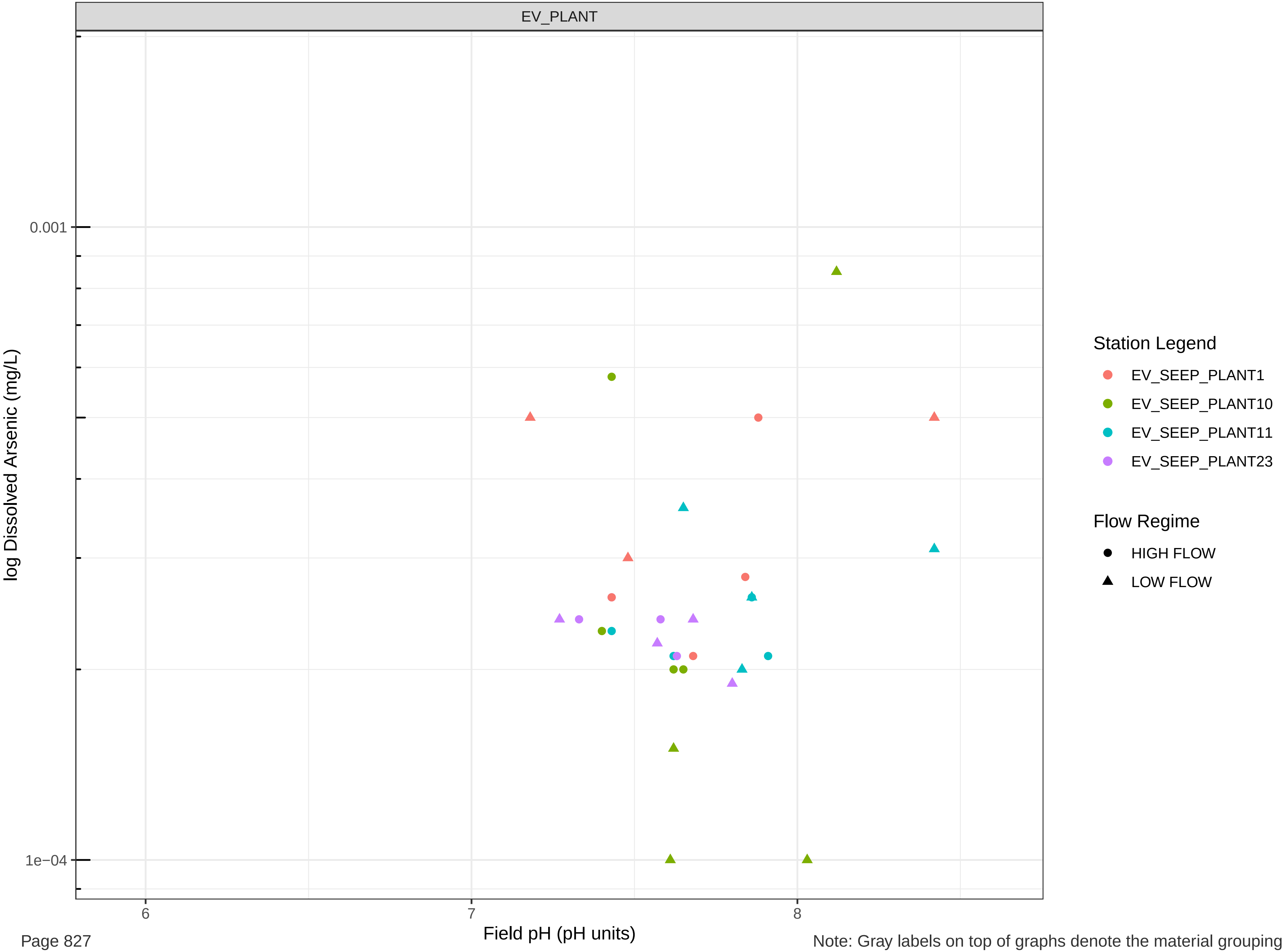

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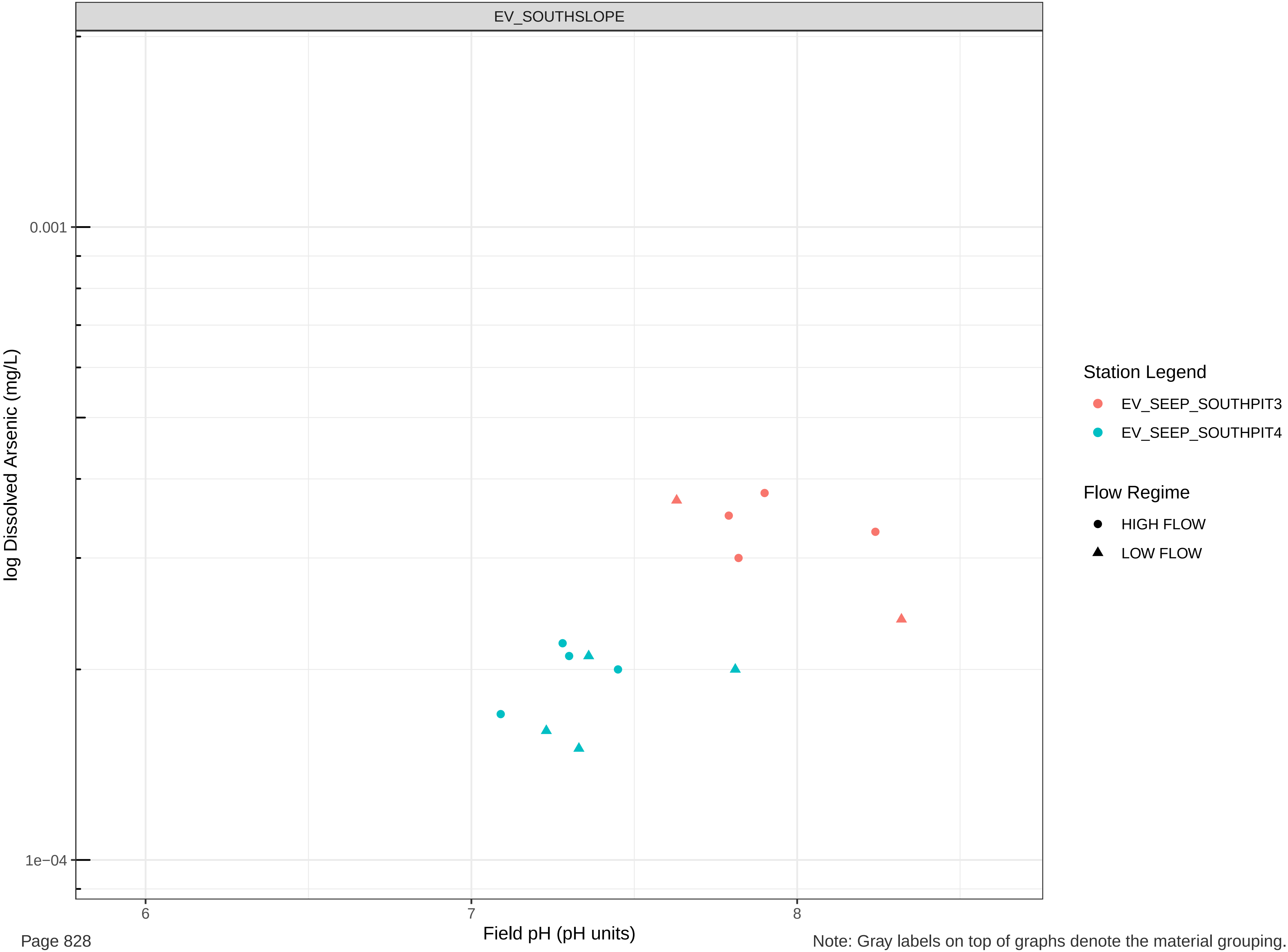

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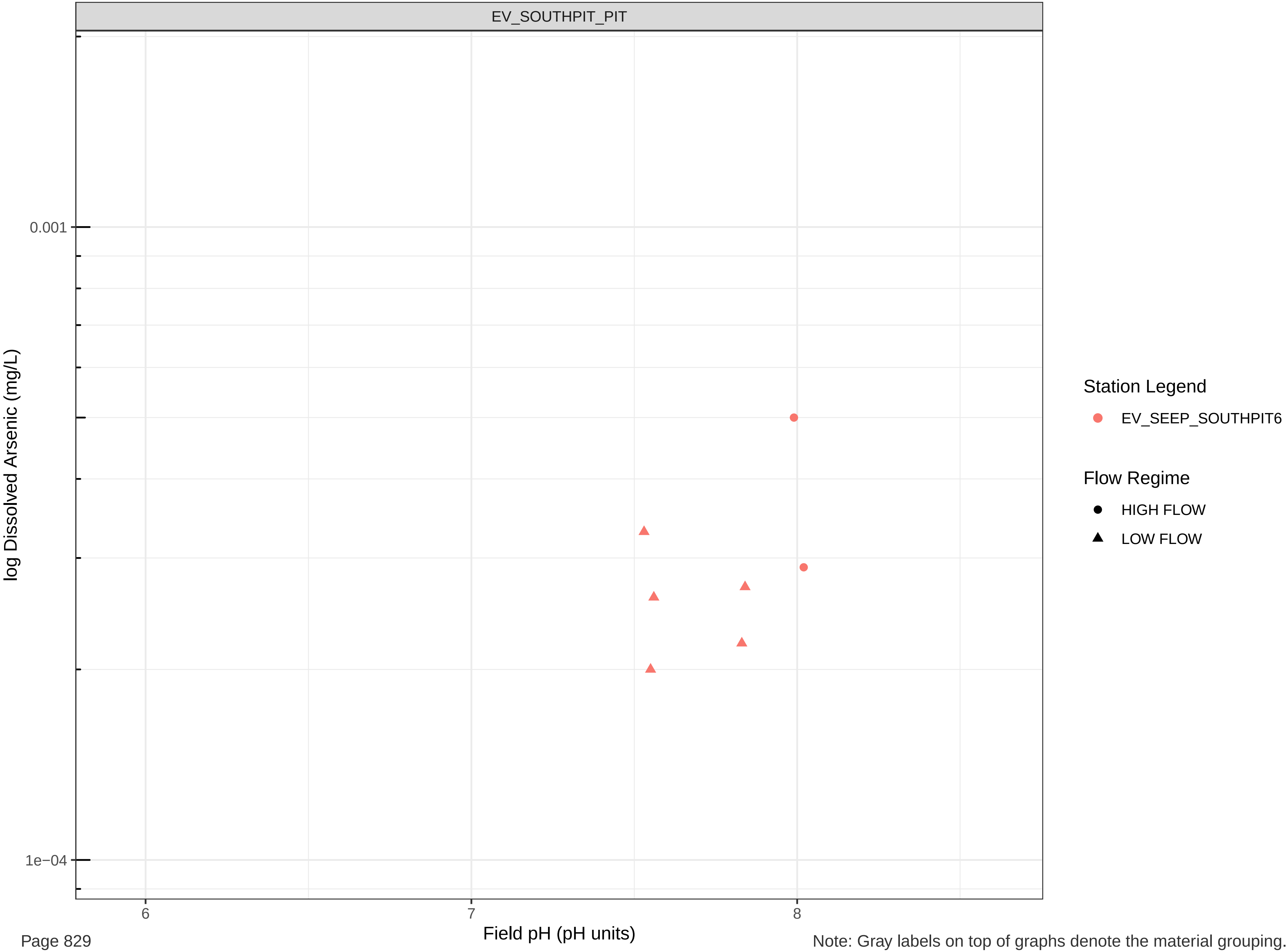

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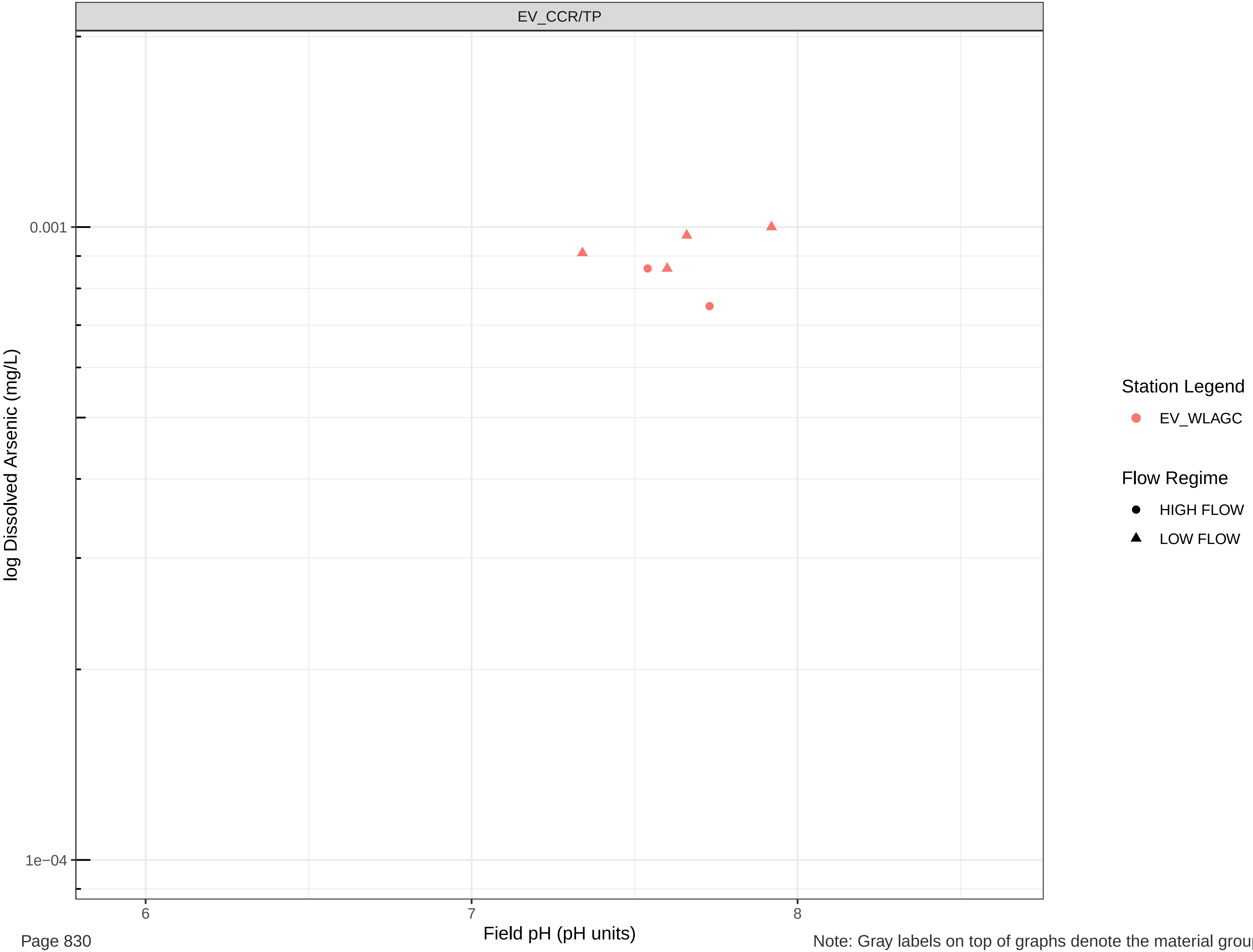

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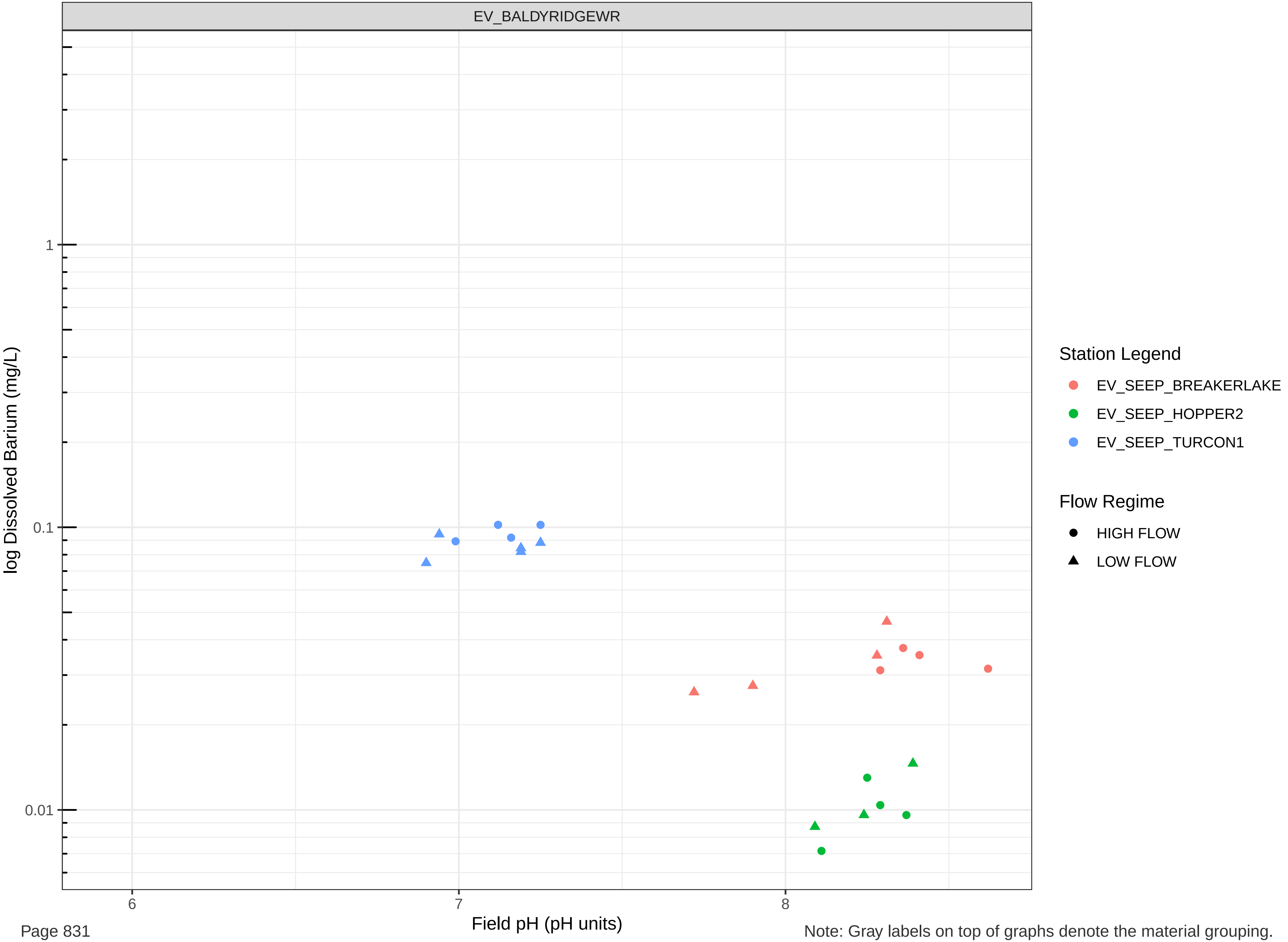

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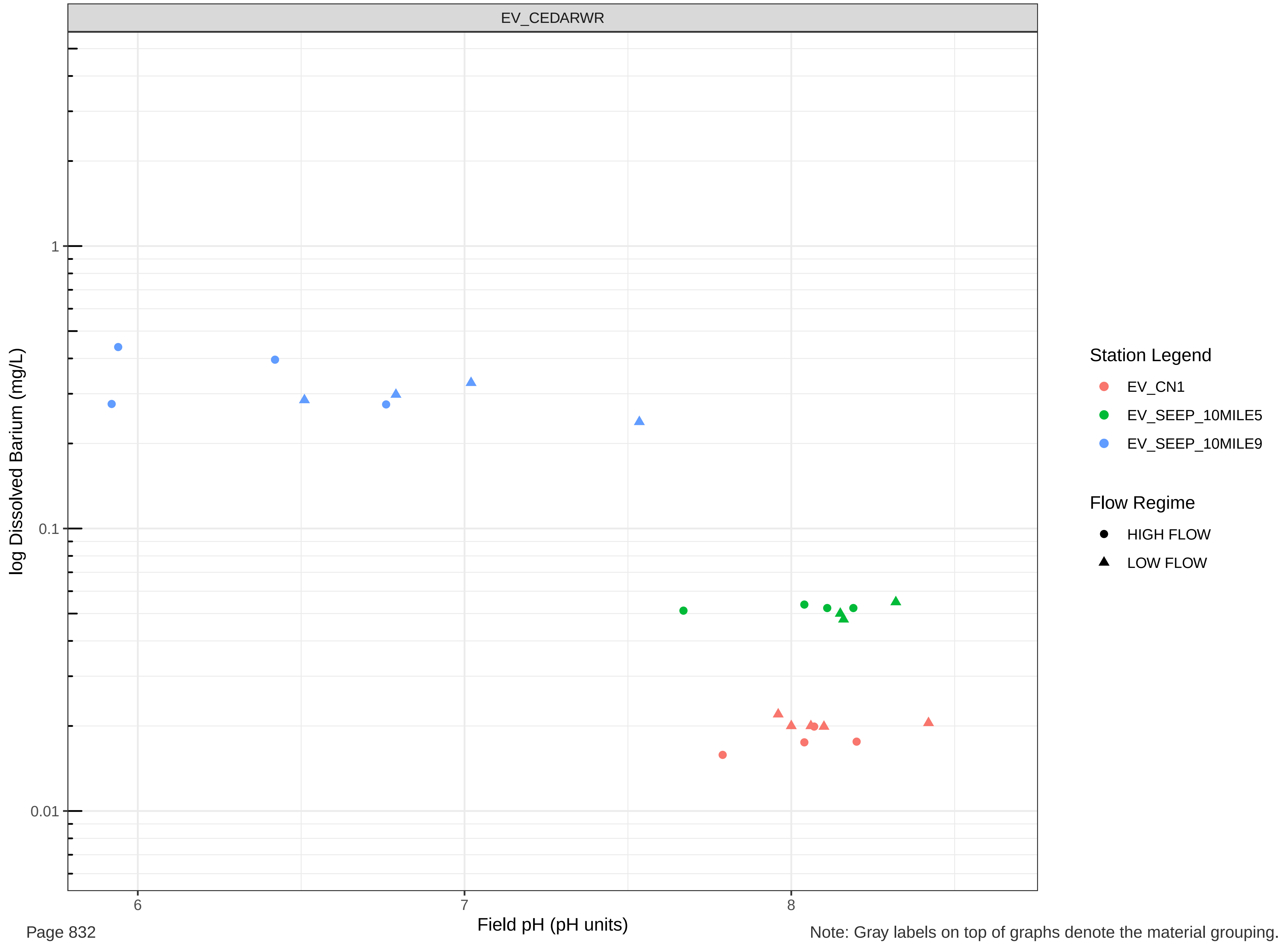

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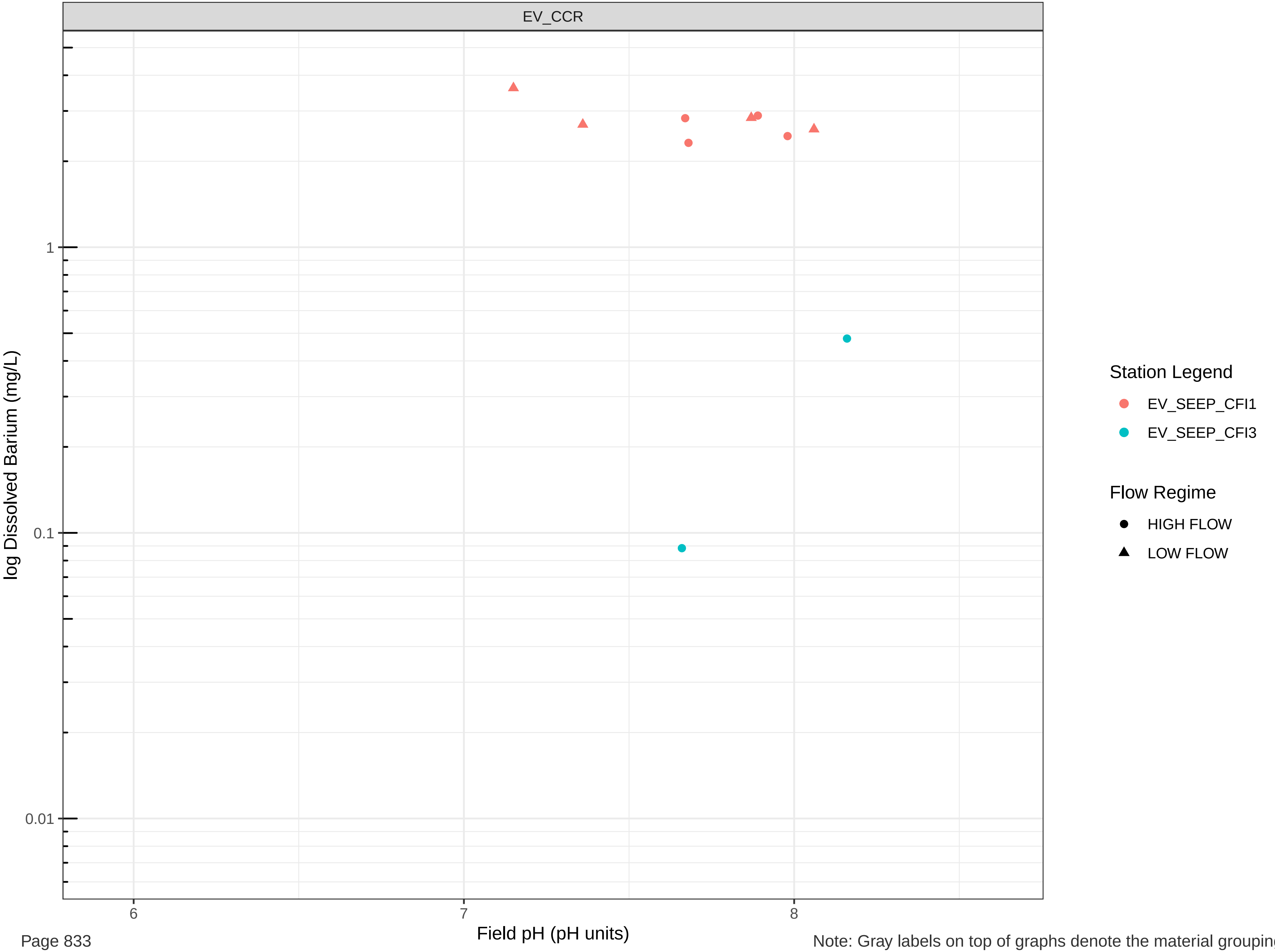

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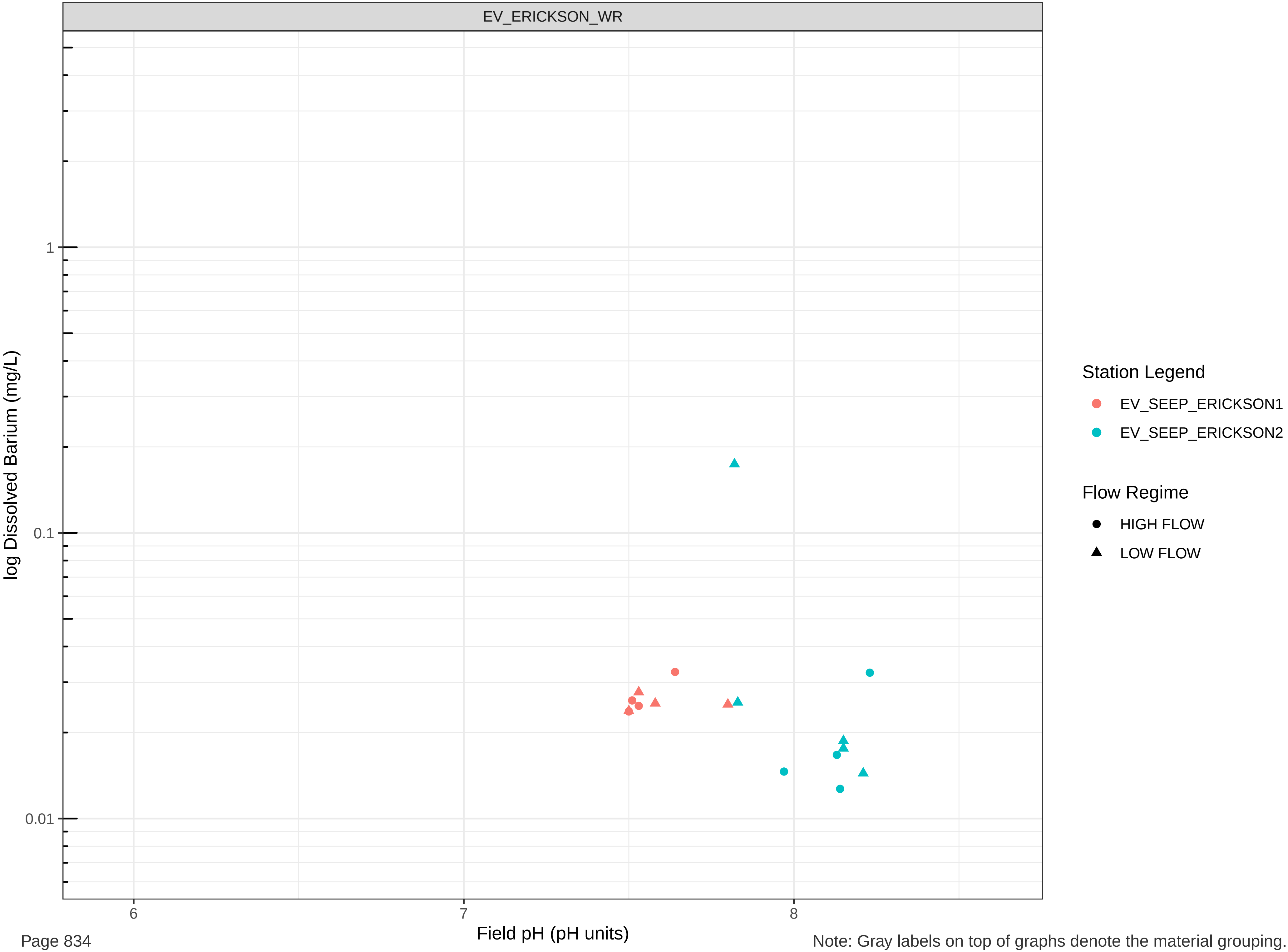

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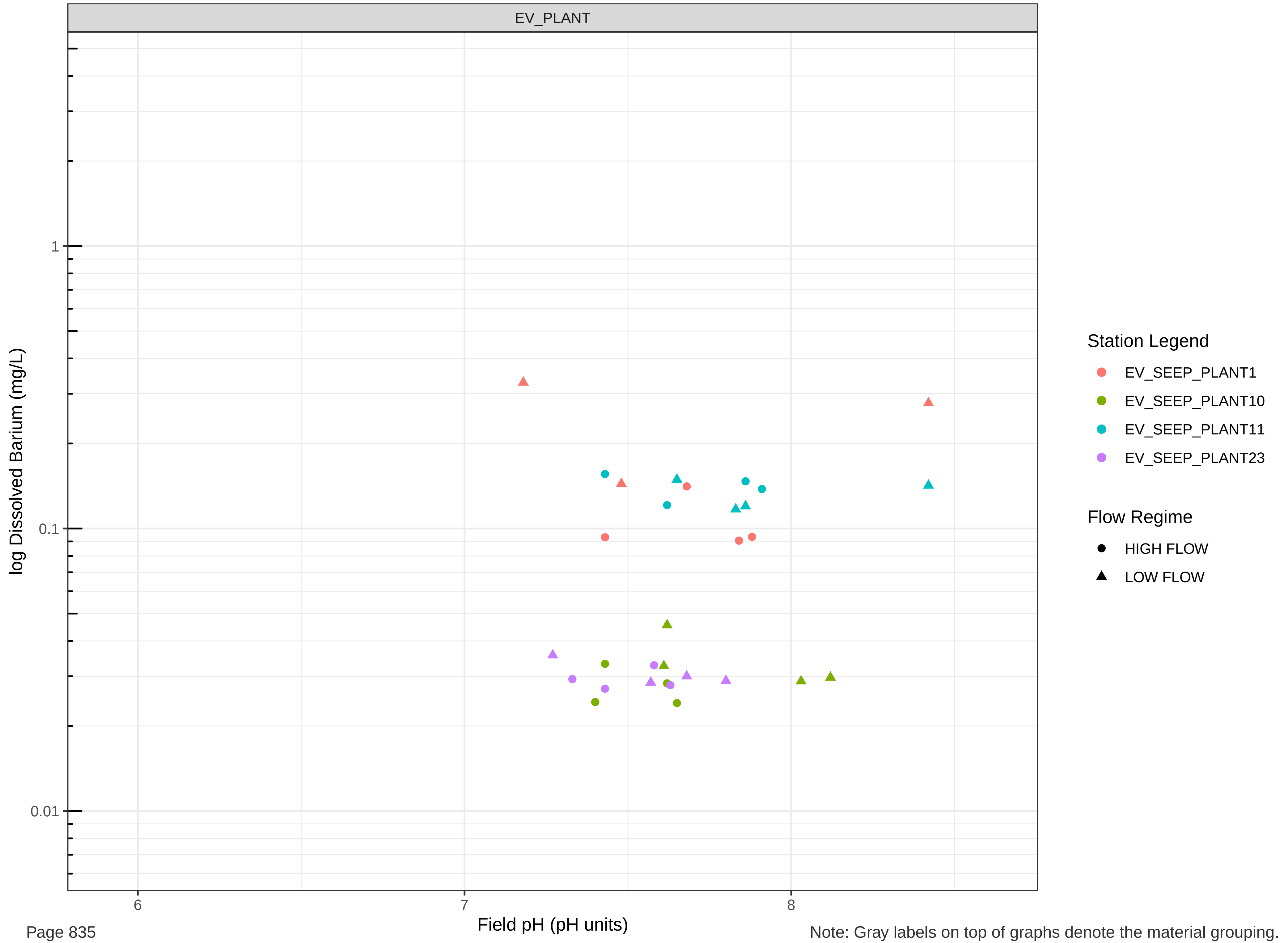

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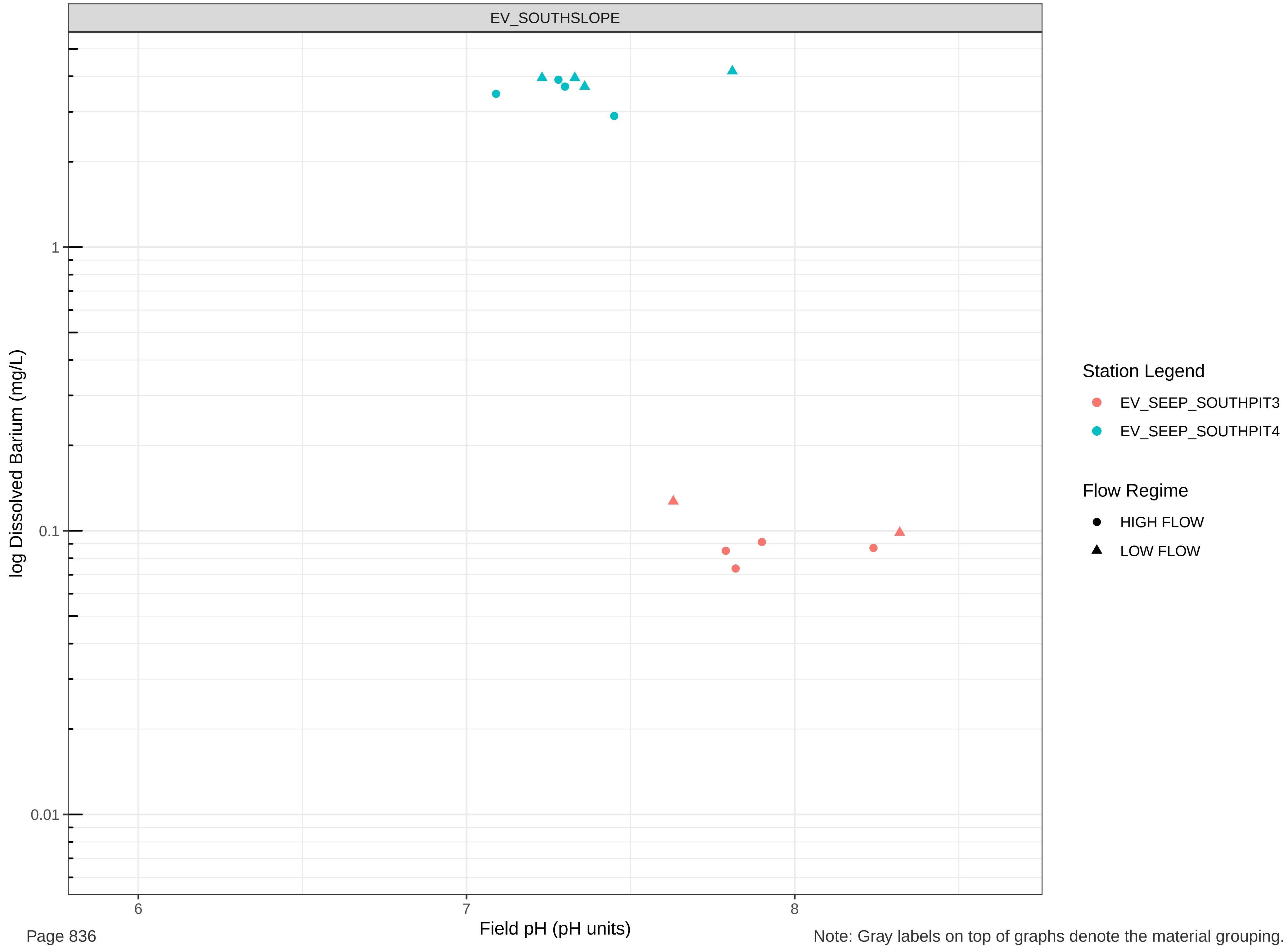

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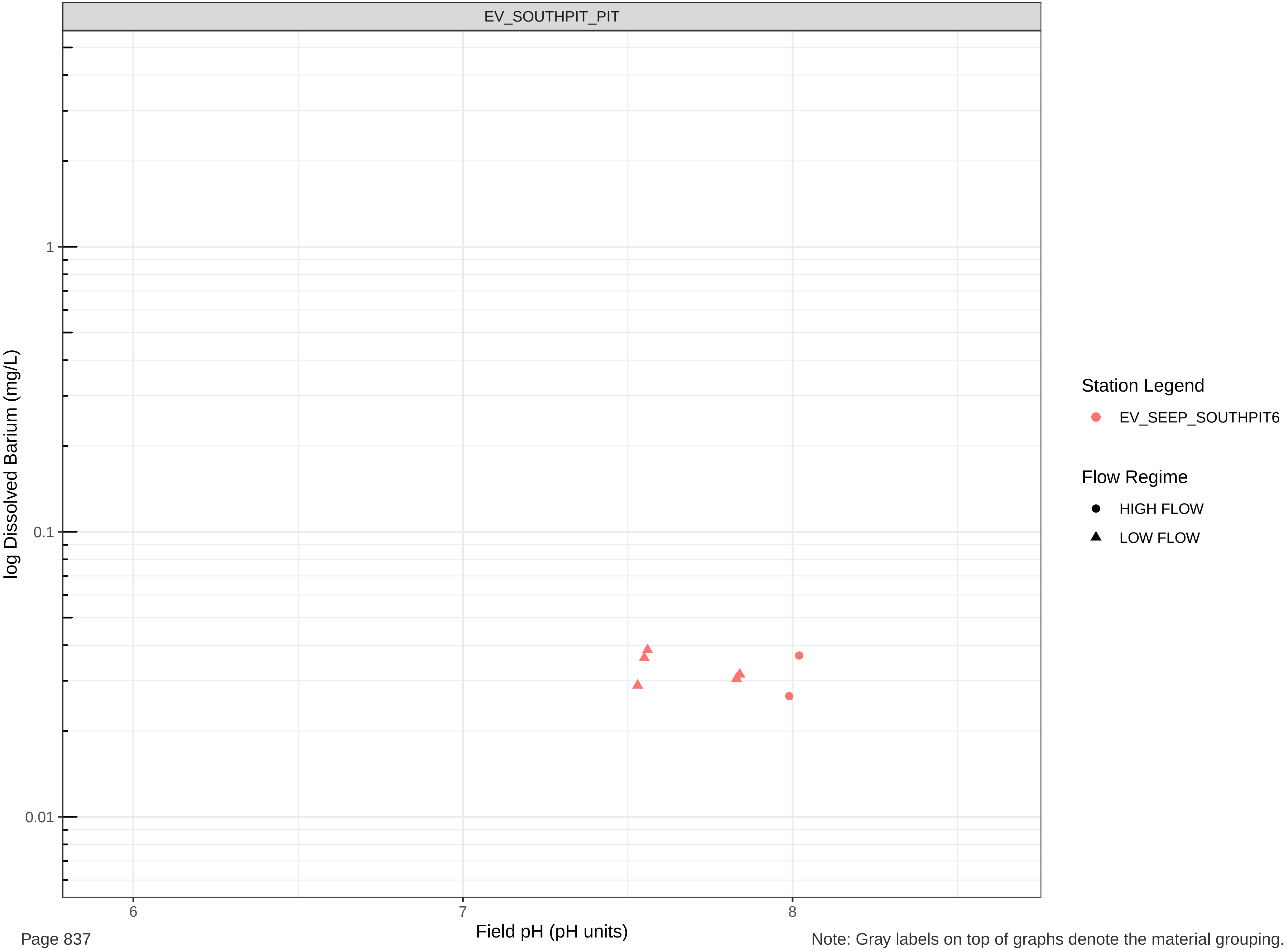

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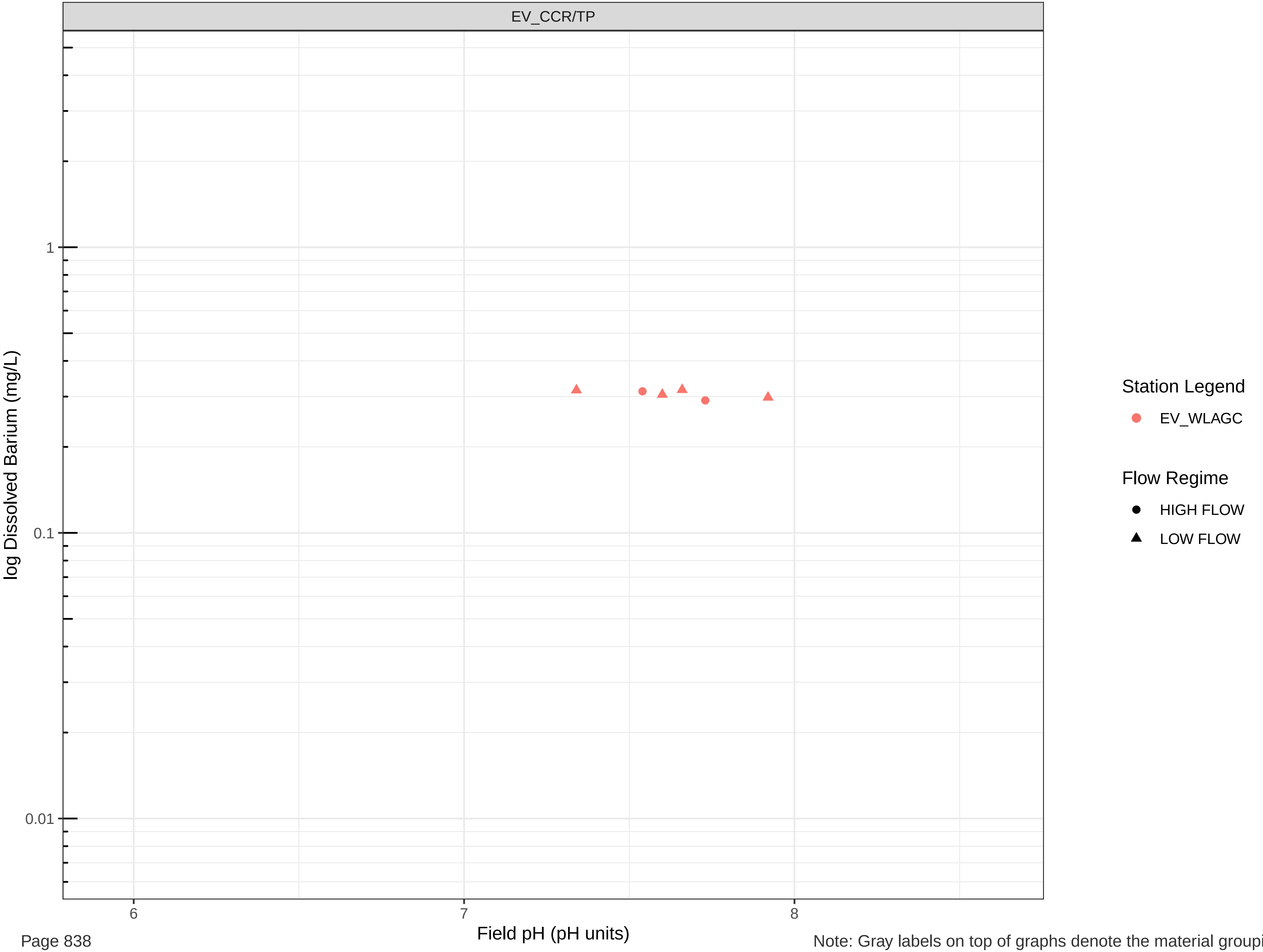

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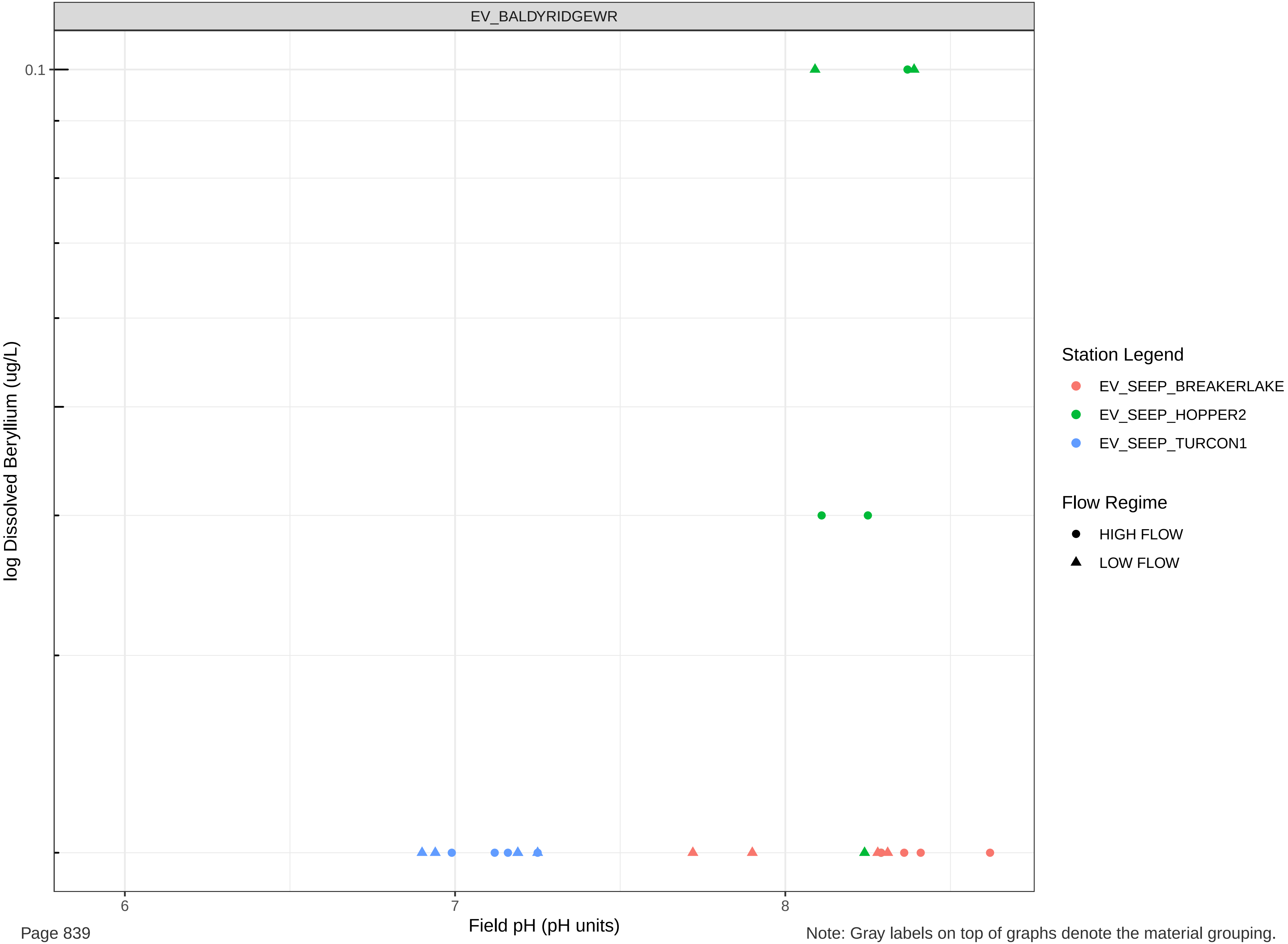

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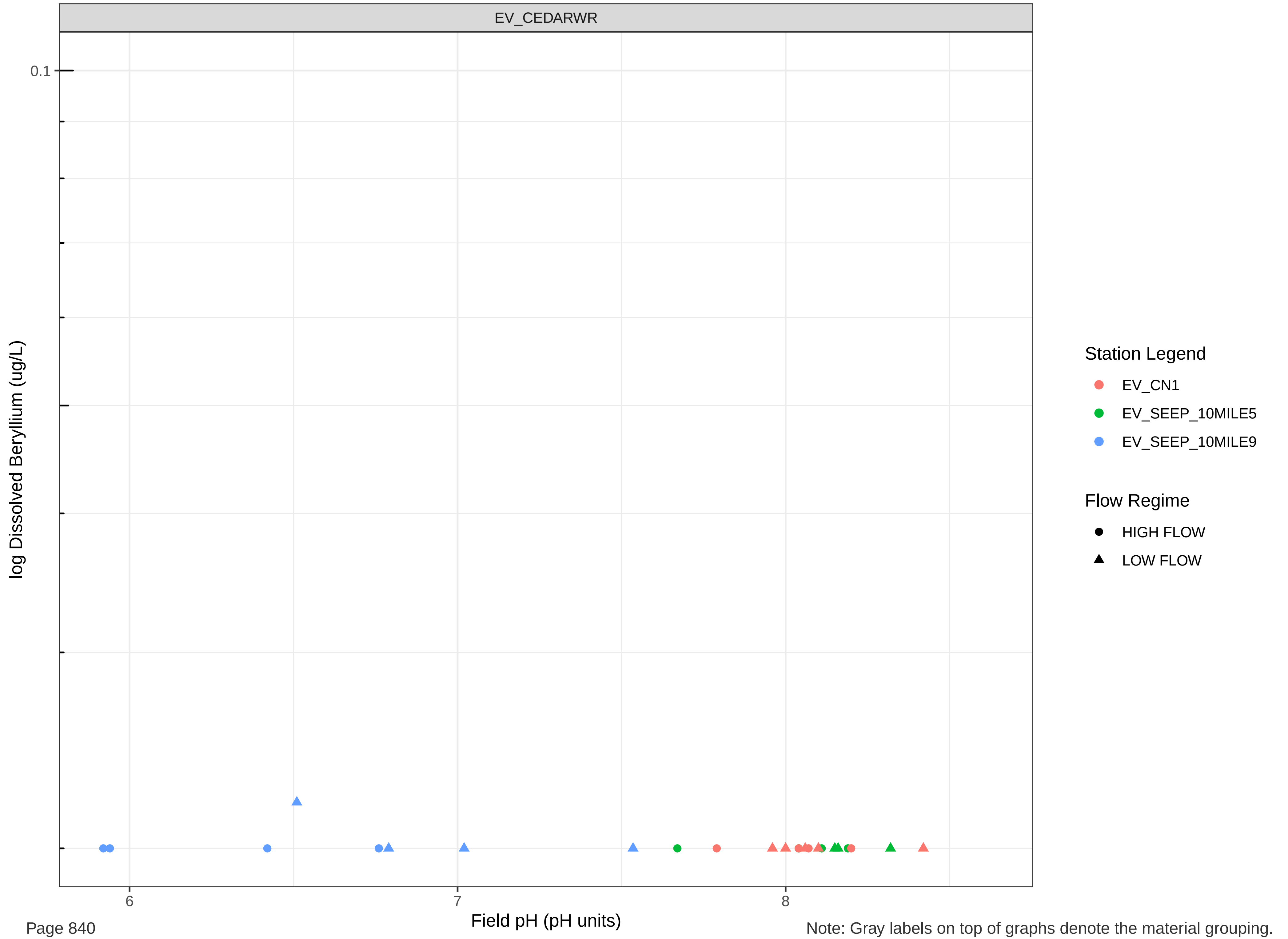

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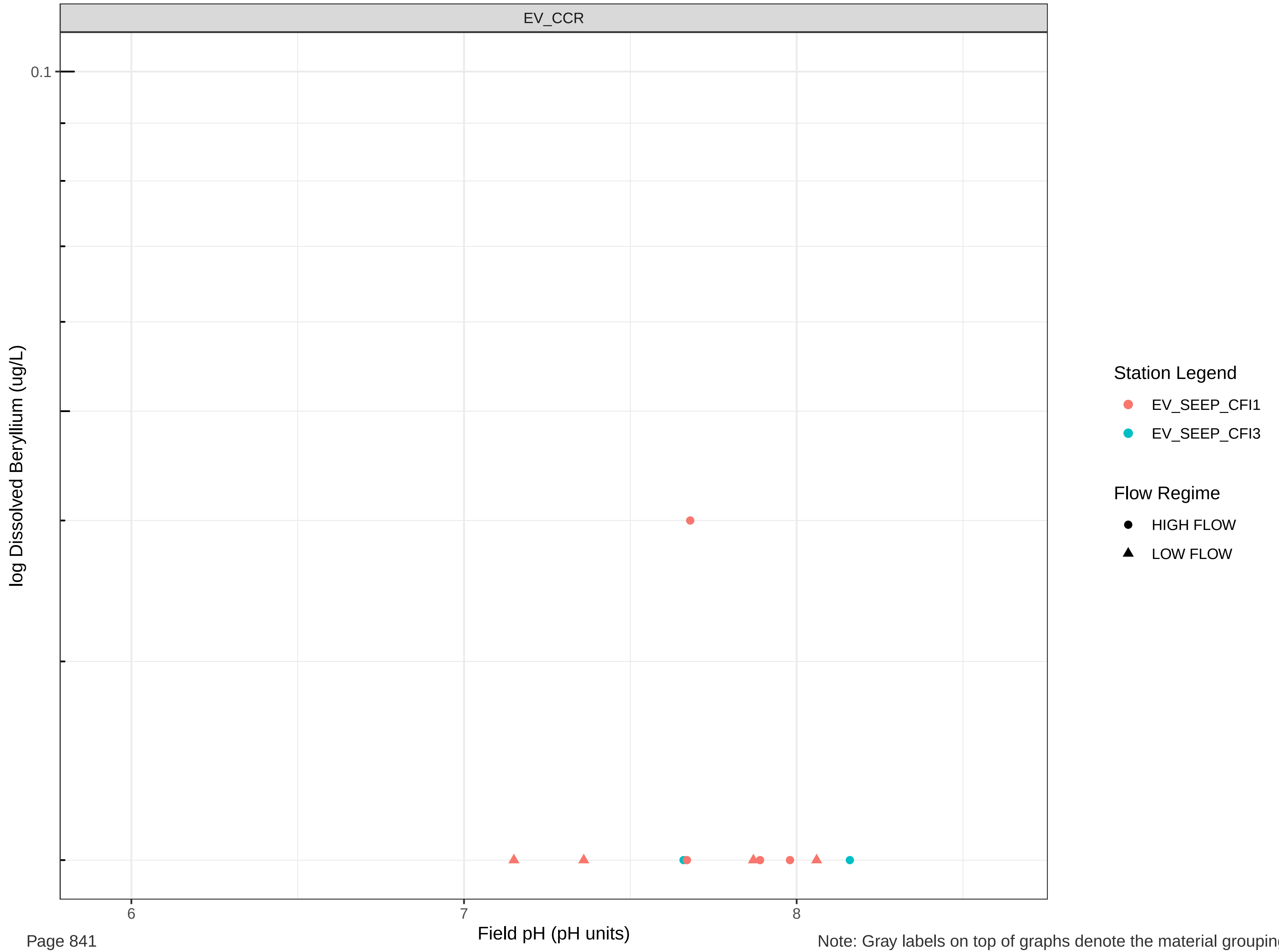
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7
8
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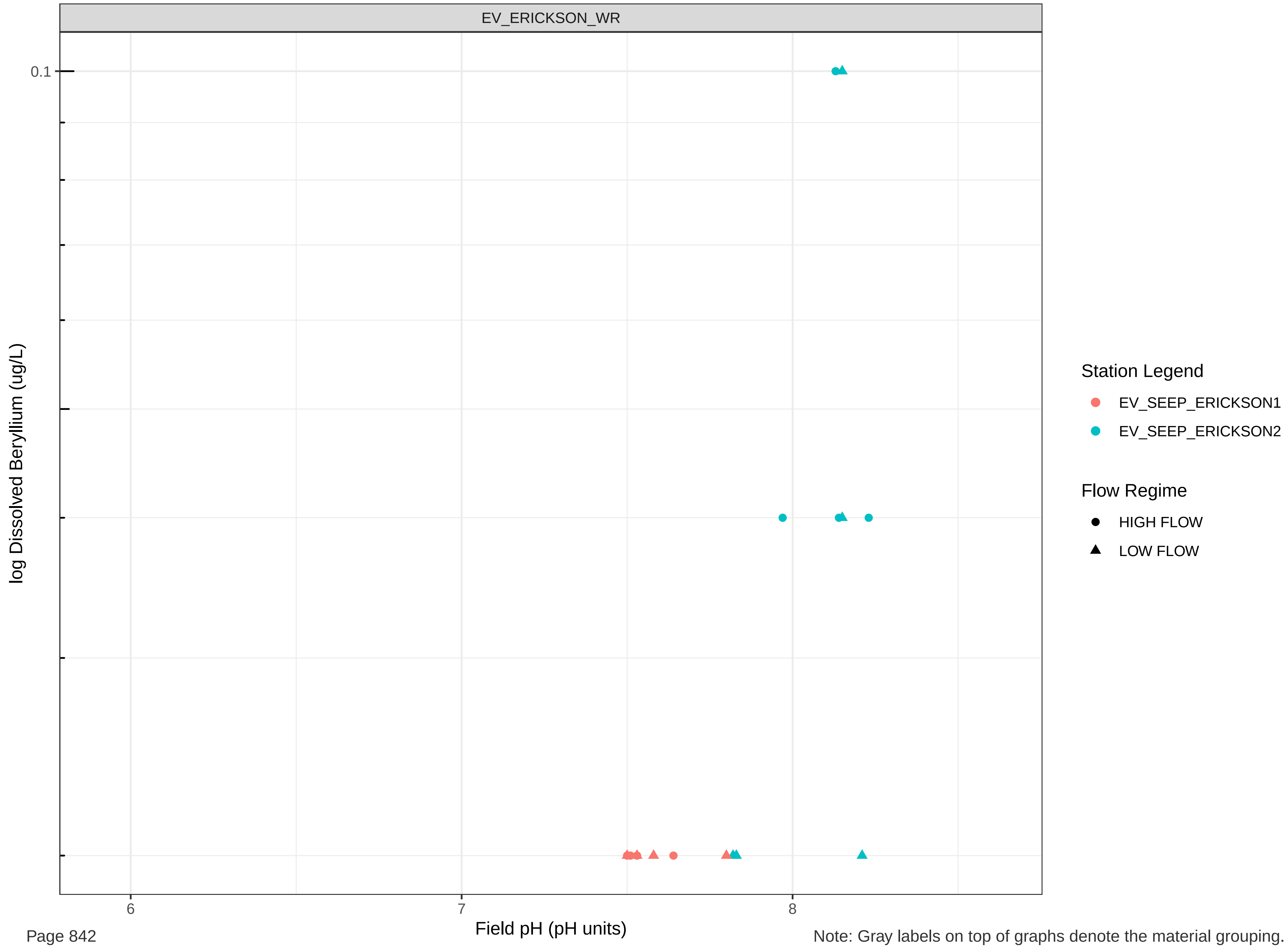

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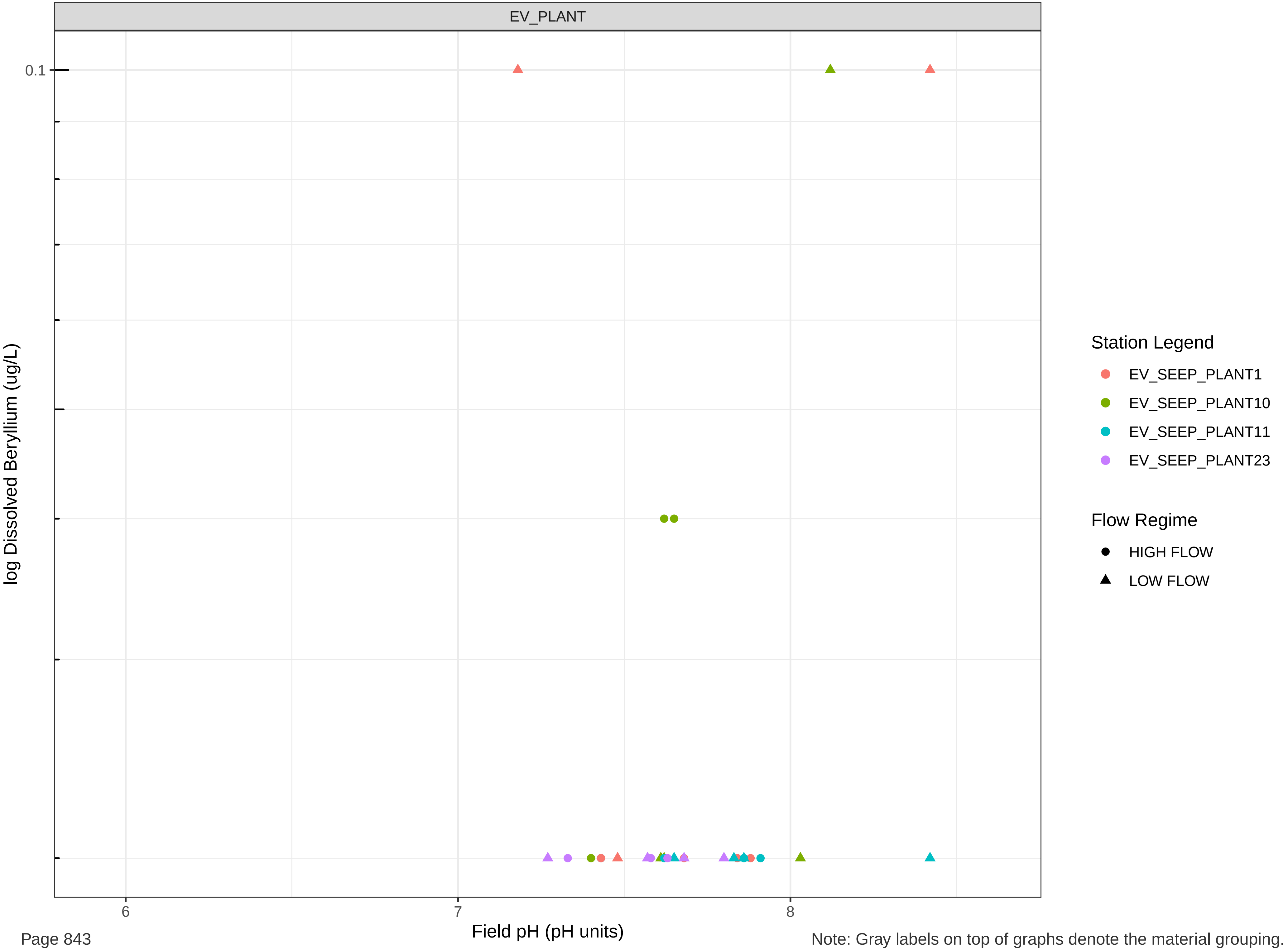

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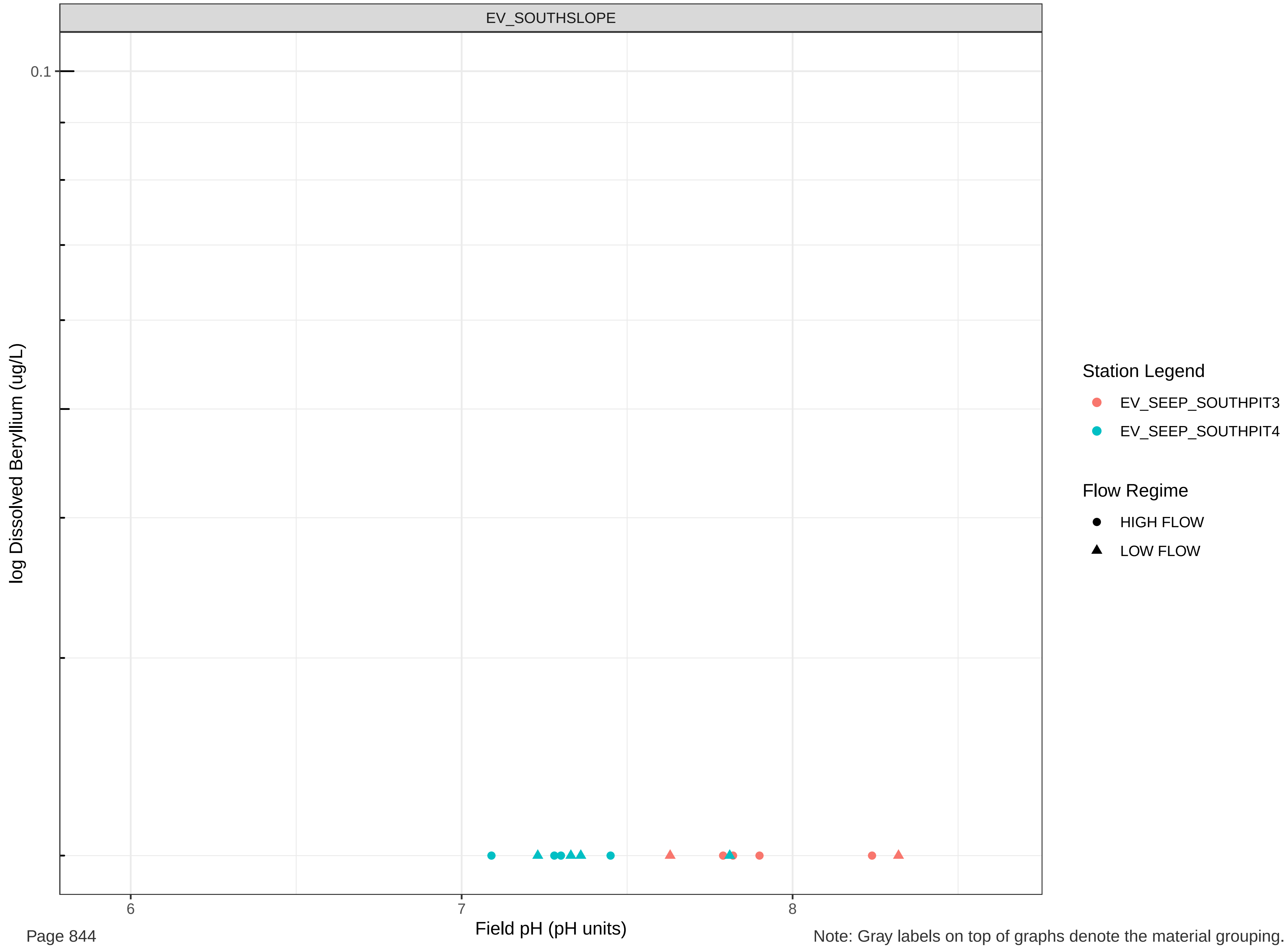

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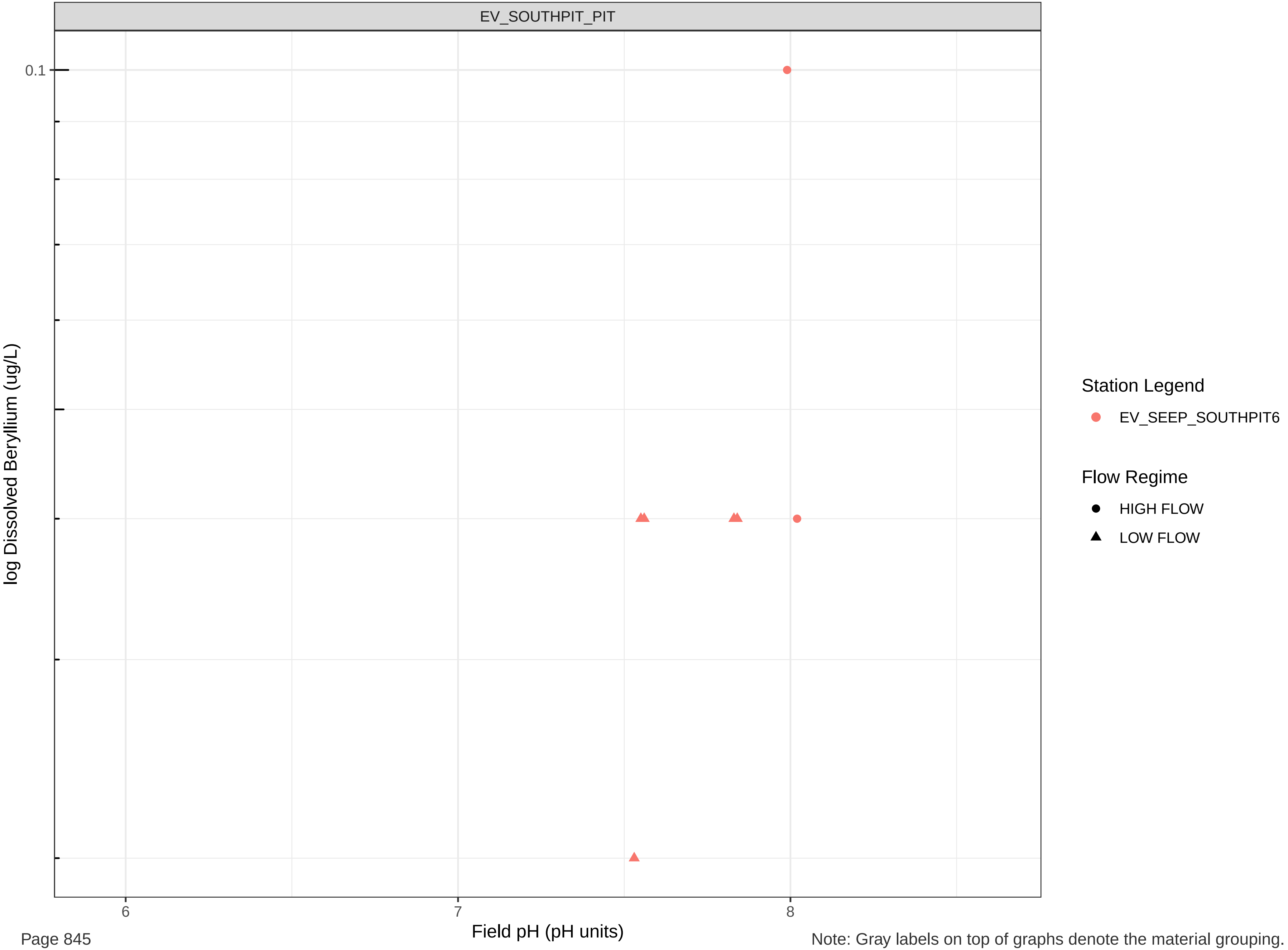

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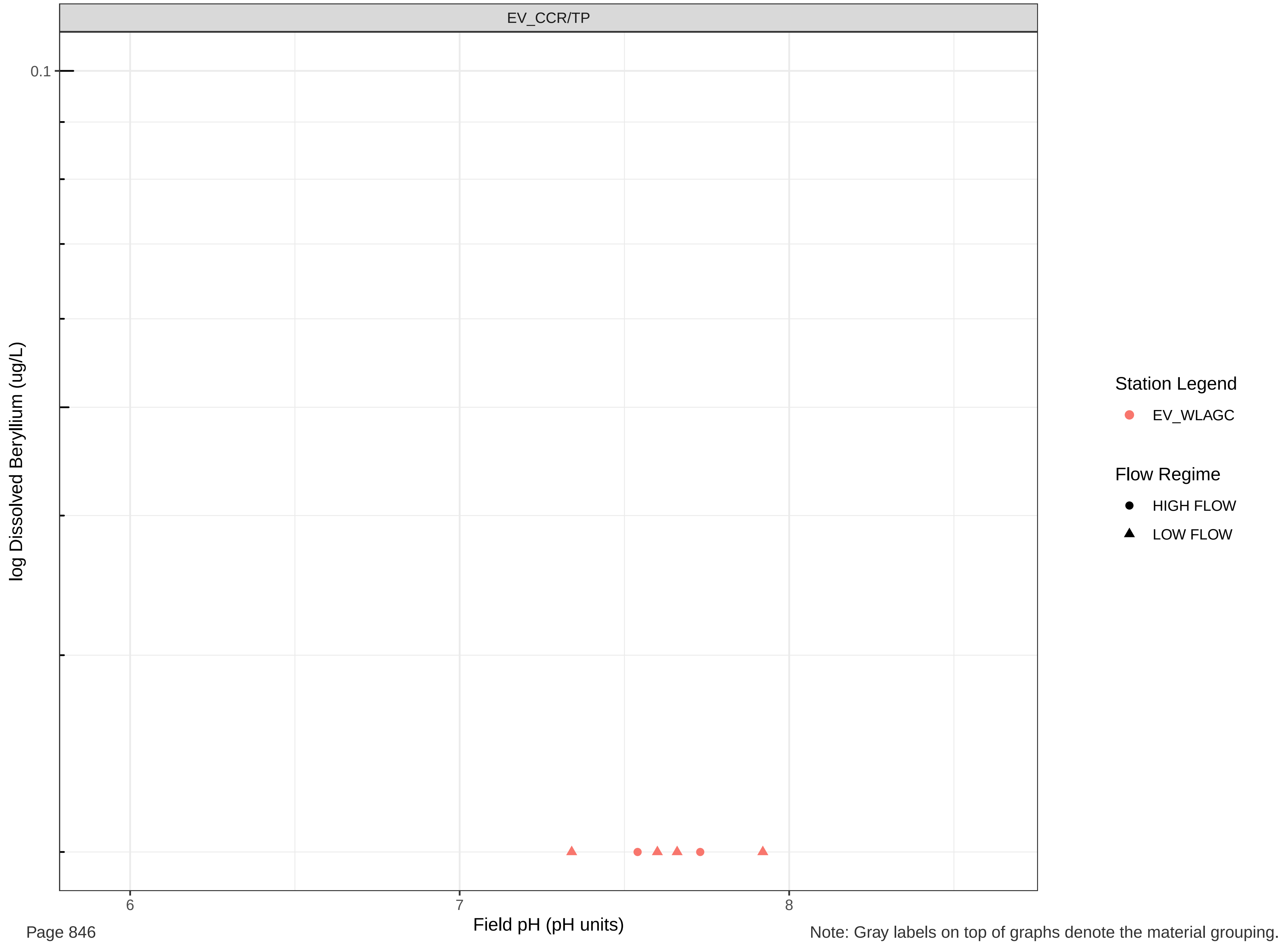

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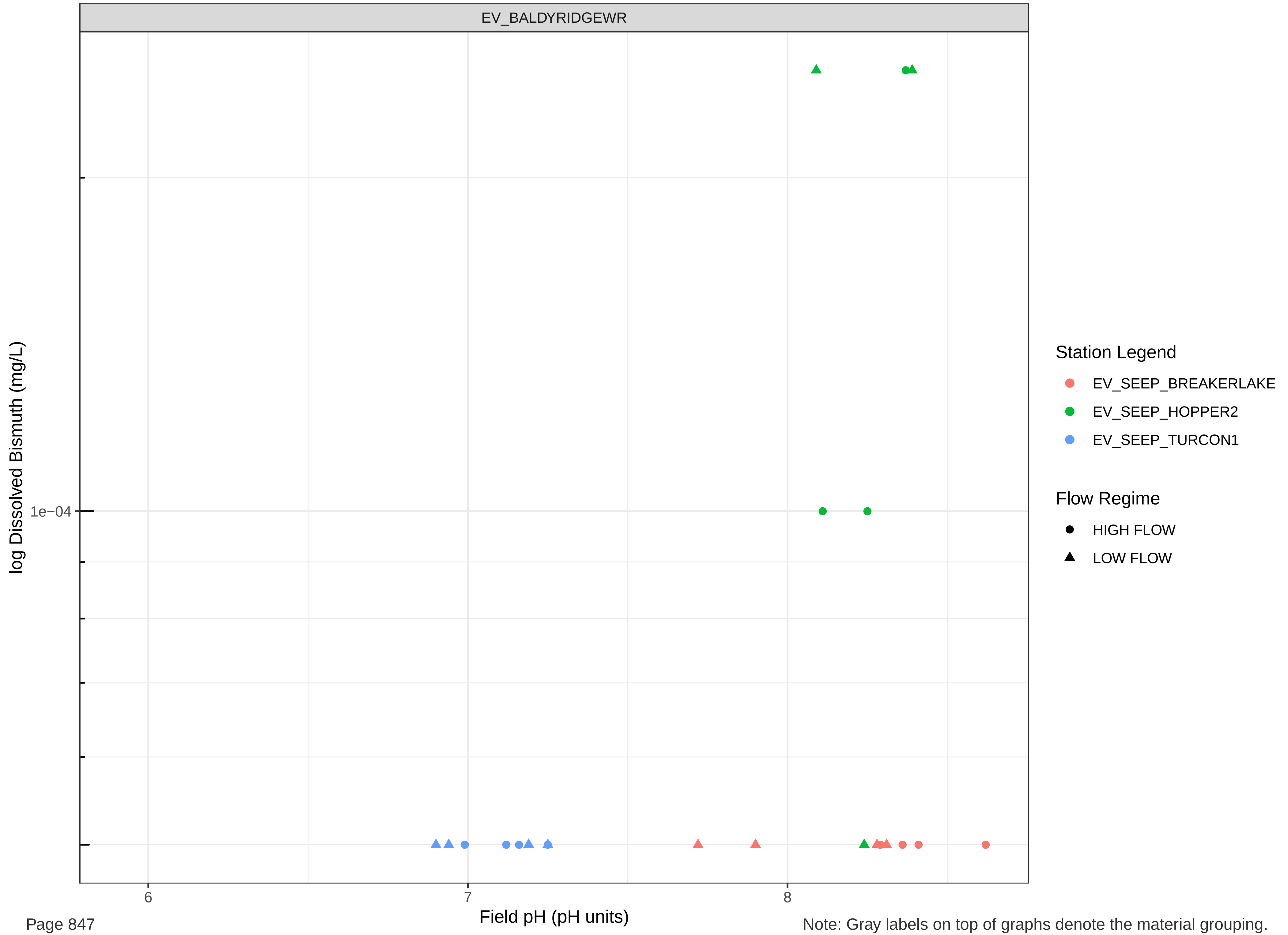

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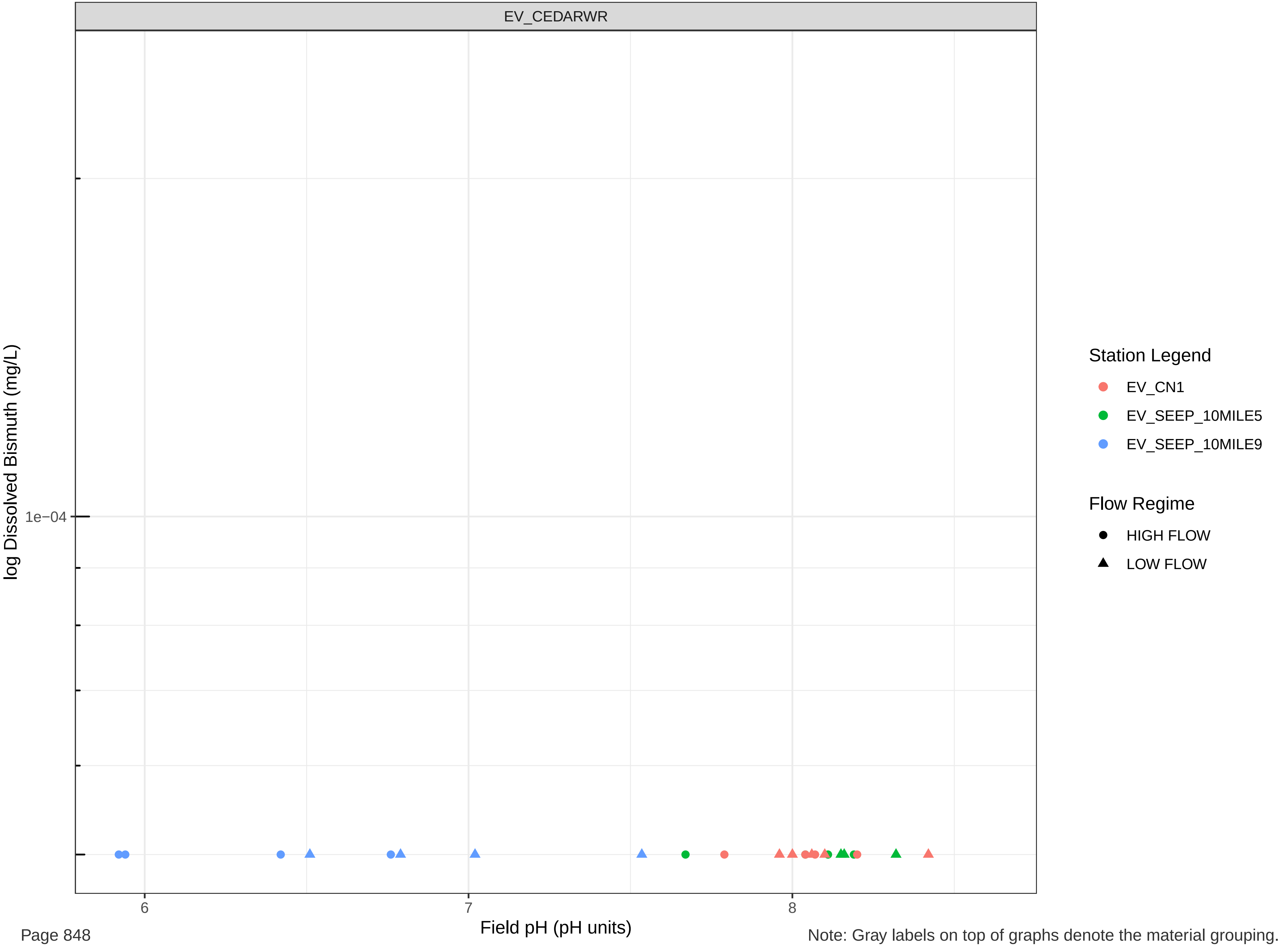

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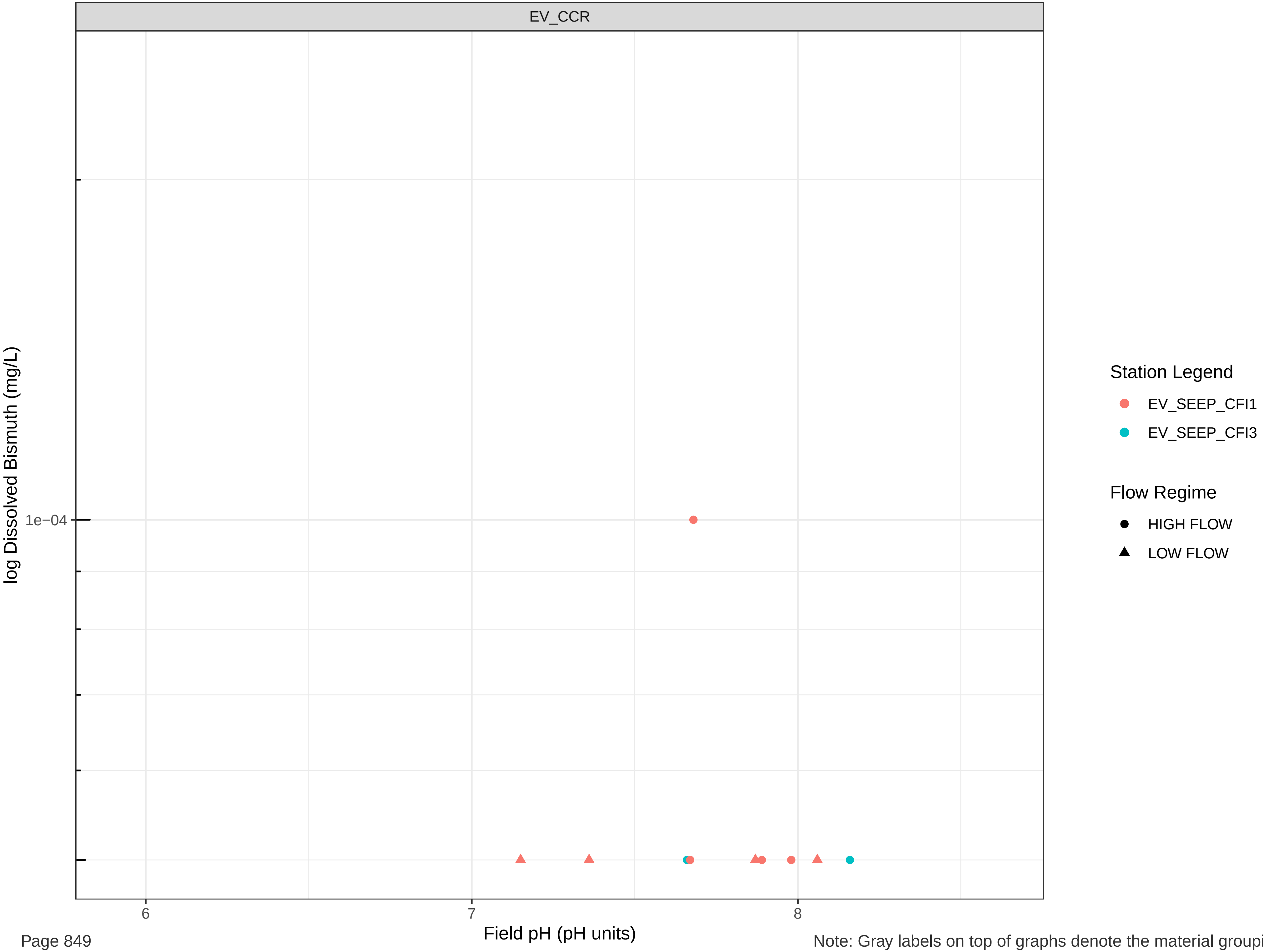

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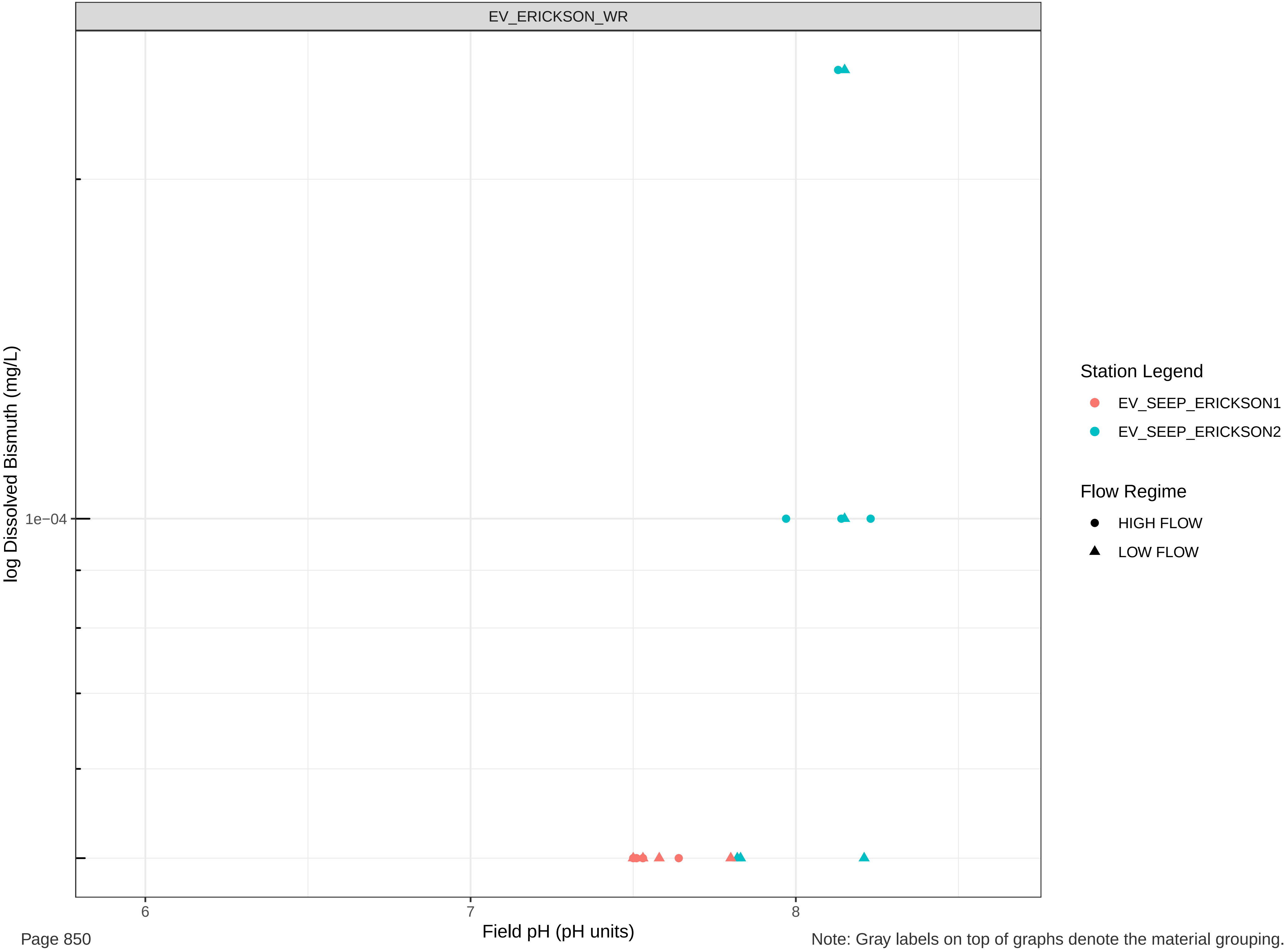

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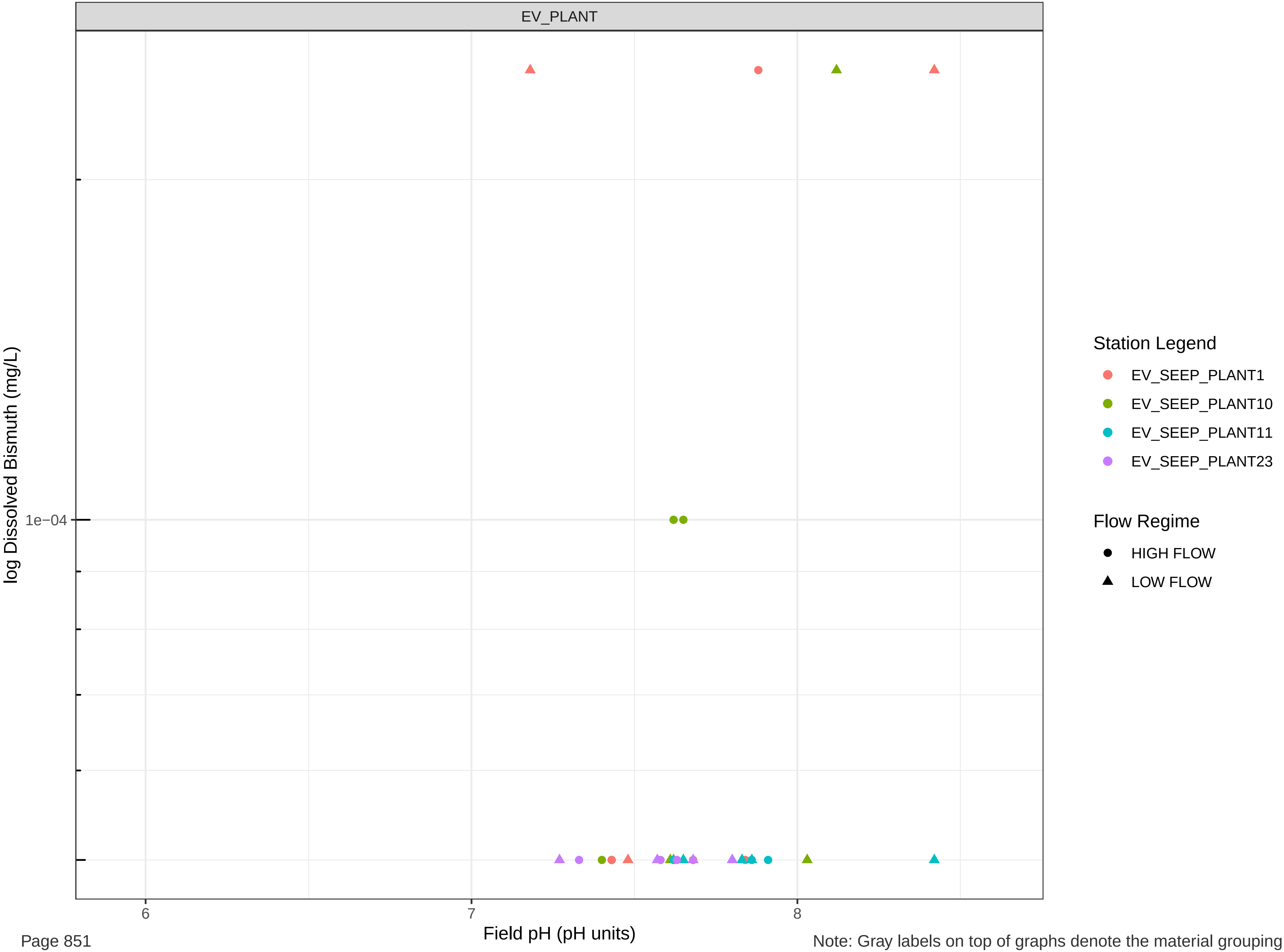
6
7
8
Field pH (pH units)
Station Legend
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



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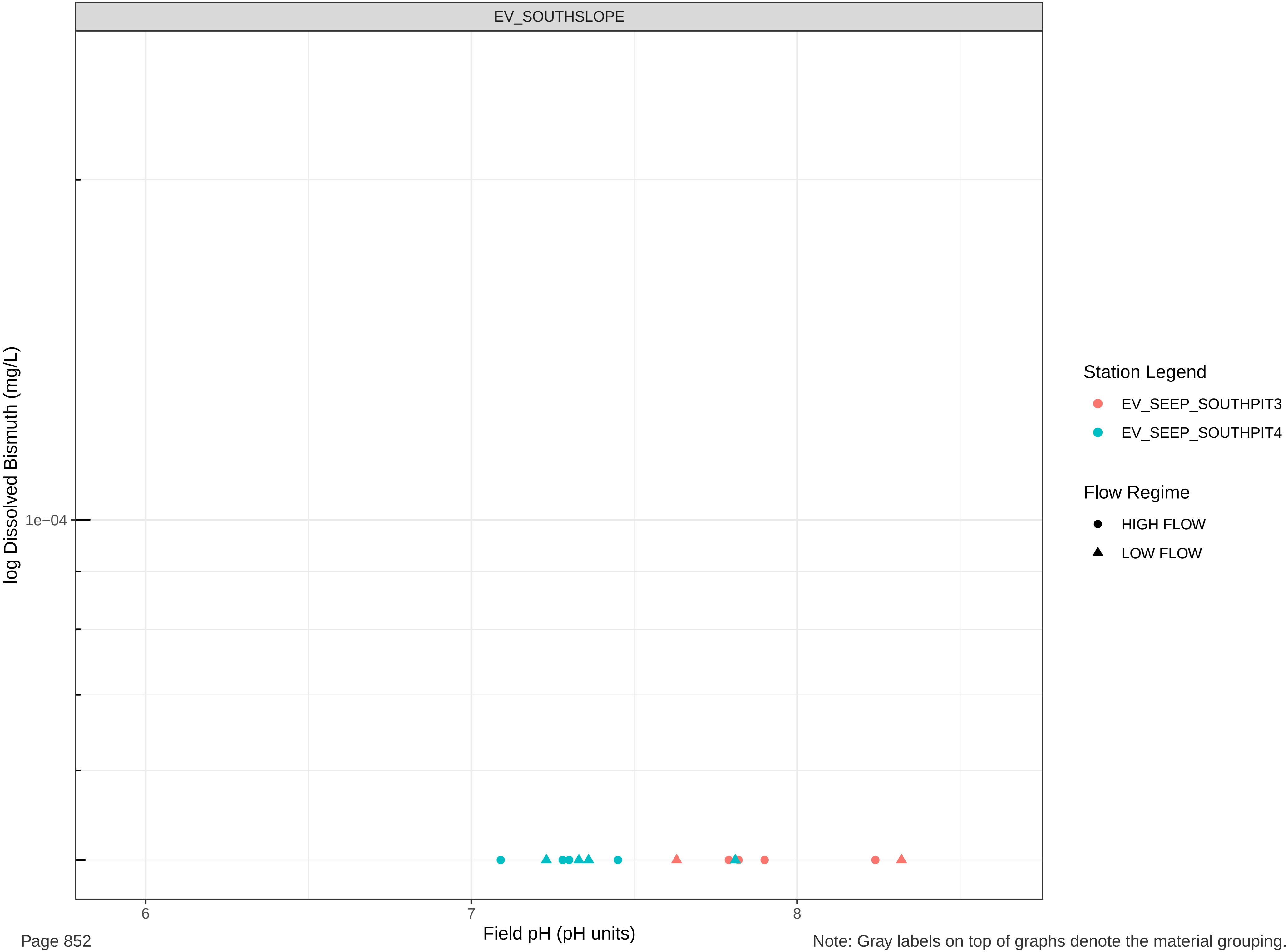

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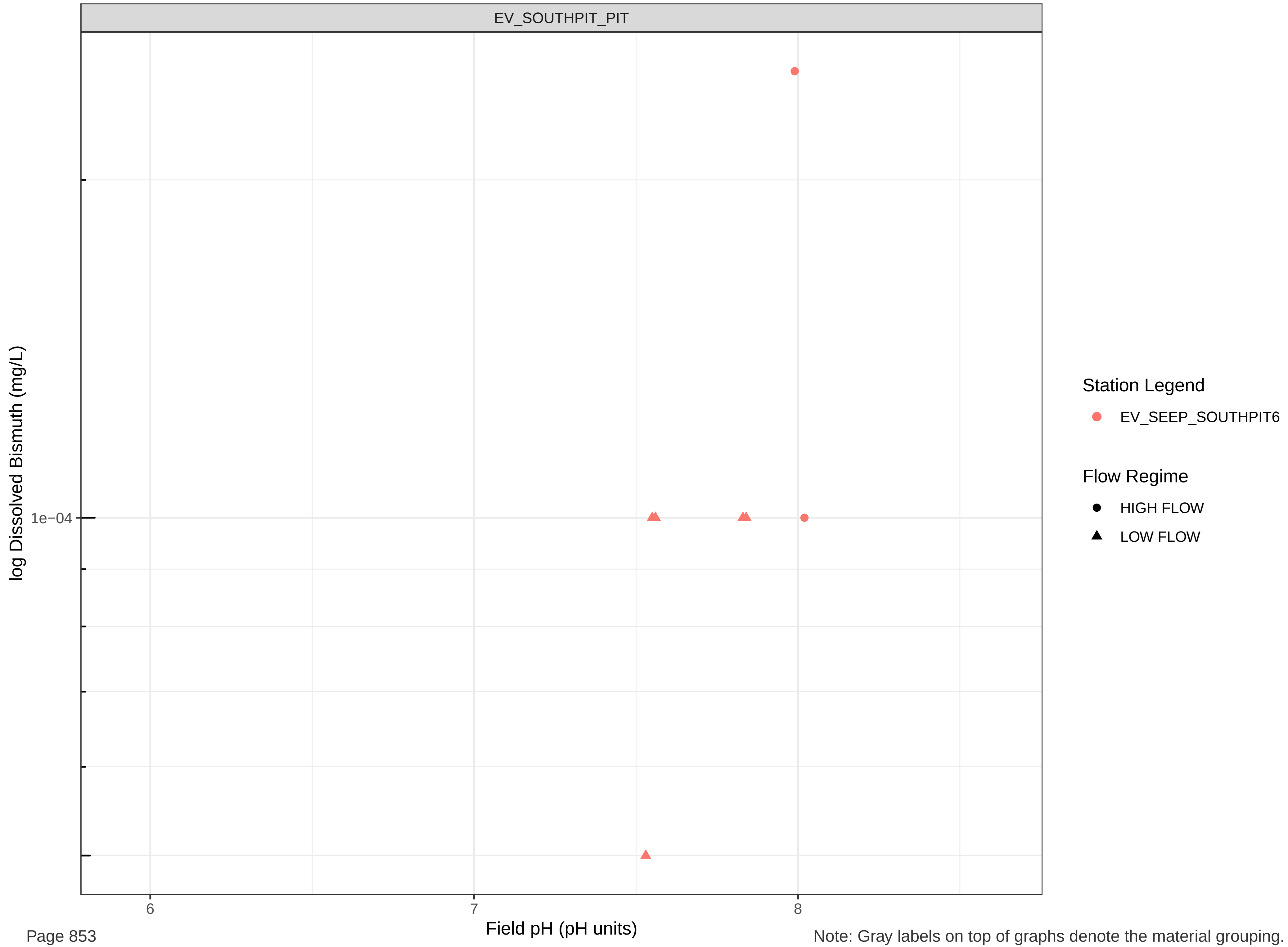

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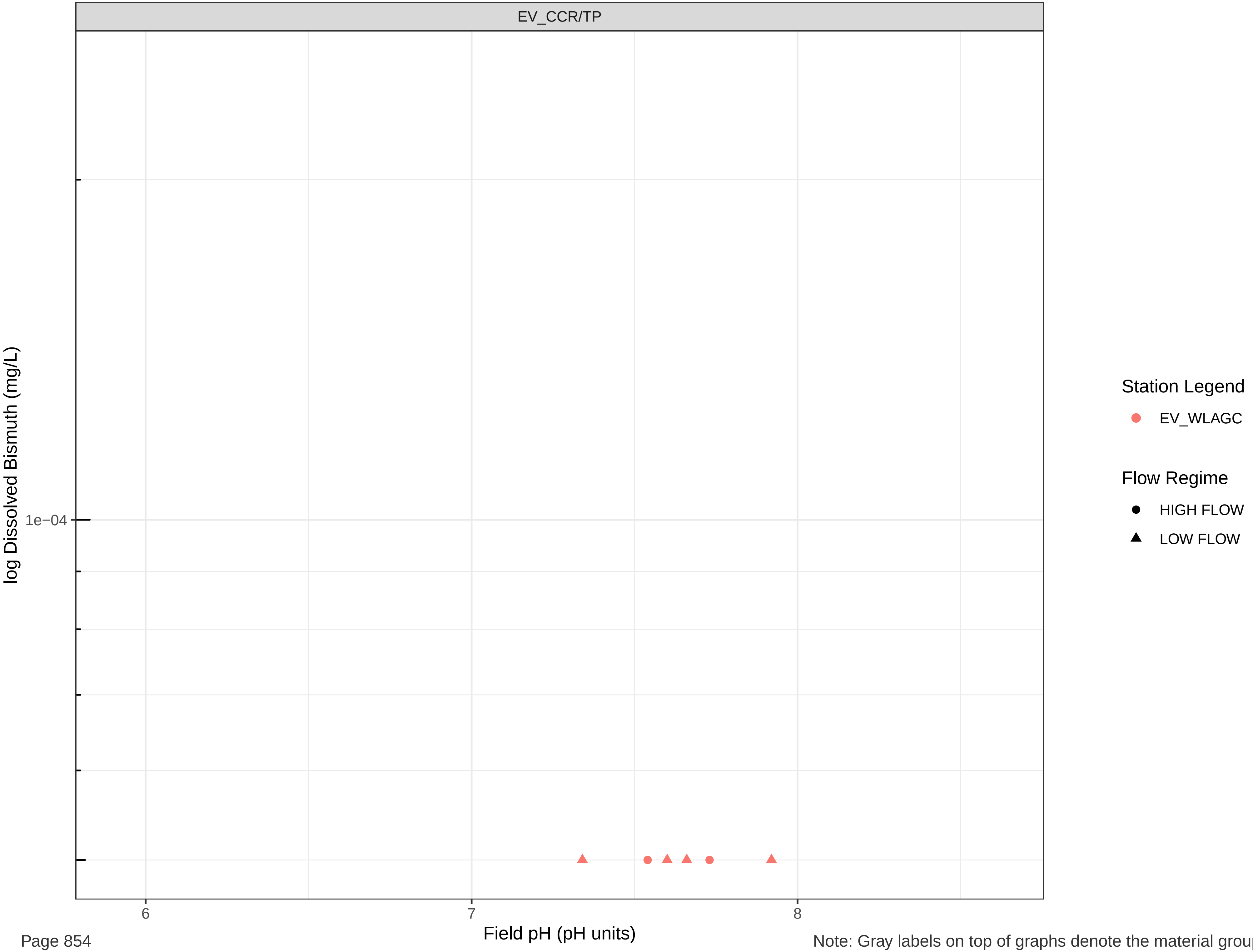

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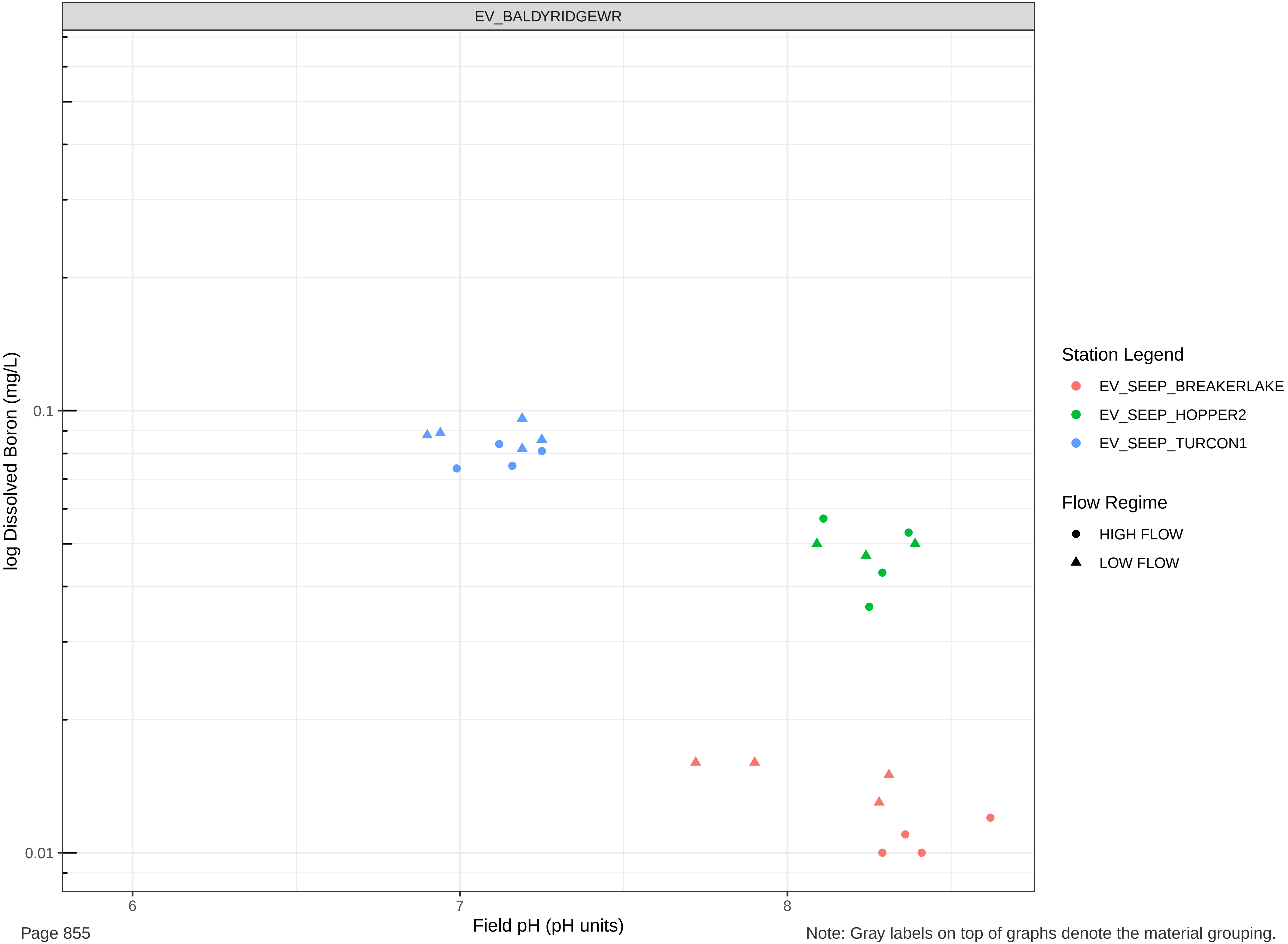

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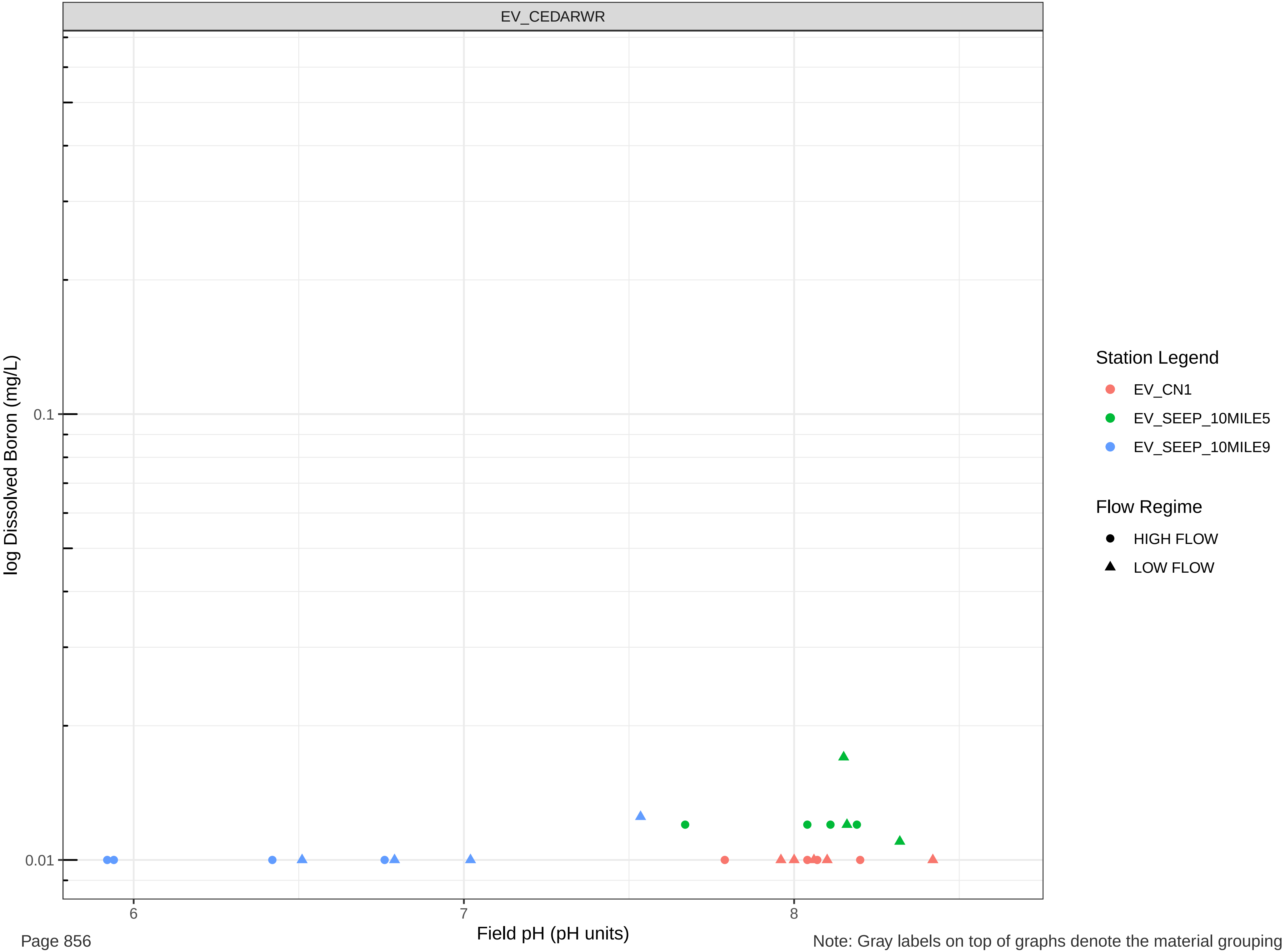

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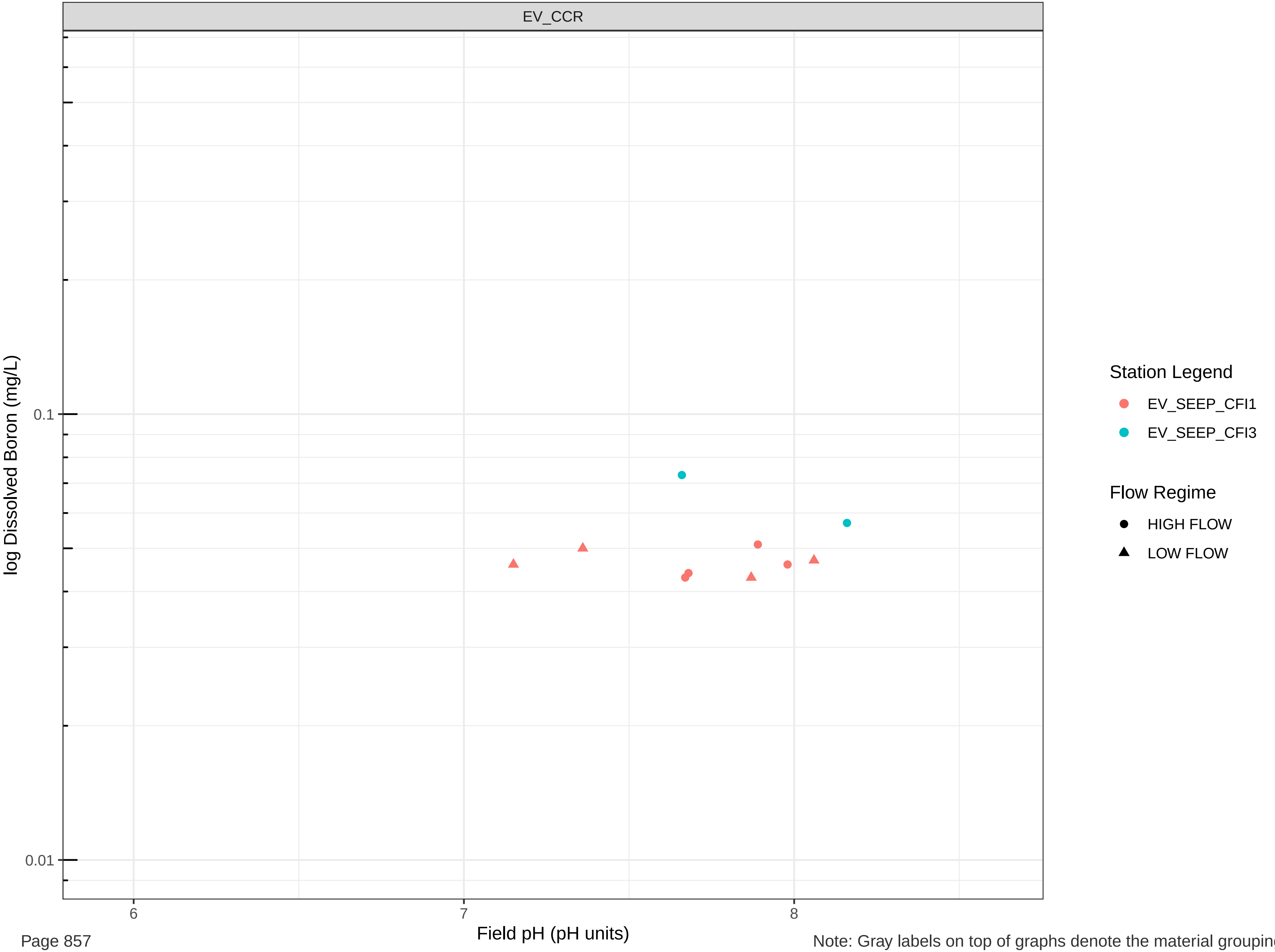

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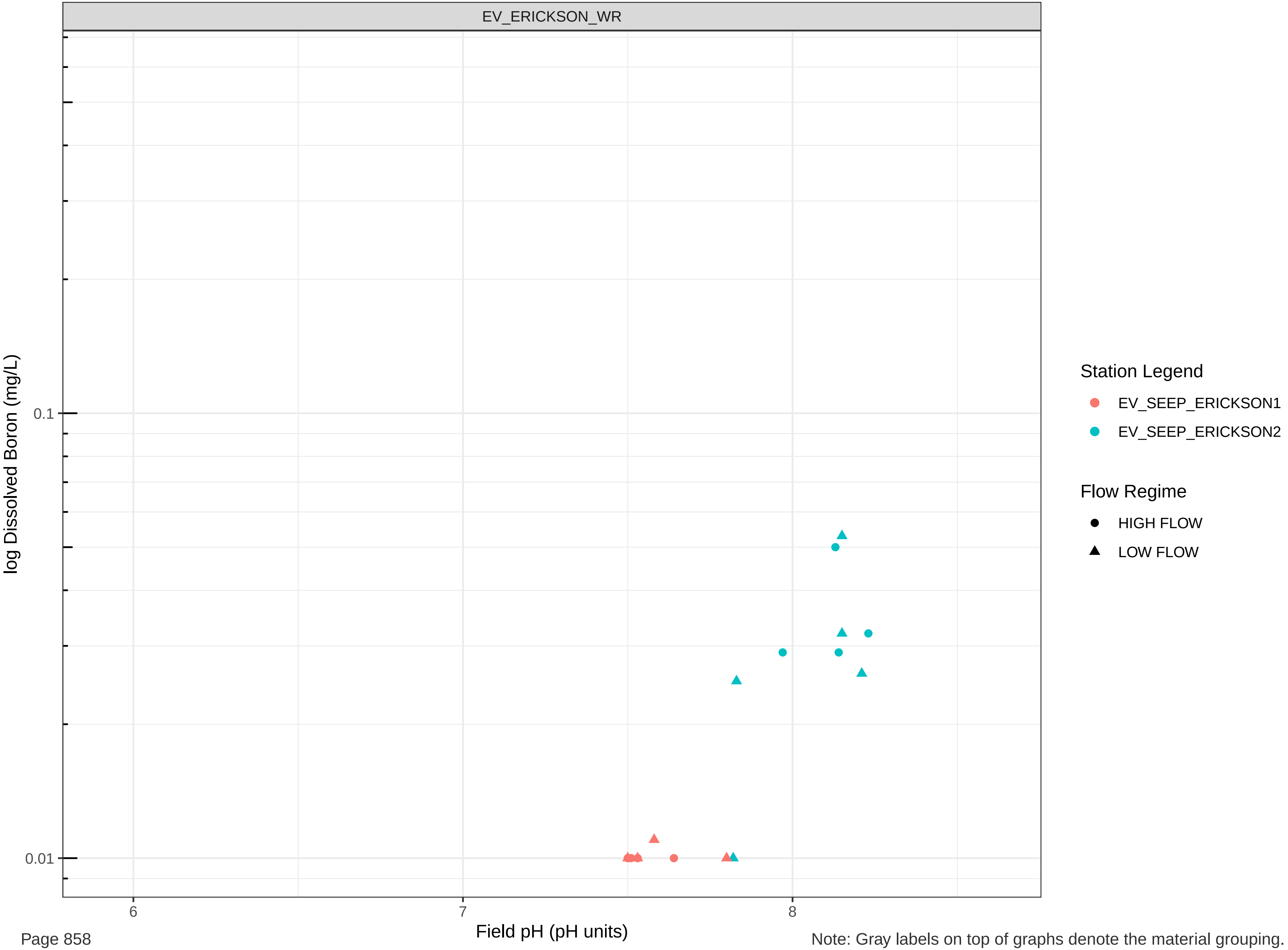

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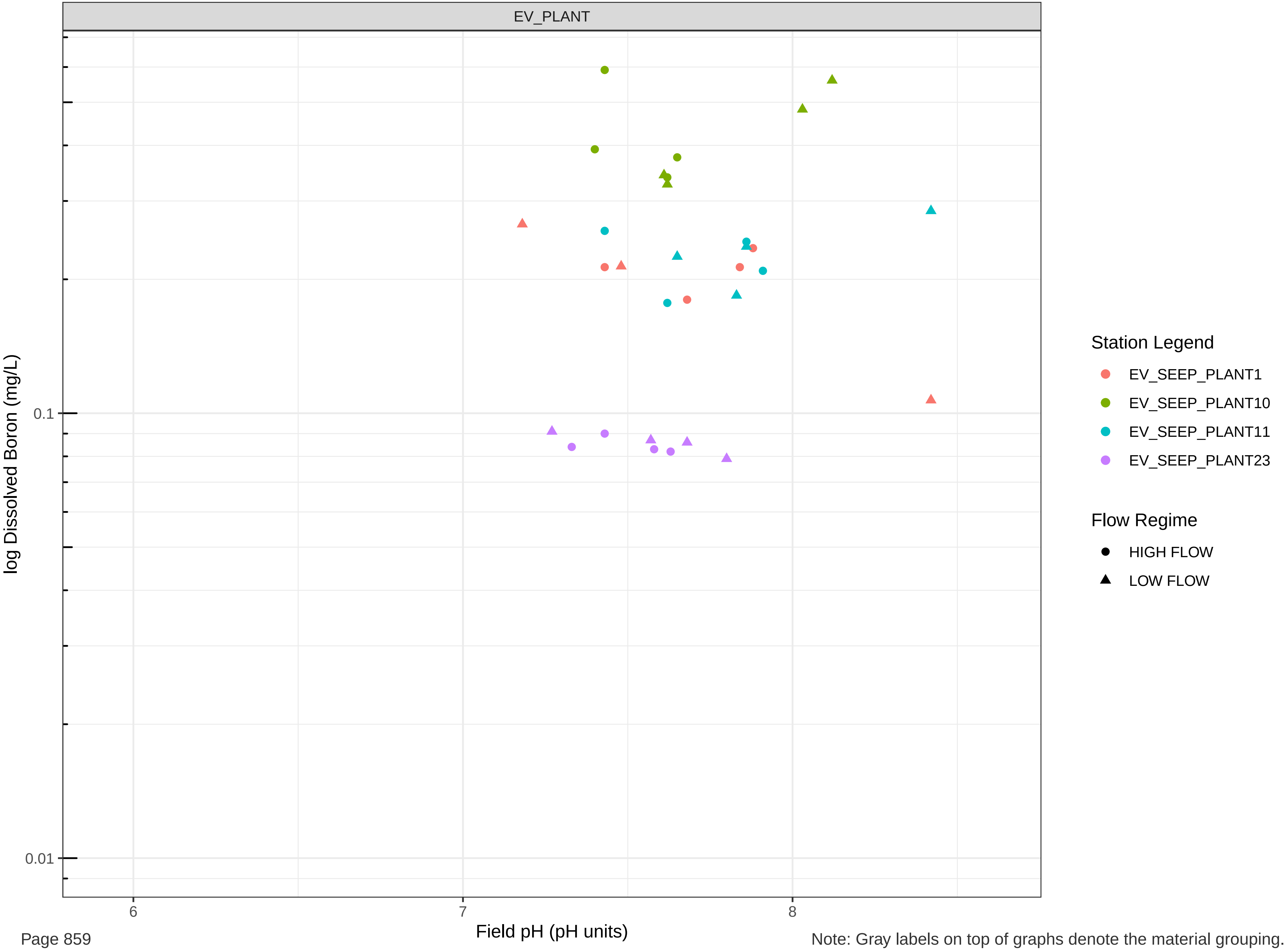

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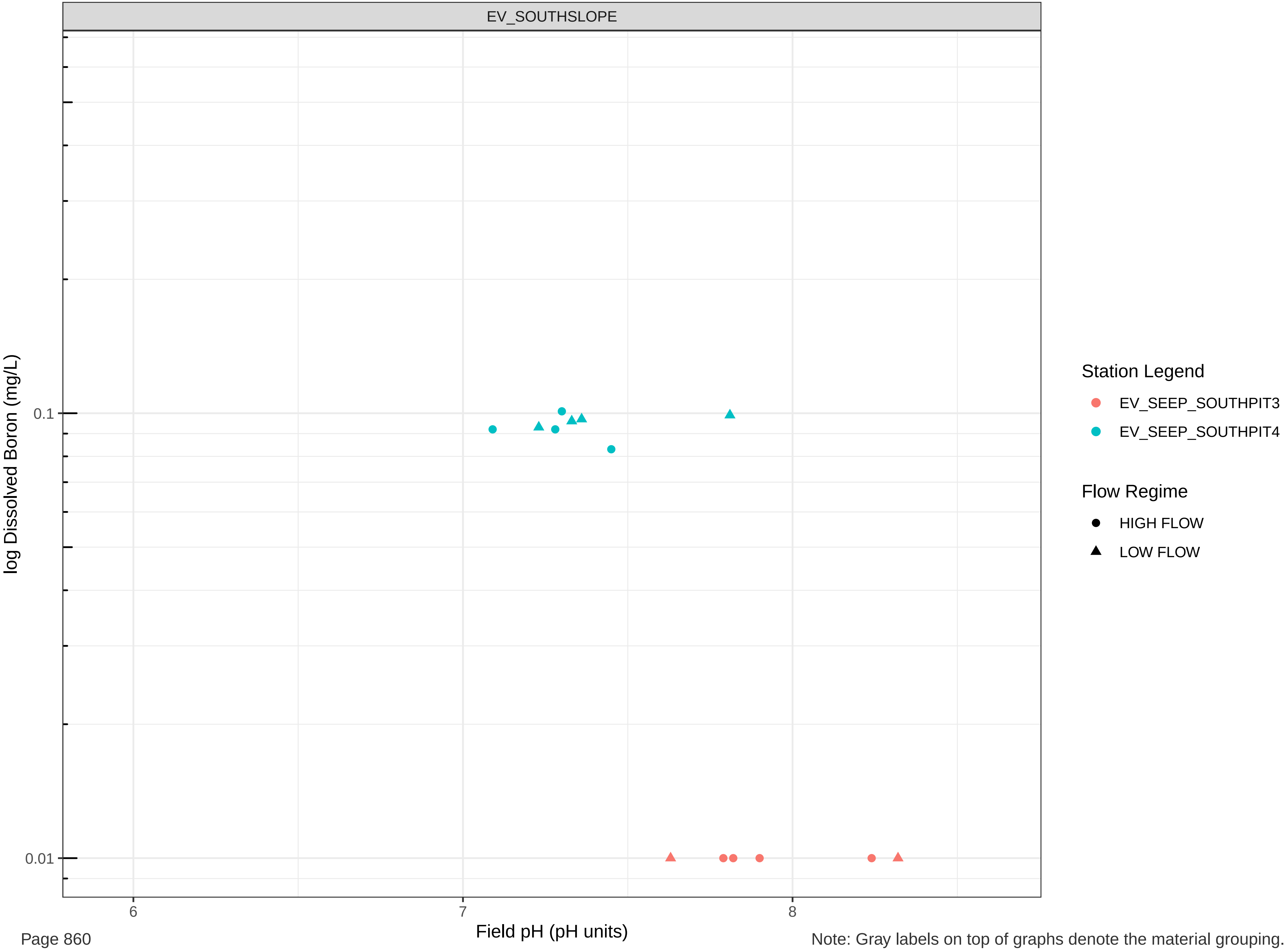

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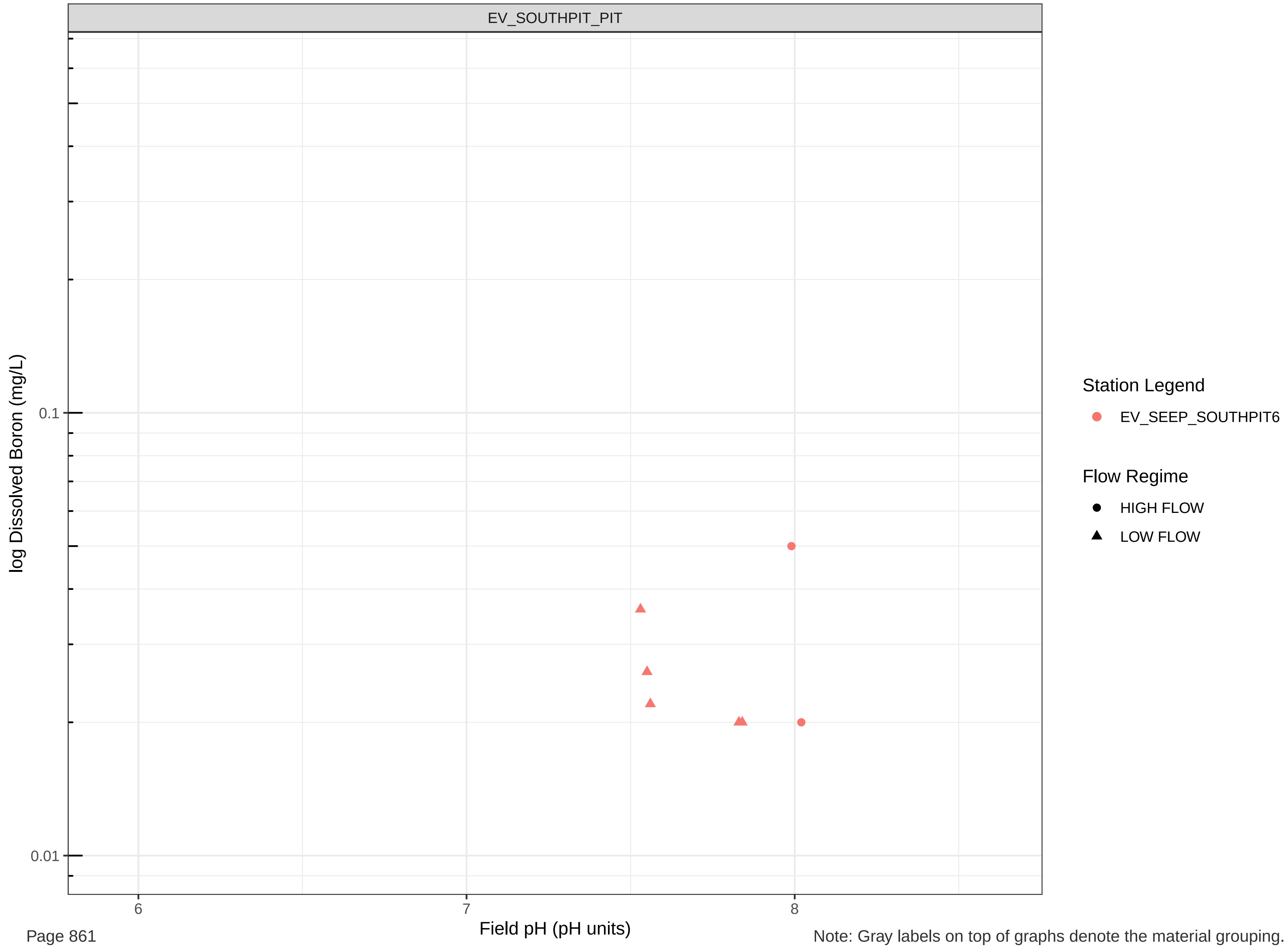

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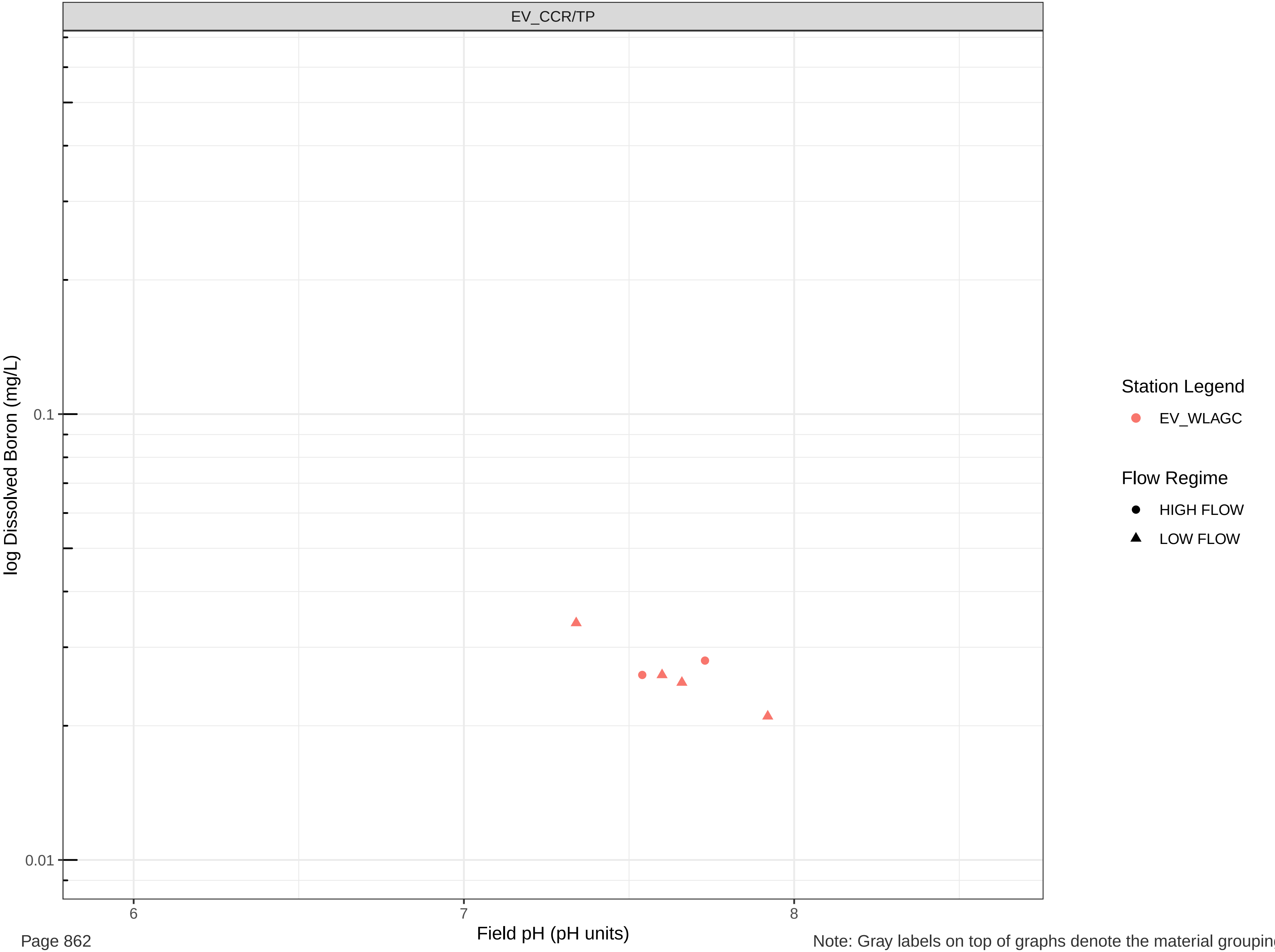

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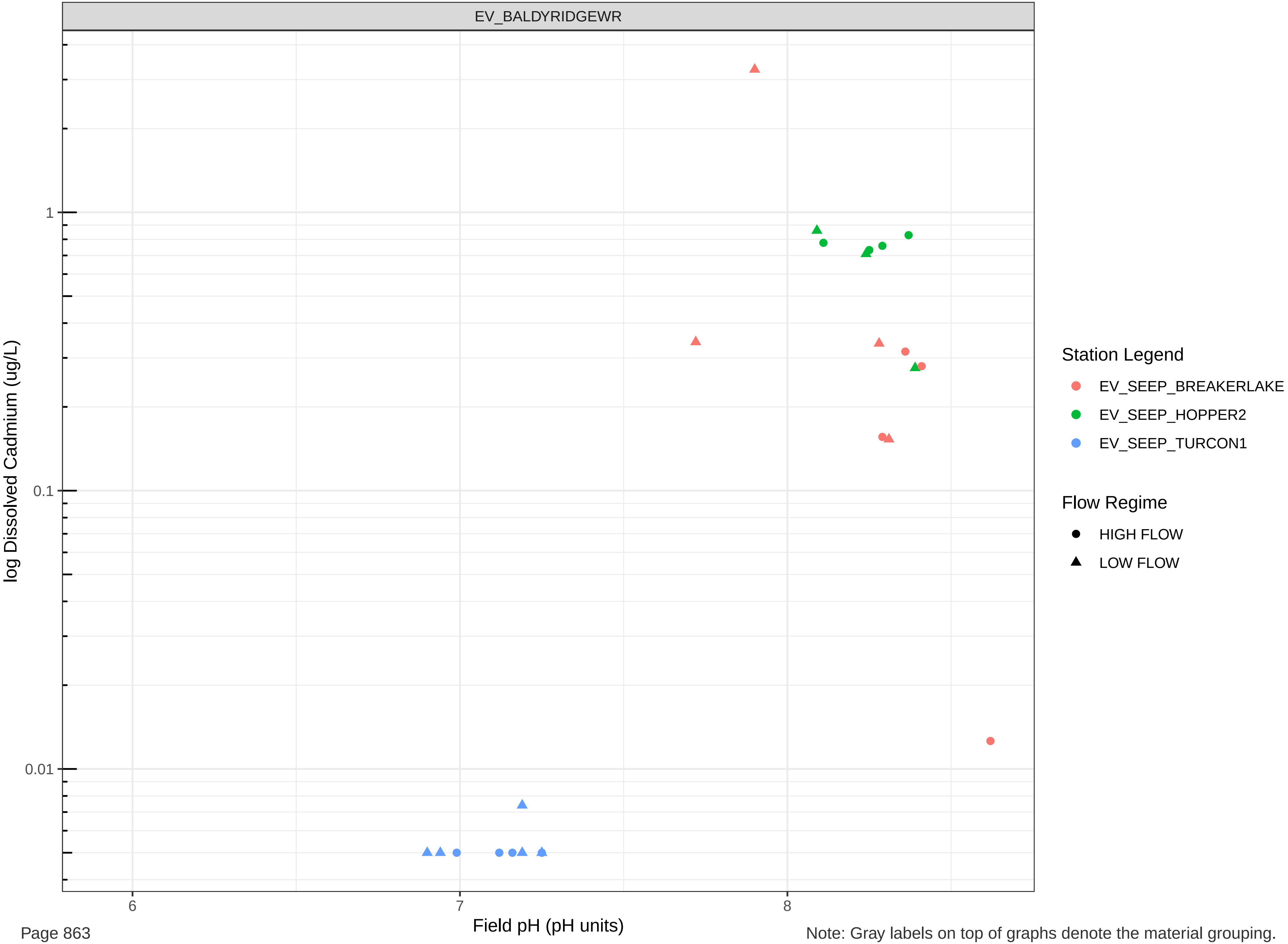

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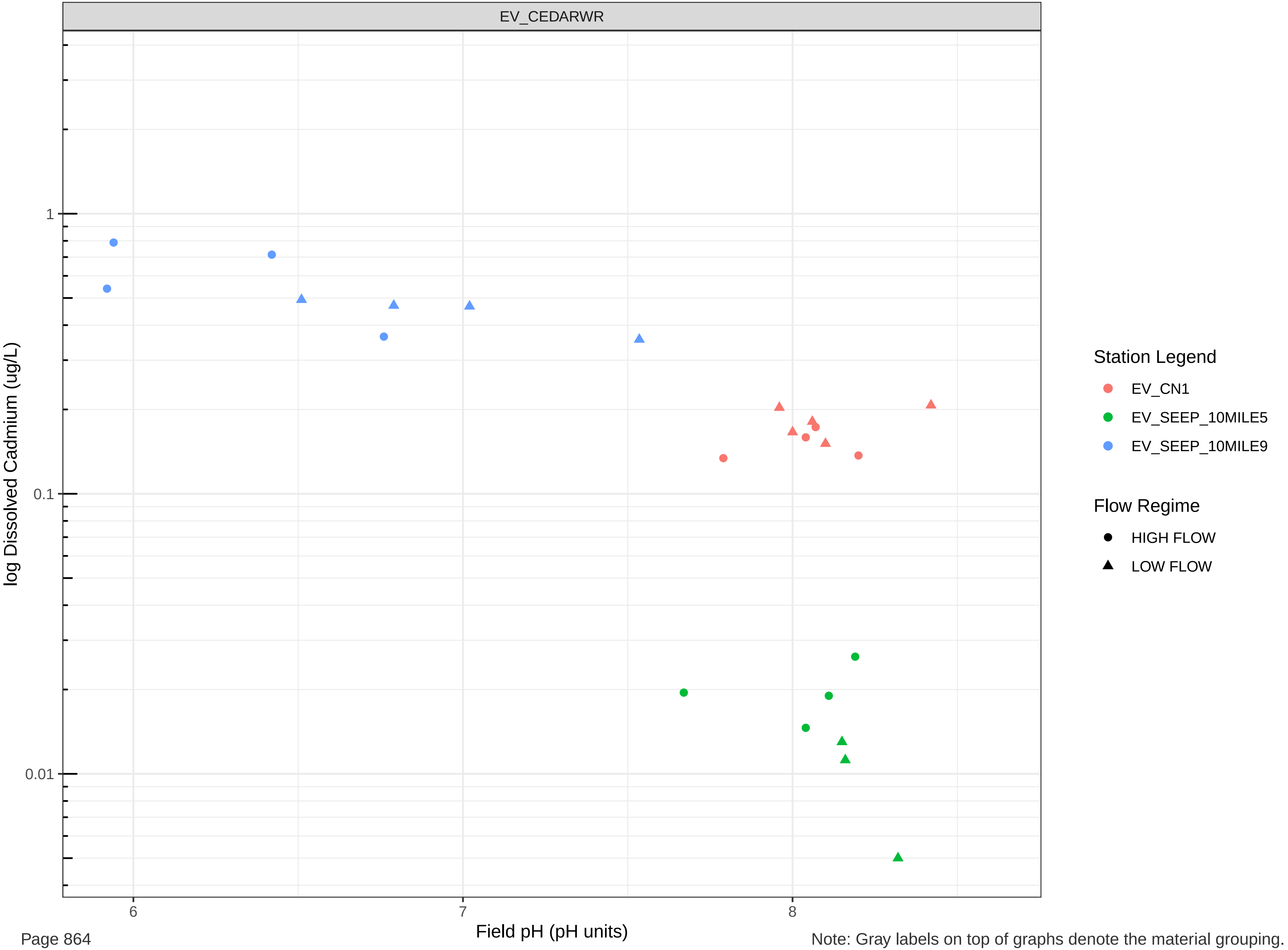

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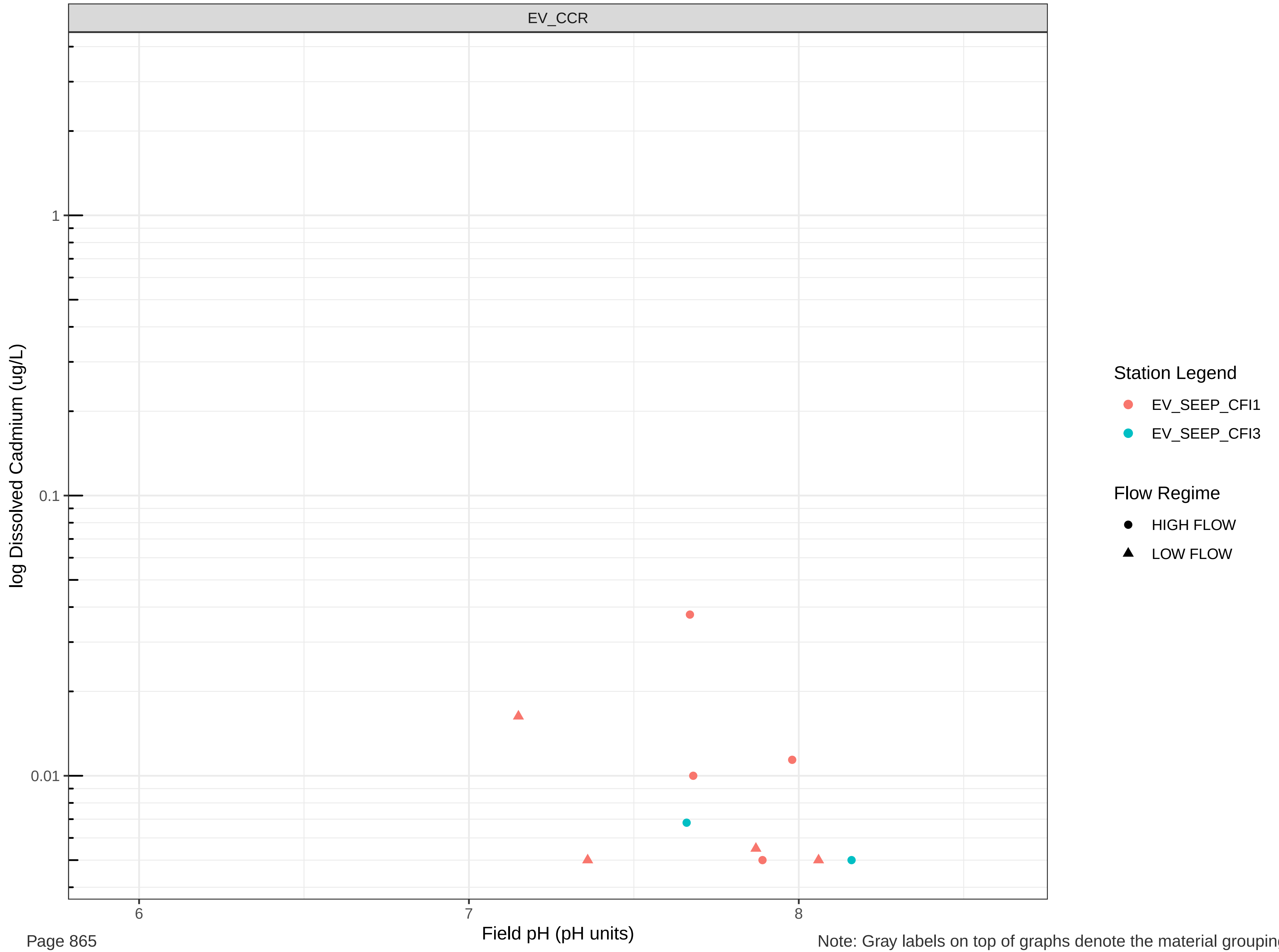

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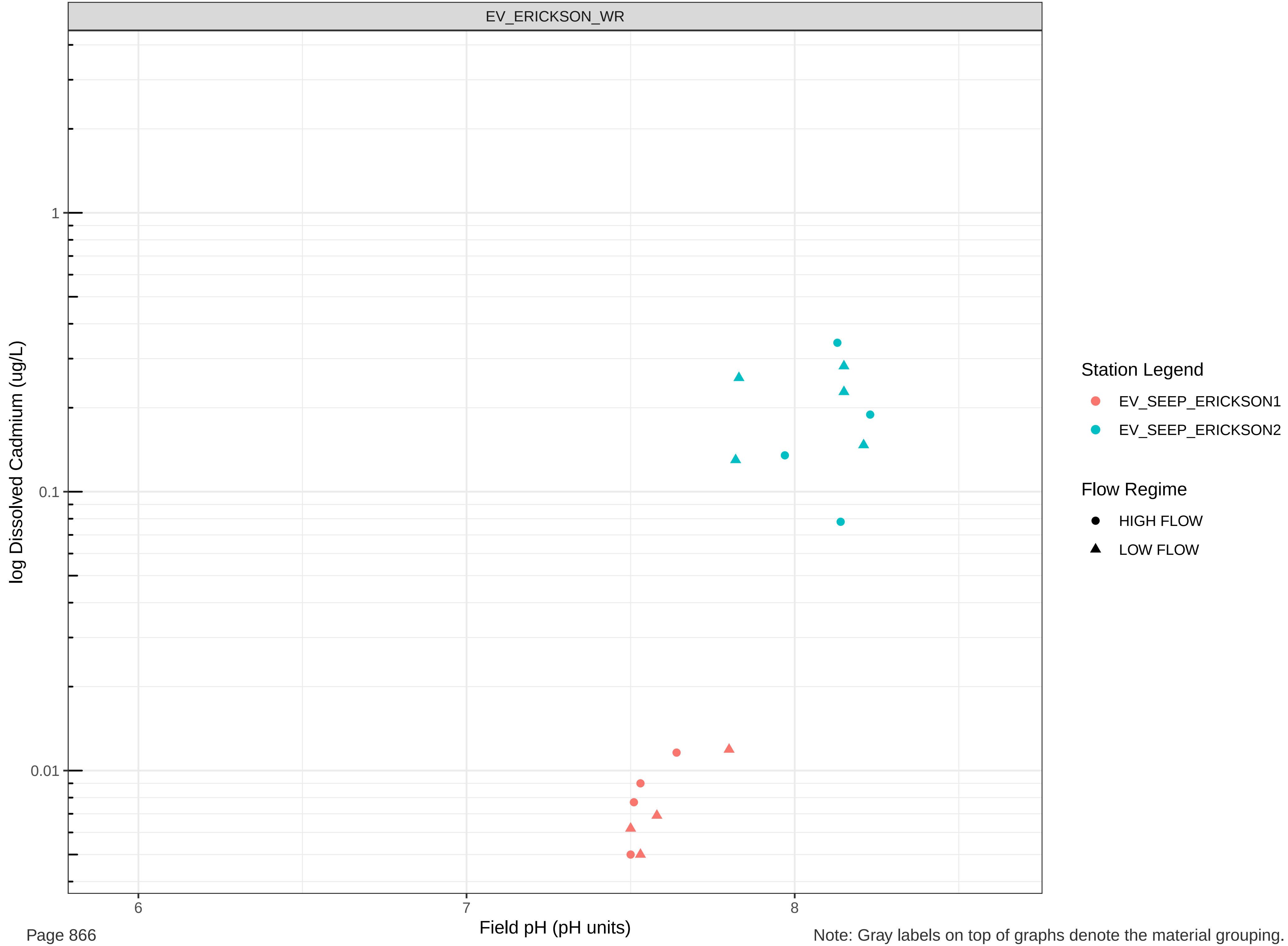

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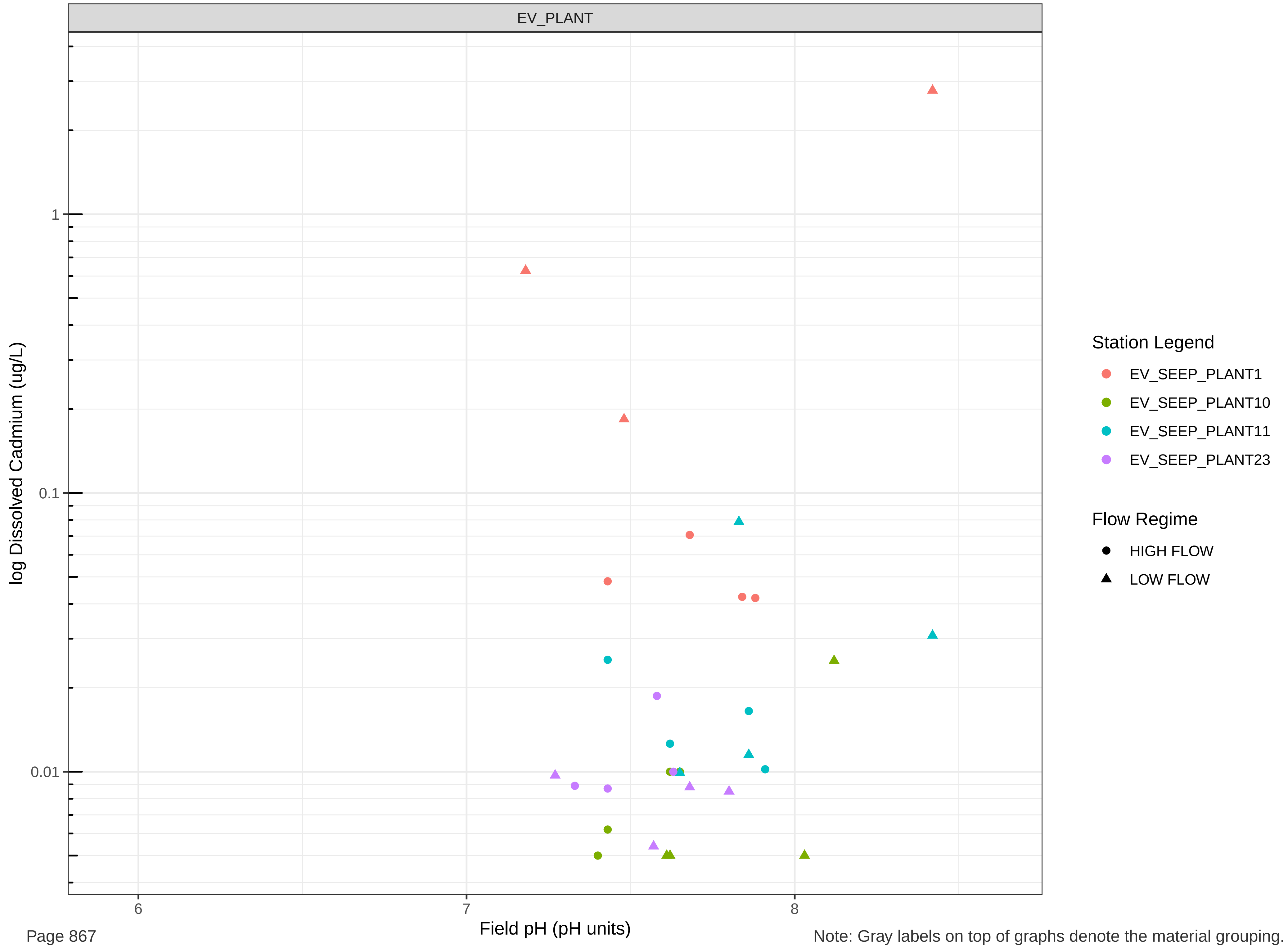

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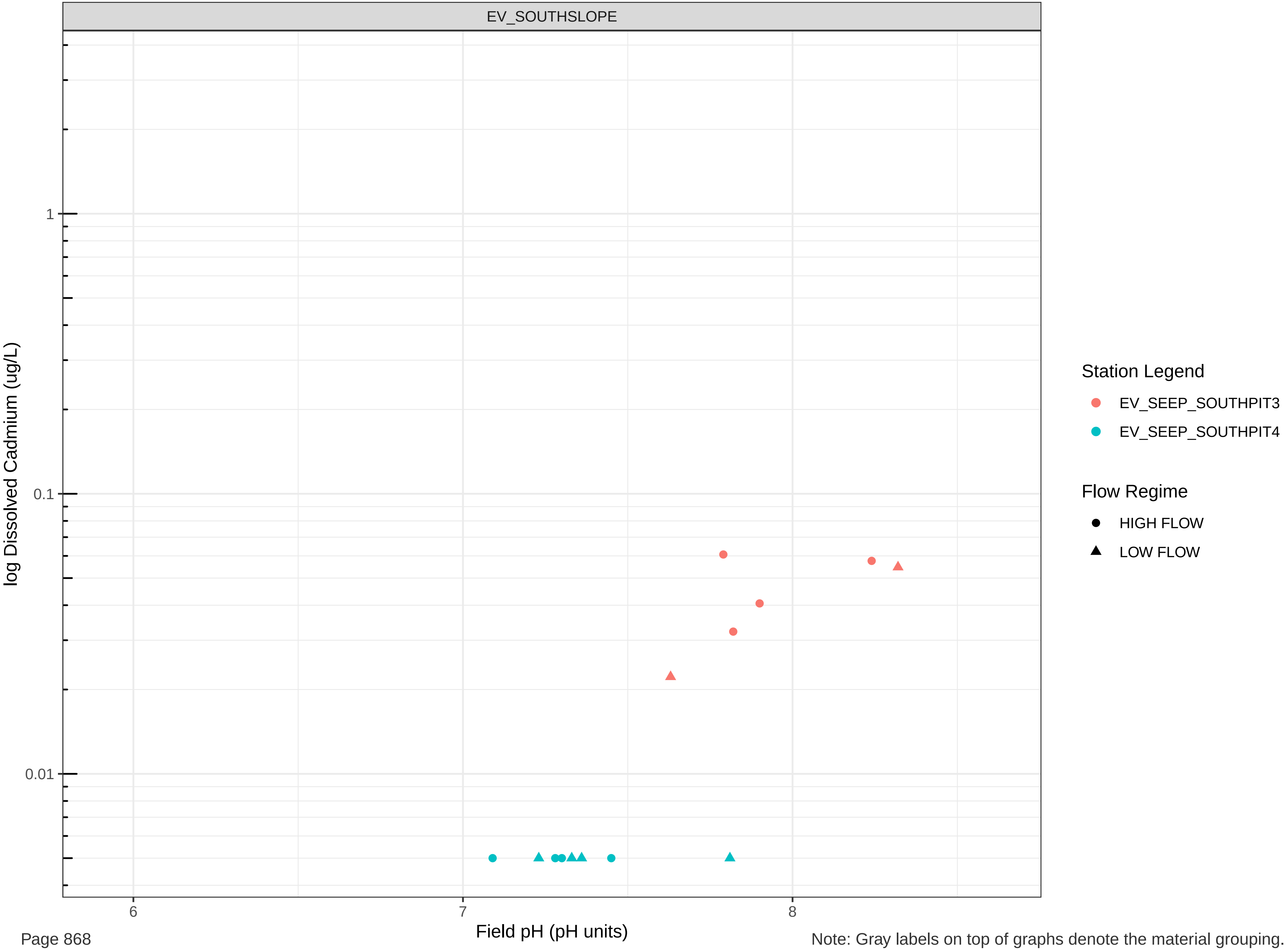

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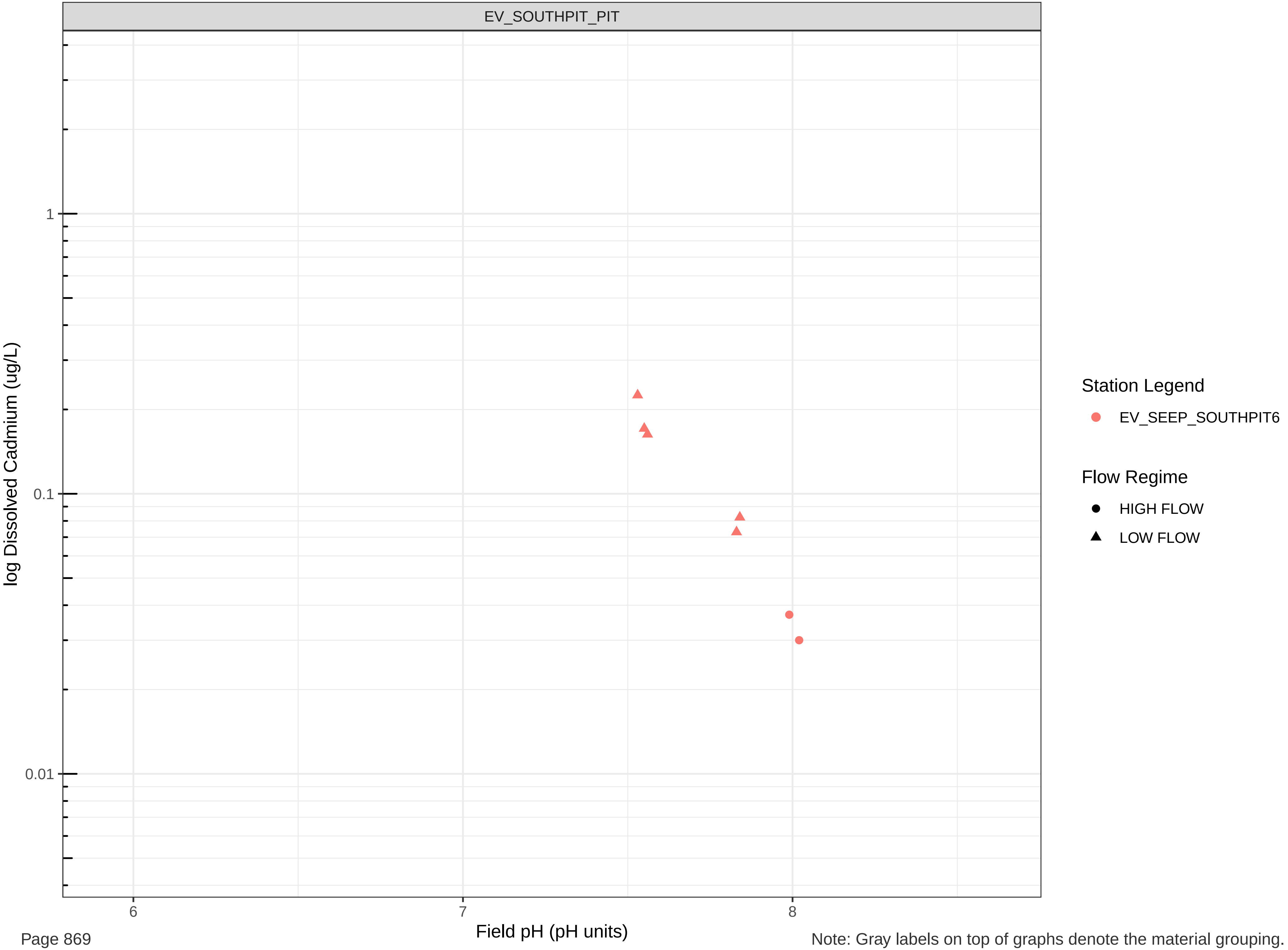

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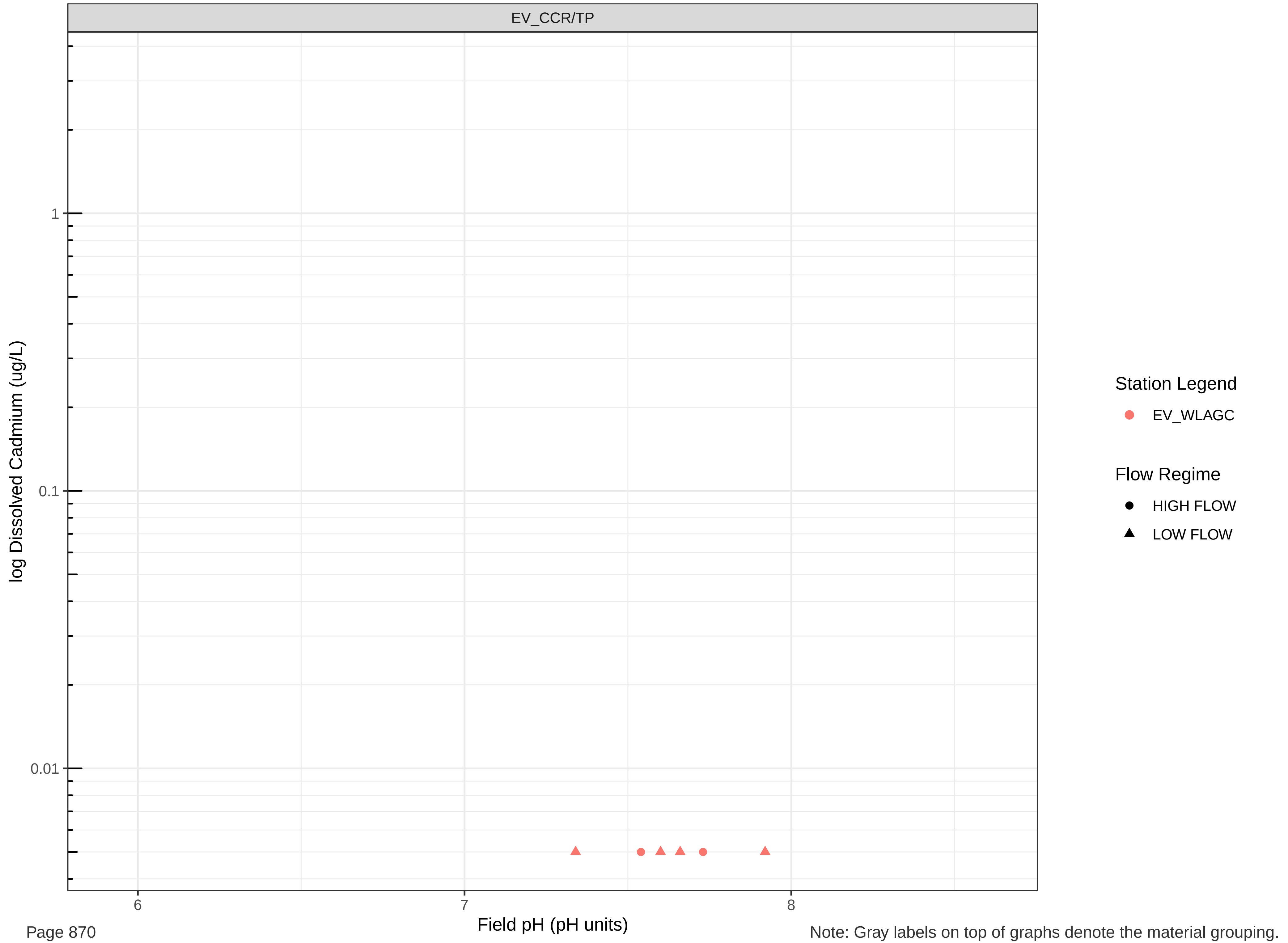

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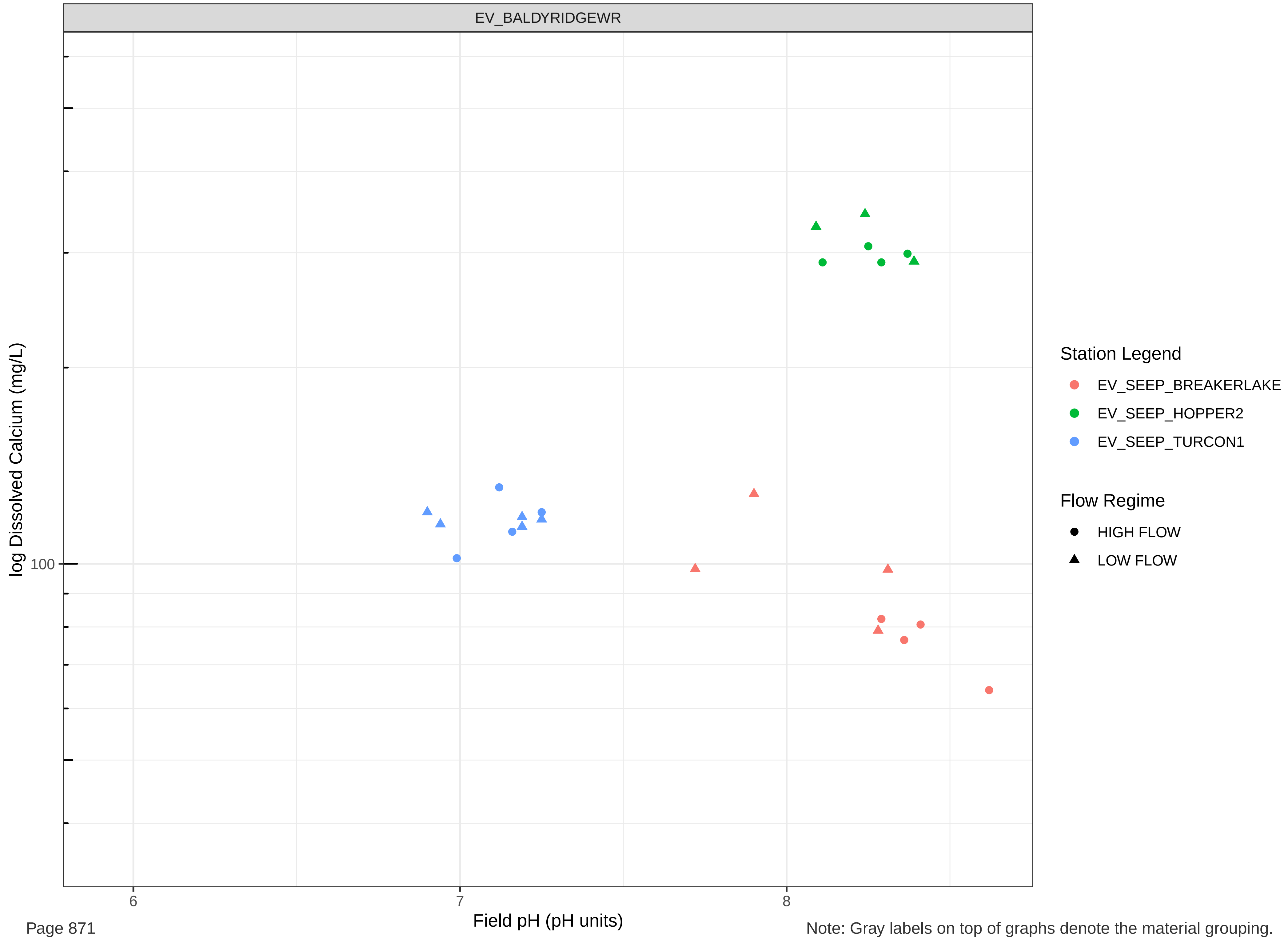

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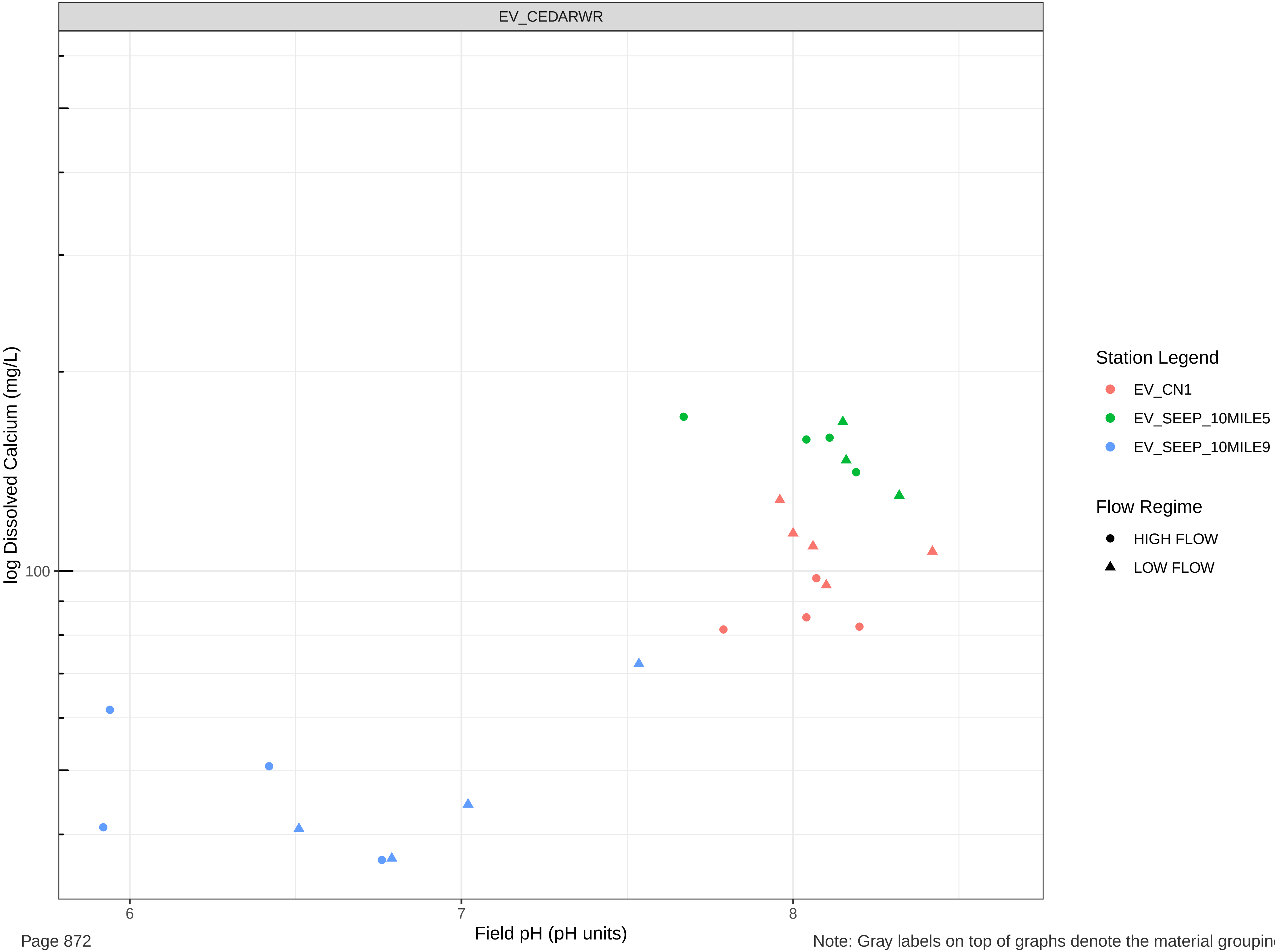

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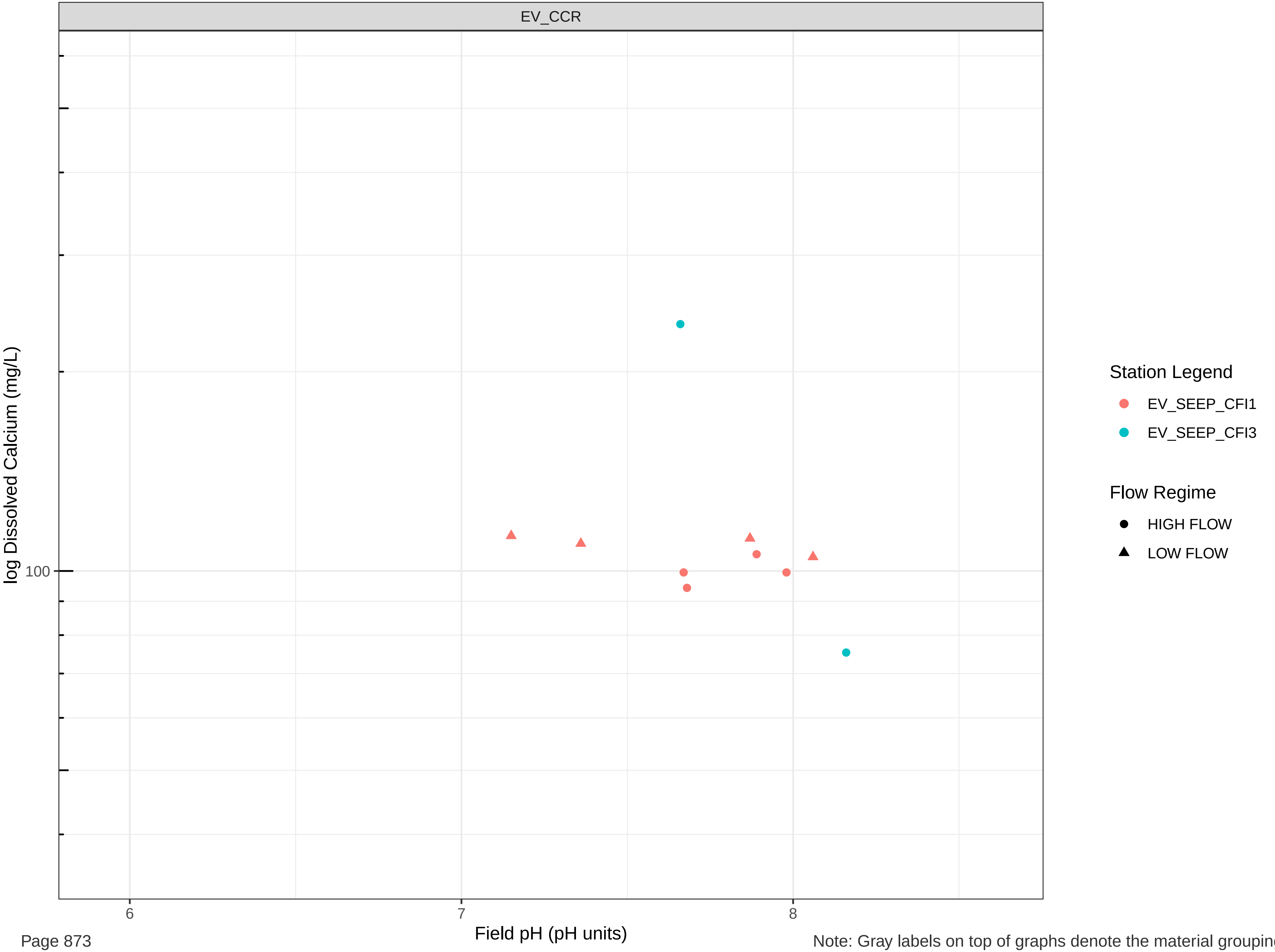

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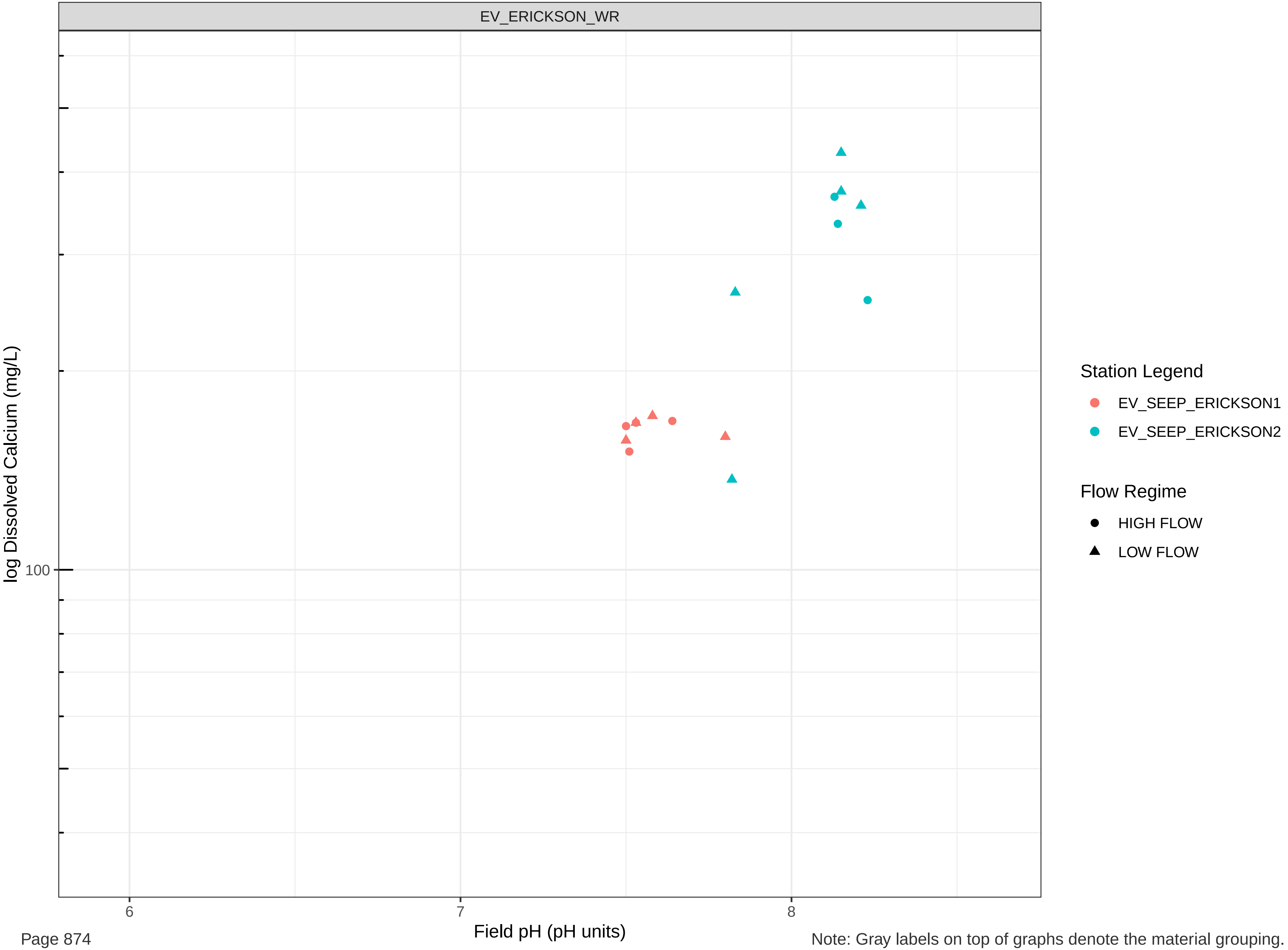
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6
7
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Field pH (pH units)
Station Legend
EV_SEEP_ERICKSON1
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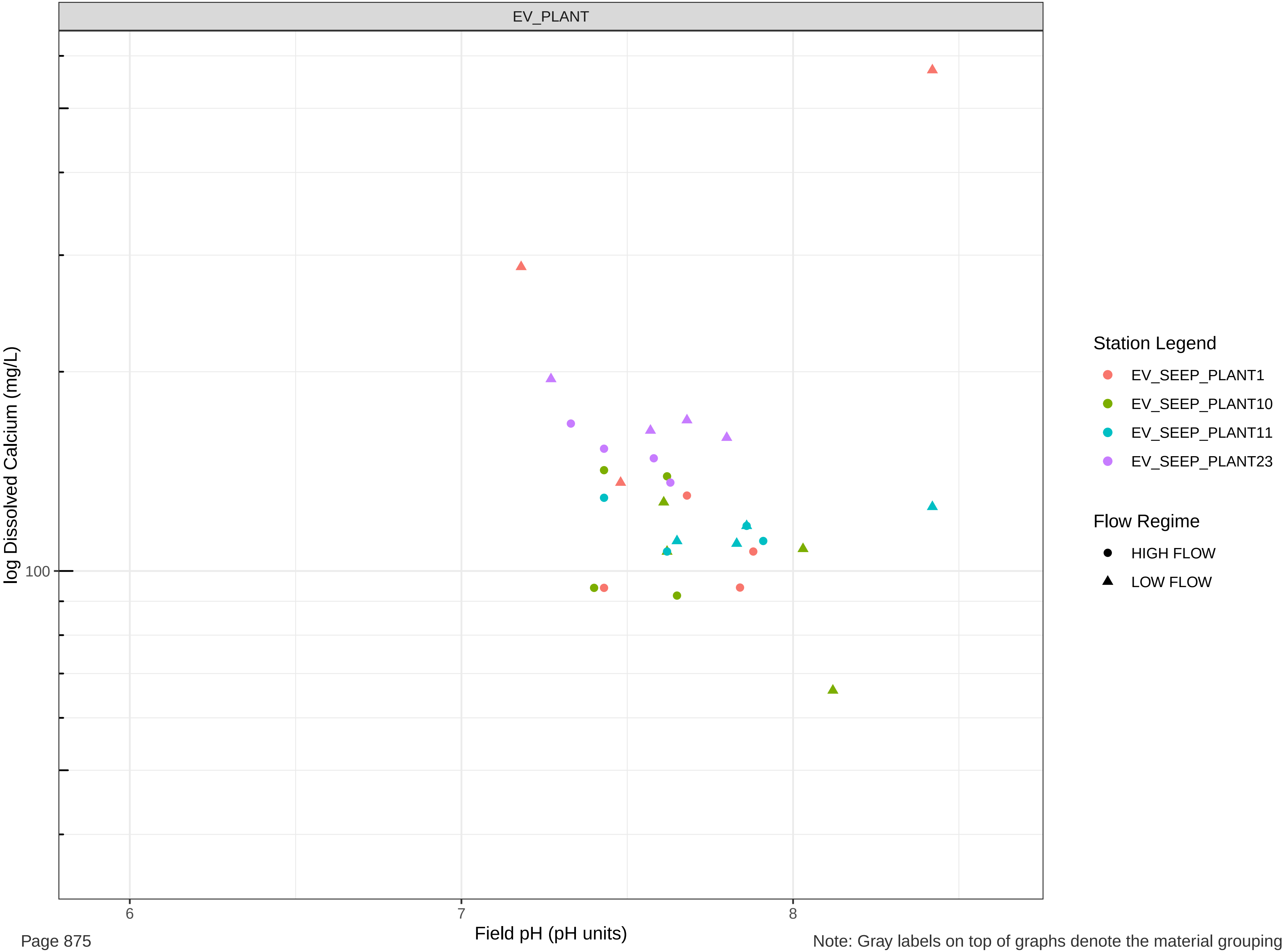
Flow Regime
HIGH FLOW
LOW FLOW



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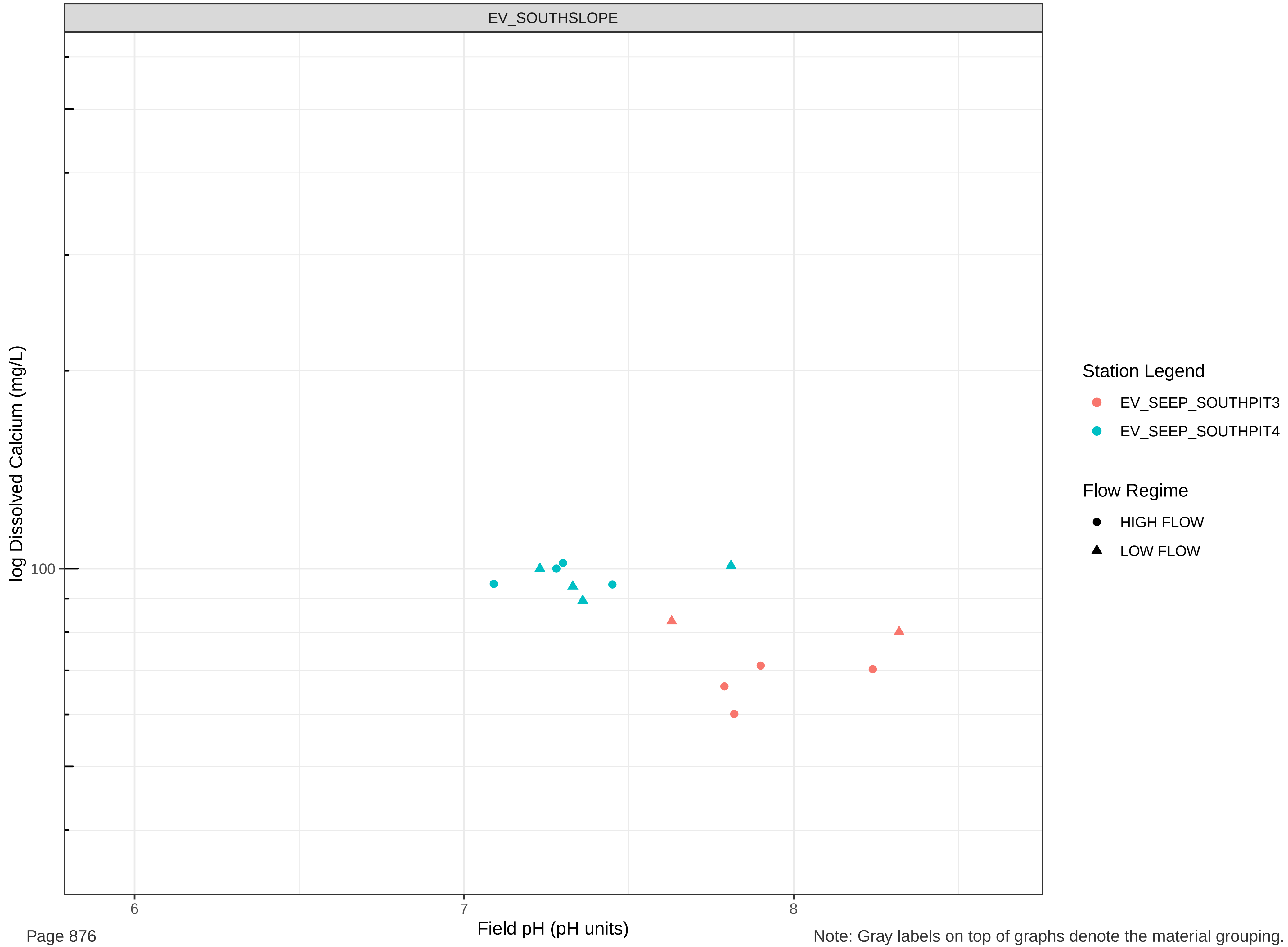

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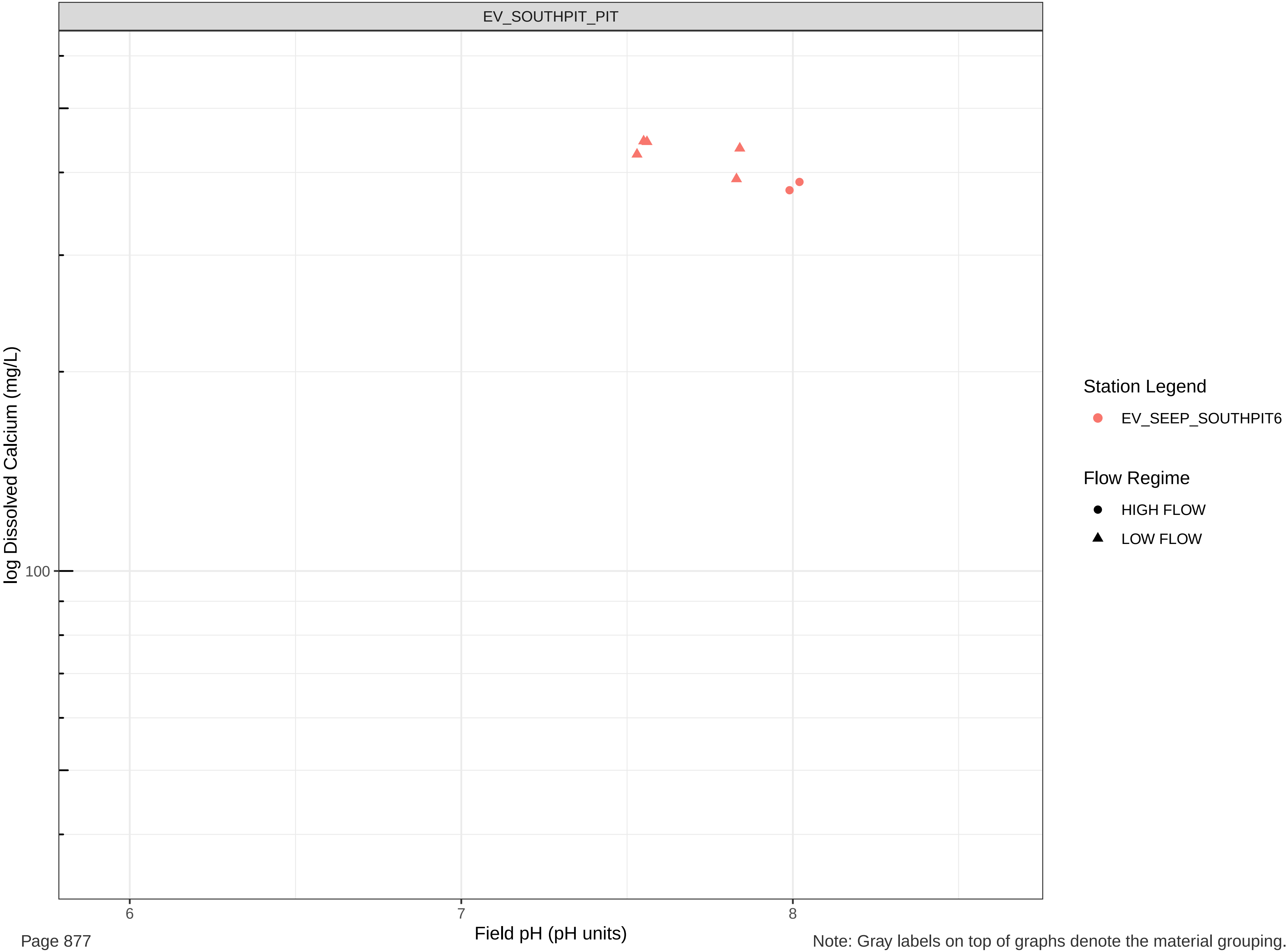

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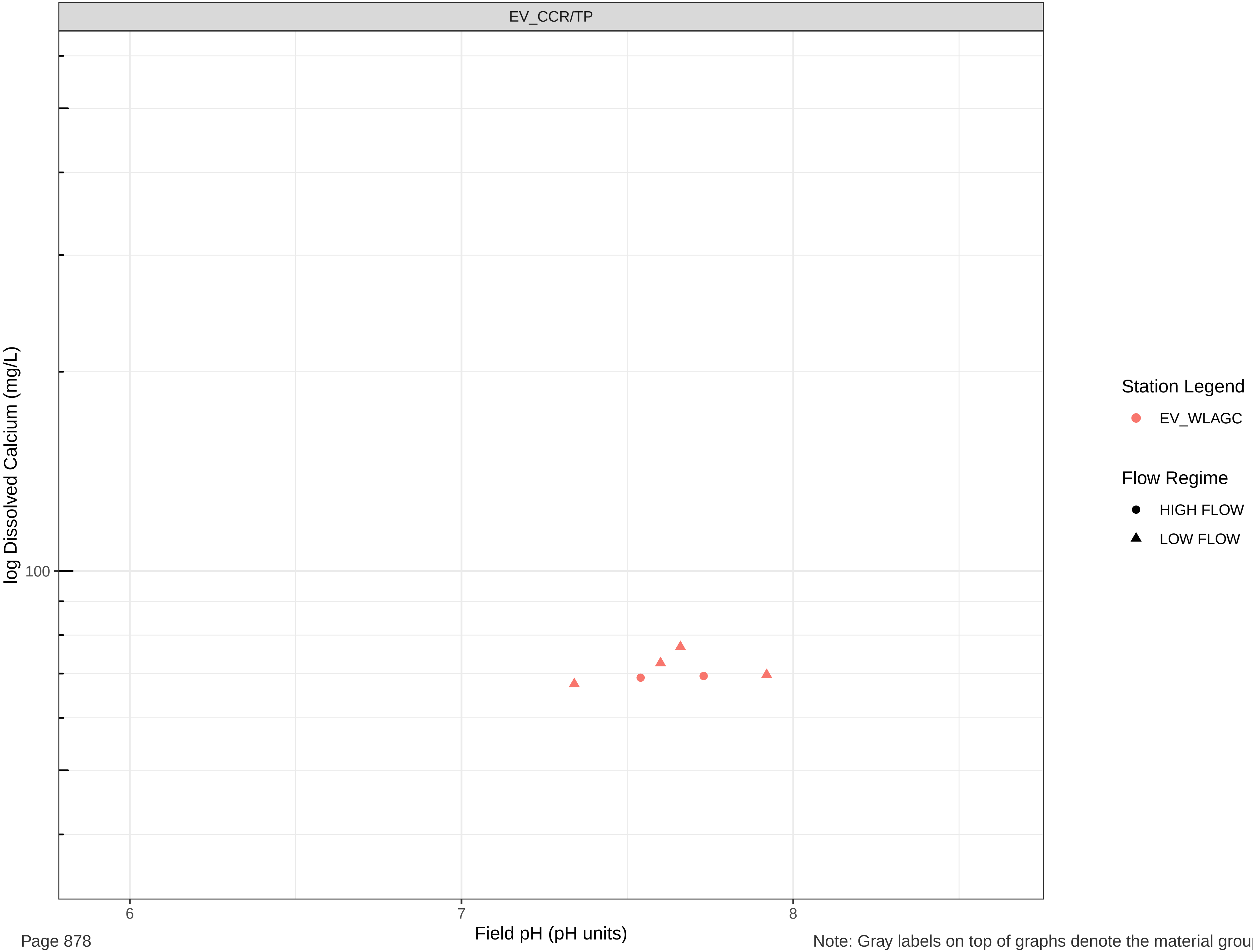

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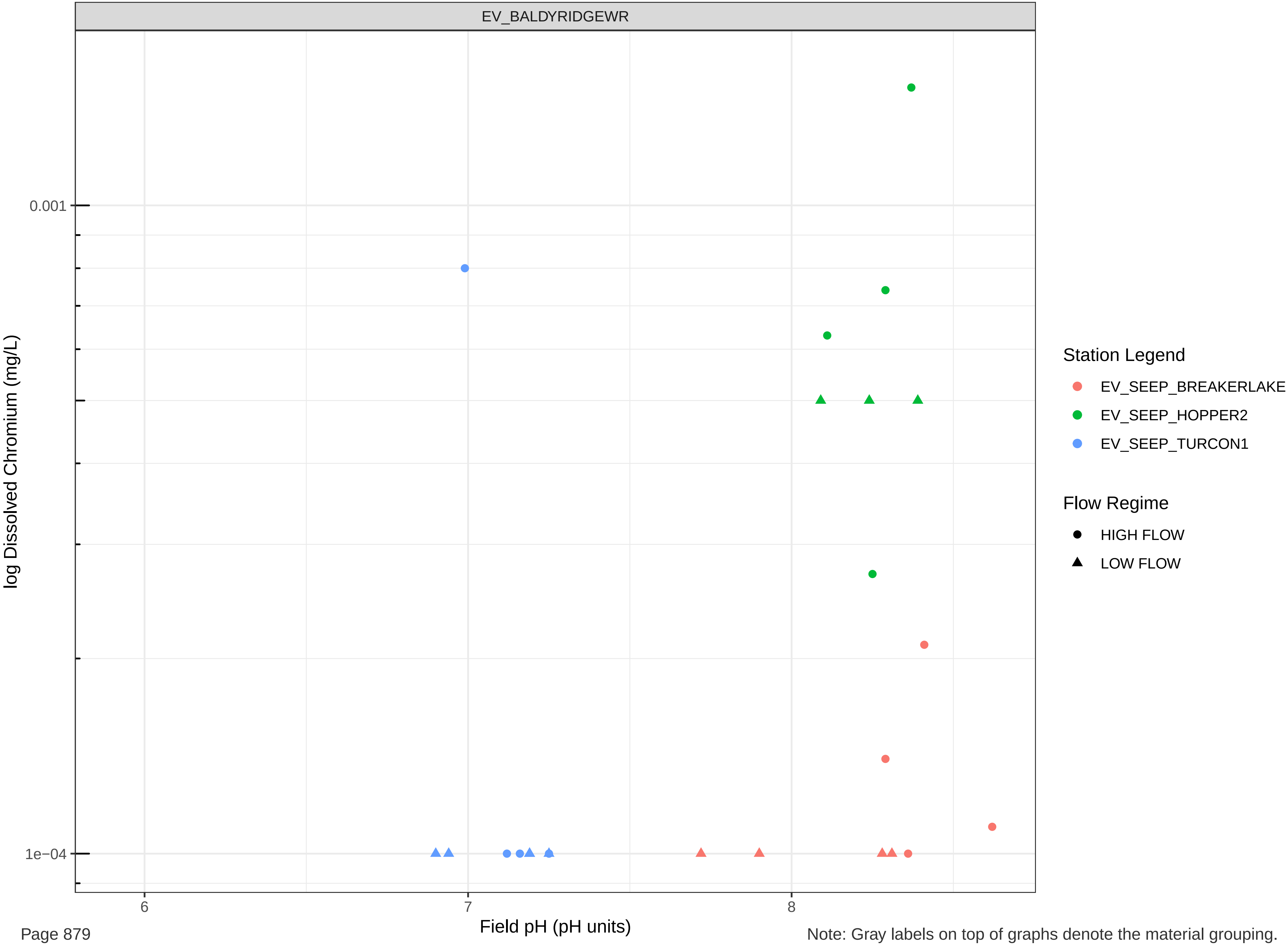

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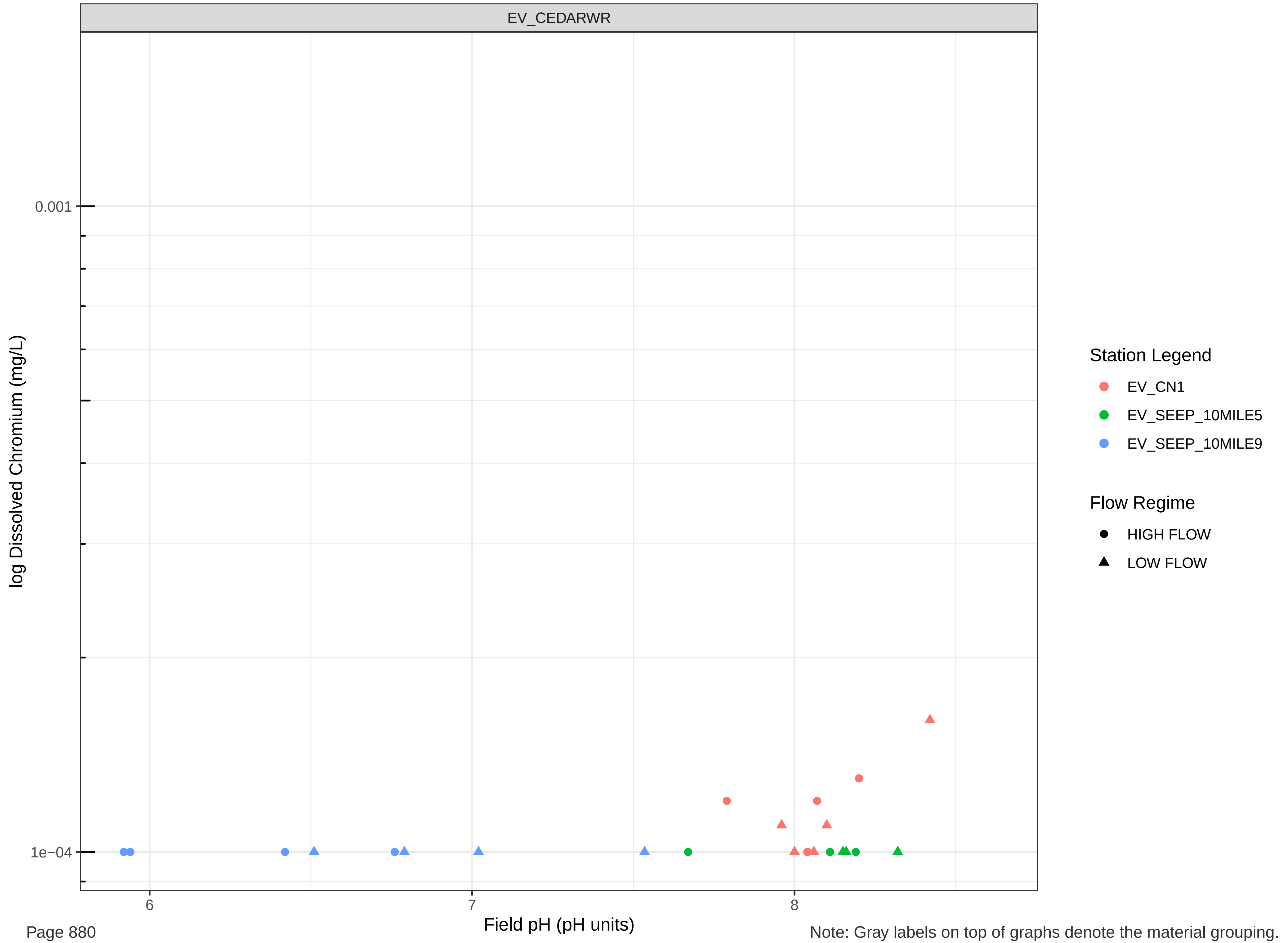

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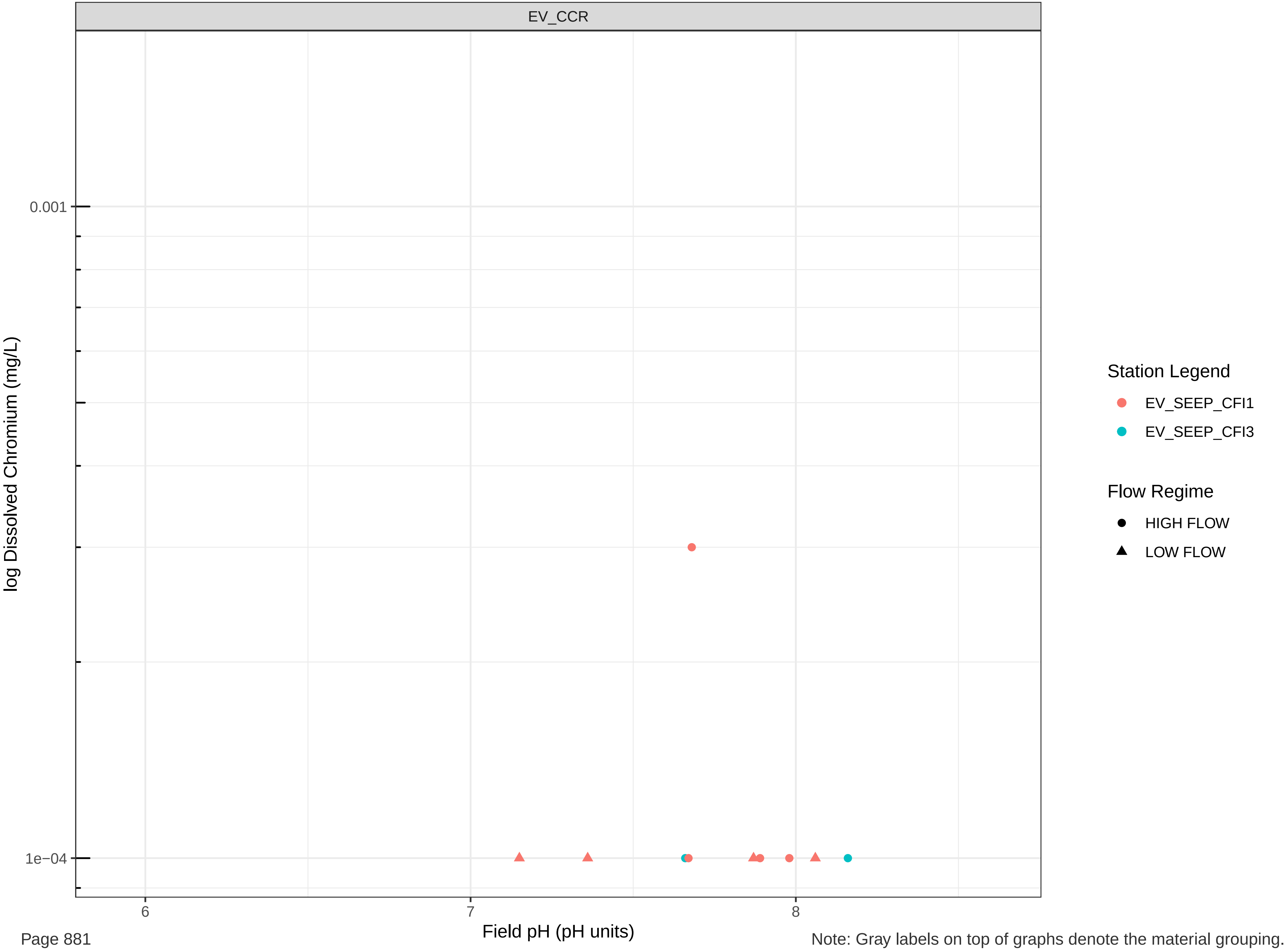

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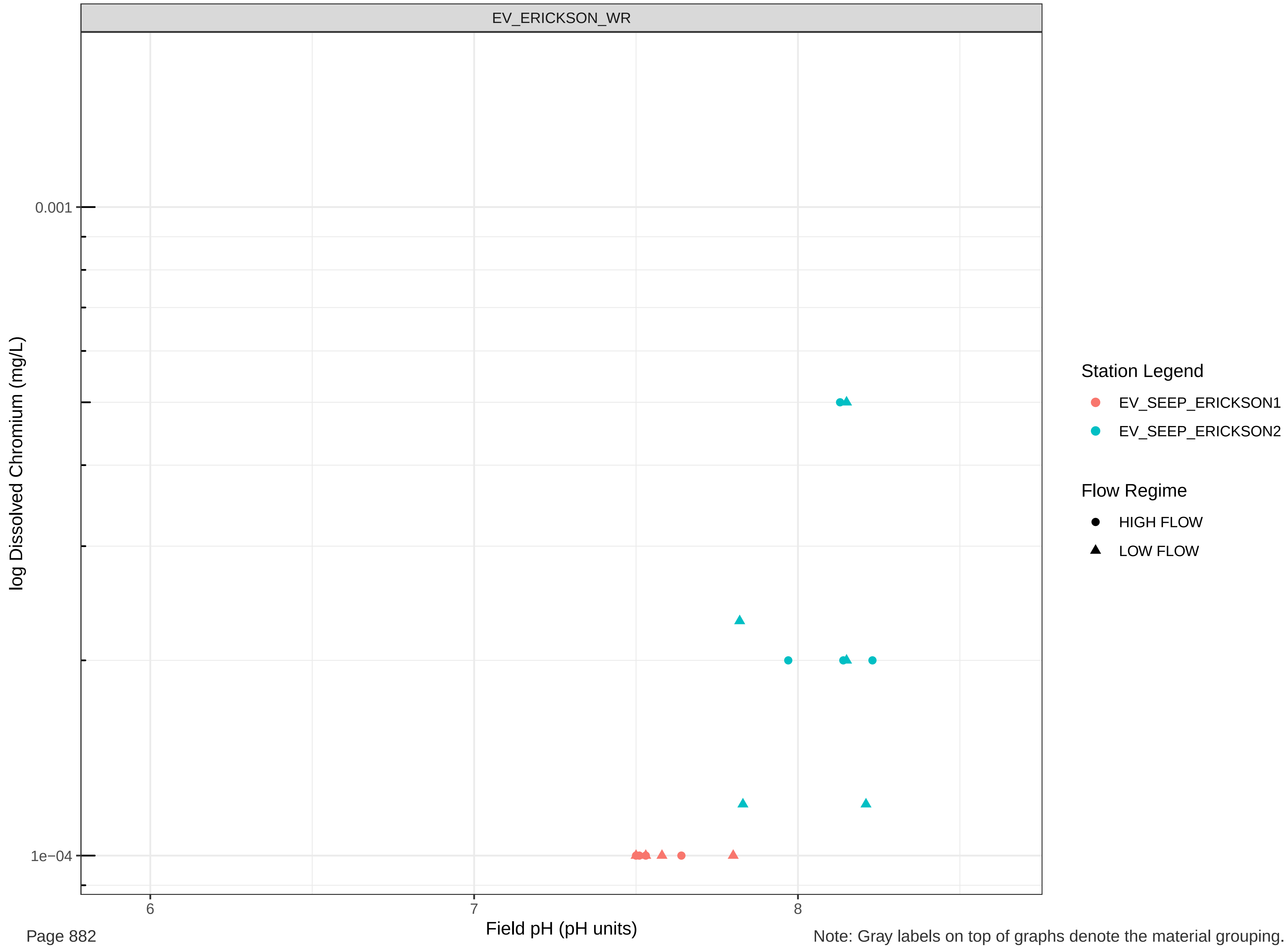

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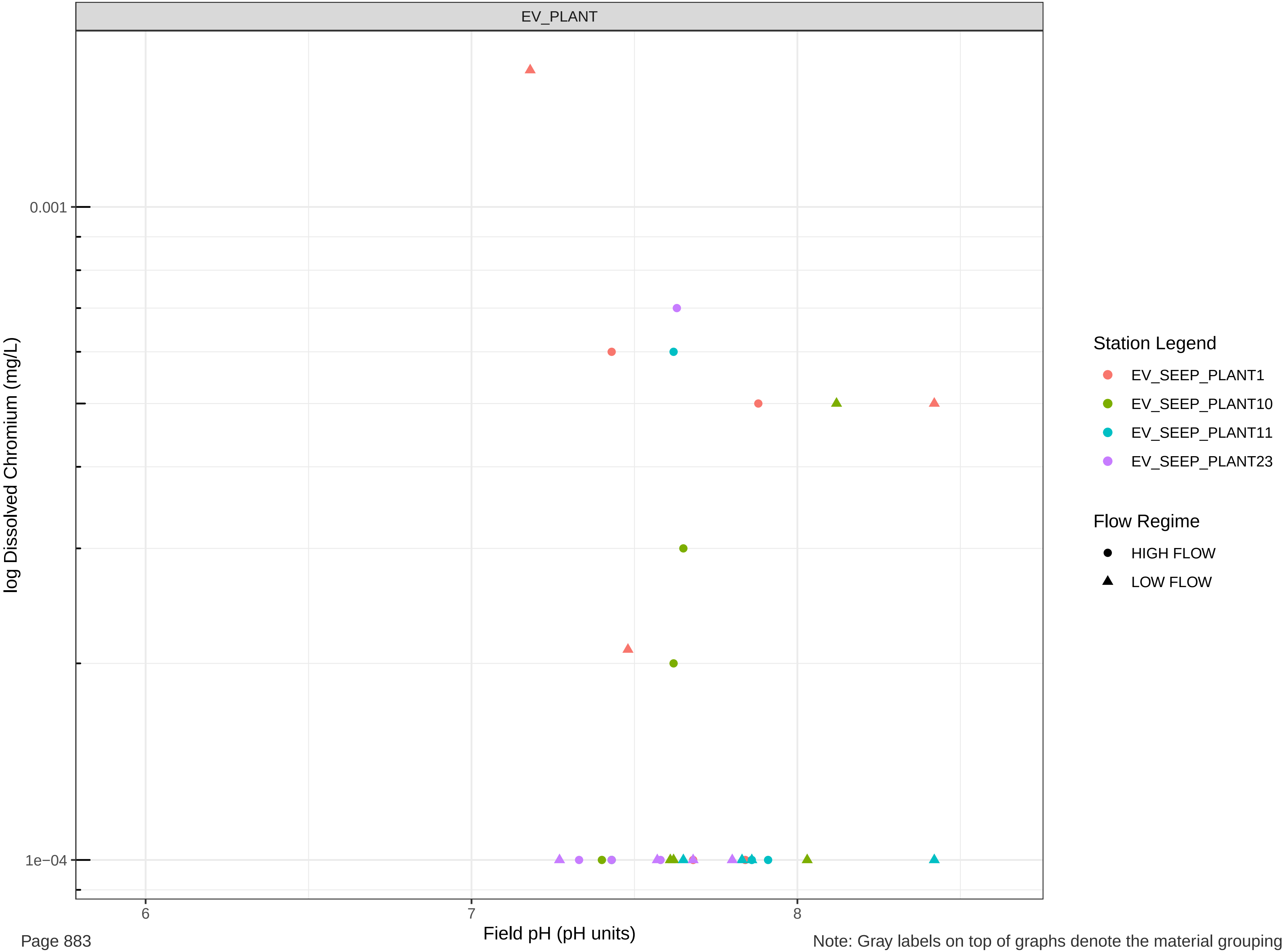

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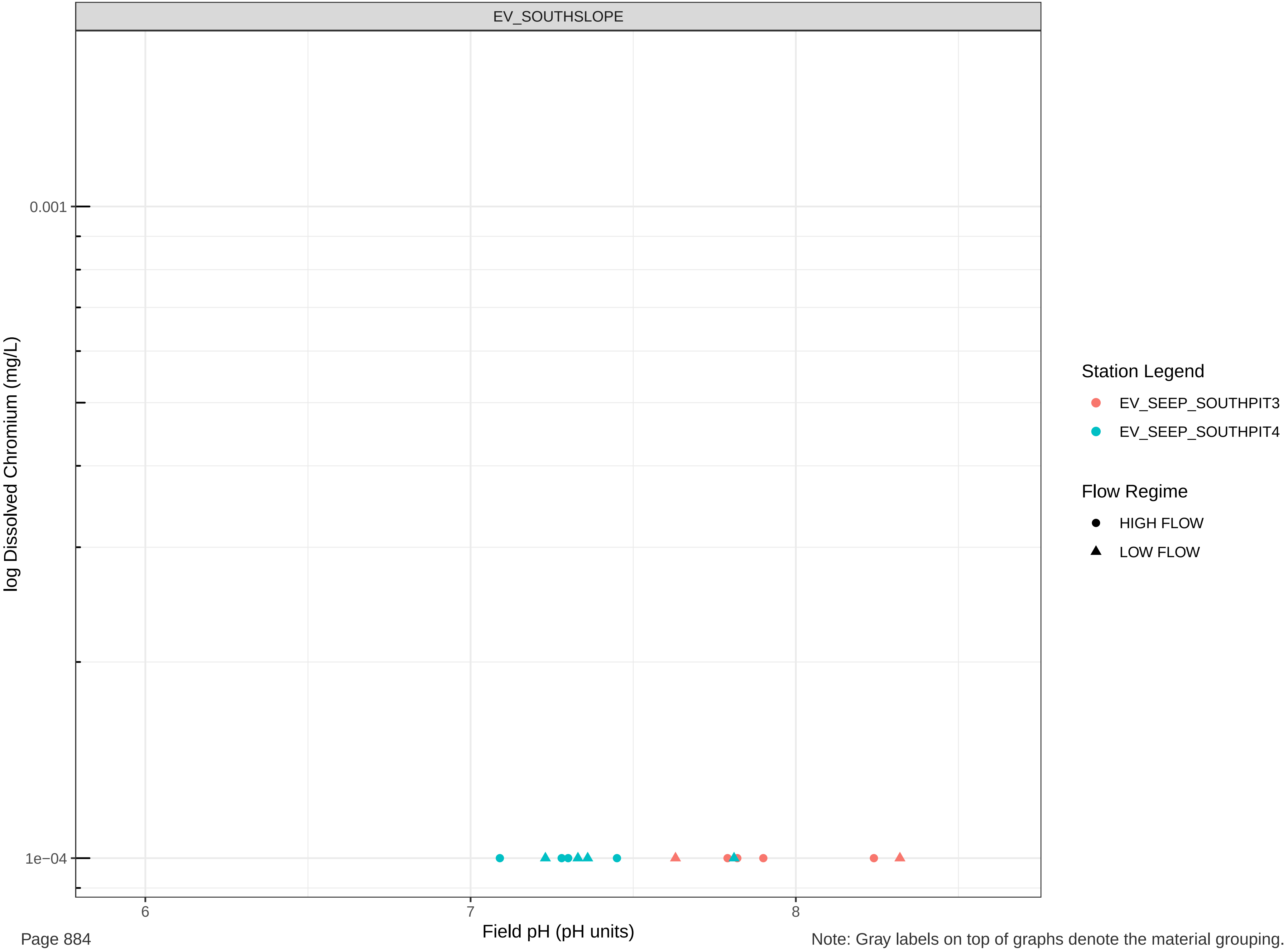

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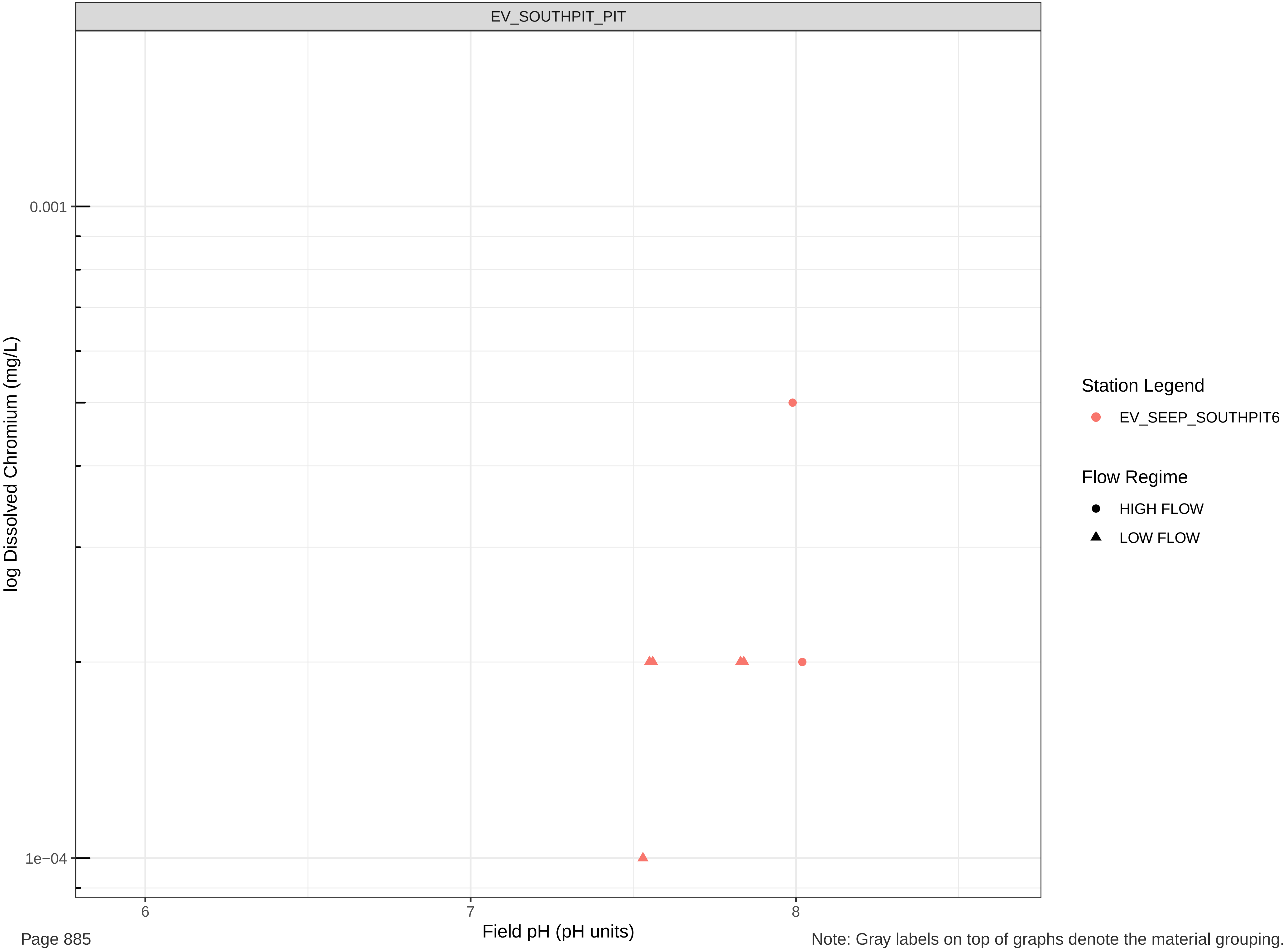

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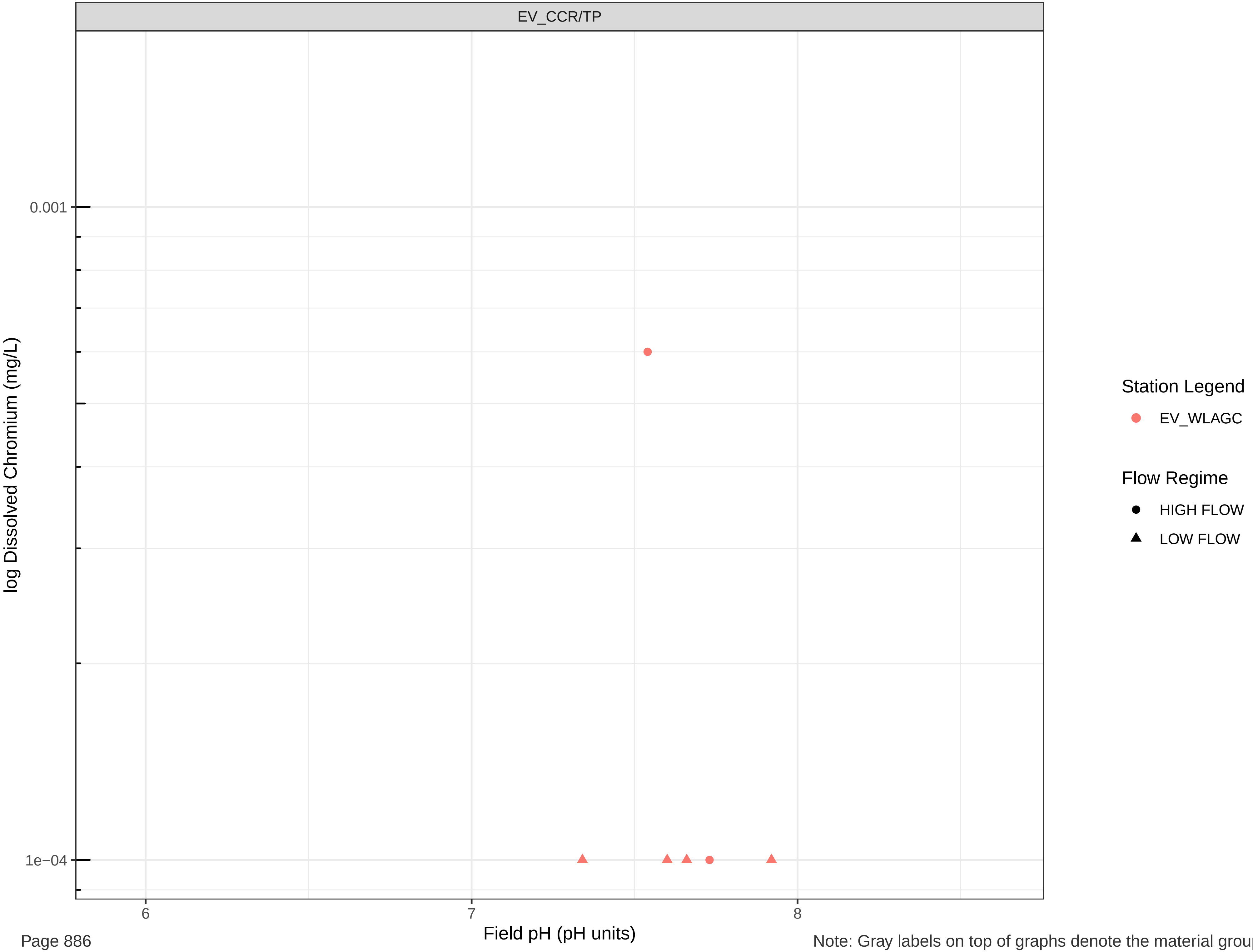

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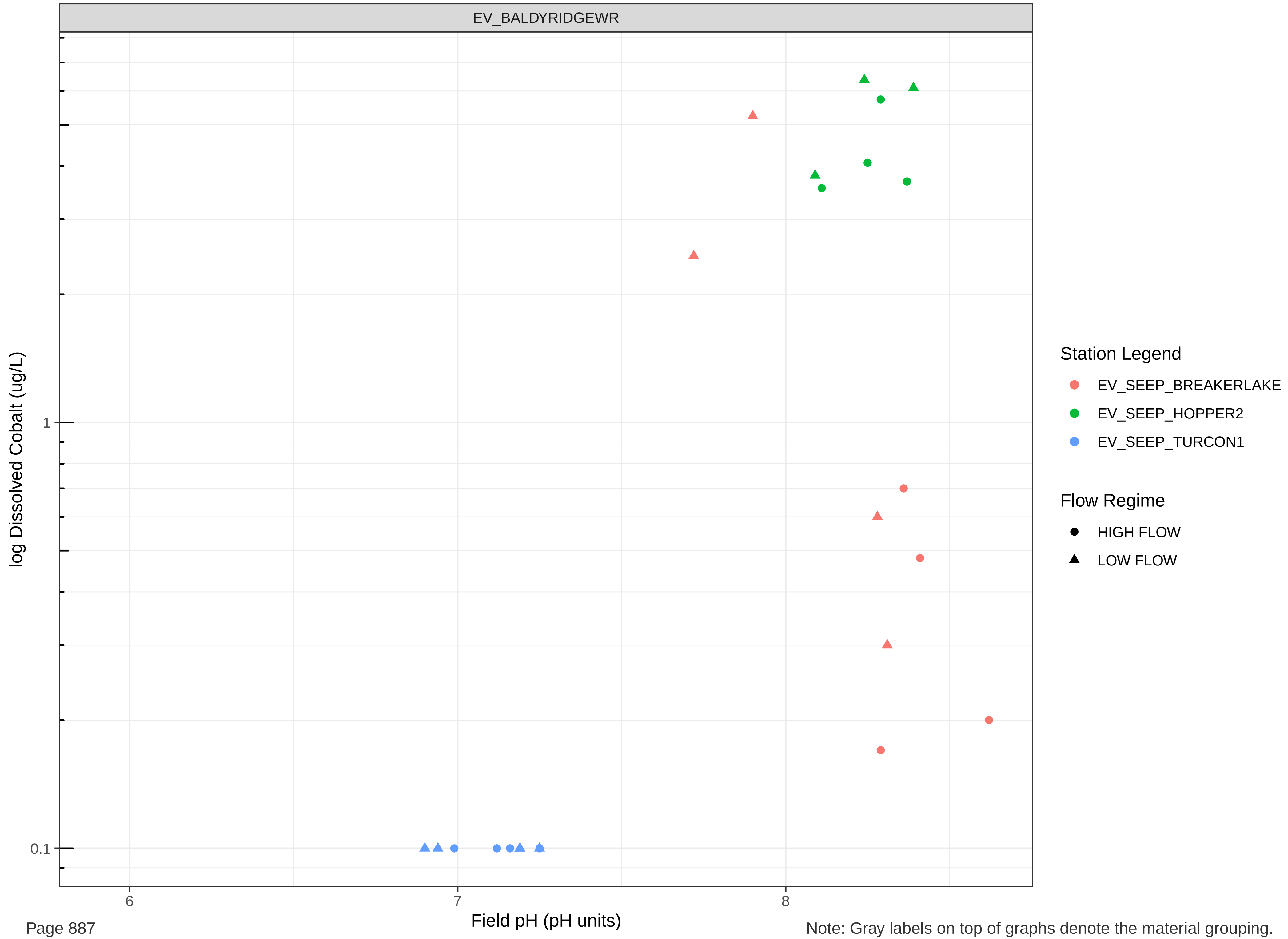

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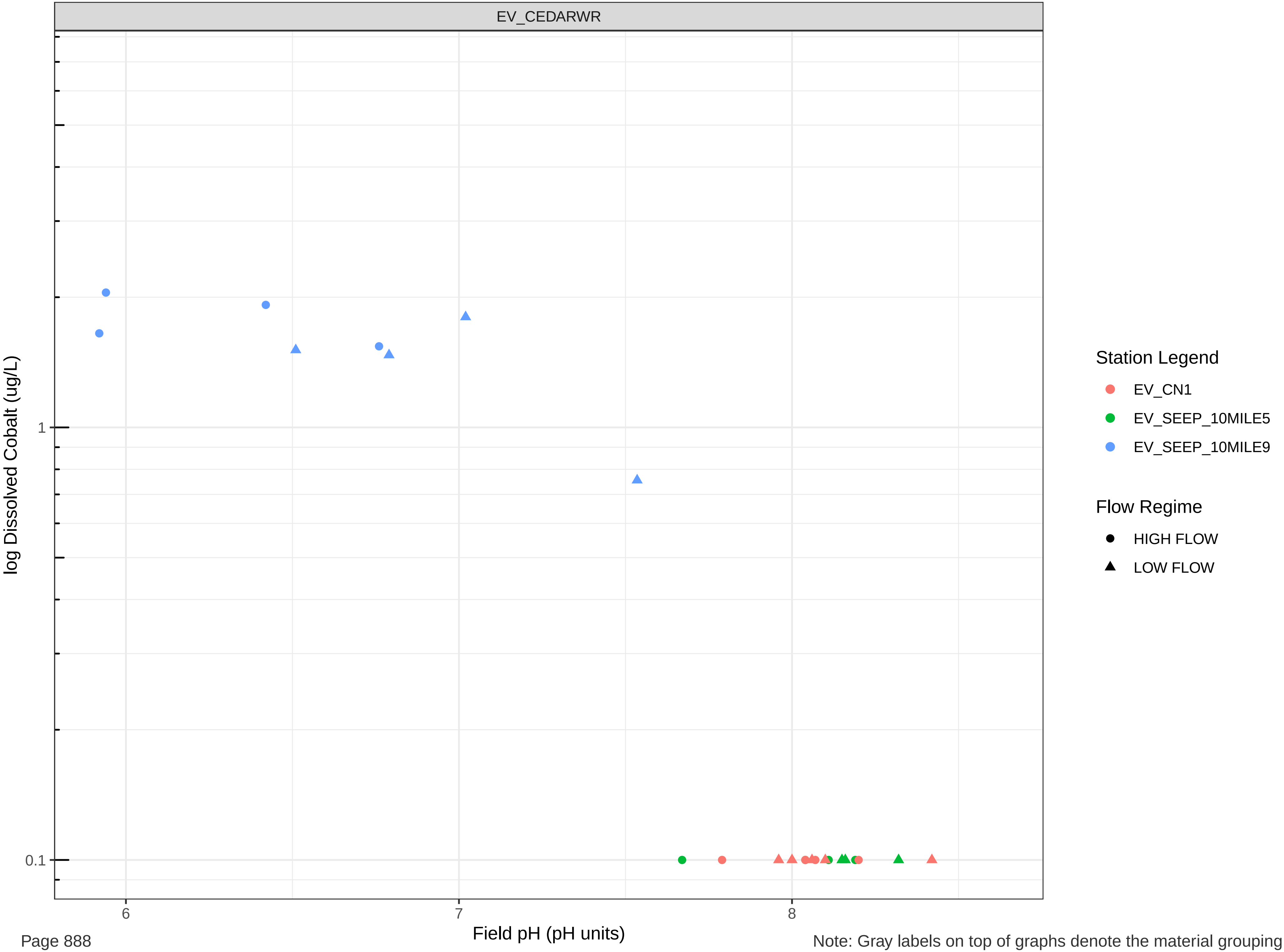

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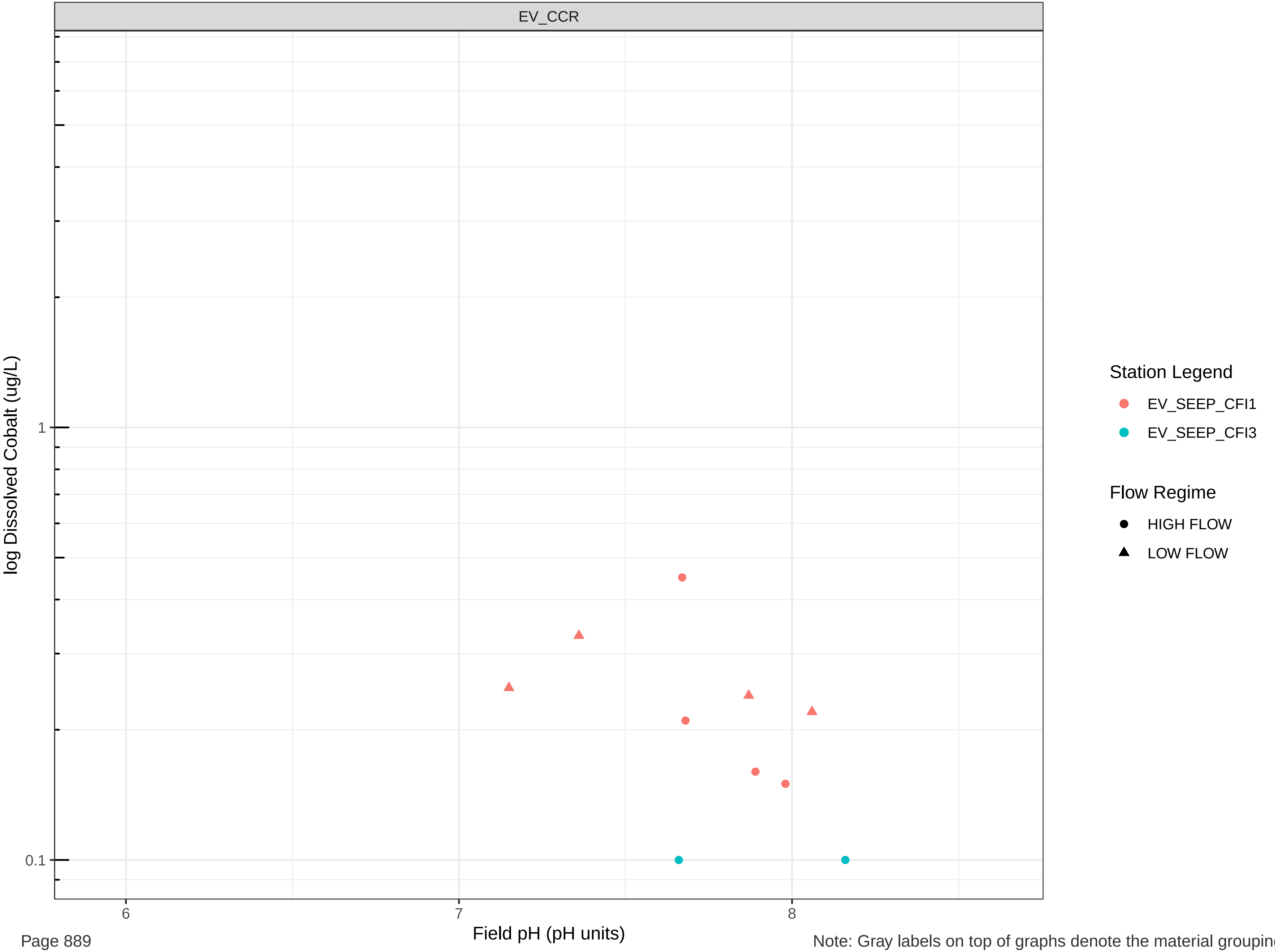

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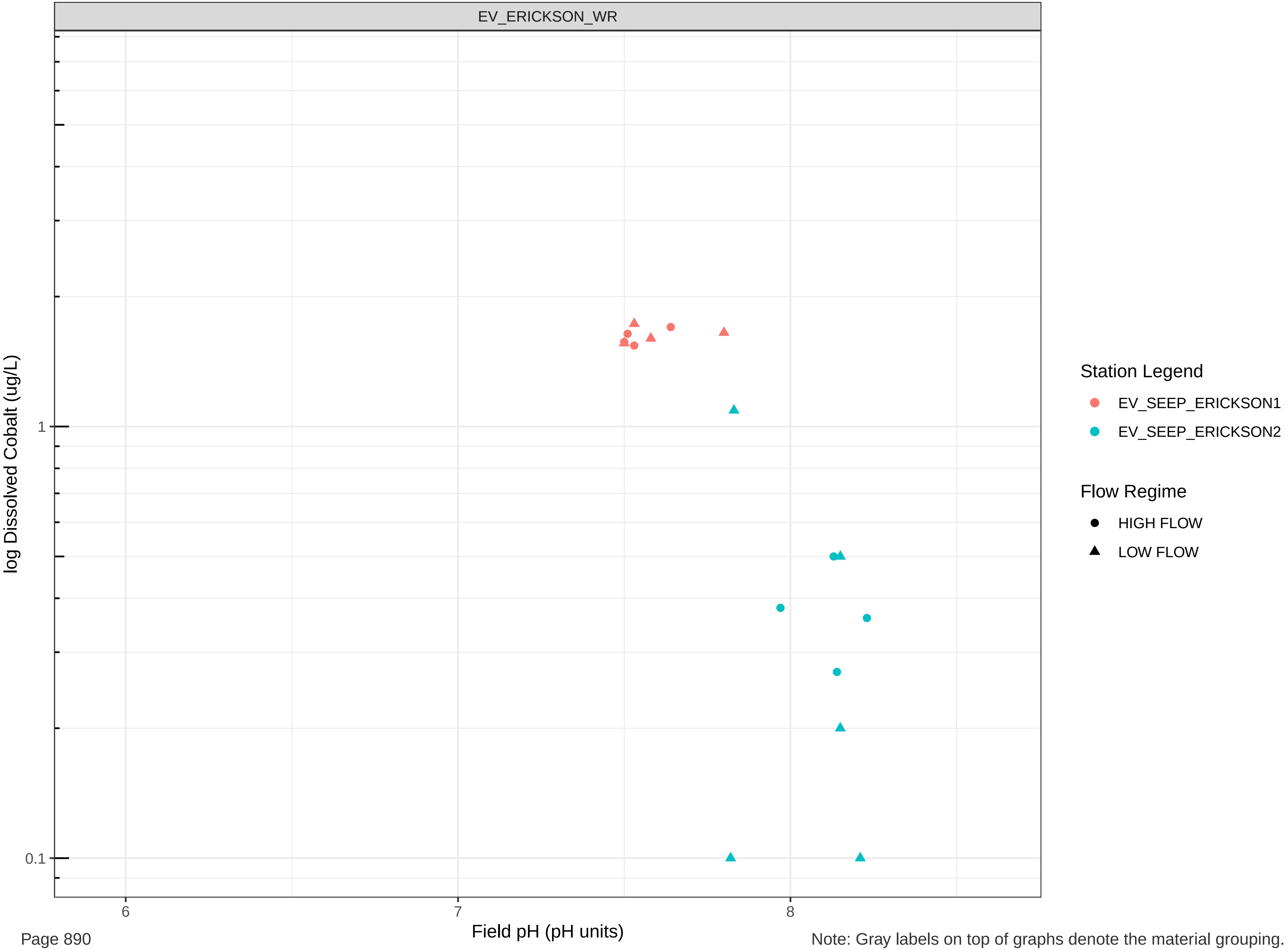

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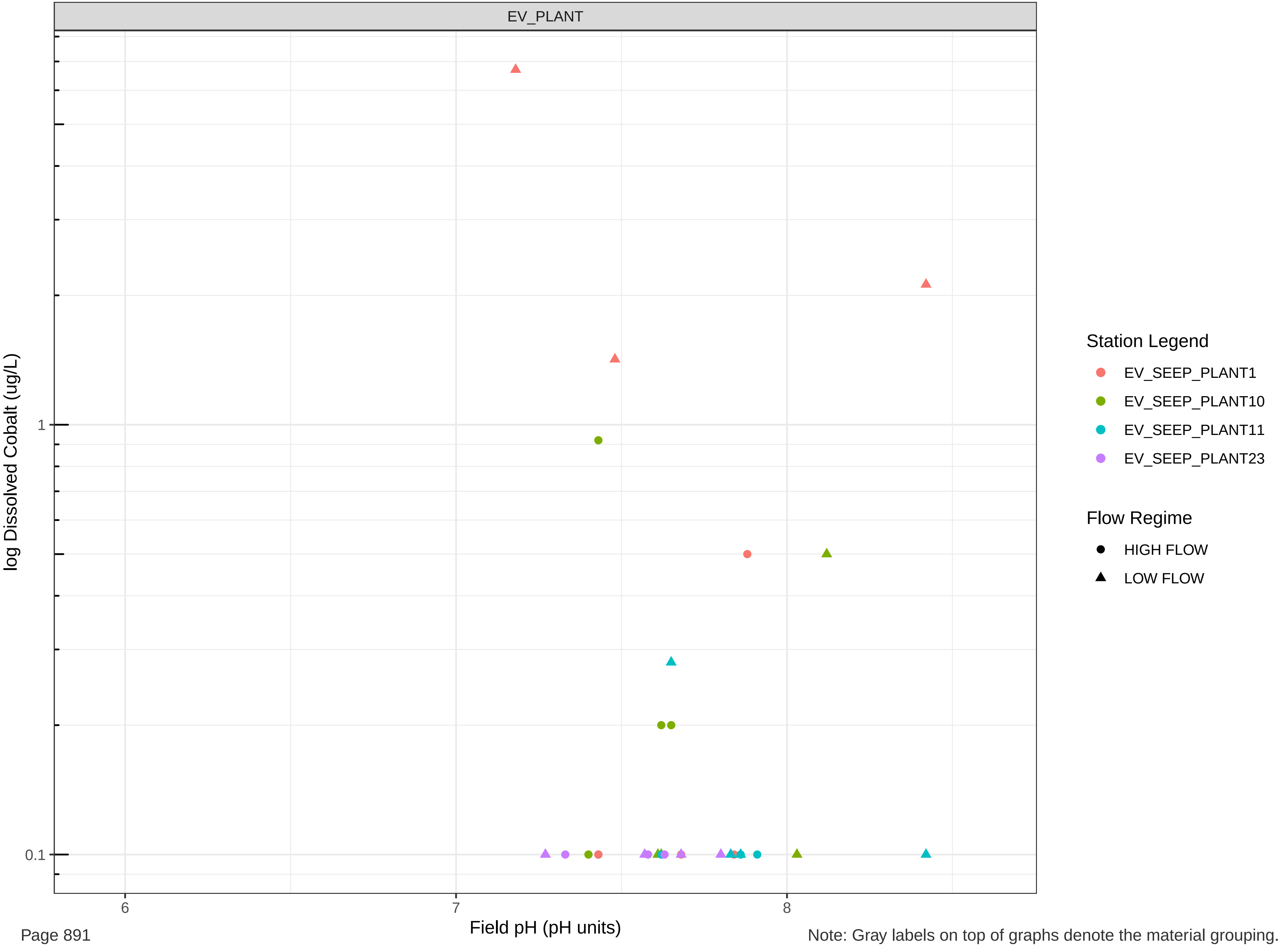

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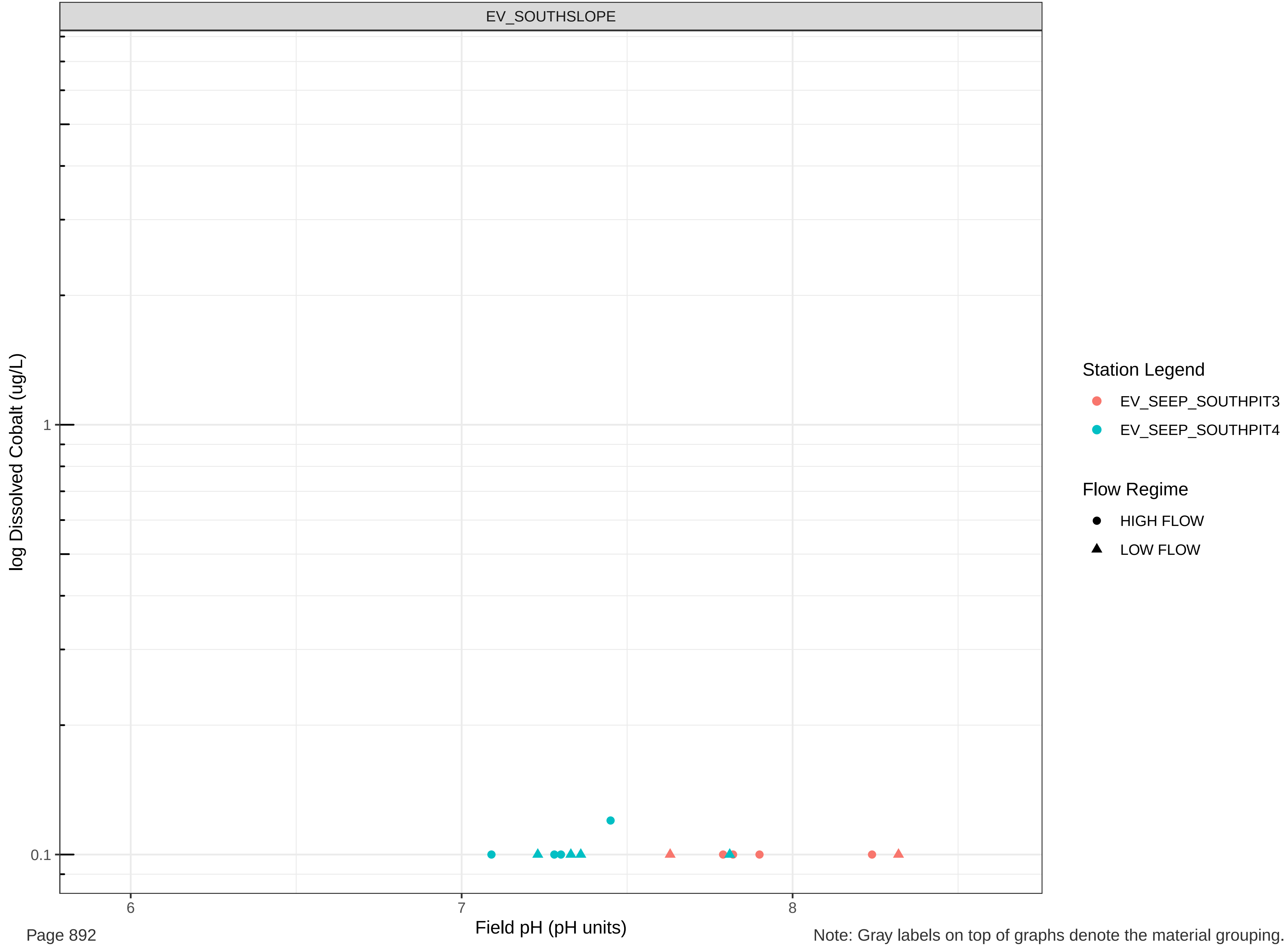

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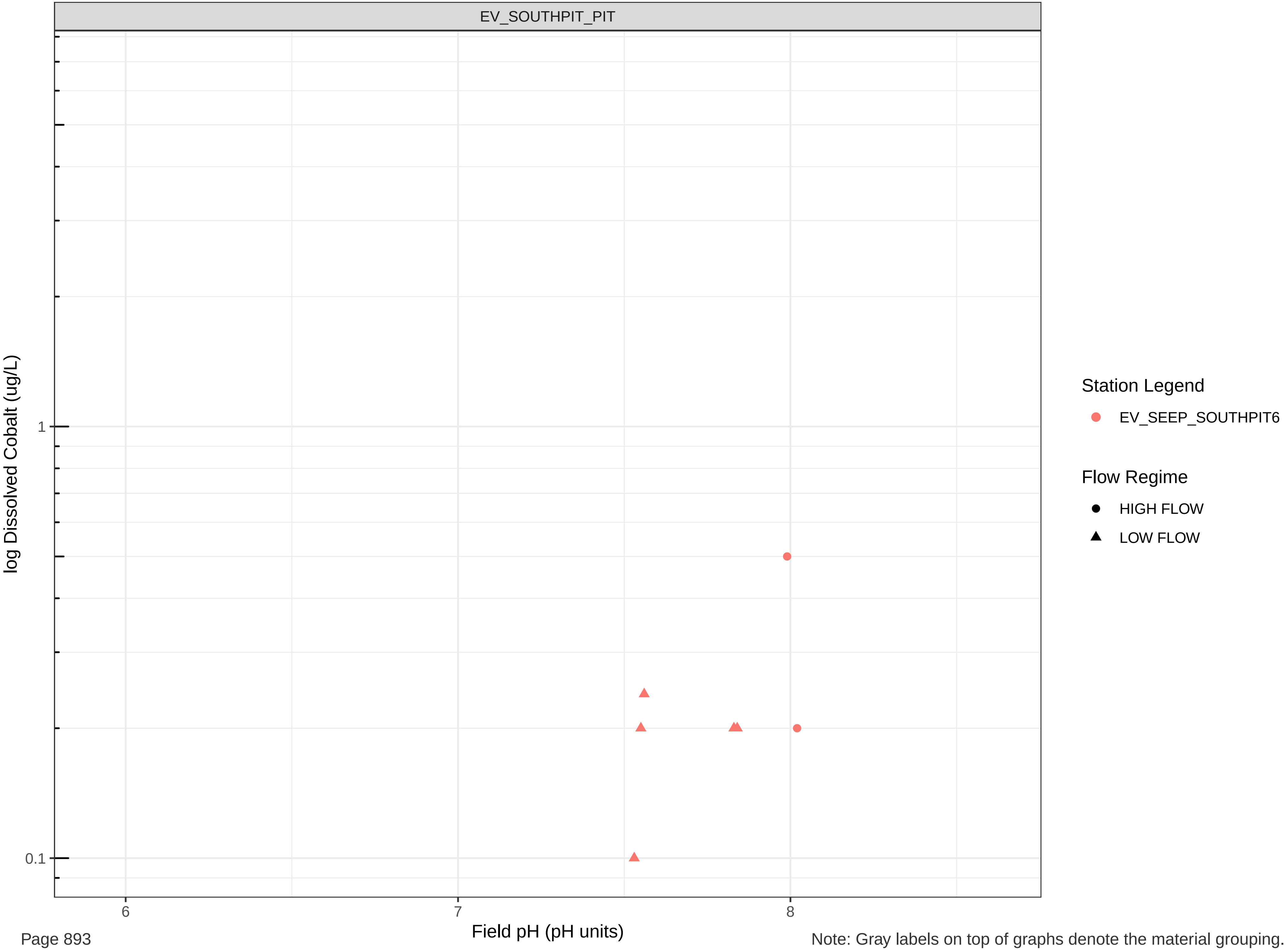

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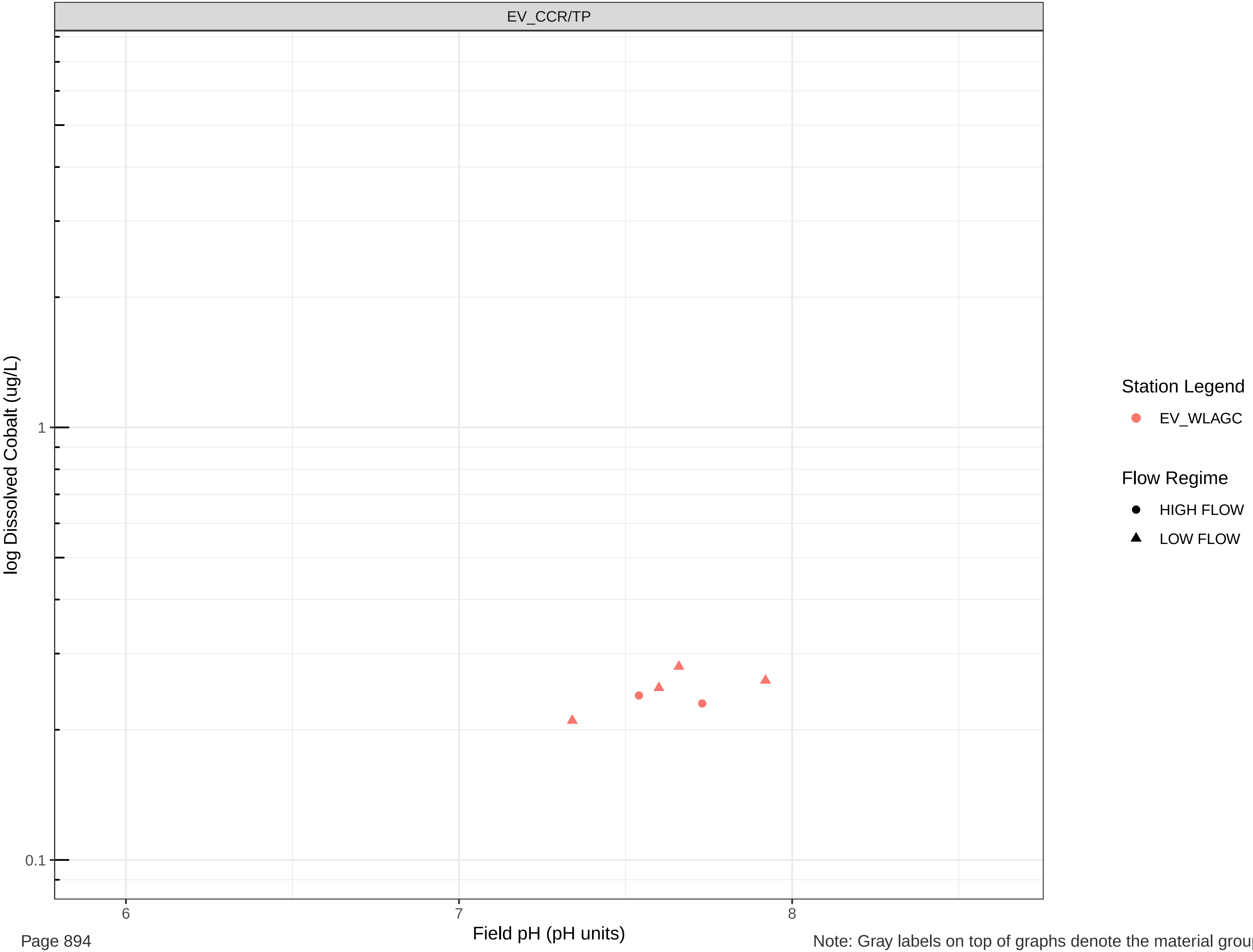

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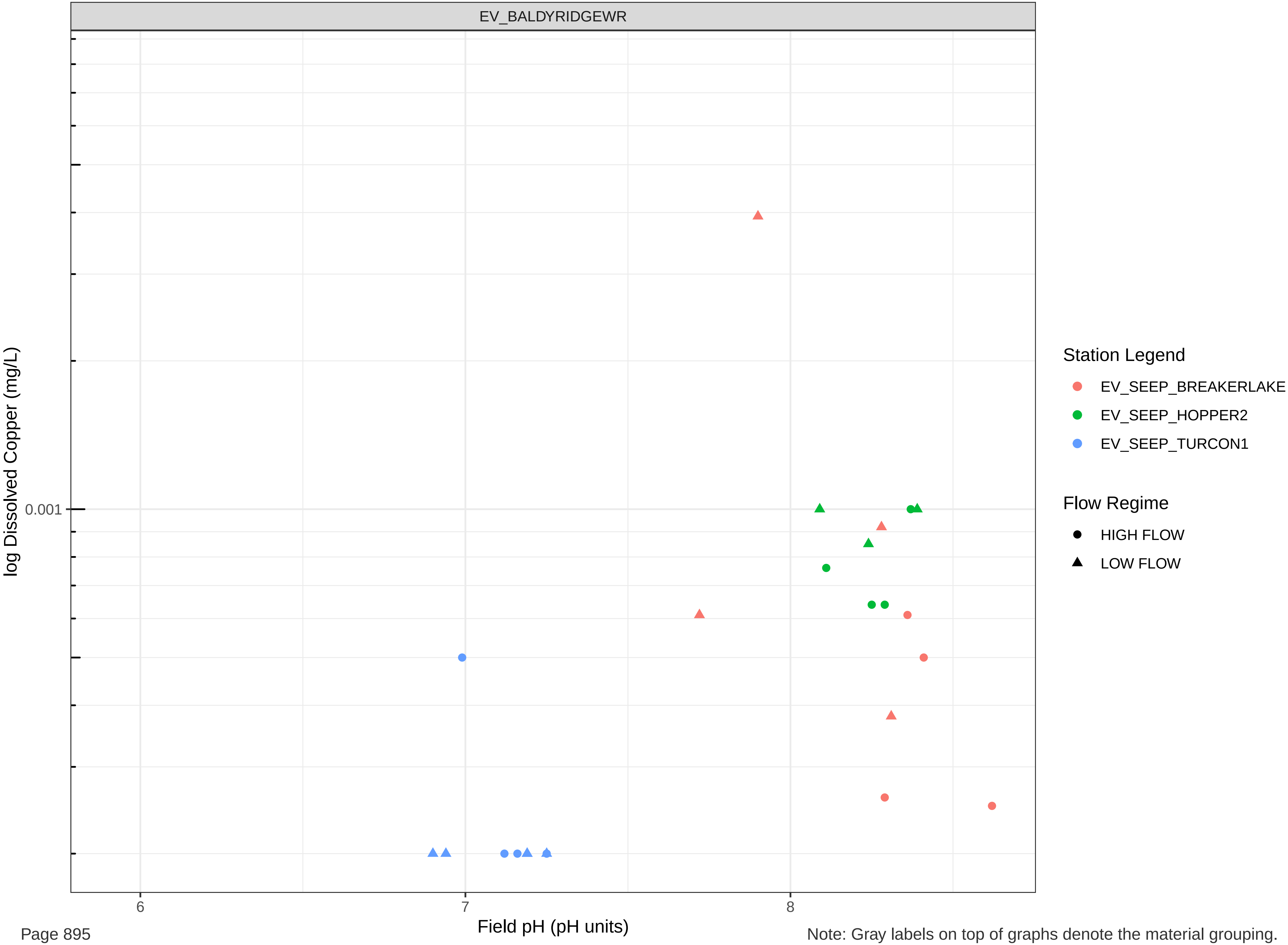

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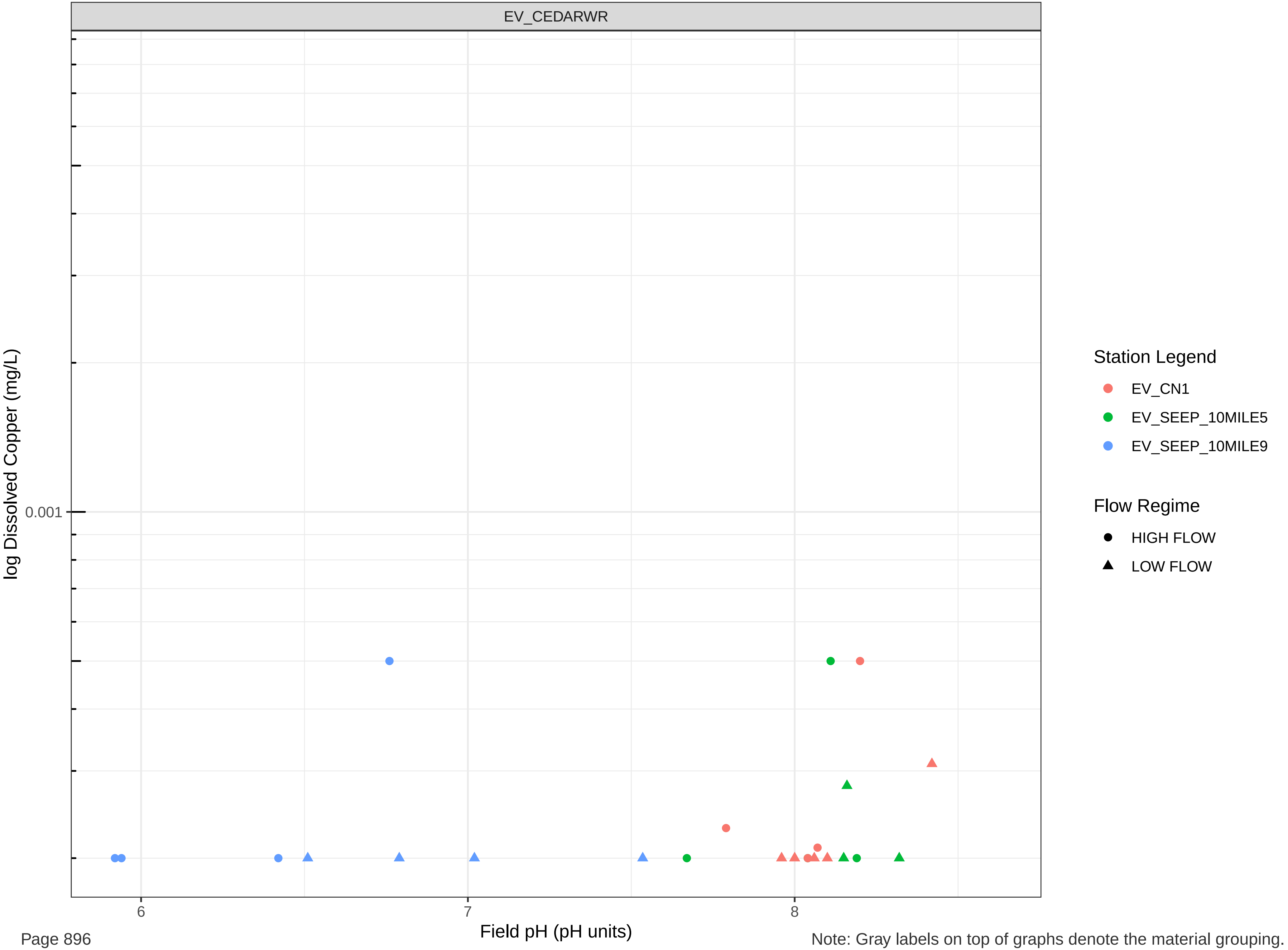

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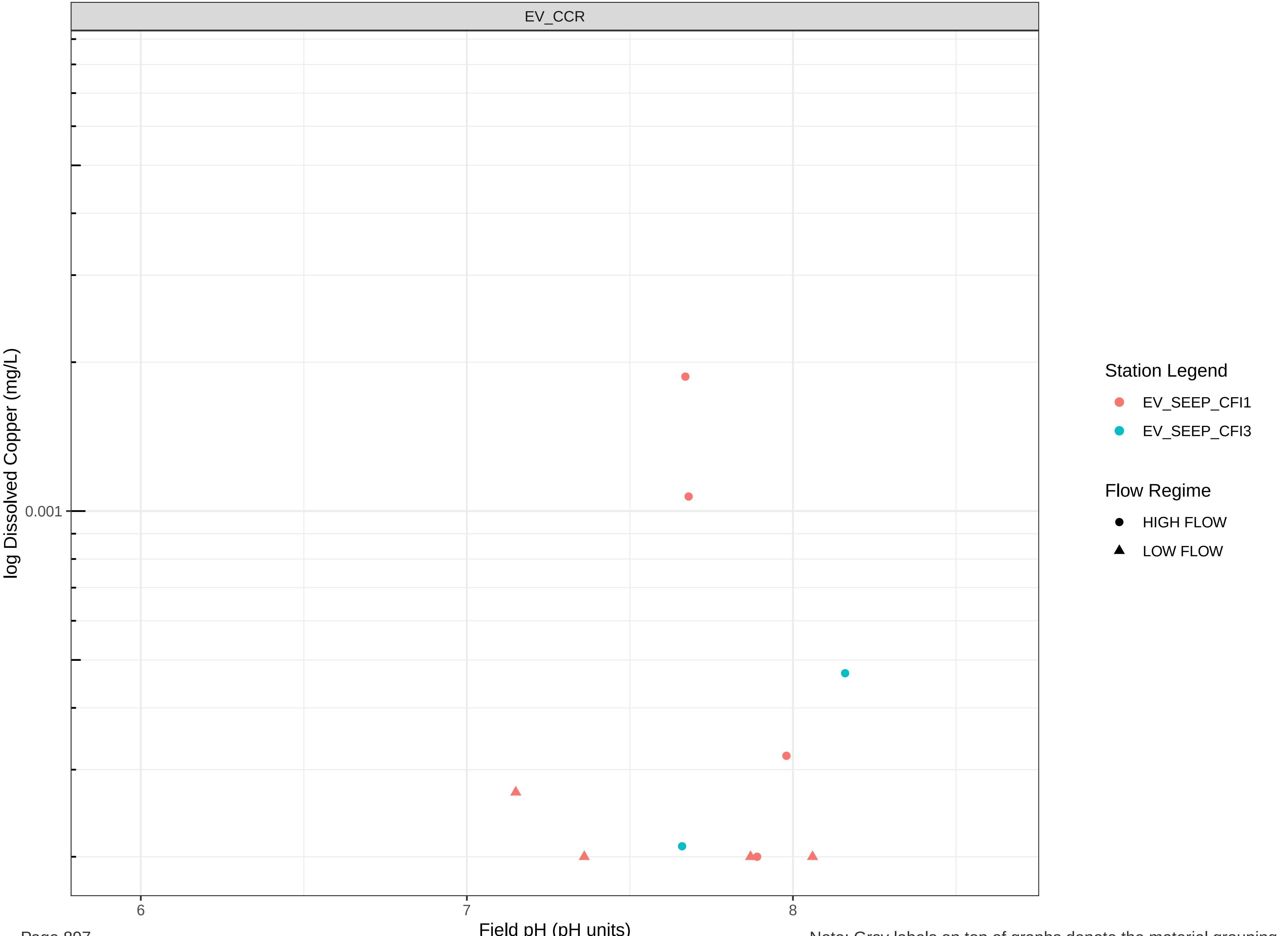

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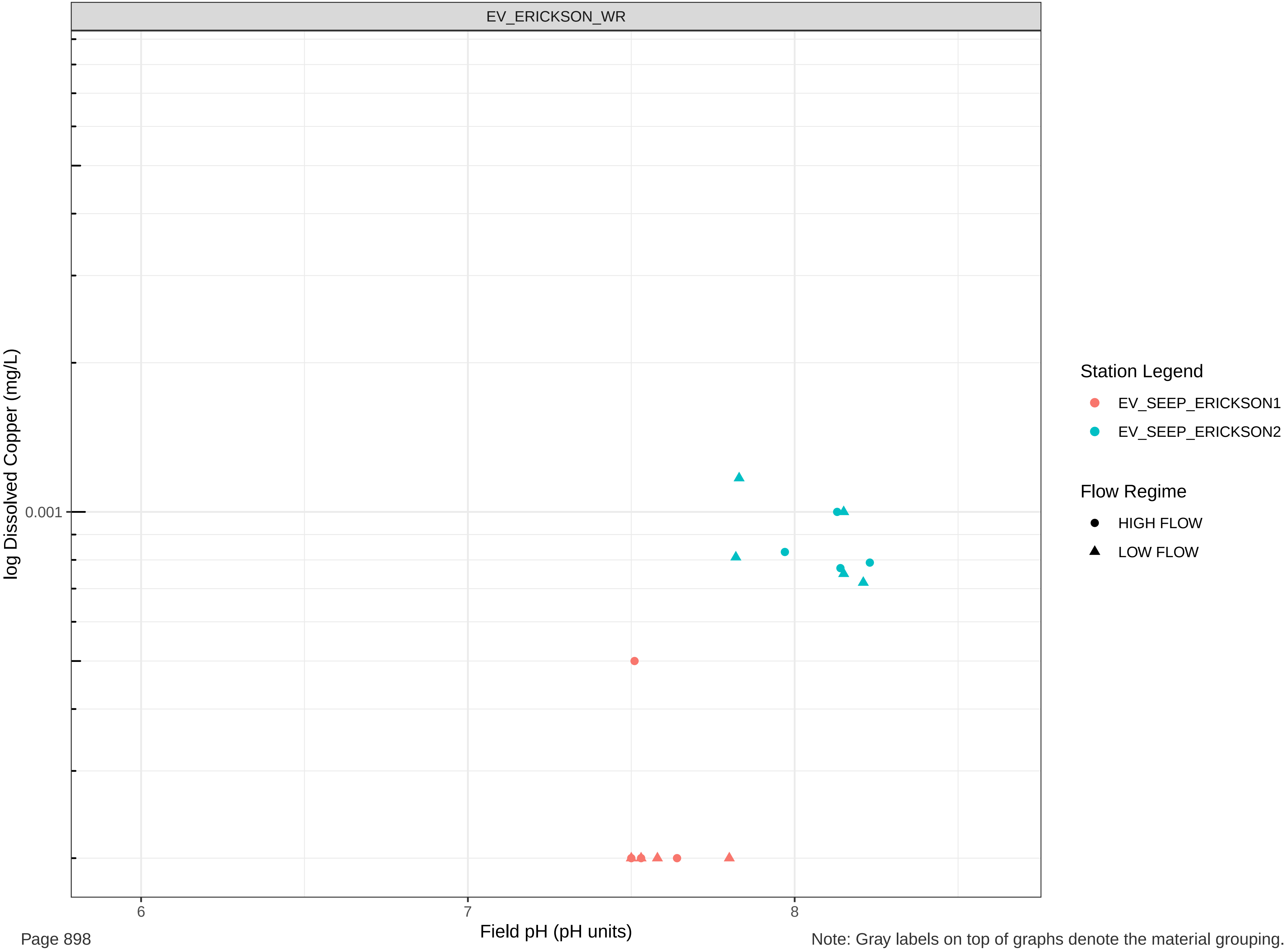

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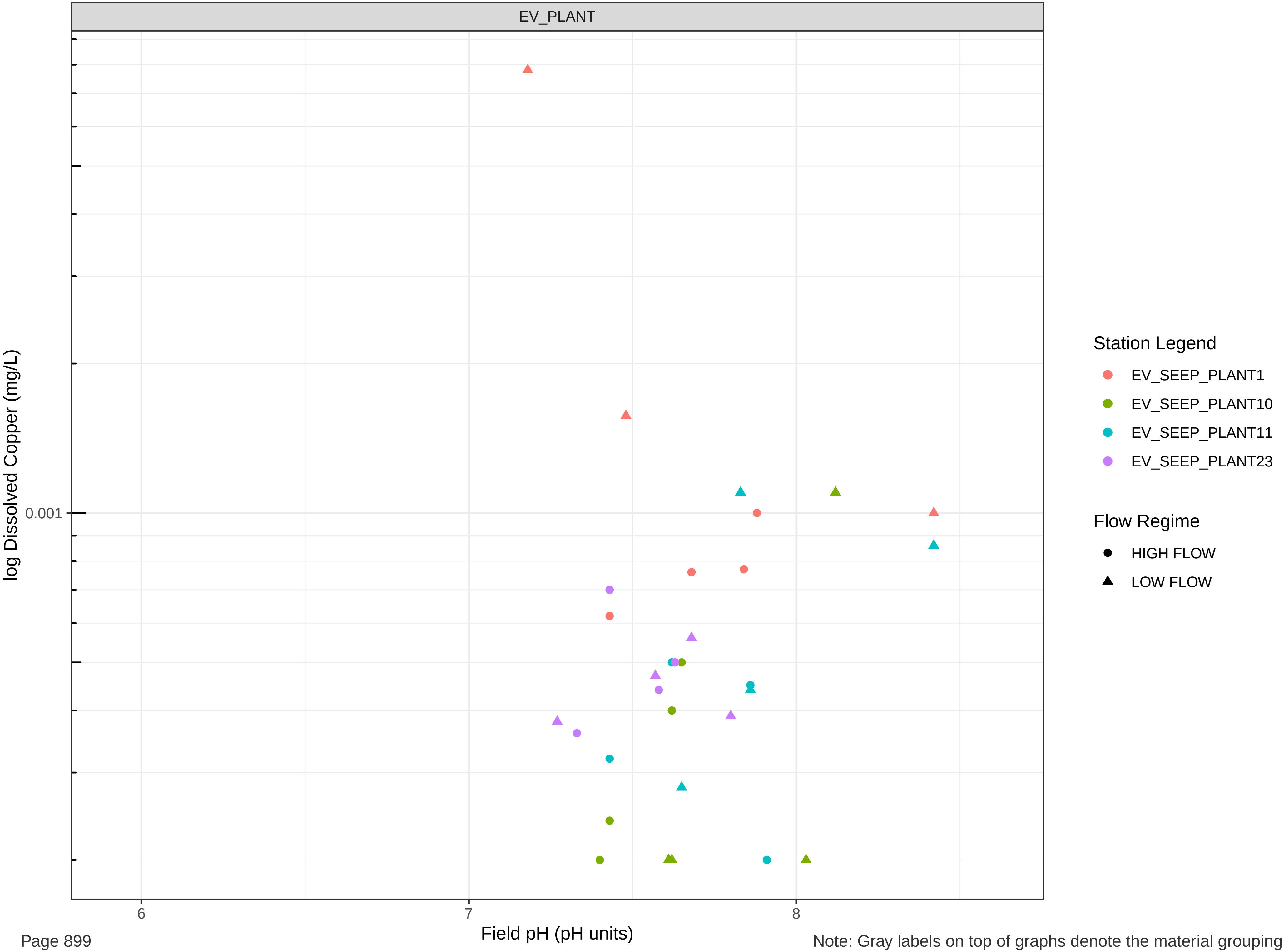

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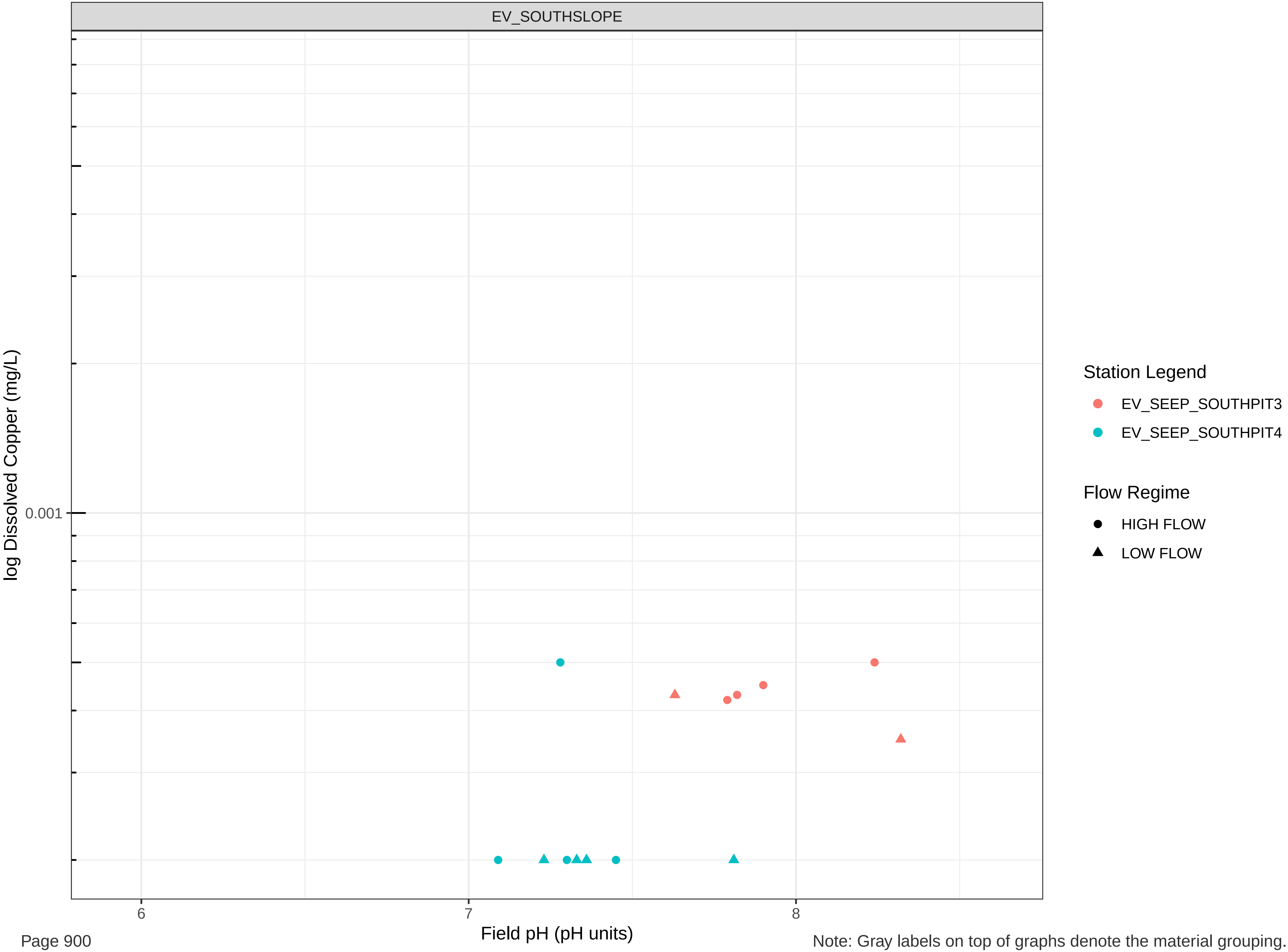

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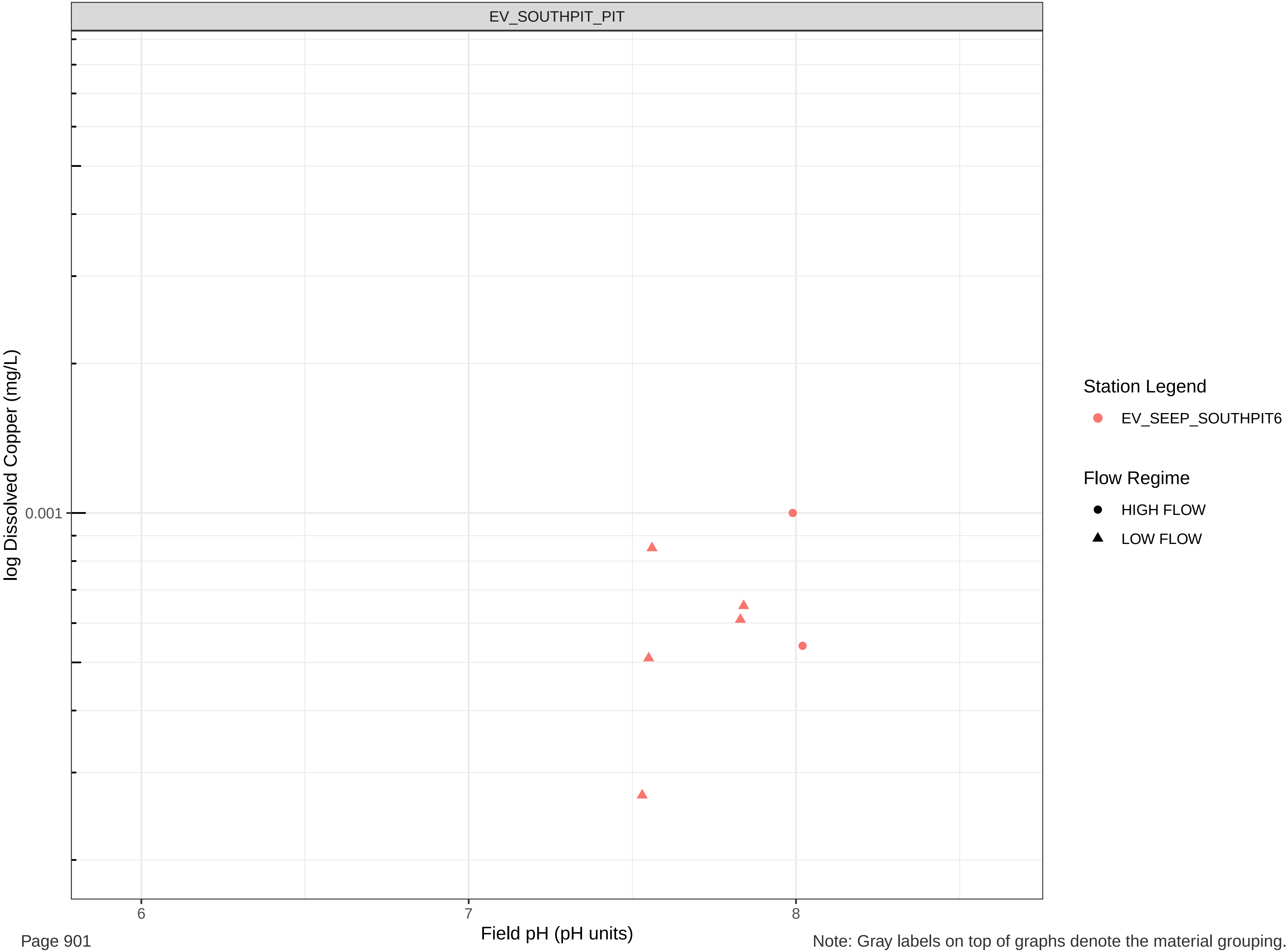

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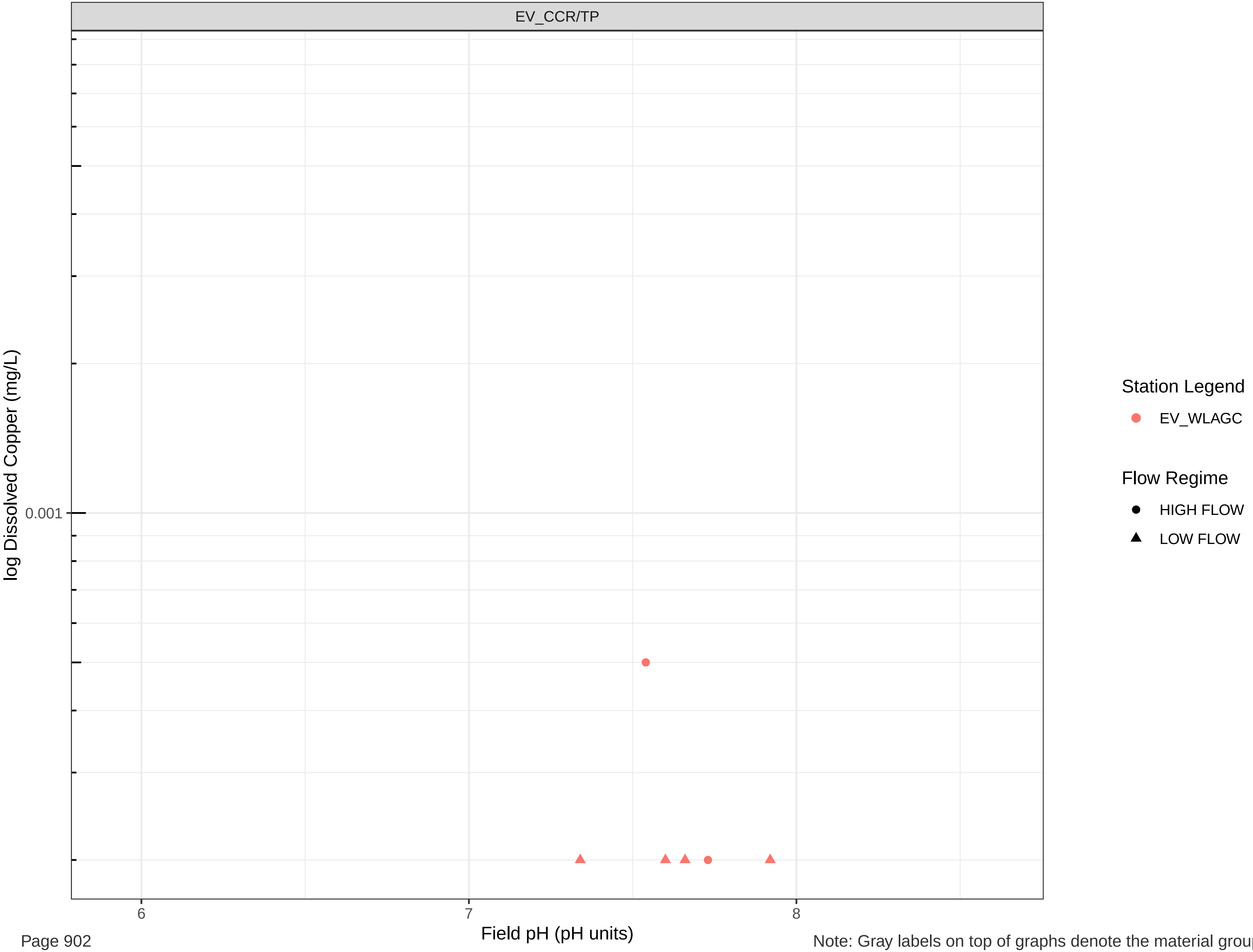

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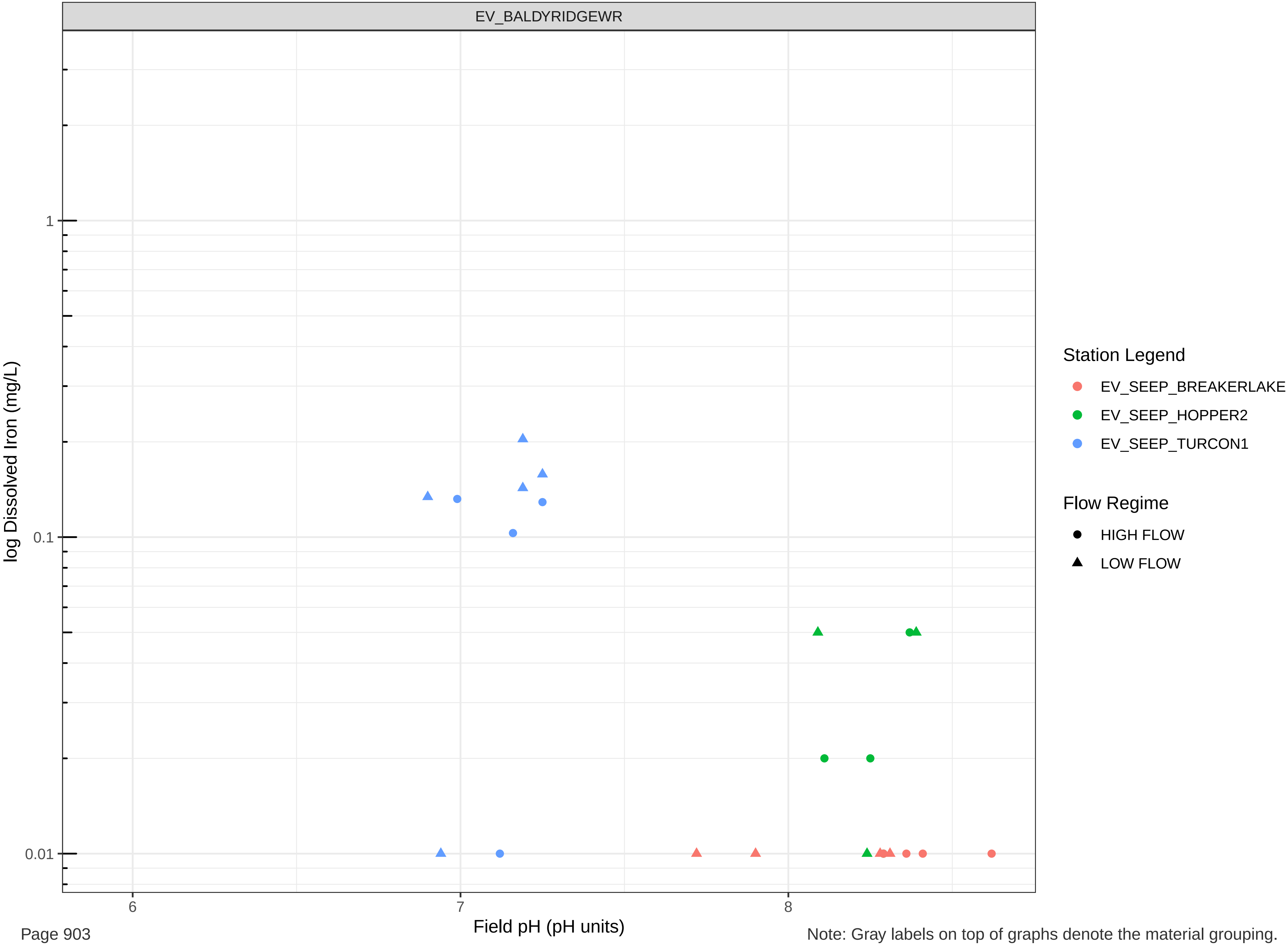

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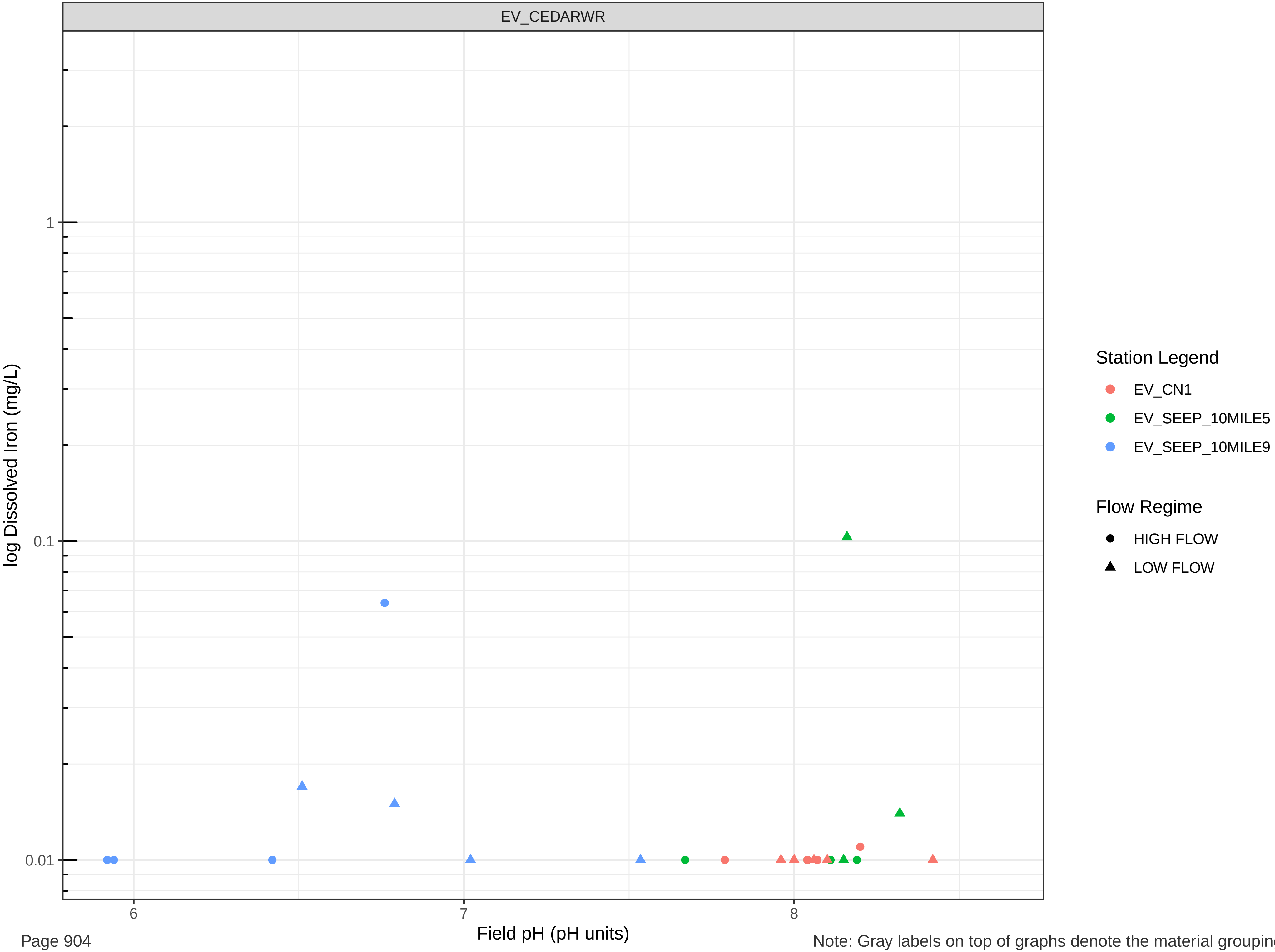

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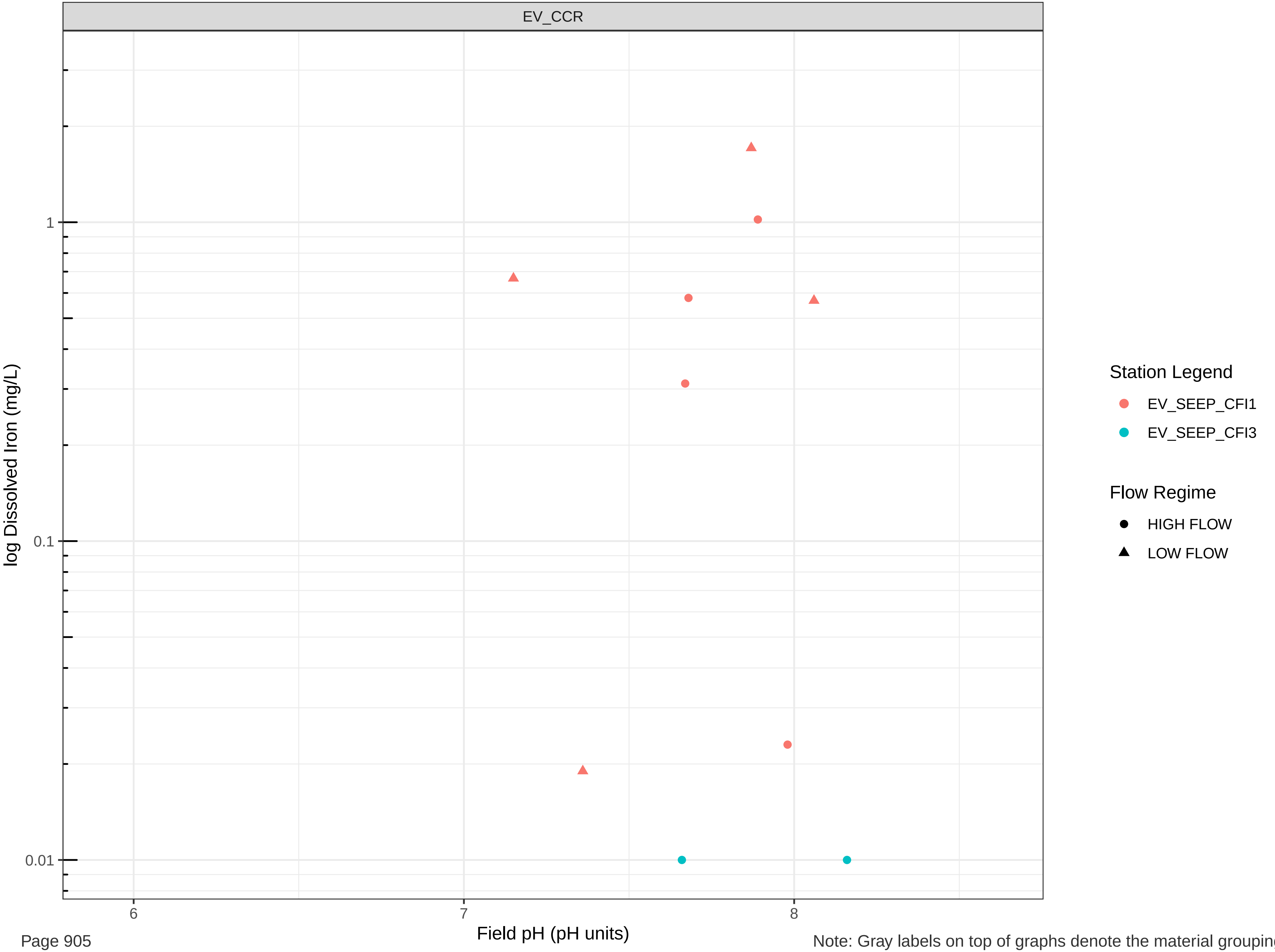

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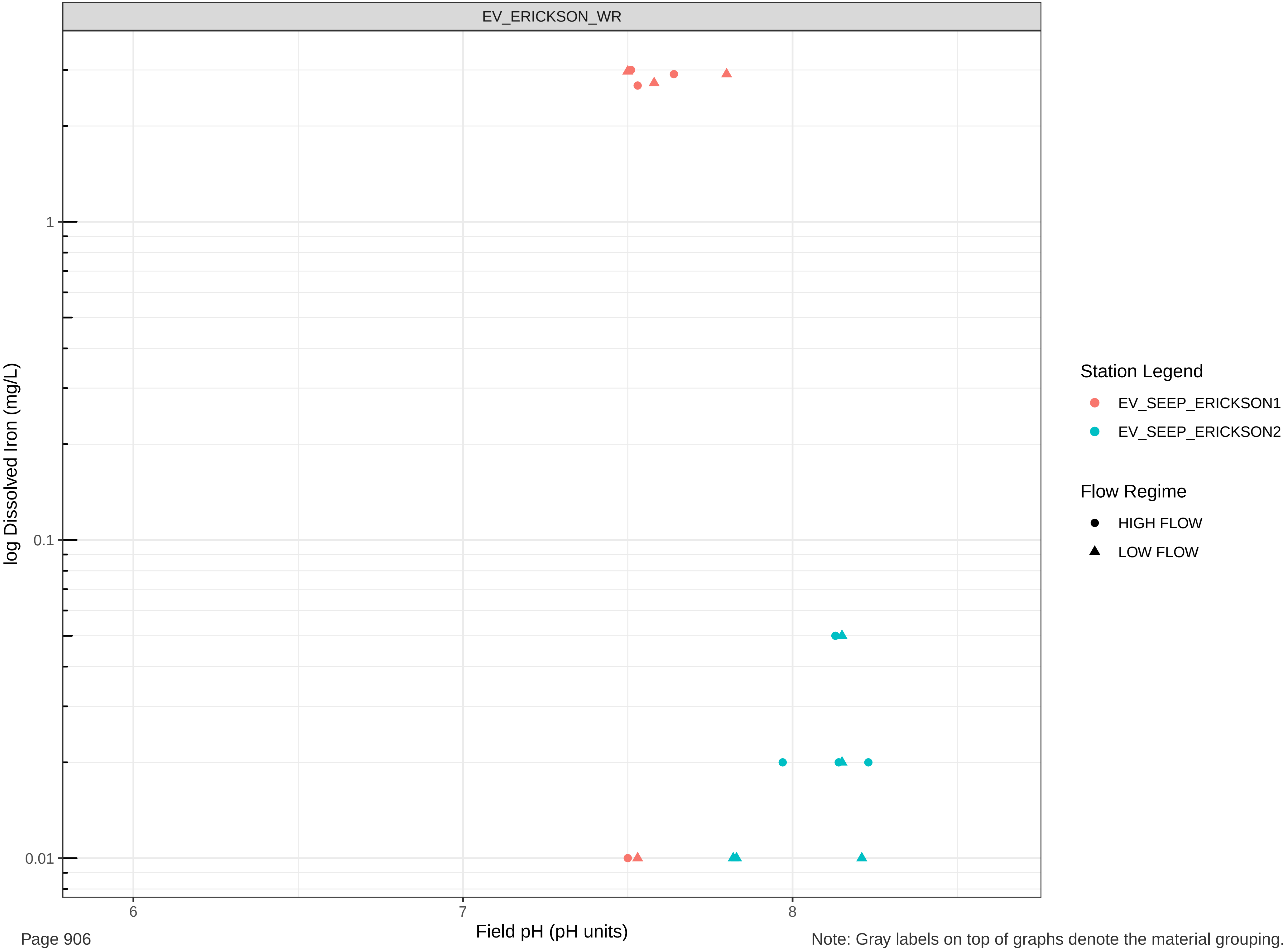

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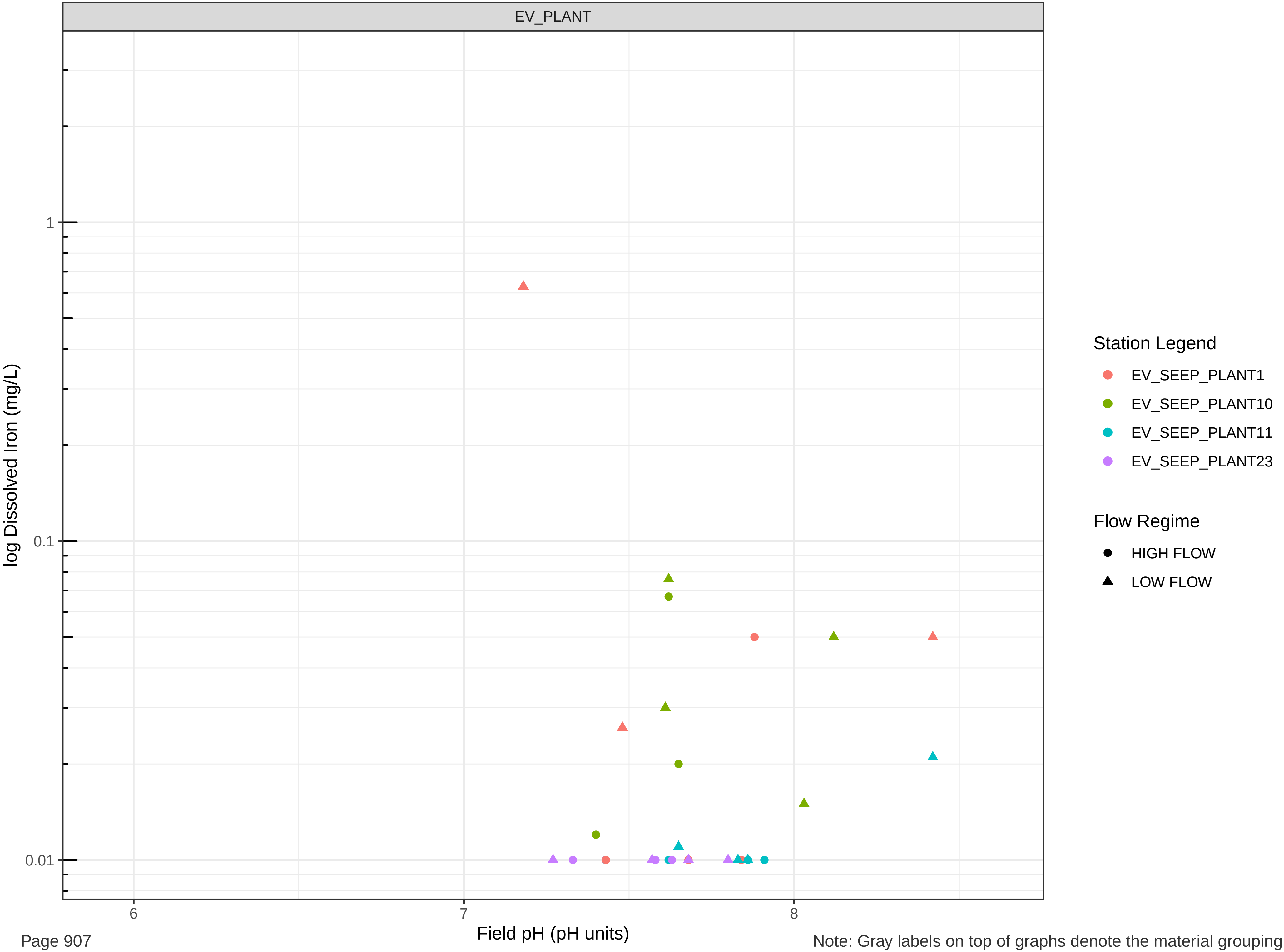

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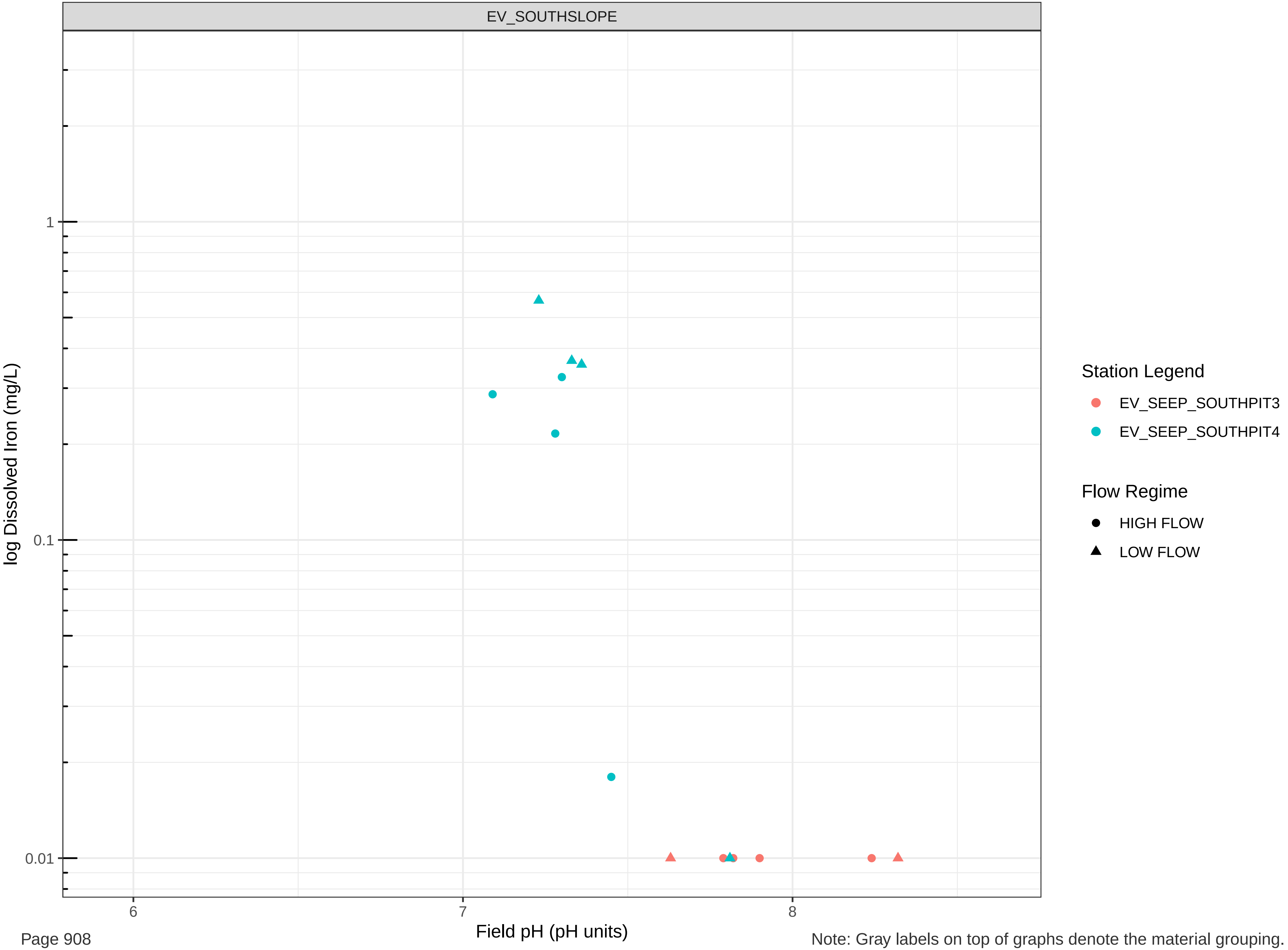

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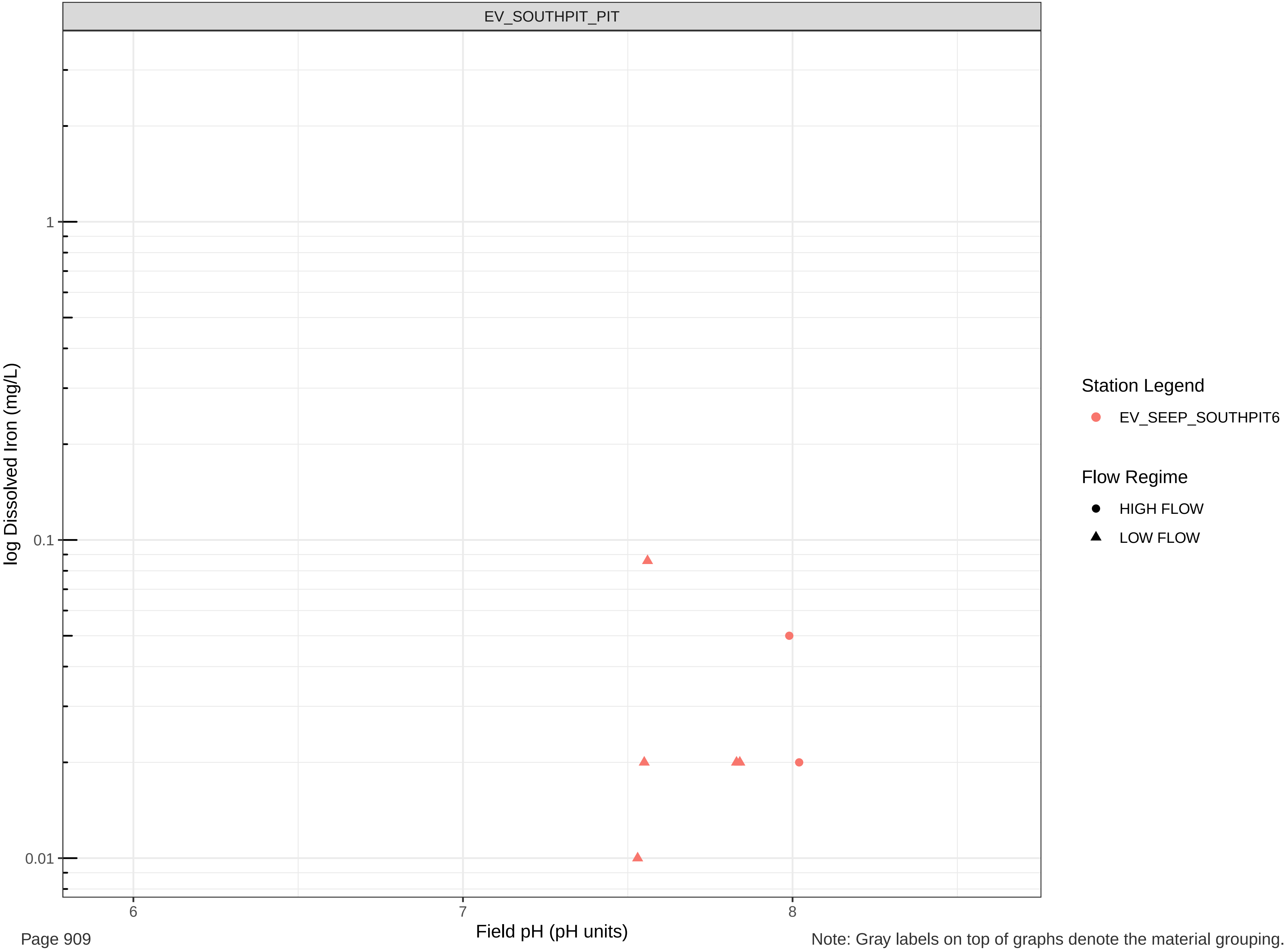

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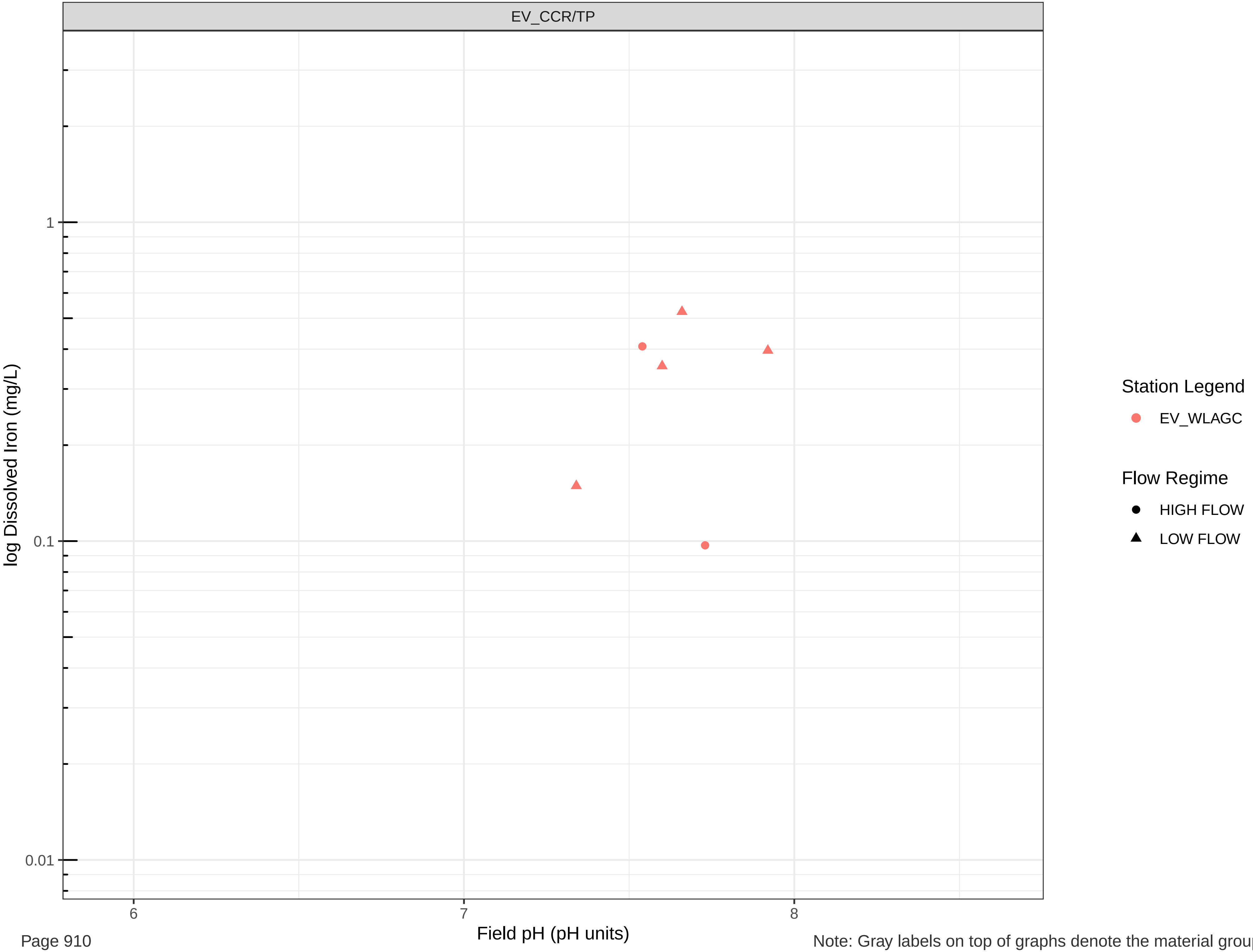

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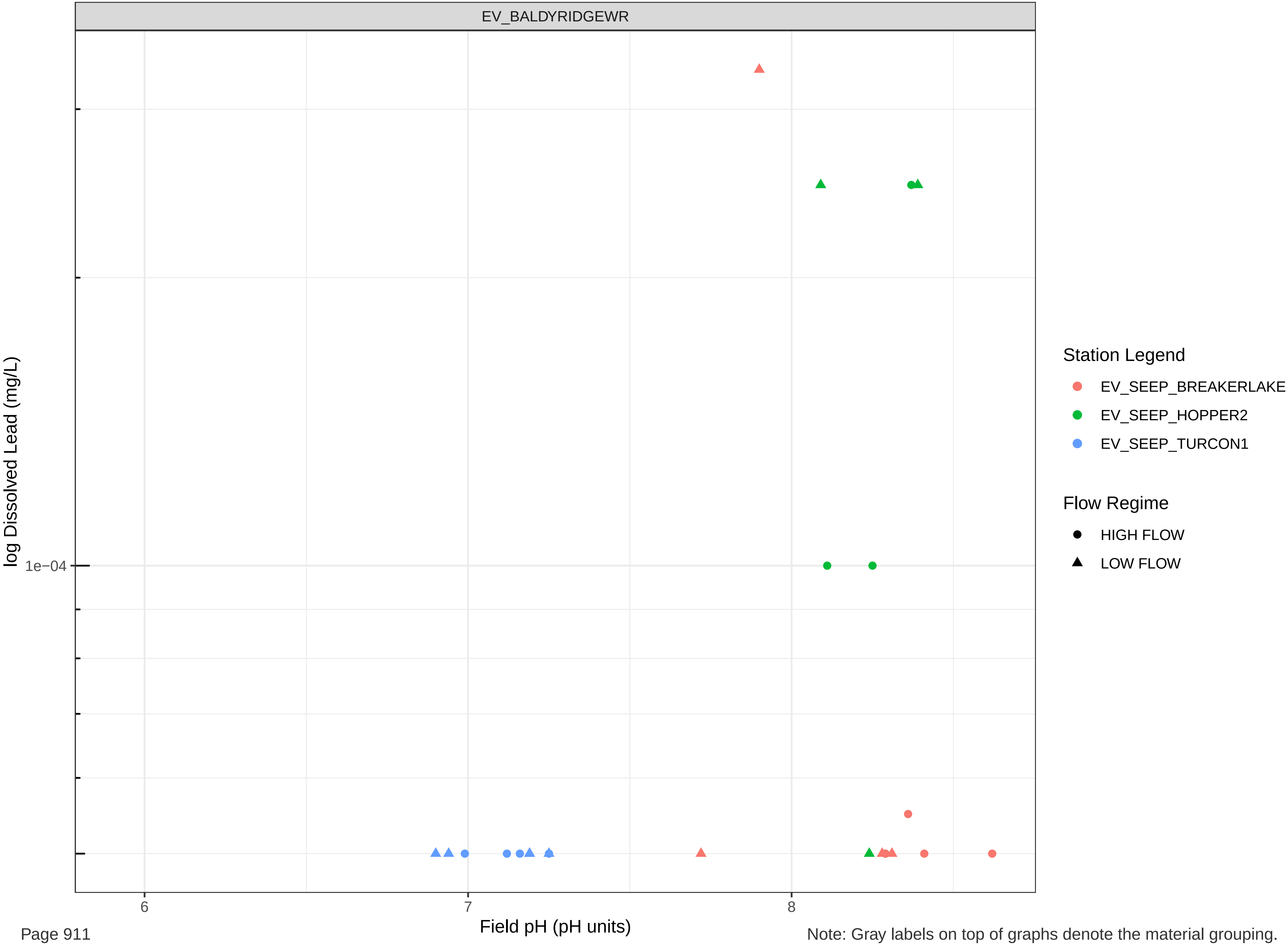

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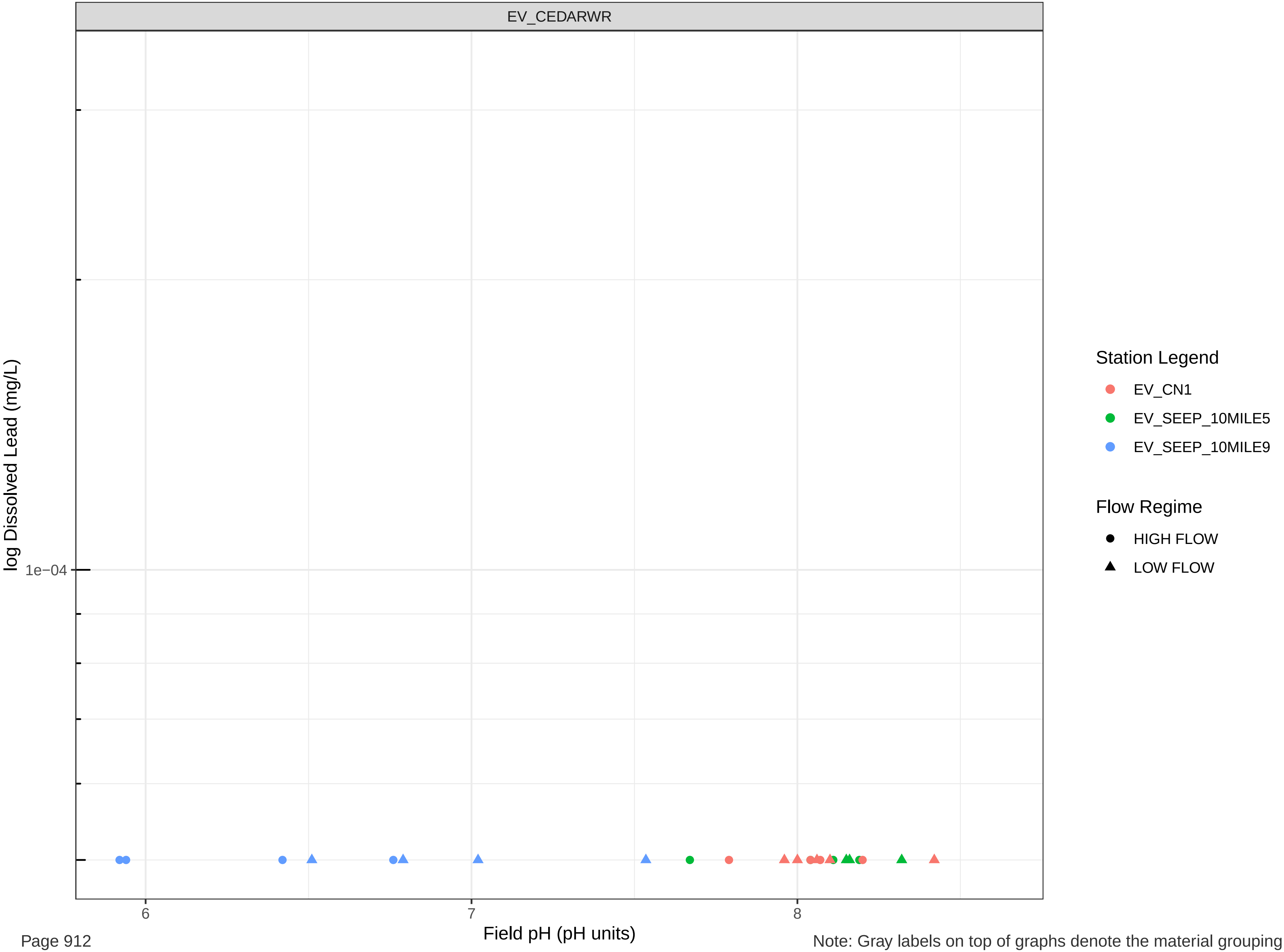

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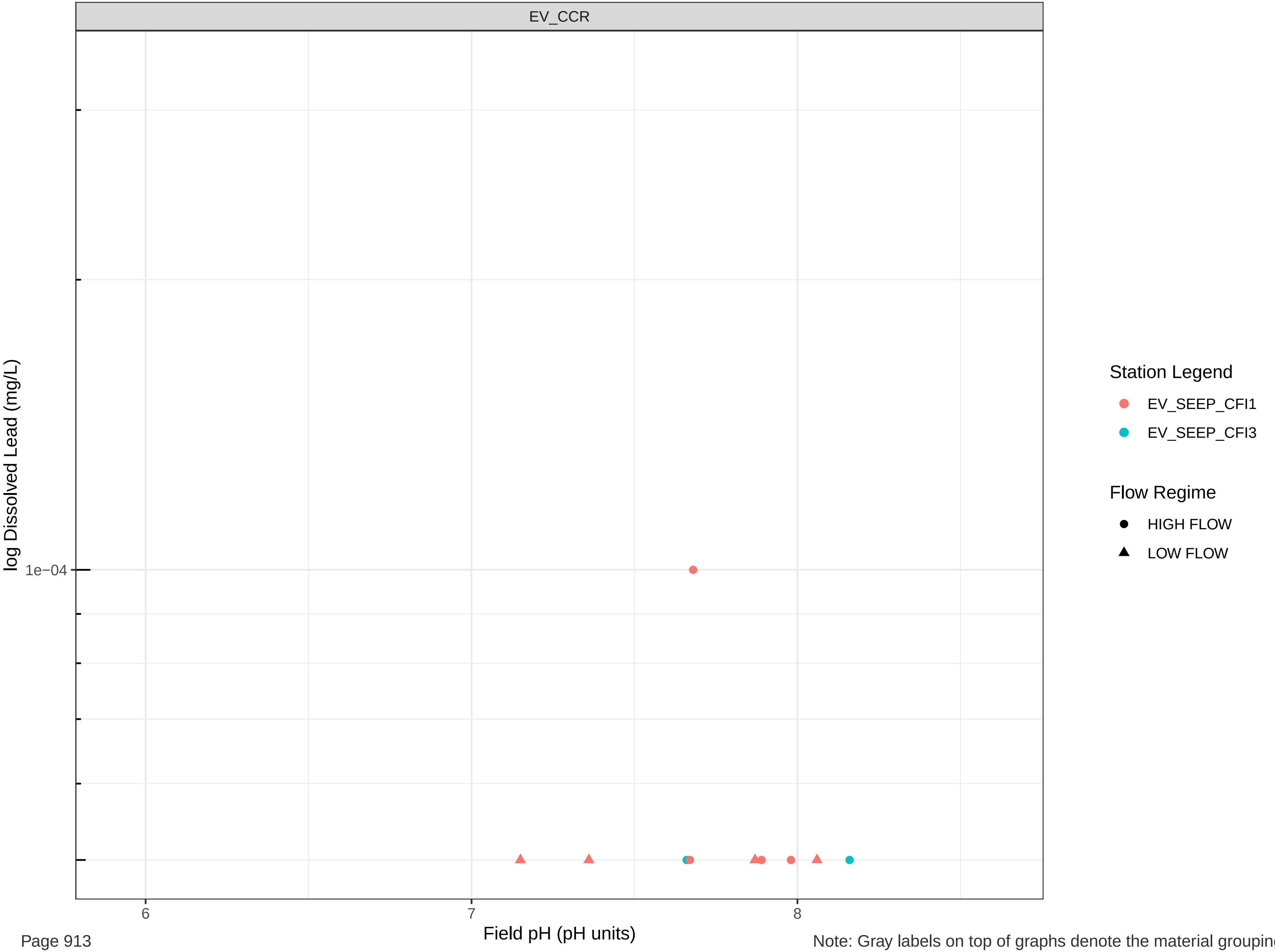

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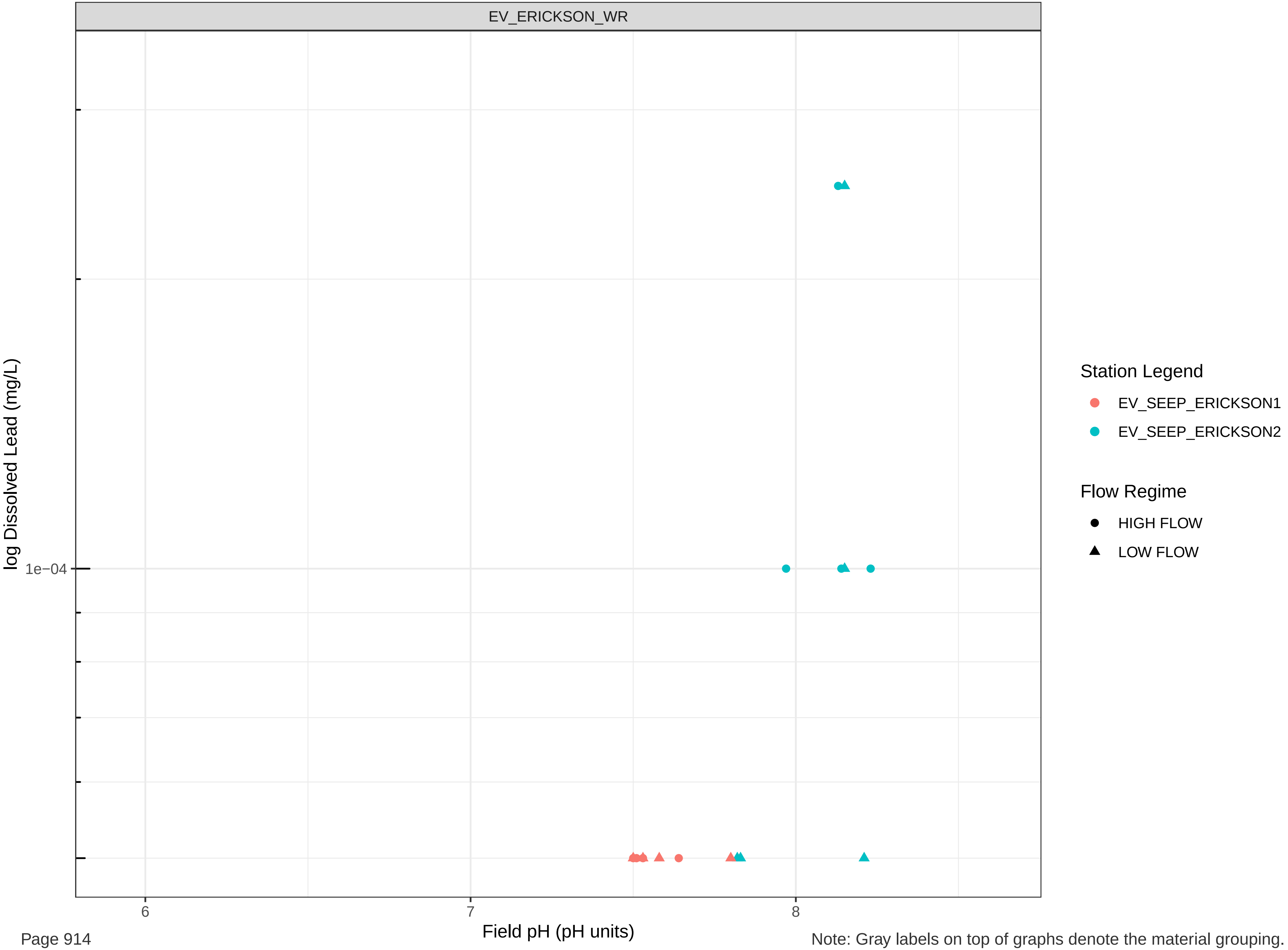

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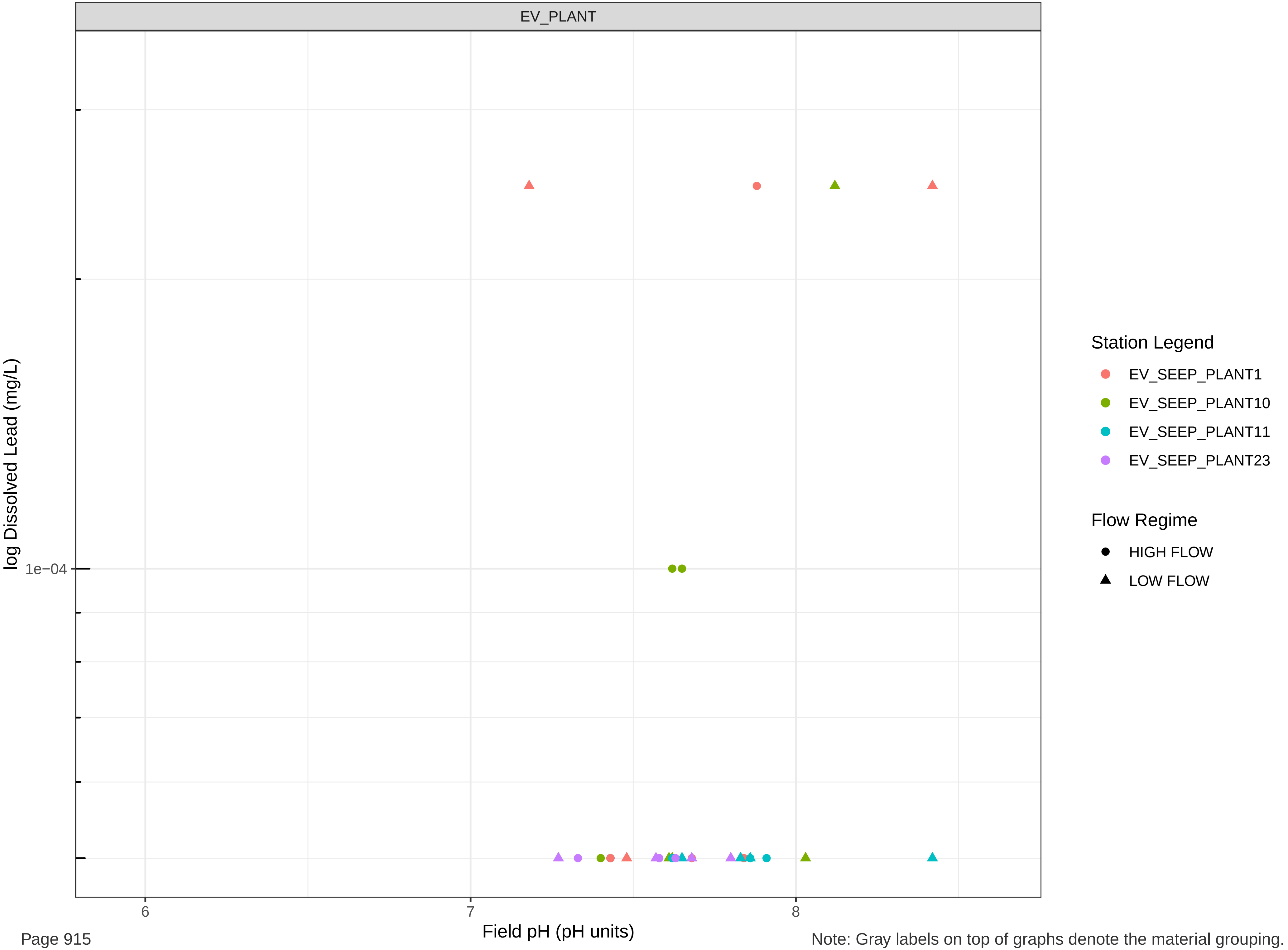

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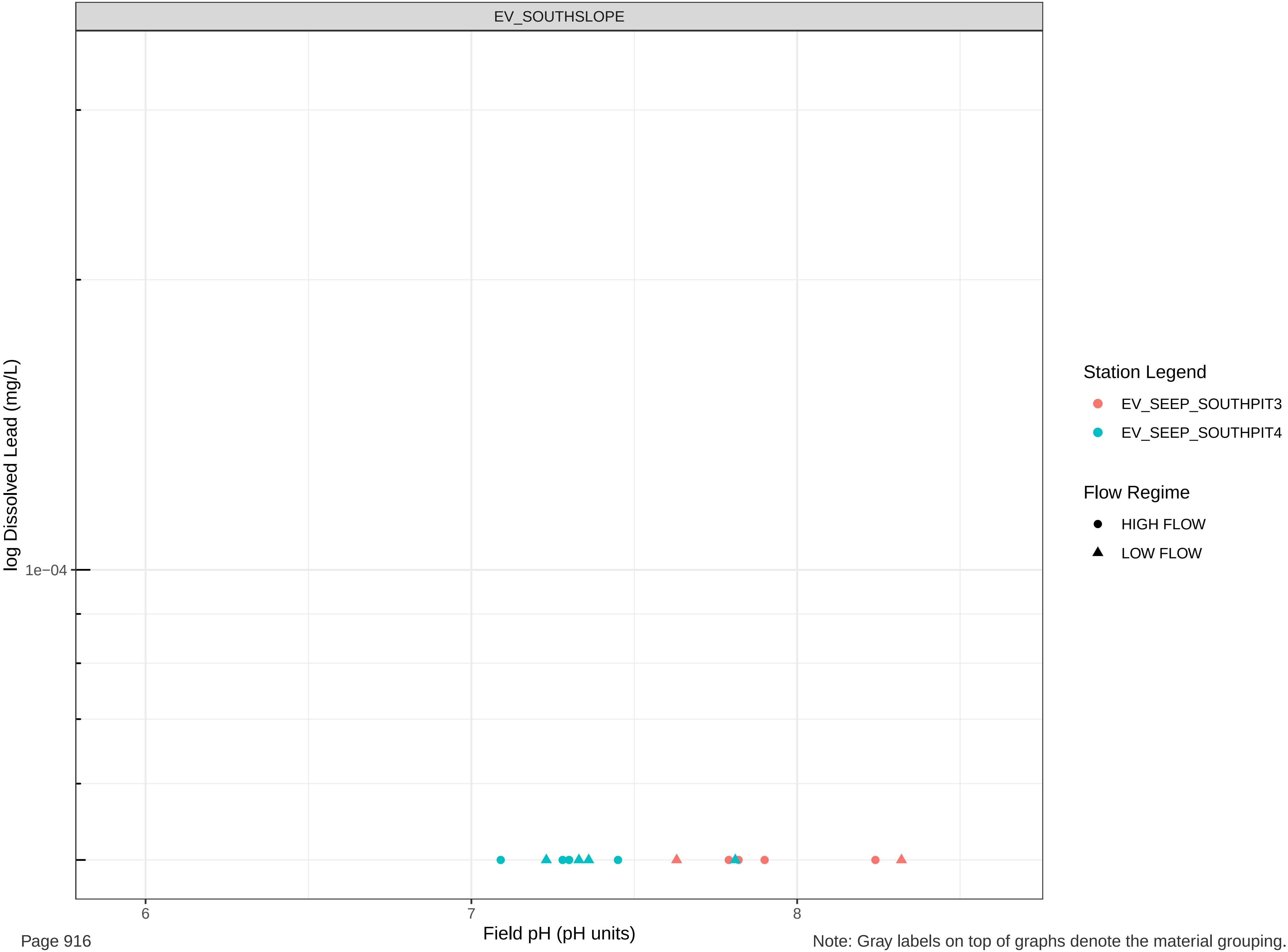

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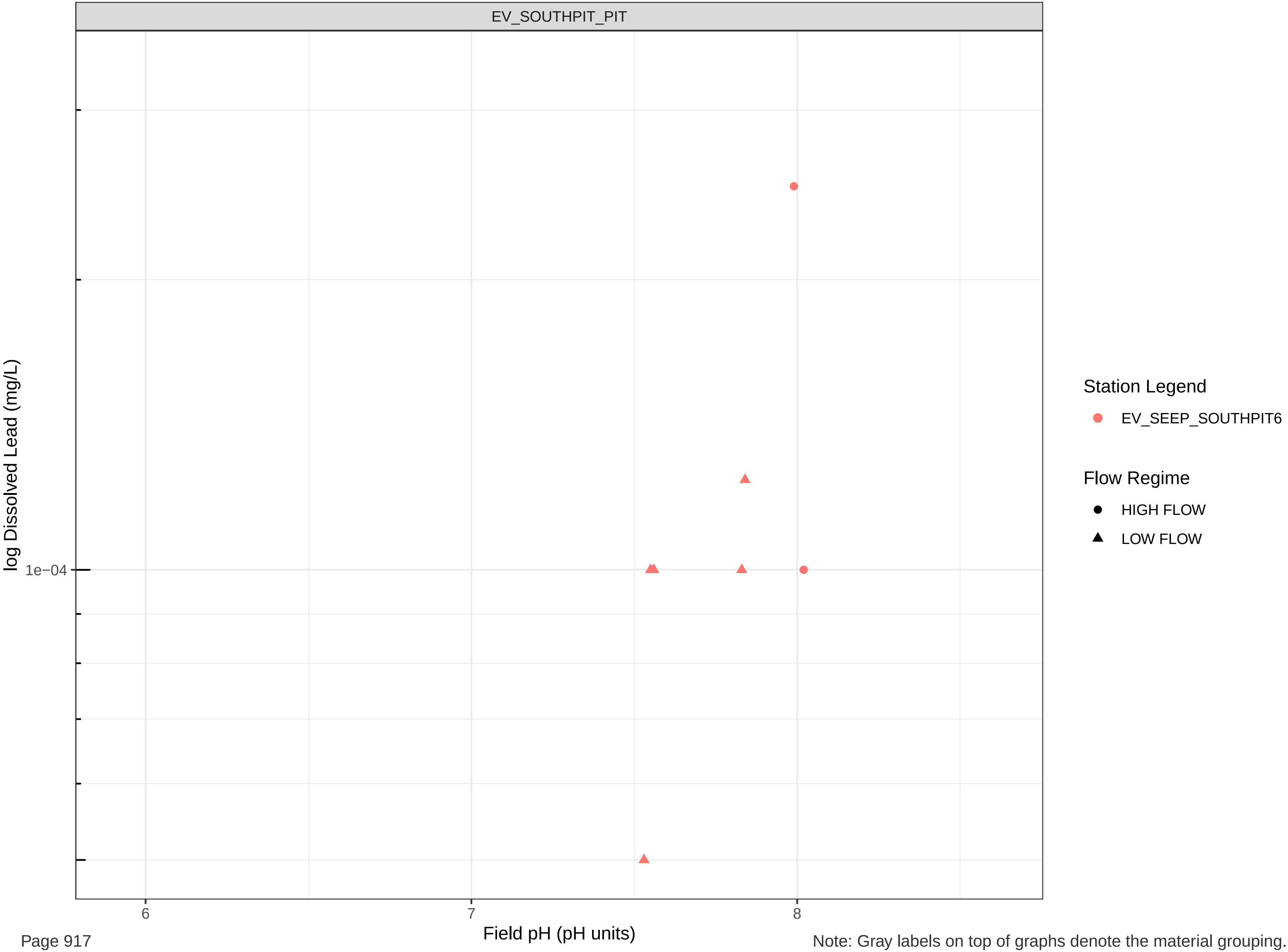

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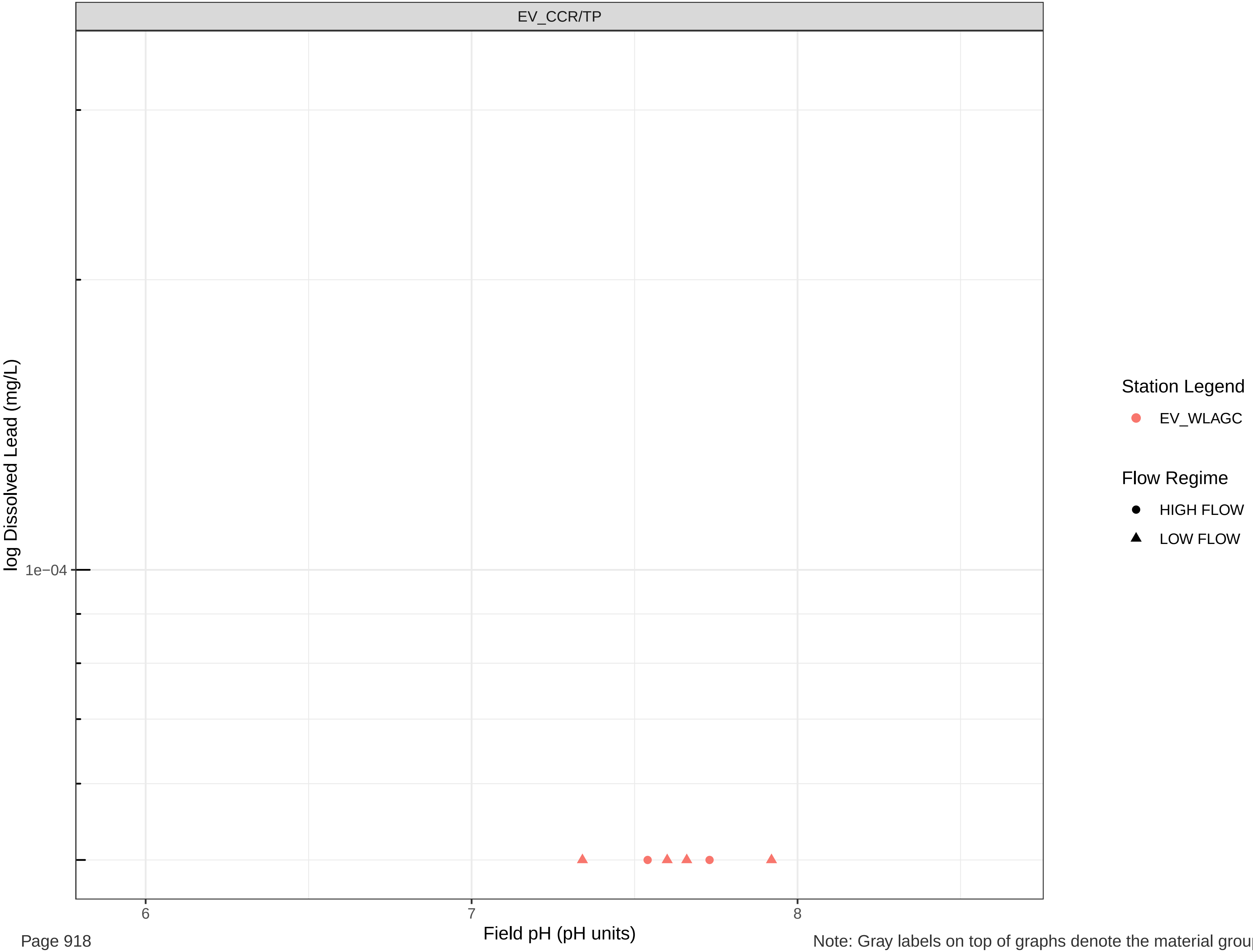

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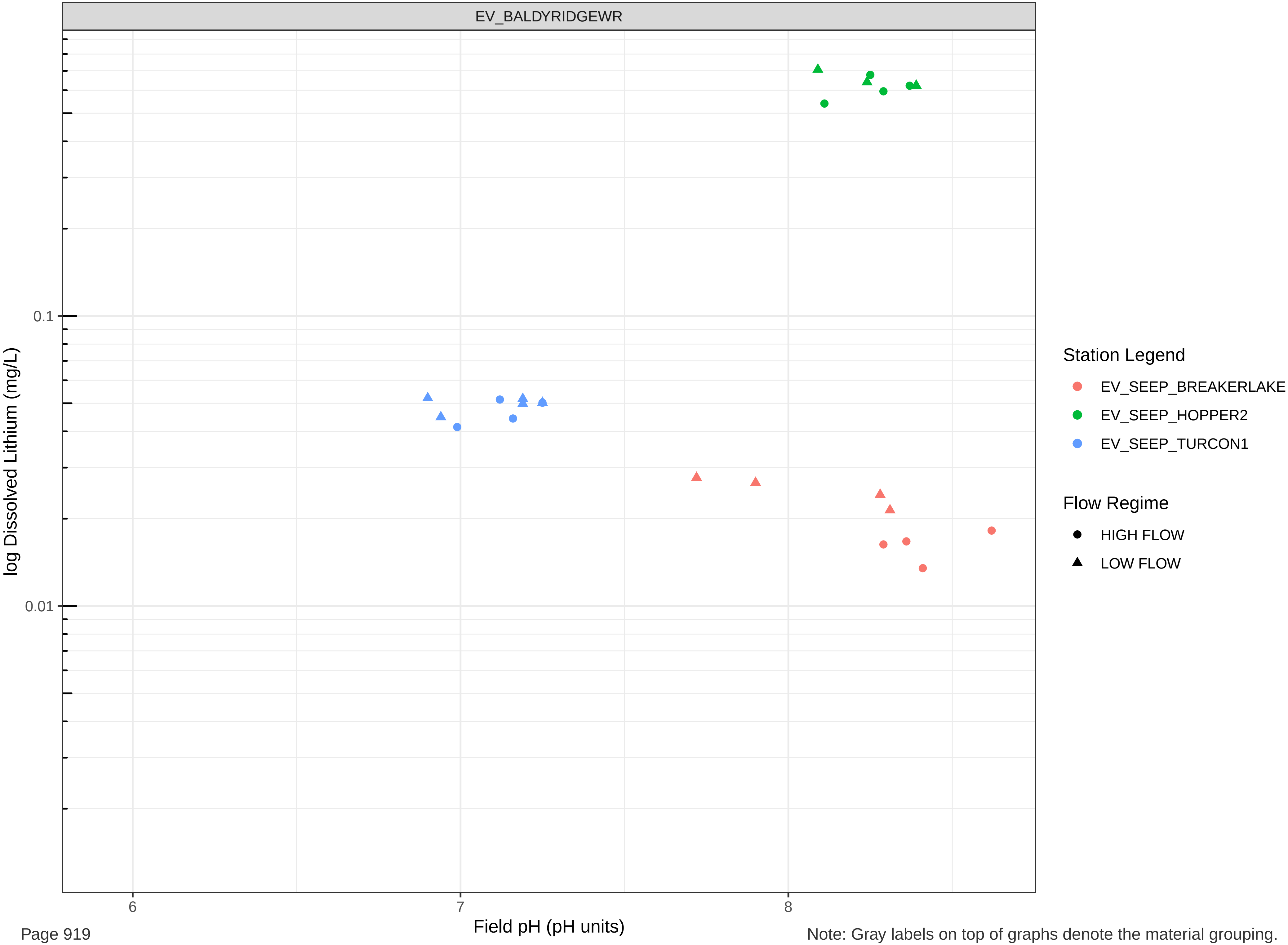

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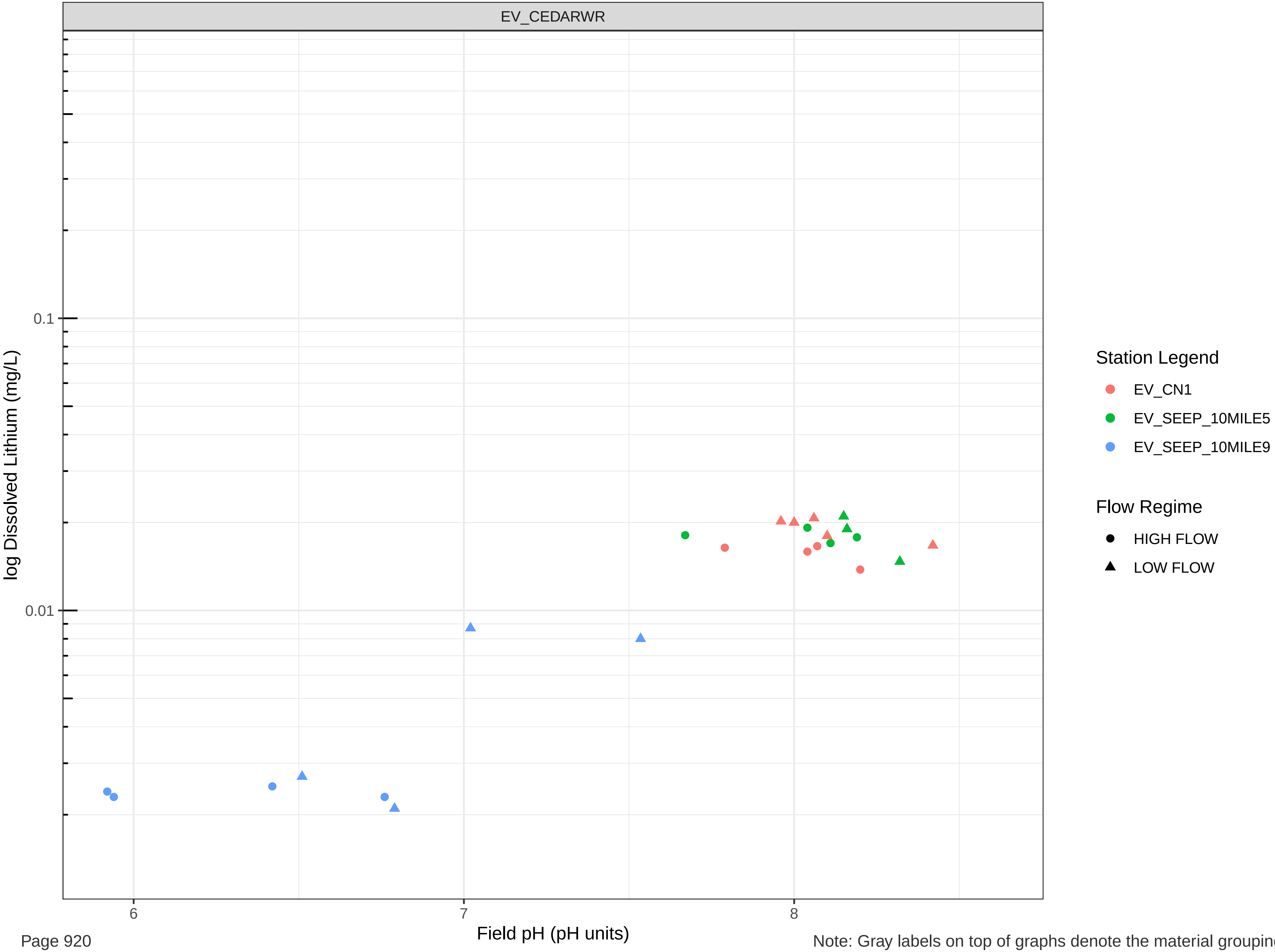

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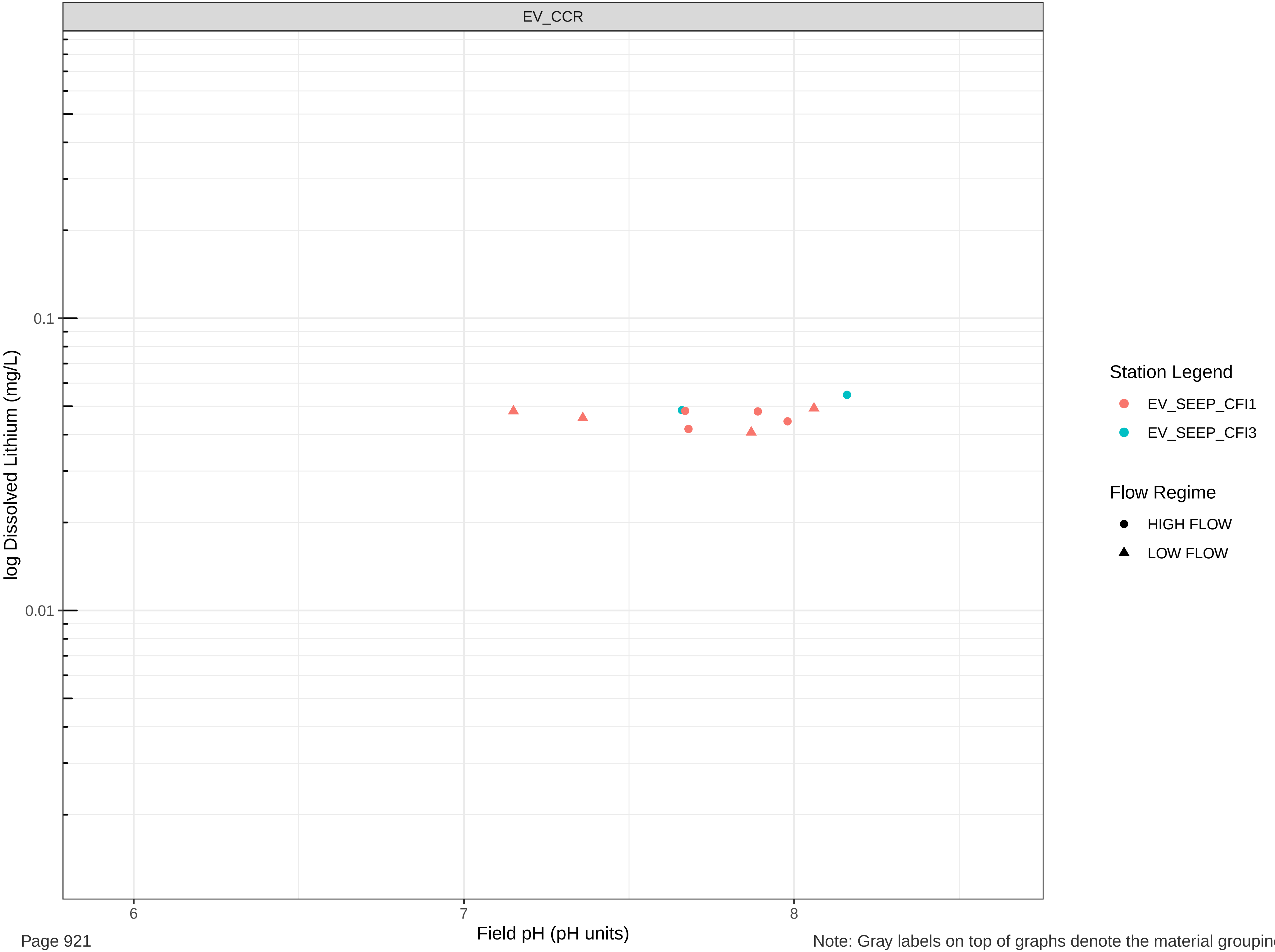

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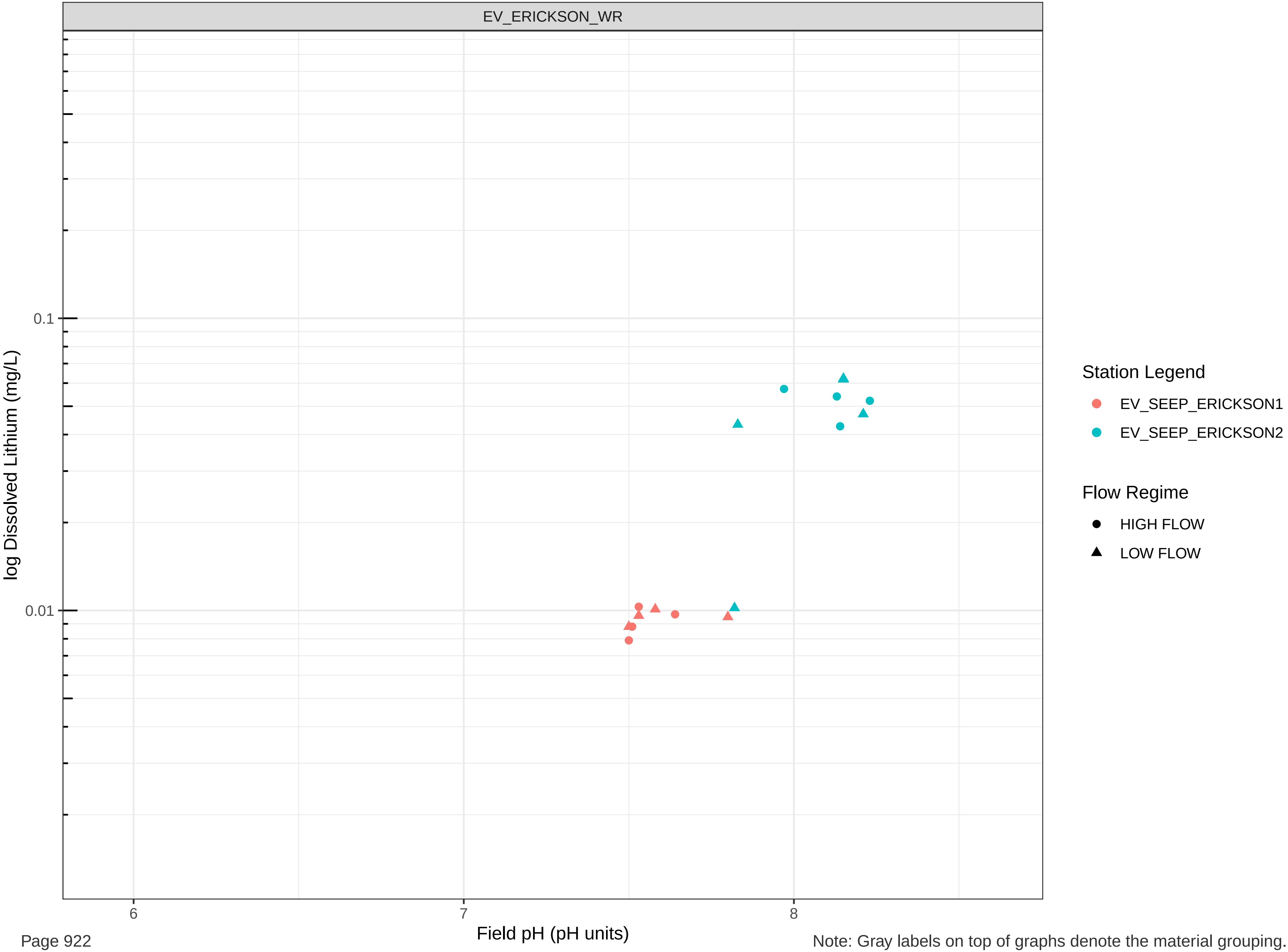

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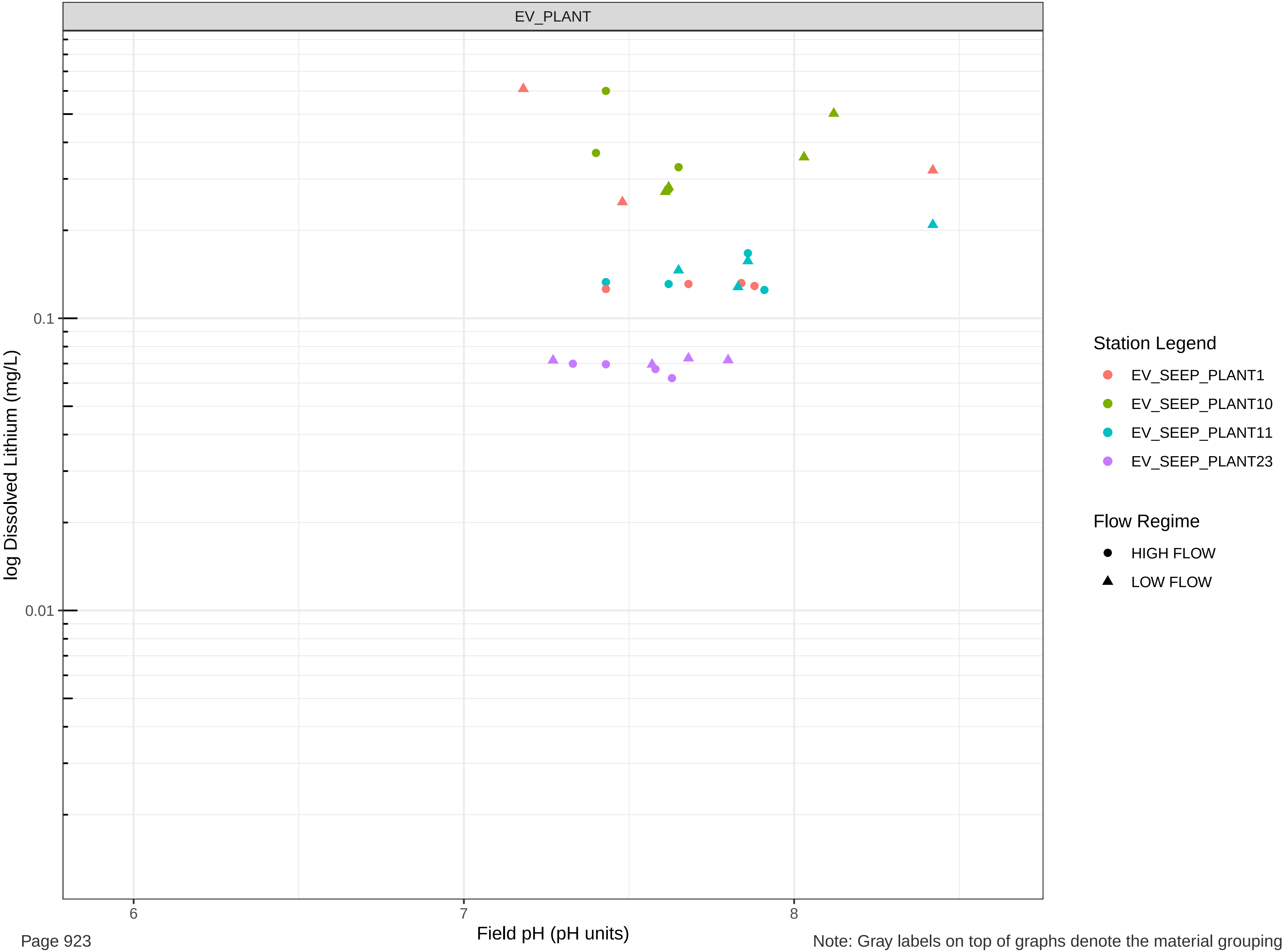

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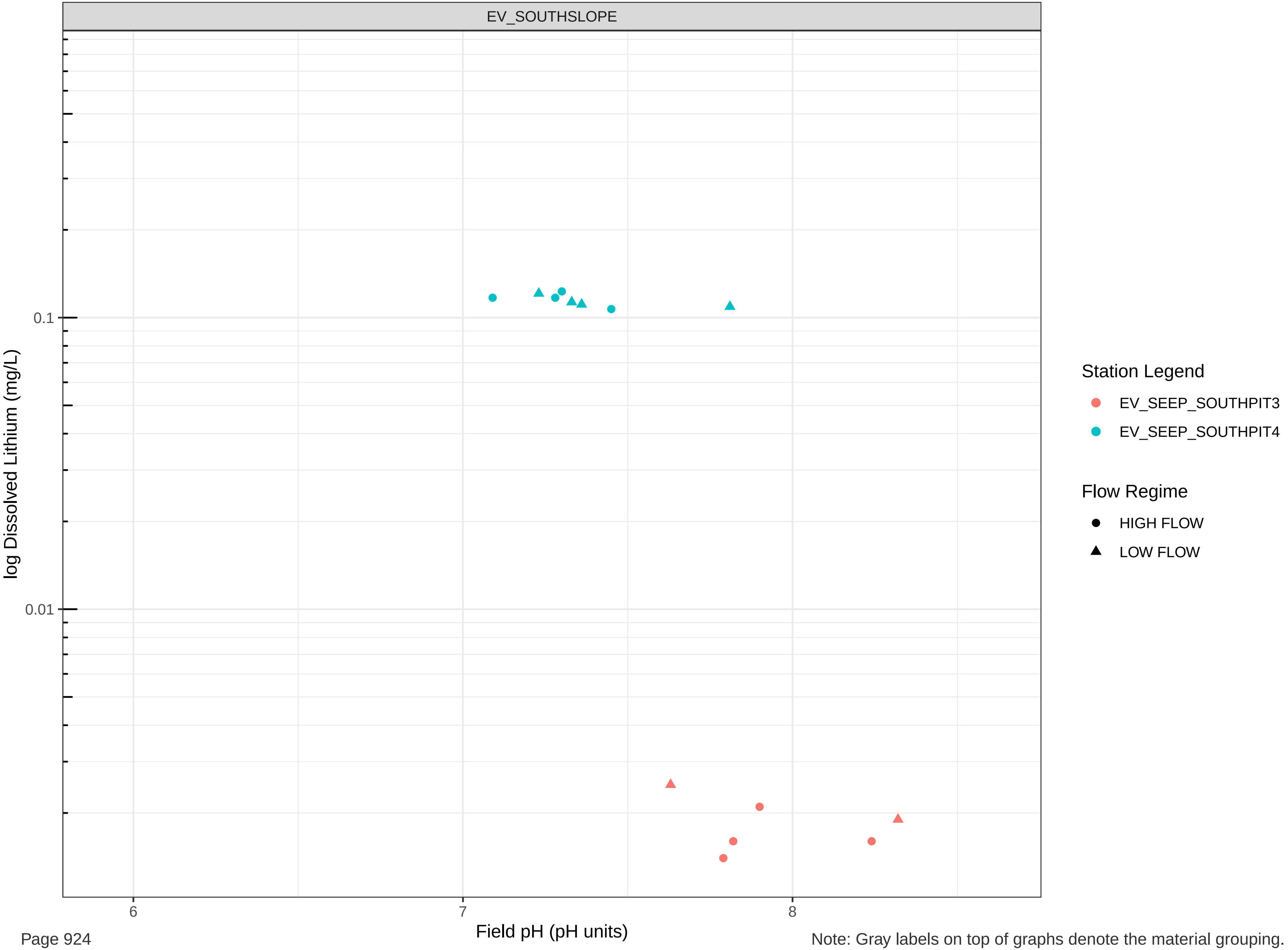

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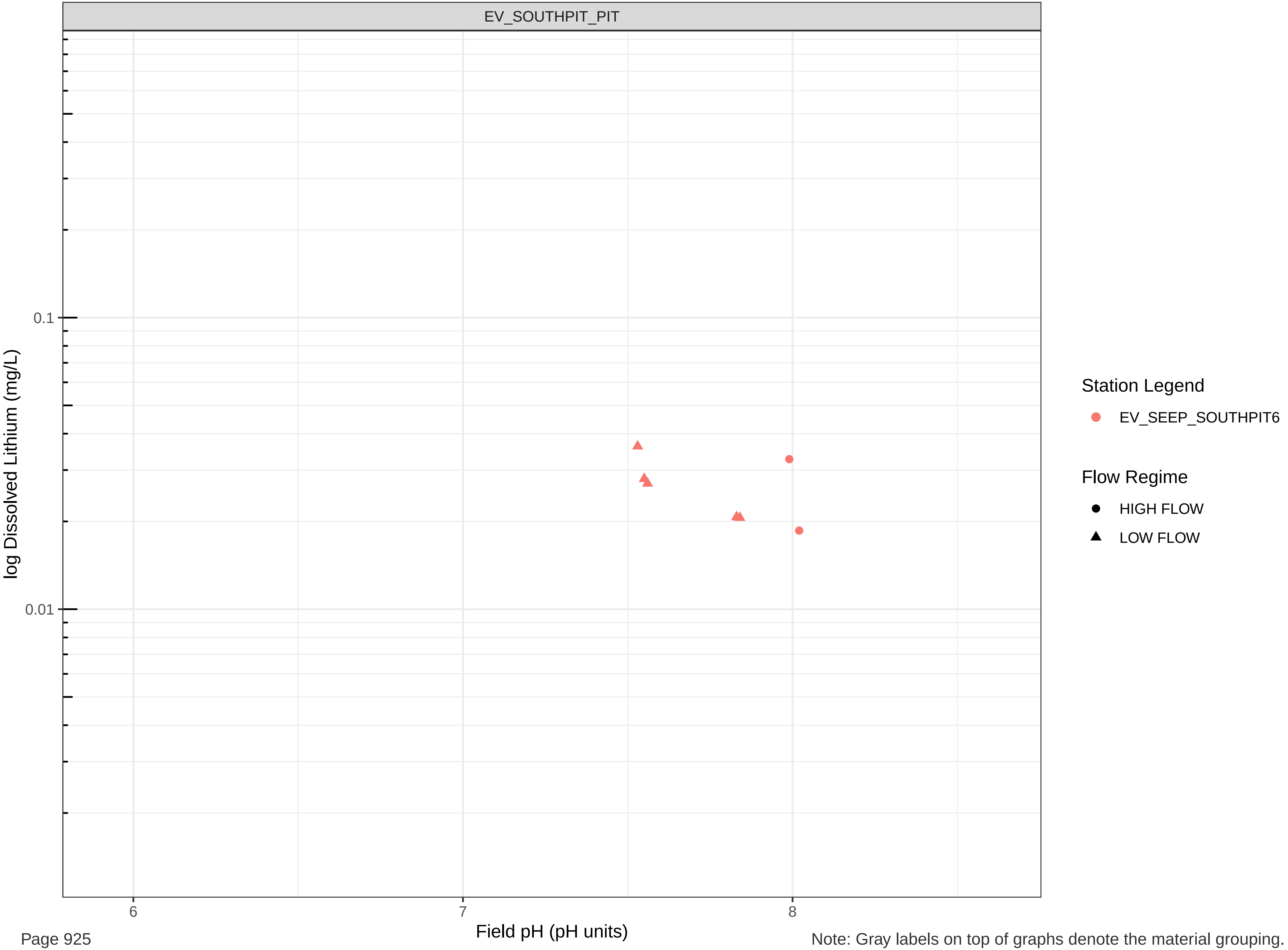

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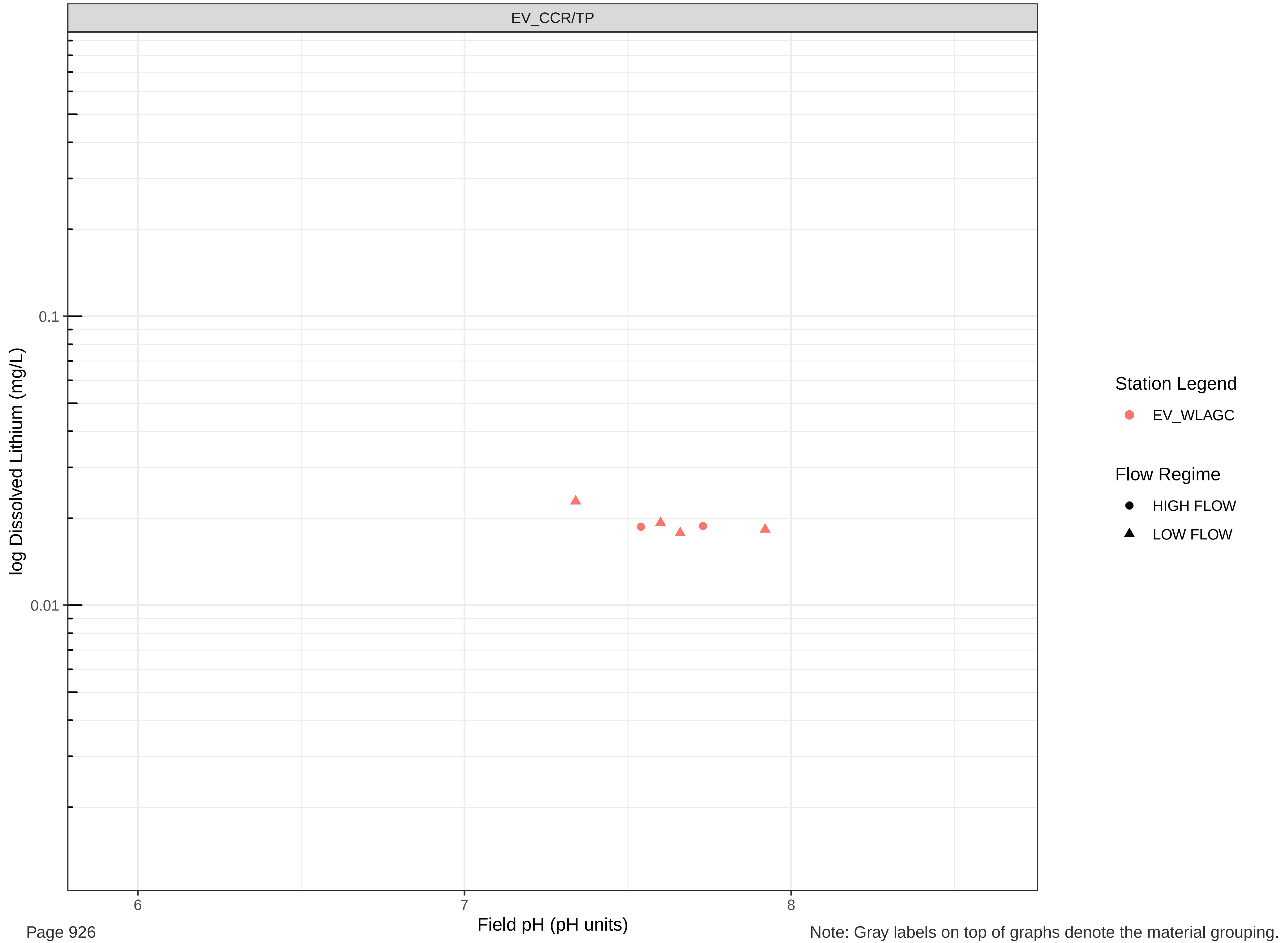

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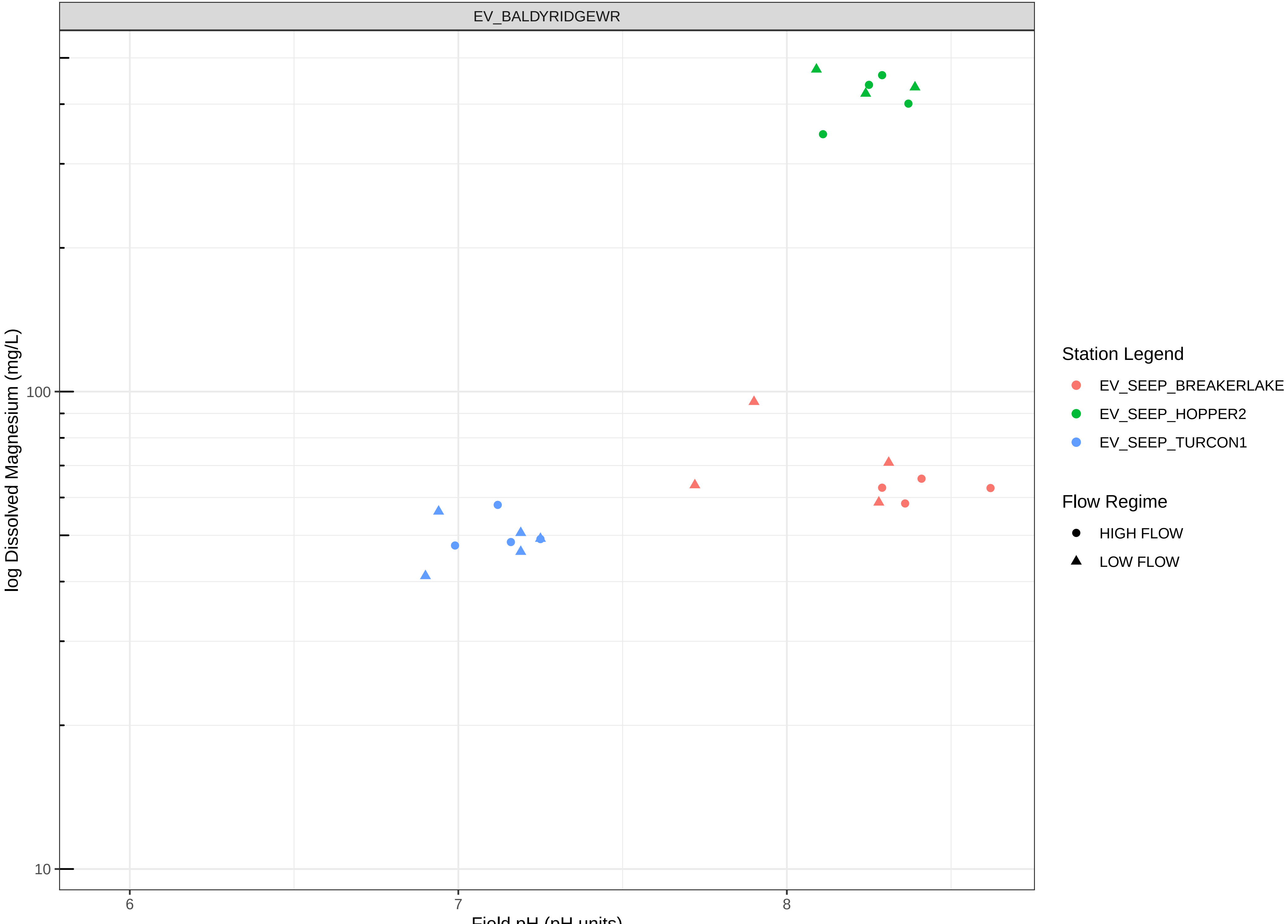

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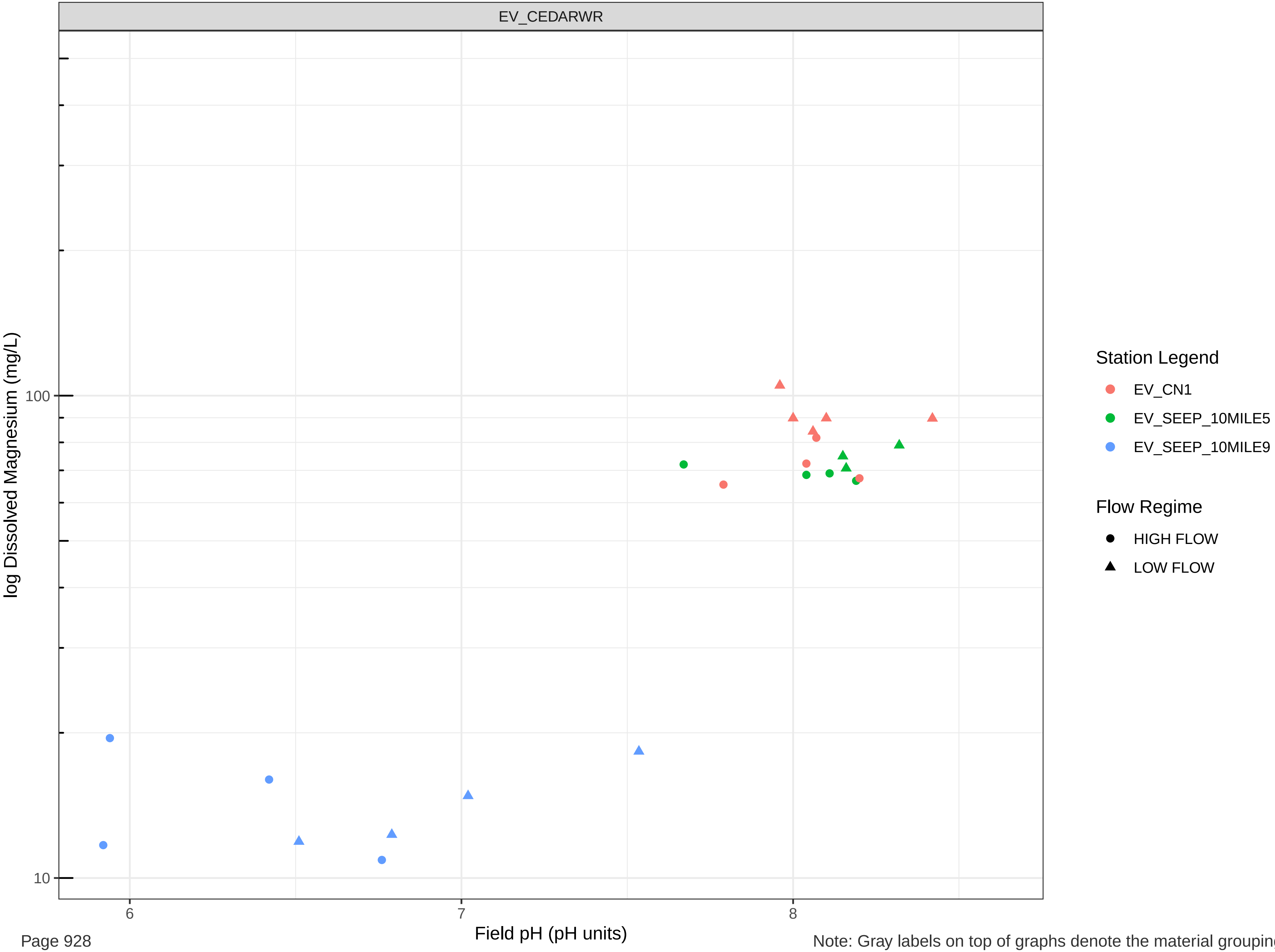

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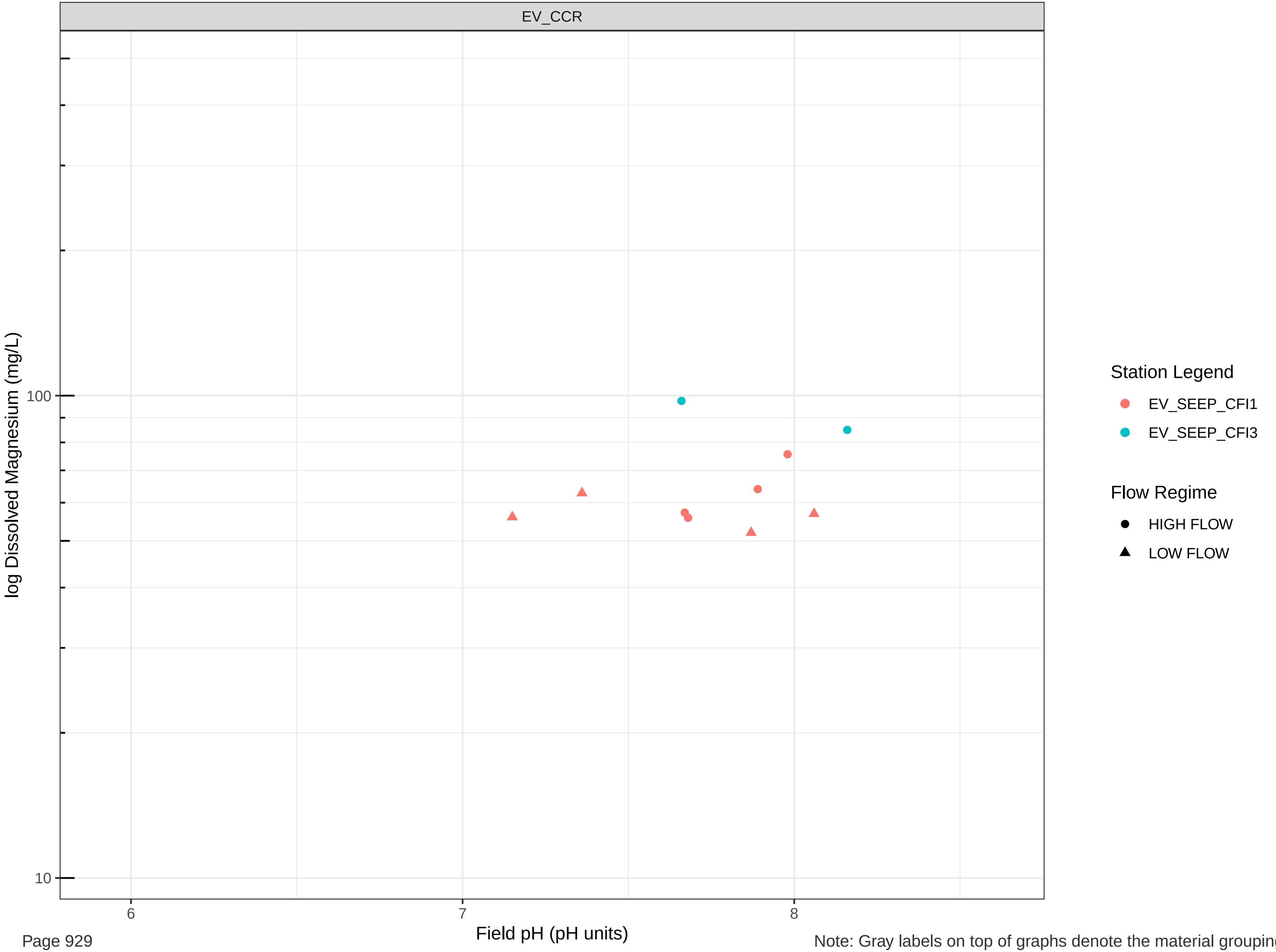

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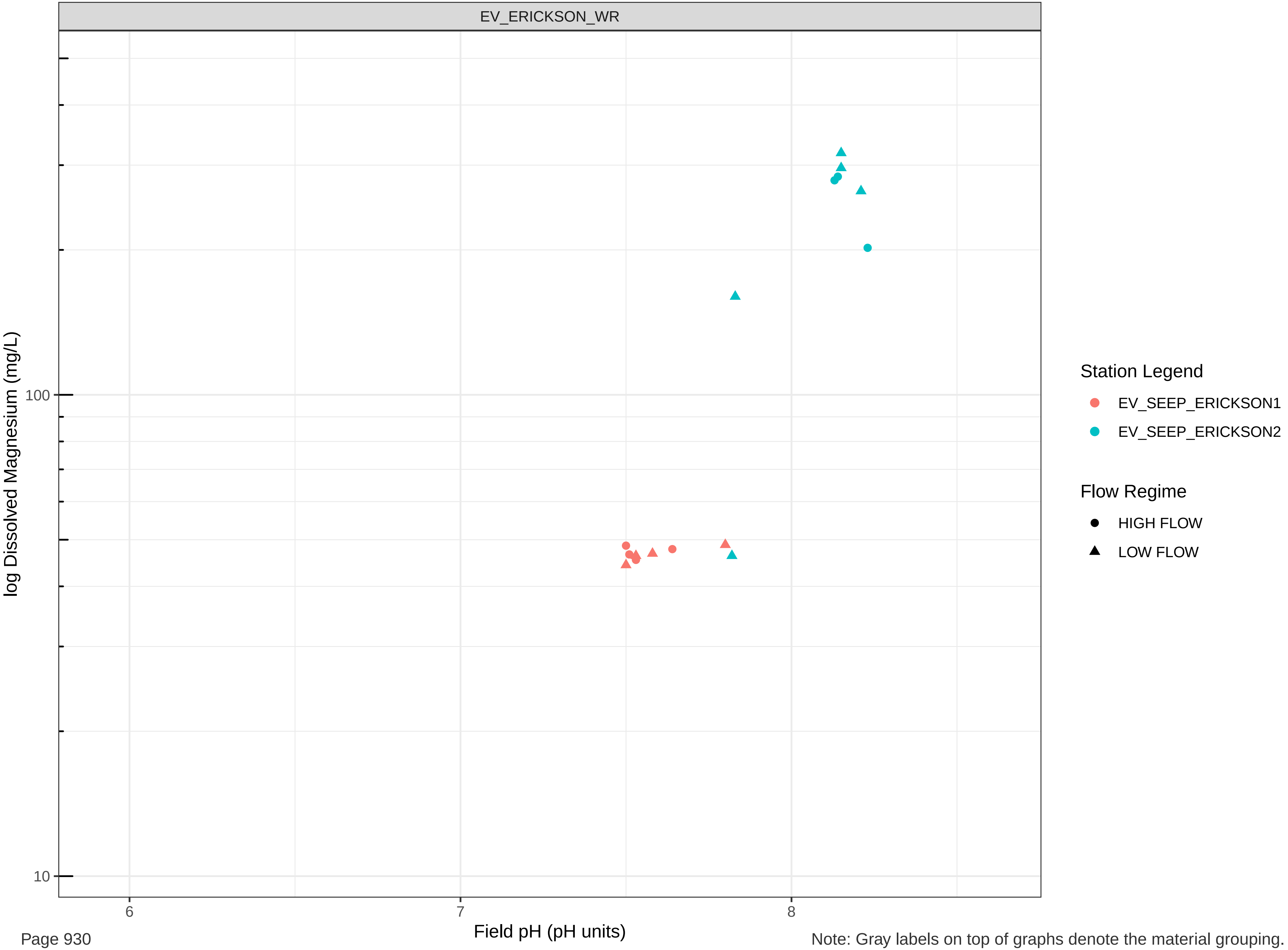

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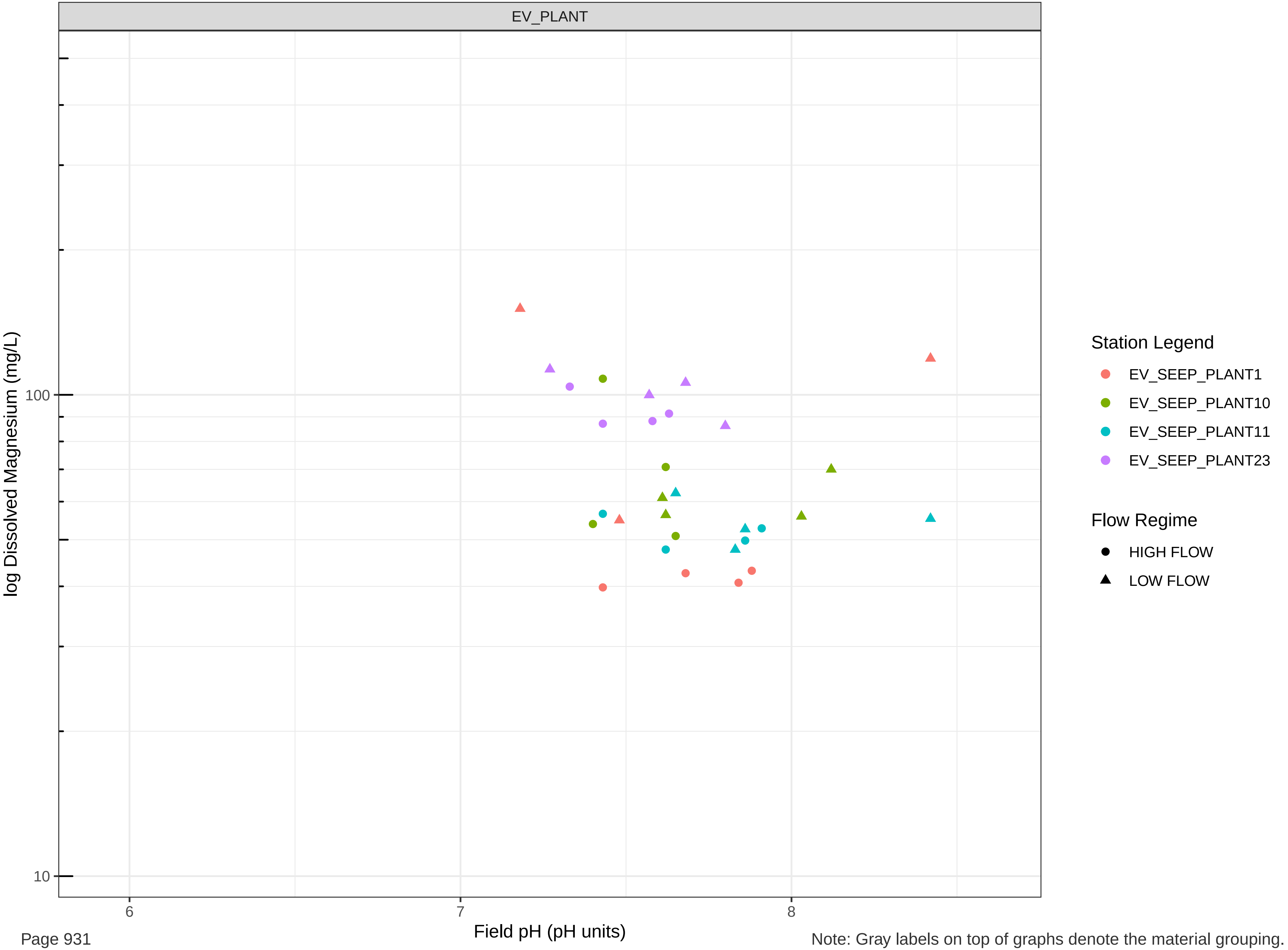

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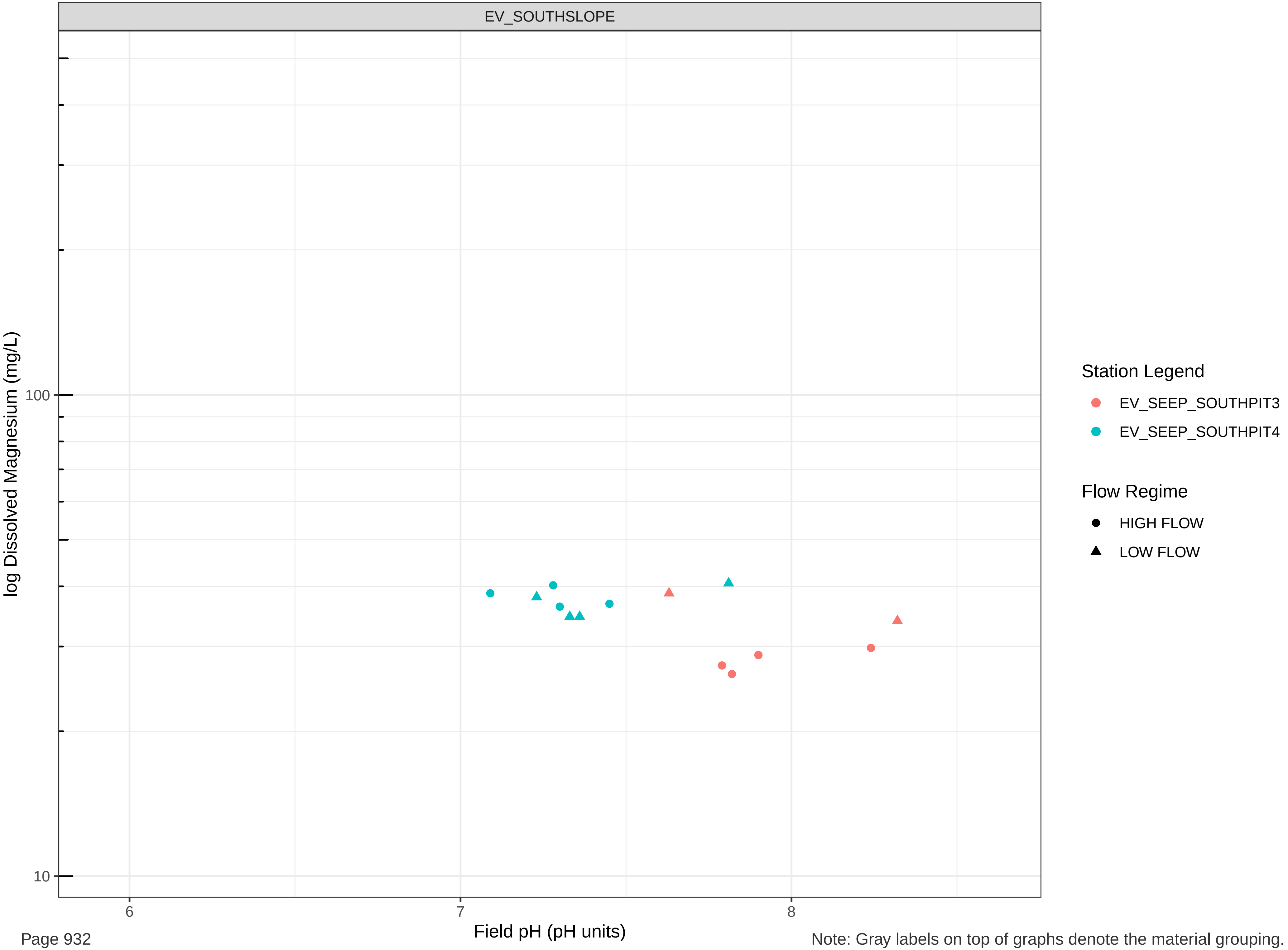

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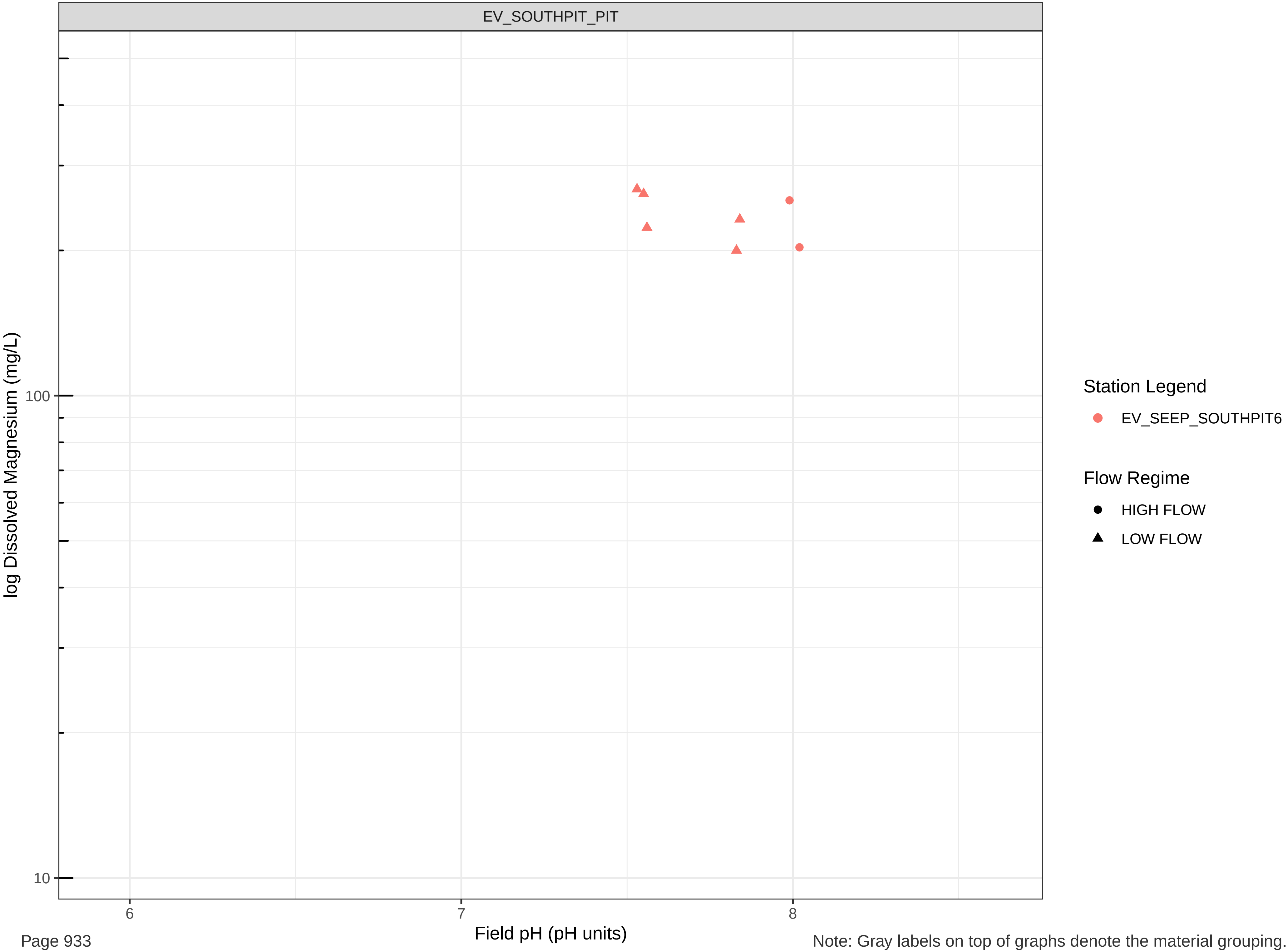

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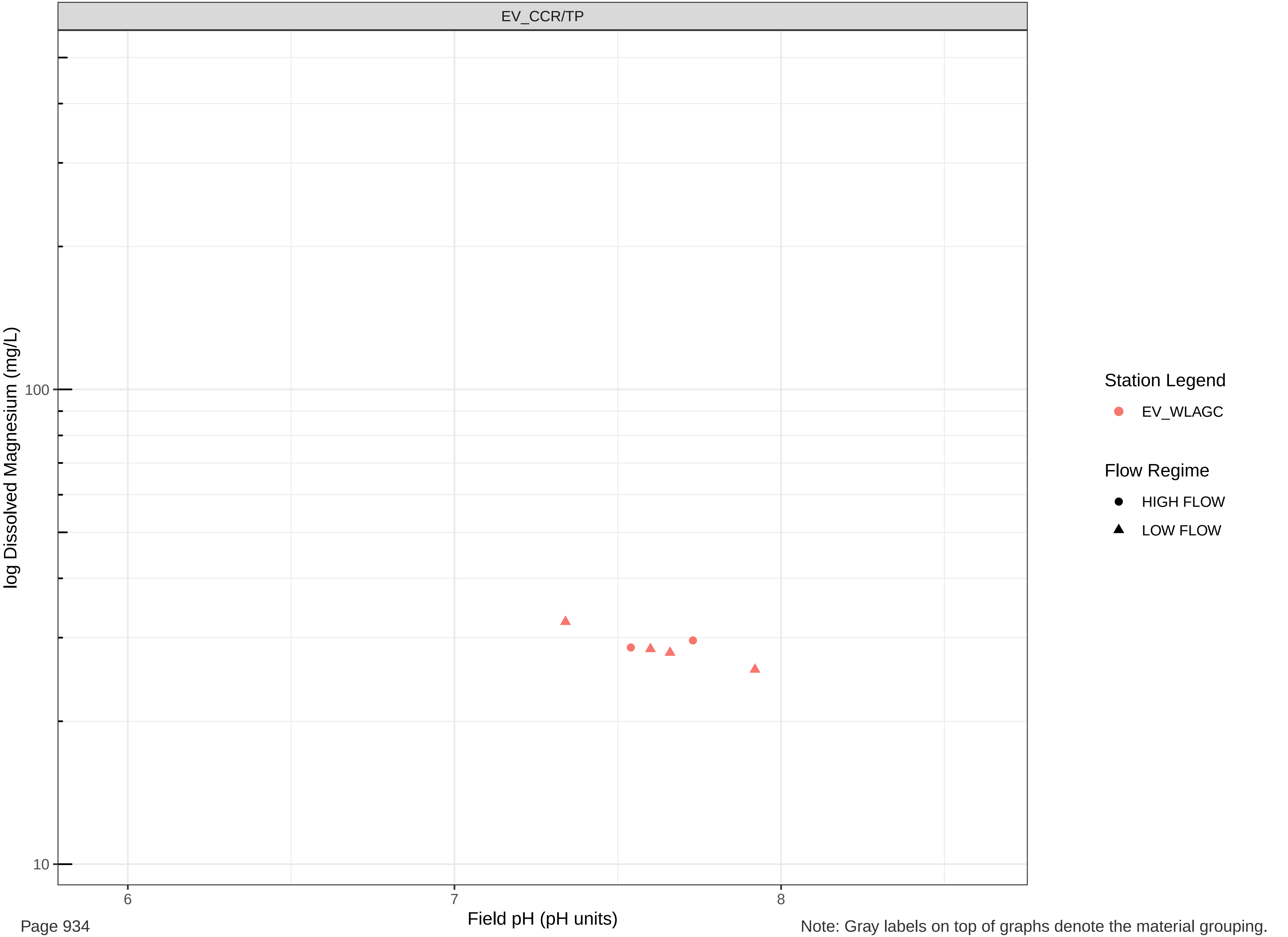

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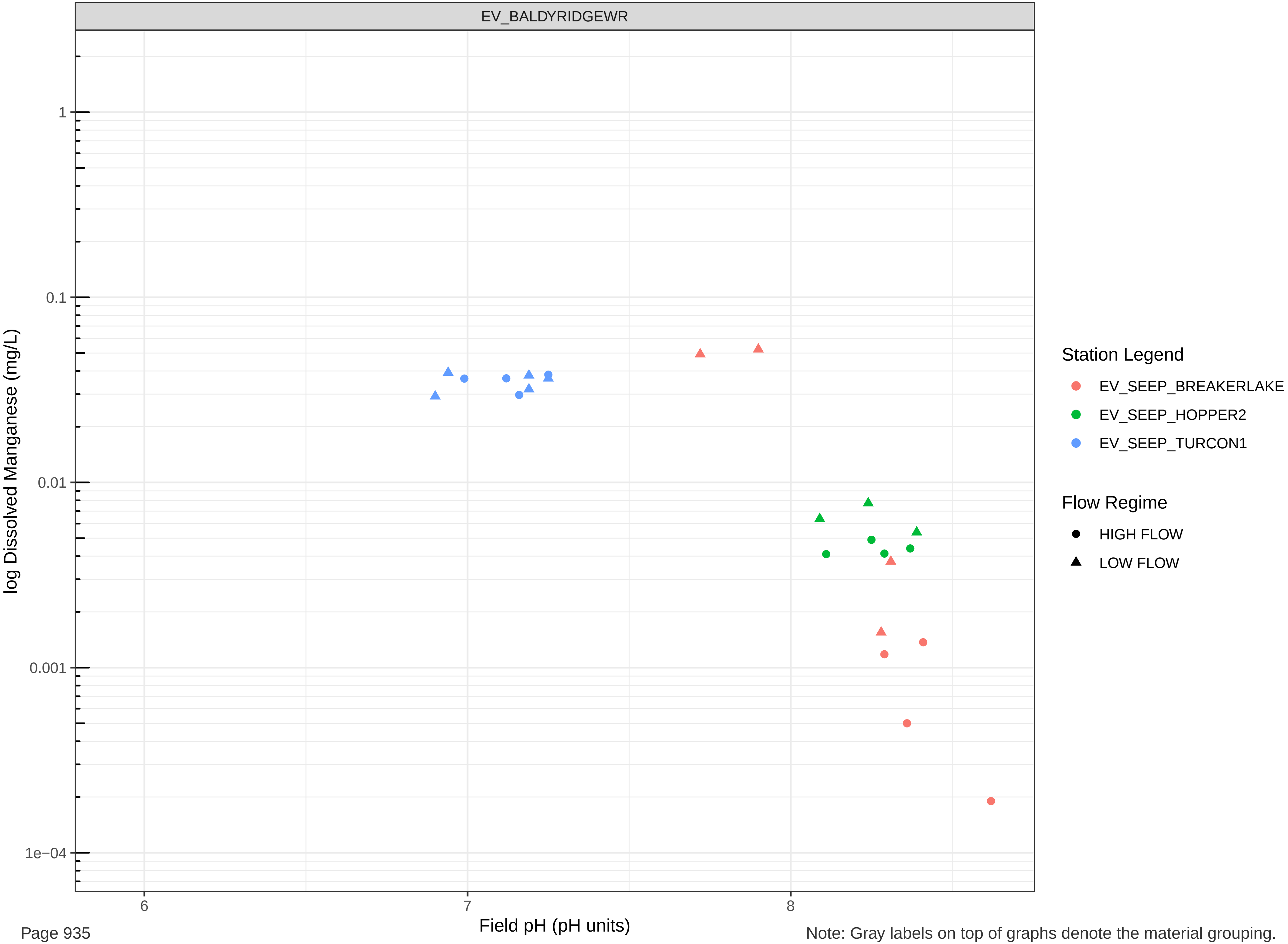

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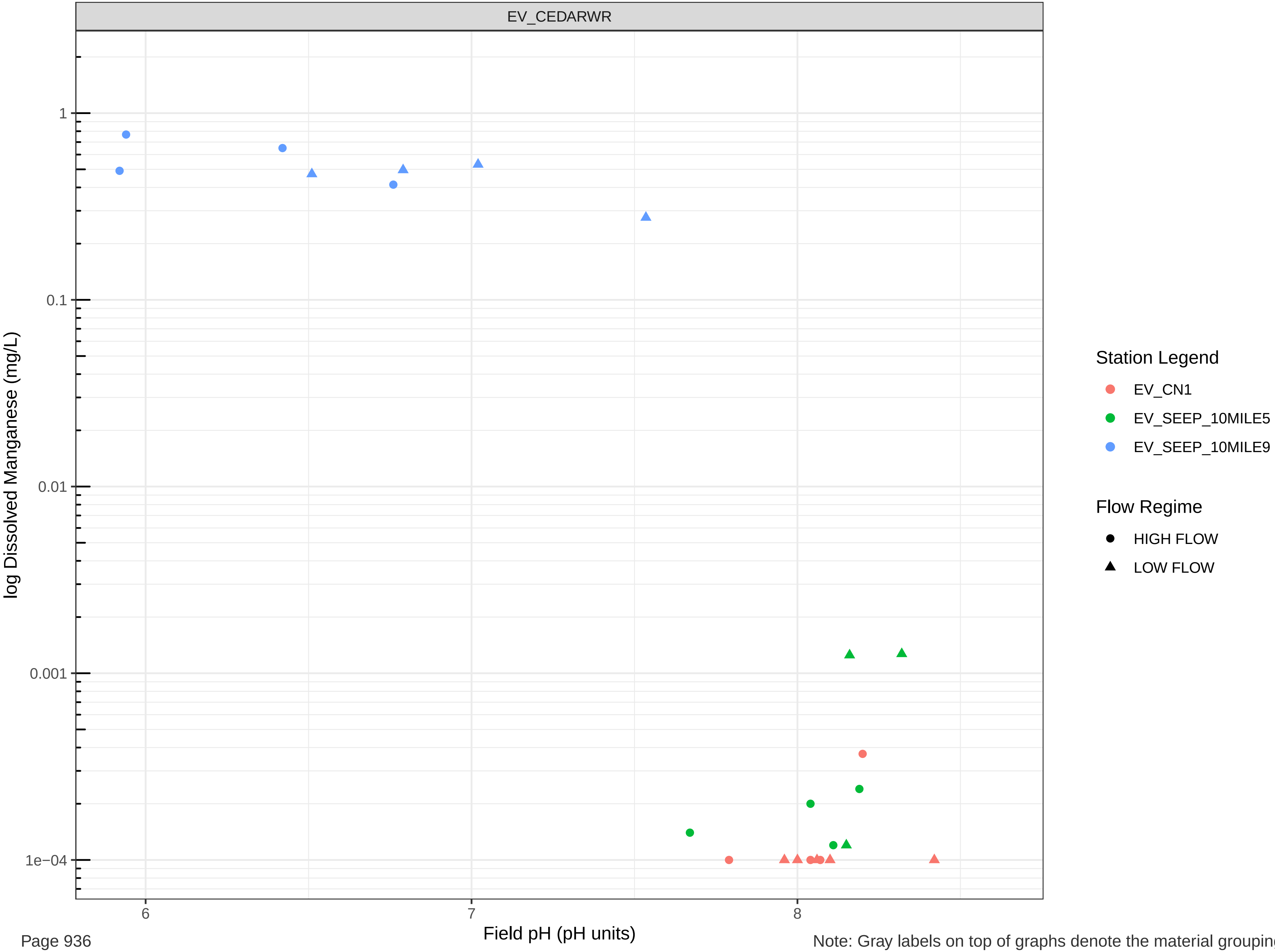

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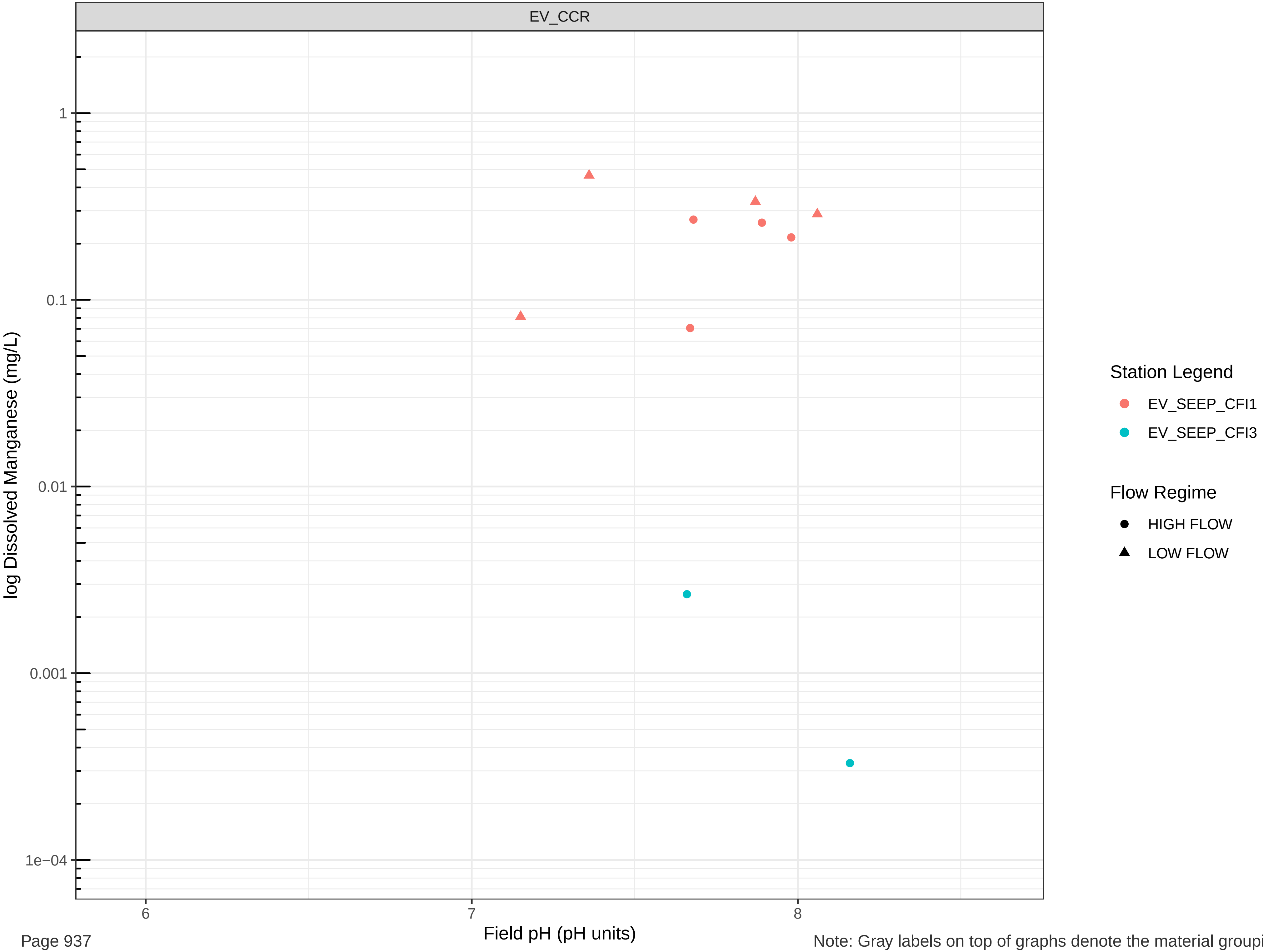

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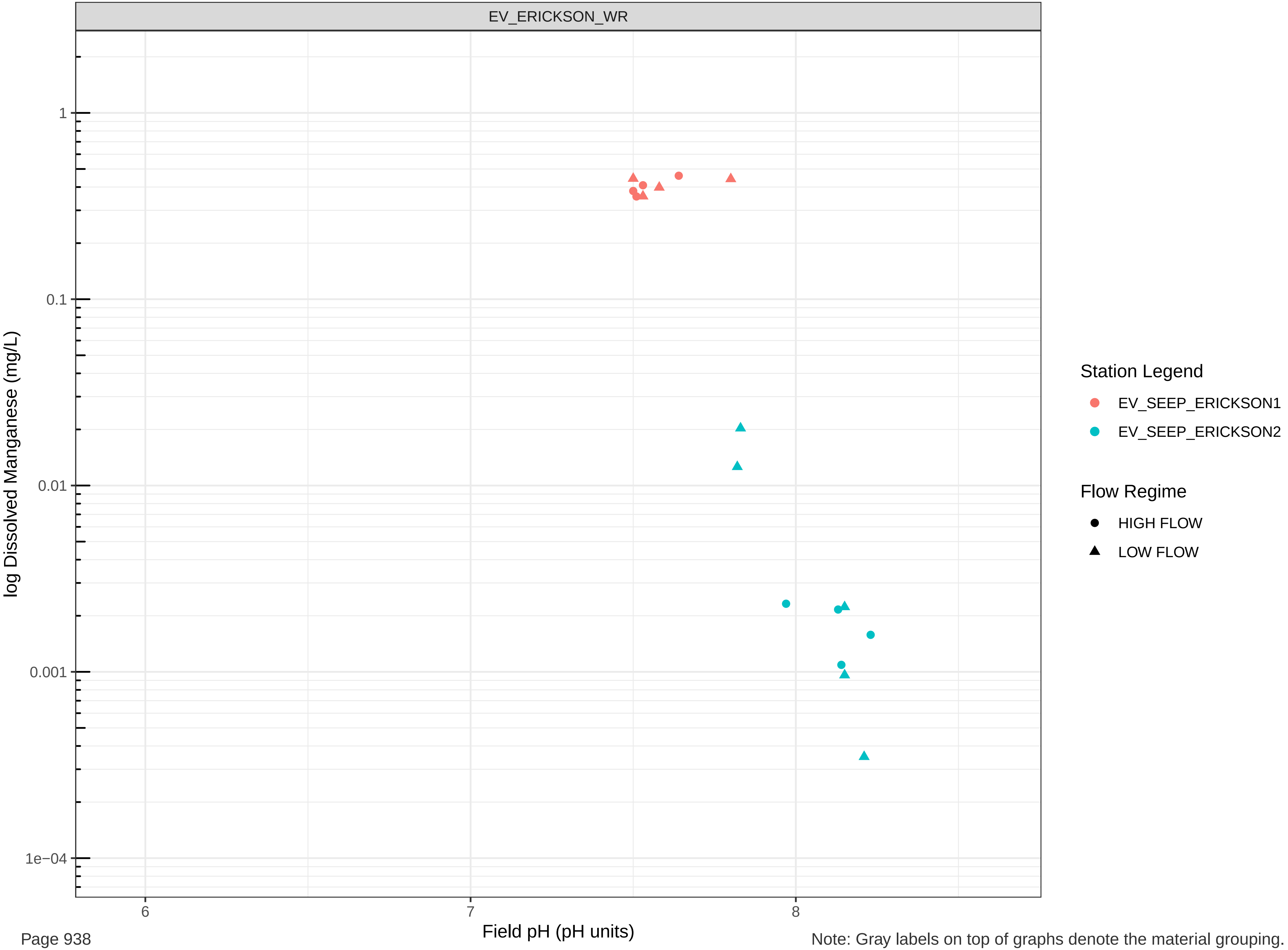

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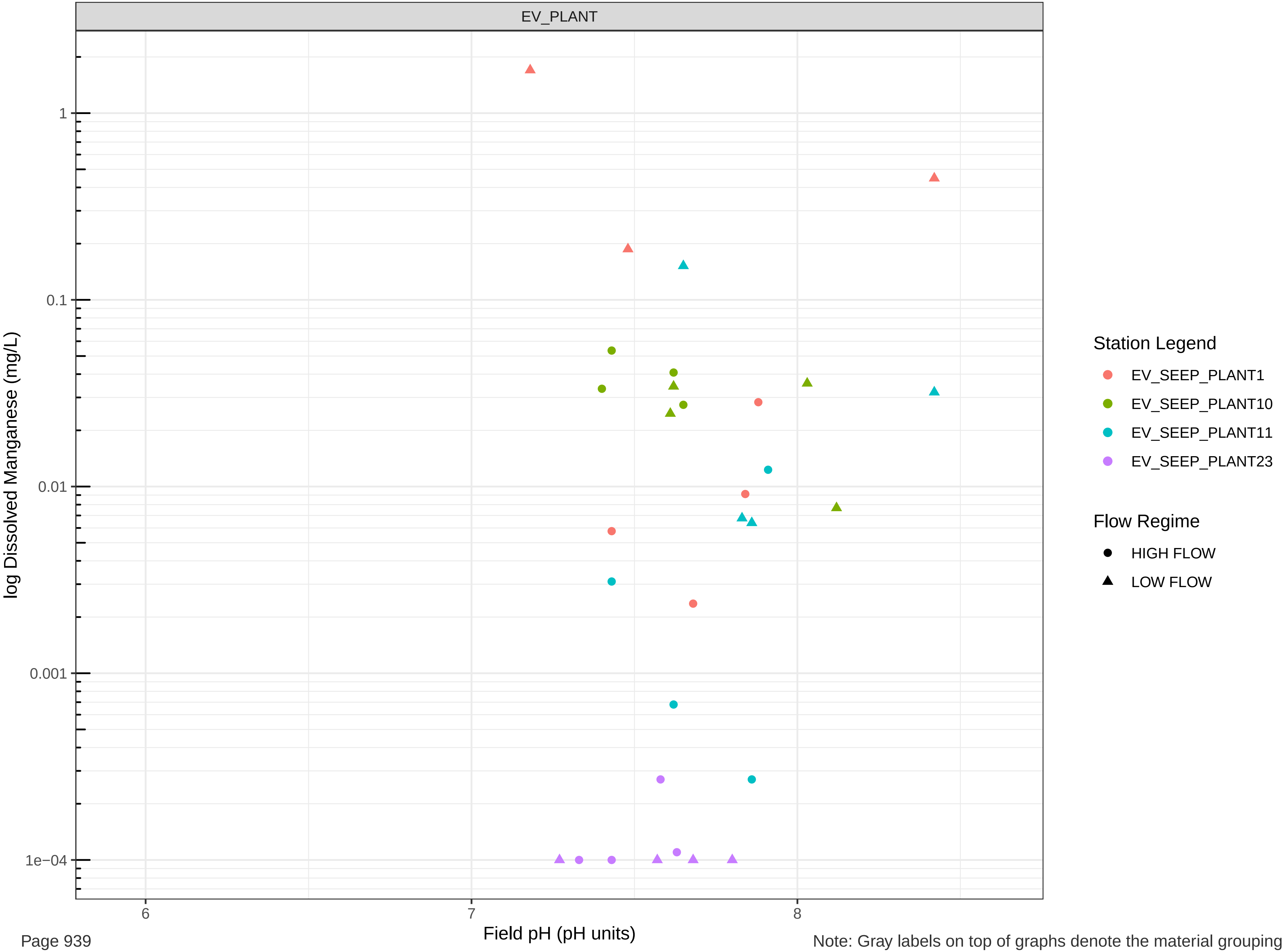

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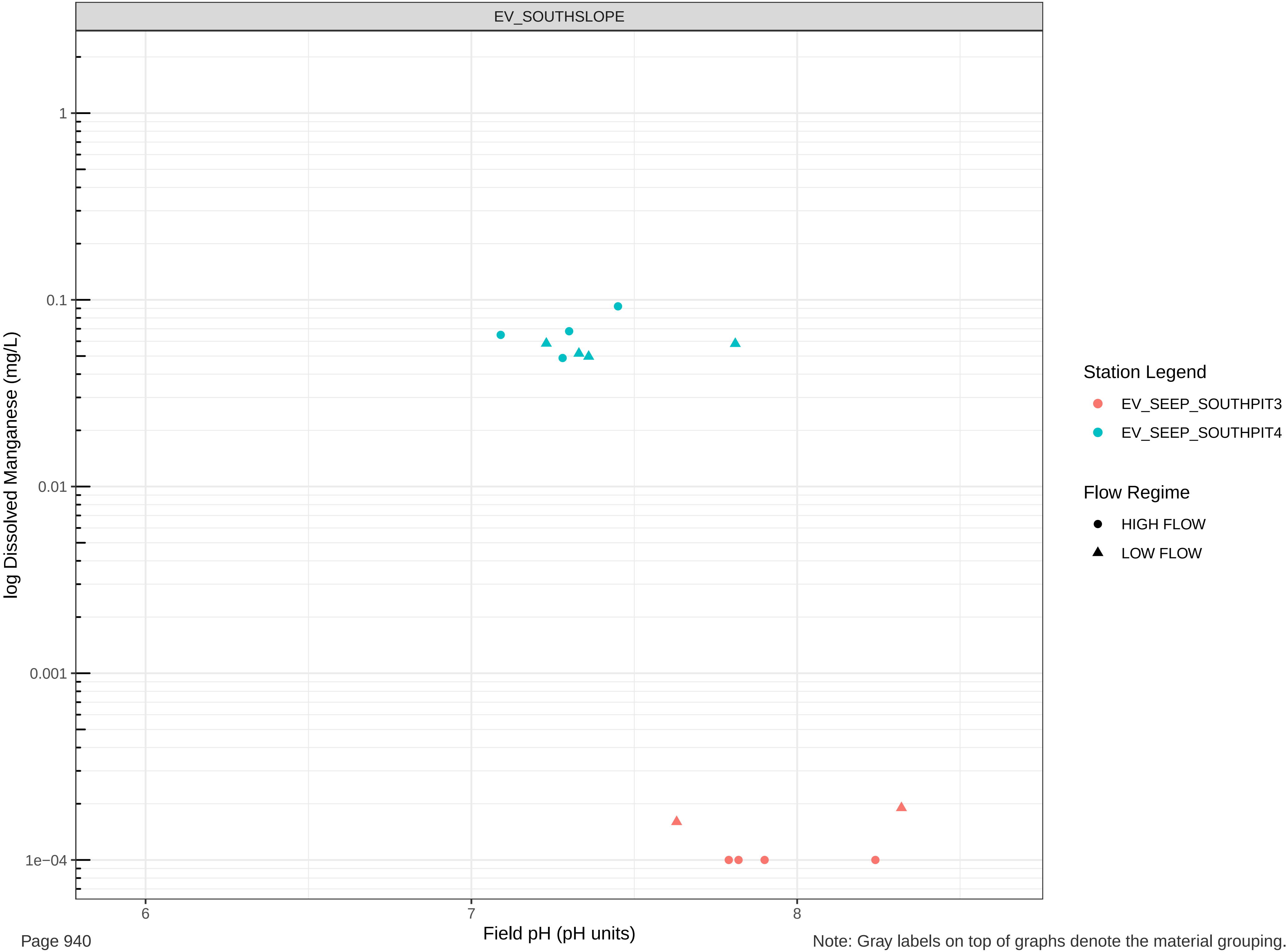

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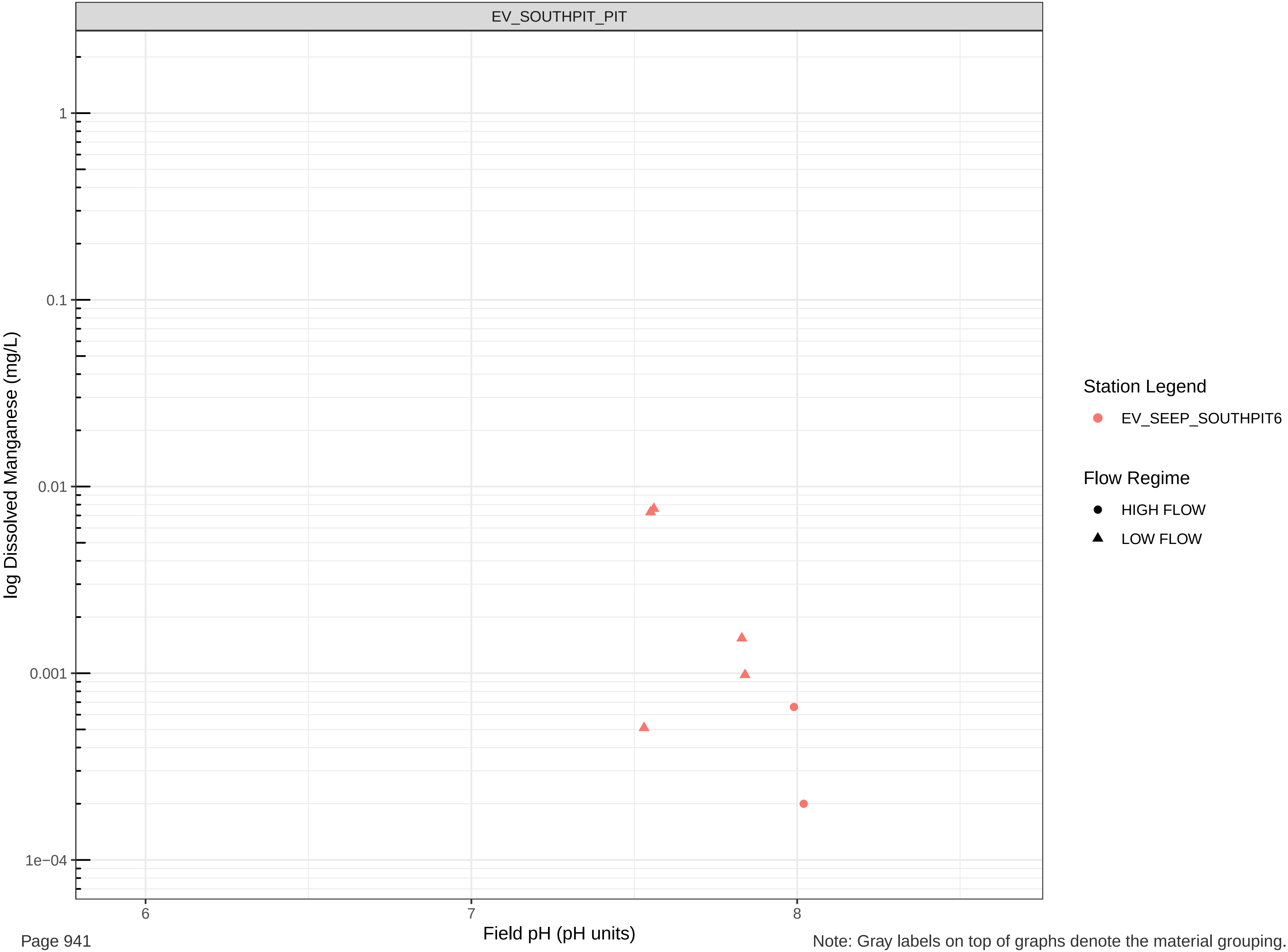

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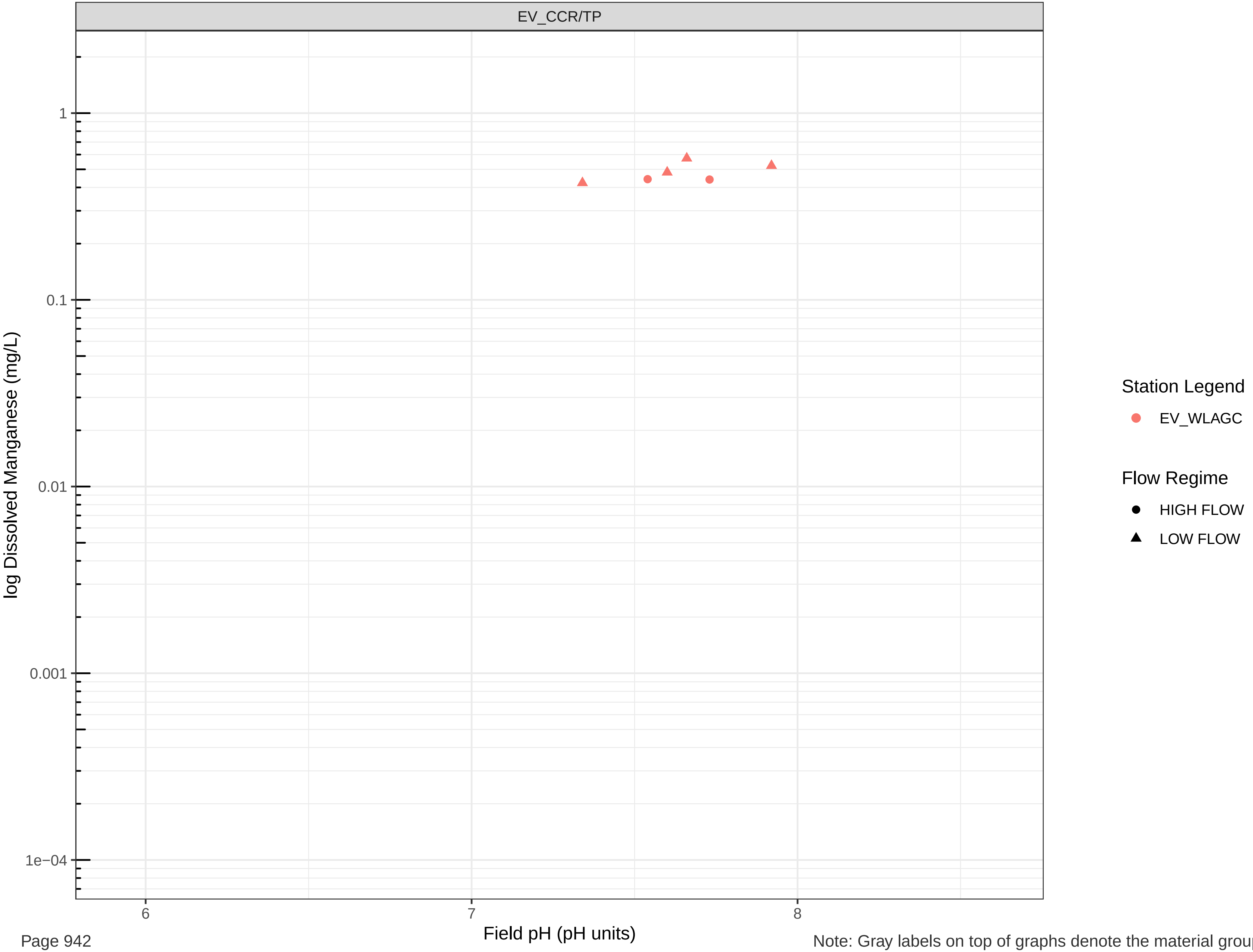

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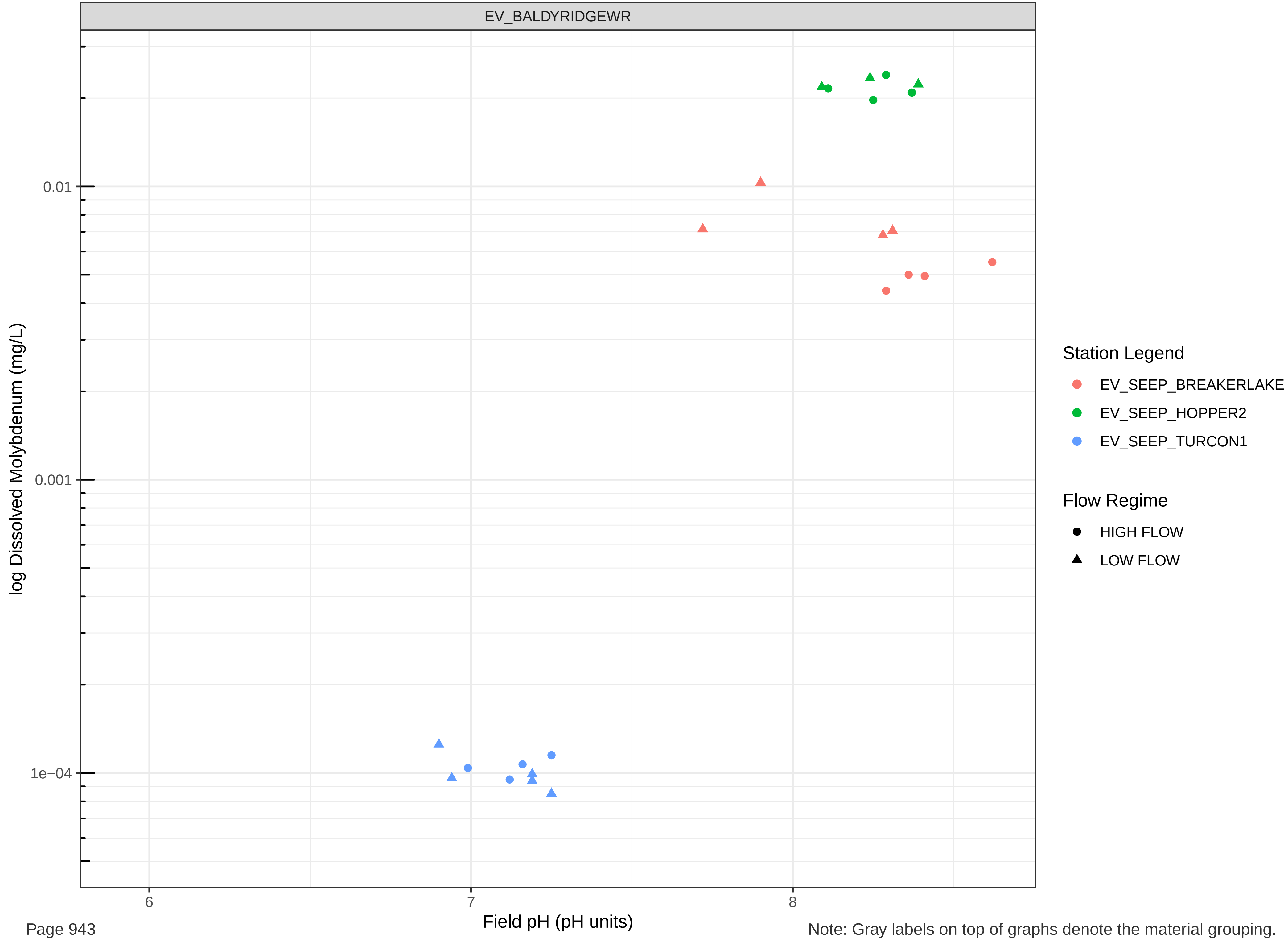

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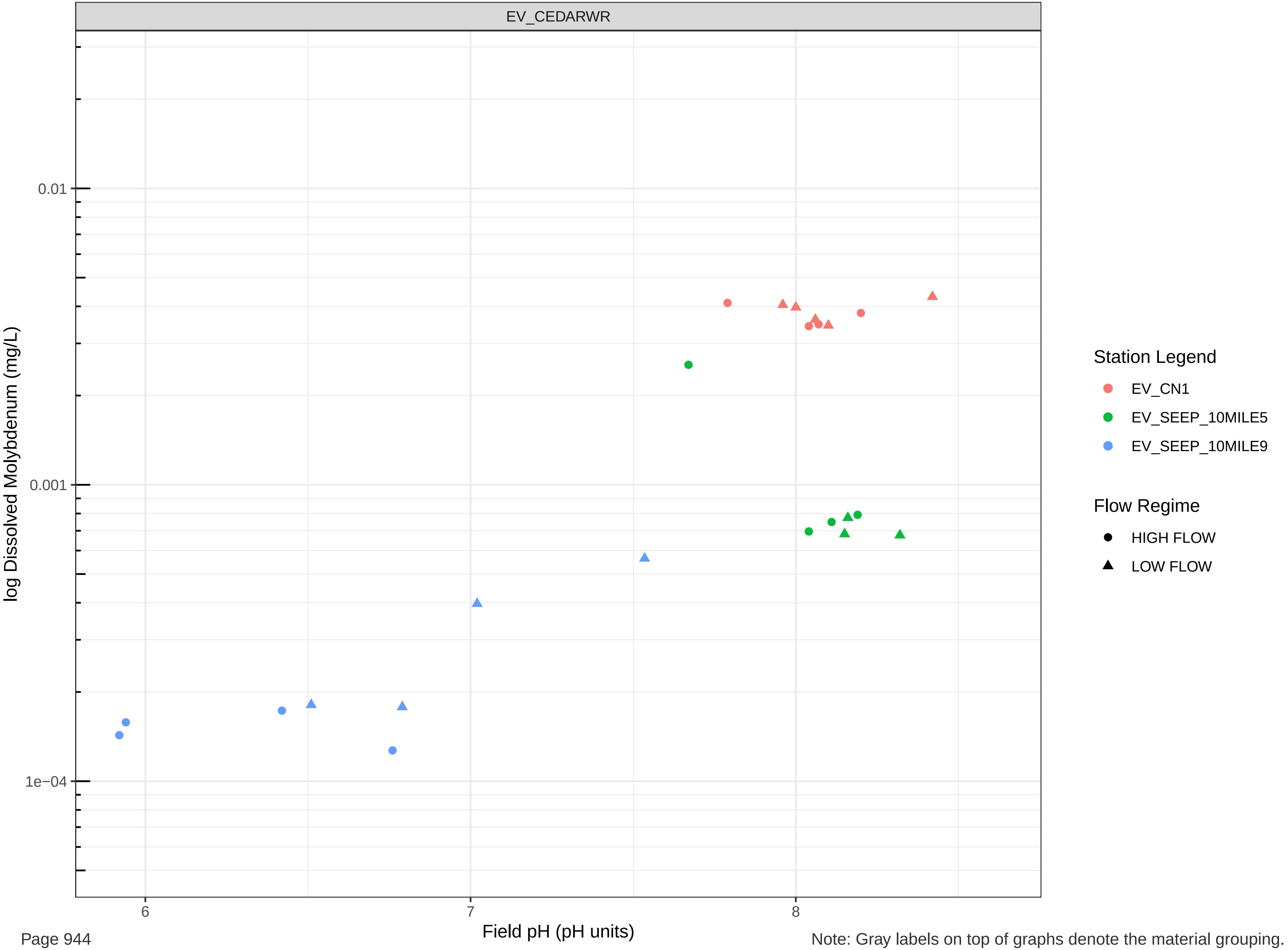

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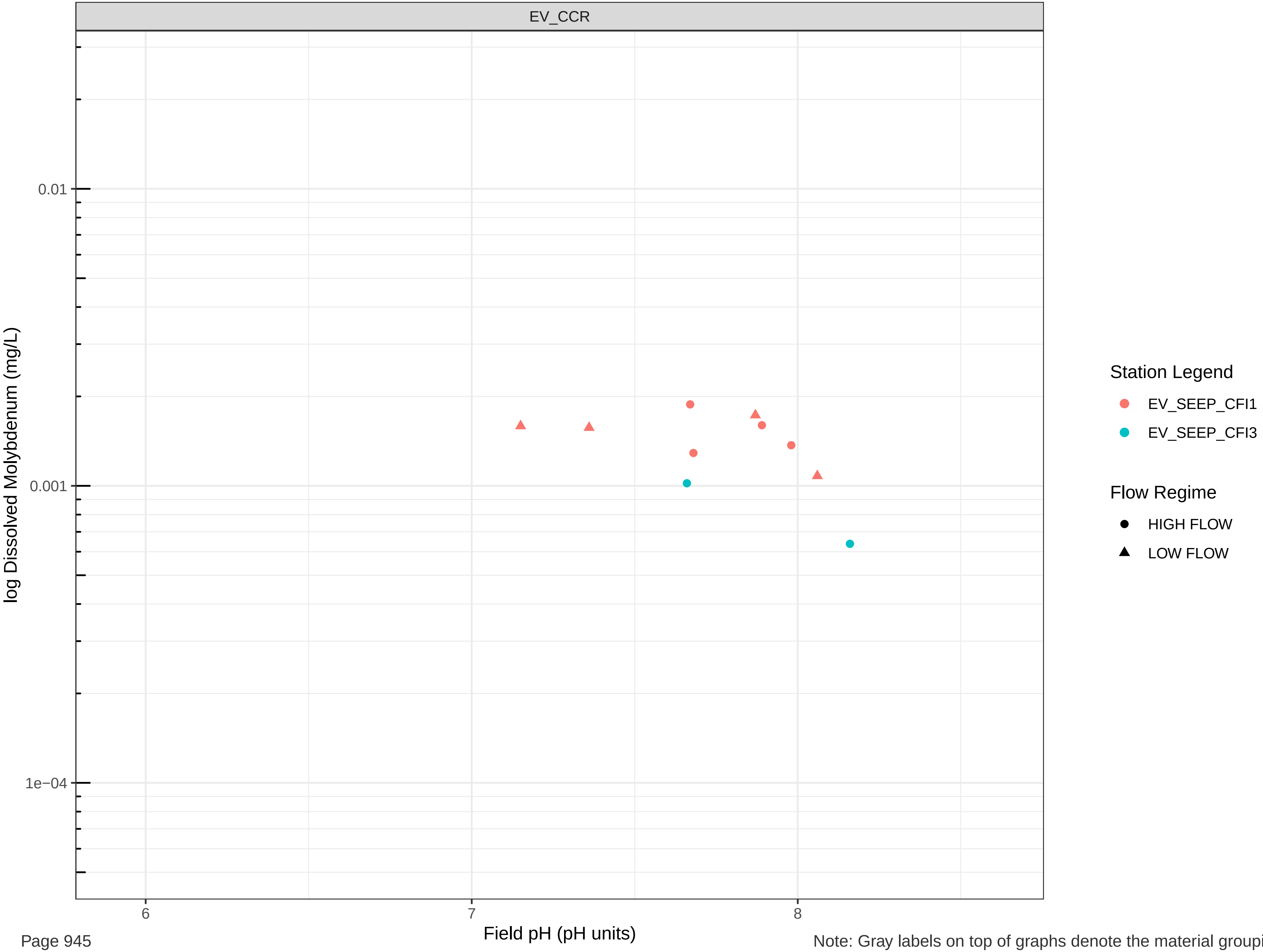

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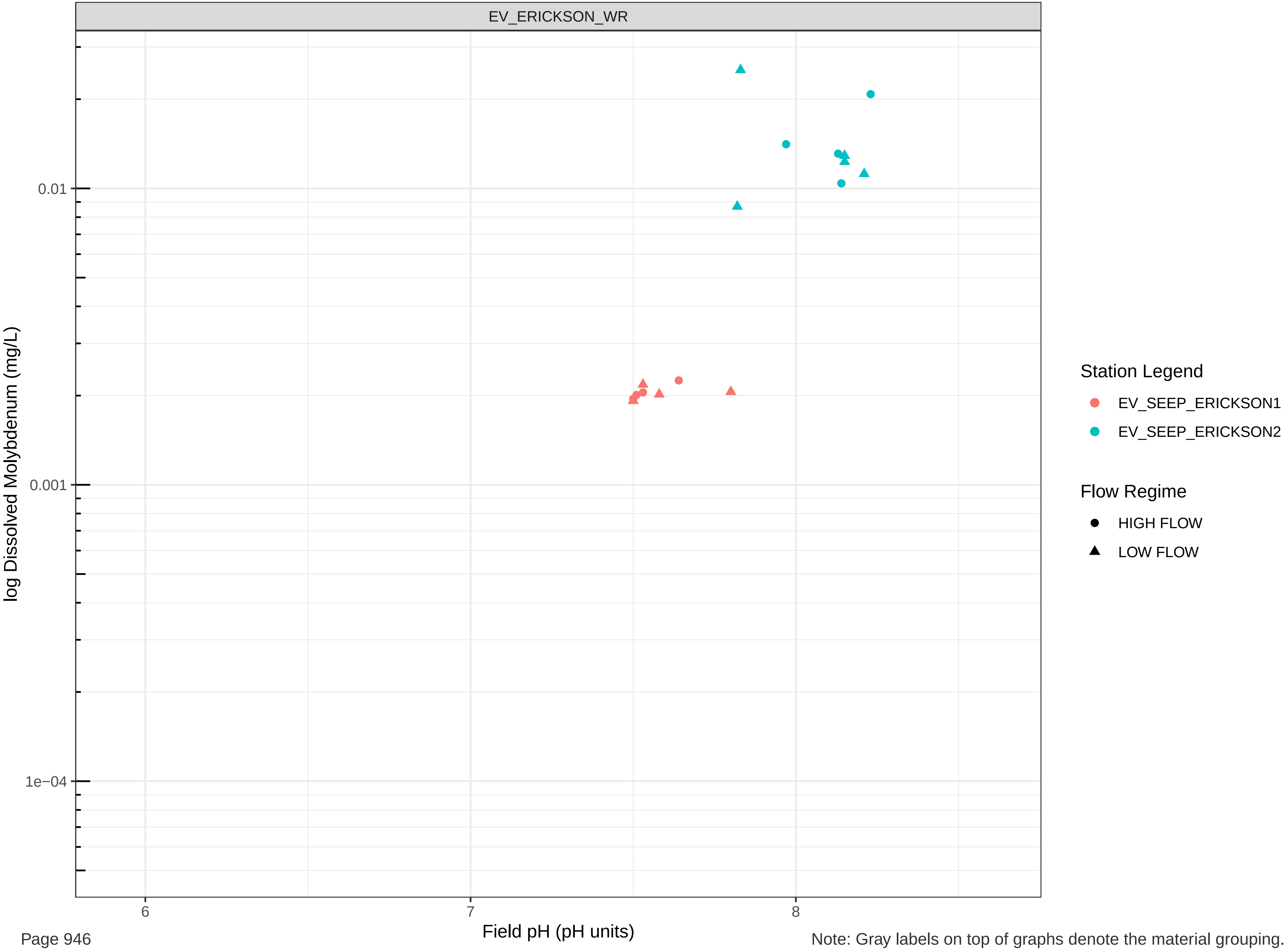

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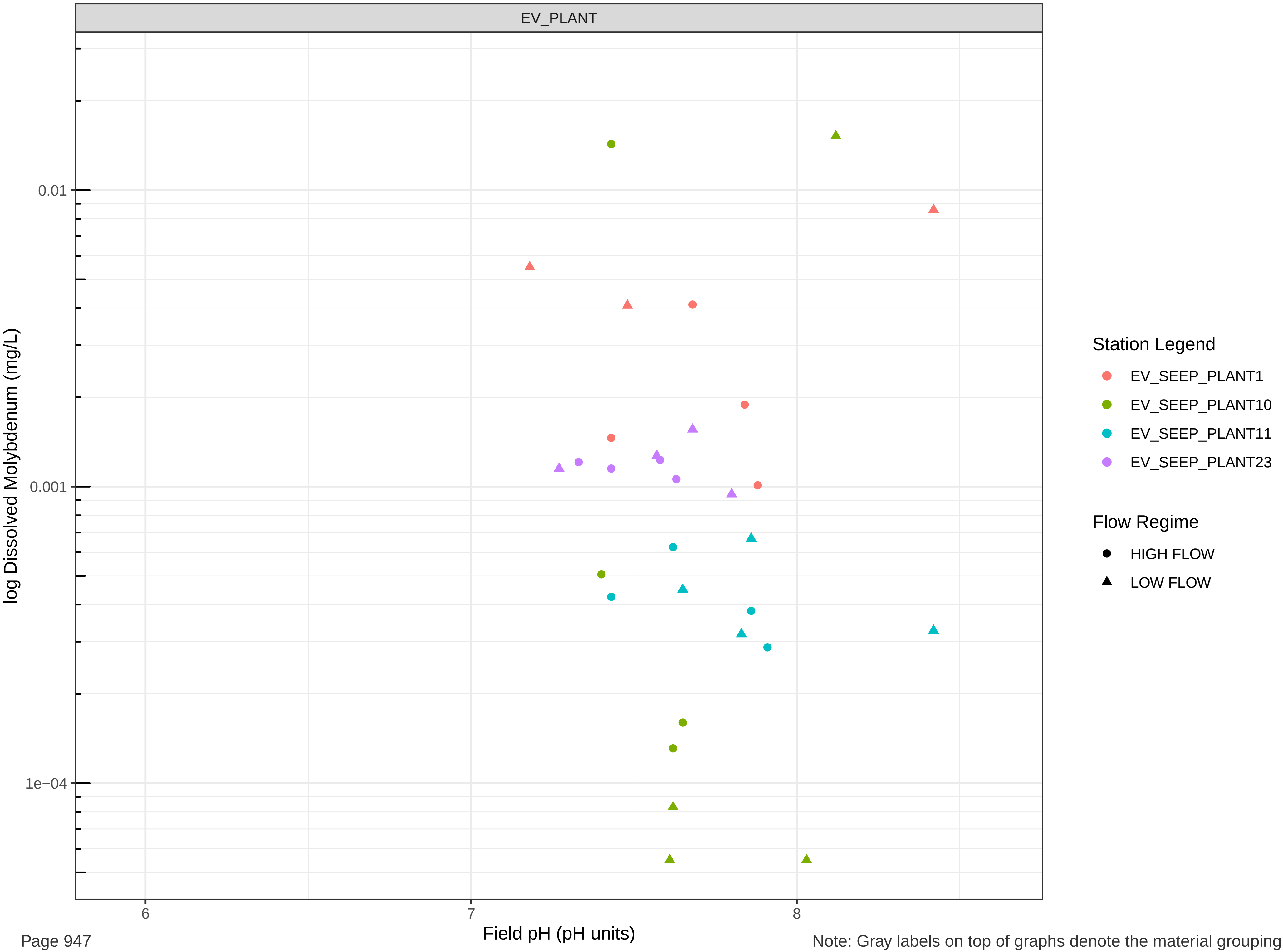

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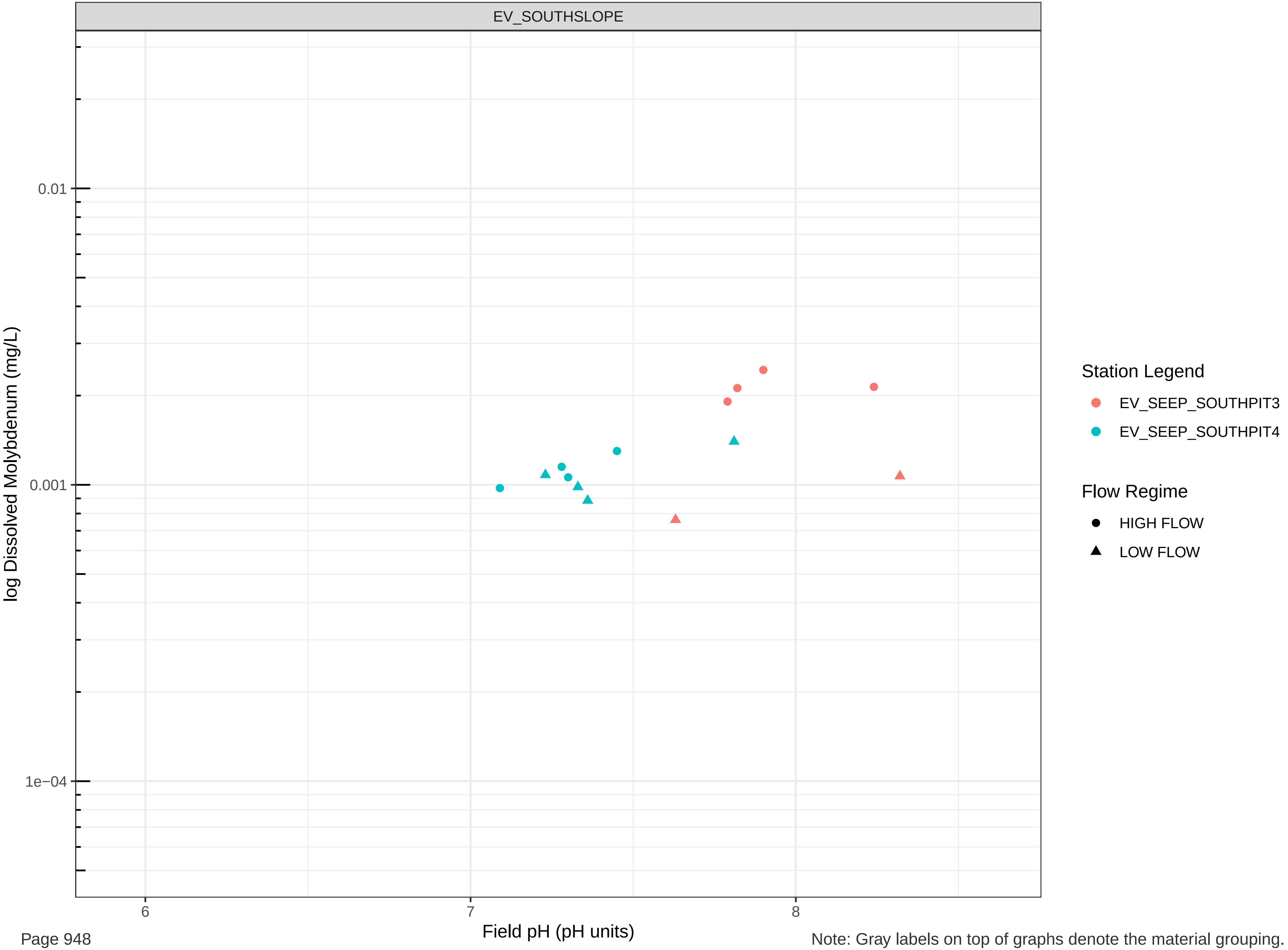

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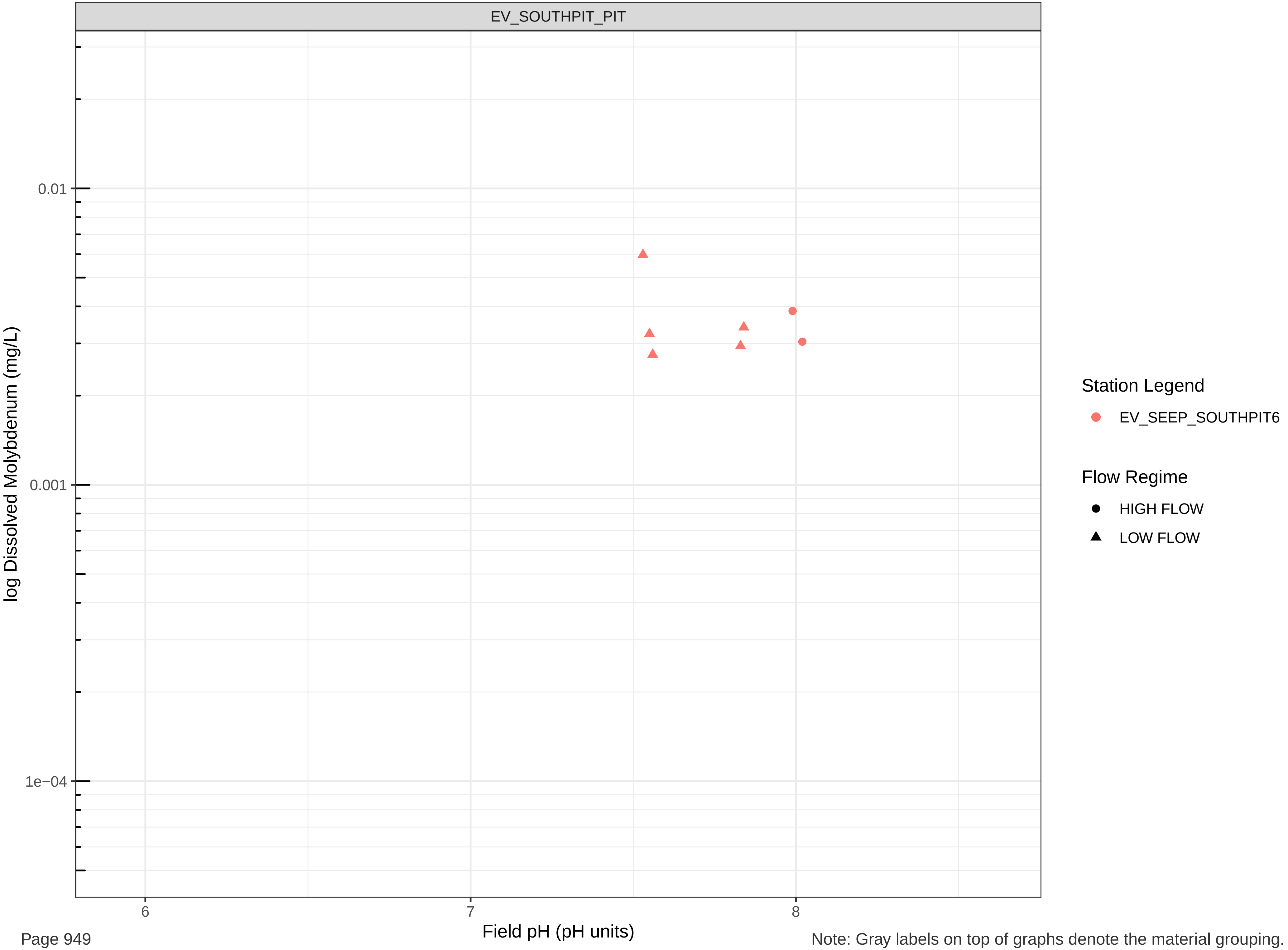

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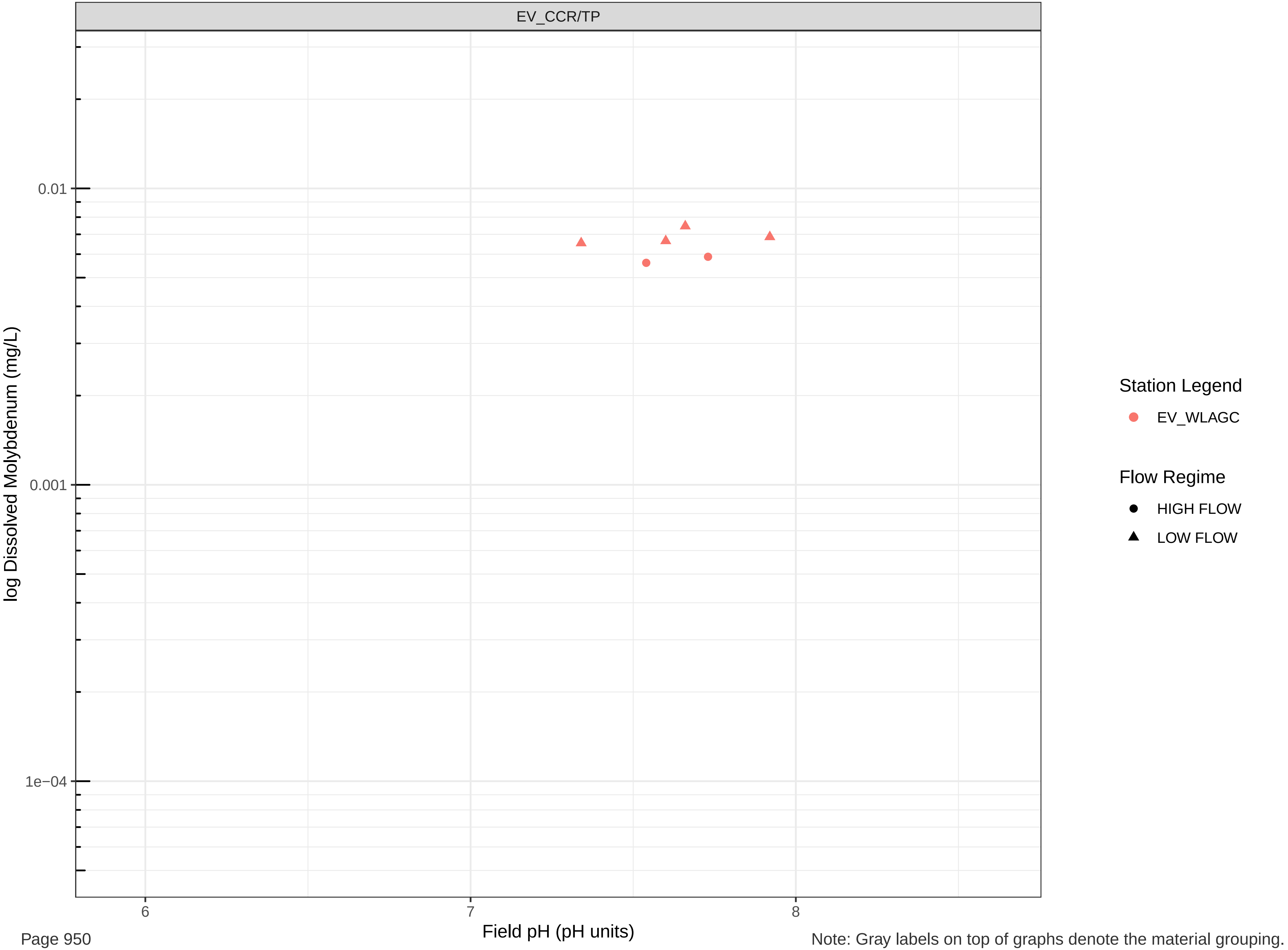

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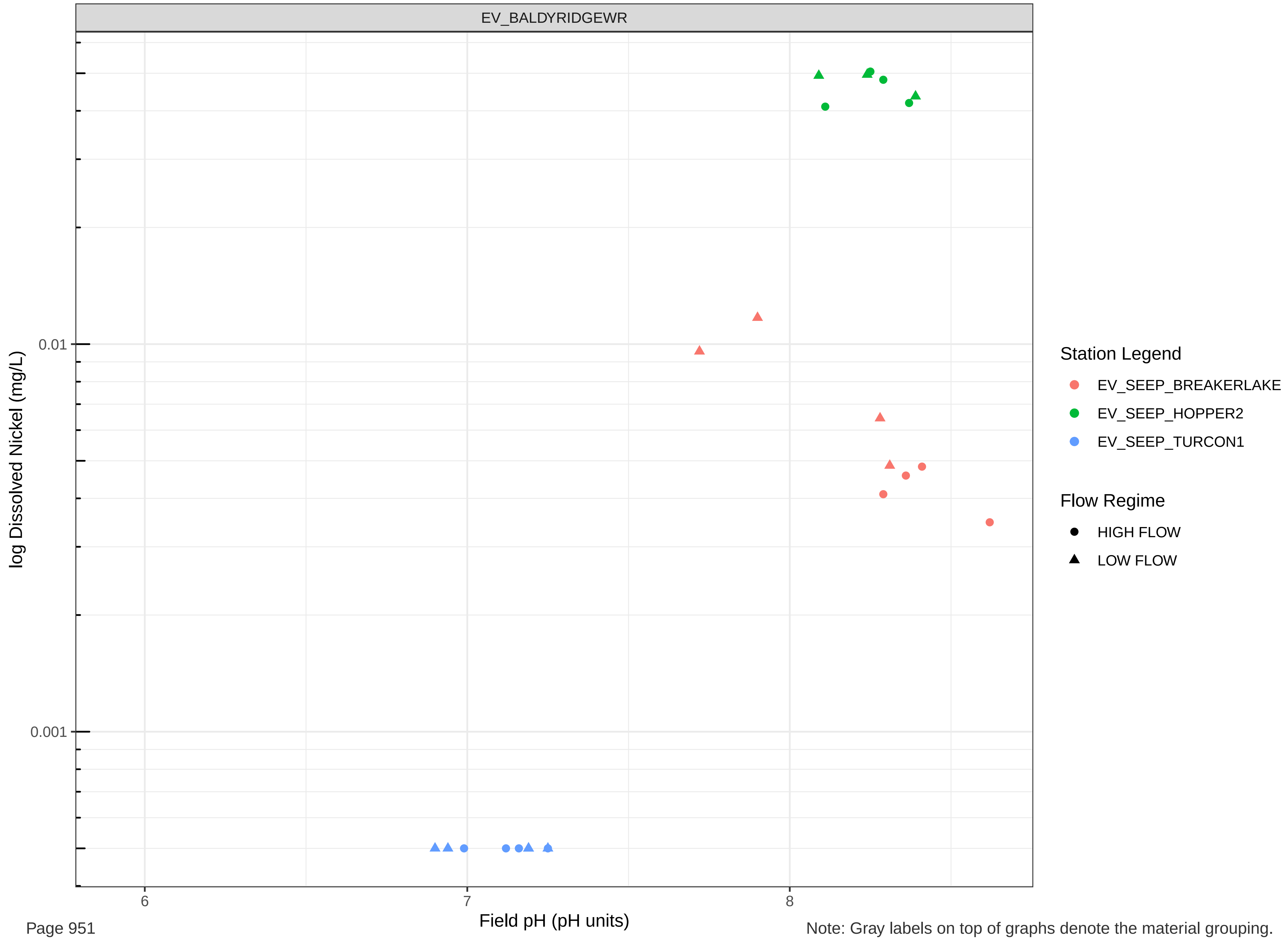

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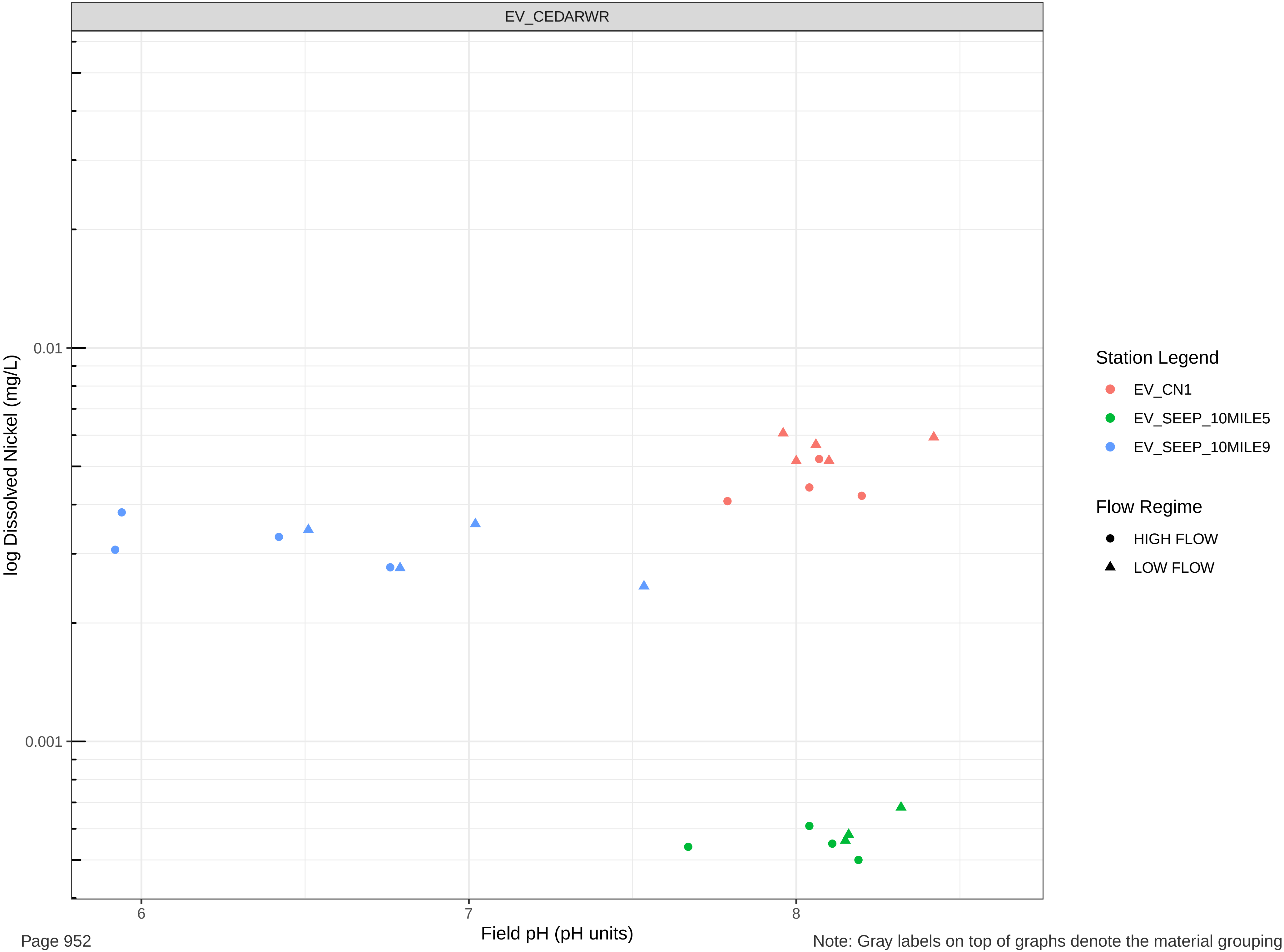

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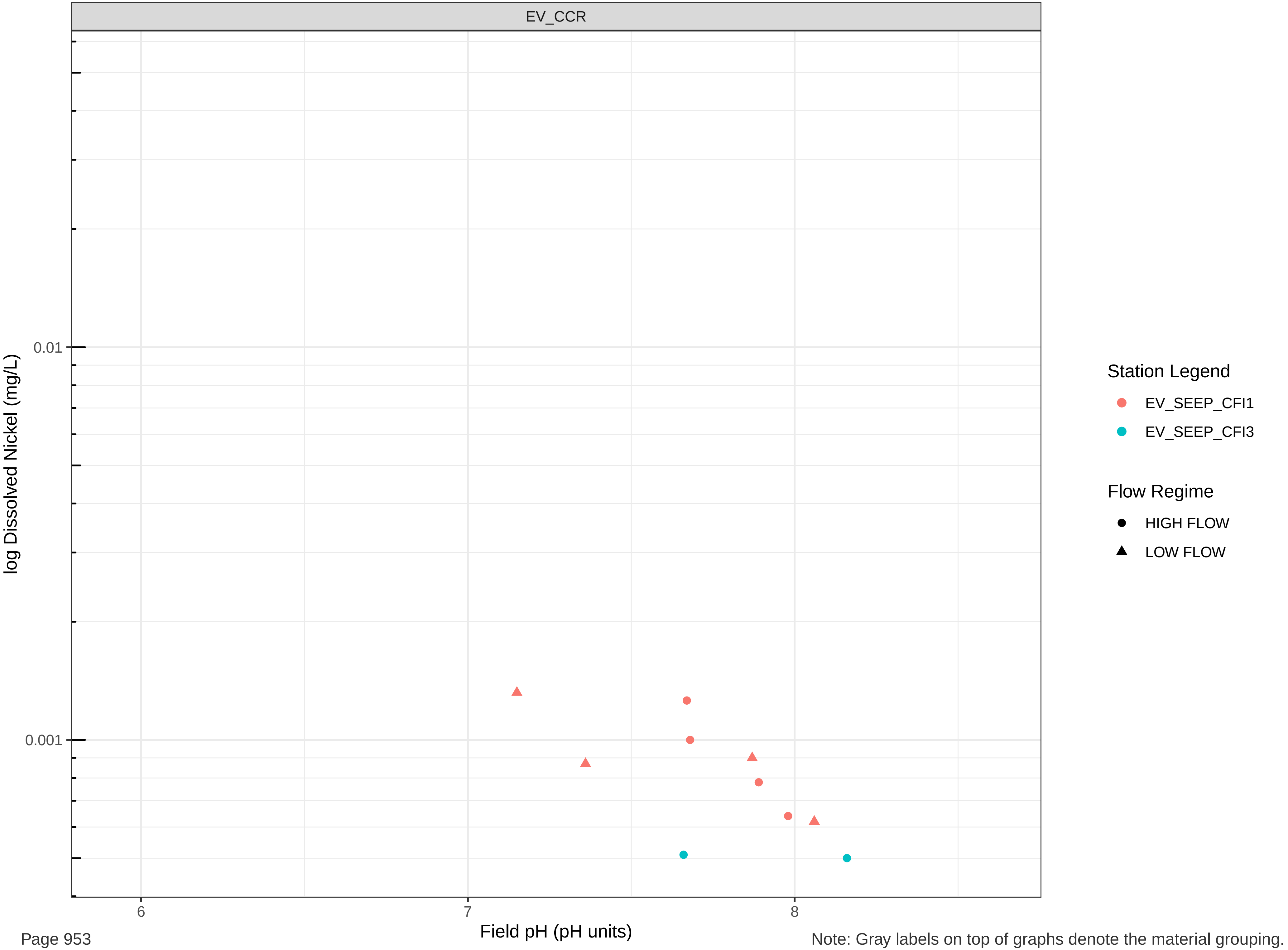

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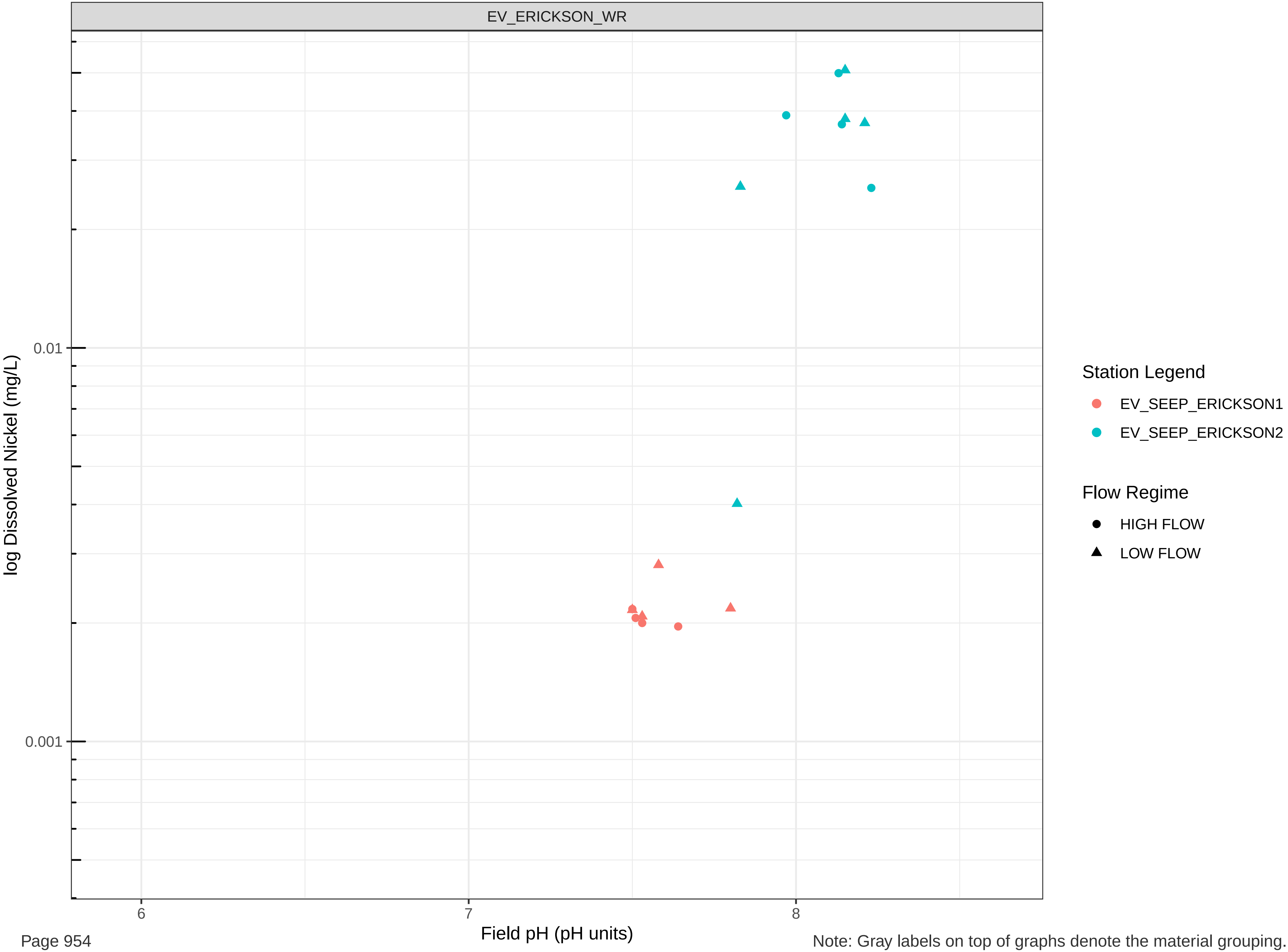

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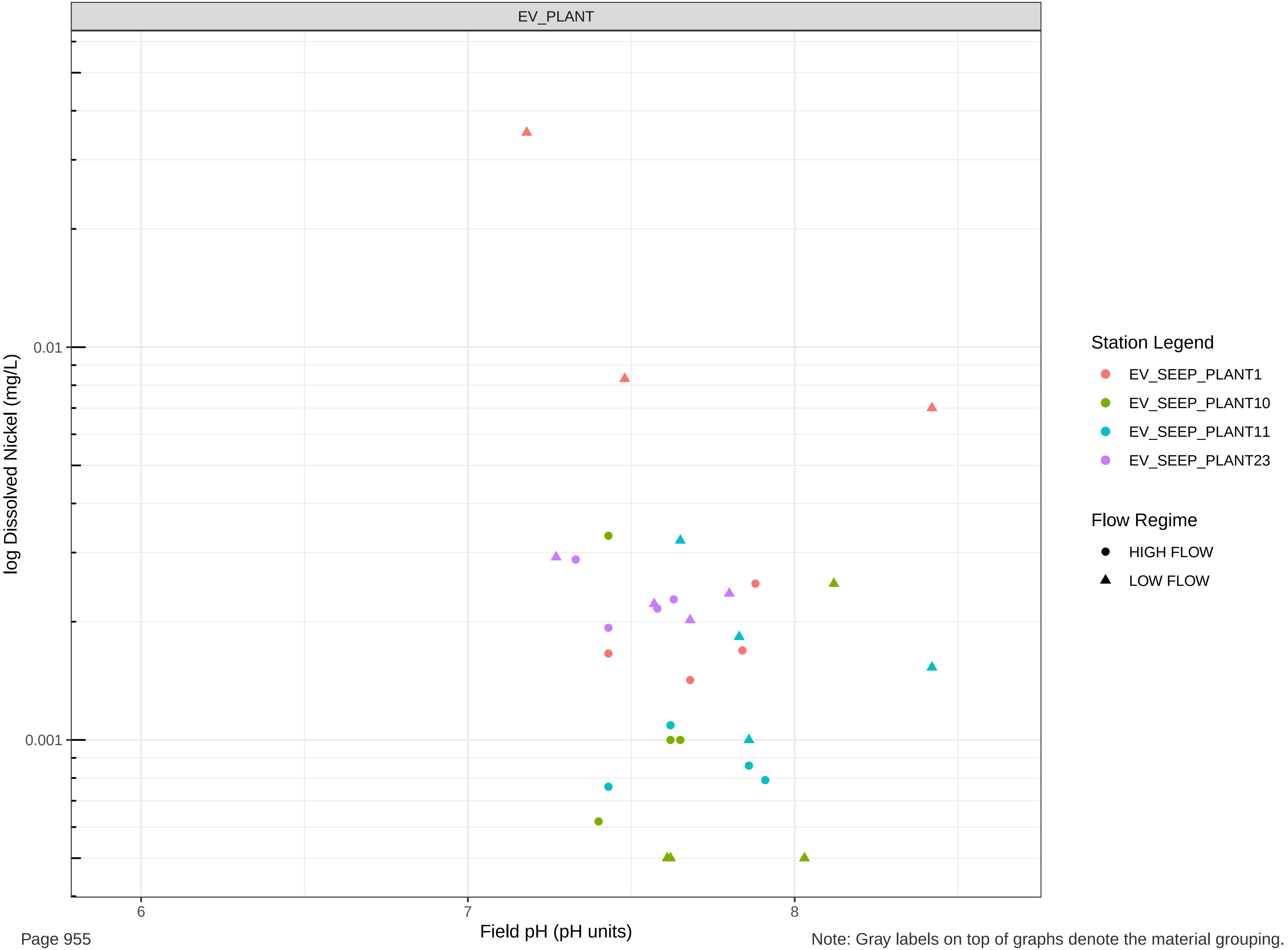

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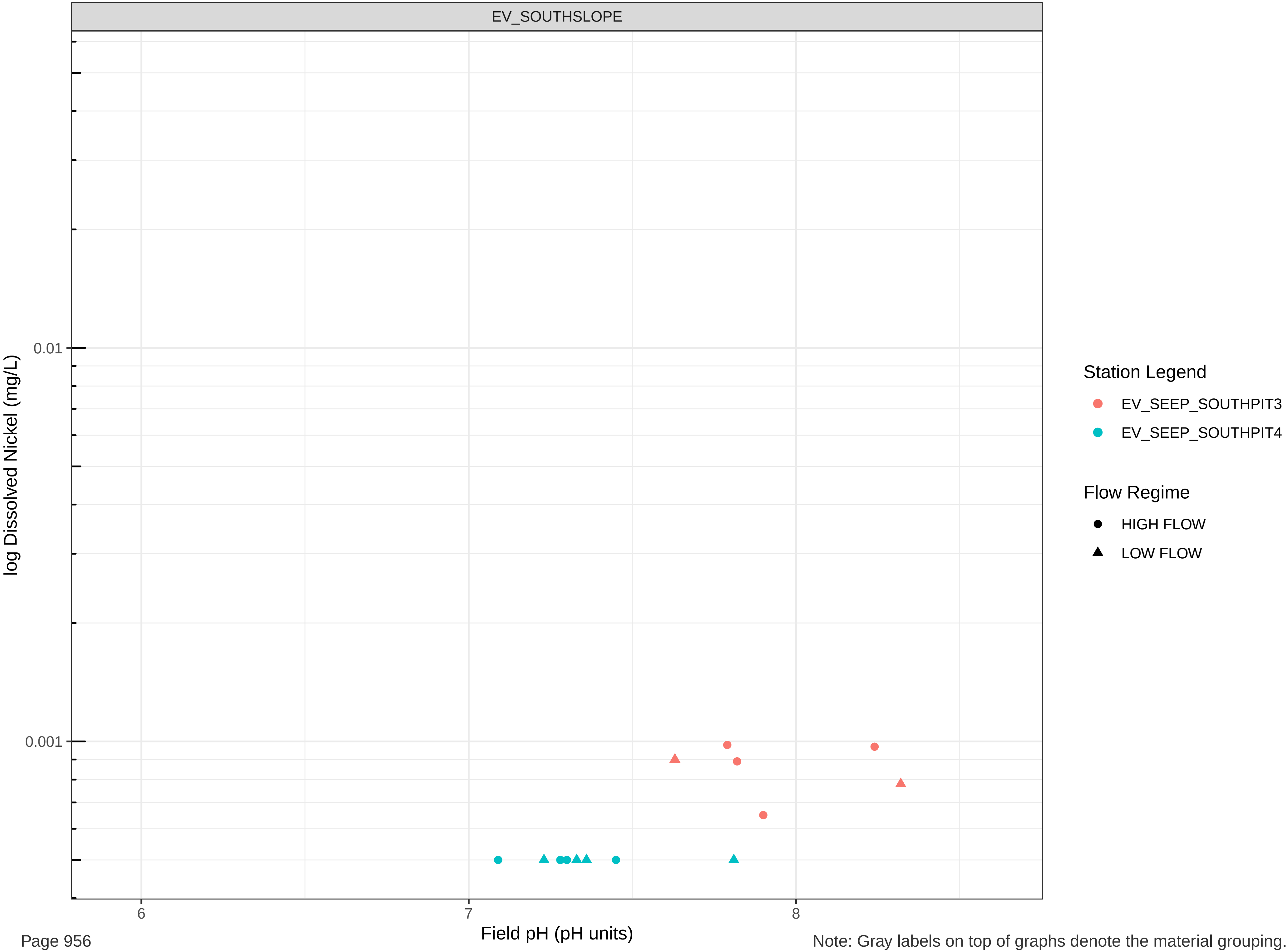

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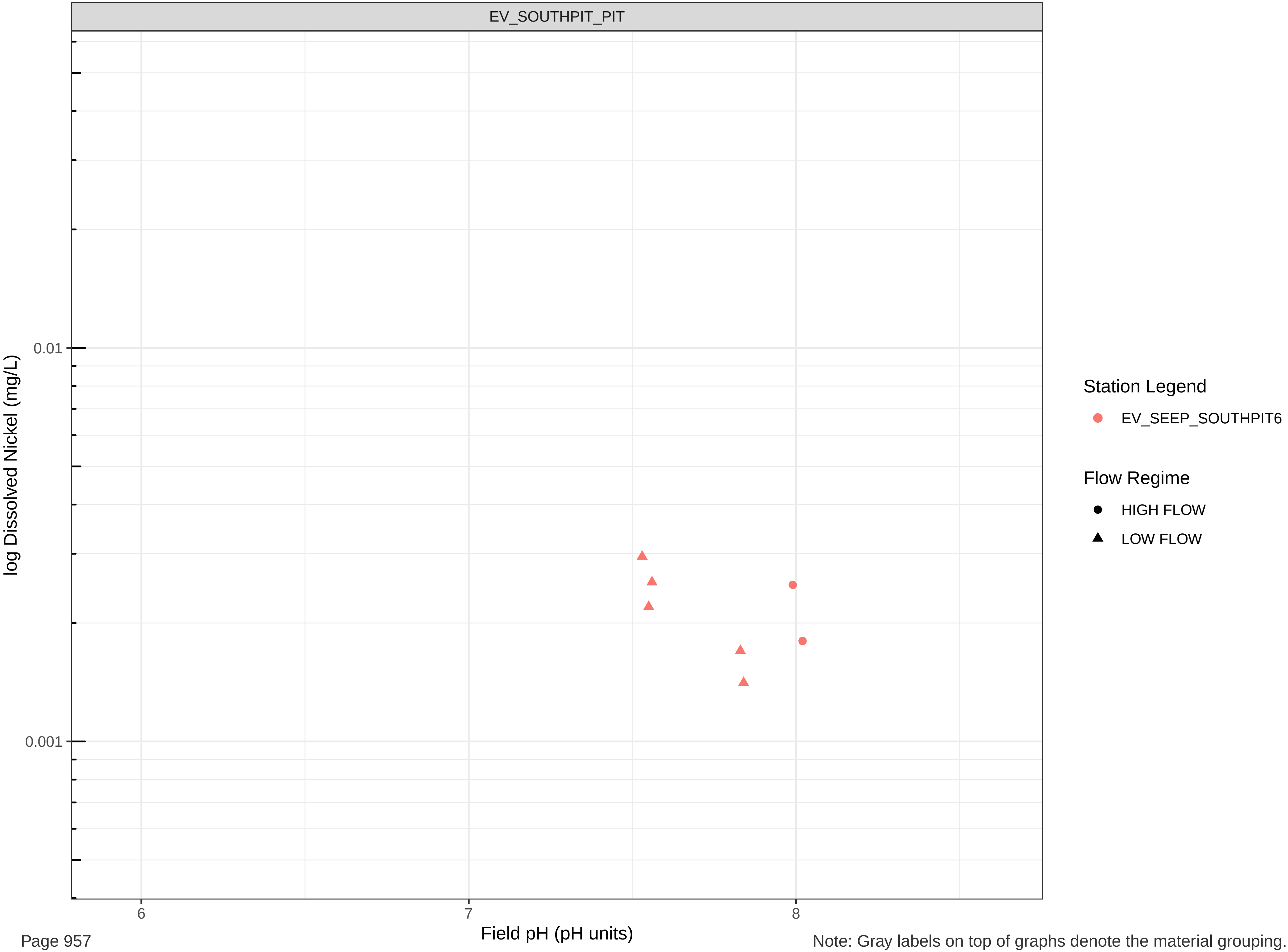

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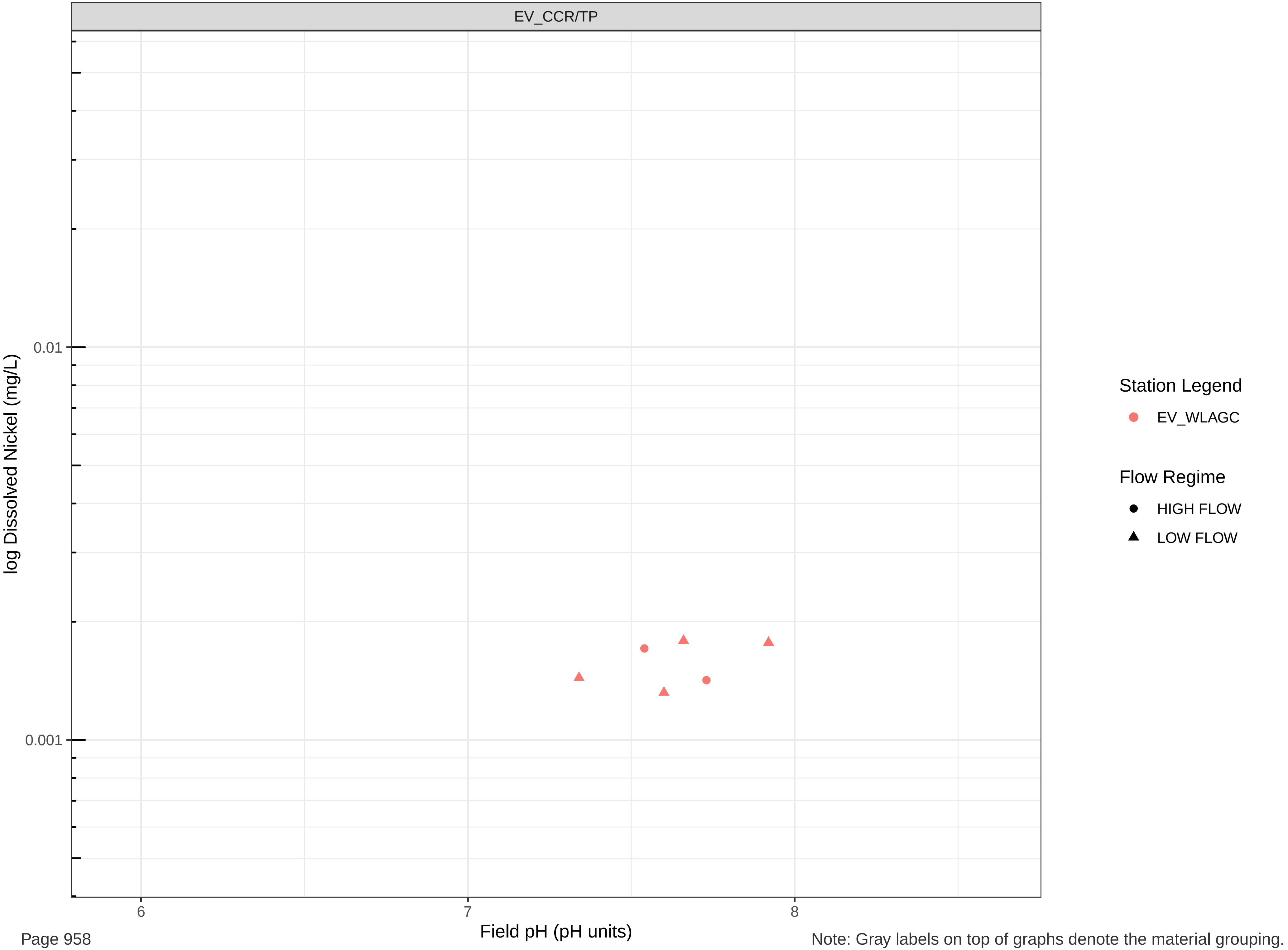

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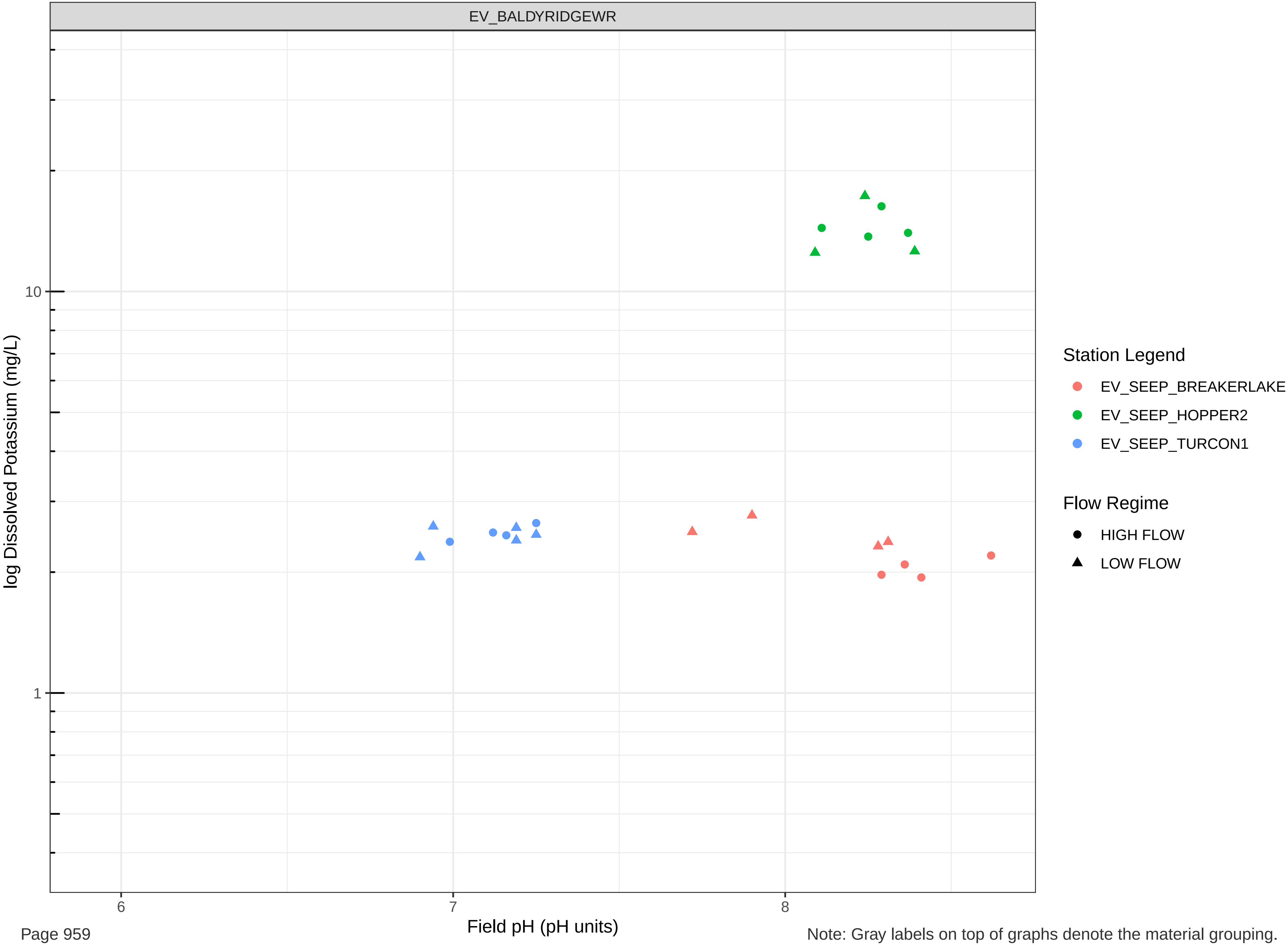

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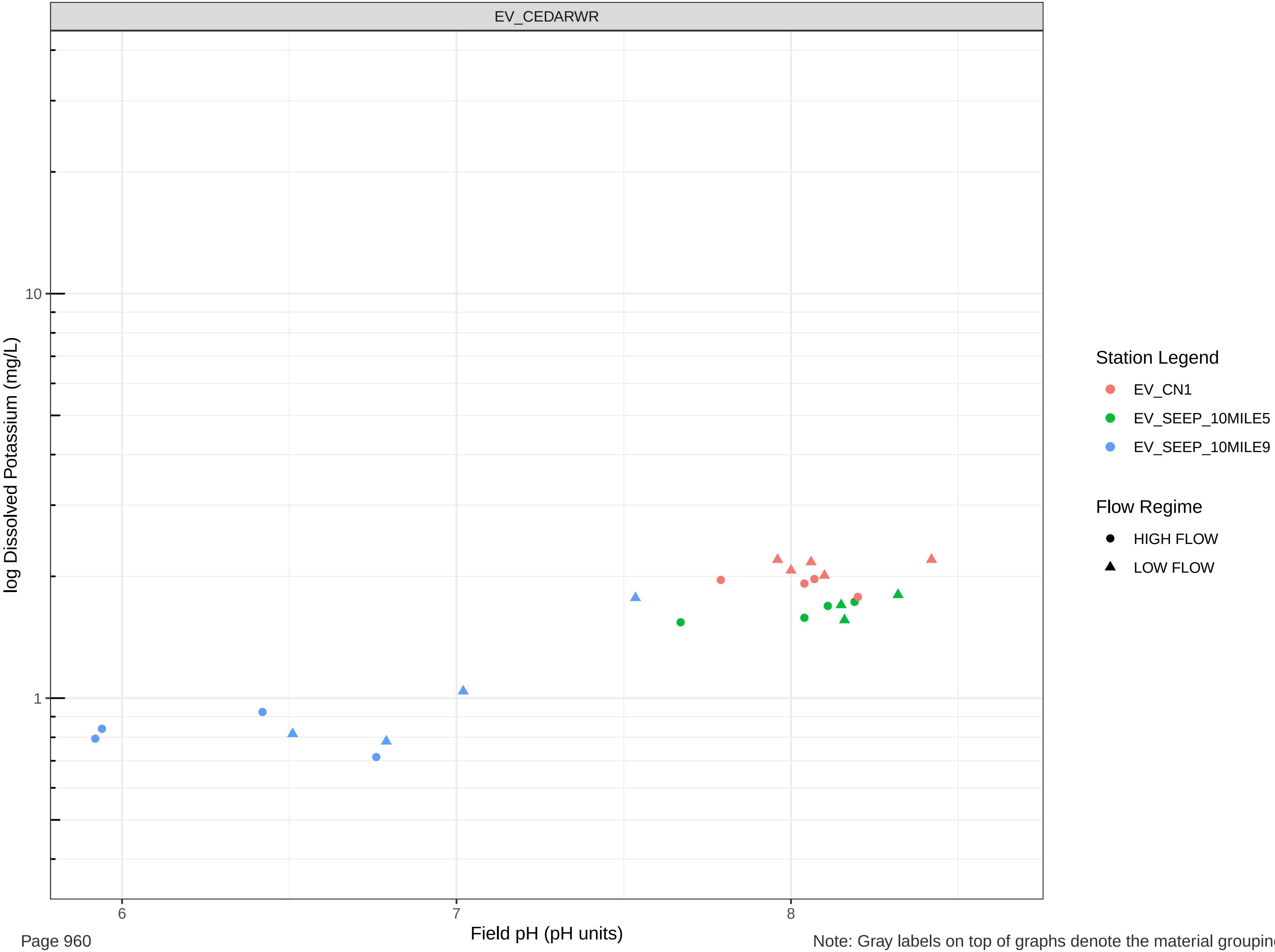

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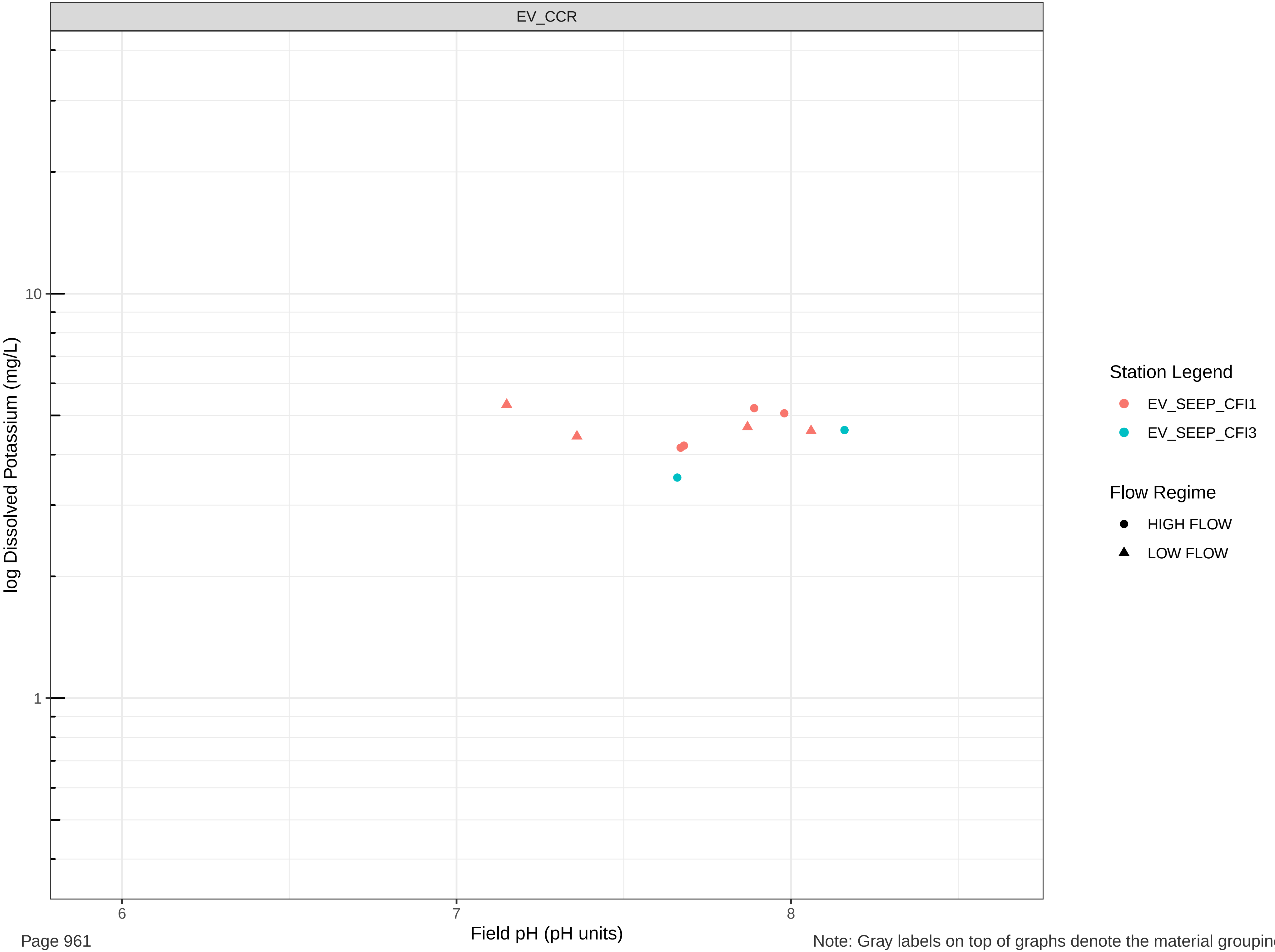

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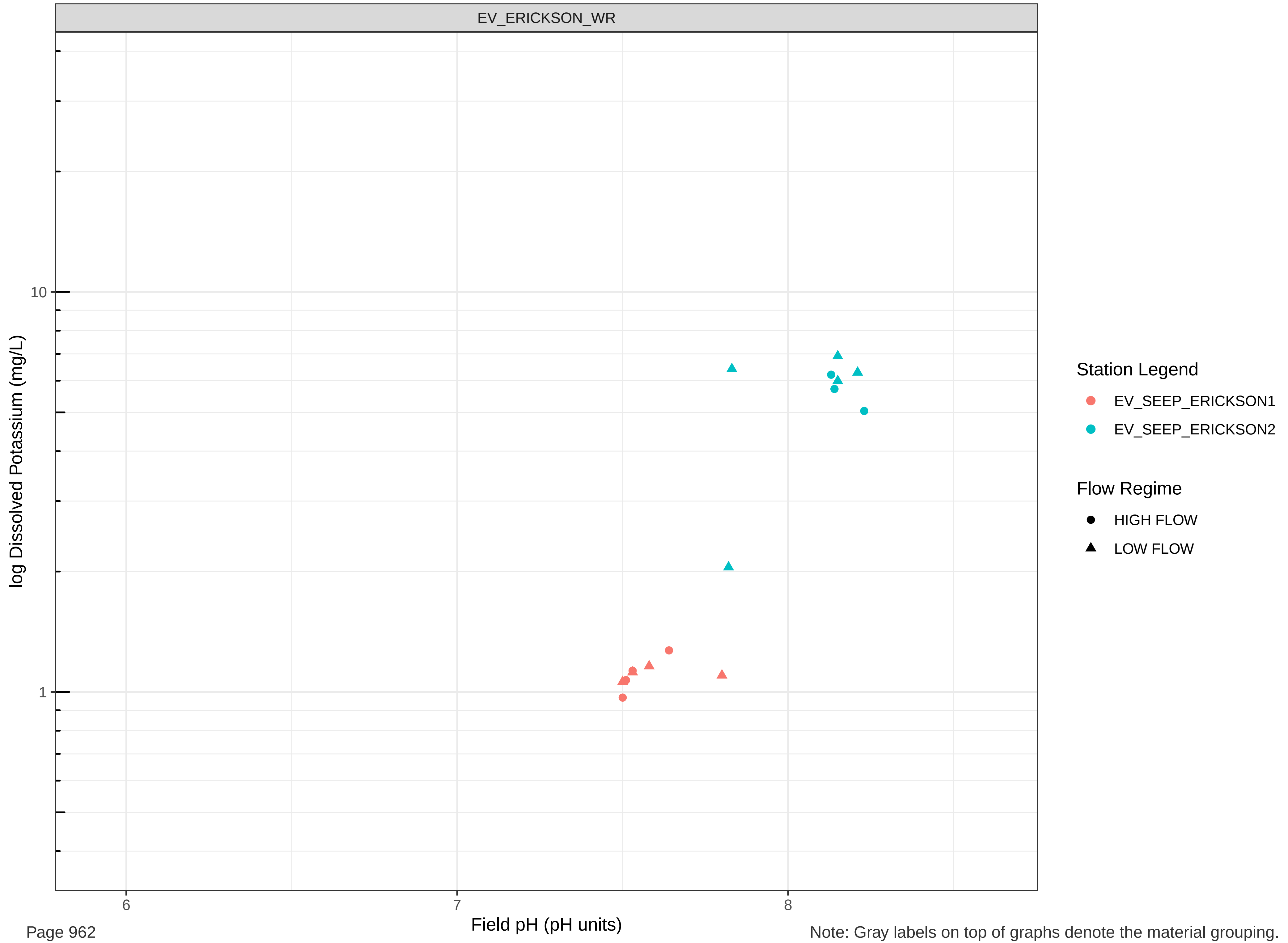

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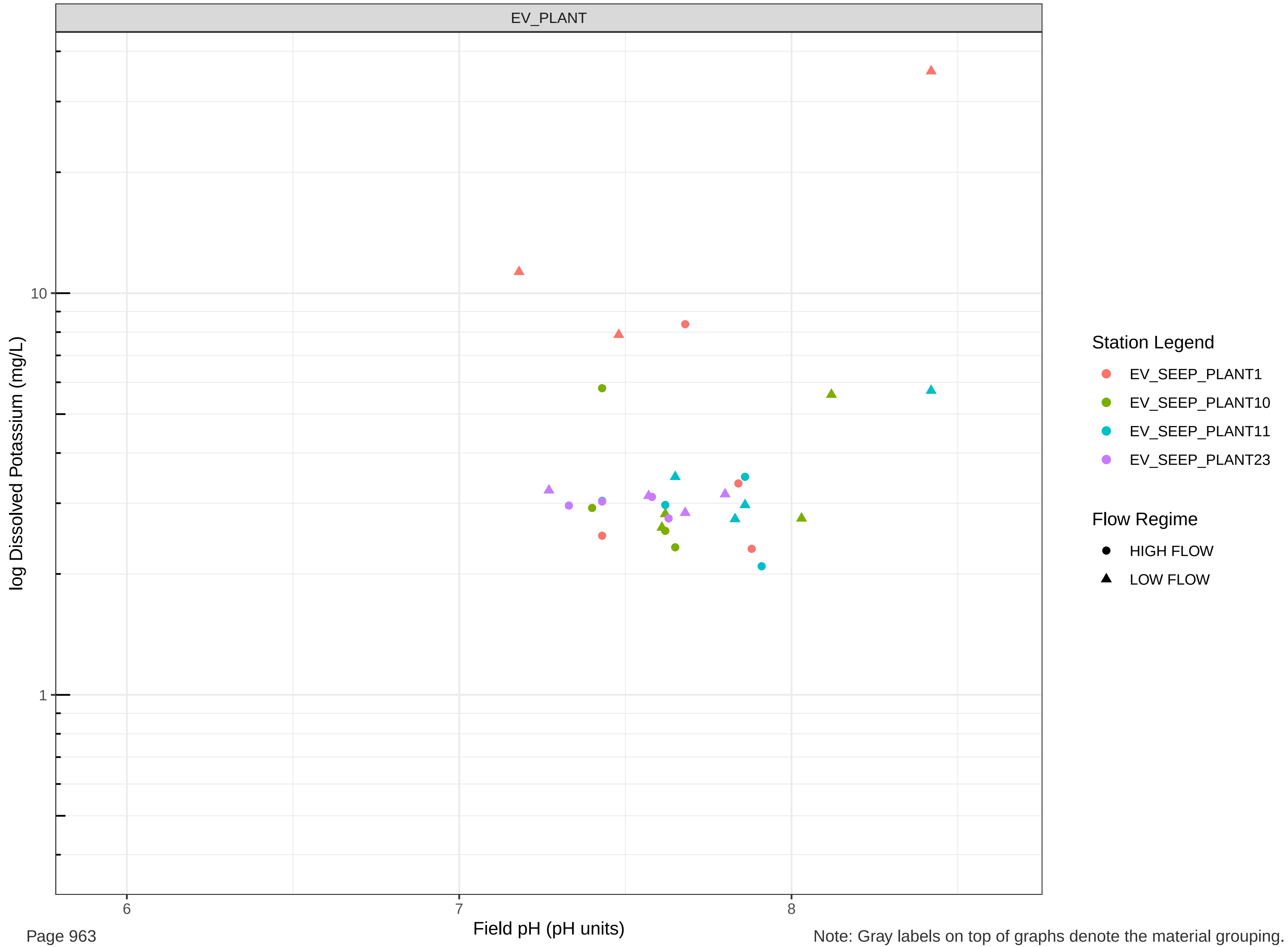

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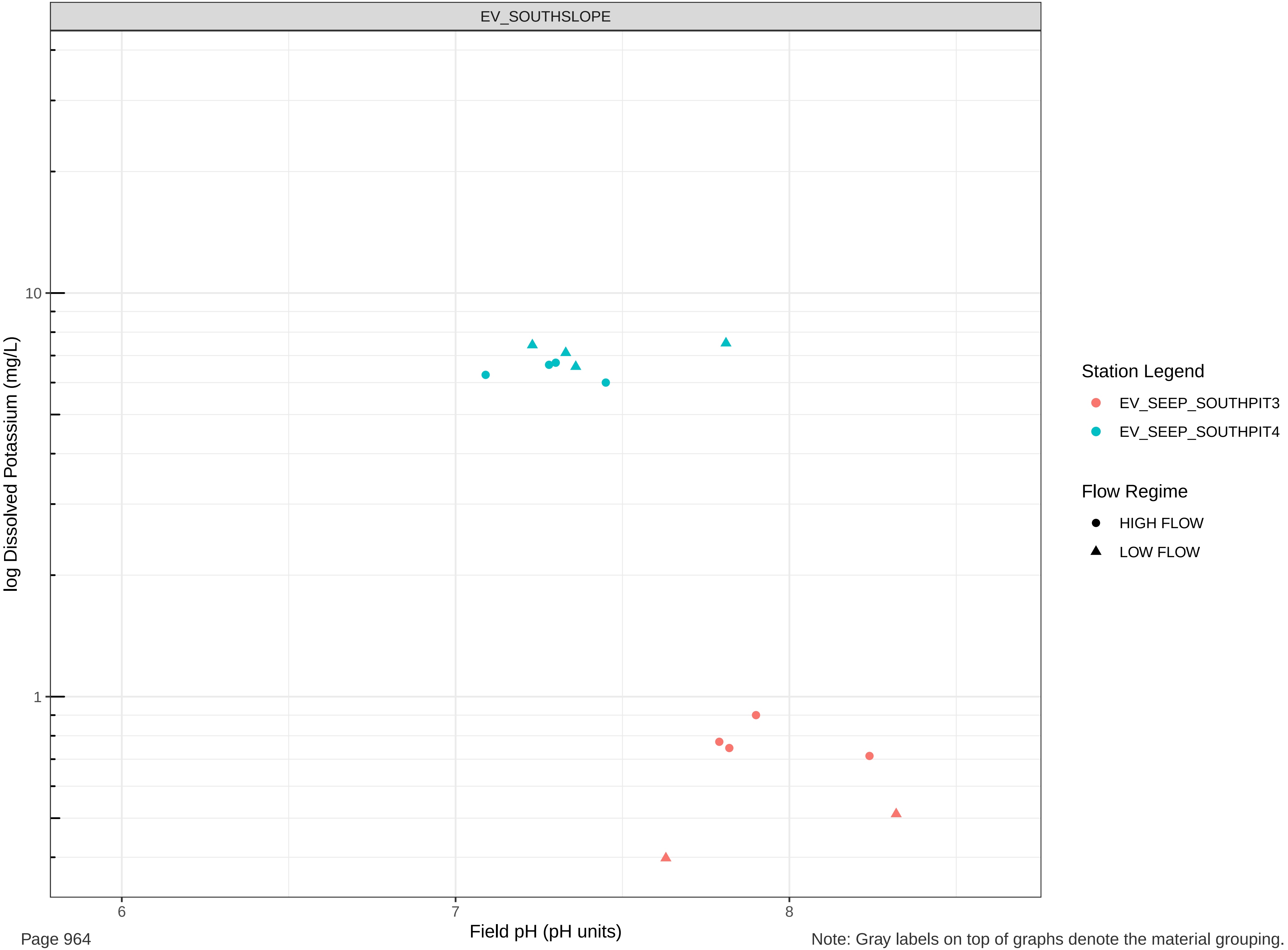

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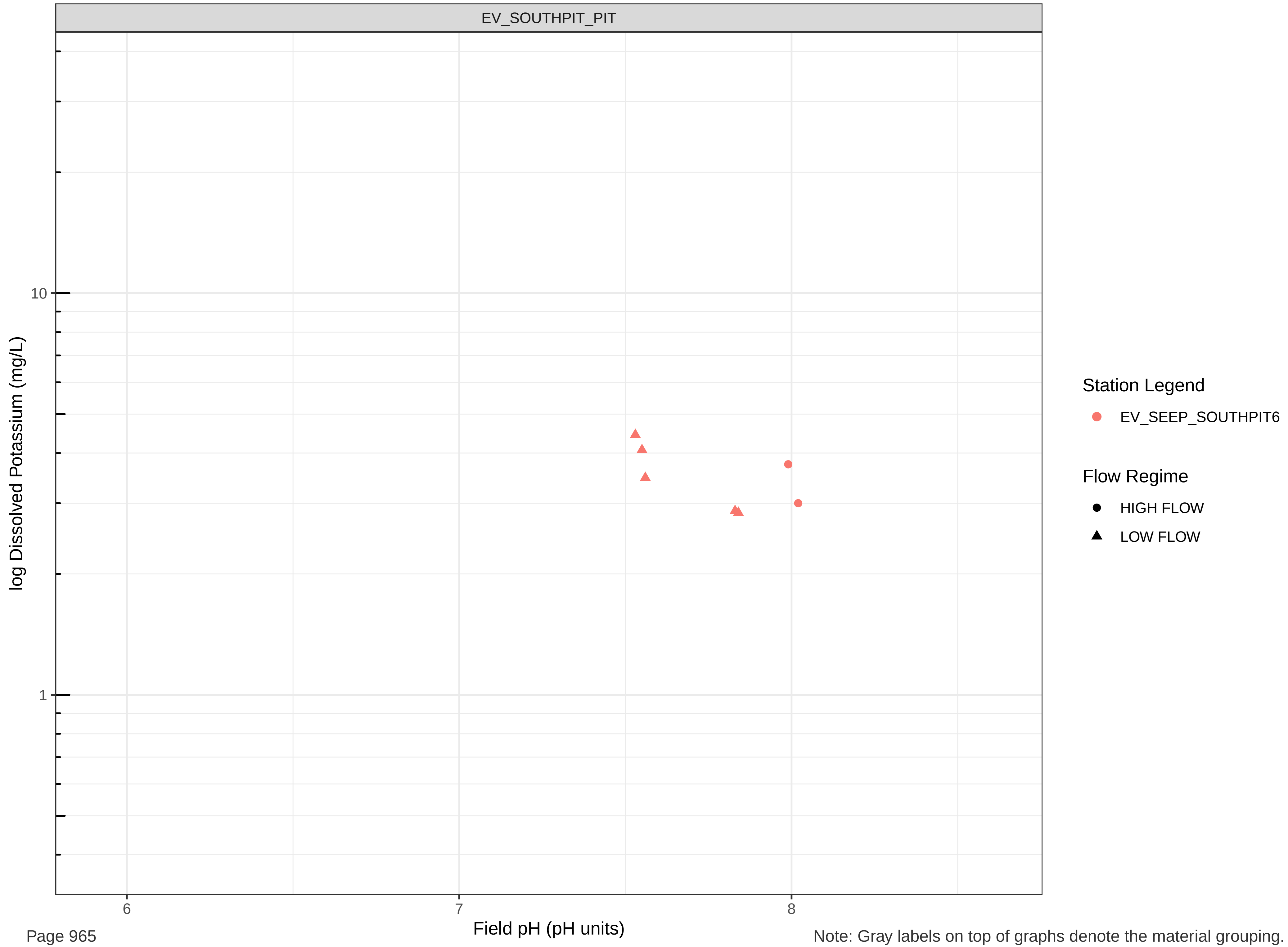

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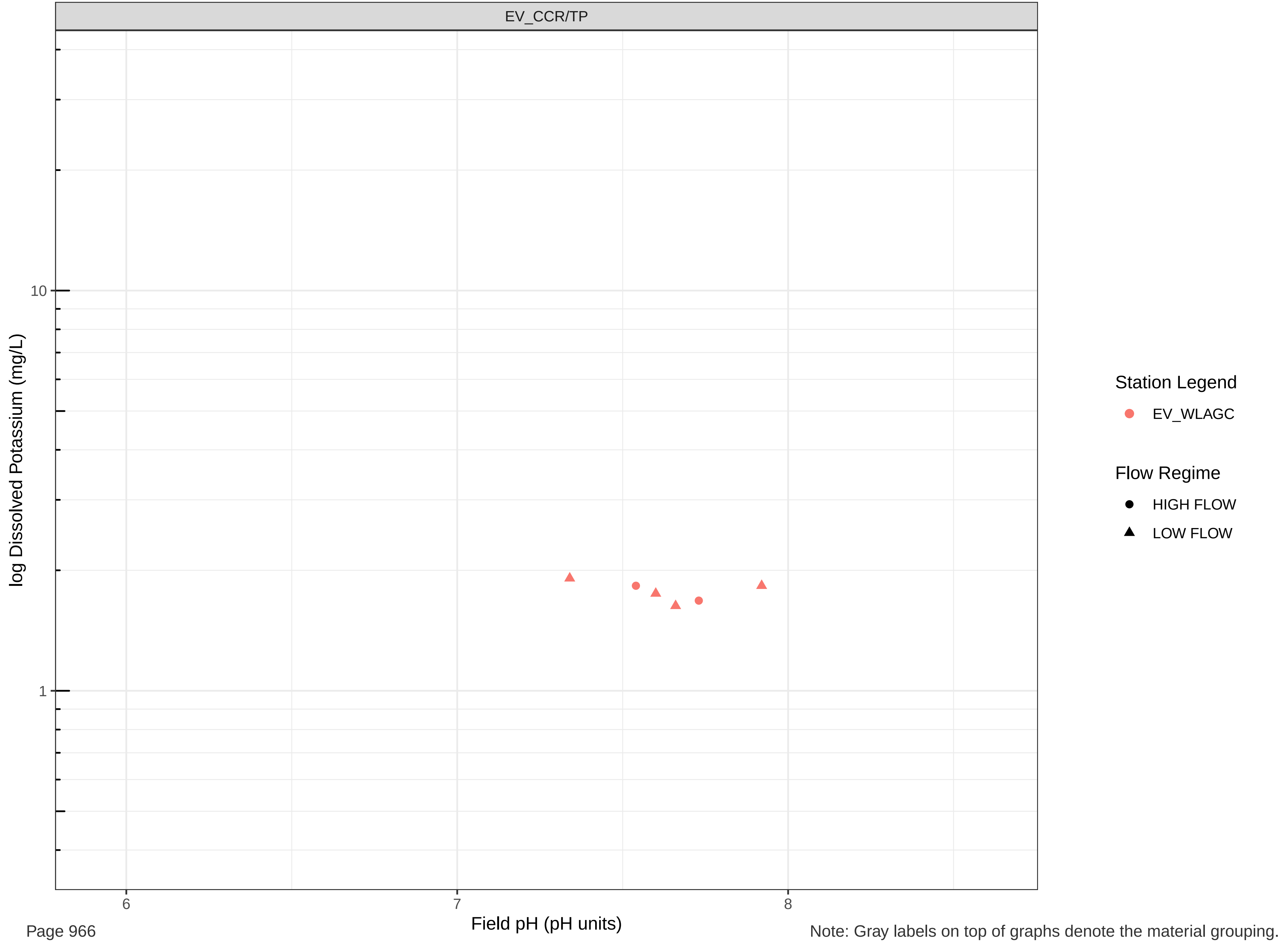

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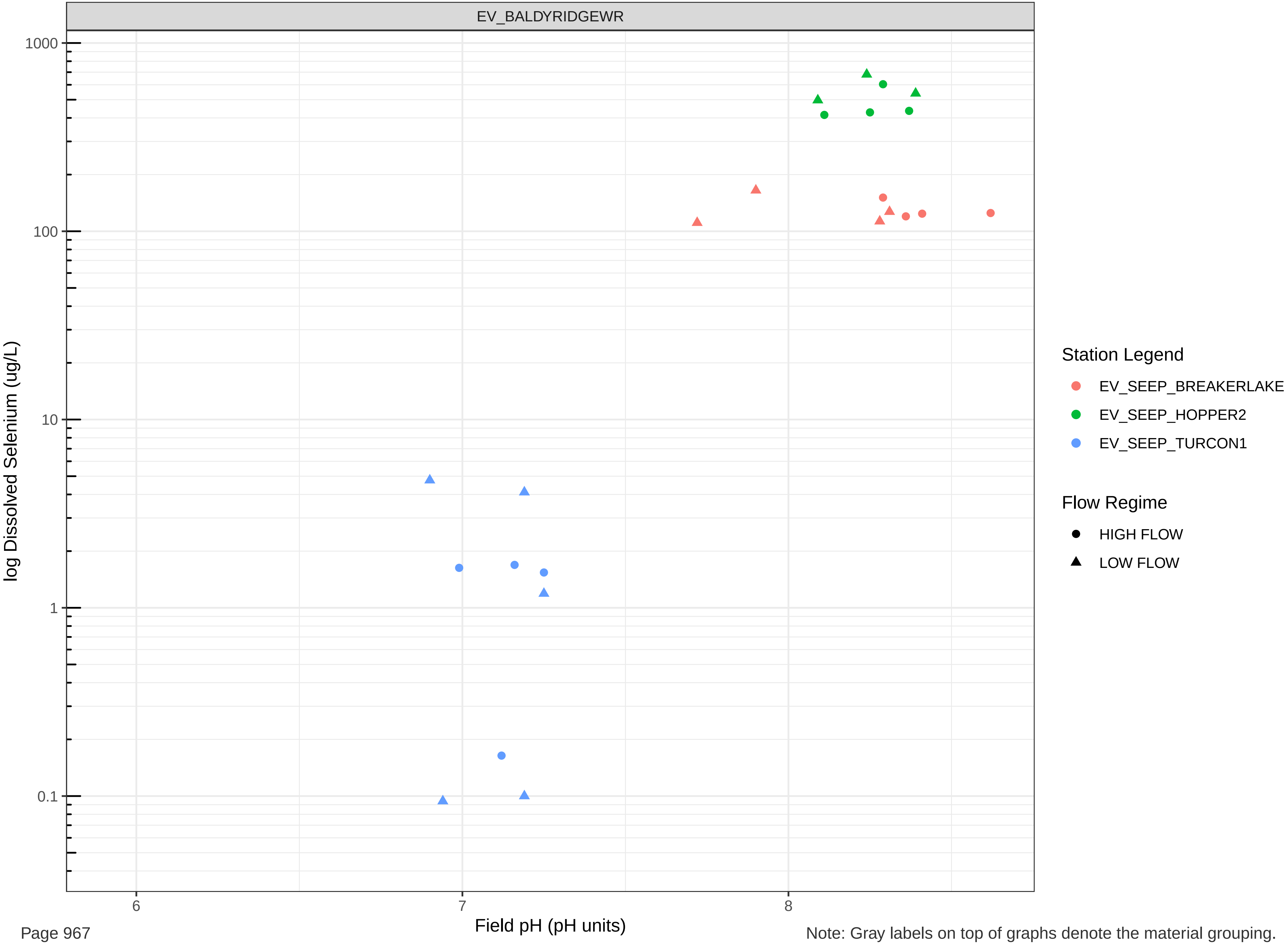

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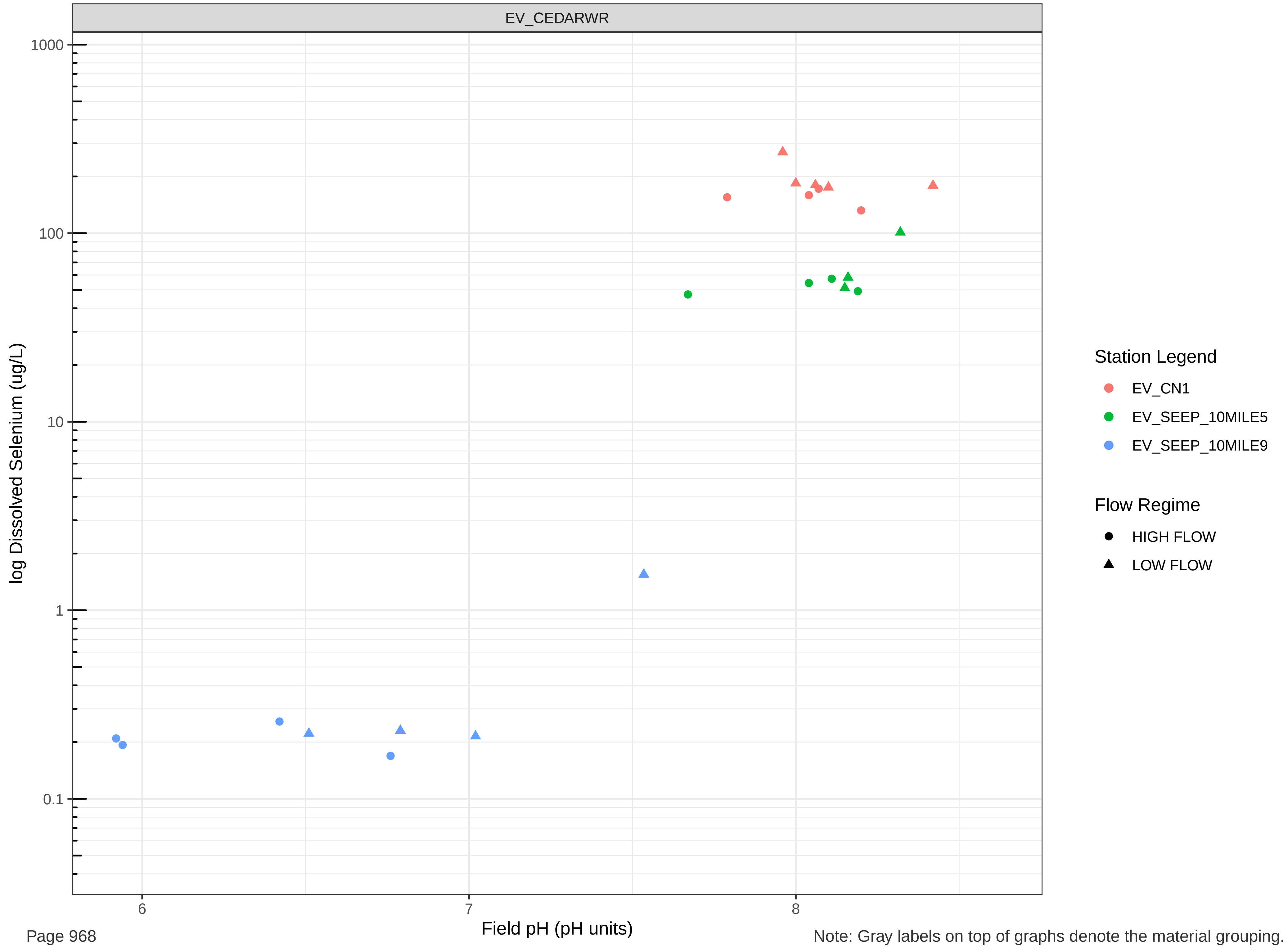

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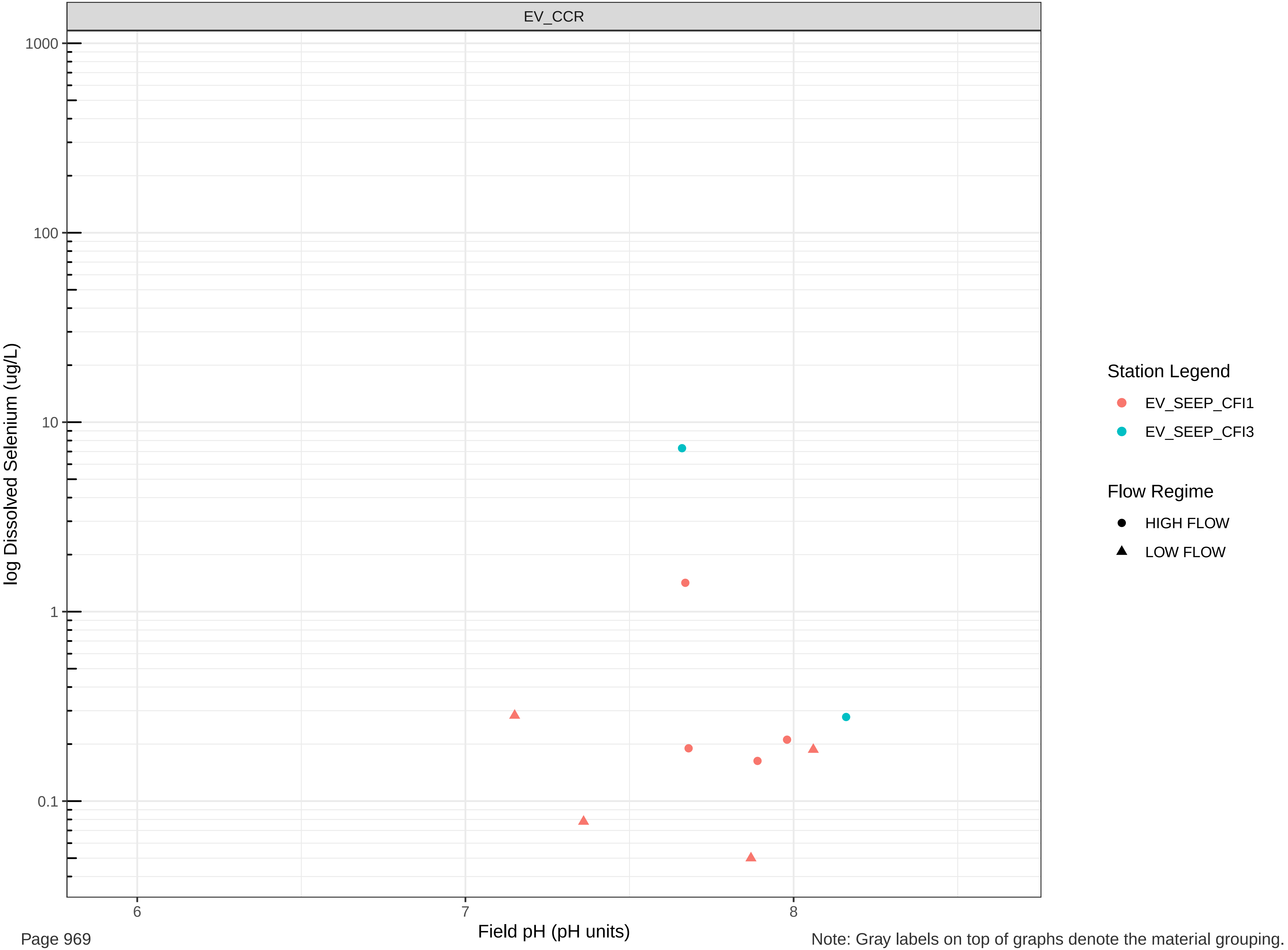

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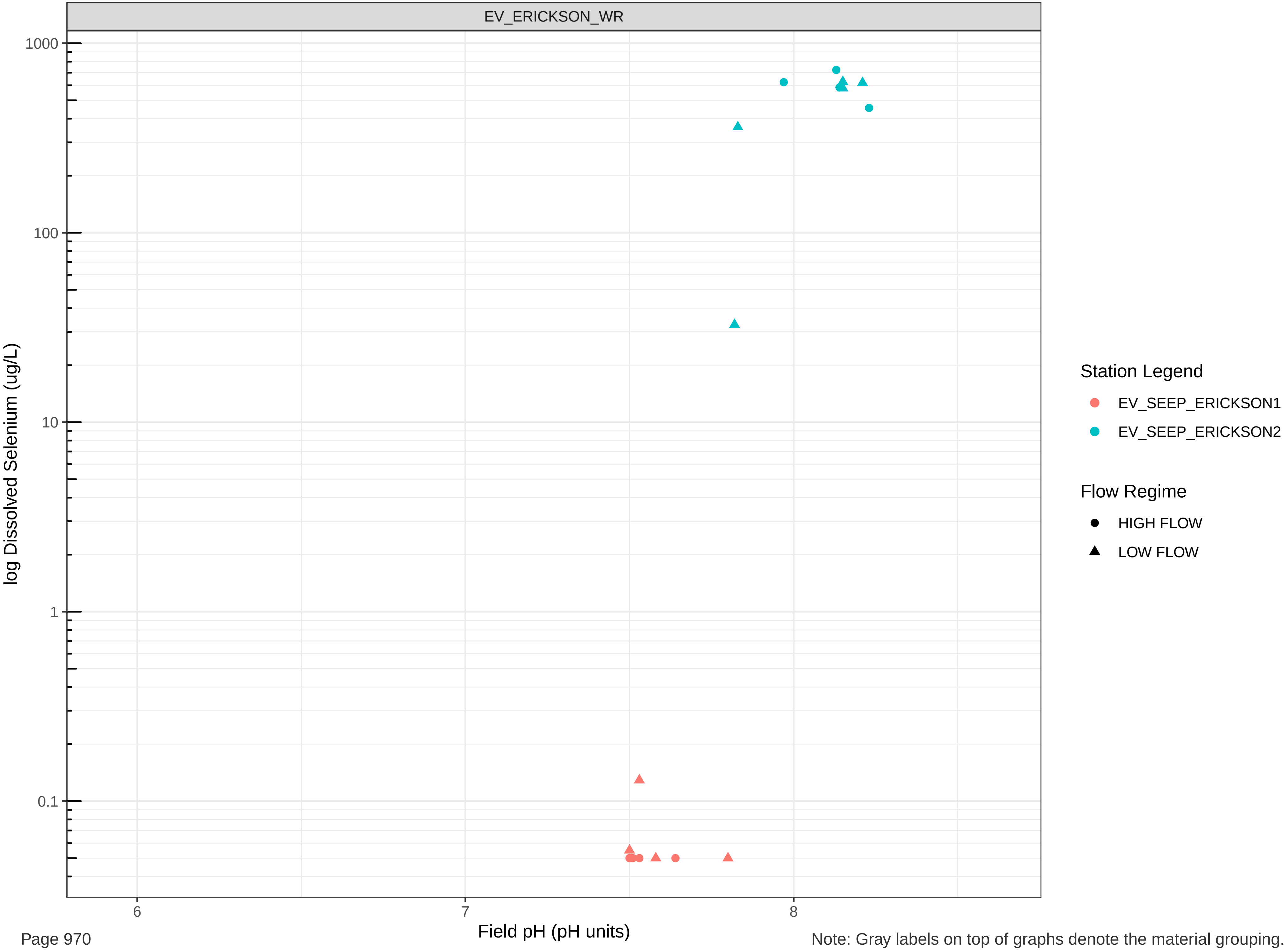

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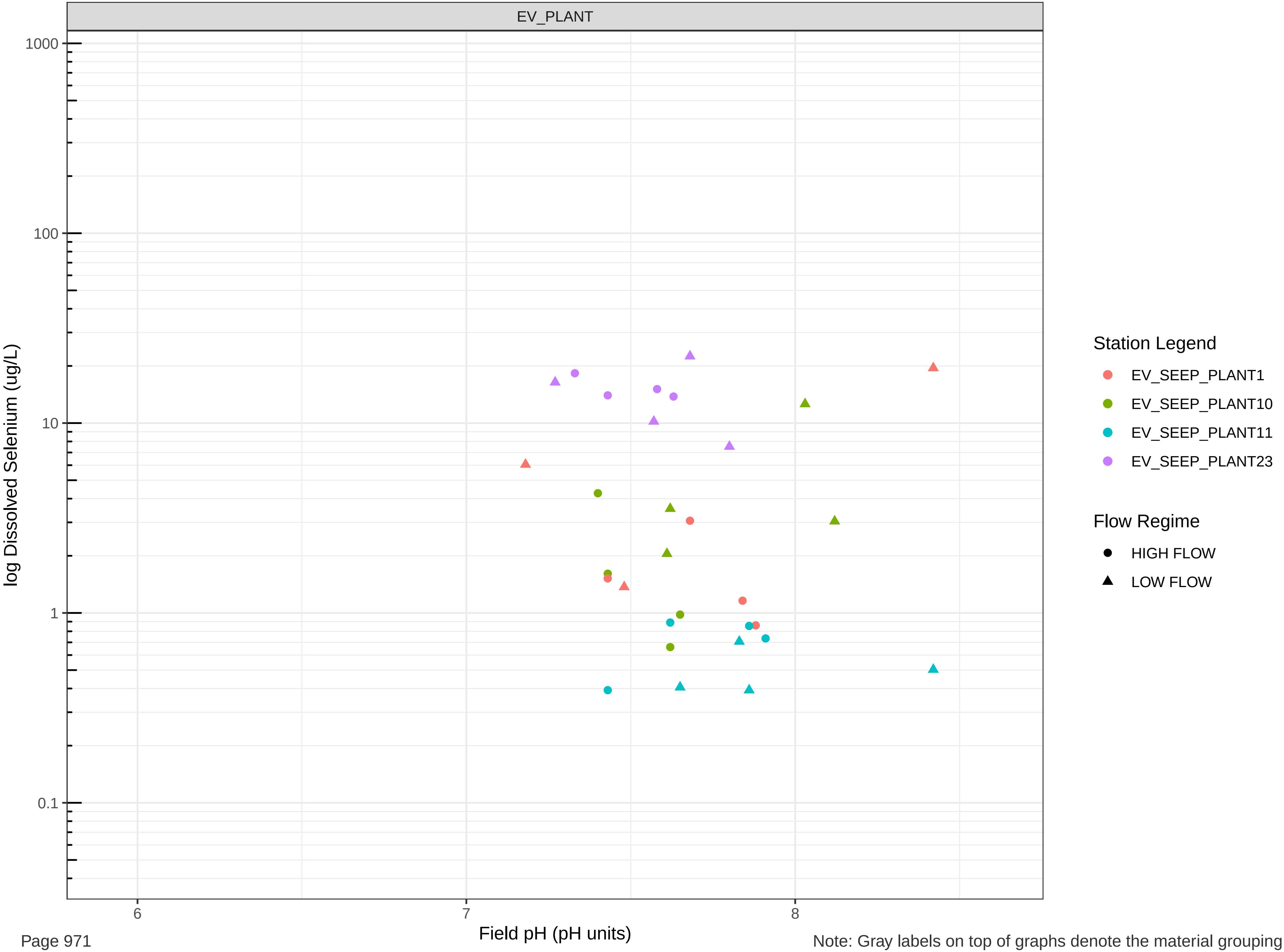

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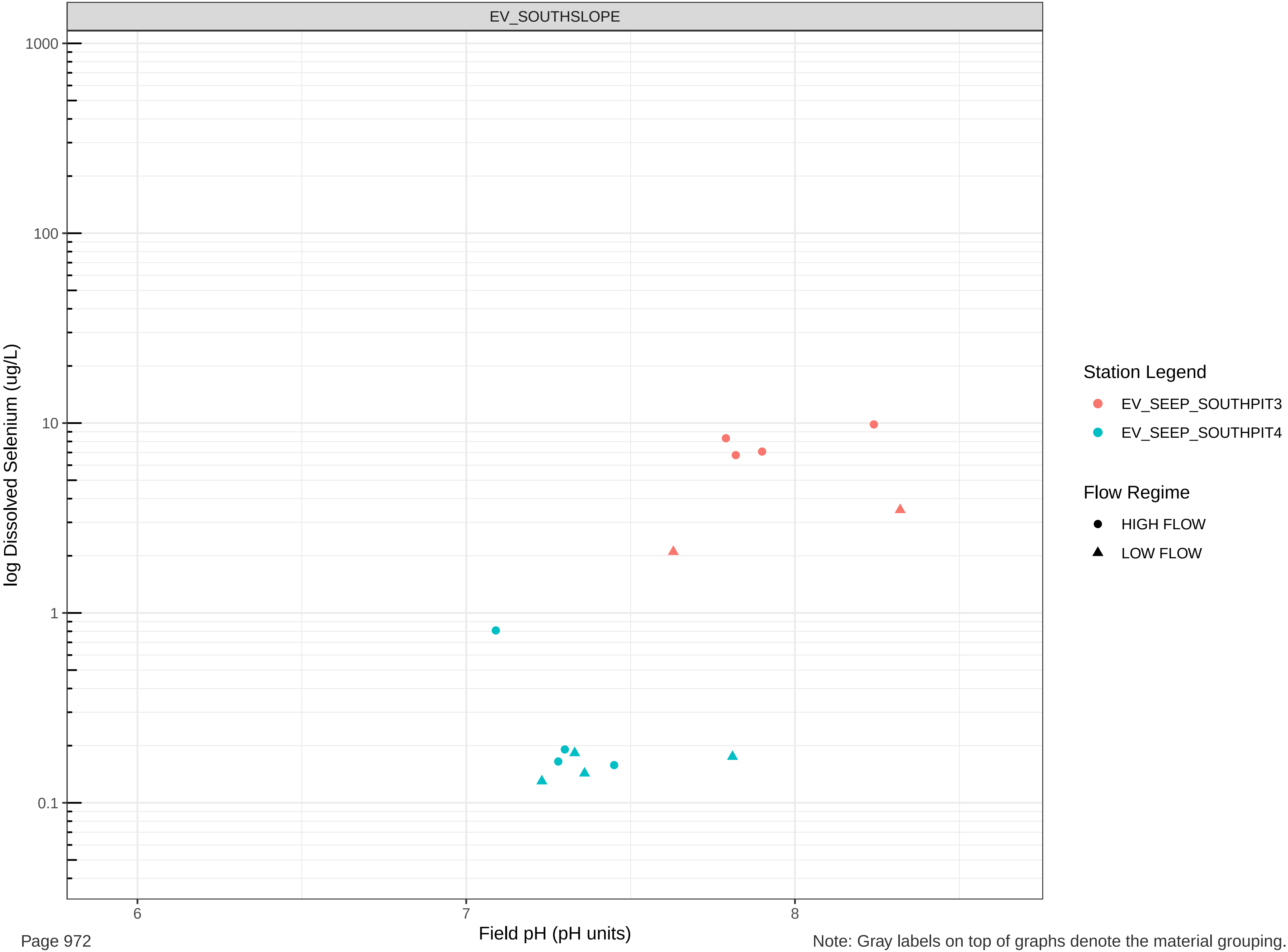

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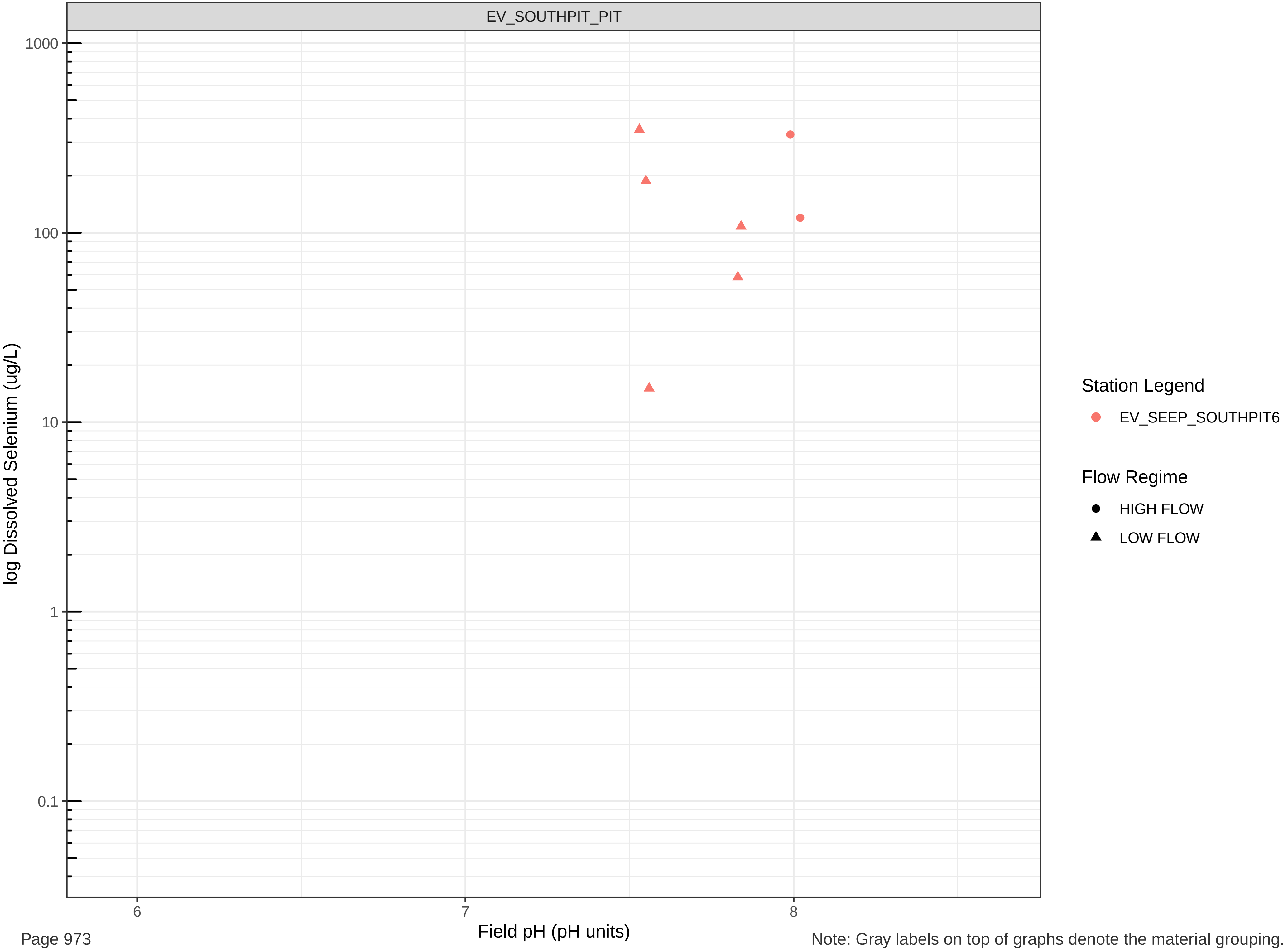

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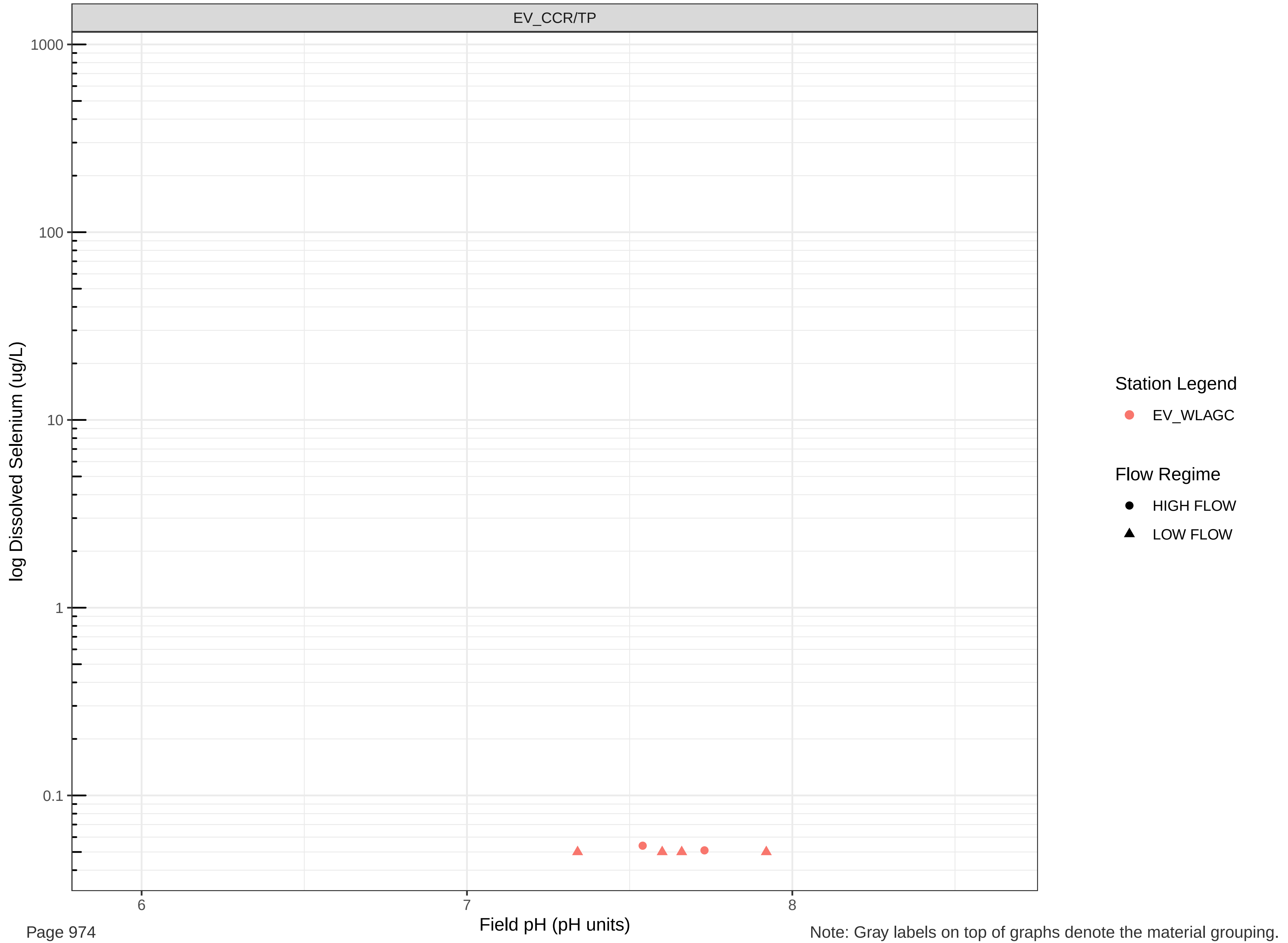

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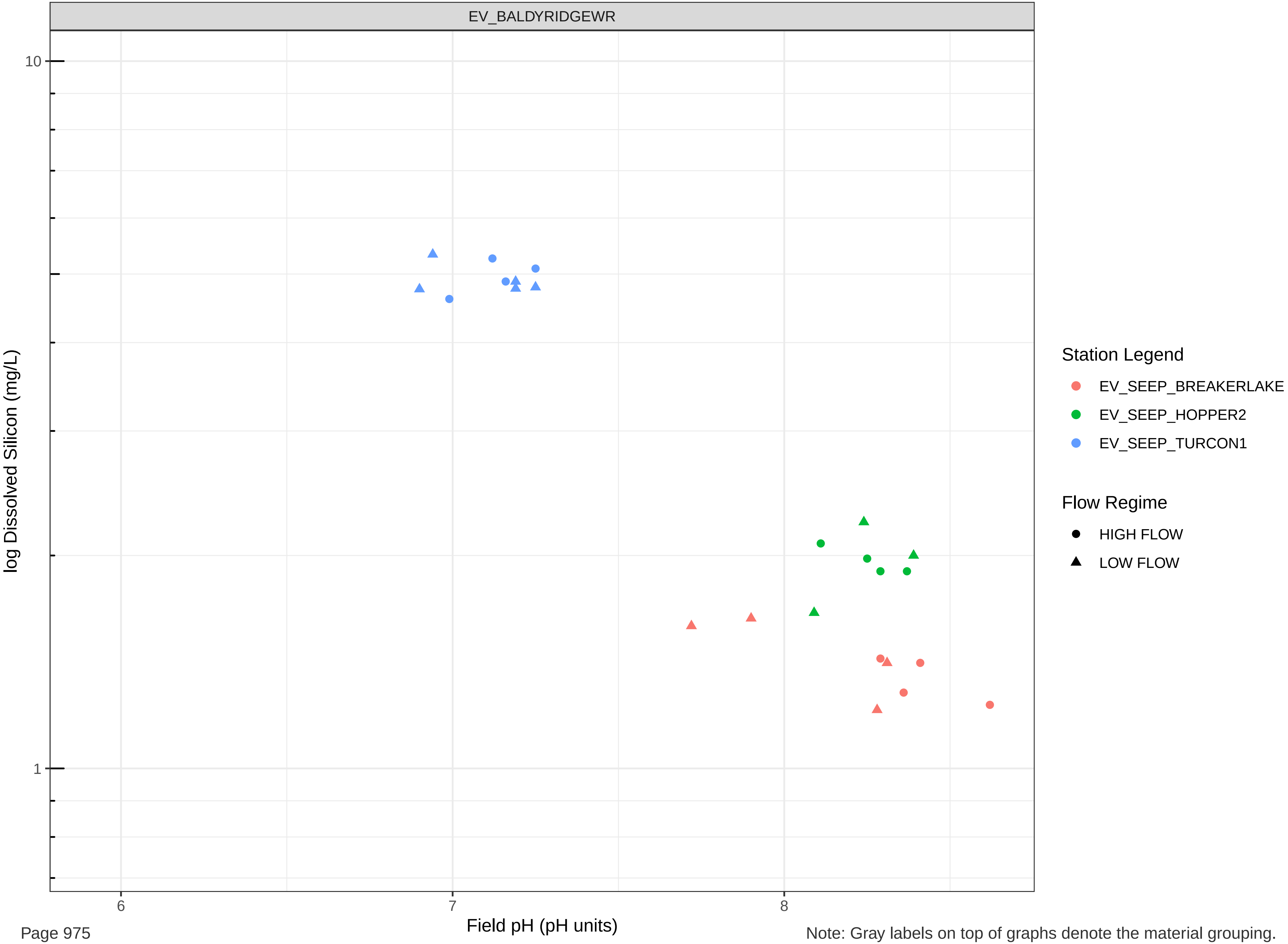

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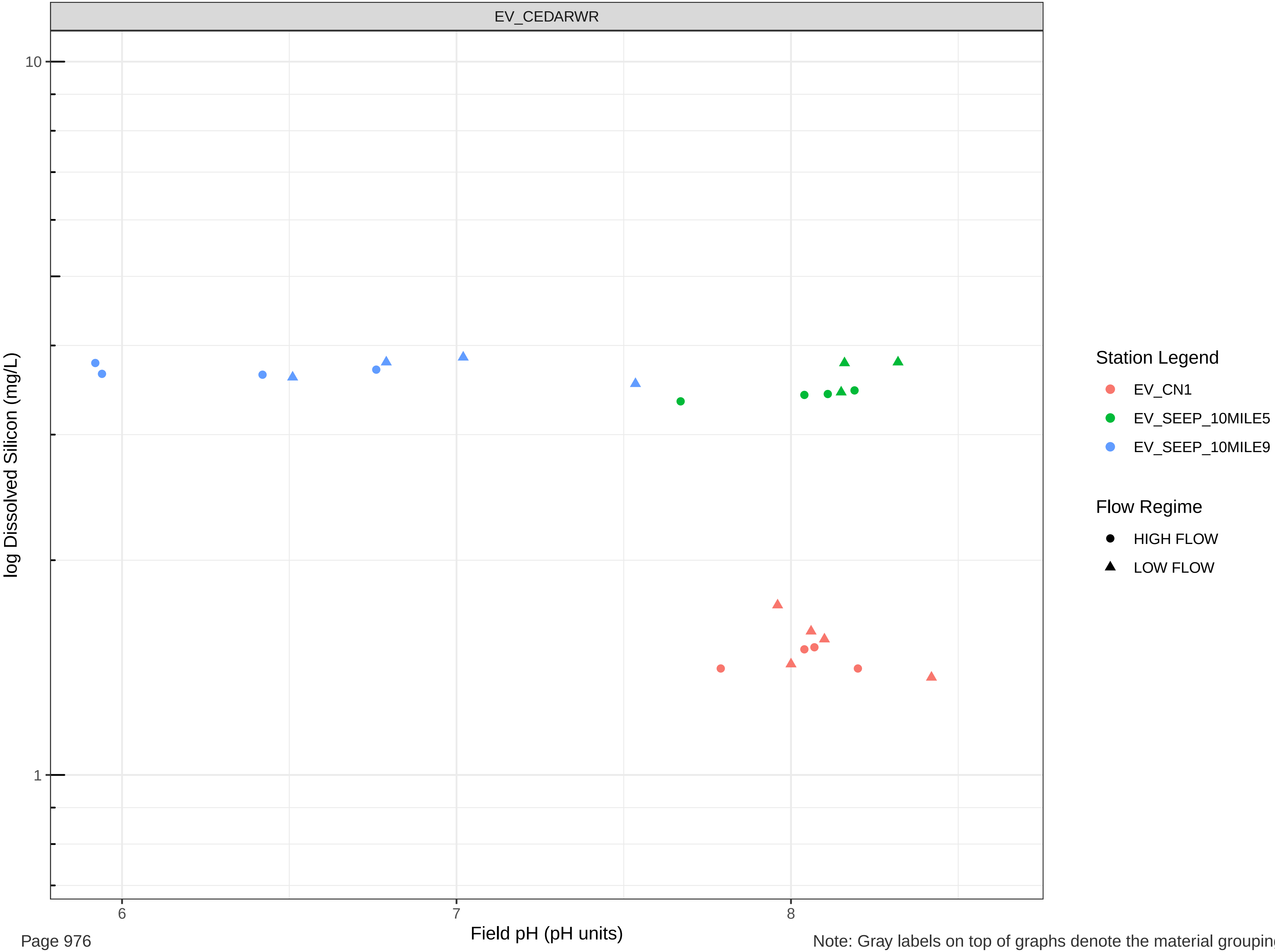

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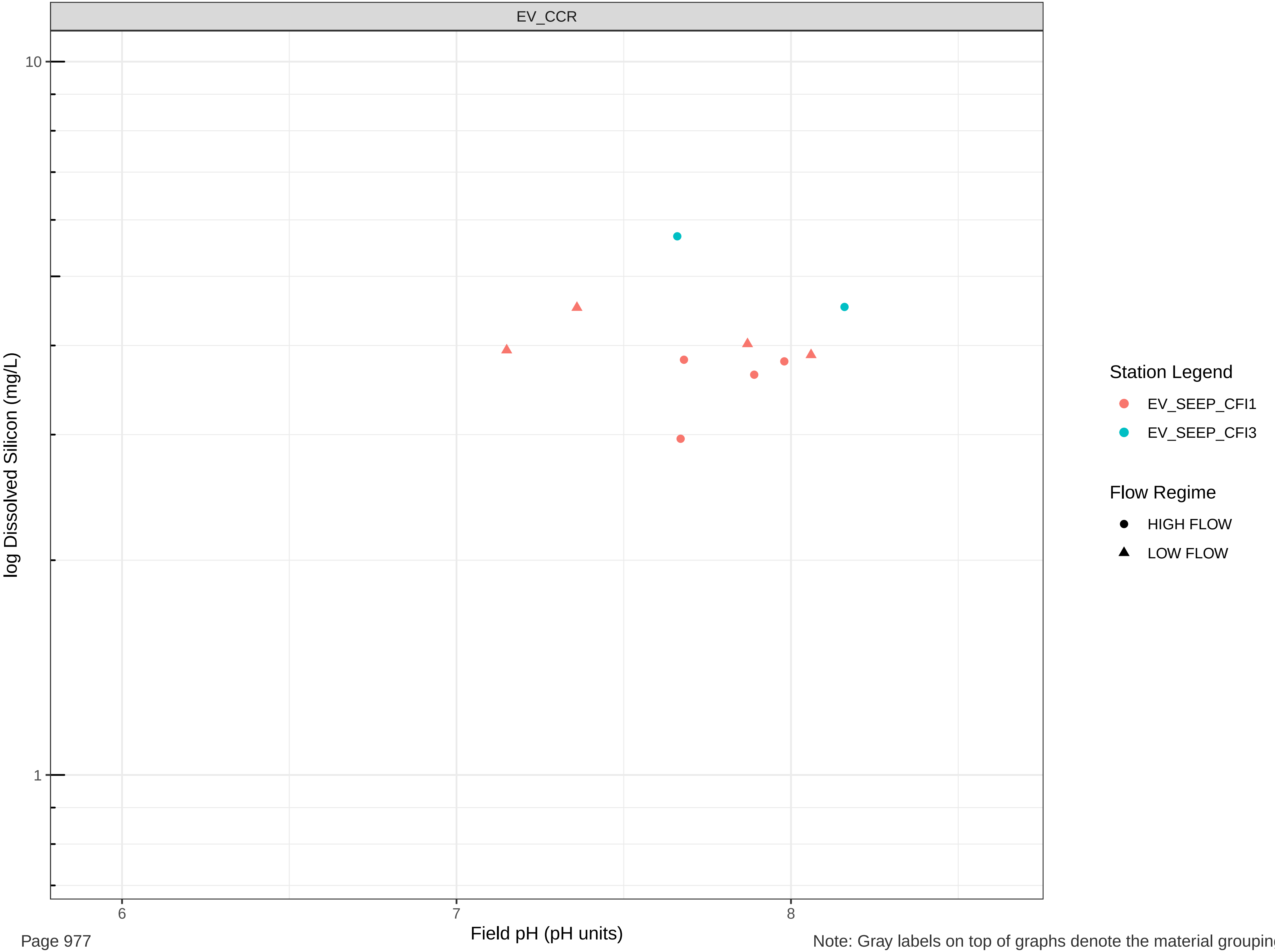

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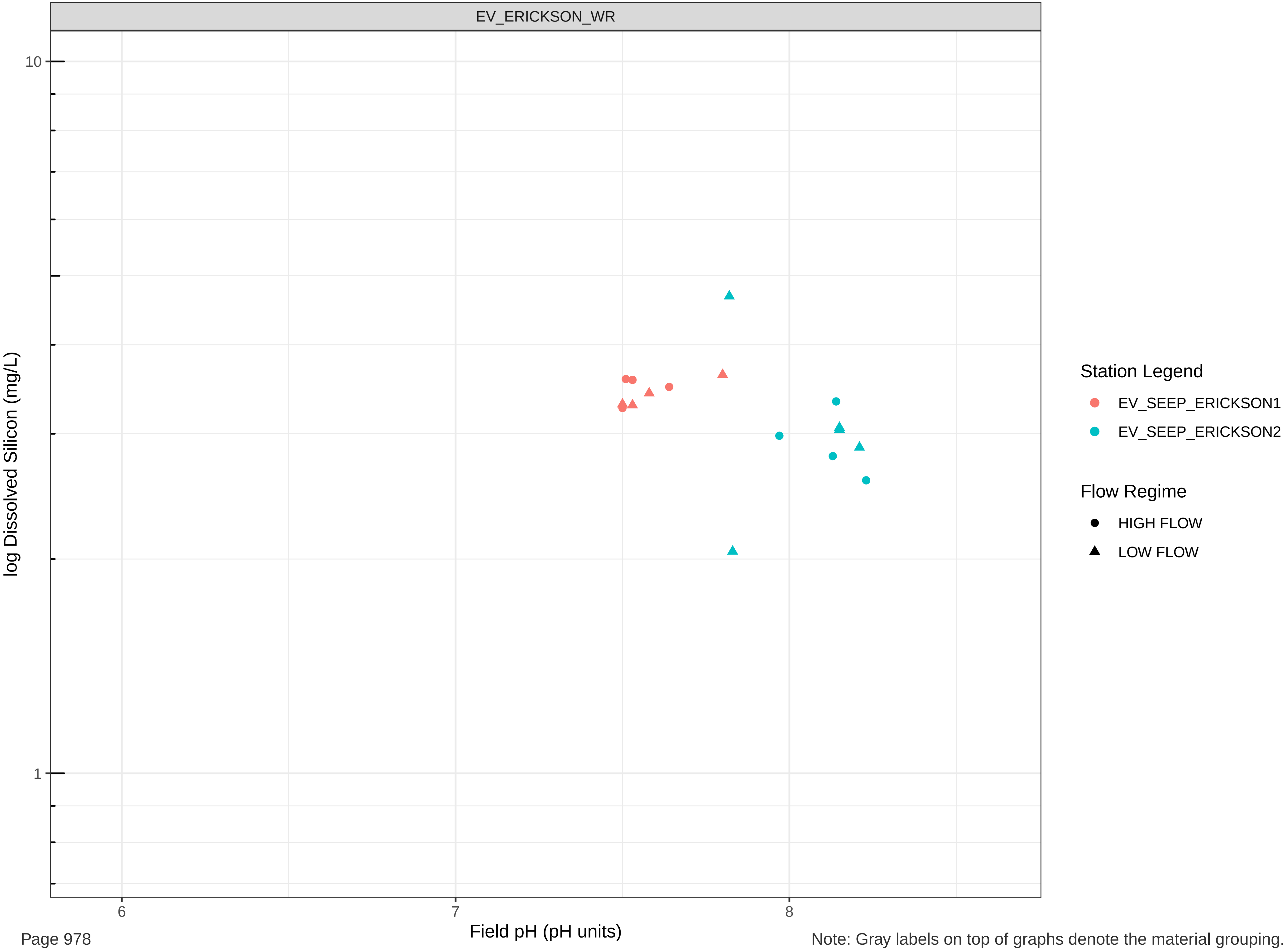

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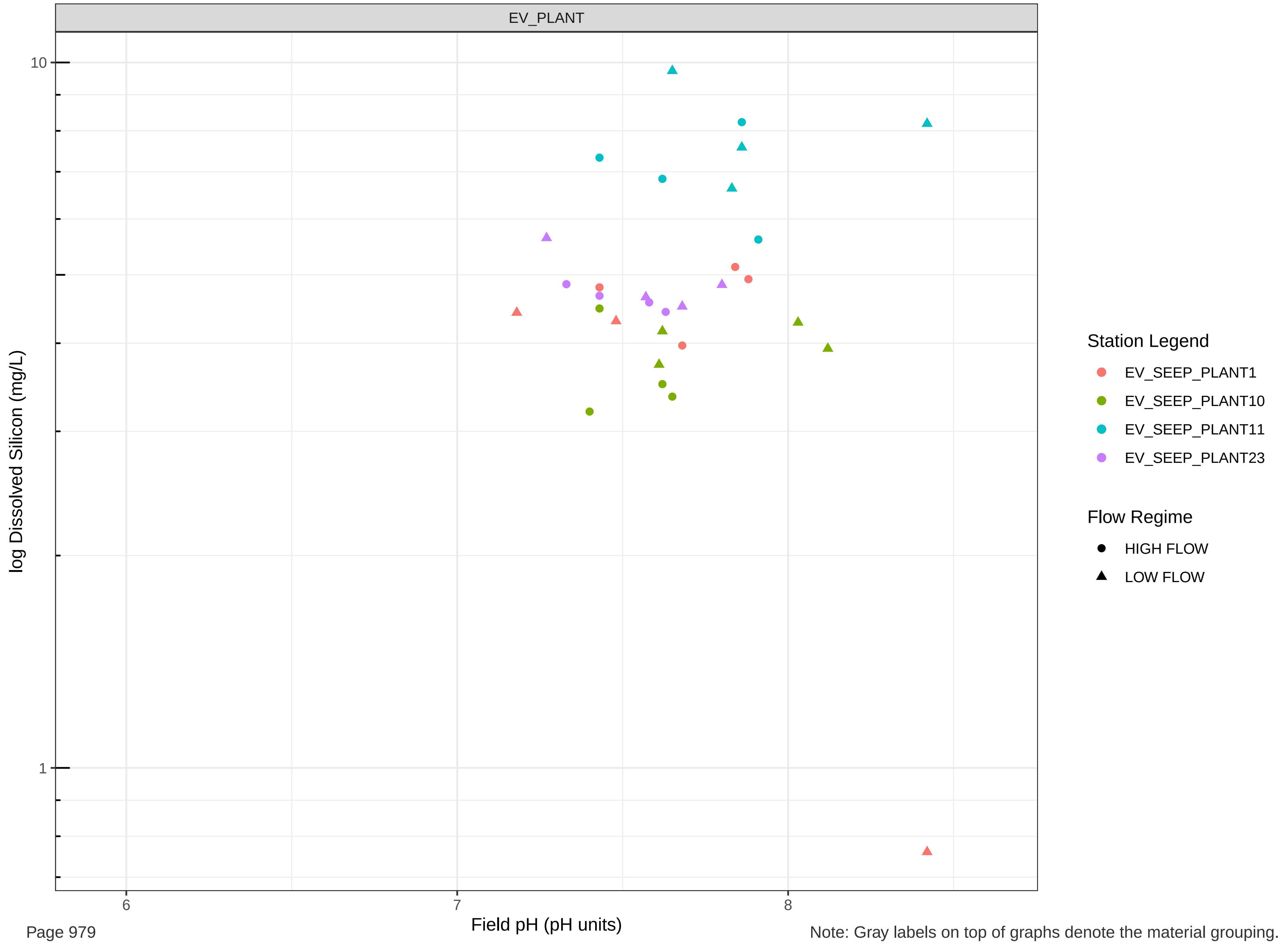

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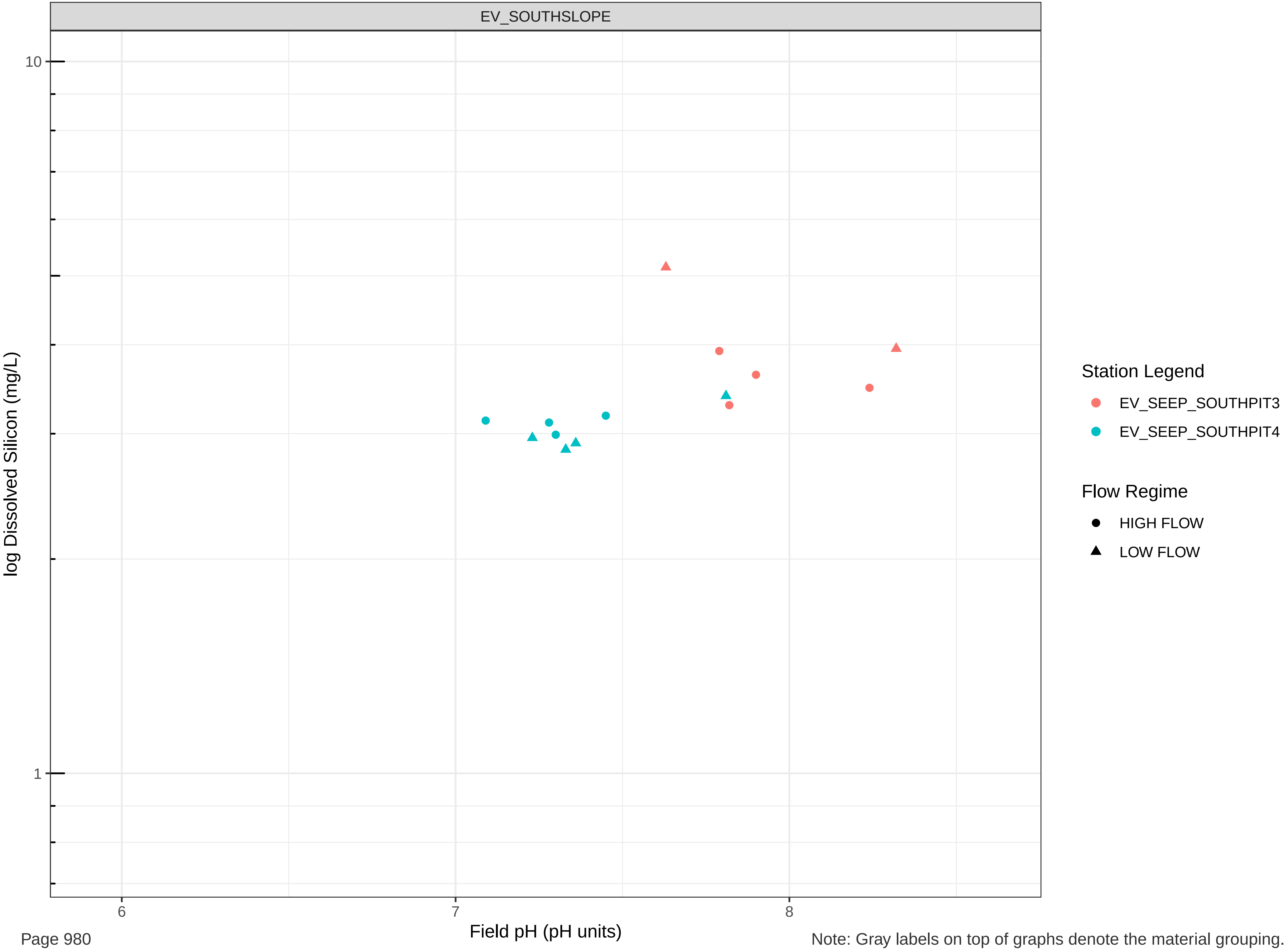

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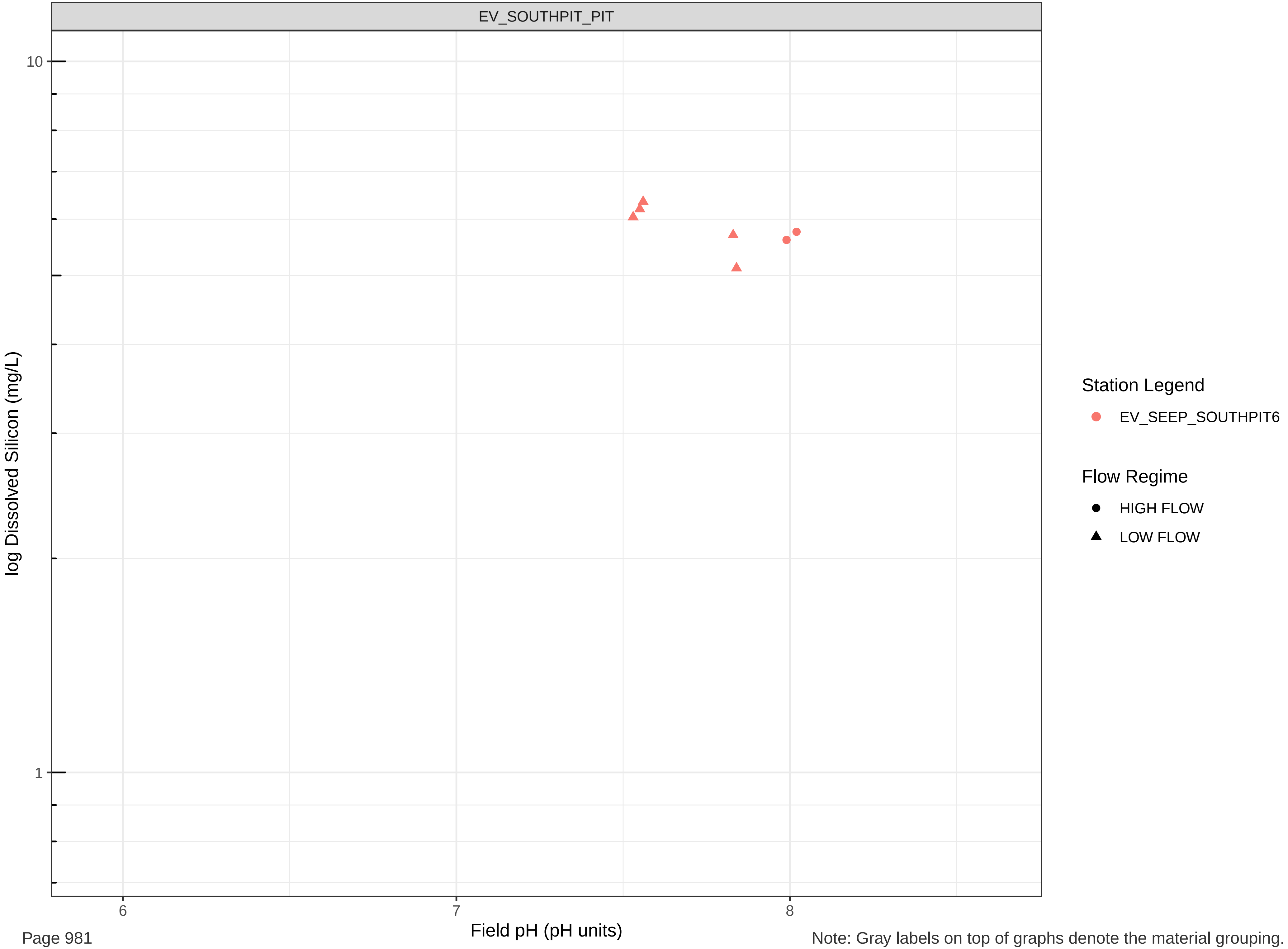

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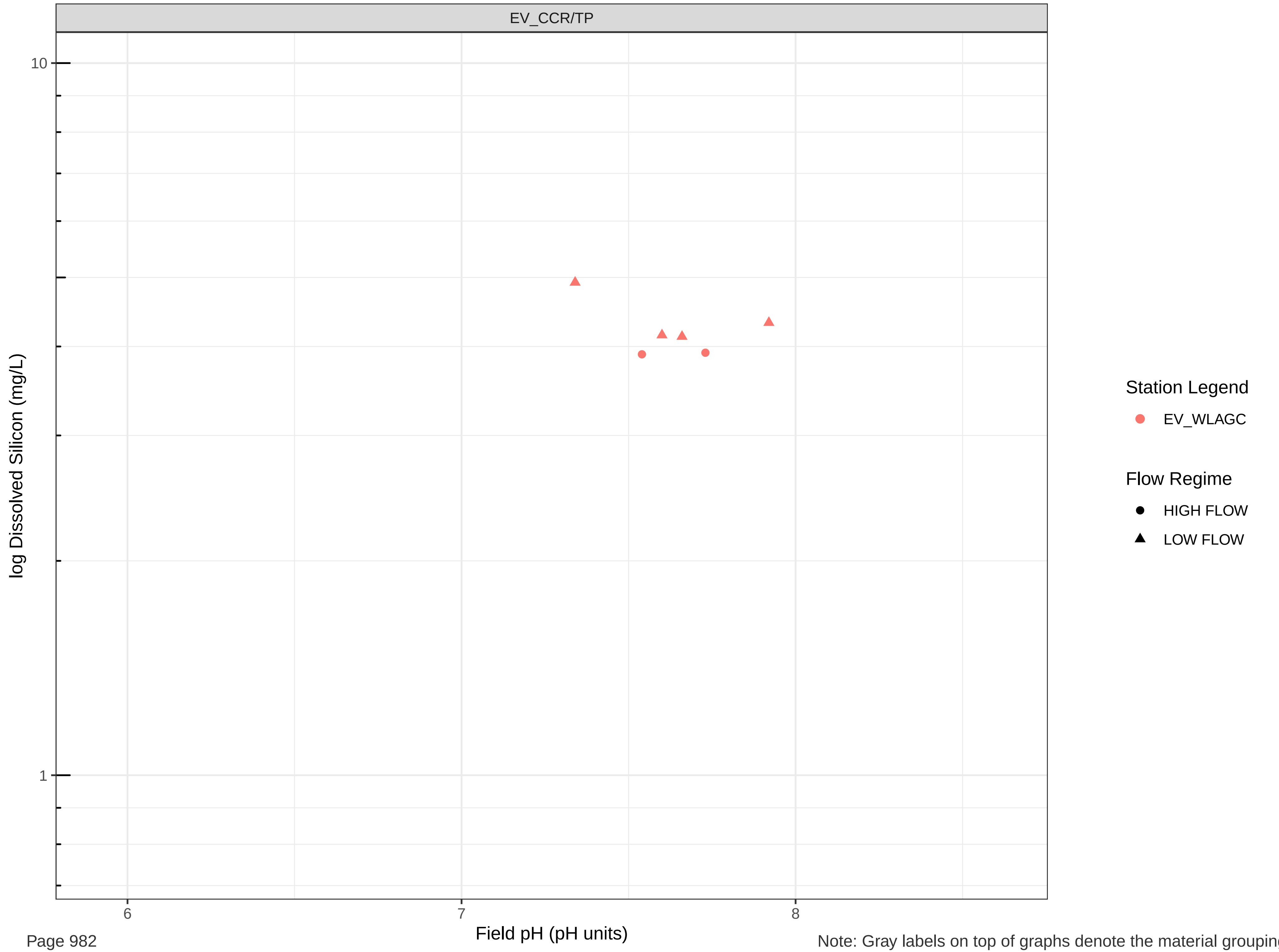

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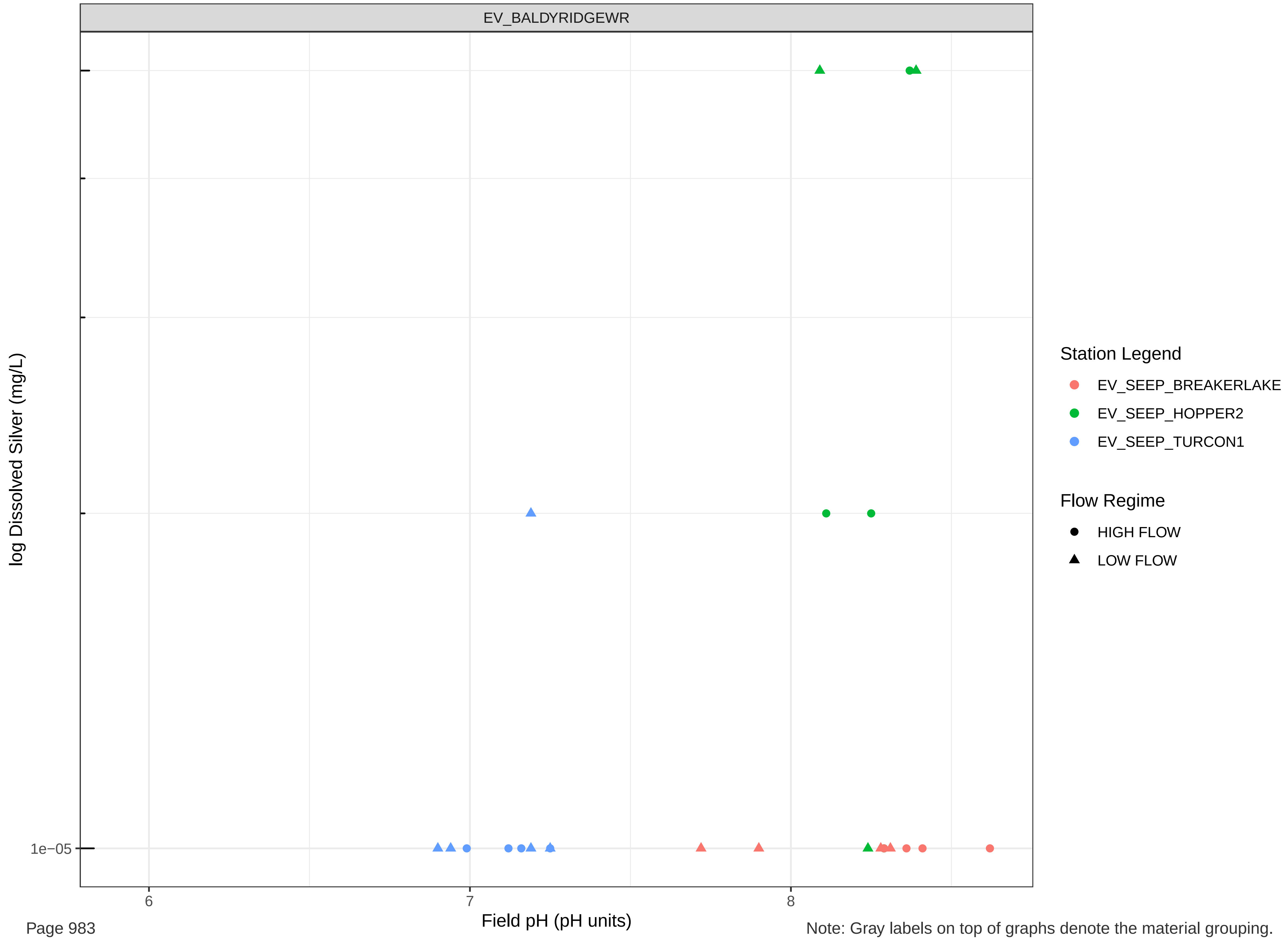

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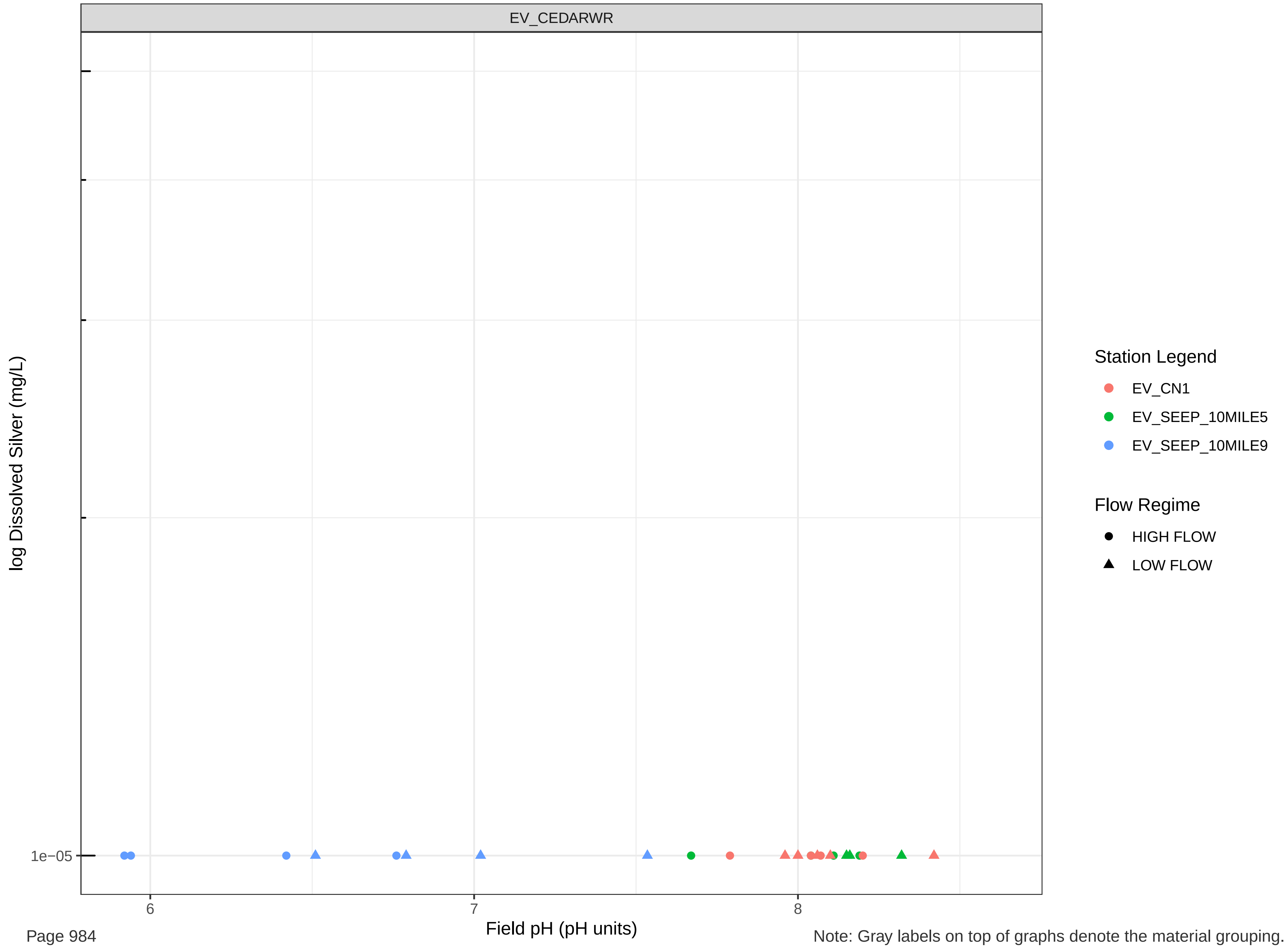

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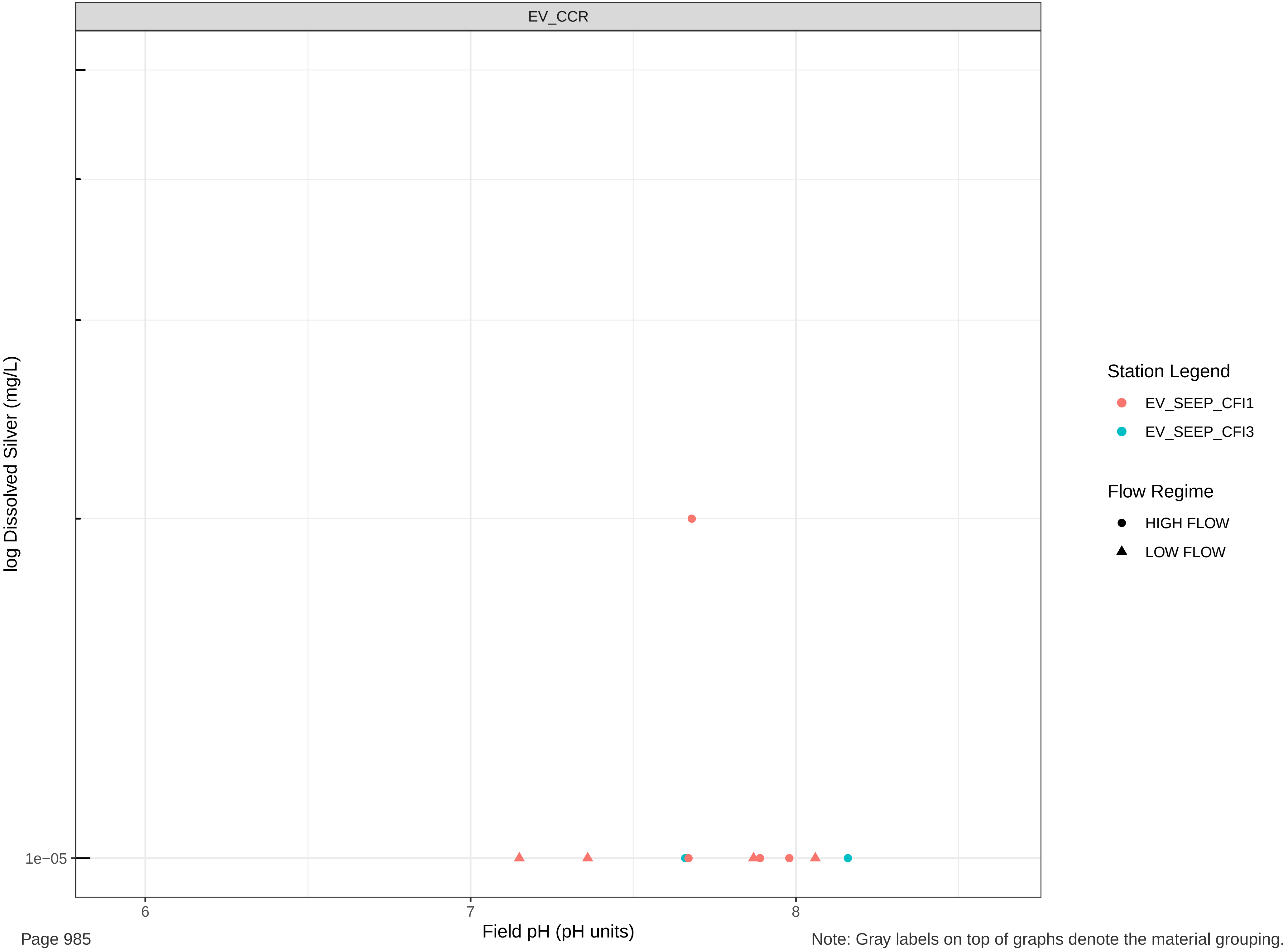

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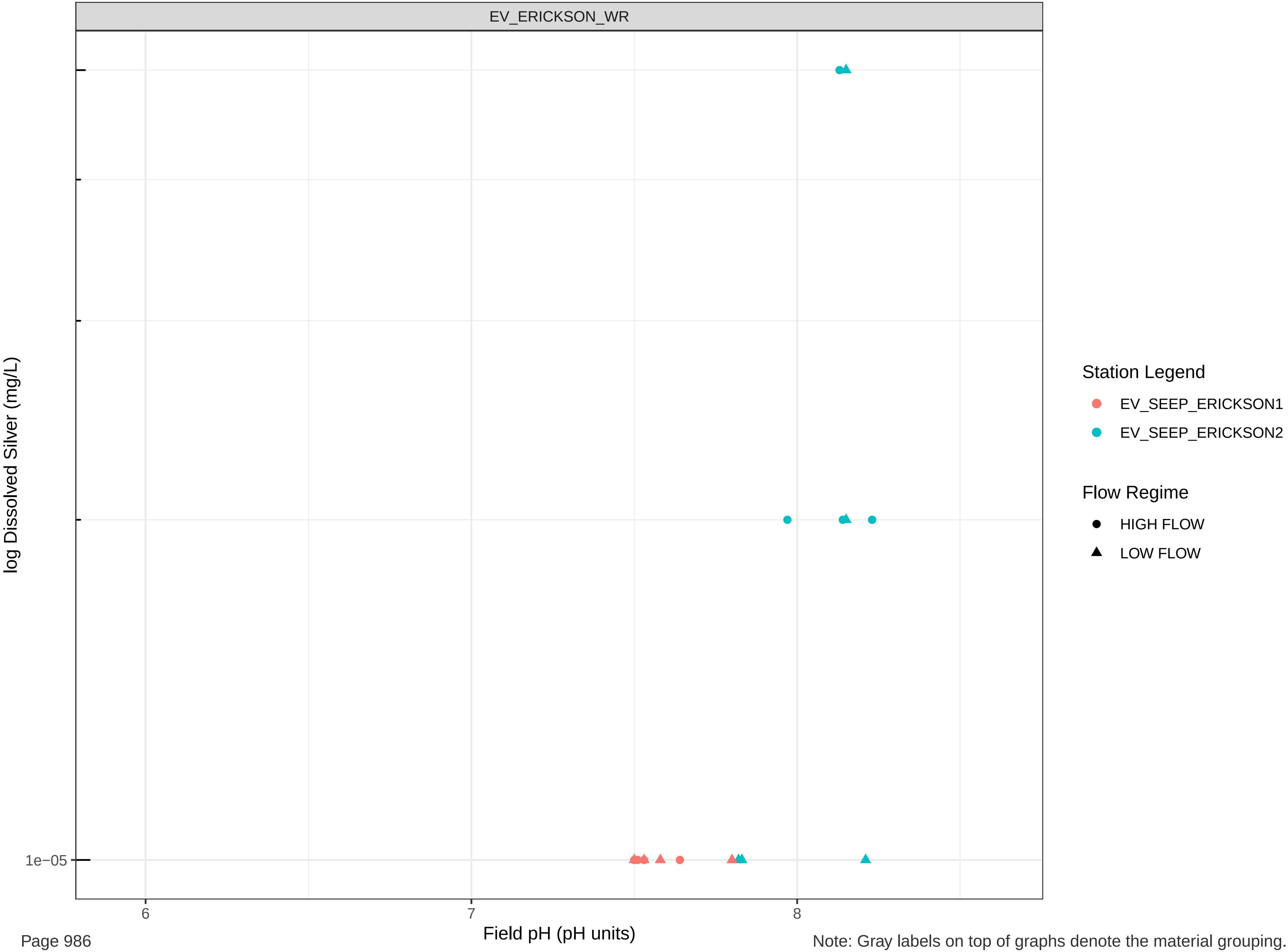

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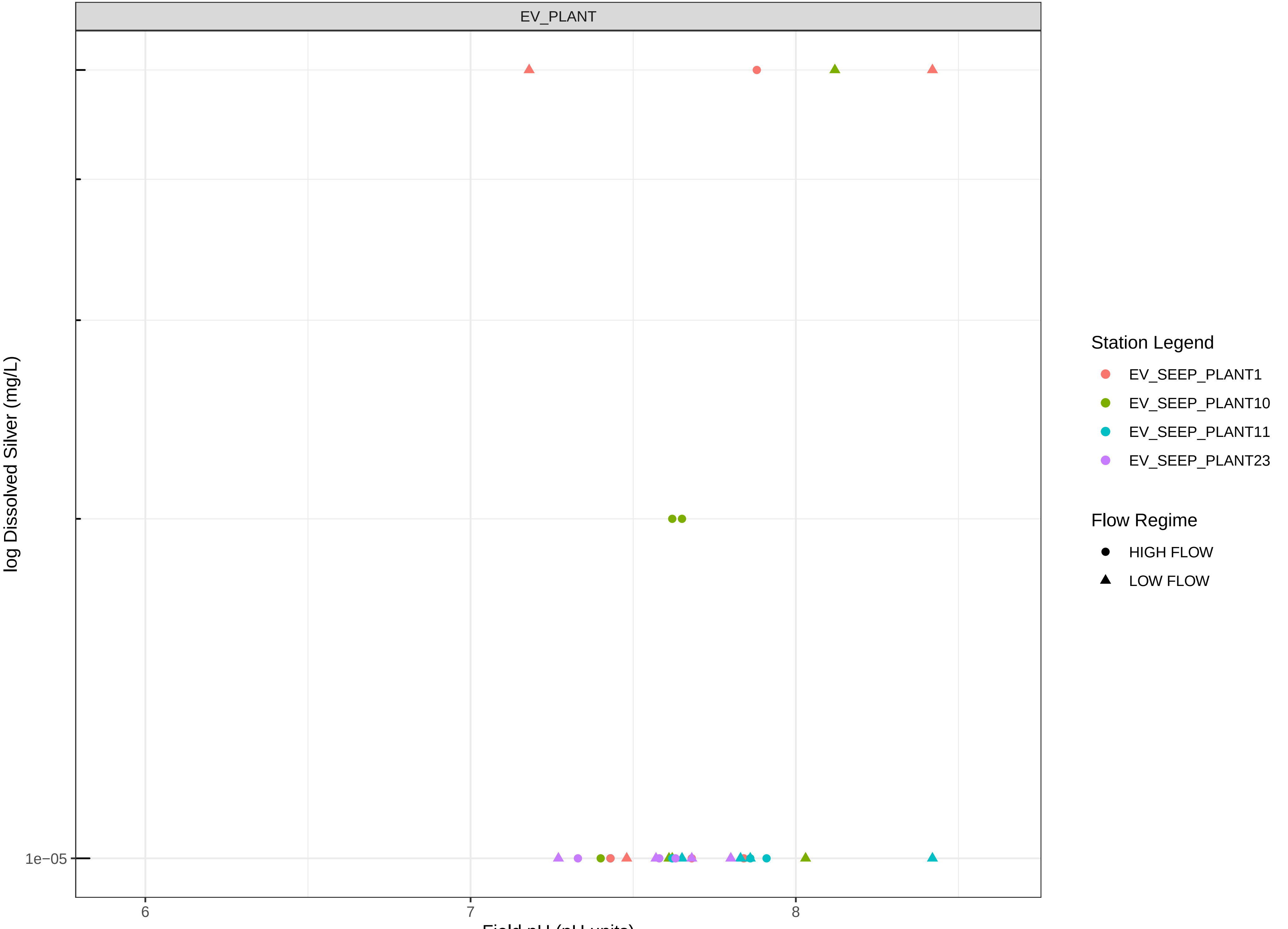

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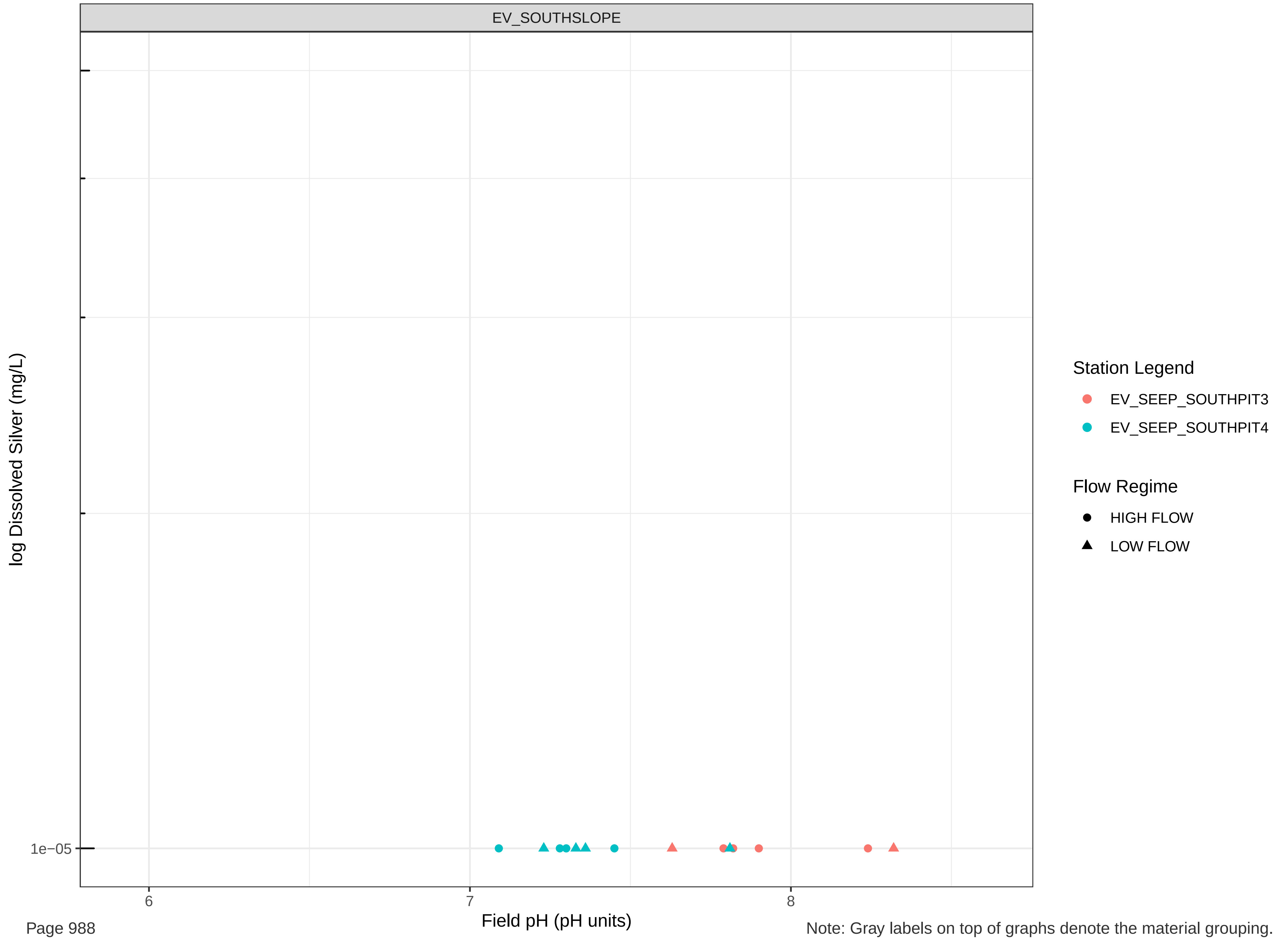

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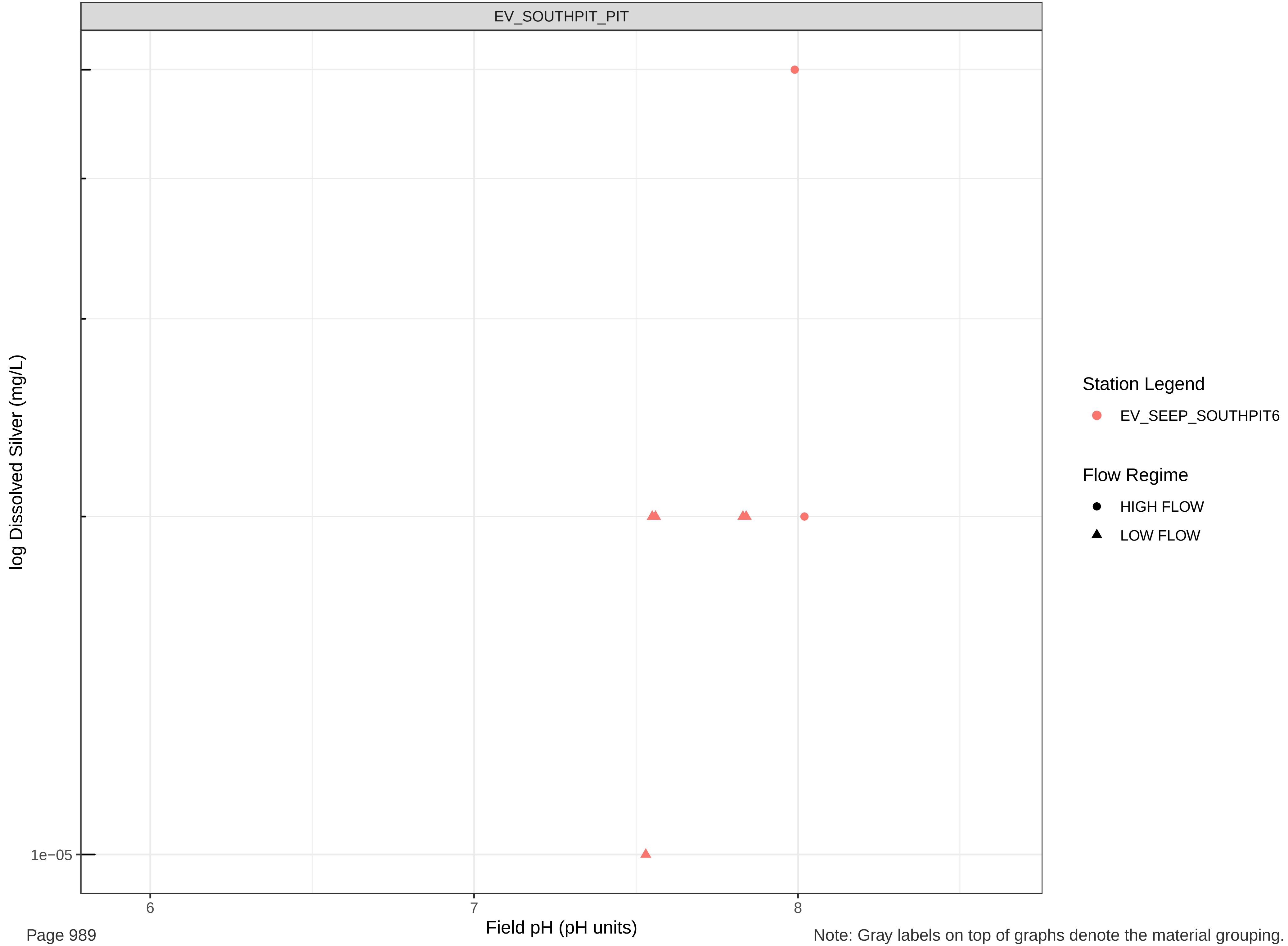

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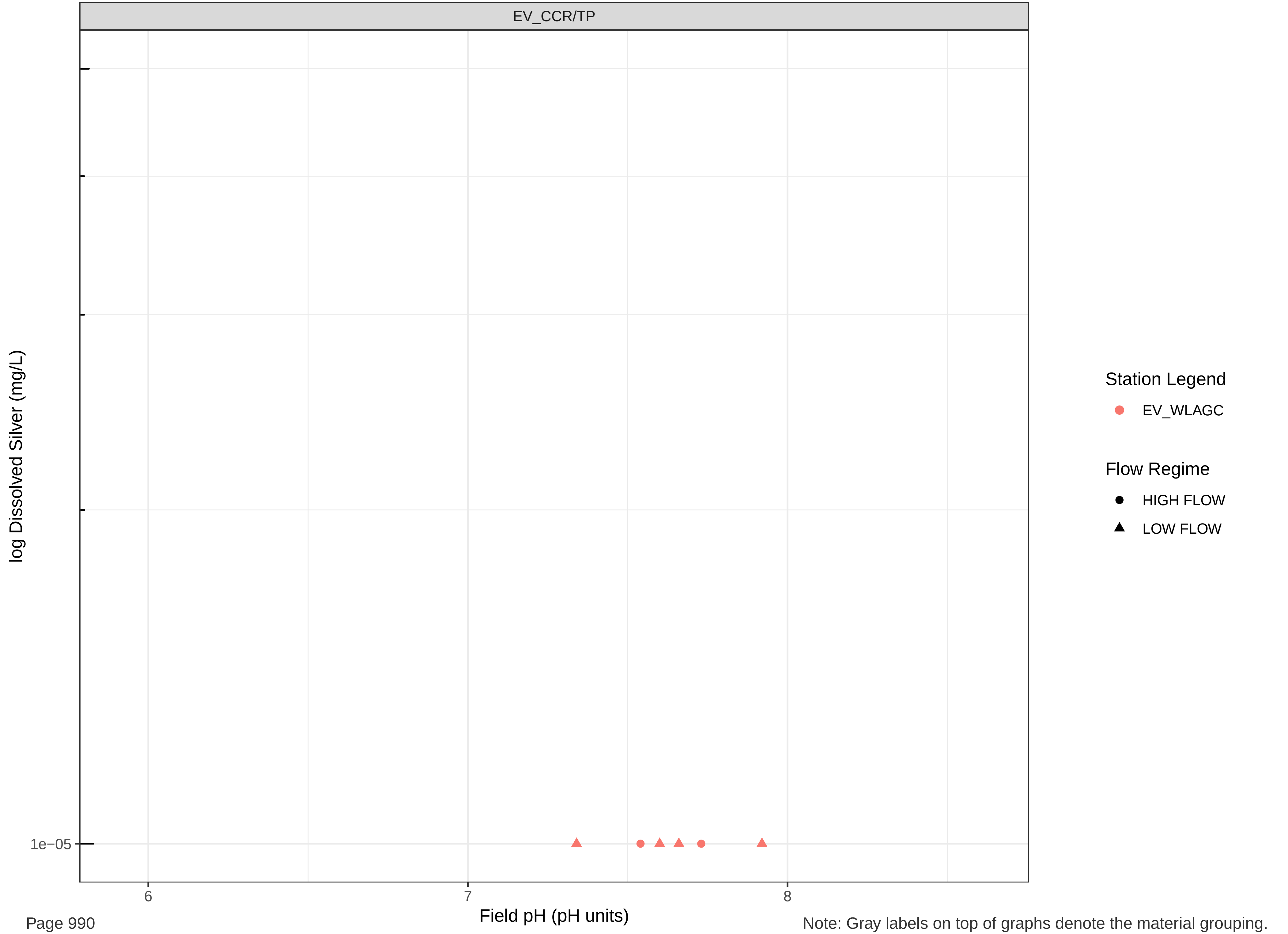

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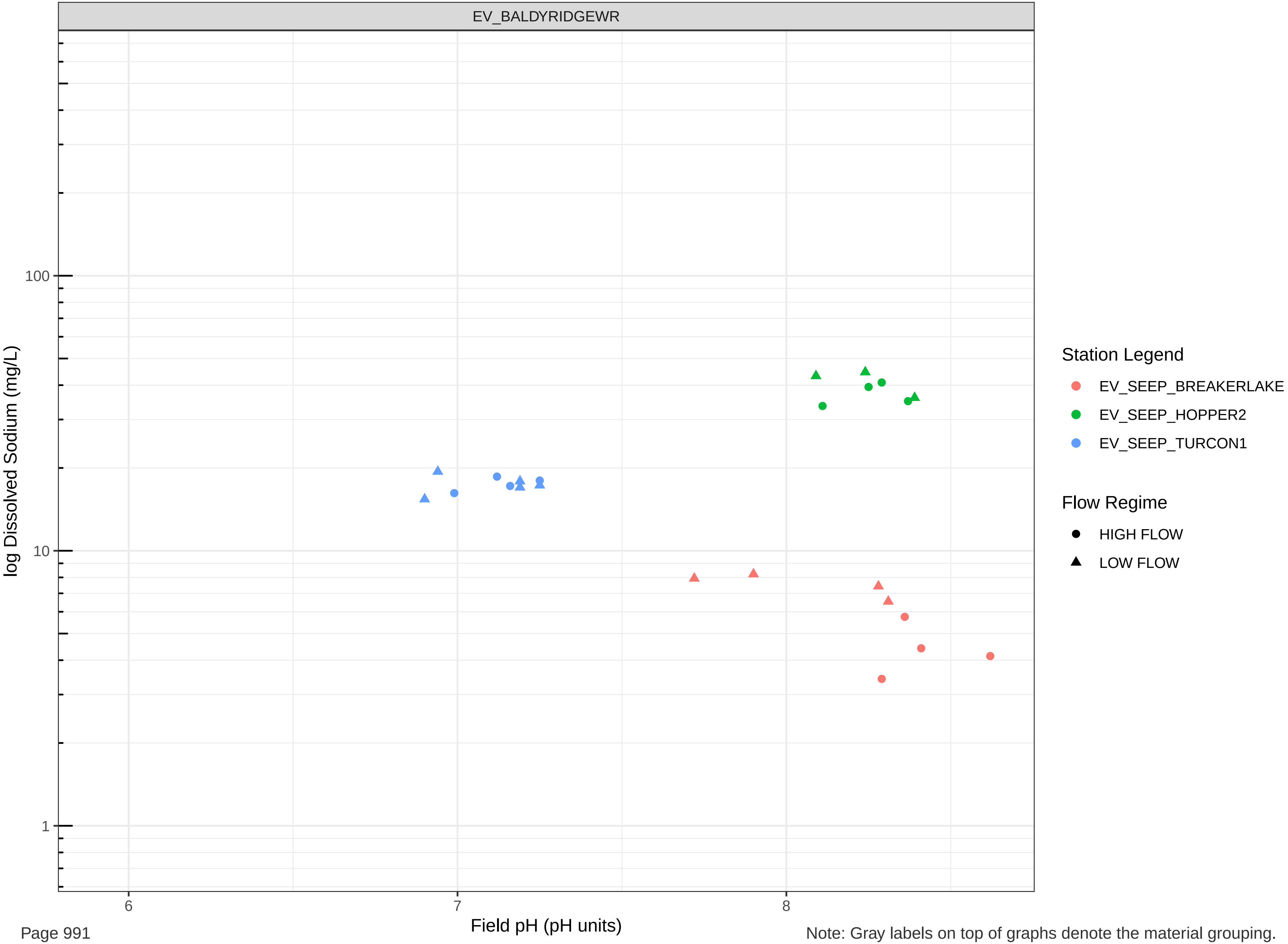

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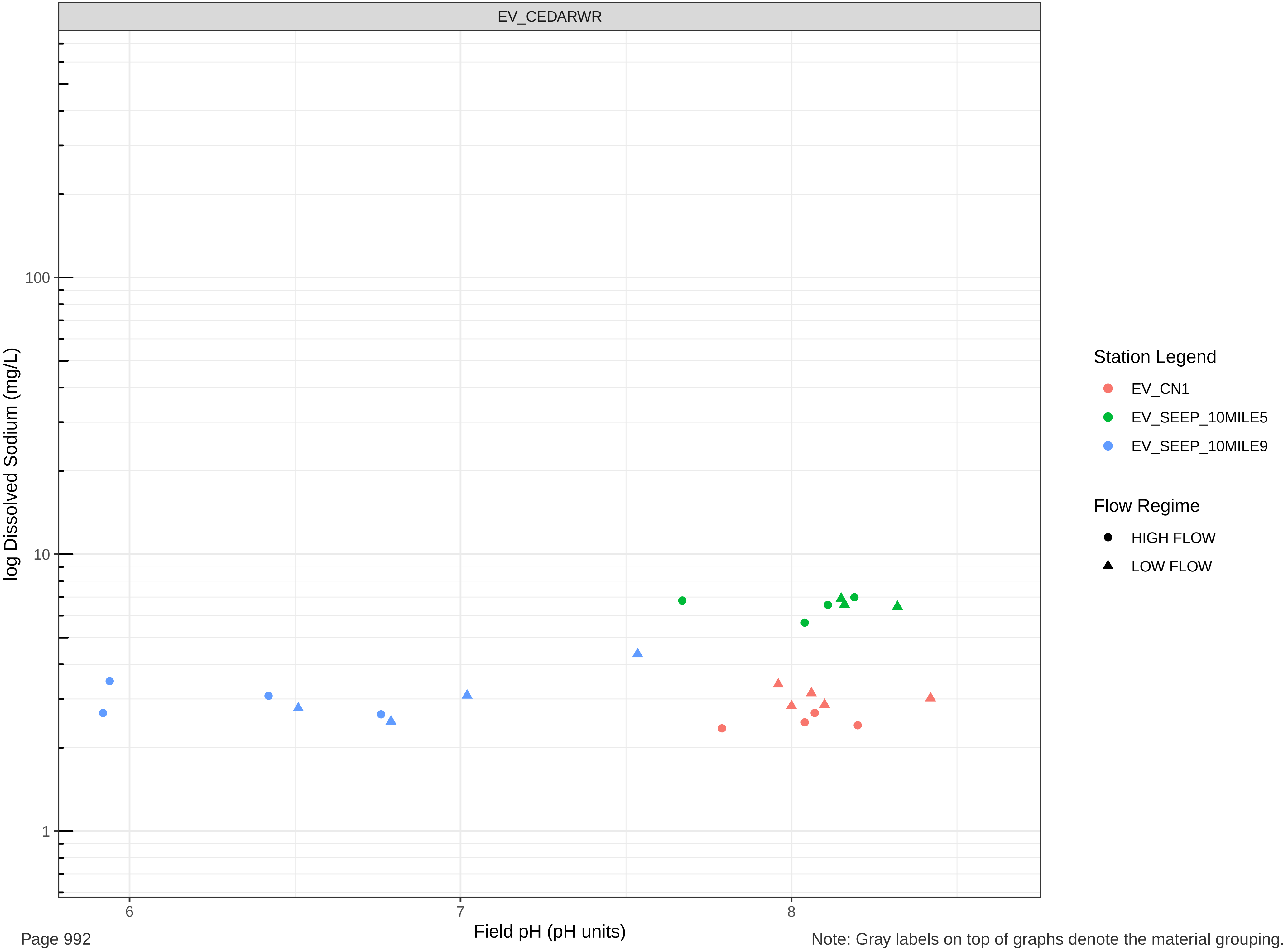

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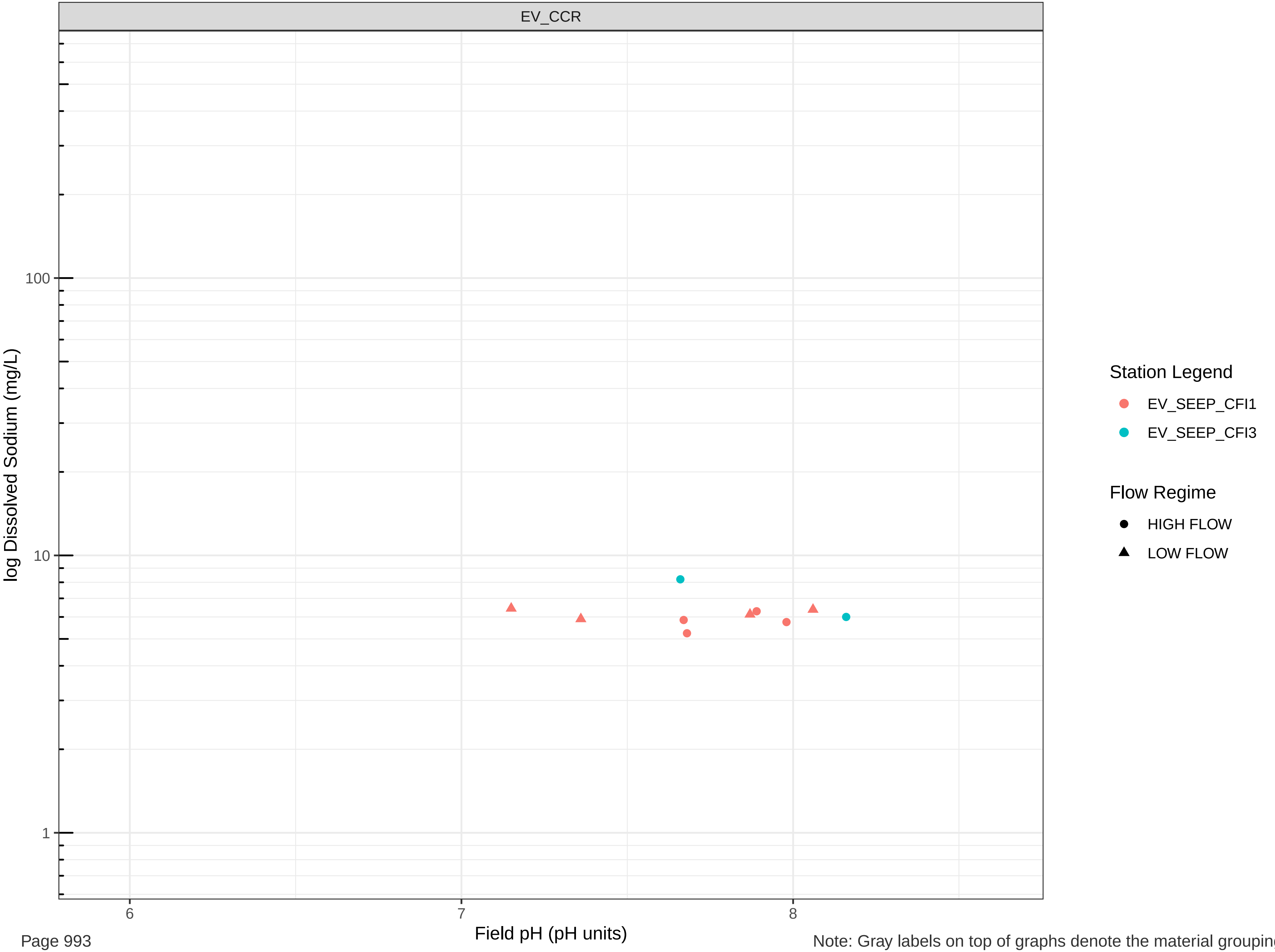

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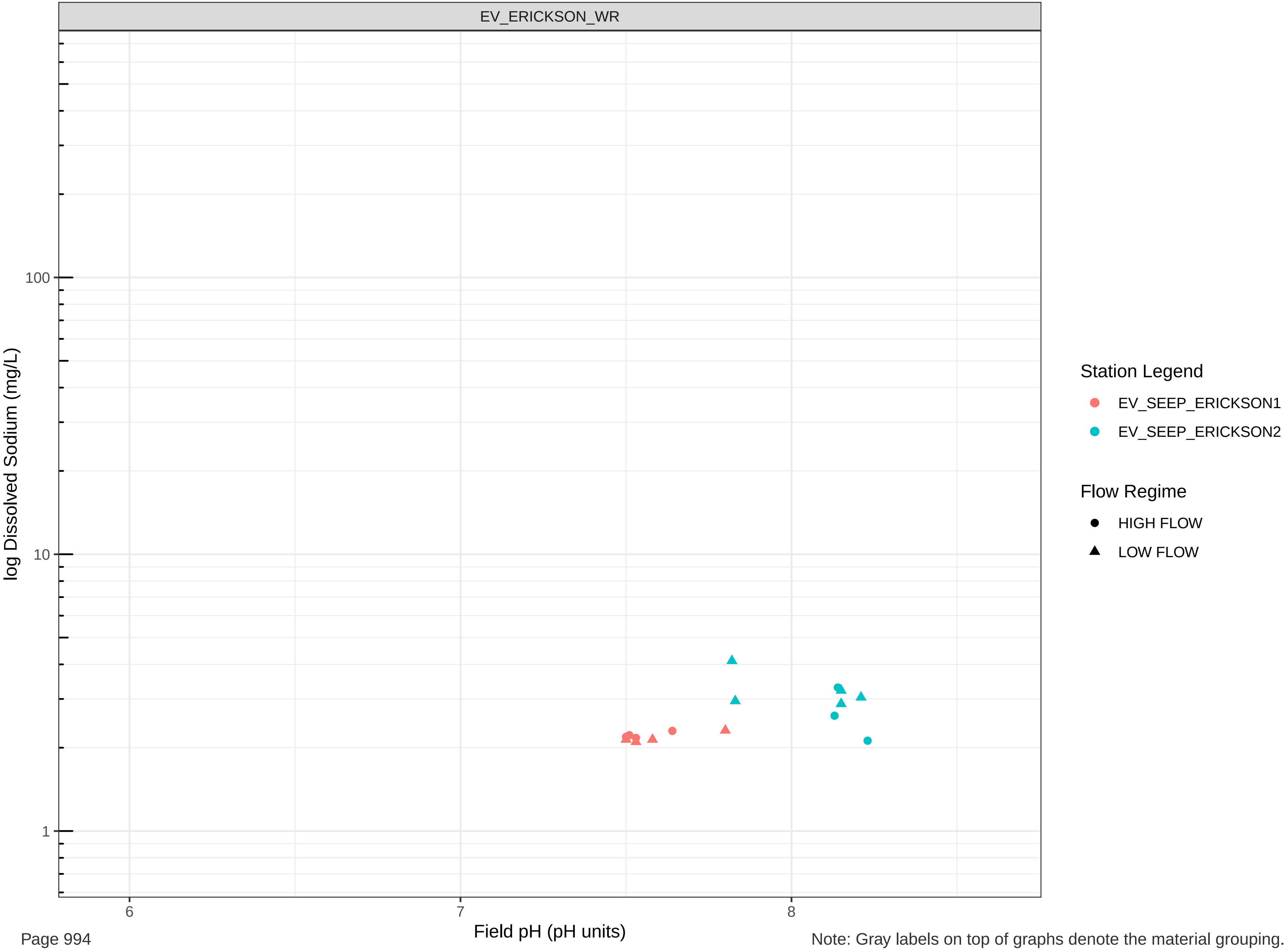

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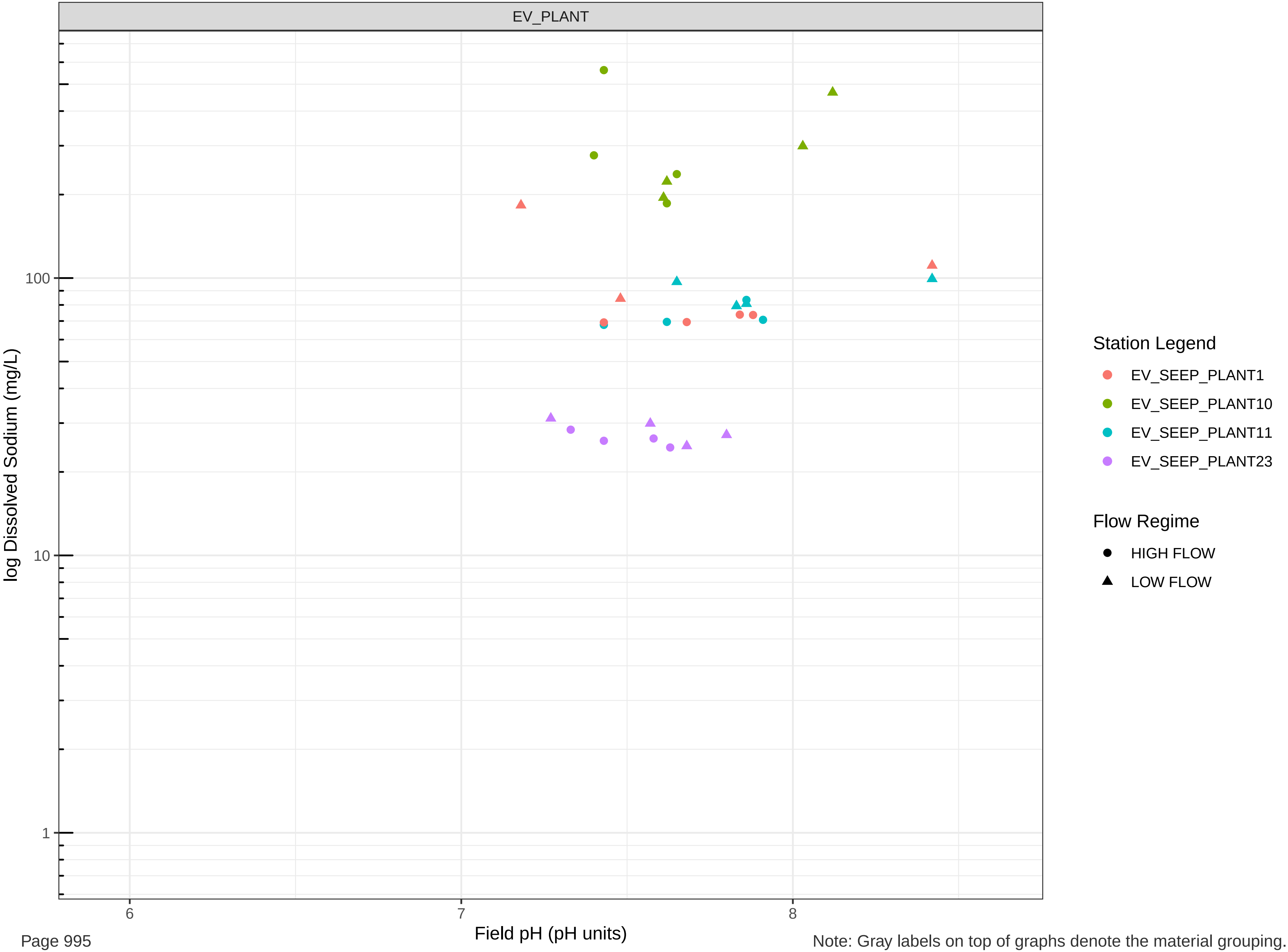

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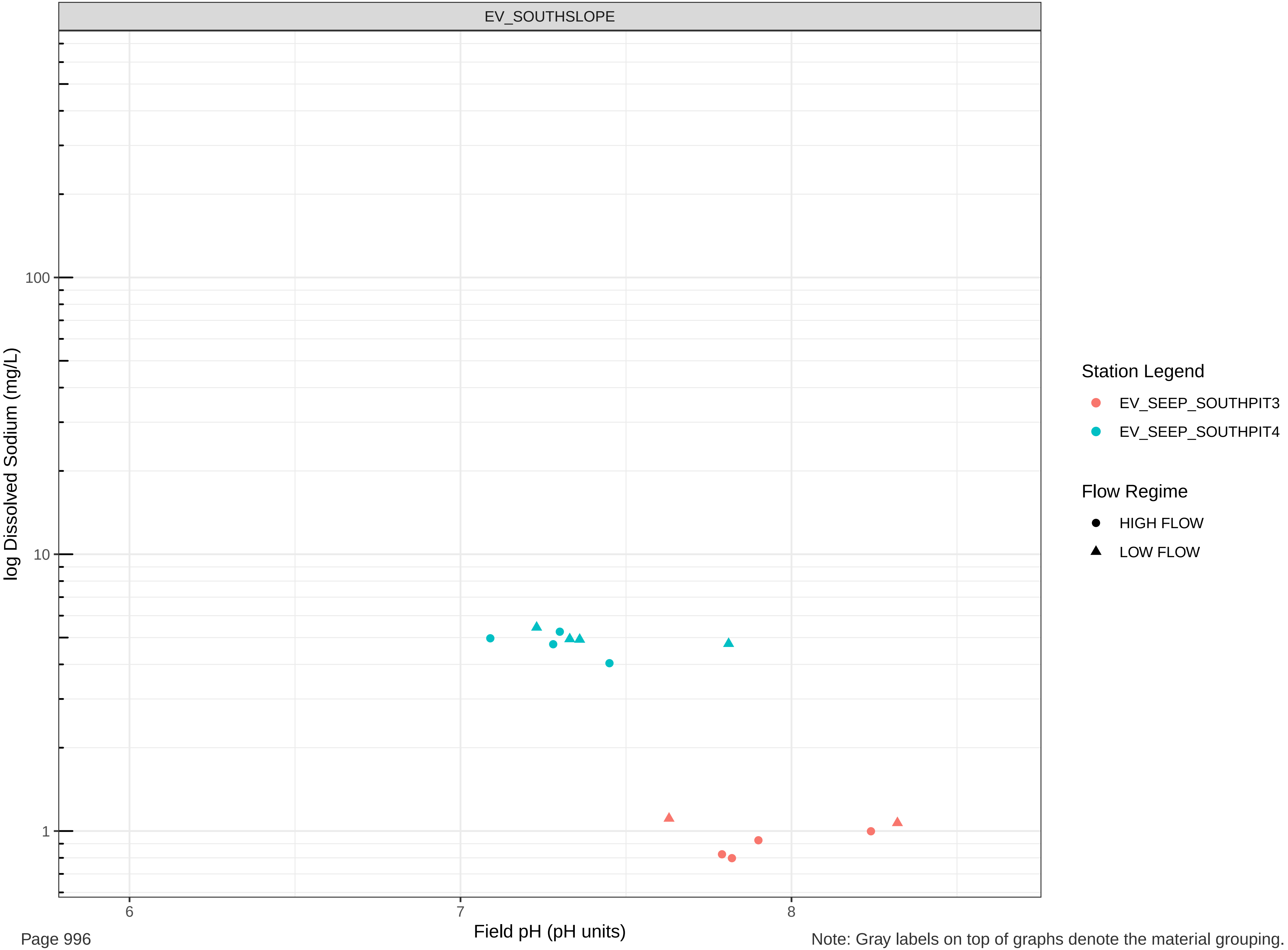

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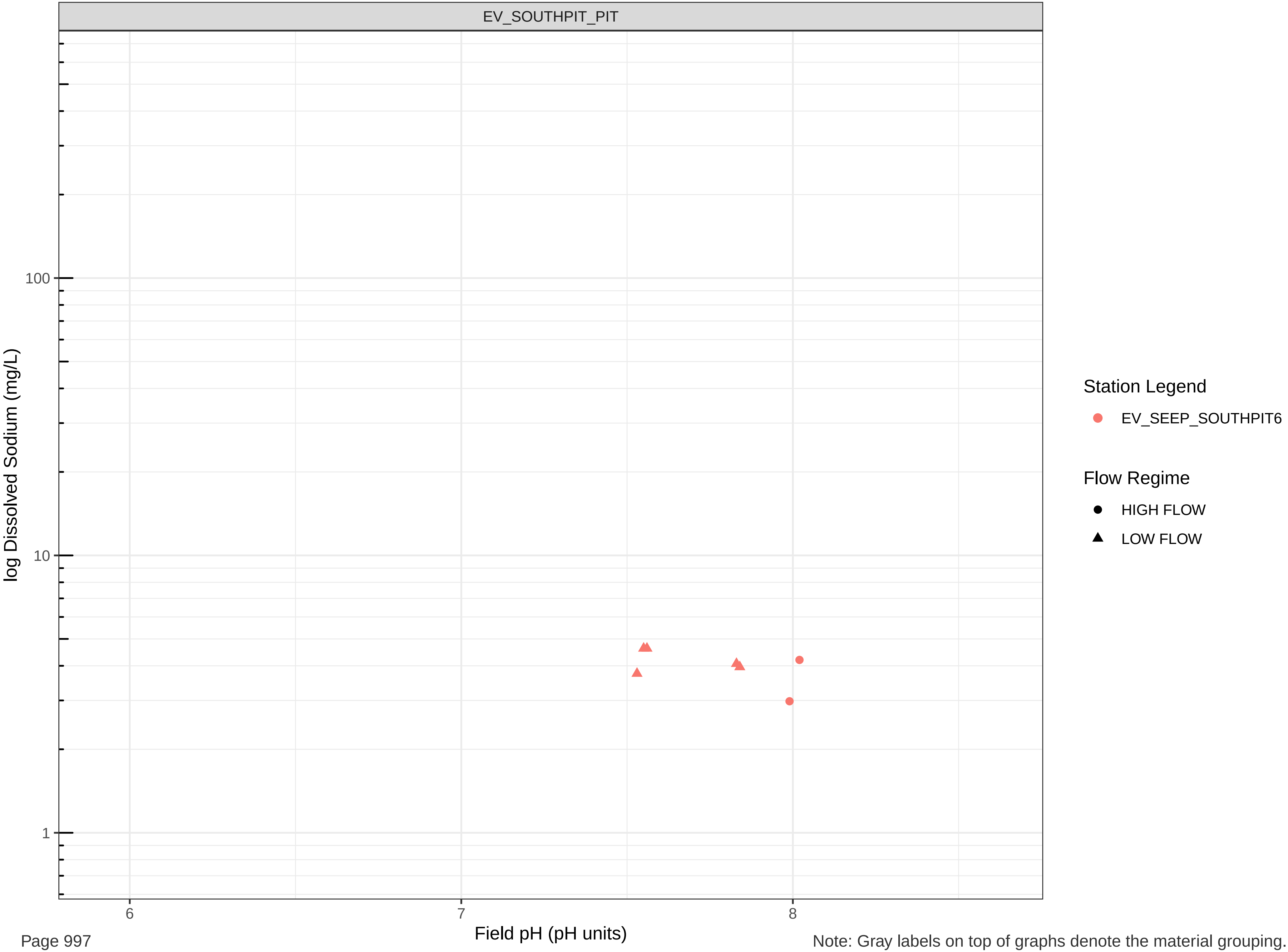

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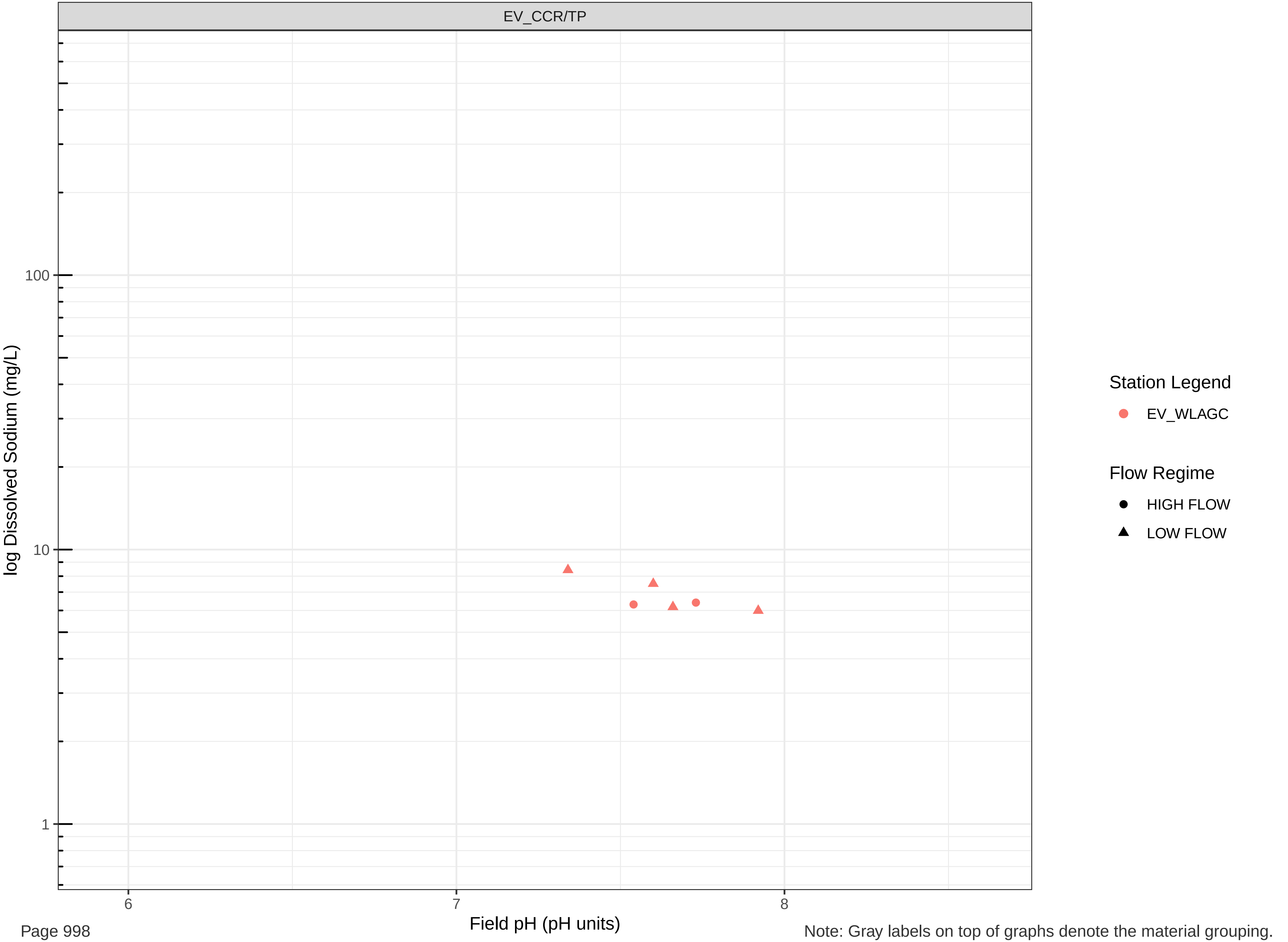

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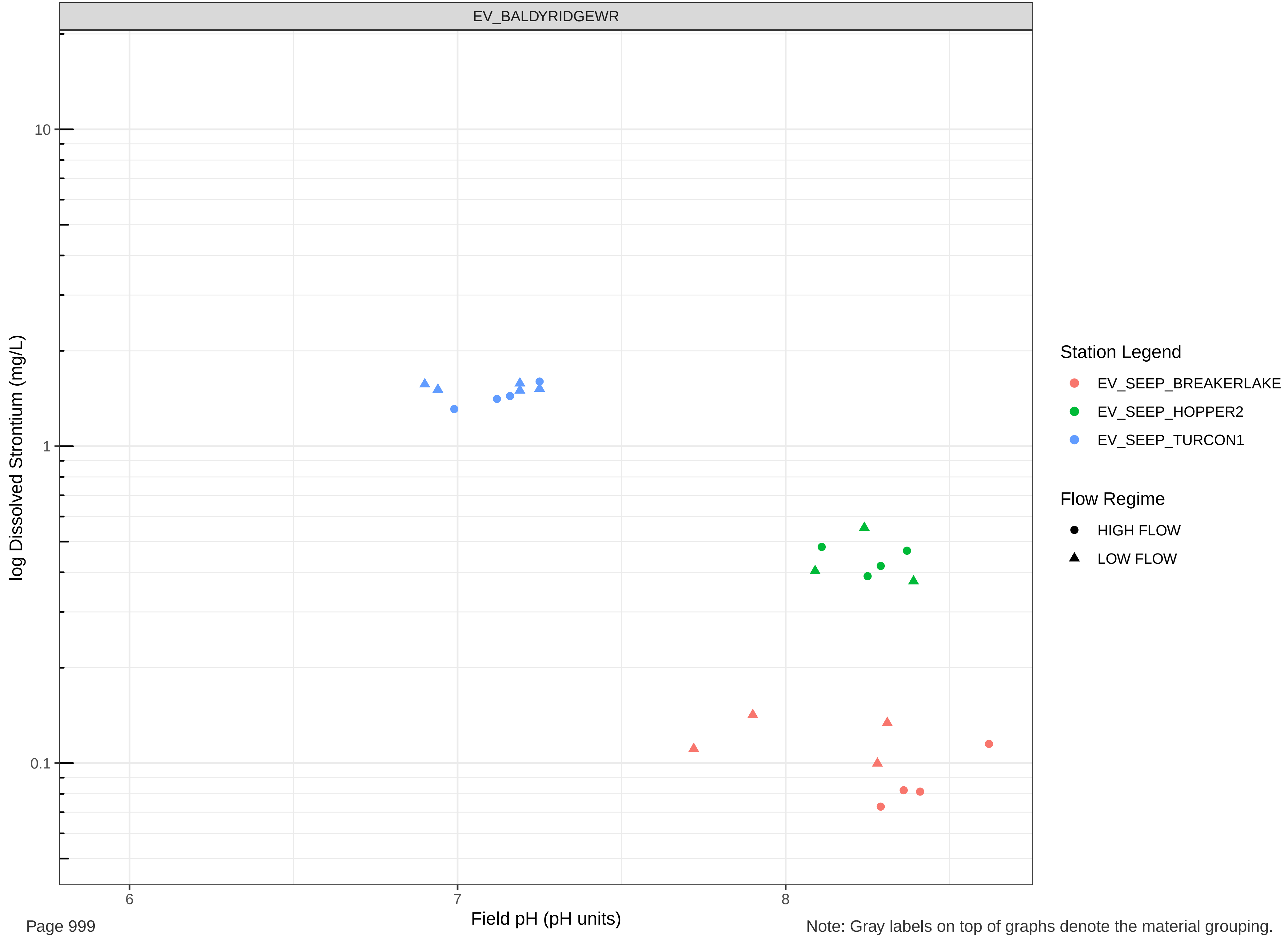

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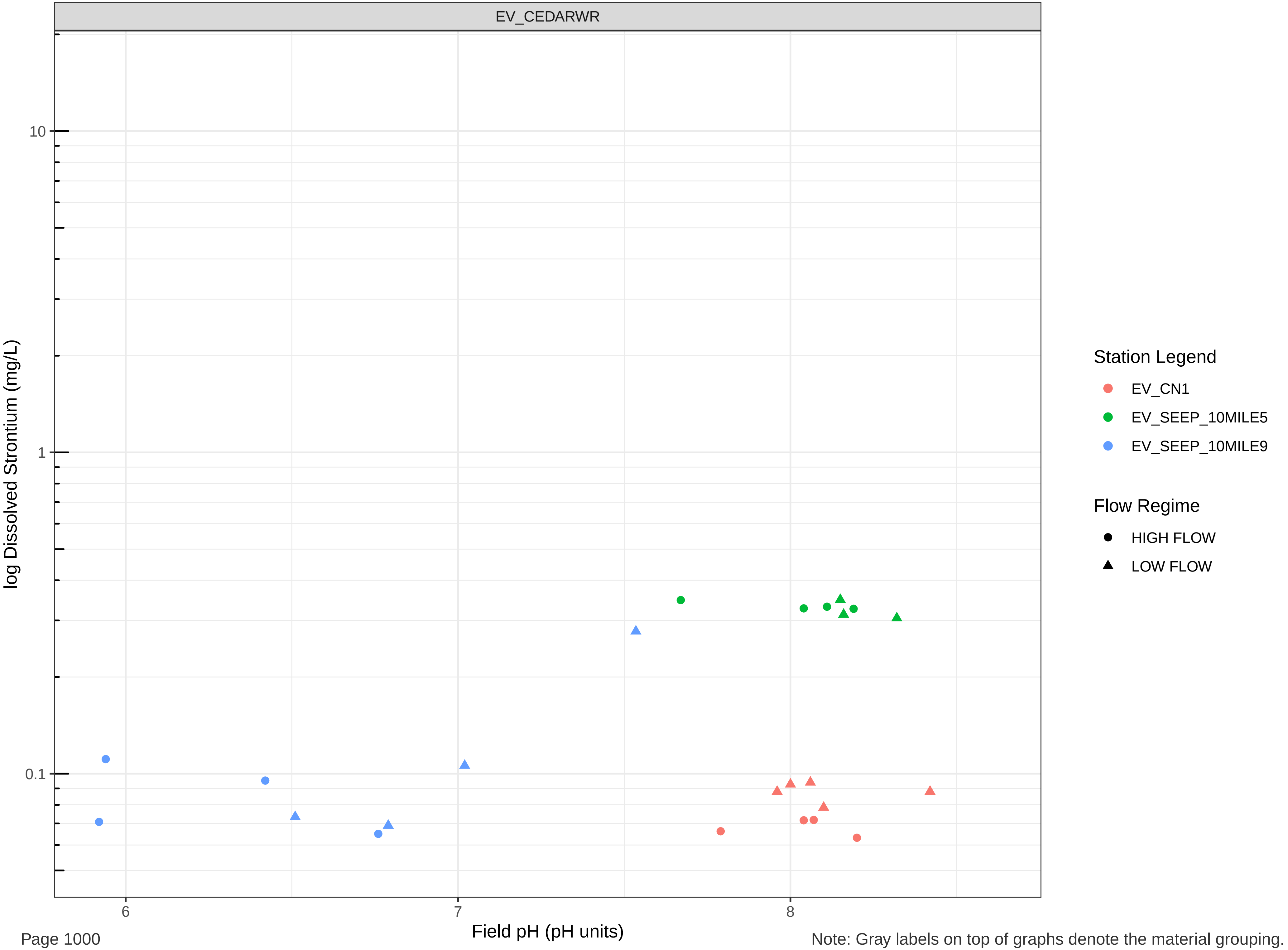

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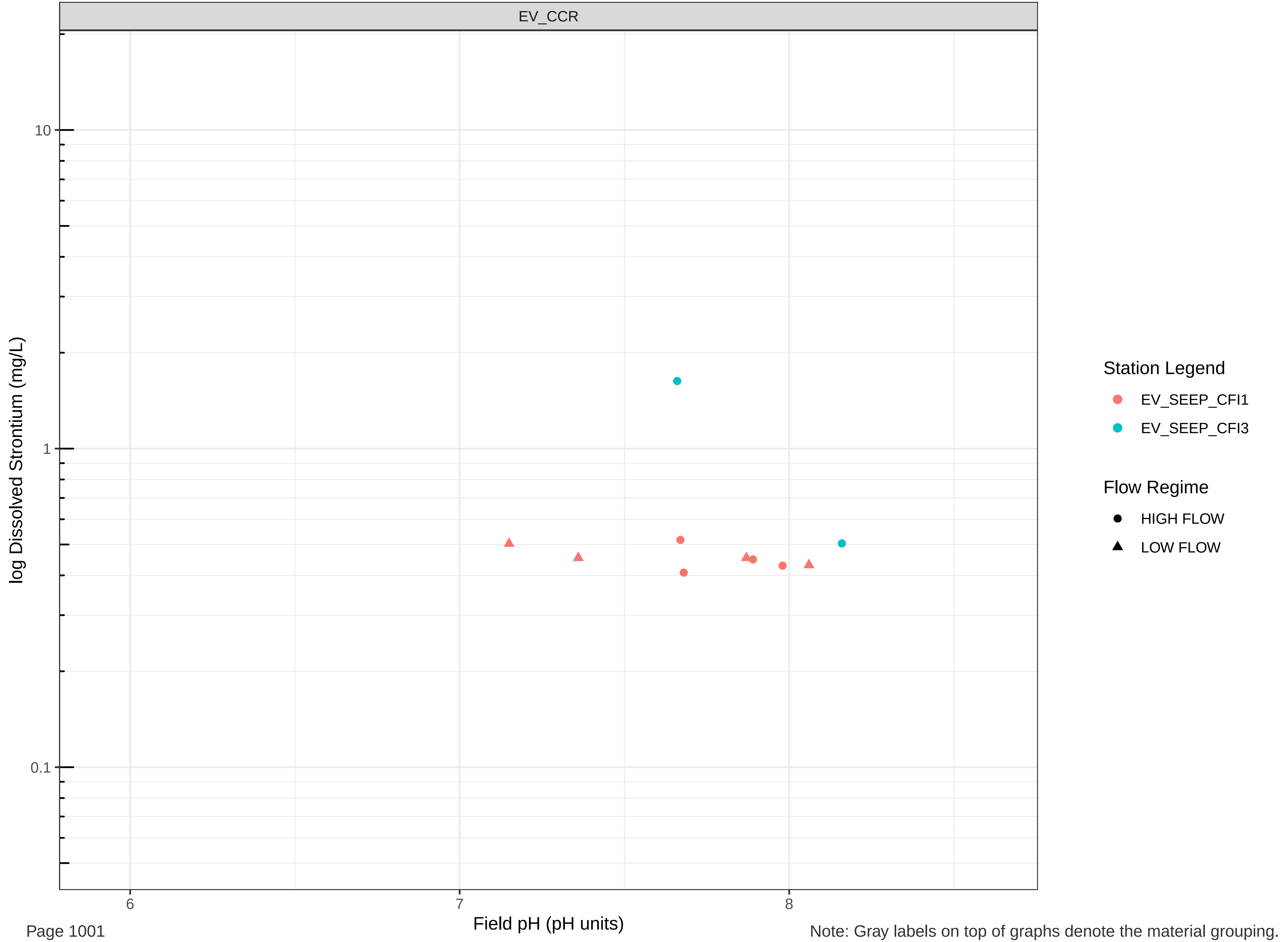

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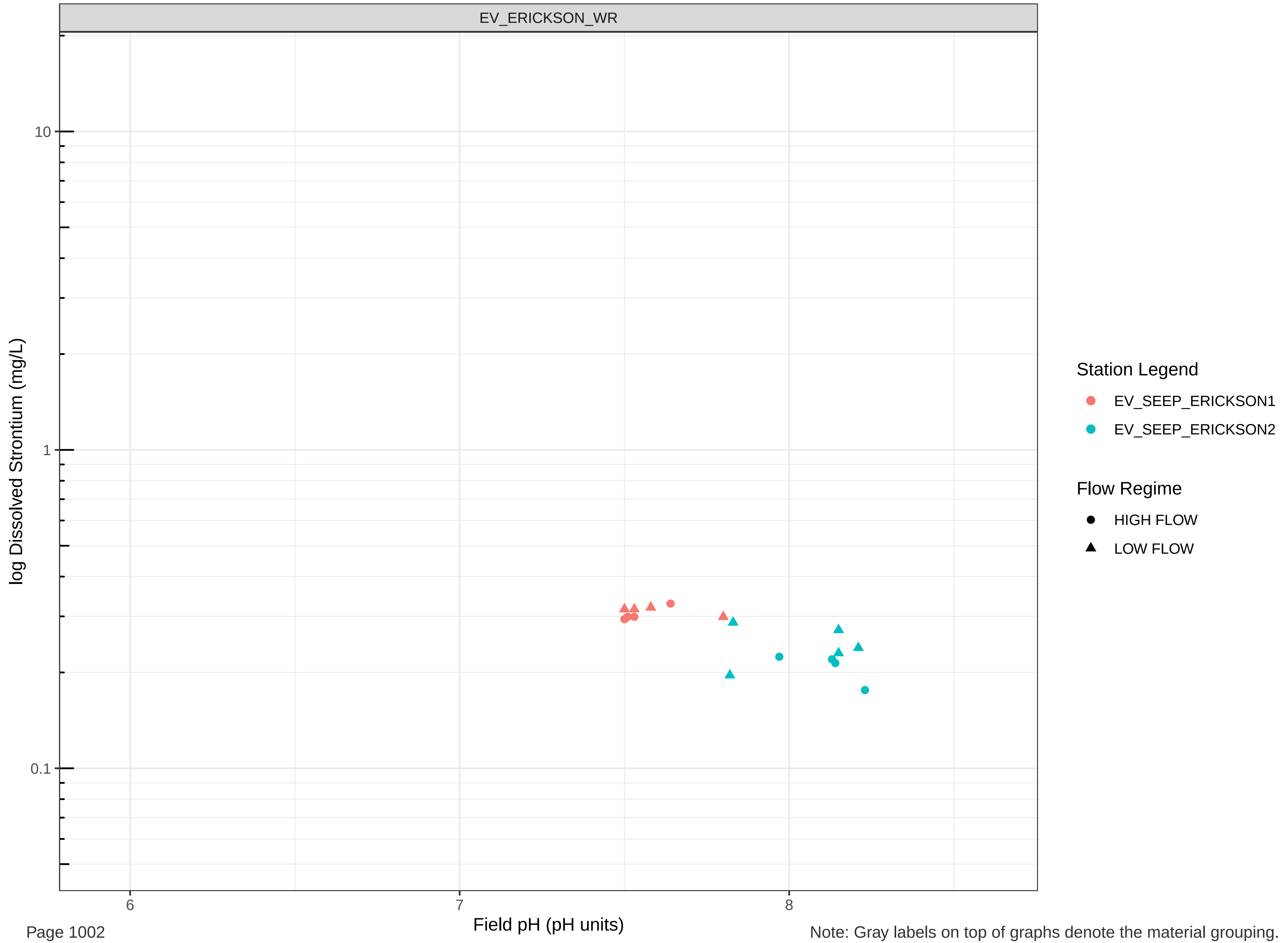

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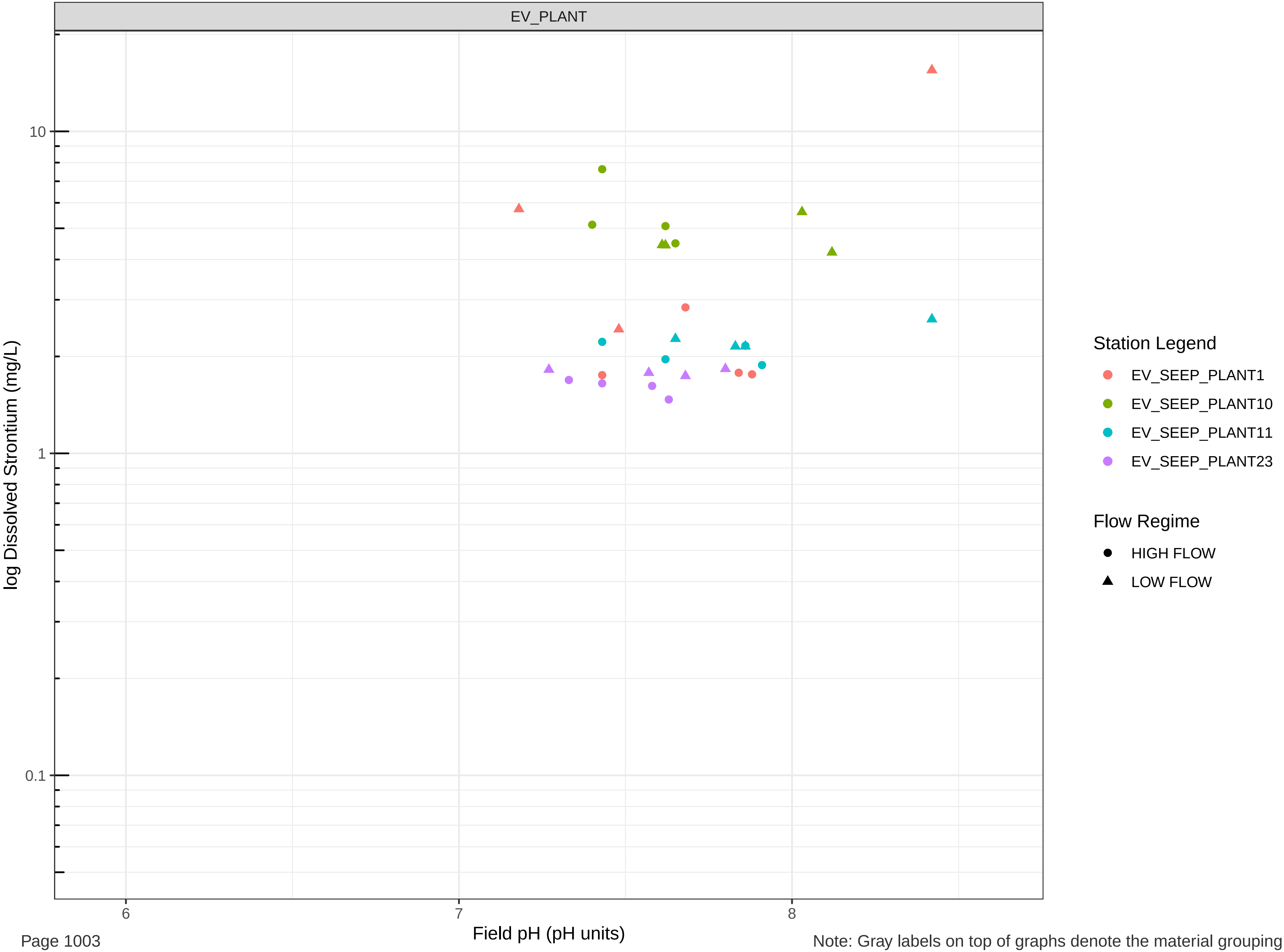

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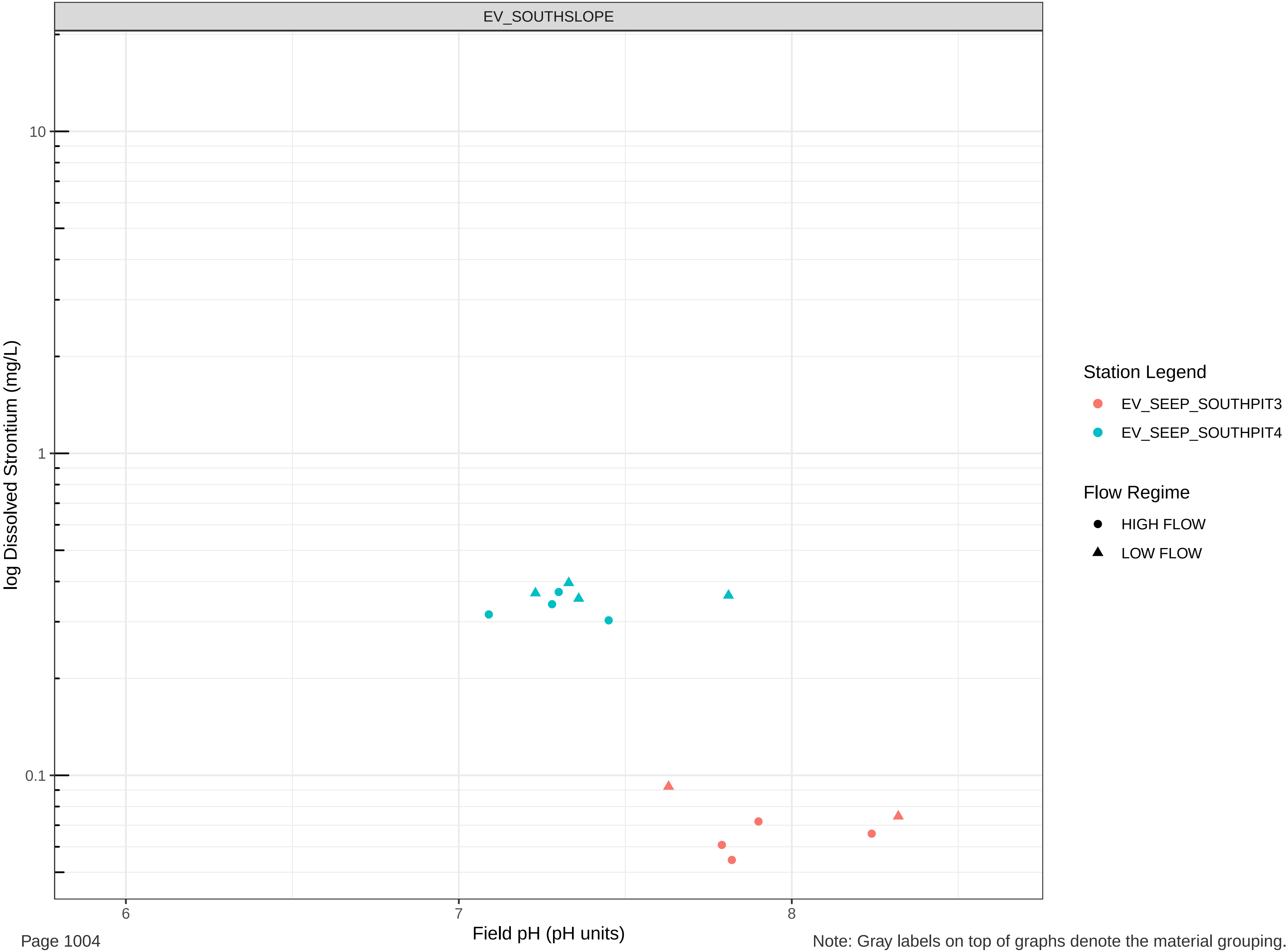

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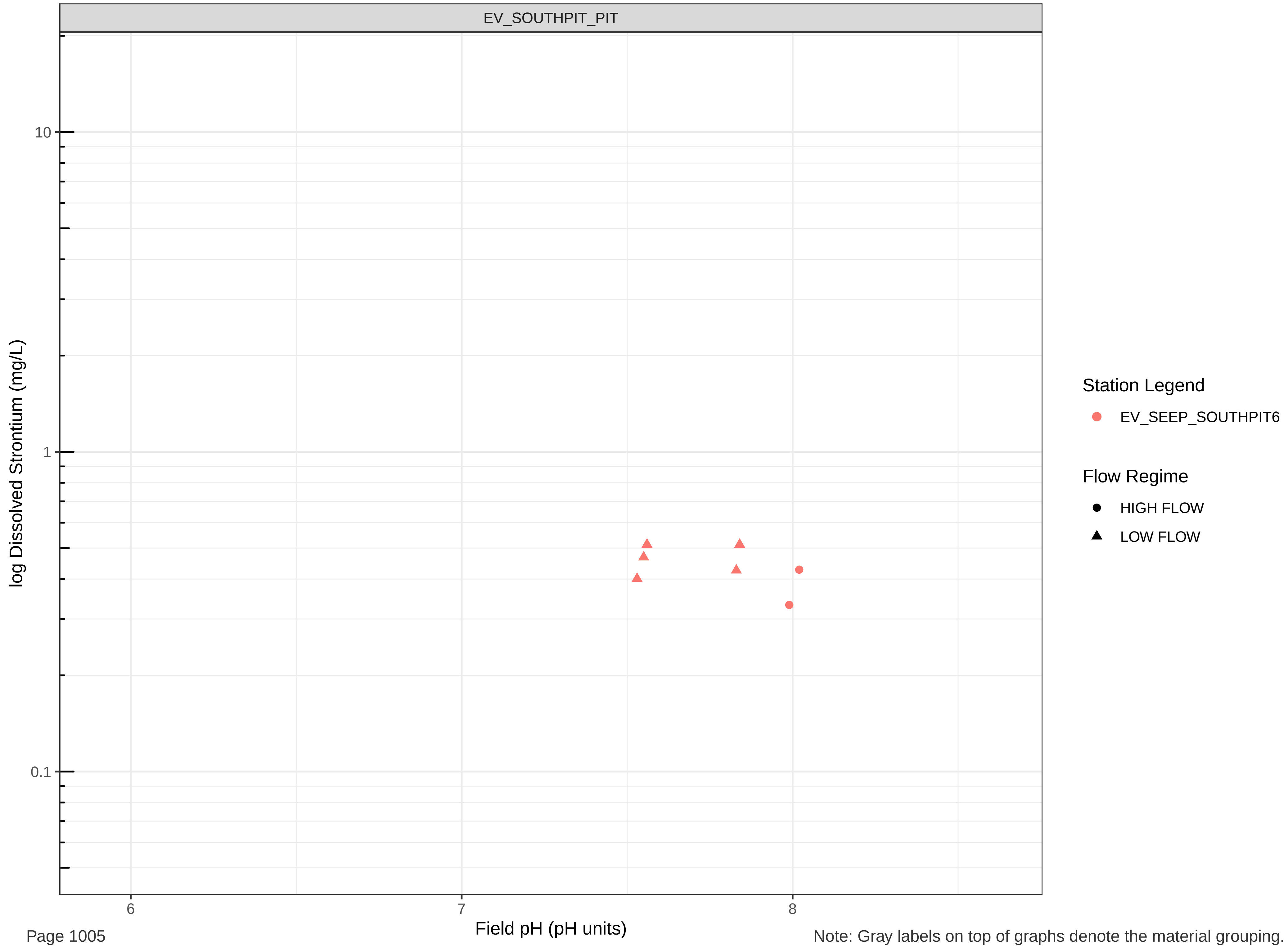

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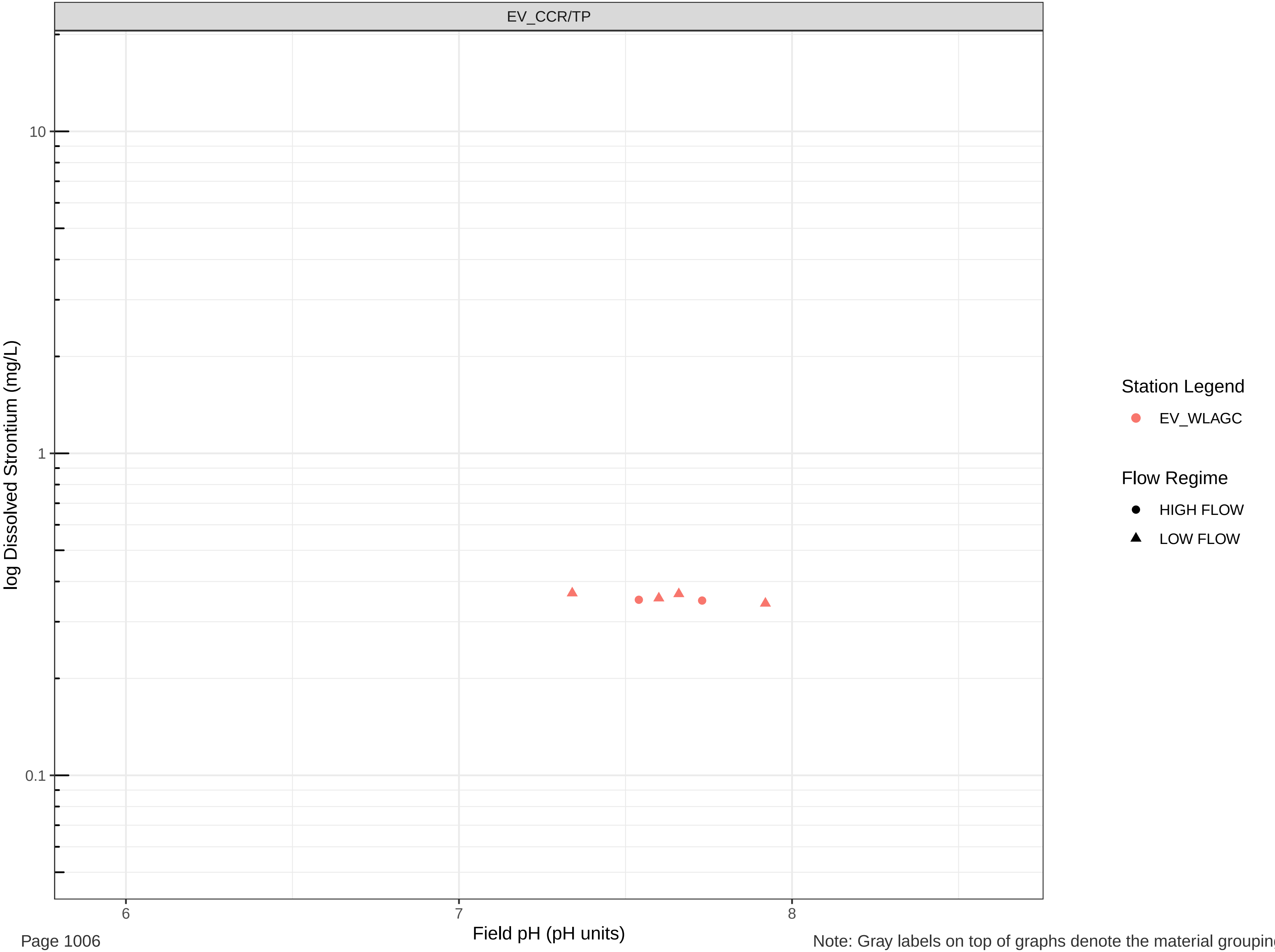

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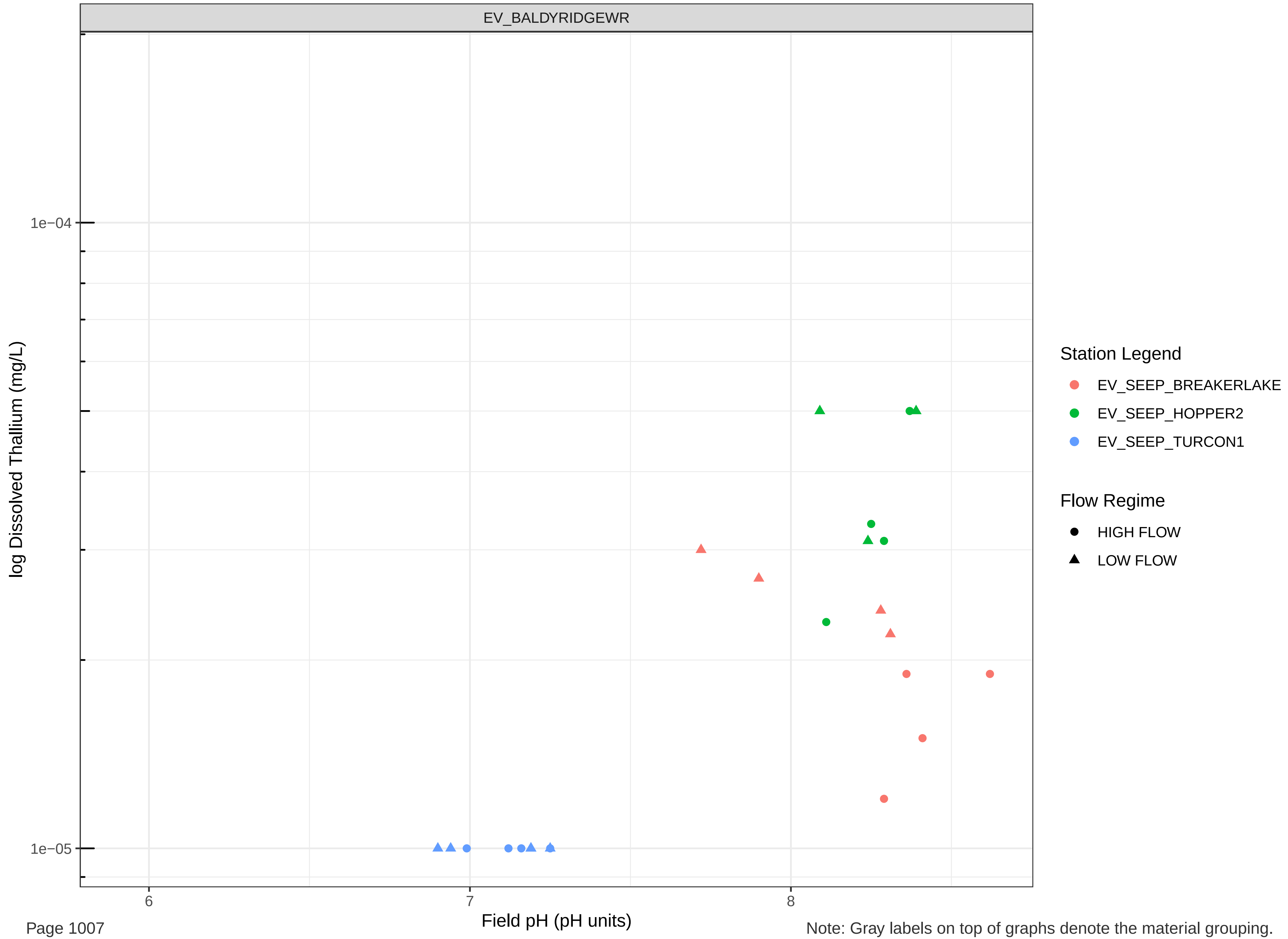

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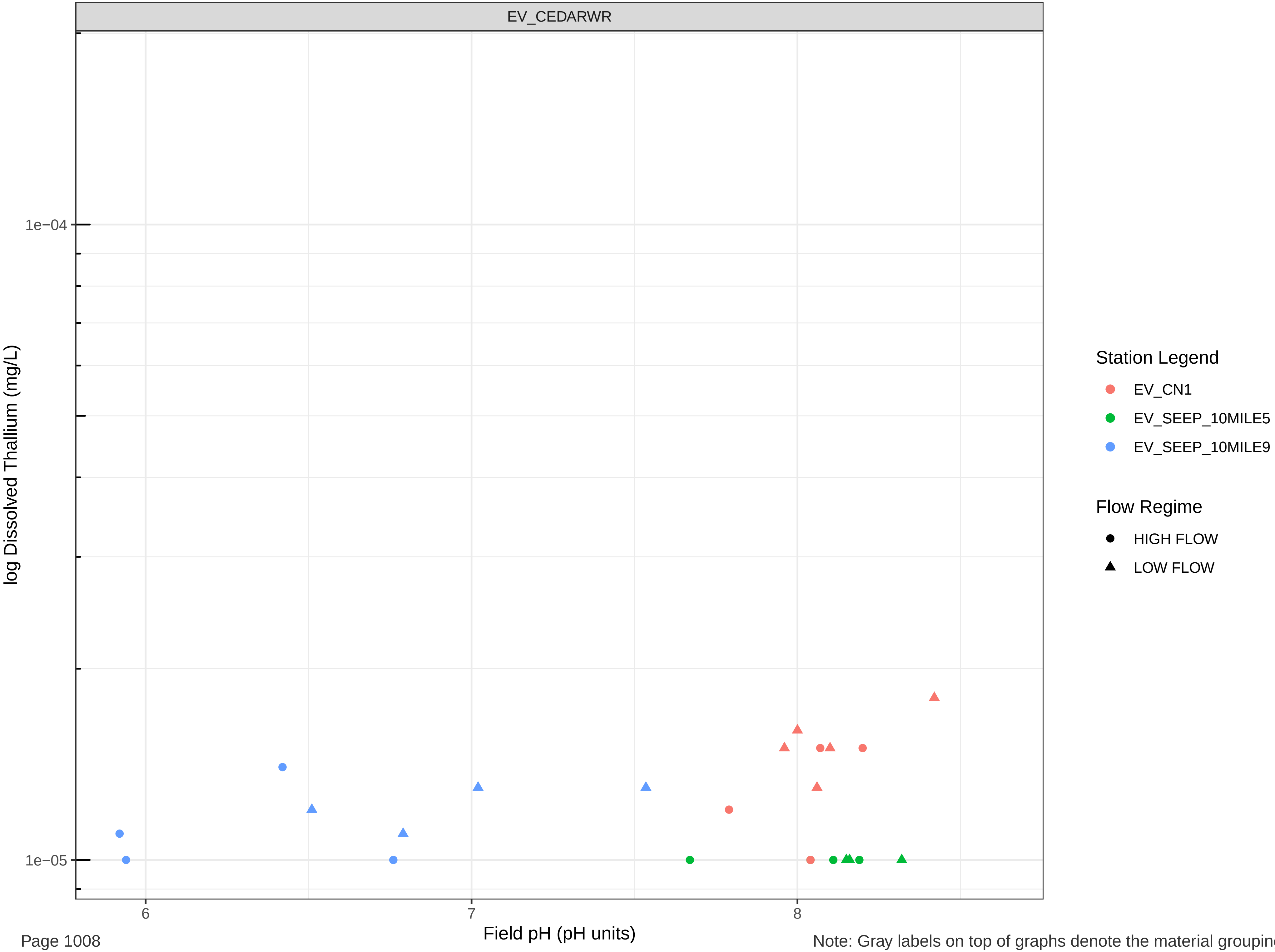

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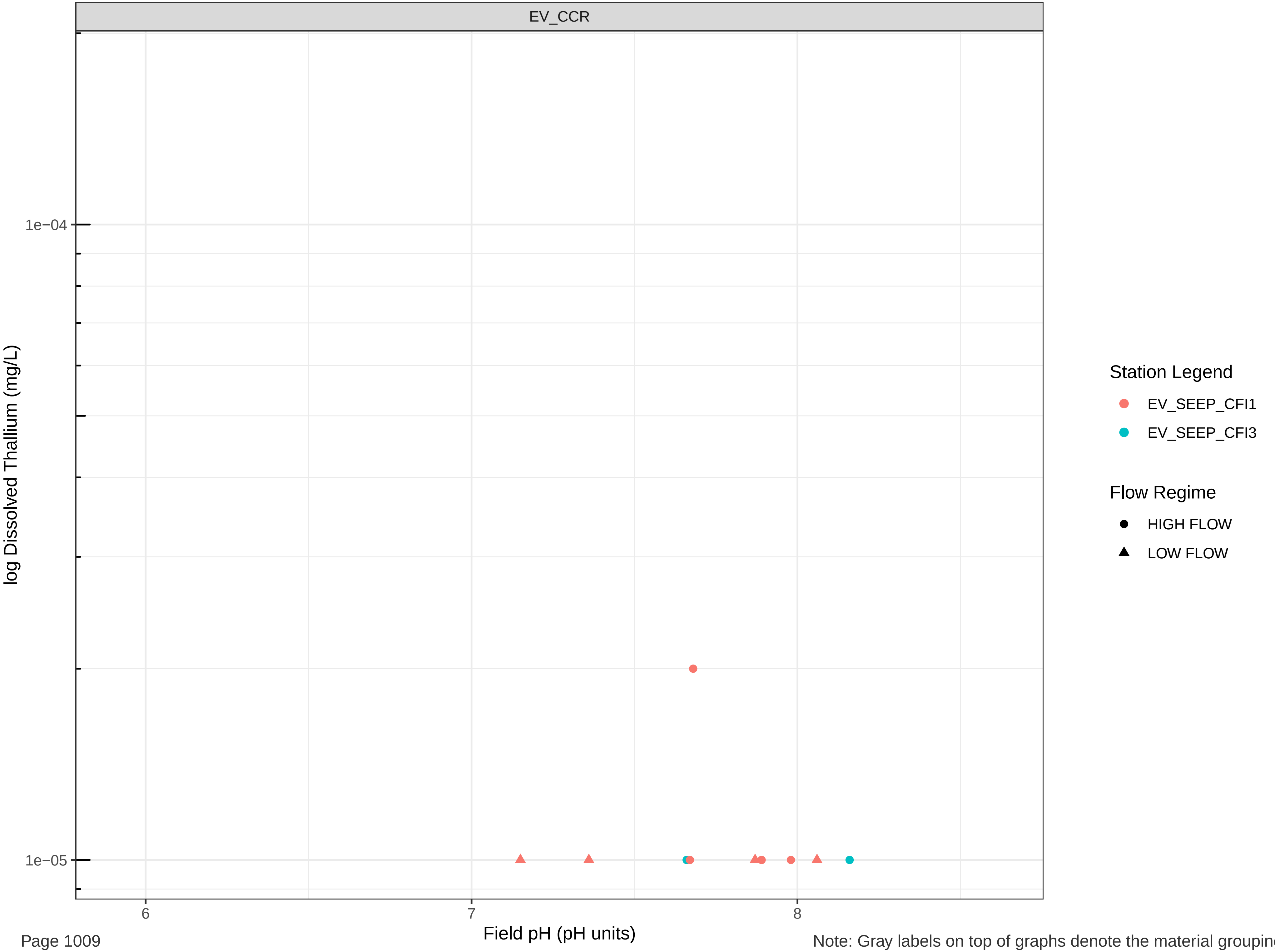

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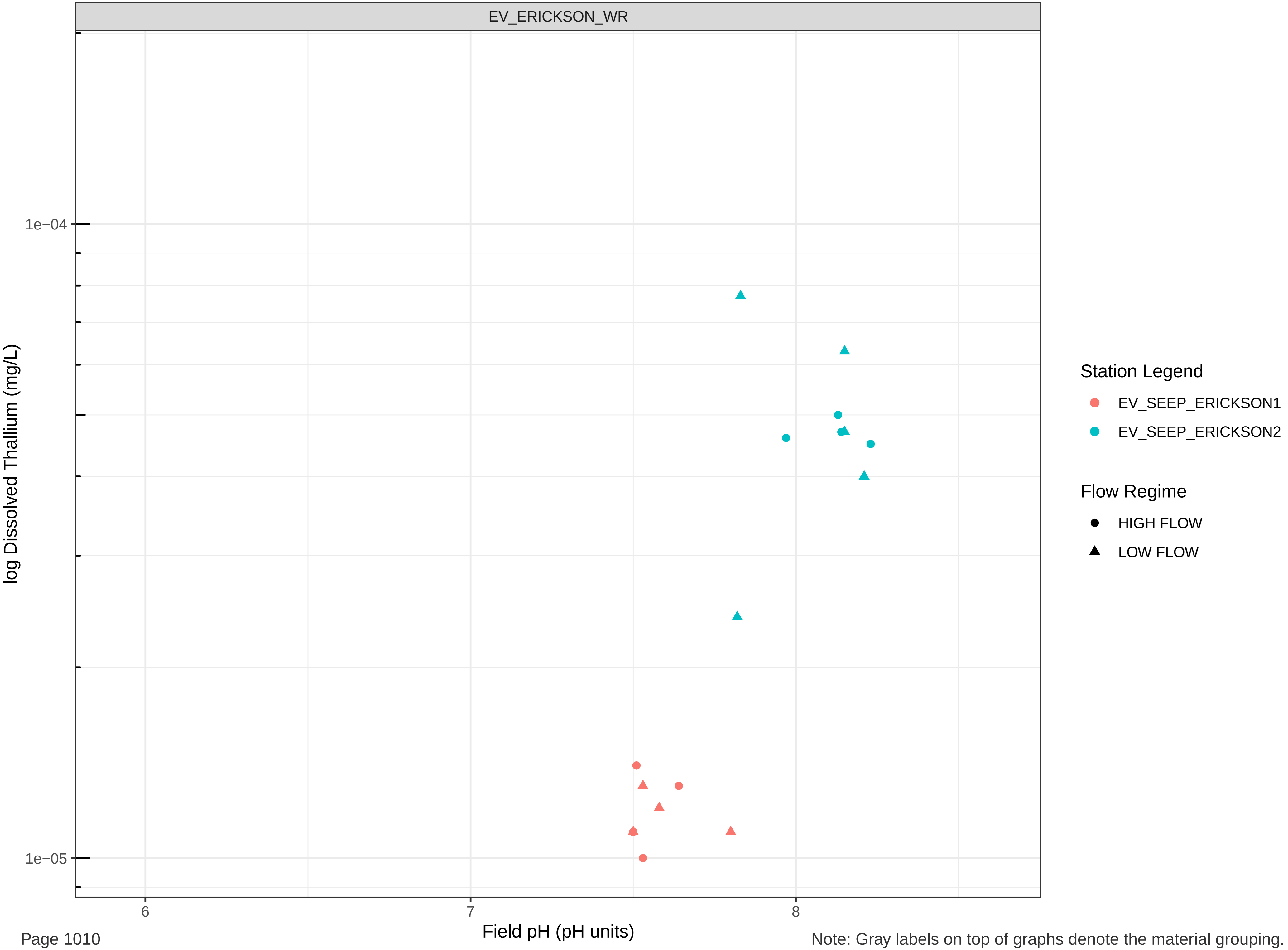

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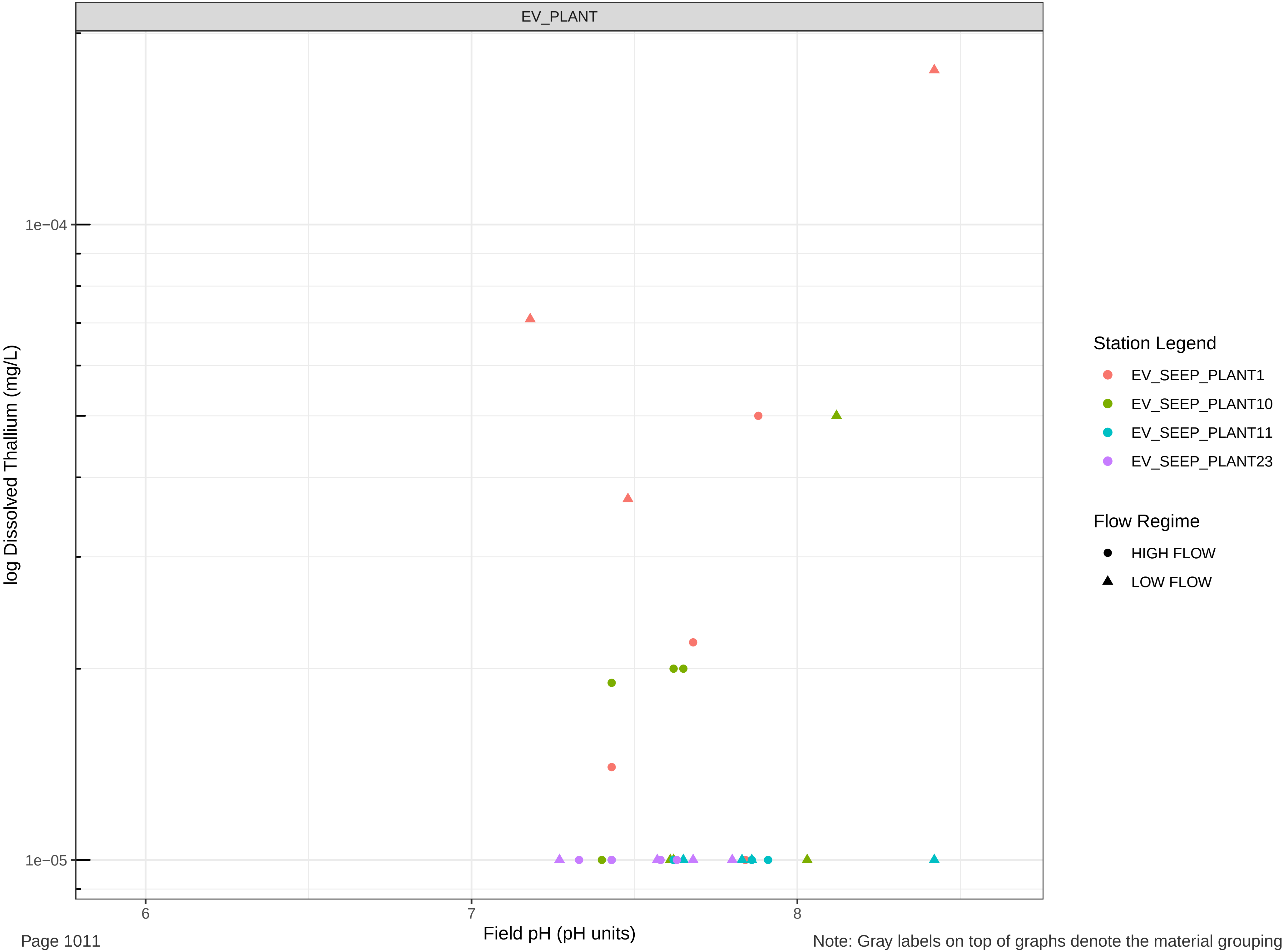

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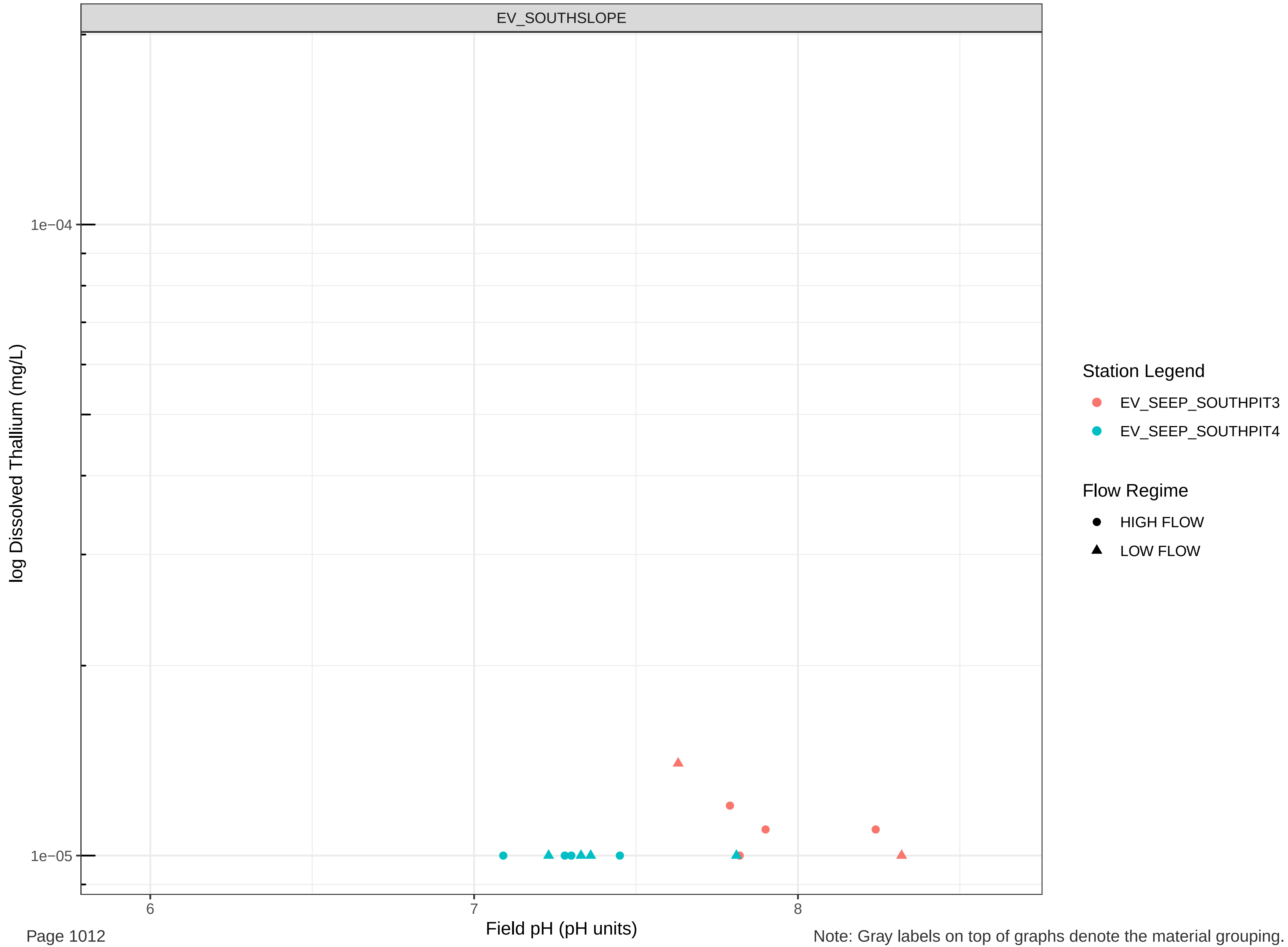

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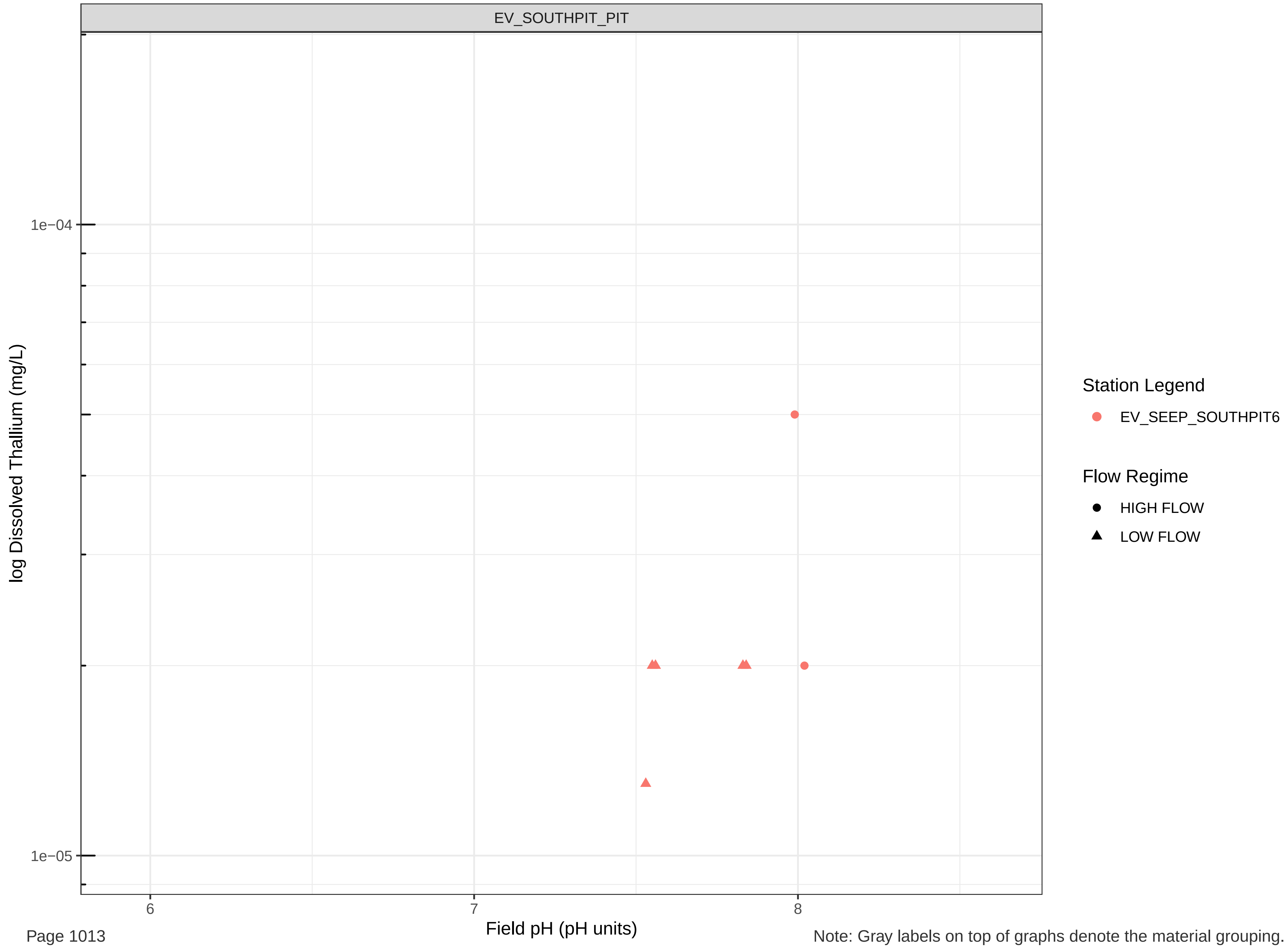

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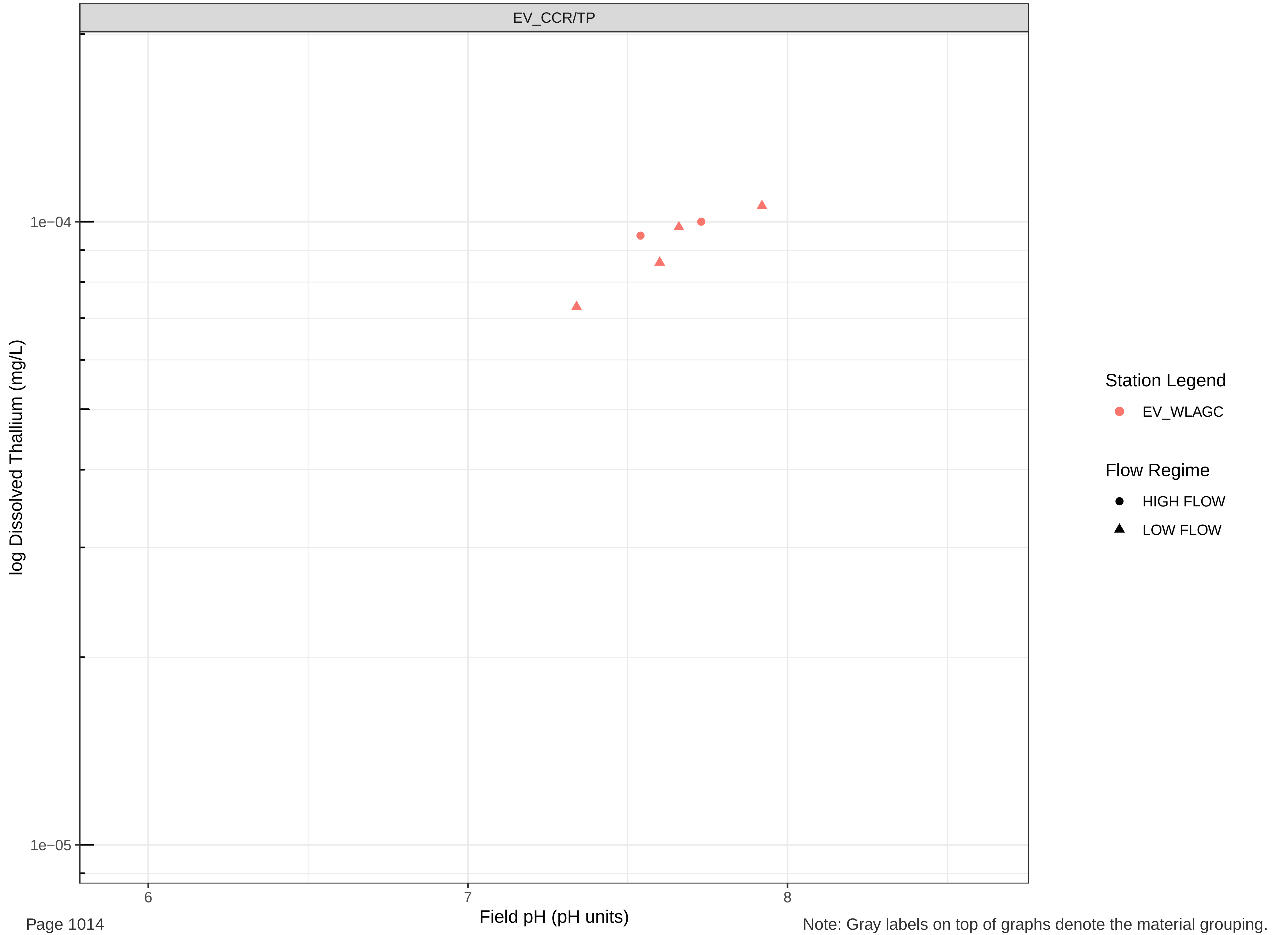

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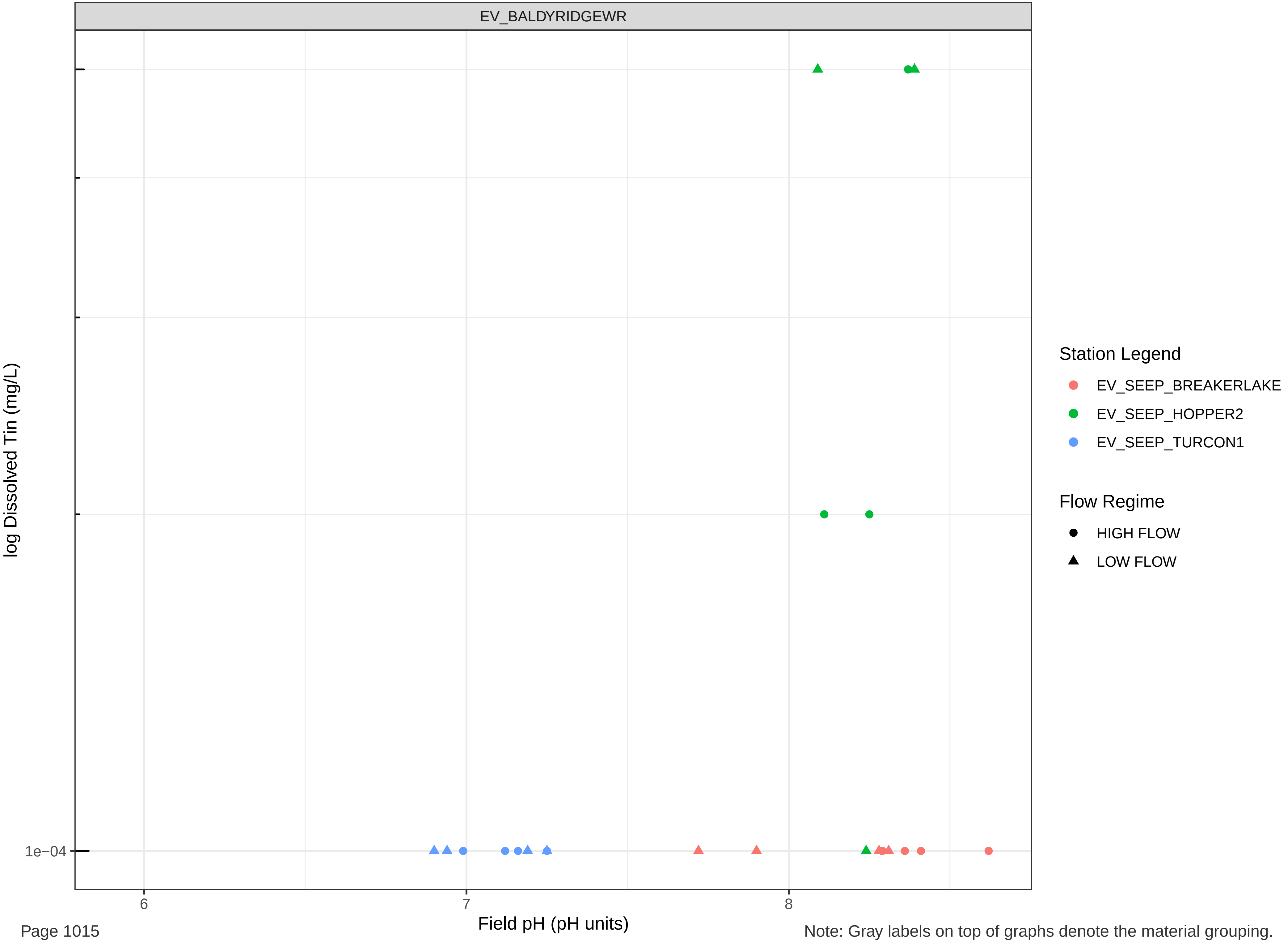

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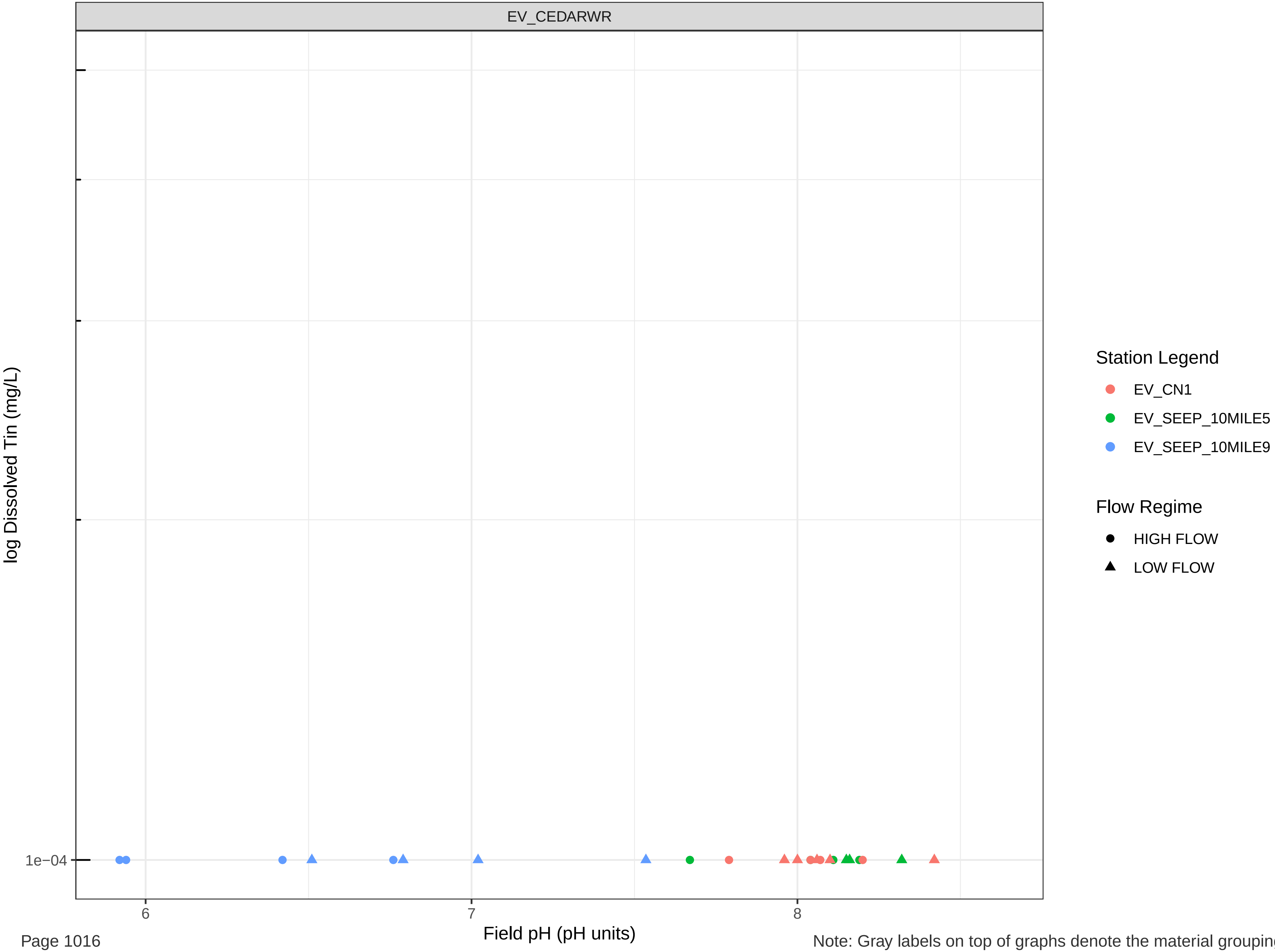

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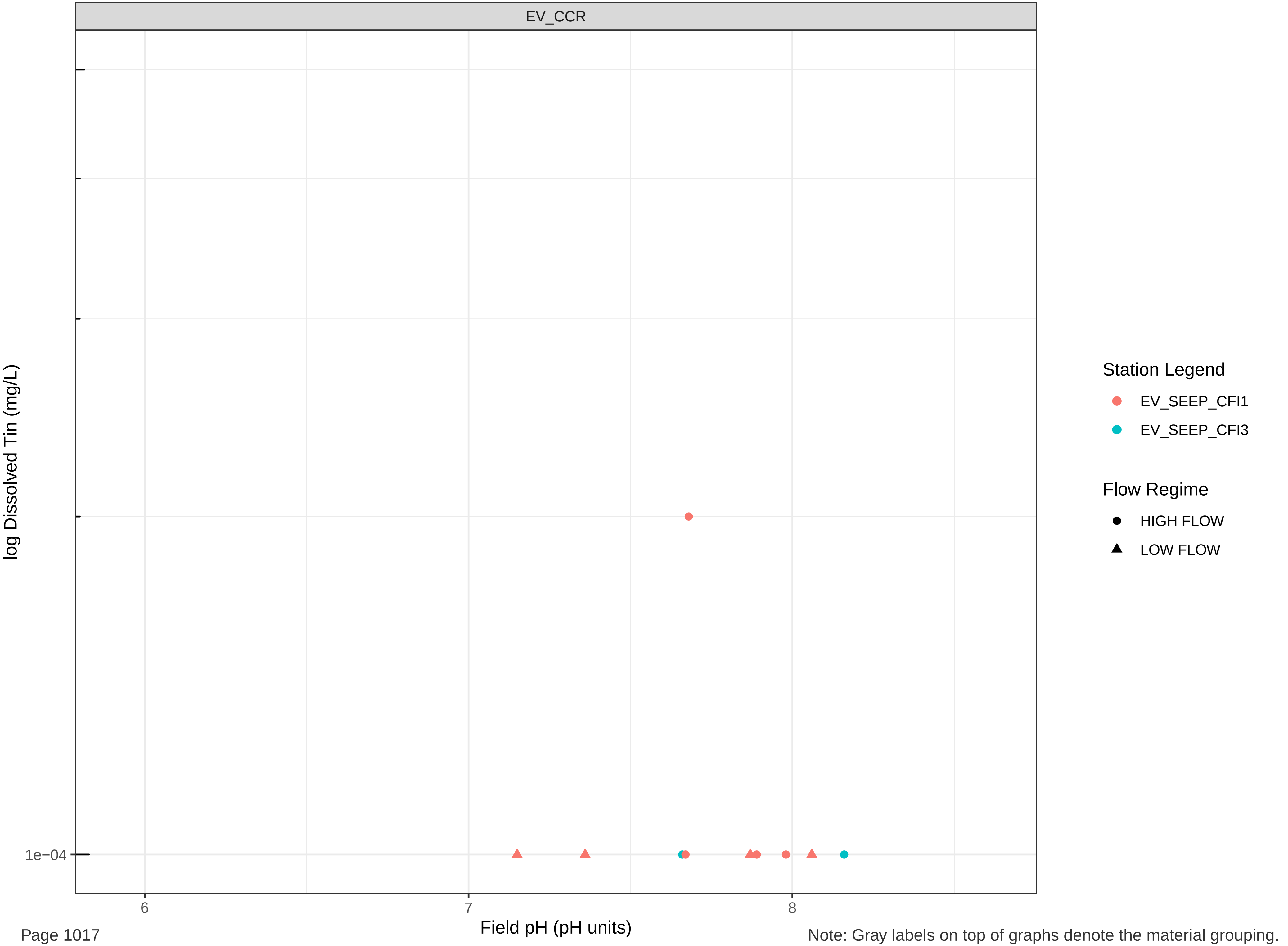

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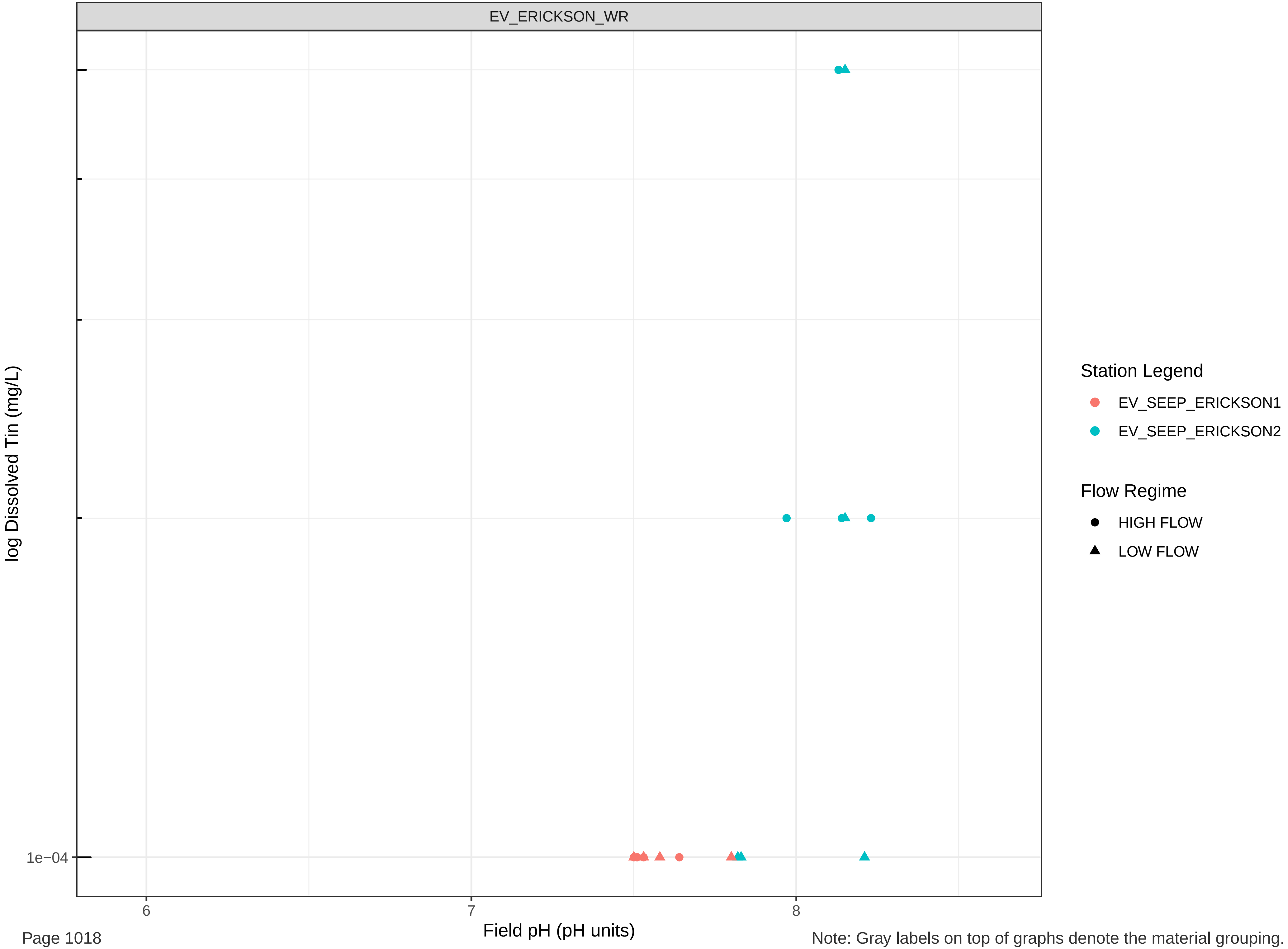

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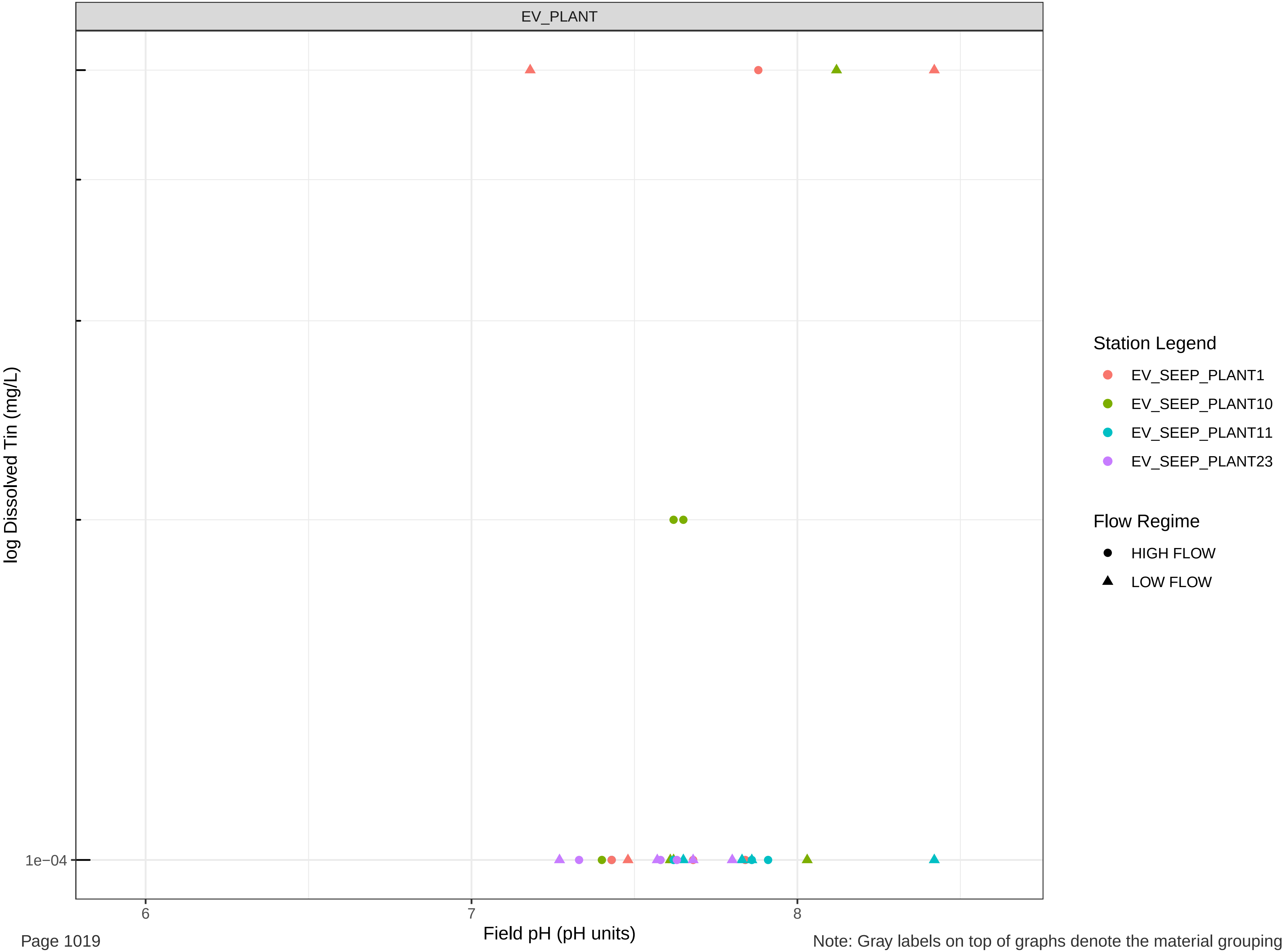

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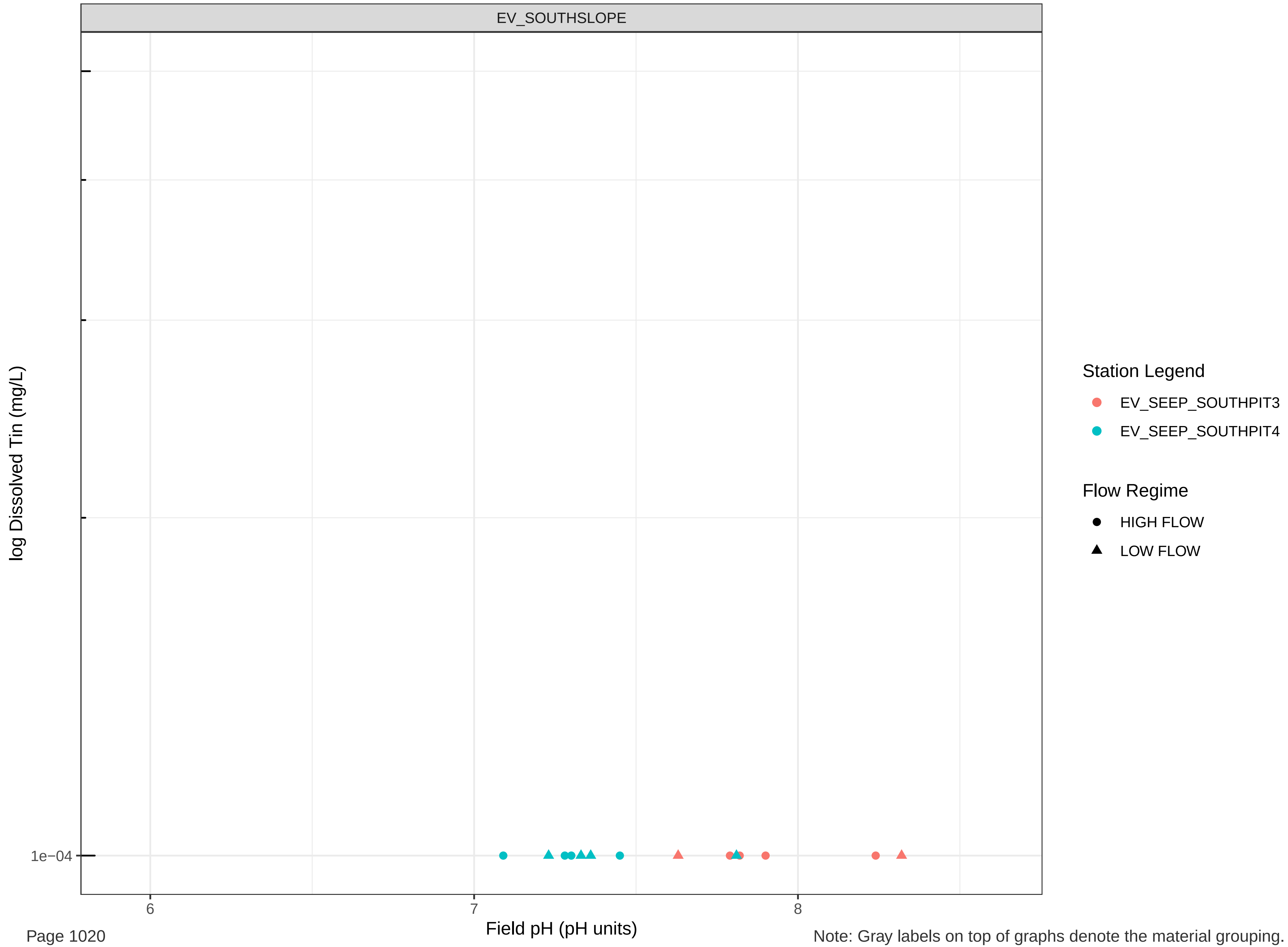

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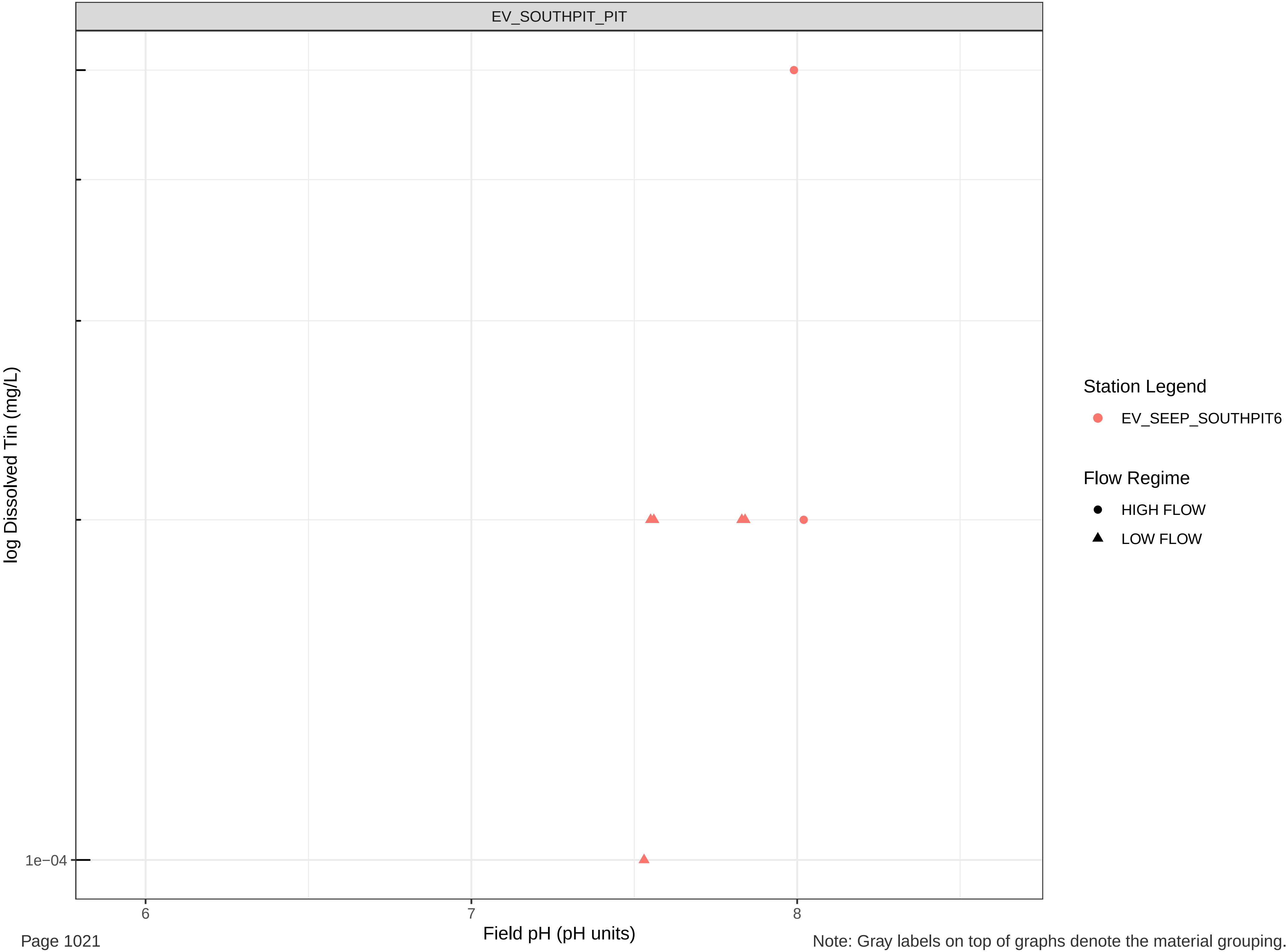

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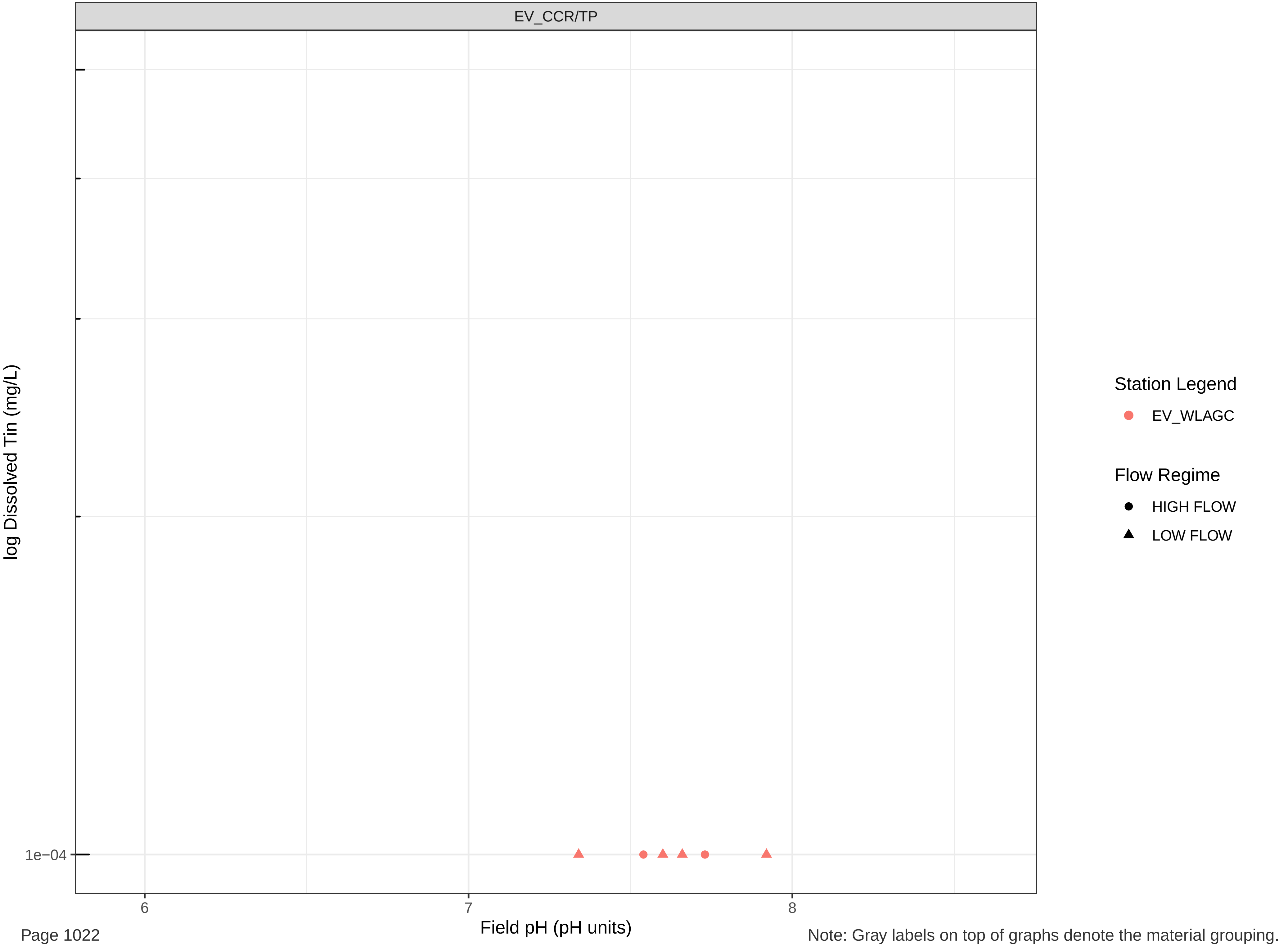

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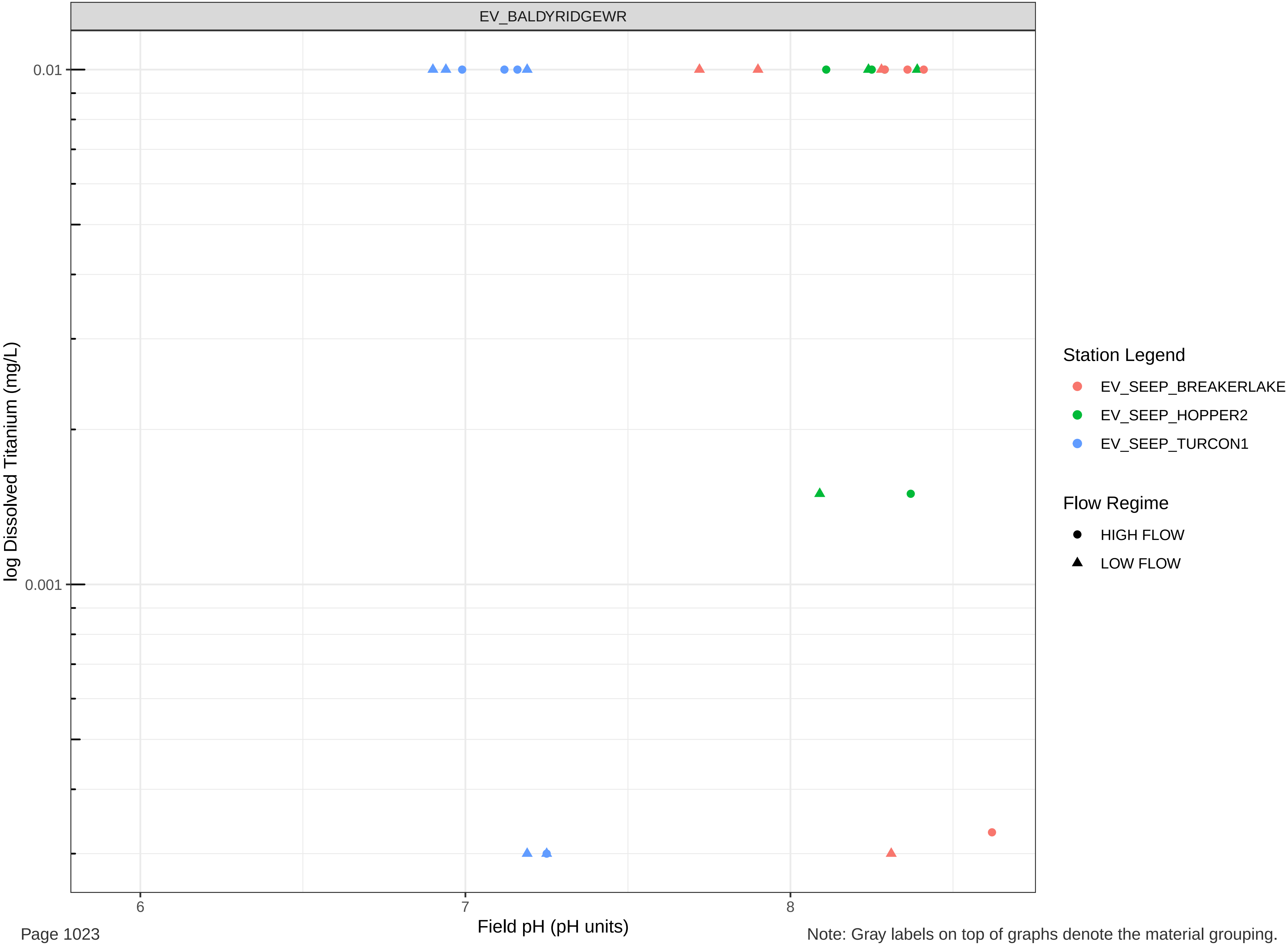

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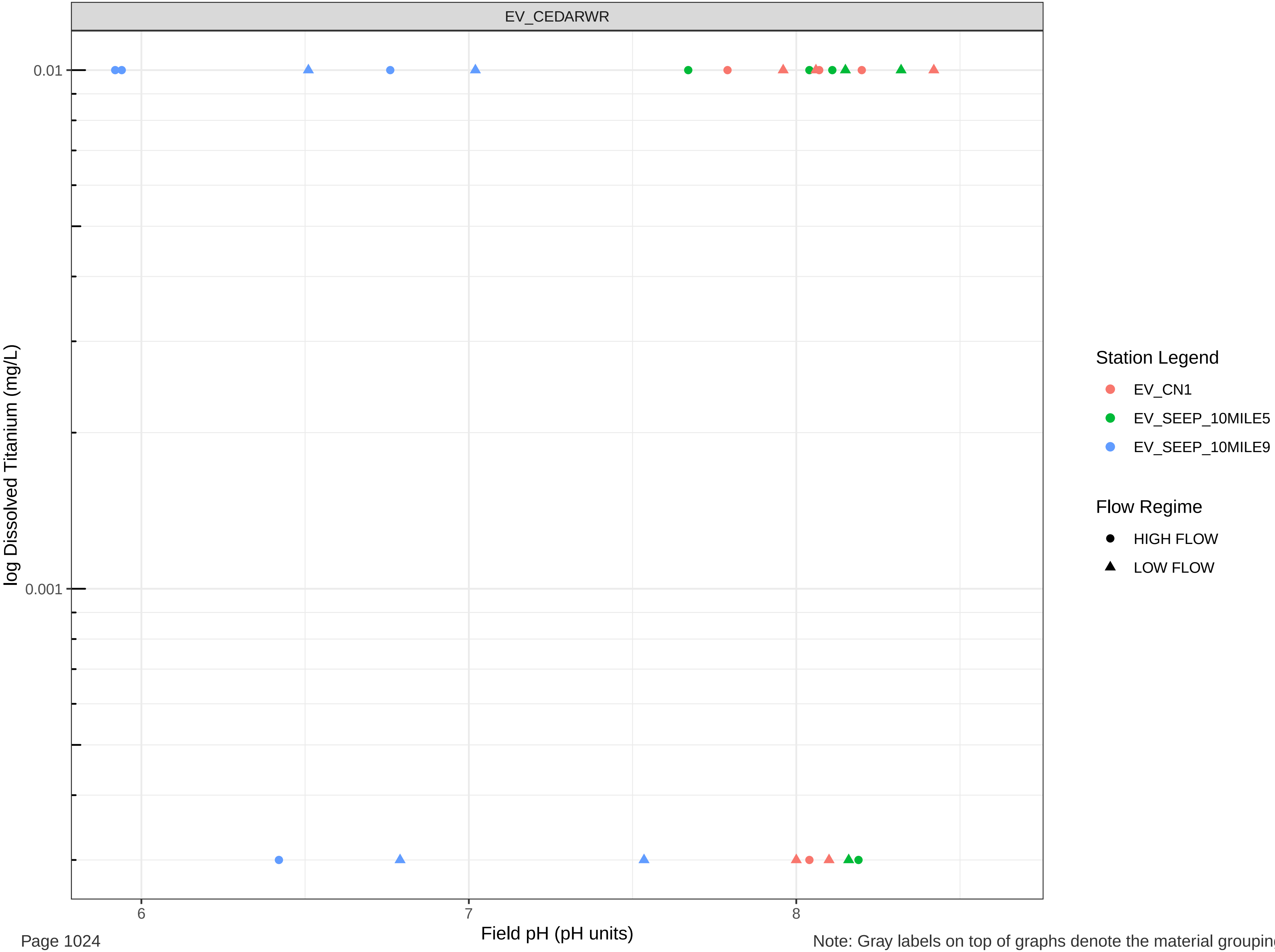

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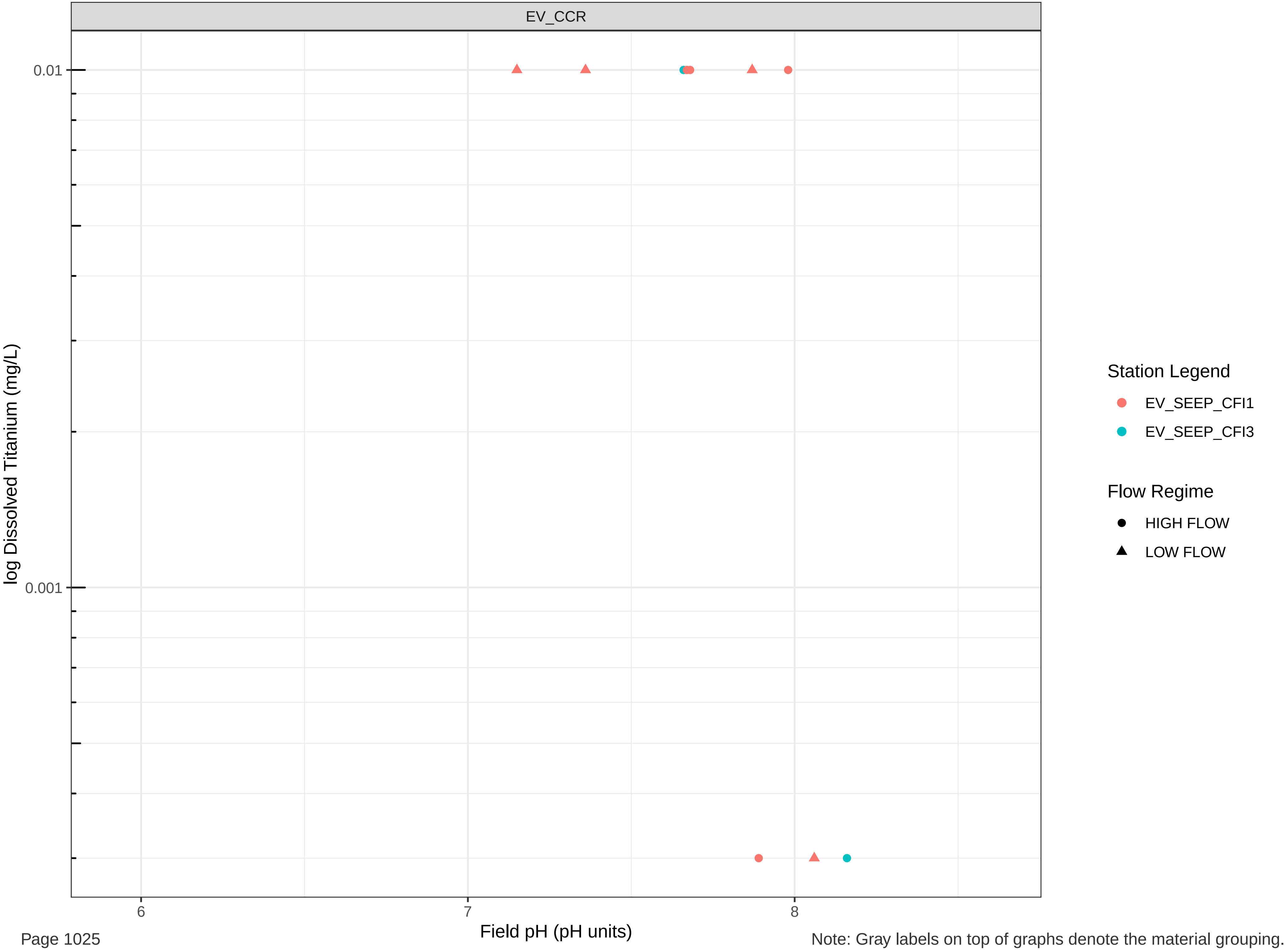

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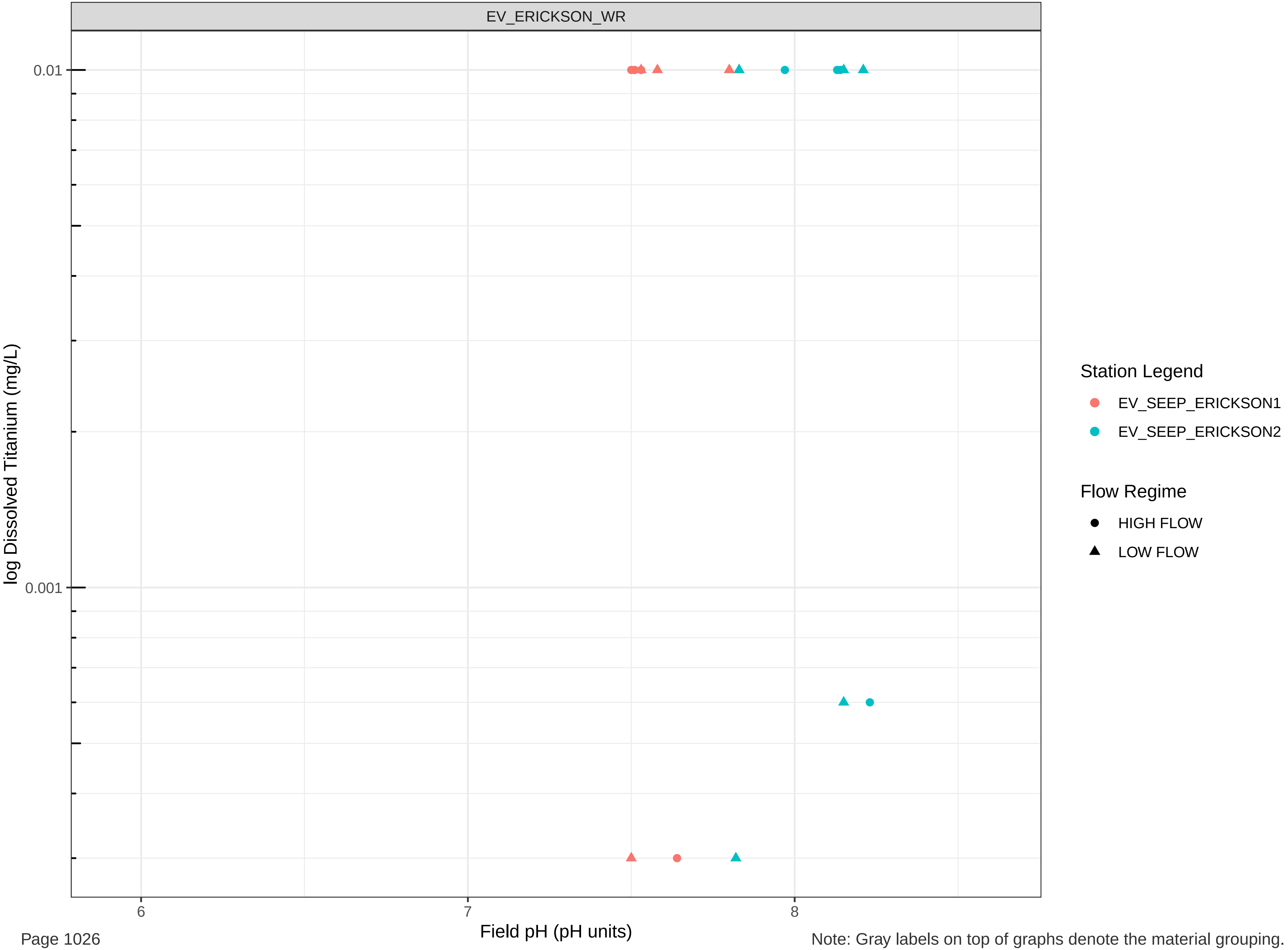

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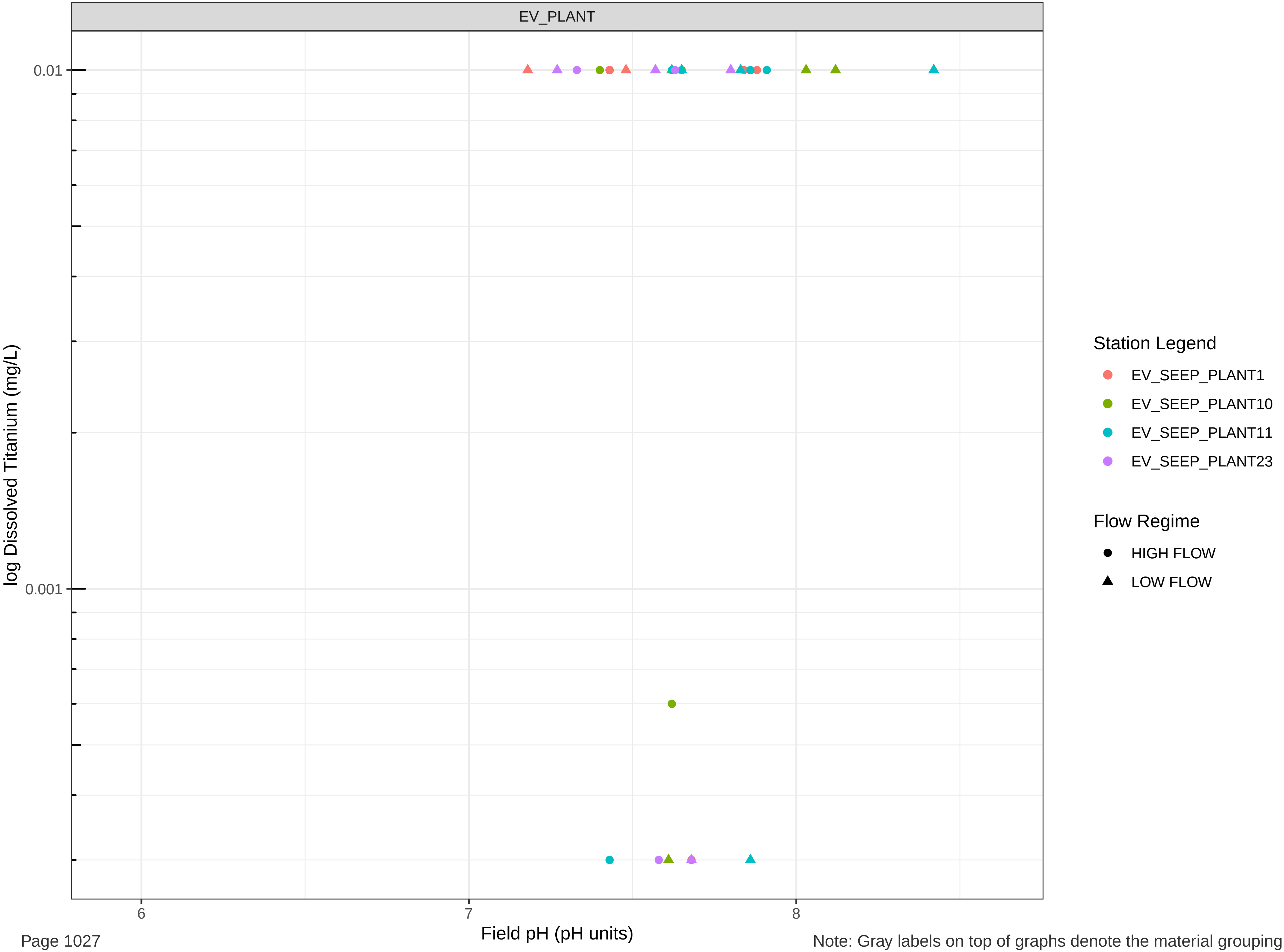

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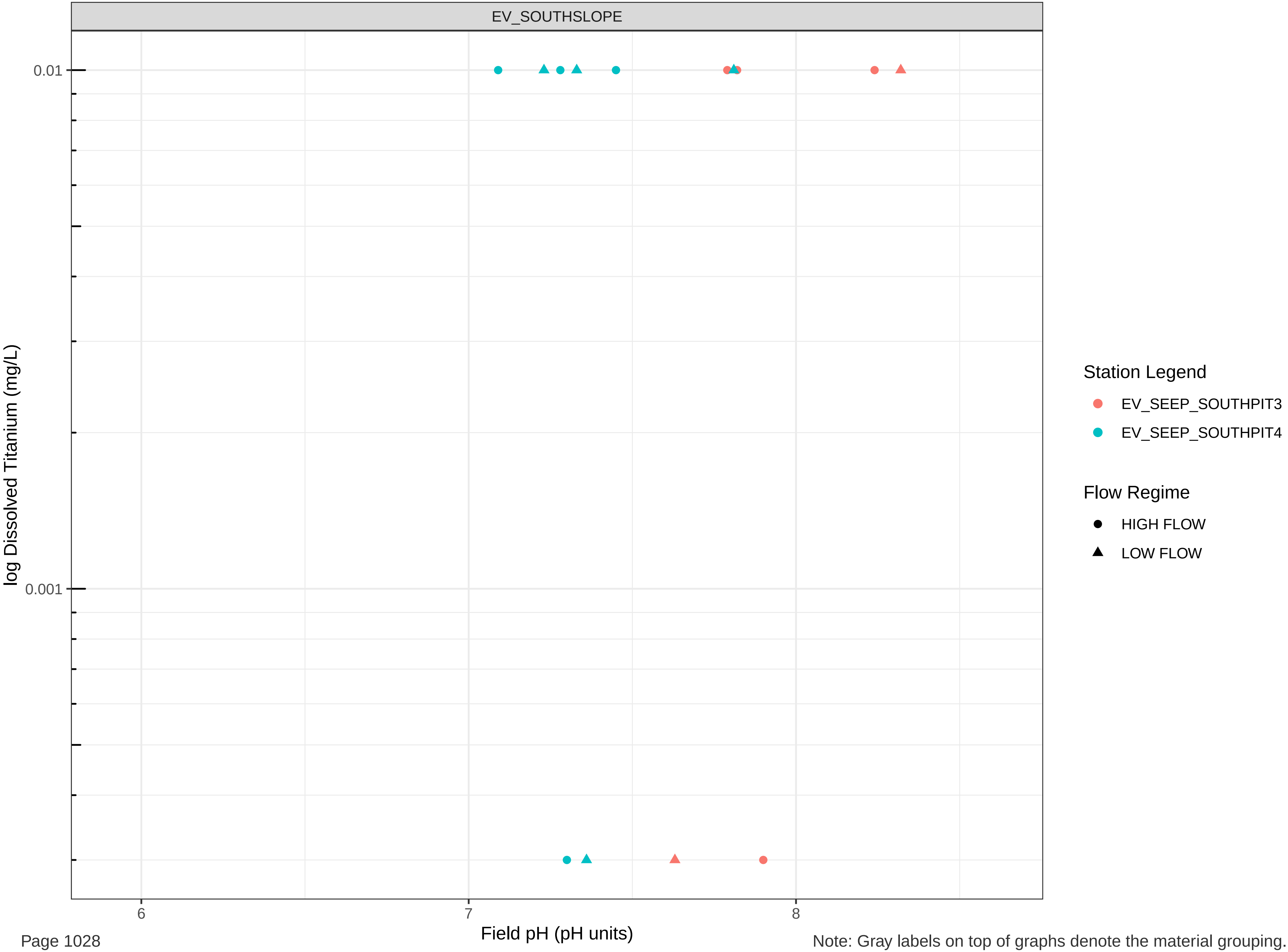

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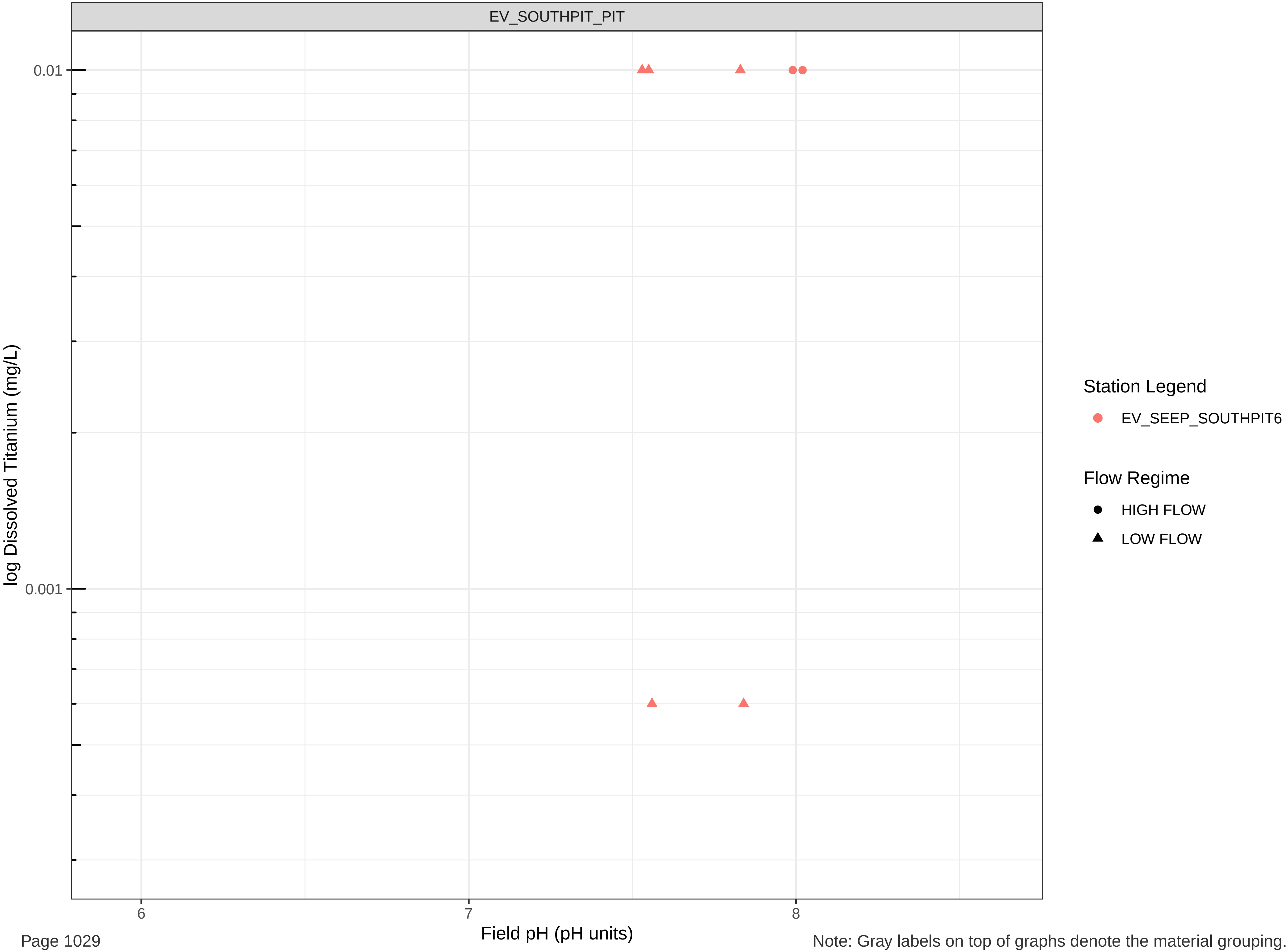

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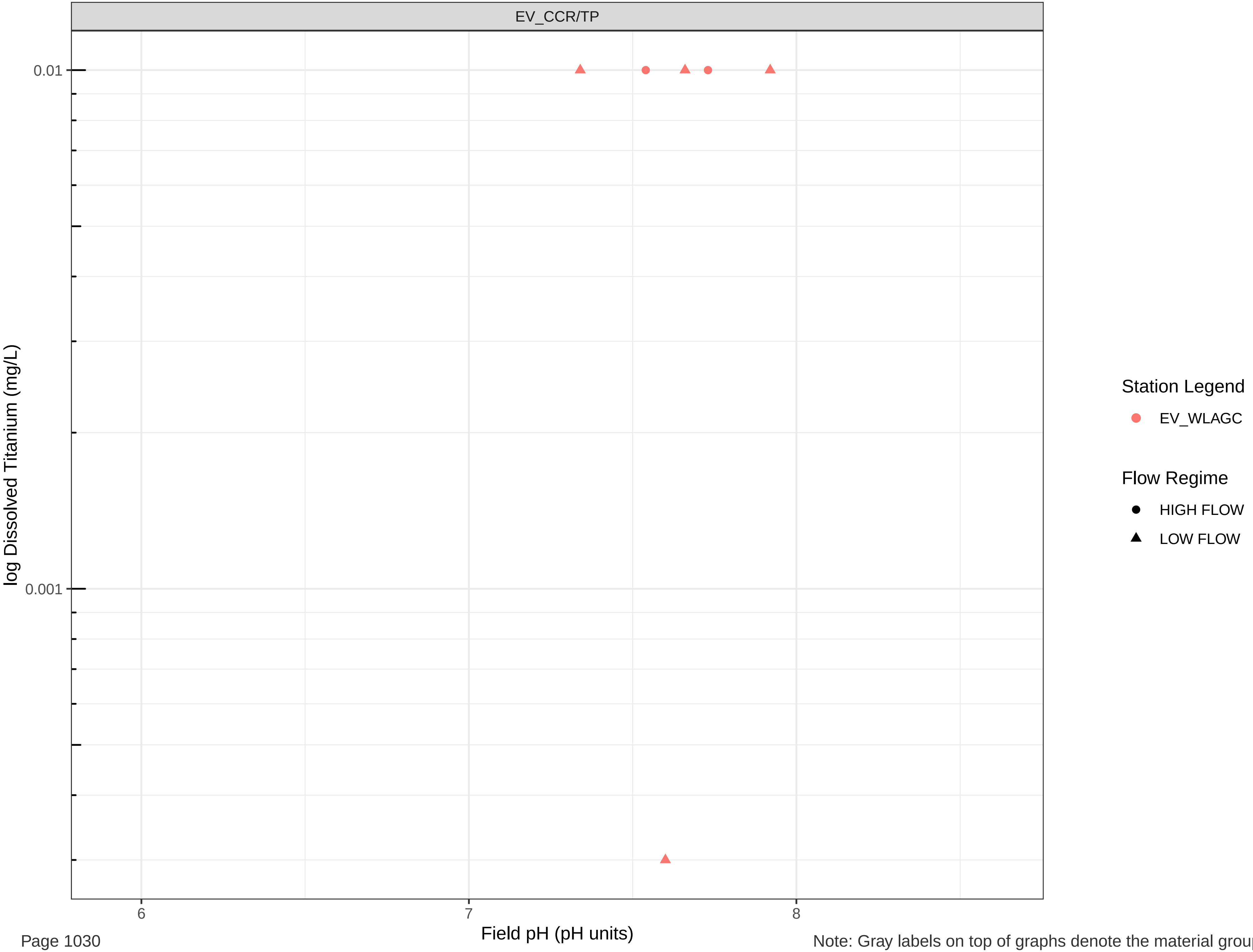

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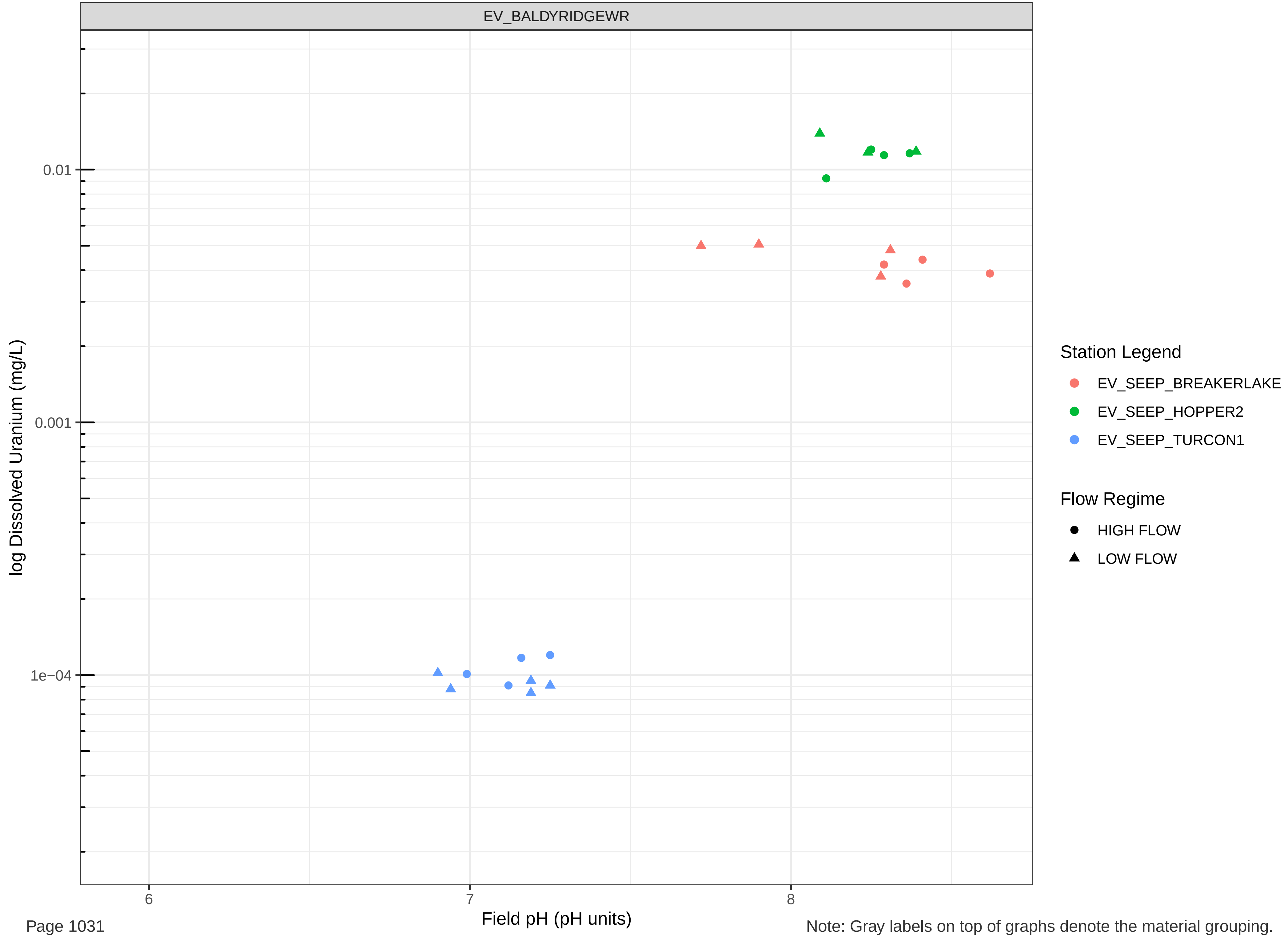

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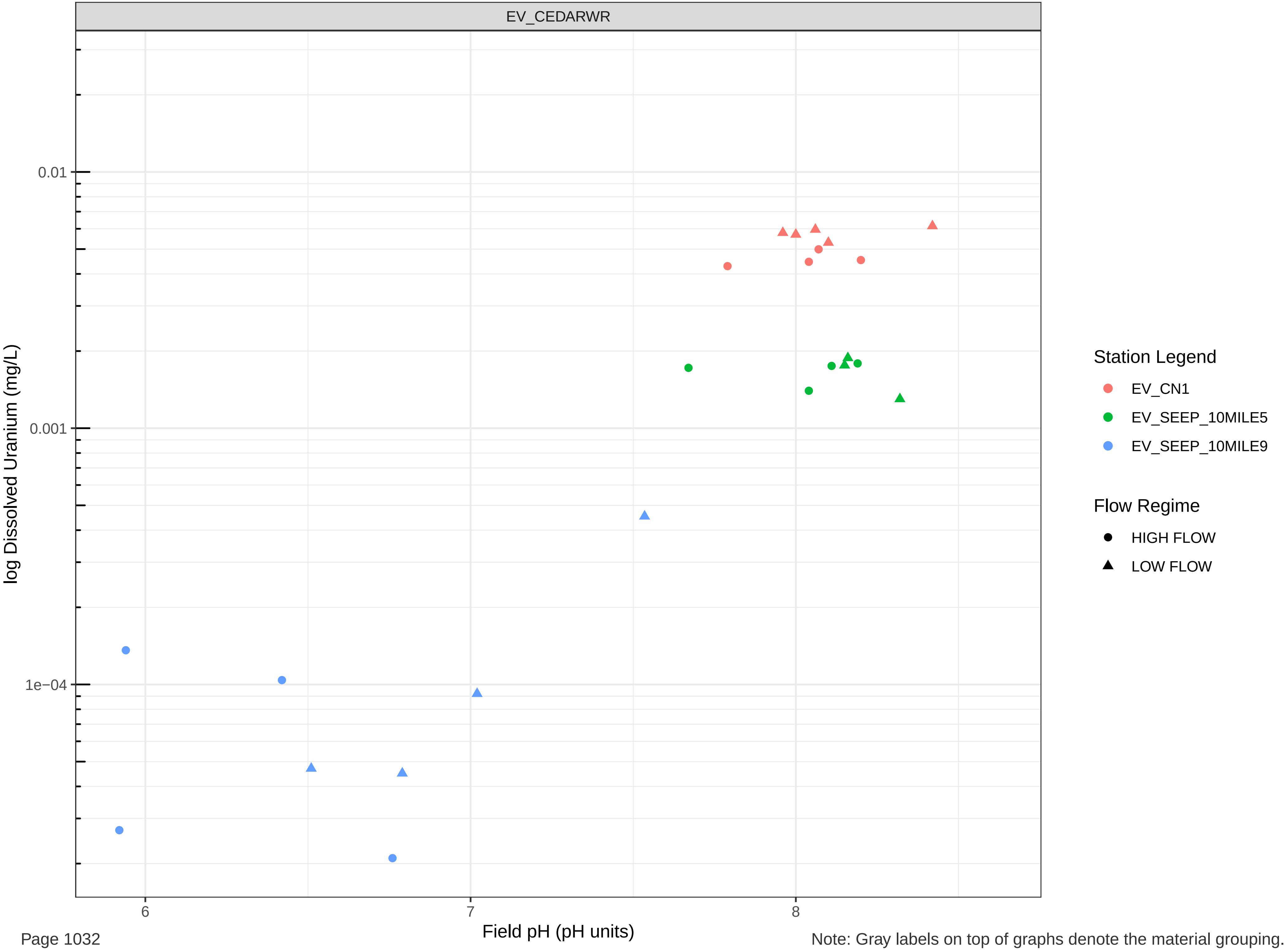

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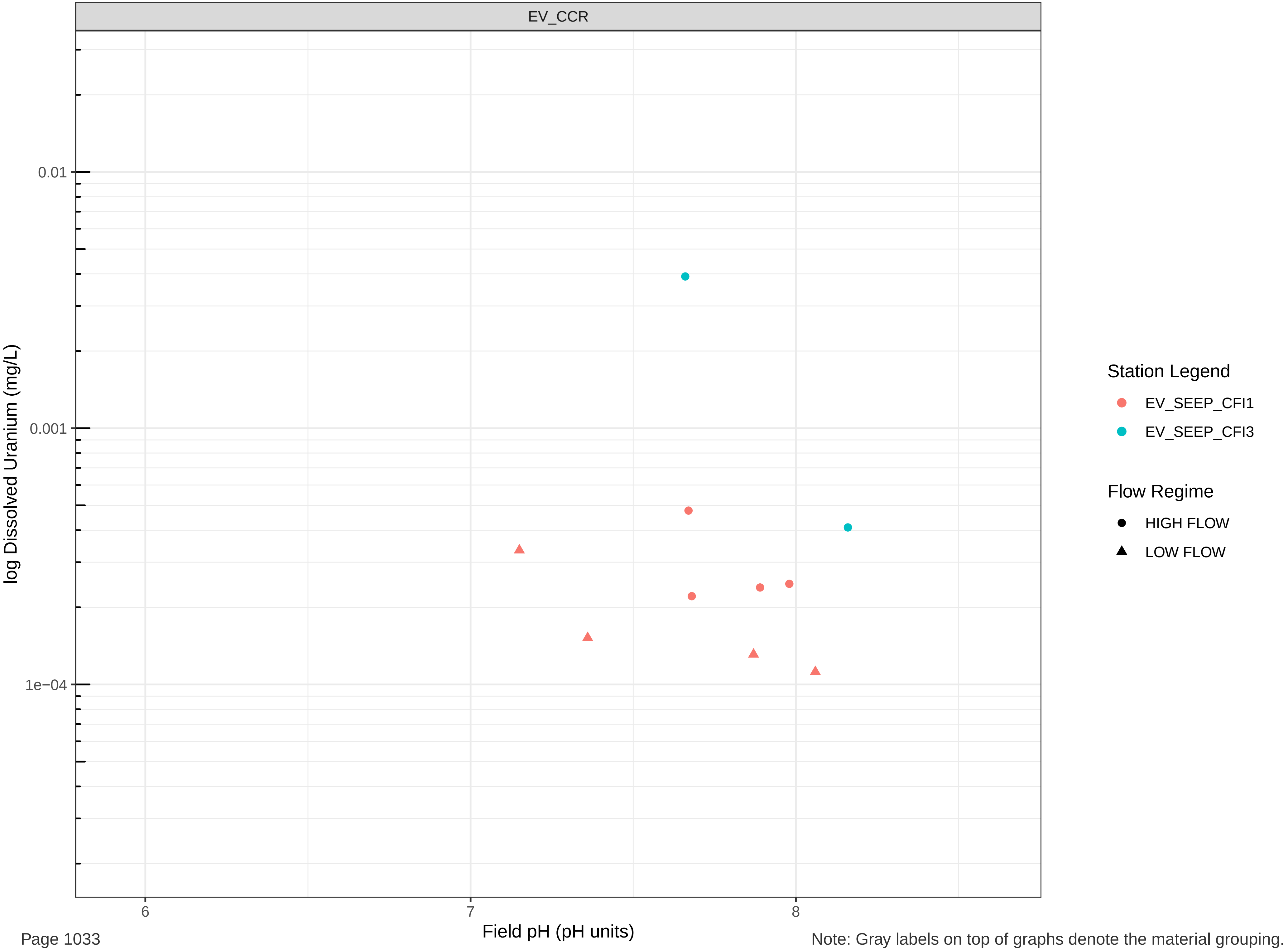

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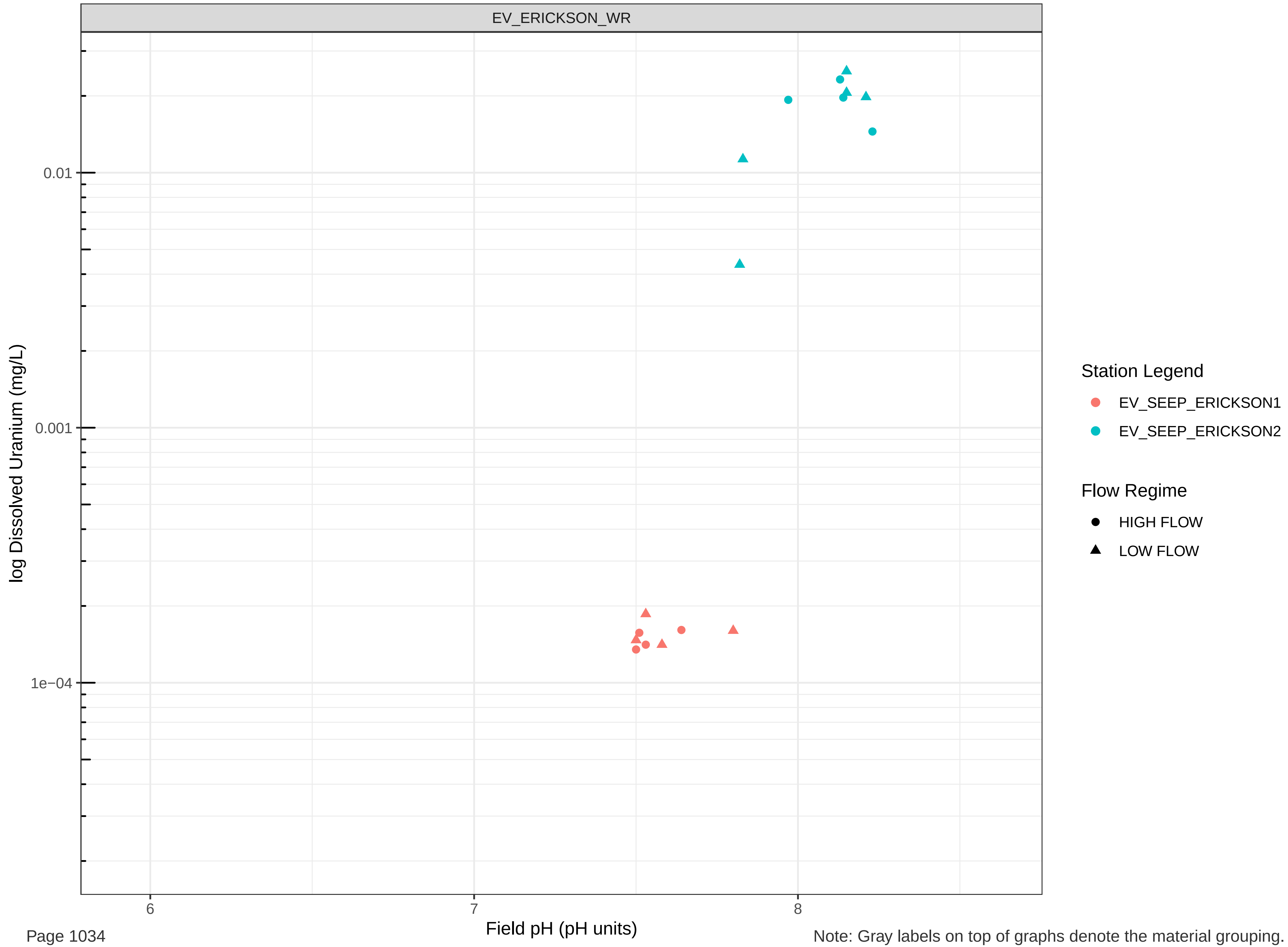

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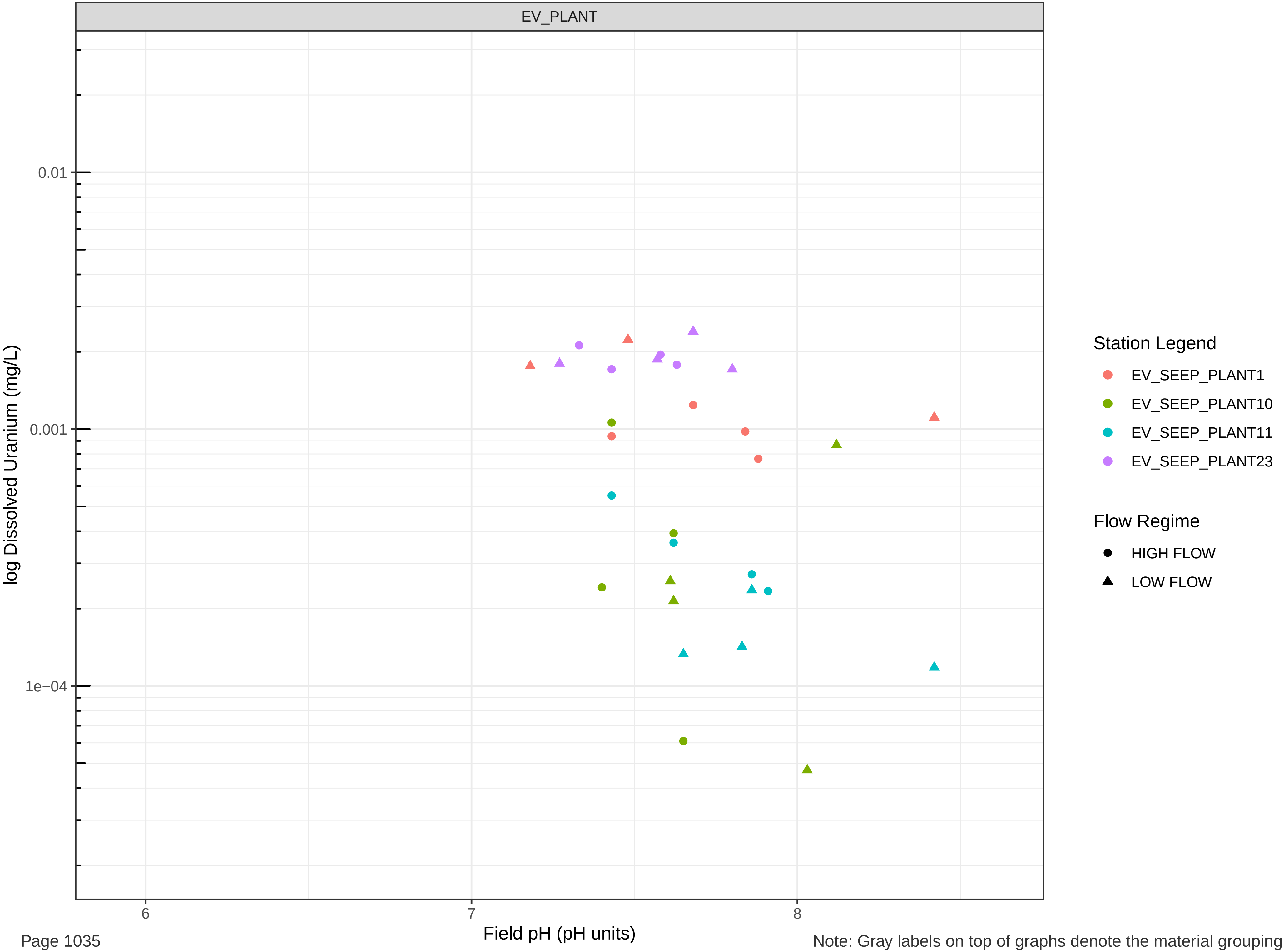

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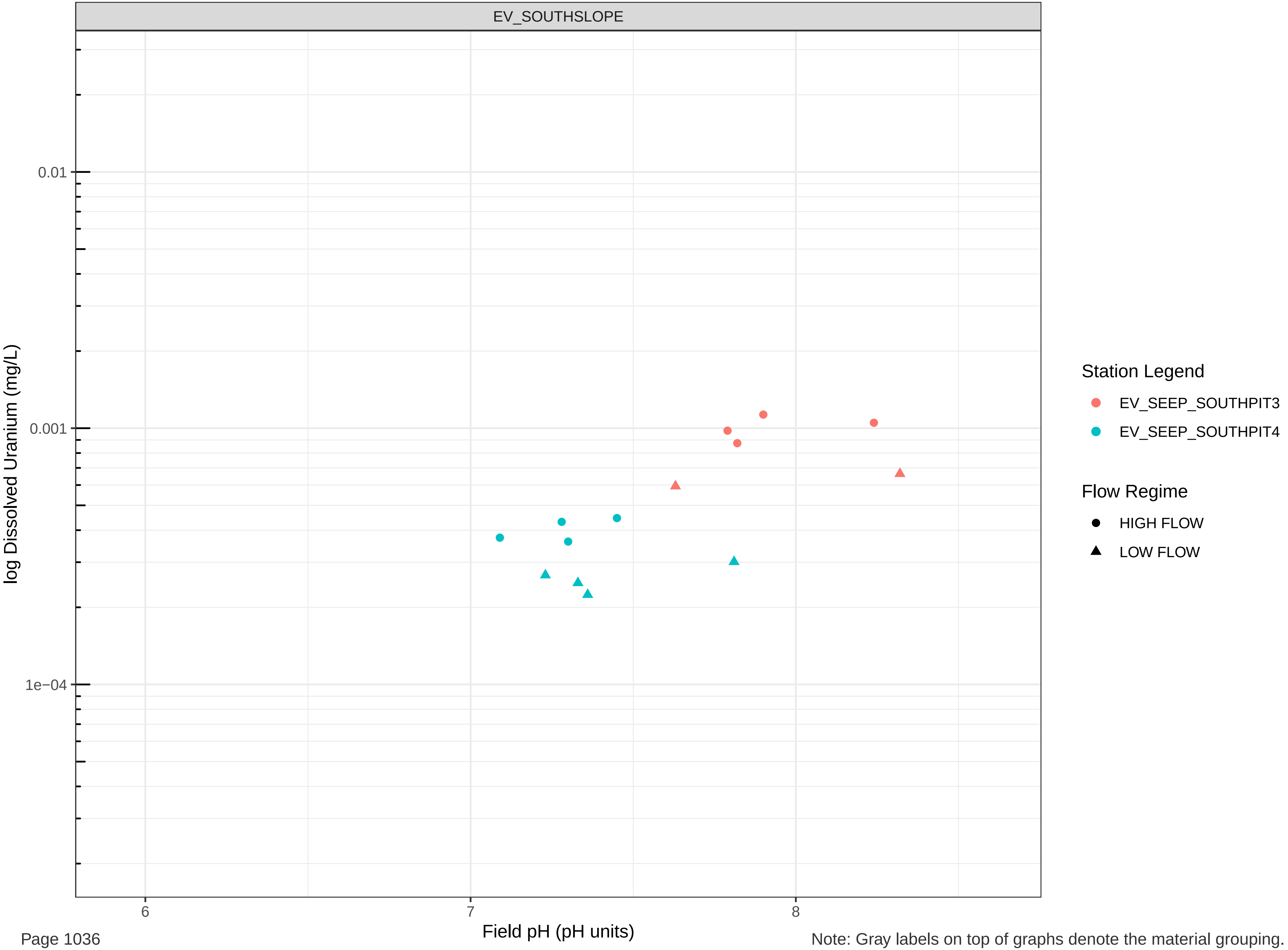

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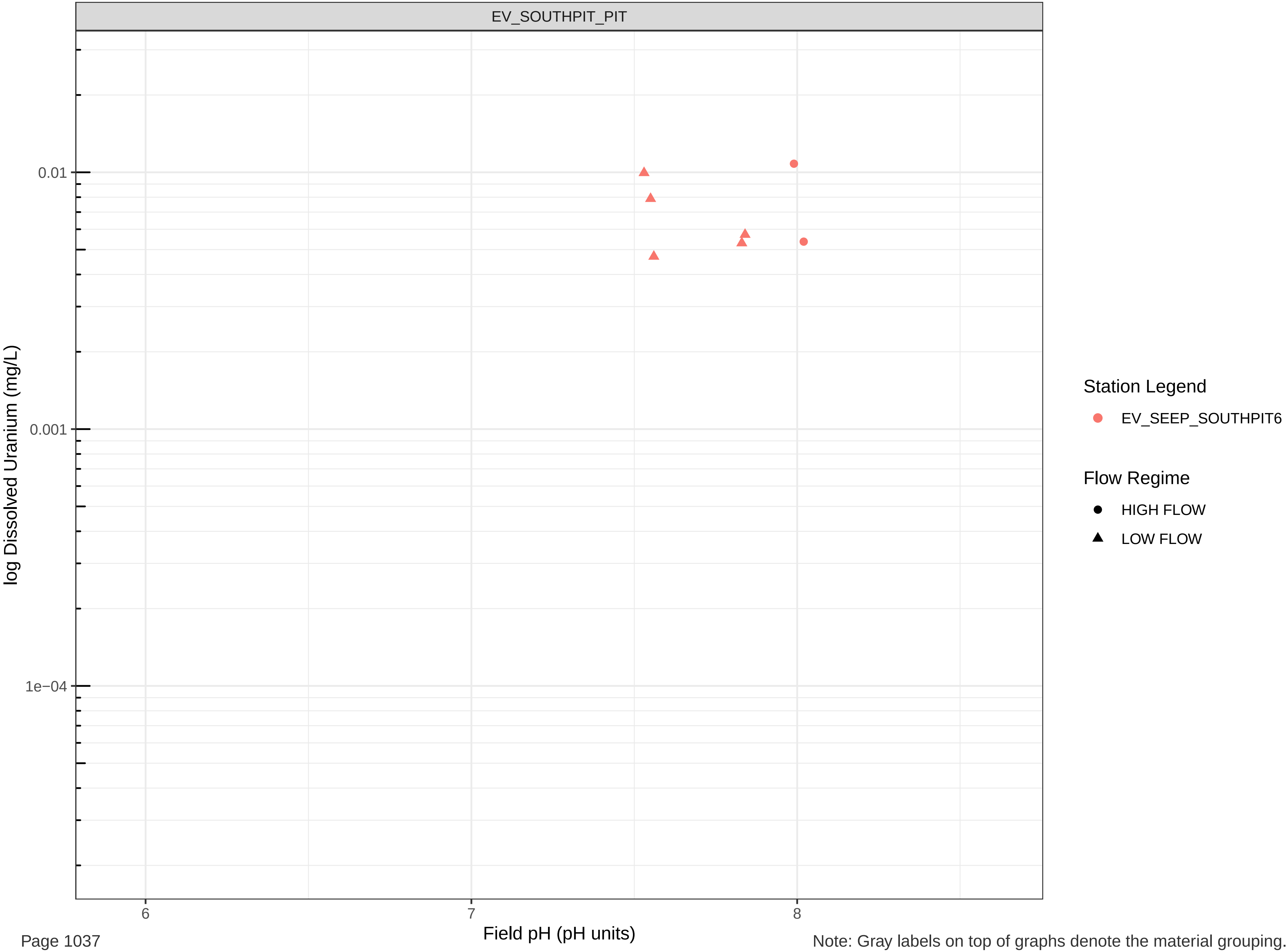

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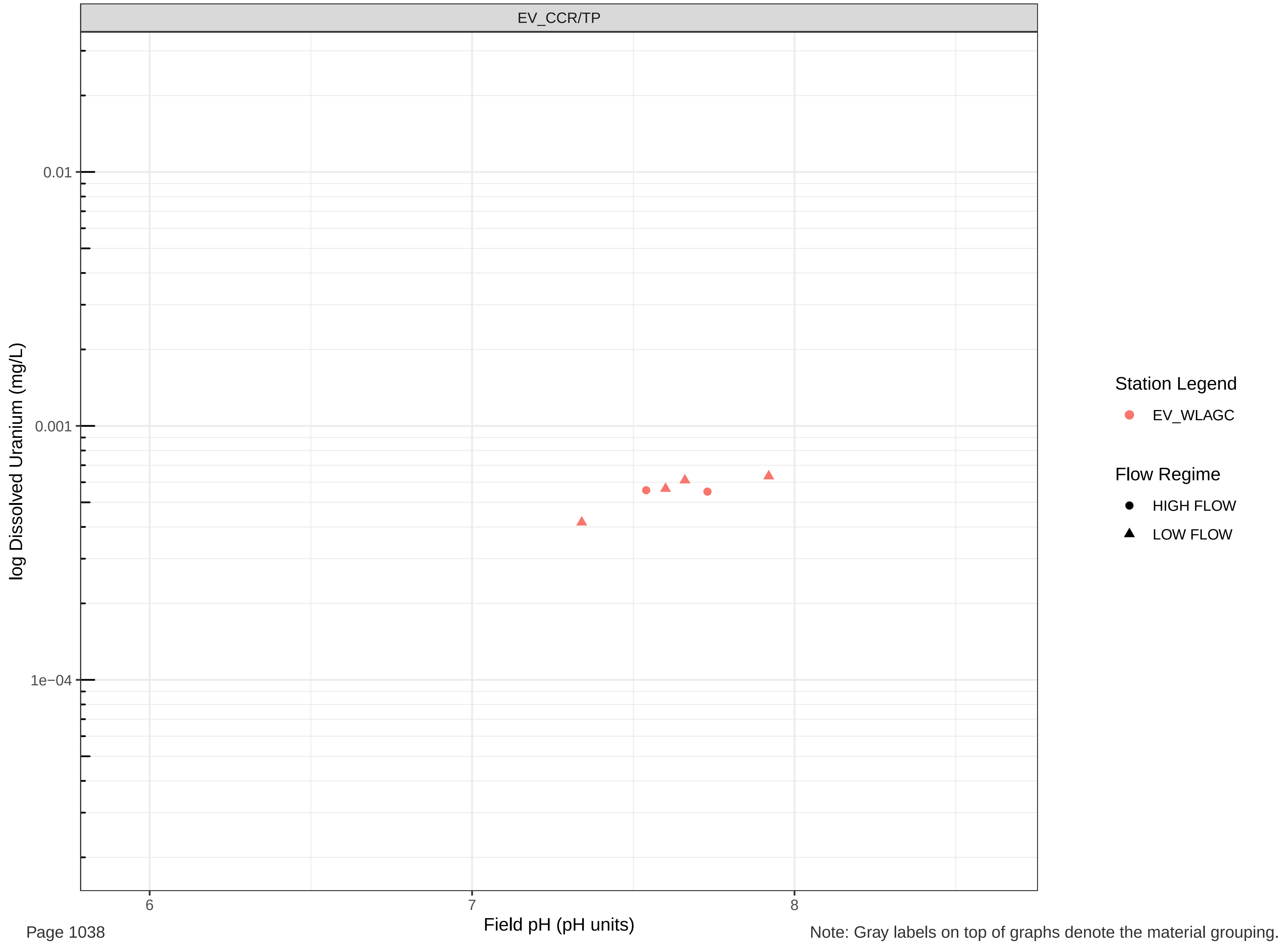

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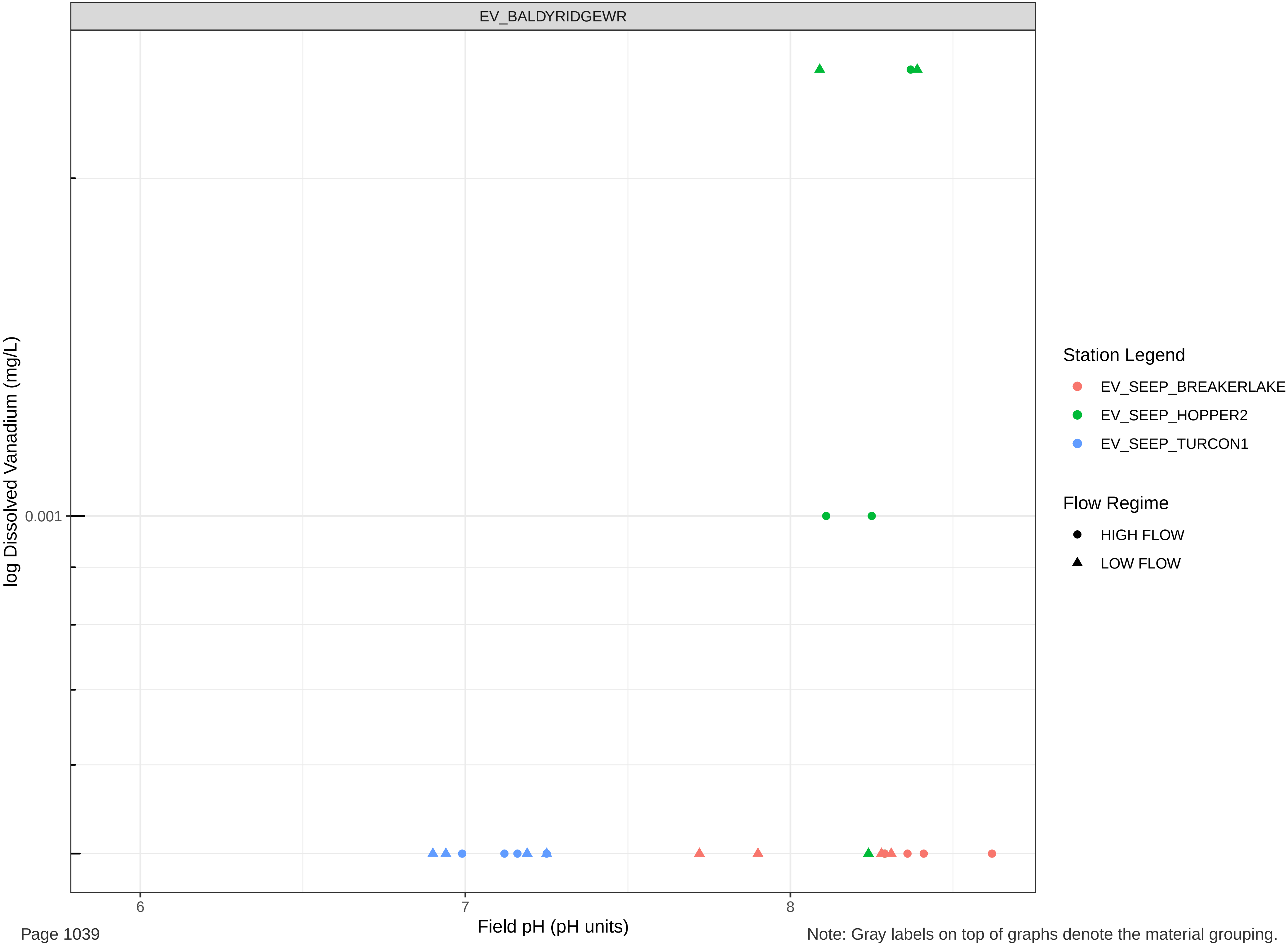

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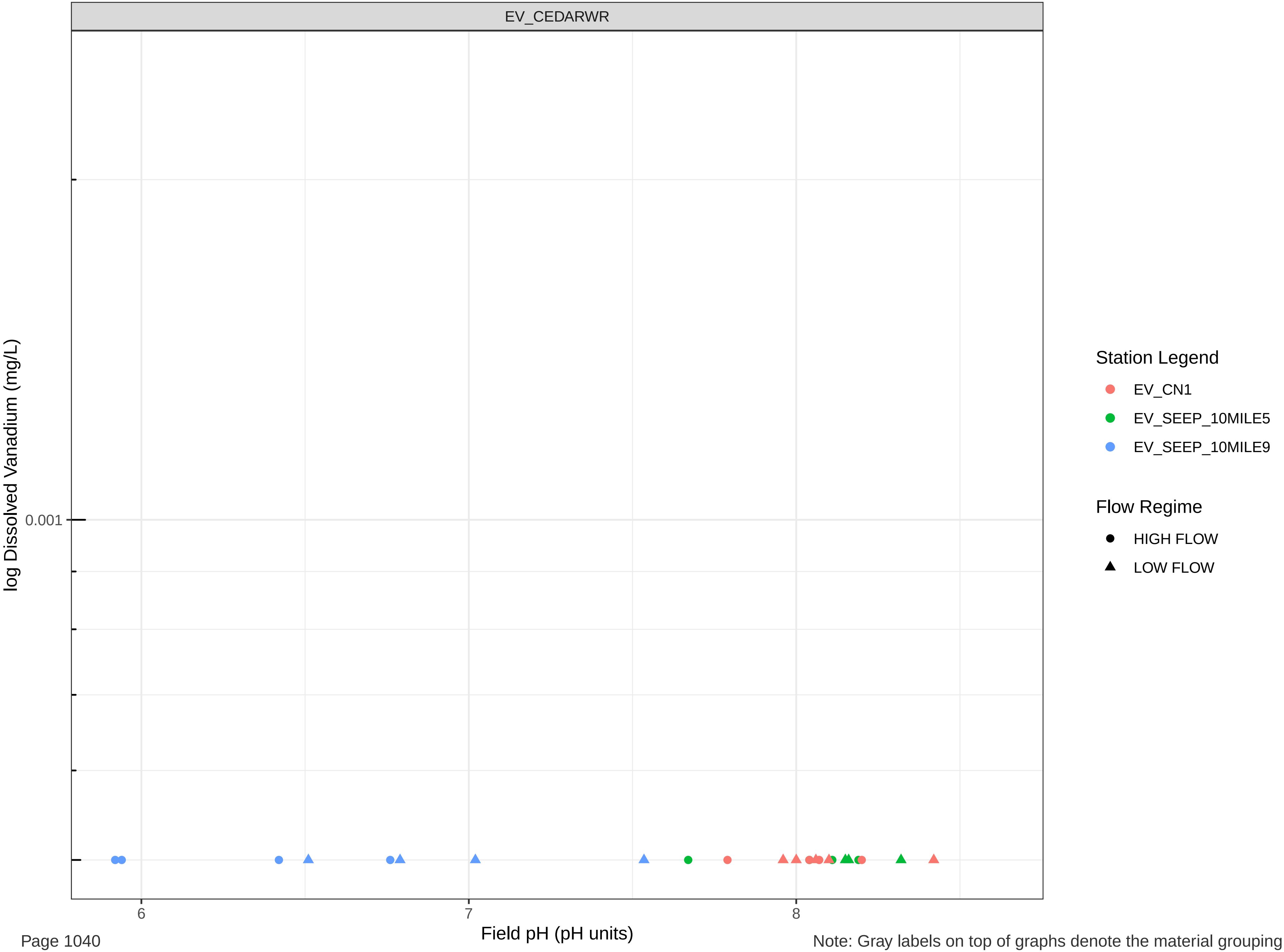

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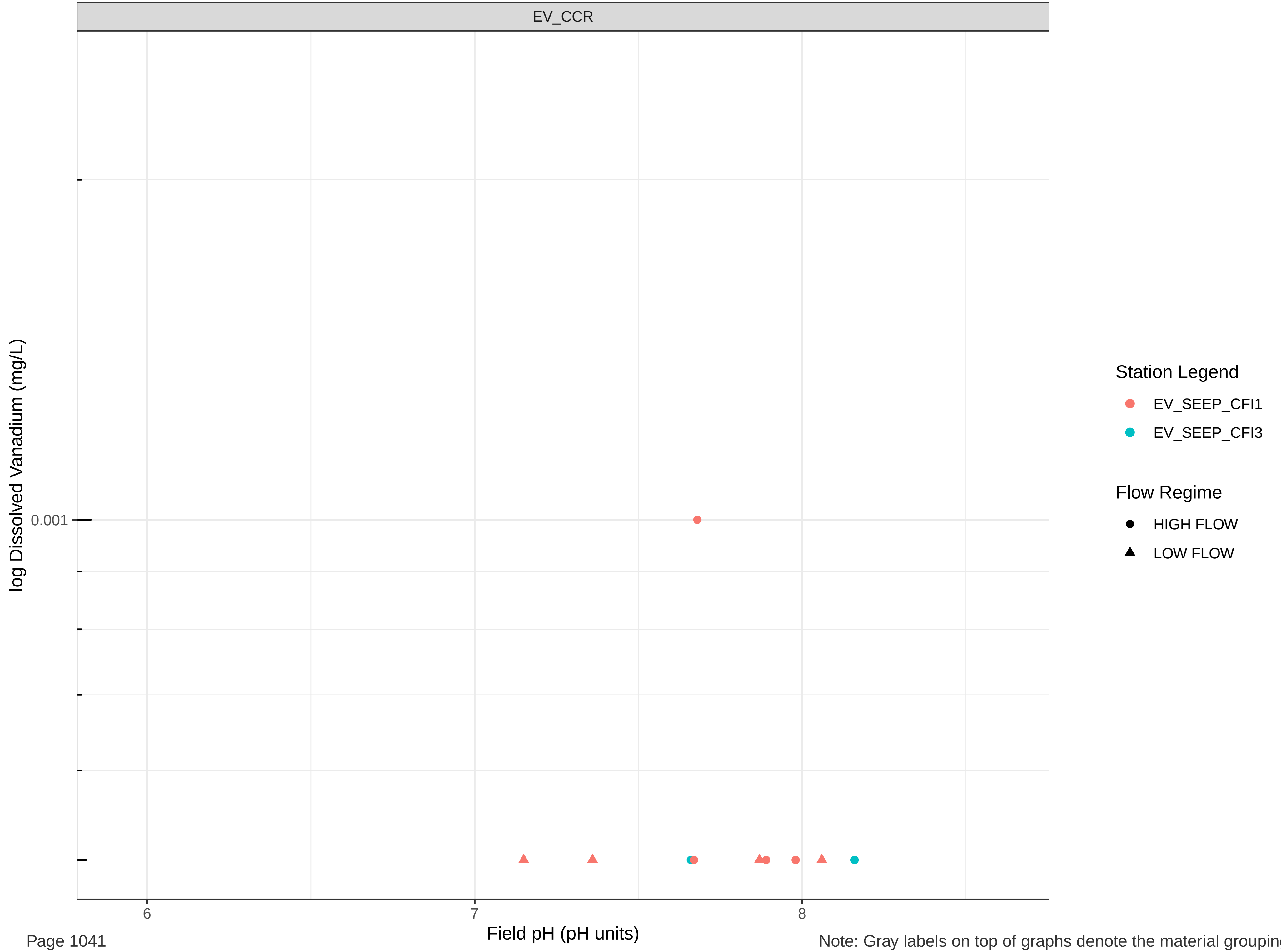

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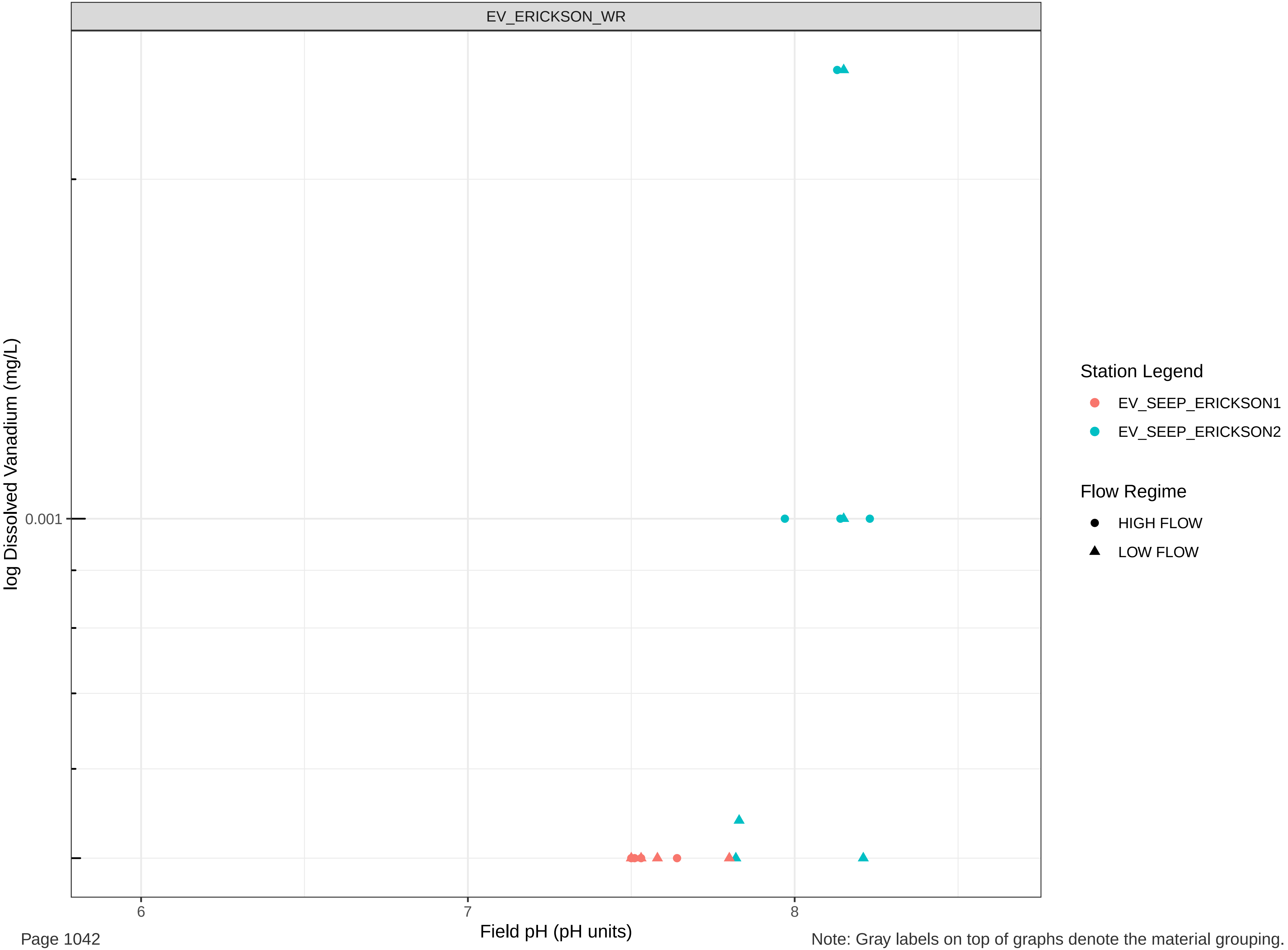

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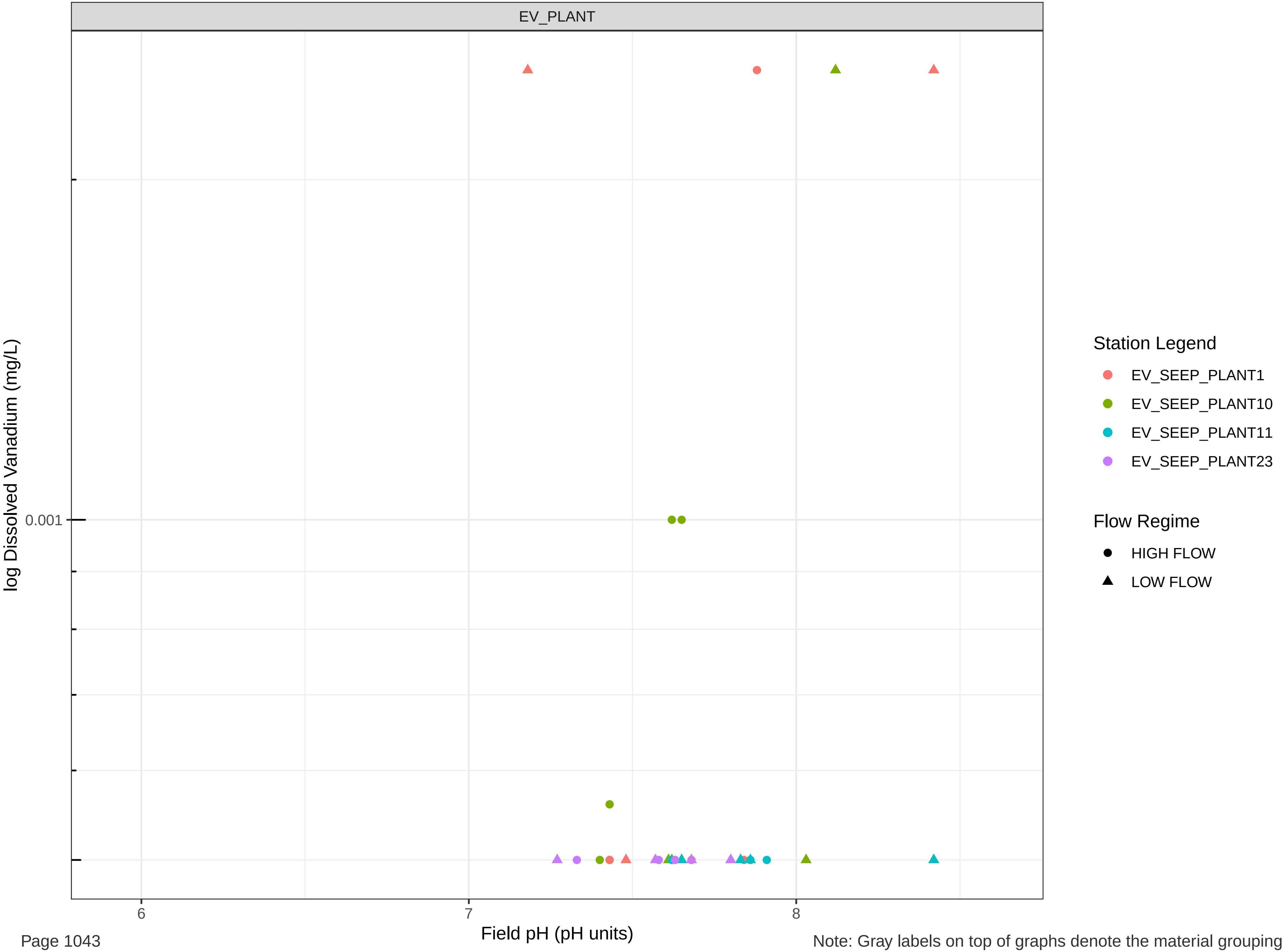

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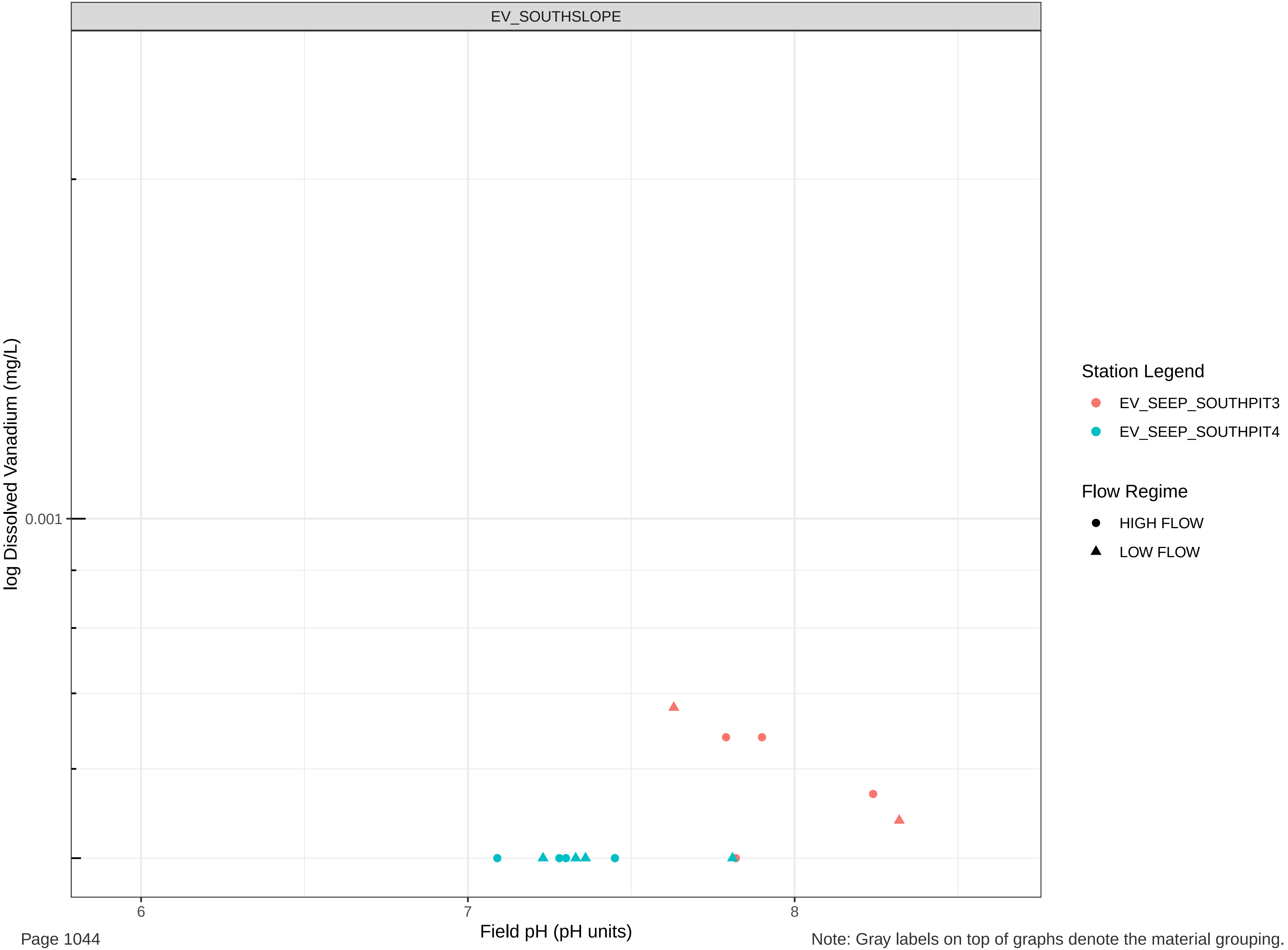

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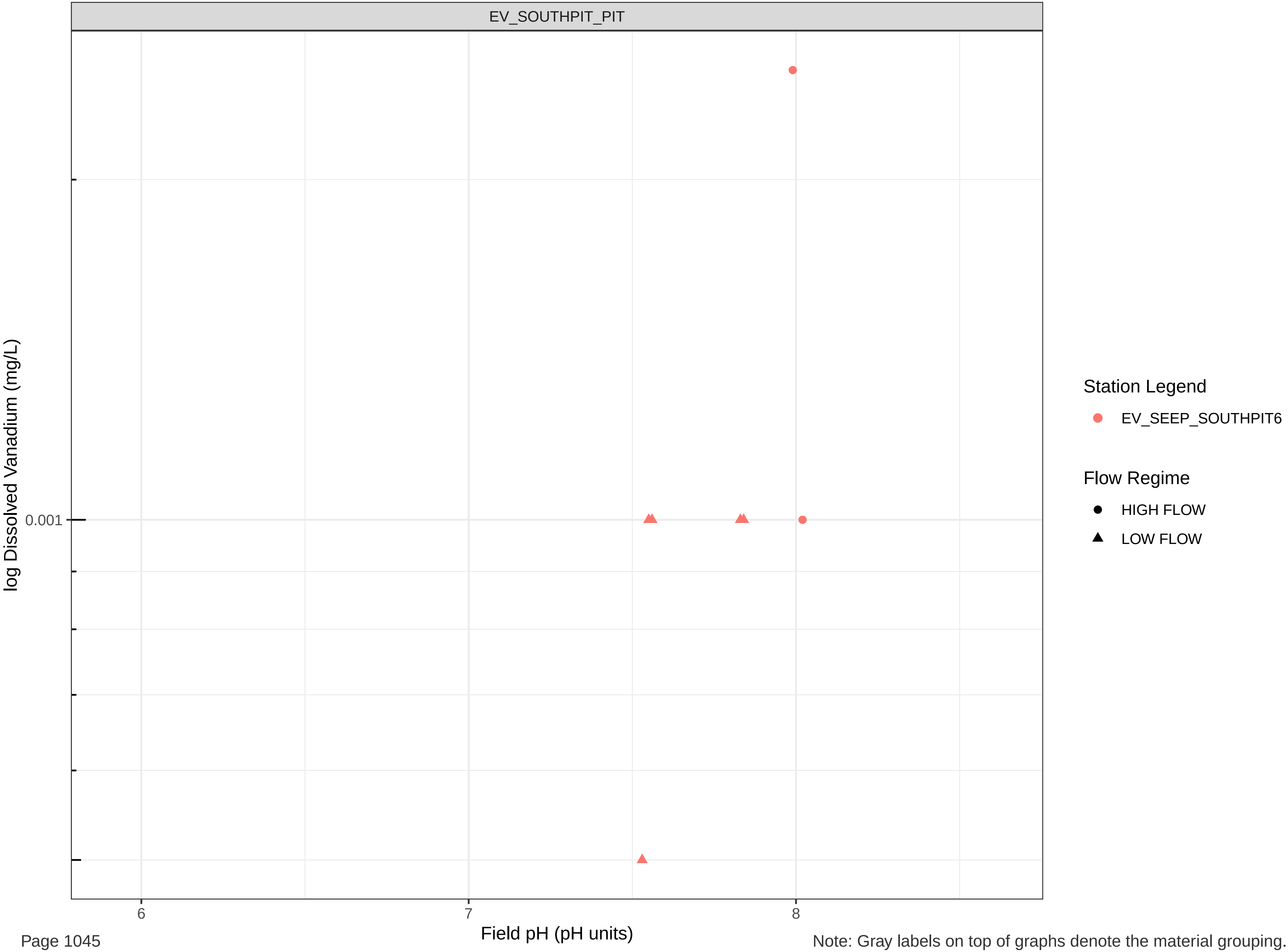

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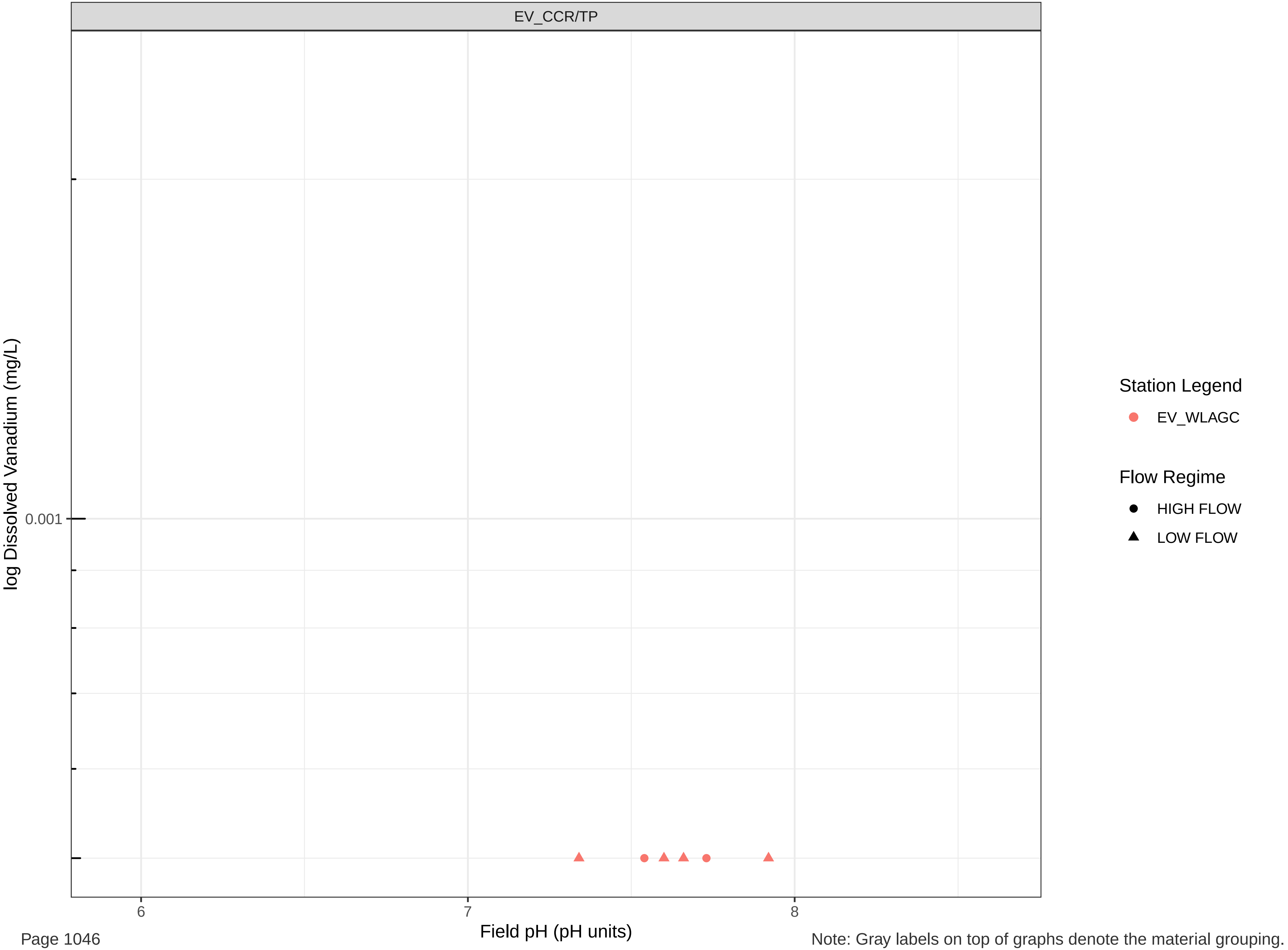

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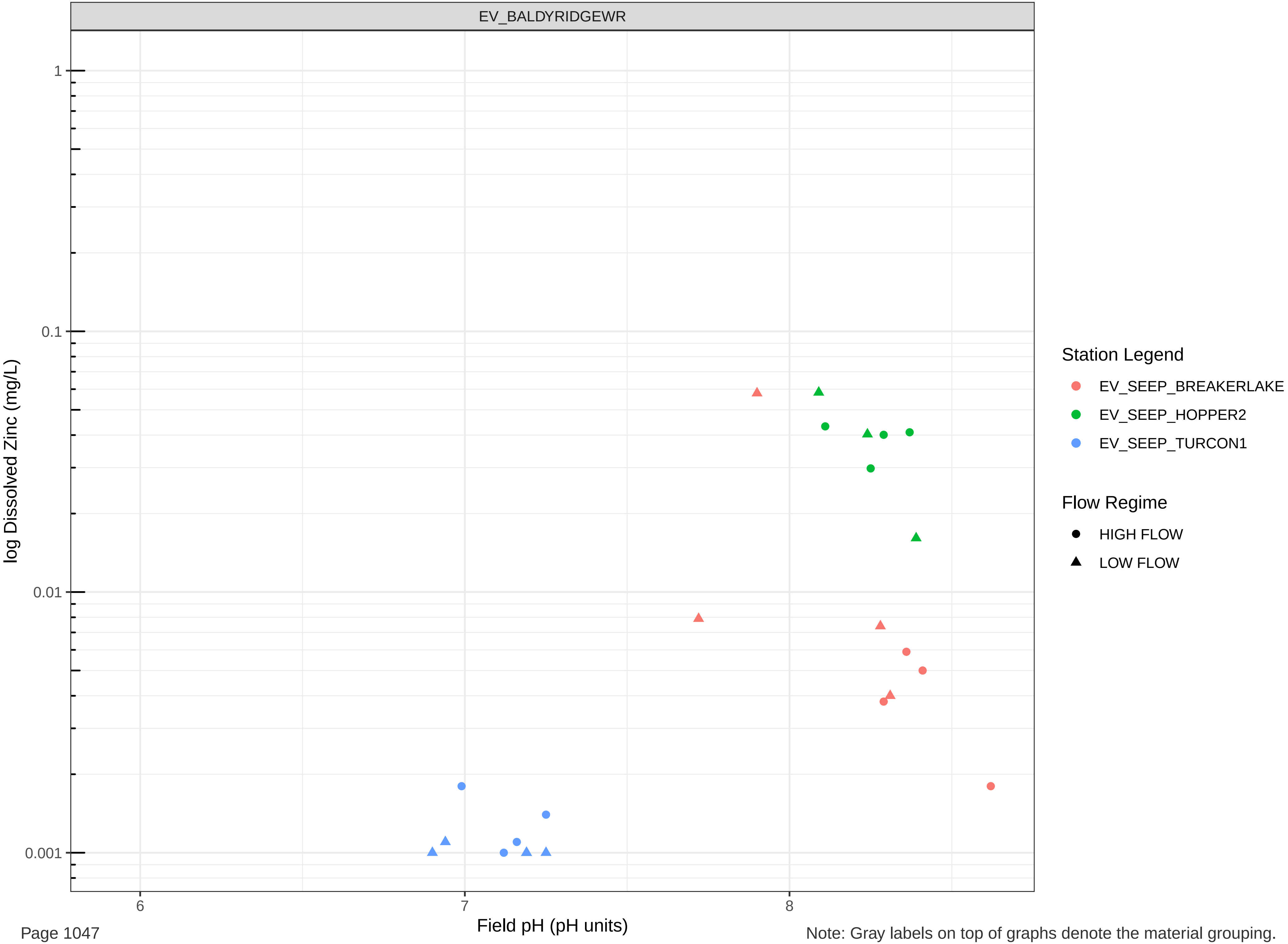

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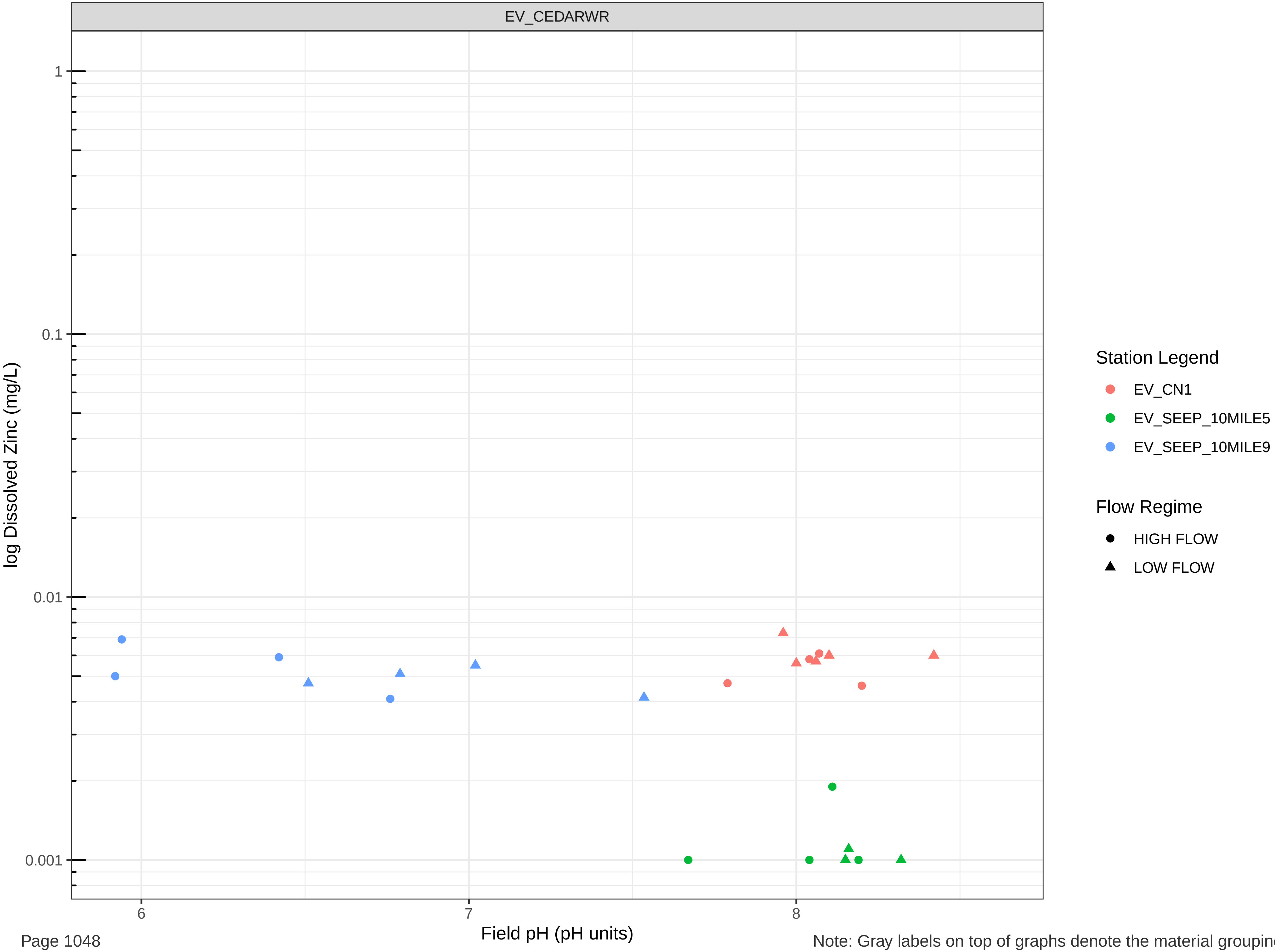

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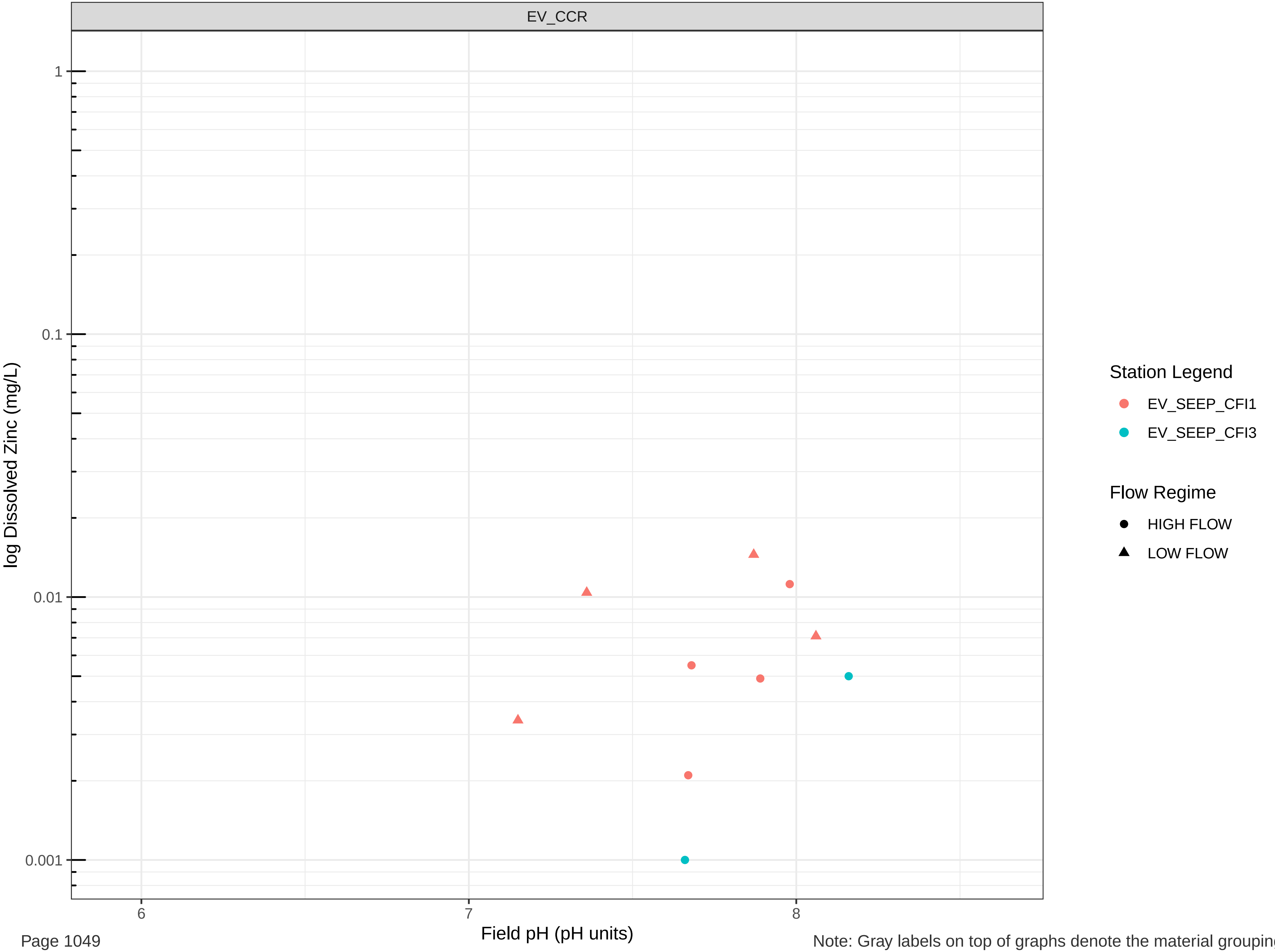

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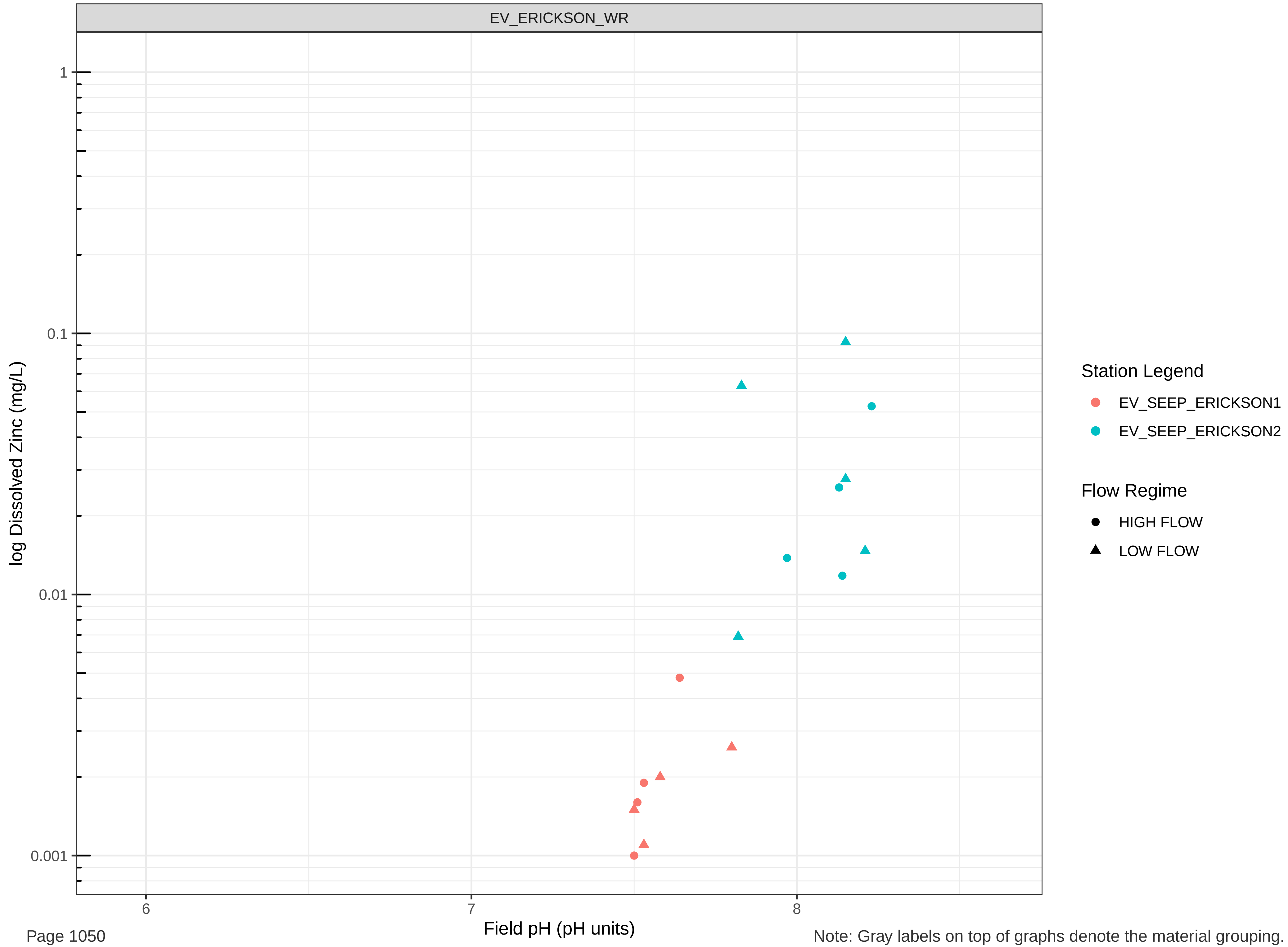

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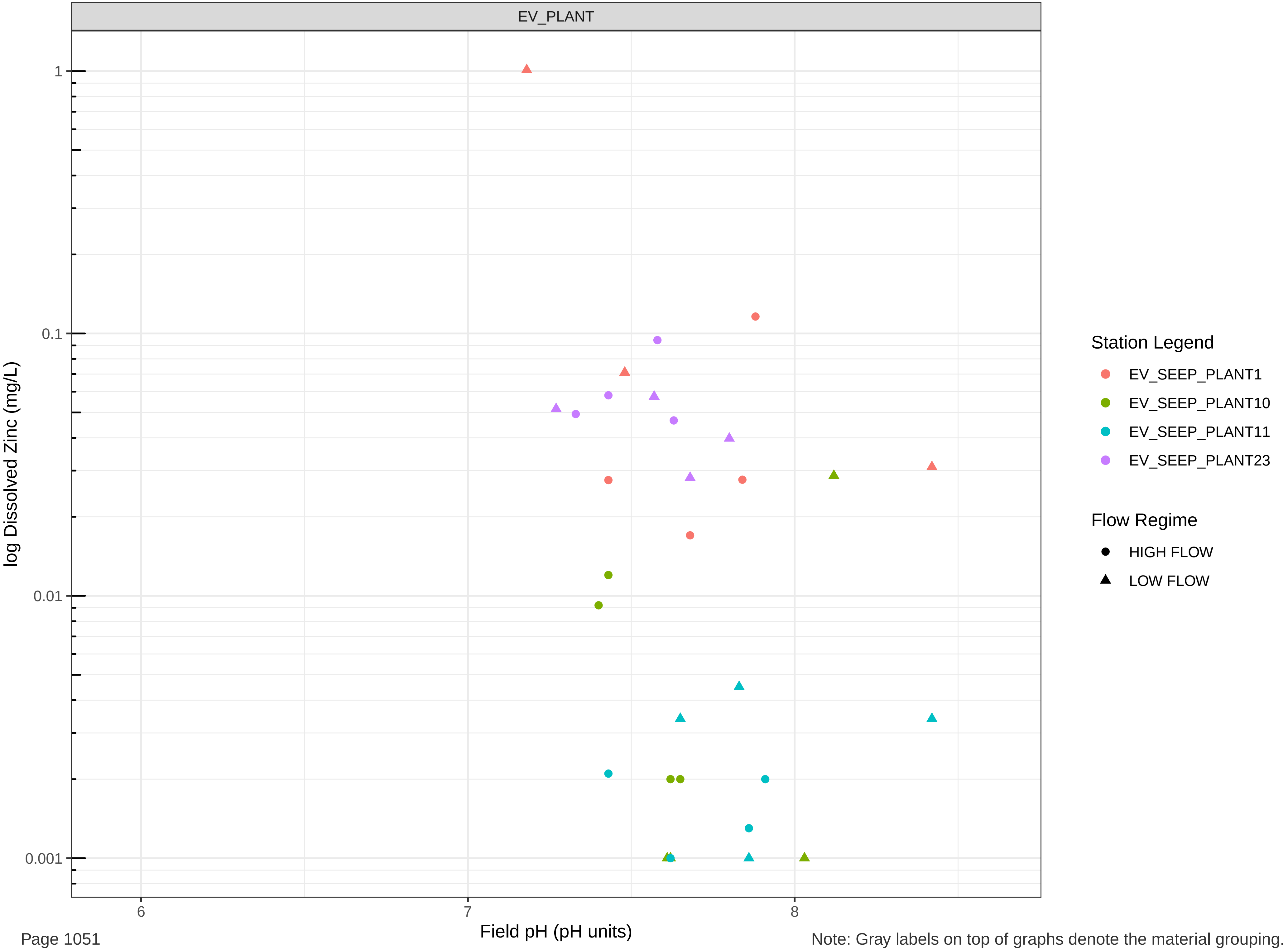

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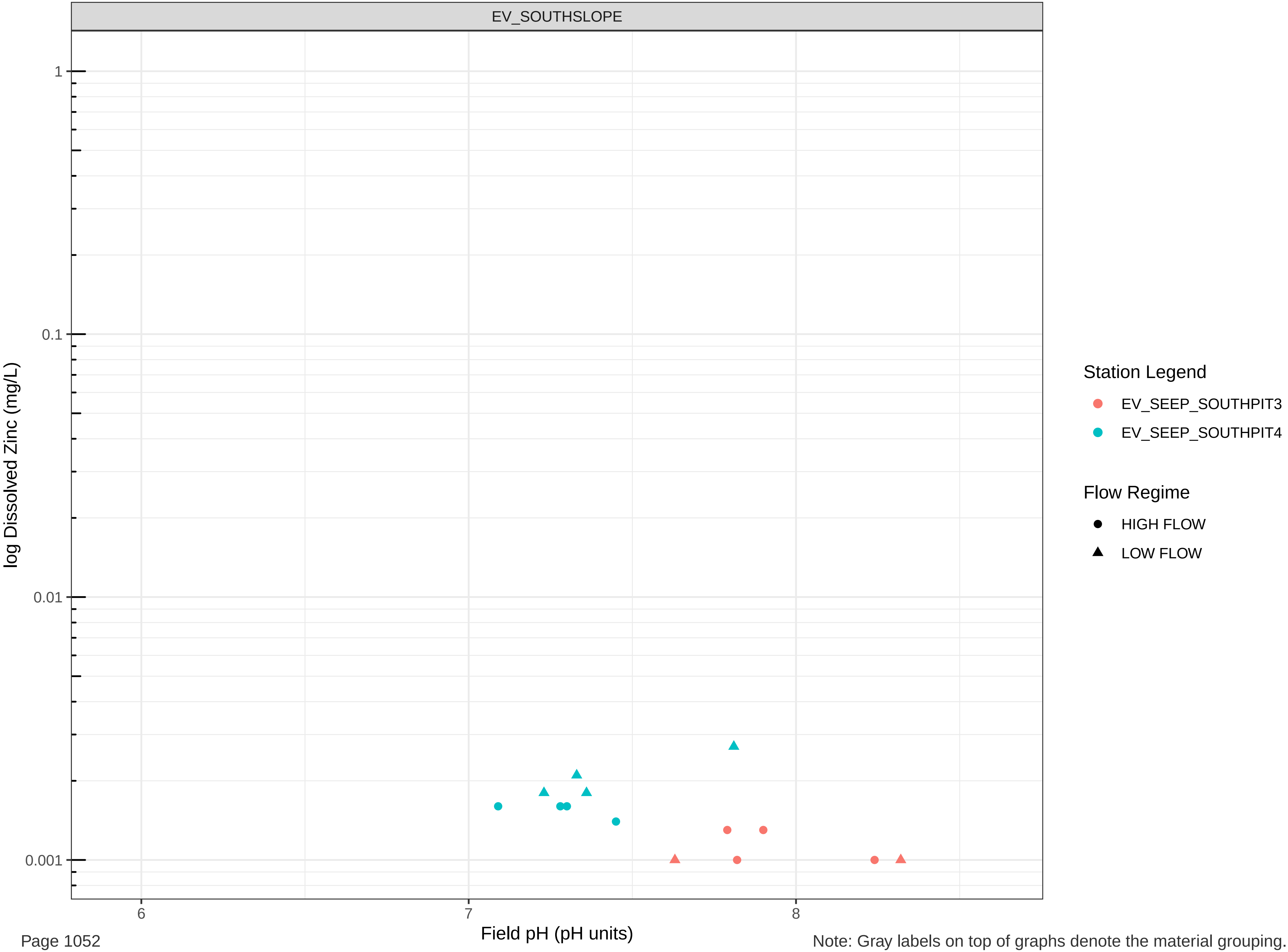

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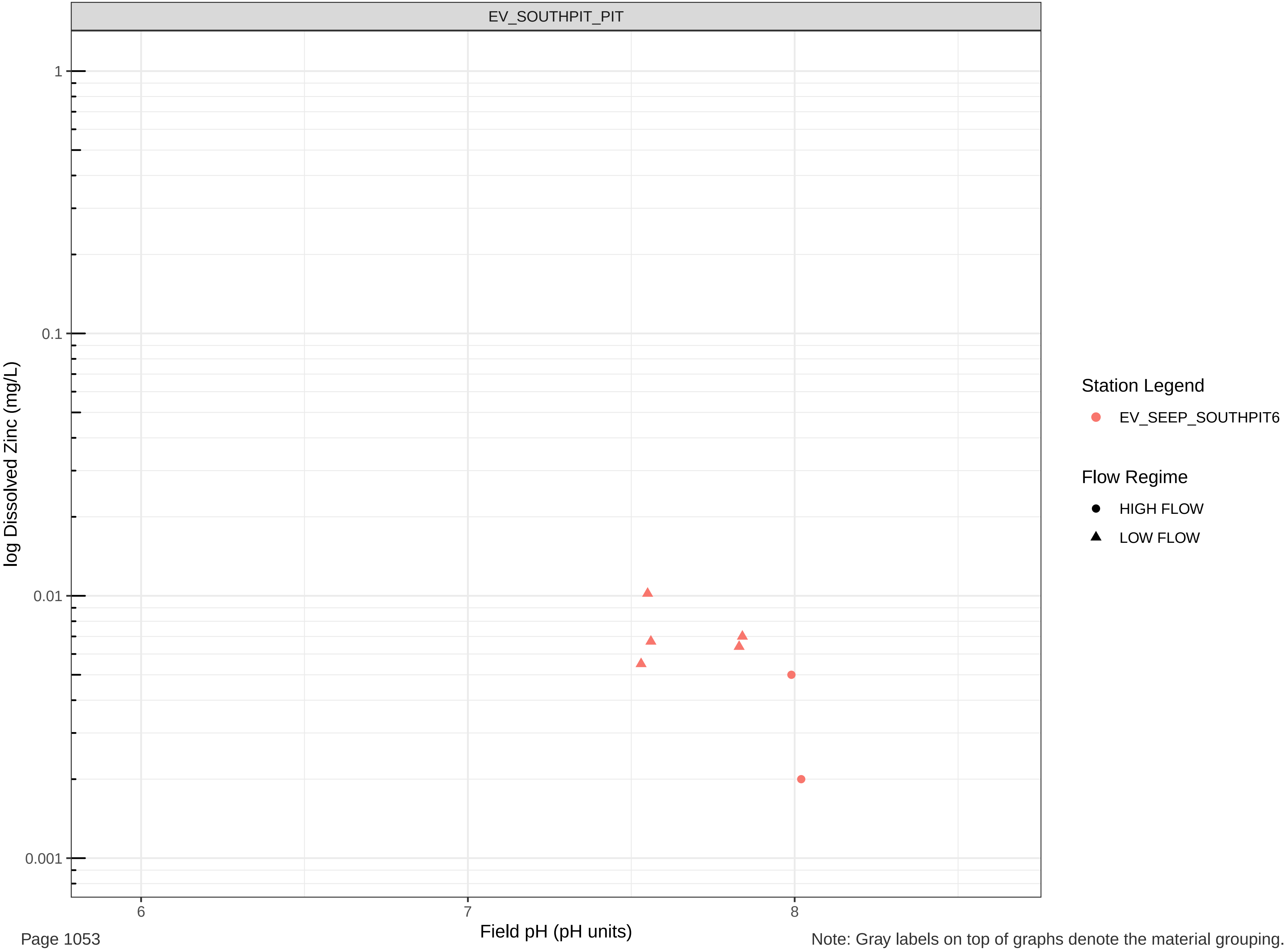

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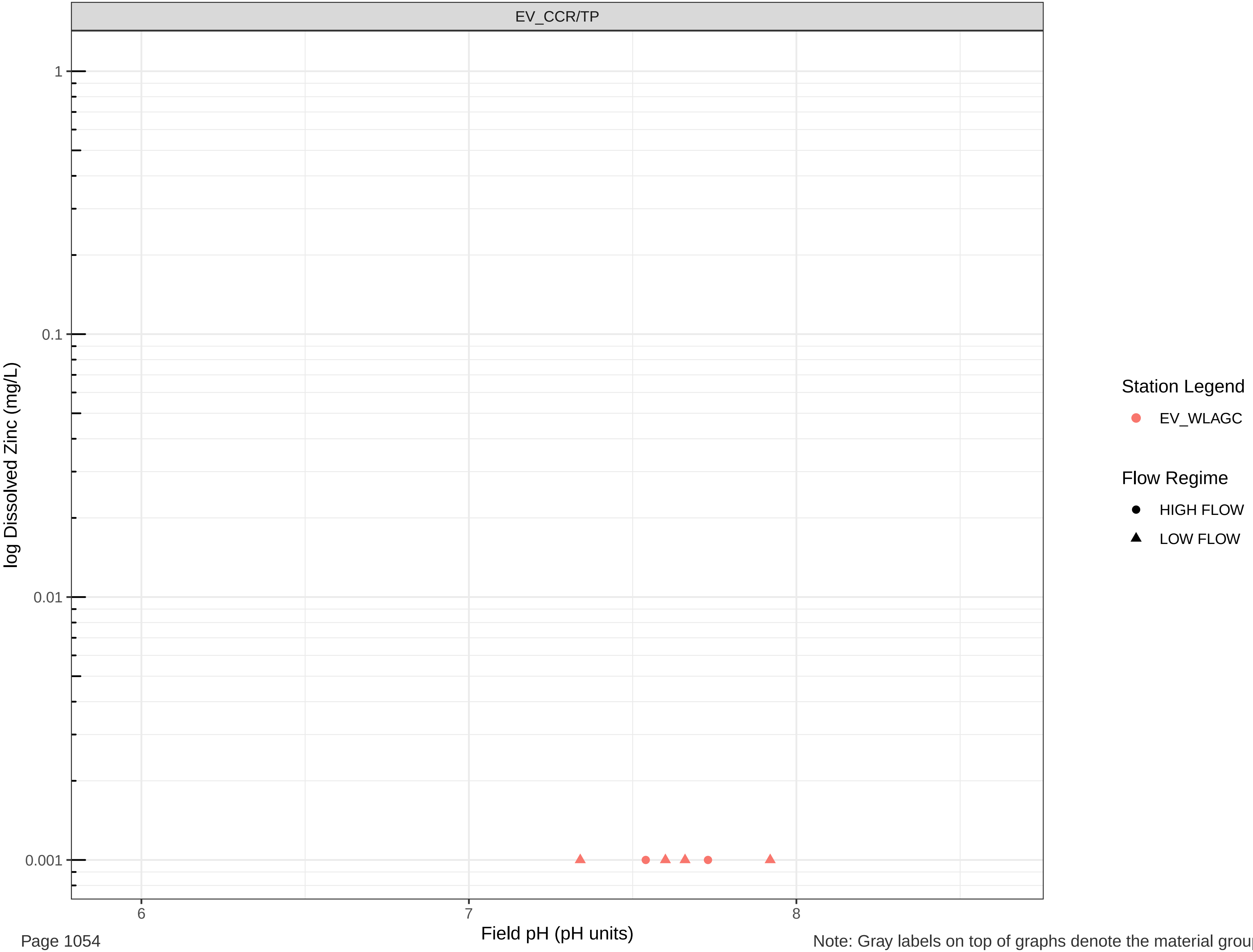

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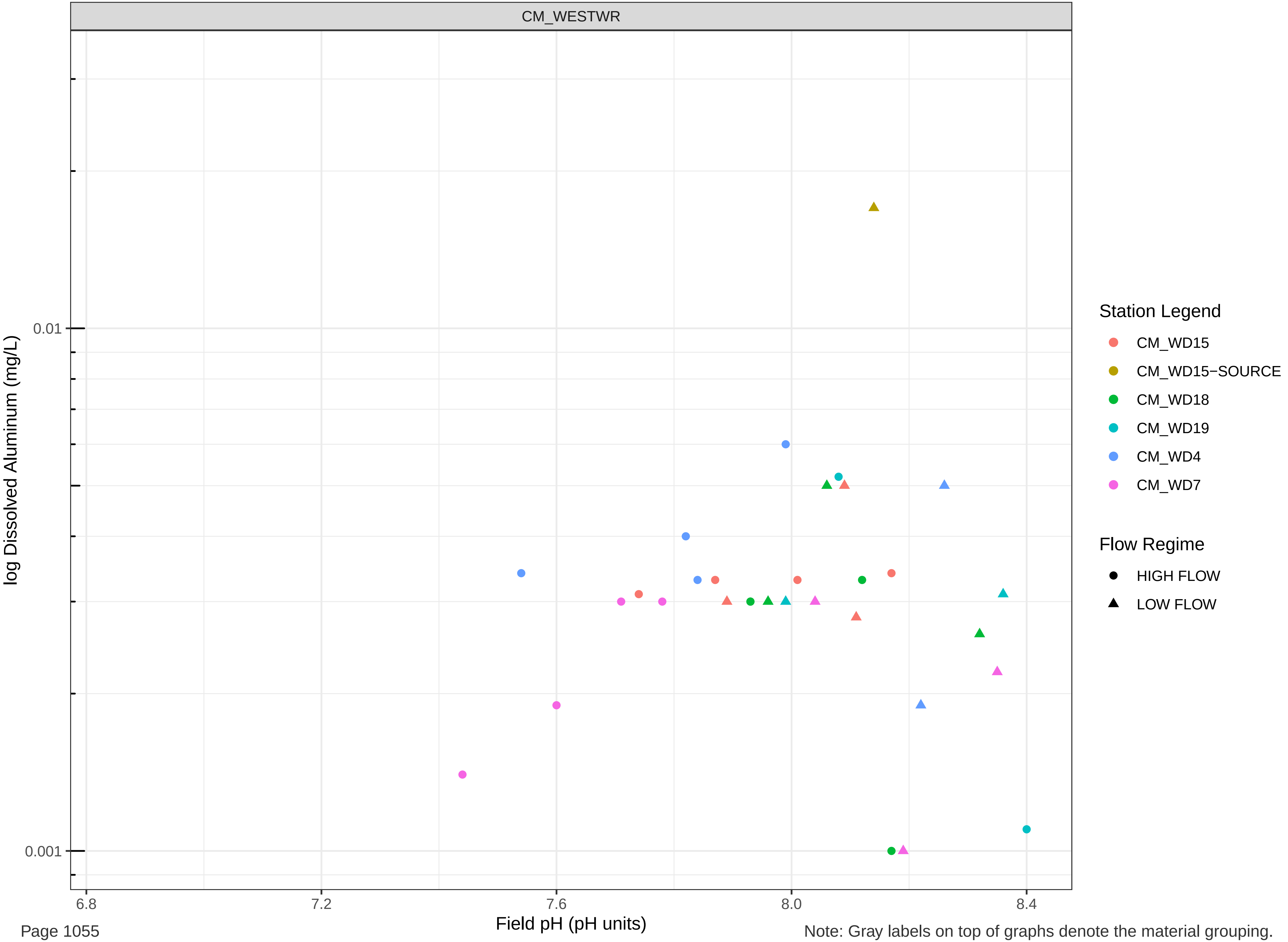

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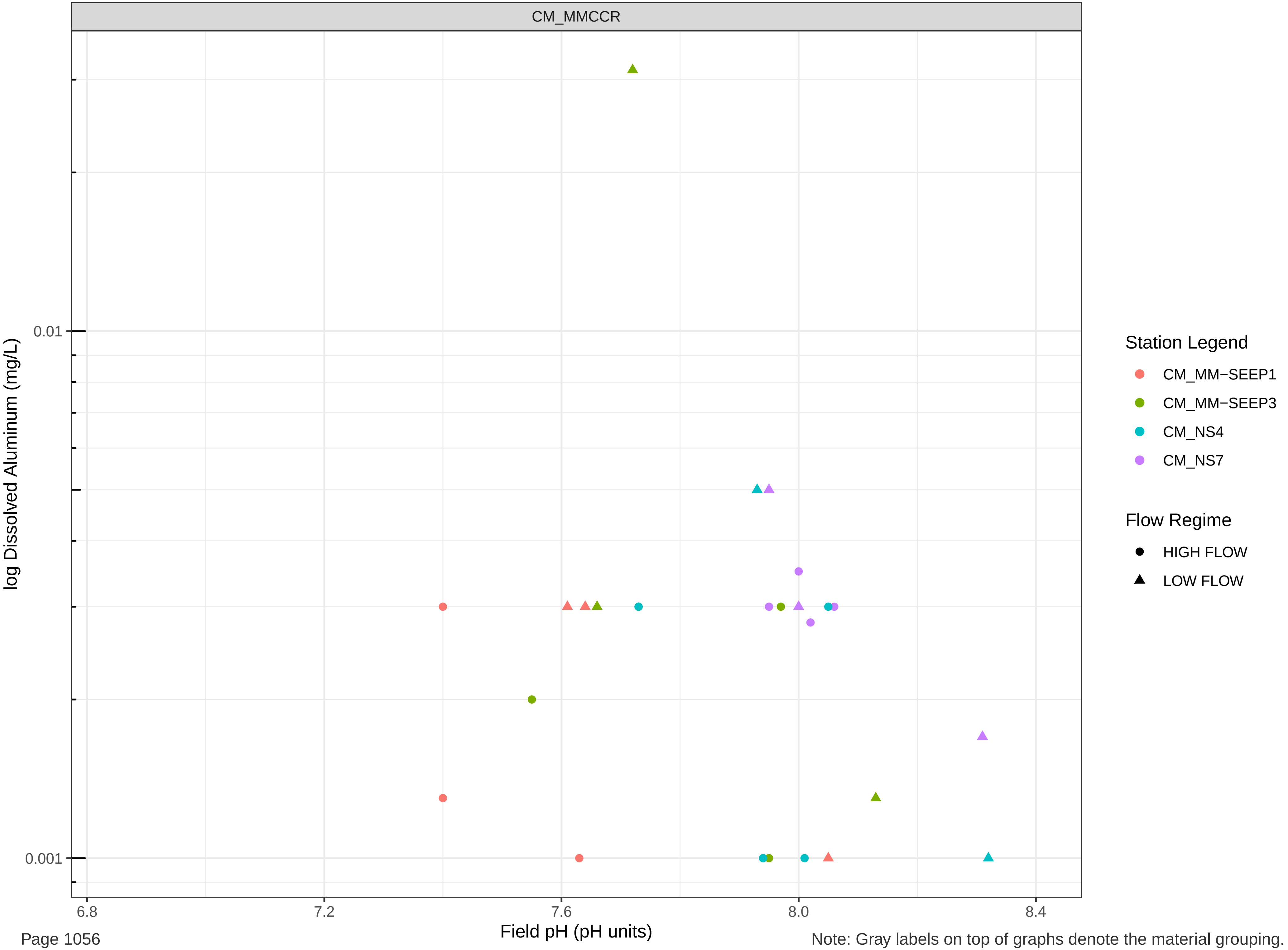

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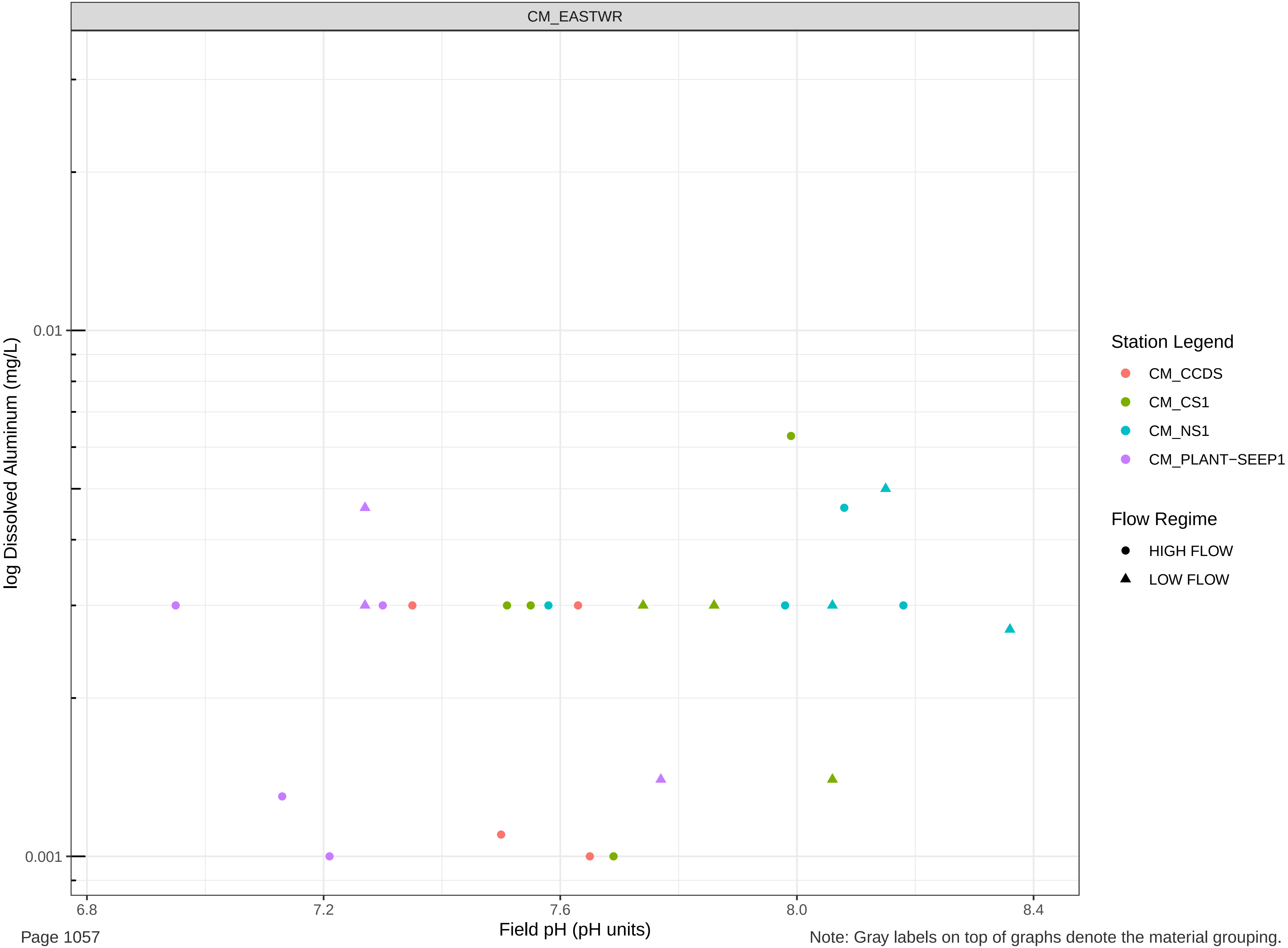

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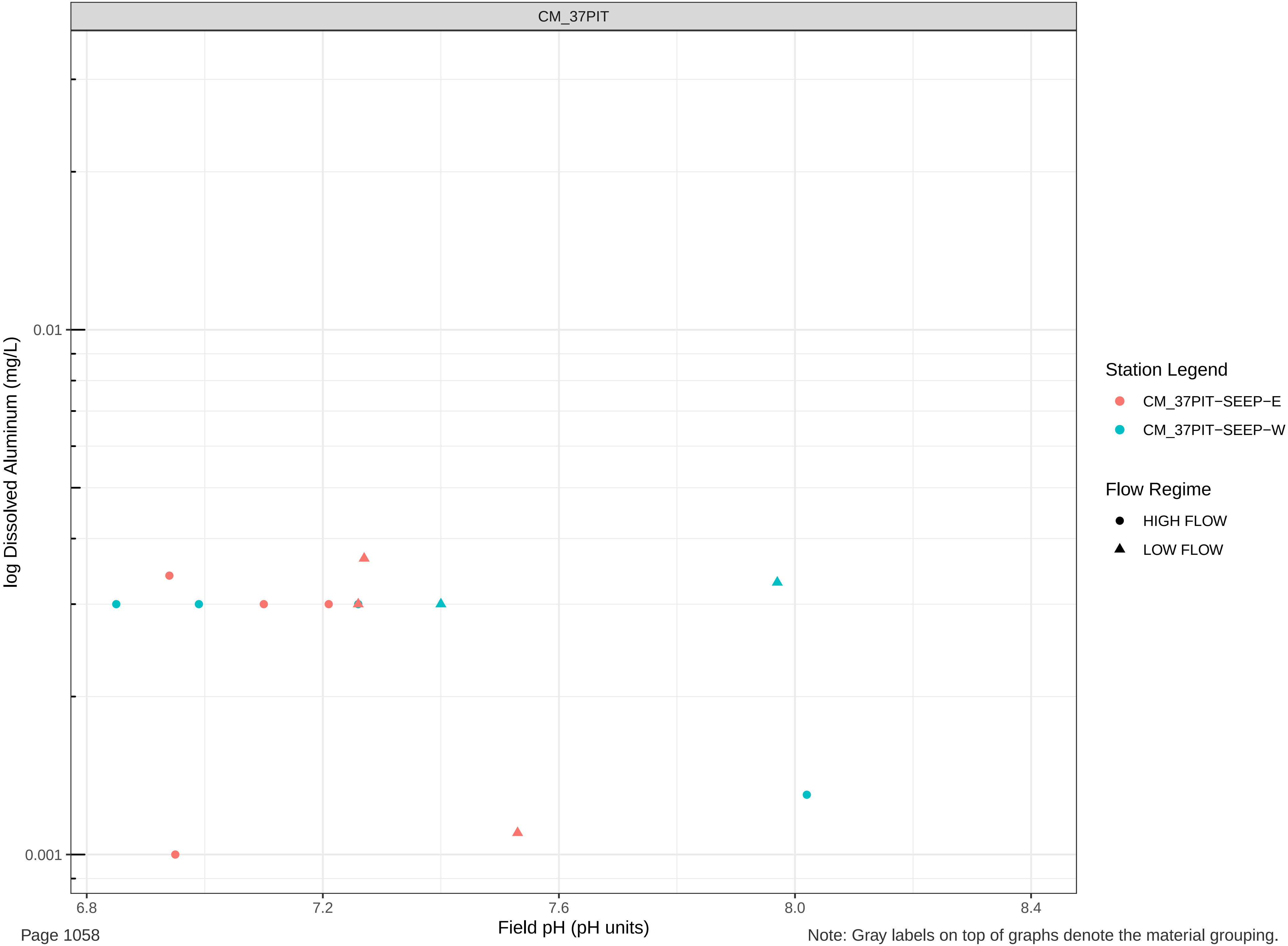

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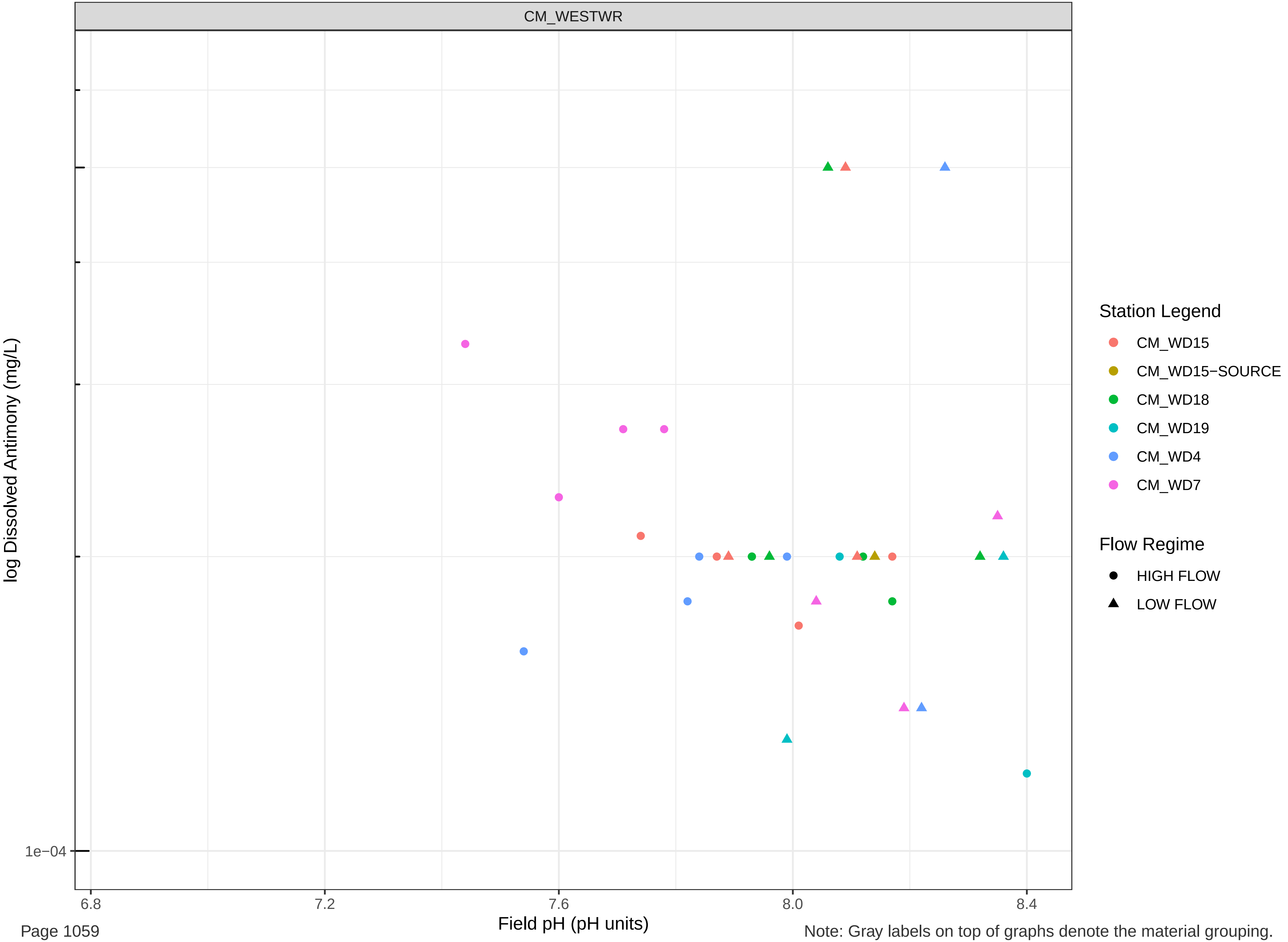

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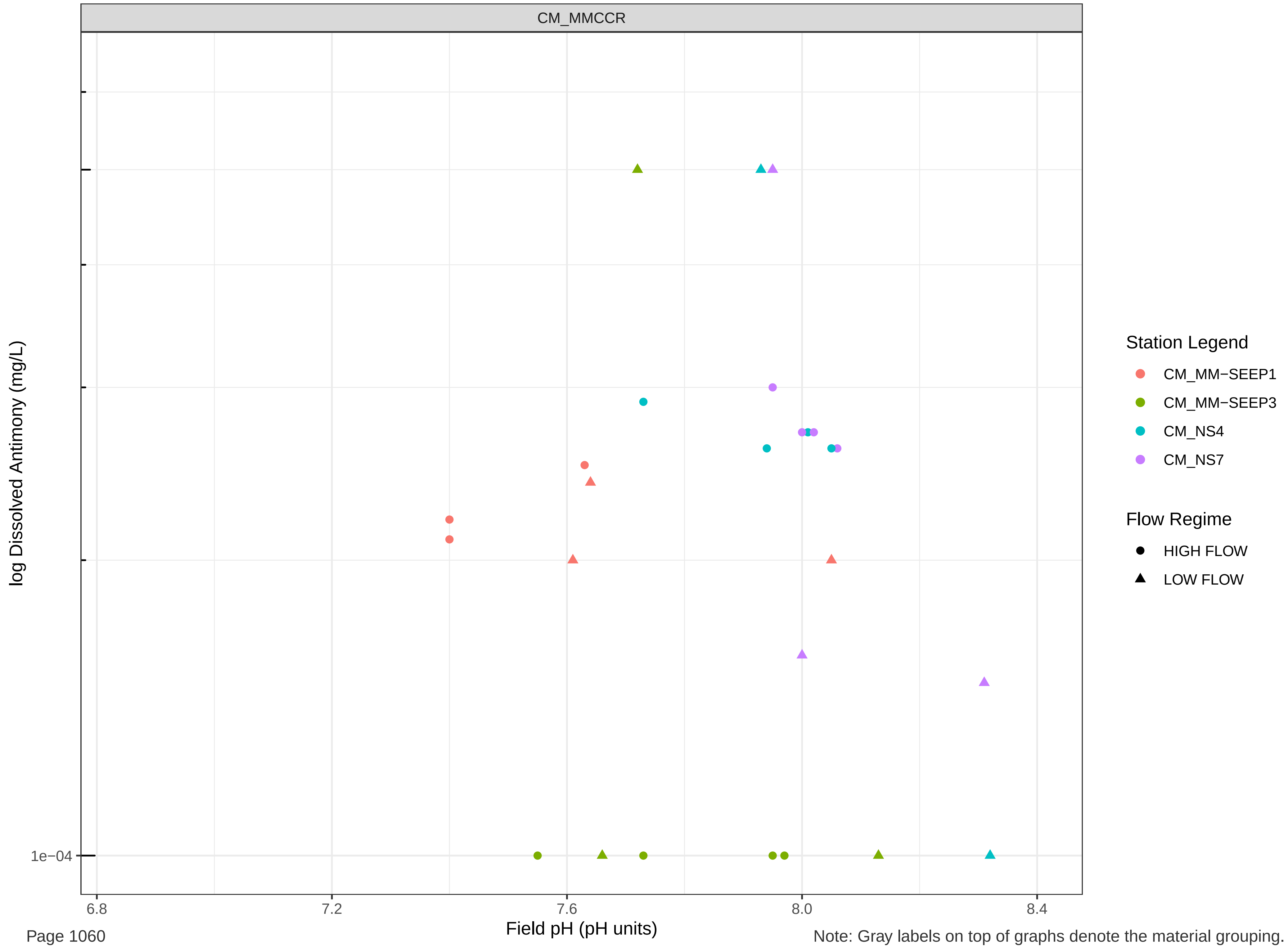

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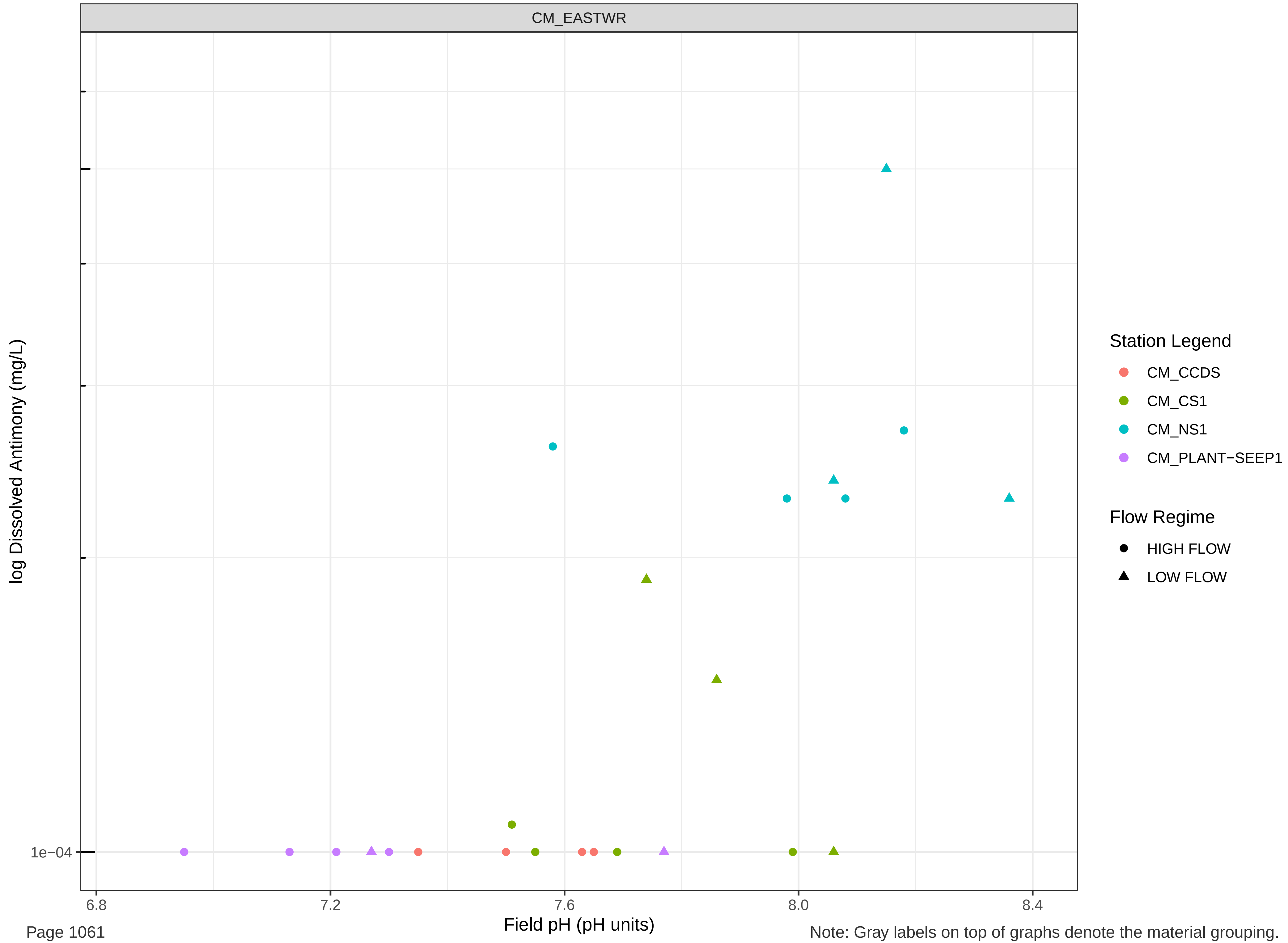

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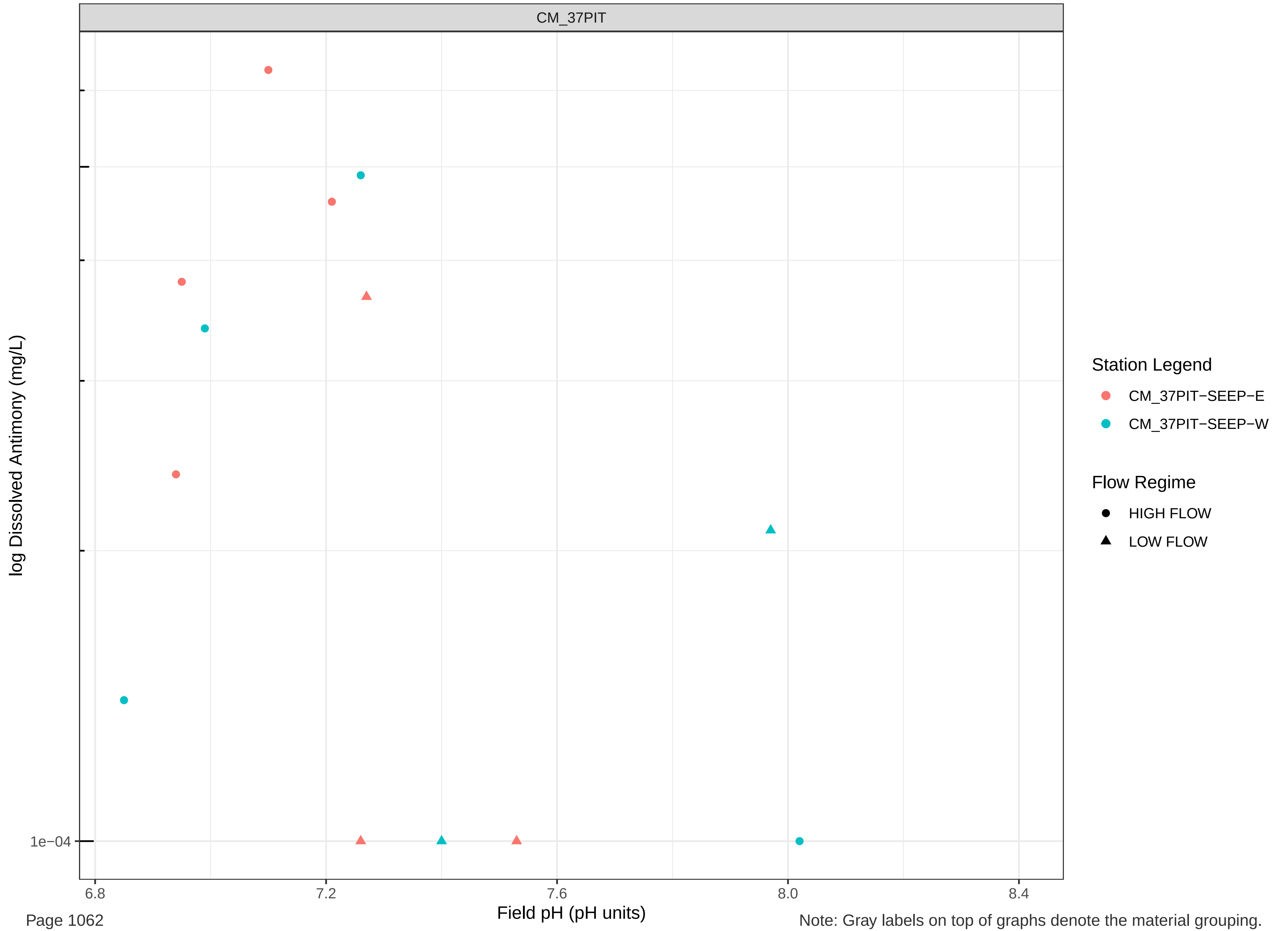

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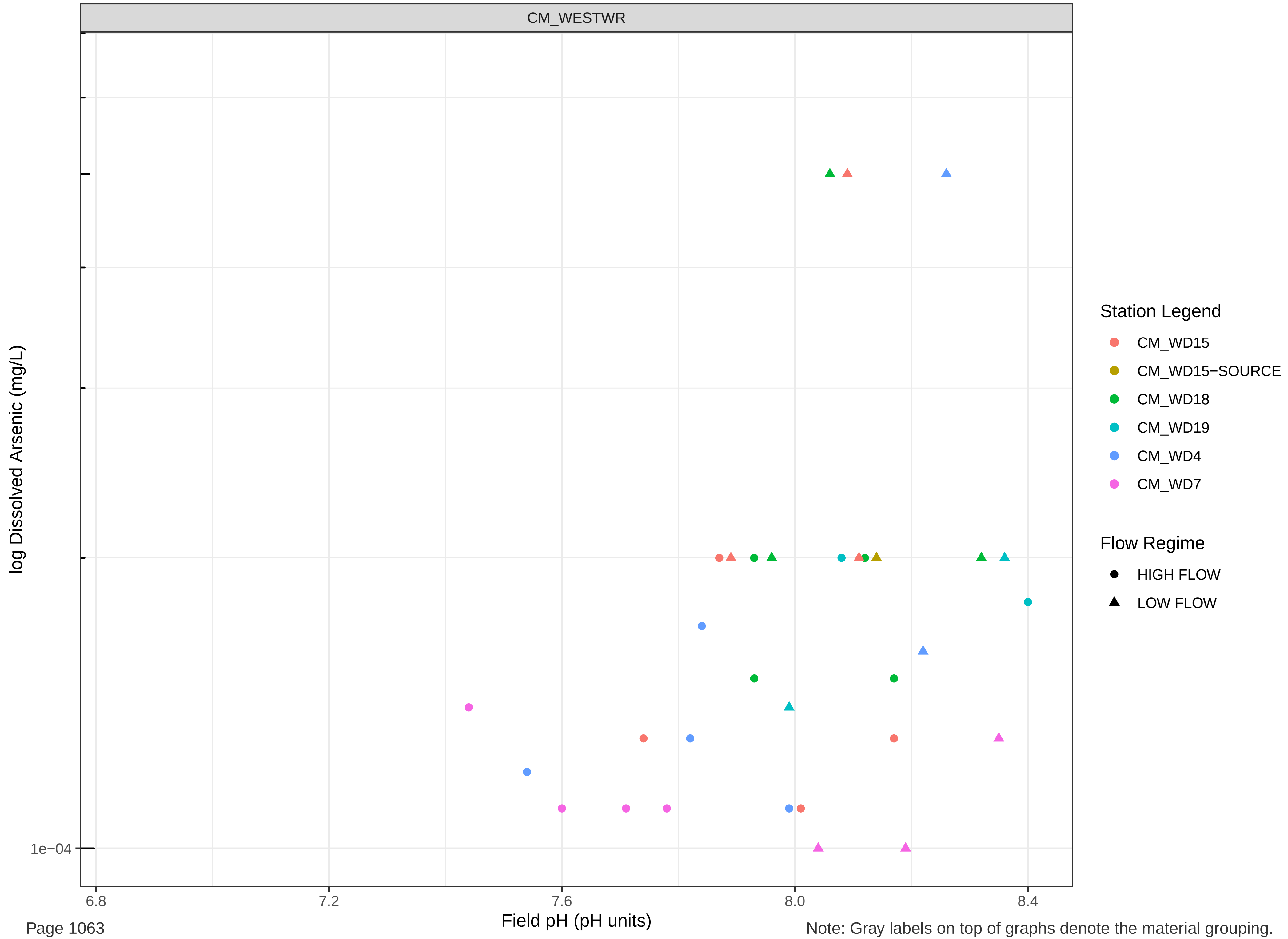

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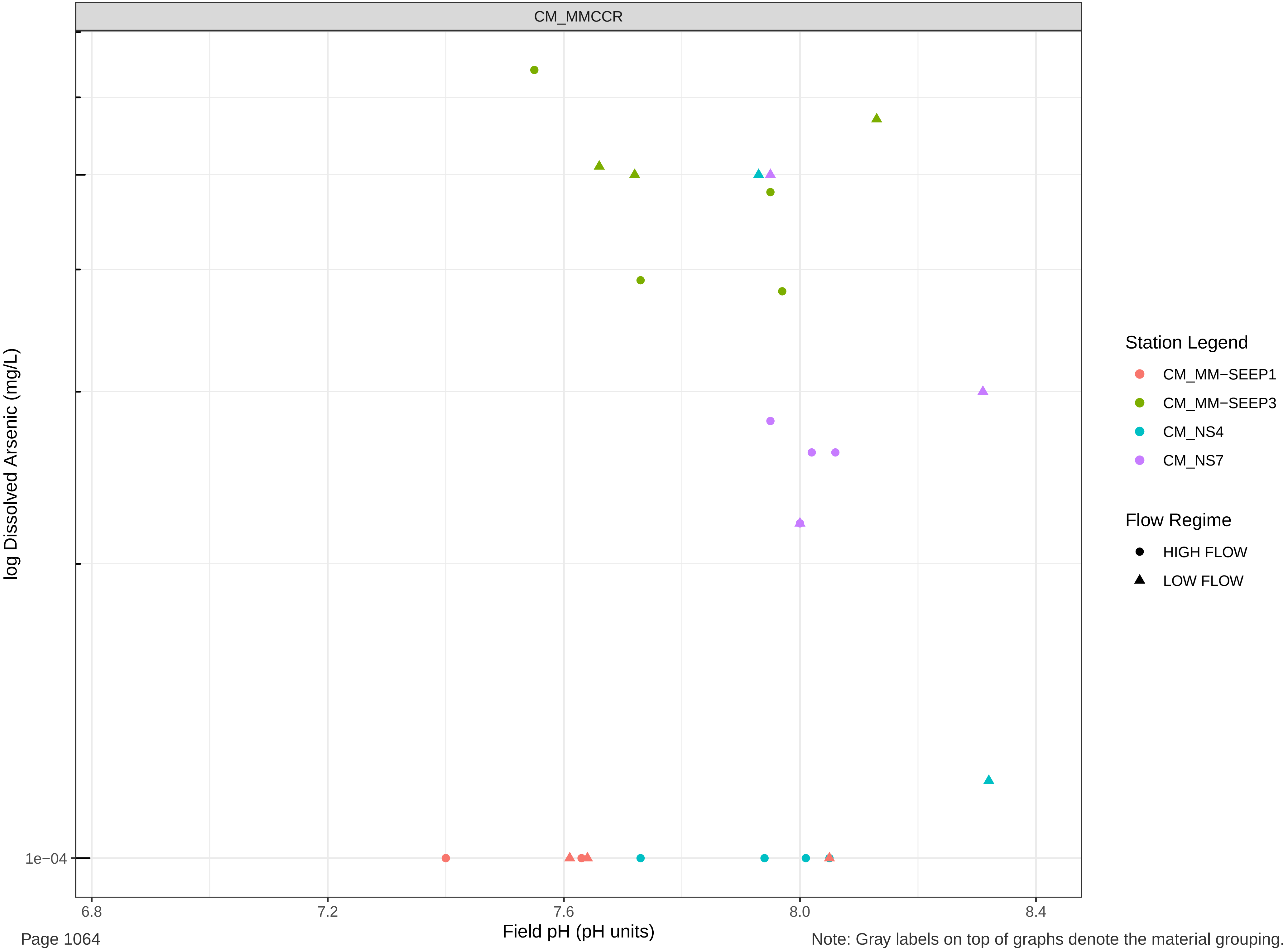

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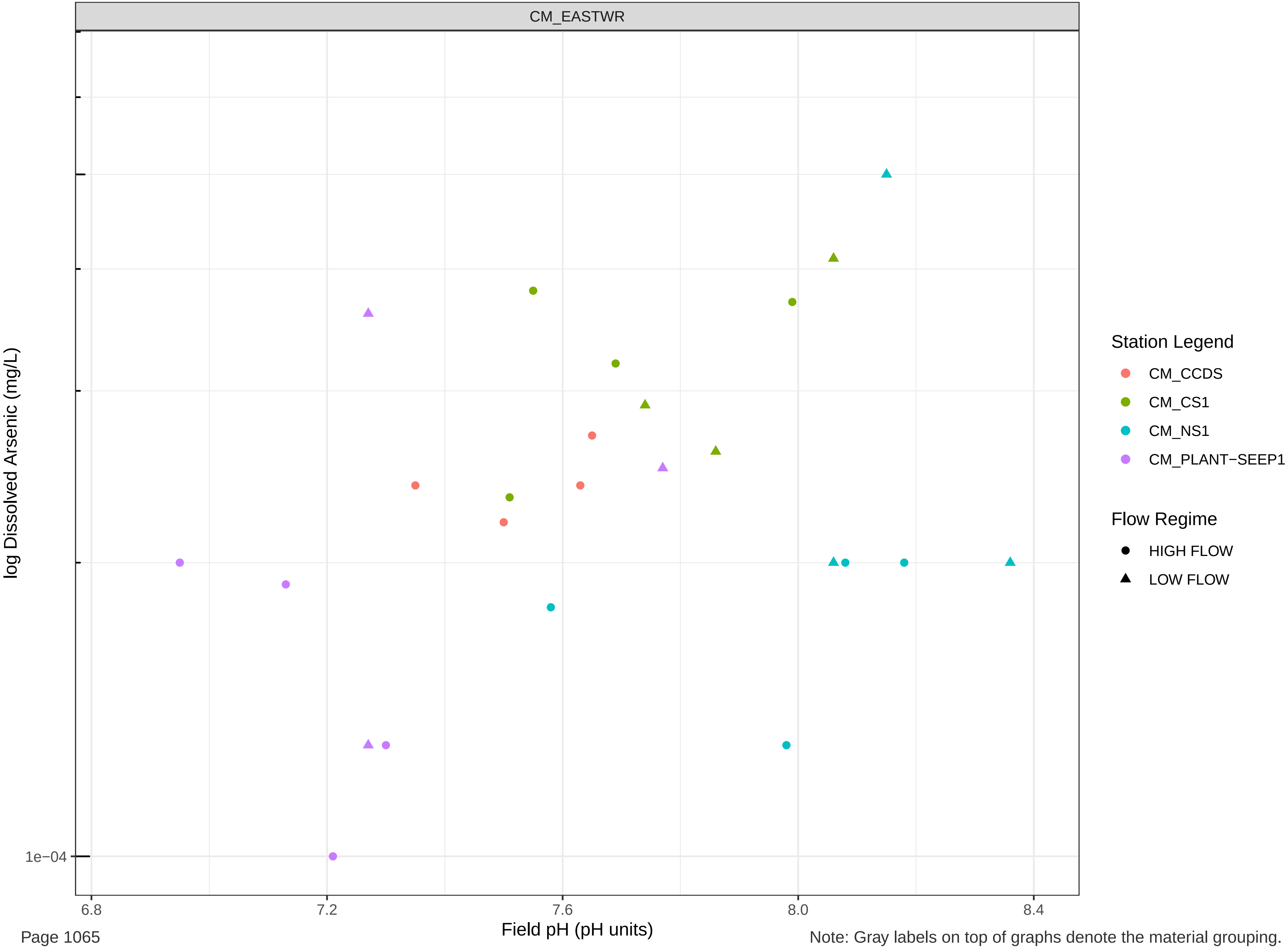

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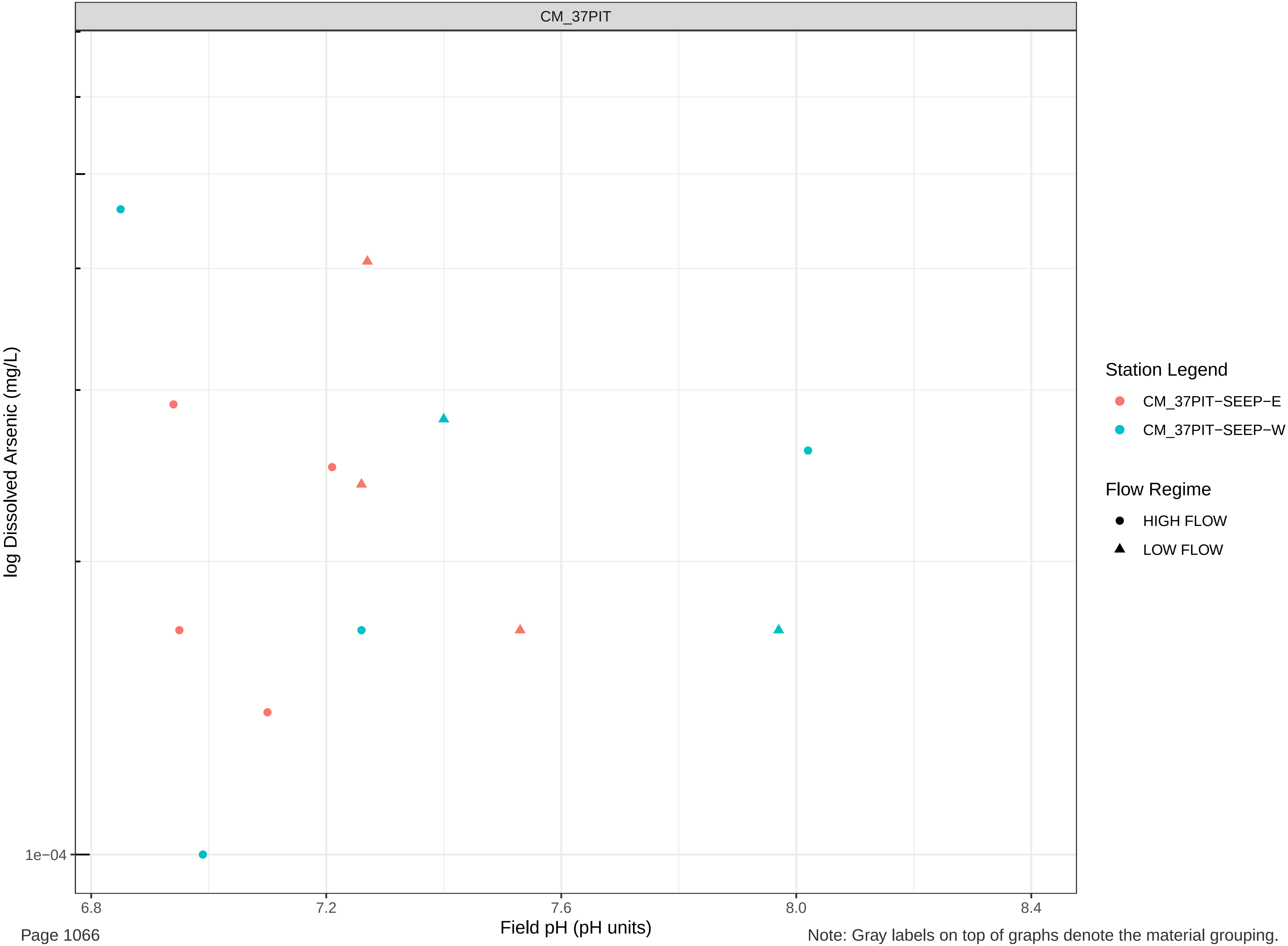

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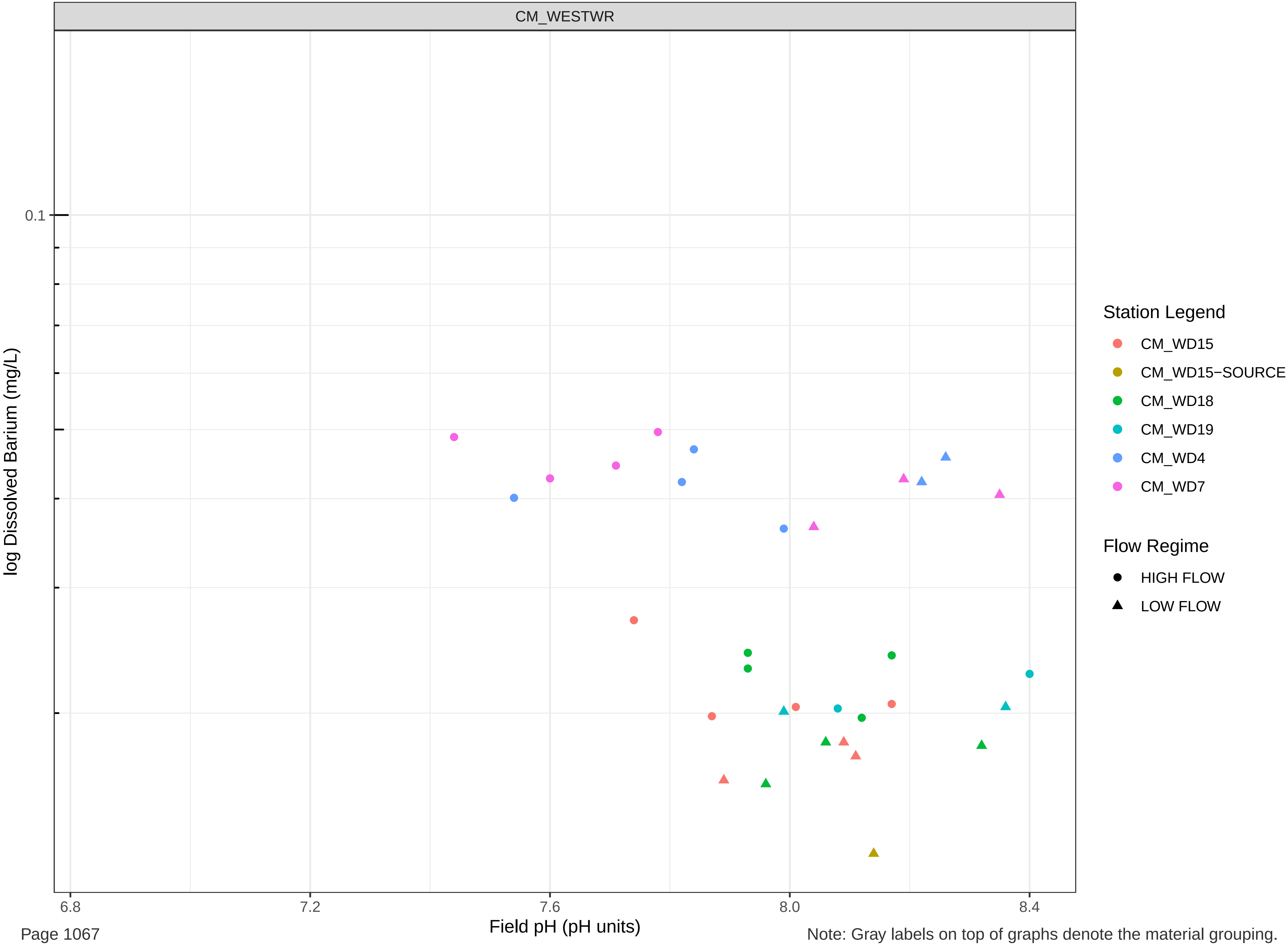

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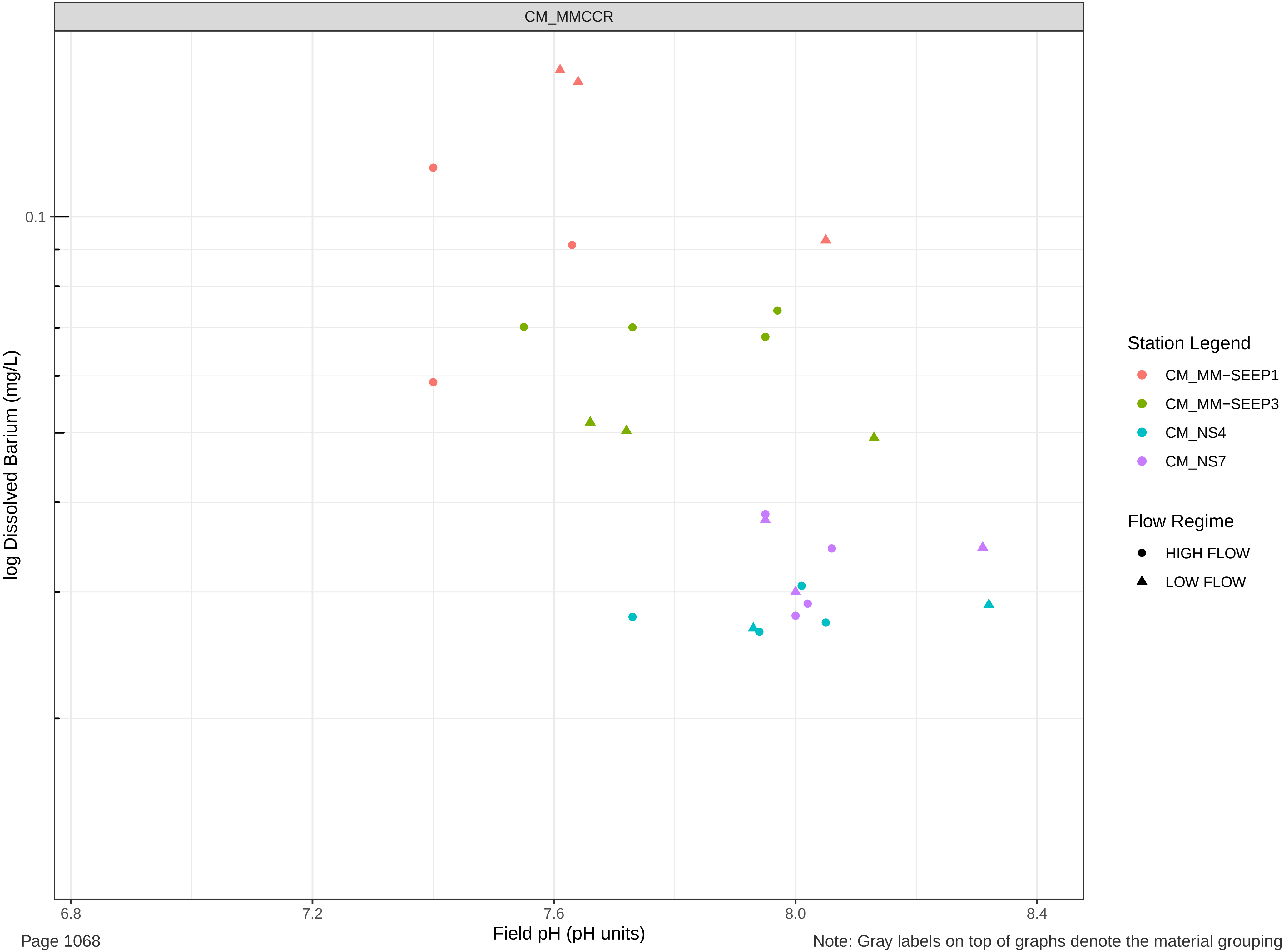

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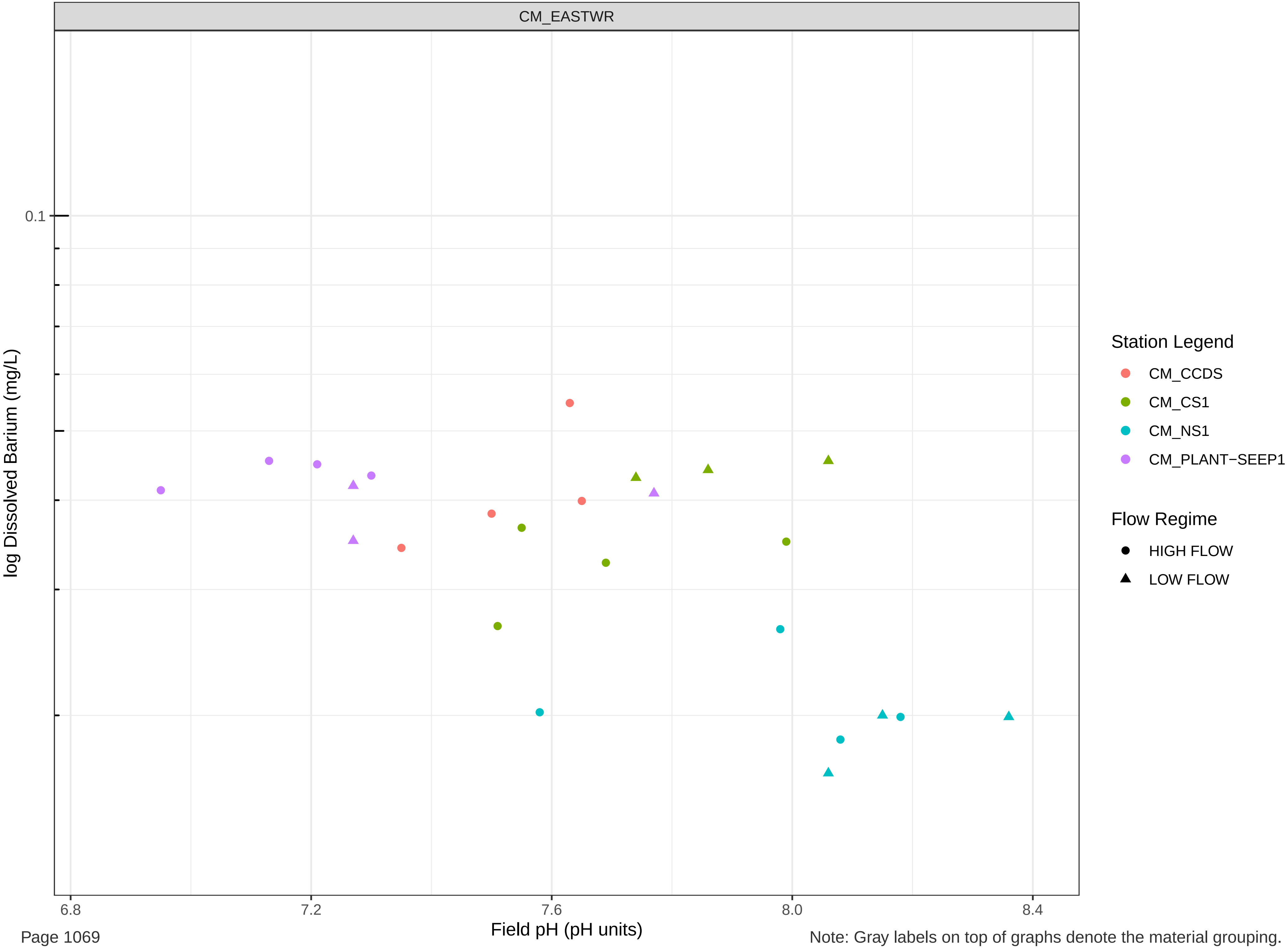

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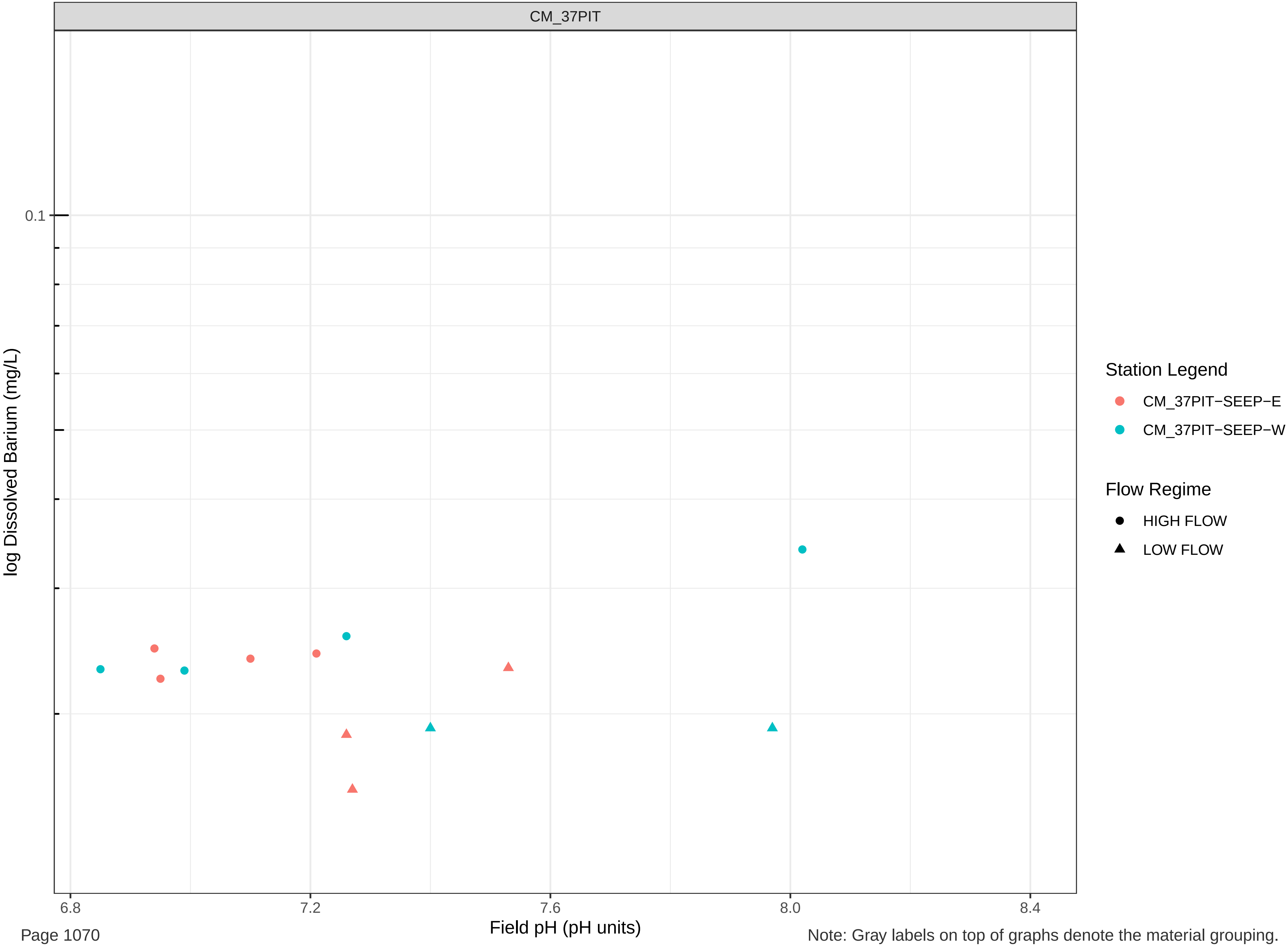

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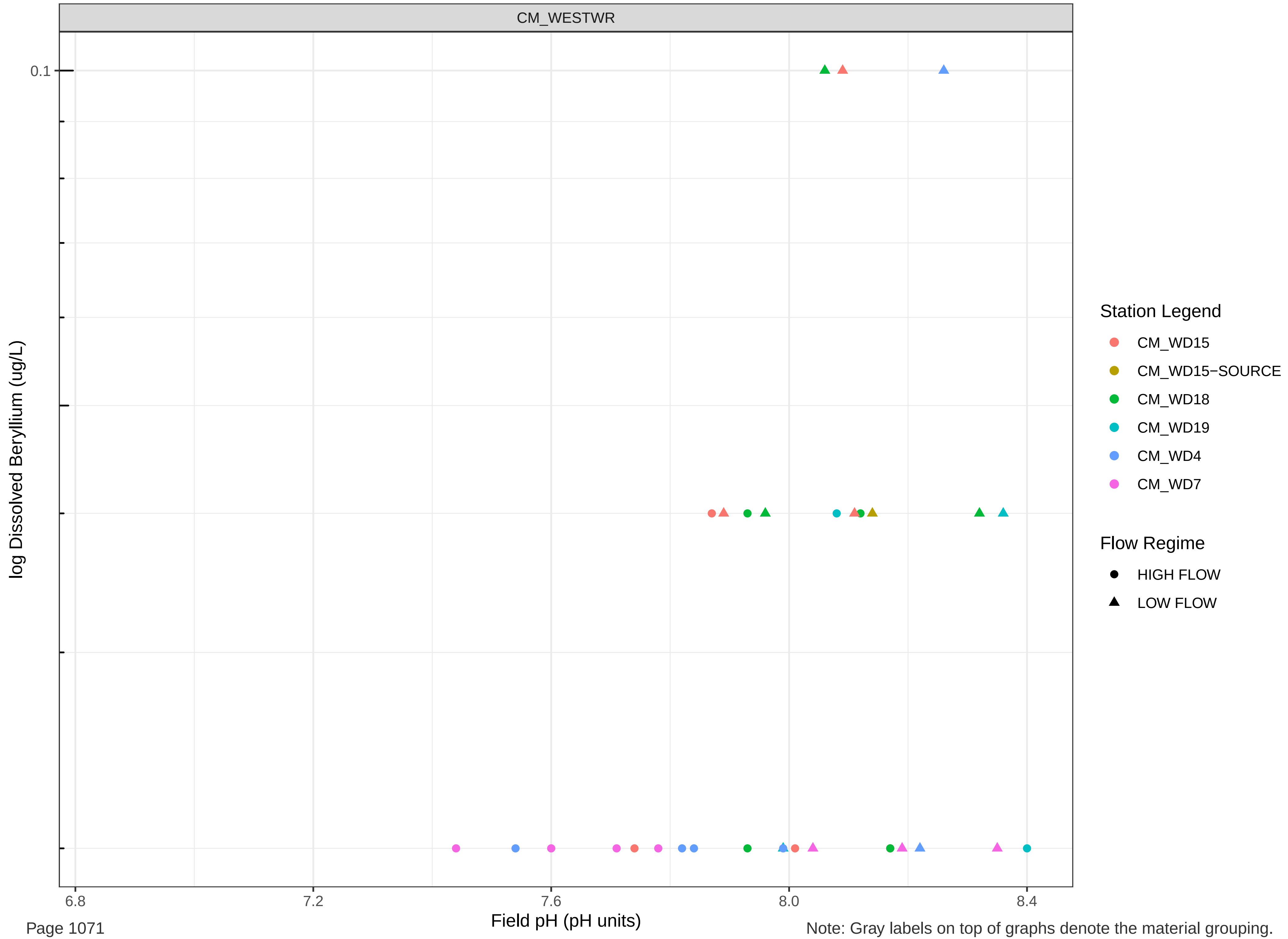

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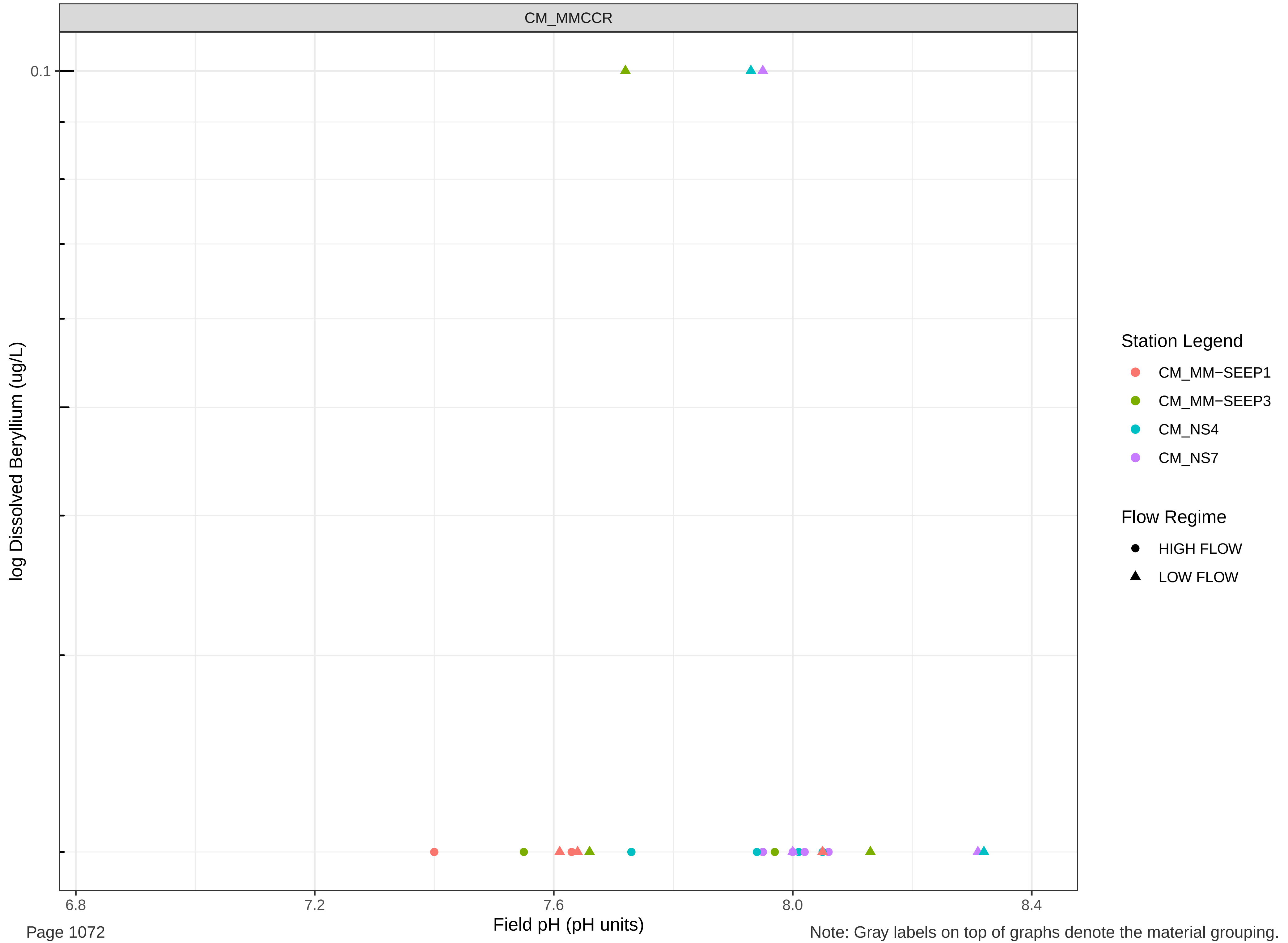
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log Dissolved Beryllium (ug/L)
6.8
7.2
7.6
8.0
8.4
Field pH (pH units)
Station Legend
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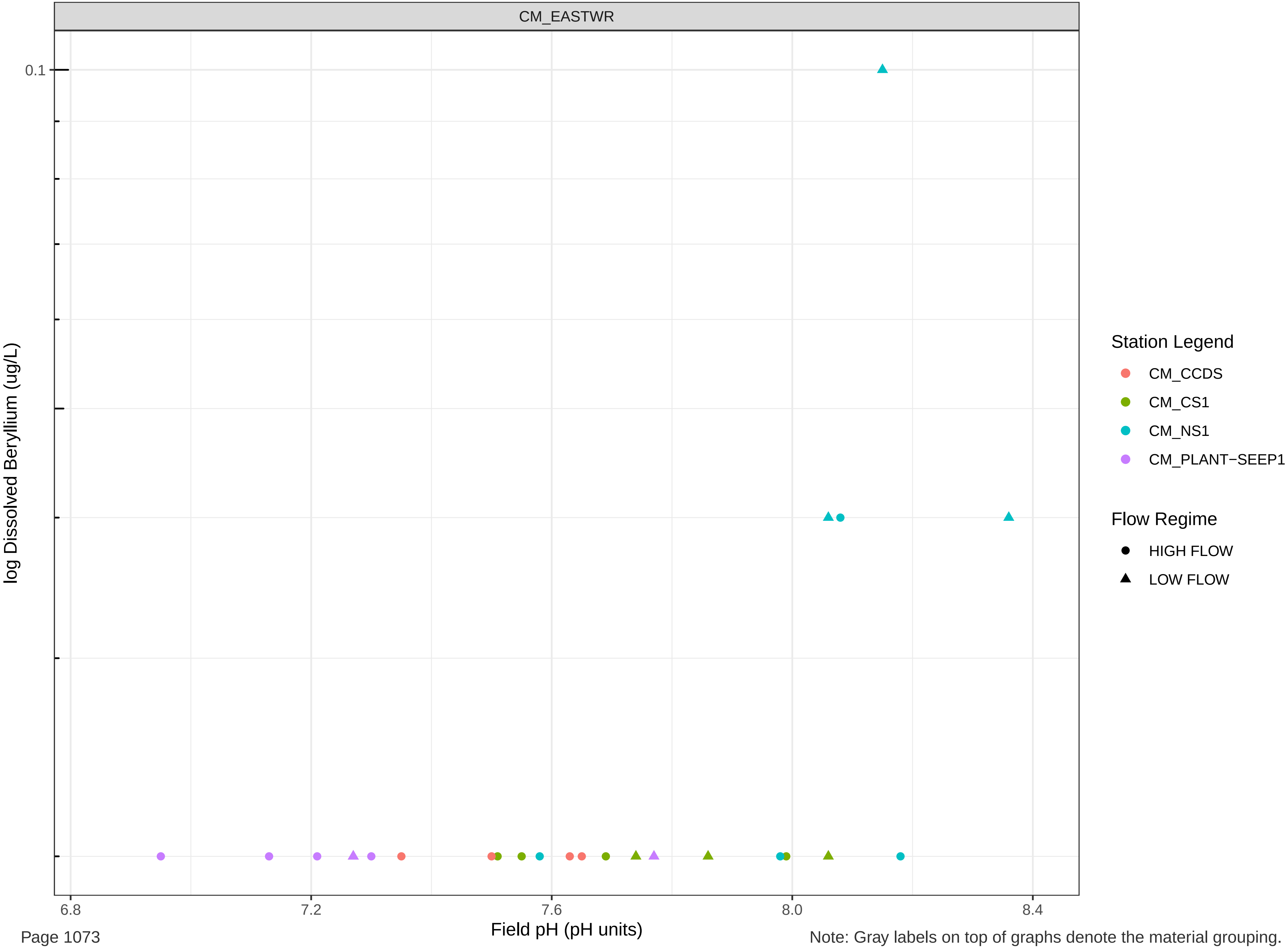
CM_NS7
Flow Regime
HIGH FLOW
LOW FLOW



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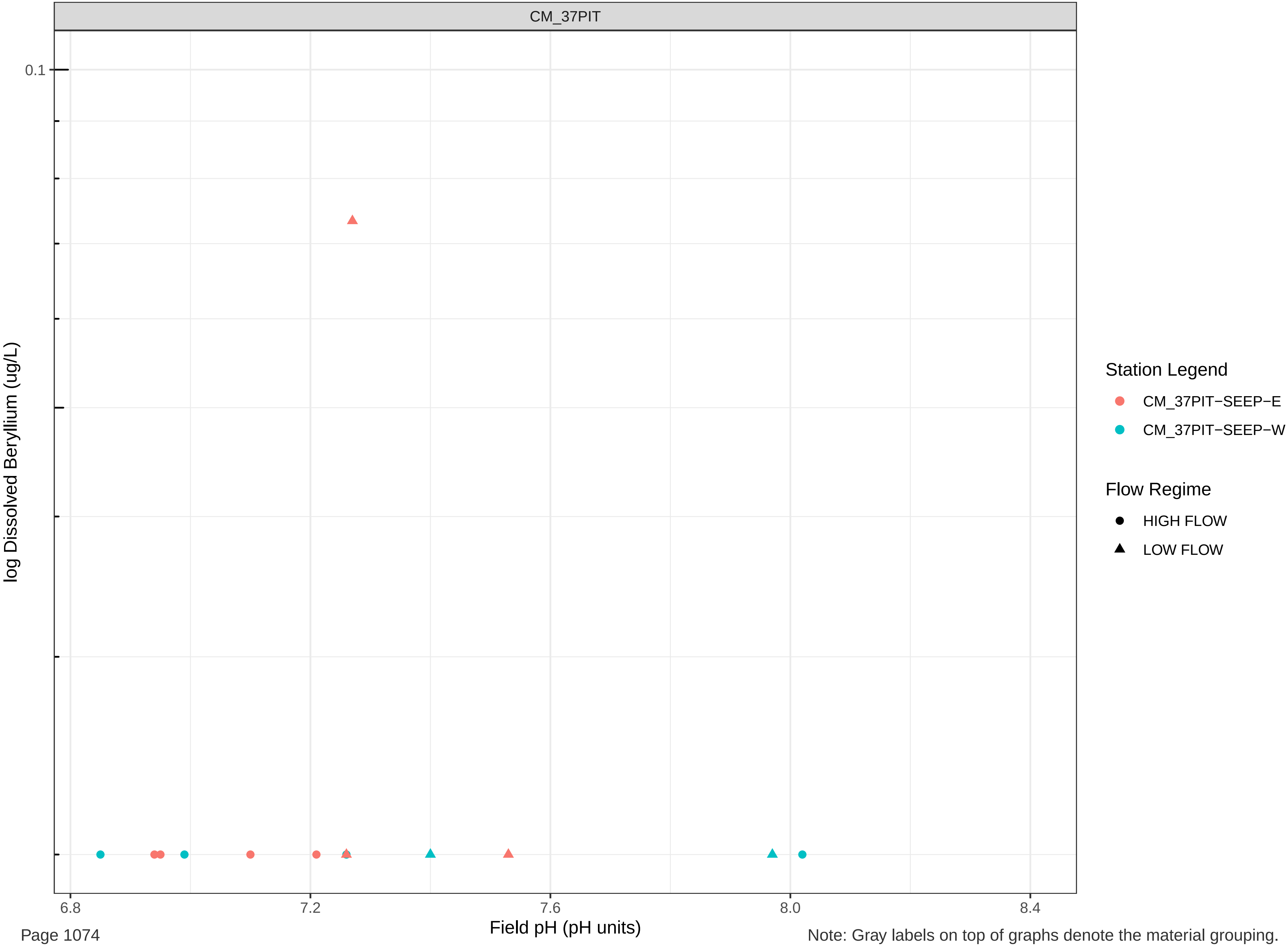

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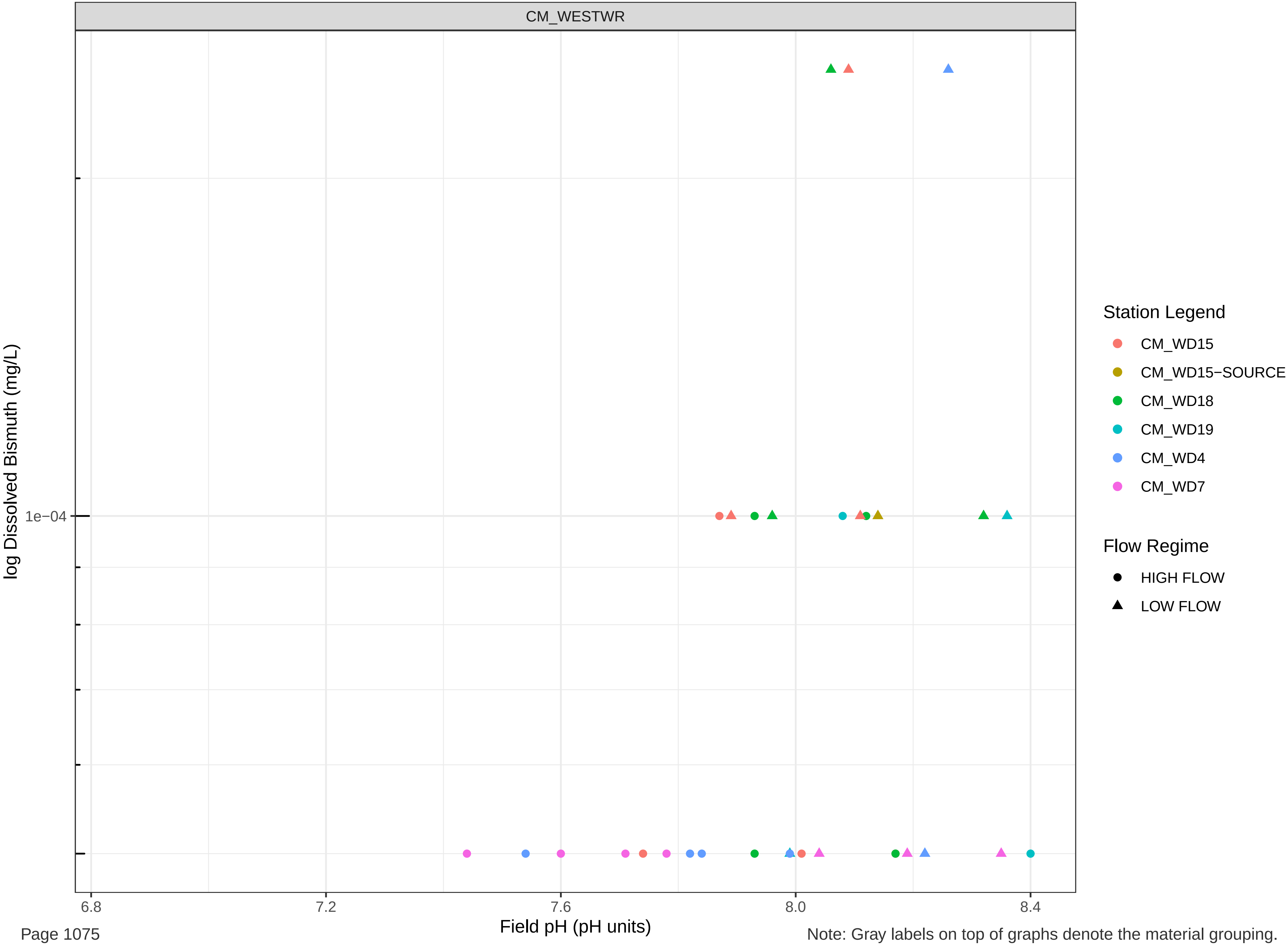

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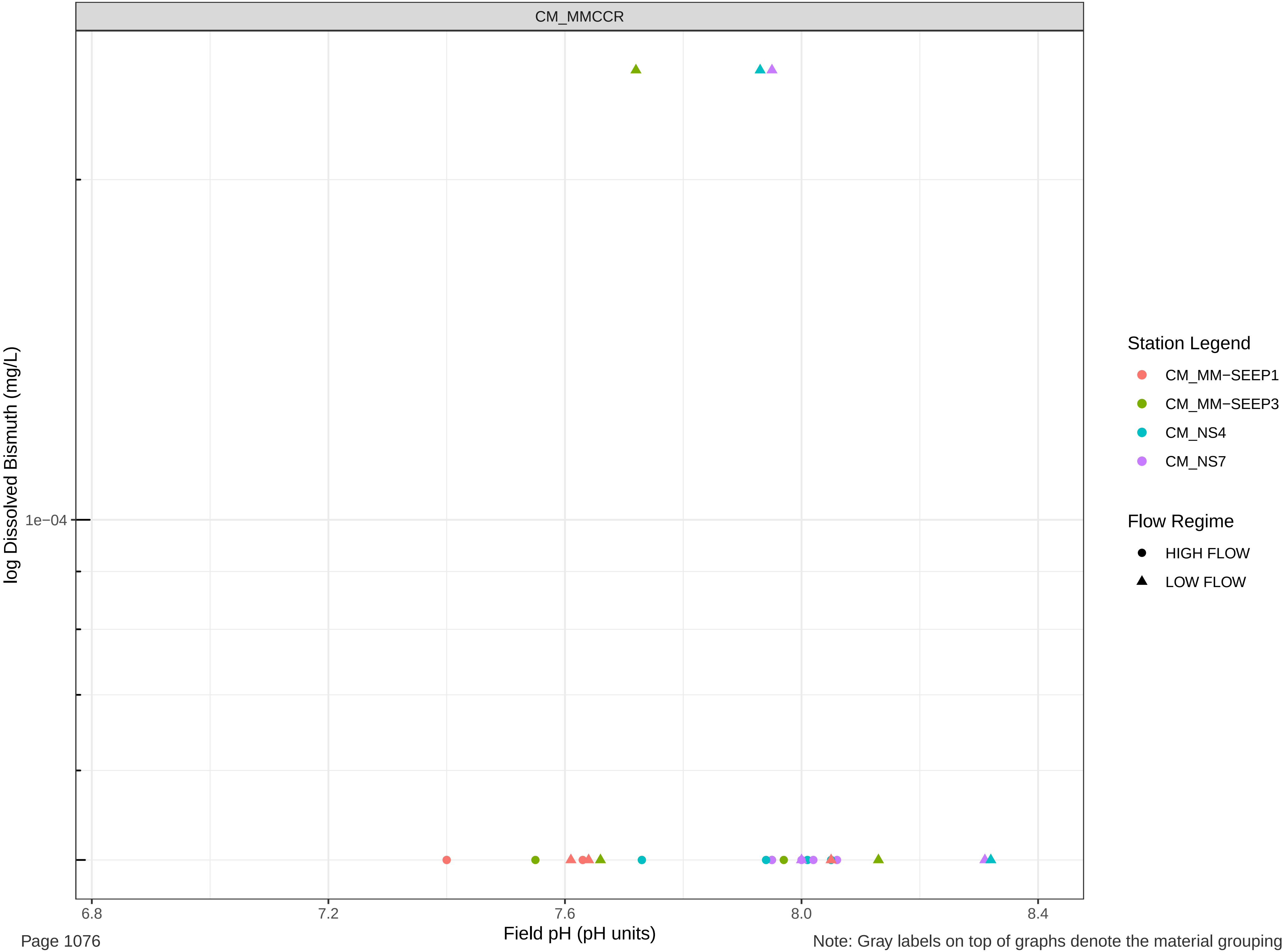

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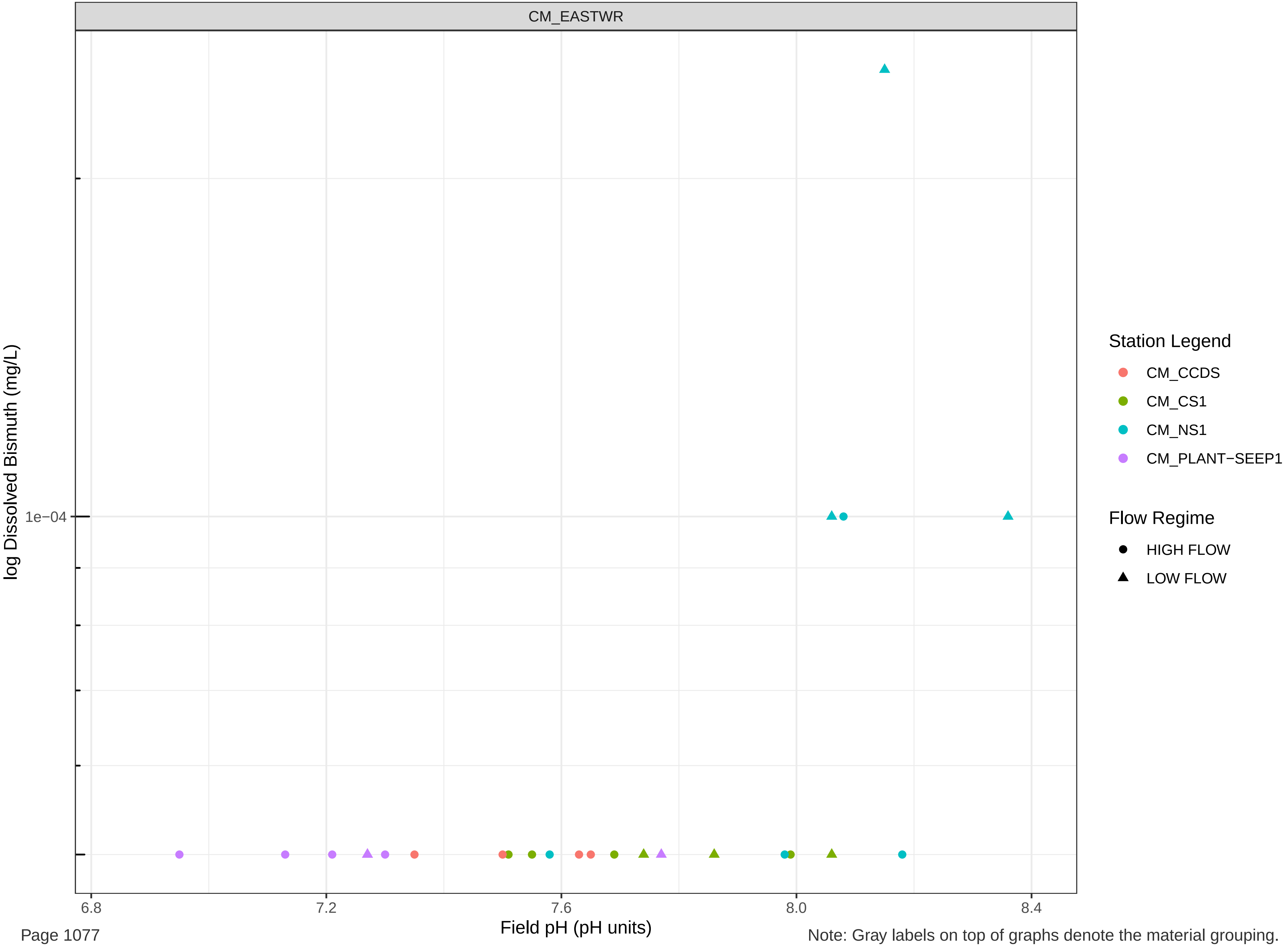

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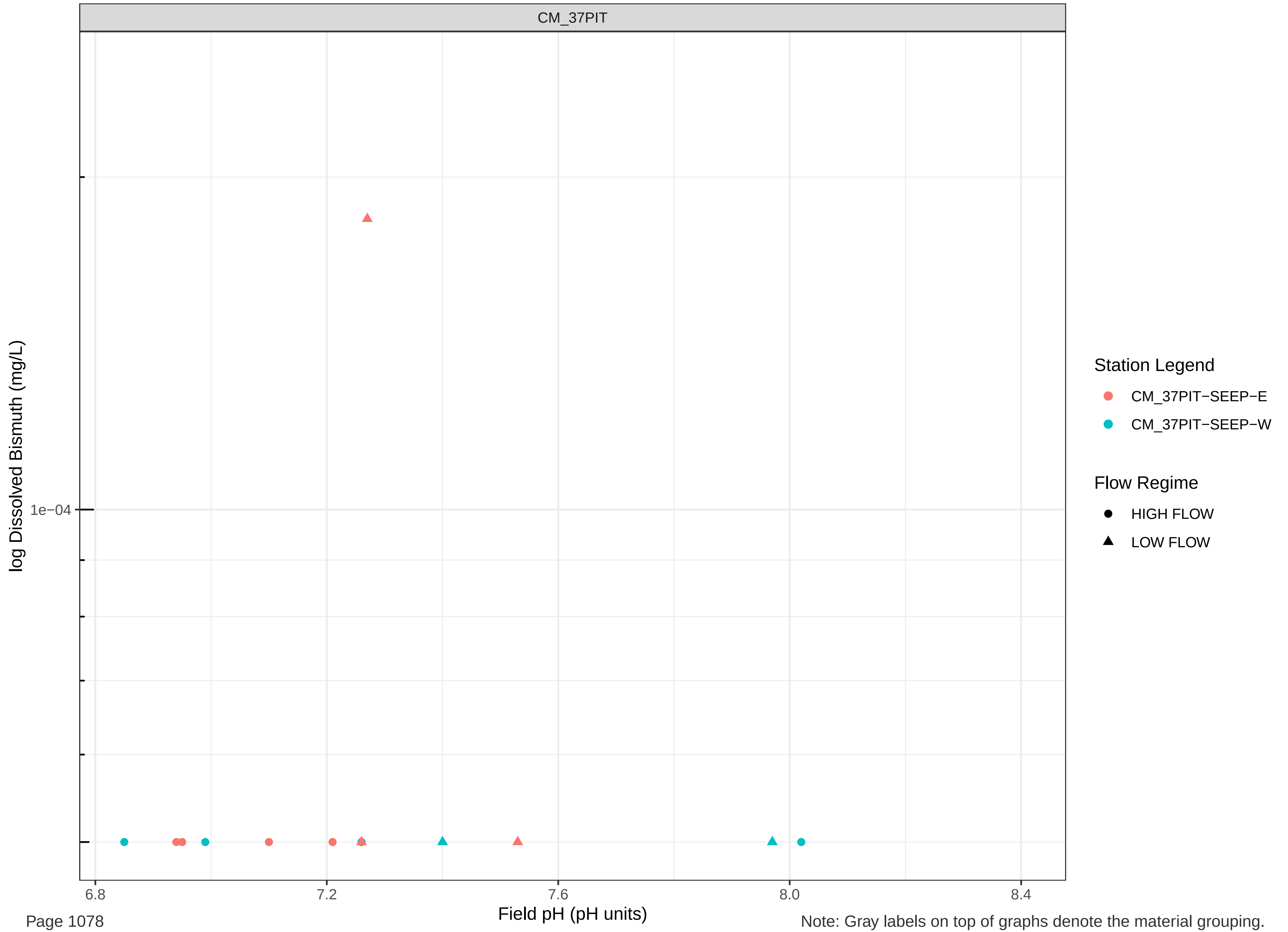

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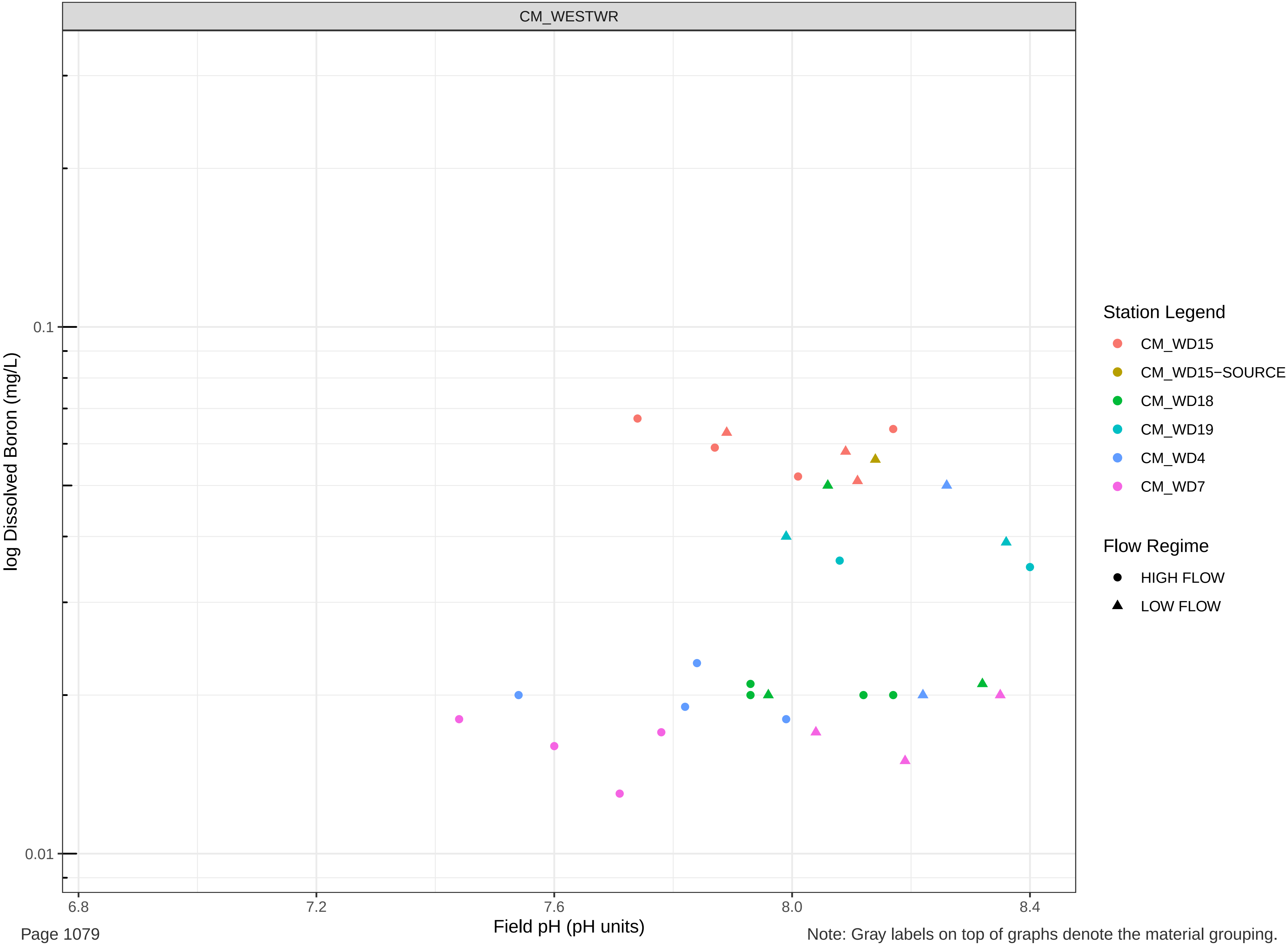

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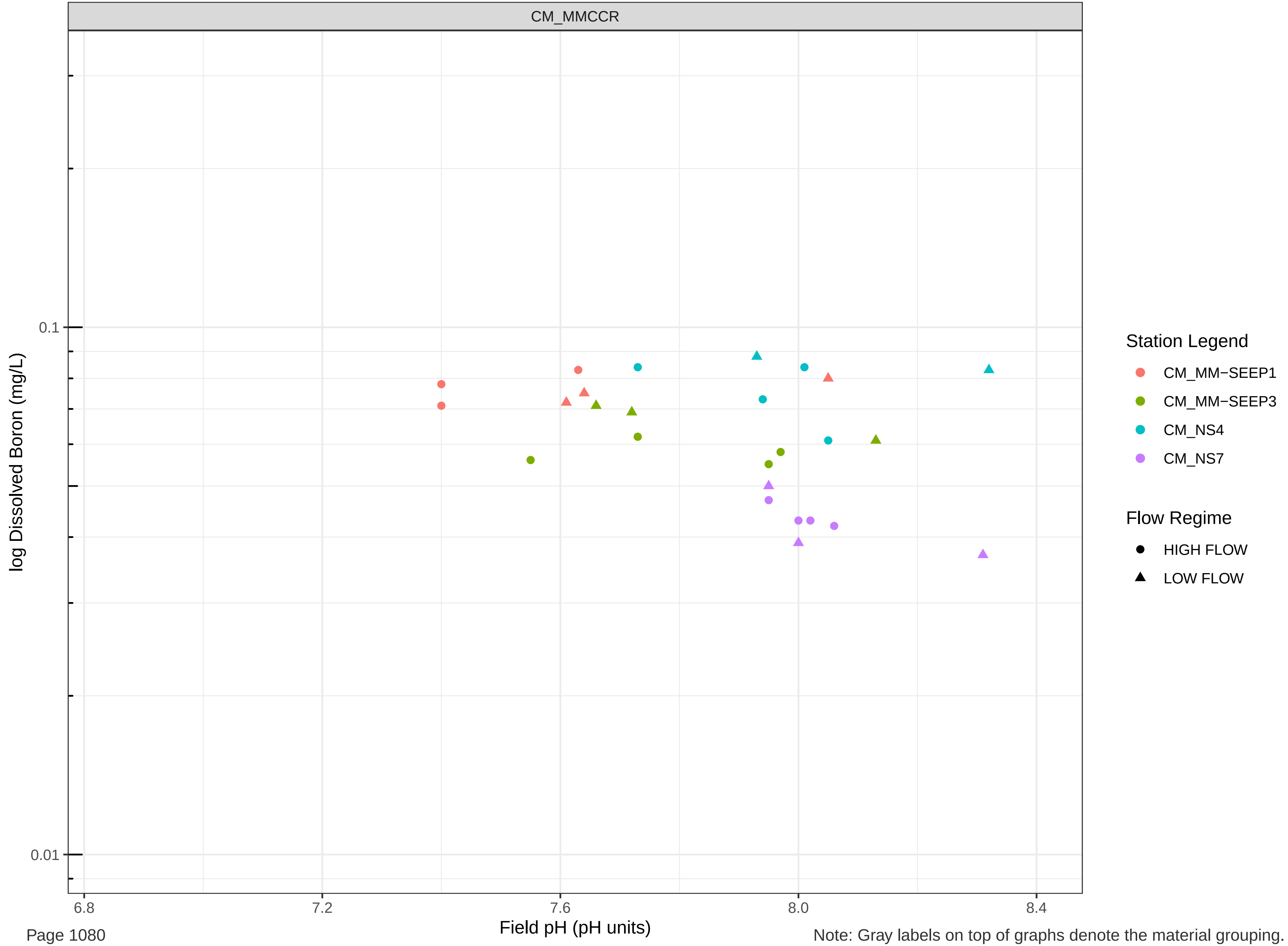

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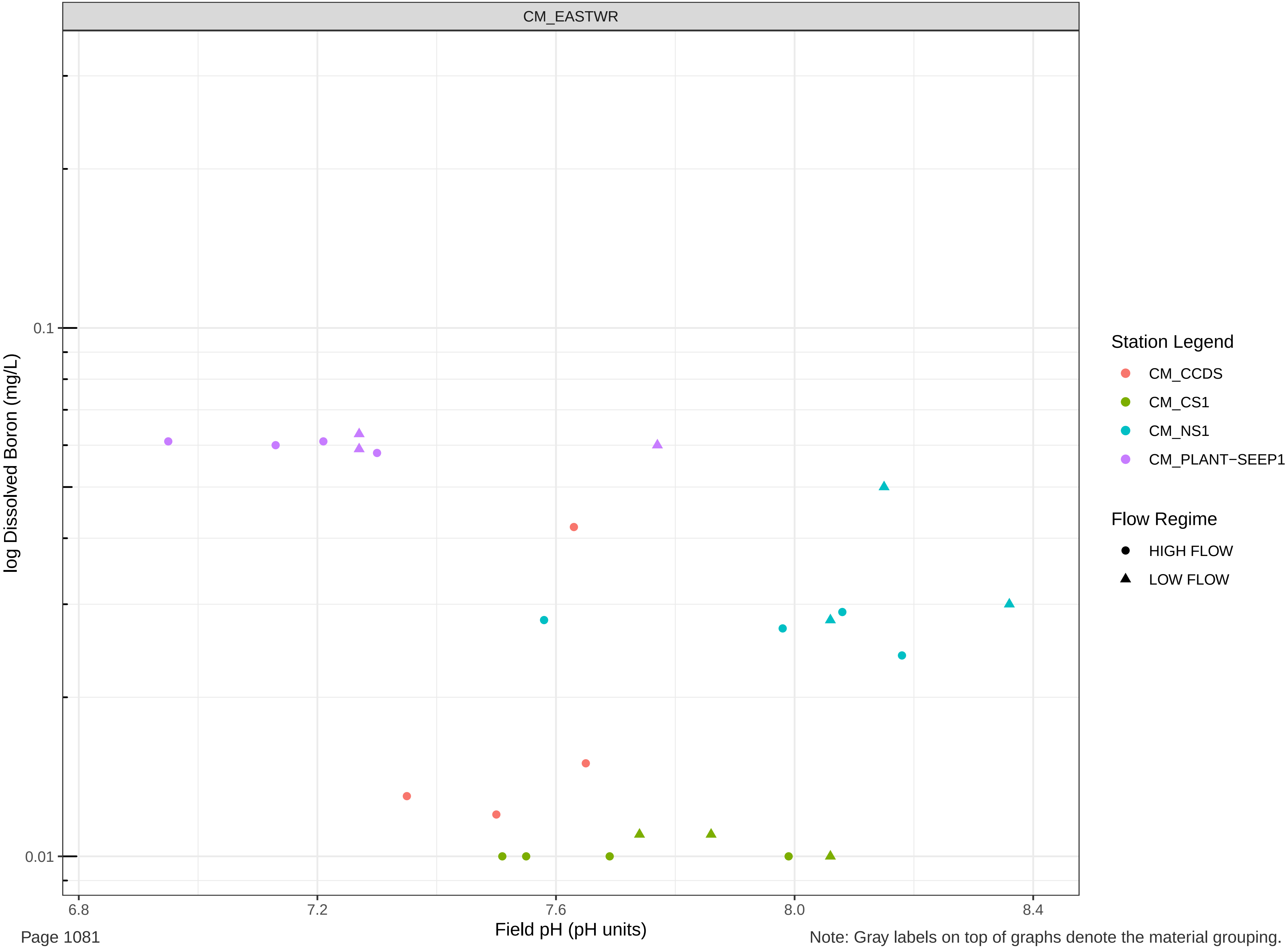

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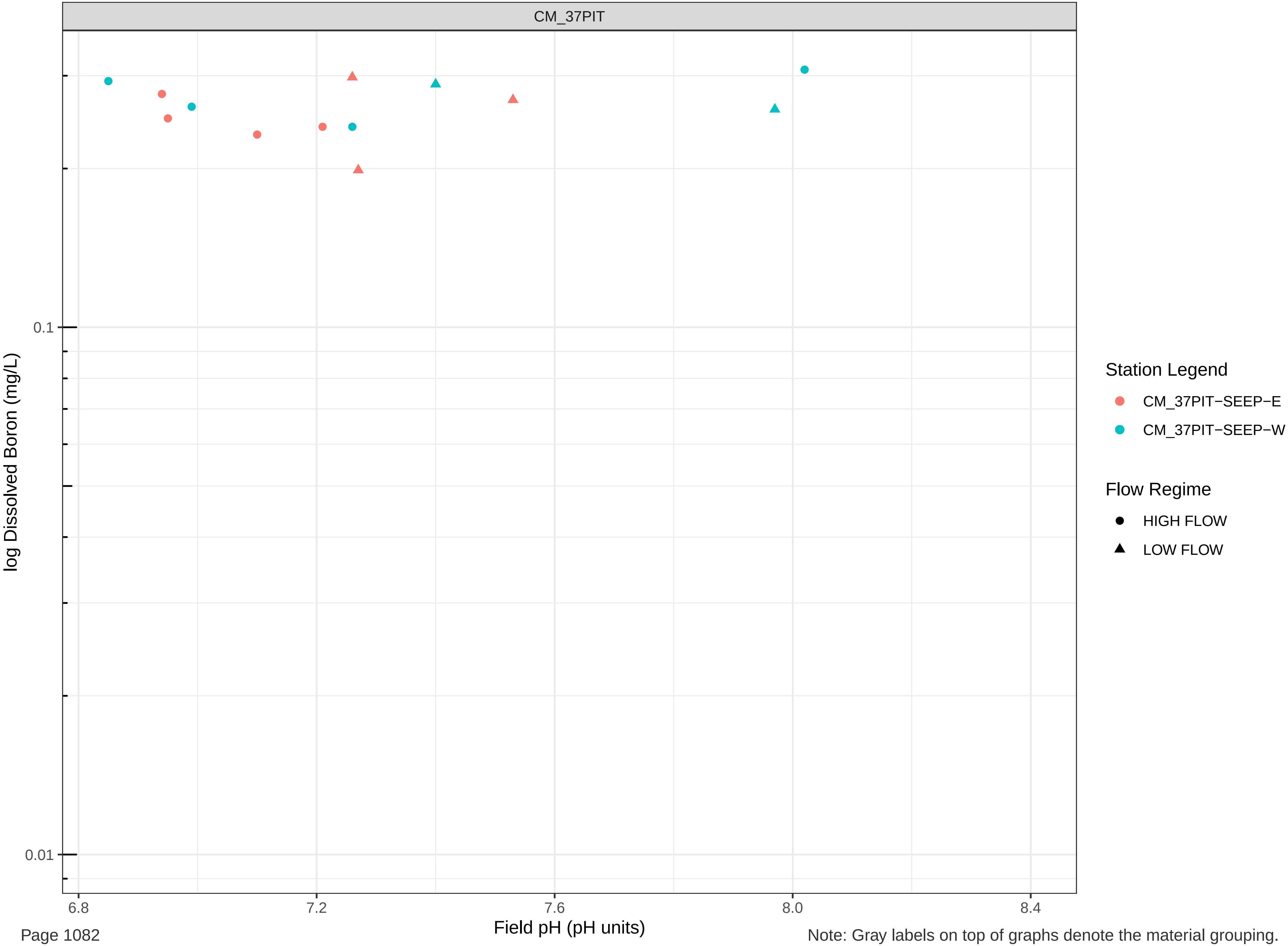

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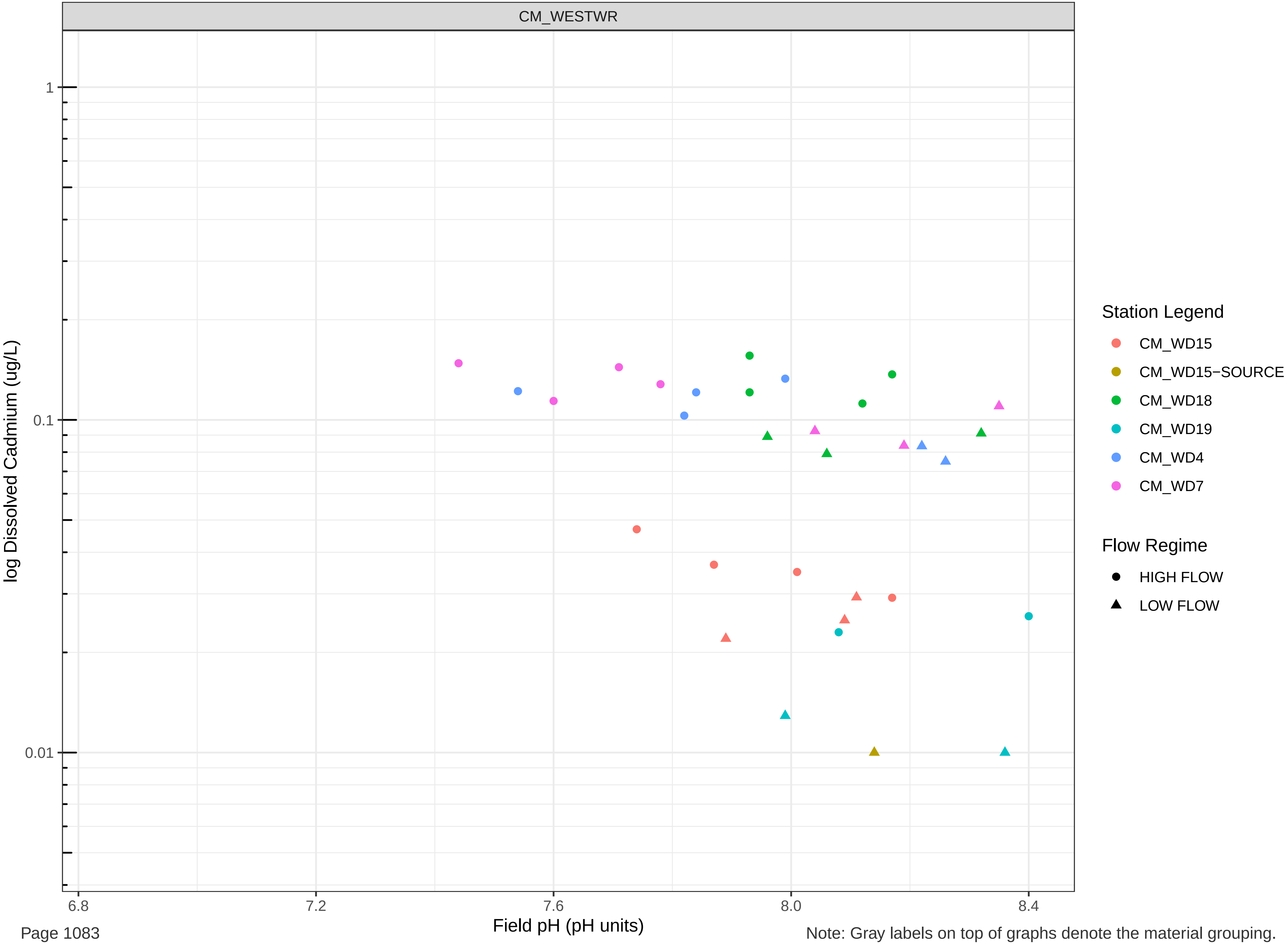

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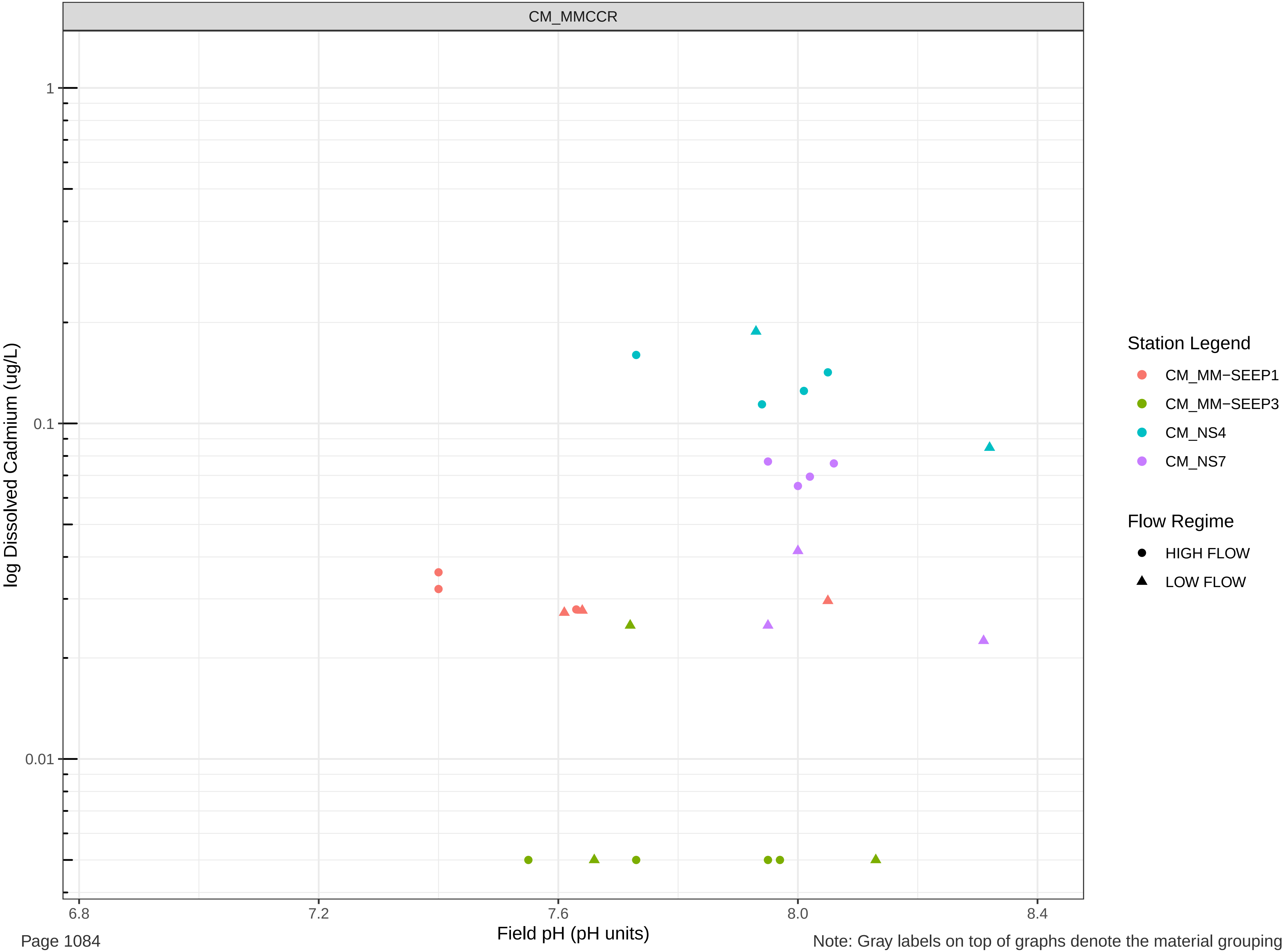

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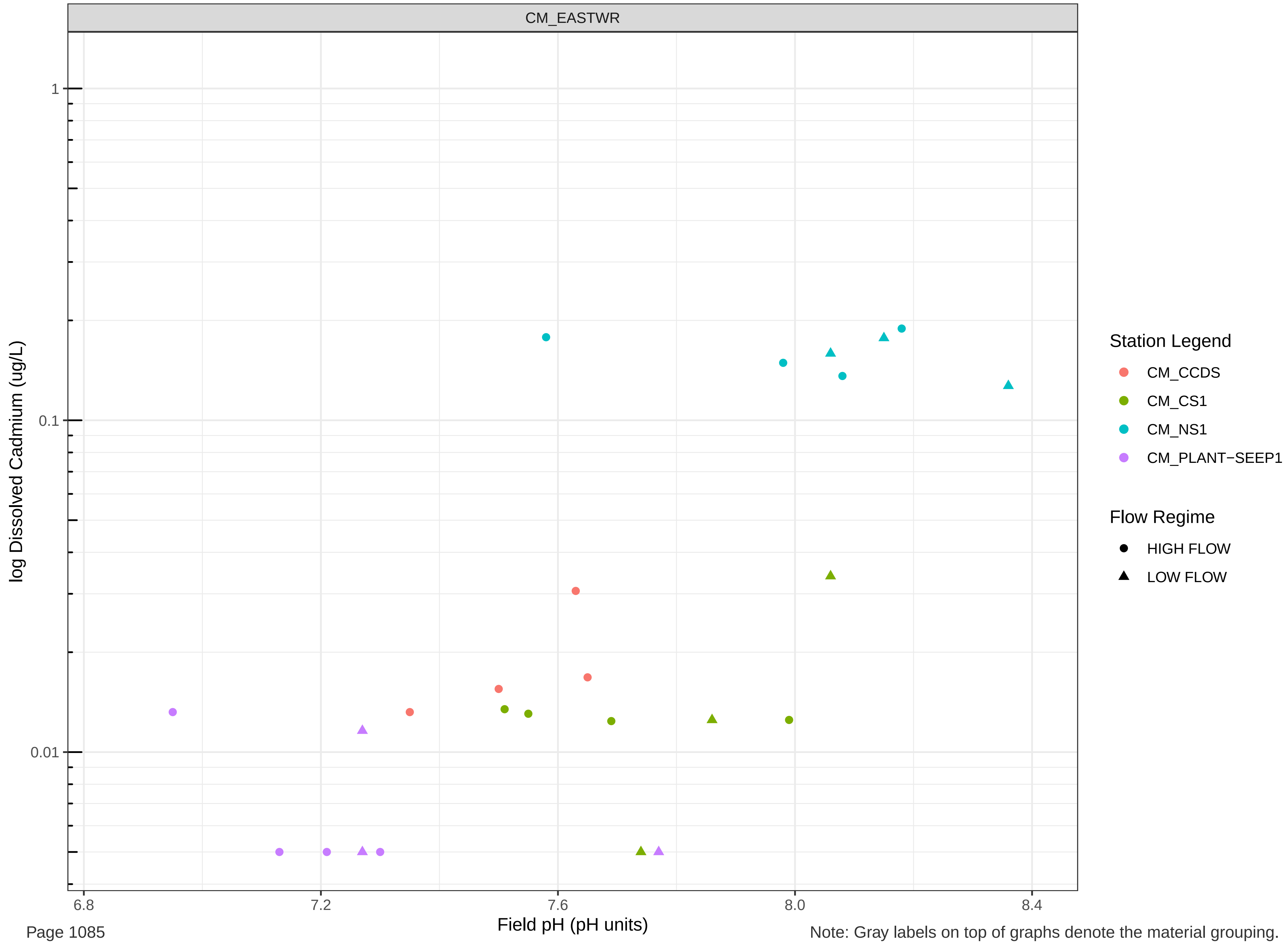

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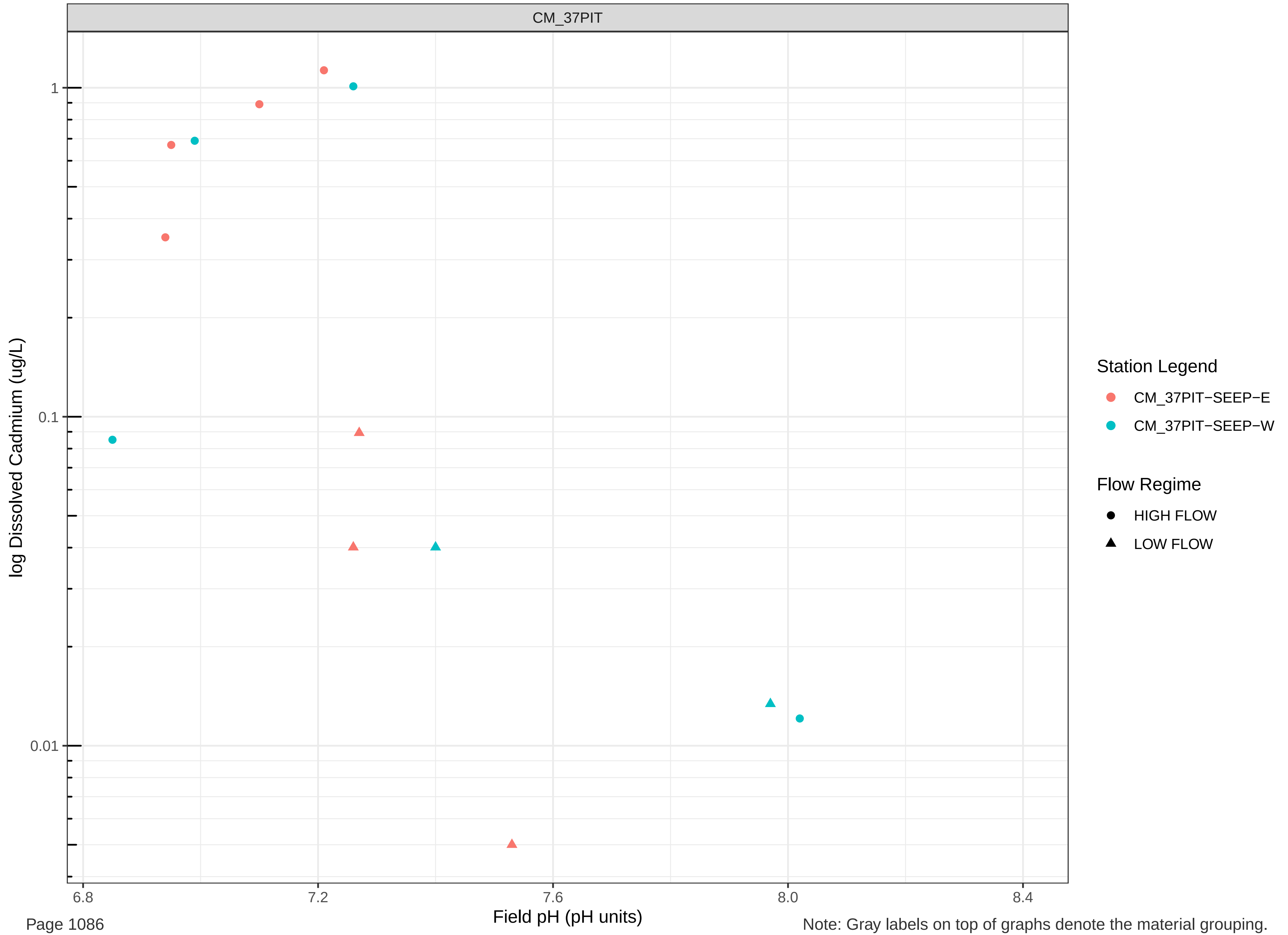

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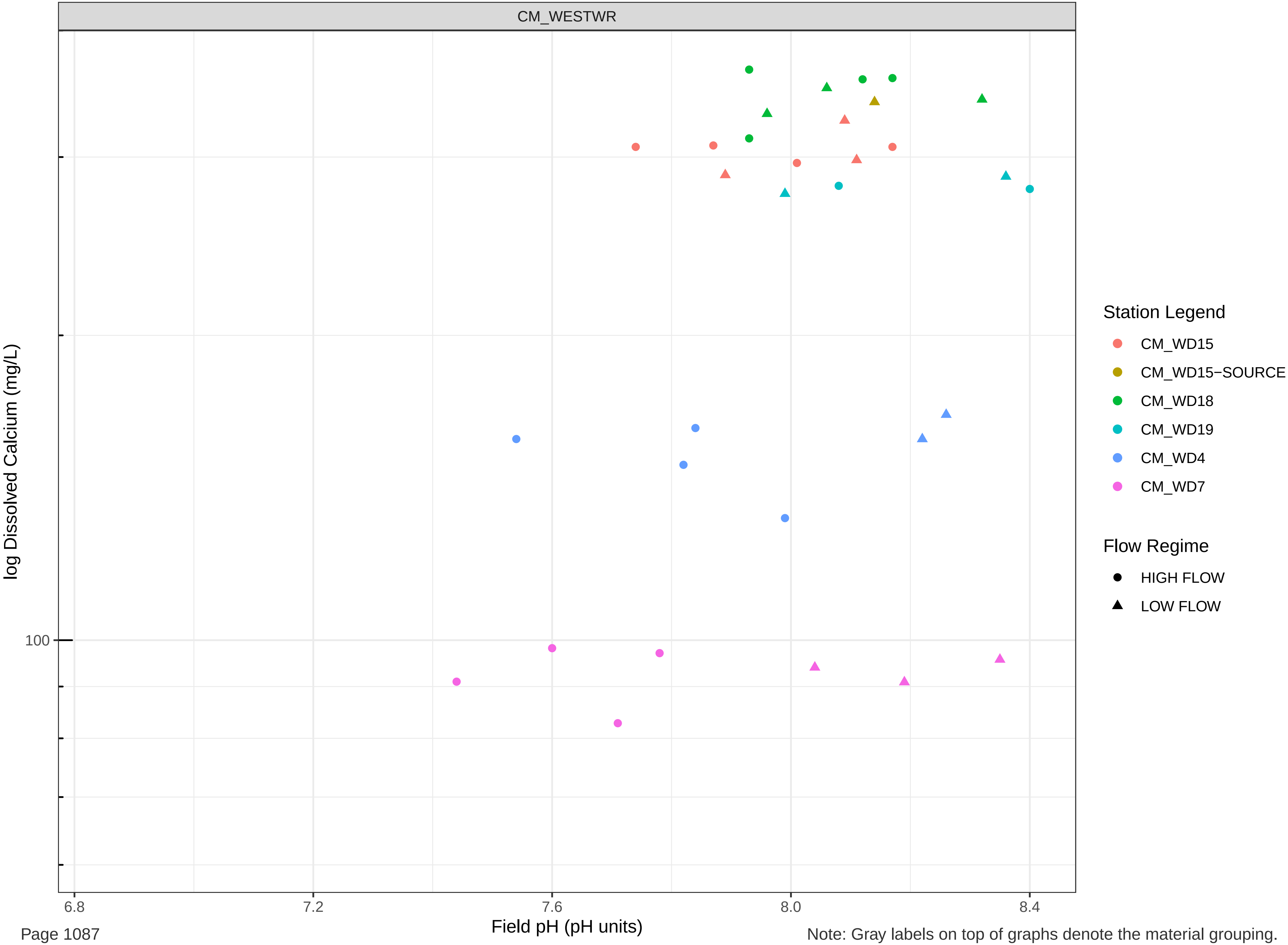

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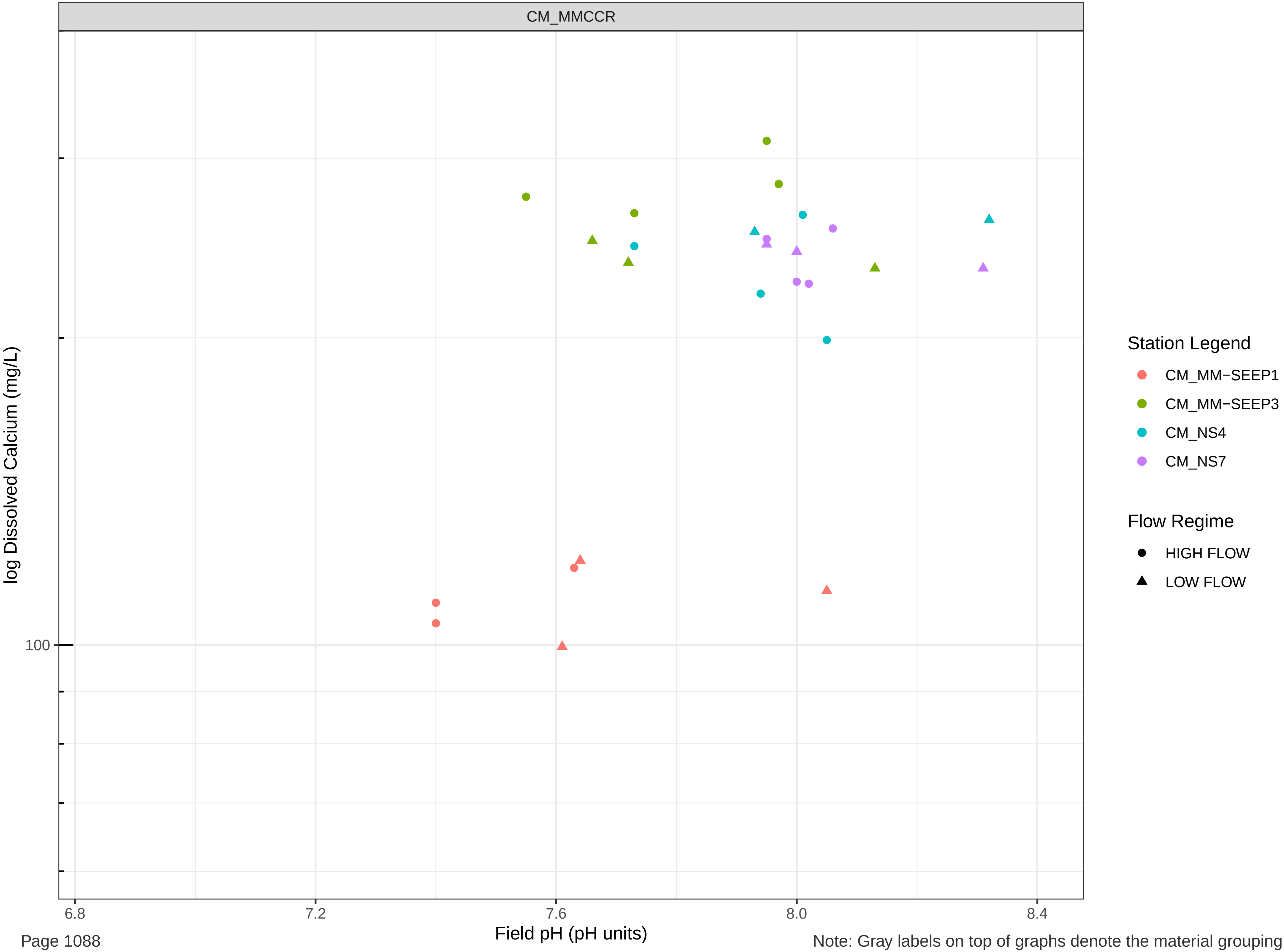

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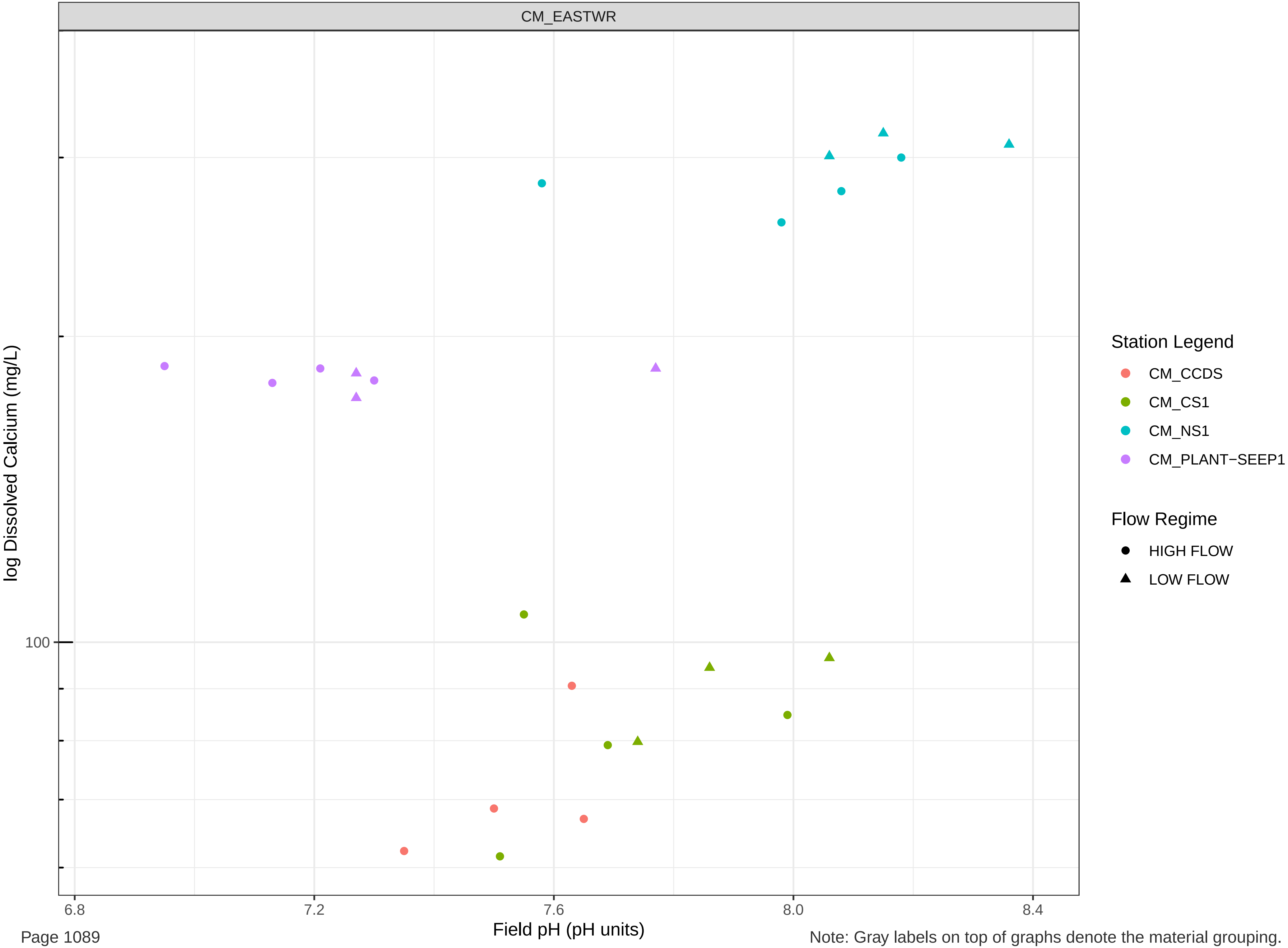

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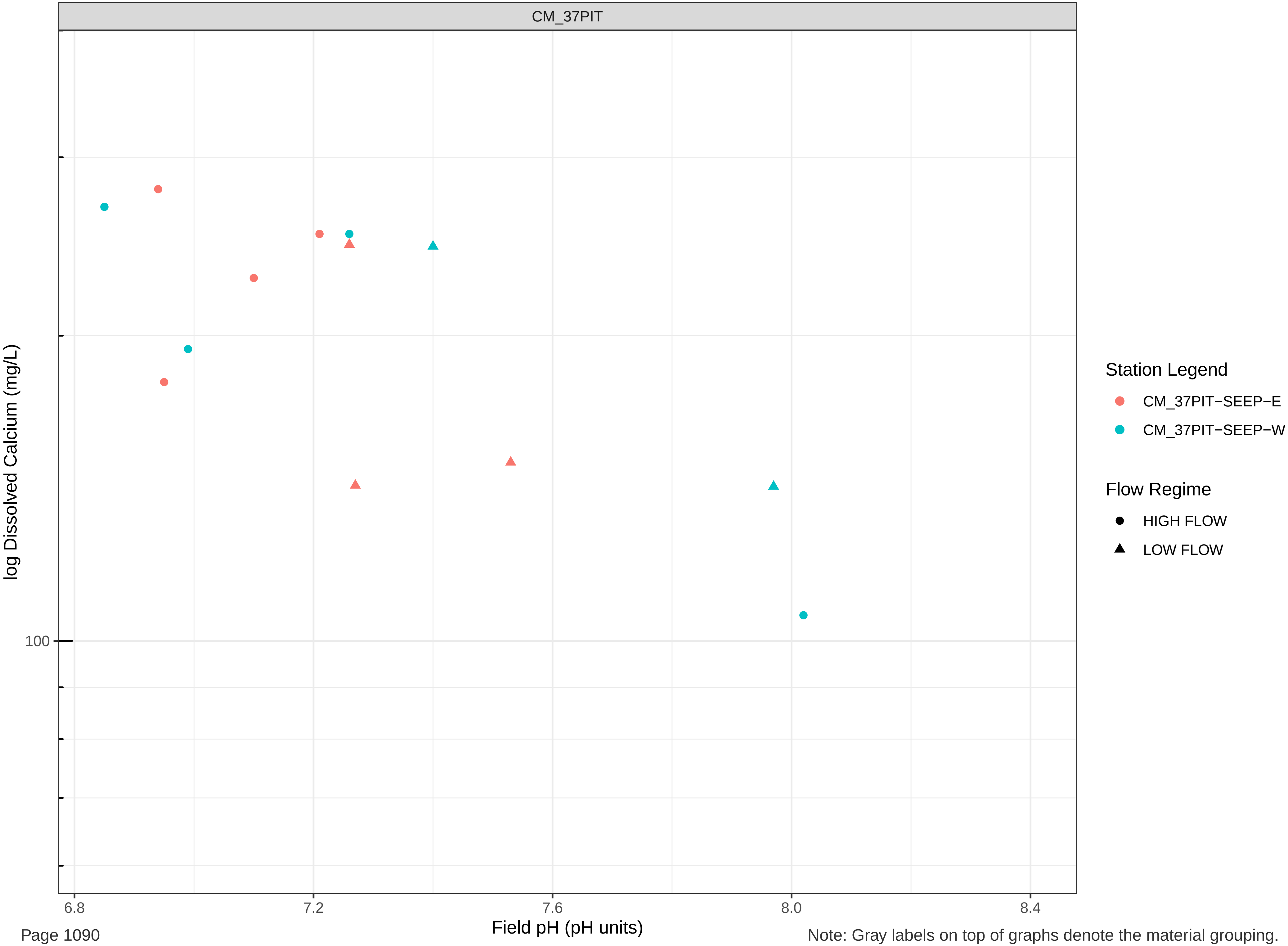

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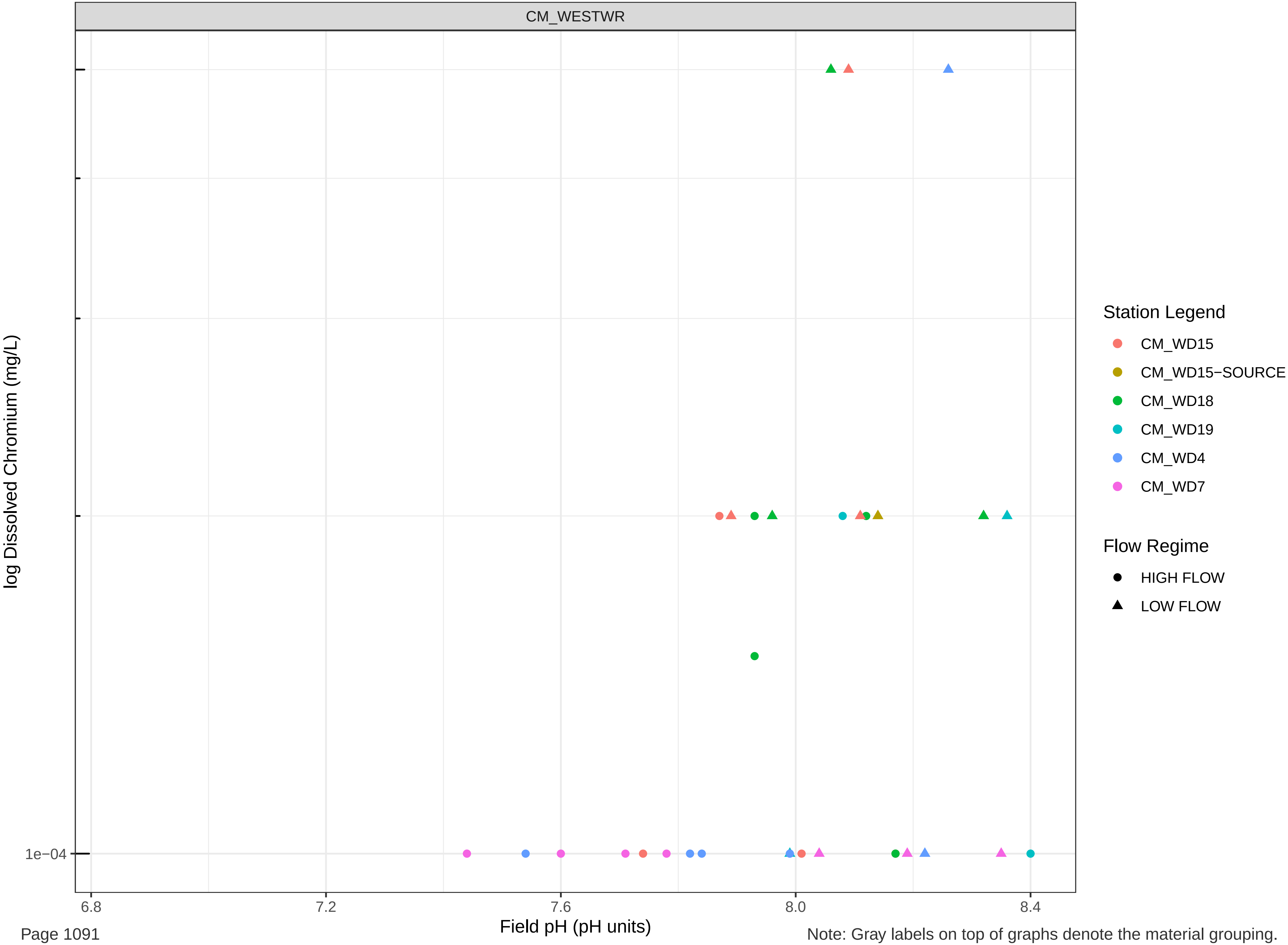

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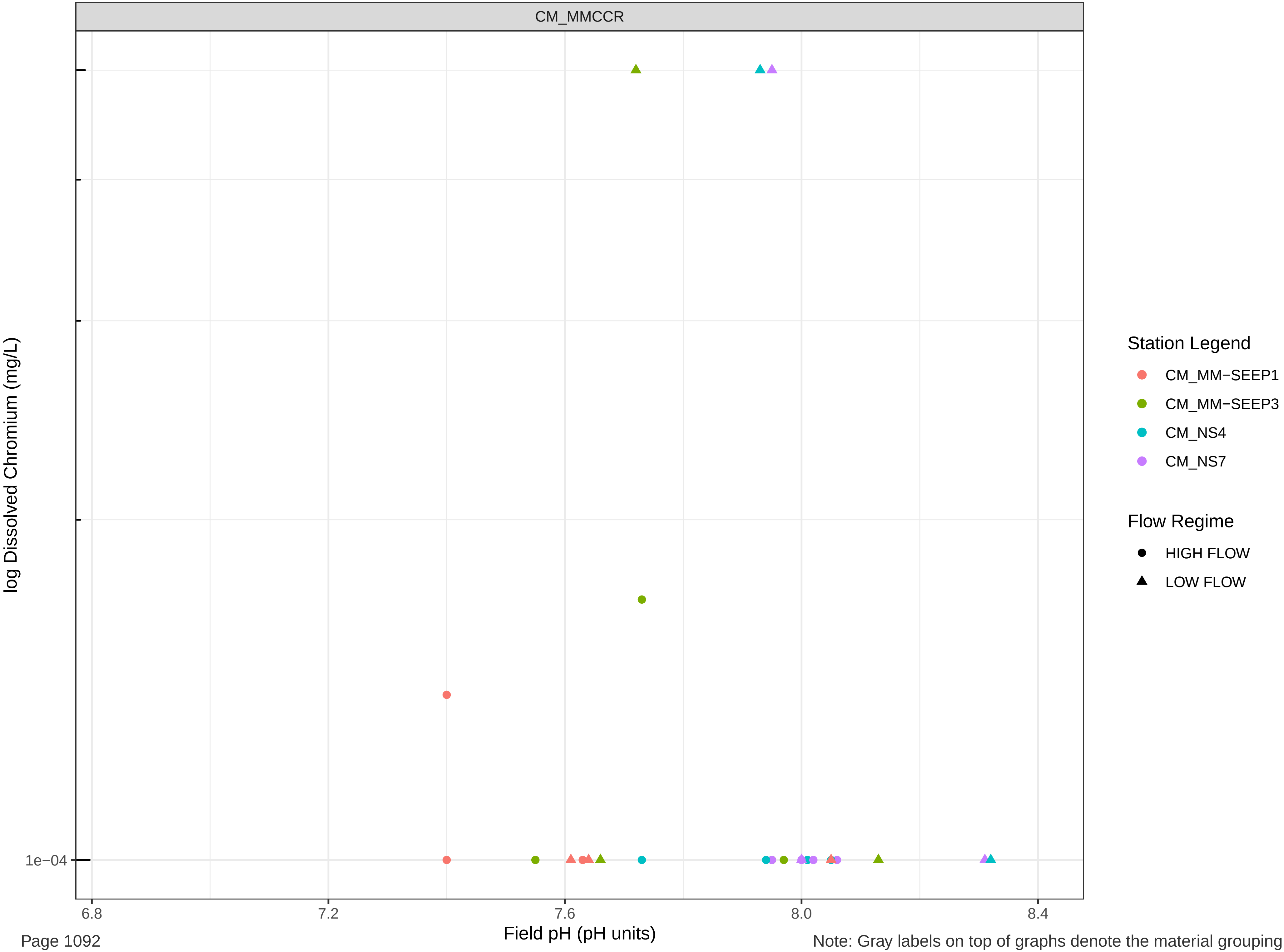

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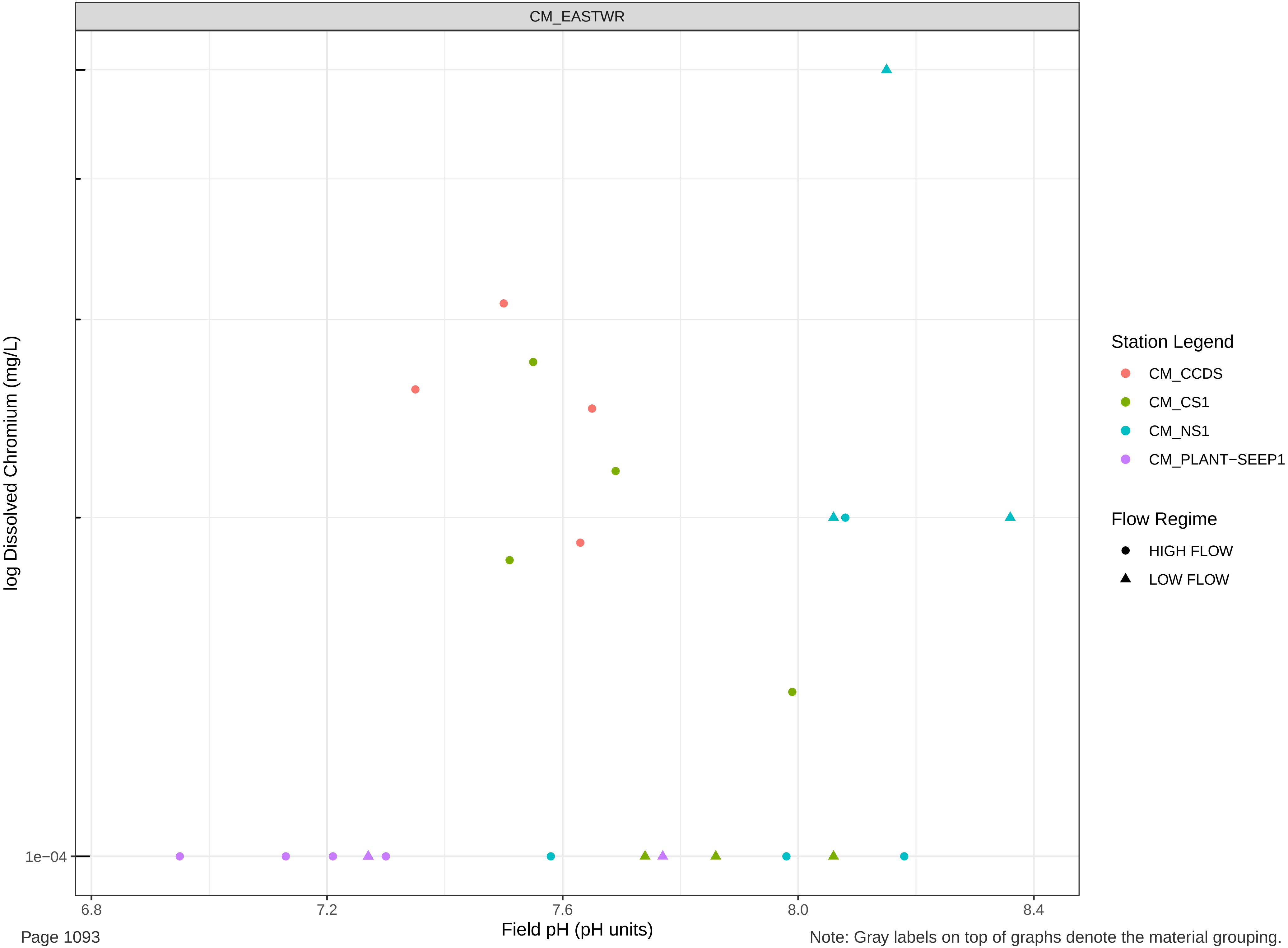

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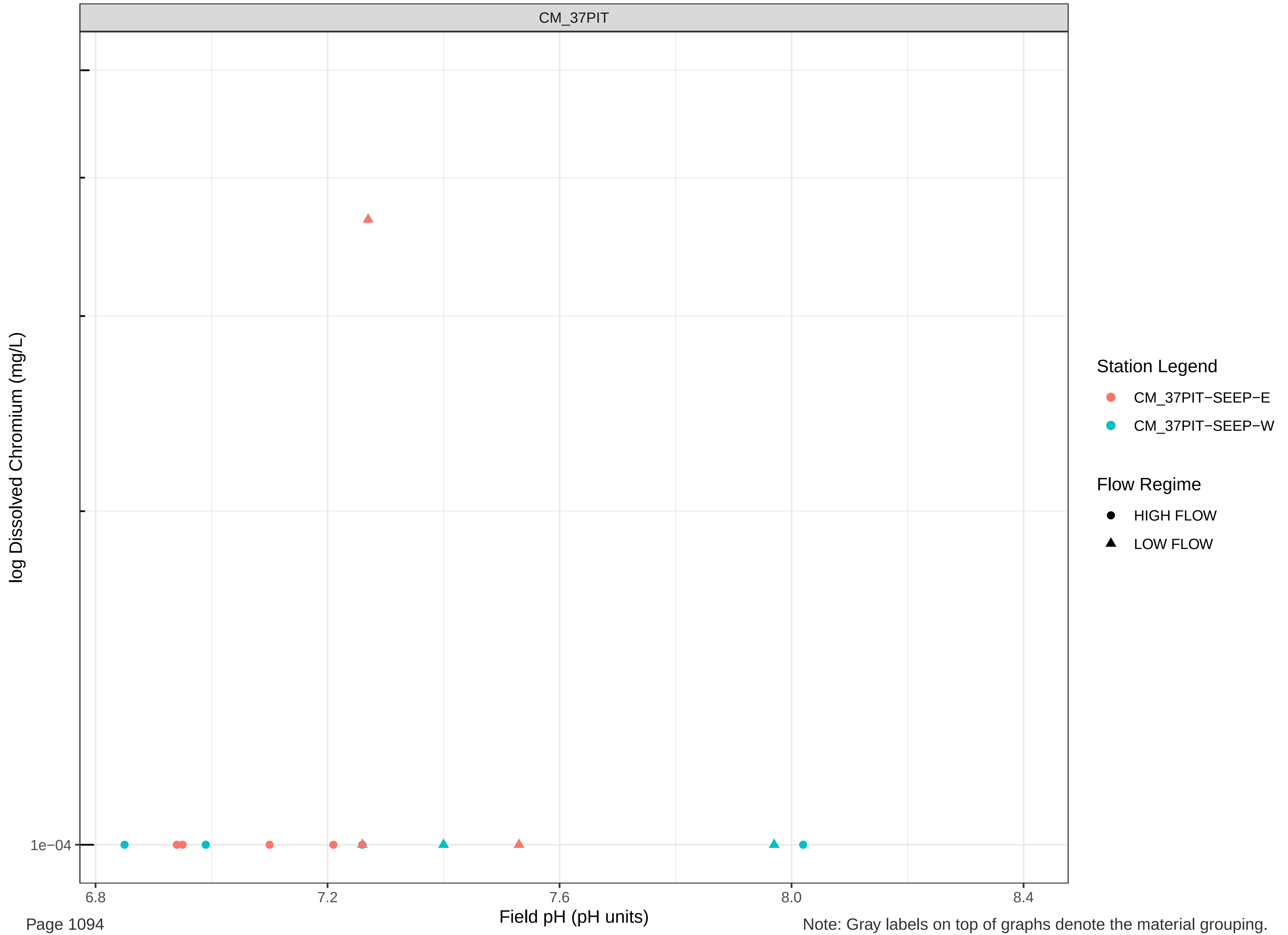

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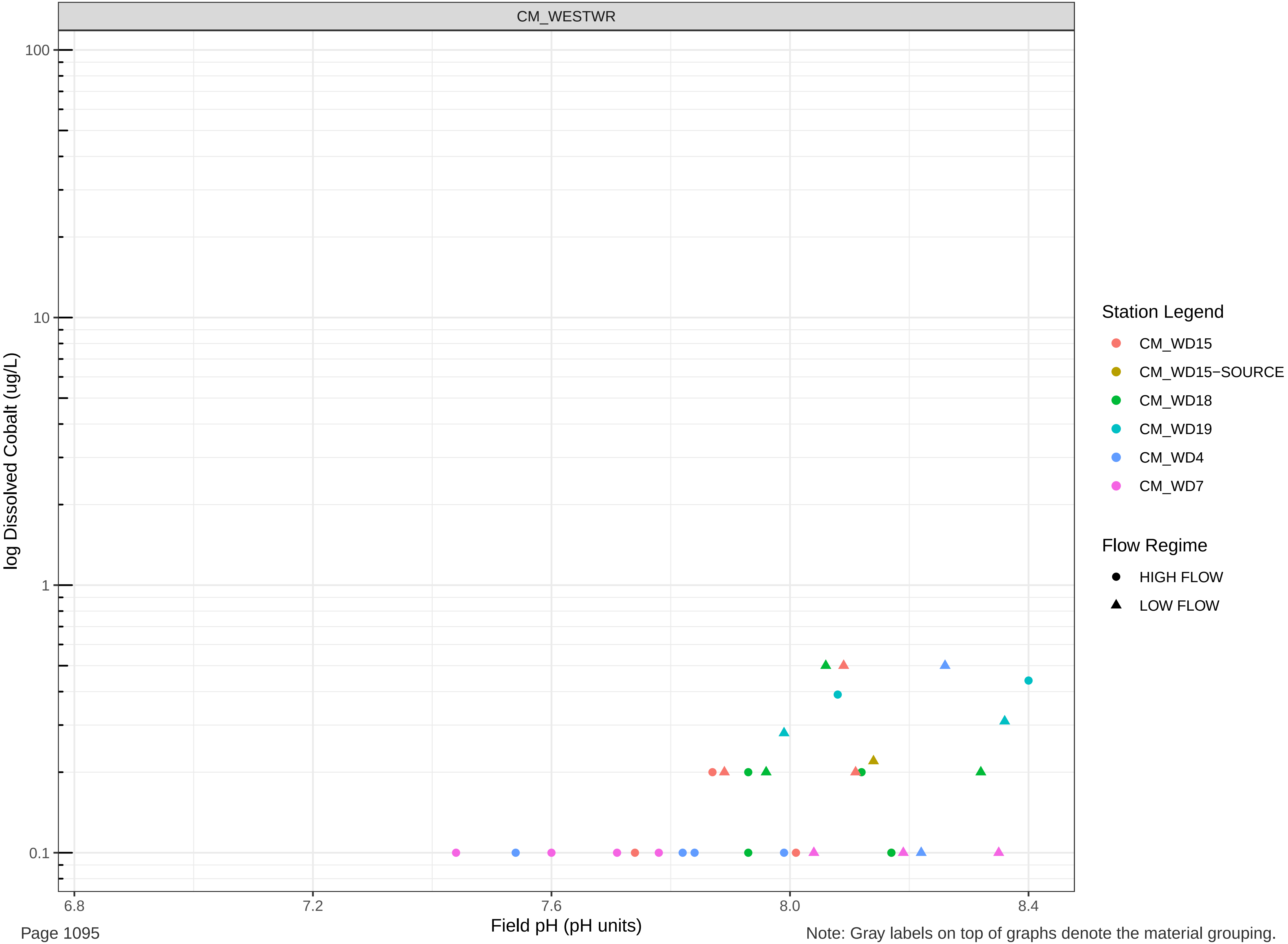

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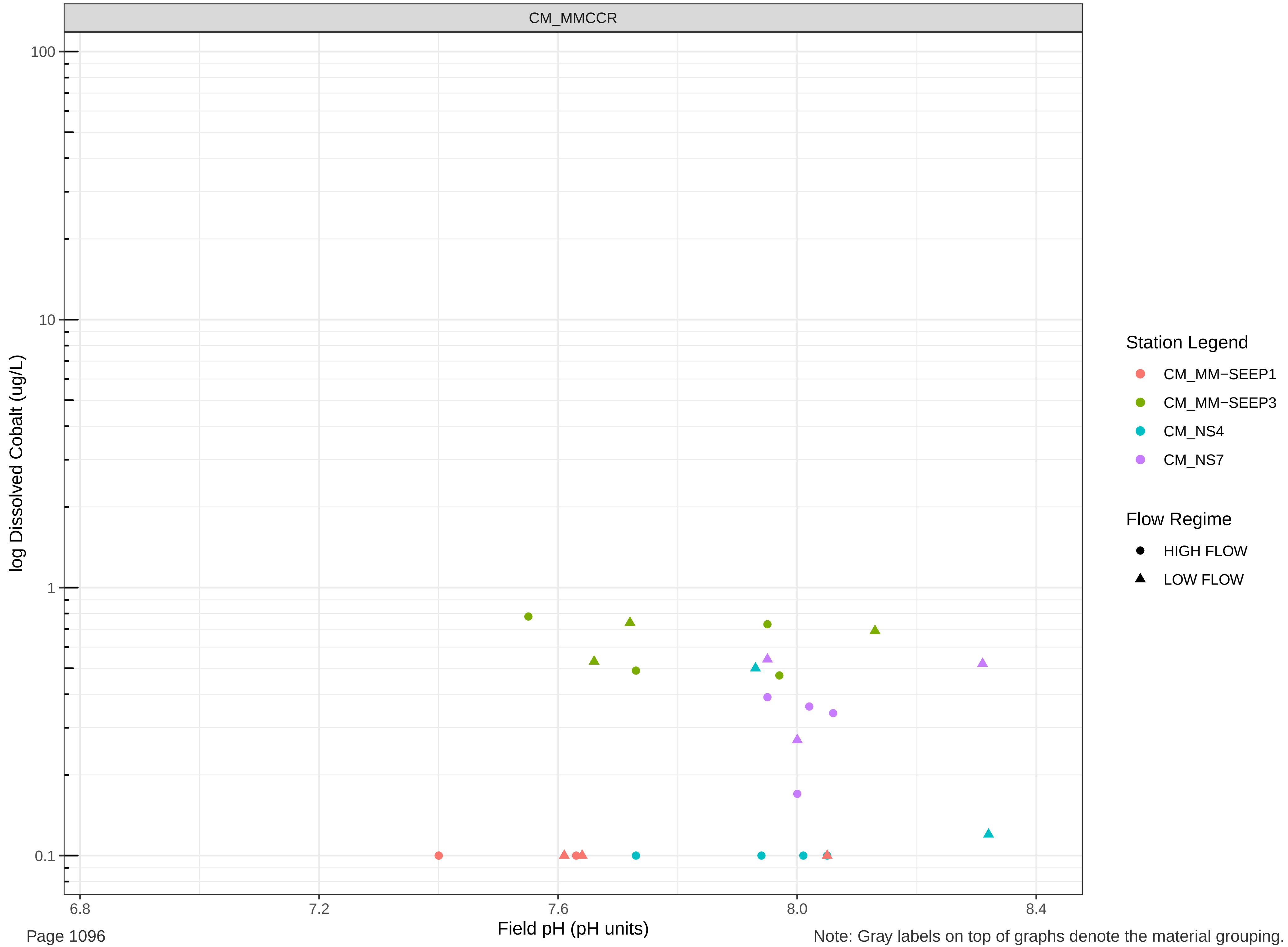

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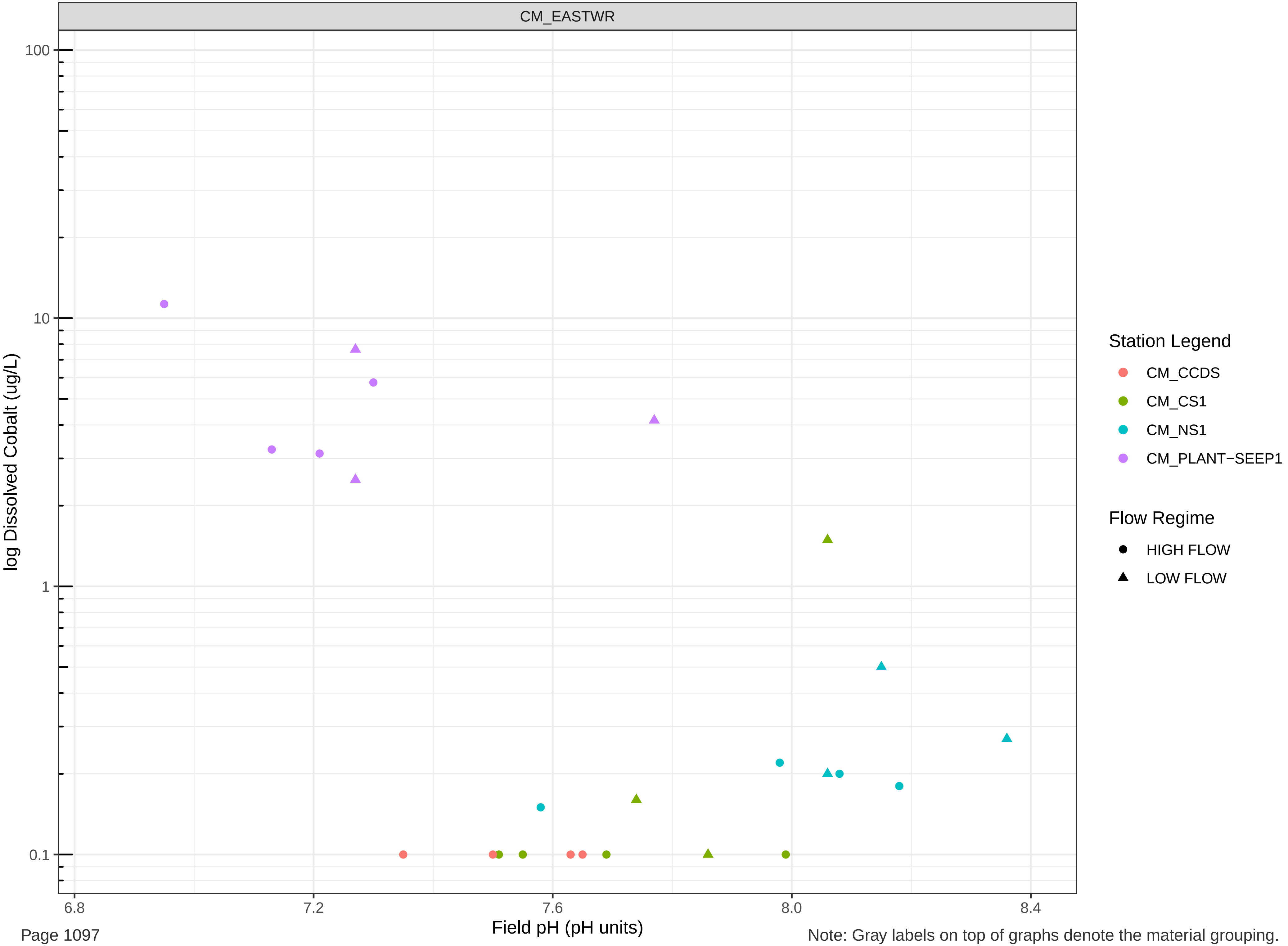

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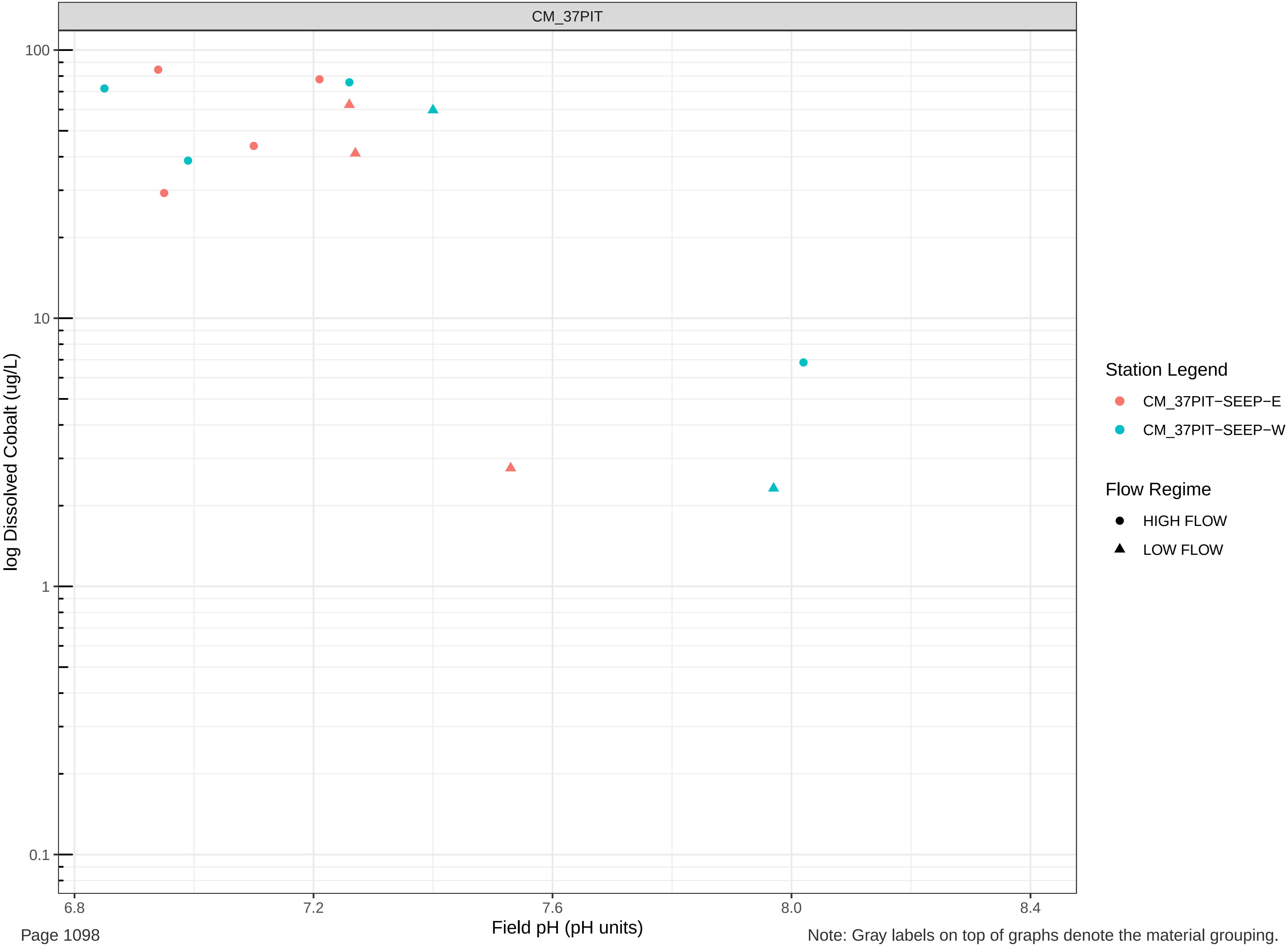

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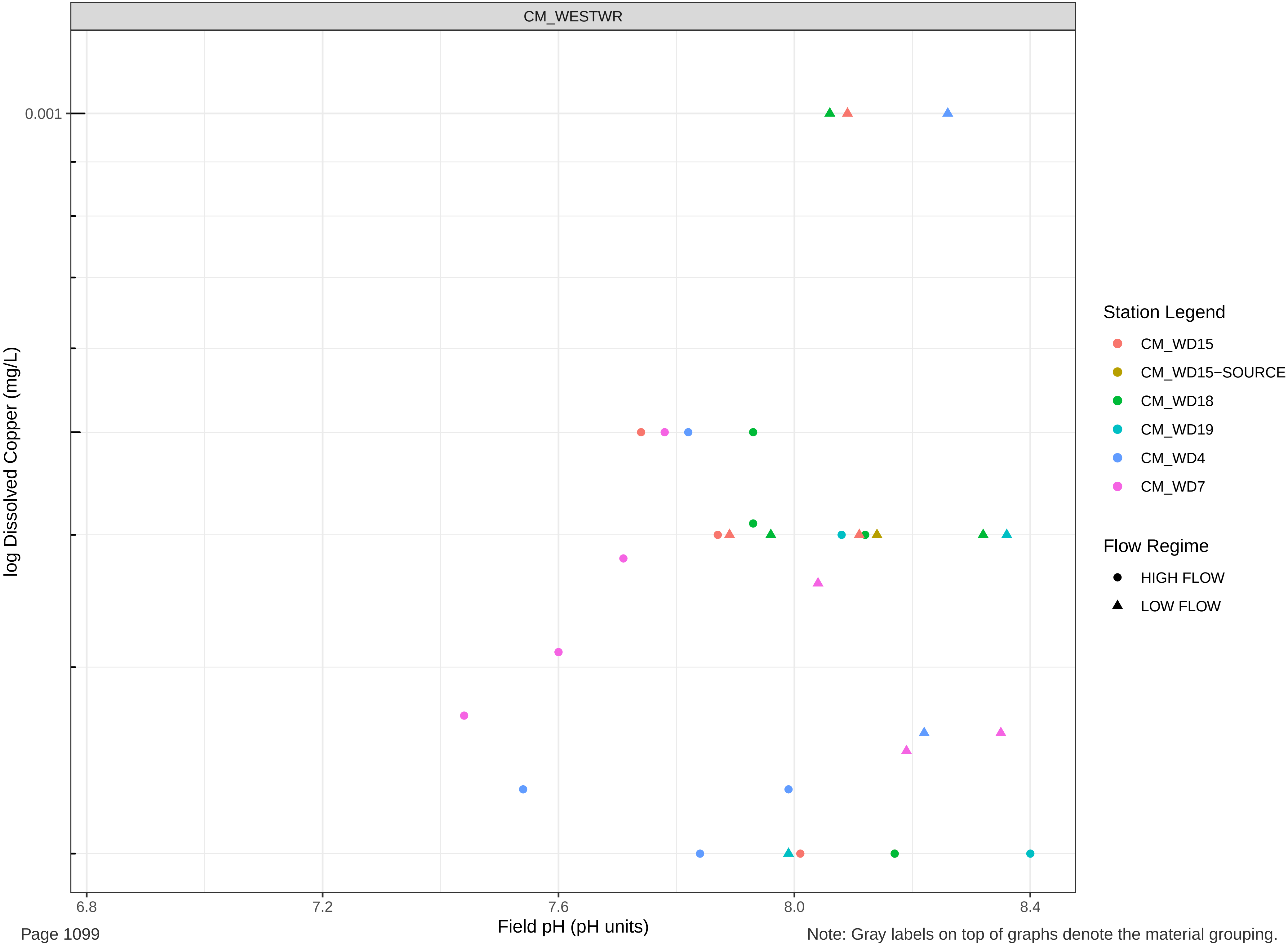

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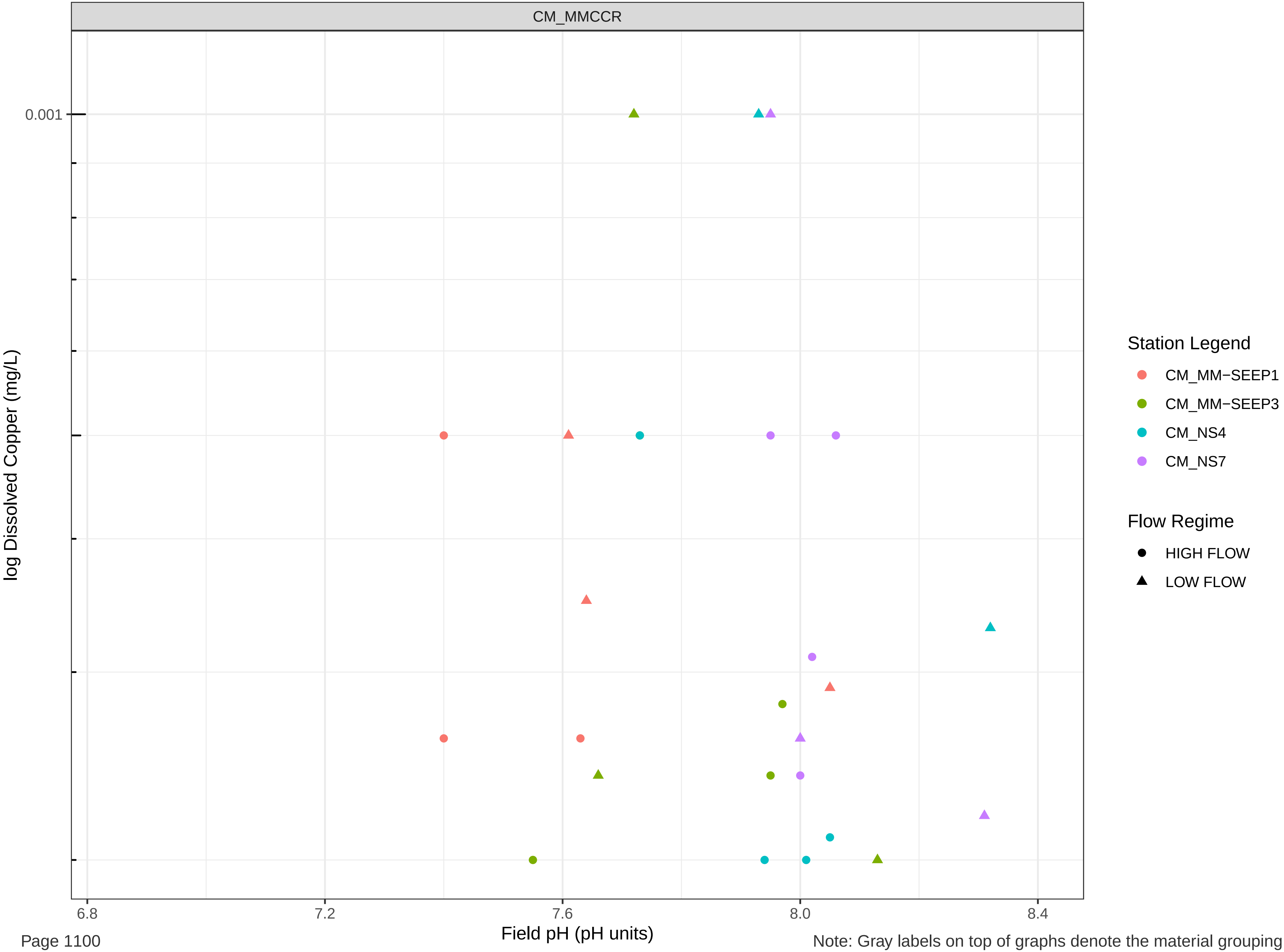

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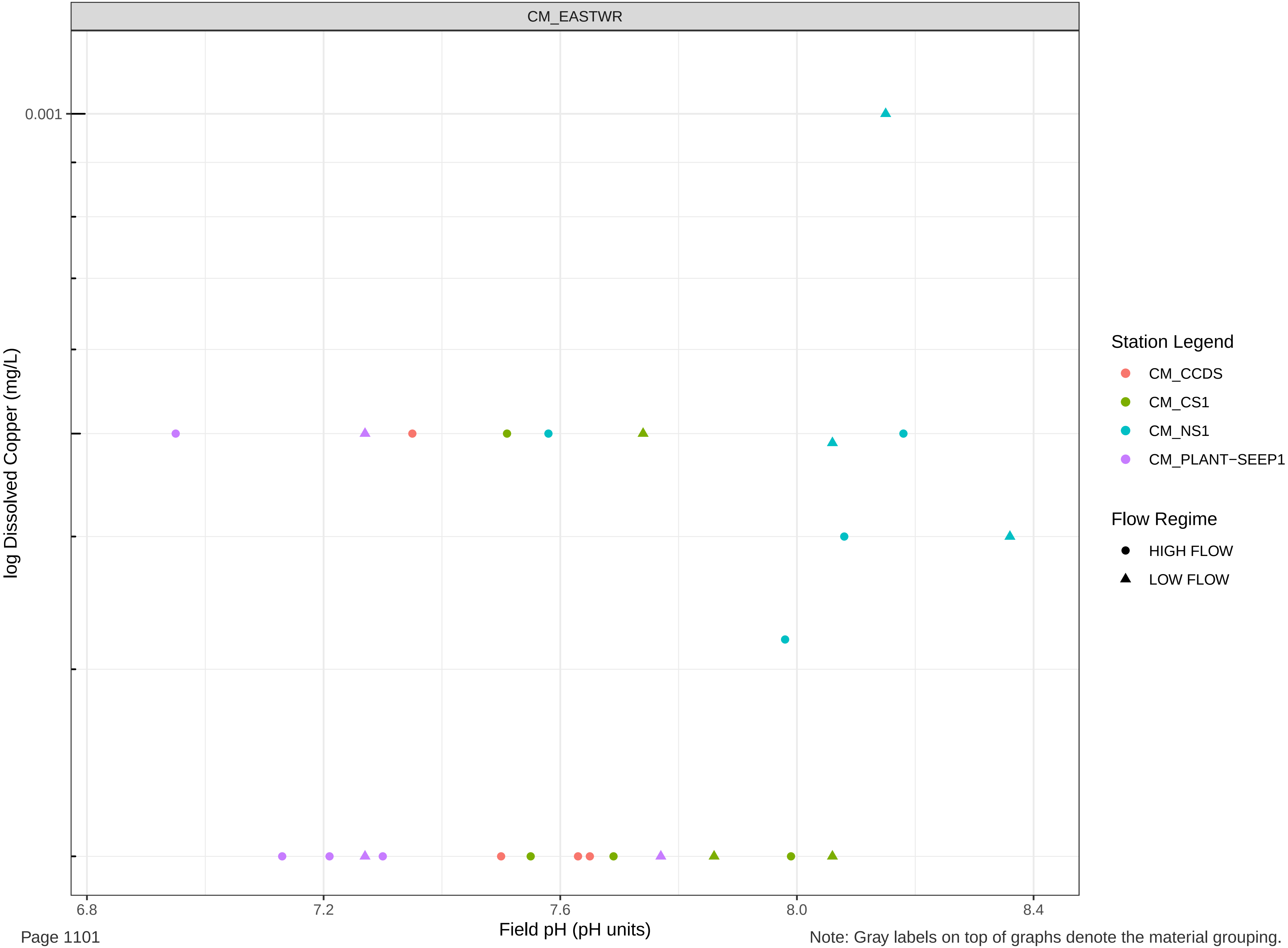

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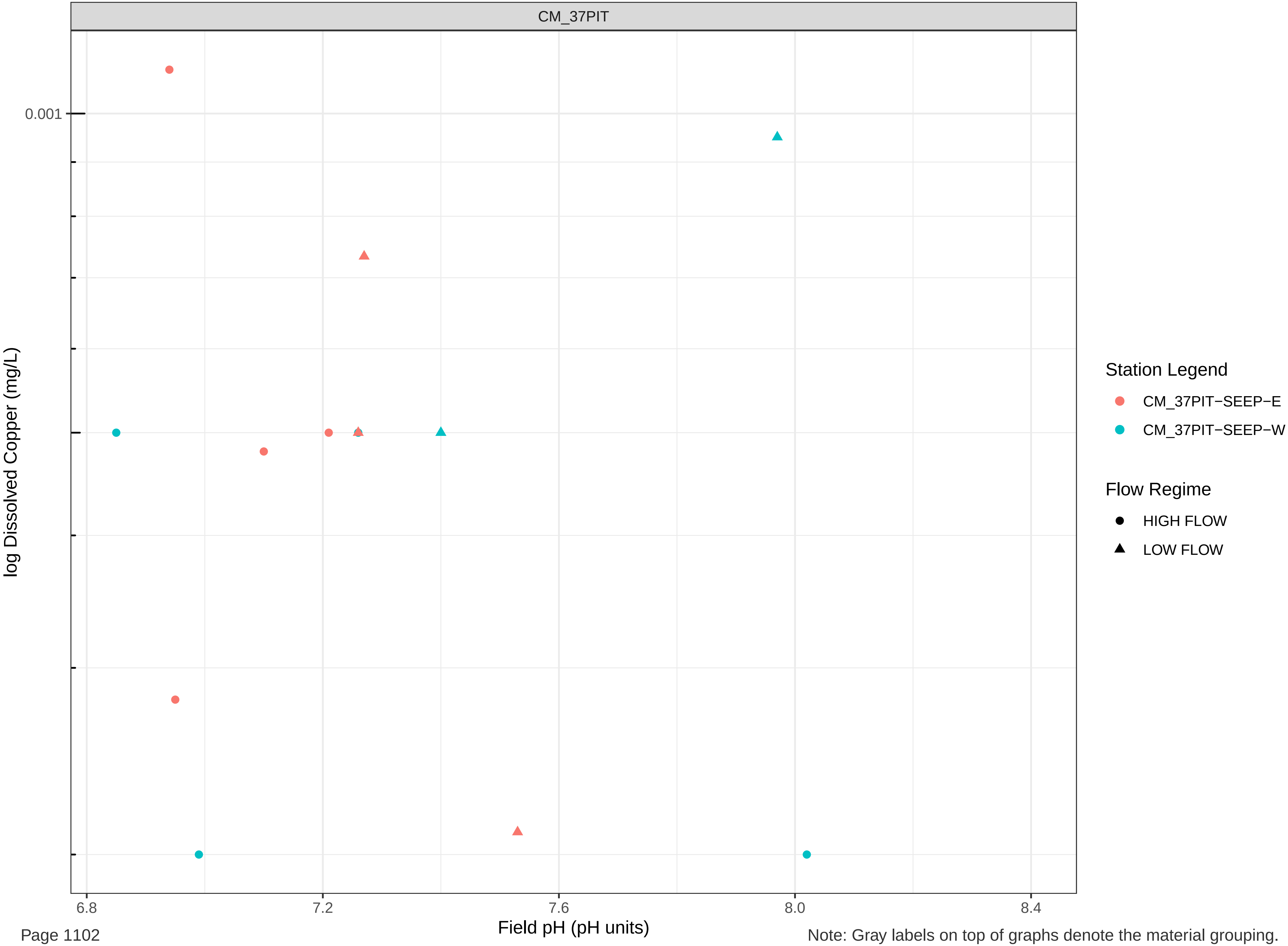

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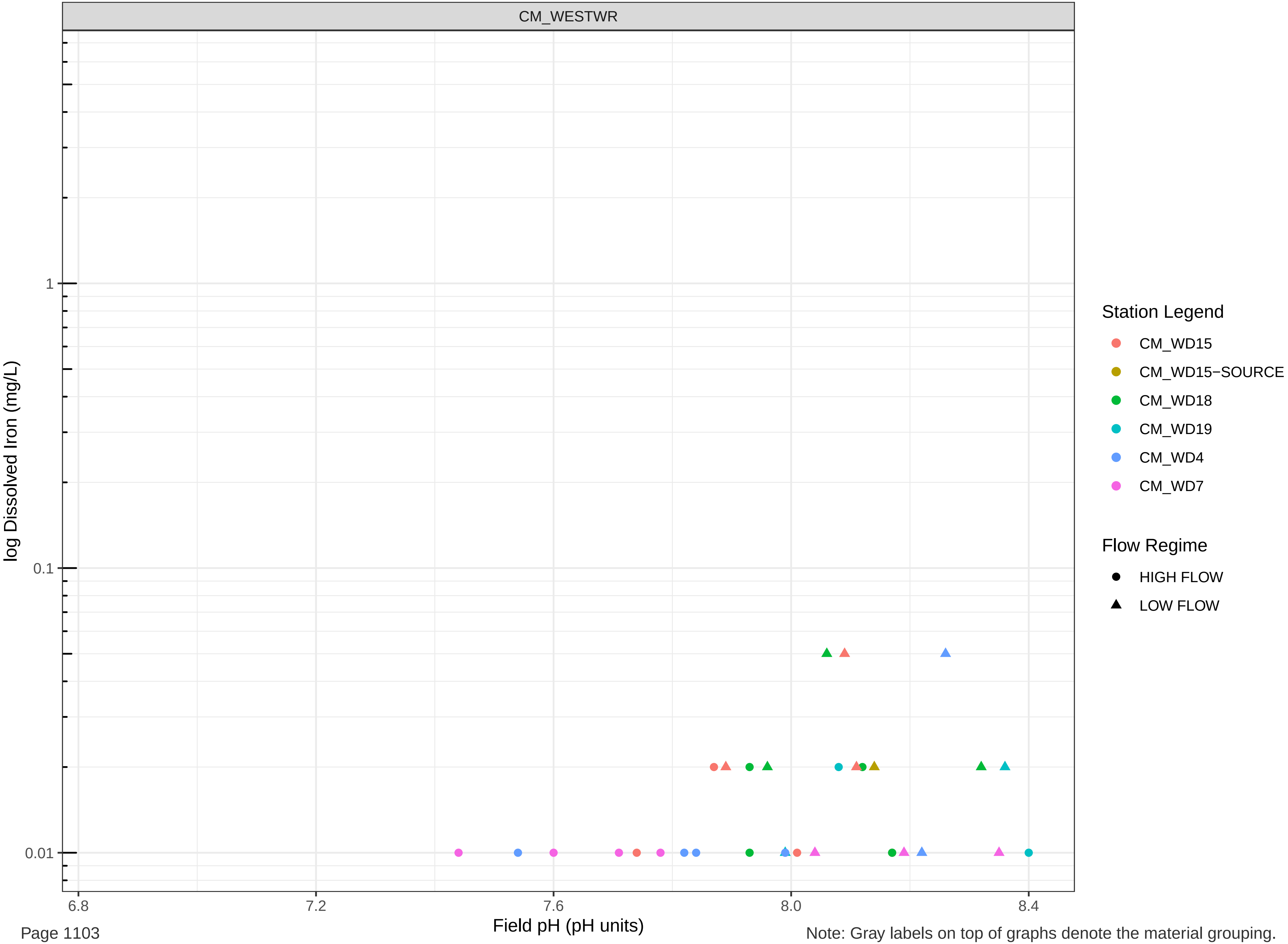

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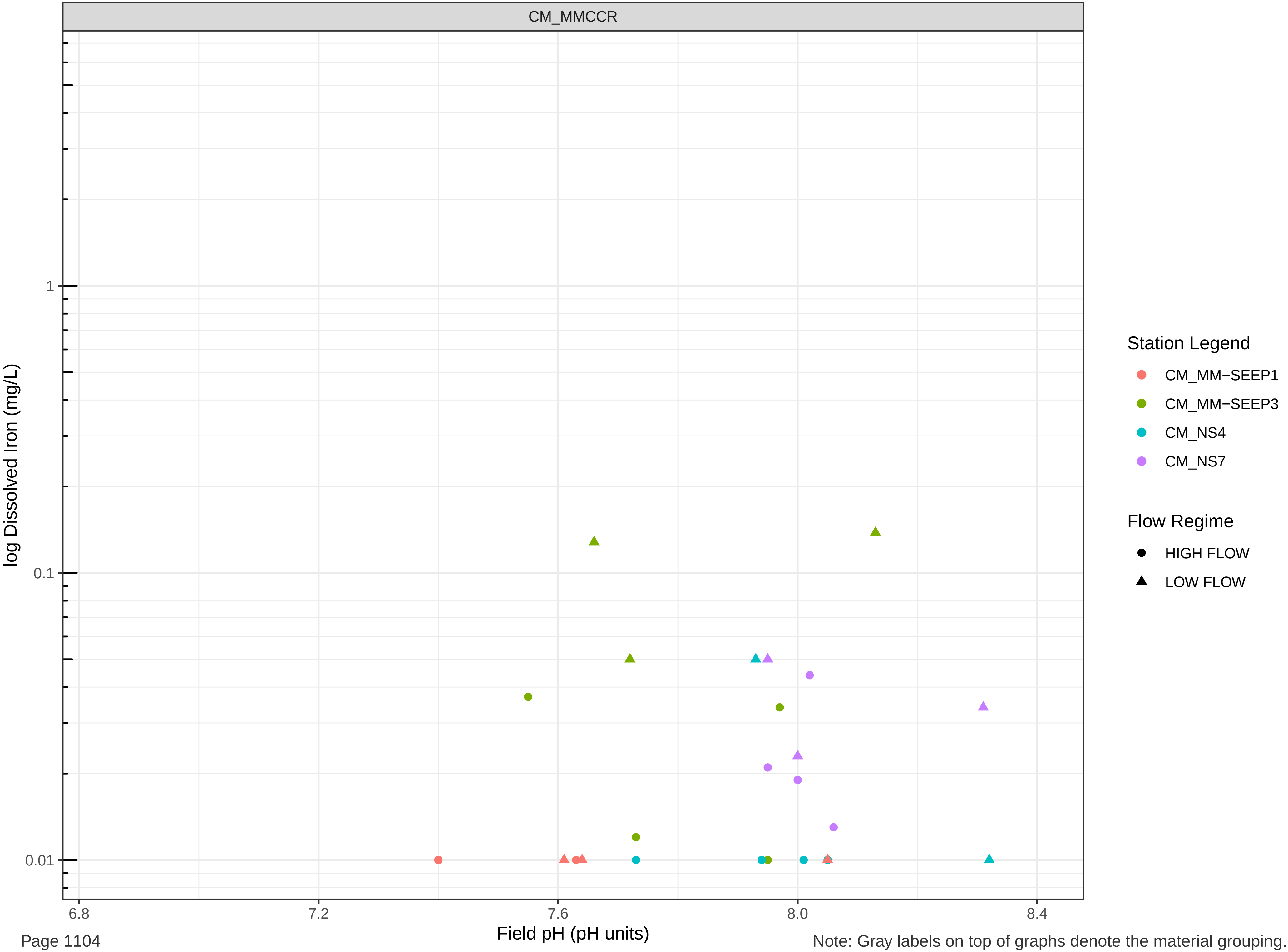

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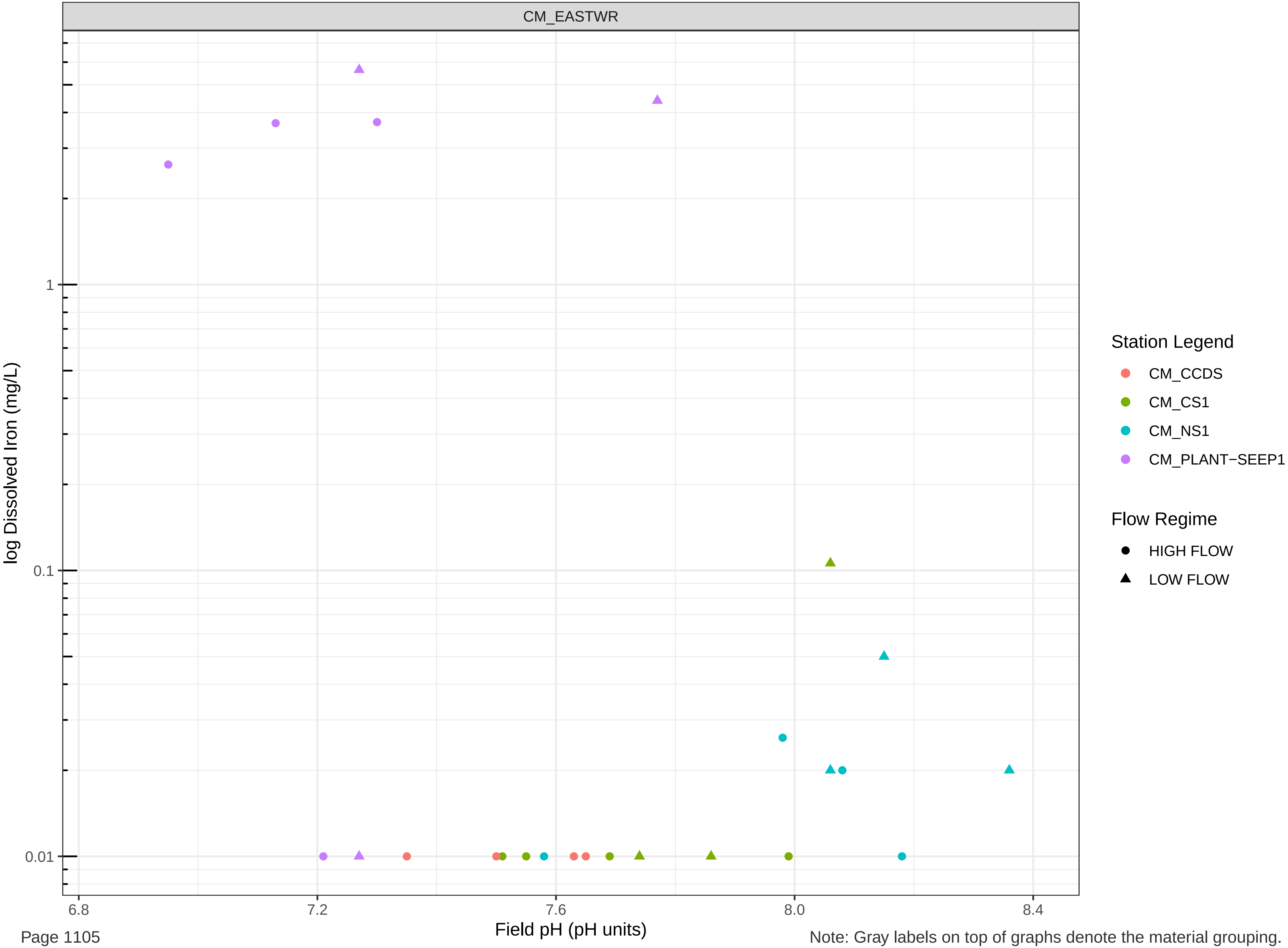

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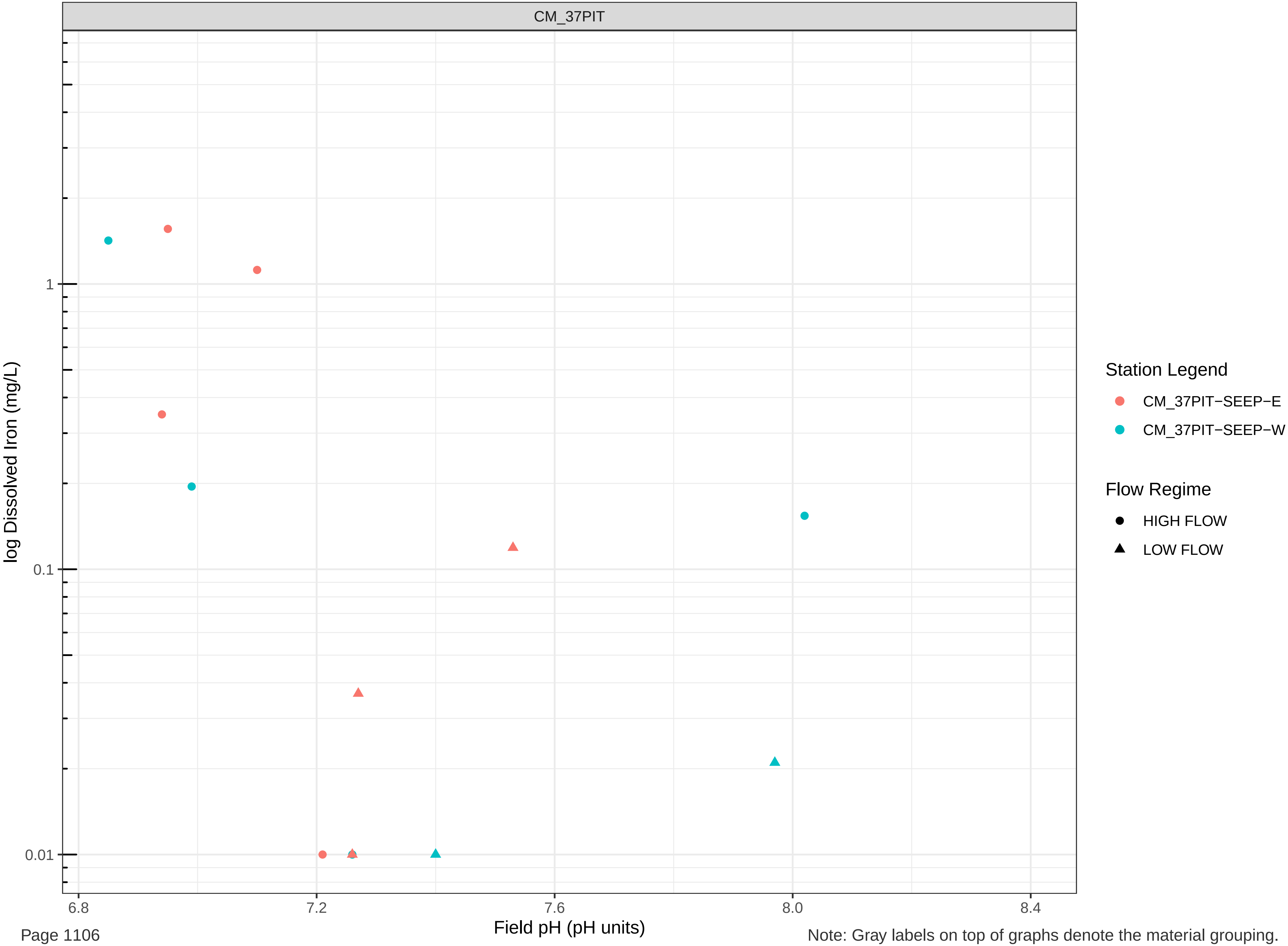

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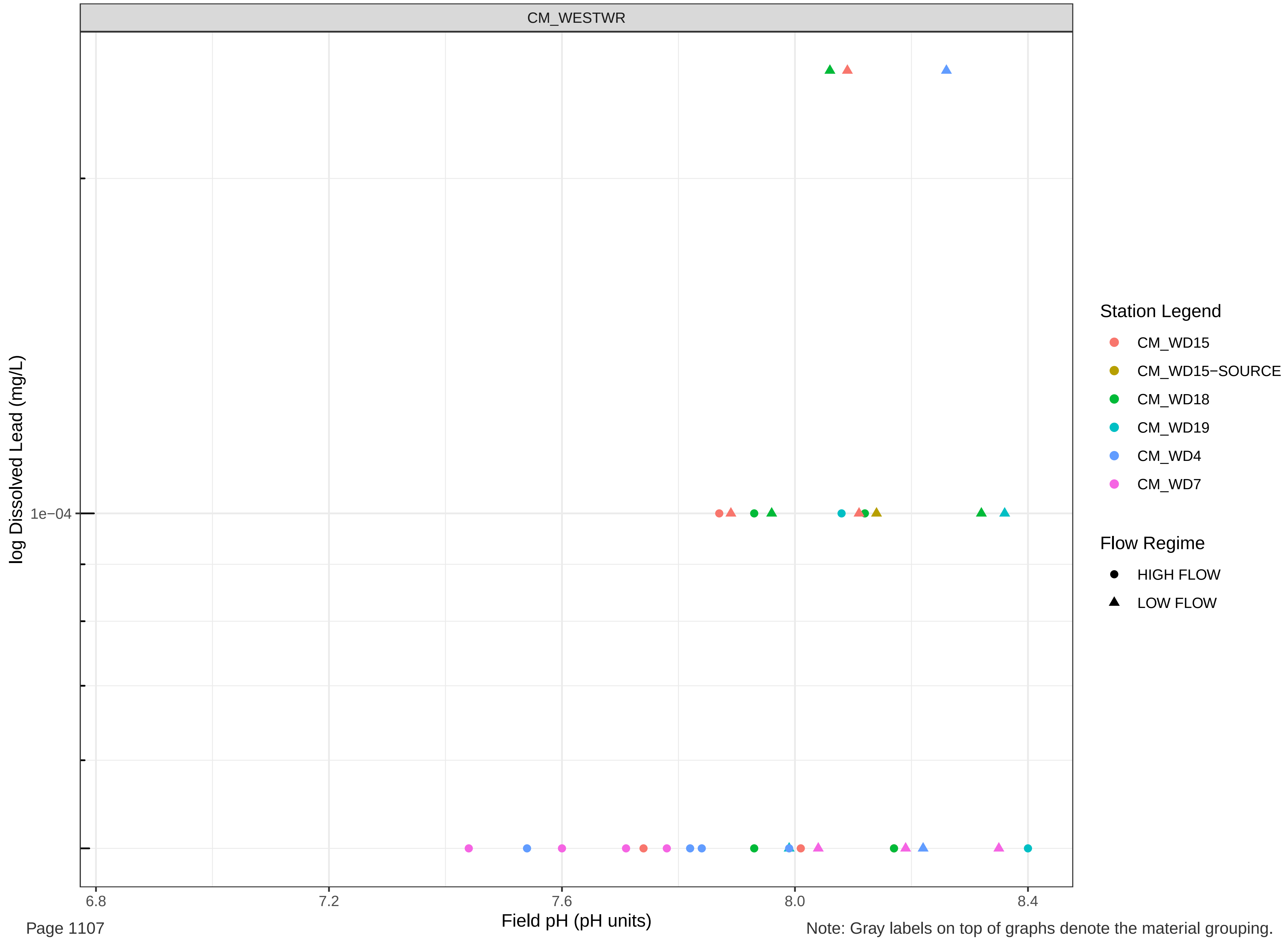

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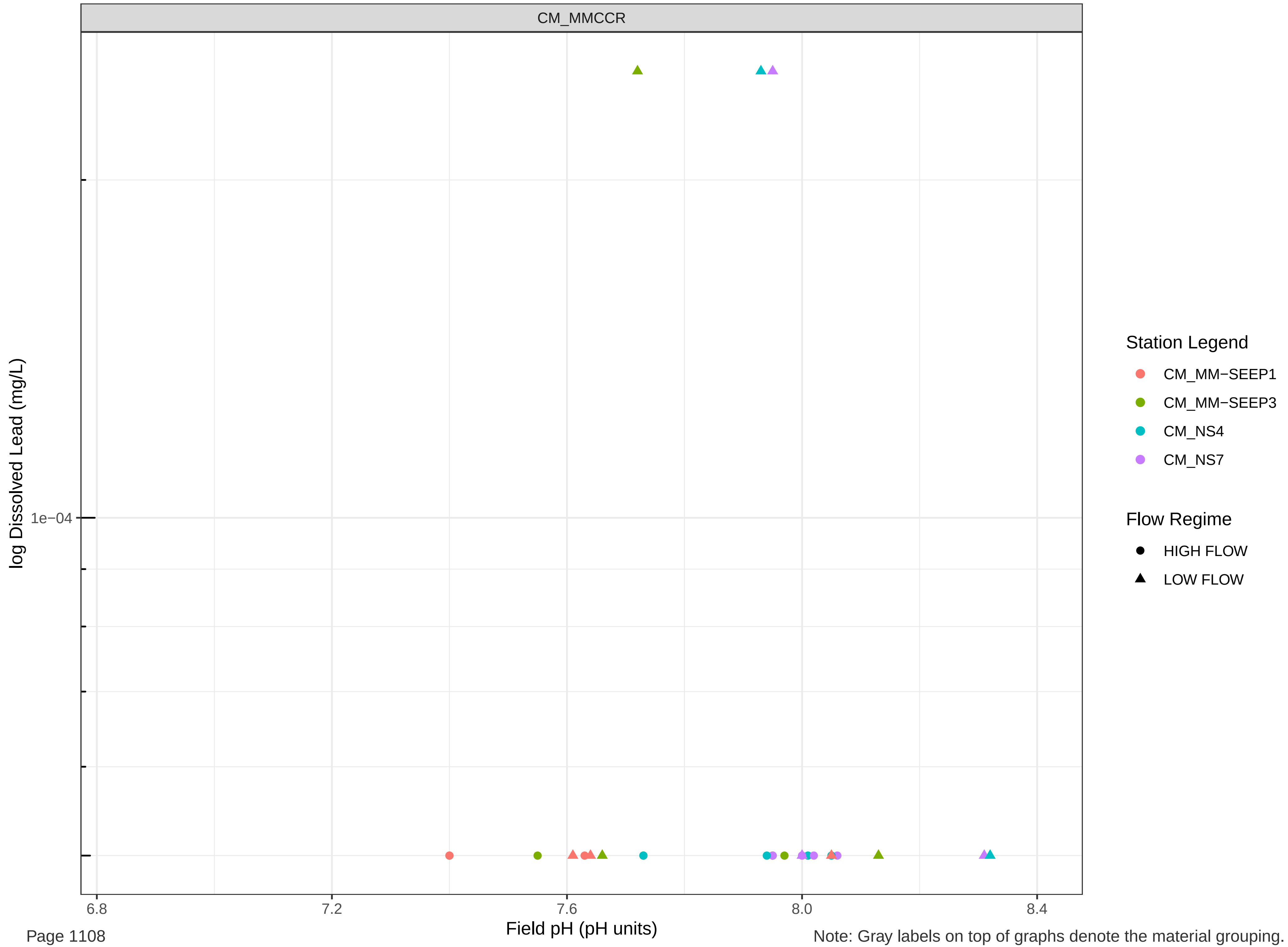

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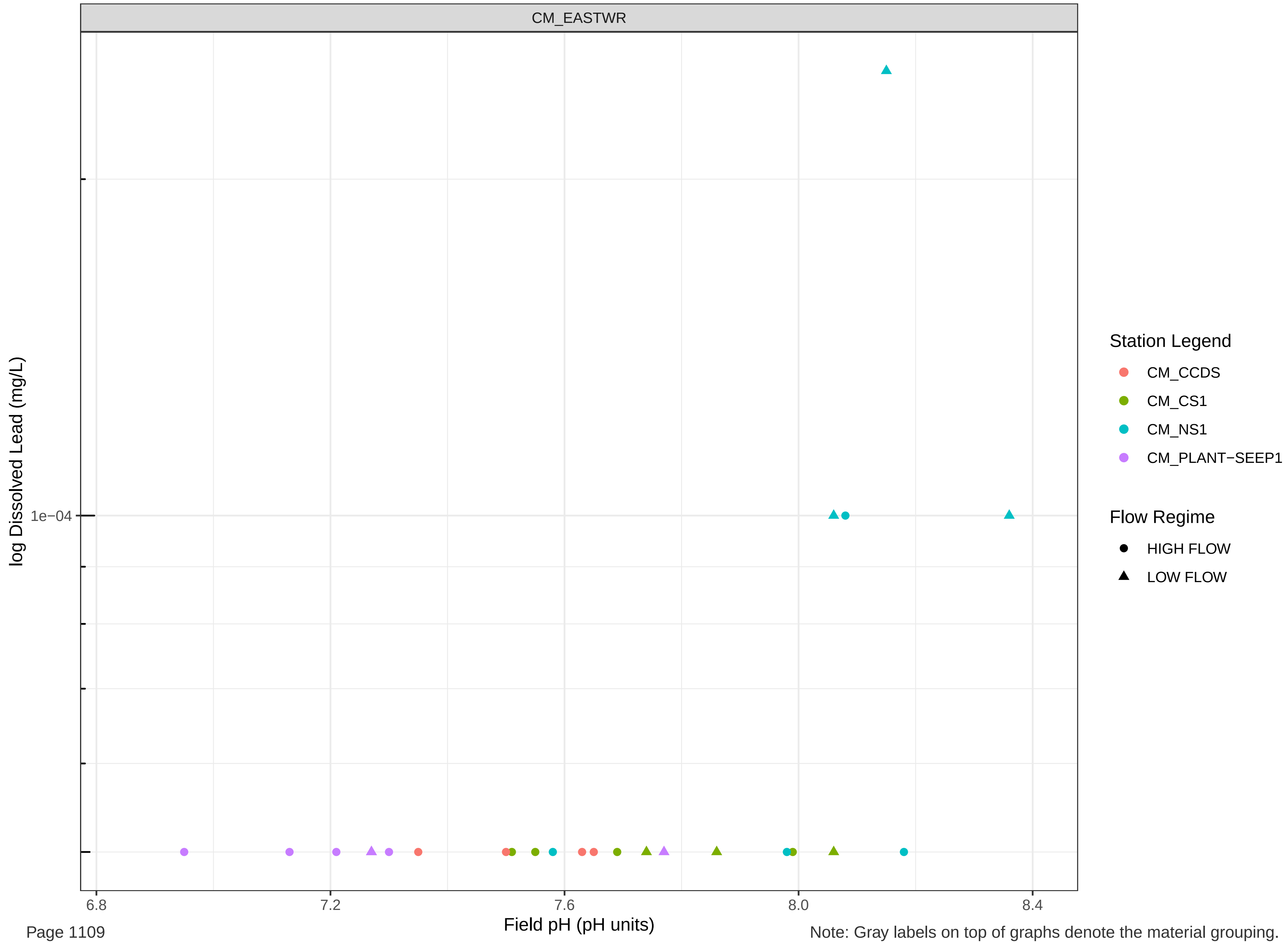

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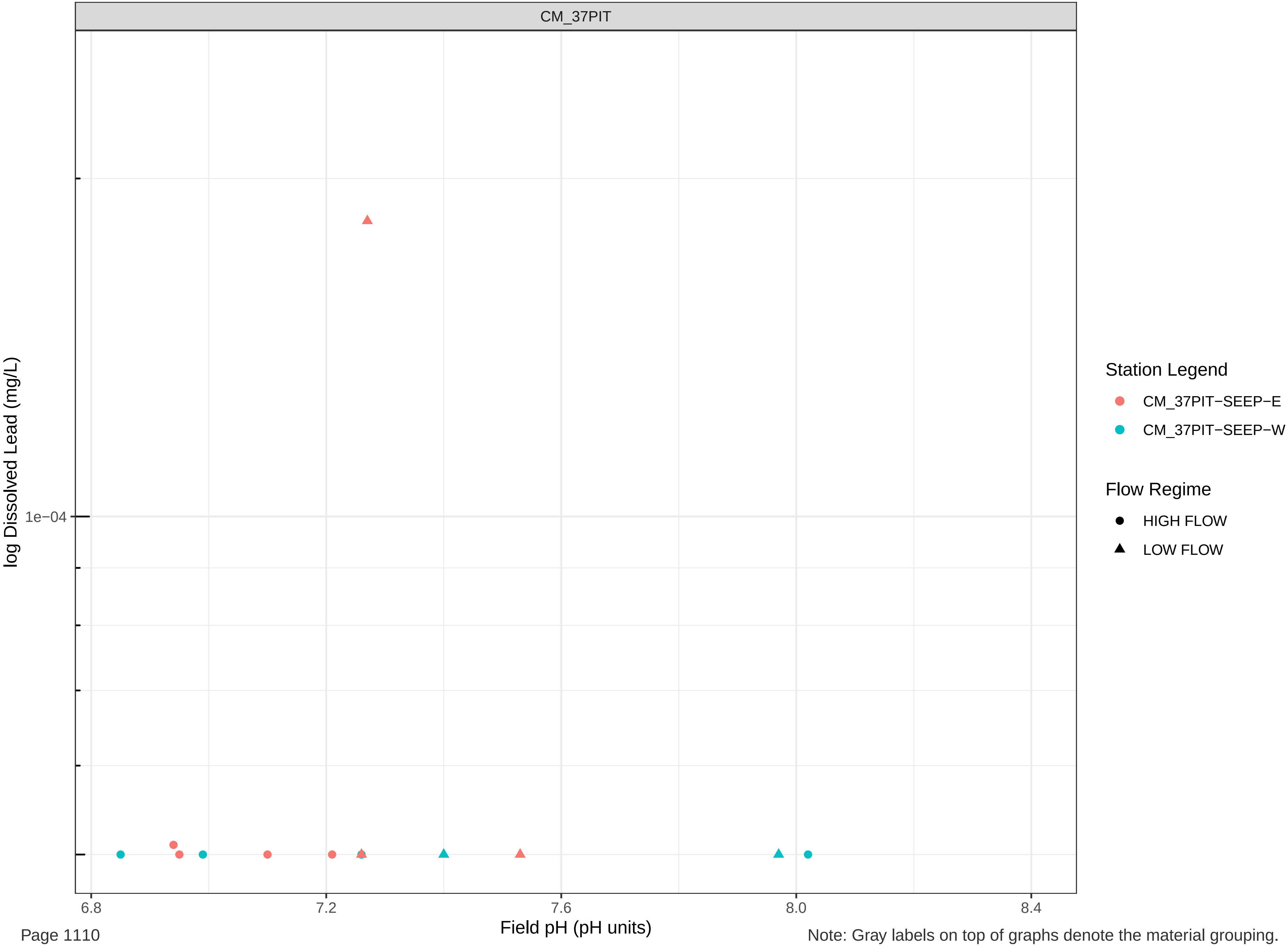

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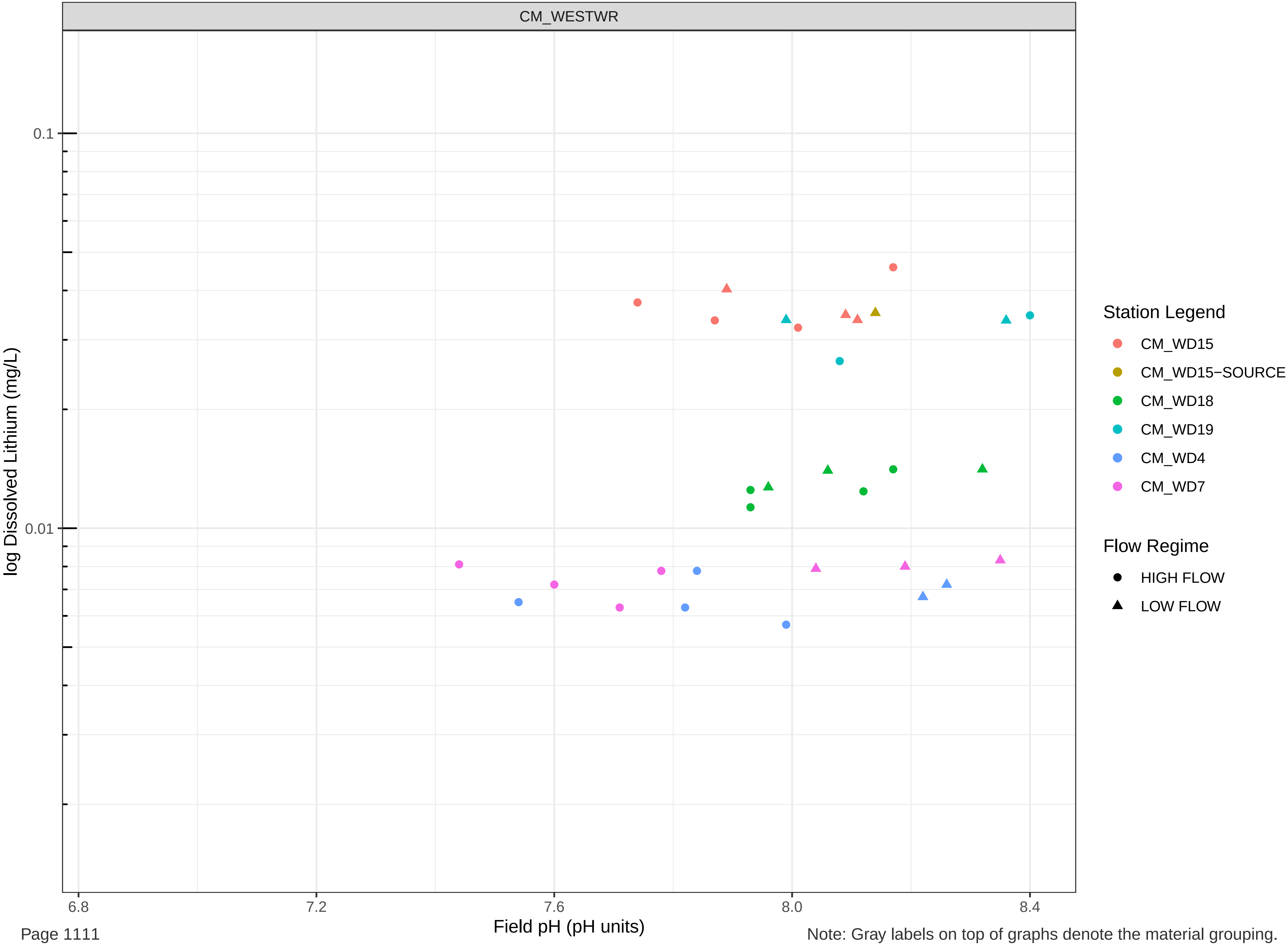

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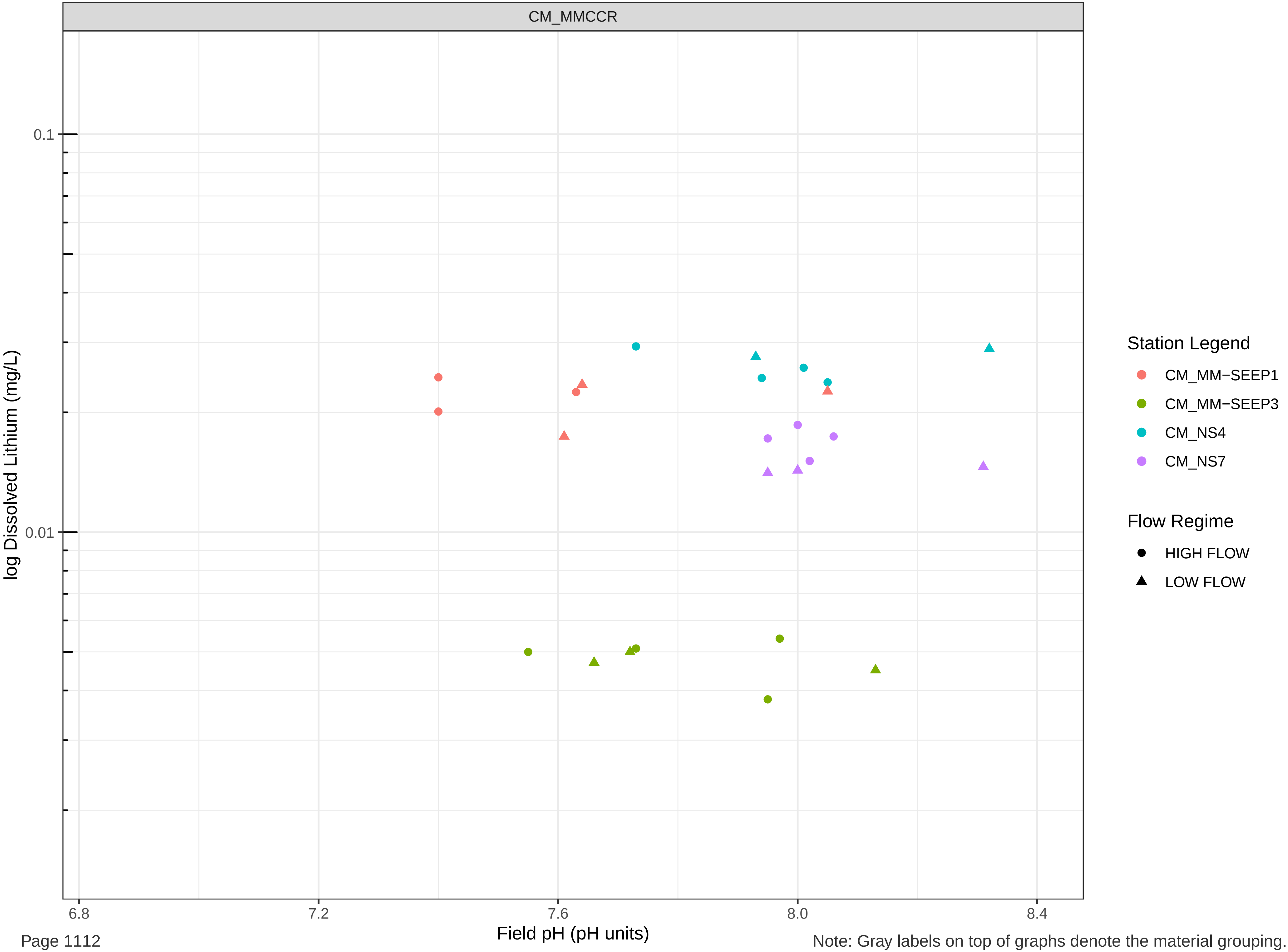

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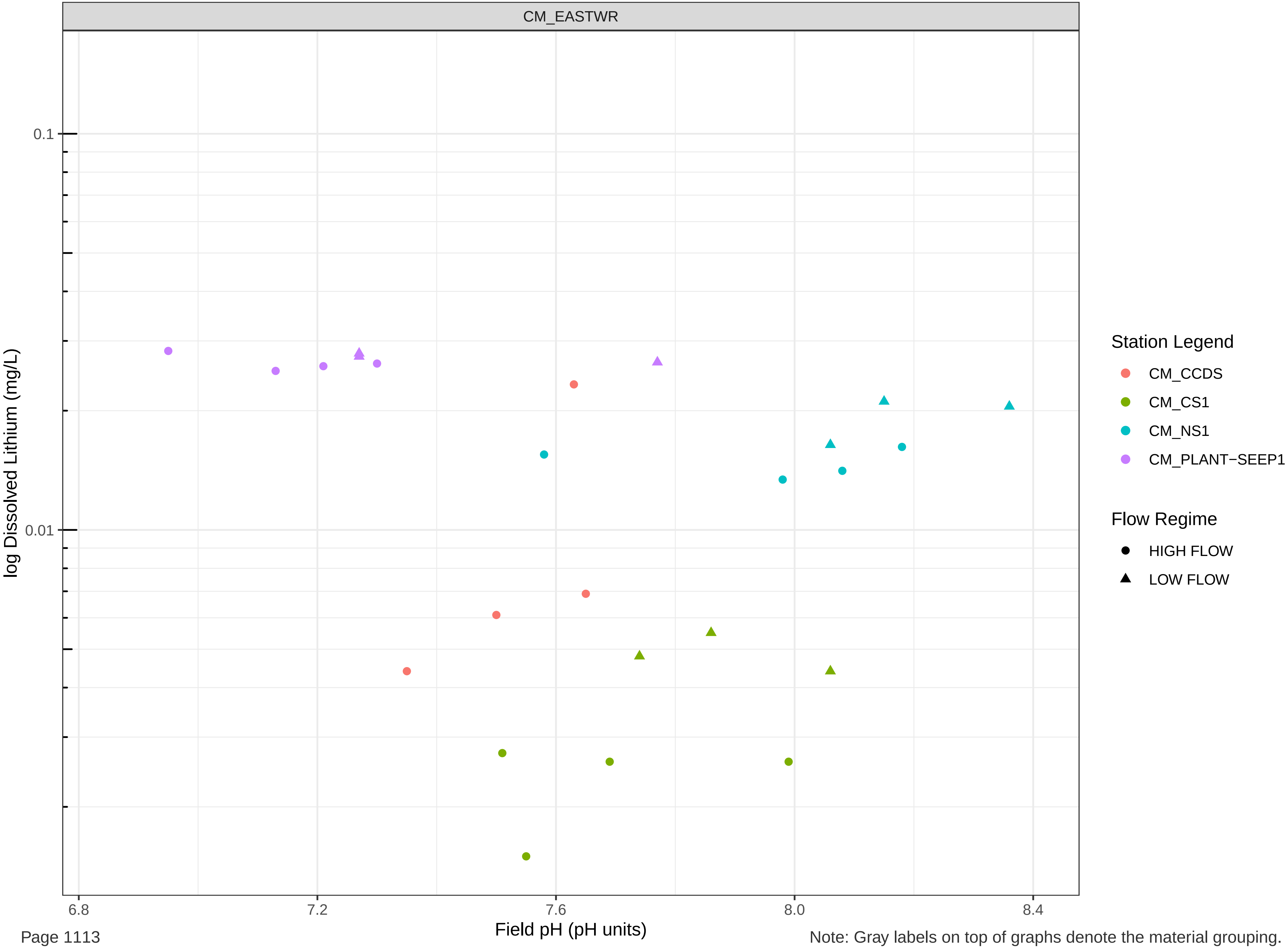

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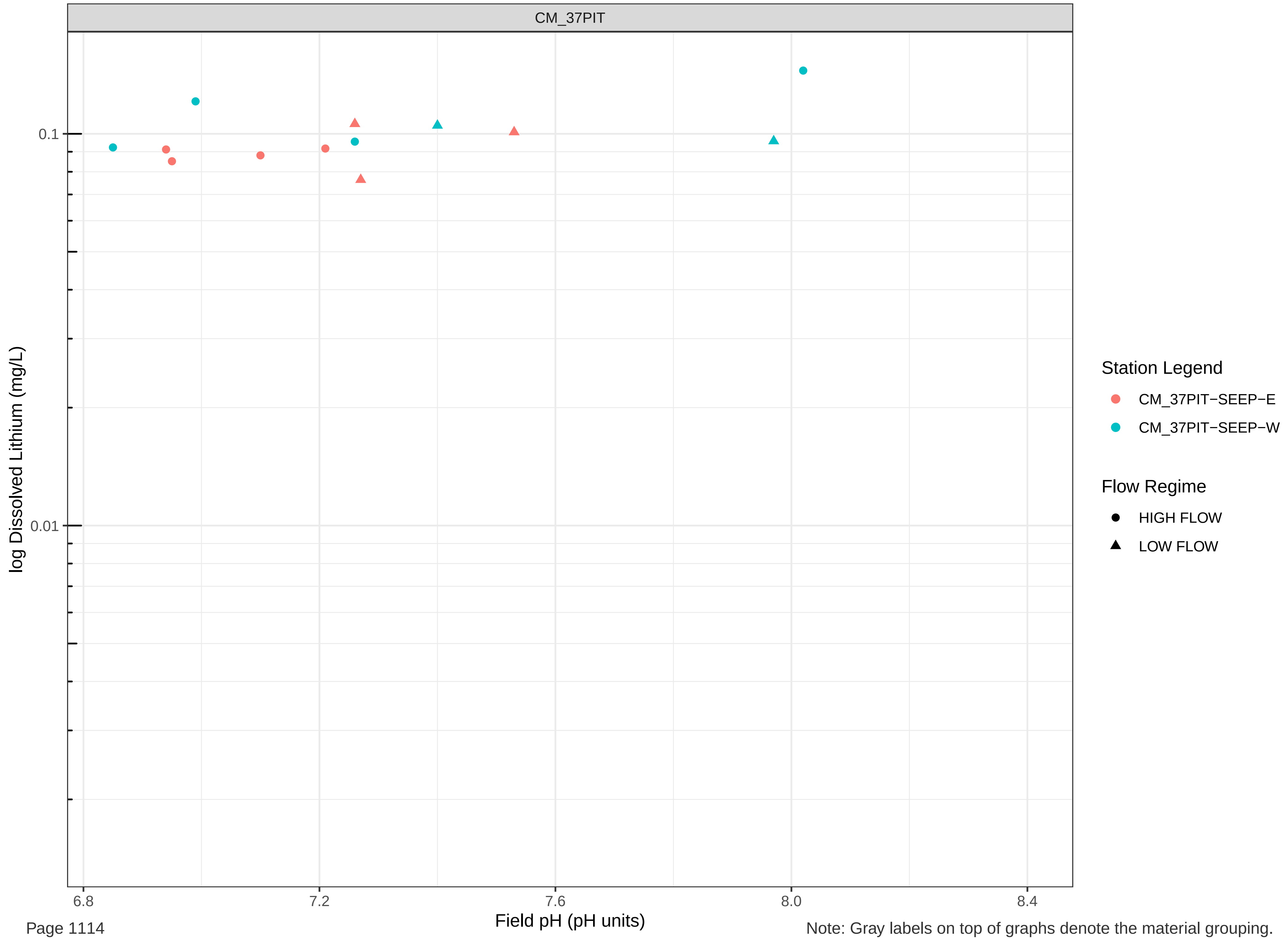

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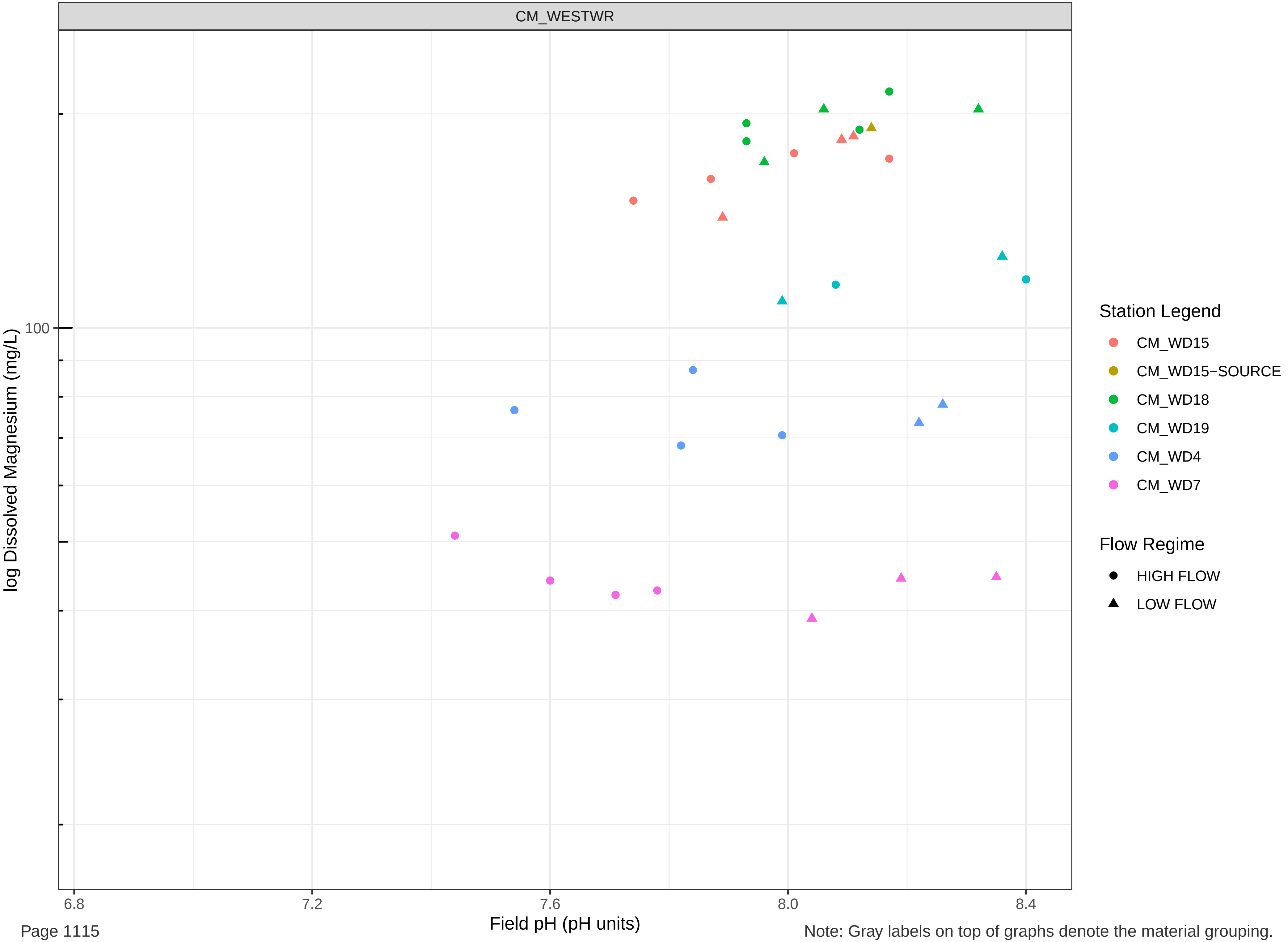

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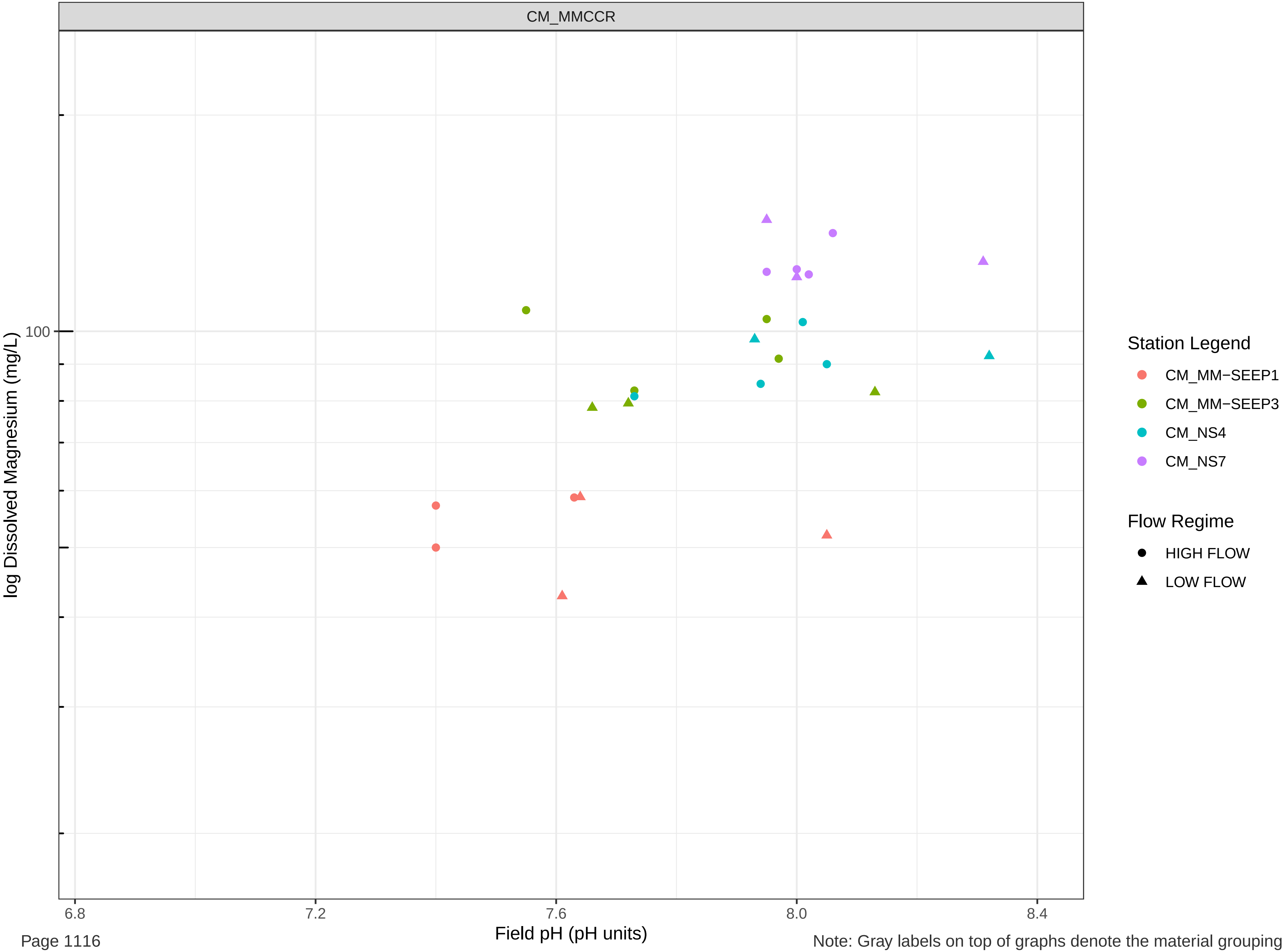

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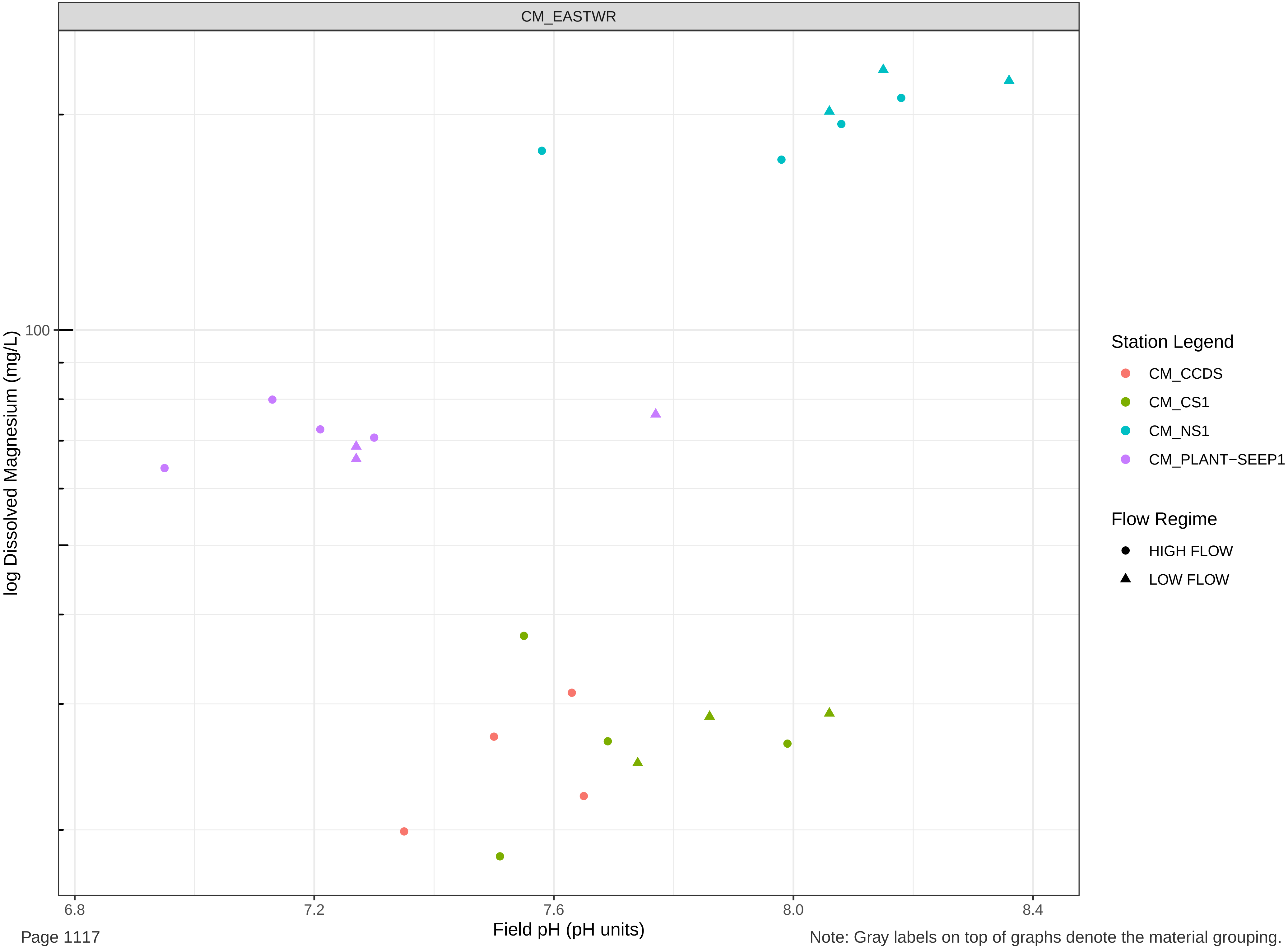

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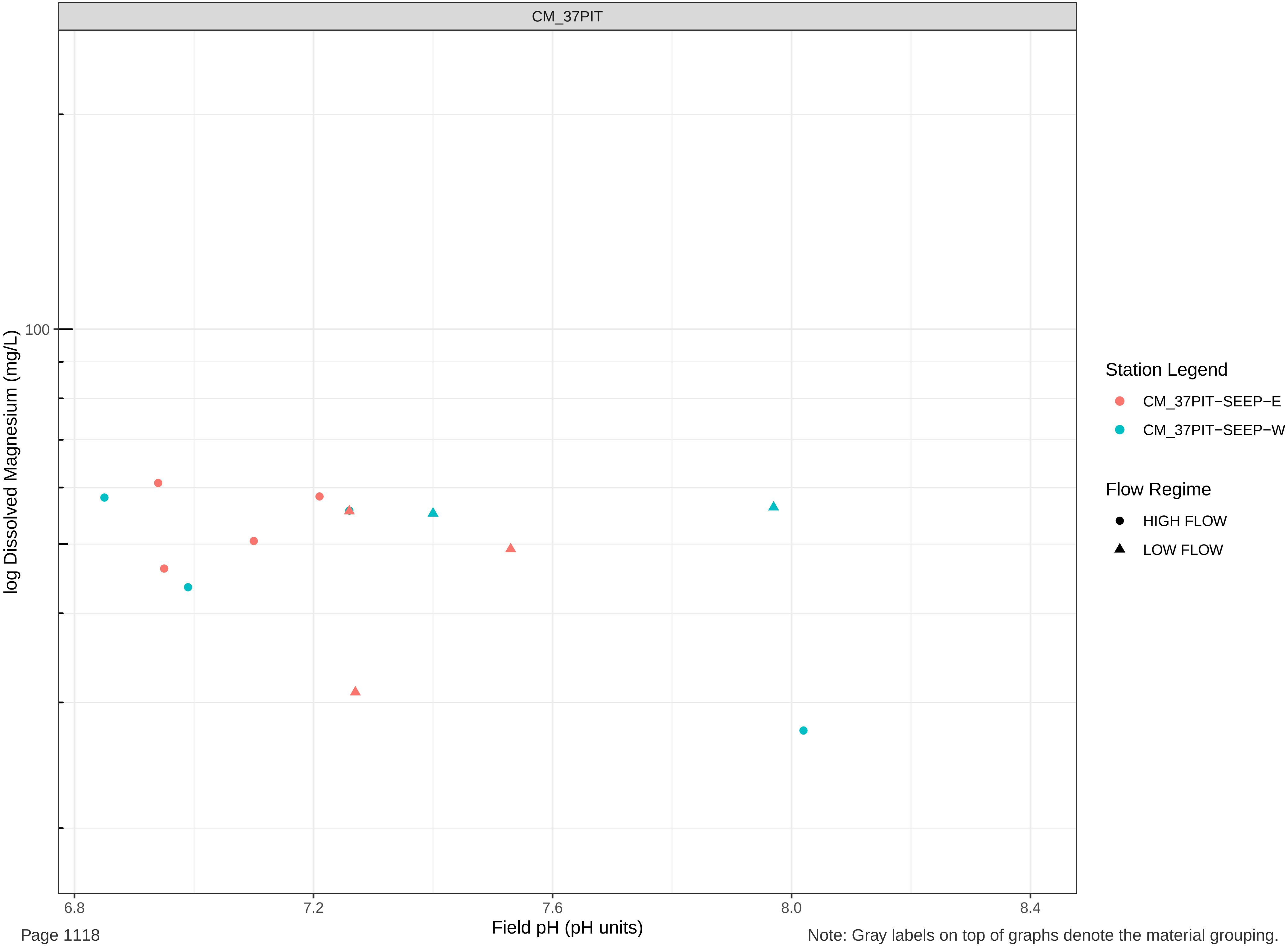

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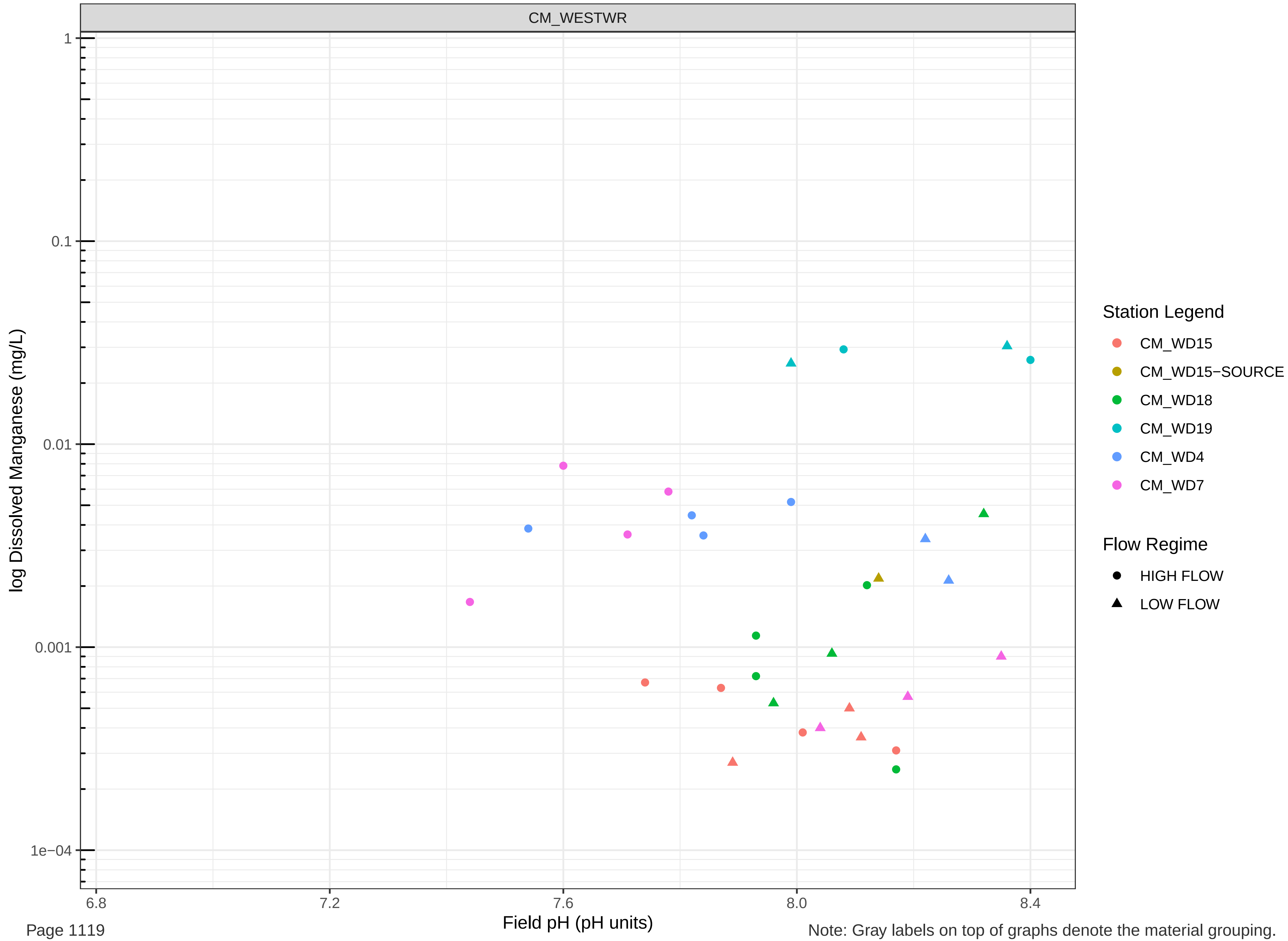

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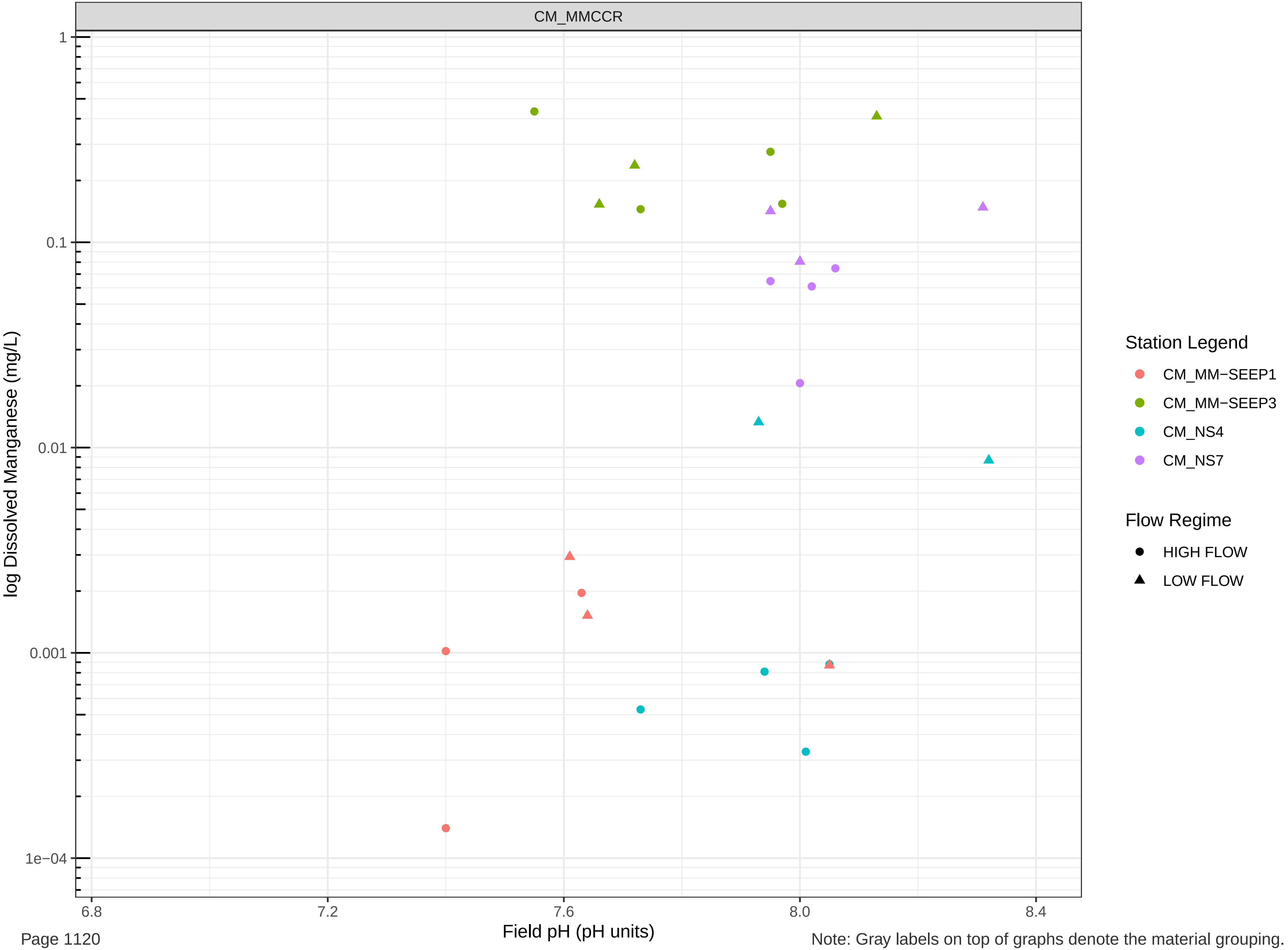

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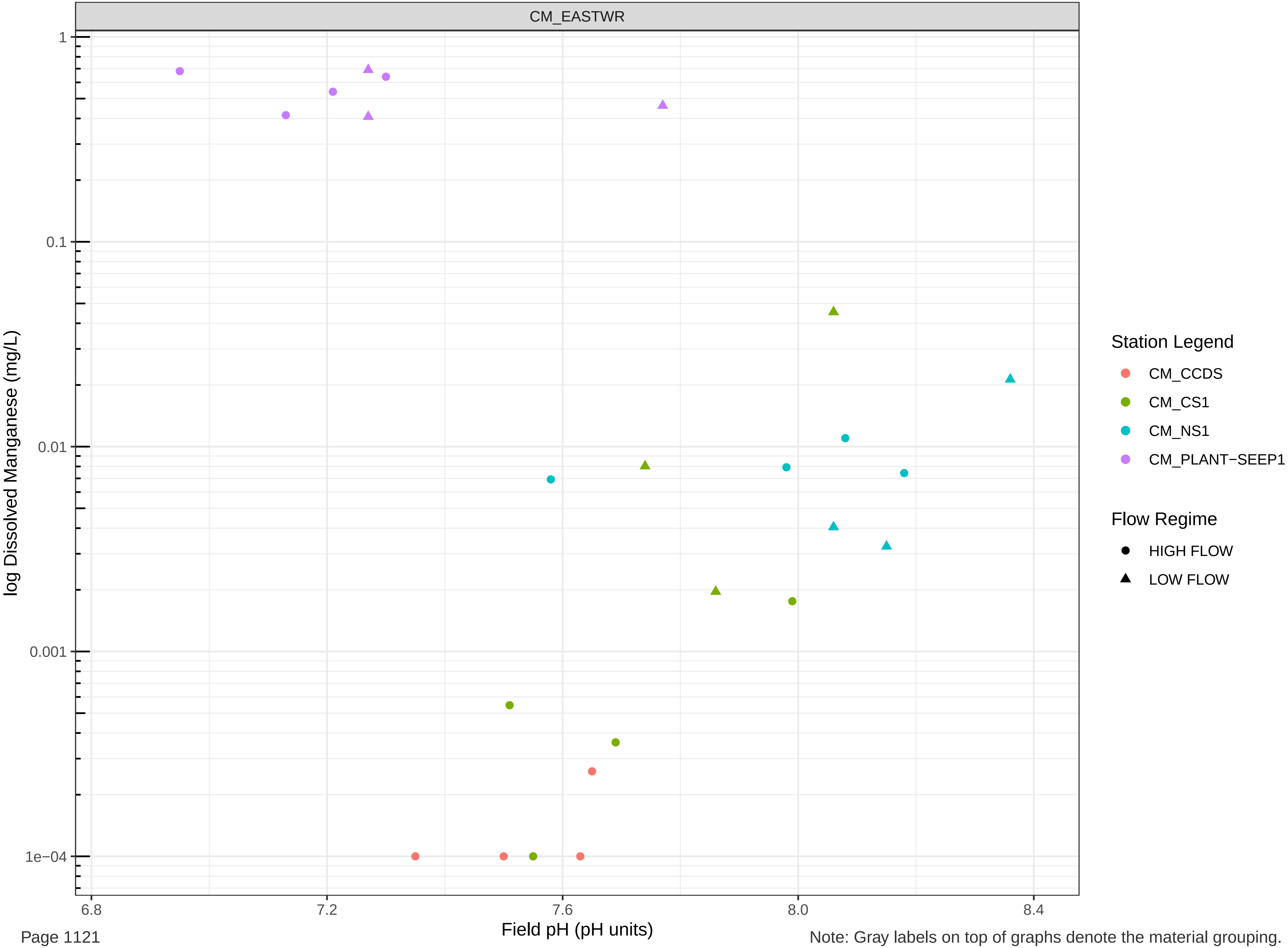

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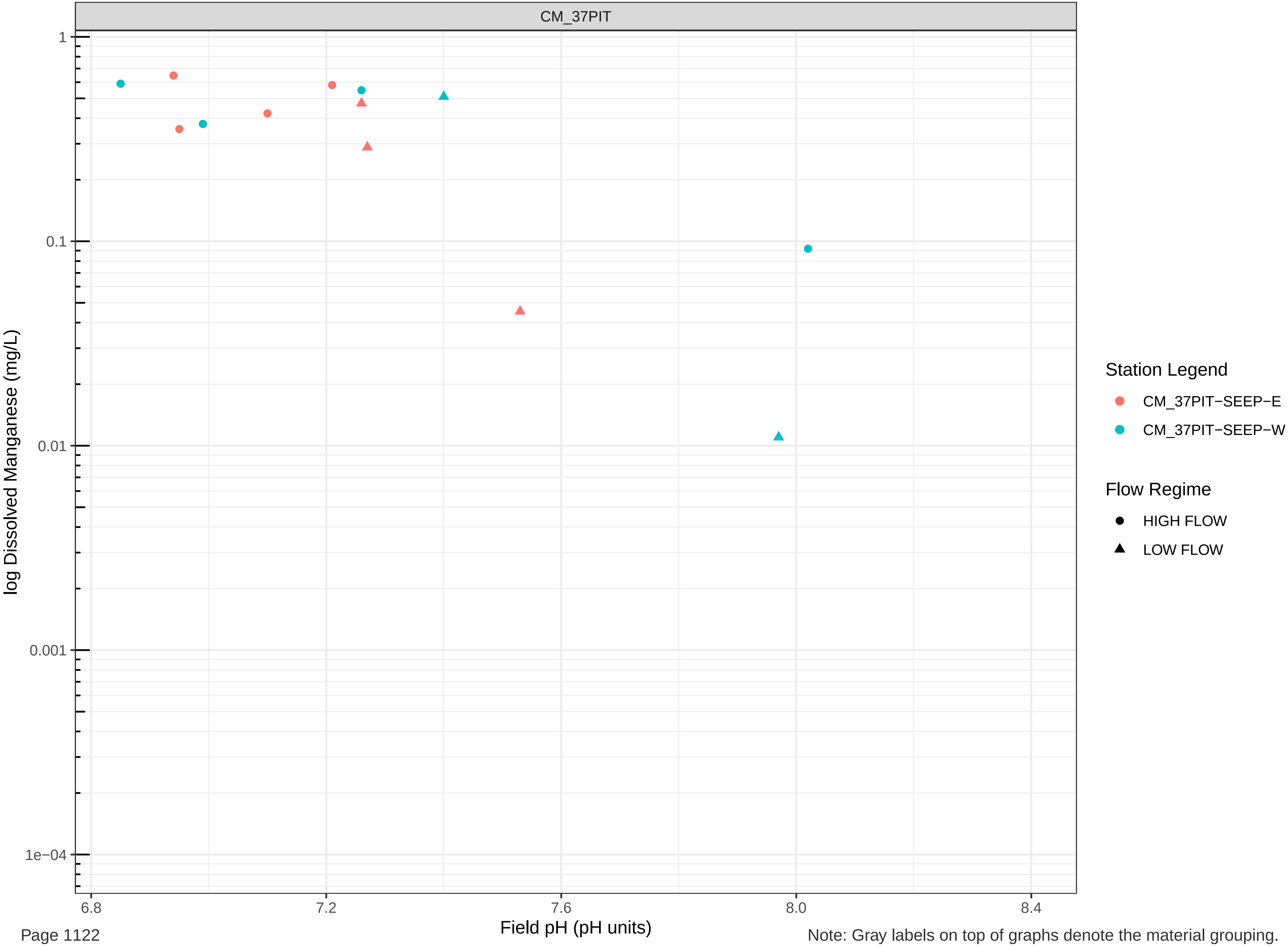

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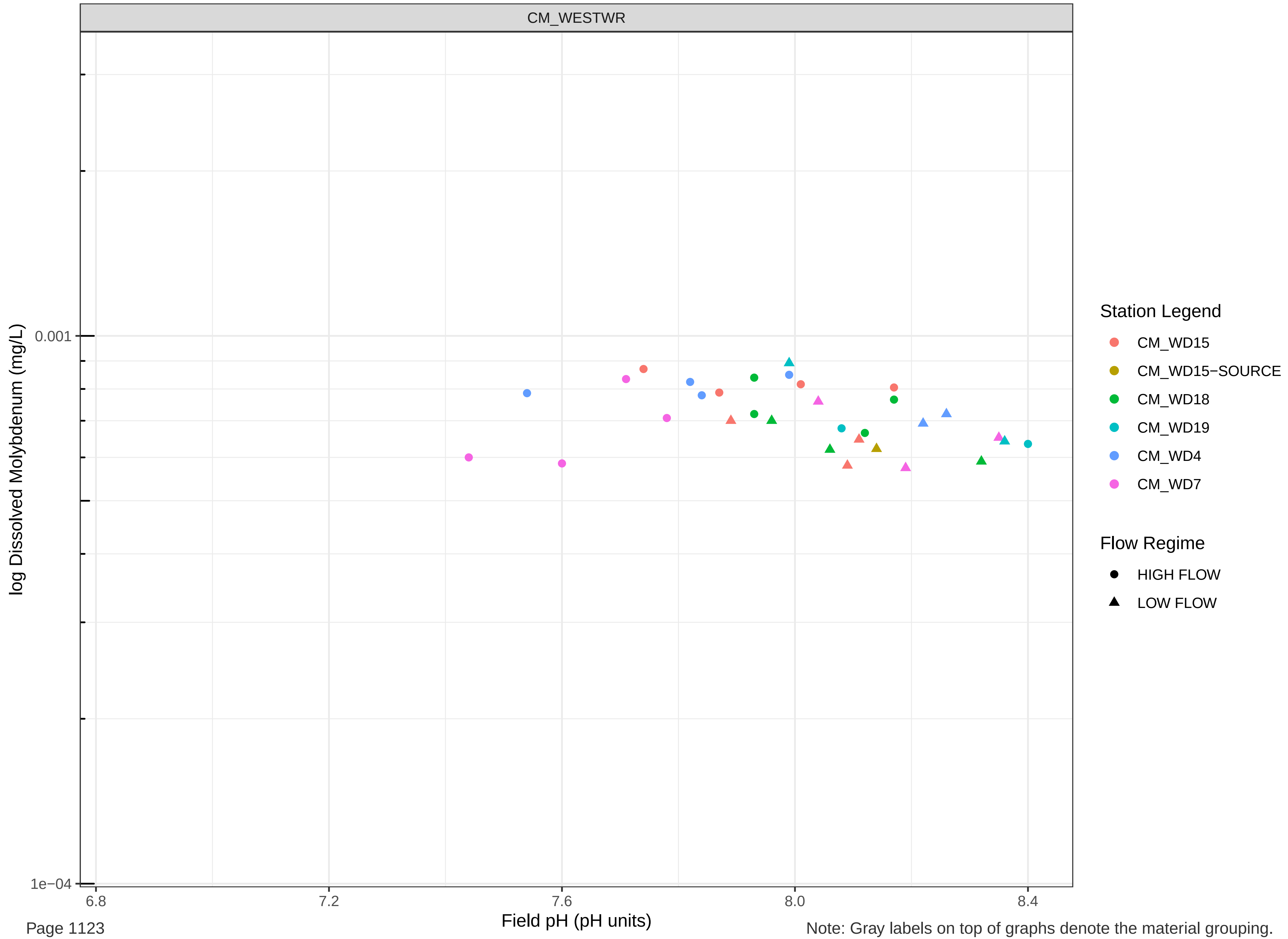

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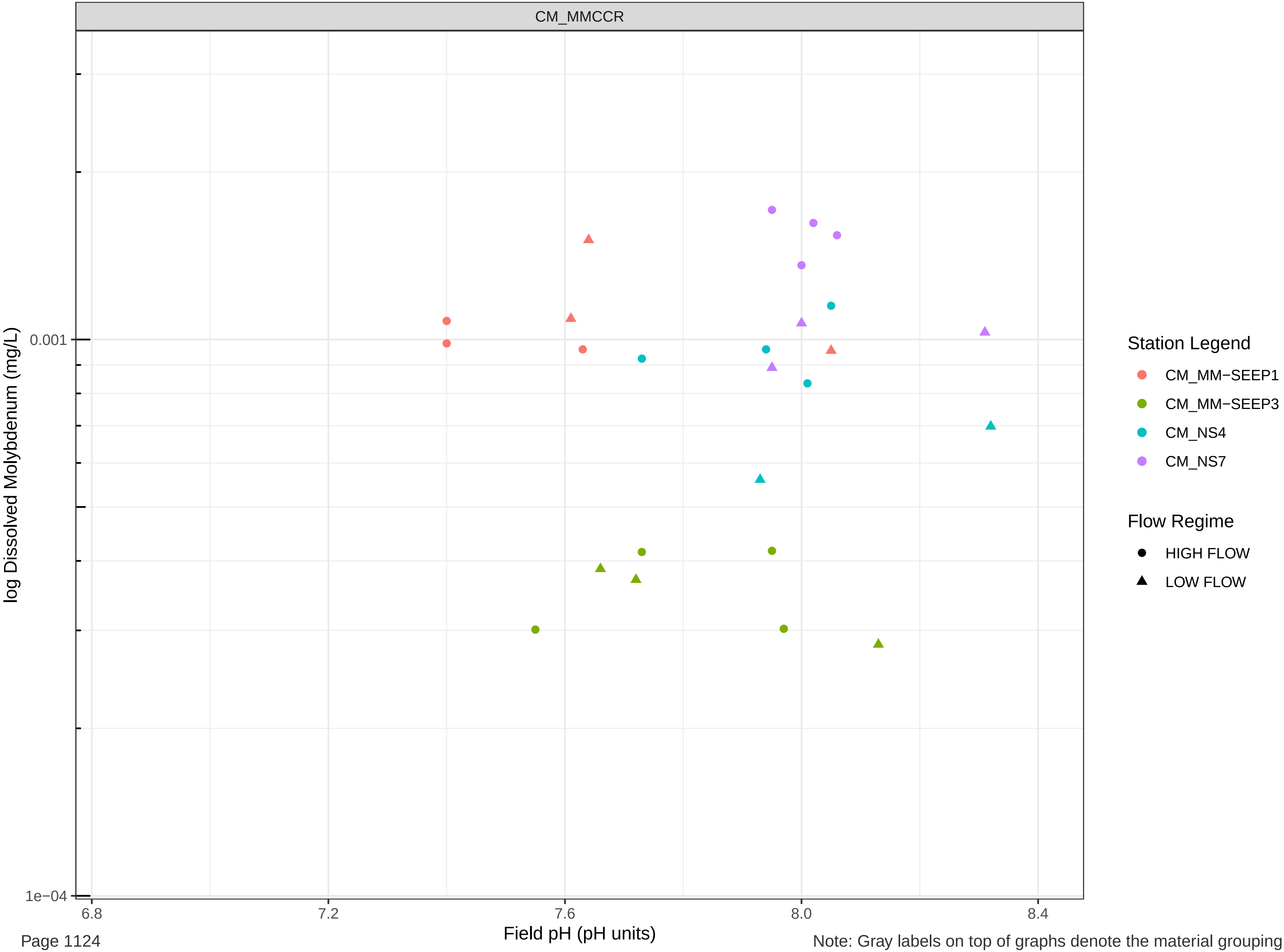

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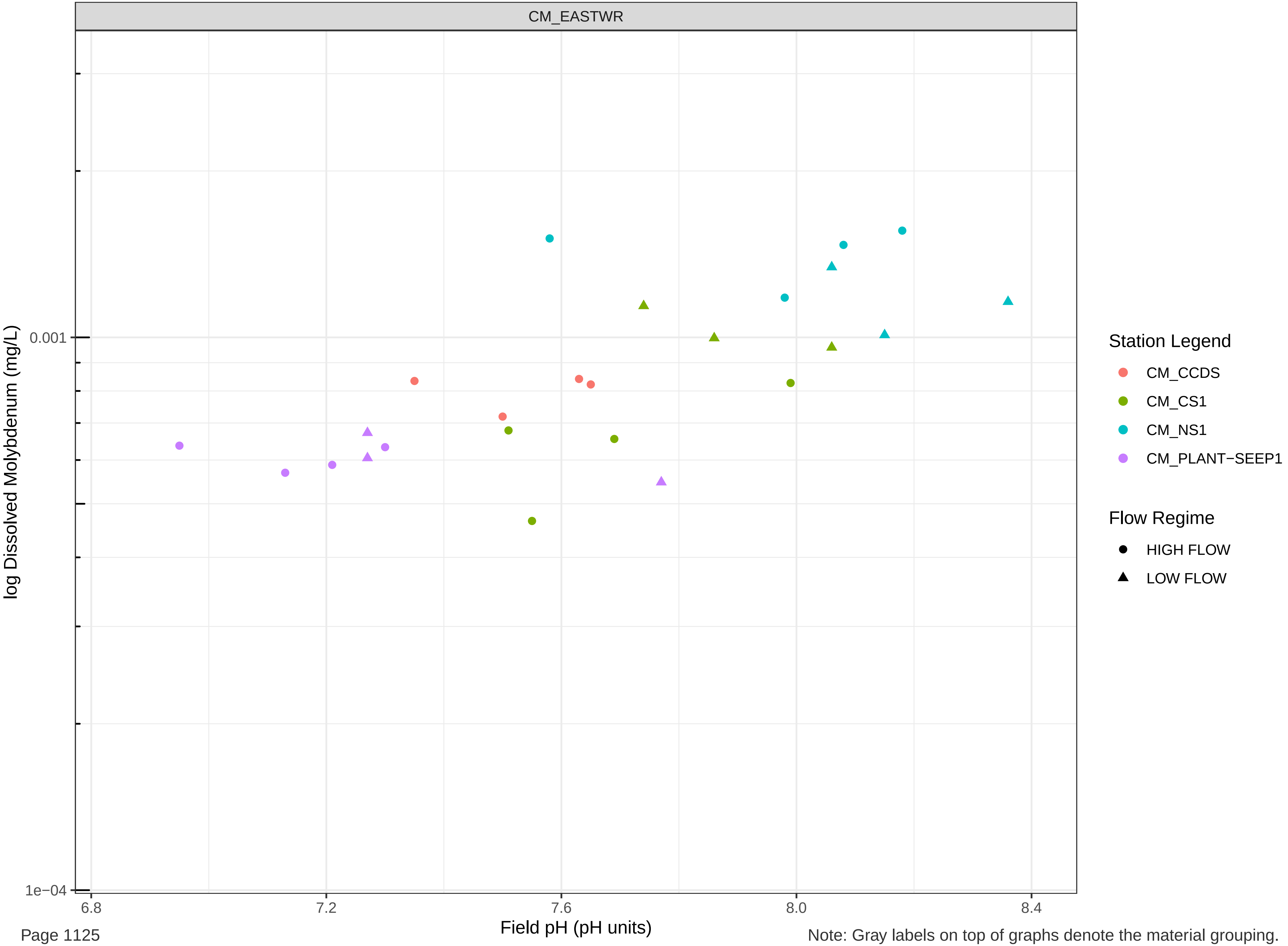
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Station Legend
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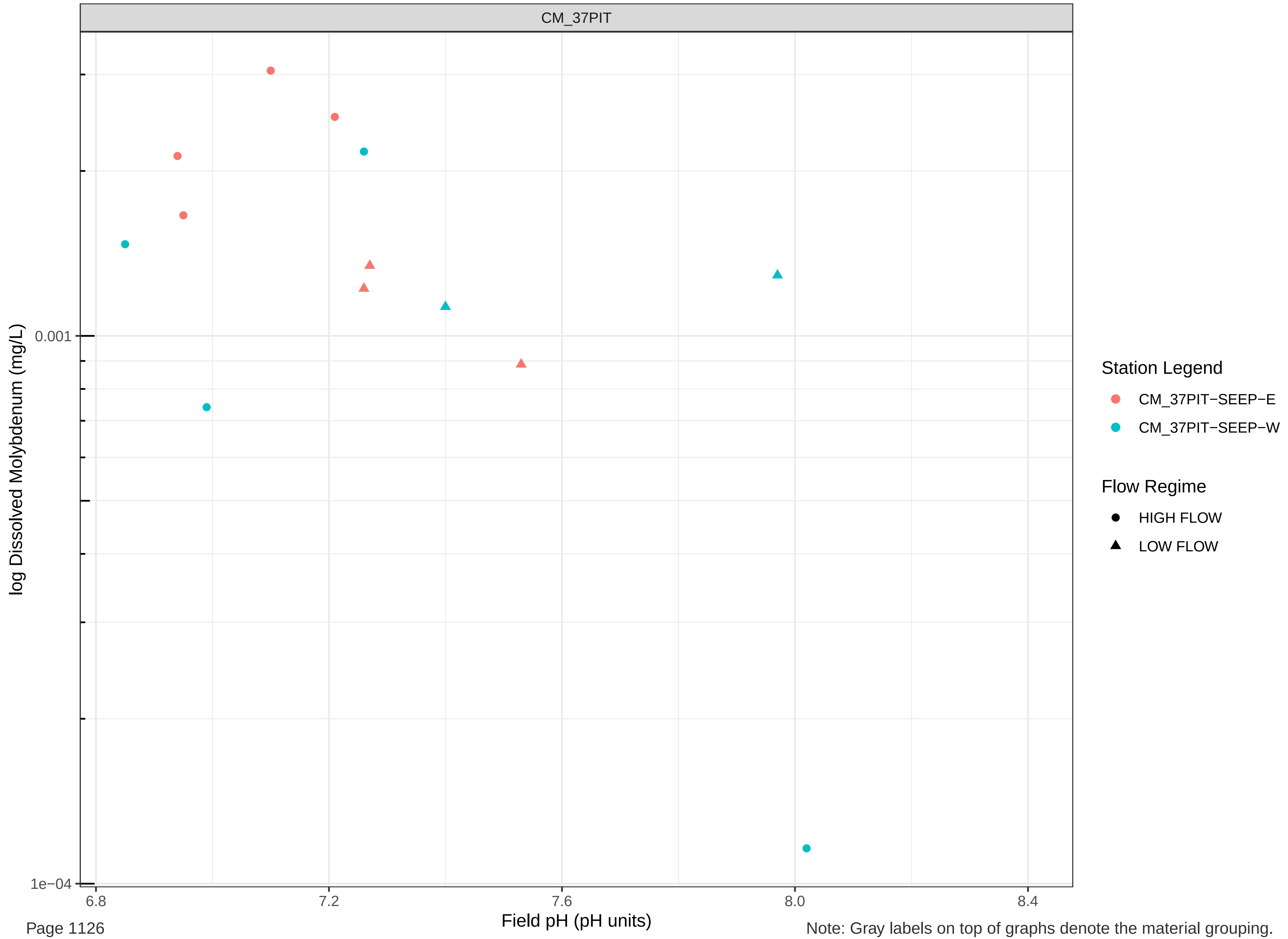
LOW FLOW



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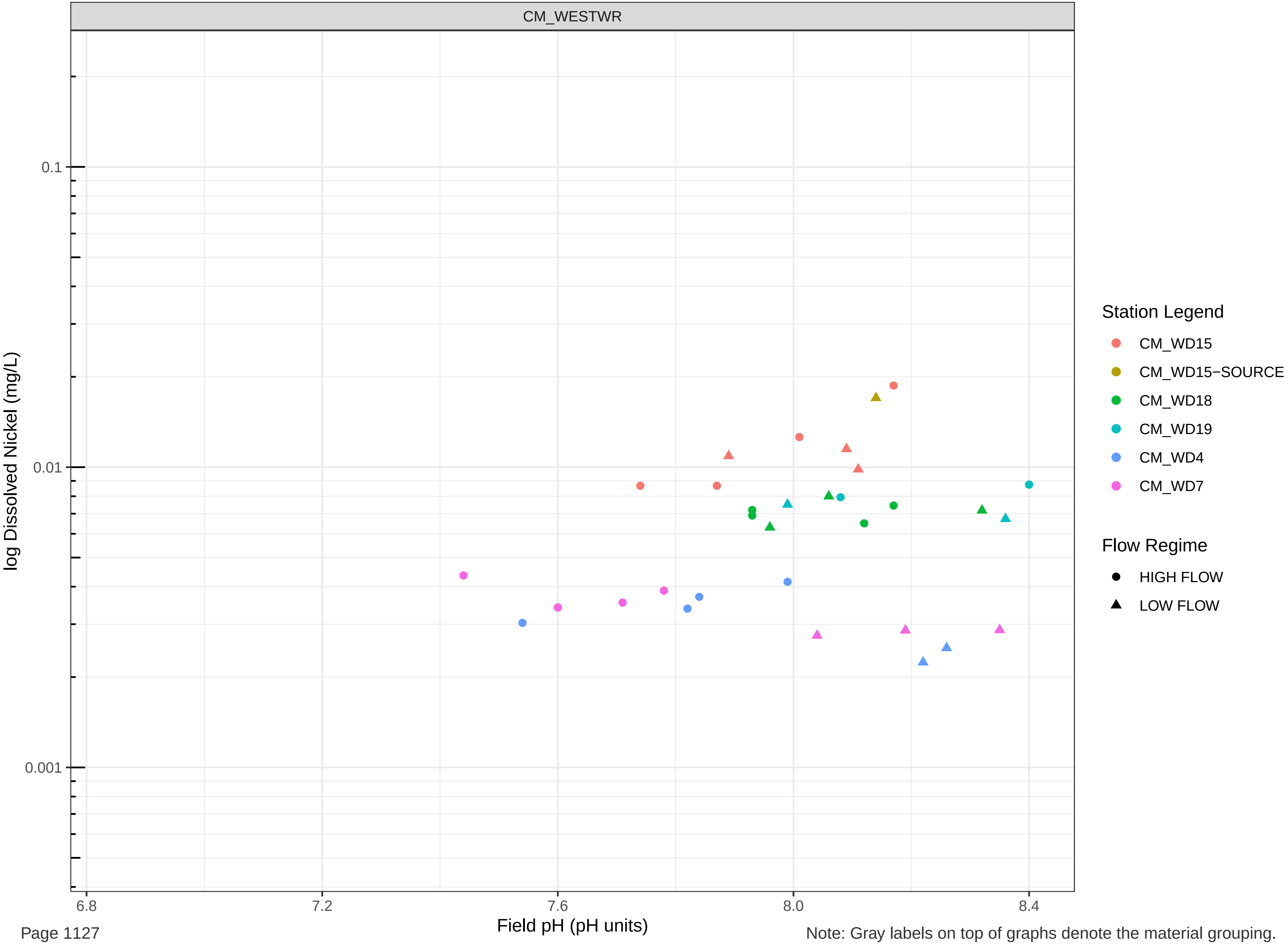

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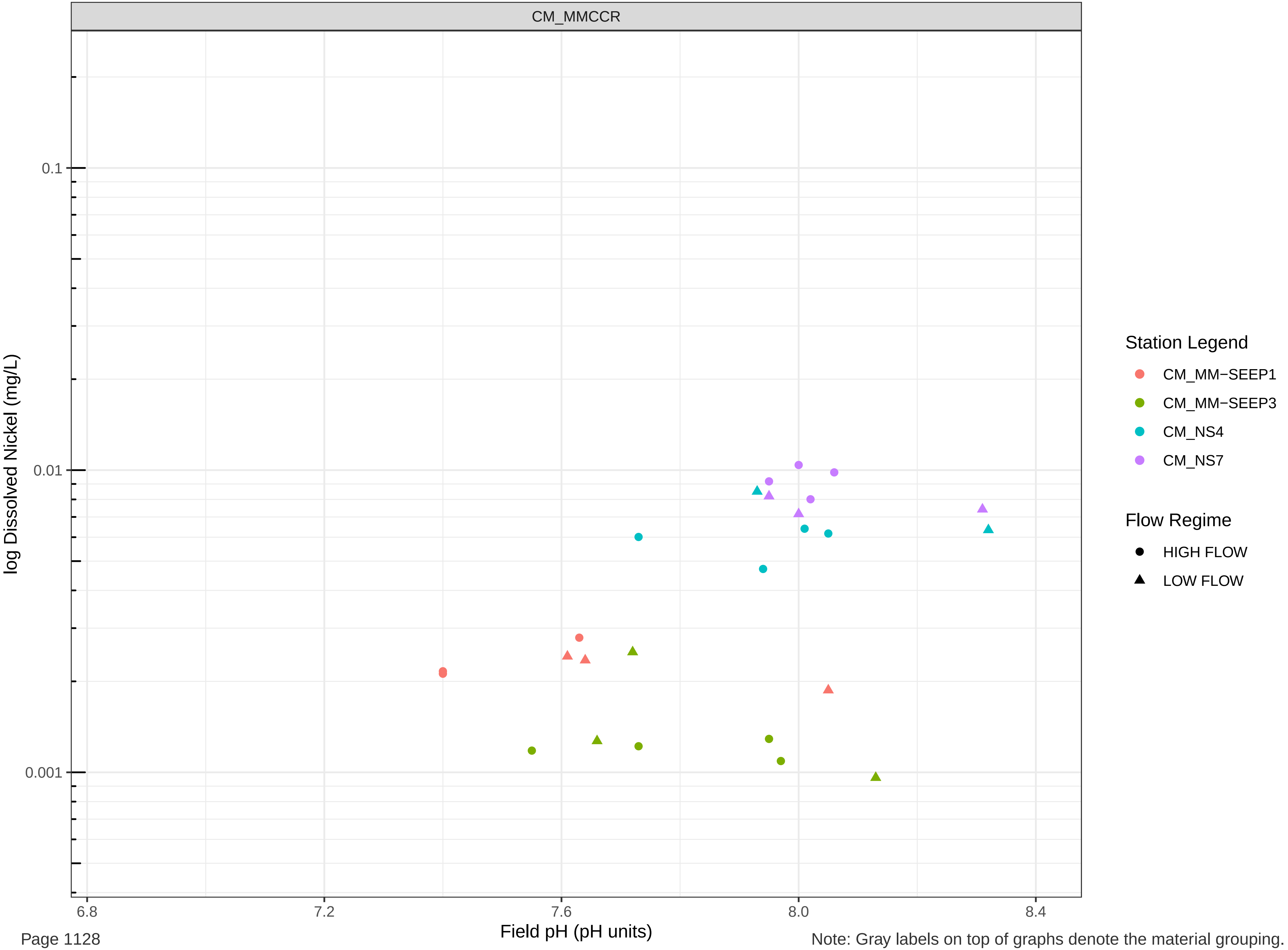

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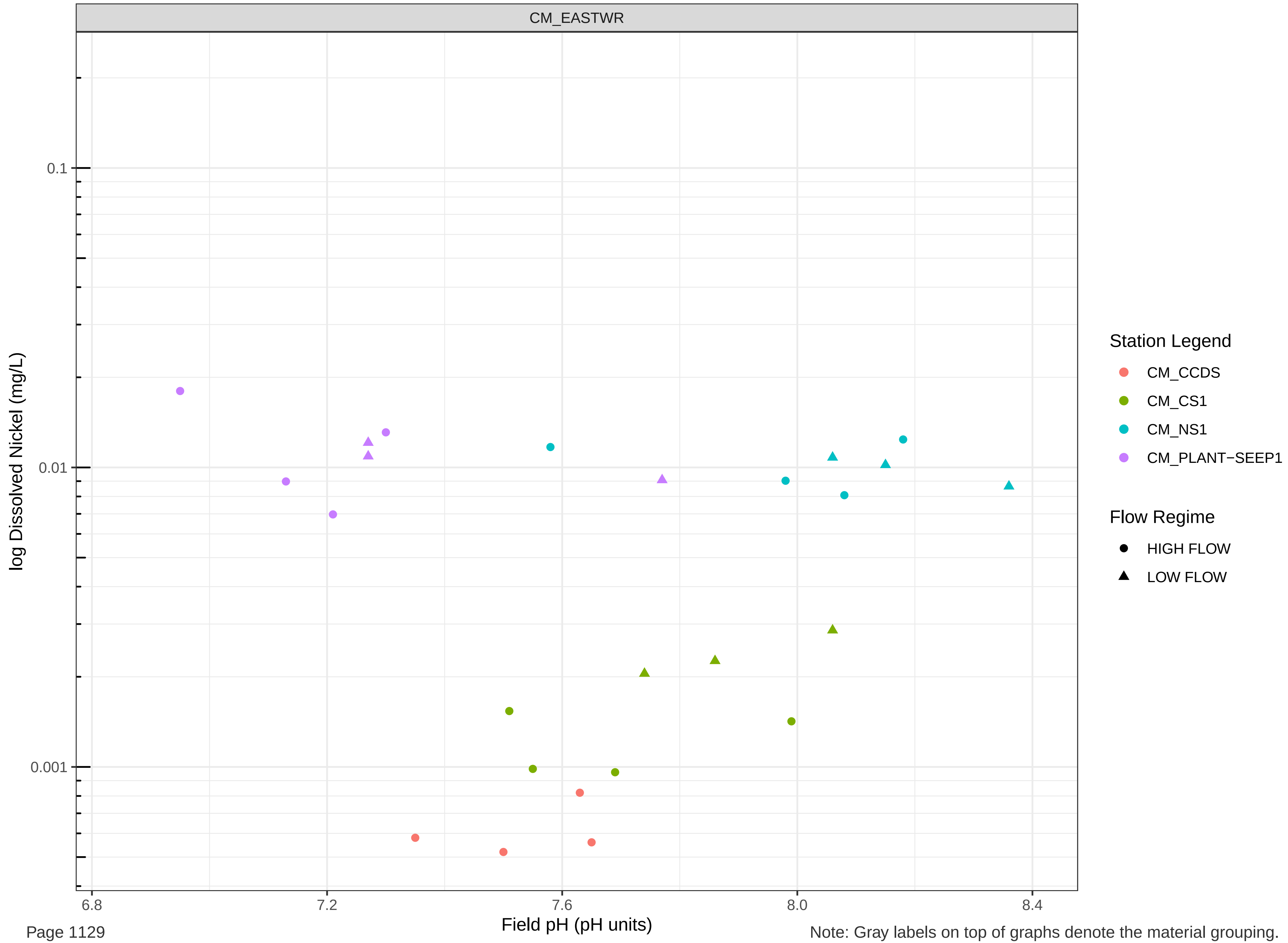

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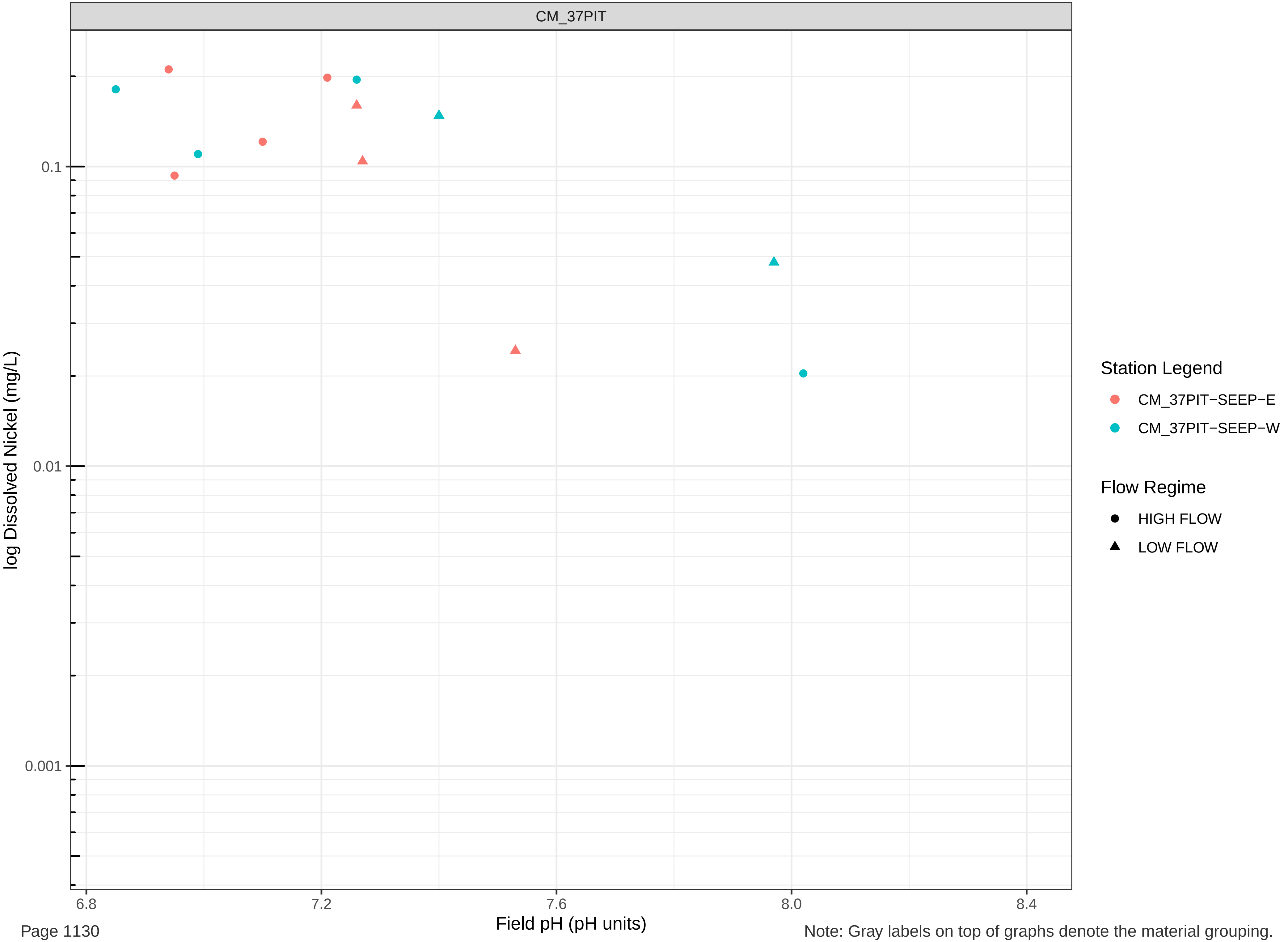

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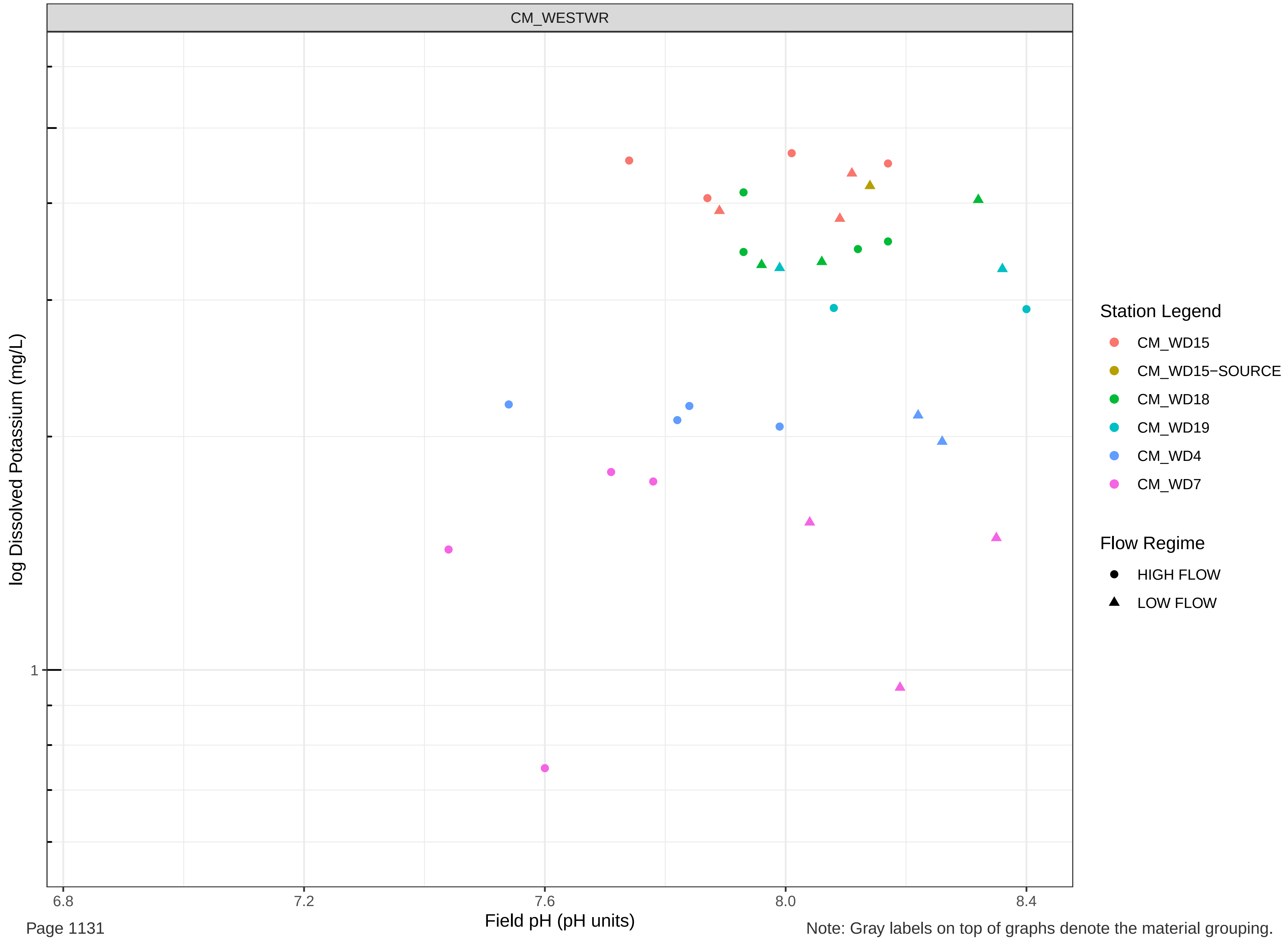

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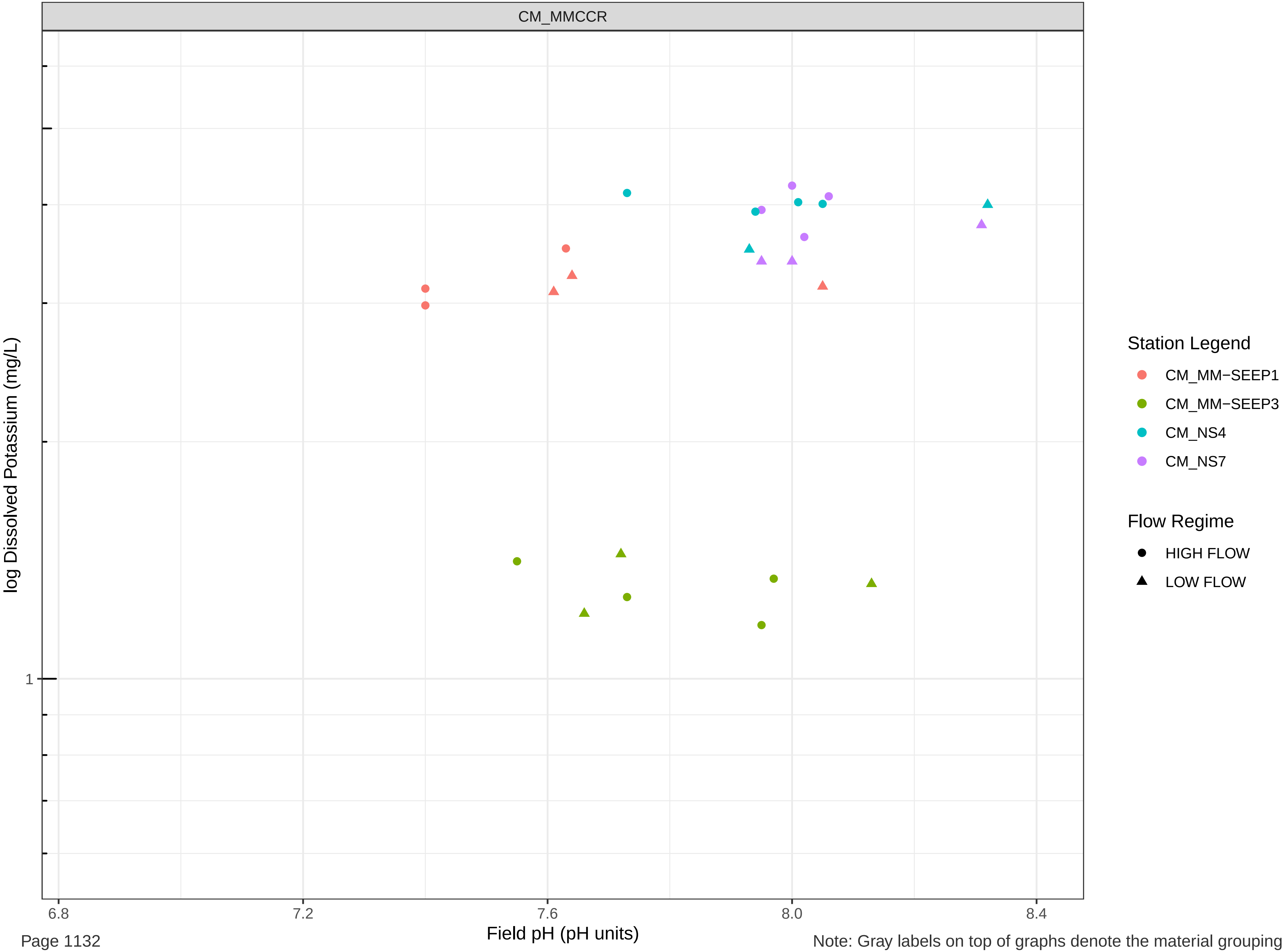

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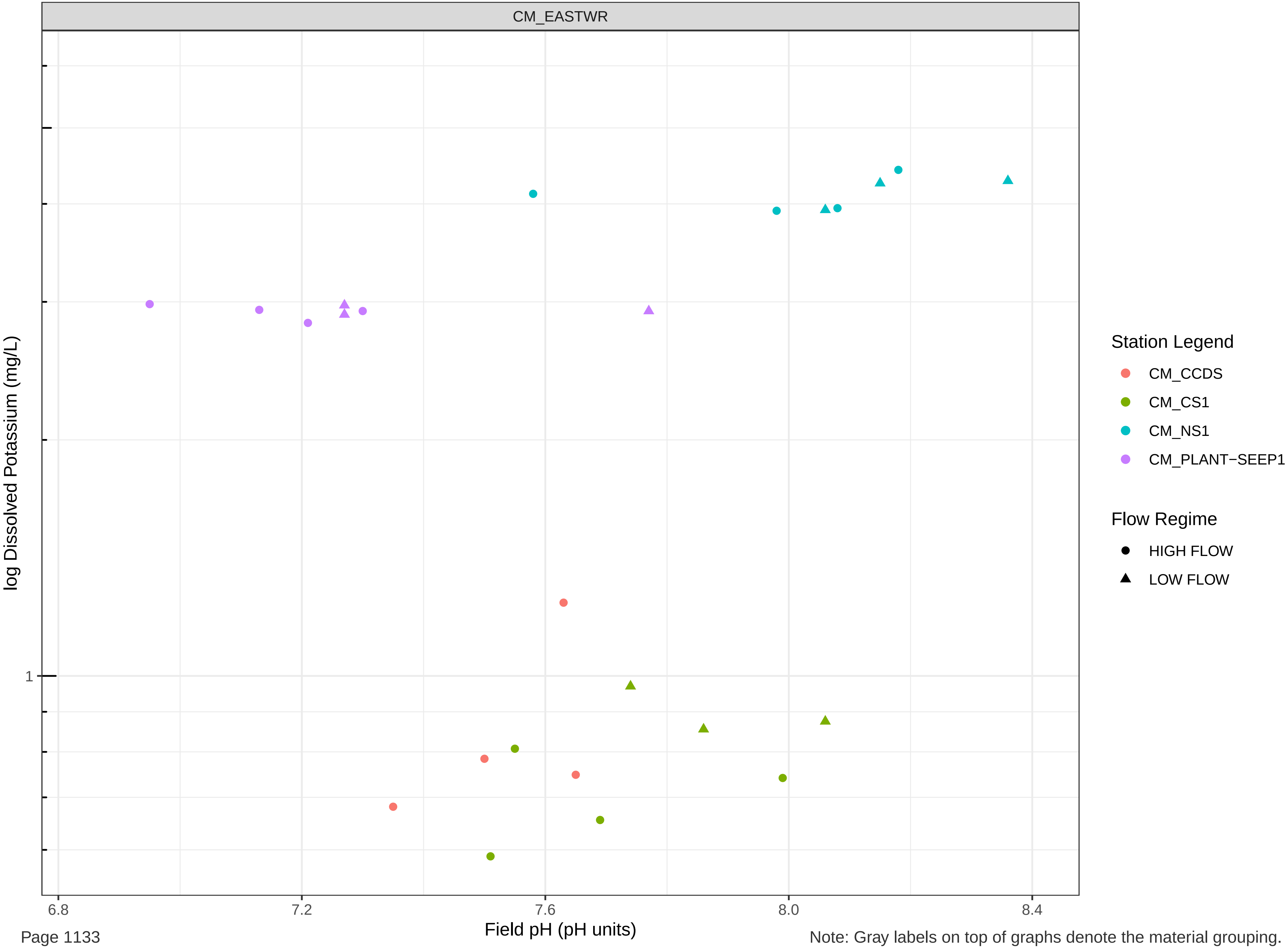

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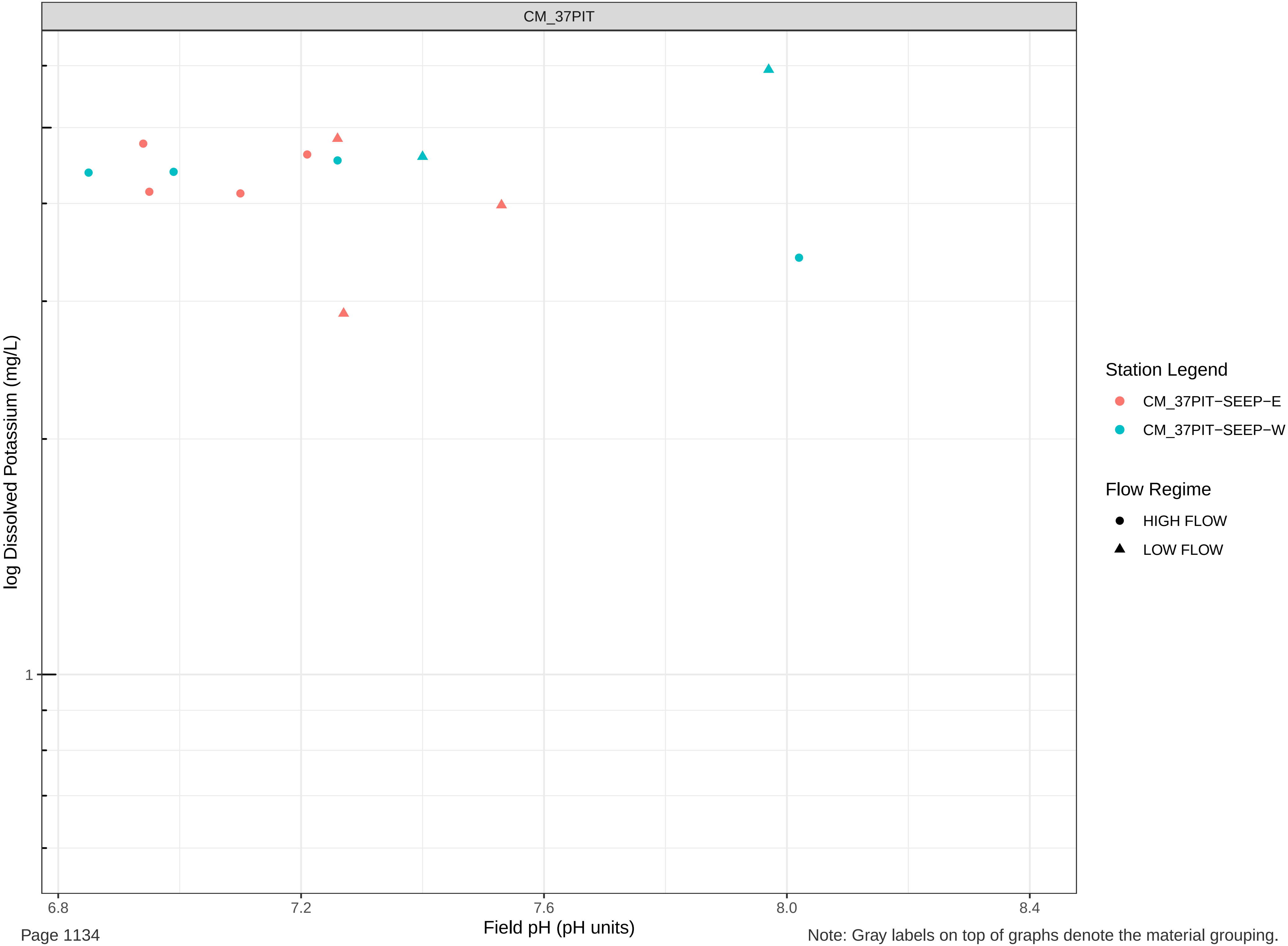

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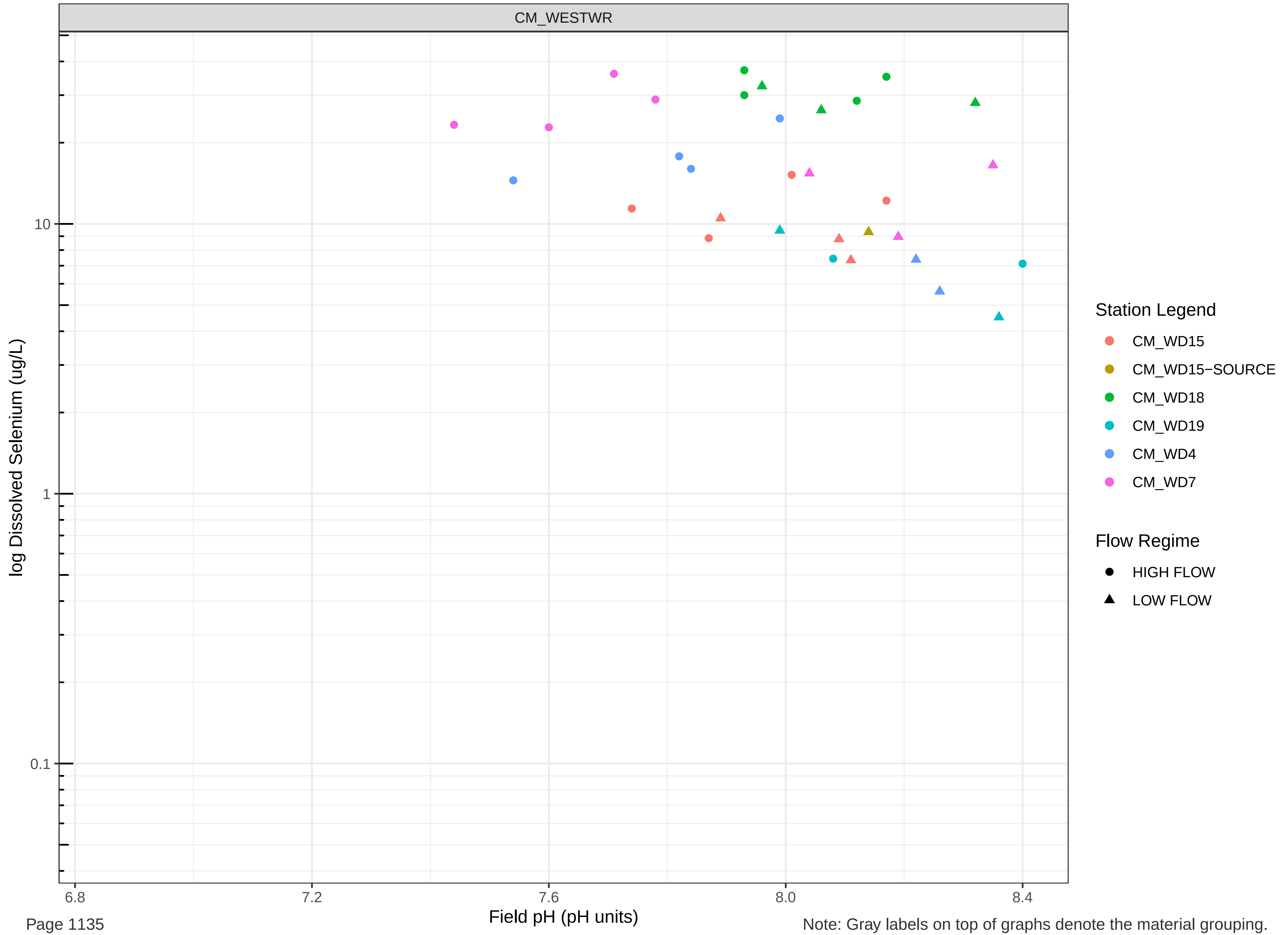

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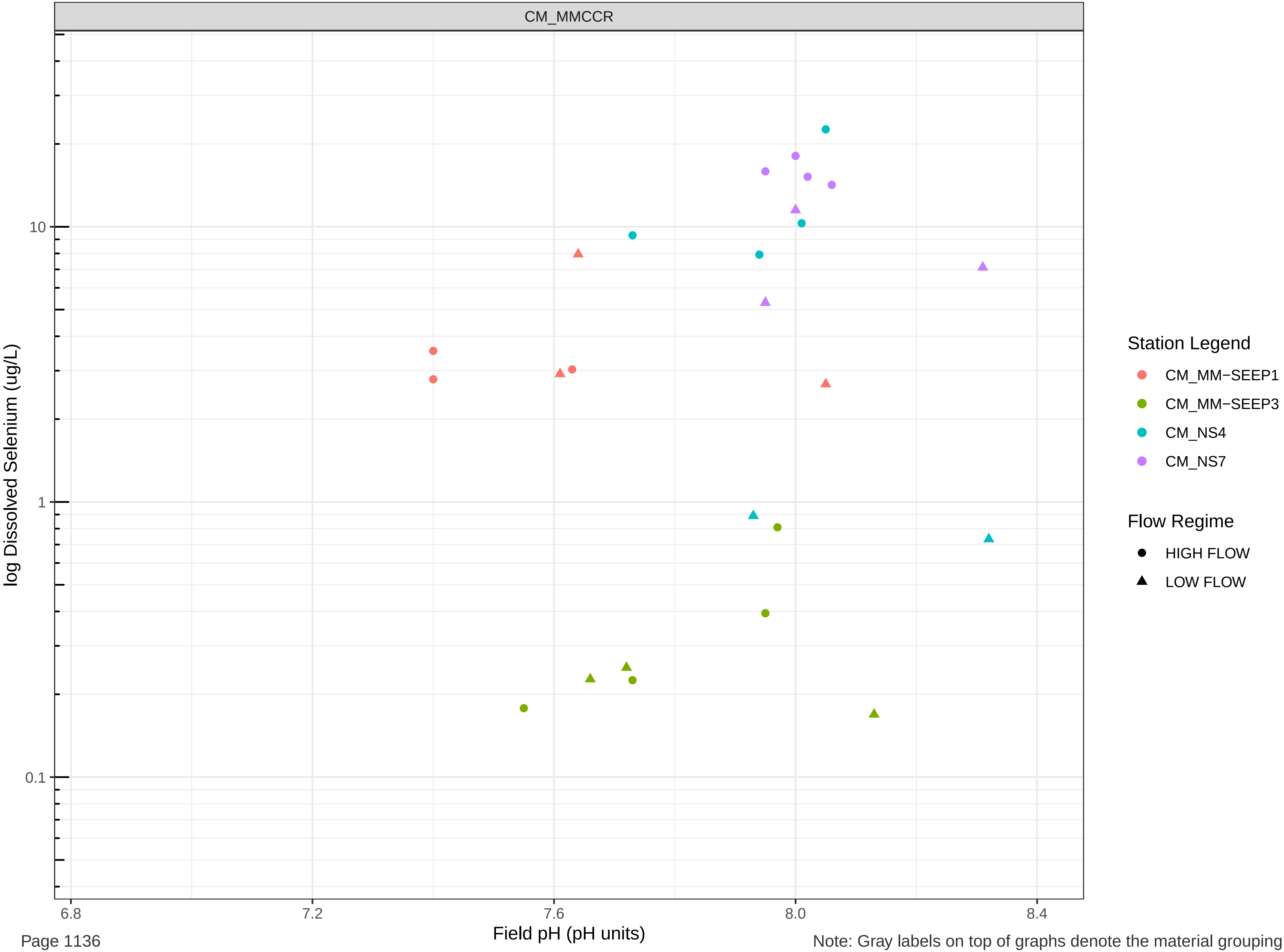

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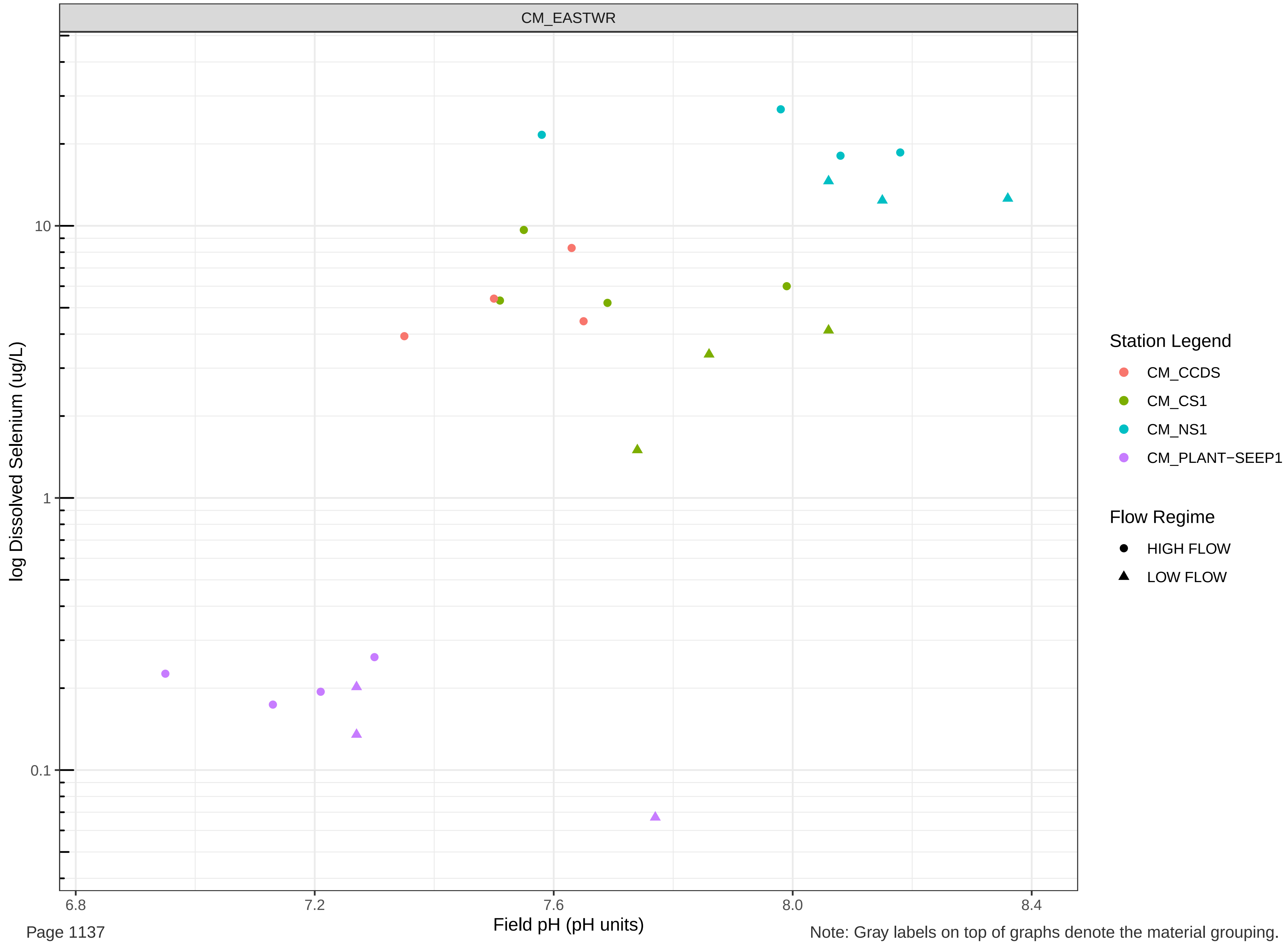

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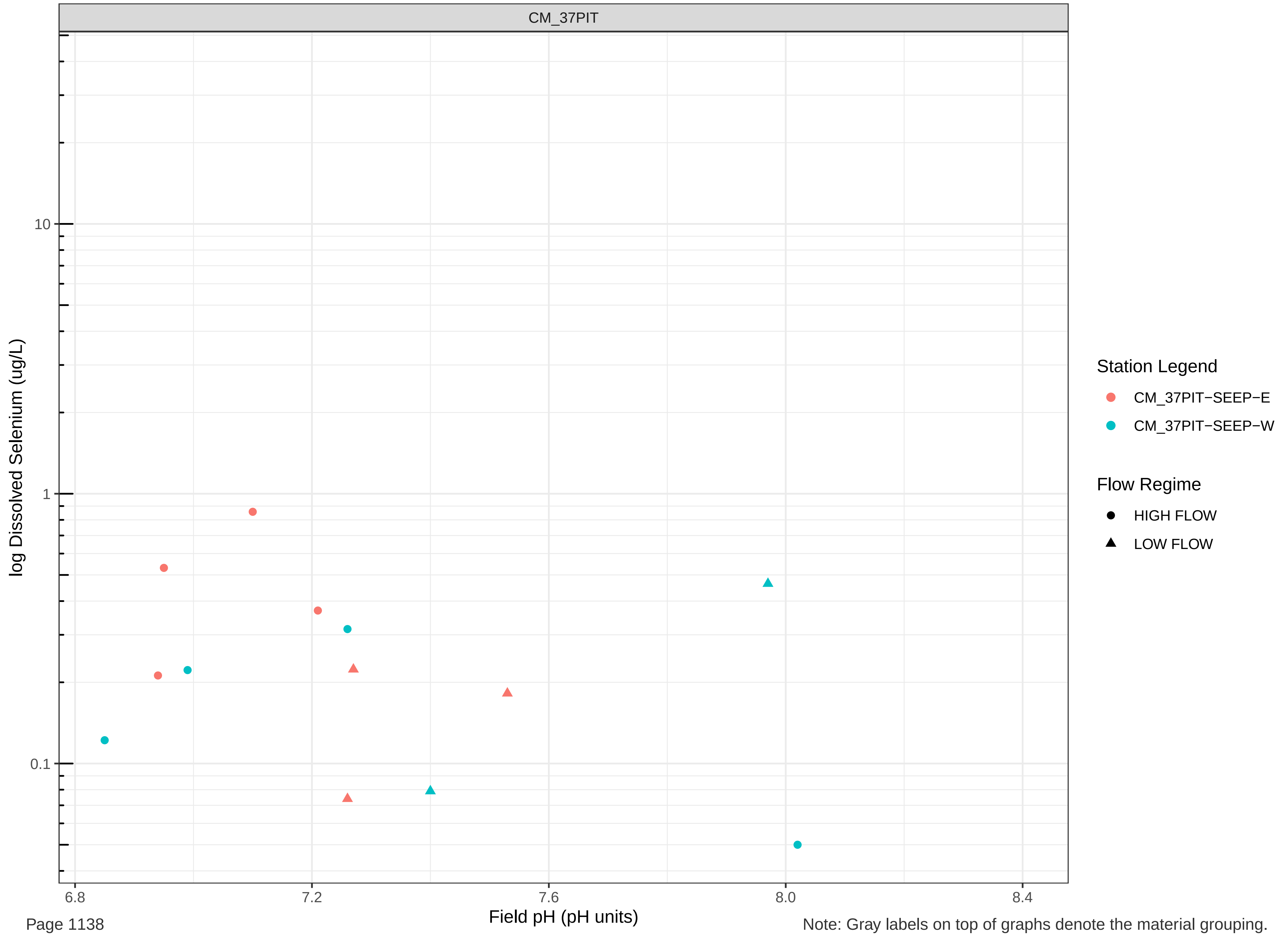

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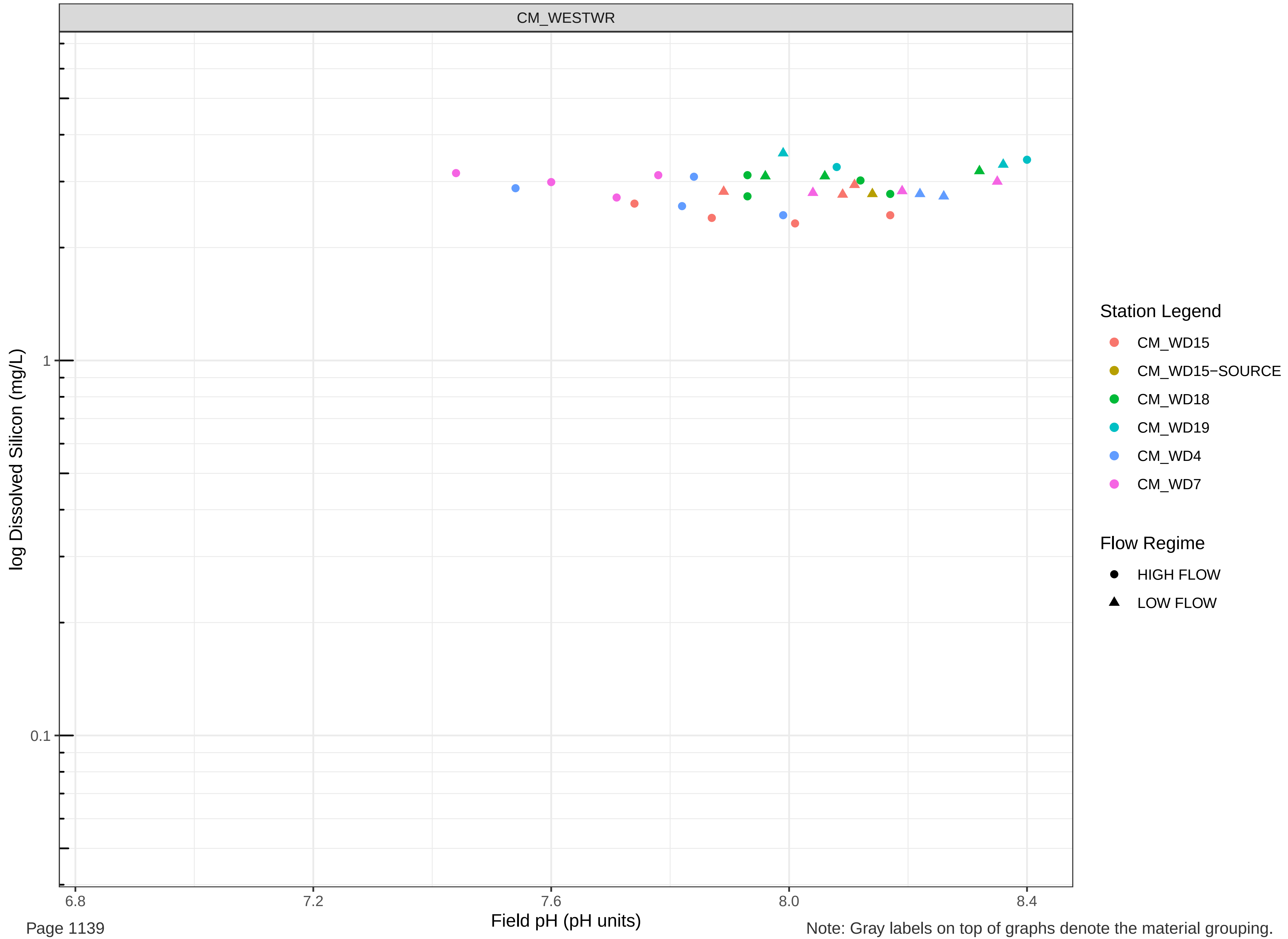

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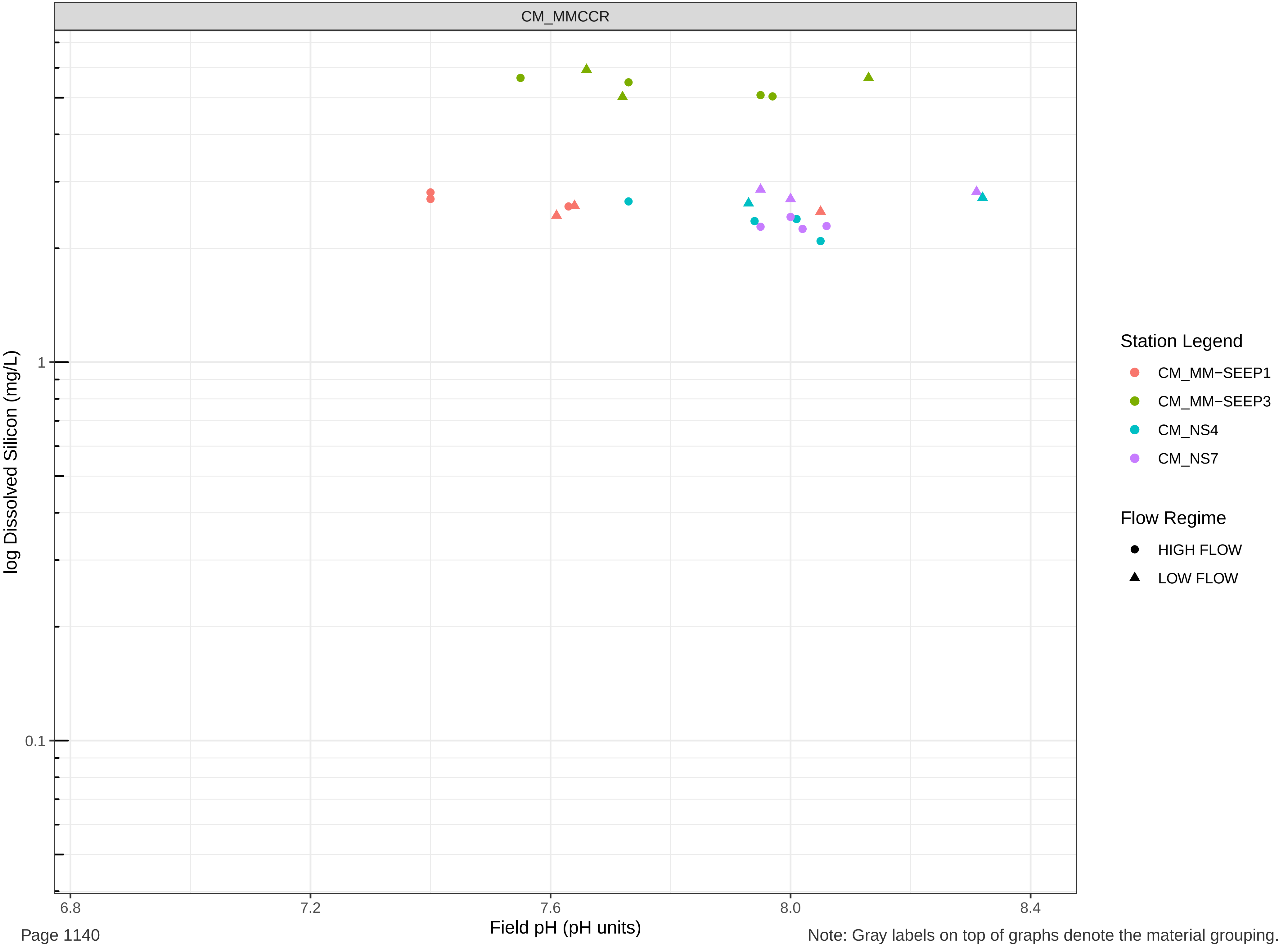

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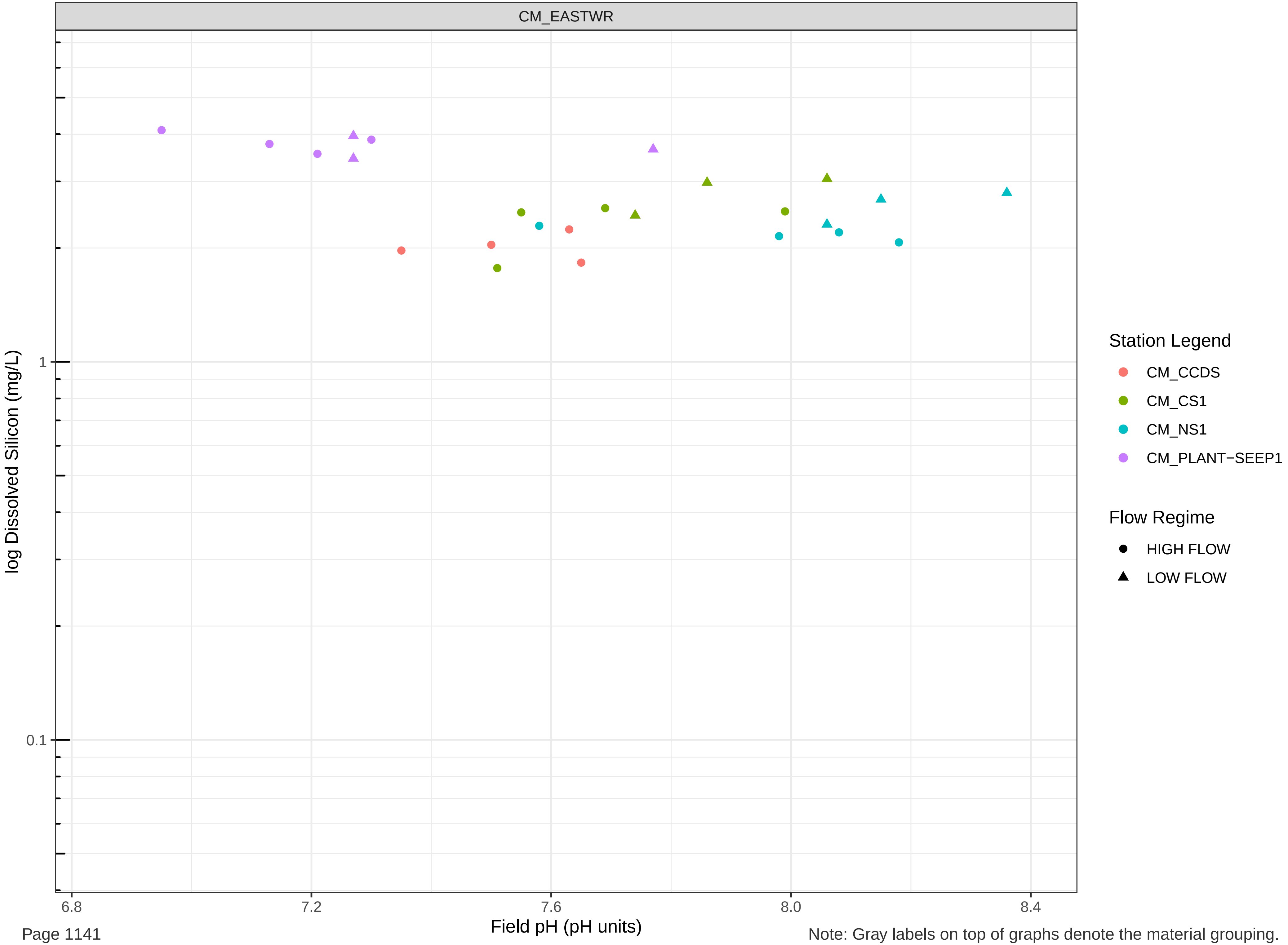

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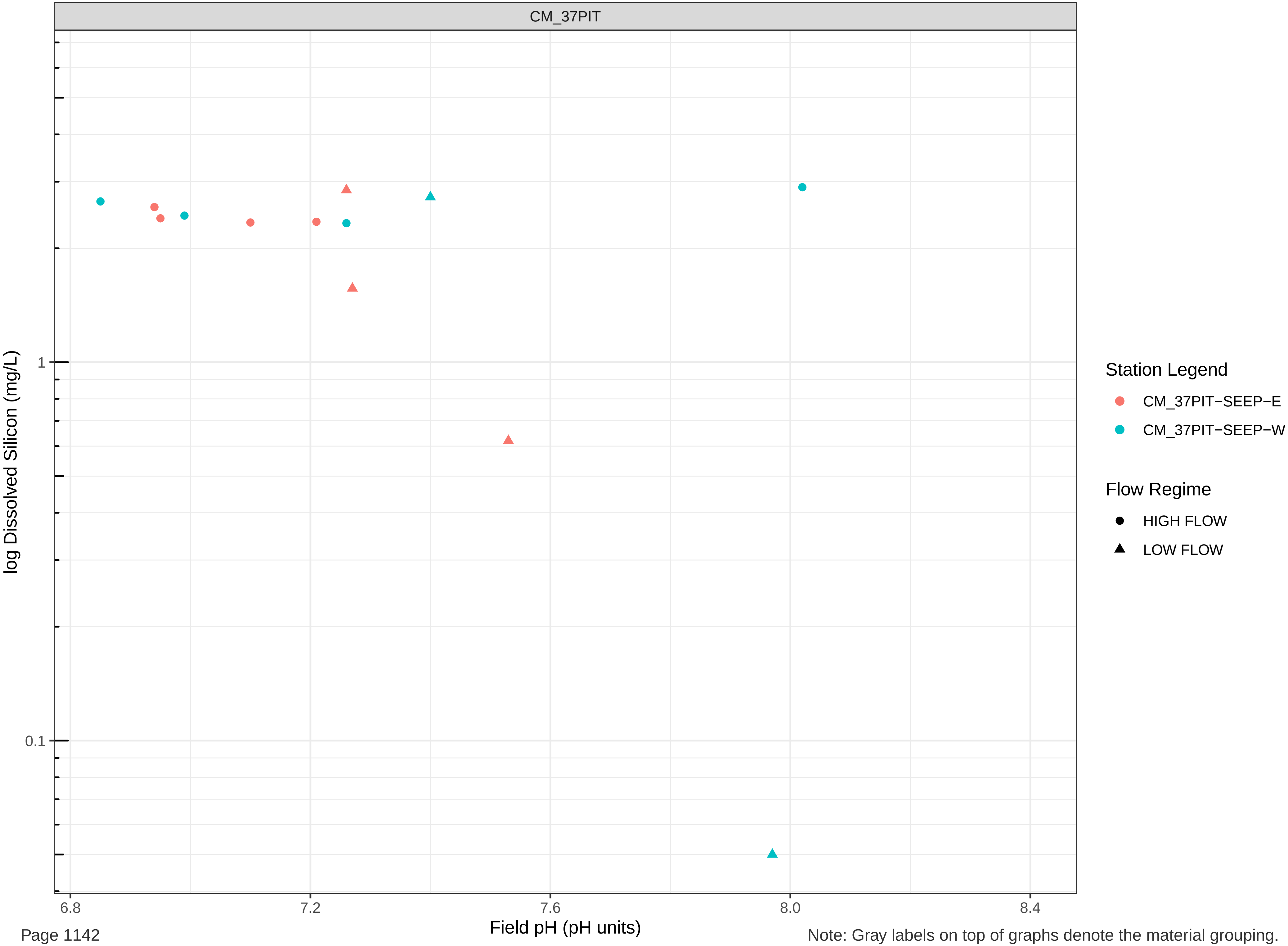

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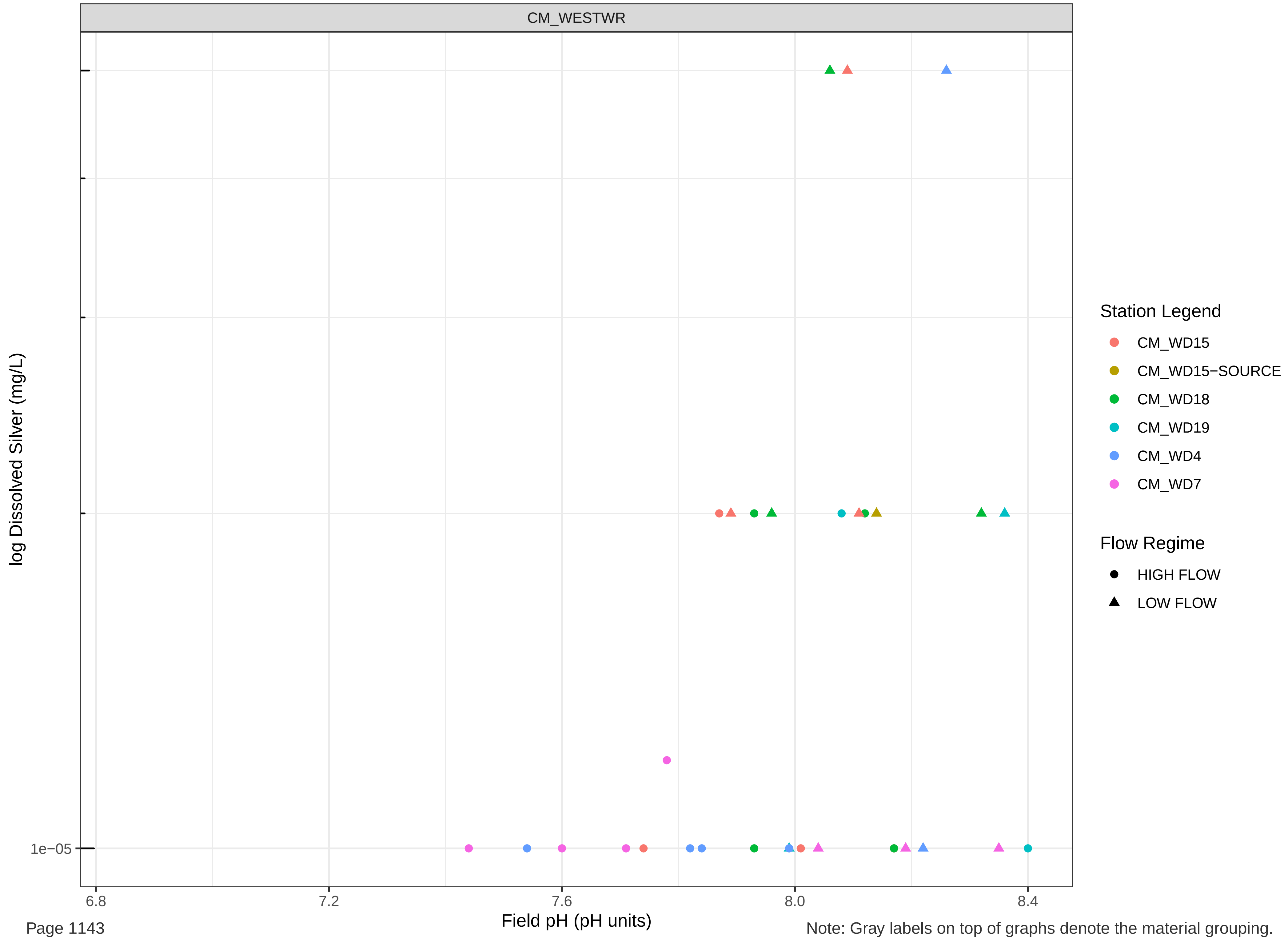

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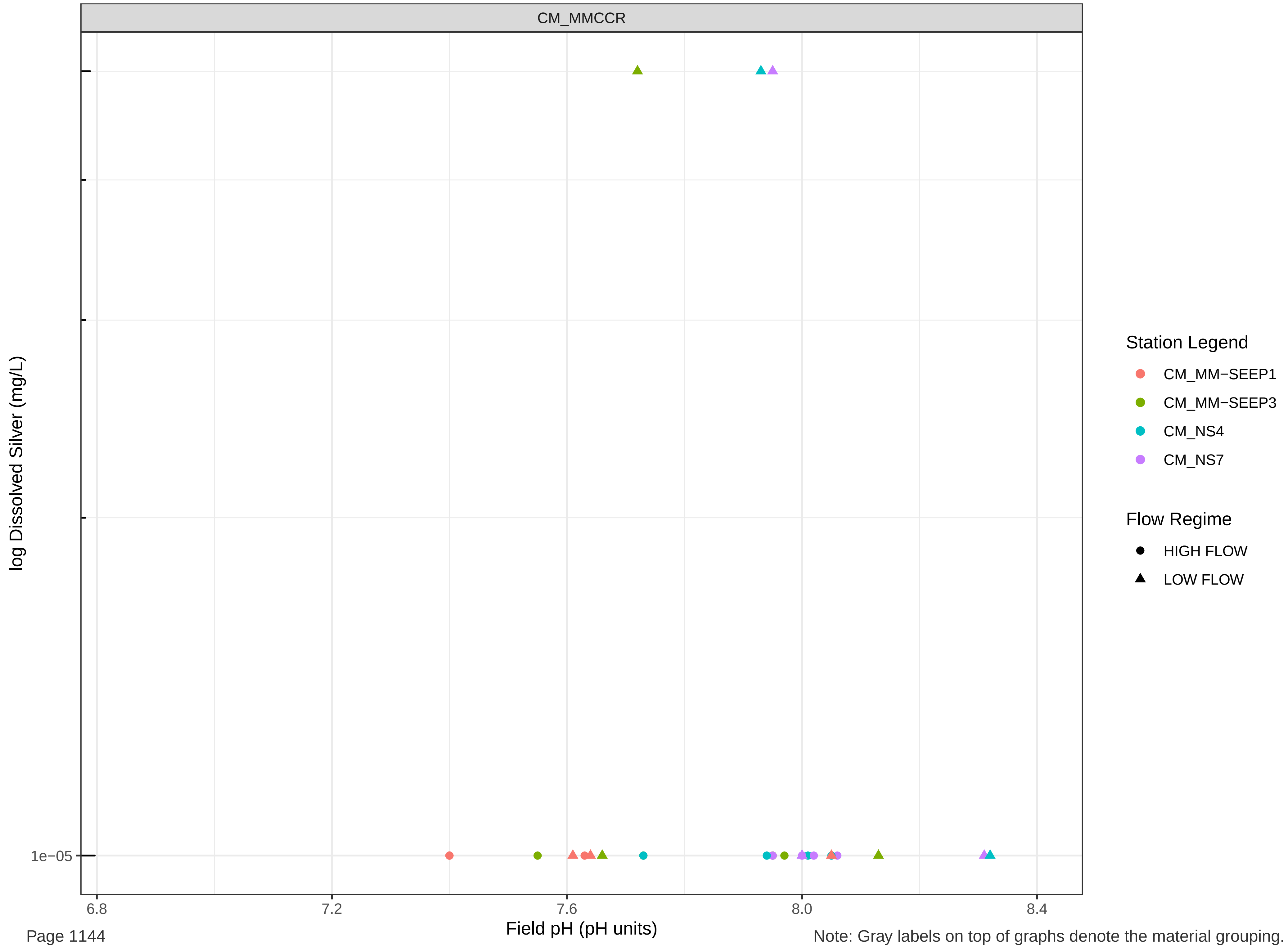

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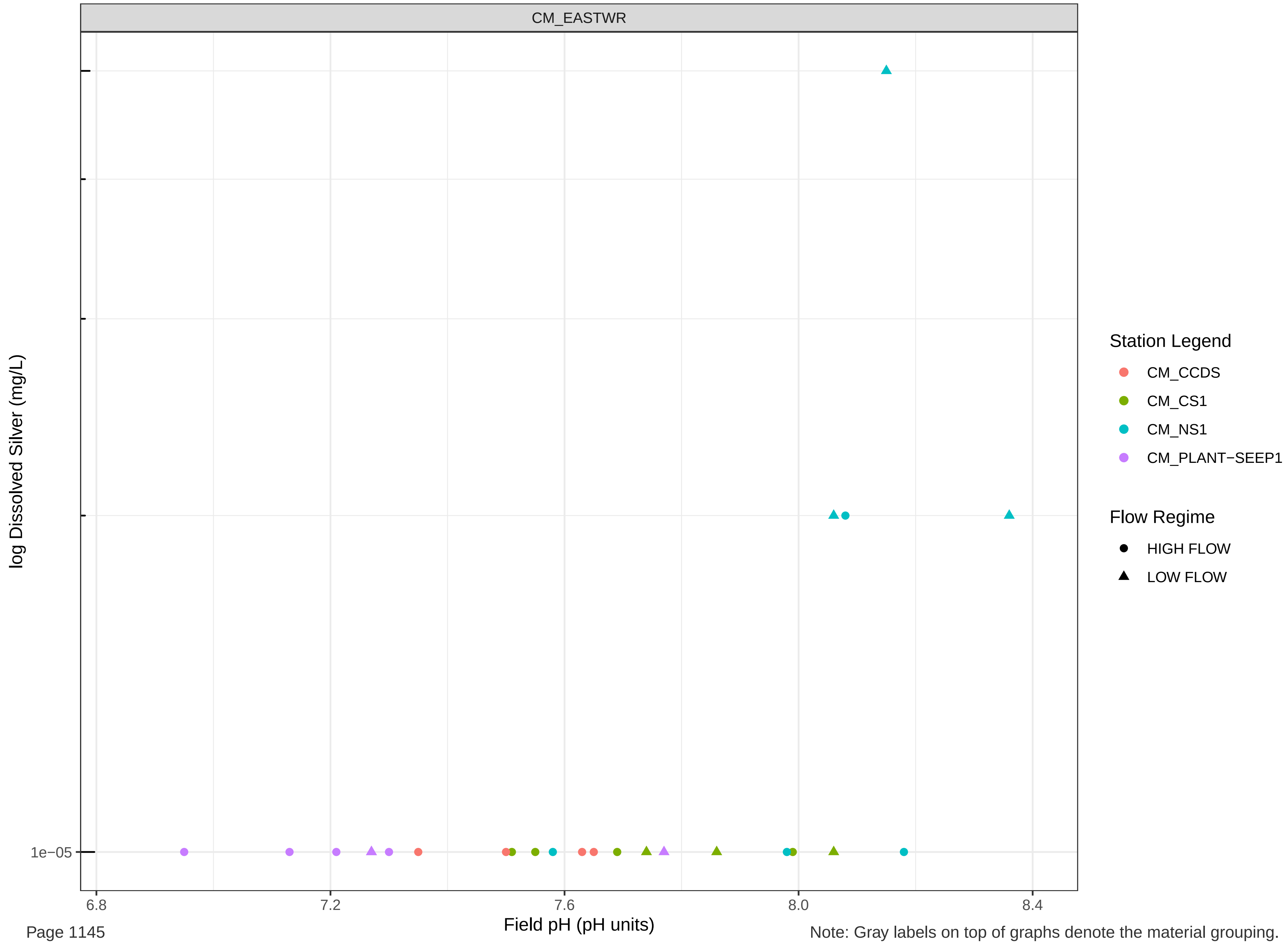

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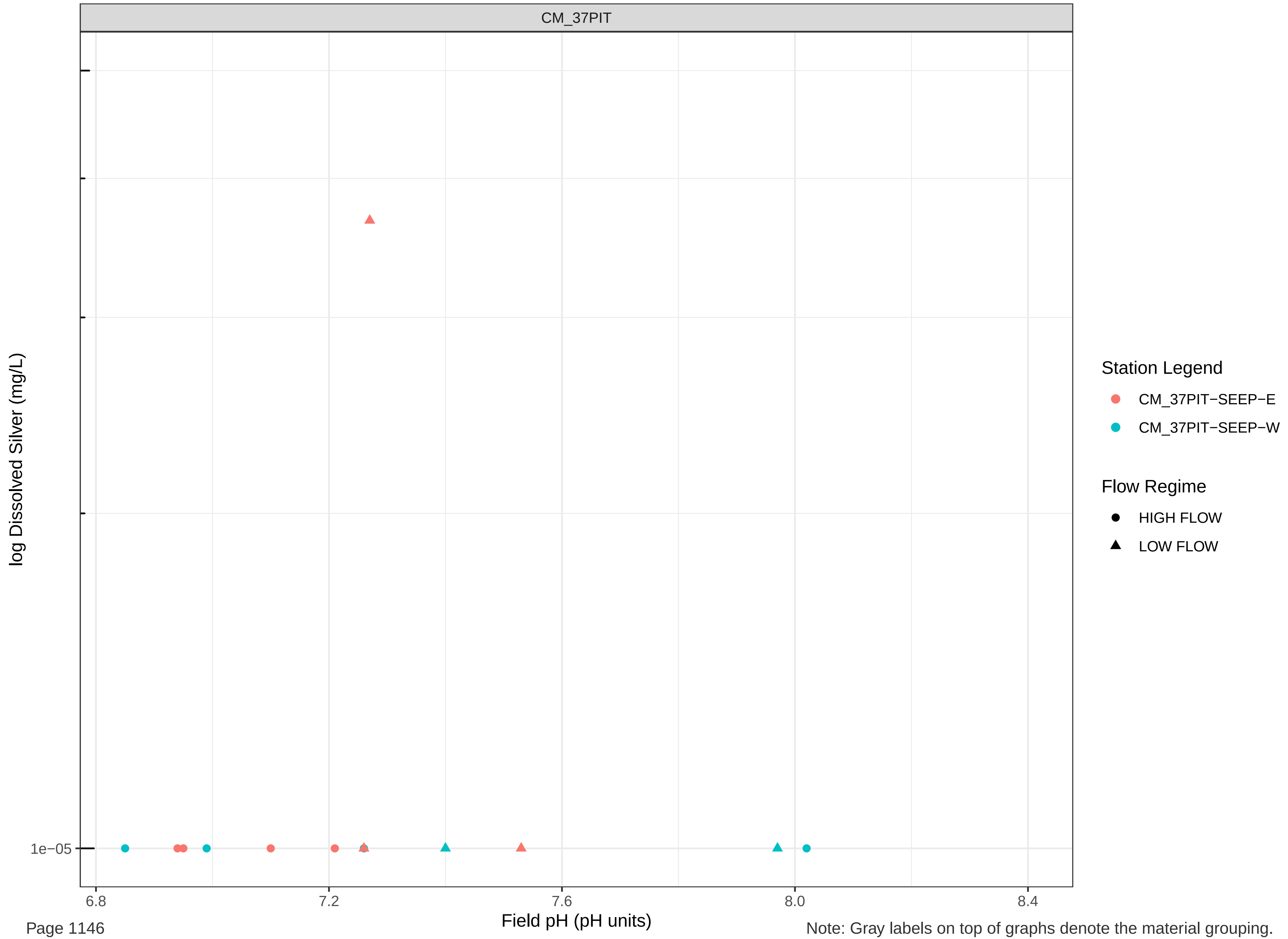

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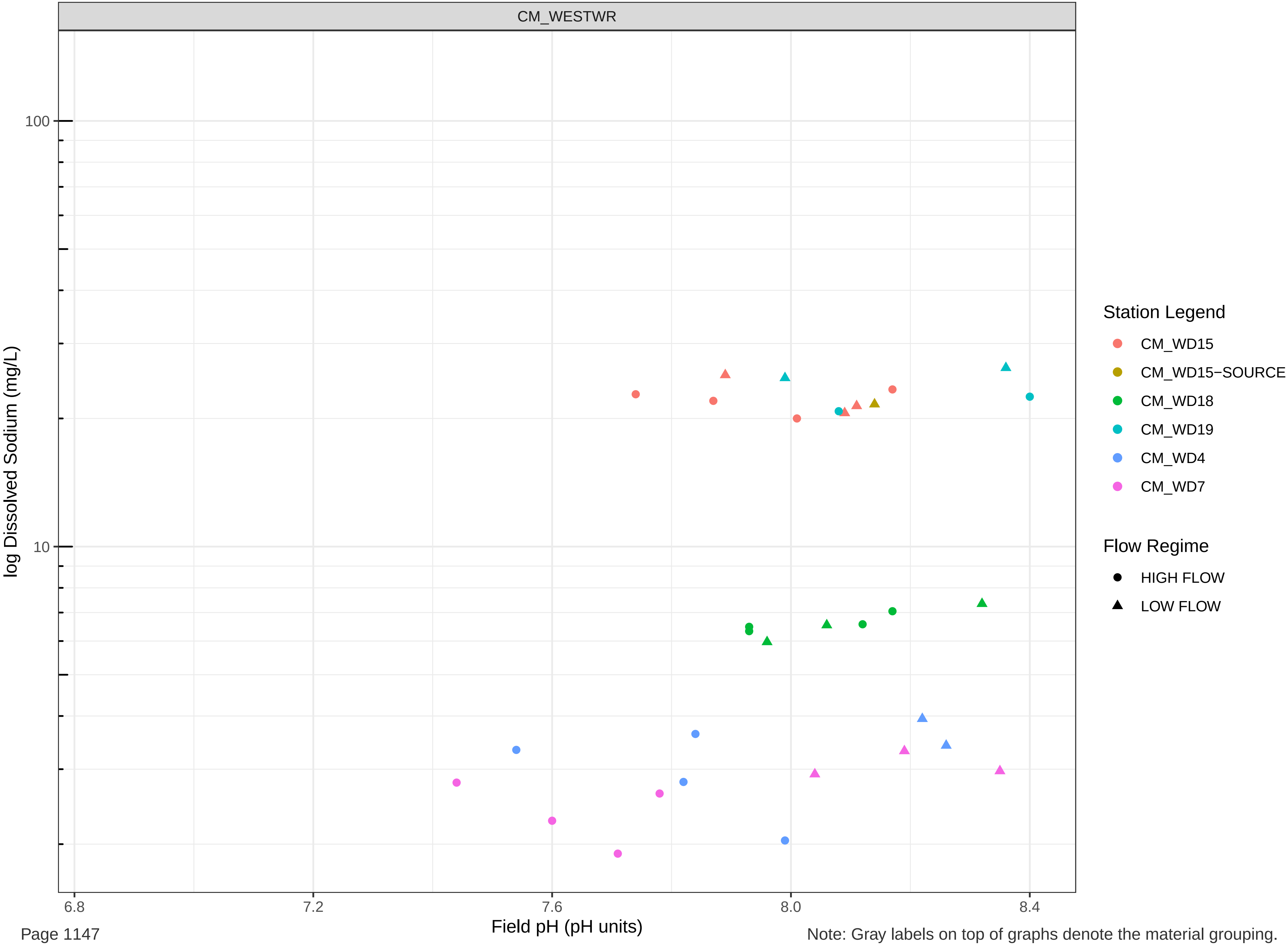

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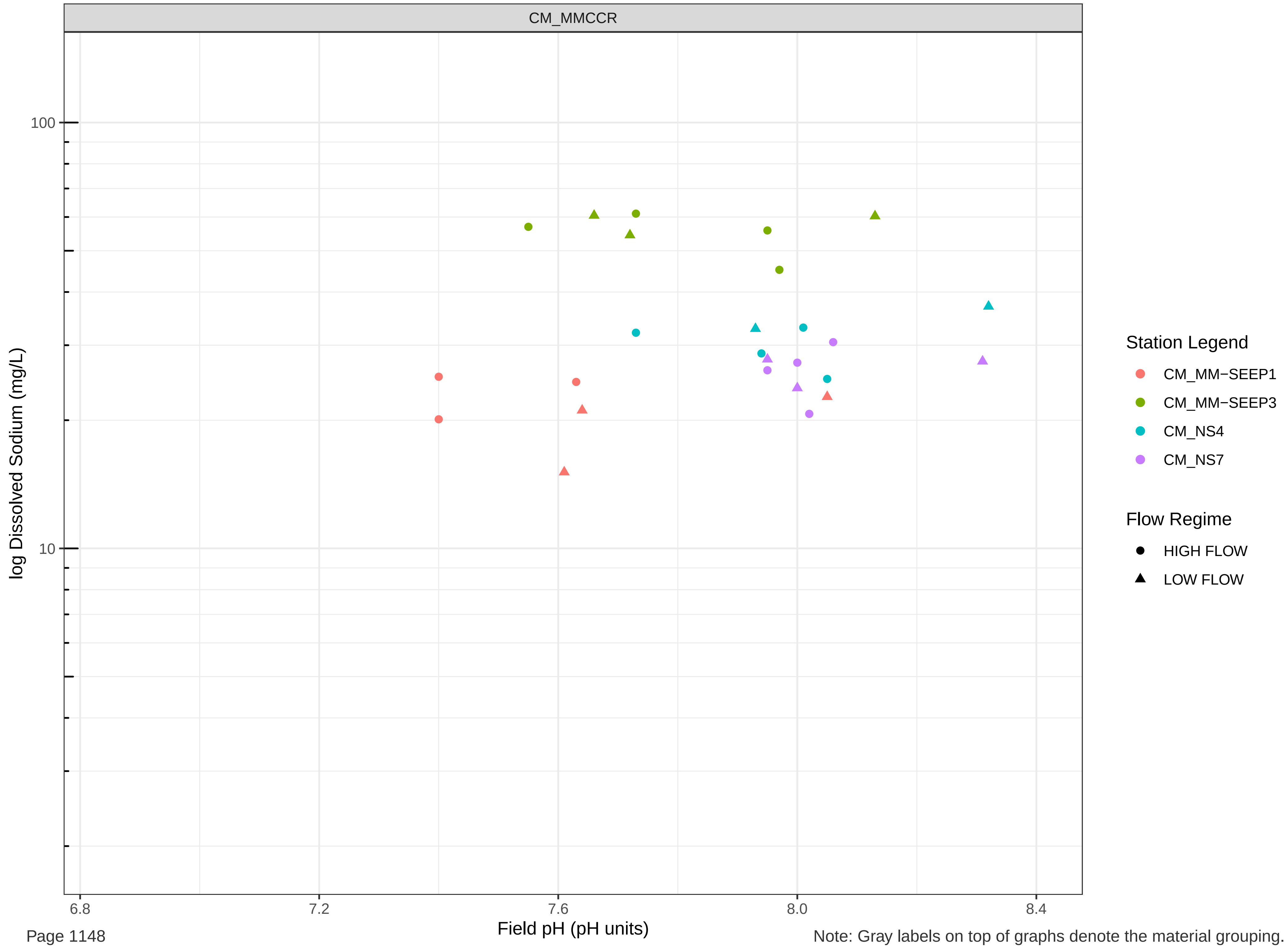

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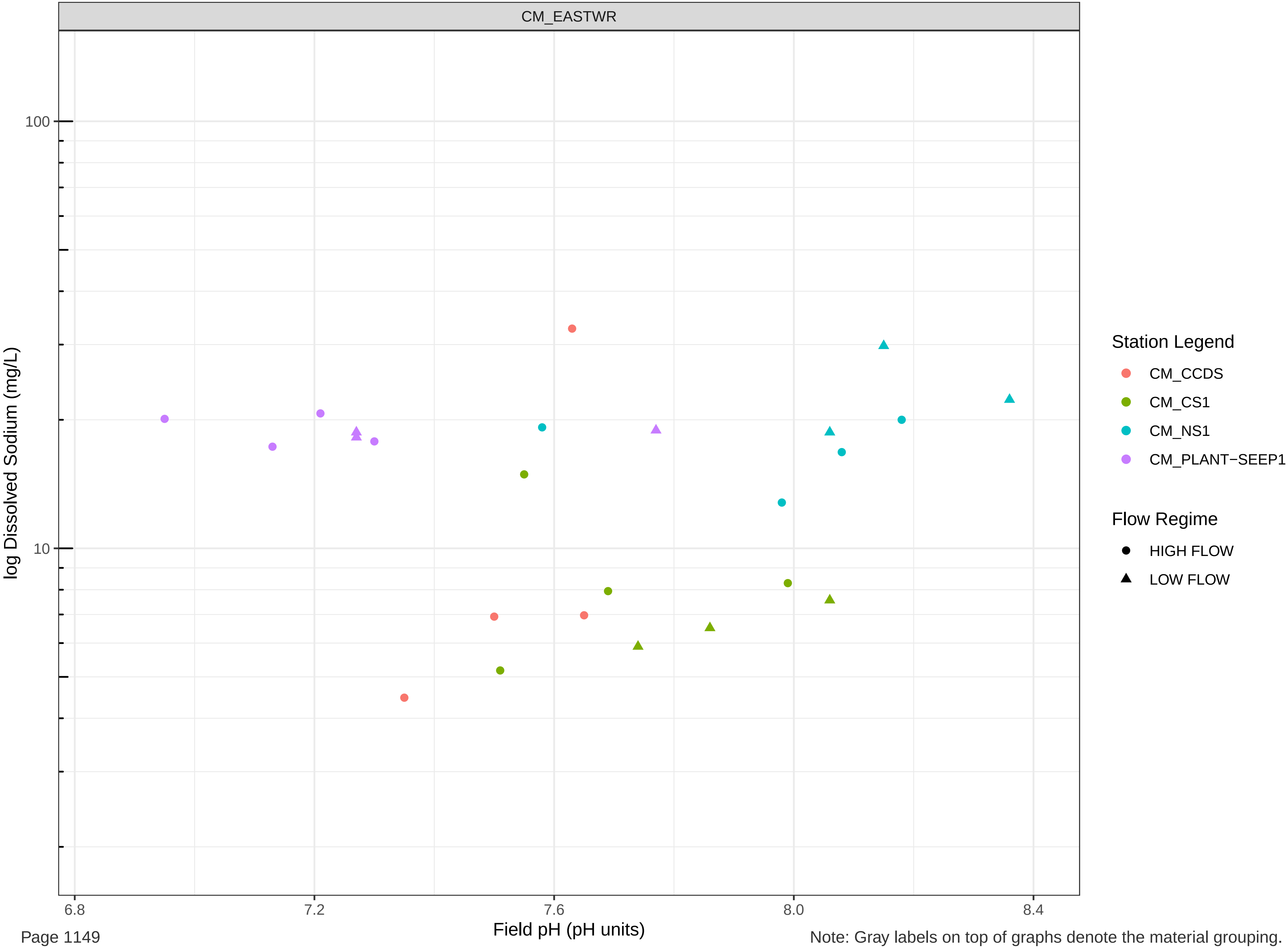

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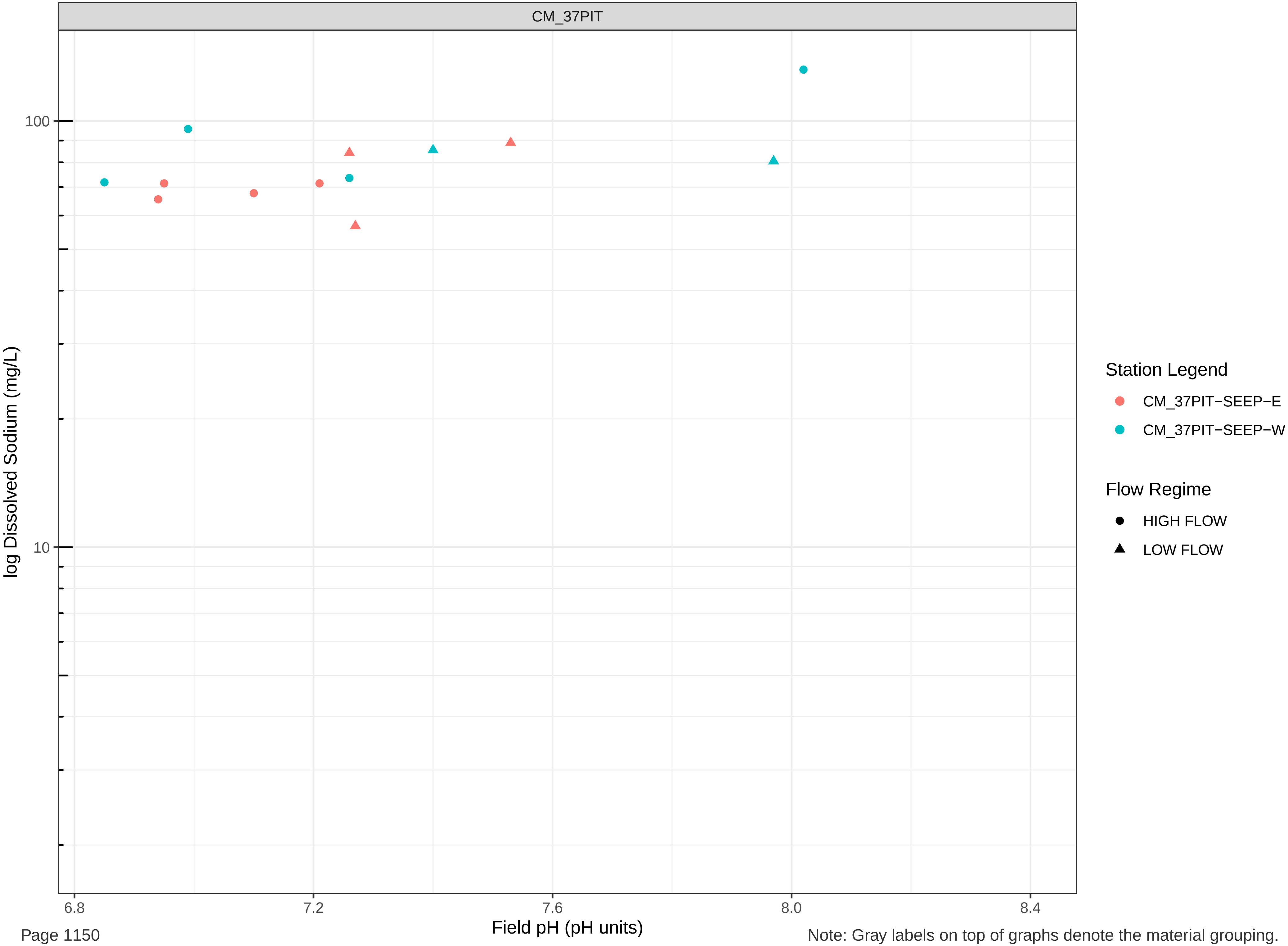

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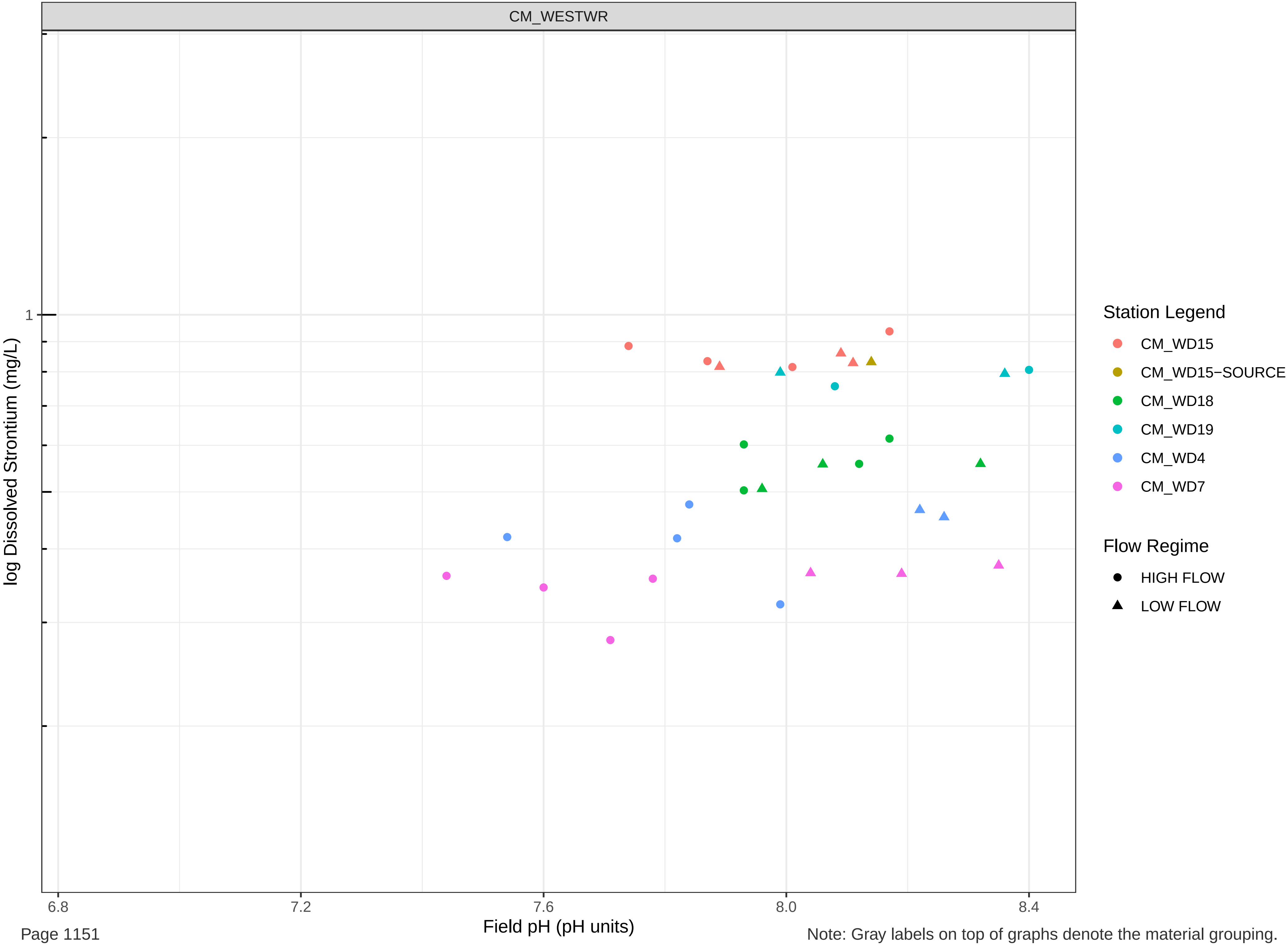

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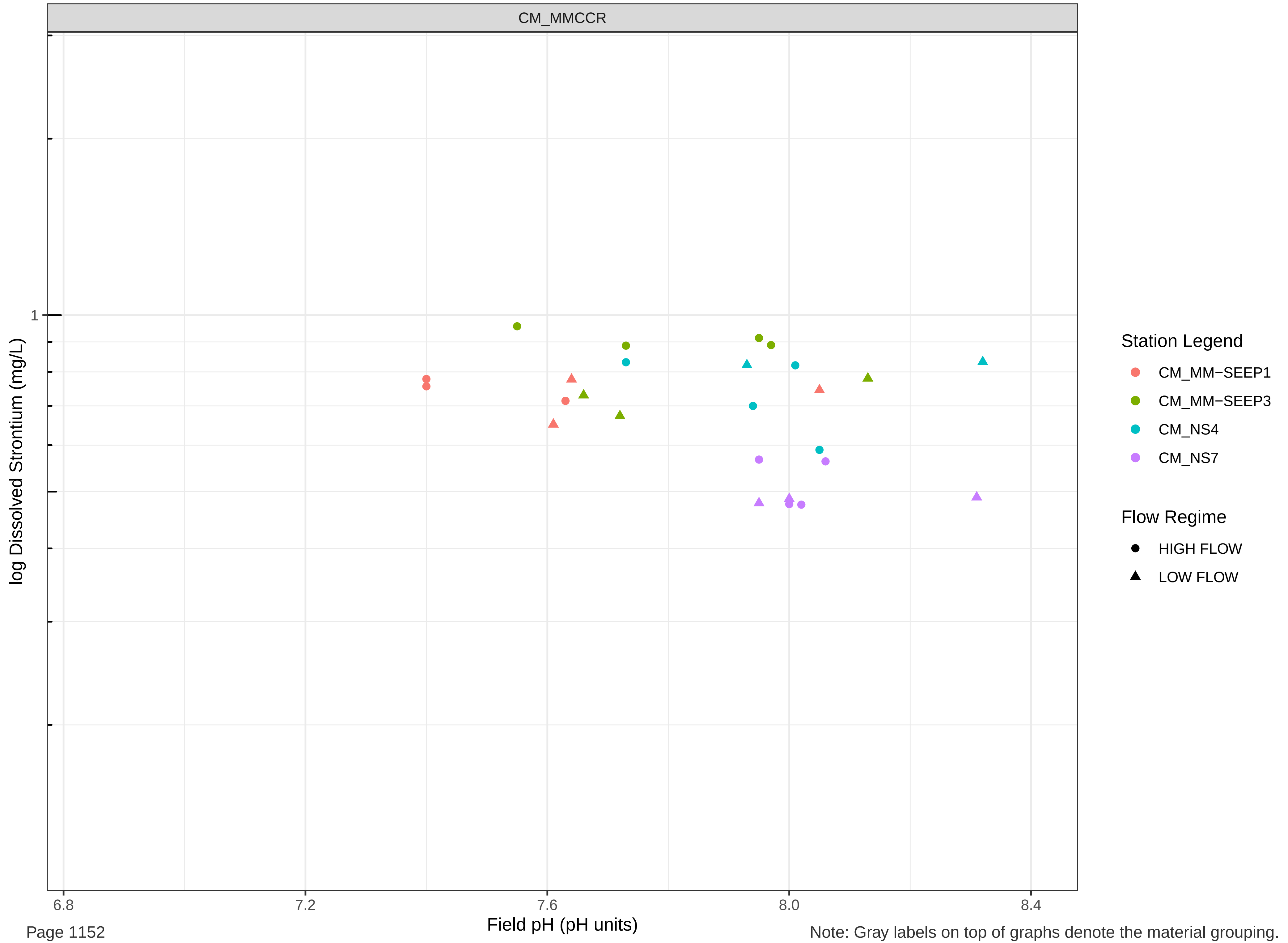

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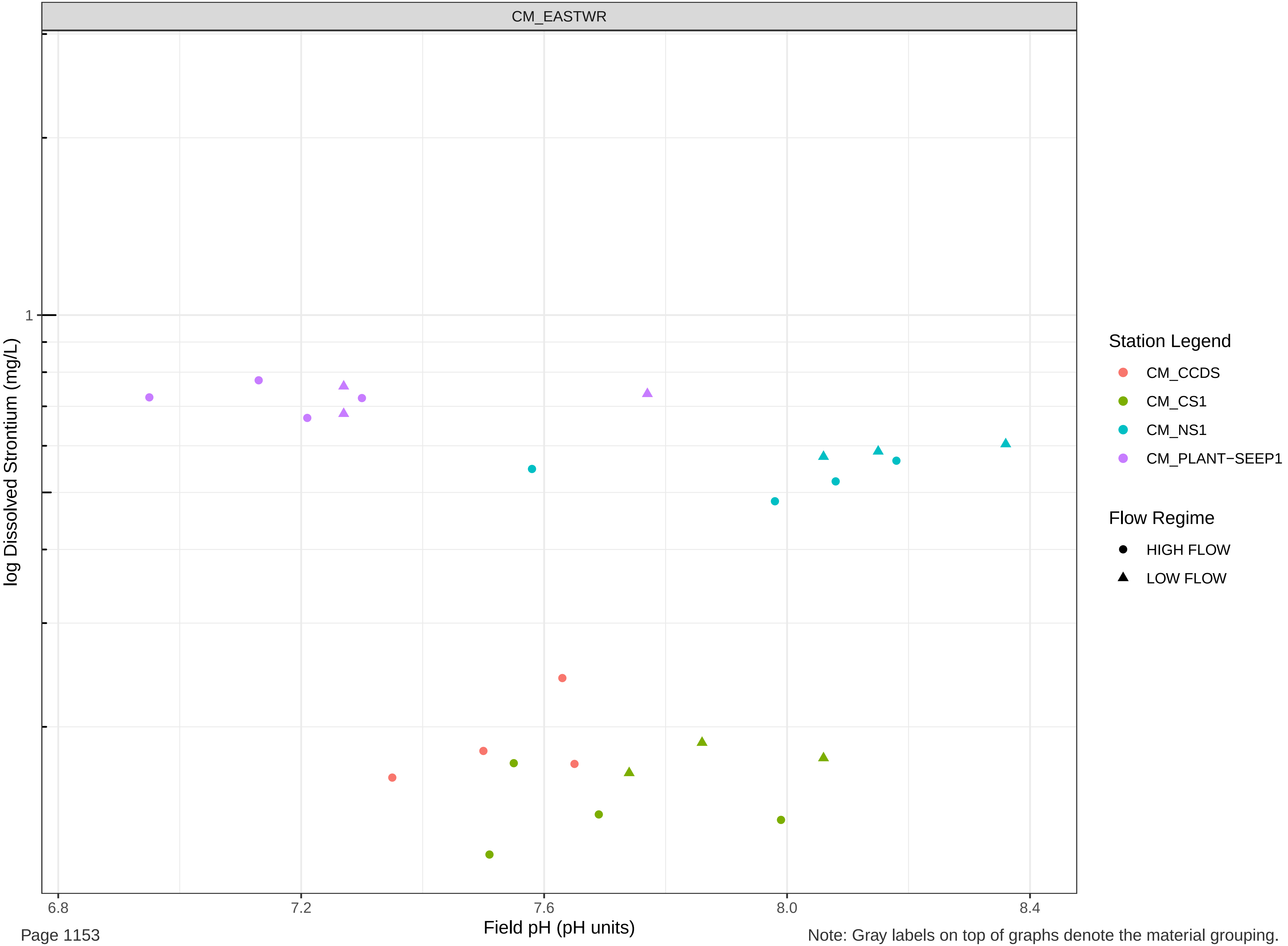

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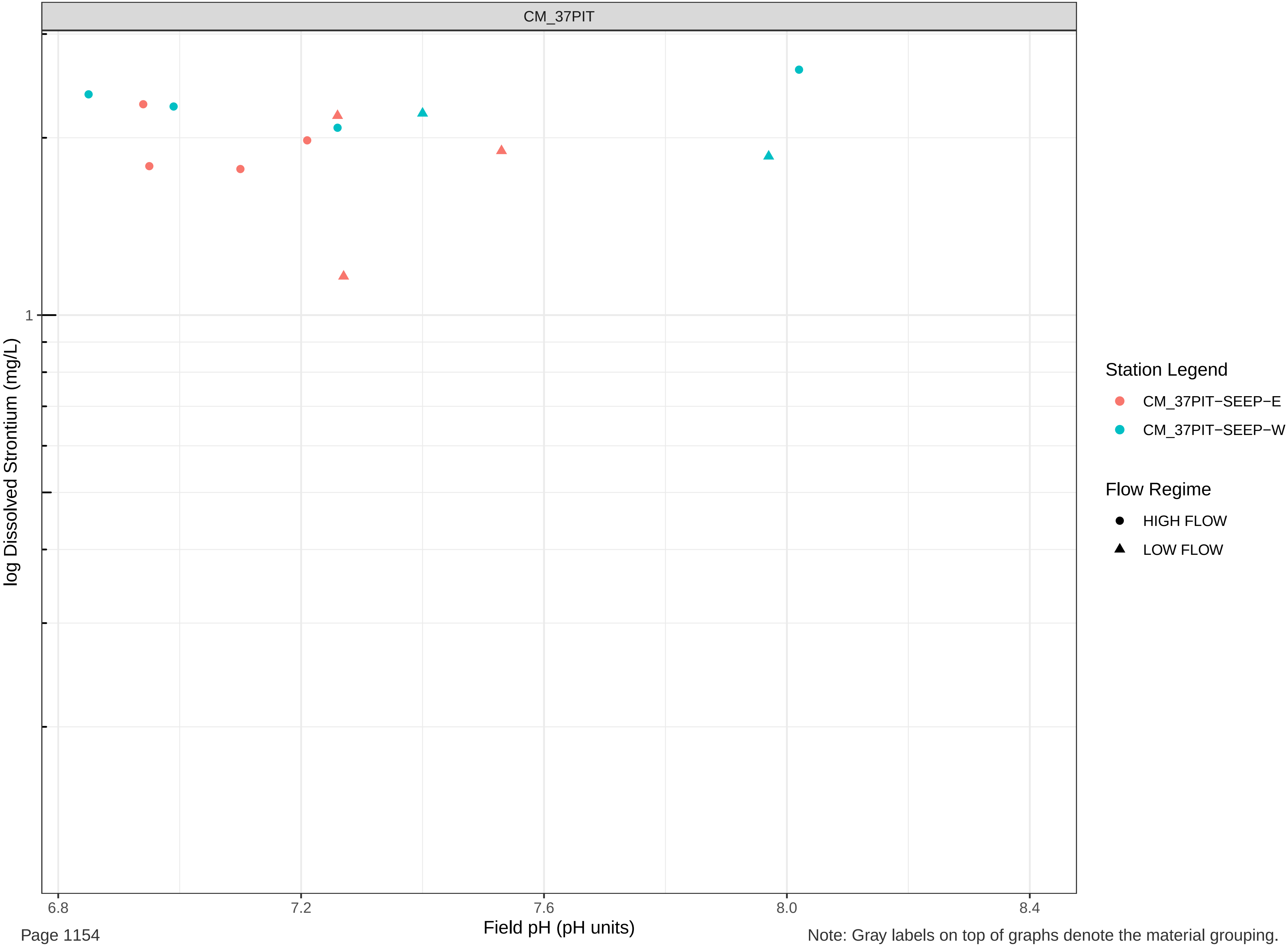

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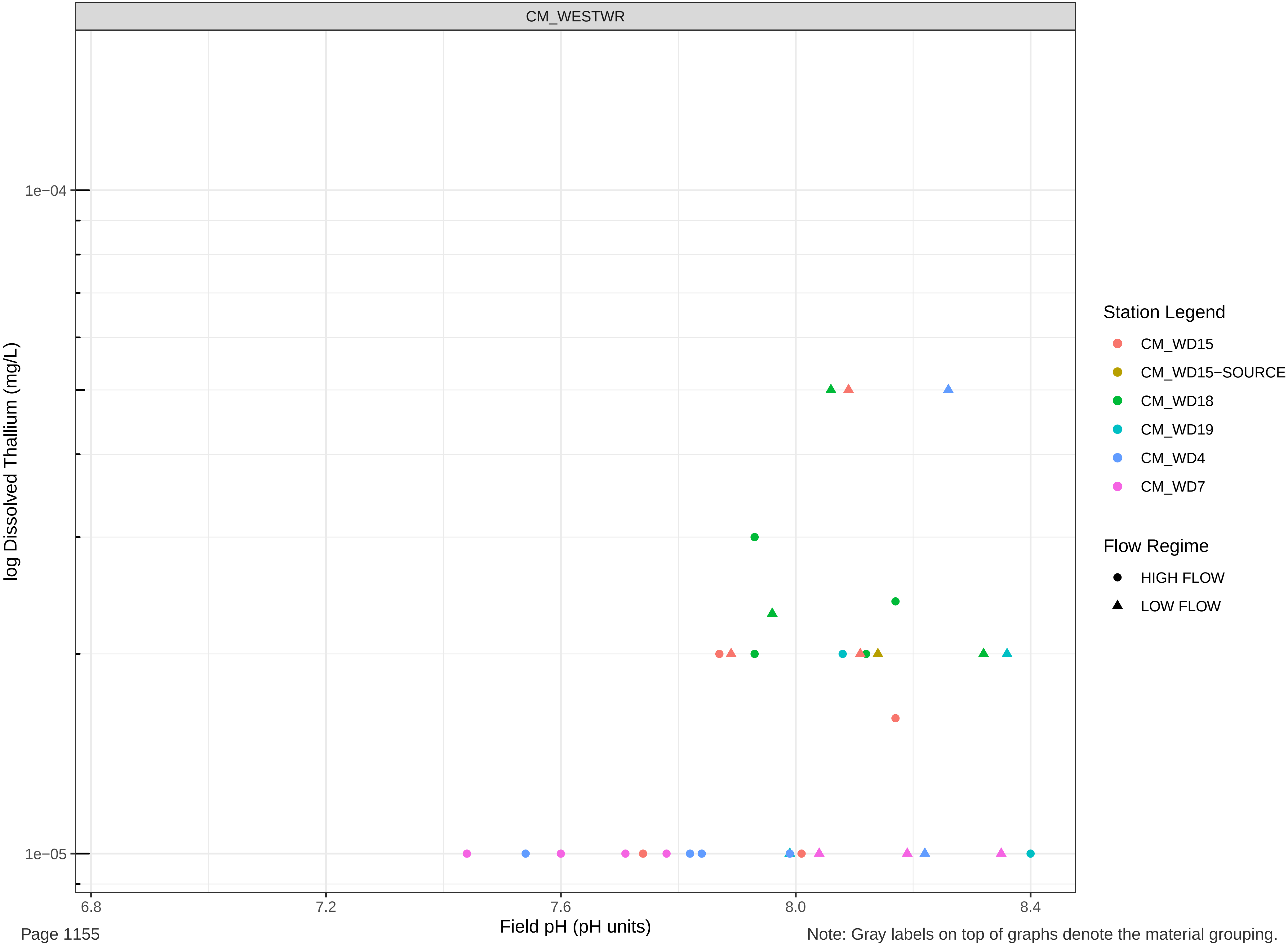

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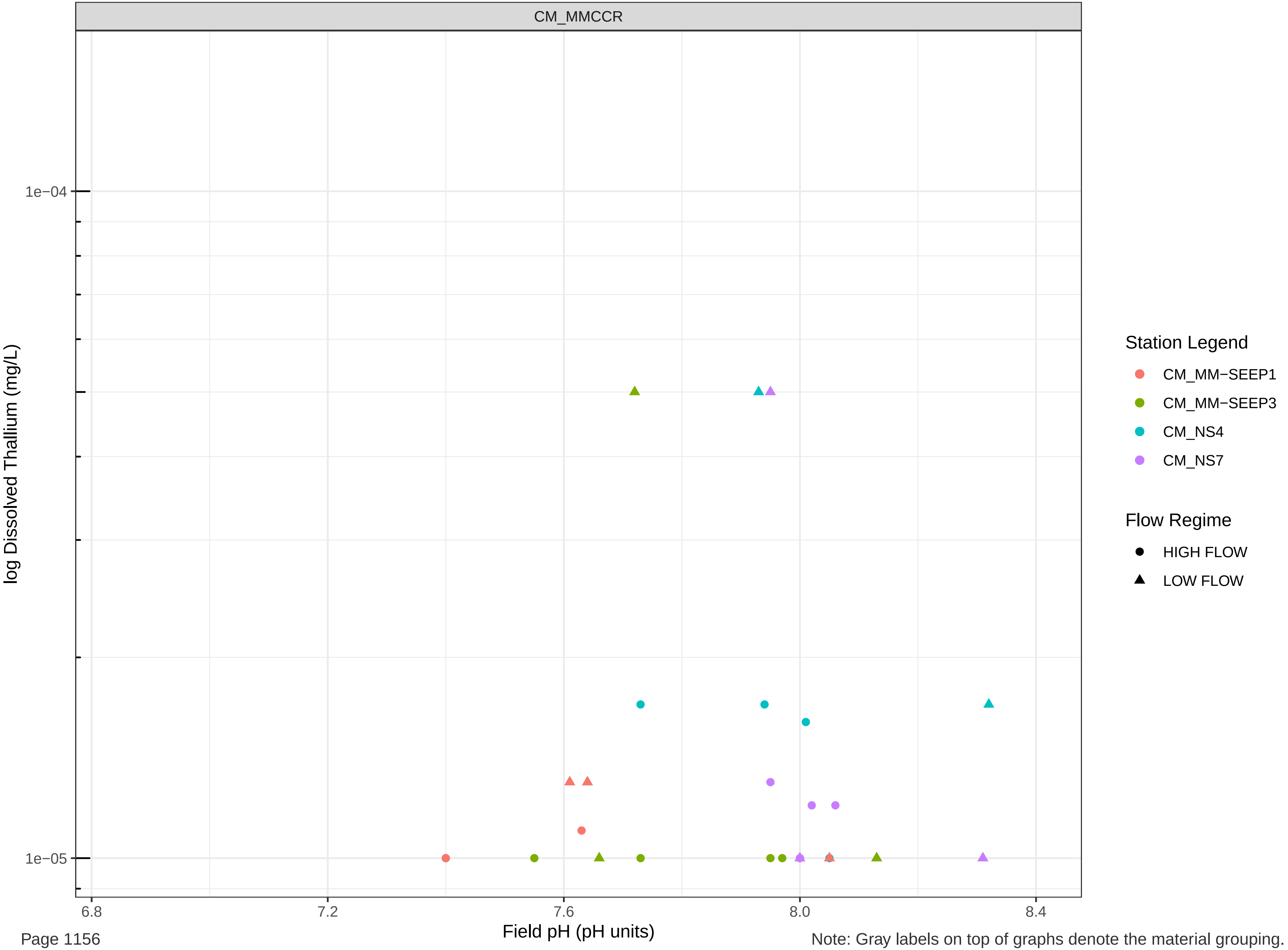

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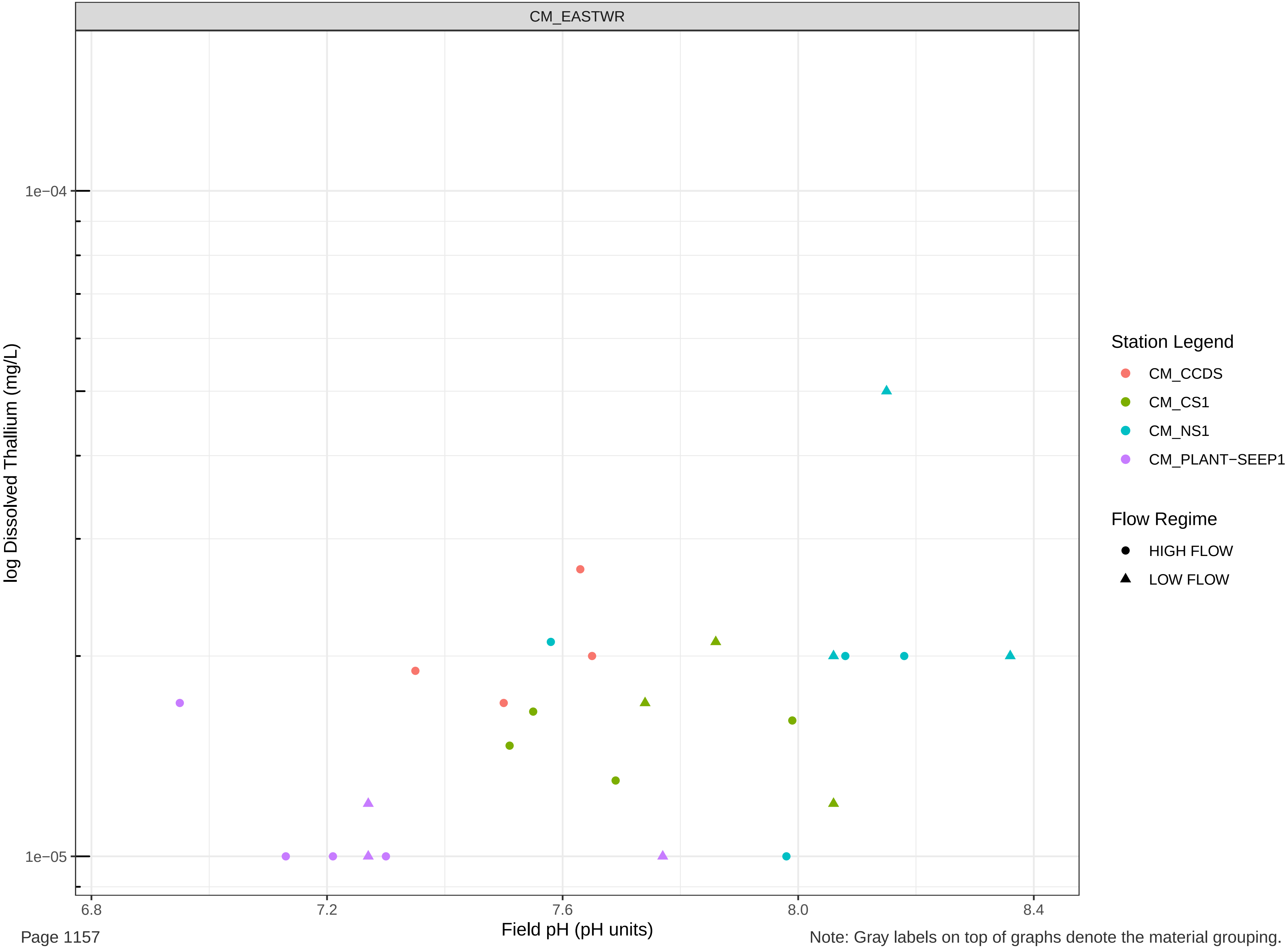

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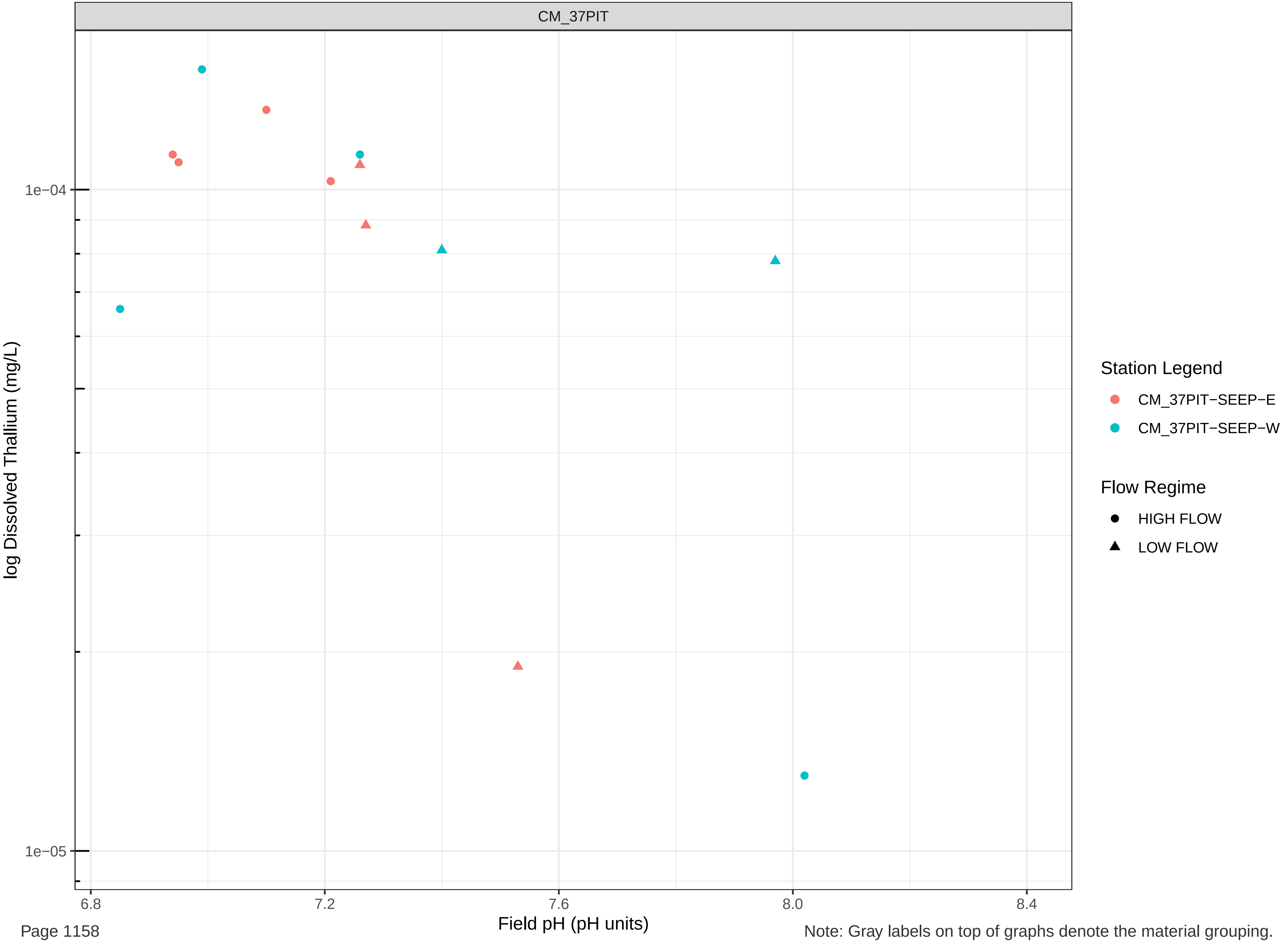

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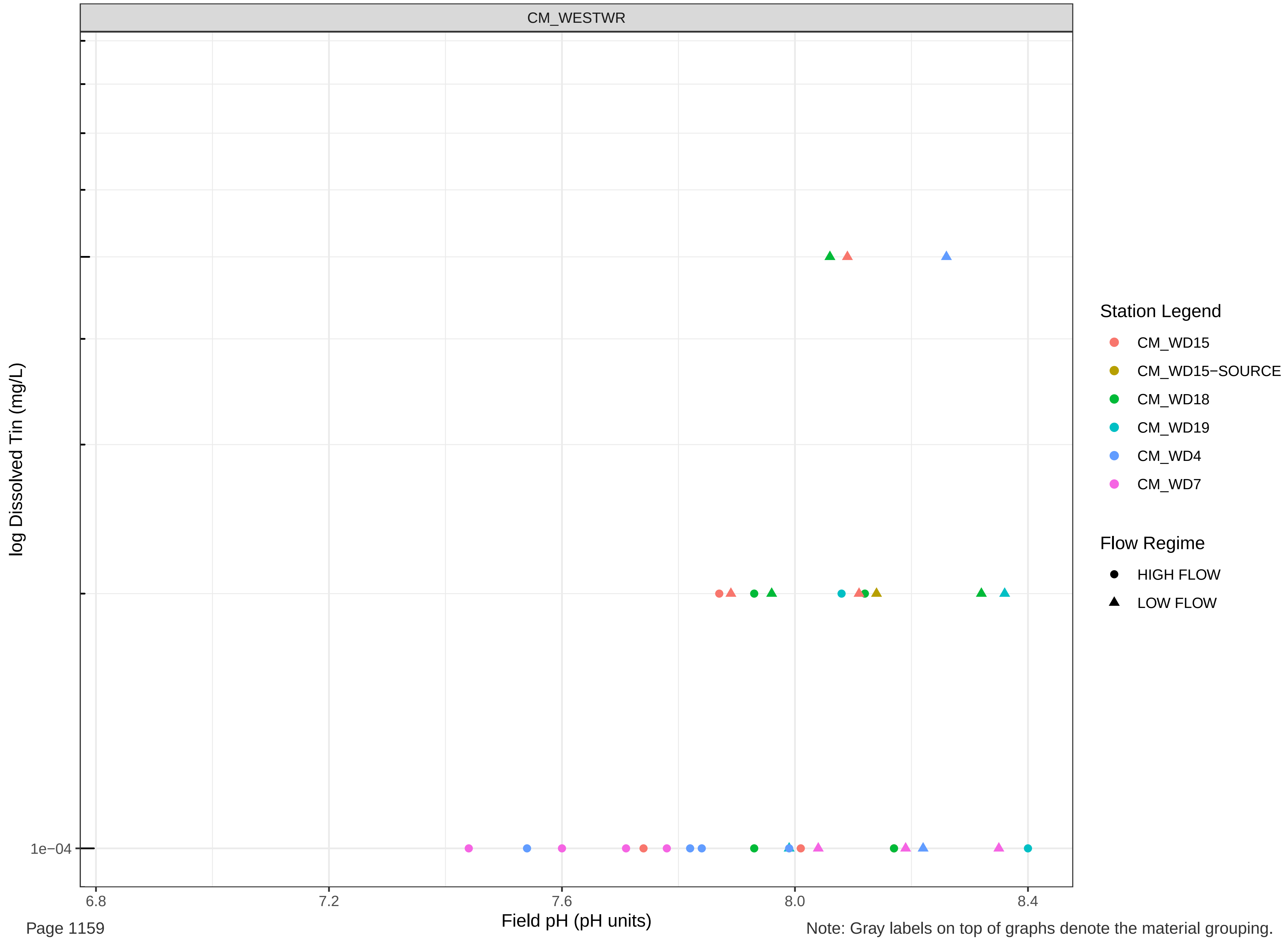

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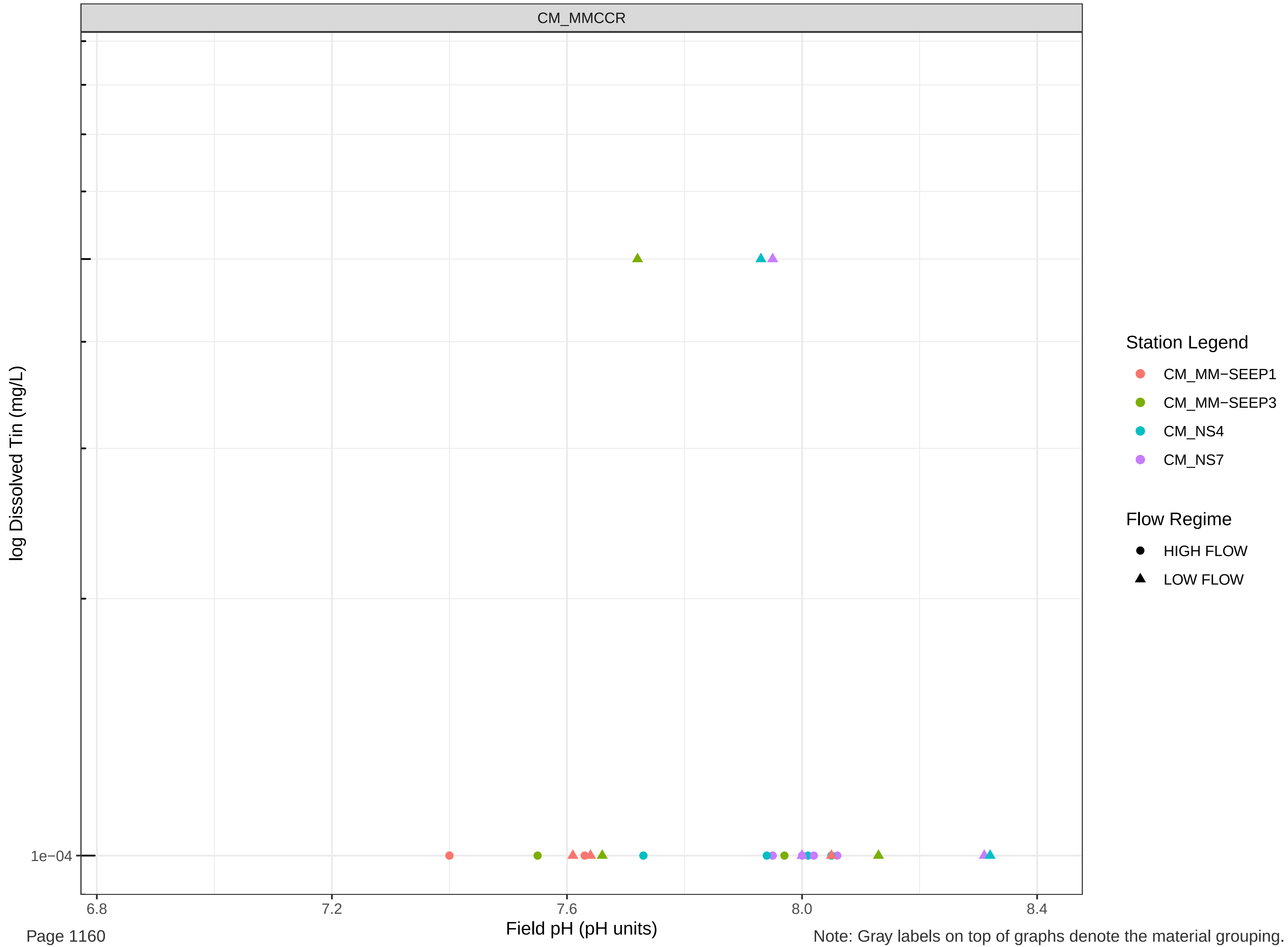

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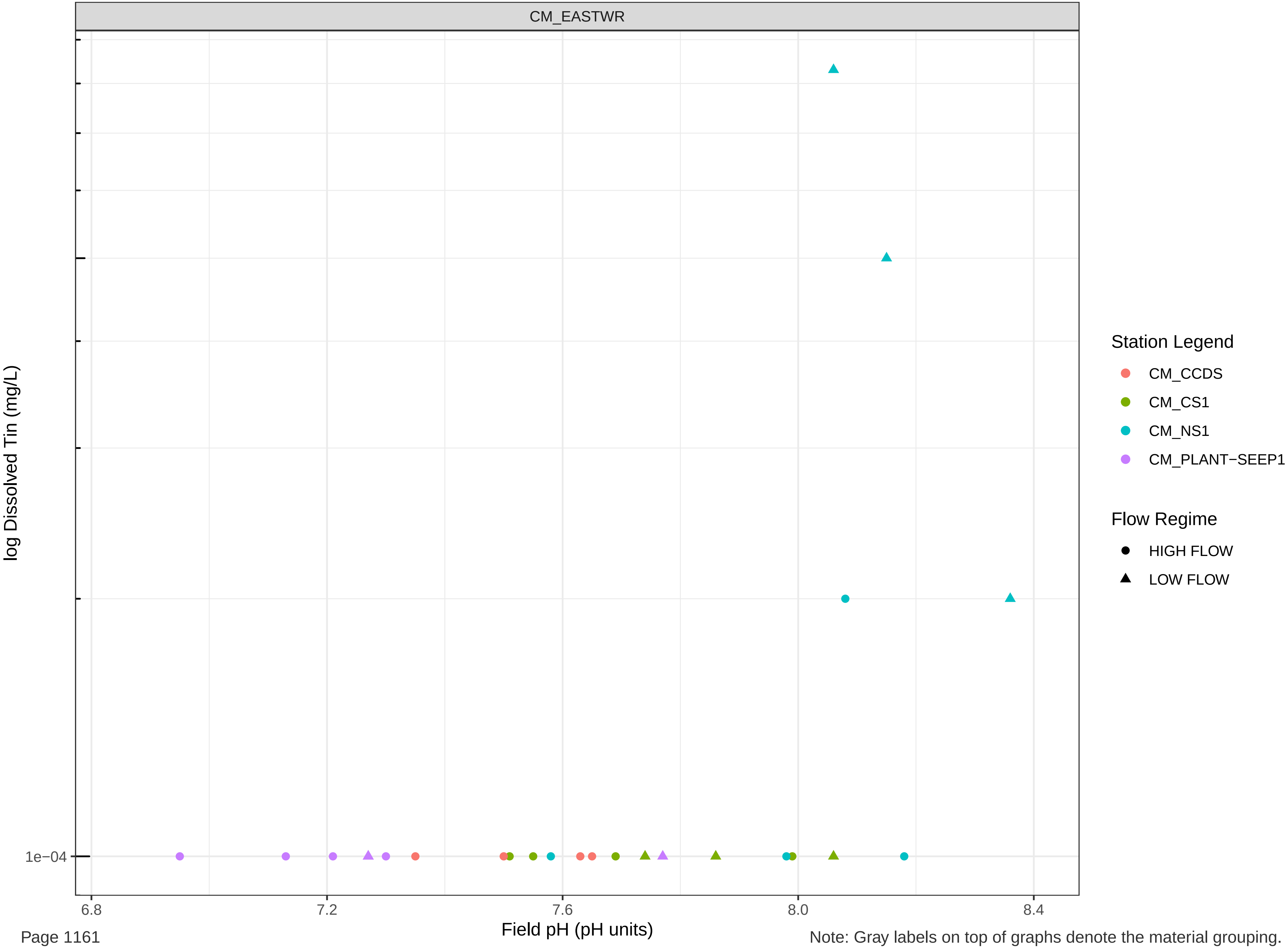

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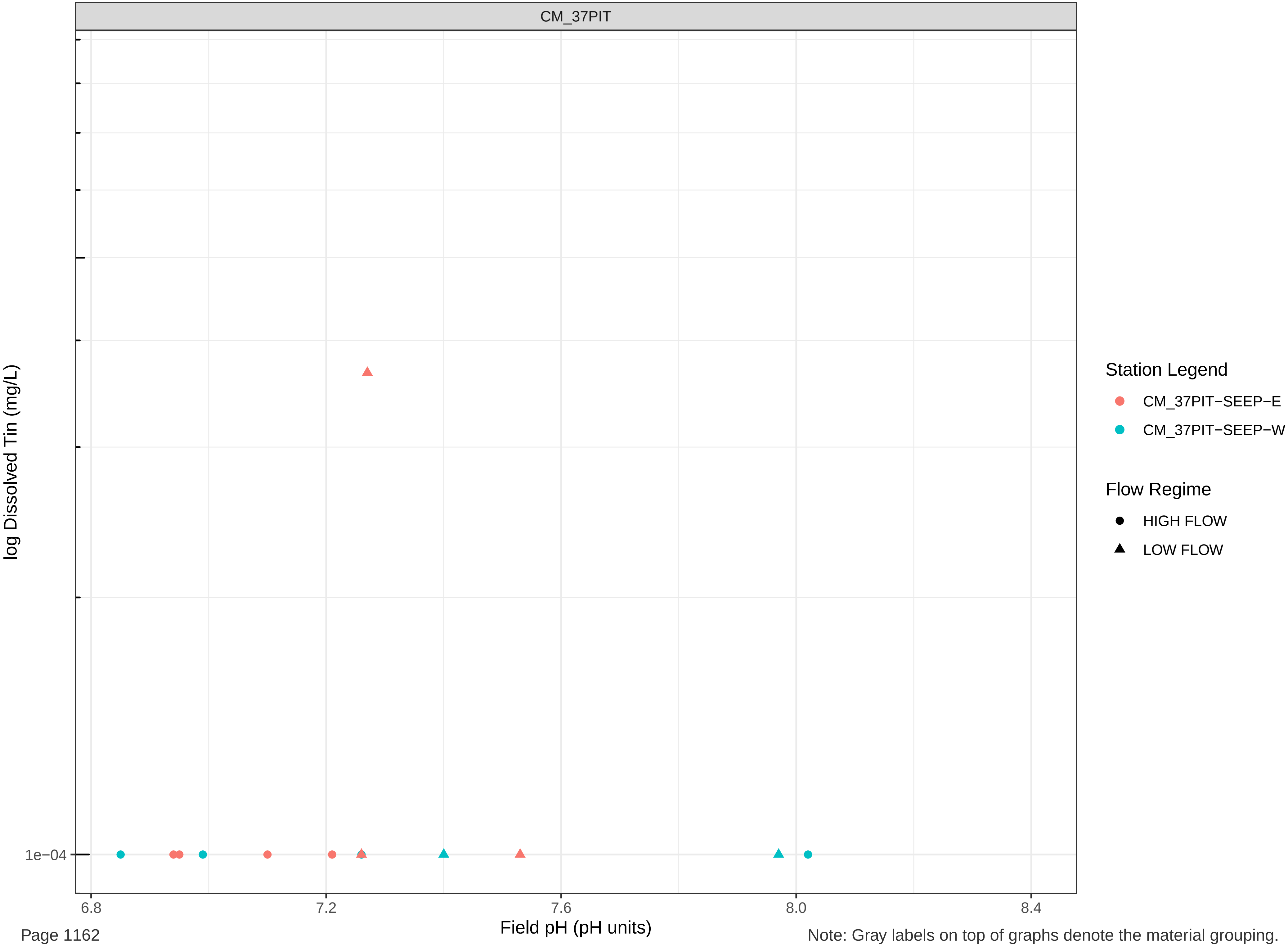

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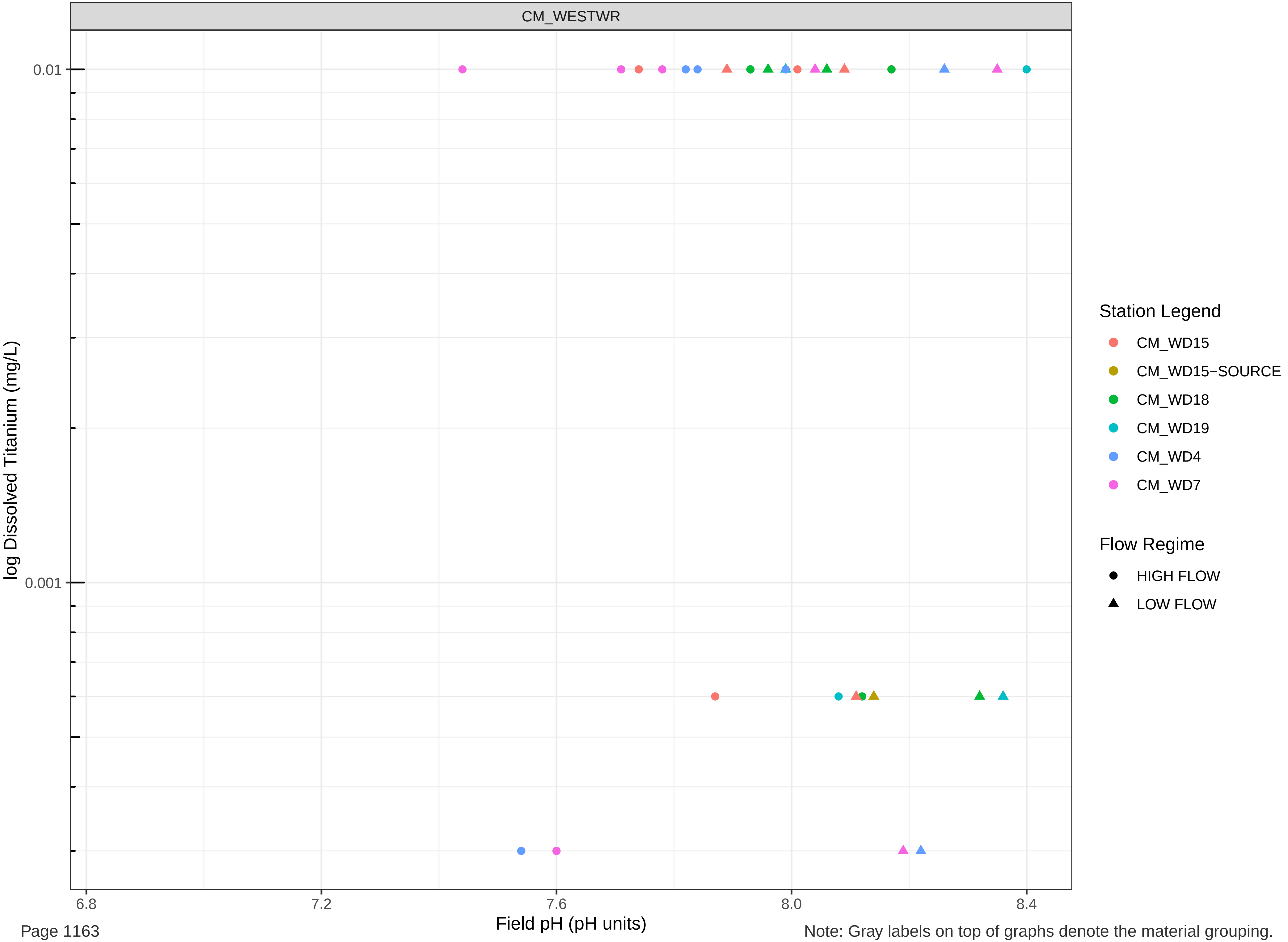

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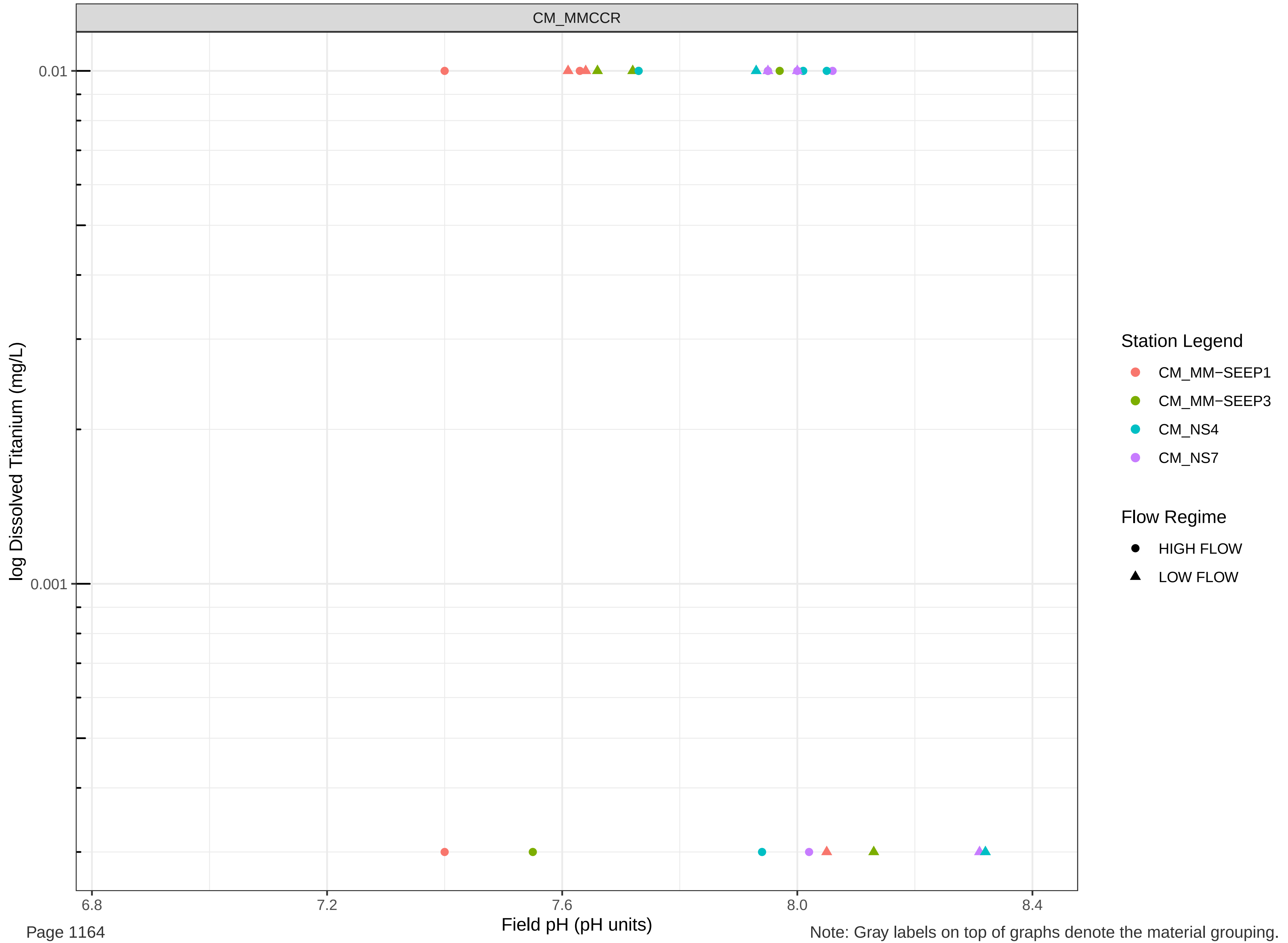

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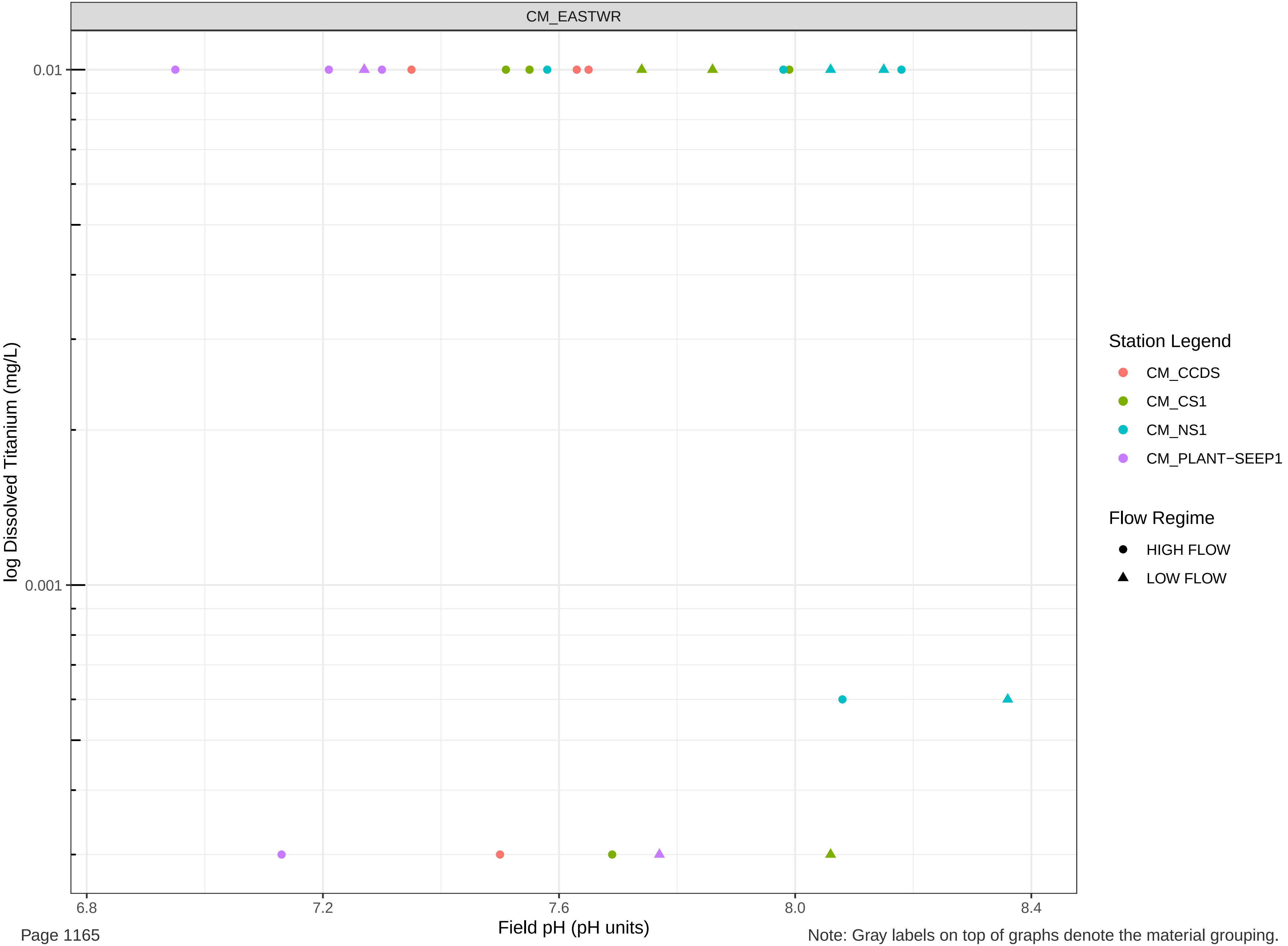

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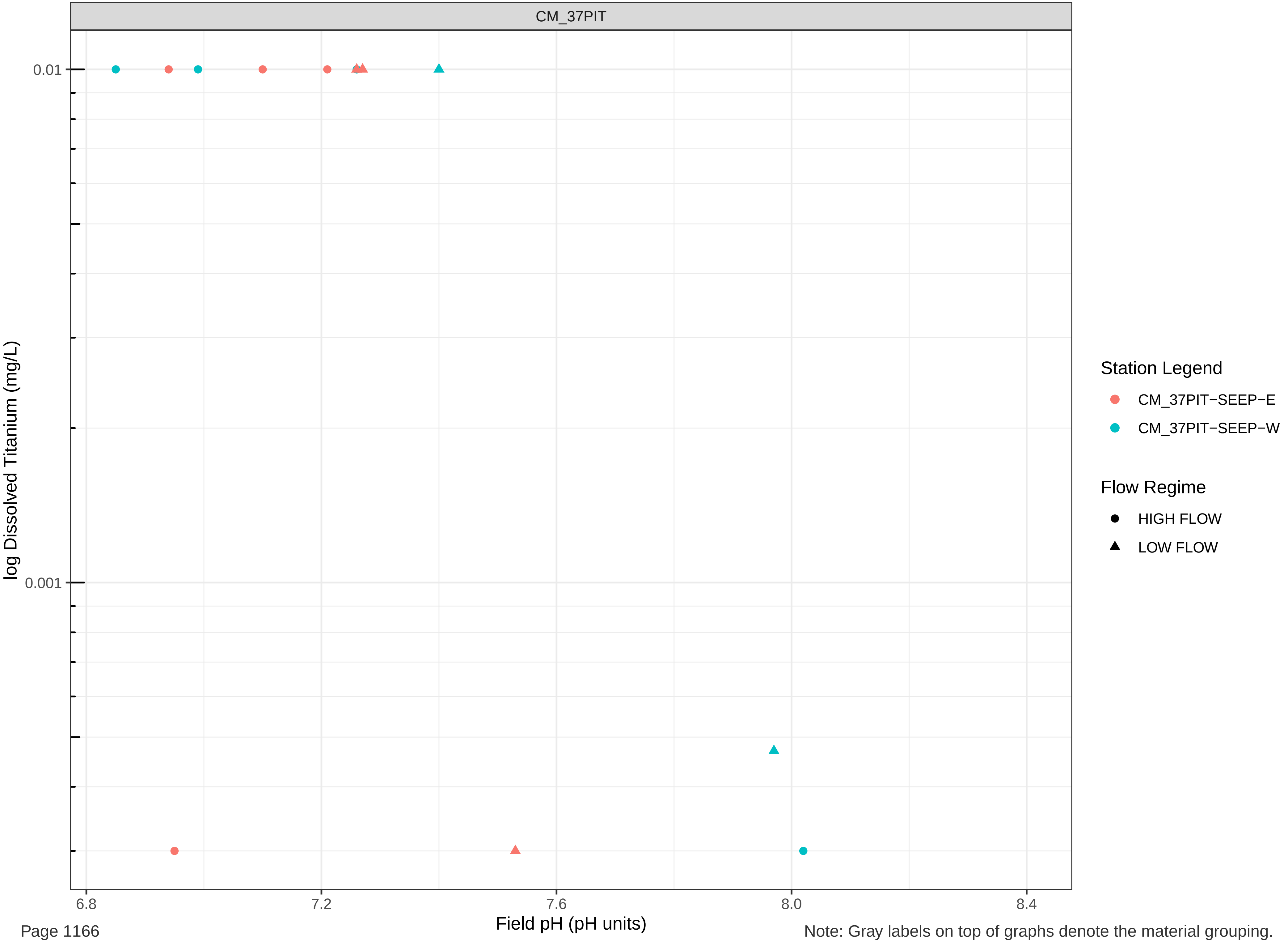

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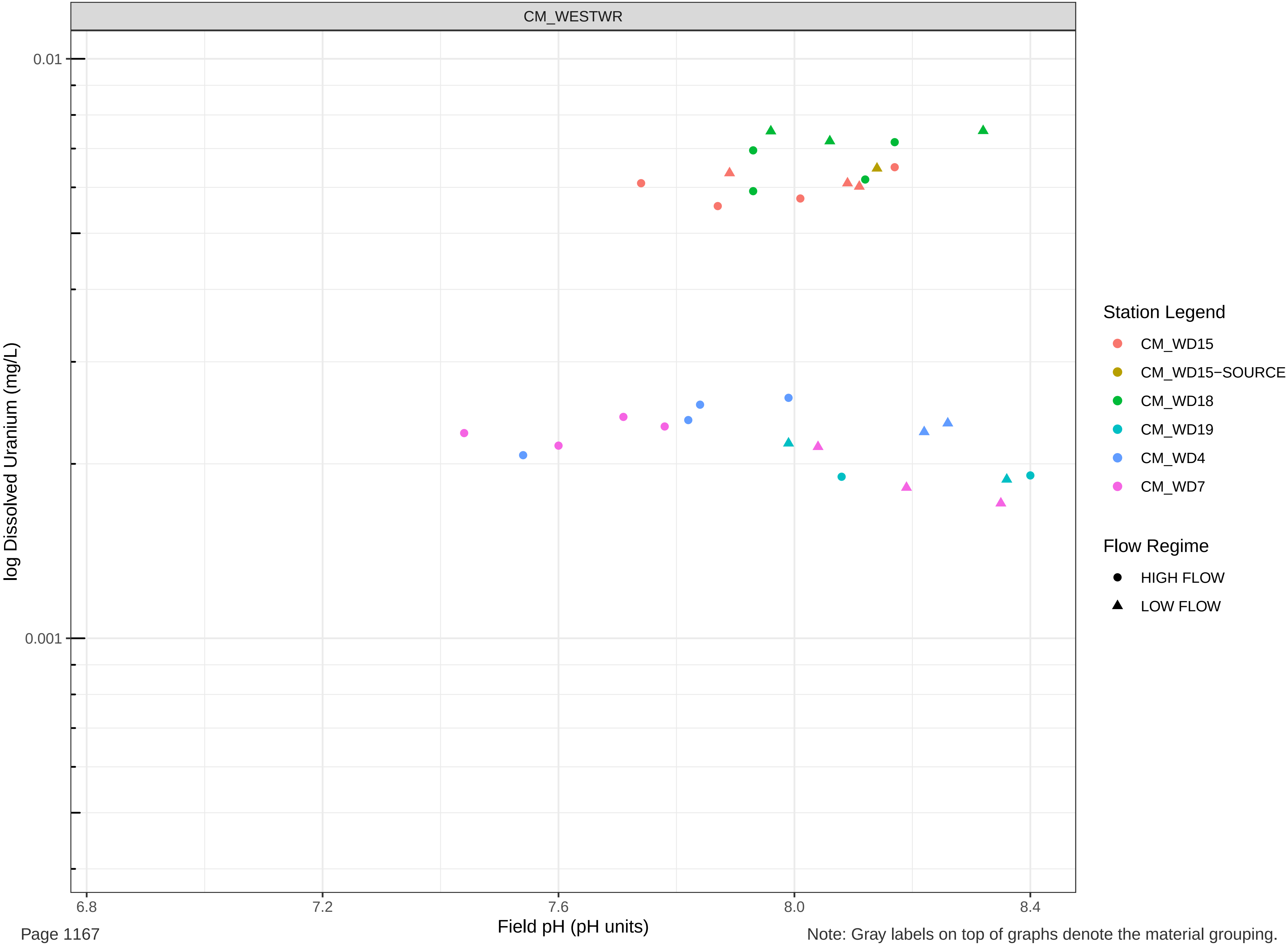

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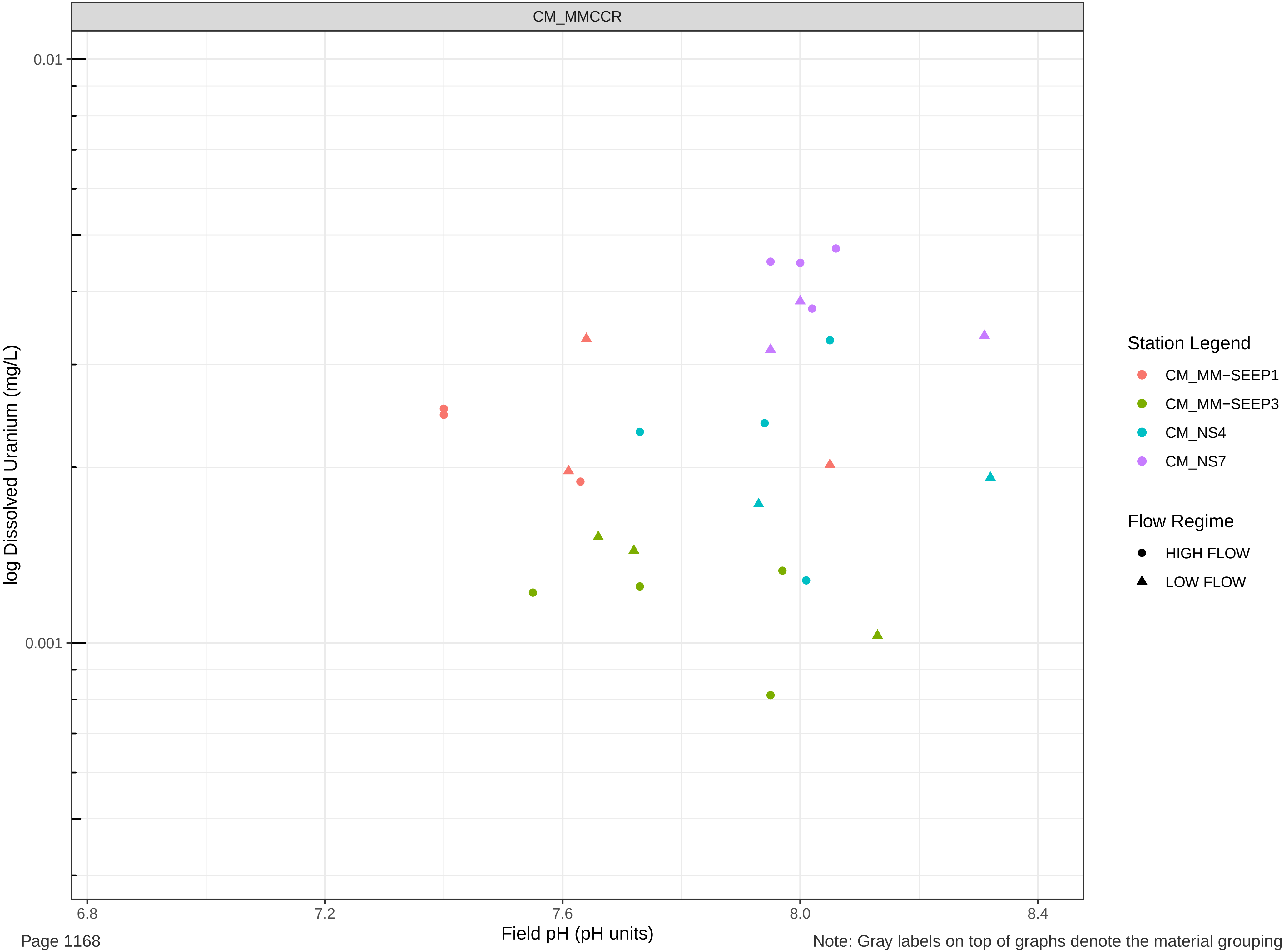

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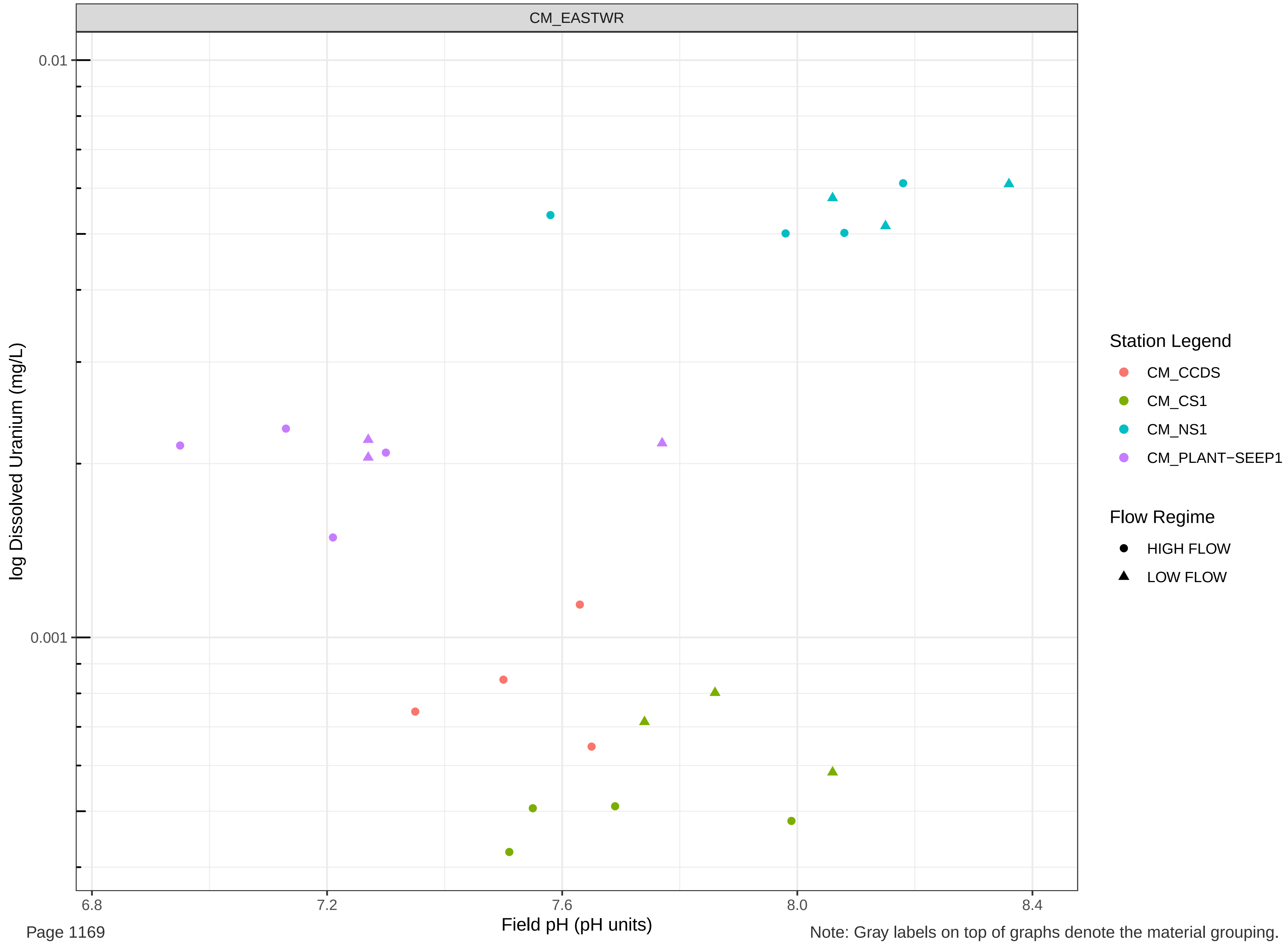

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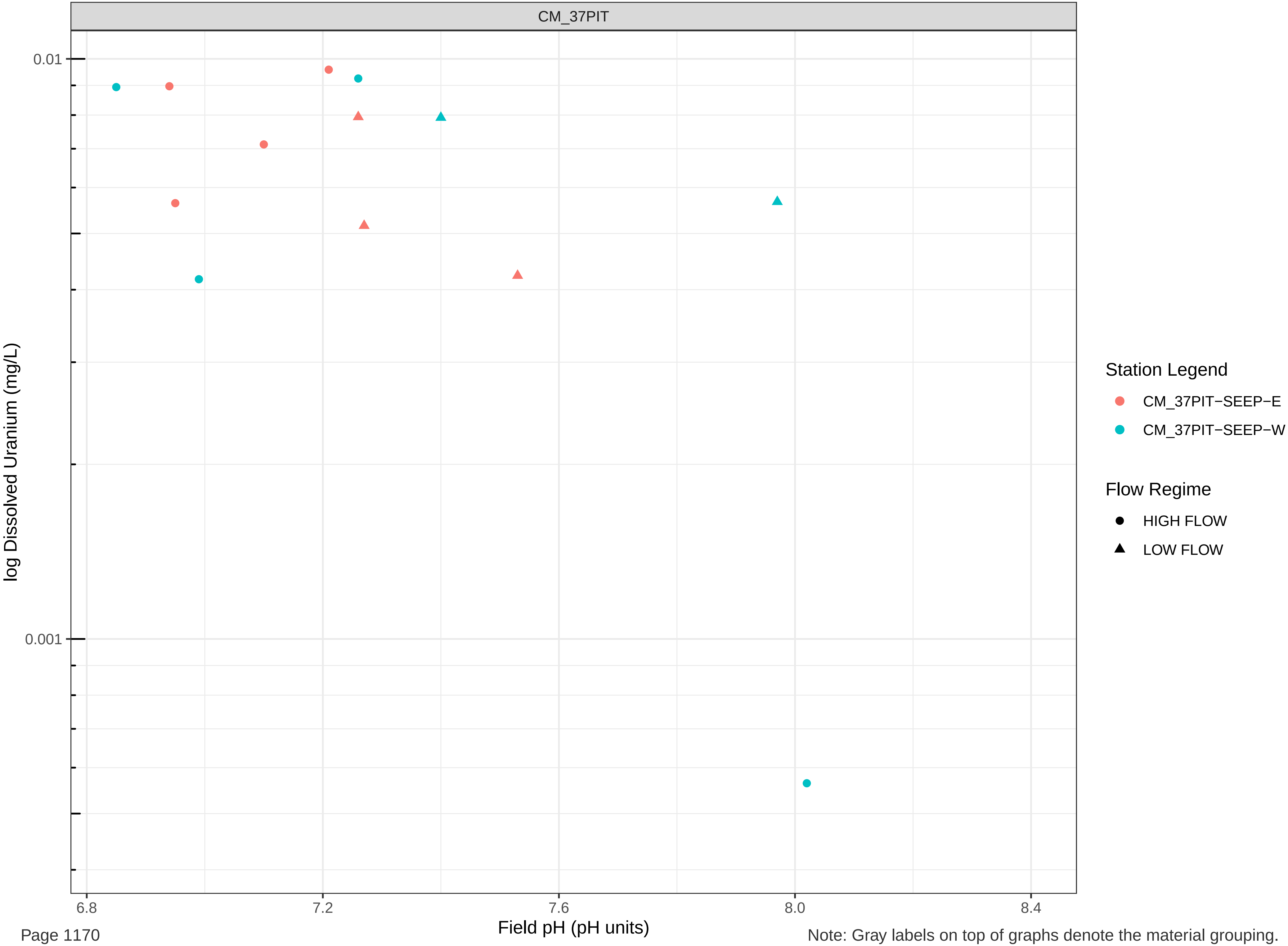

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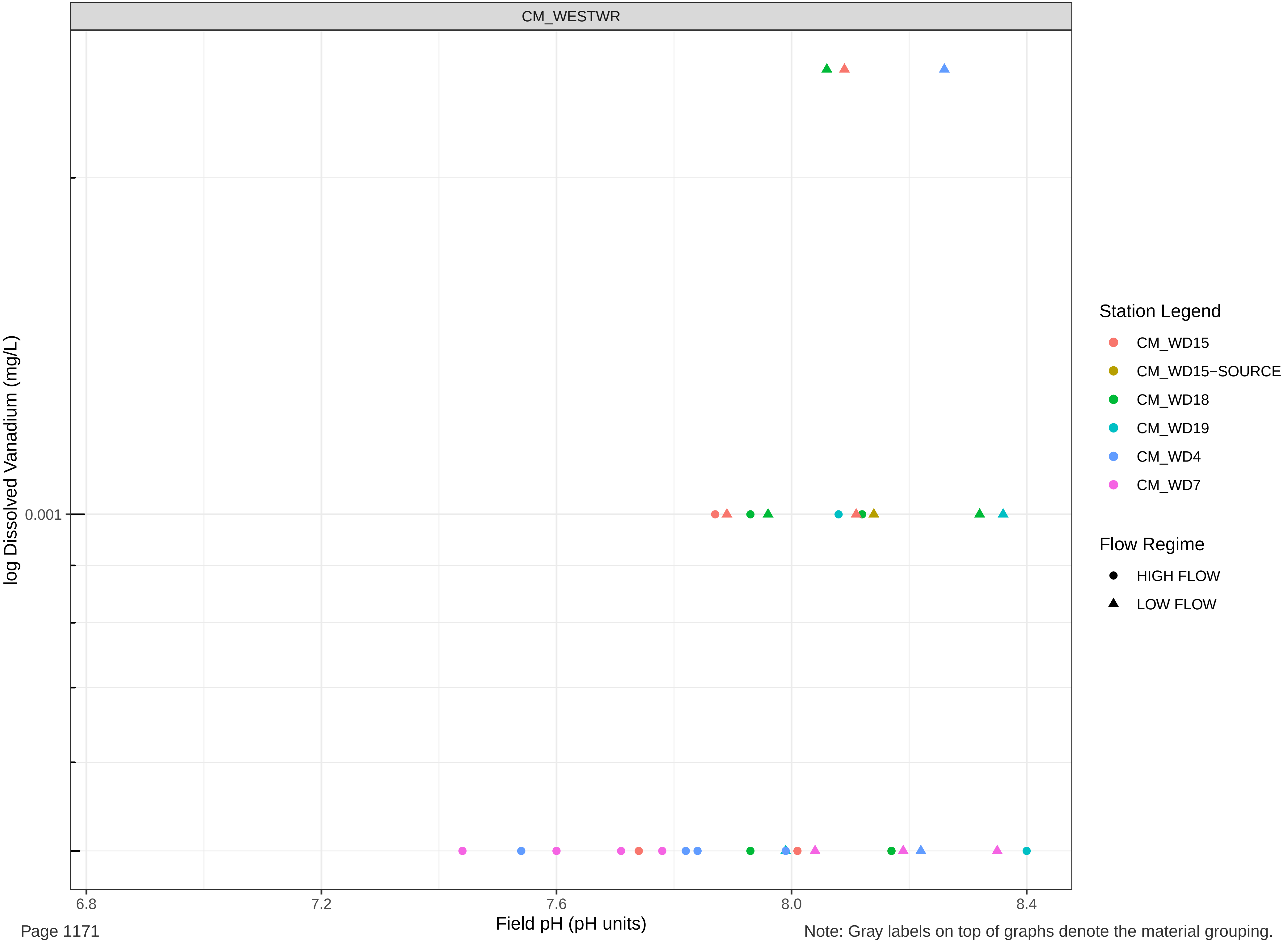

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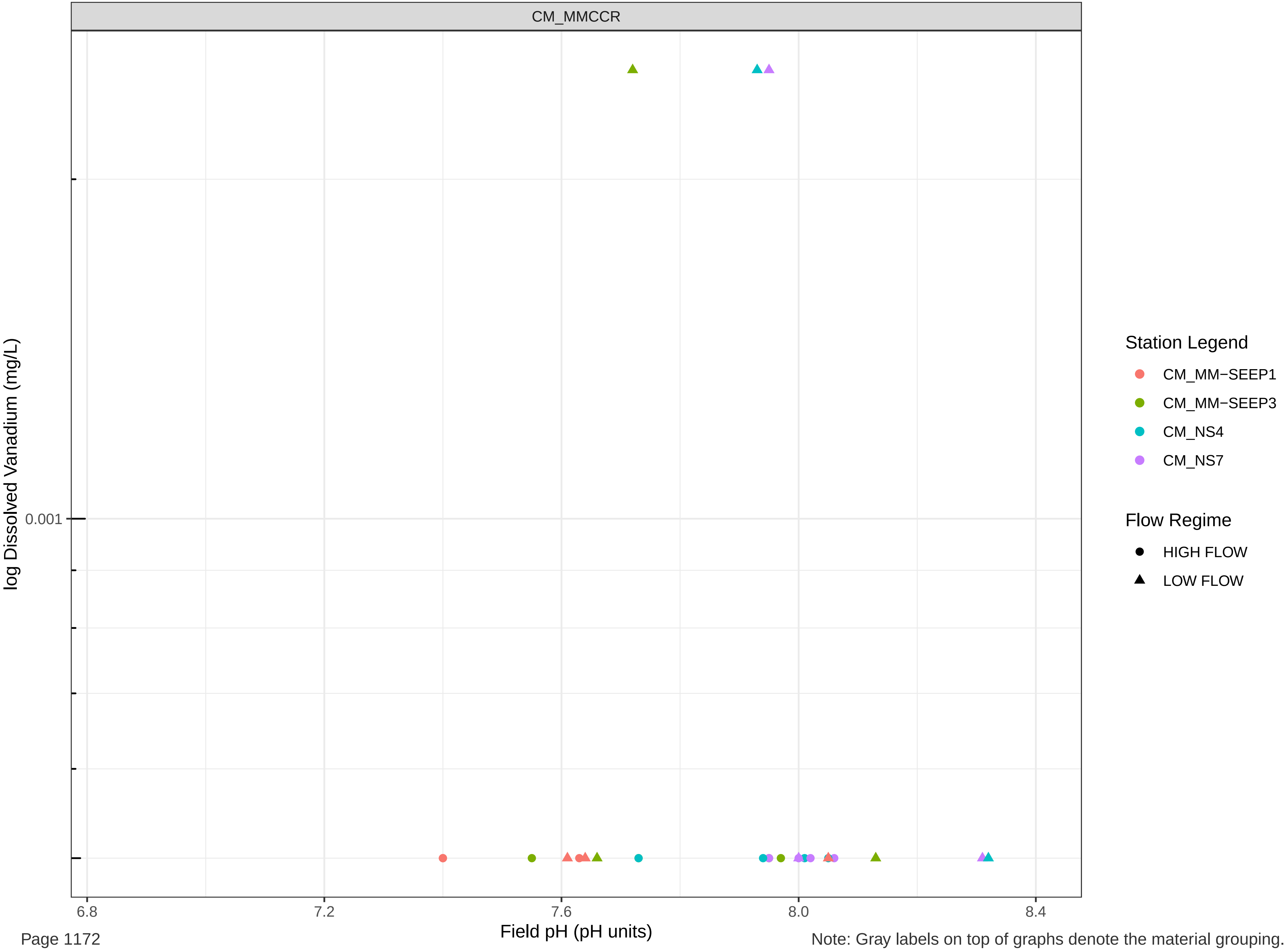
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7.2
7.6
8.0
8.4
Field pH (pH units)
Station Legend
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Flow Regime
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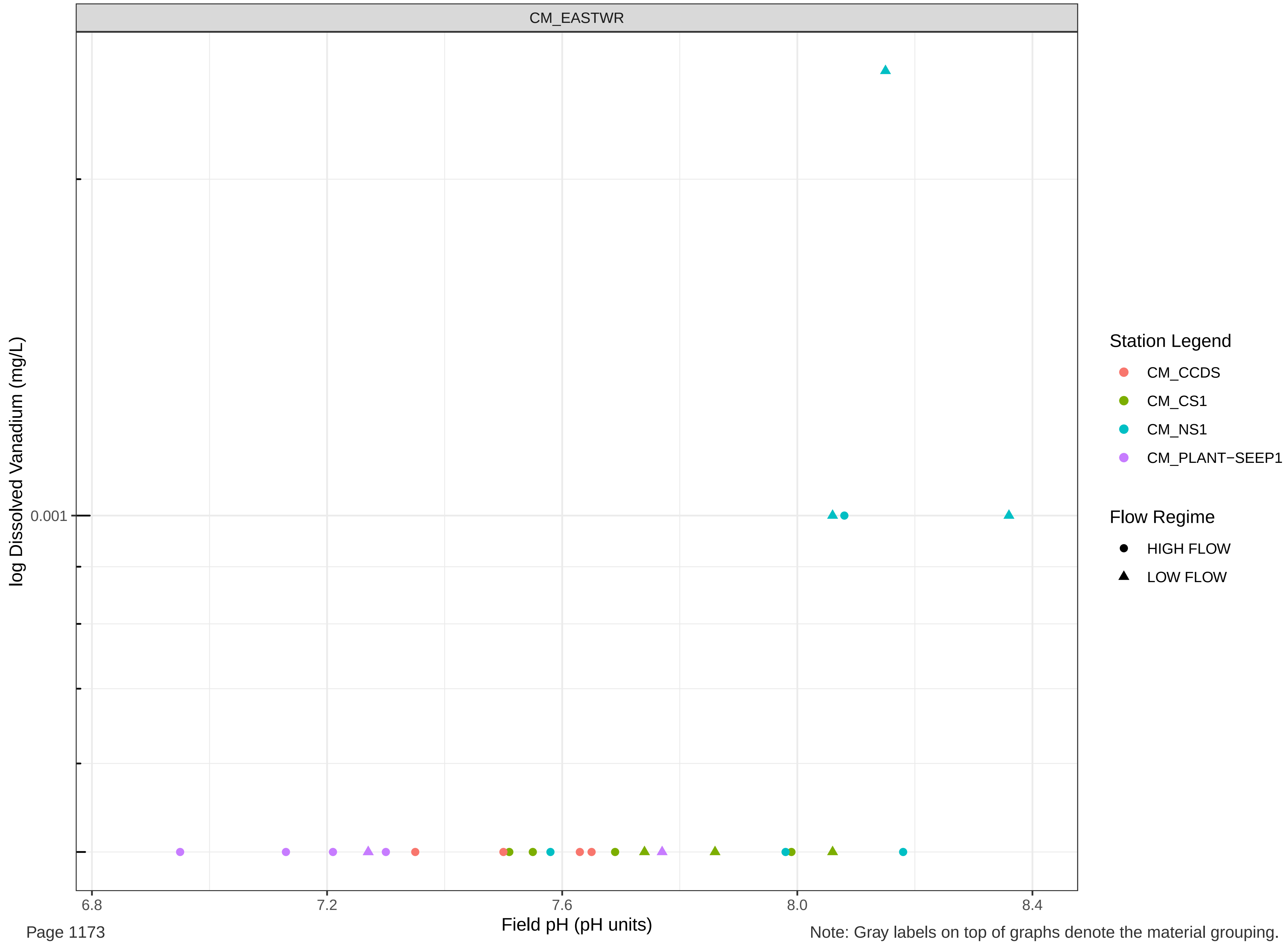

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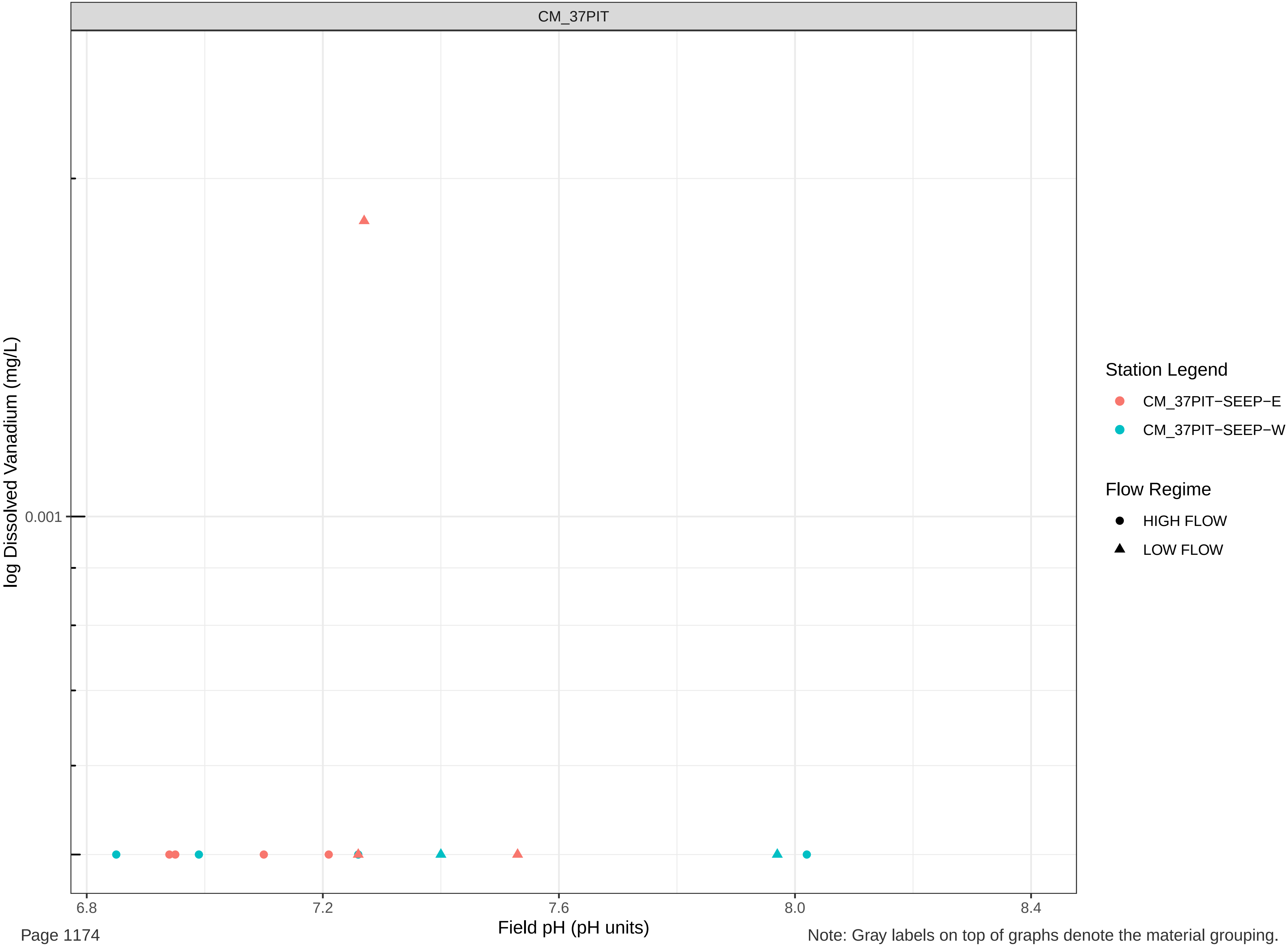

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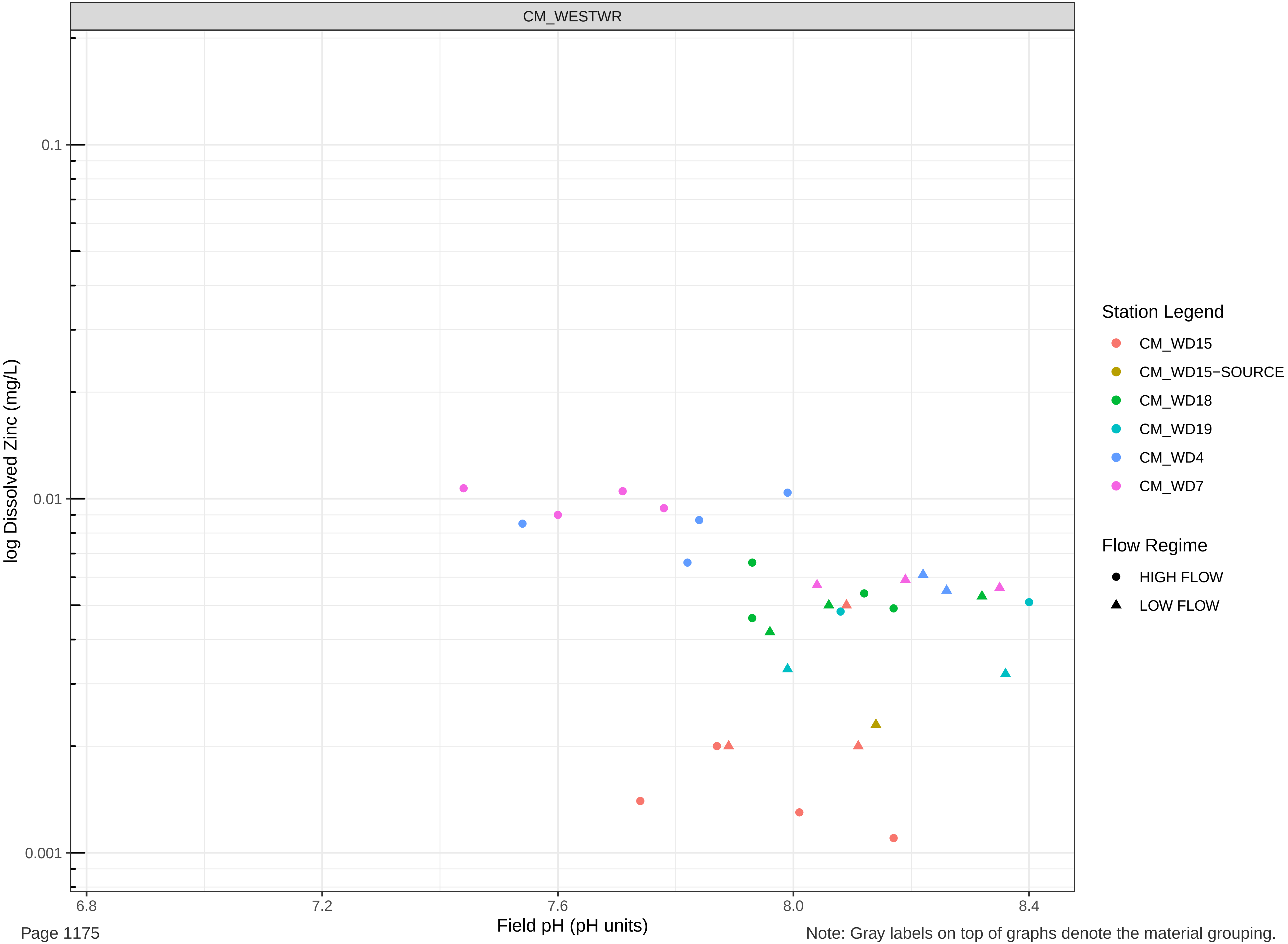

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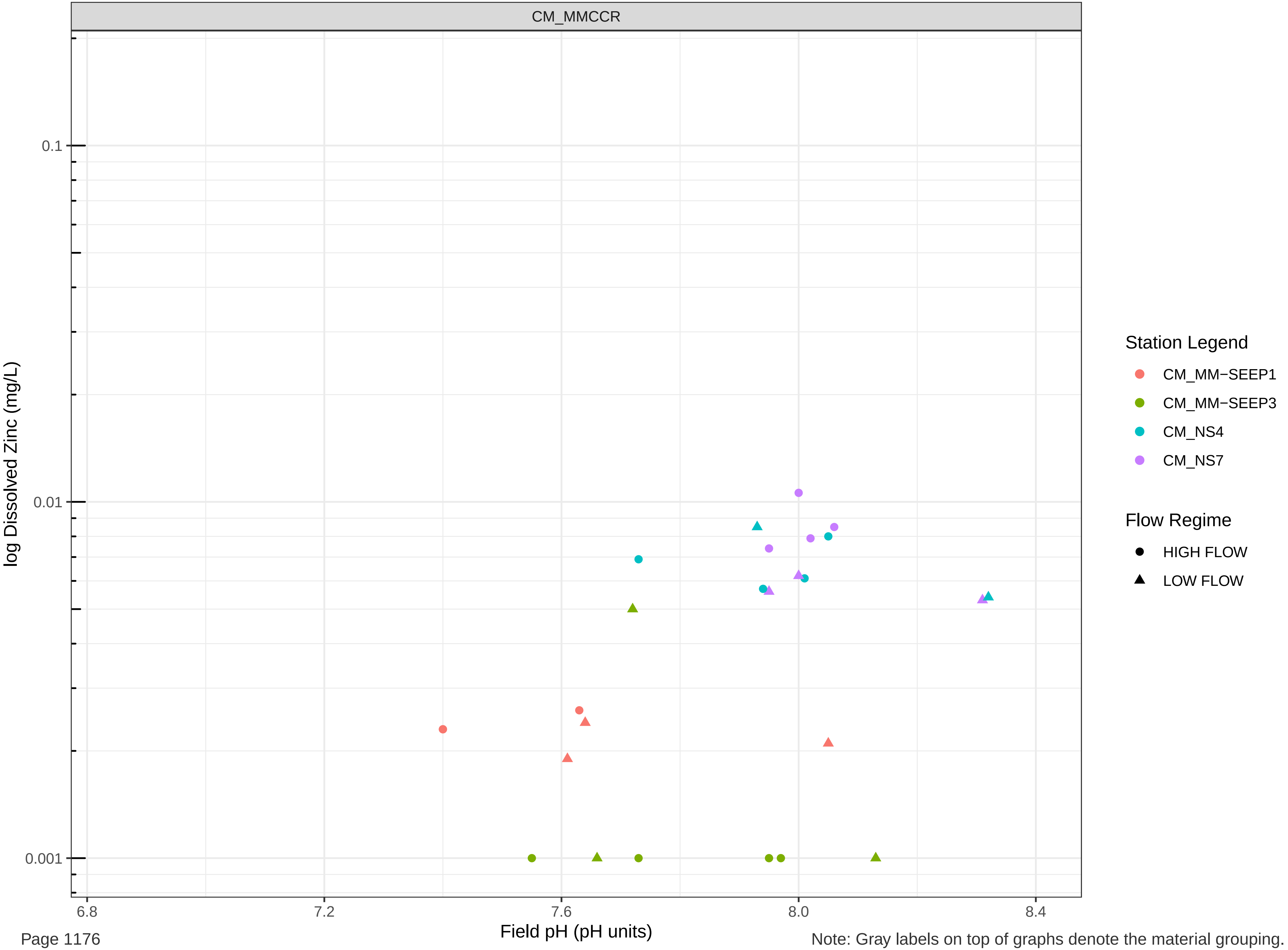

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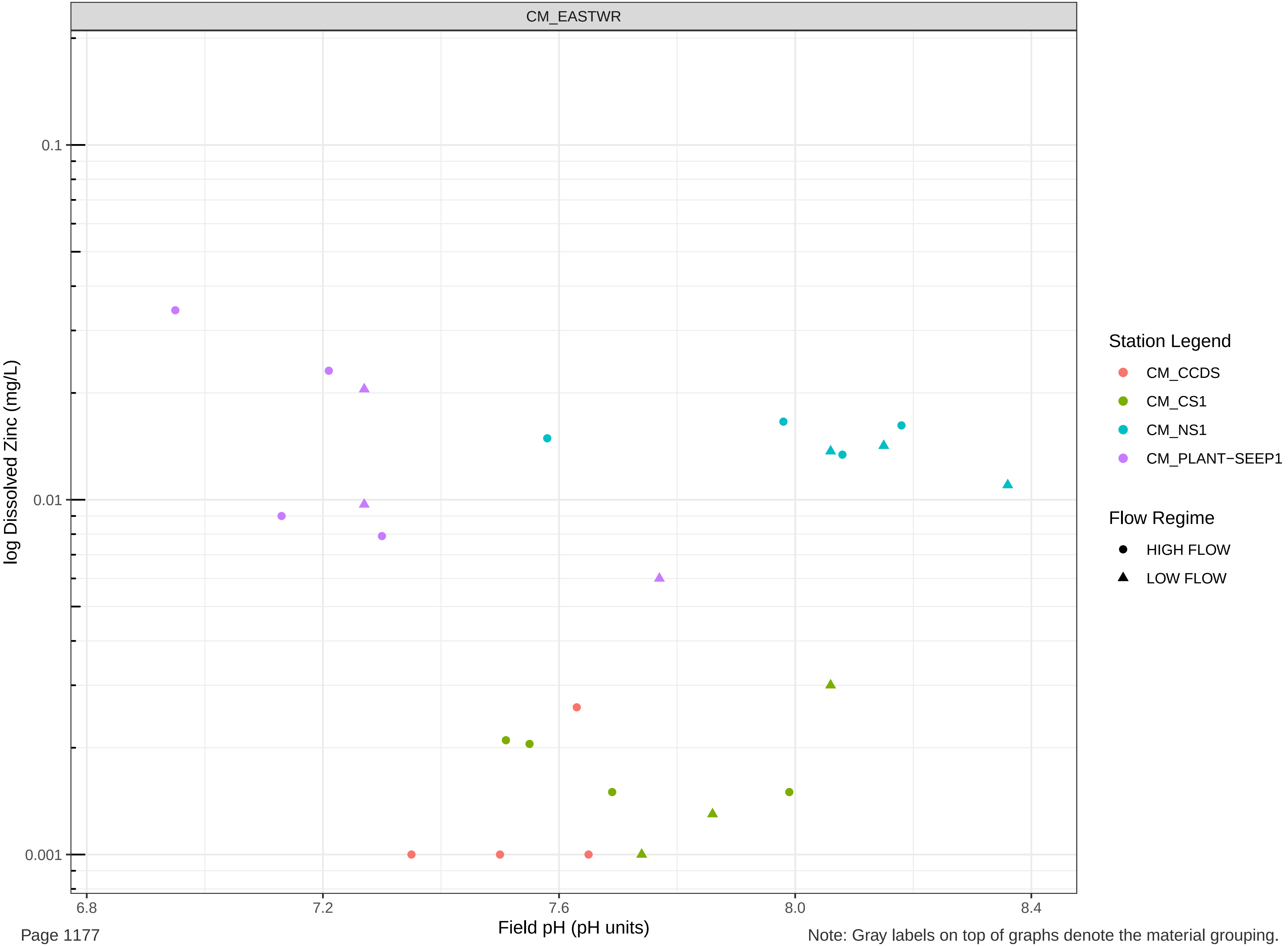

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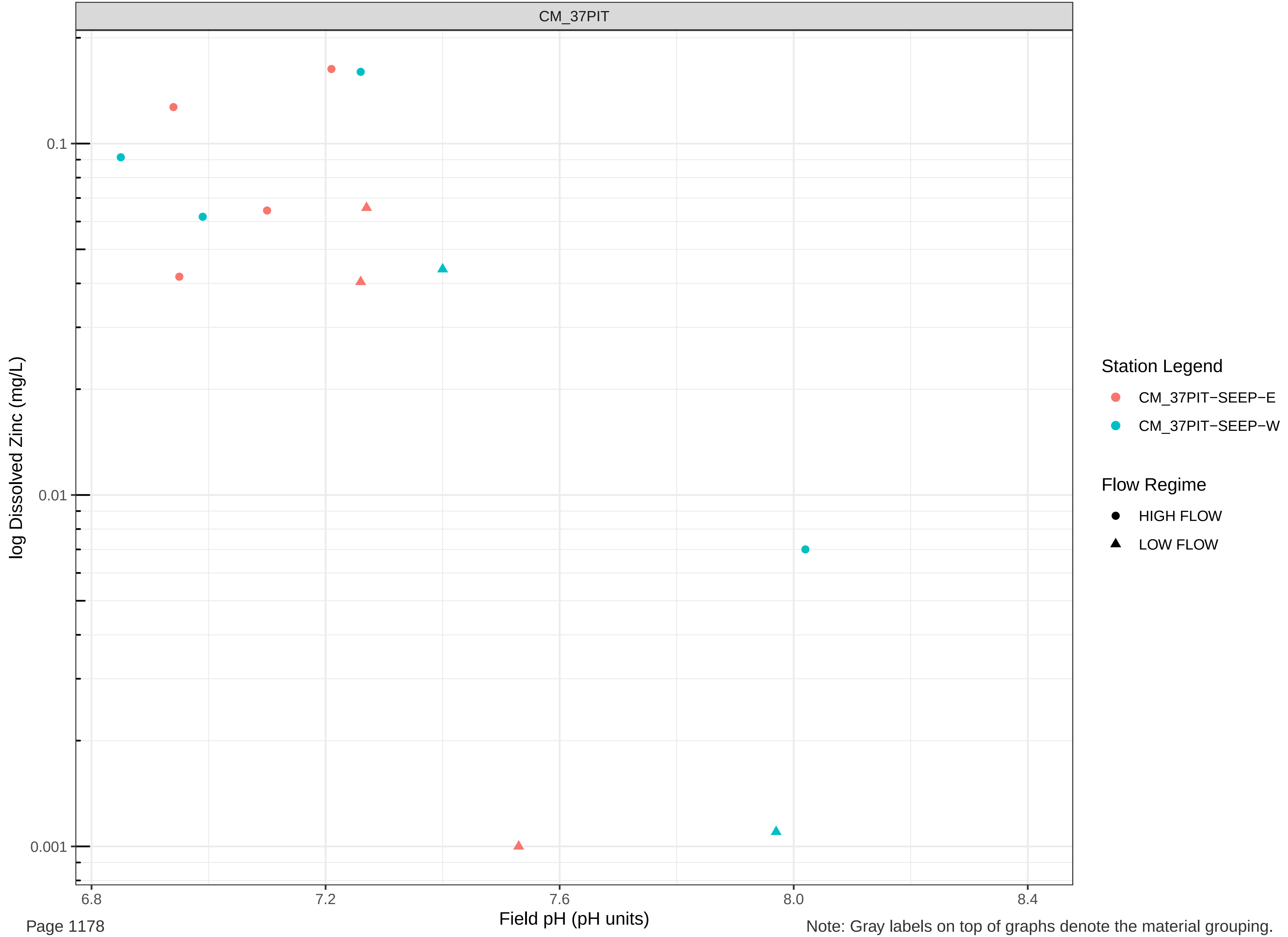
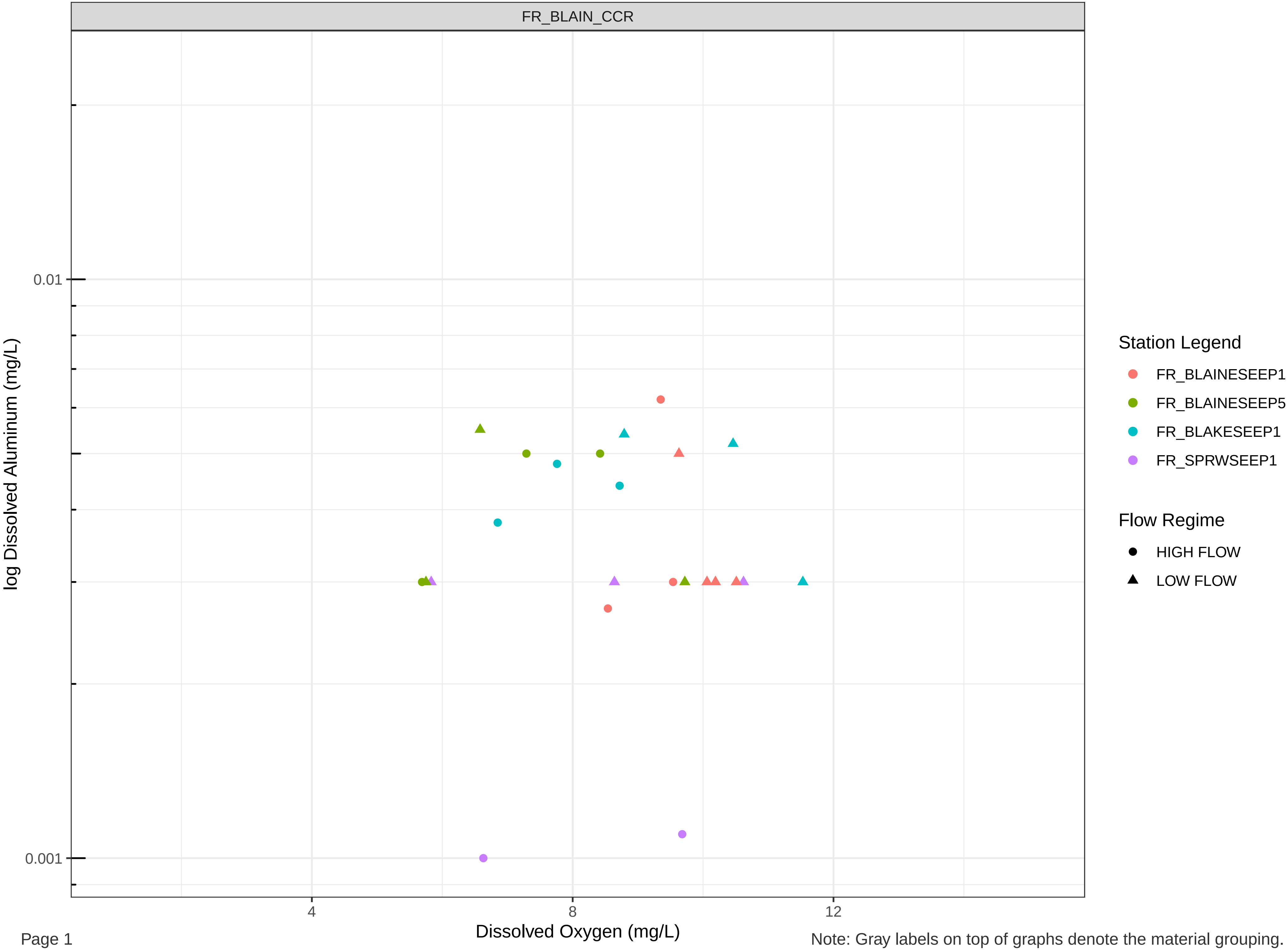


Note: Gray labels on top of graphs denote the material grouping.

Appendix C Metals versus field Dissolved Oxygen Cross Plots



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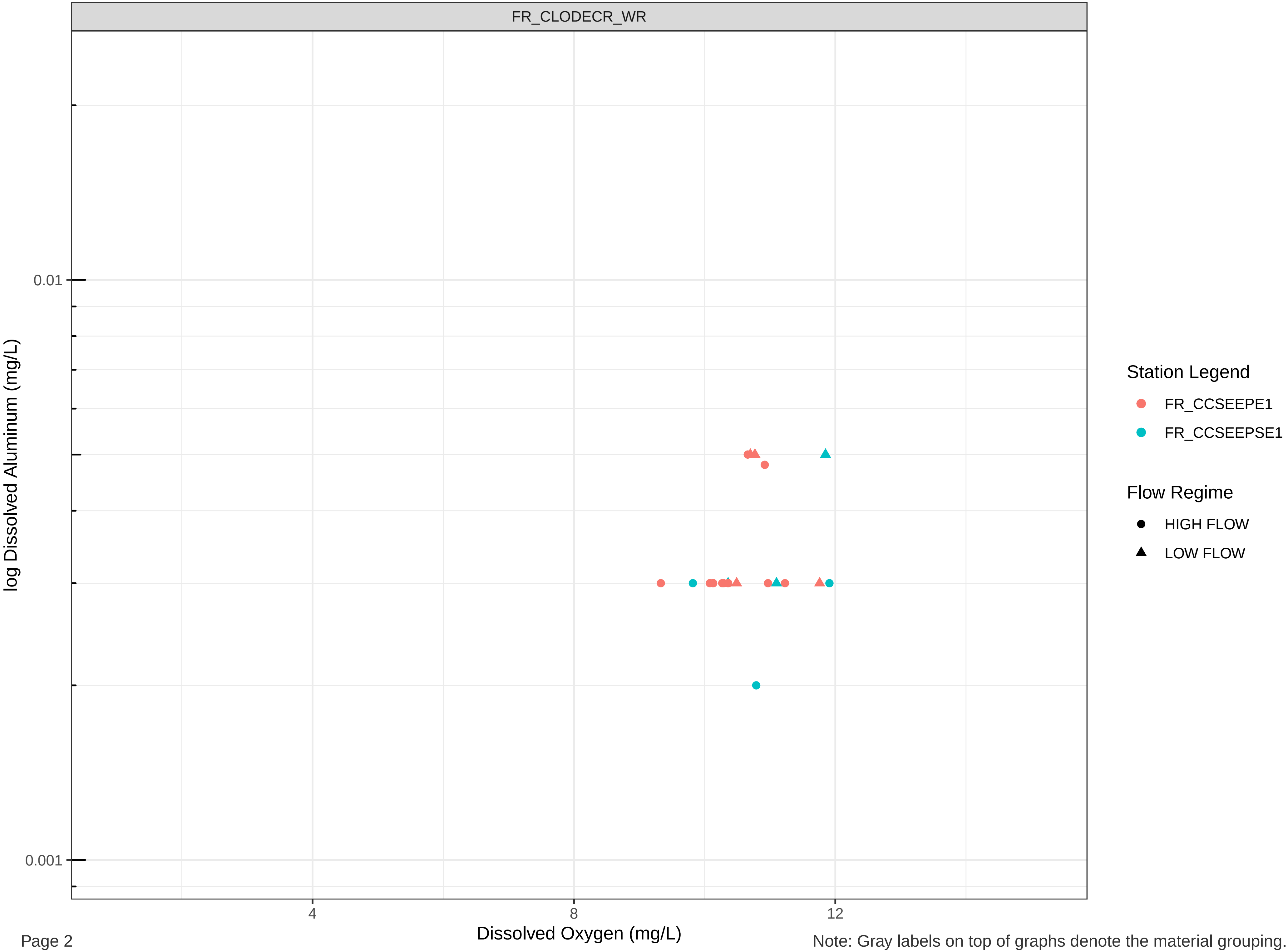

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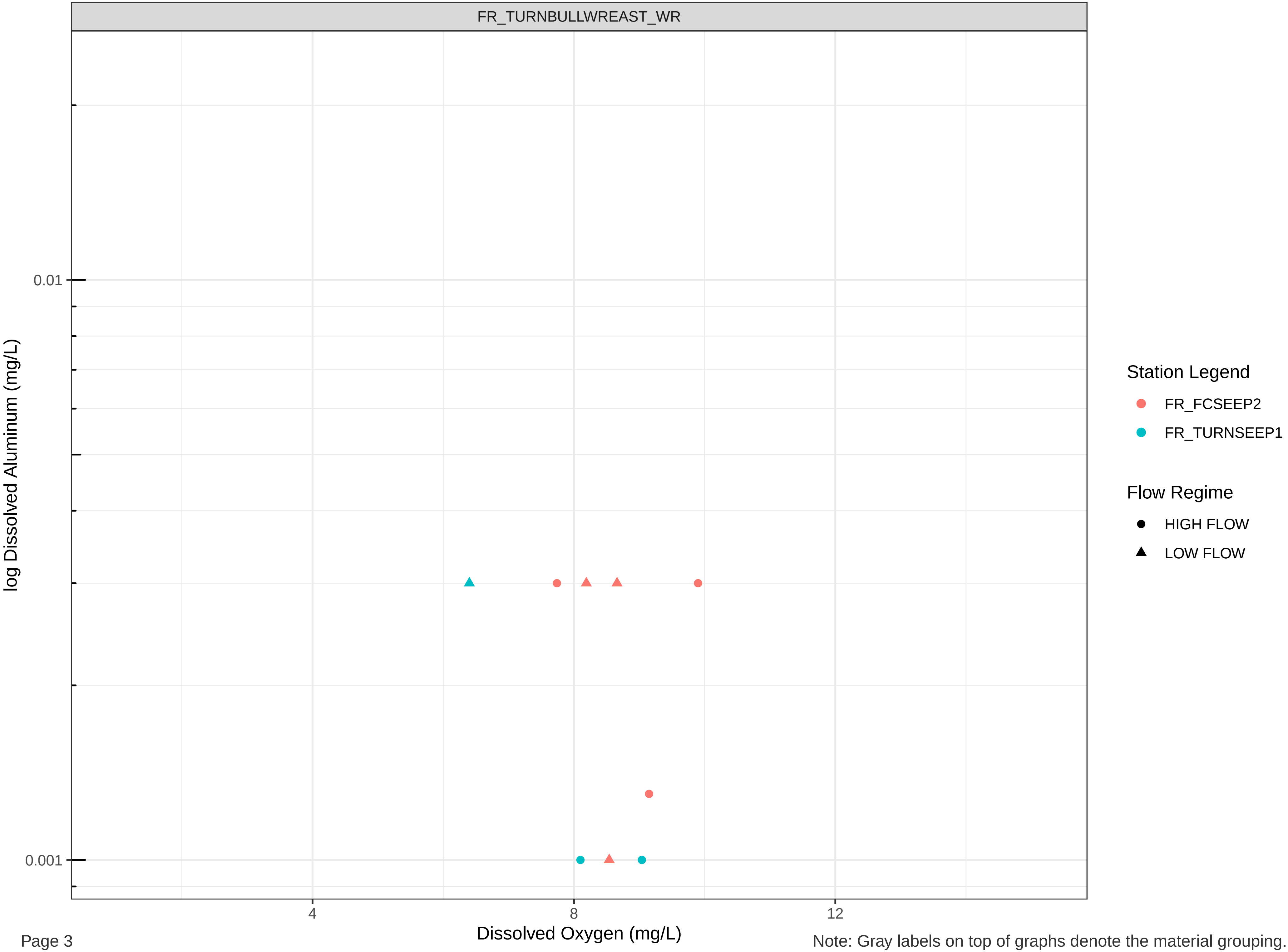

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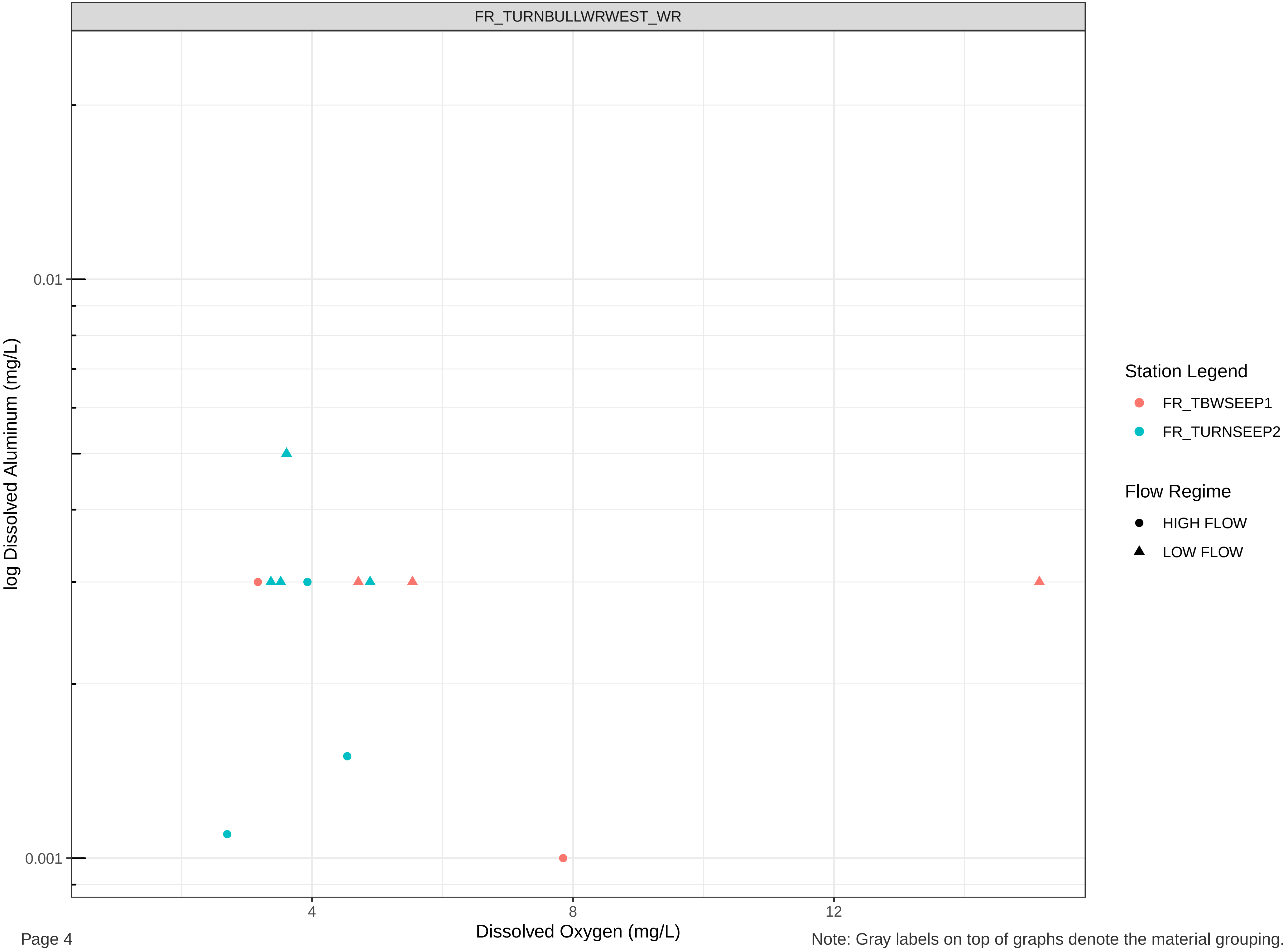

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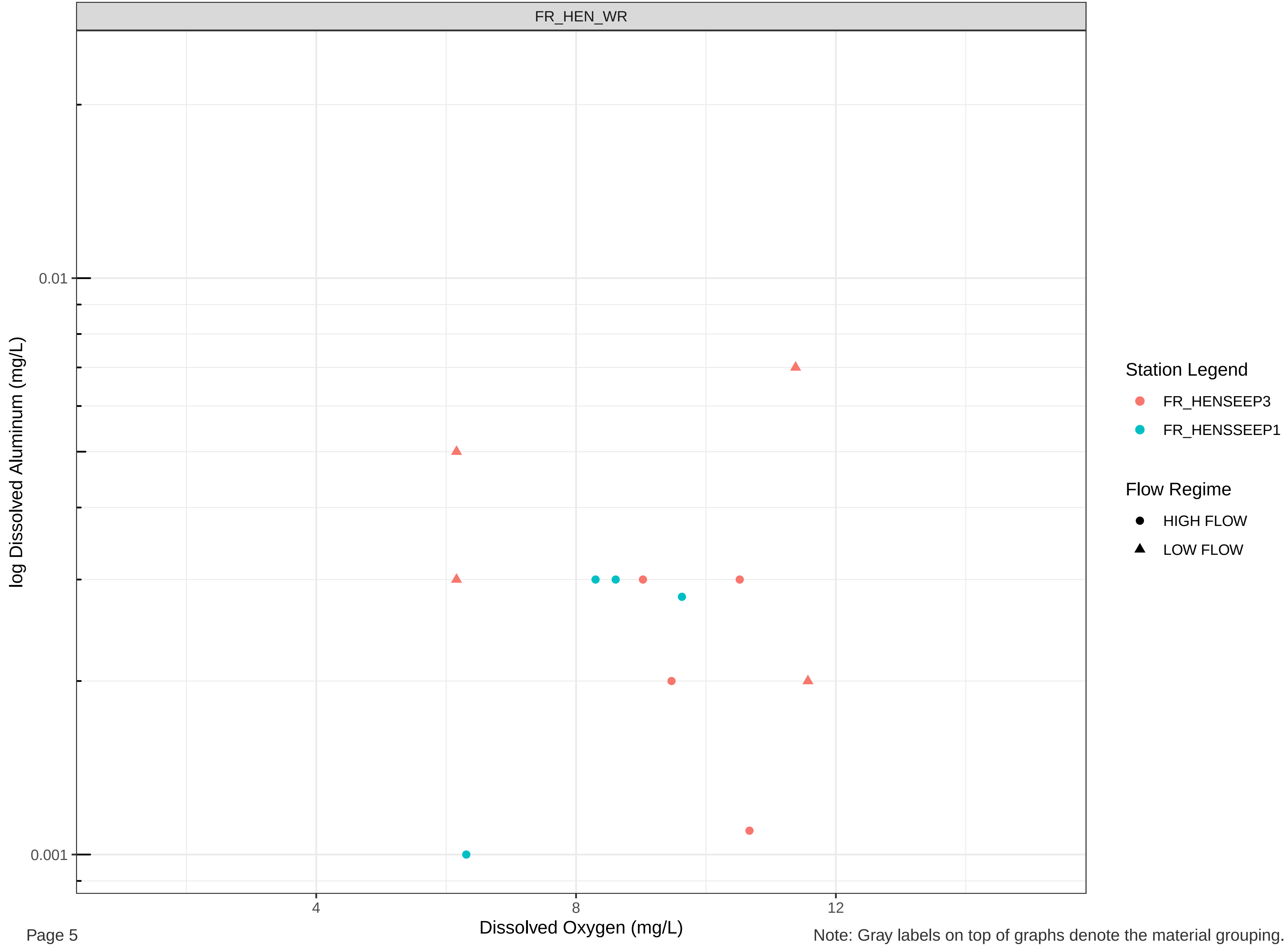

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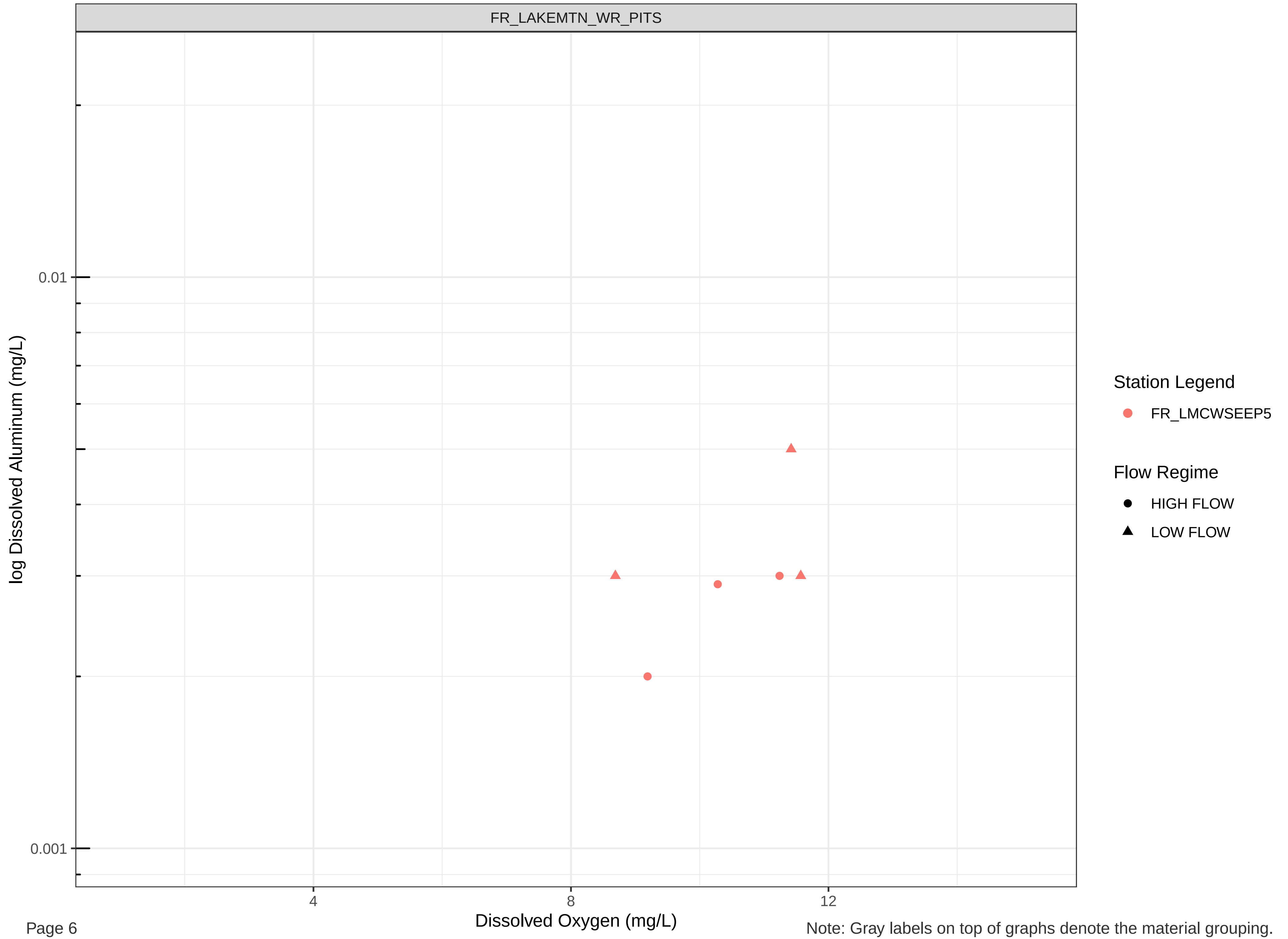

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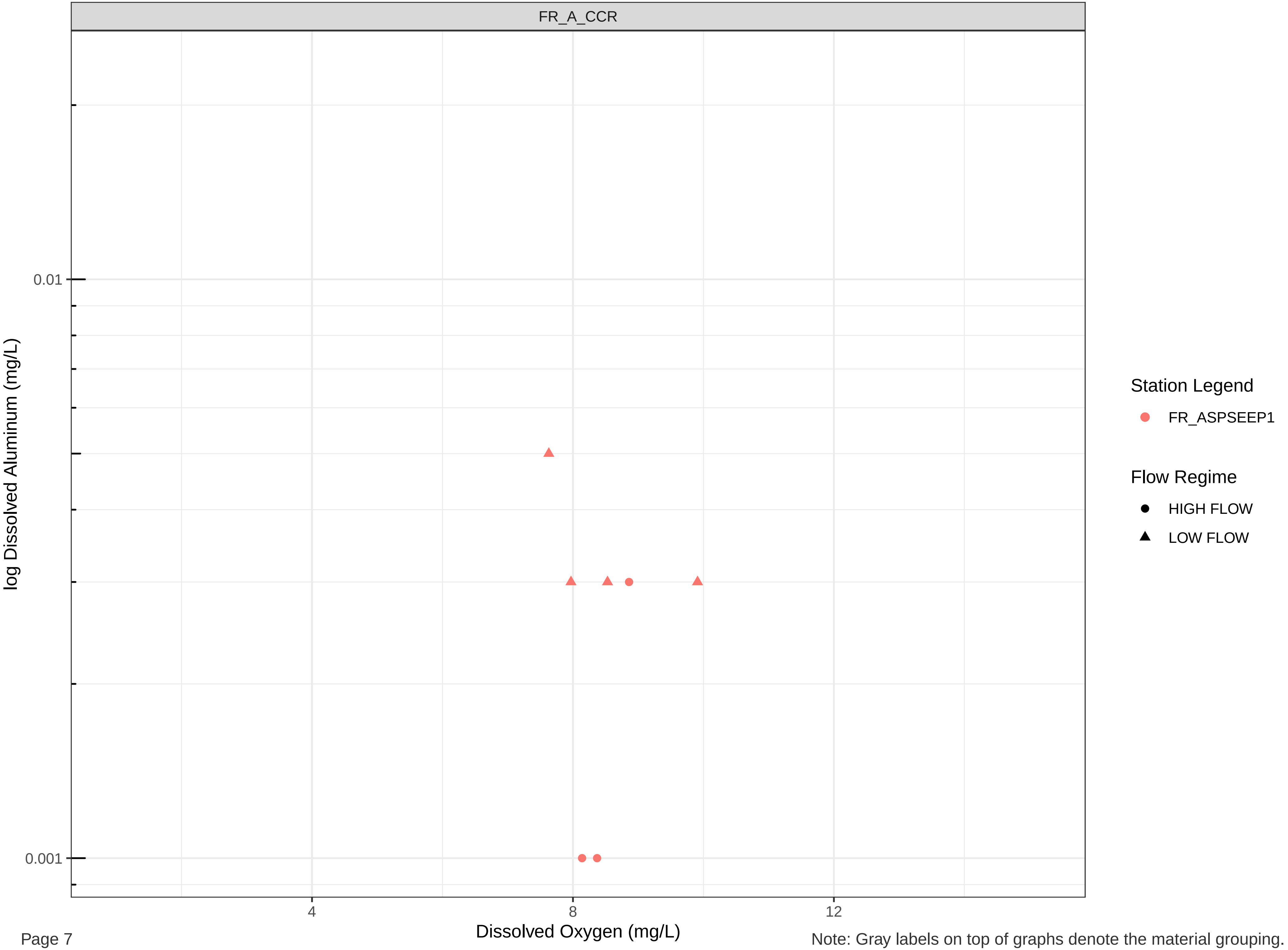

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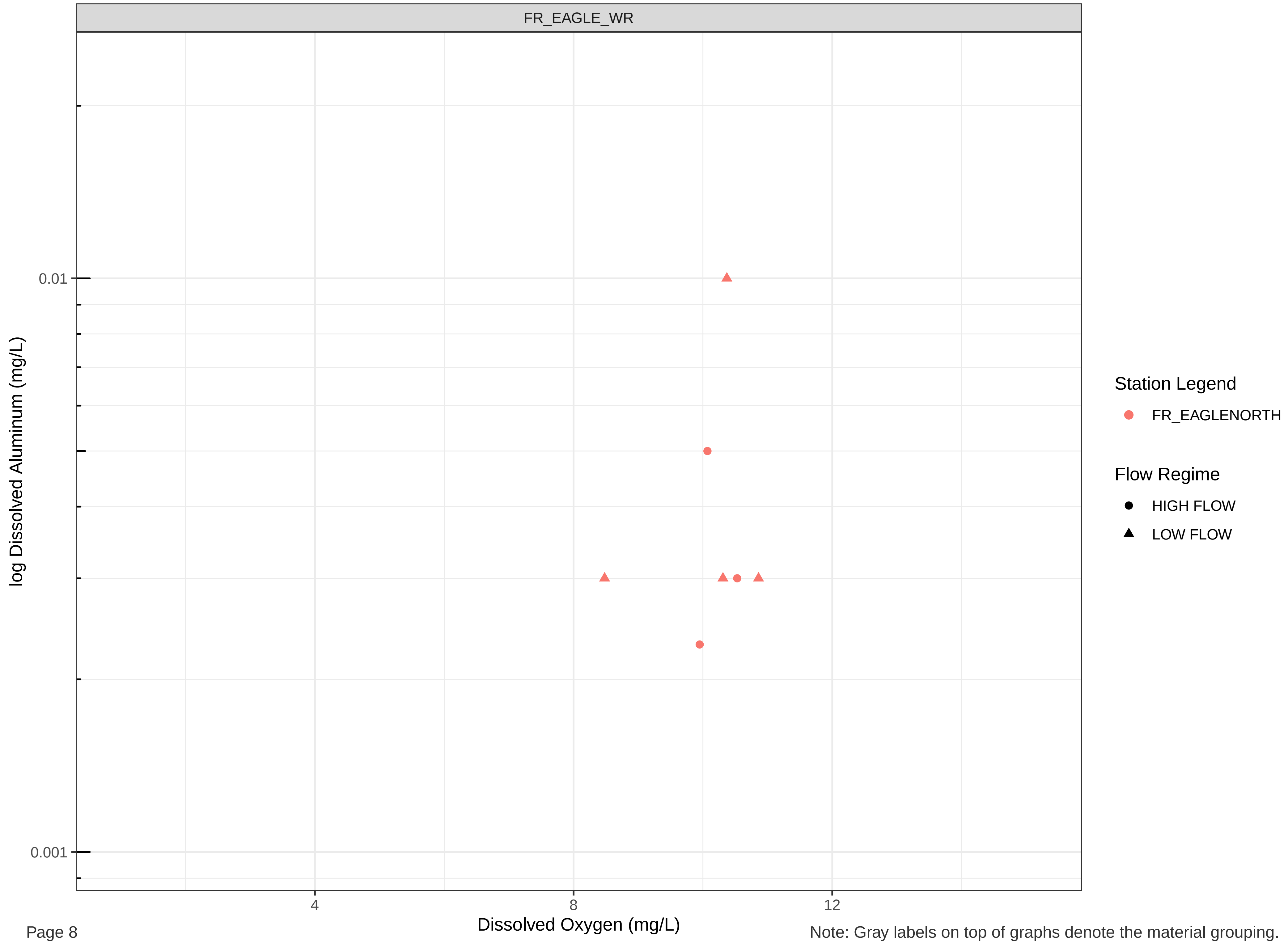

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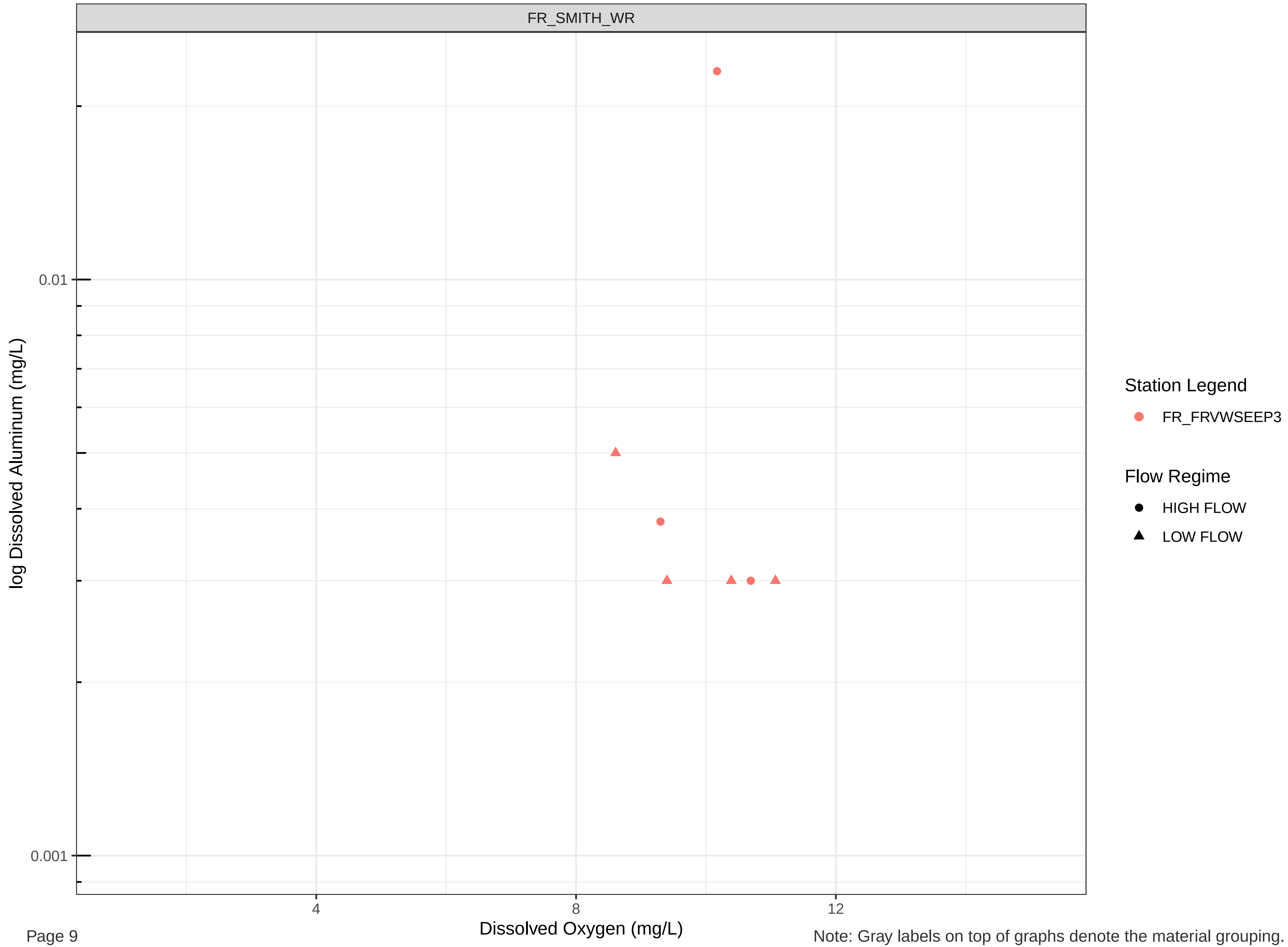

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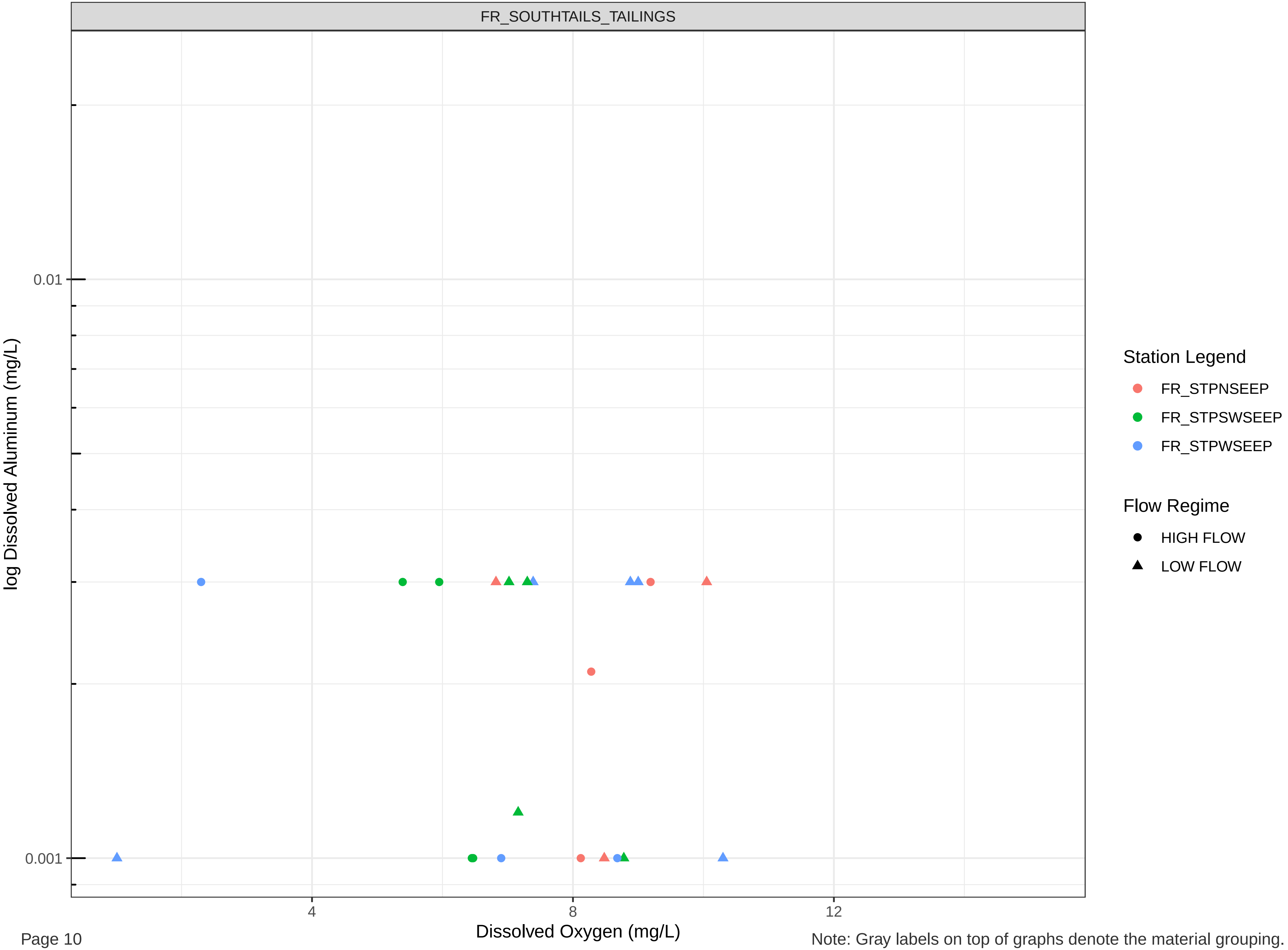

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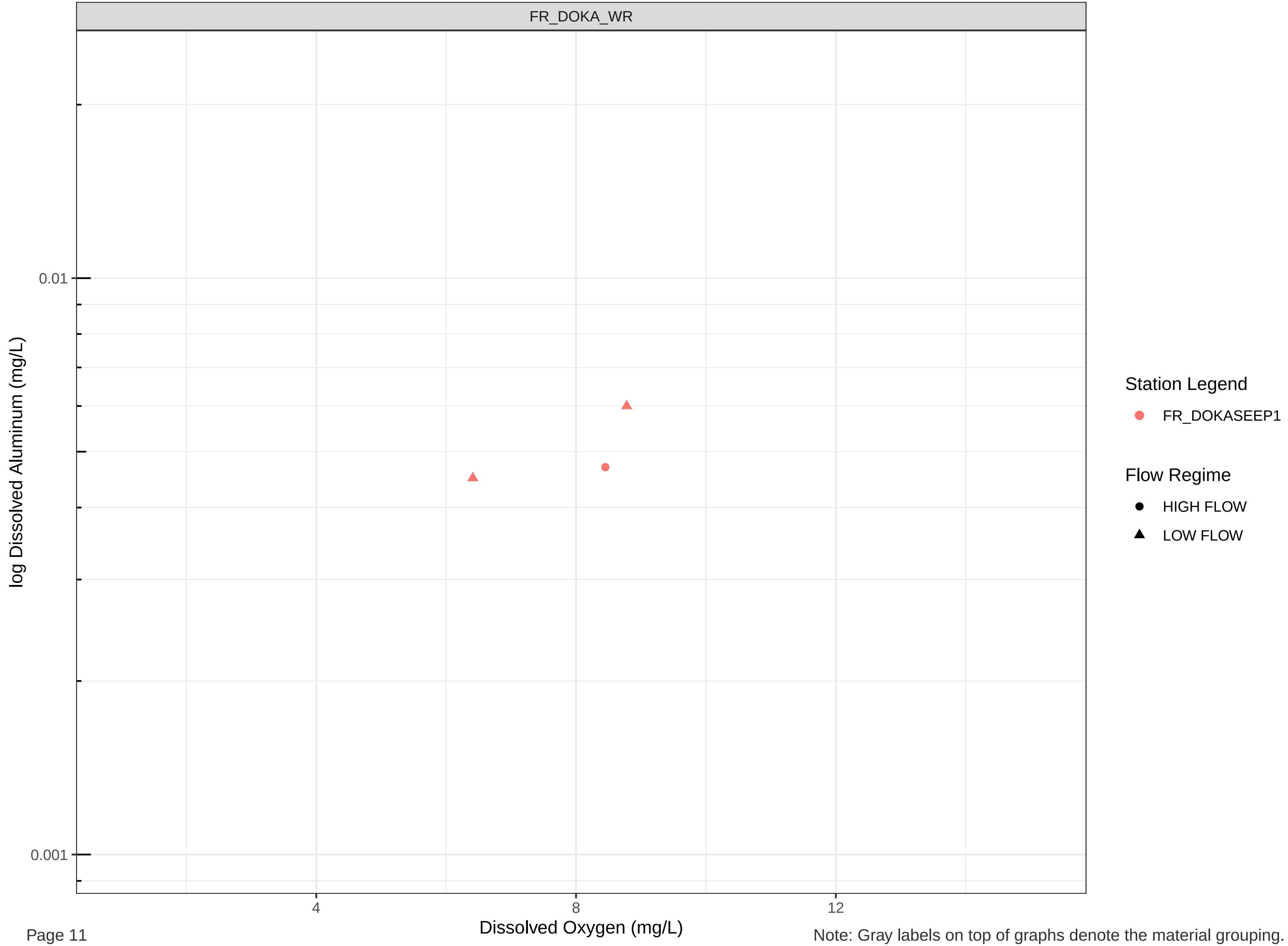

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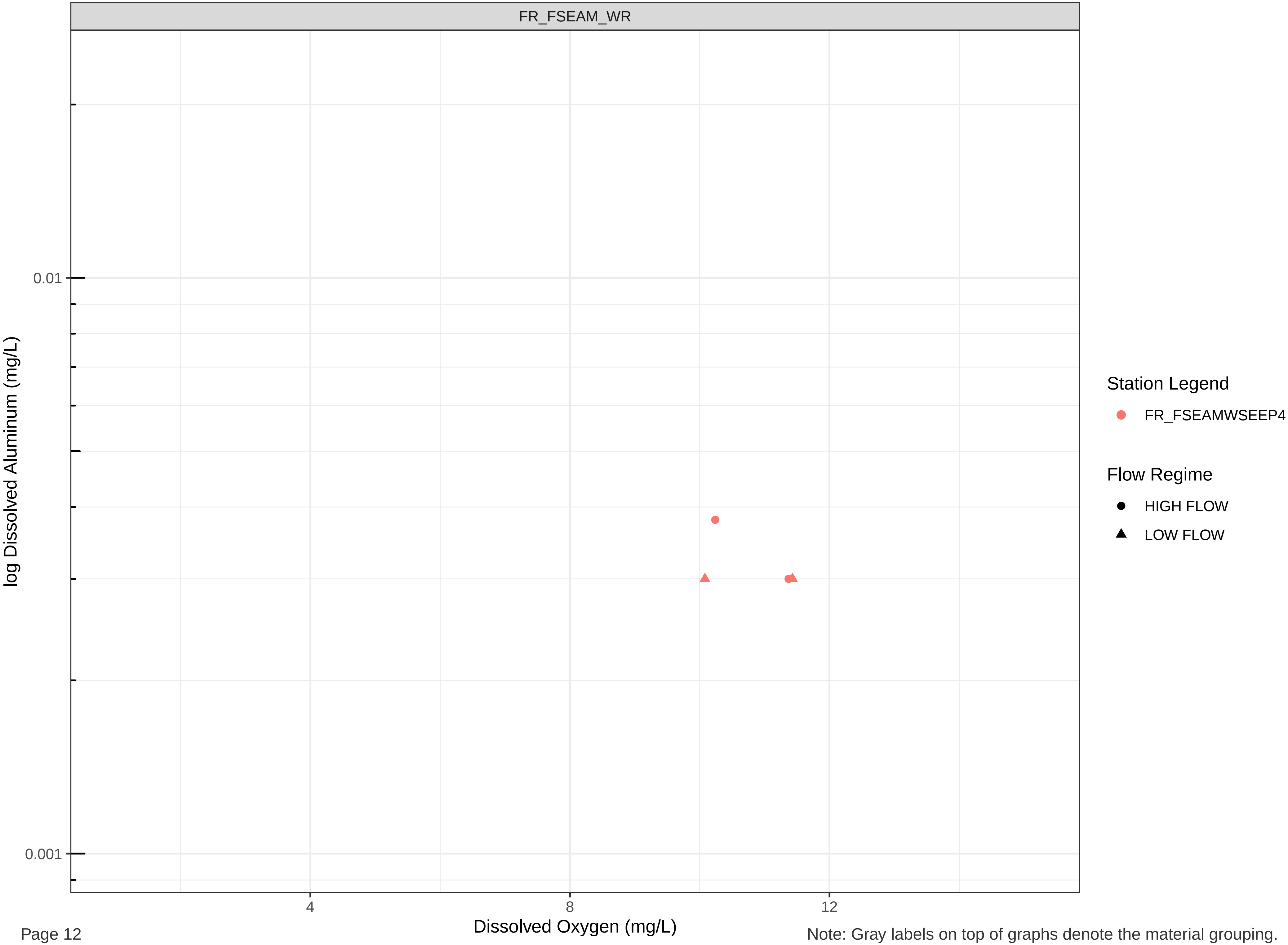

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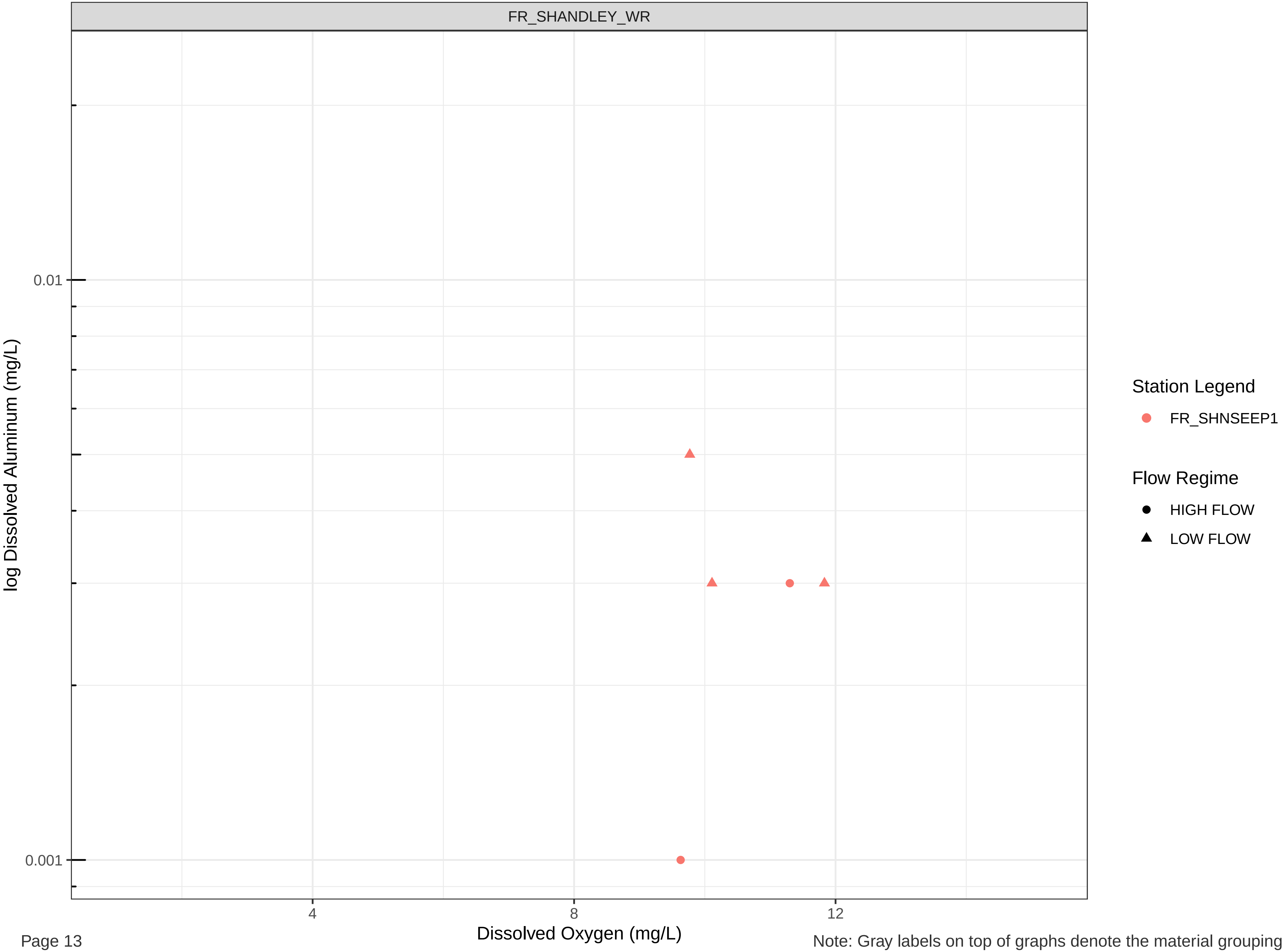

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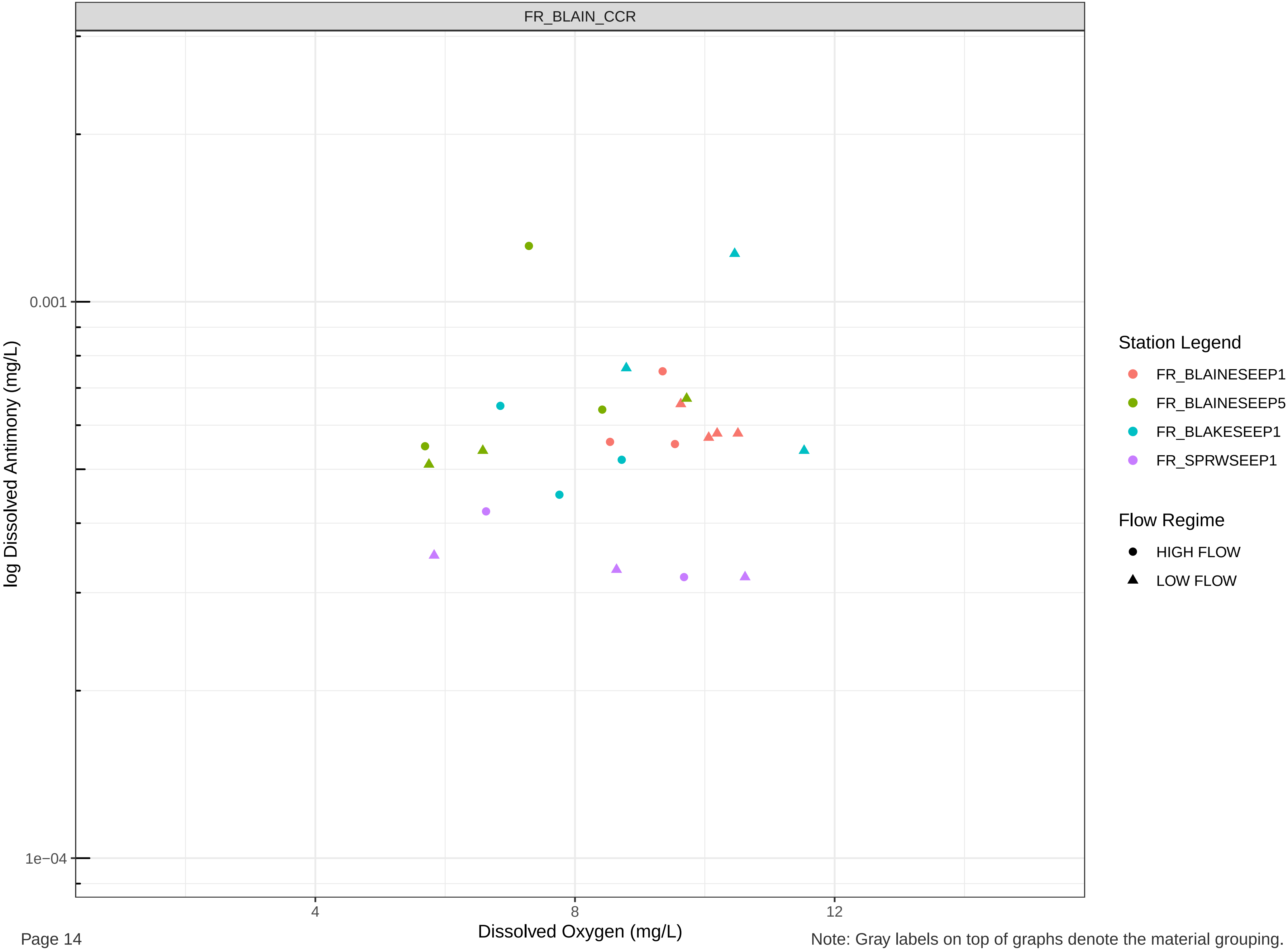

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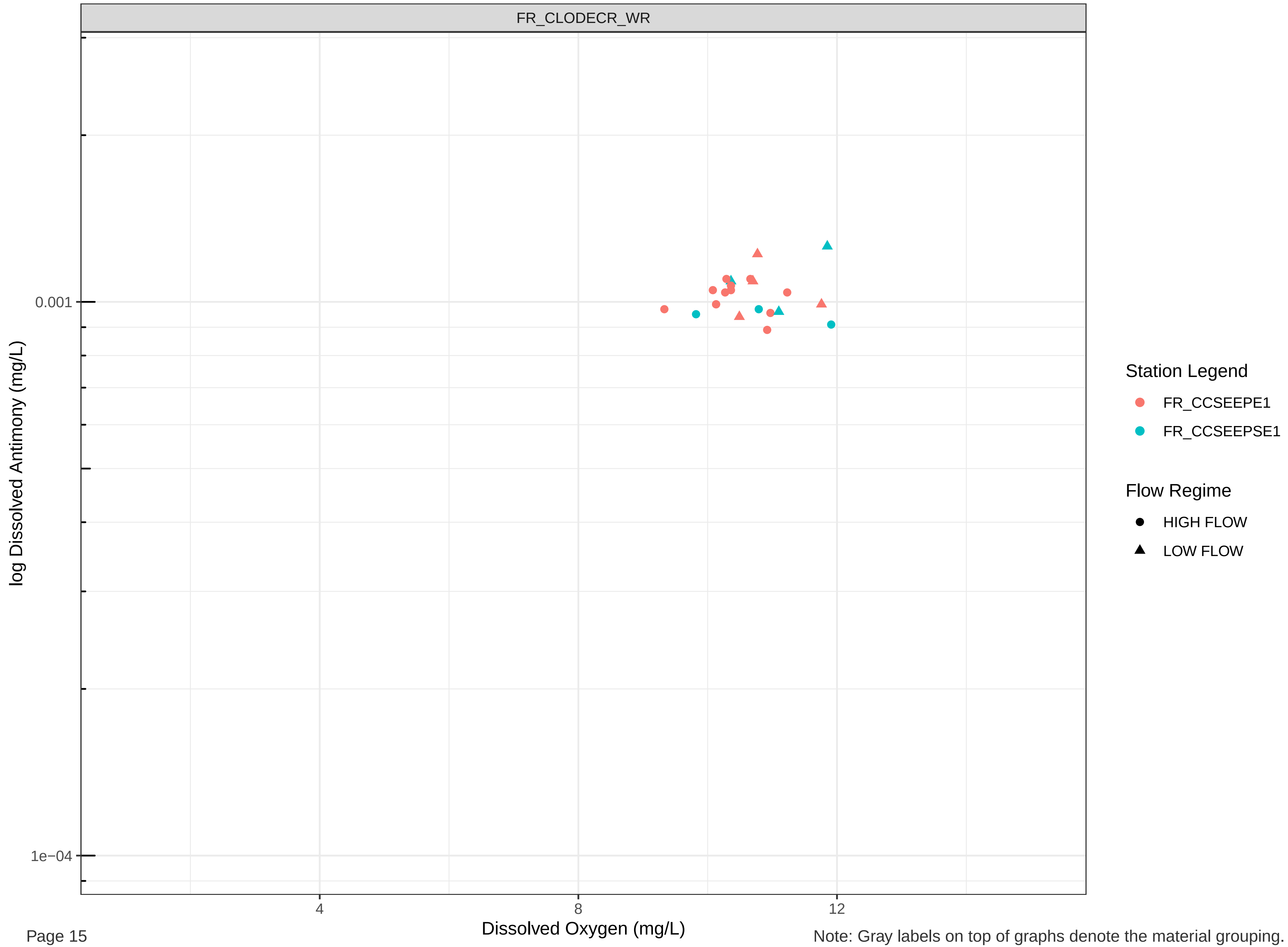

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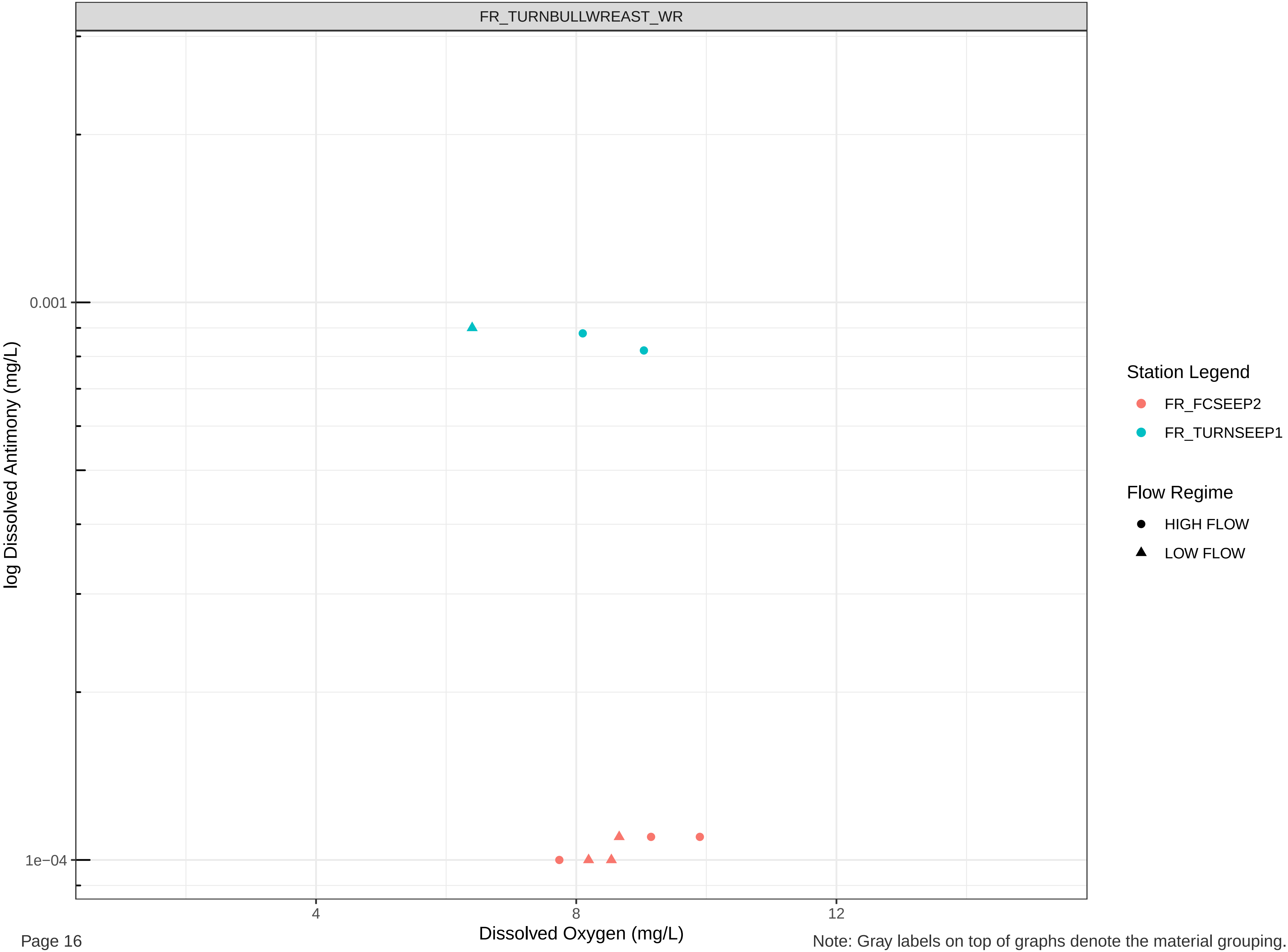

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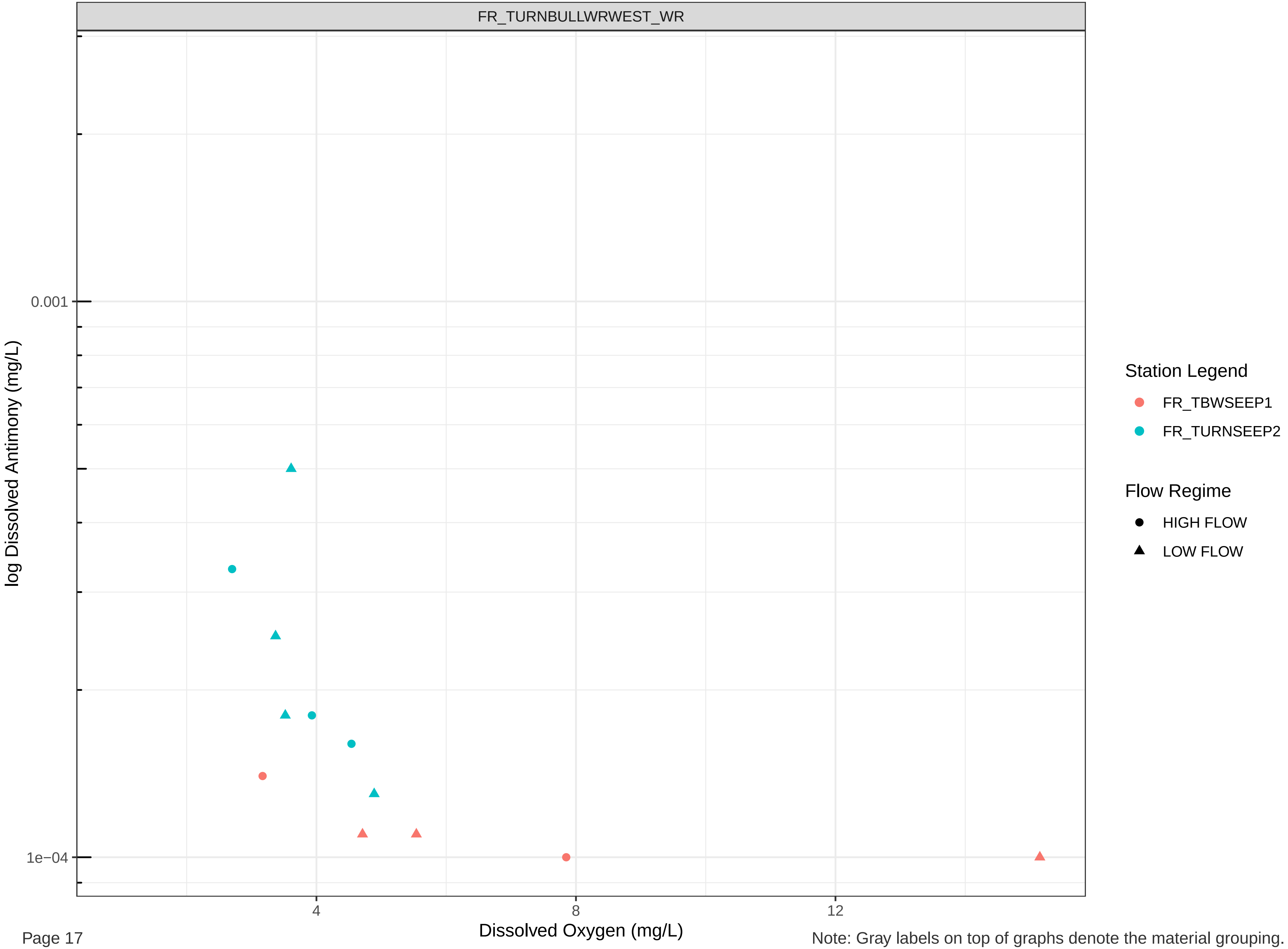

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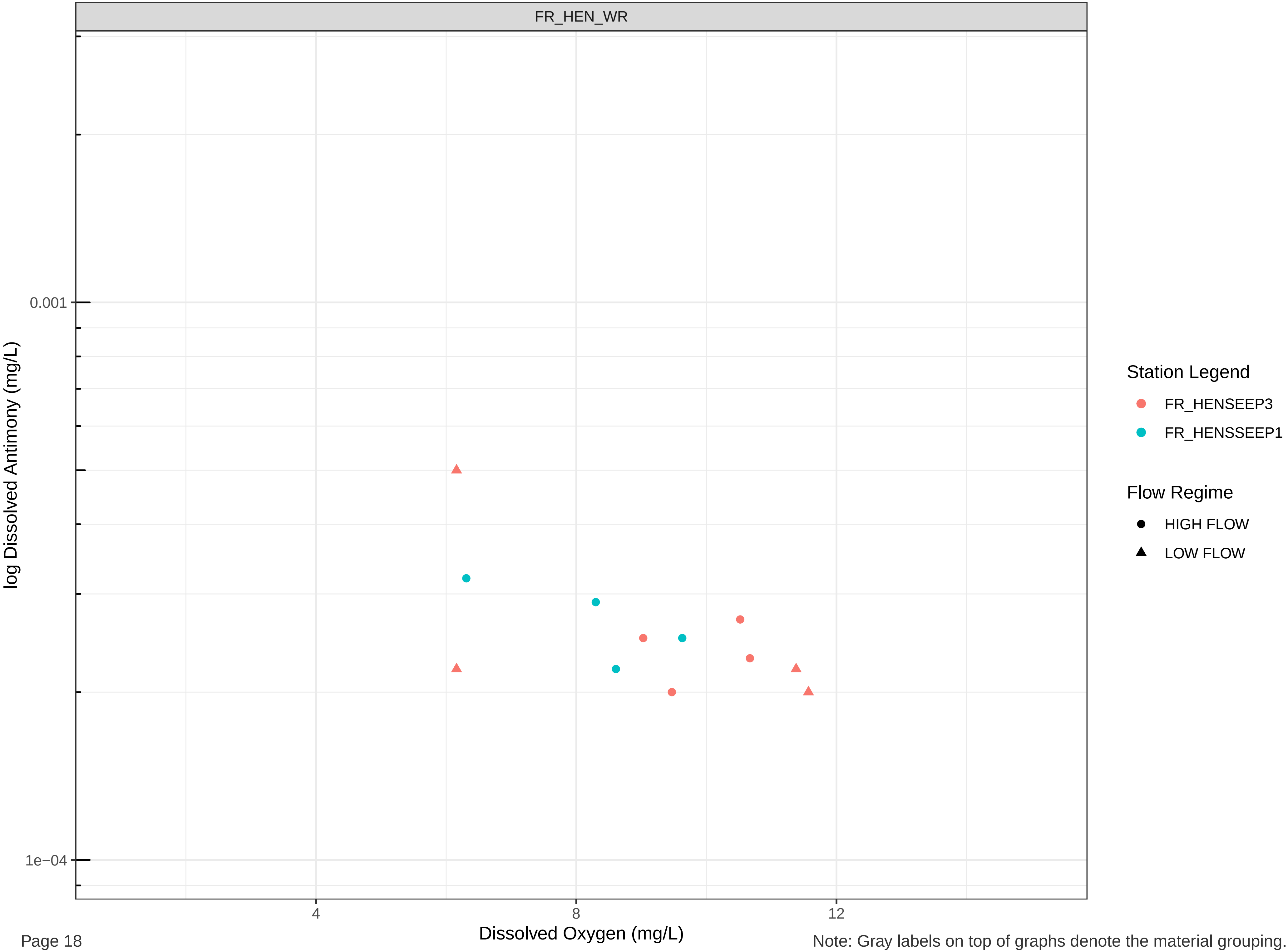

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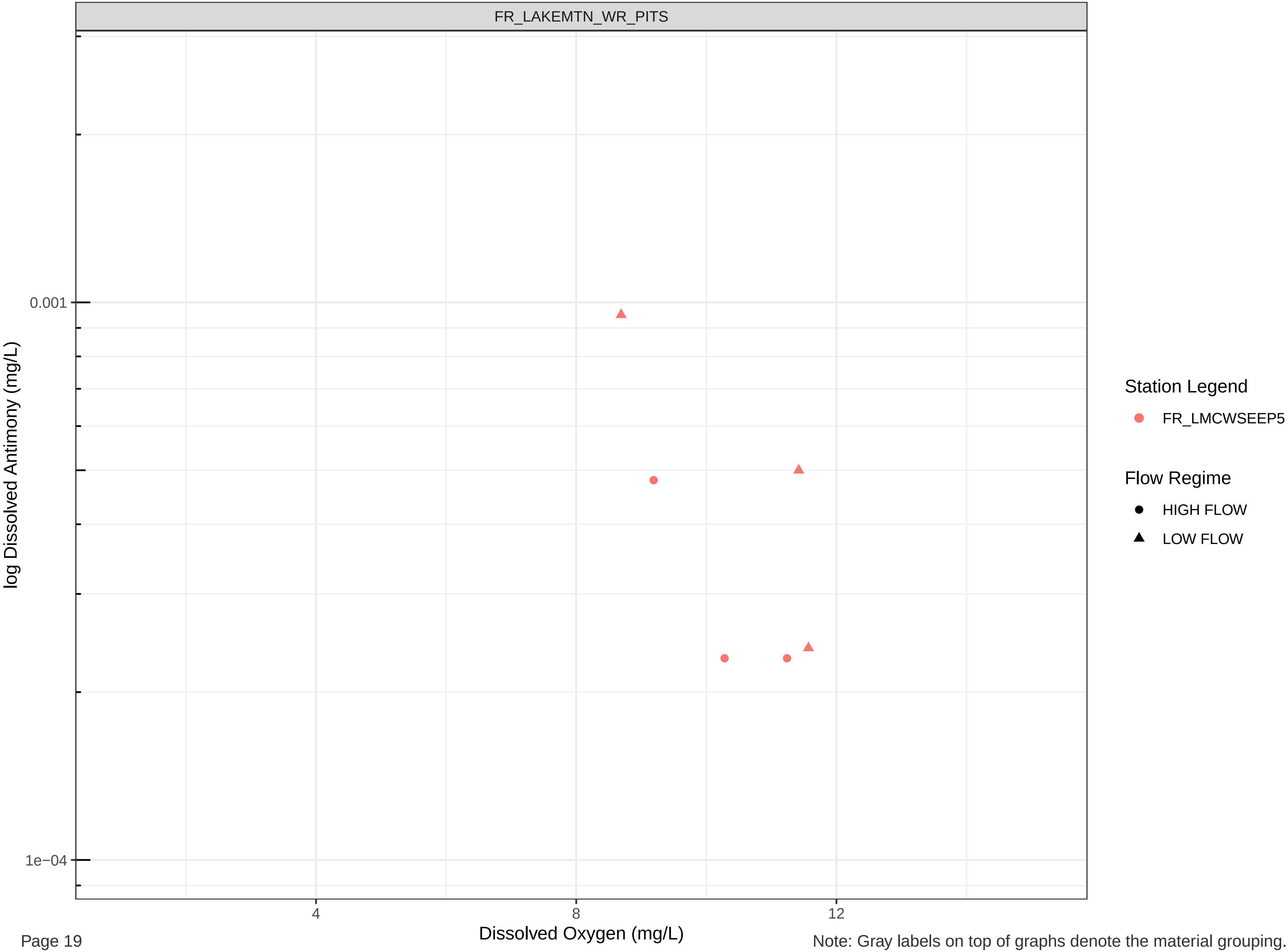

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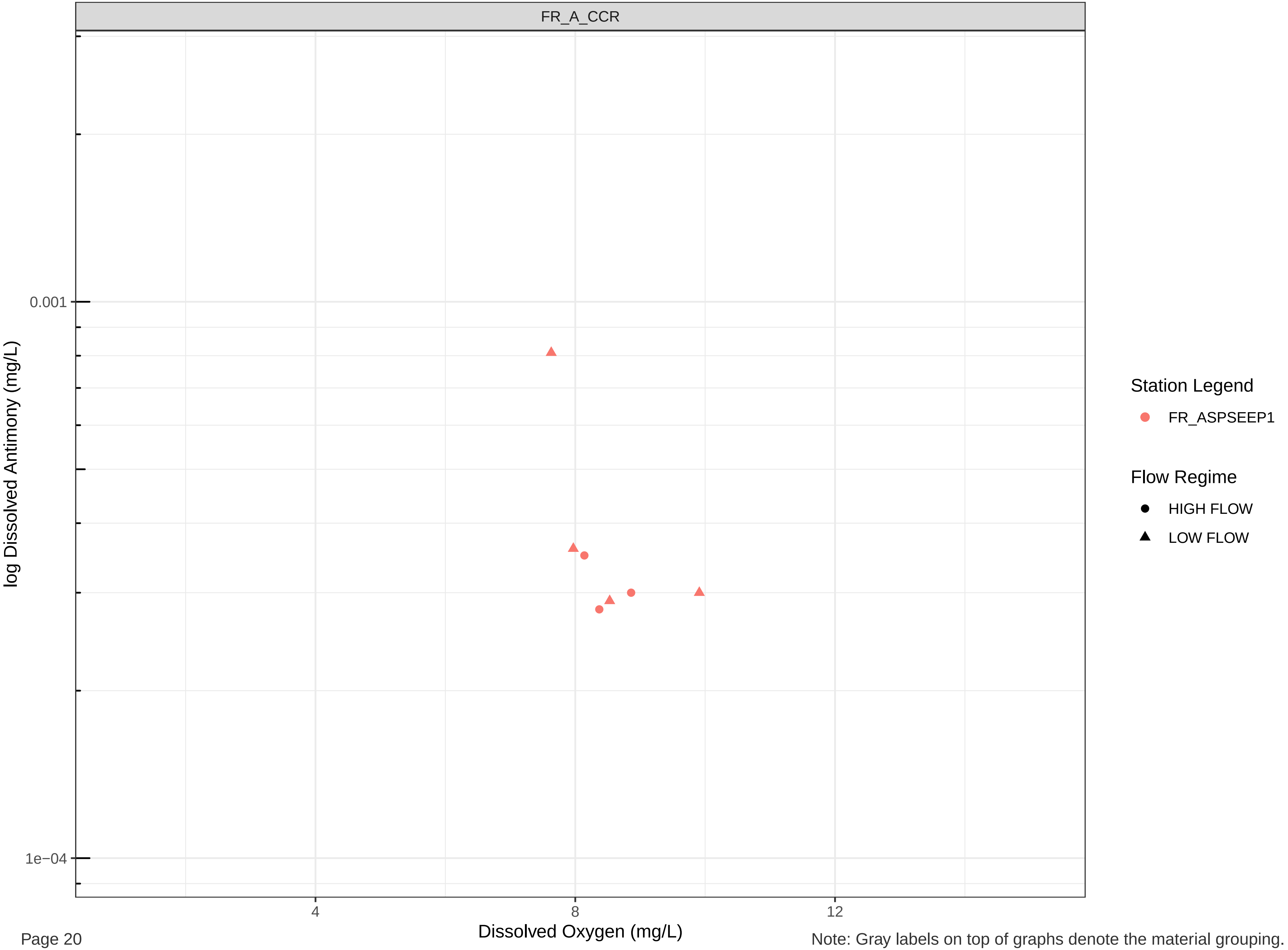

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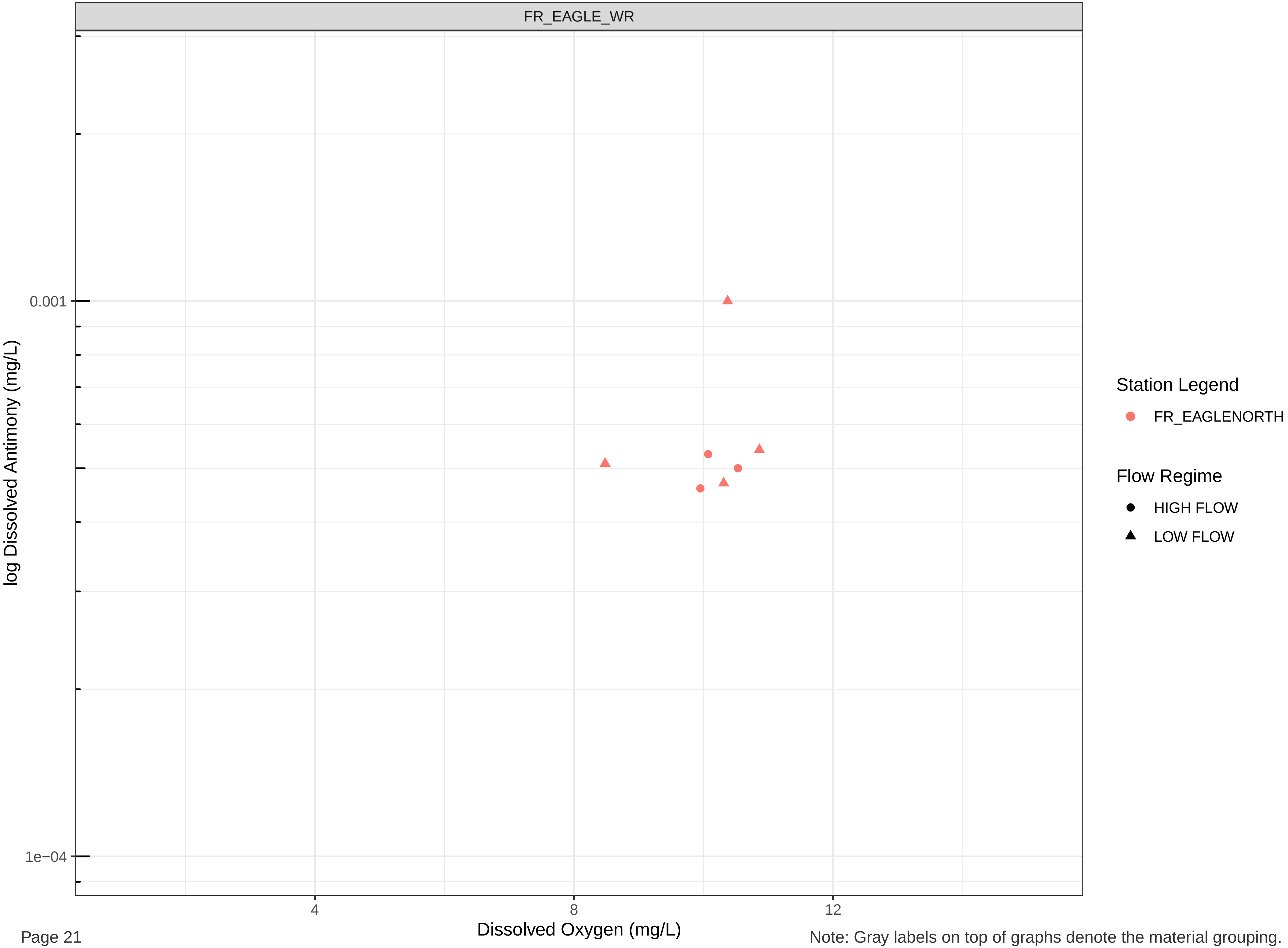

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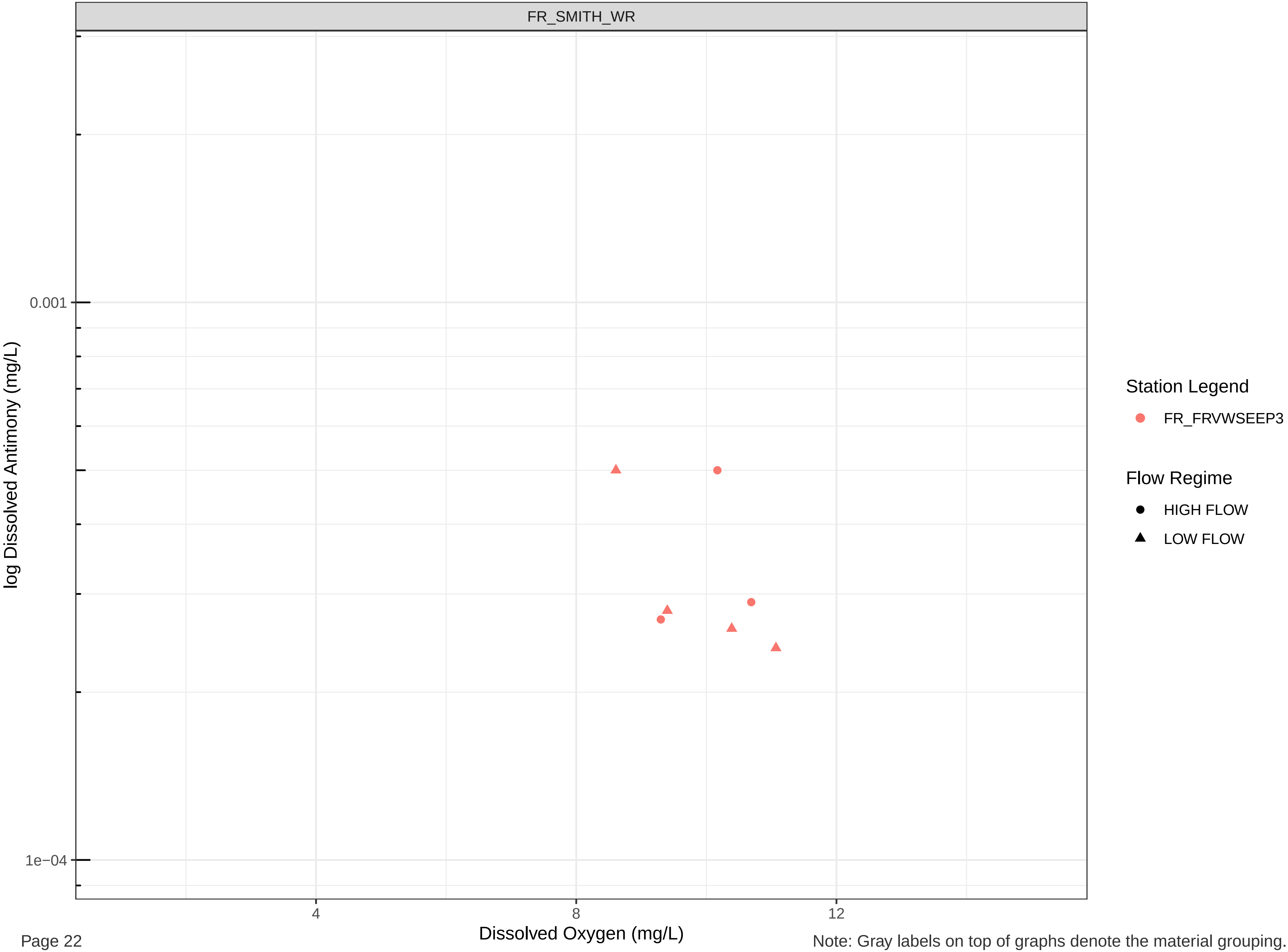

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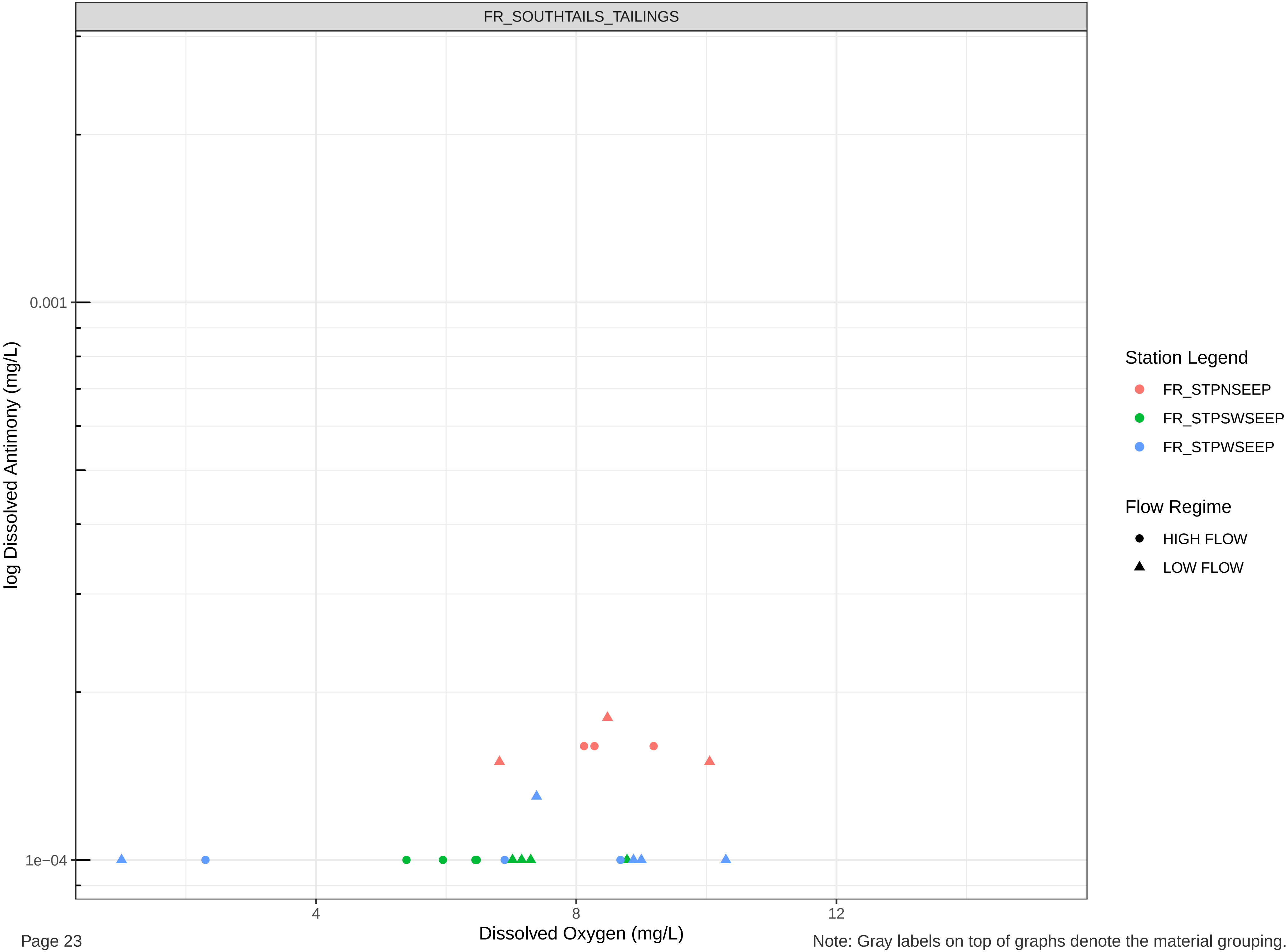

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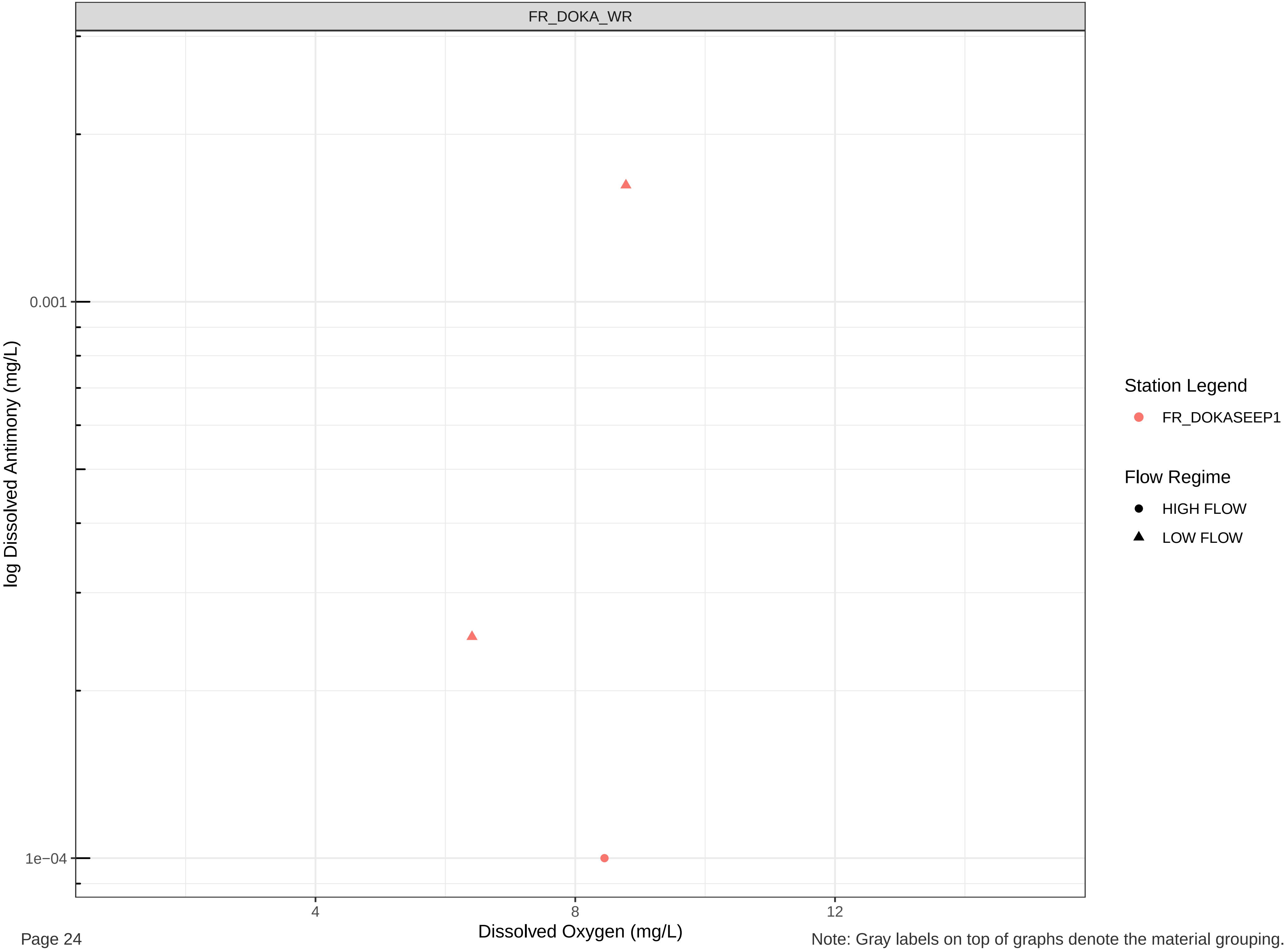

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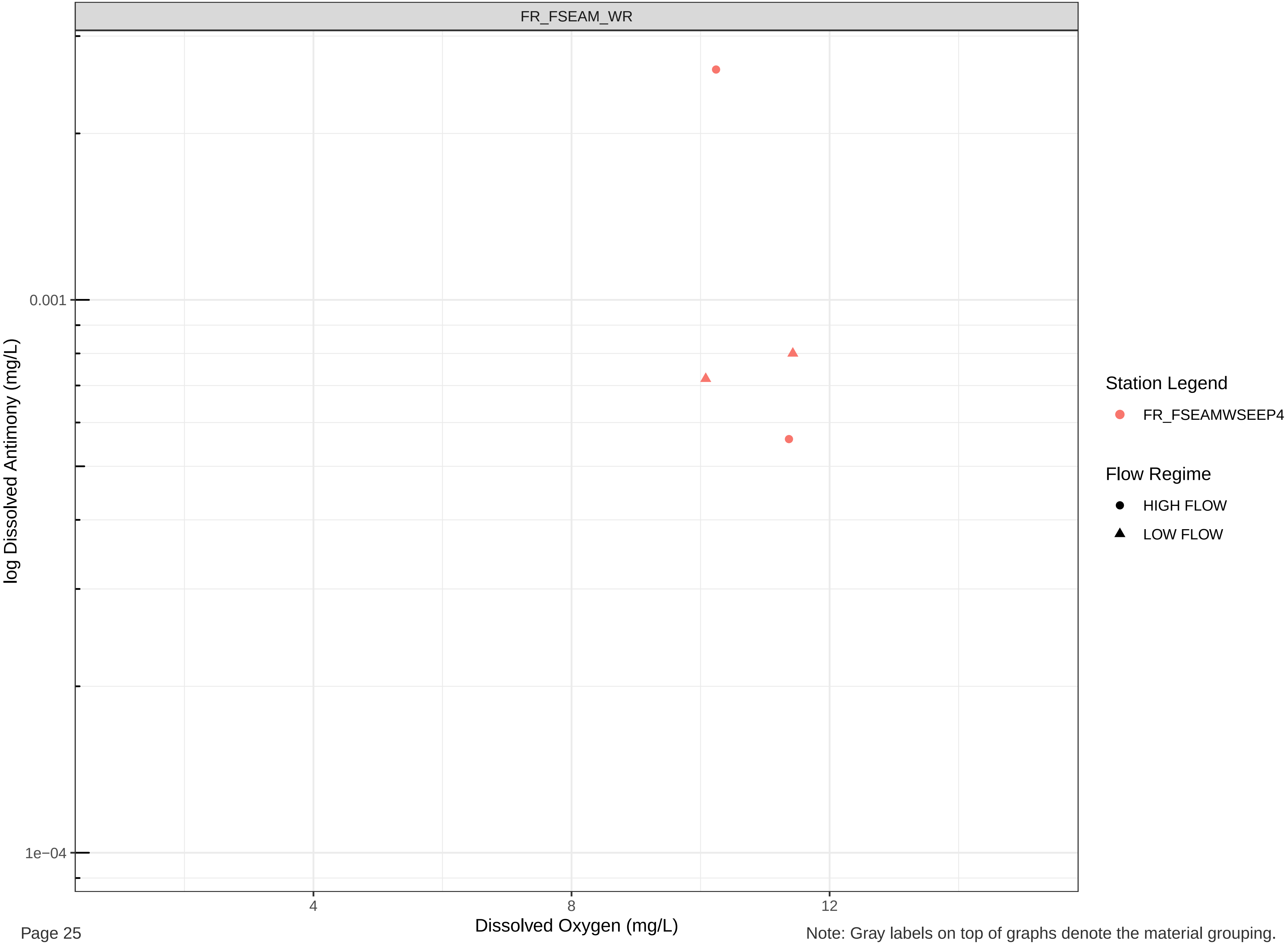

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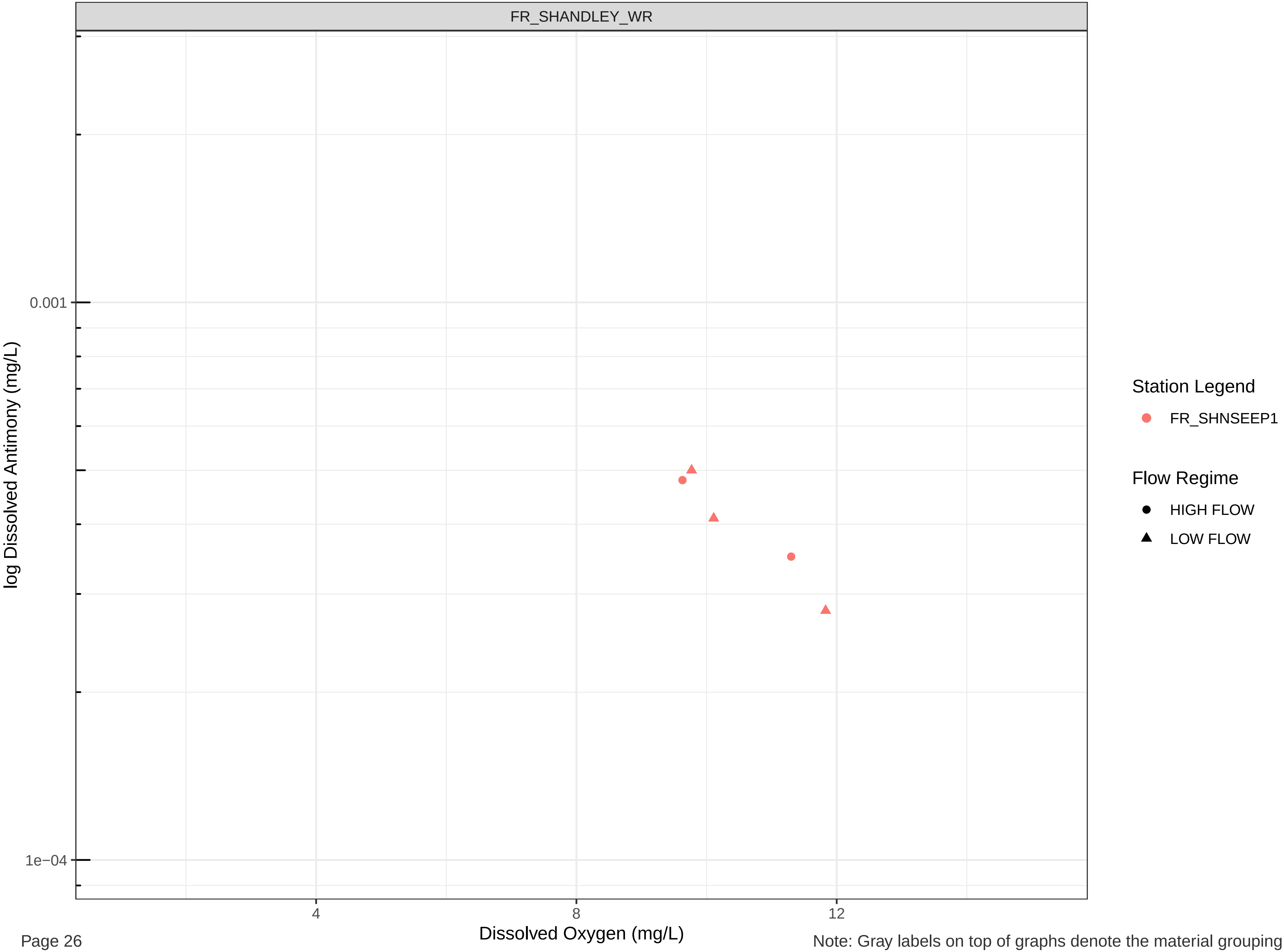

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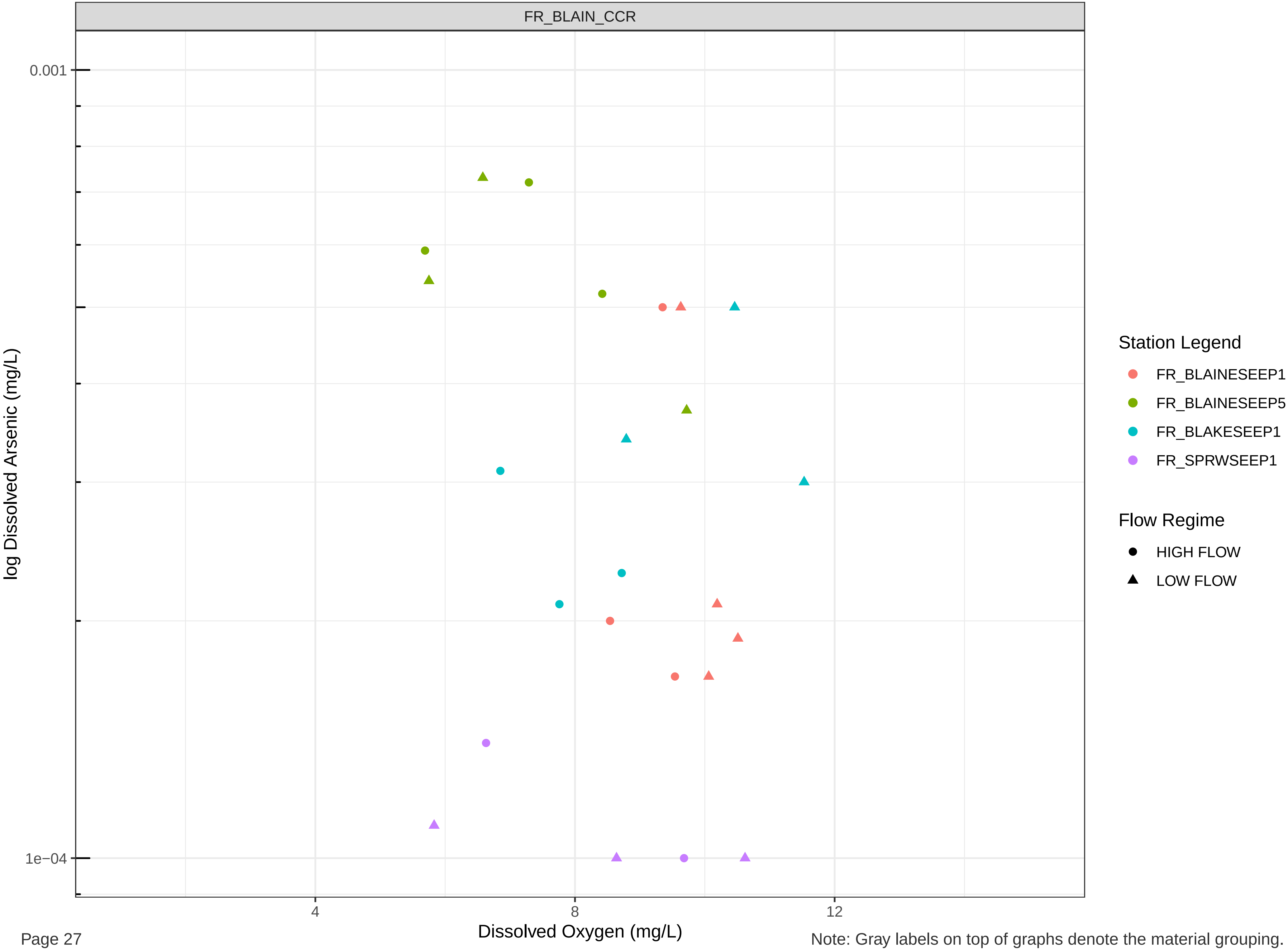
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1e−04
log Dissolved Arsenic (mg/L)
4
8
12
Dissolved Oxygen (mg/L)
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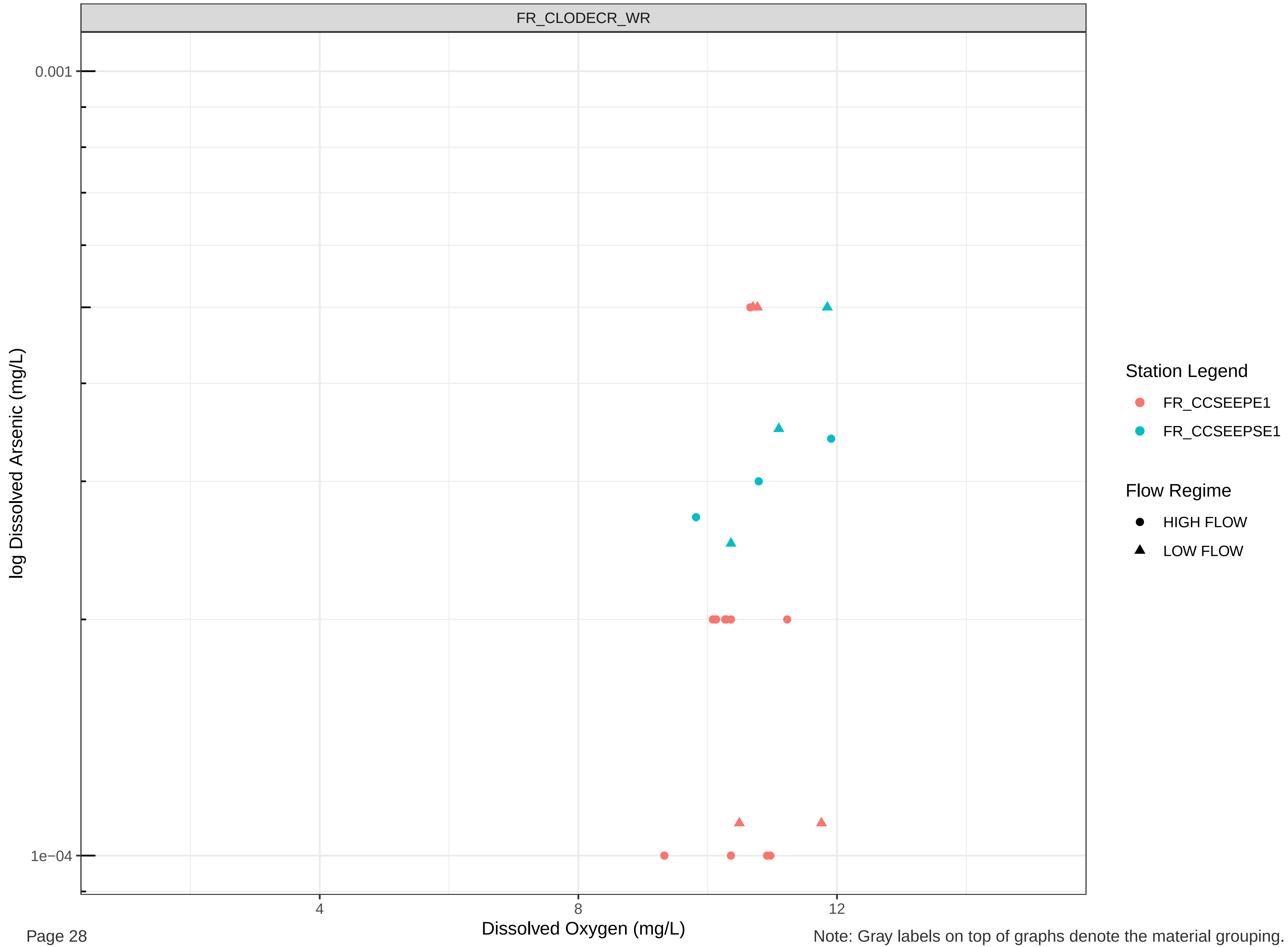

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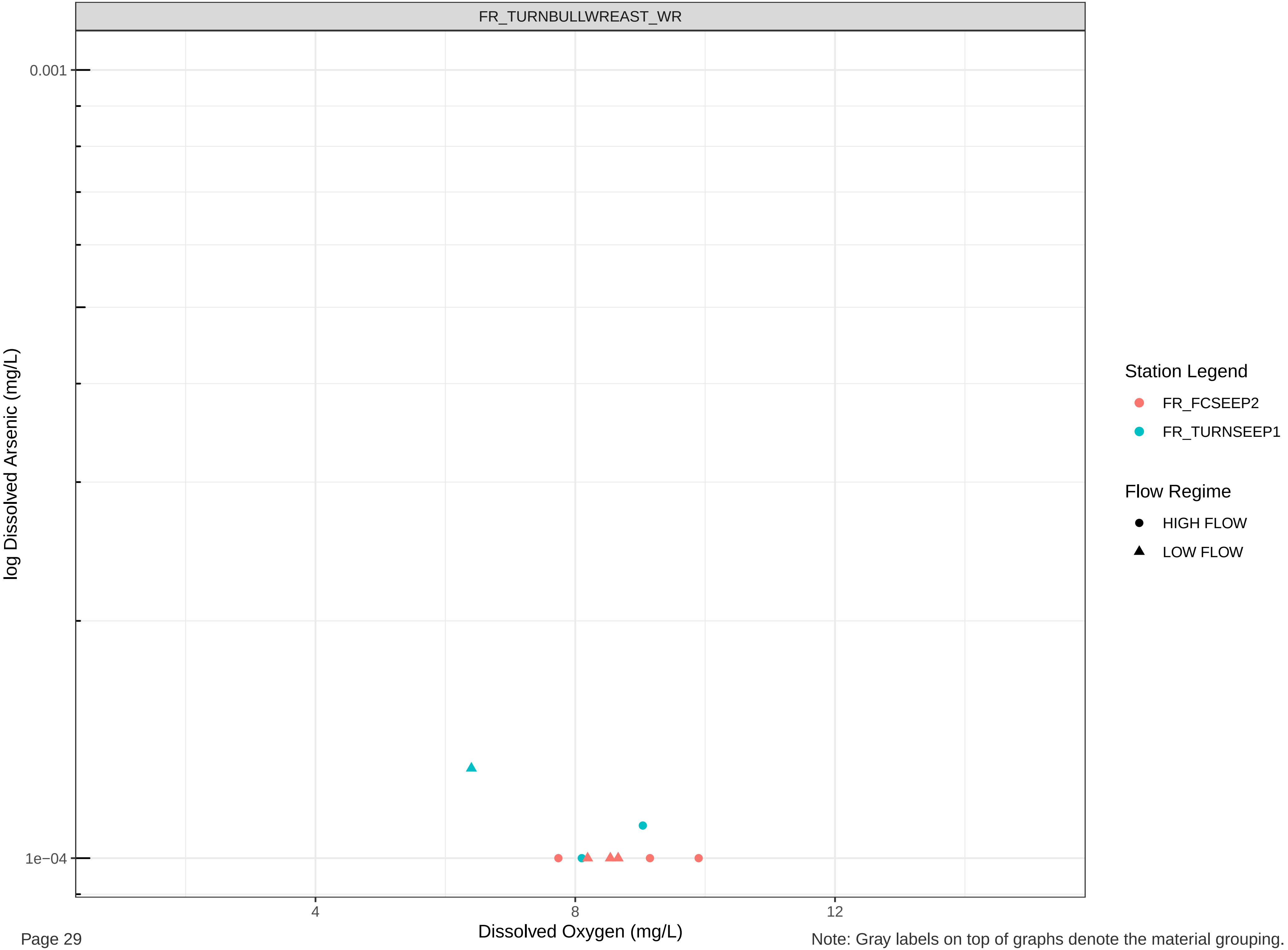

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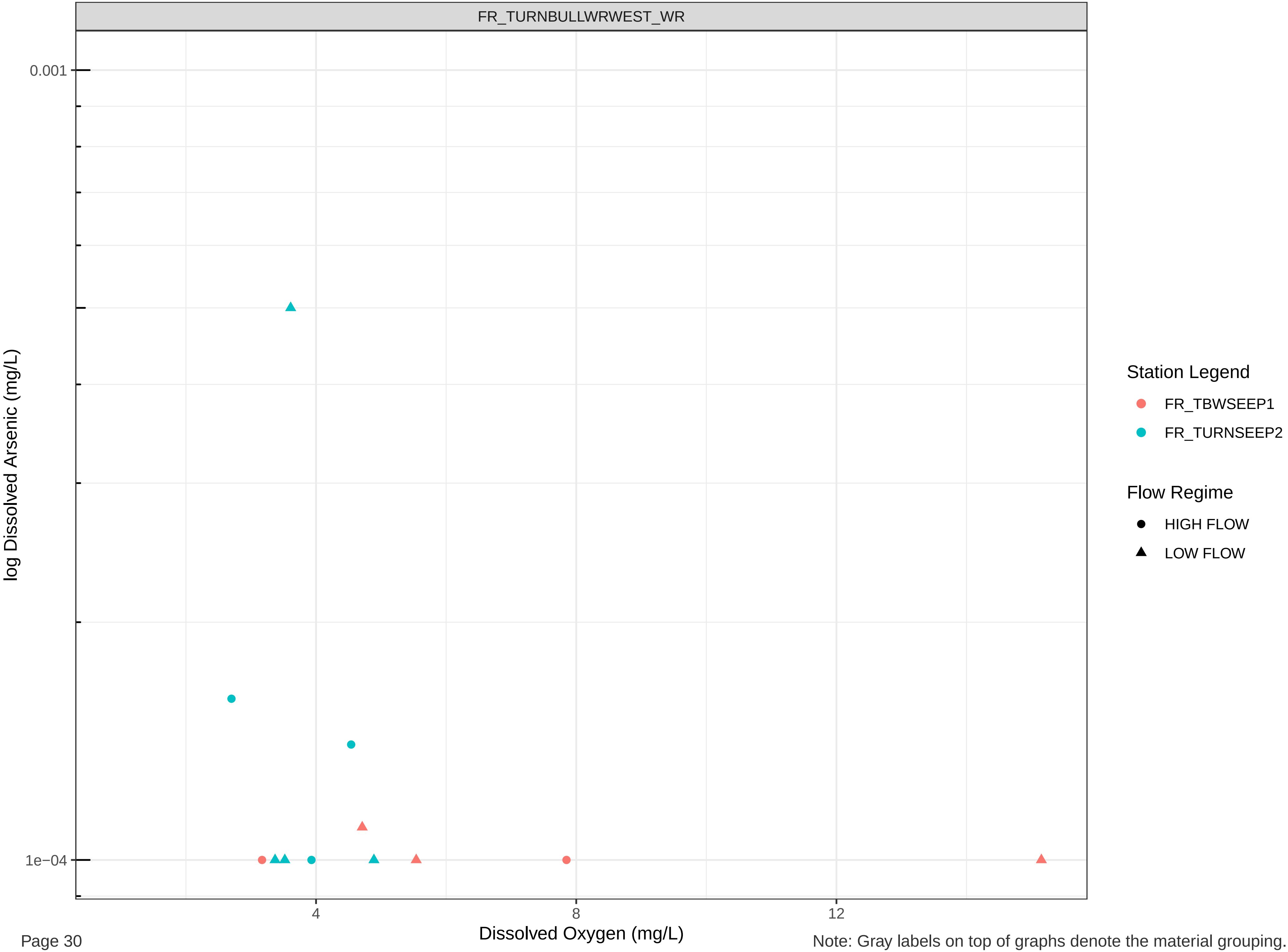

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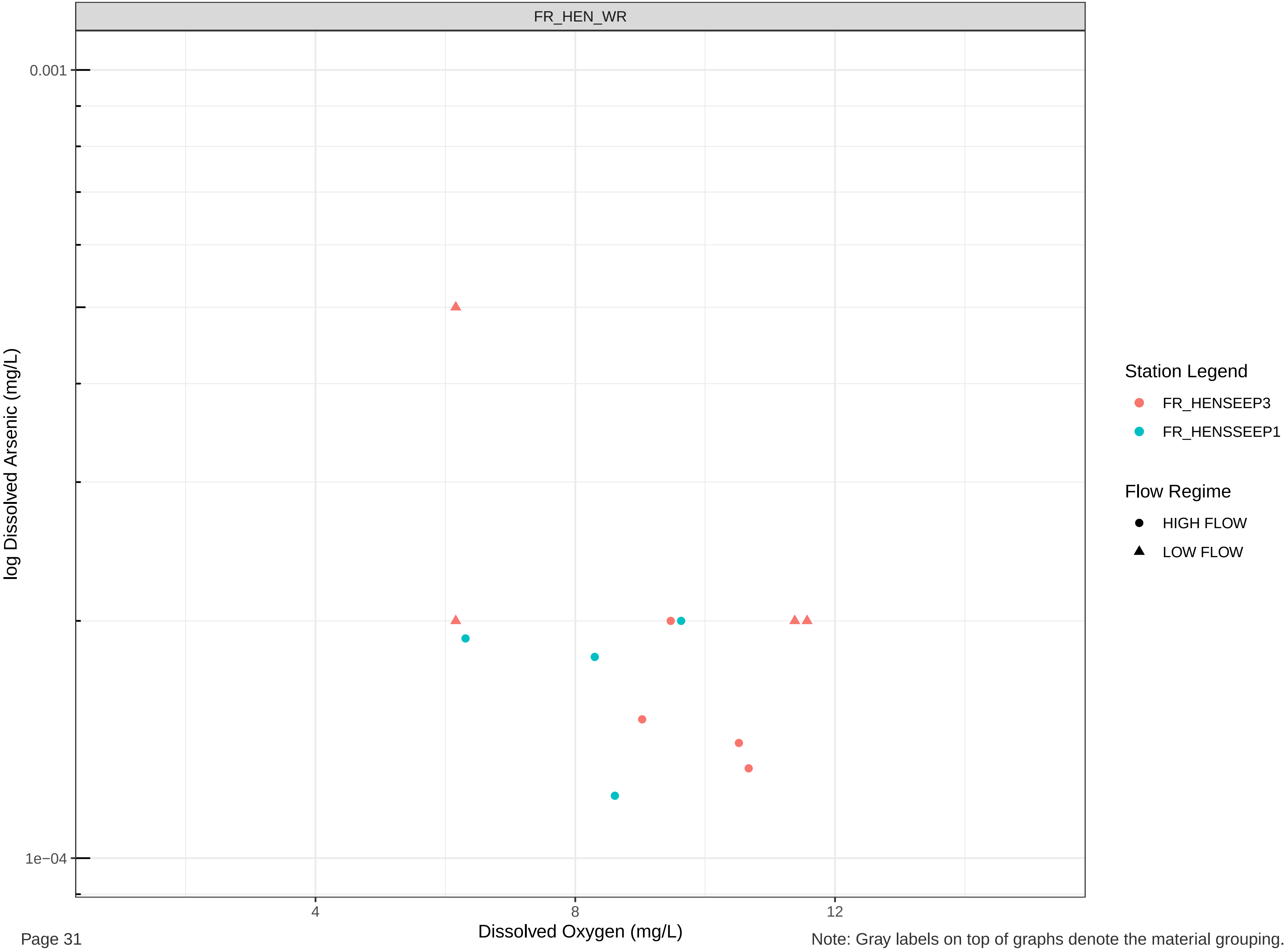

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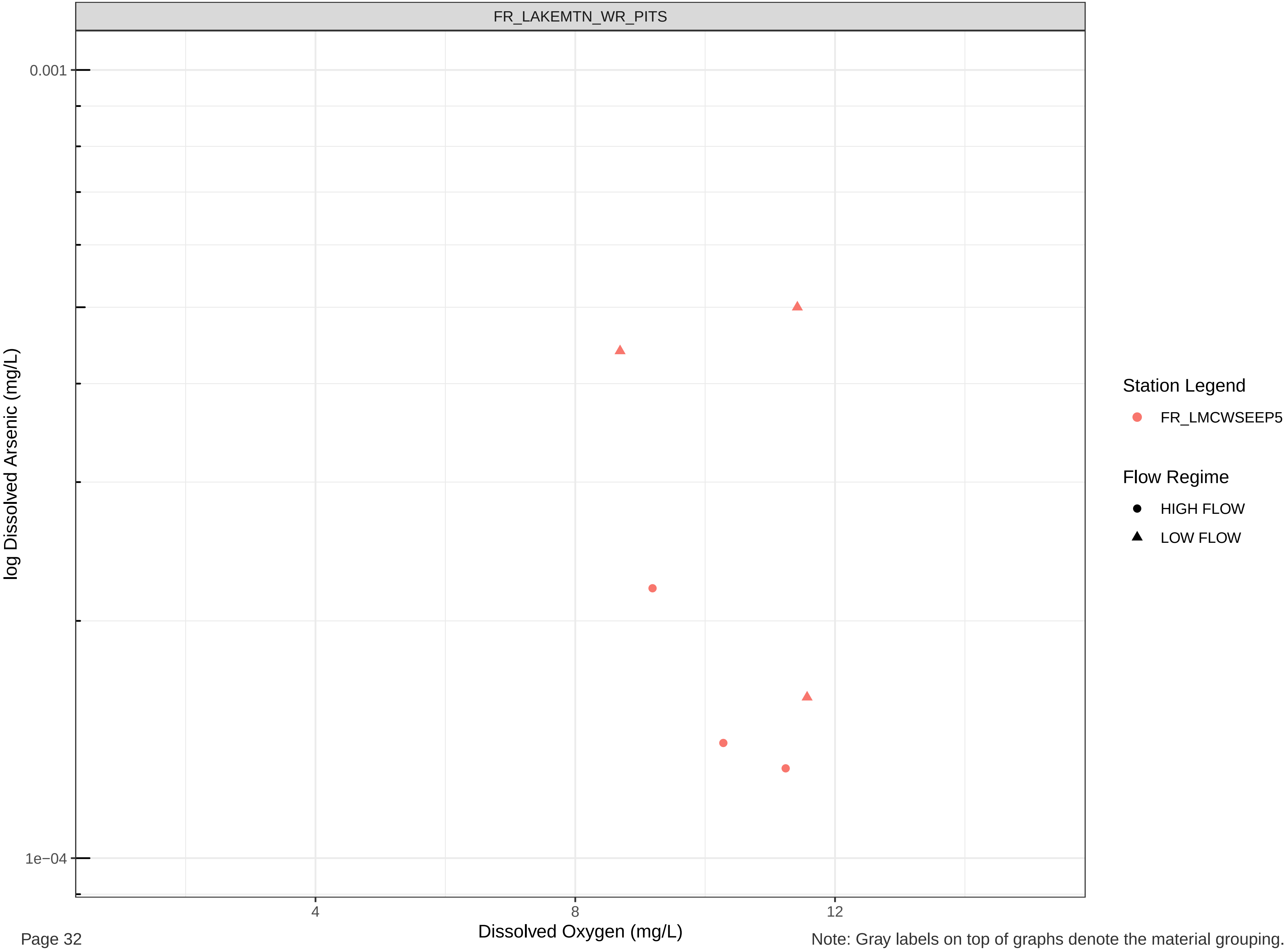

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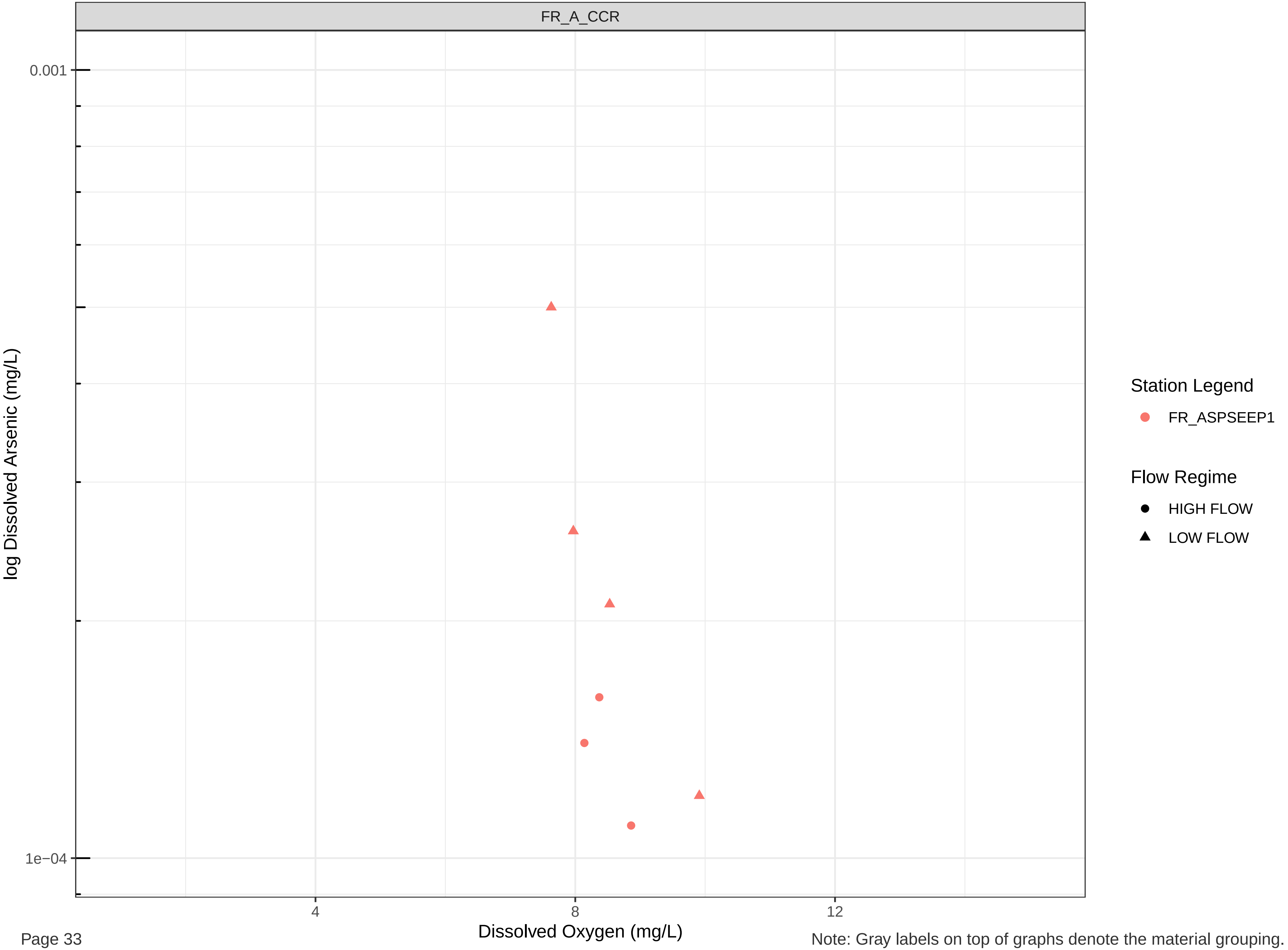

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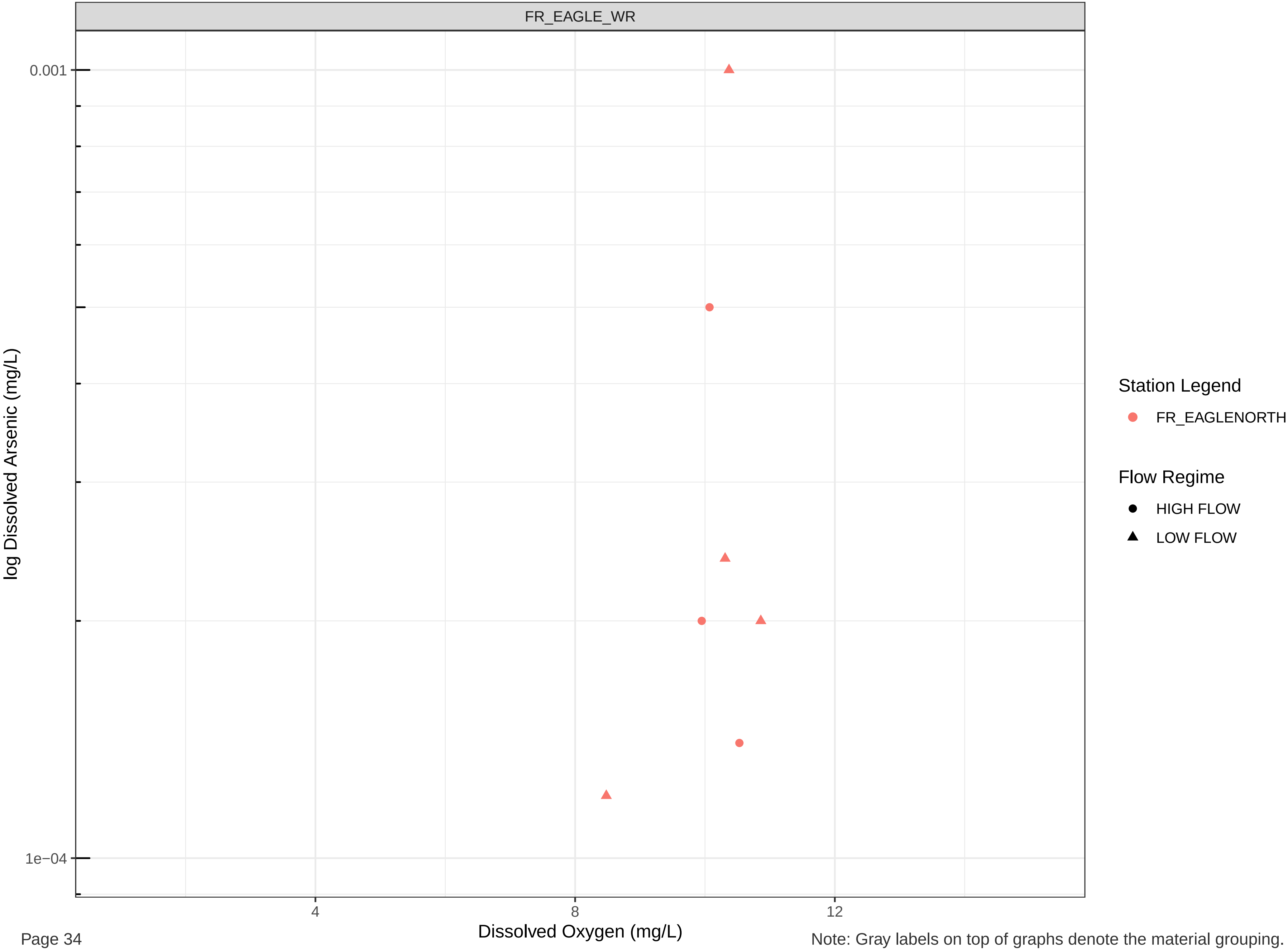

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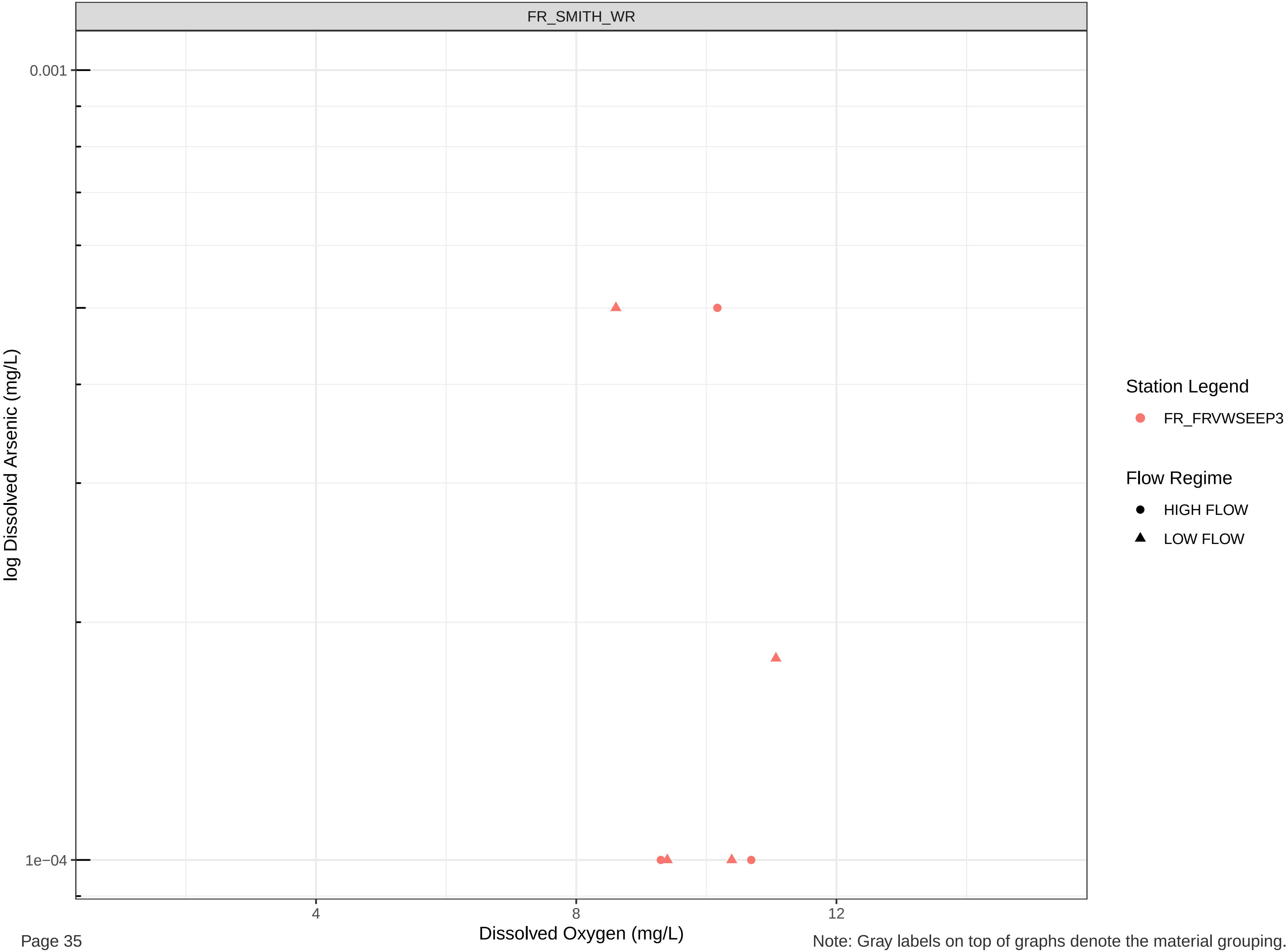

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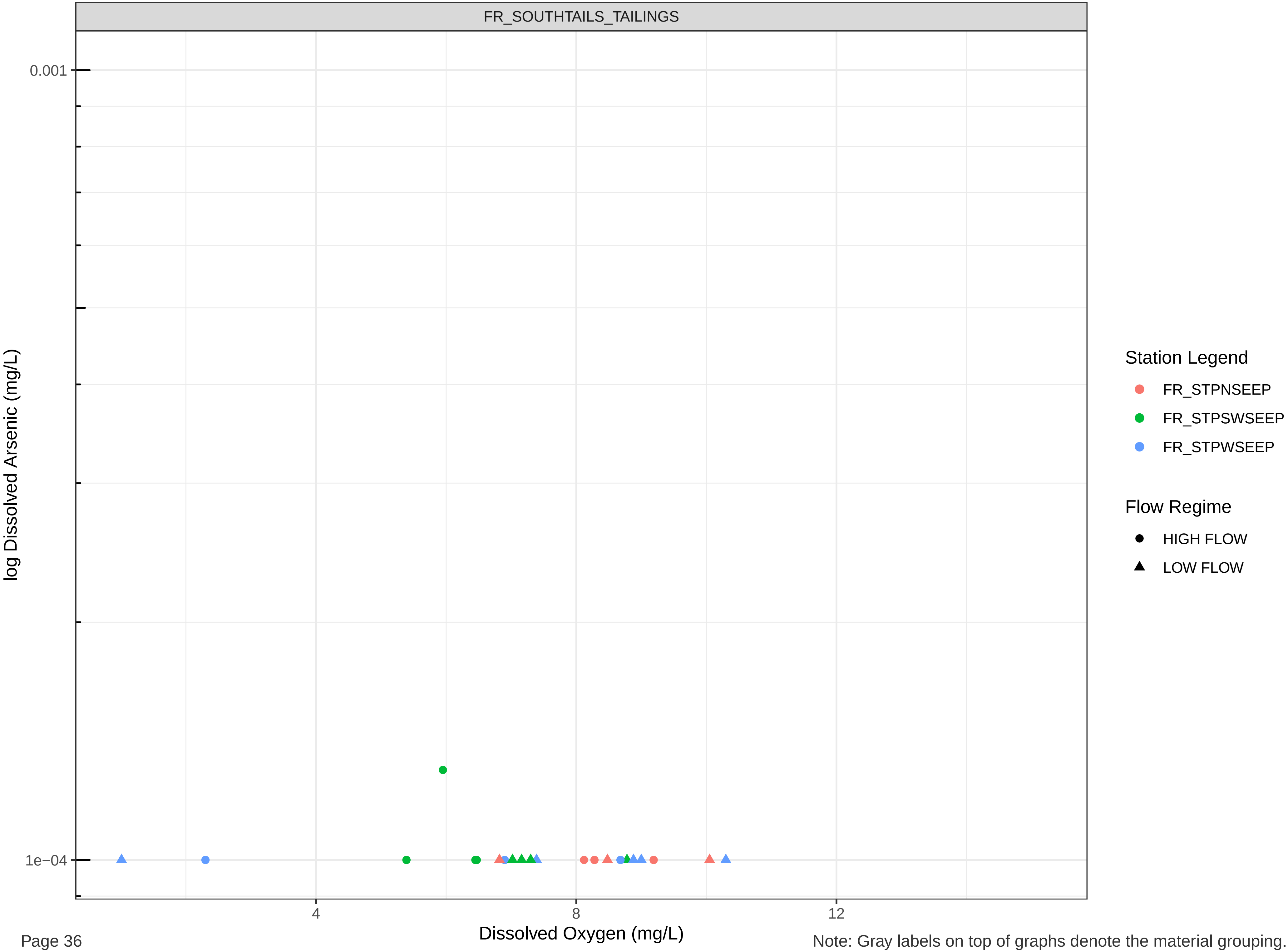

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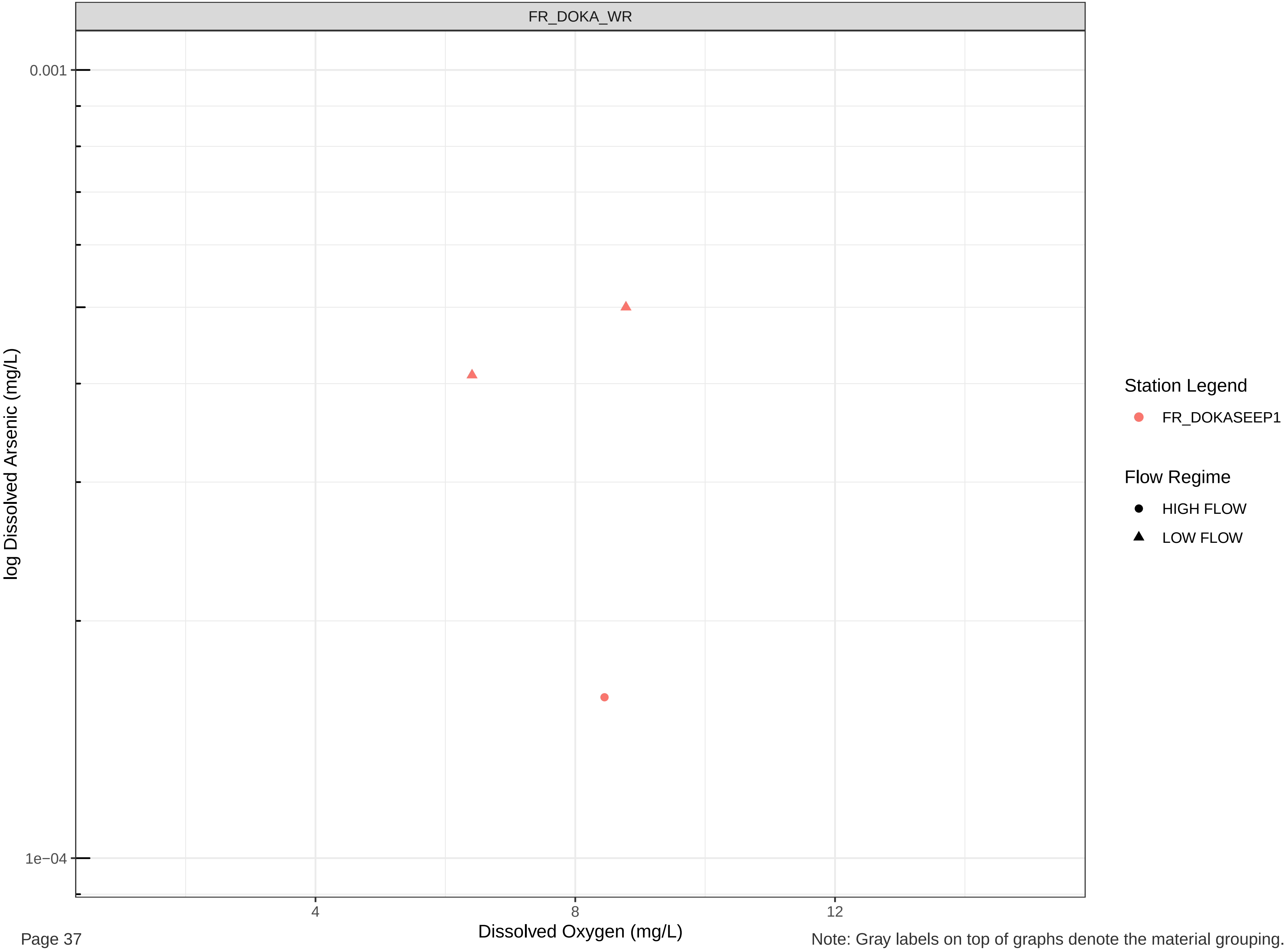

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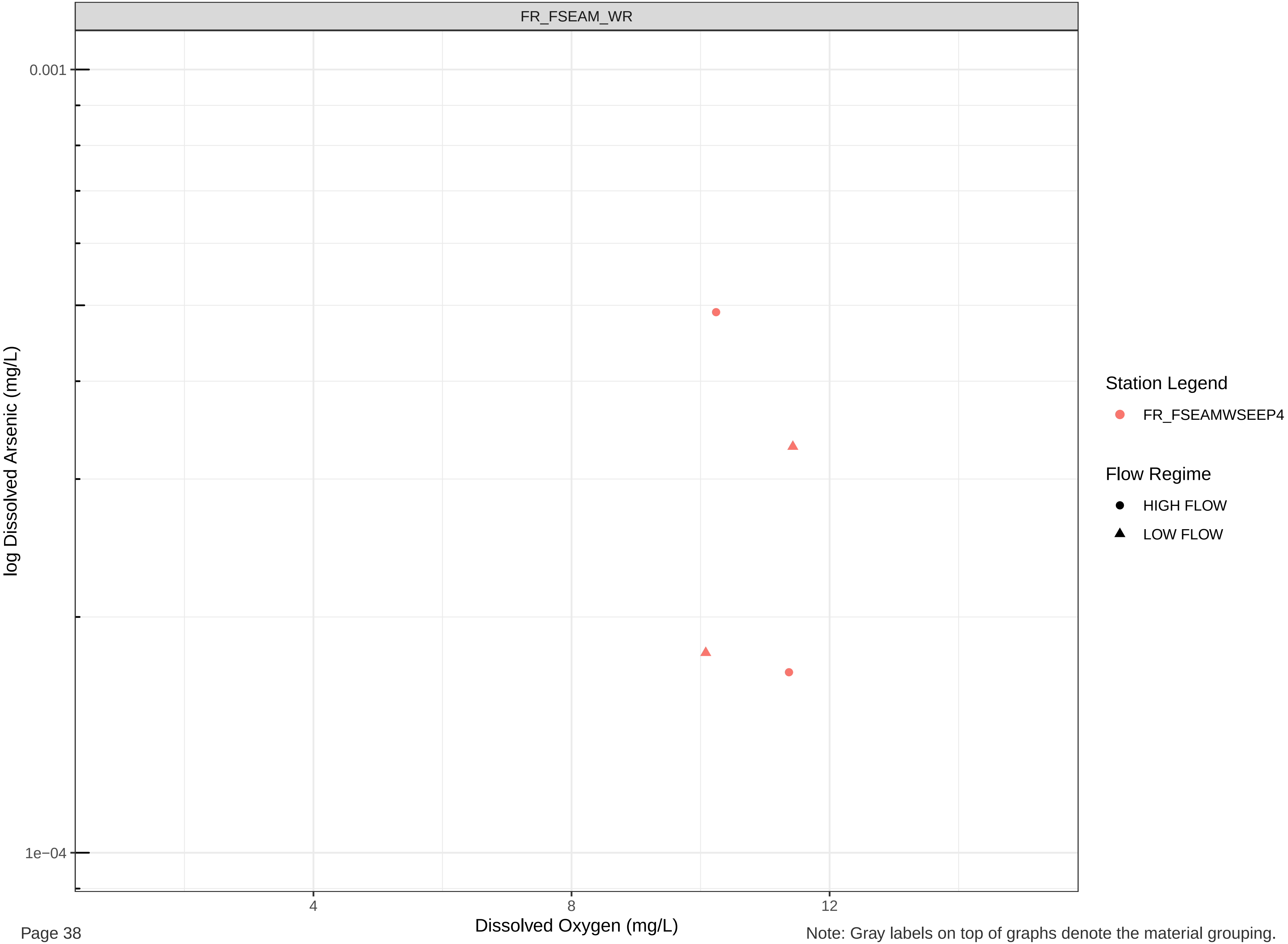

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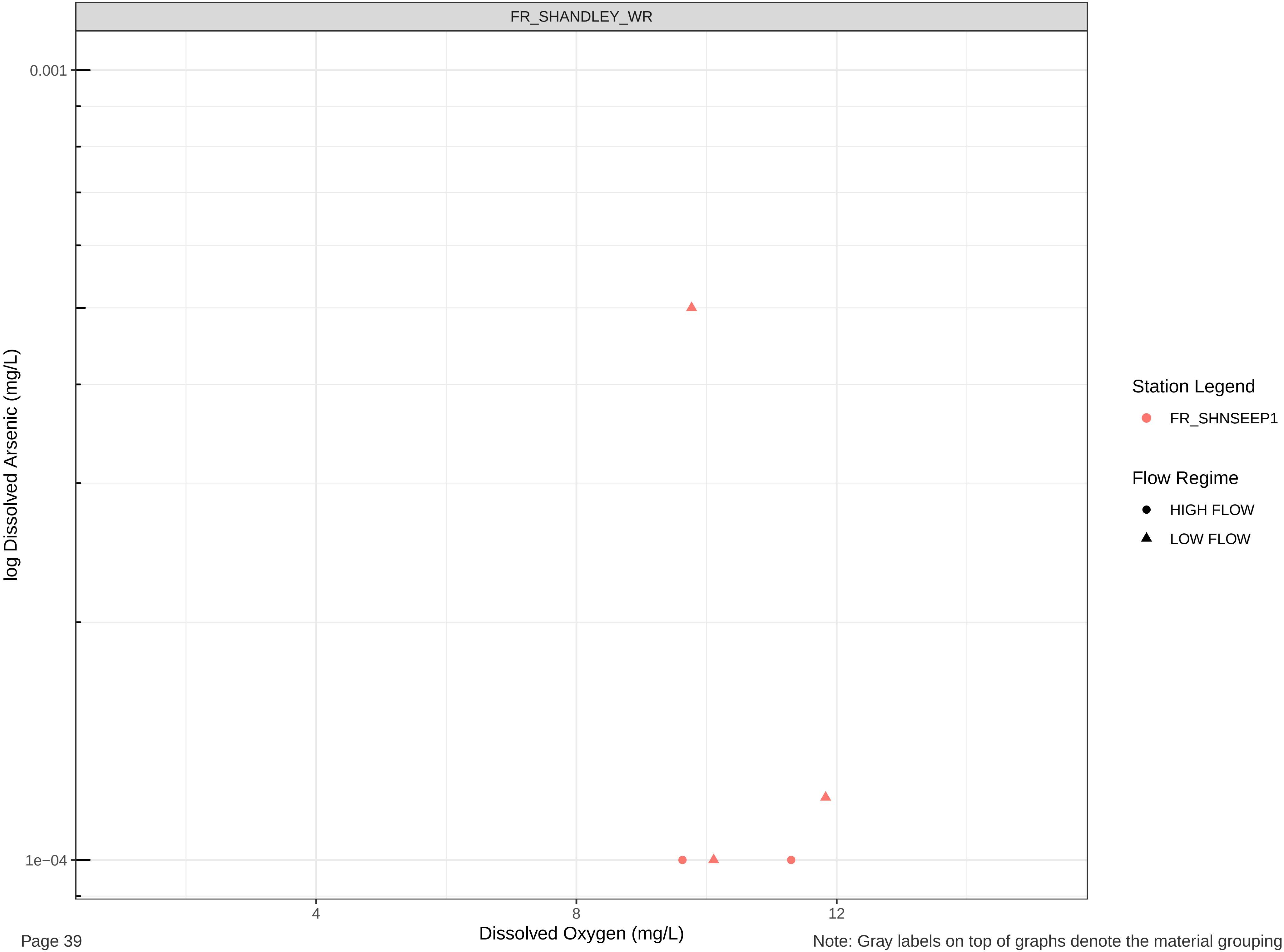

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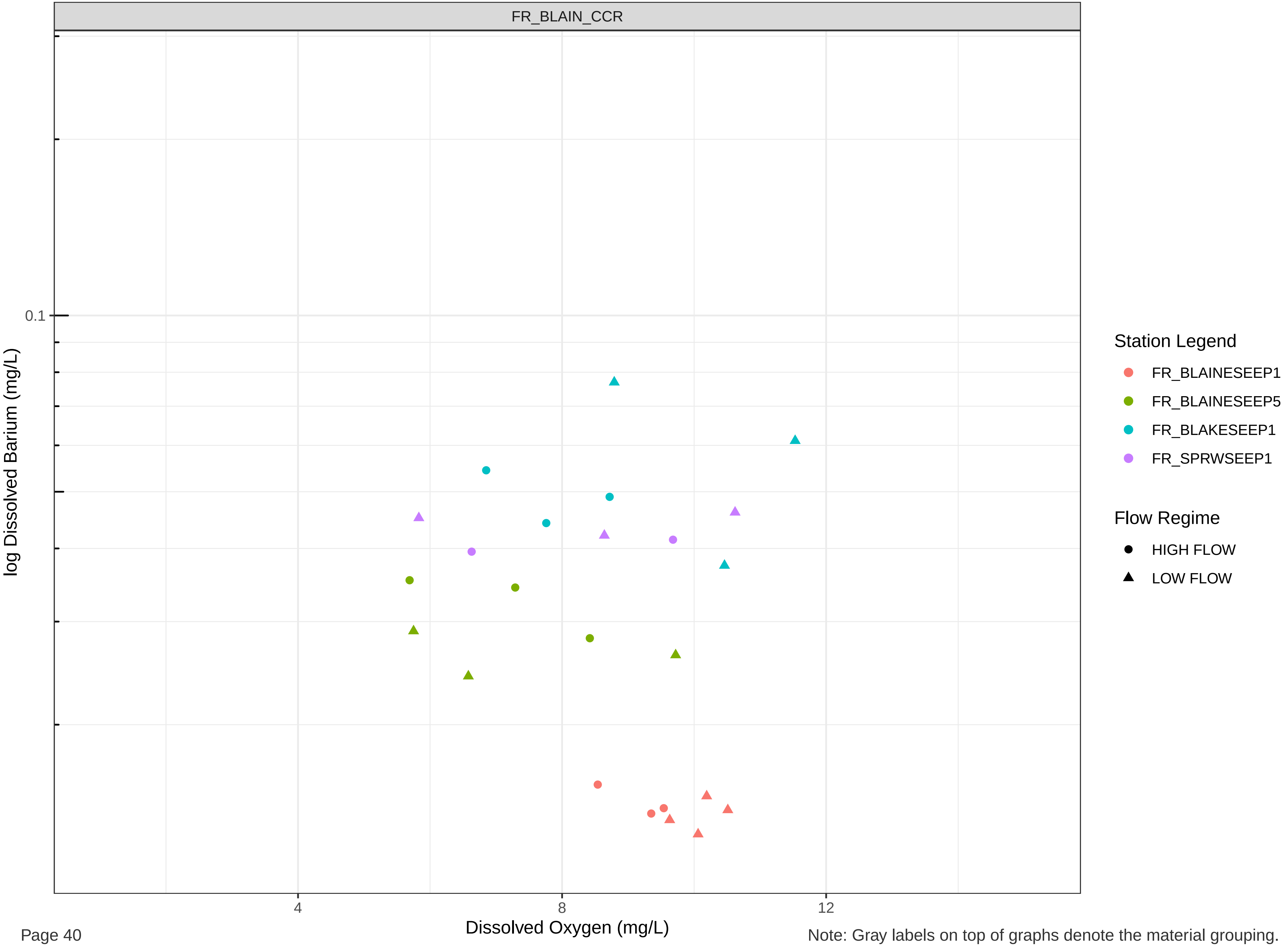

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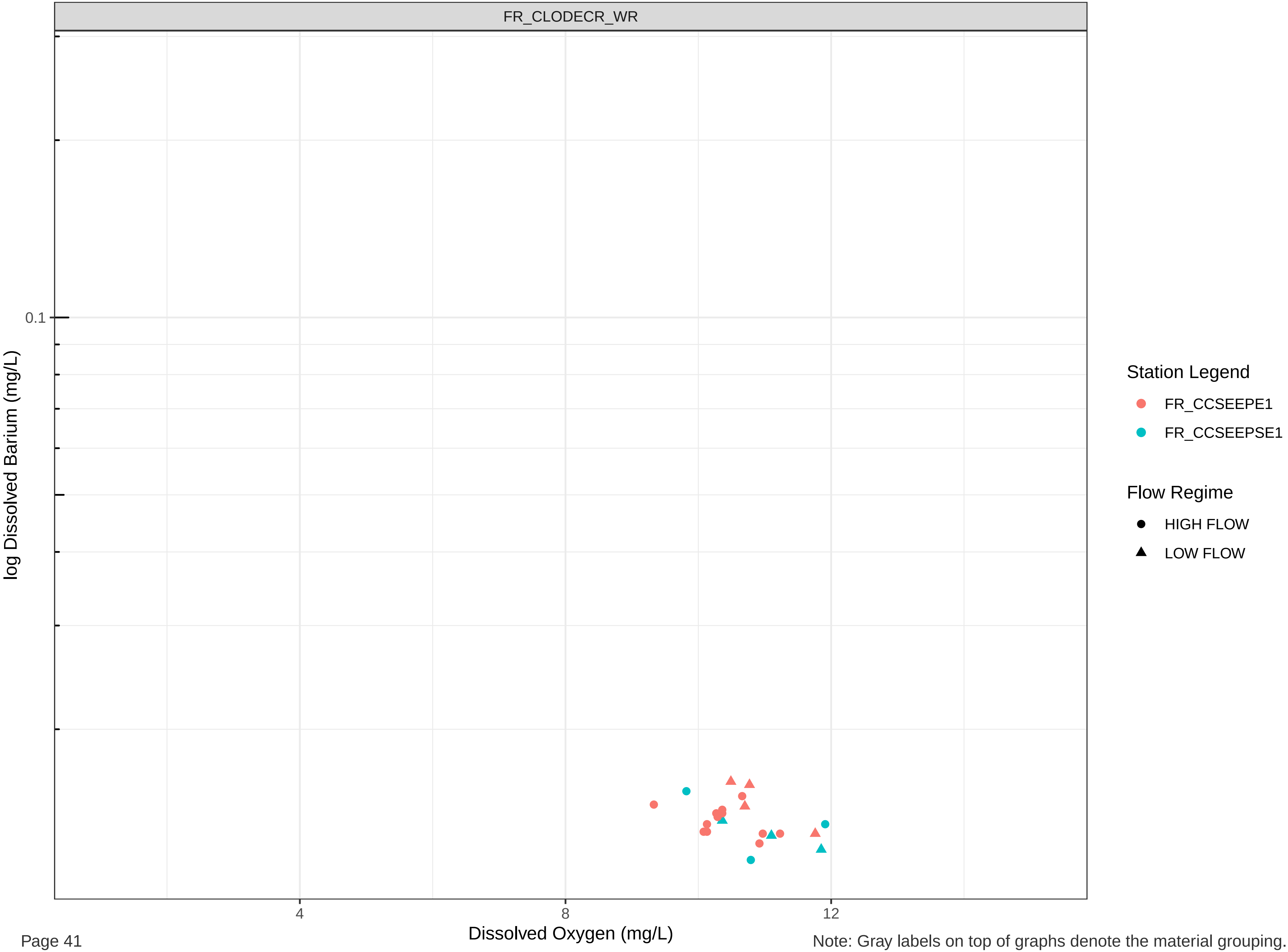

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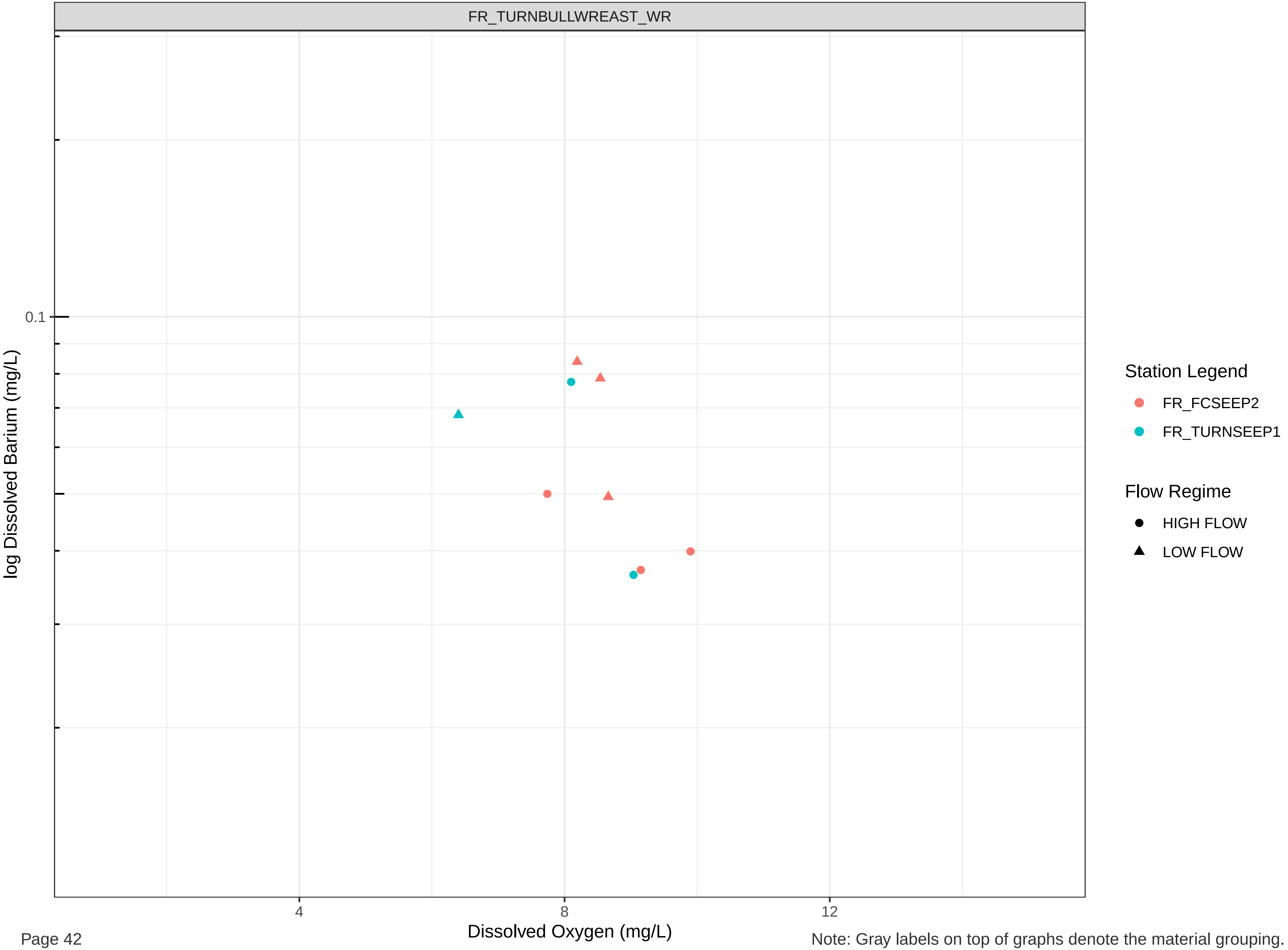

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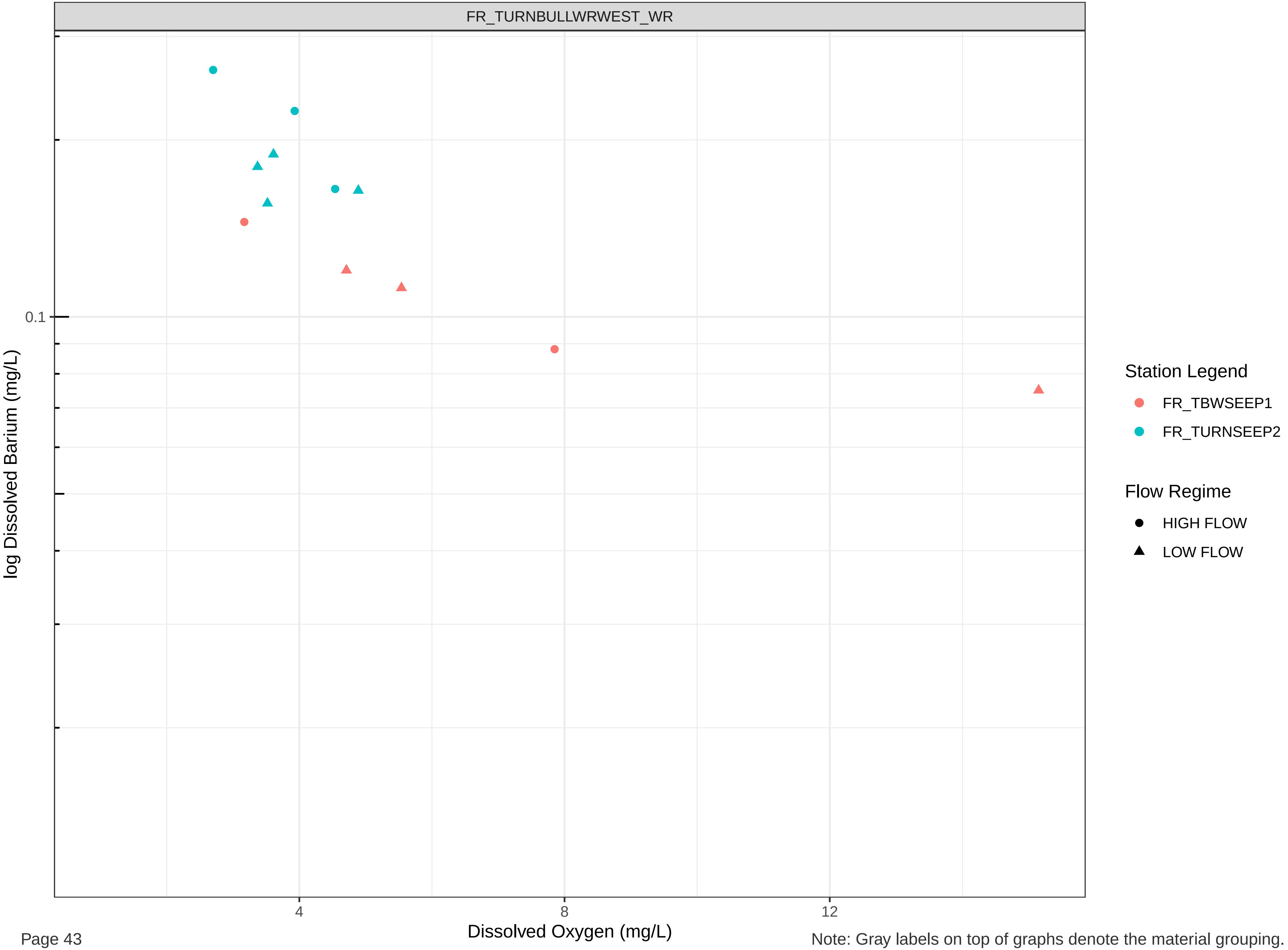

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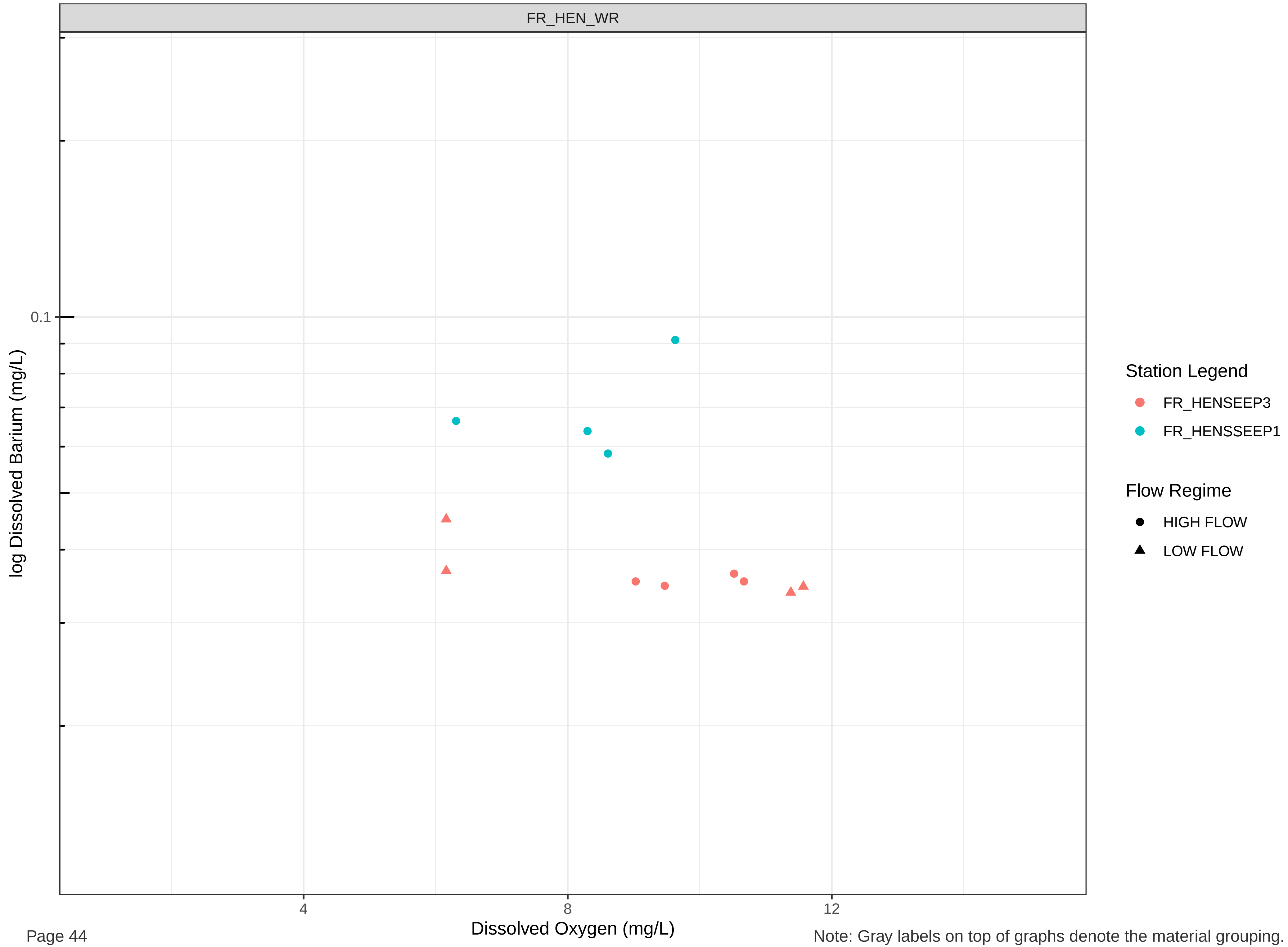

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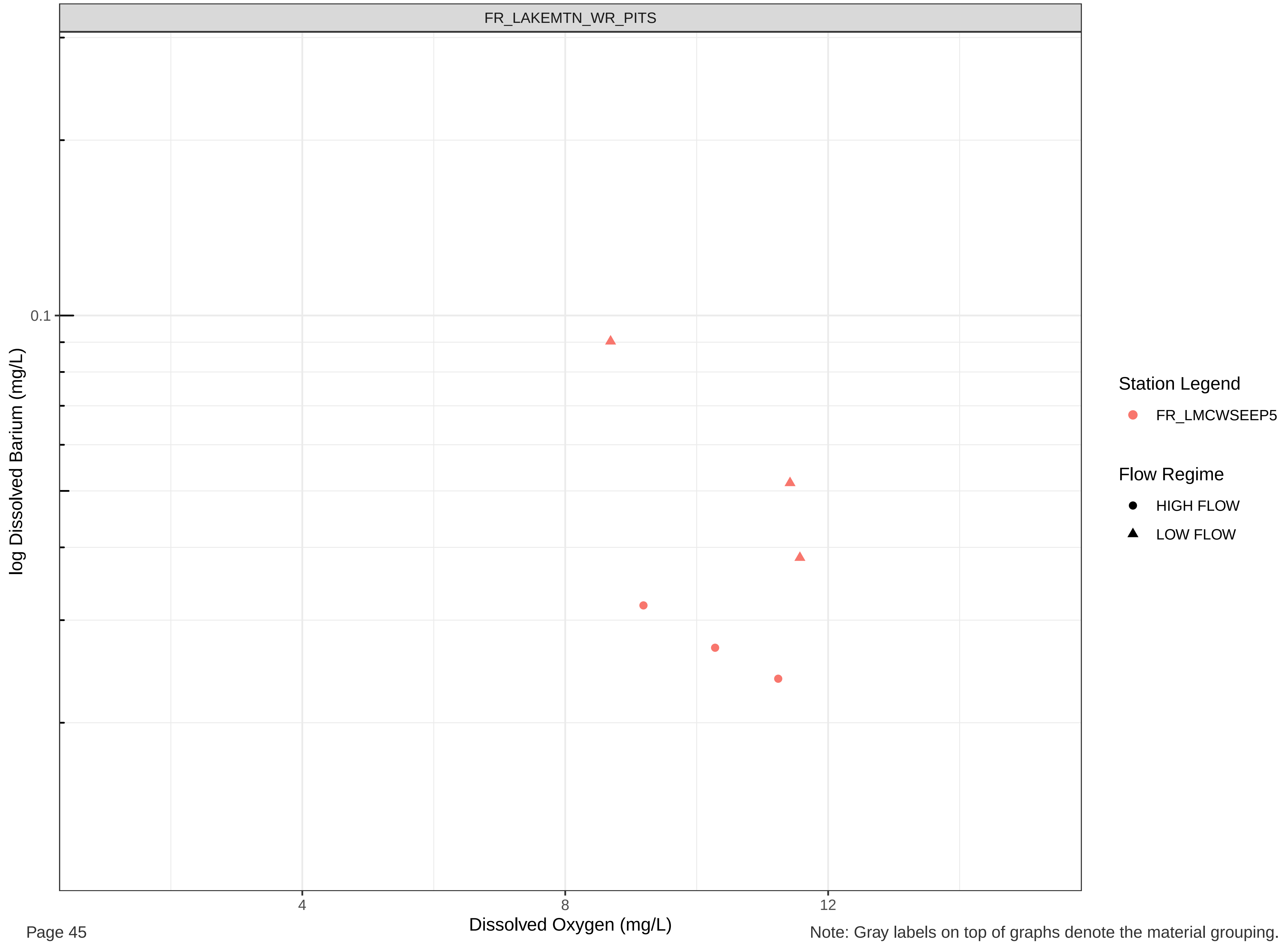

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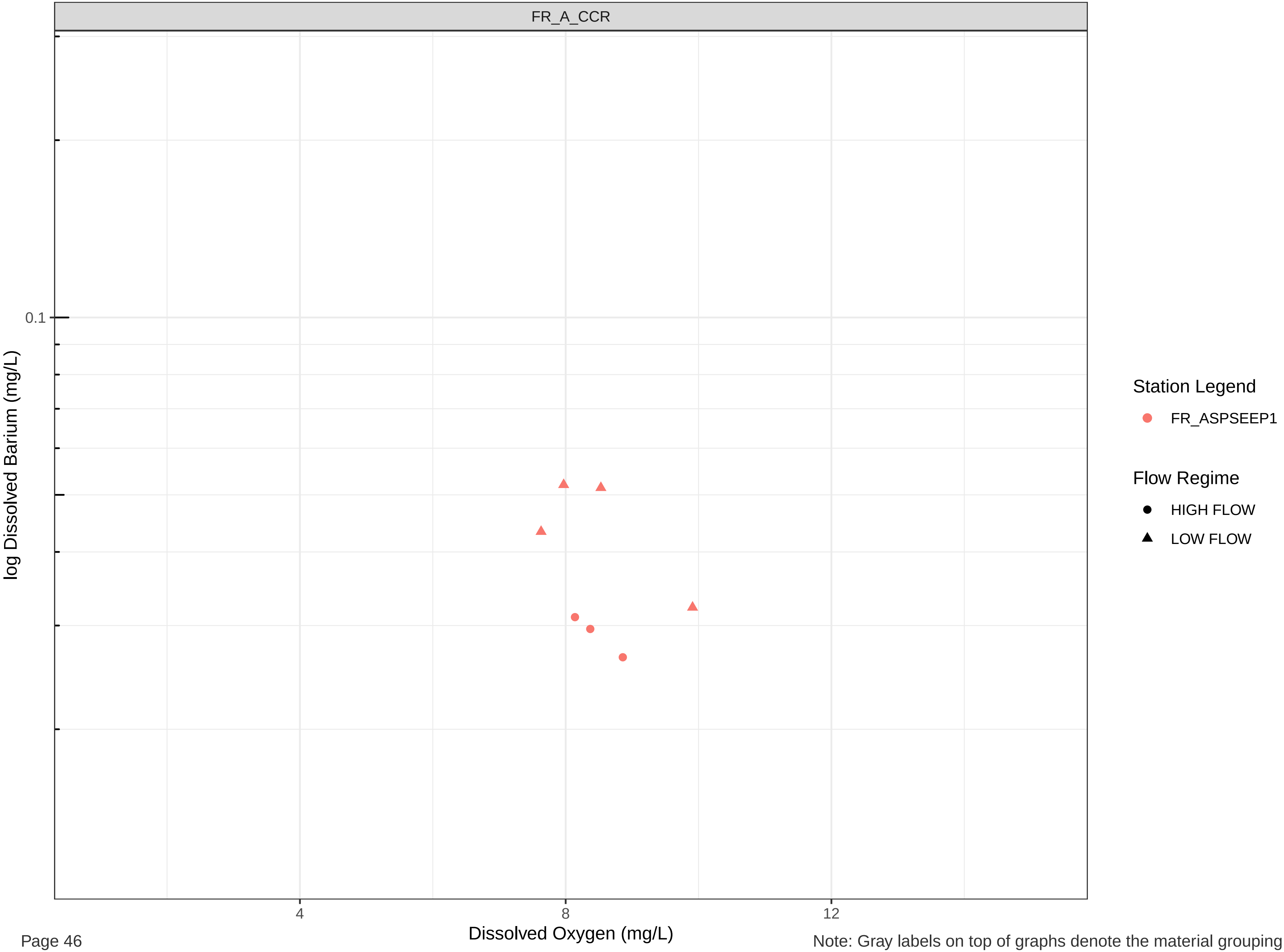

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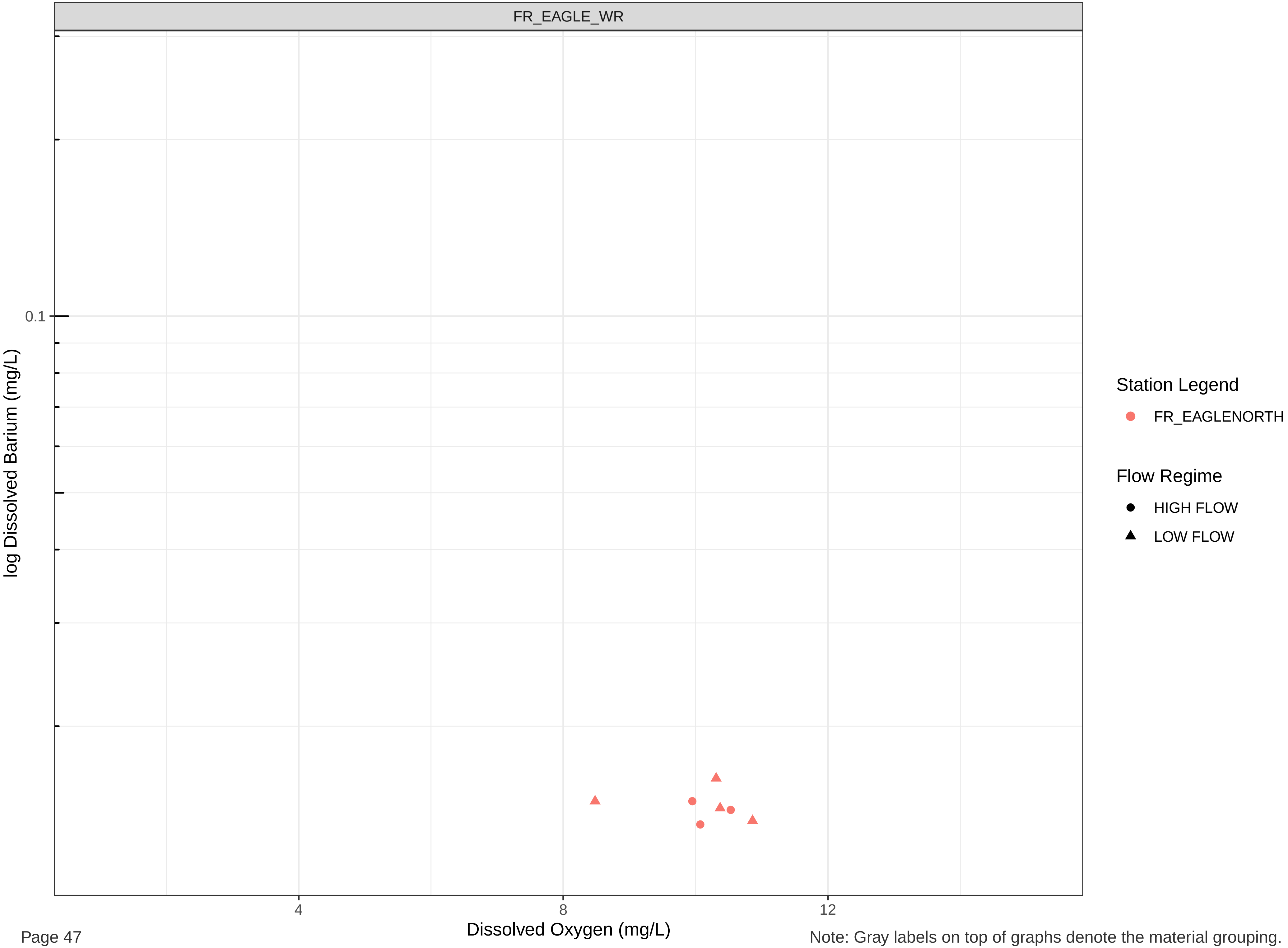

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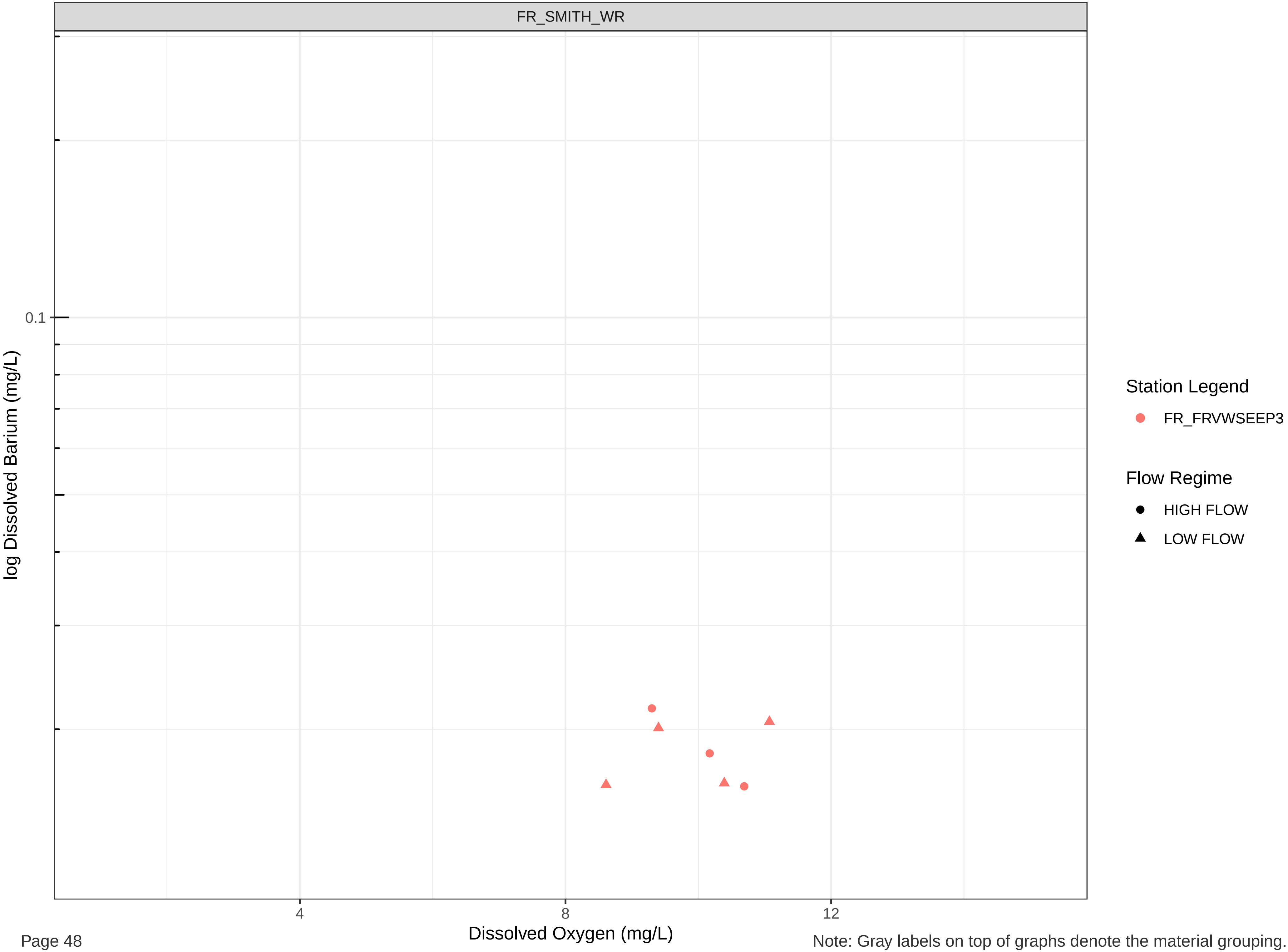

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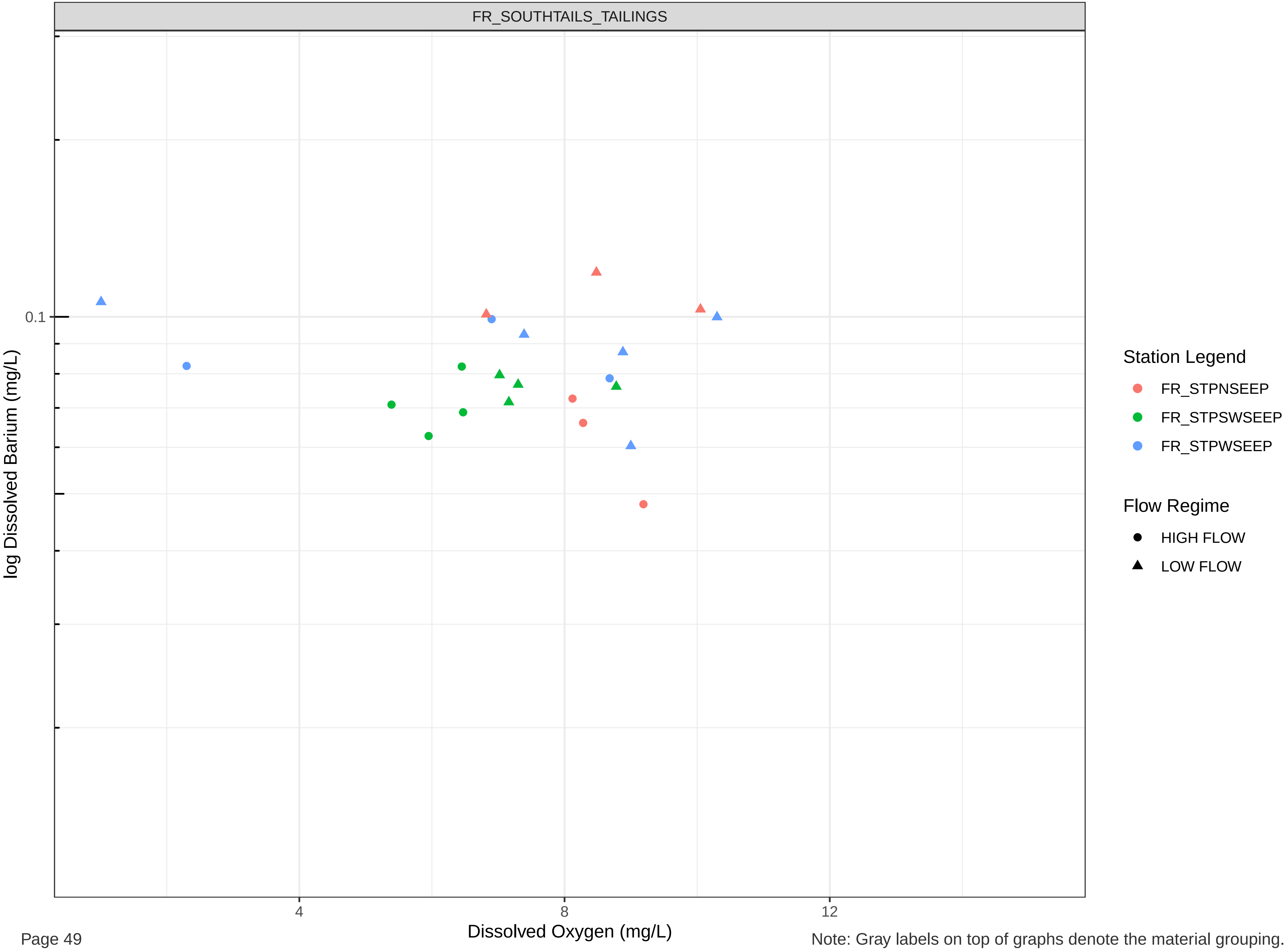

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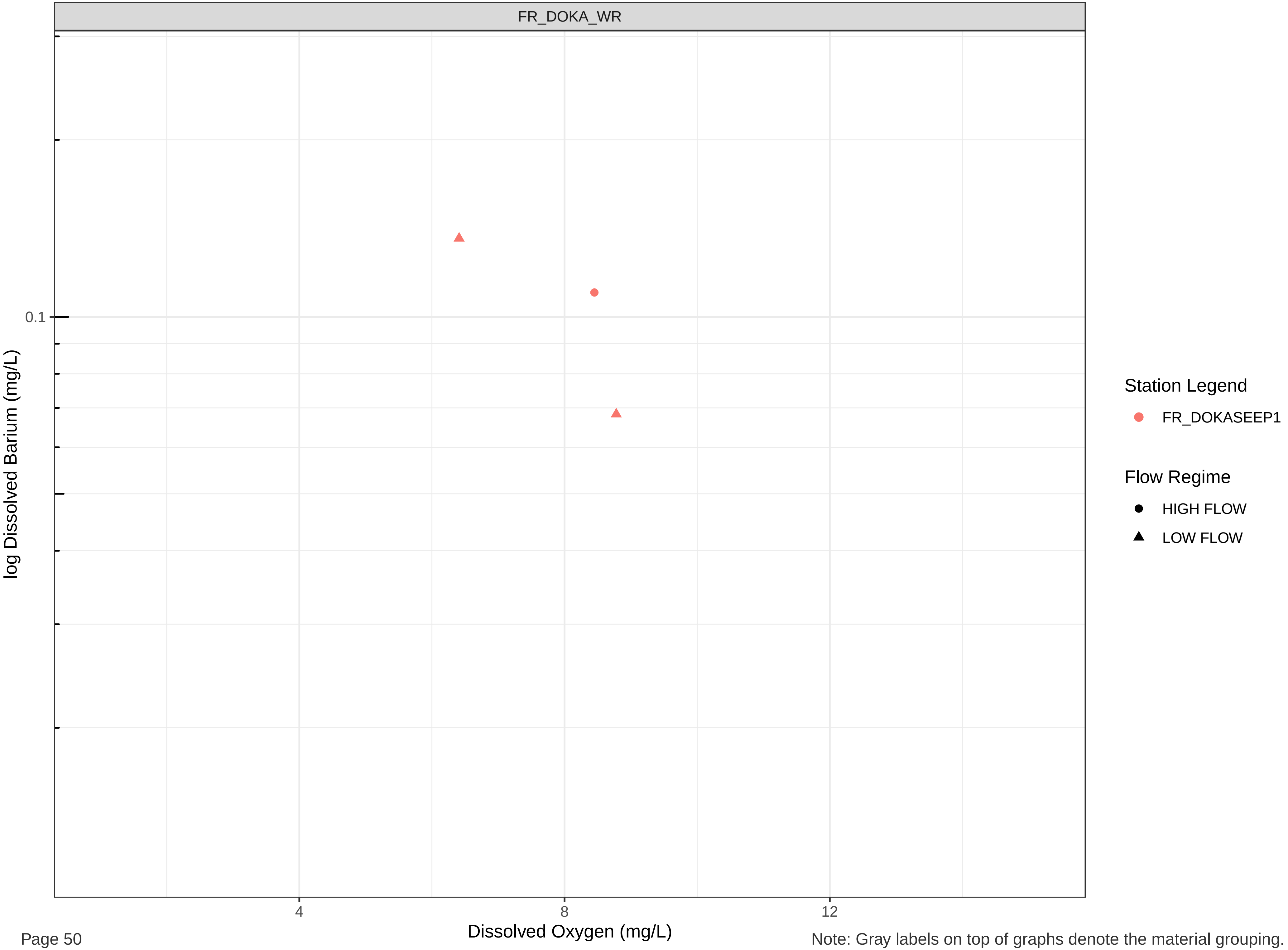

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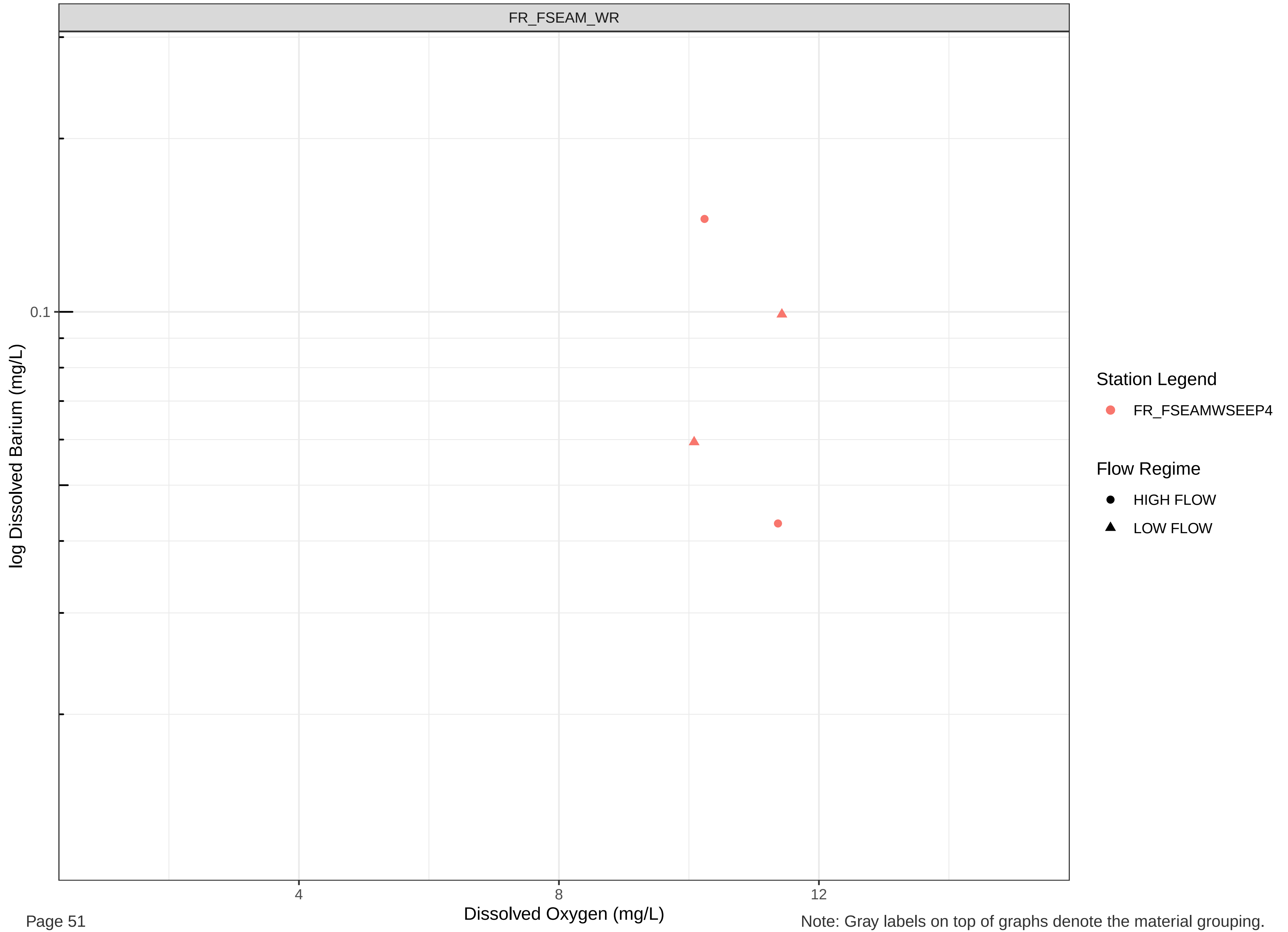

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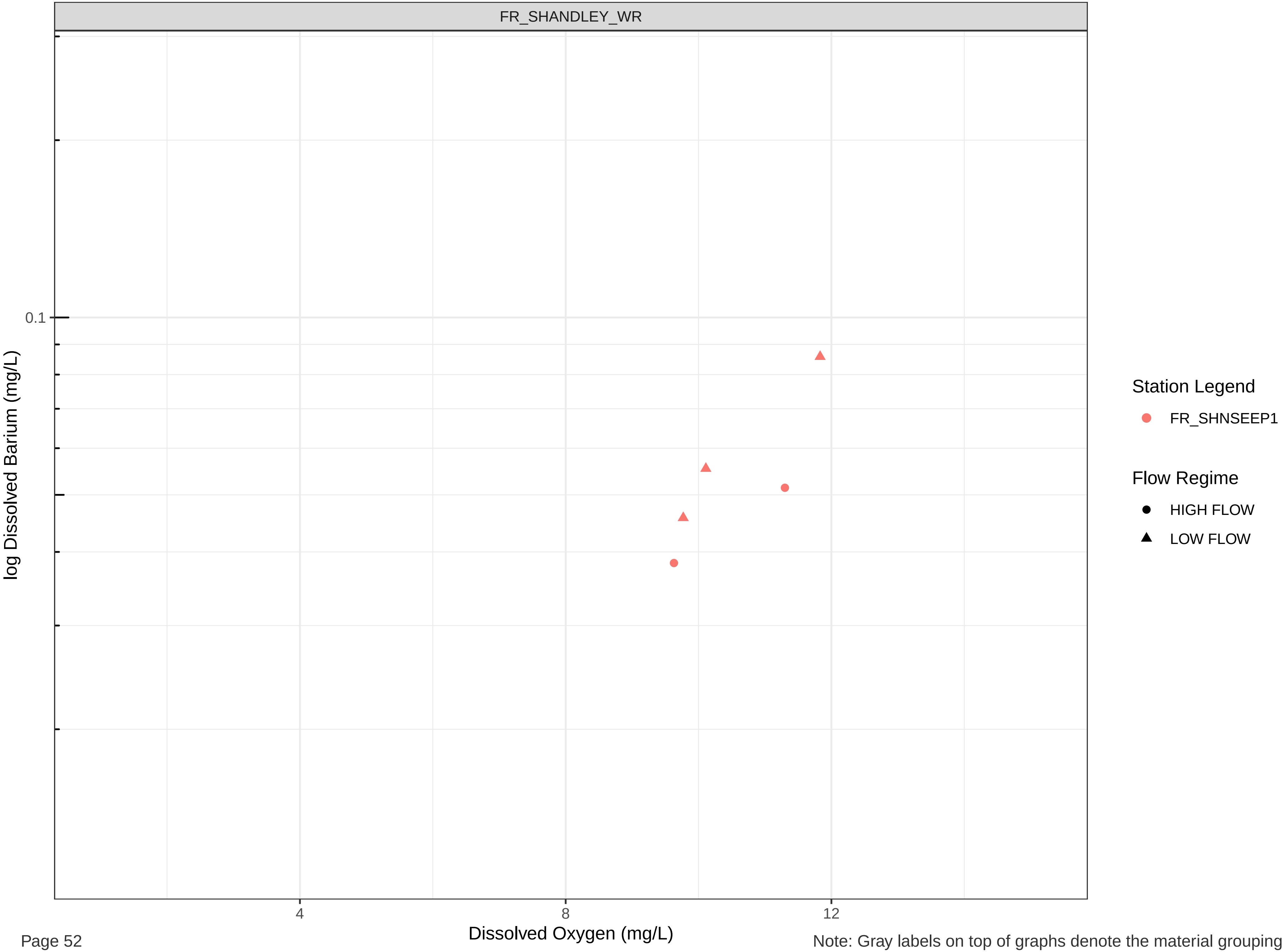

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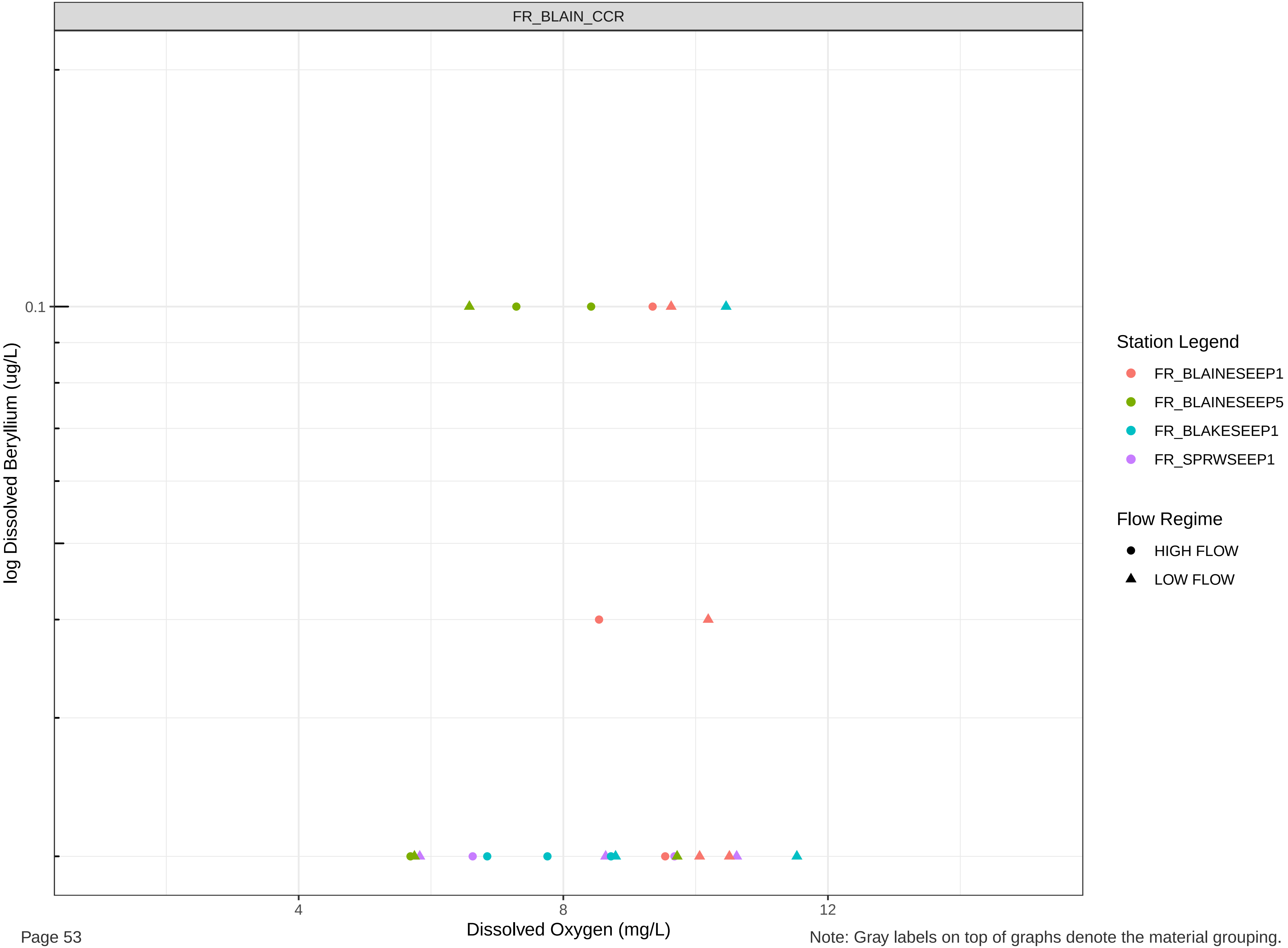

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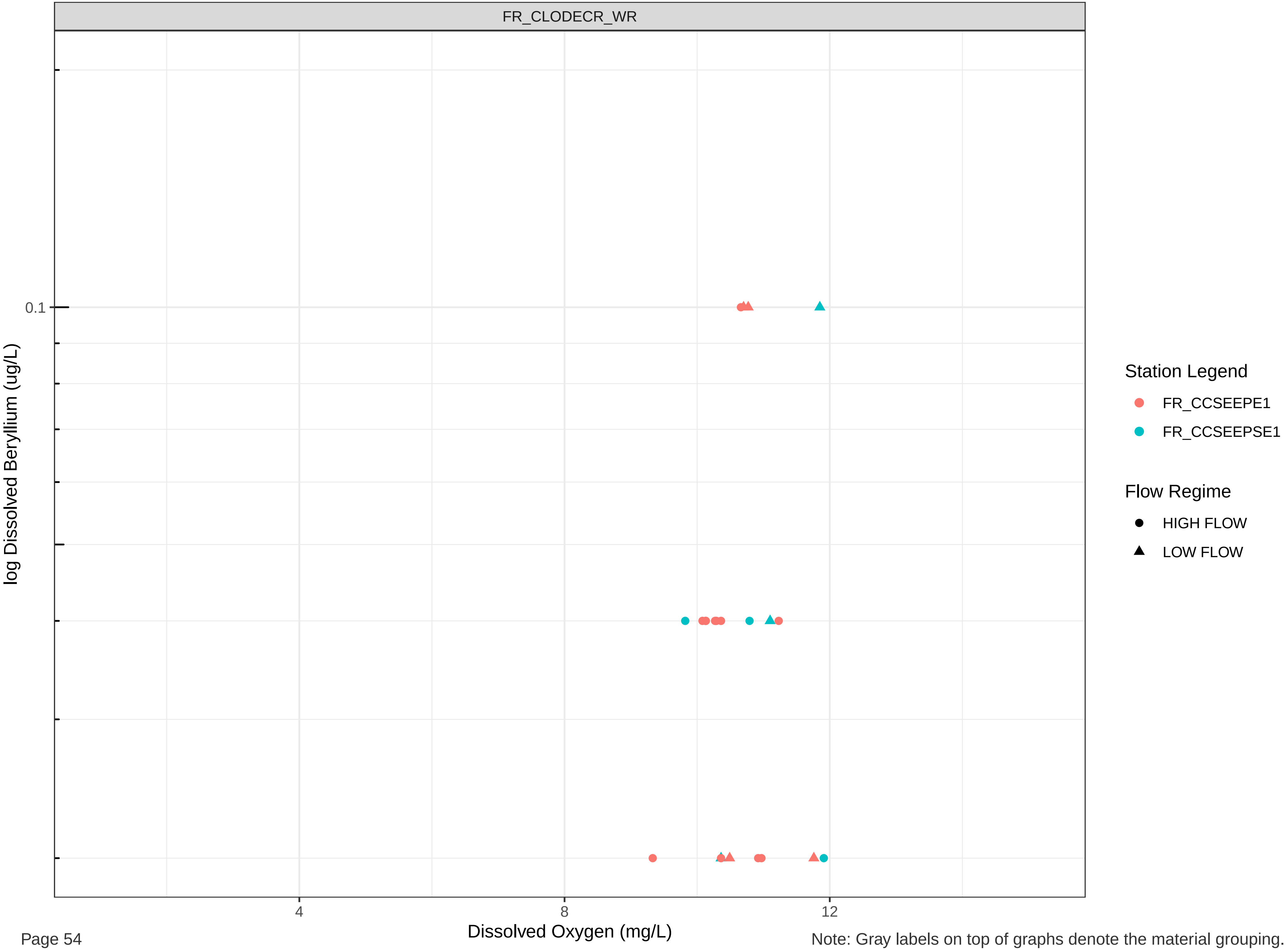

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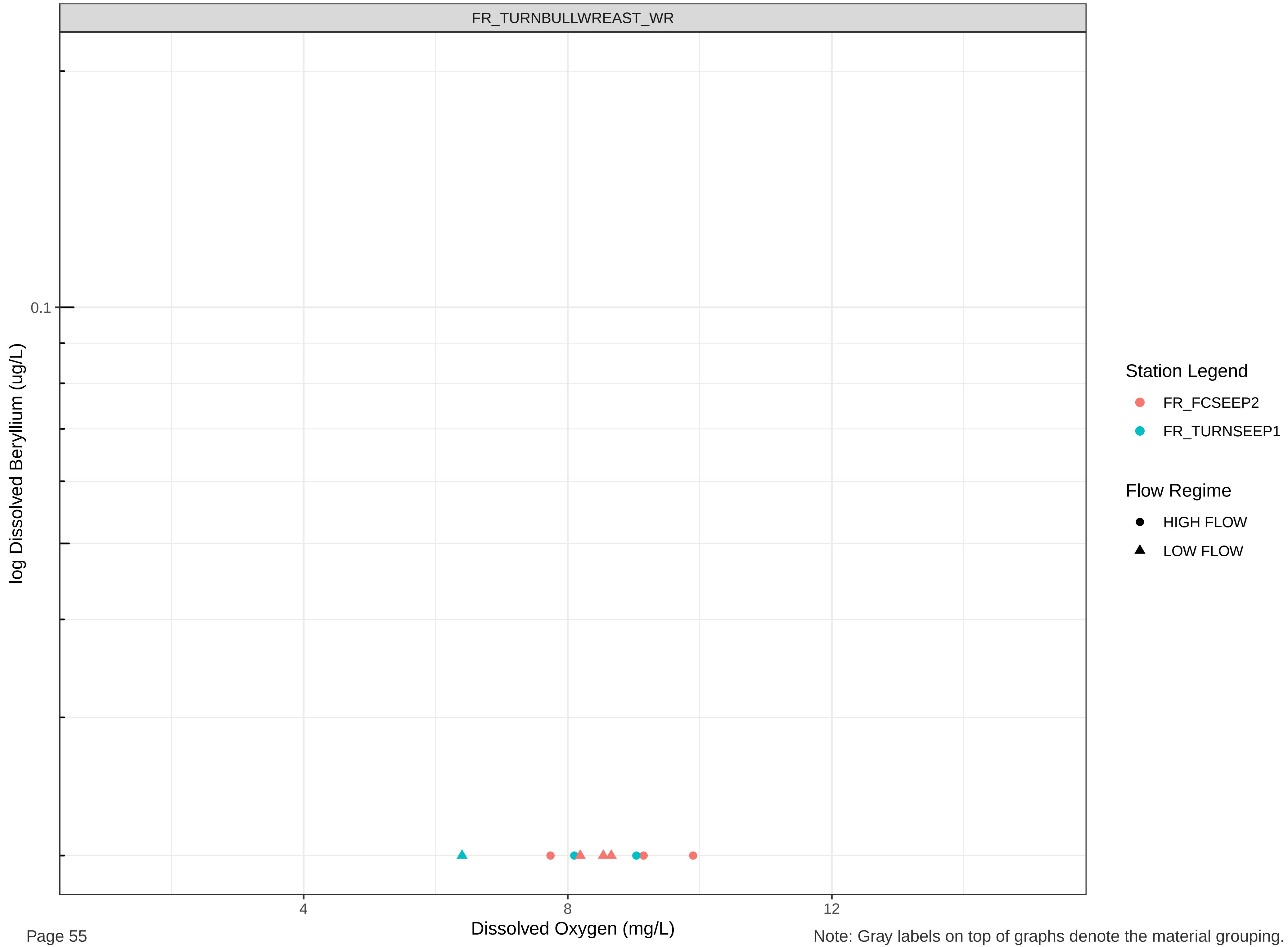

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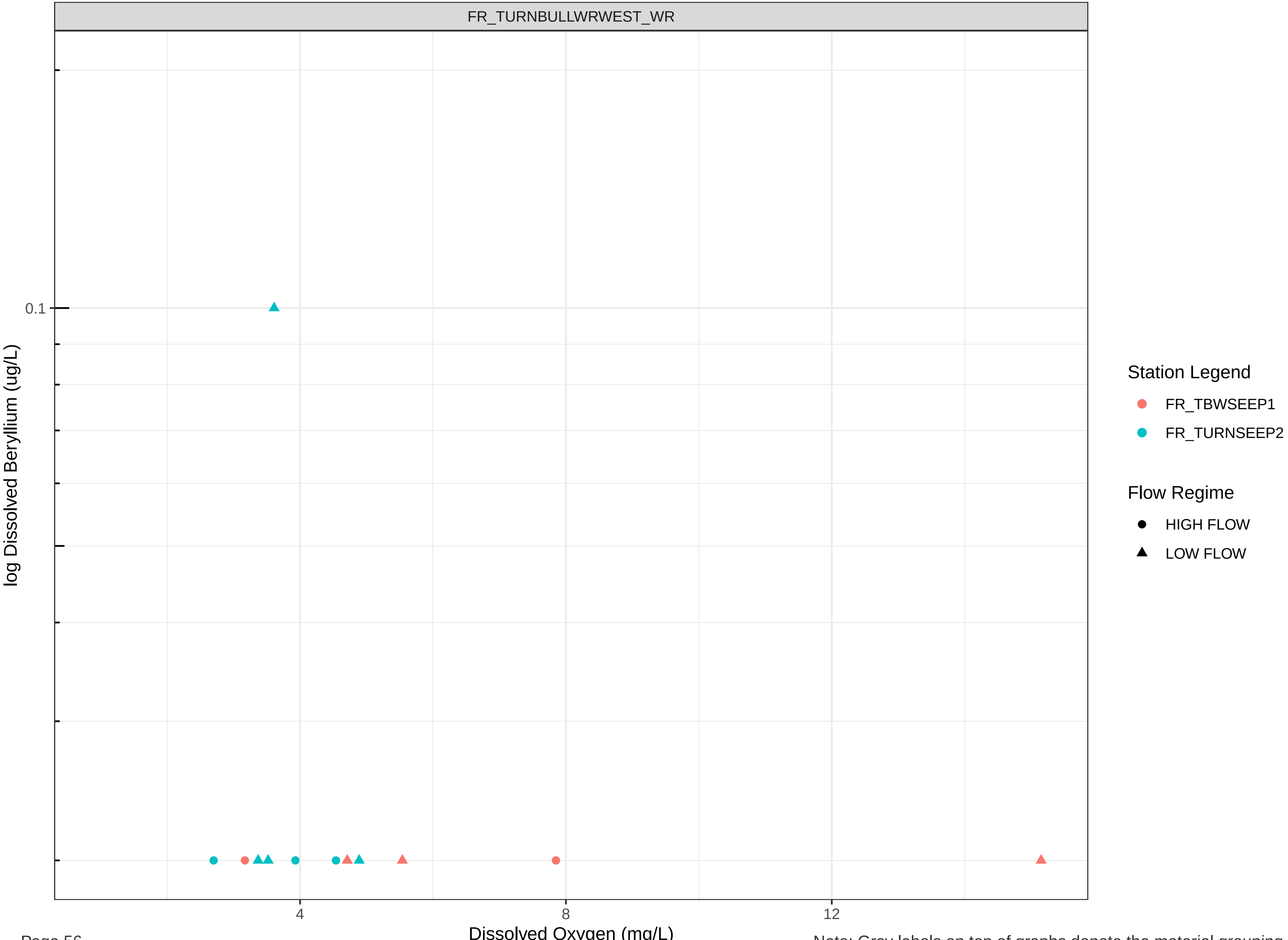

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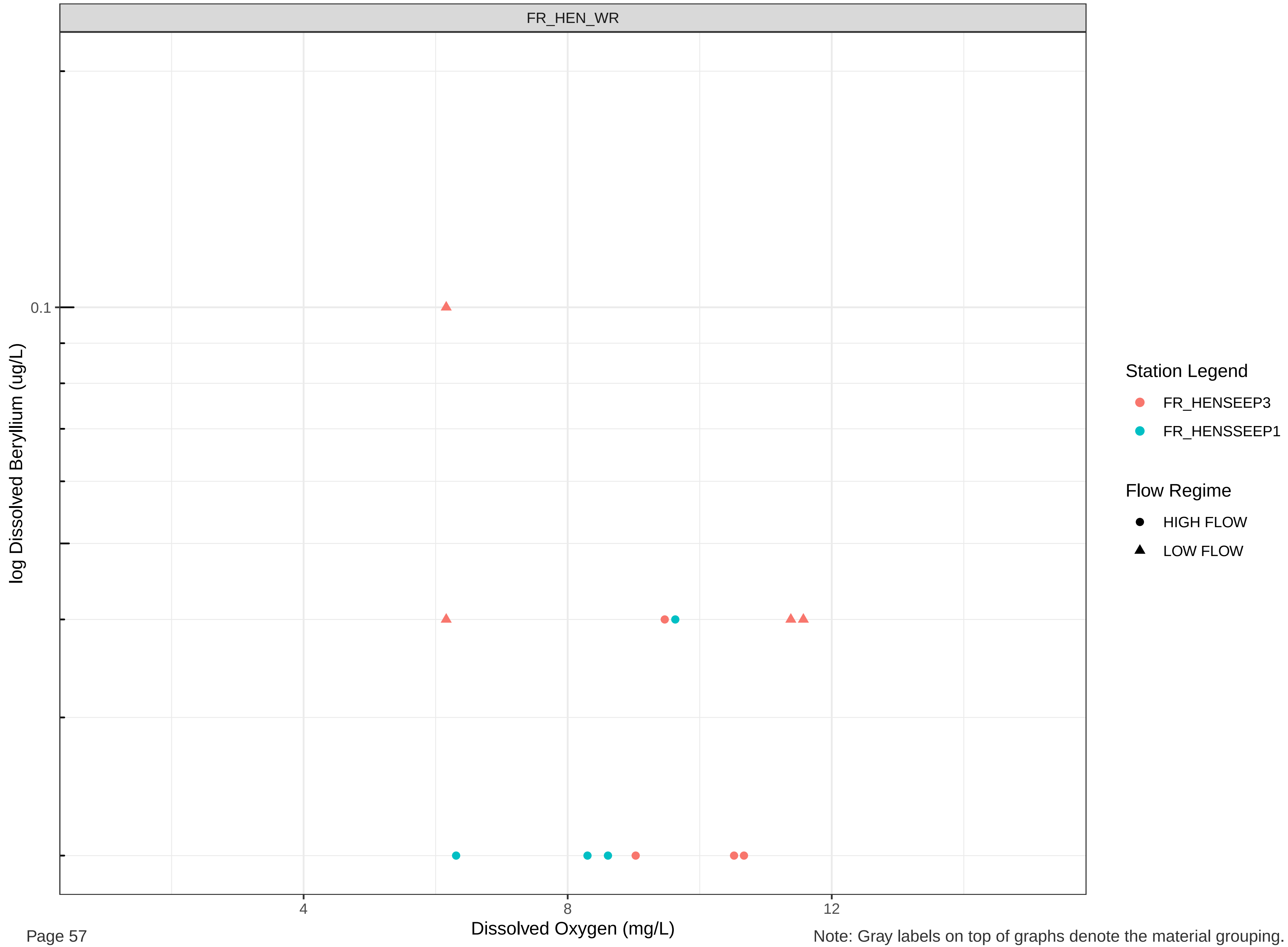

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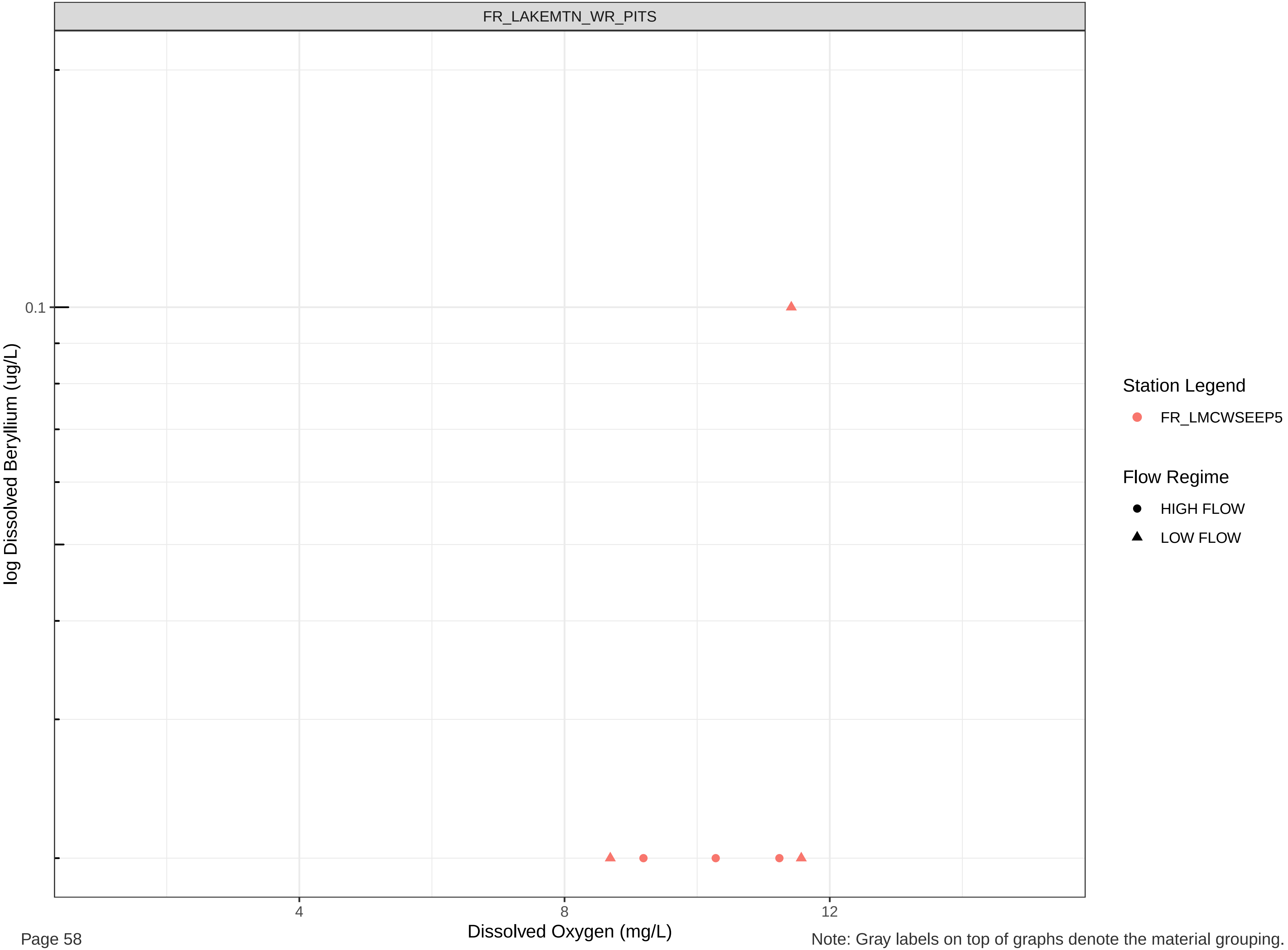

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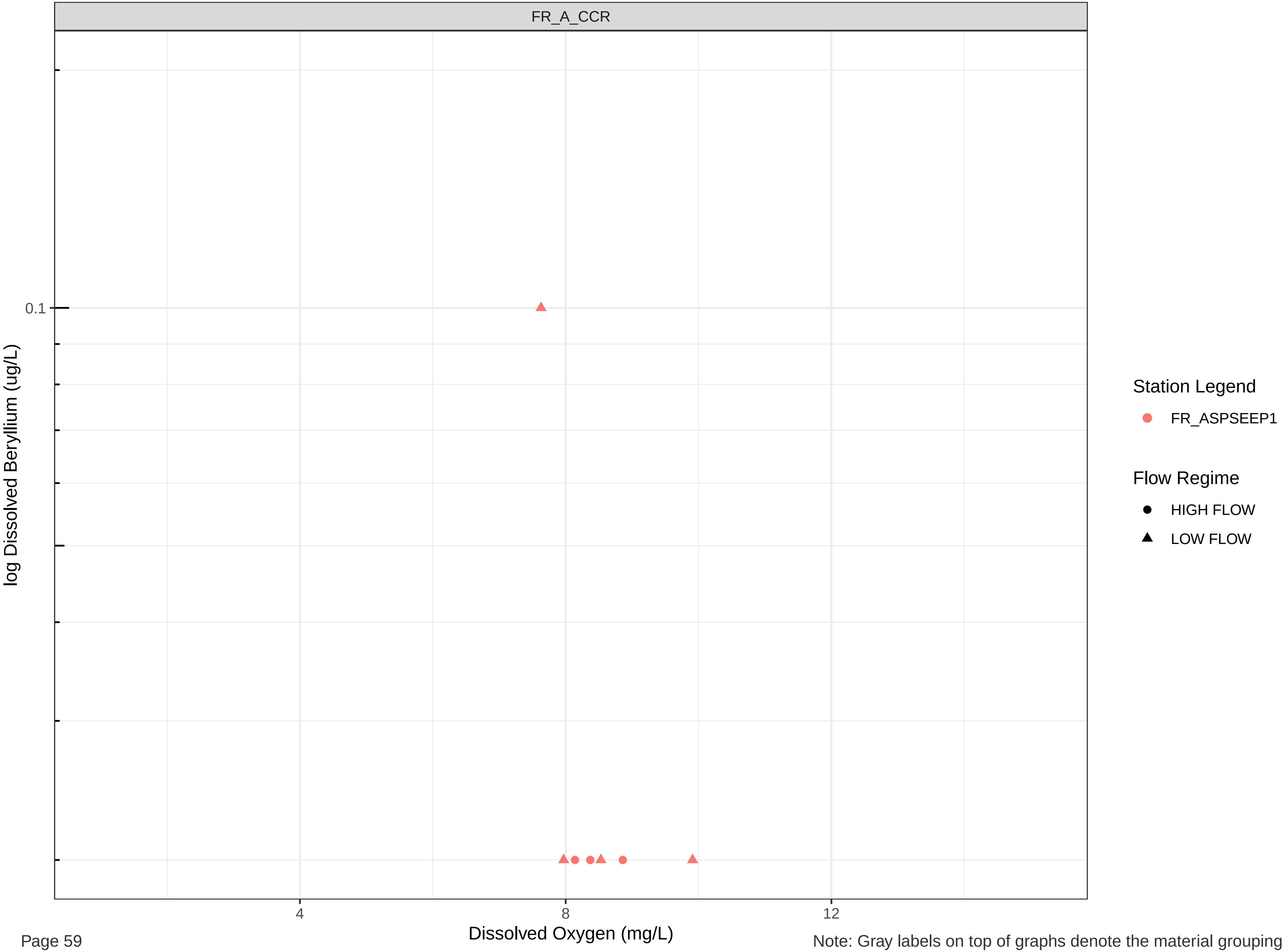

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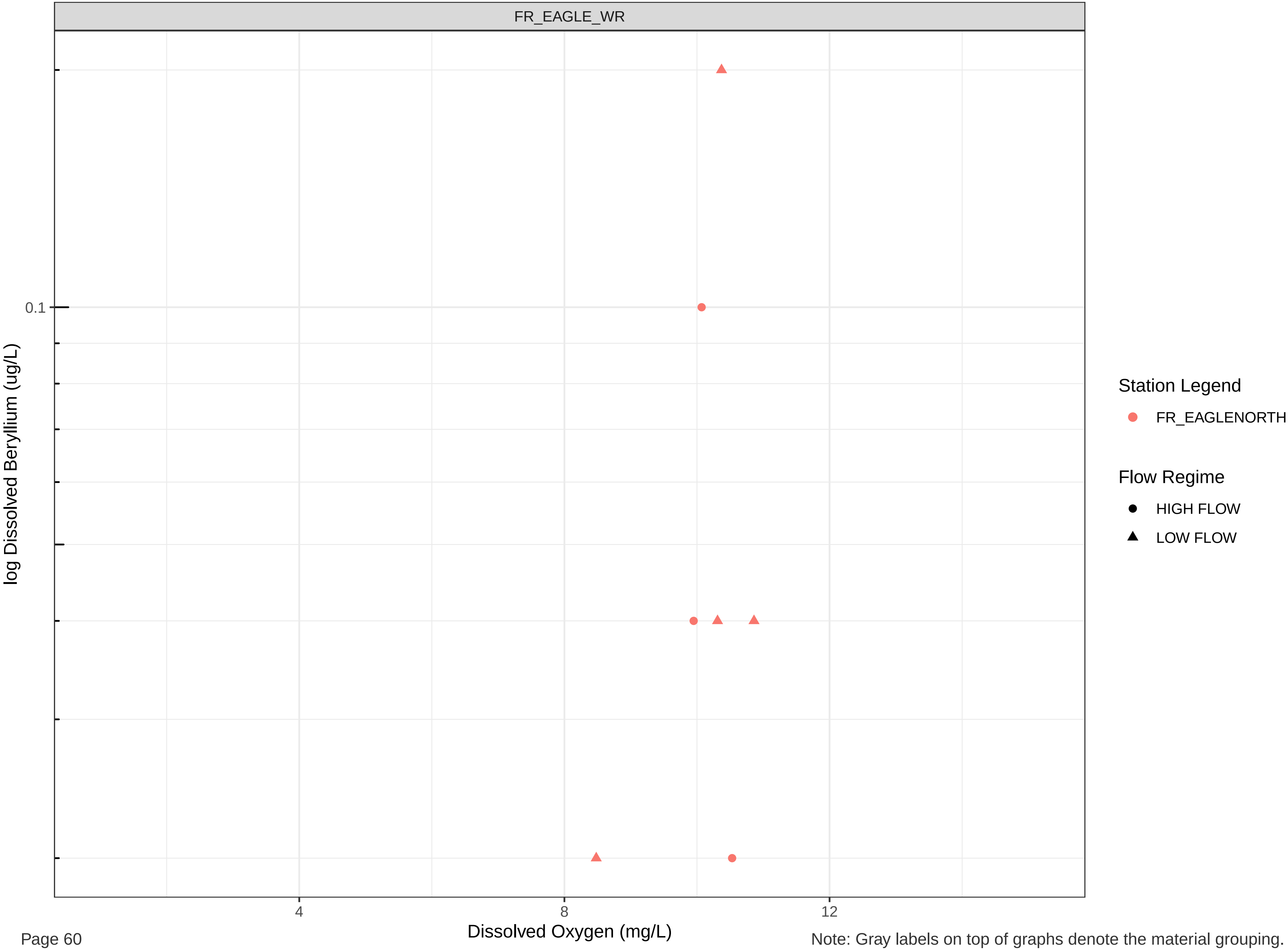

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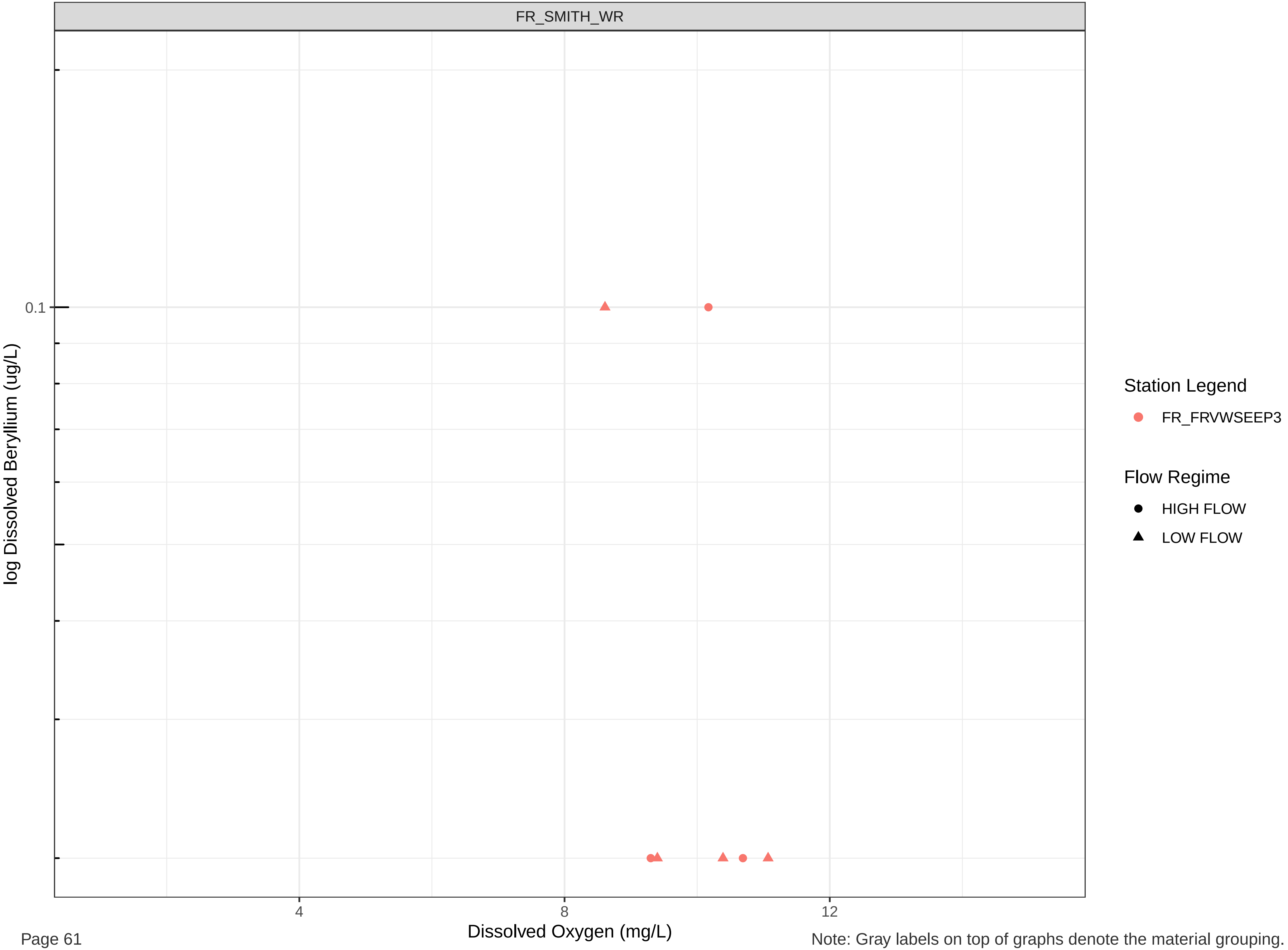

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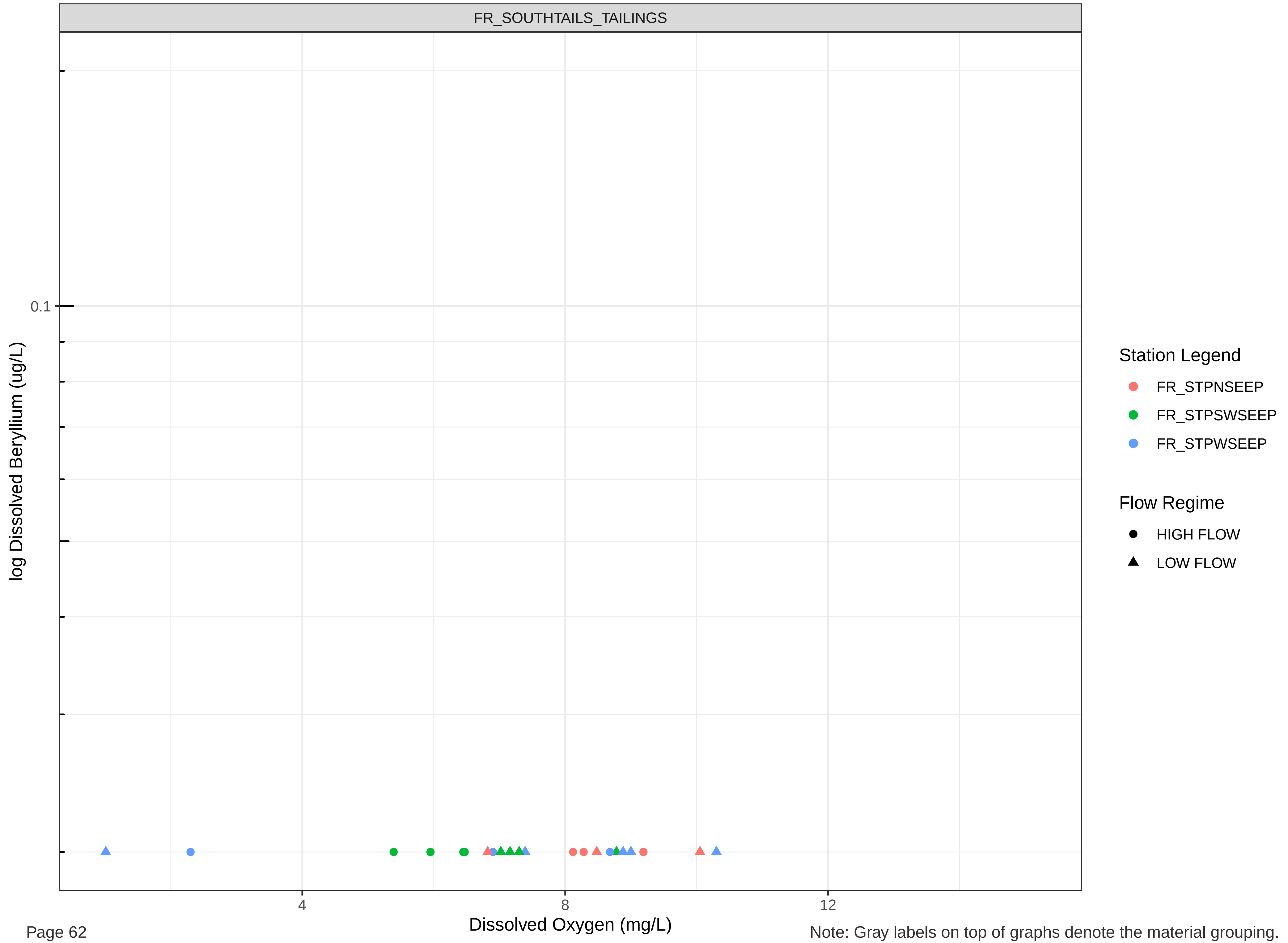

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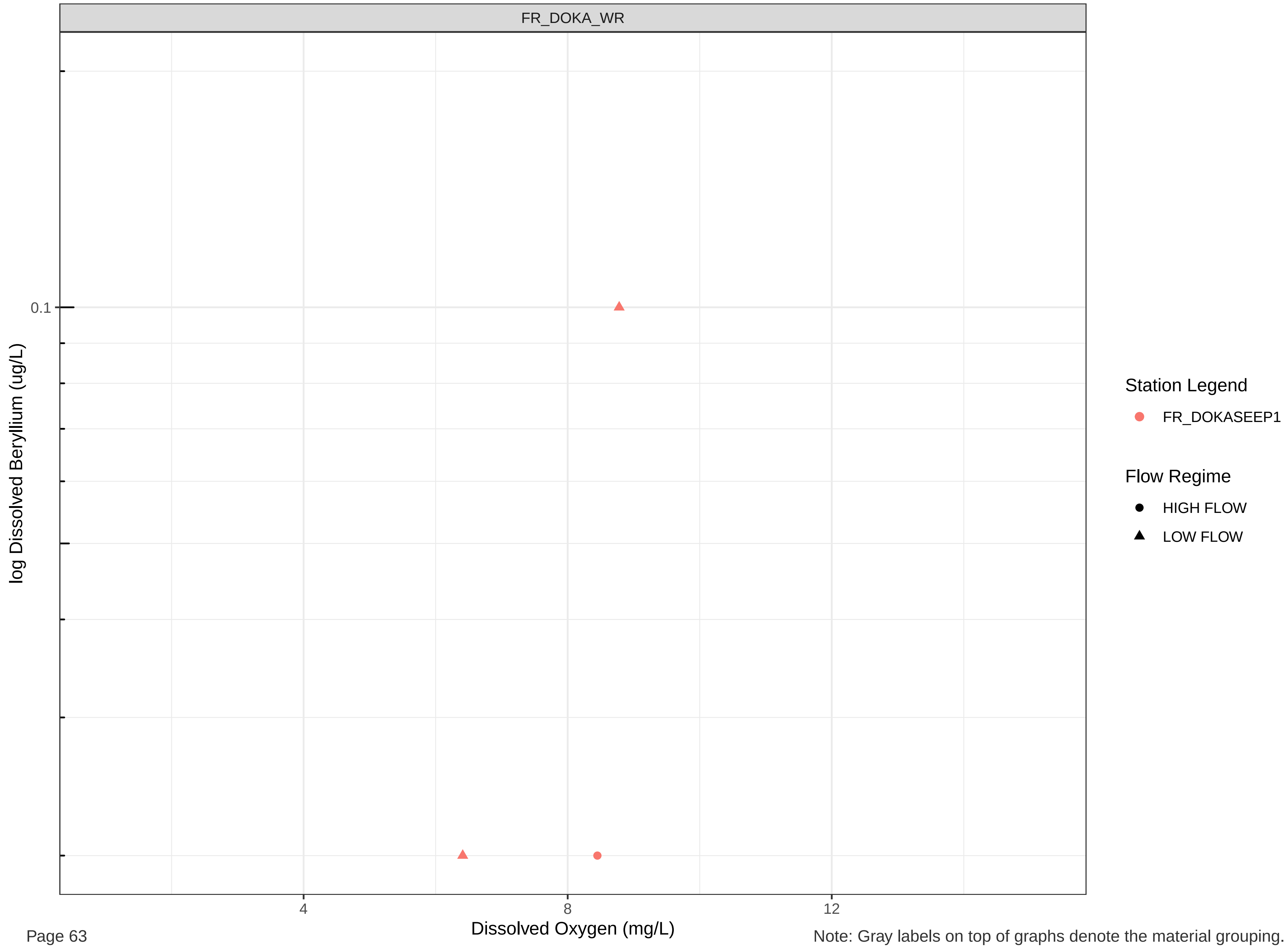

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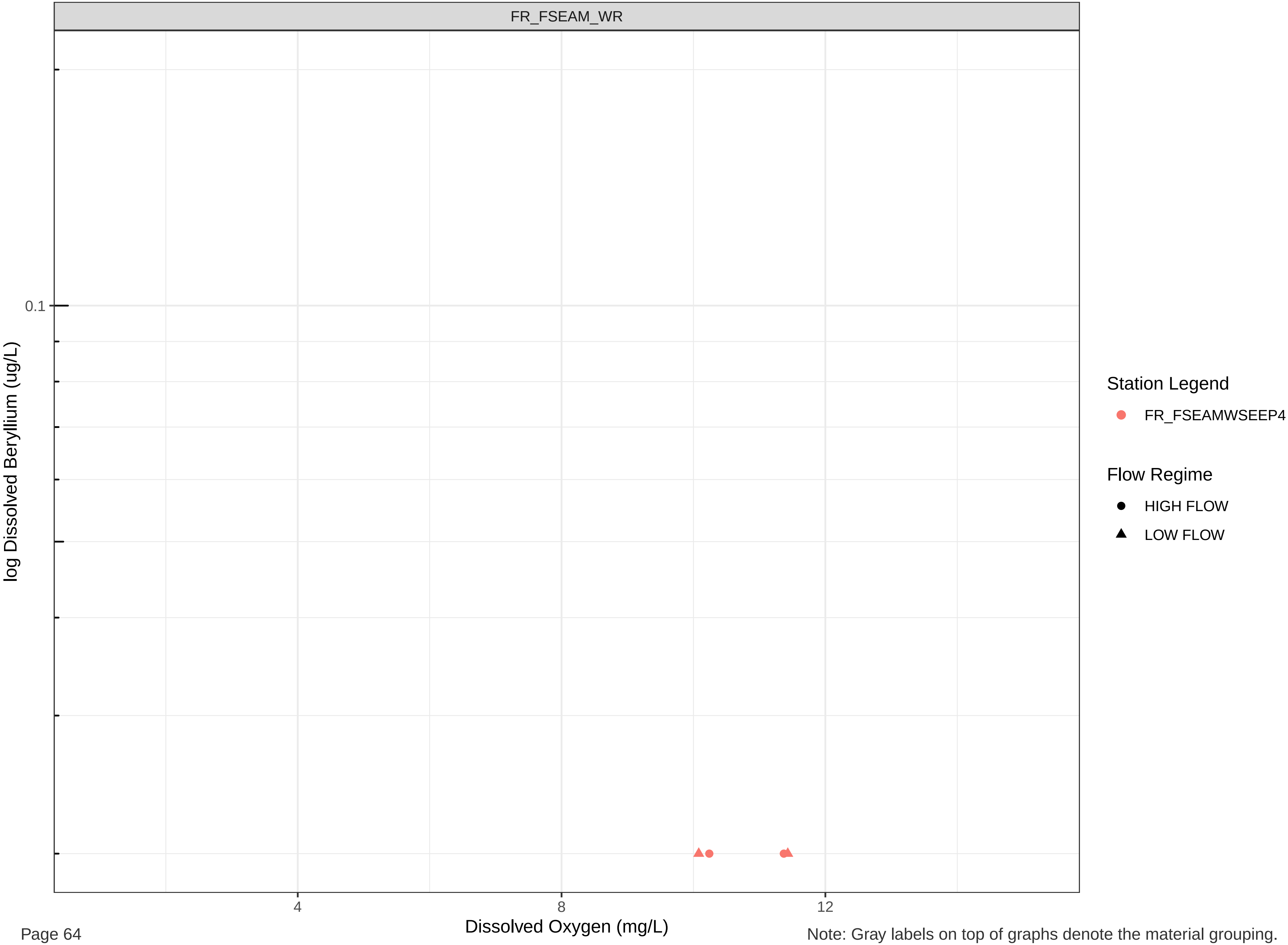

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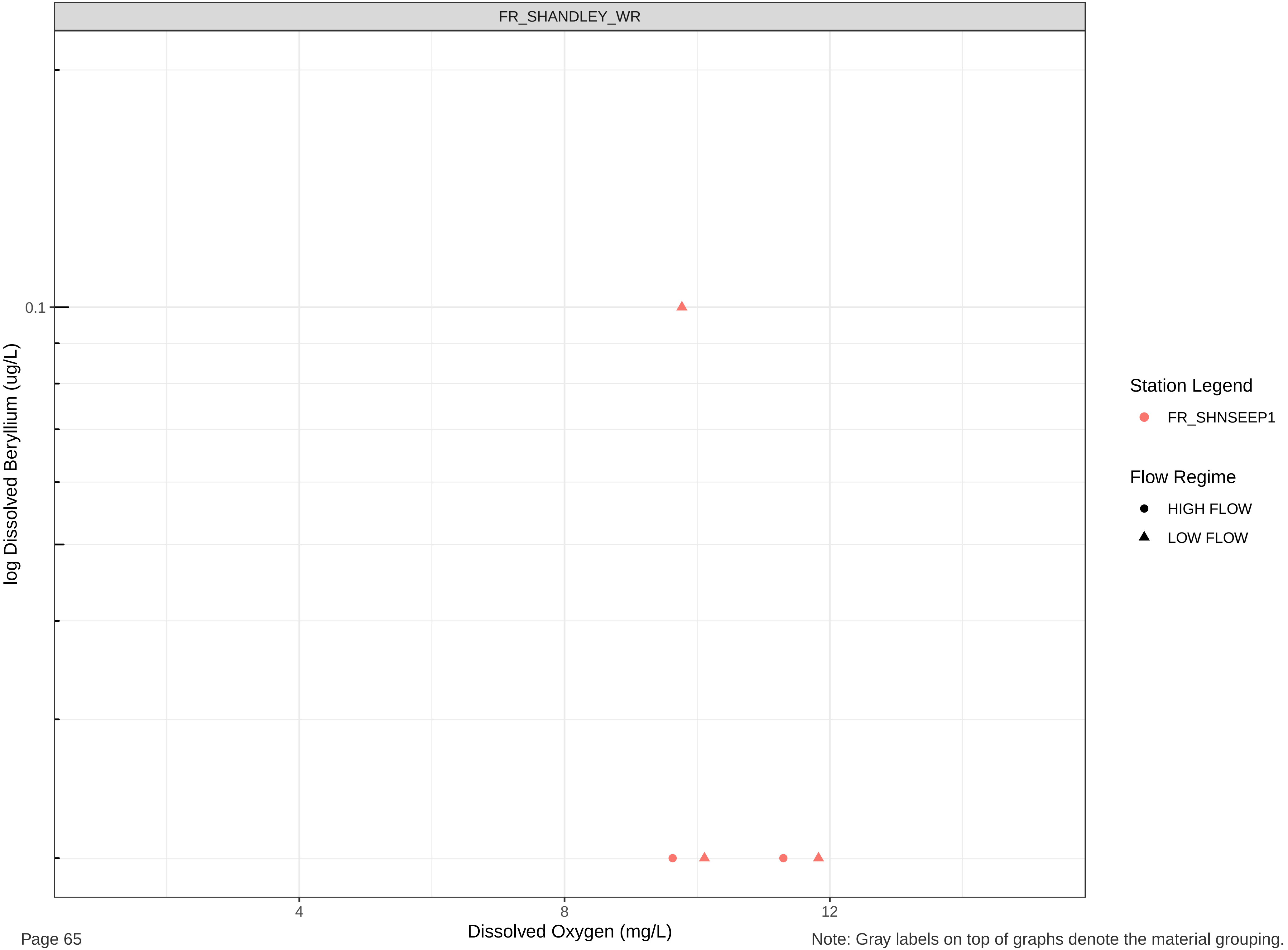

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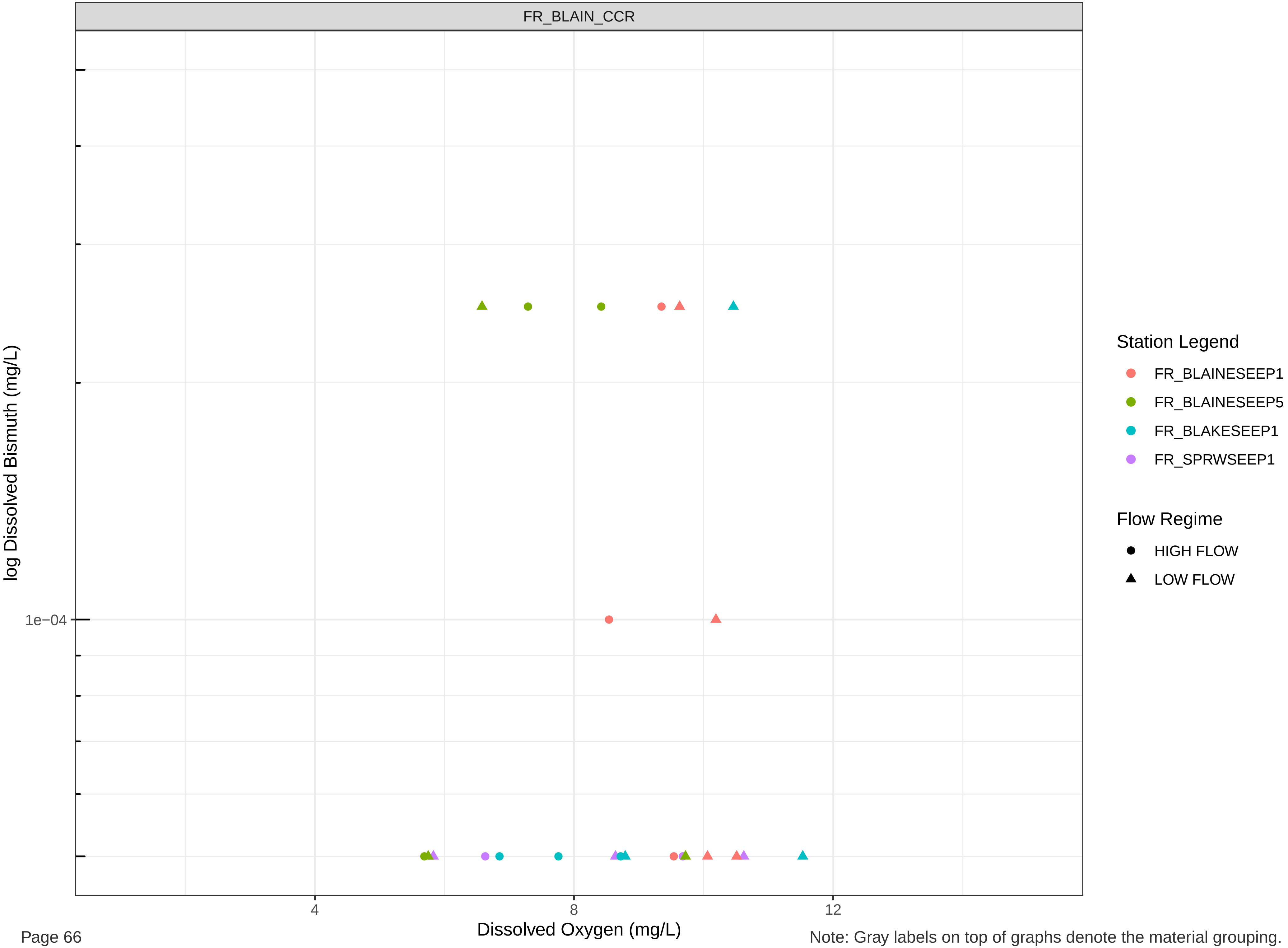

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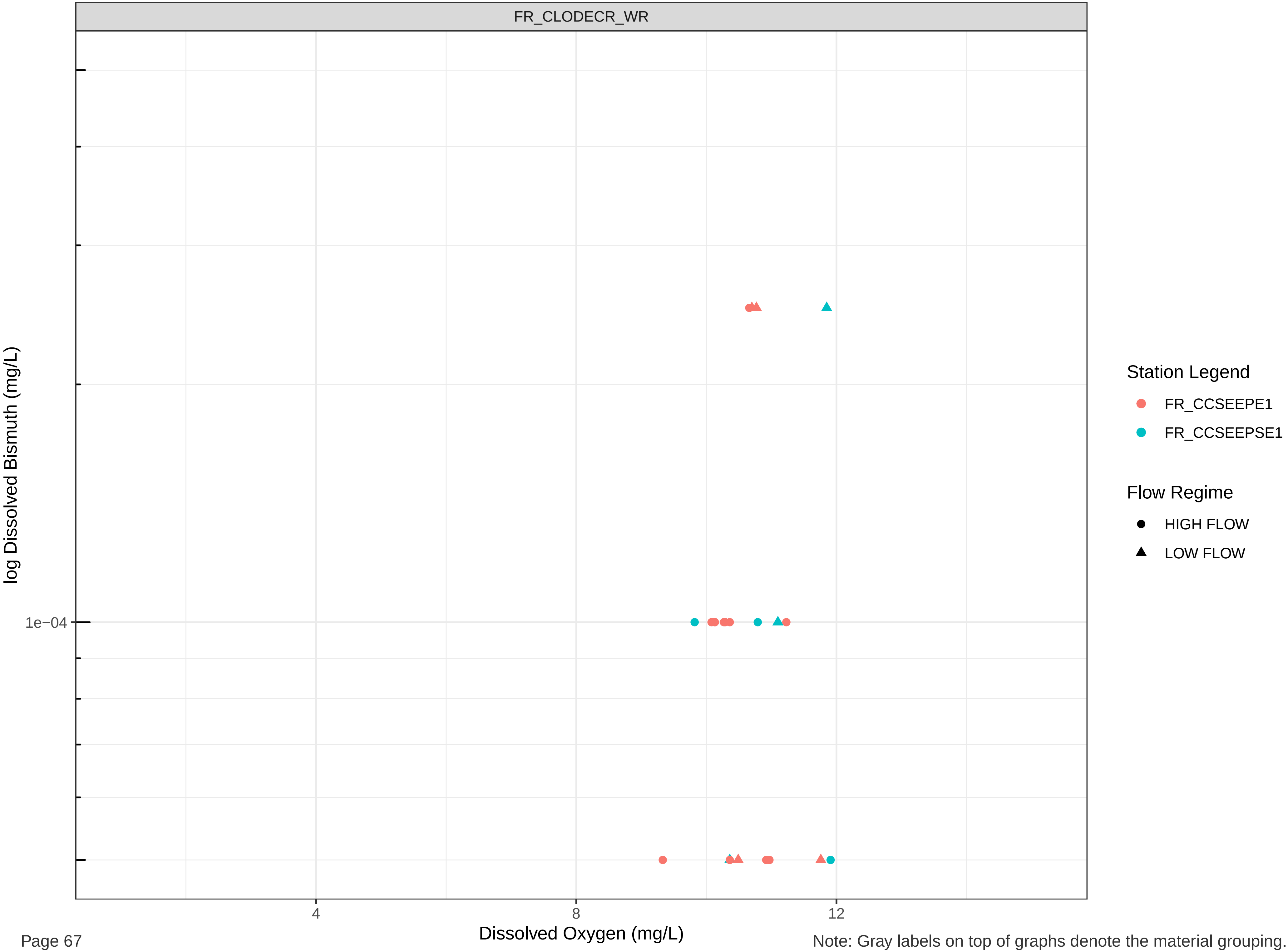

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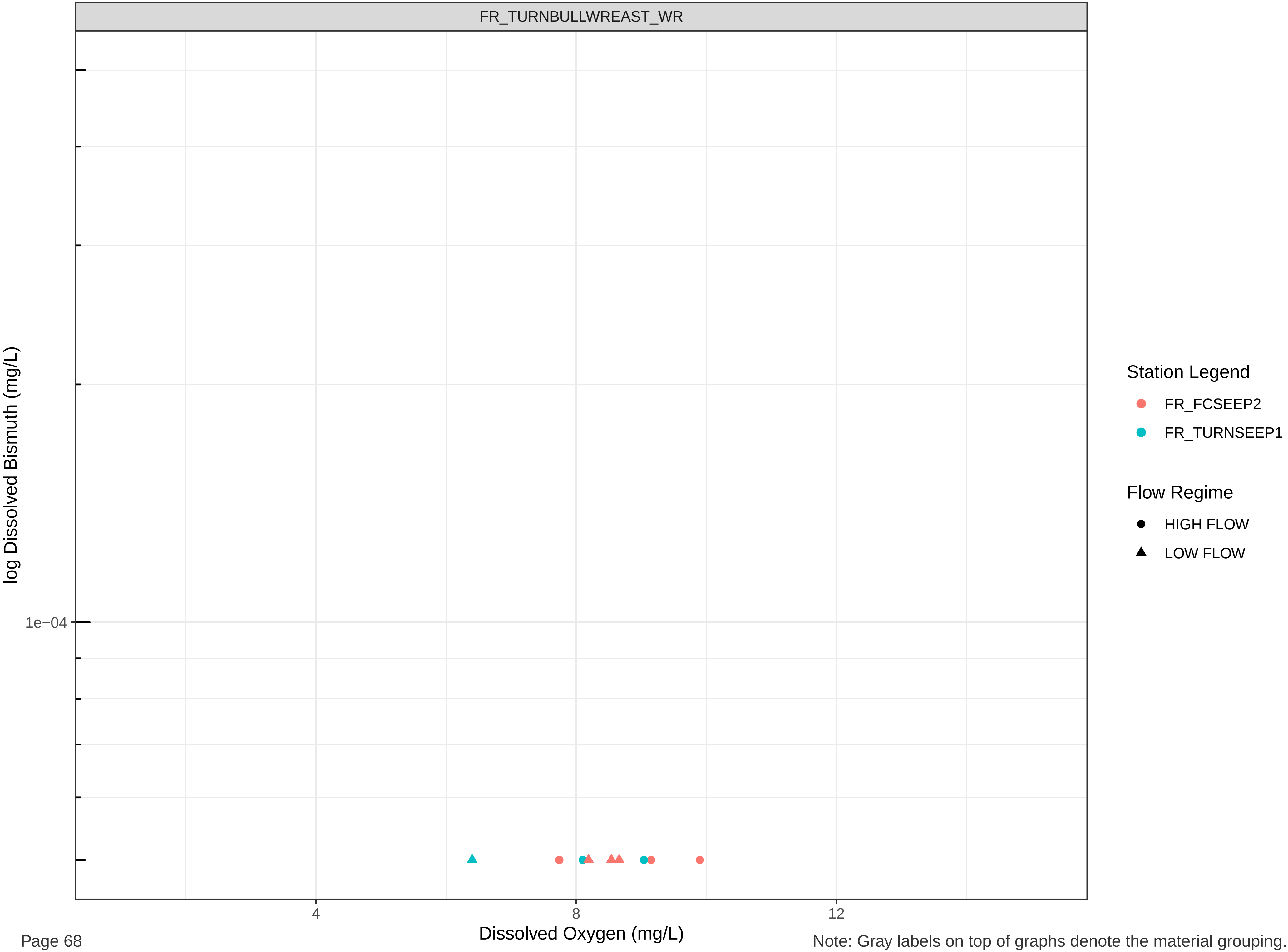

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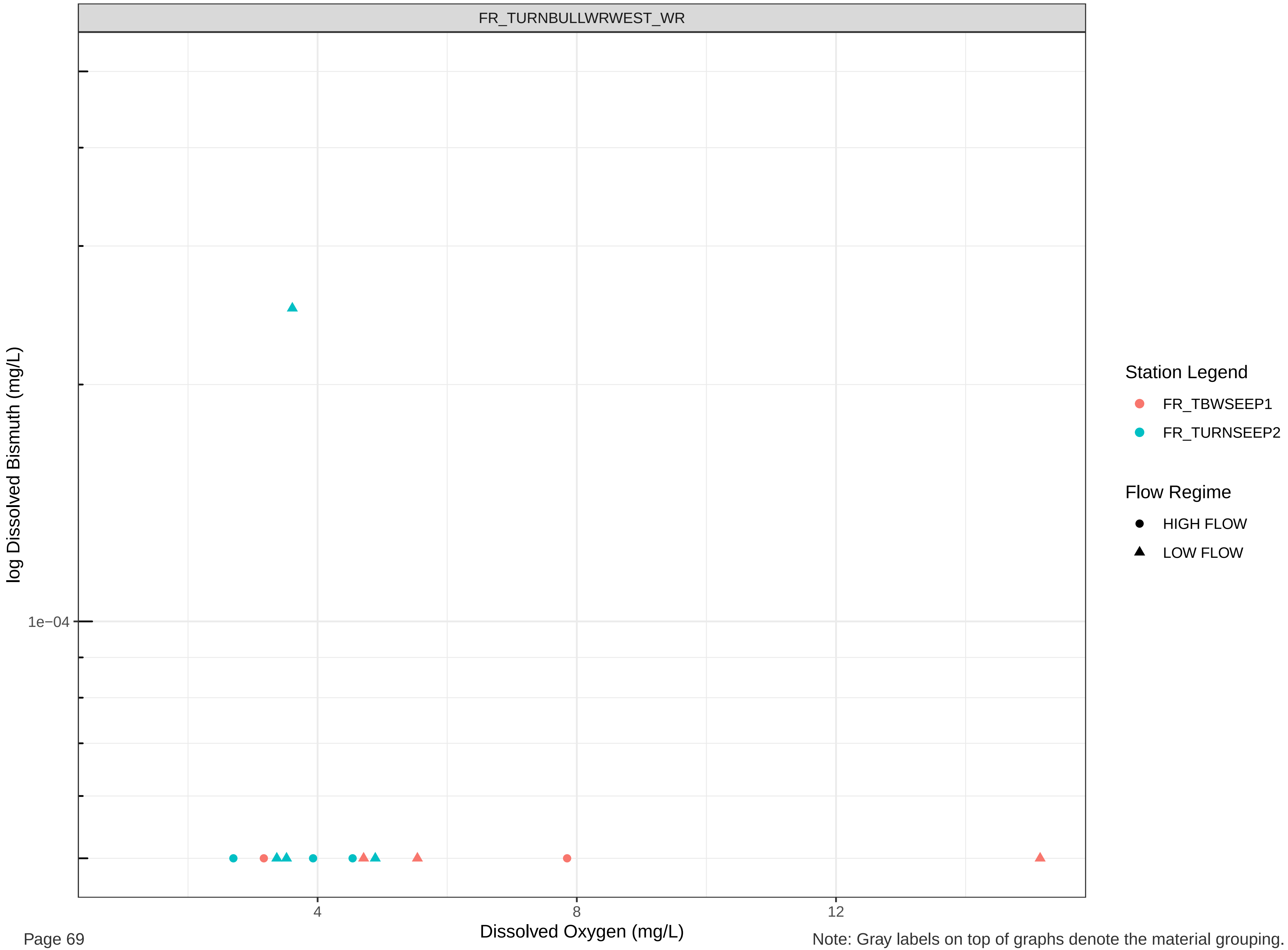

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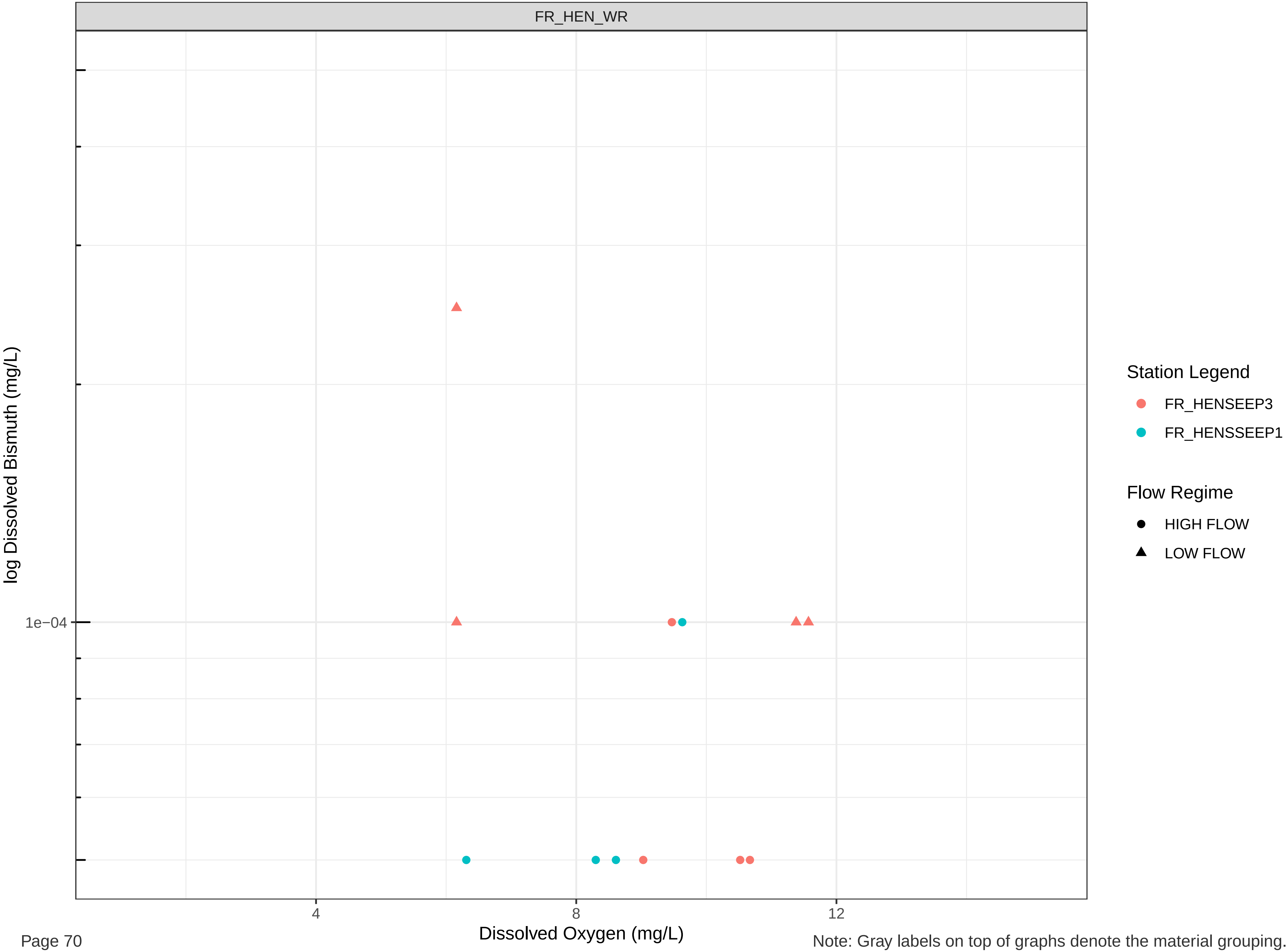

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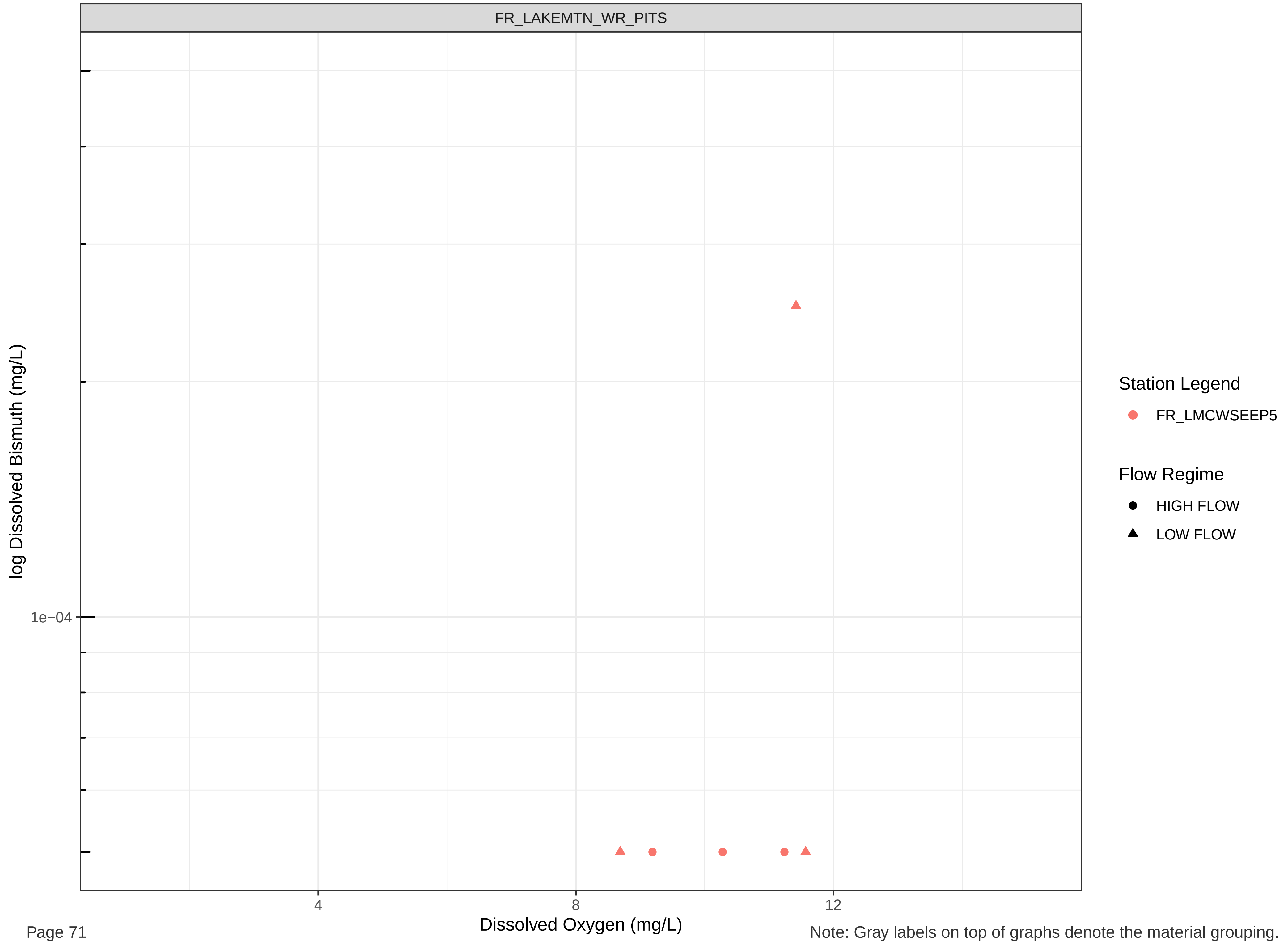

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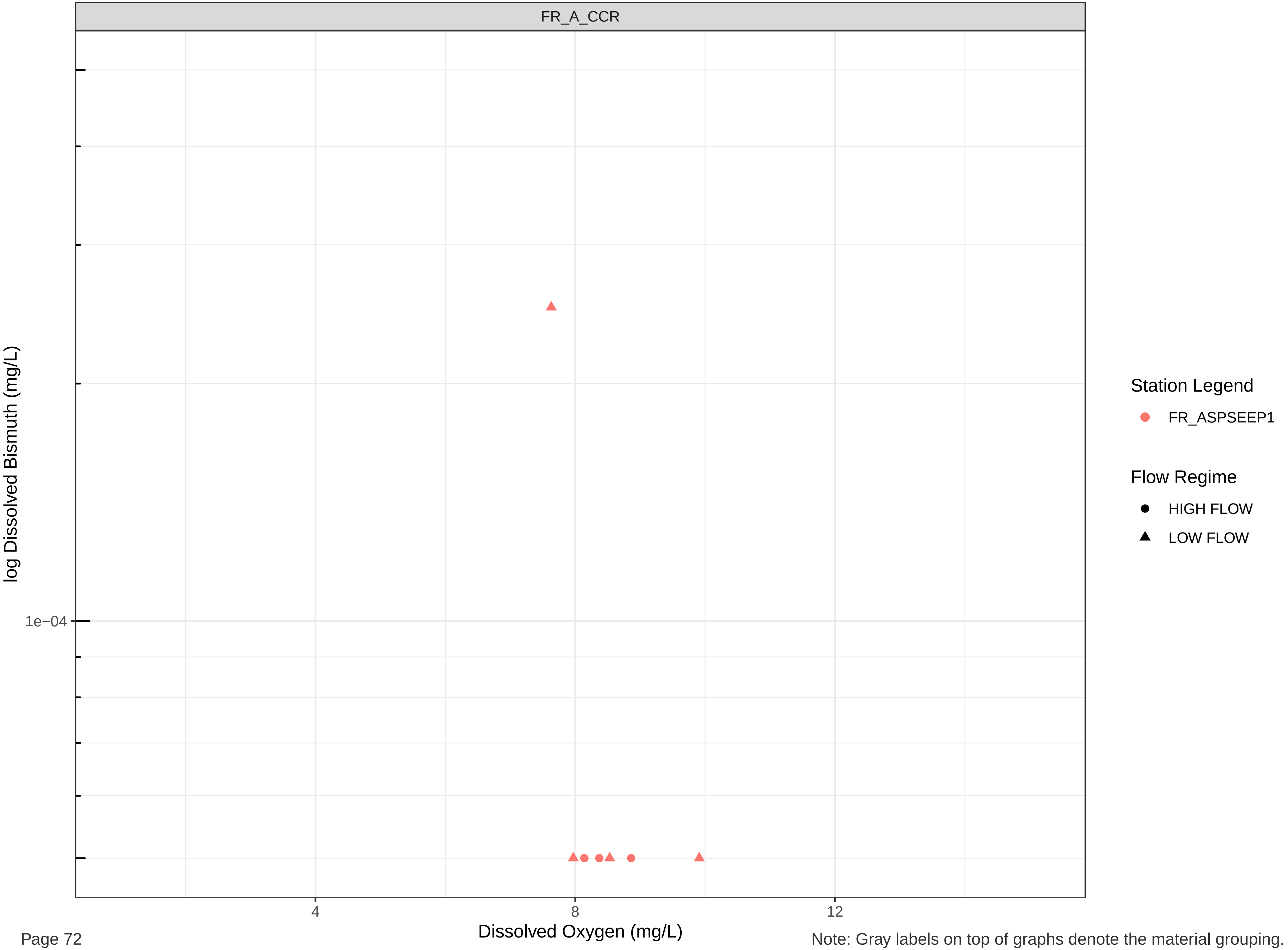

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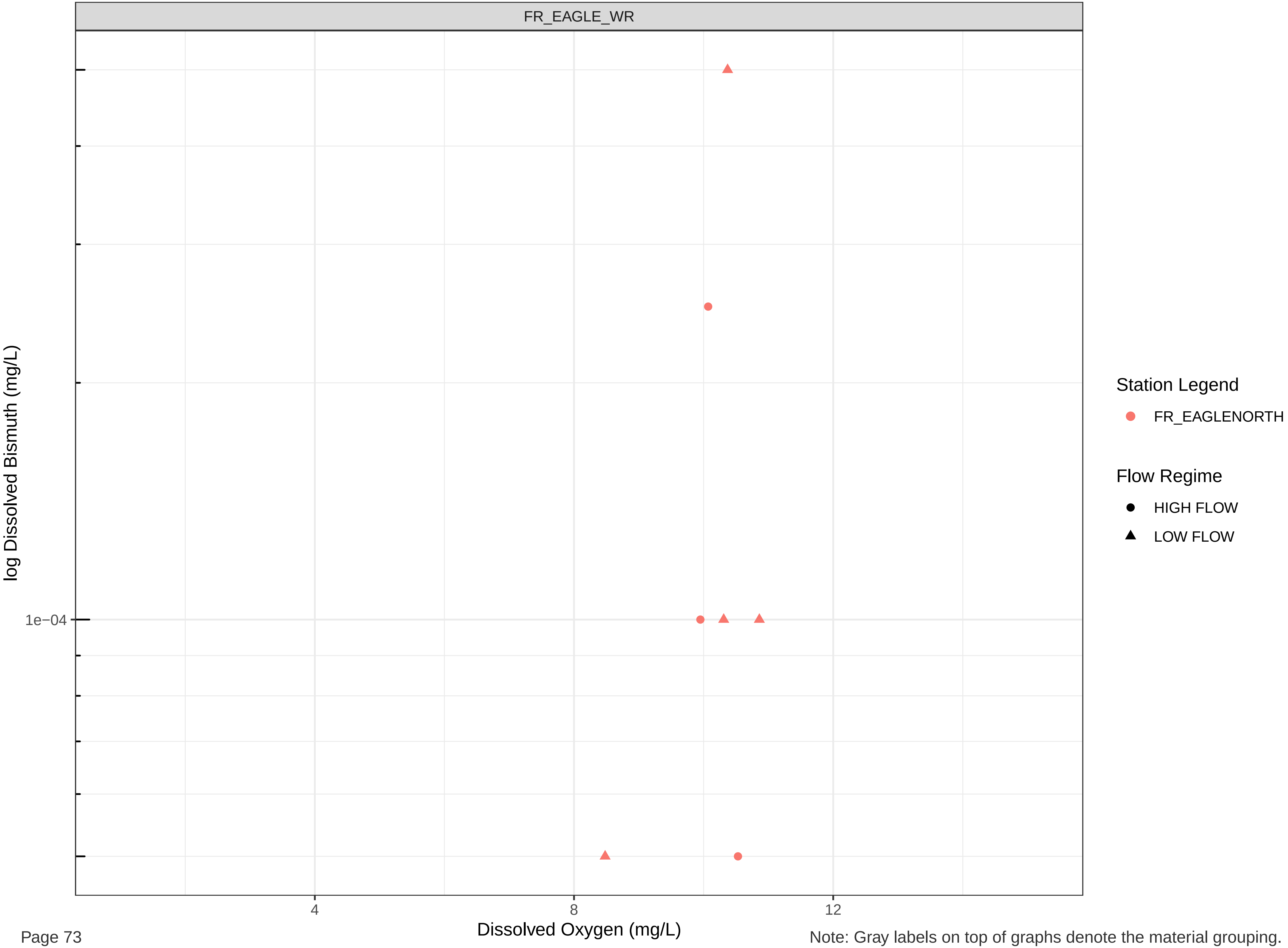

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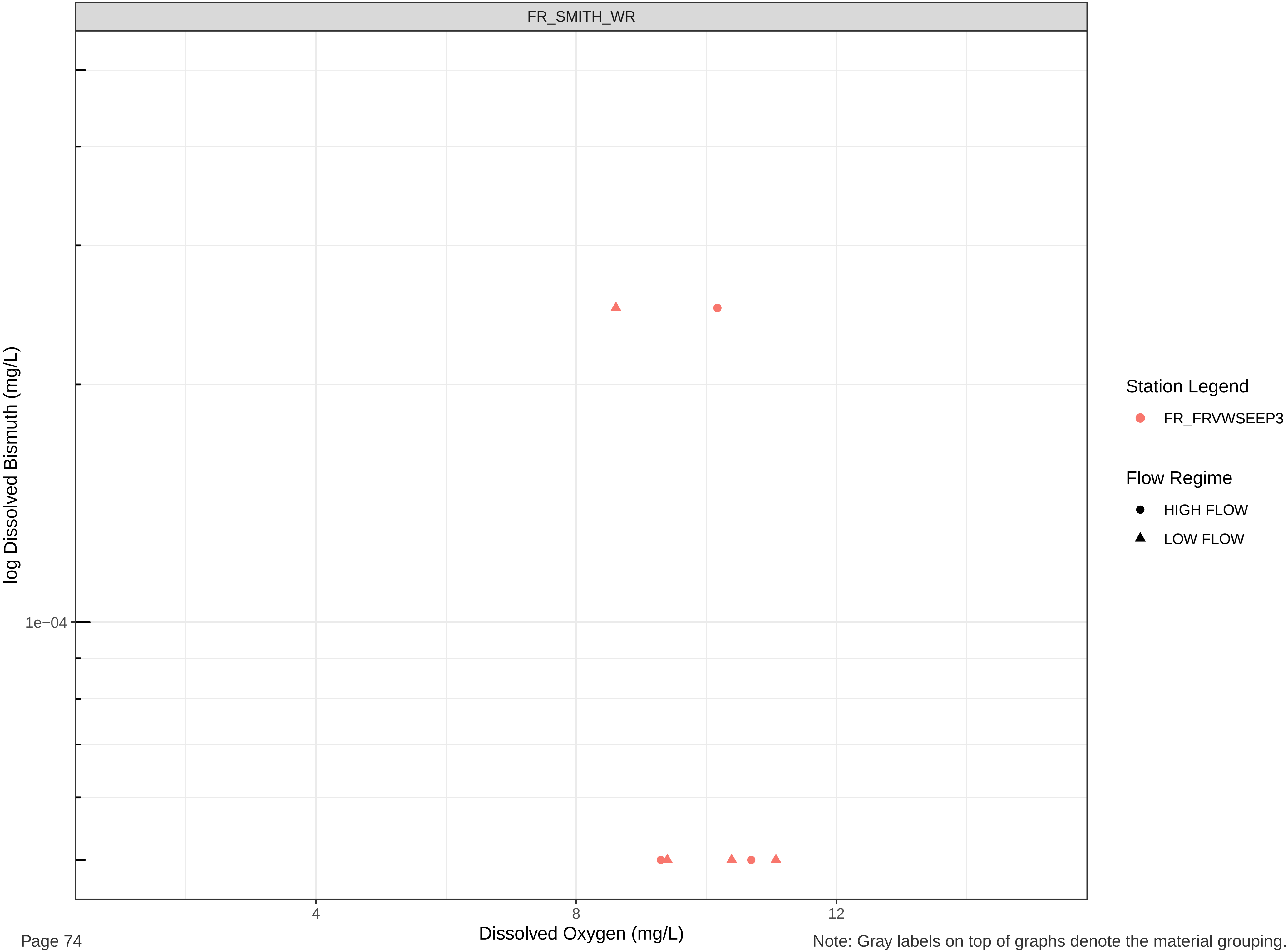

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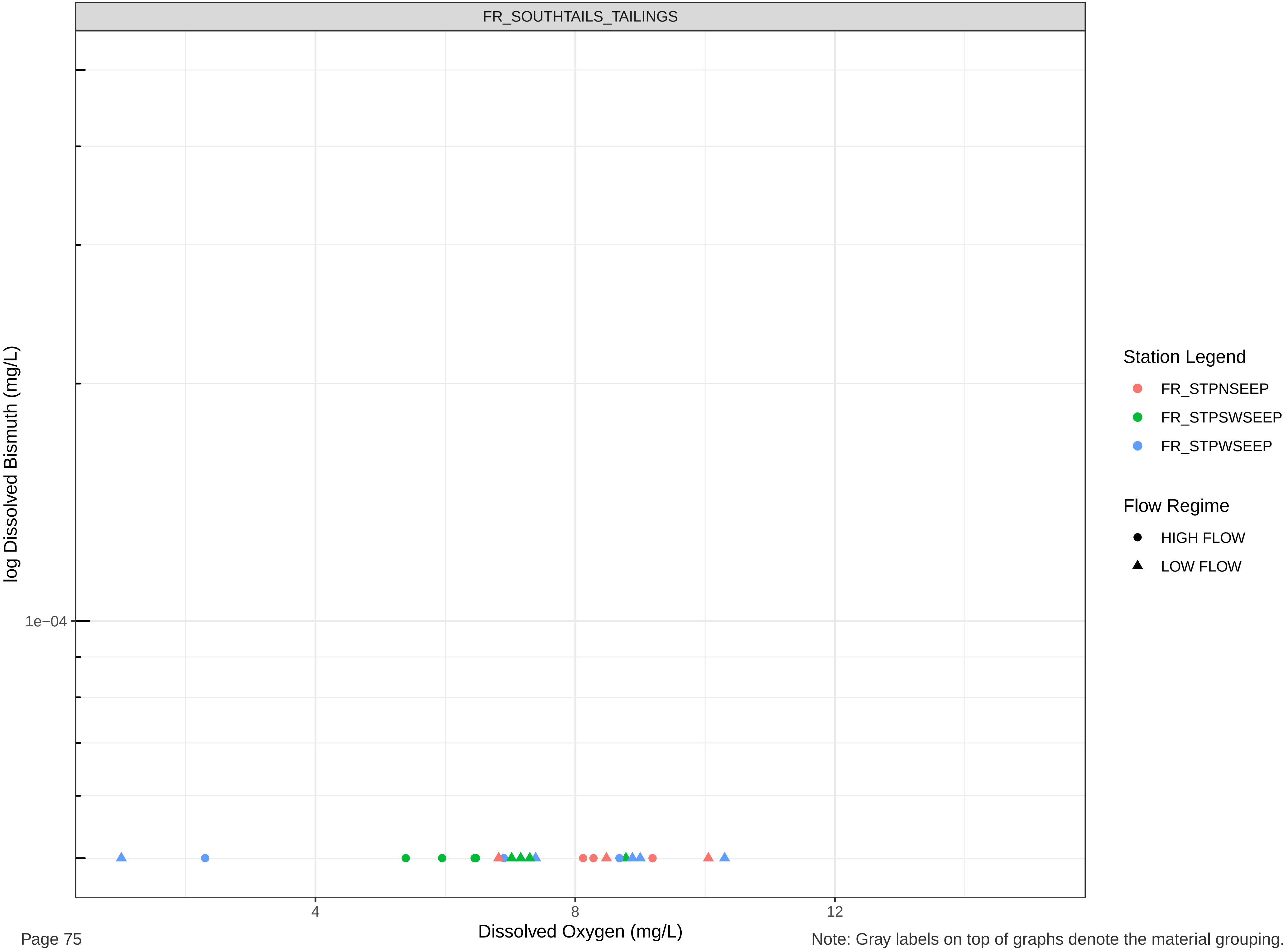

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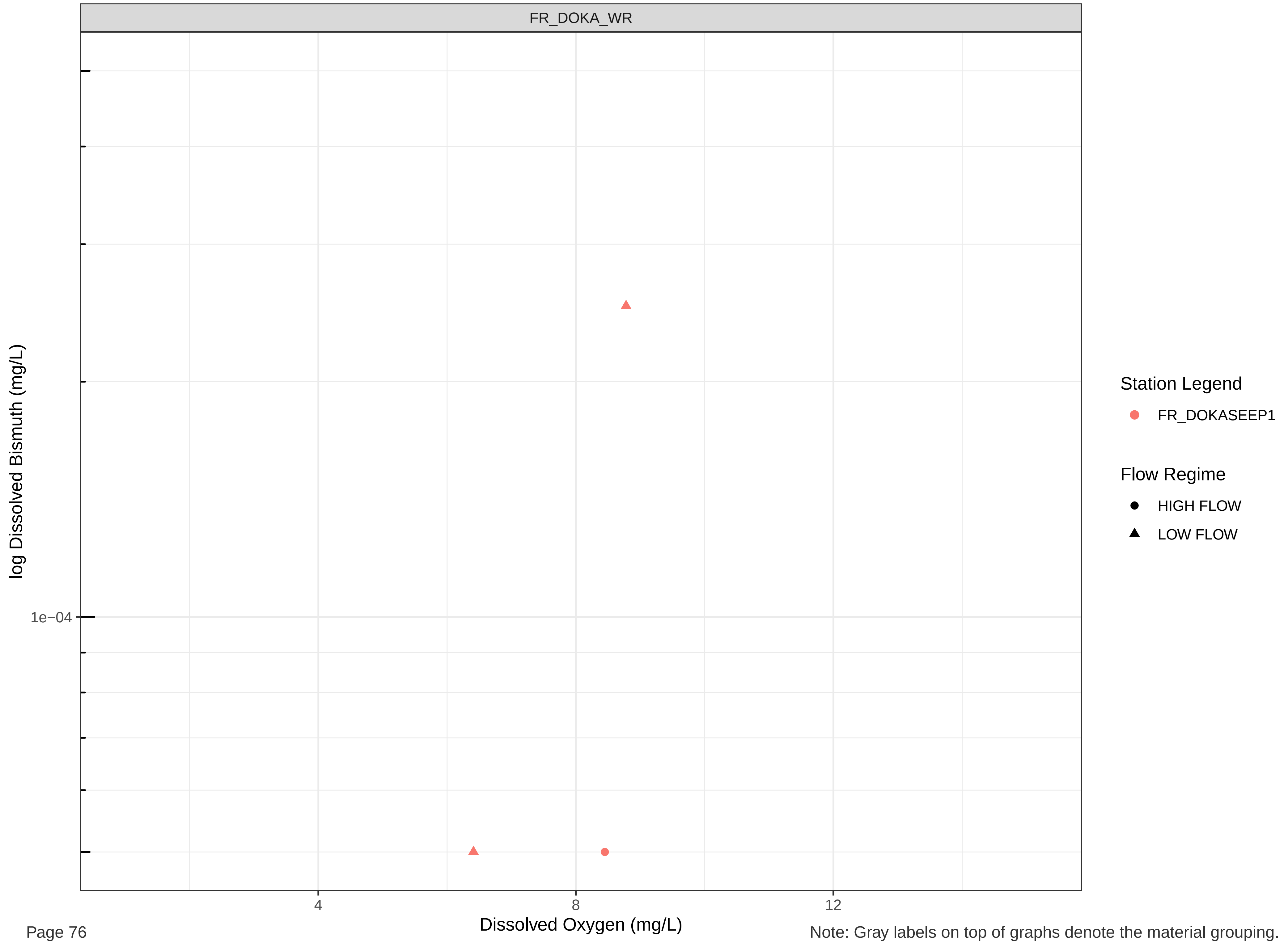

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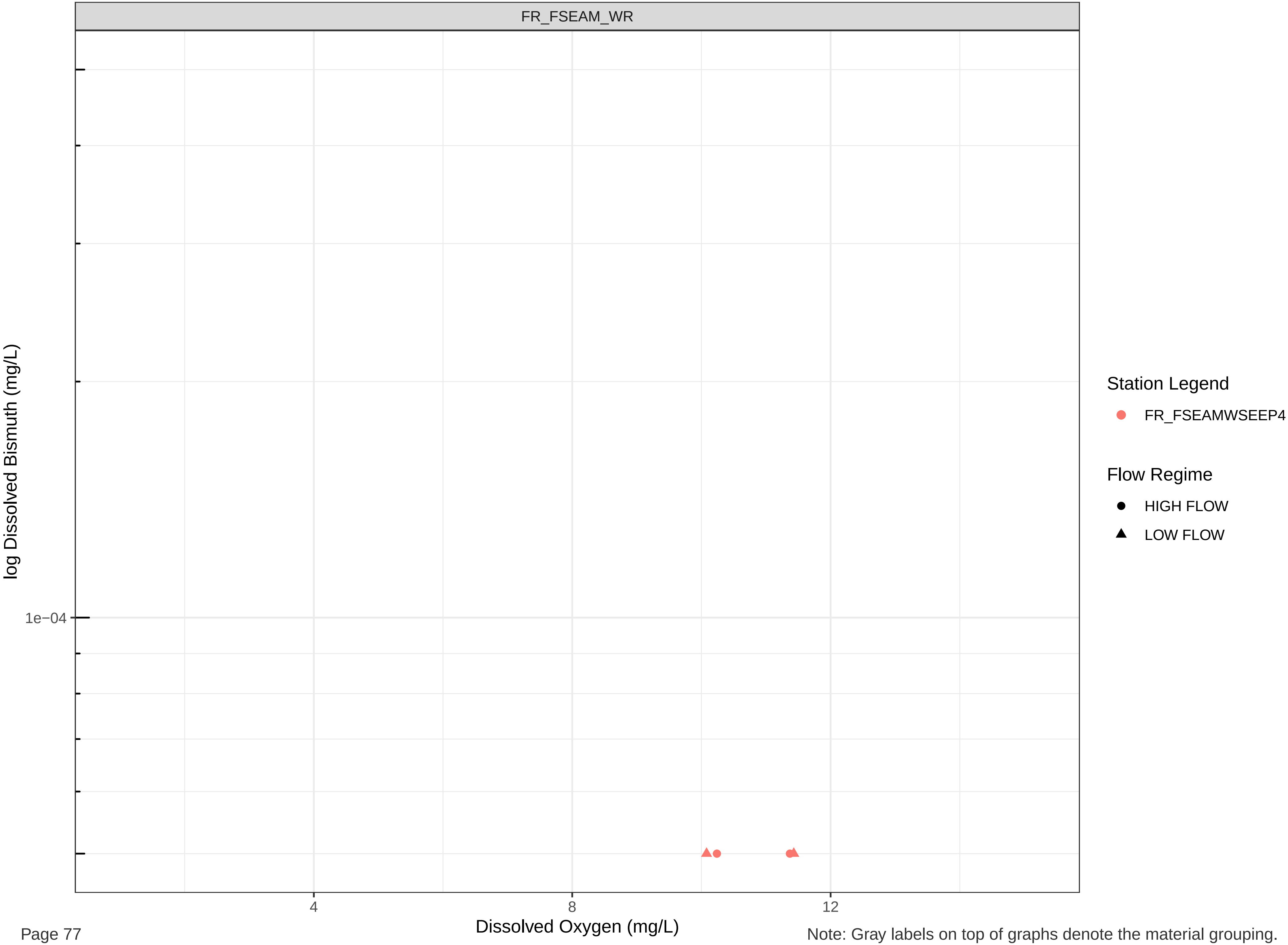

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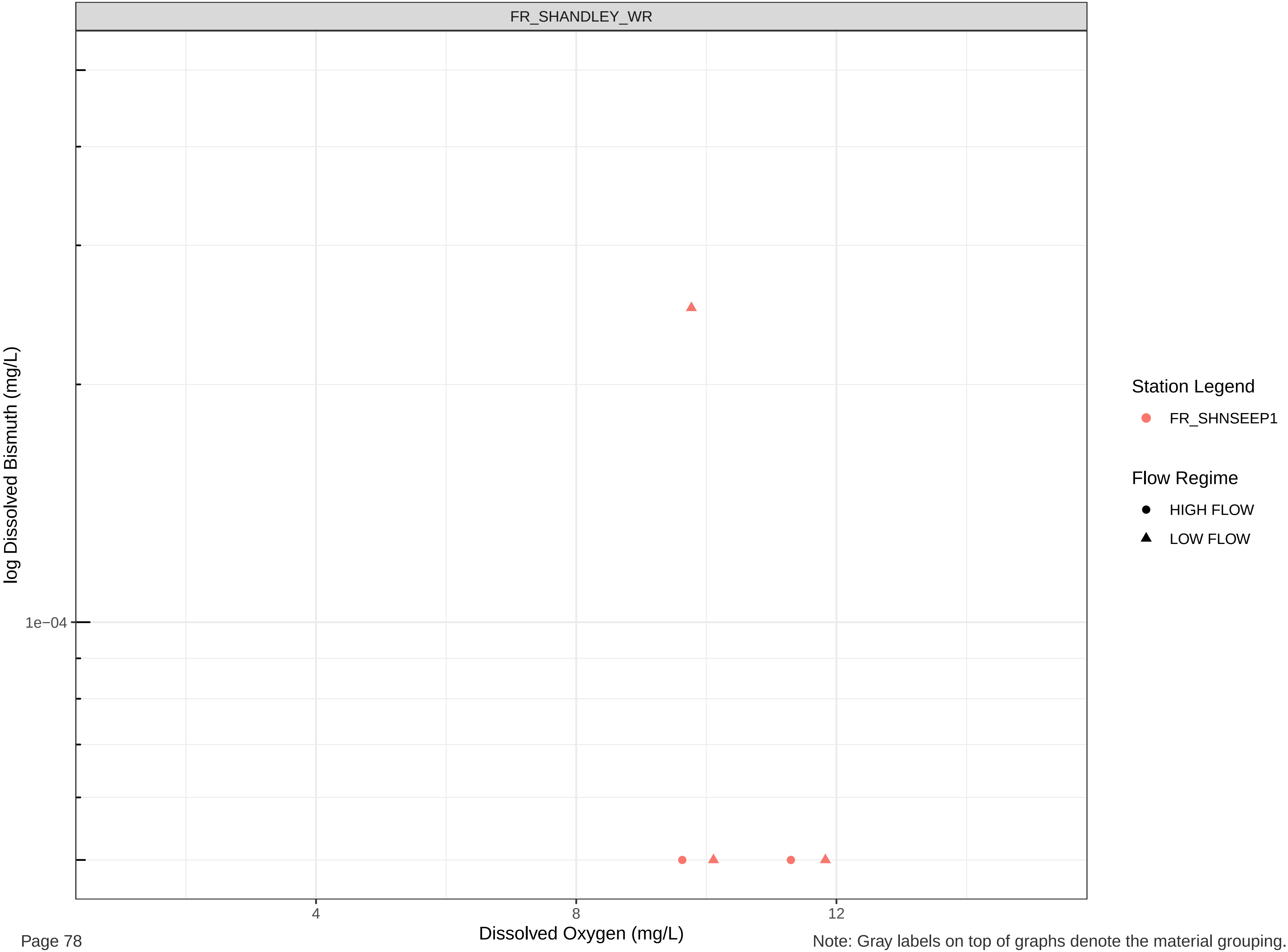

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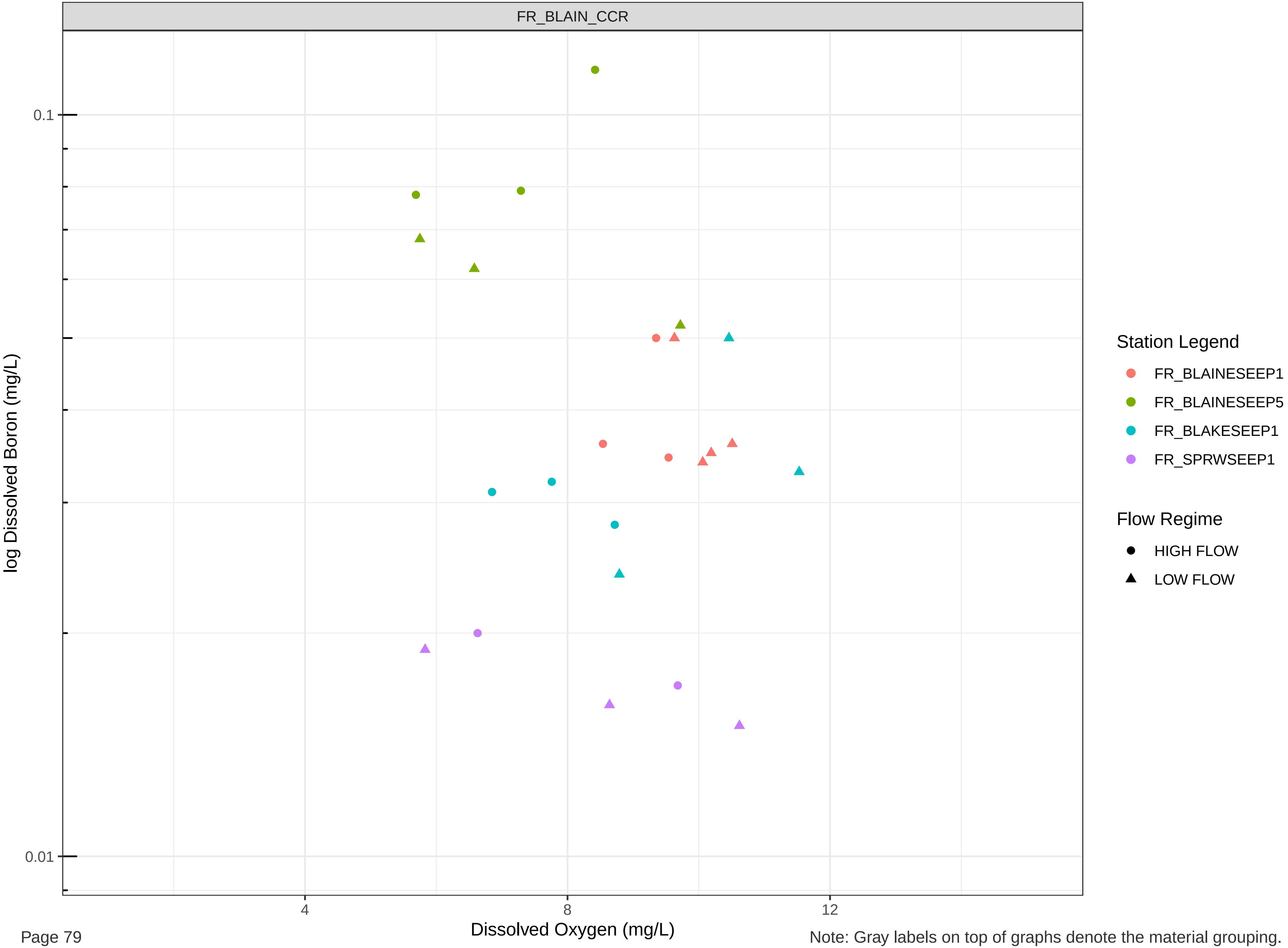

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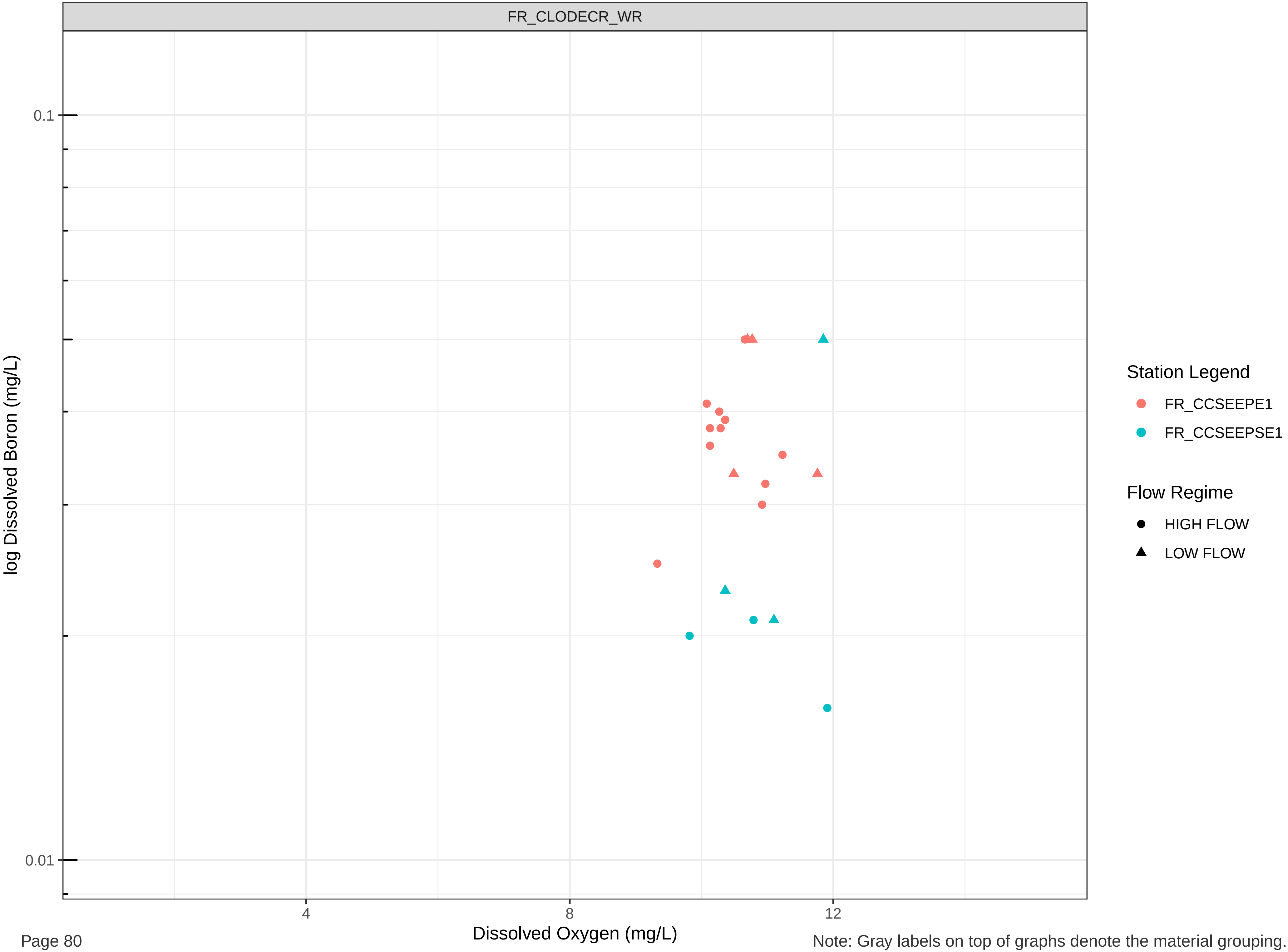

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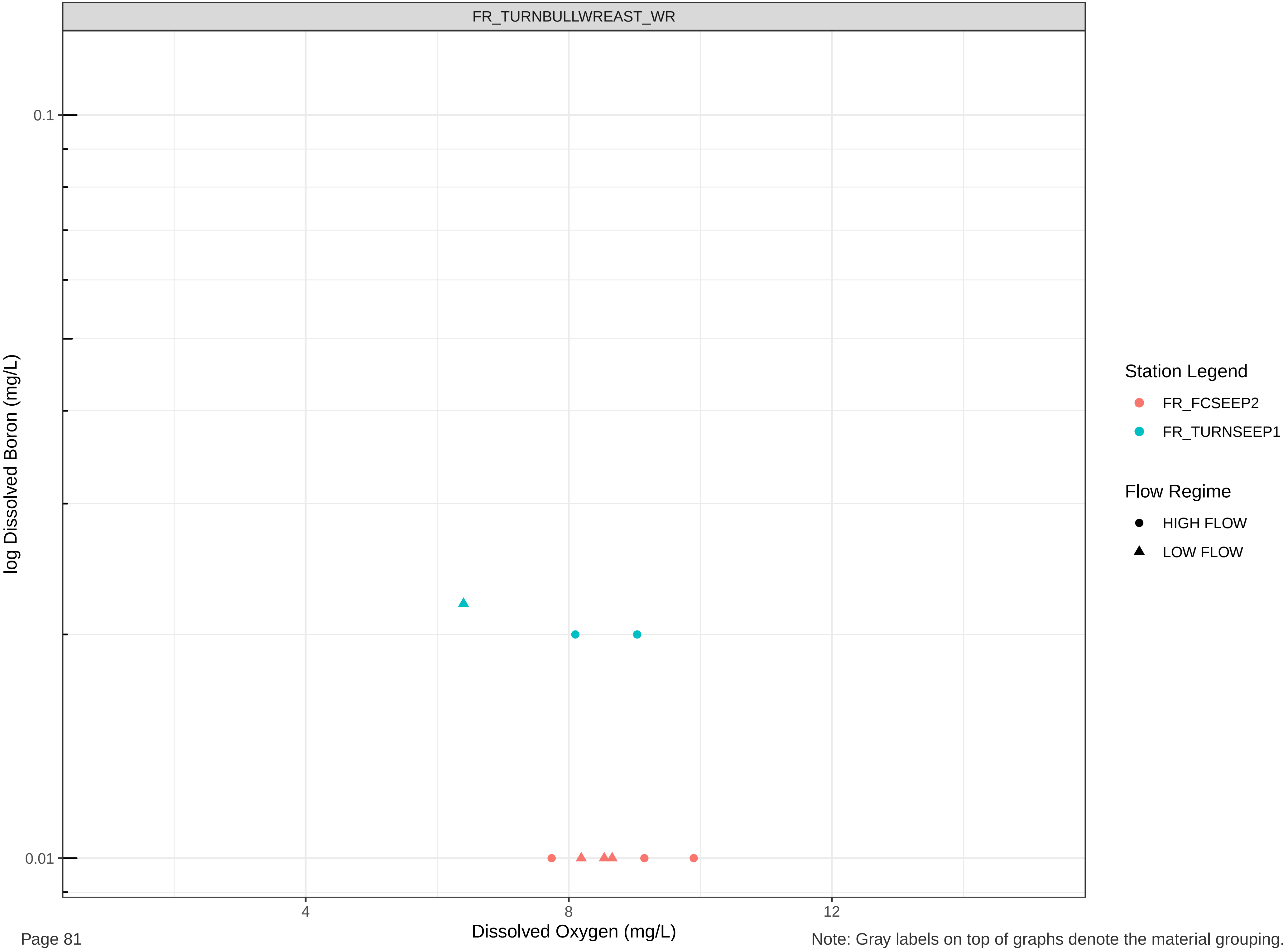

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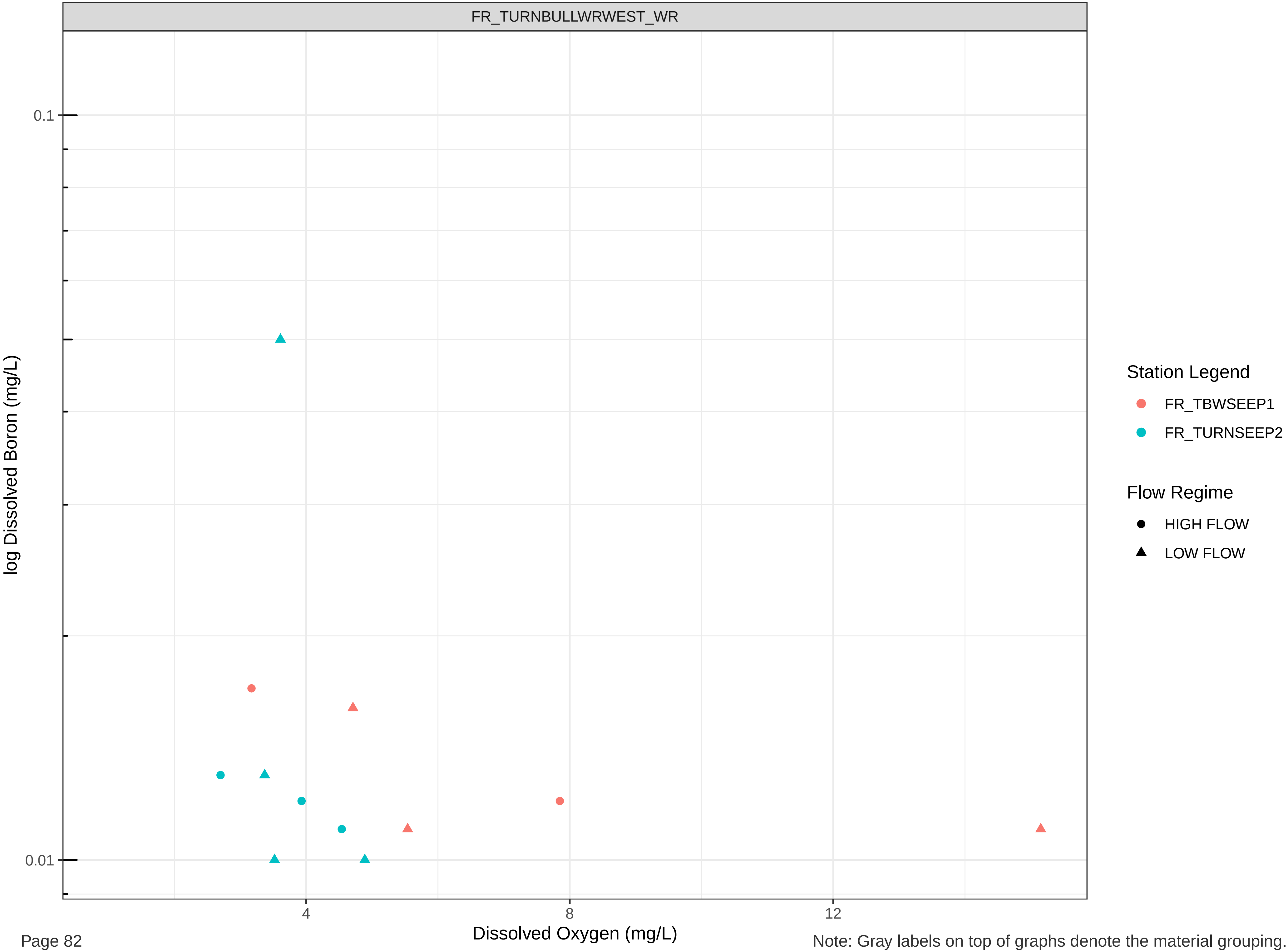

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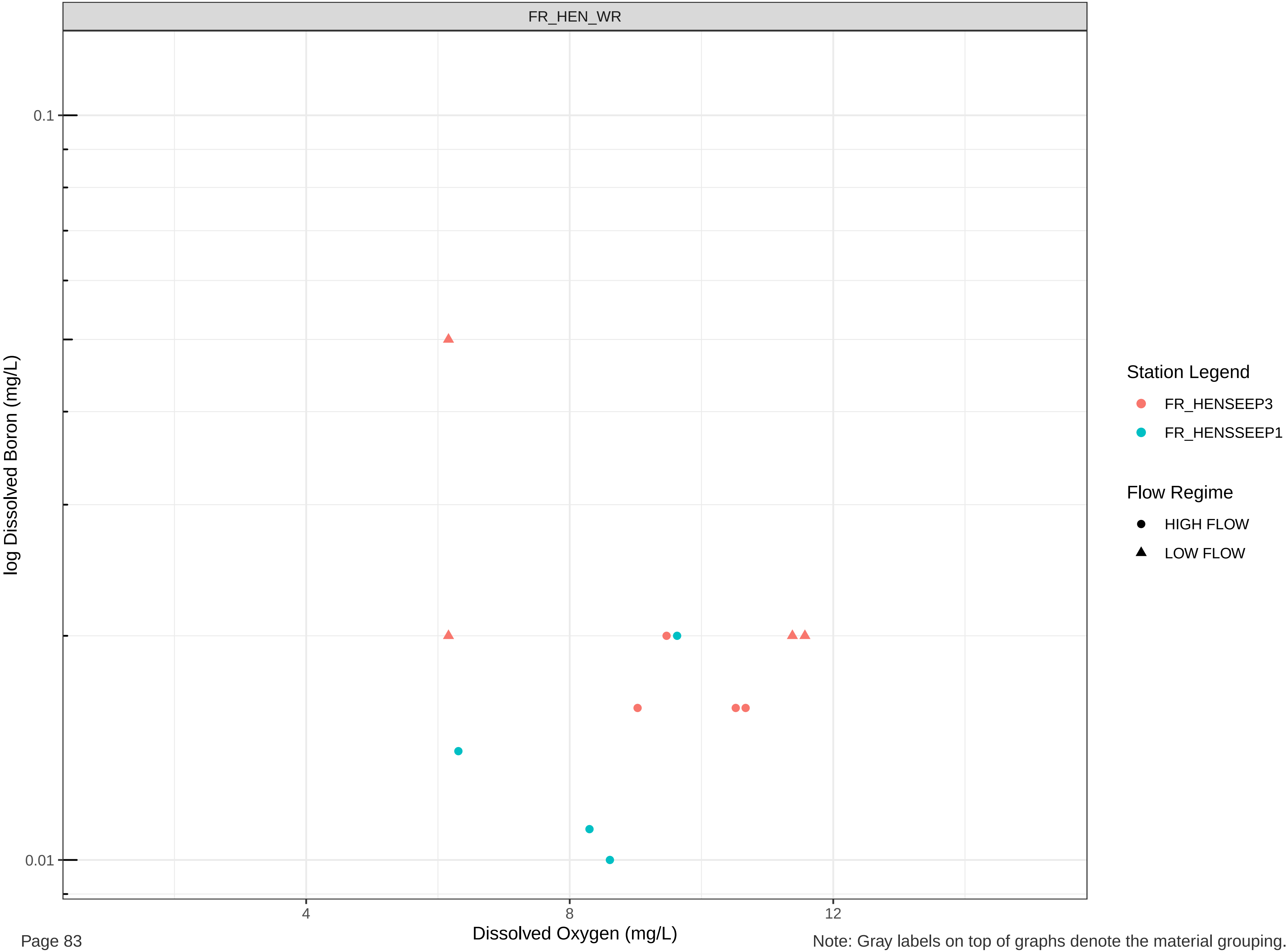

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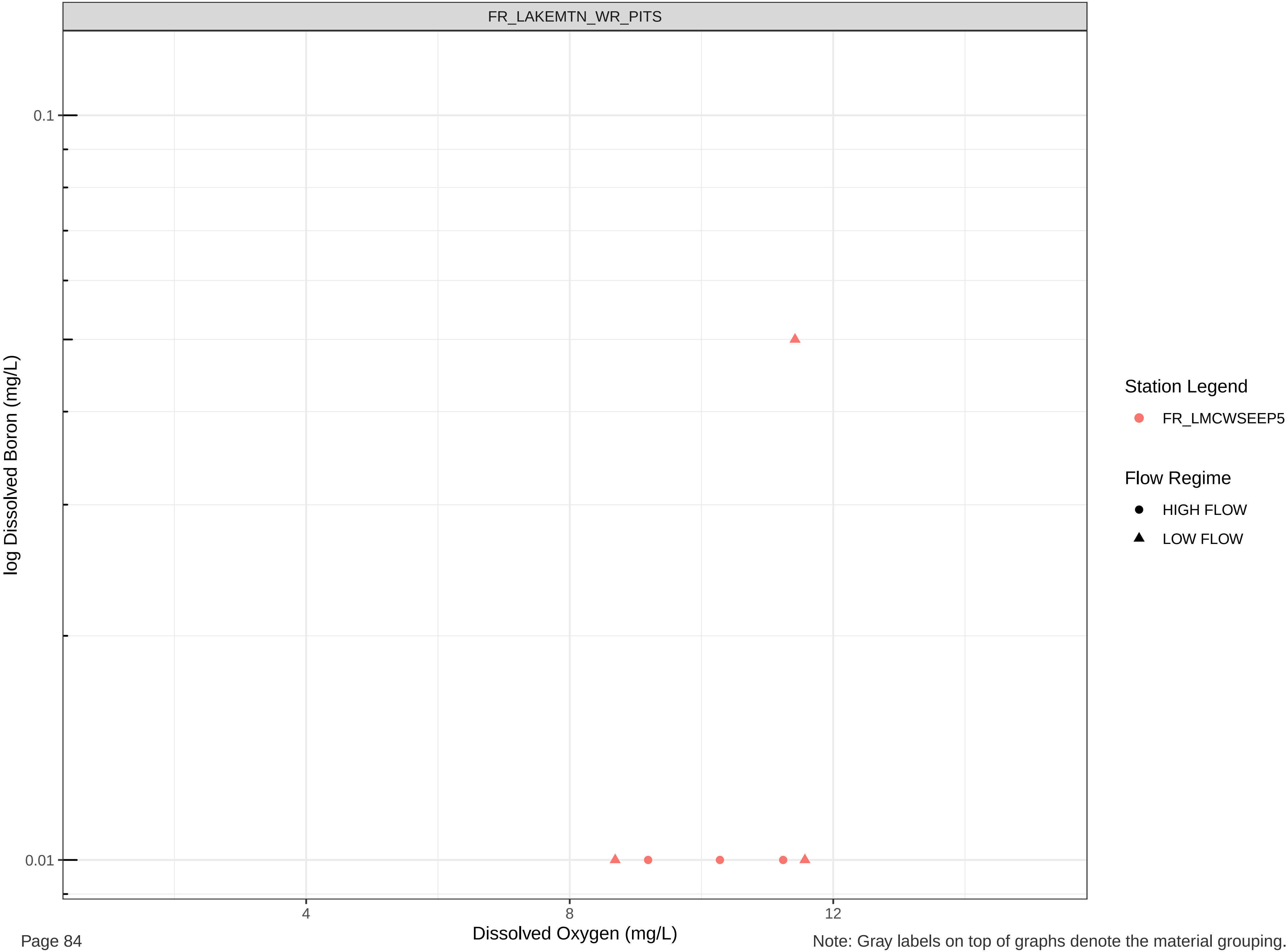

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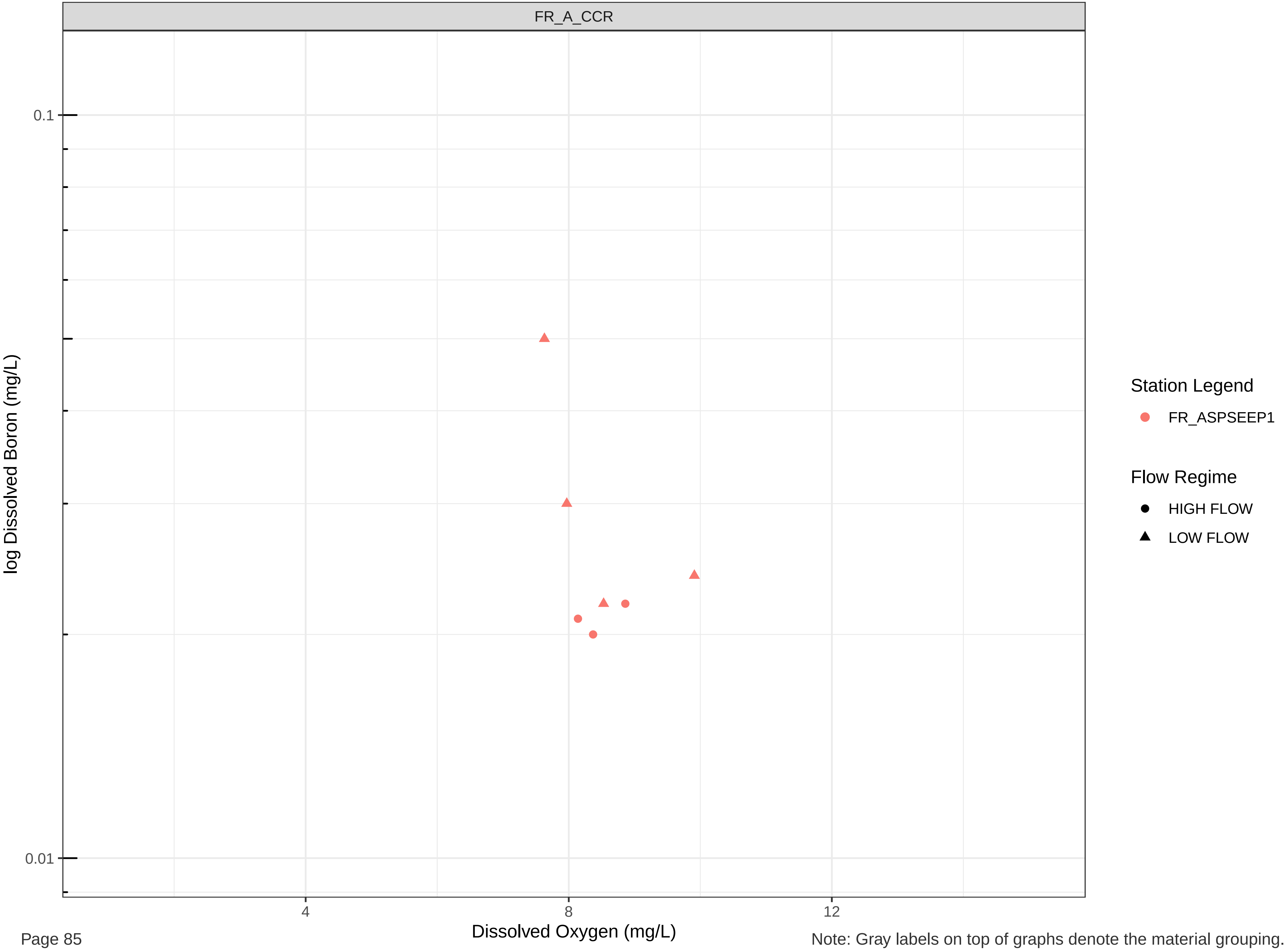

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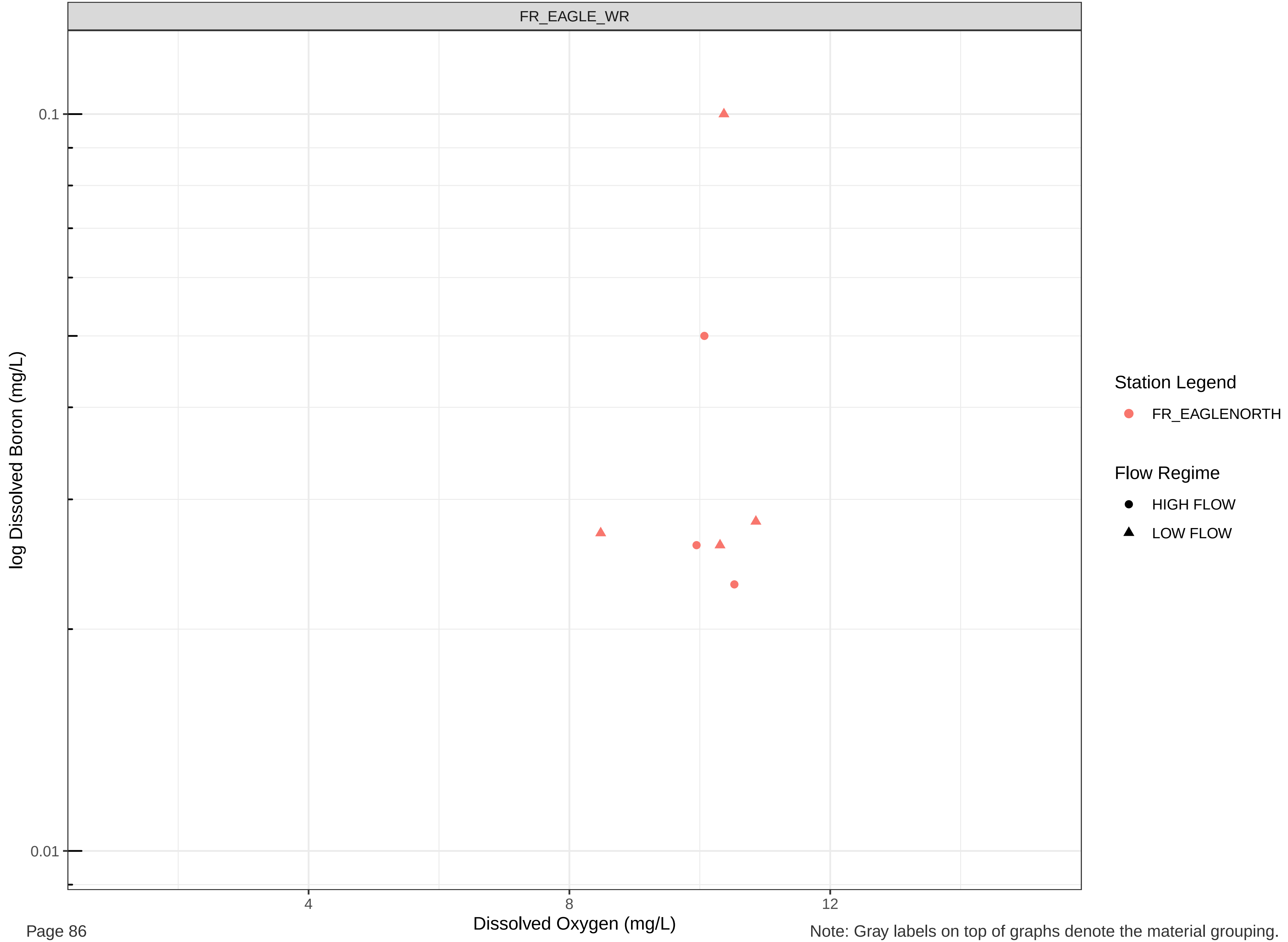

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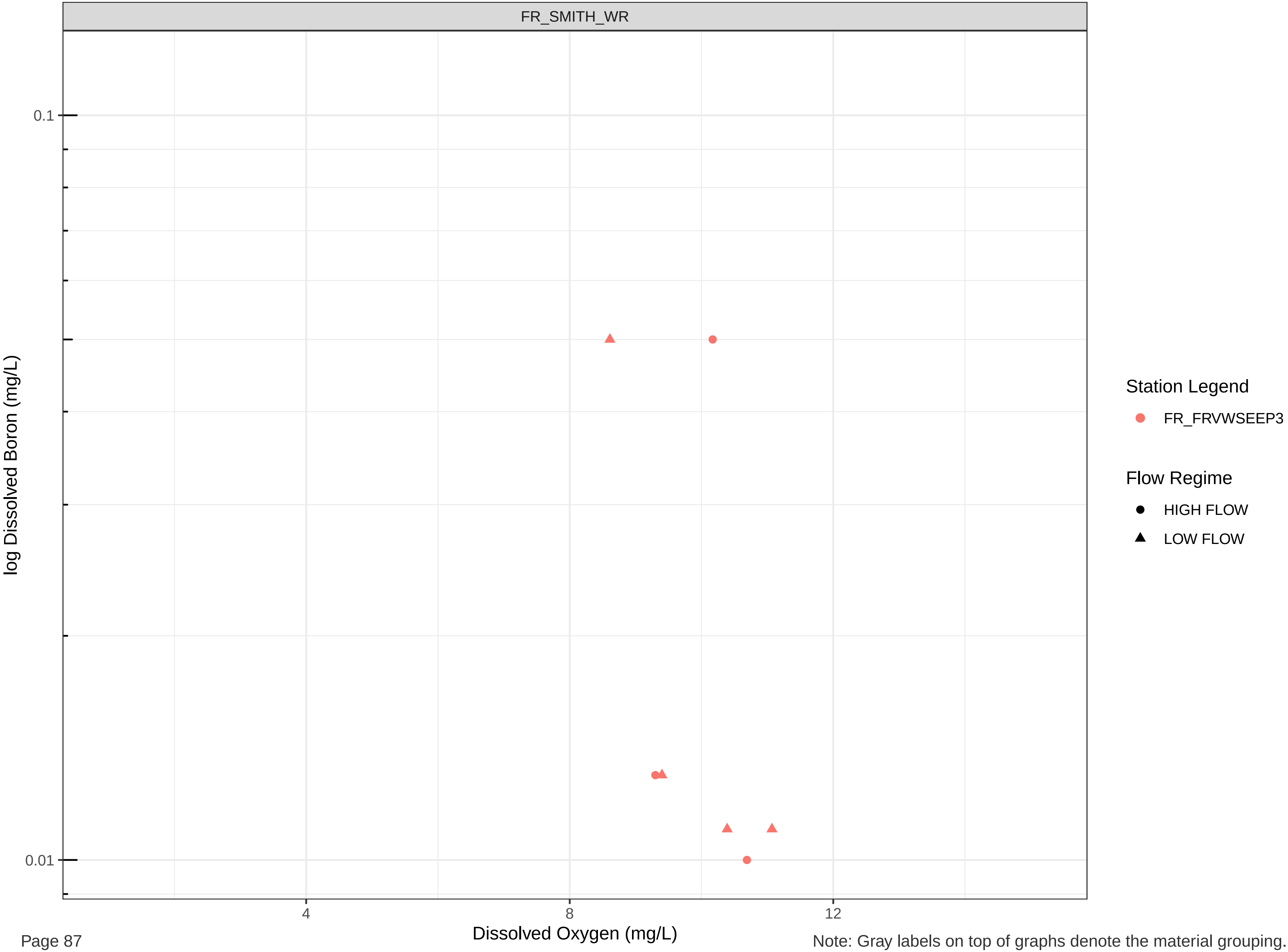

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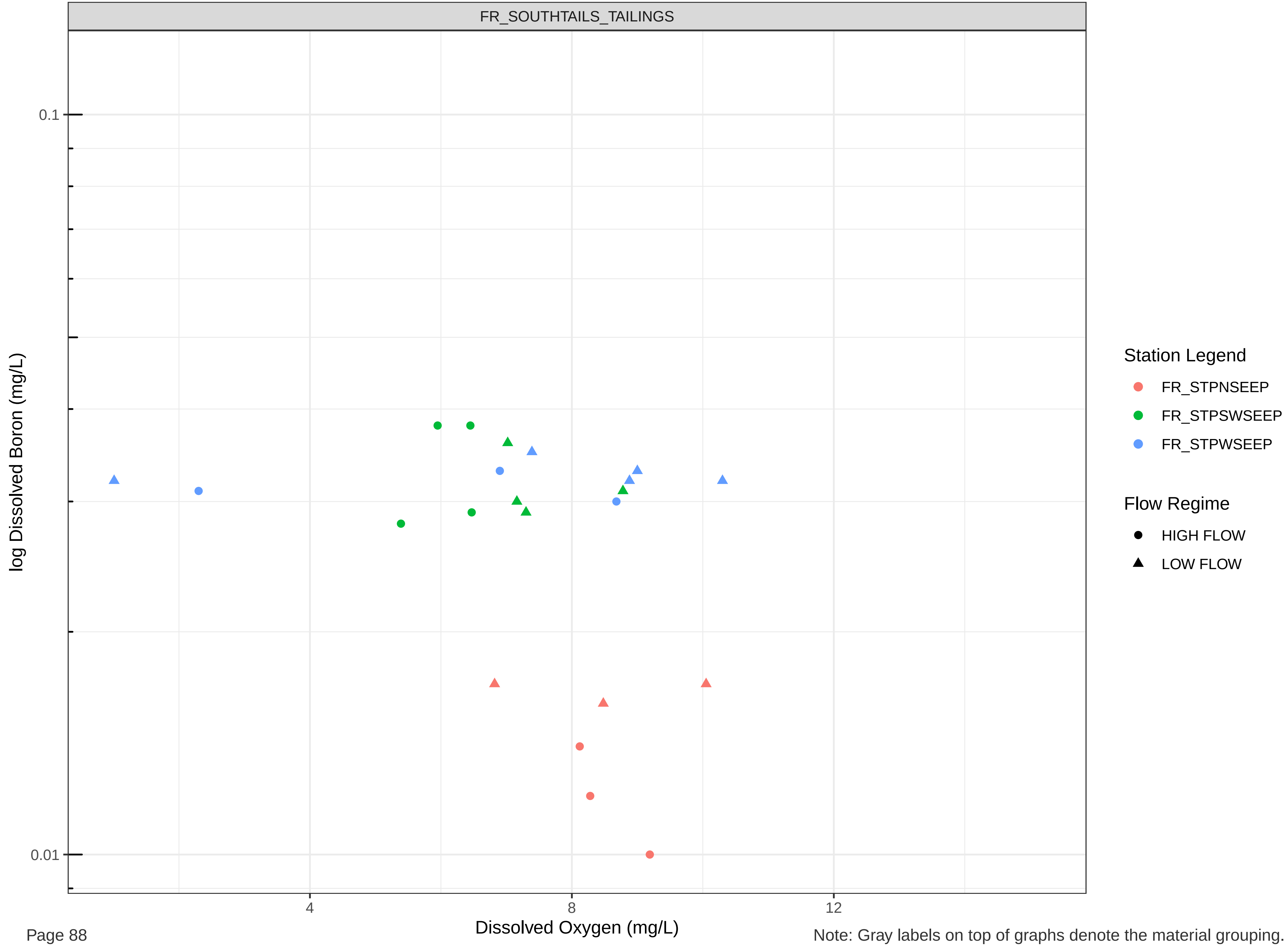

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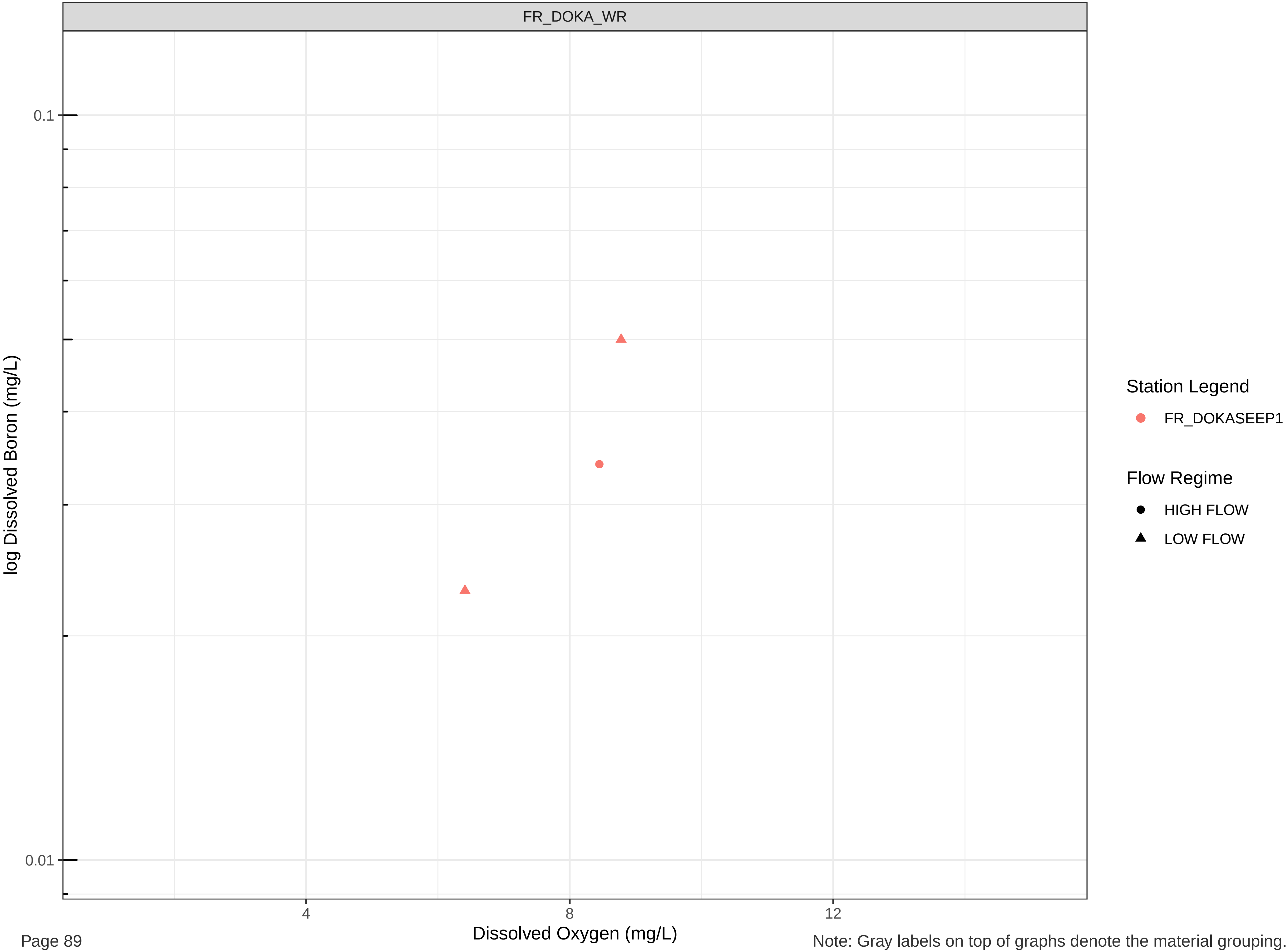

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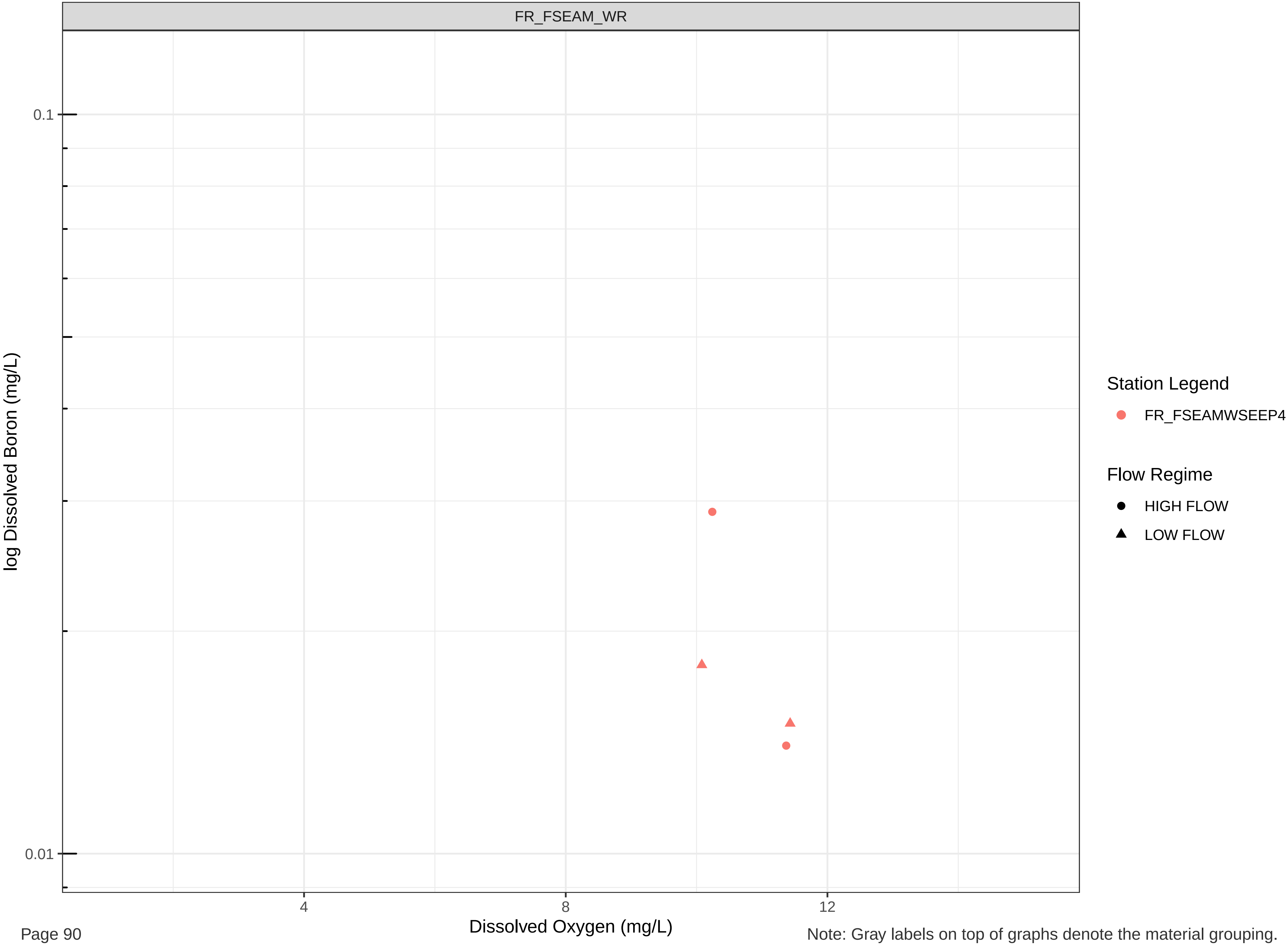

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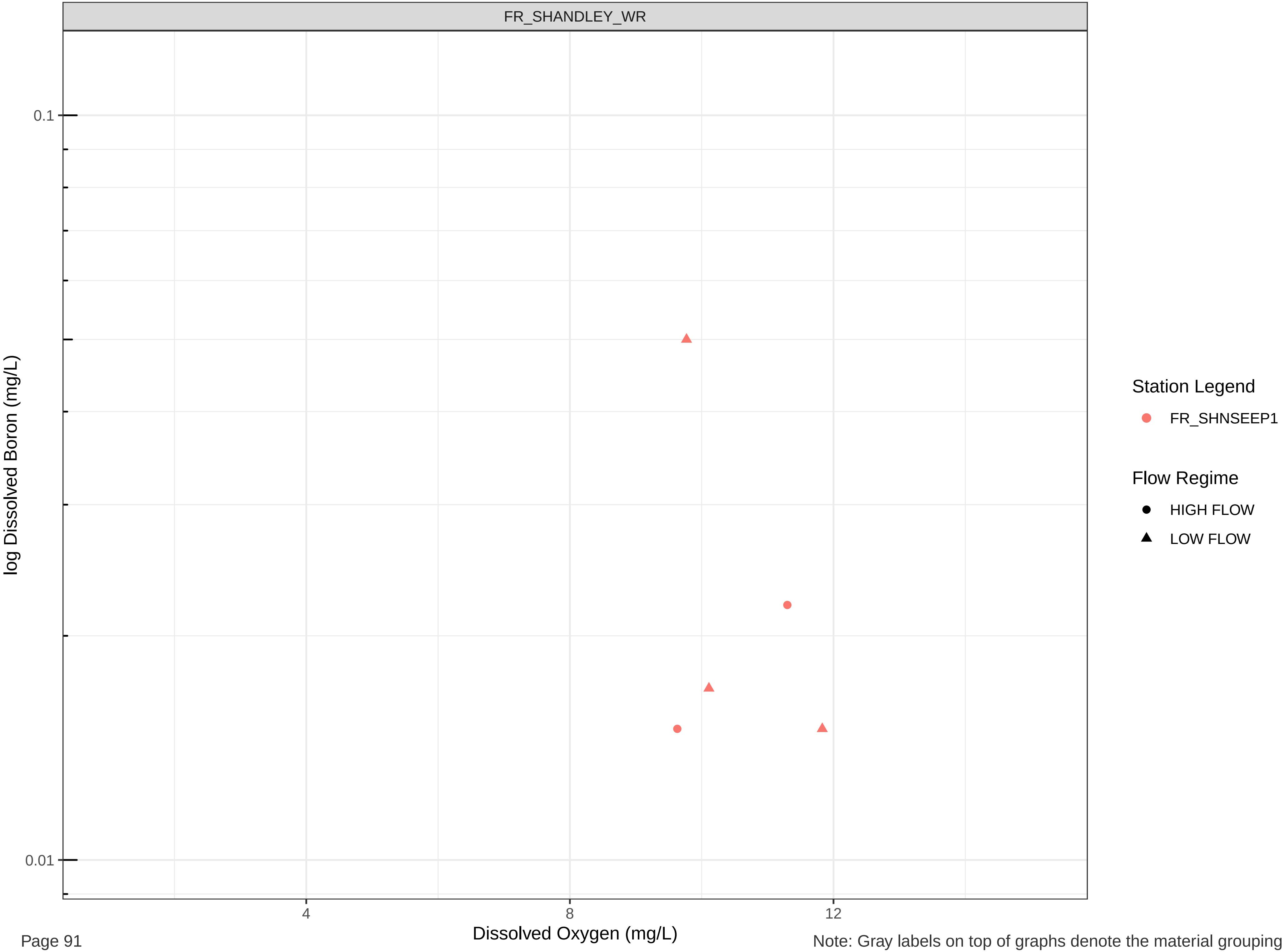

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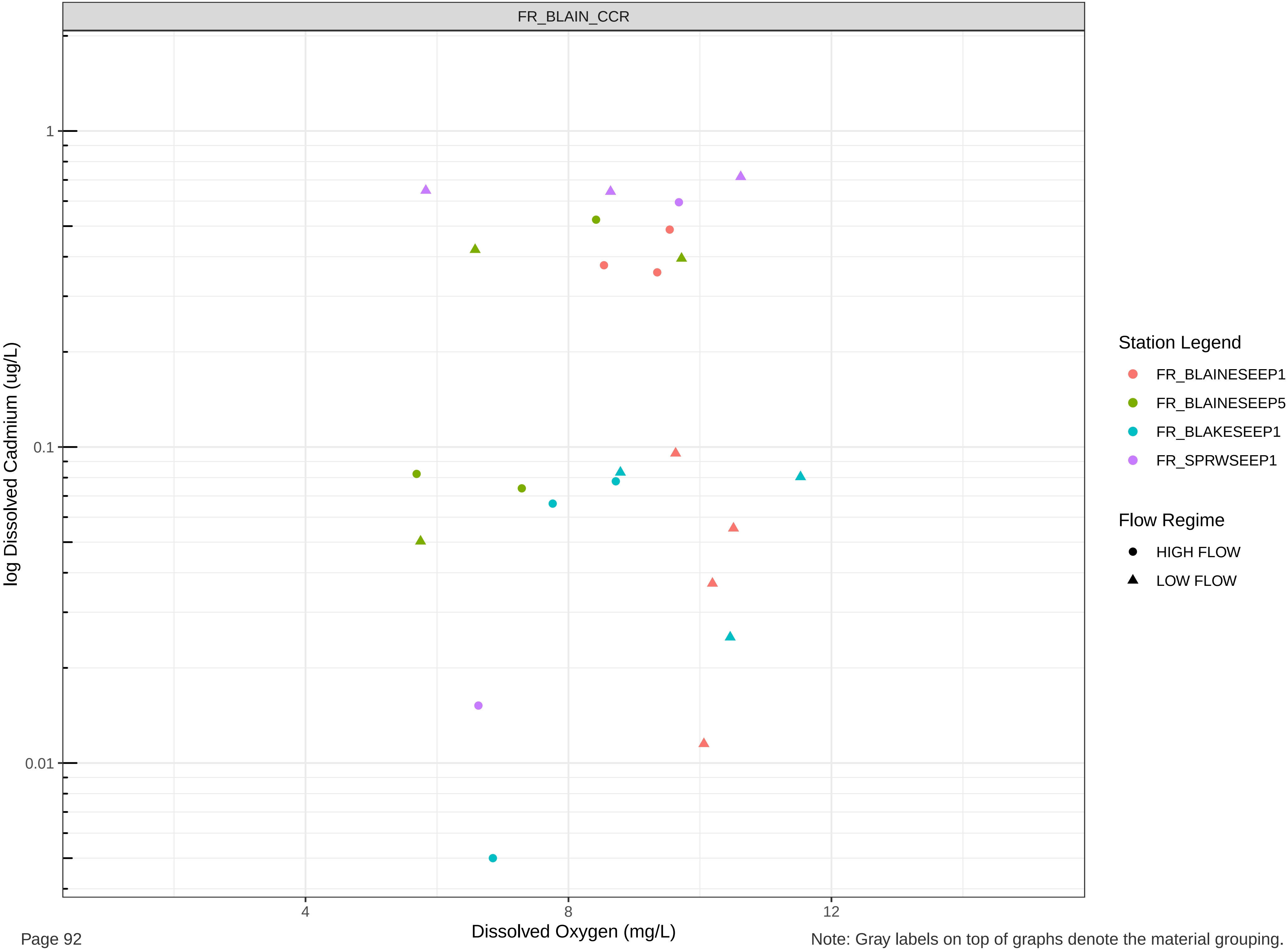

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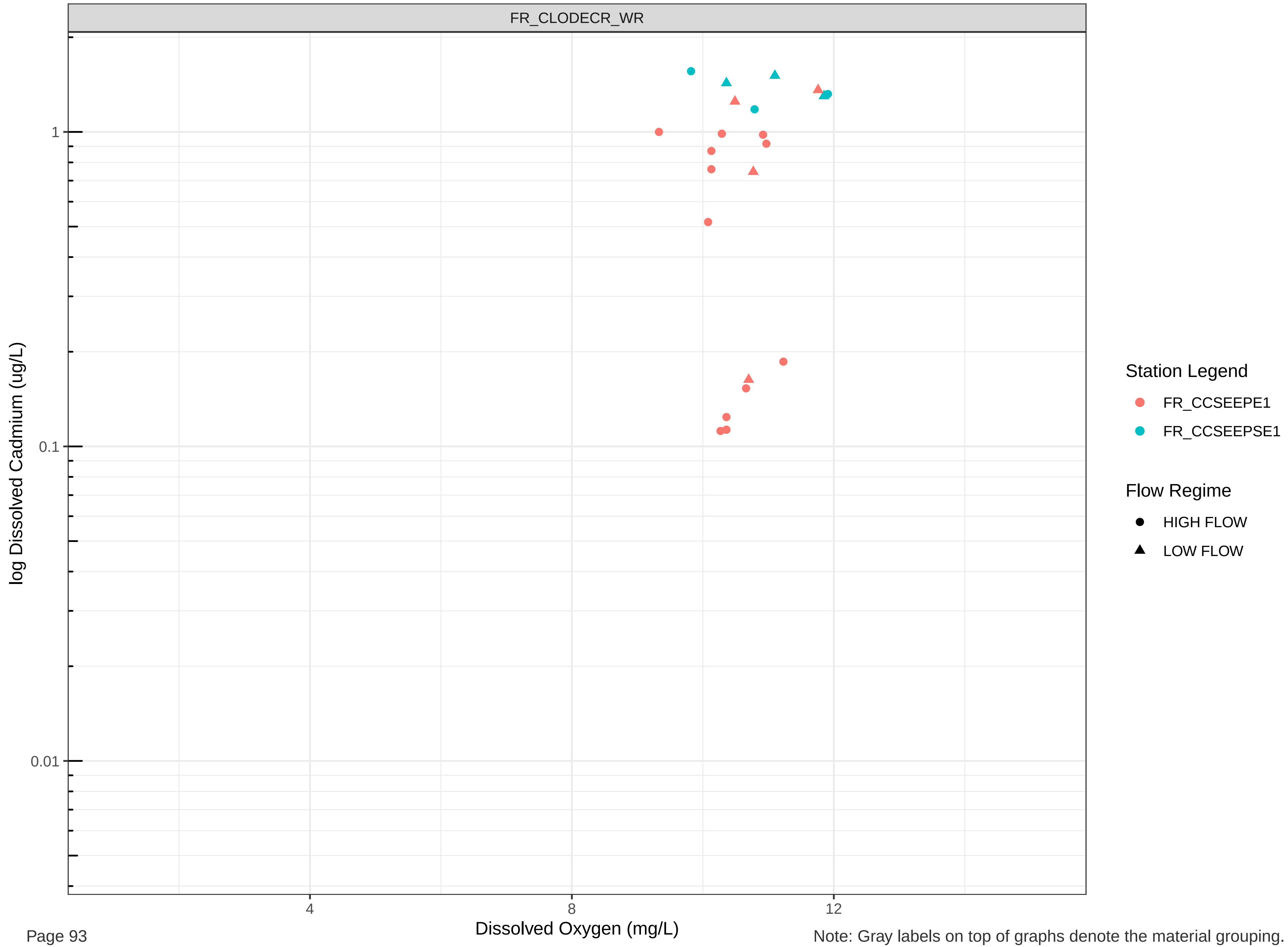

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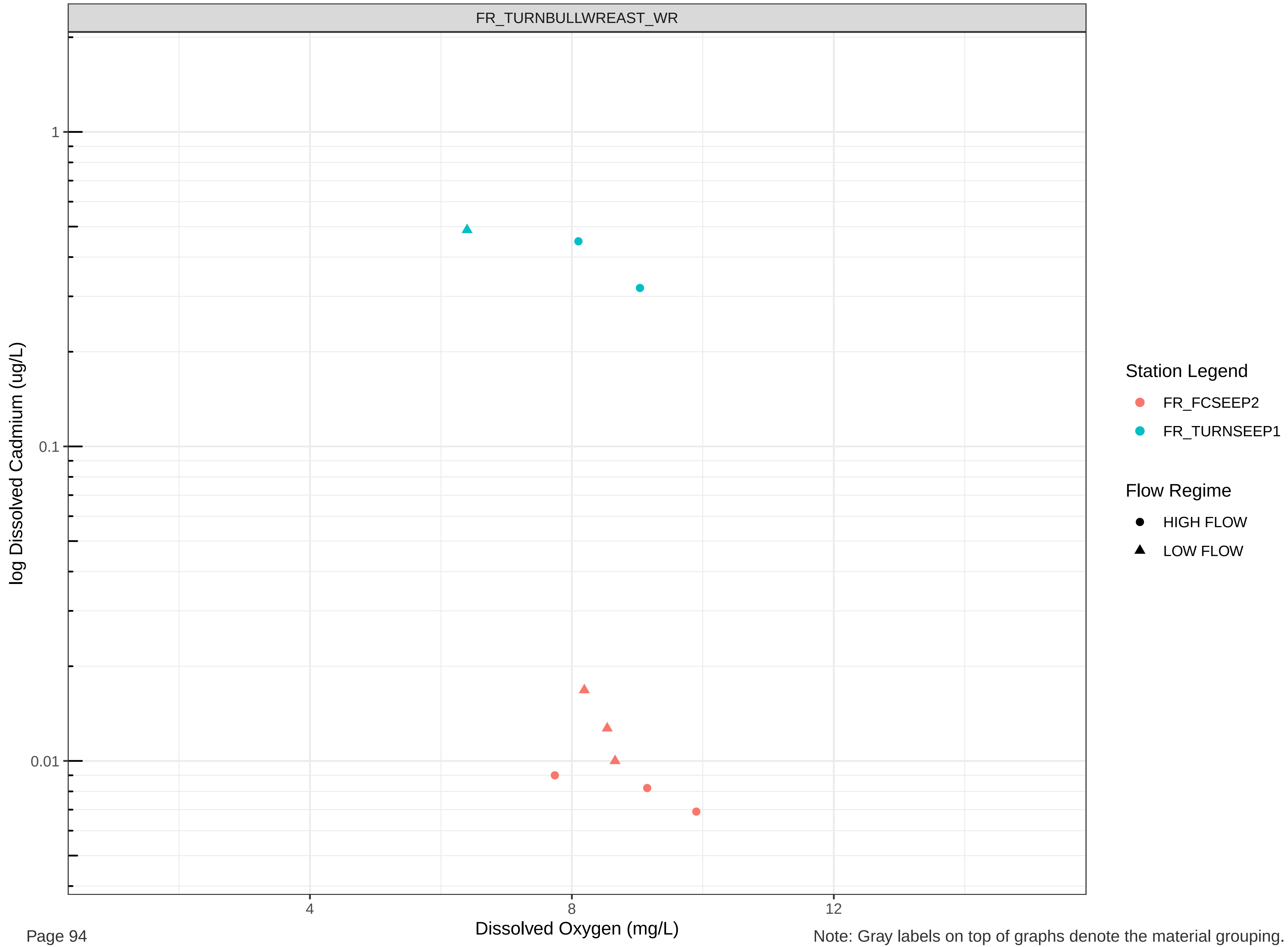

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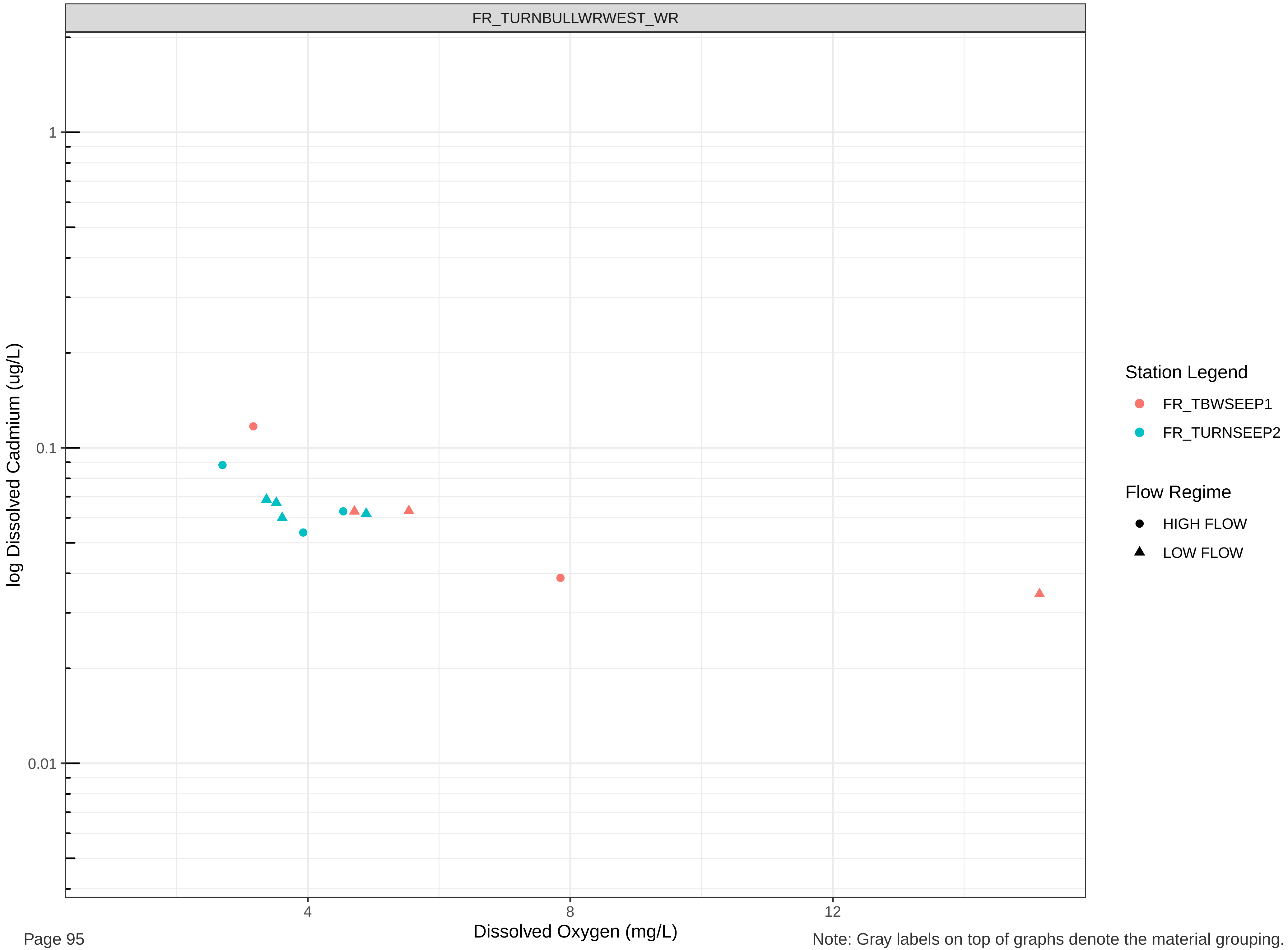

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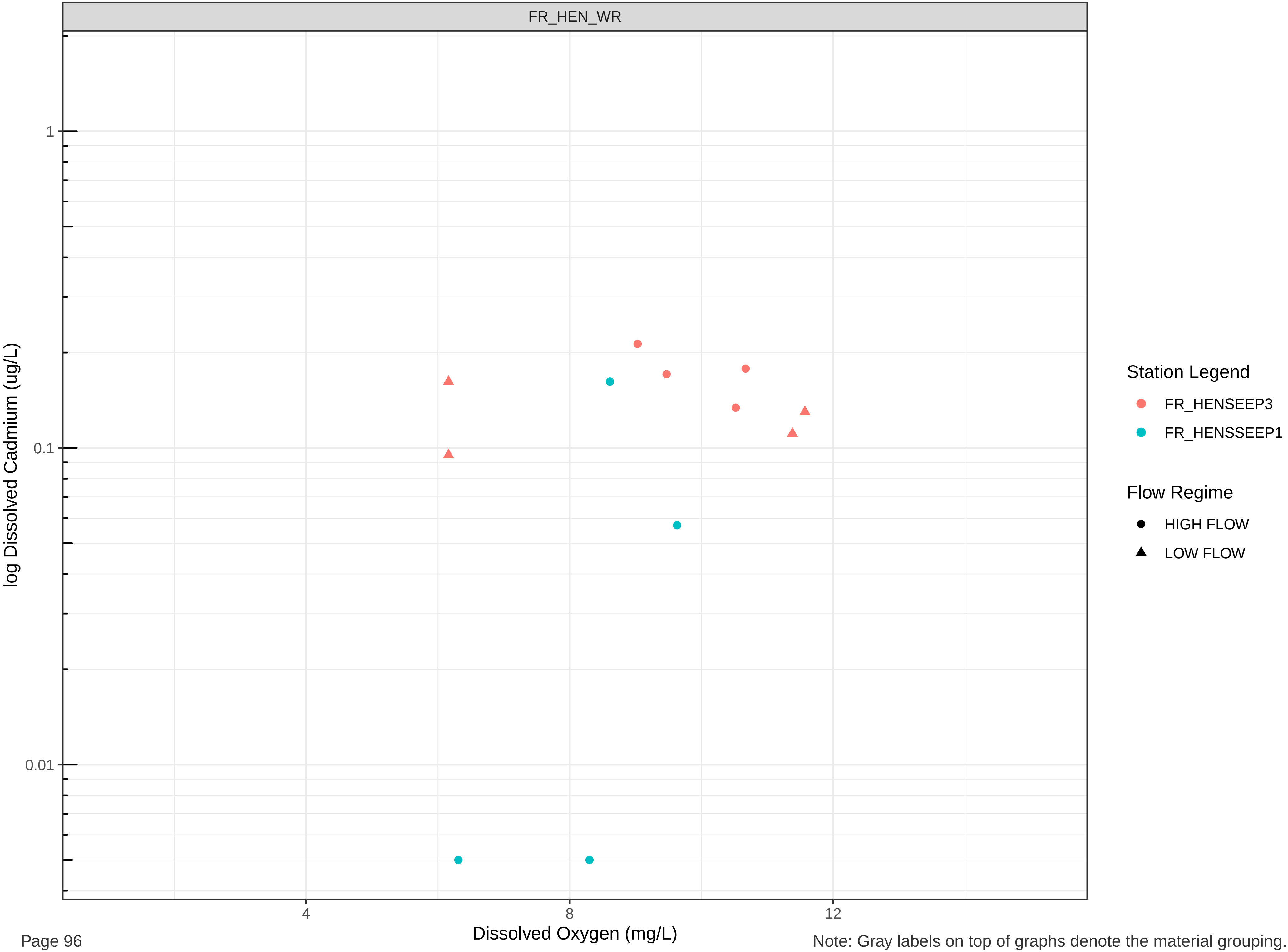

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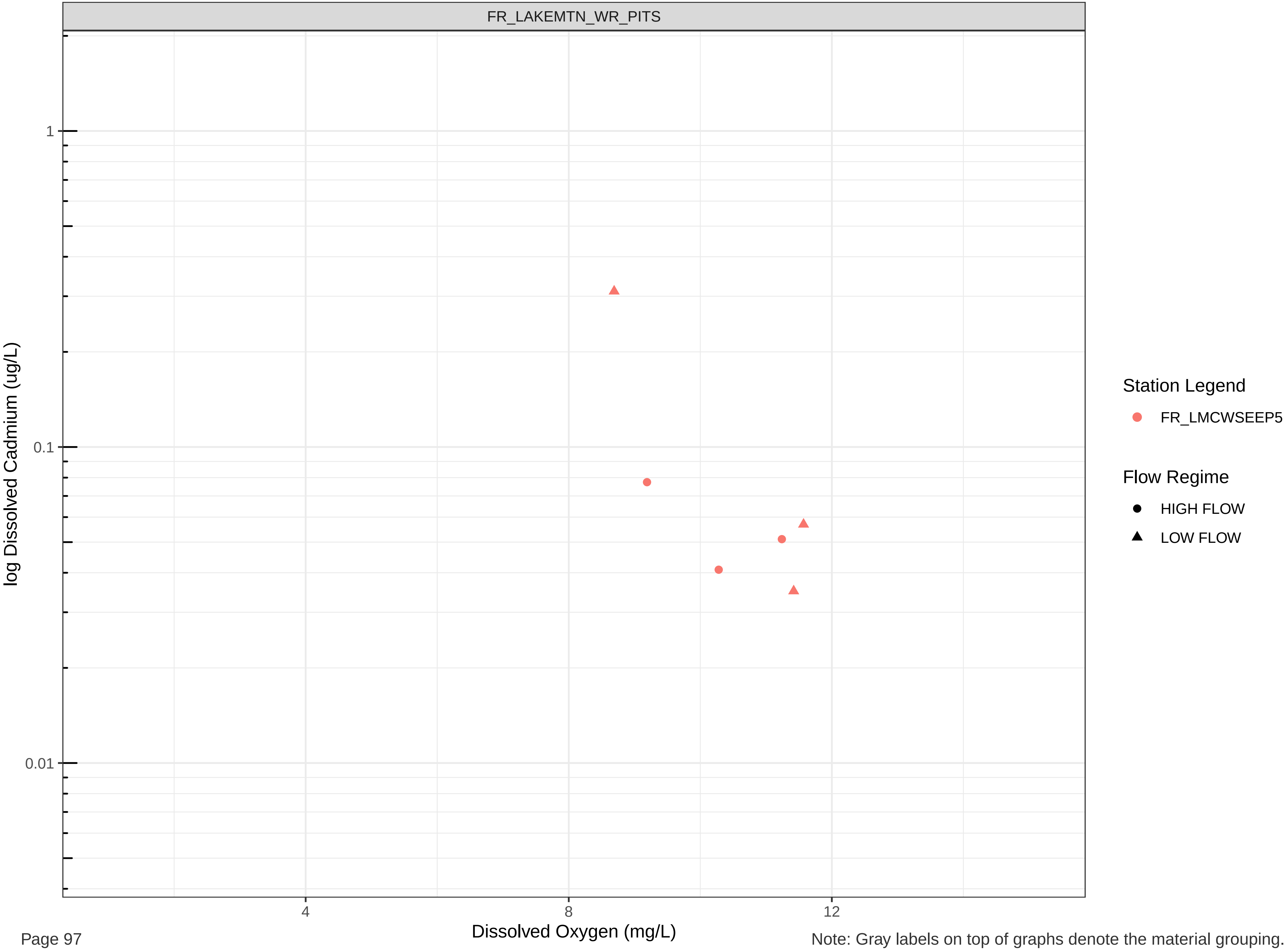

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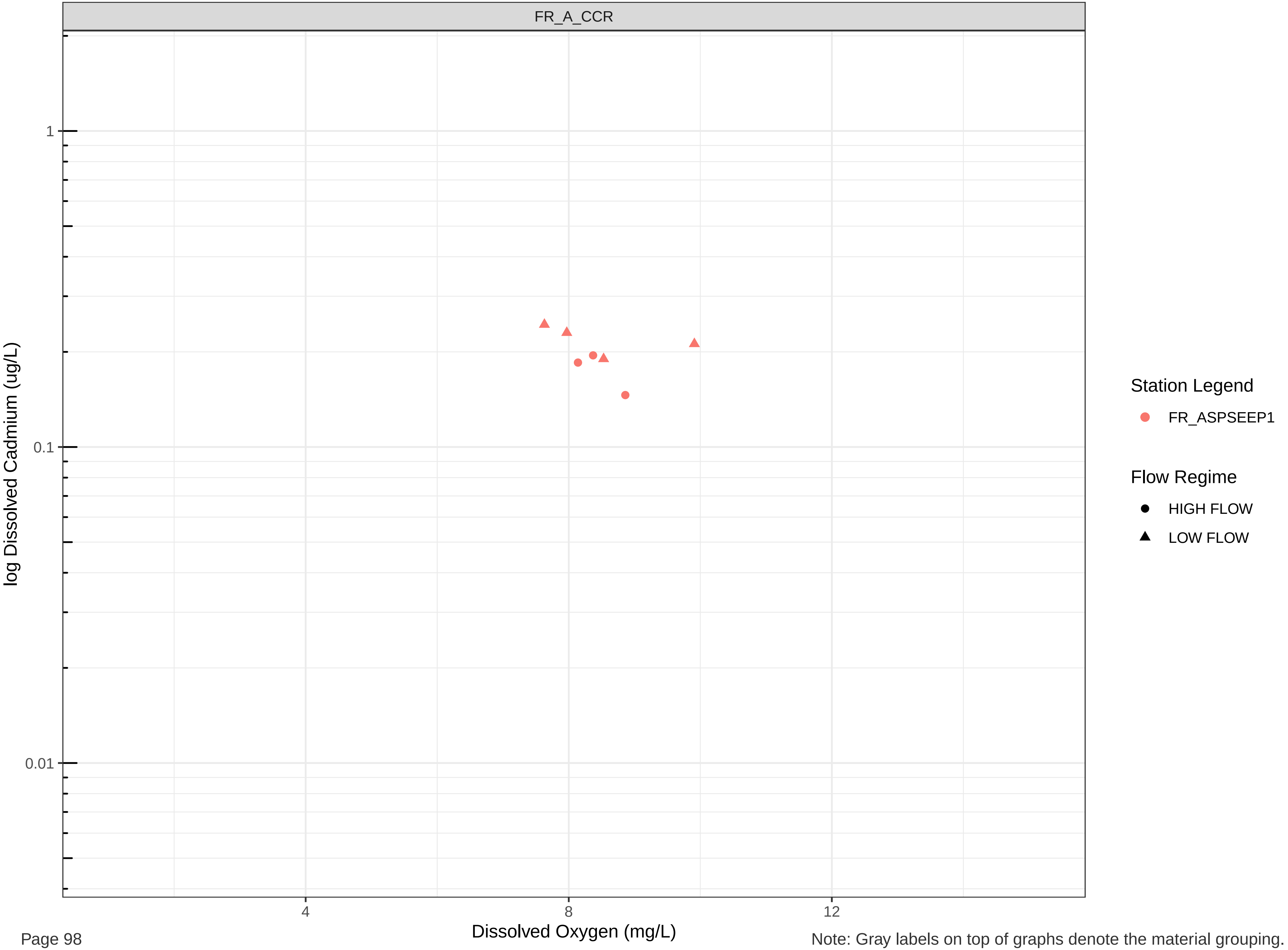

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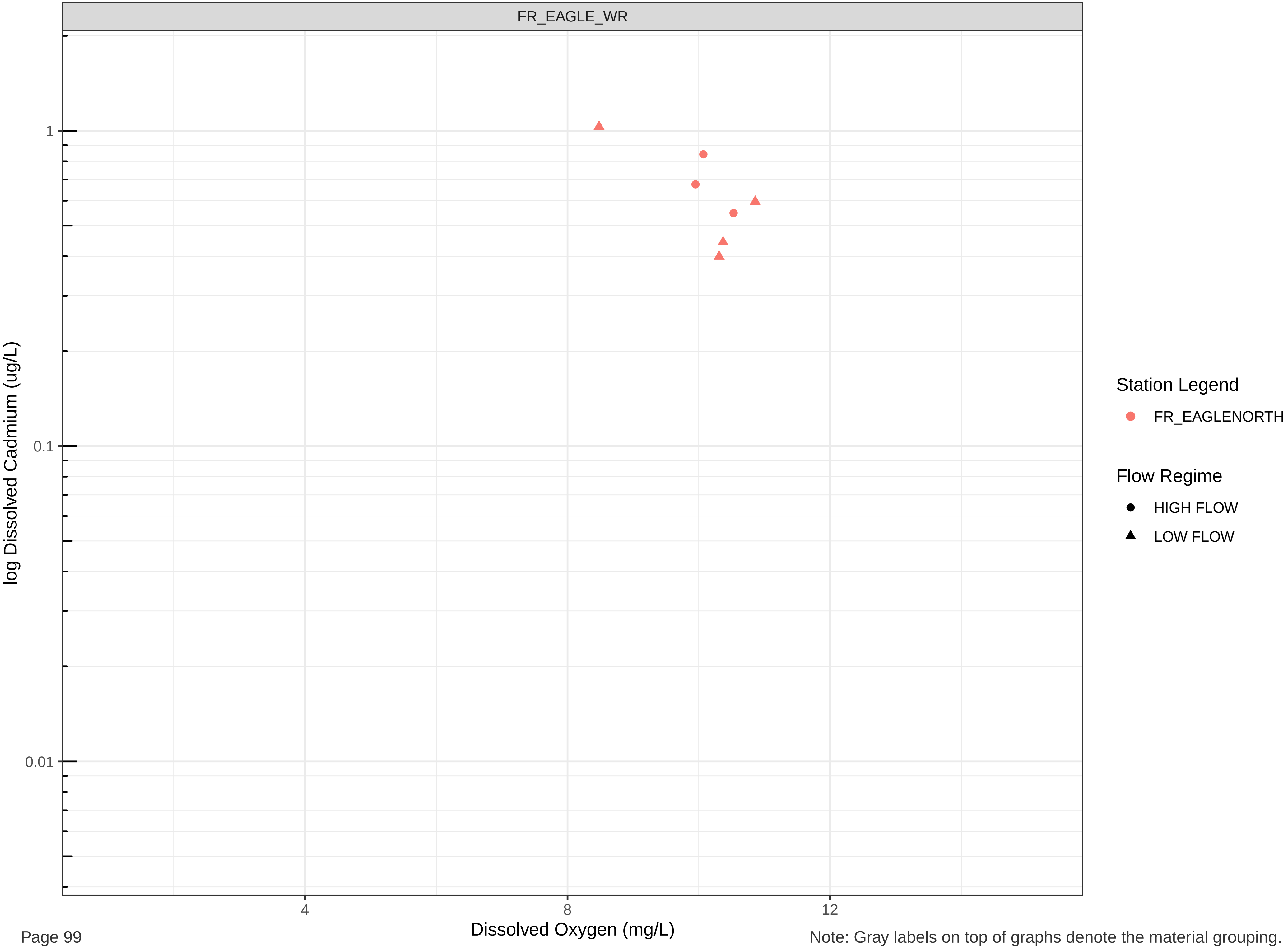

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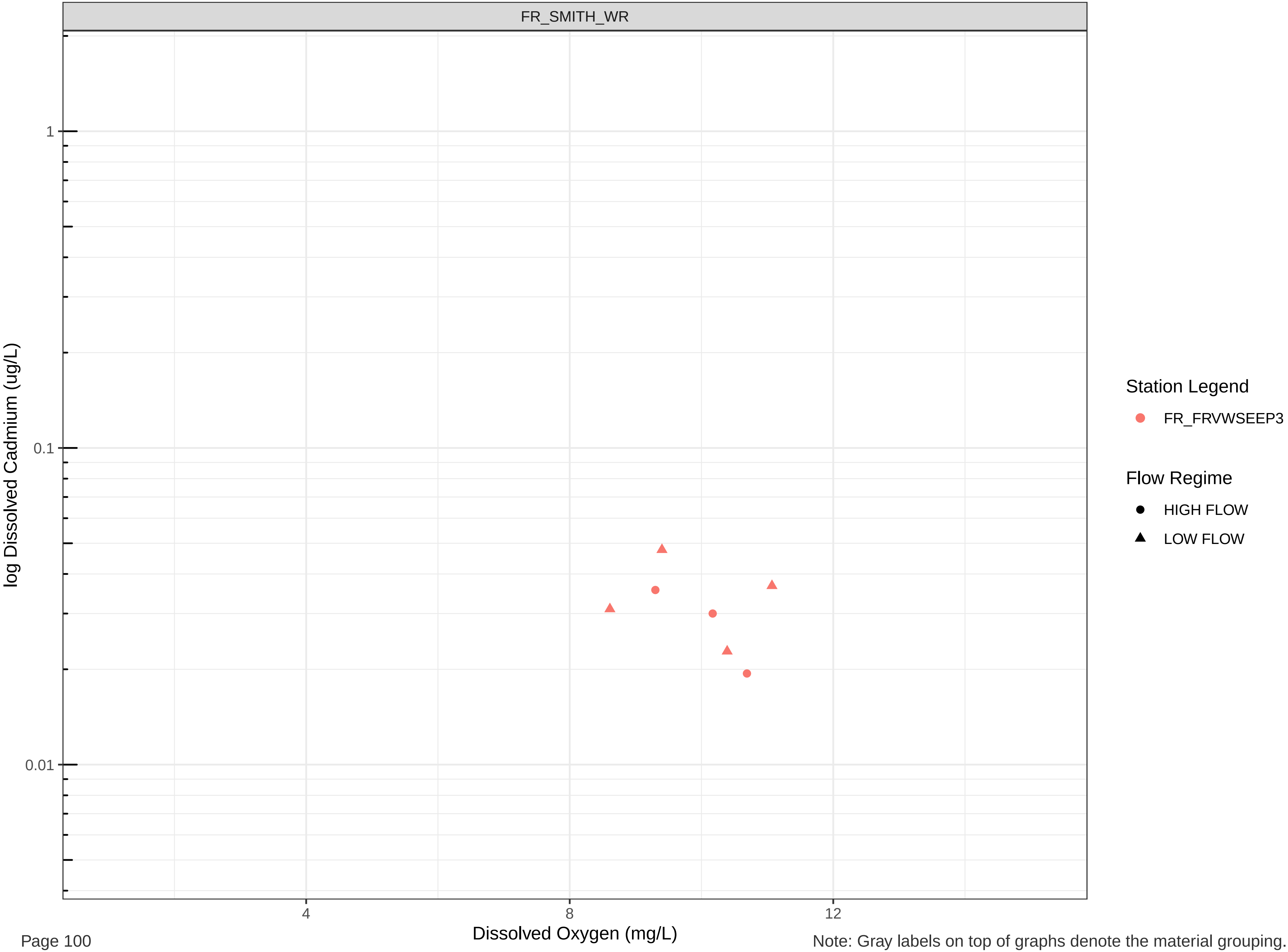

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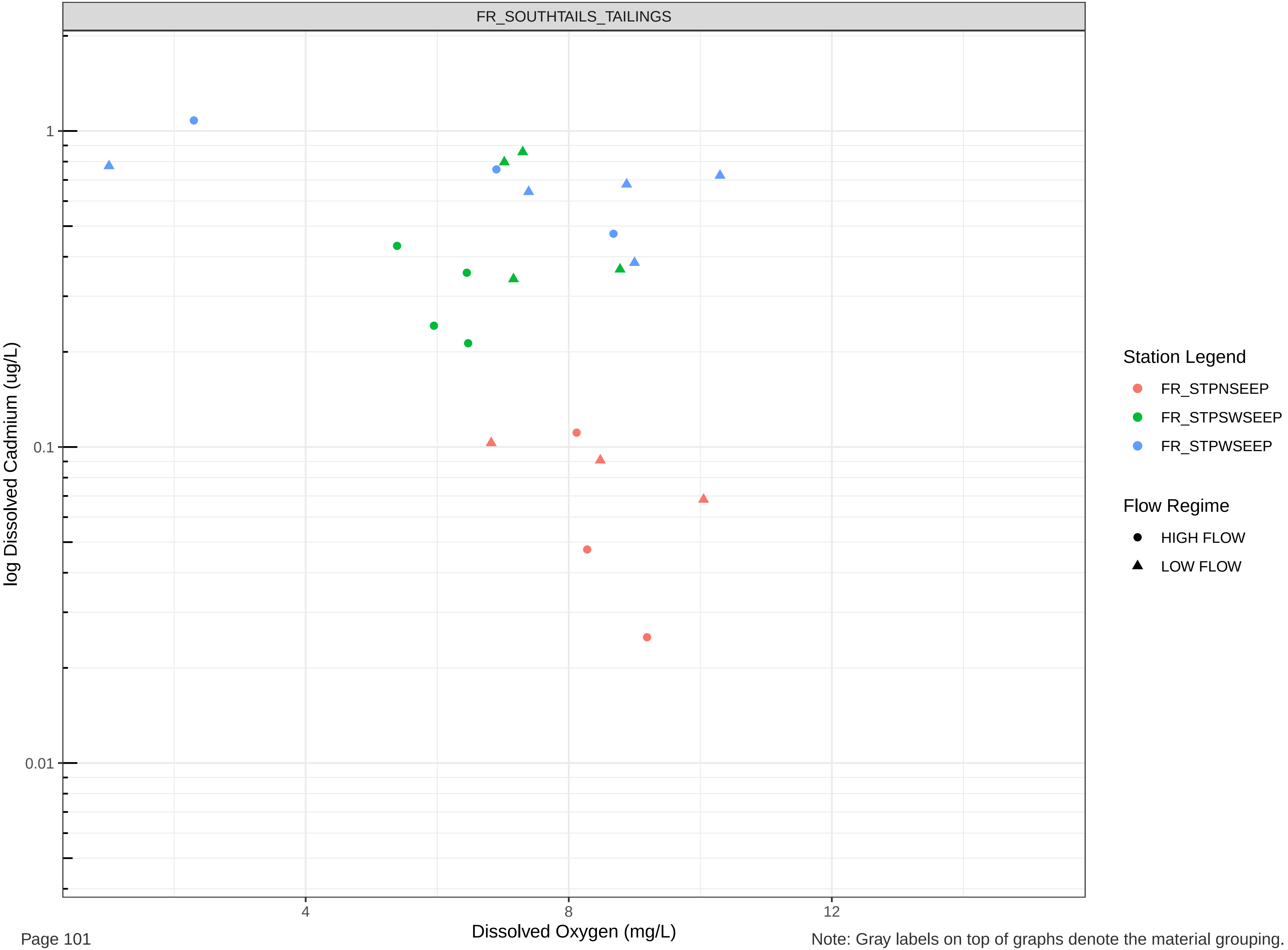

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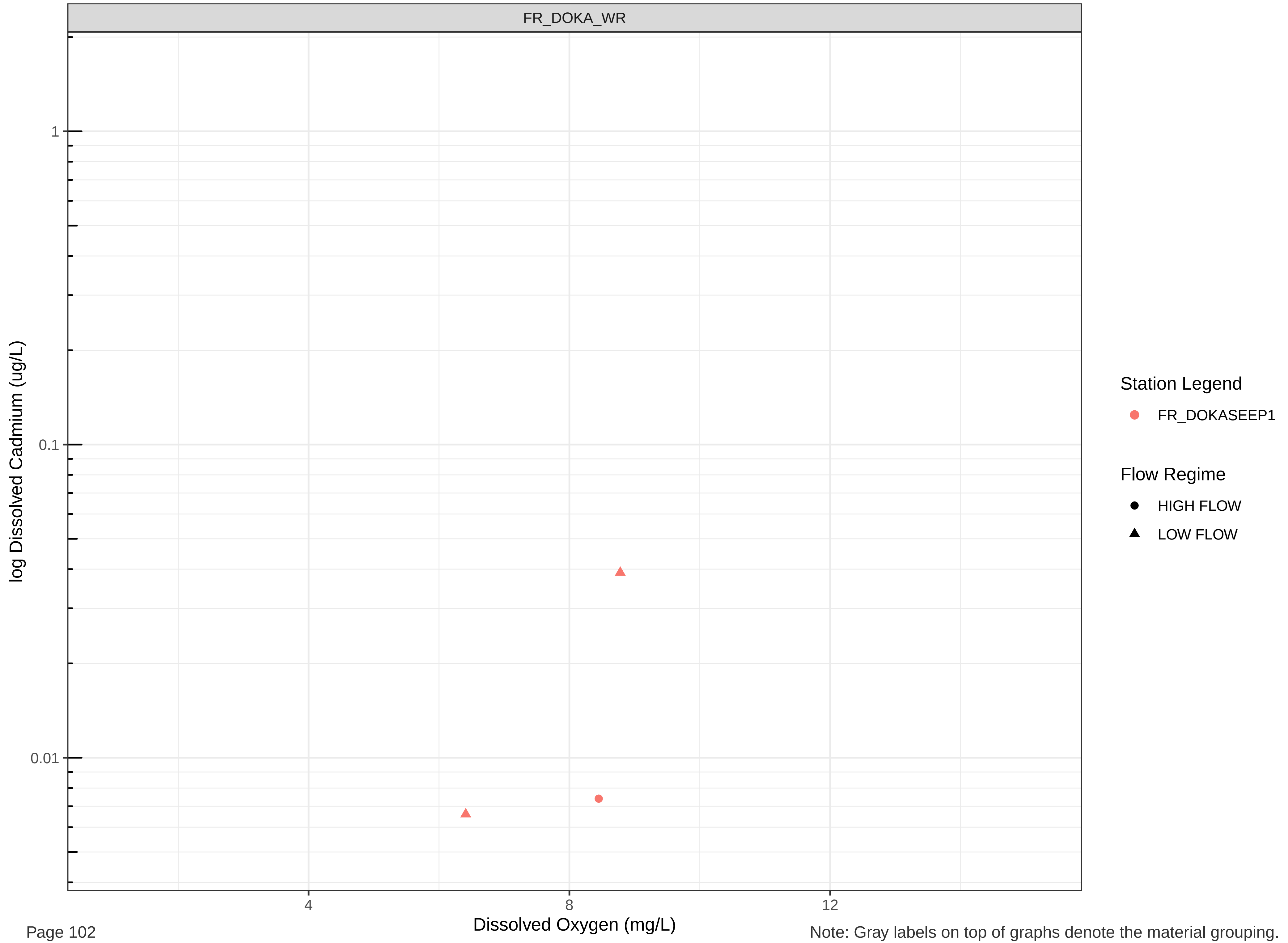

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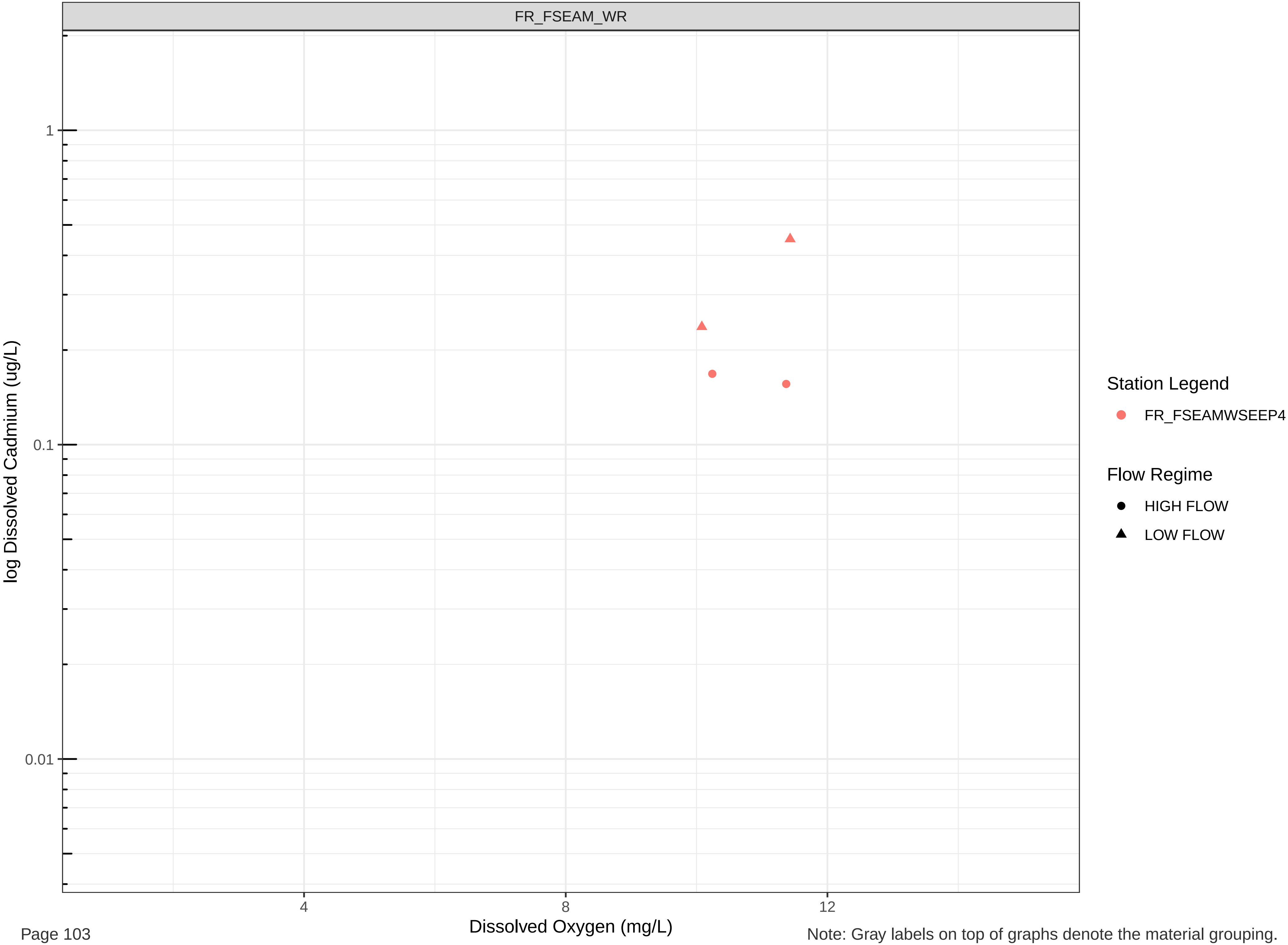

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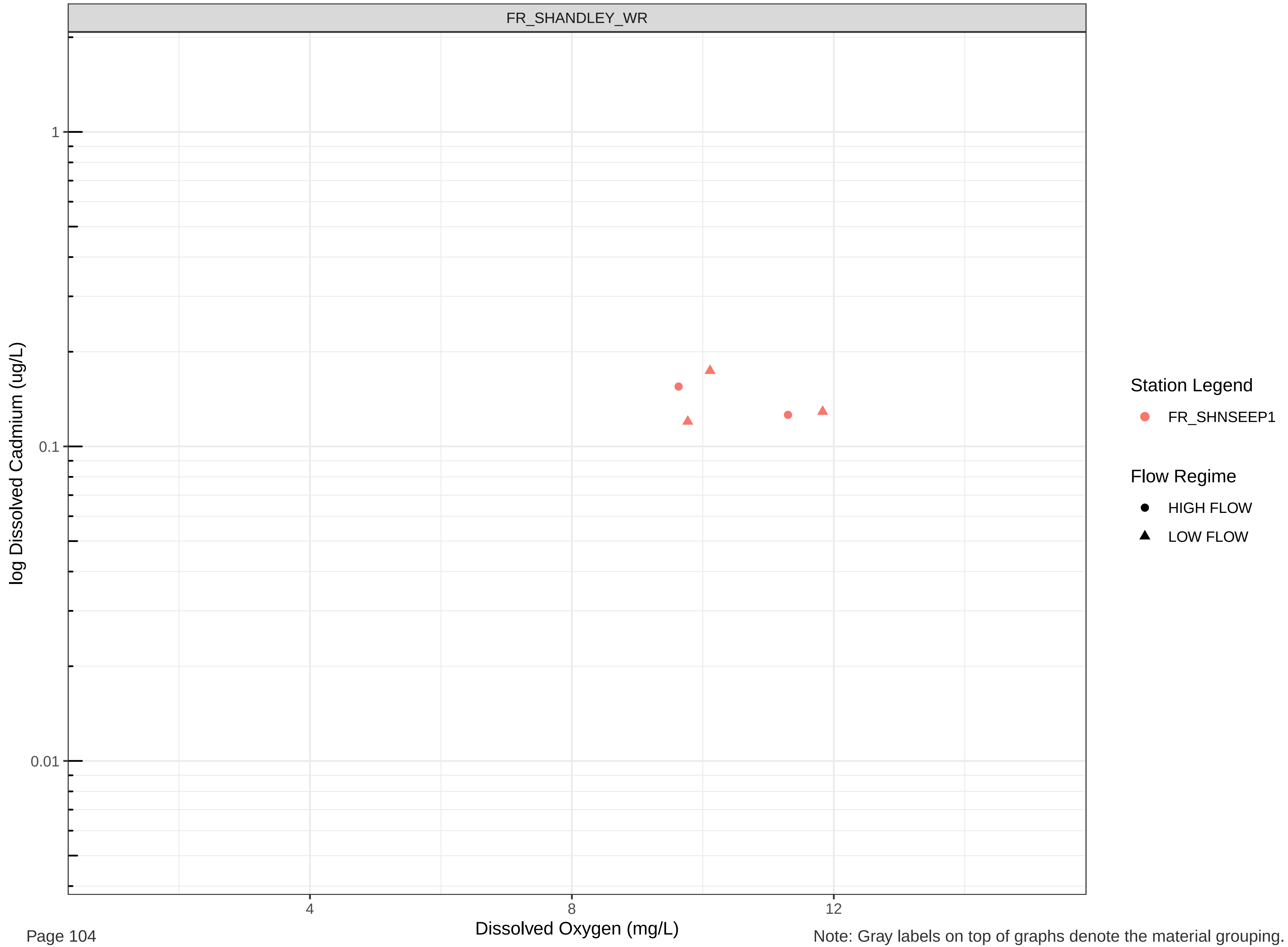

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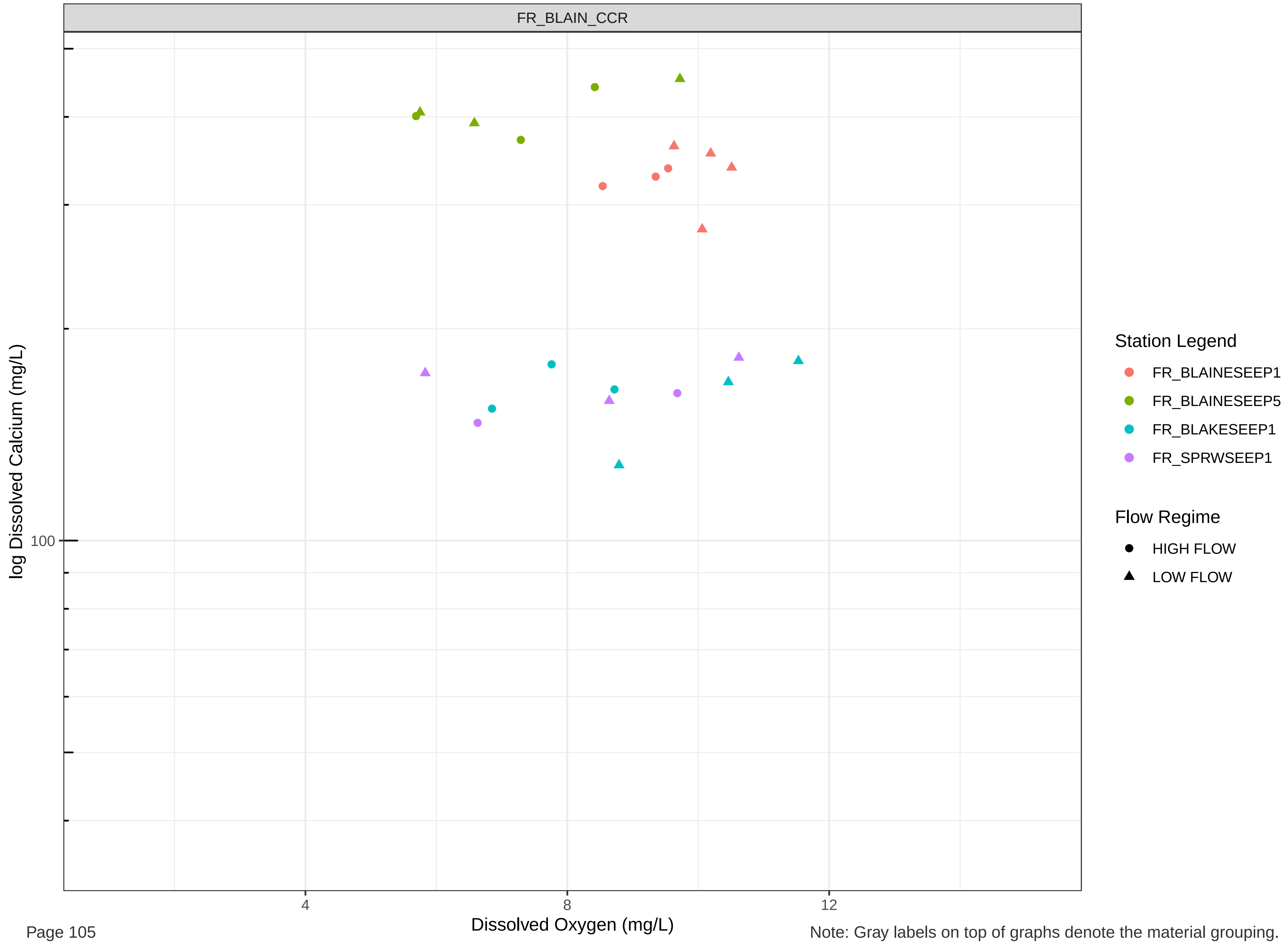

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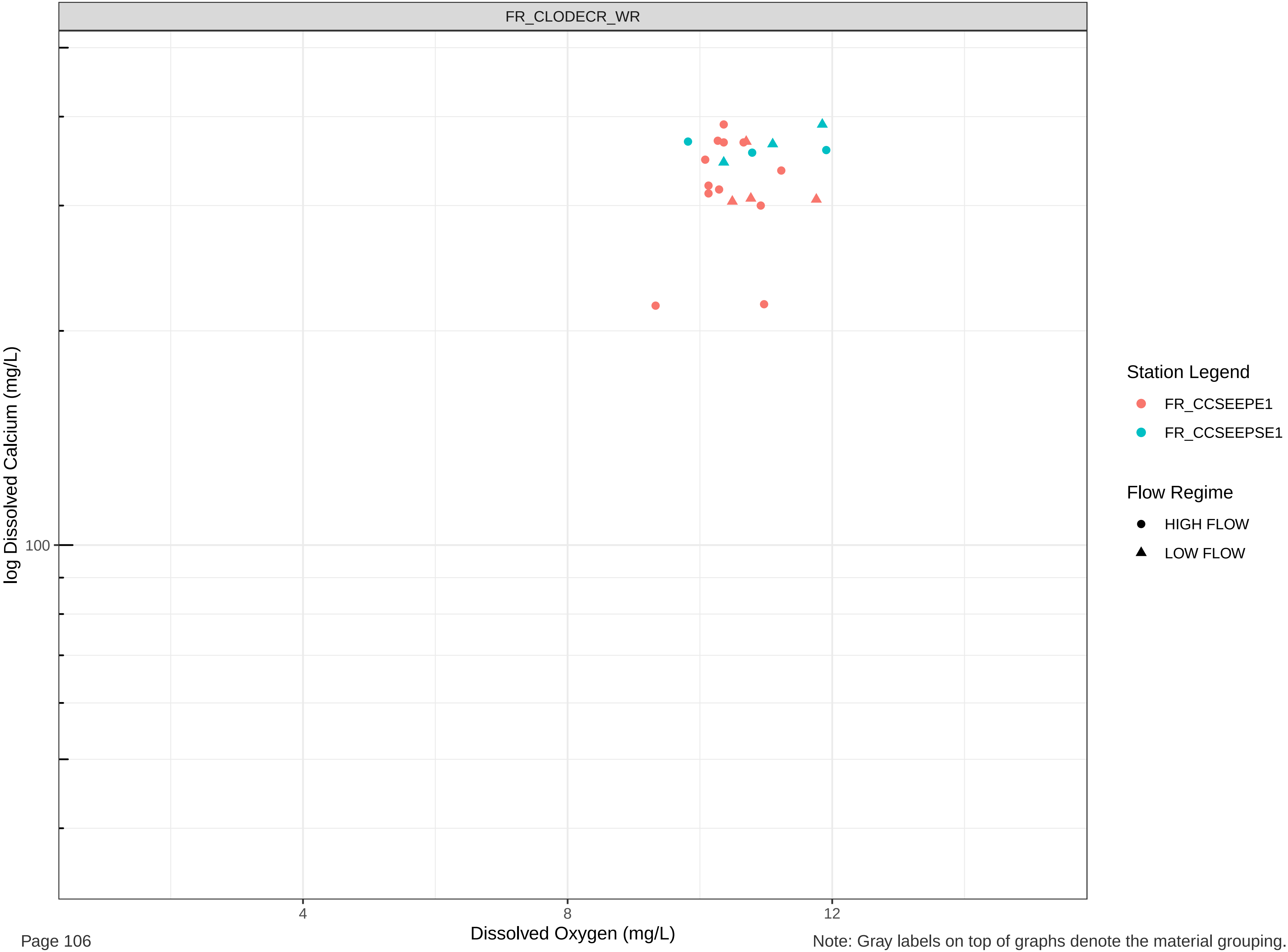

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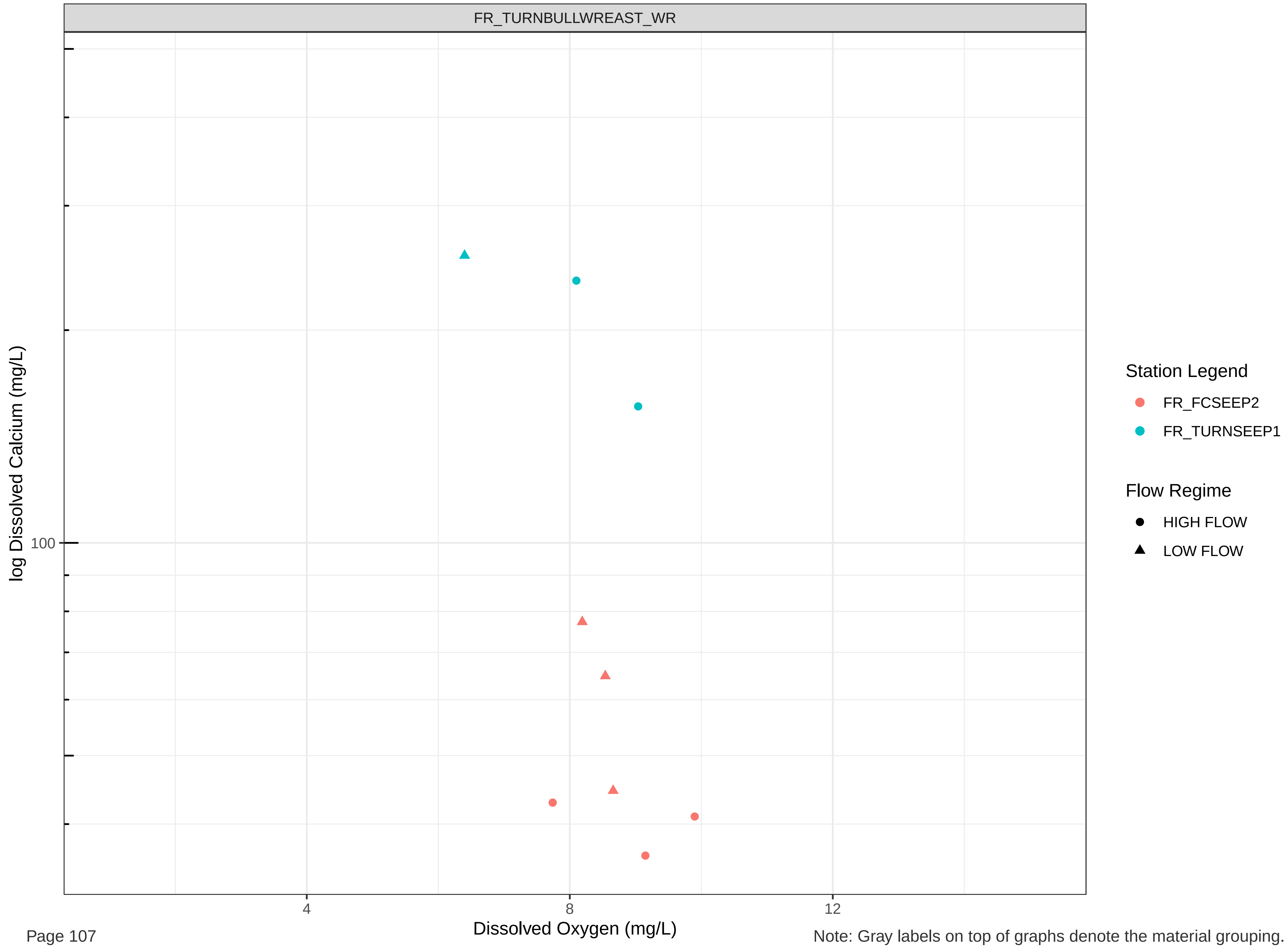

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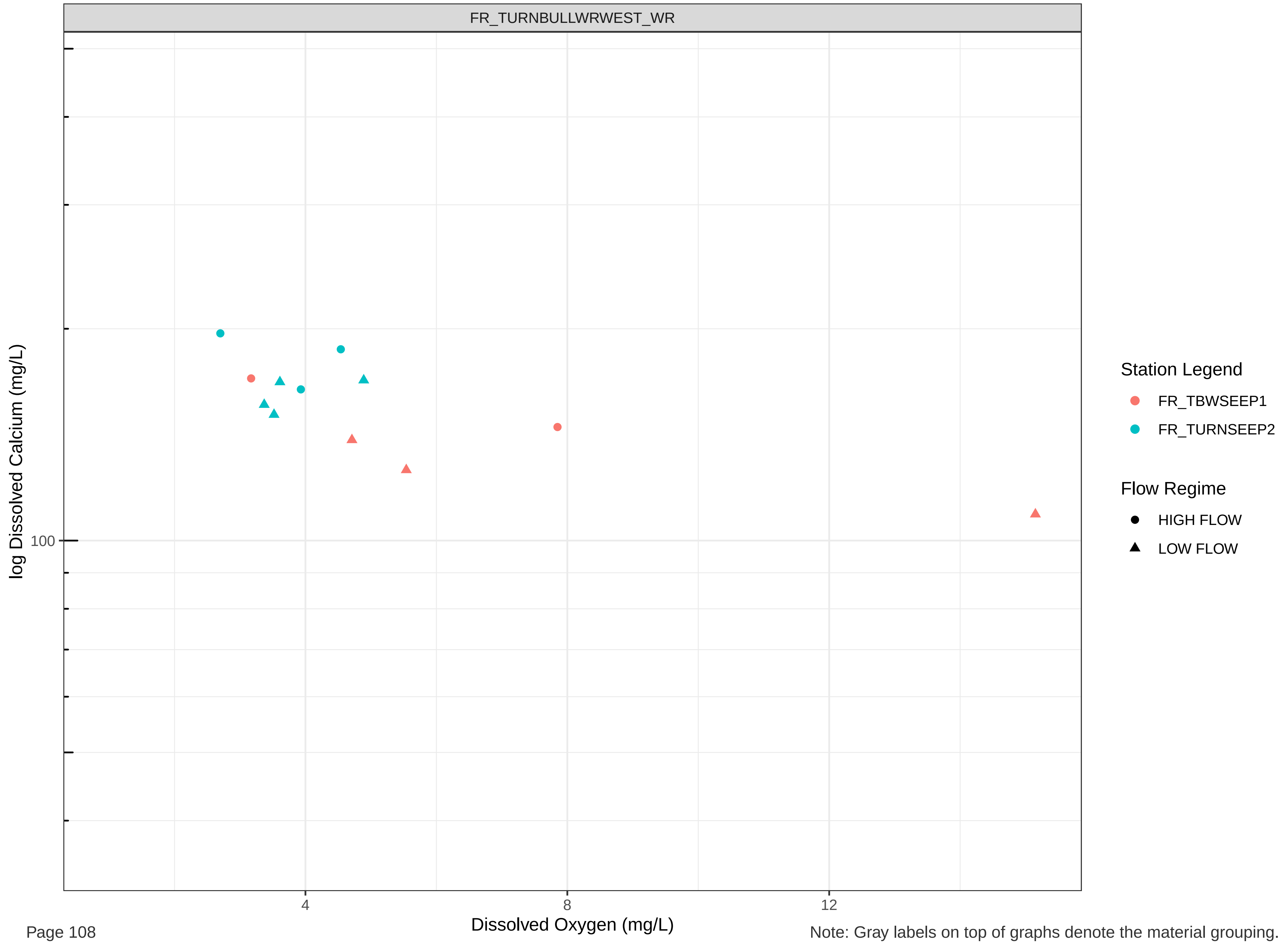

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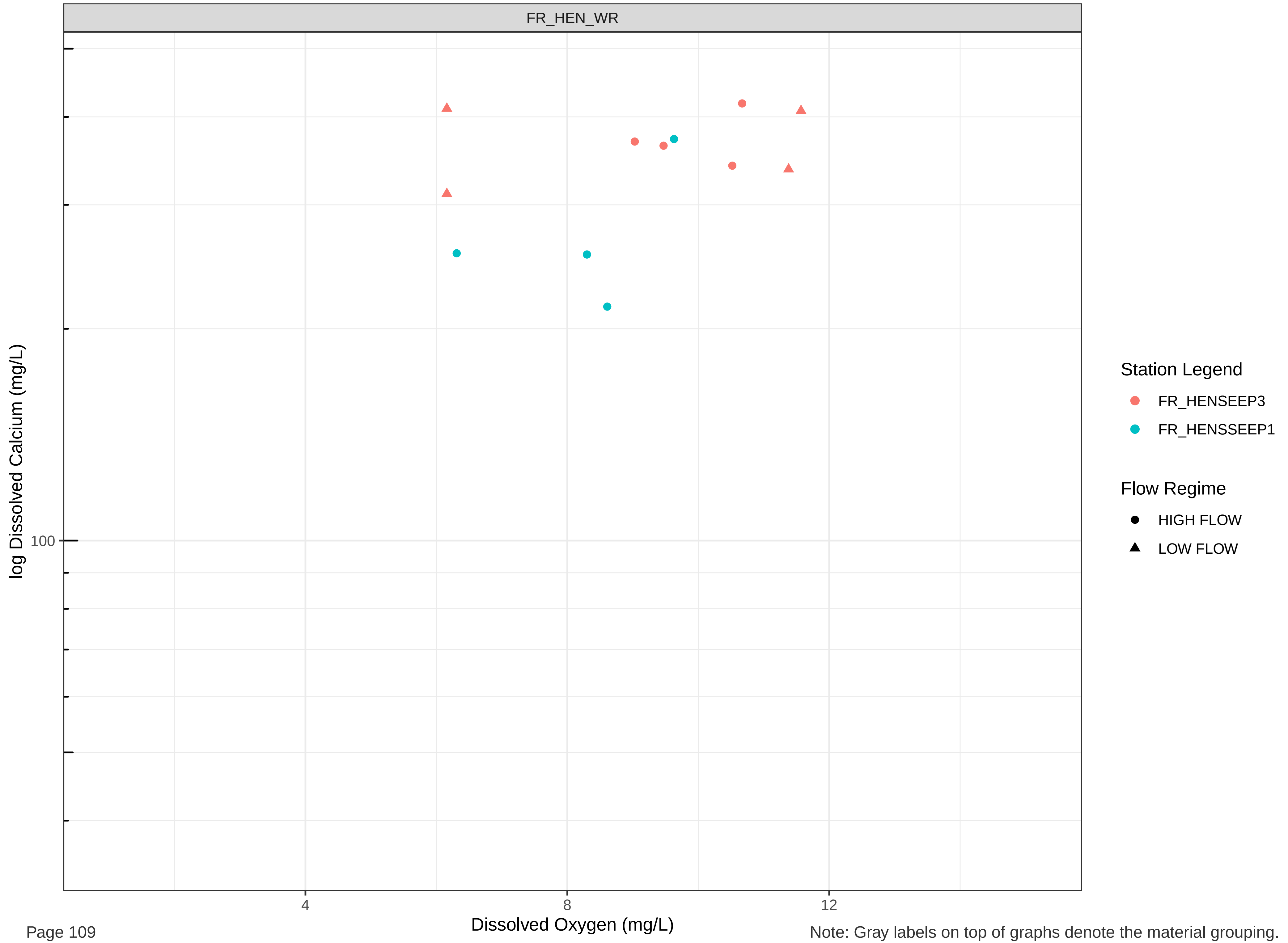

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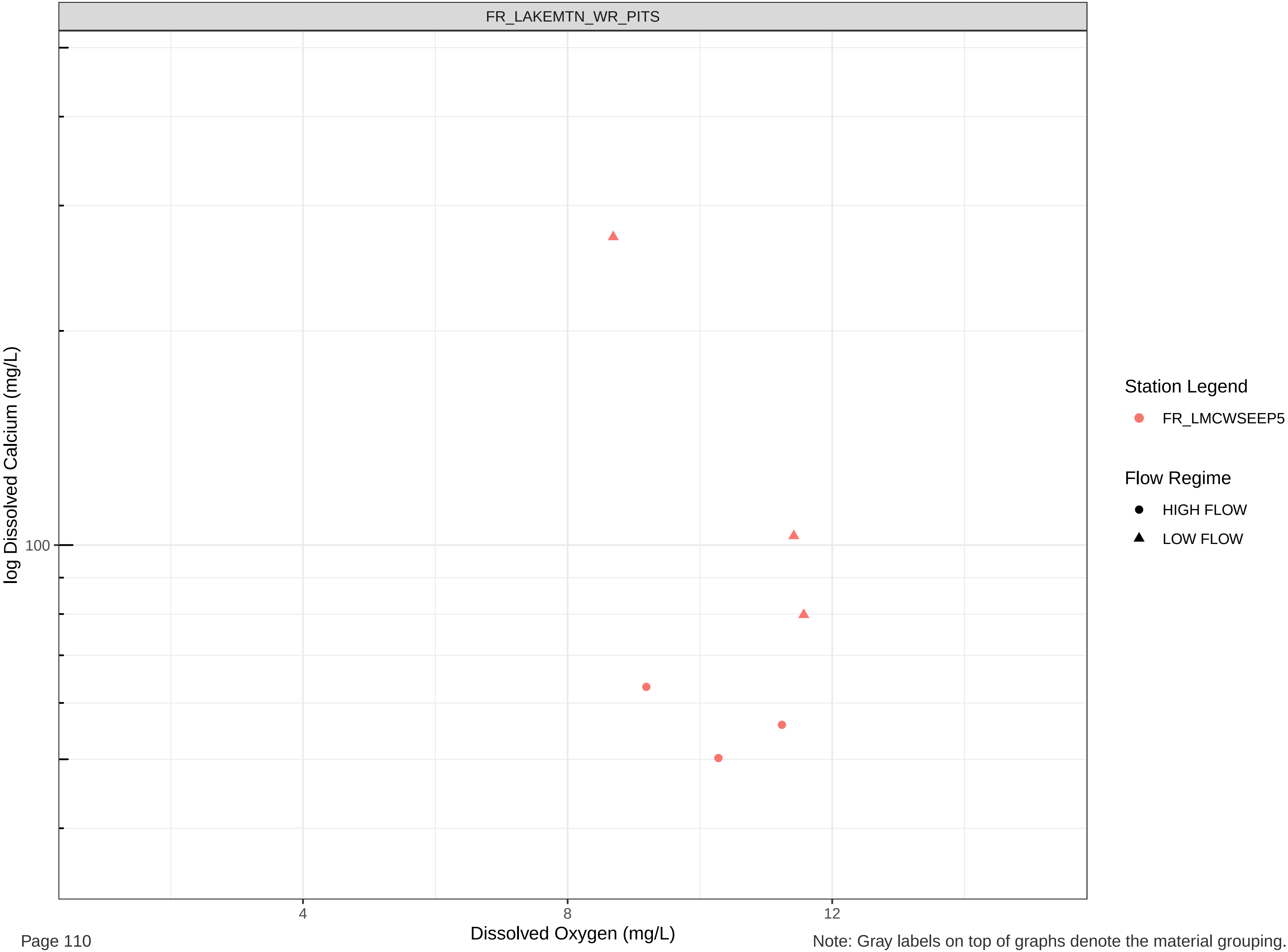

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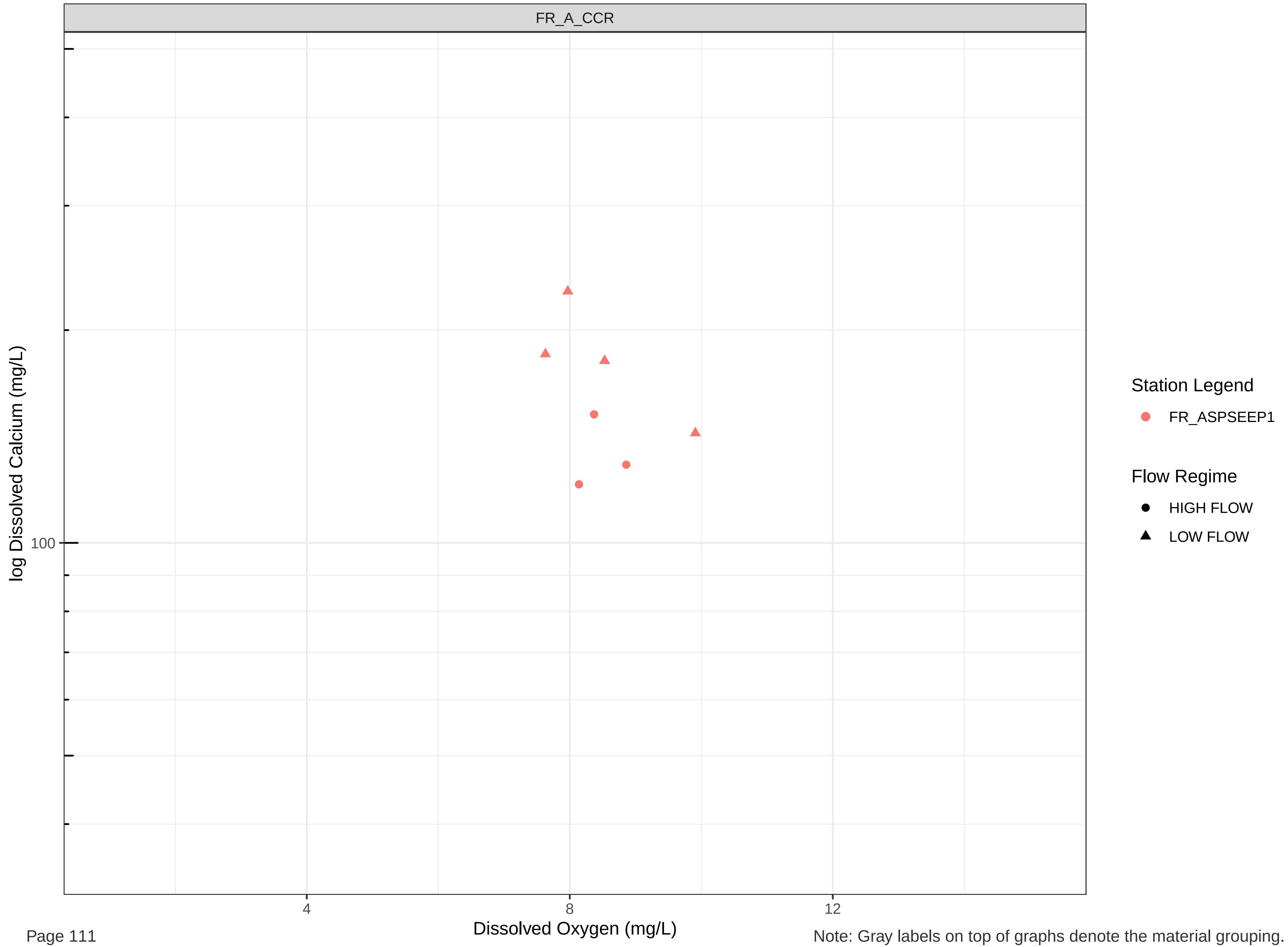

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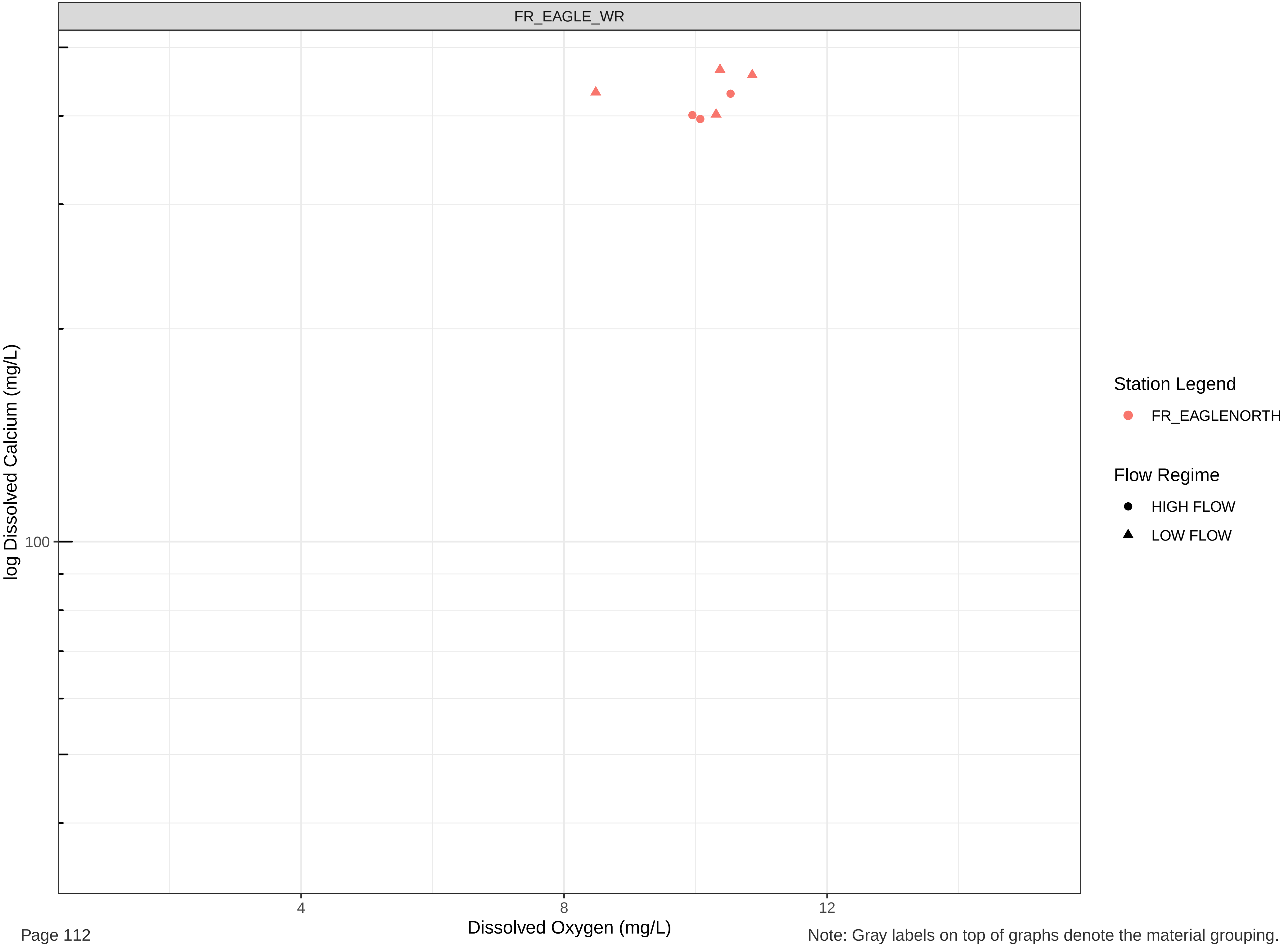
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log Dissolved Calcium (mg/L)
100
4
8
12
Dissolved Oxygen (mg/L)
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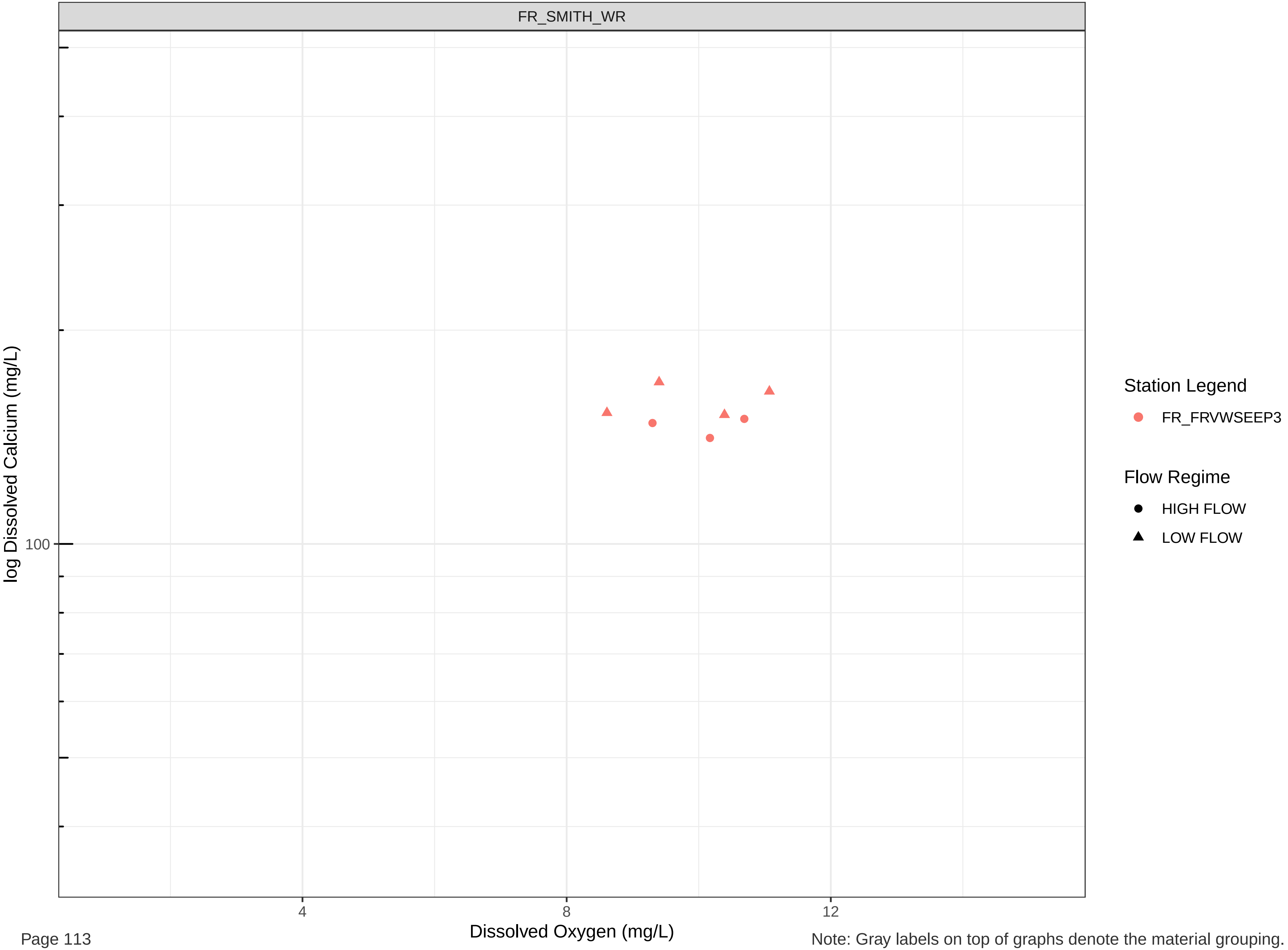

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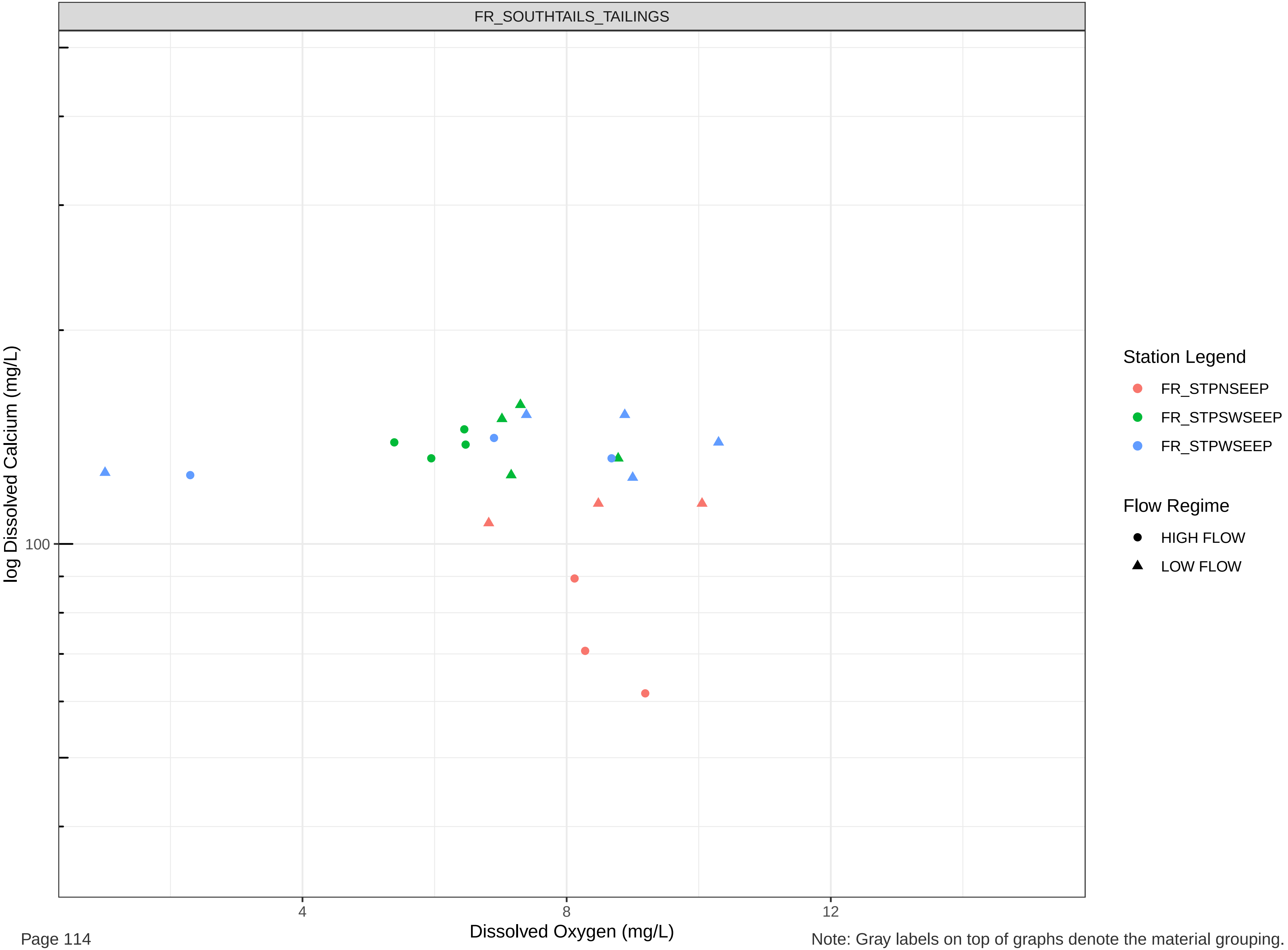

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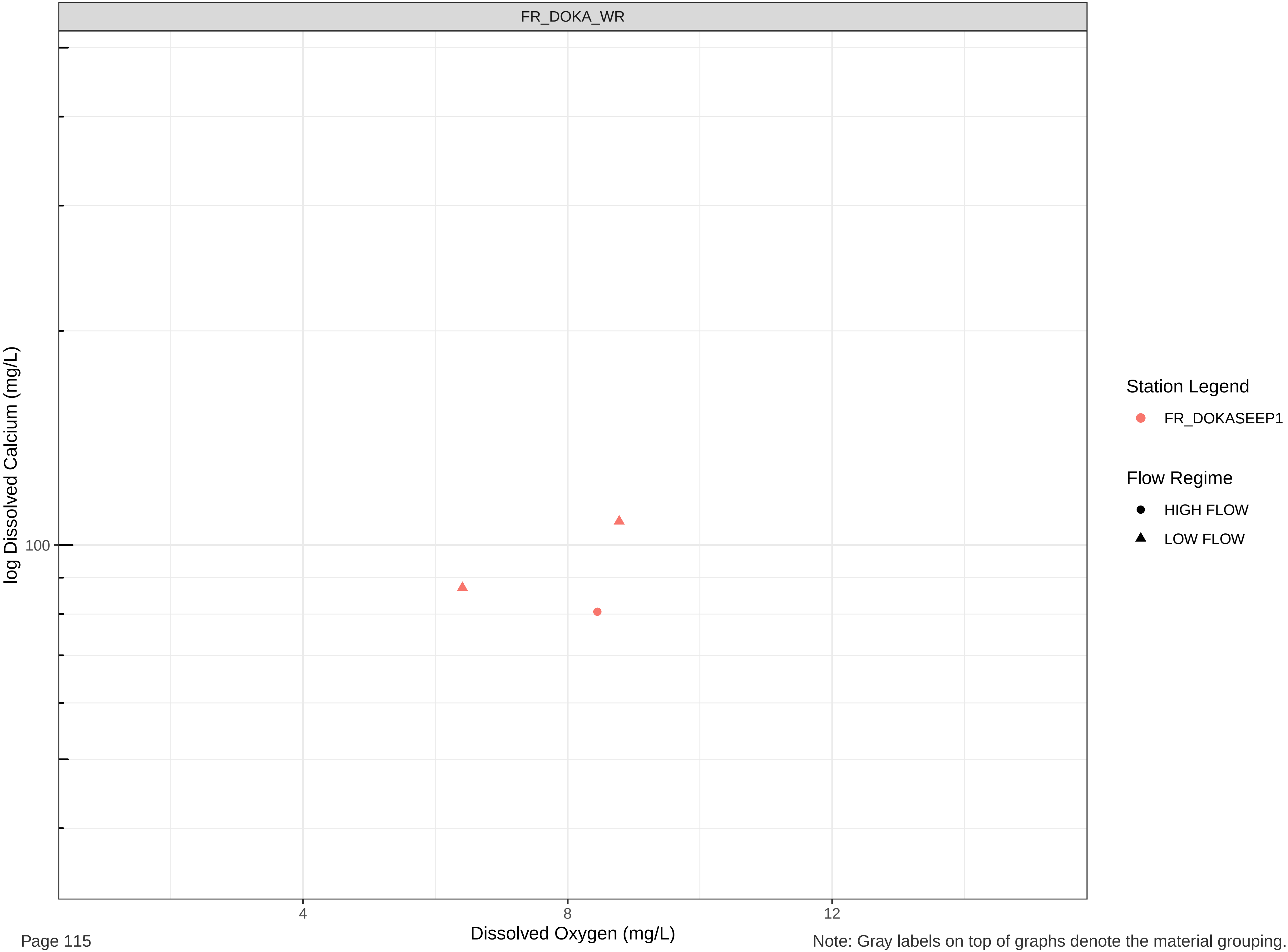

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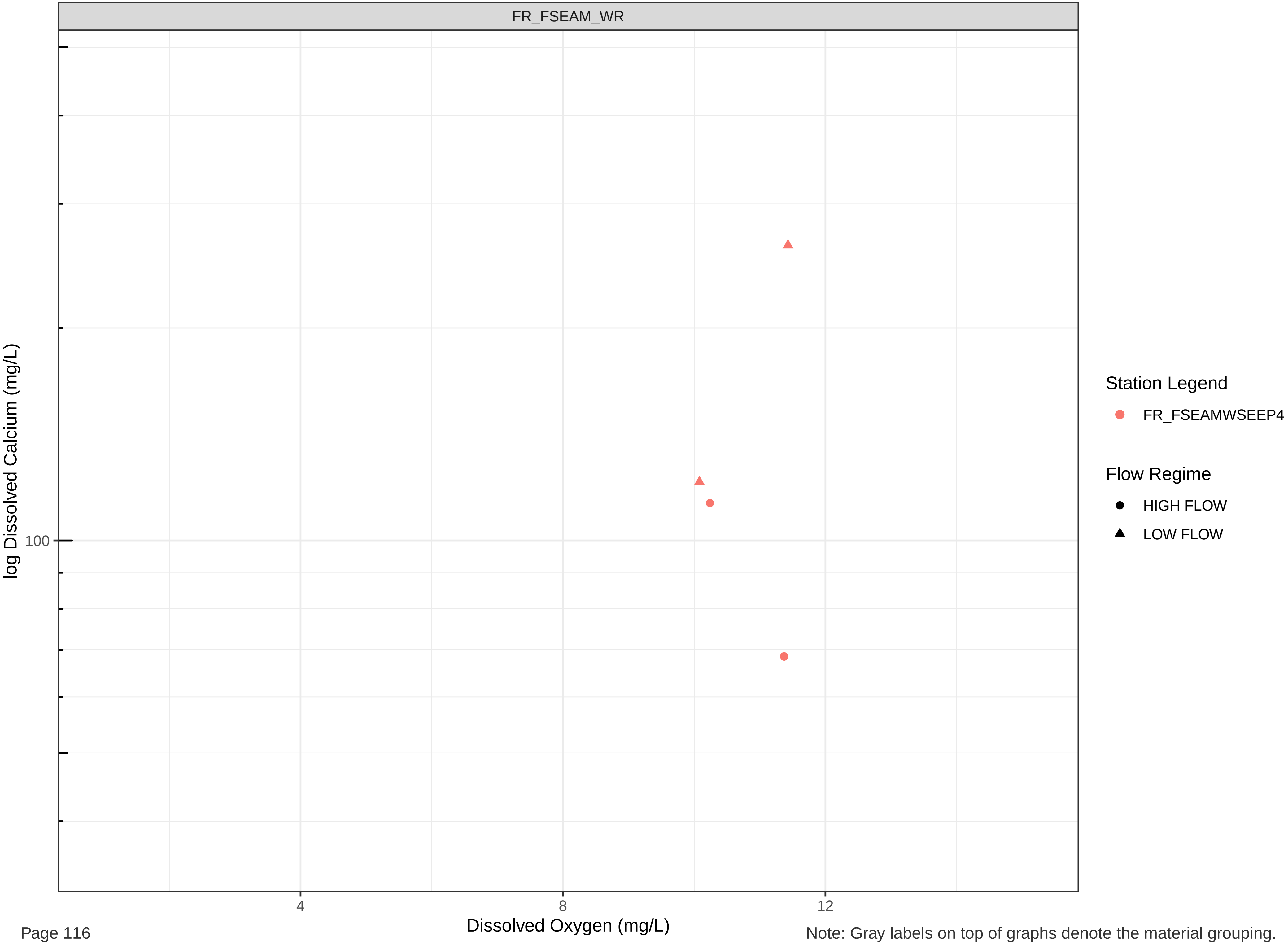

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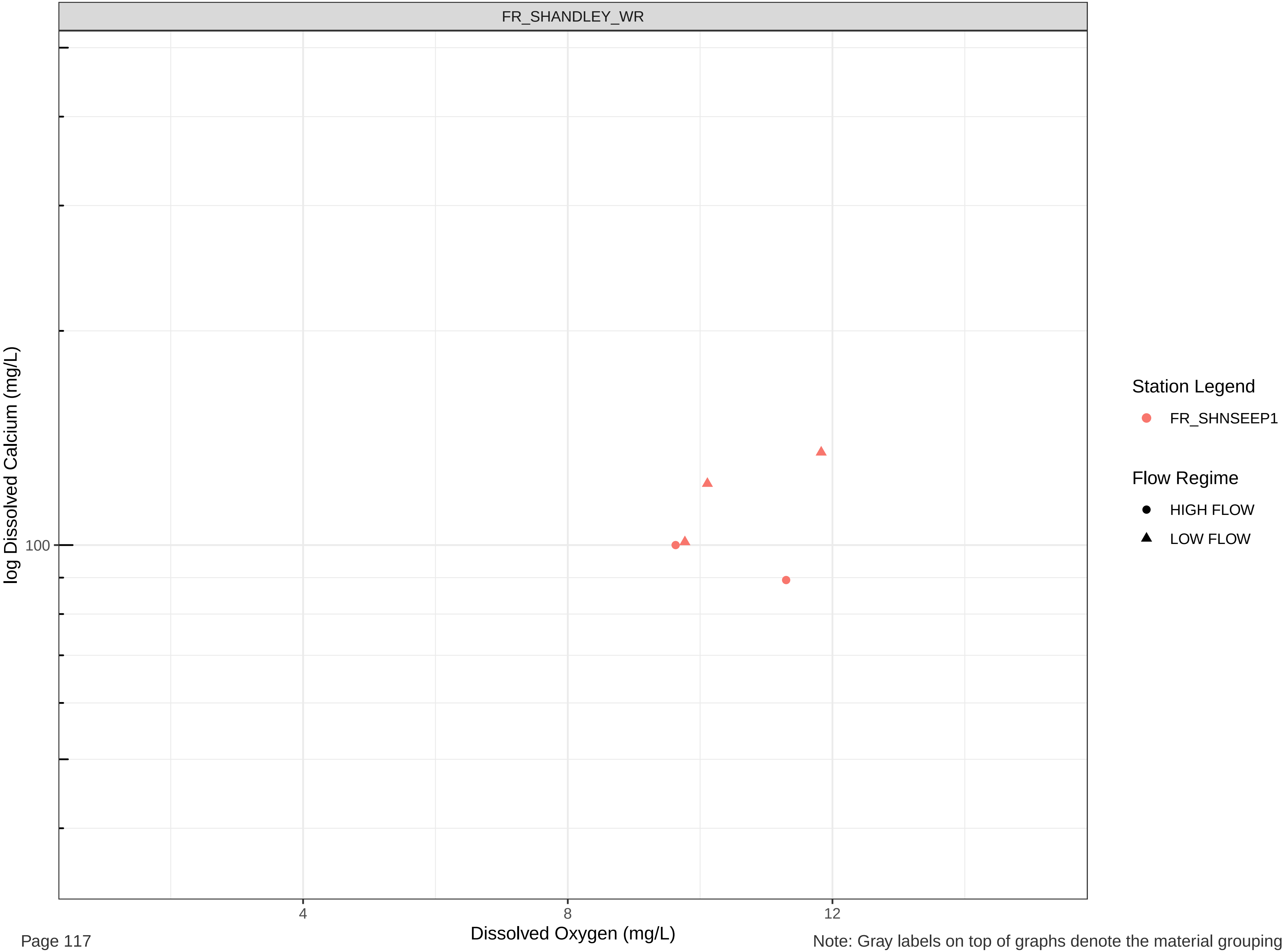

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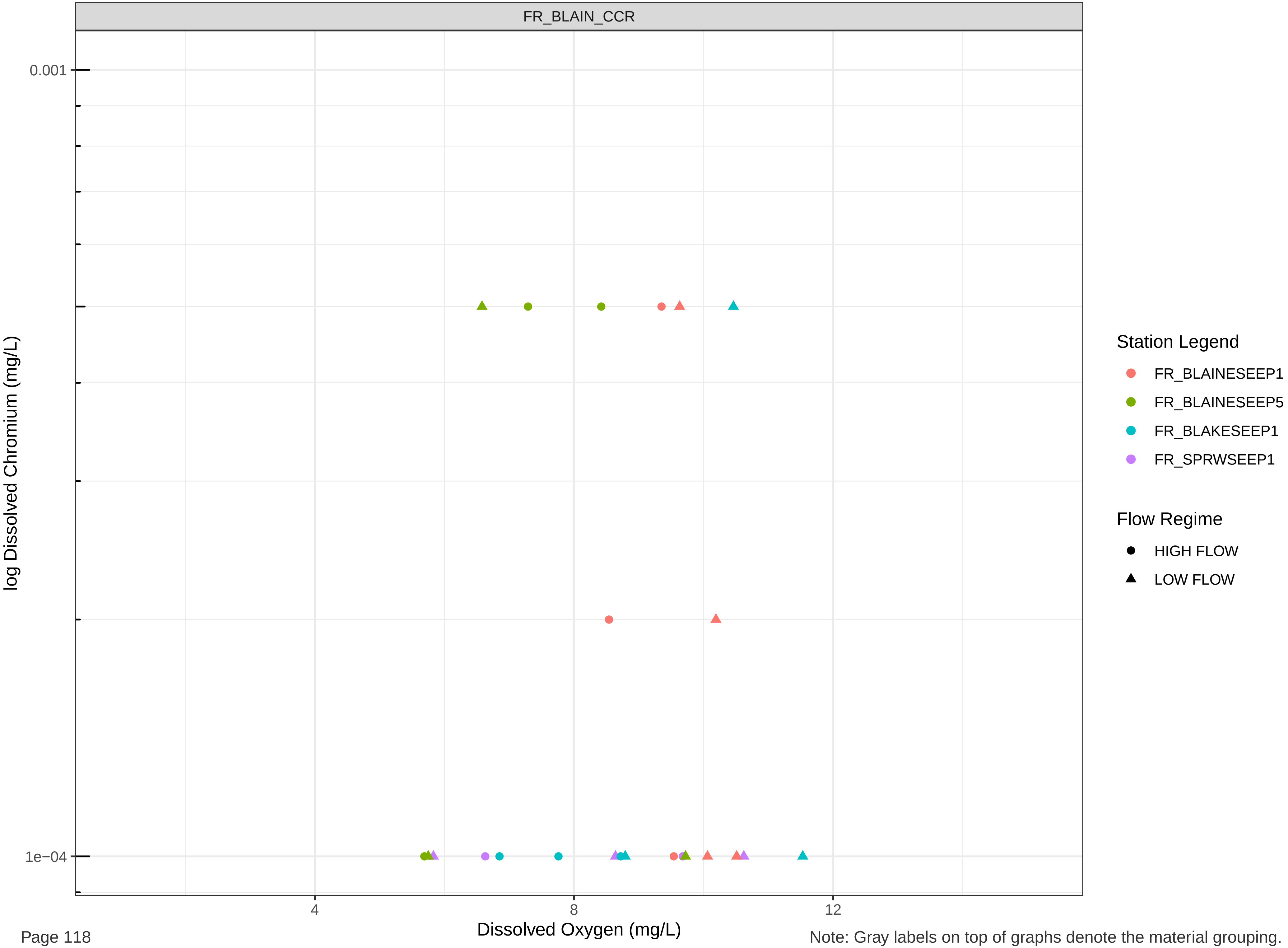

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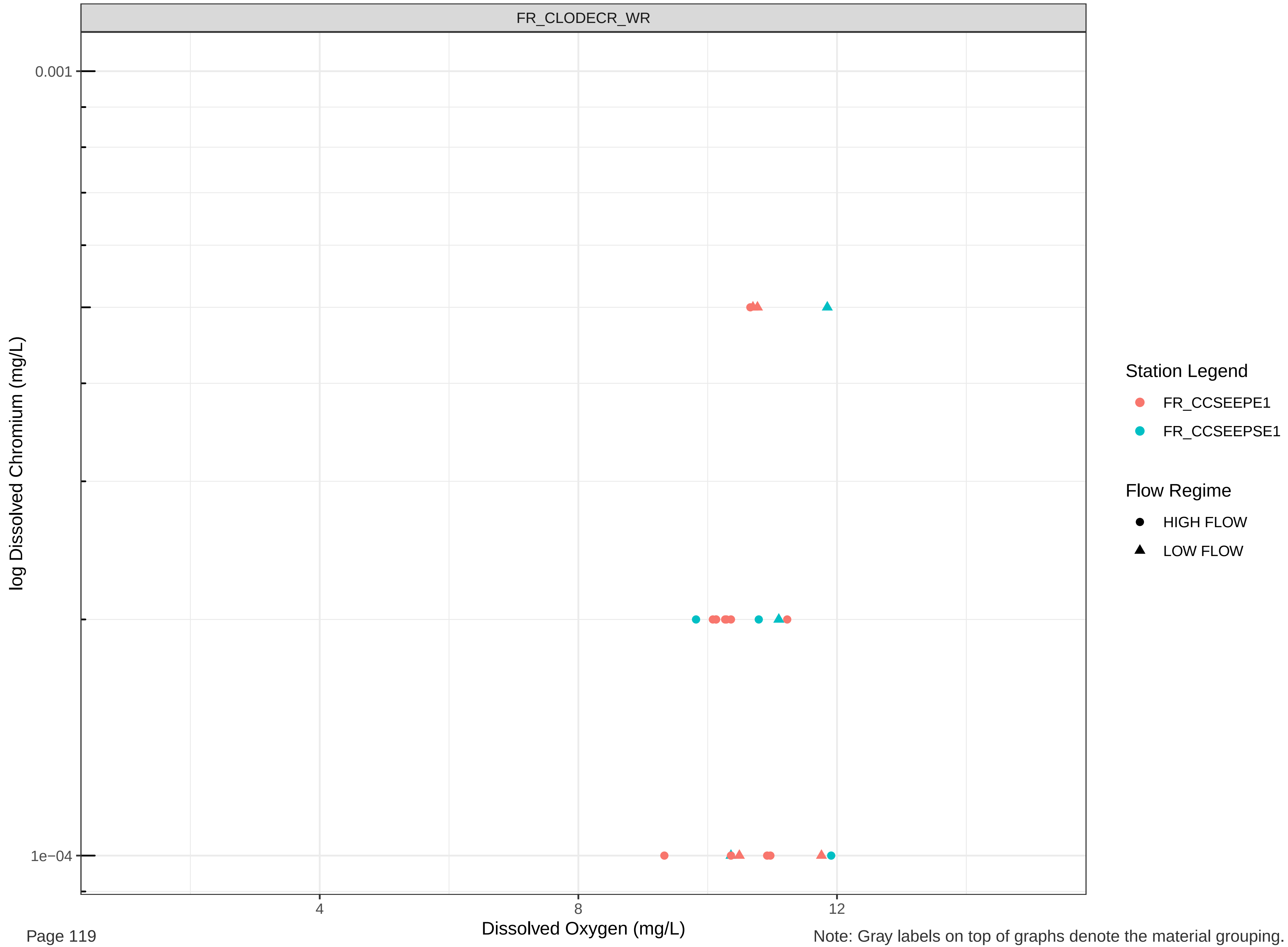

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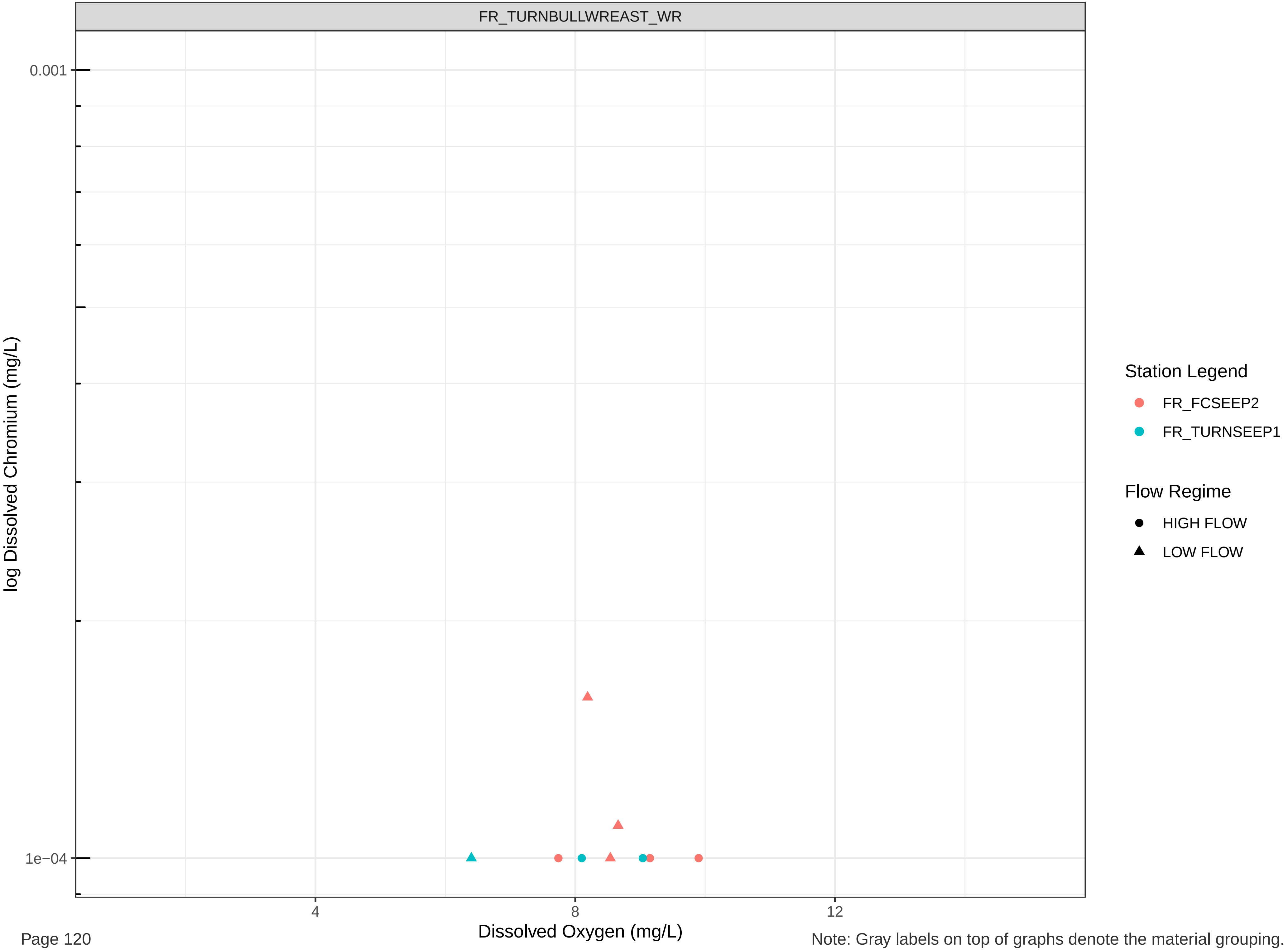

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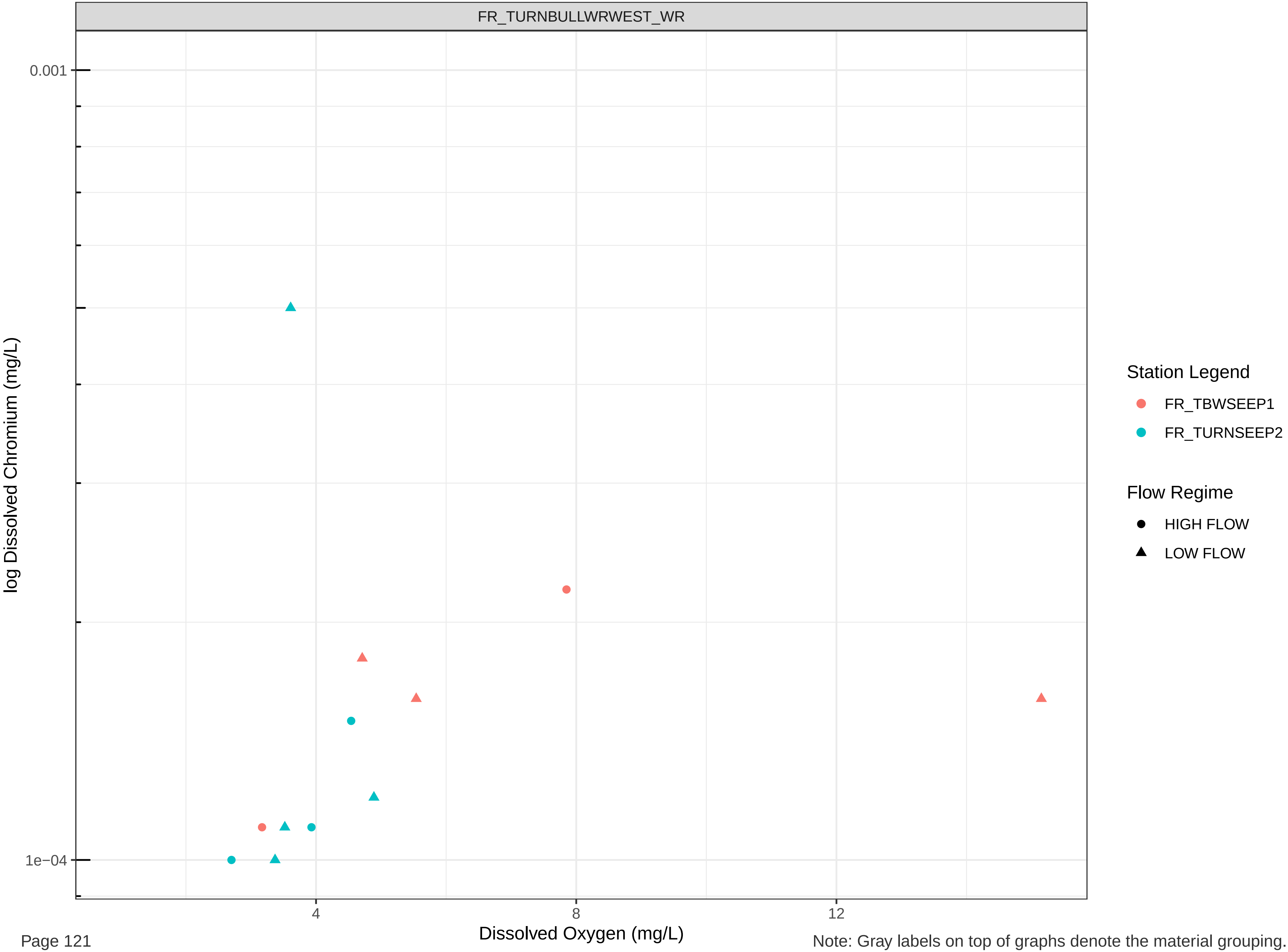

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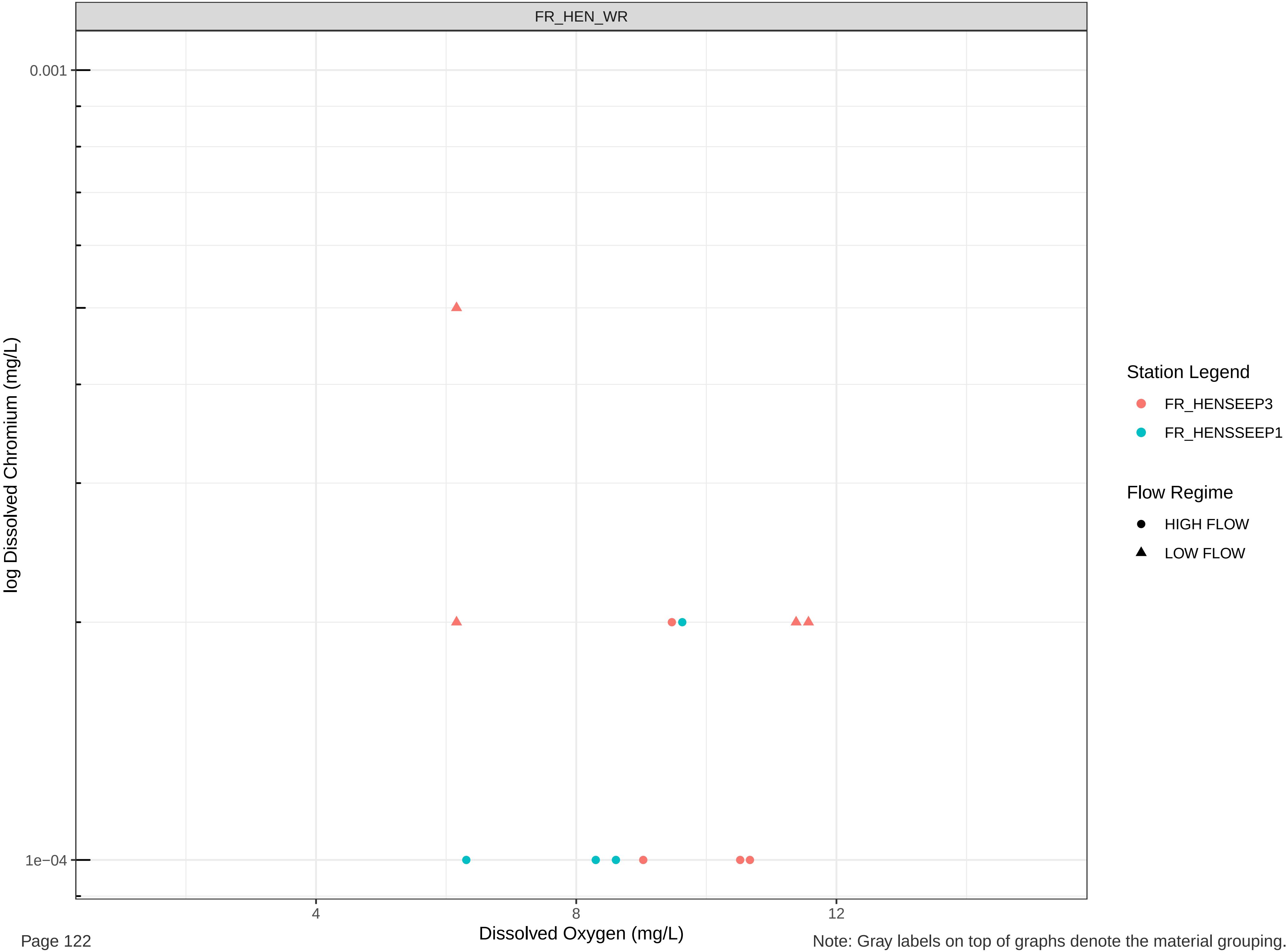

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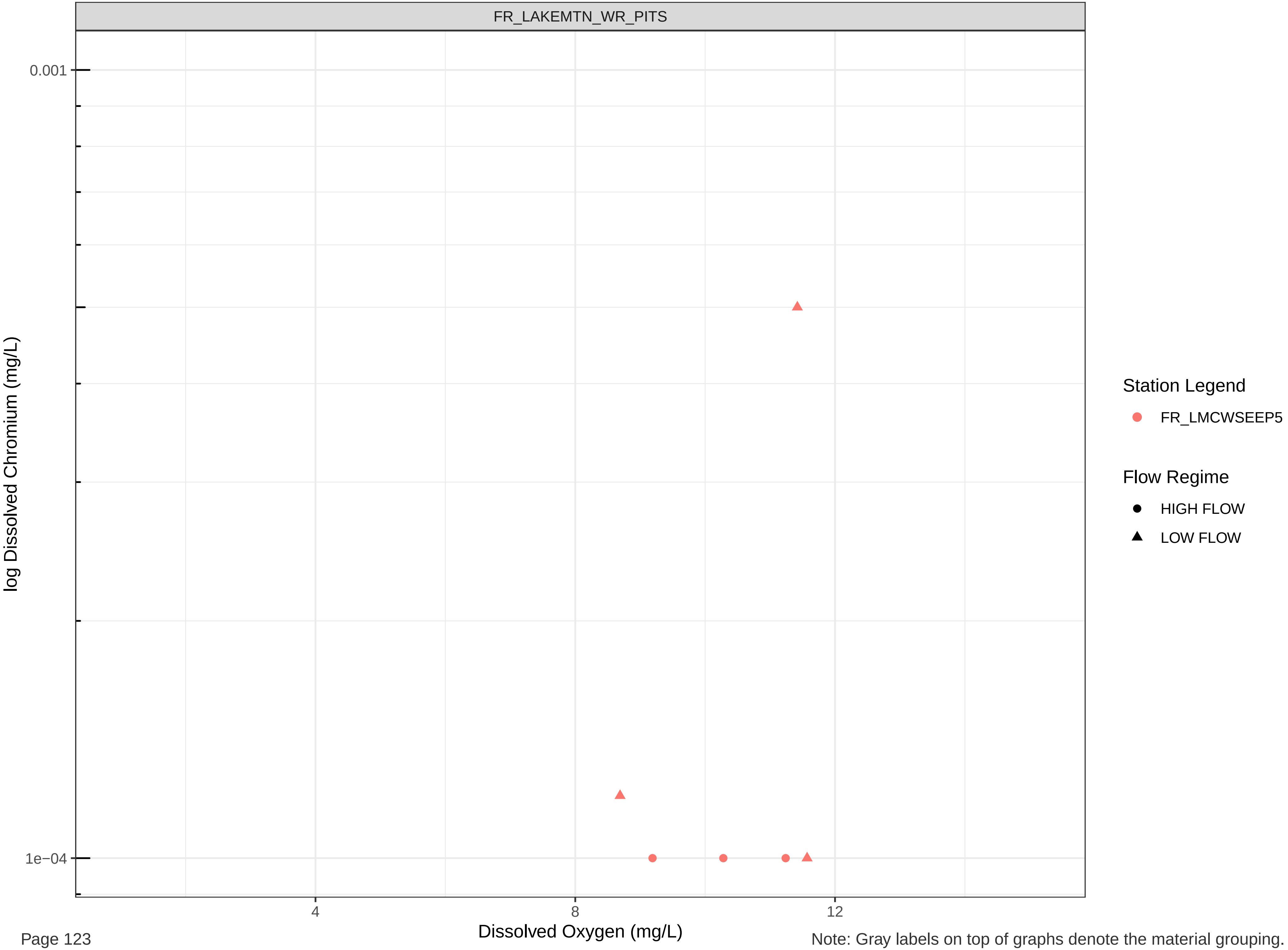

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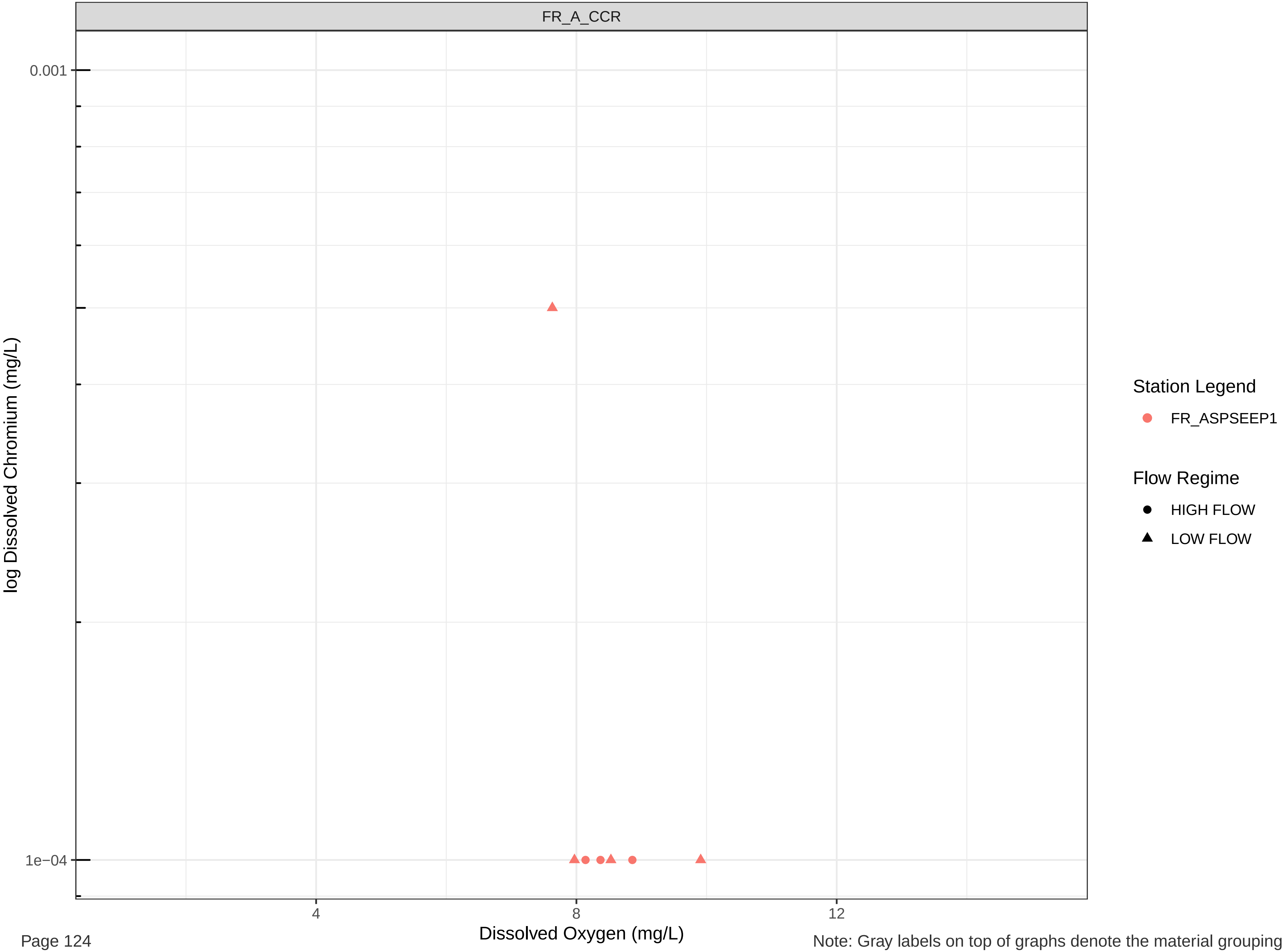

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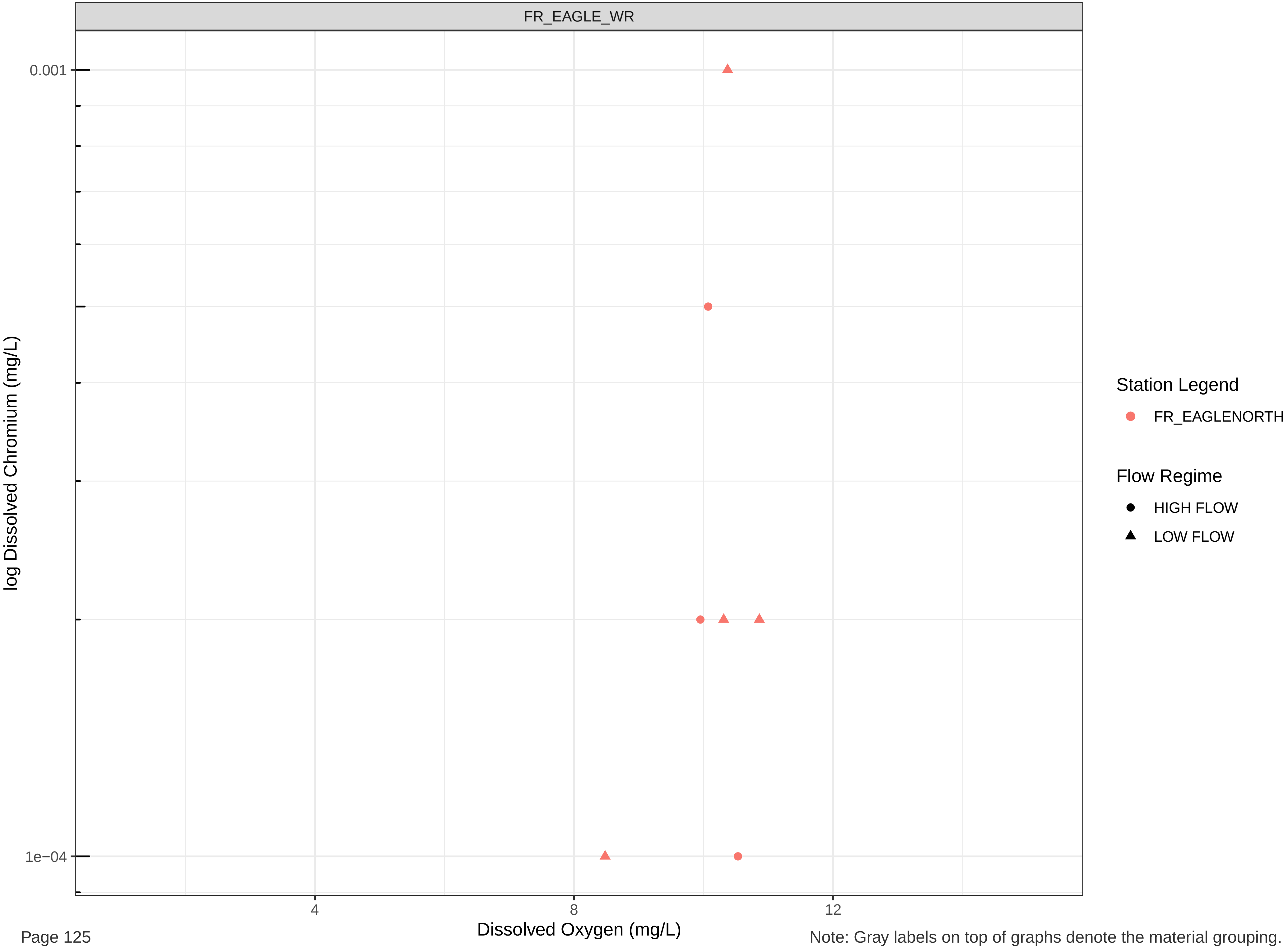

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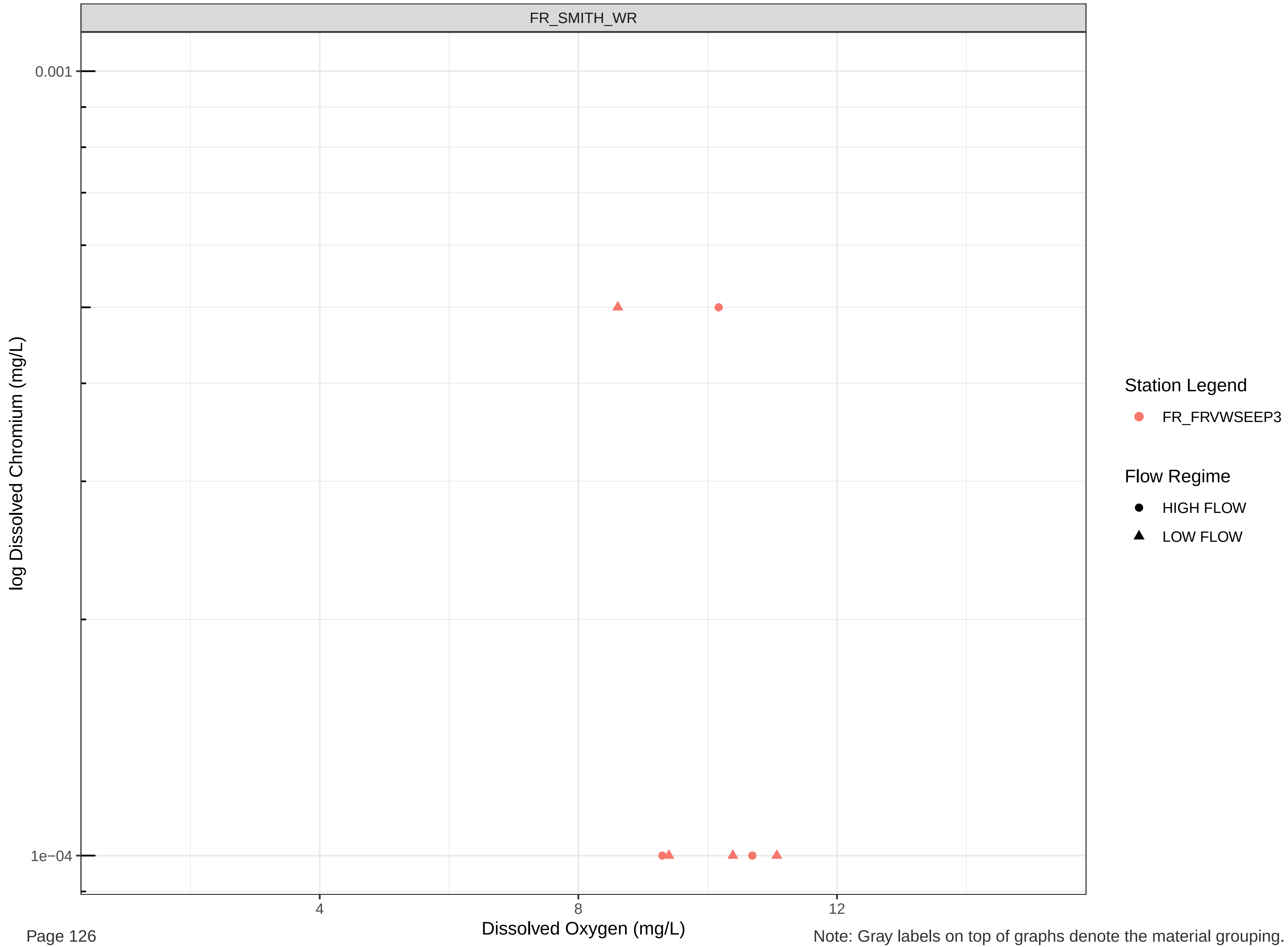

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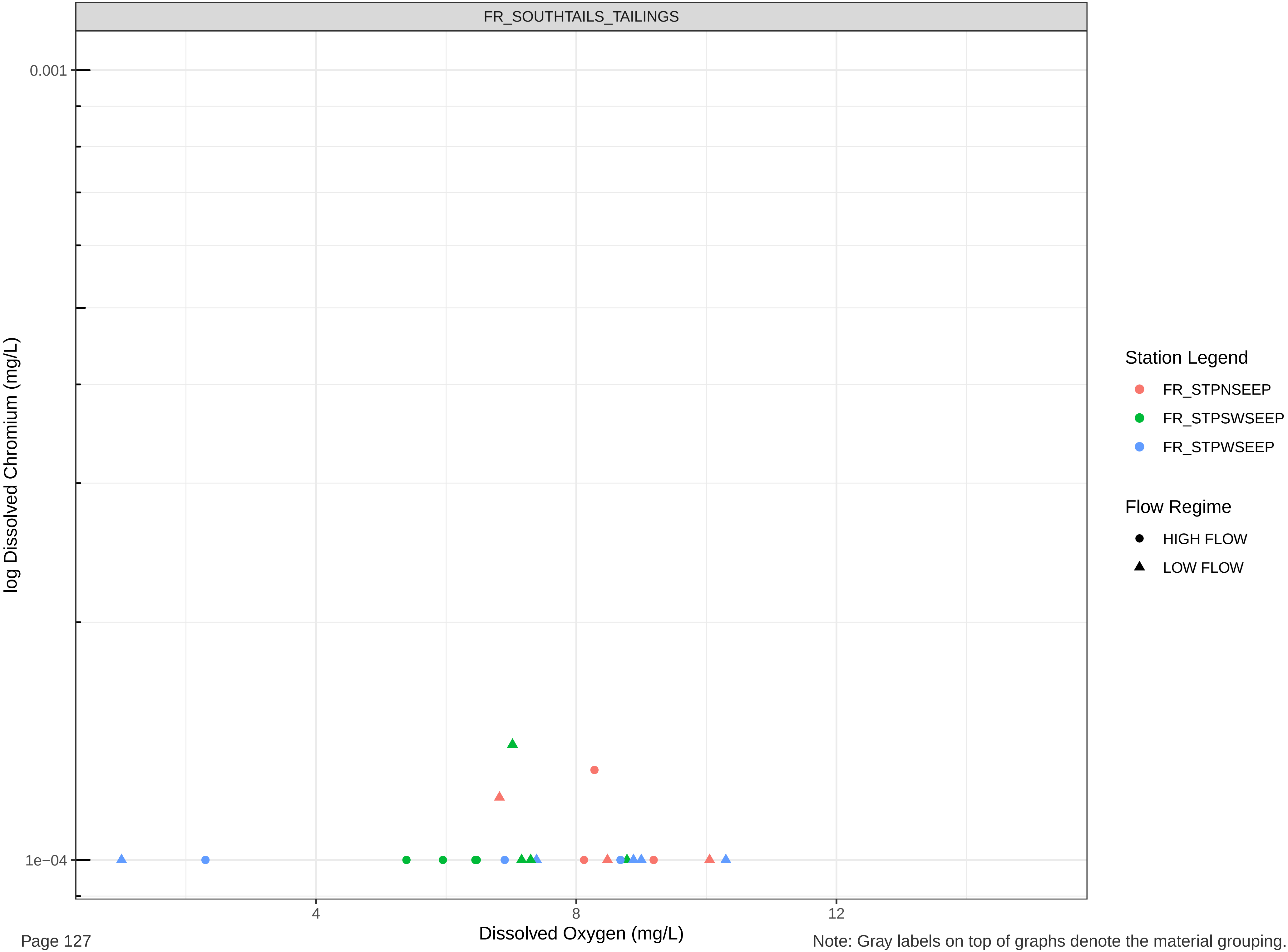

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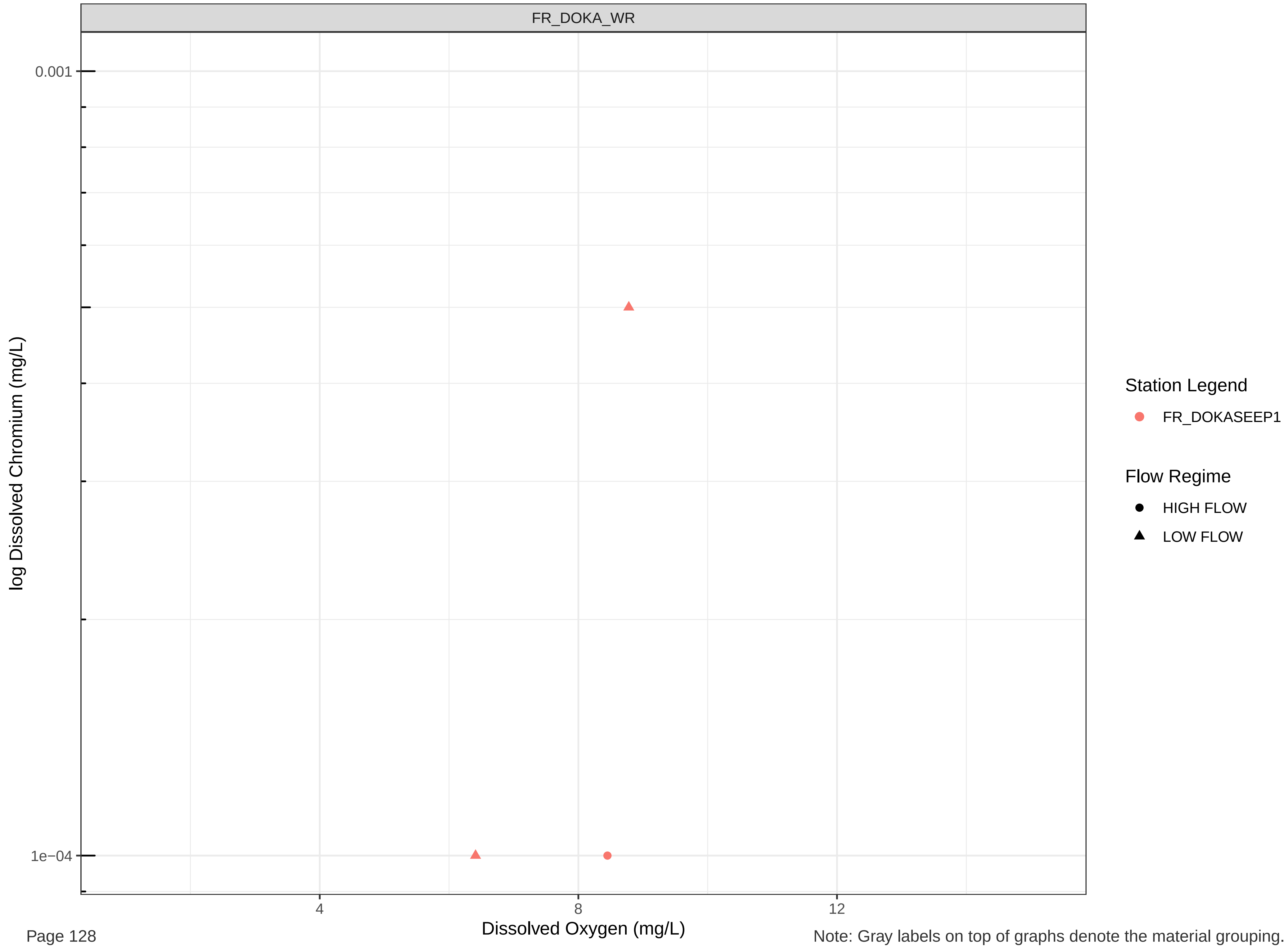

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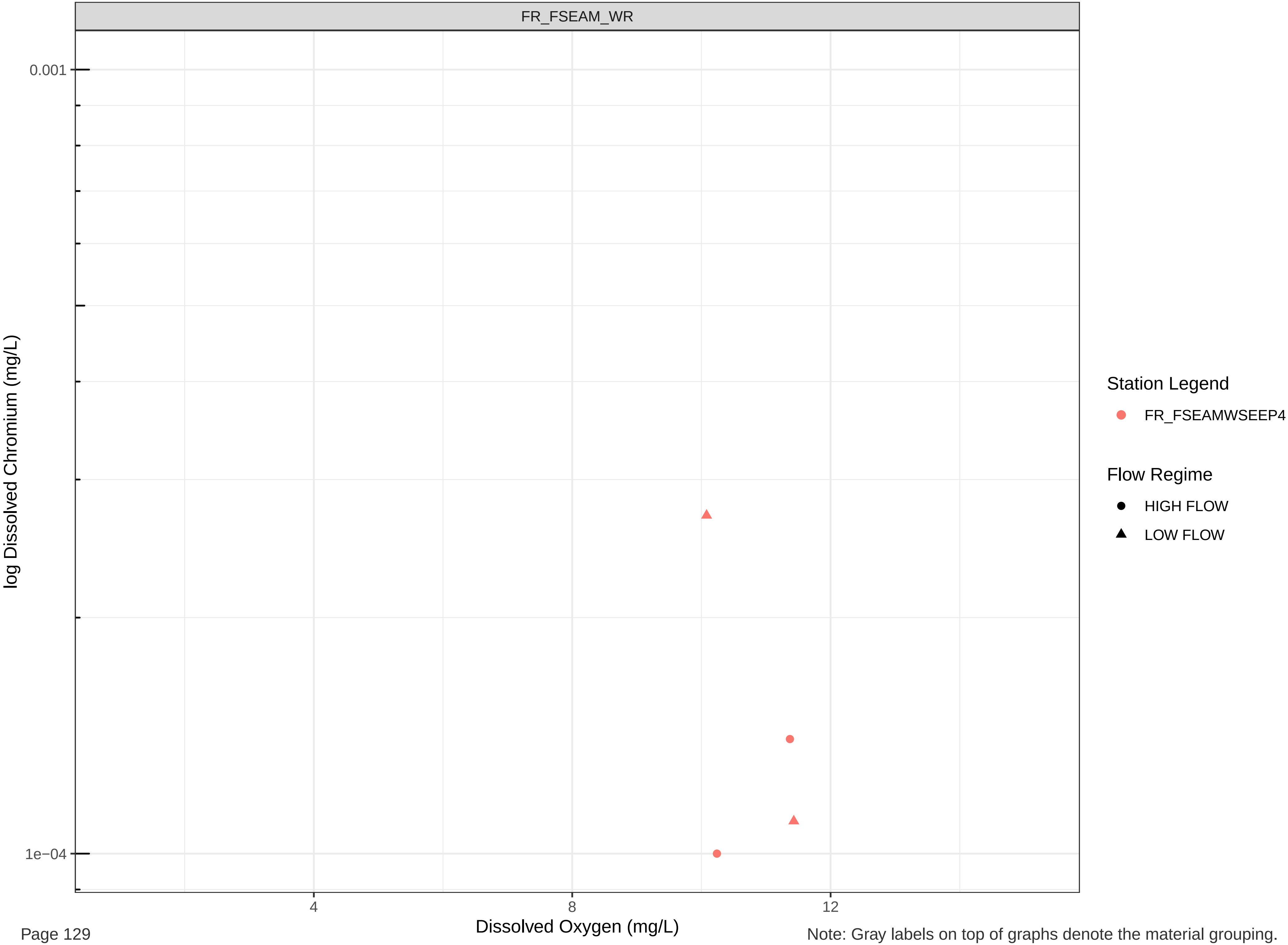

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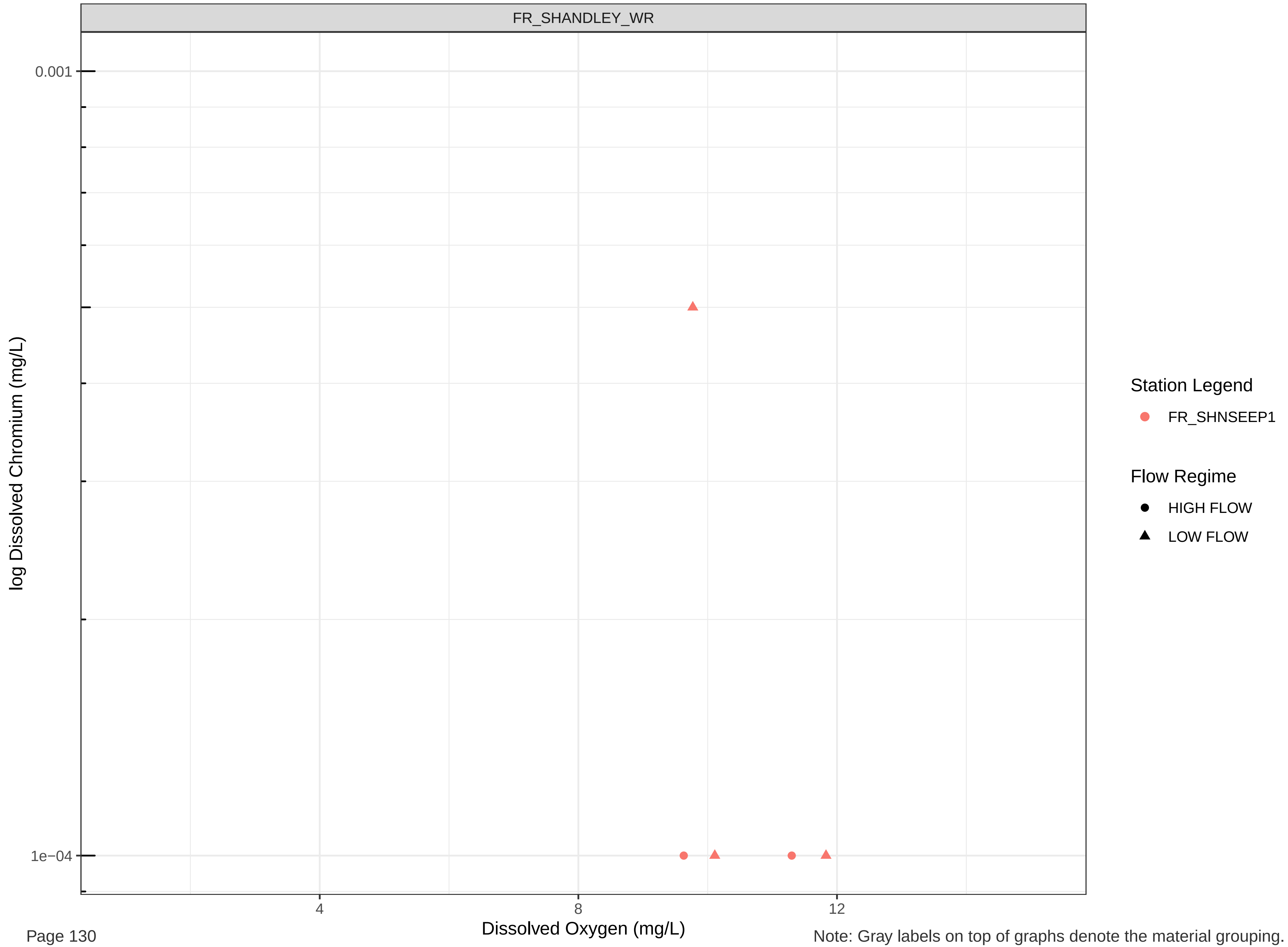

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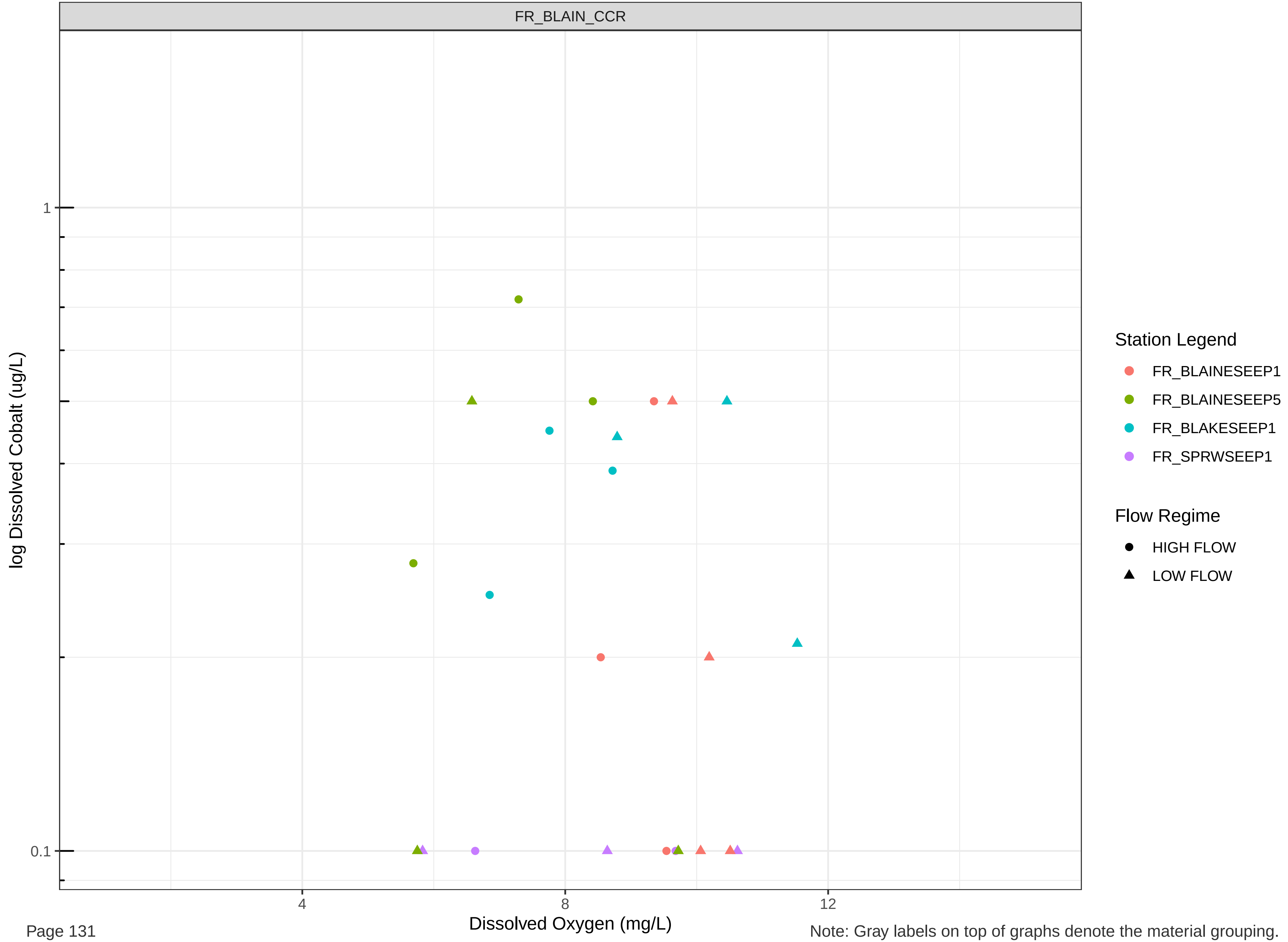

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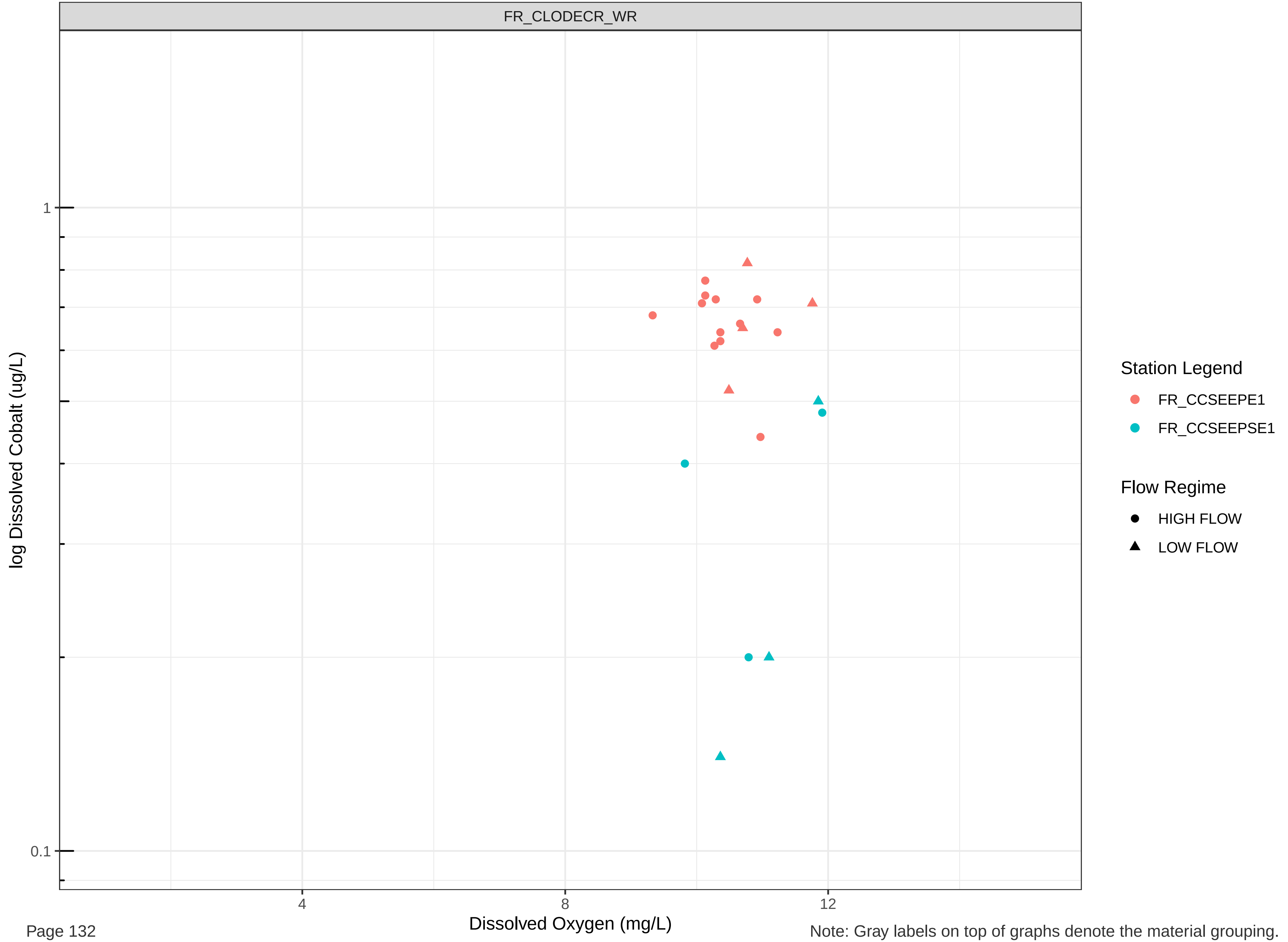

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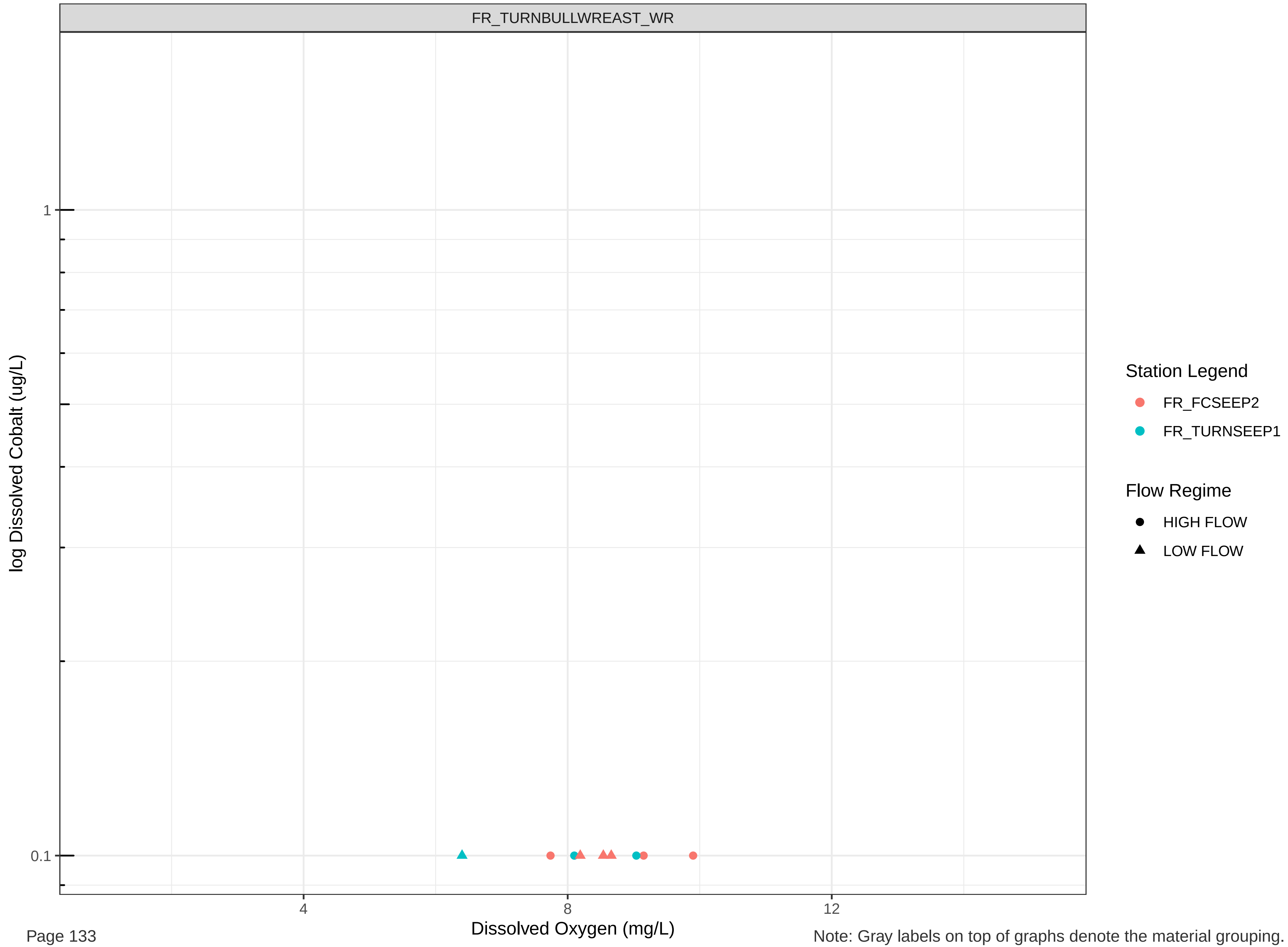

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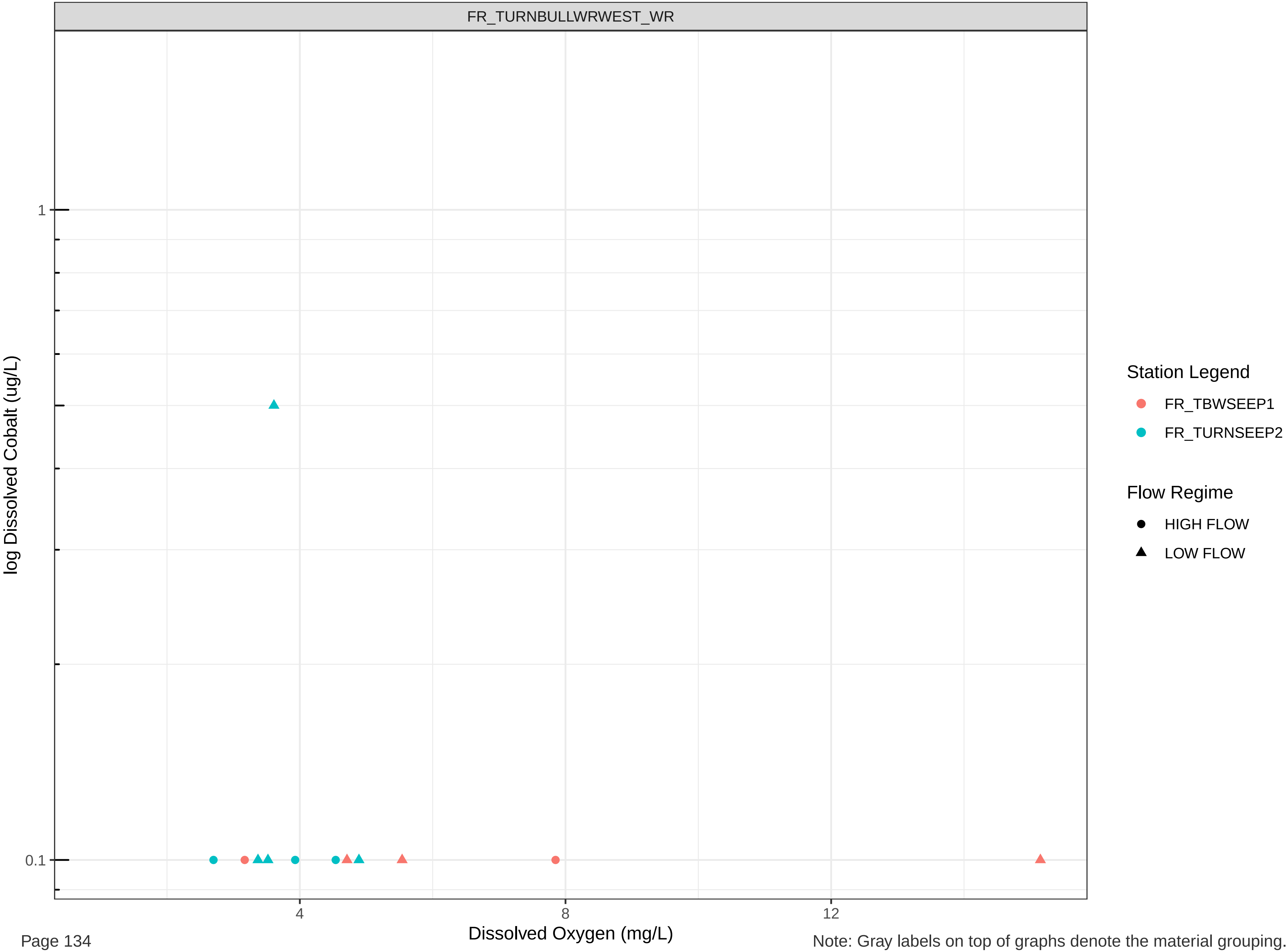

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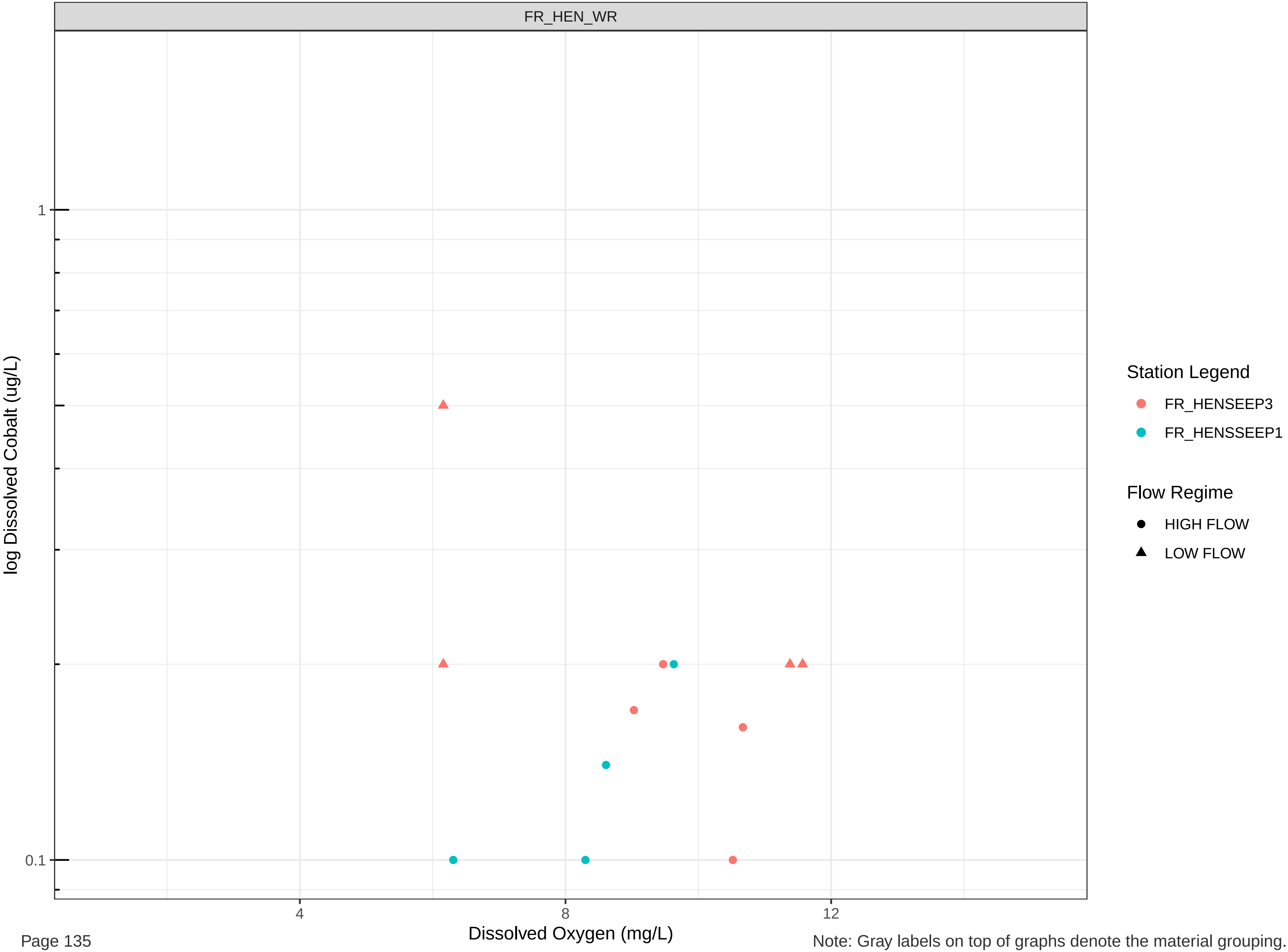

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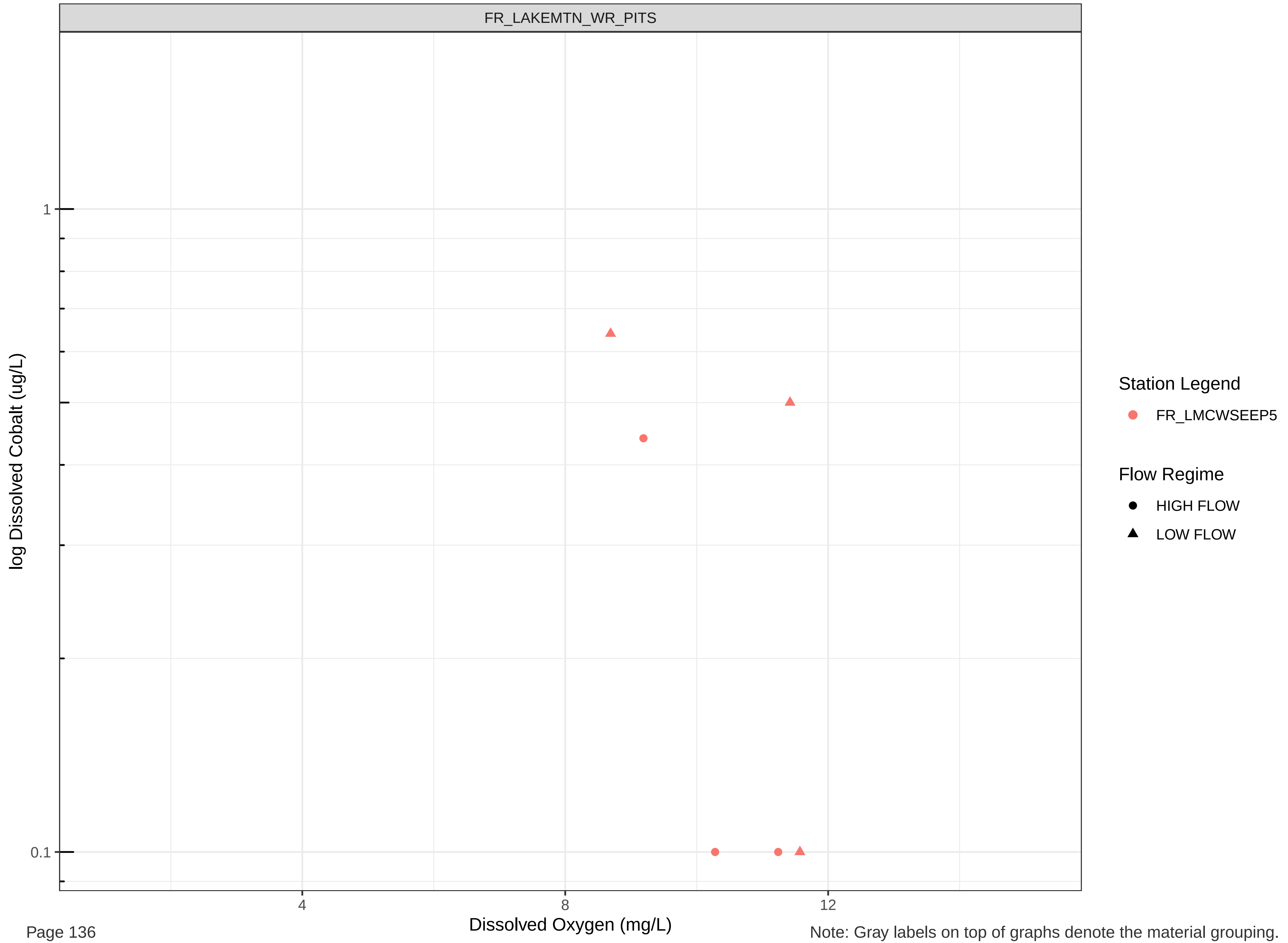

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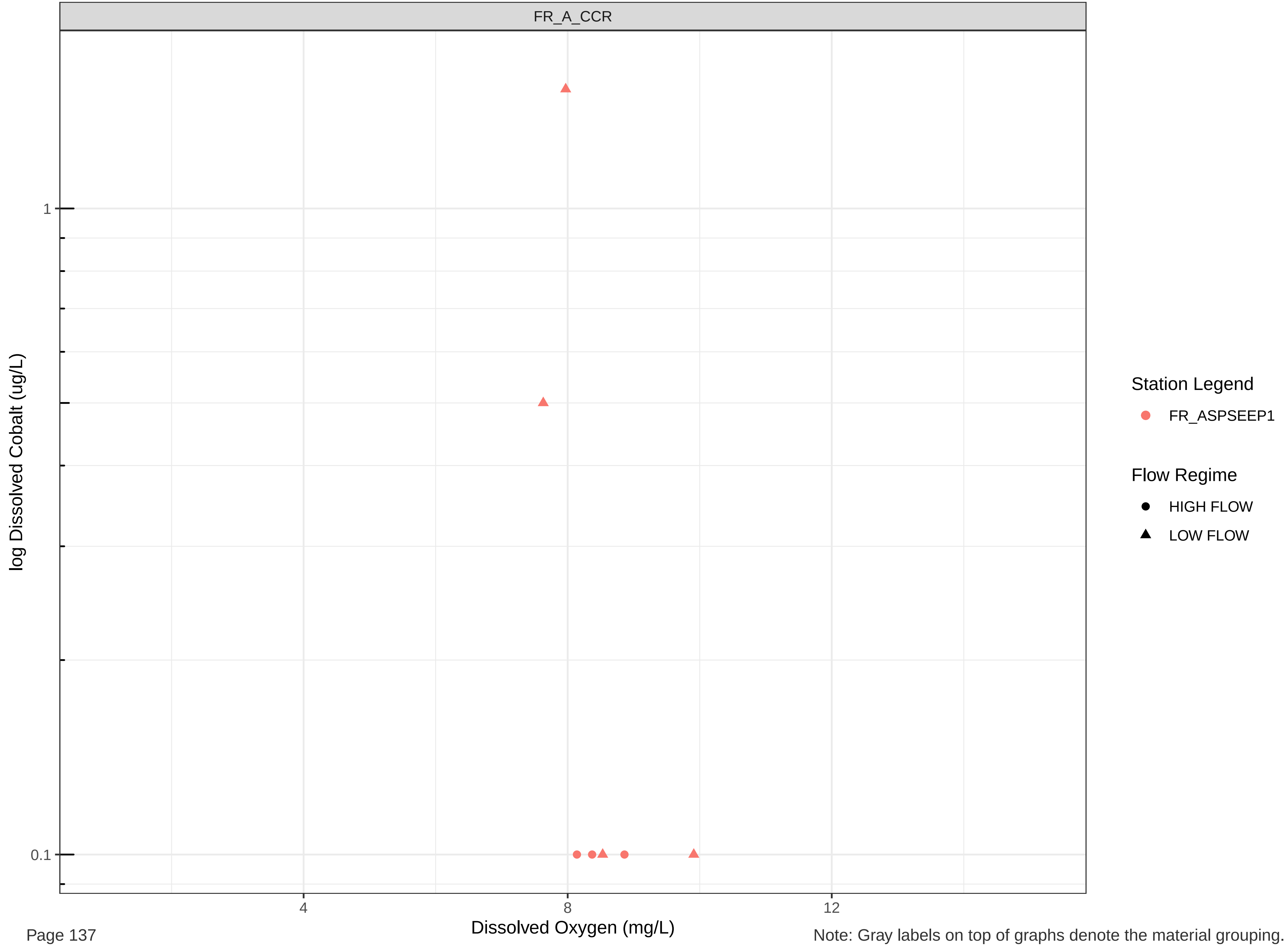

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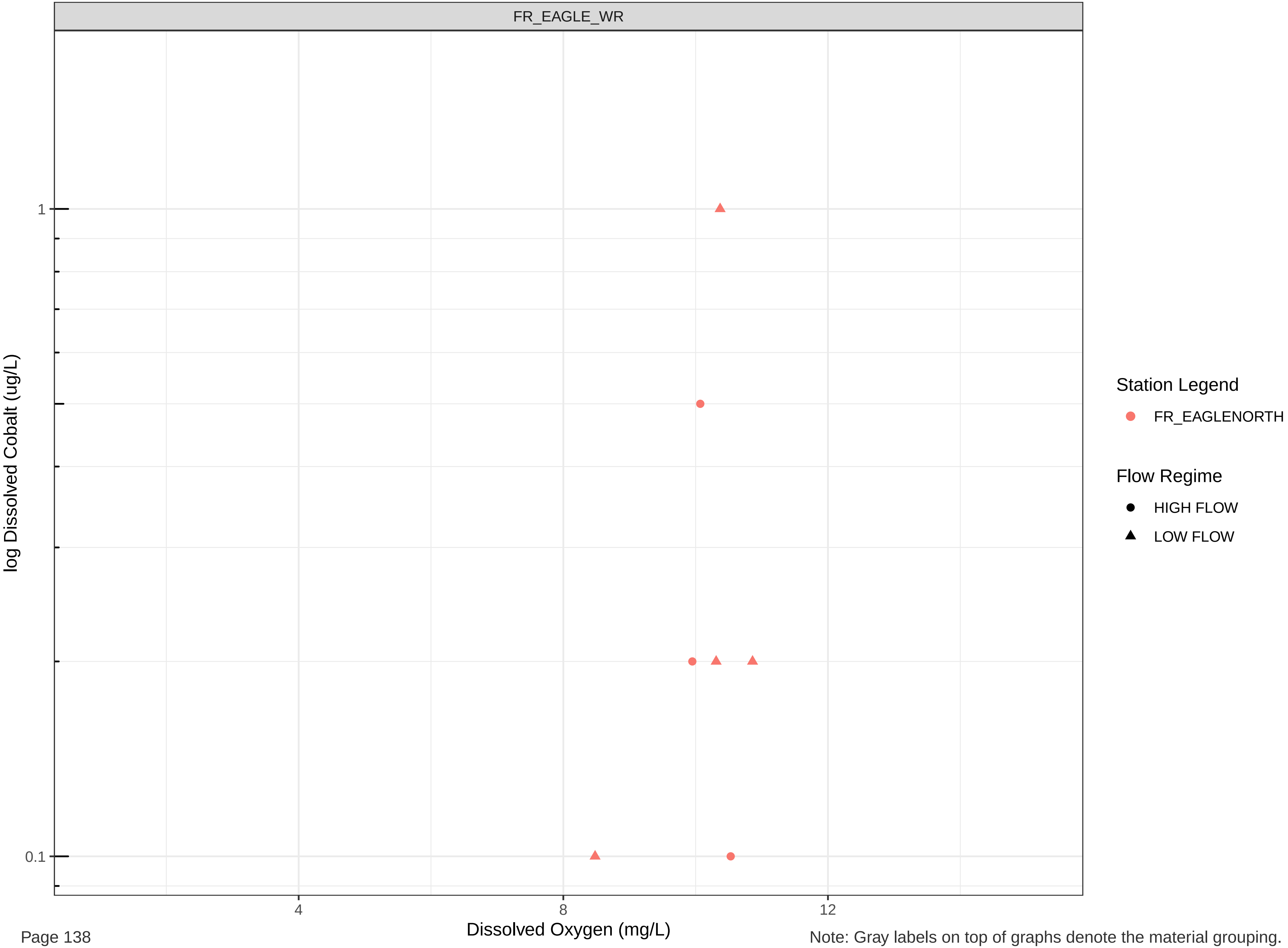

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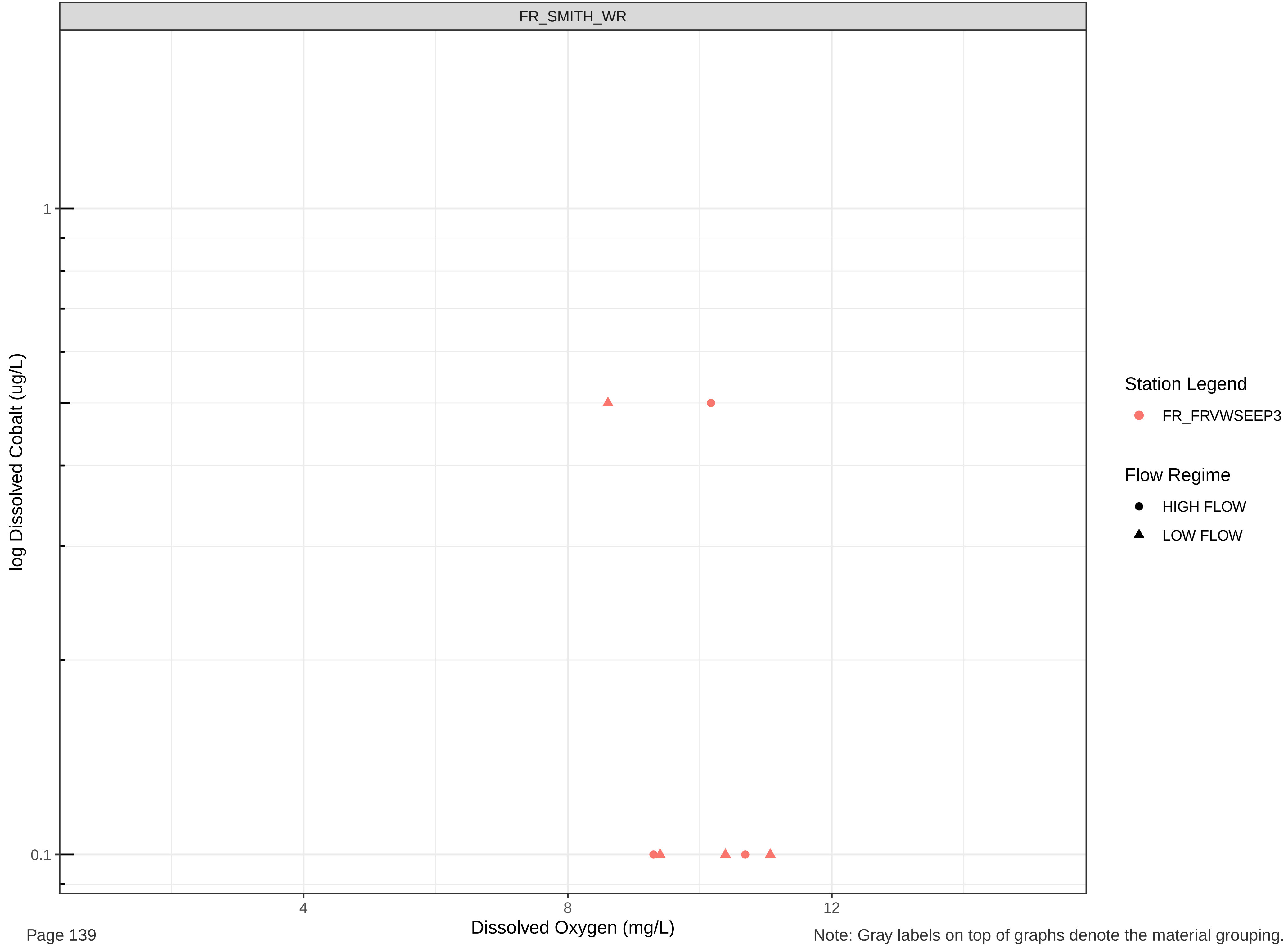

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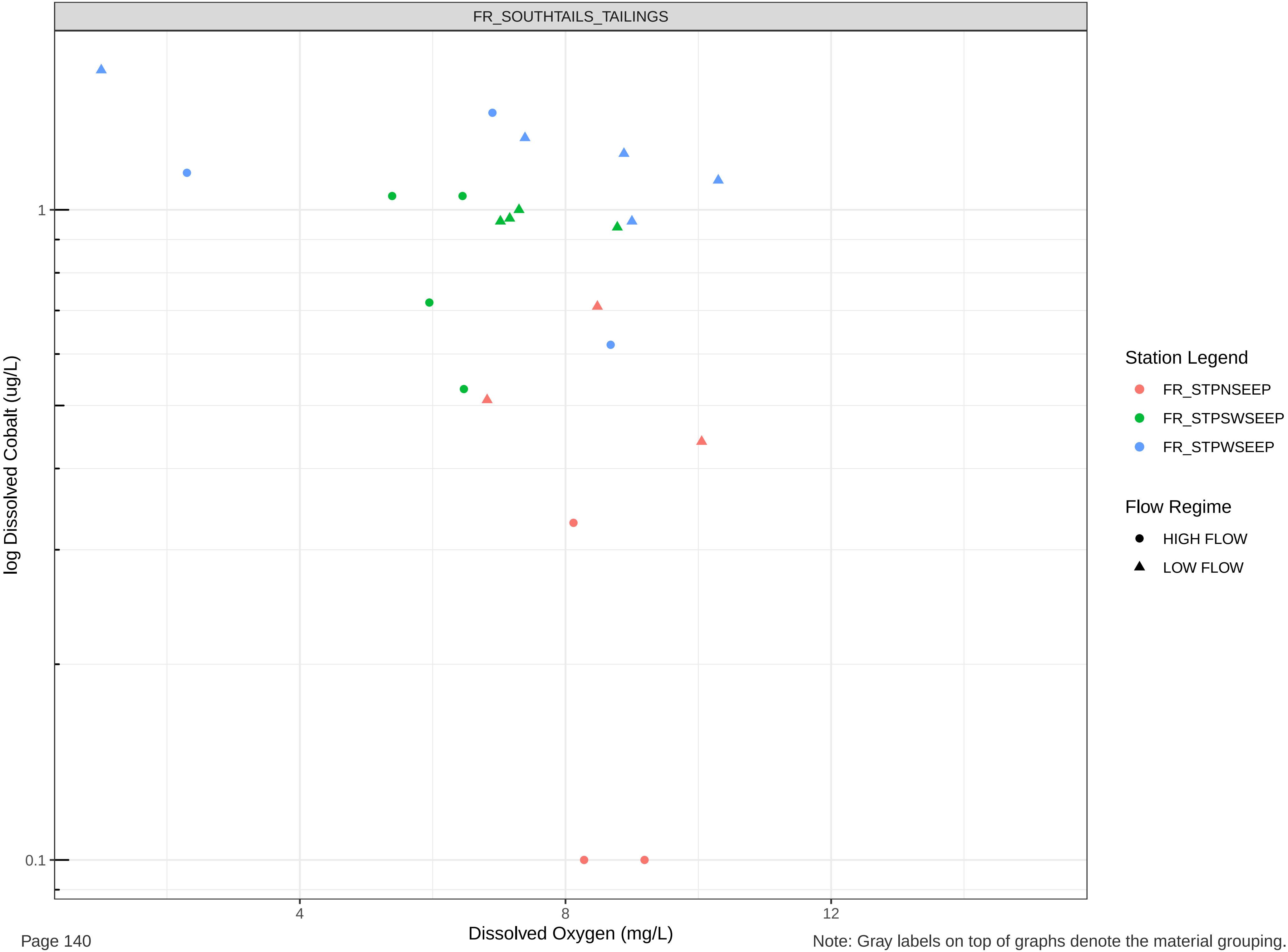

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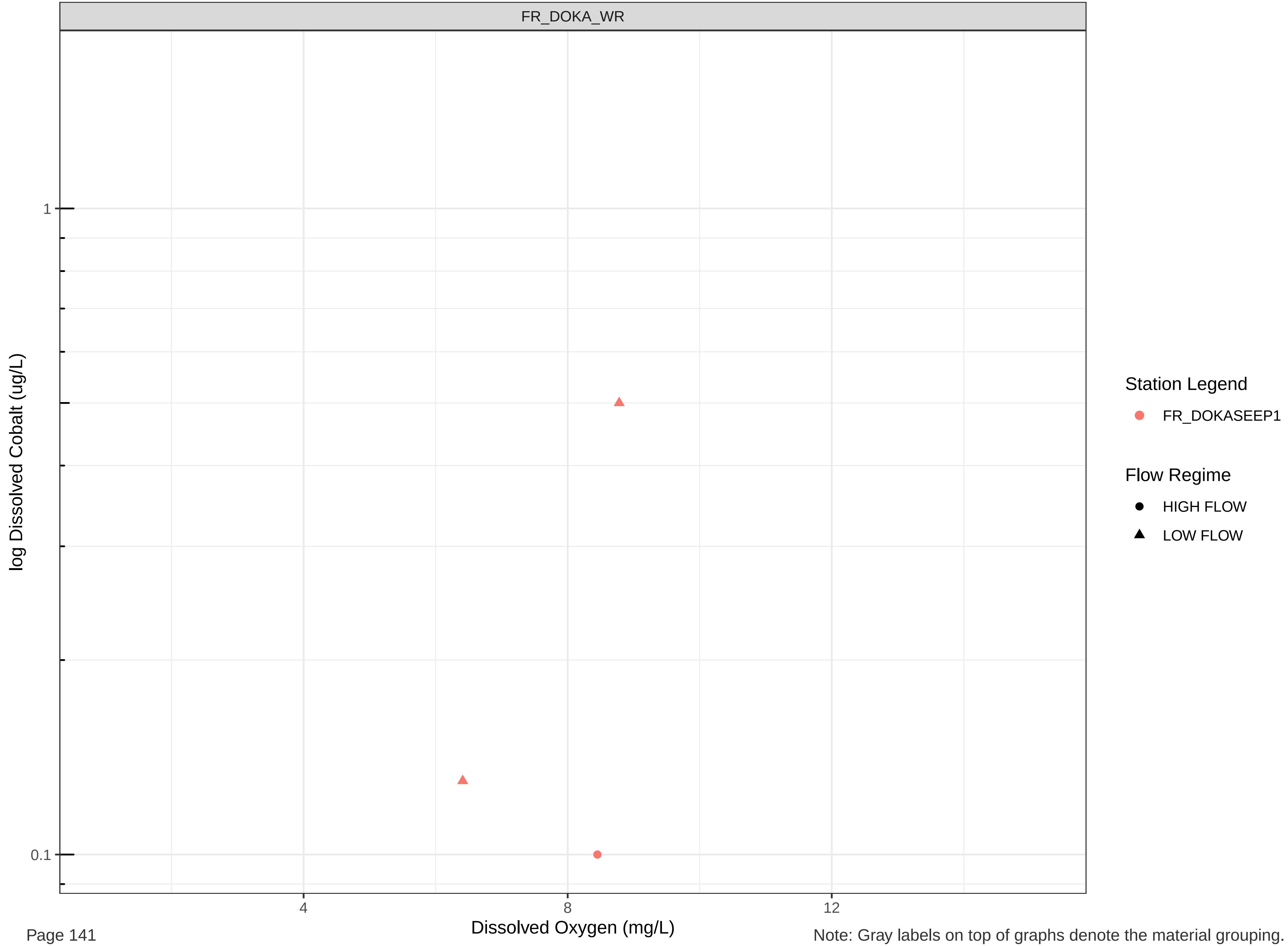

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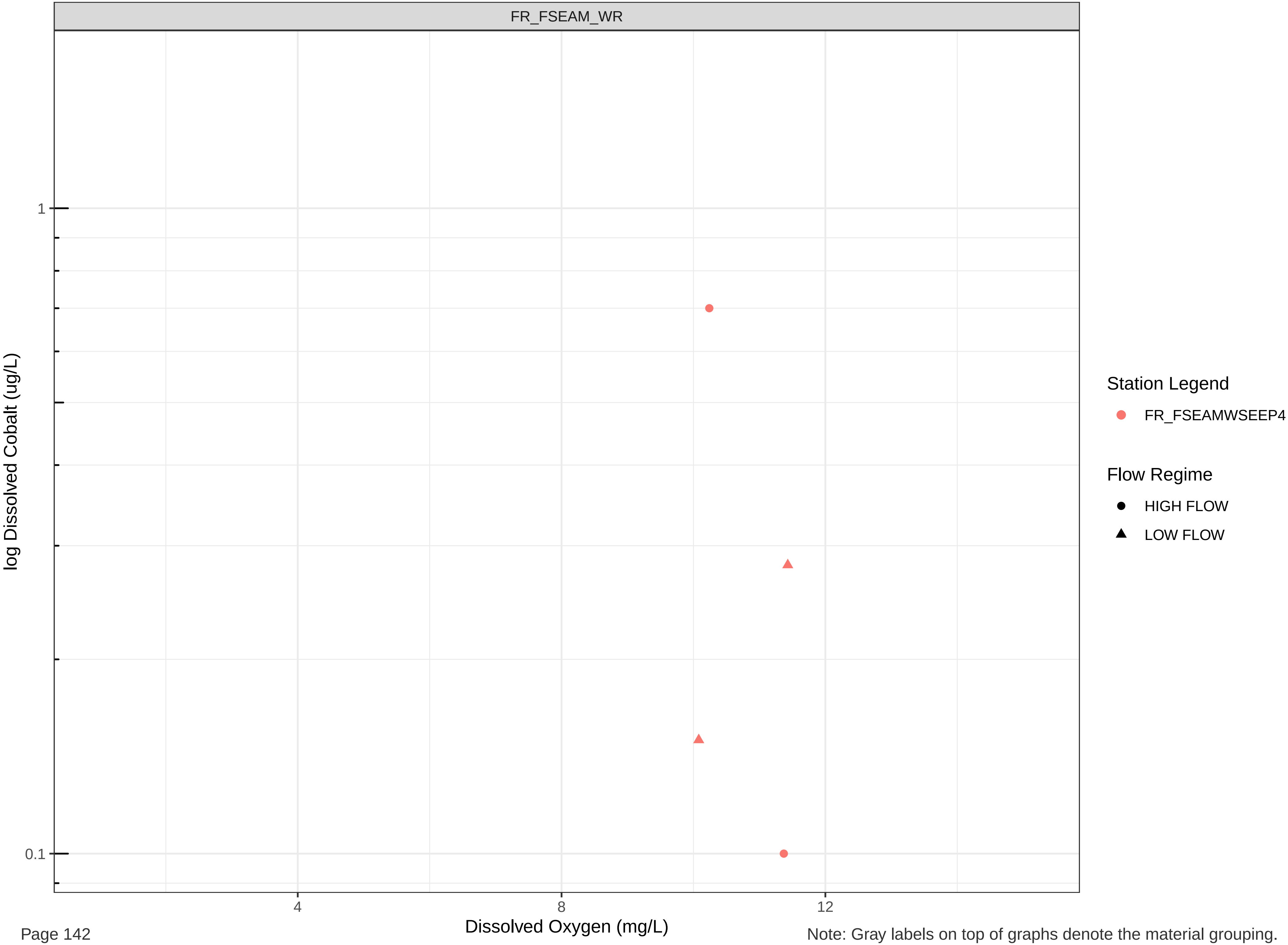

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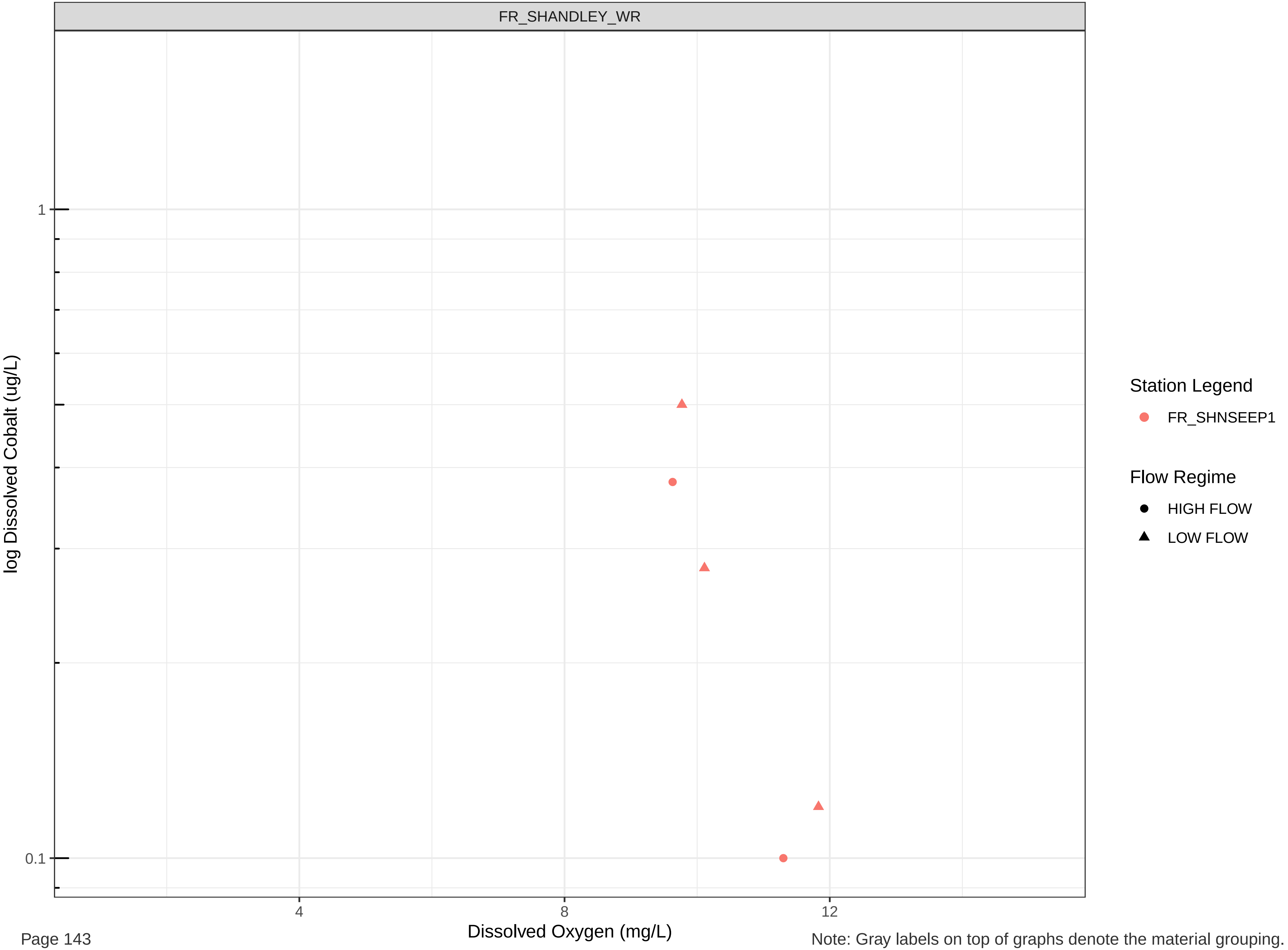

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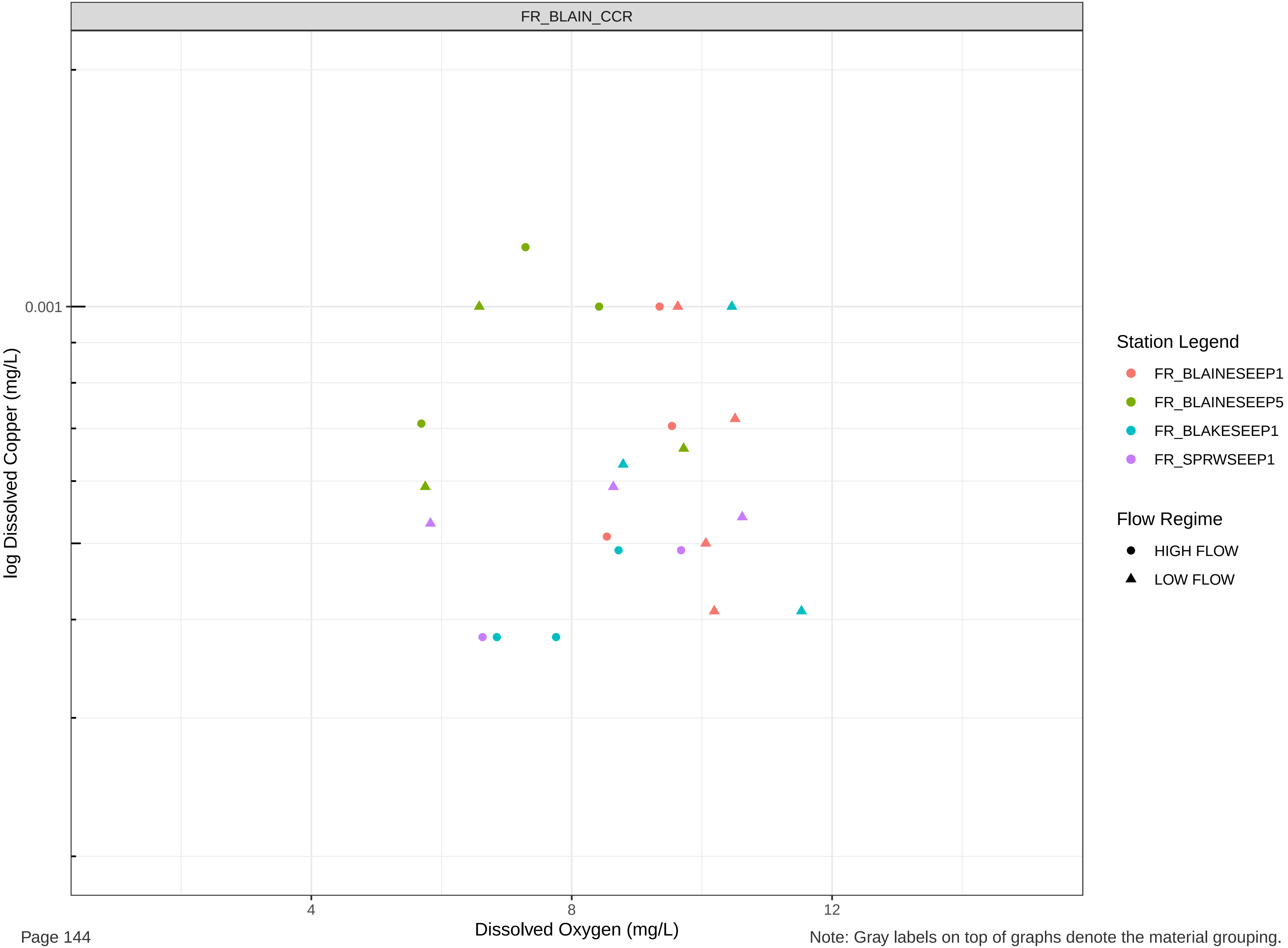

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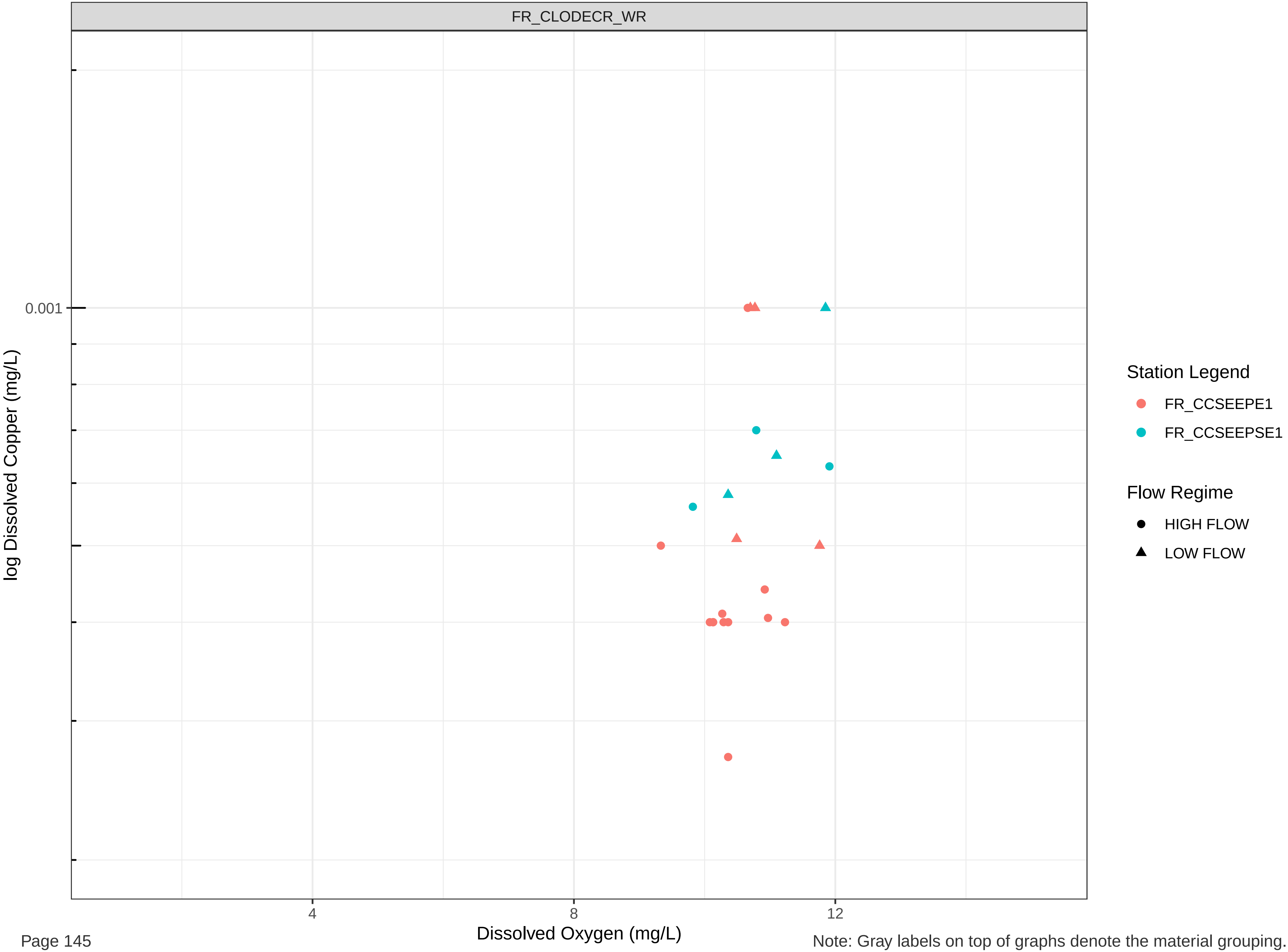

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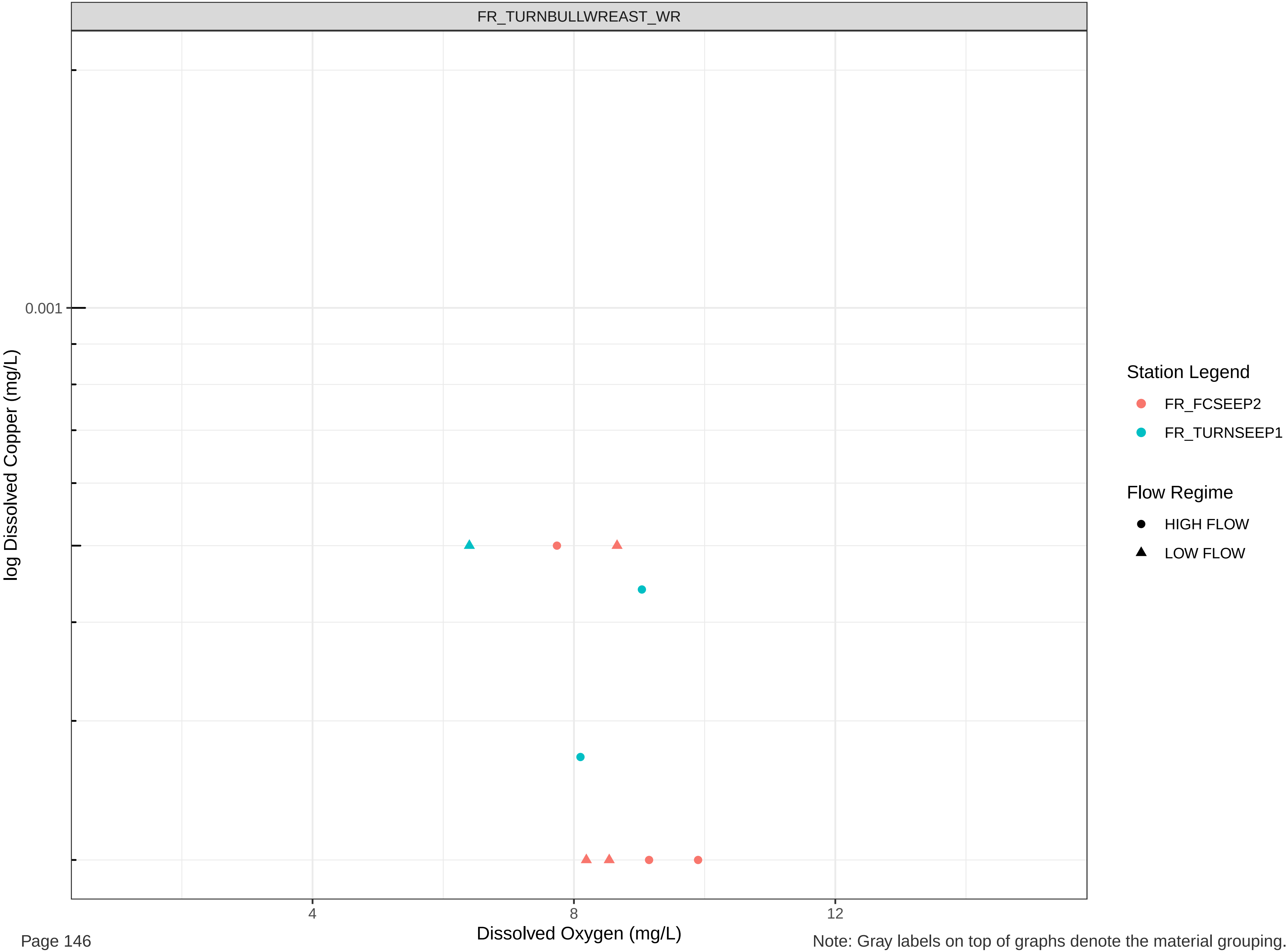

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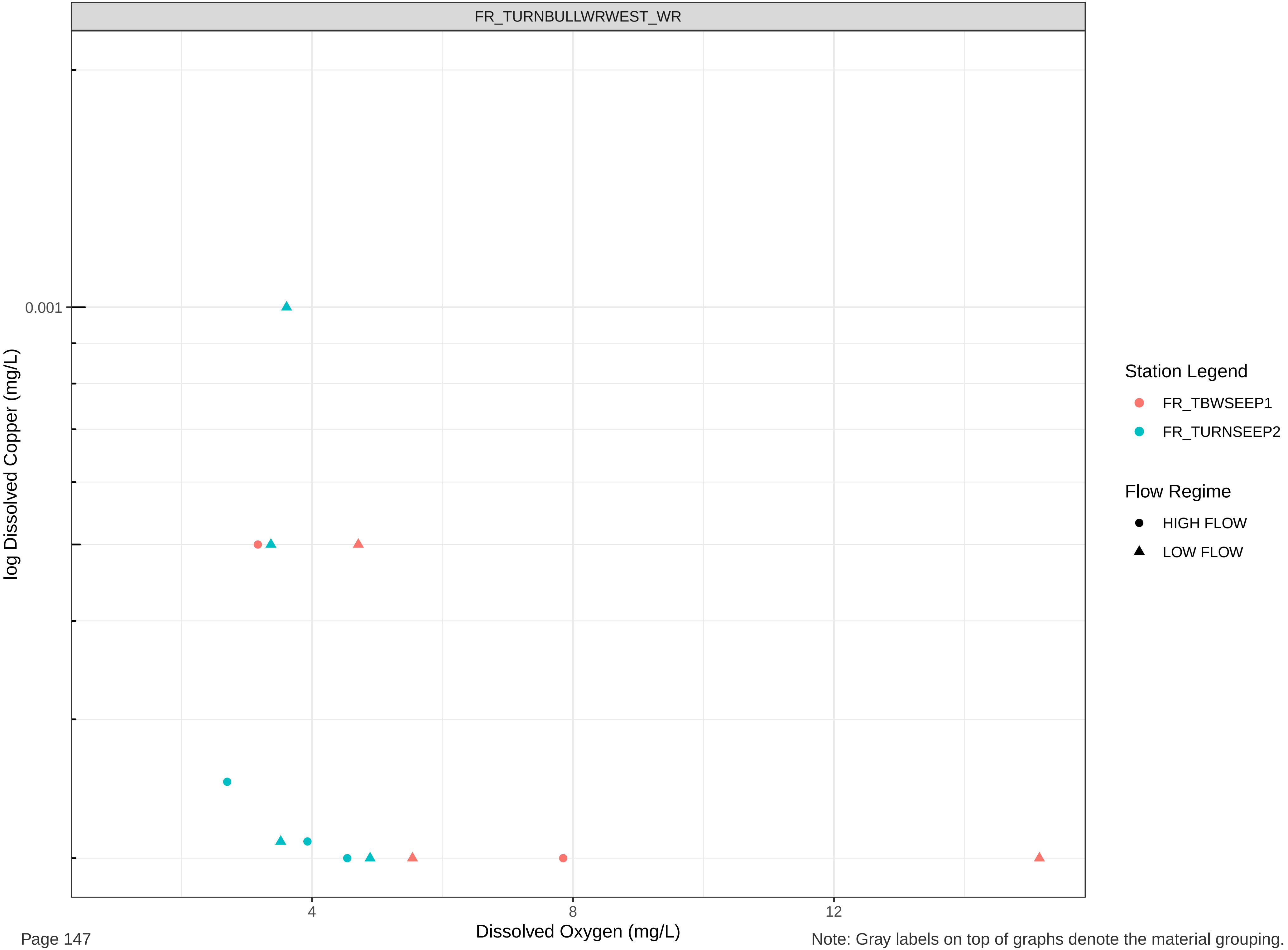

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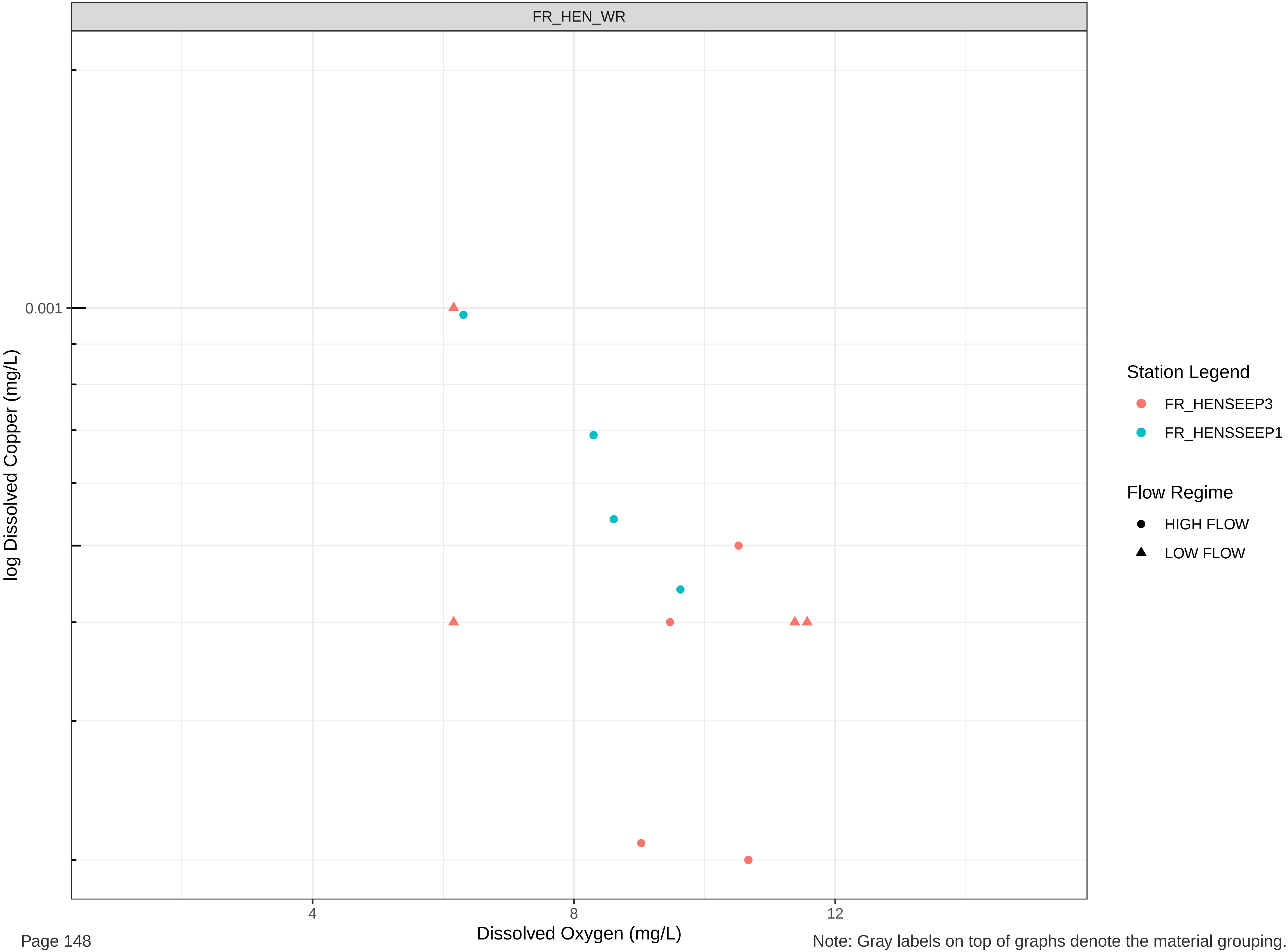

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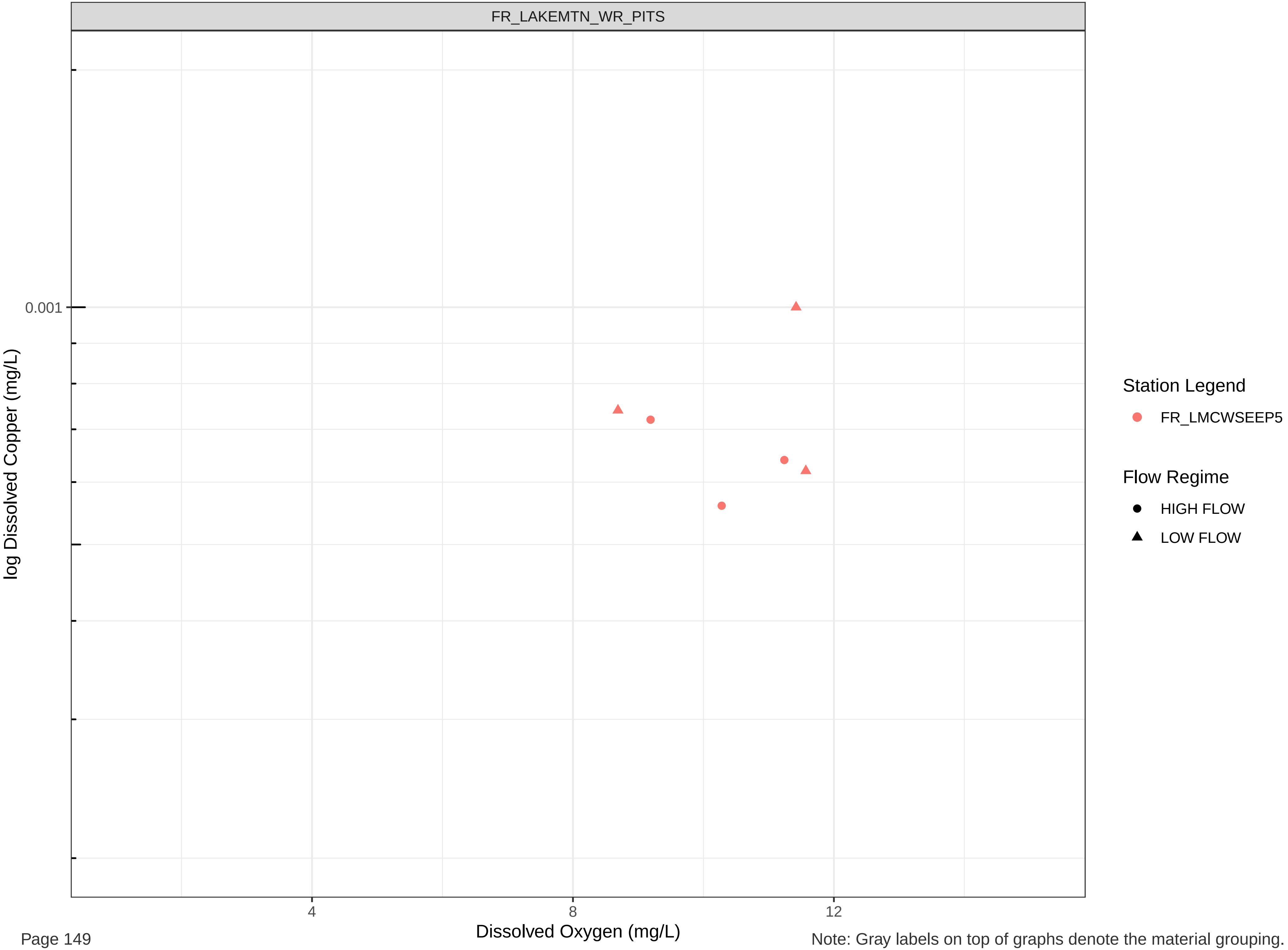

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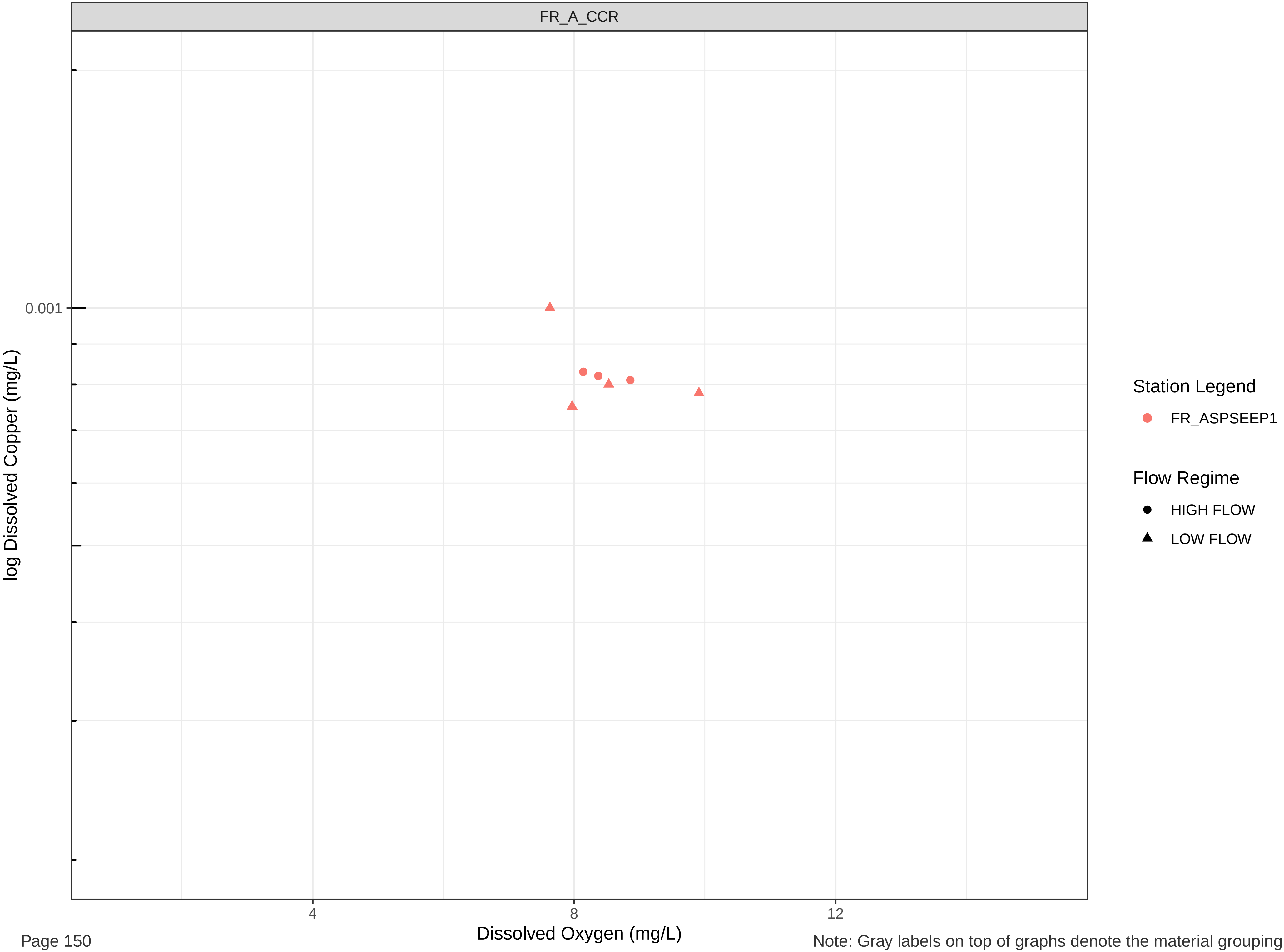

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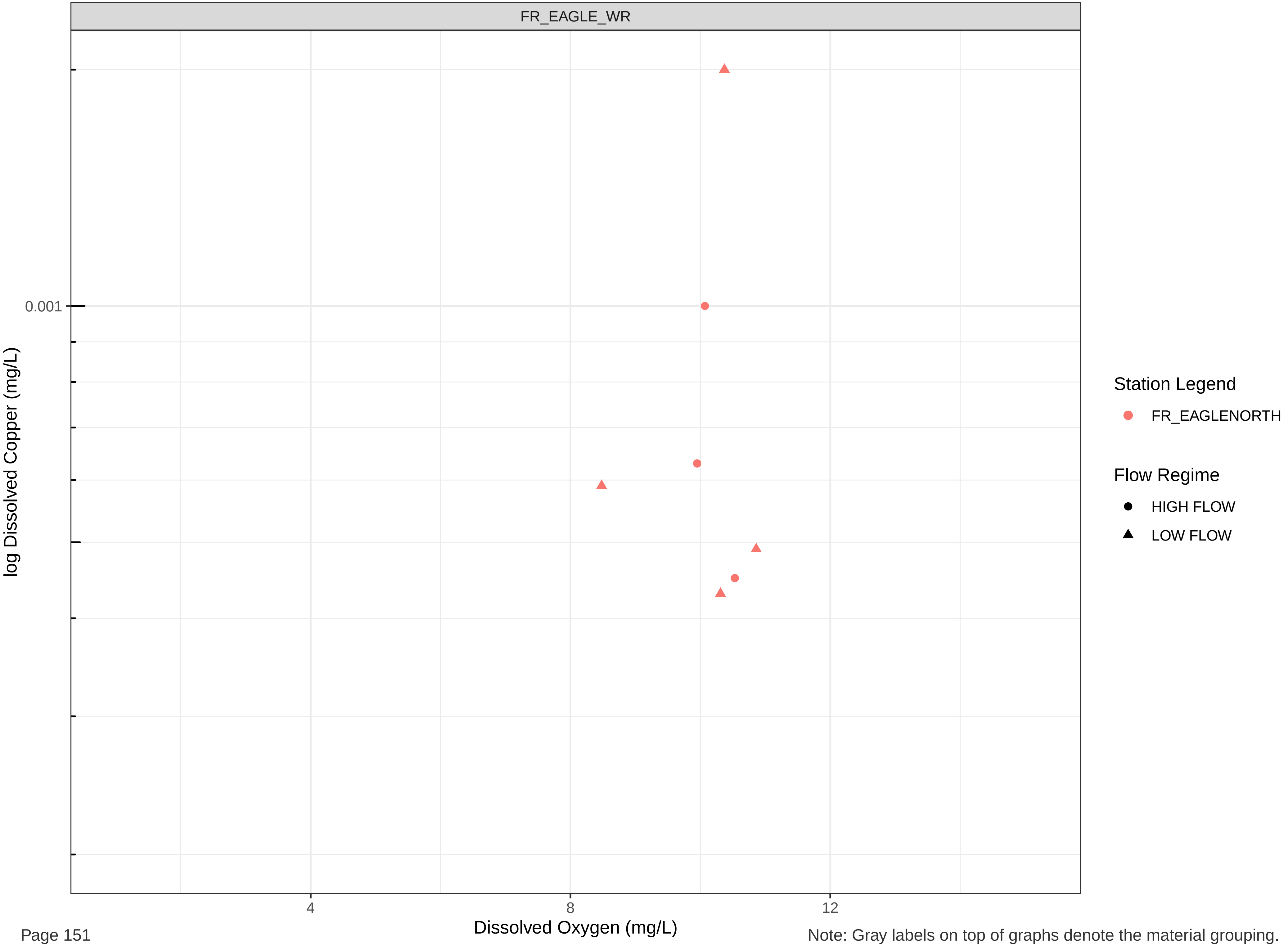

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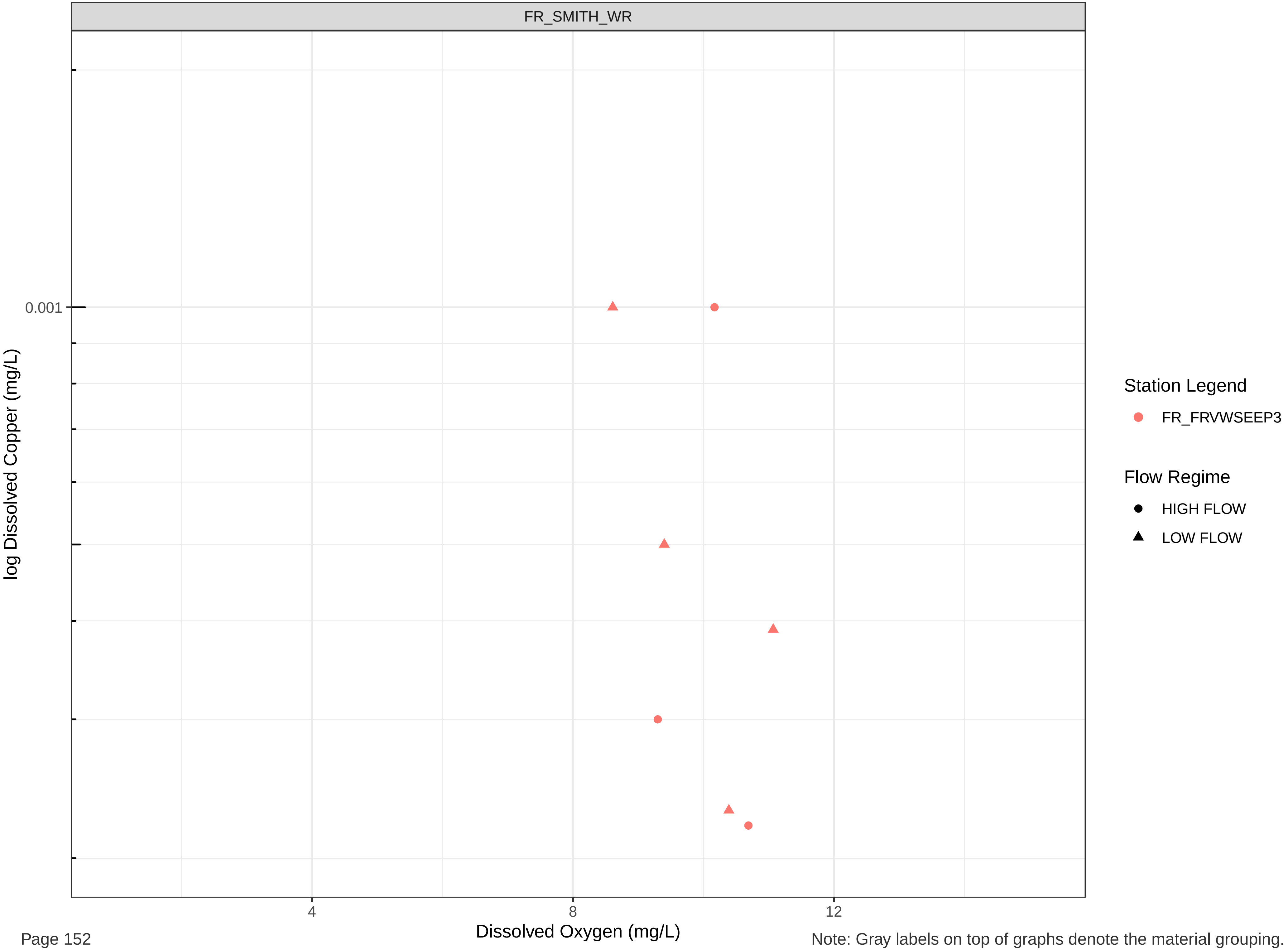

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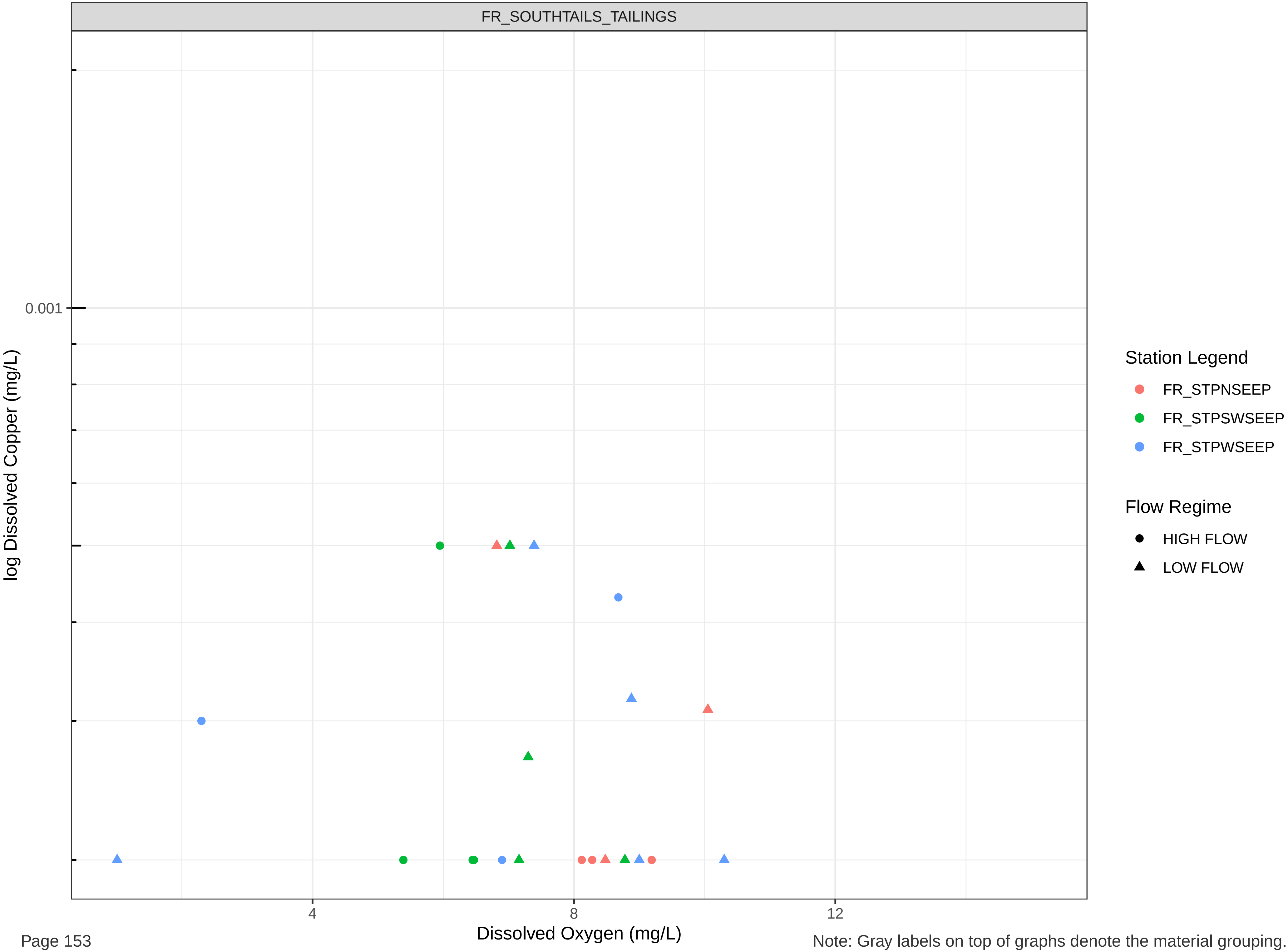

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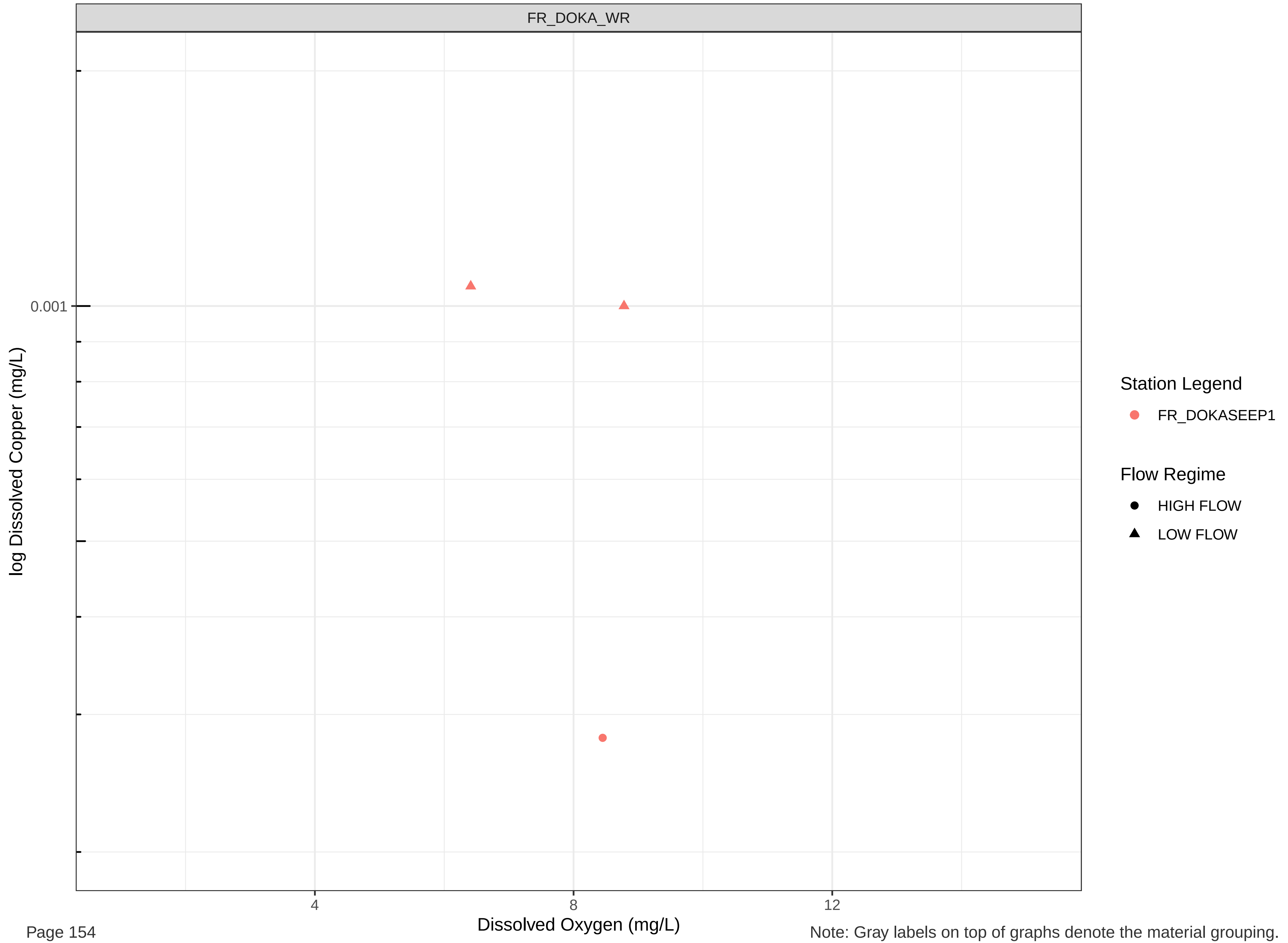

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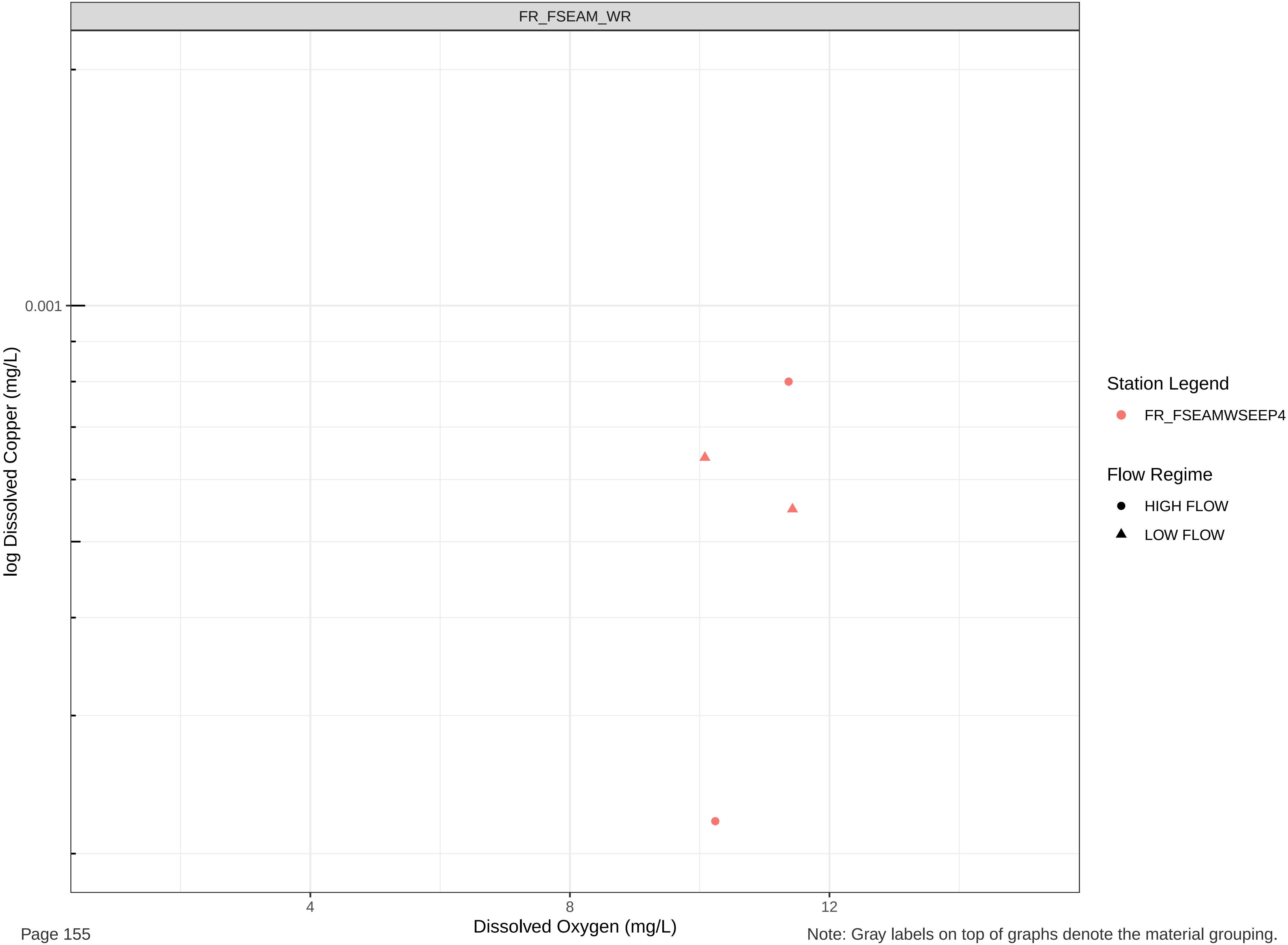

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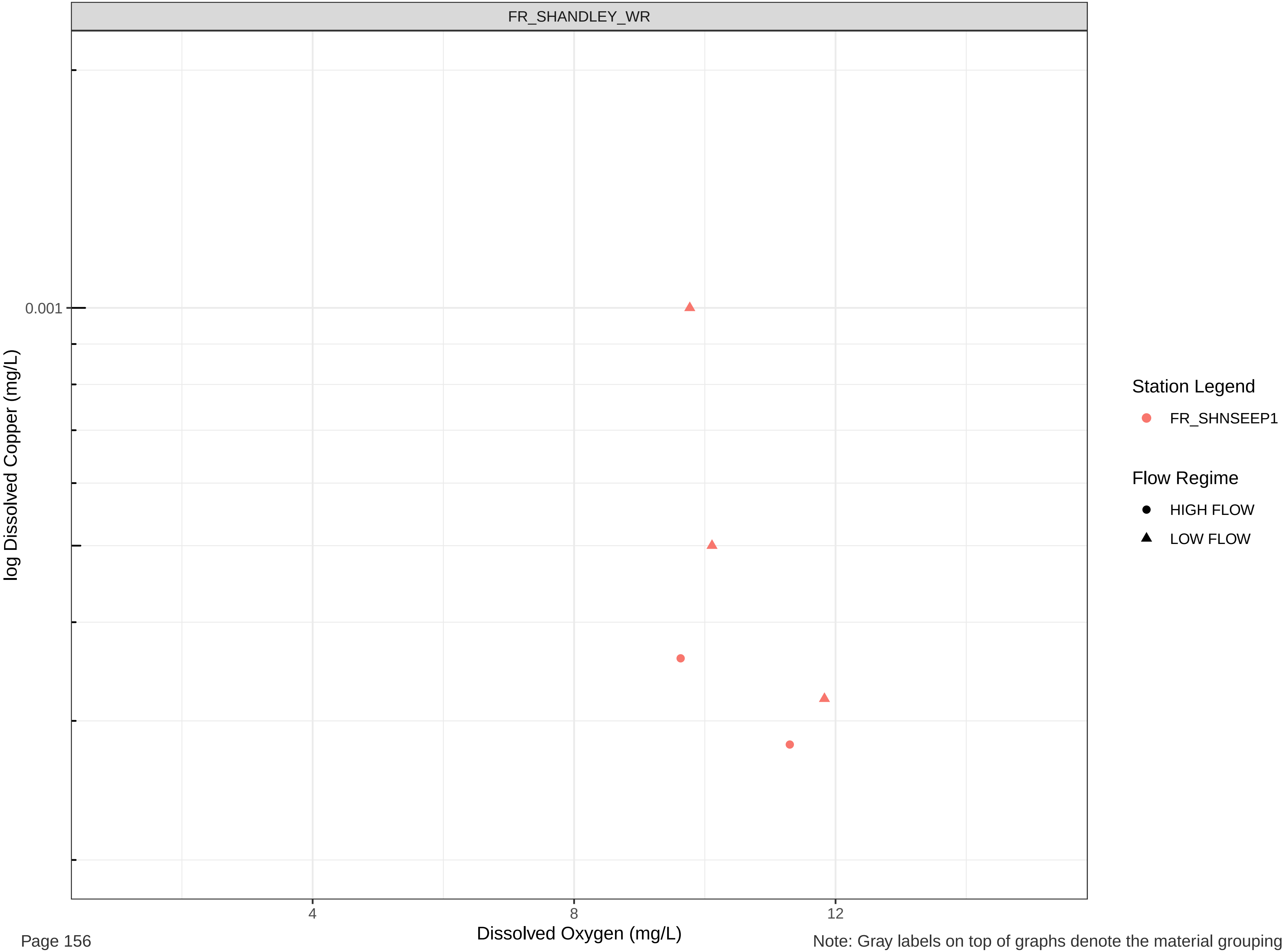

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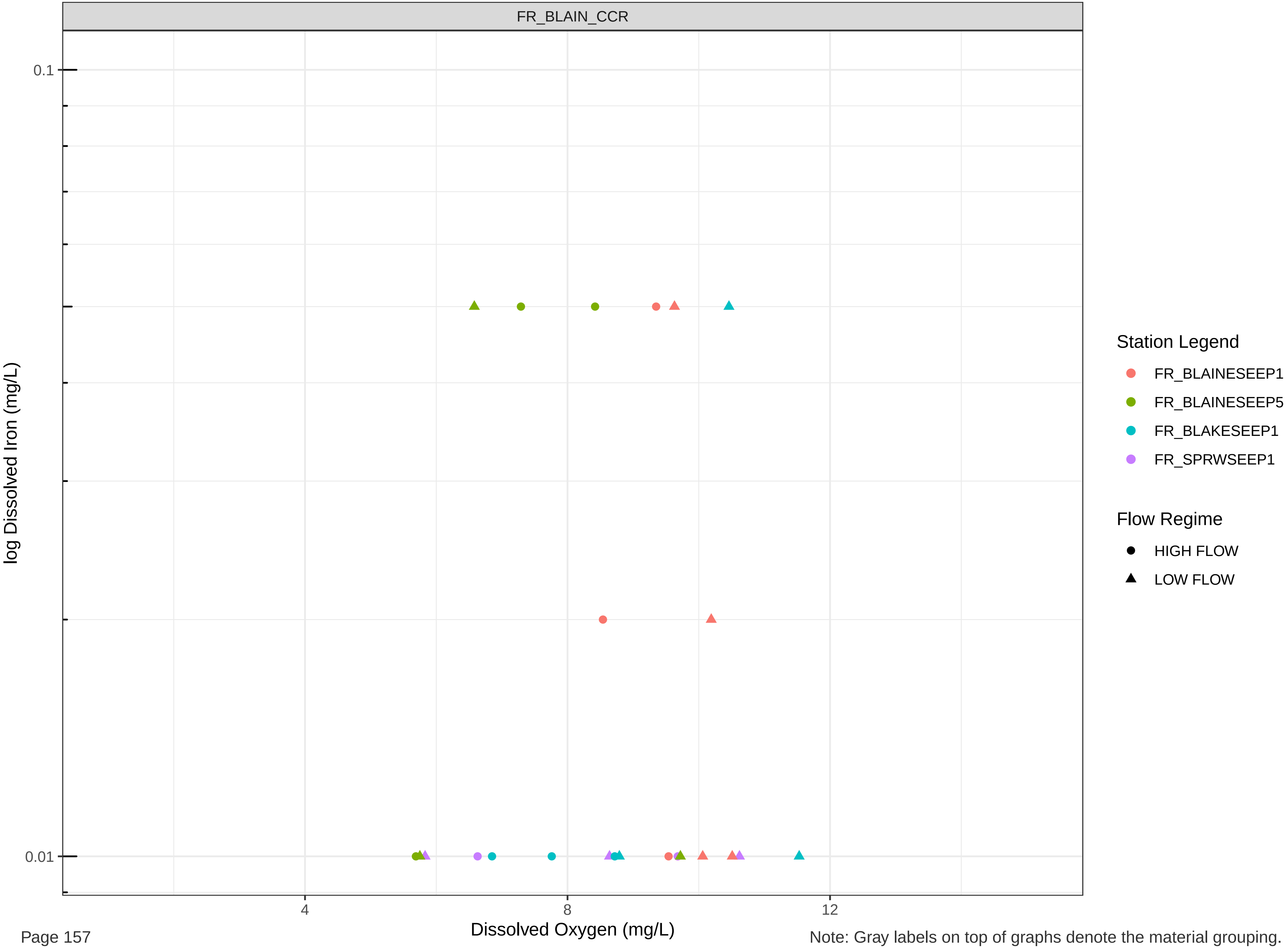

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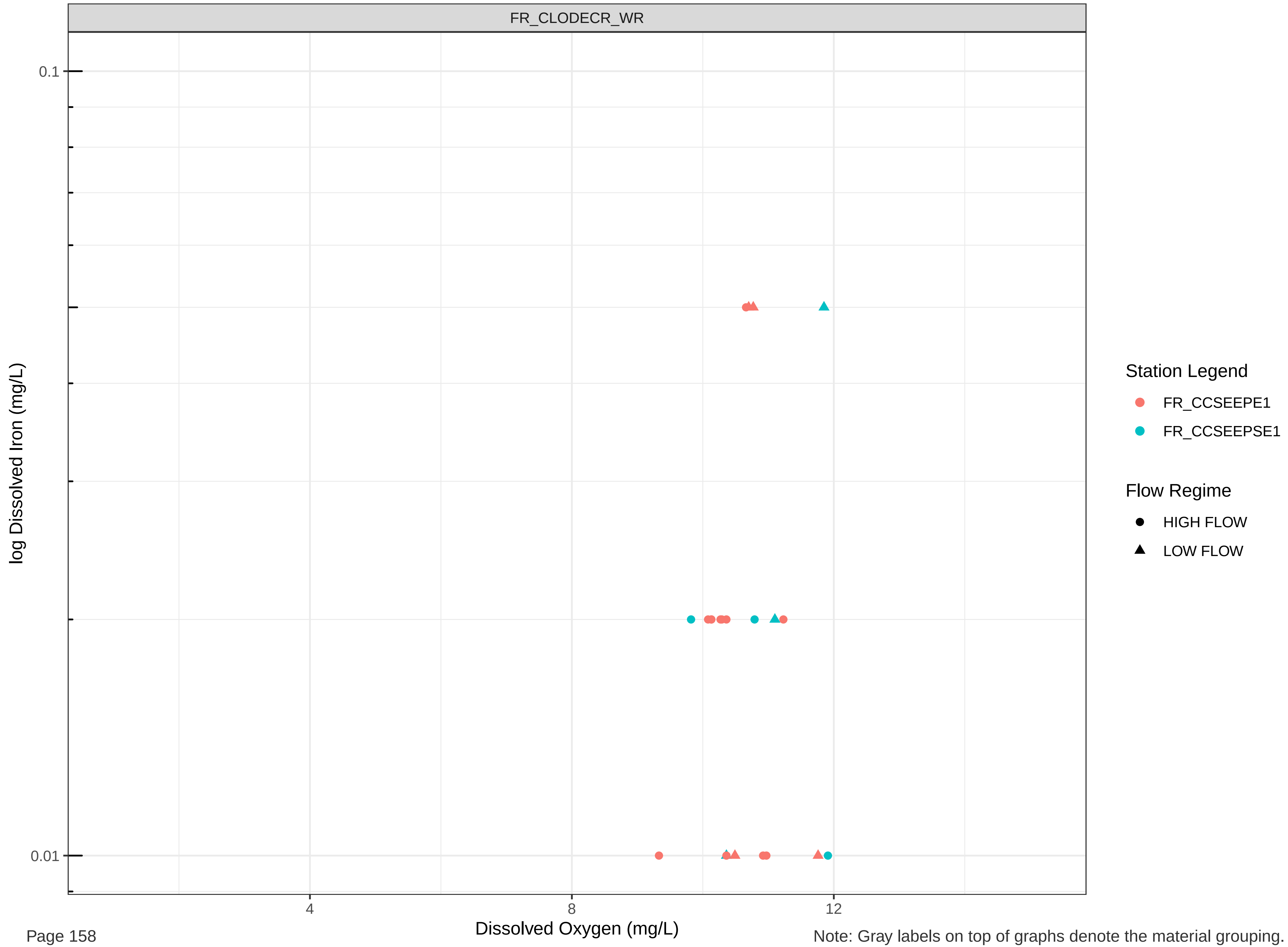

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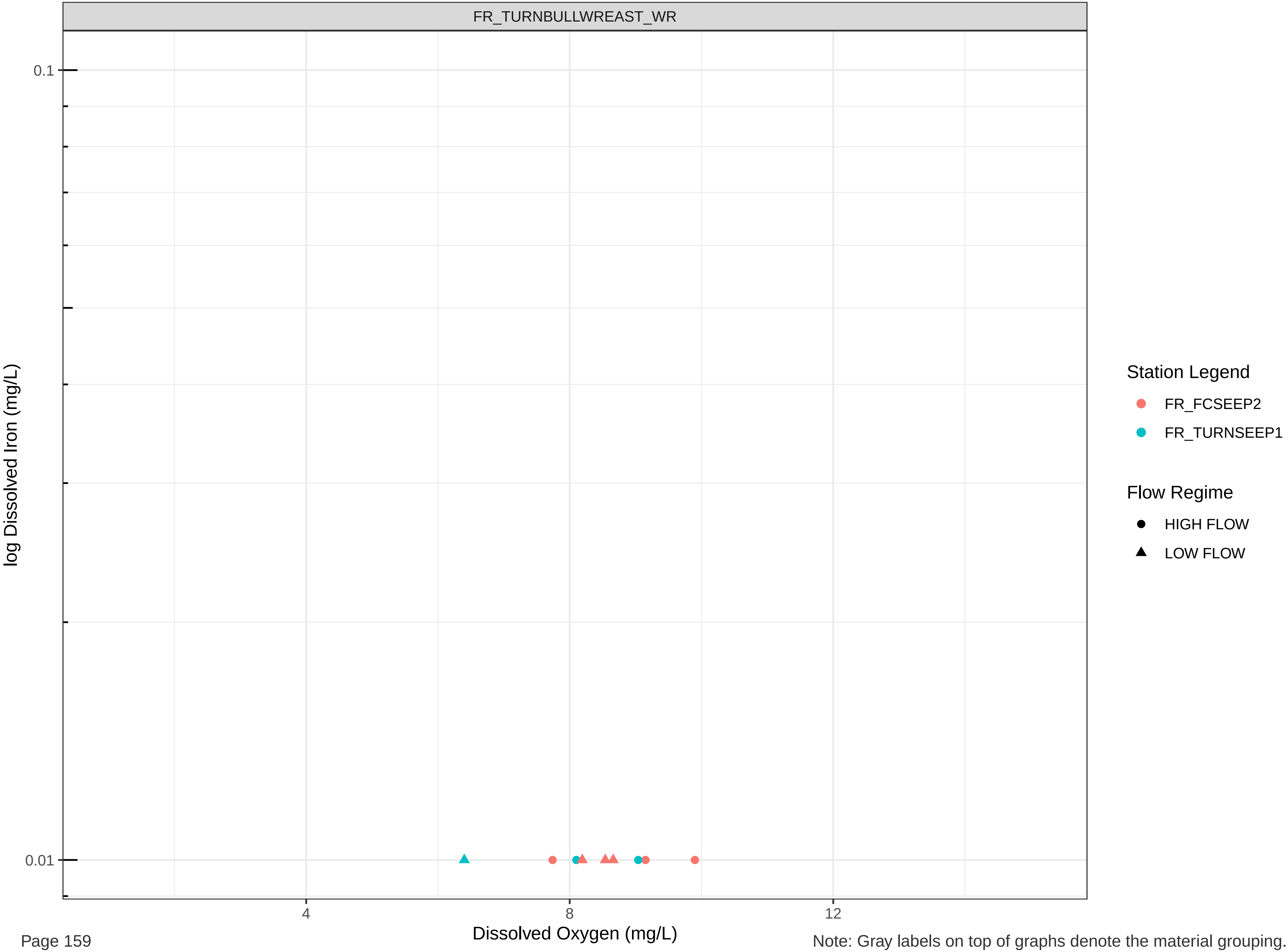

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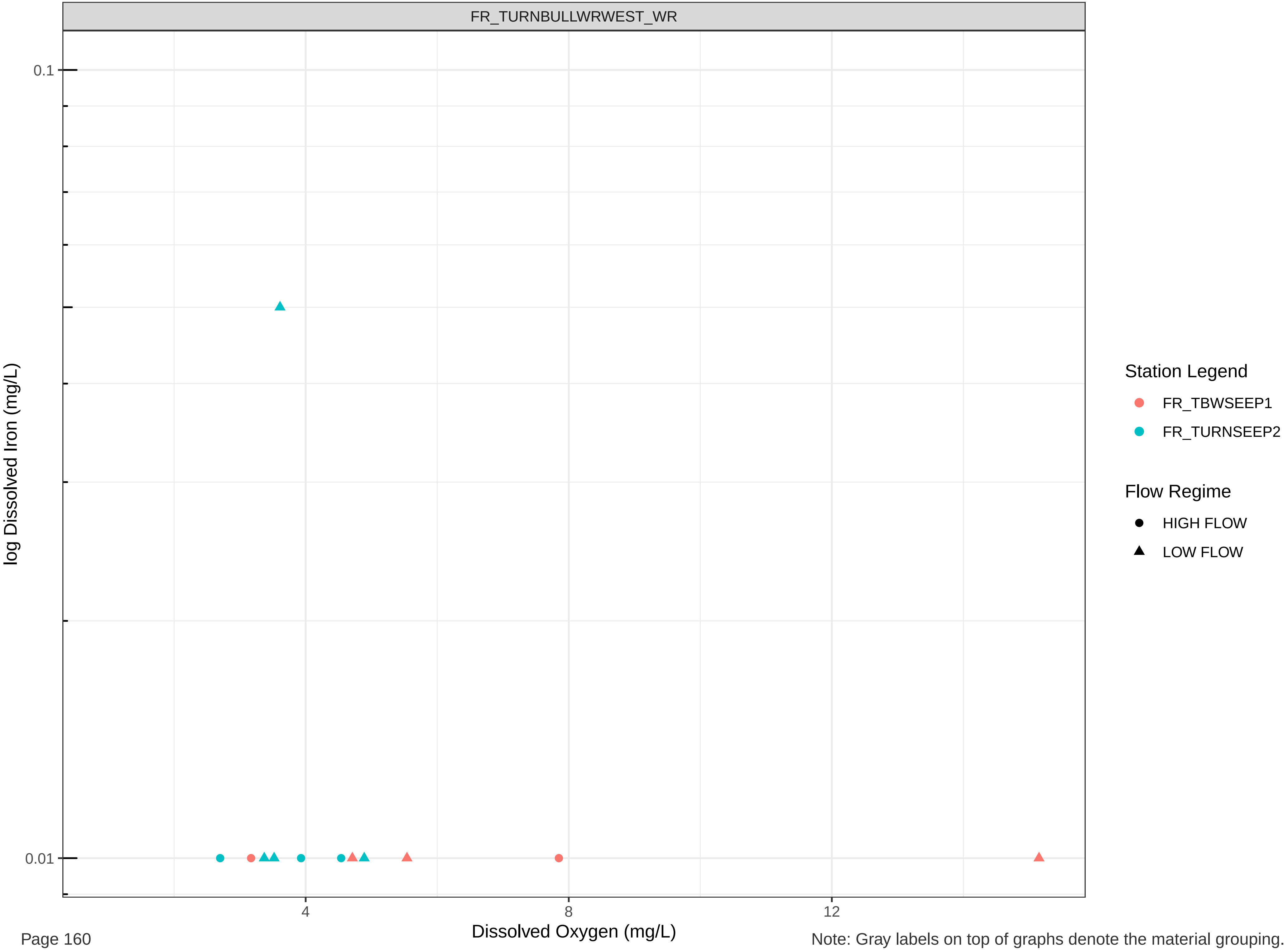

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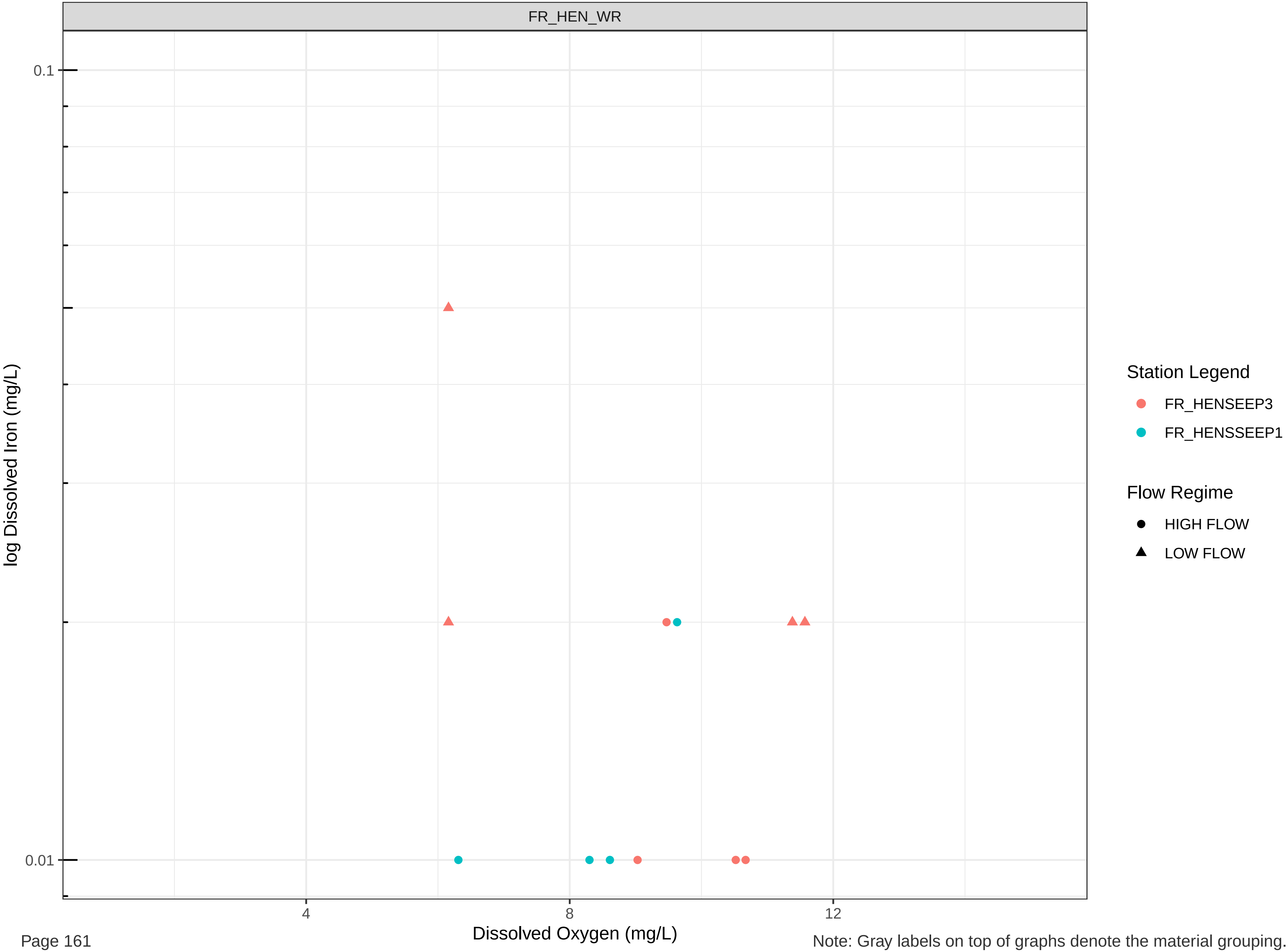

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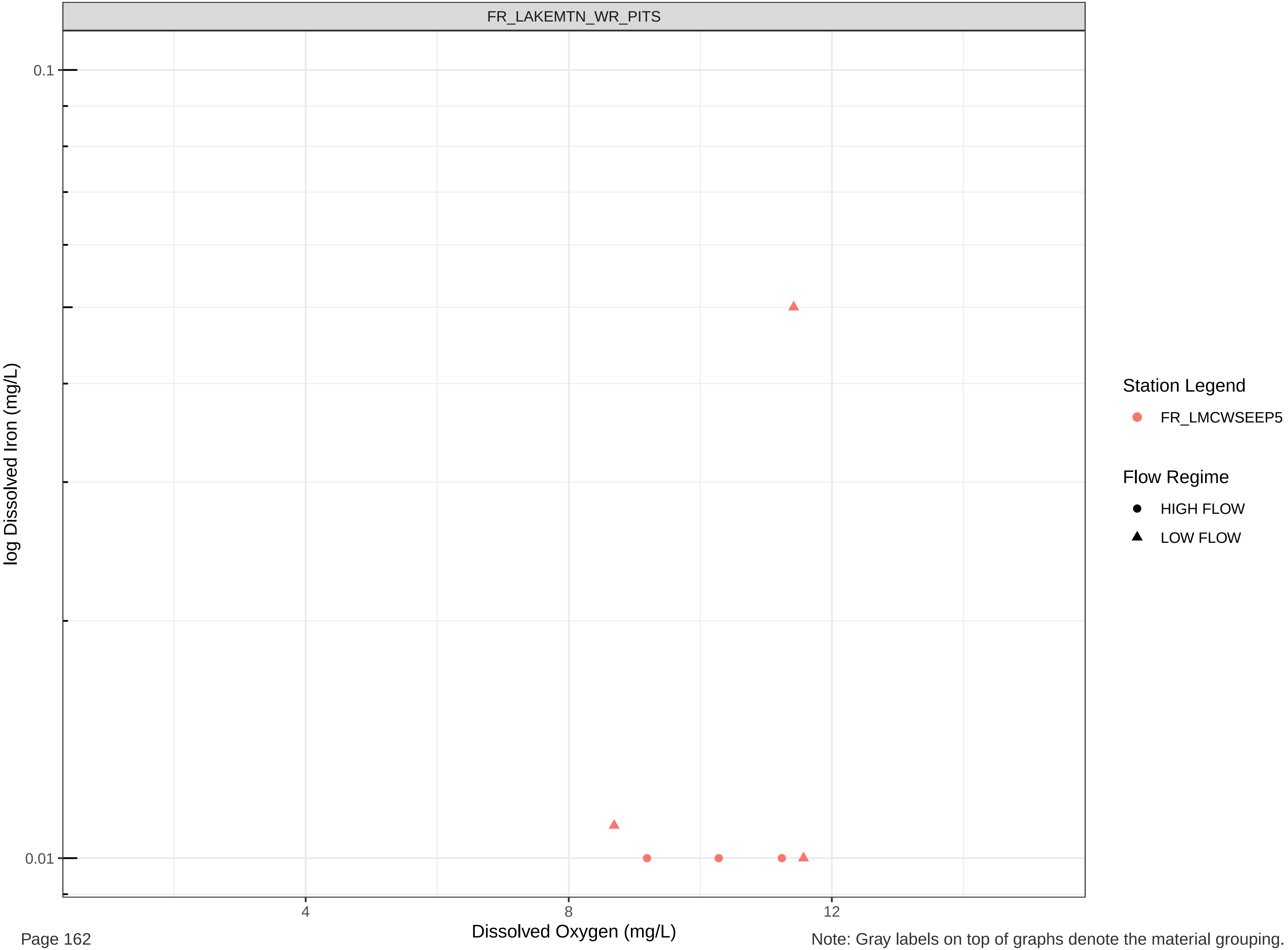

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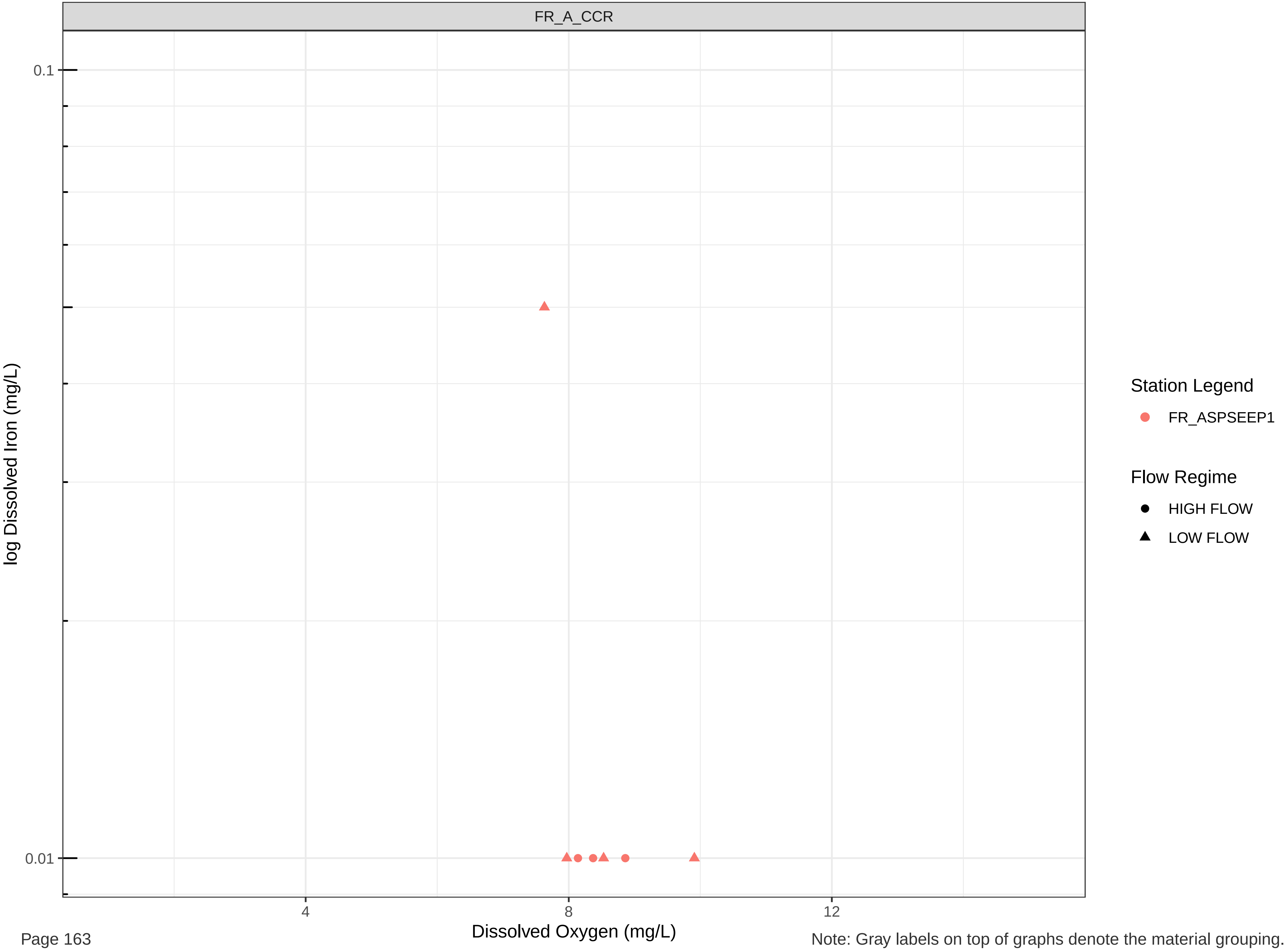

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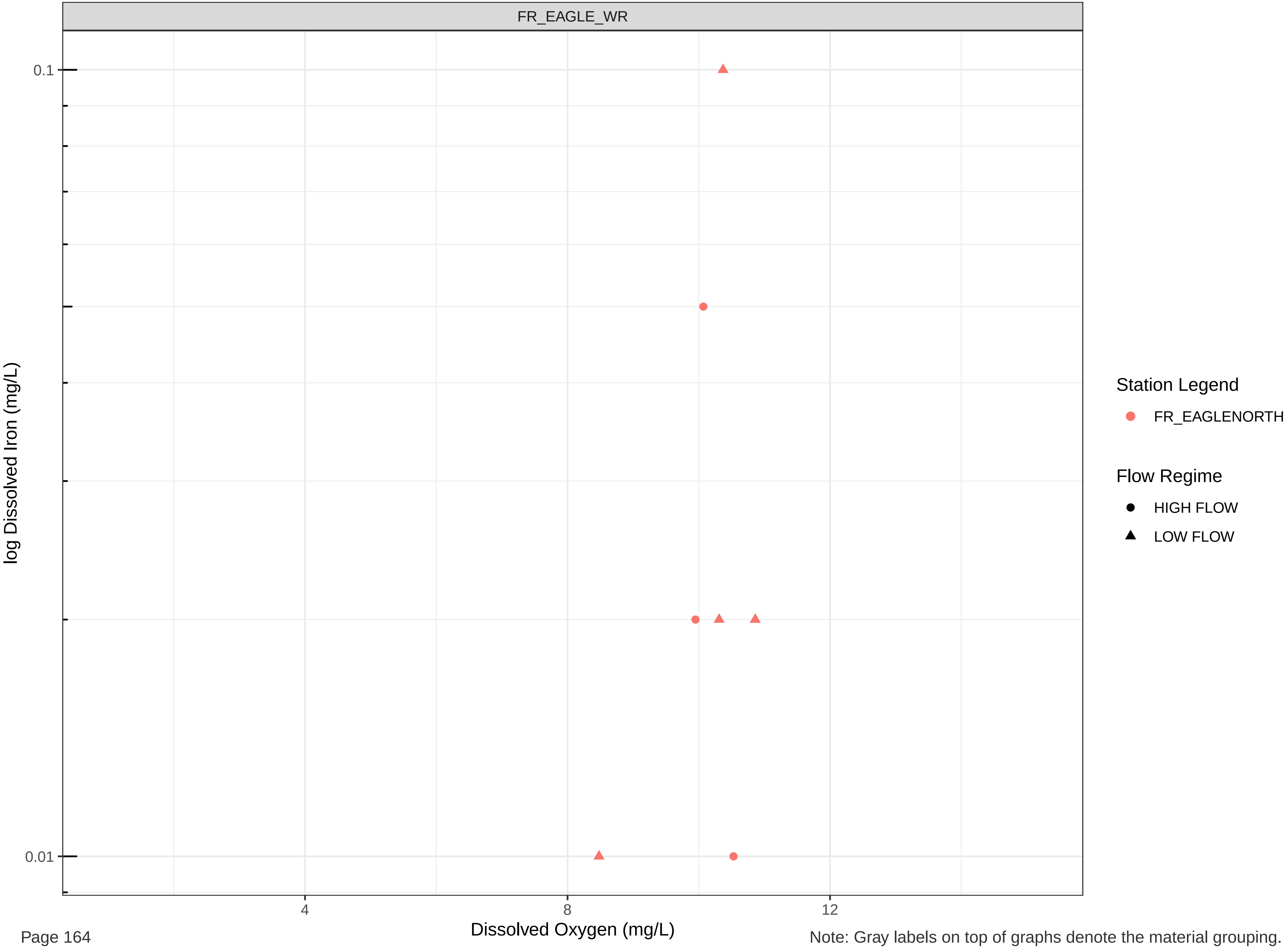

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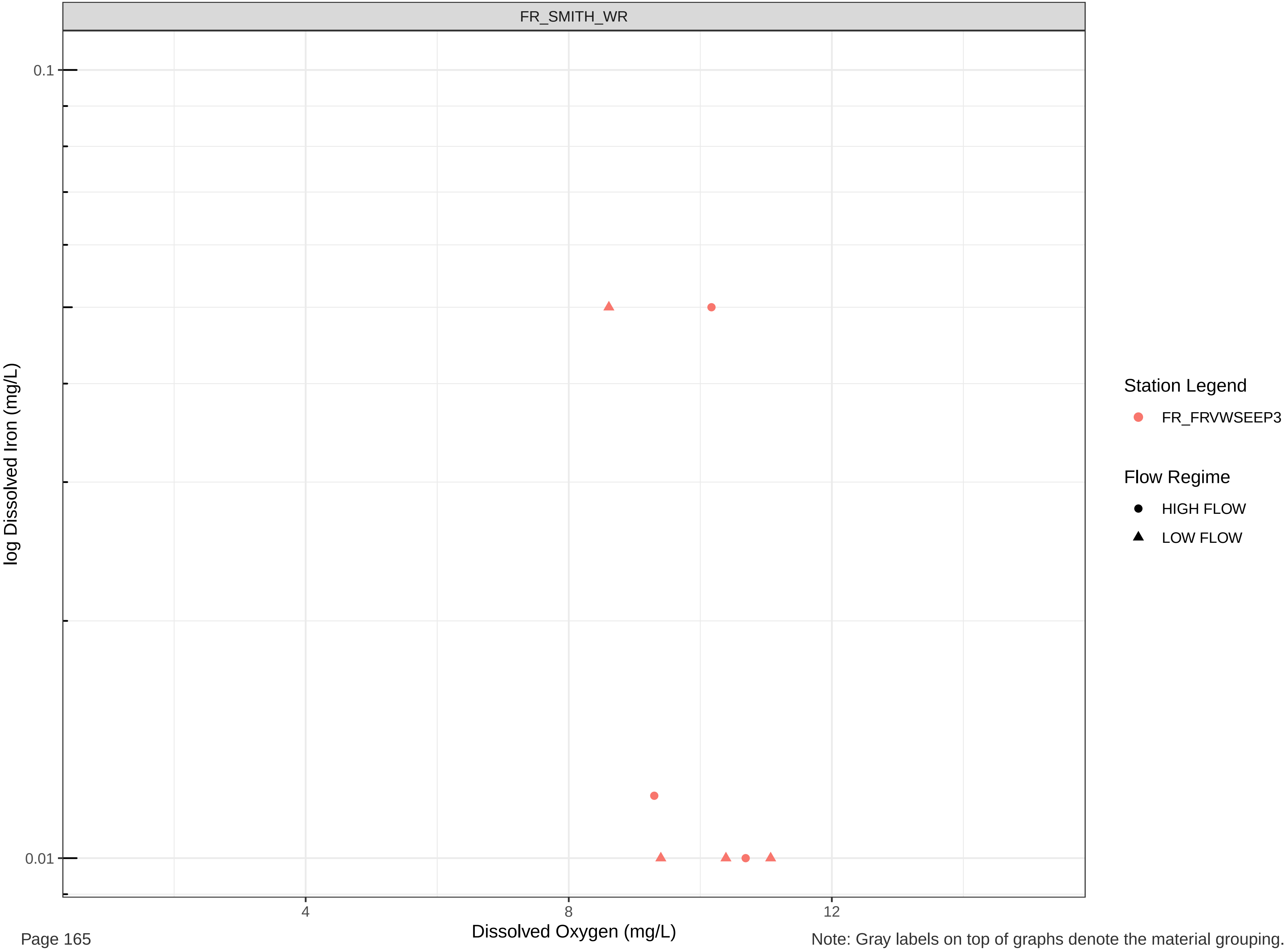

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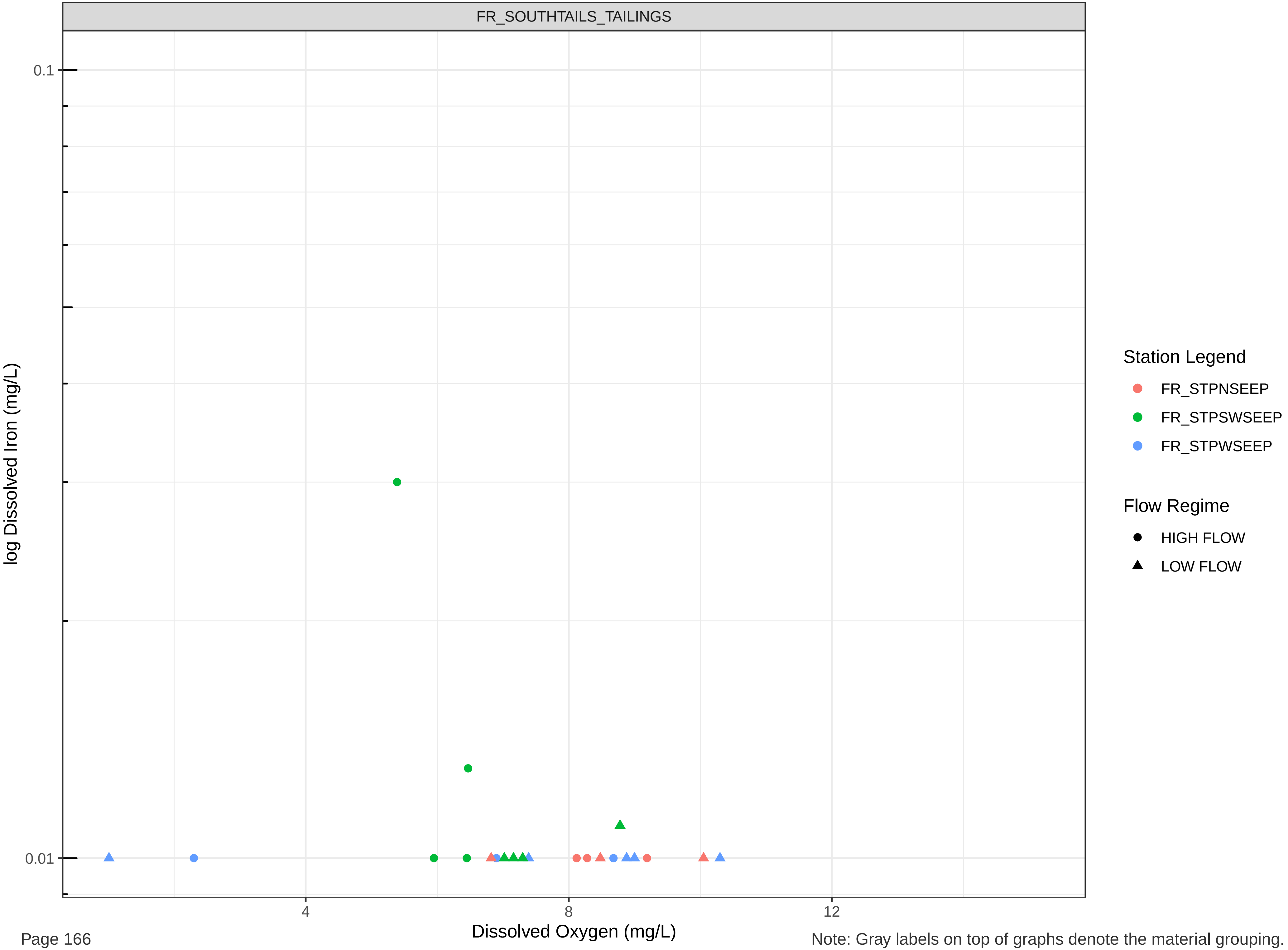

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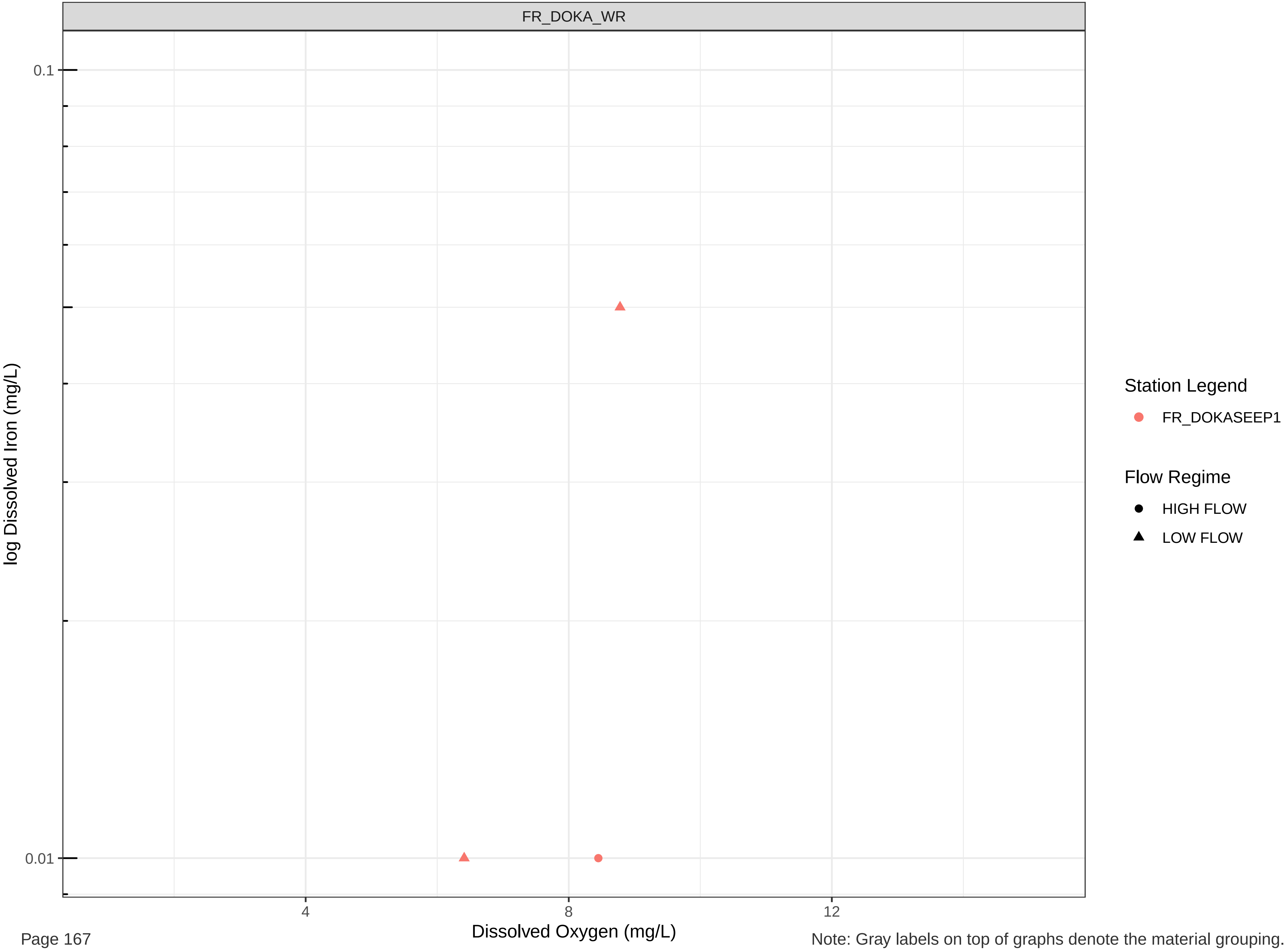

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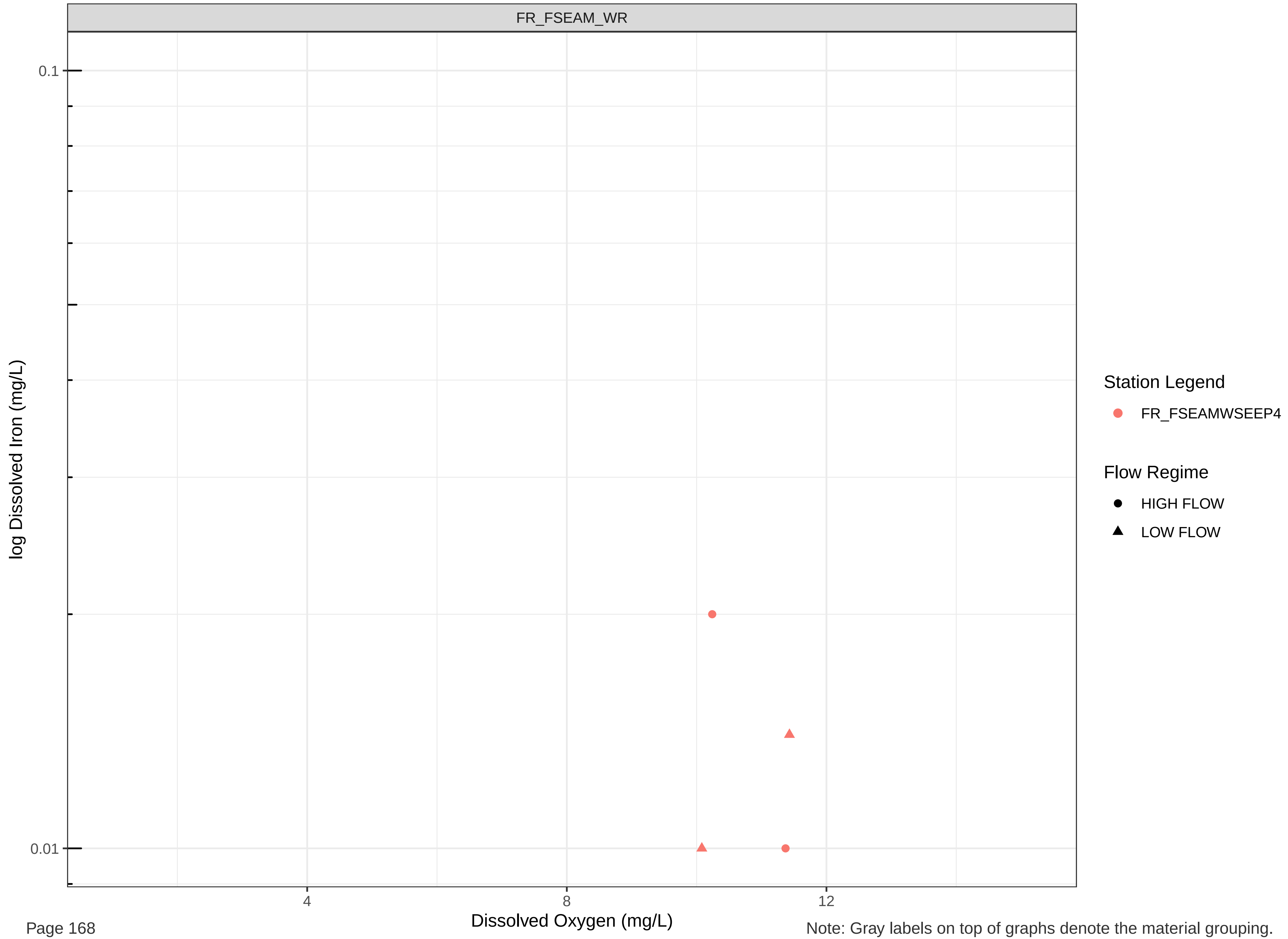

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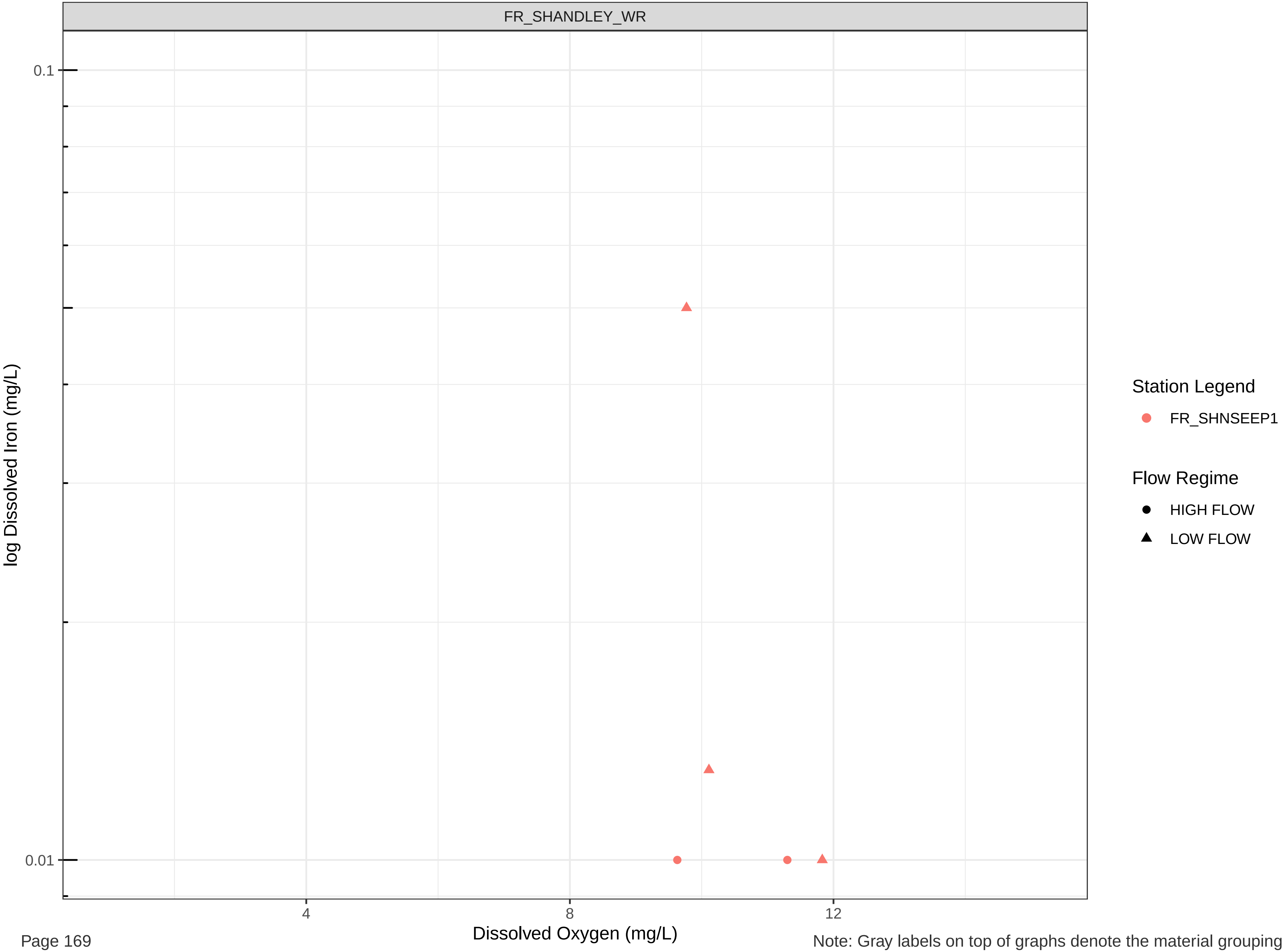

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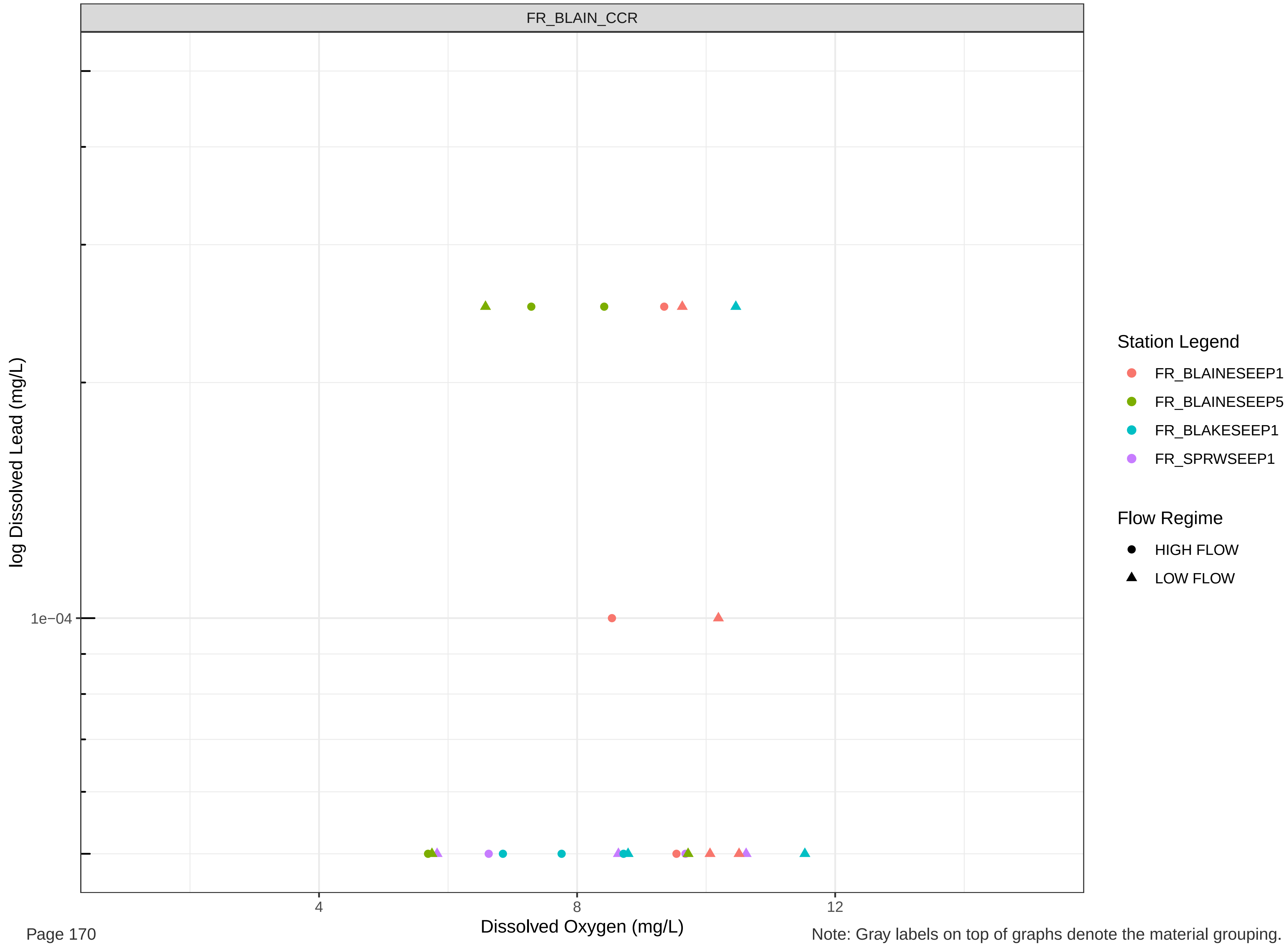

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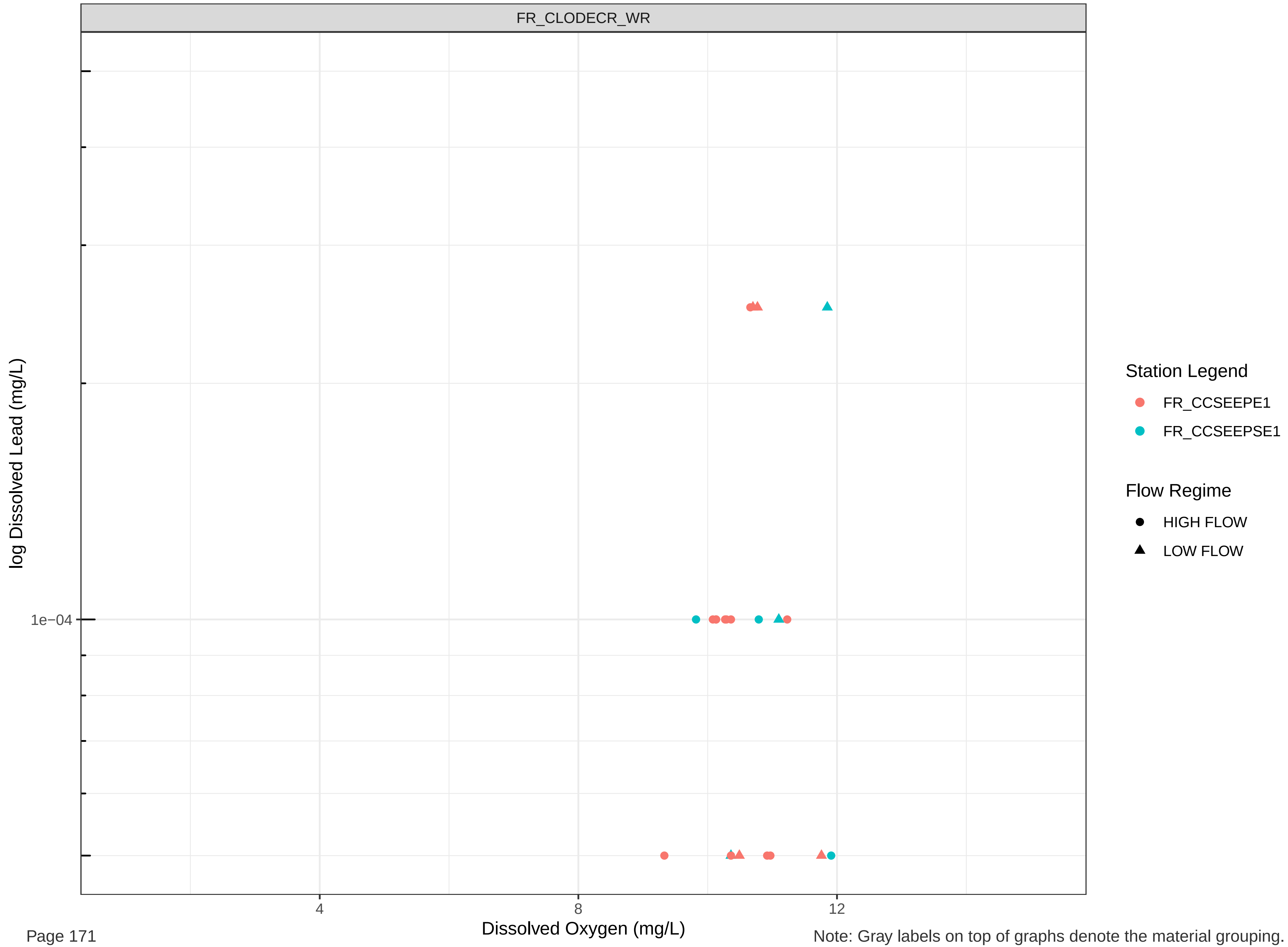

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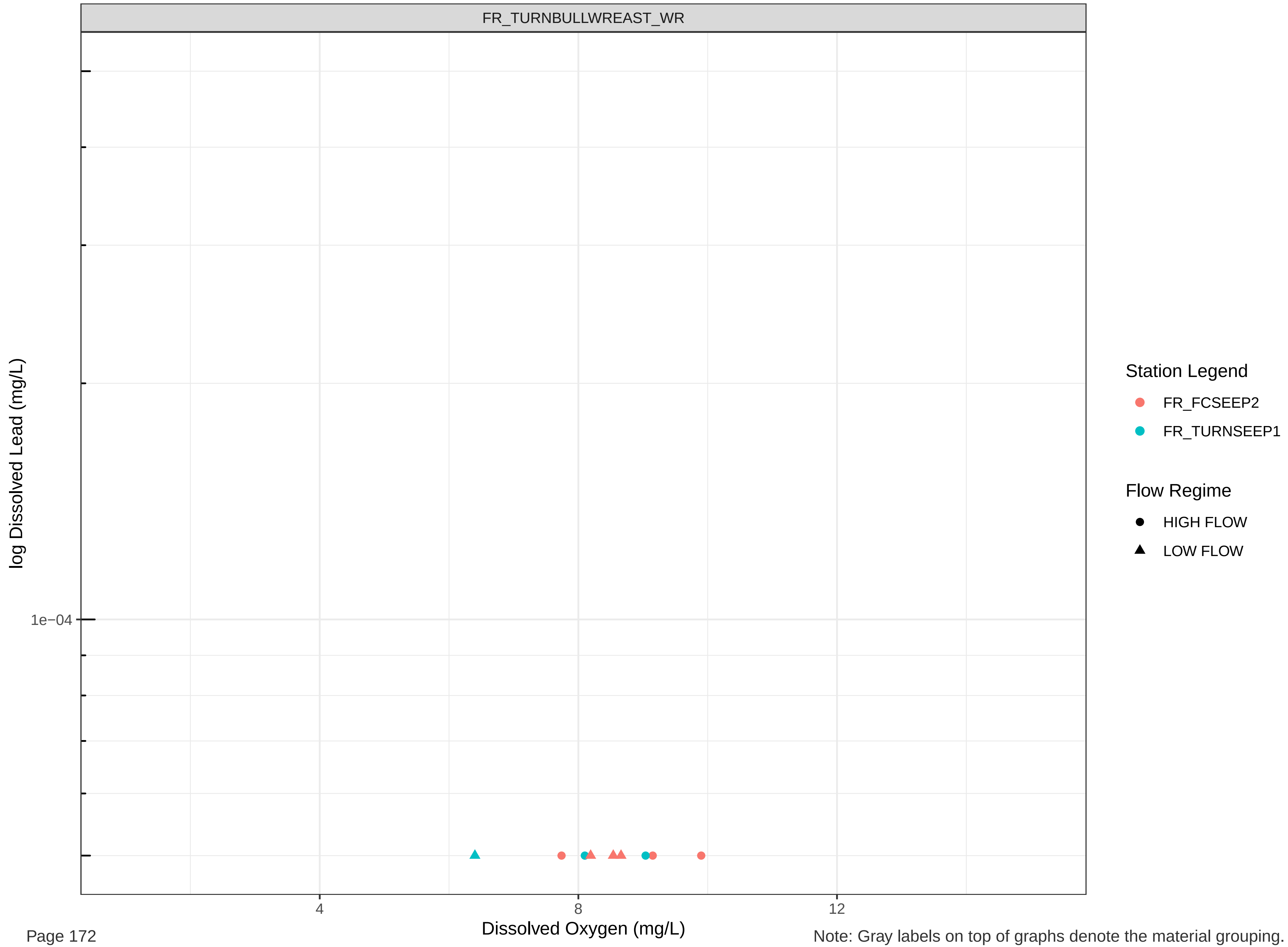

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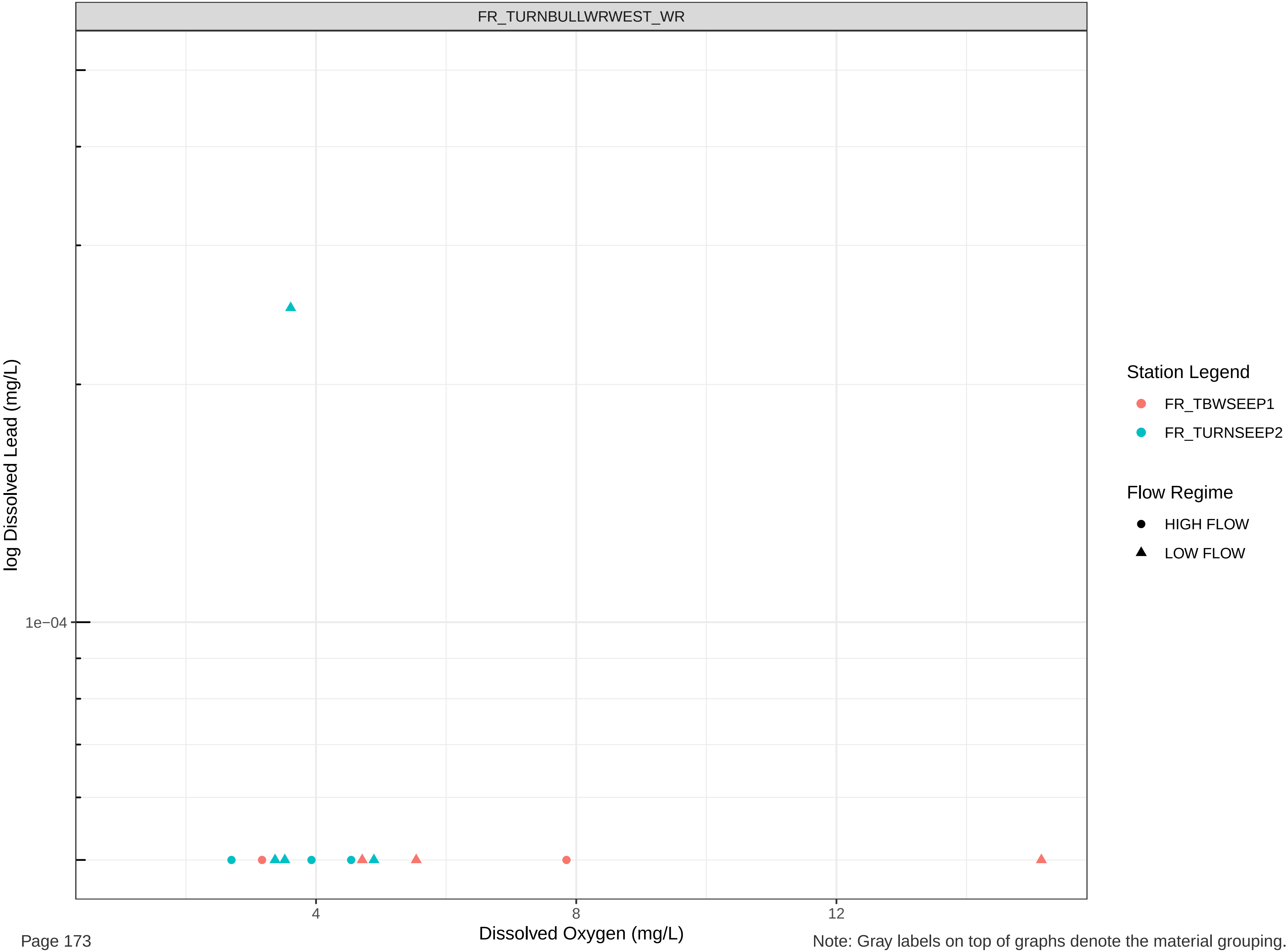

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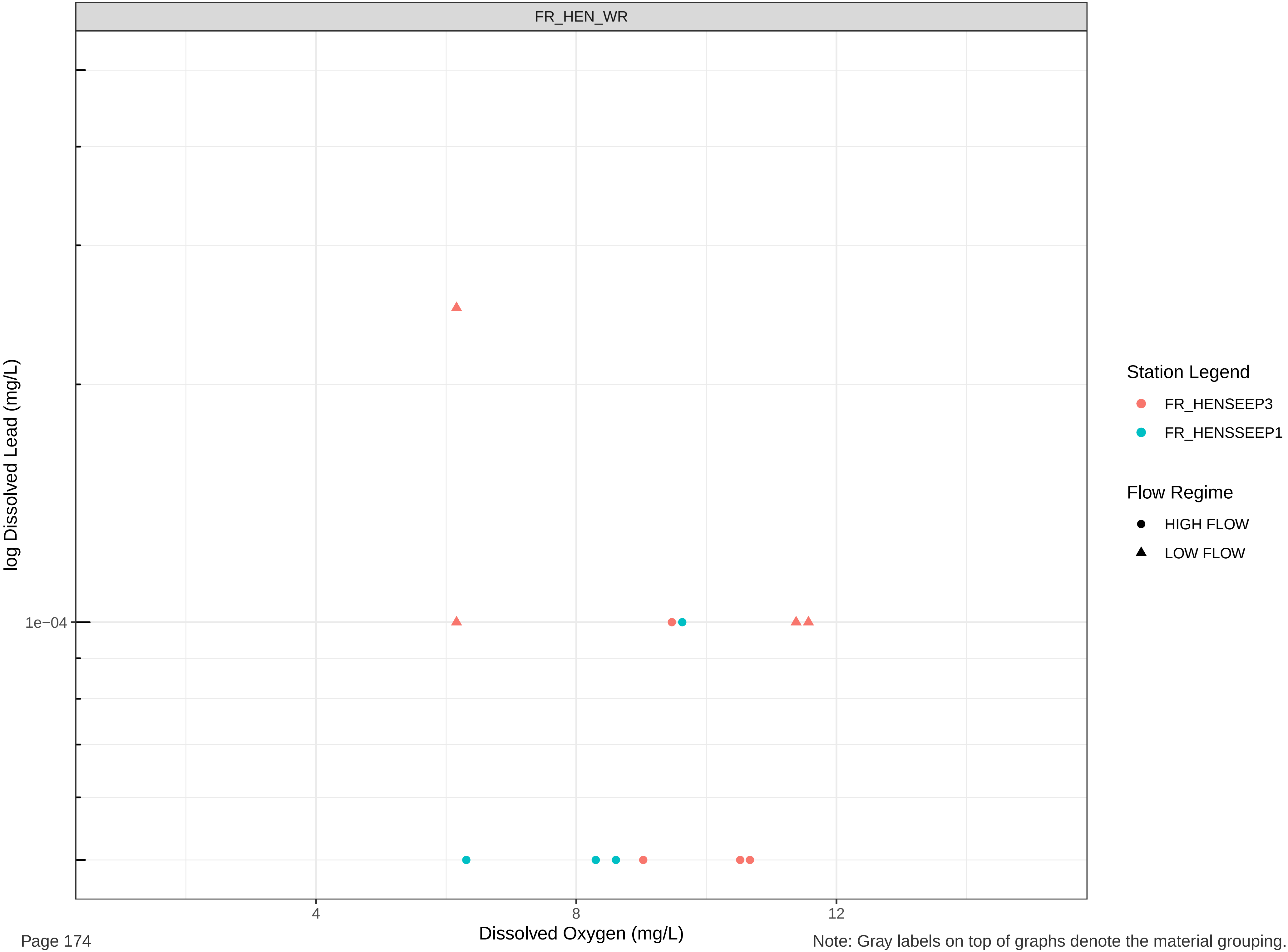

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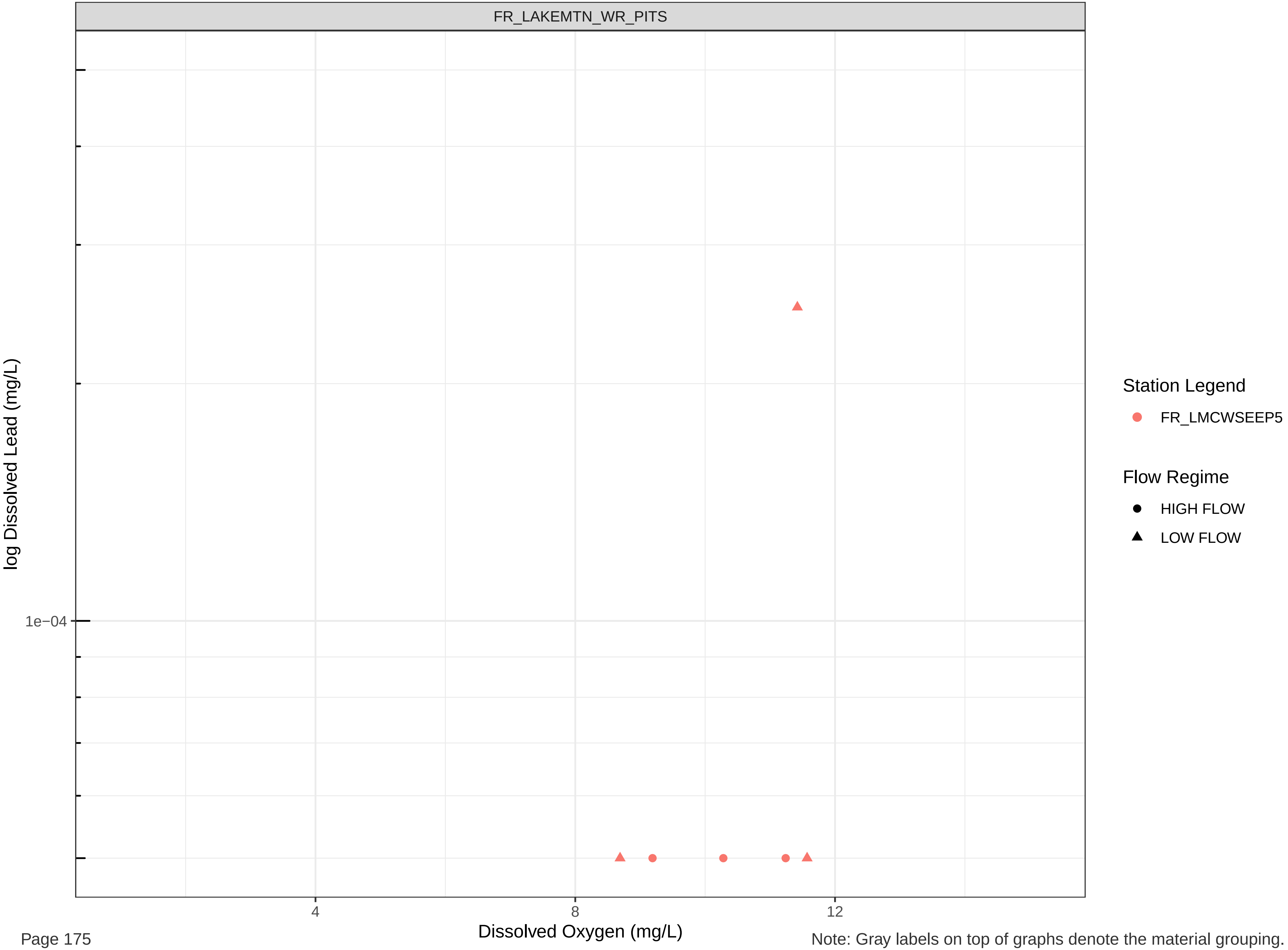

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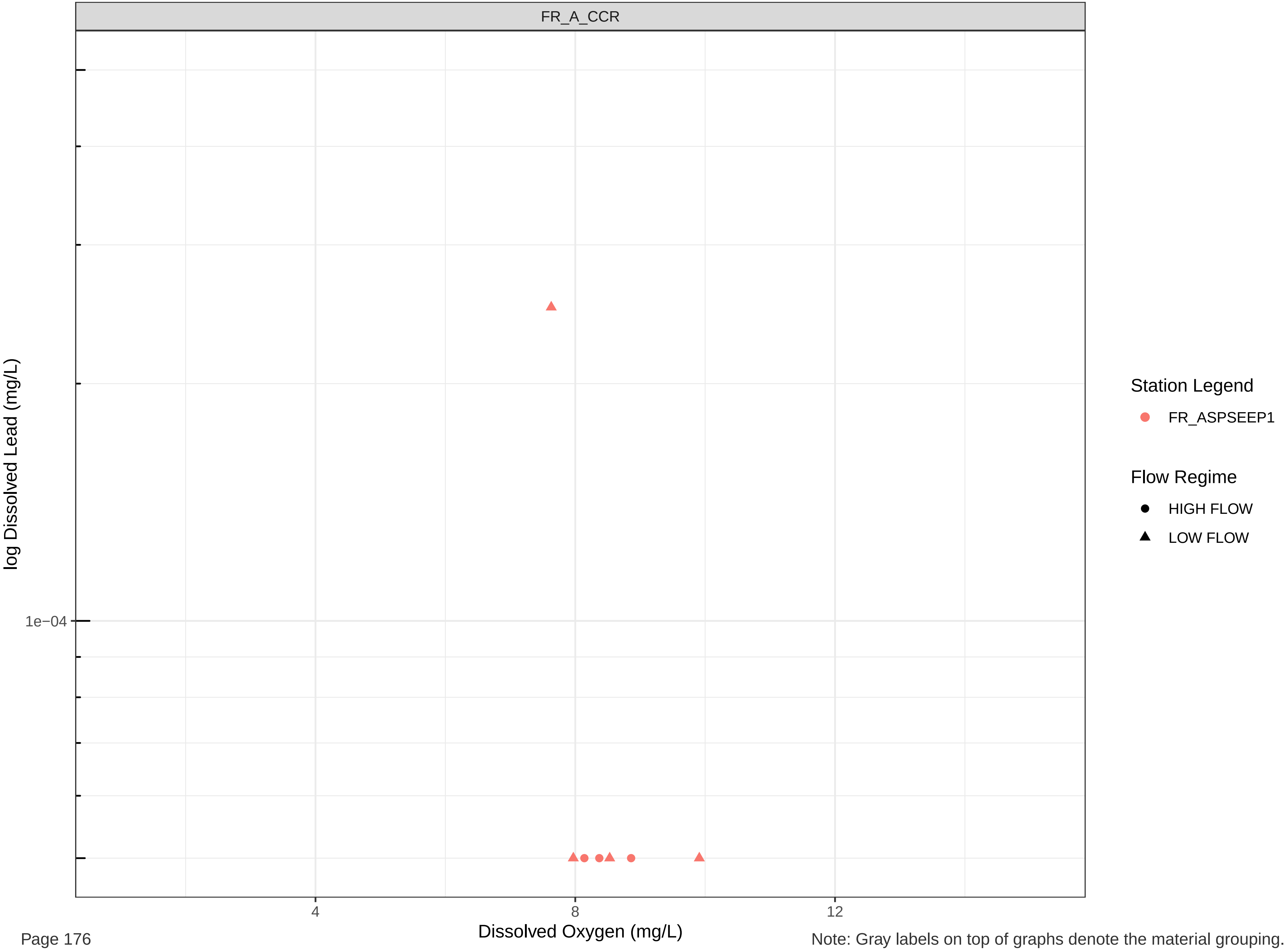

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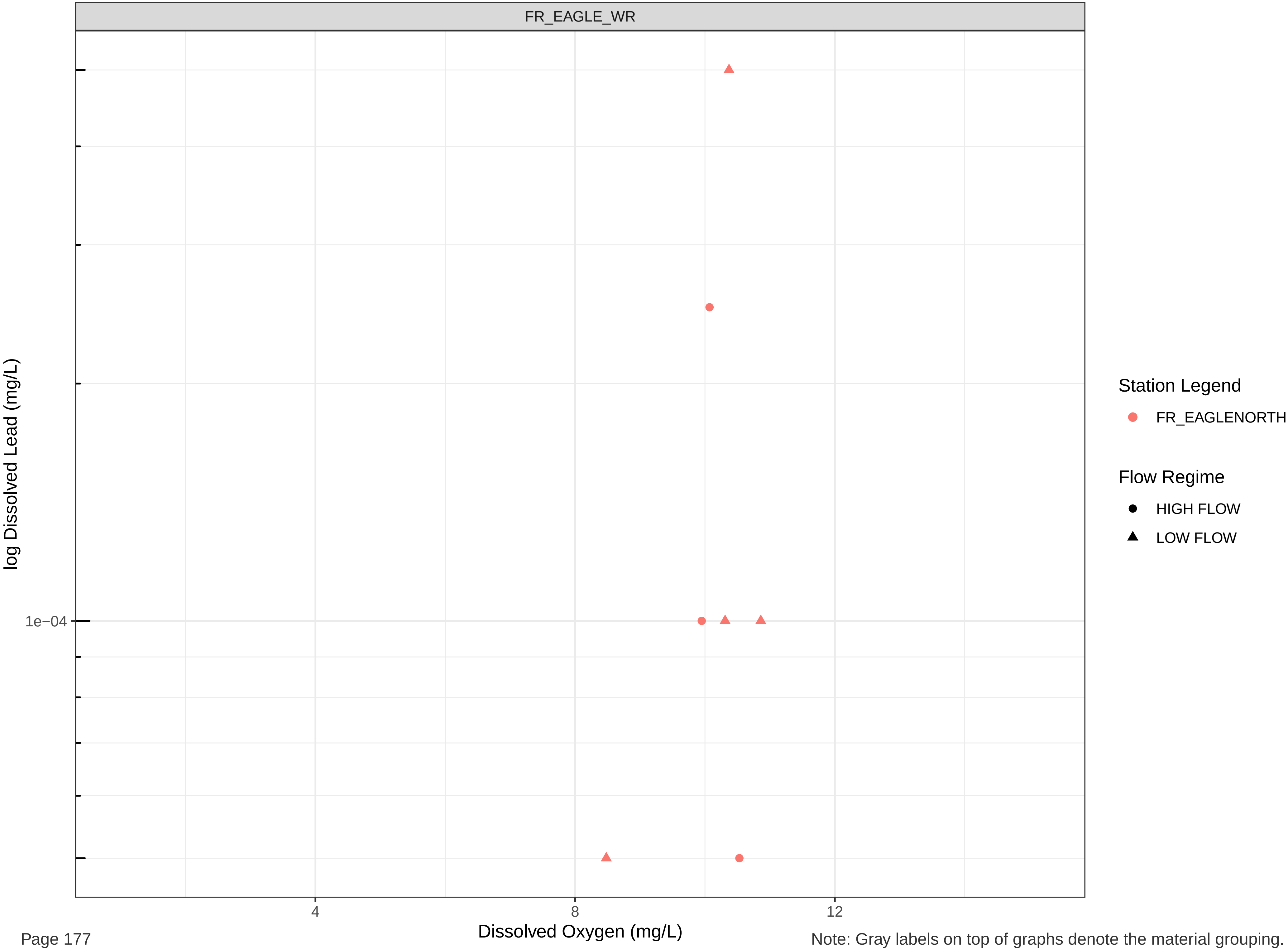

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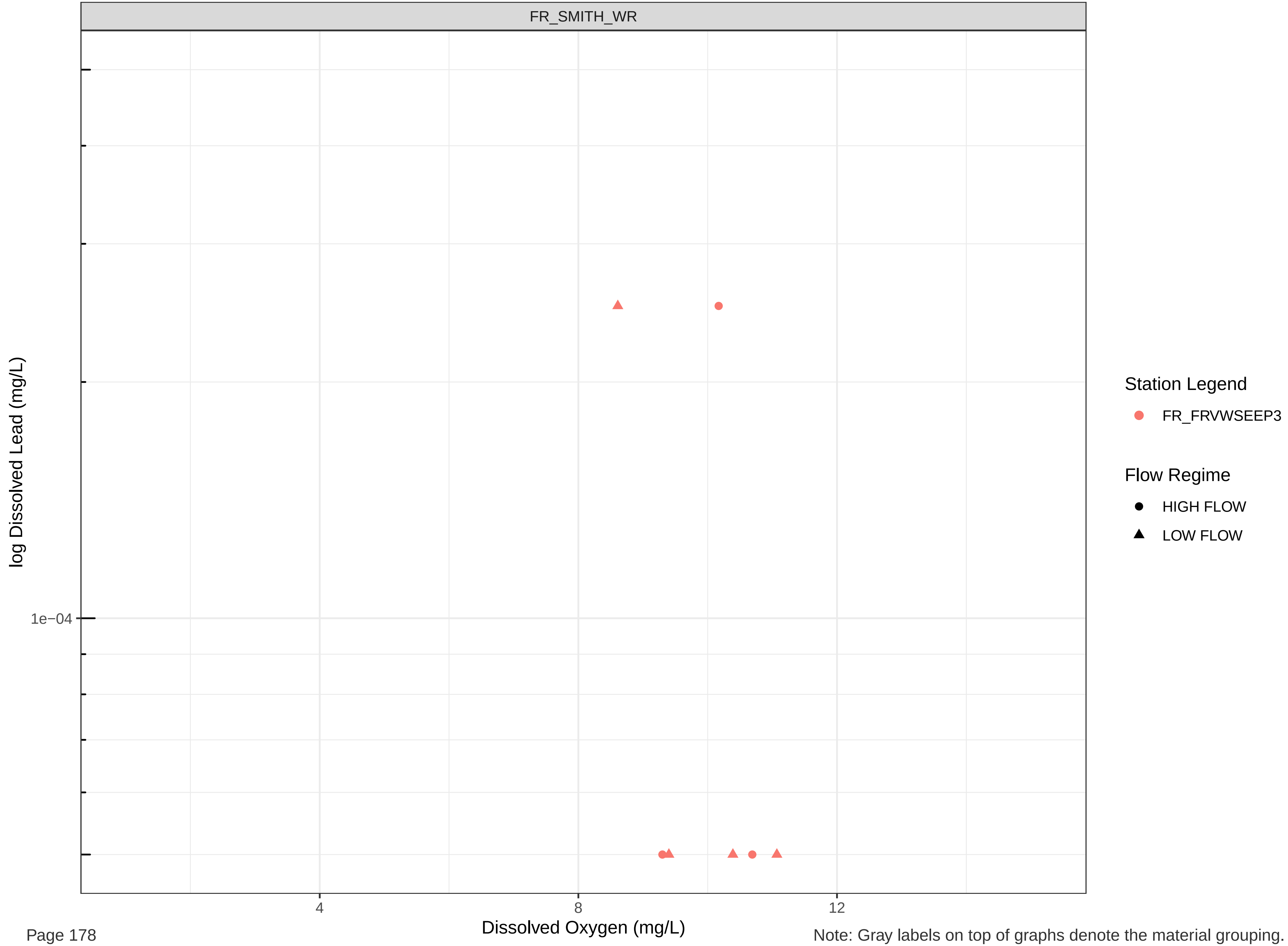

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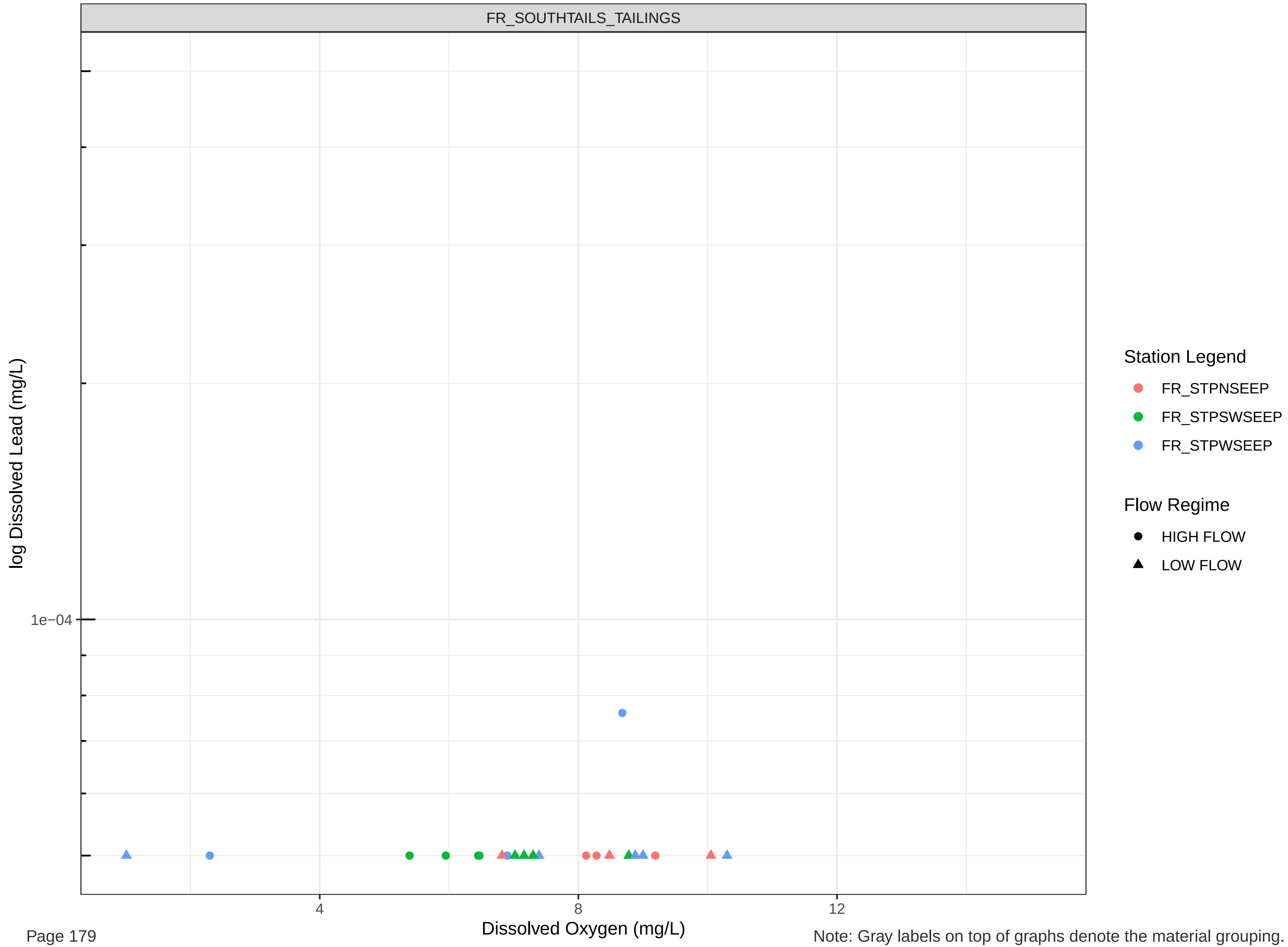

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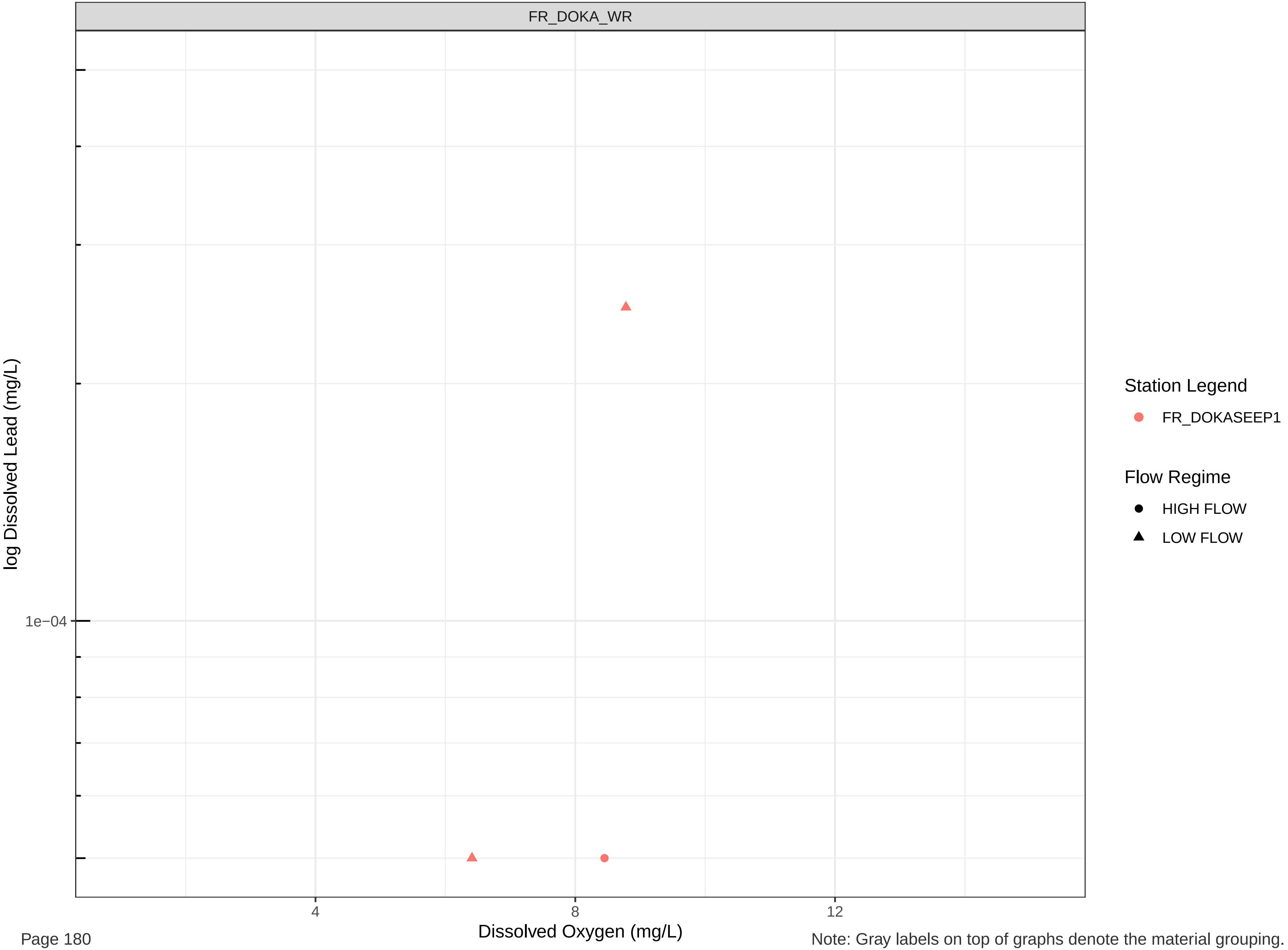

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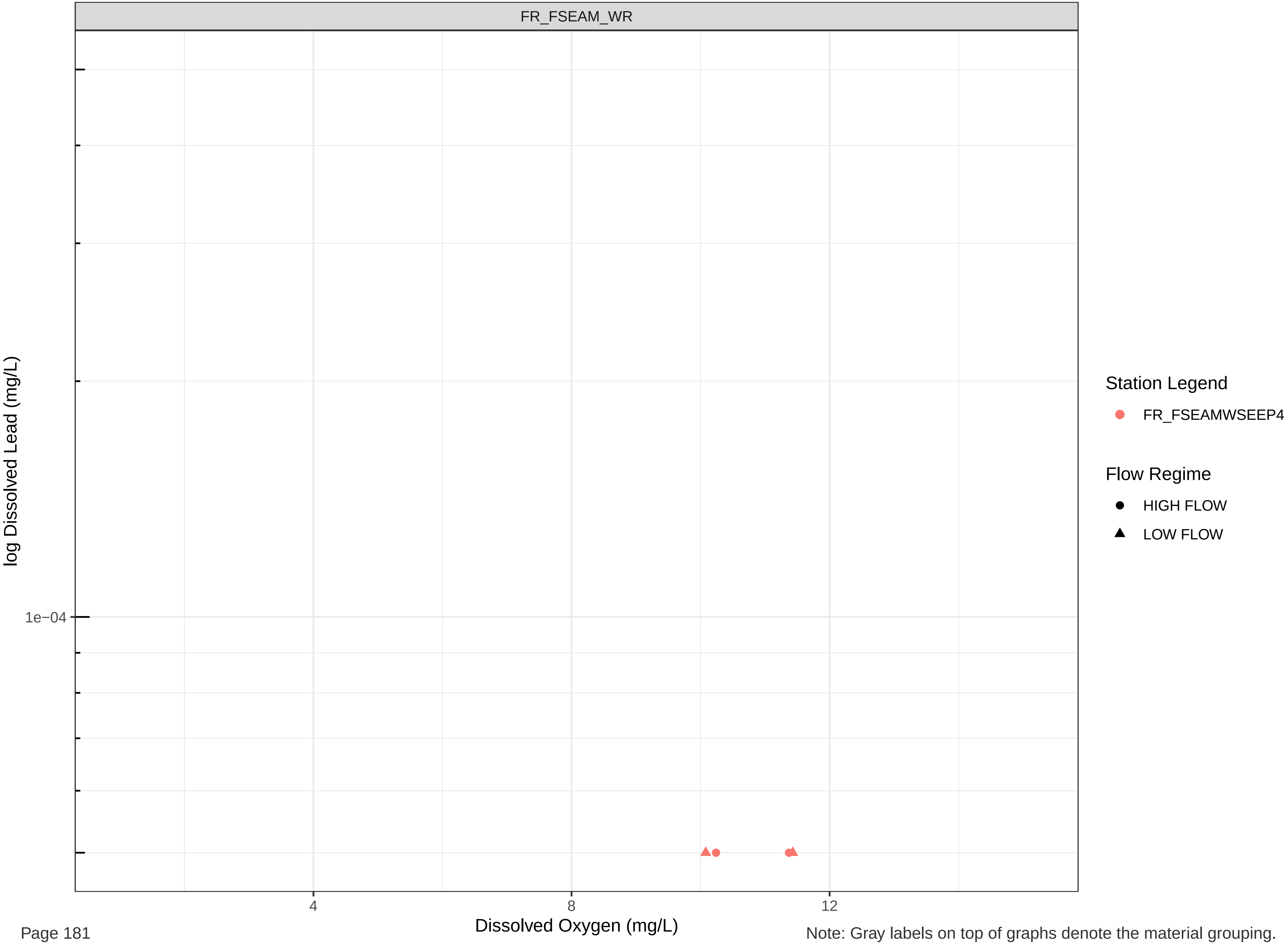

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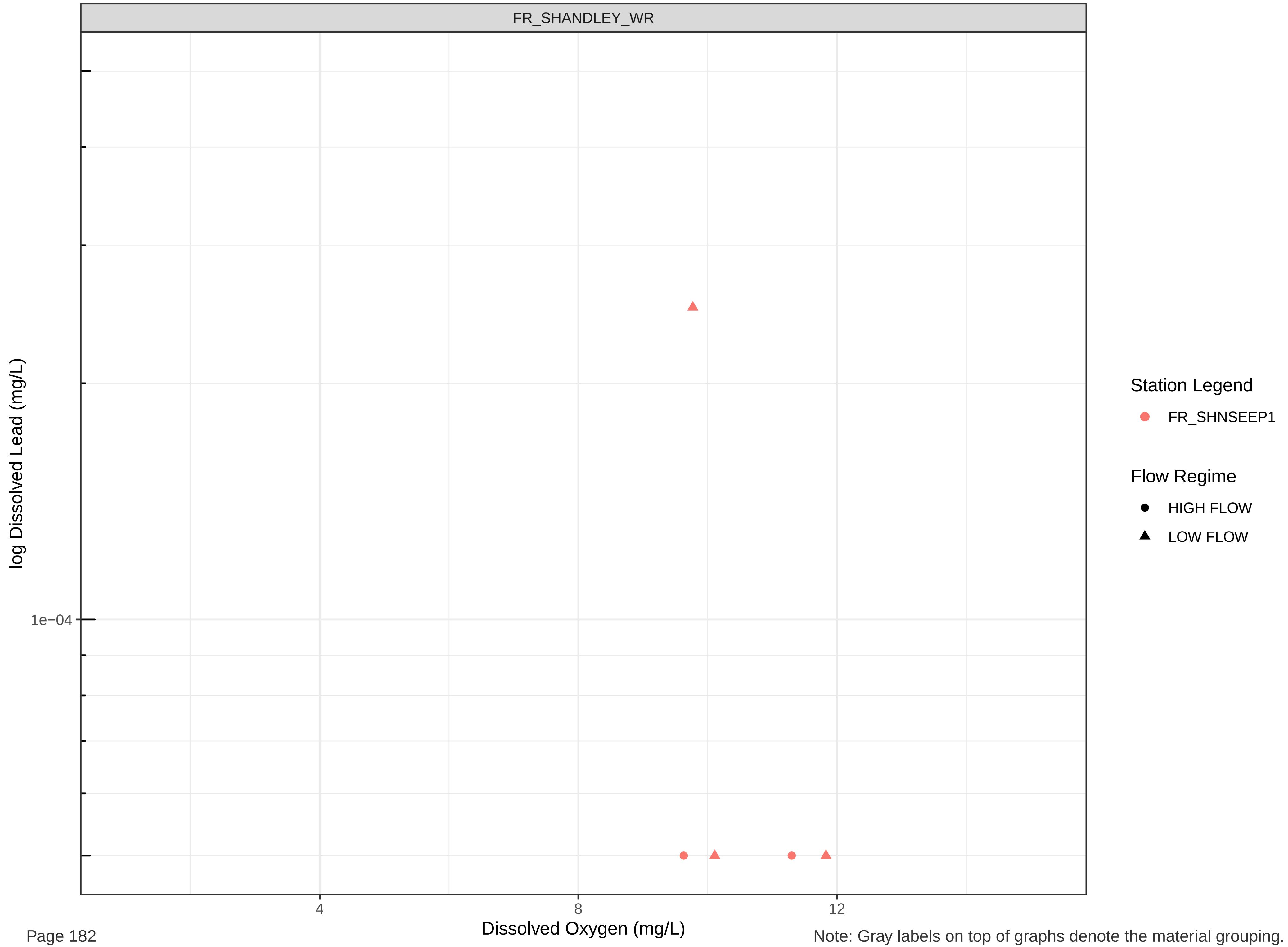

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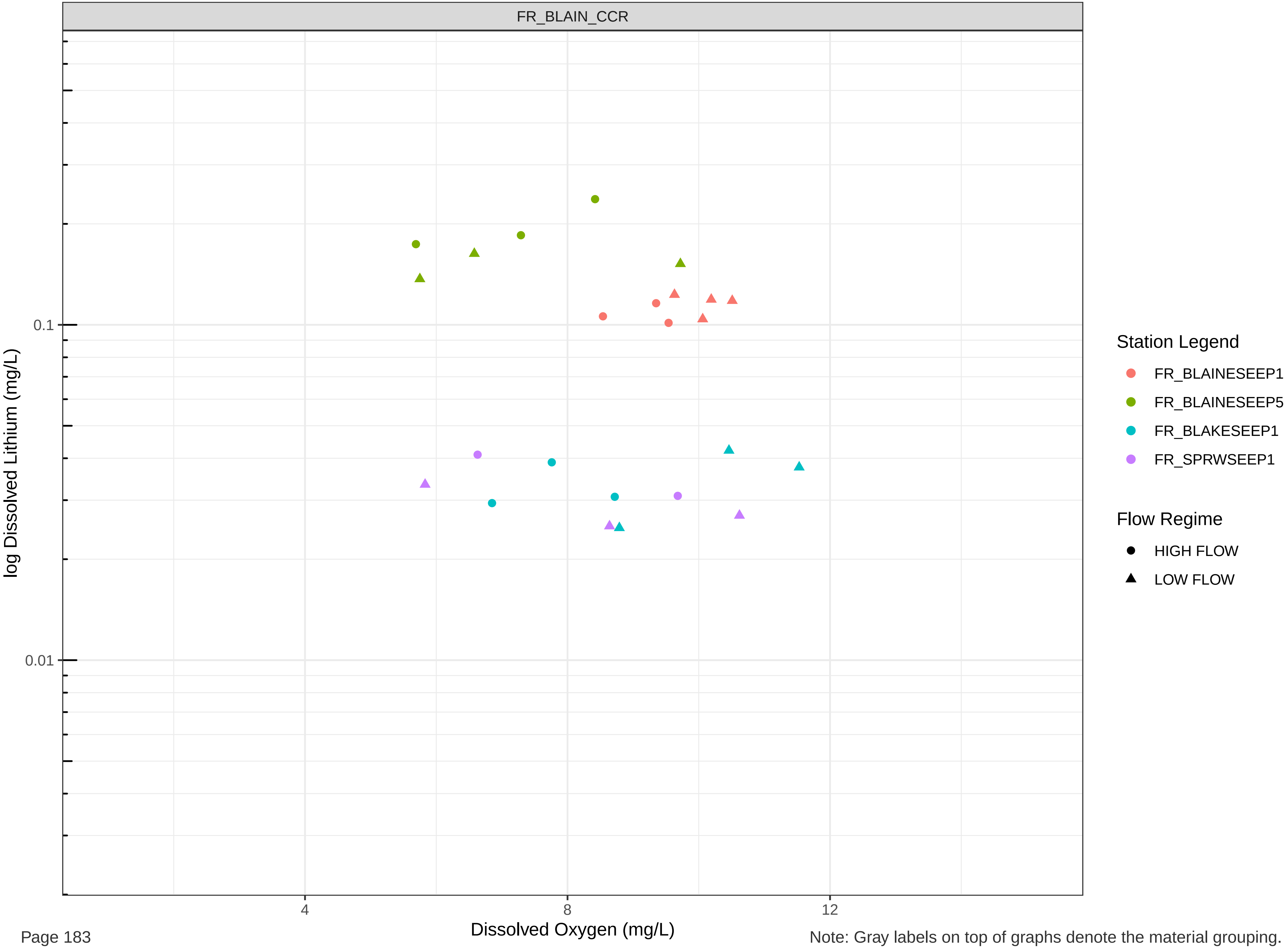

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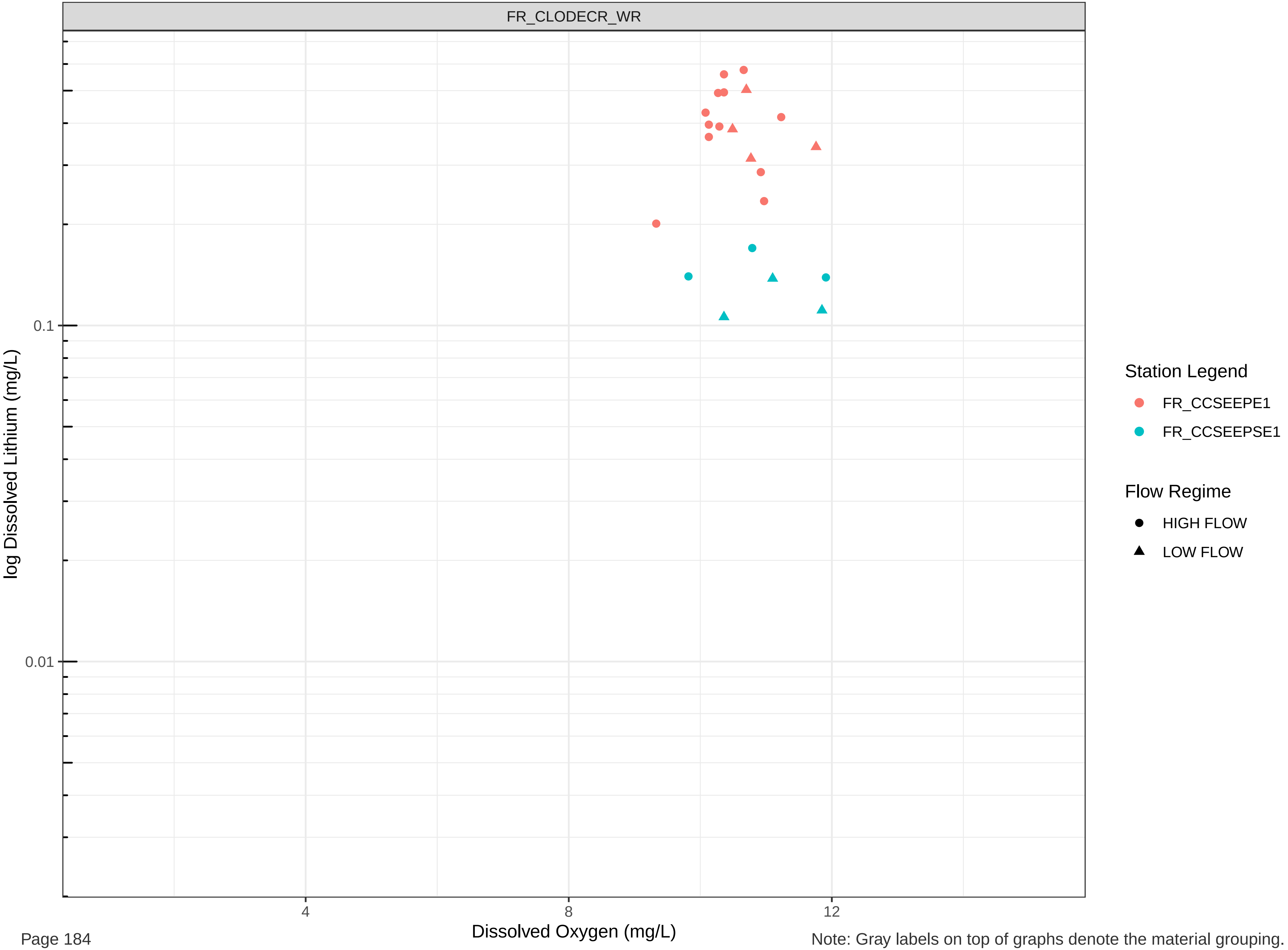

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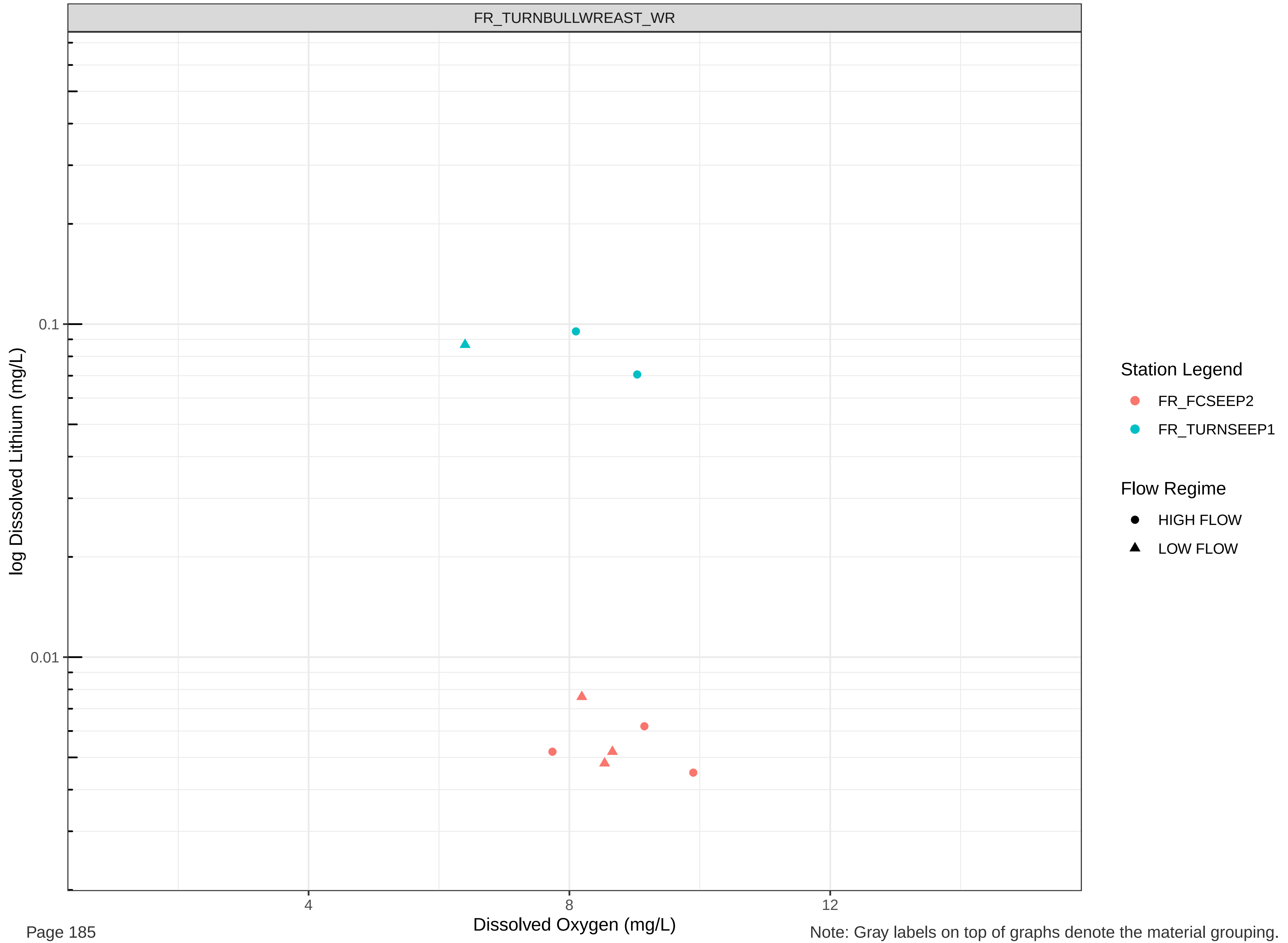
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0.1
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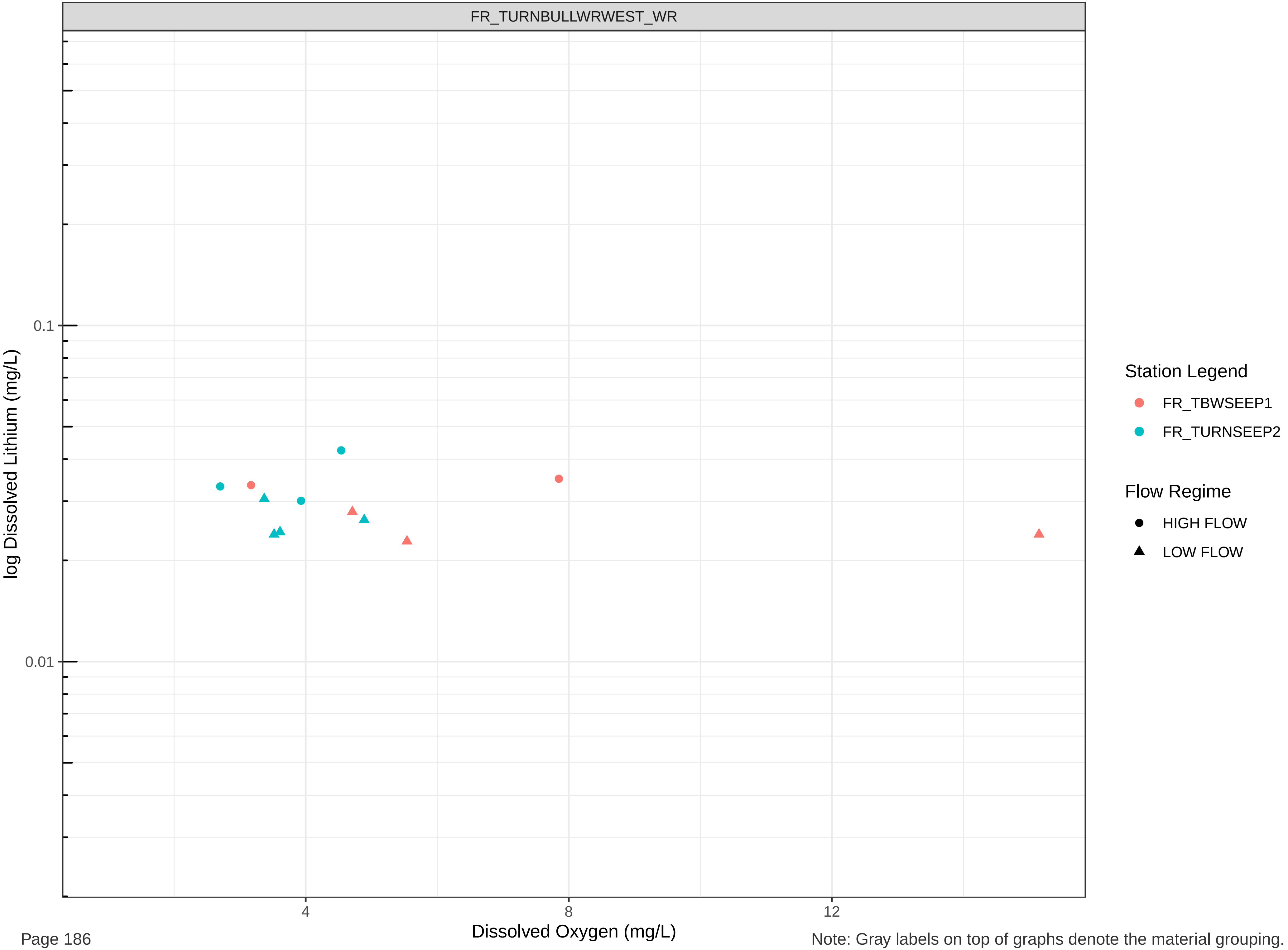

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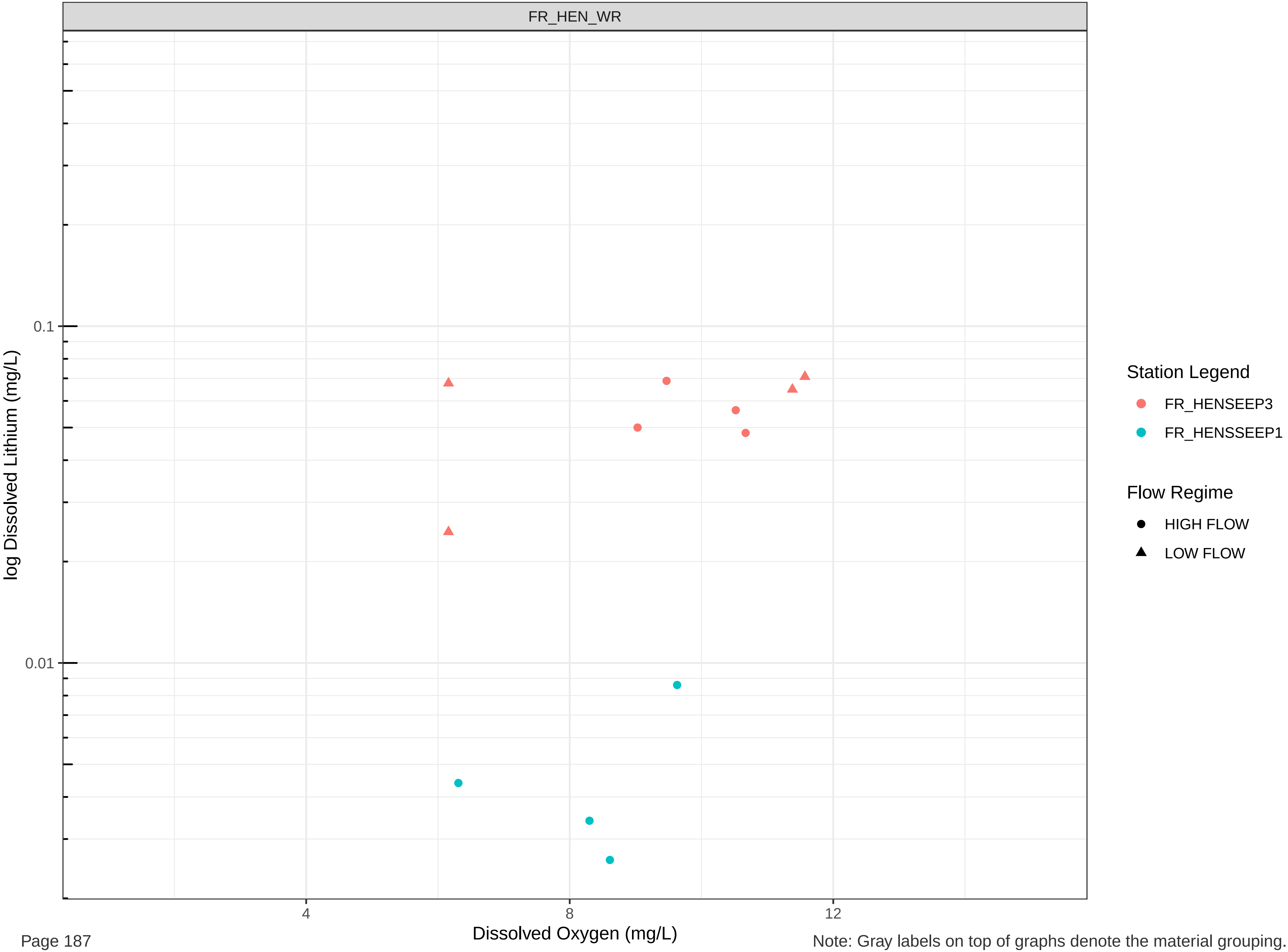

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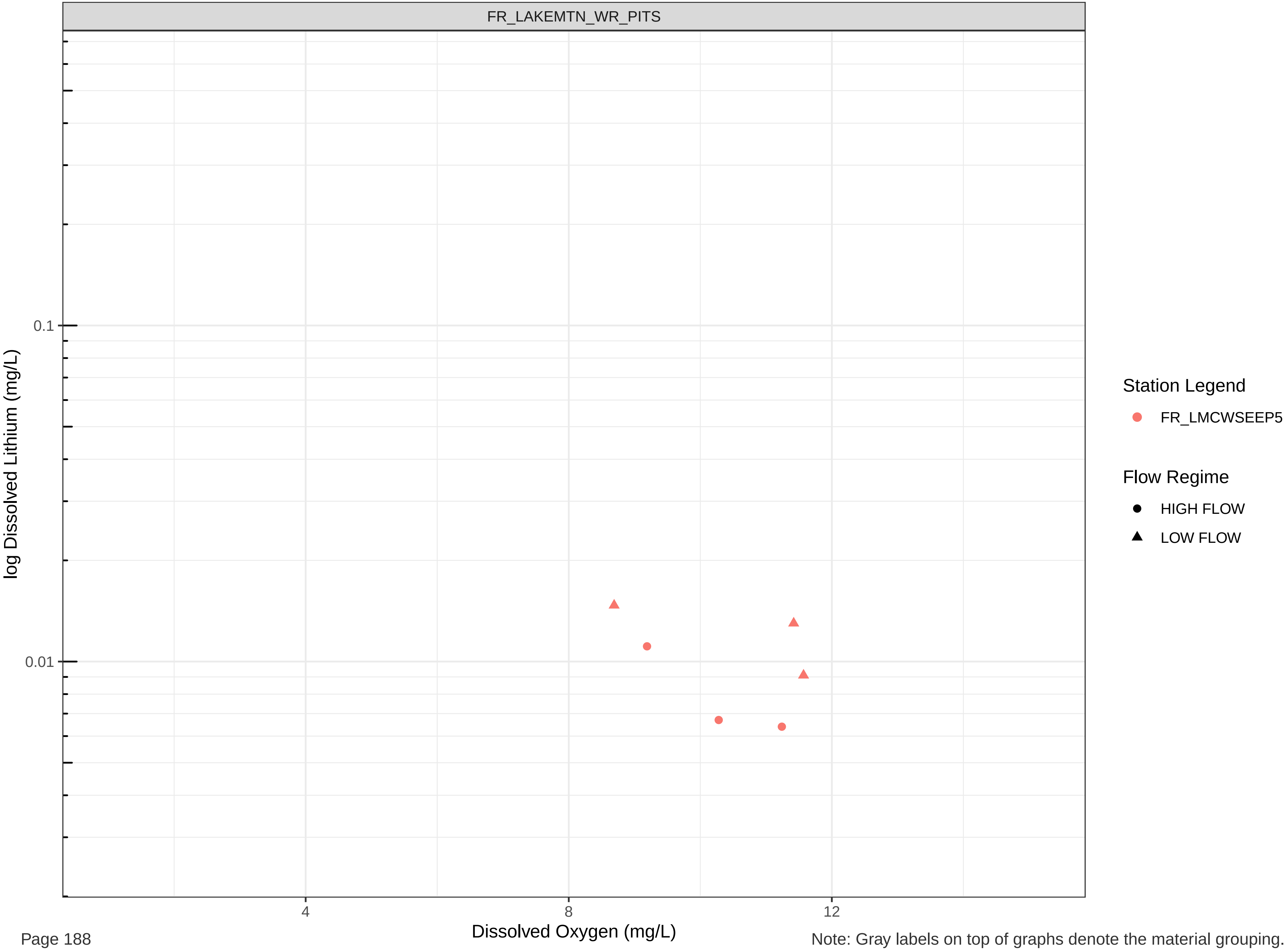

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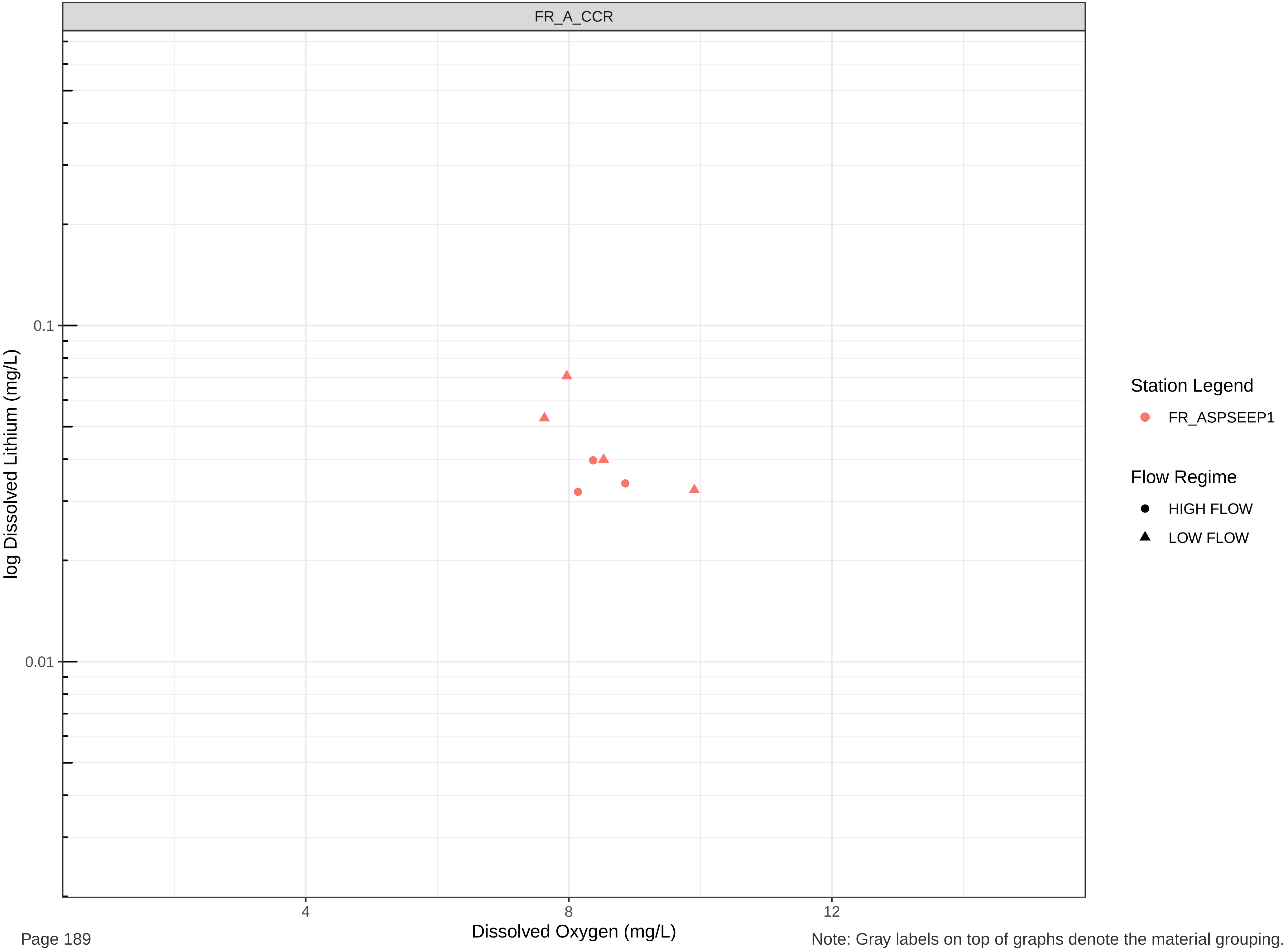

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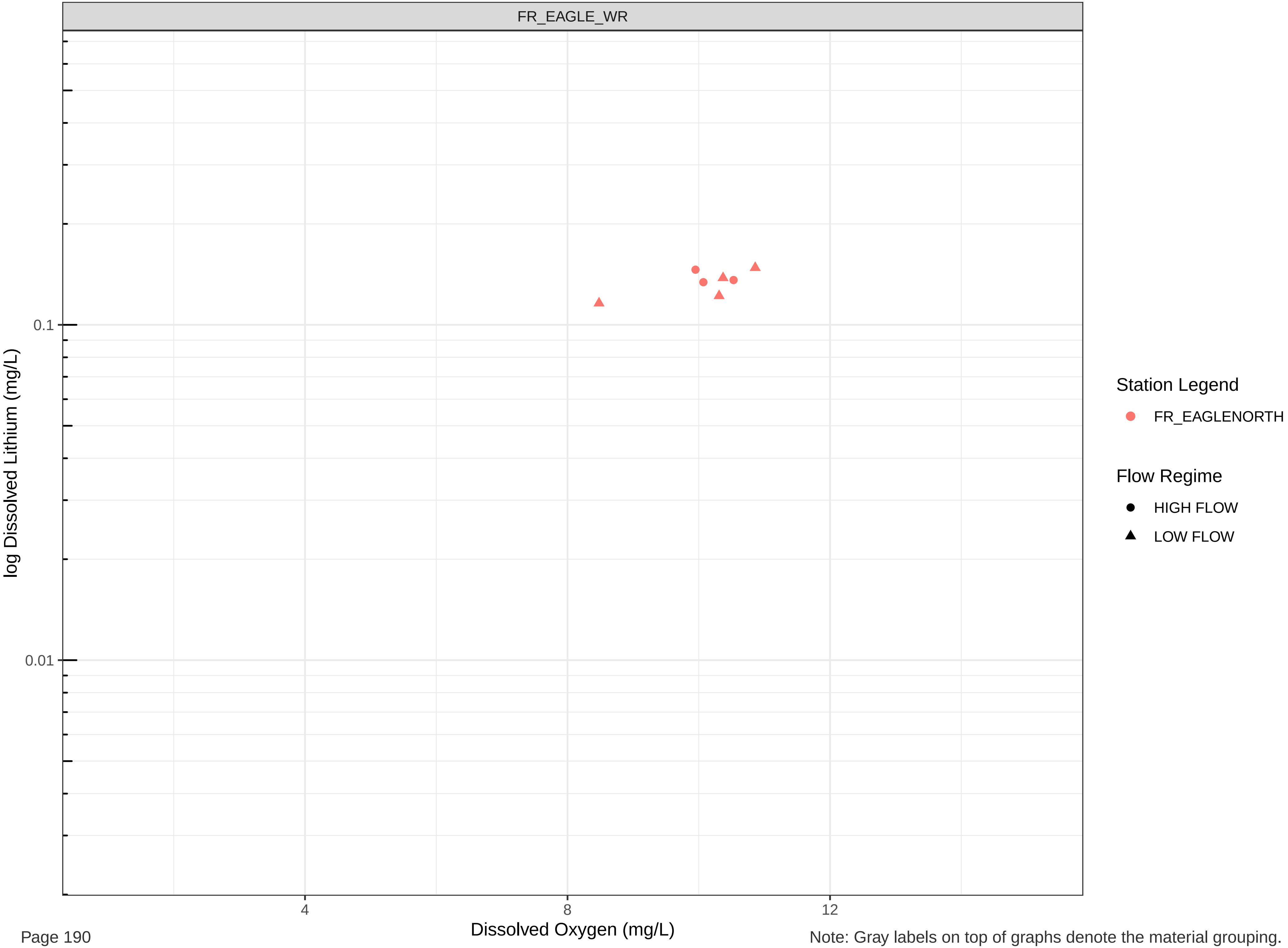

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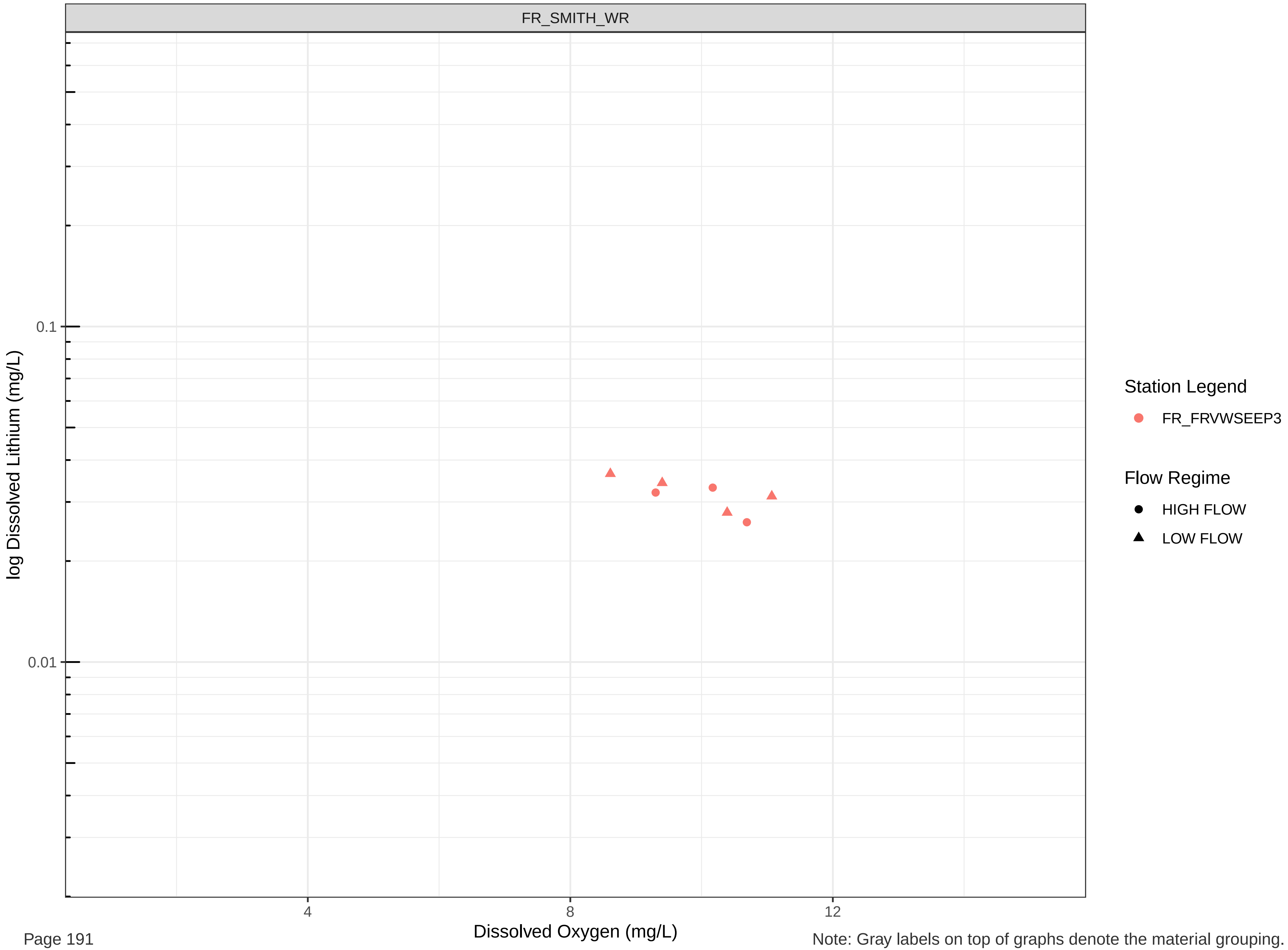

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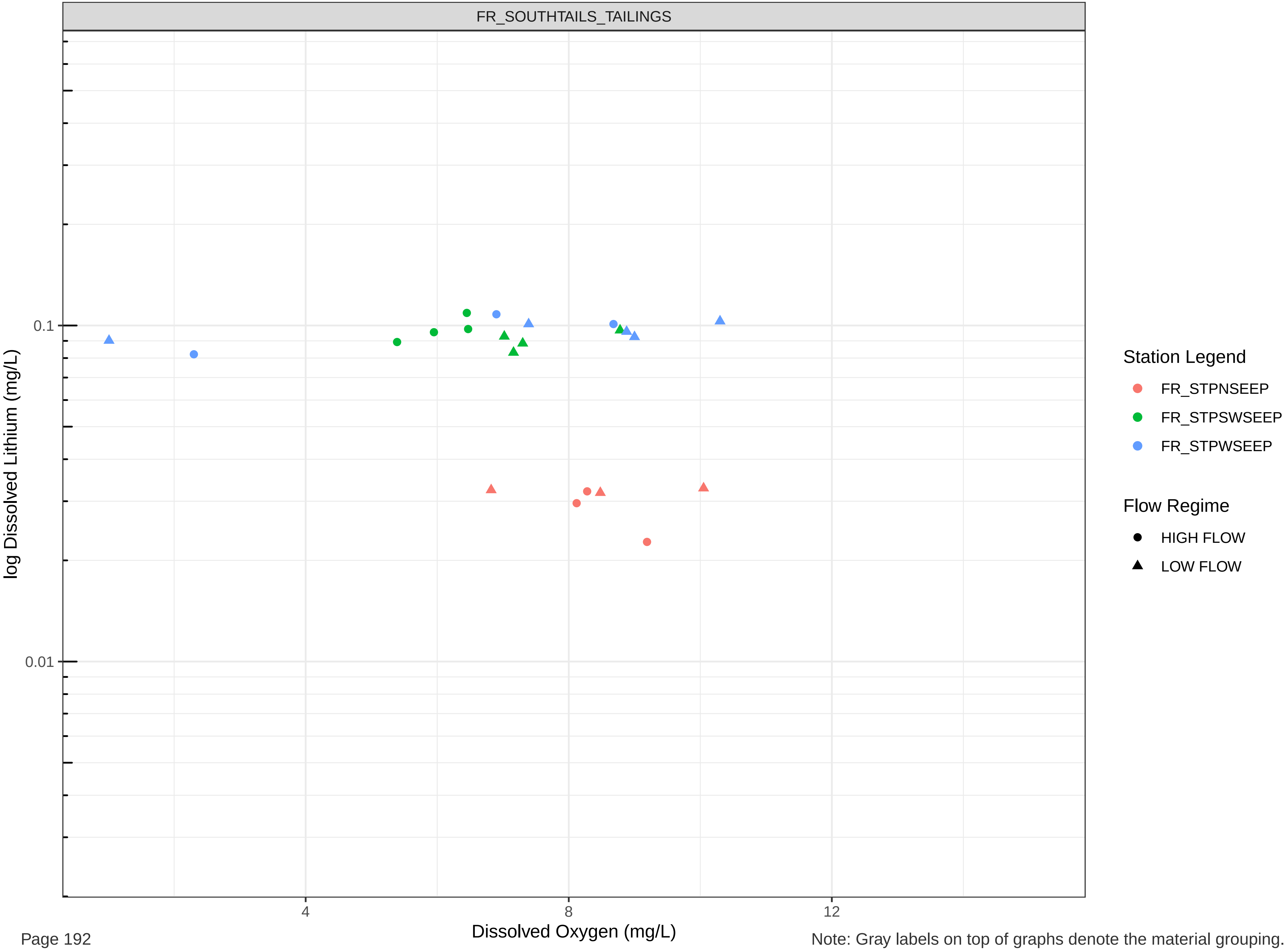

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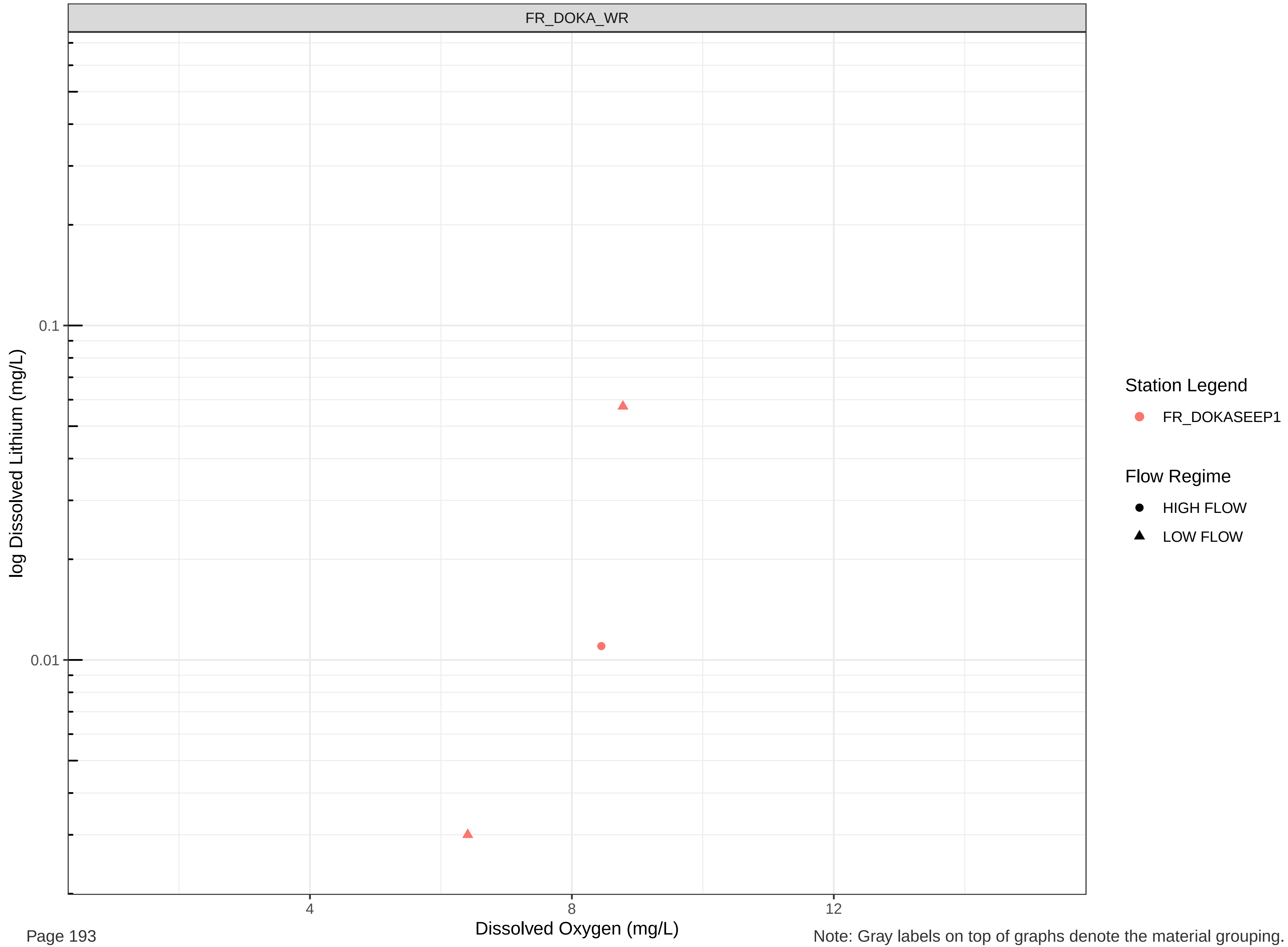

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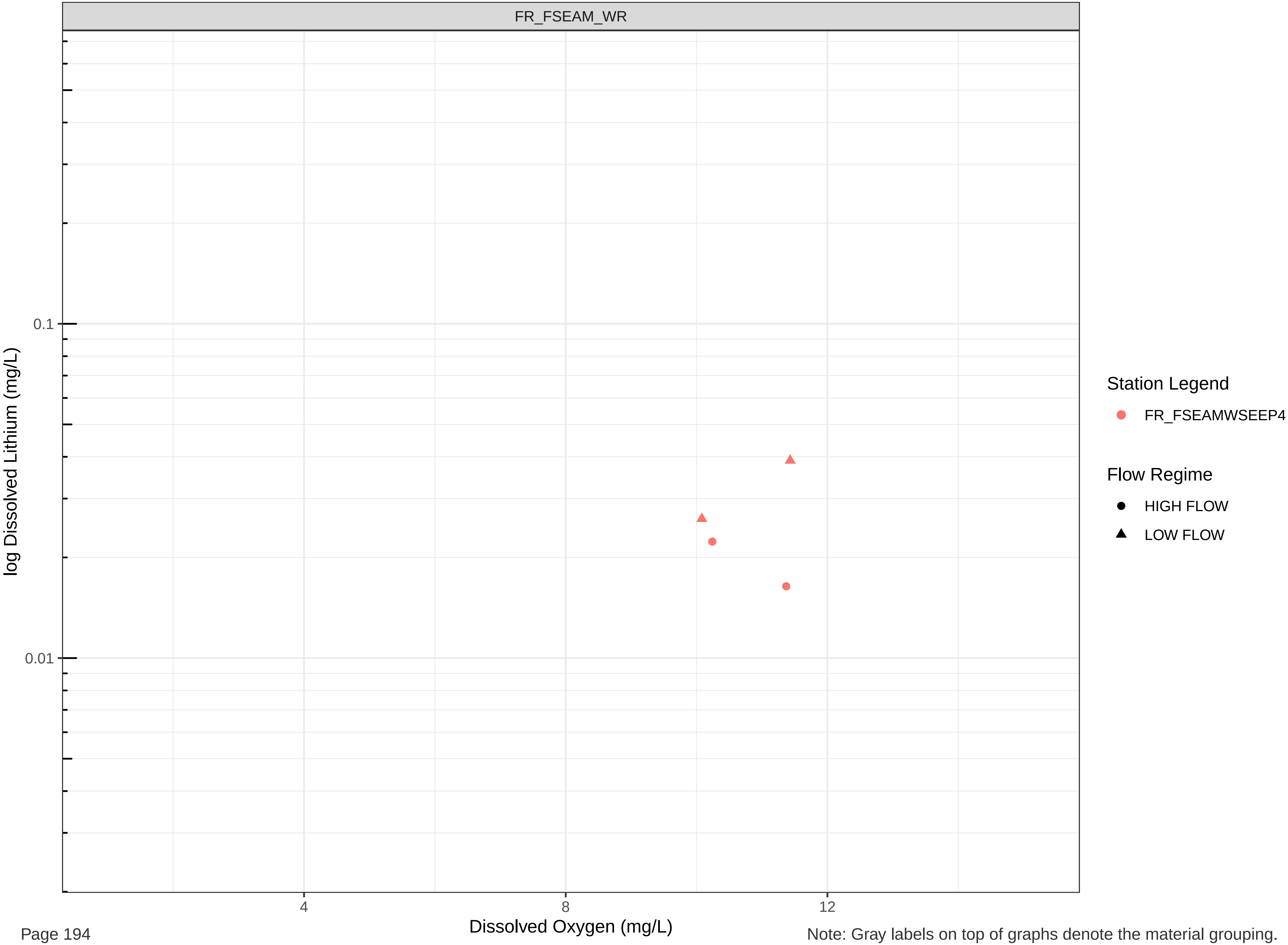

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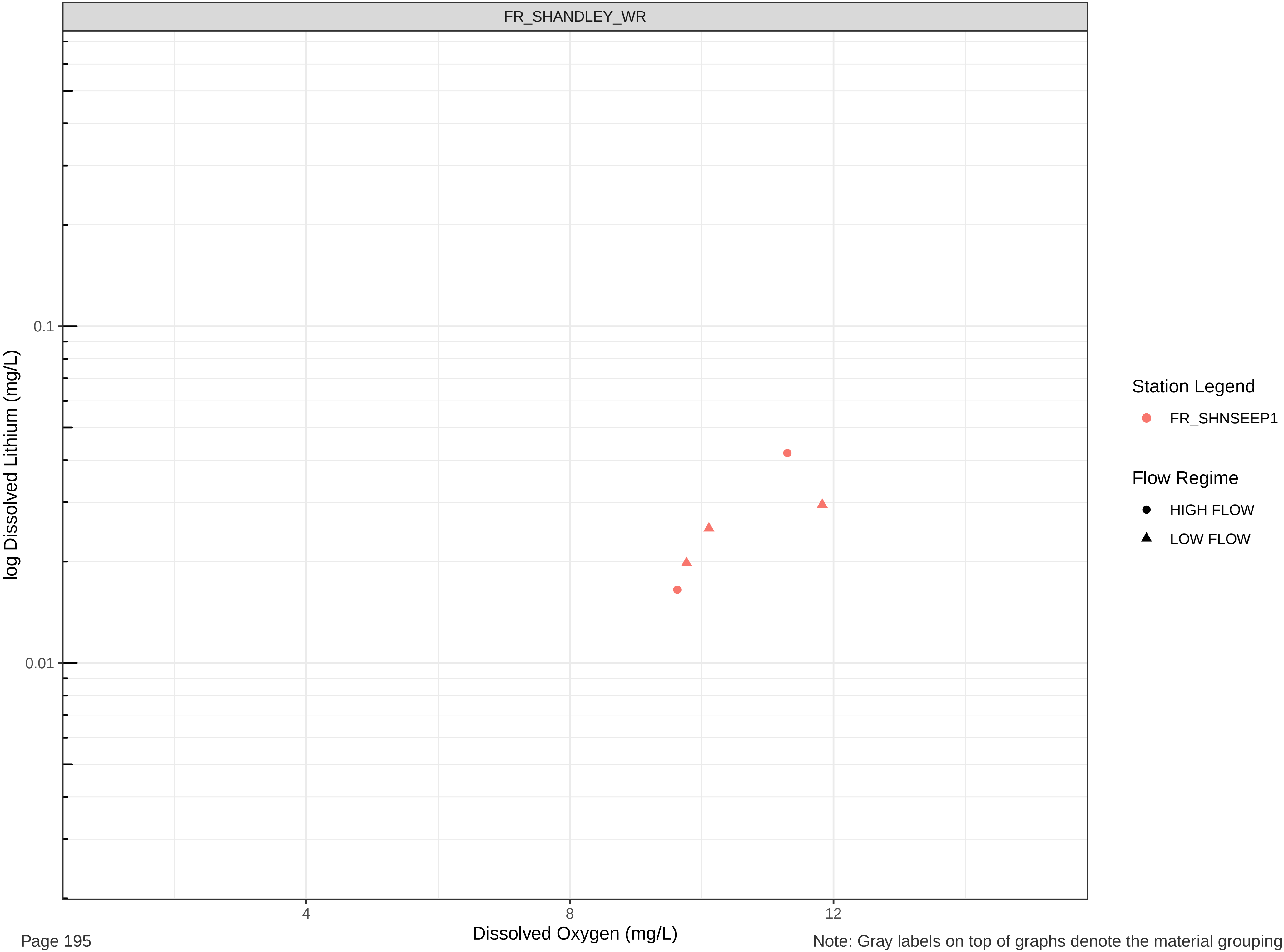

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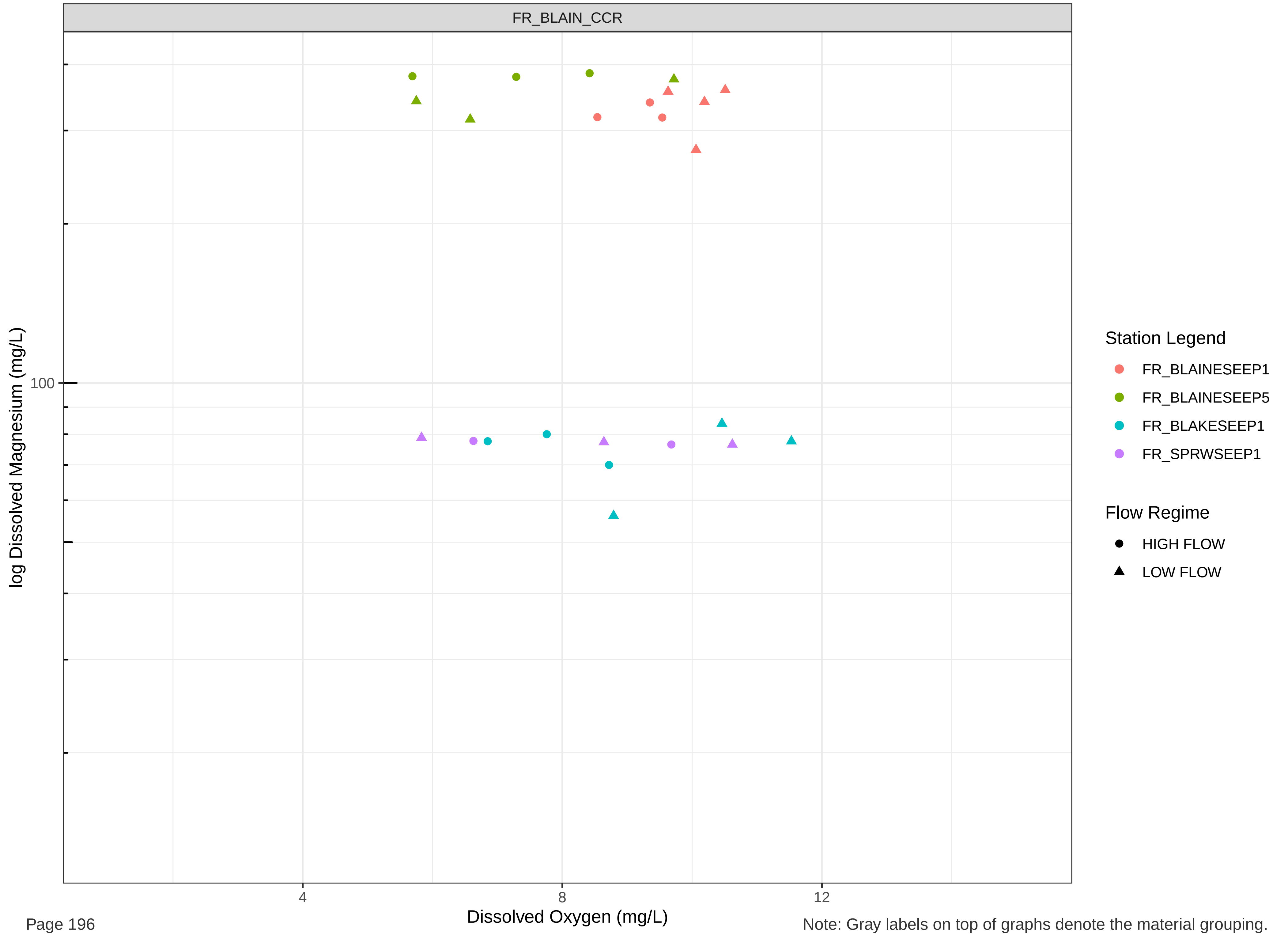

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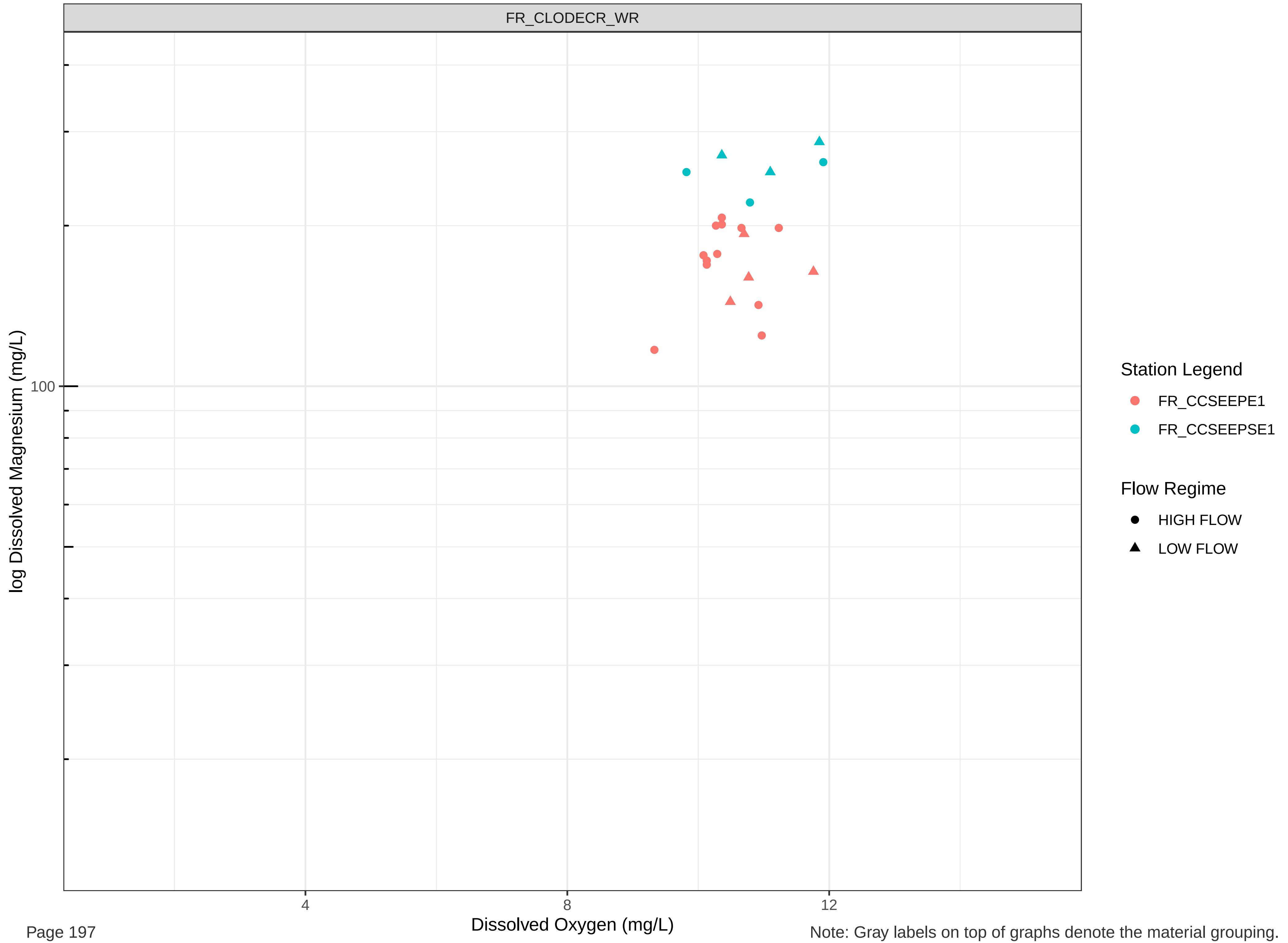

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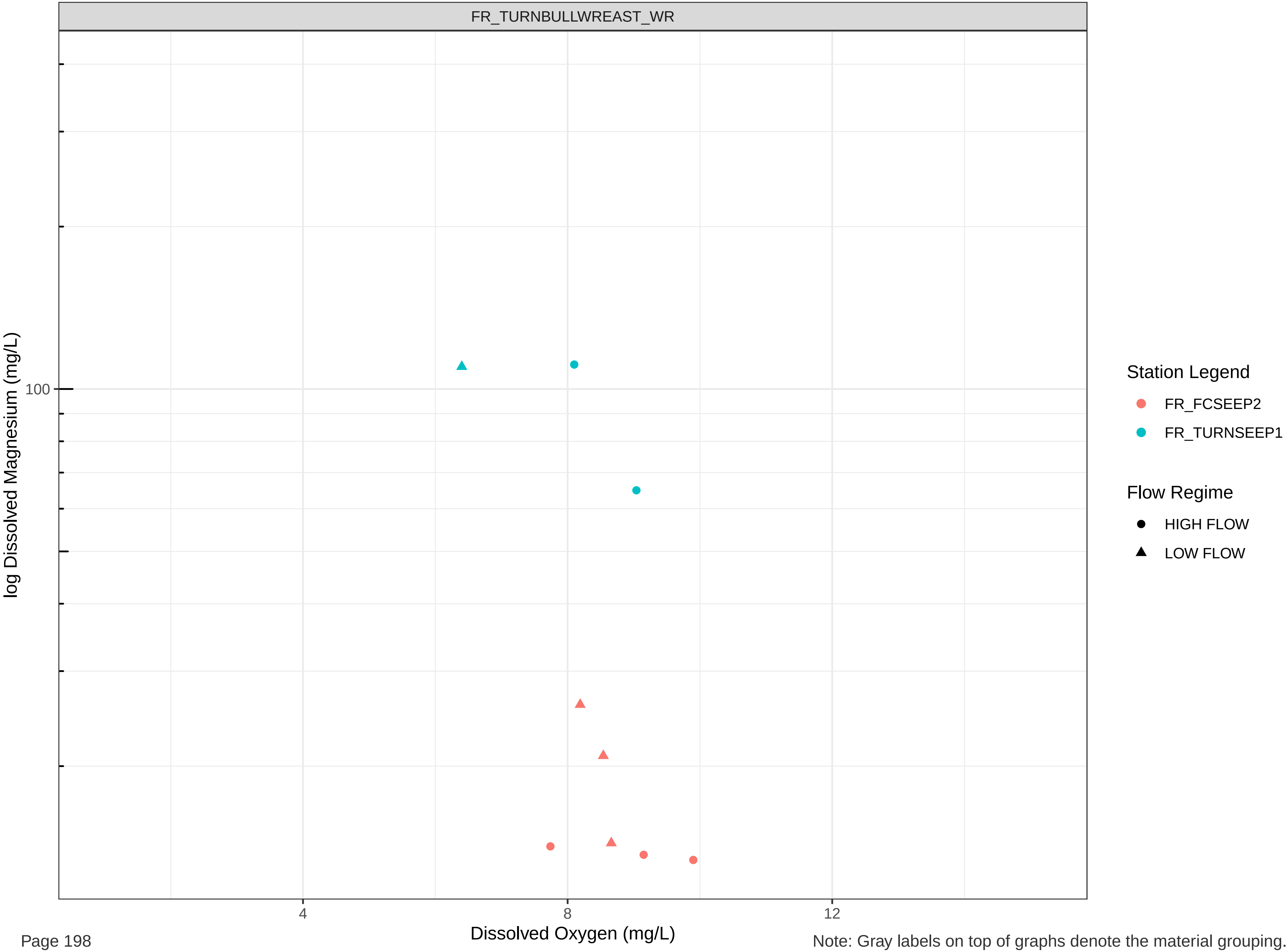

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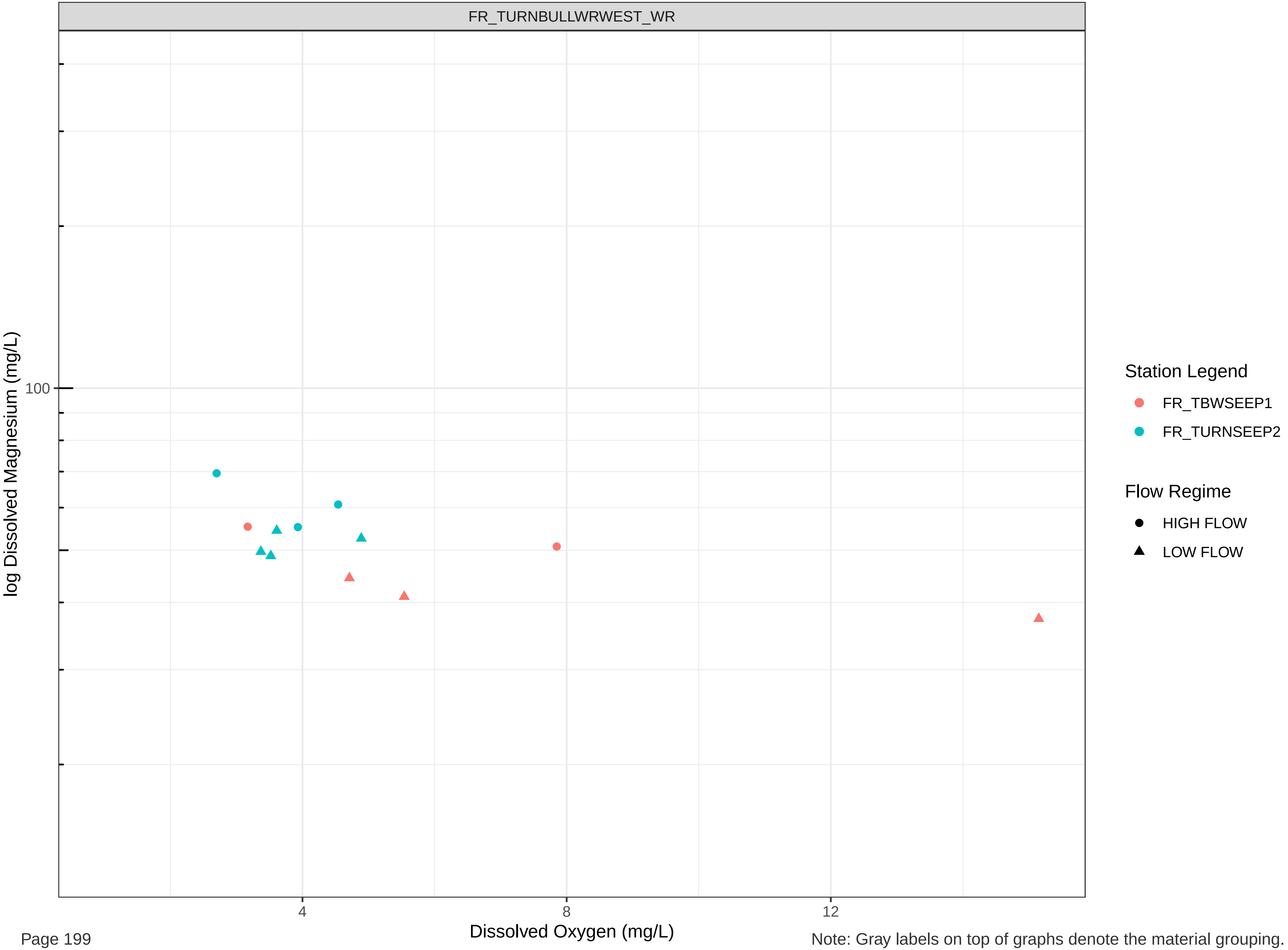

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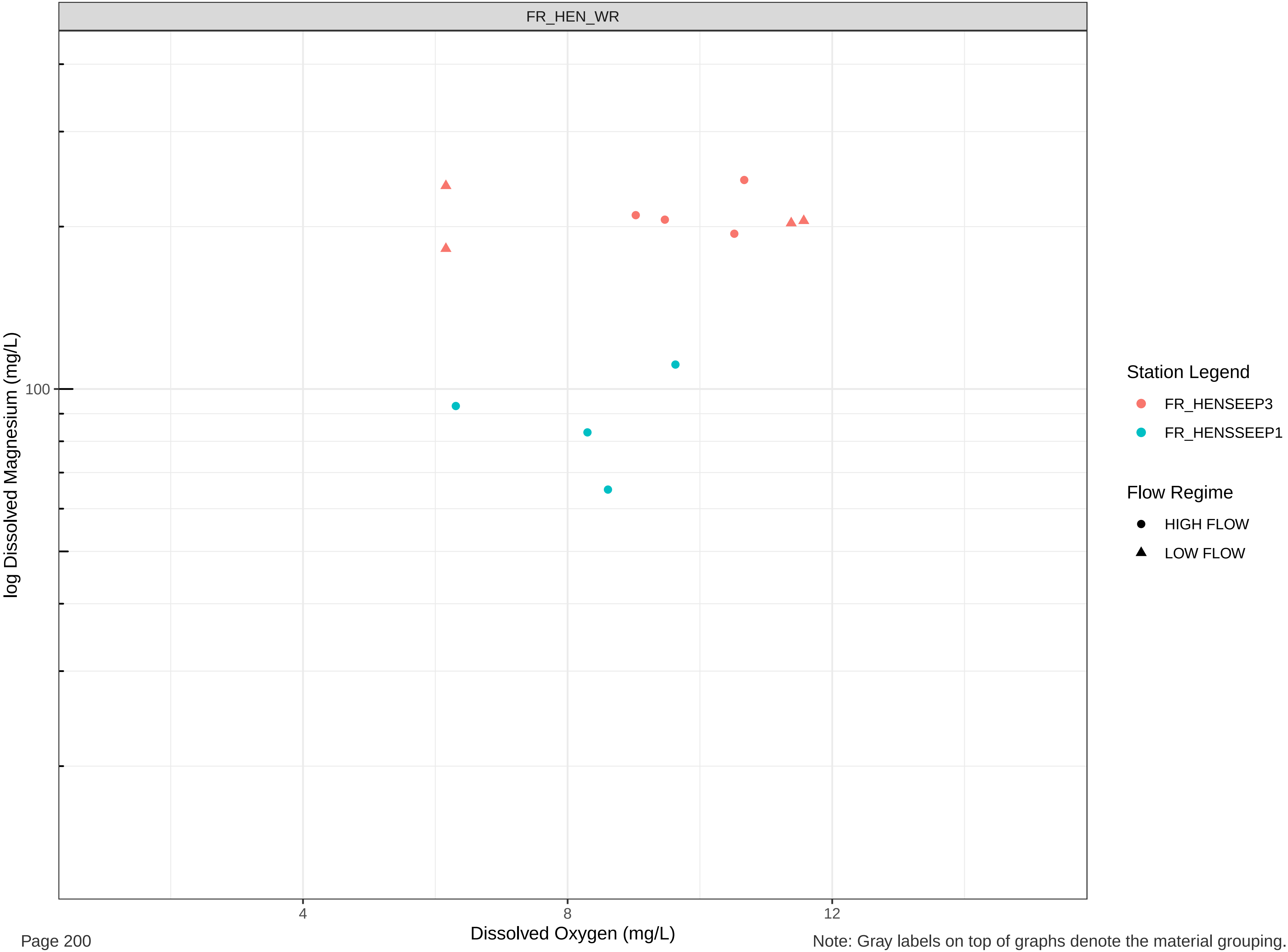

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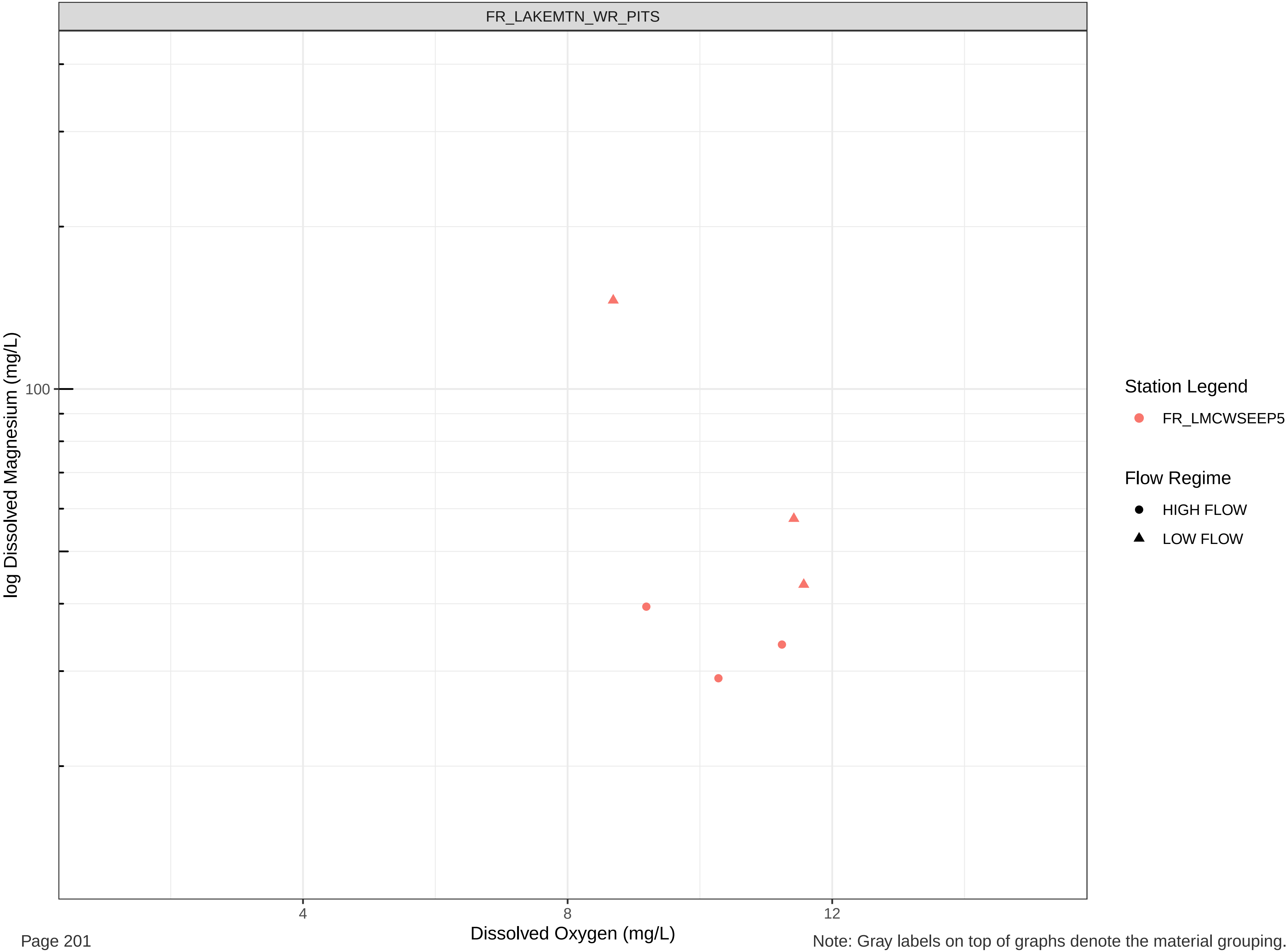

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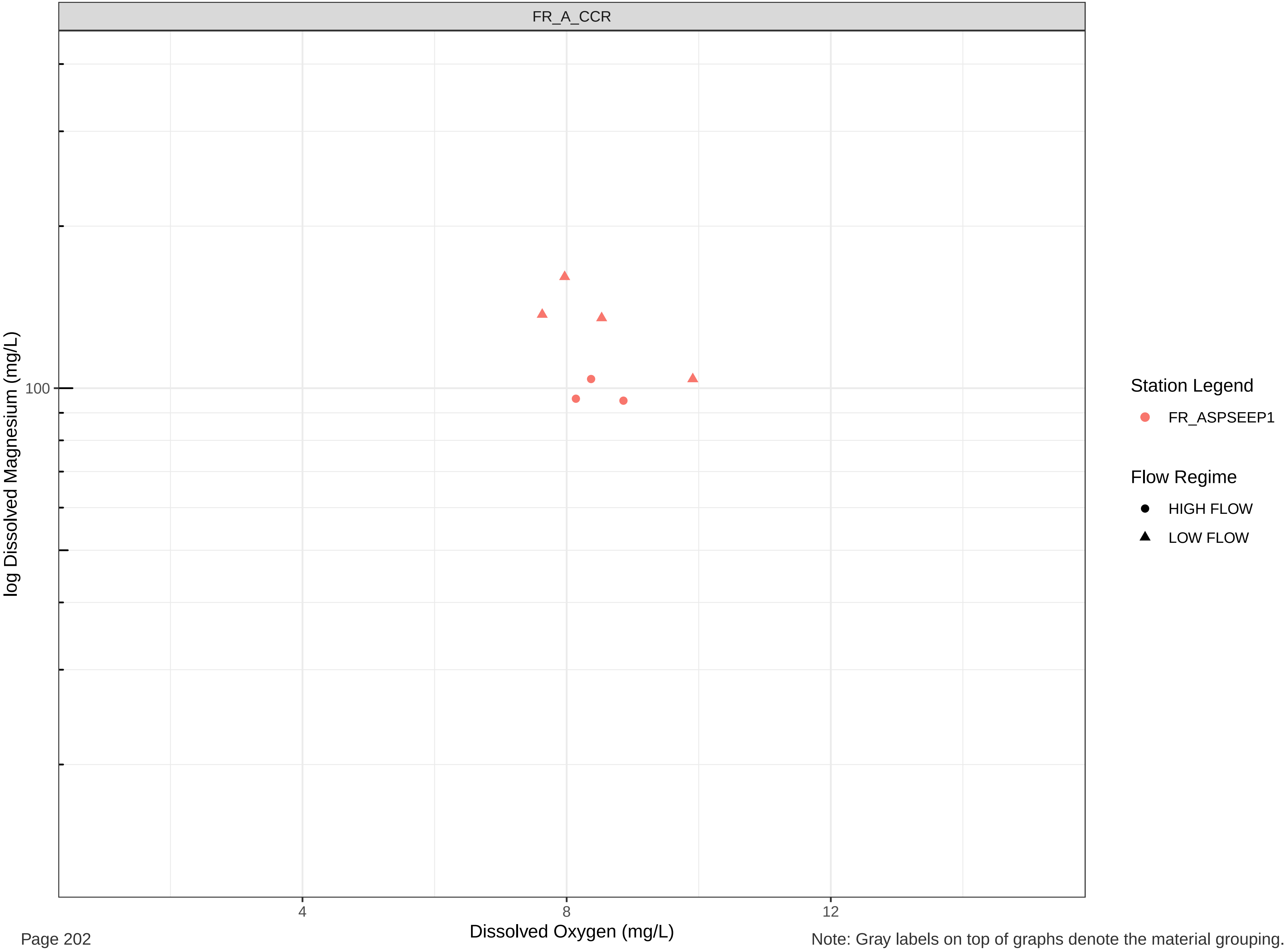

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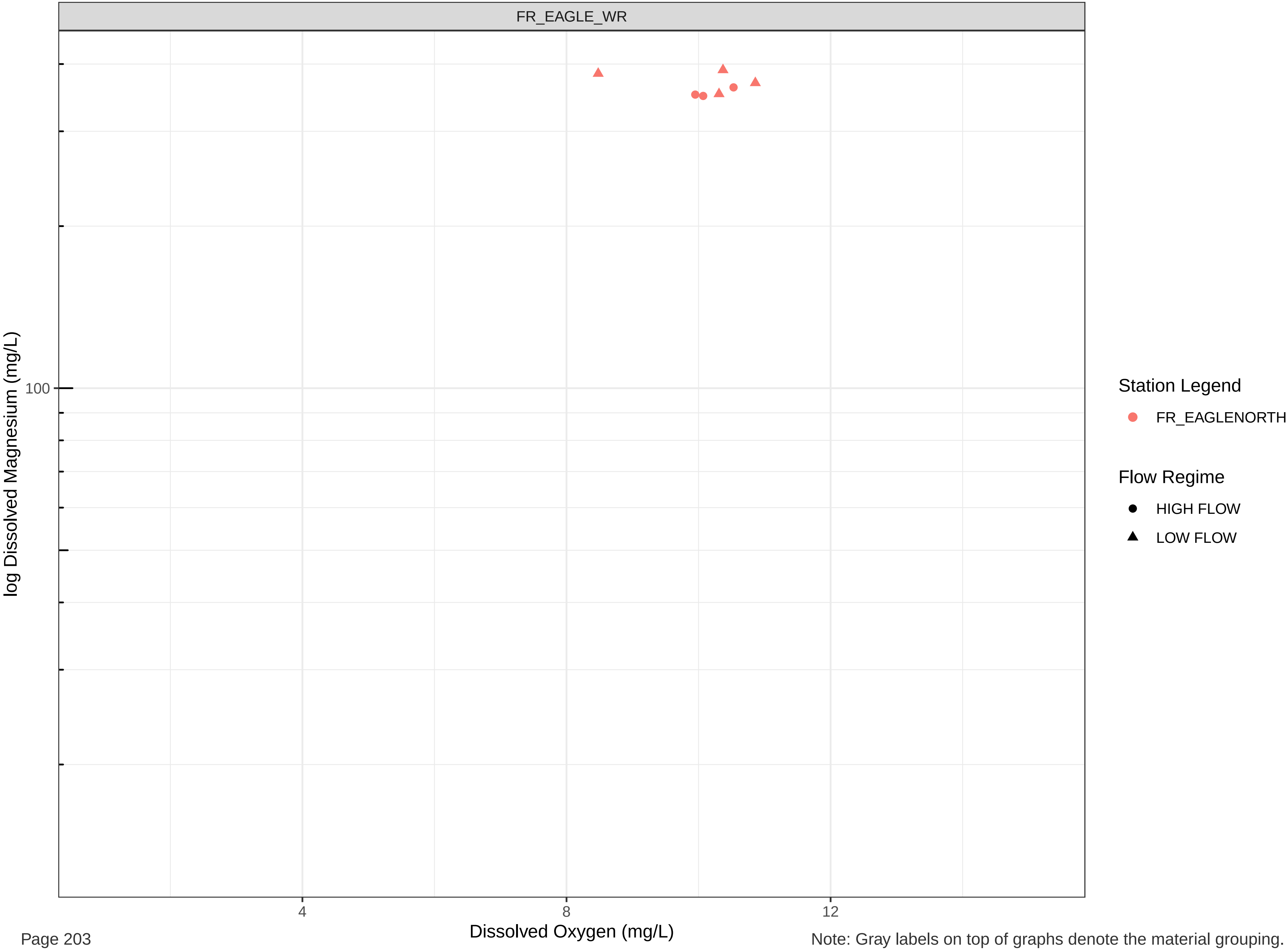

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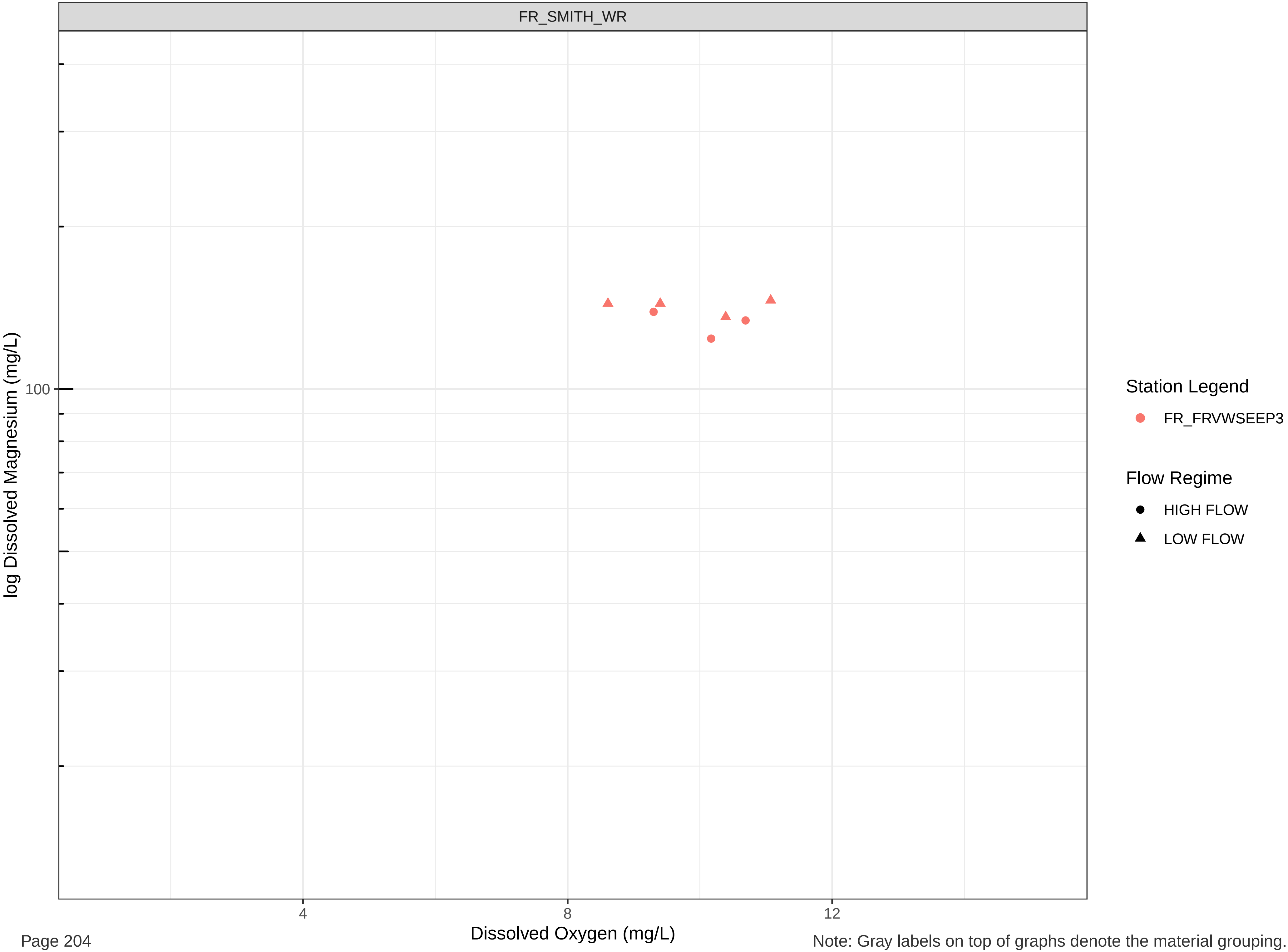

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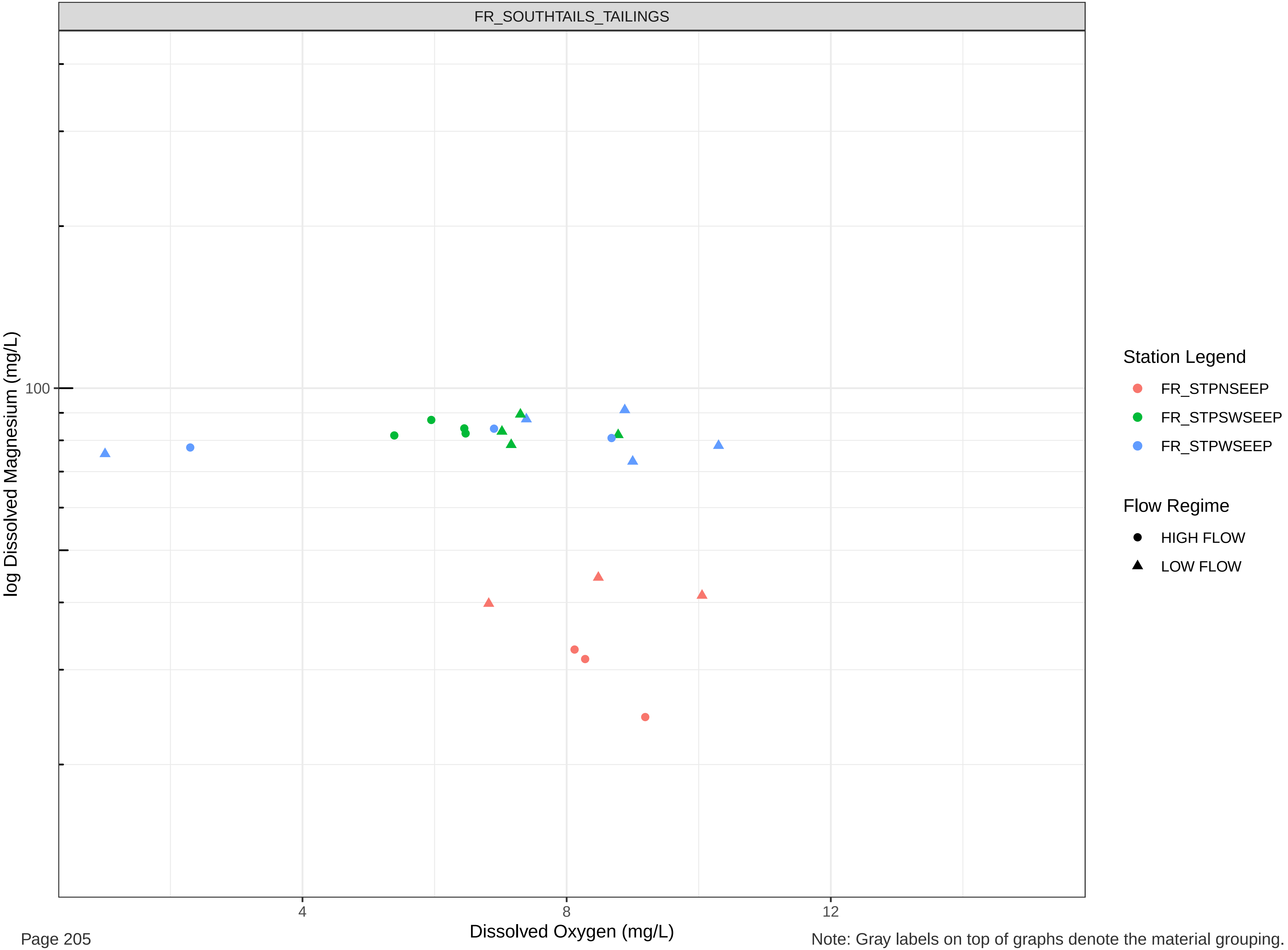

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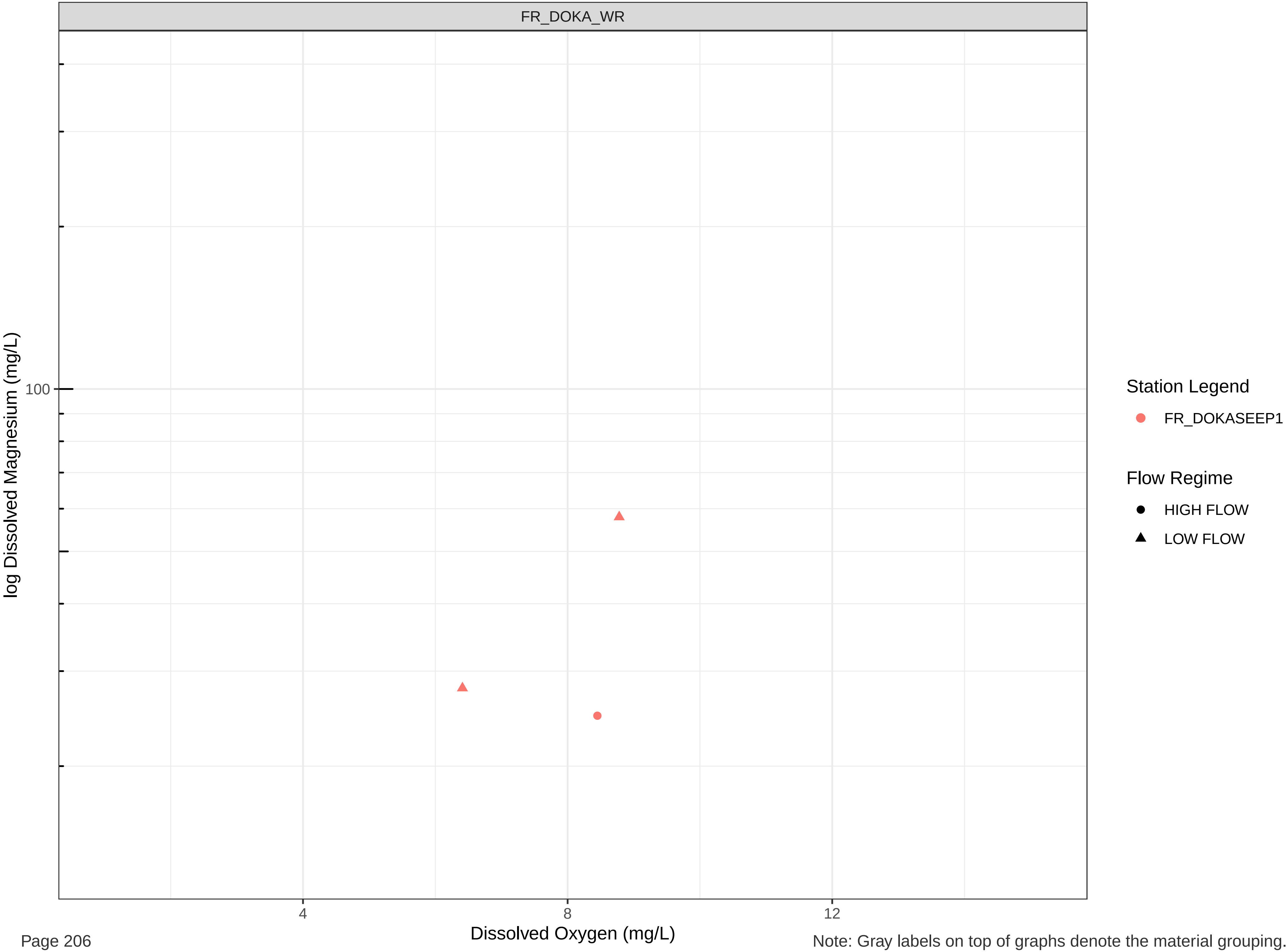

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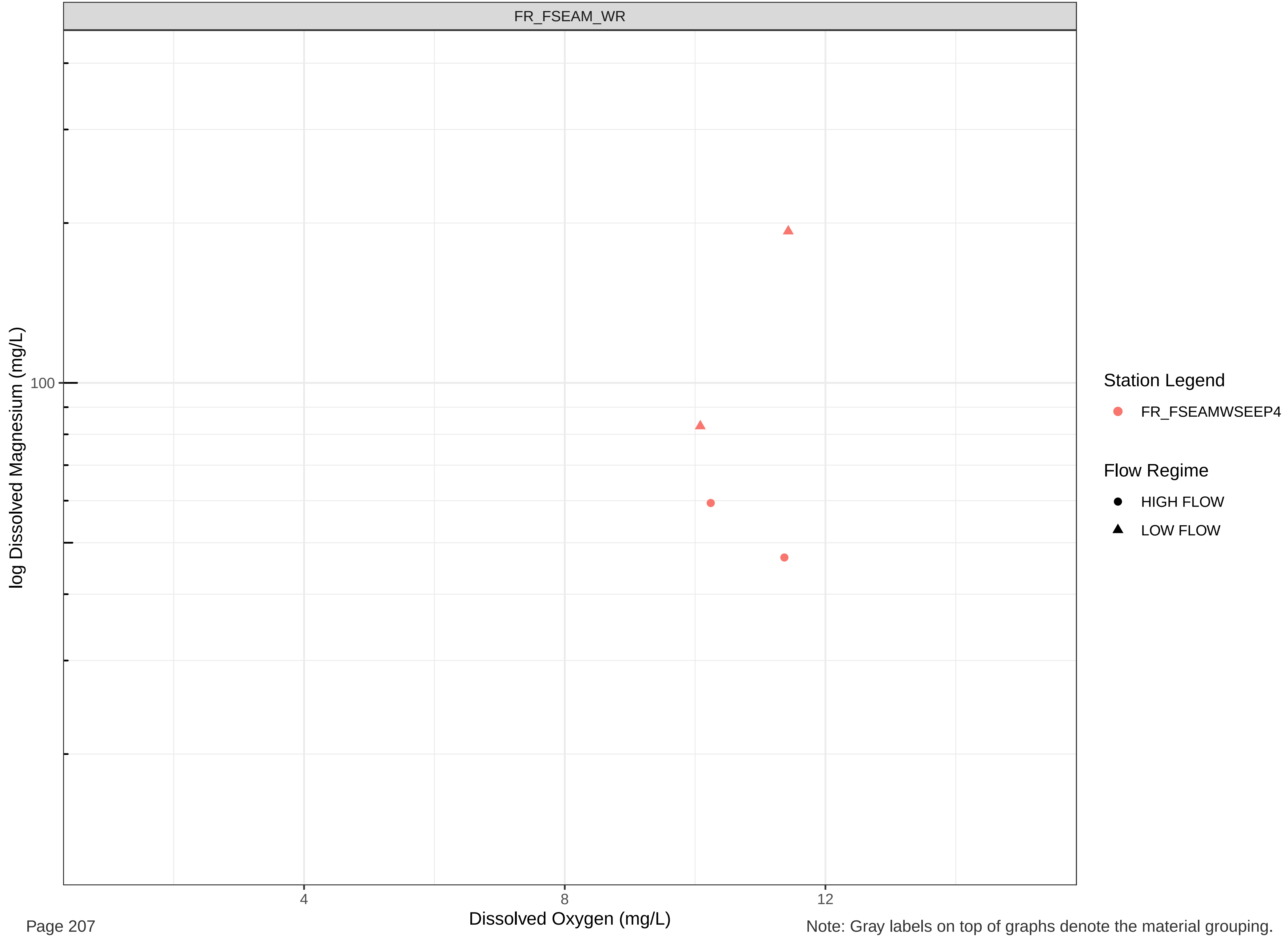

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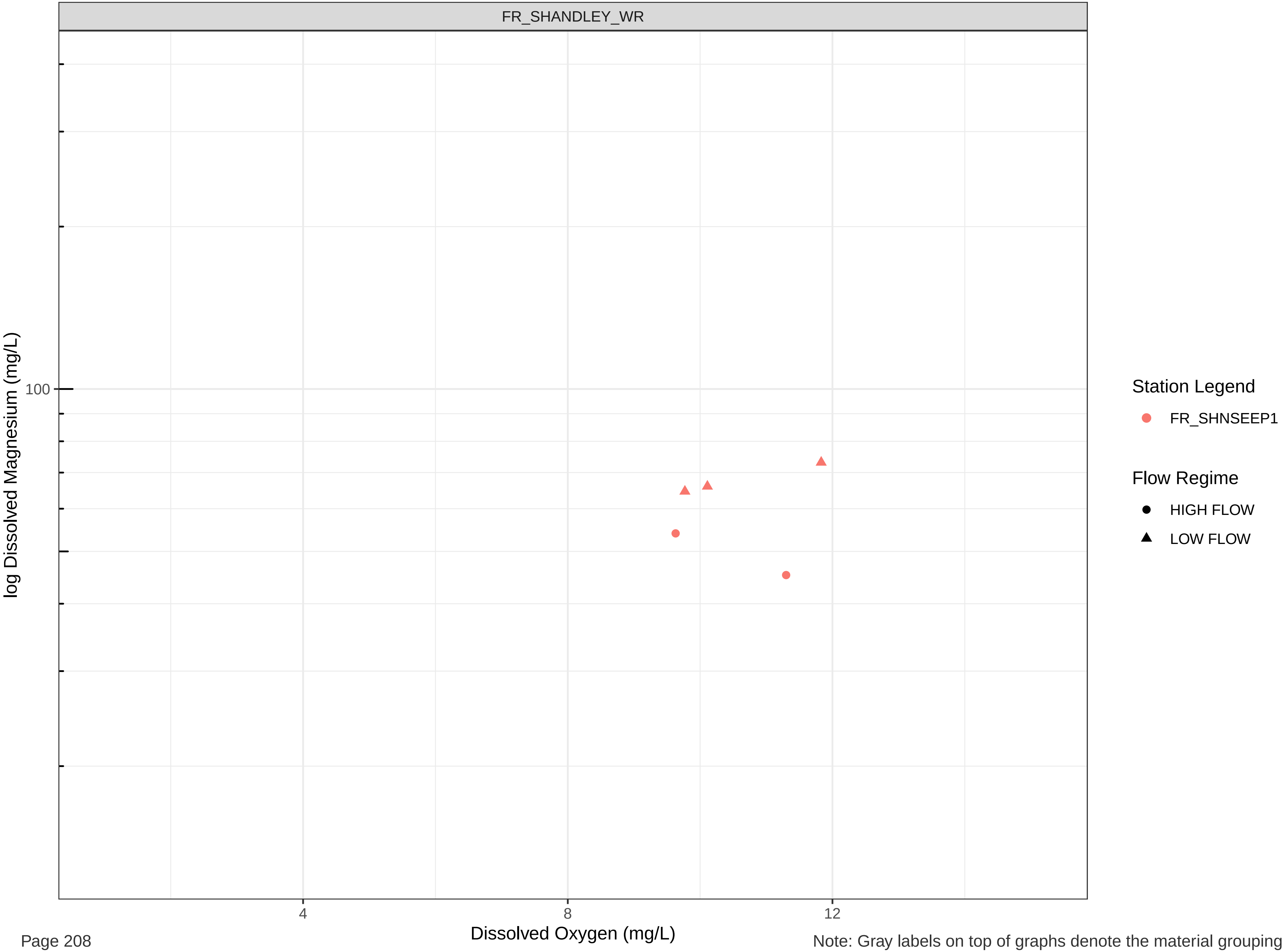

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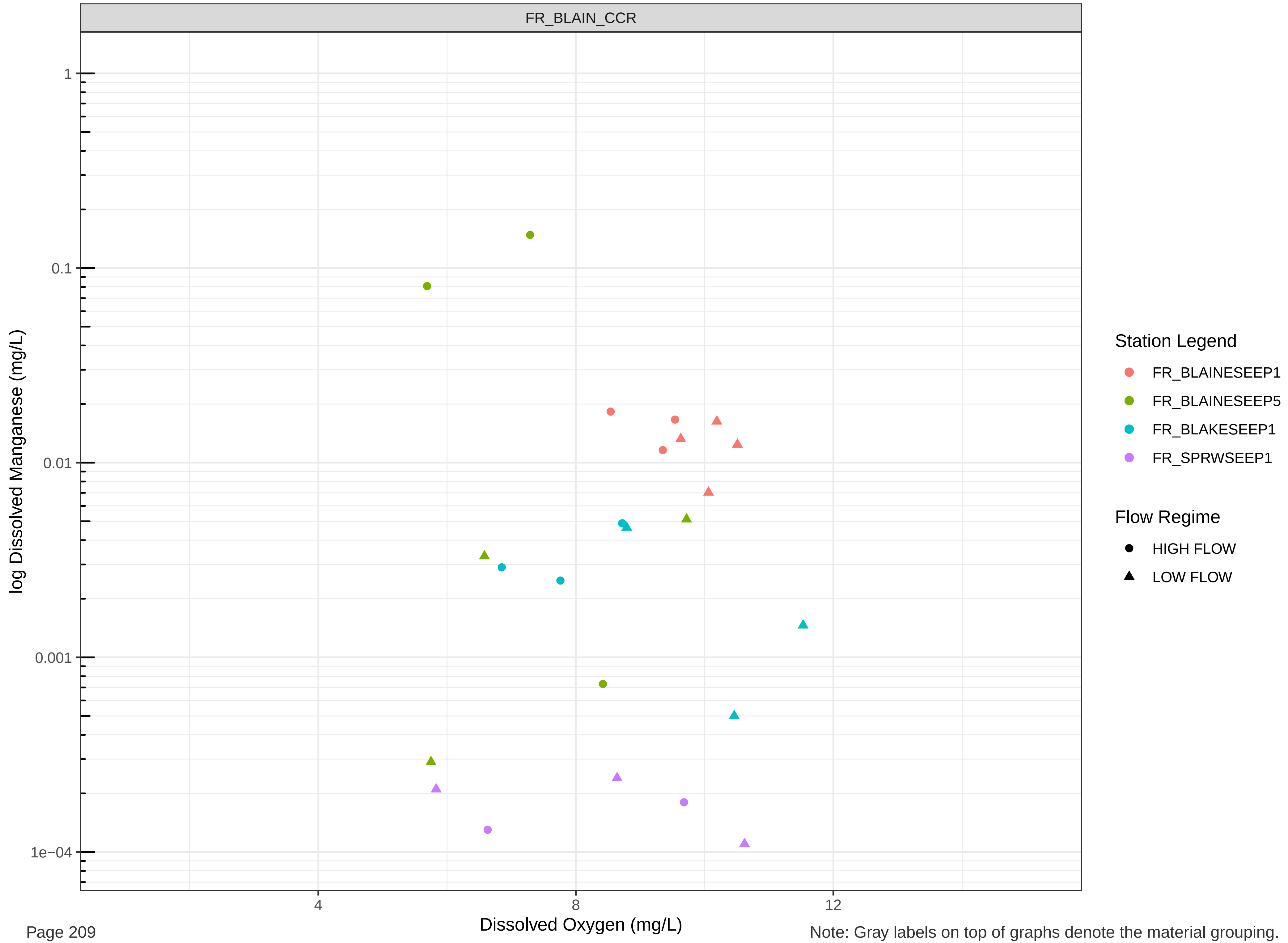
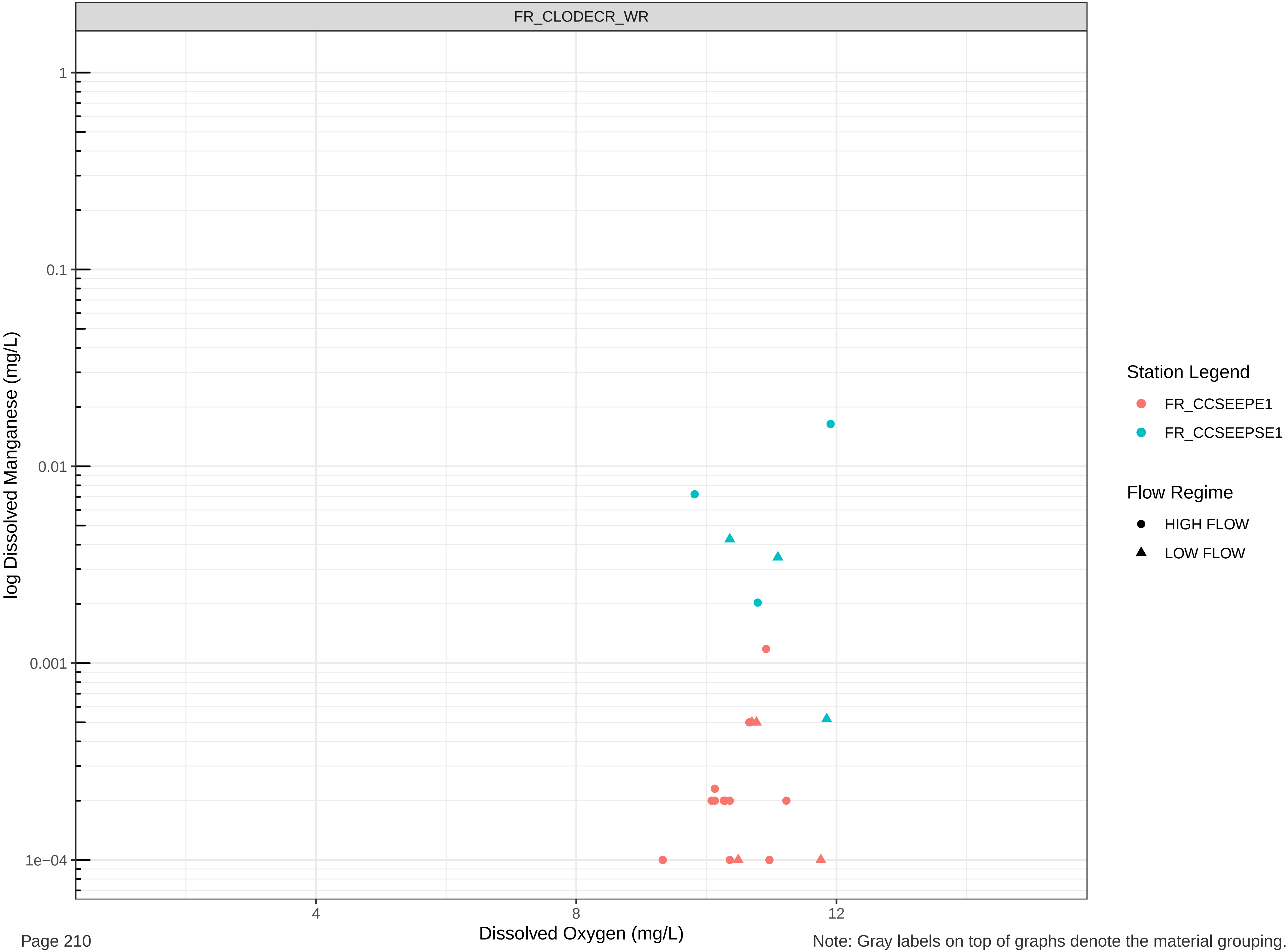

FR_BLAIN_CCR
log Dissolved Manganese (mg/L)
1
0.1
0.01
0.001
1e−04
4
8
12
Dissolved Oxygen (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



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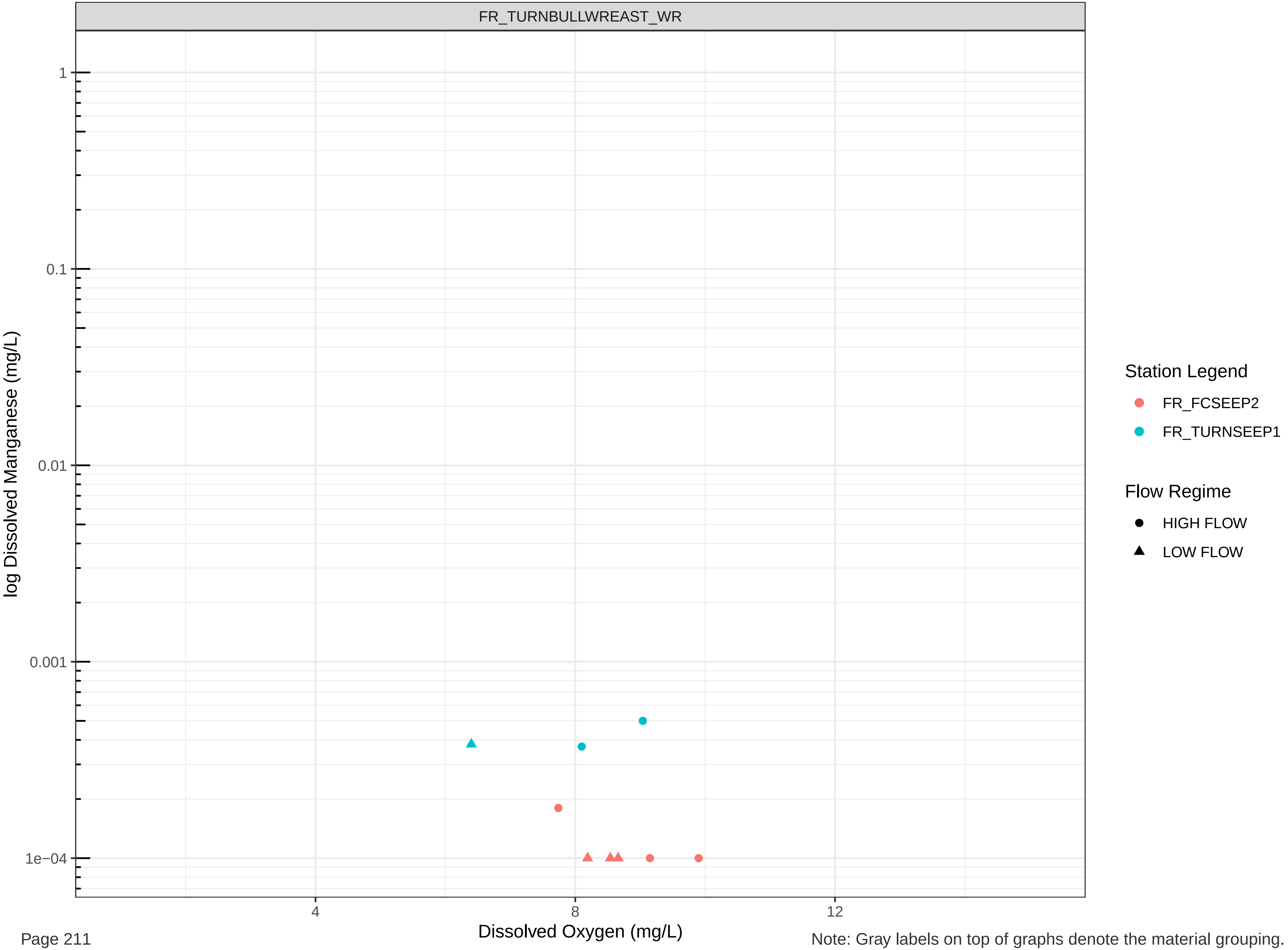

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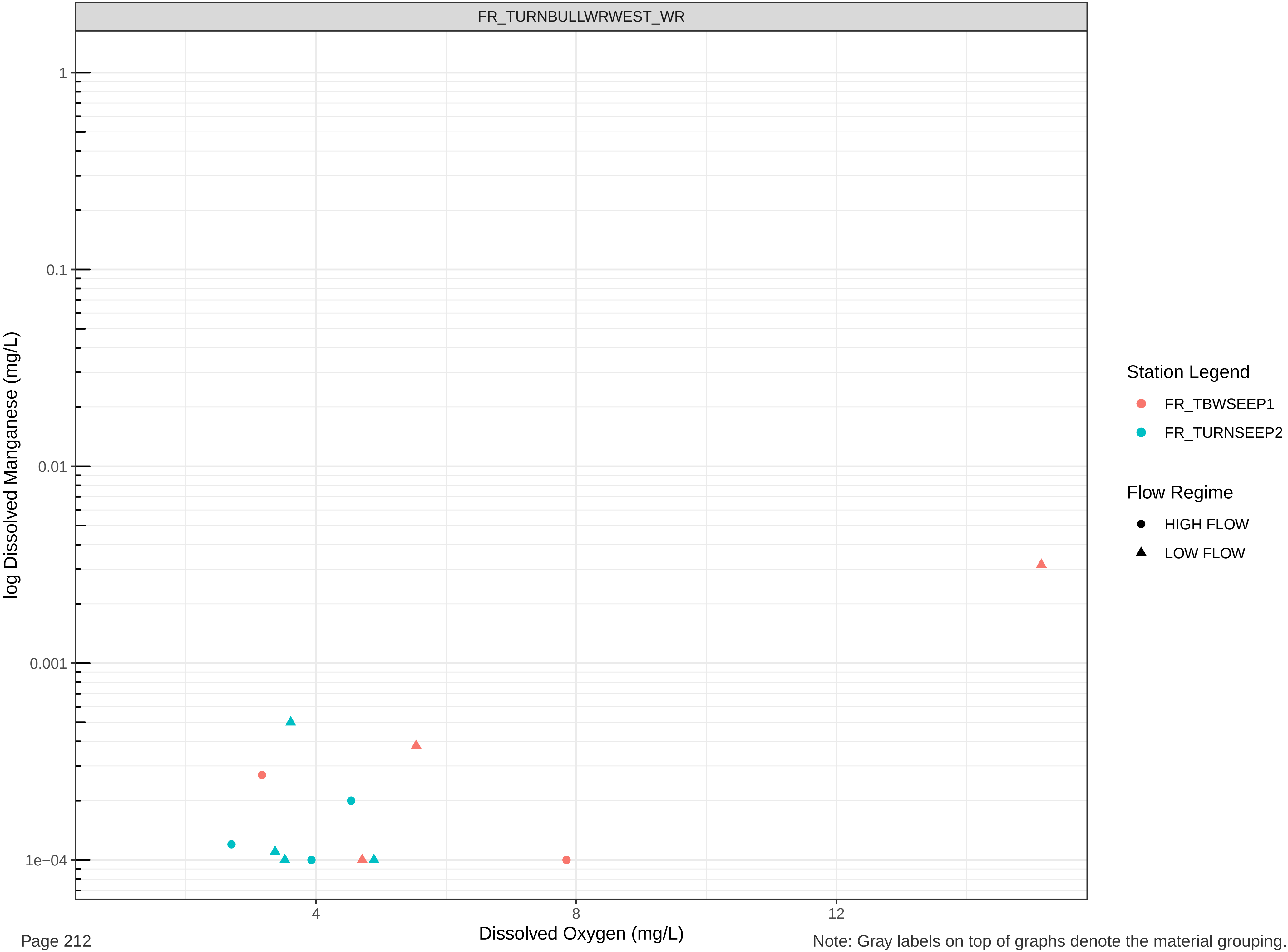

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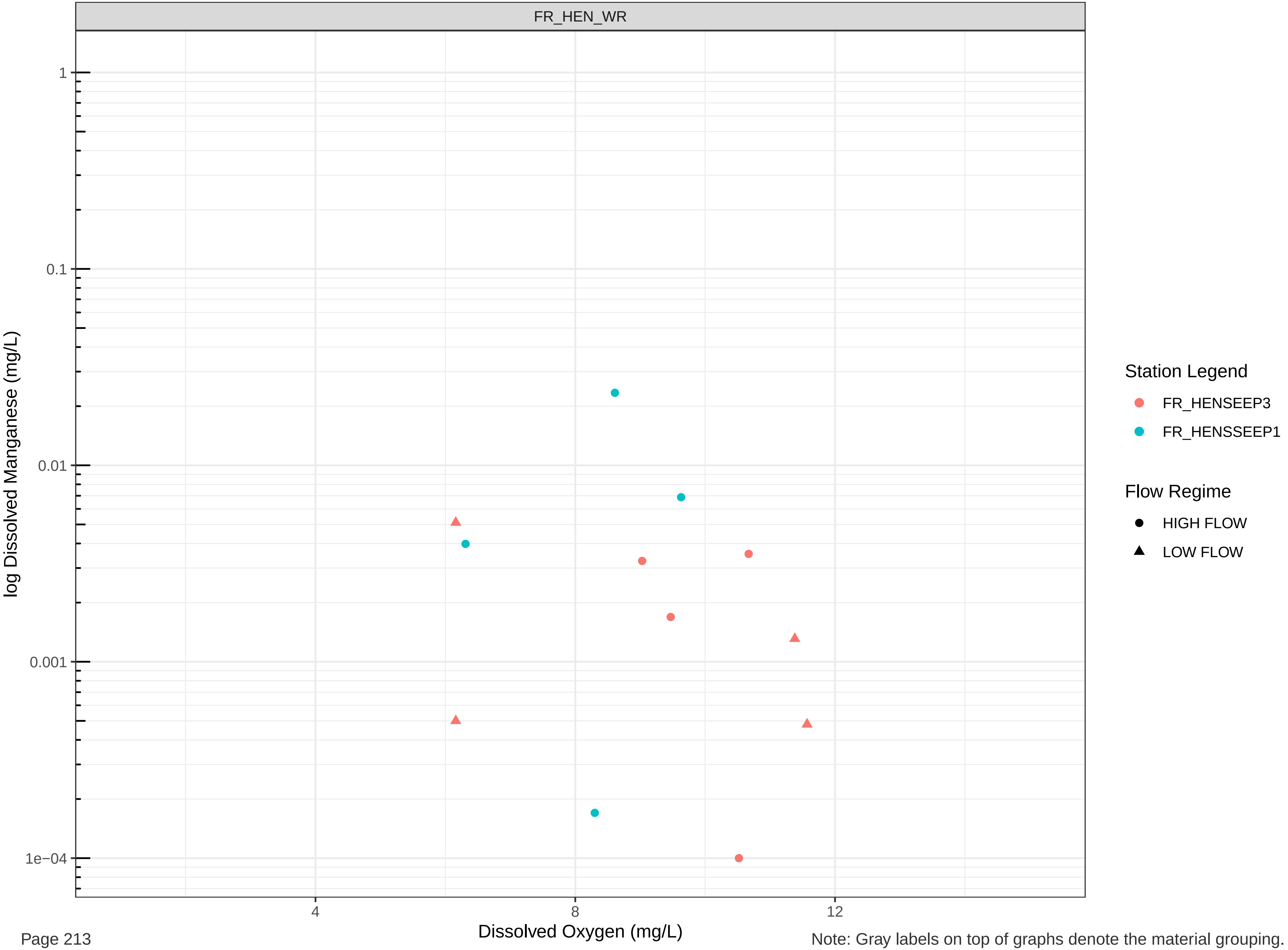

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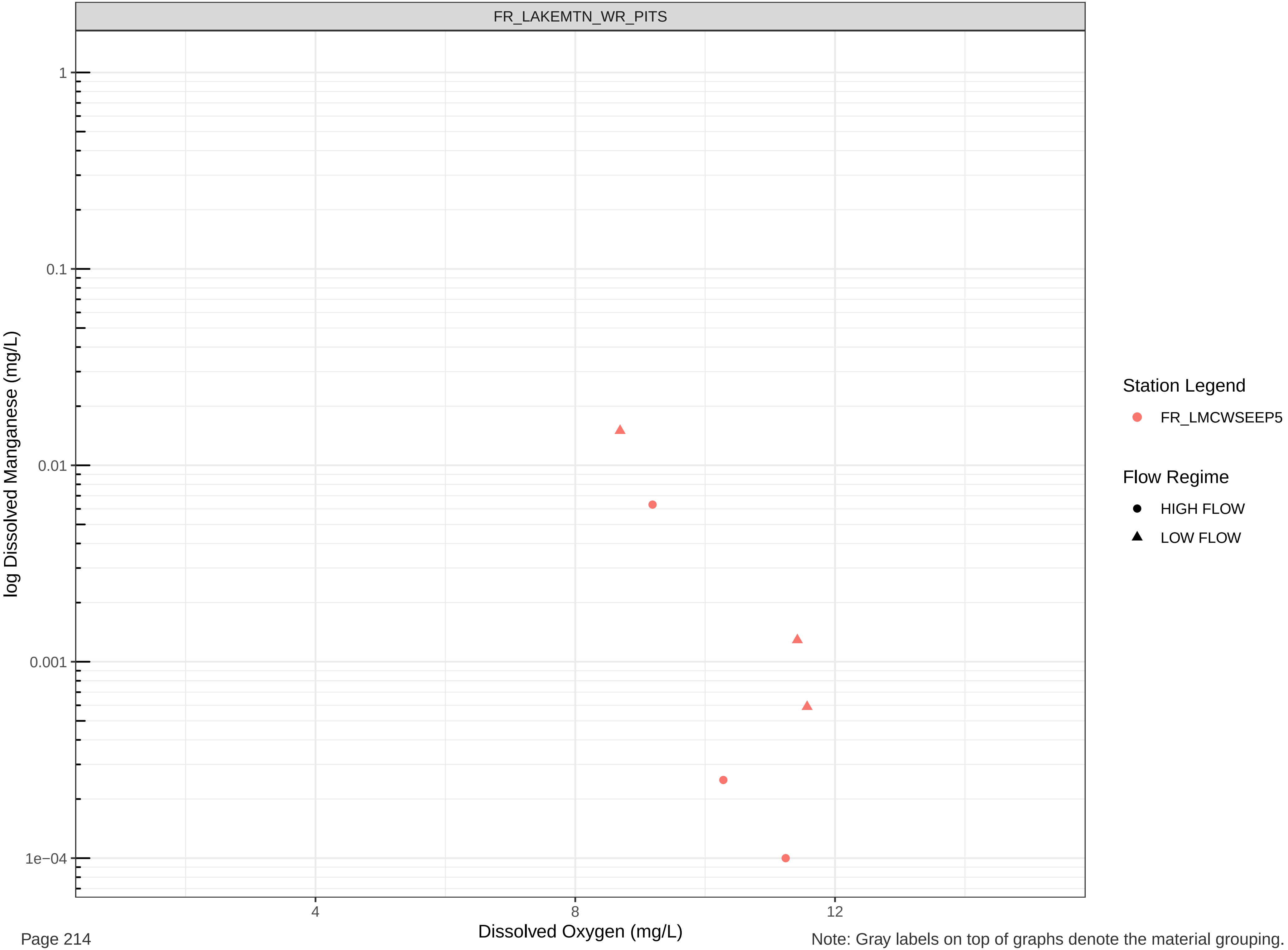

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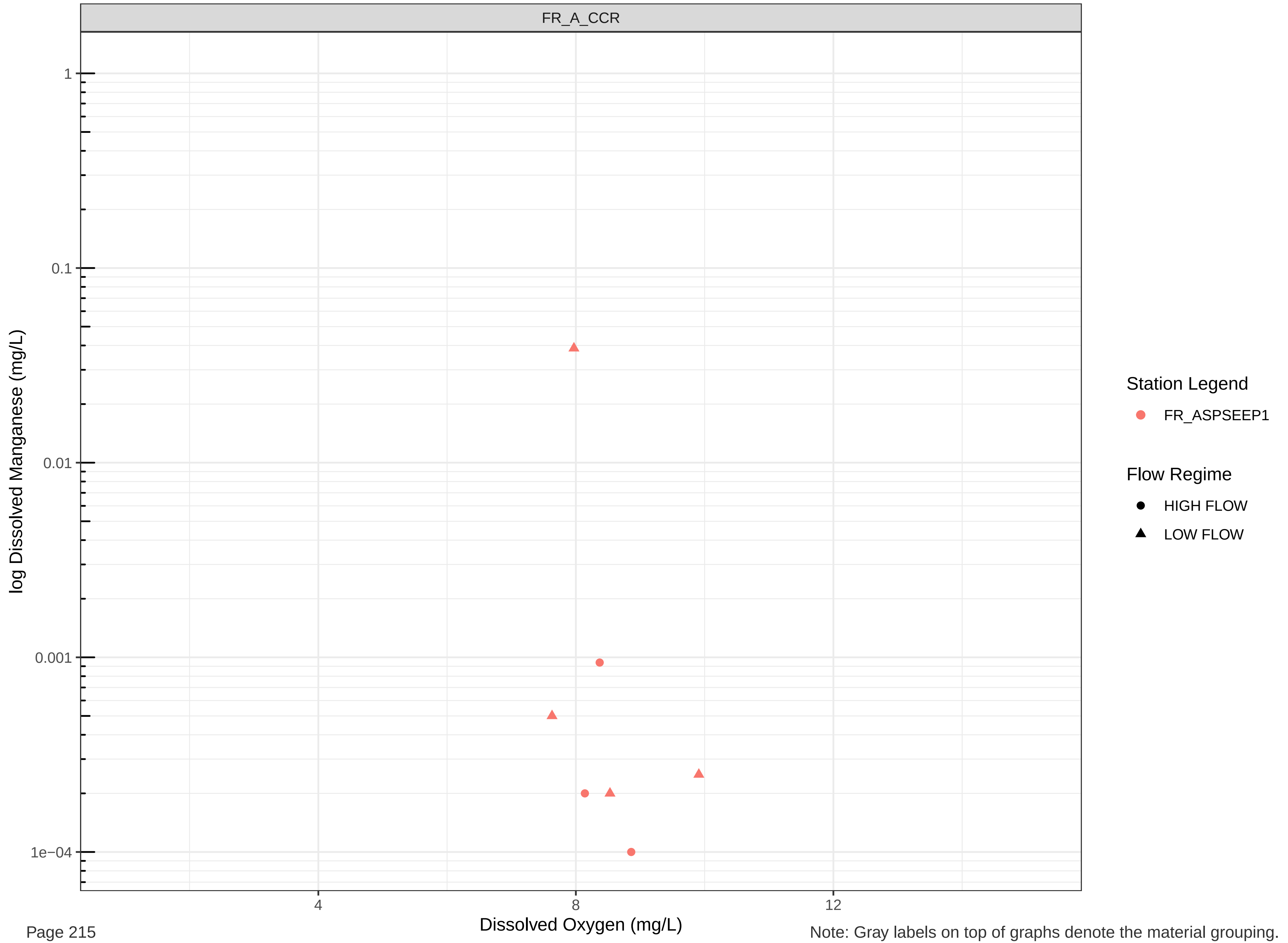

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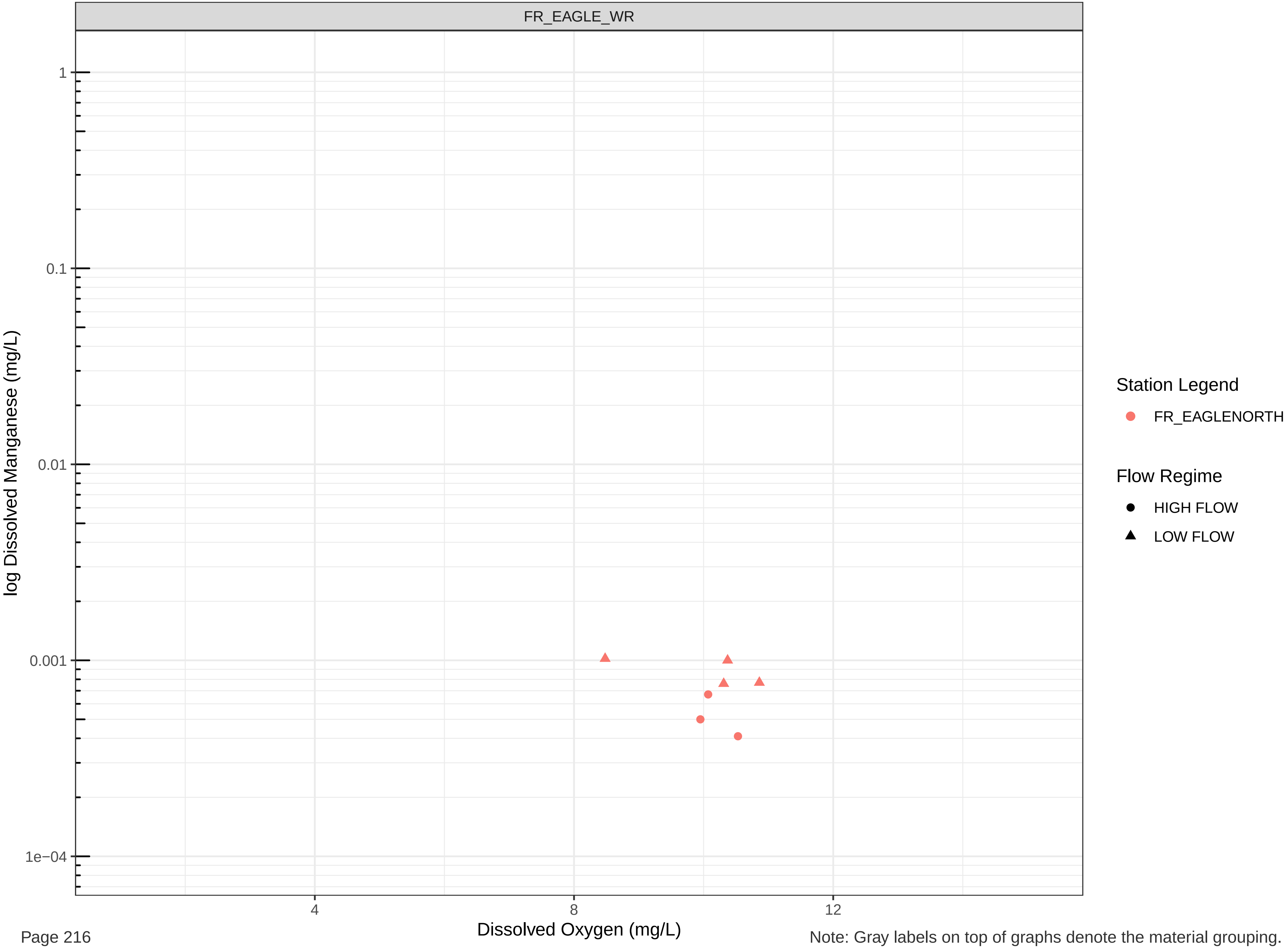

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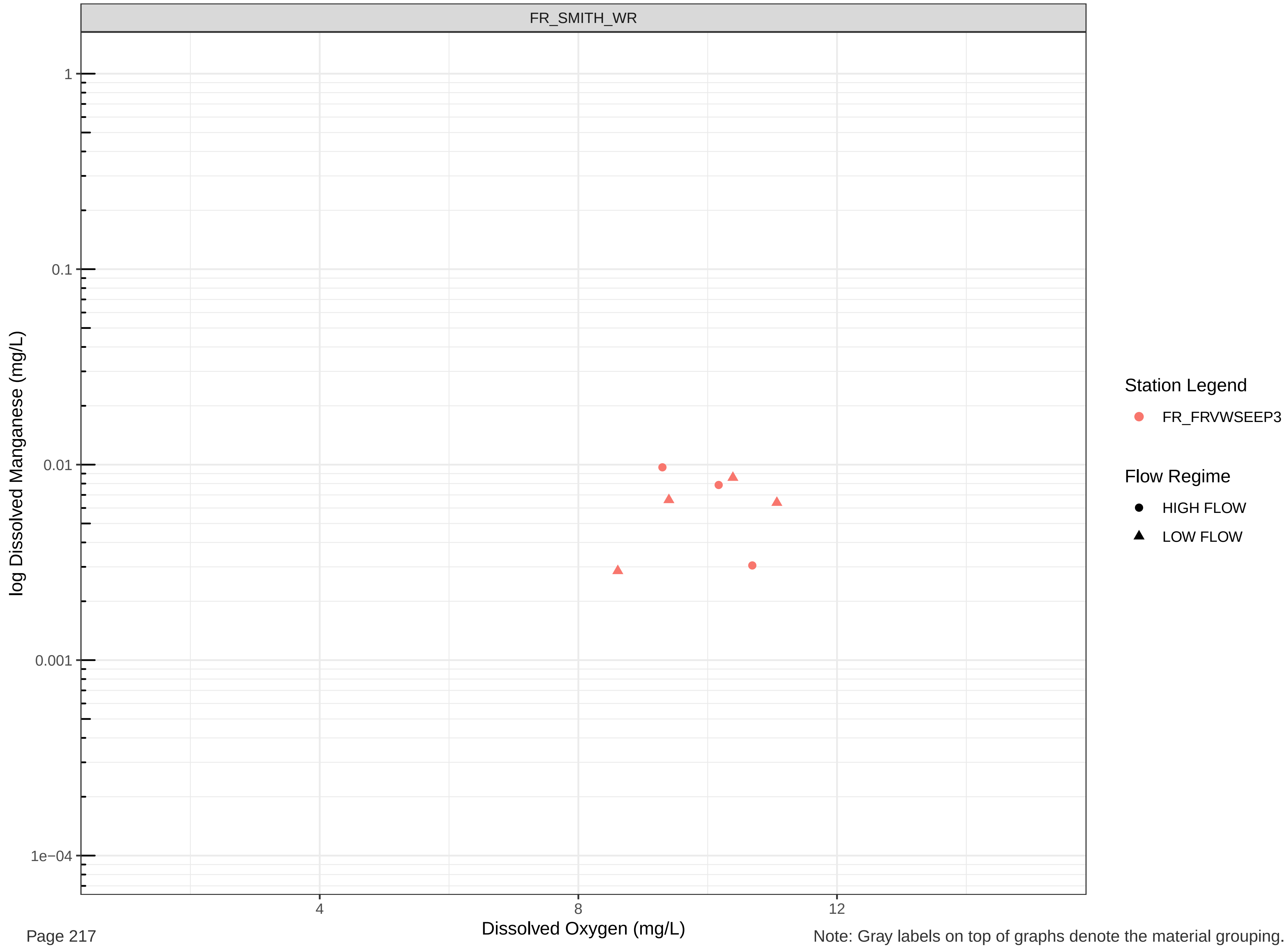

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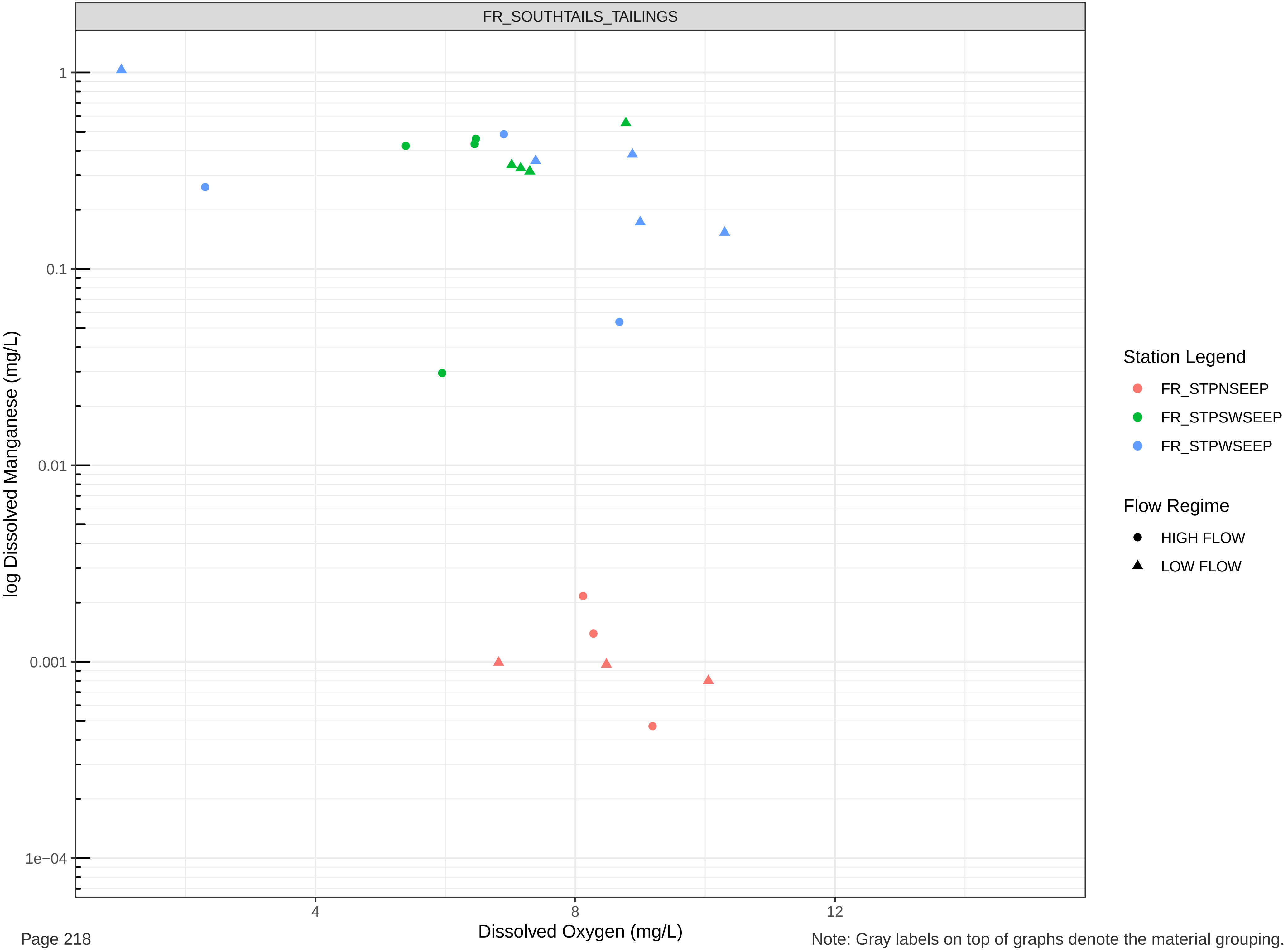

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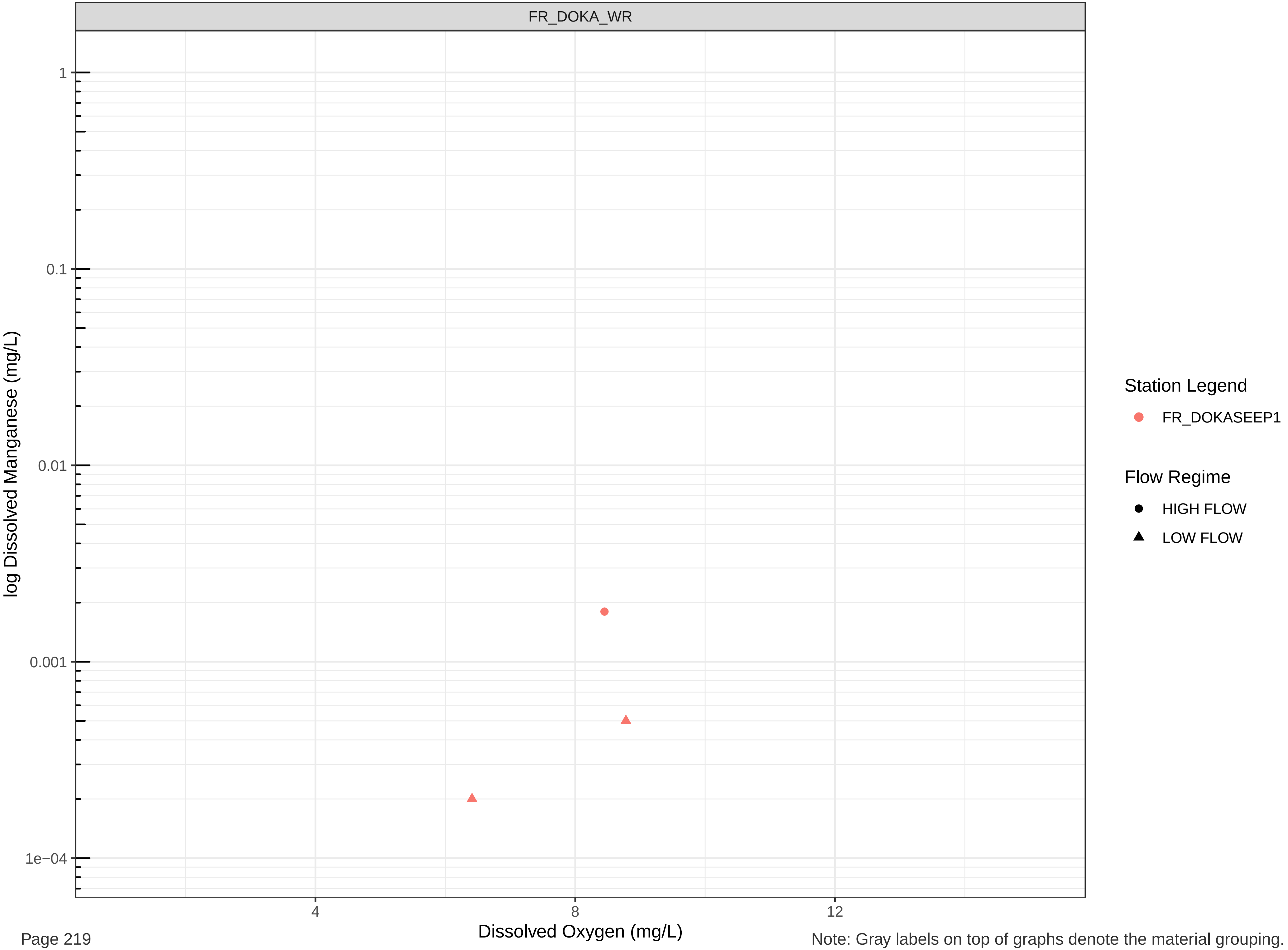

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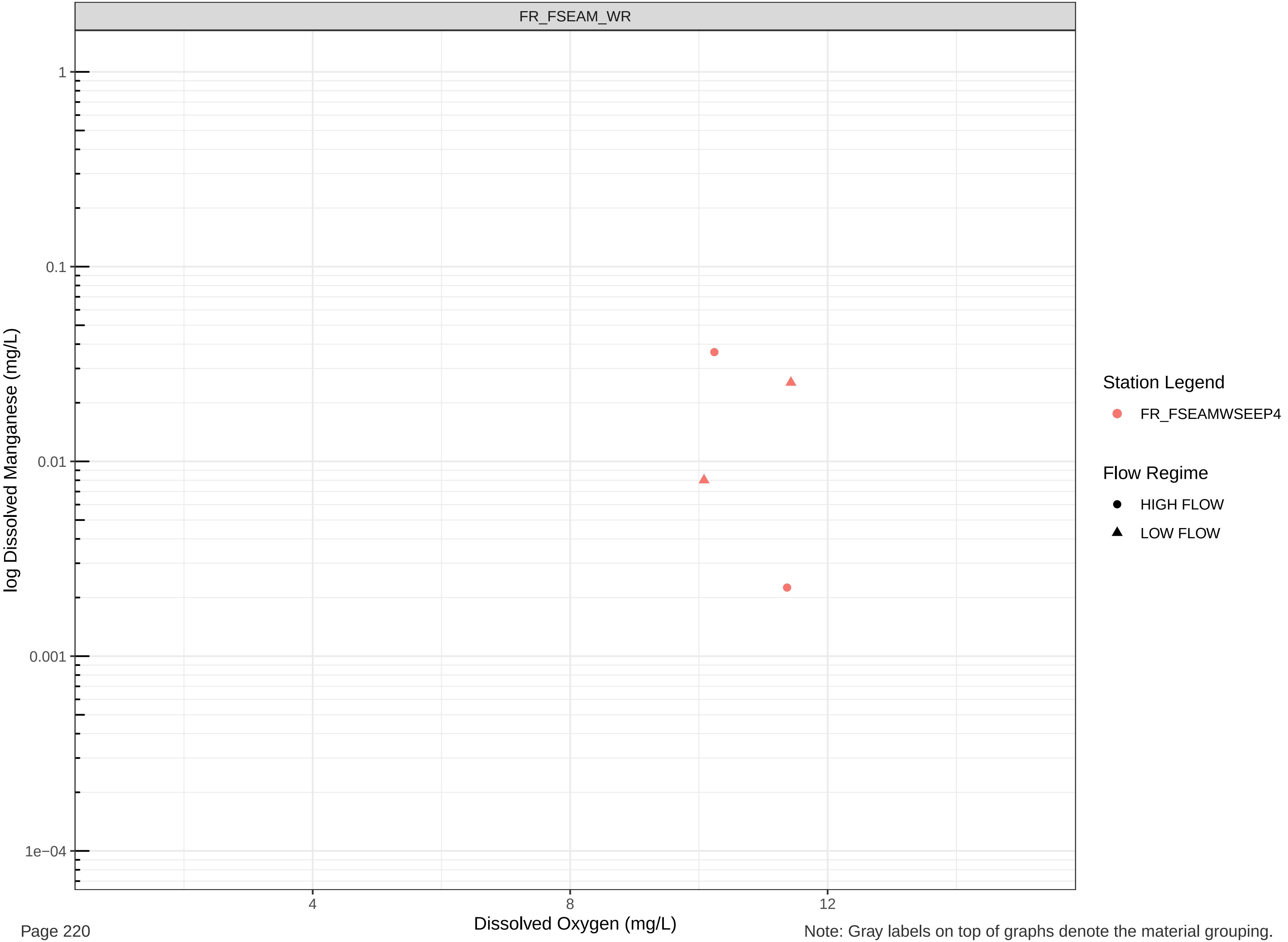

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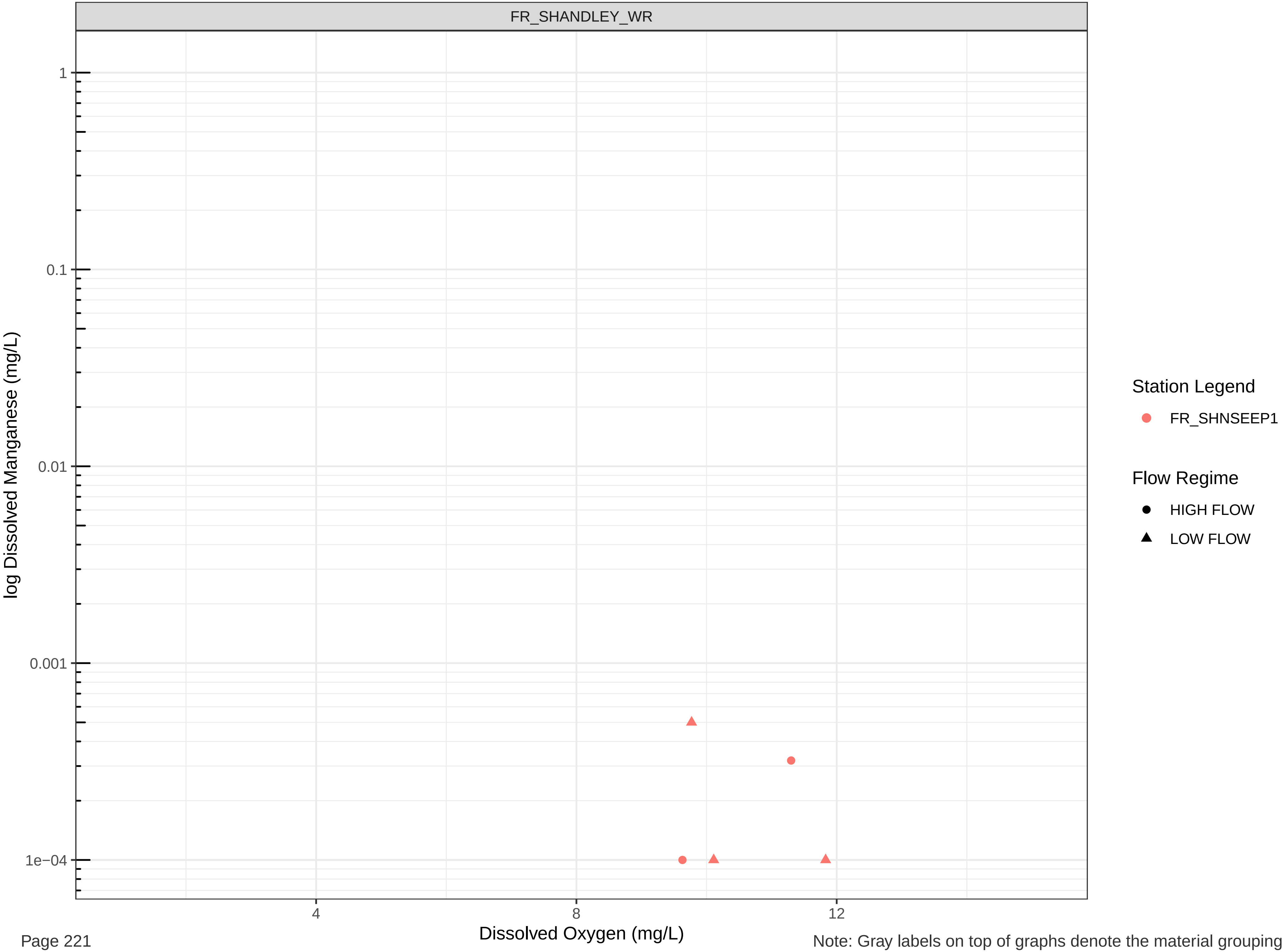

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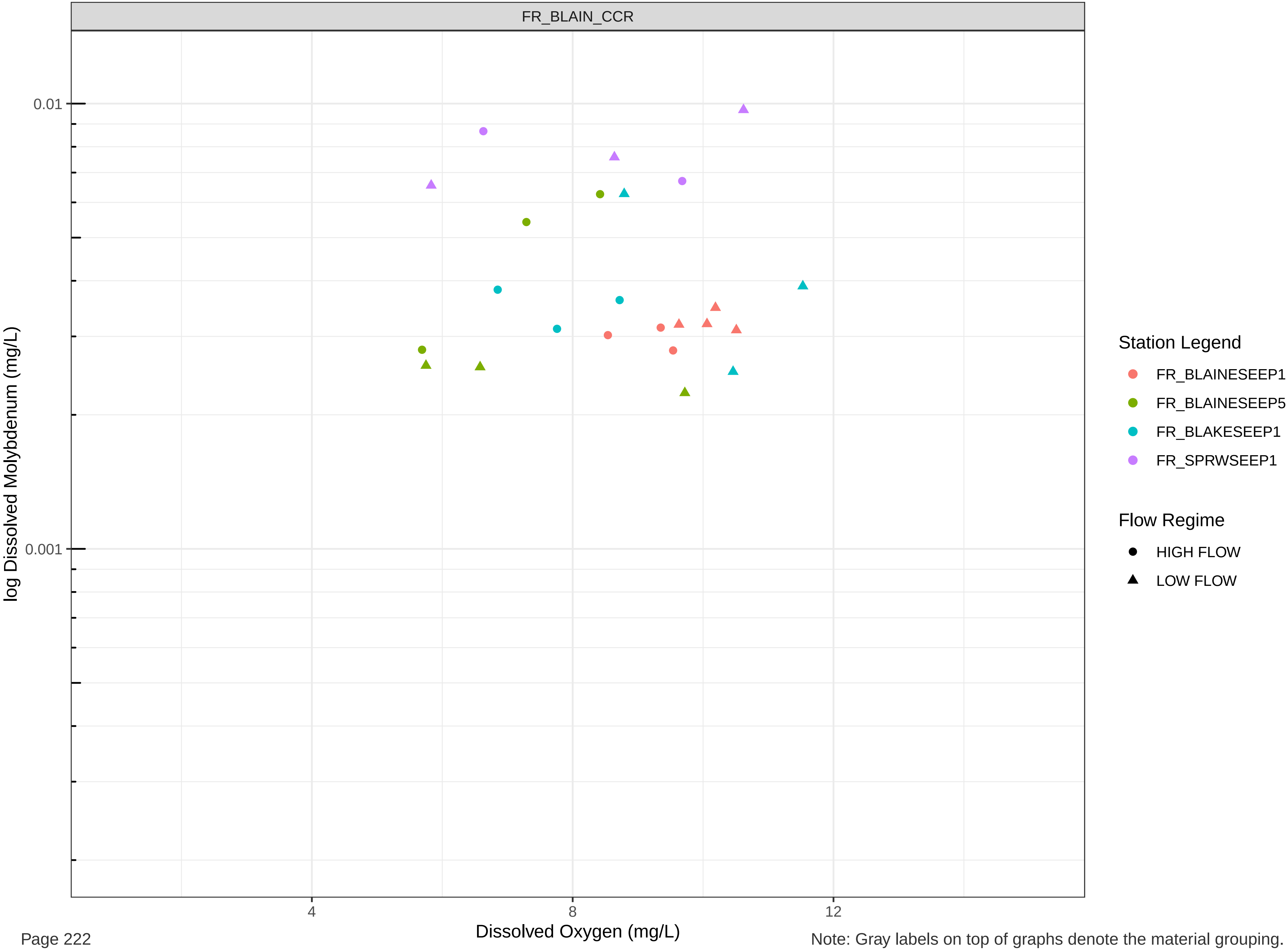

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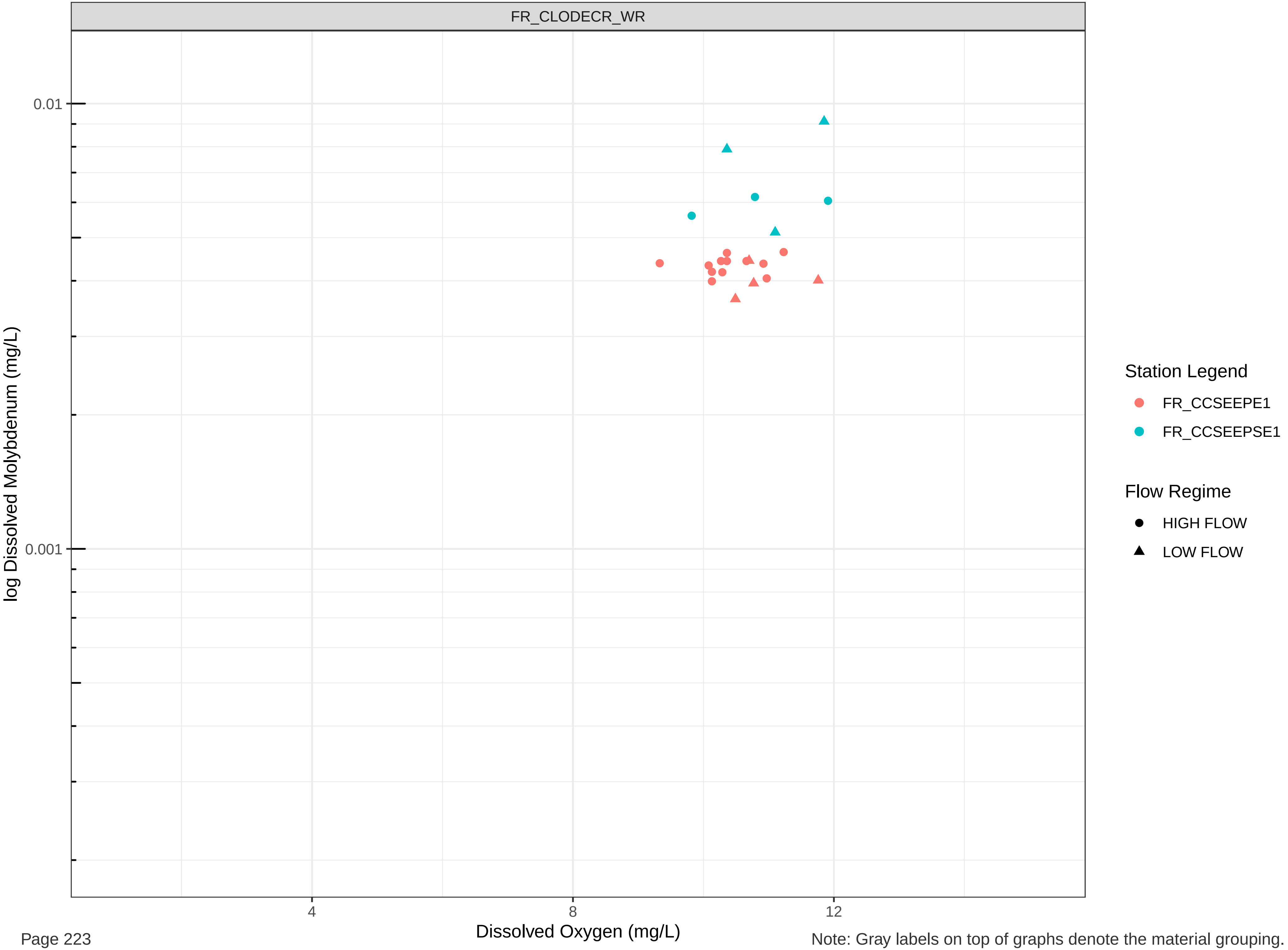

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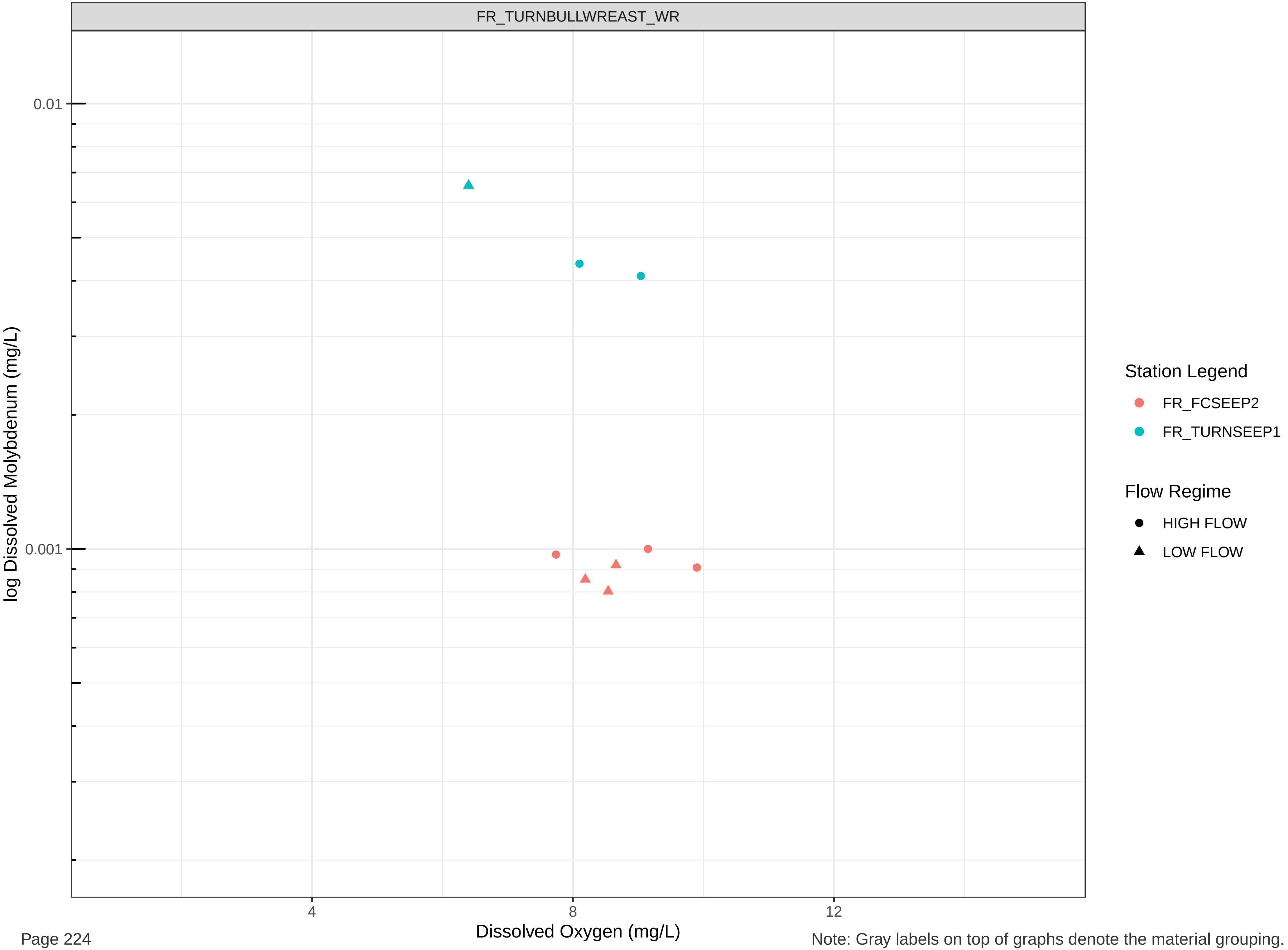

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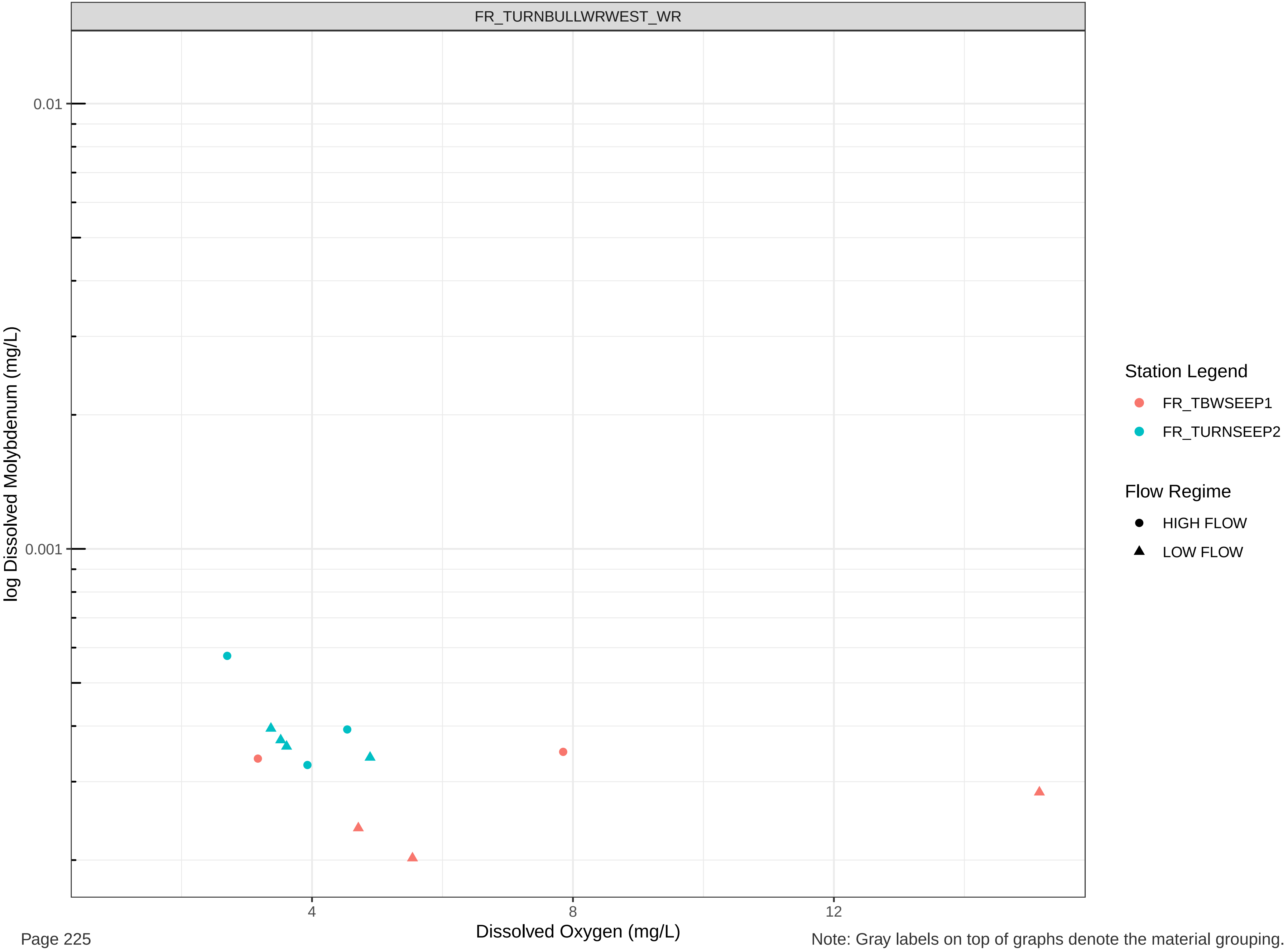

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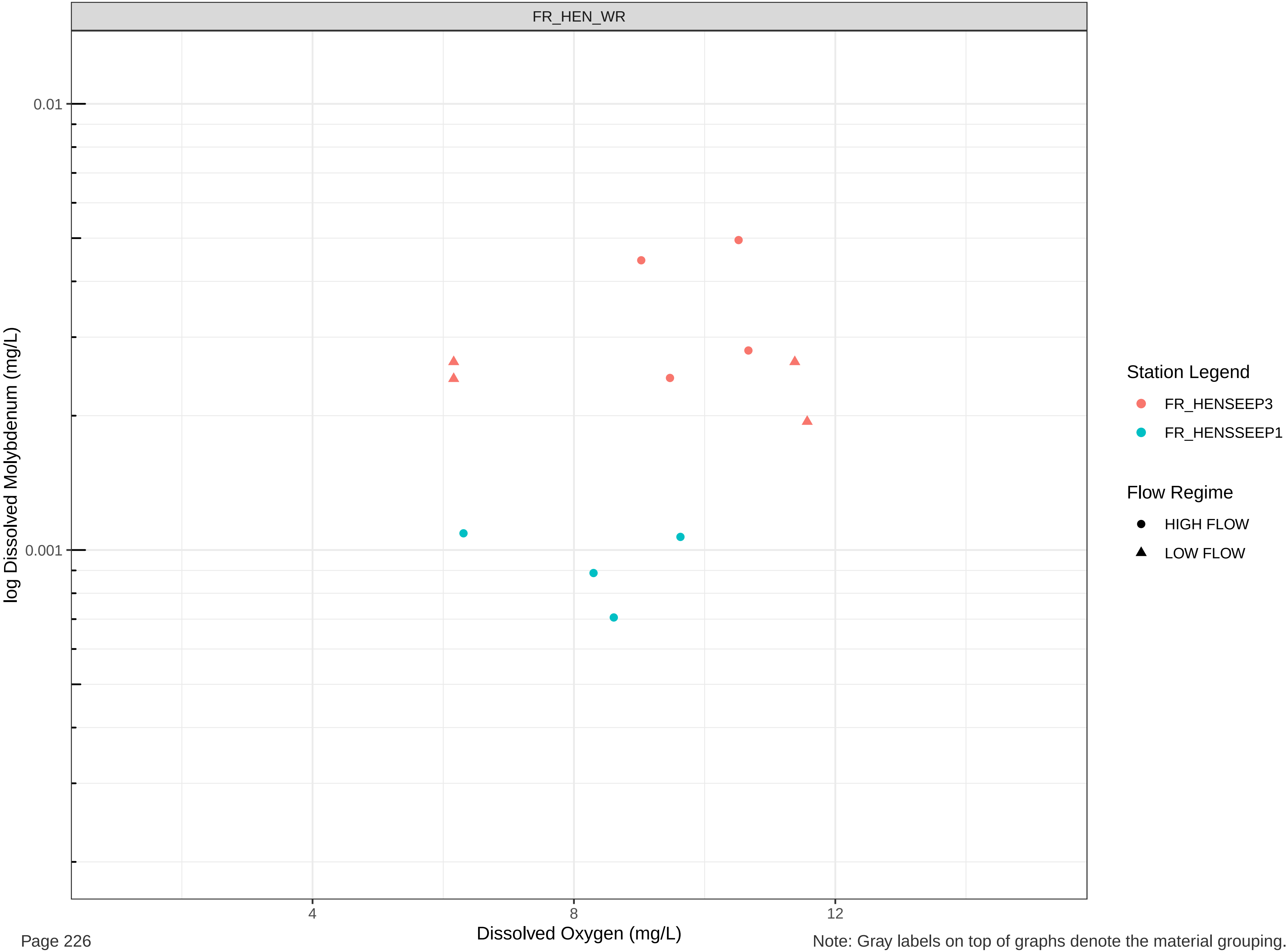
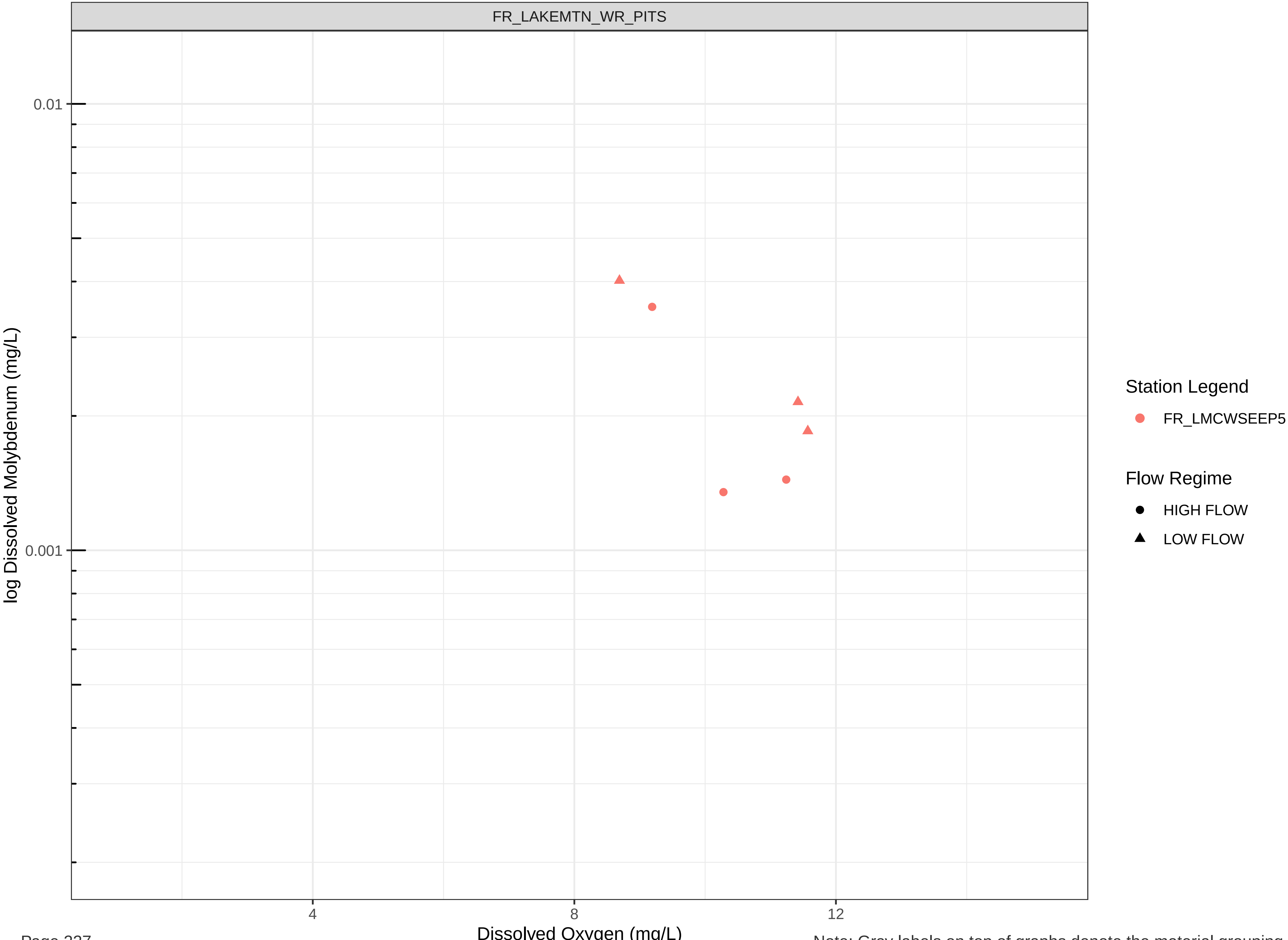

FR_HEN_WR
0.01
0.001
log Dissolved Molybdenum (mg/L)
4
8
12
Dissolved Oxygen (mg/L)
Station Legend
FR_HENSEEP3
FR_HENSSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



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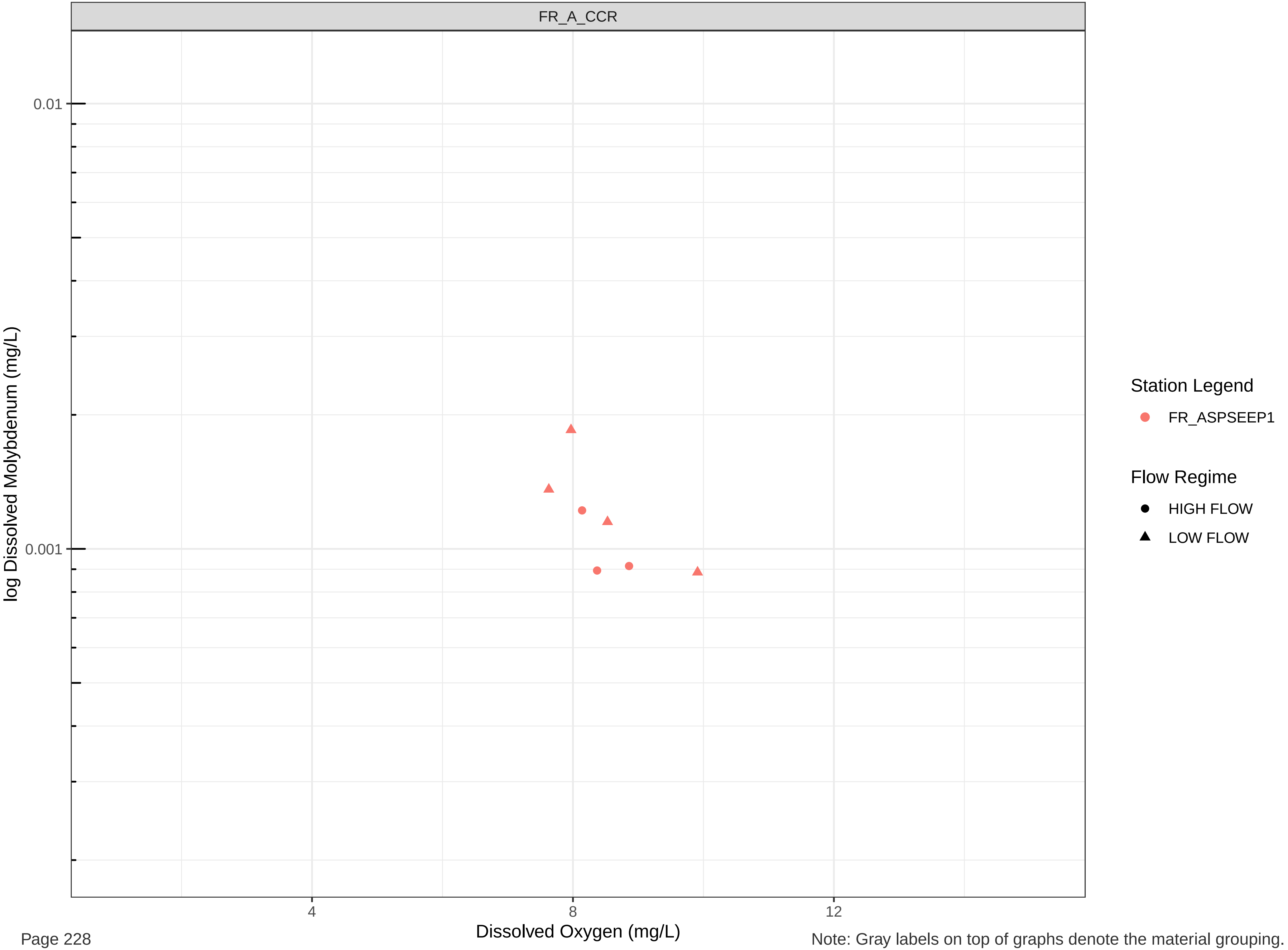

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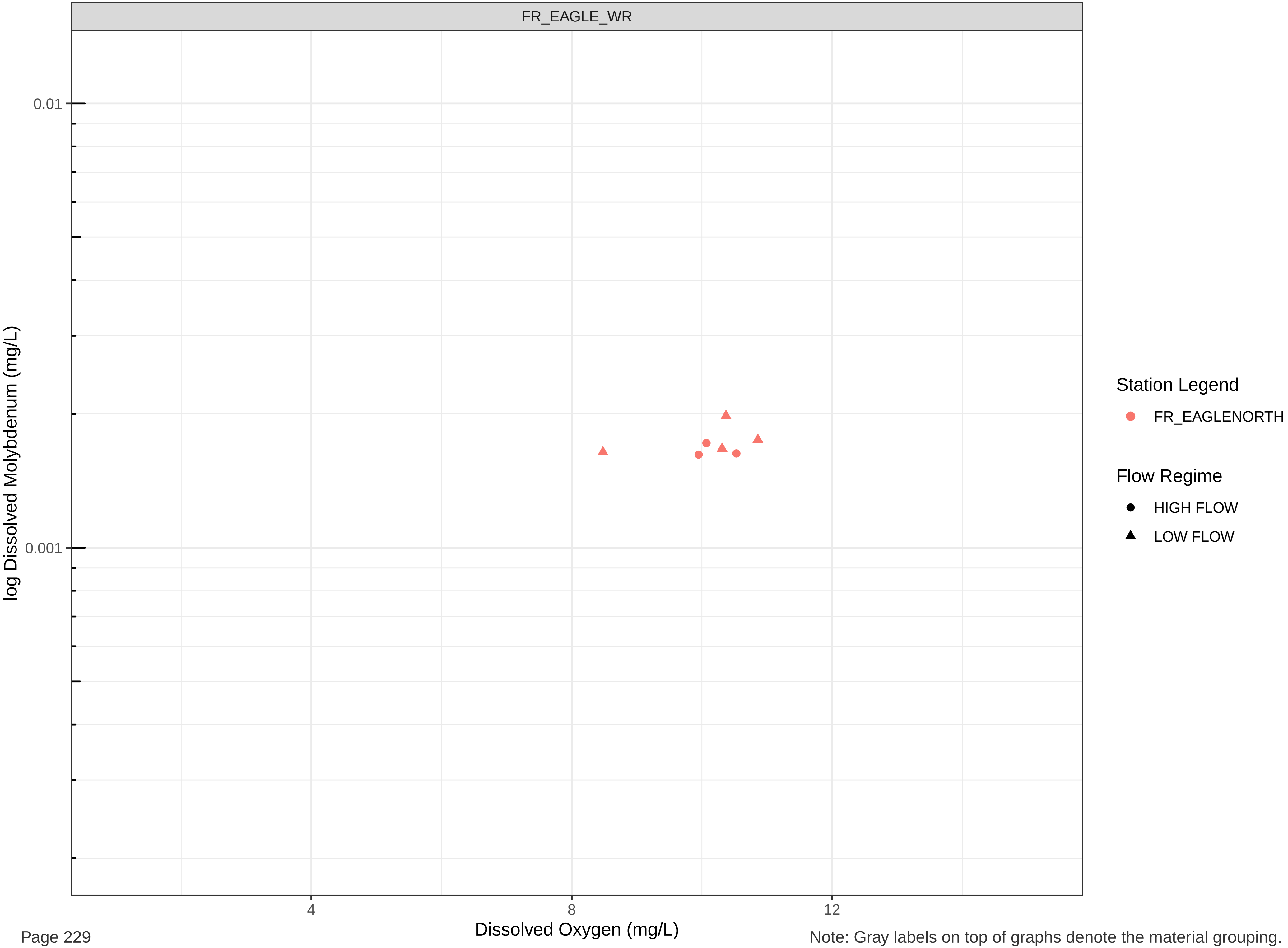

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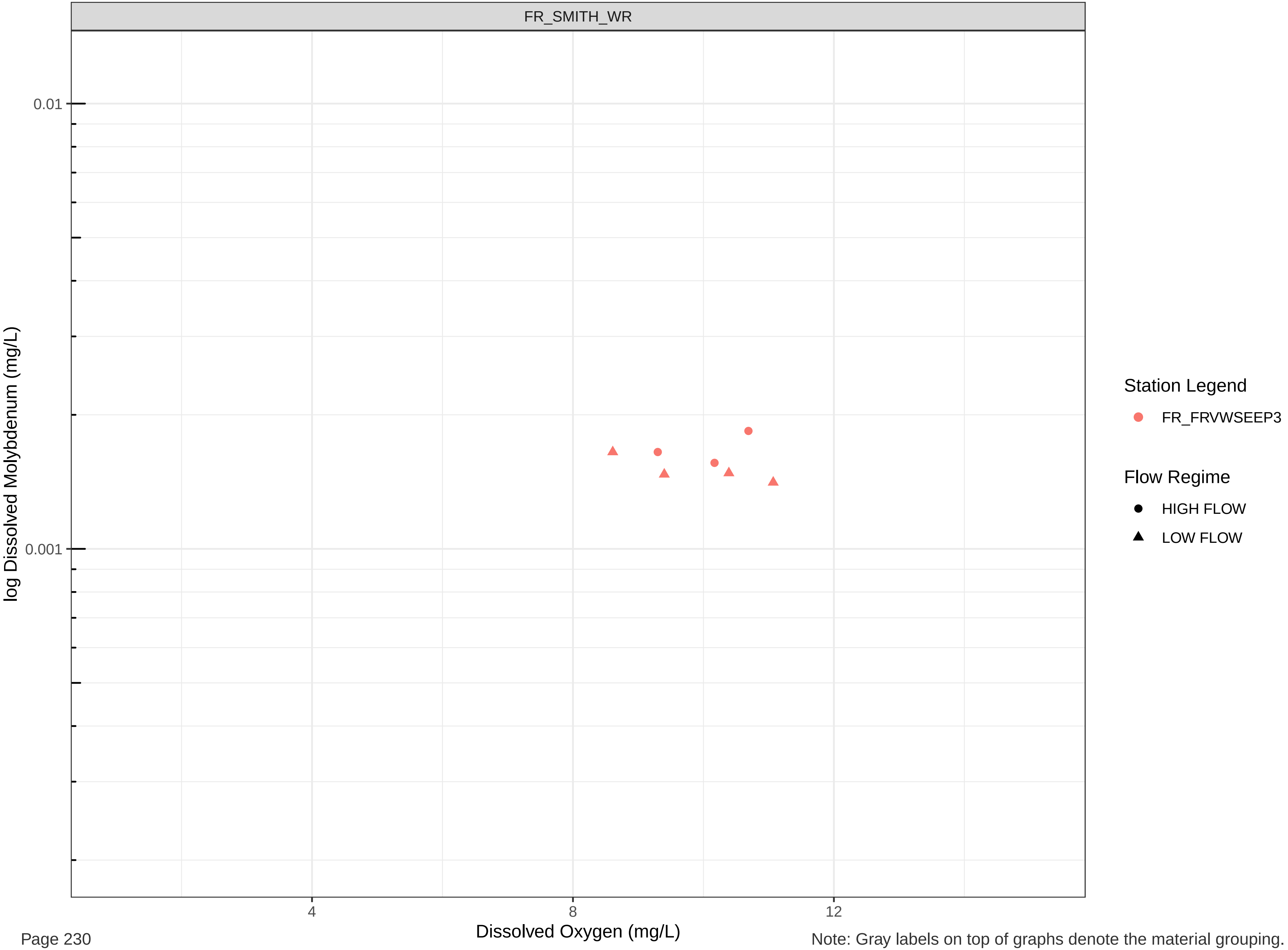

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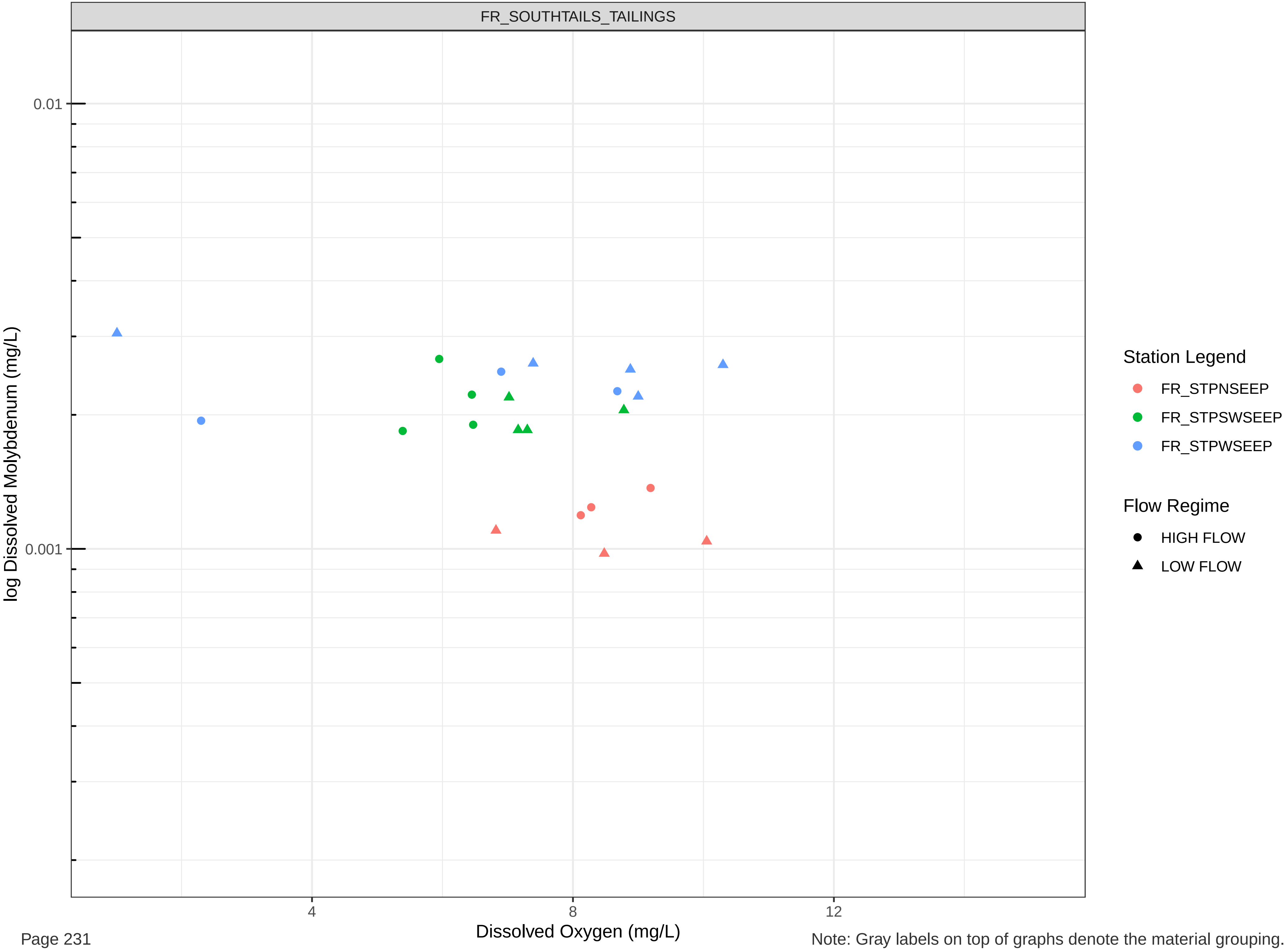

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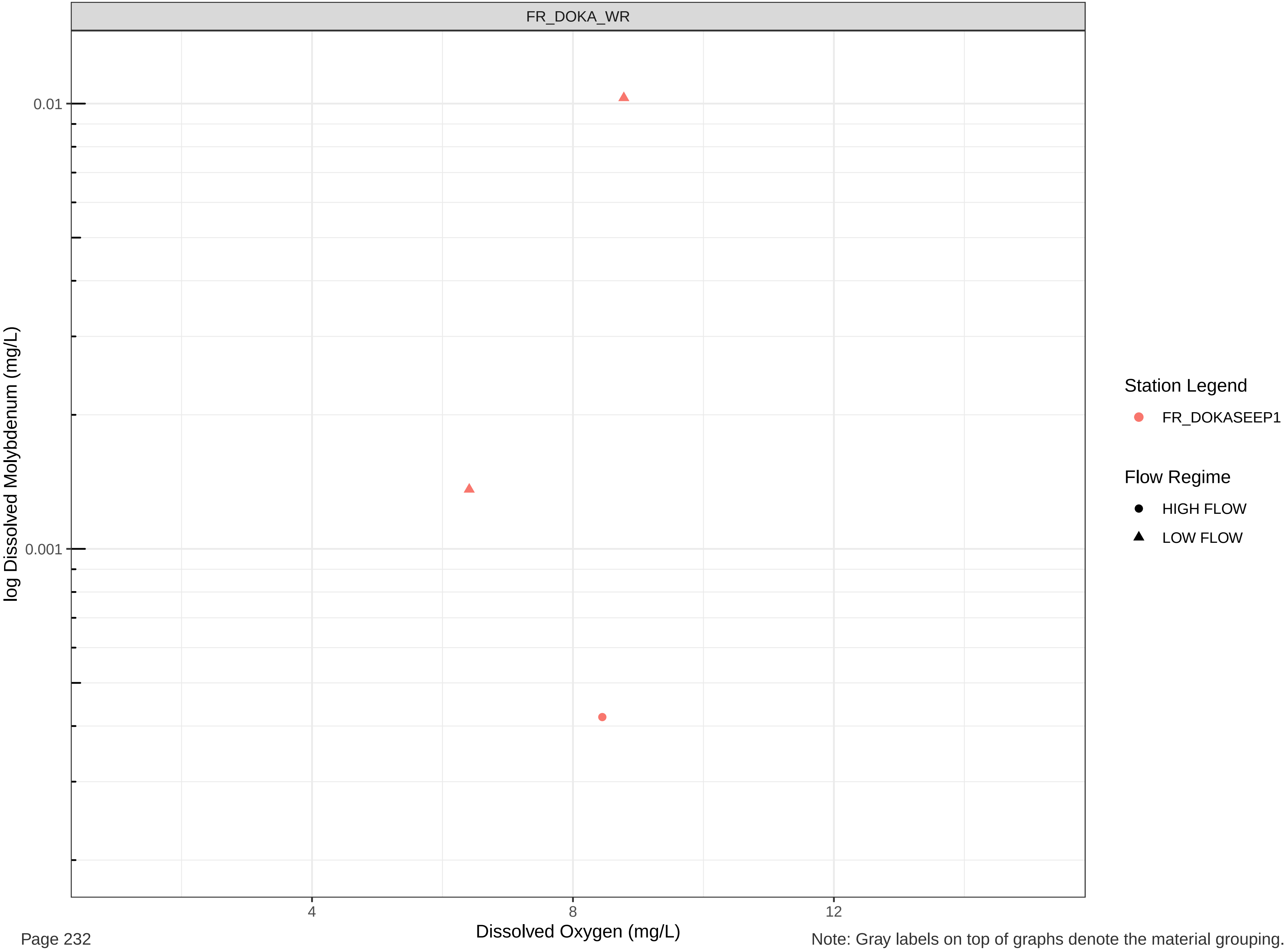

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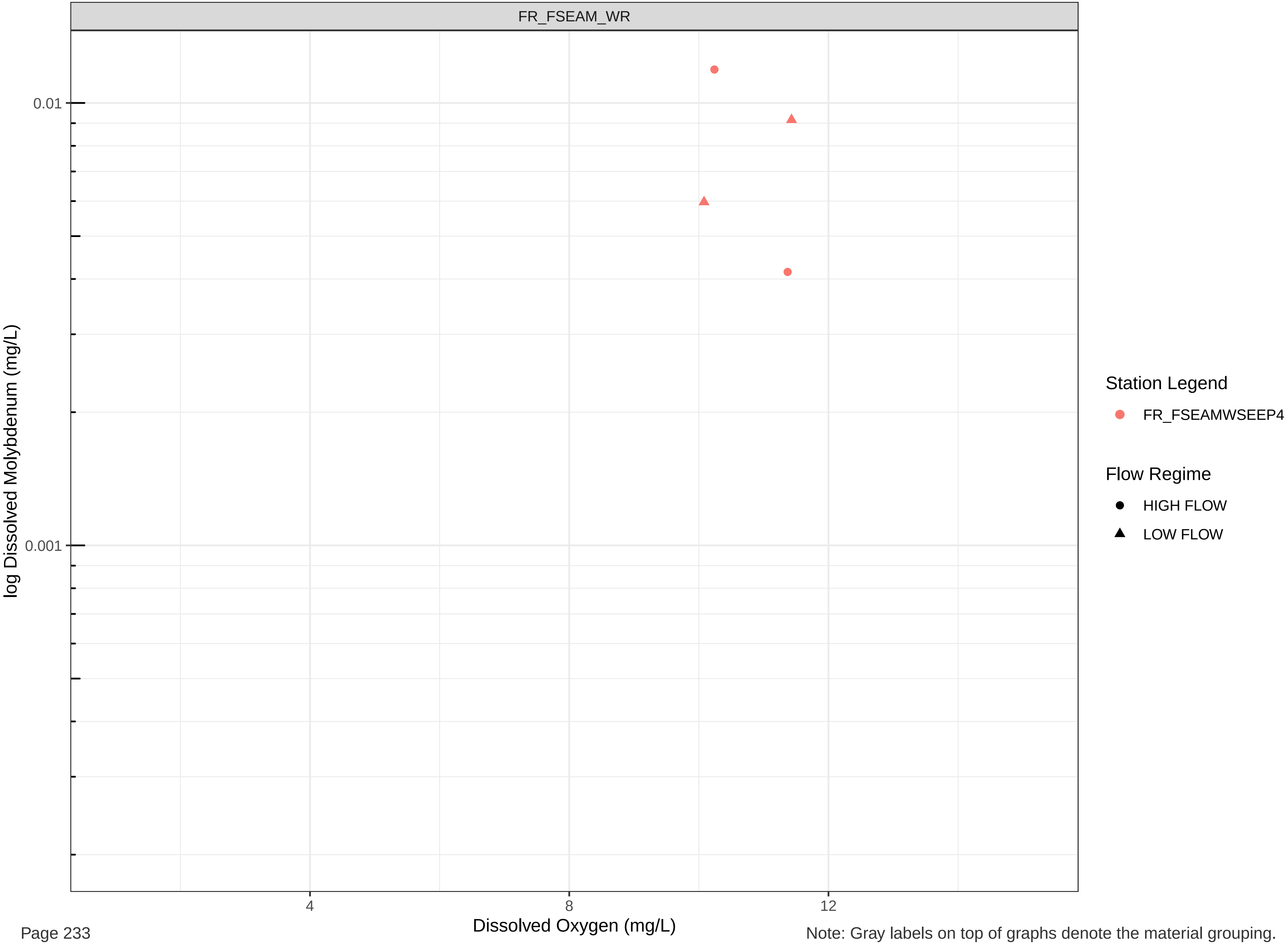

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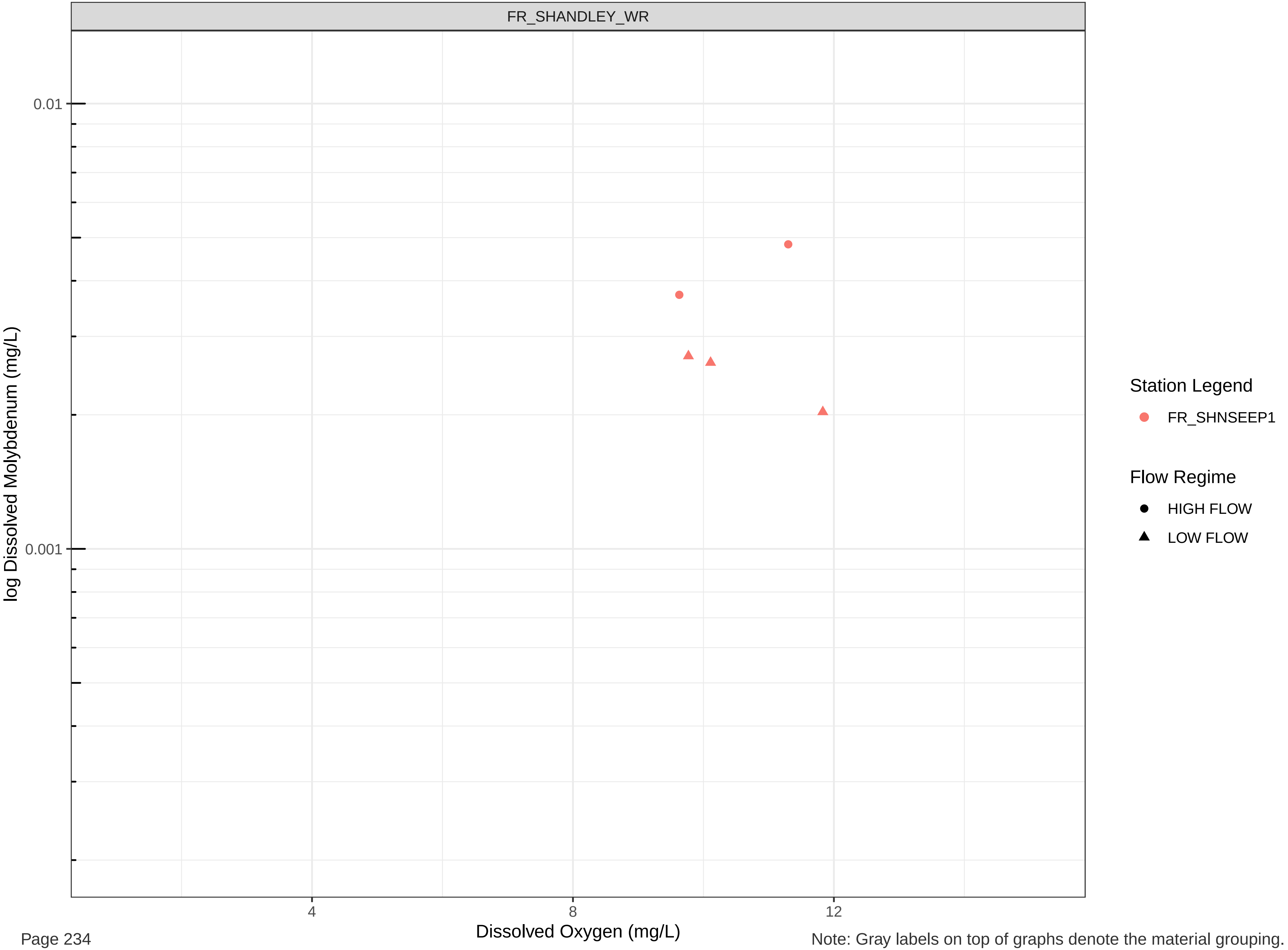

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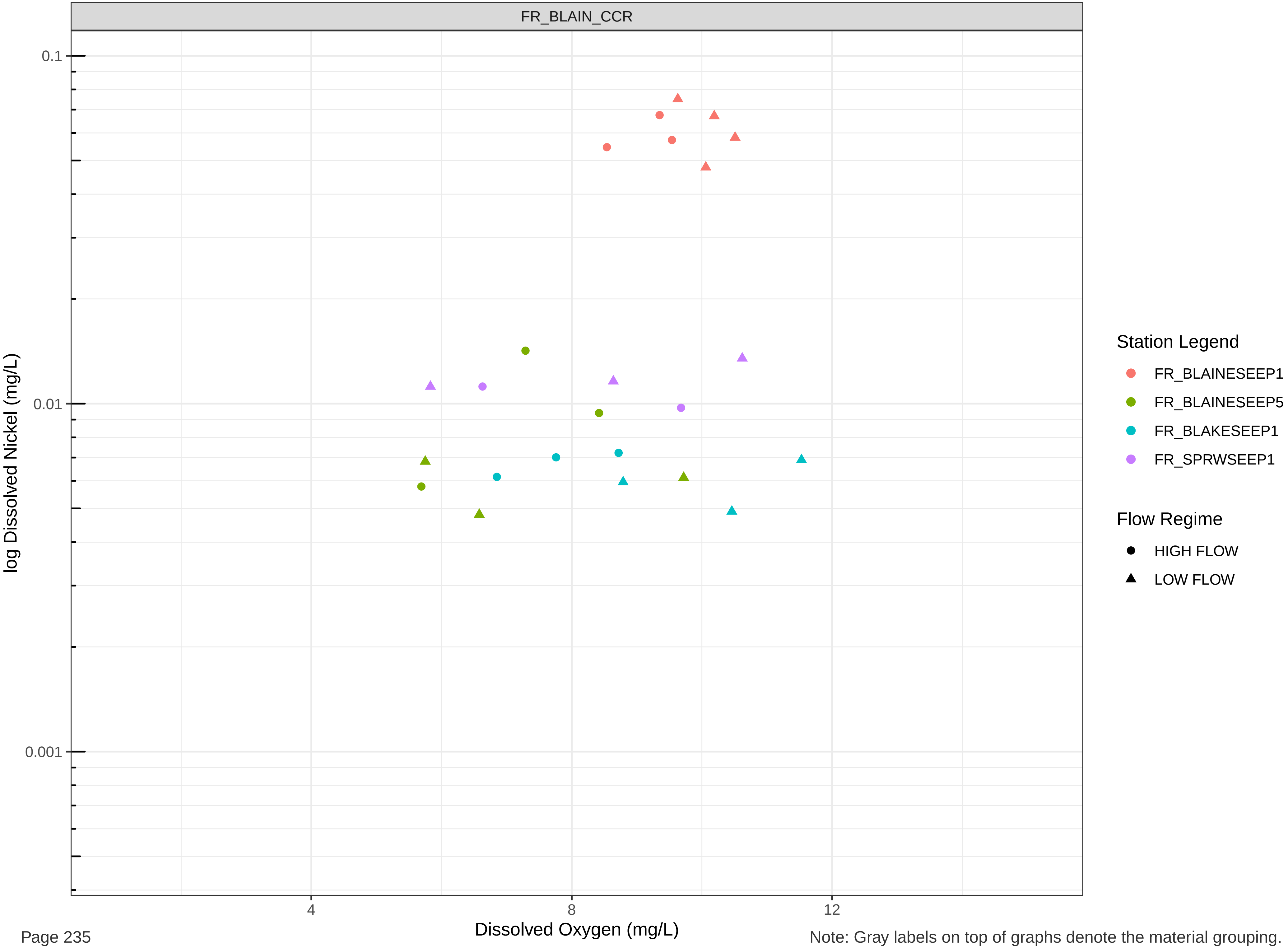

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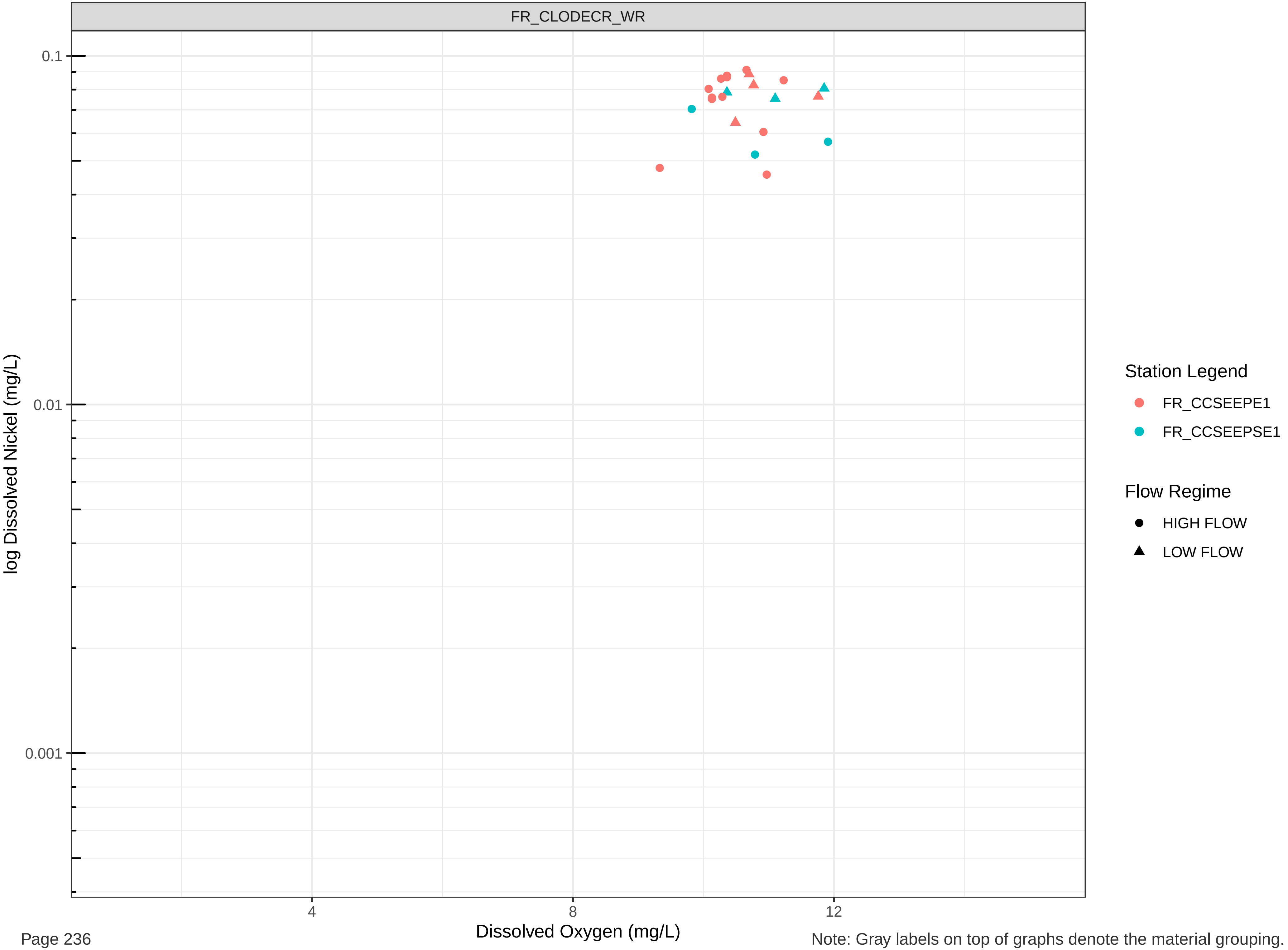

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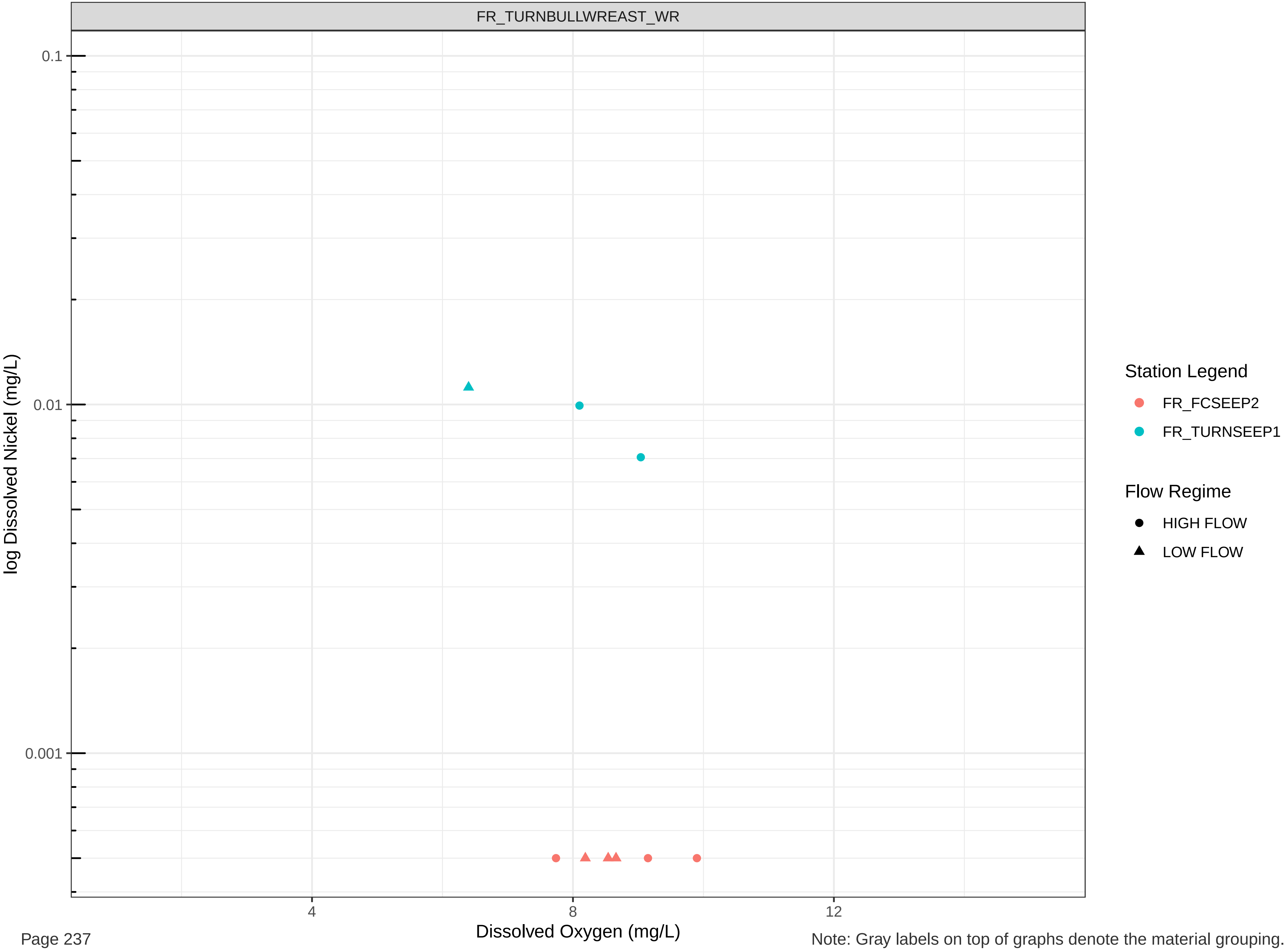

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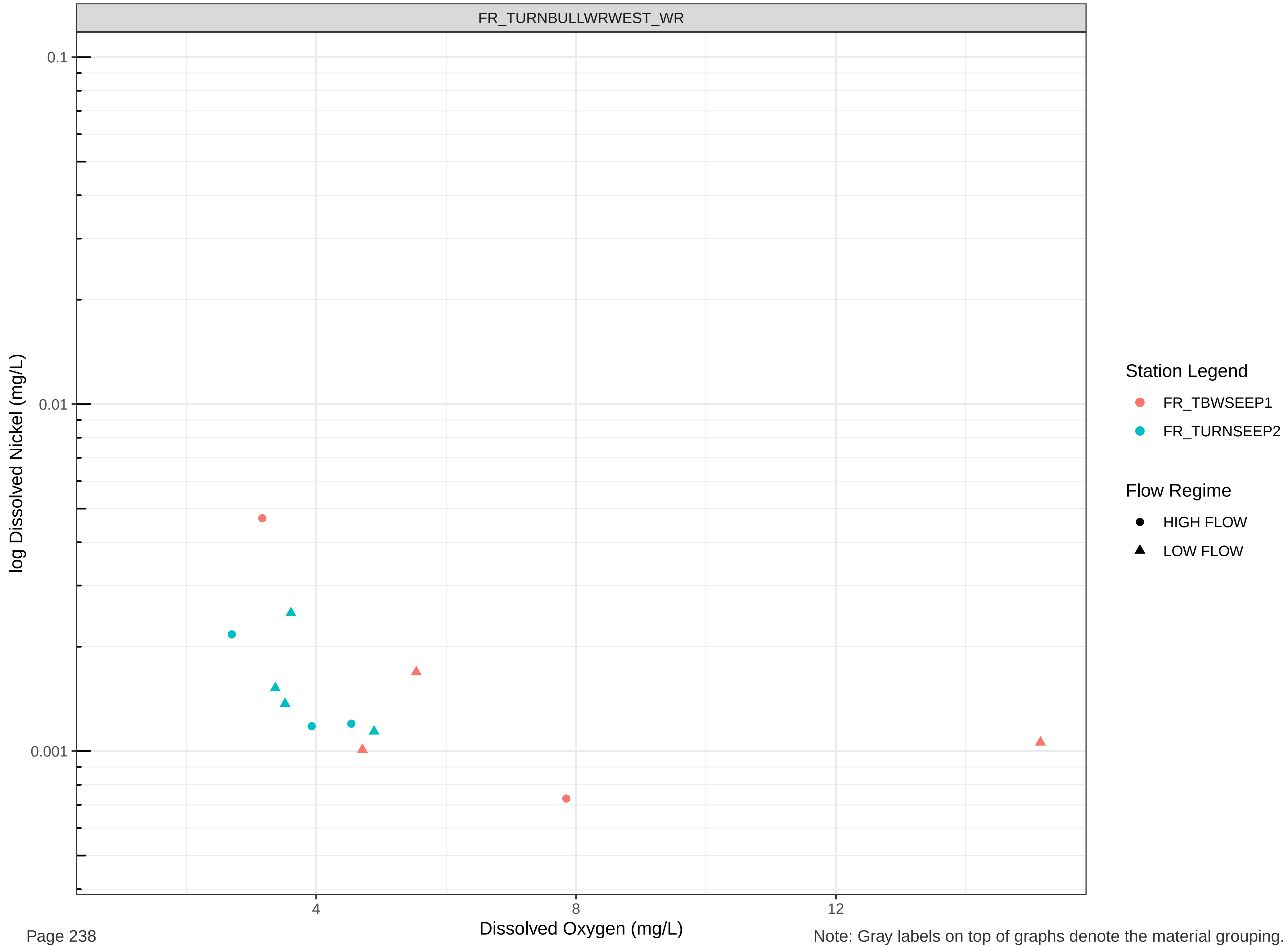

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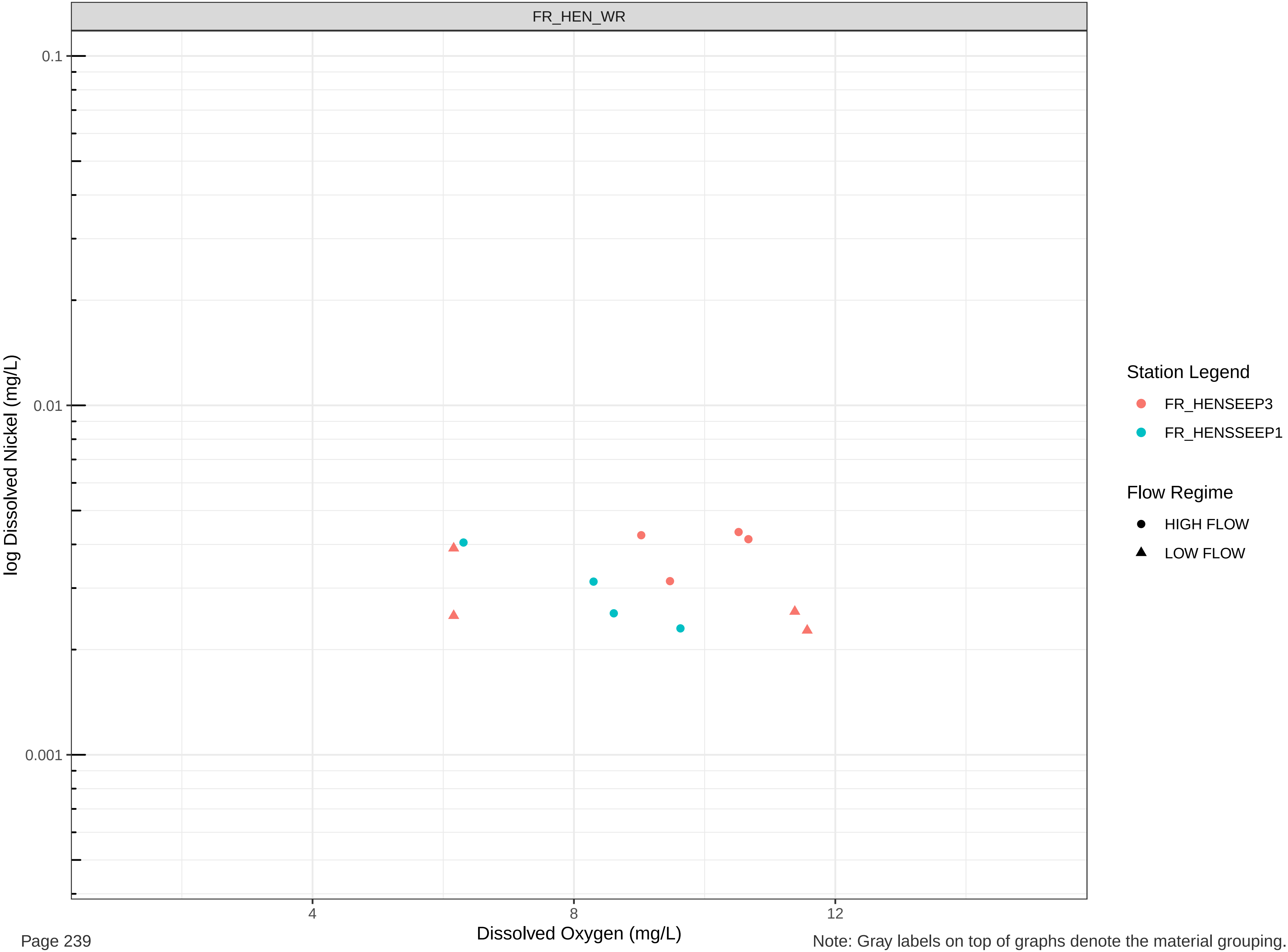

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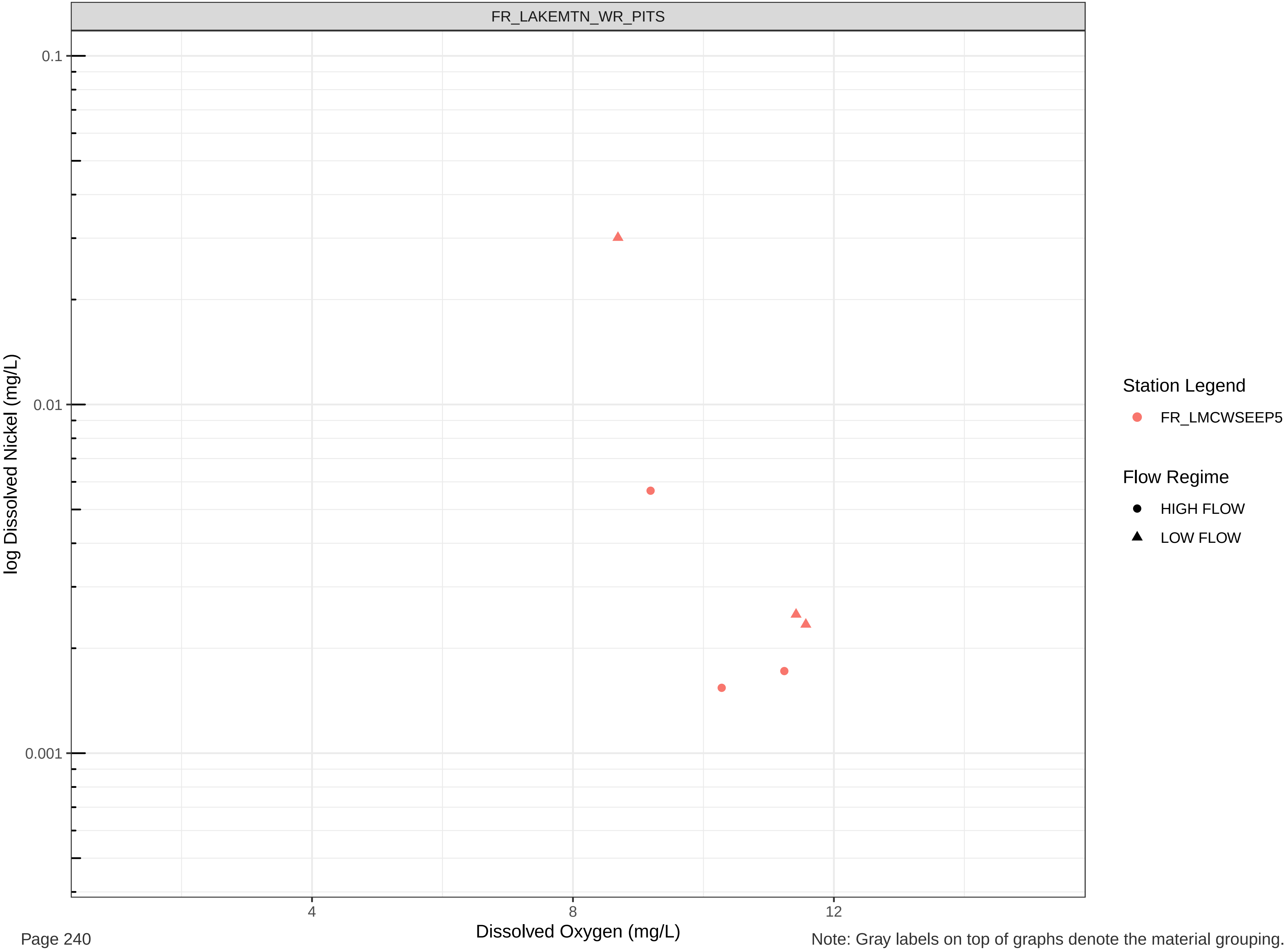

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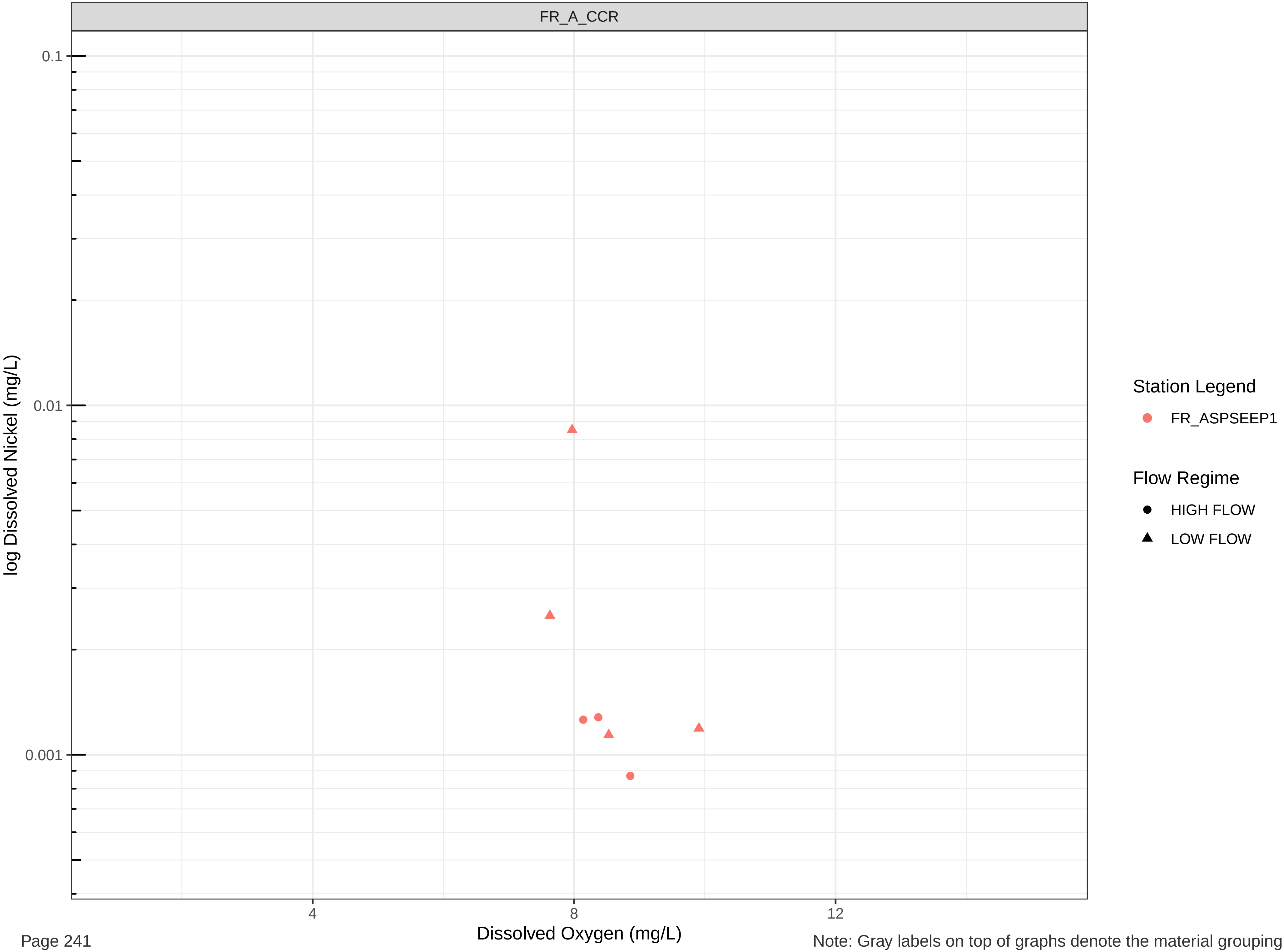

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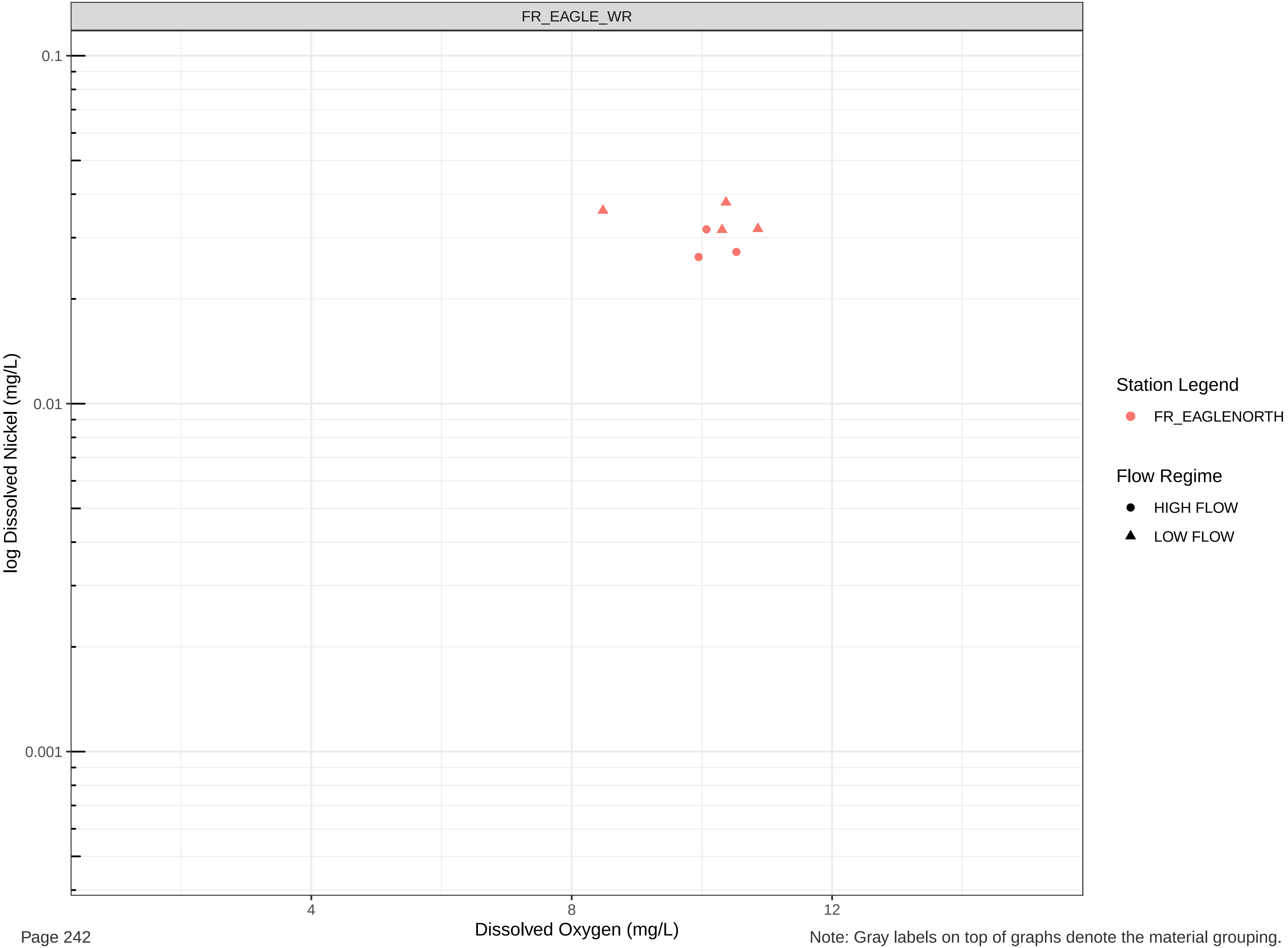

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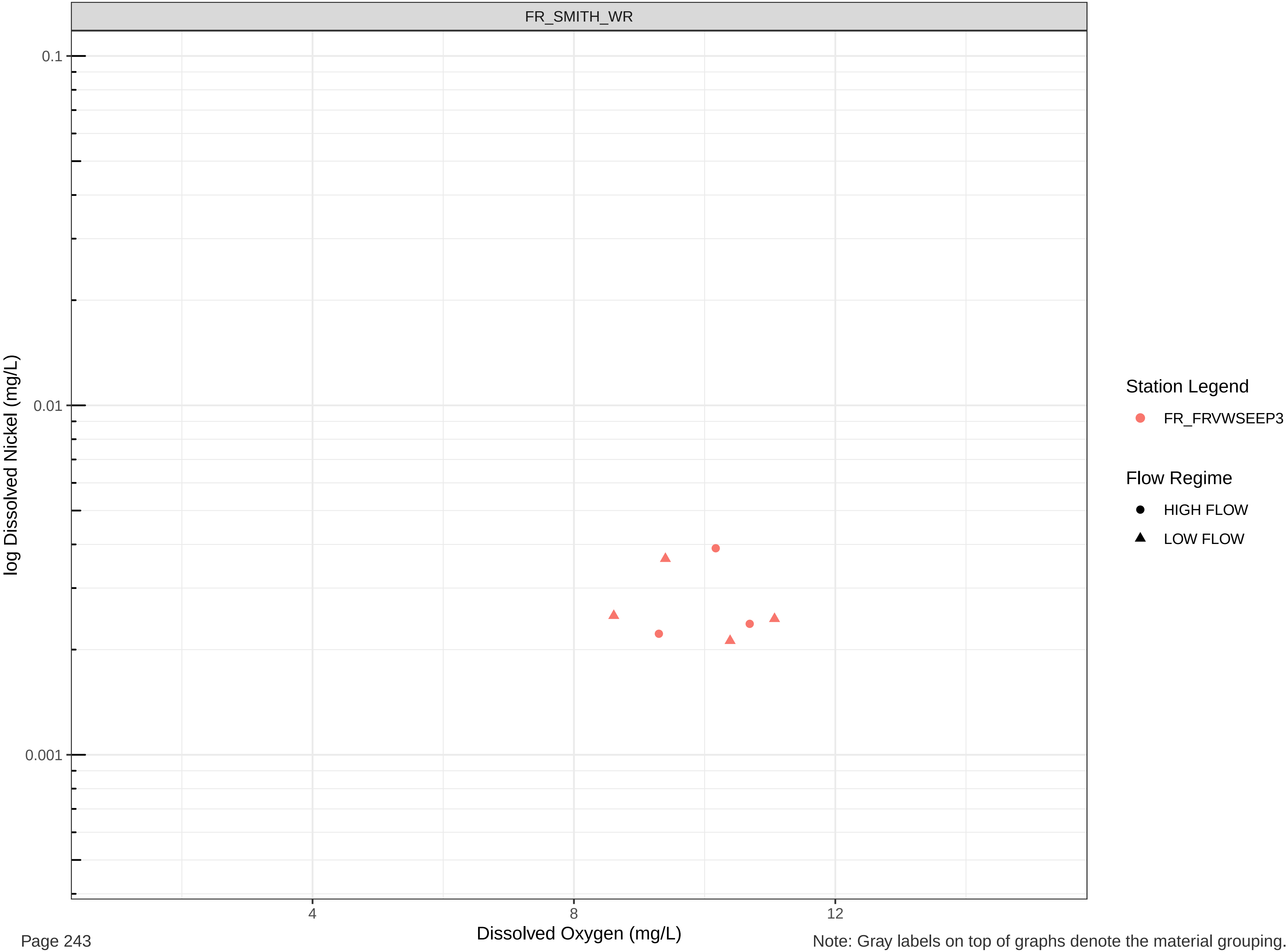

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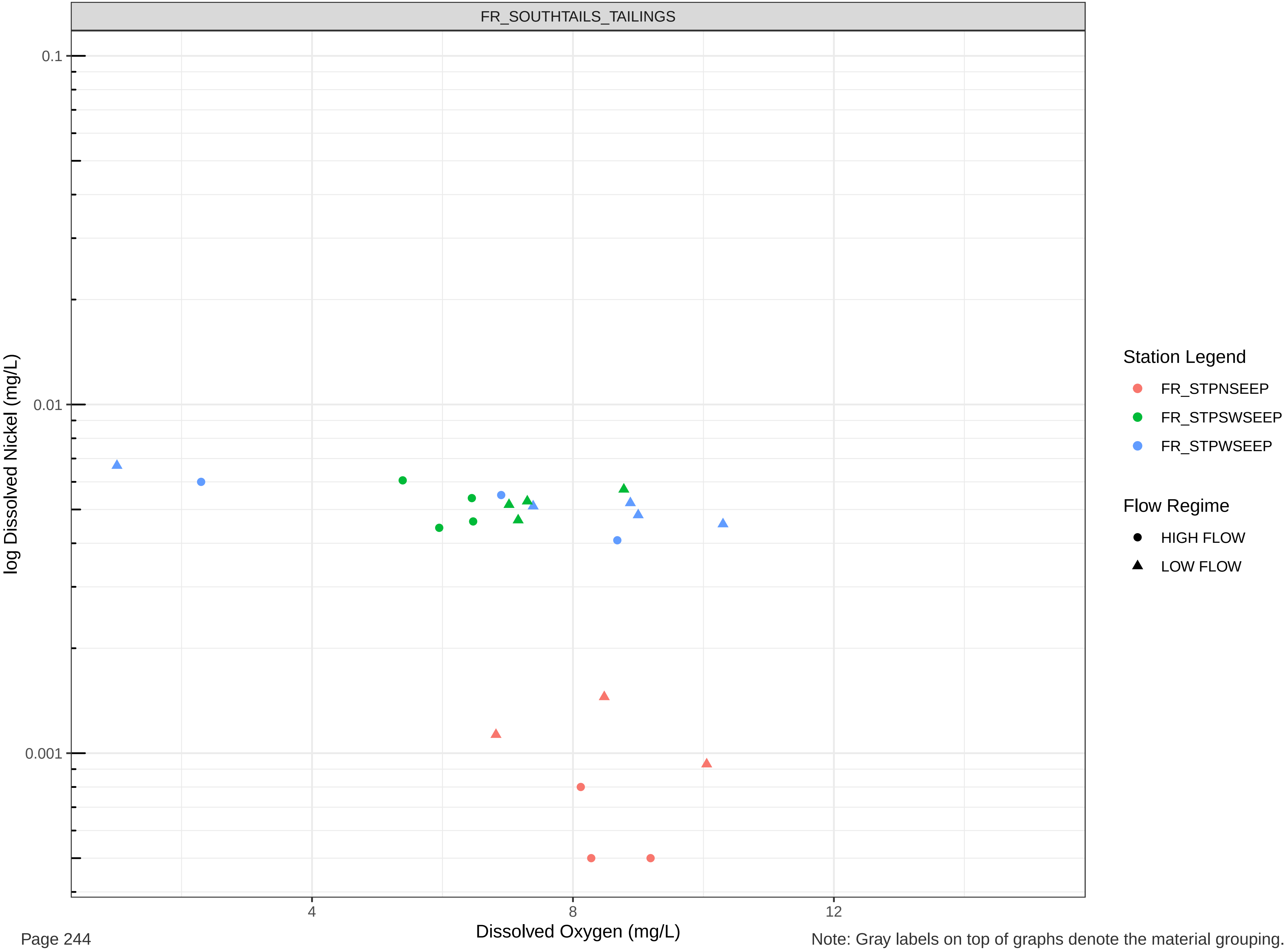

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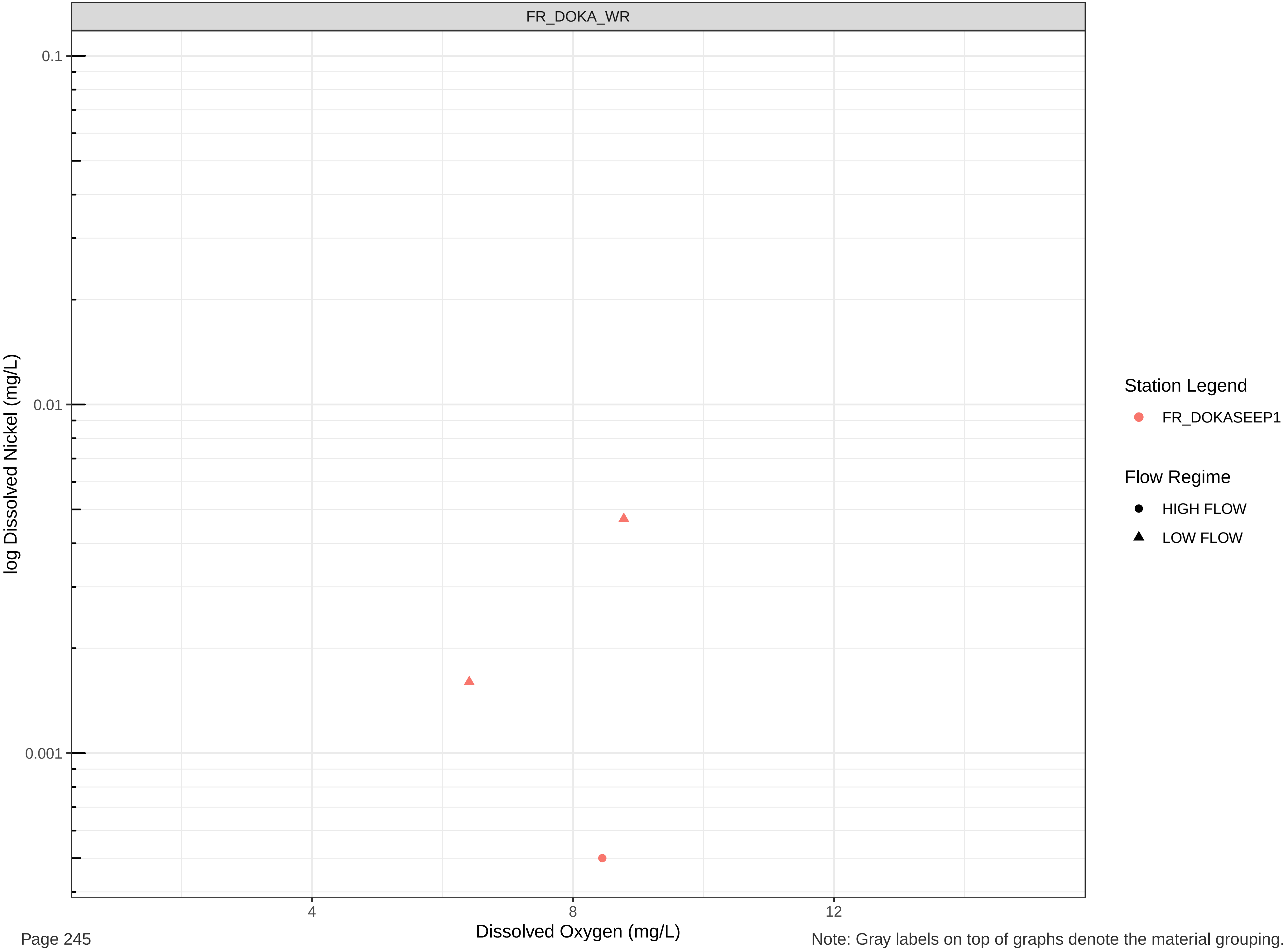

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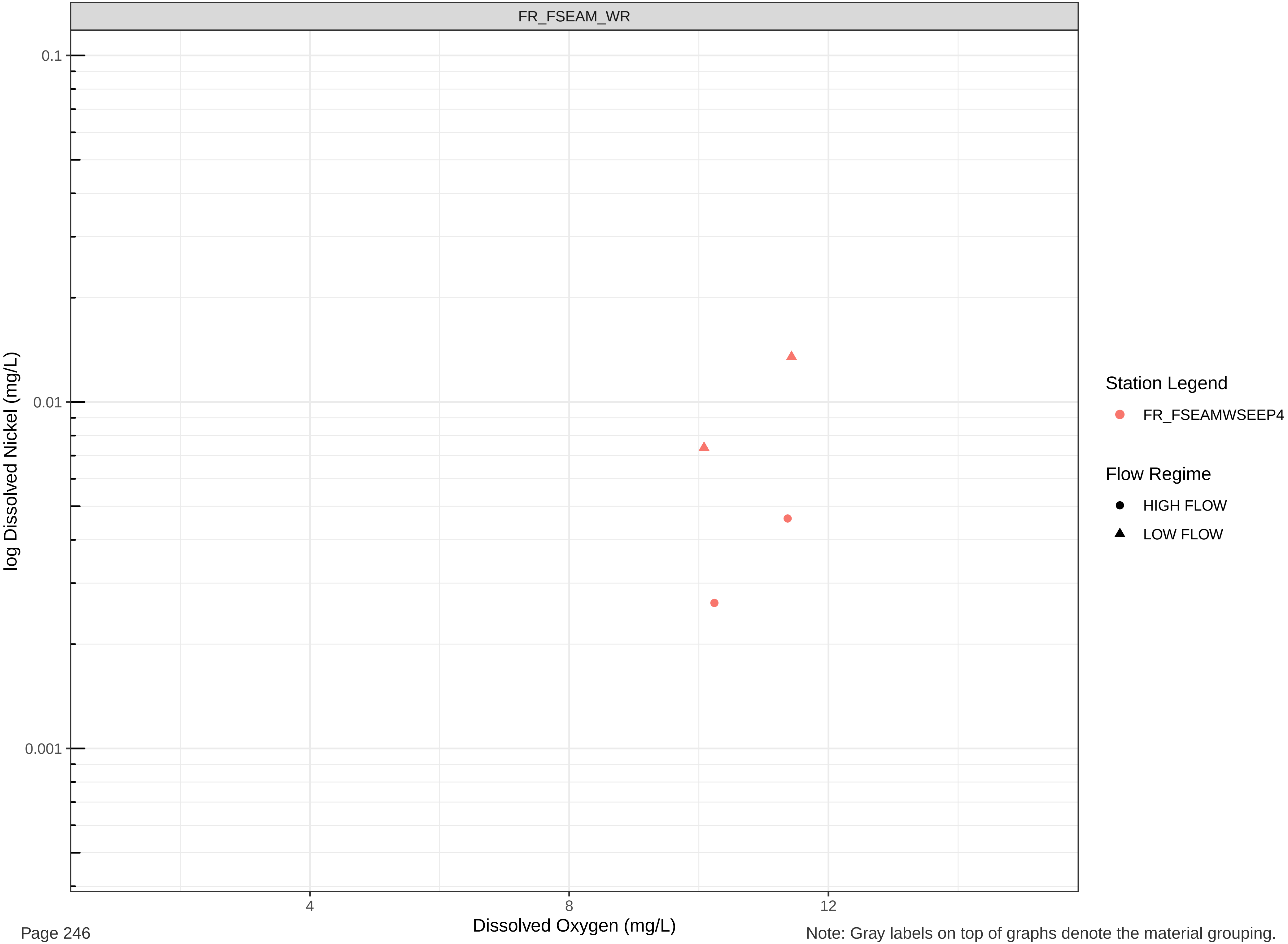

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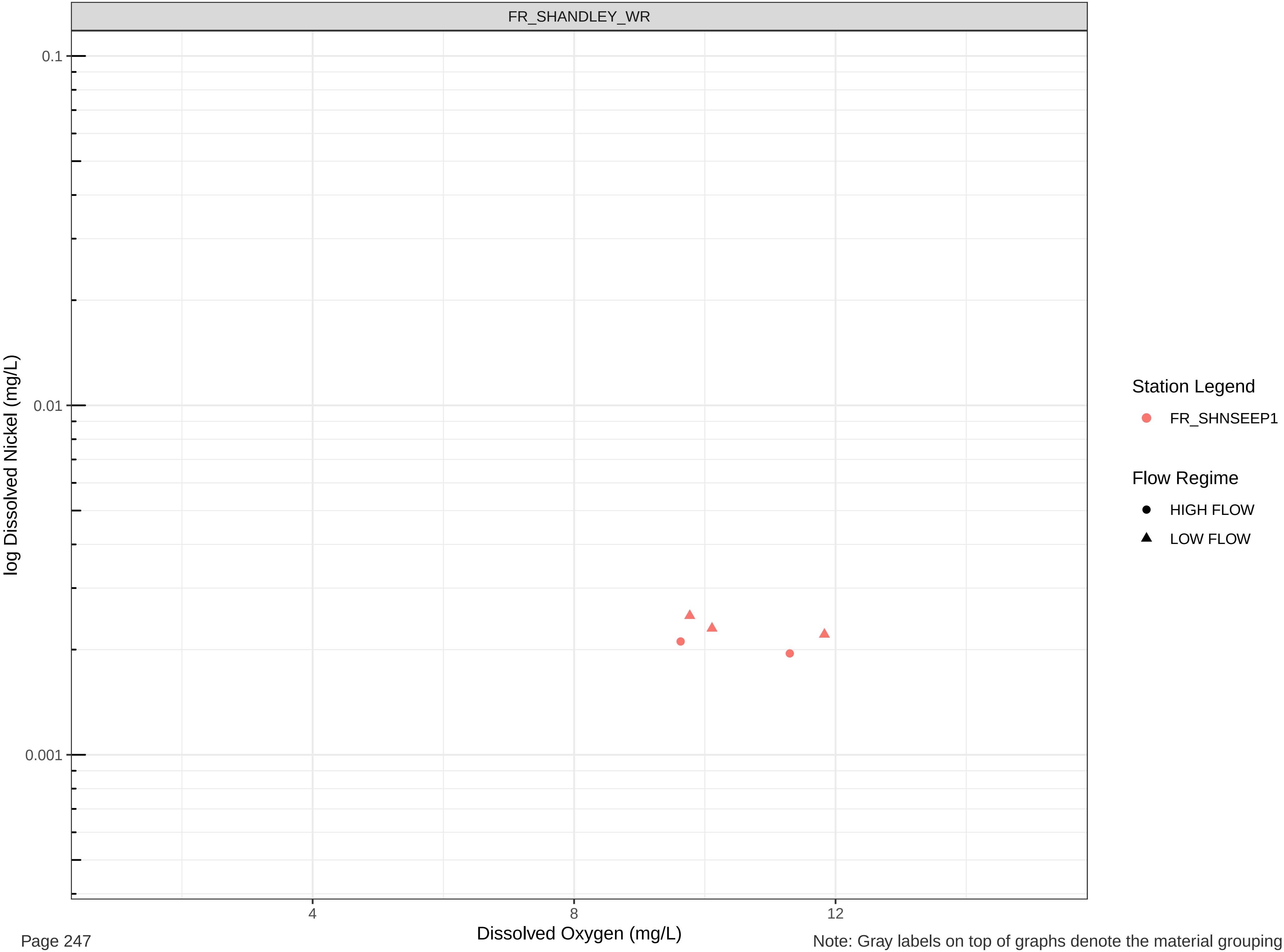

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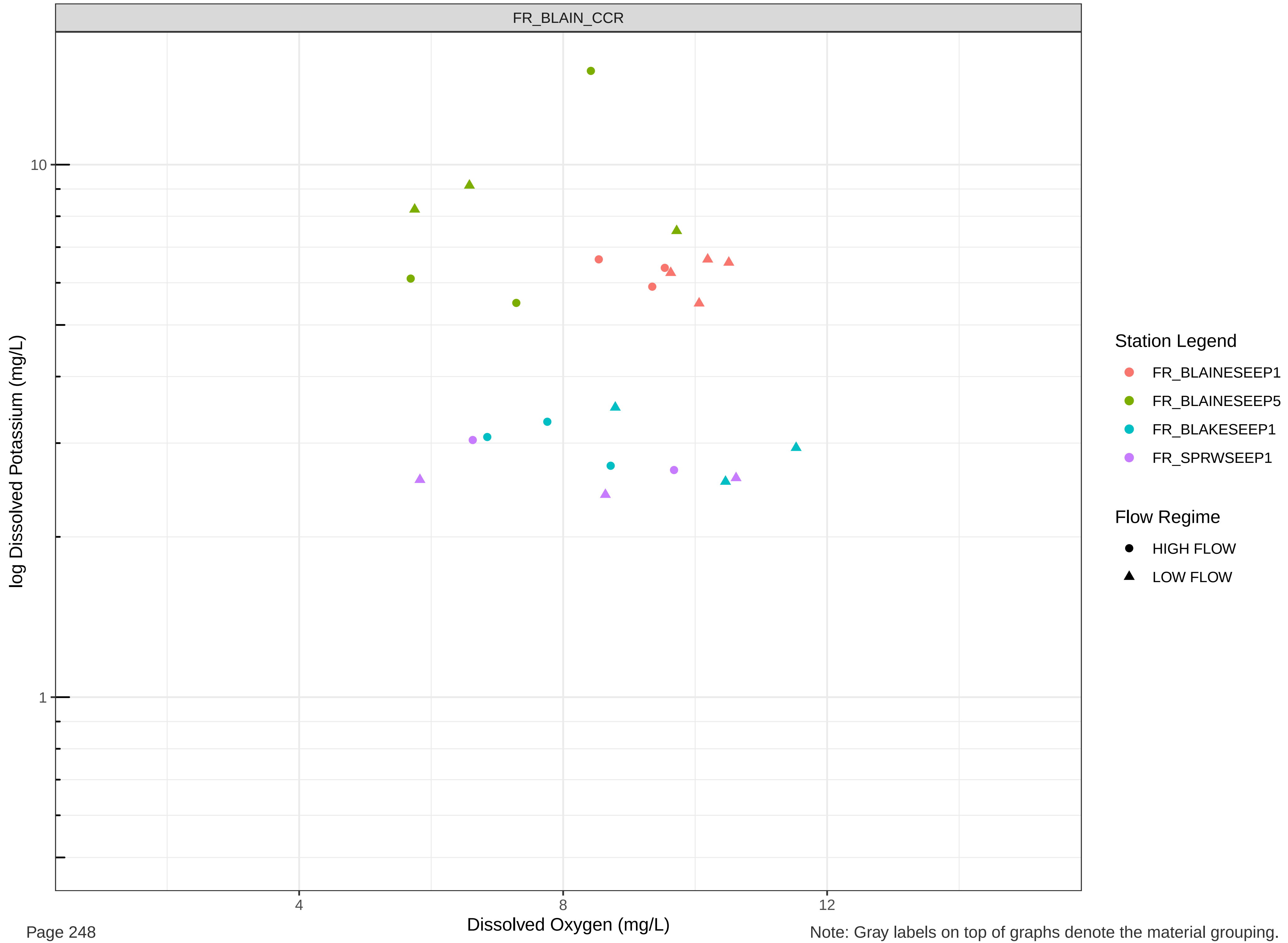

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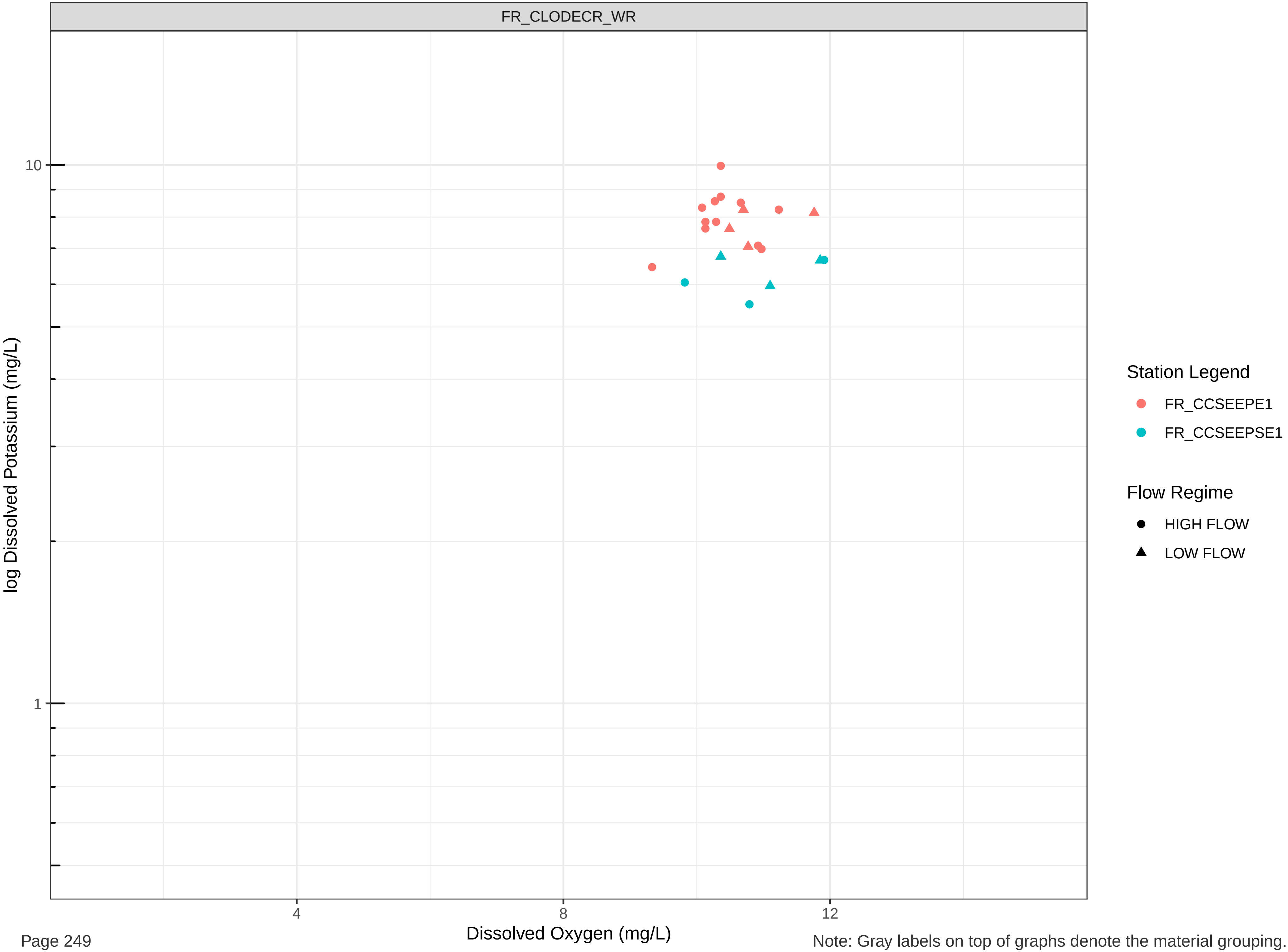

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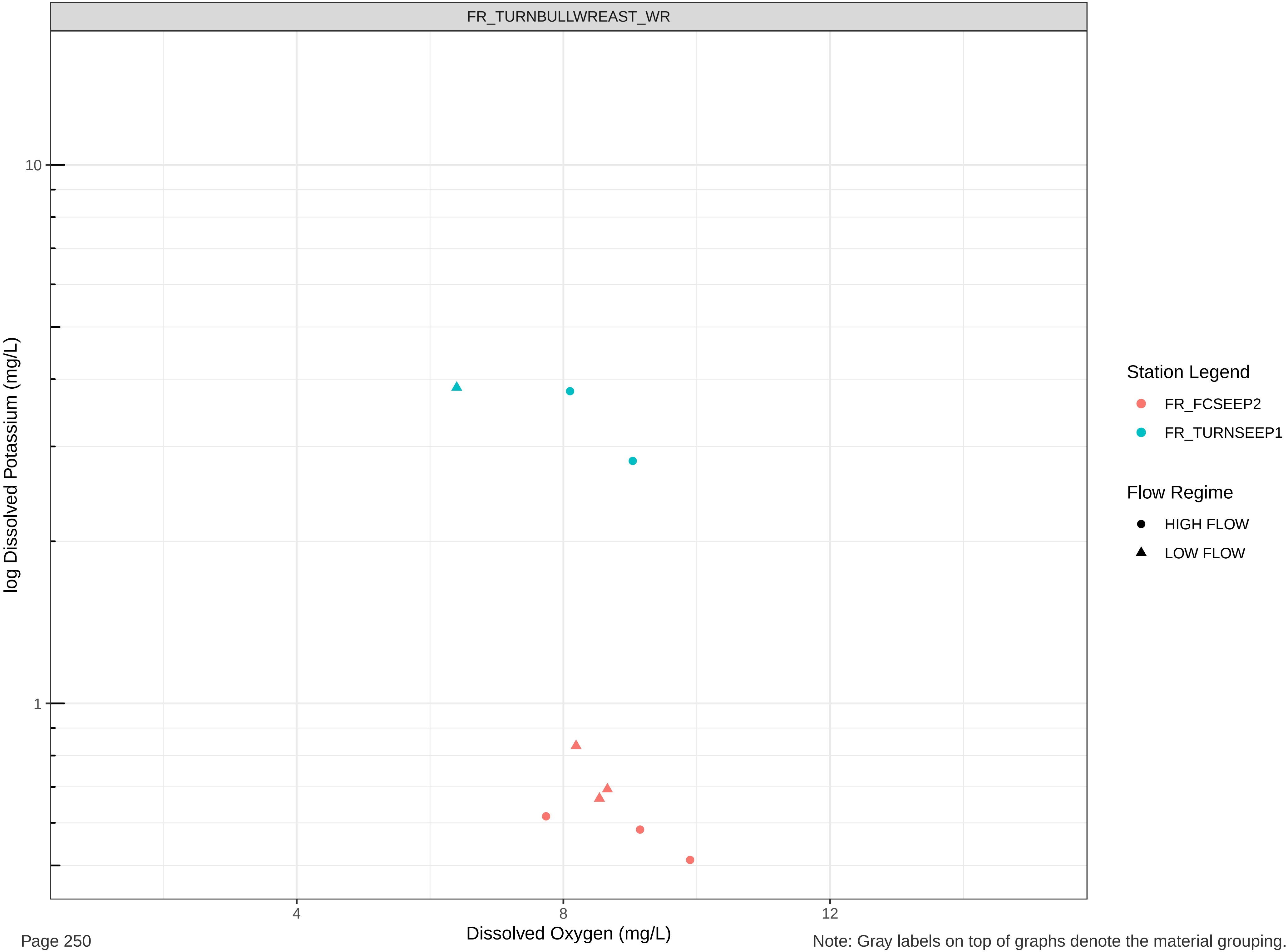

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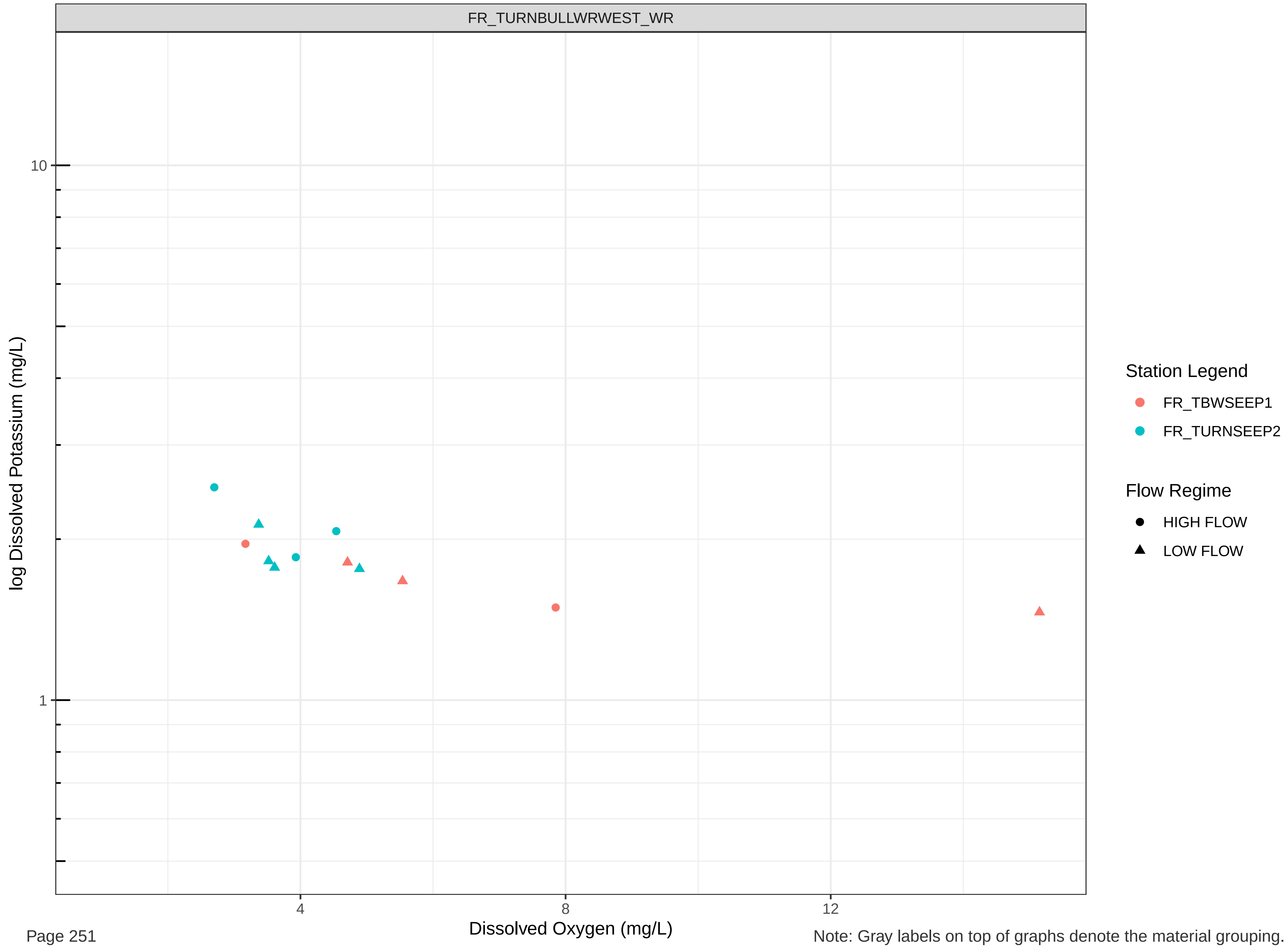

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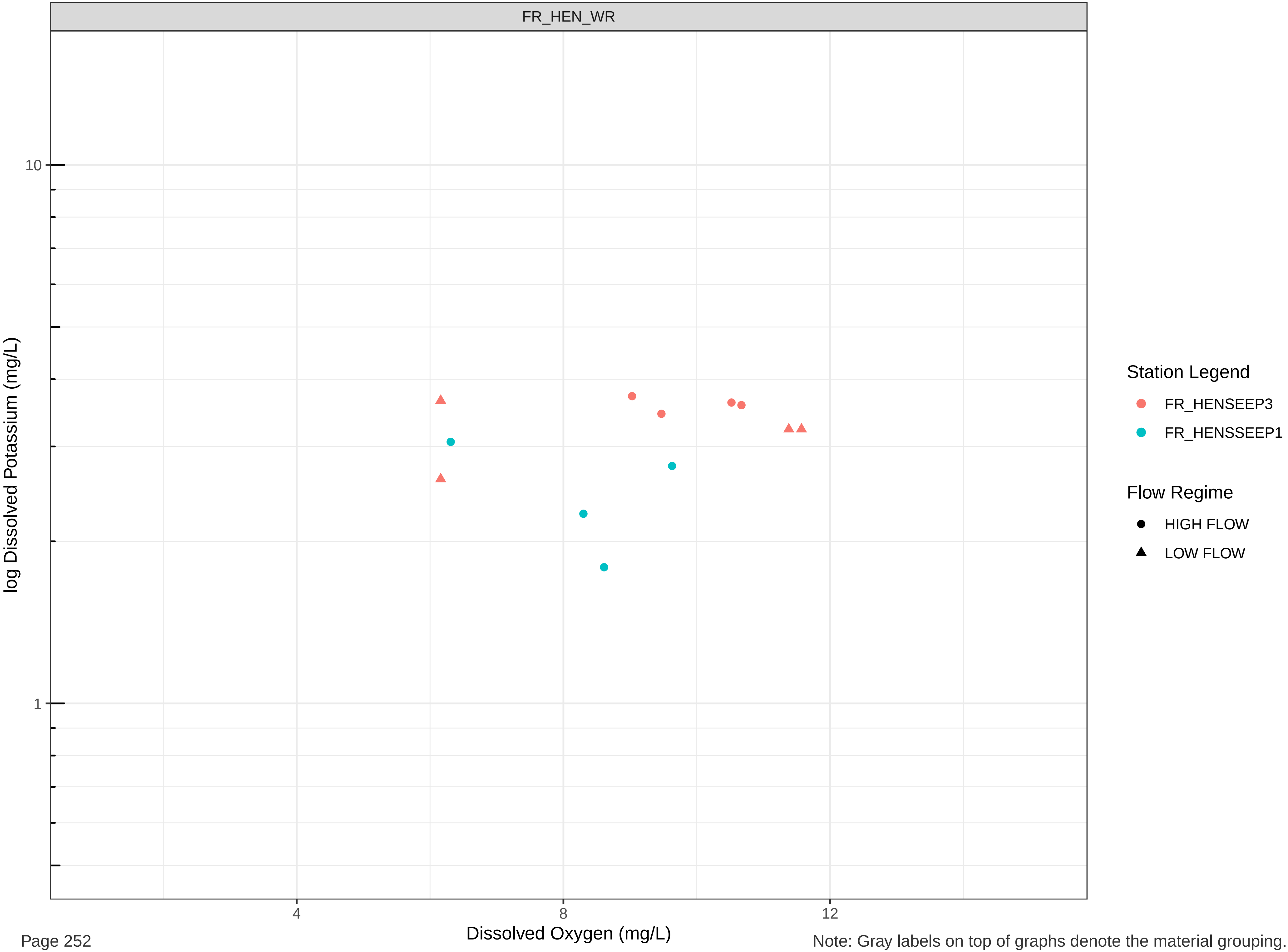

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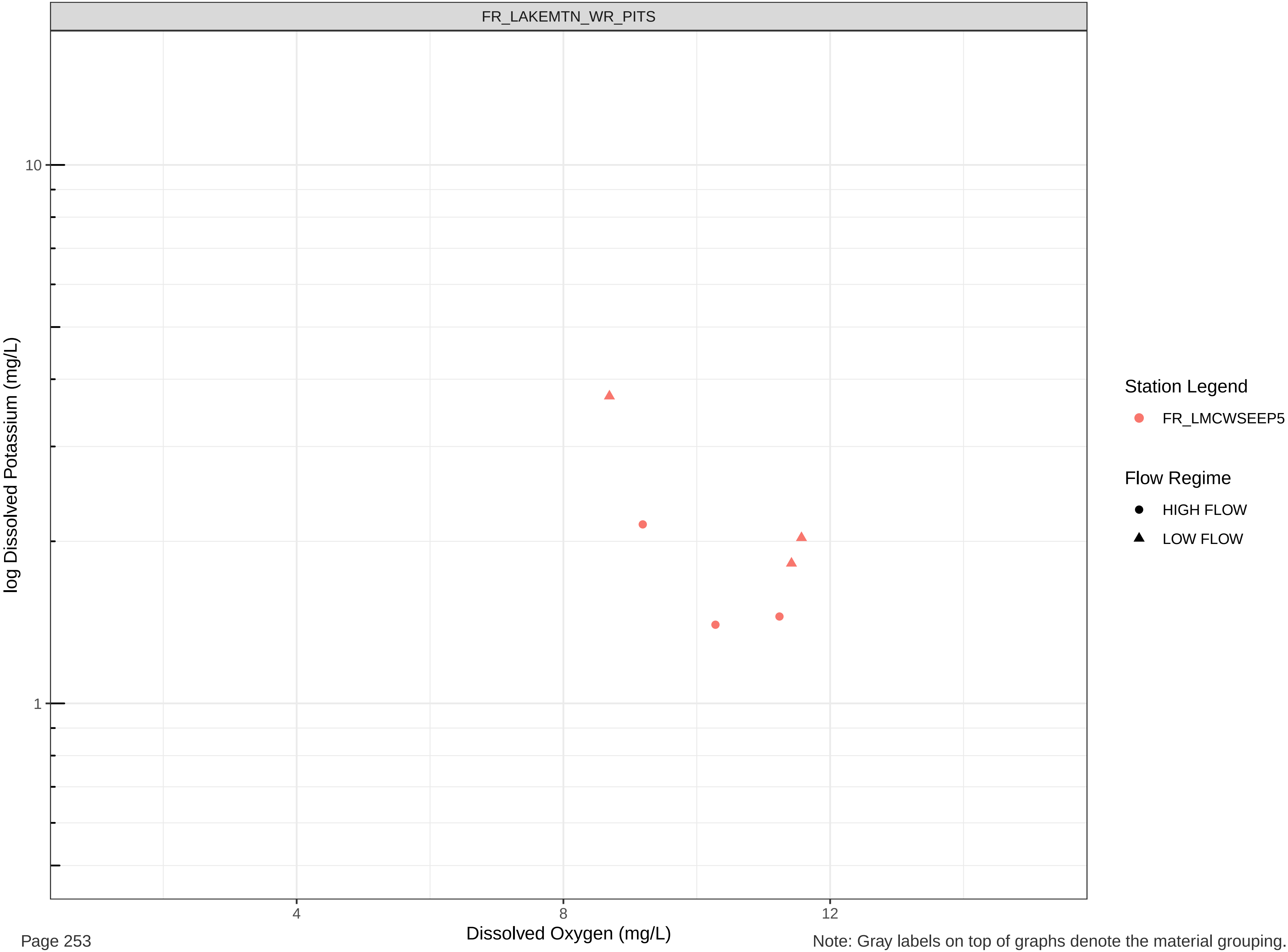

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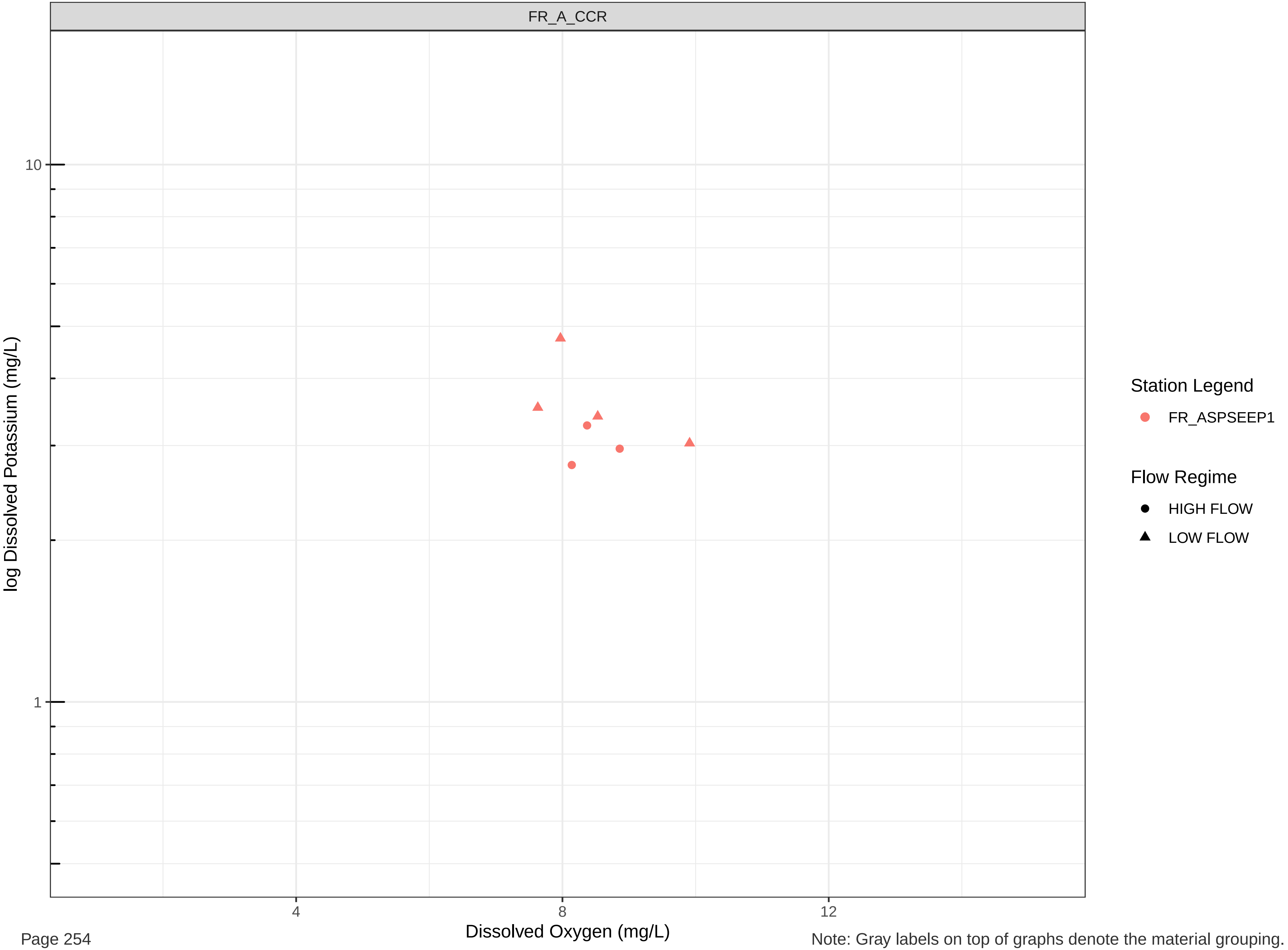

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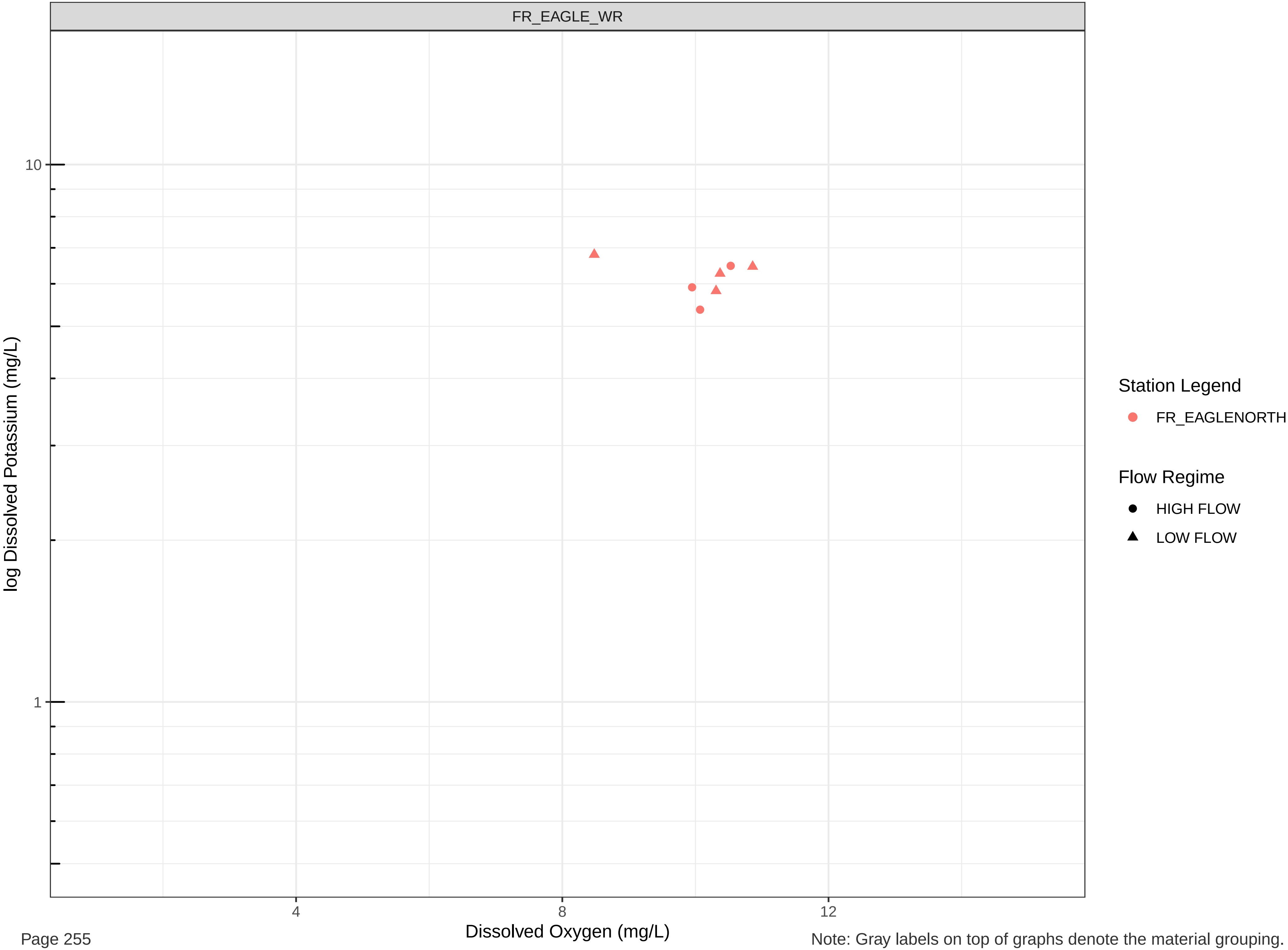

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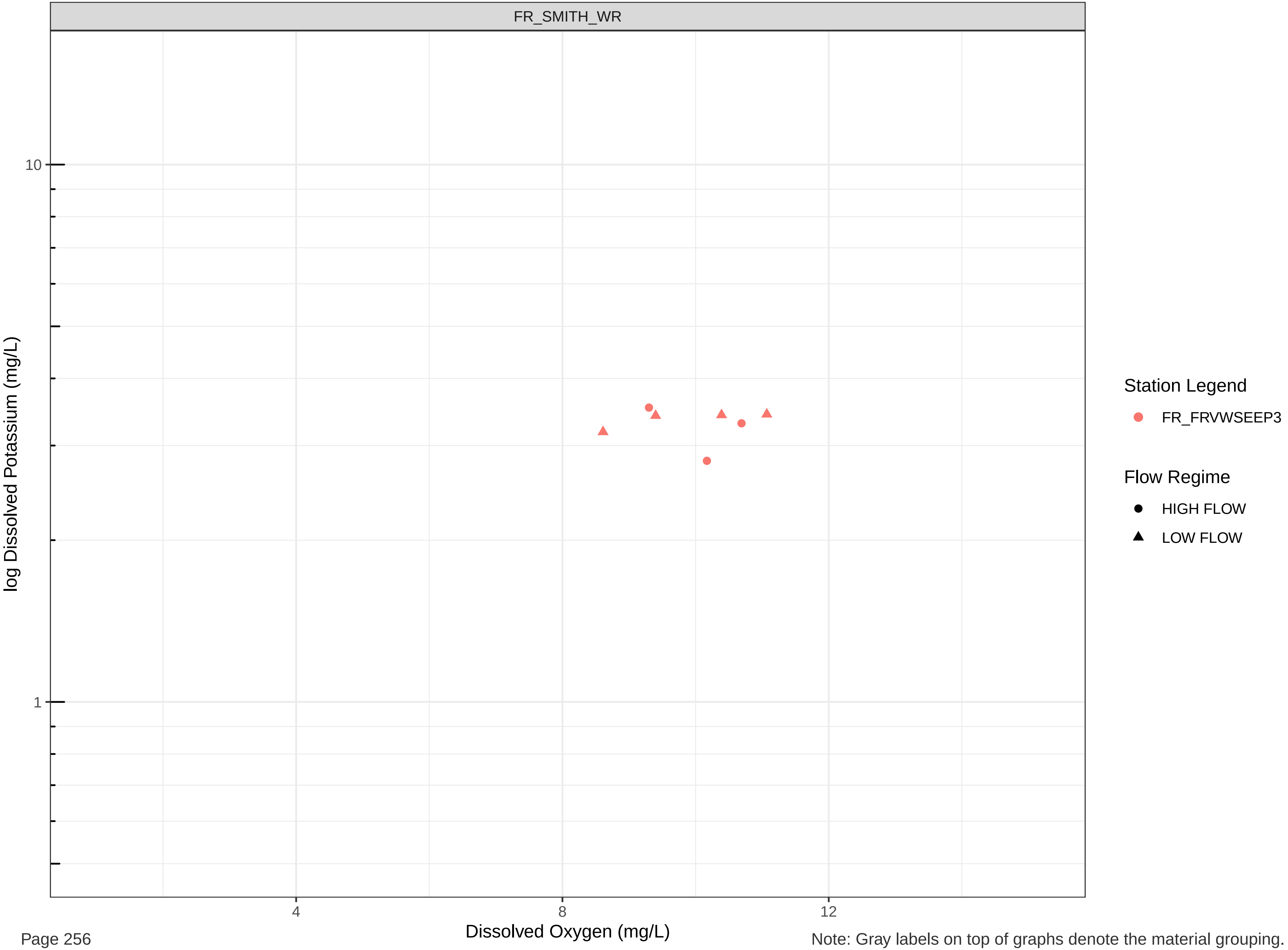

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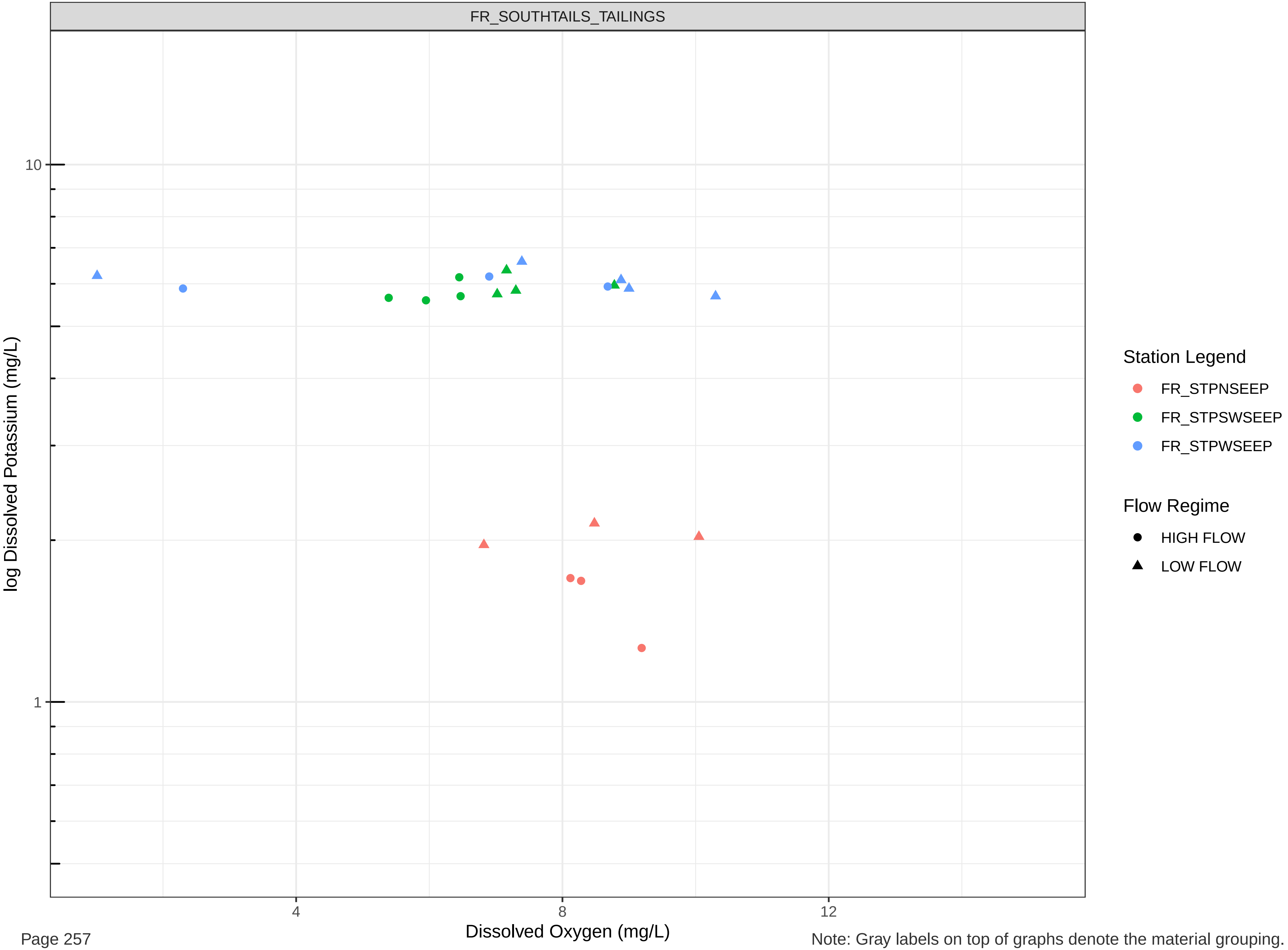

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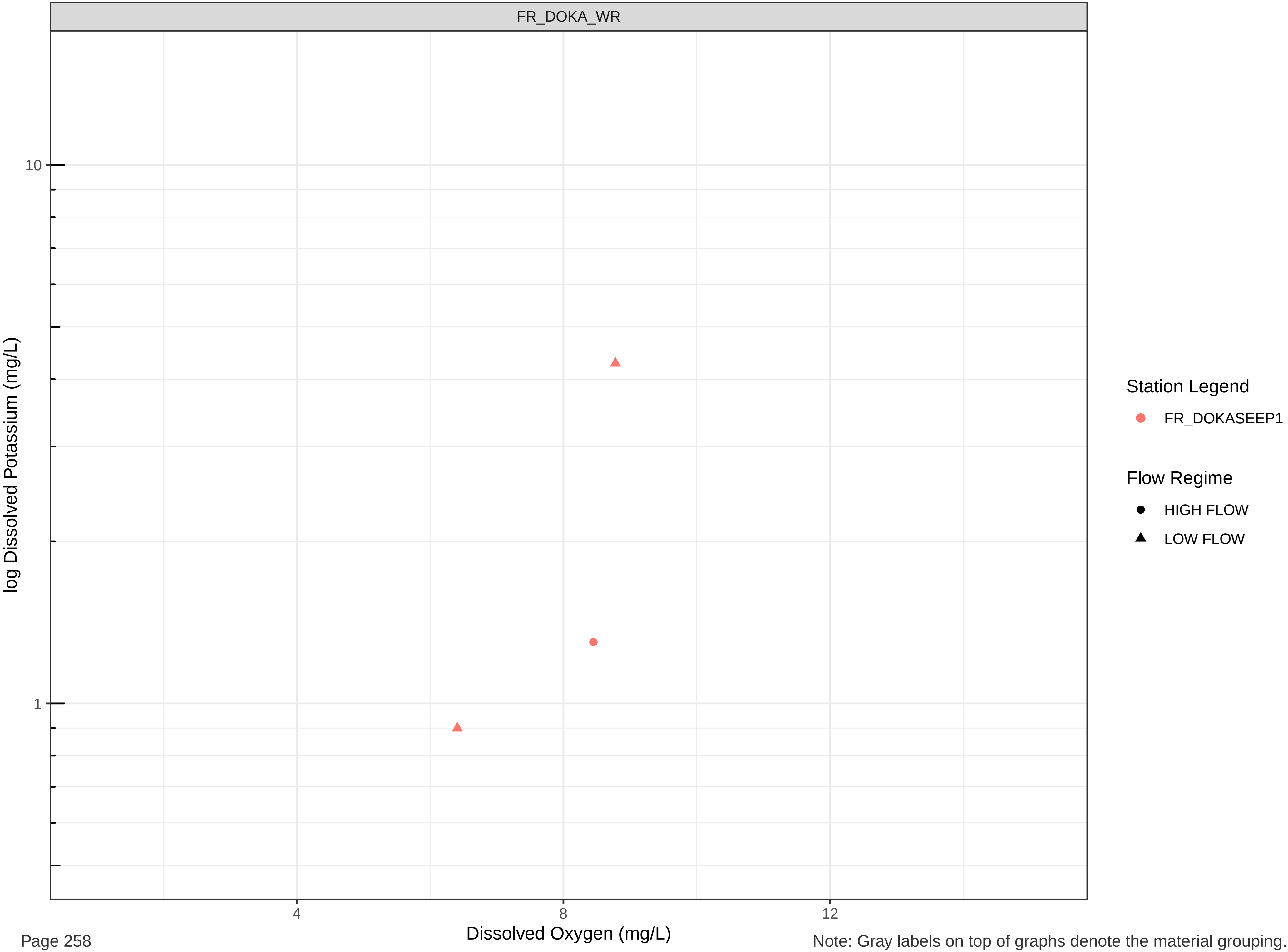

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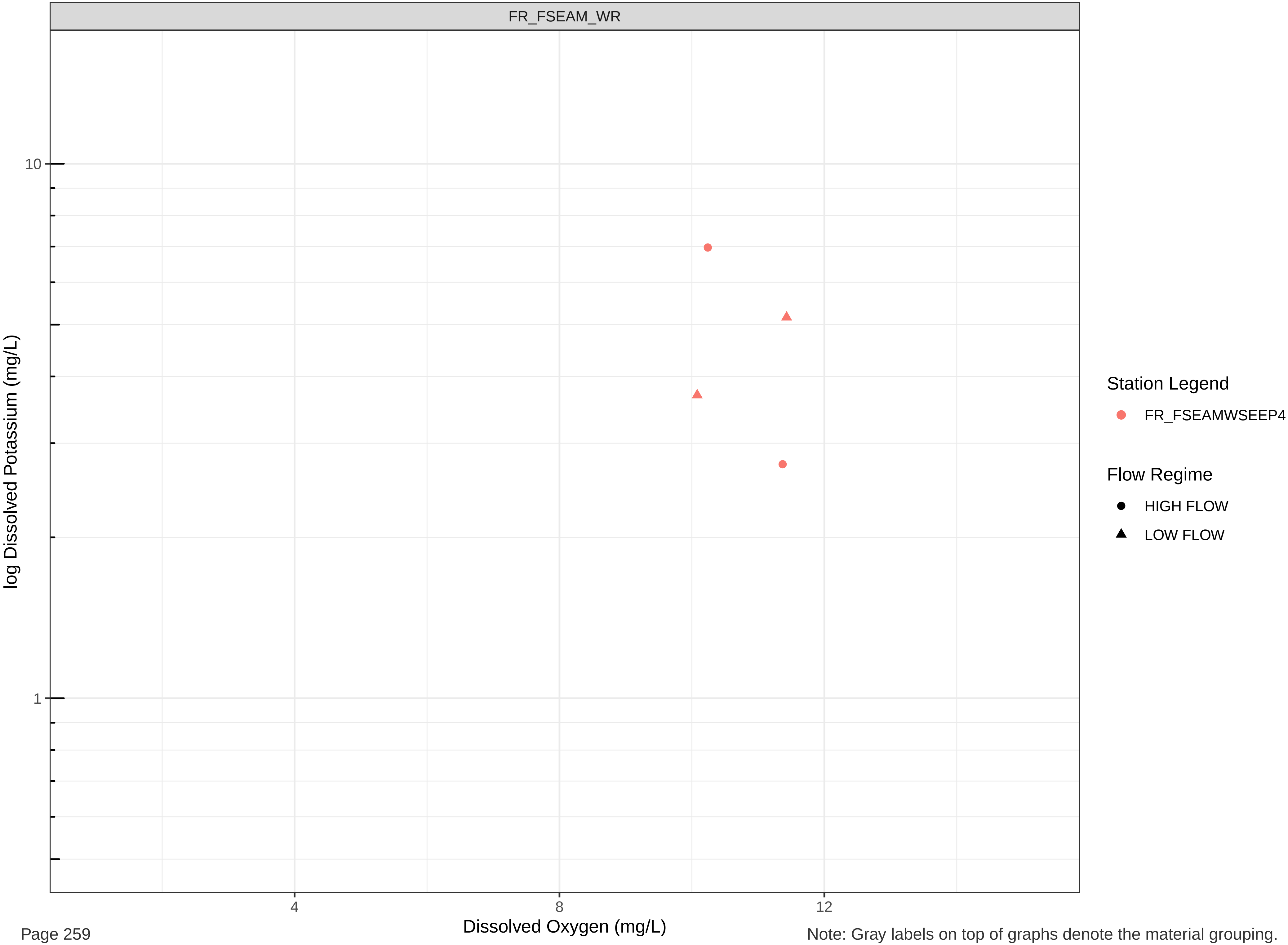

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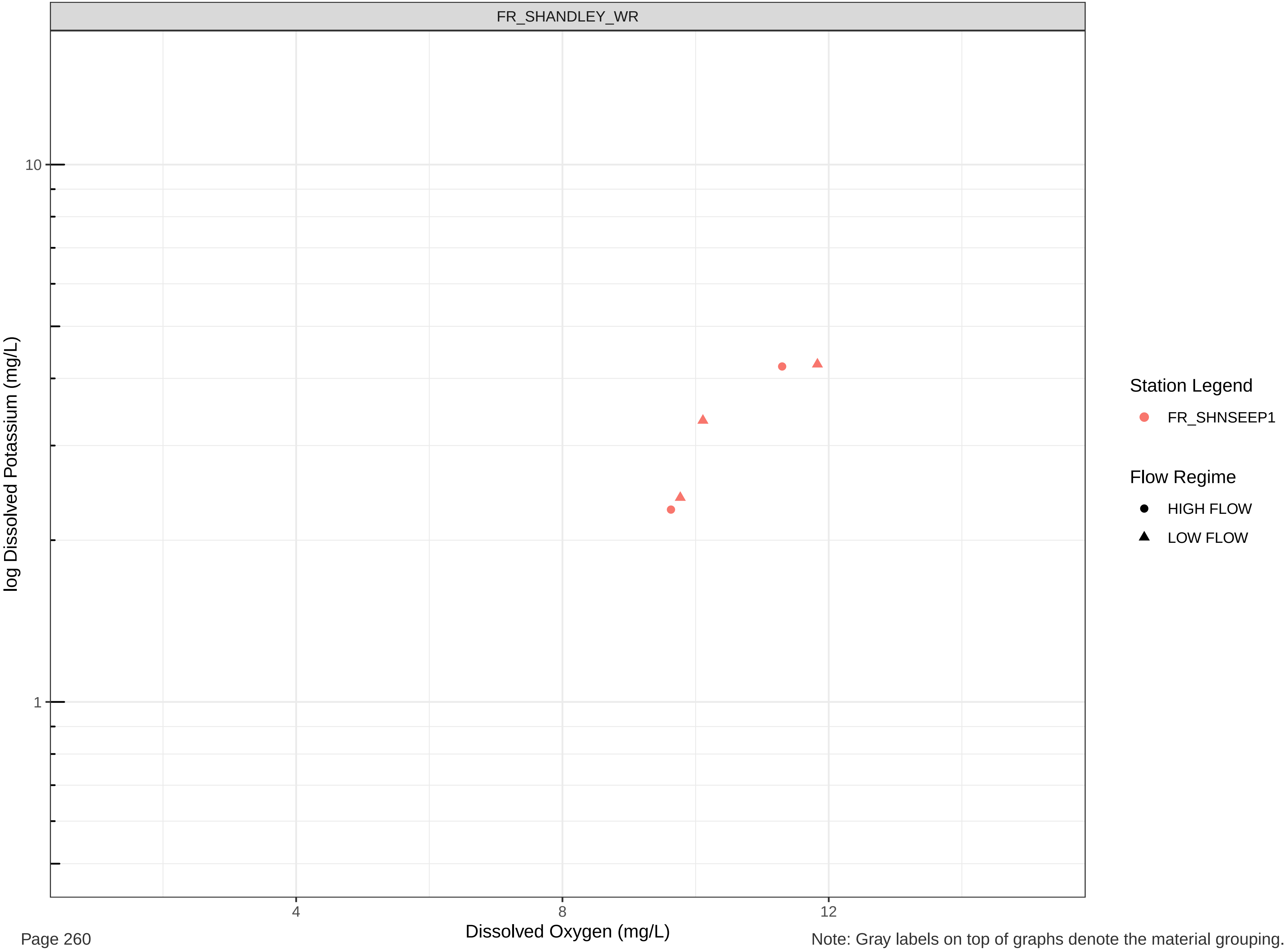

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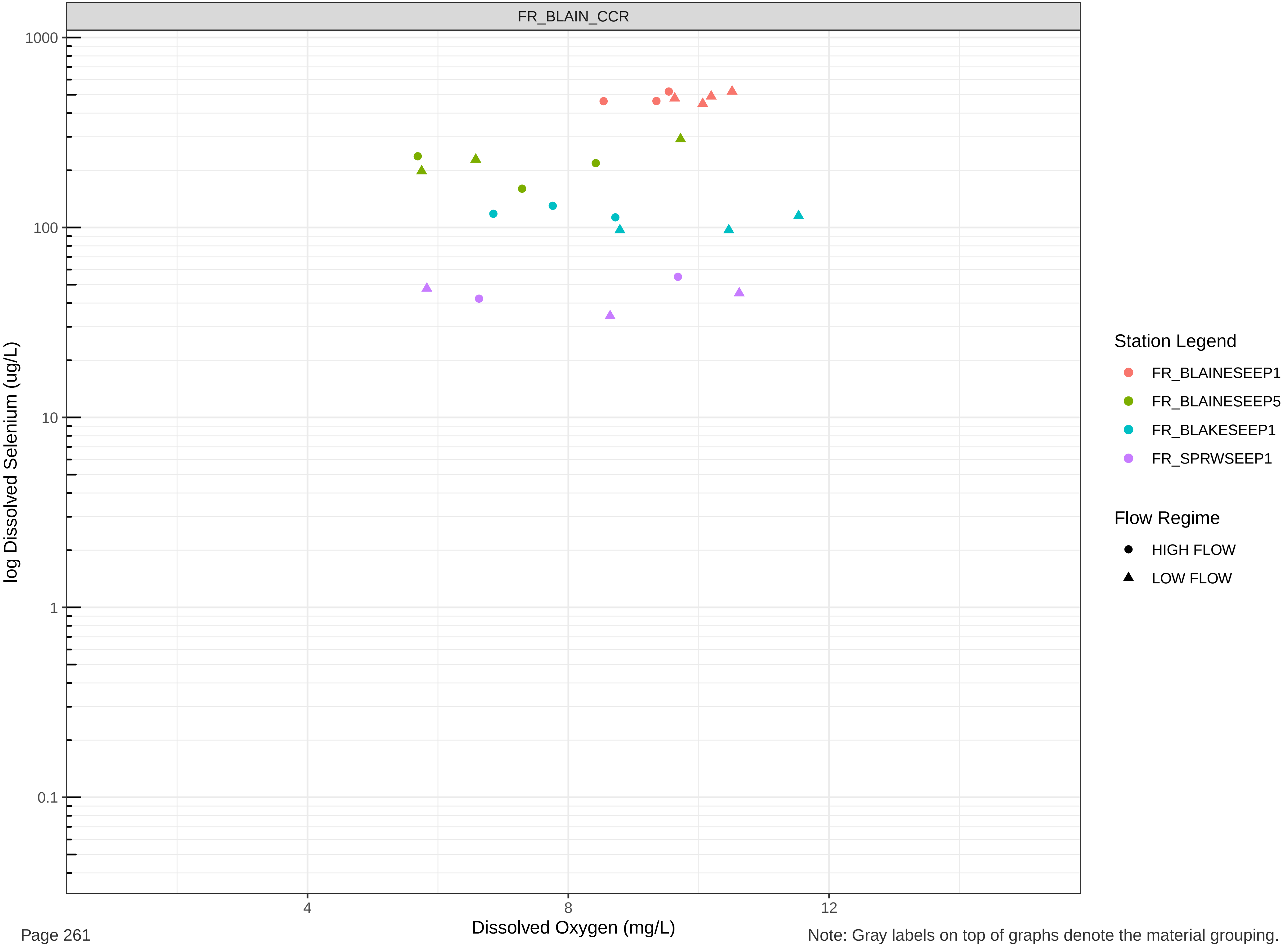

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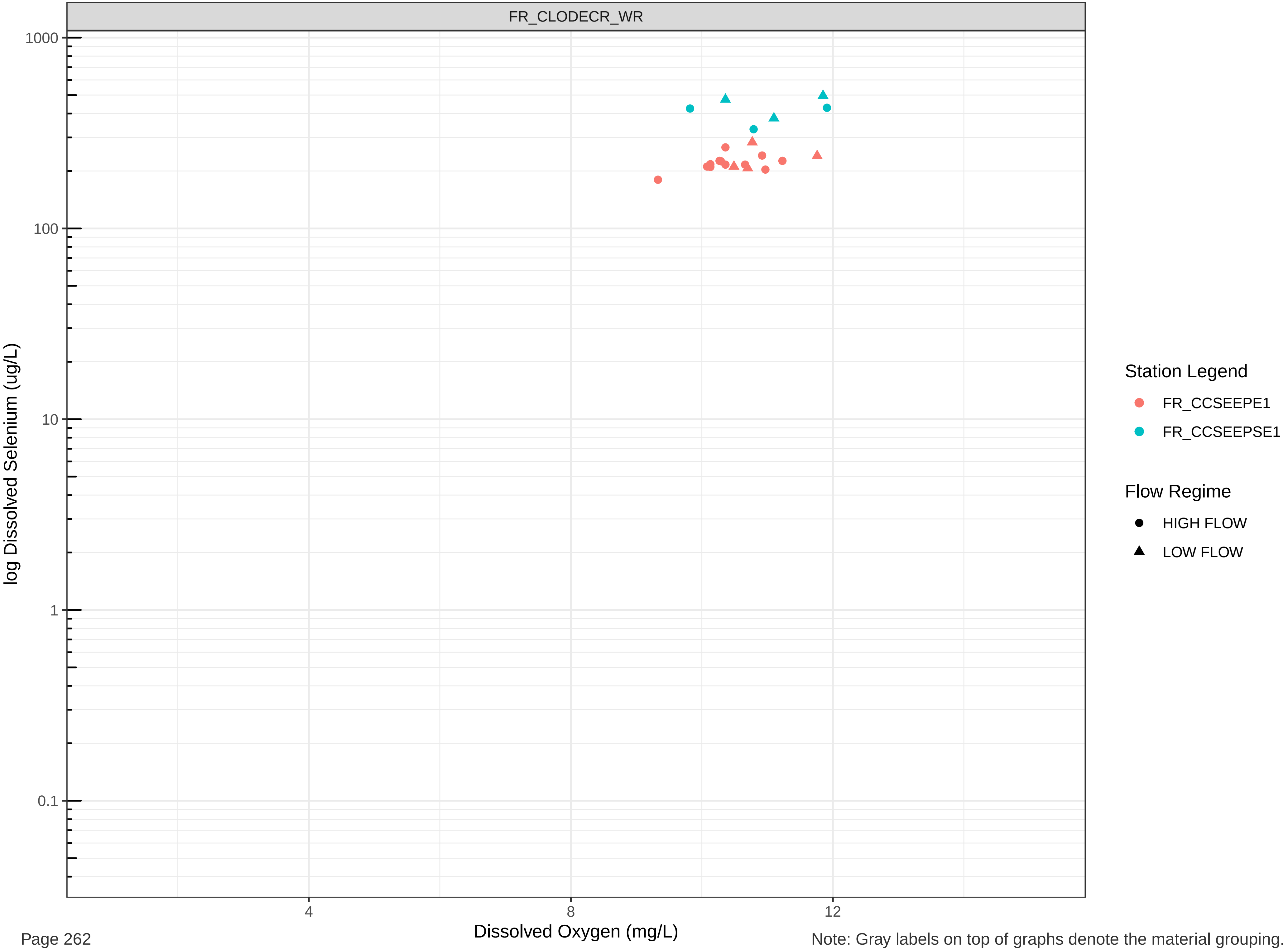

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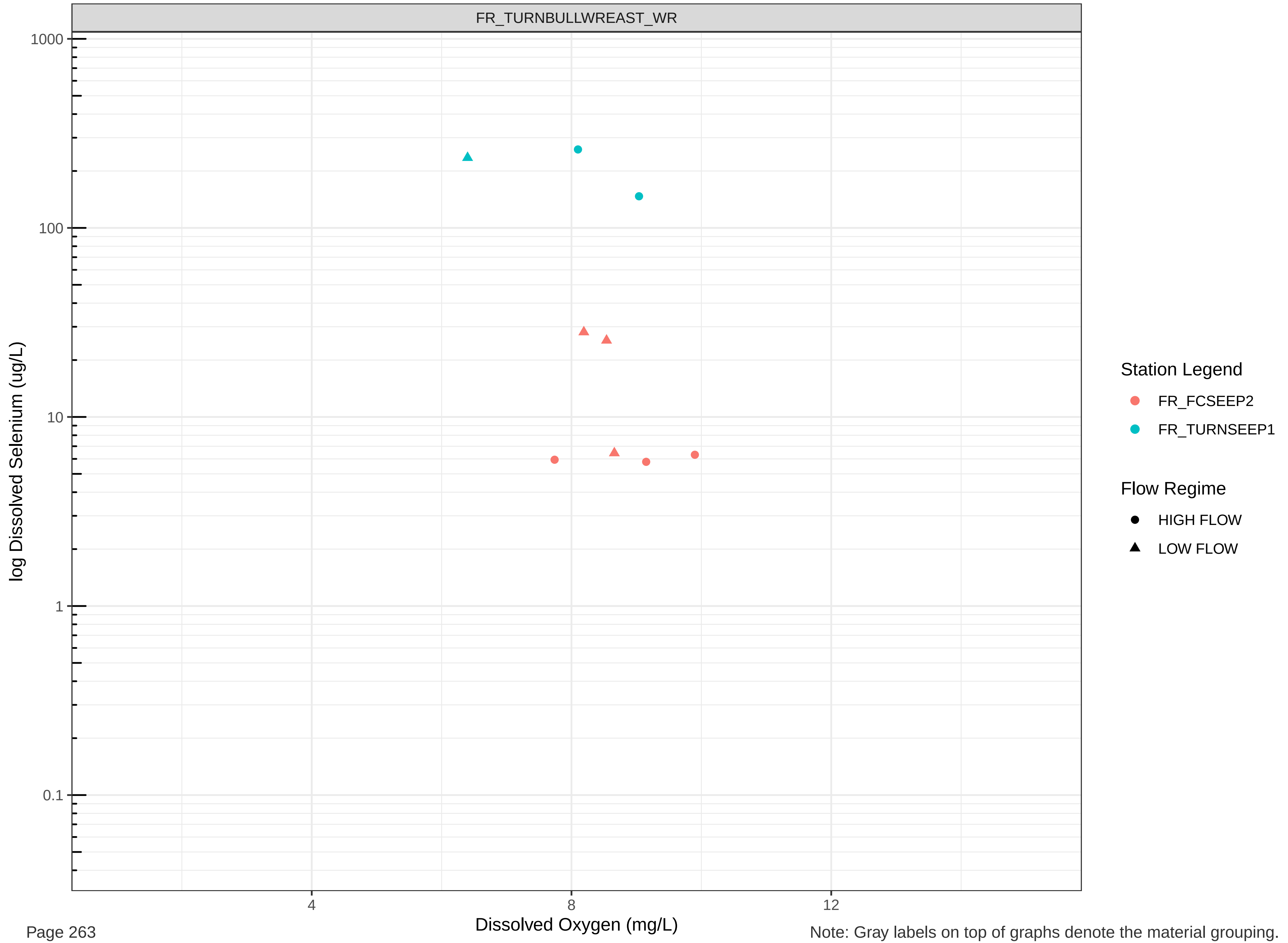

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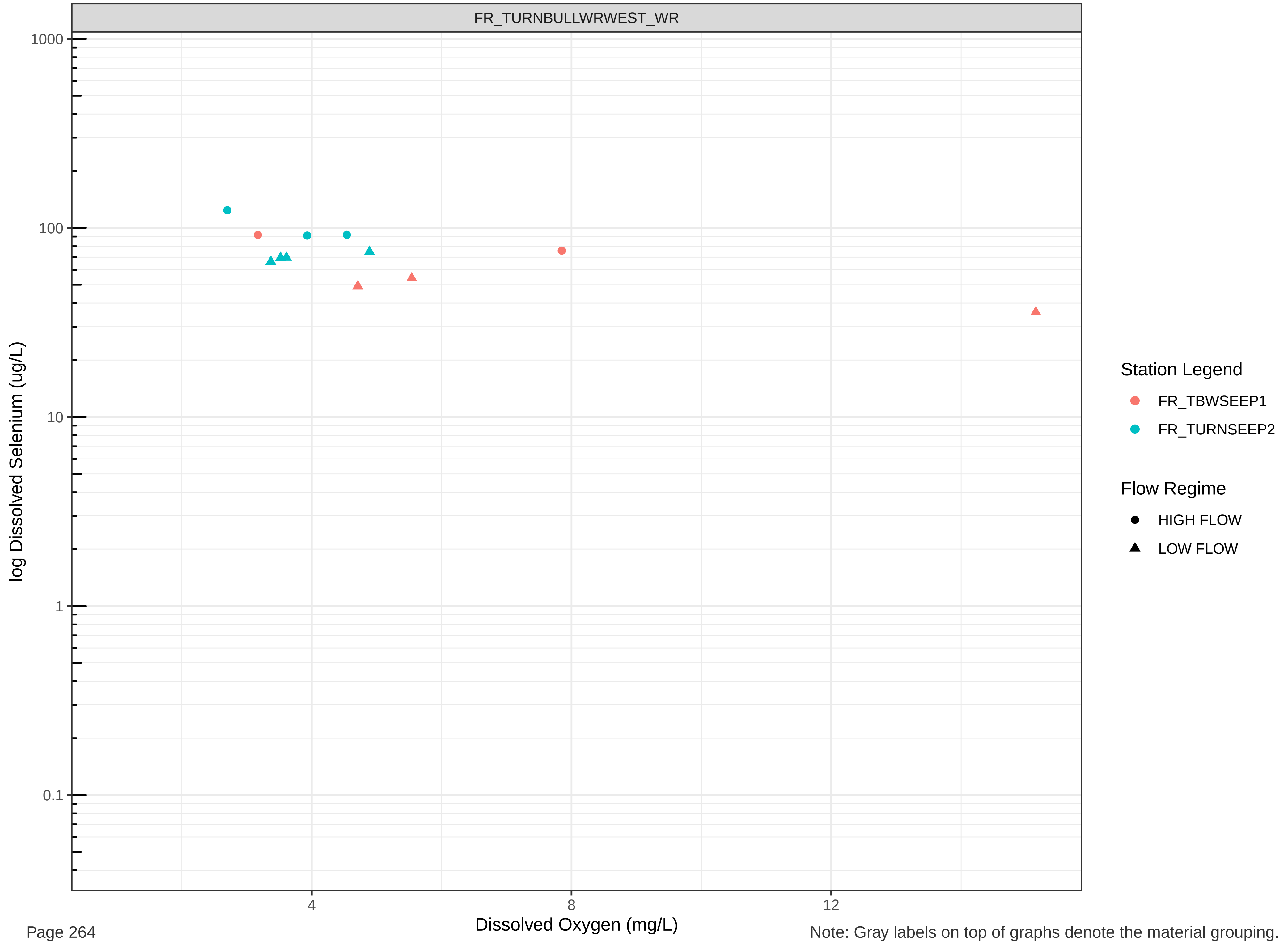

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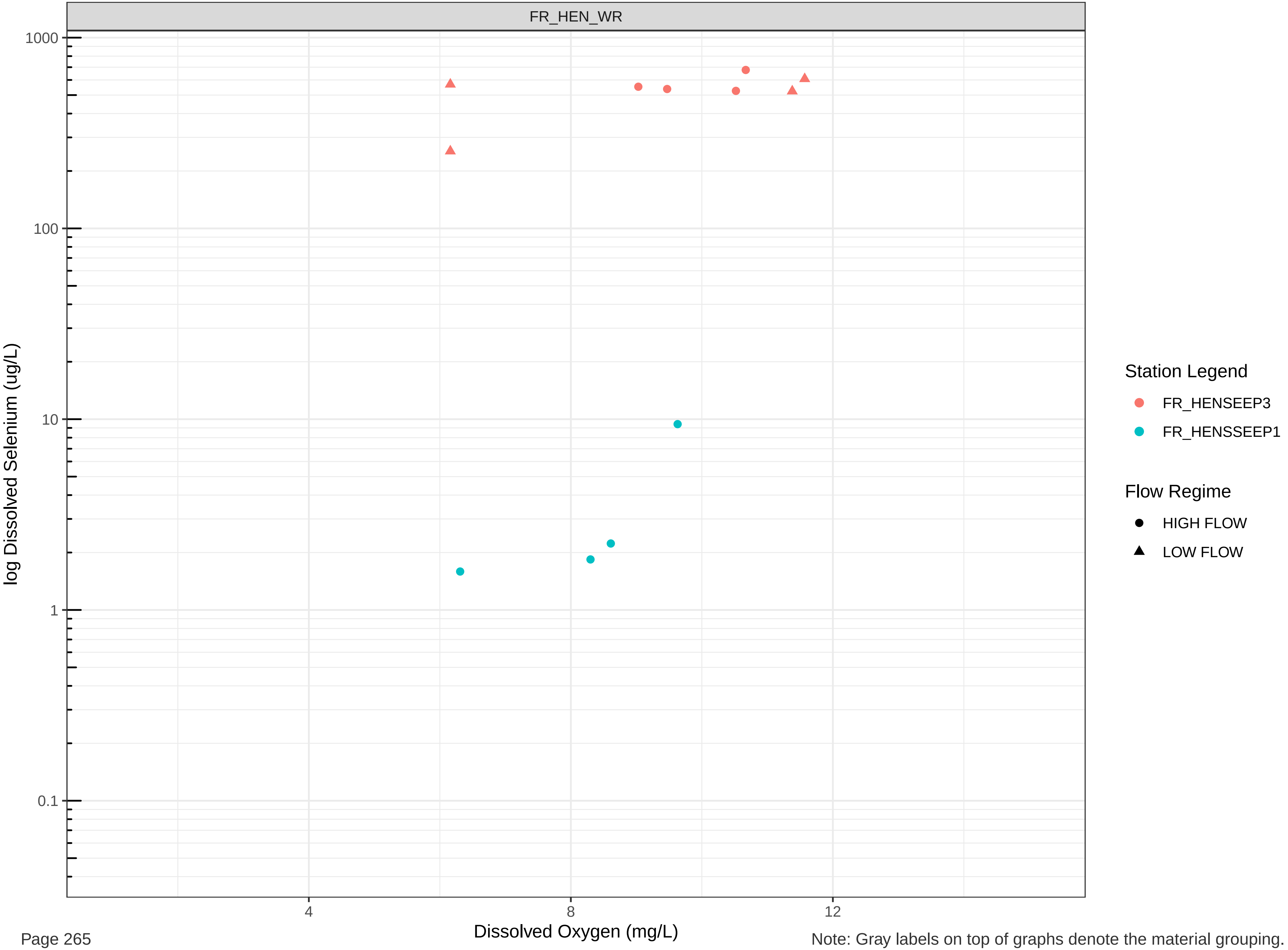

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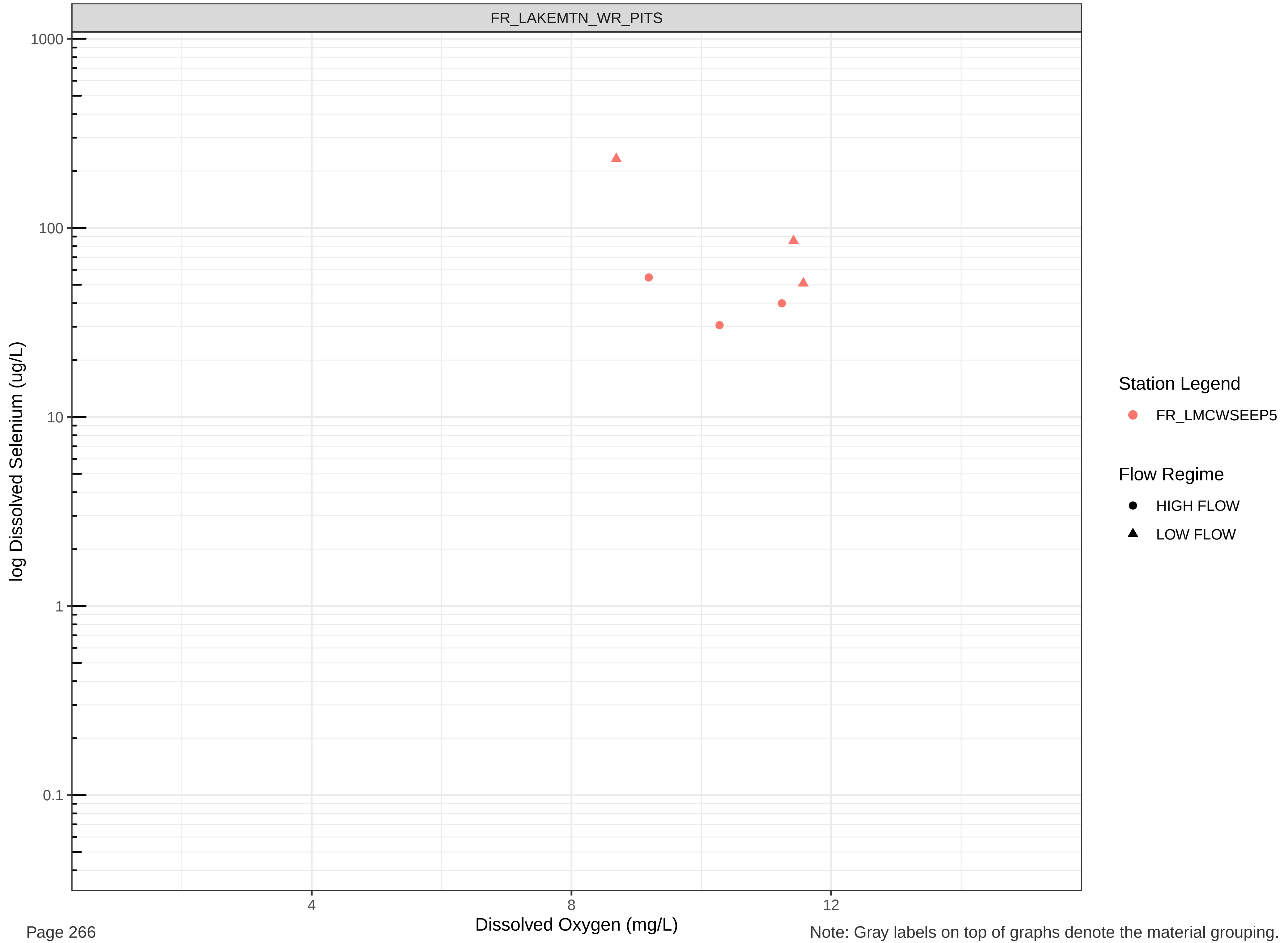

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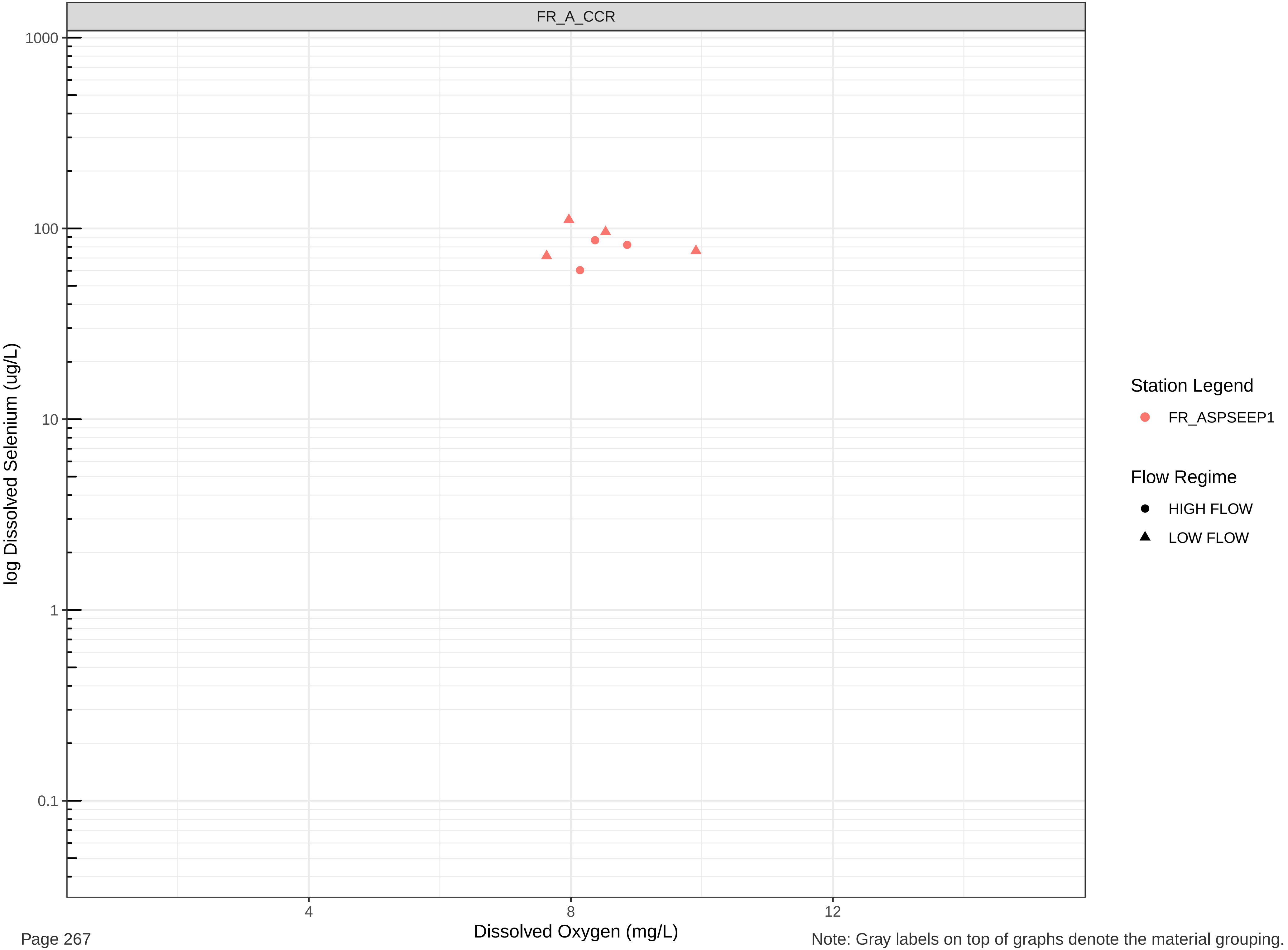

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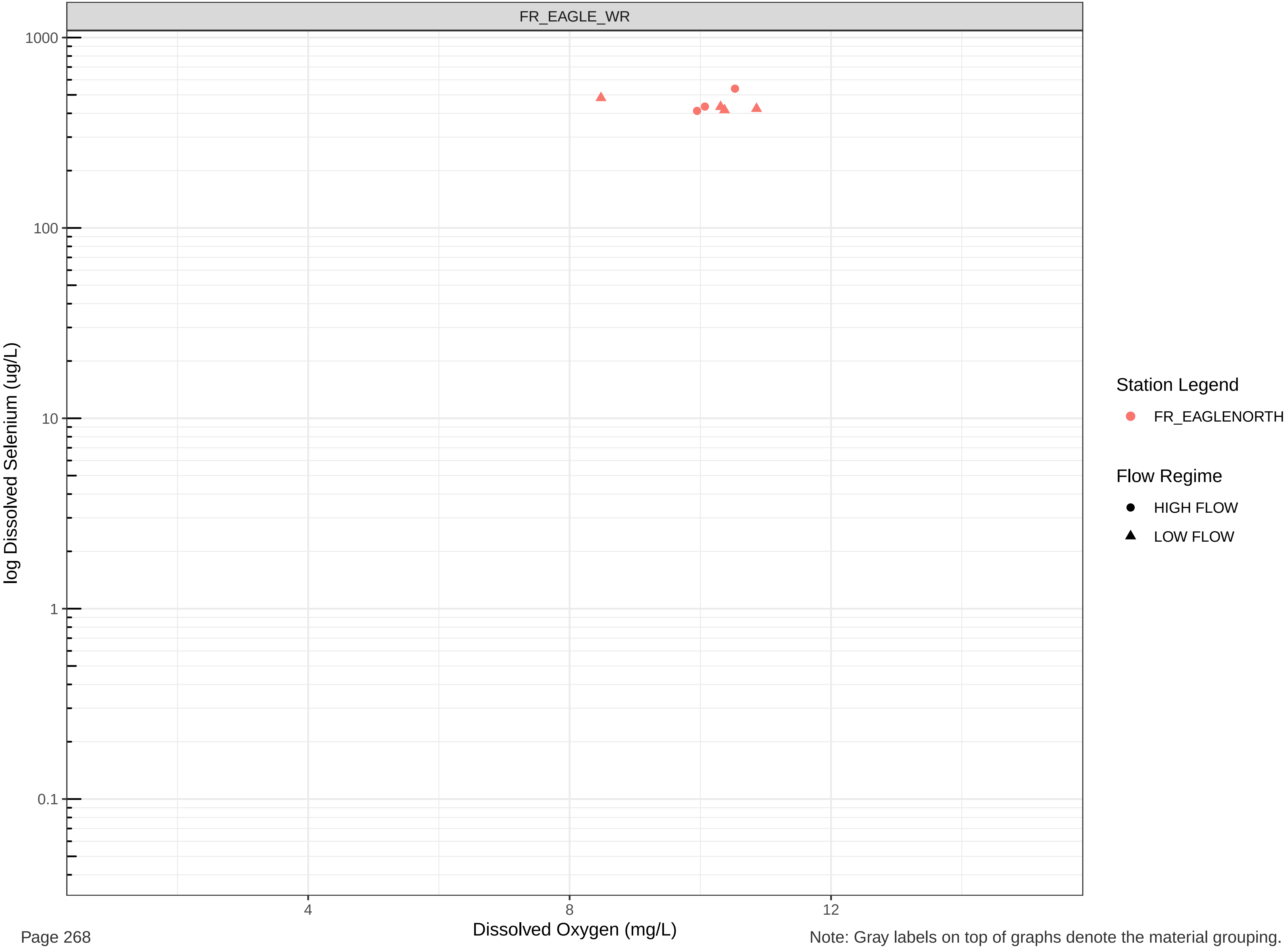

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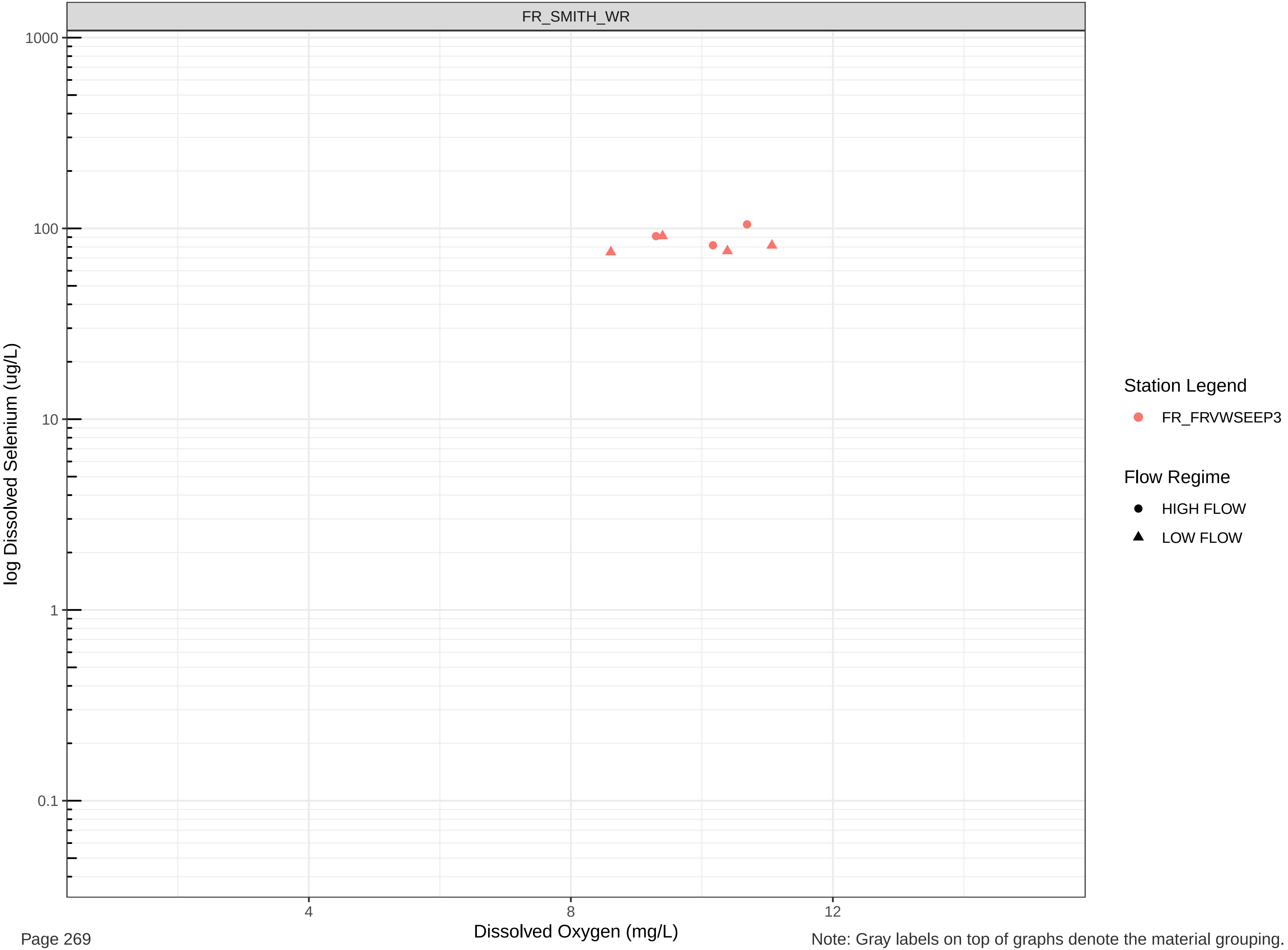

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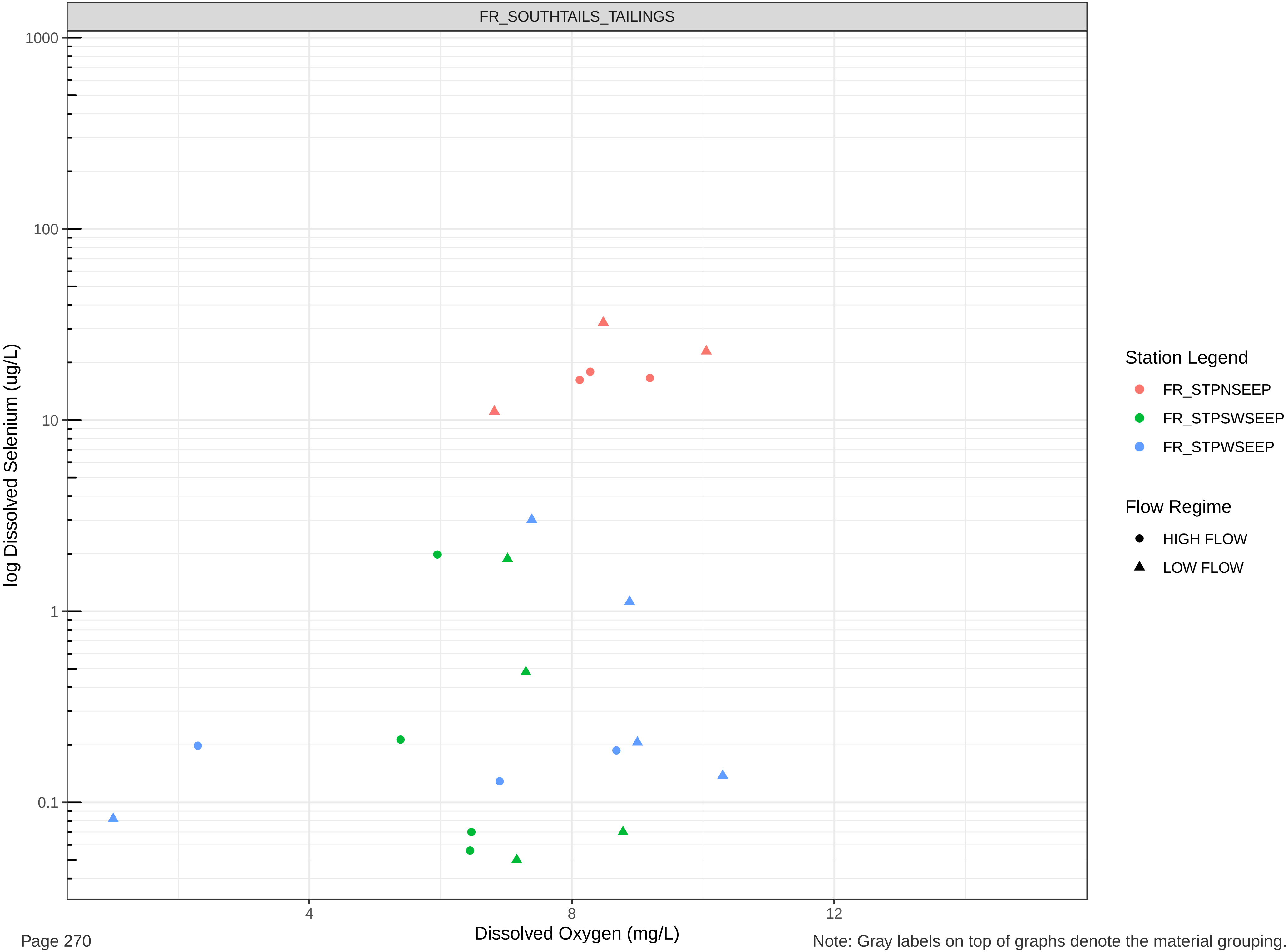

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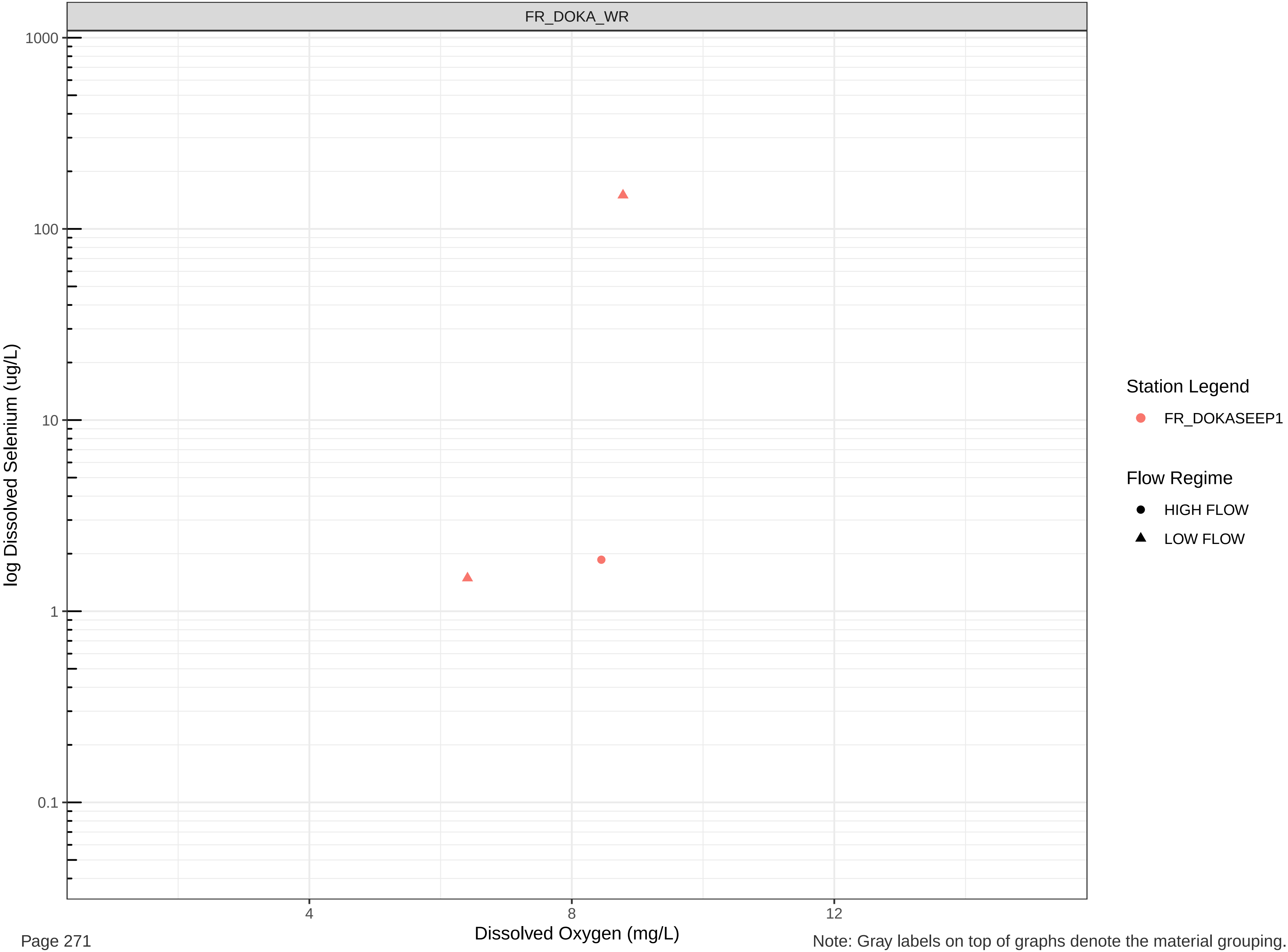

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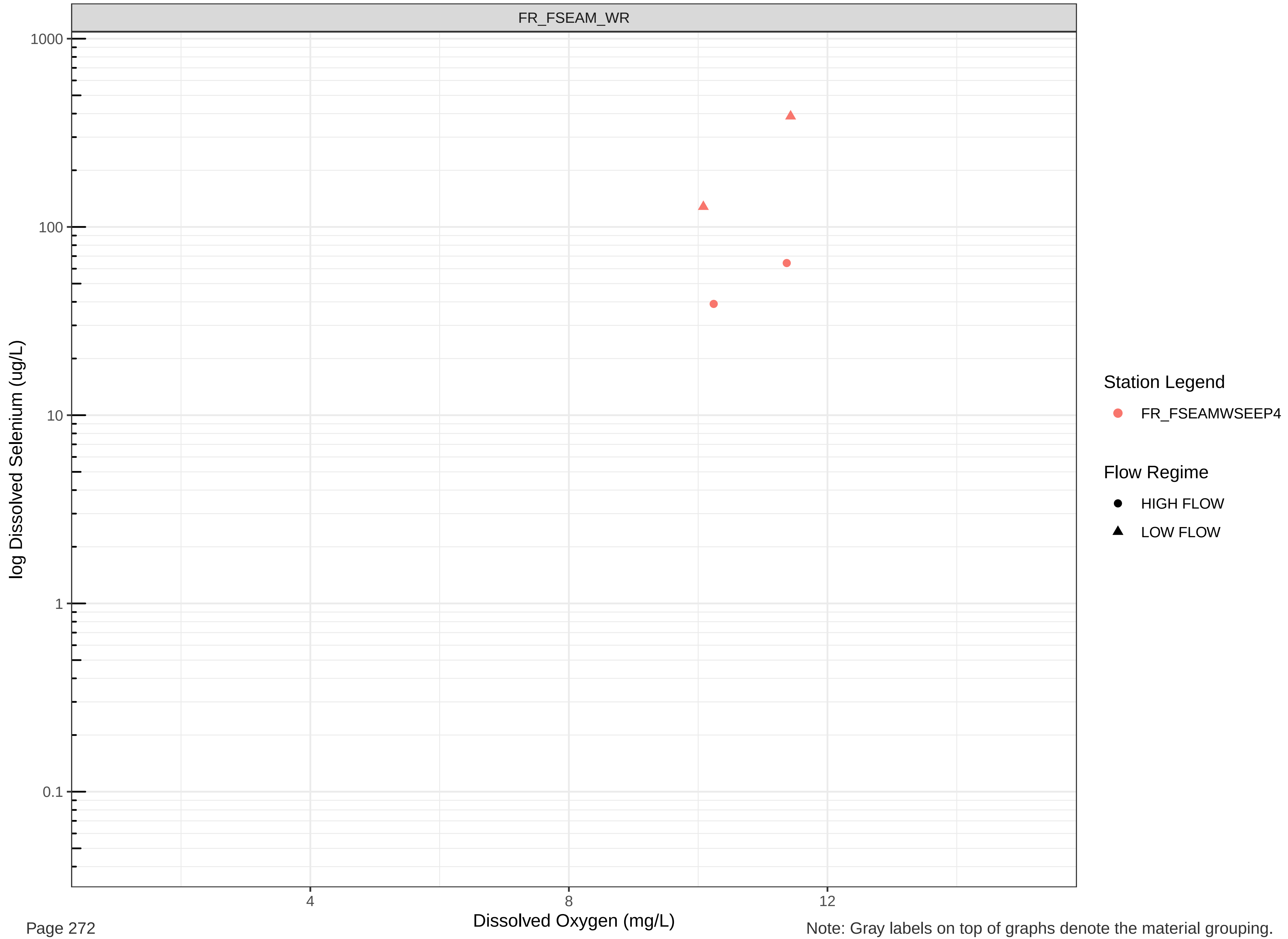

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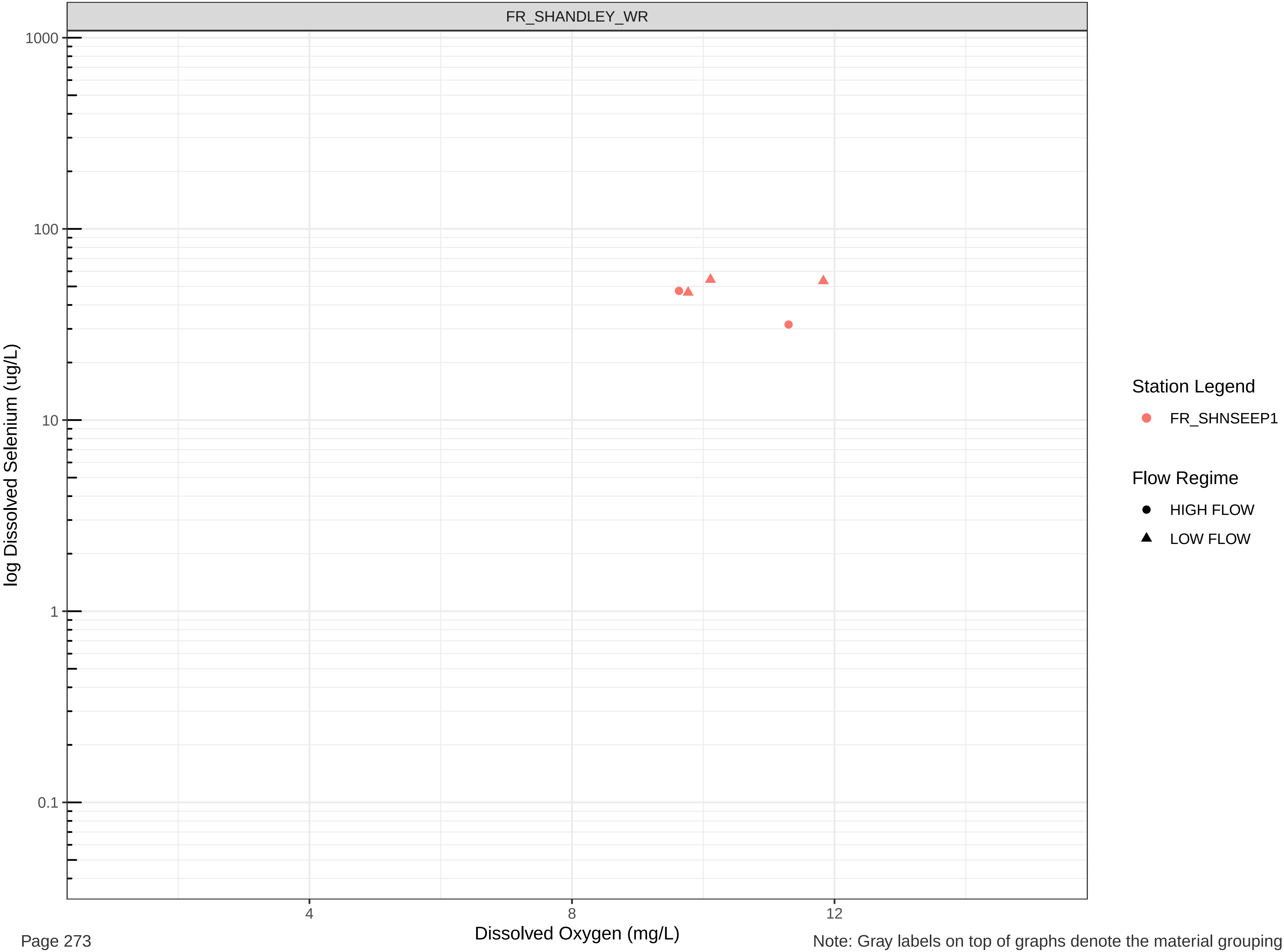

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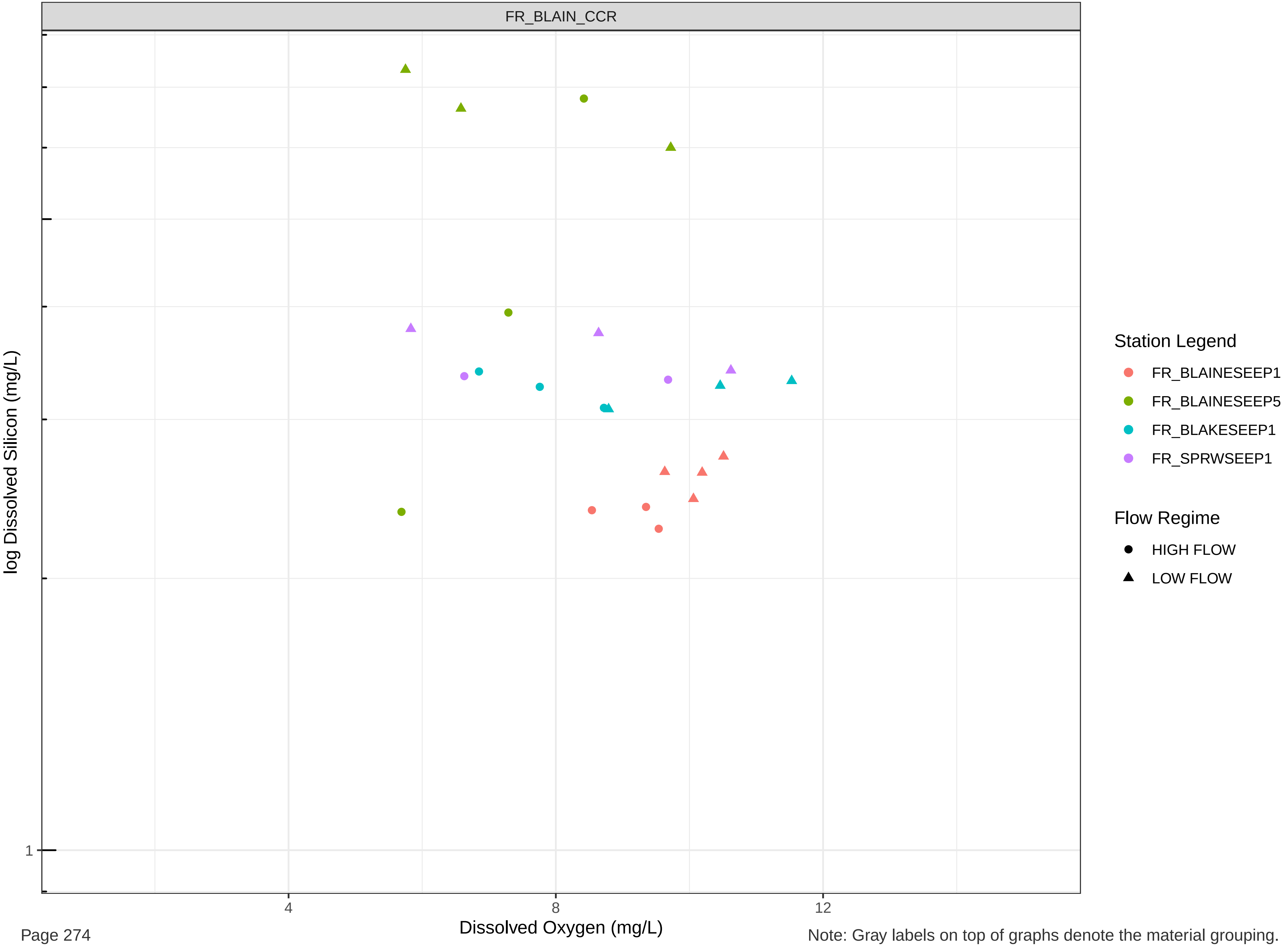

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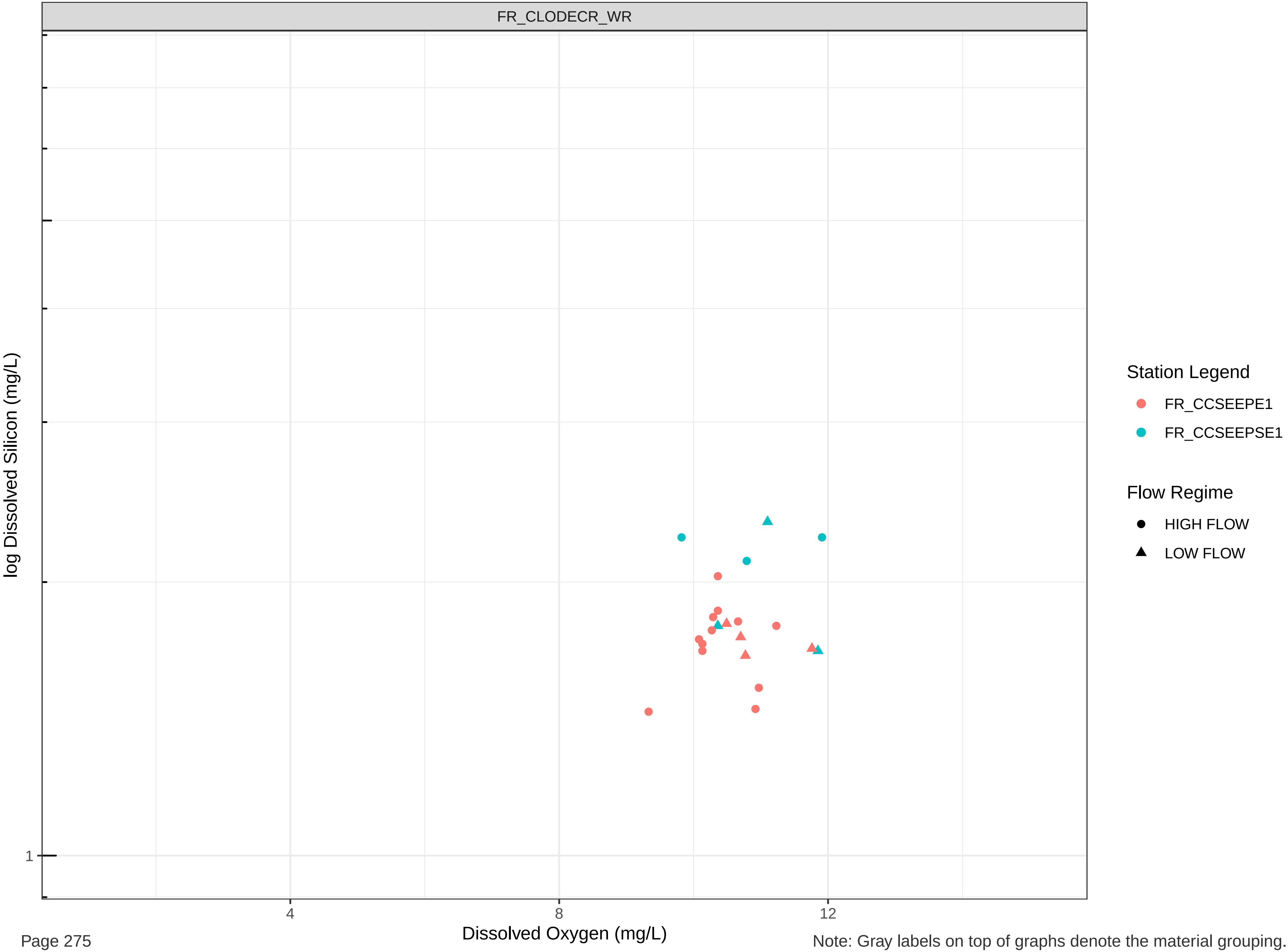

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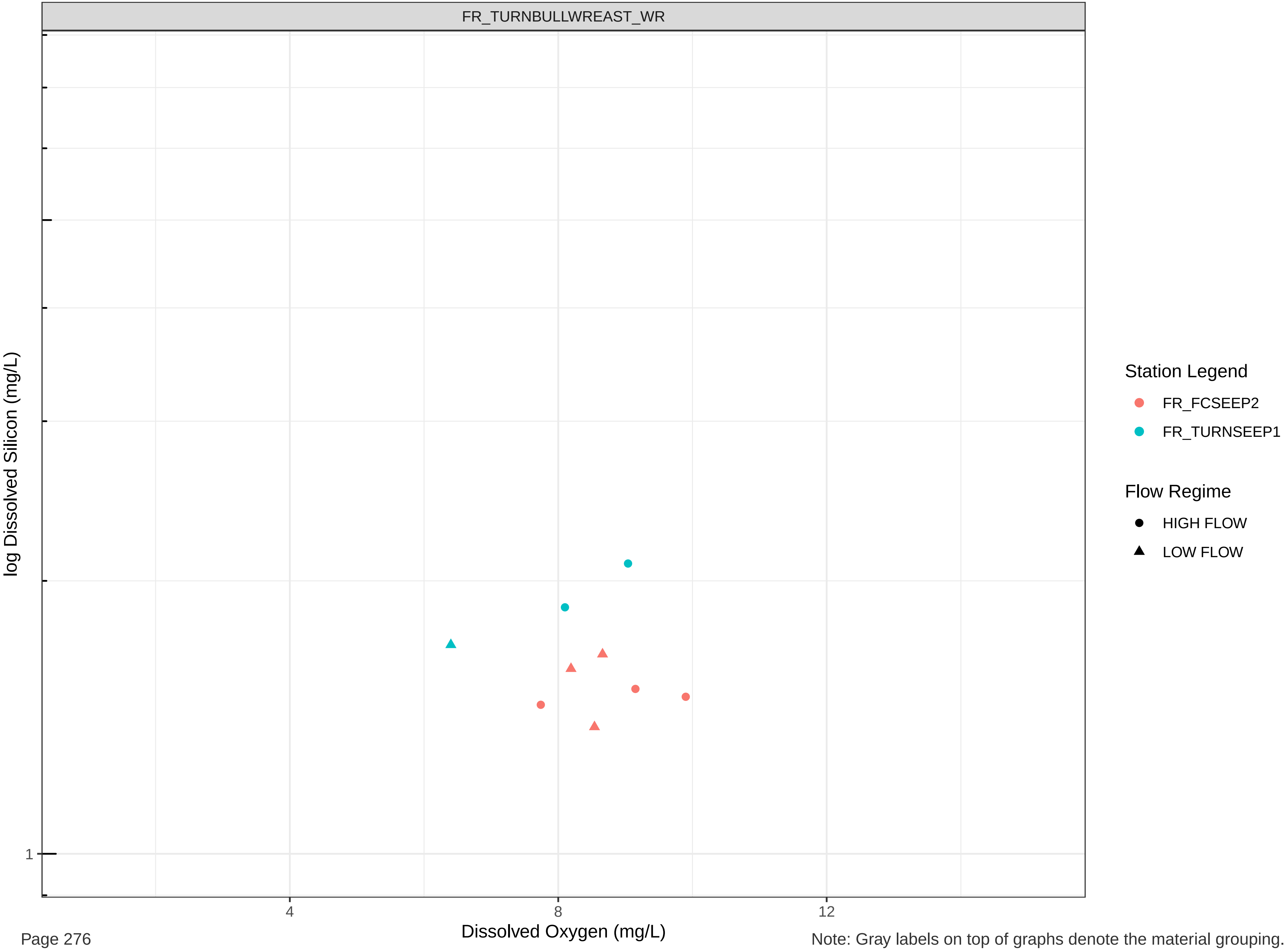

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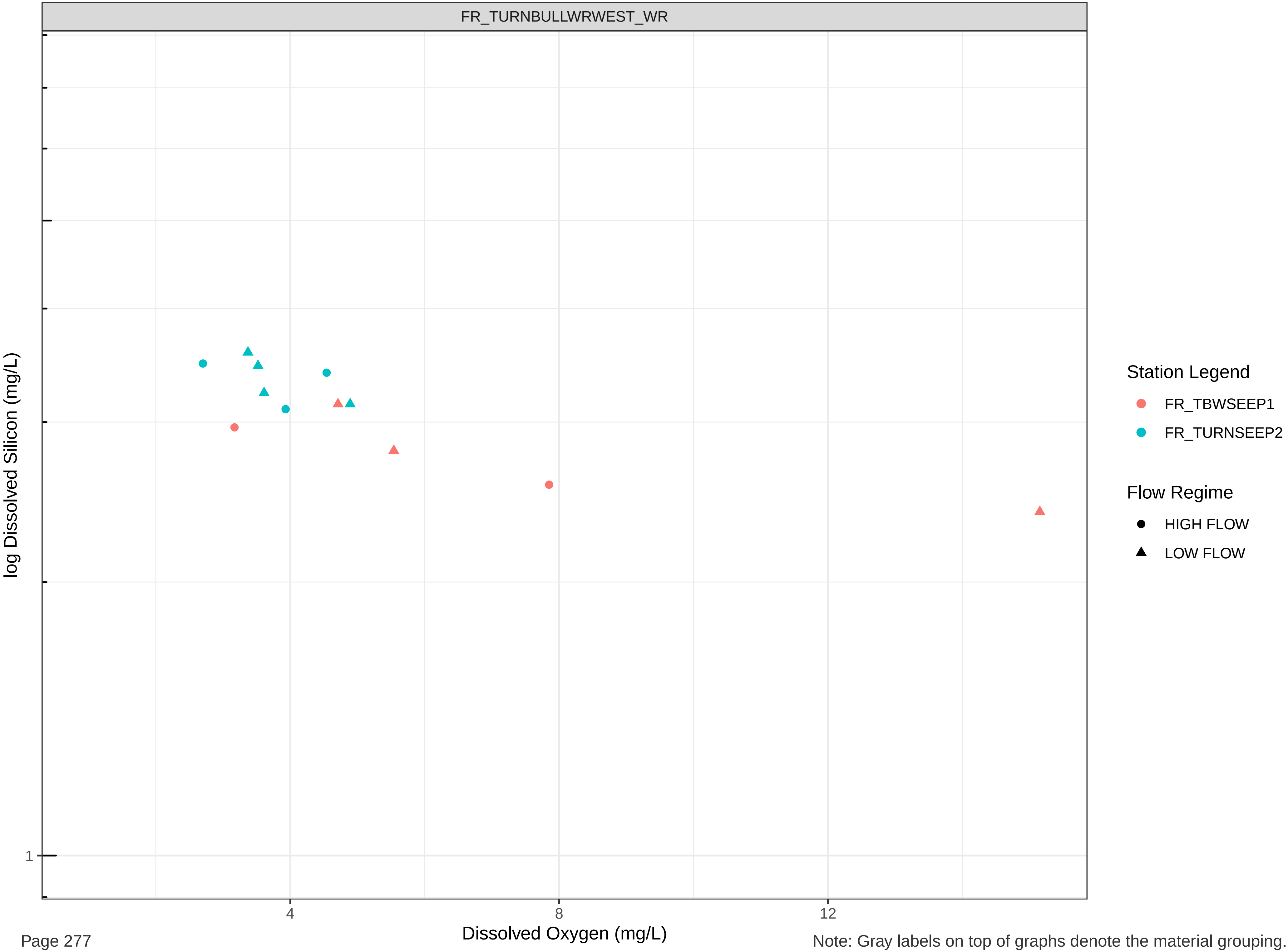

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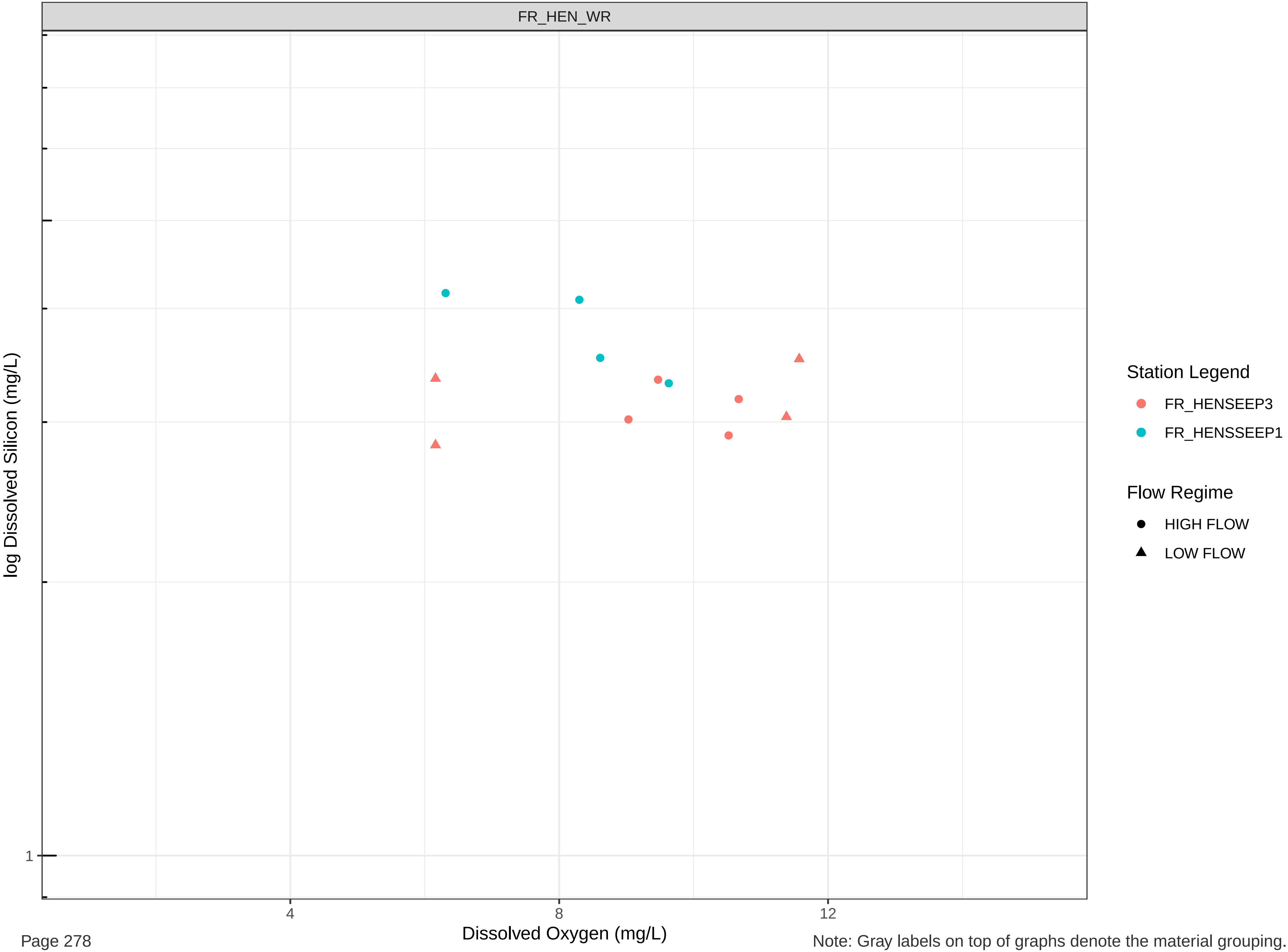

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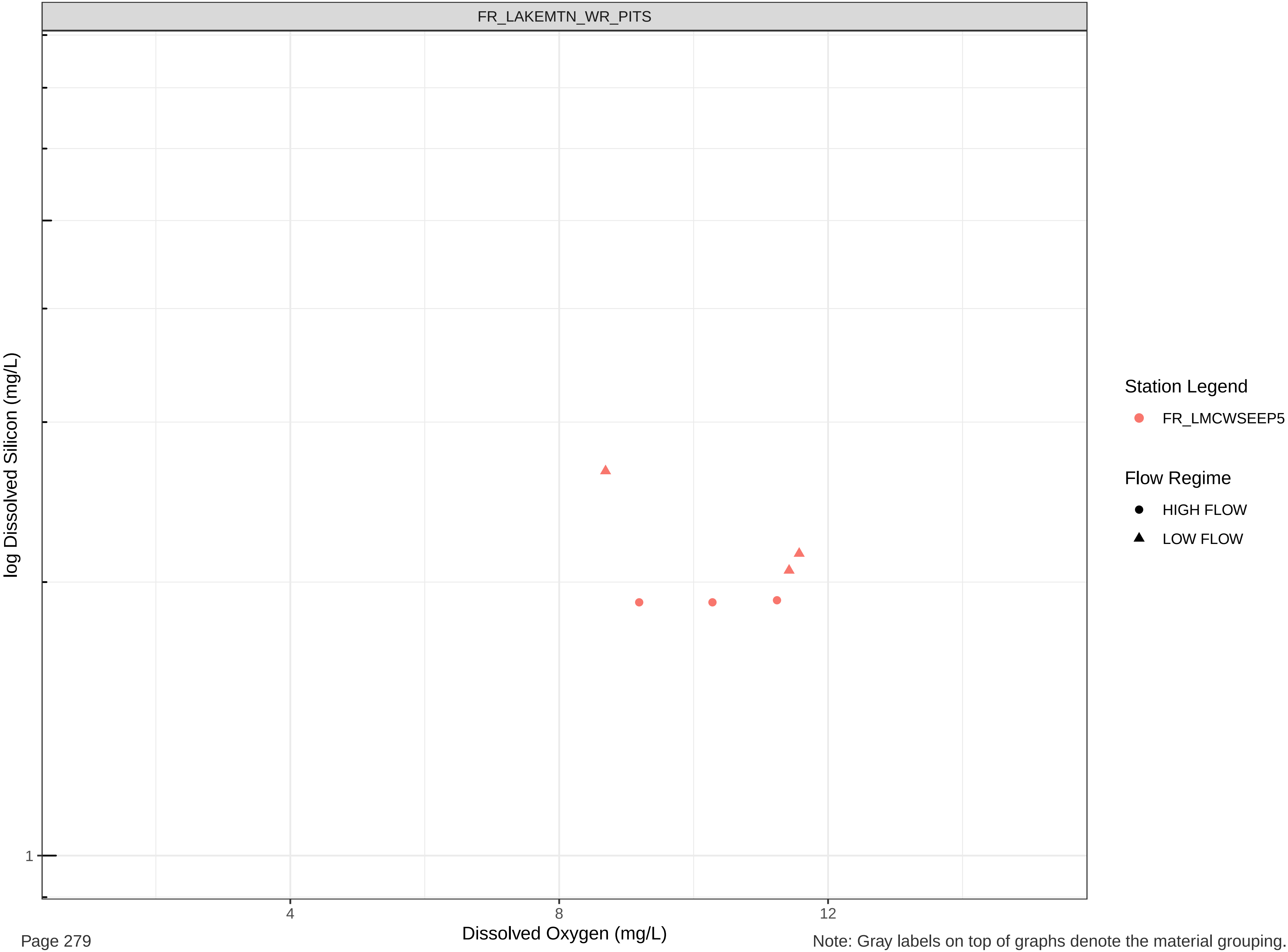

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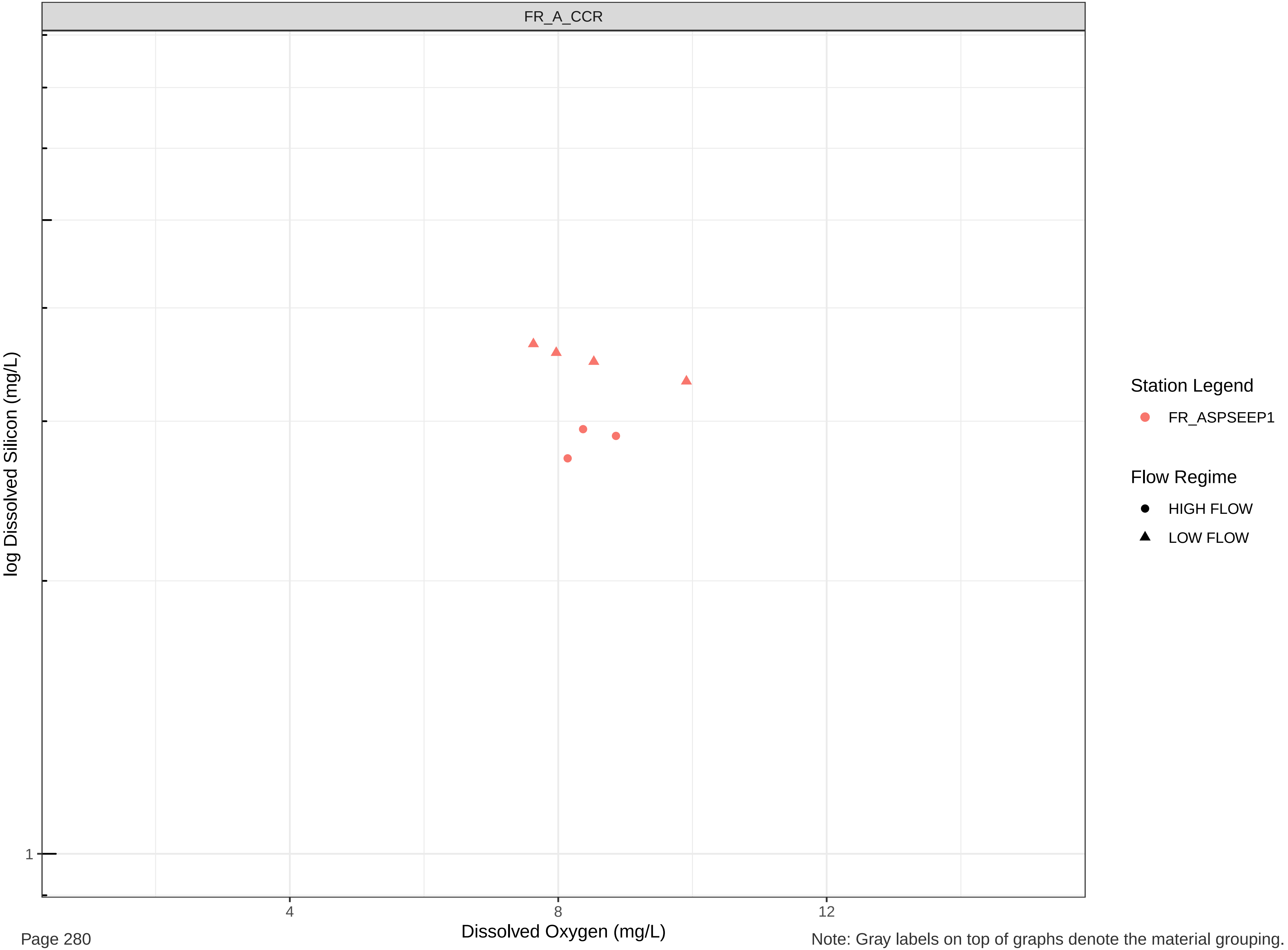

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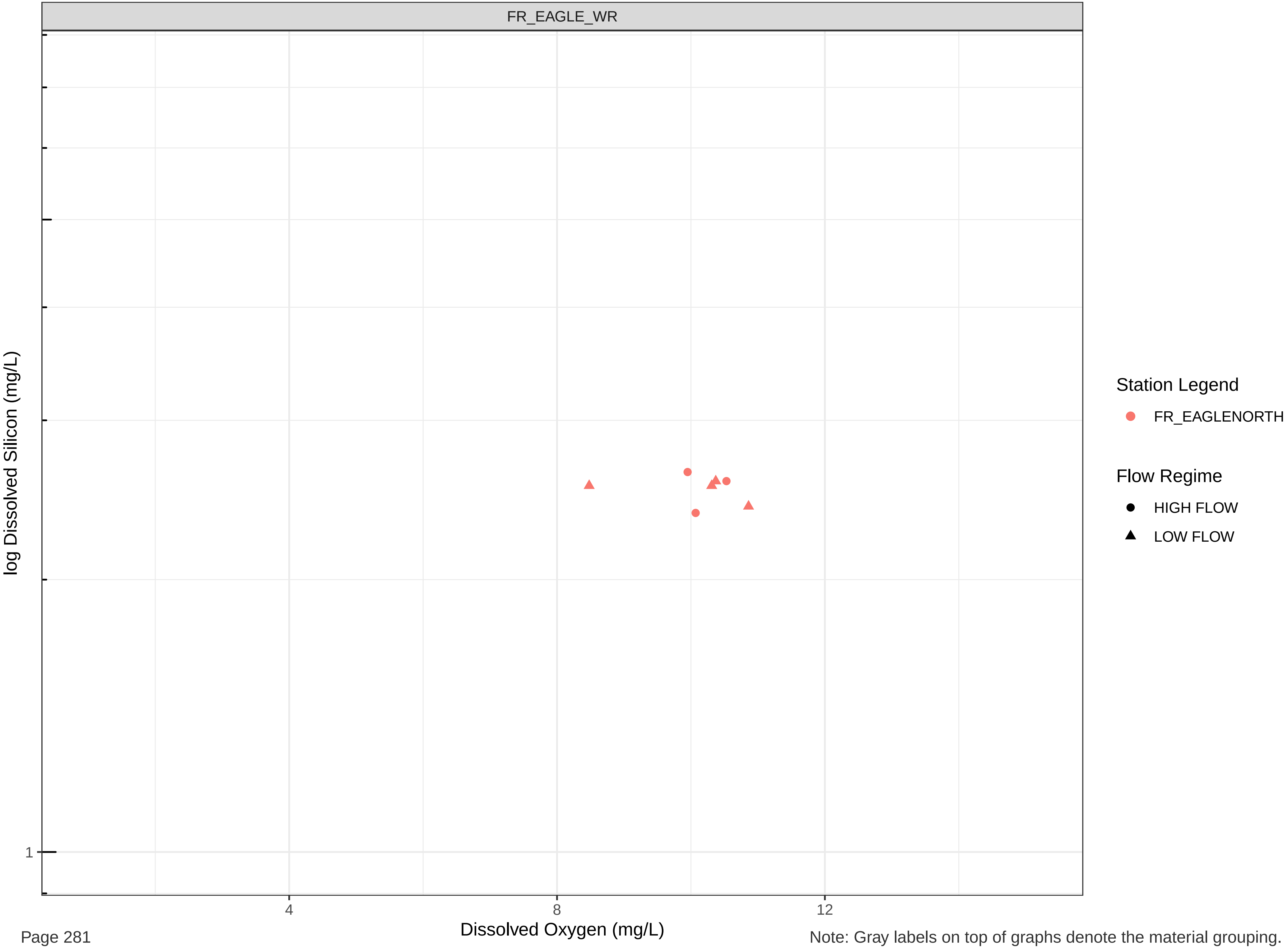

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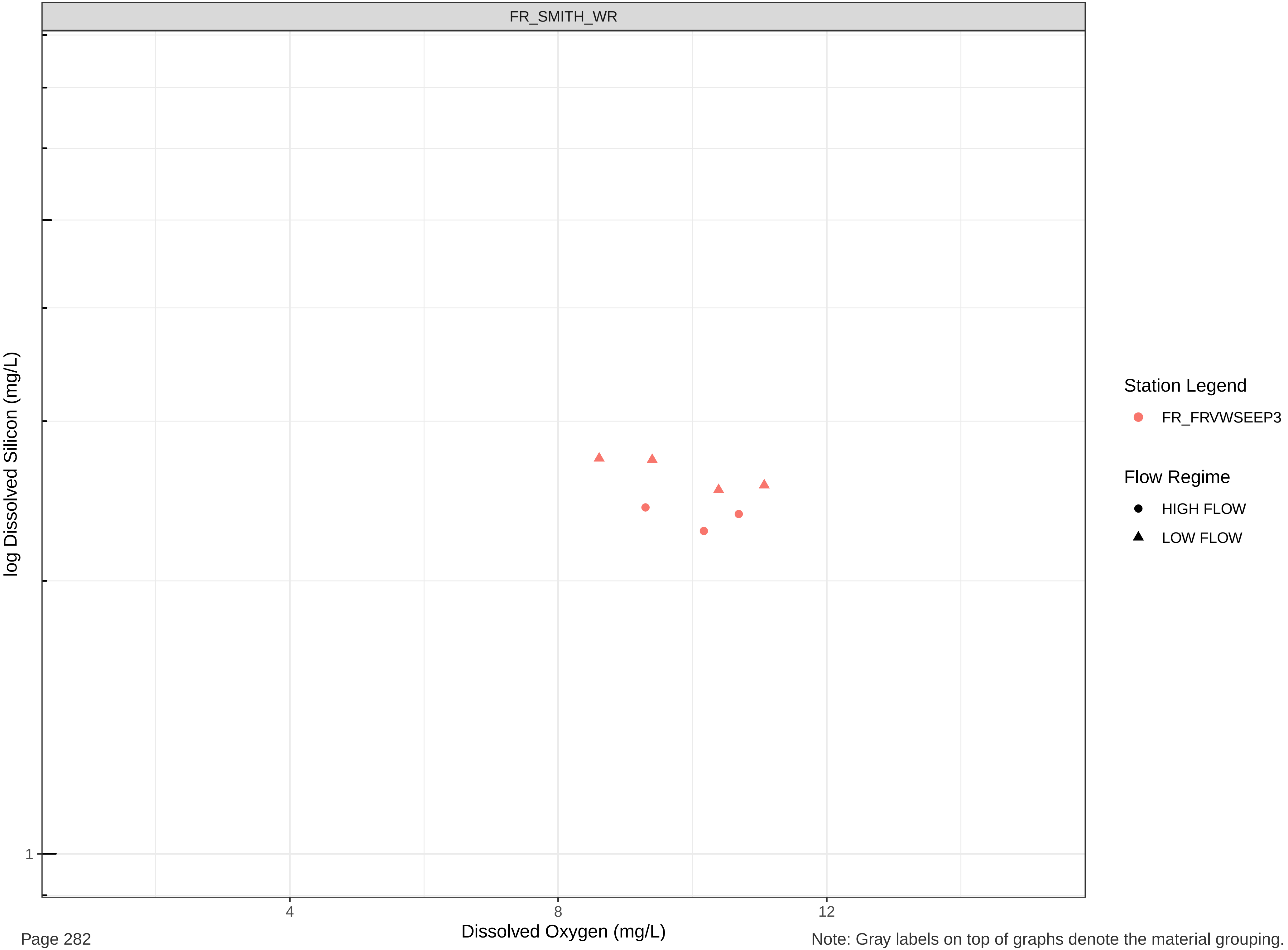

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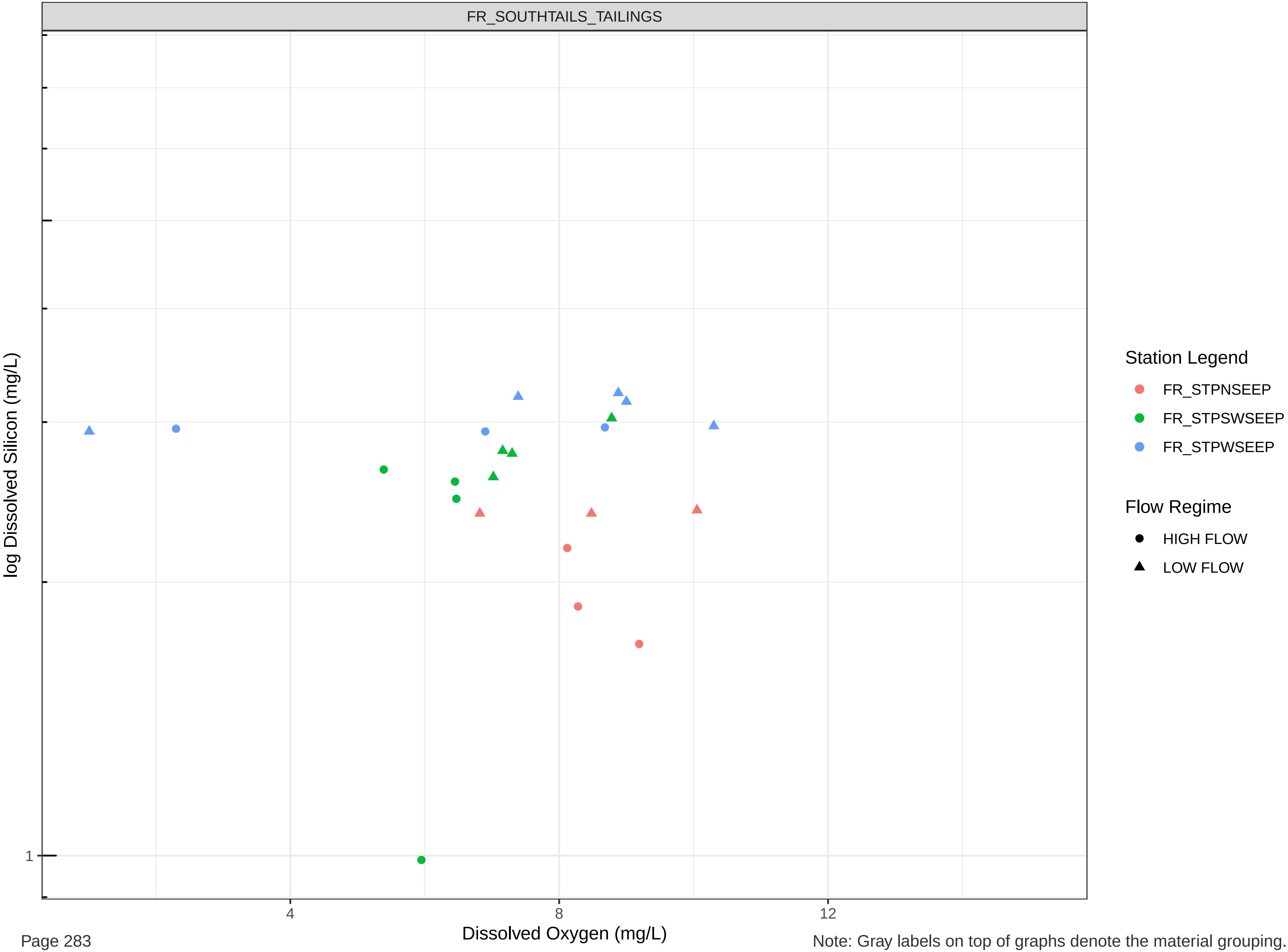

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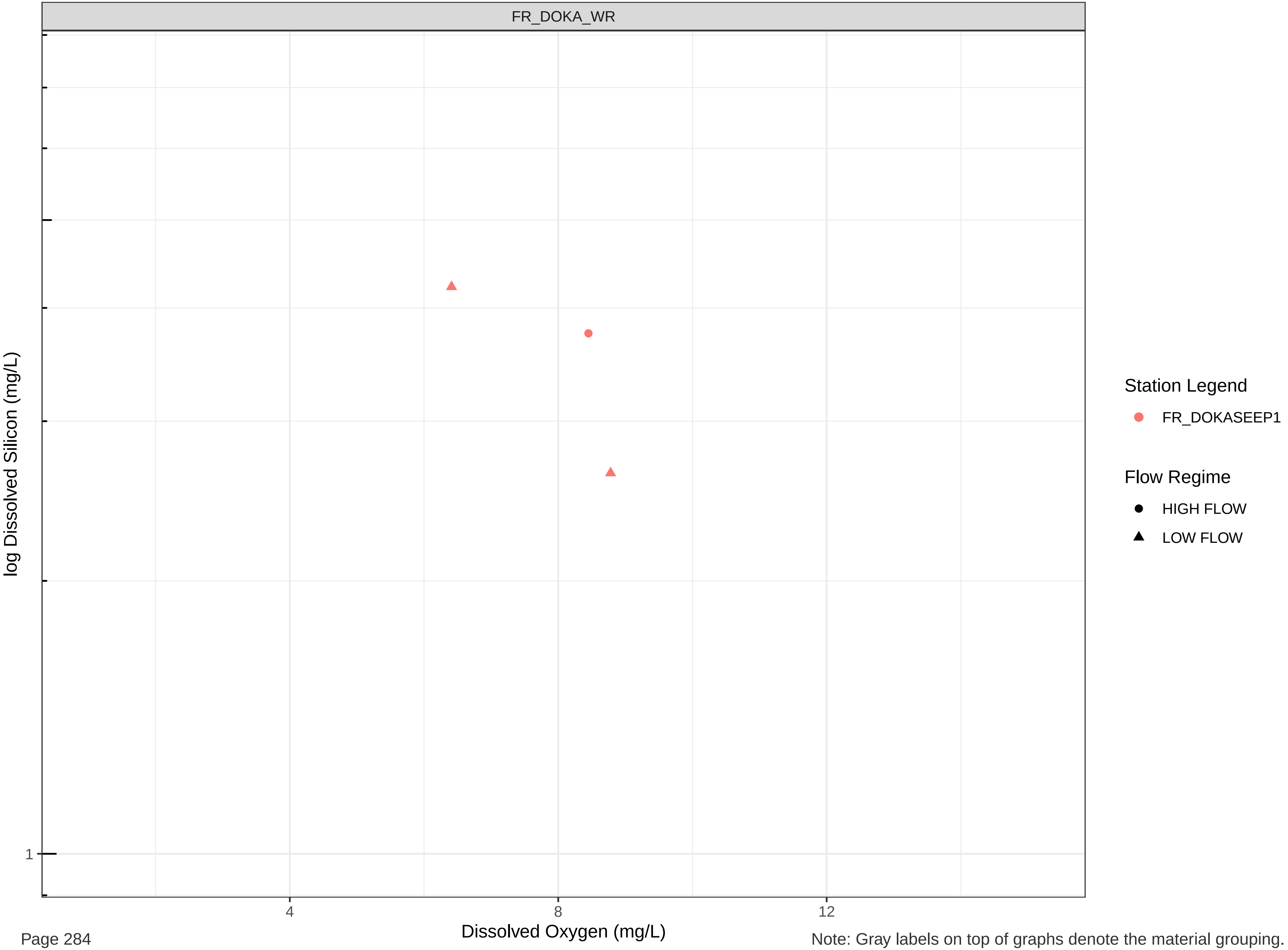

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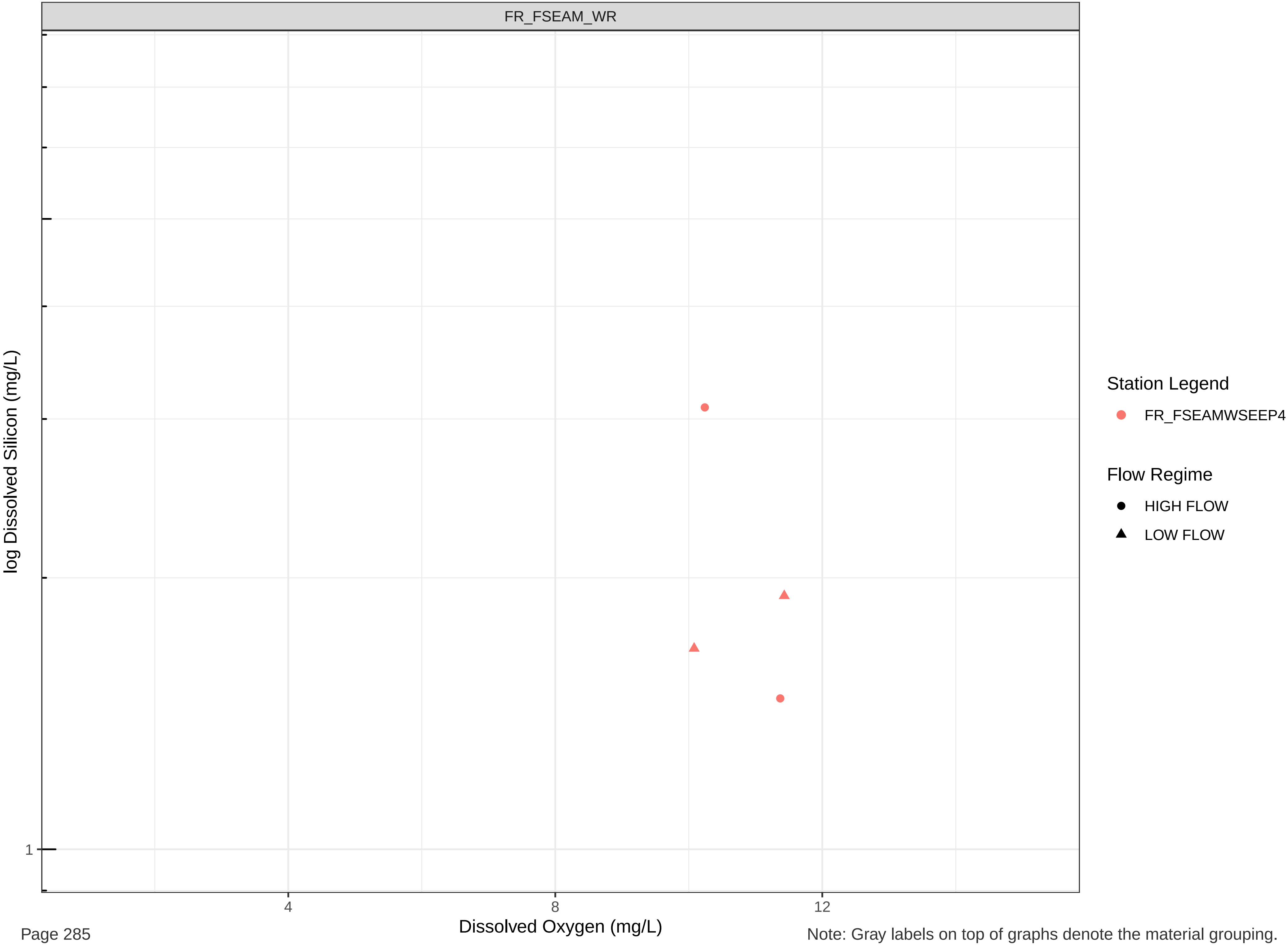
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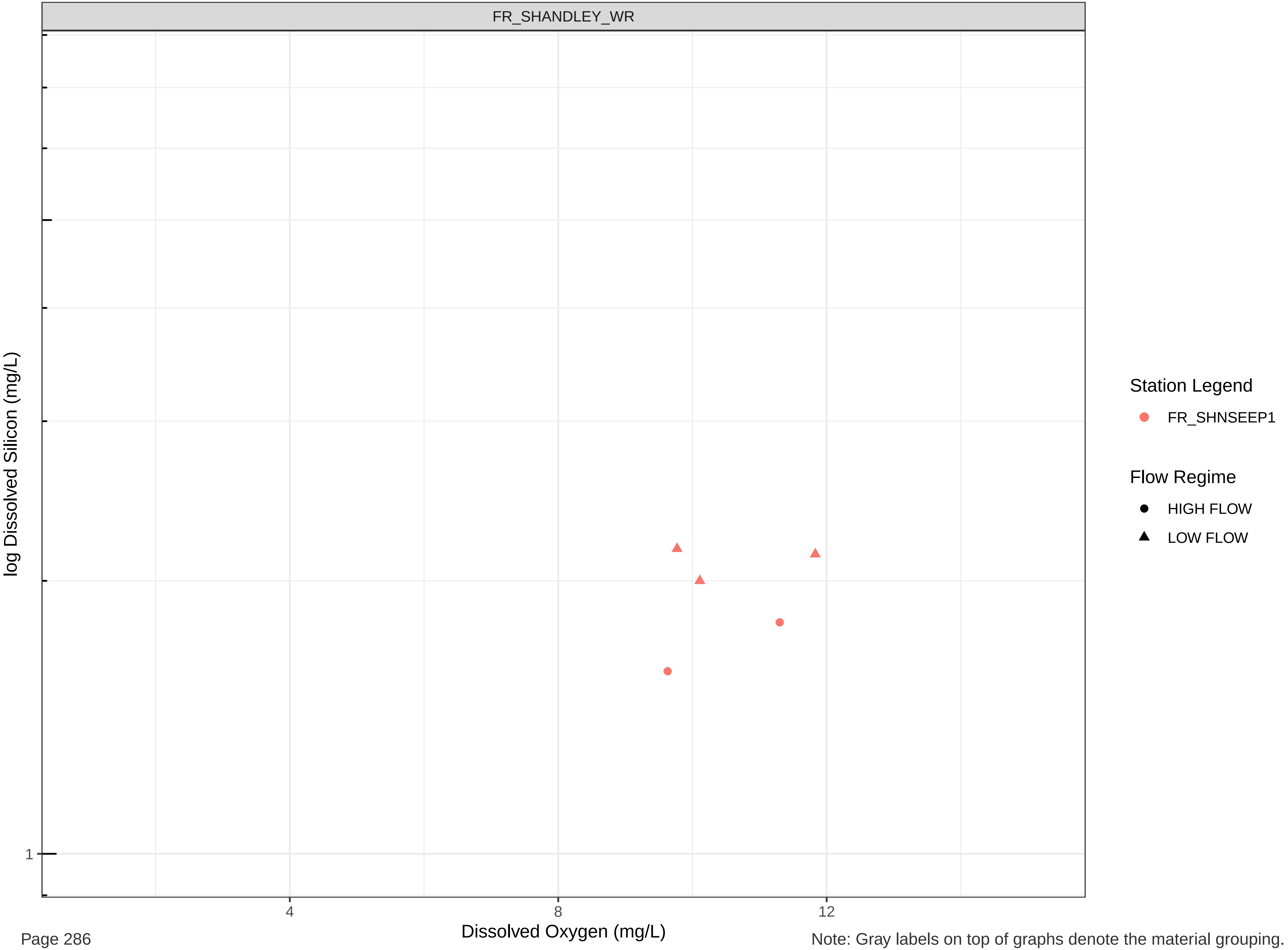

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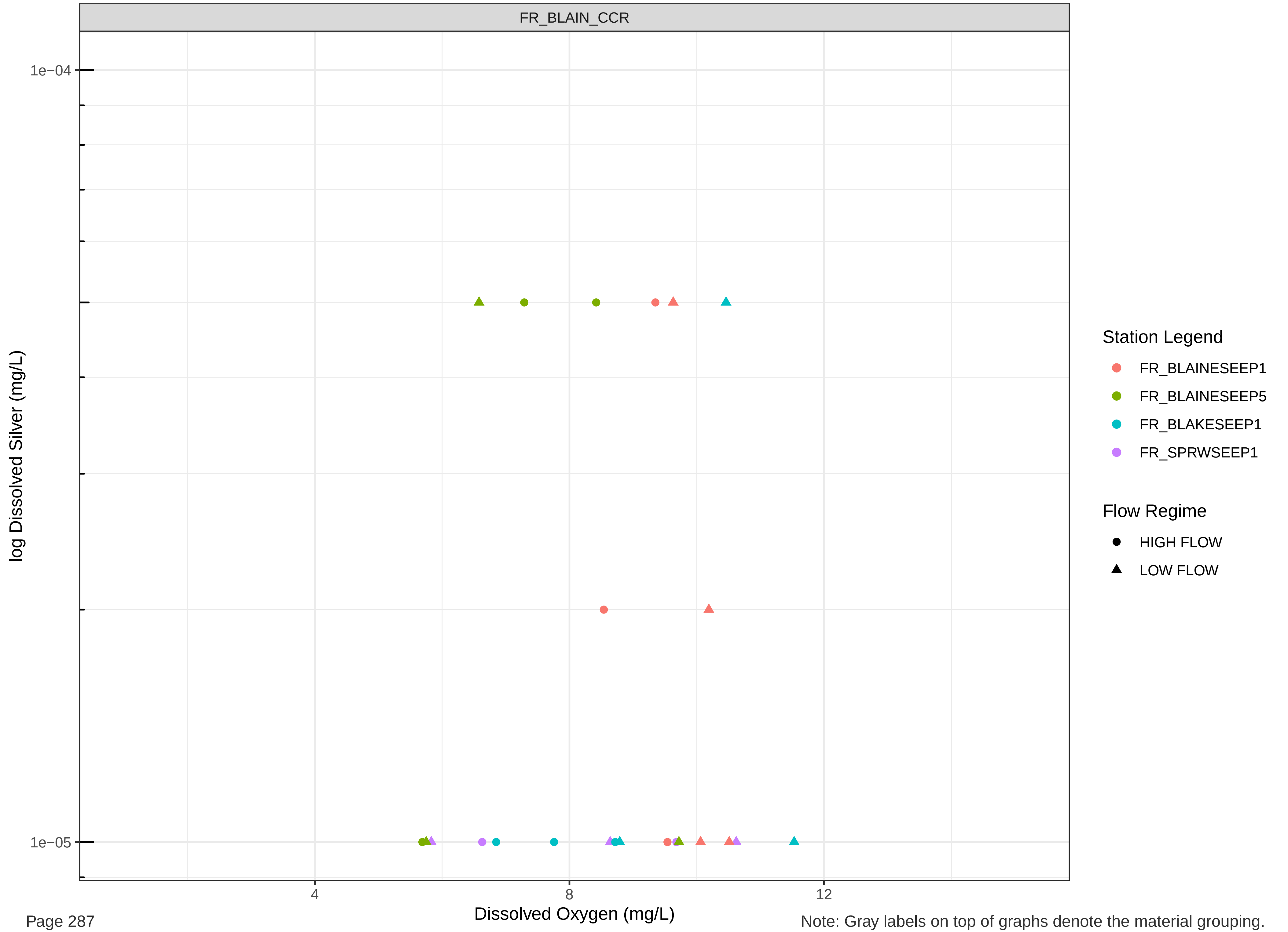

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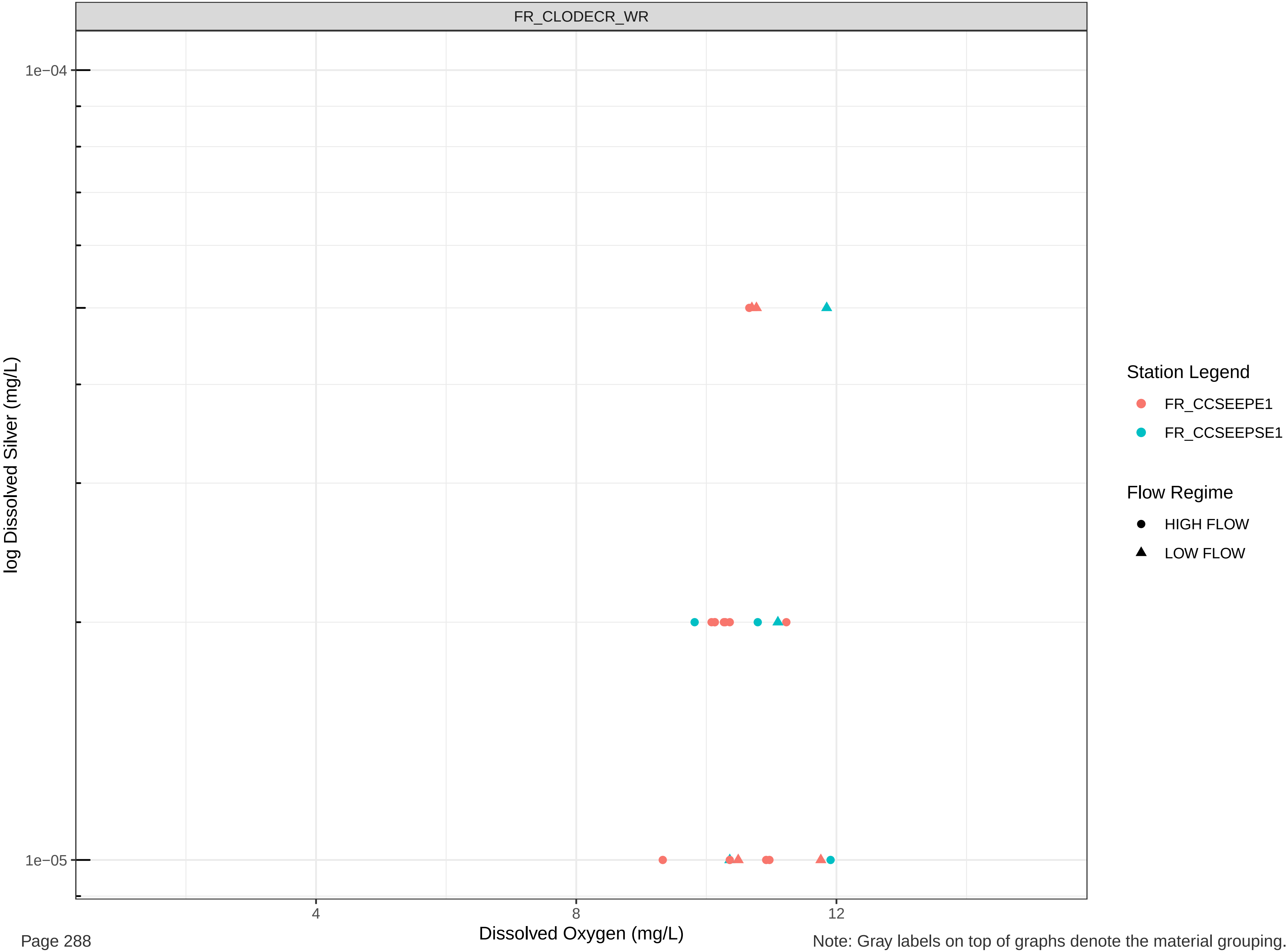

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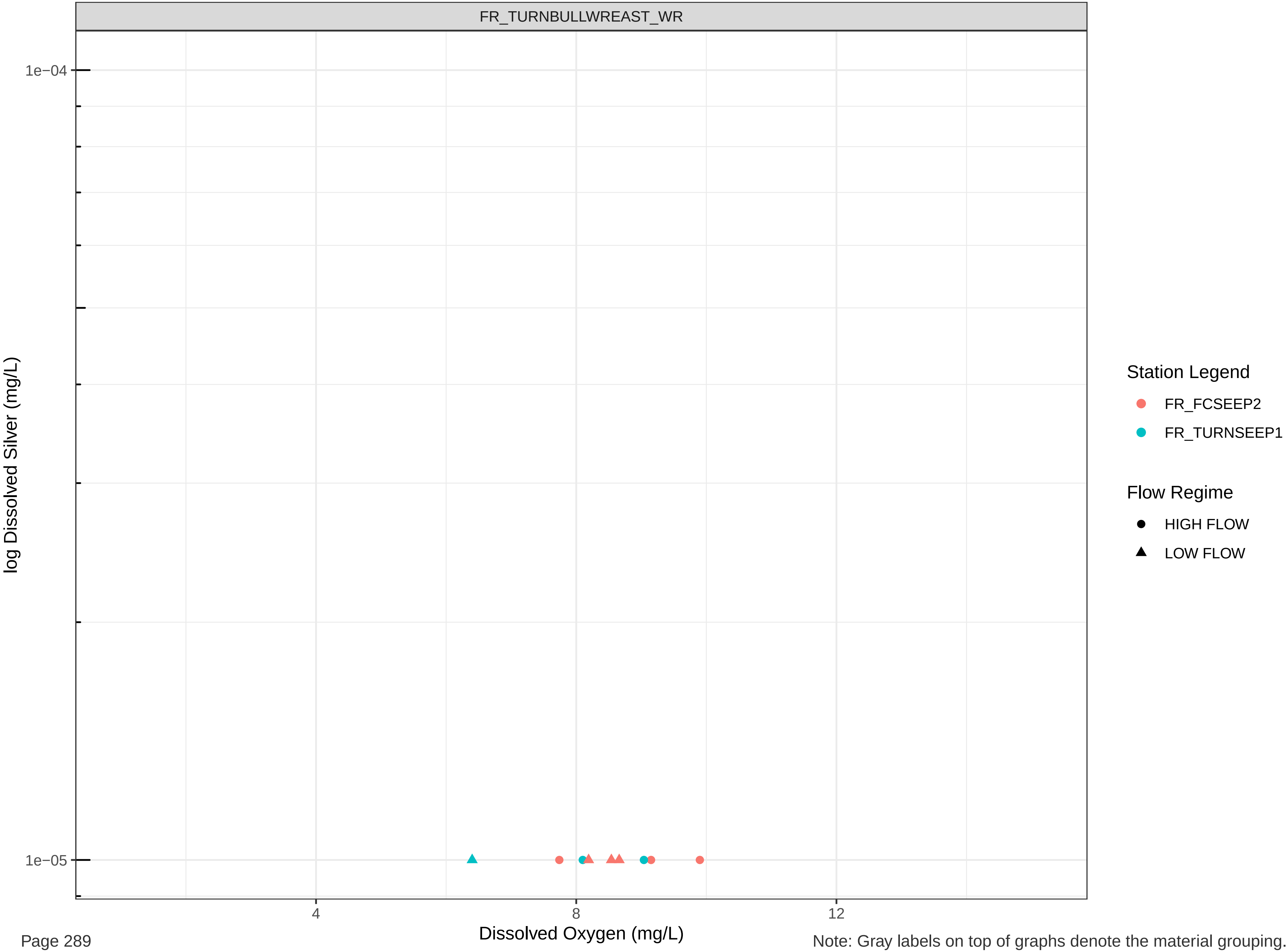

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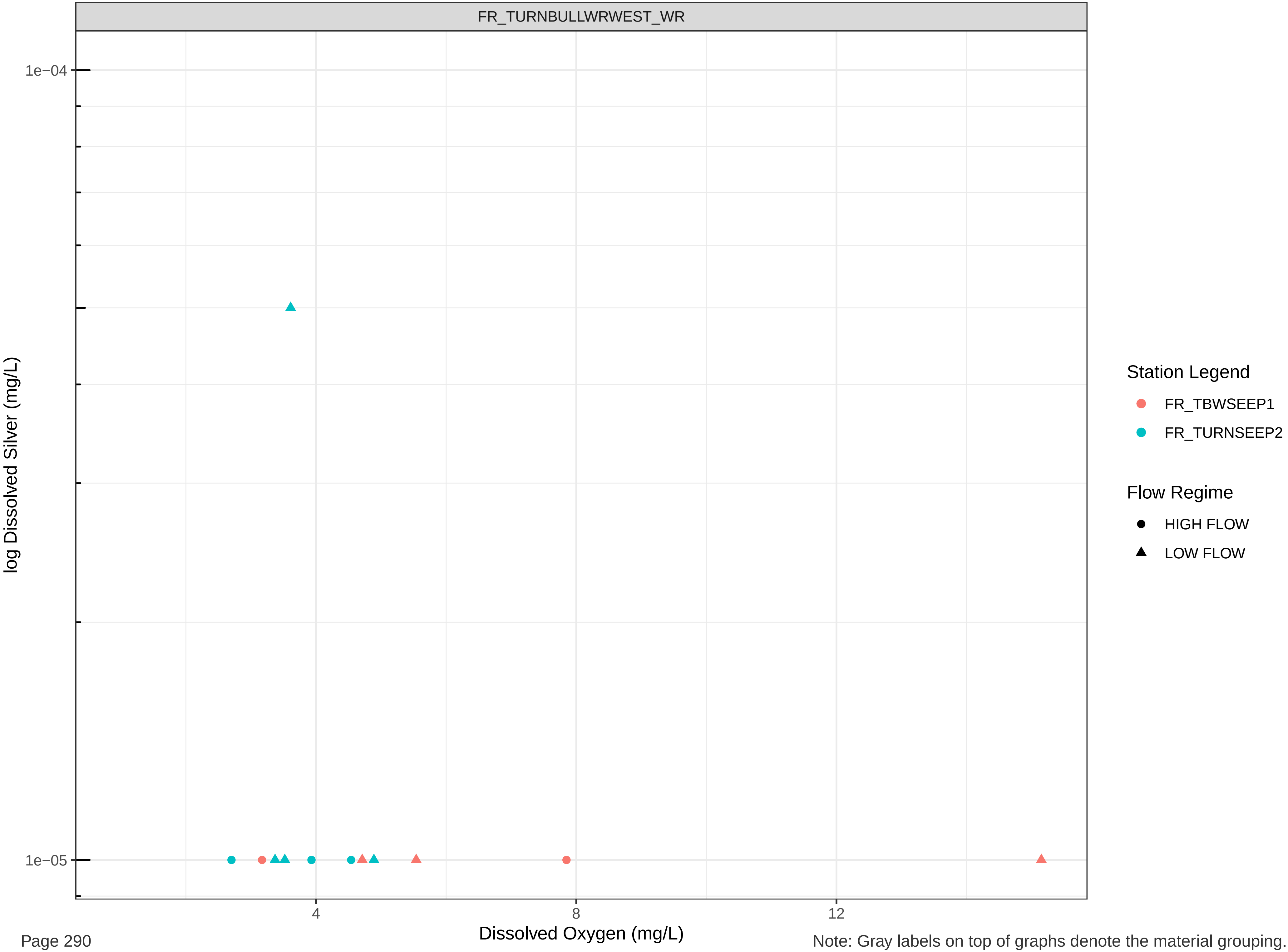

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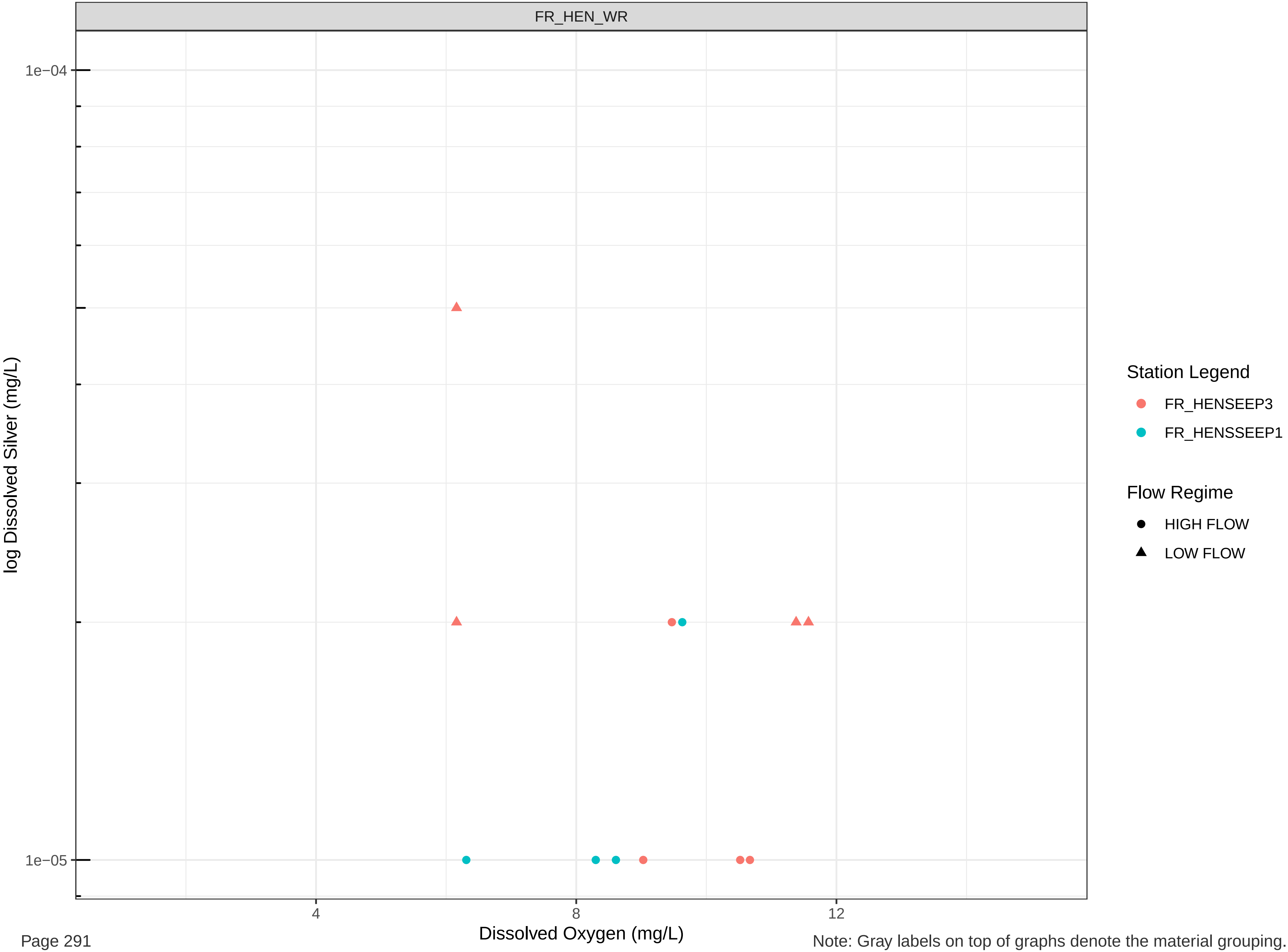

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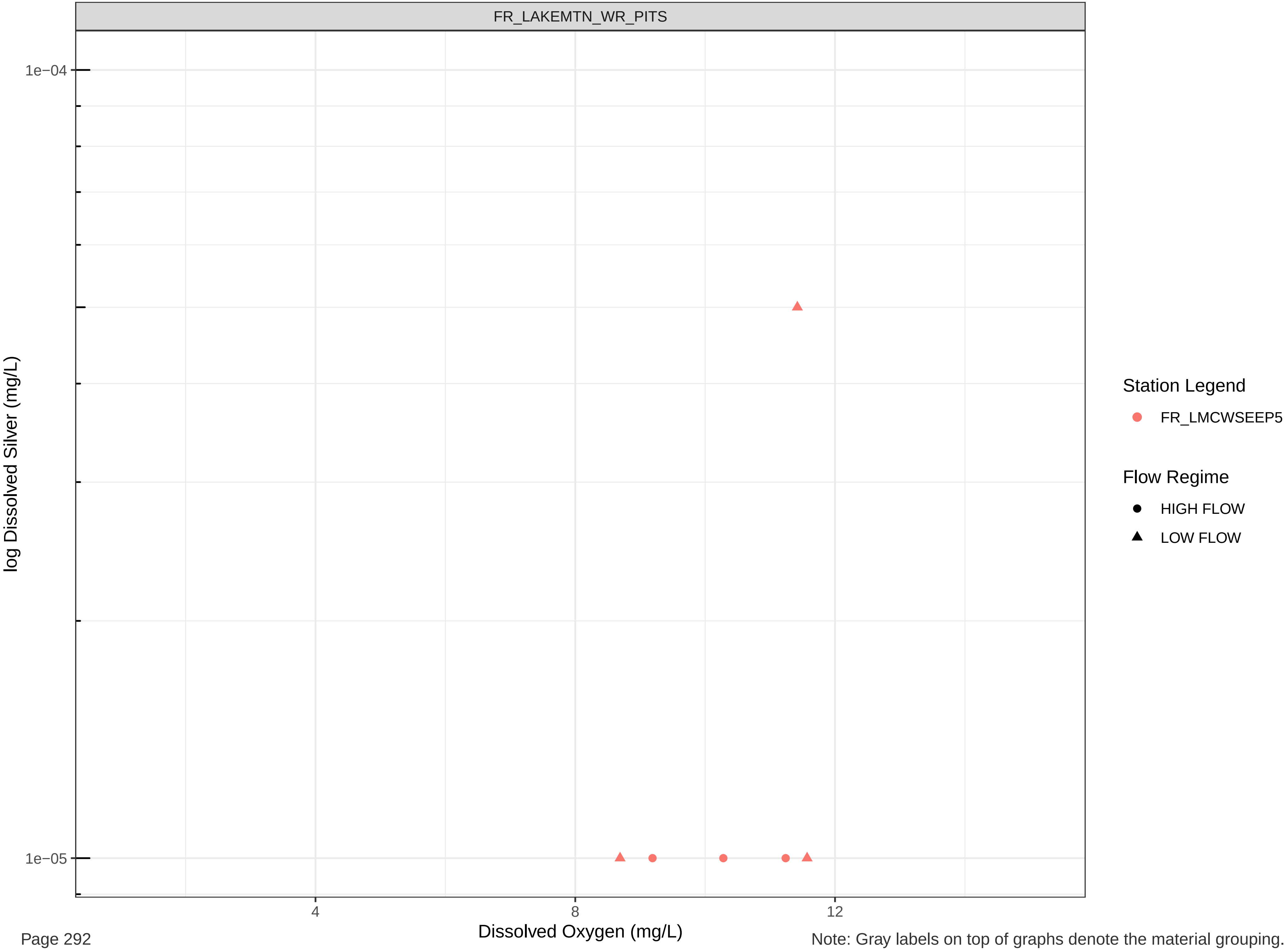

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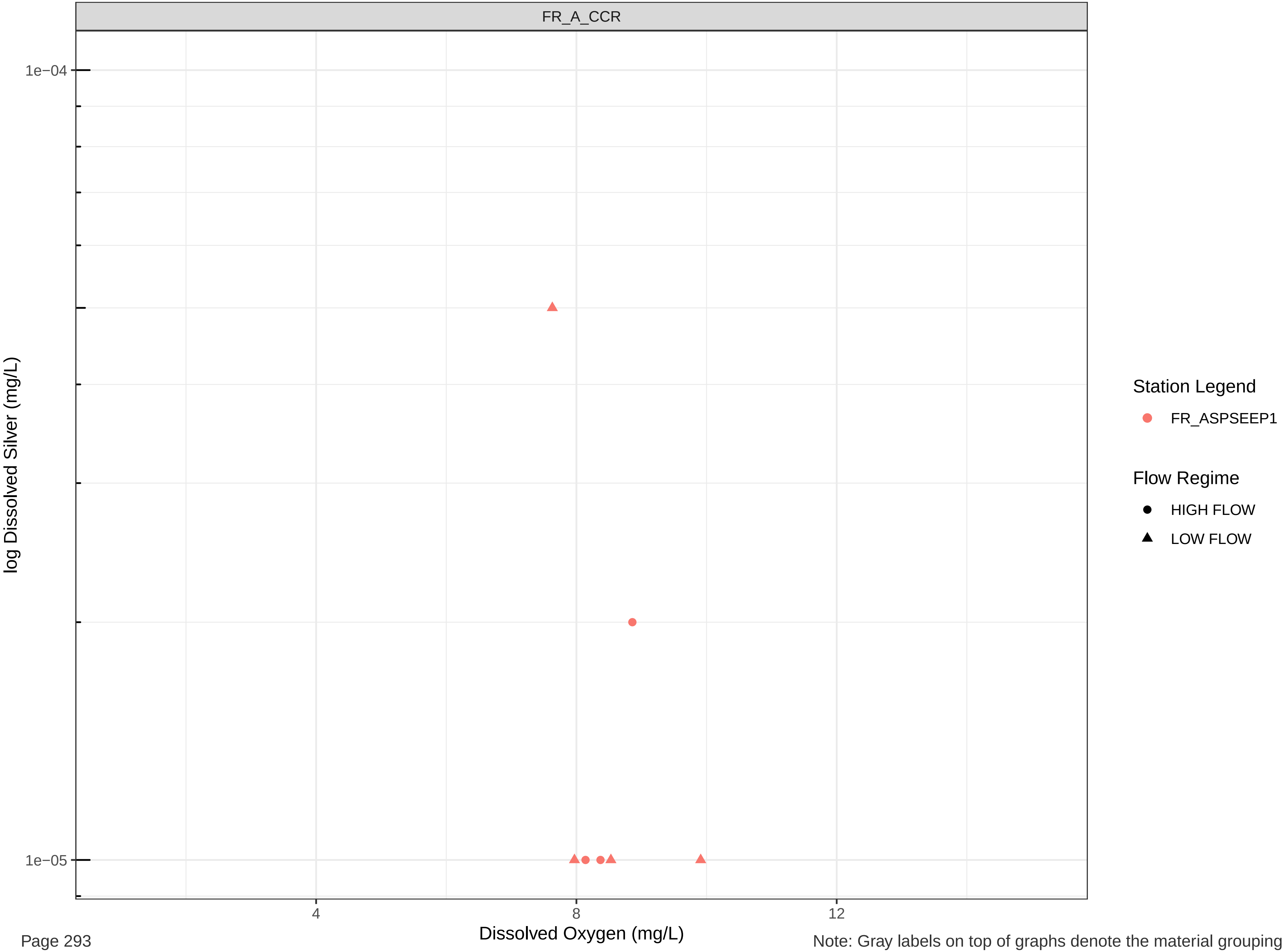

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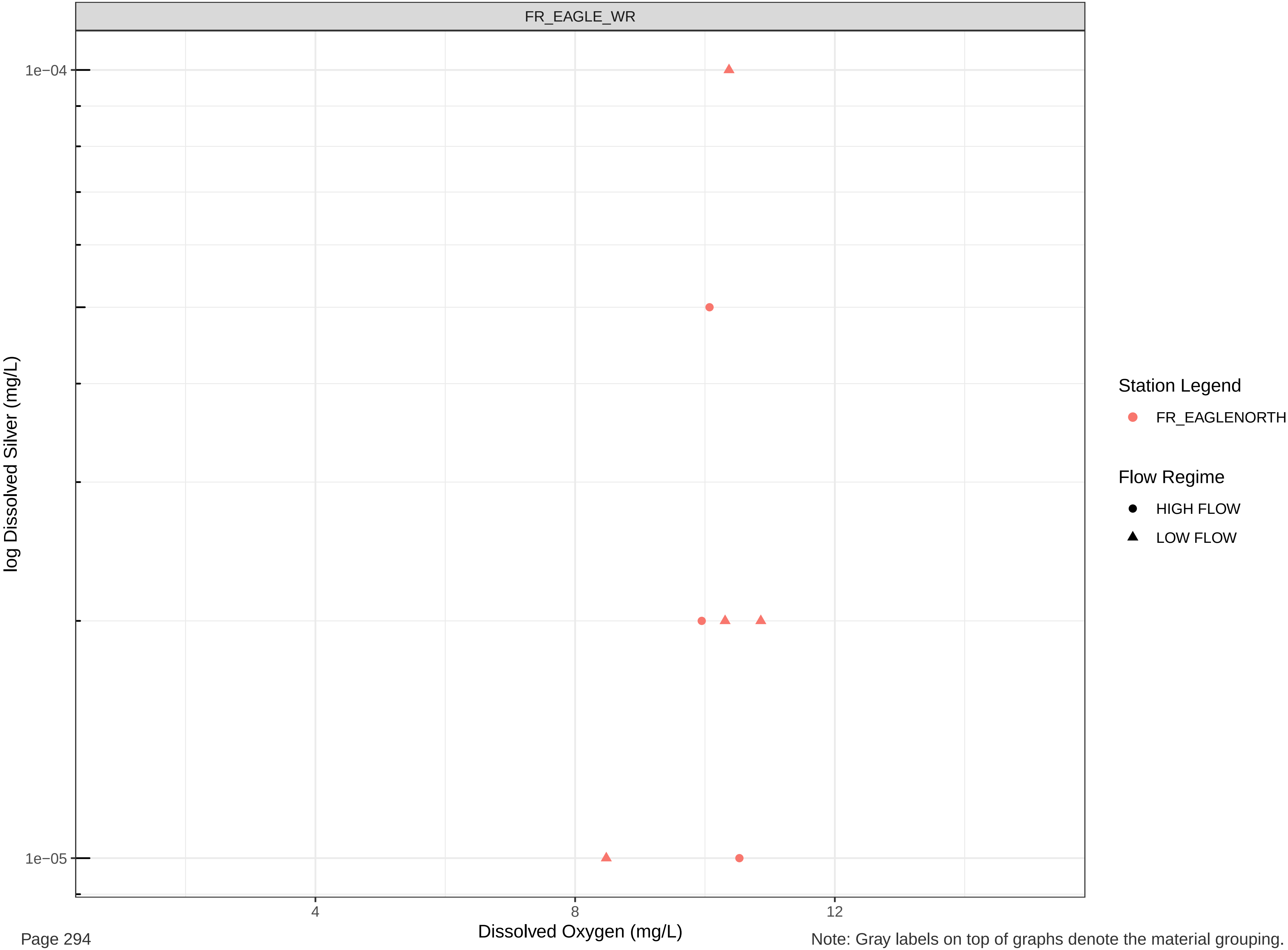

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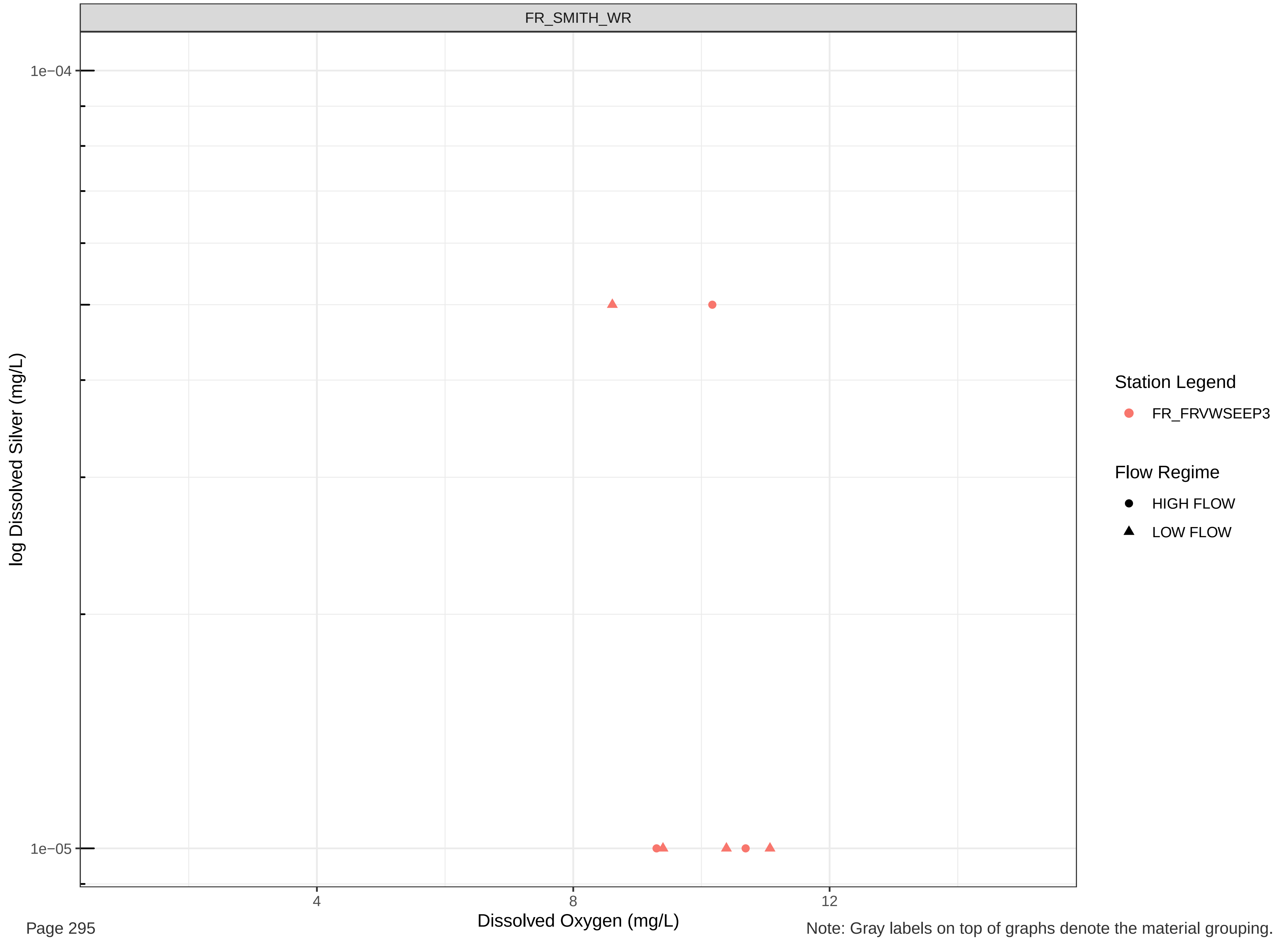

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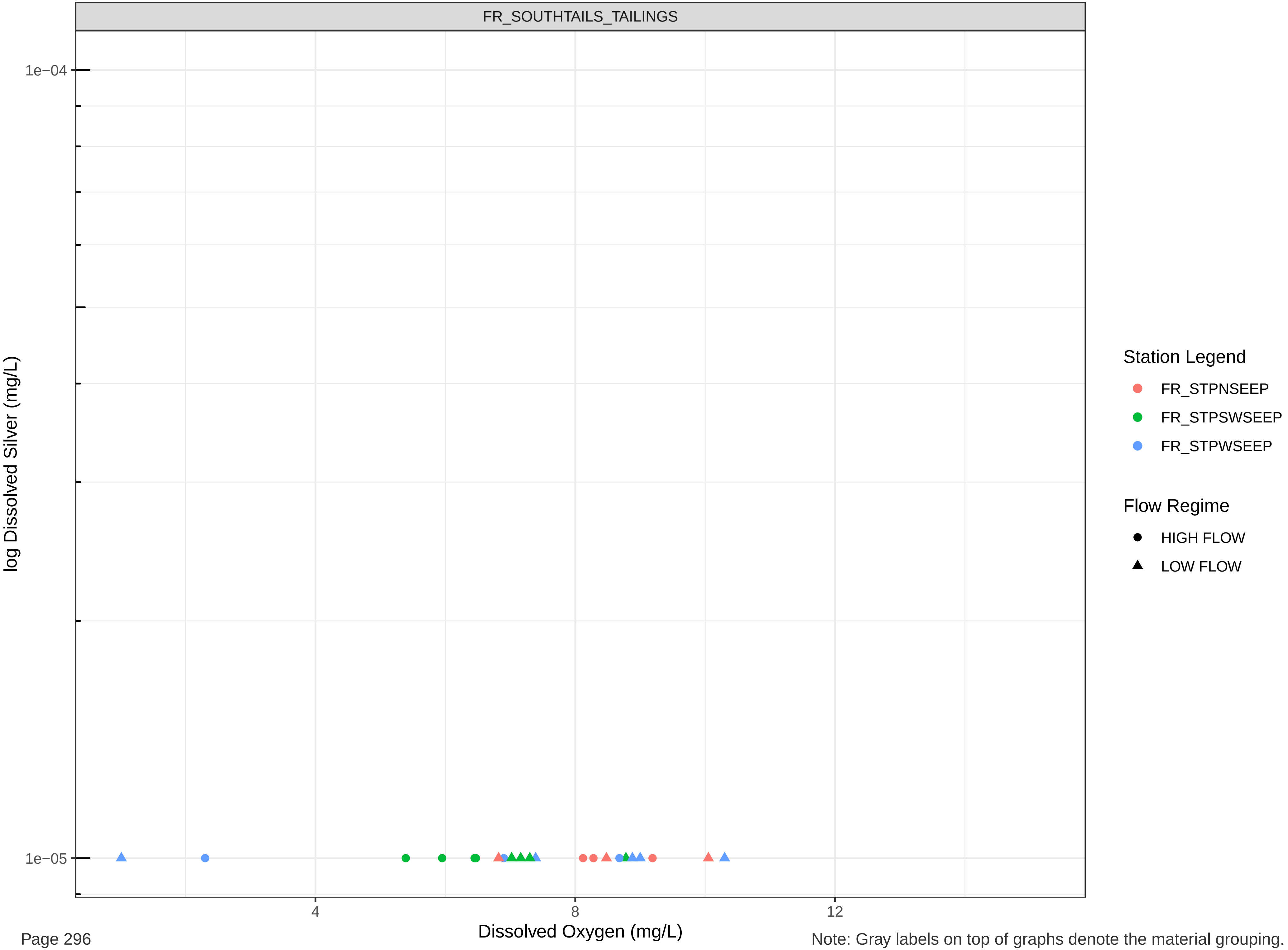

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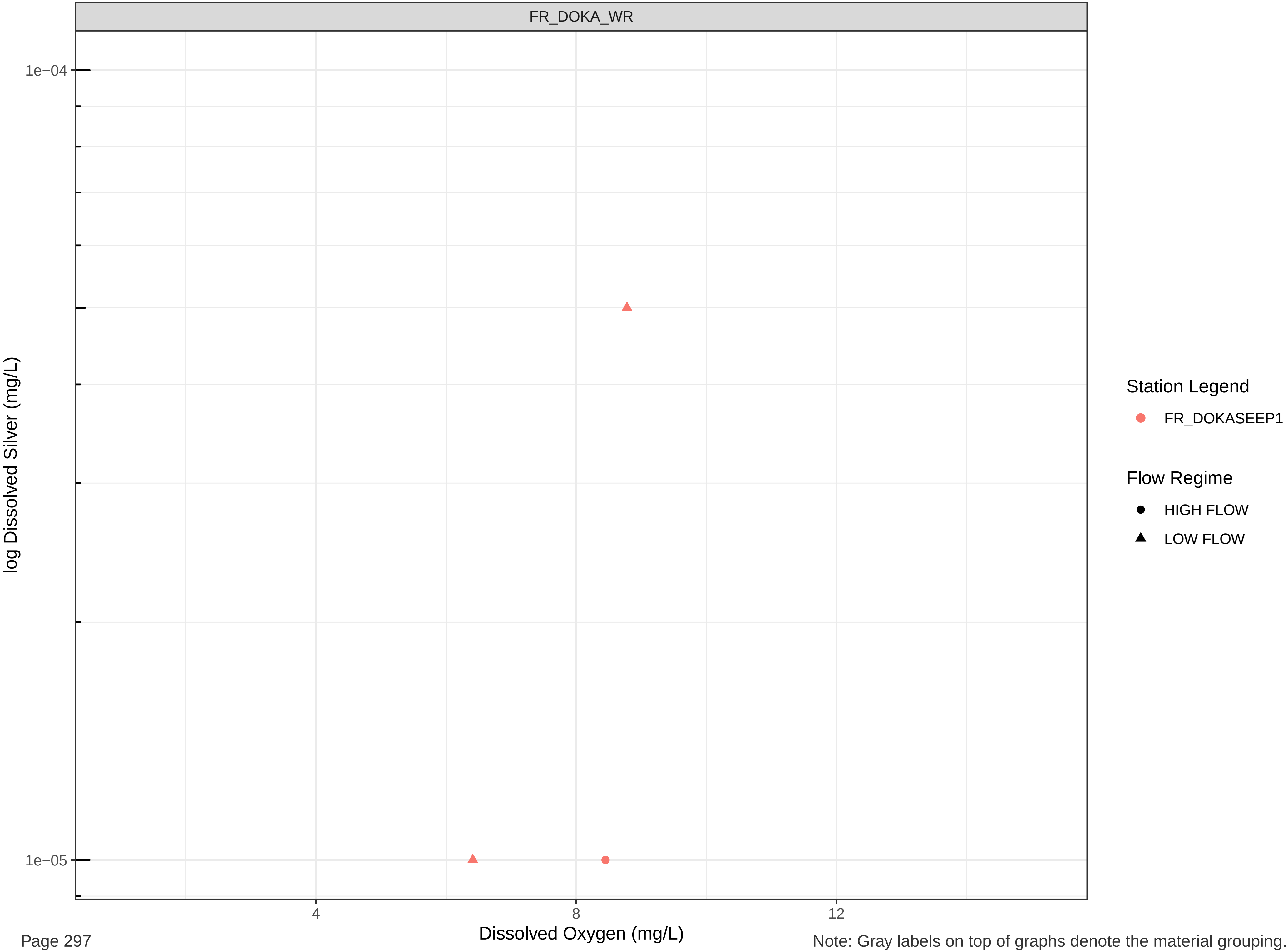

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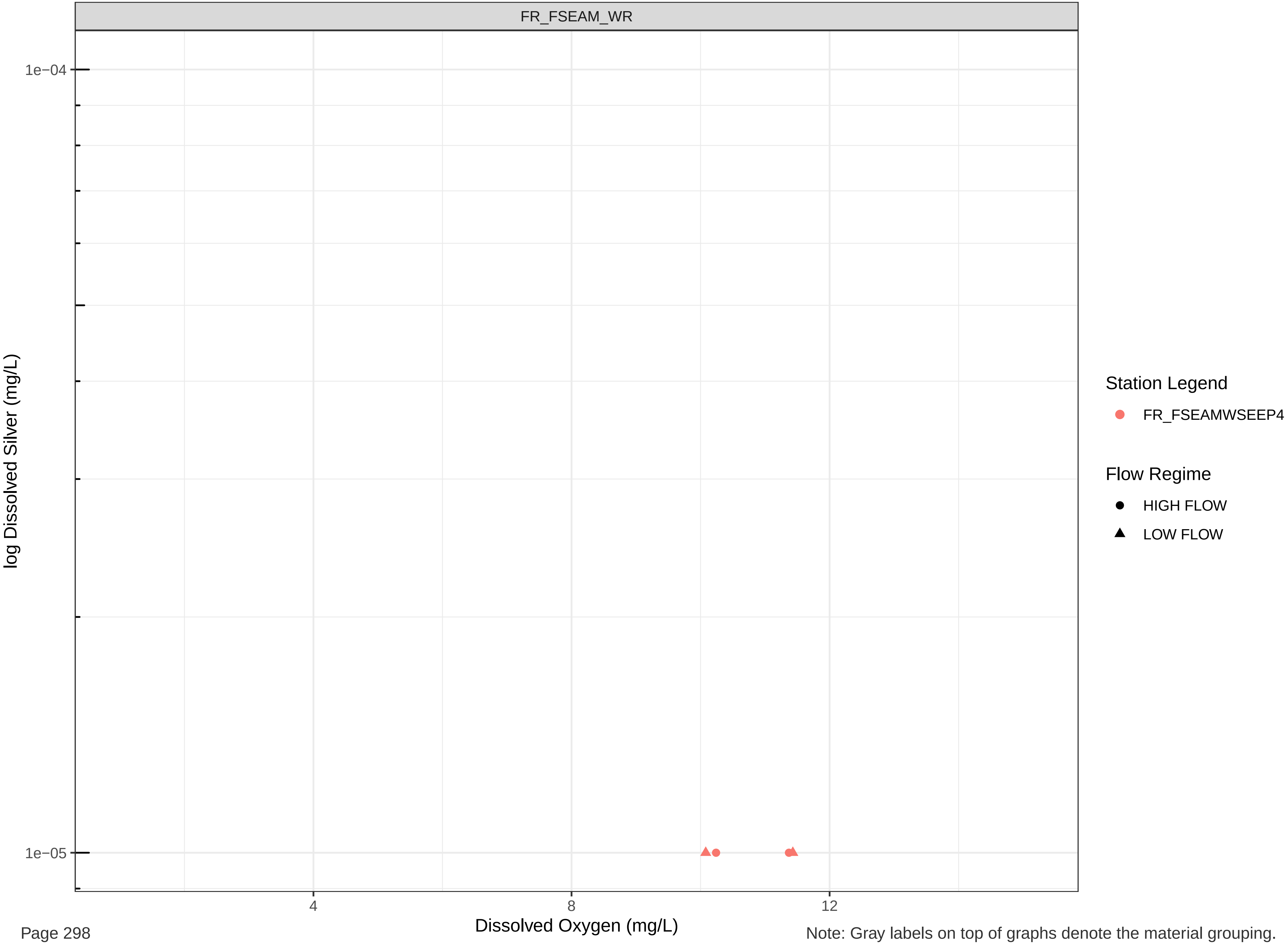

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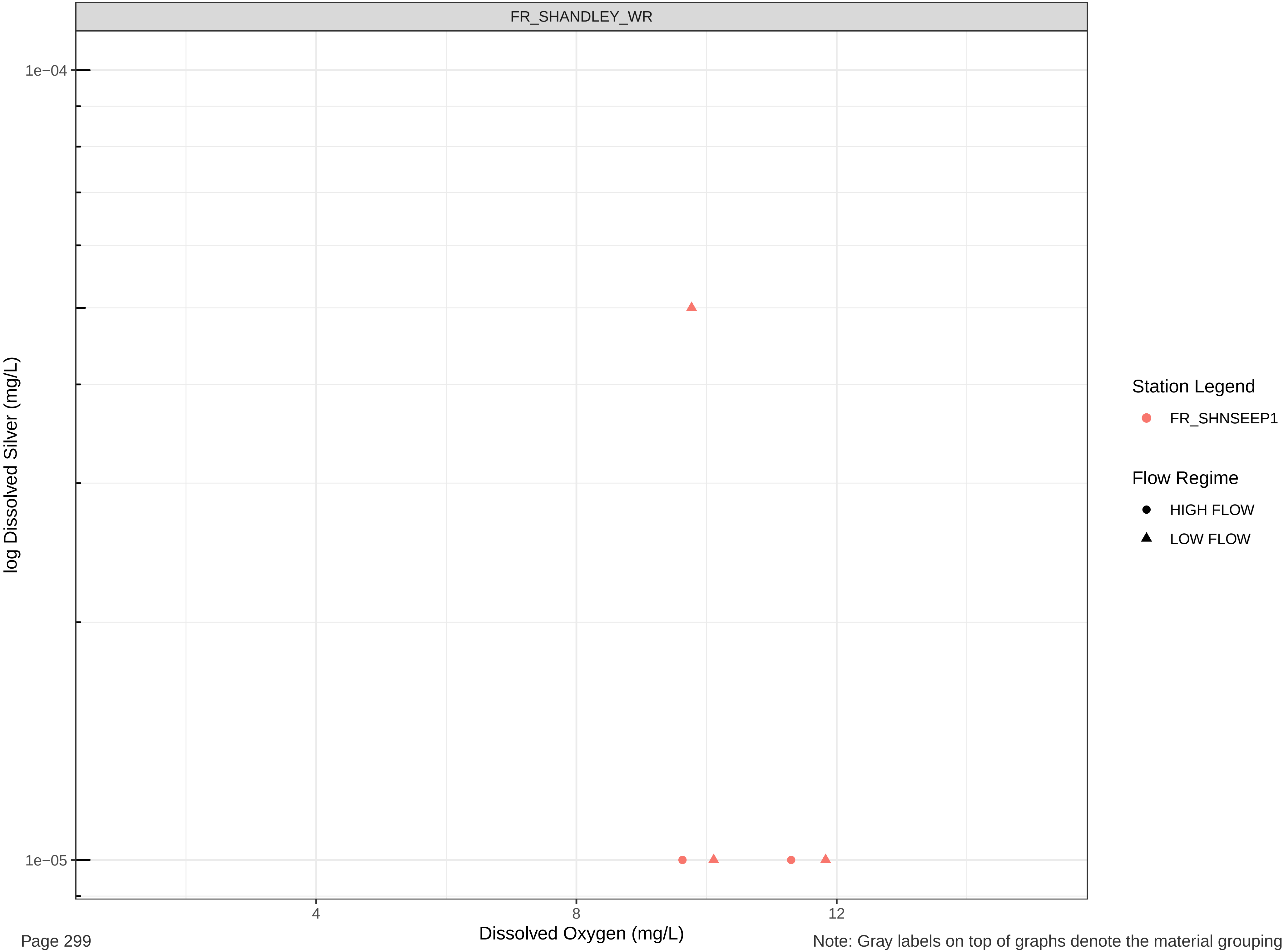

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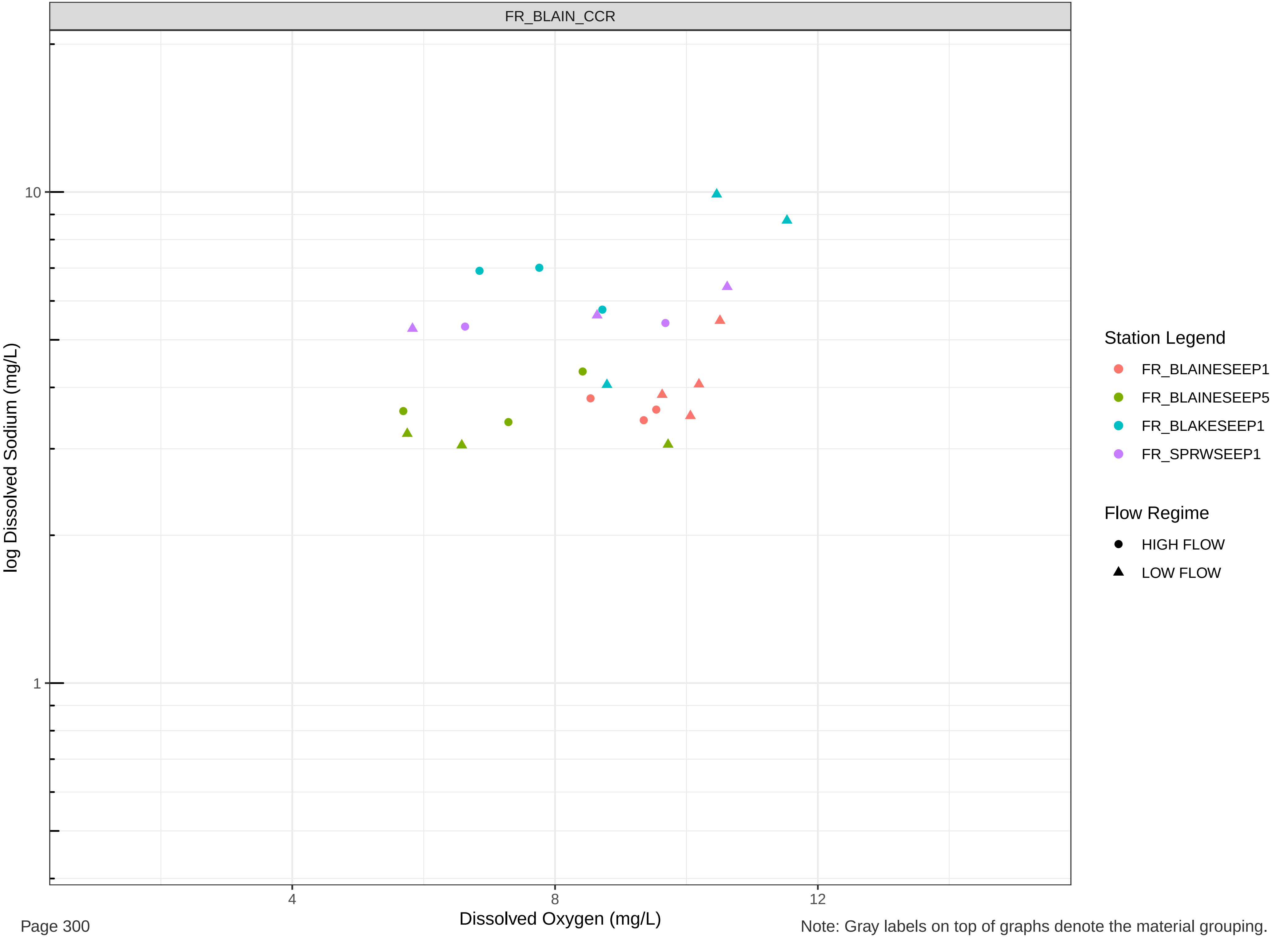

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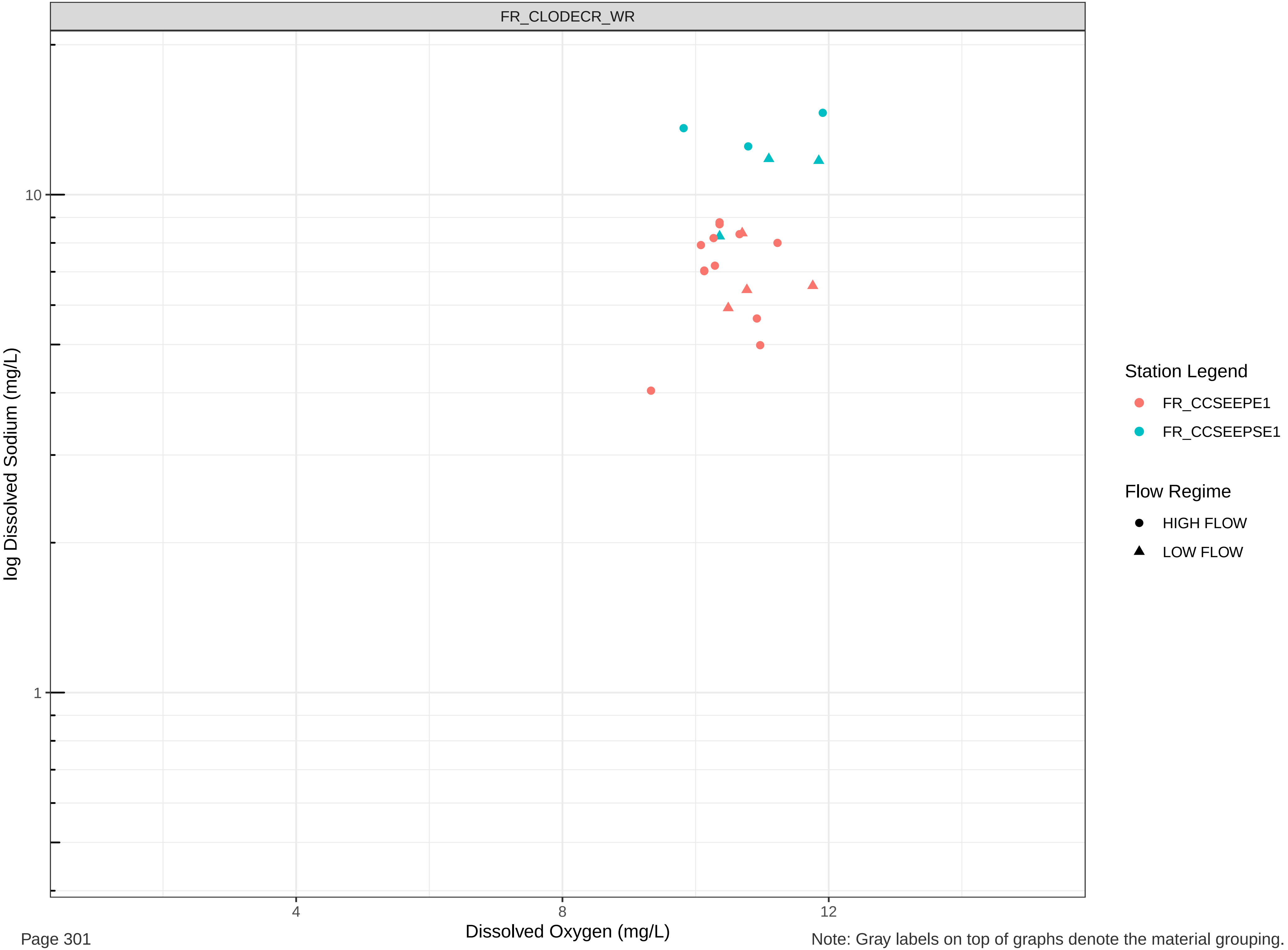

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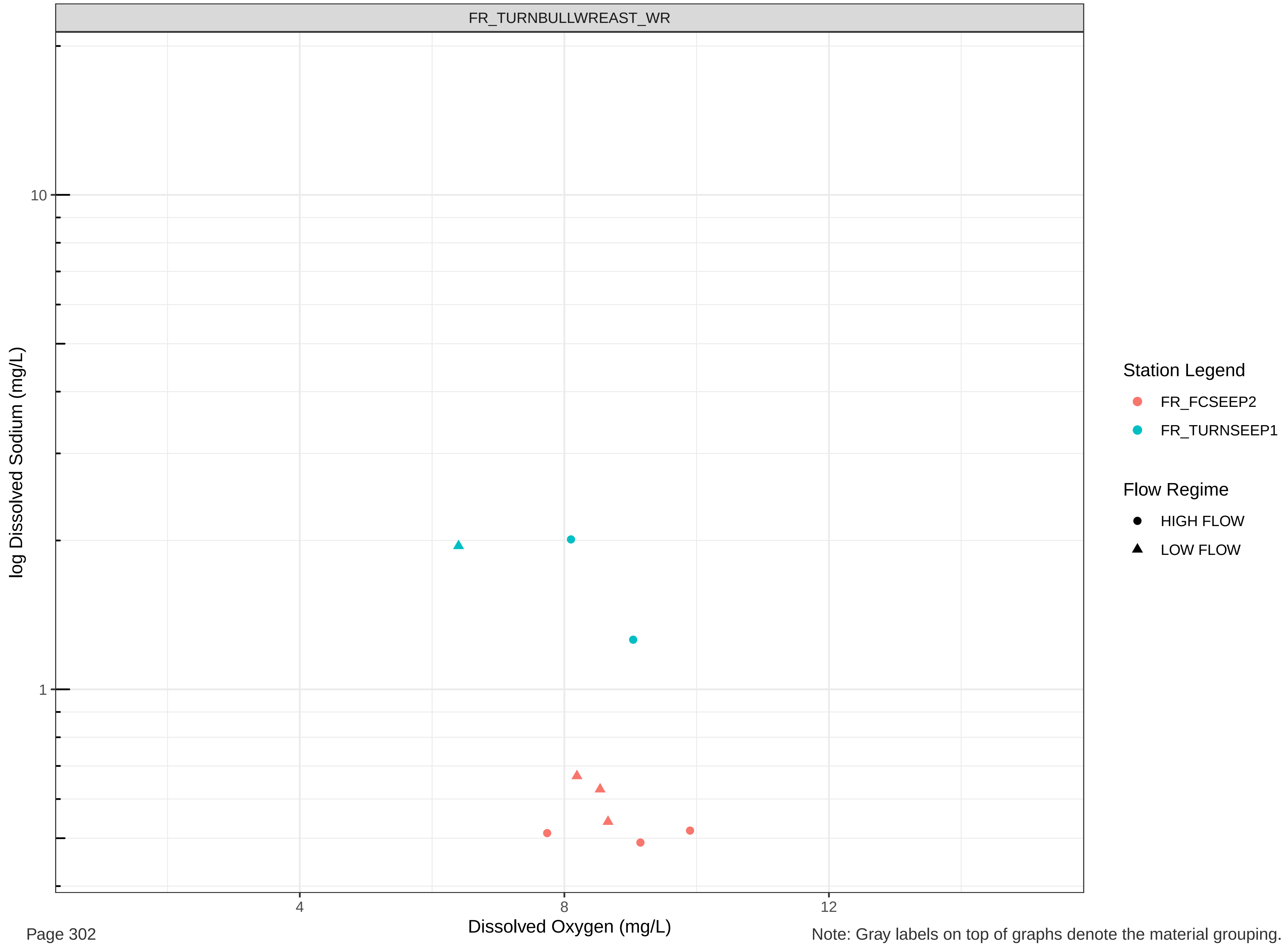

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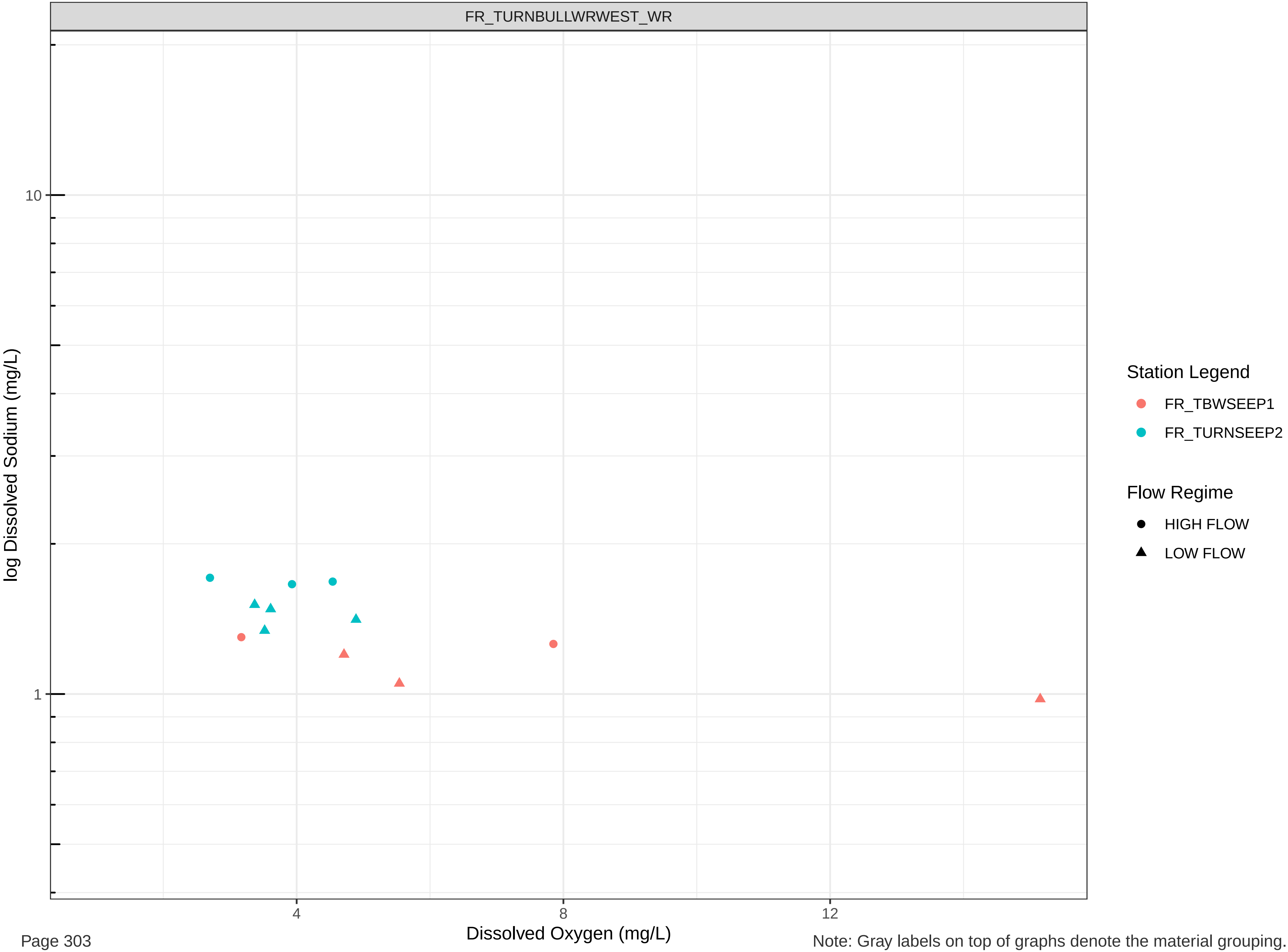

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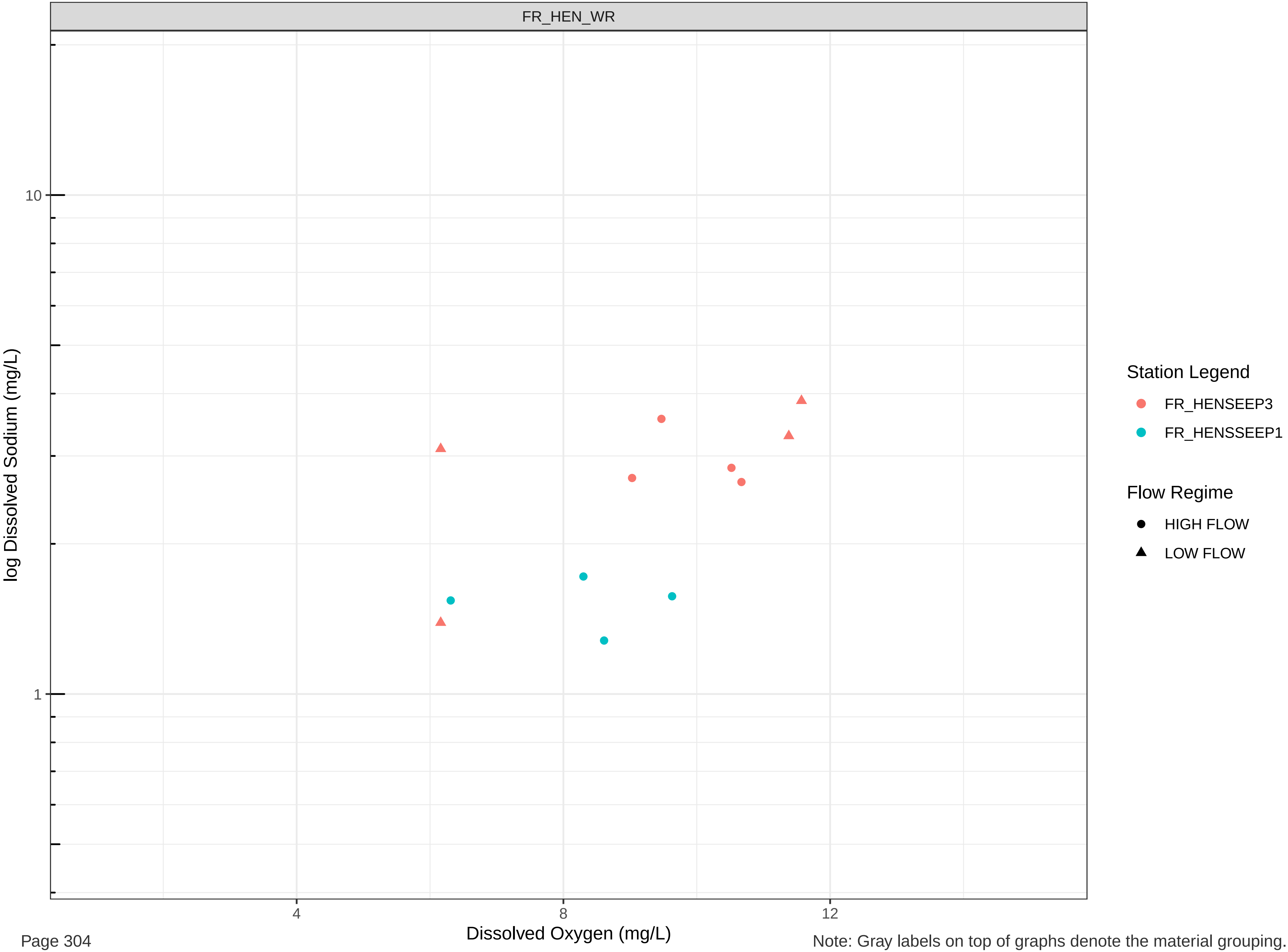

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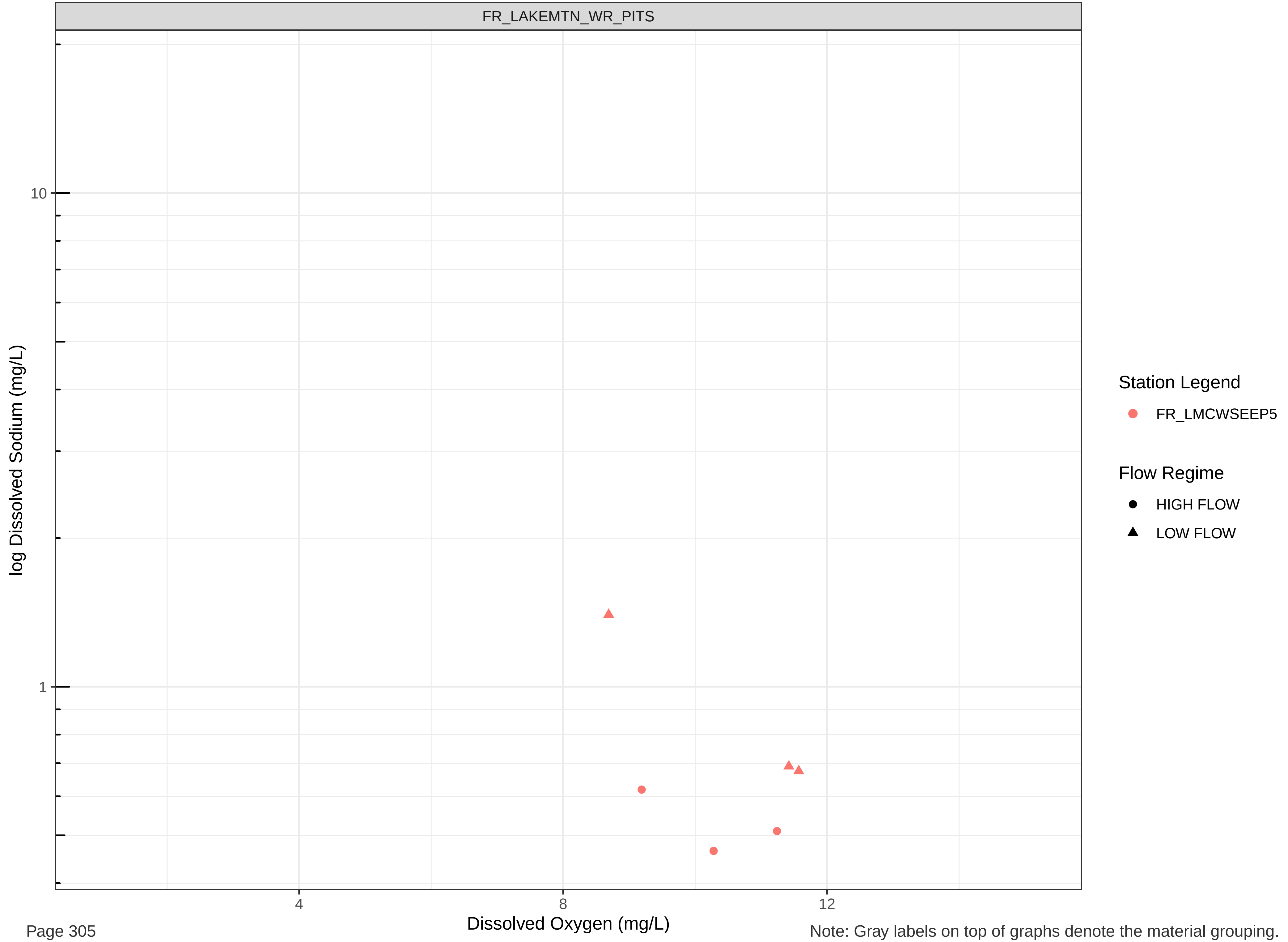

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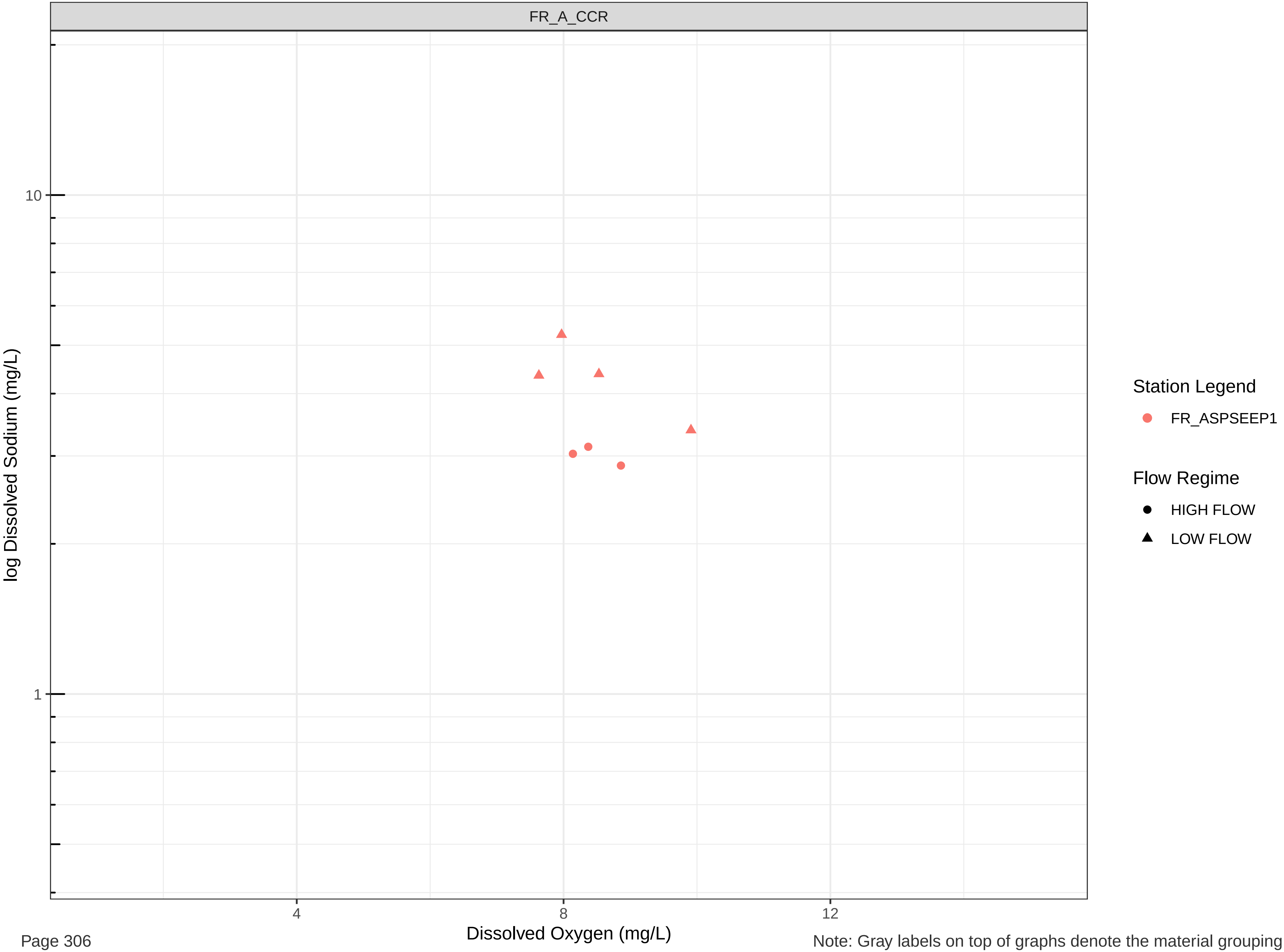

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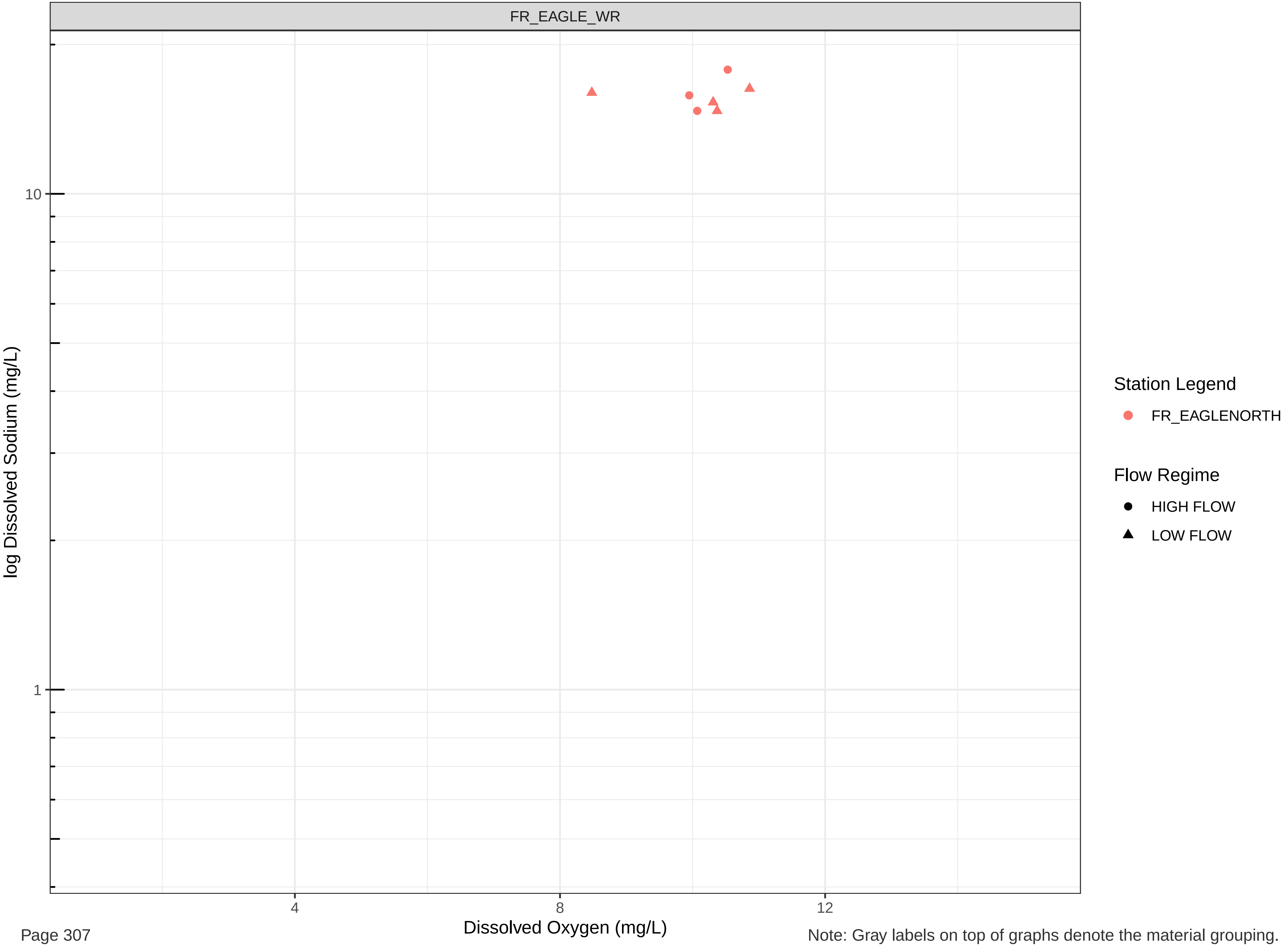

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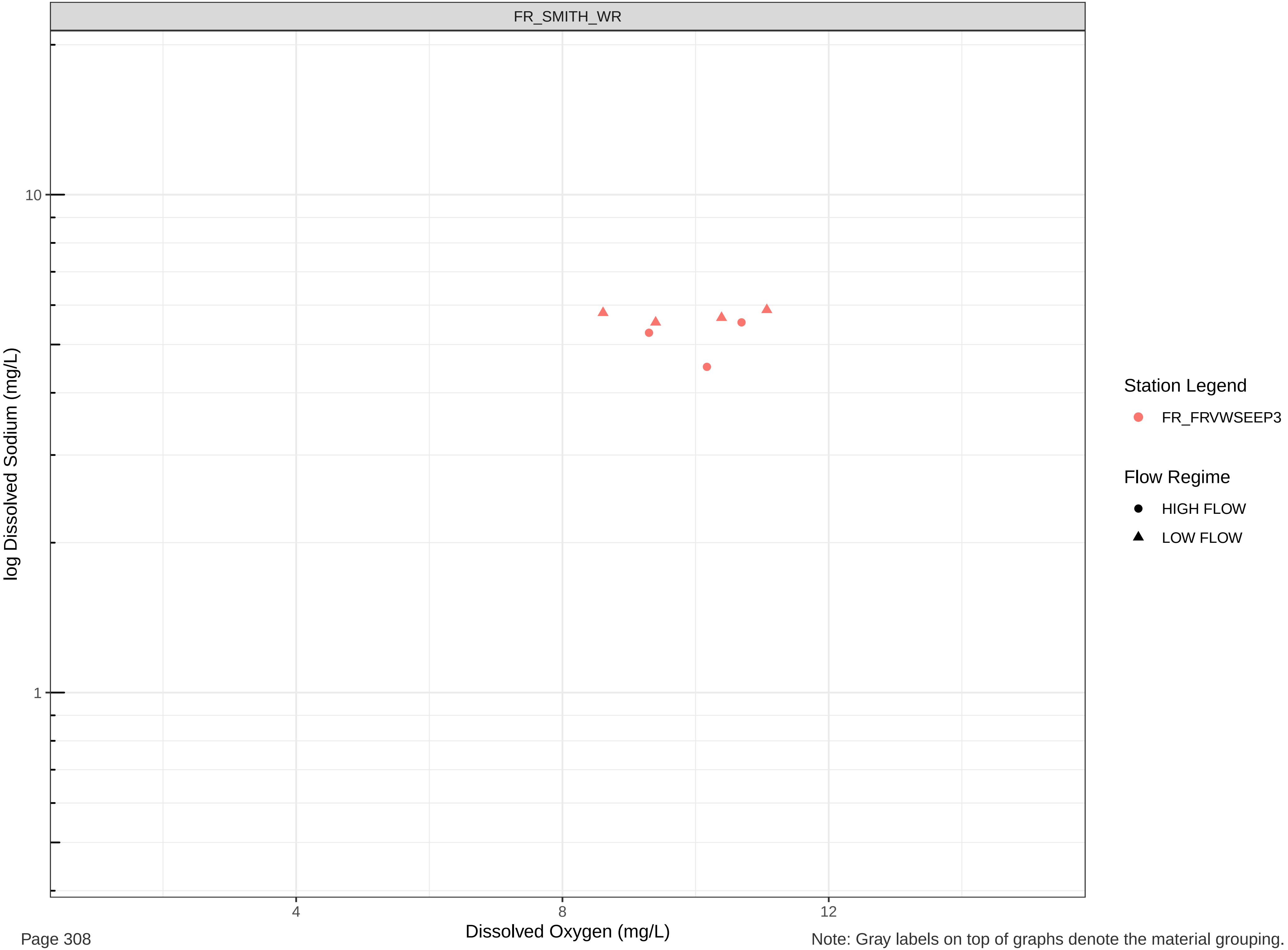

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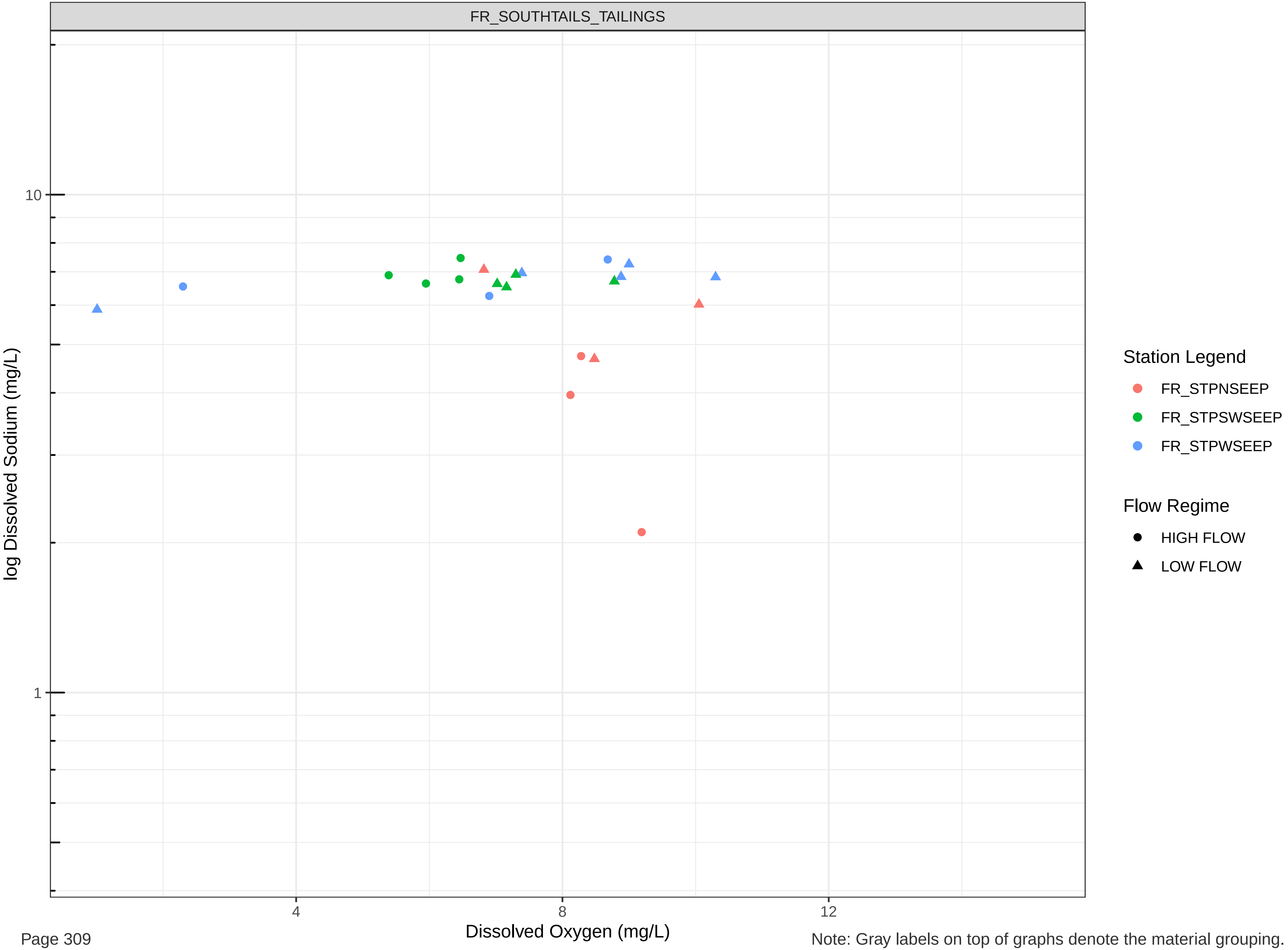

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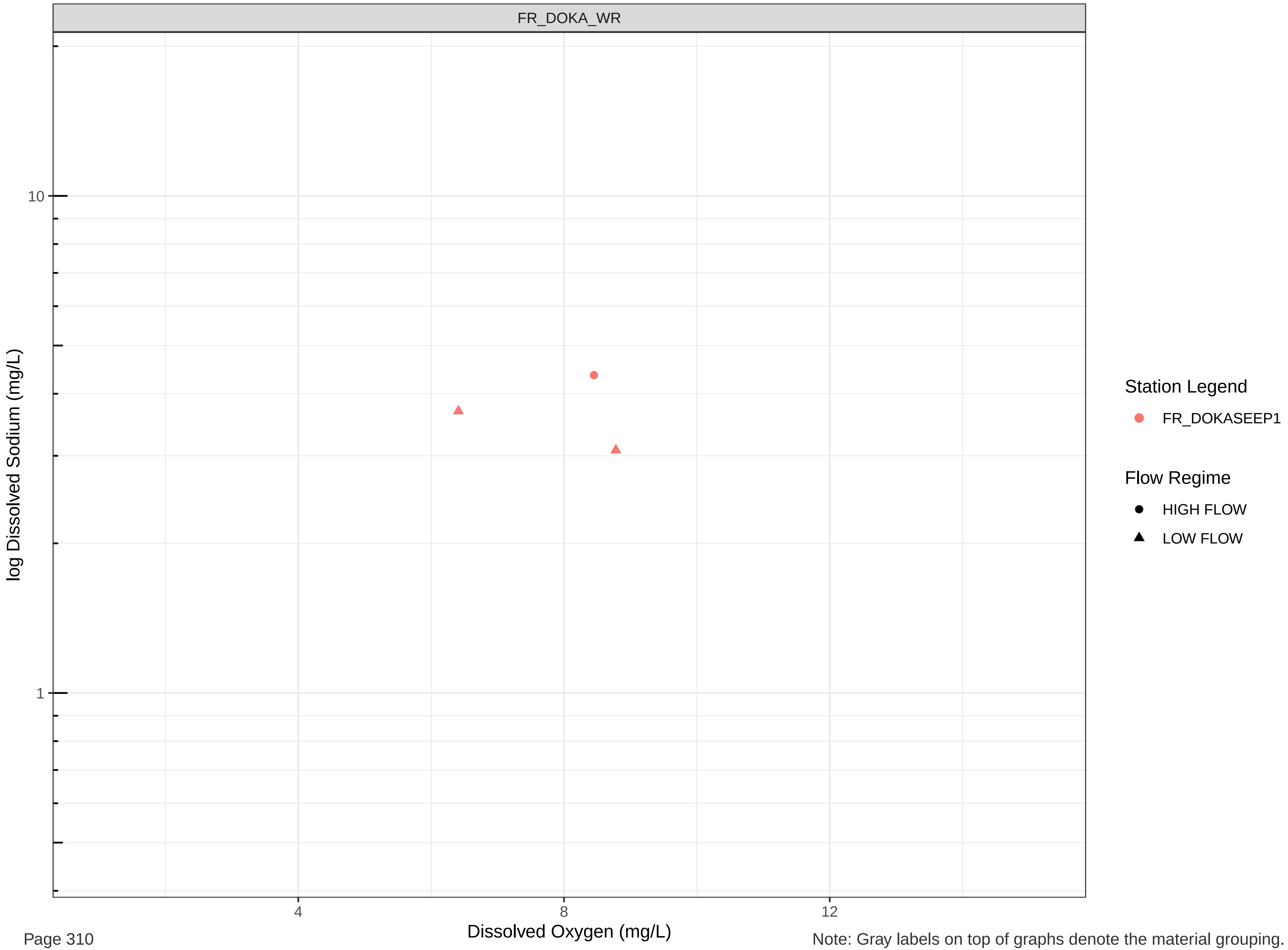

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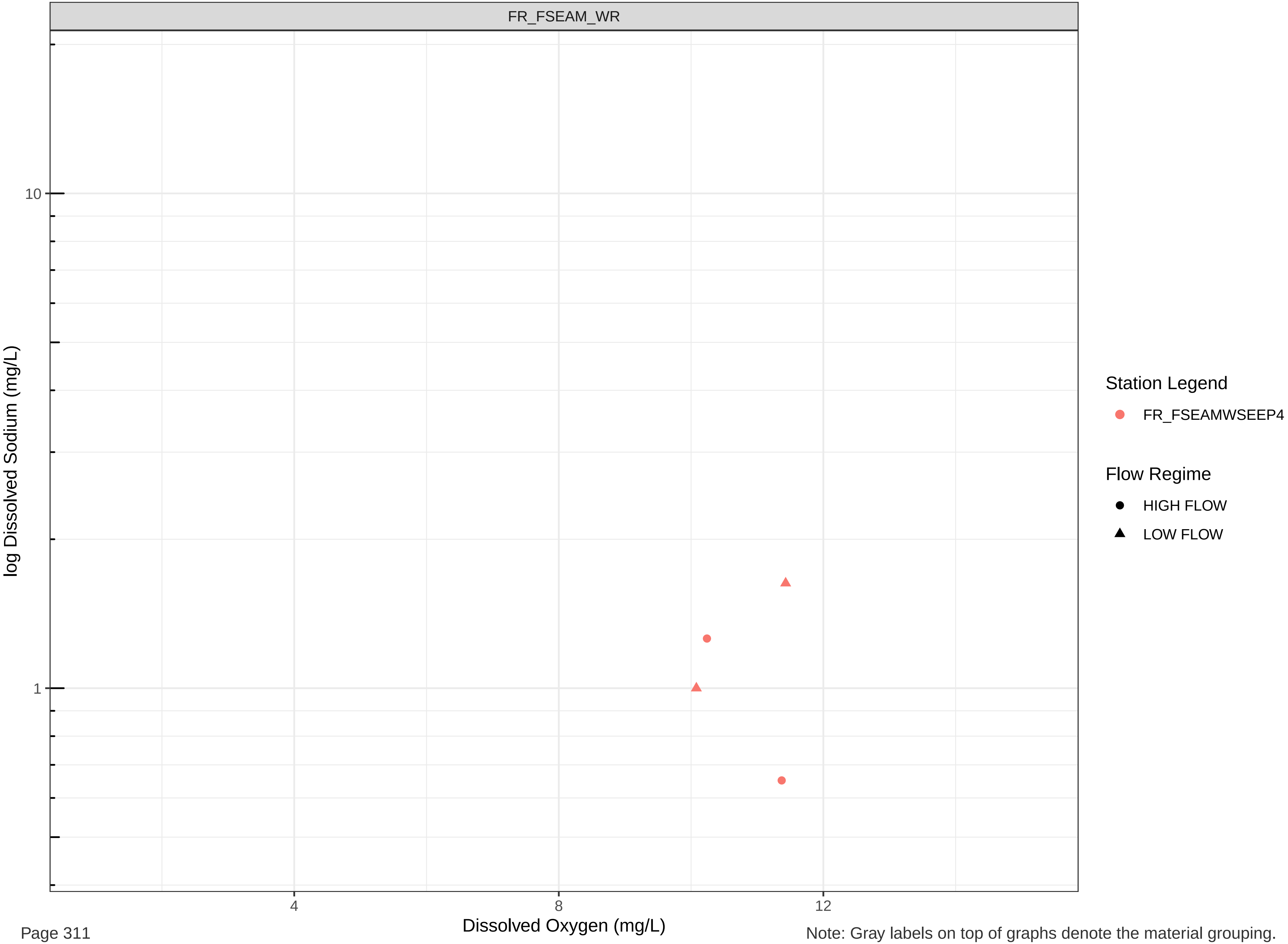

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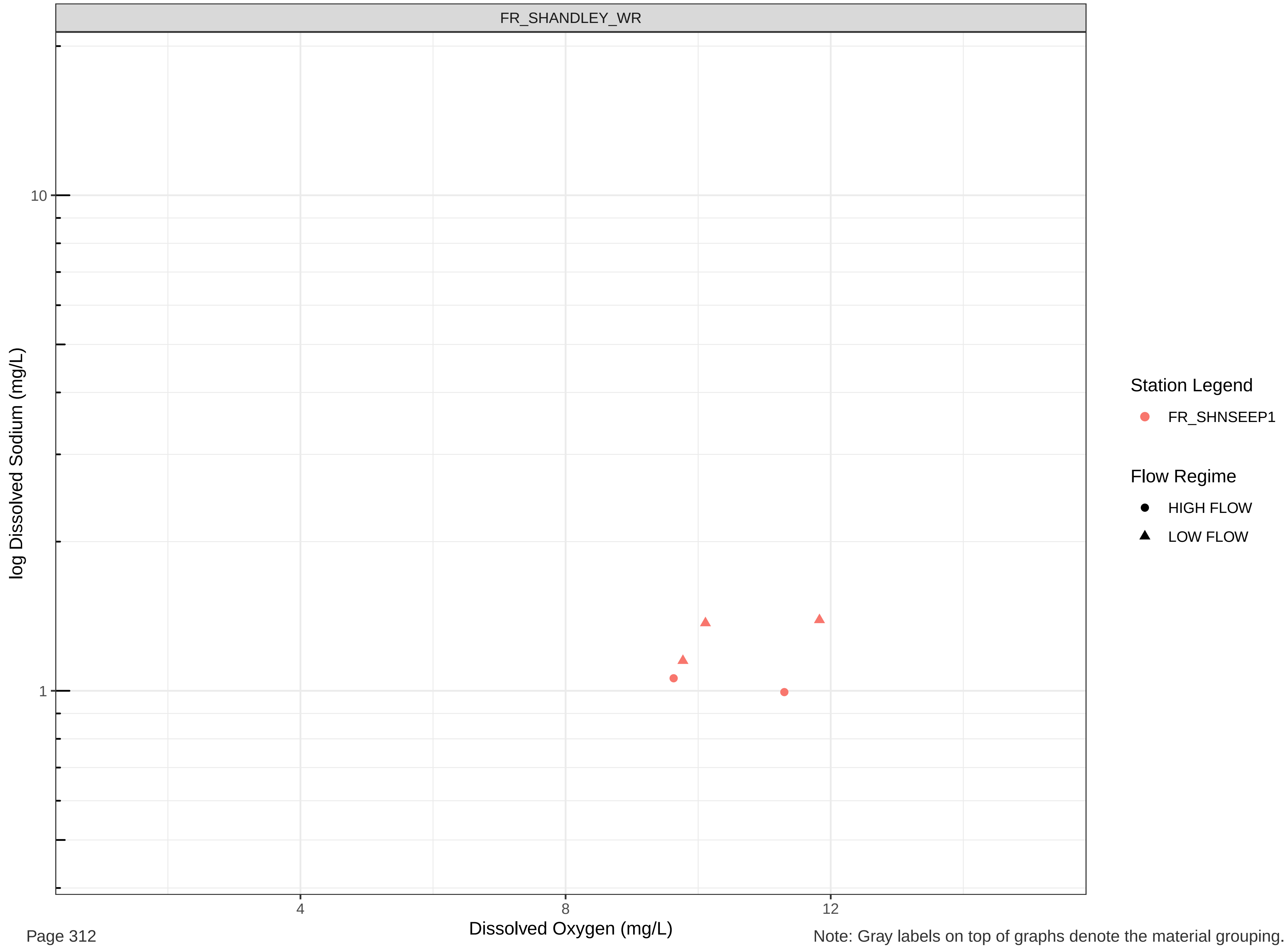

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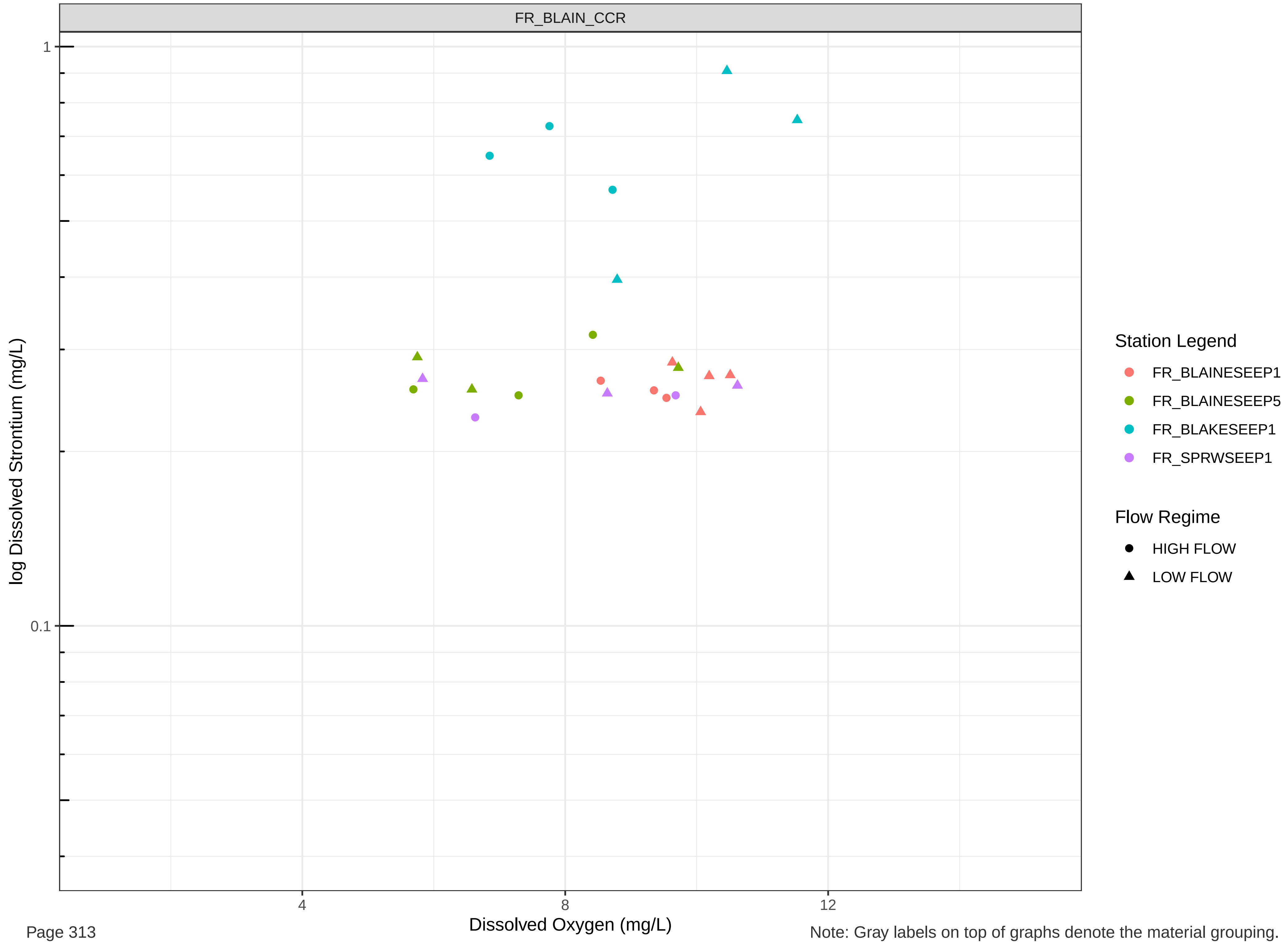

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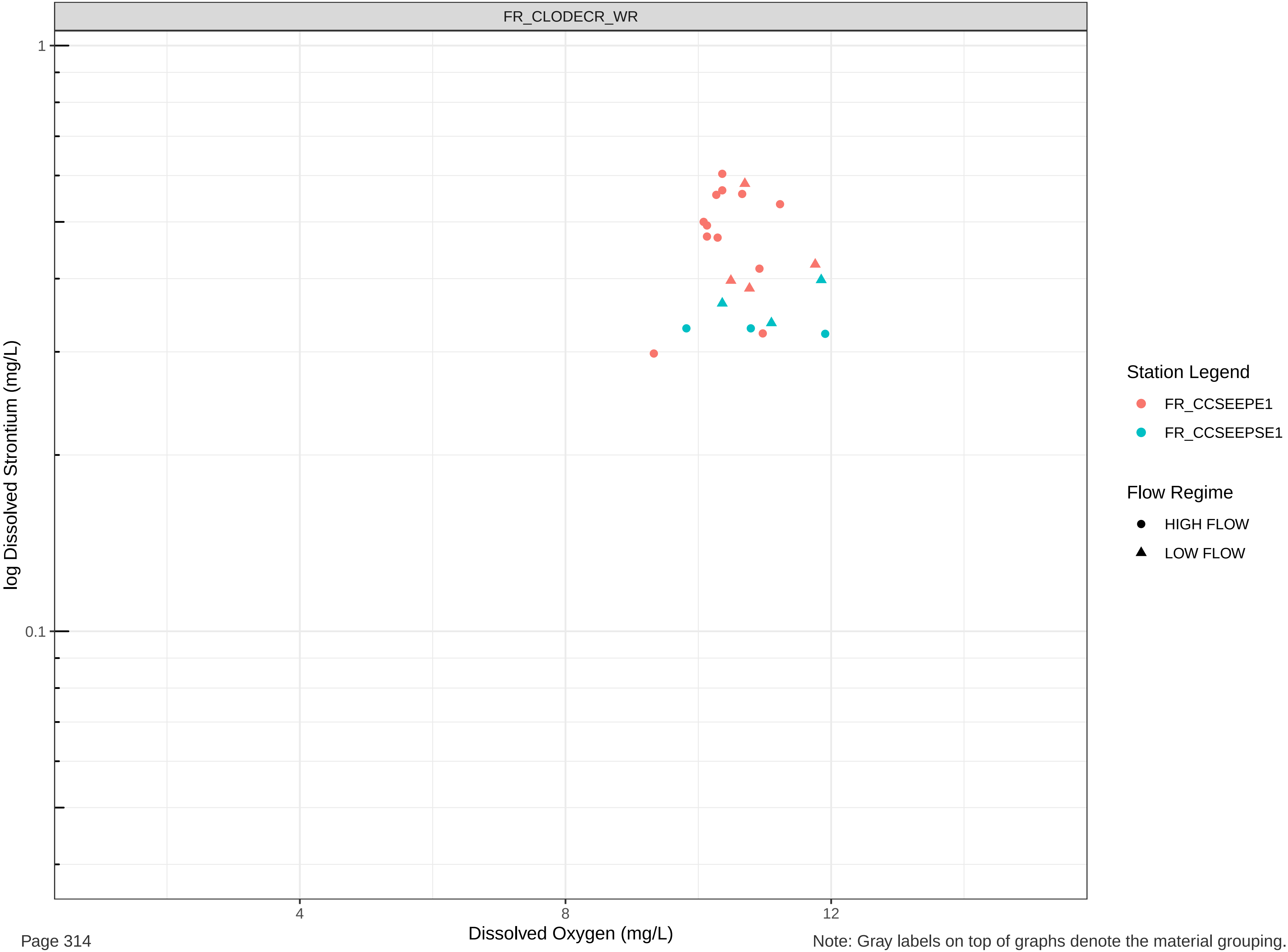

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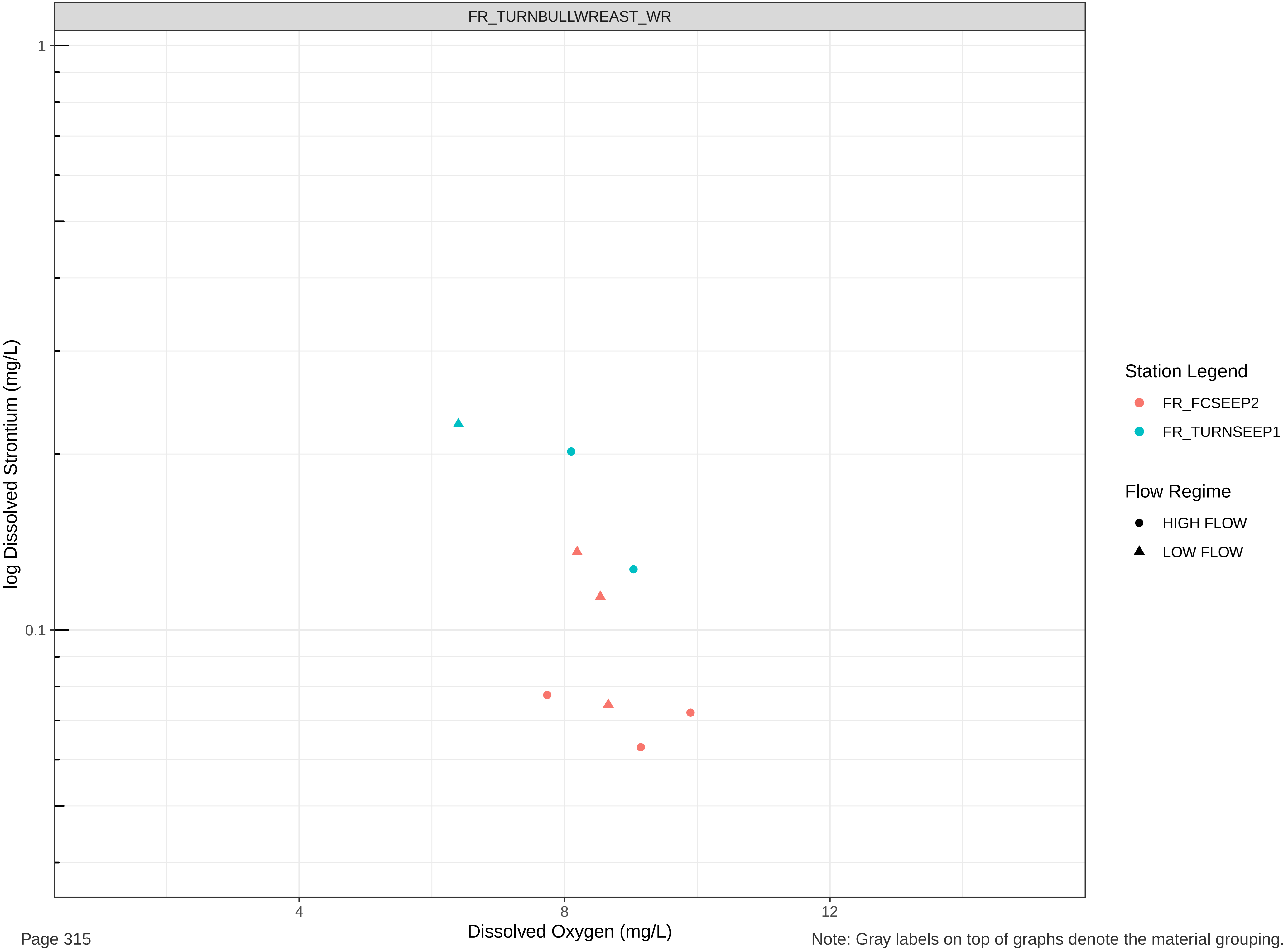

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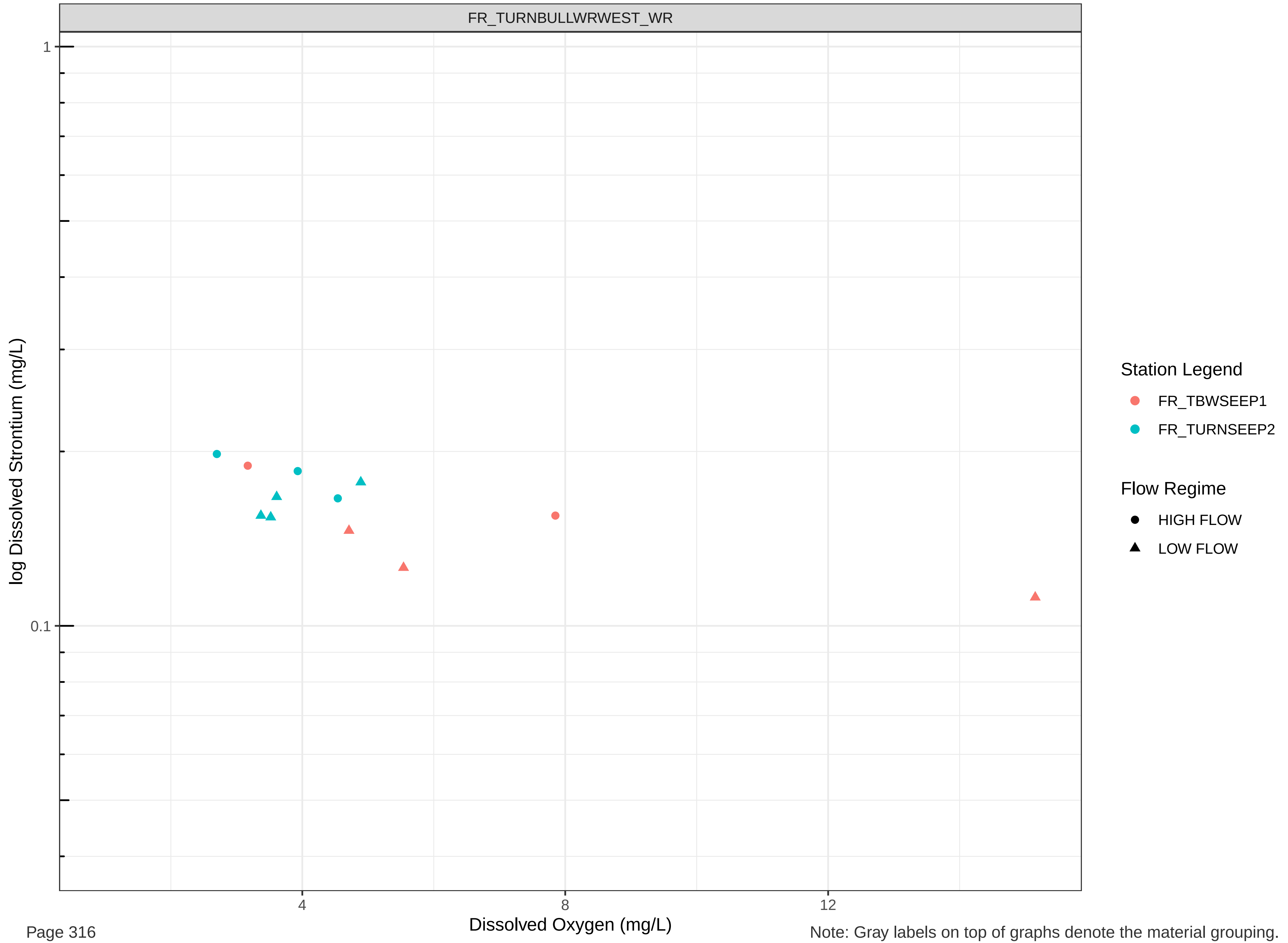

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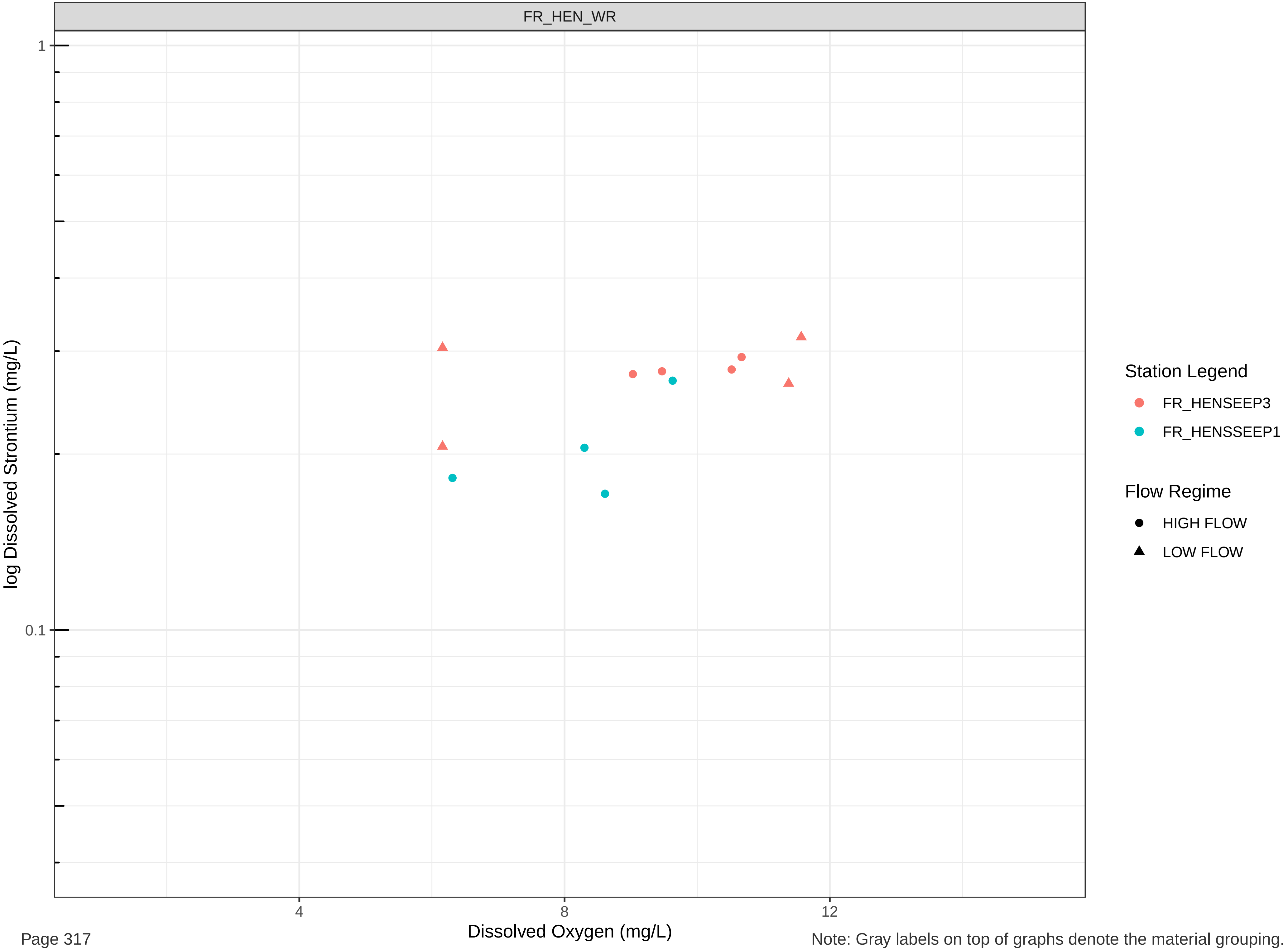

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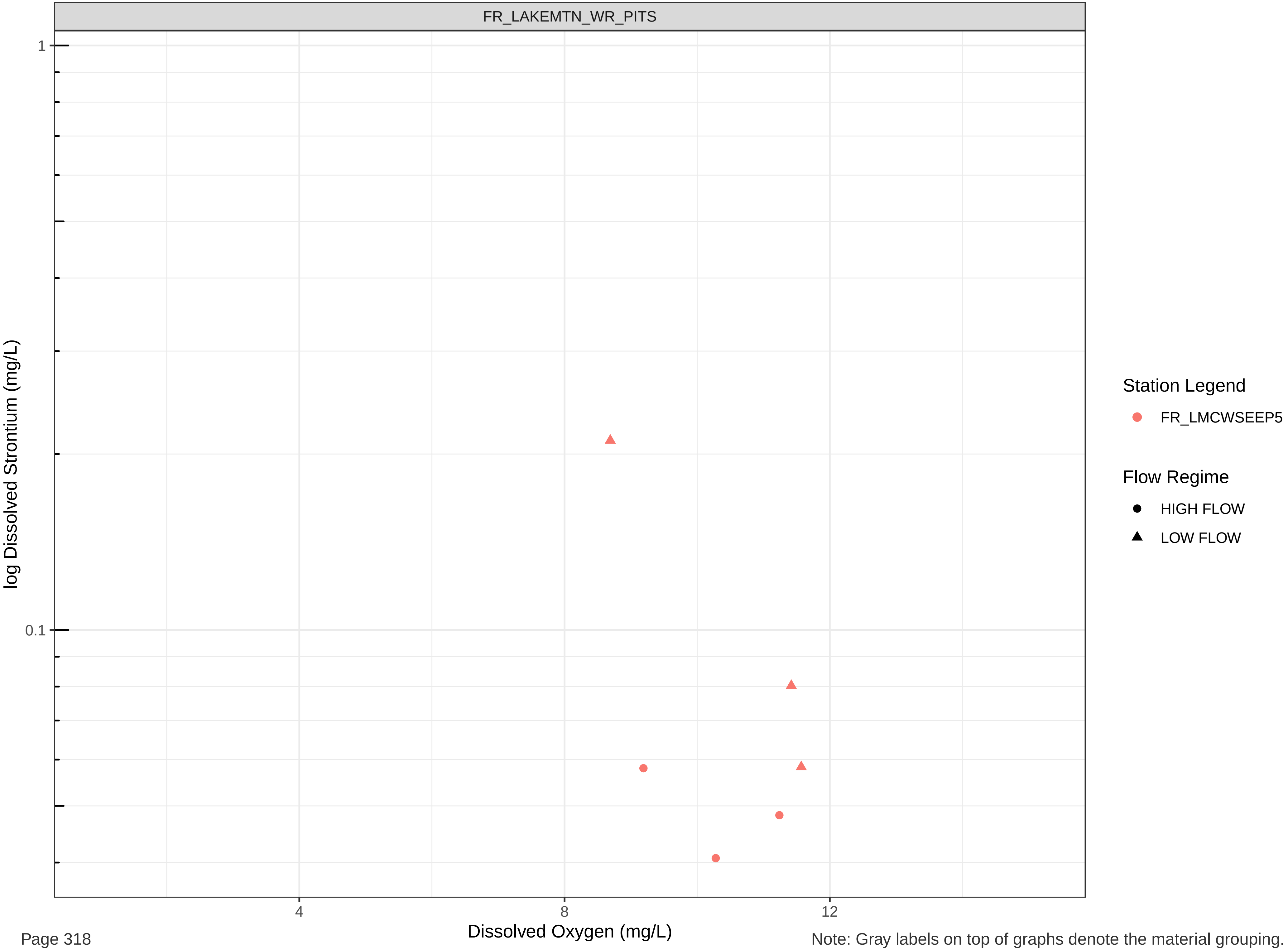

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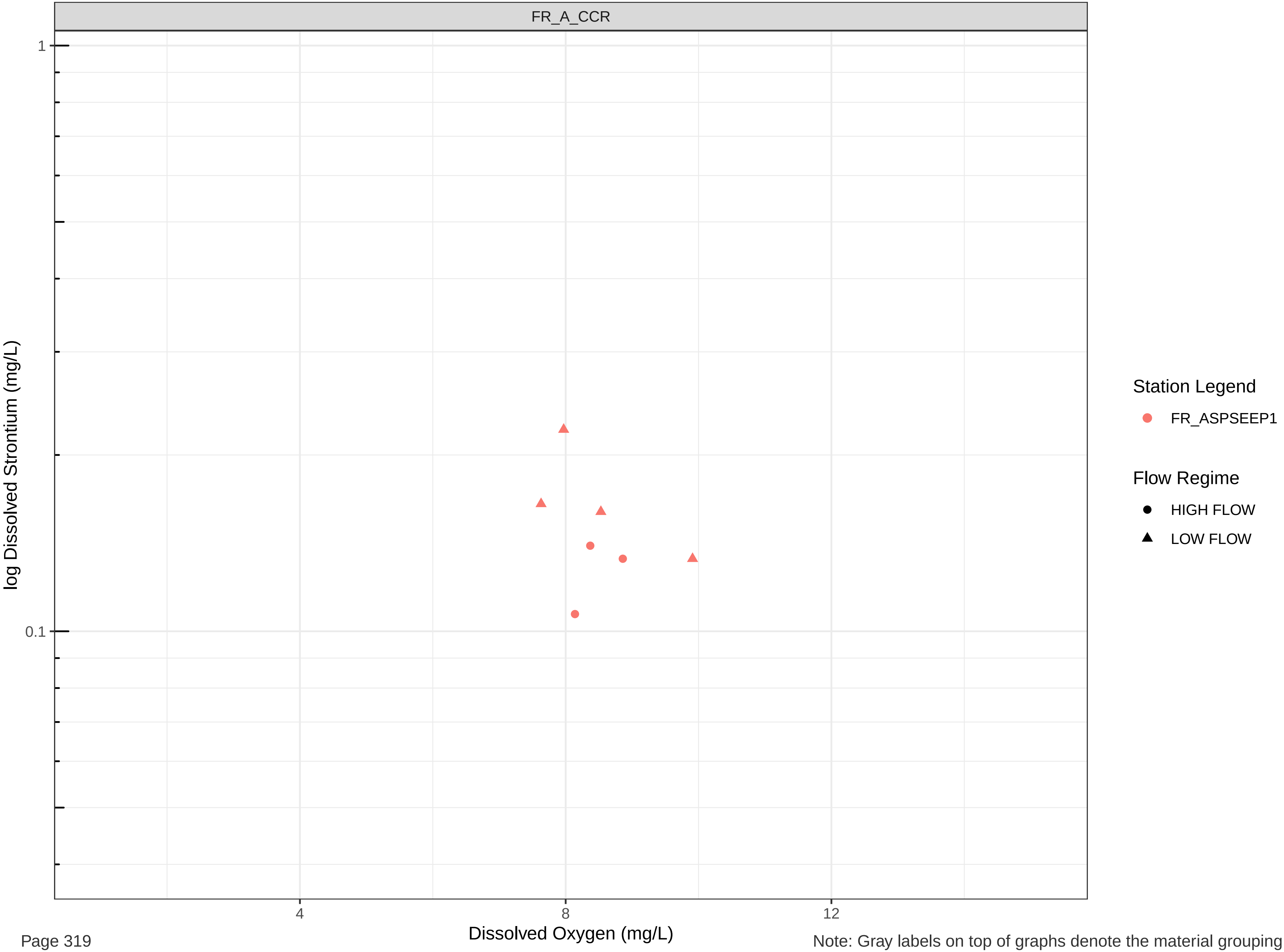

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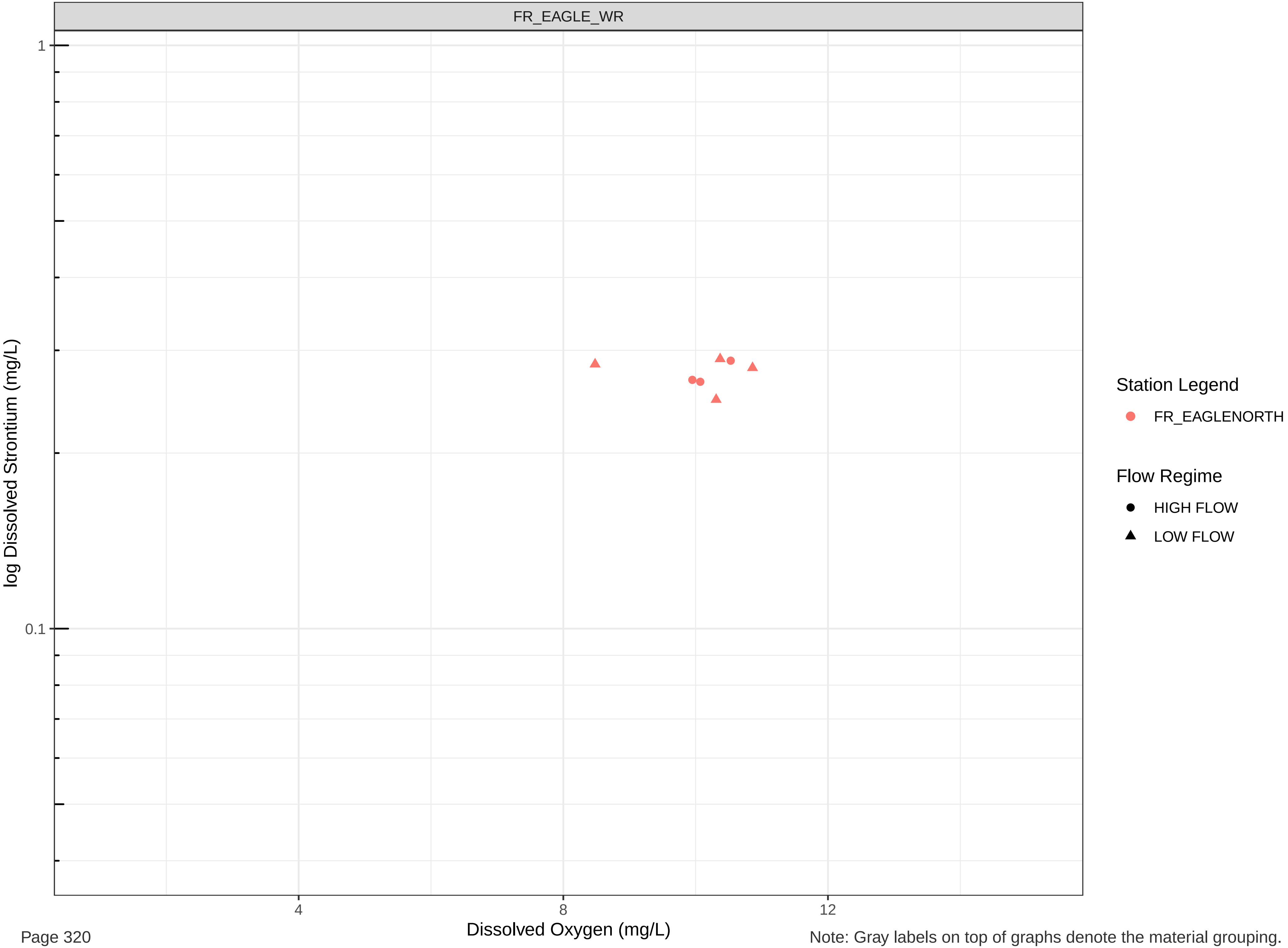

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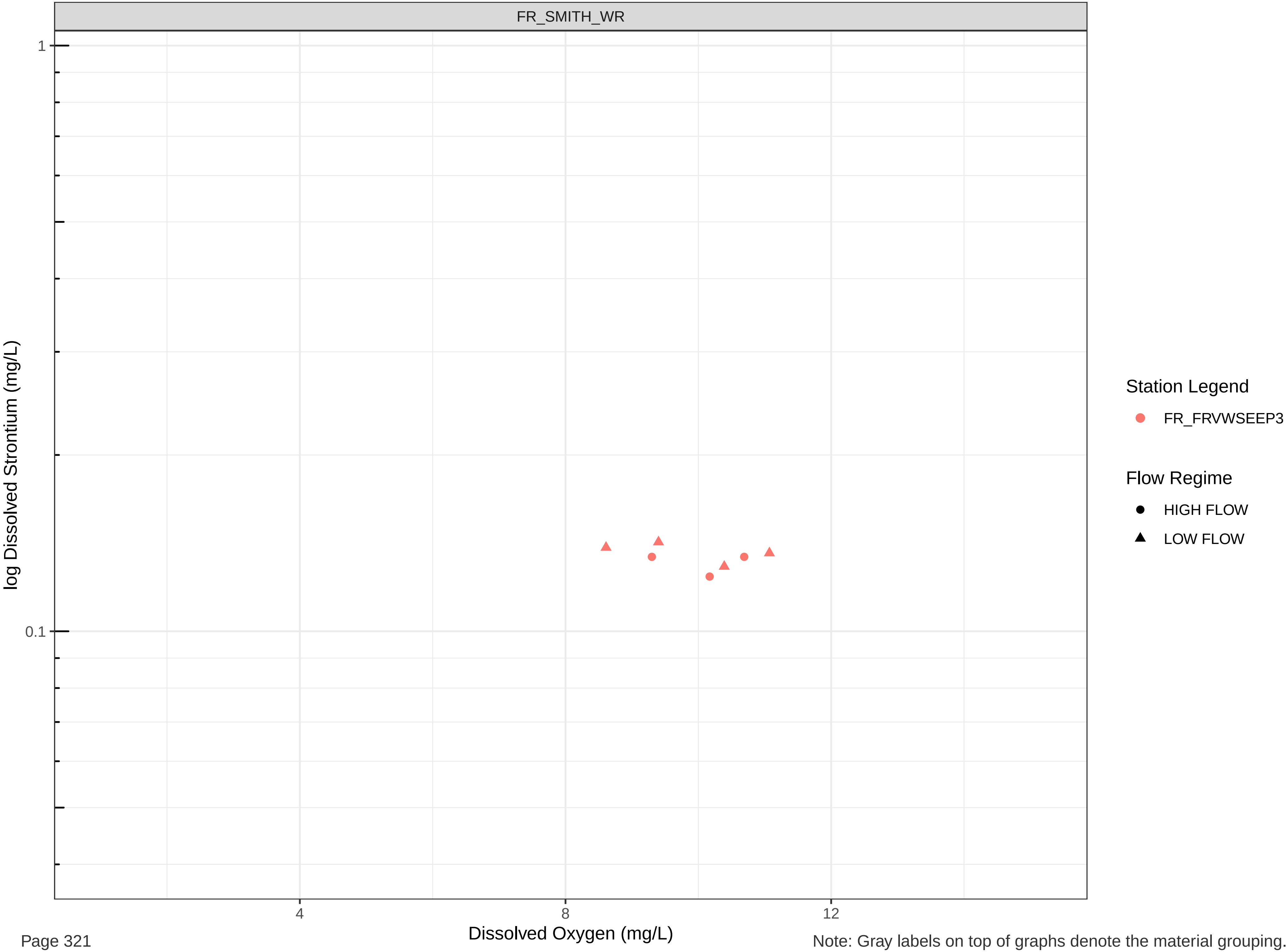

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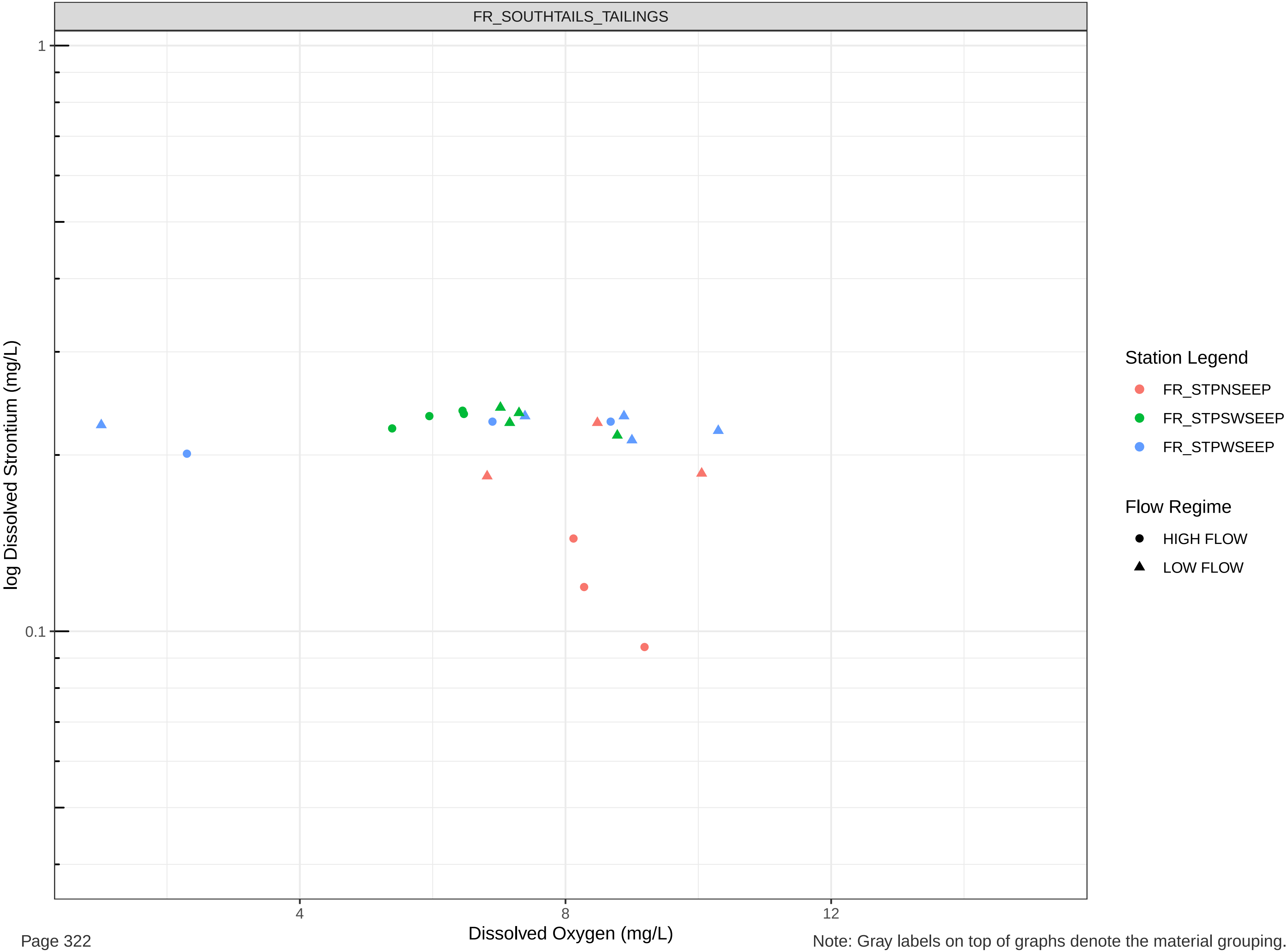

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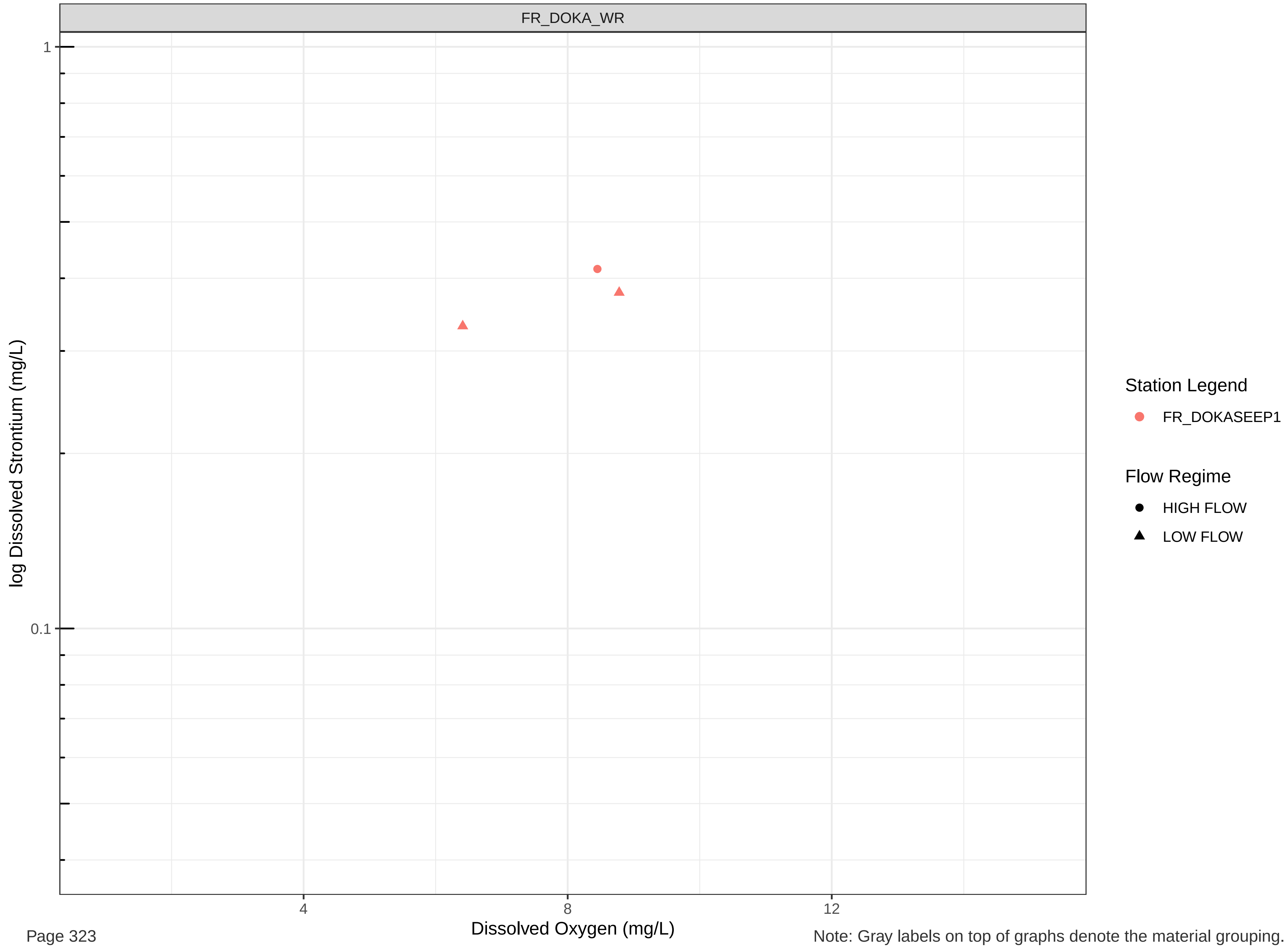

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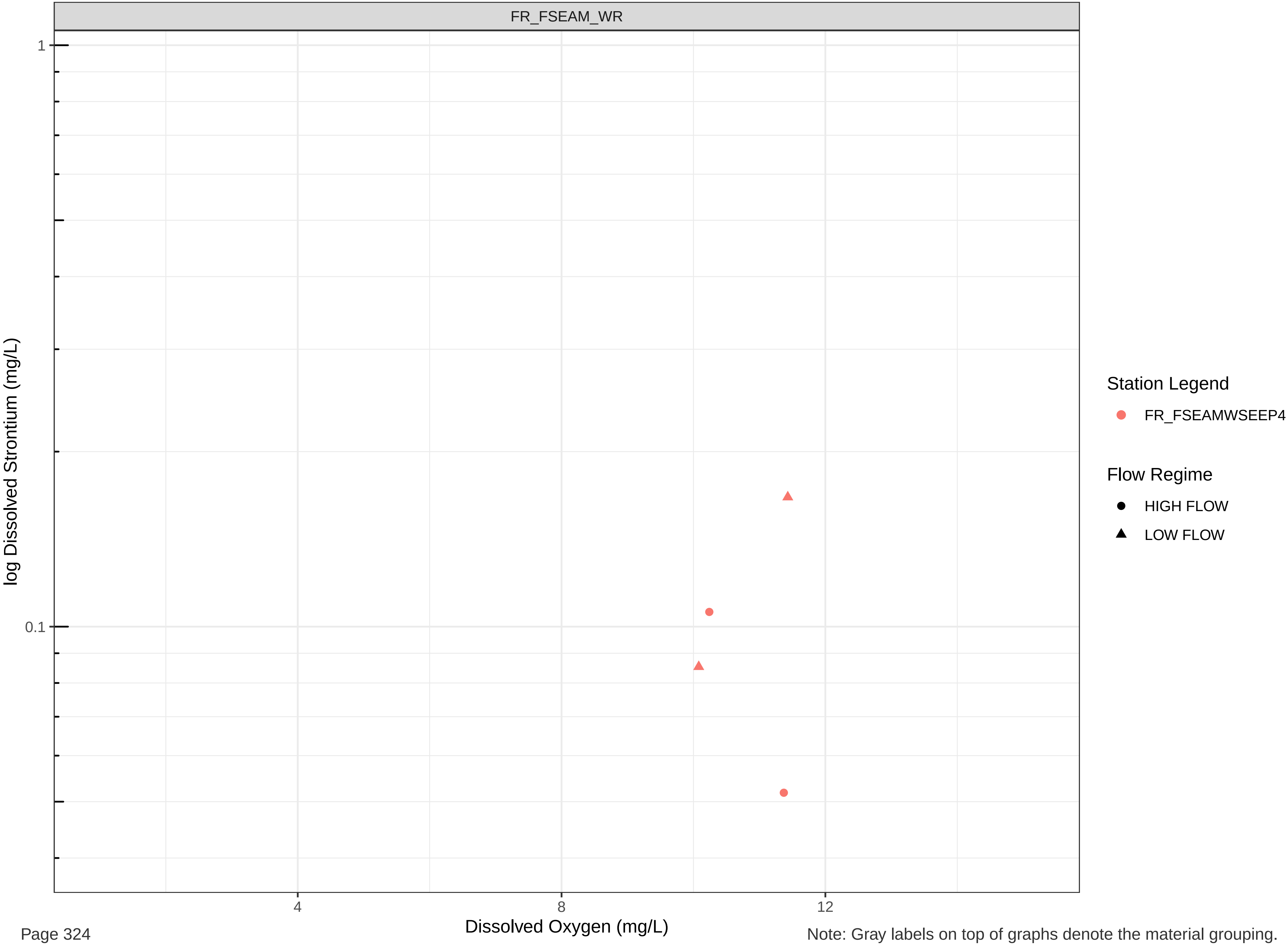

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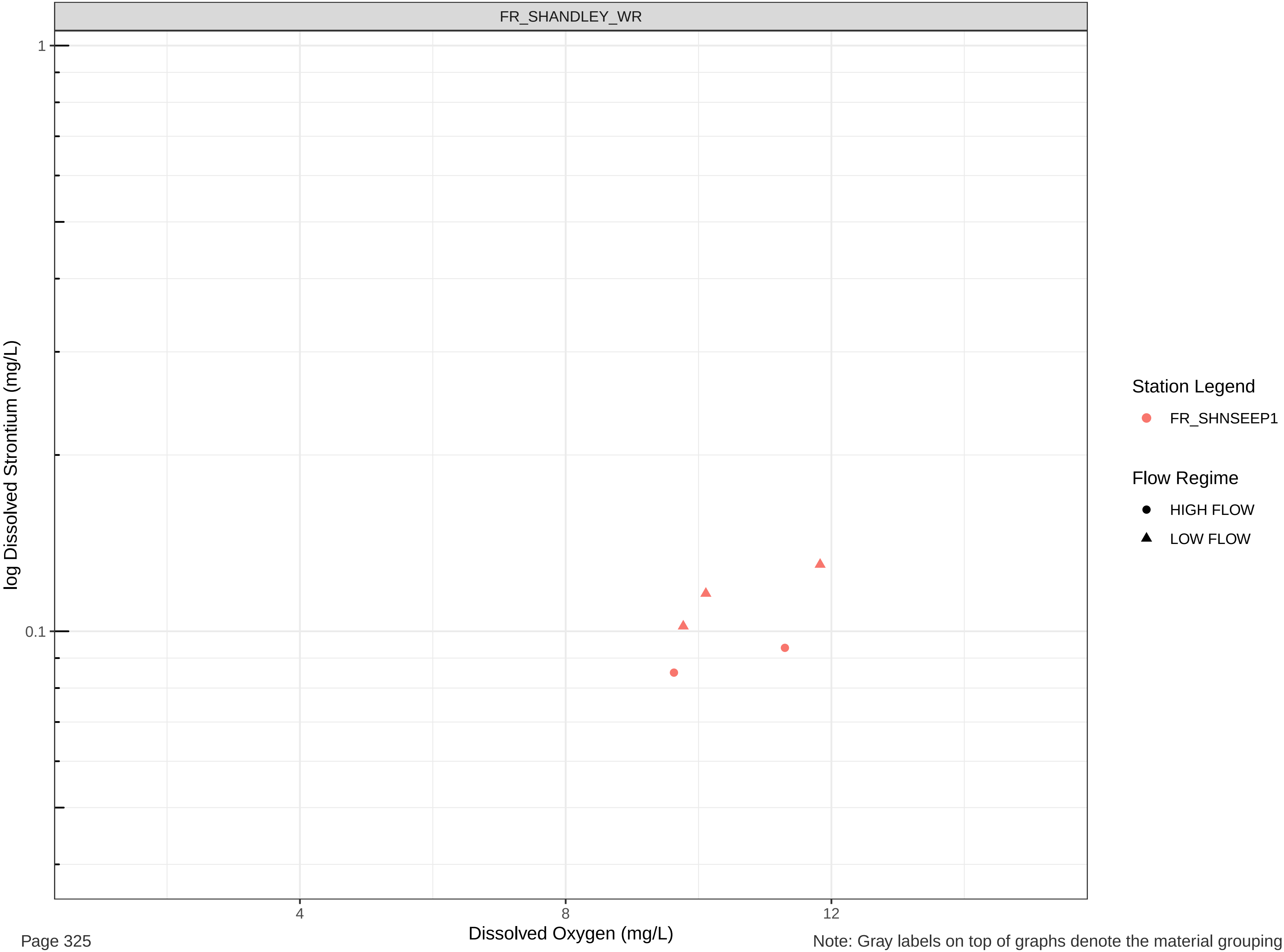

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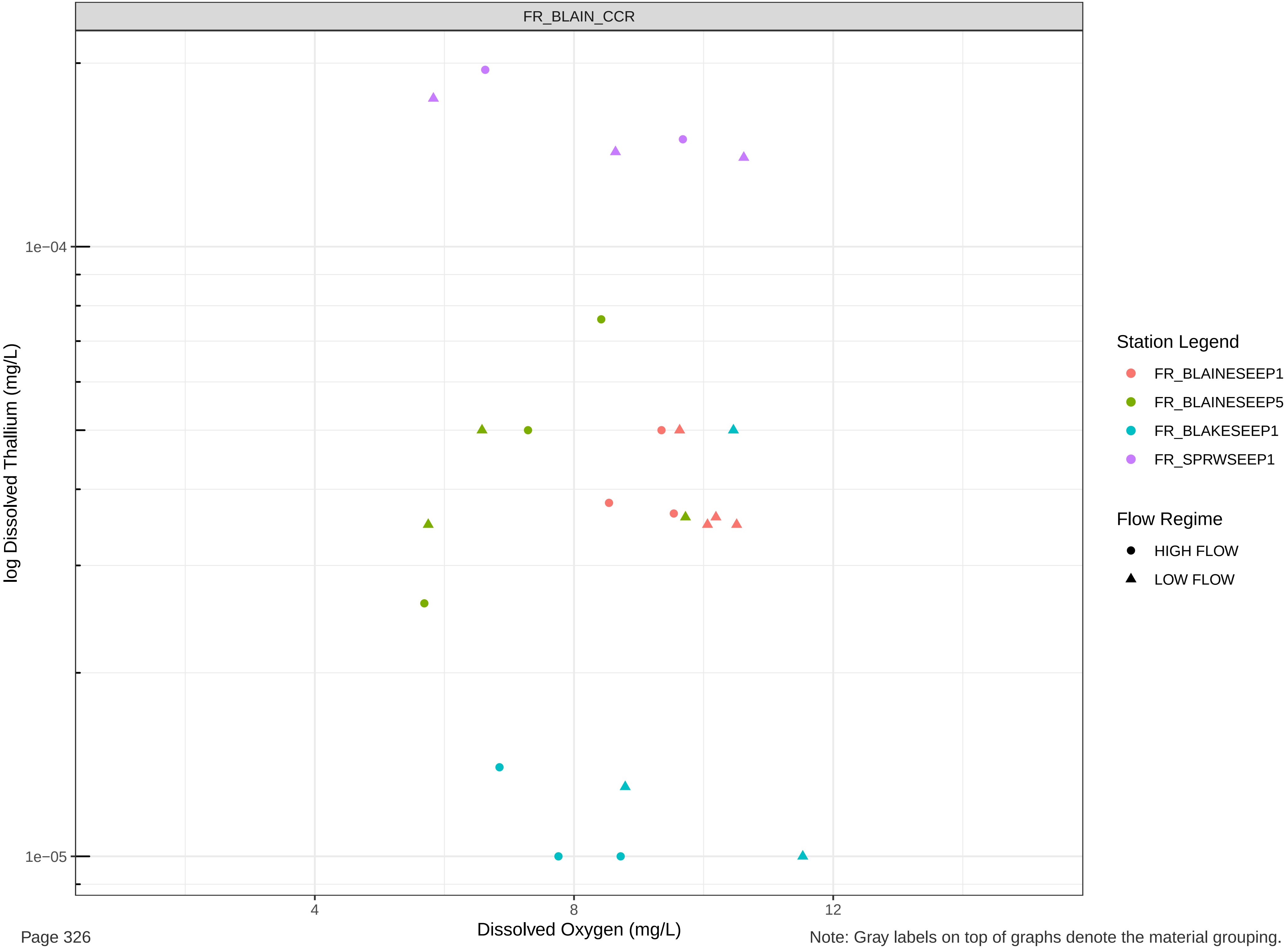

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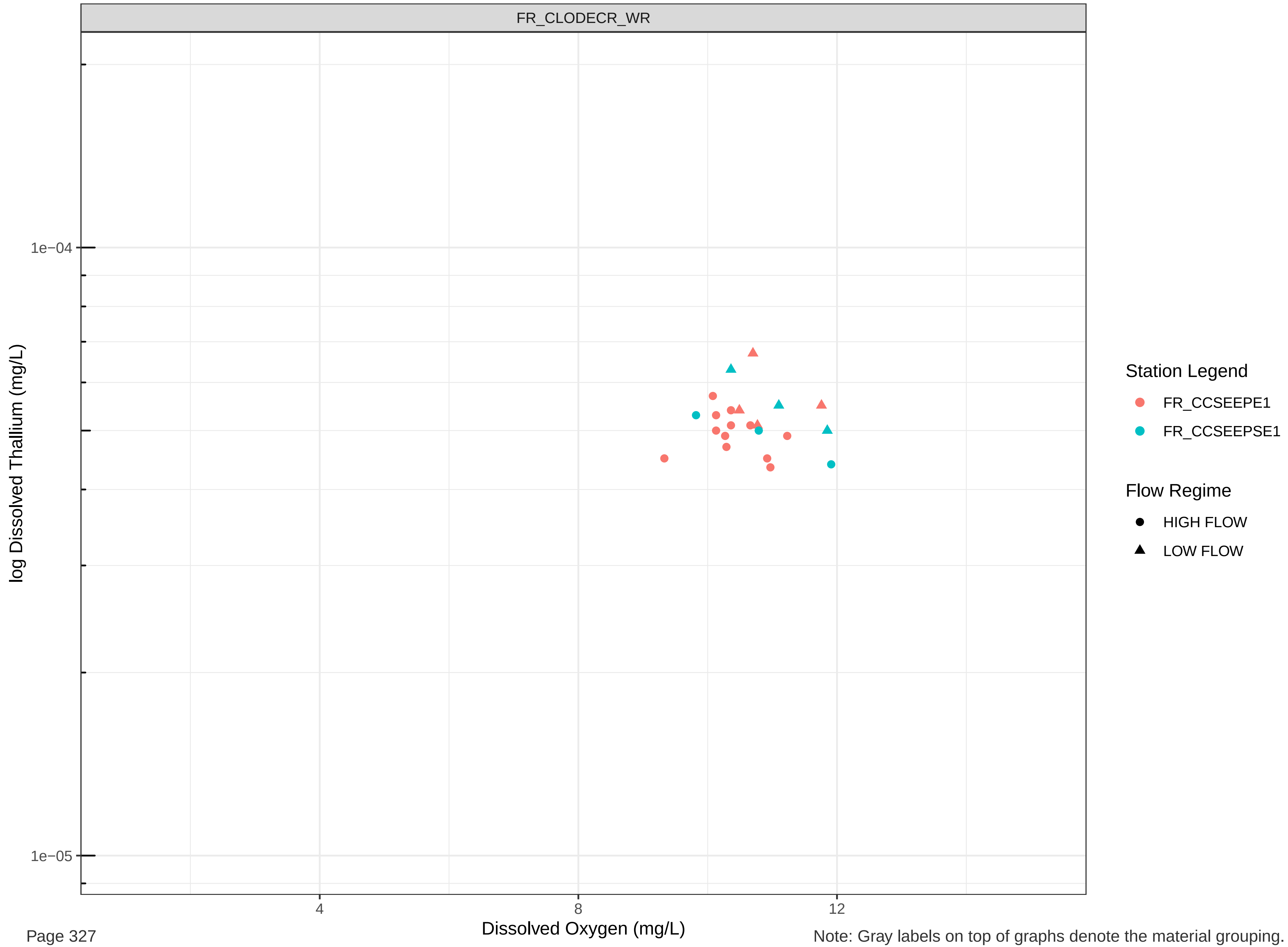

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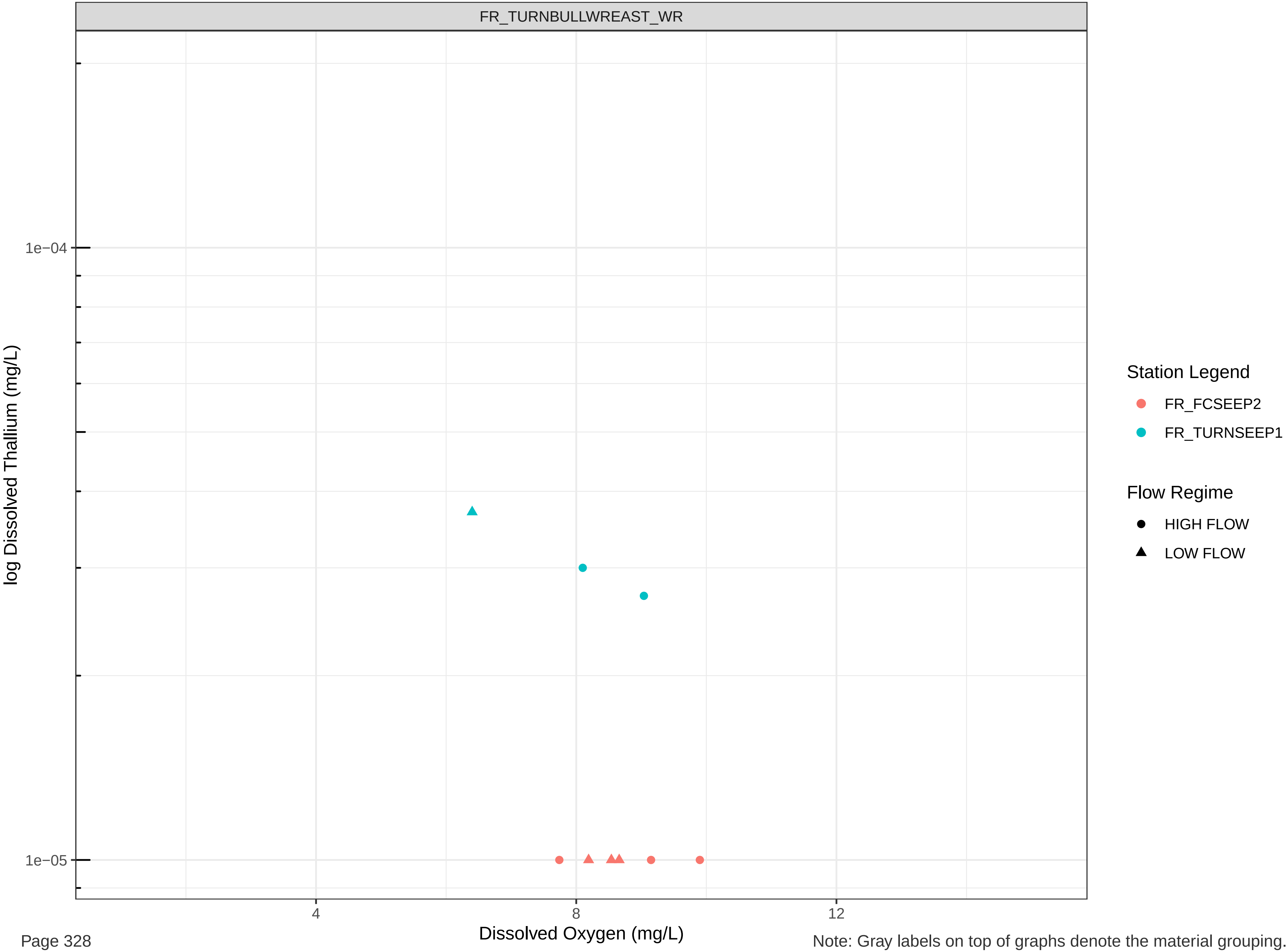

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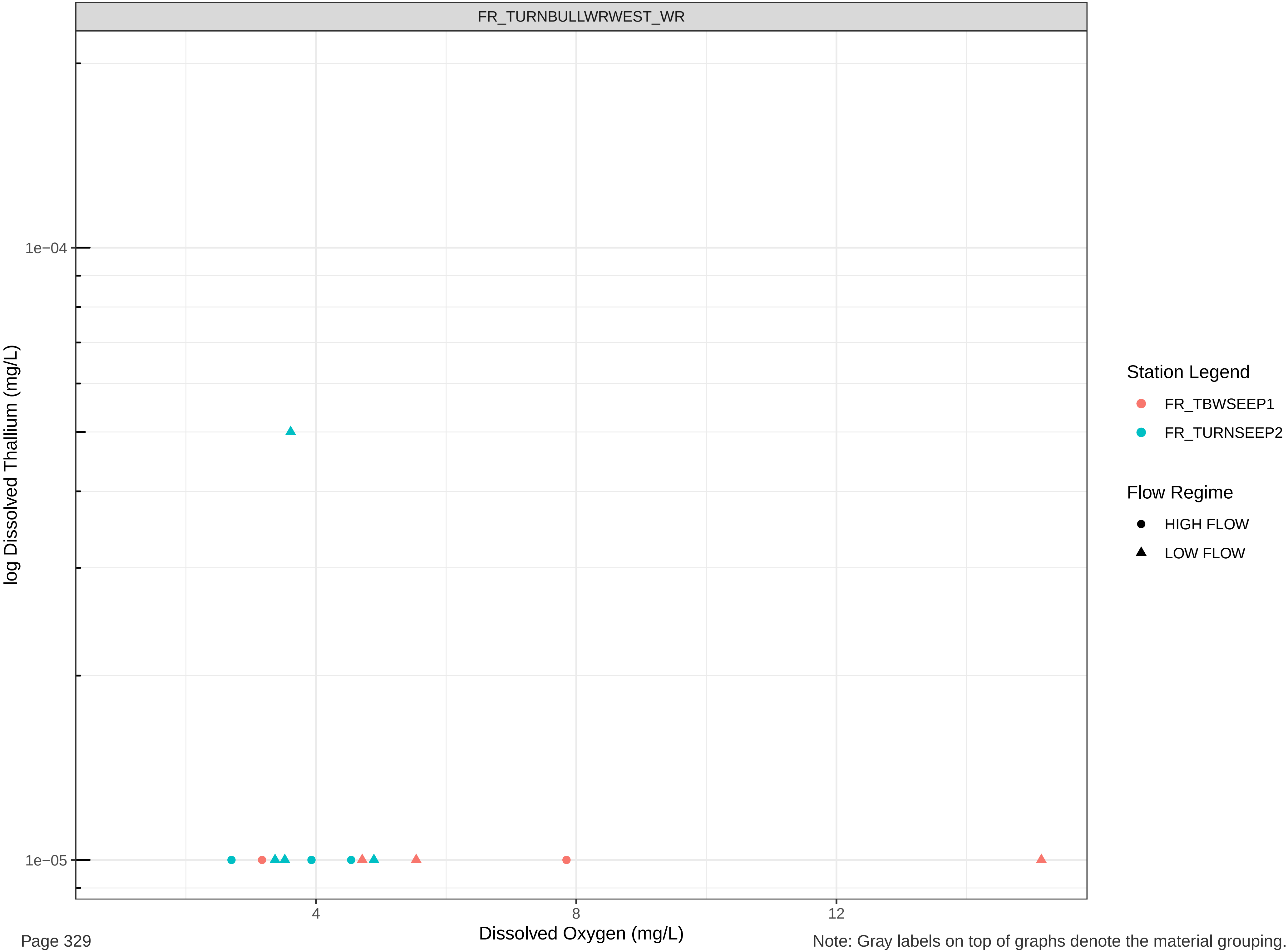

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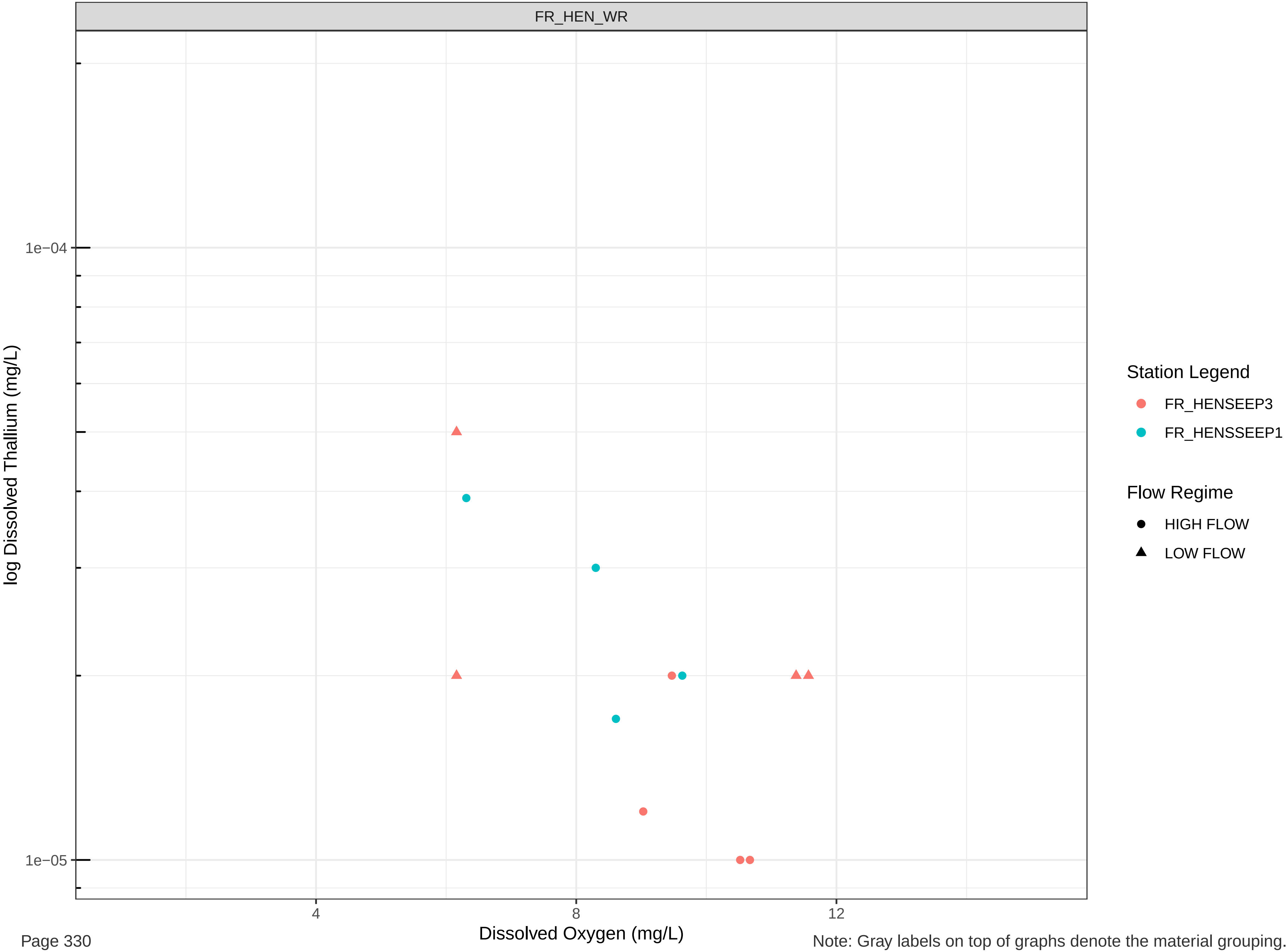

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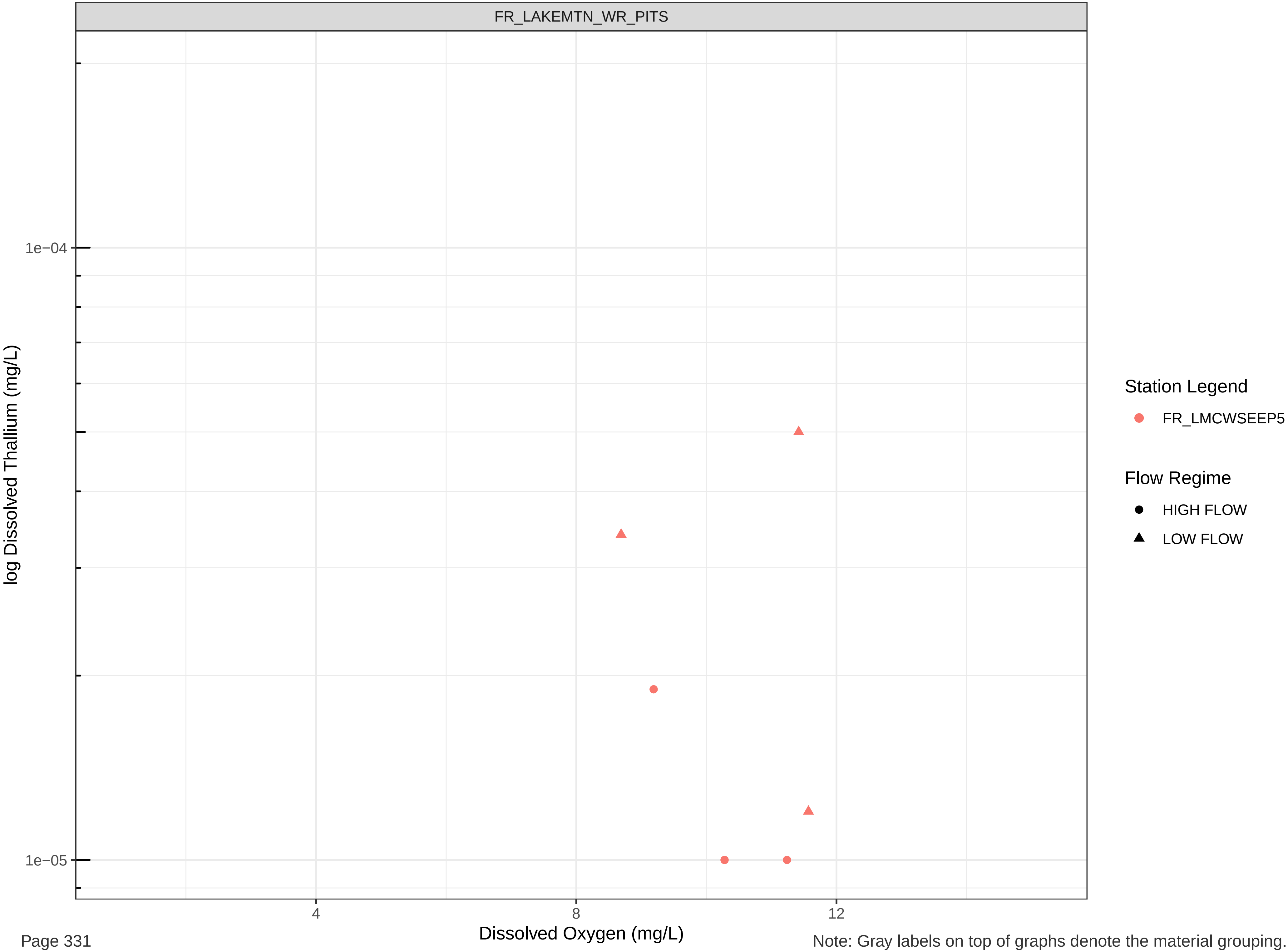

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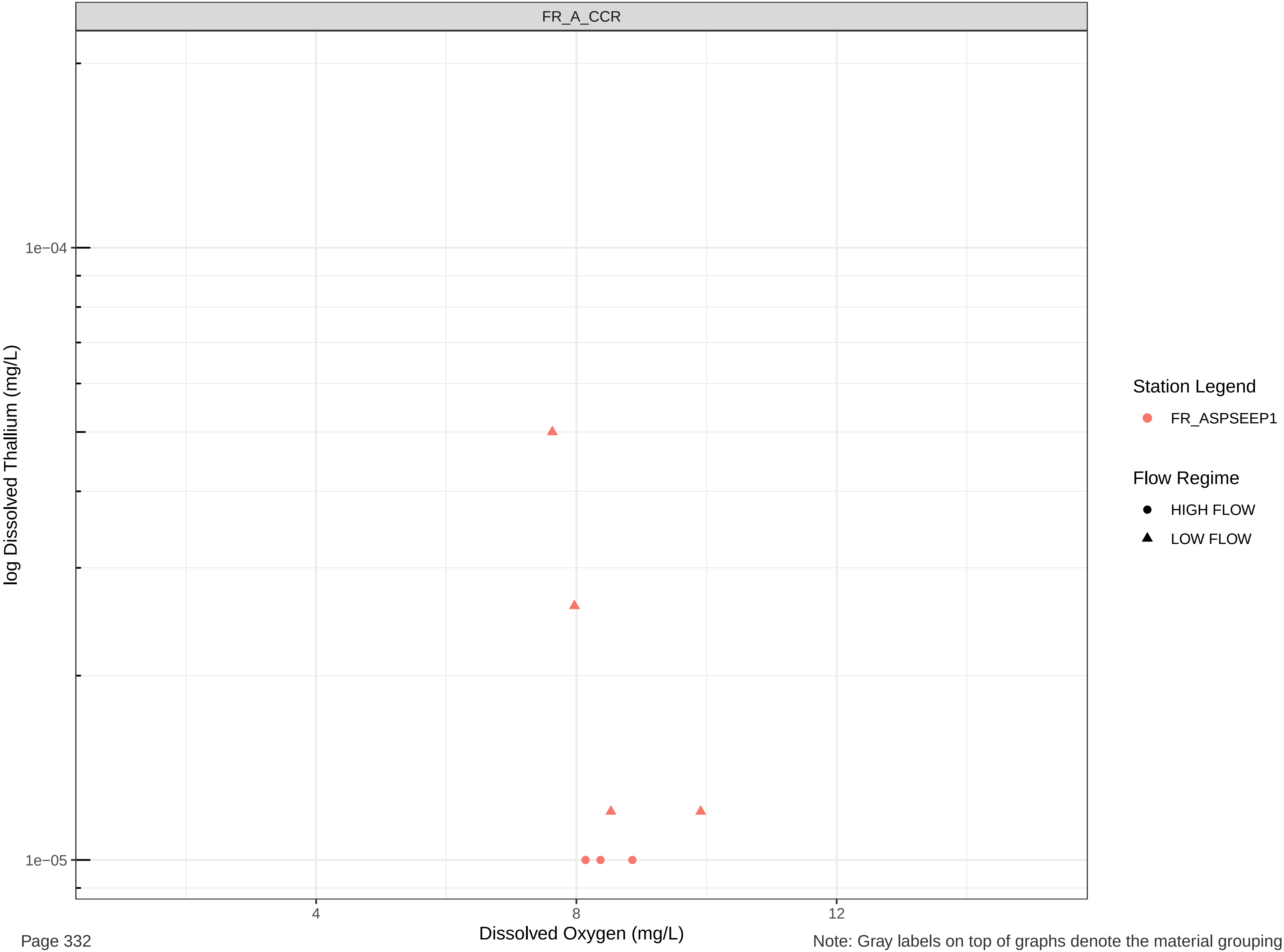

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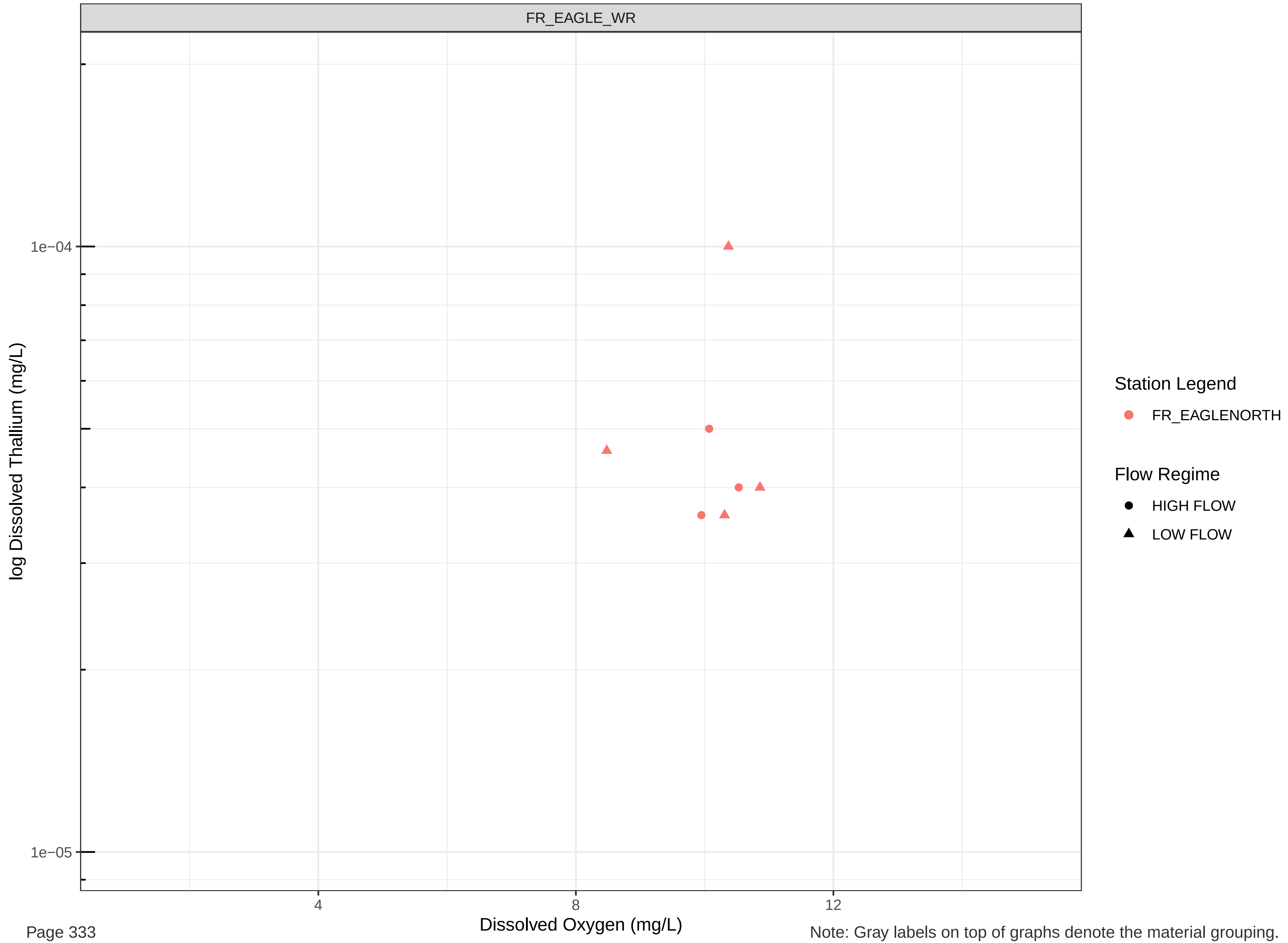

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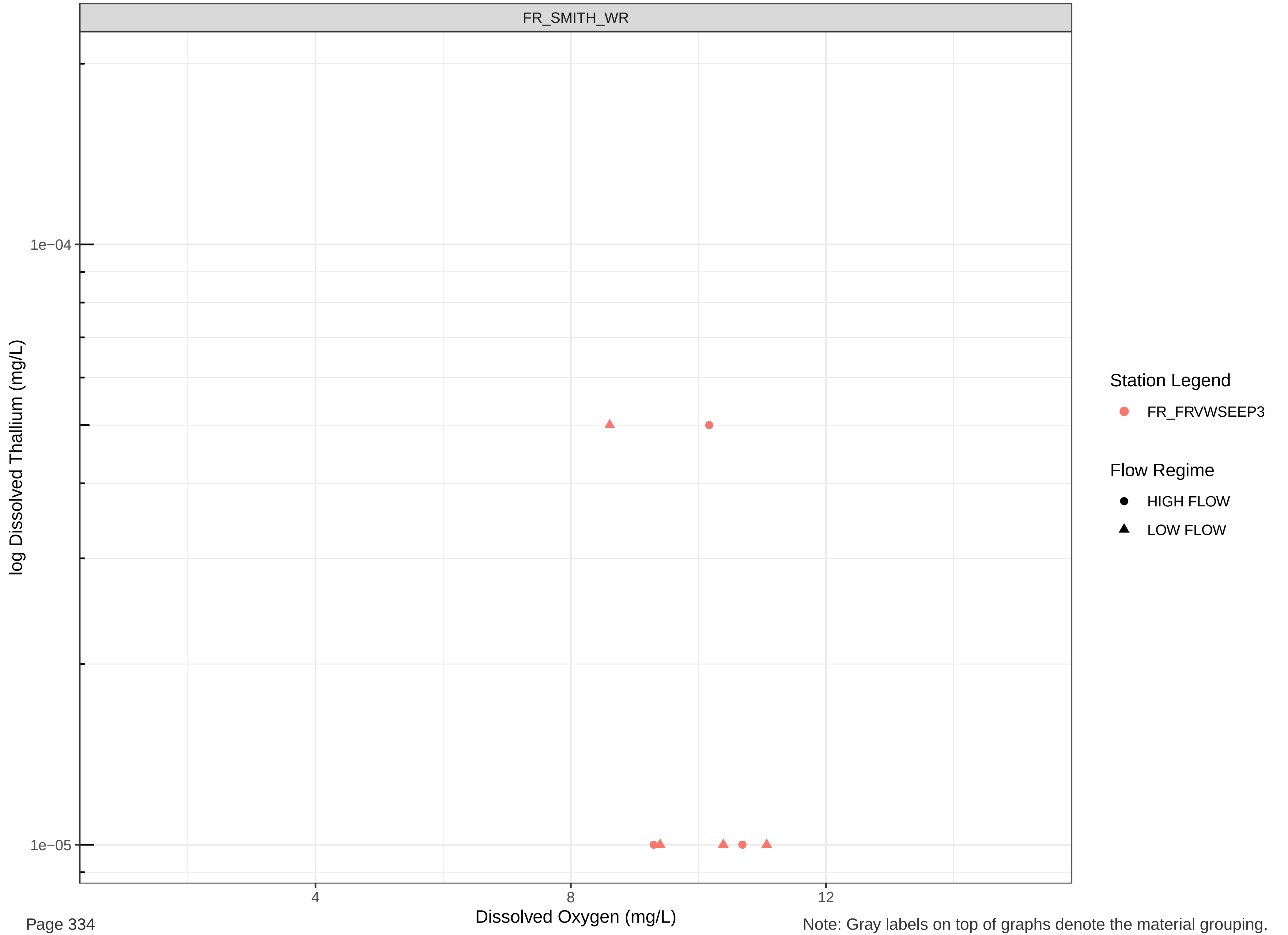

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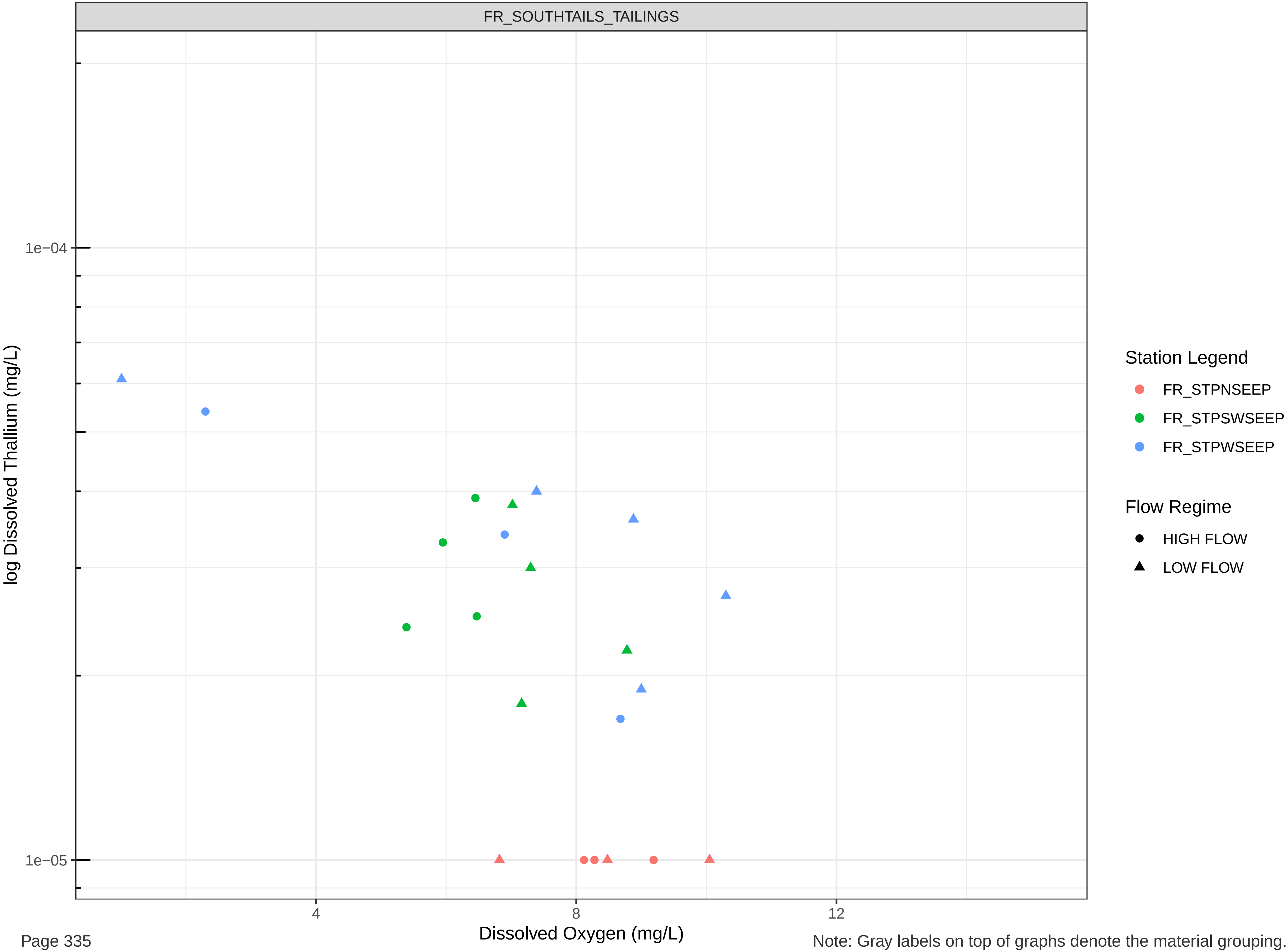

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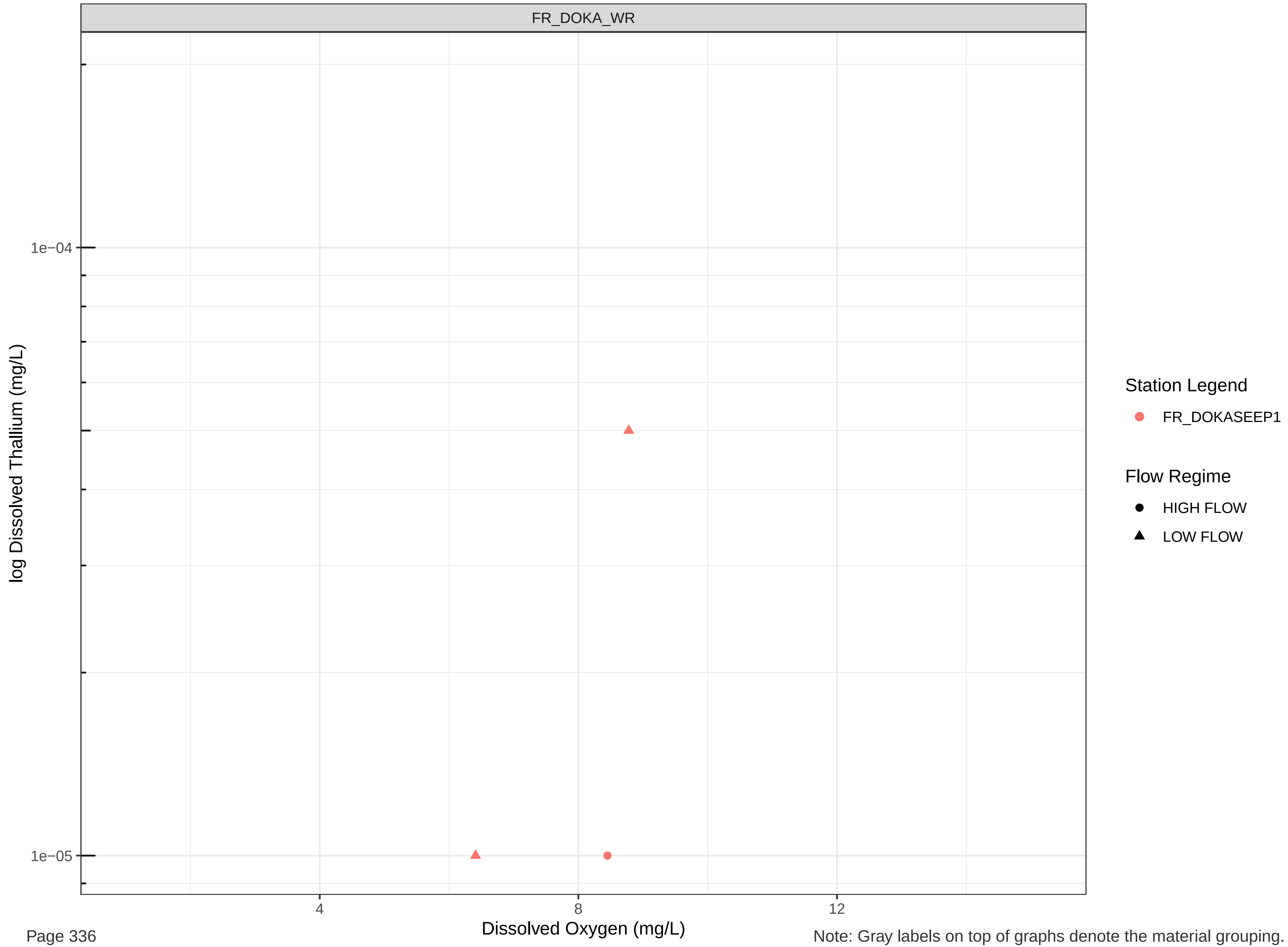

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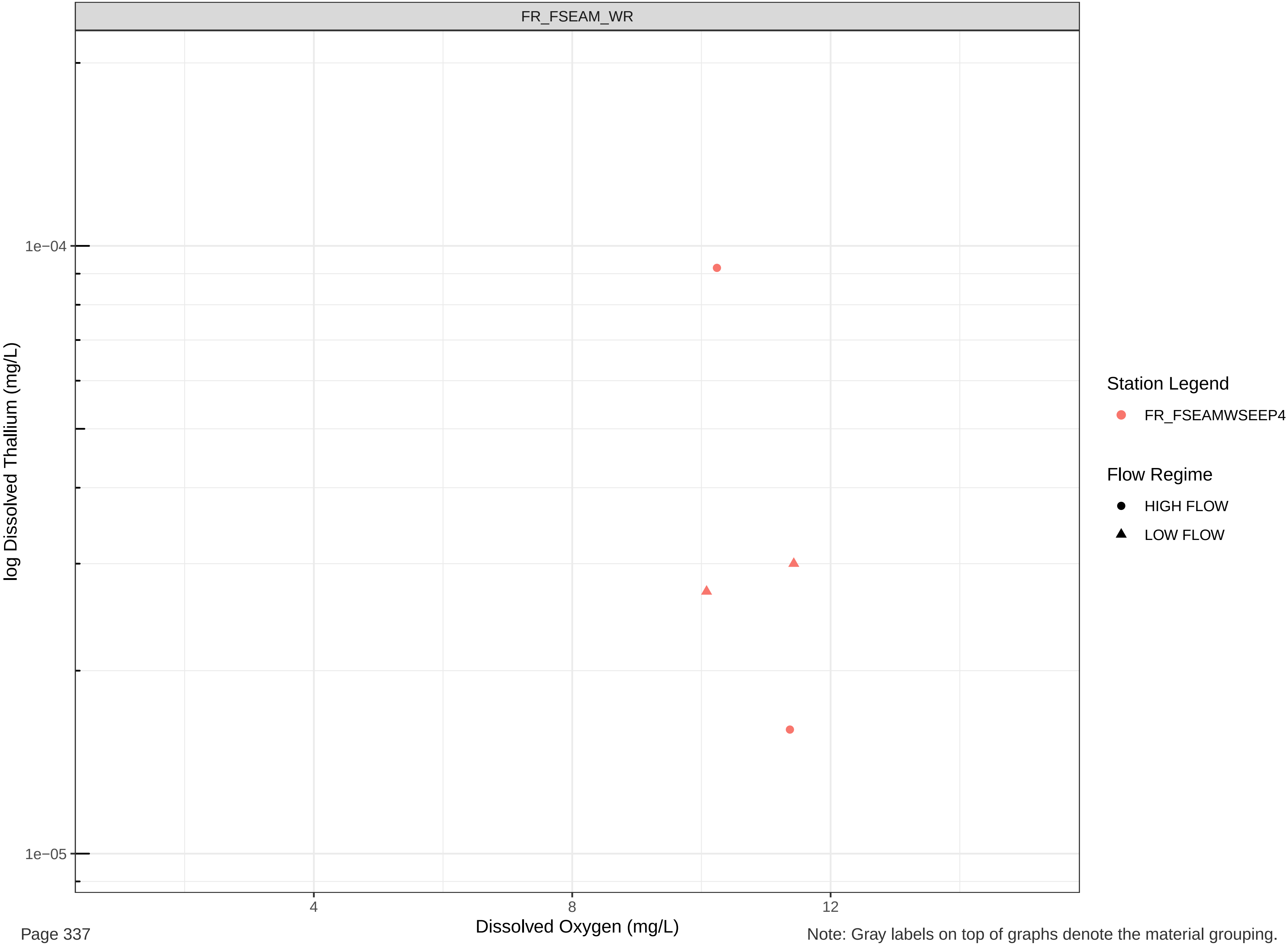

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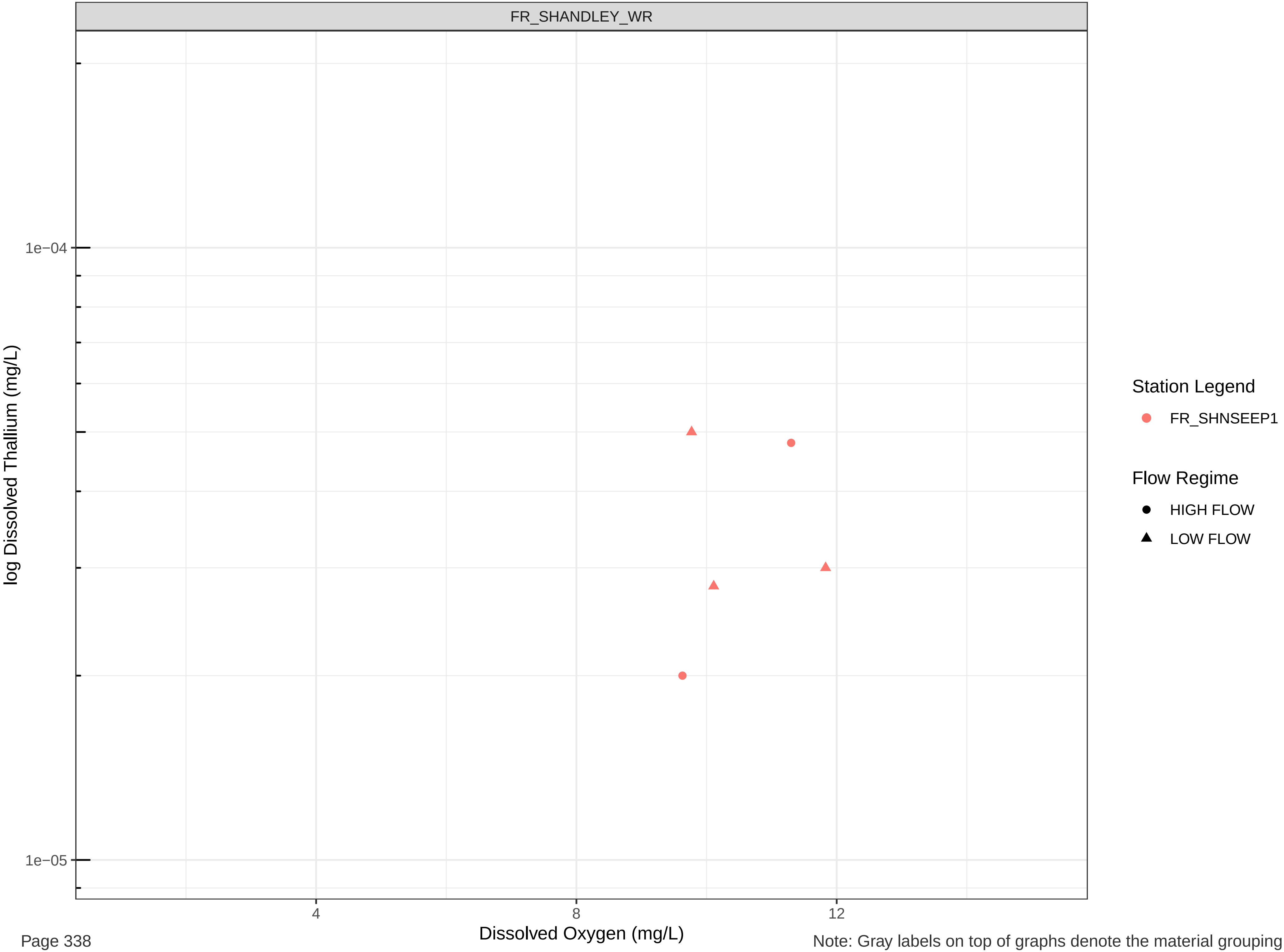

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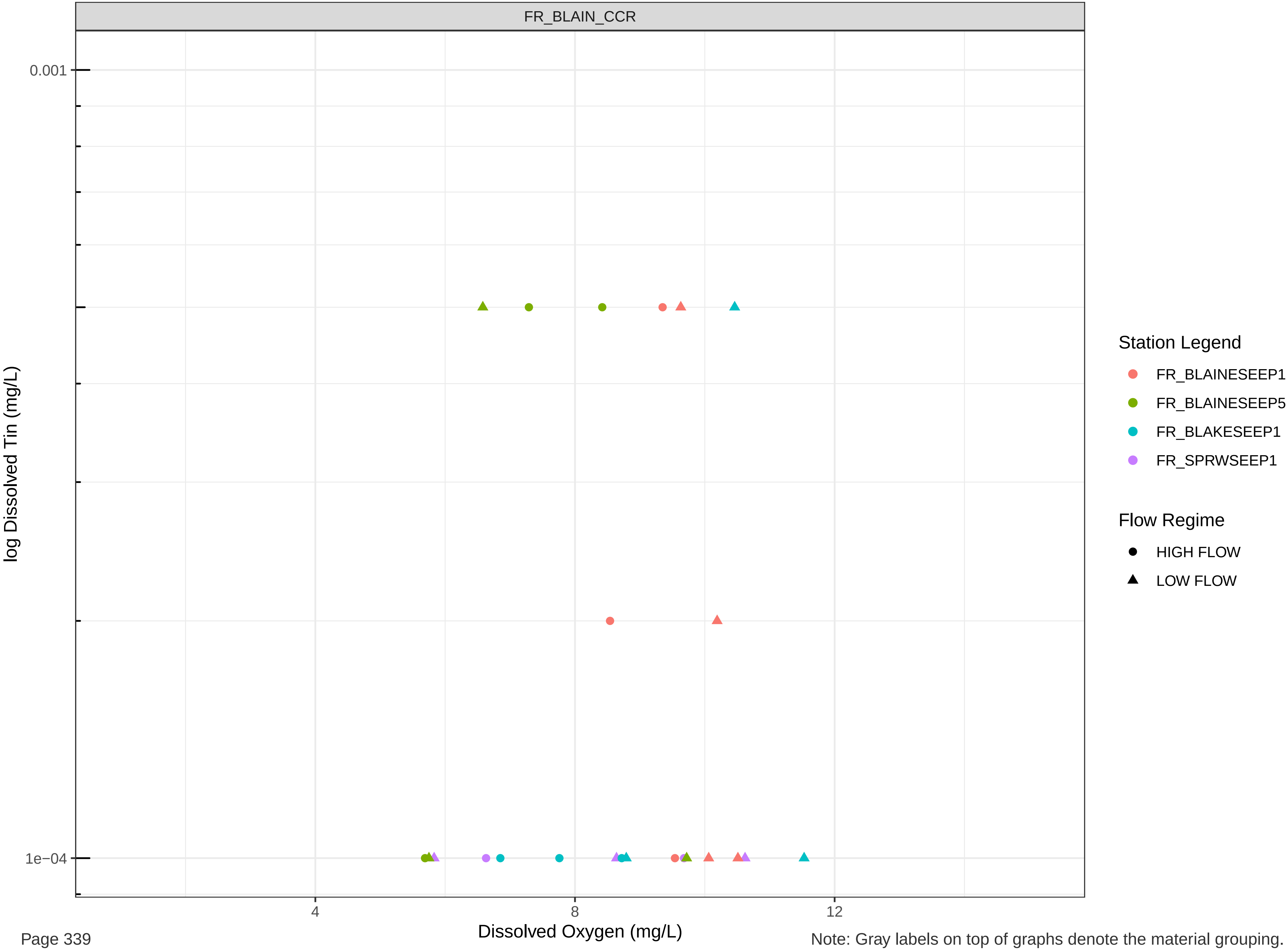

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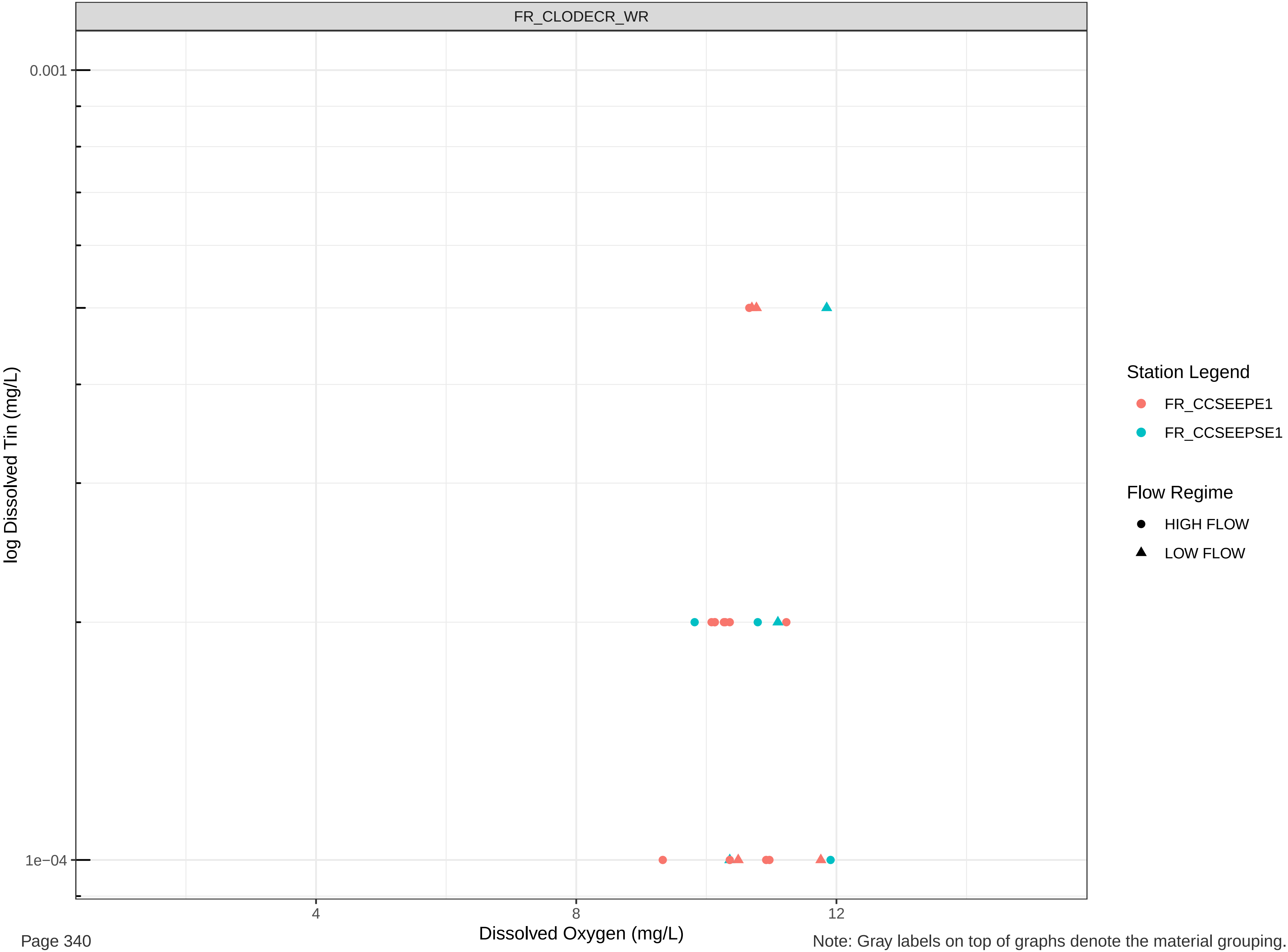

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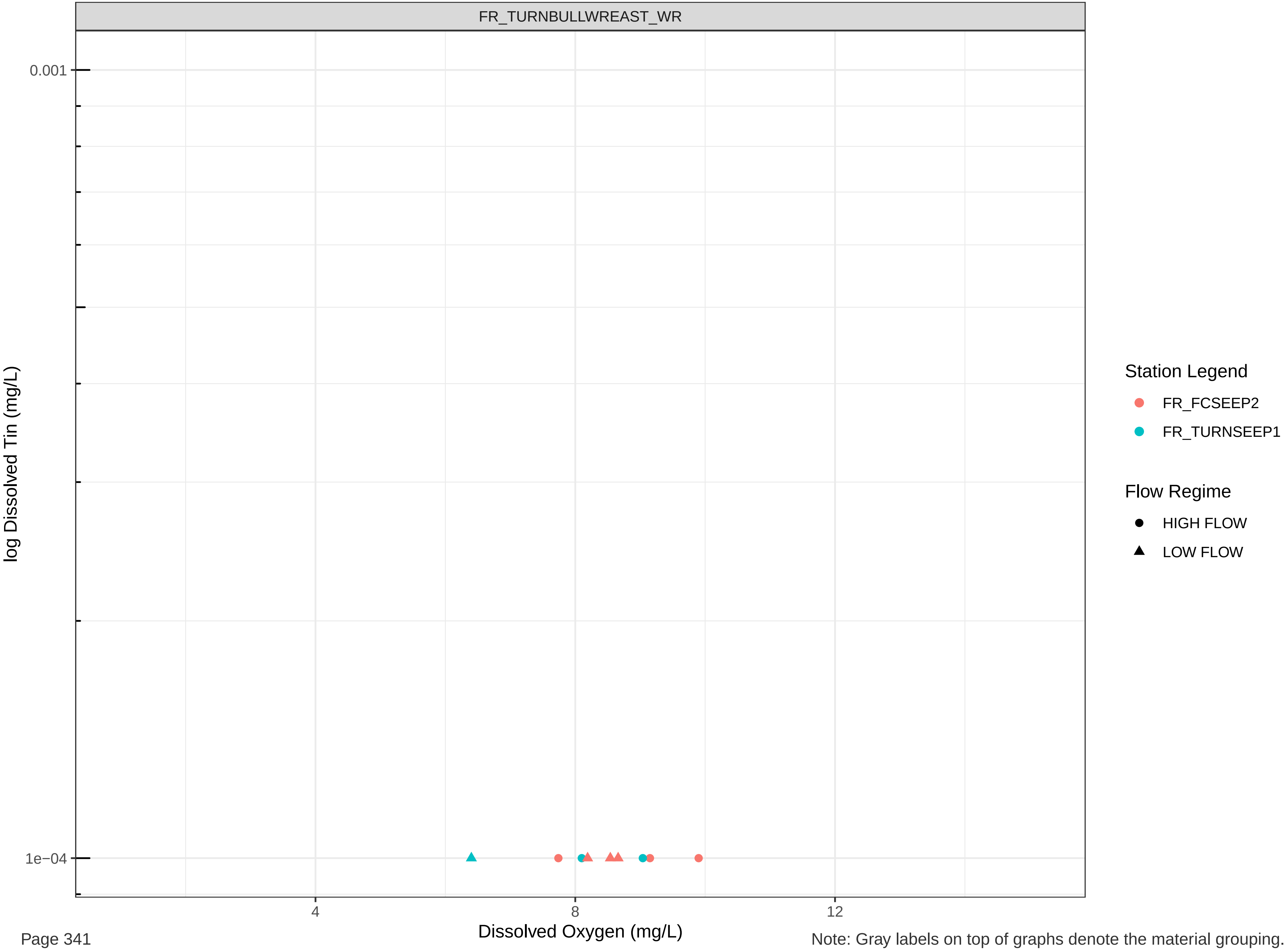

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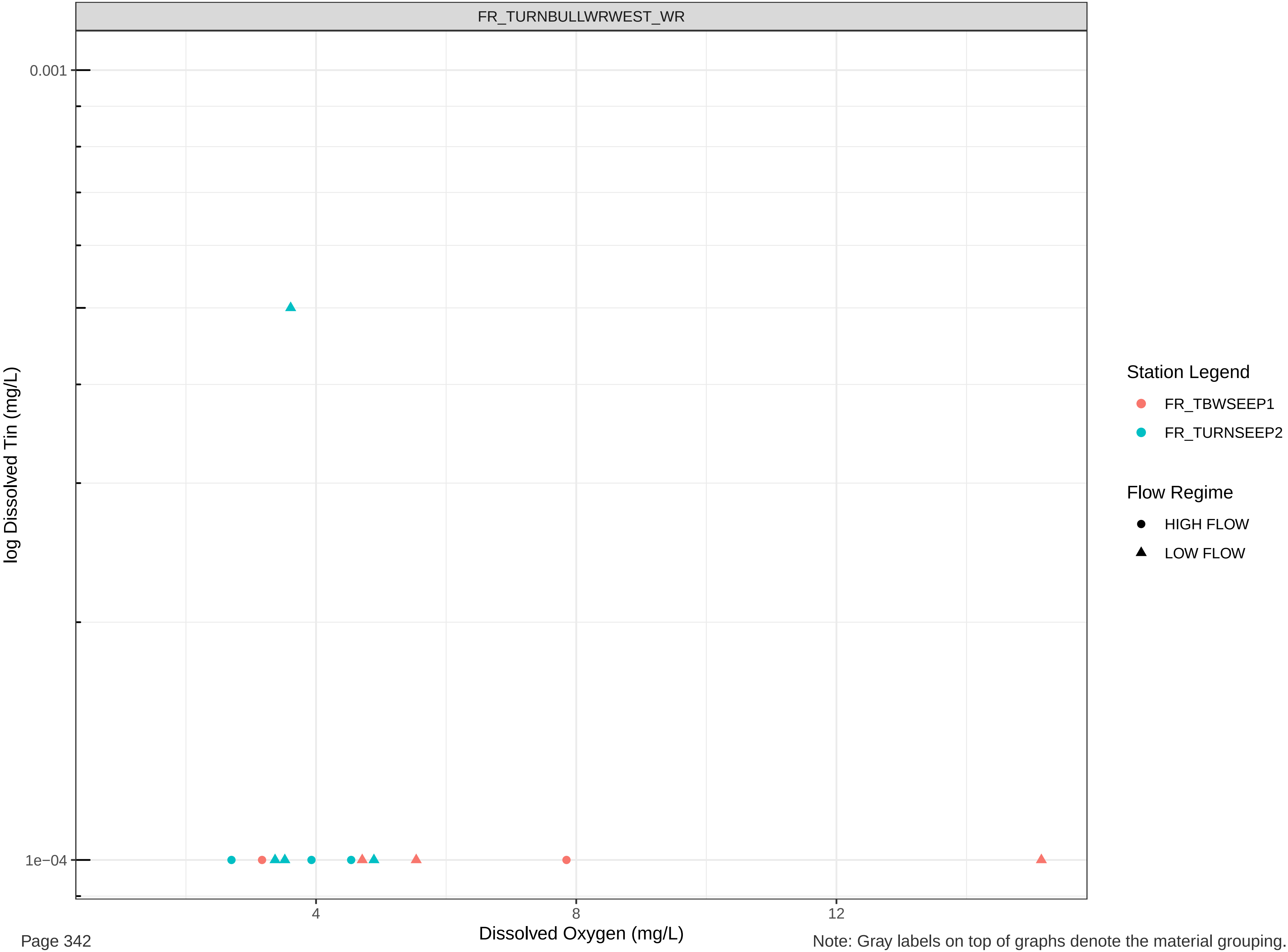

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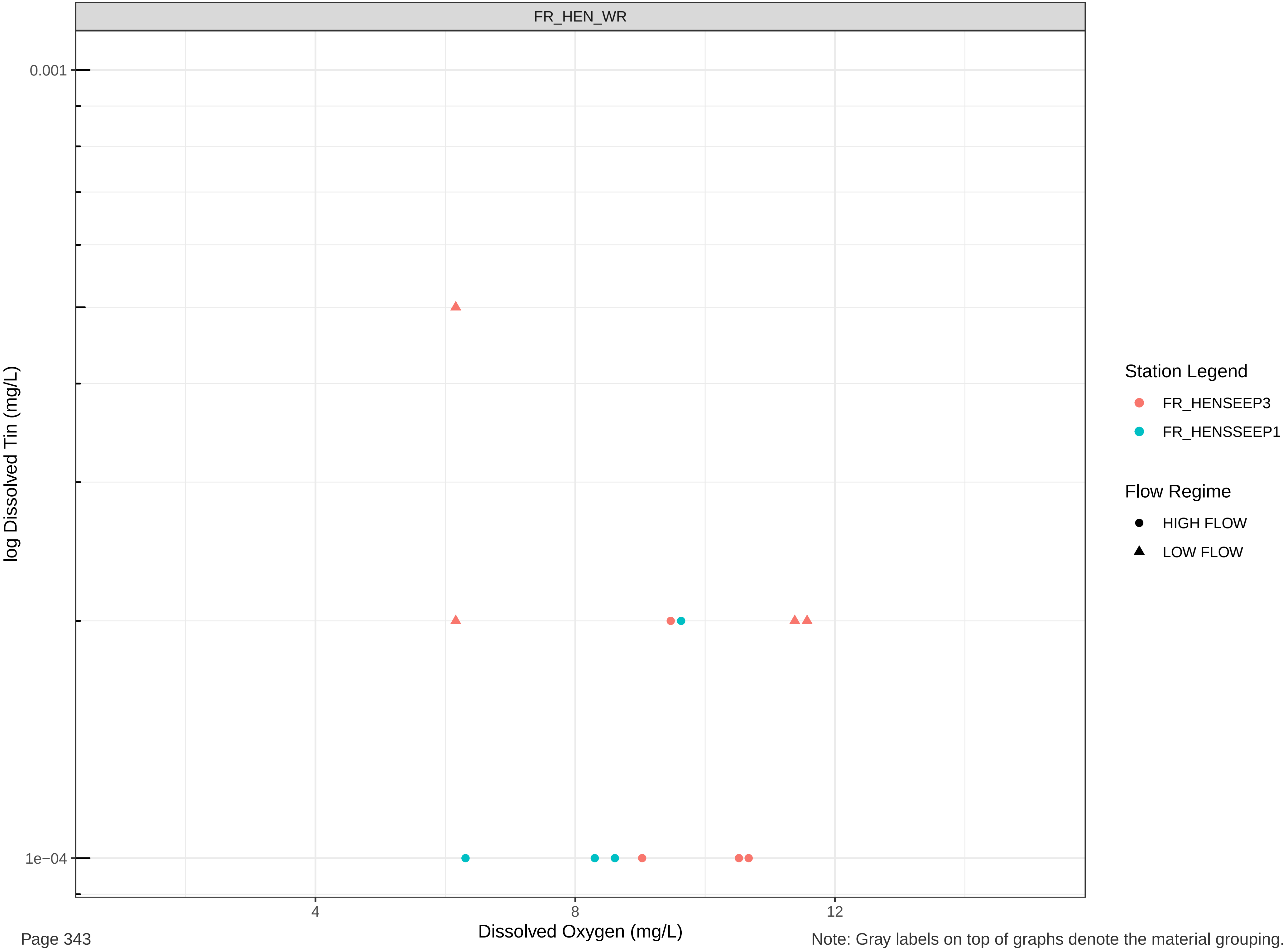

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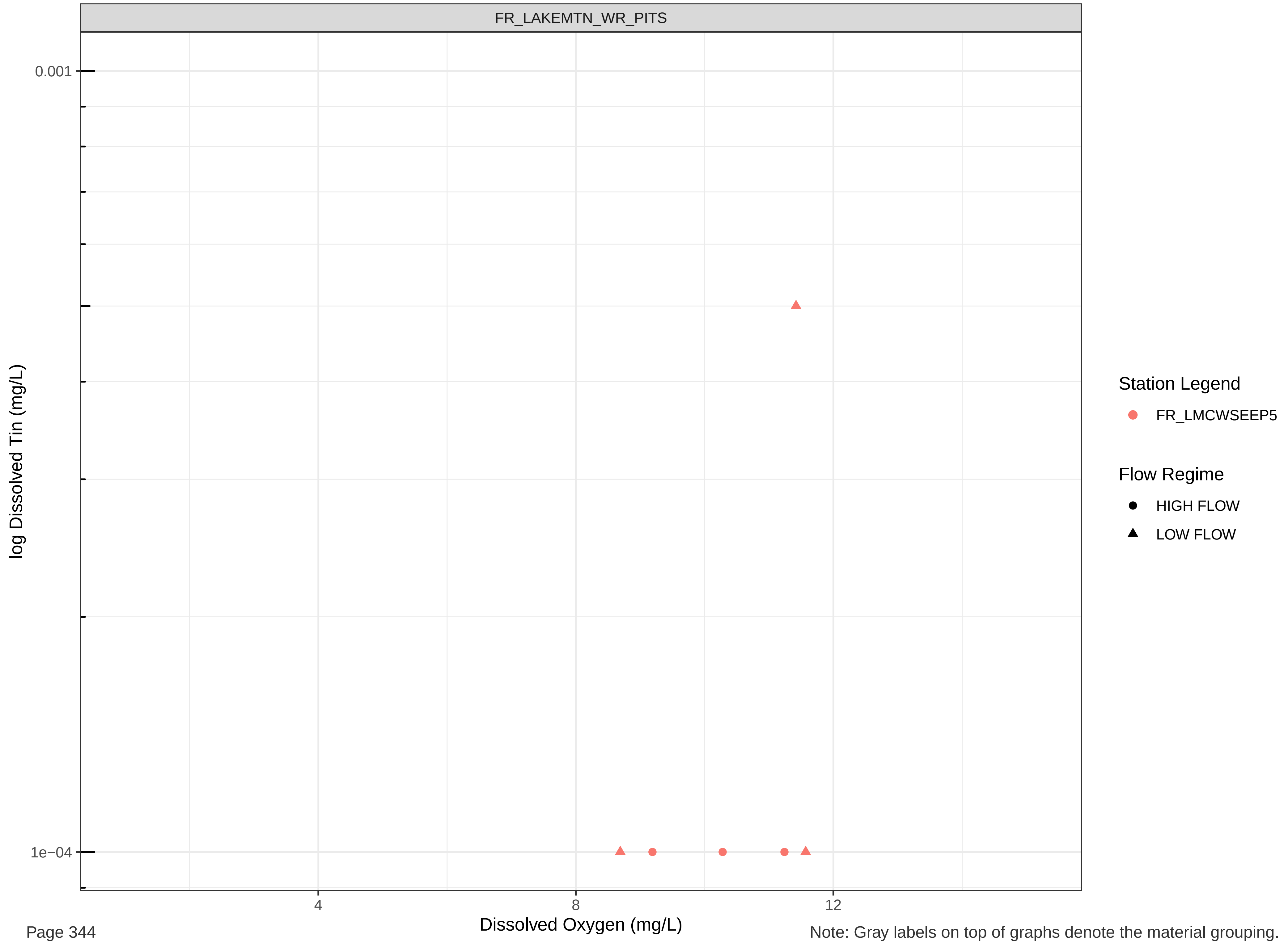

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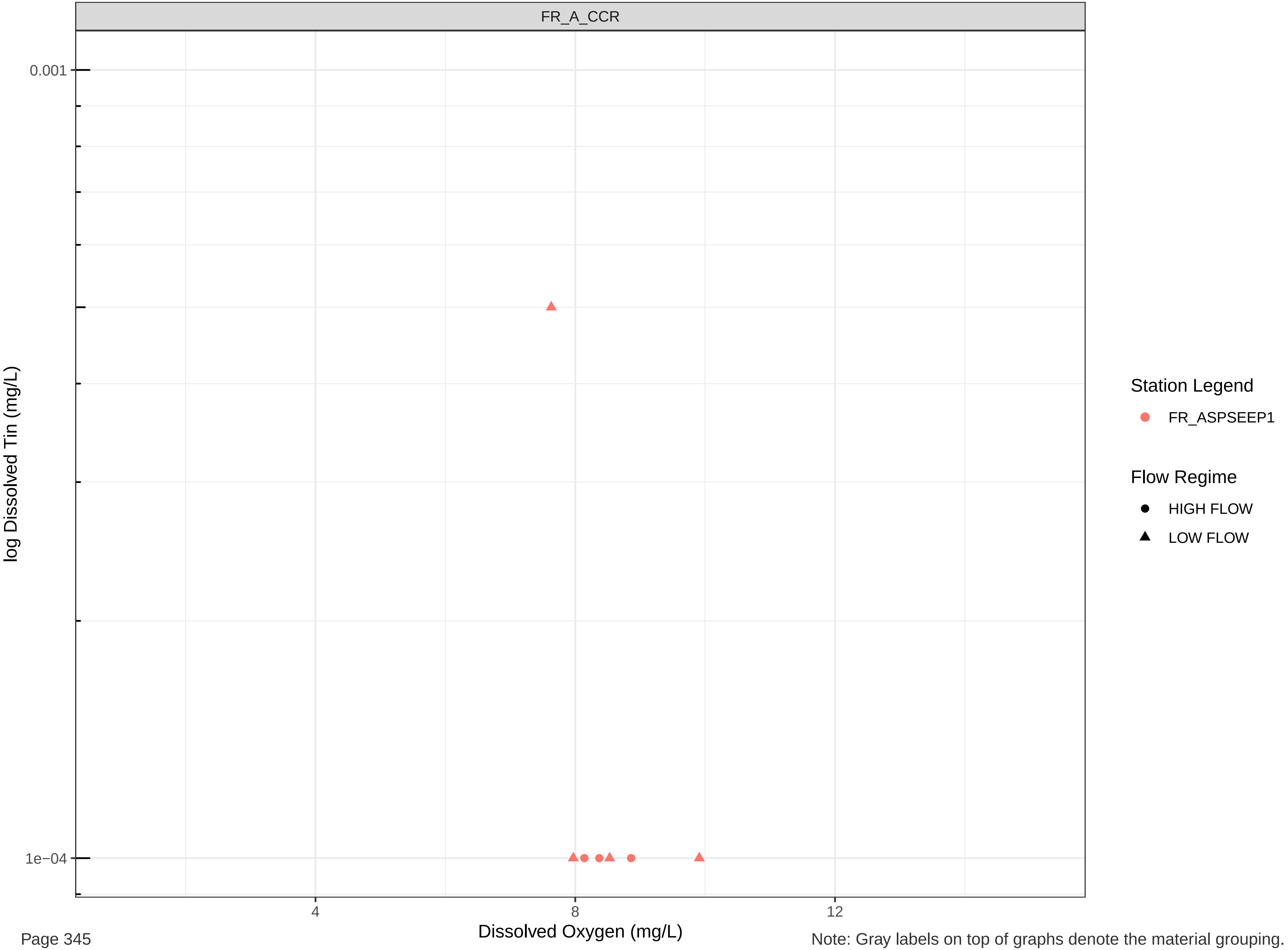

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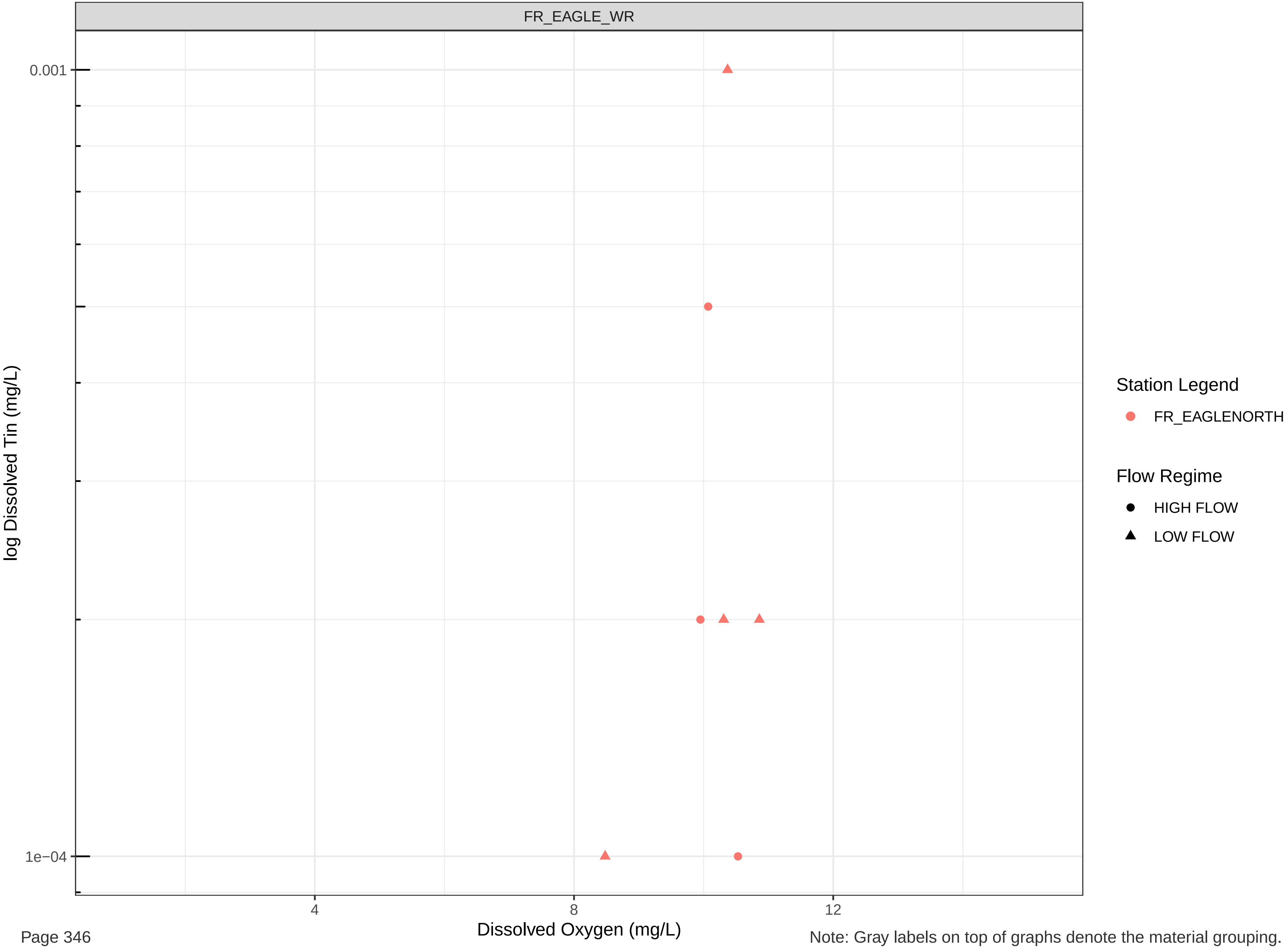

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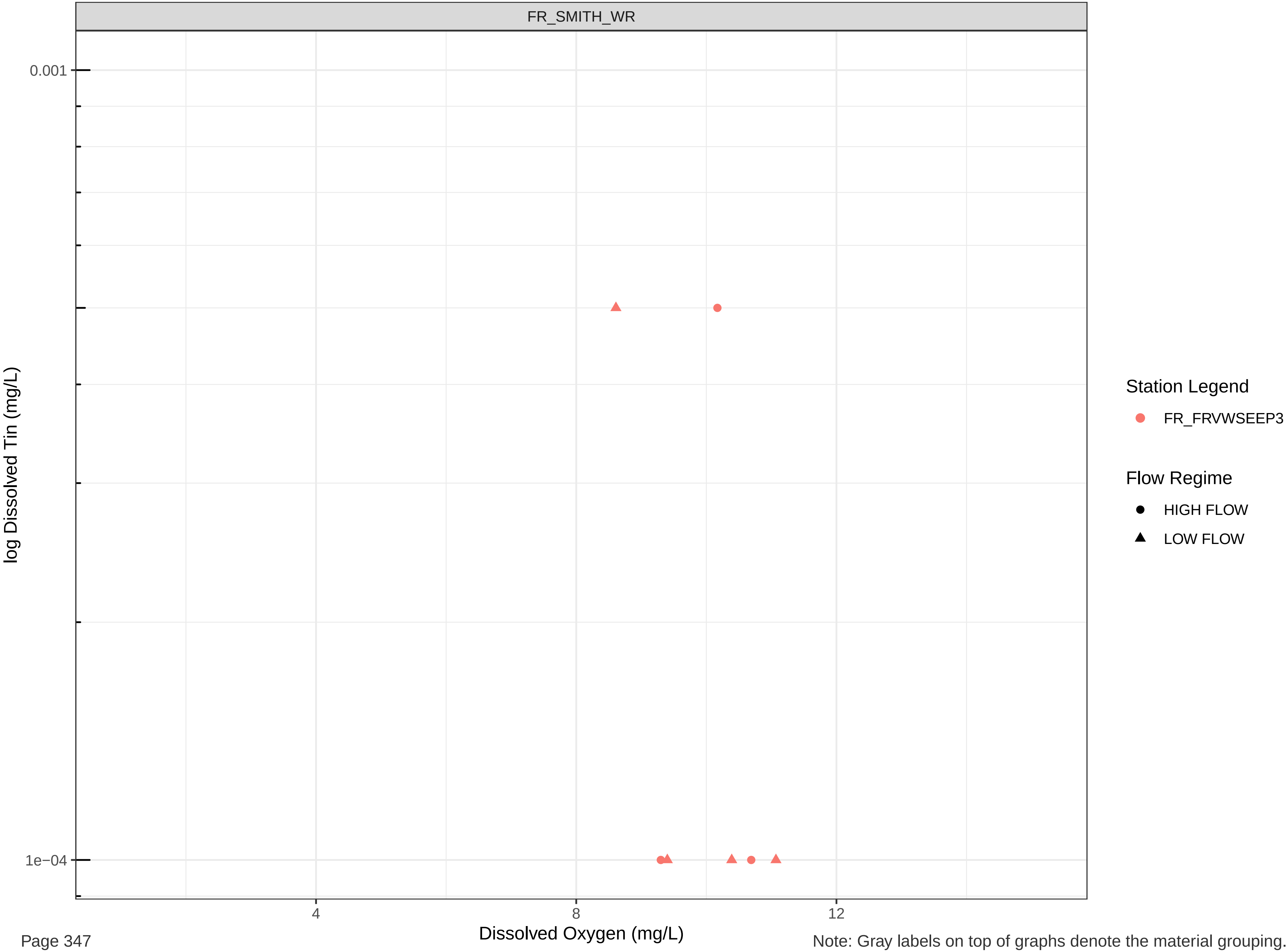

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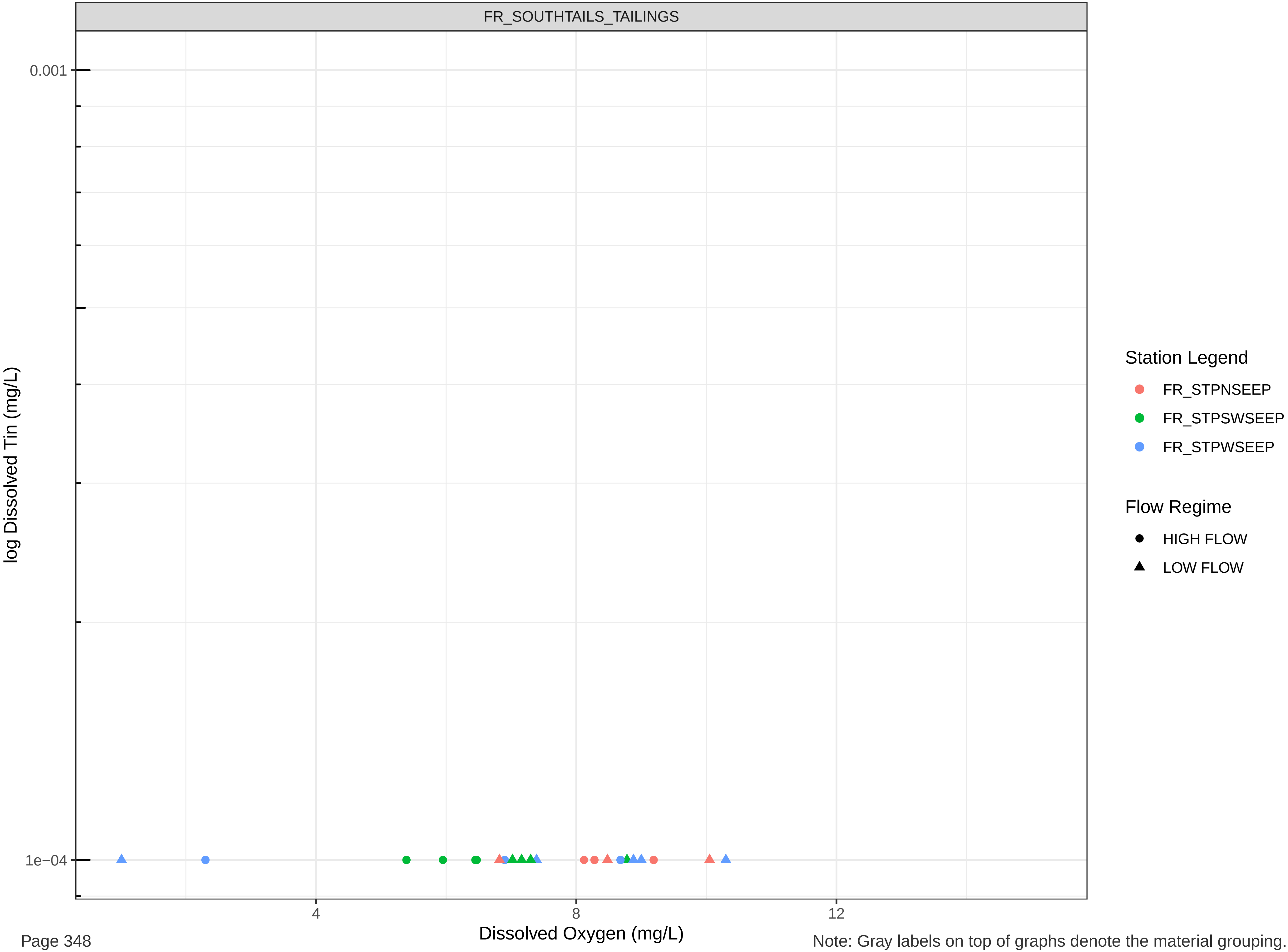

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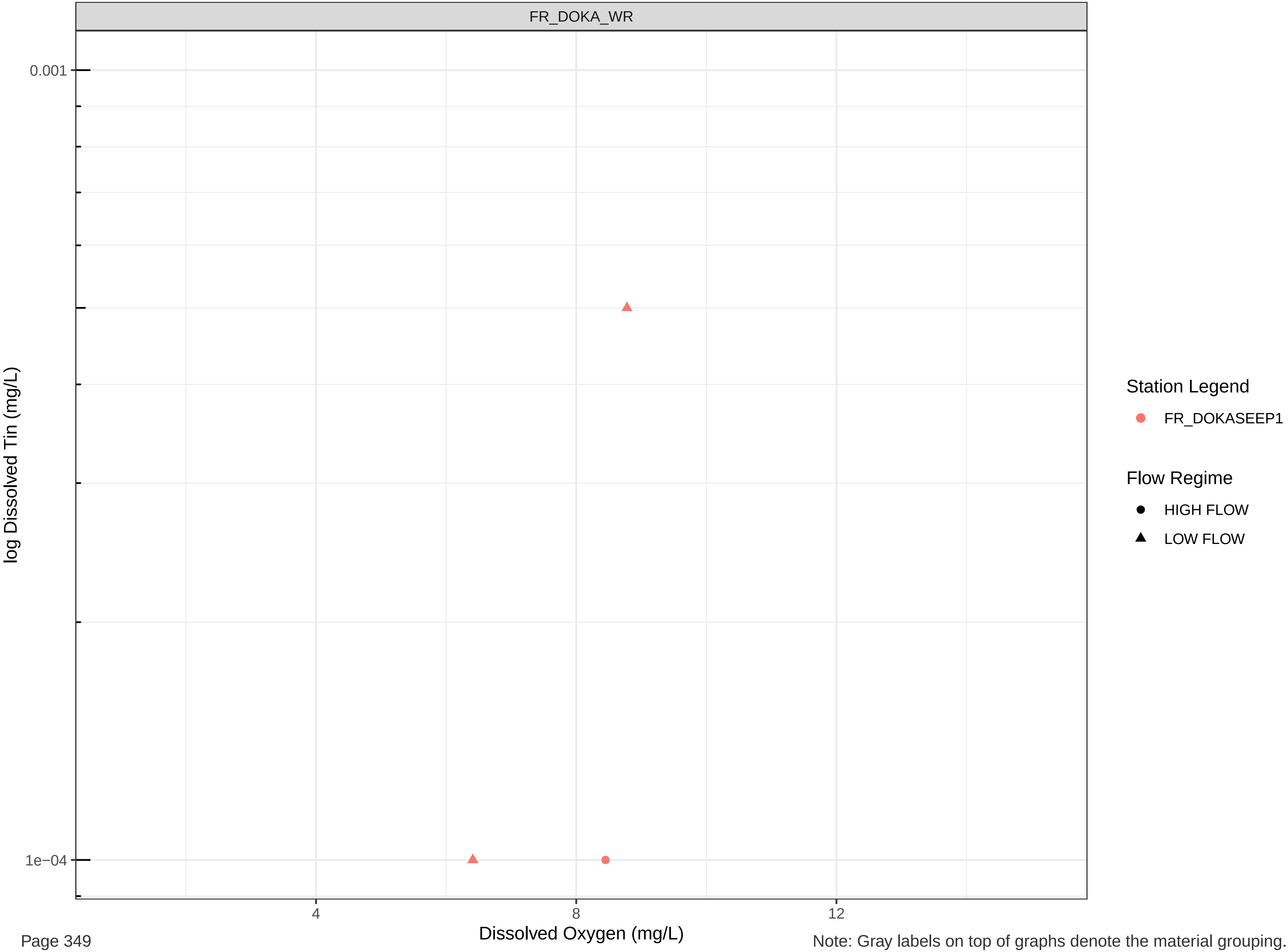

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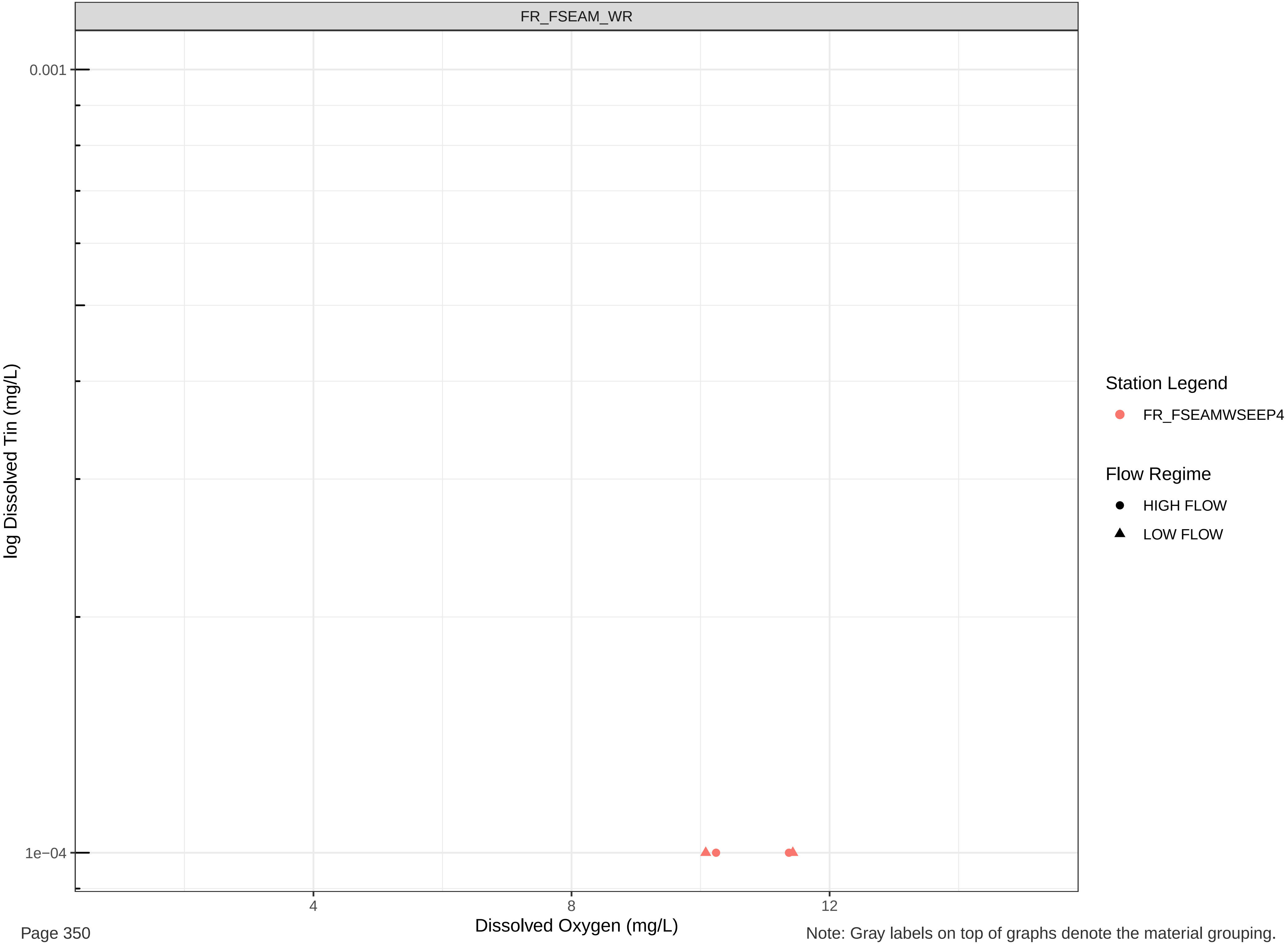

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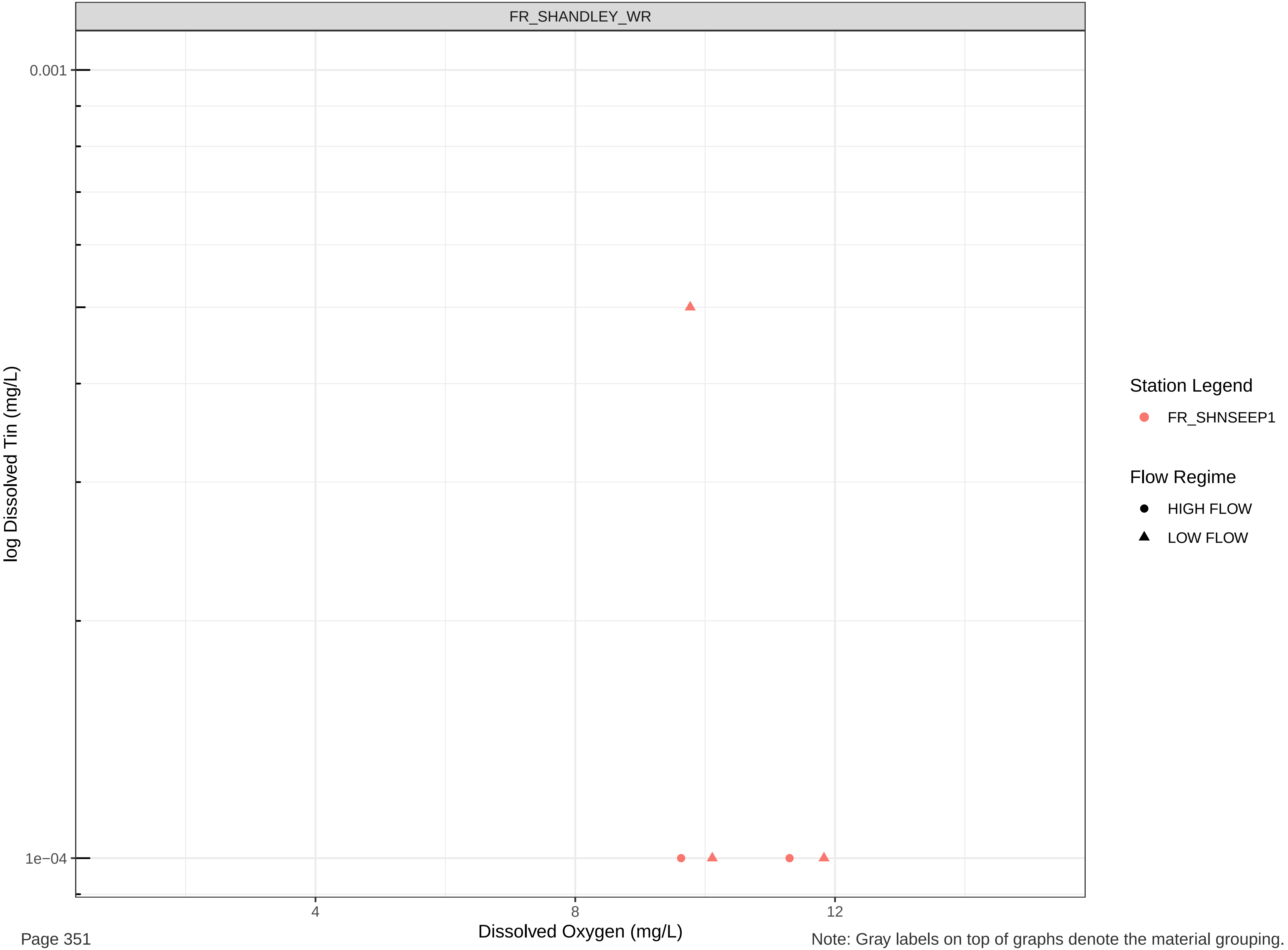

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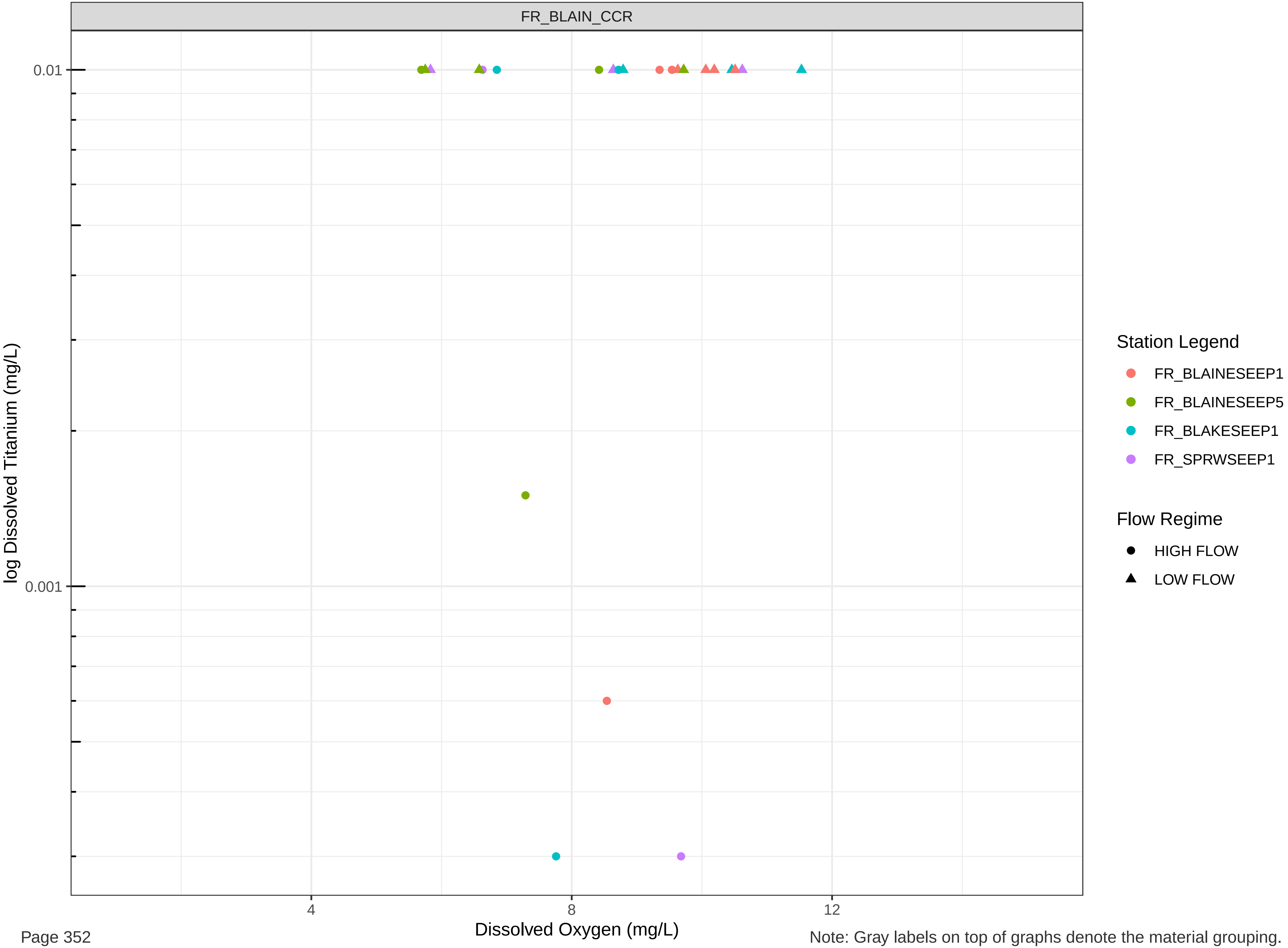

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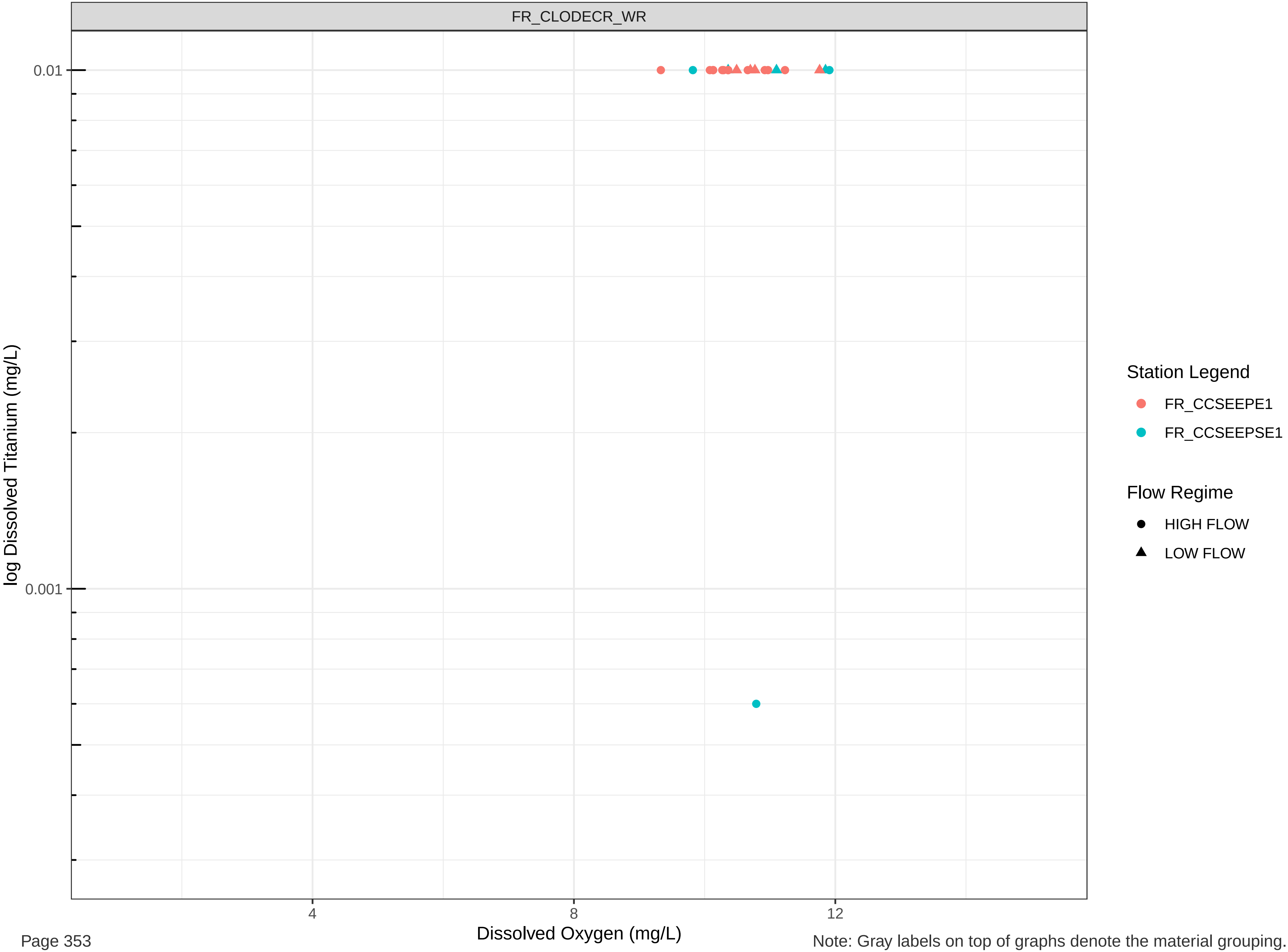

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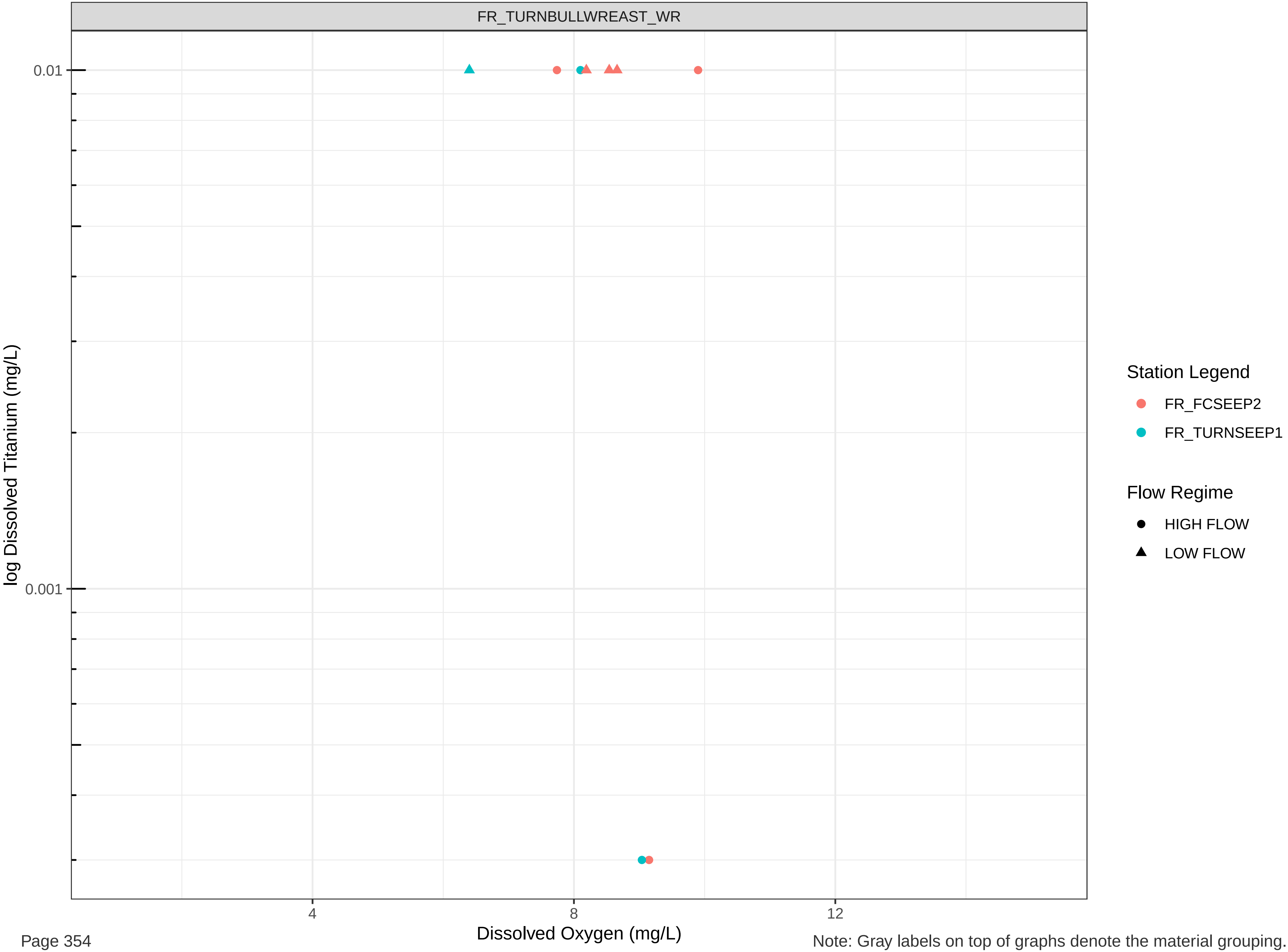

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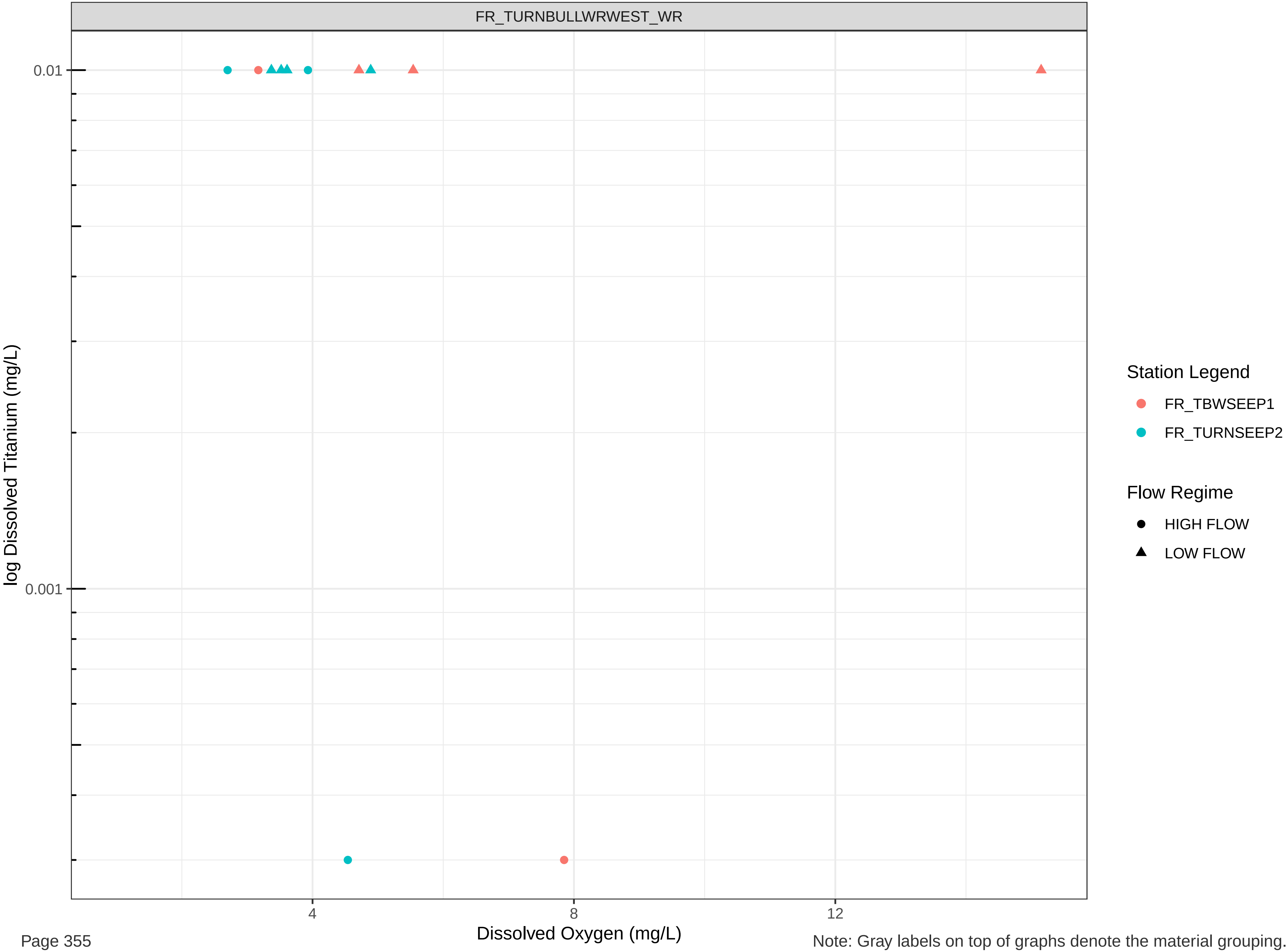

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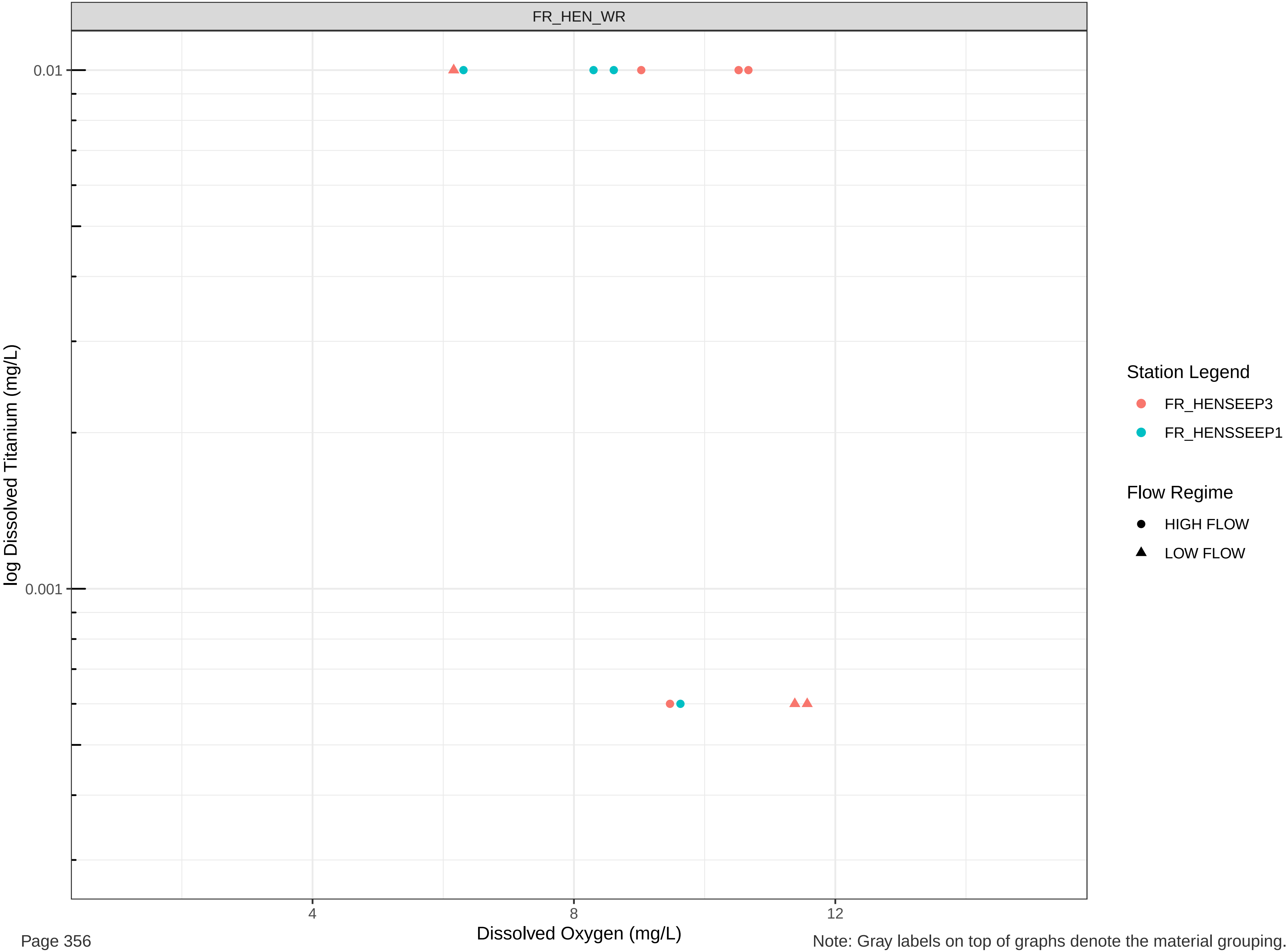

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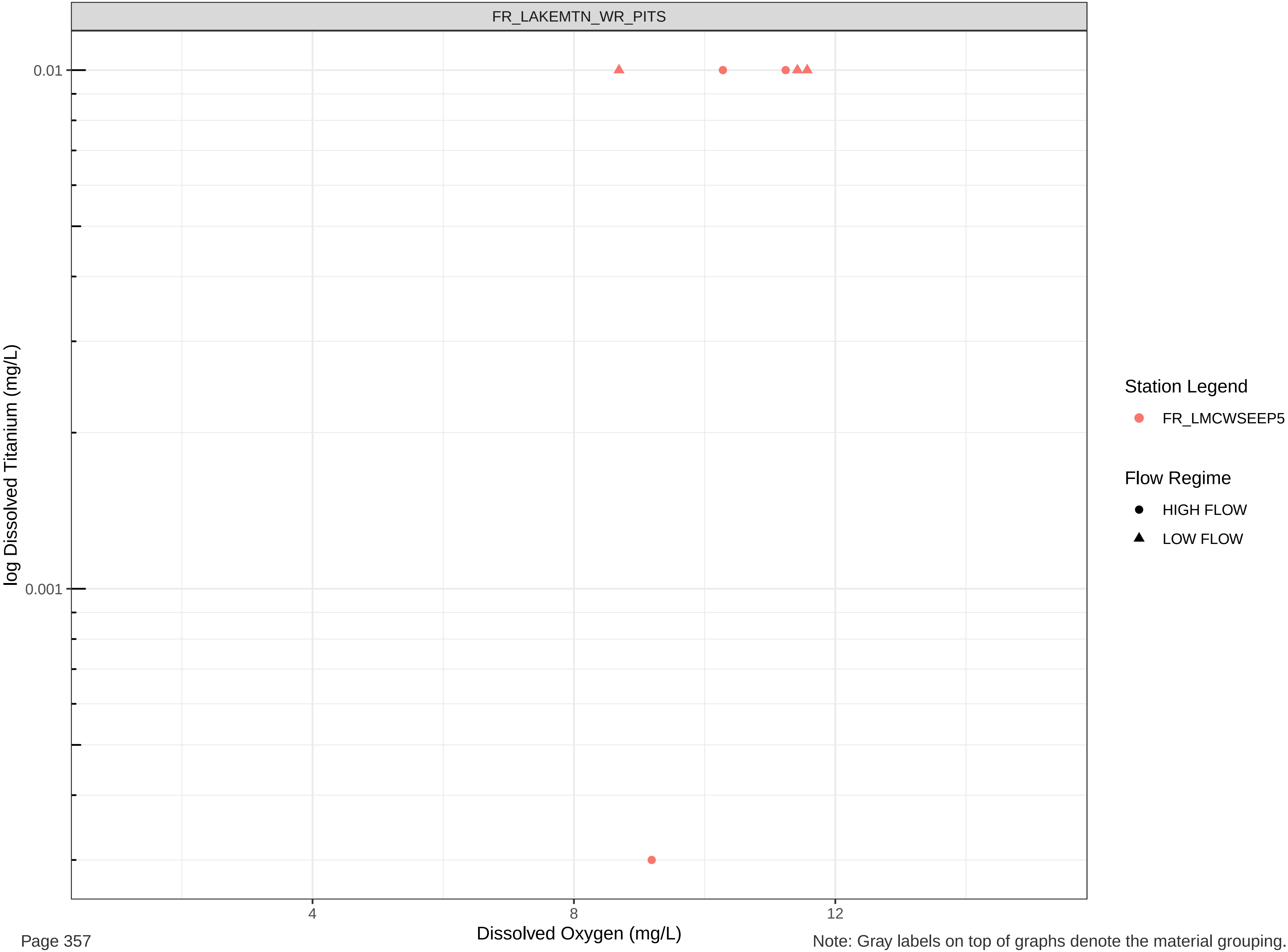

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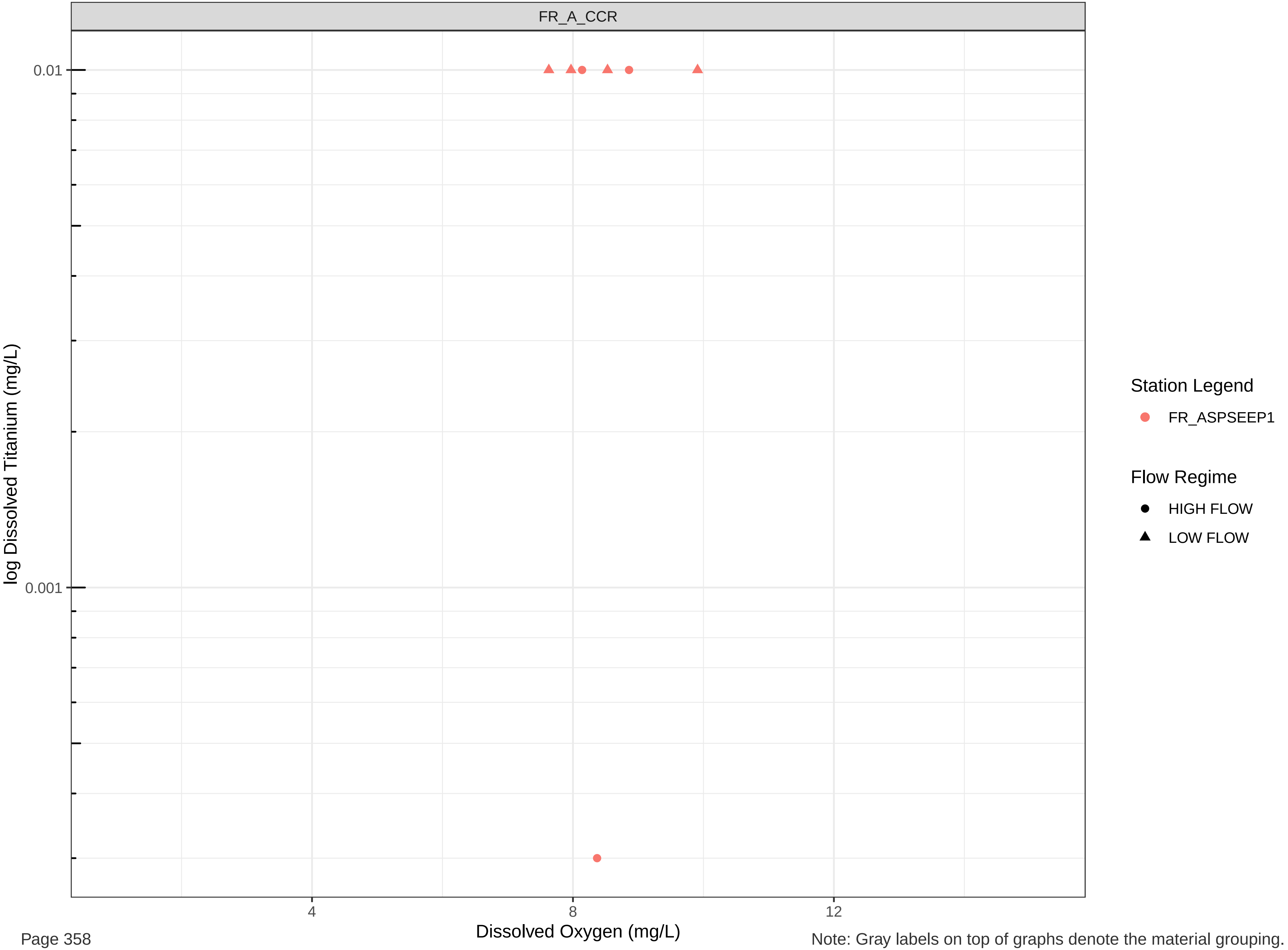

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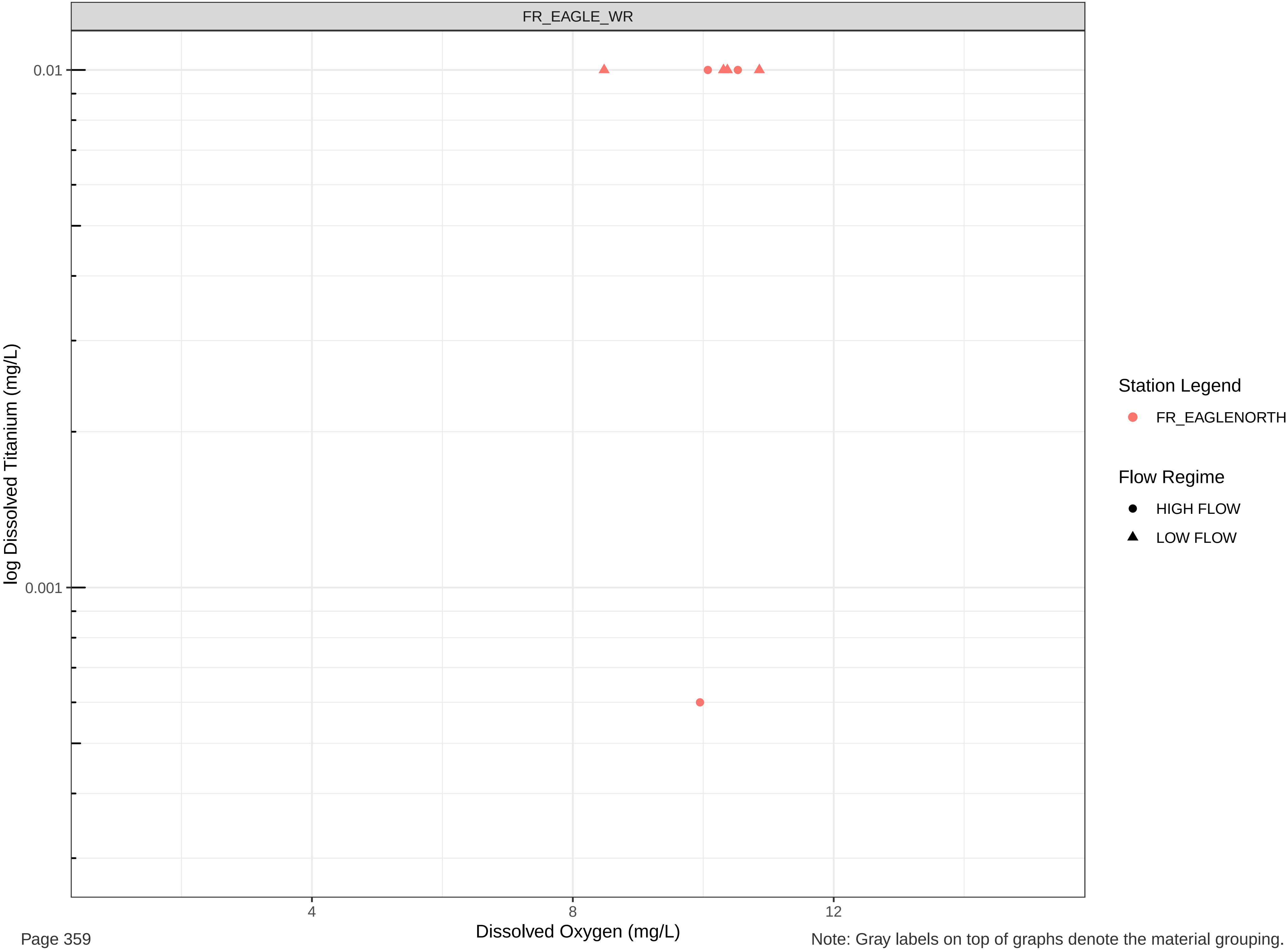

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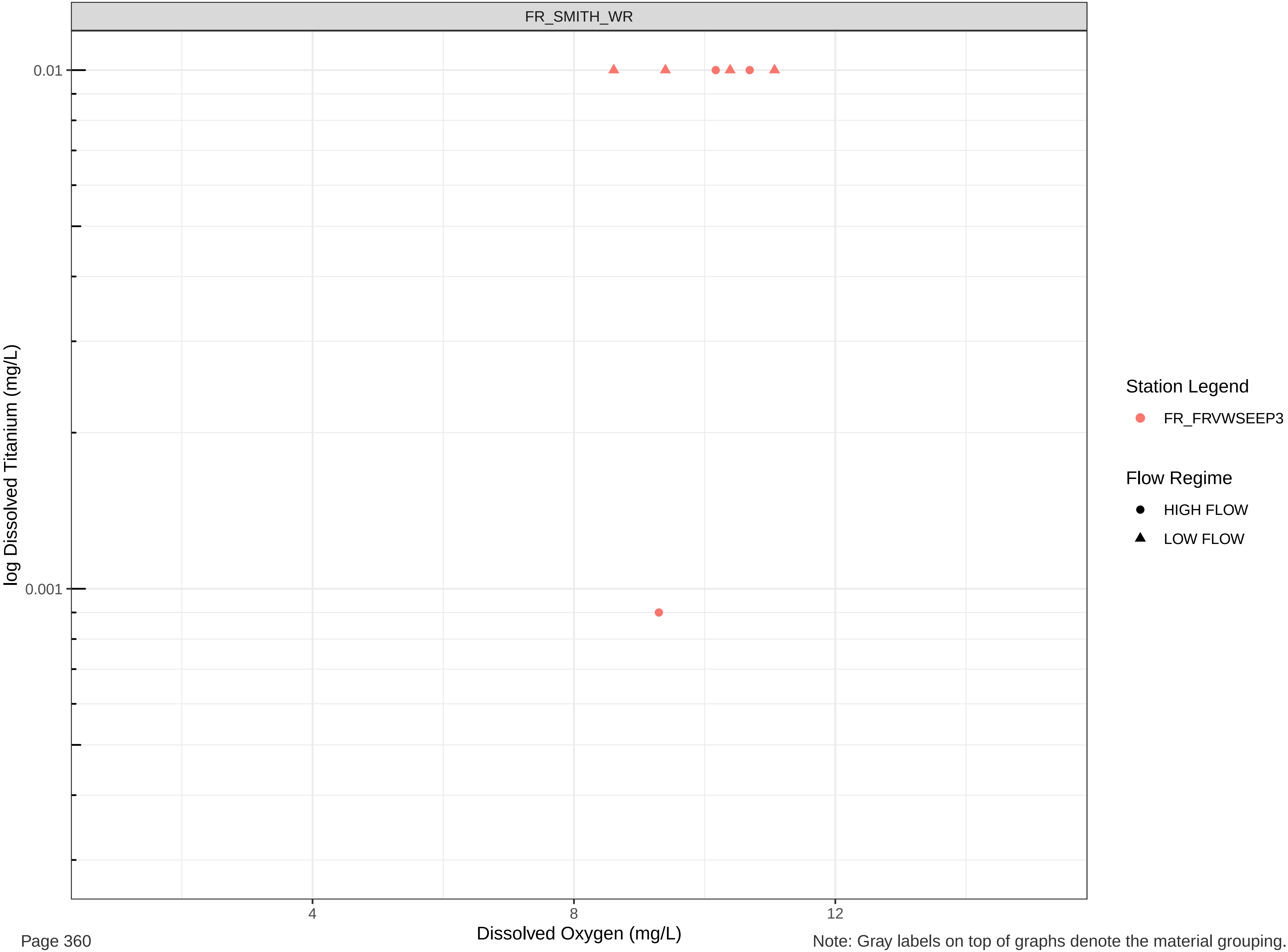

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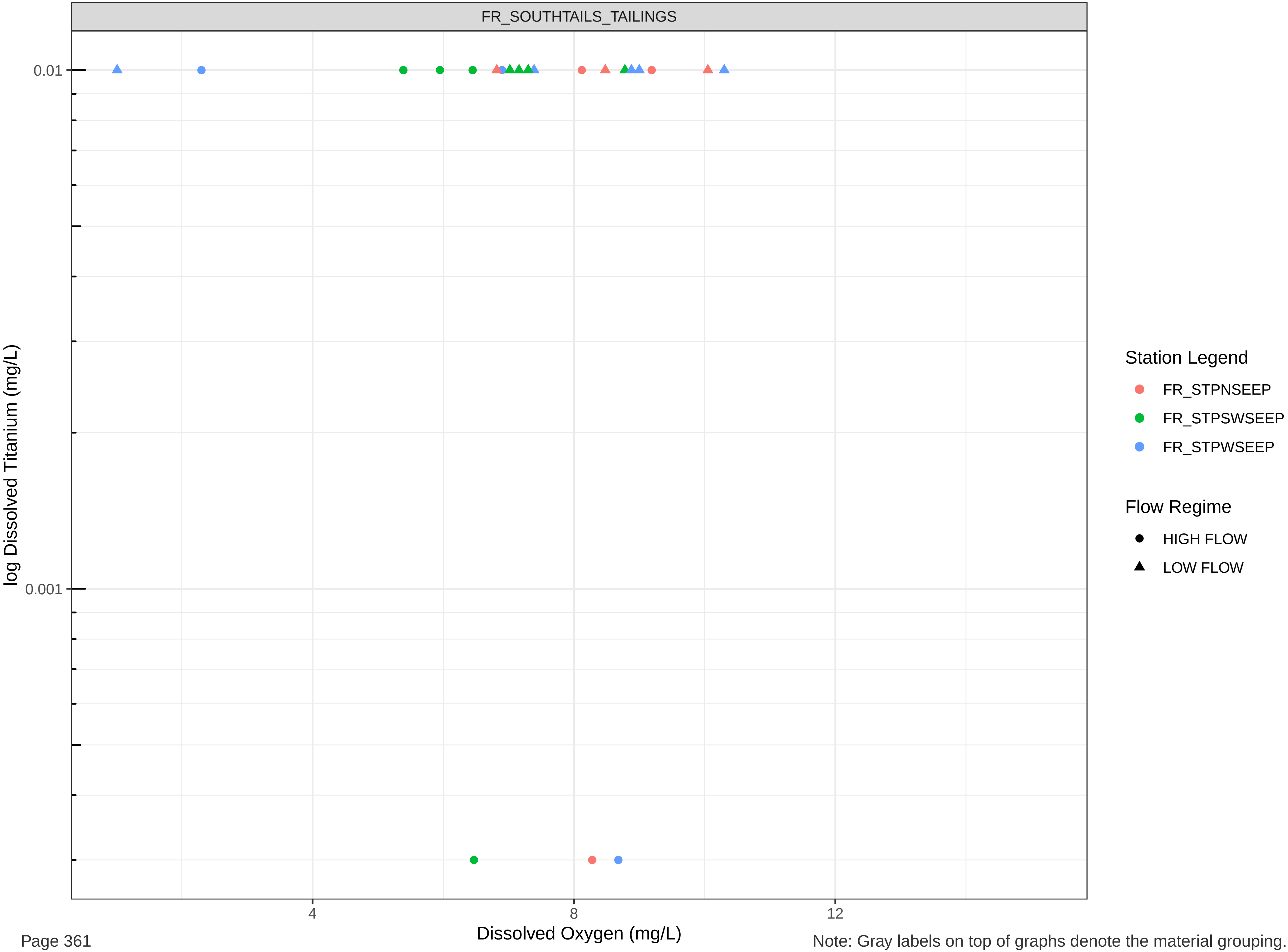

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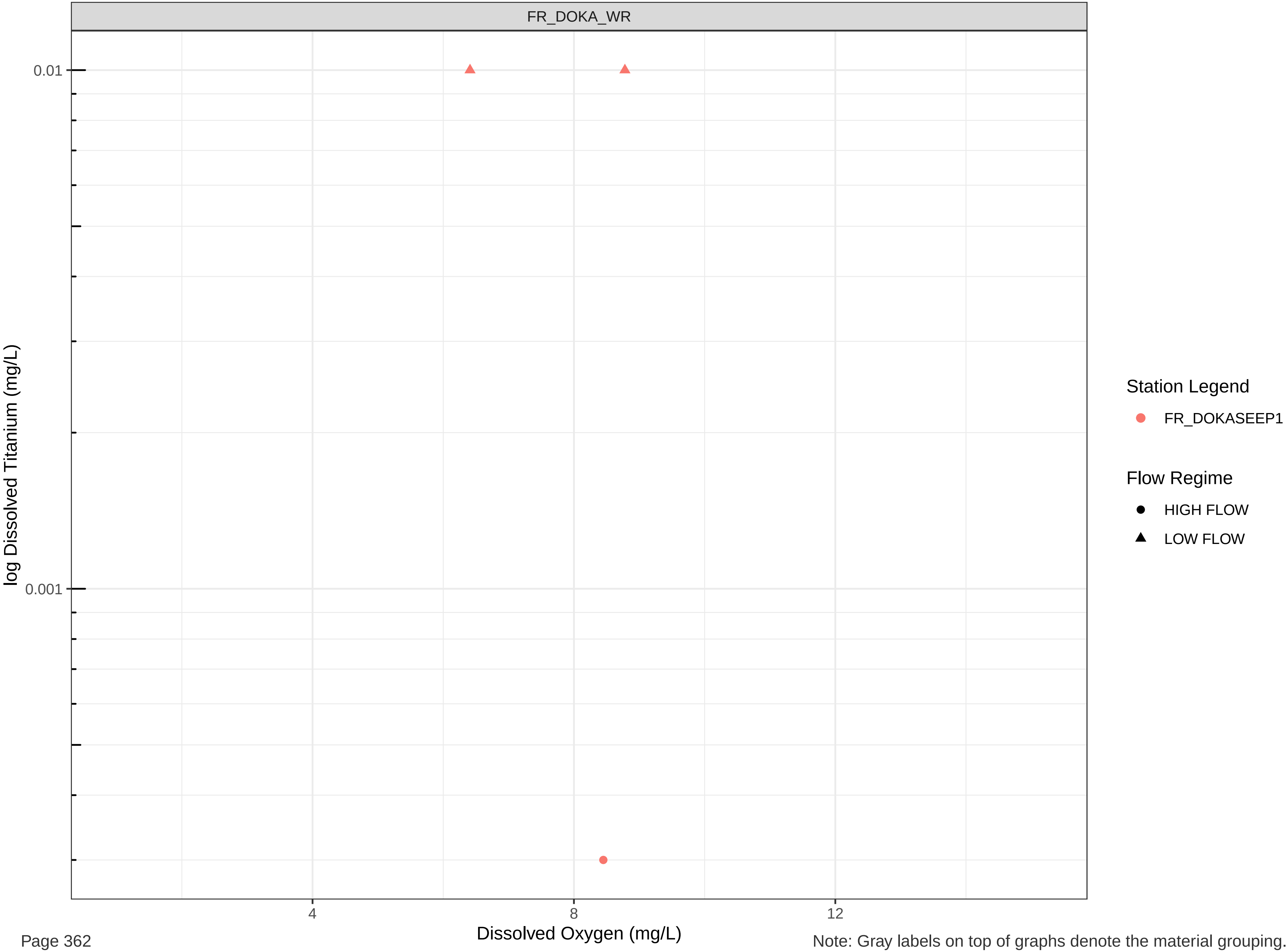

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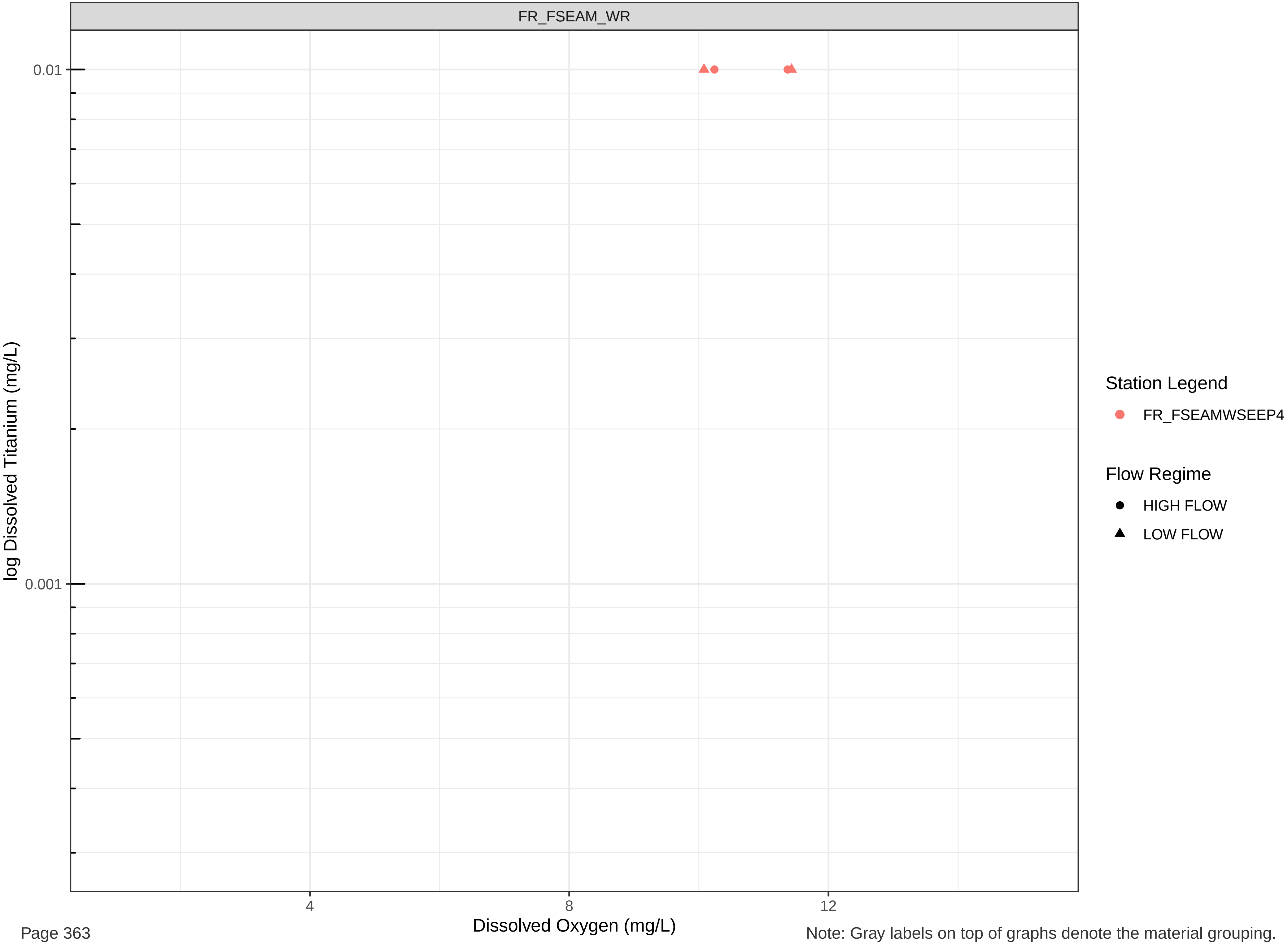

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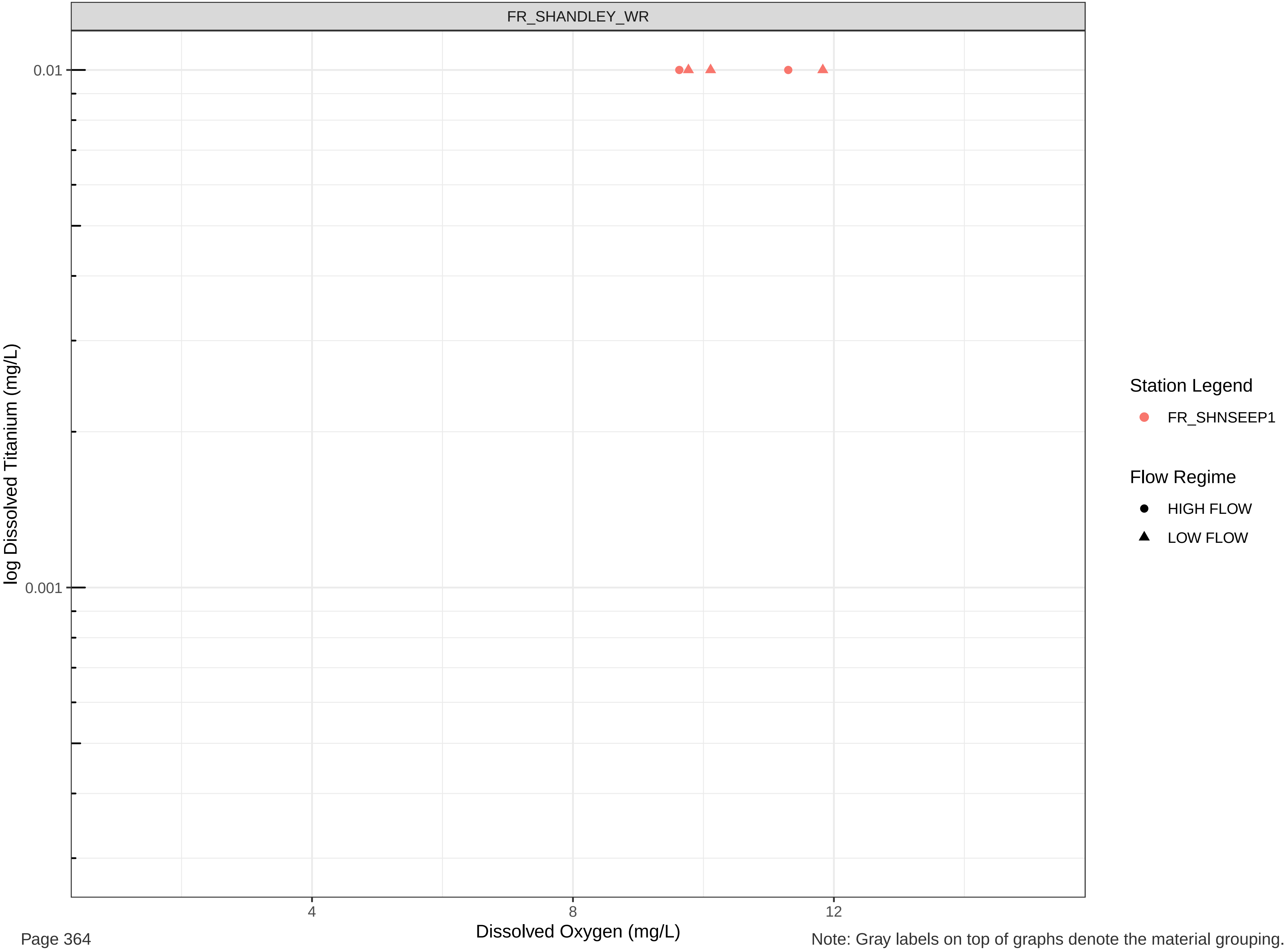

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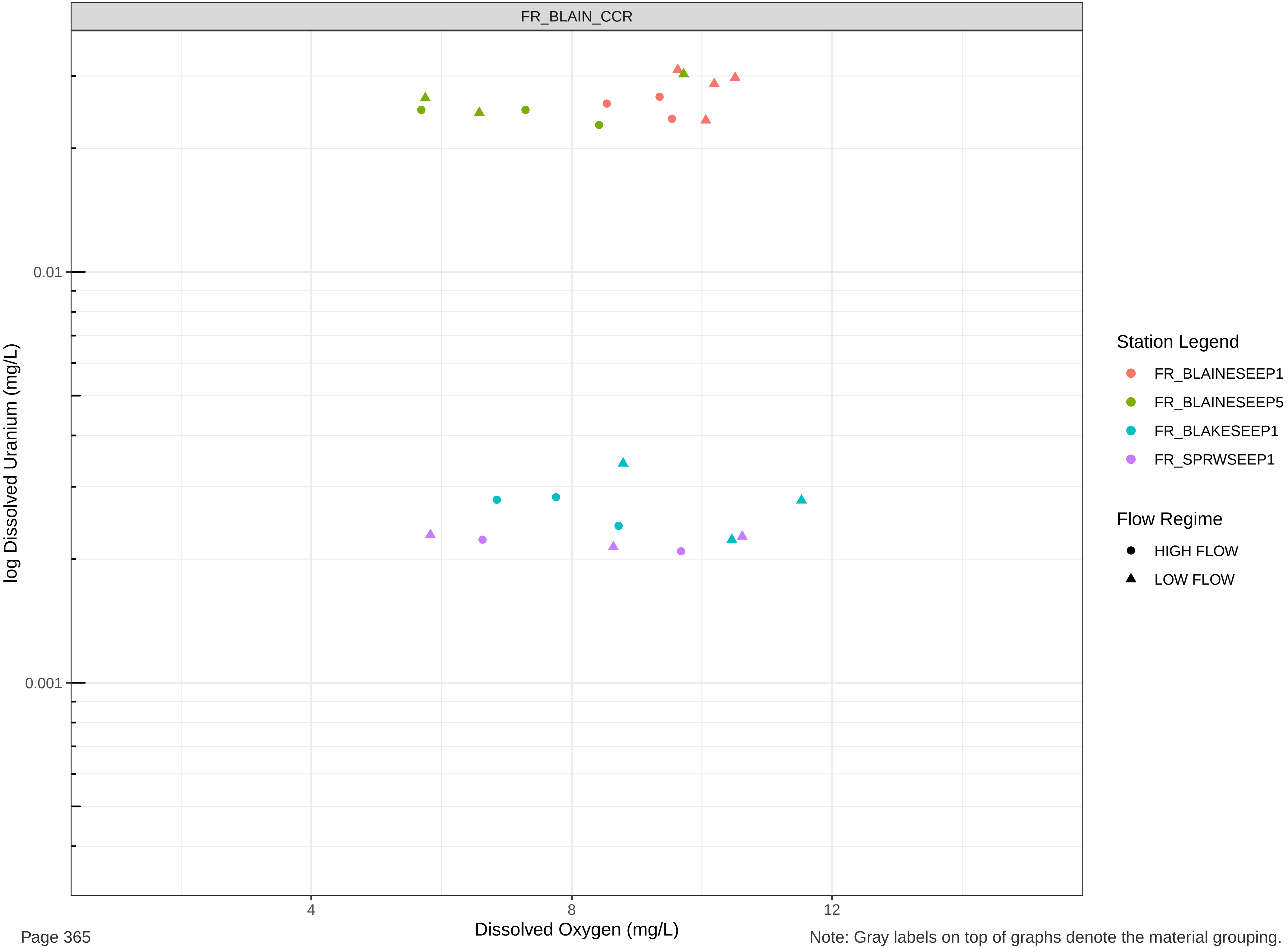

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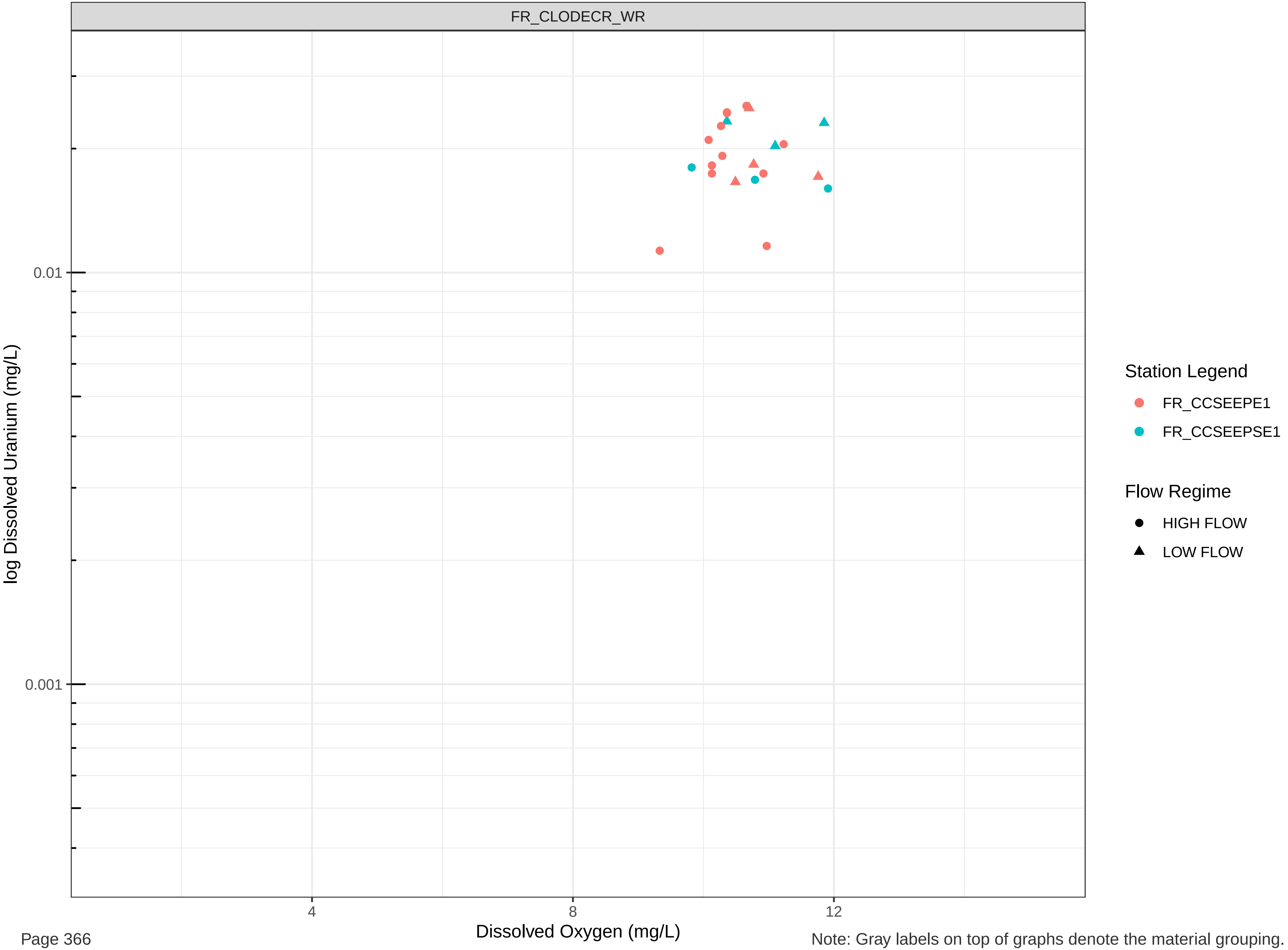

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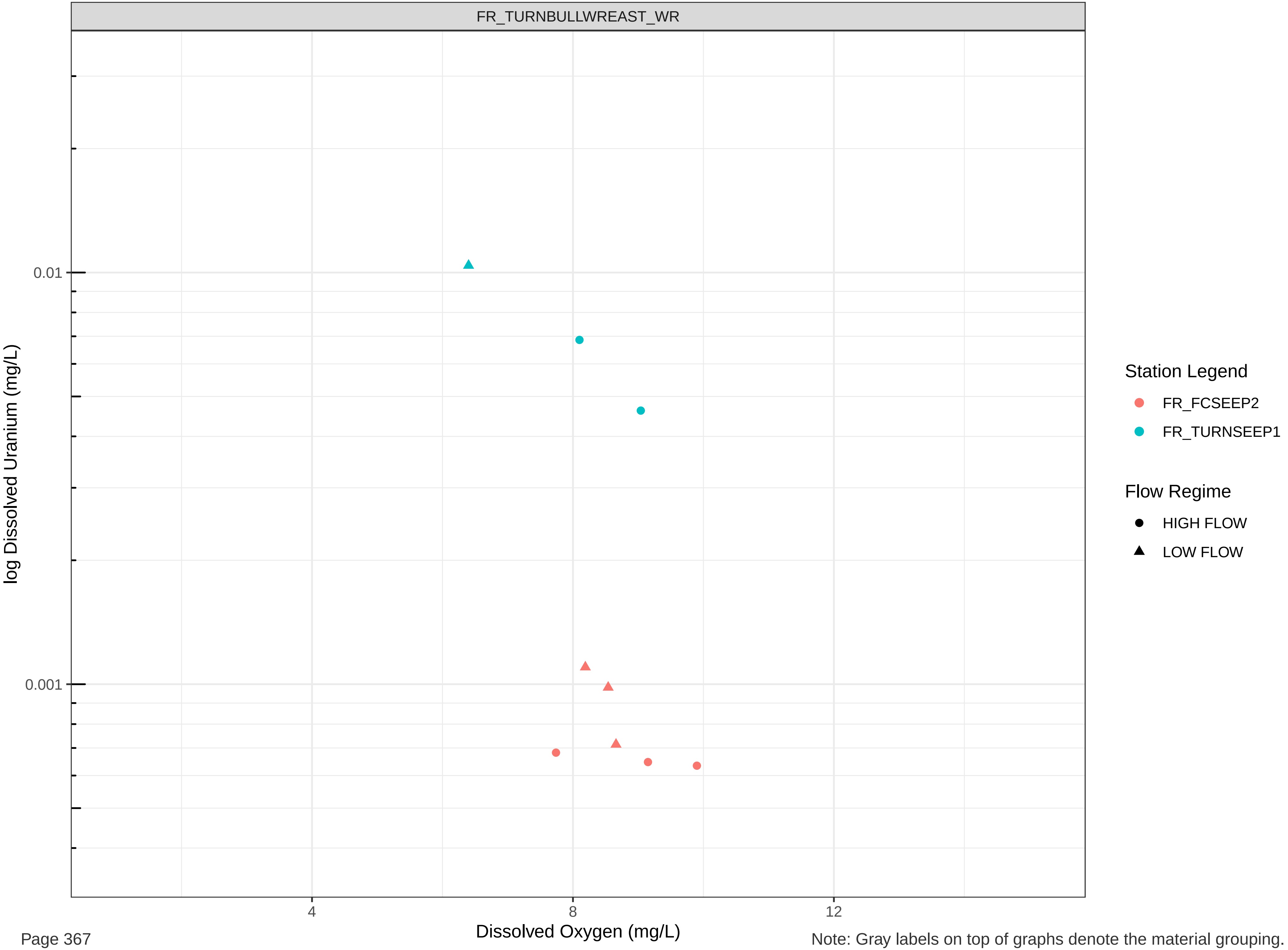

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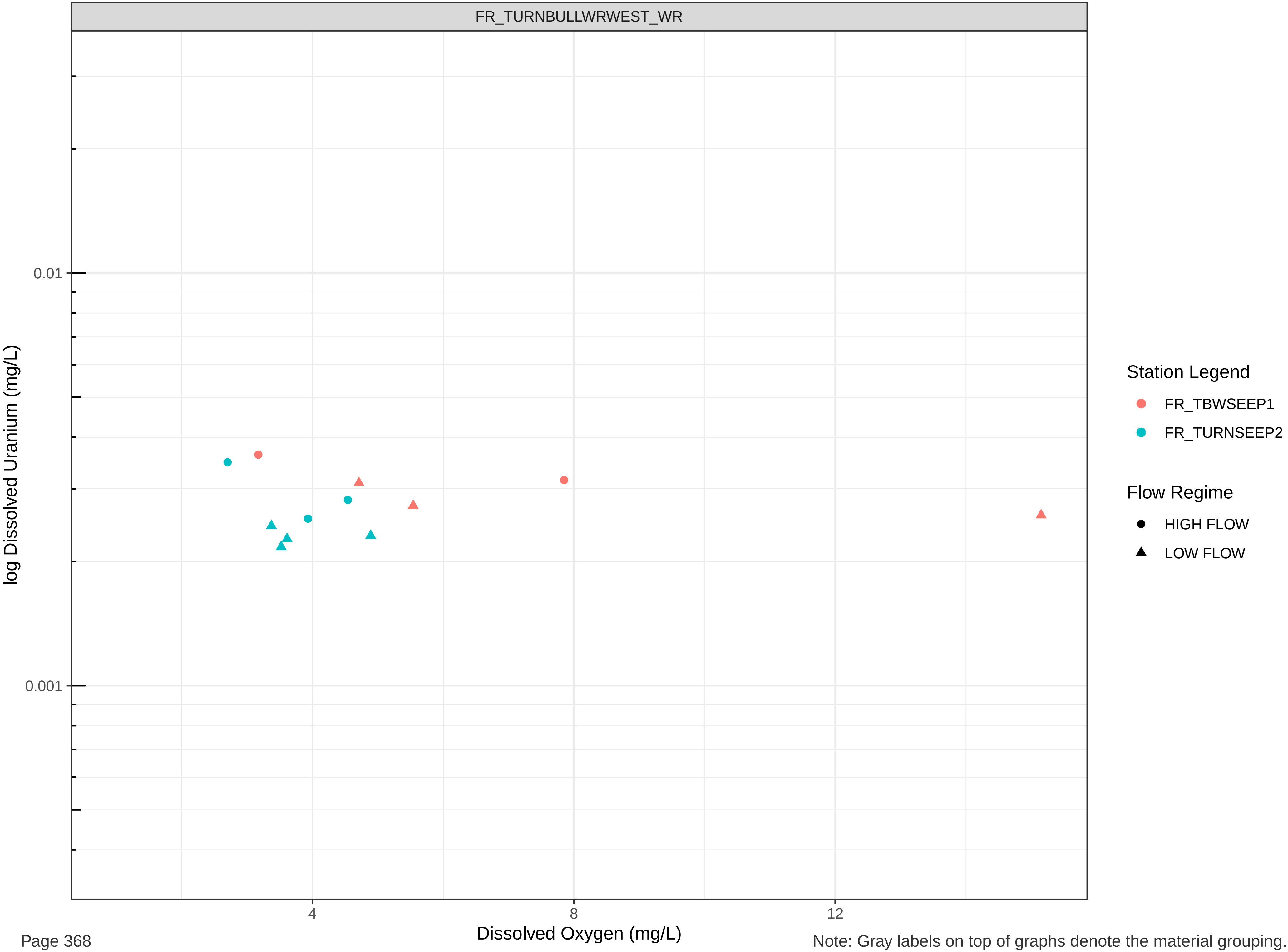

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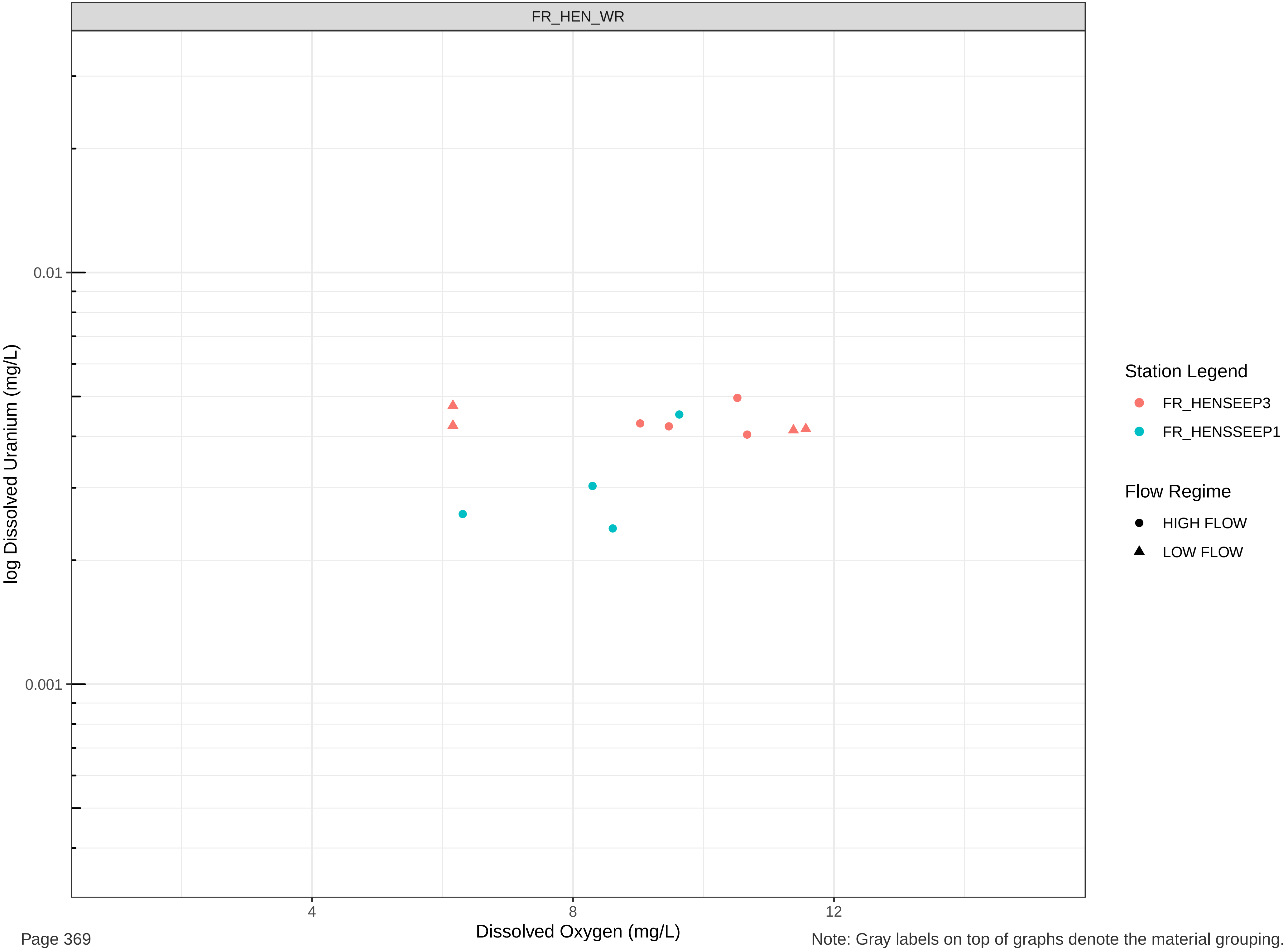

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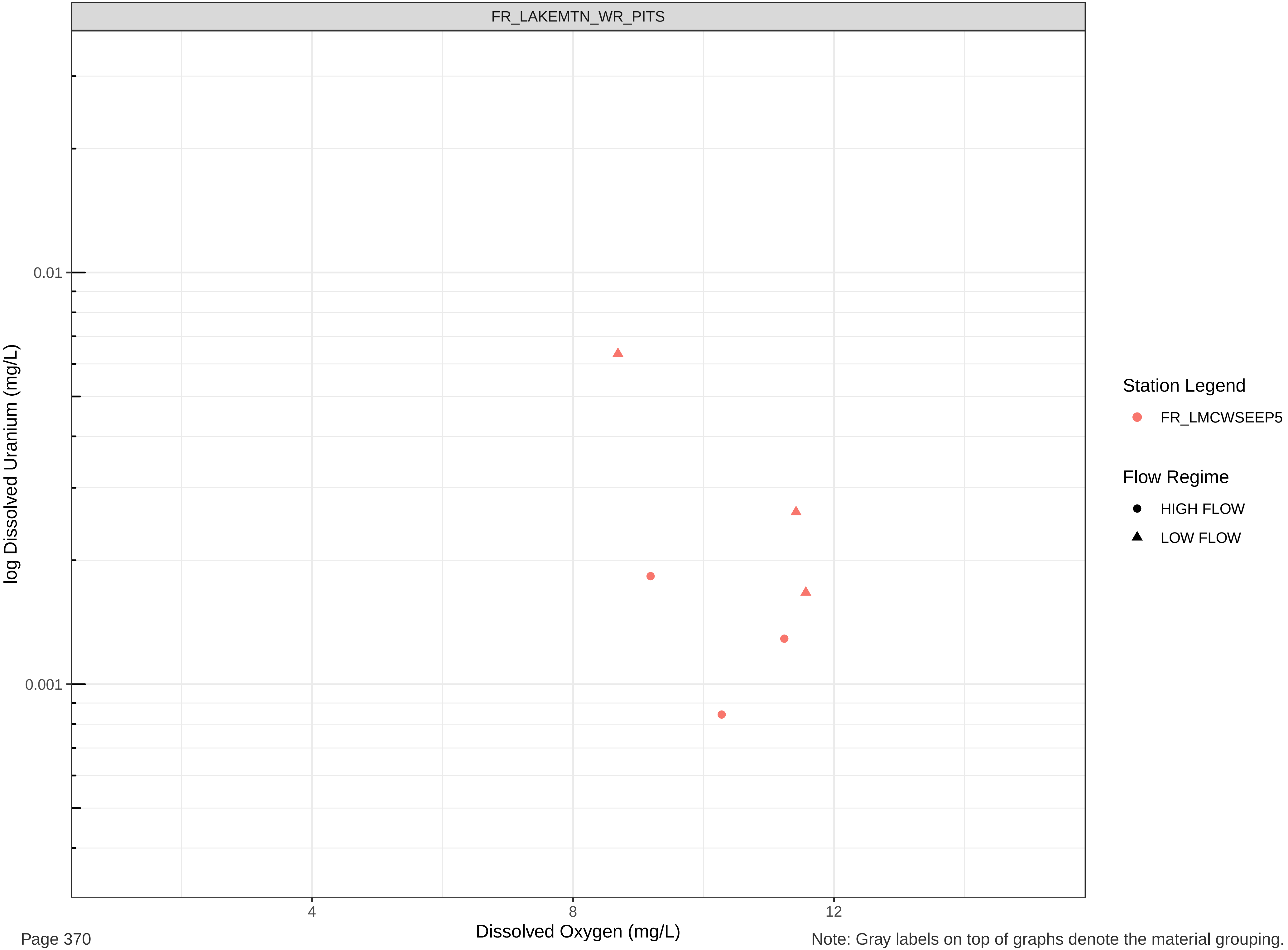

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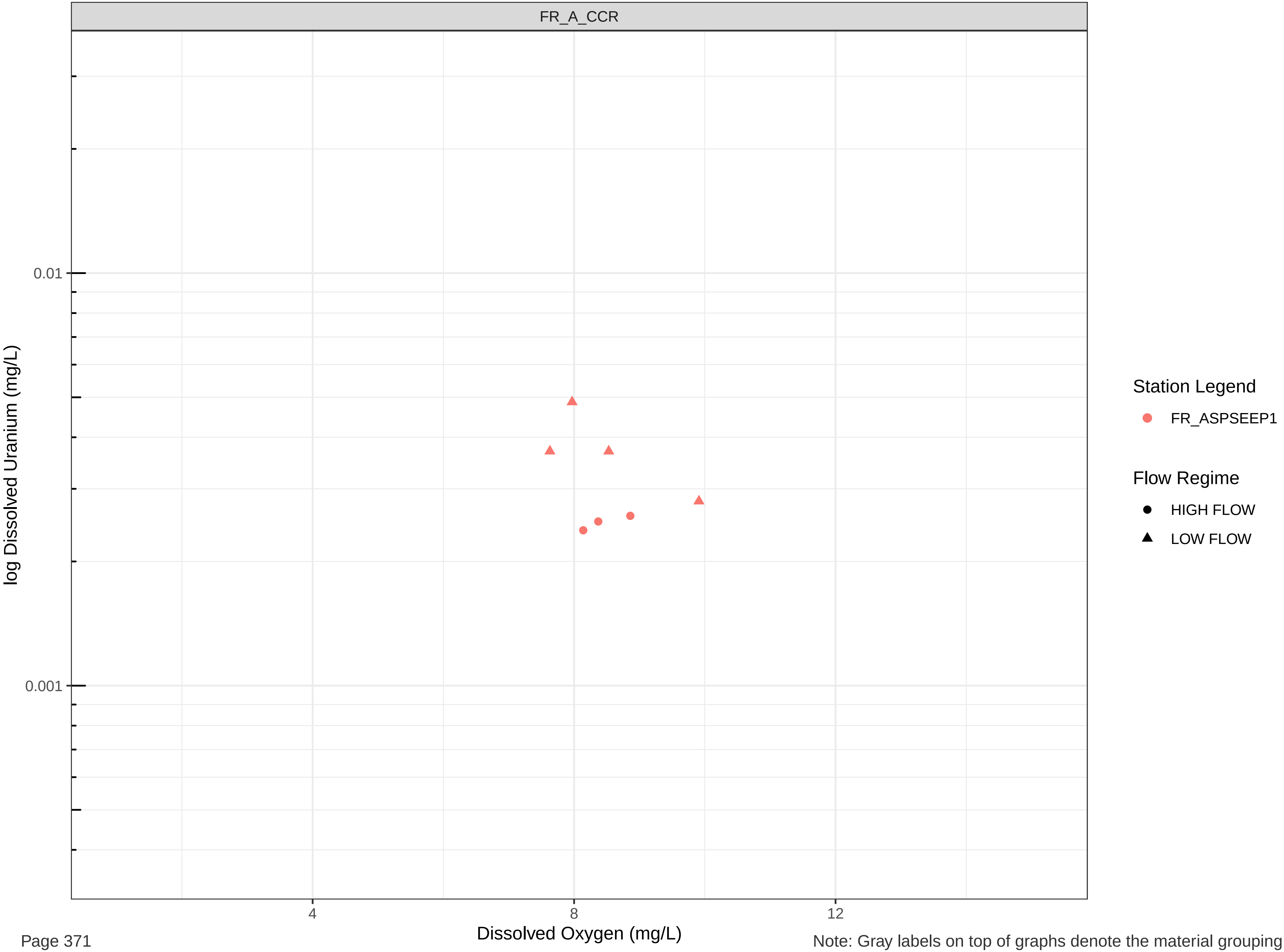

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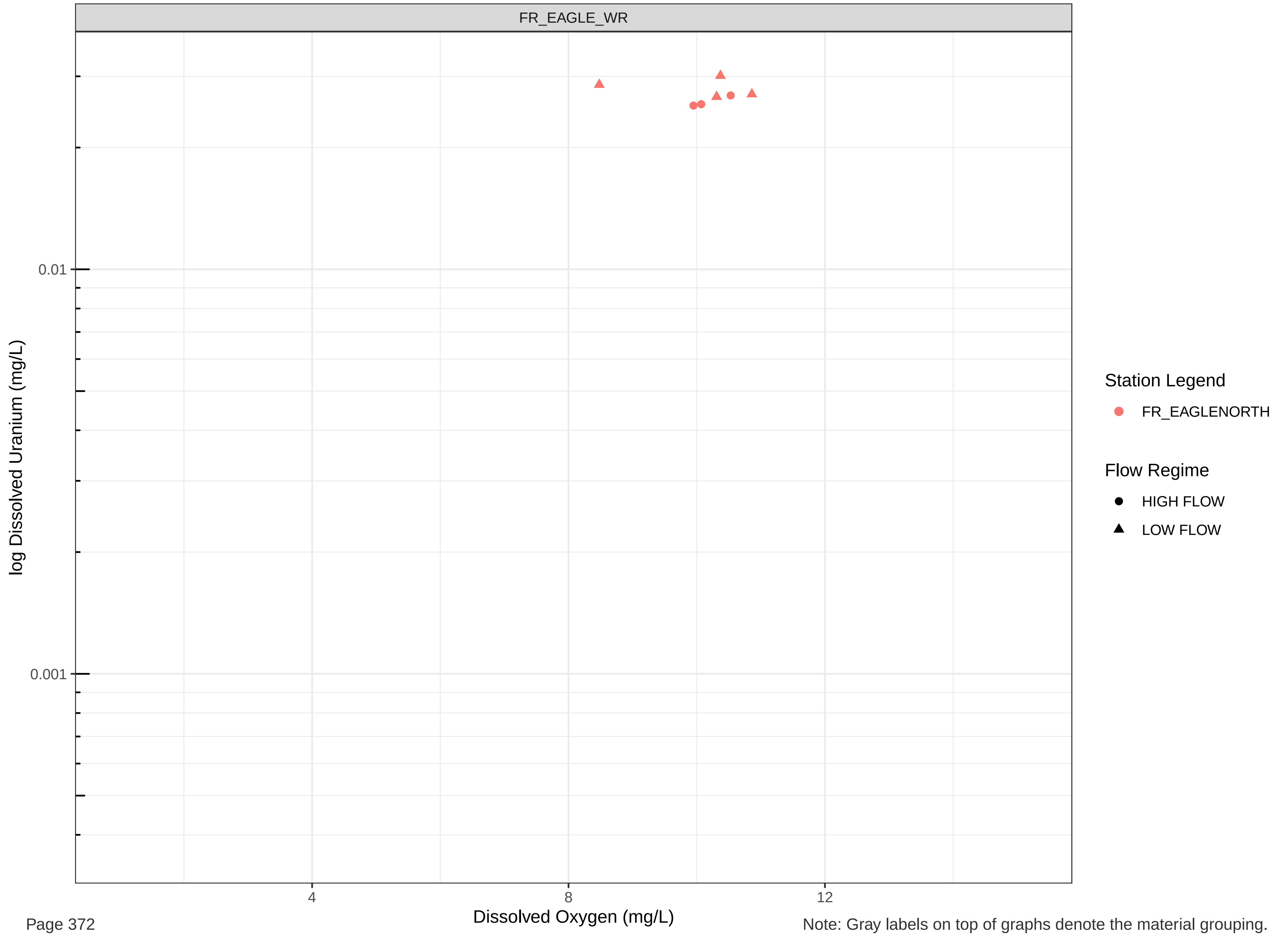

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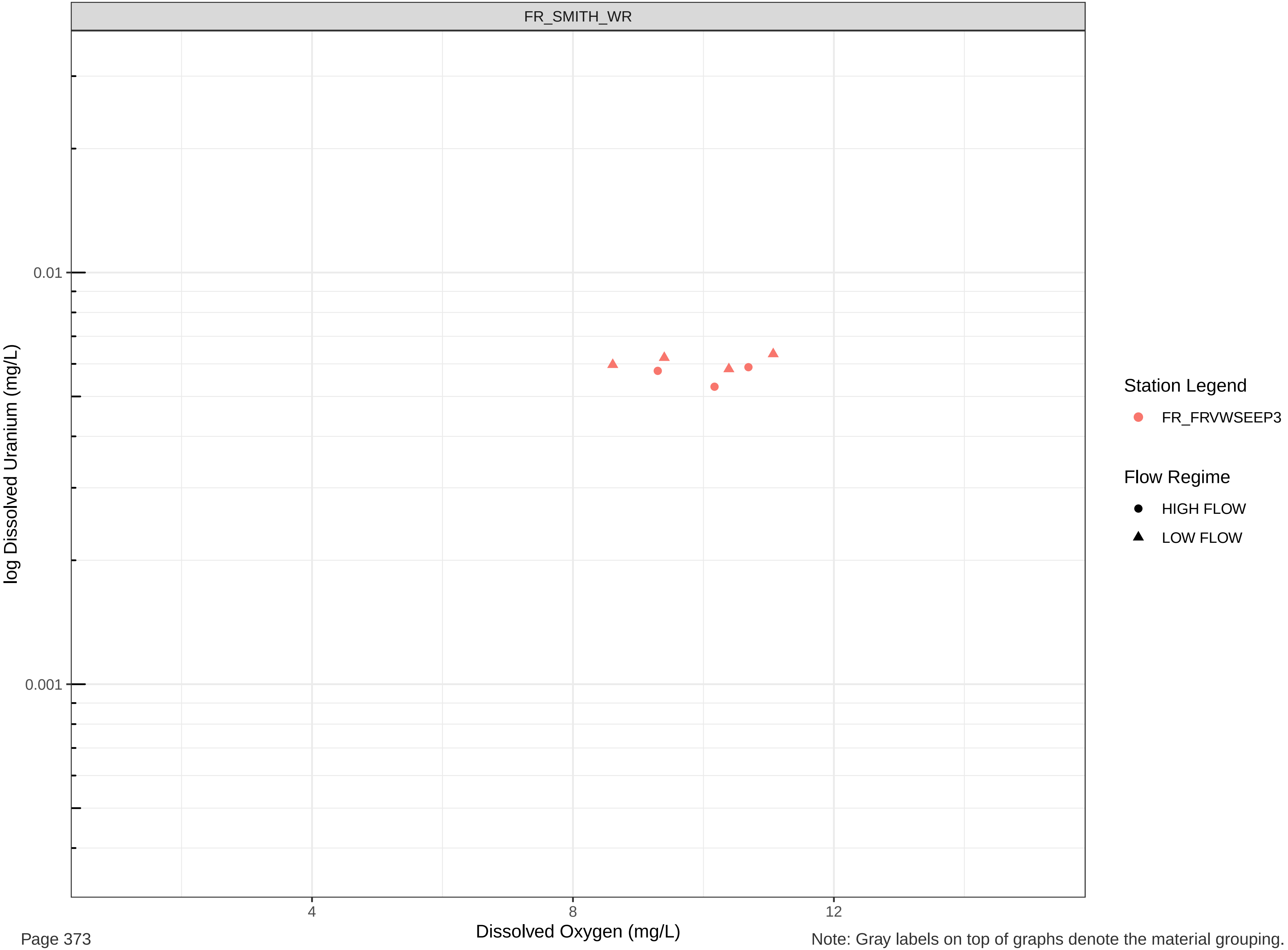

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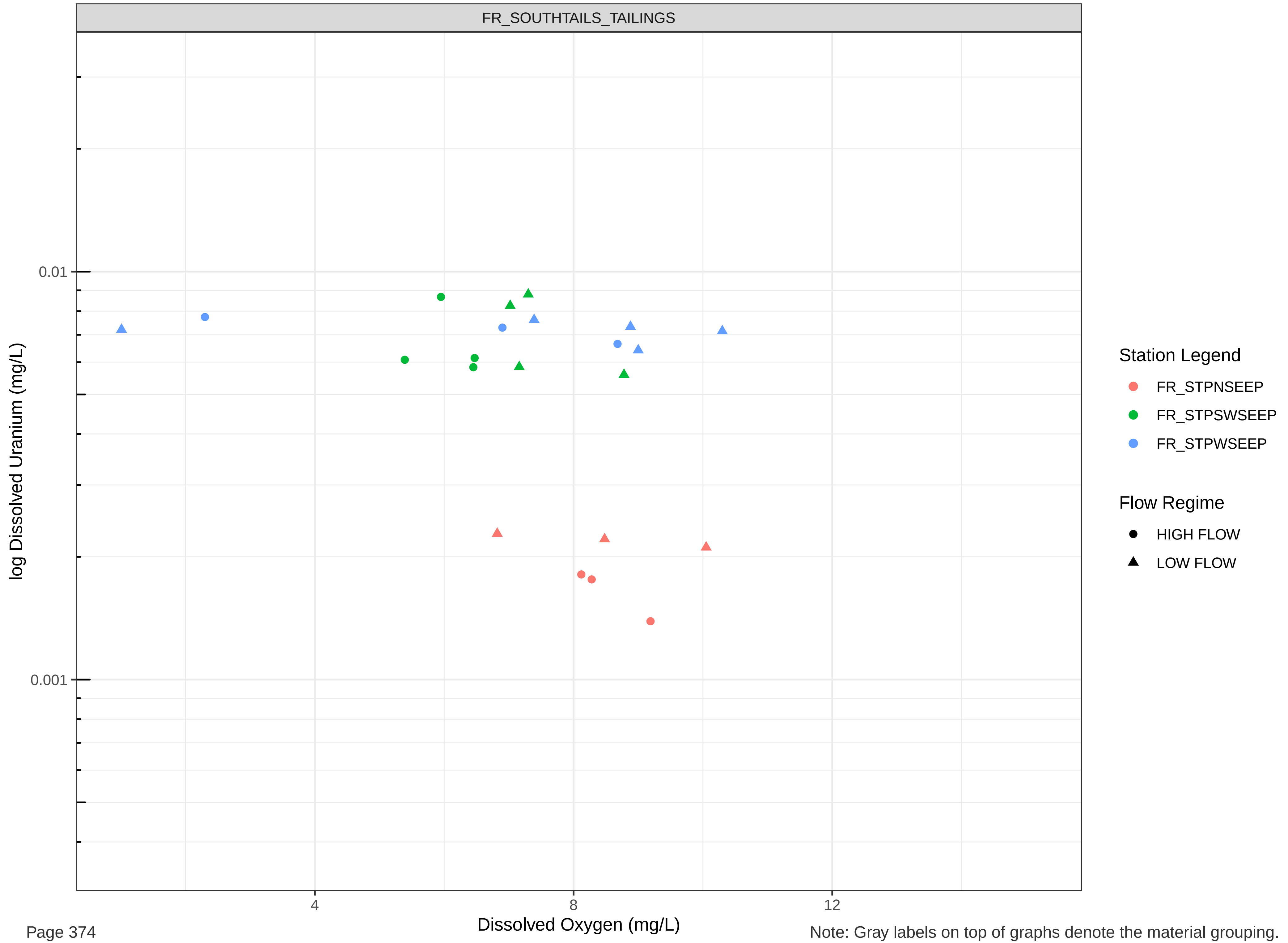

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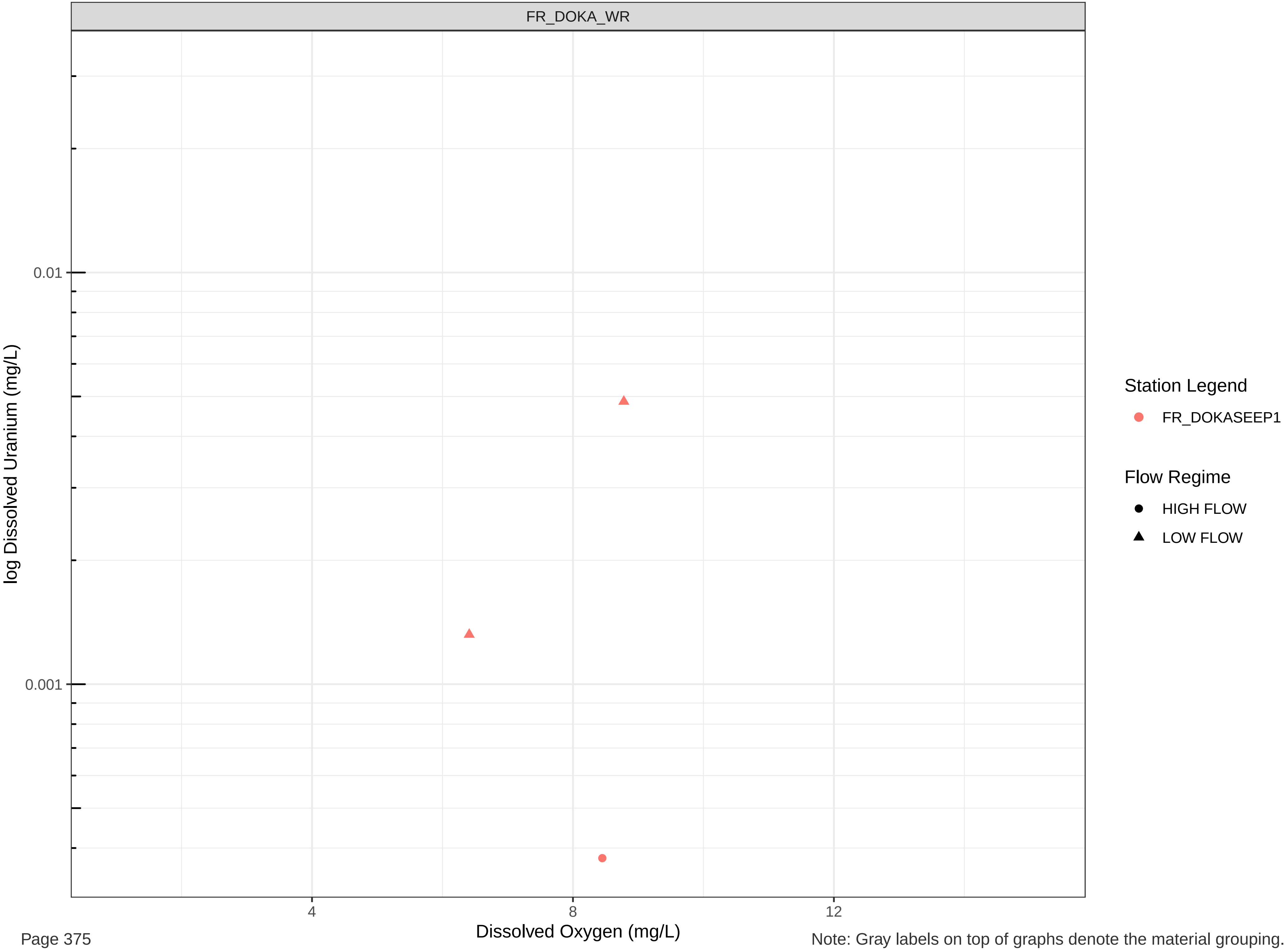

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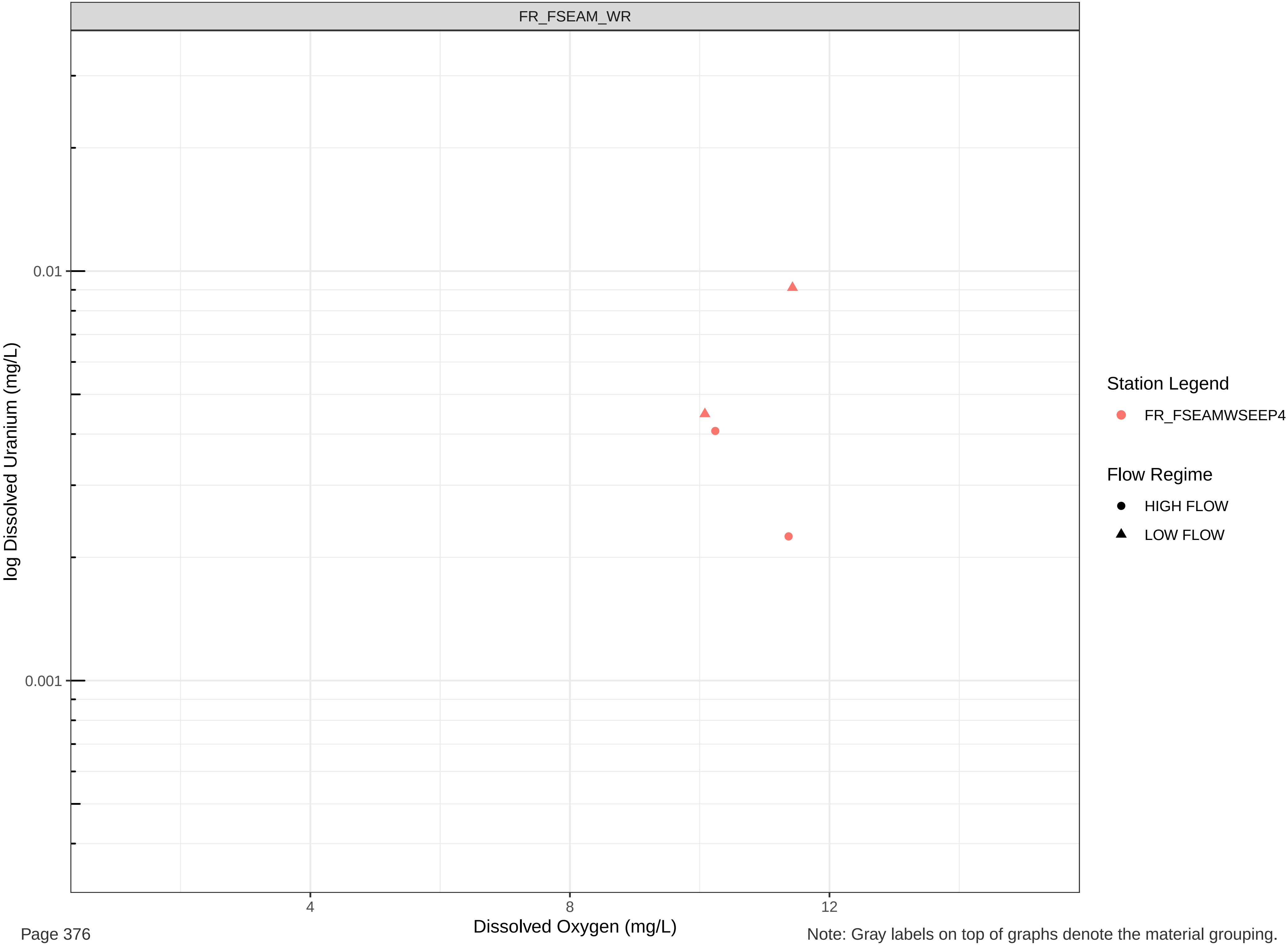

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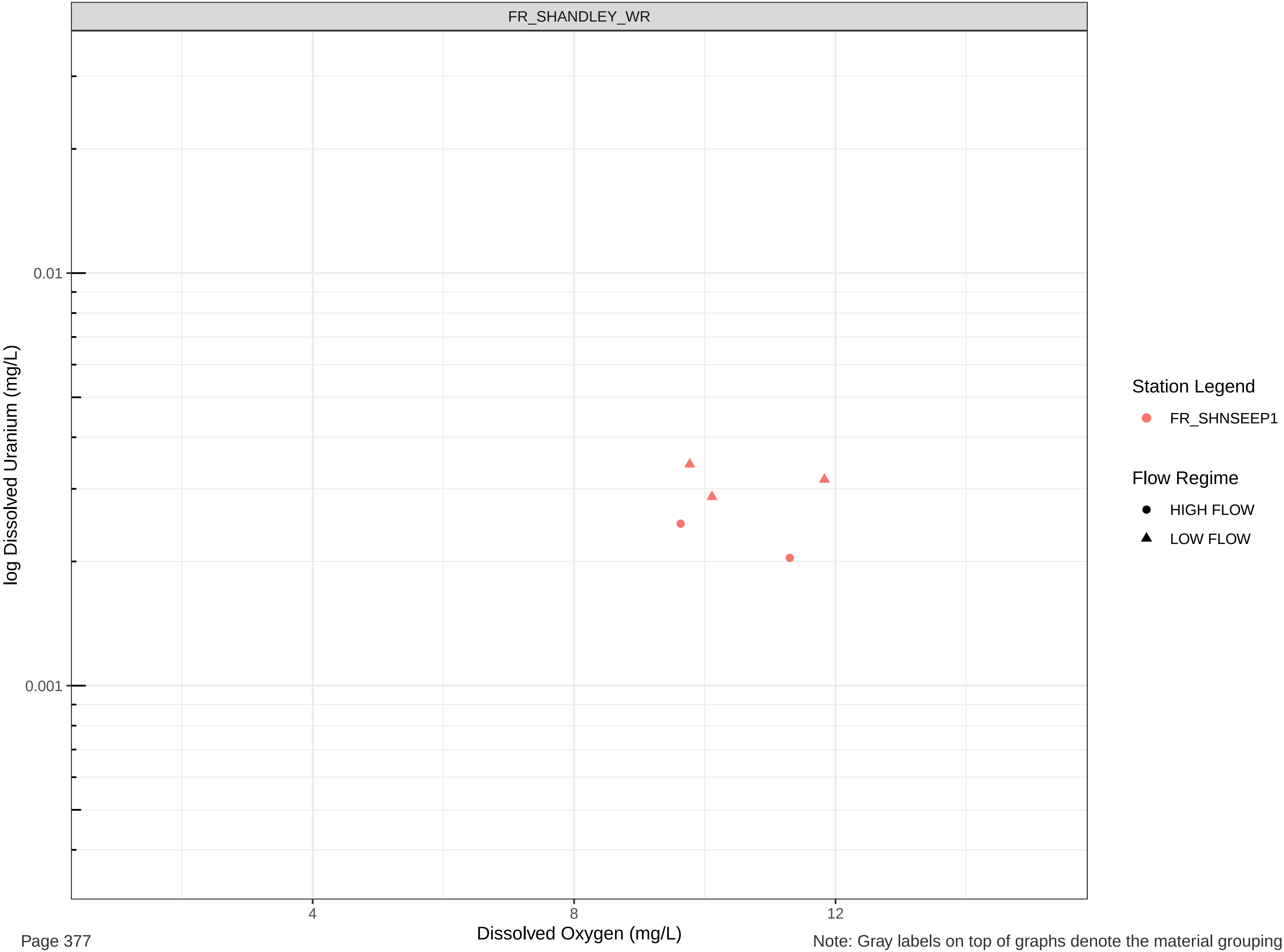

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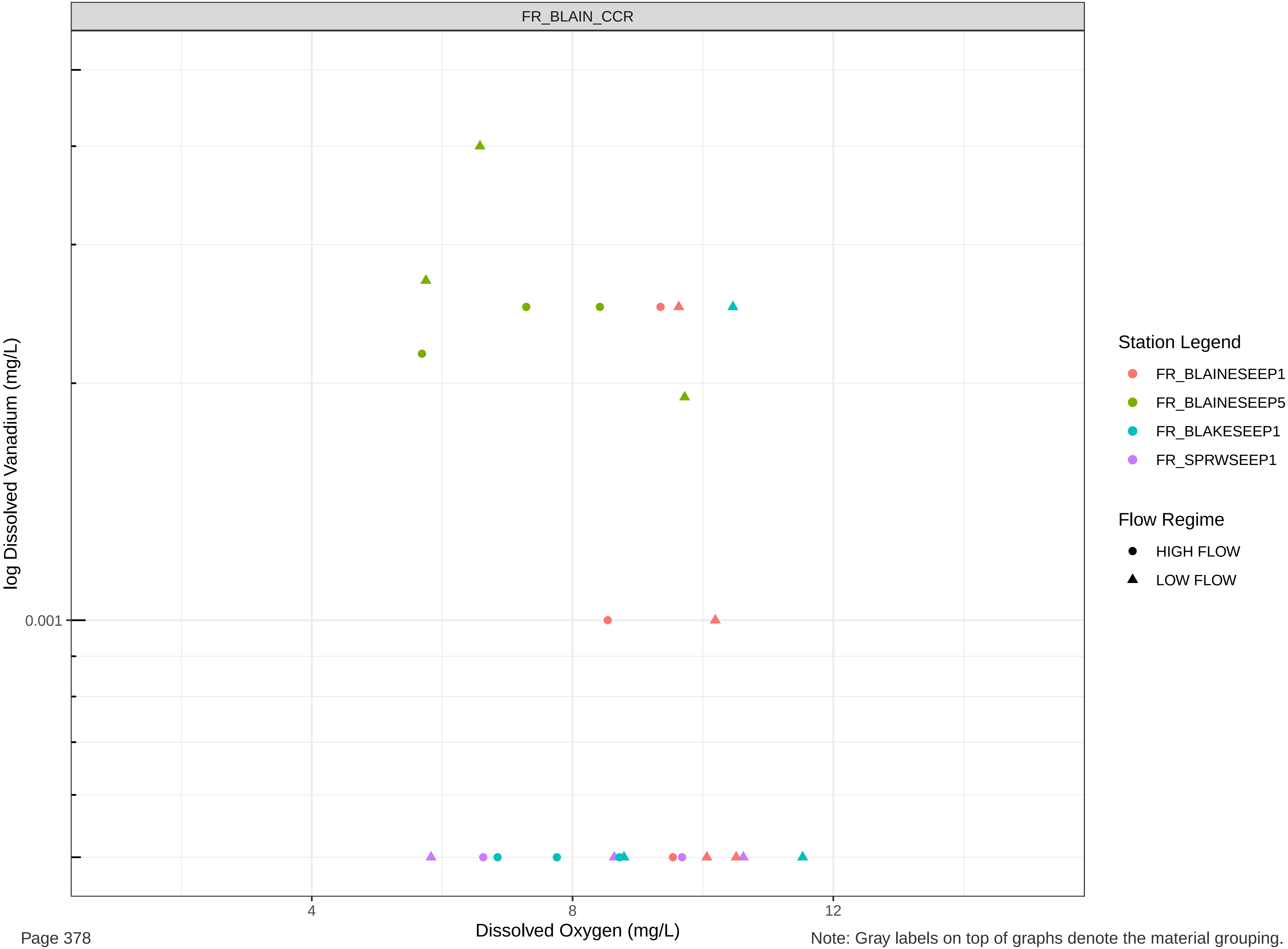

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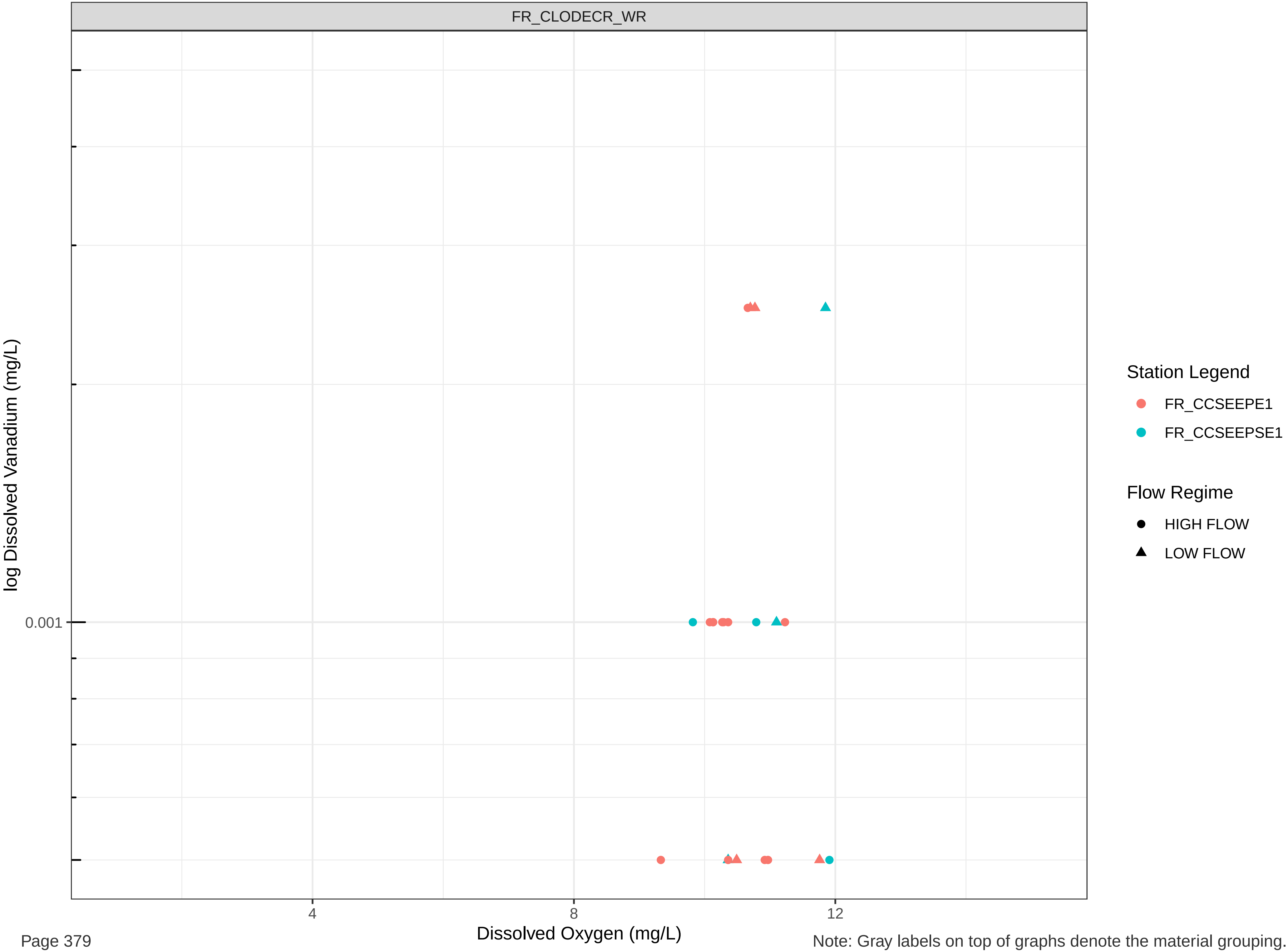

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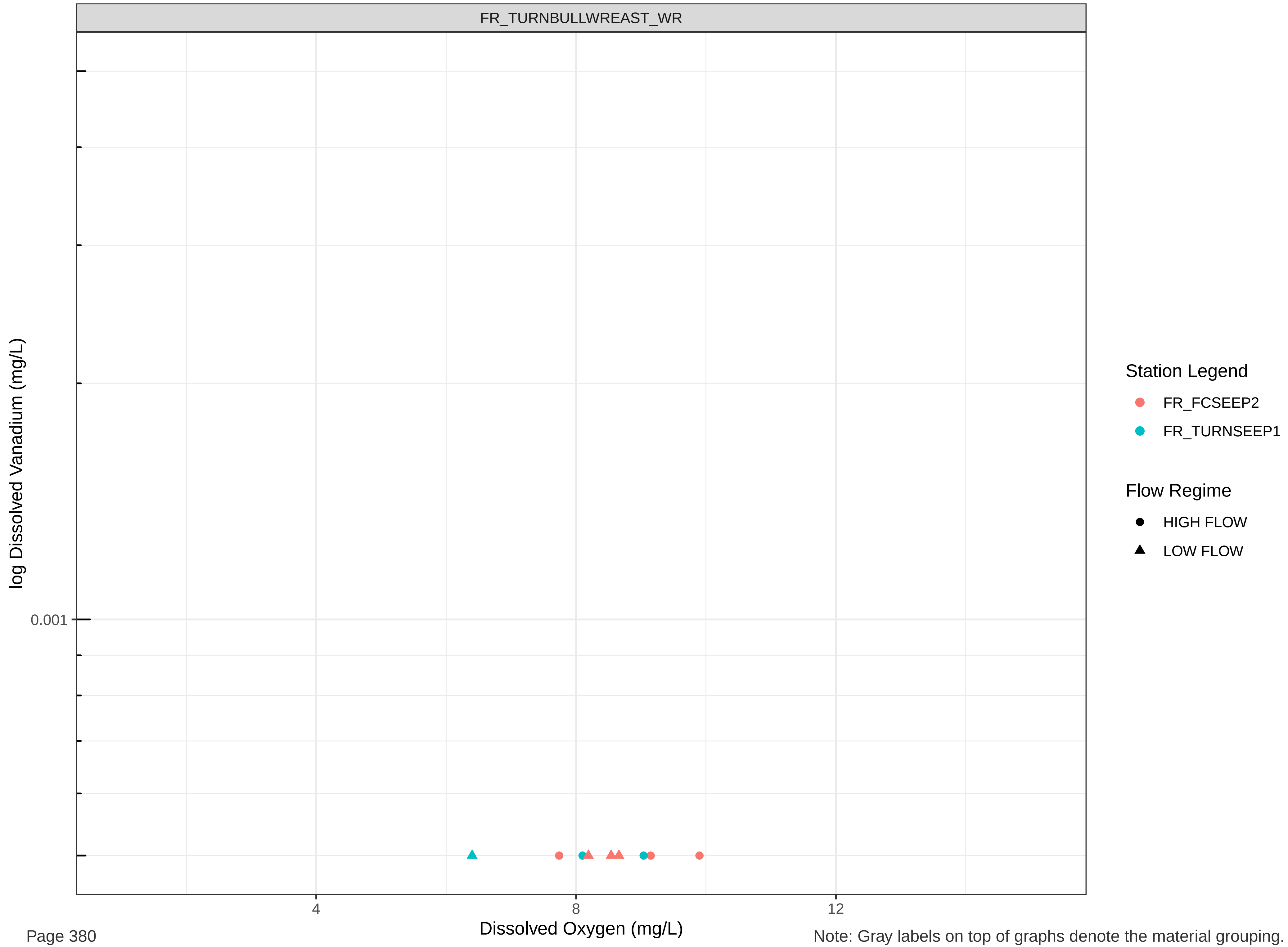

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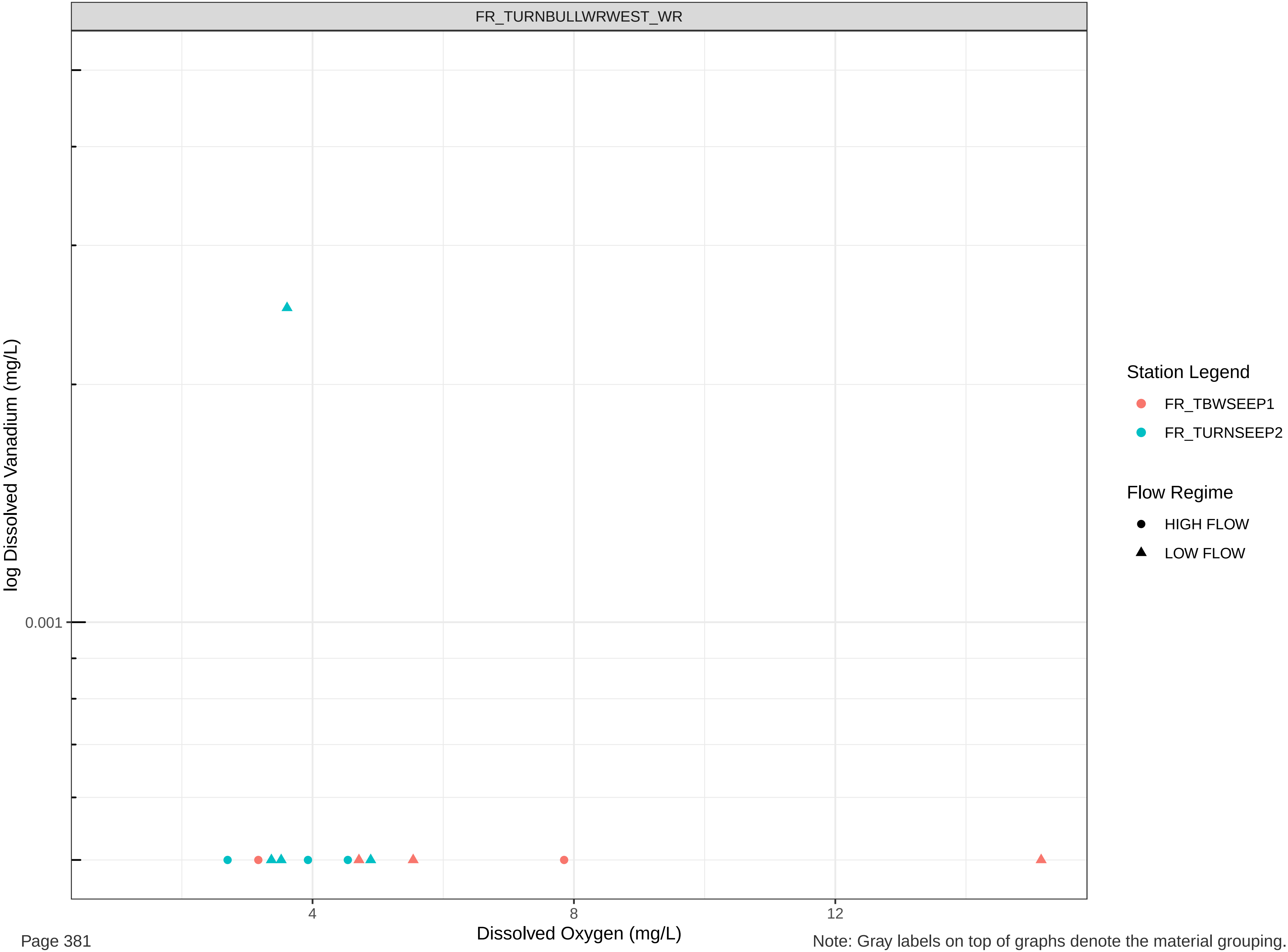

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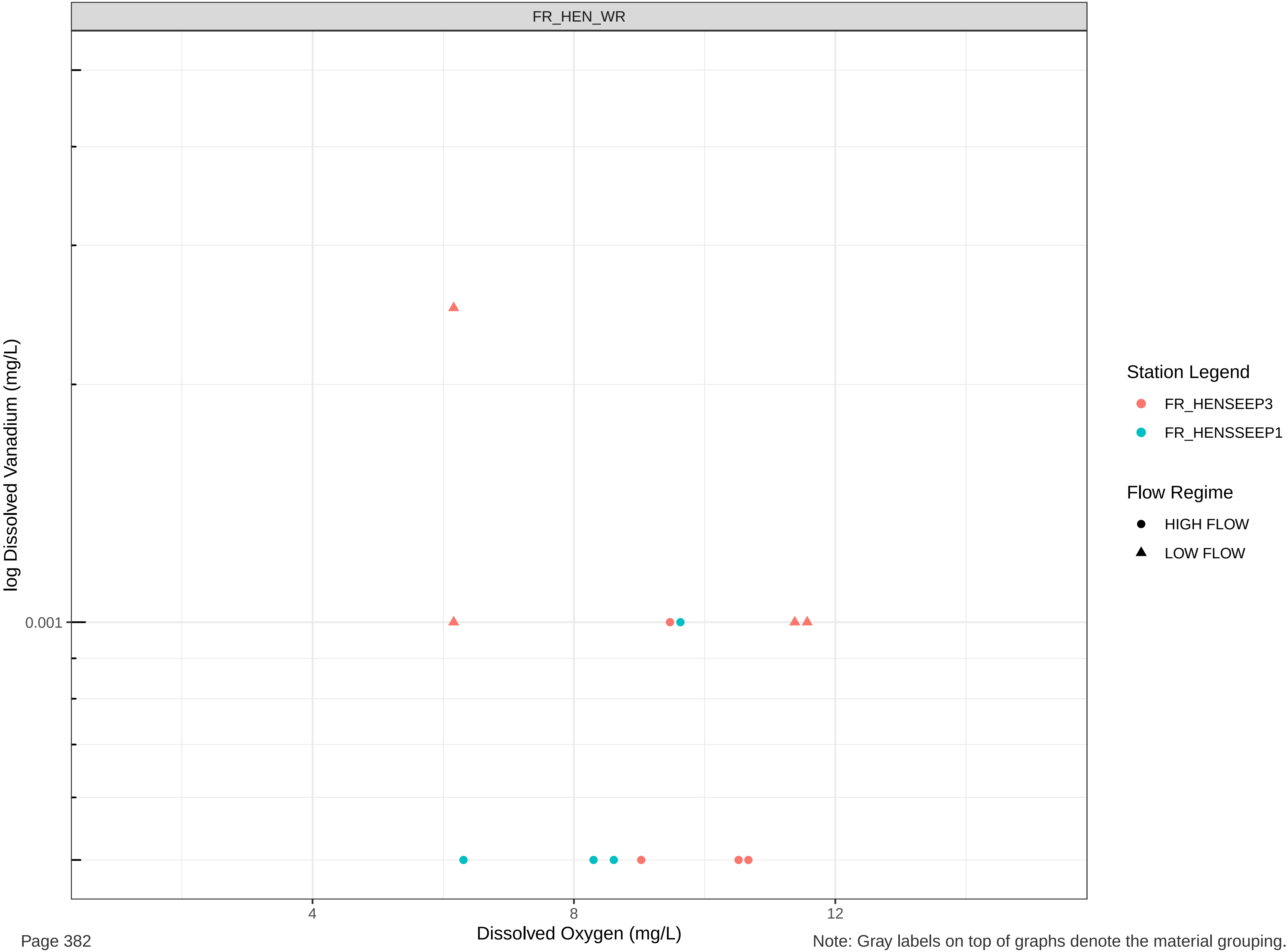

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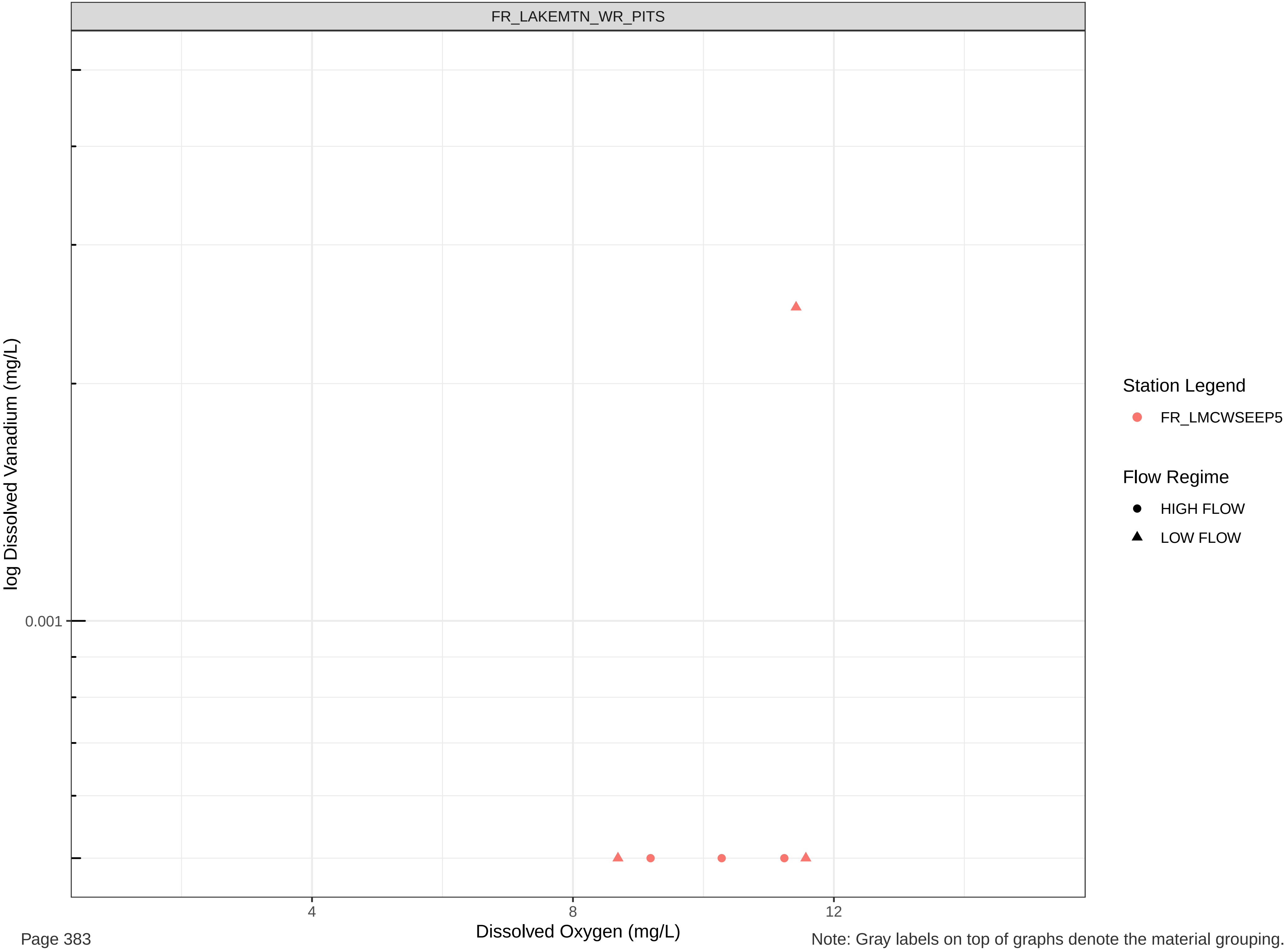

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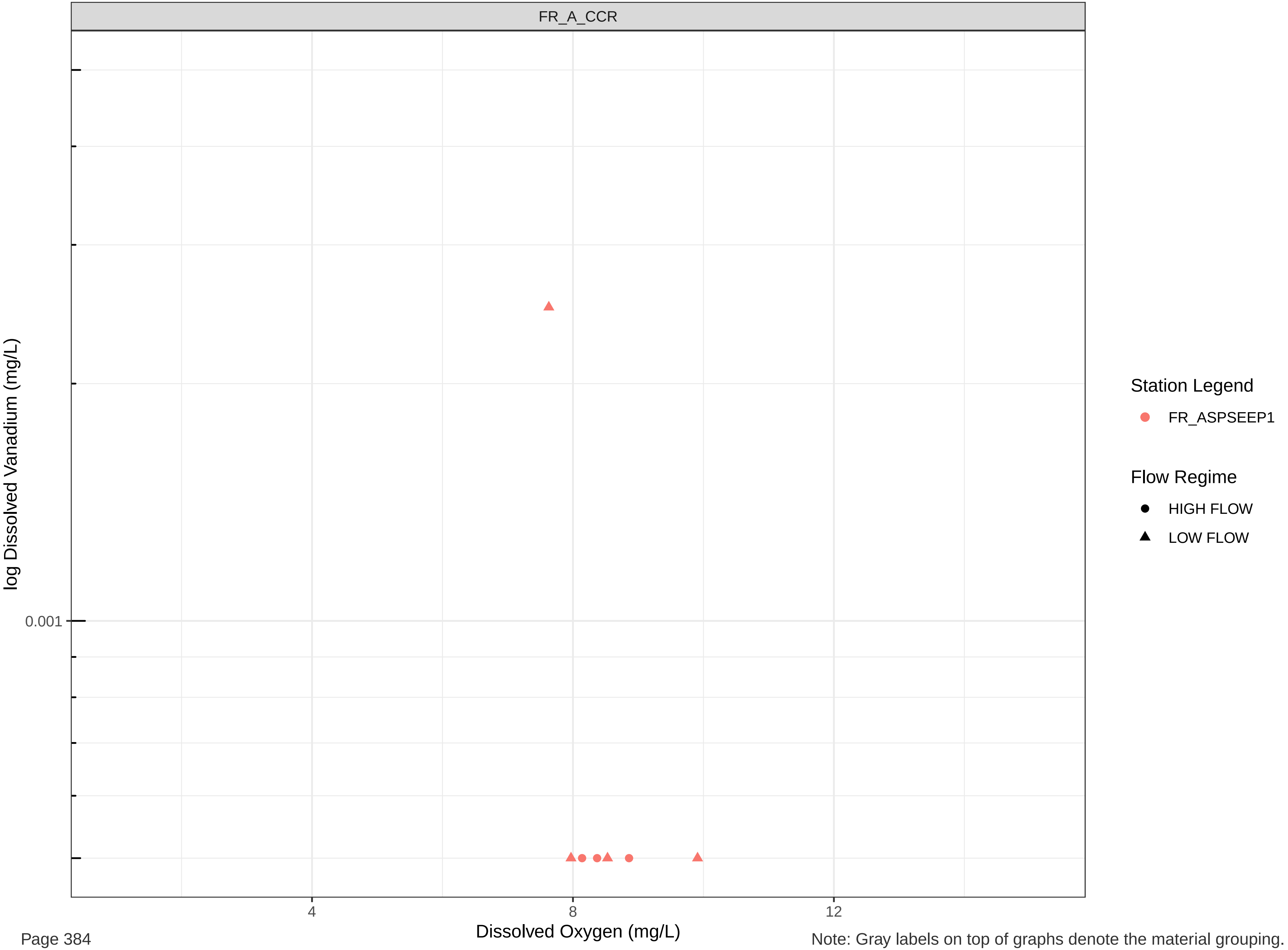

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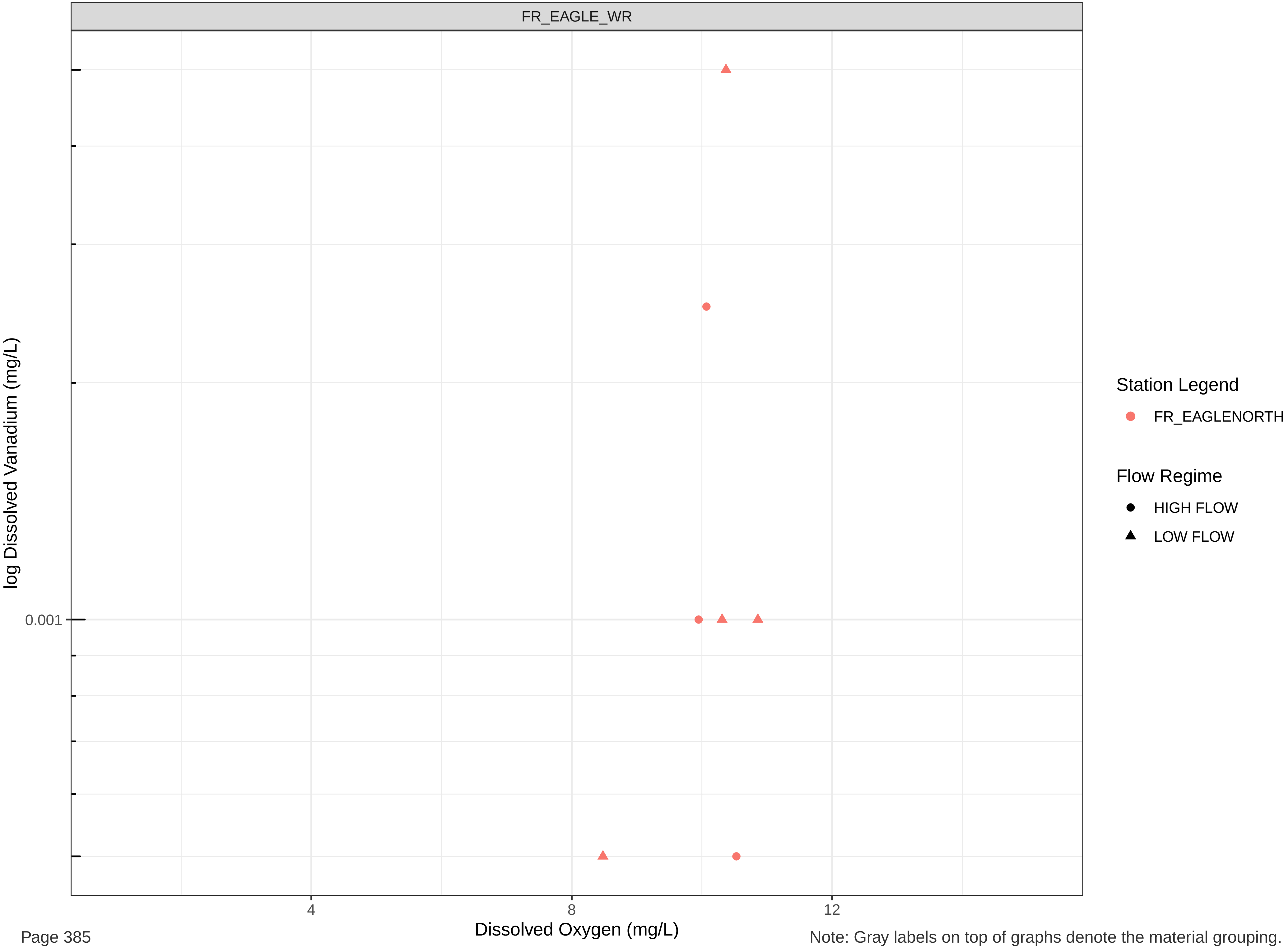

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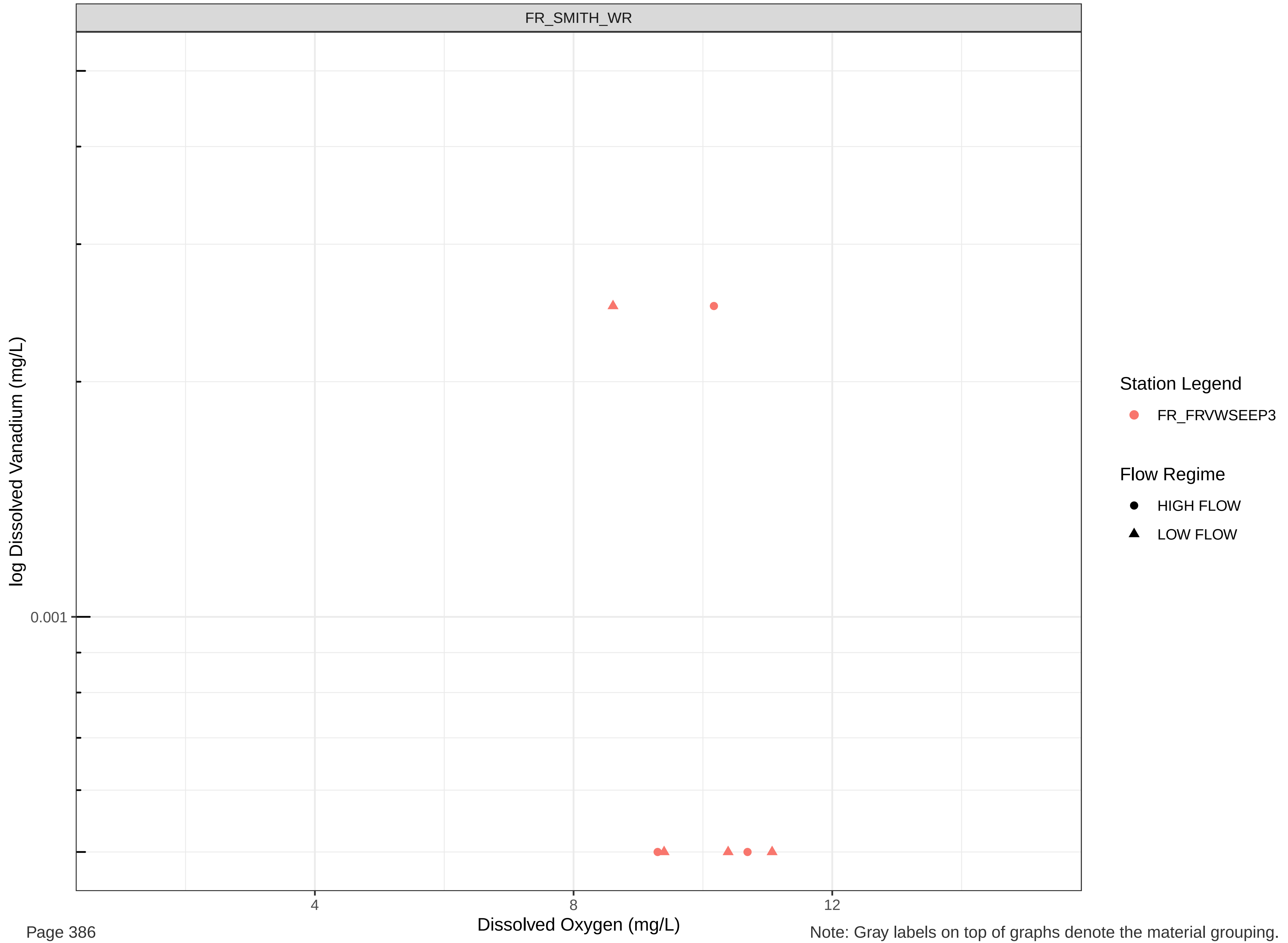

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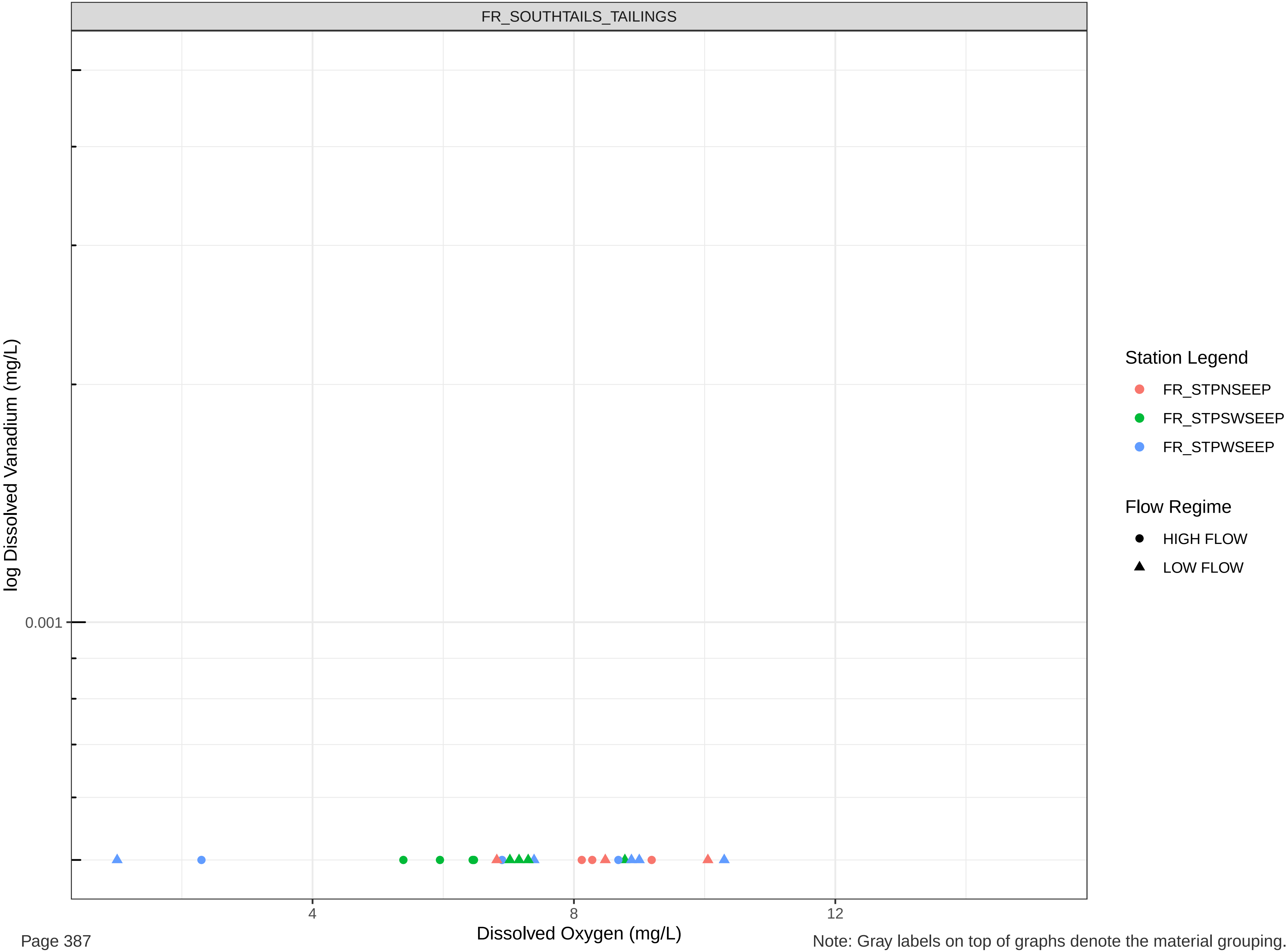

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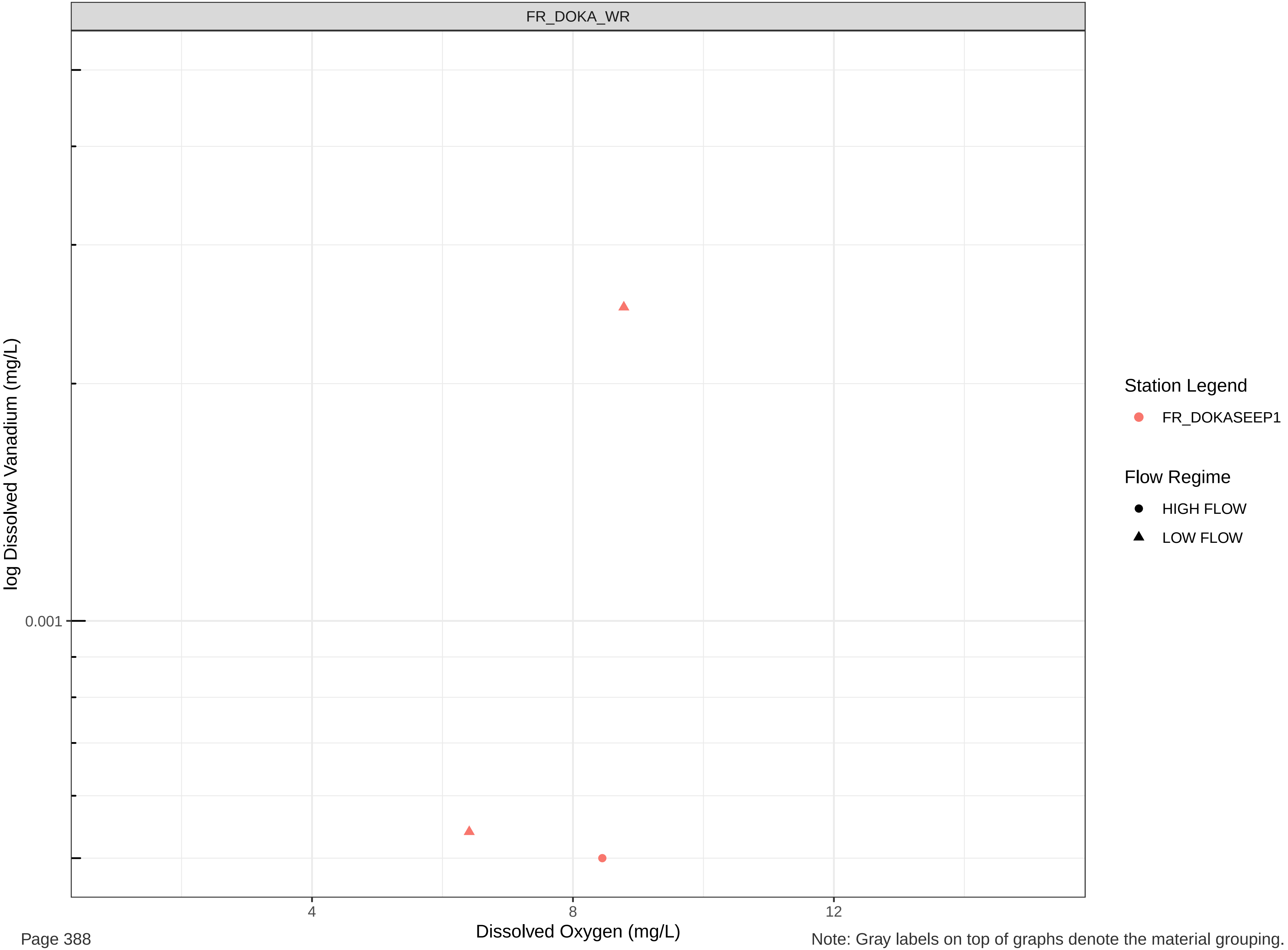

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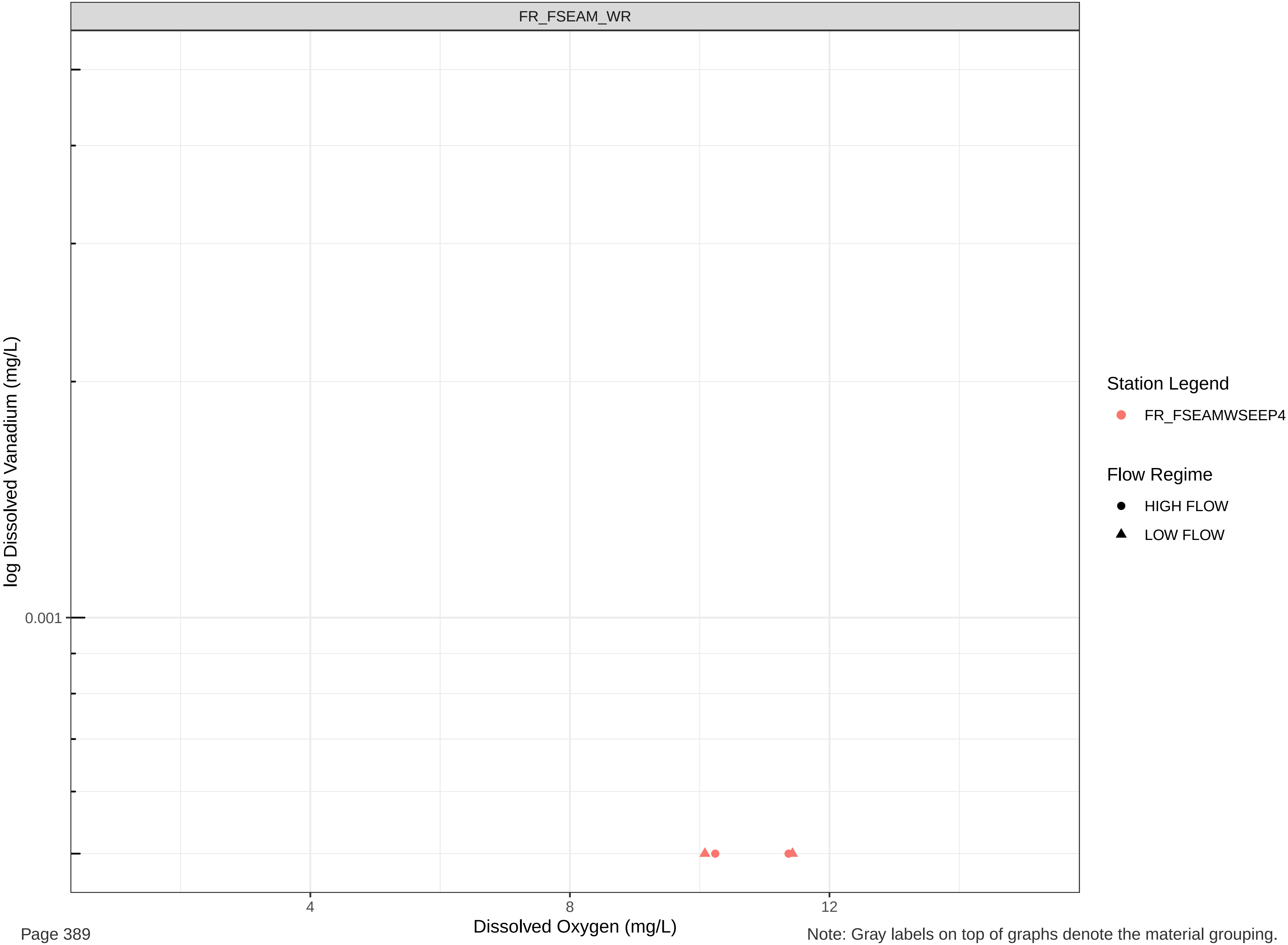

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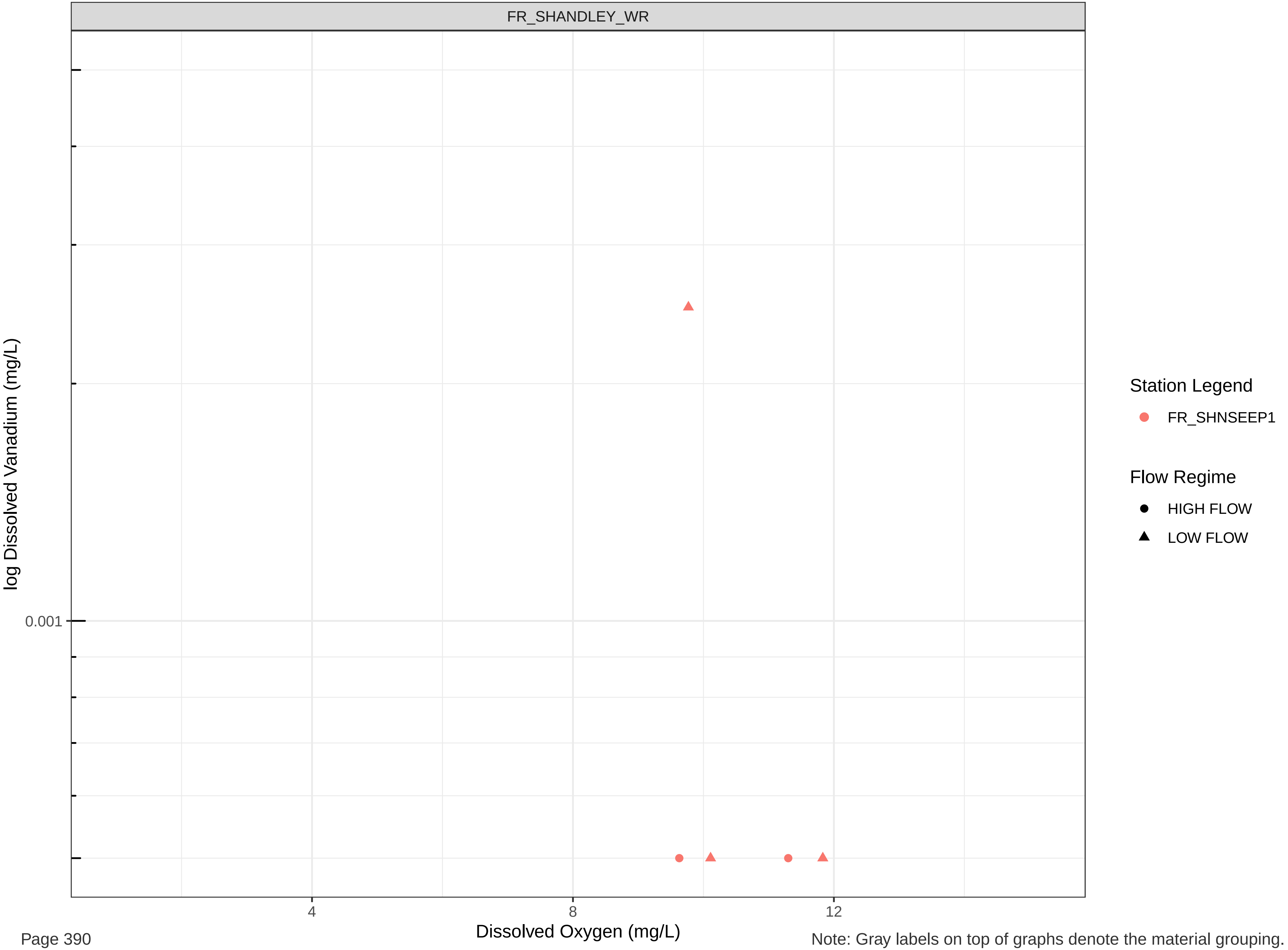

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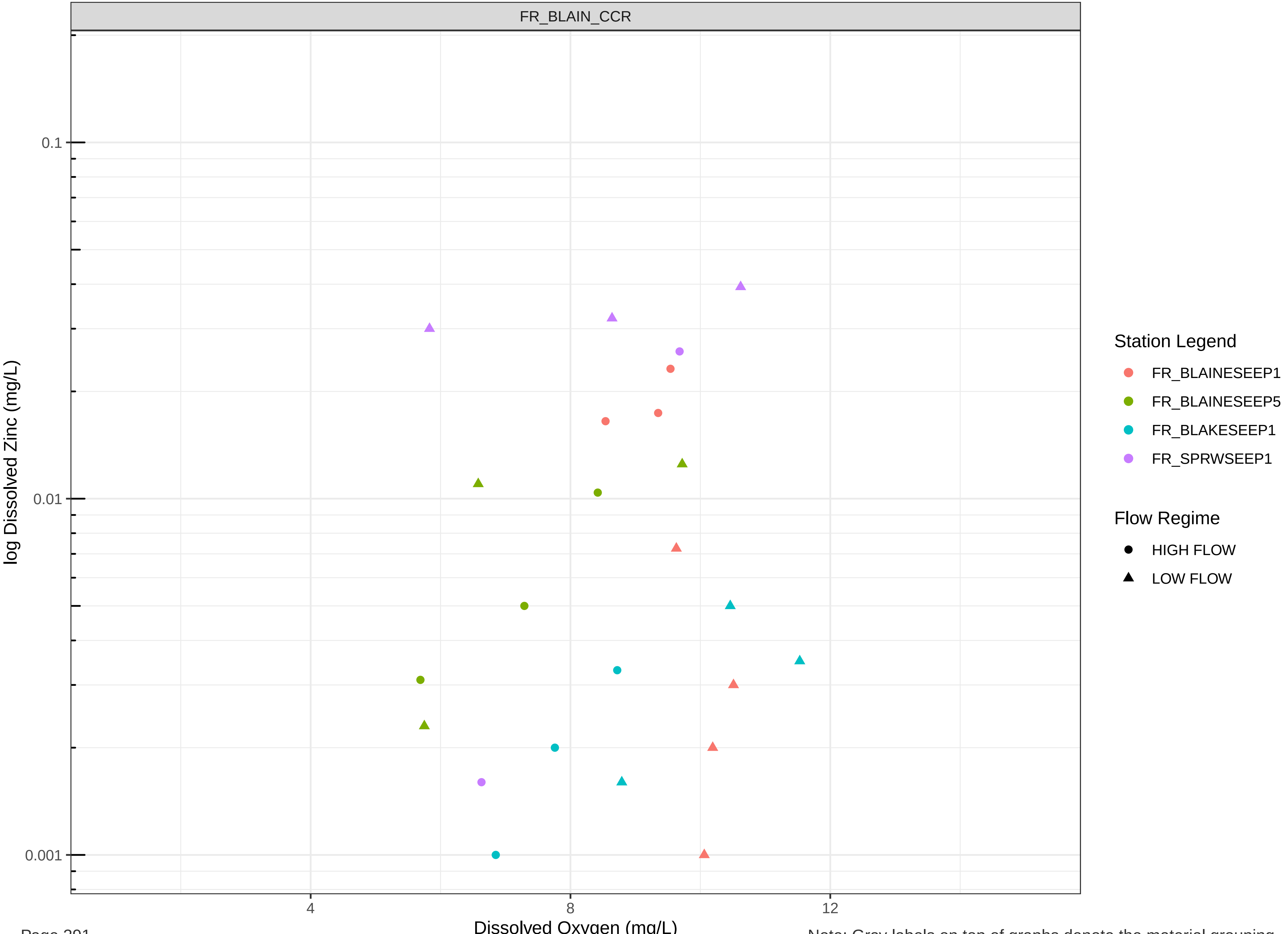

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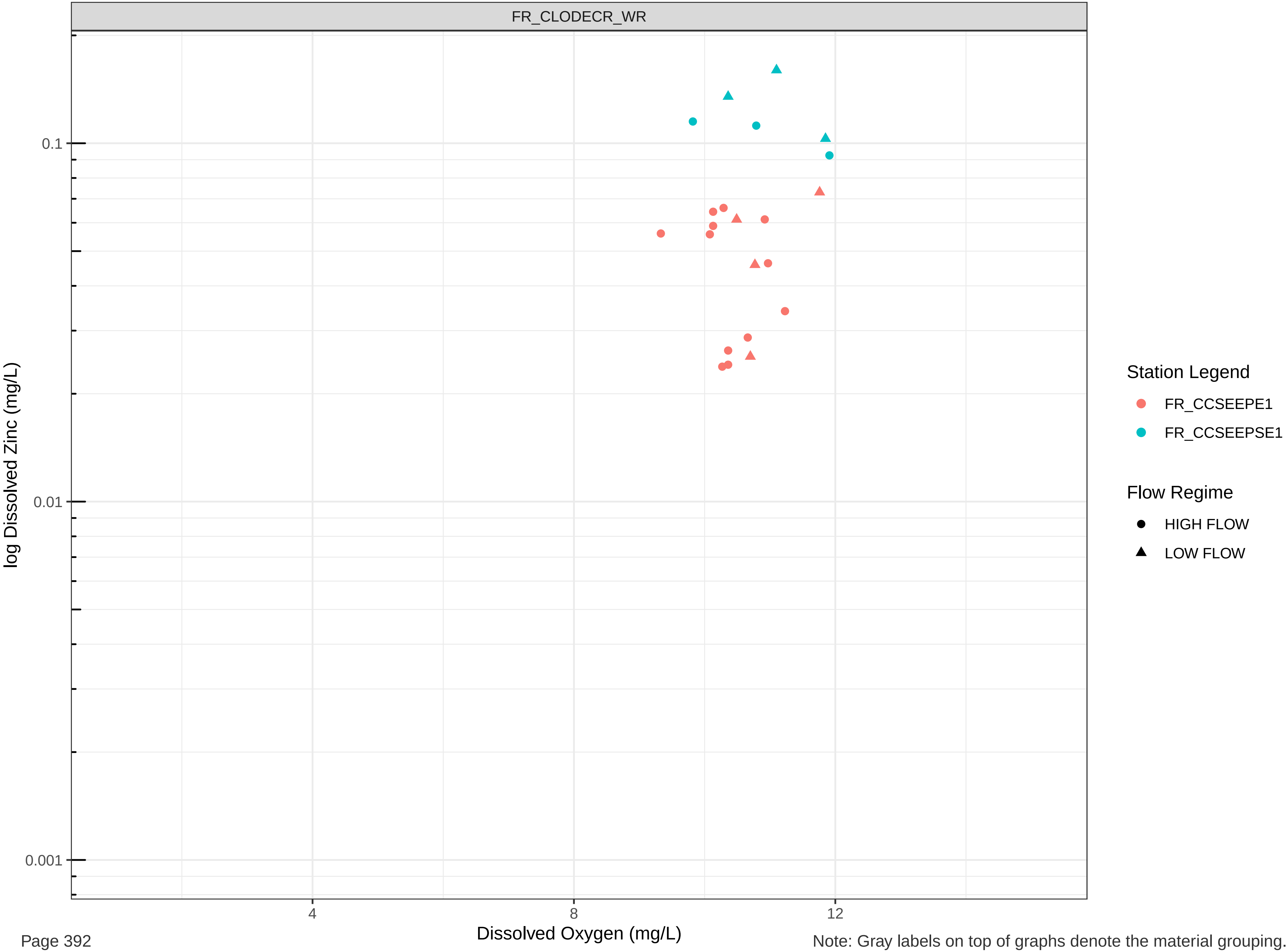

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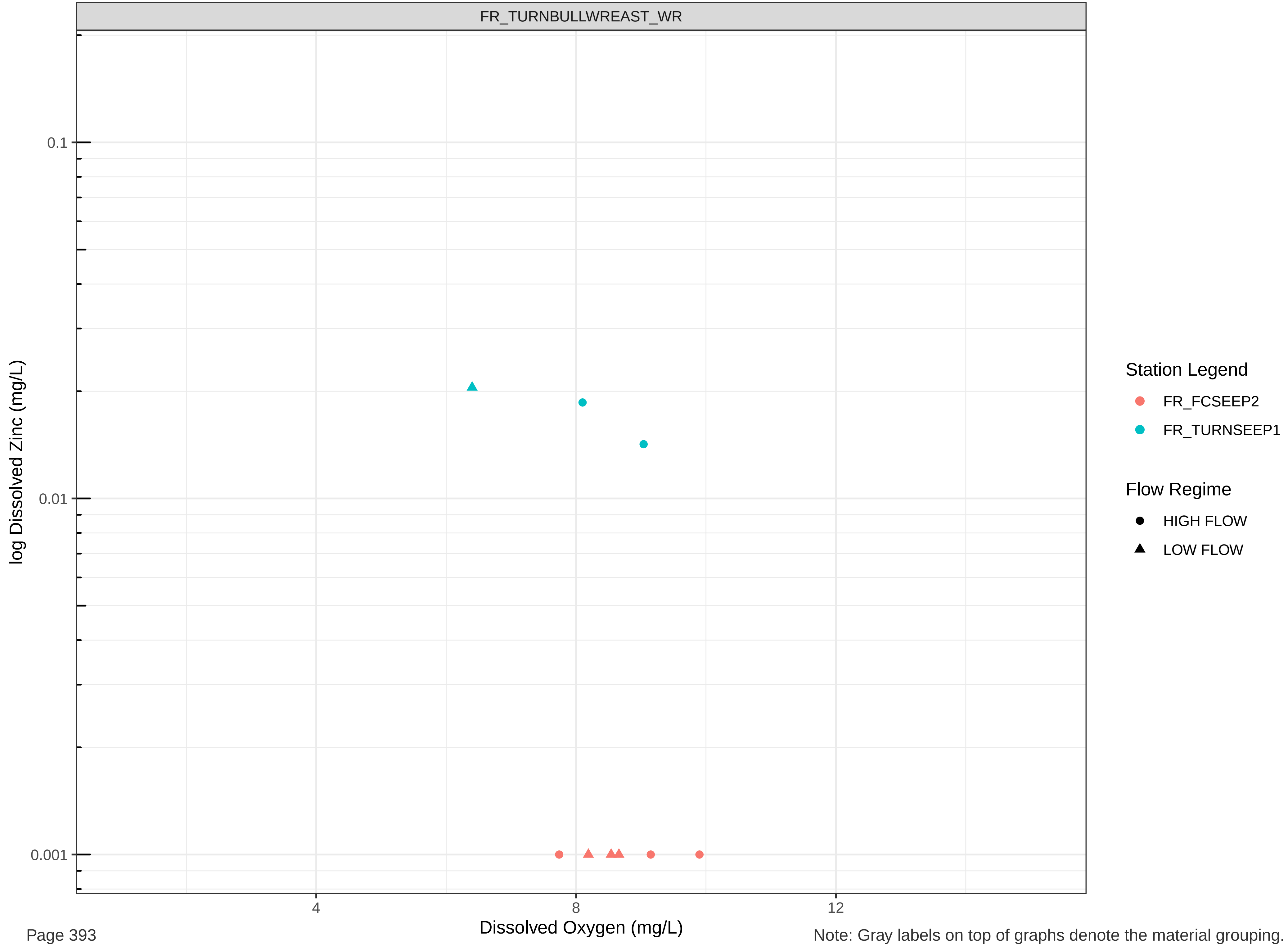
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0.1
0.01
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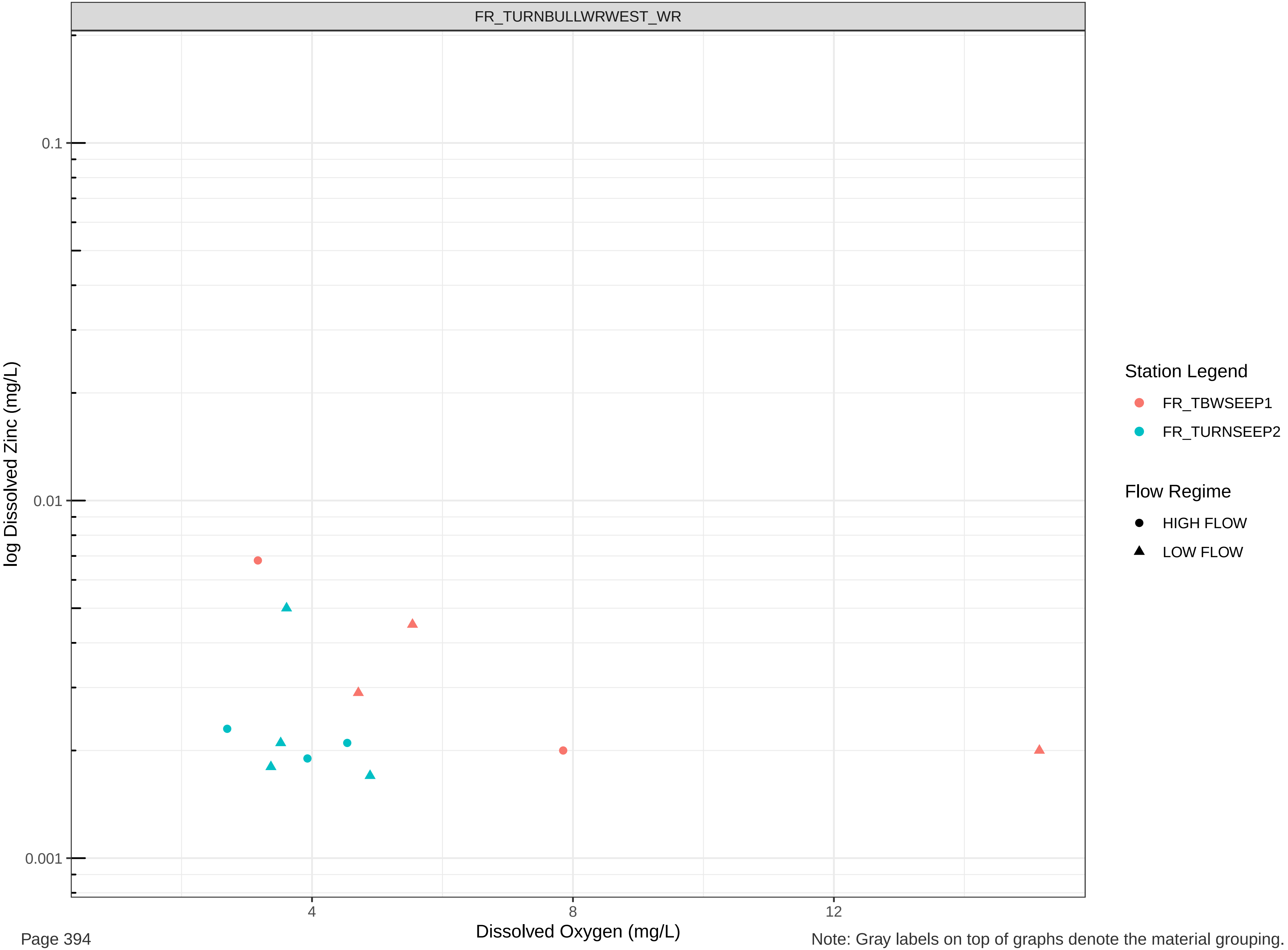

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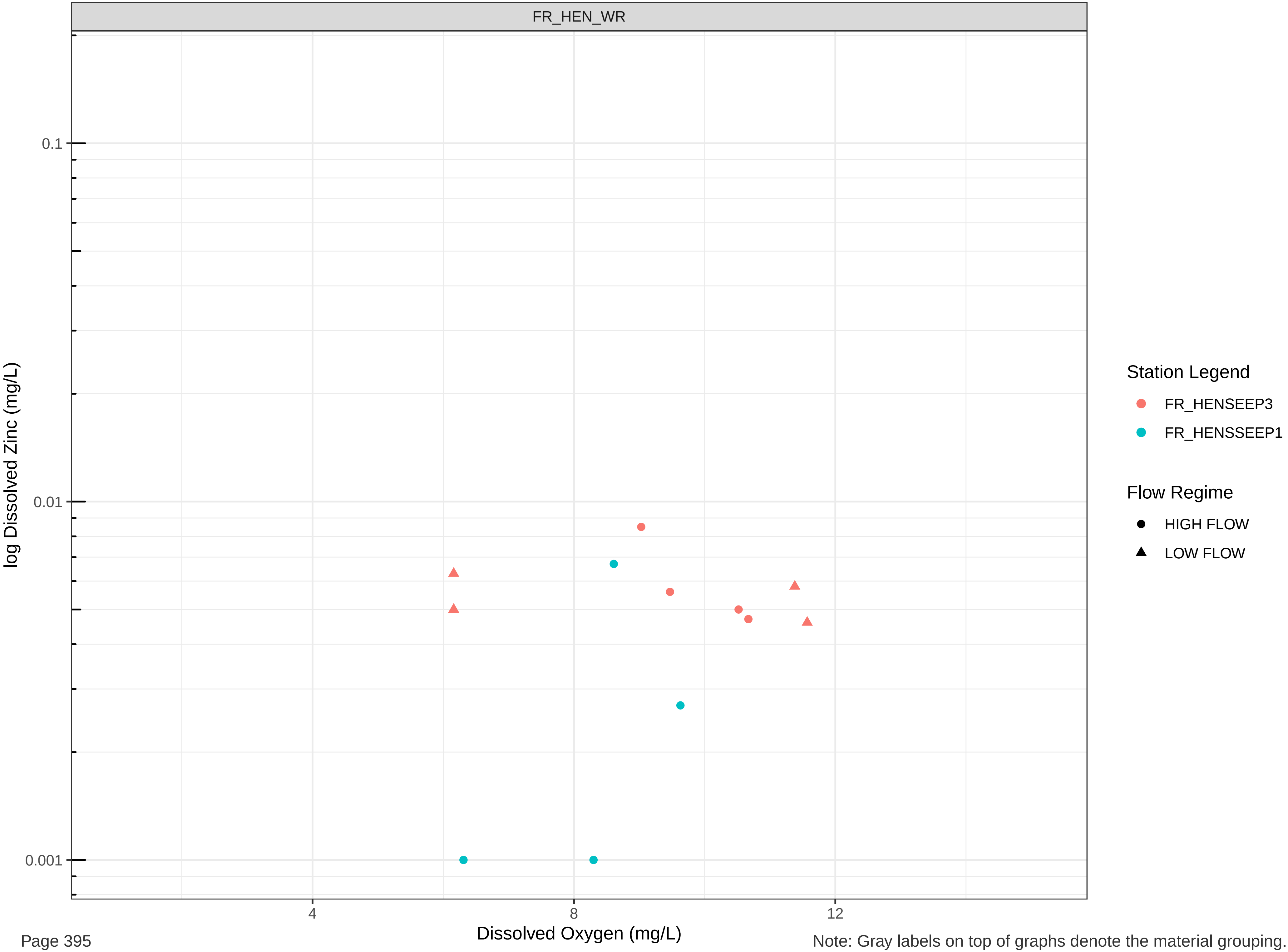

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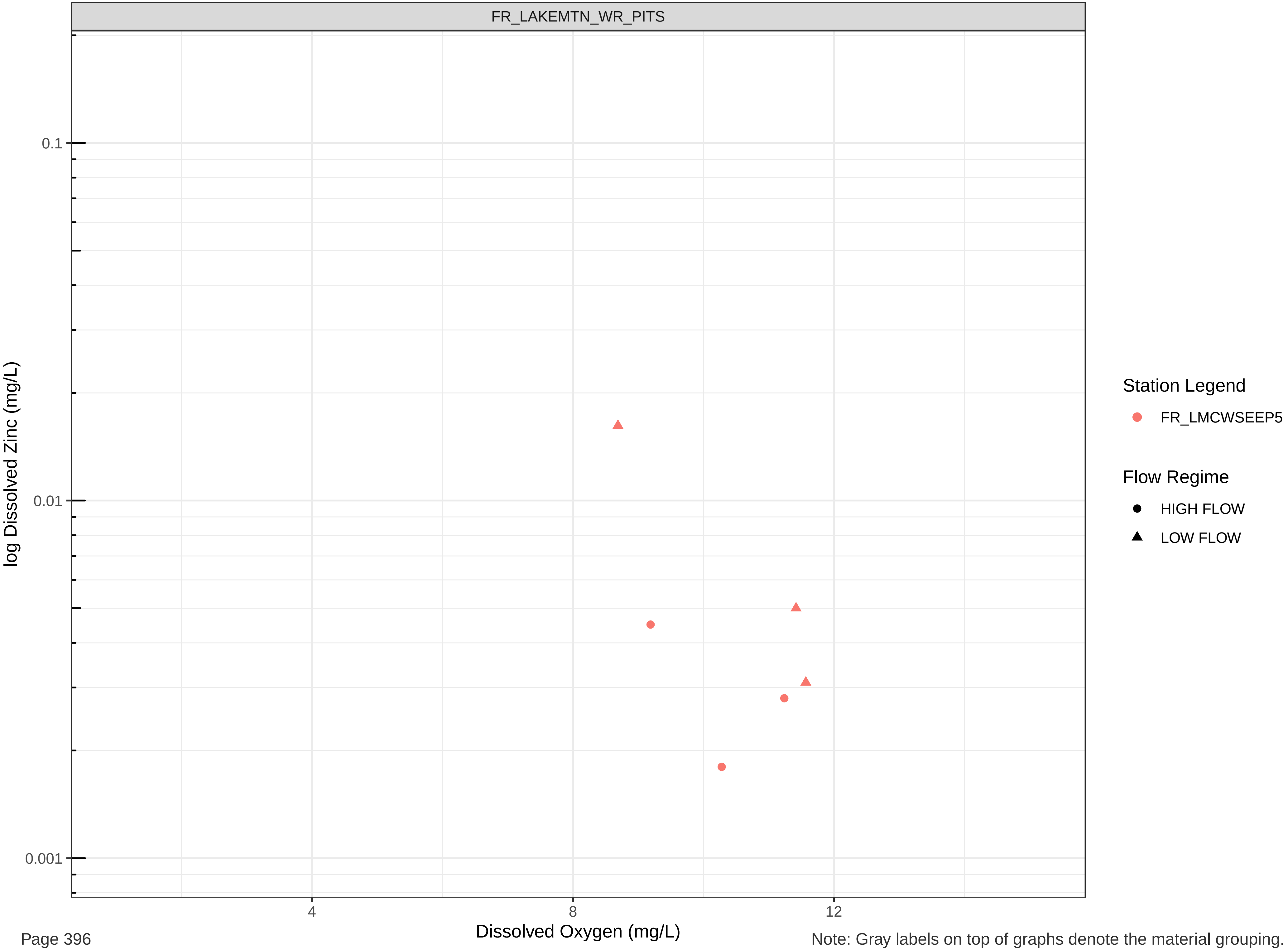

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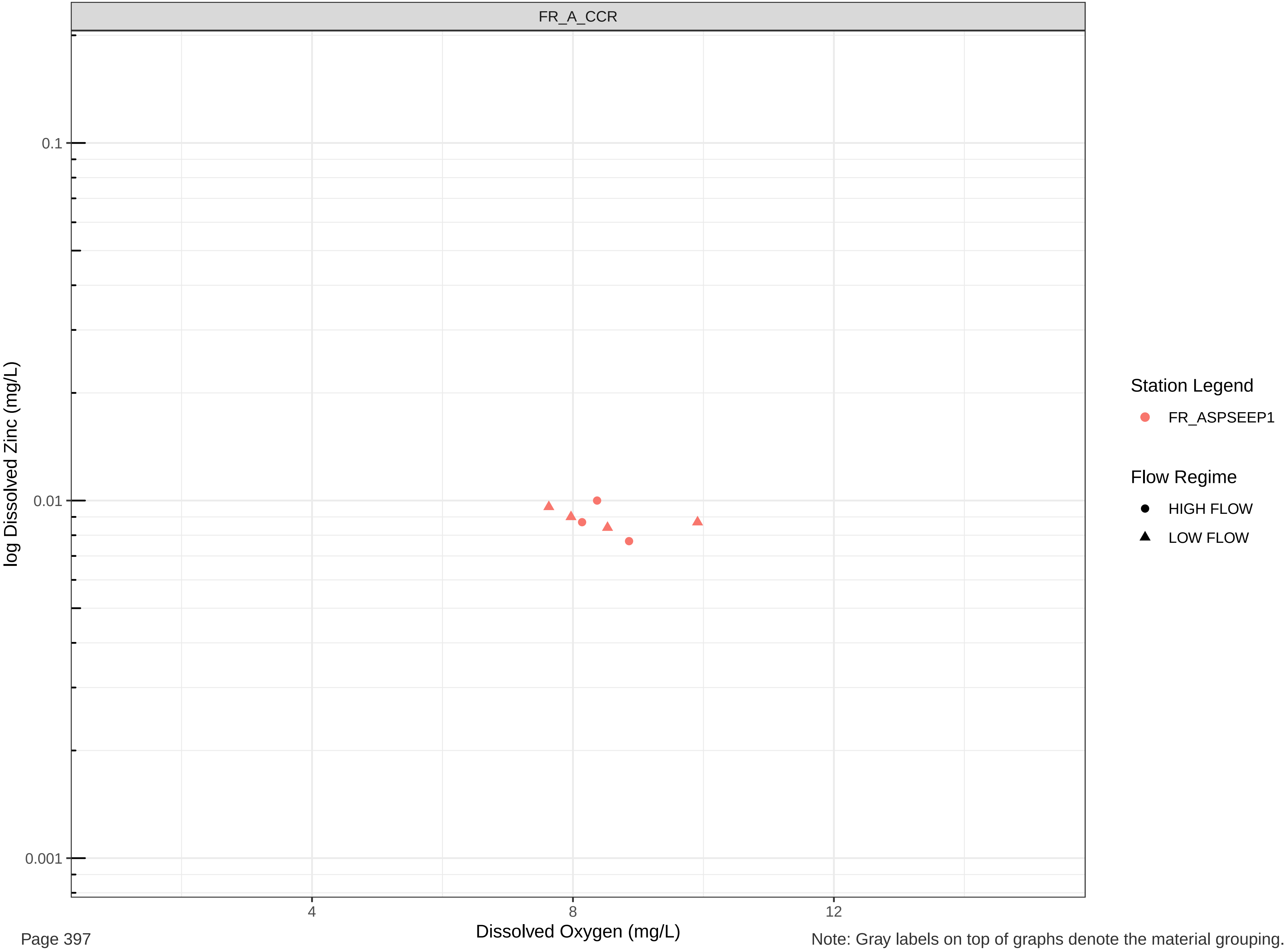

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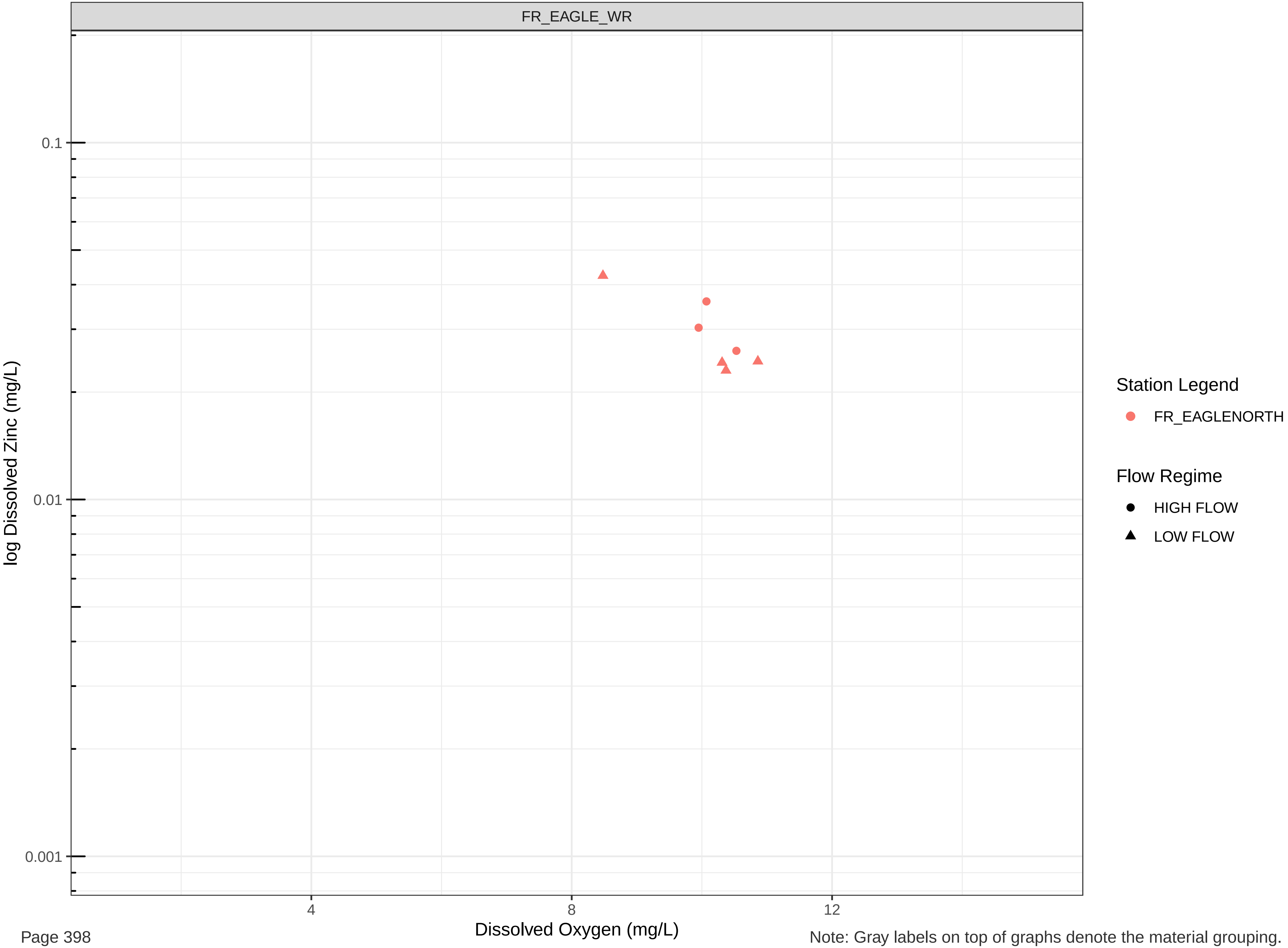

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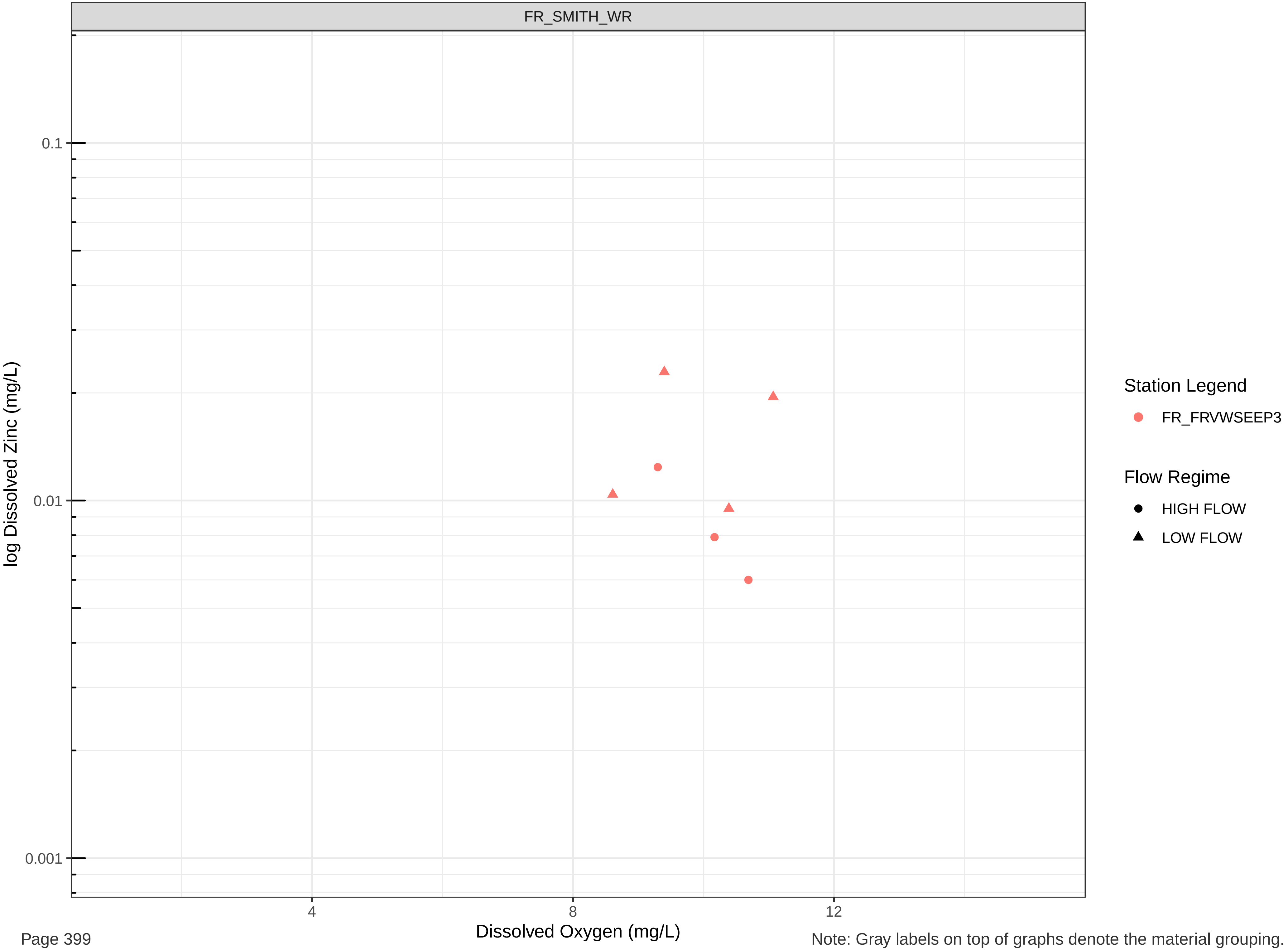

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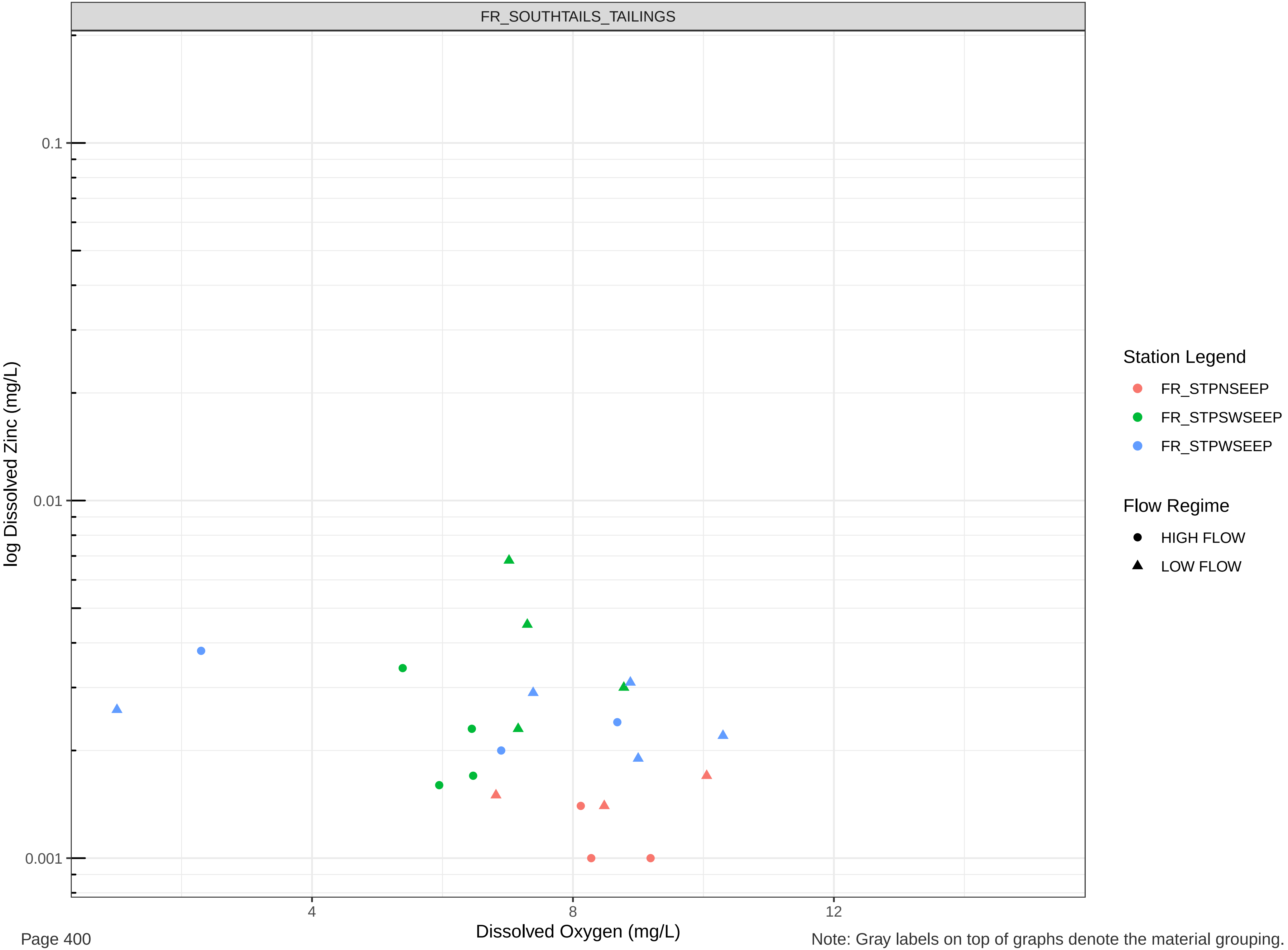

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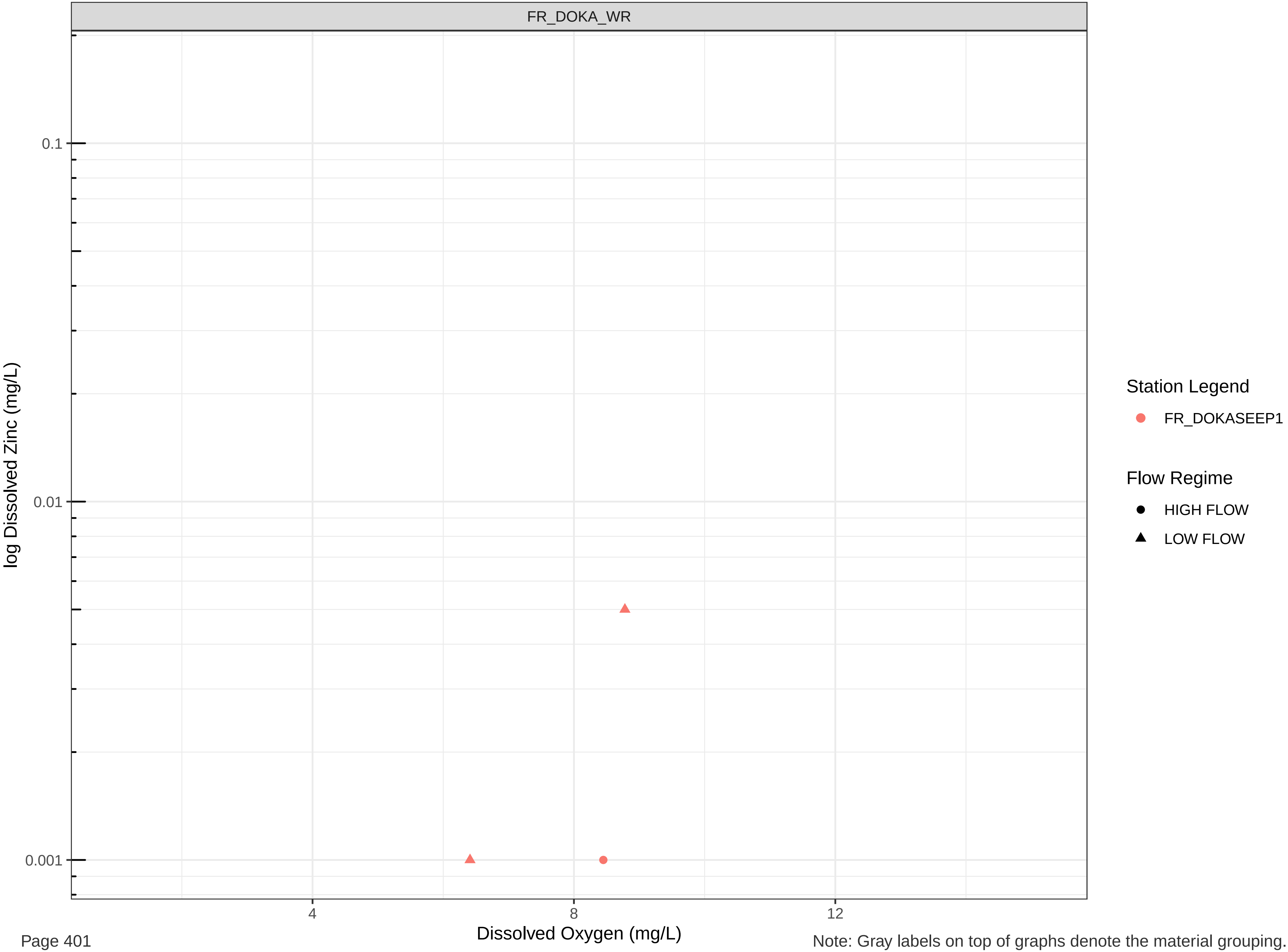

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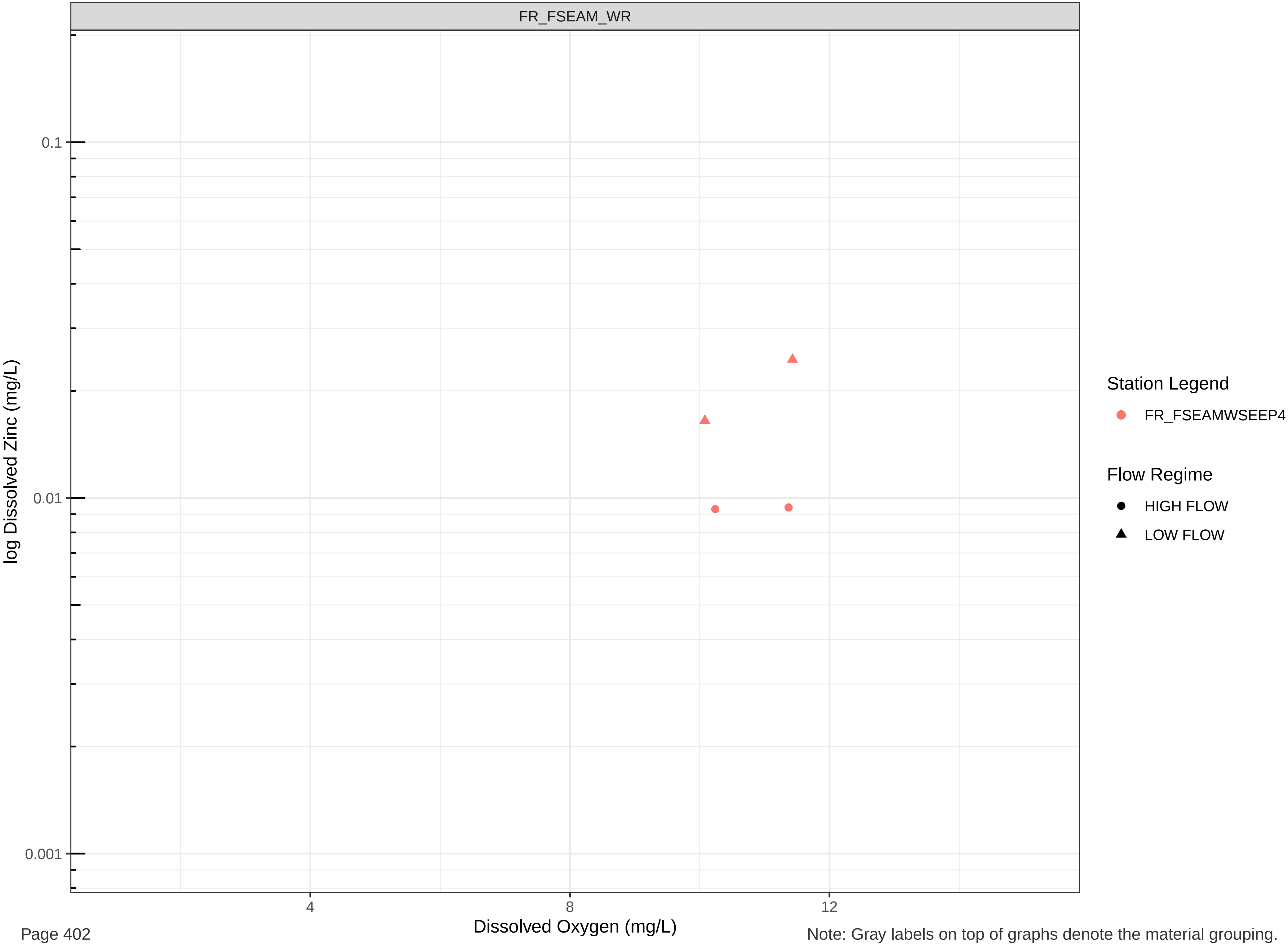

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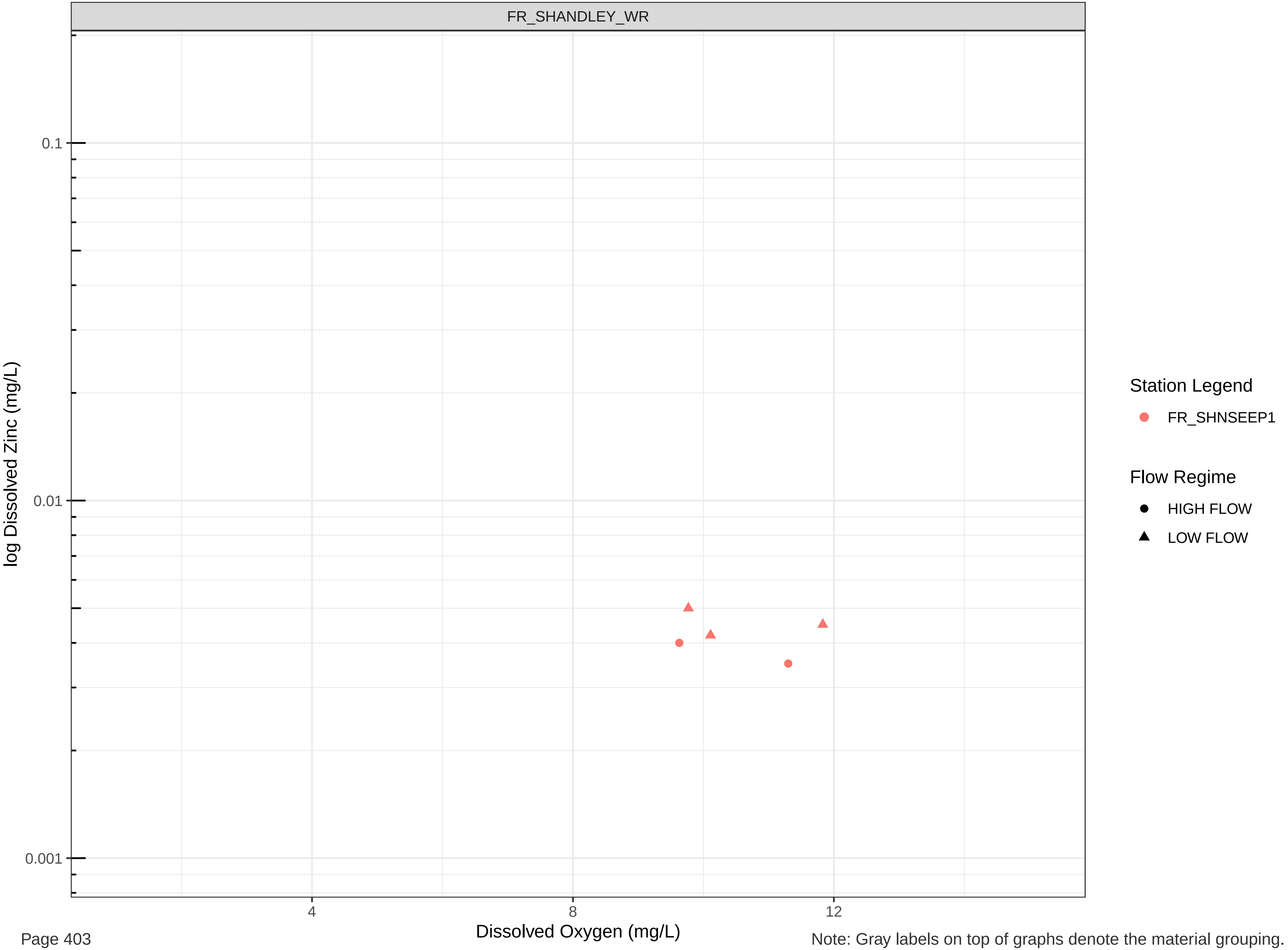

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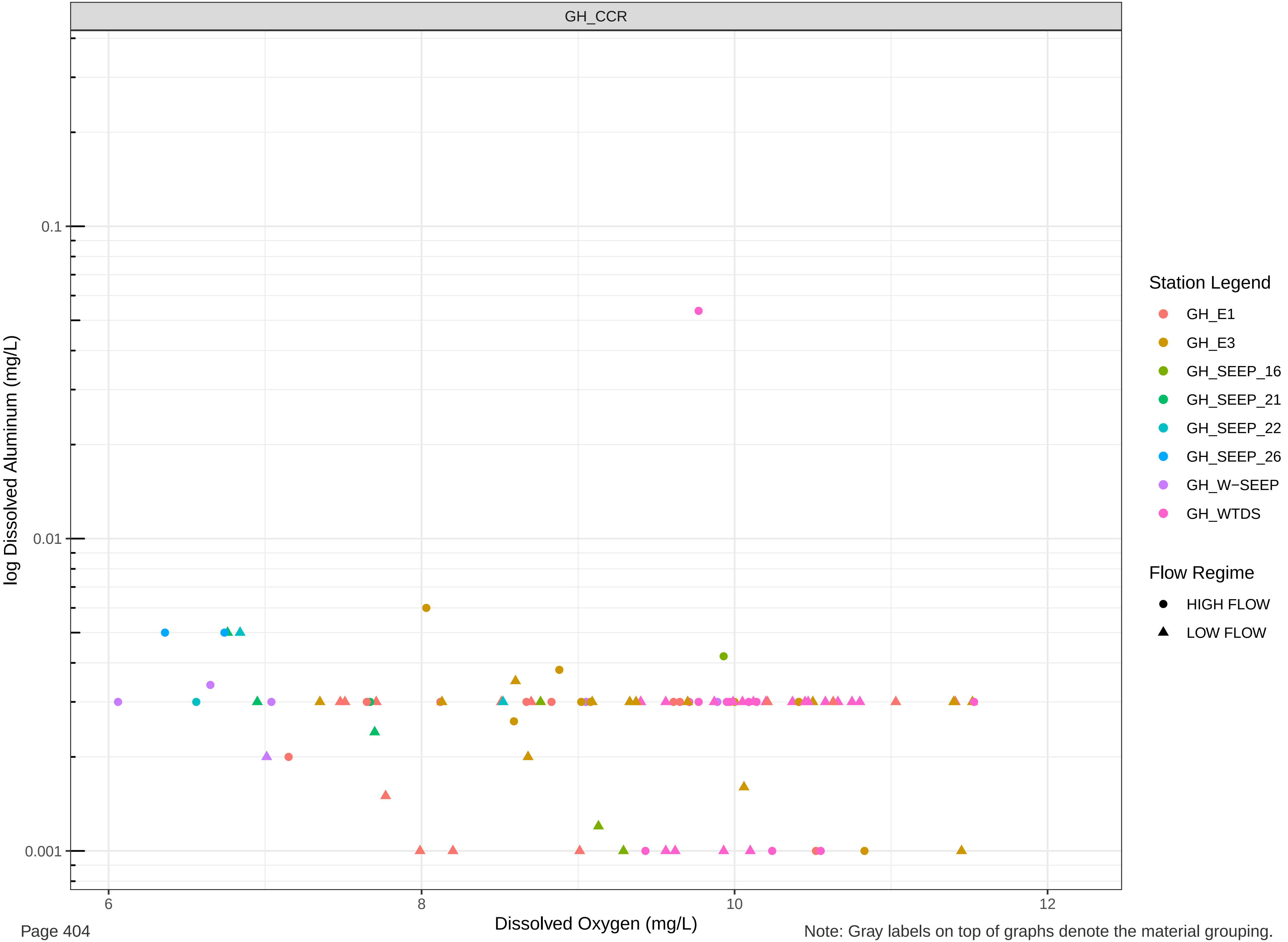

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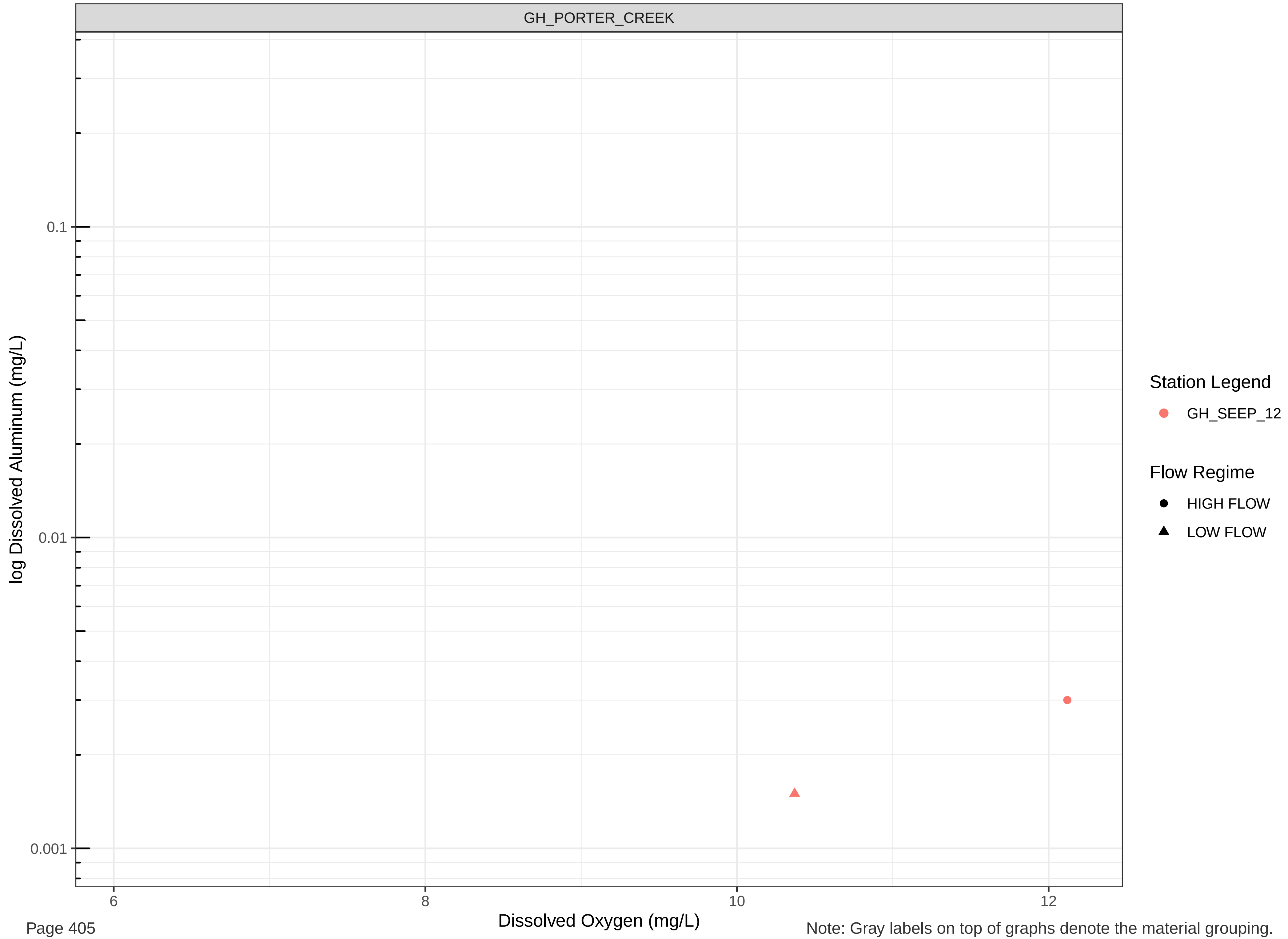

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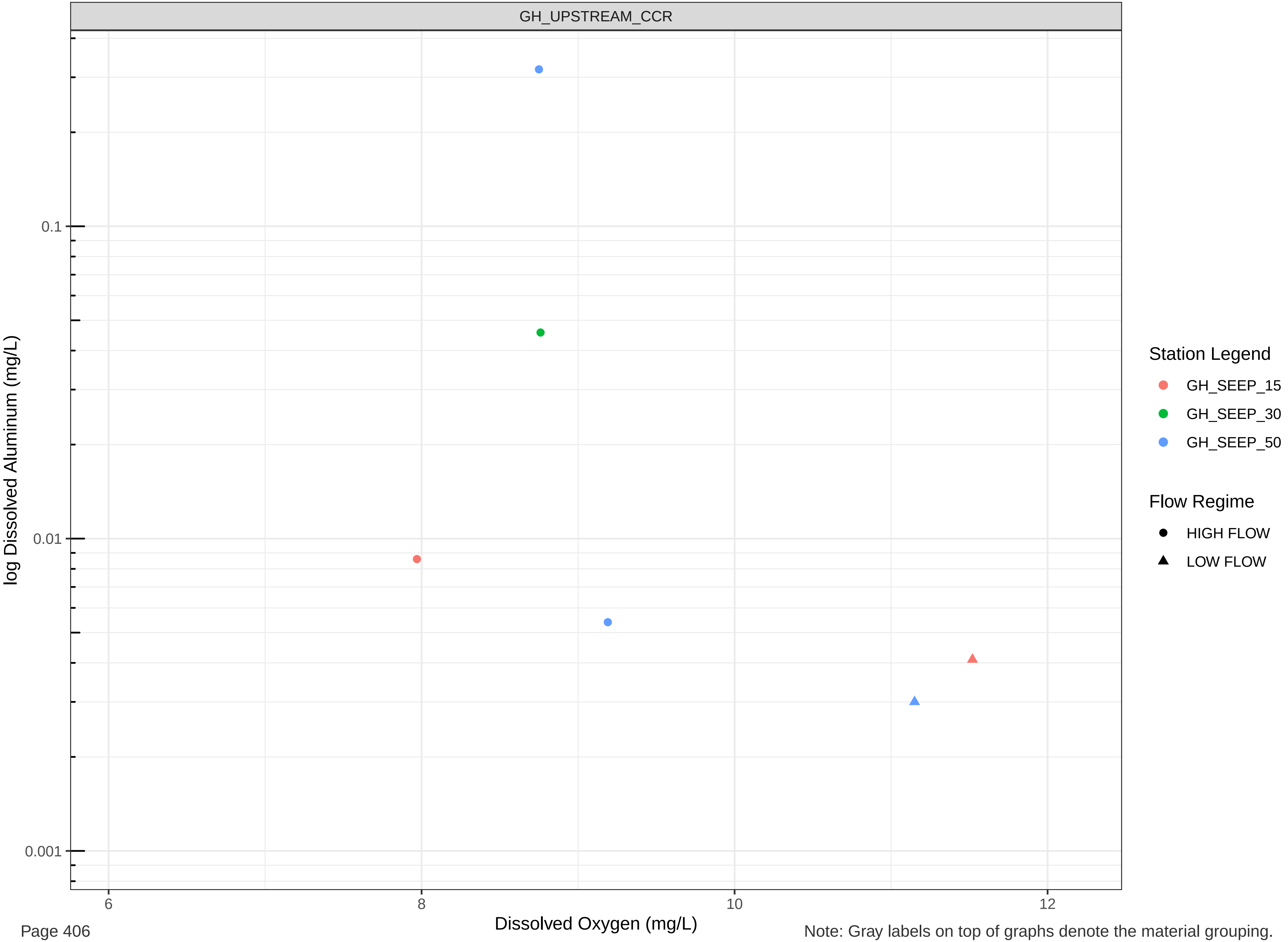

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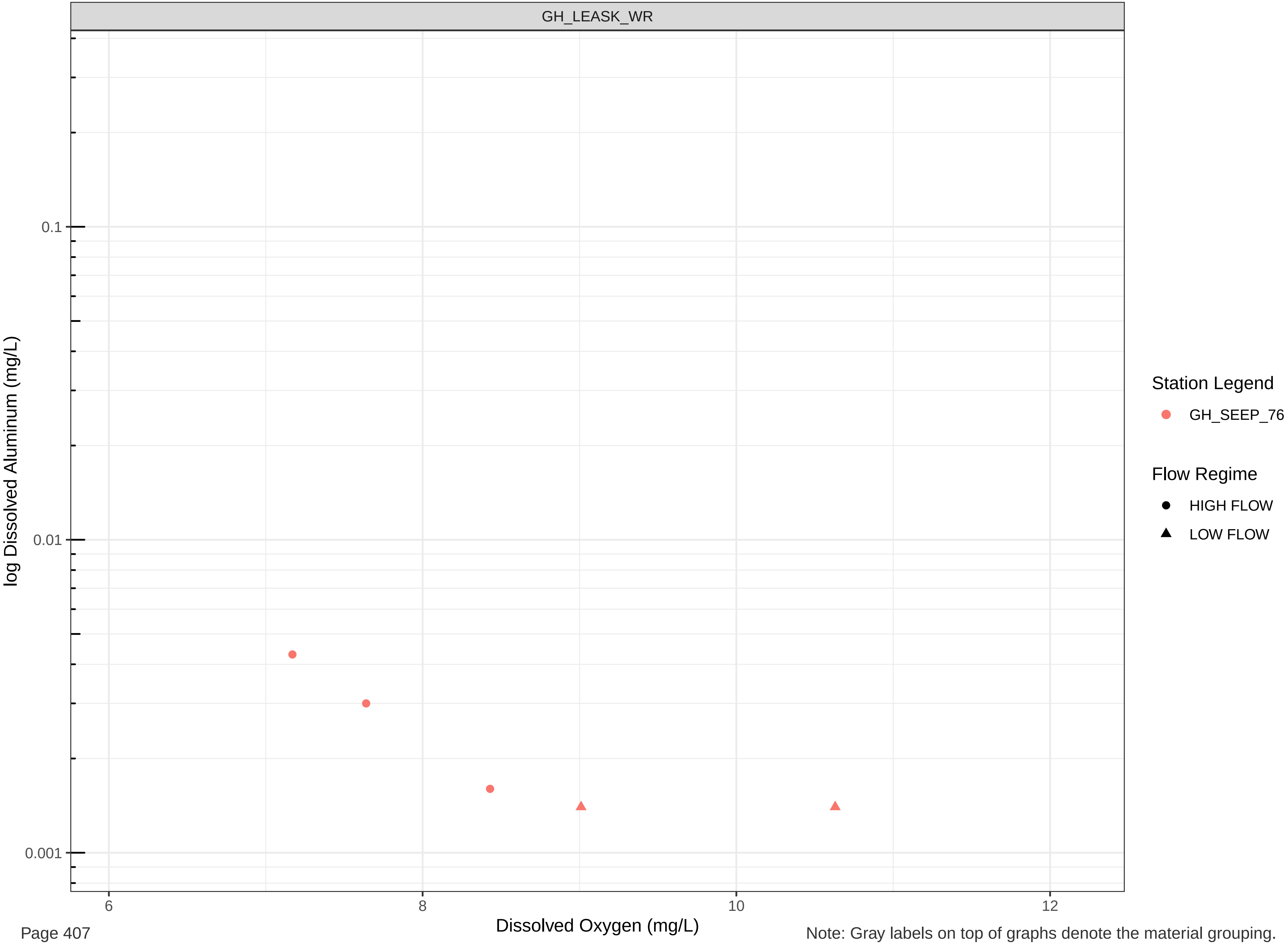

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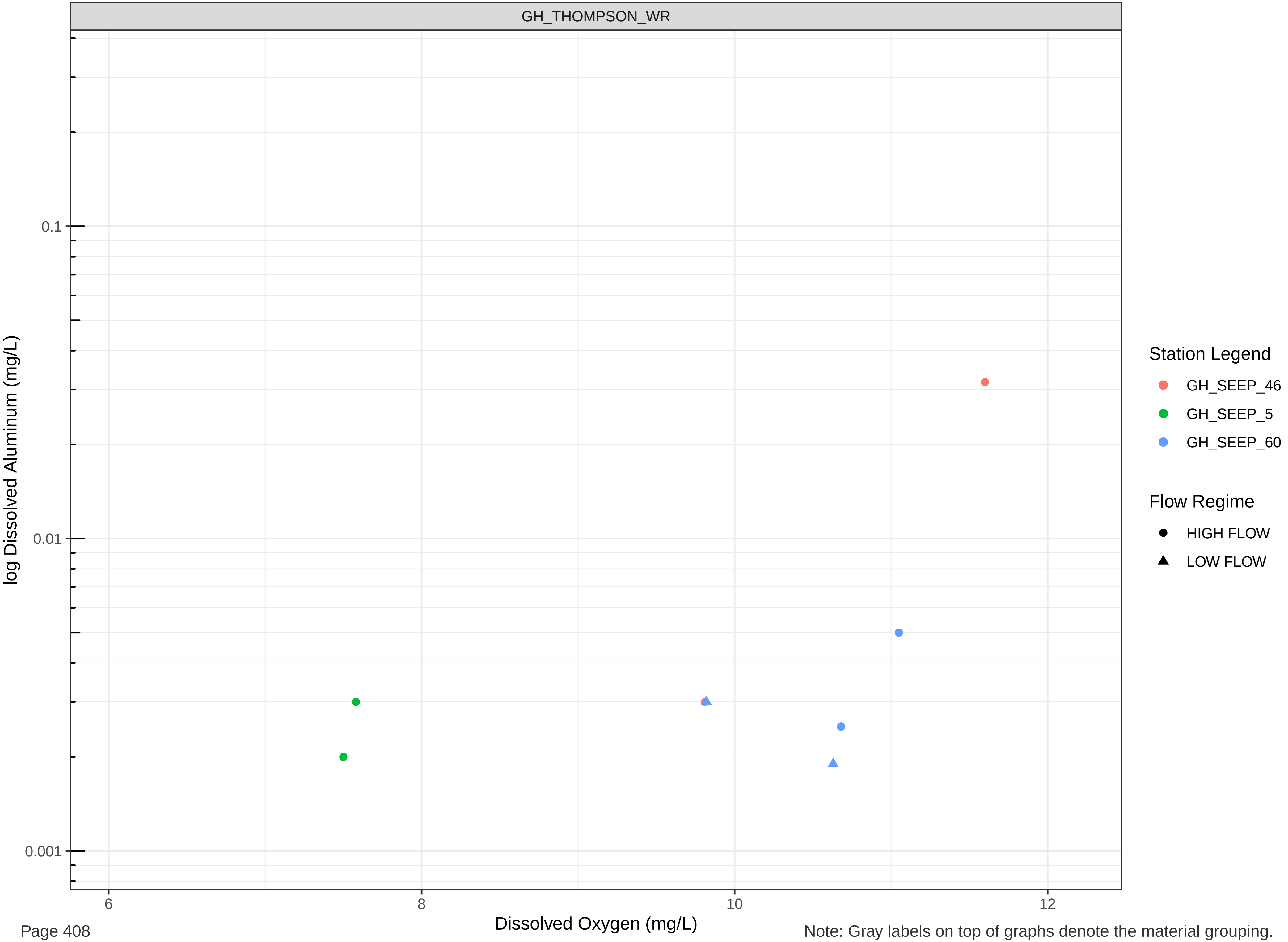

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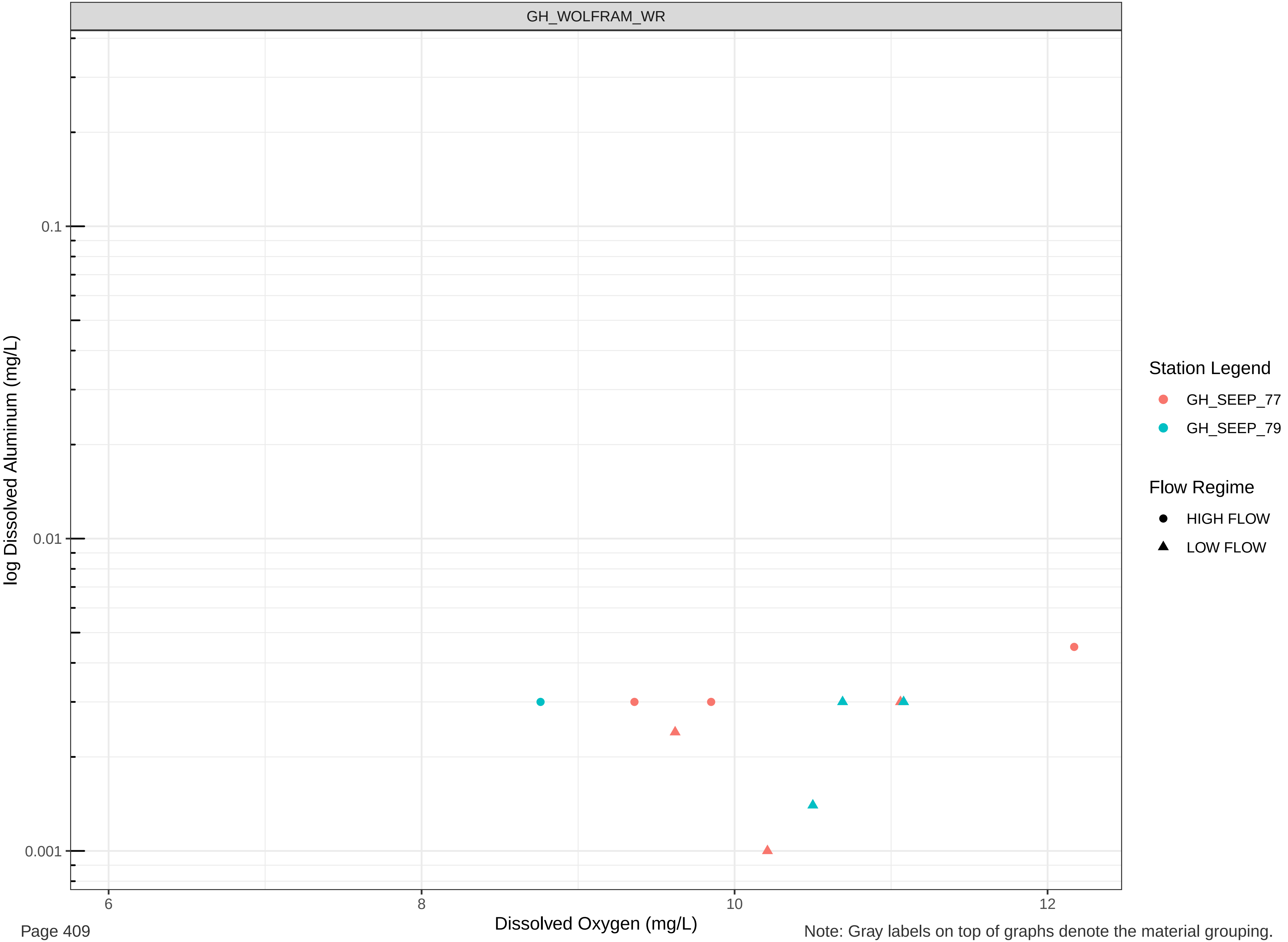

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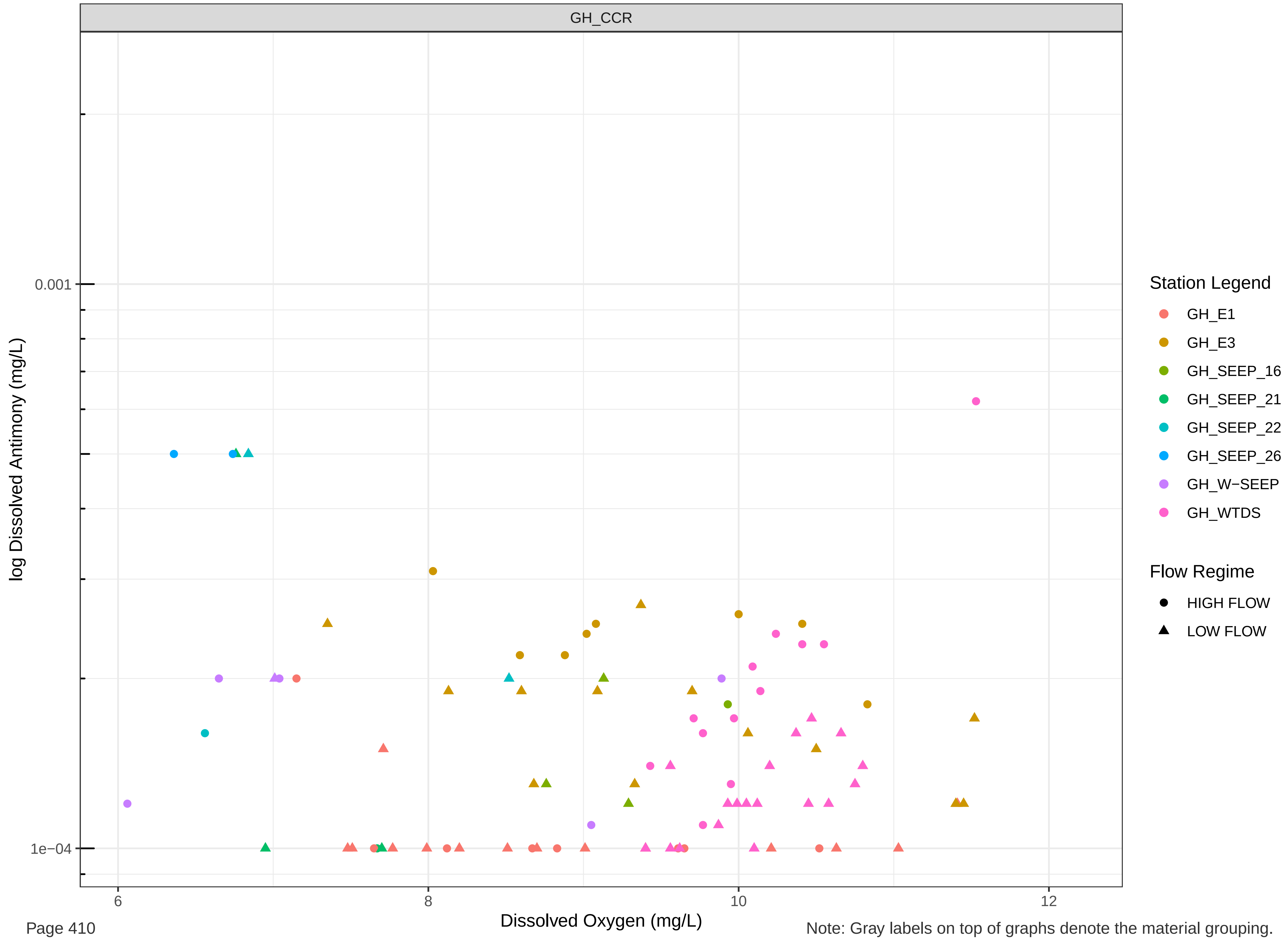
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1e−04
6
8
10
12
Dissolved Oxygen (mg/L)
Station Legend
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GH_E3
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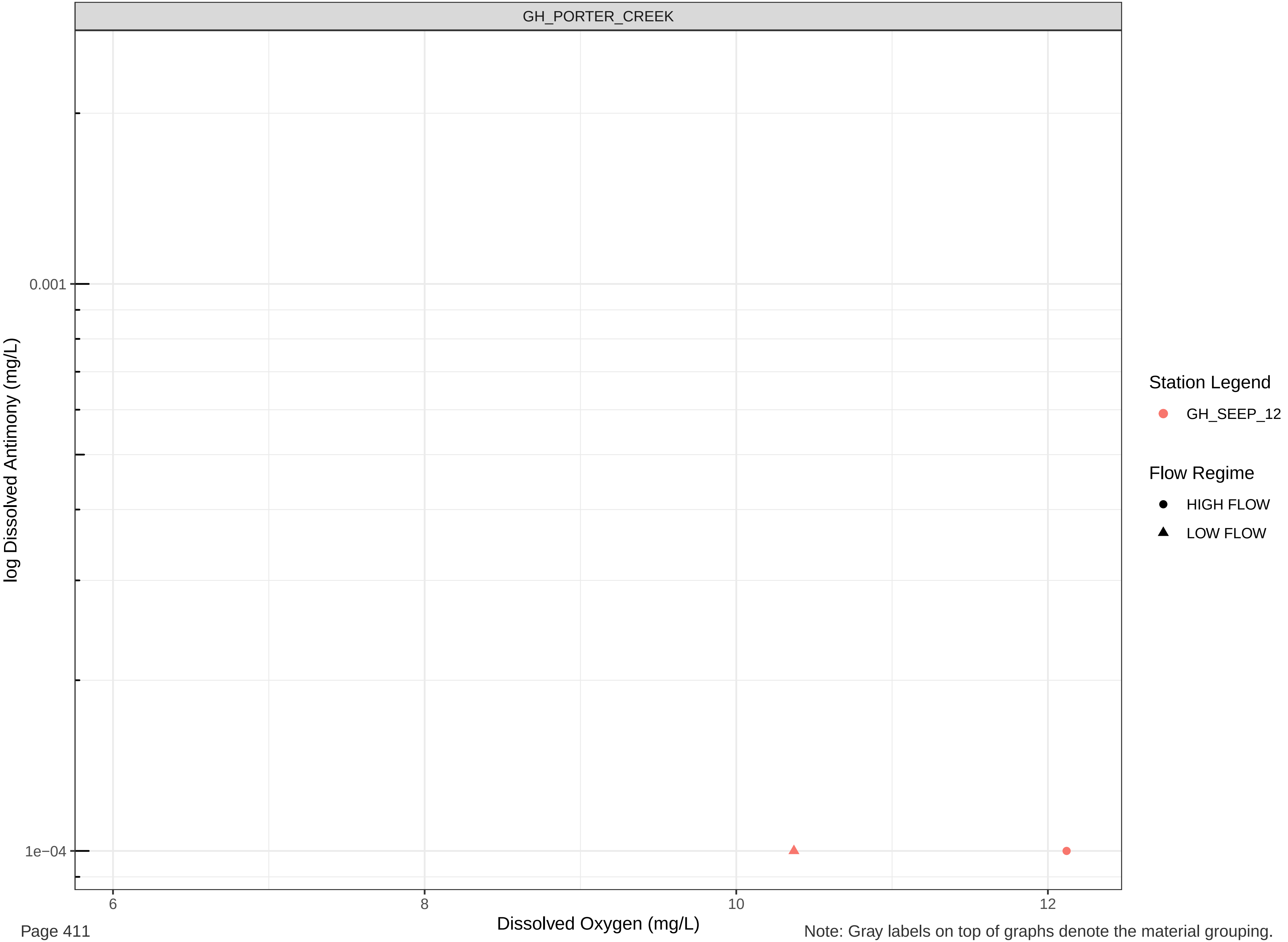
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



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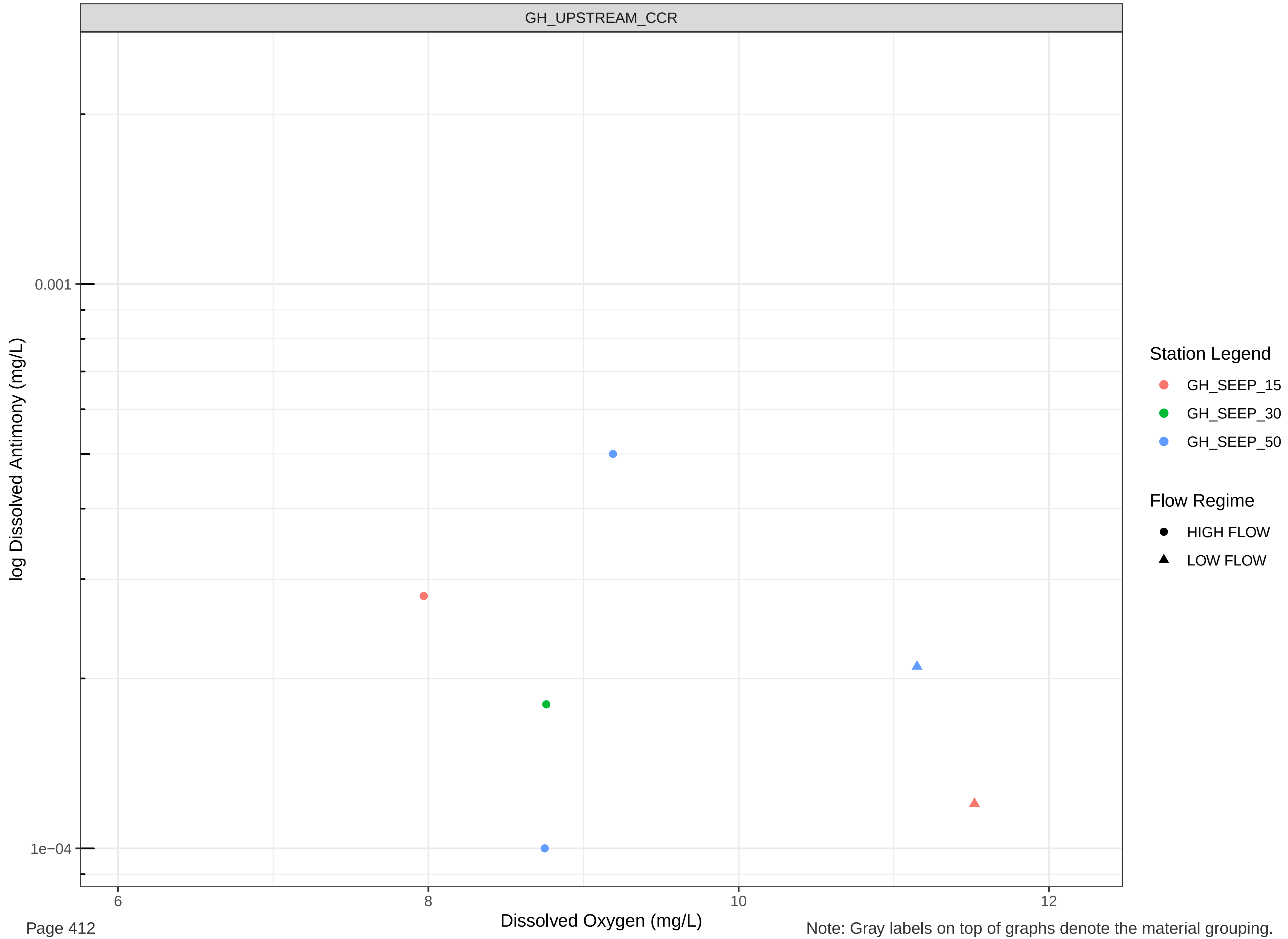

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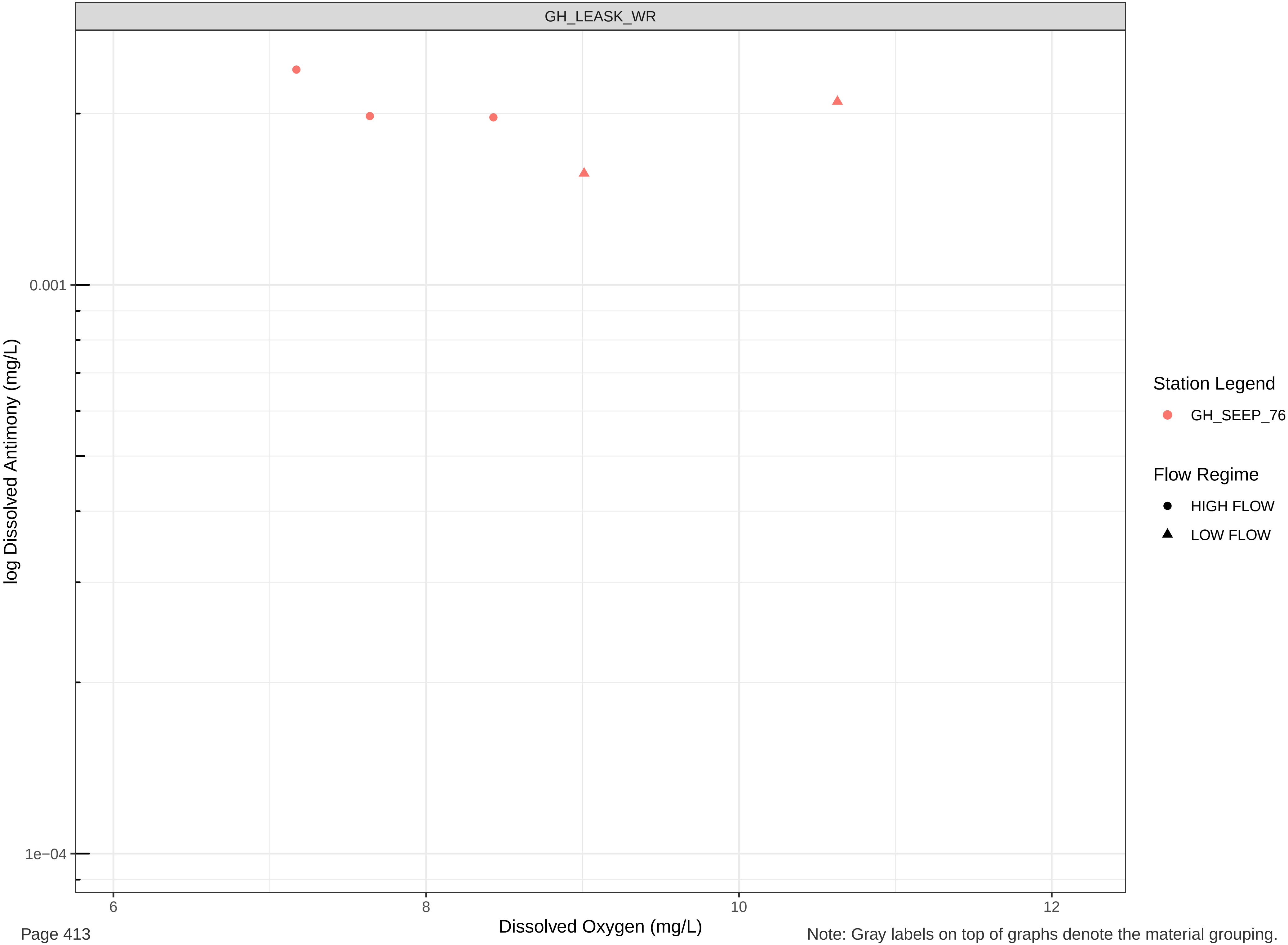

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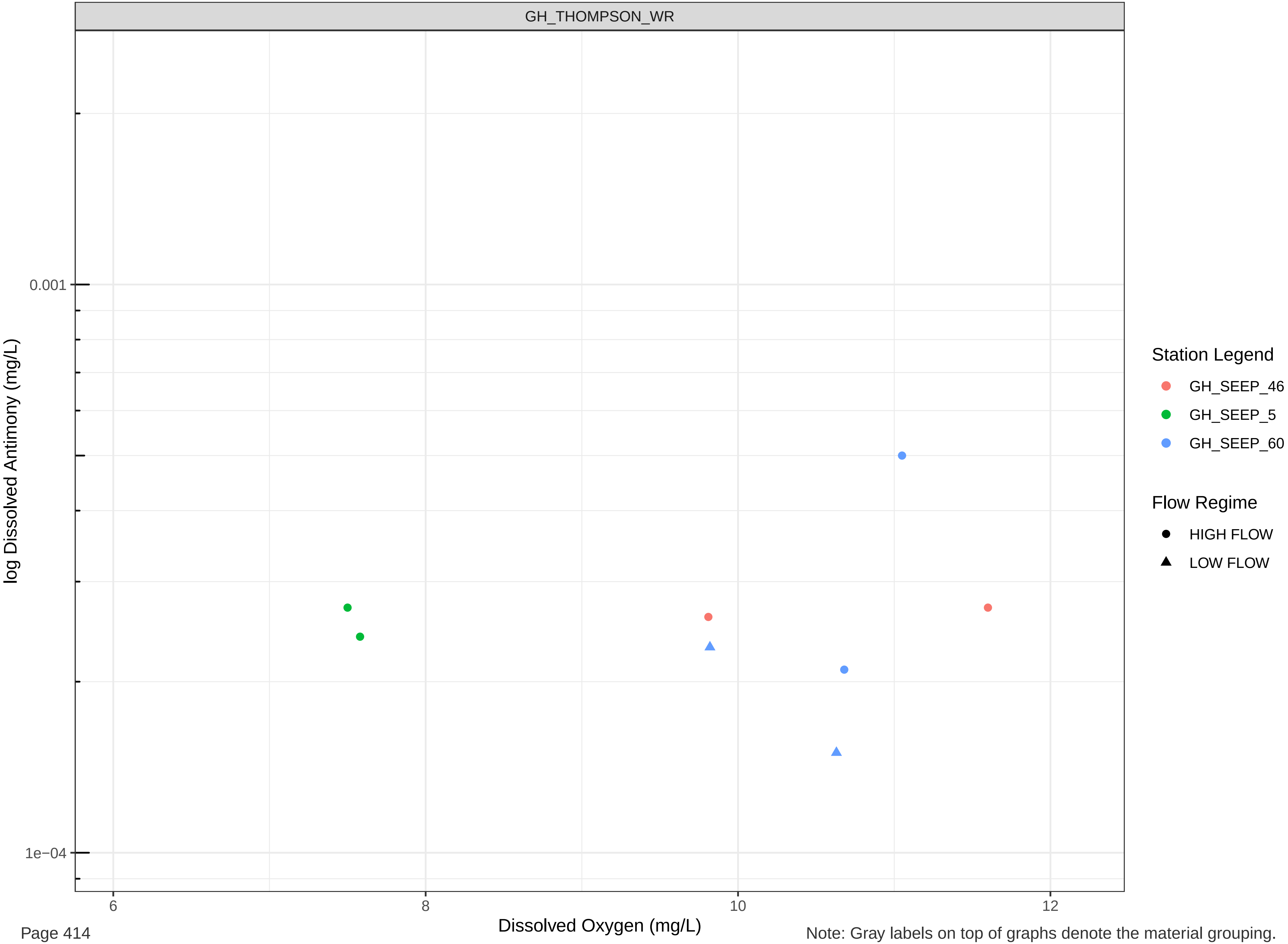

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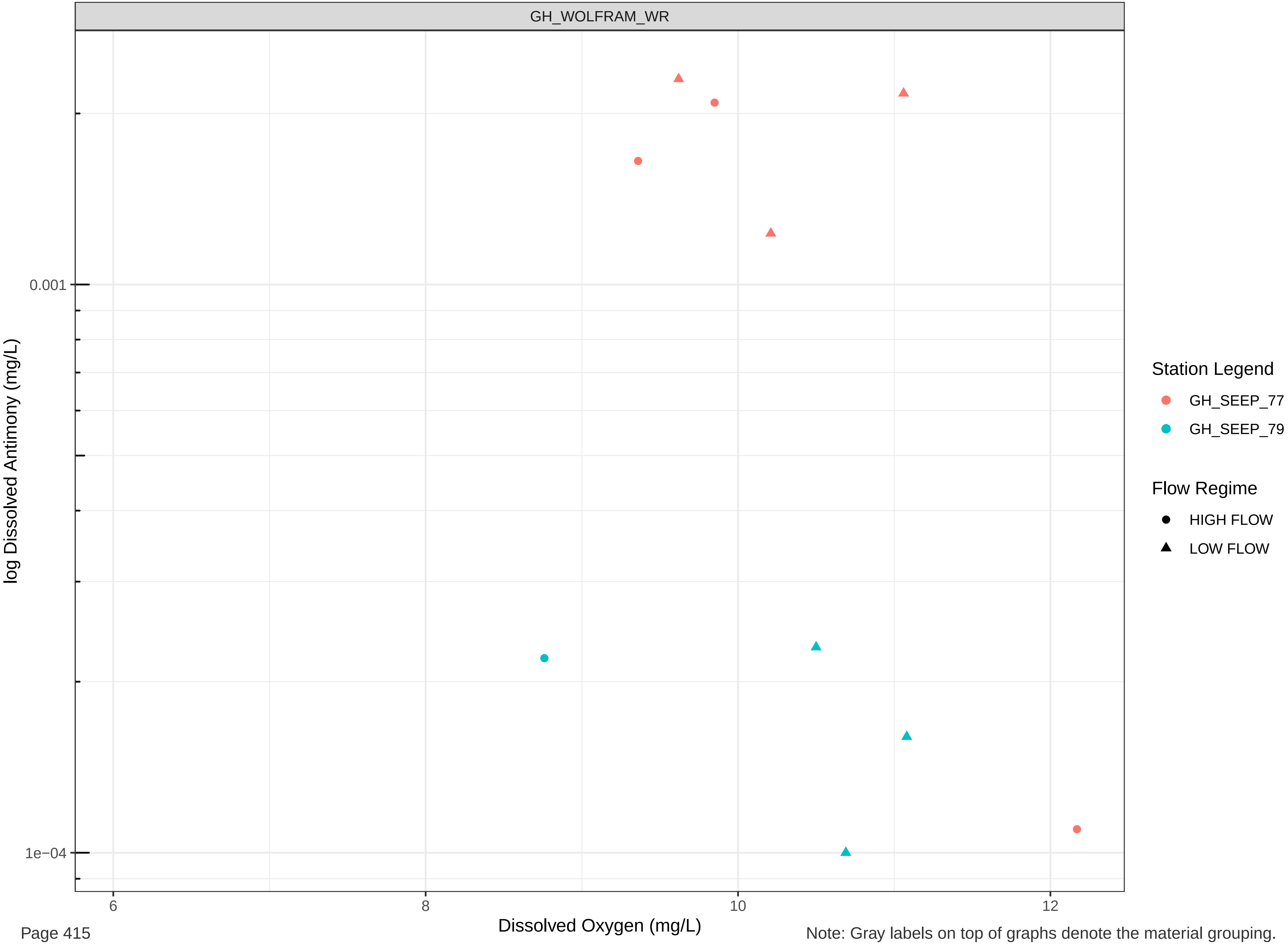

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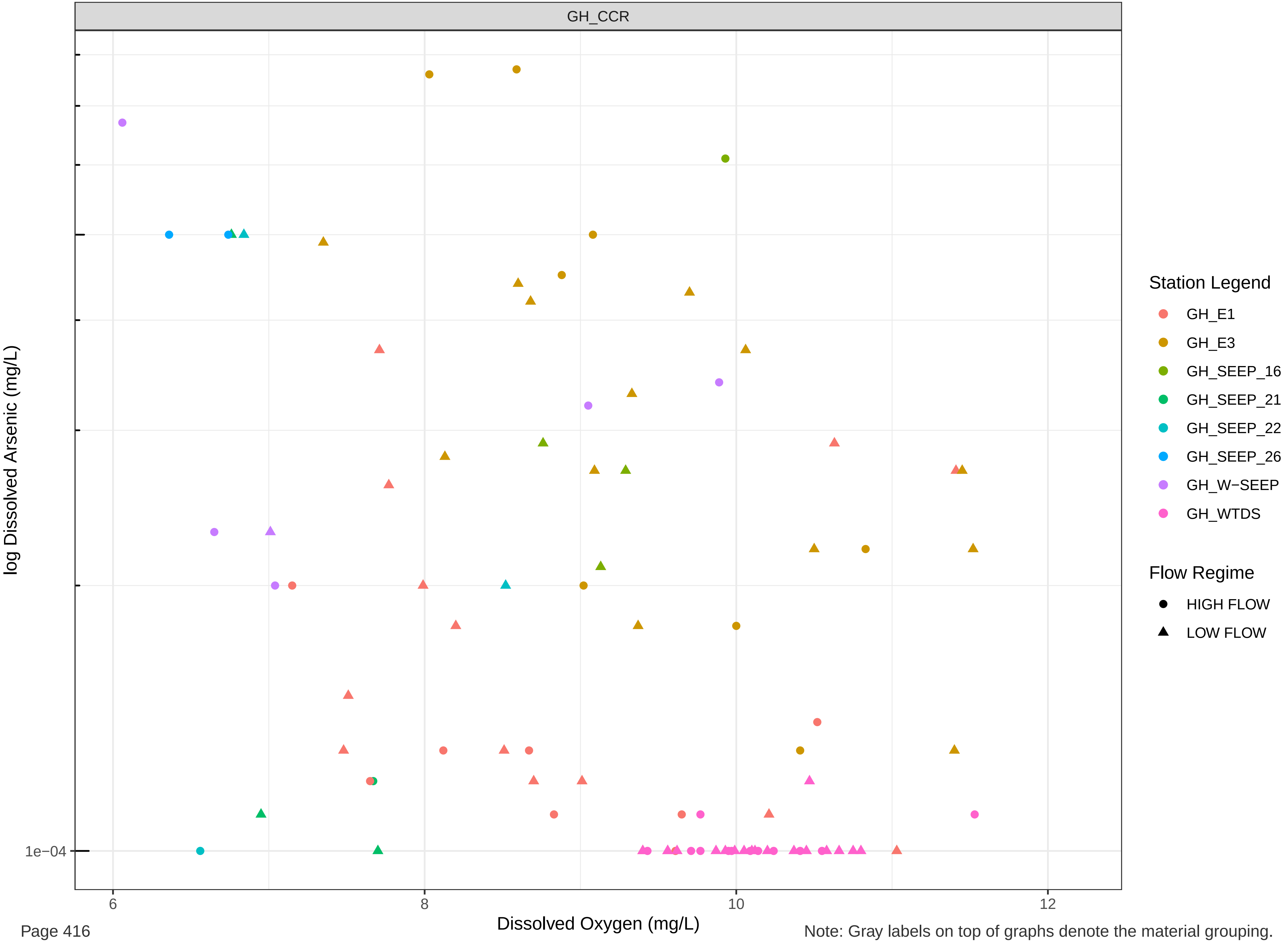

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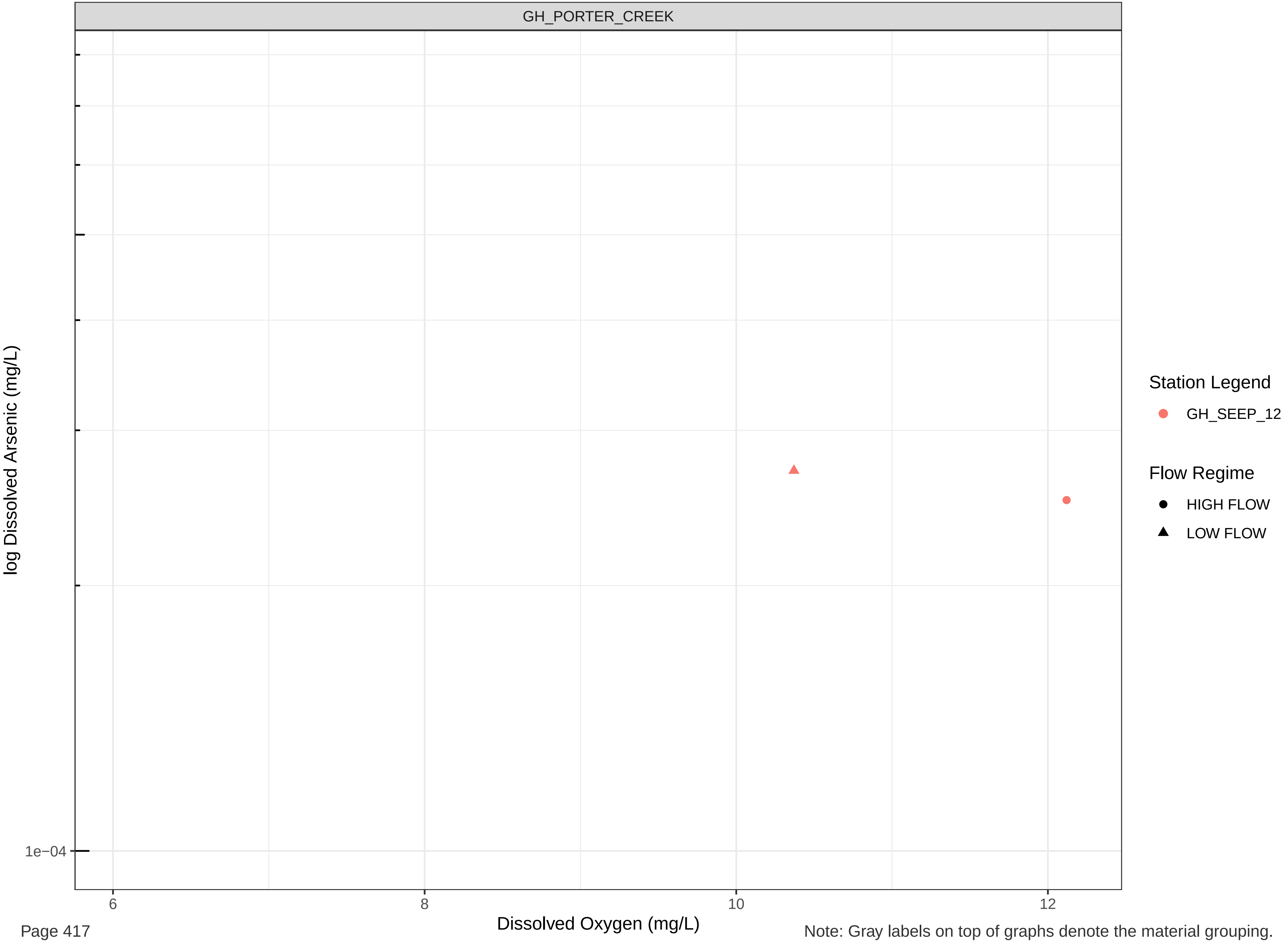

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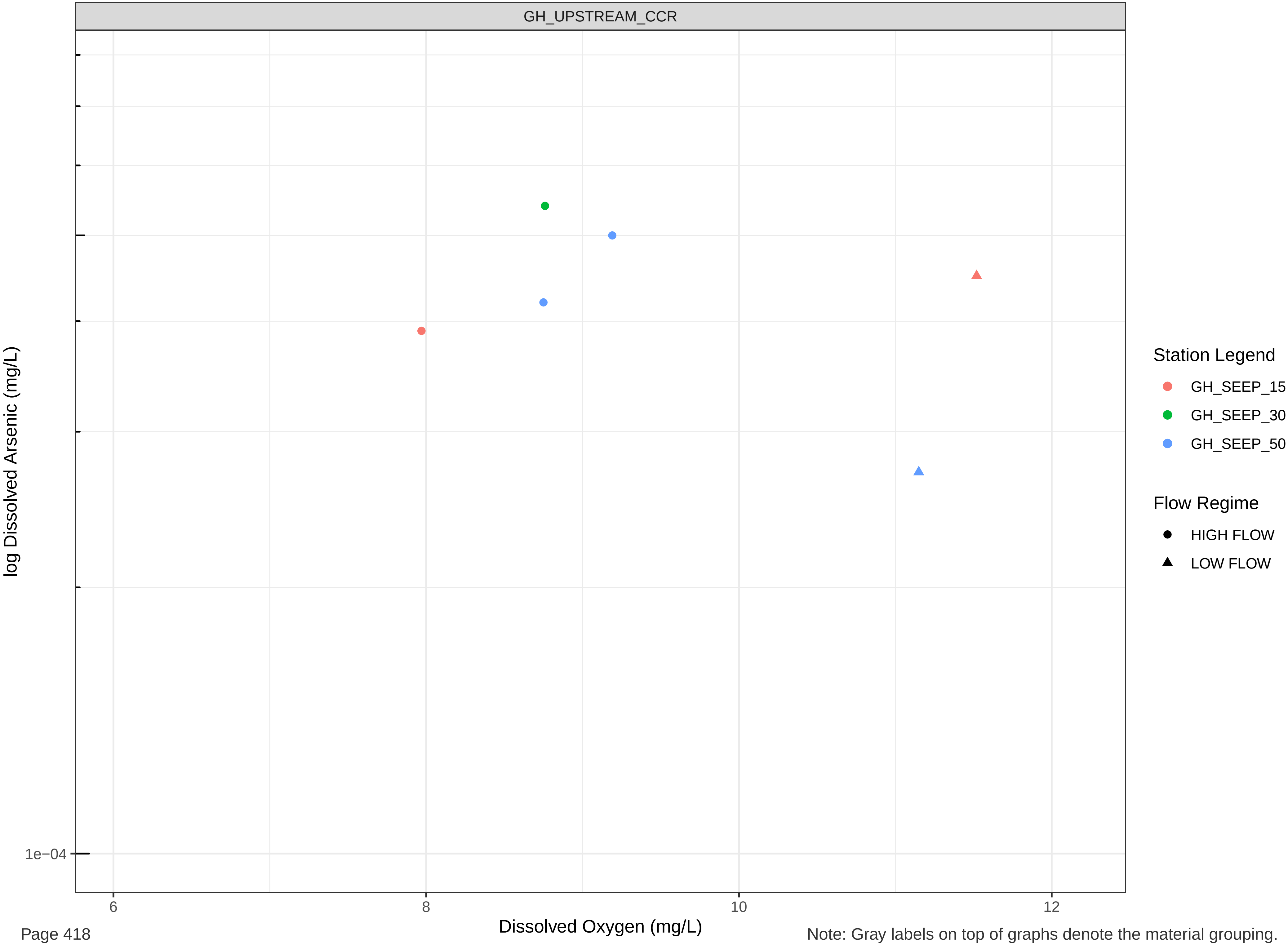

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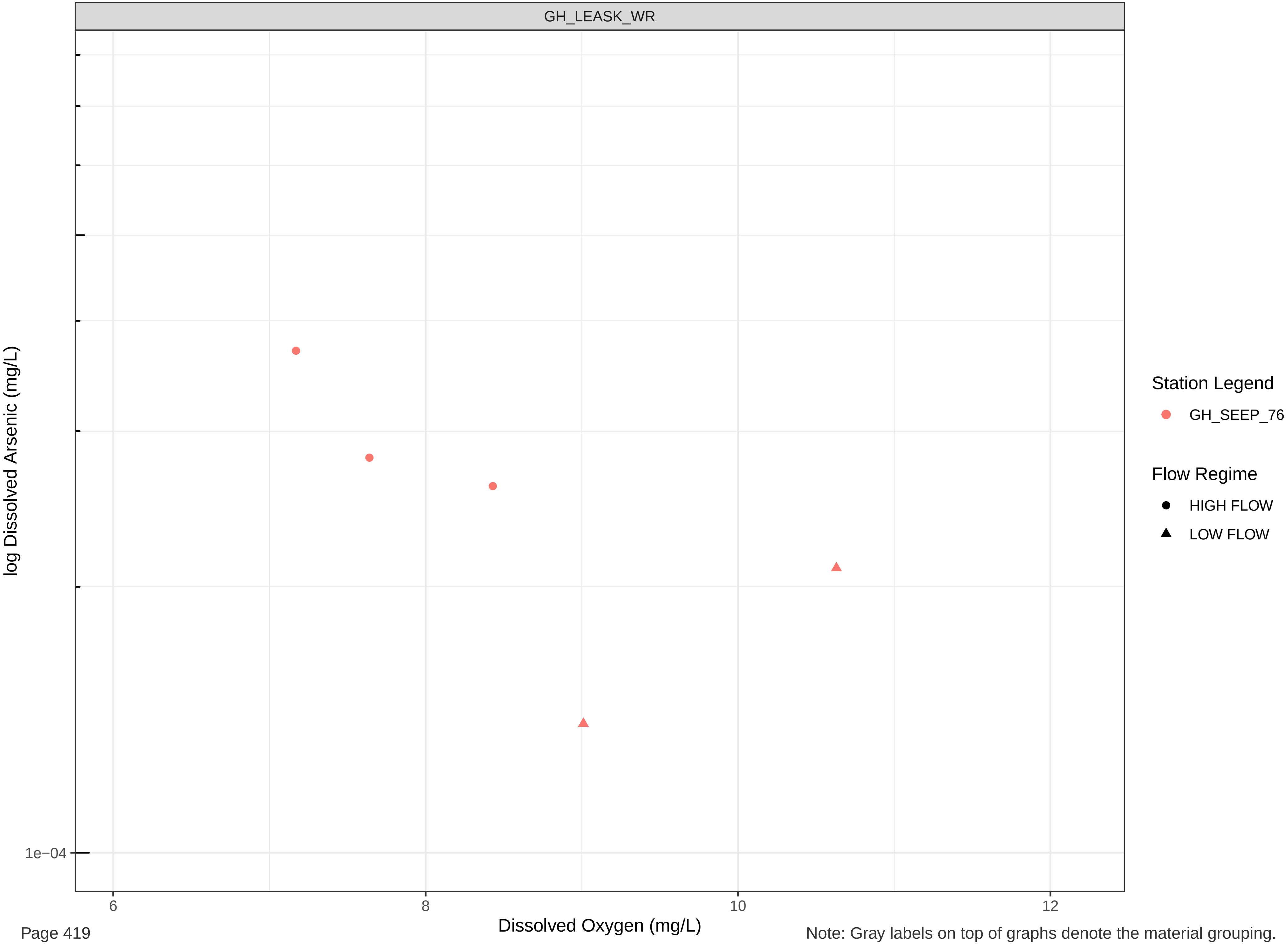

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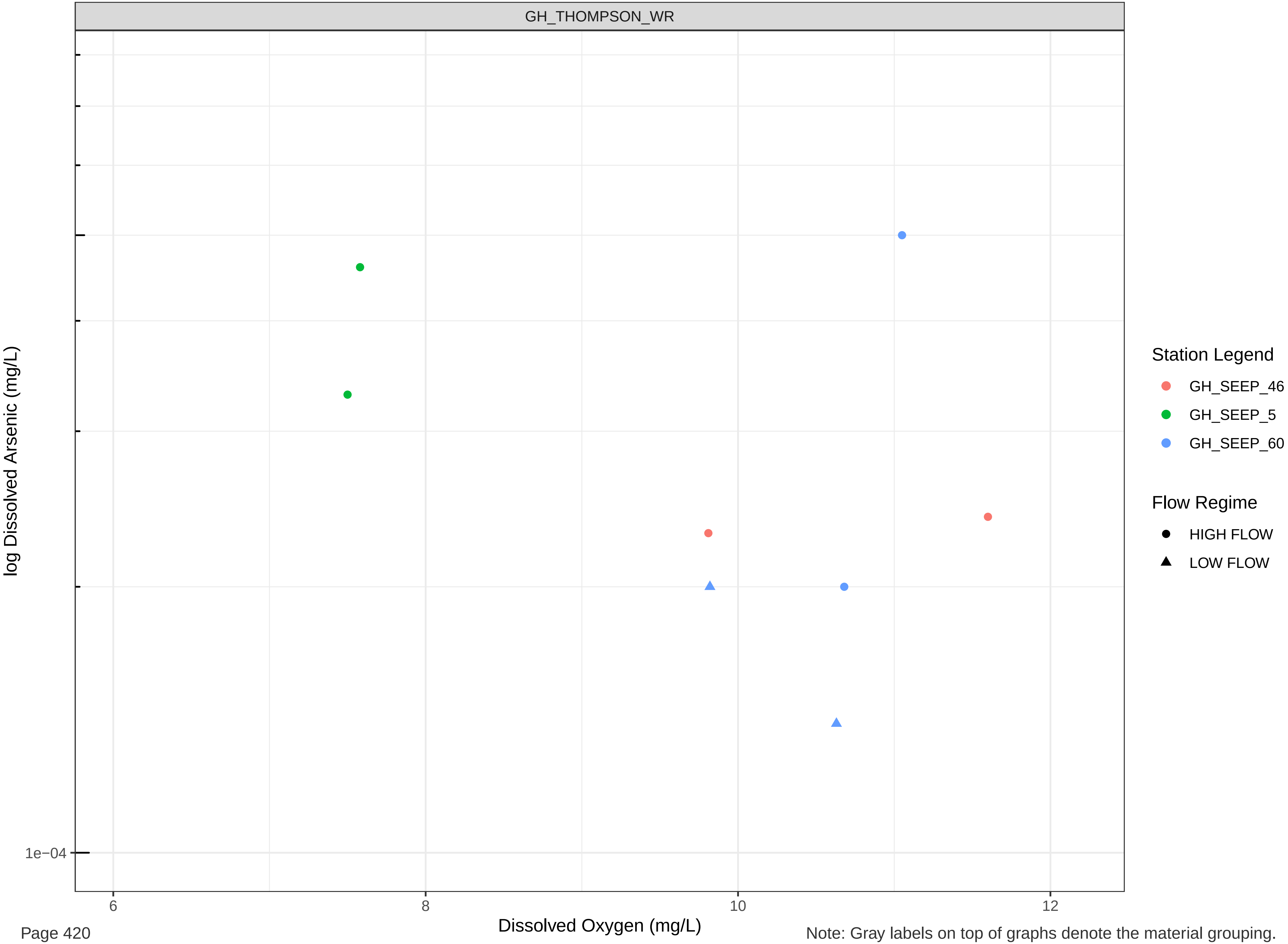

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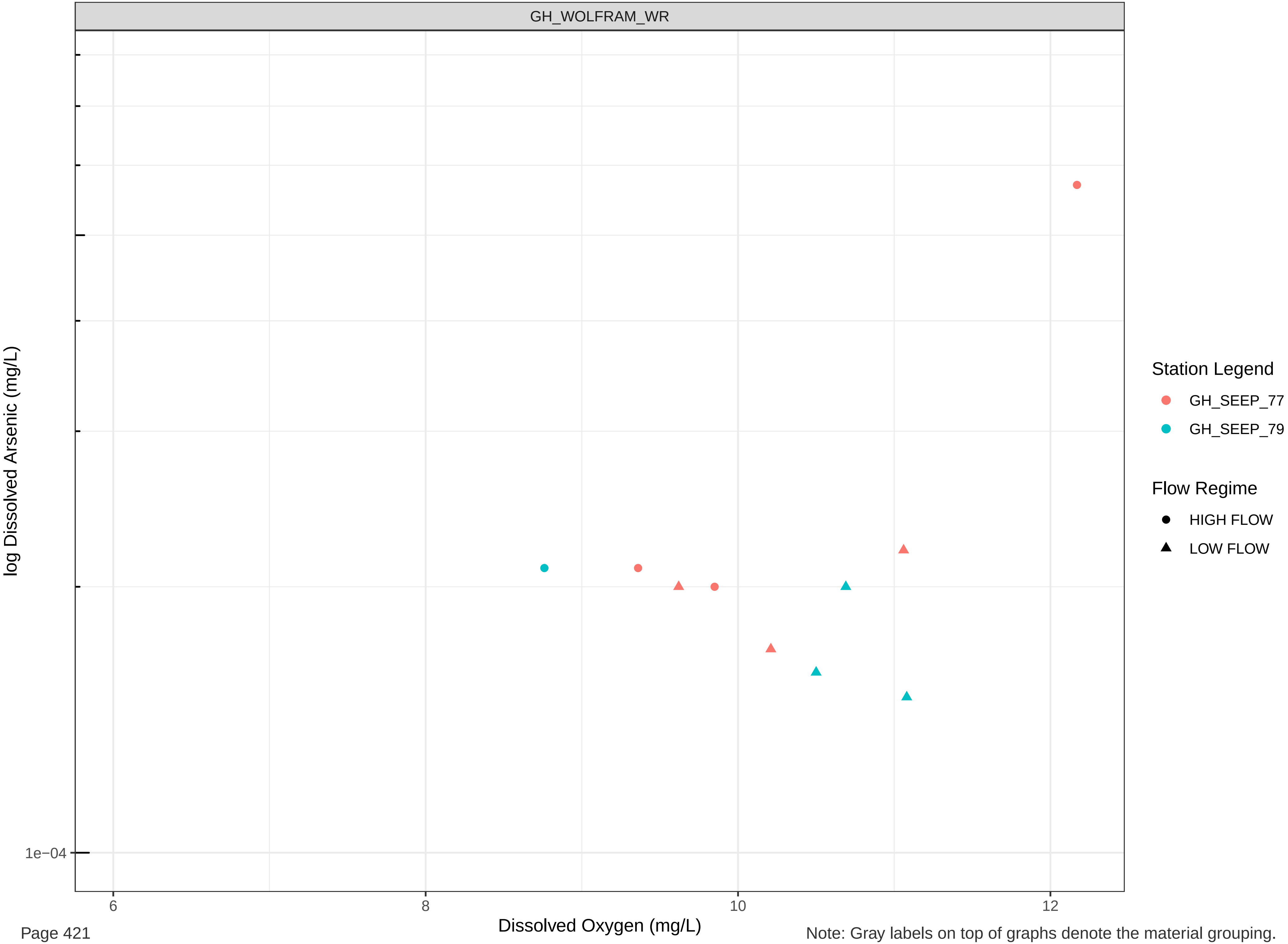

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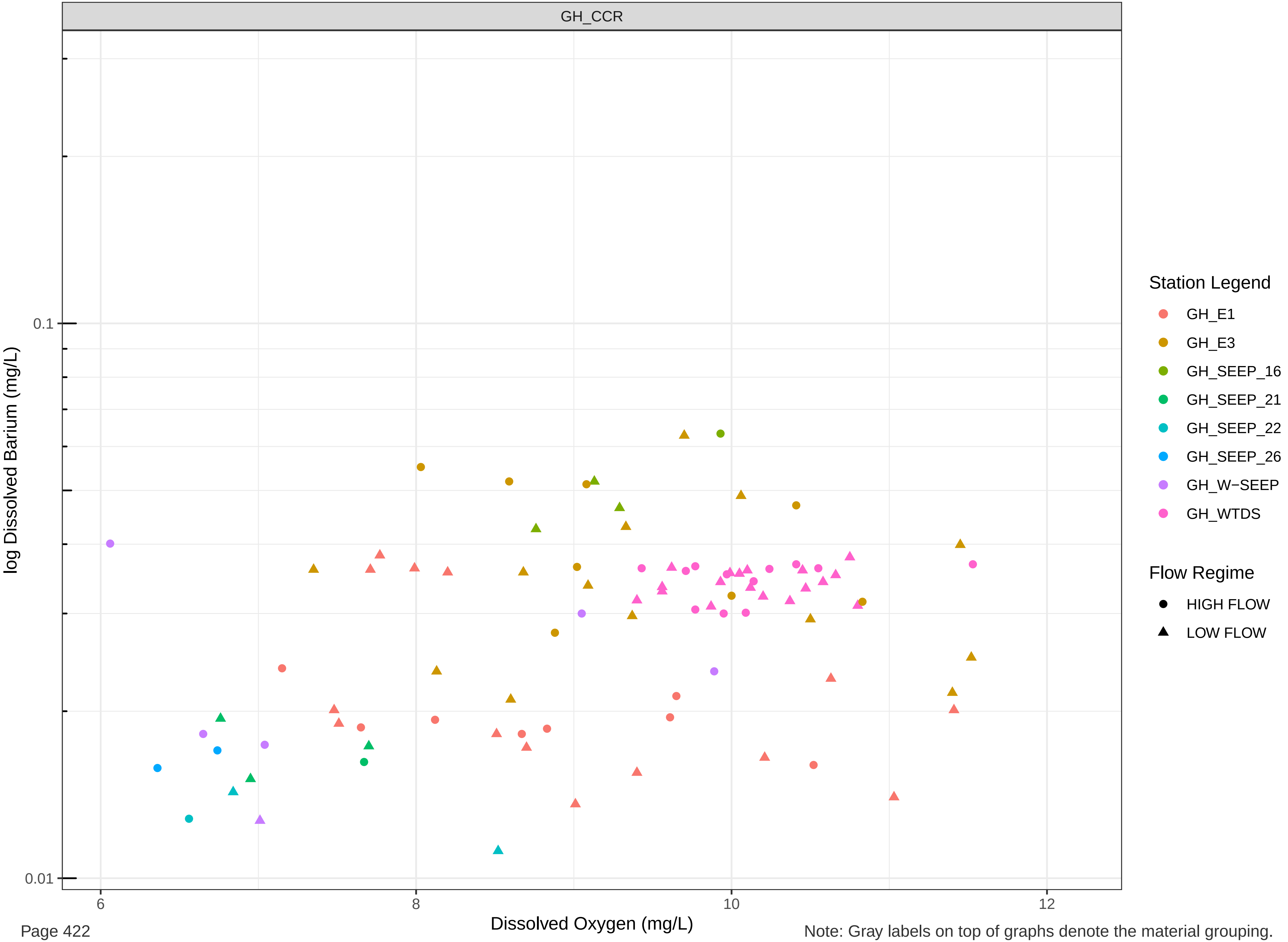
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Dissolved Oxygen (mg/L)
Station Legend
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GH_E3
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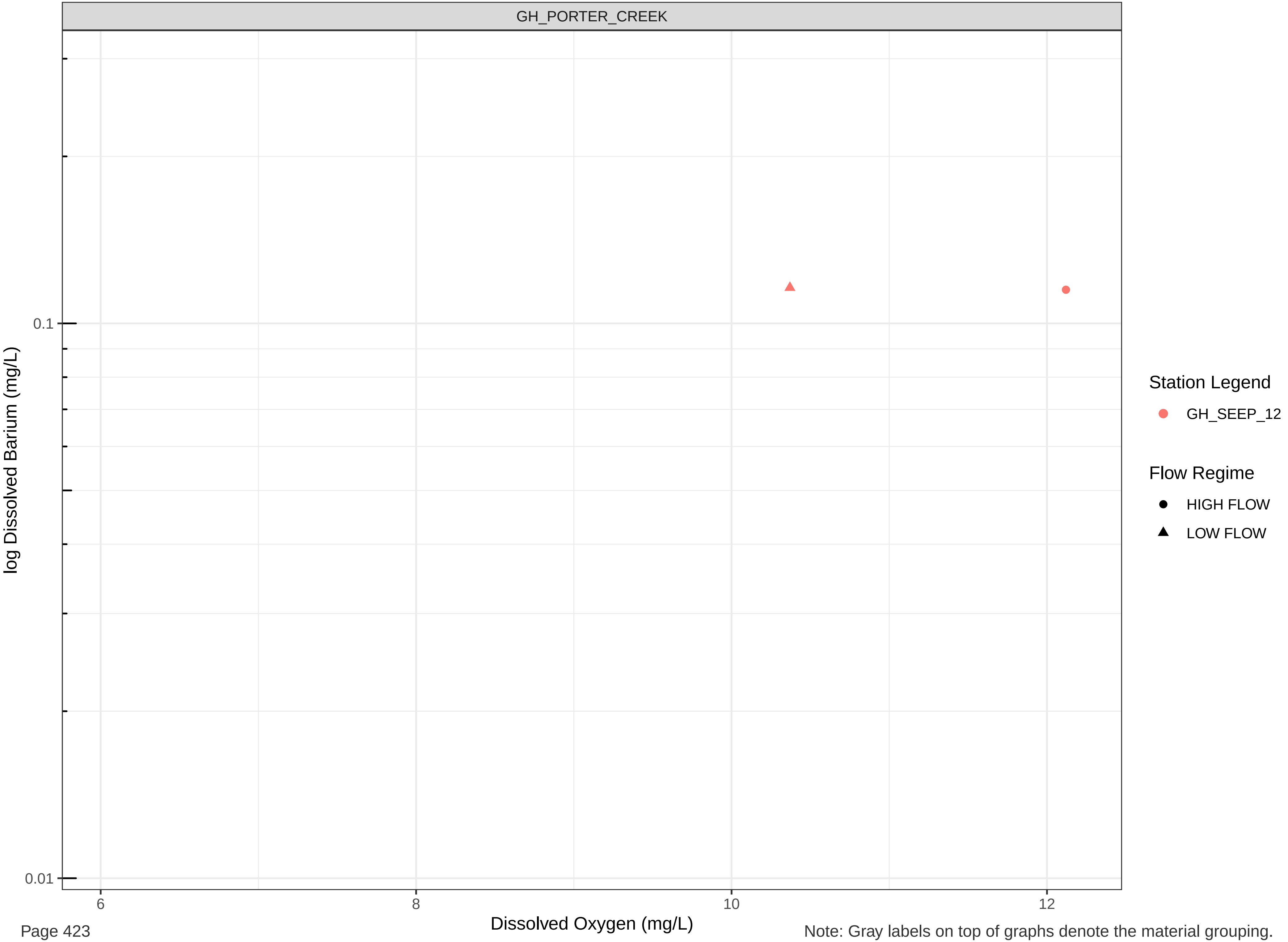
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



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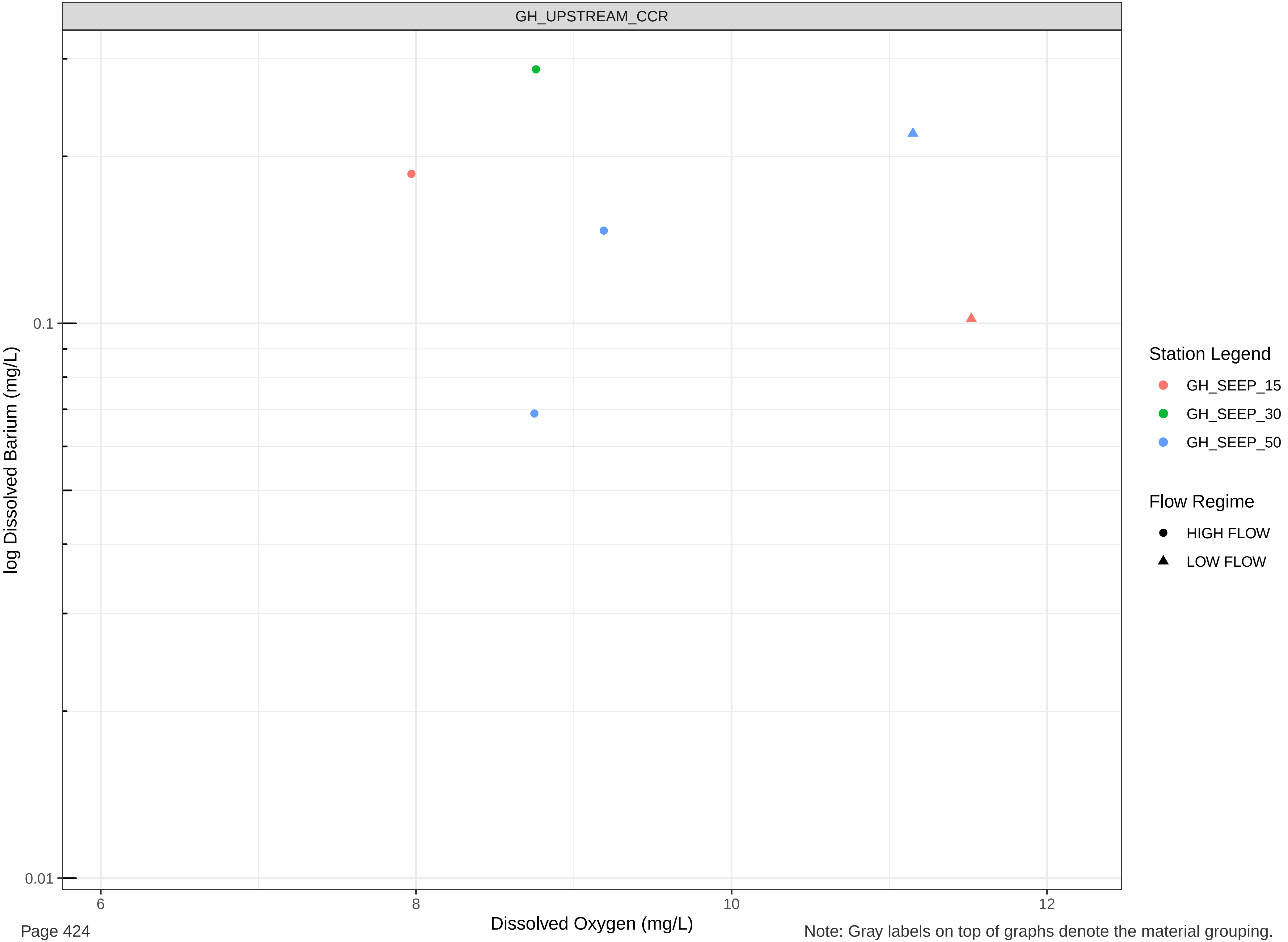

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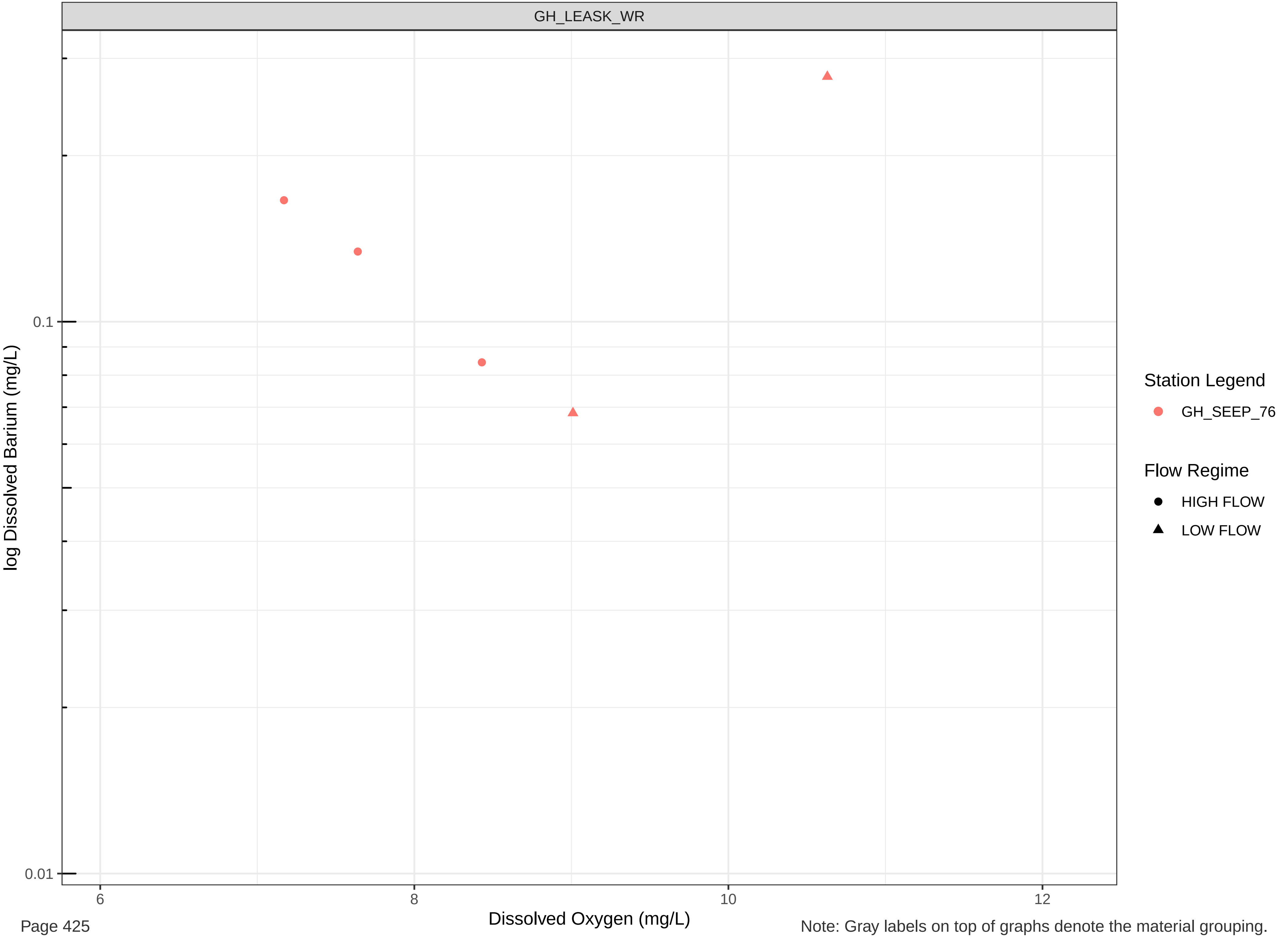

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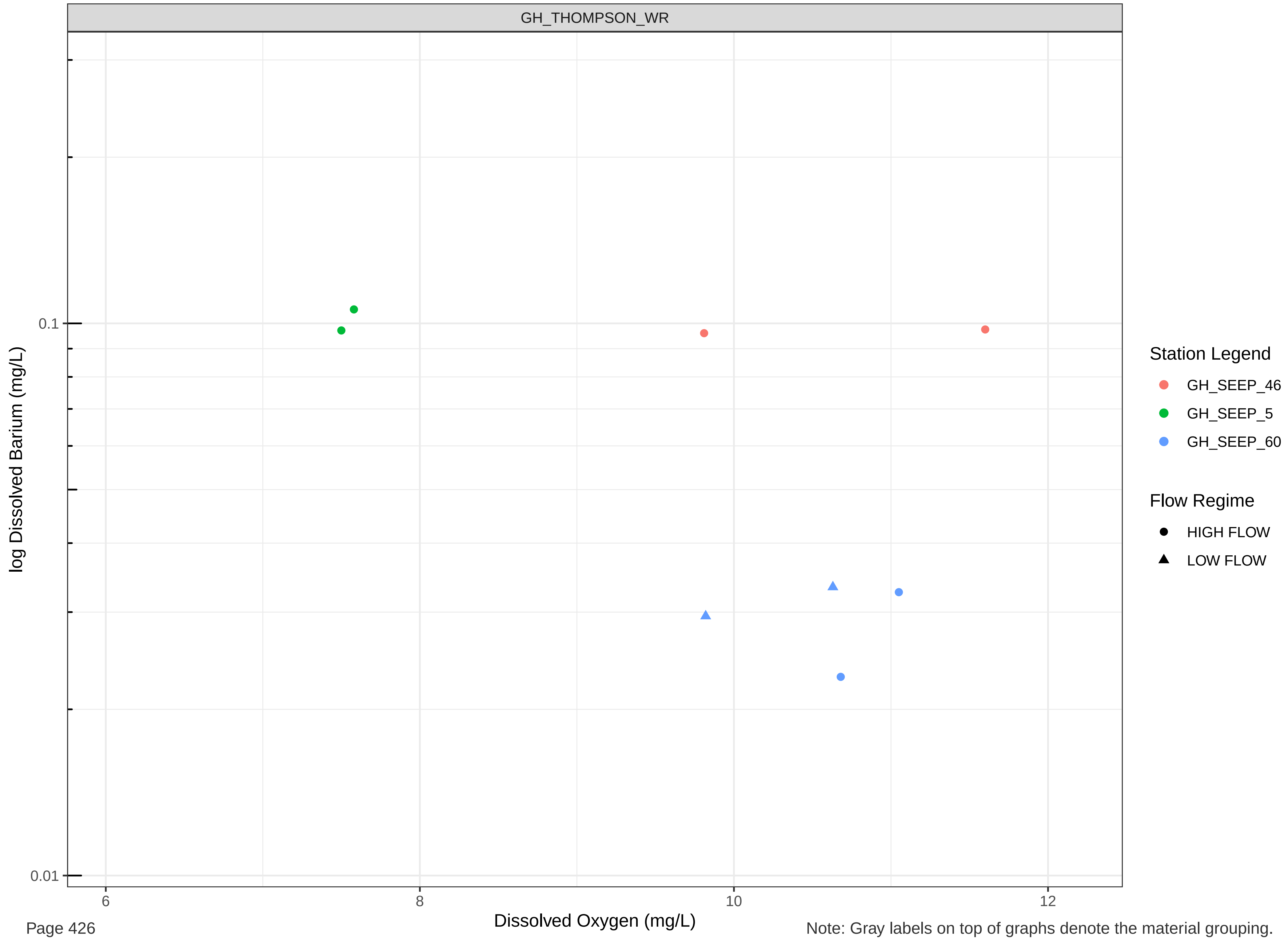

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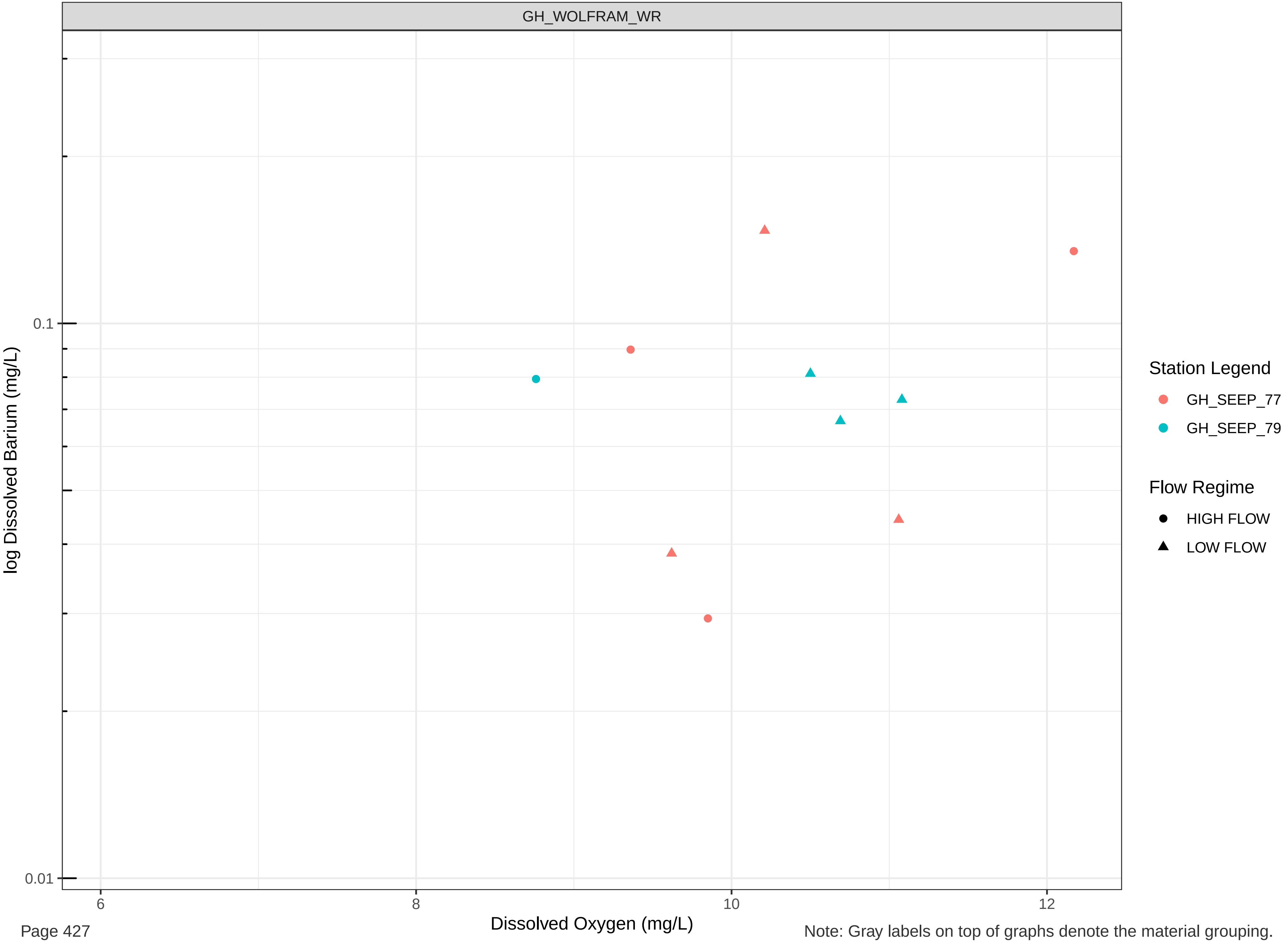

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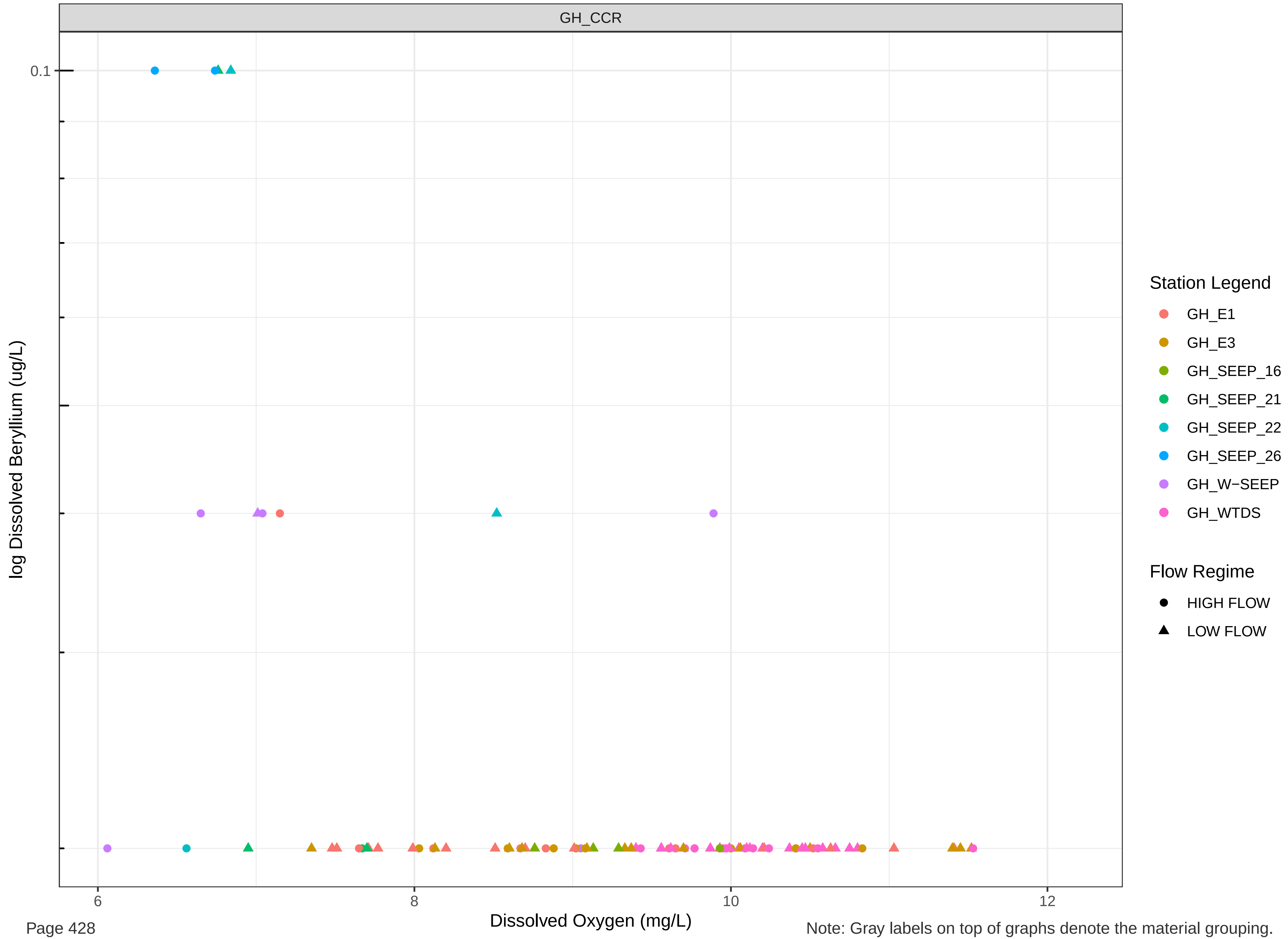

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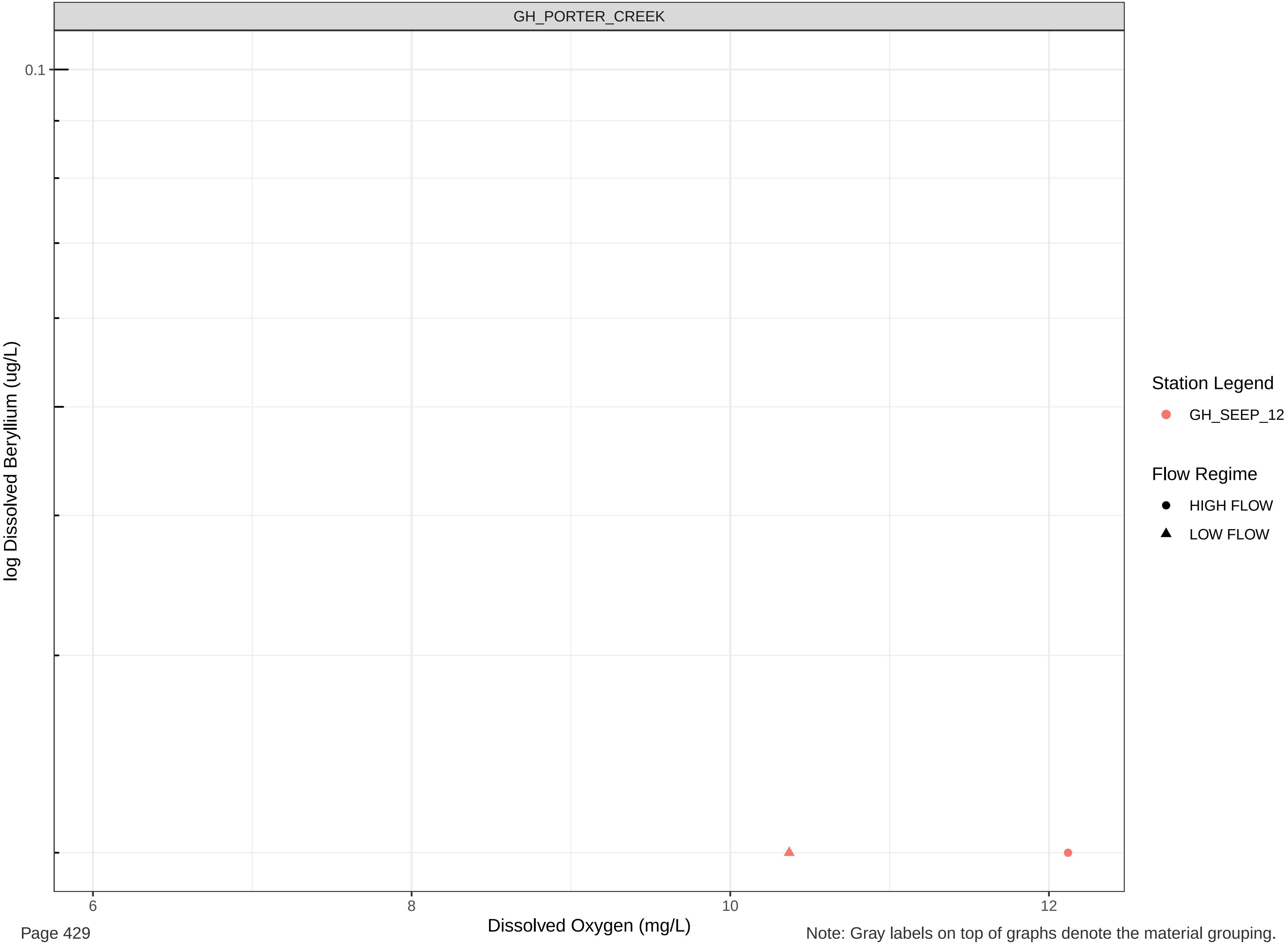

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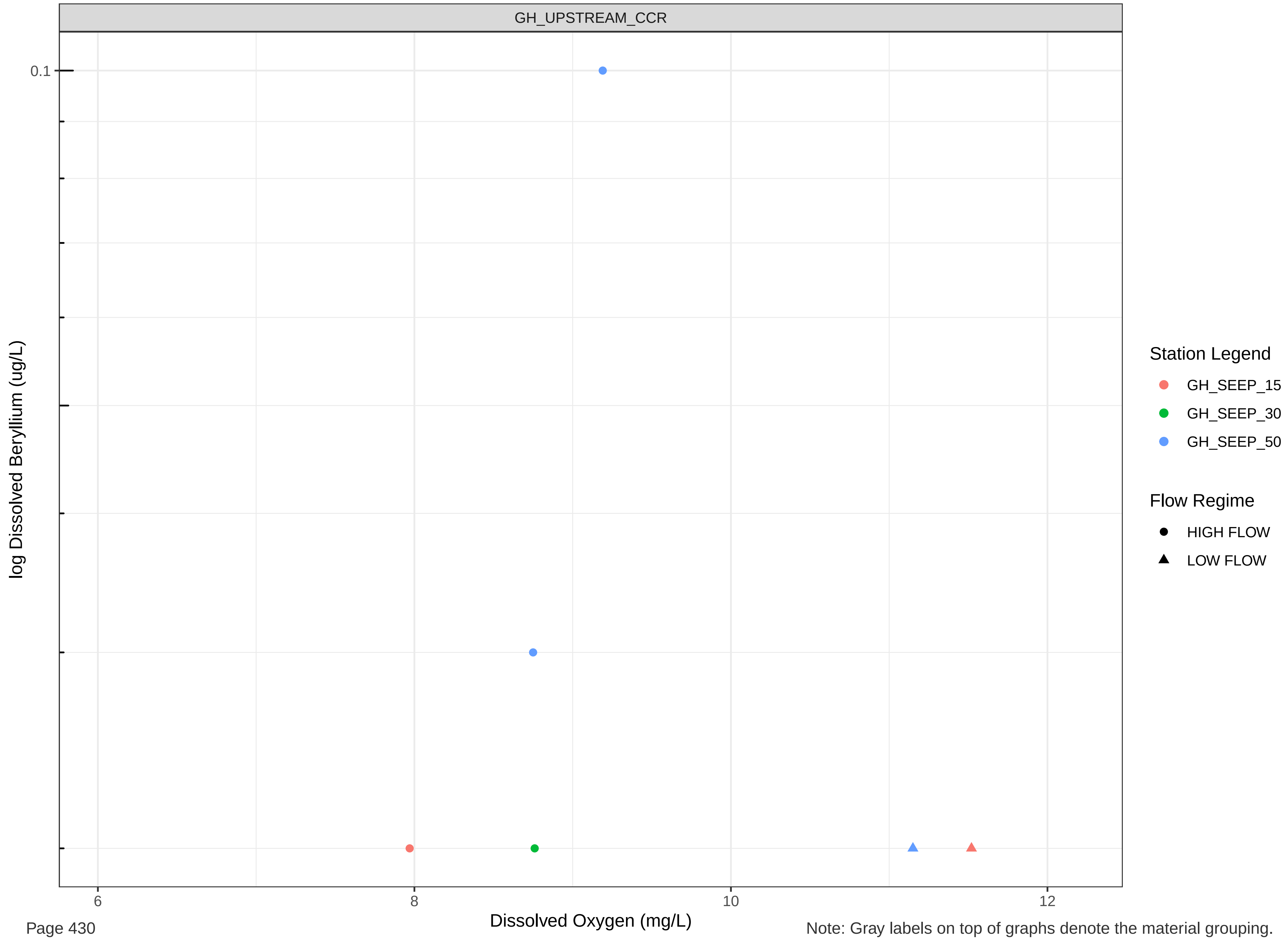

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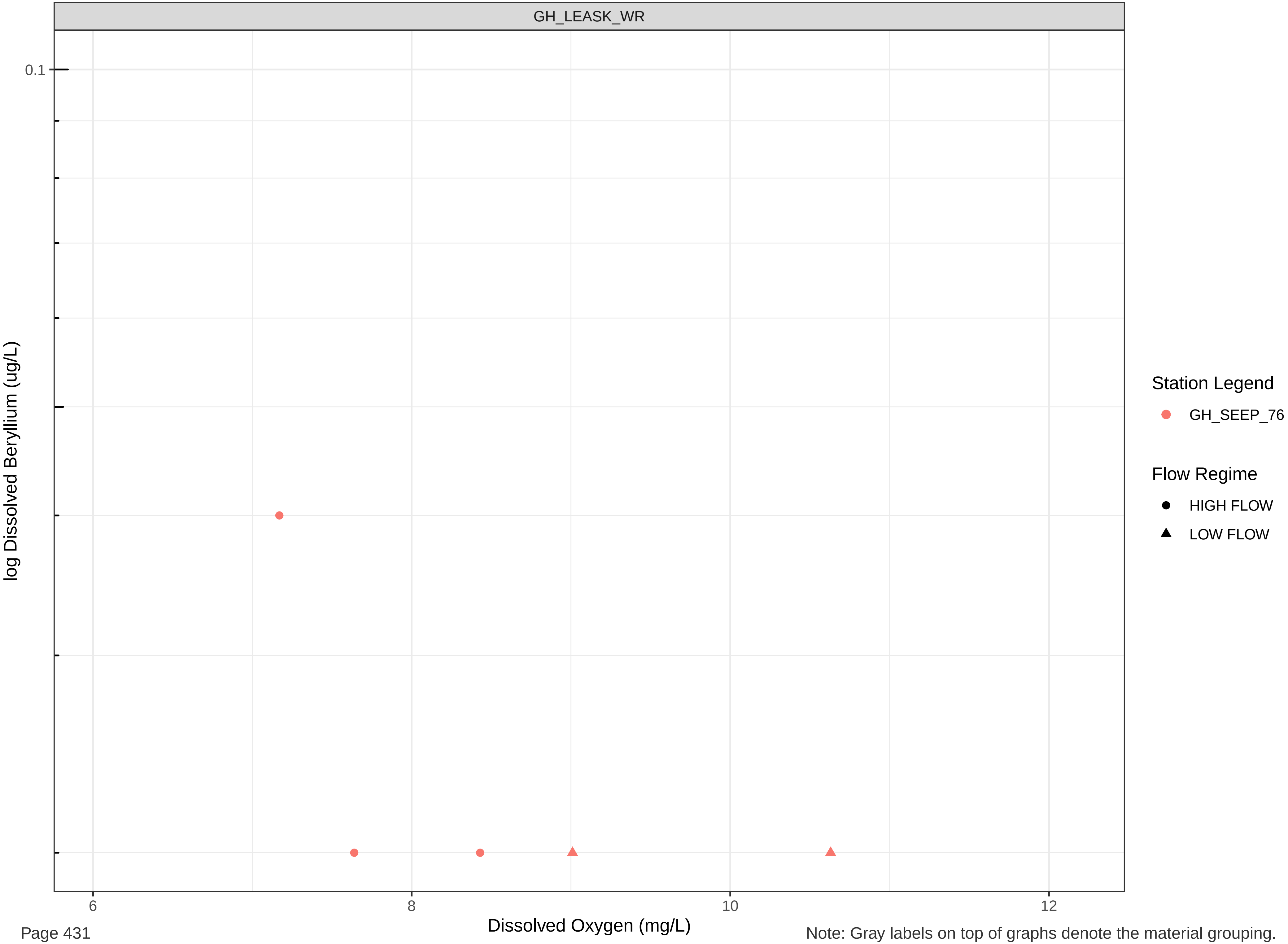

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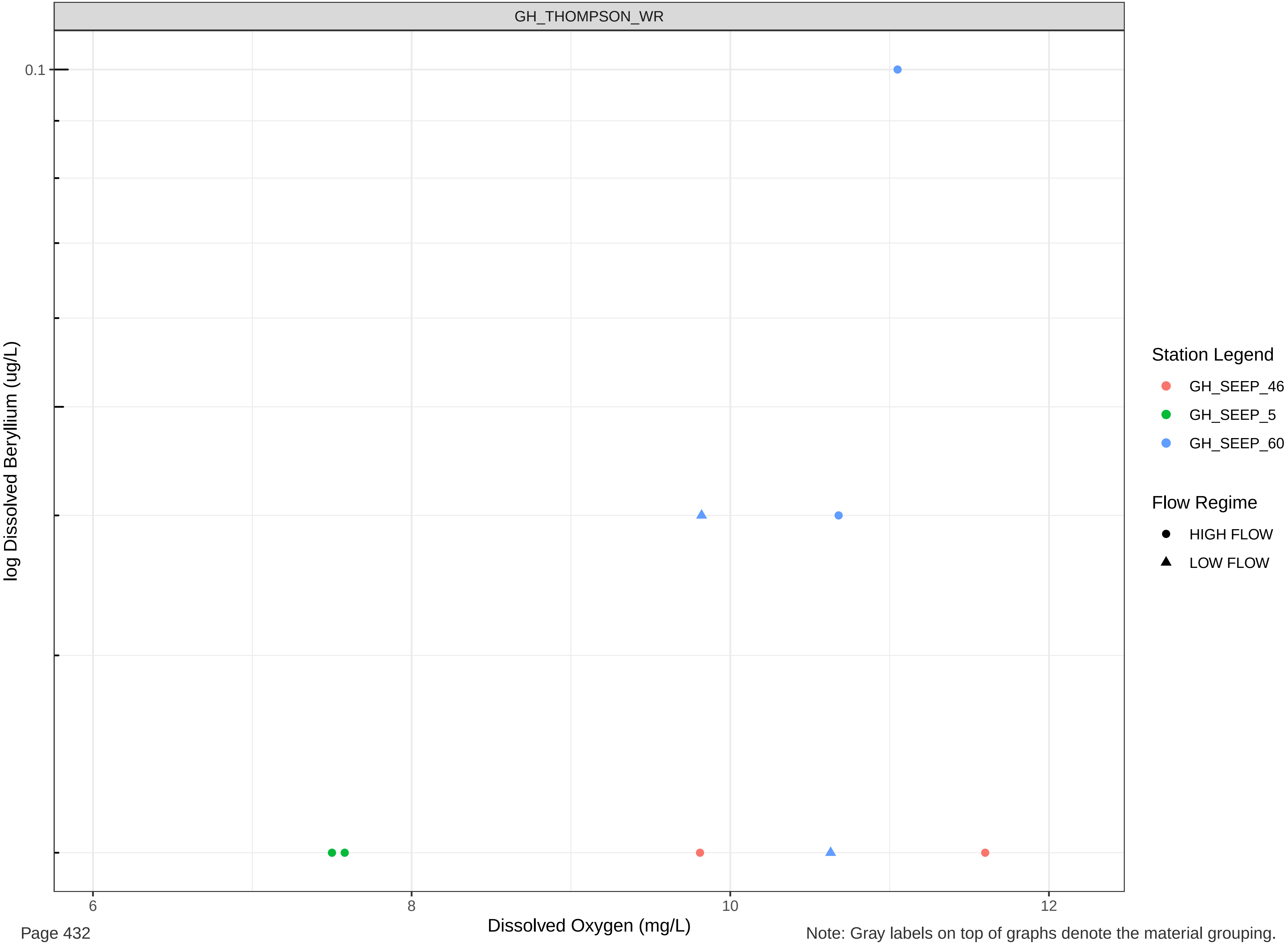

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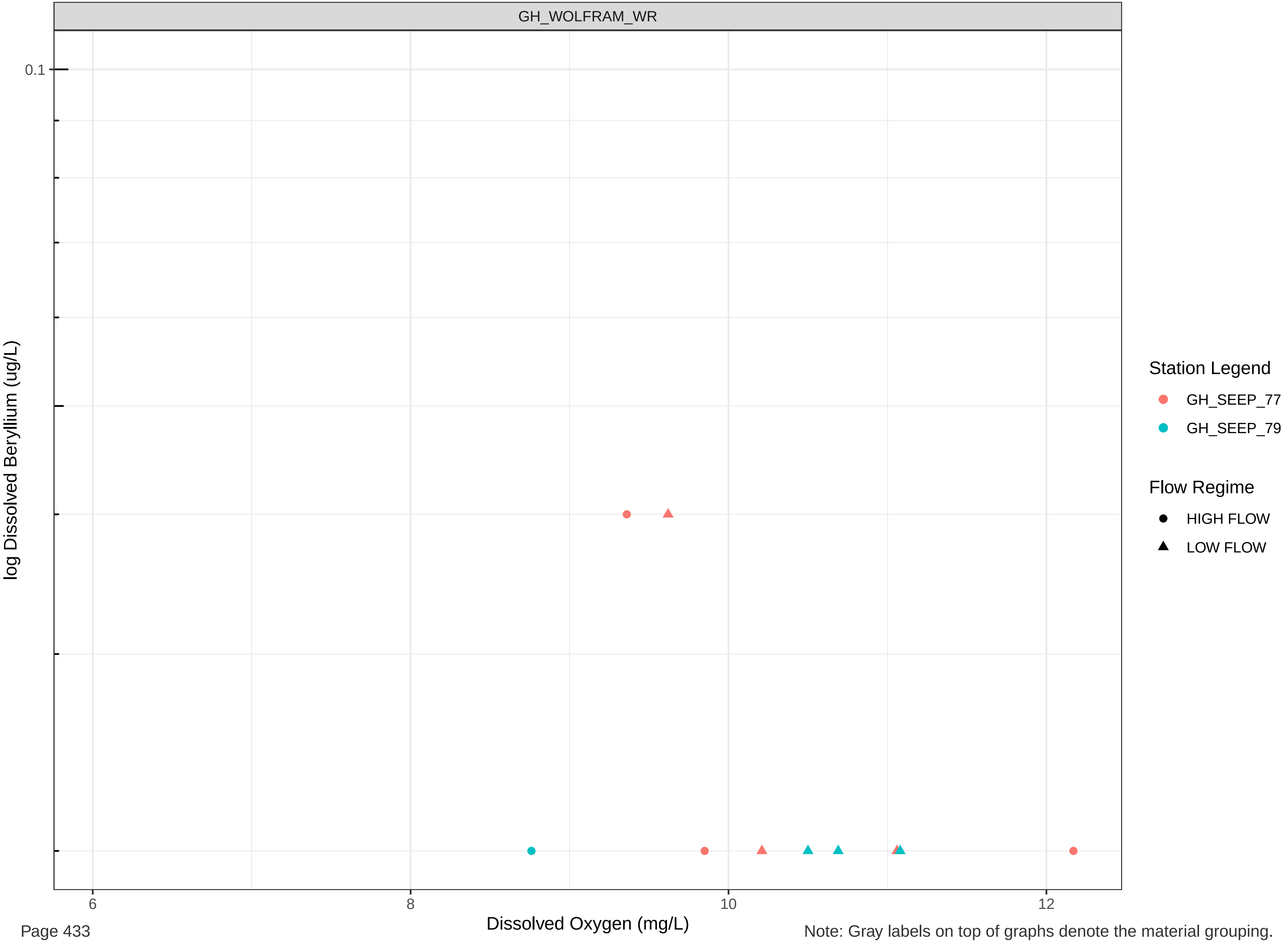

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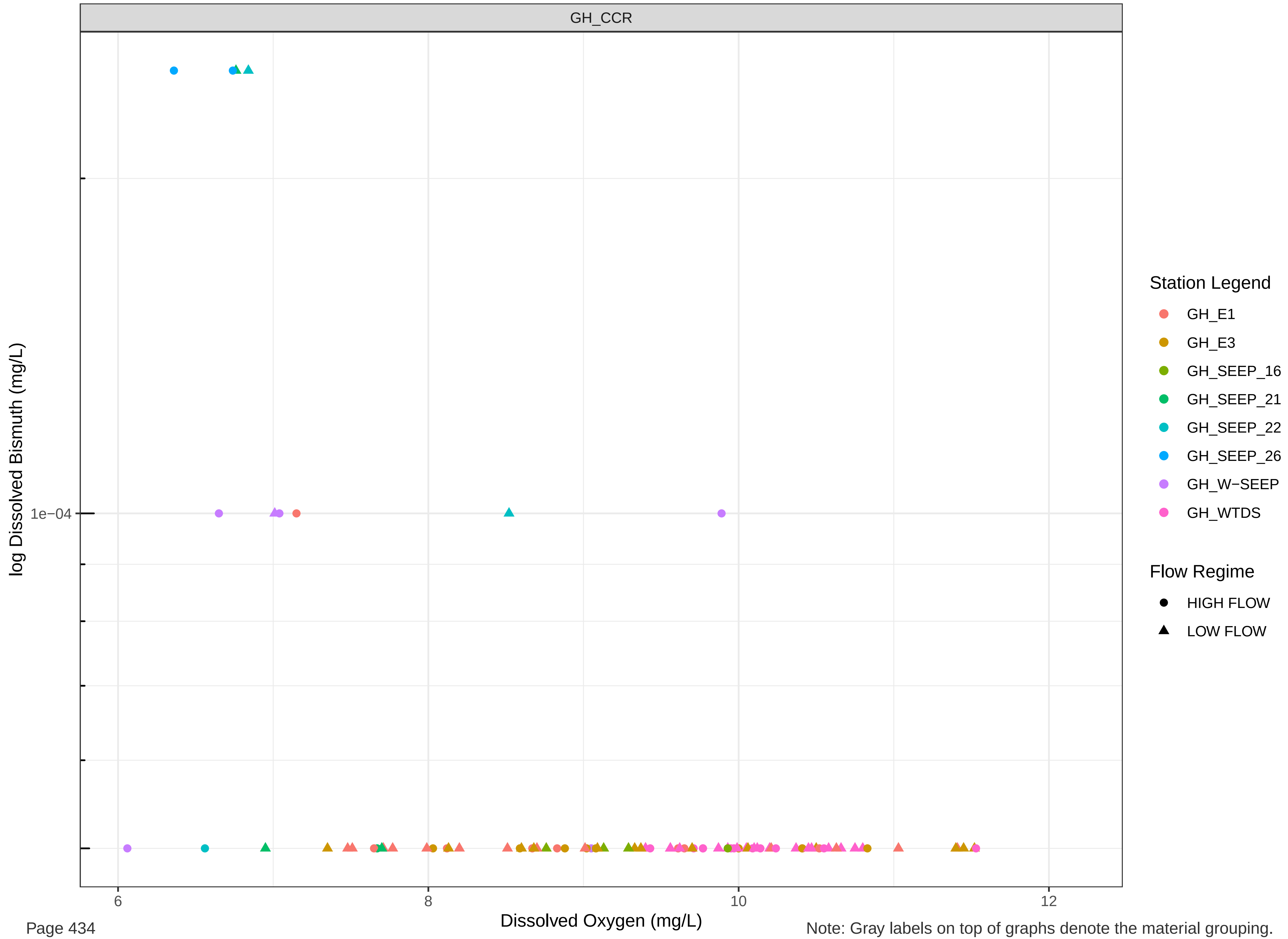

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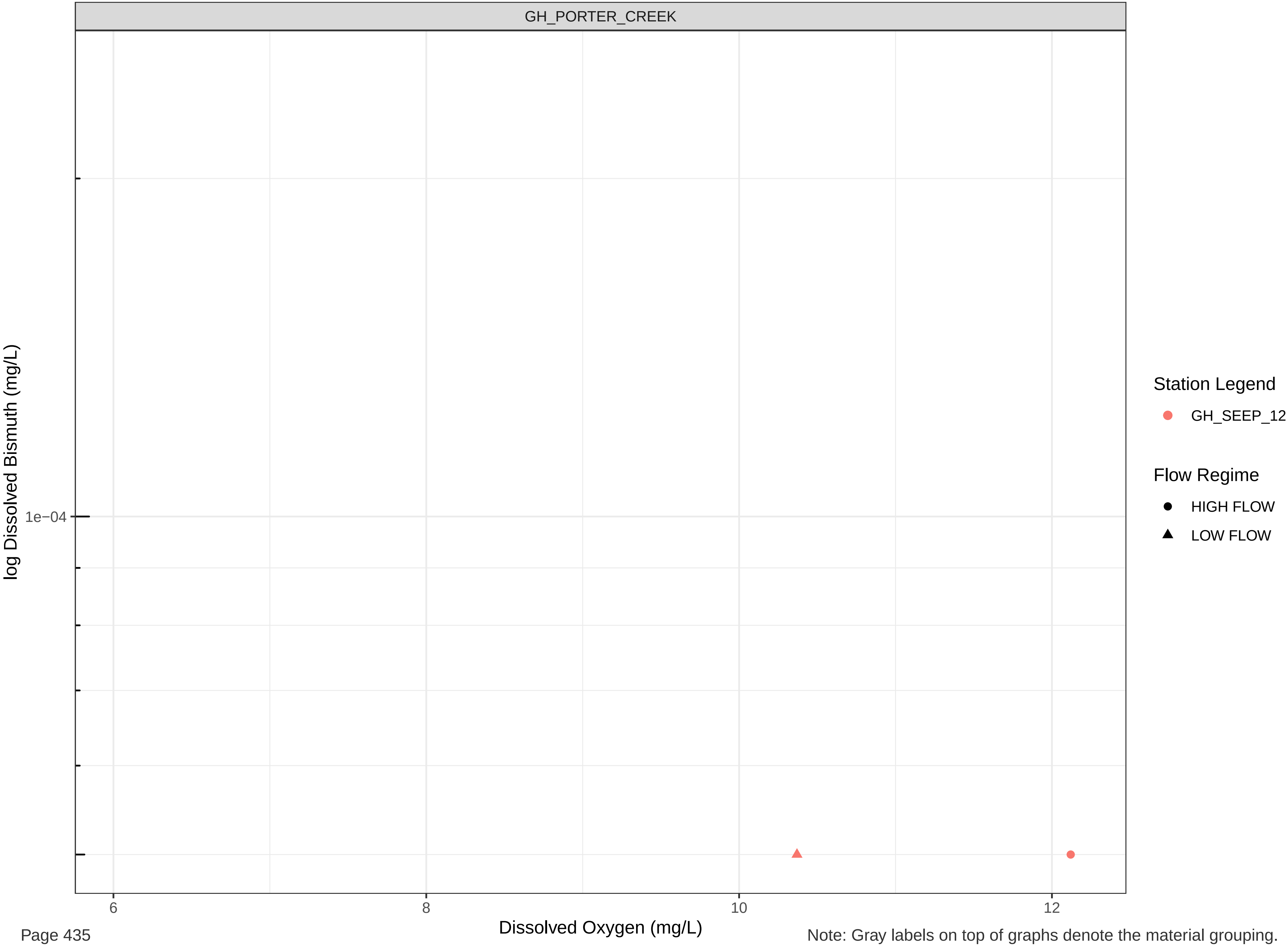

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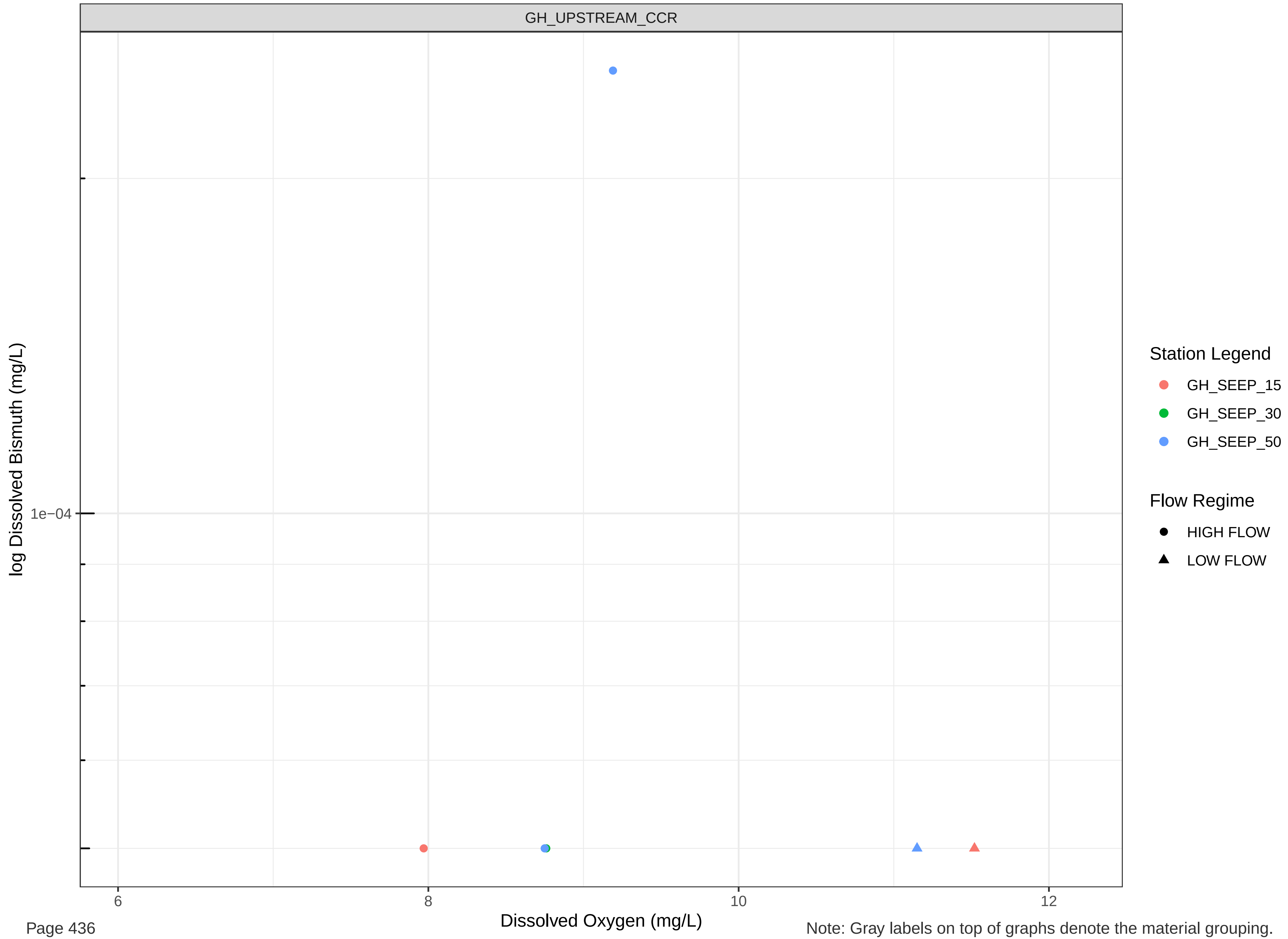

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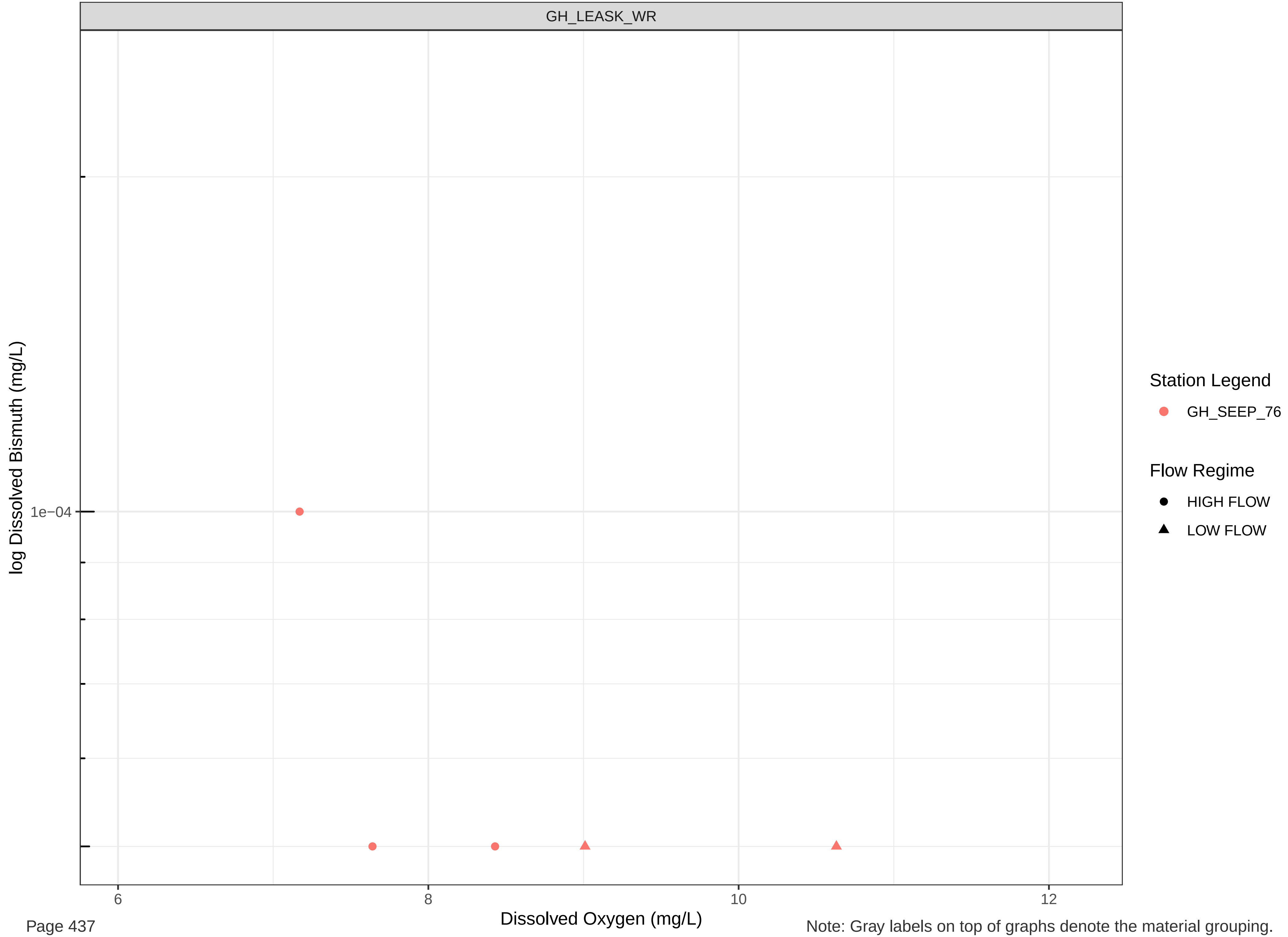

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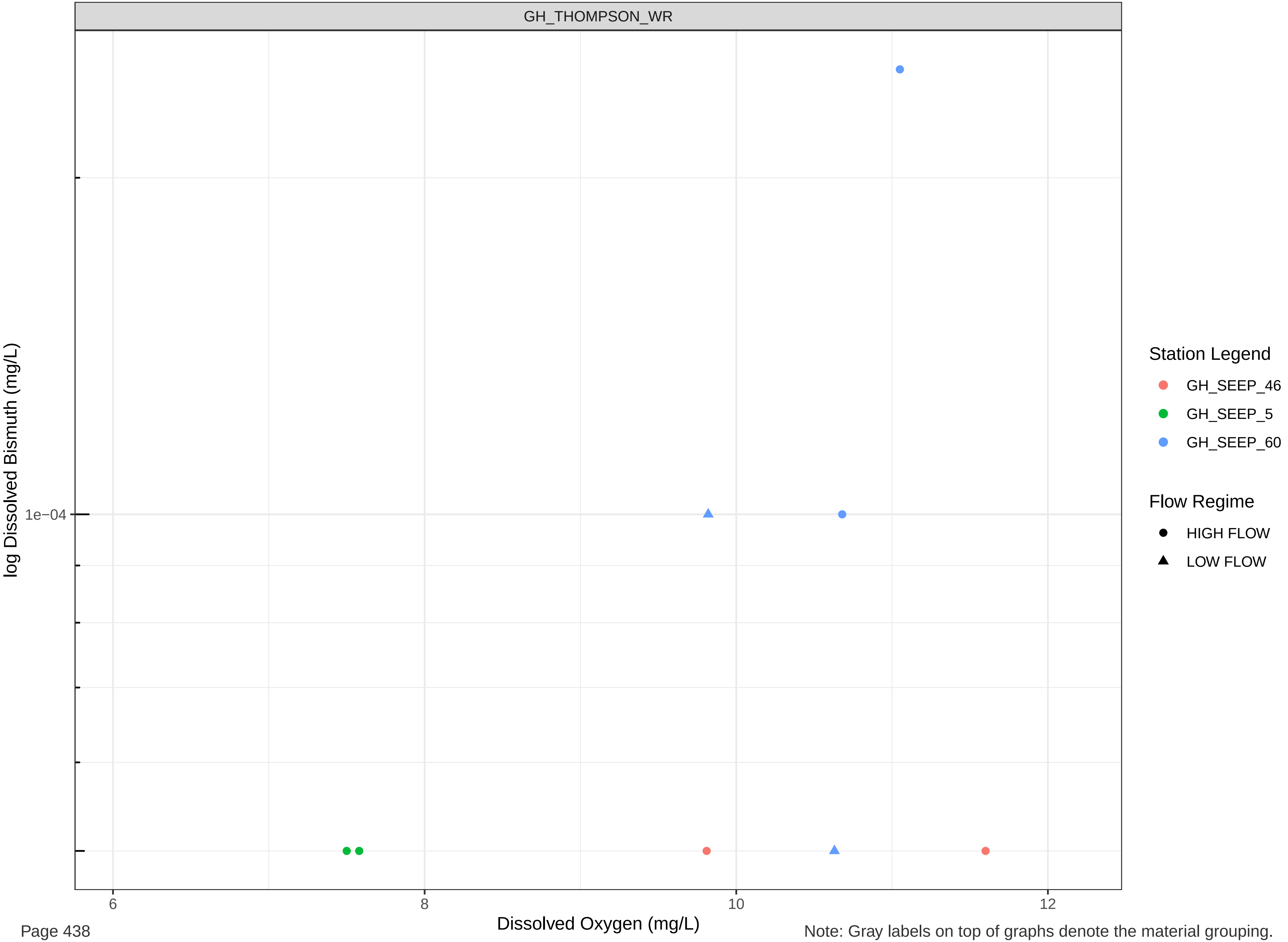

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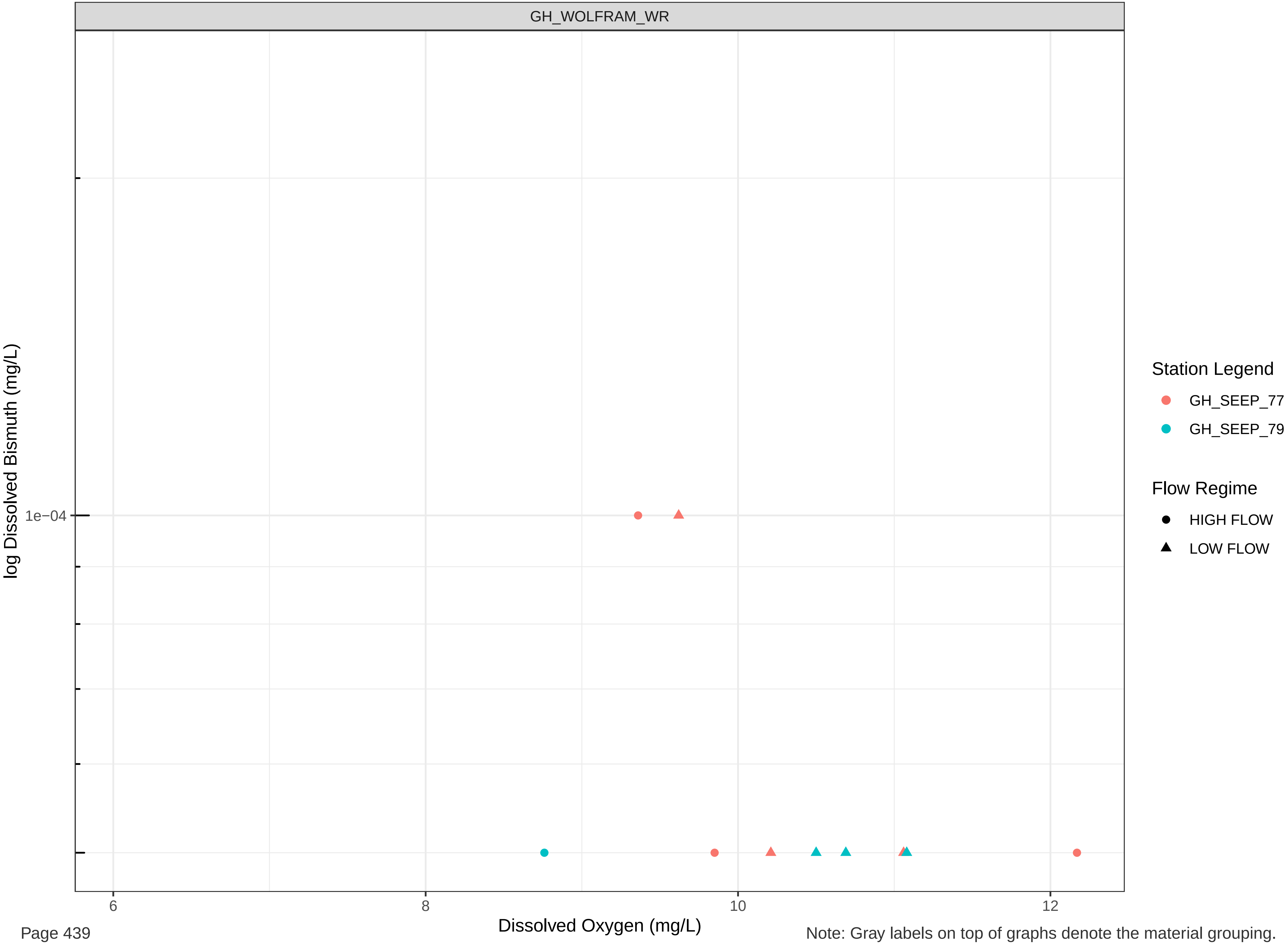

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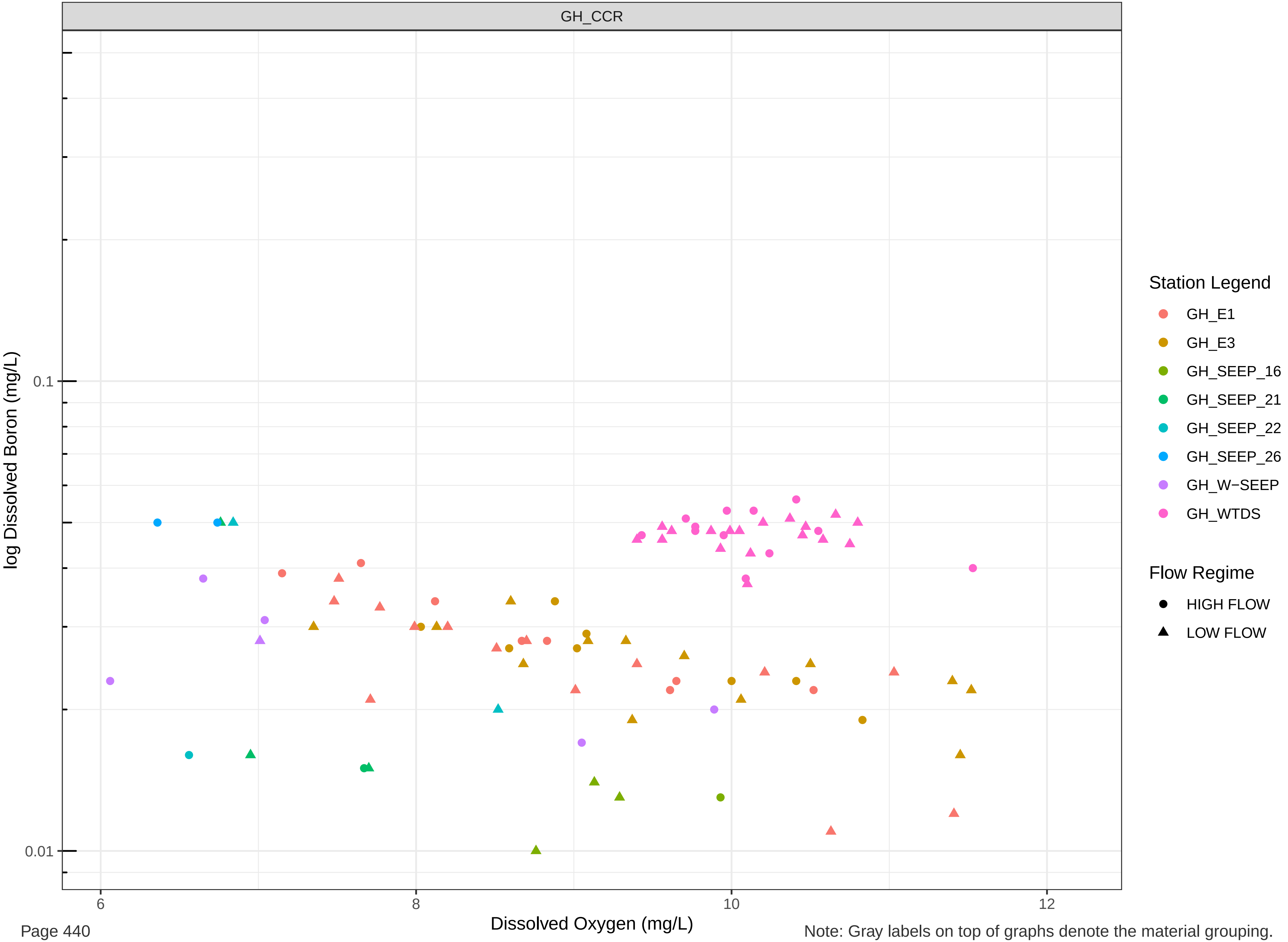

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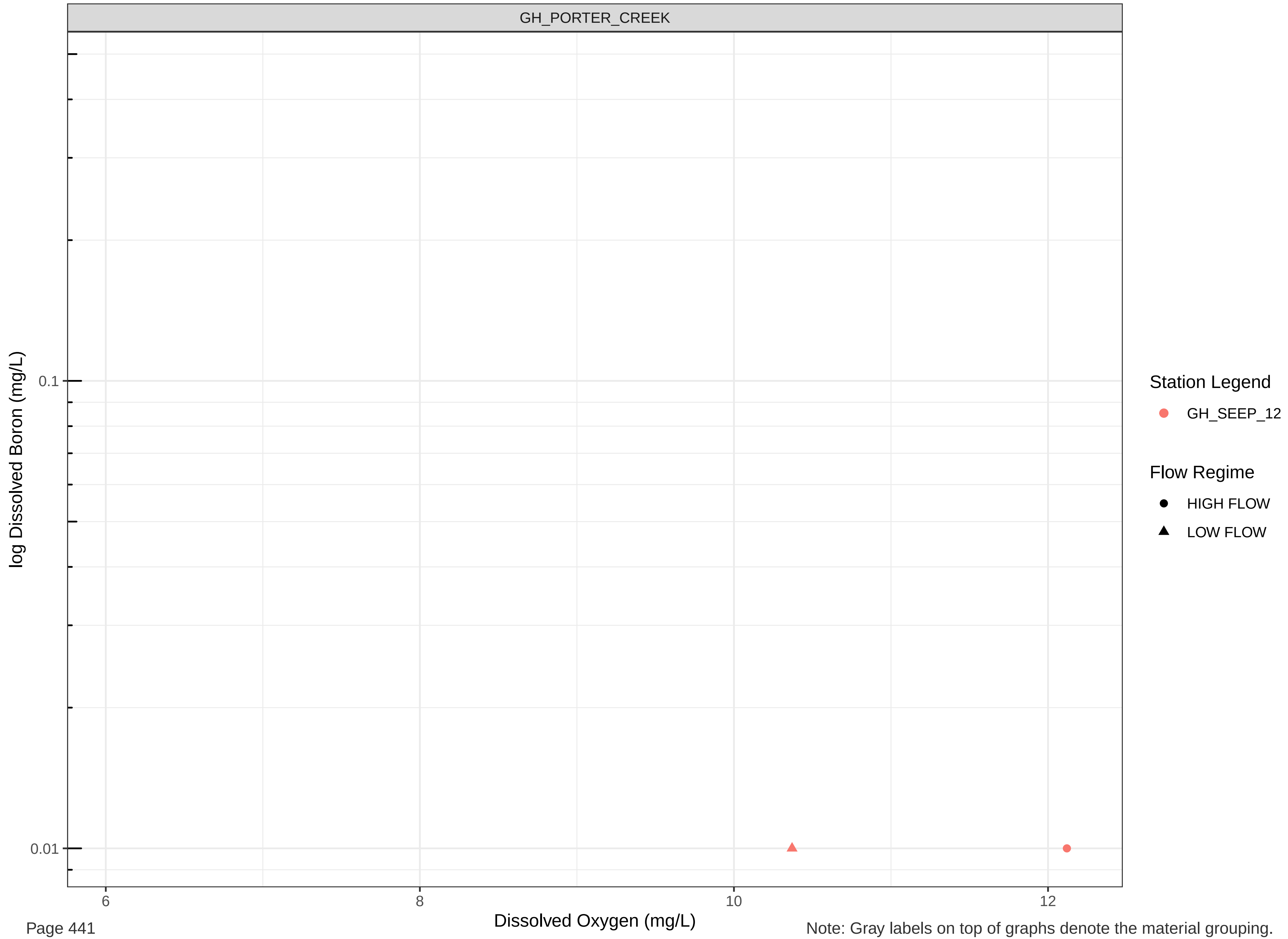

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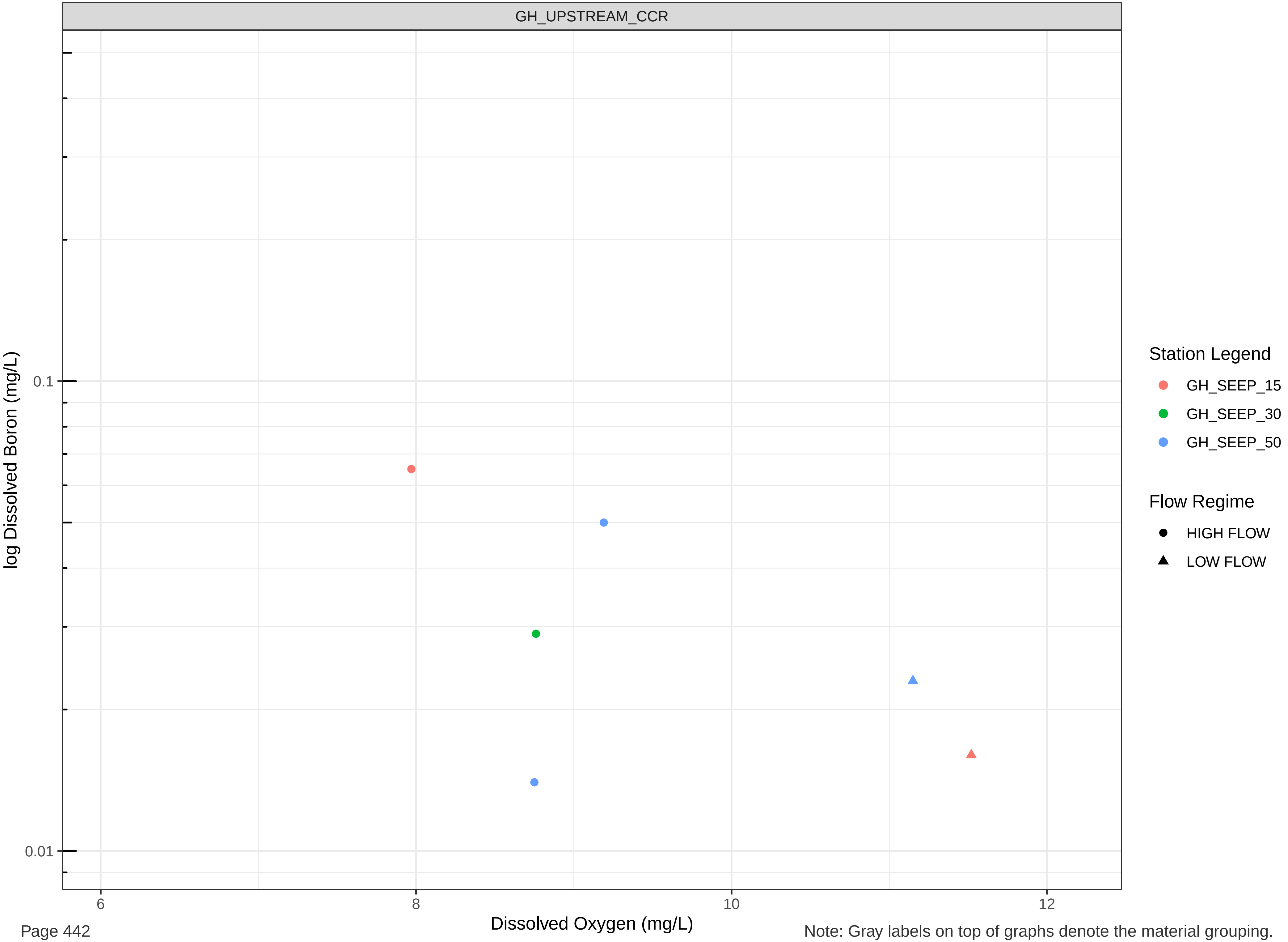

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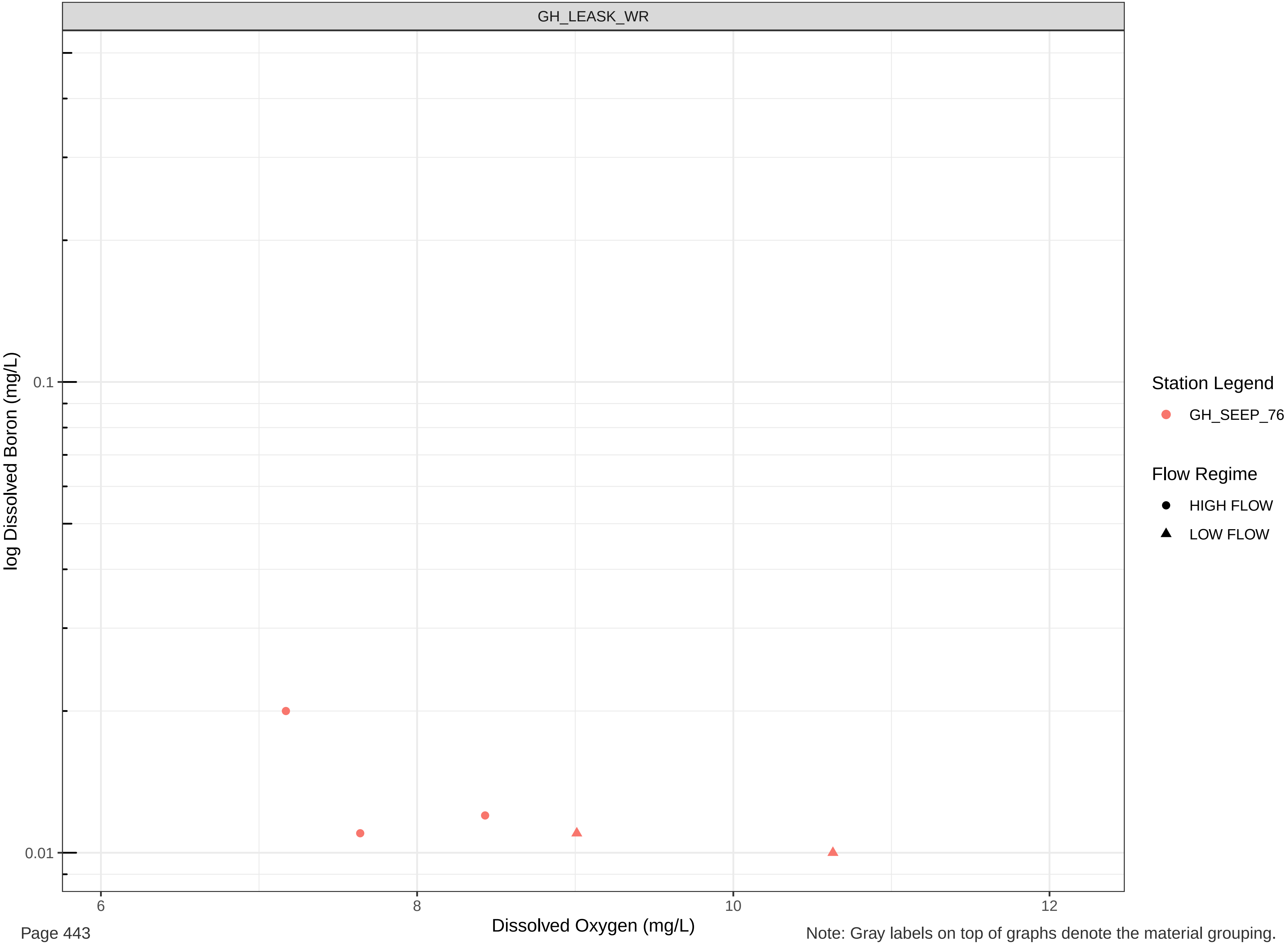

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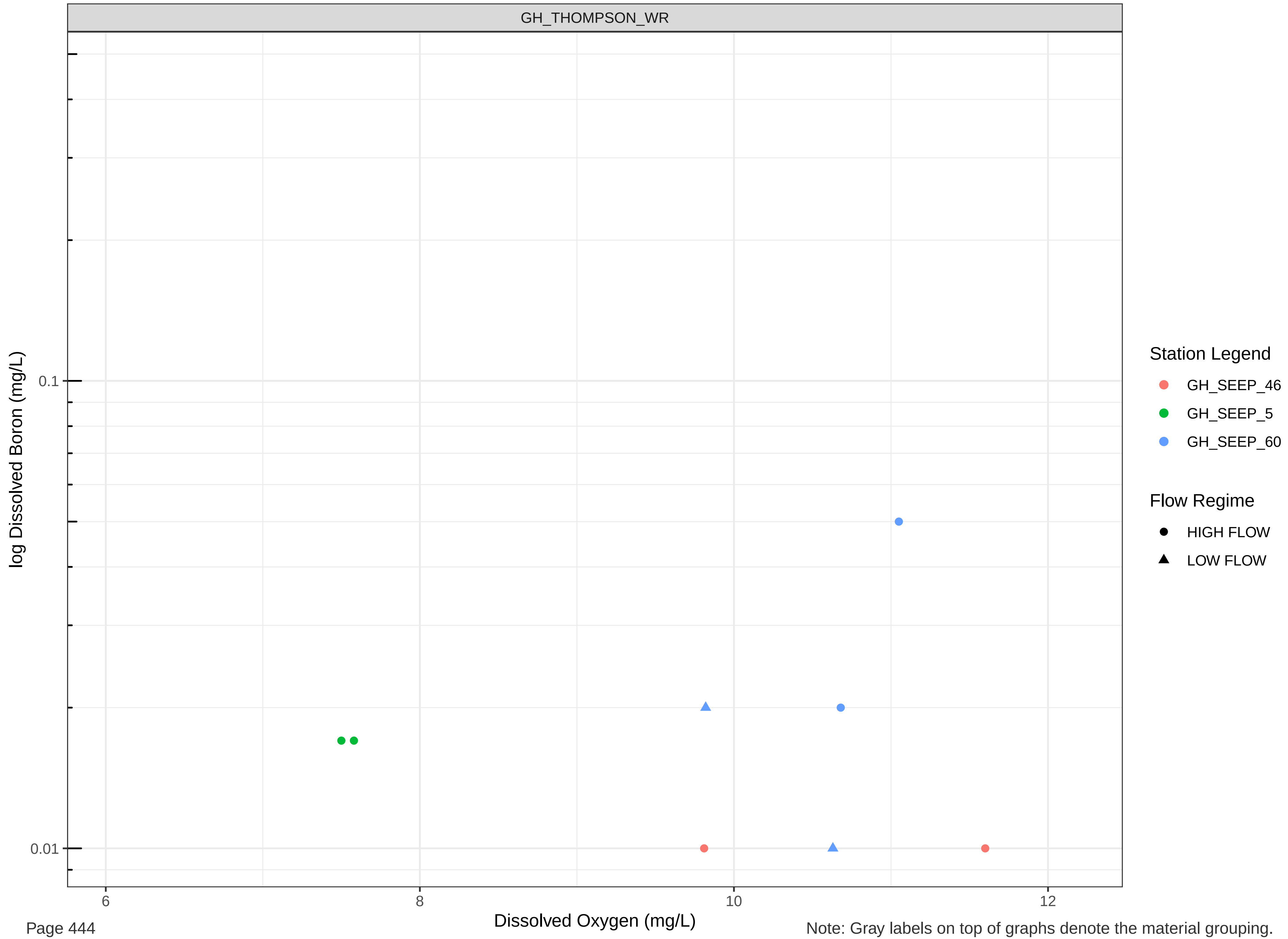

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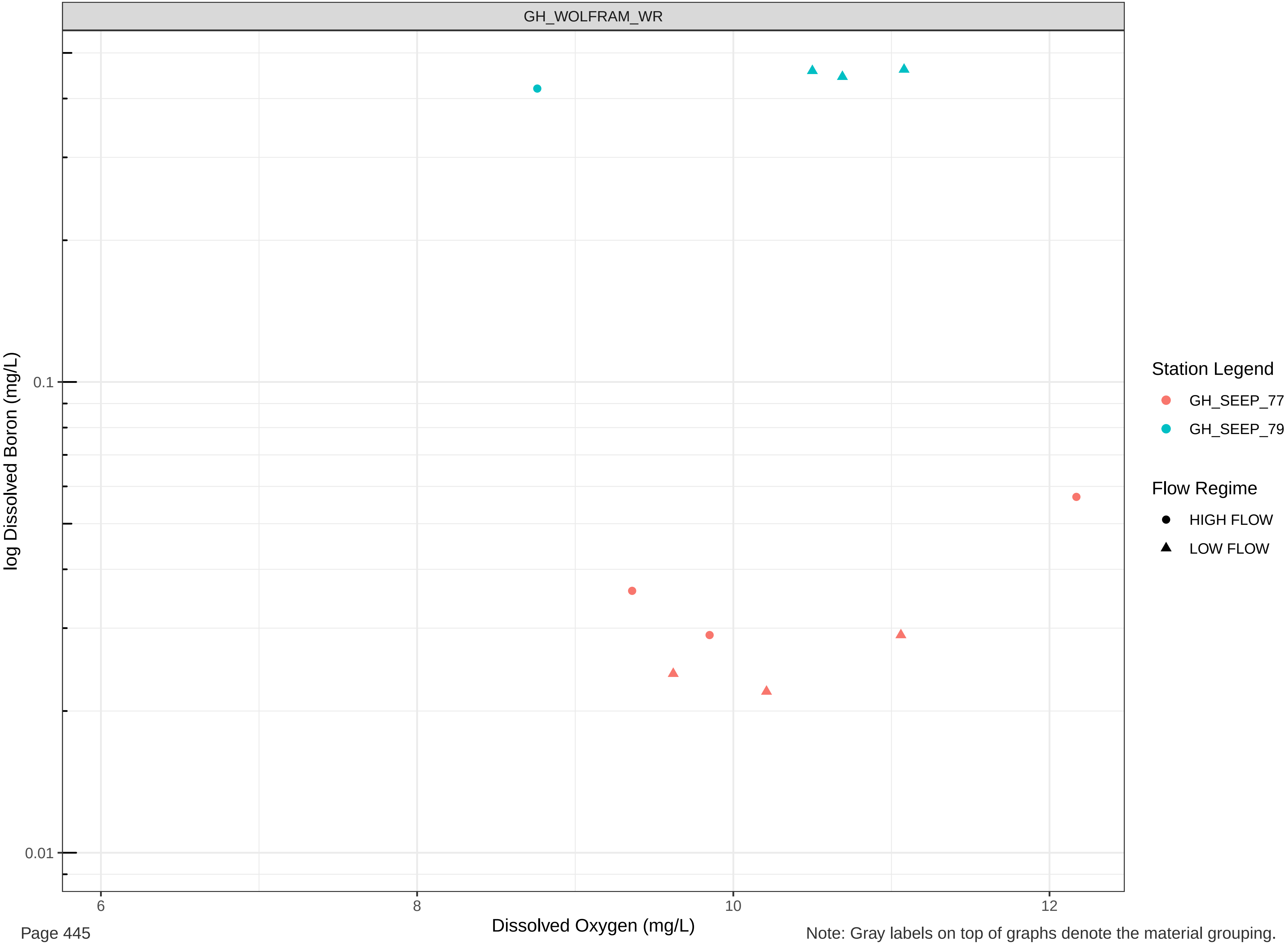

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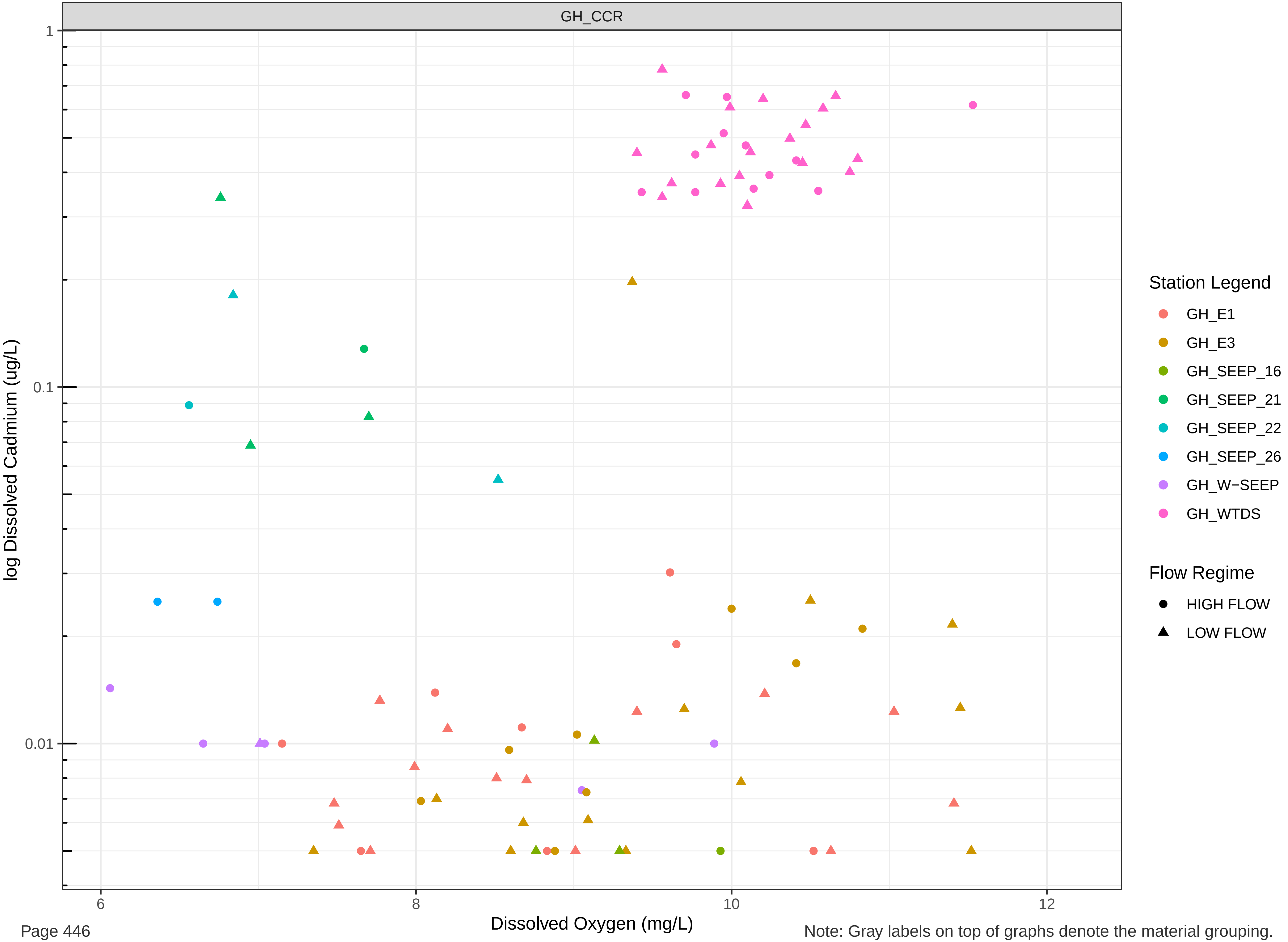

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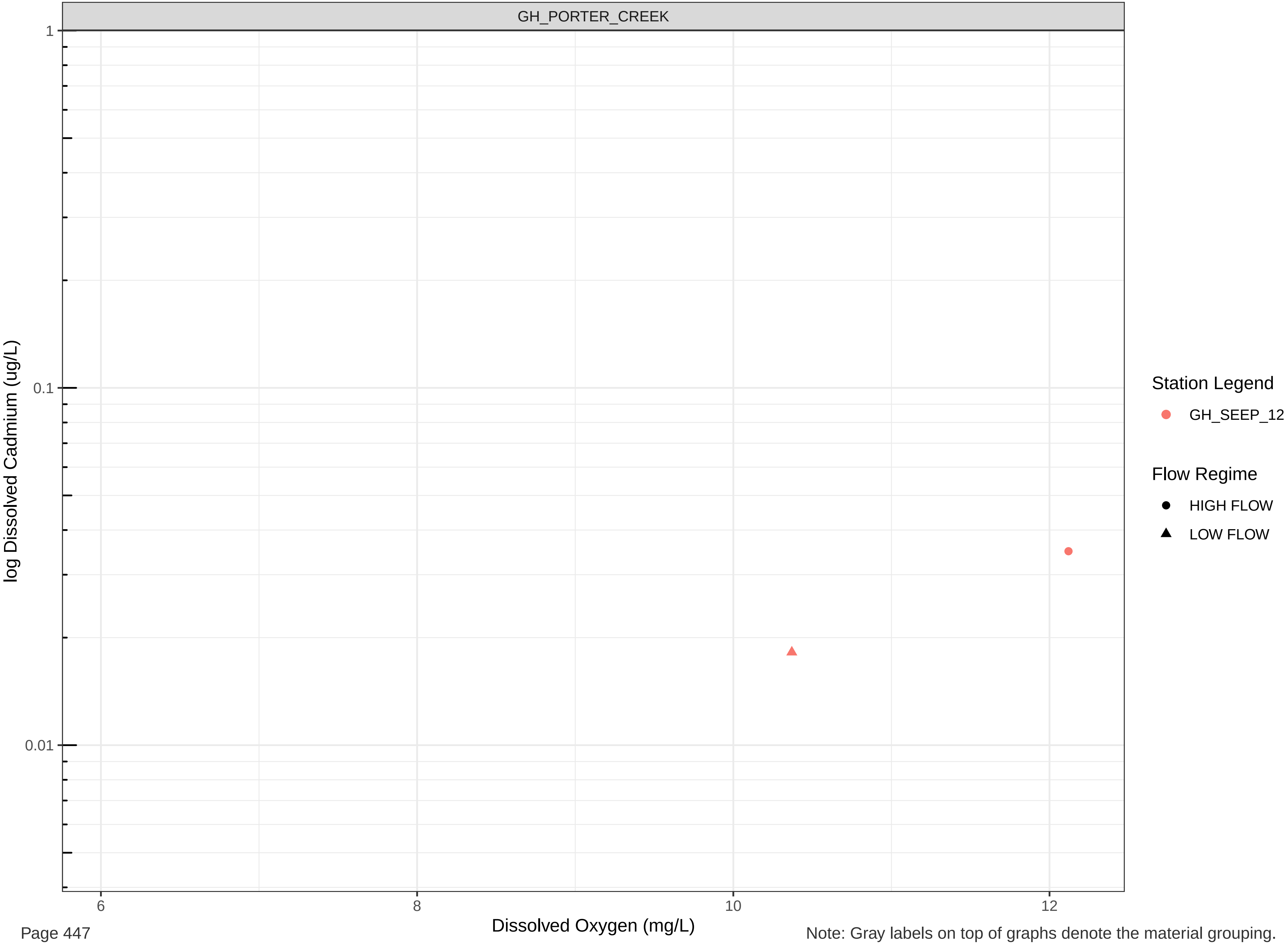

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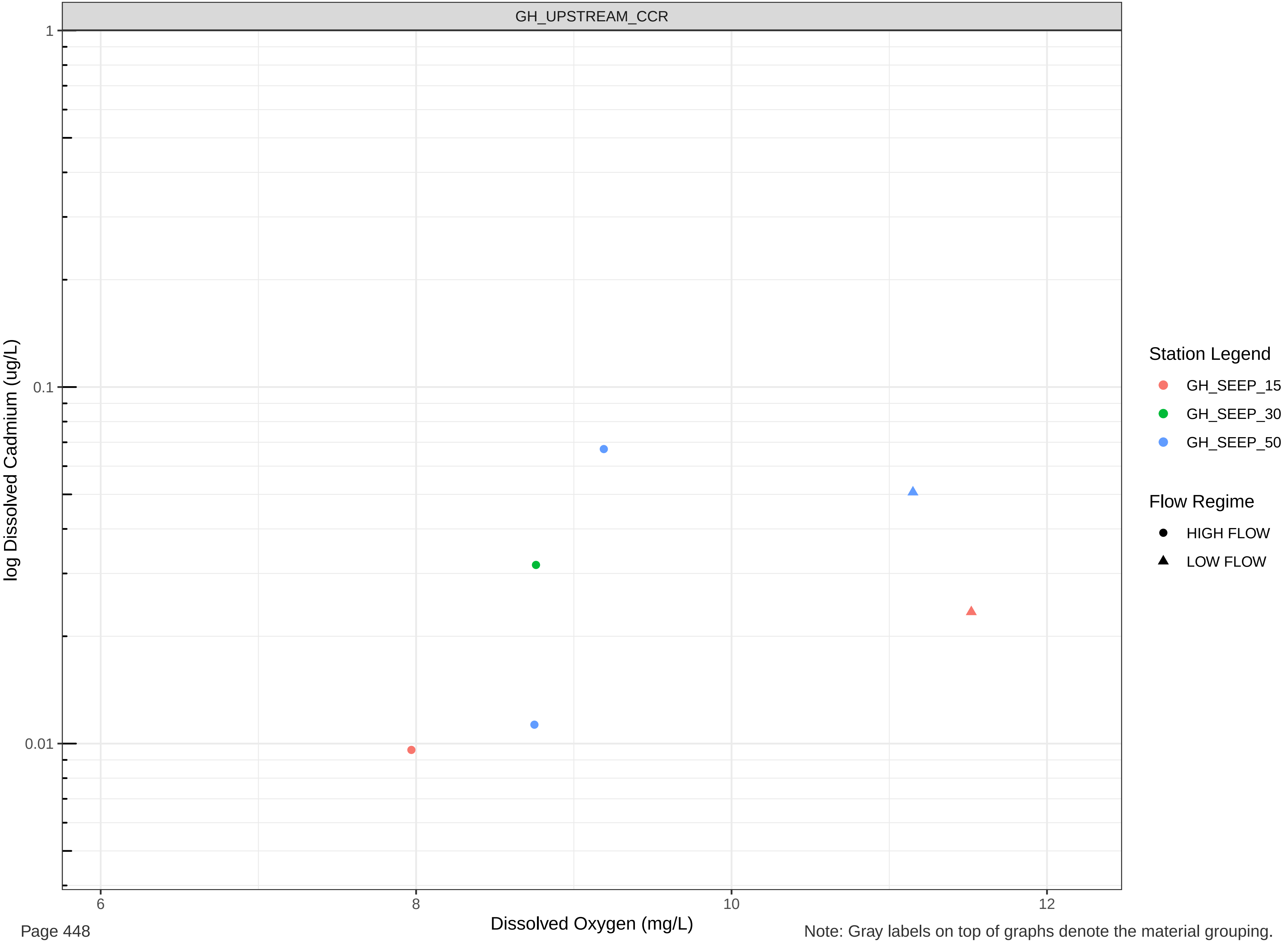

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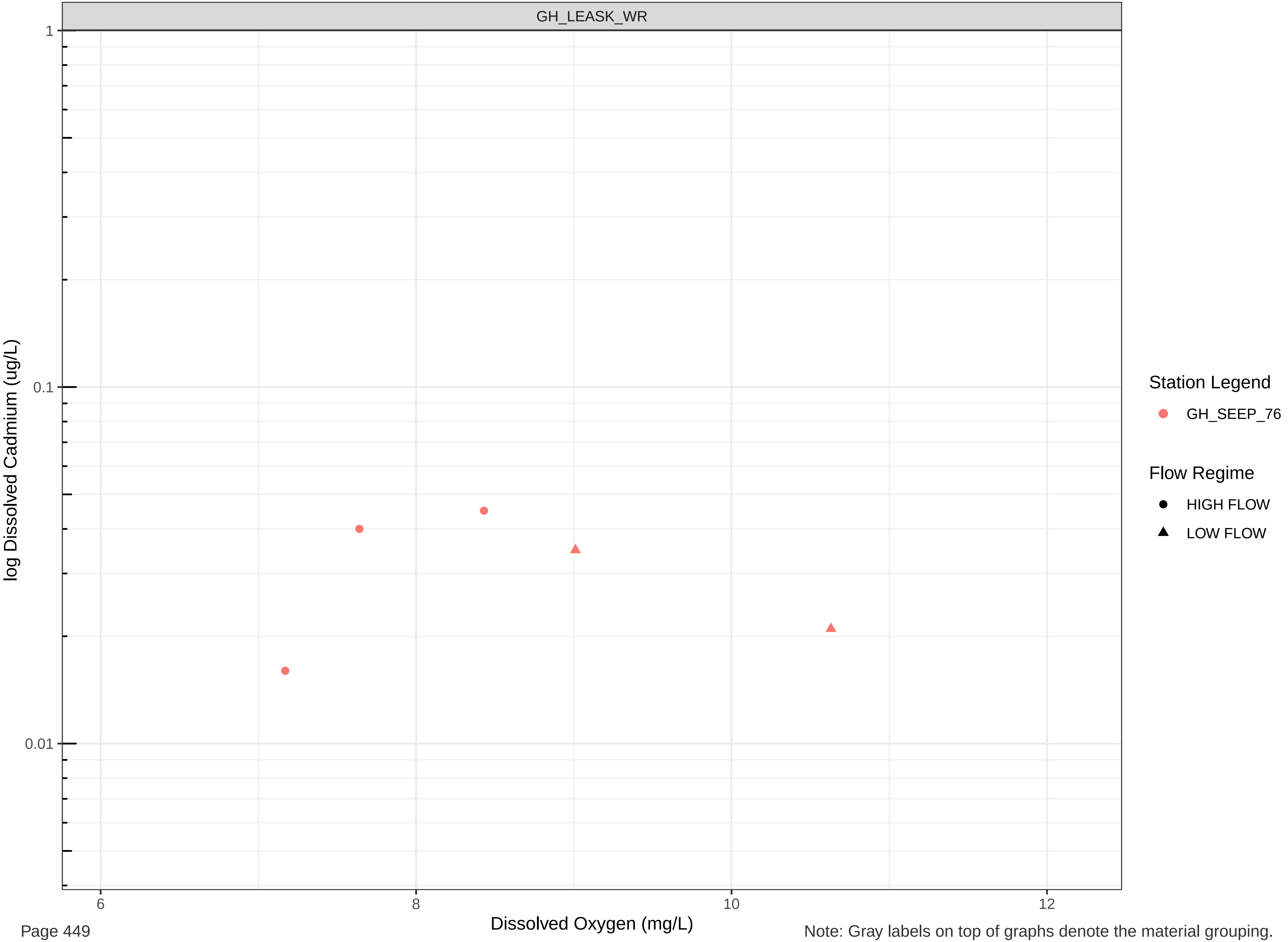

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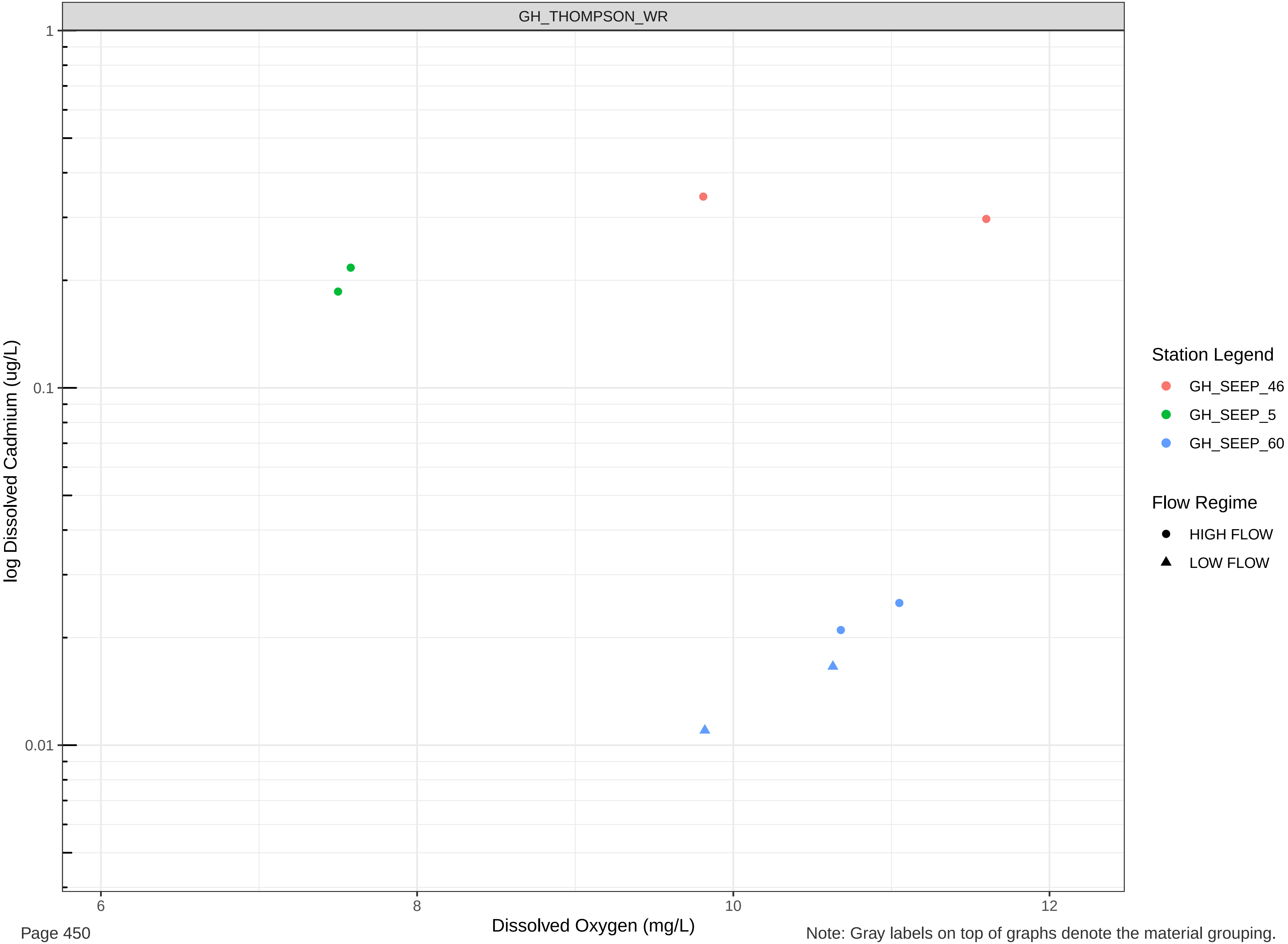

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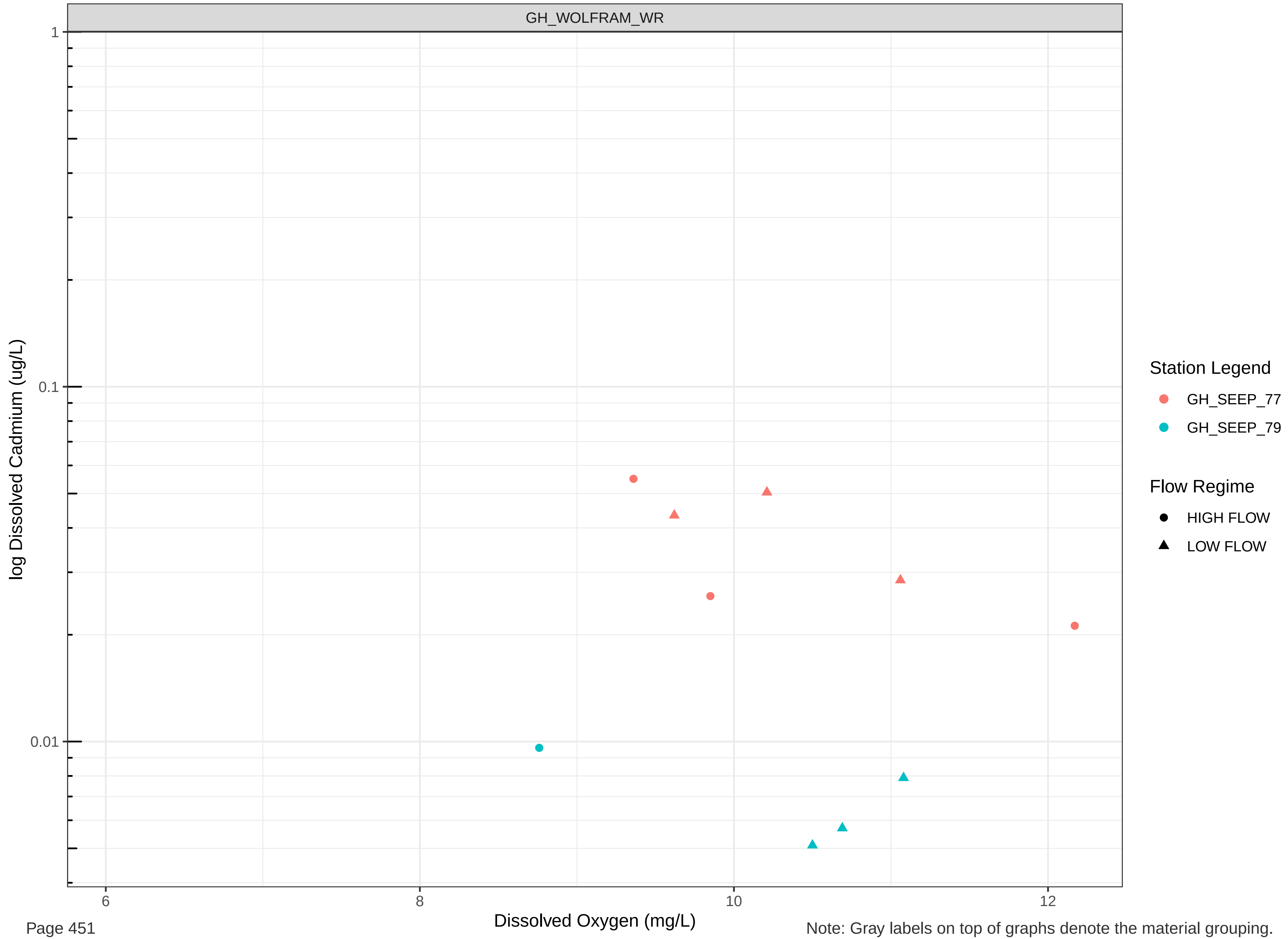

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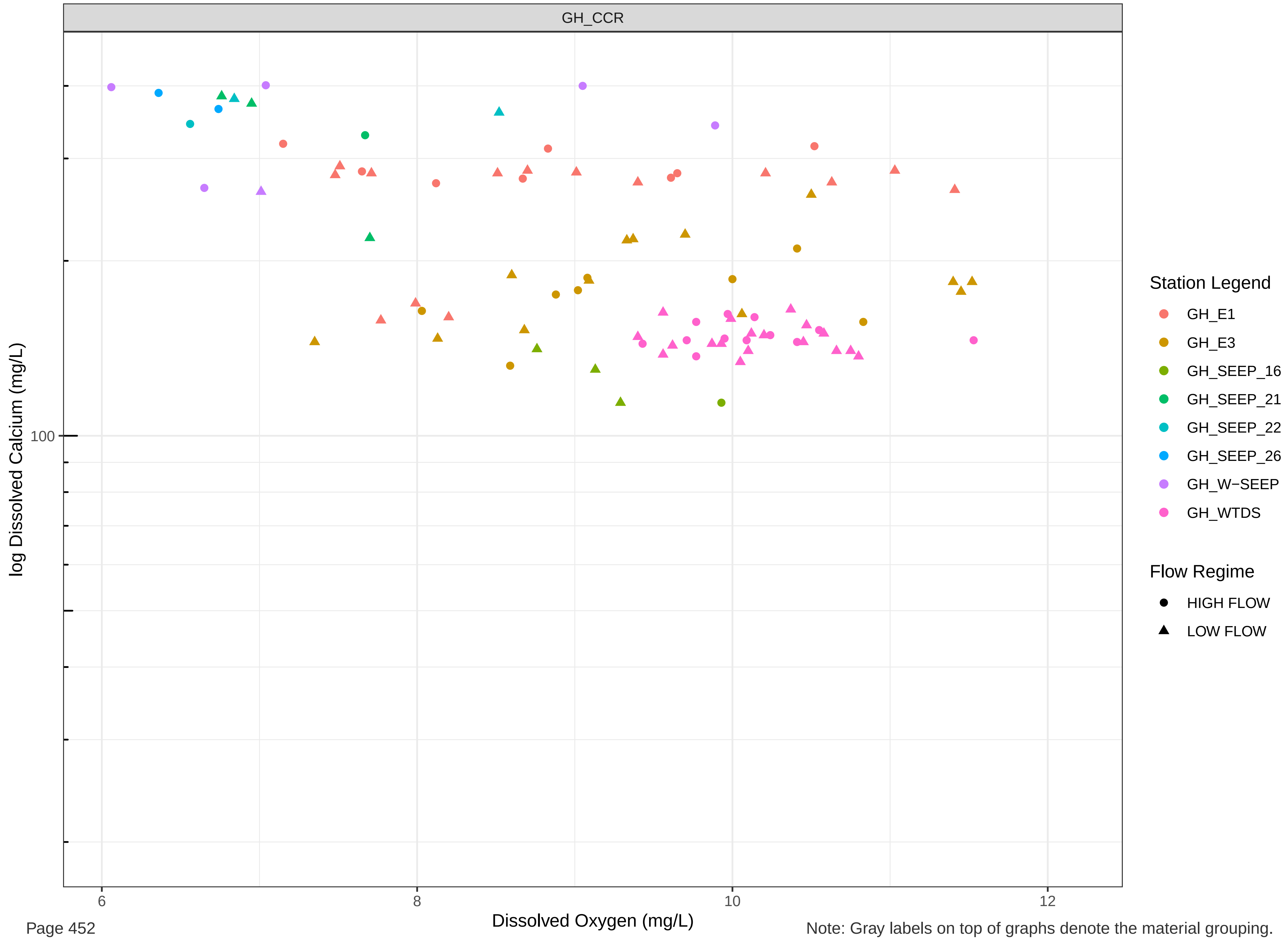

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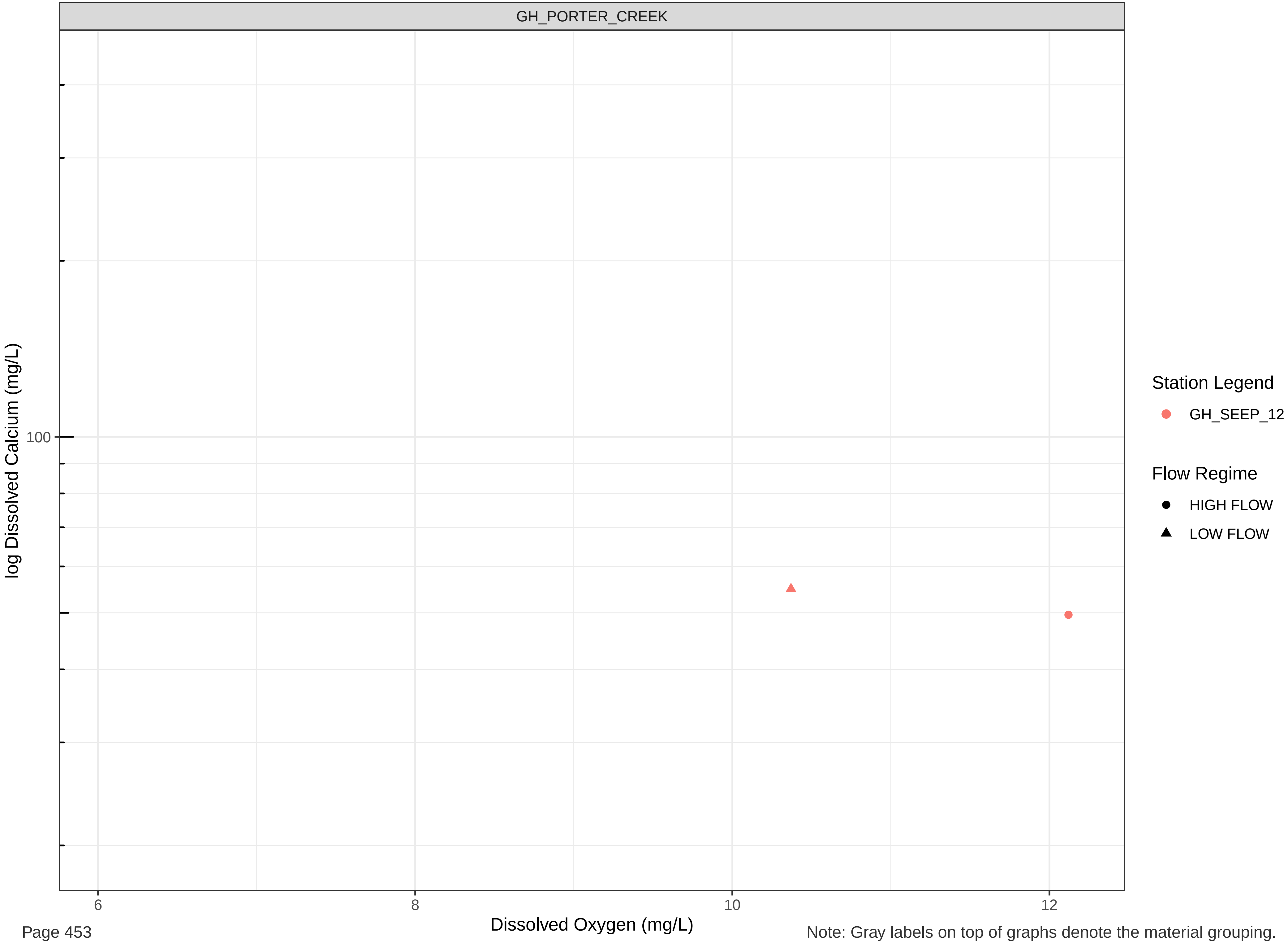

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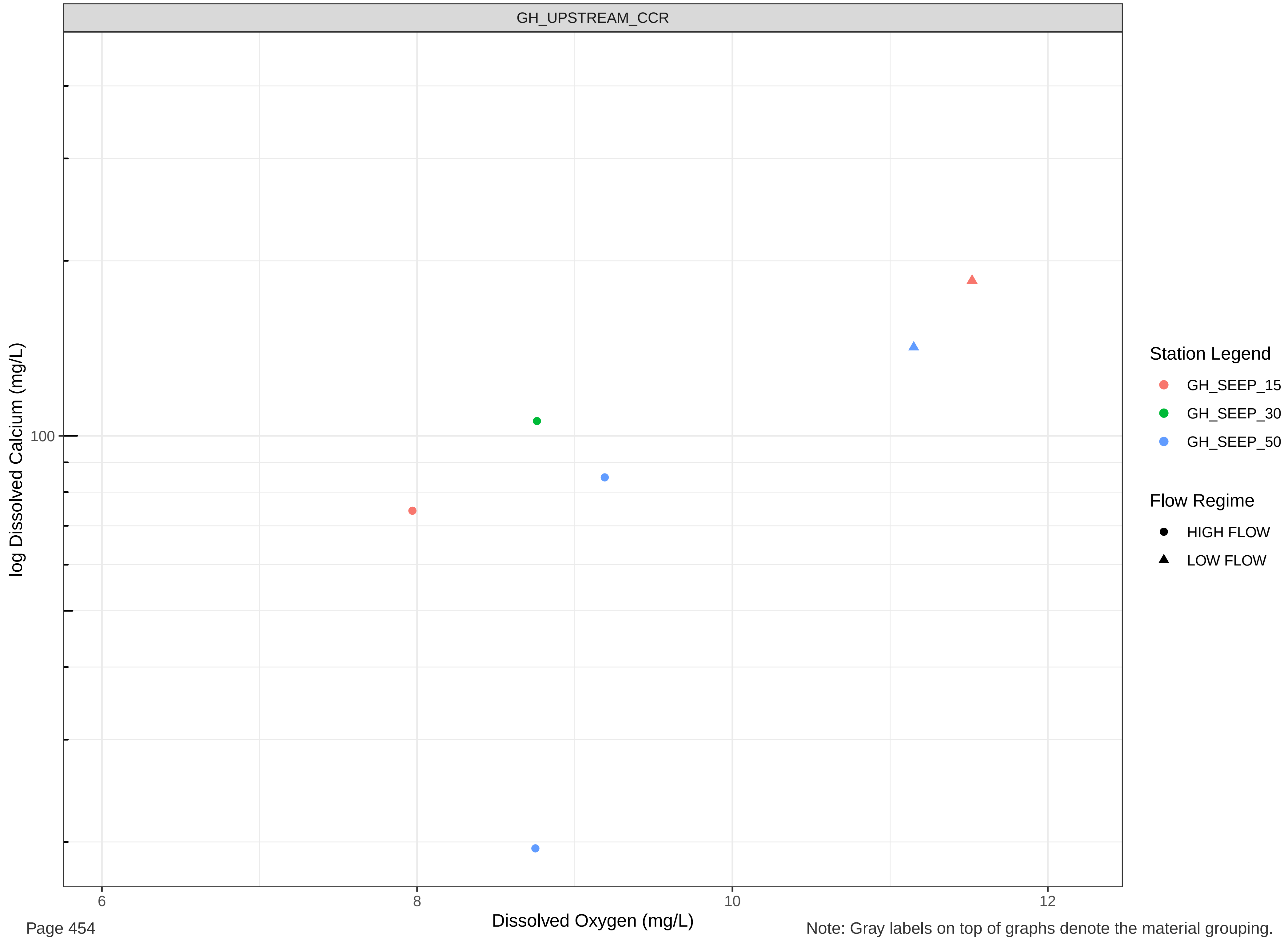

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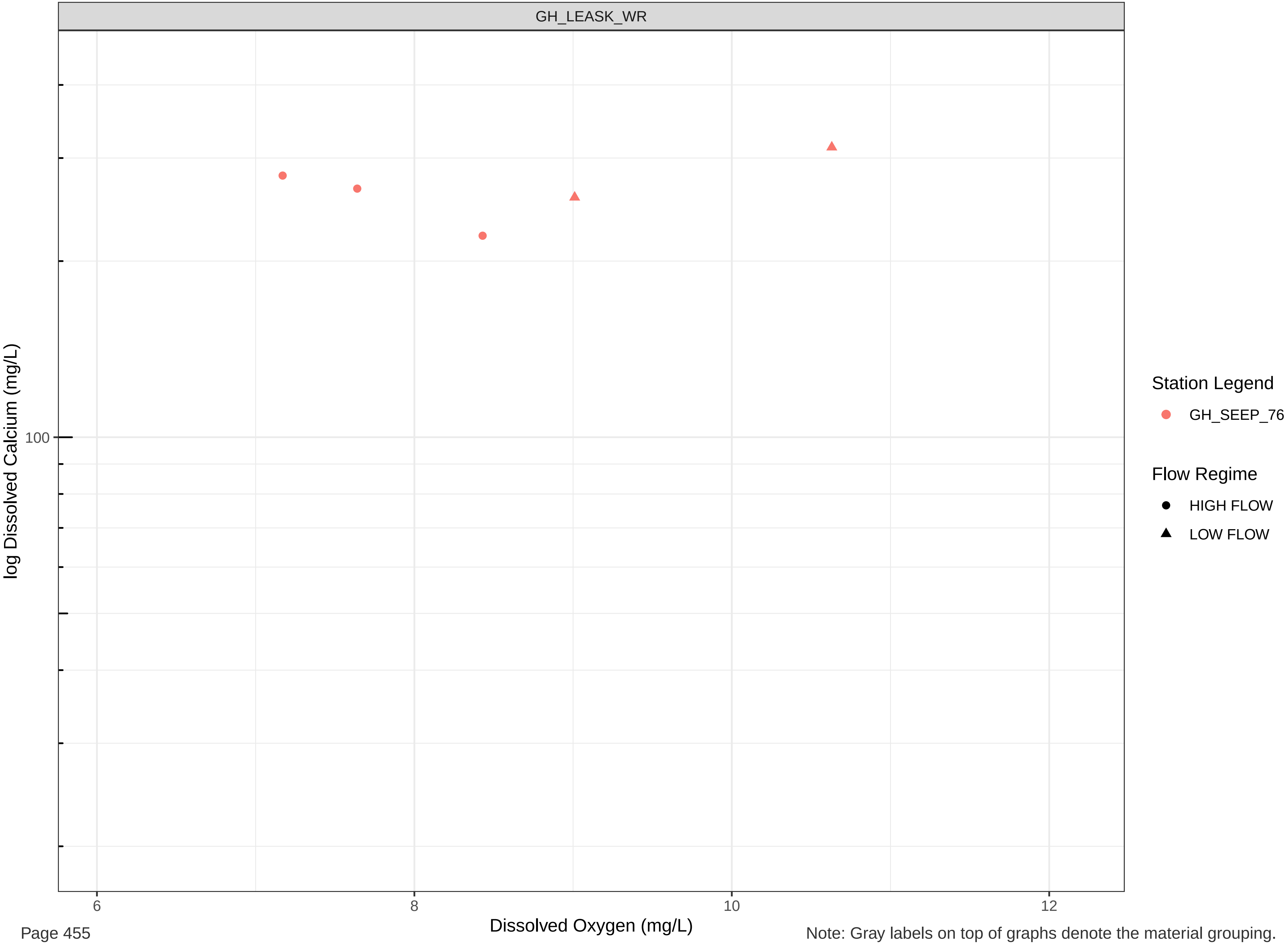

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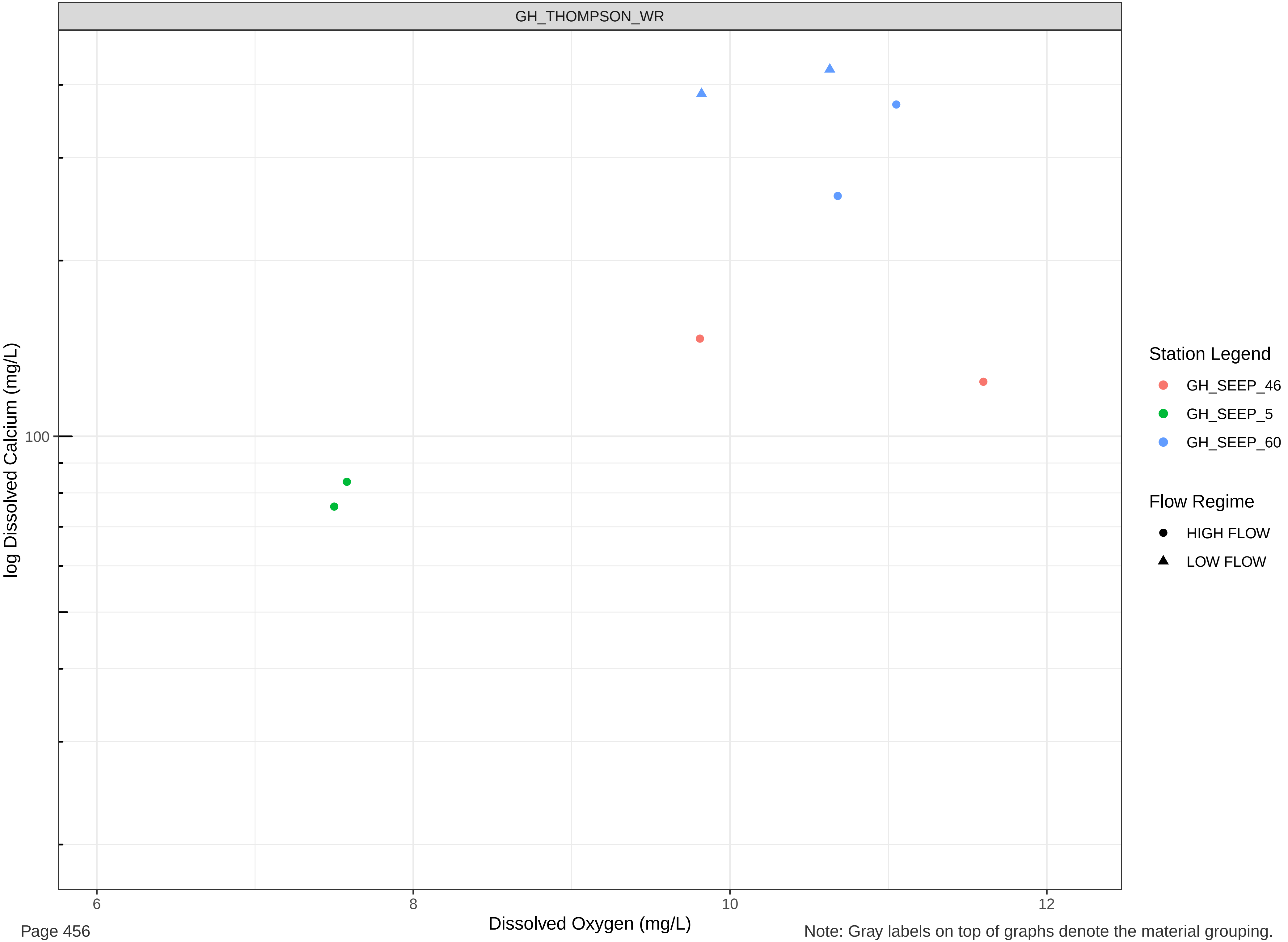

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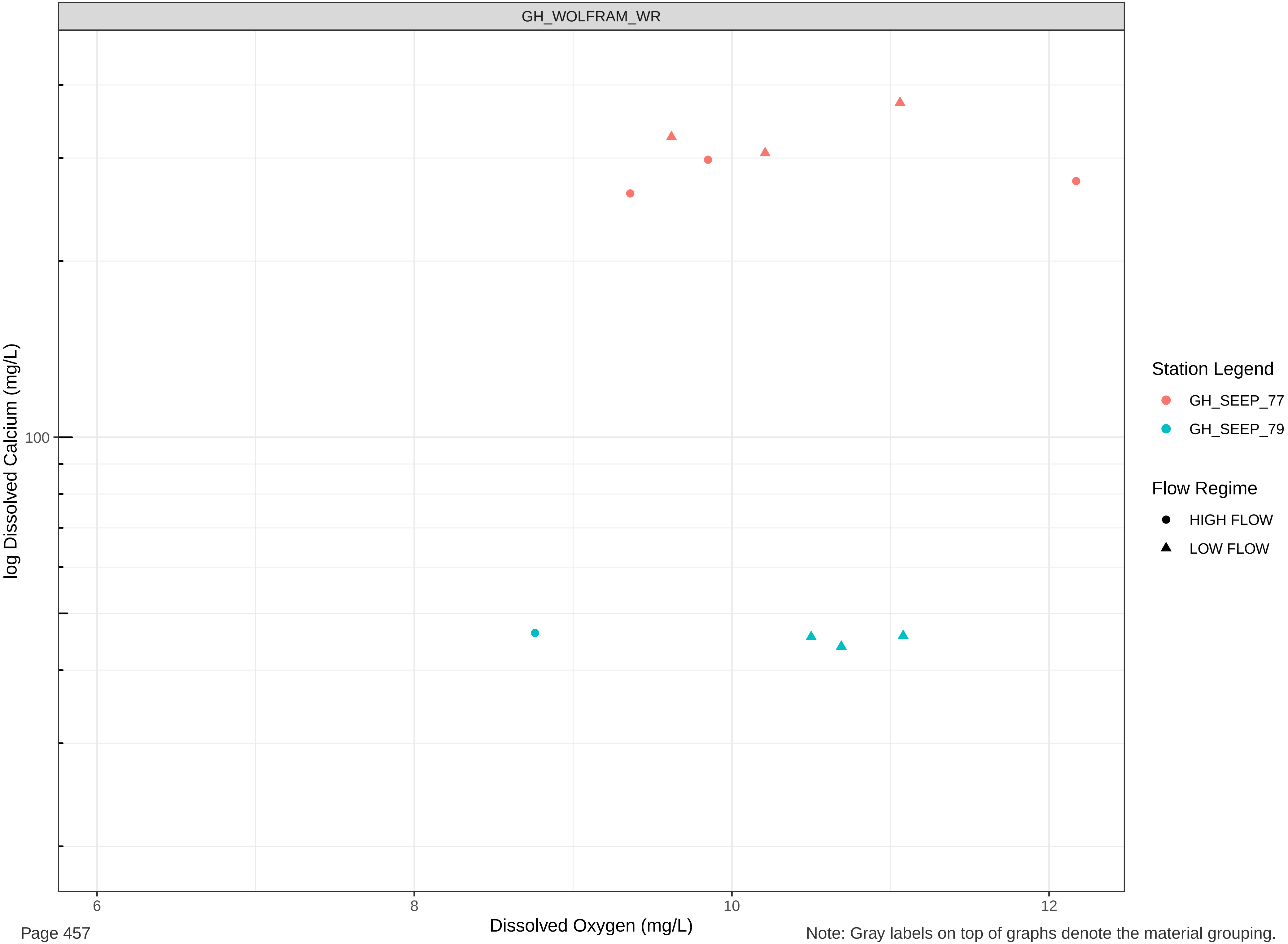

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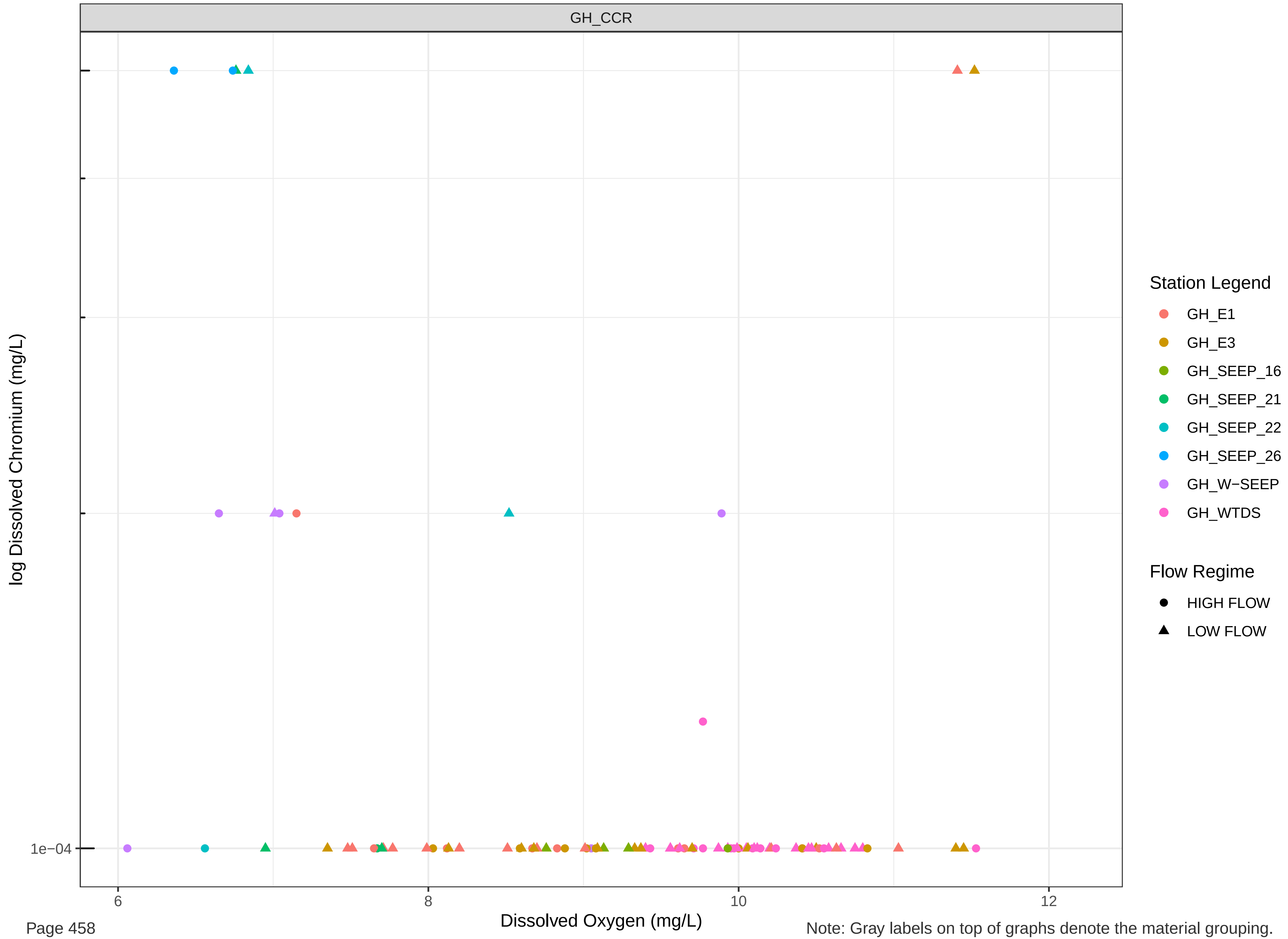

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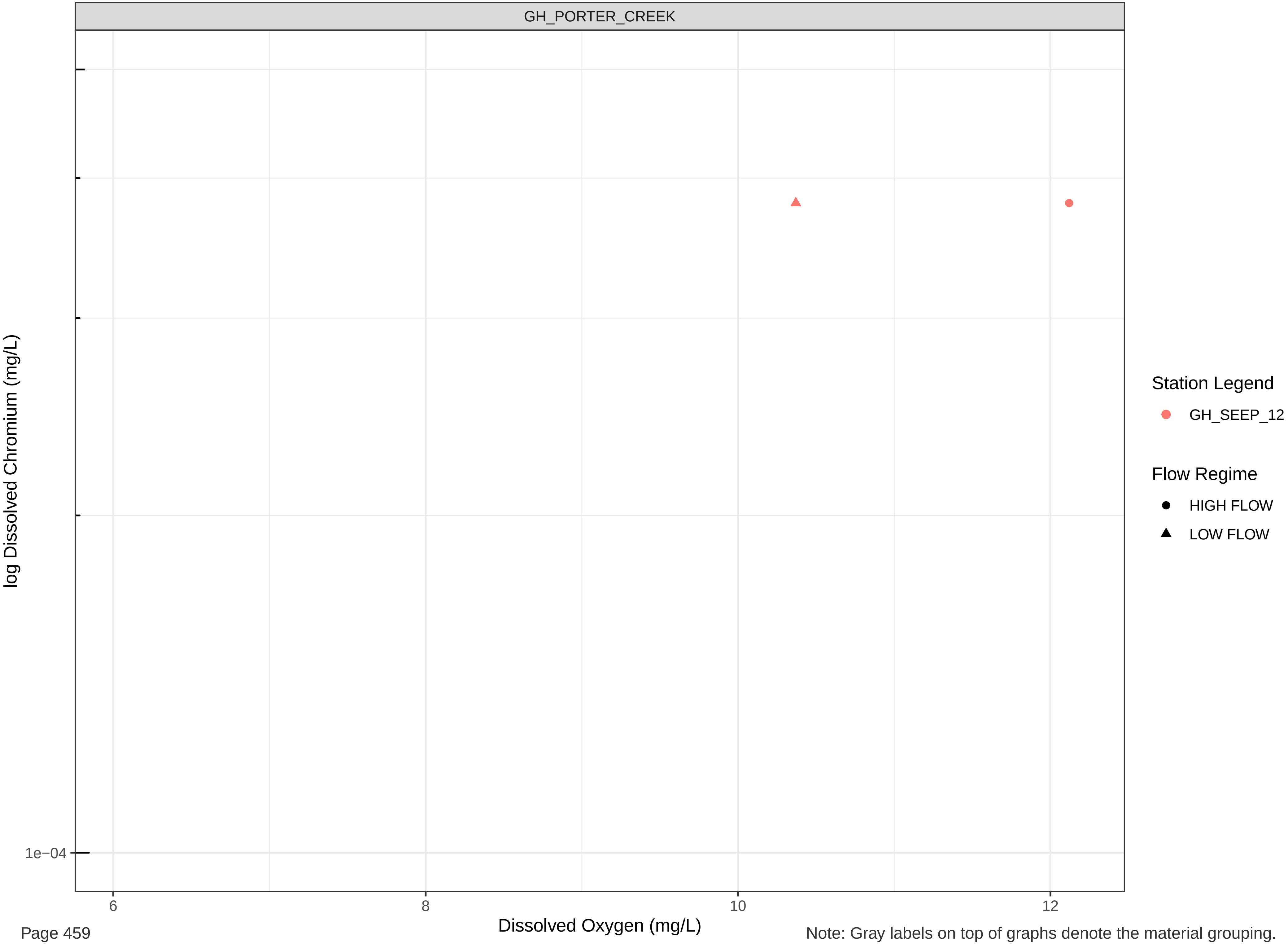

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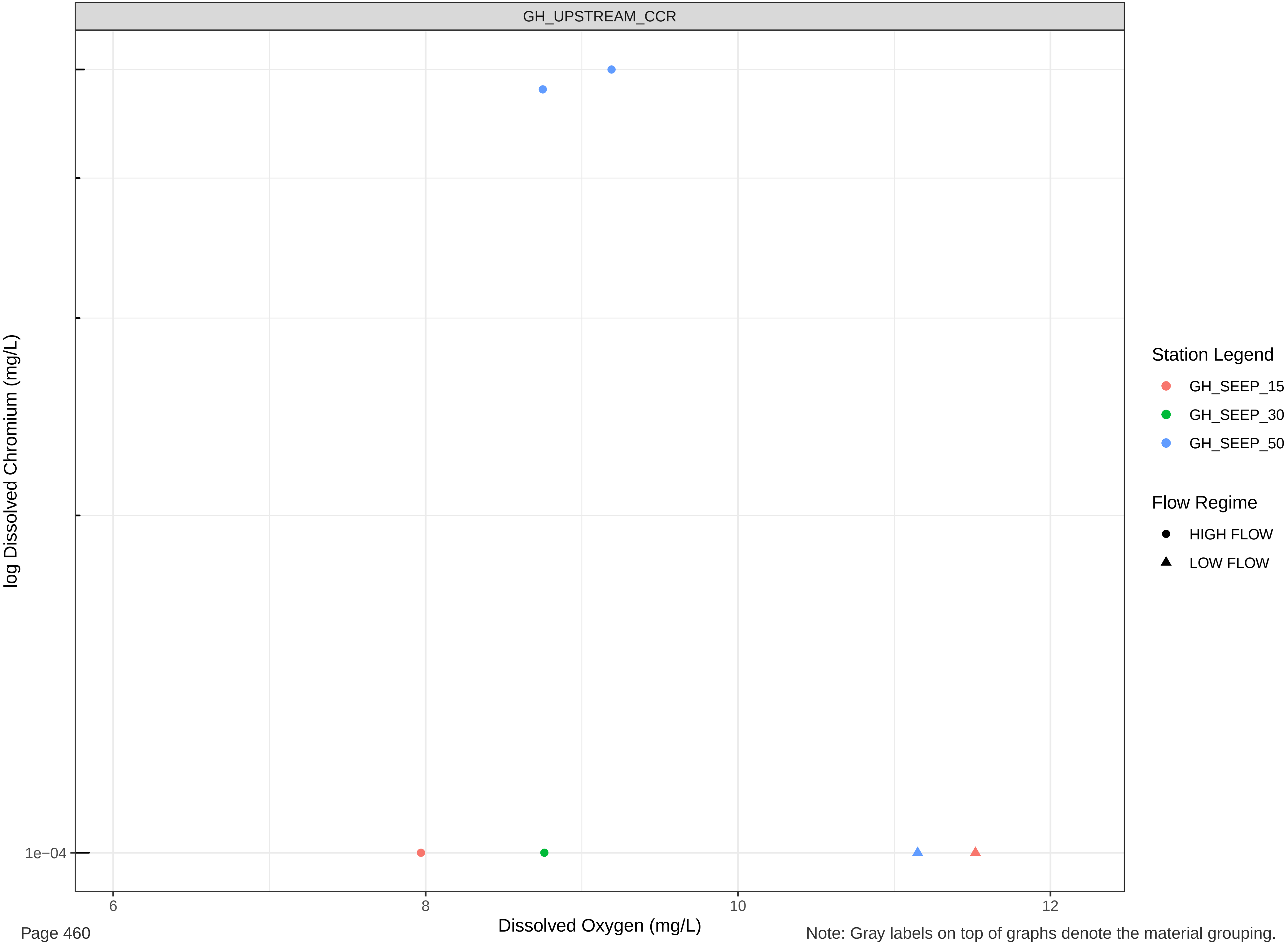

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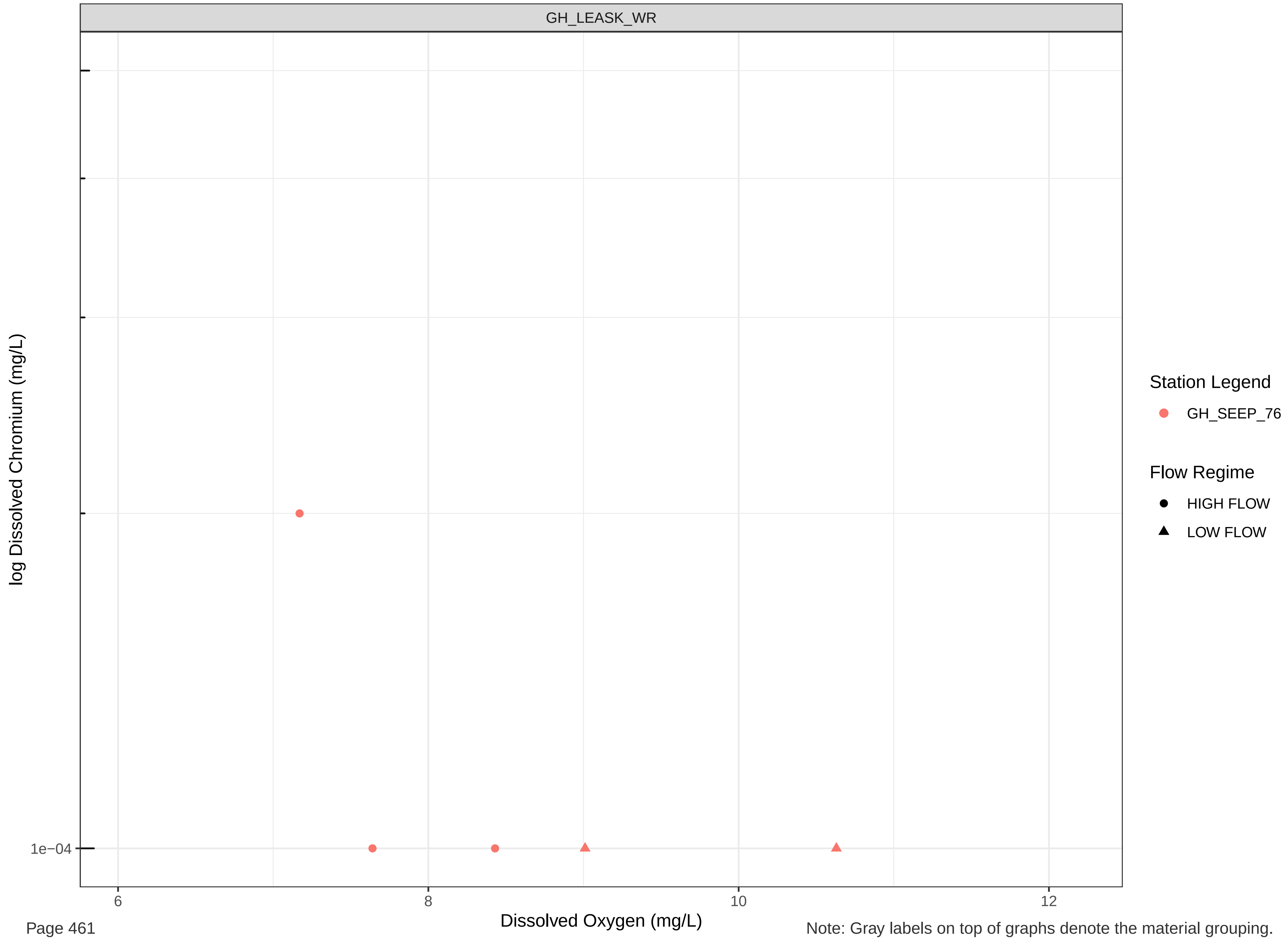

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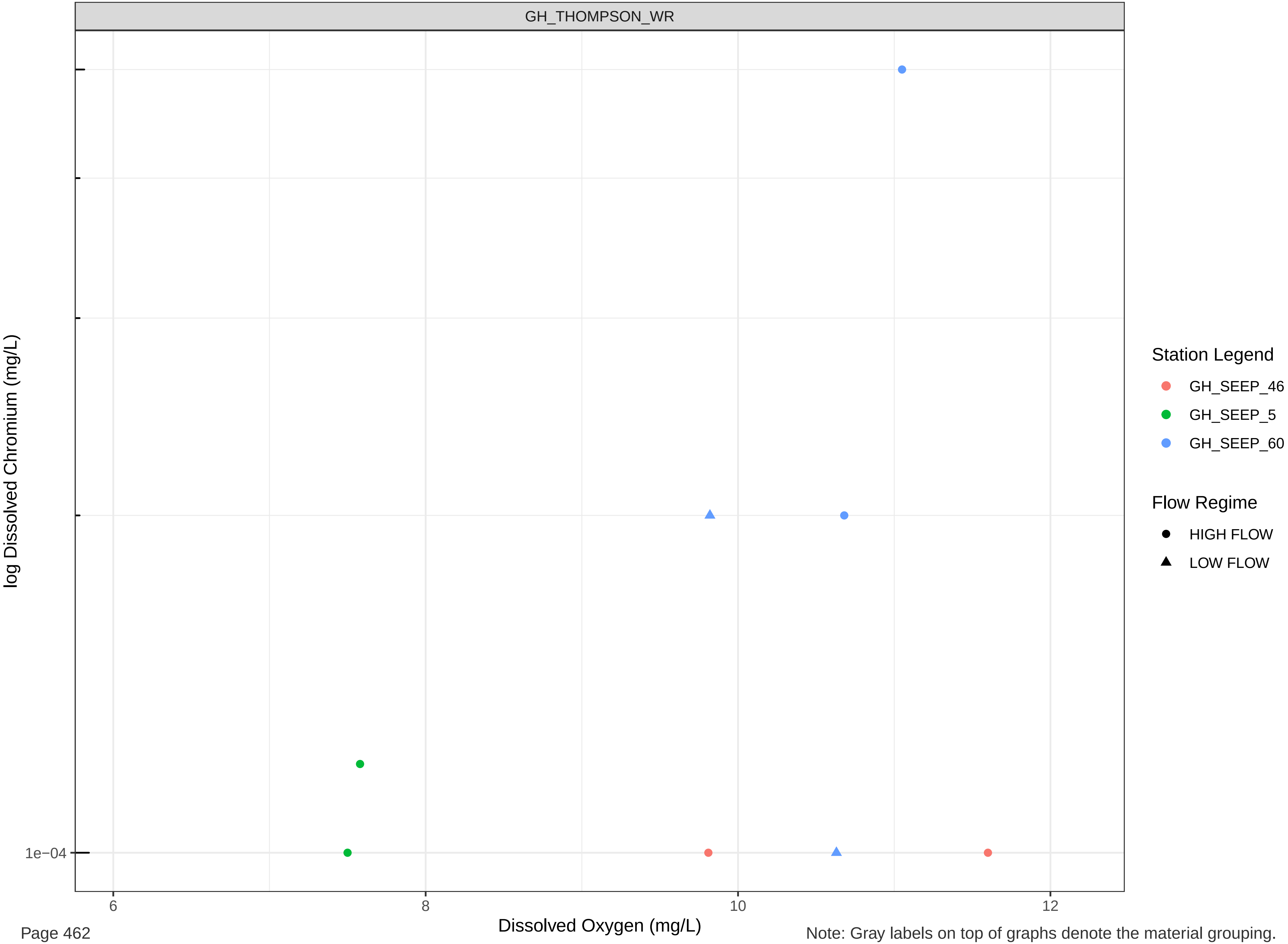

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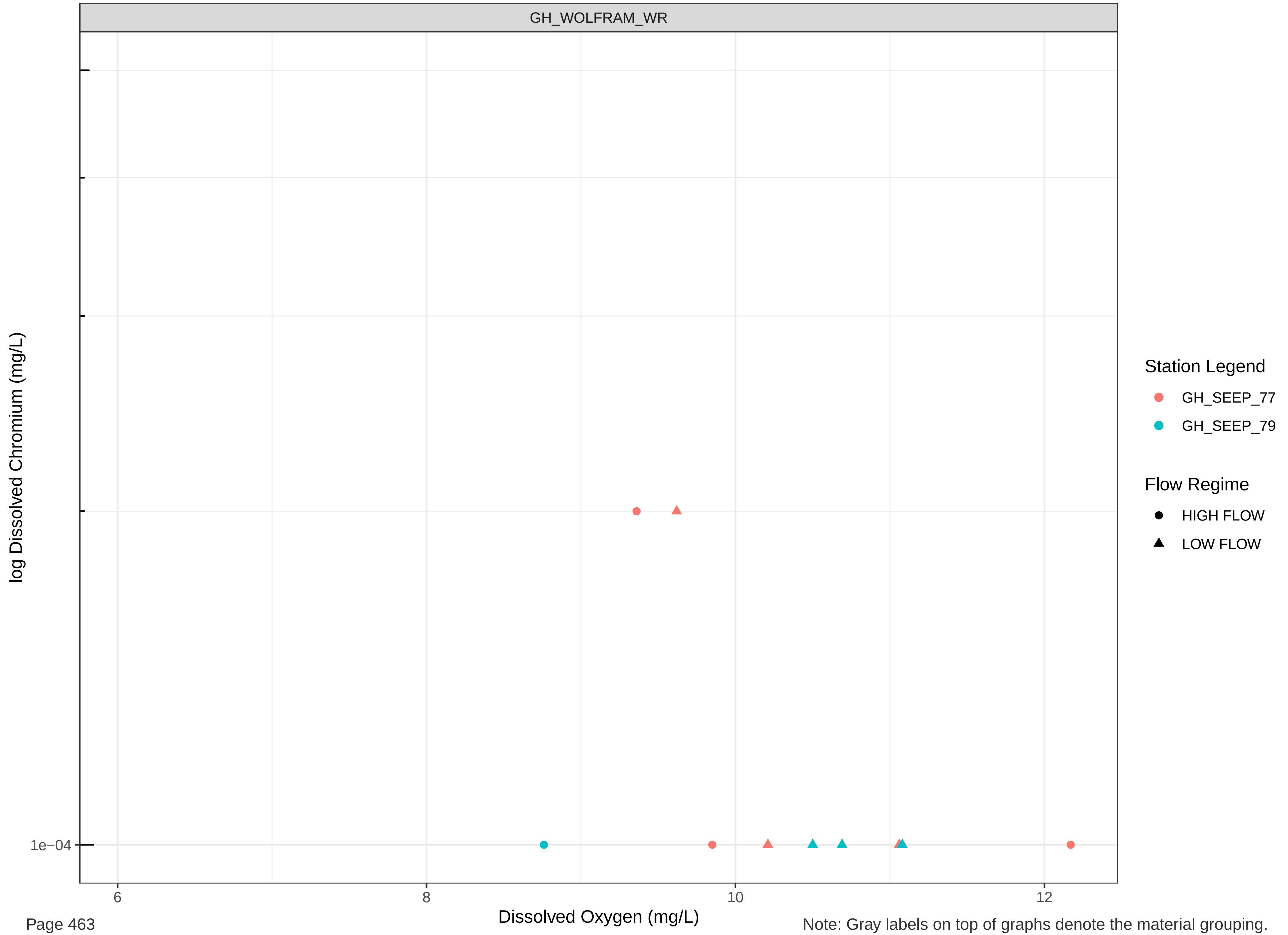

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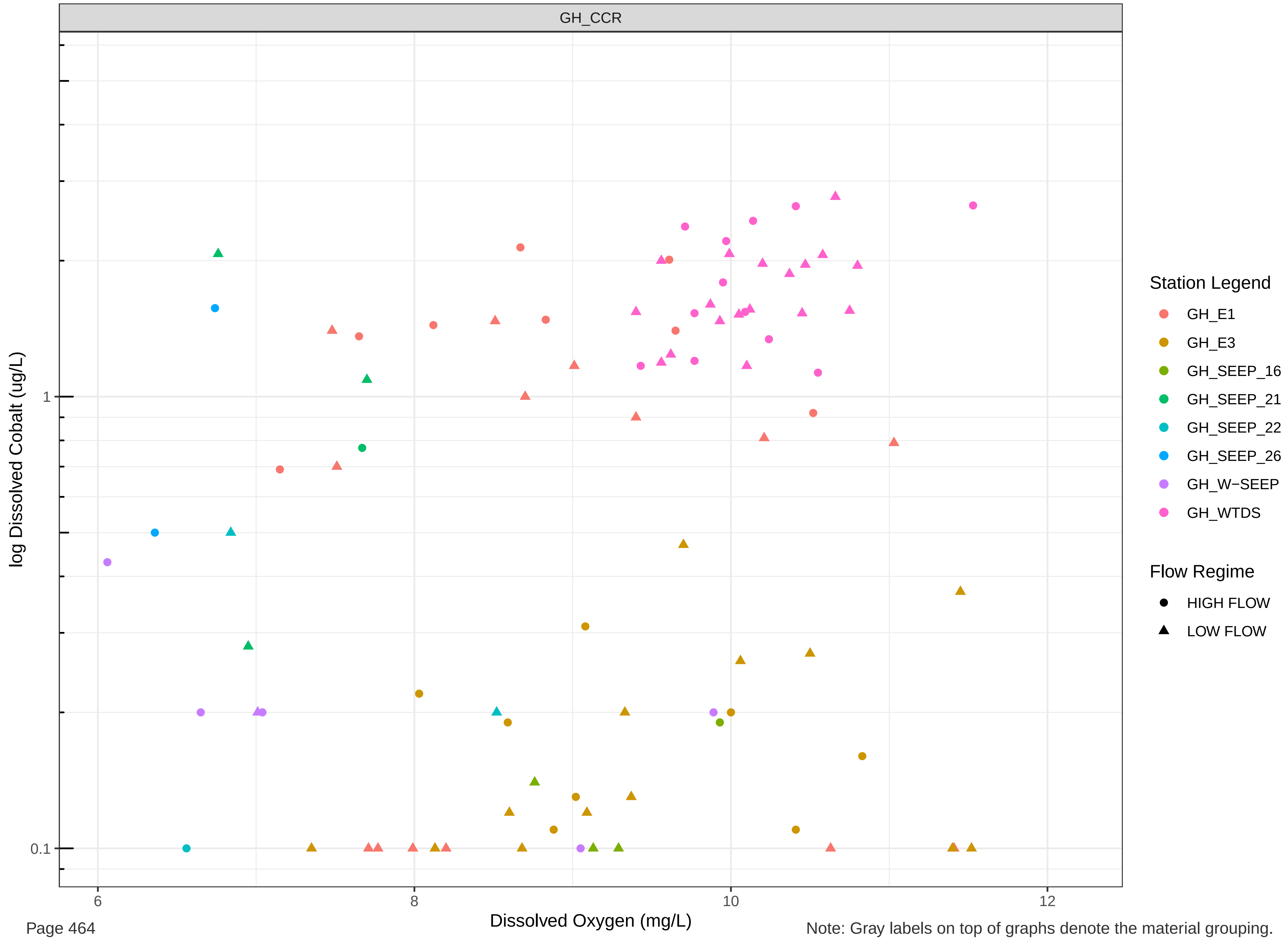

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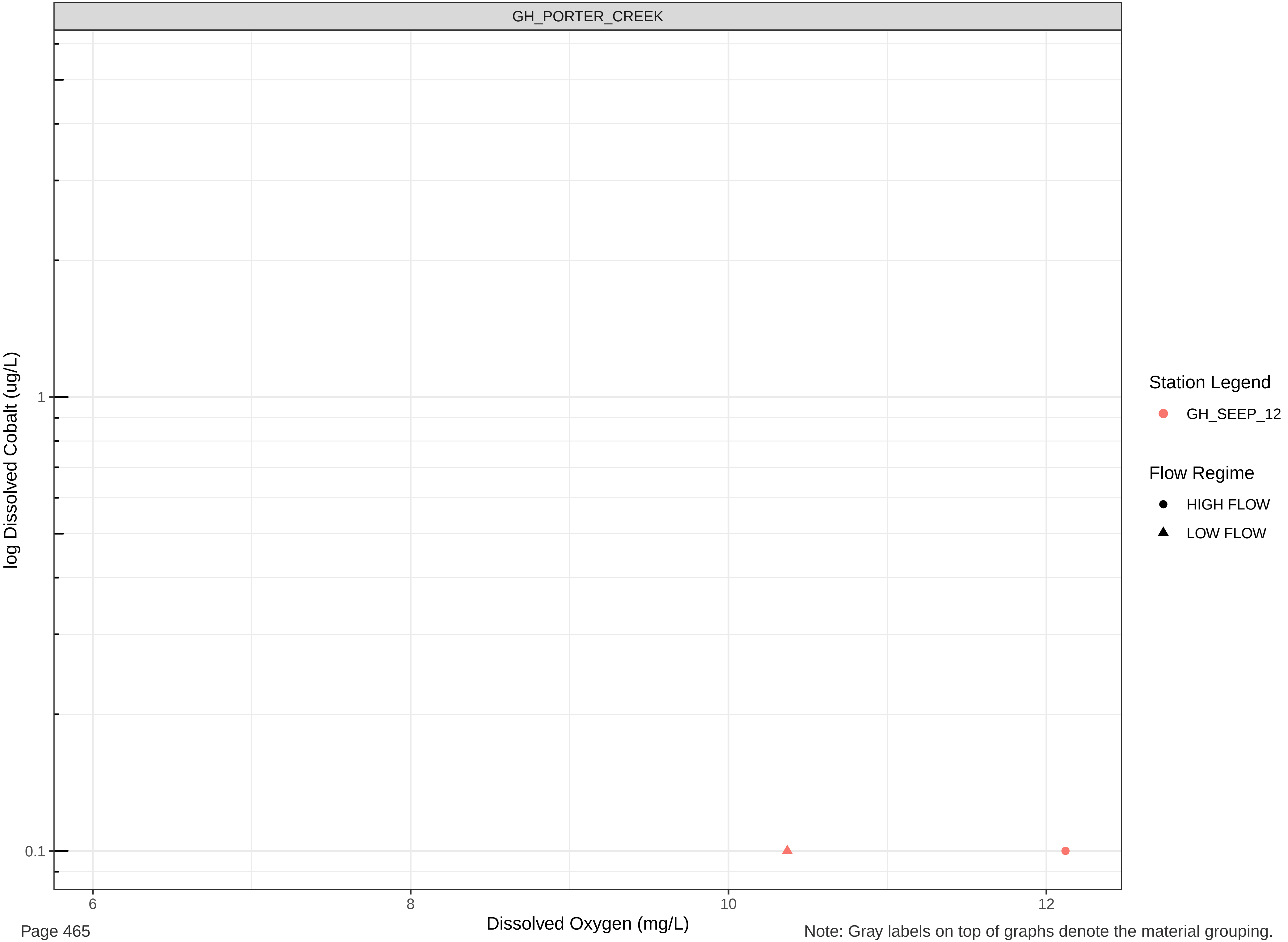

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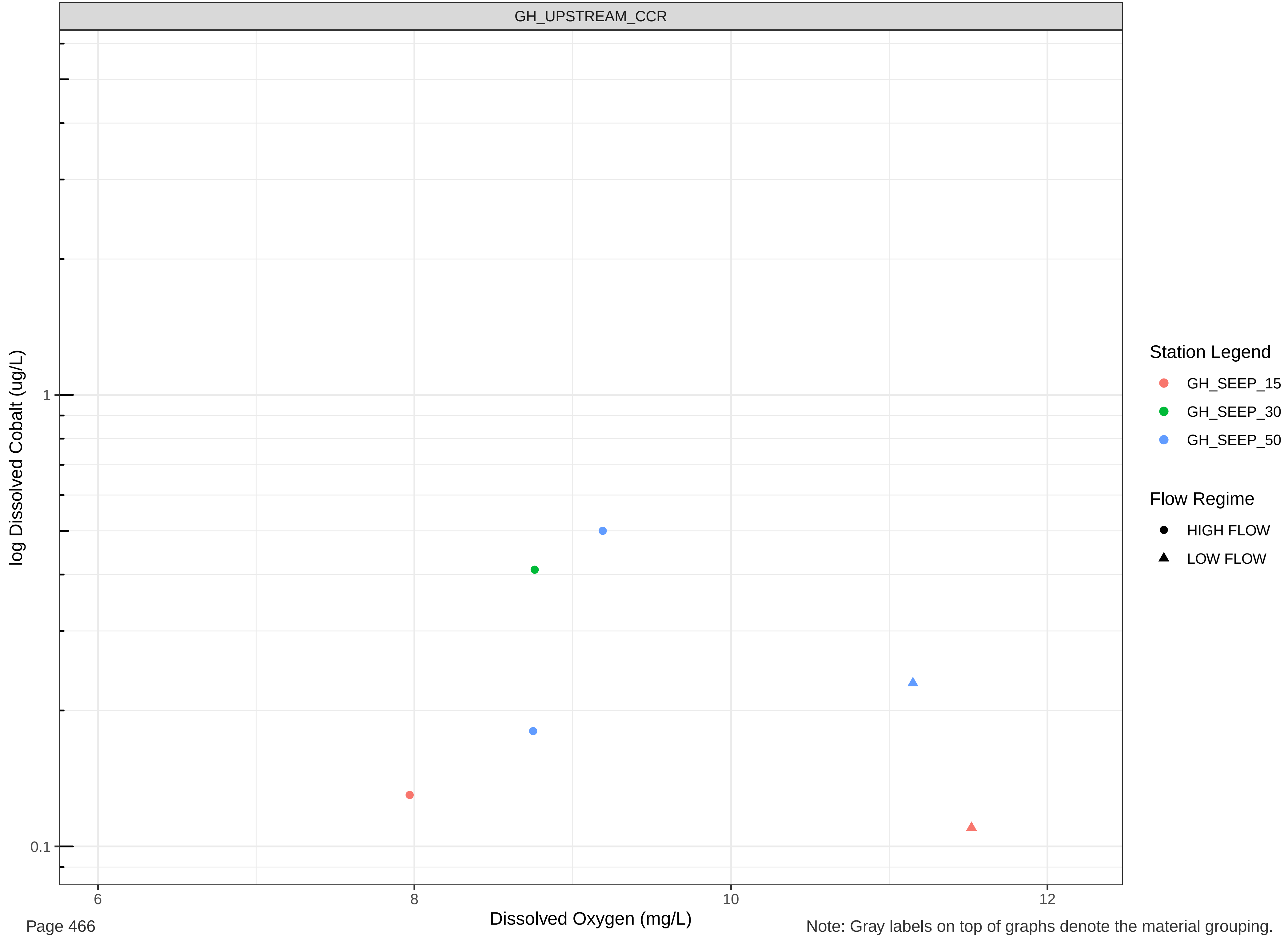

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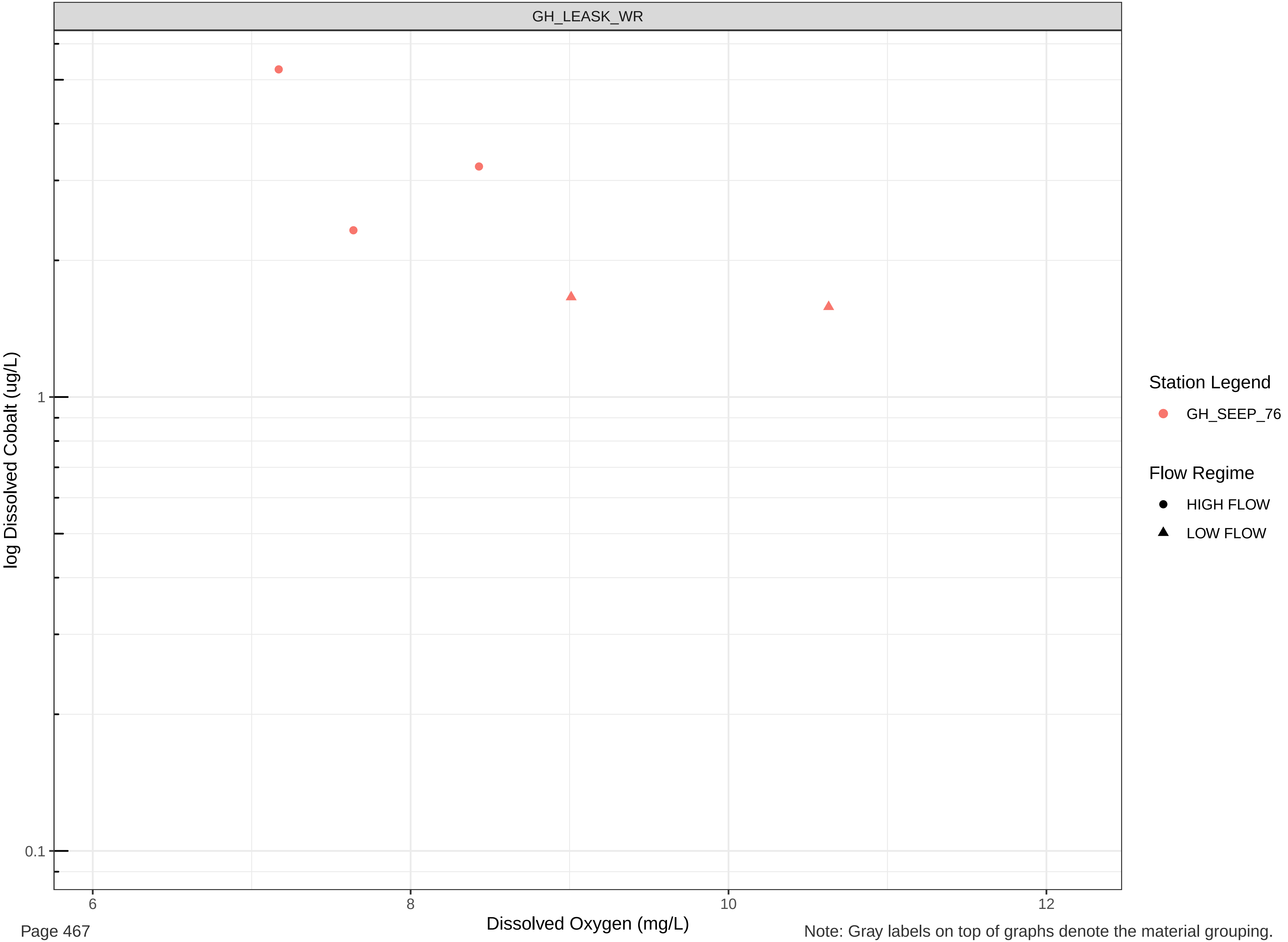

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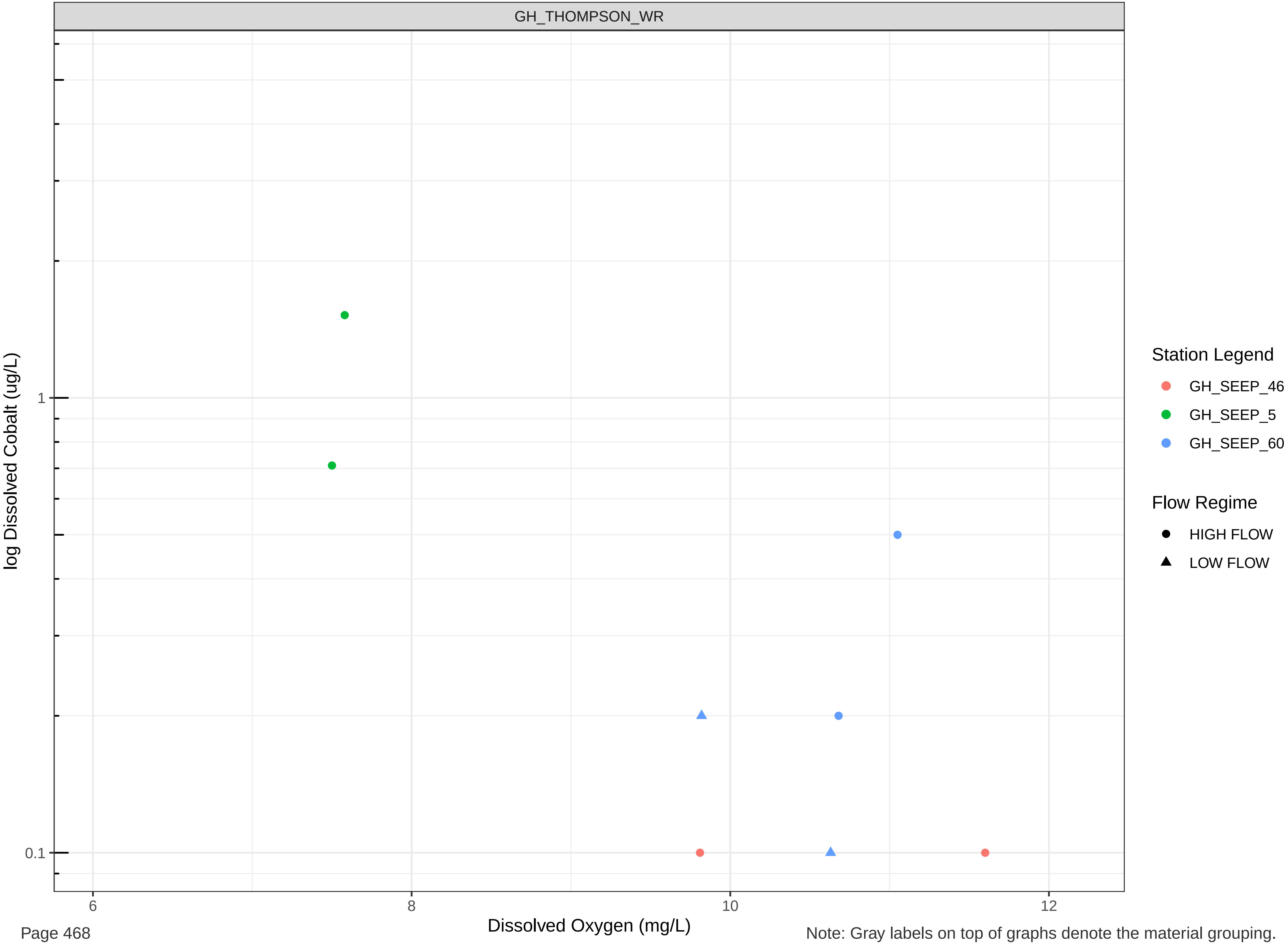

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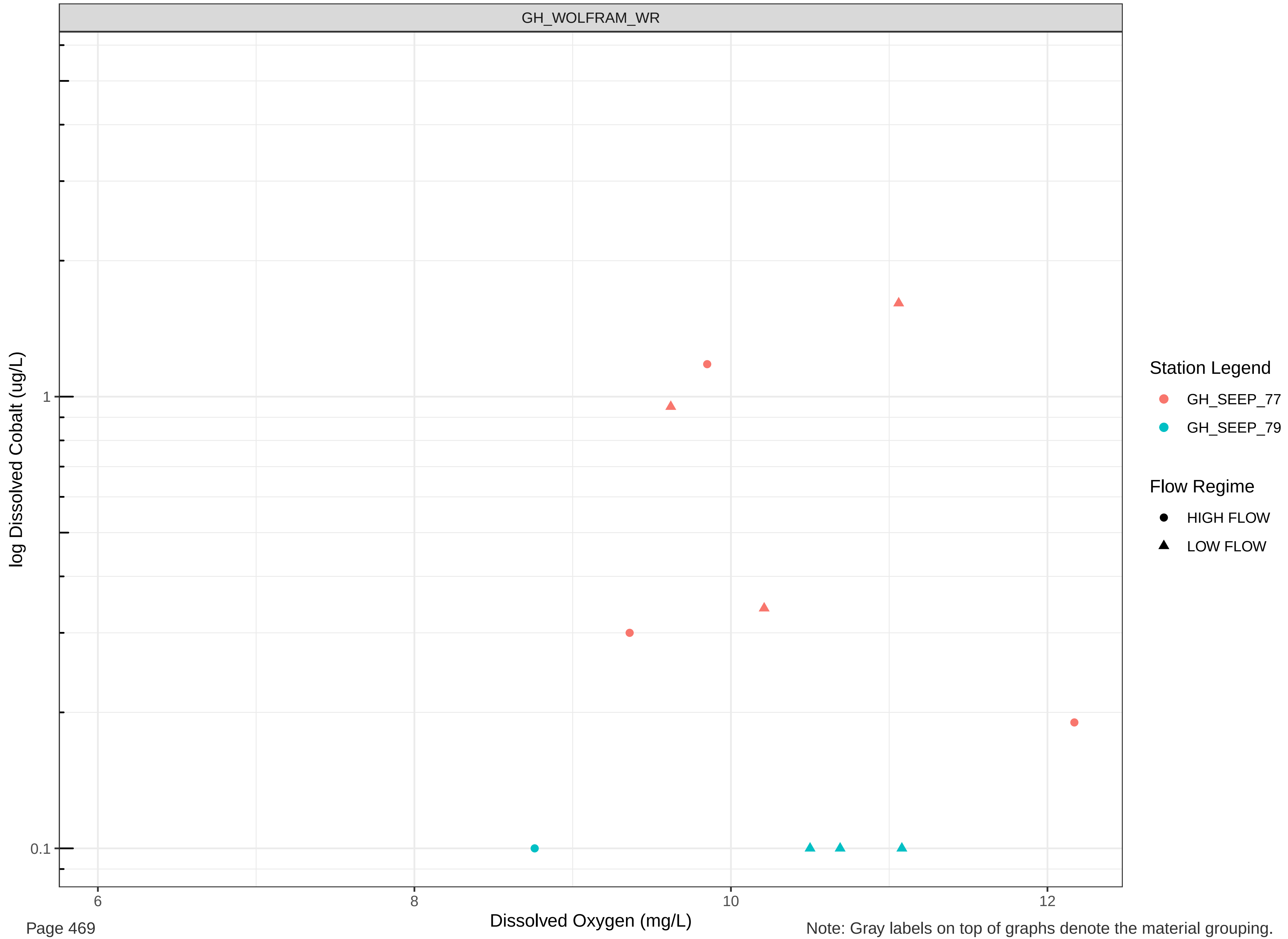

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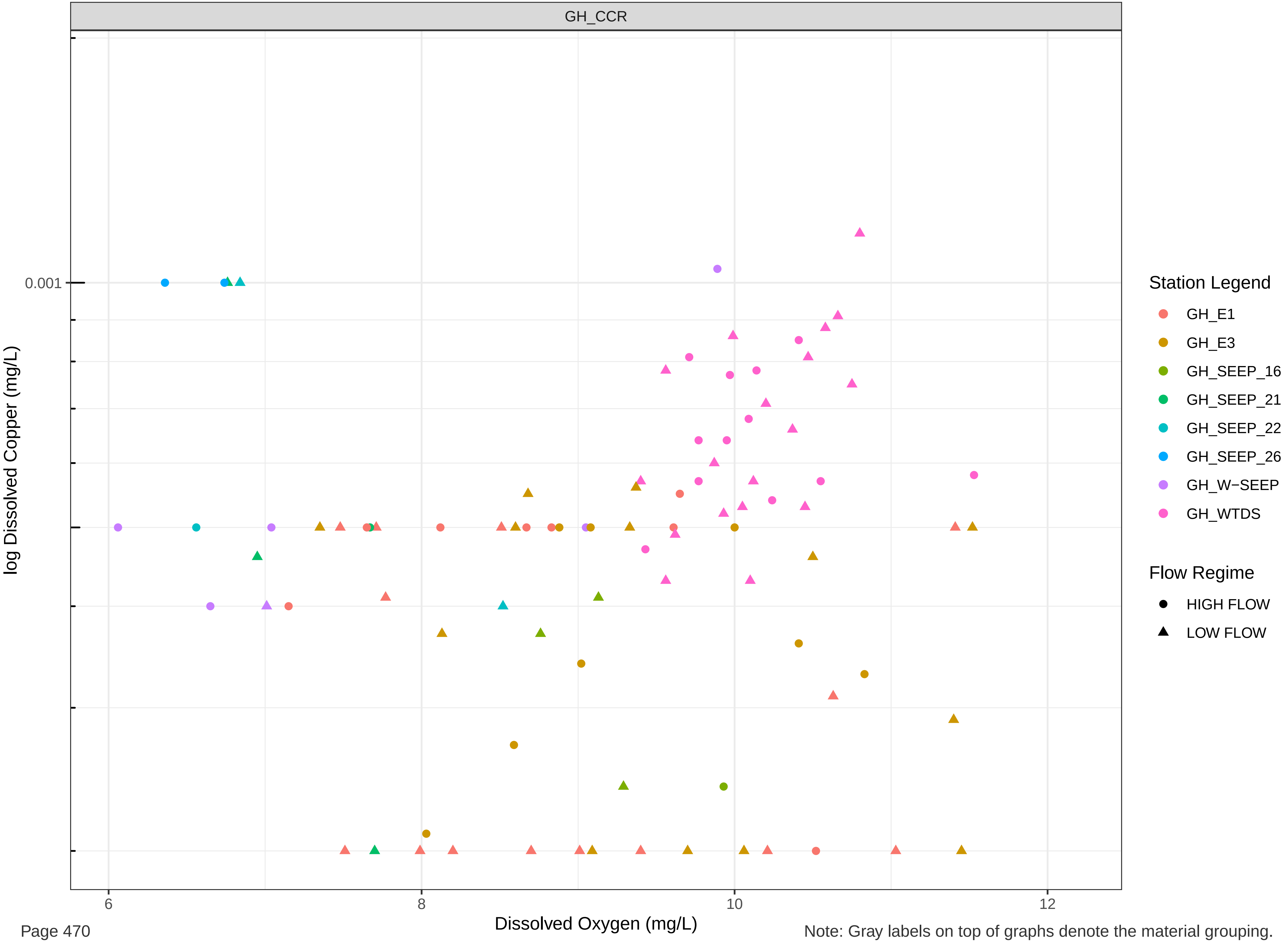

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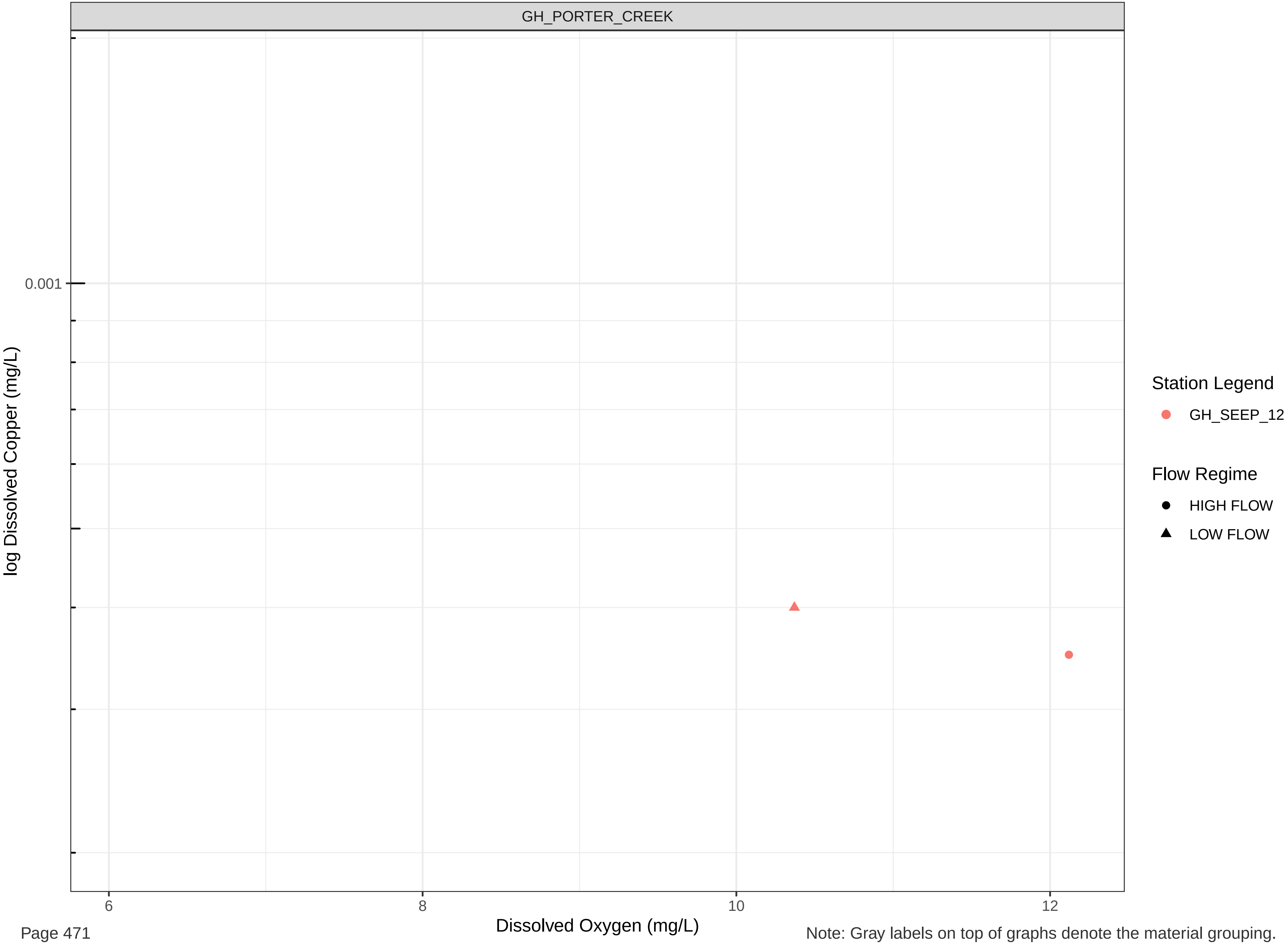

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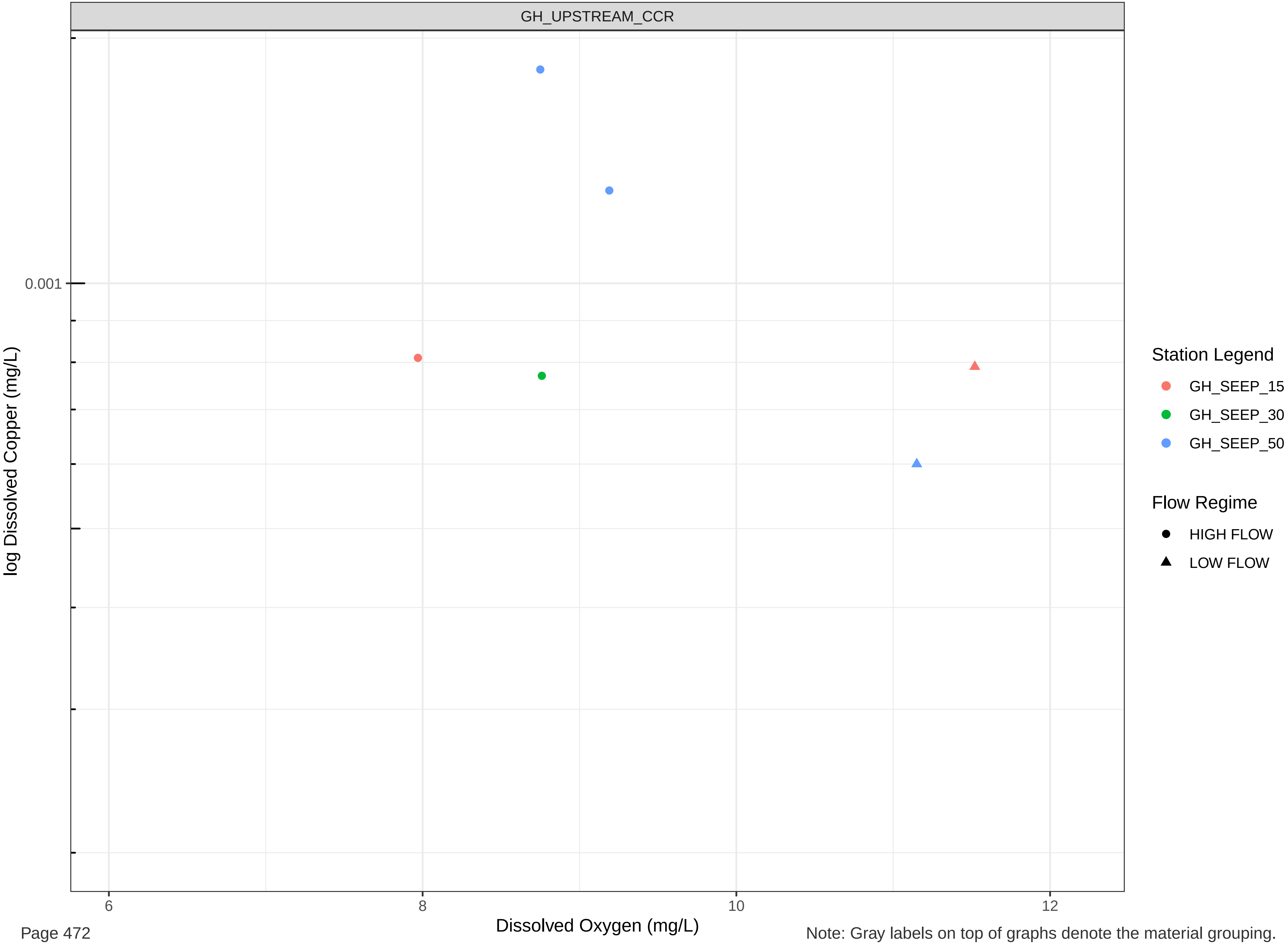

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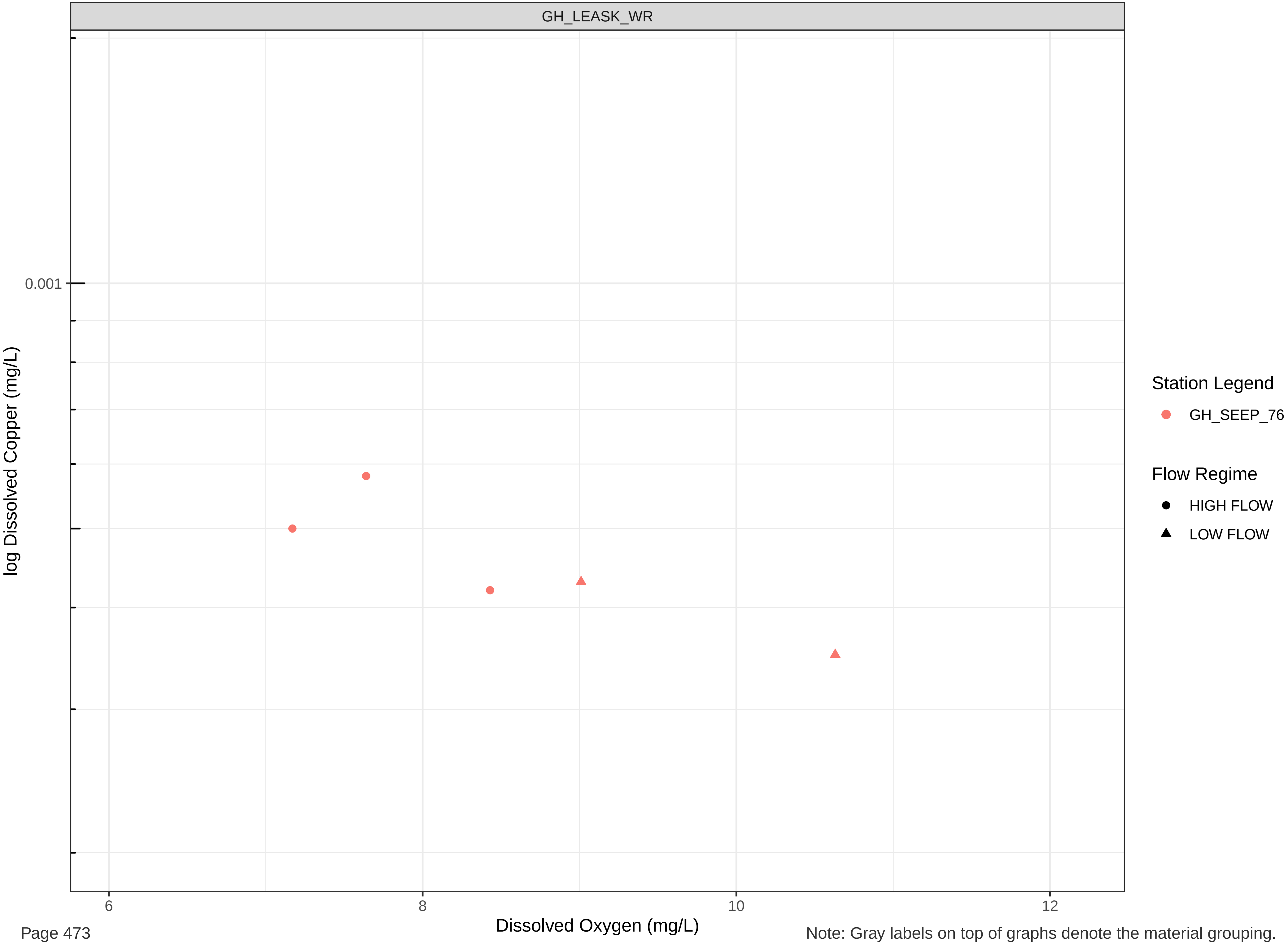

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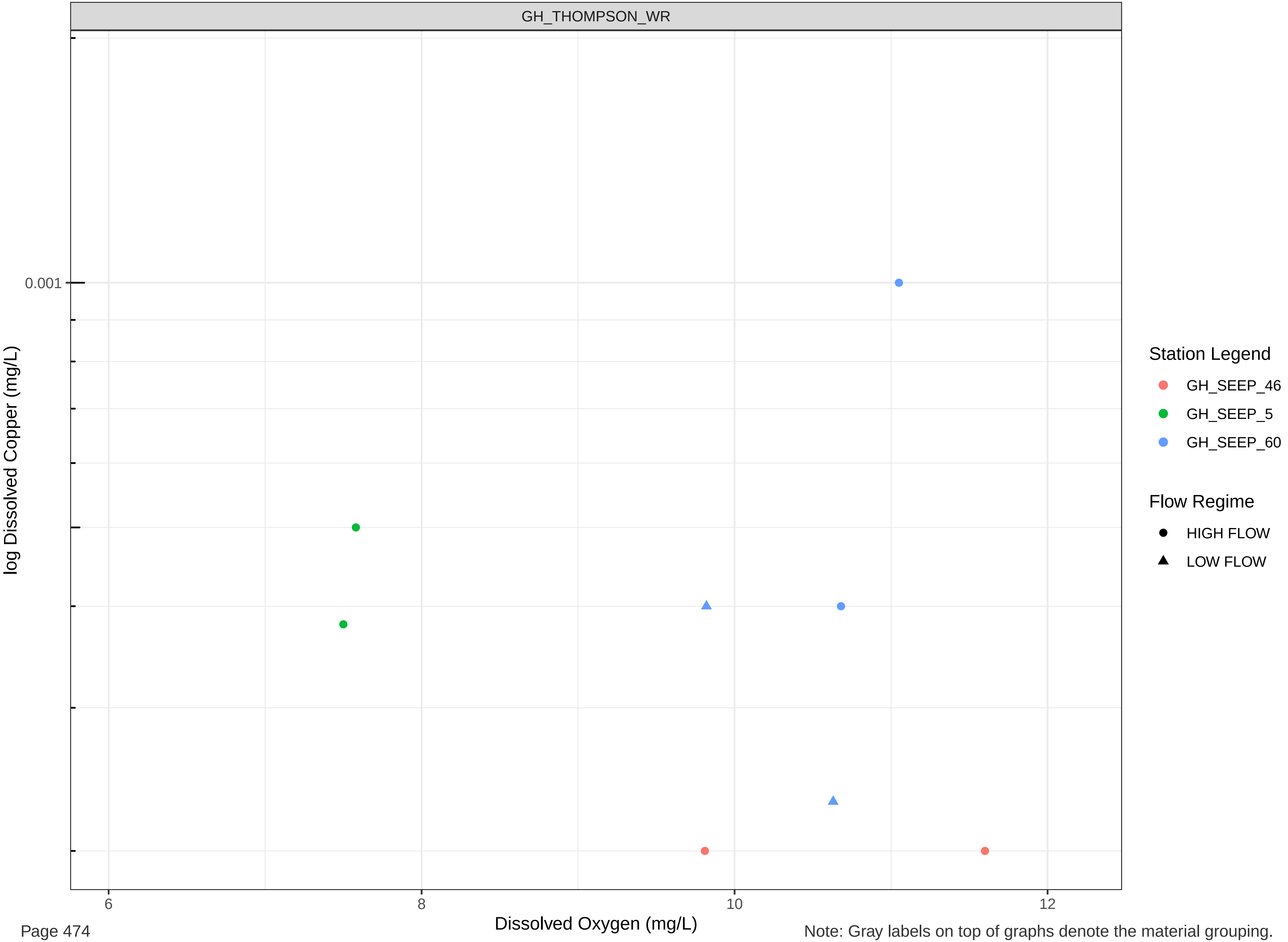

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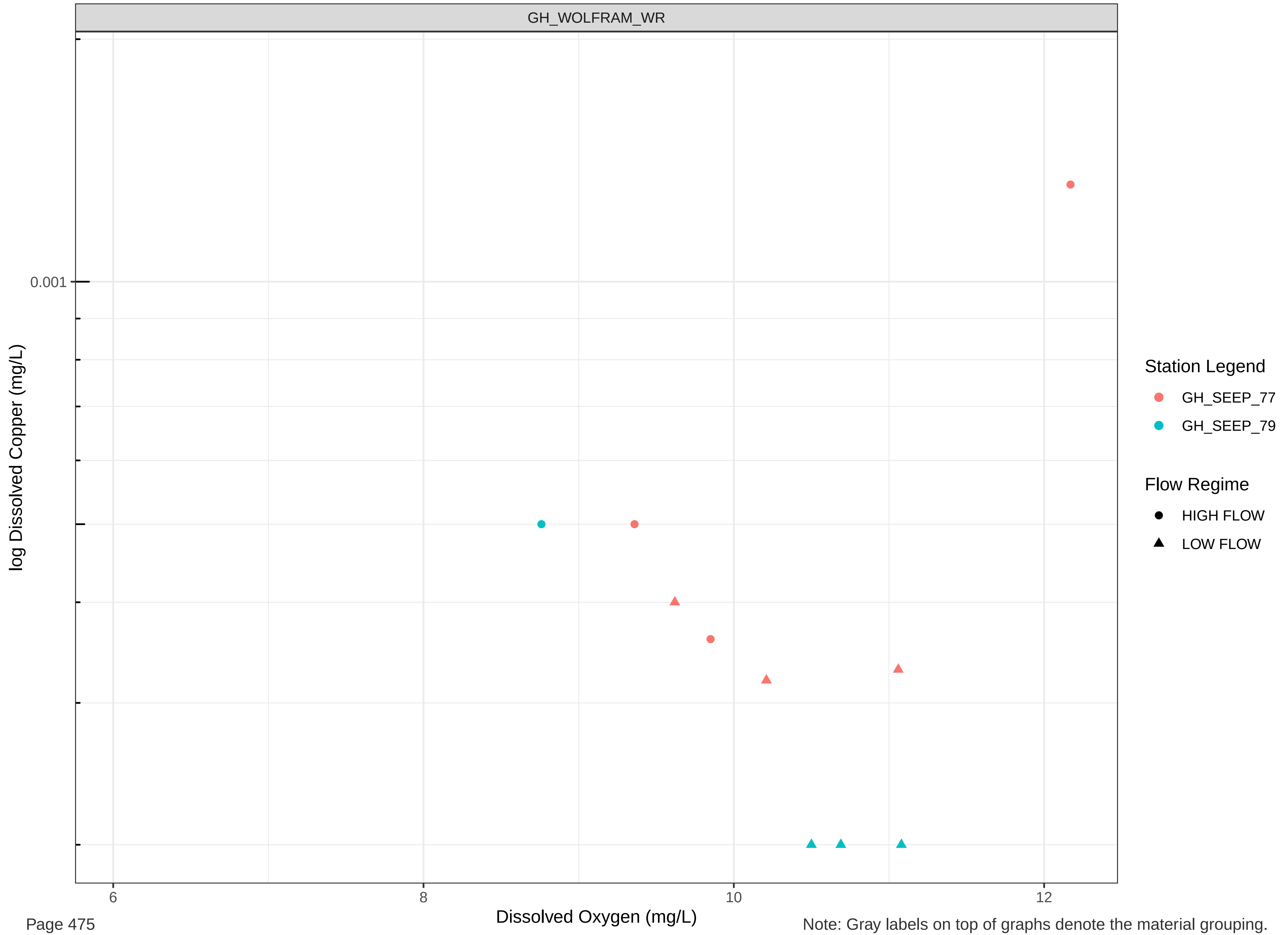

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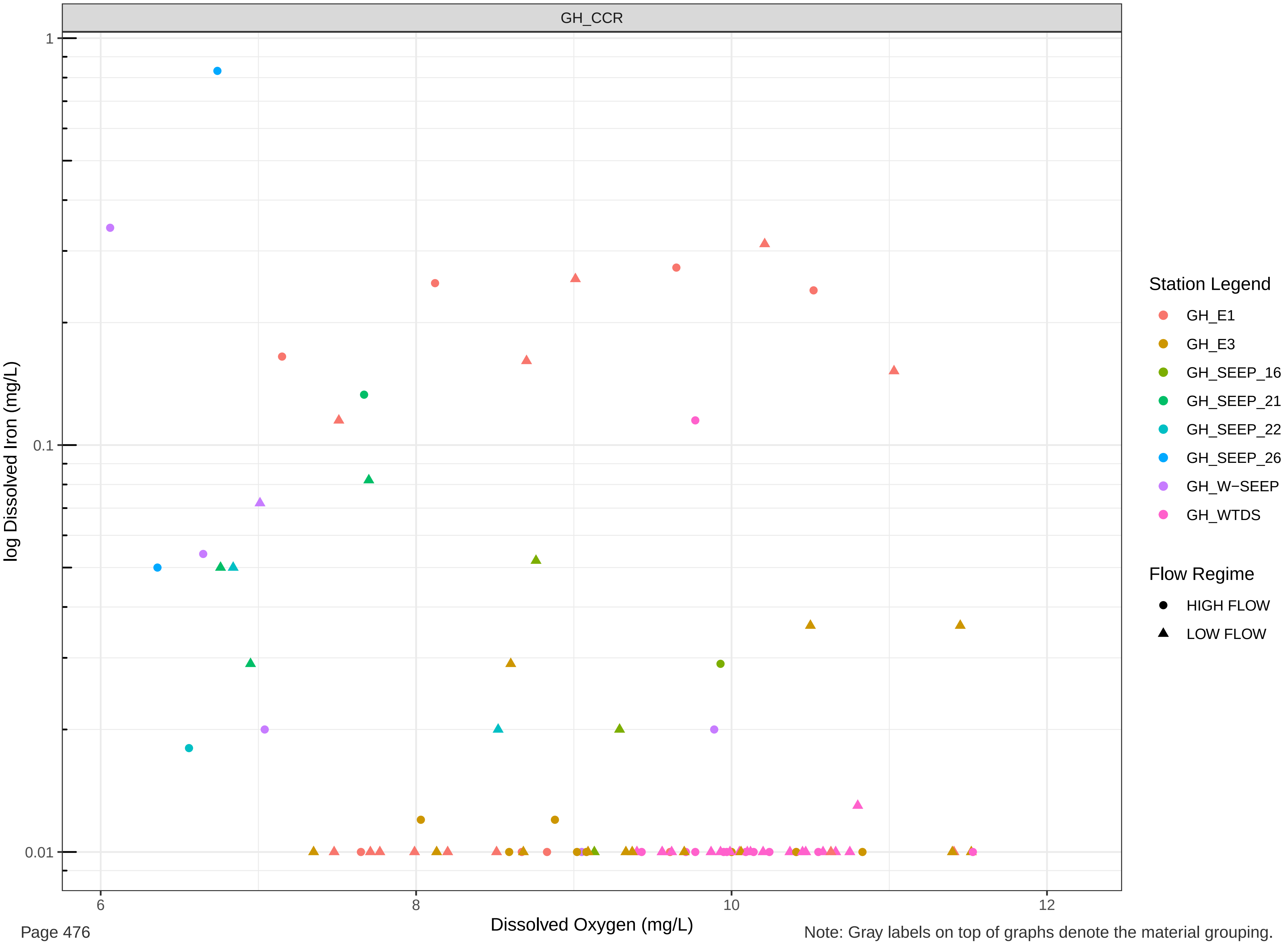

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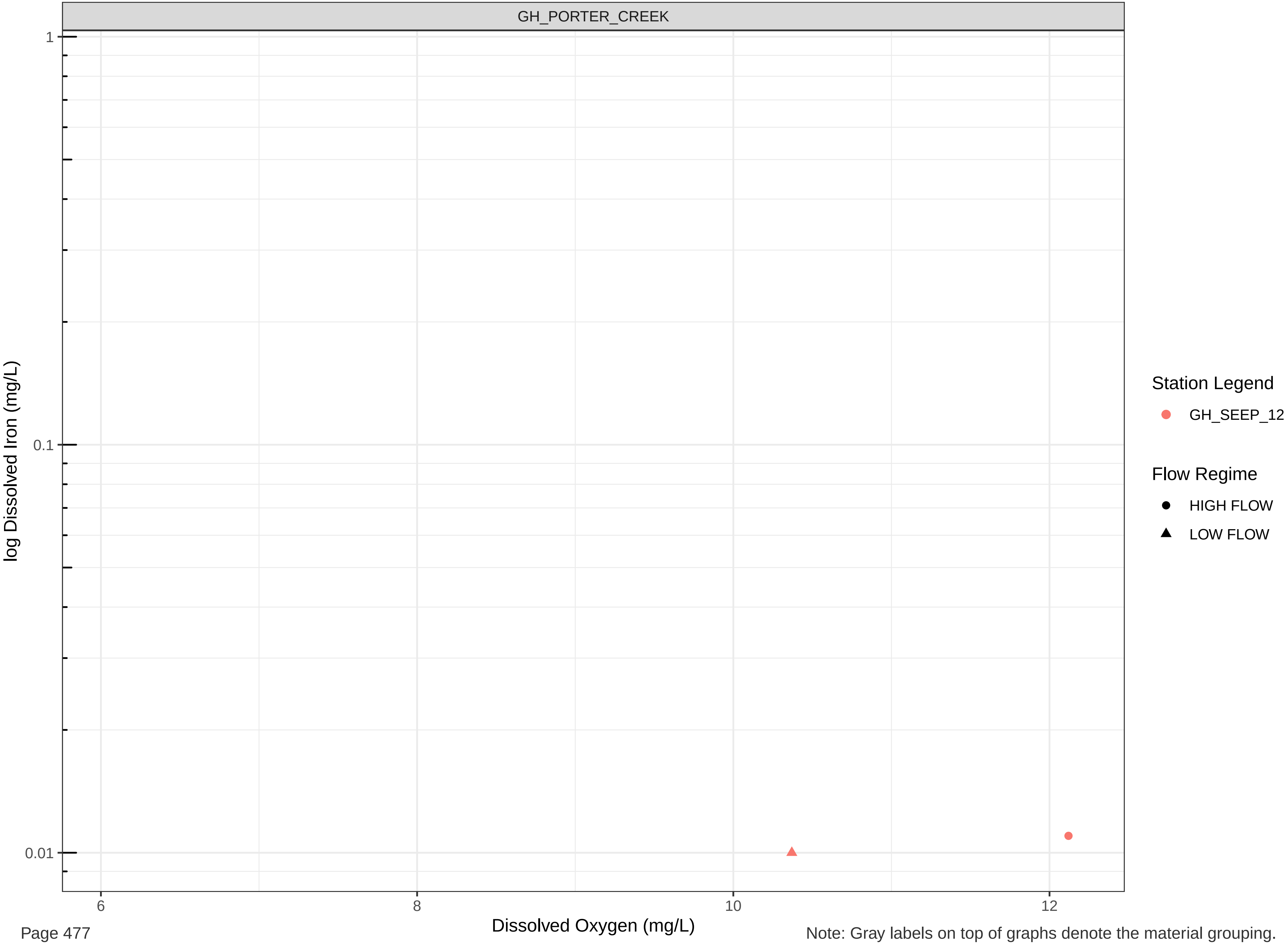

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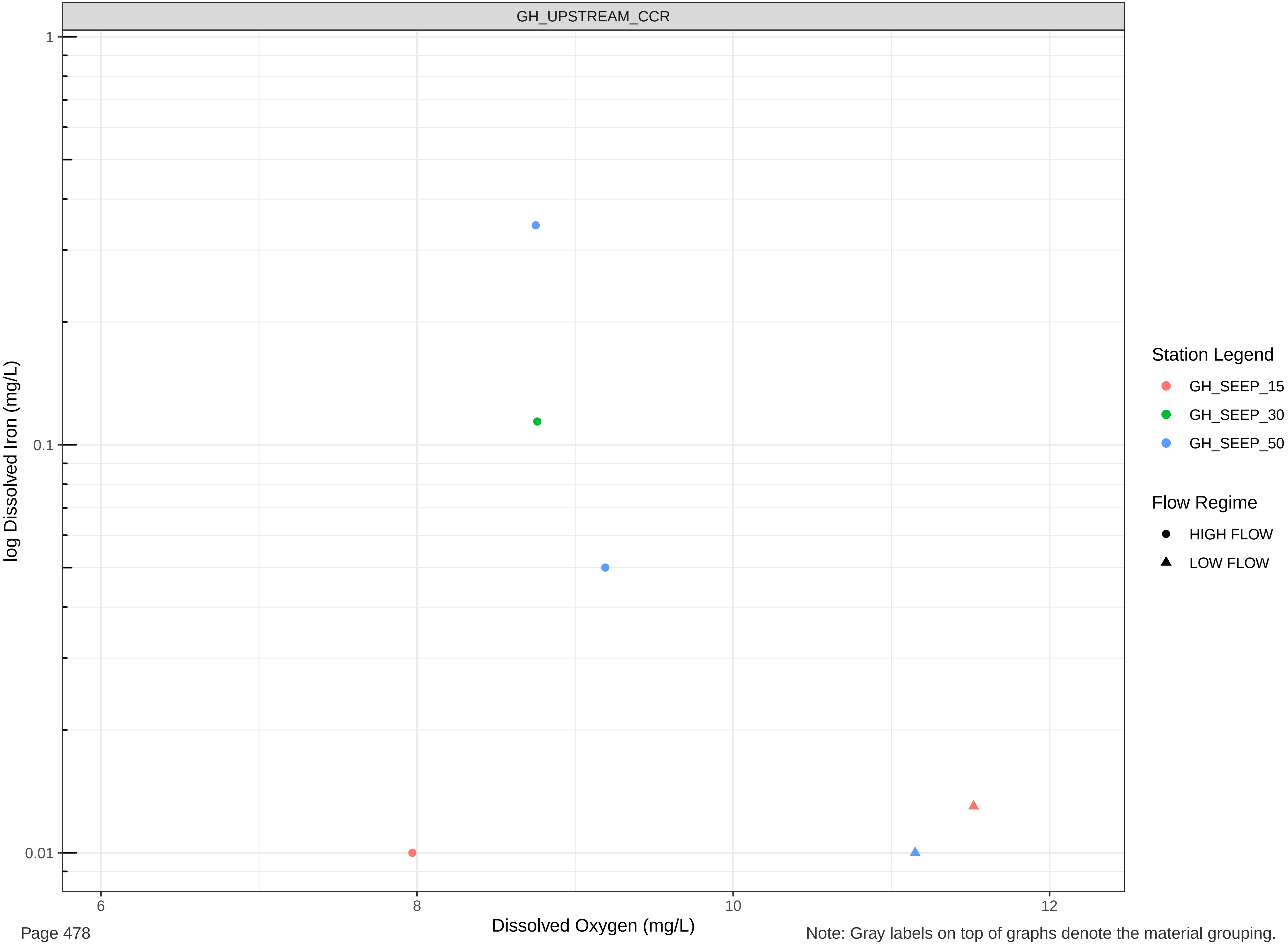

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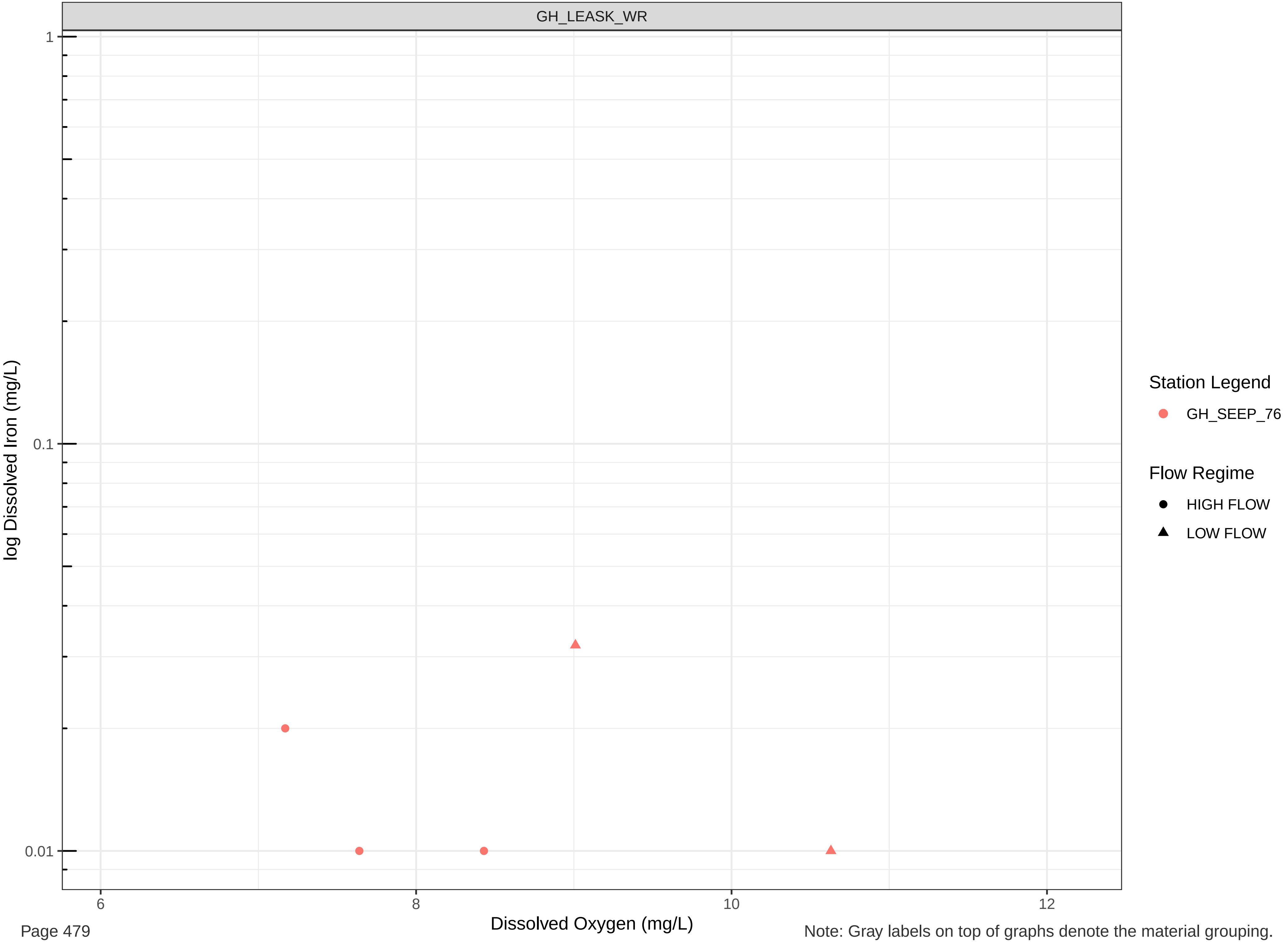

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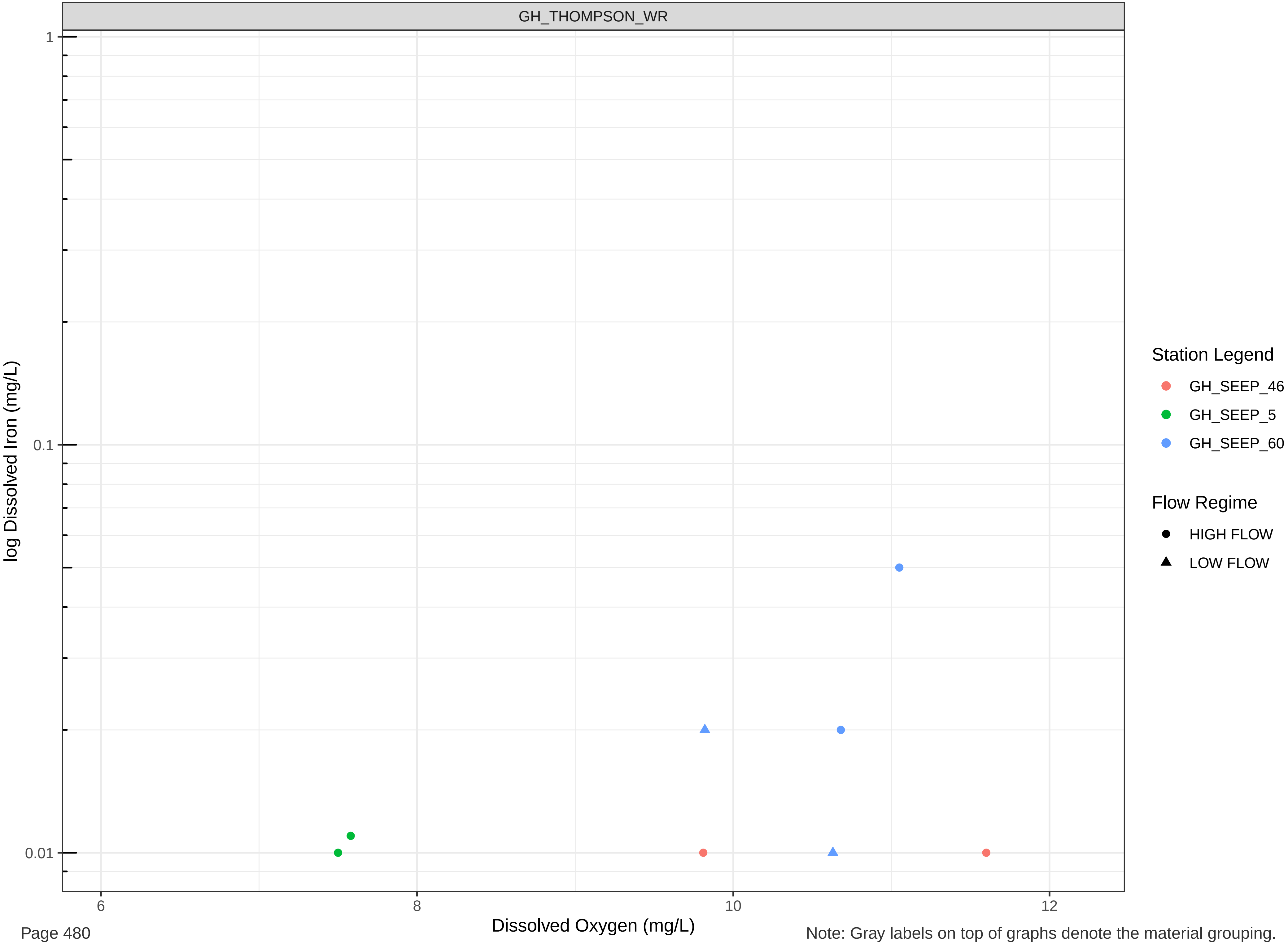
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1
0.1
0.01
6
8
10
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Dissolved Oxygen (mg/L)
Station Legend
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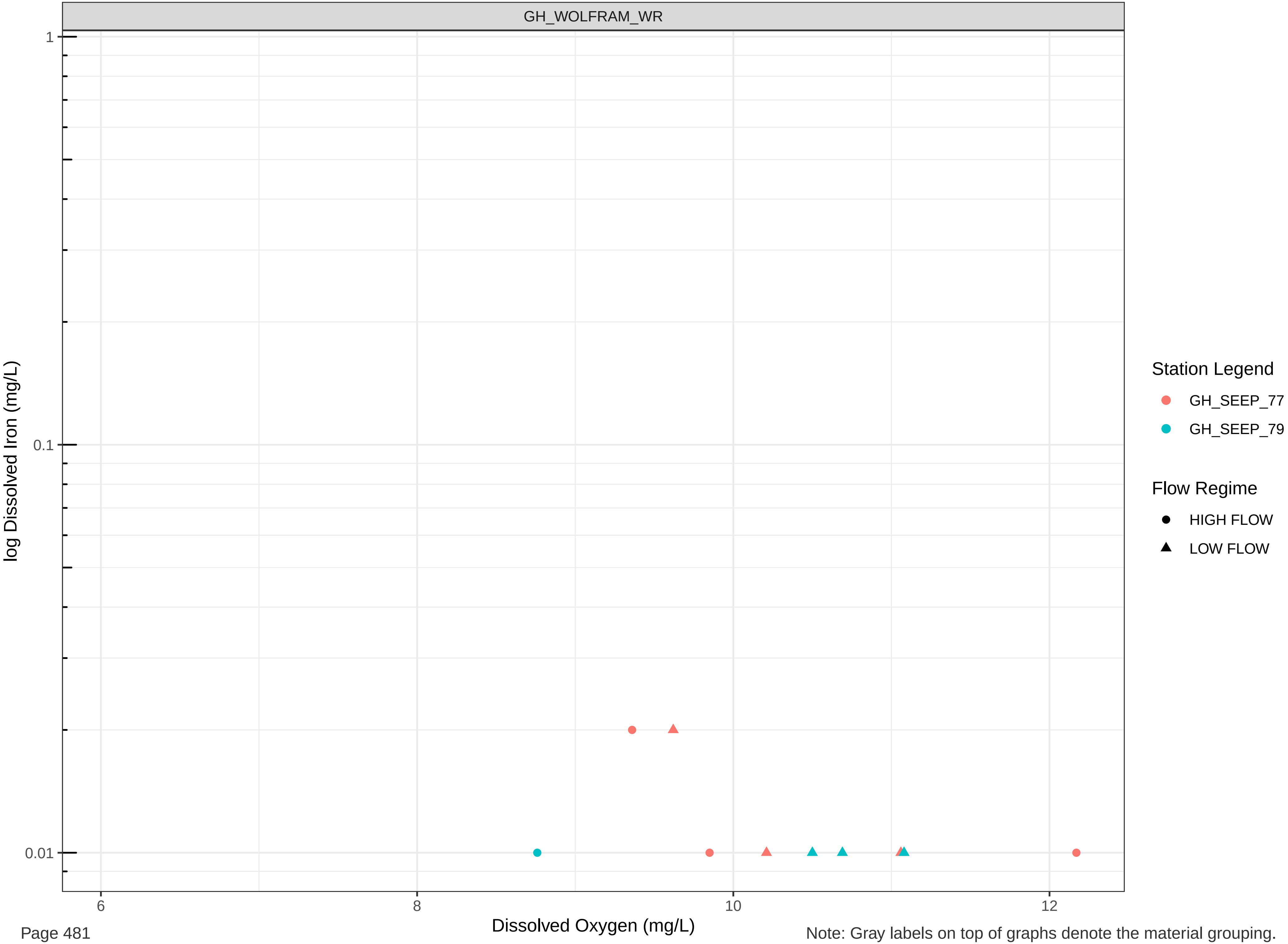
LOW FLOW



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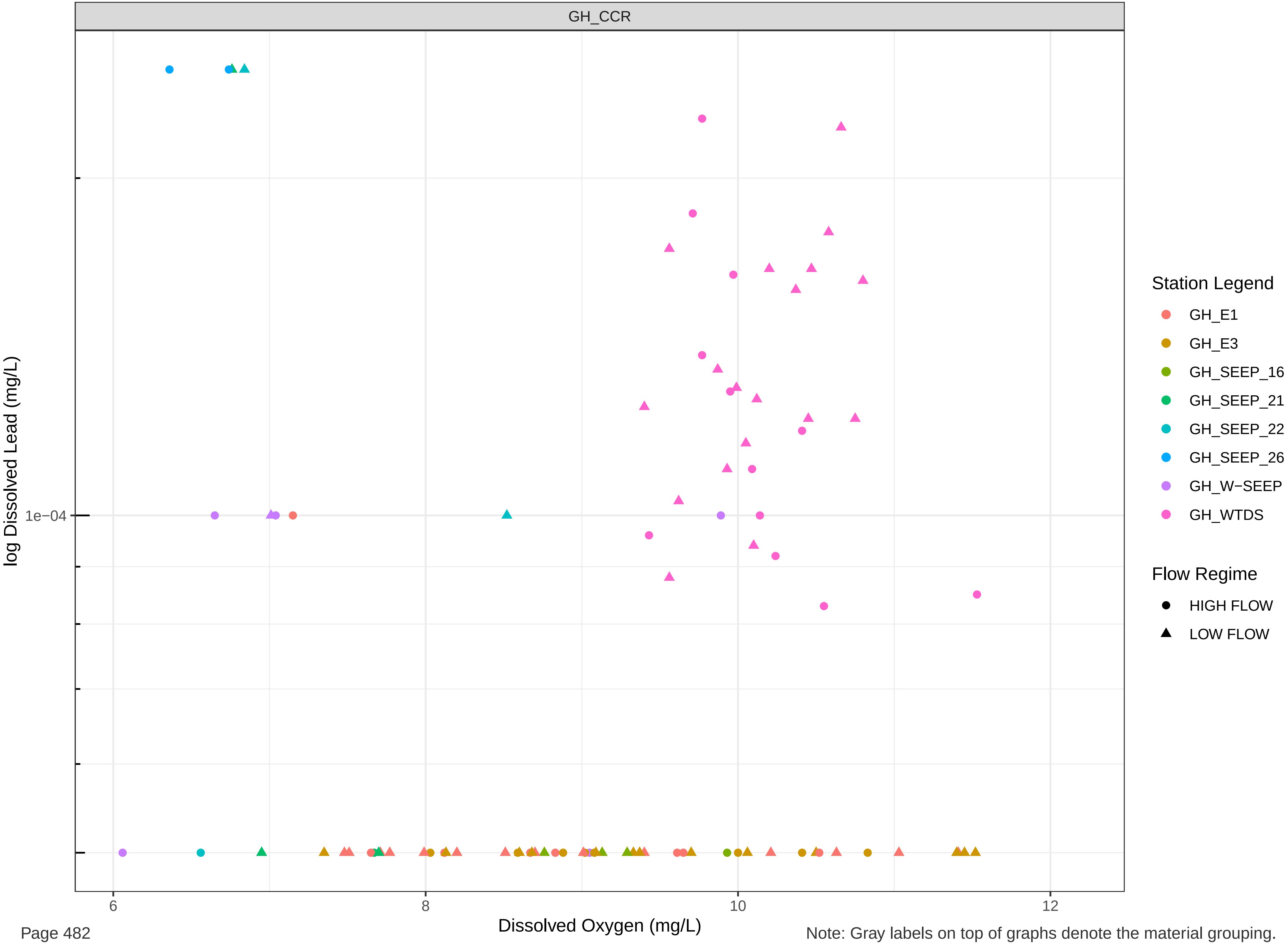

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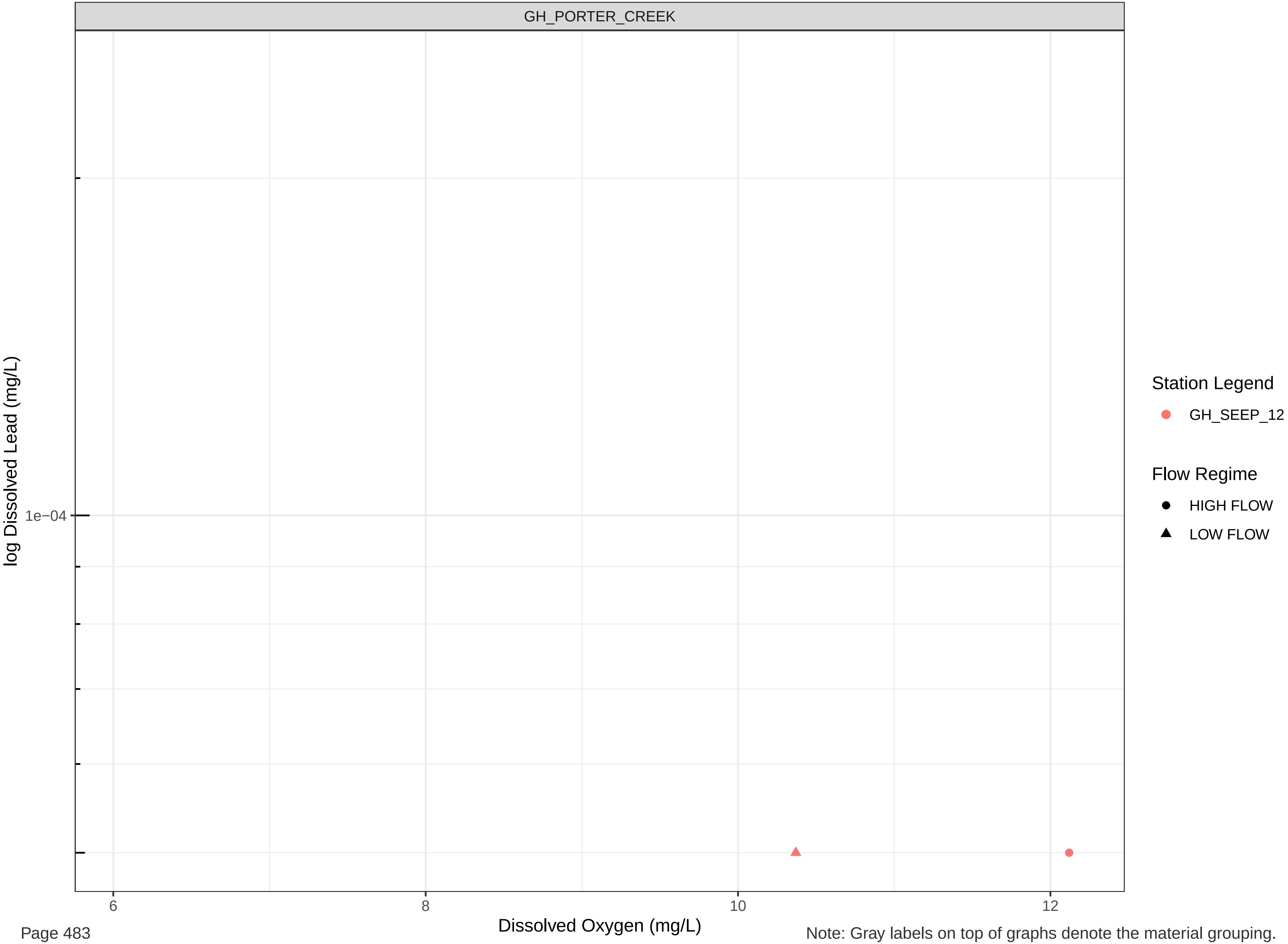

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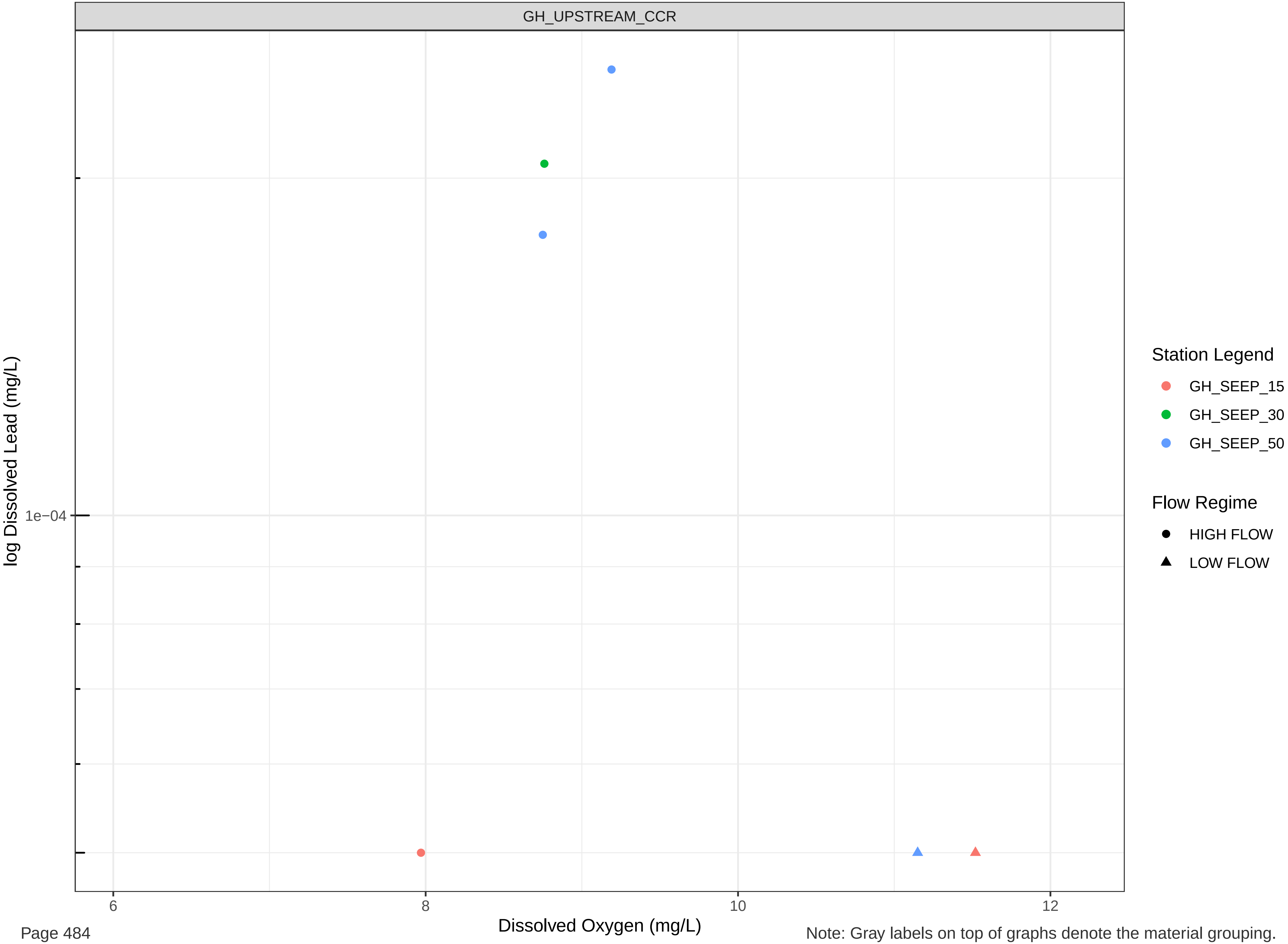

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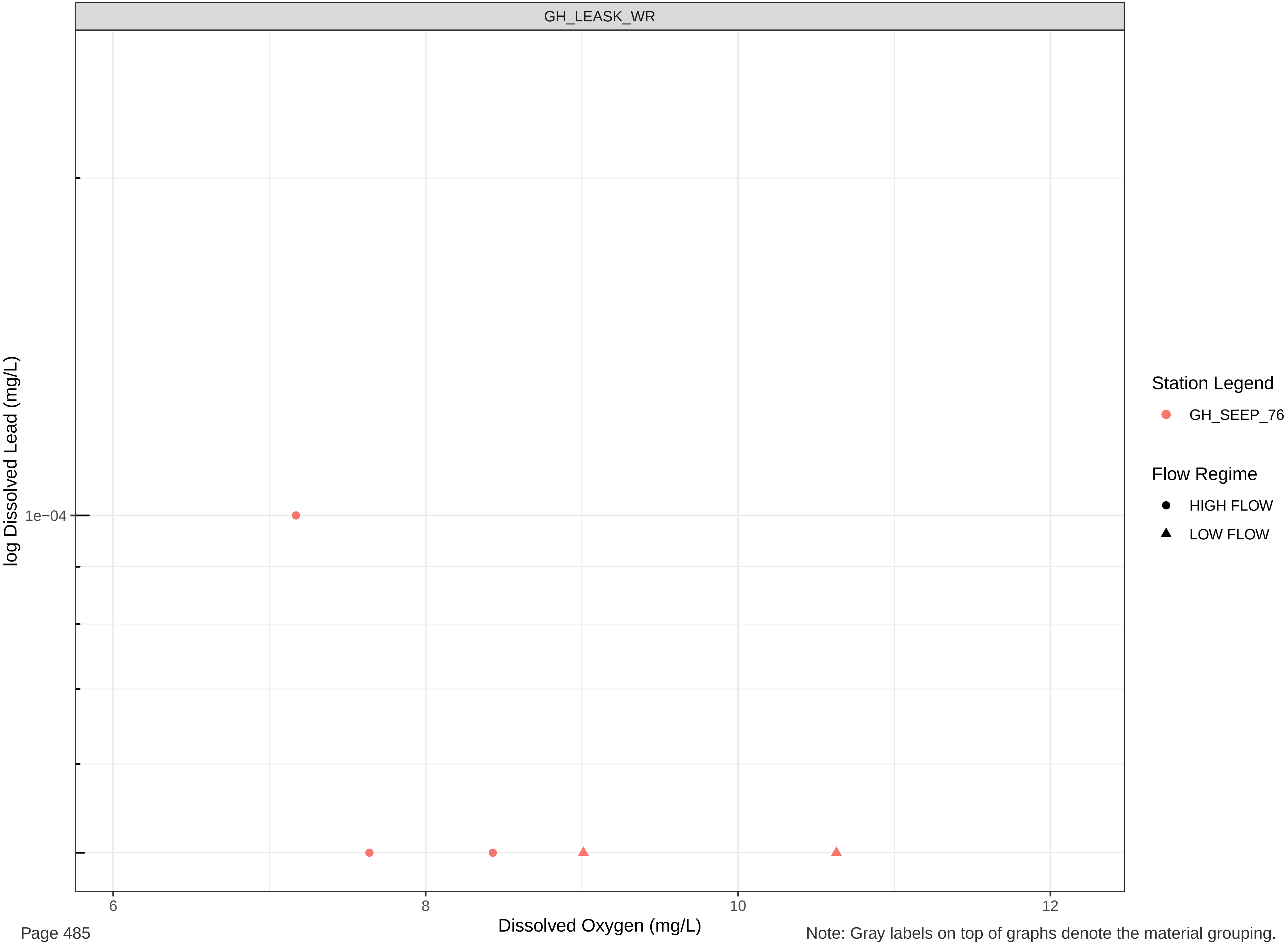

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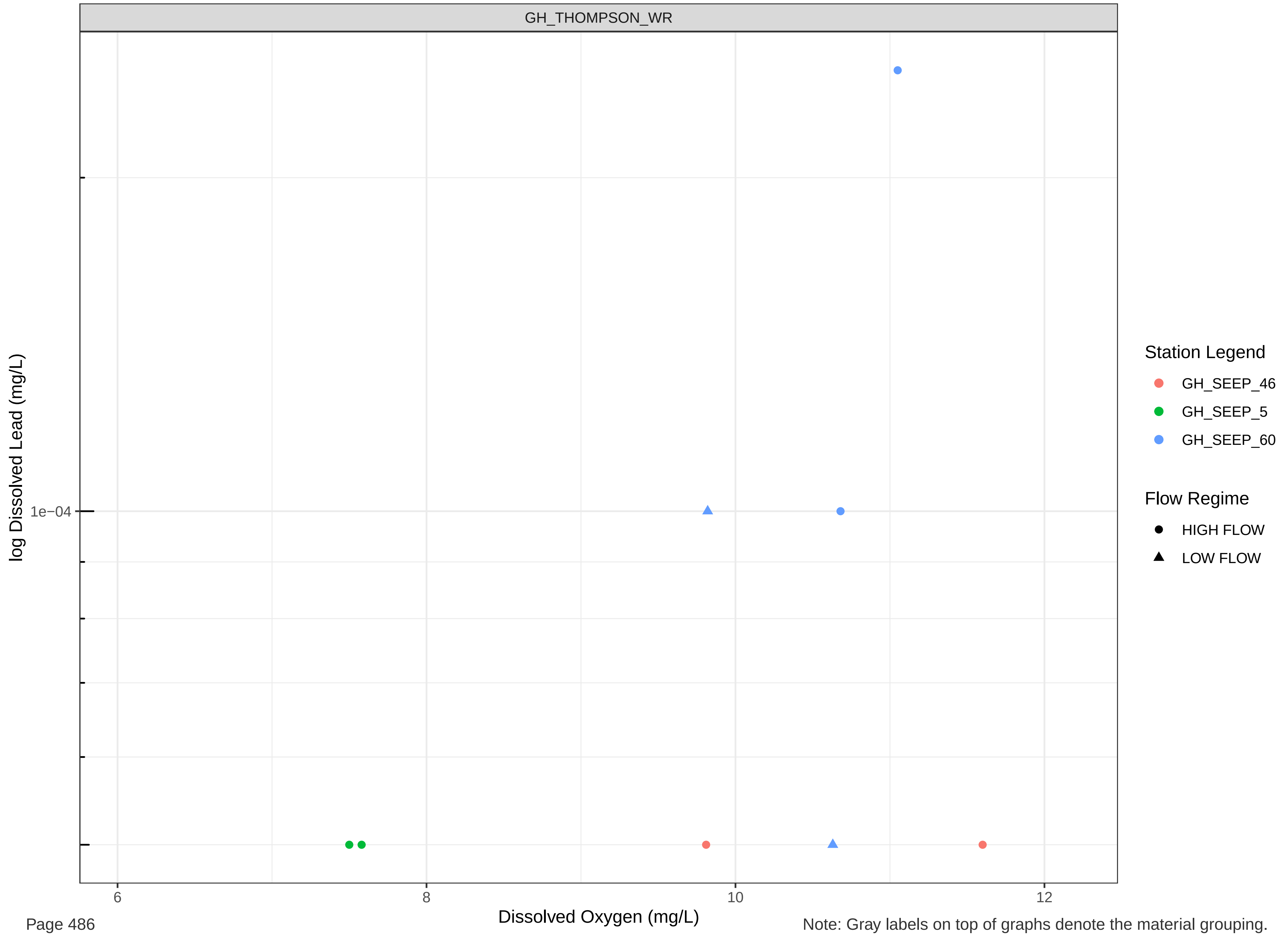

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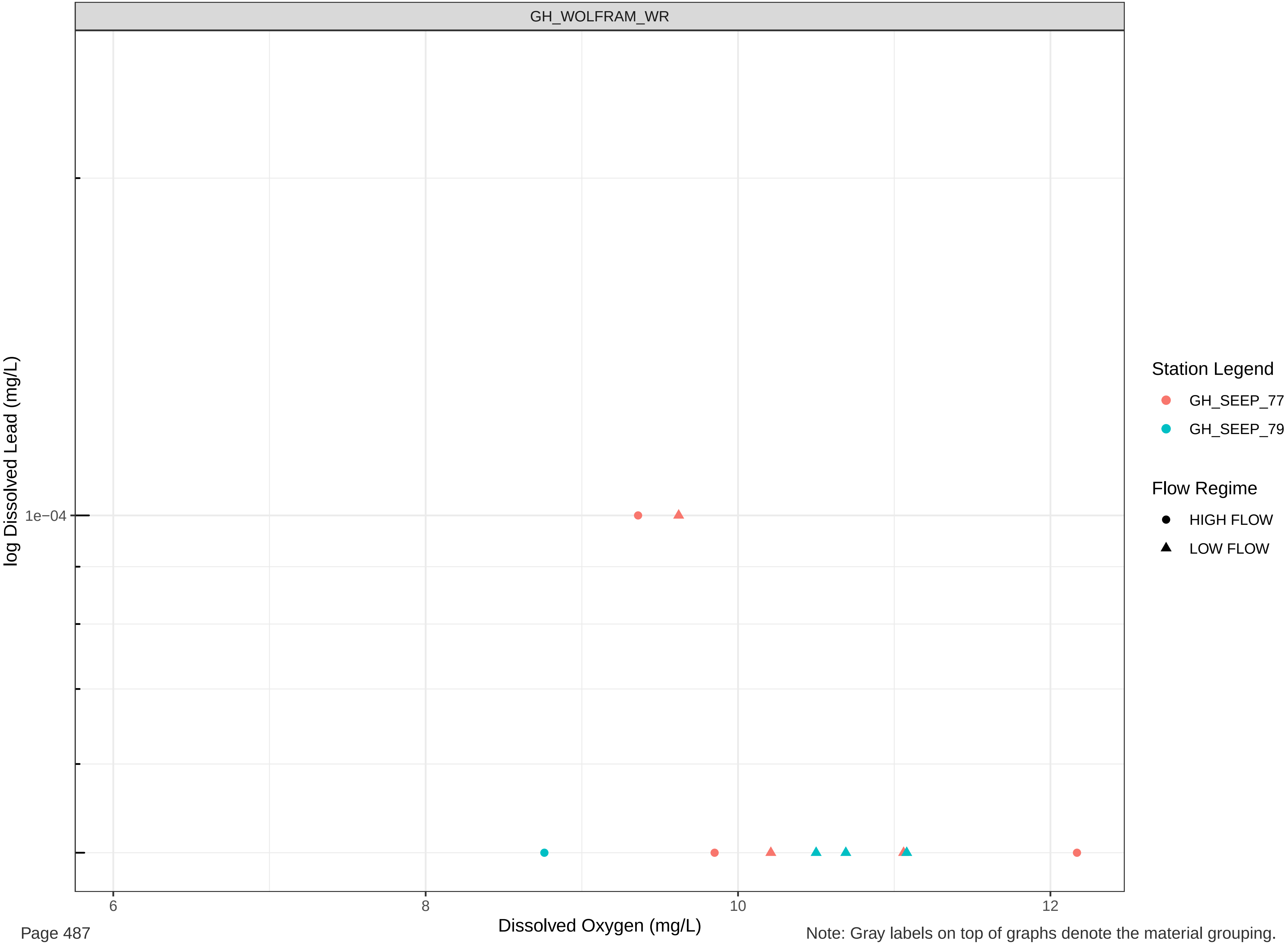

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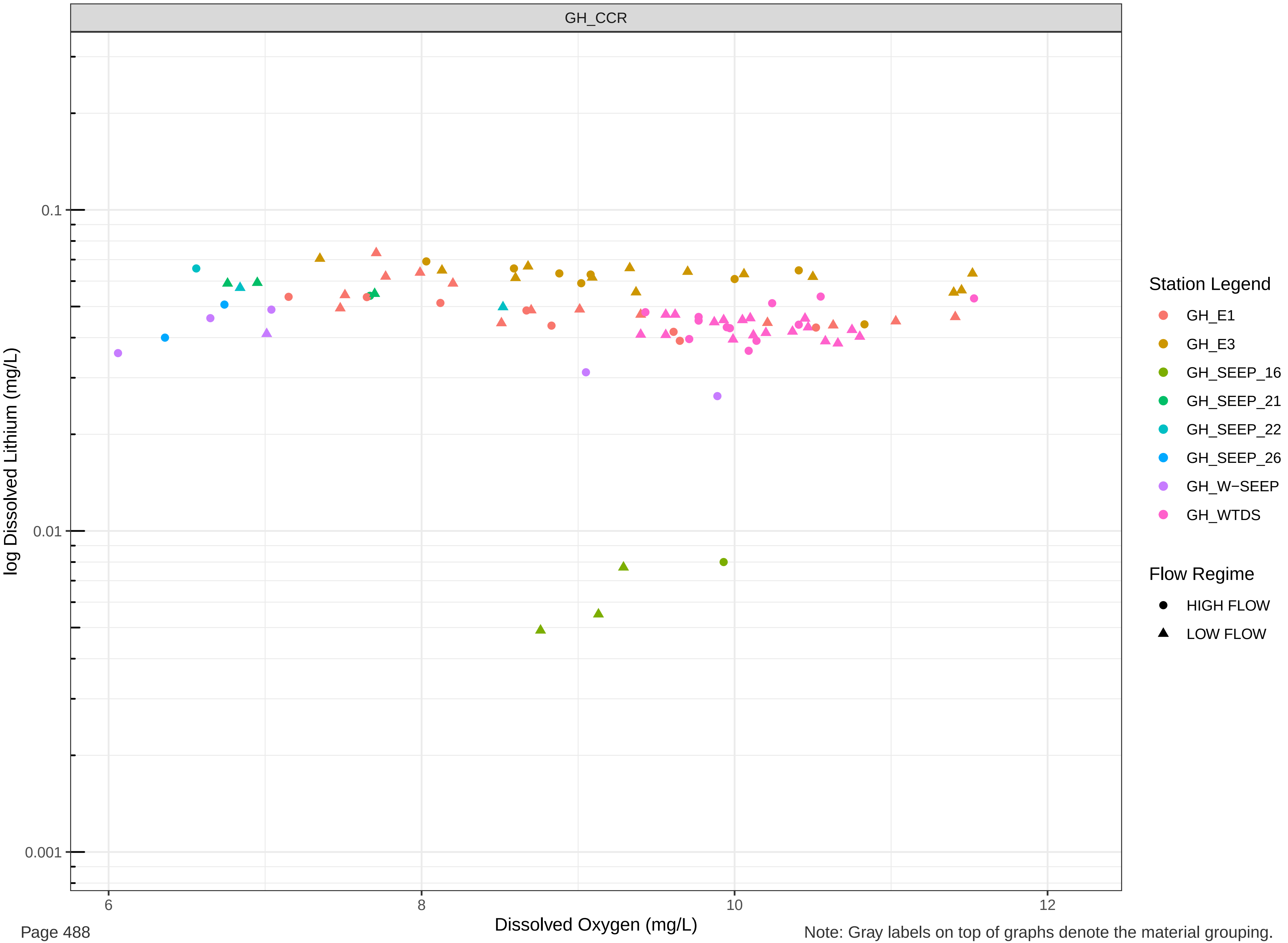

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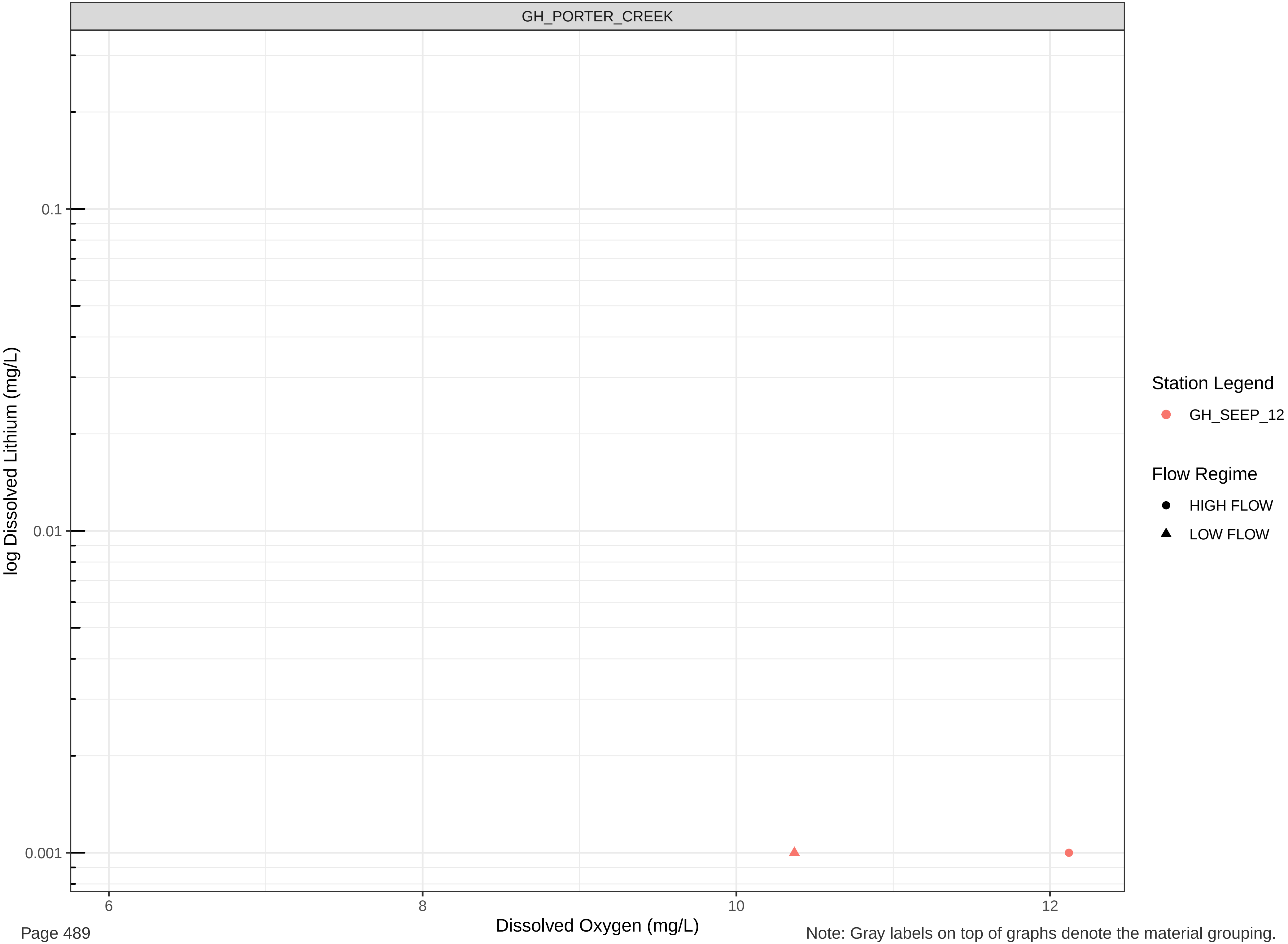

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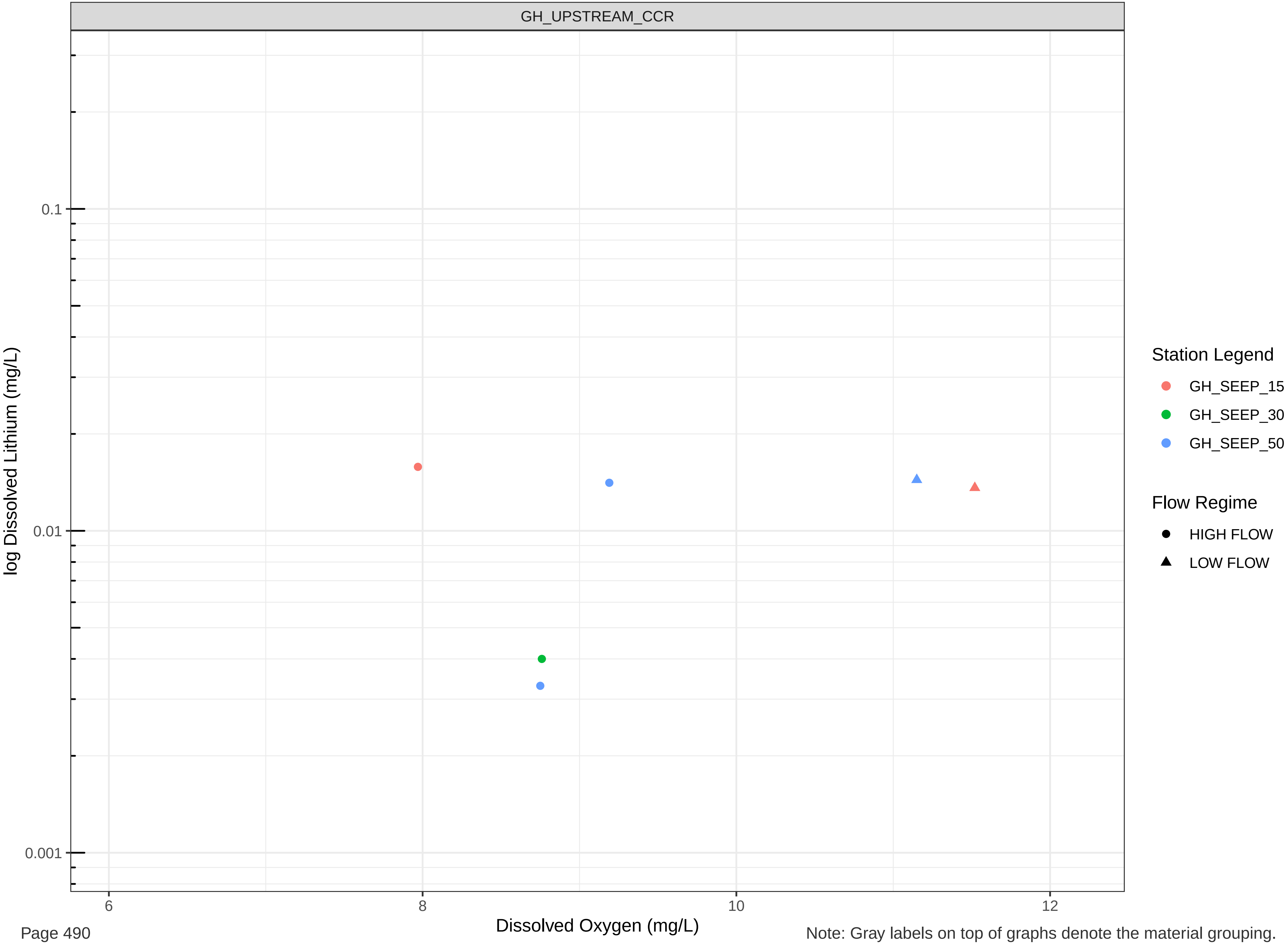

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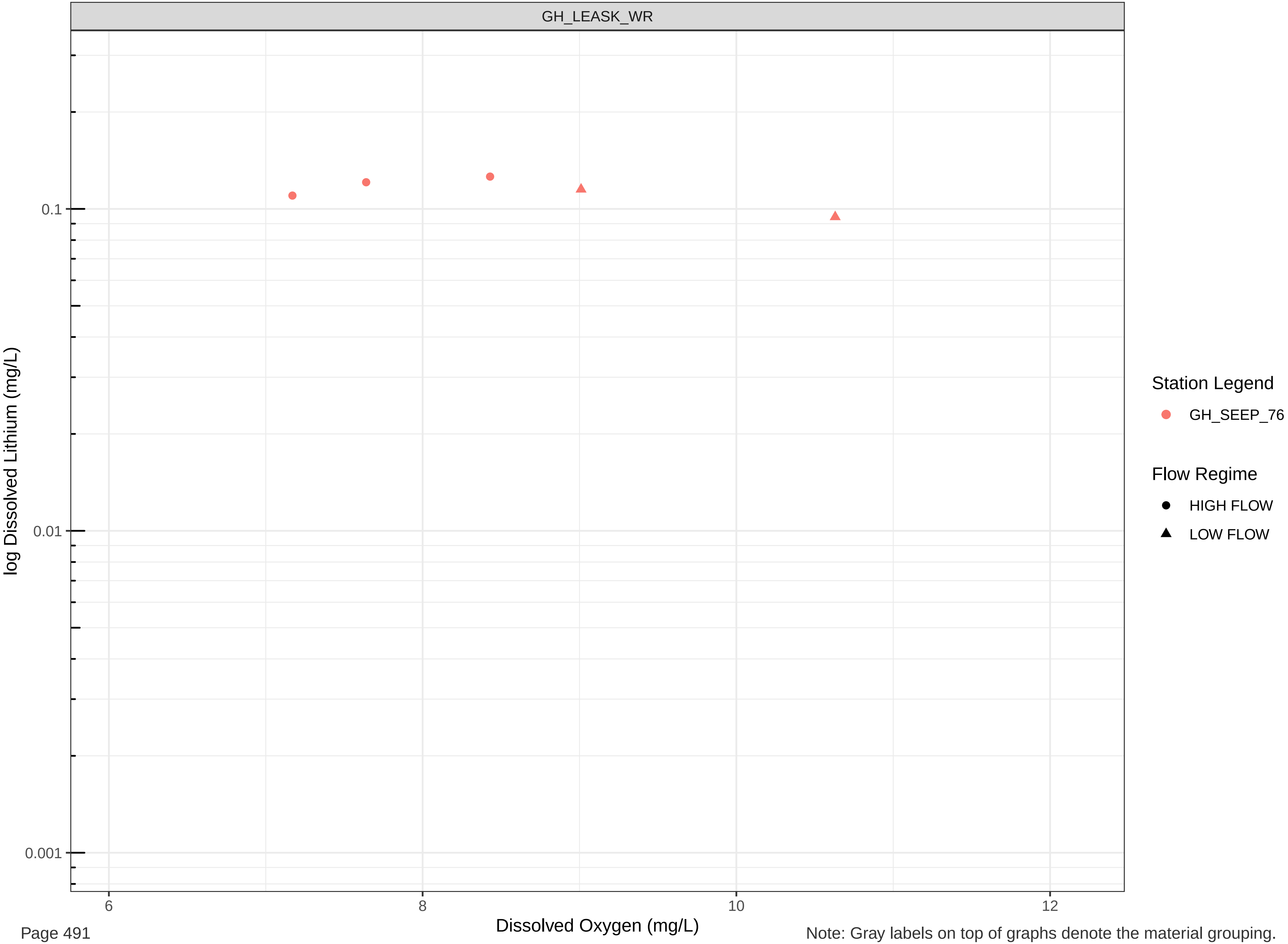

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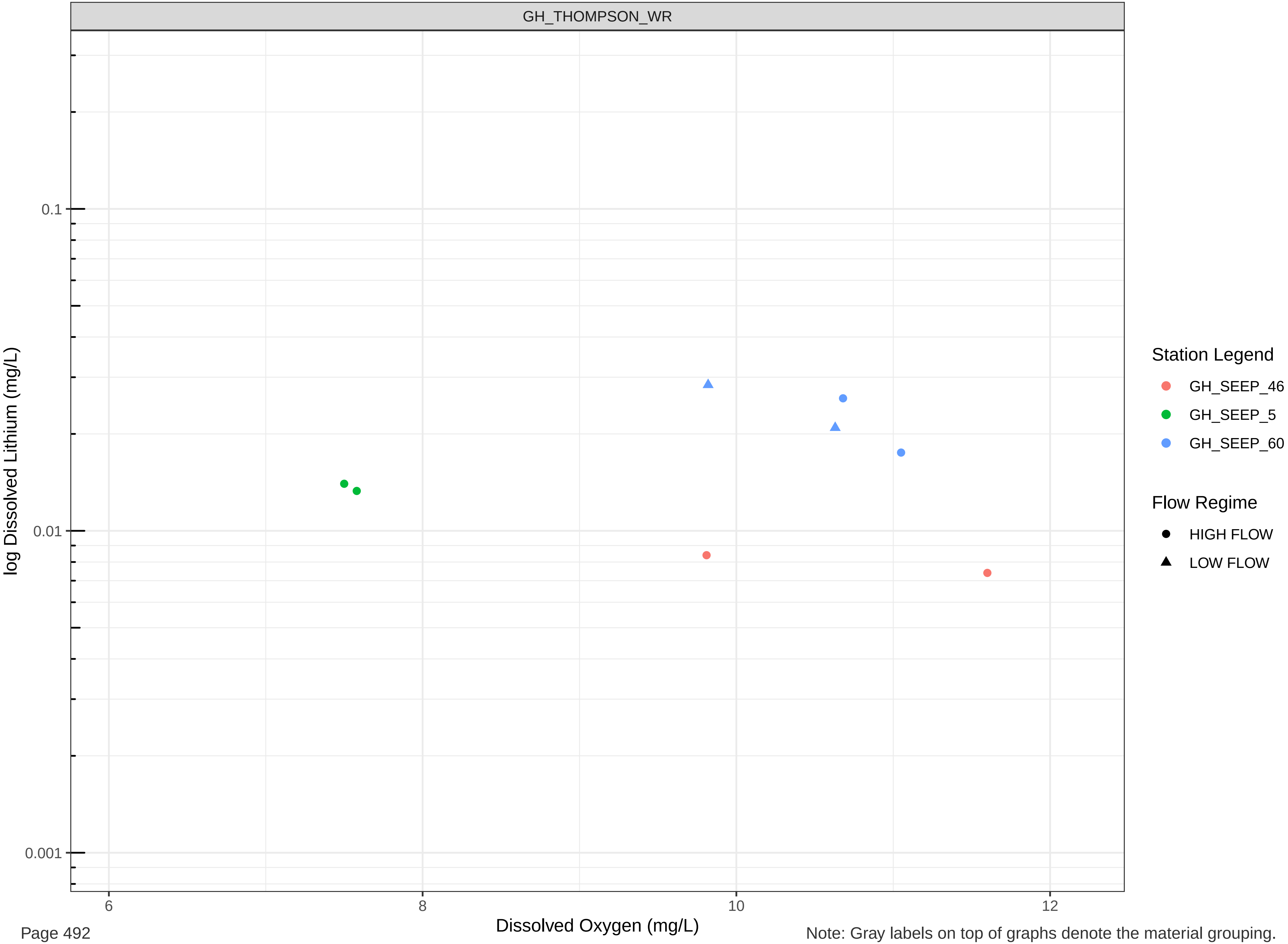

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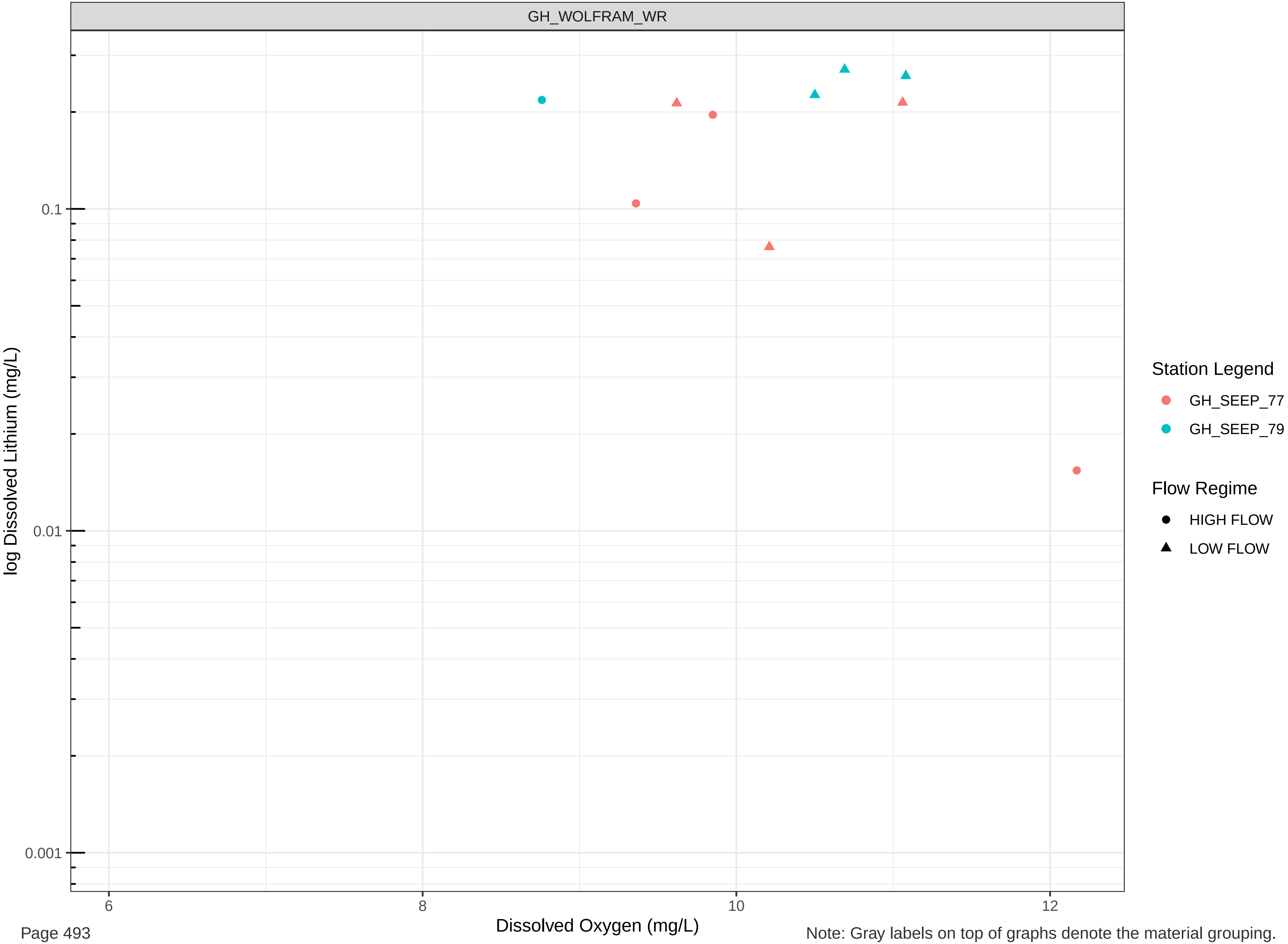

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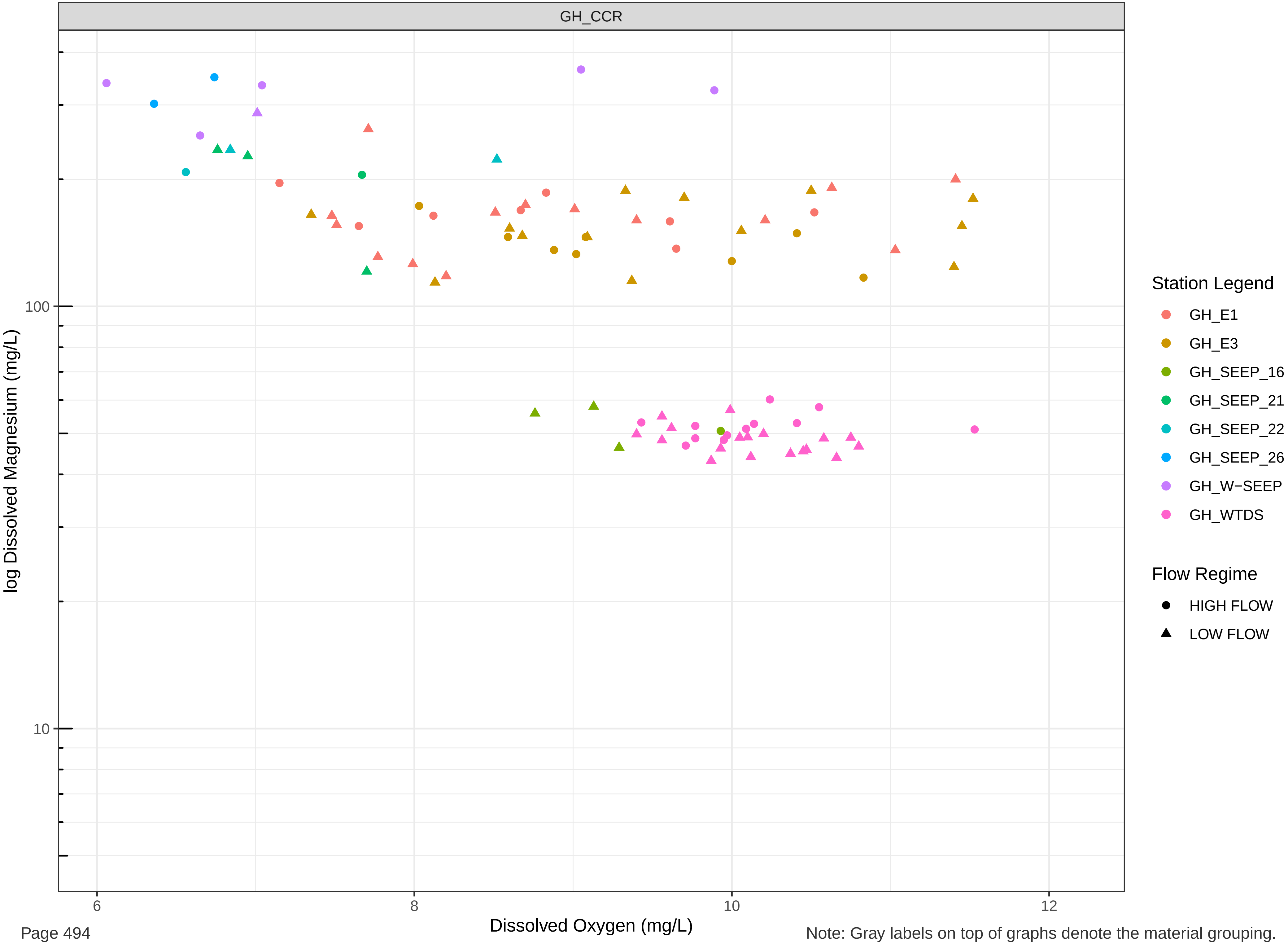

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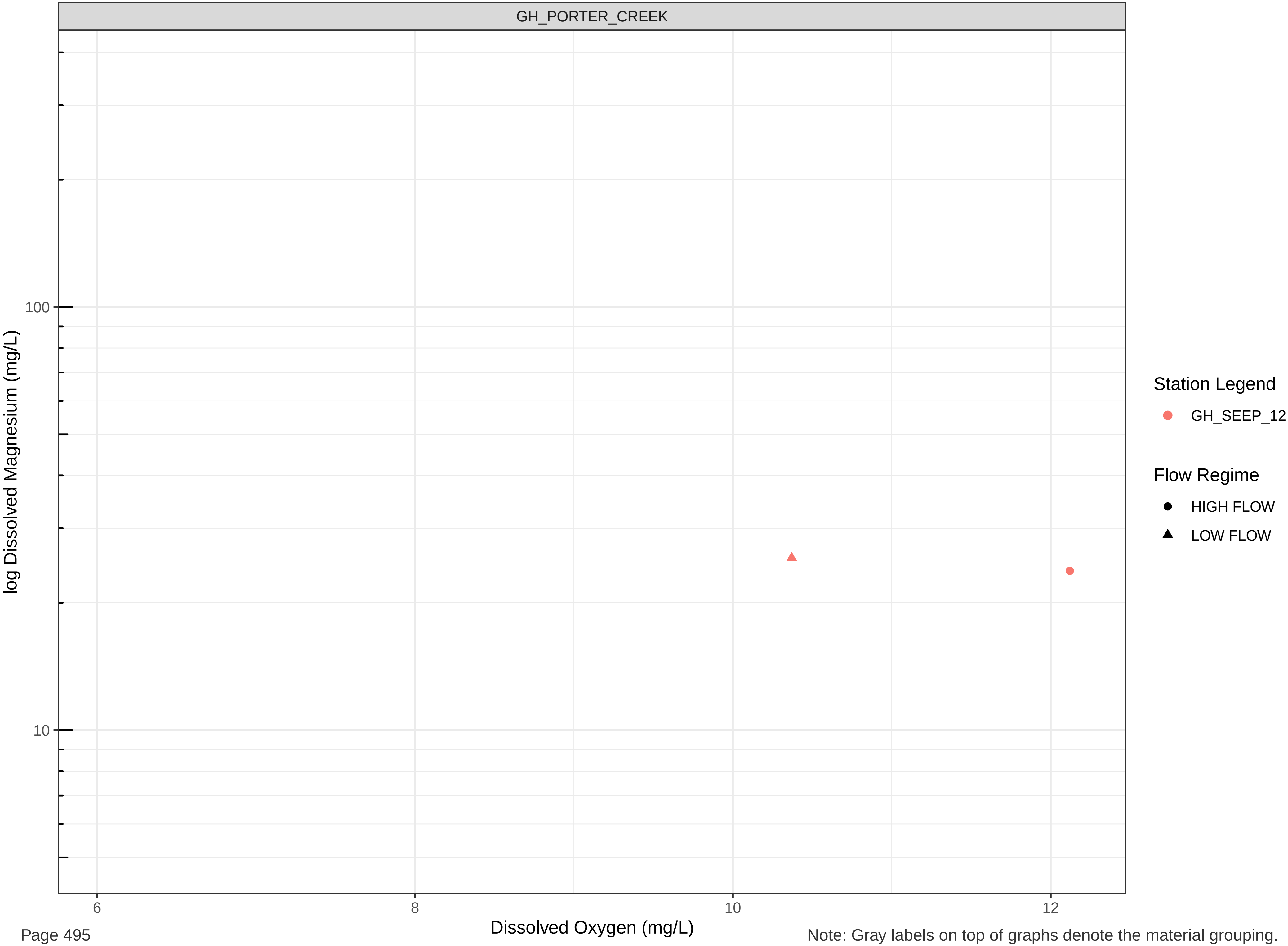

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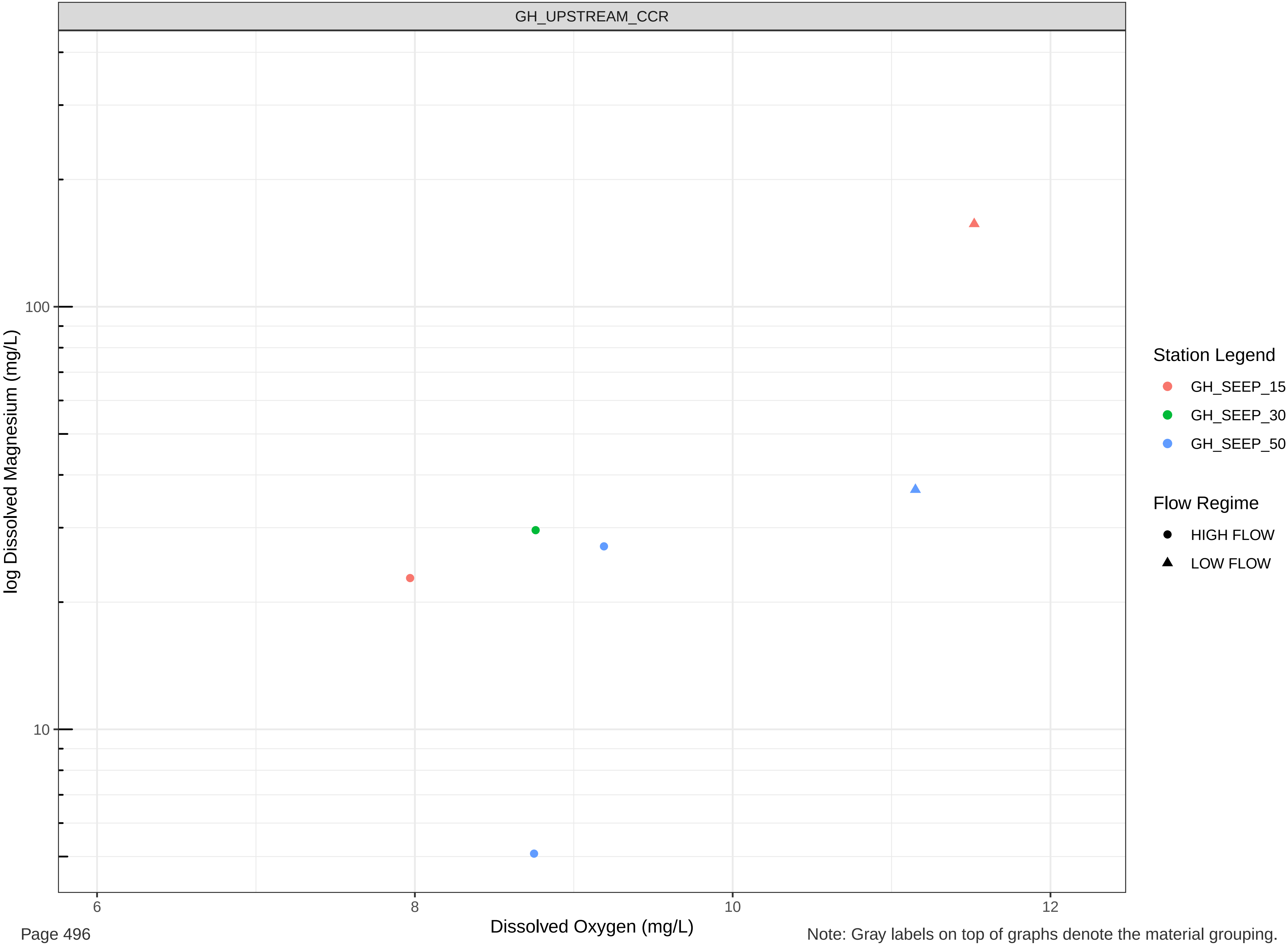

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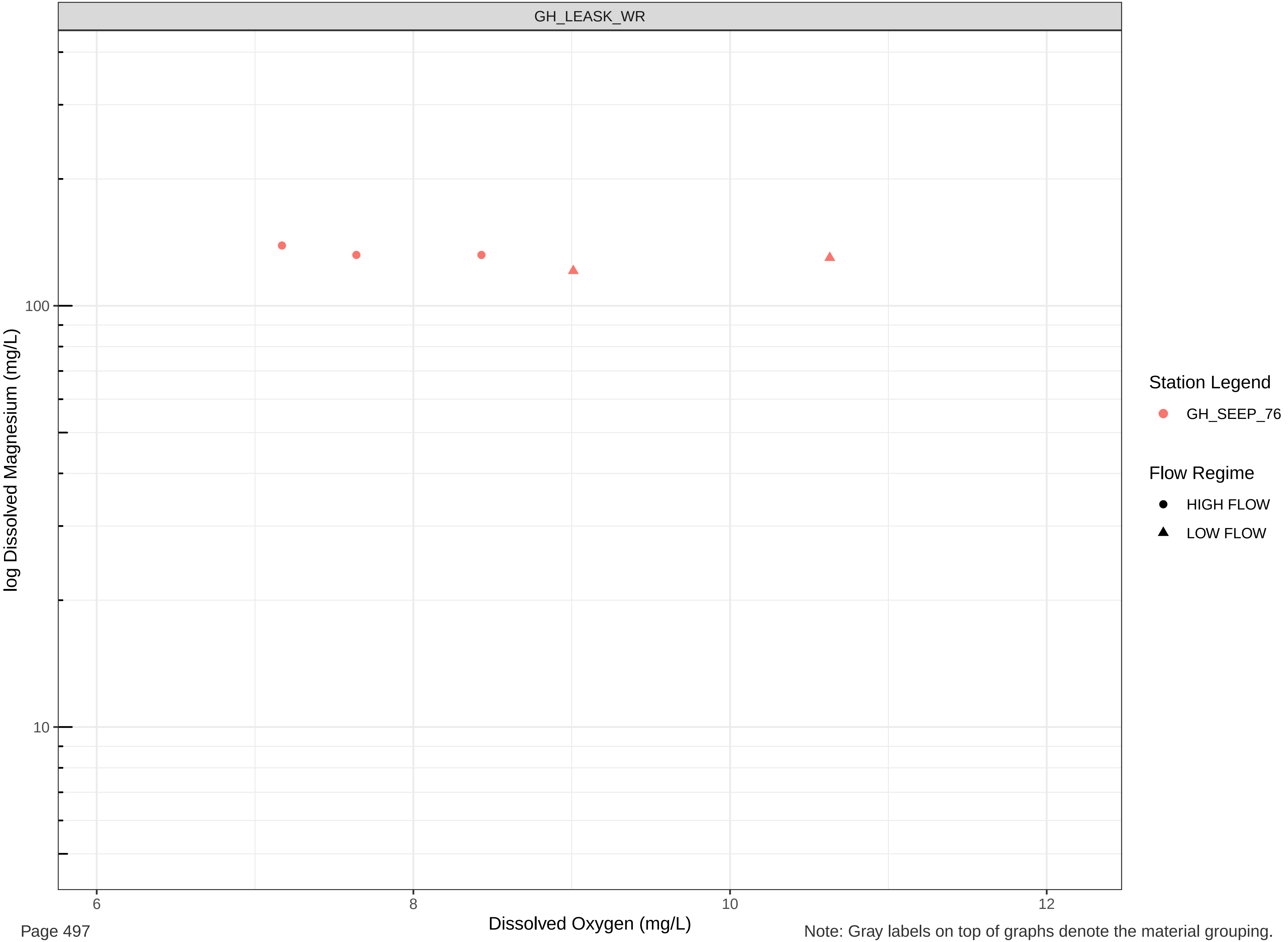

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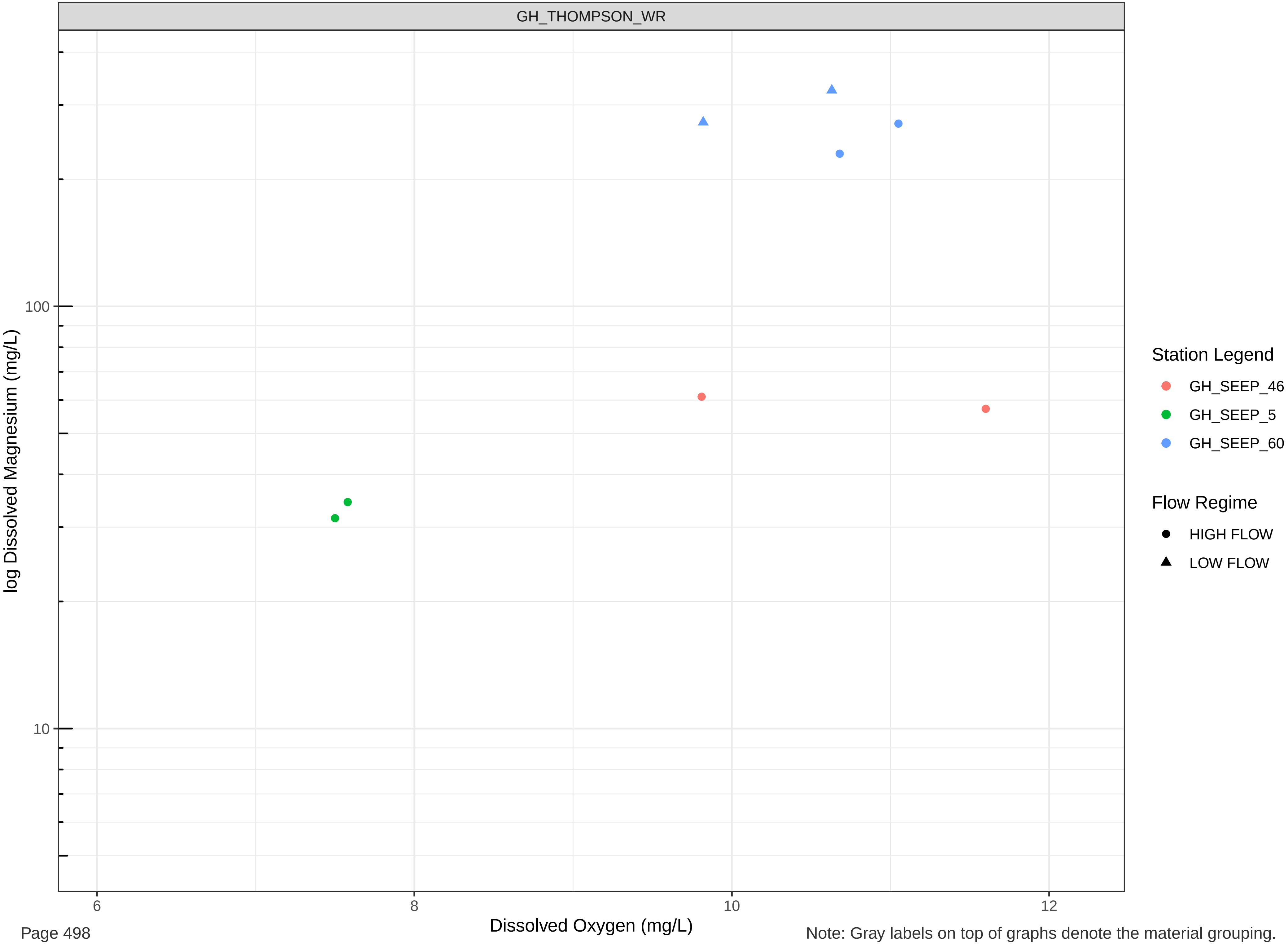

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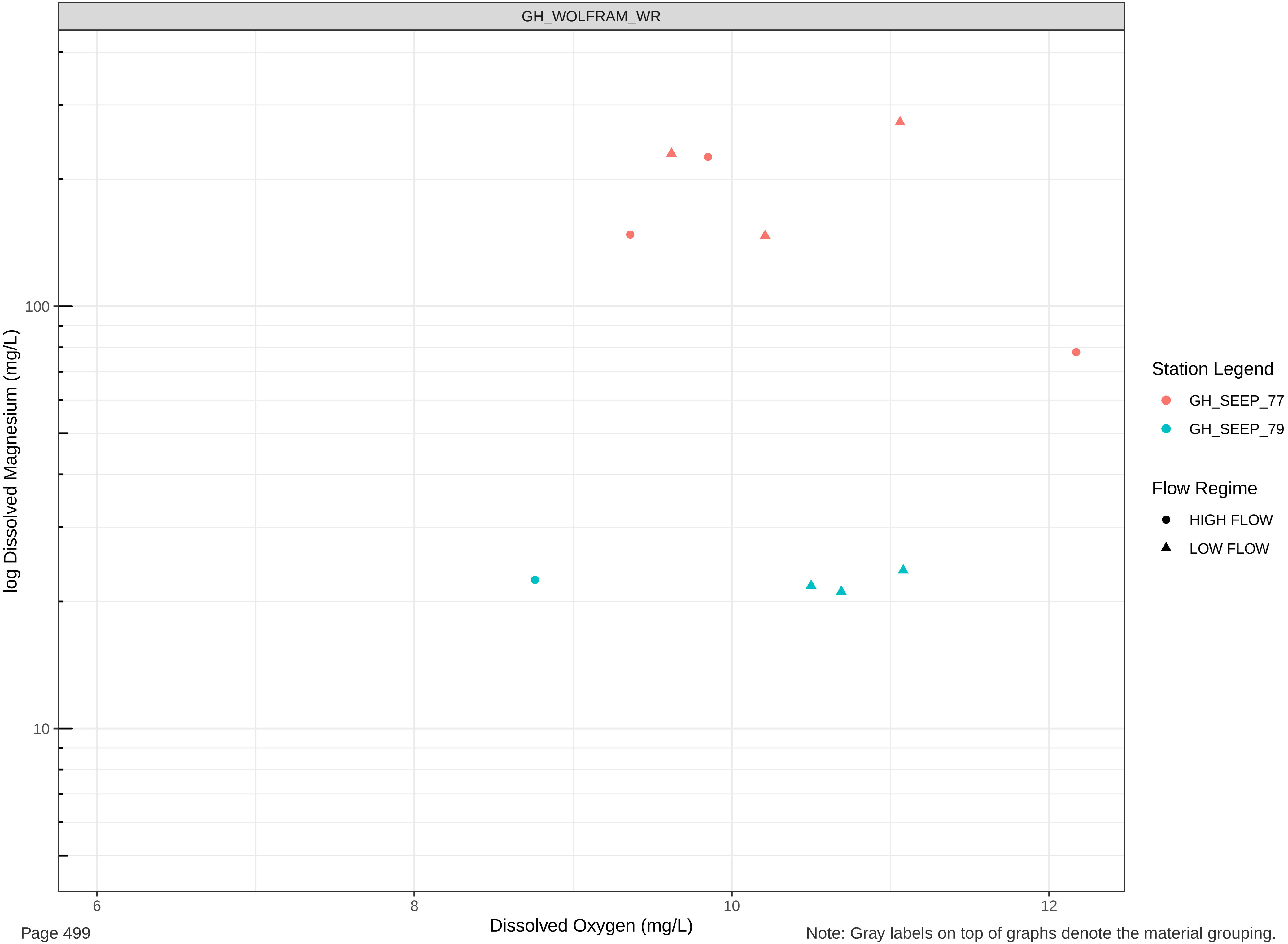

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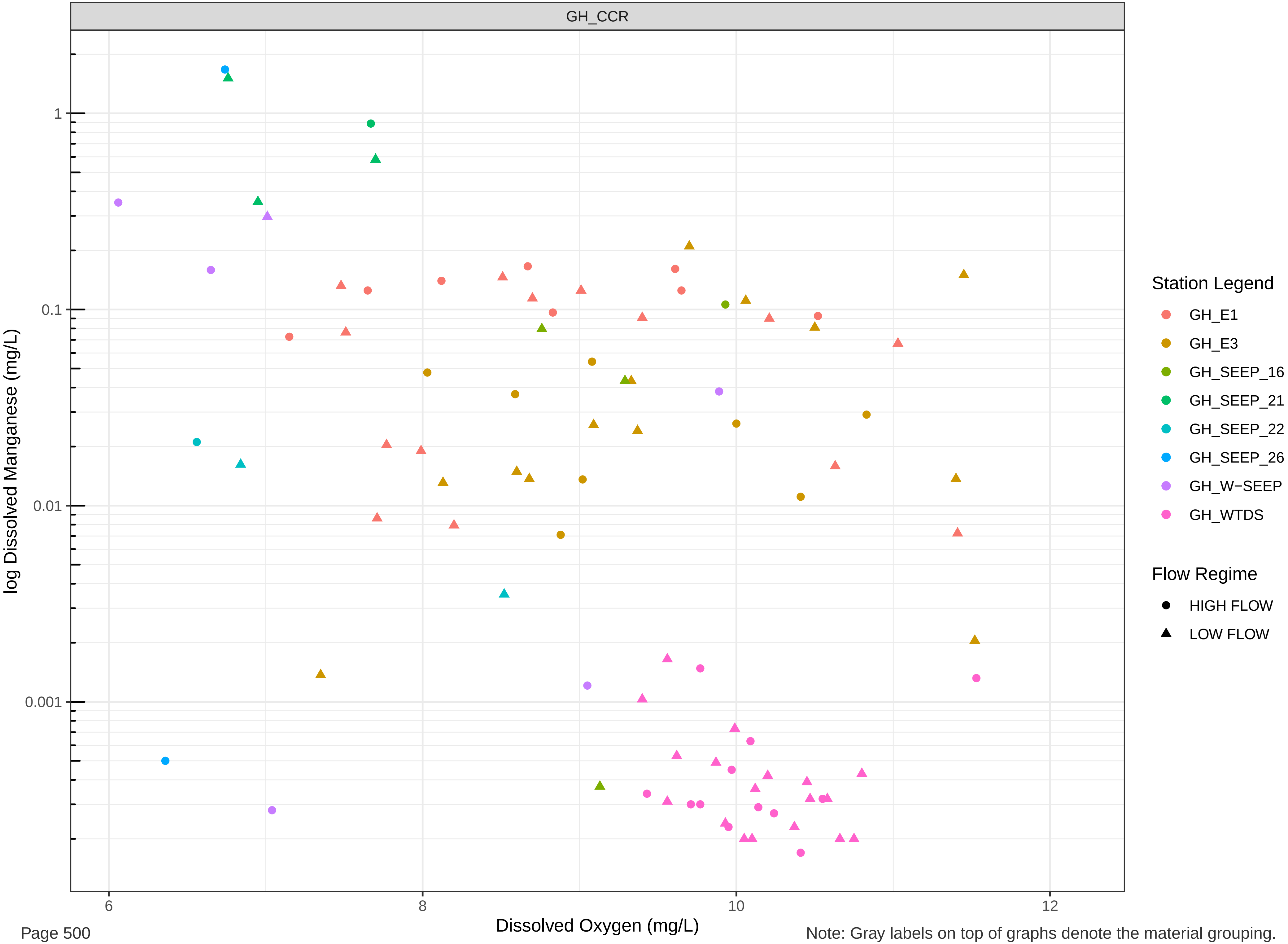

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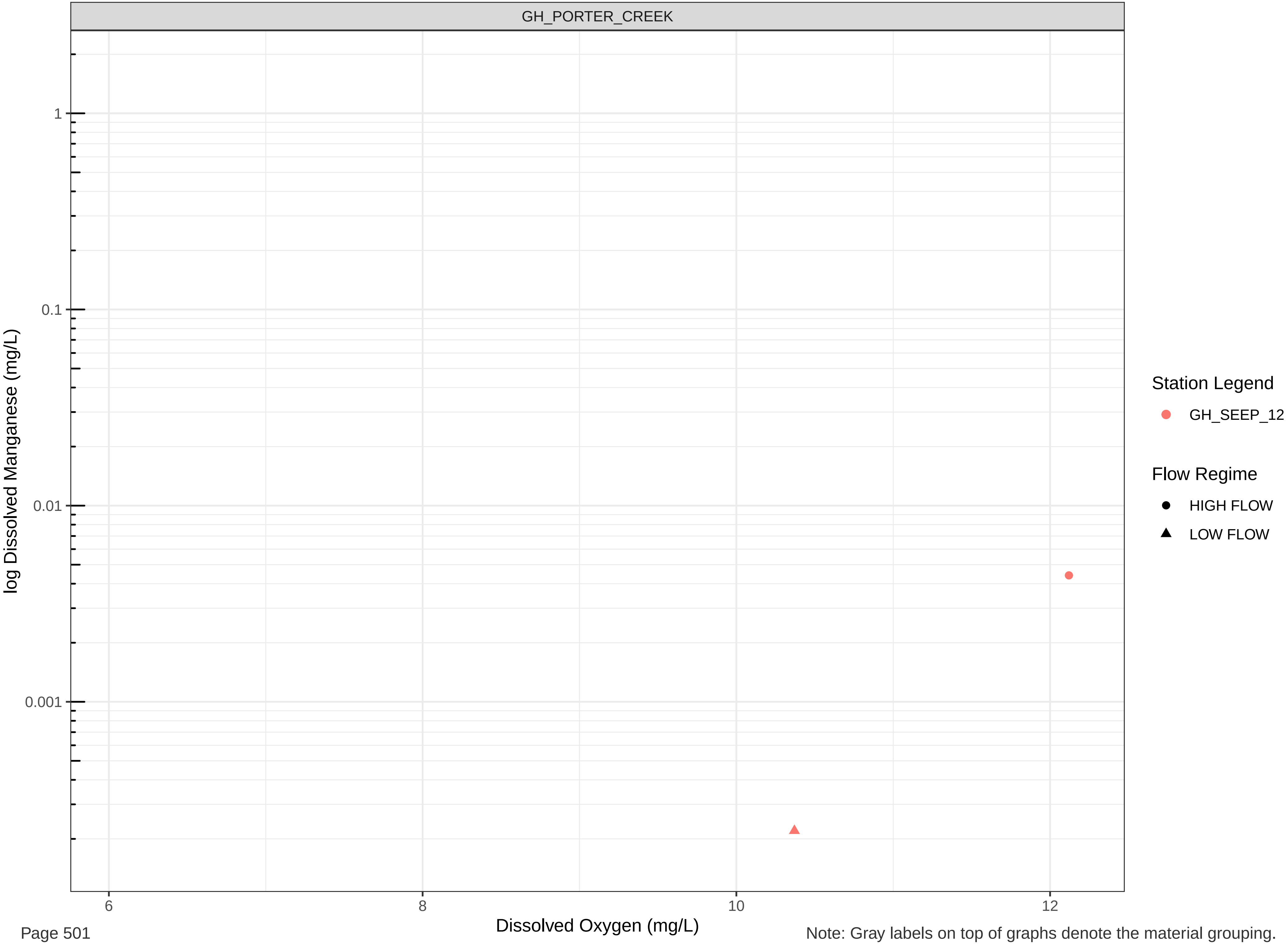

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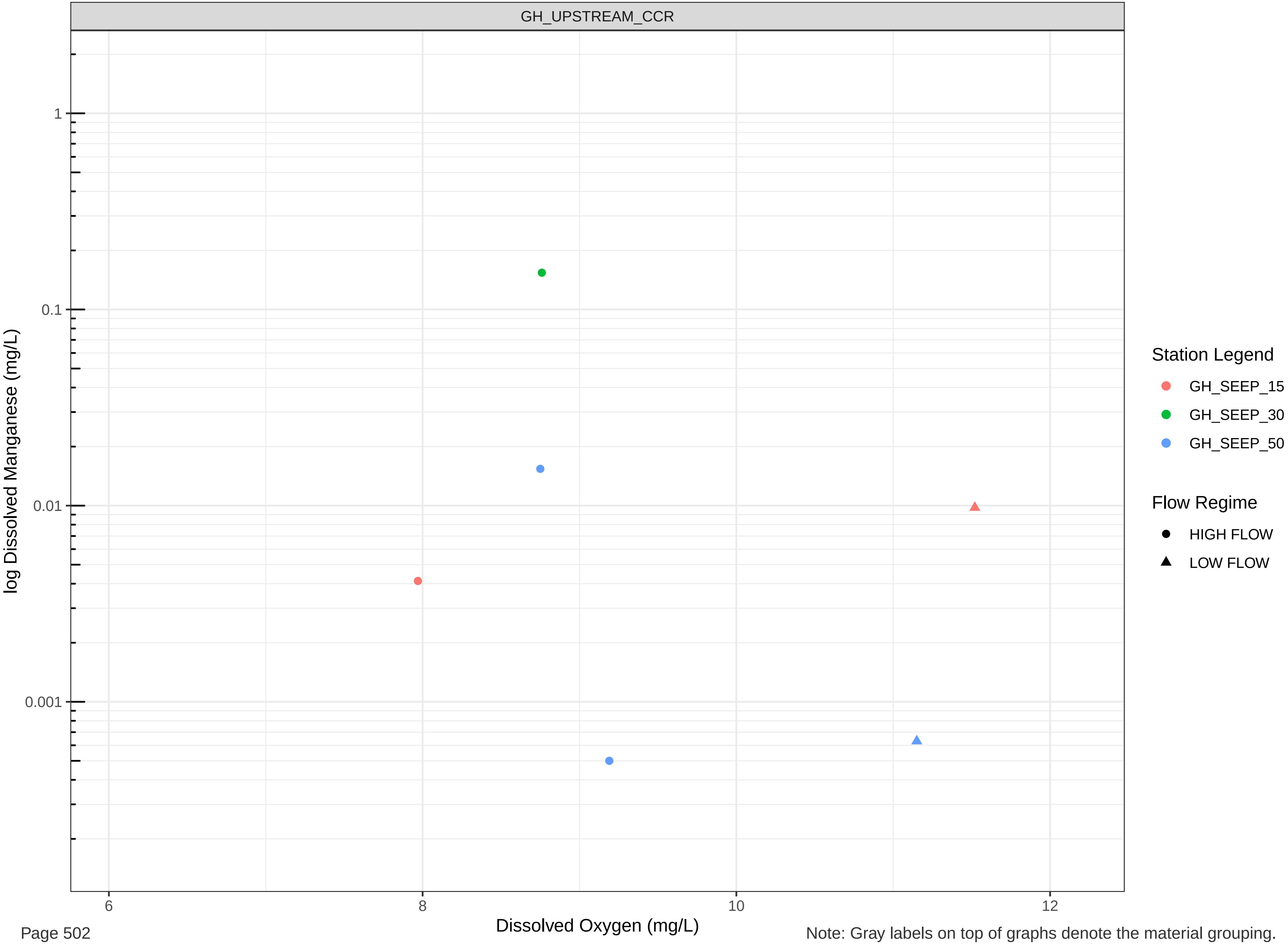

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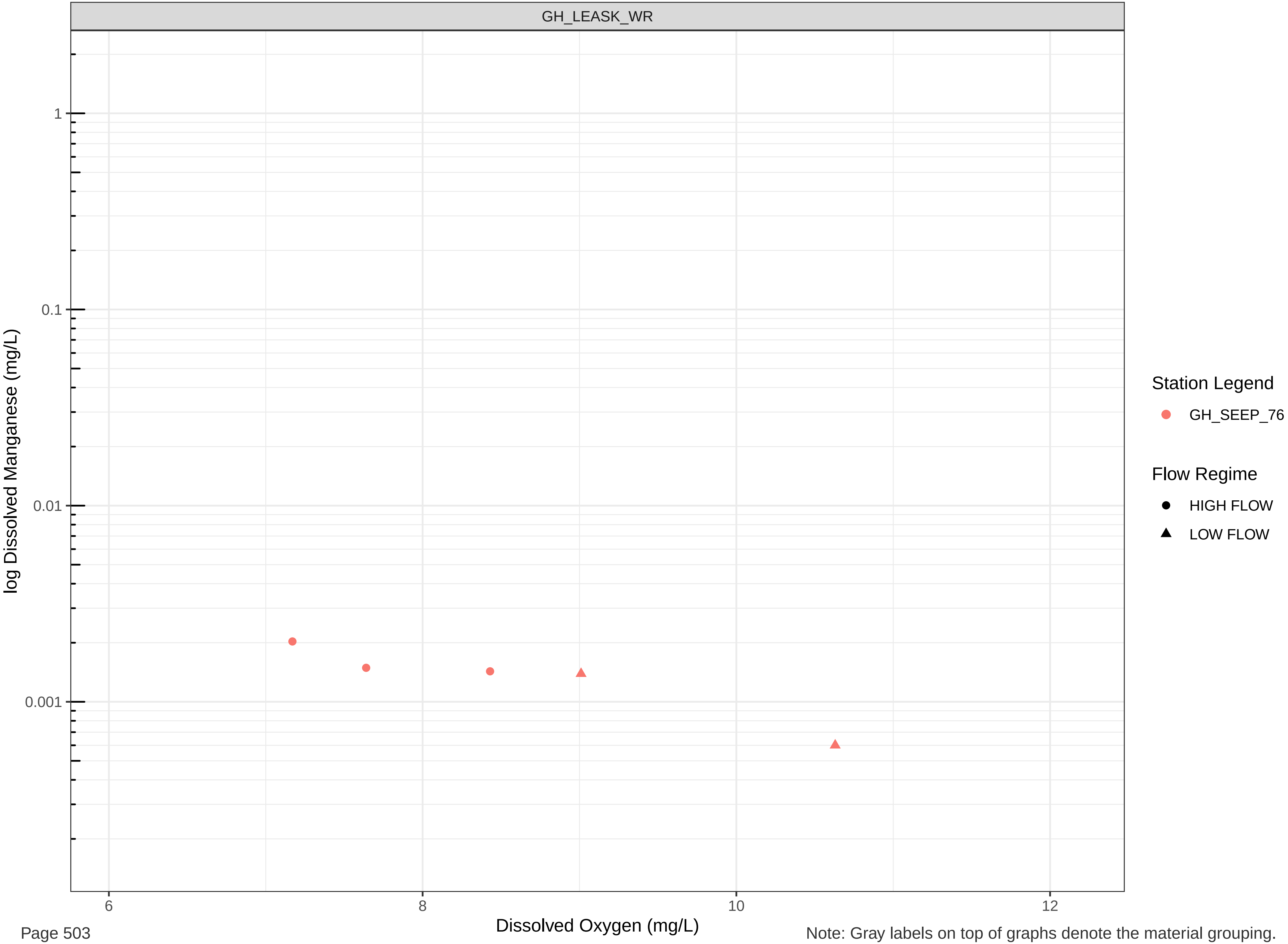

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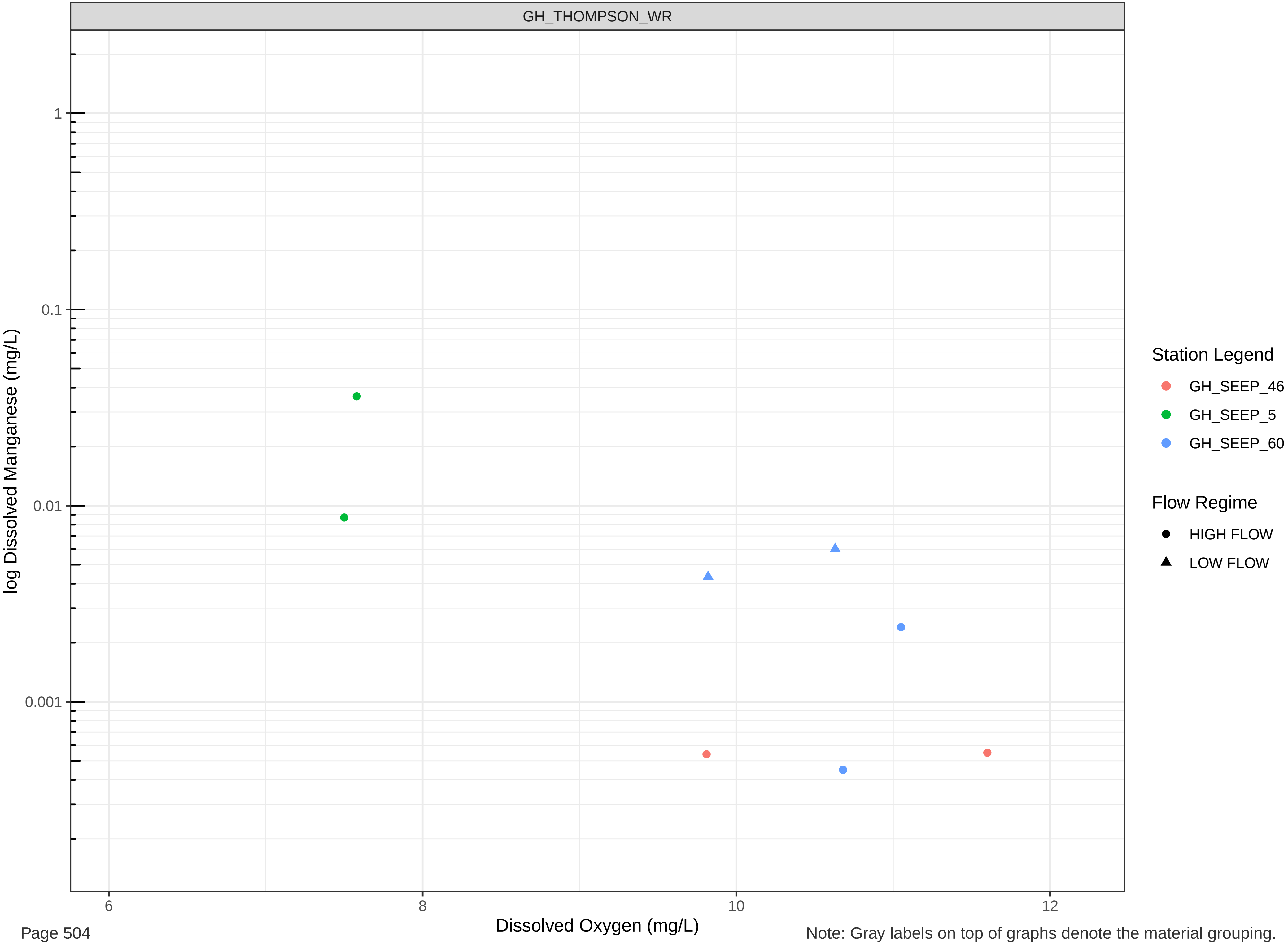

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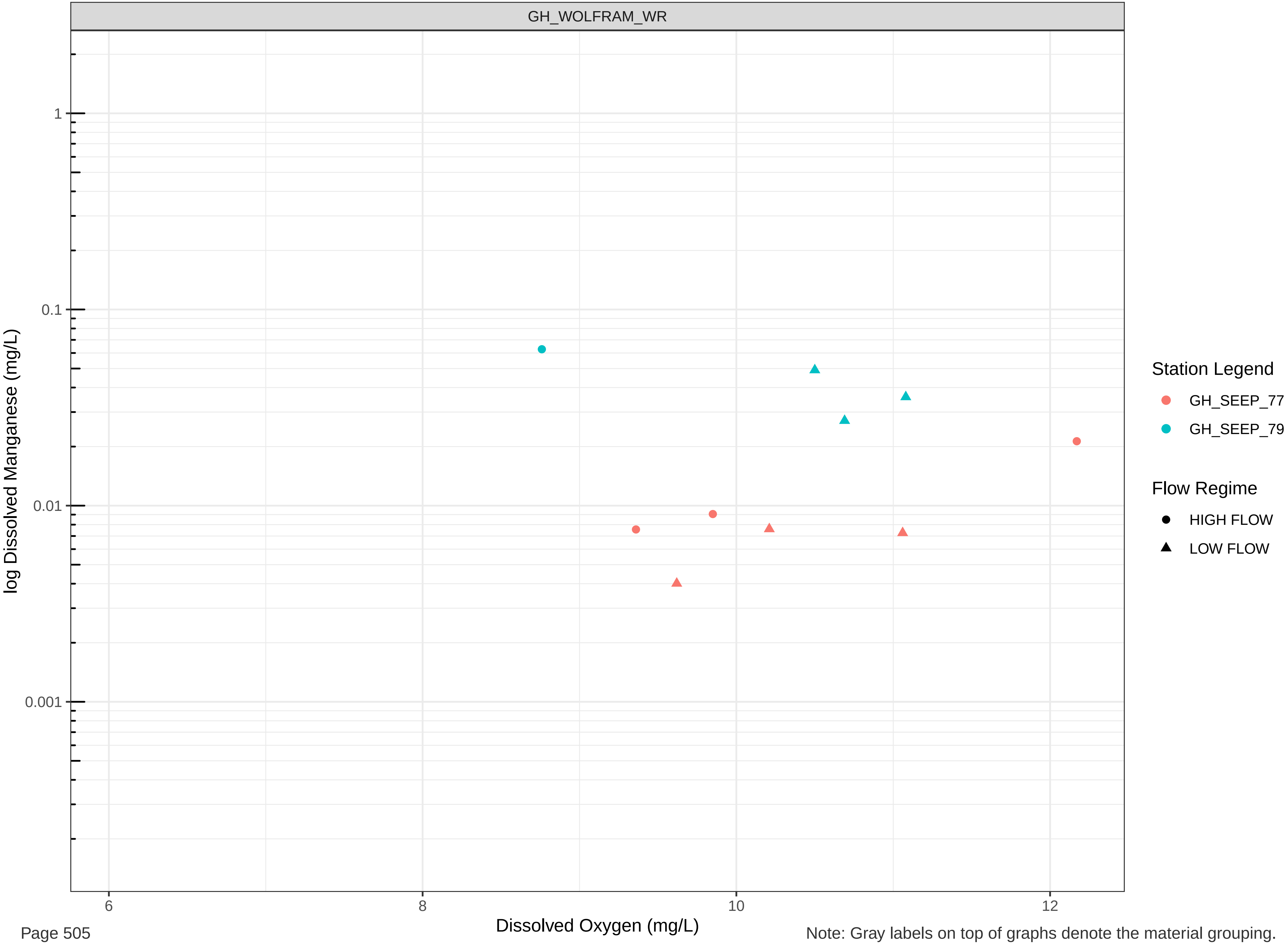

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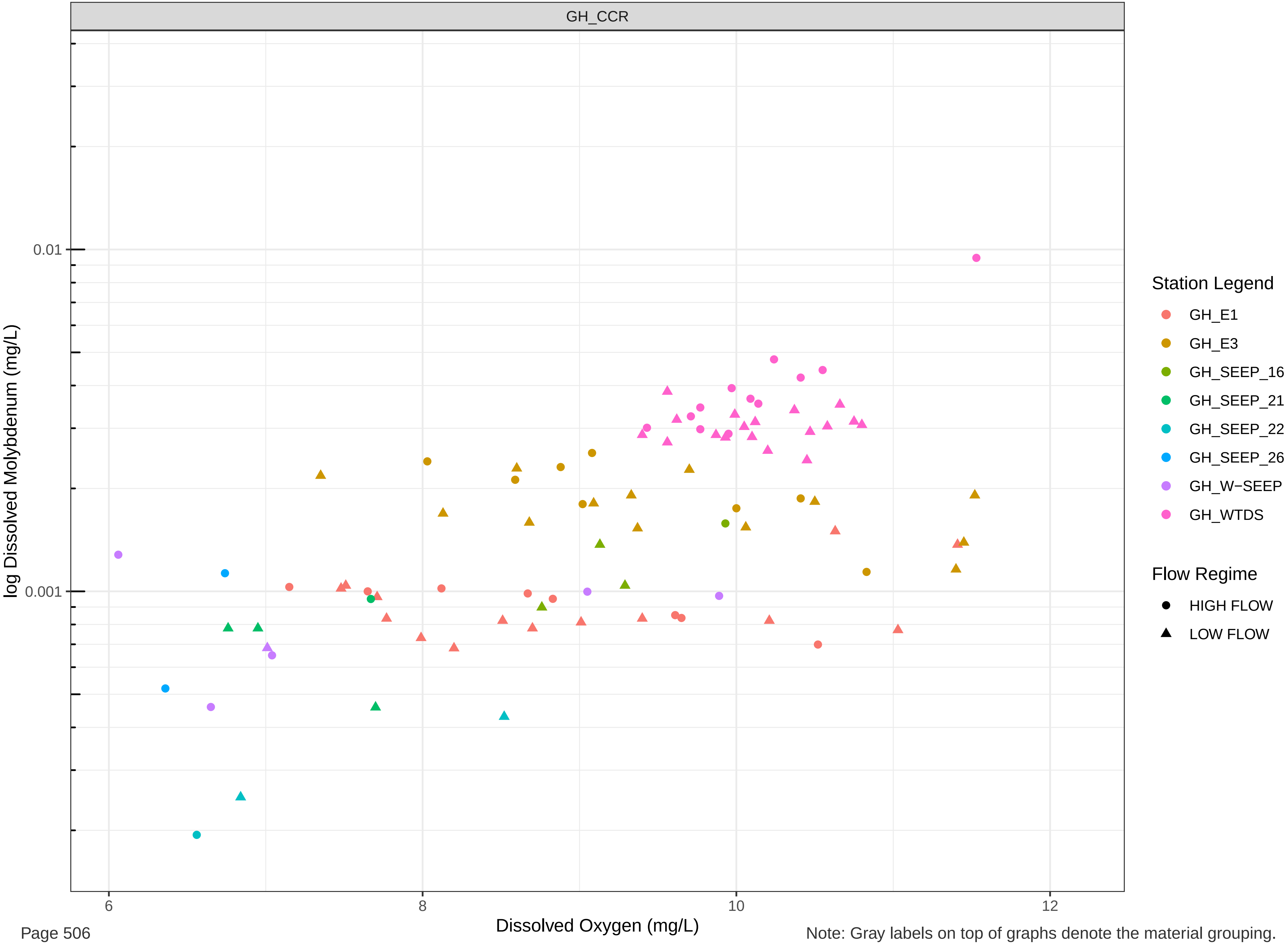

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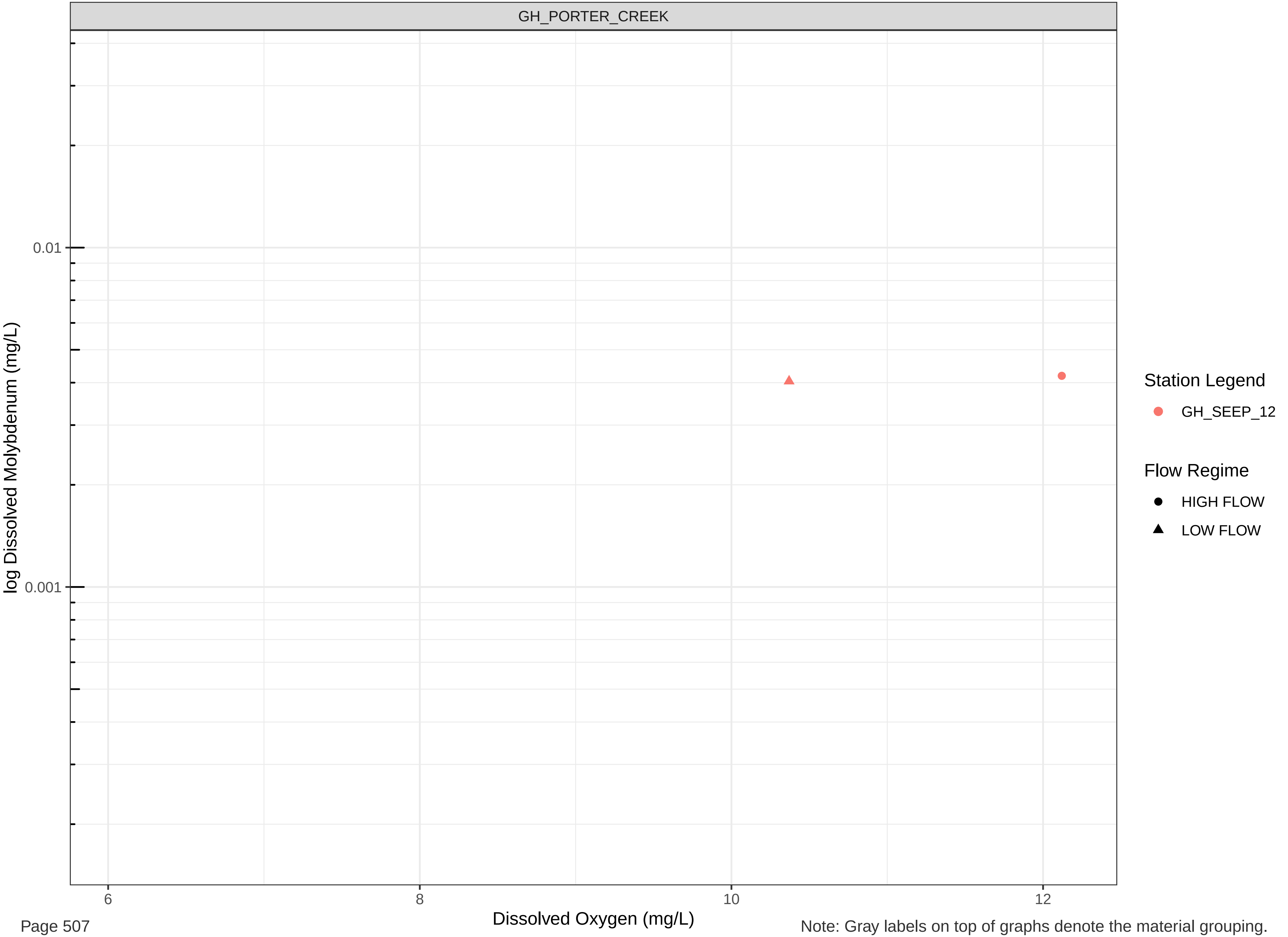

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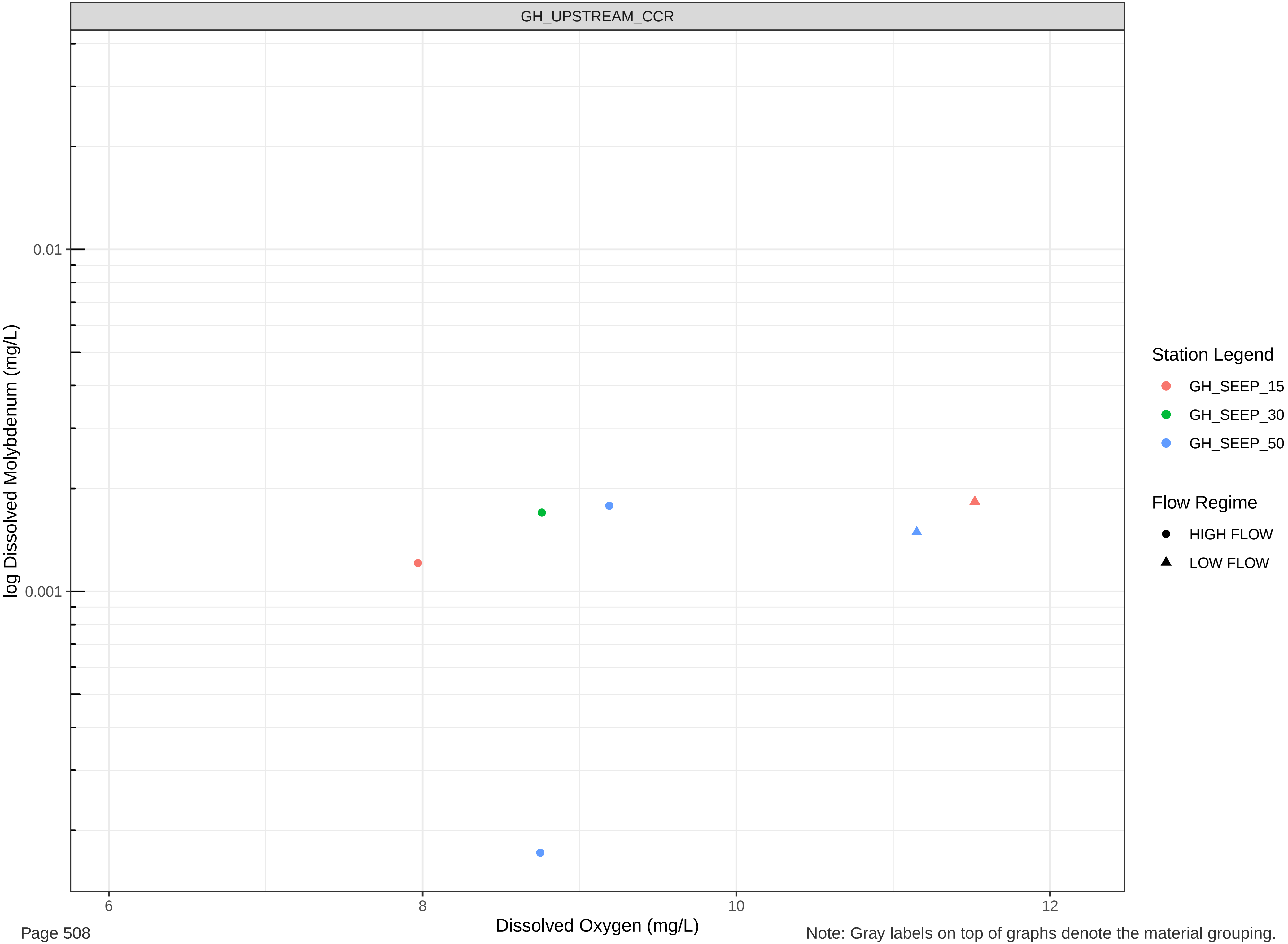
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0.01
0.001
6
8
10
12
Dissolved Oxygen (mg/L)
Station Legend
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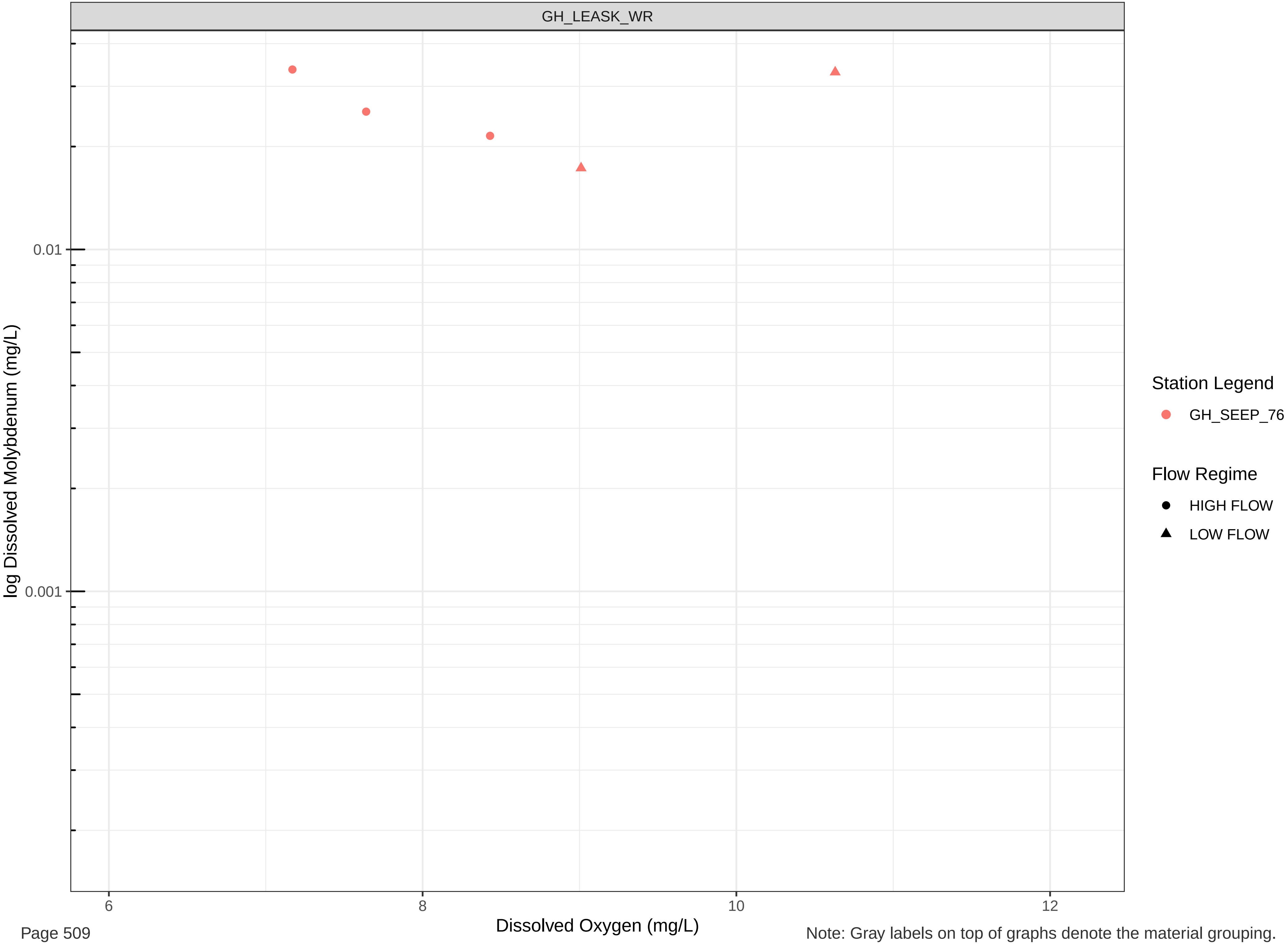
LOW FLOW



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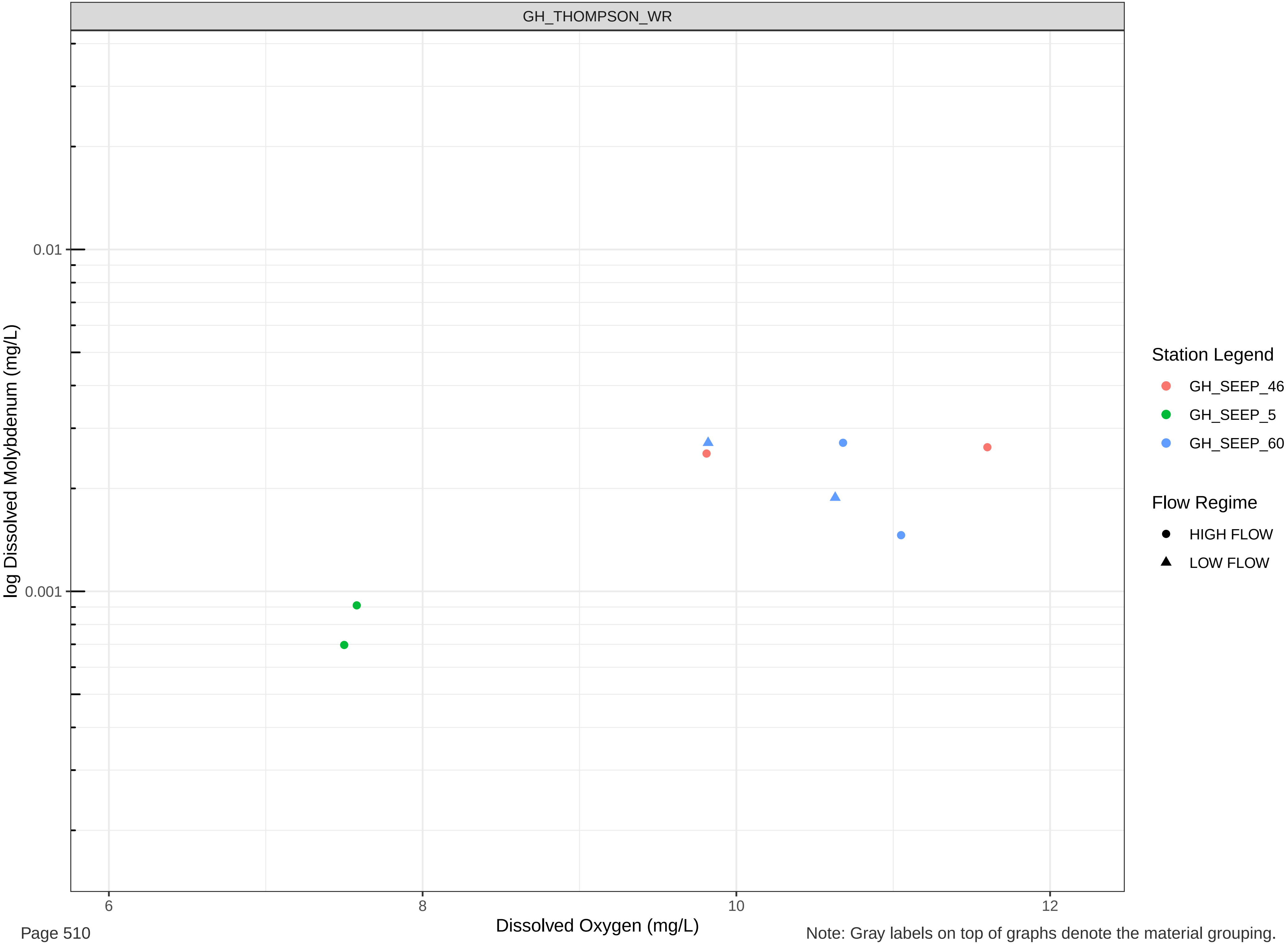

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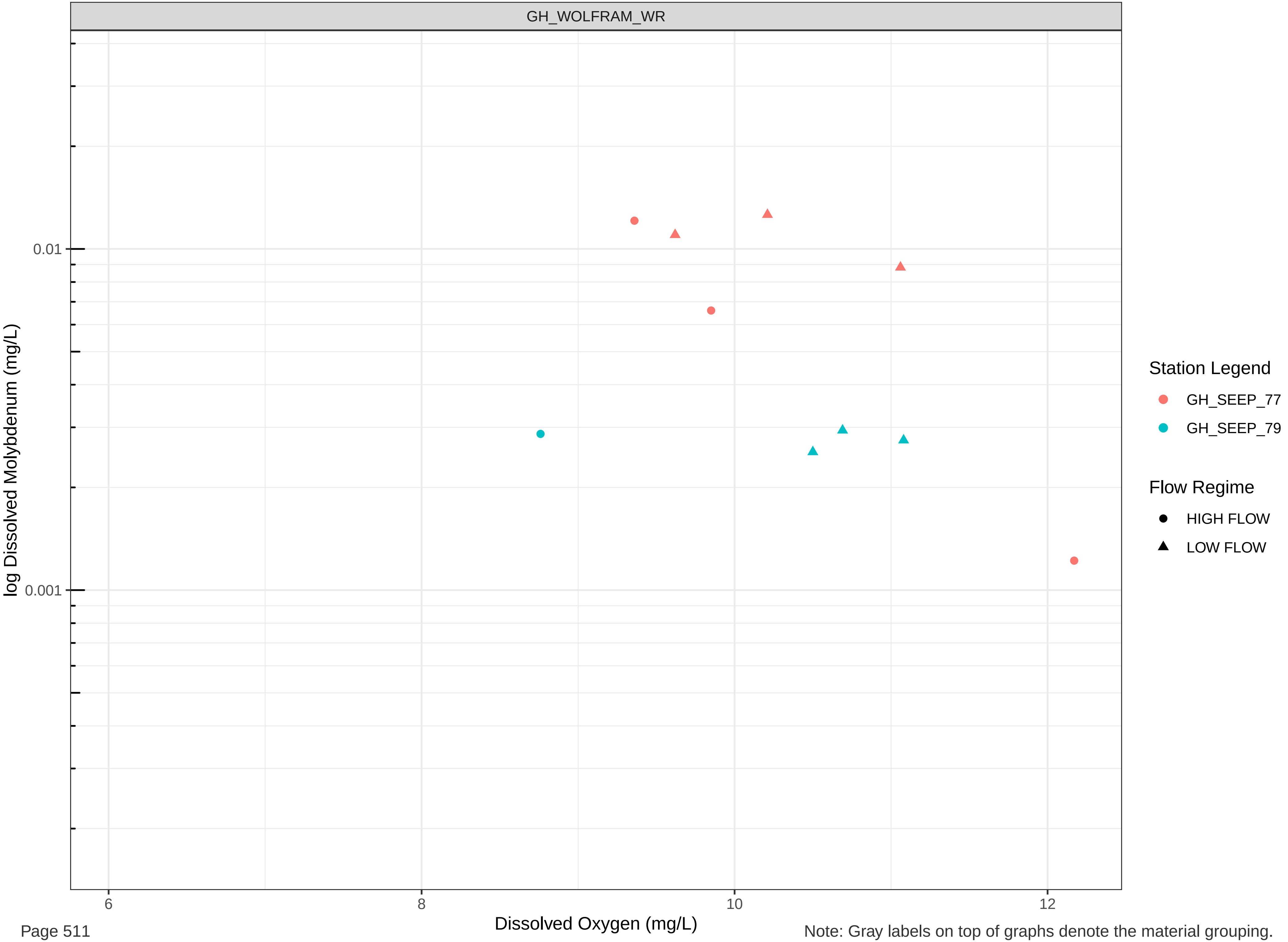

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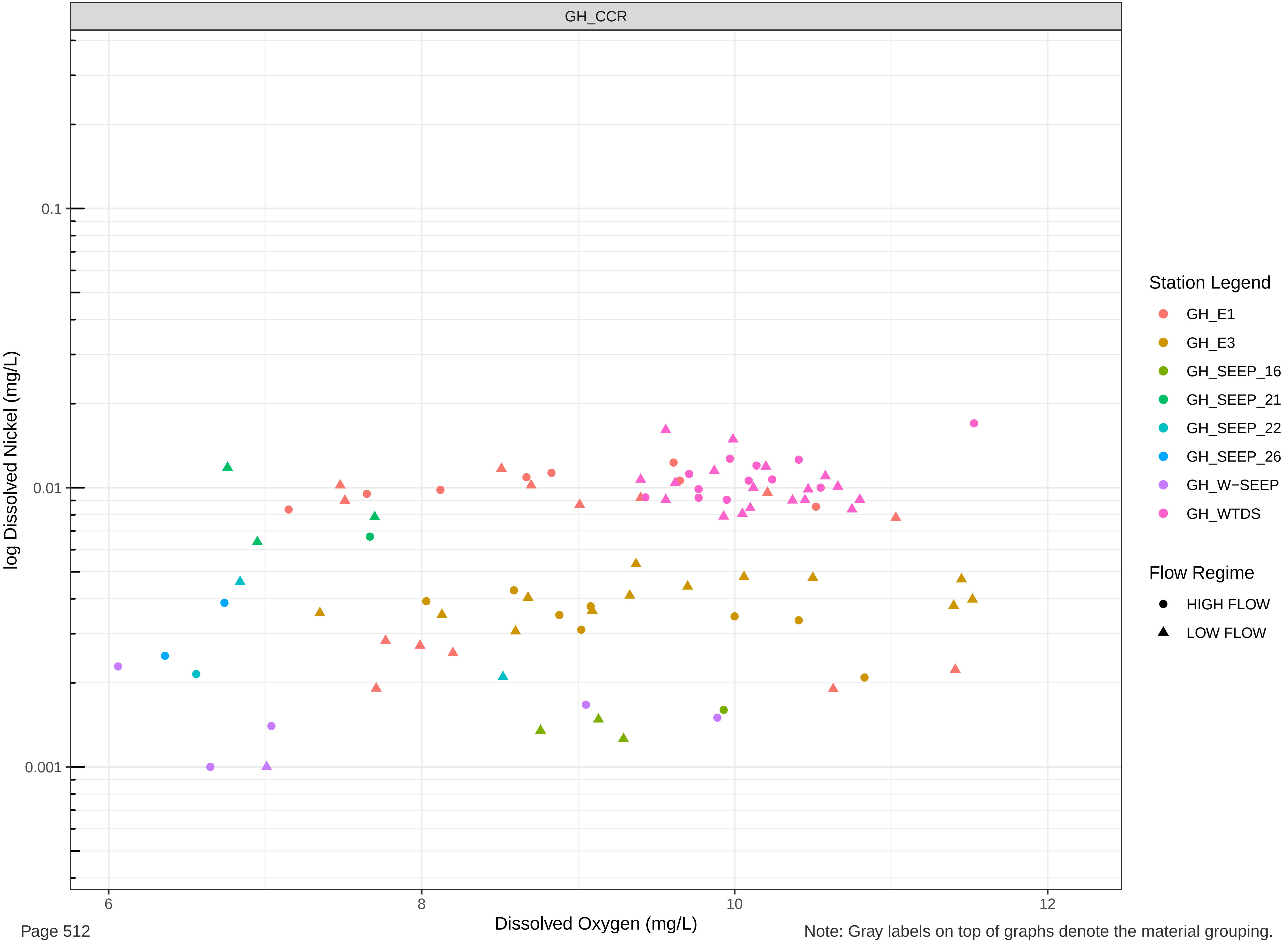

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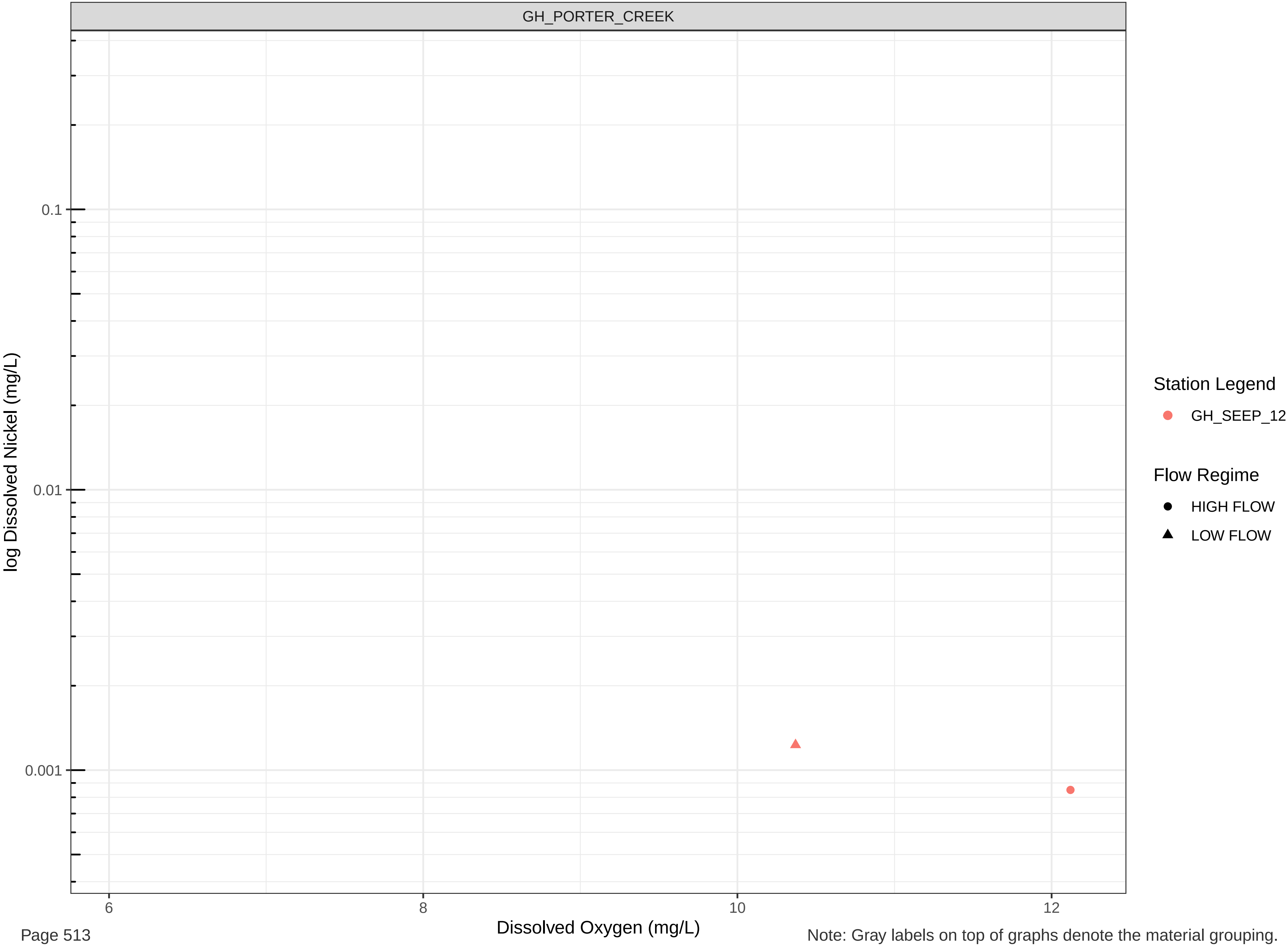

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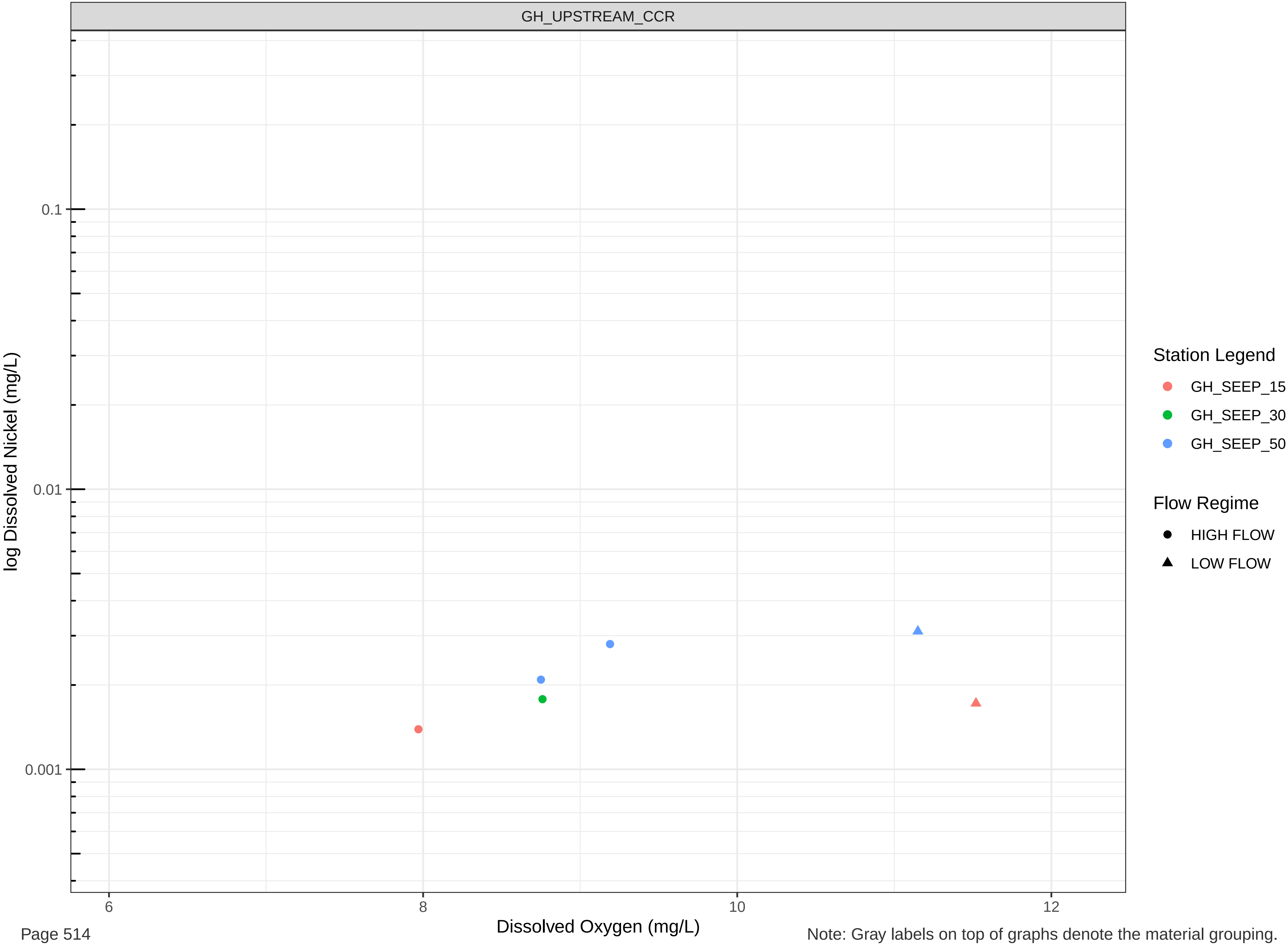

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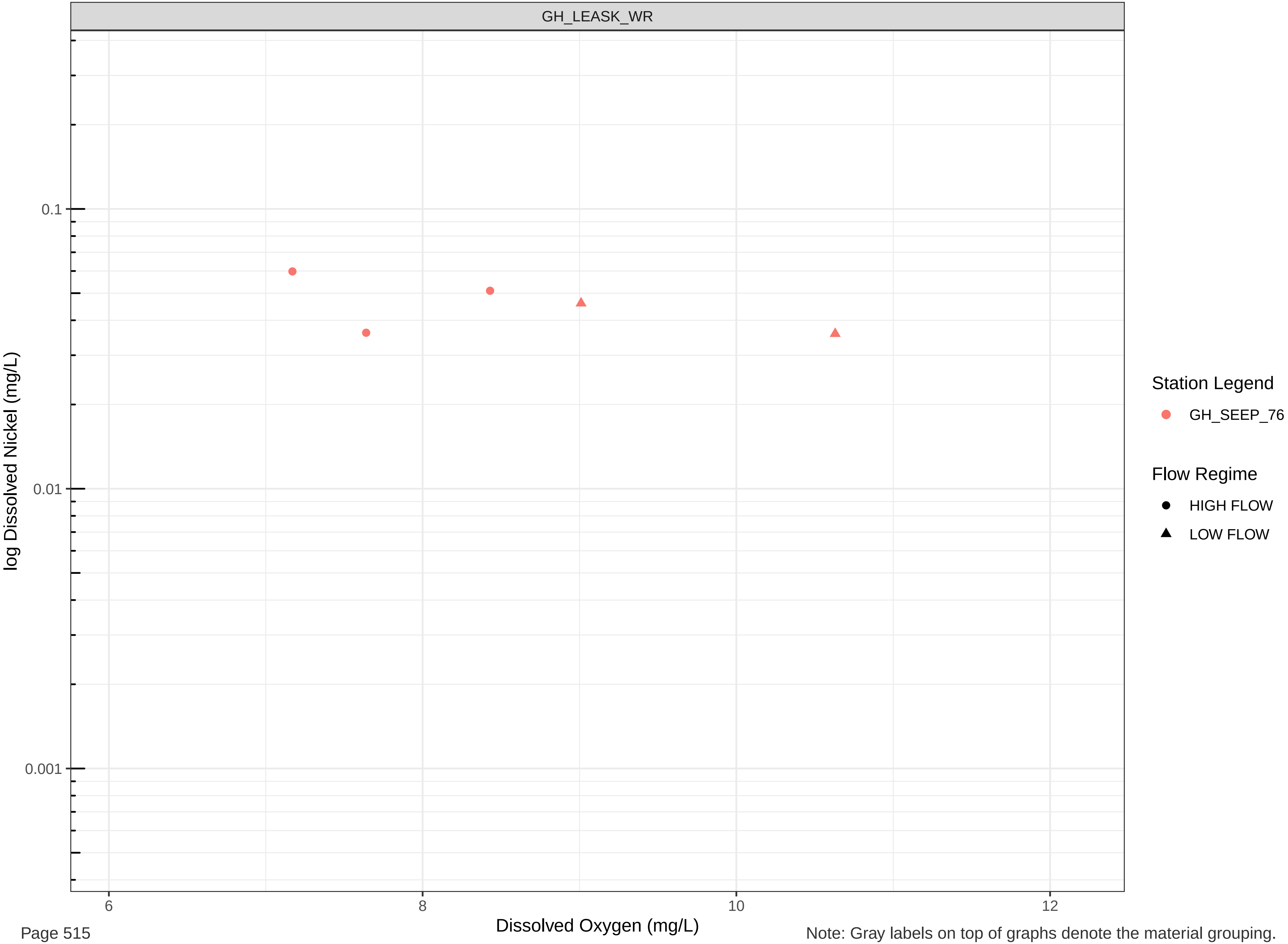

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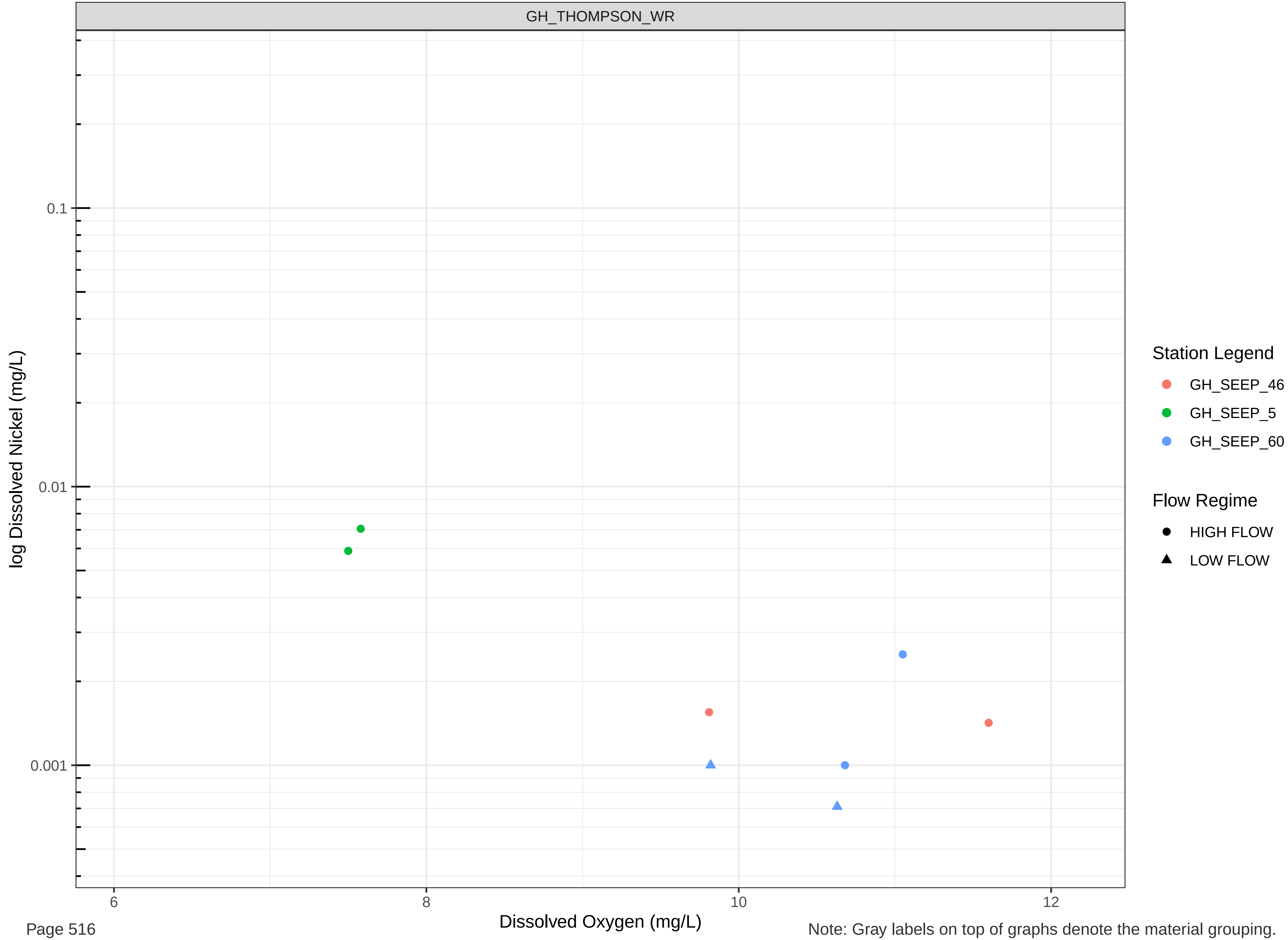

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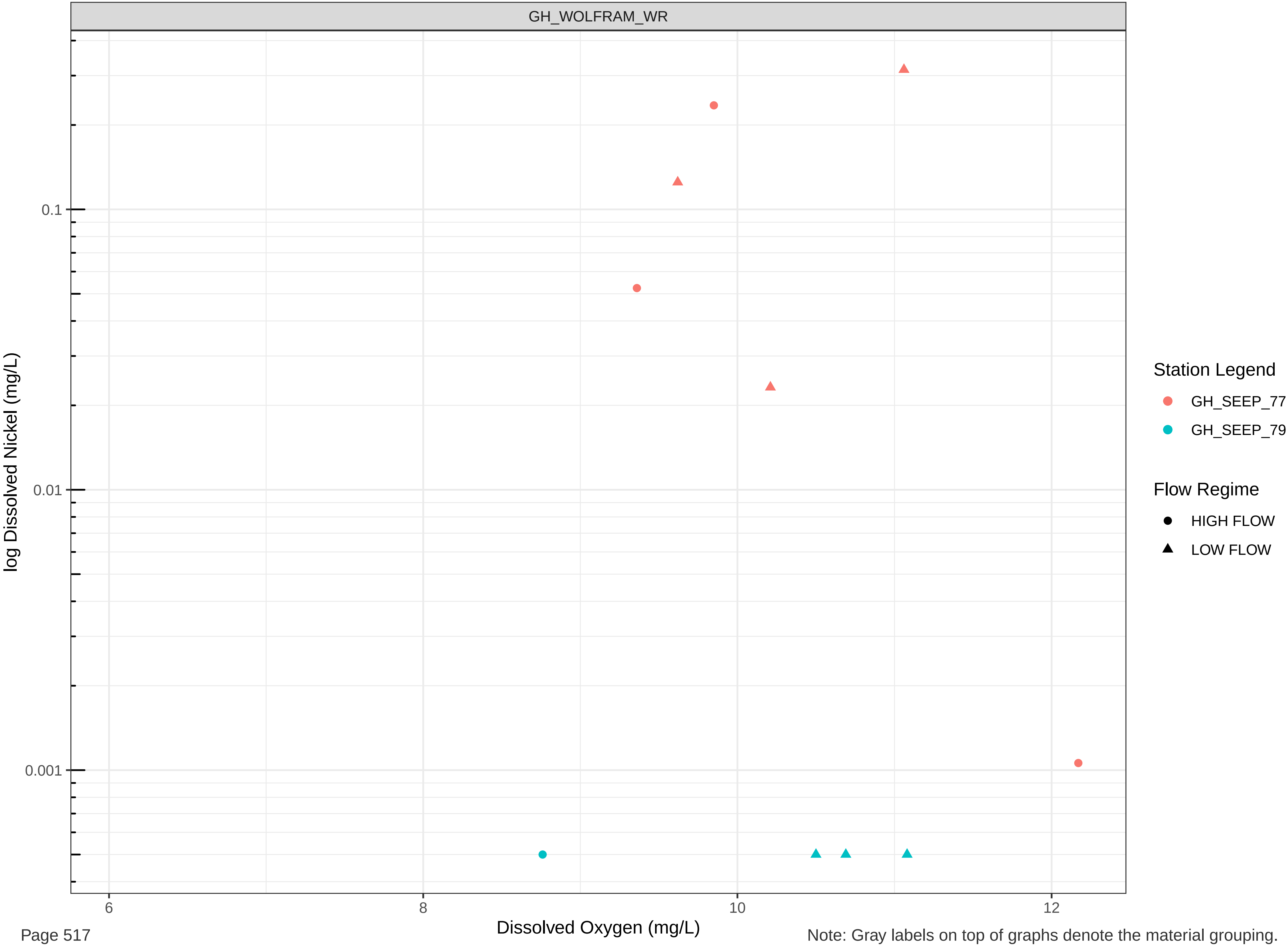

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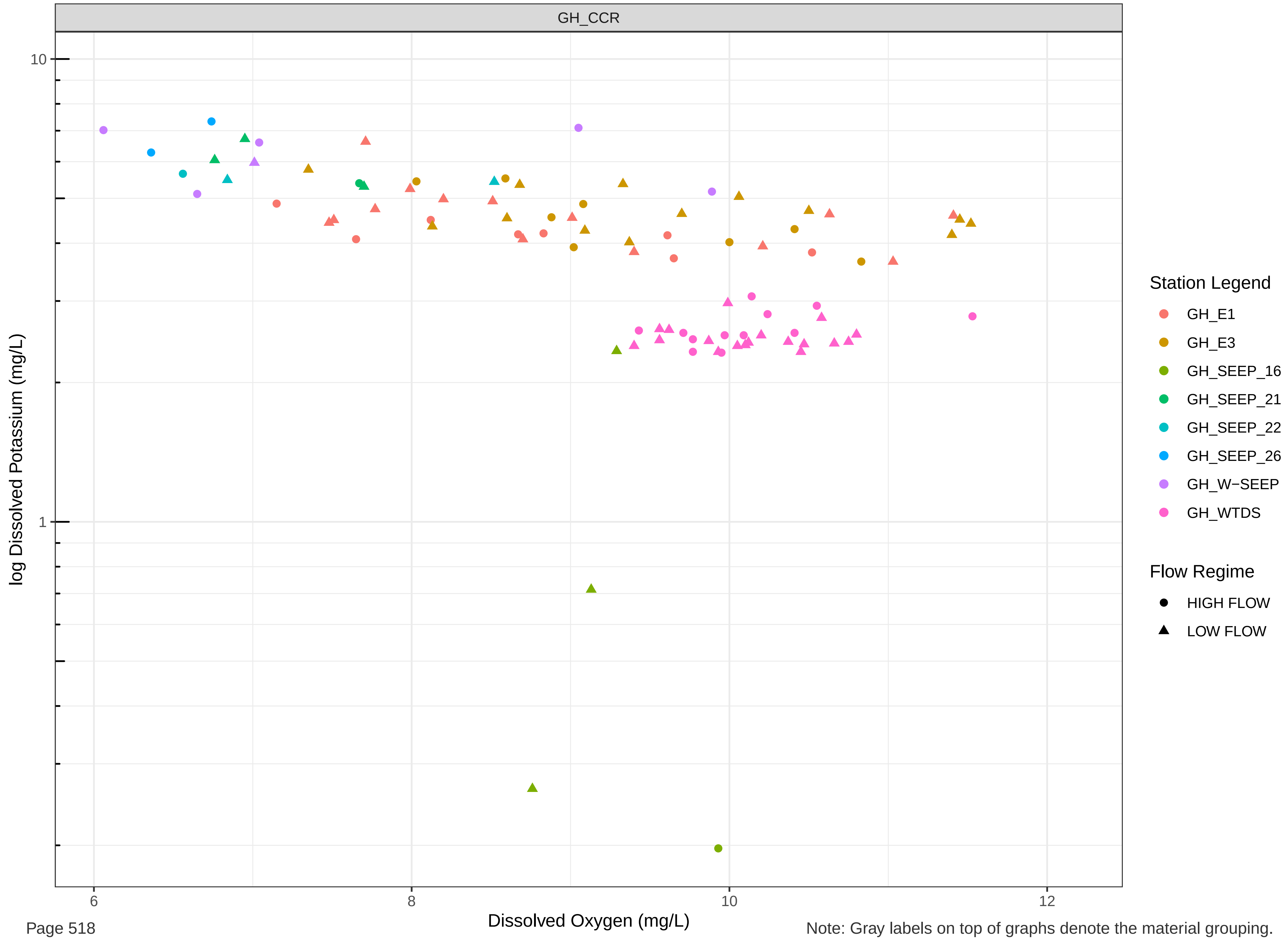

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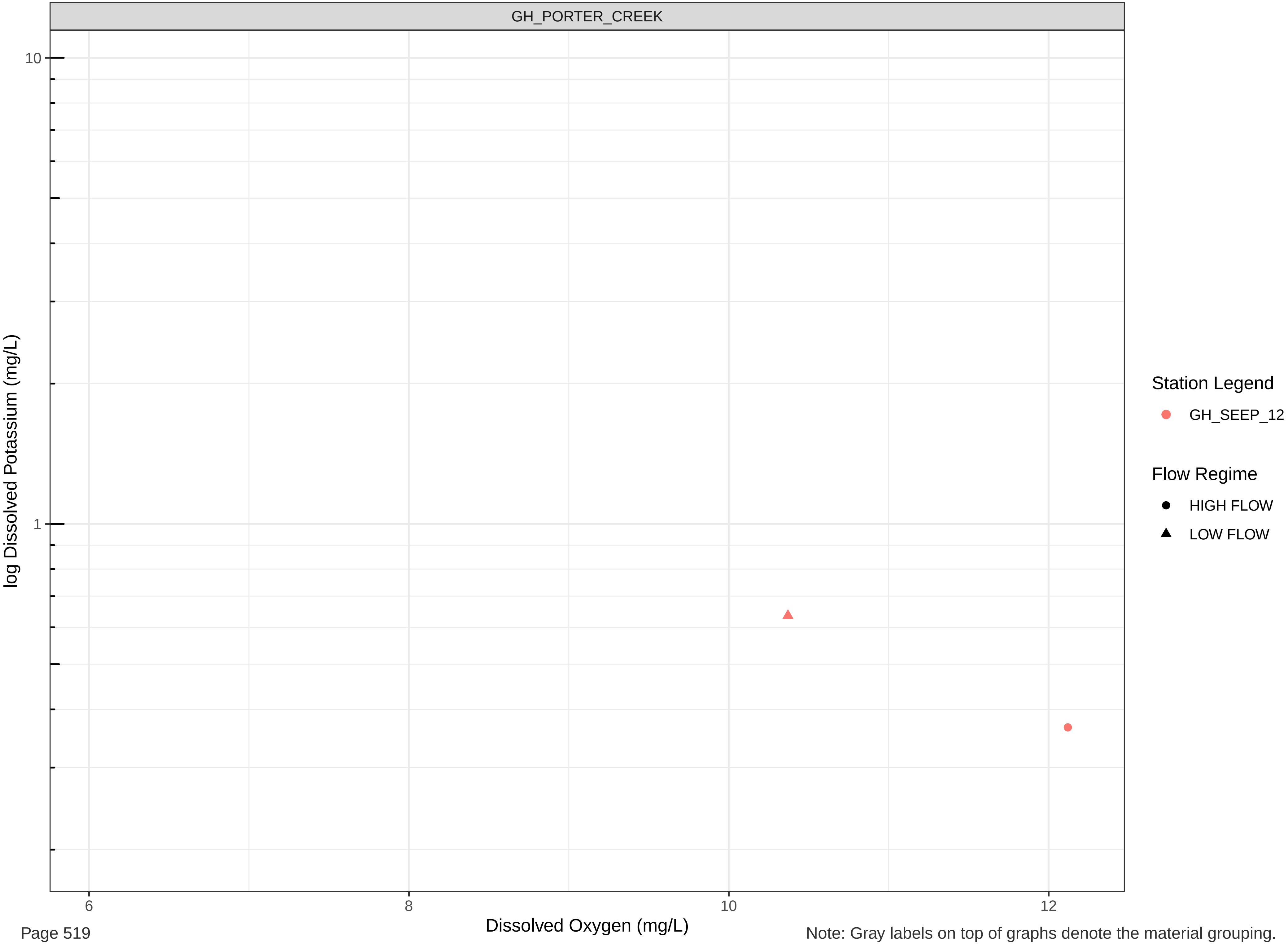

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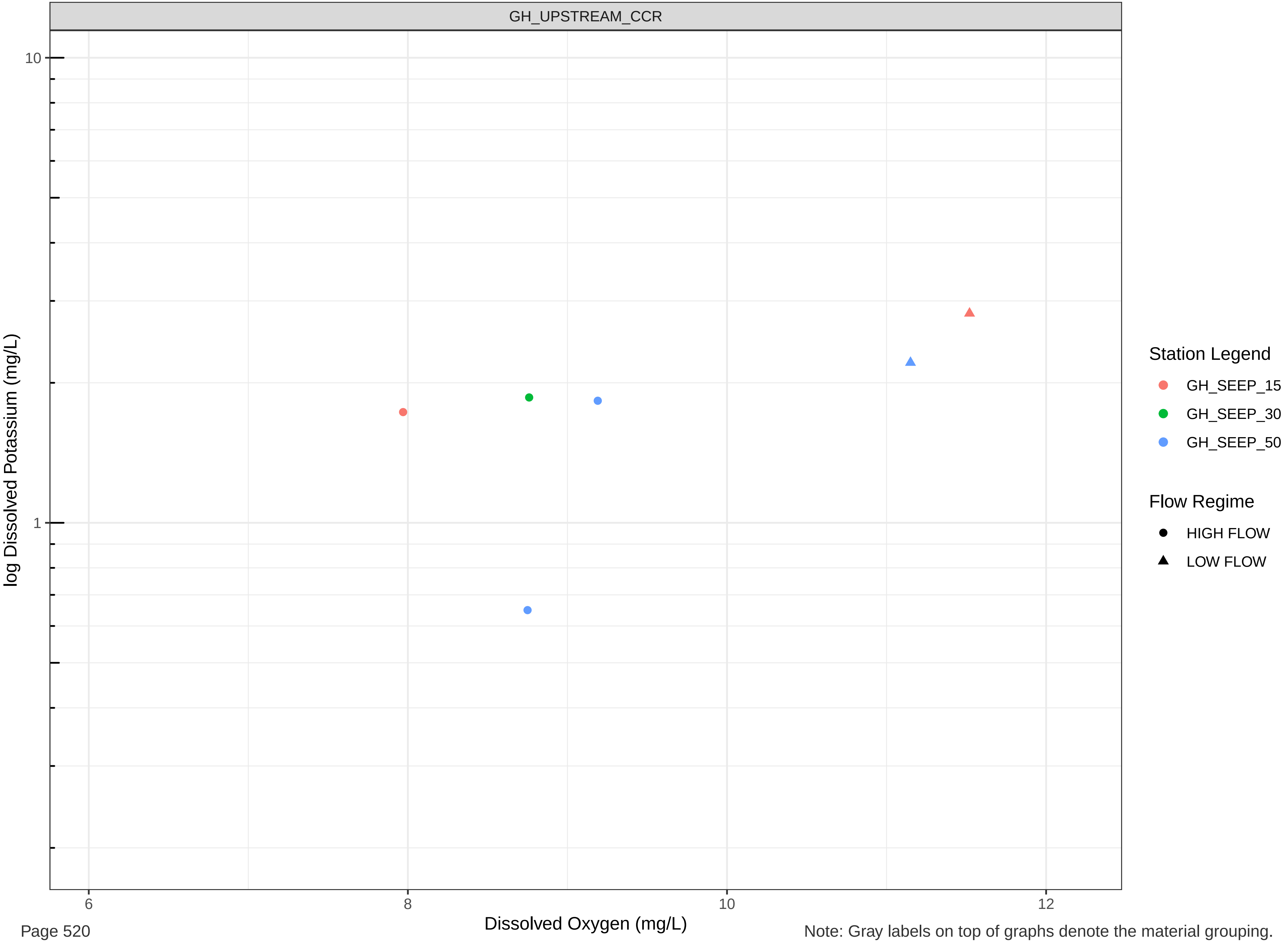

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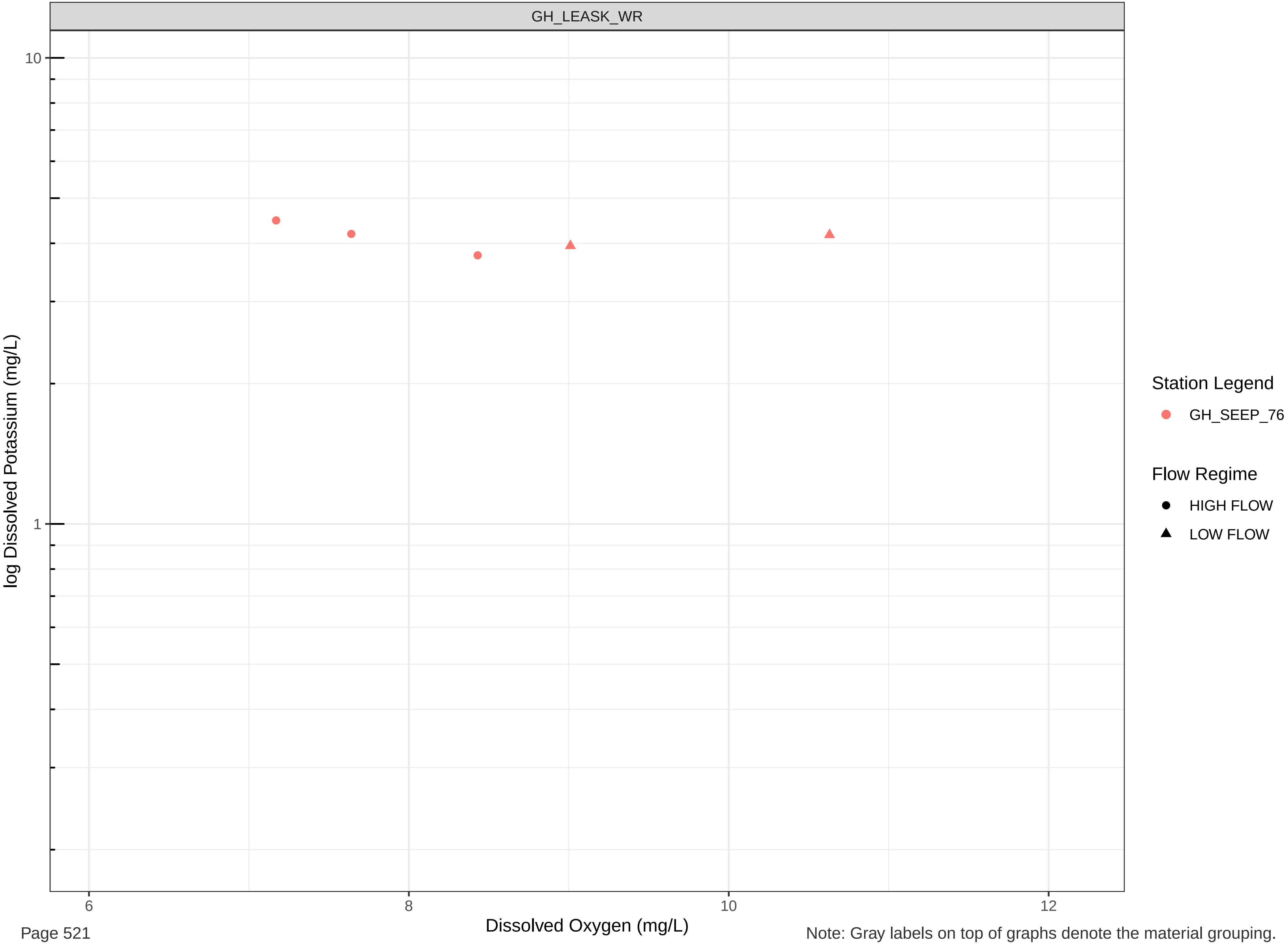

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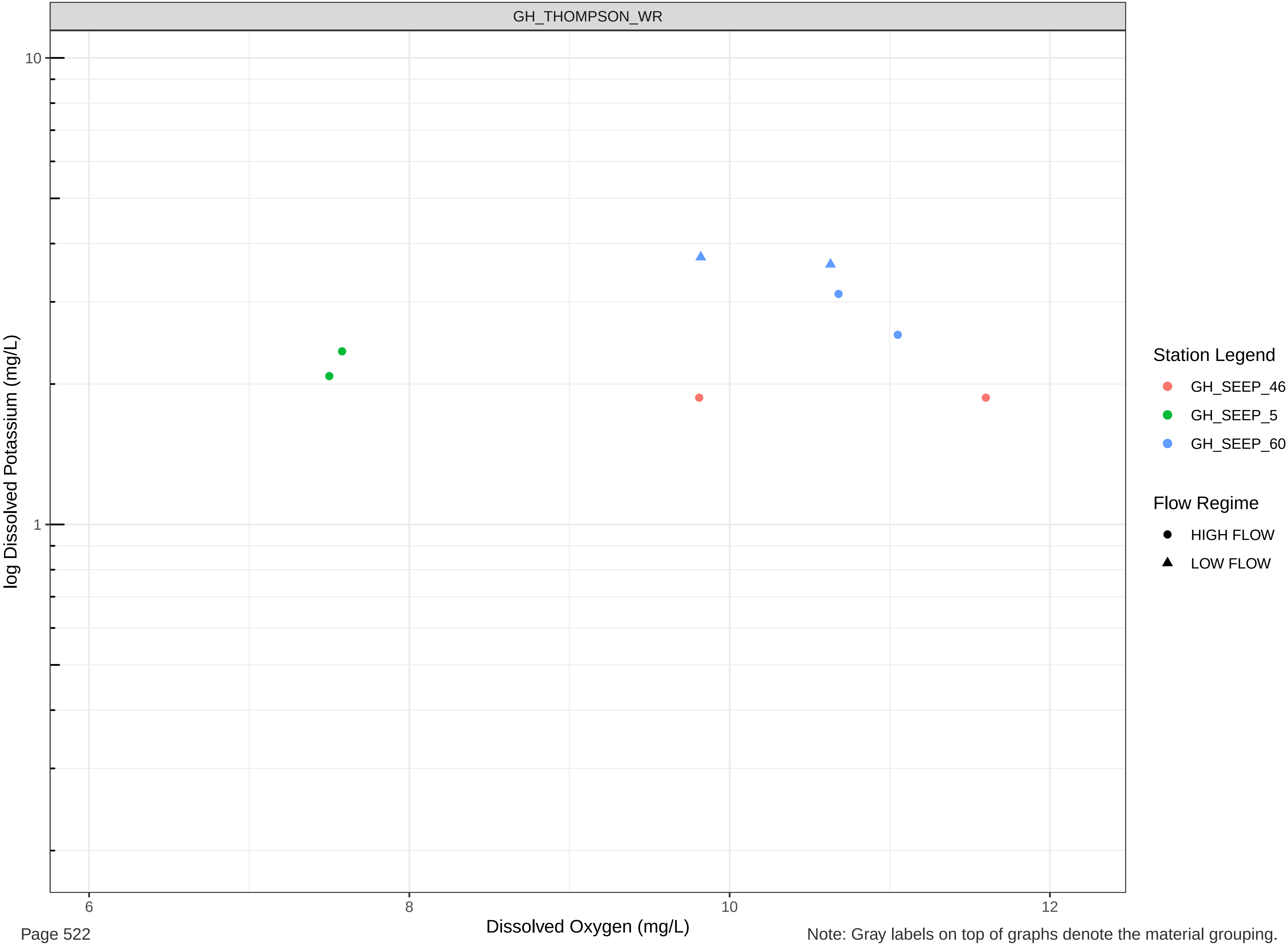

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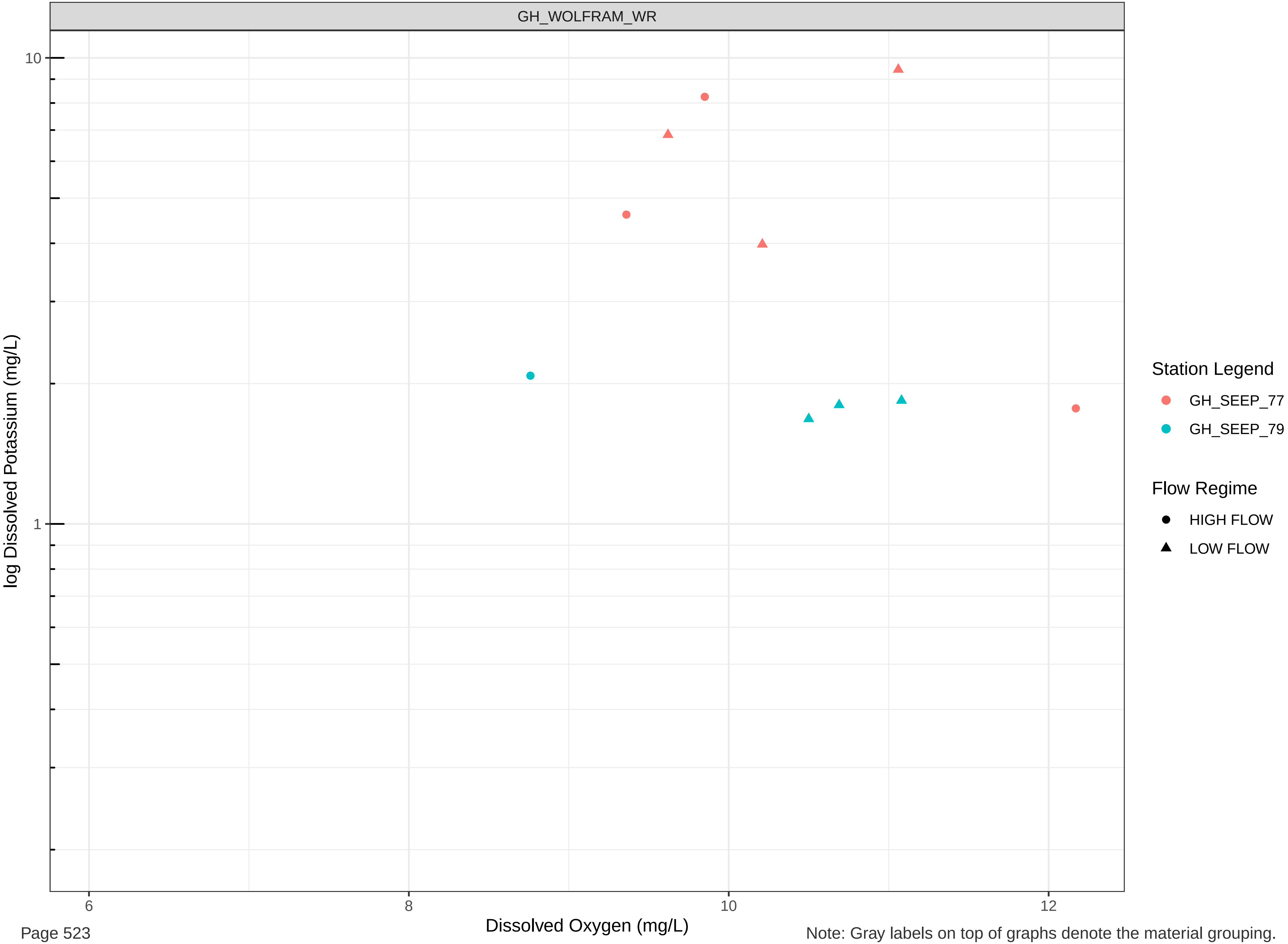

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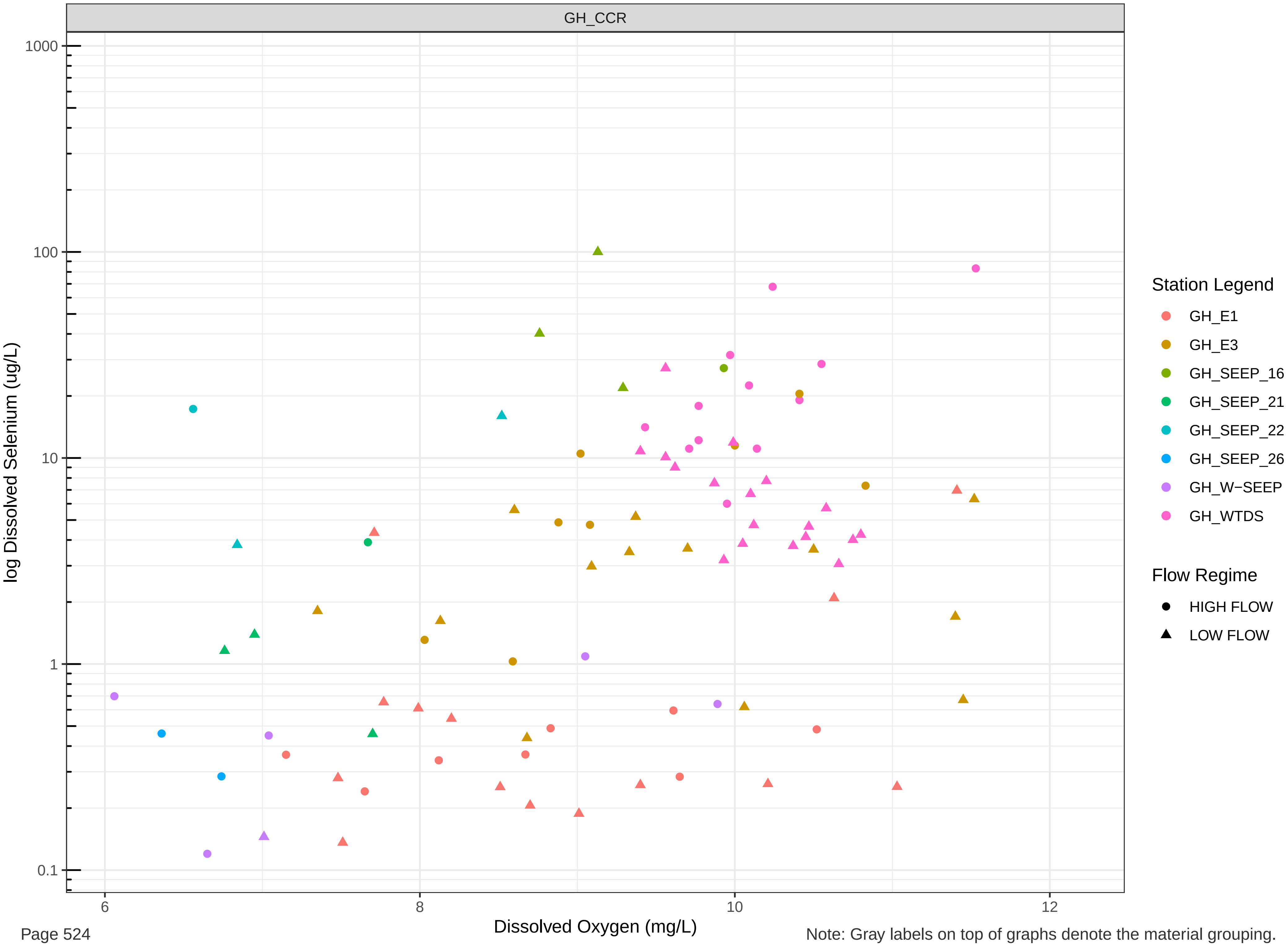

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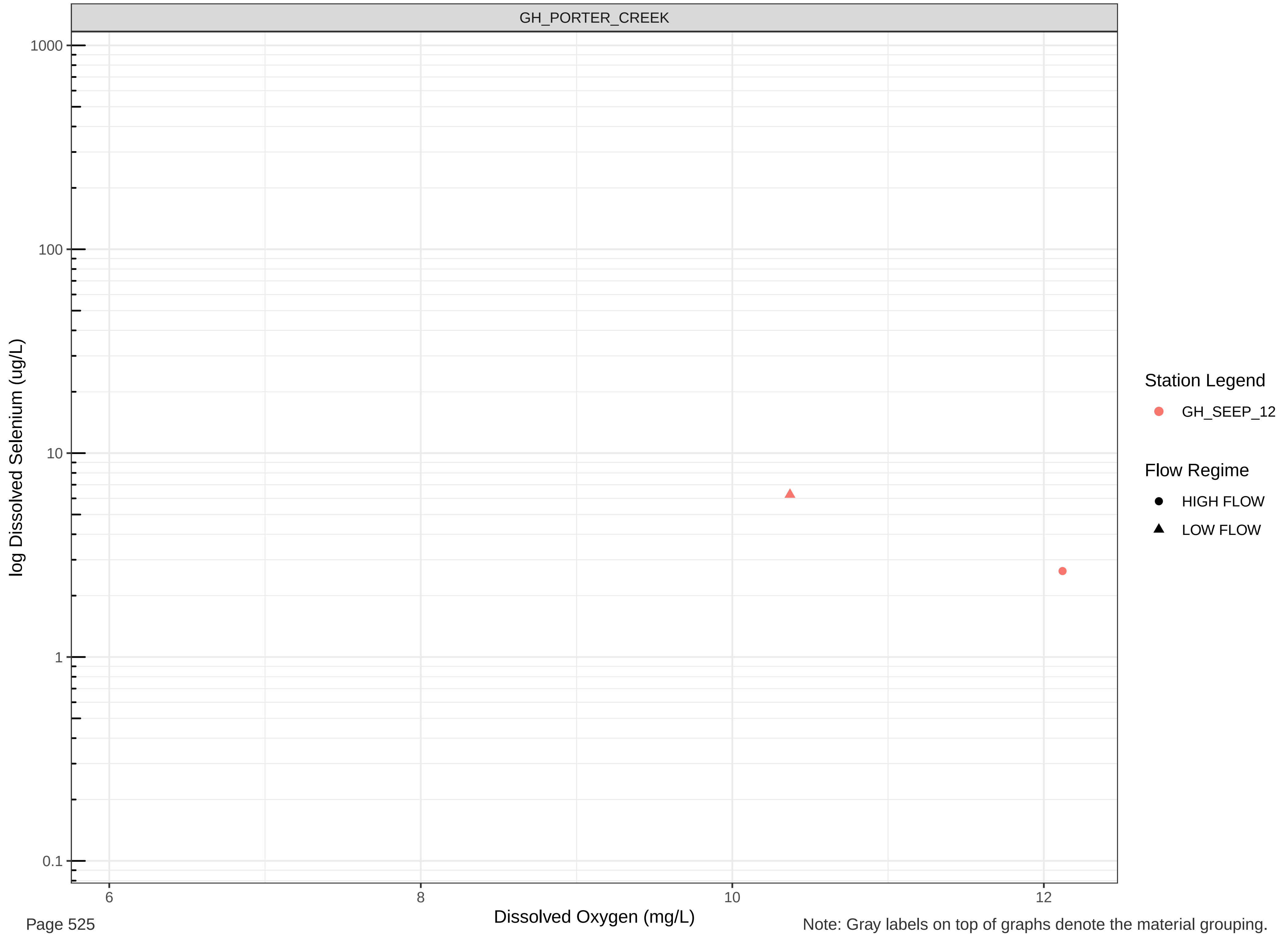

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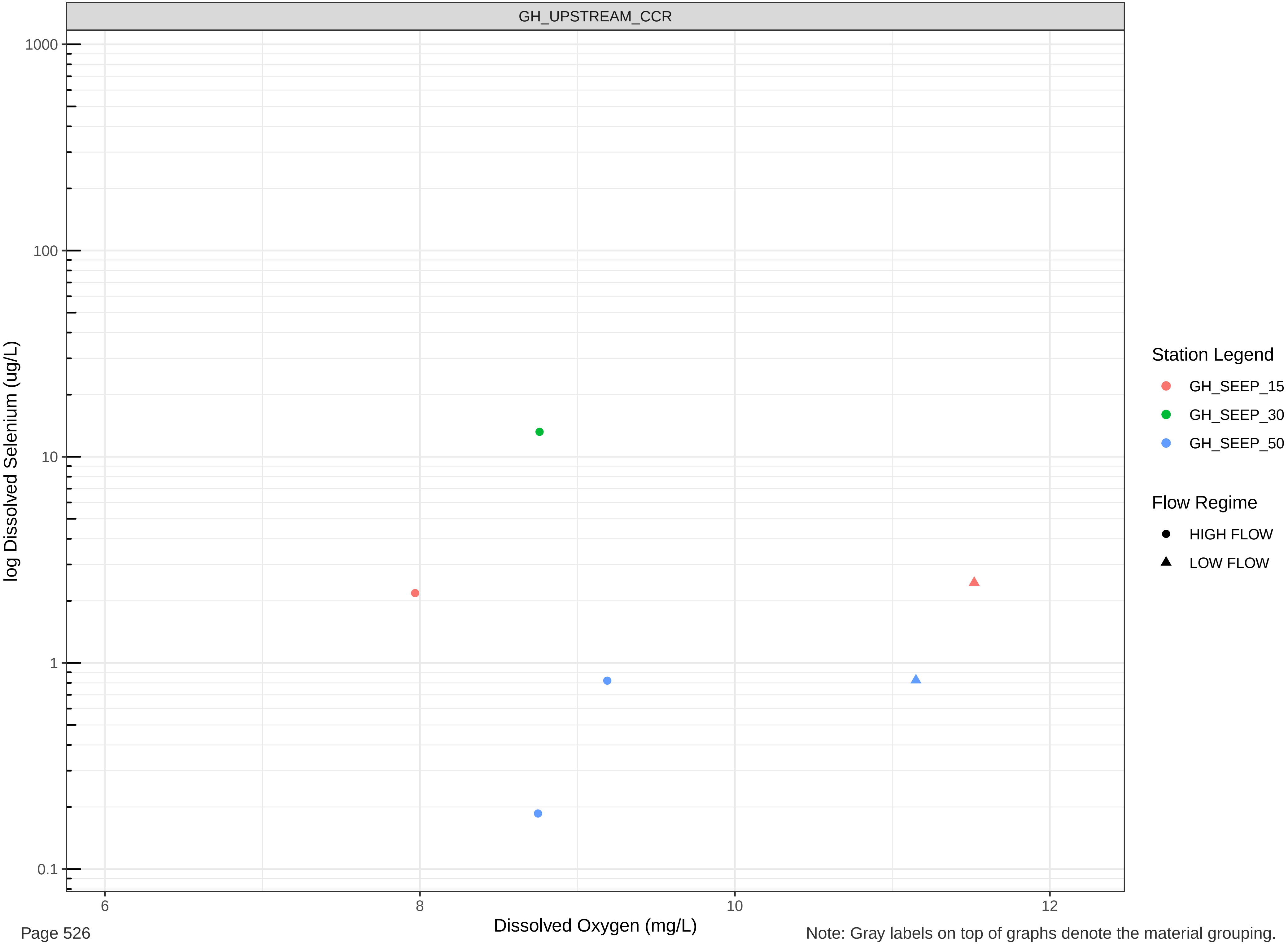

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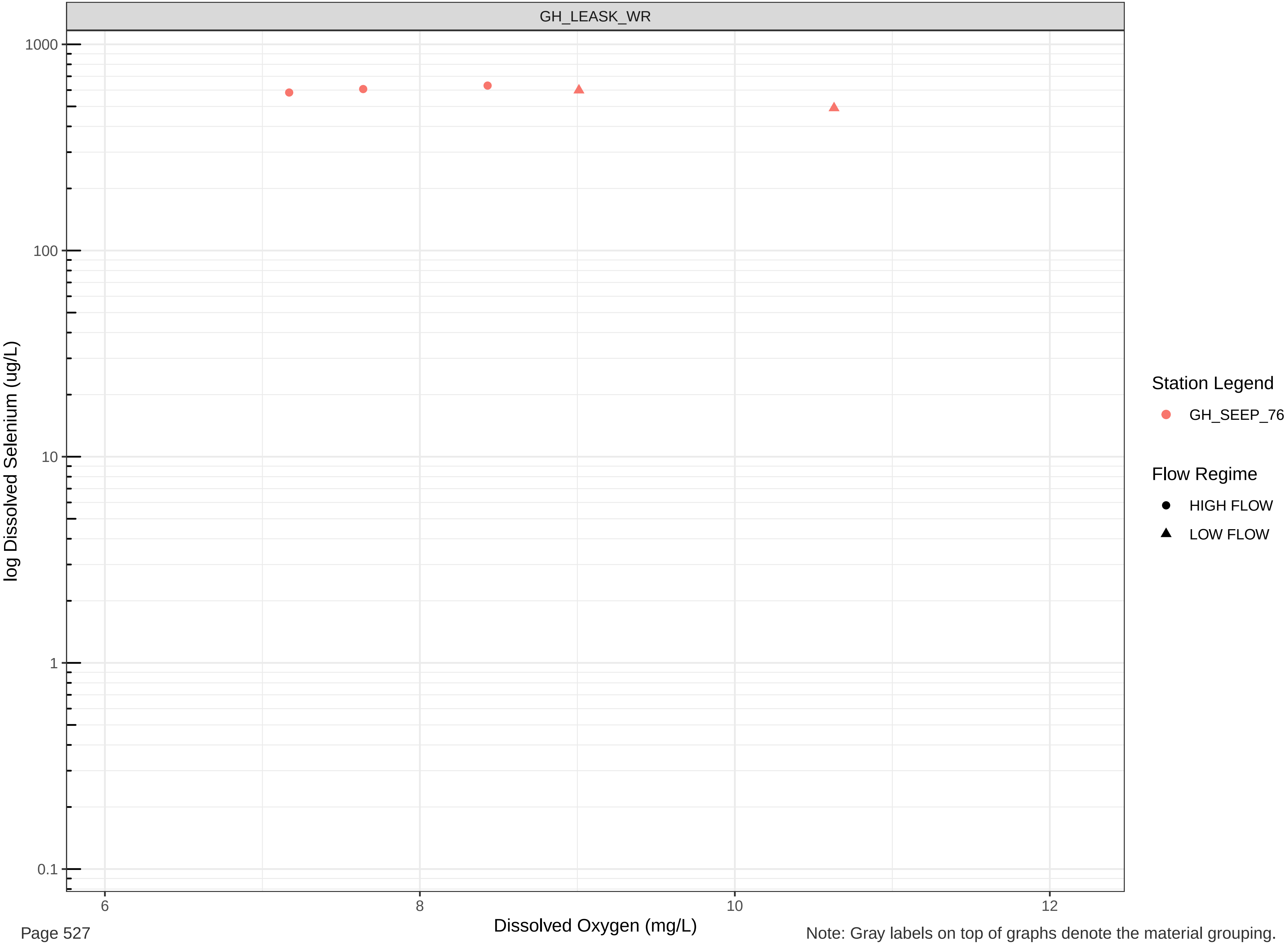

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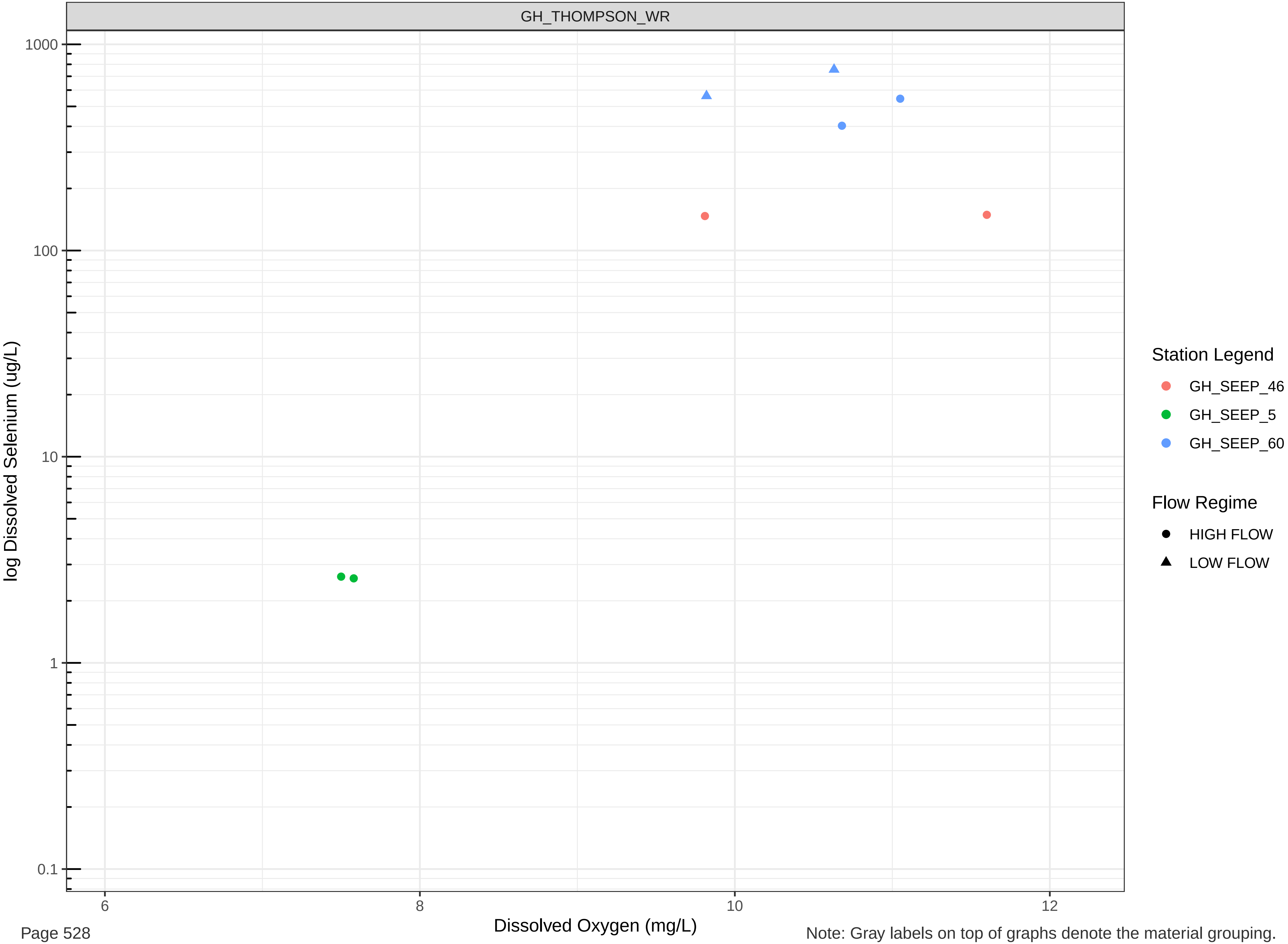

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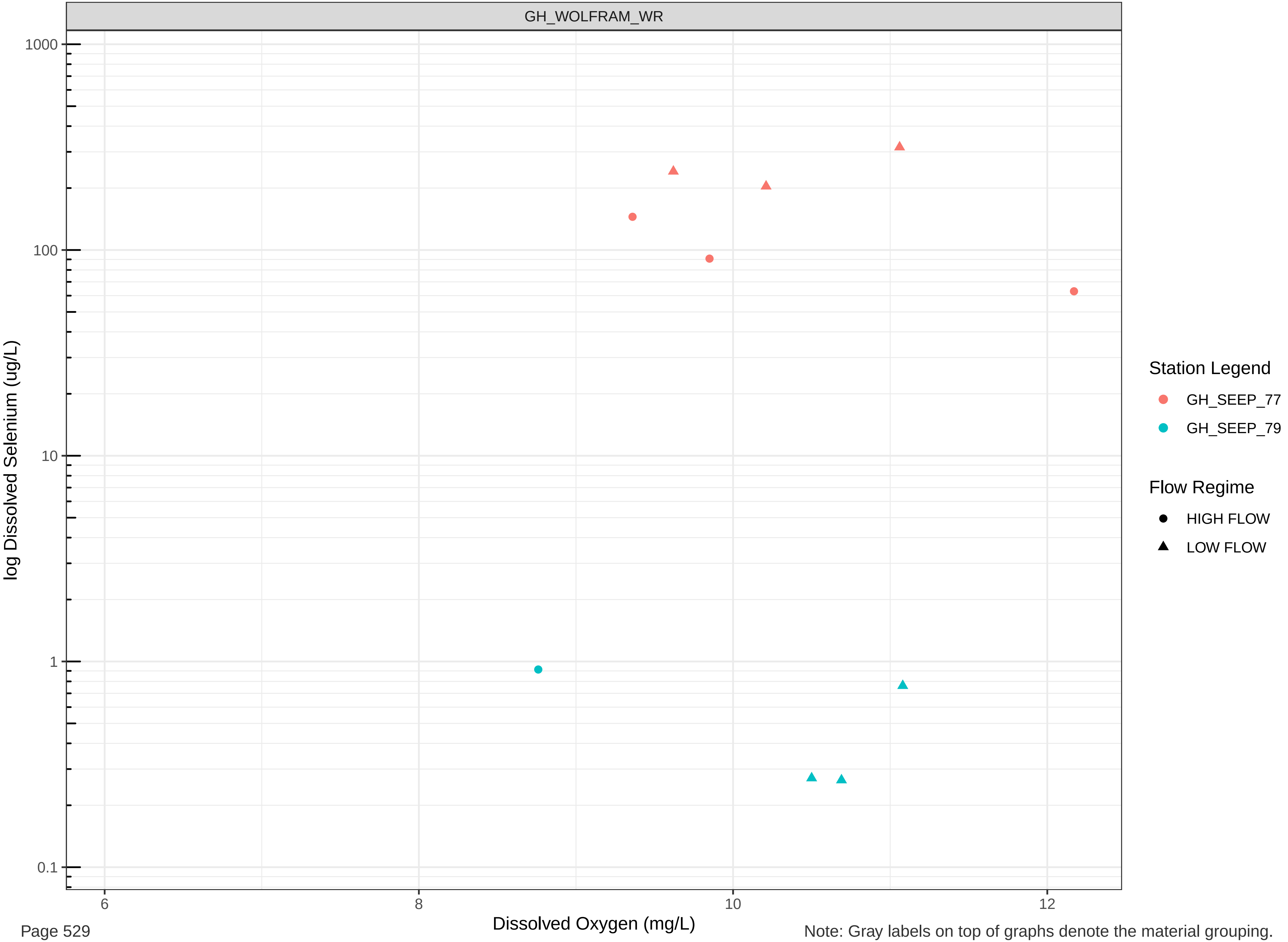

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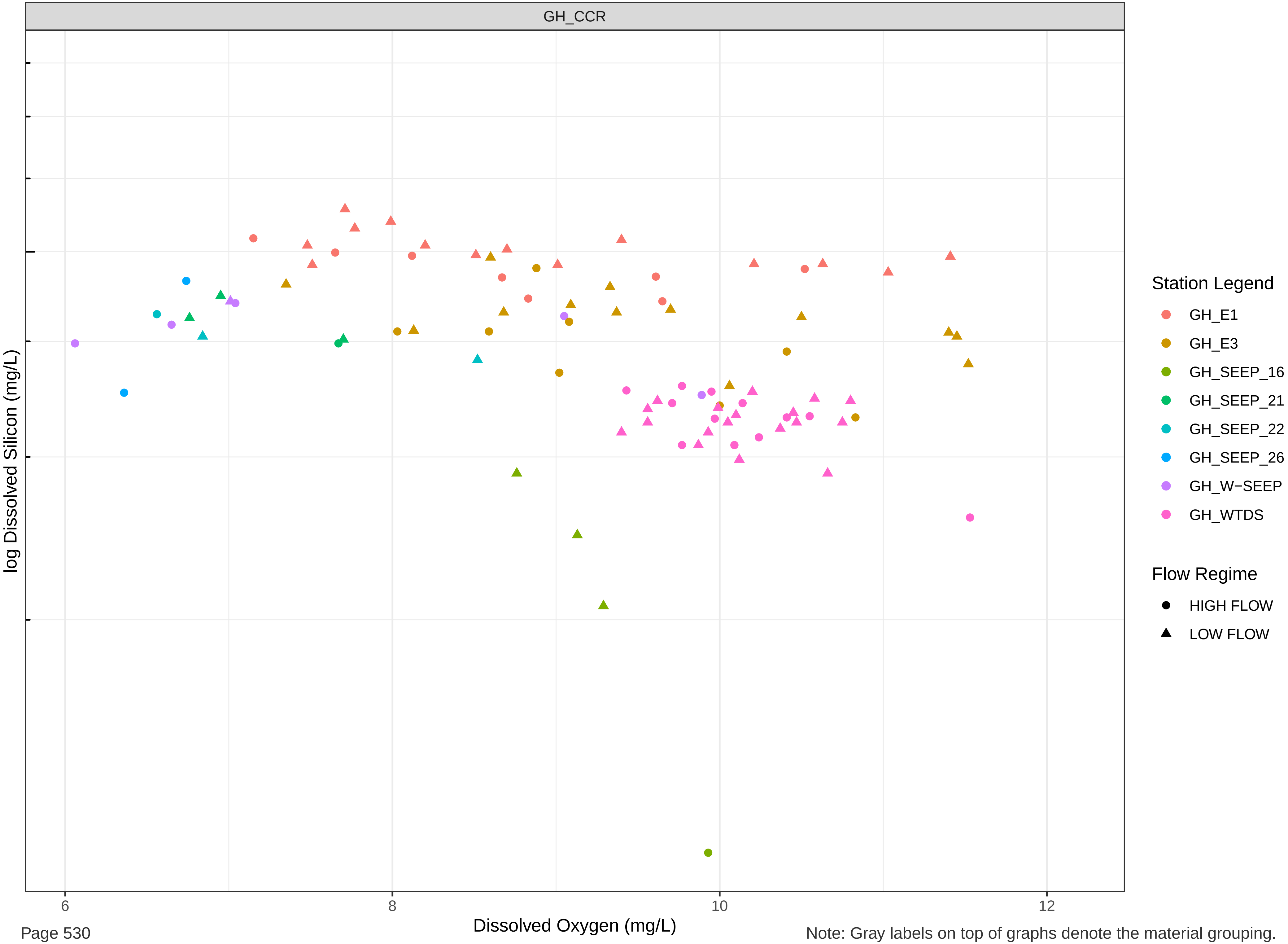

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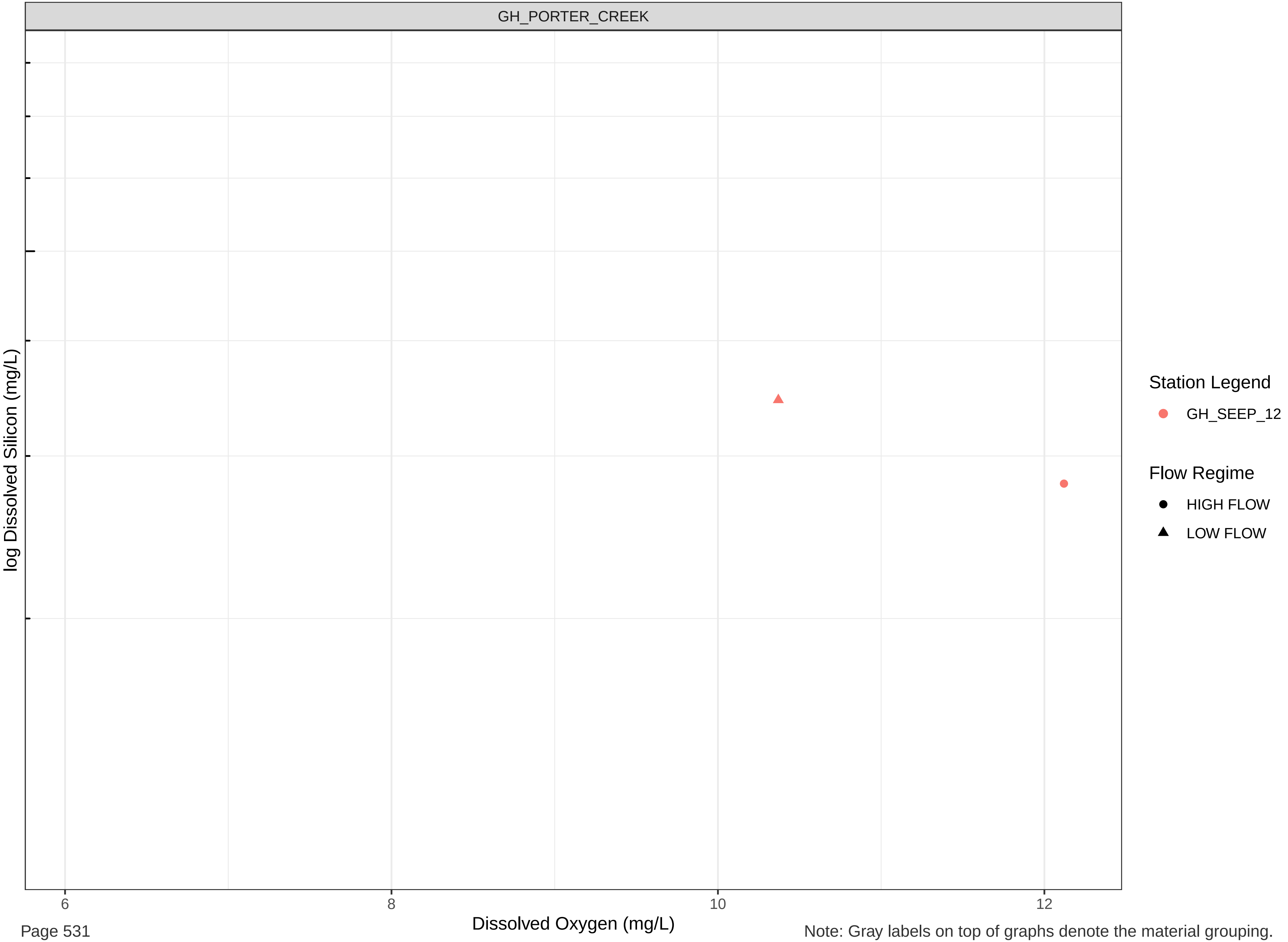

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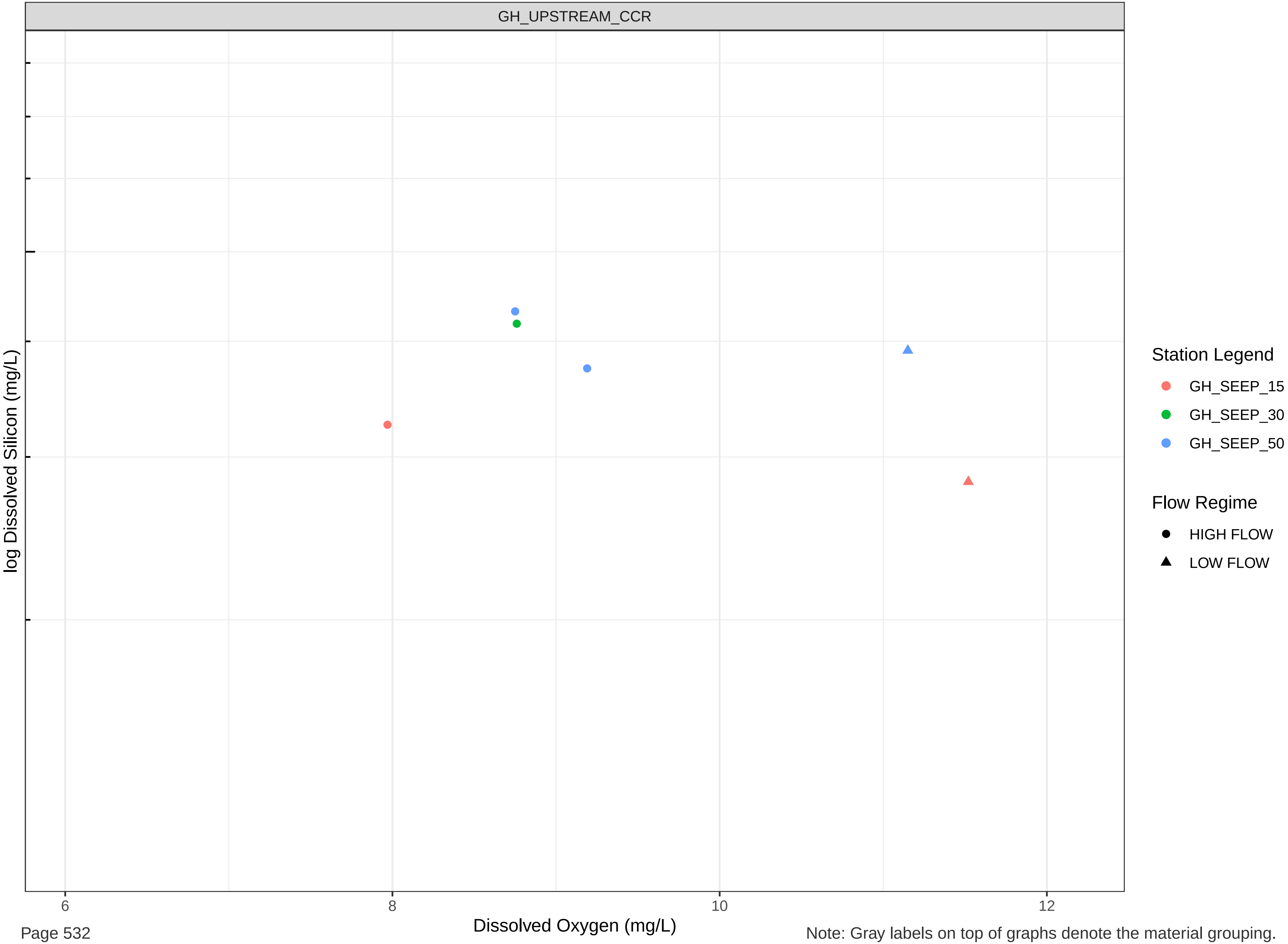

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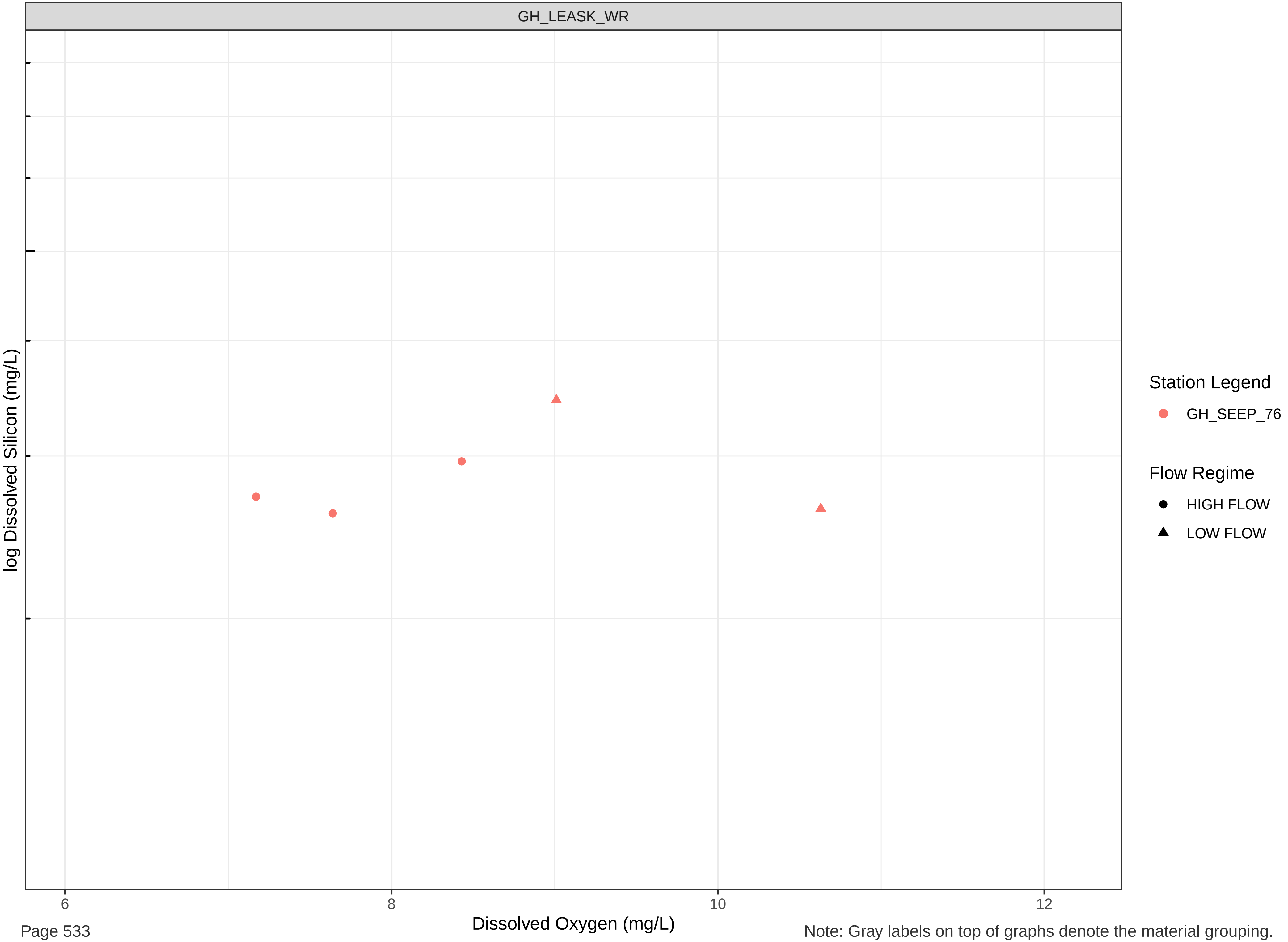

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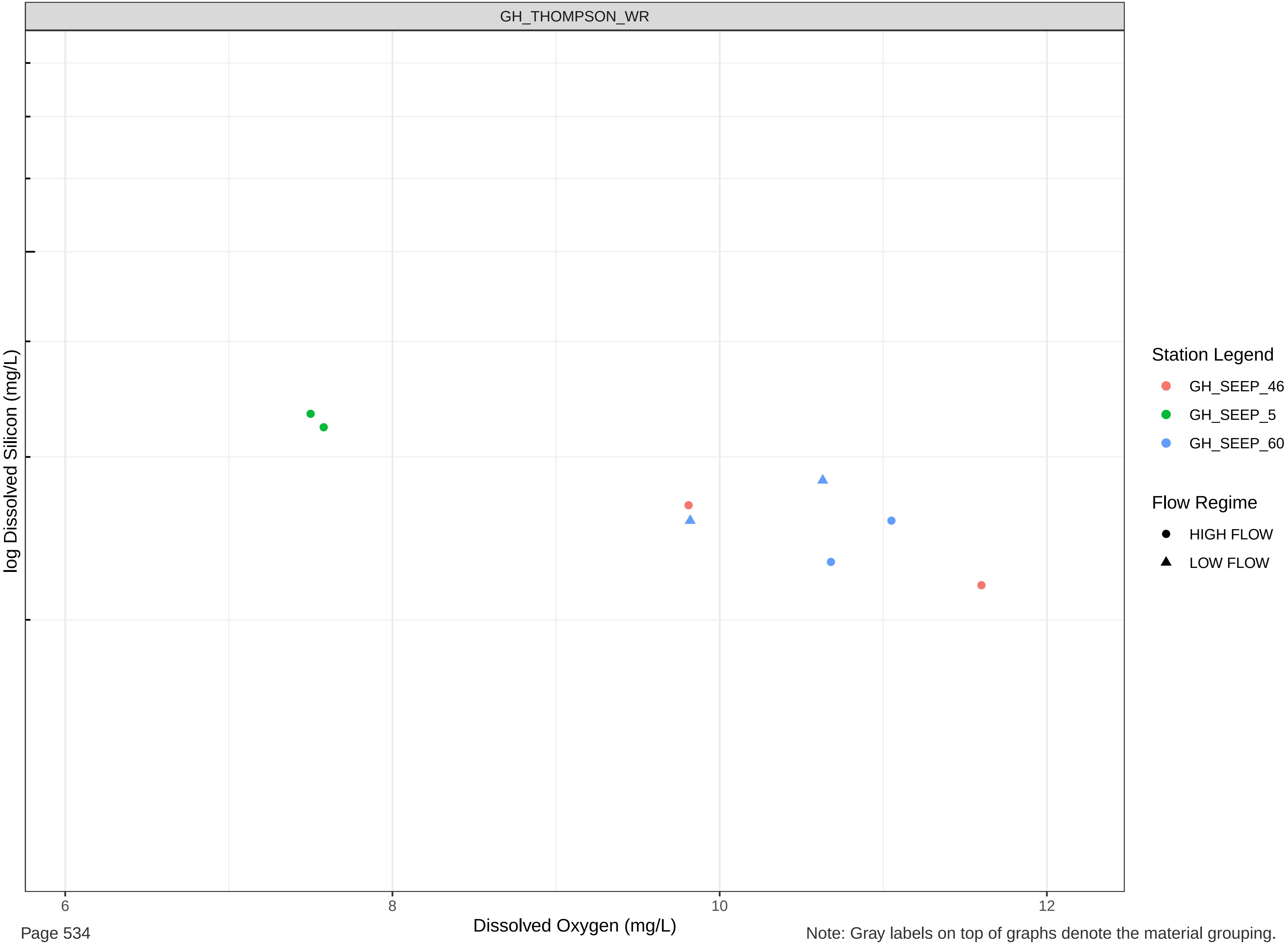

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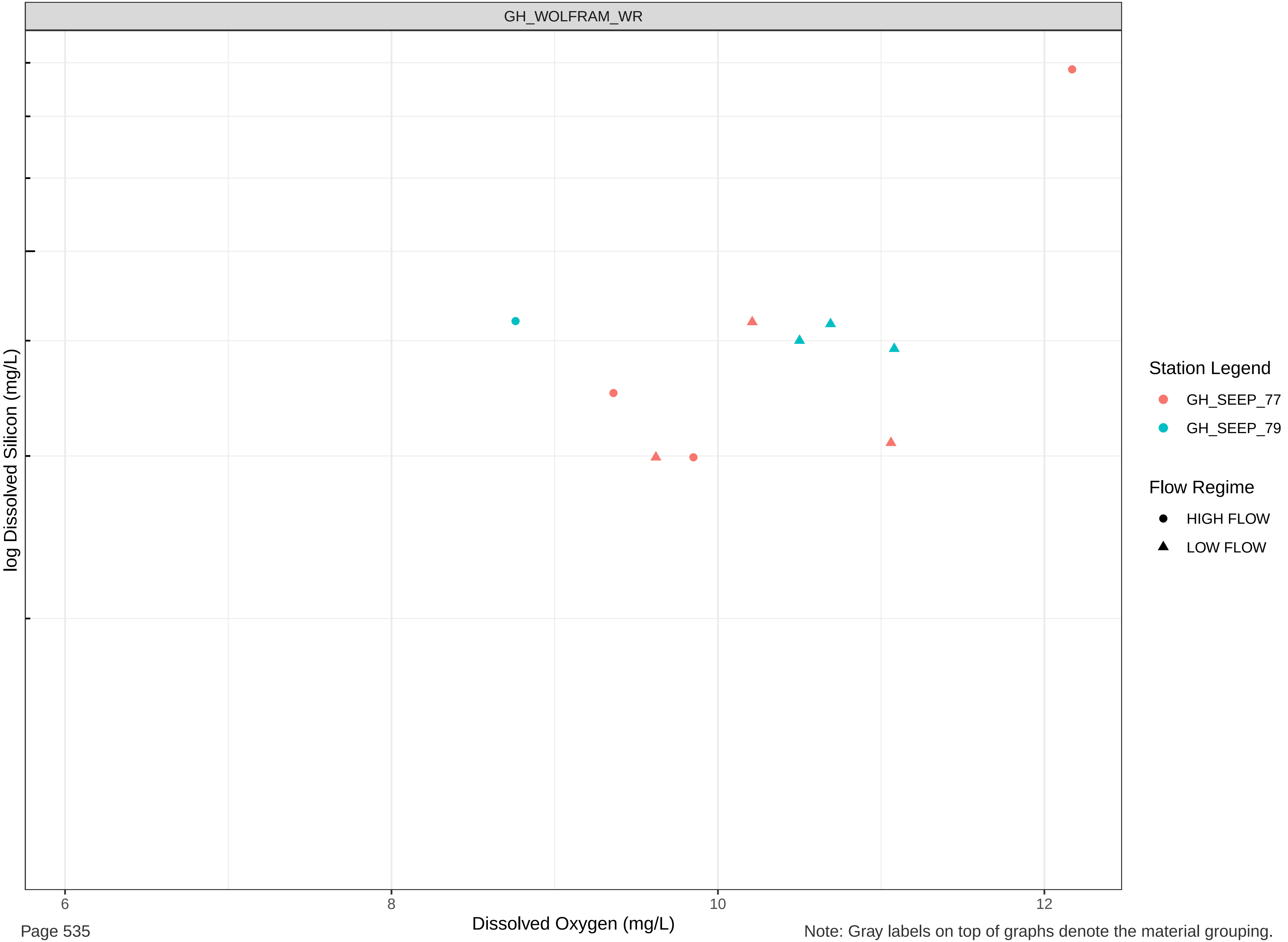

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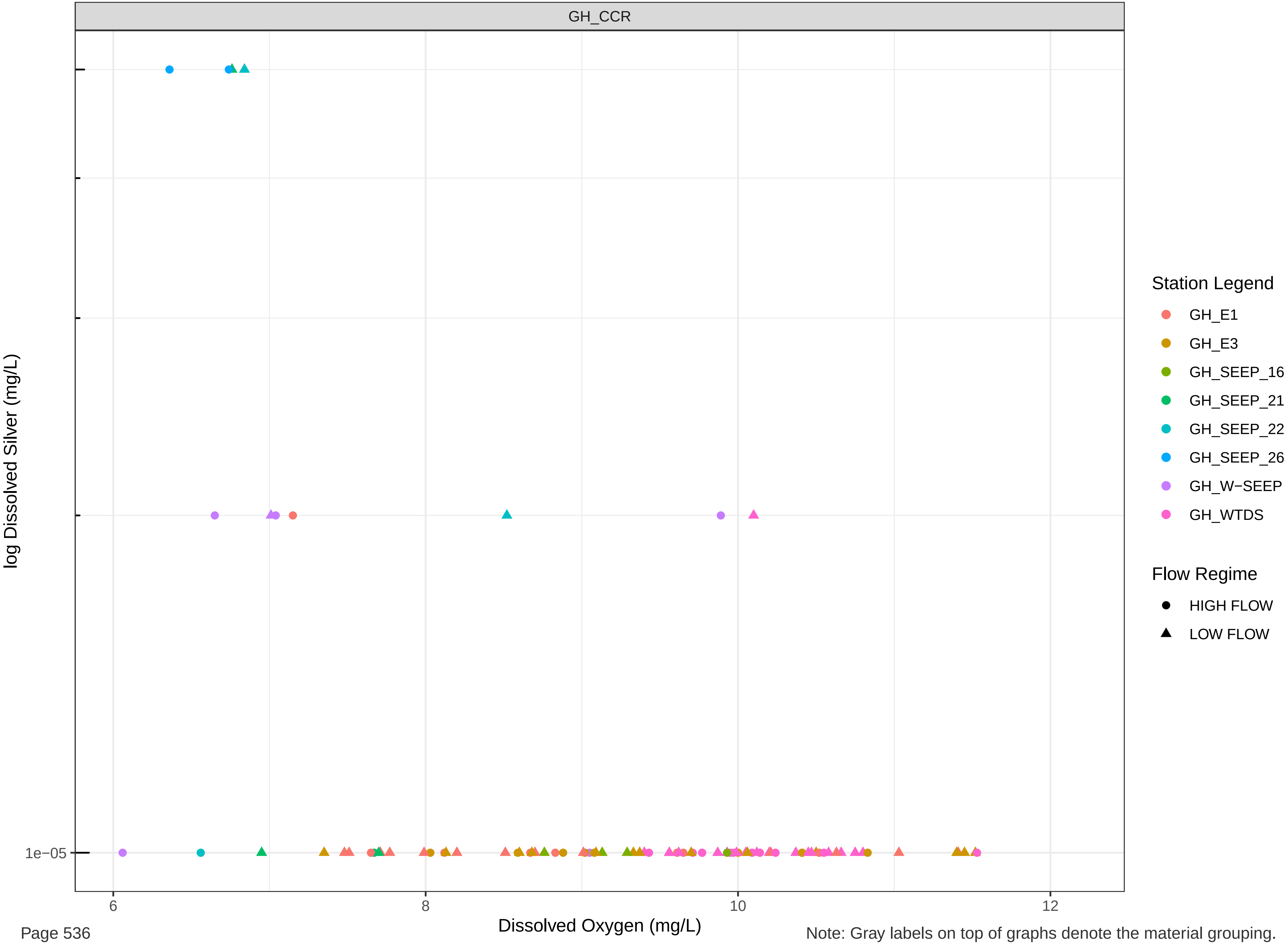

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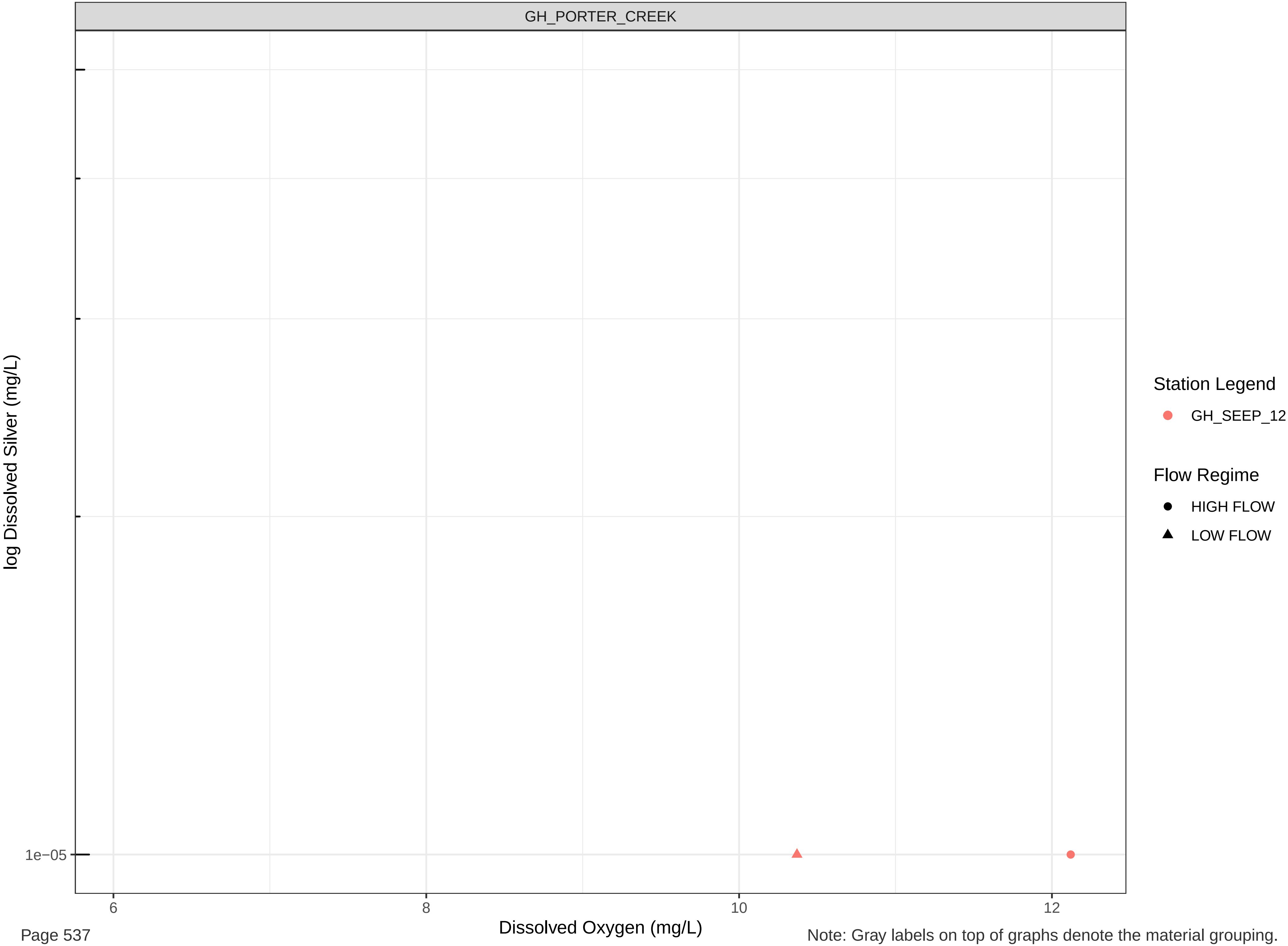

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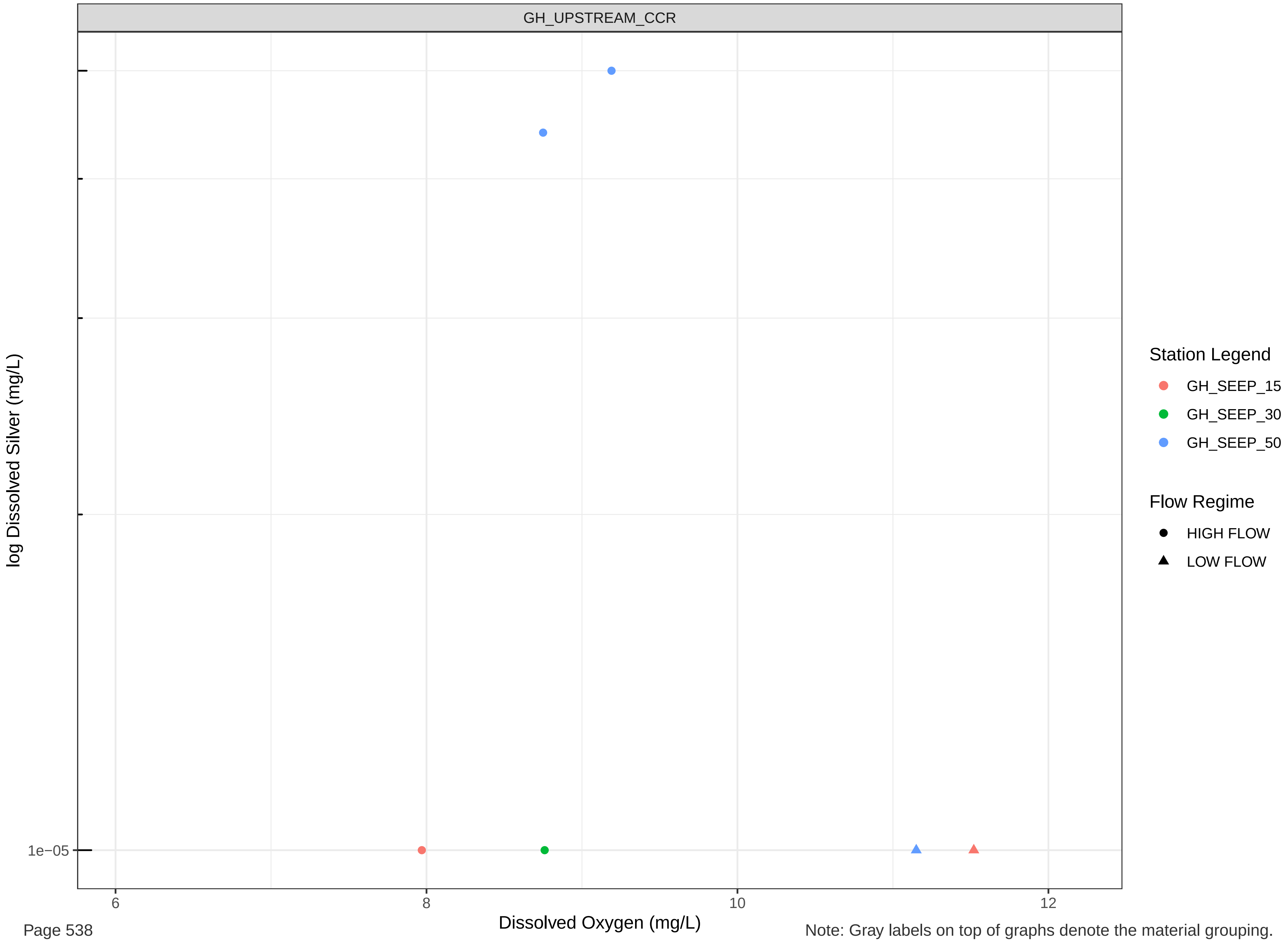

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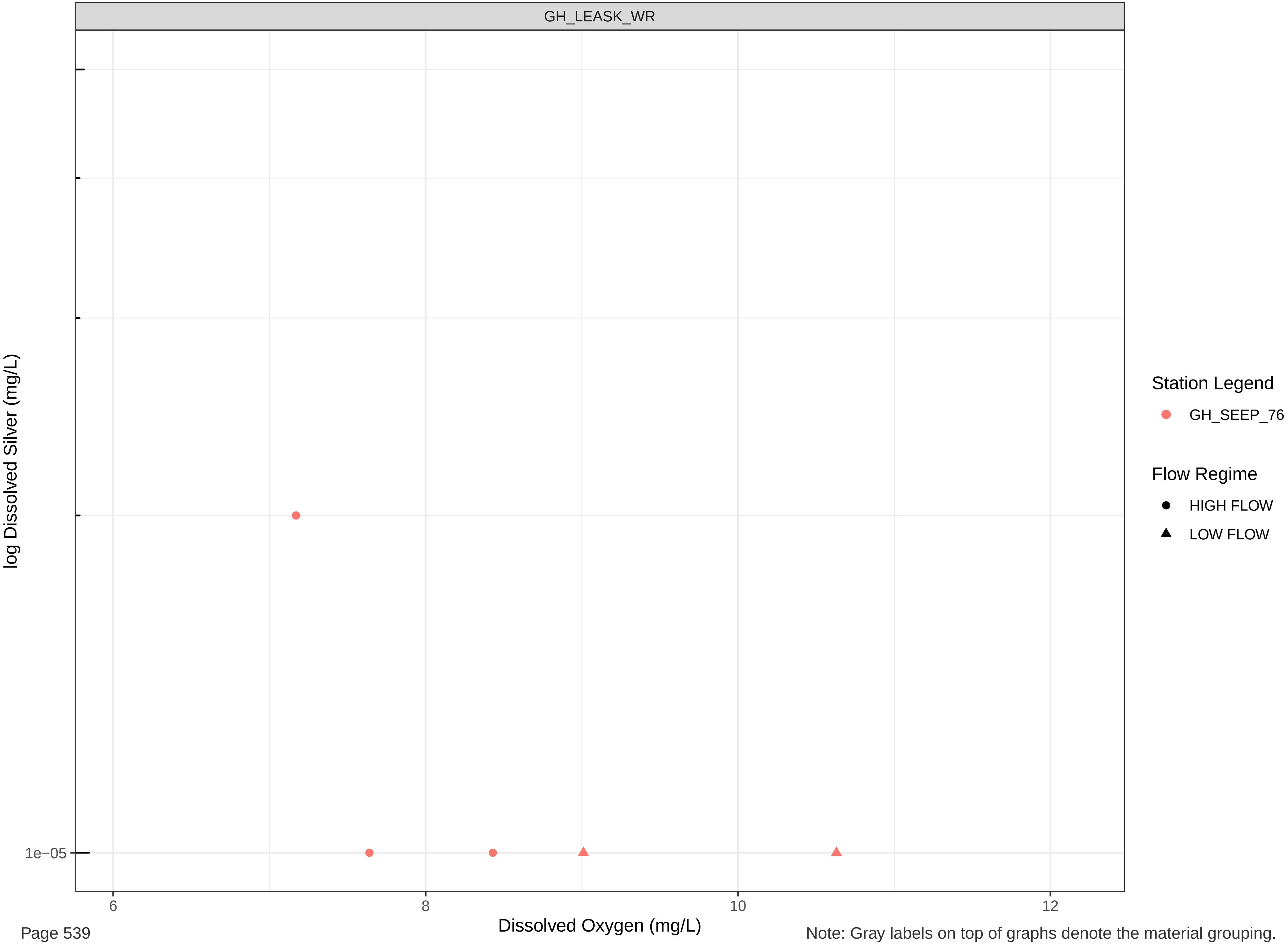

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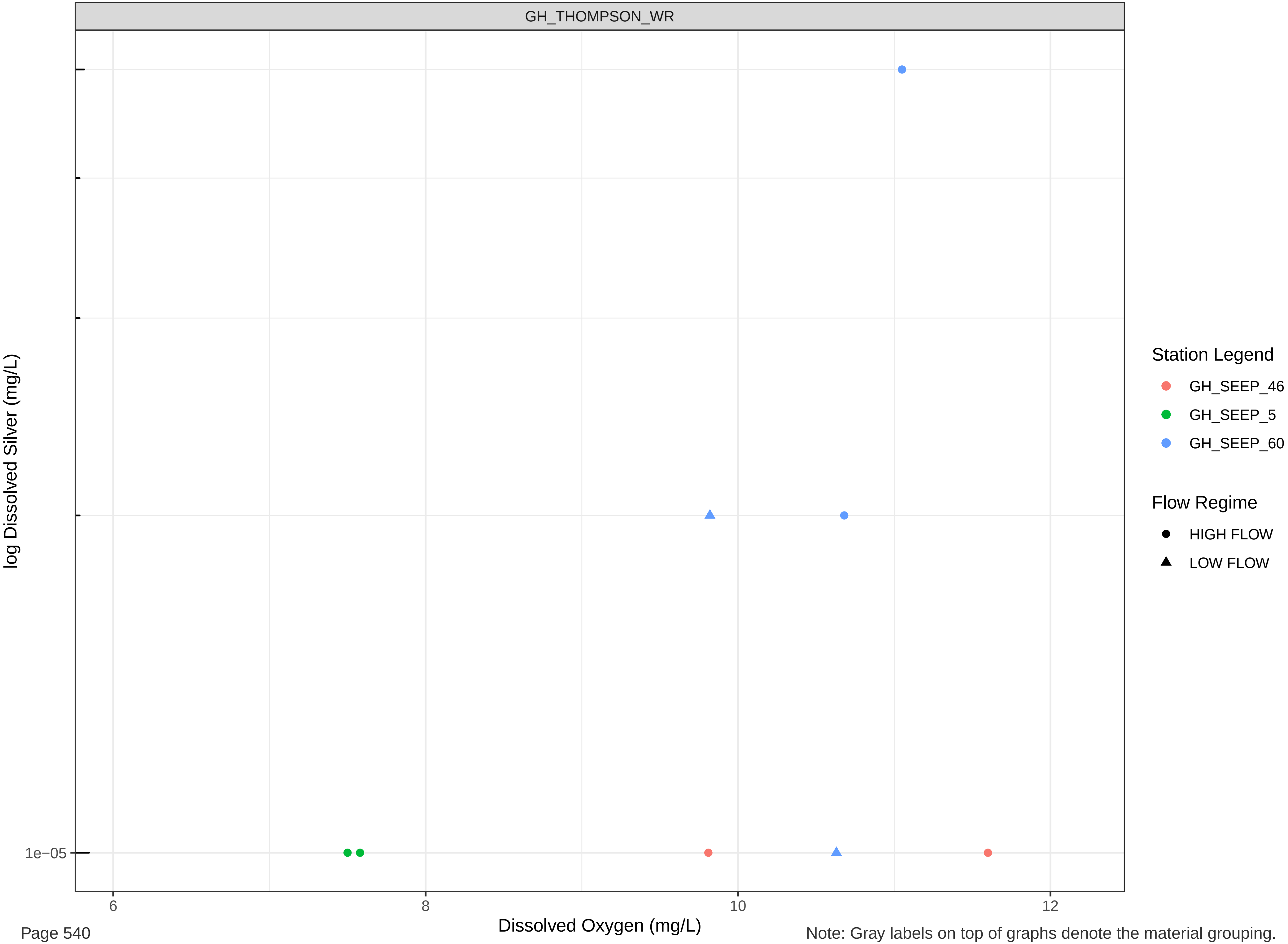

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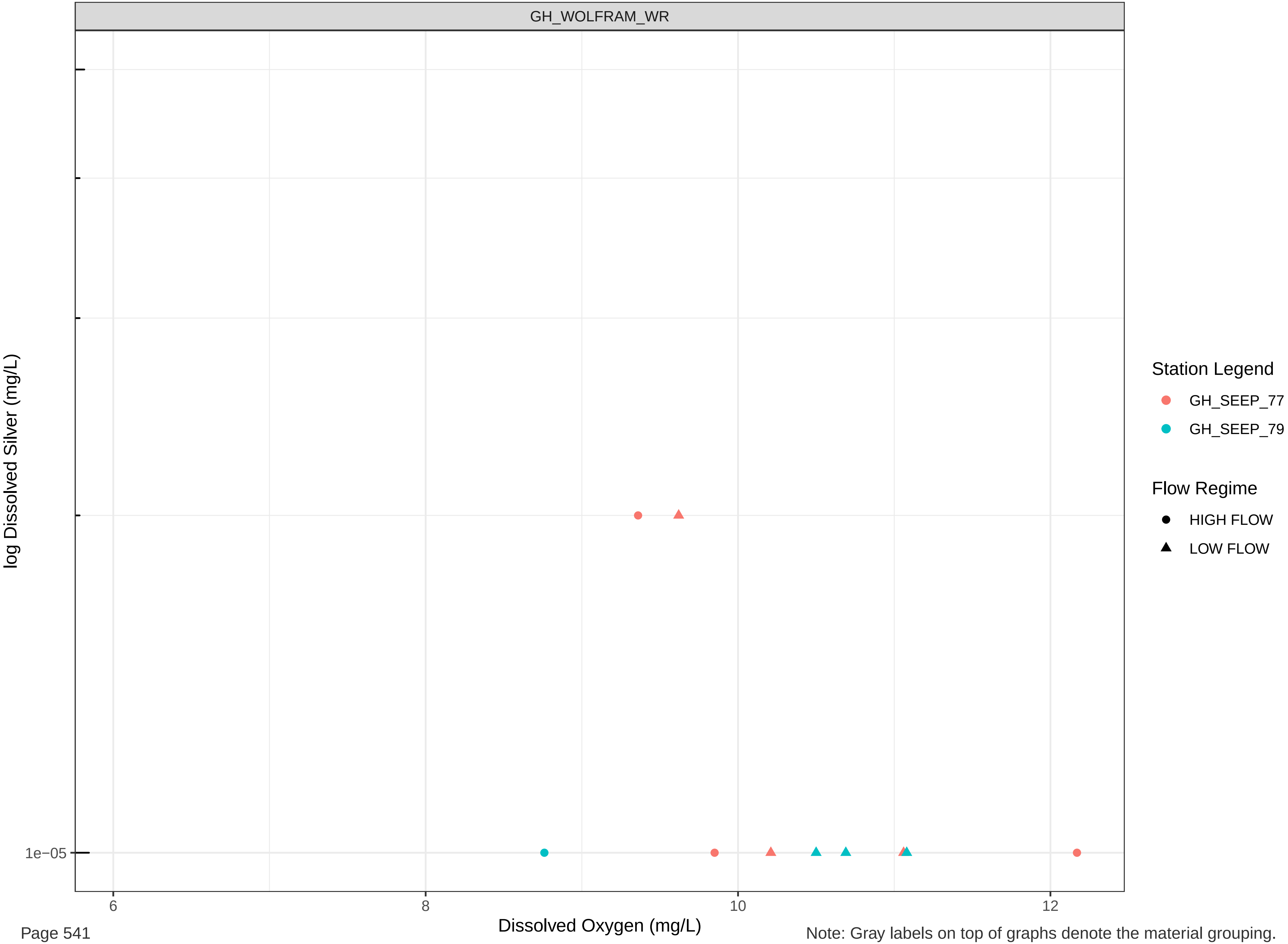

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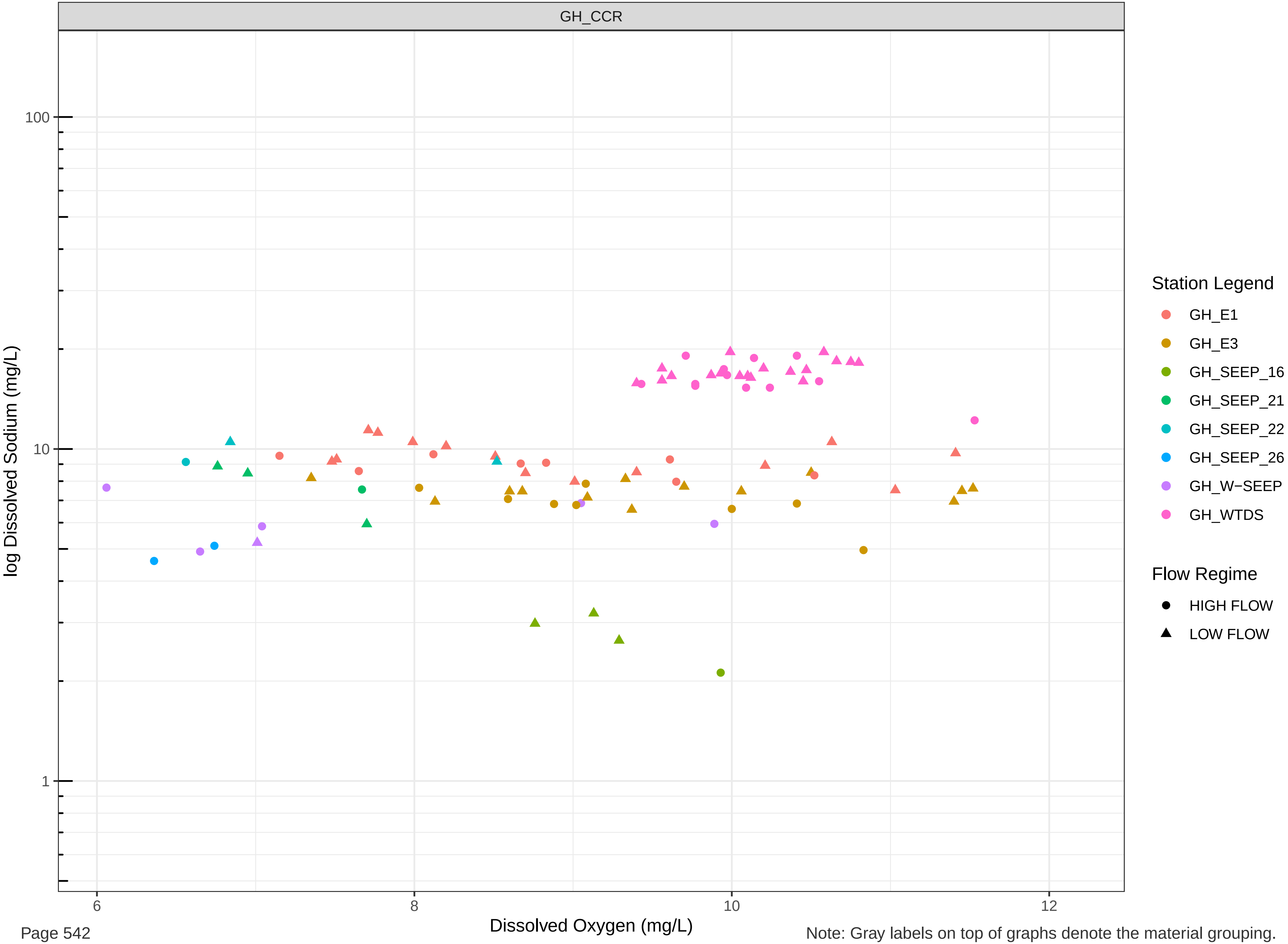

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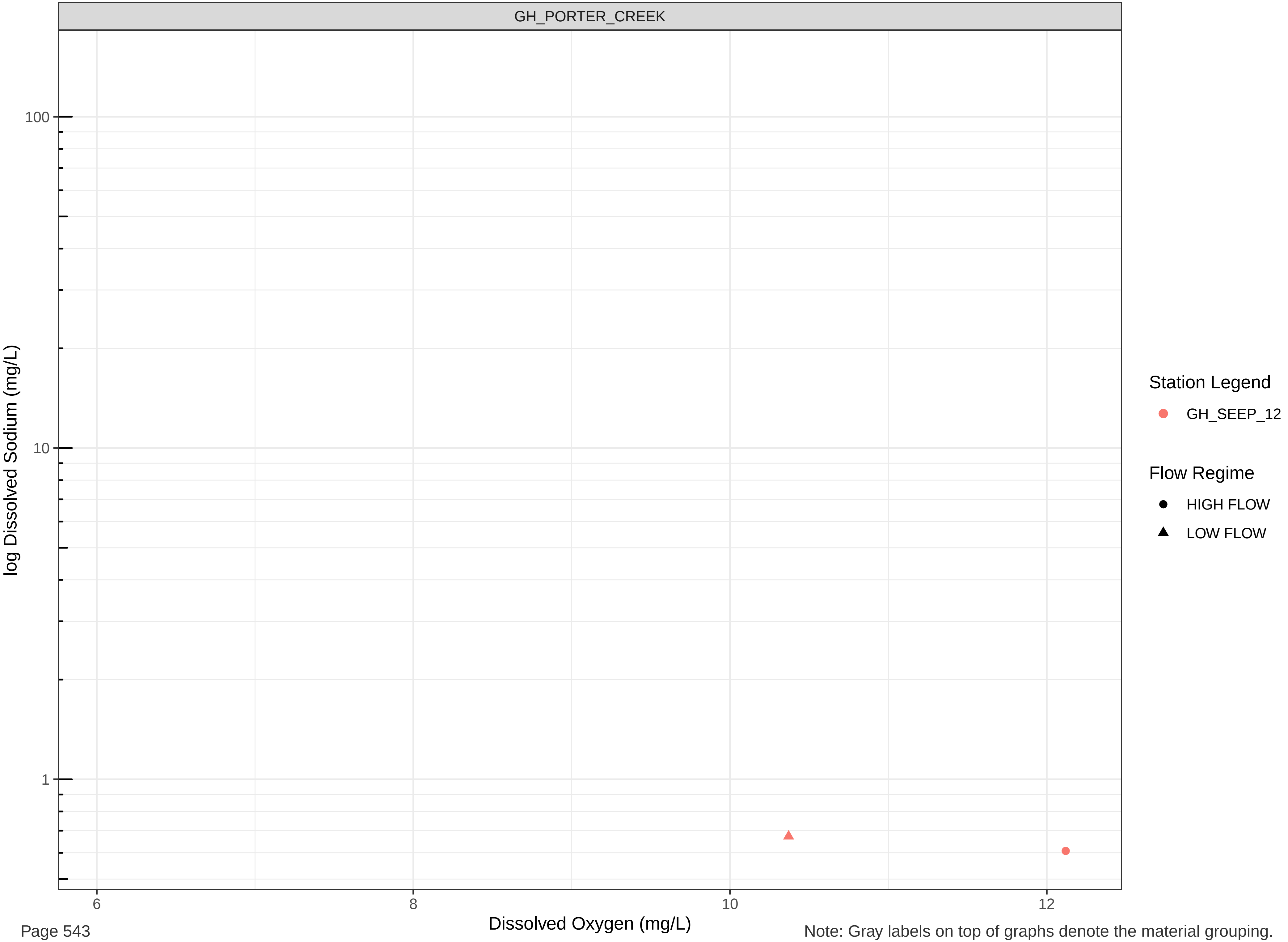

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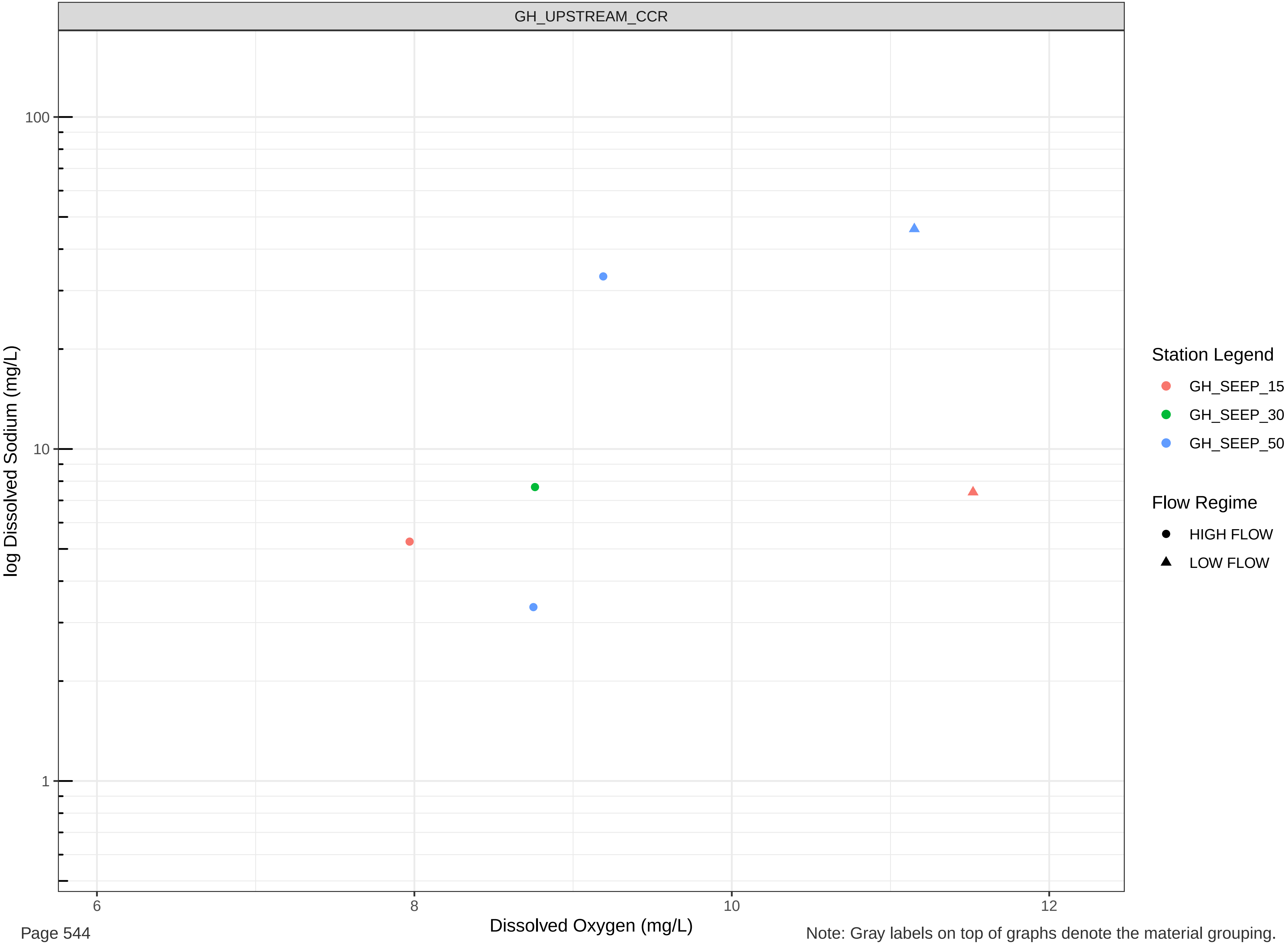

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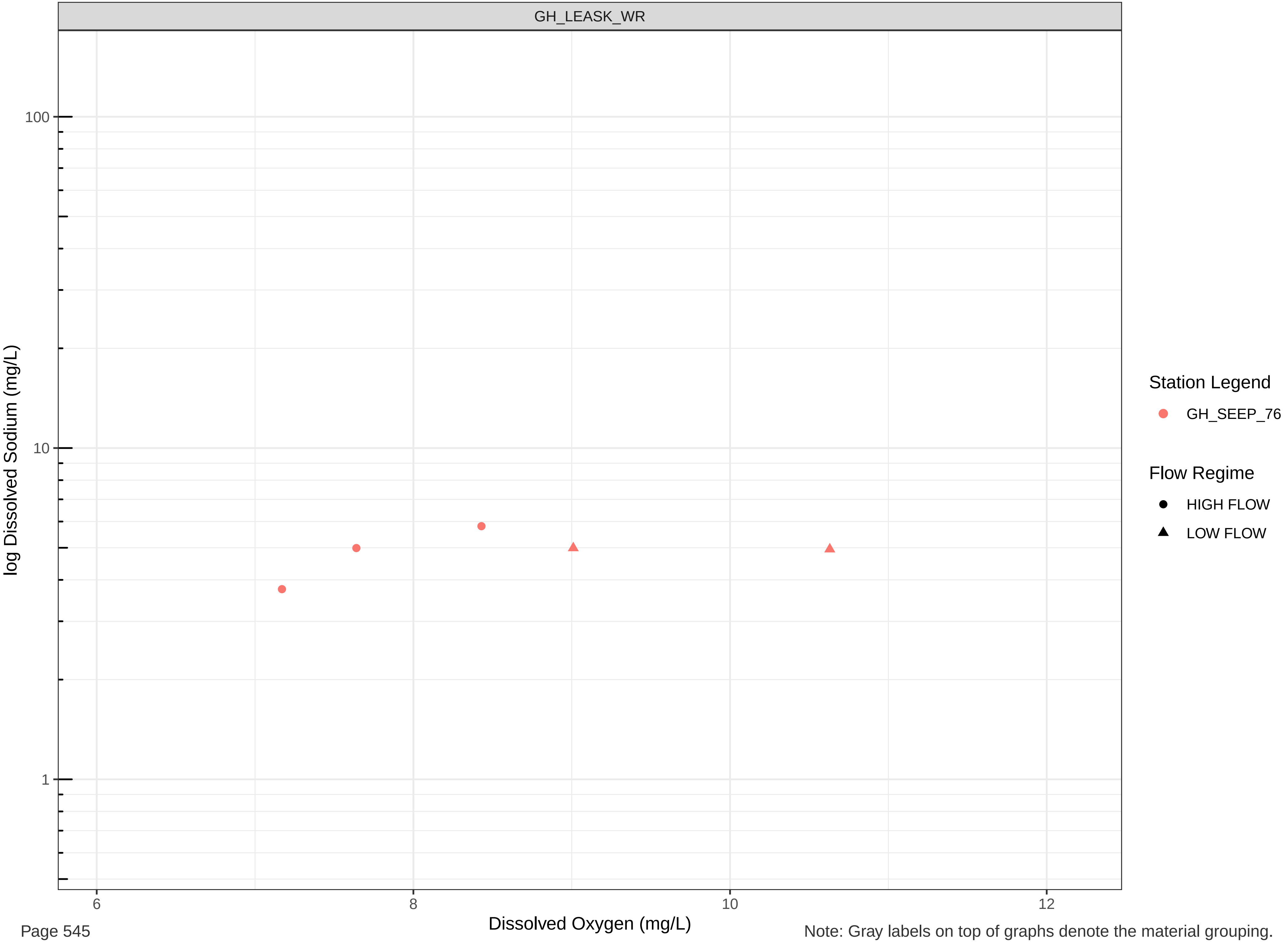

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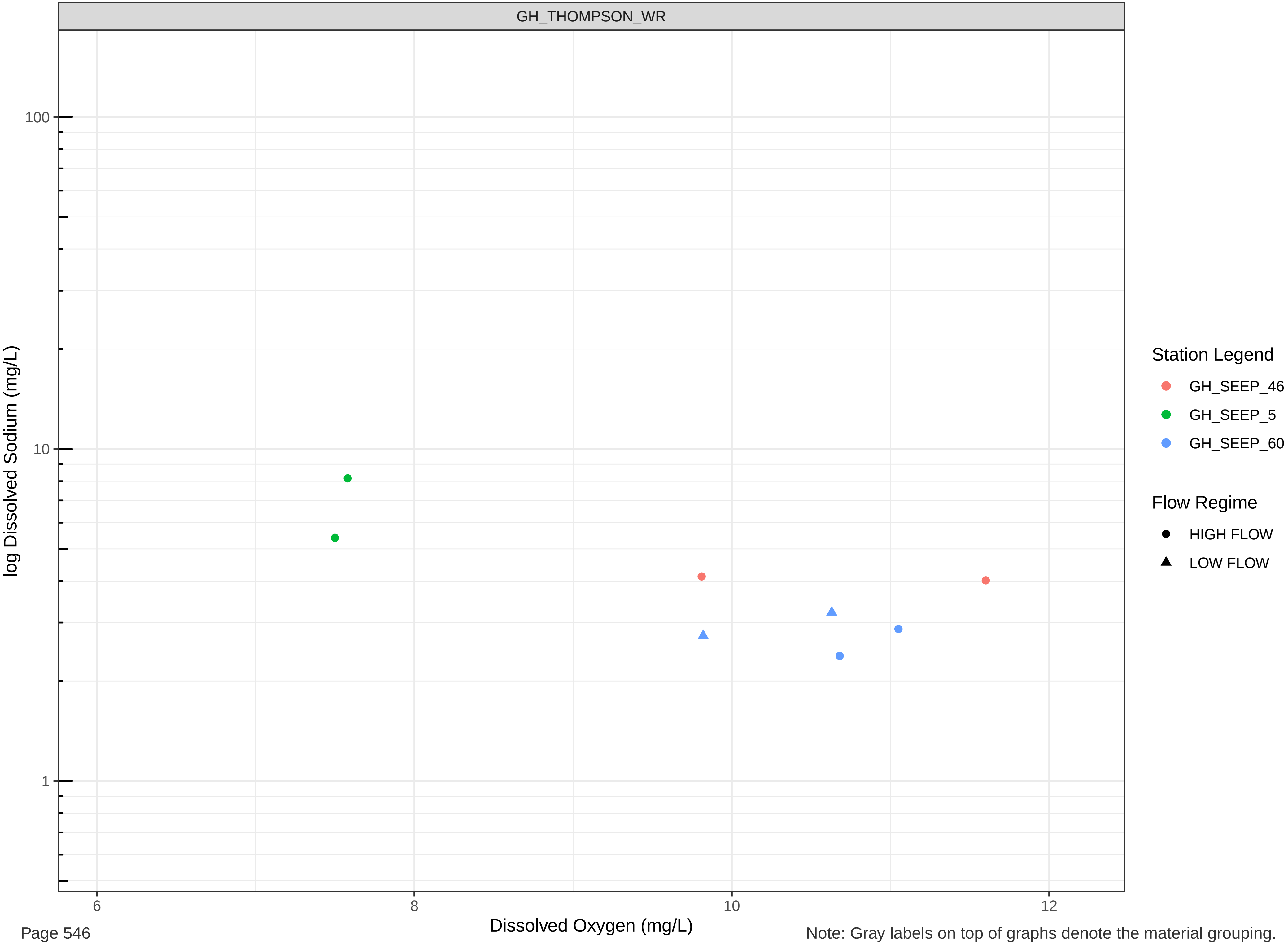

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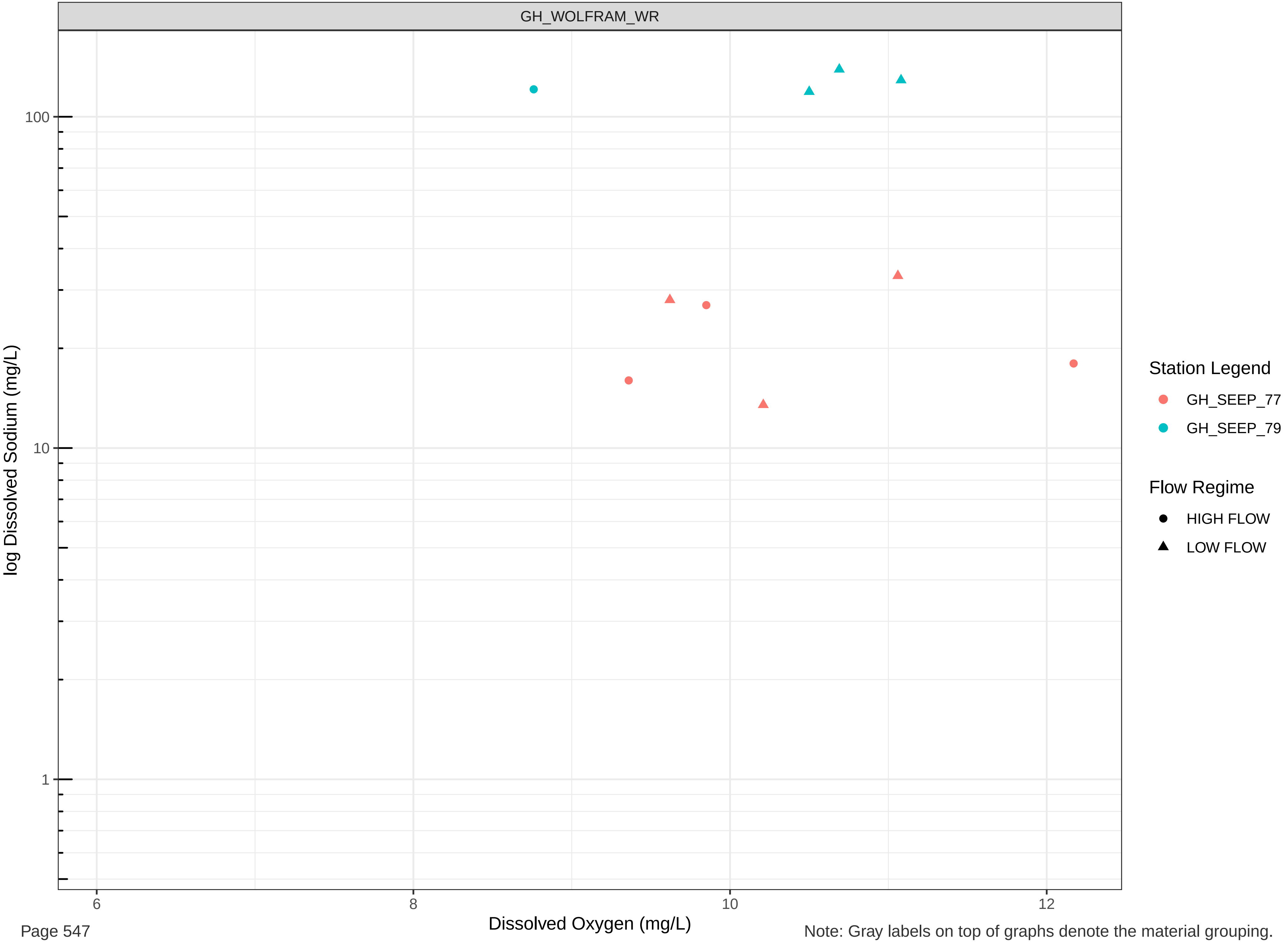

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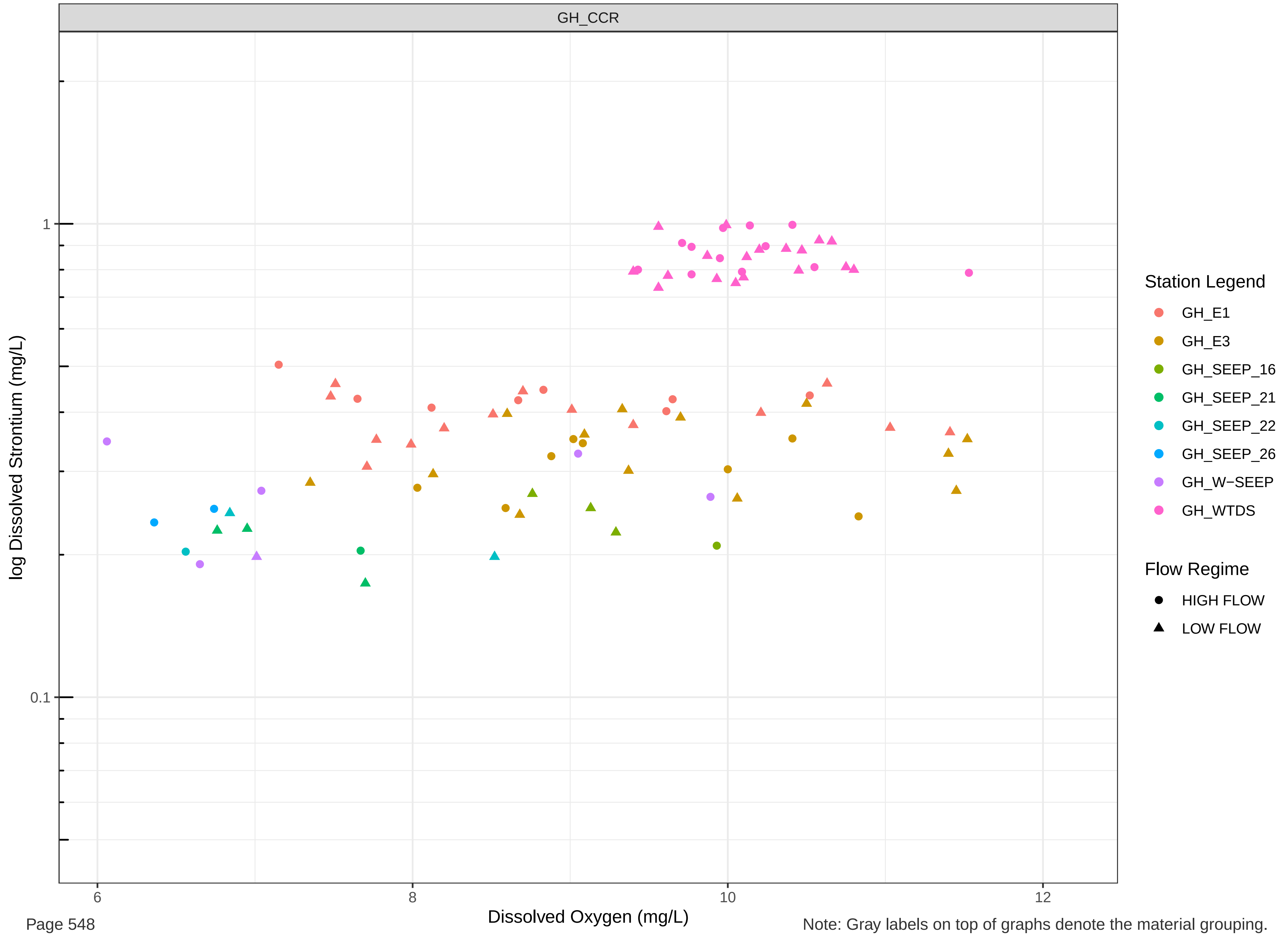

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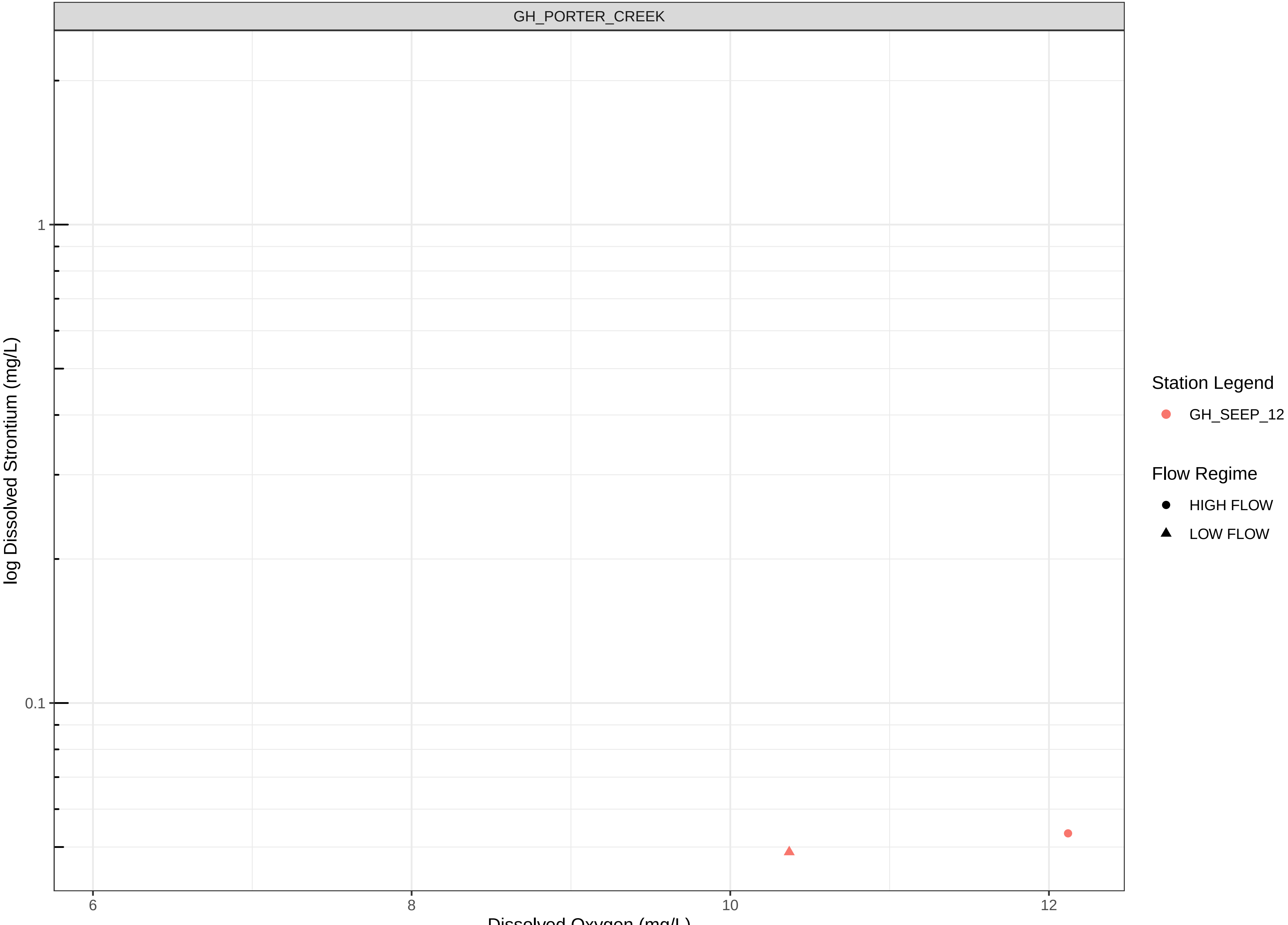
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Station Legend
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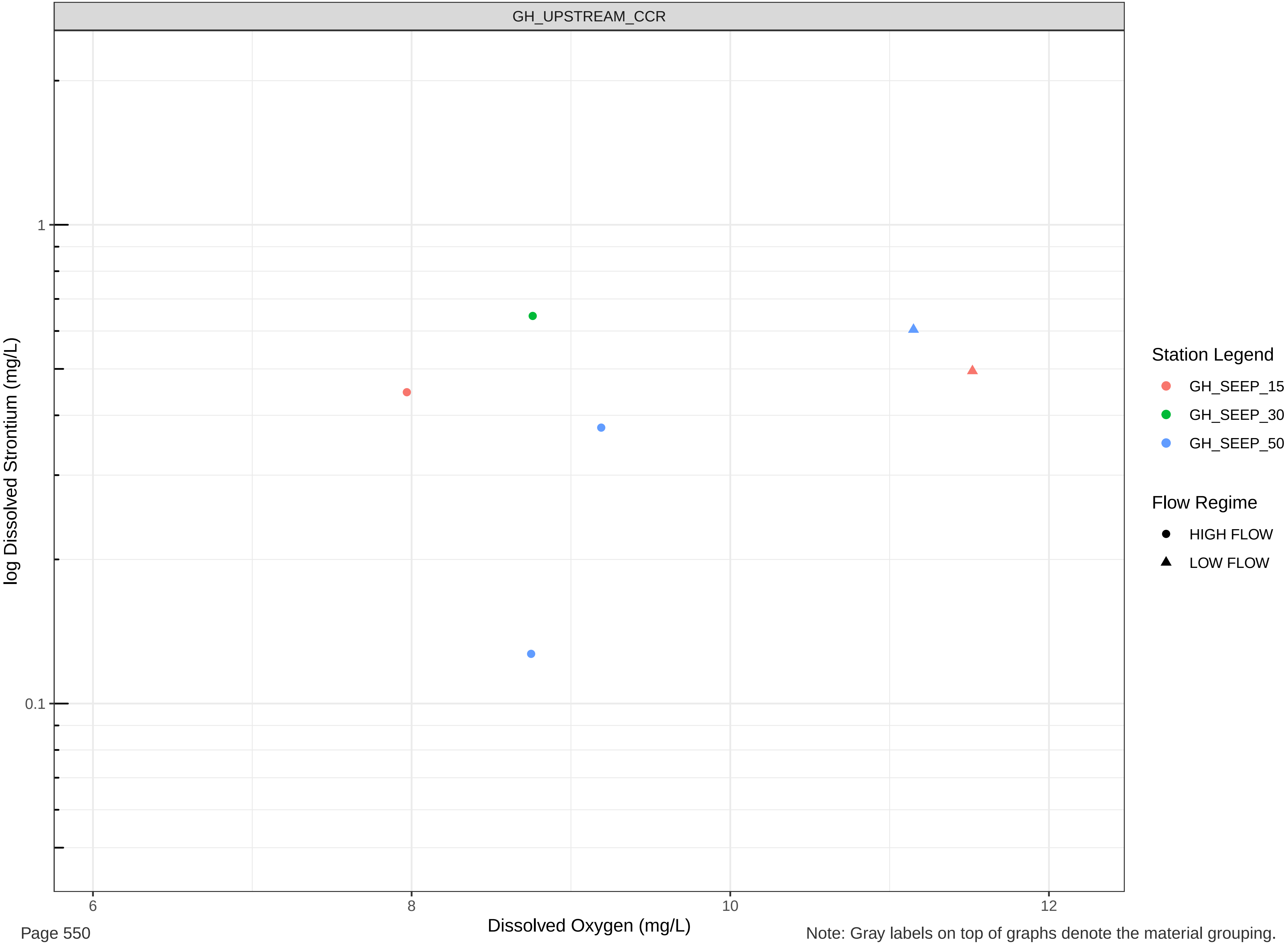

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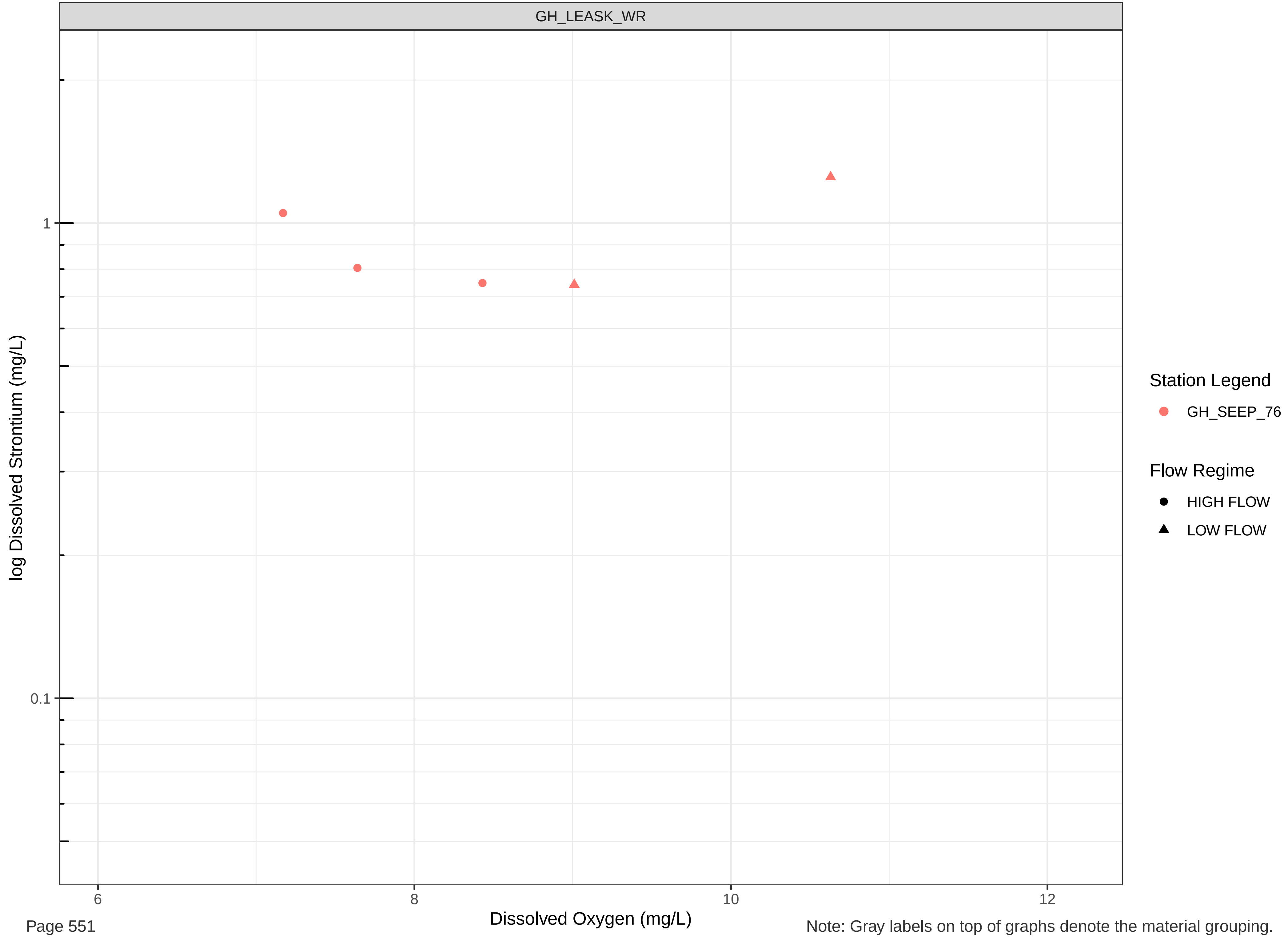

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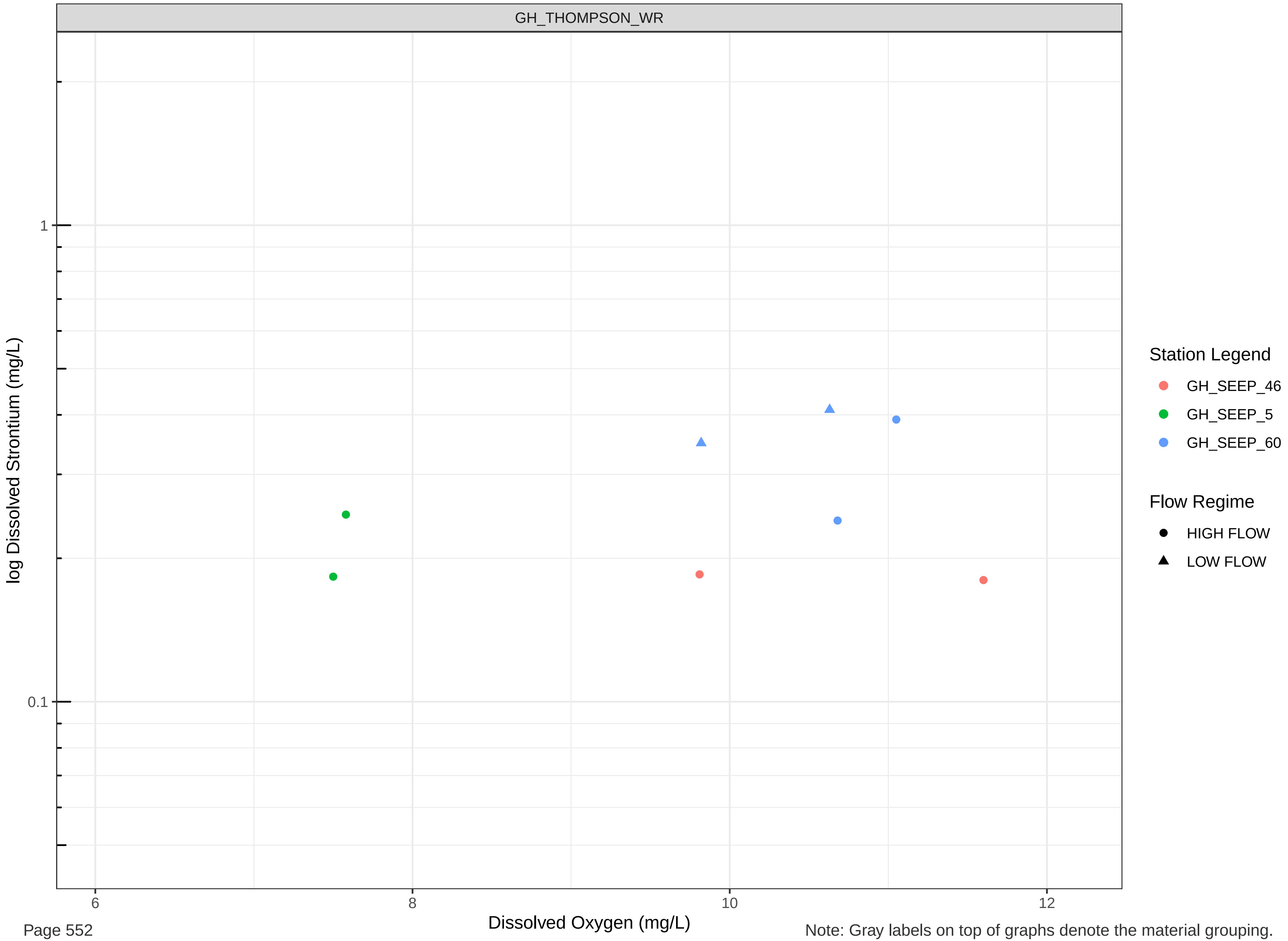

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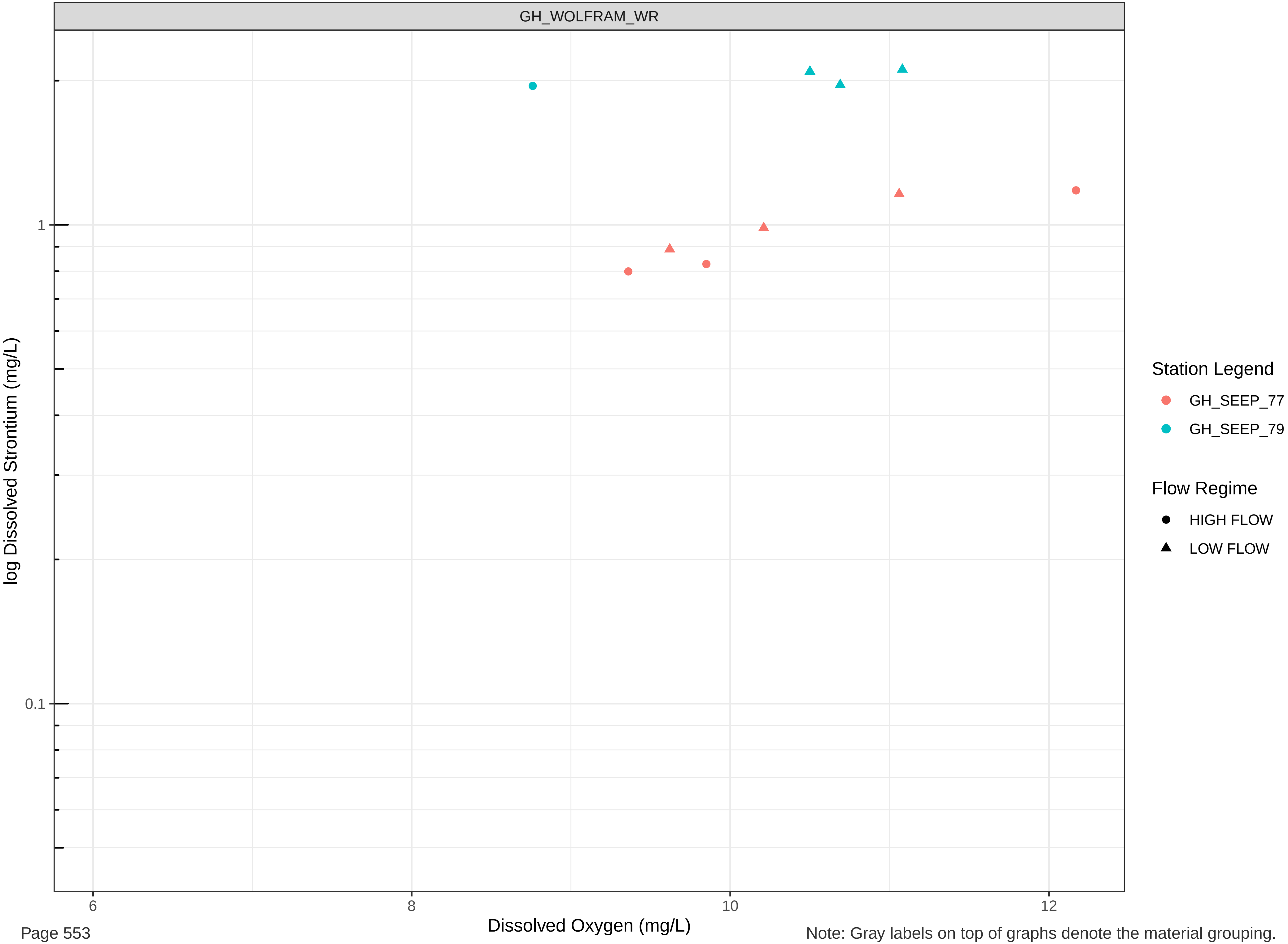

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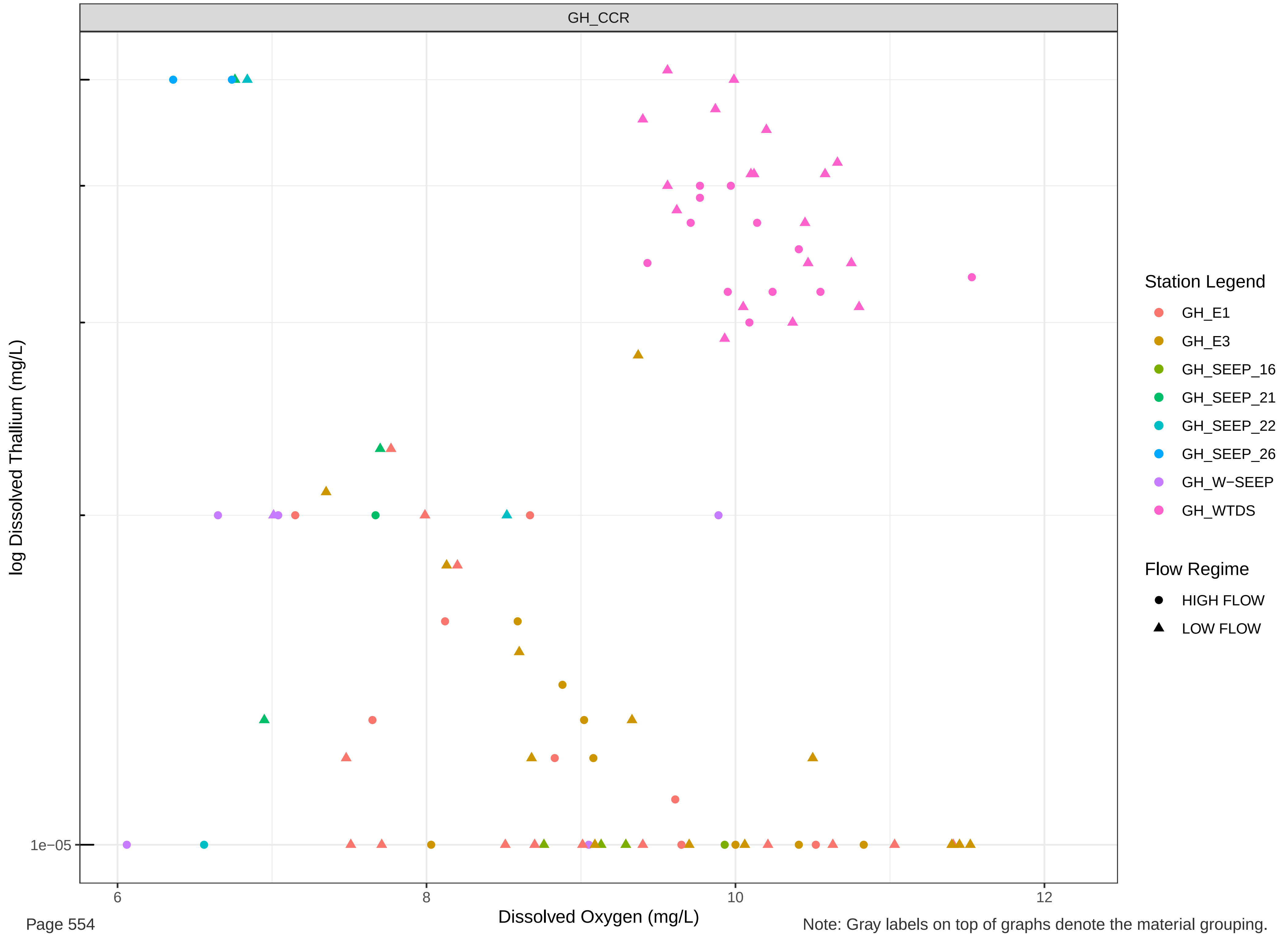

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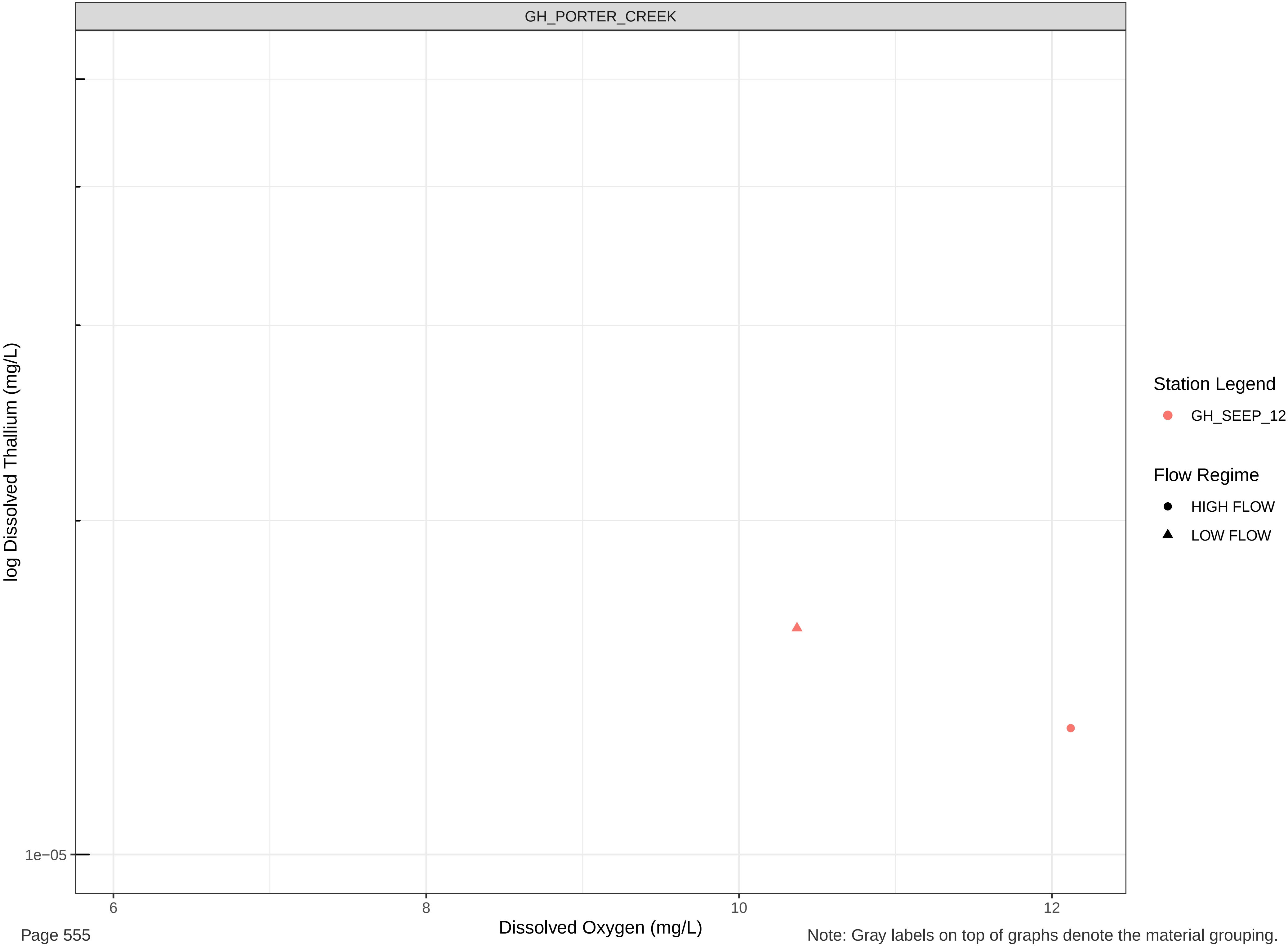

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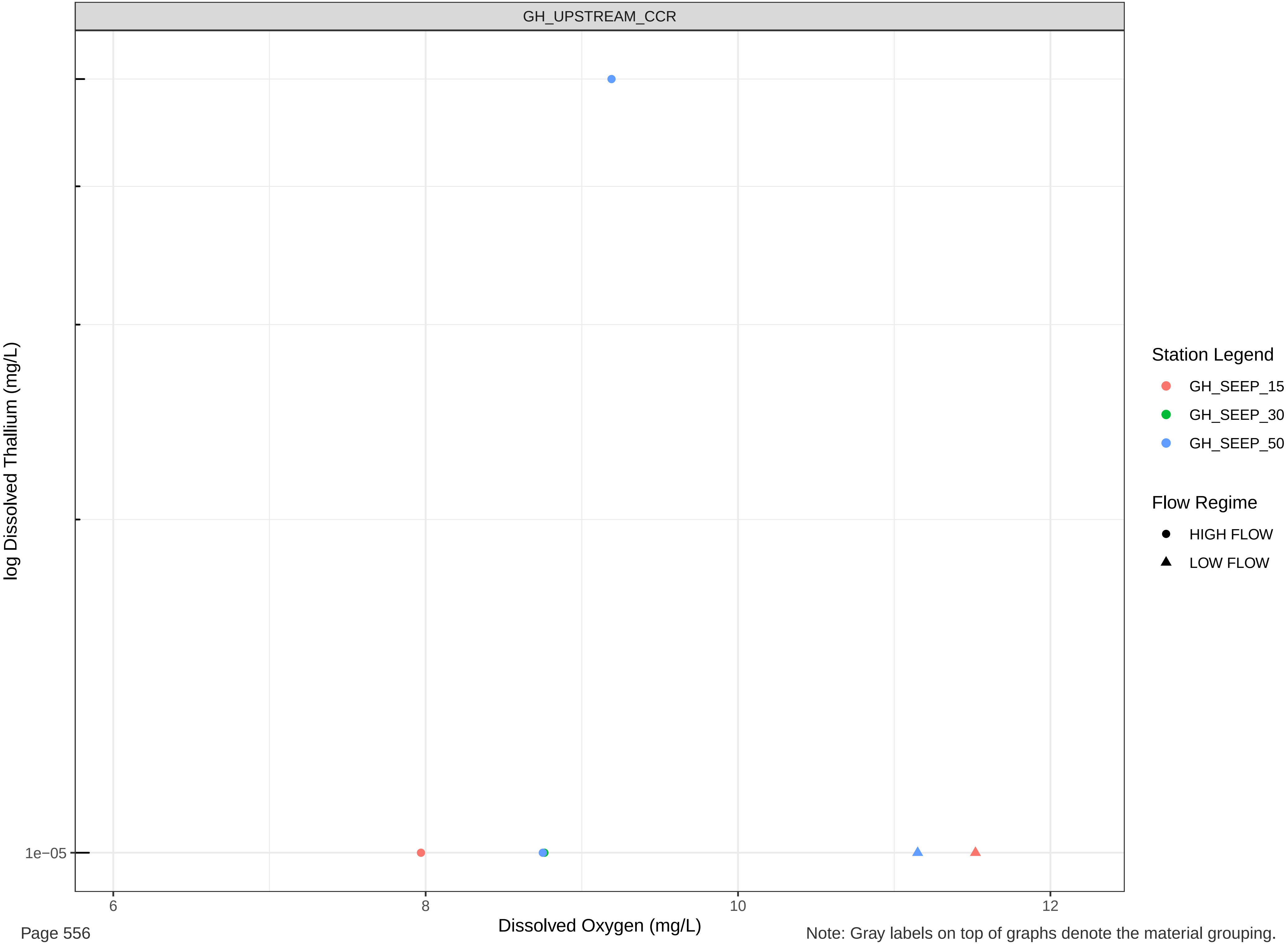

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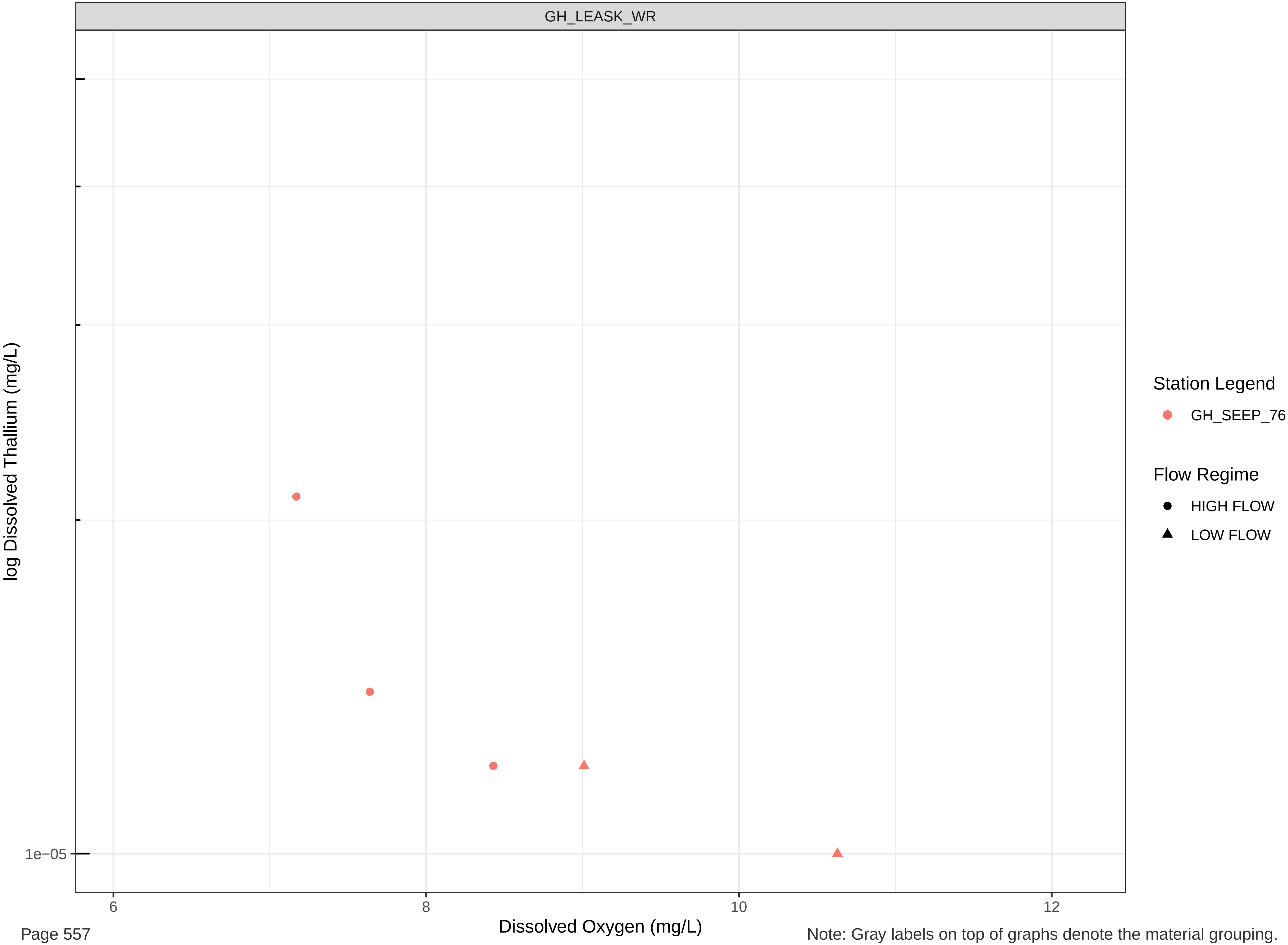

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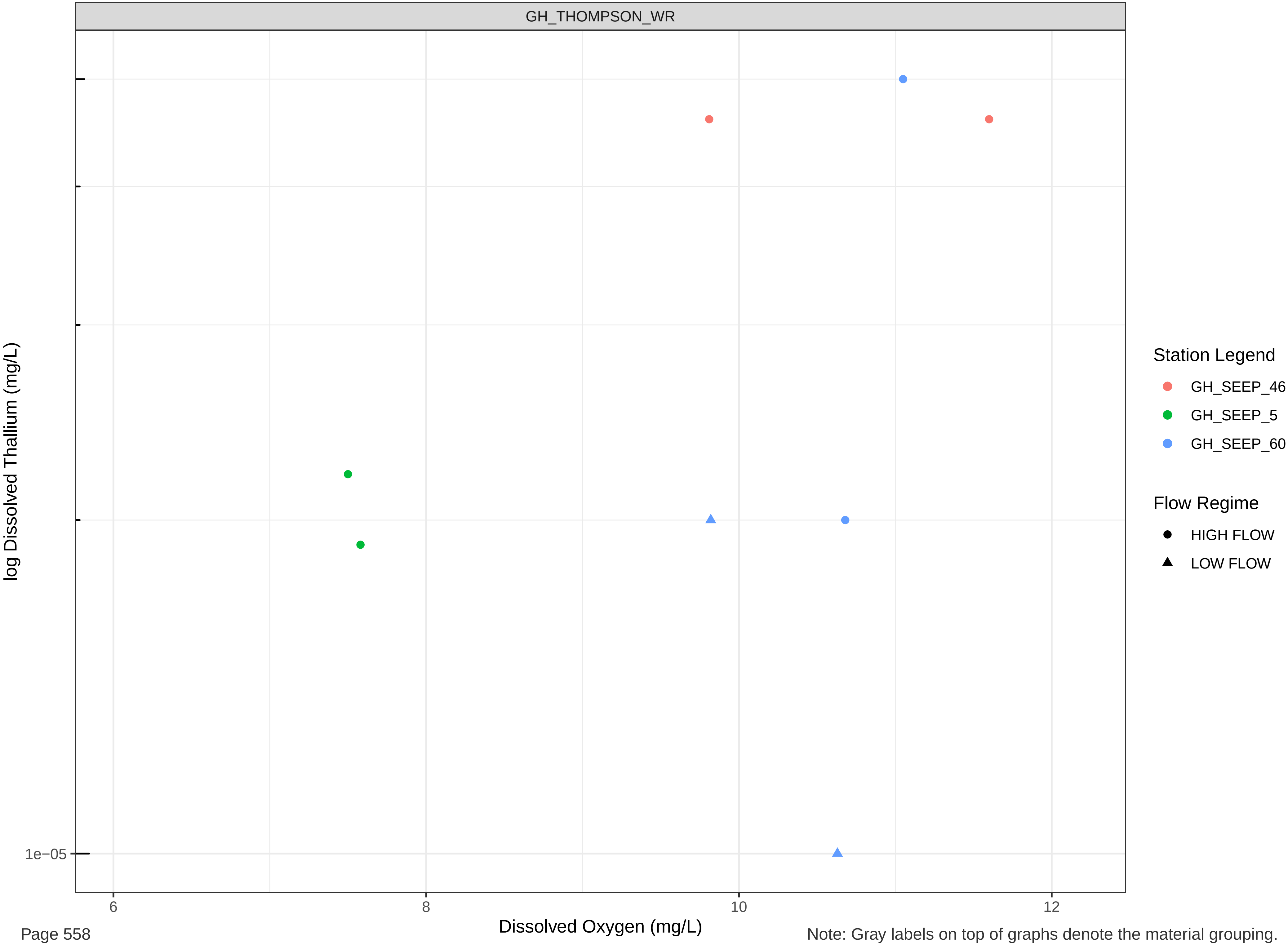
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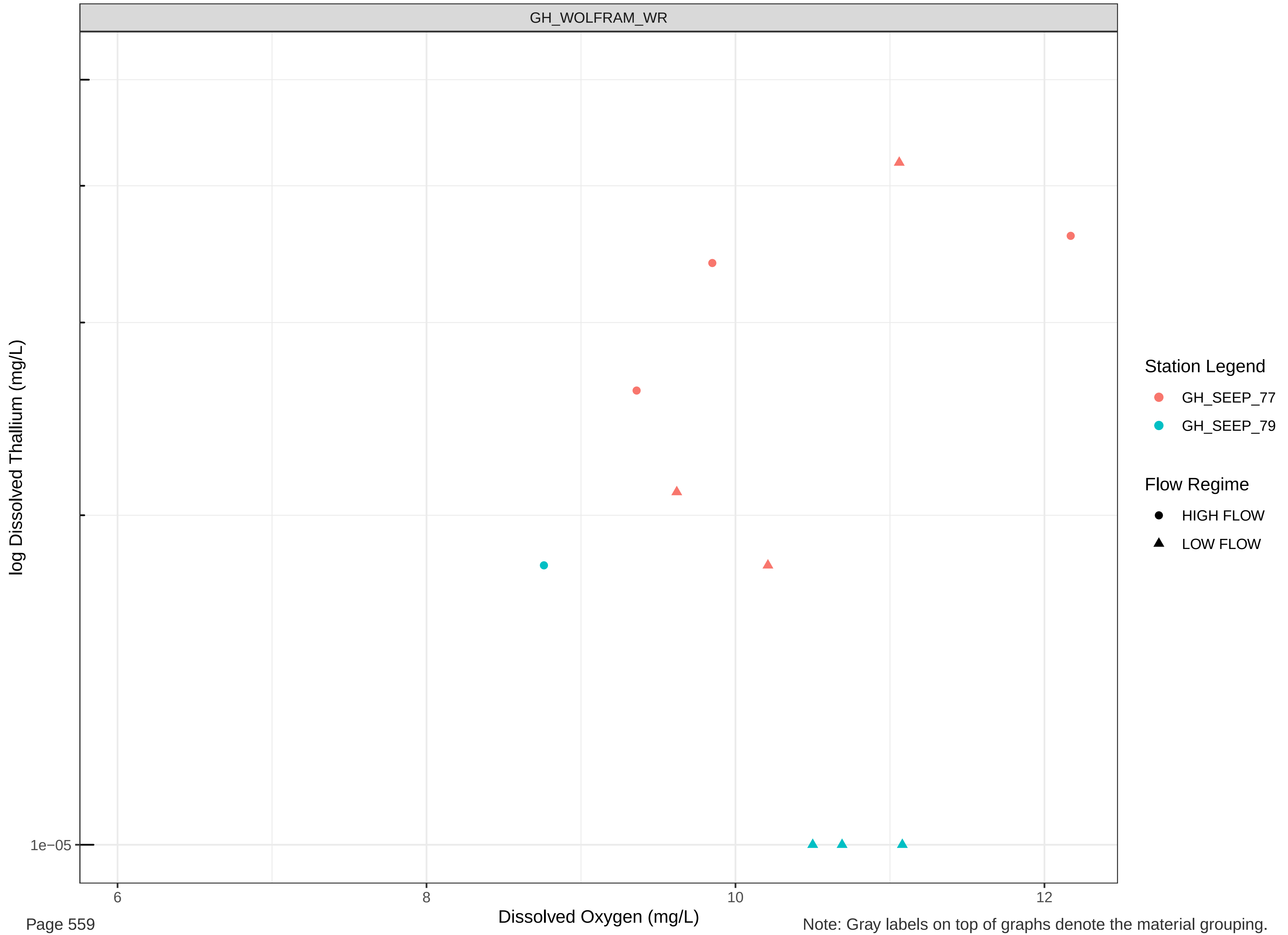

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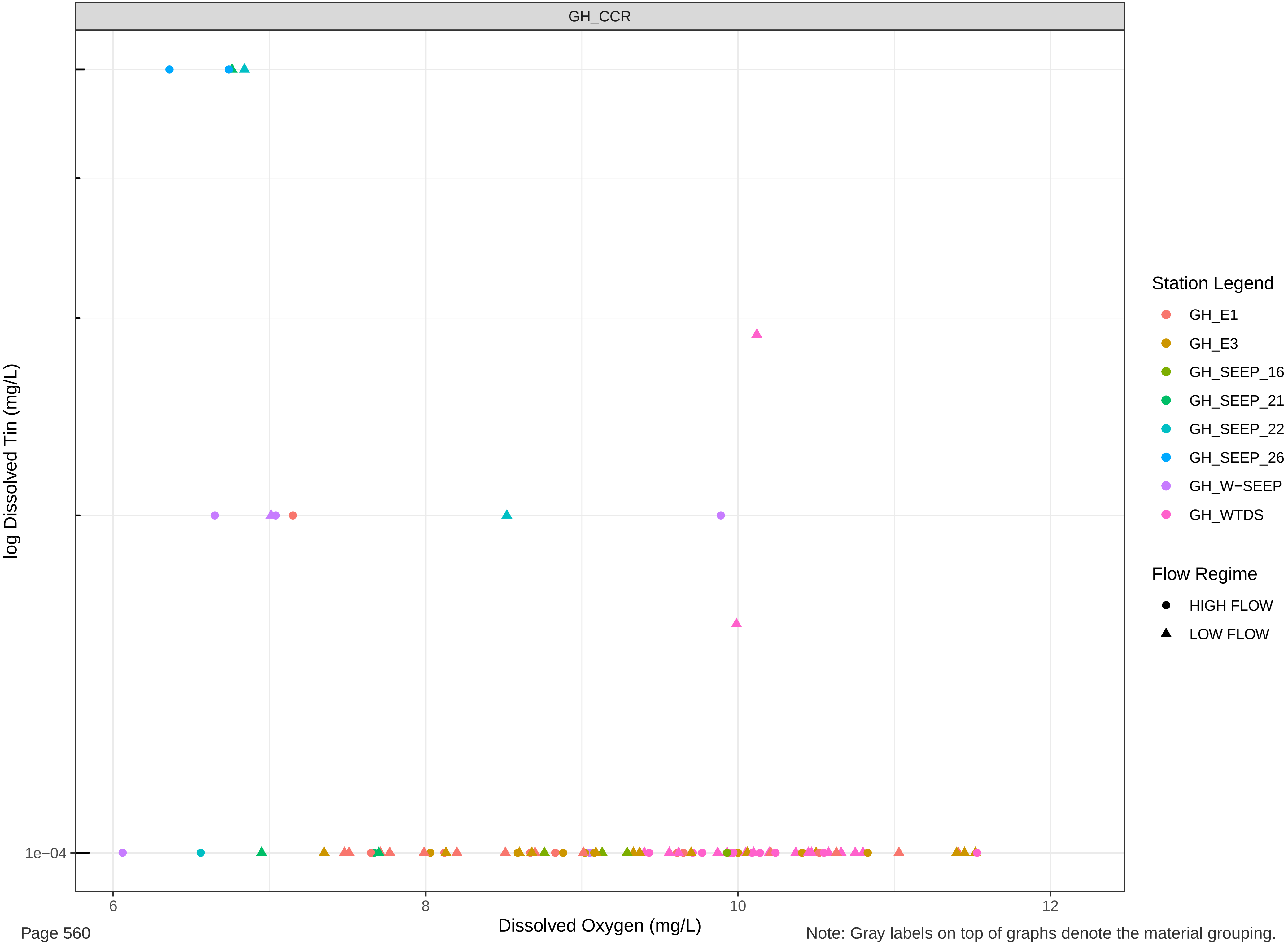

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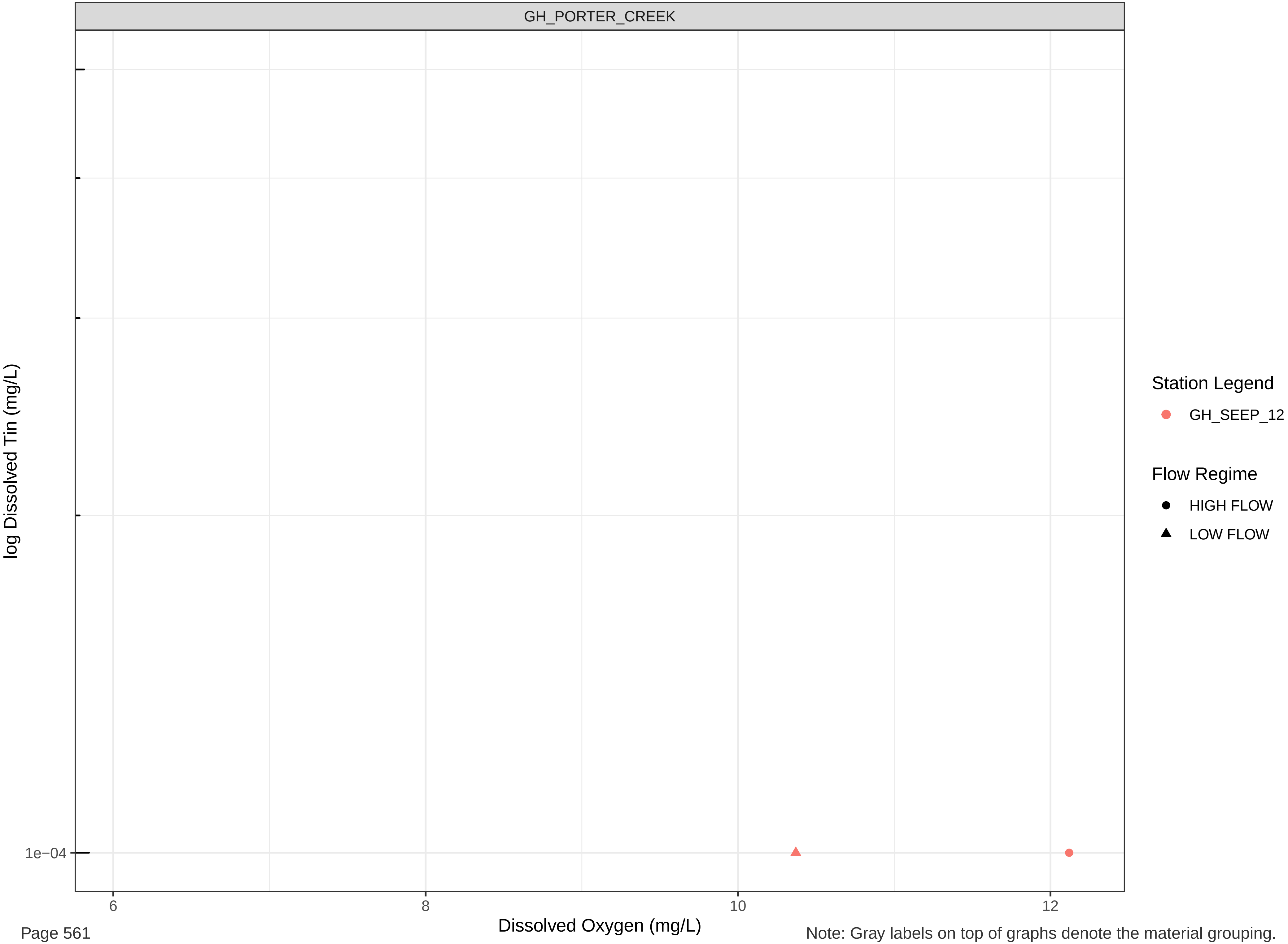

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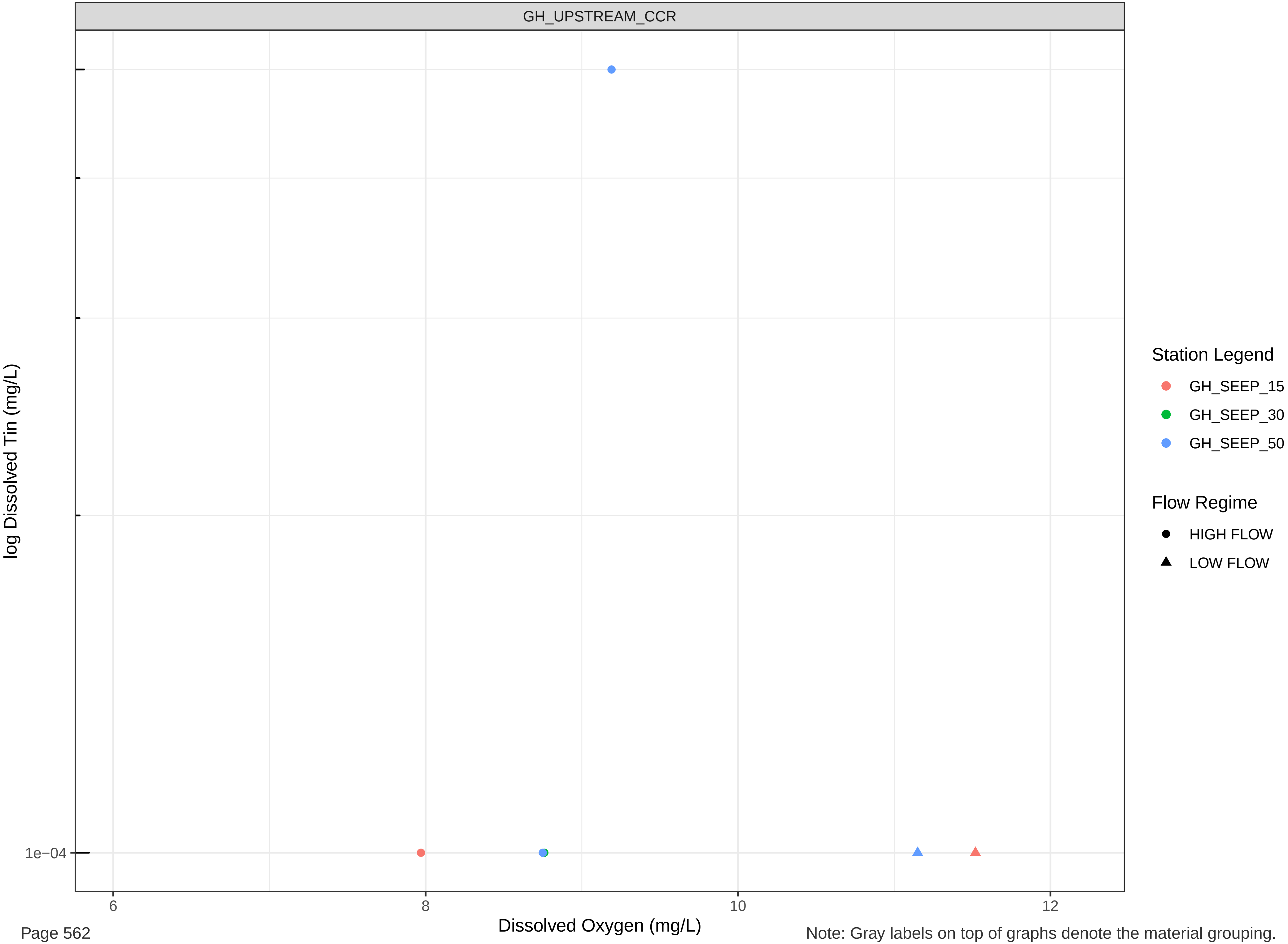

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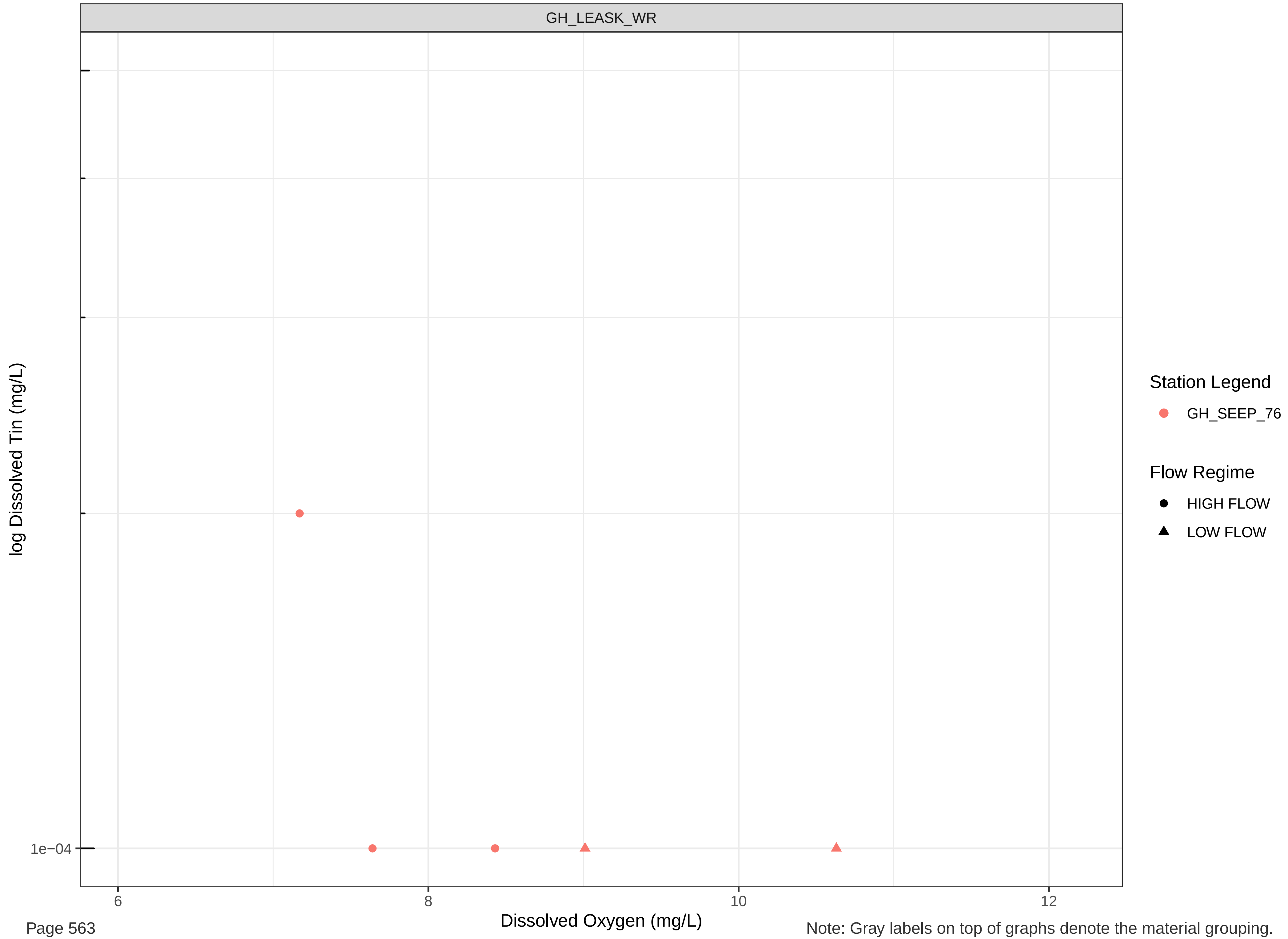

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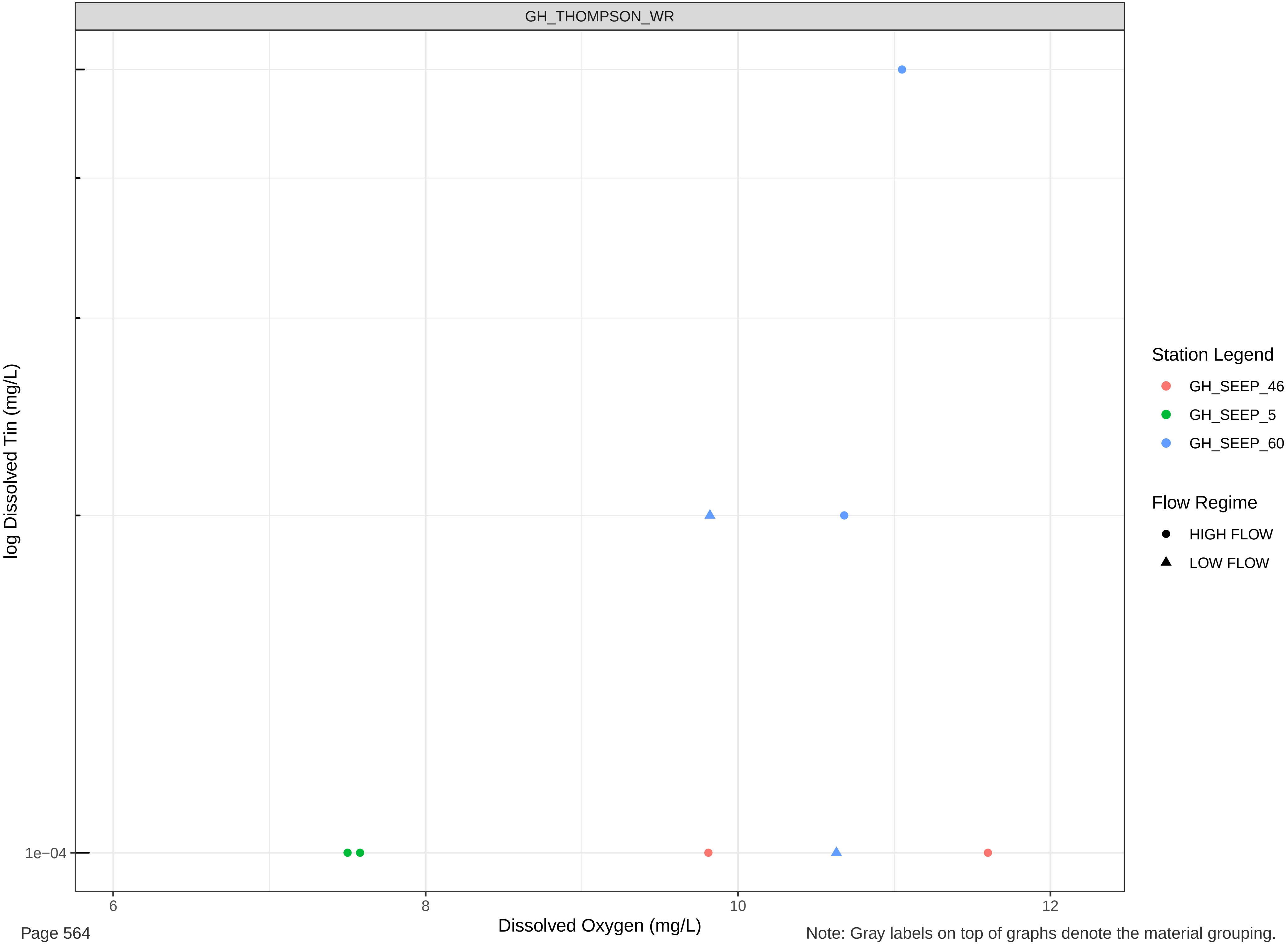

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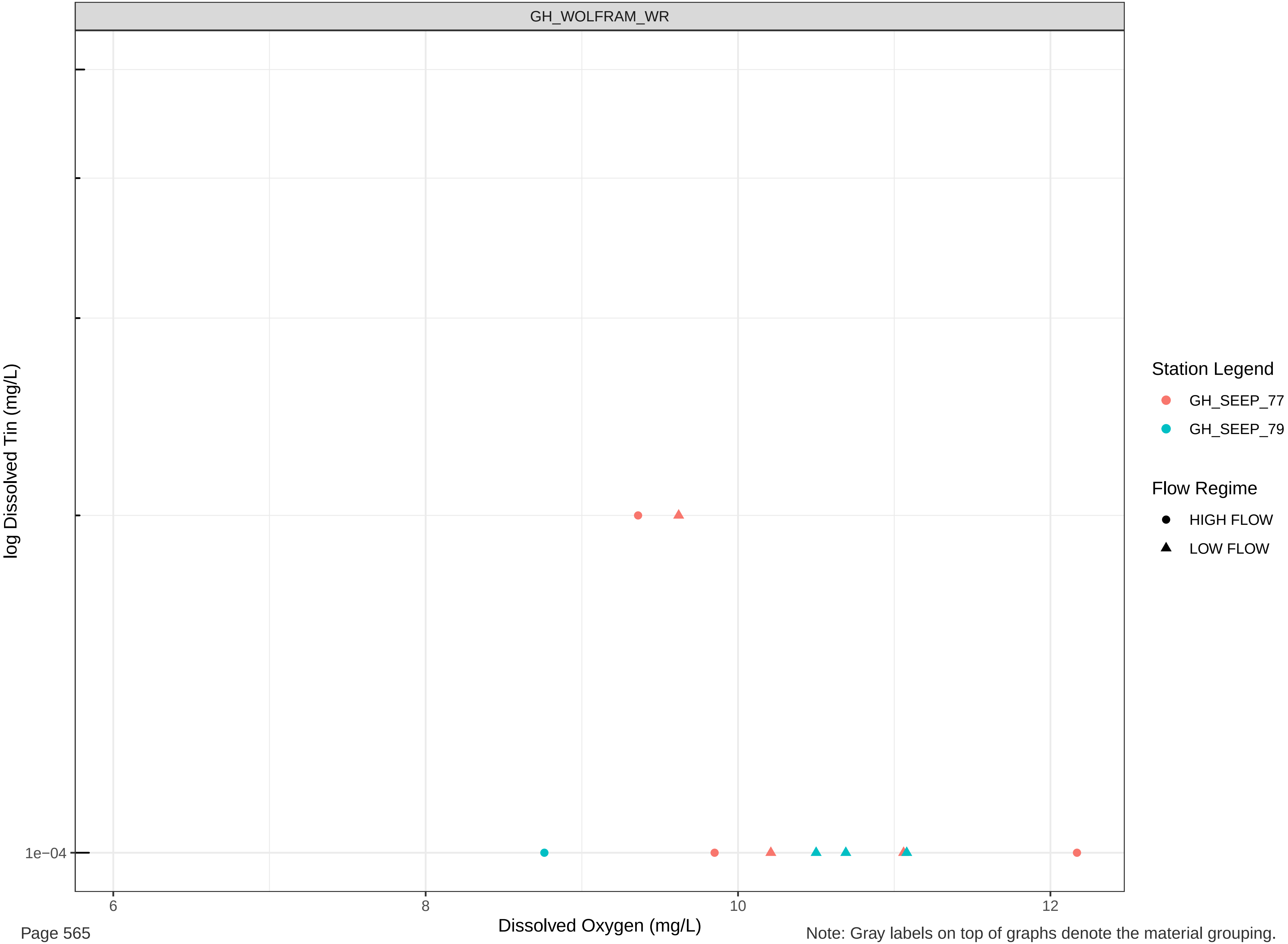

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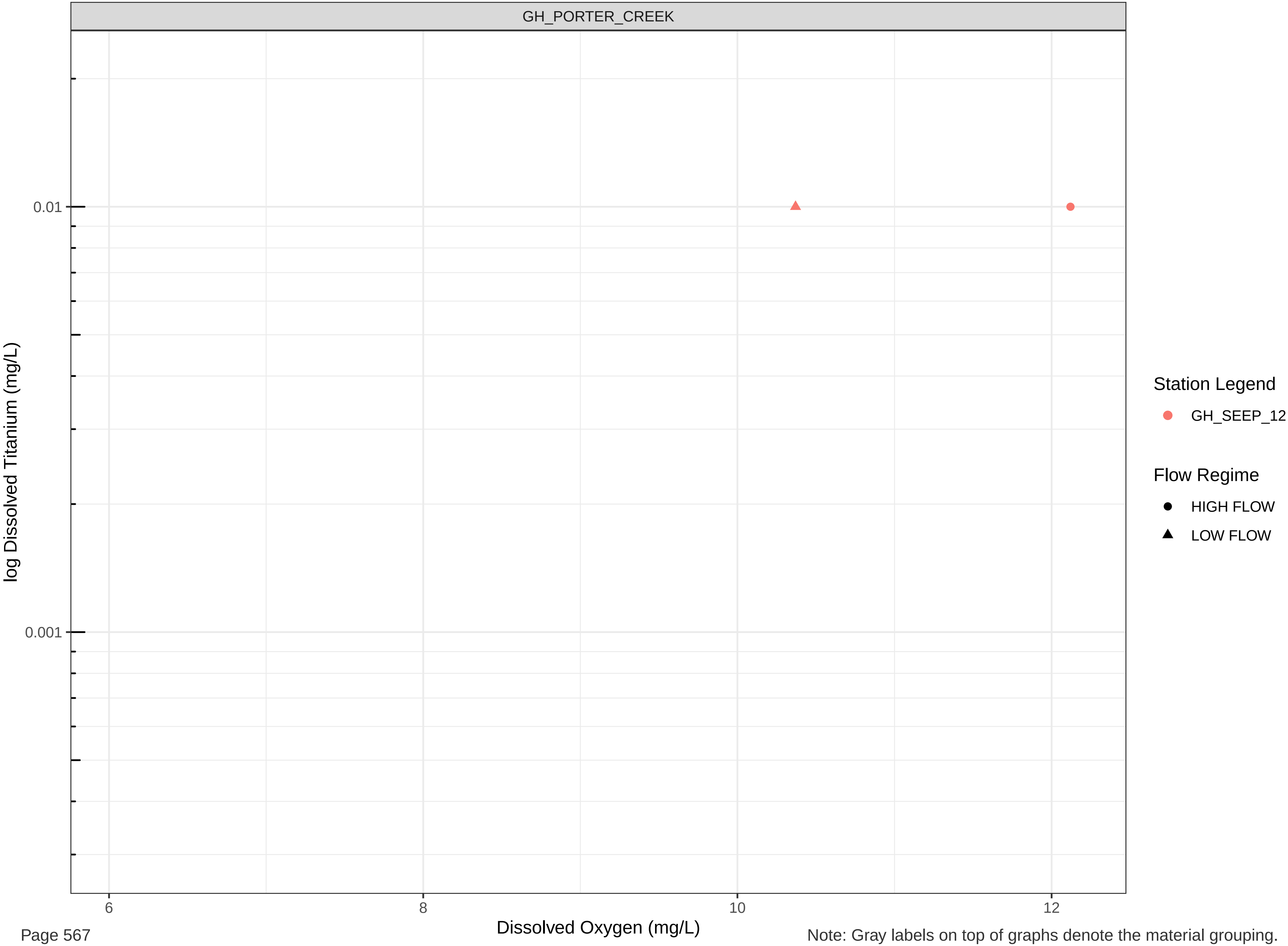

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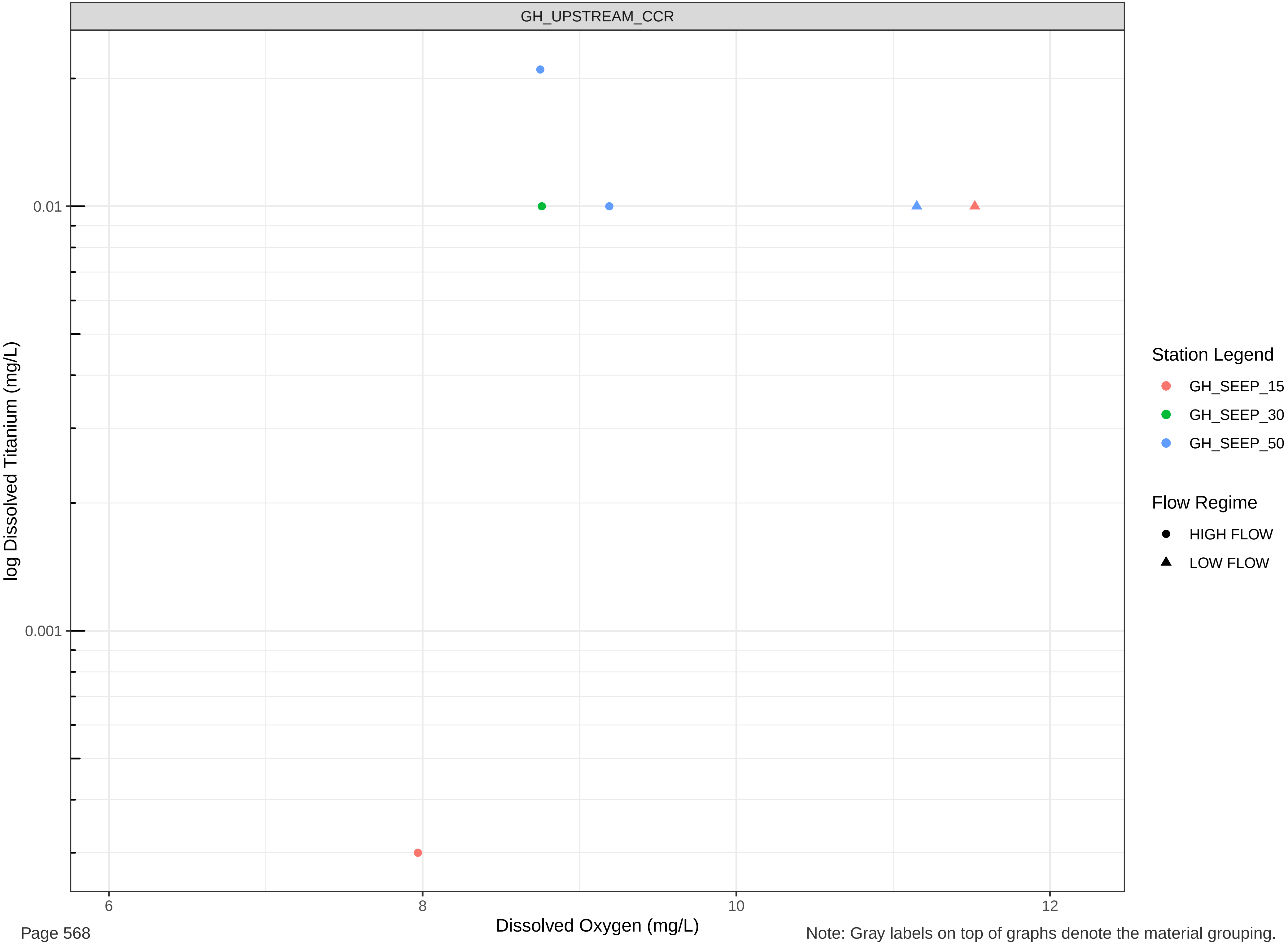

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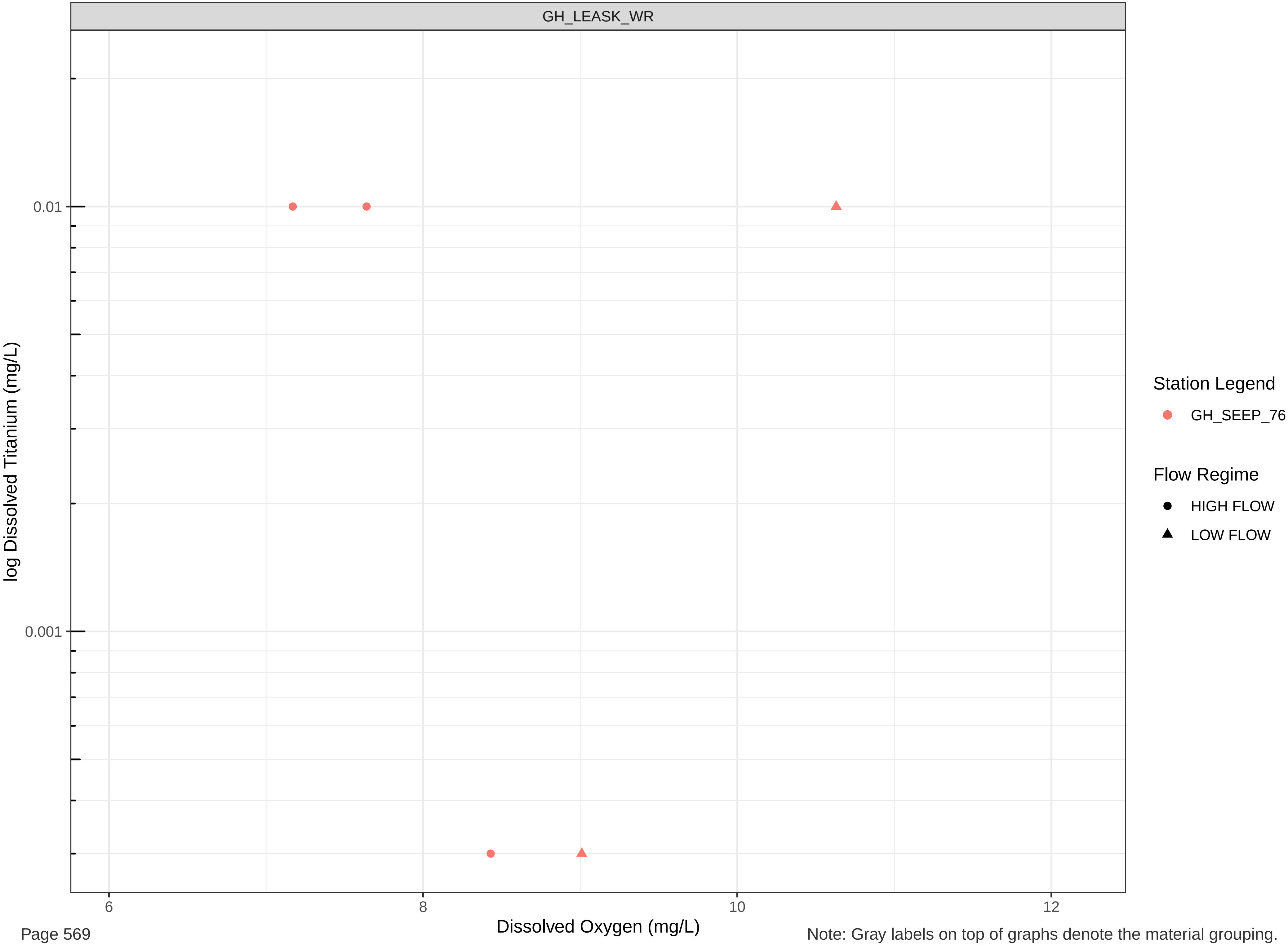

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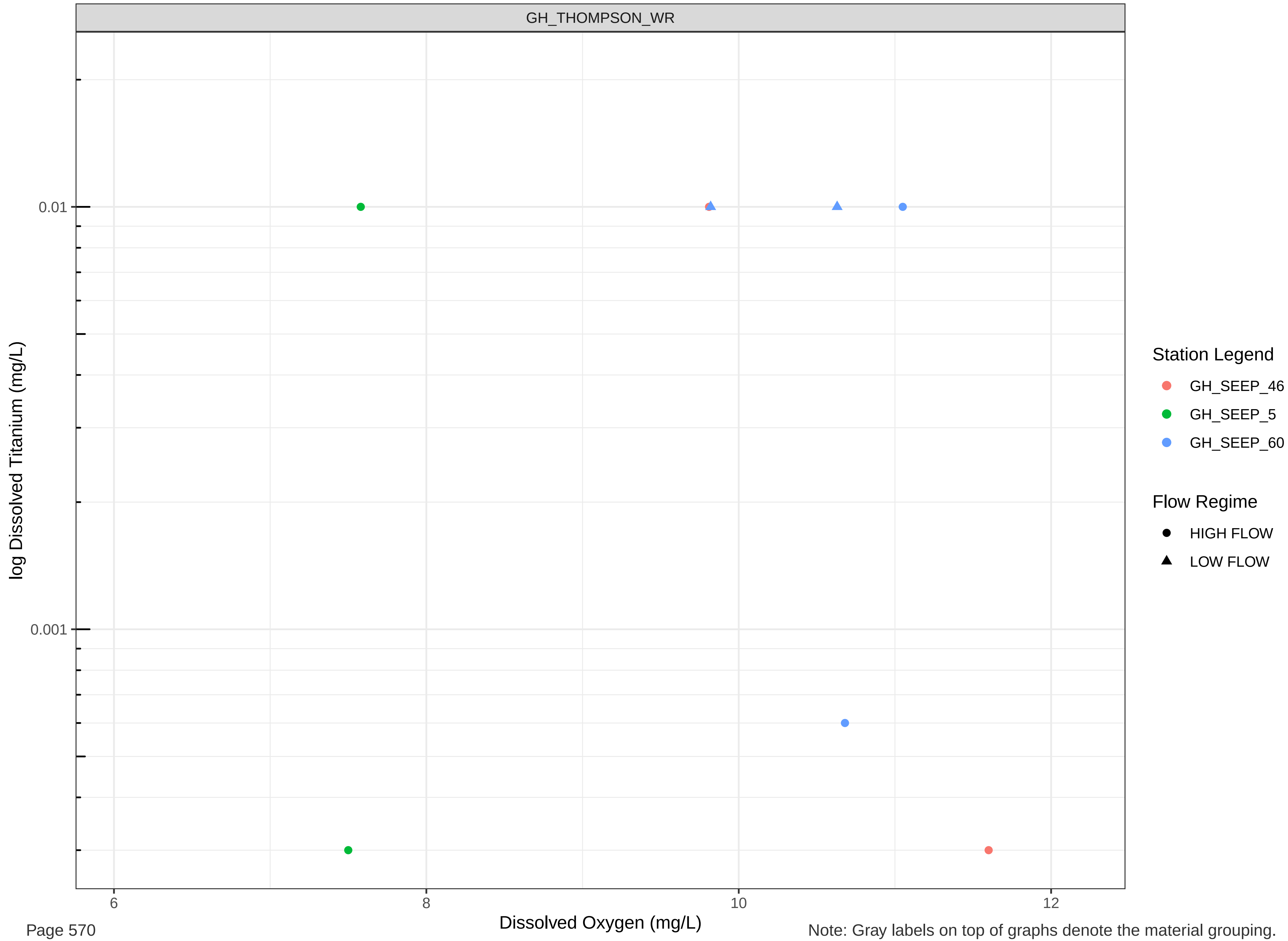

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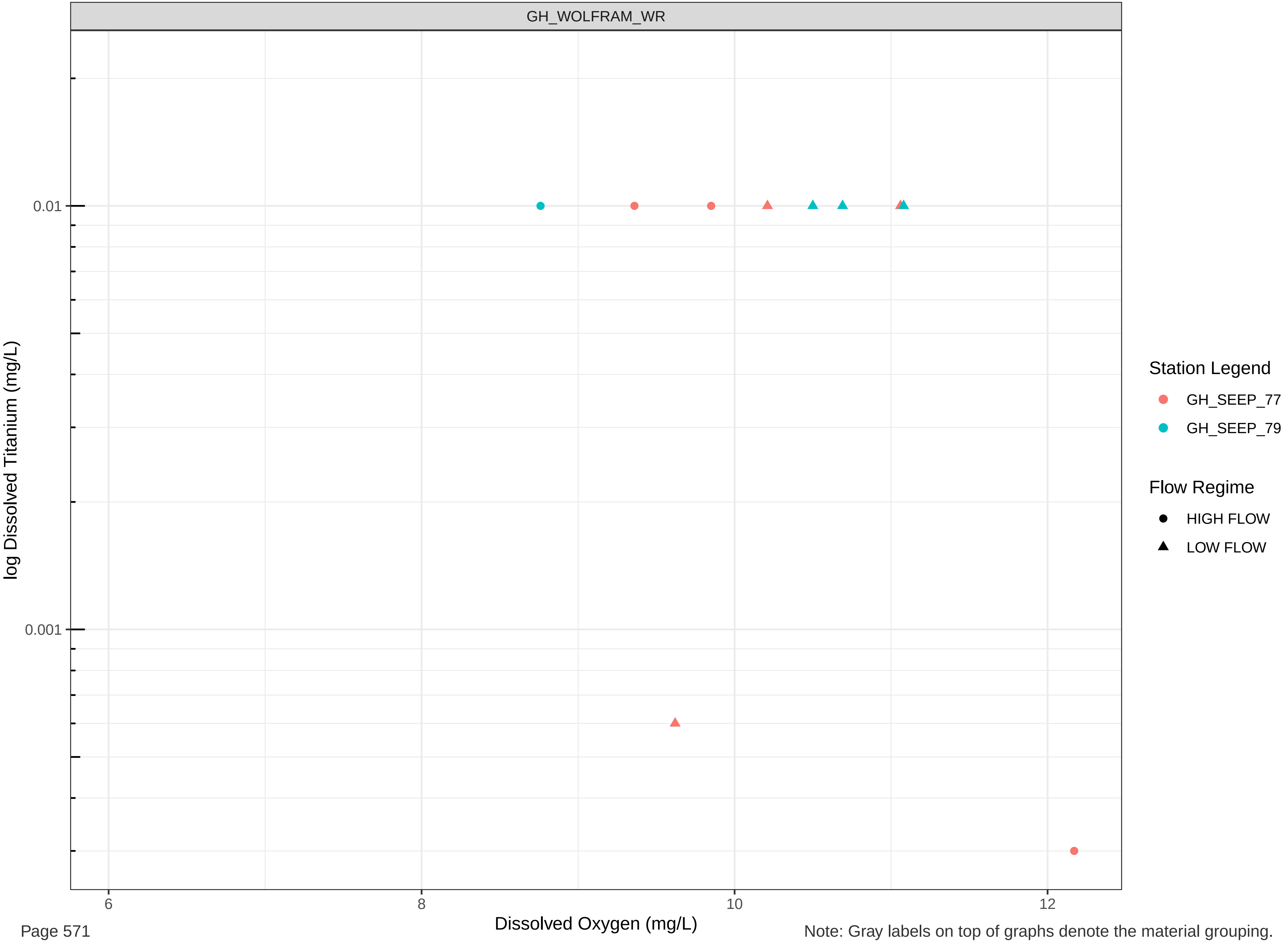

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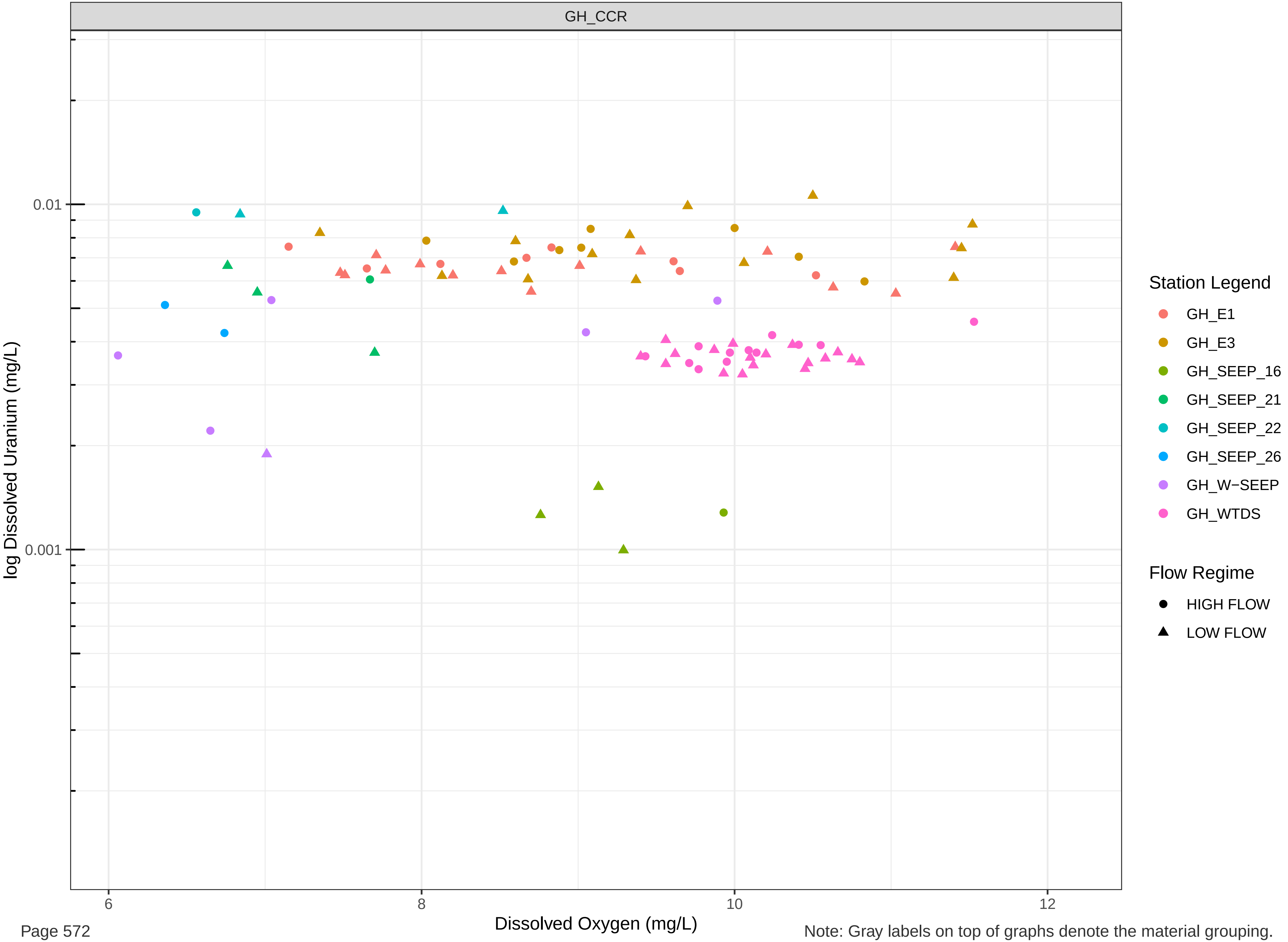

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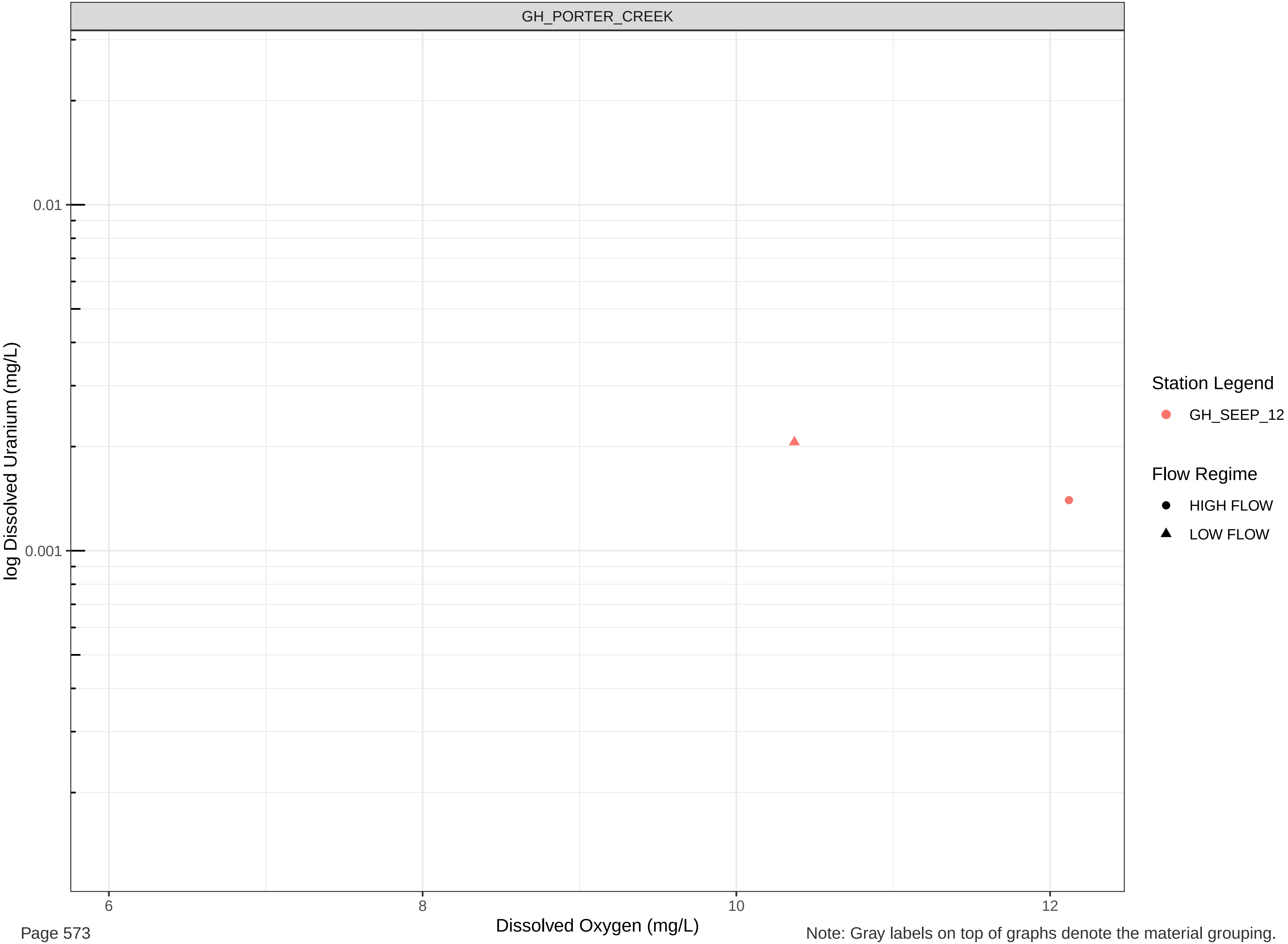

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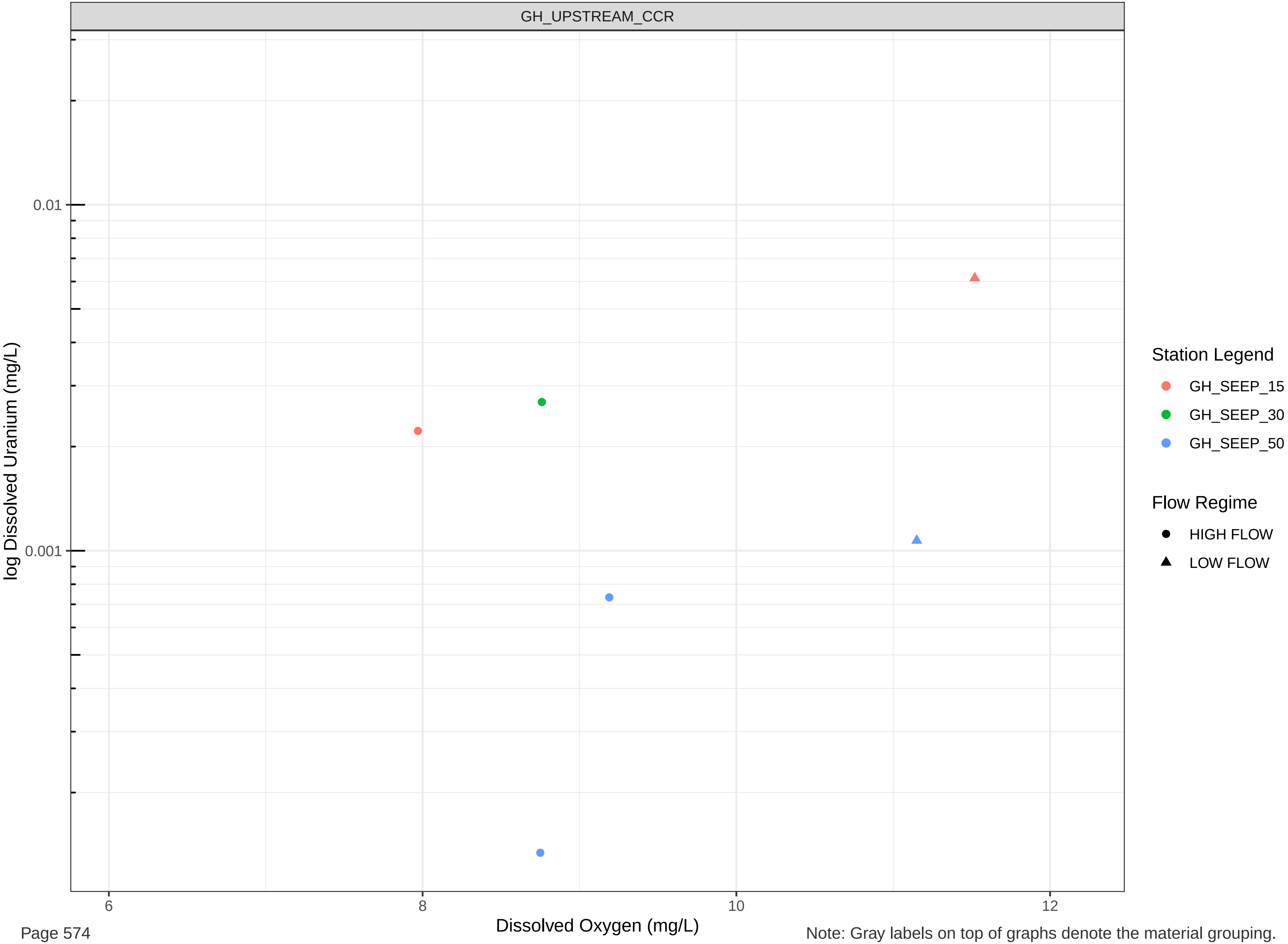

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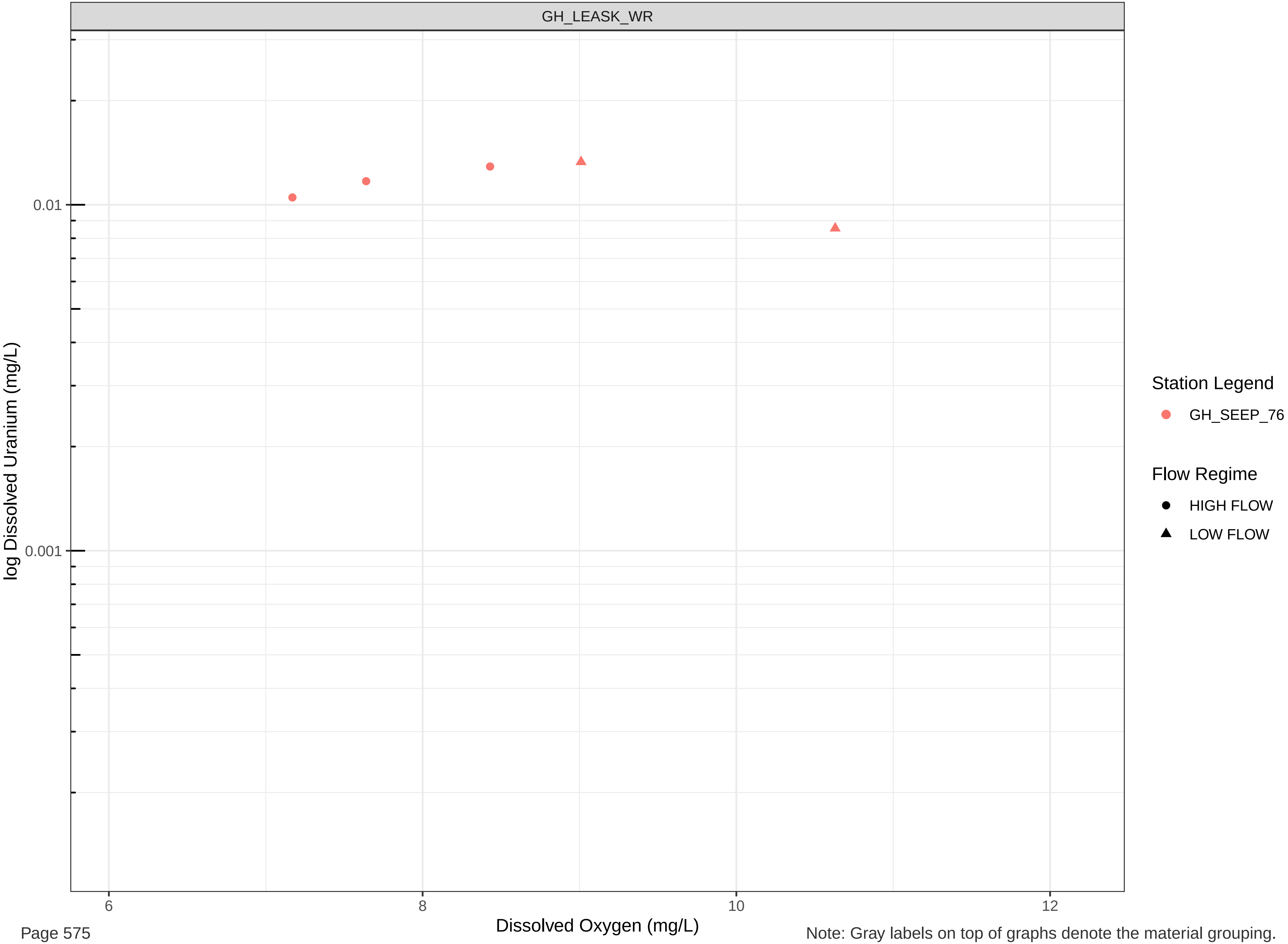

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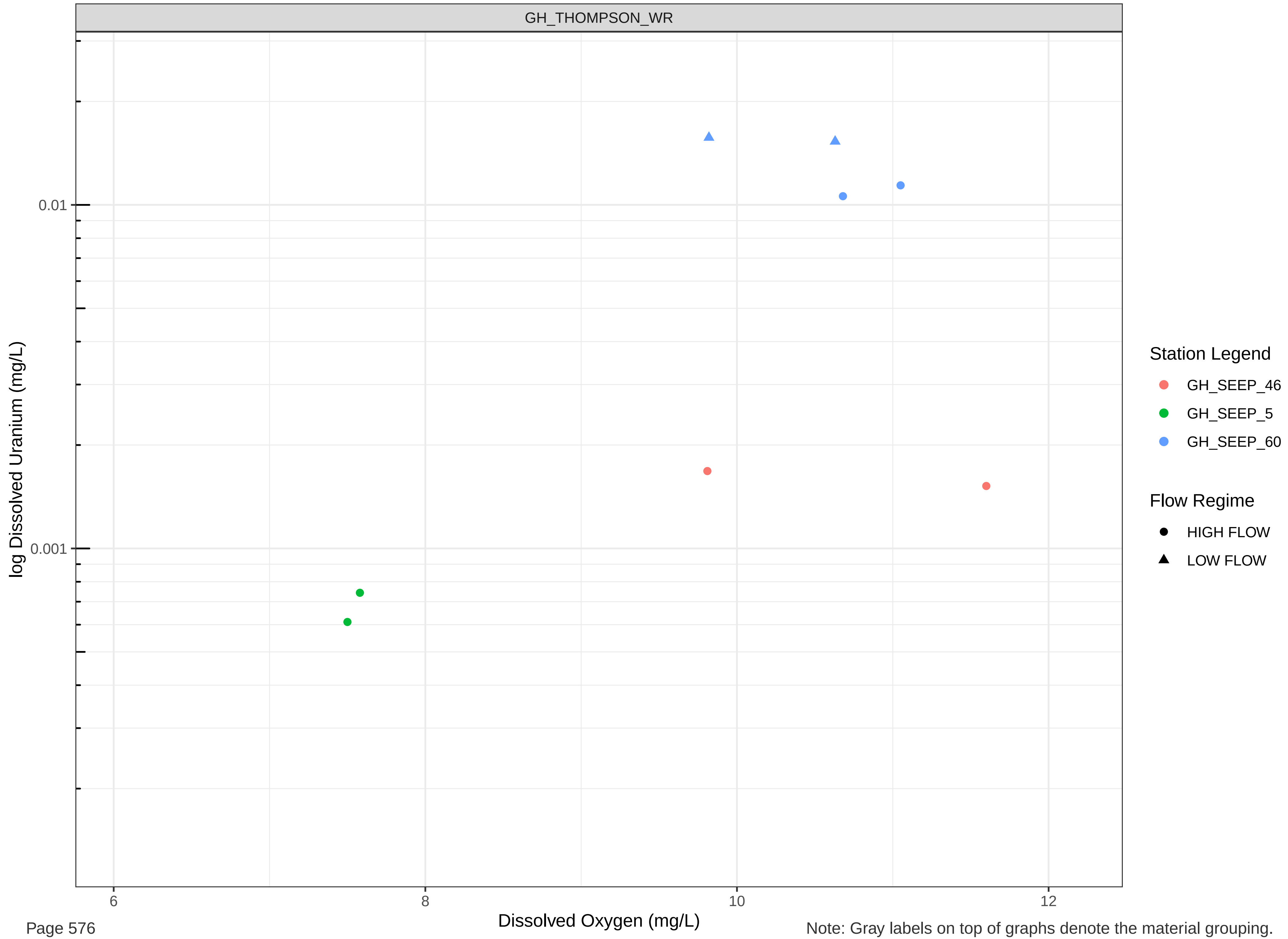

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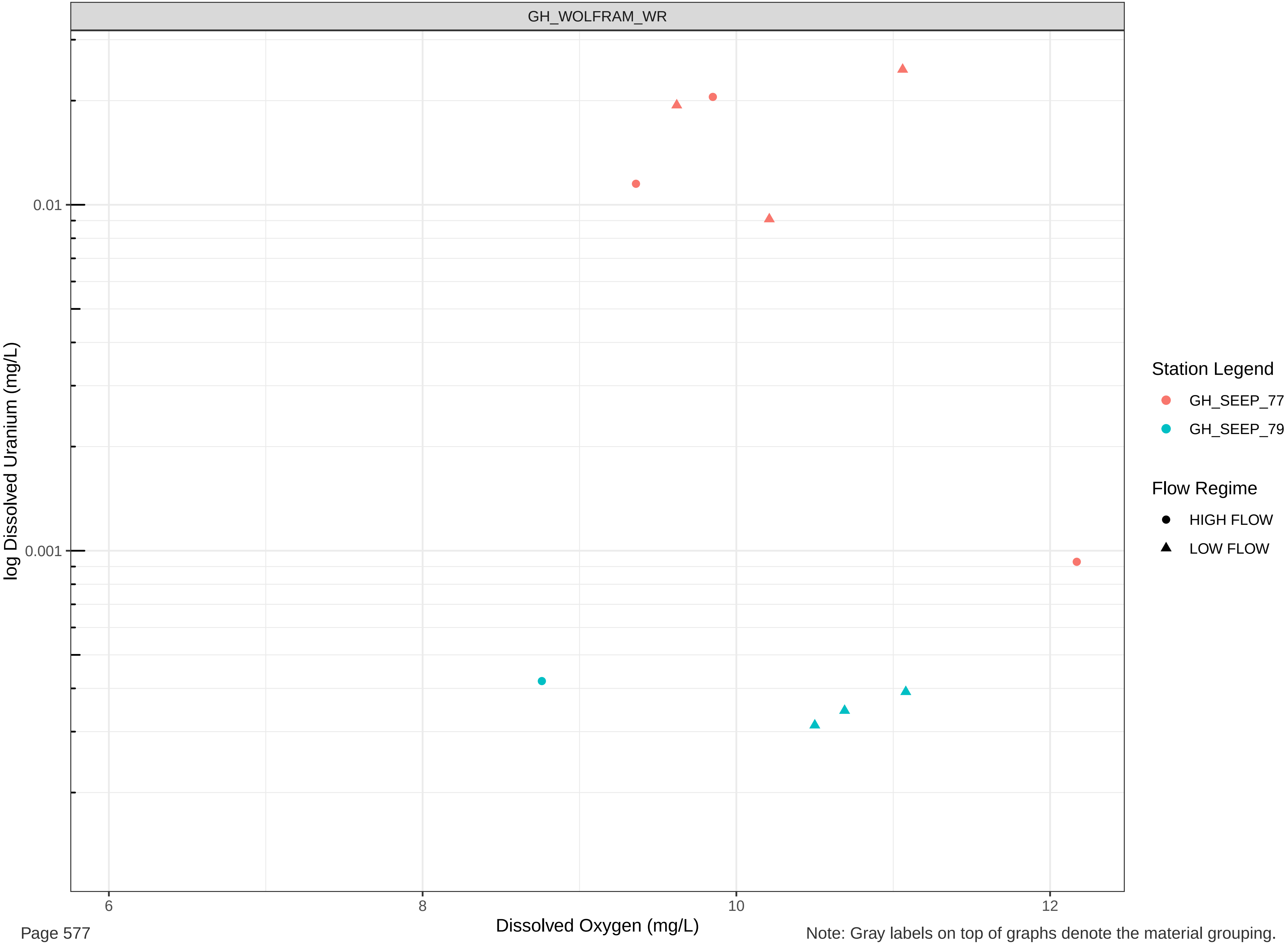

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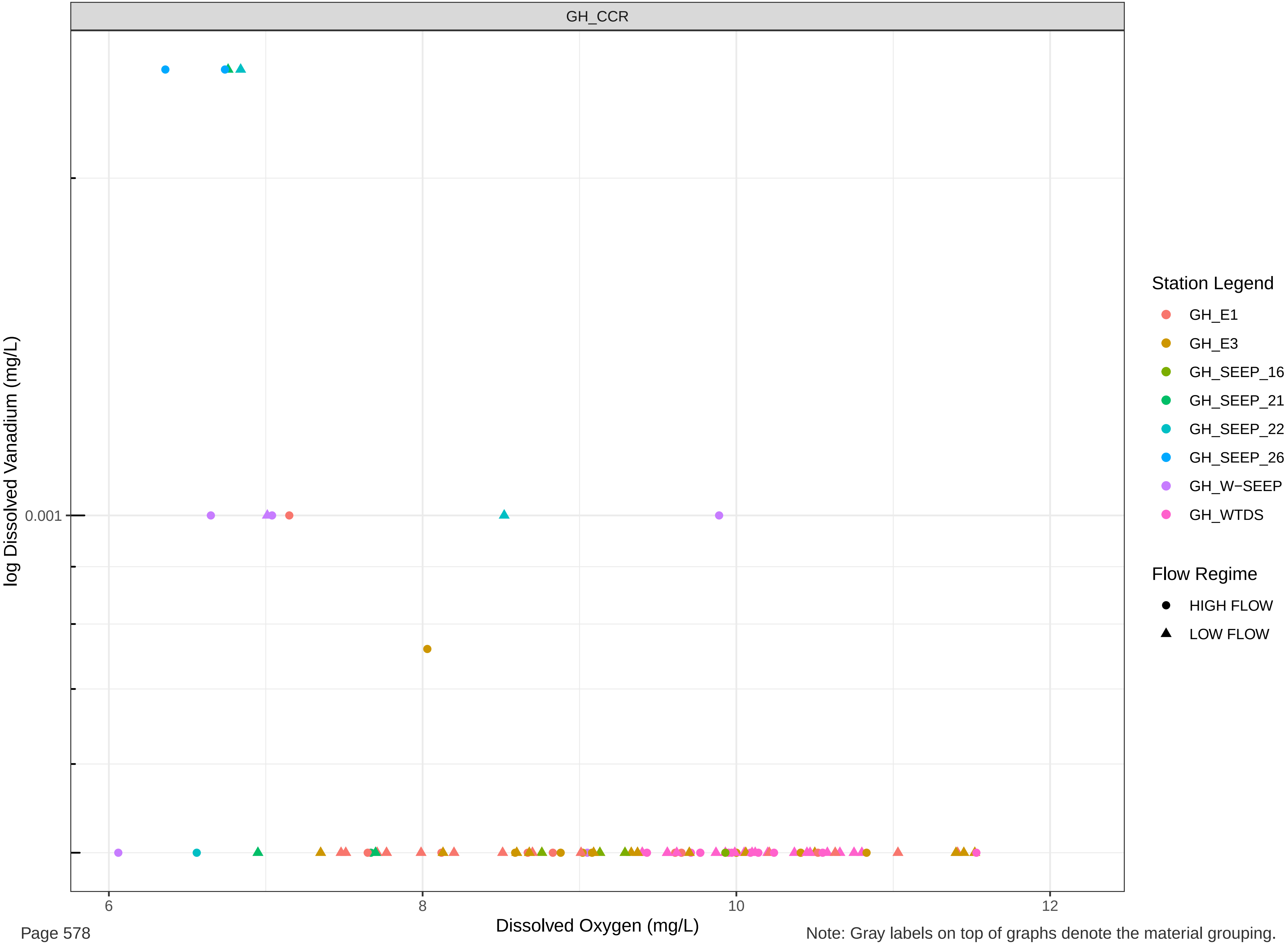

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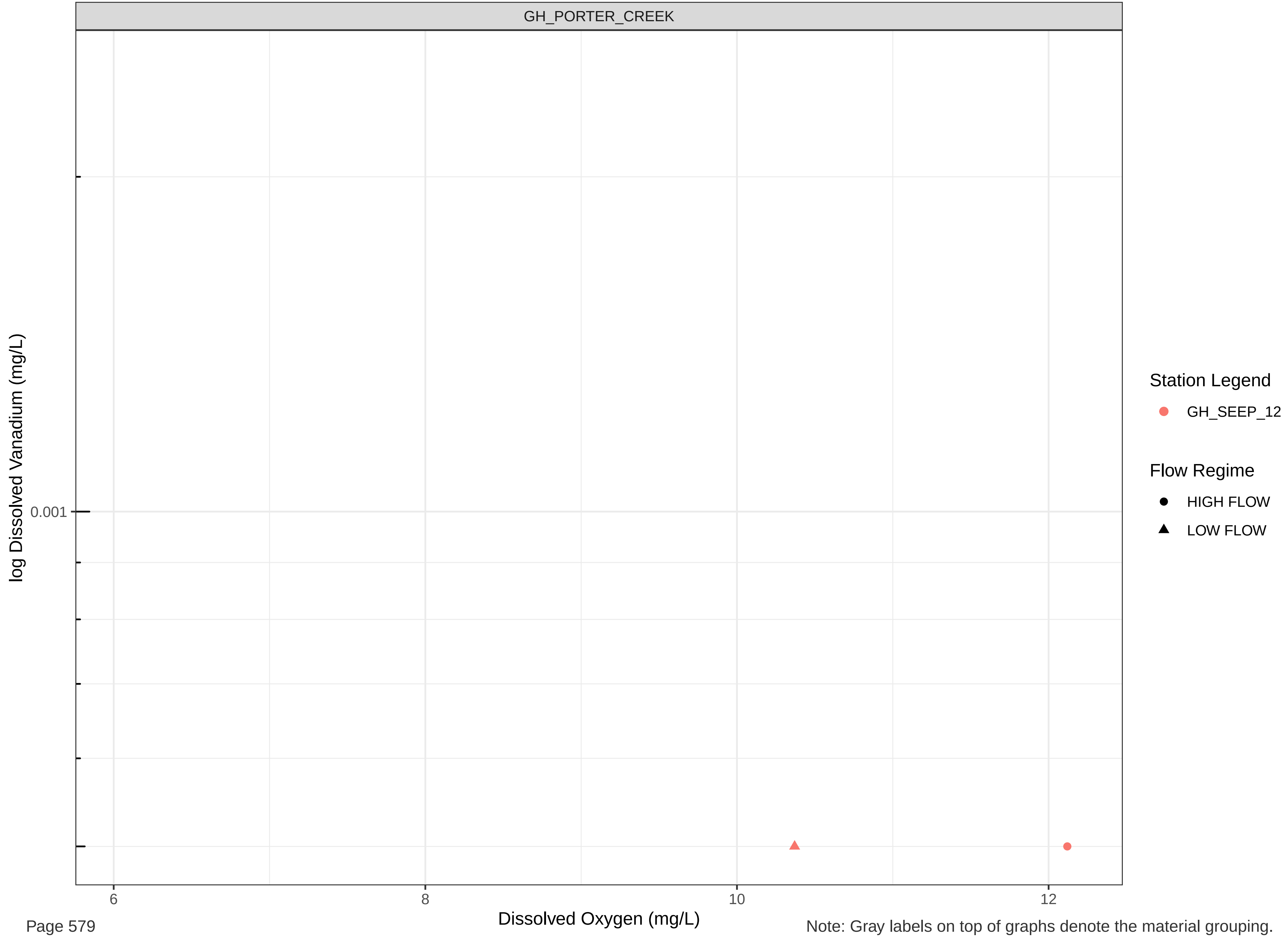

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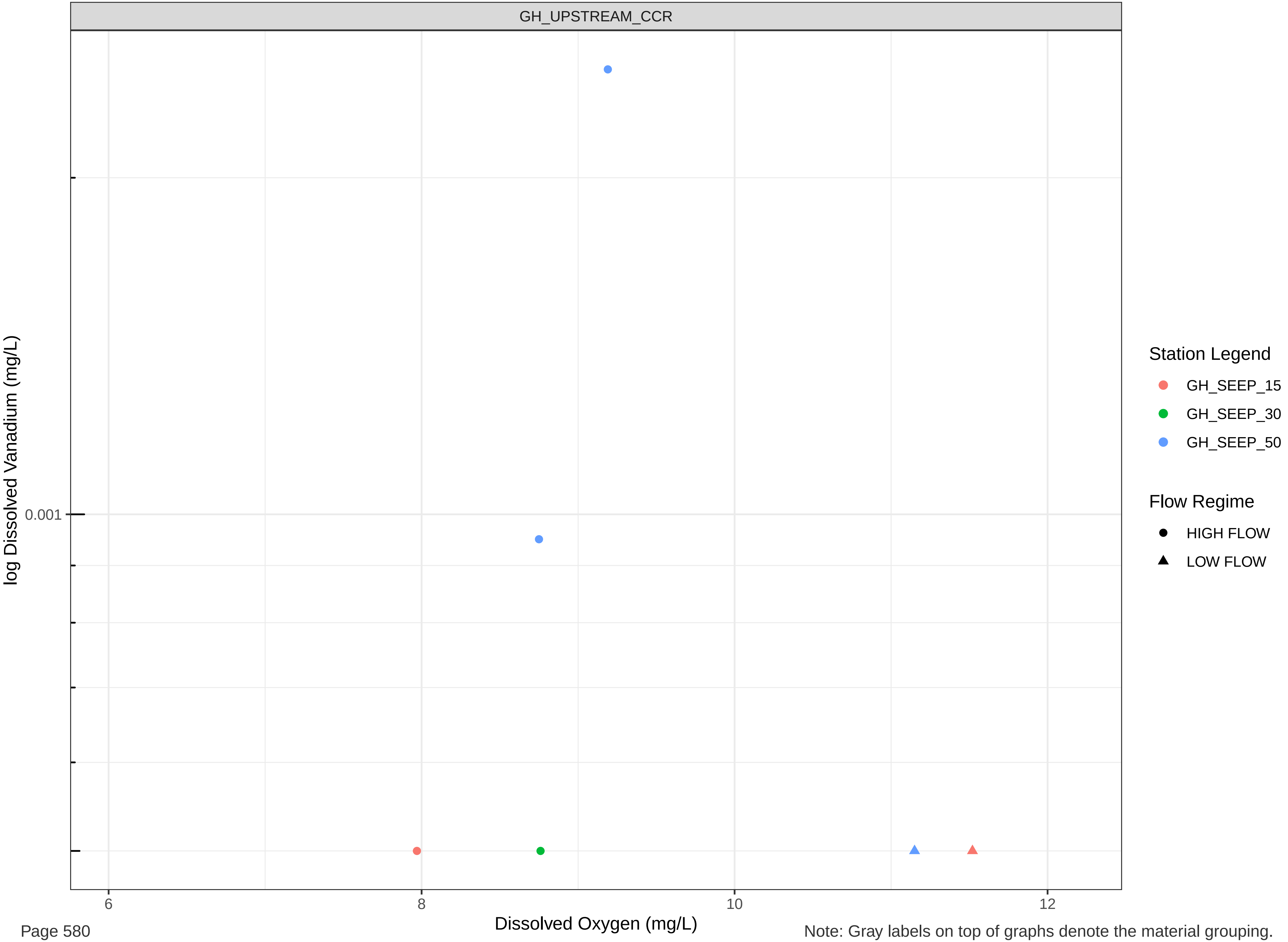

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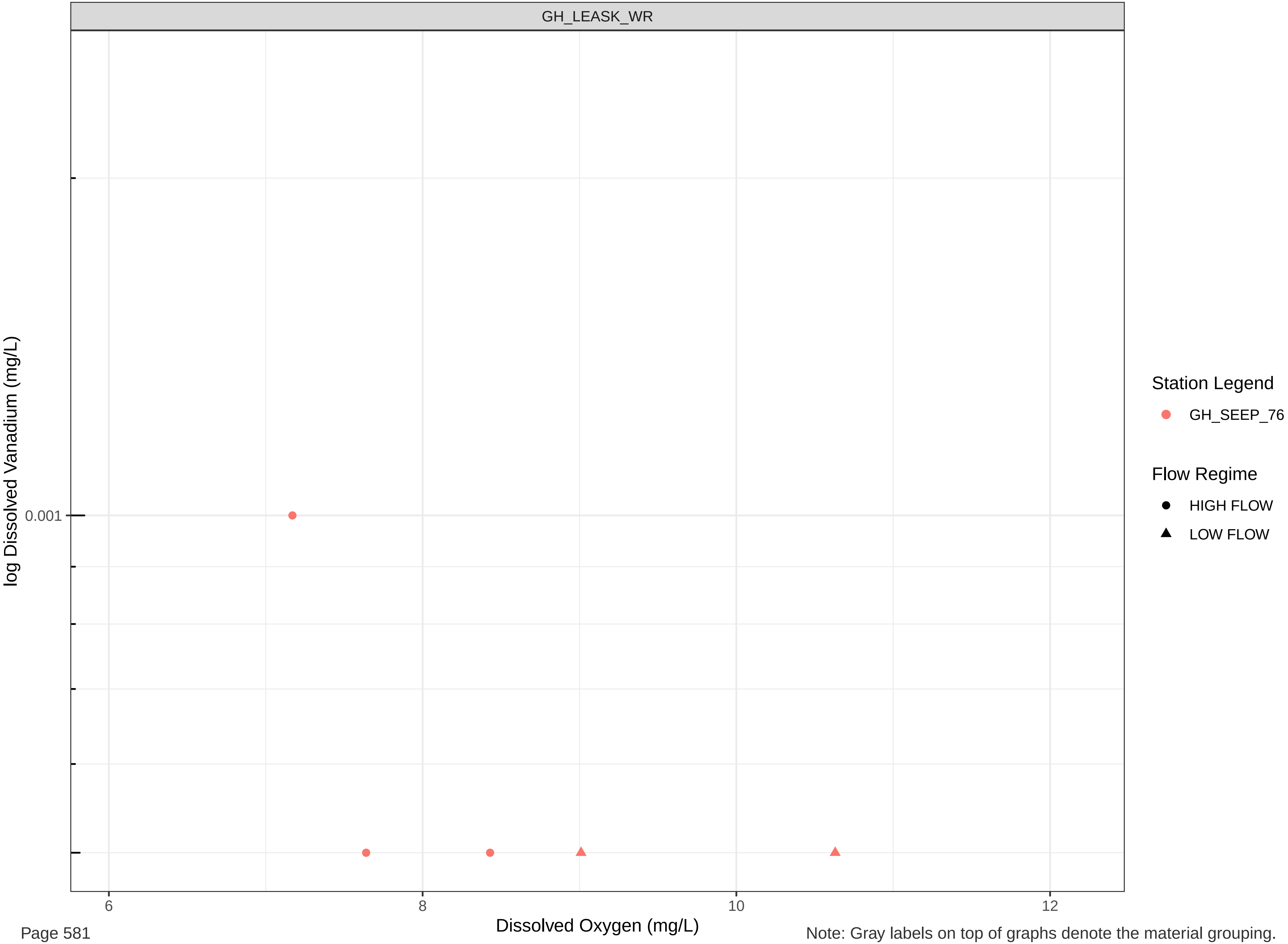

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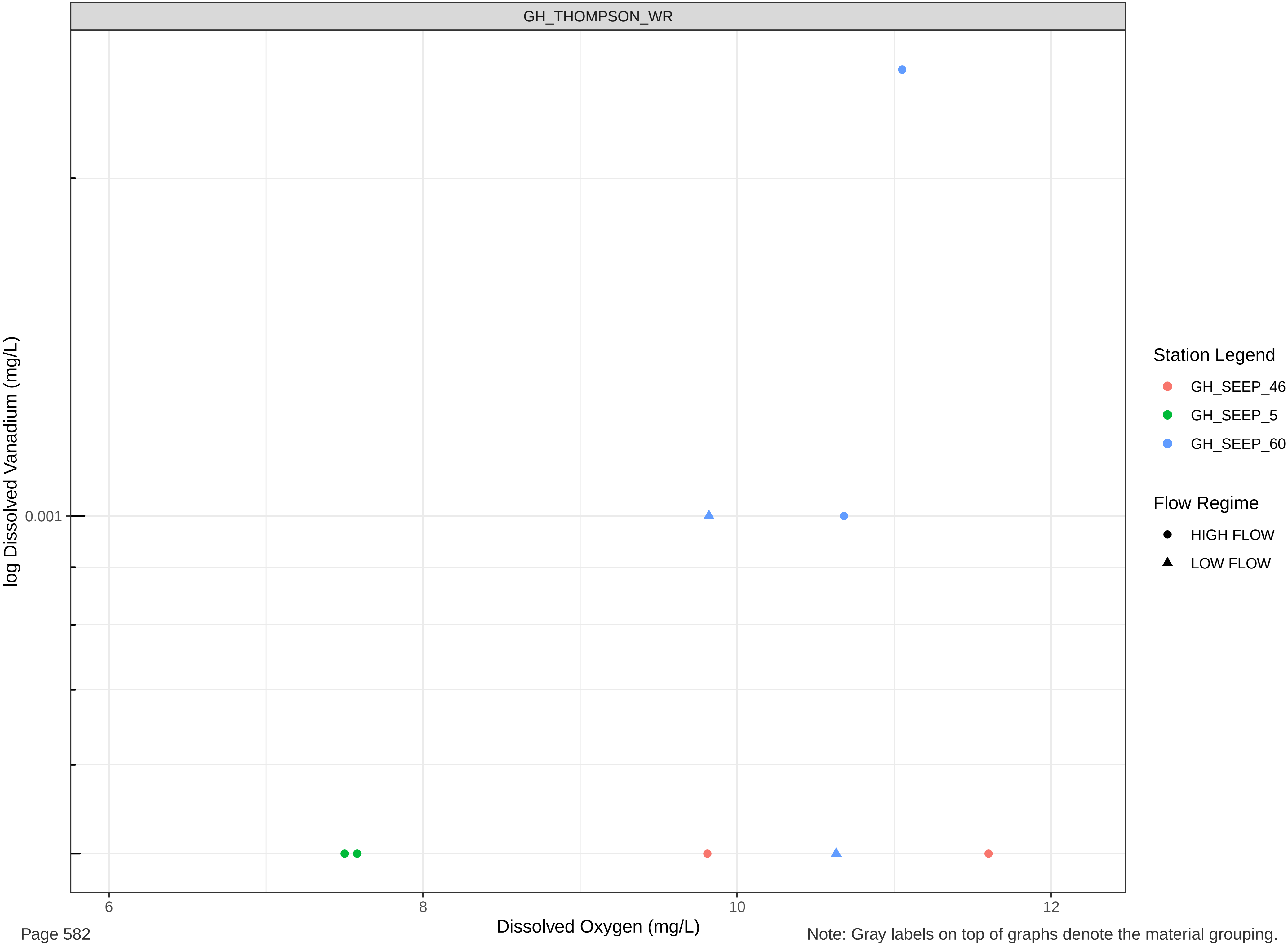

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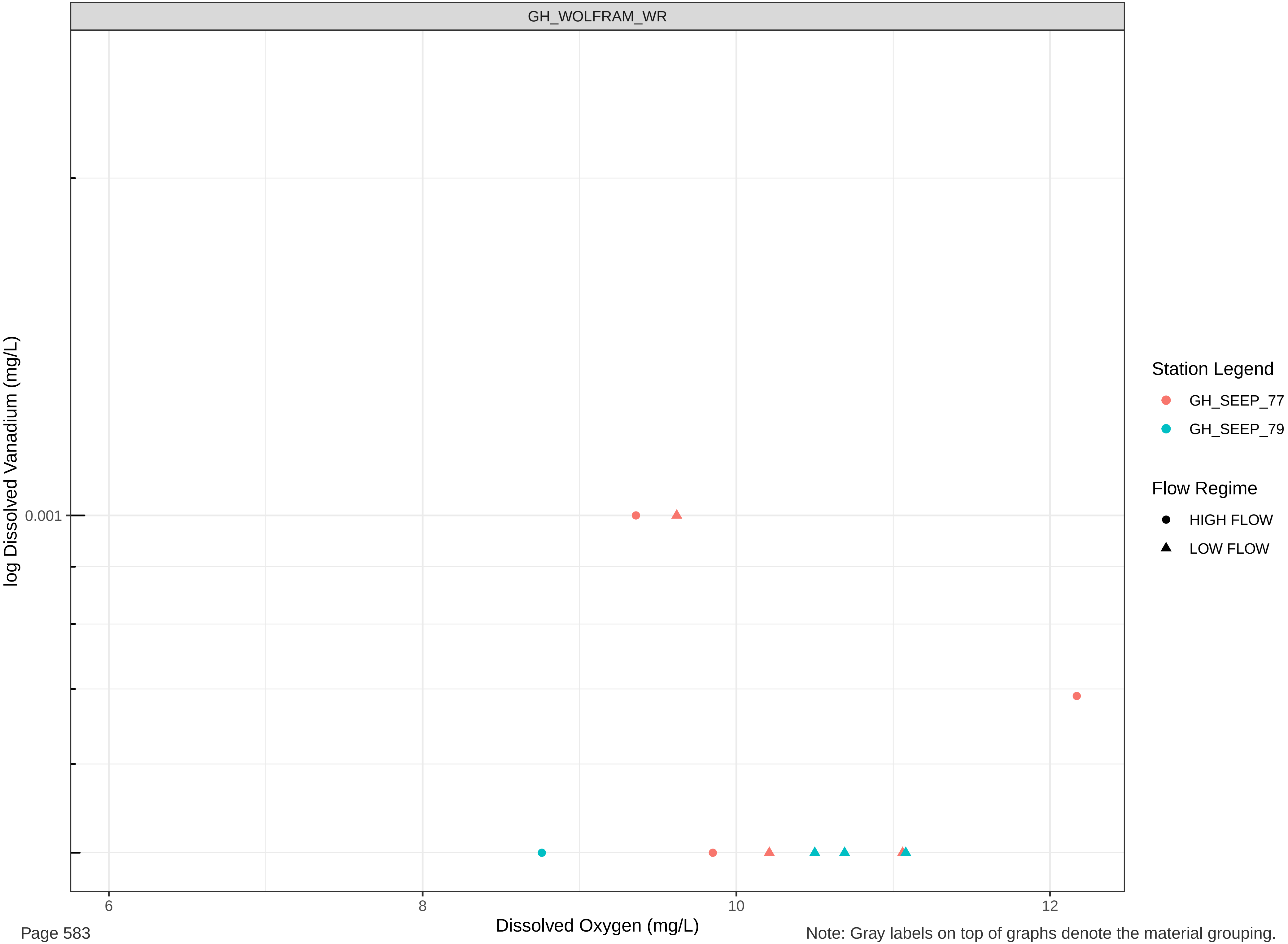

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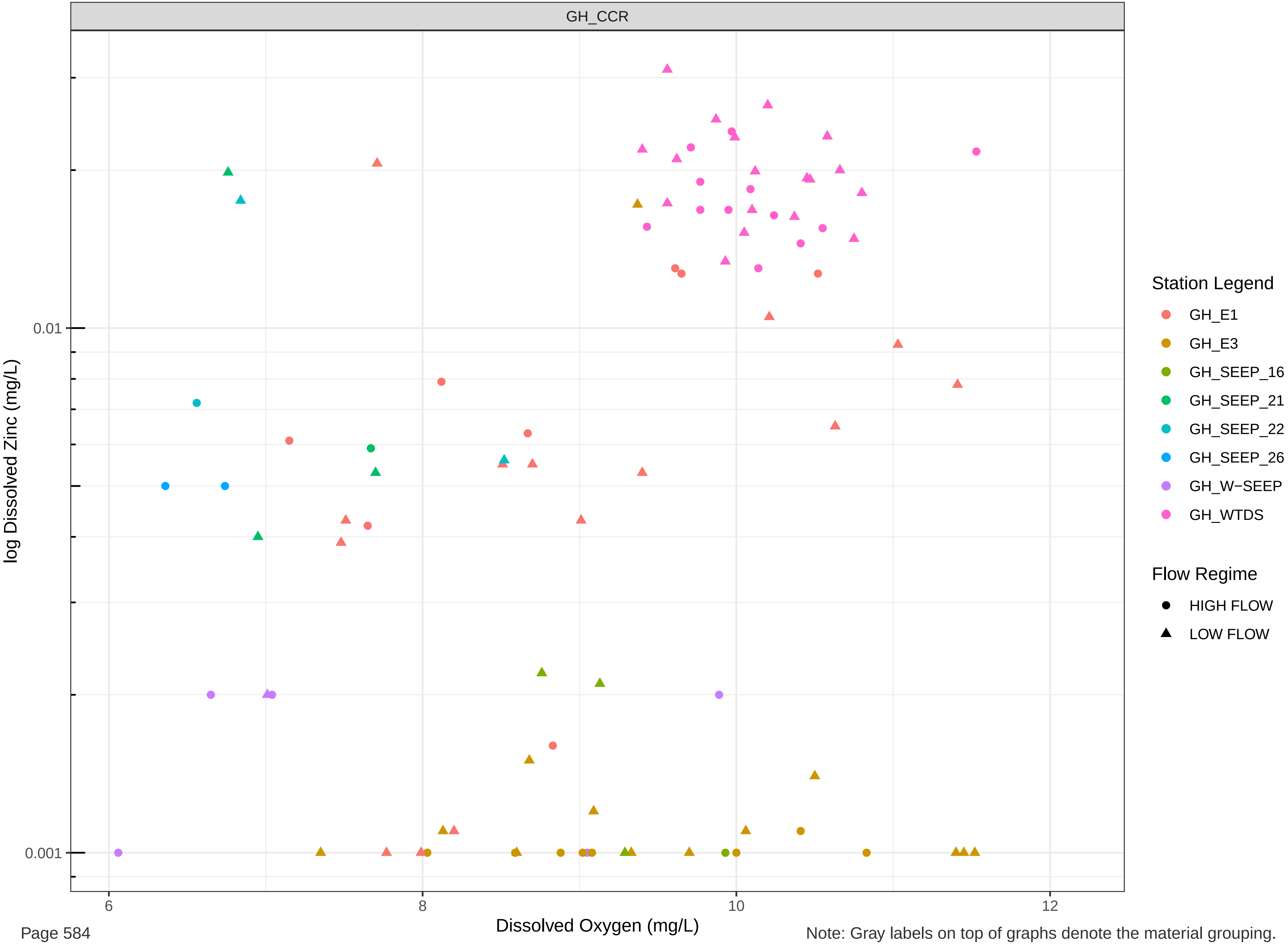

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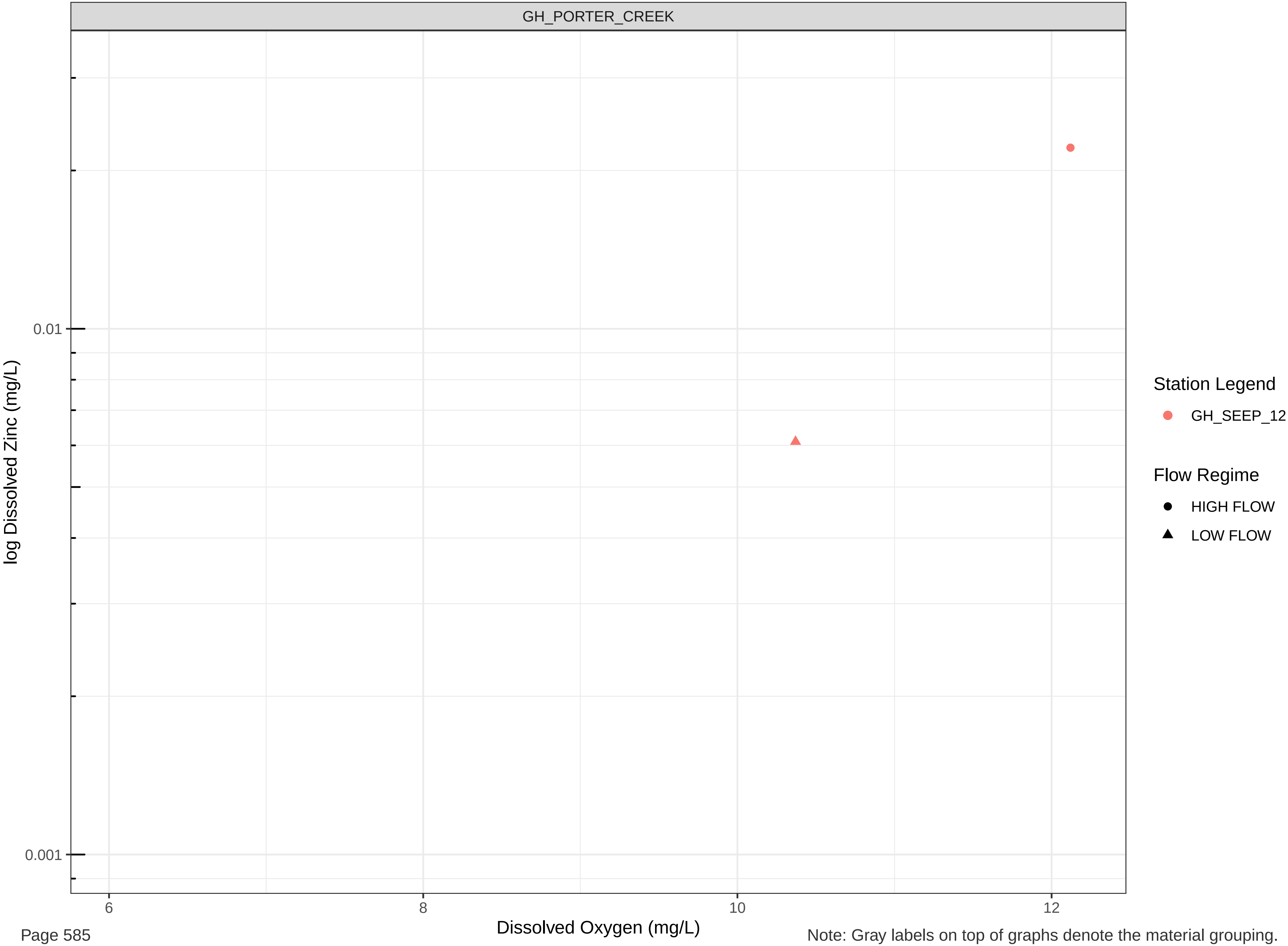

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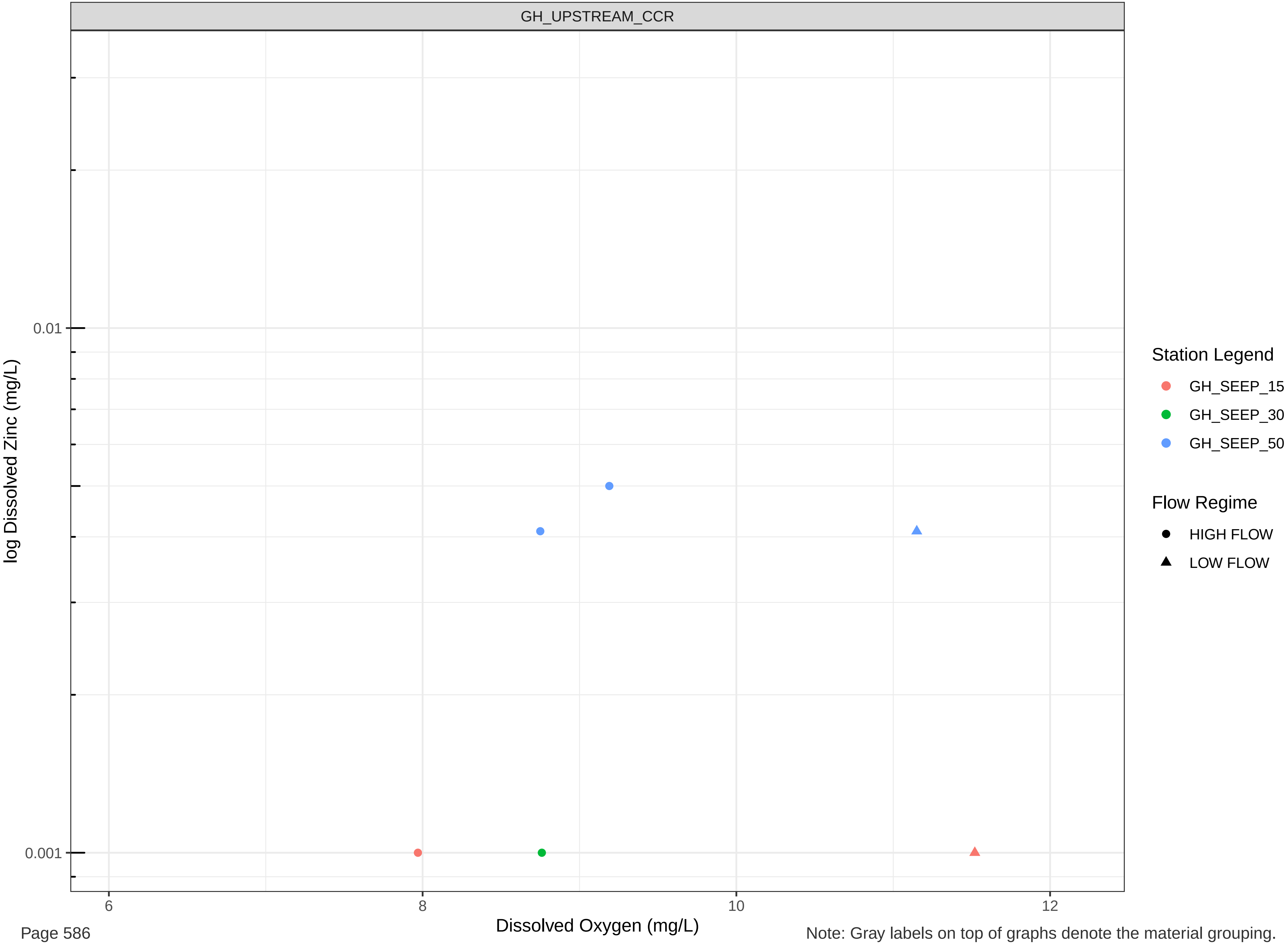

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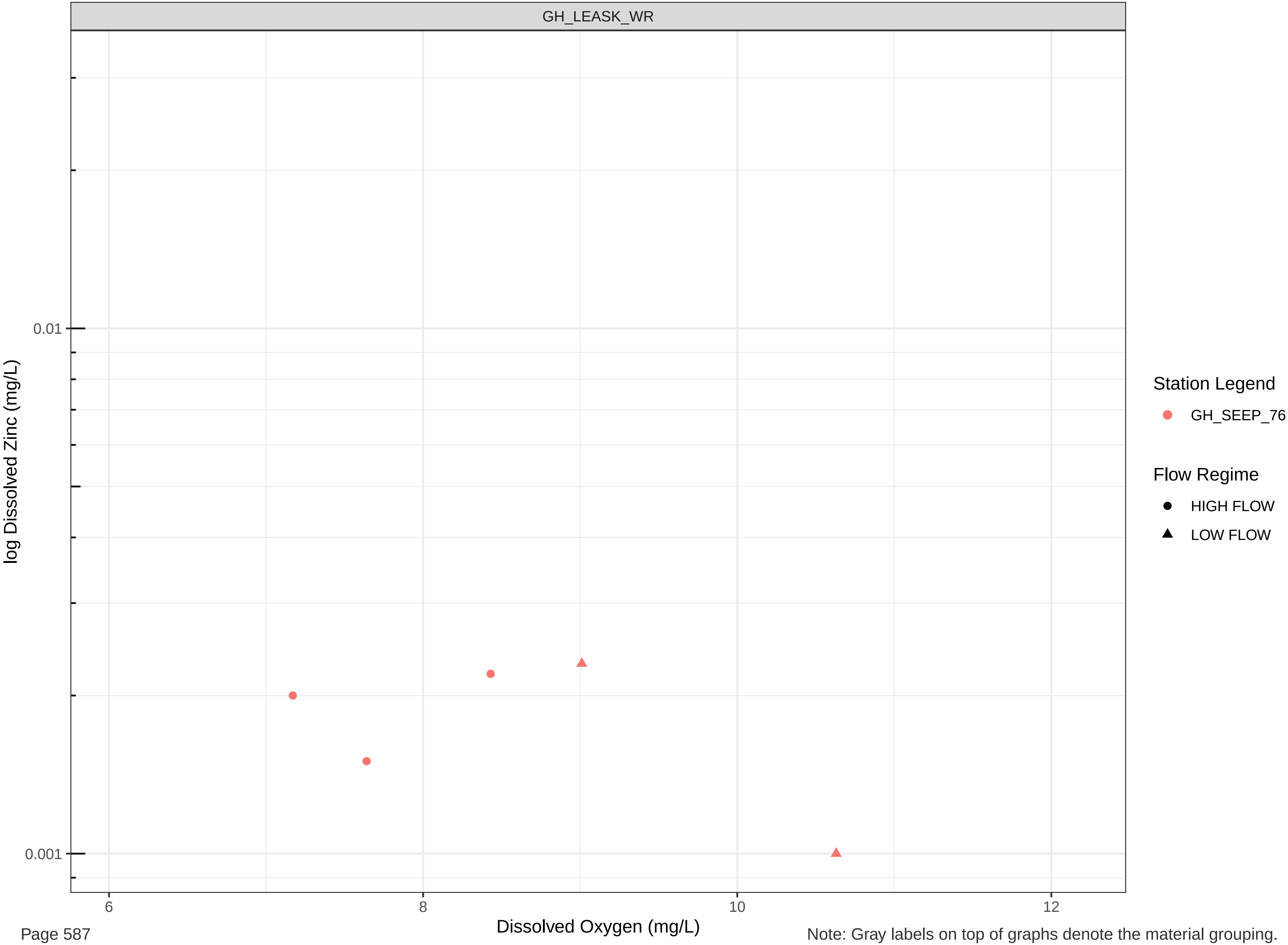

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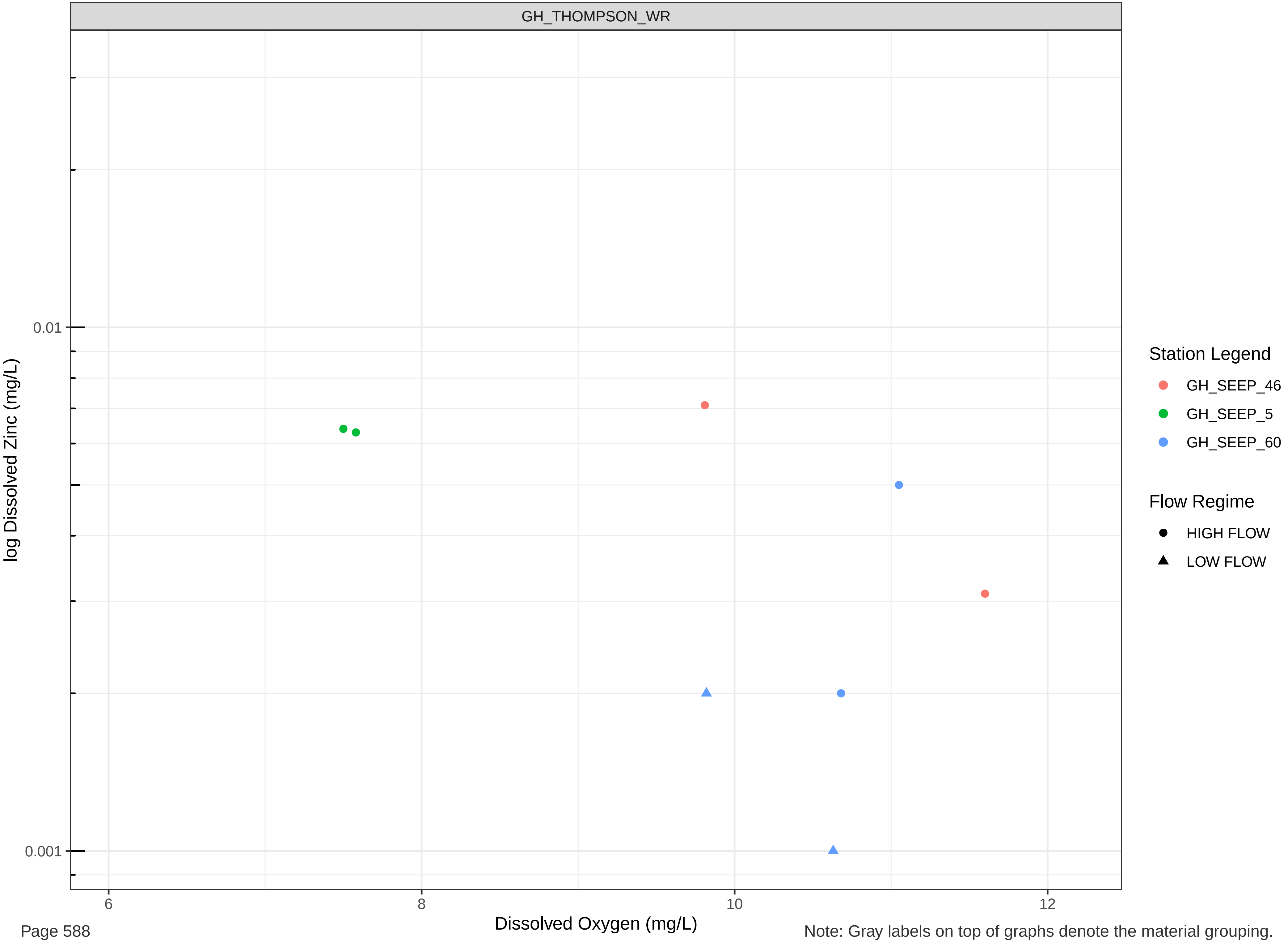

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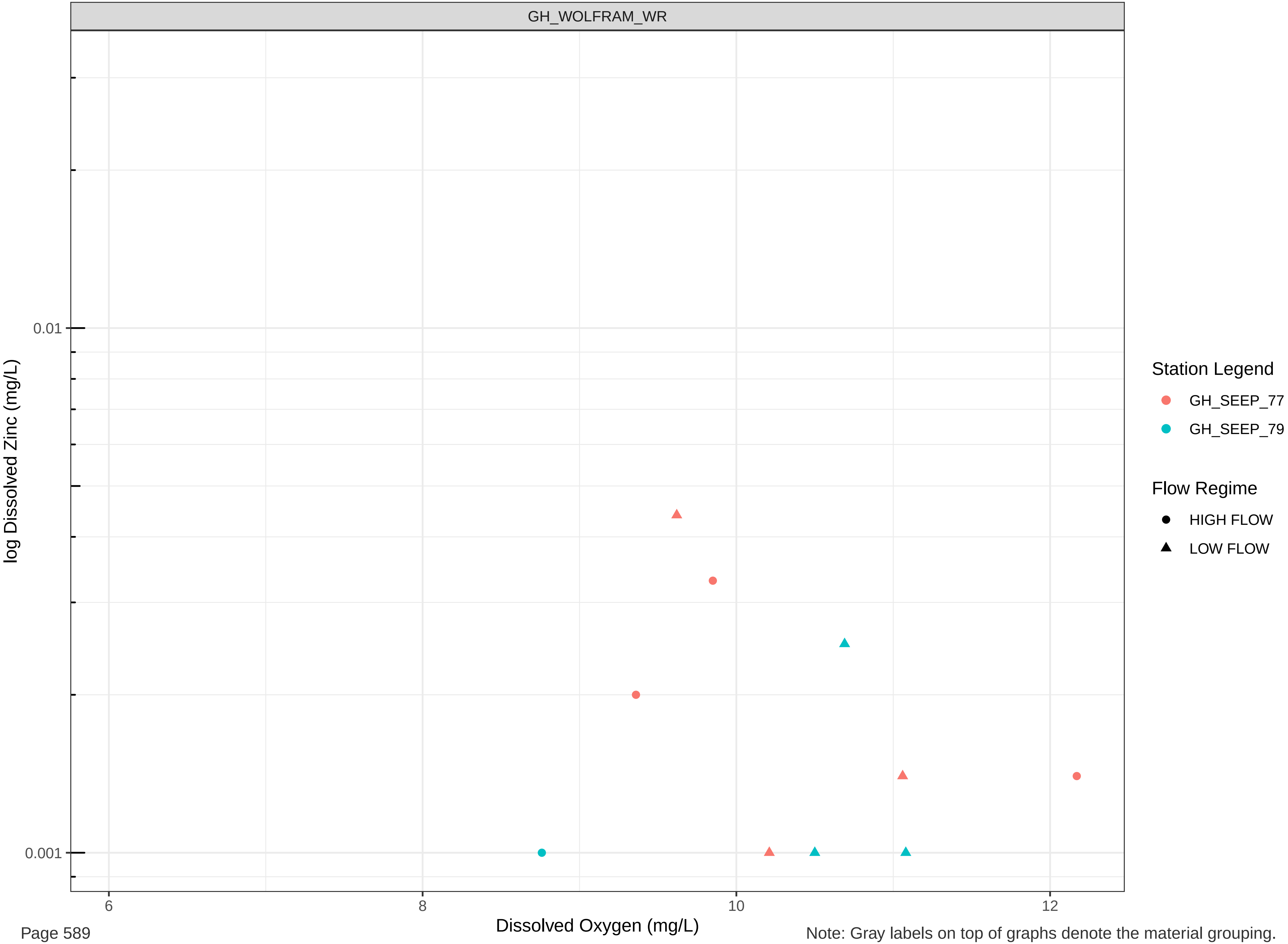

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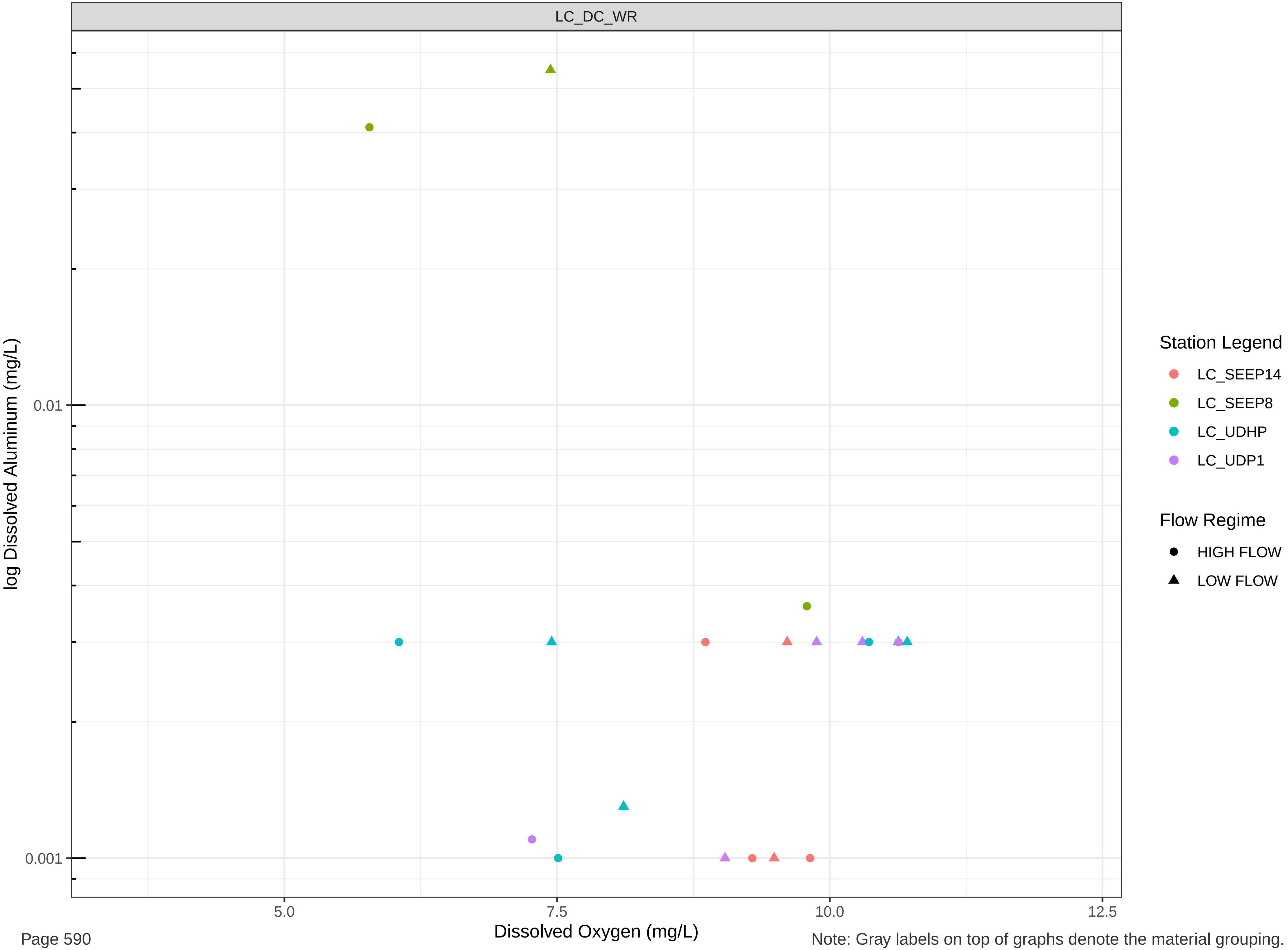

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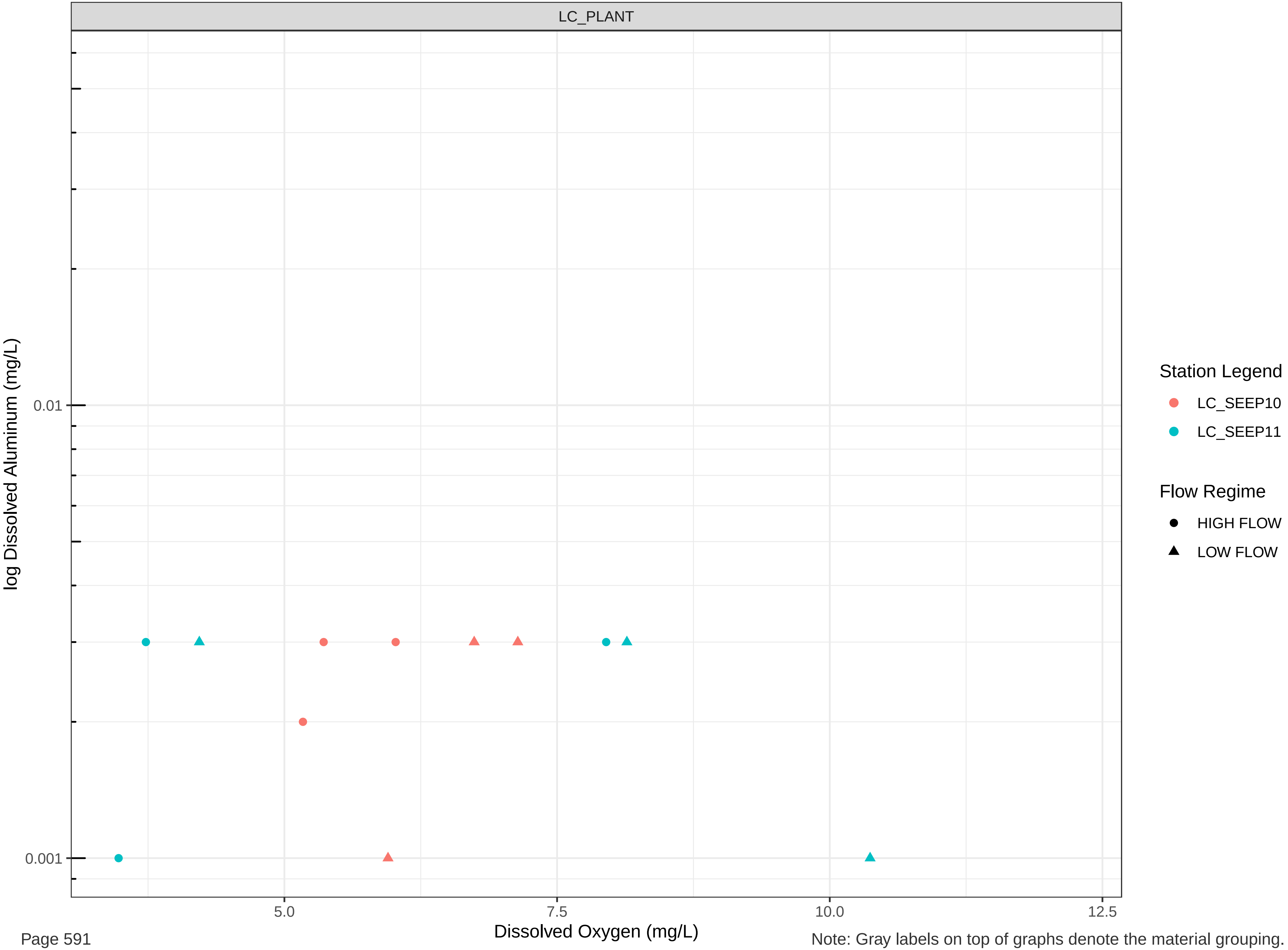

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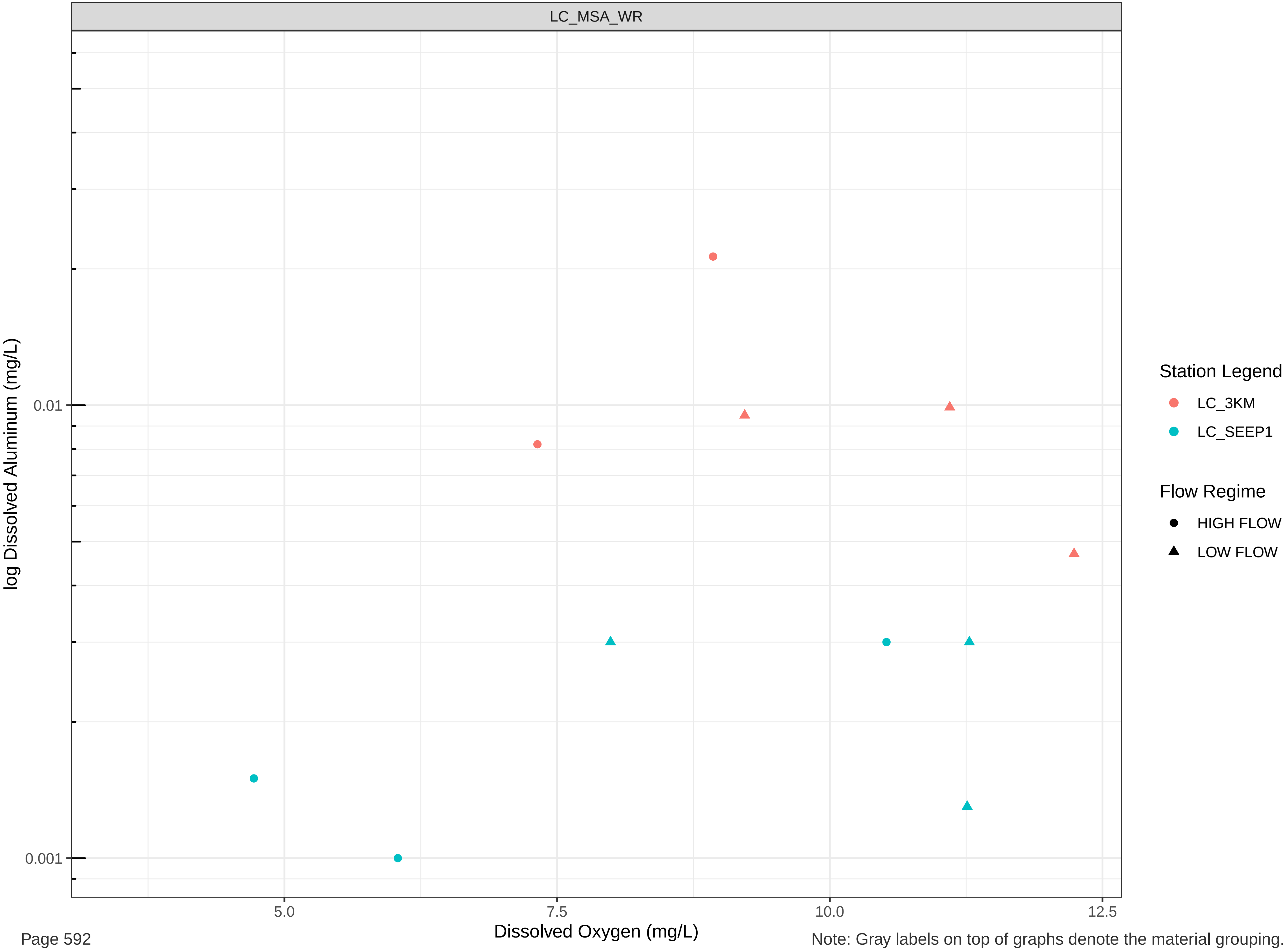

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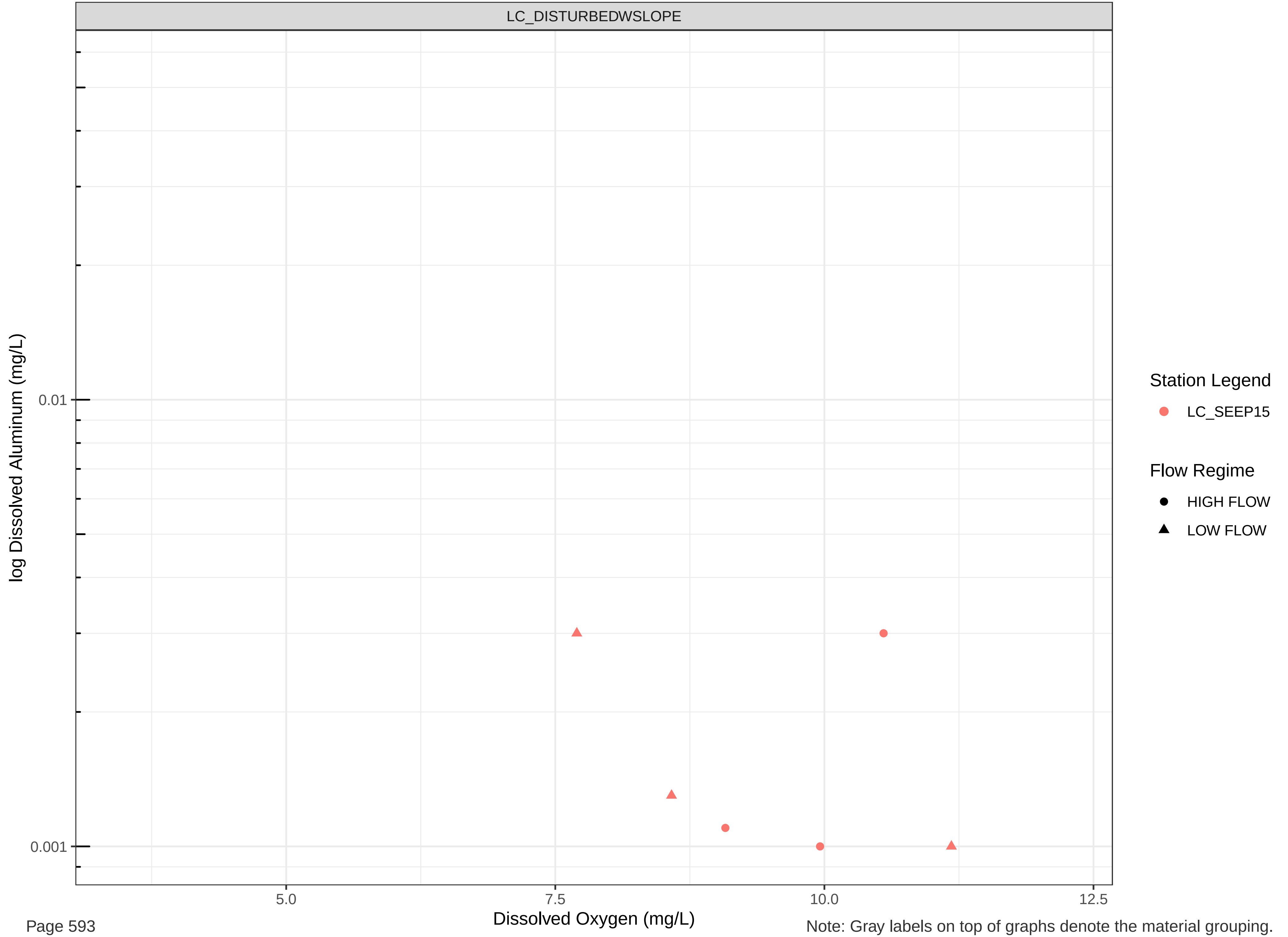

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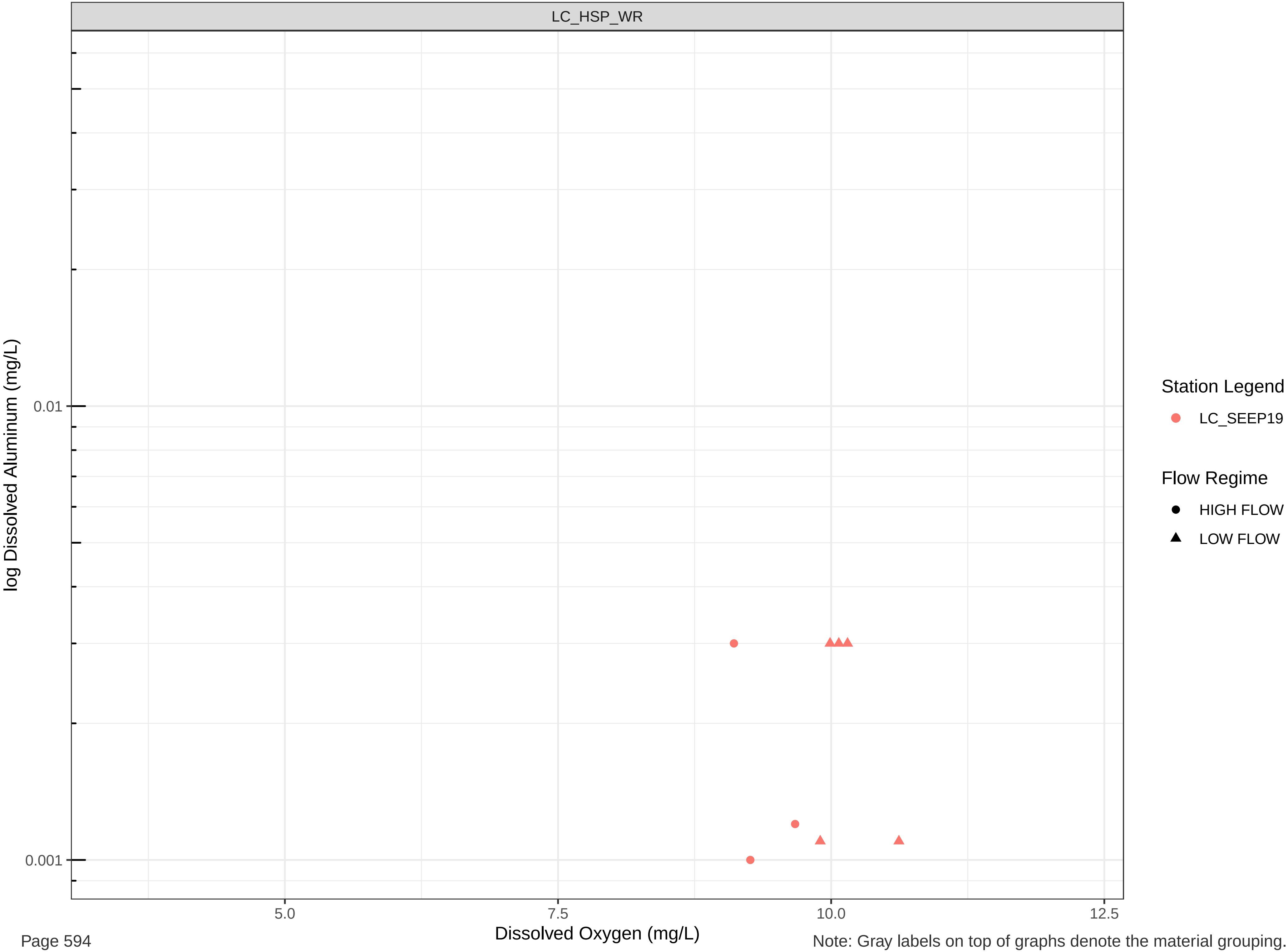

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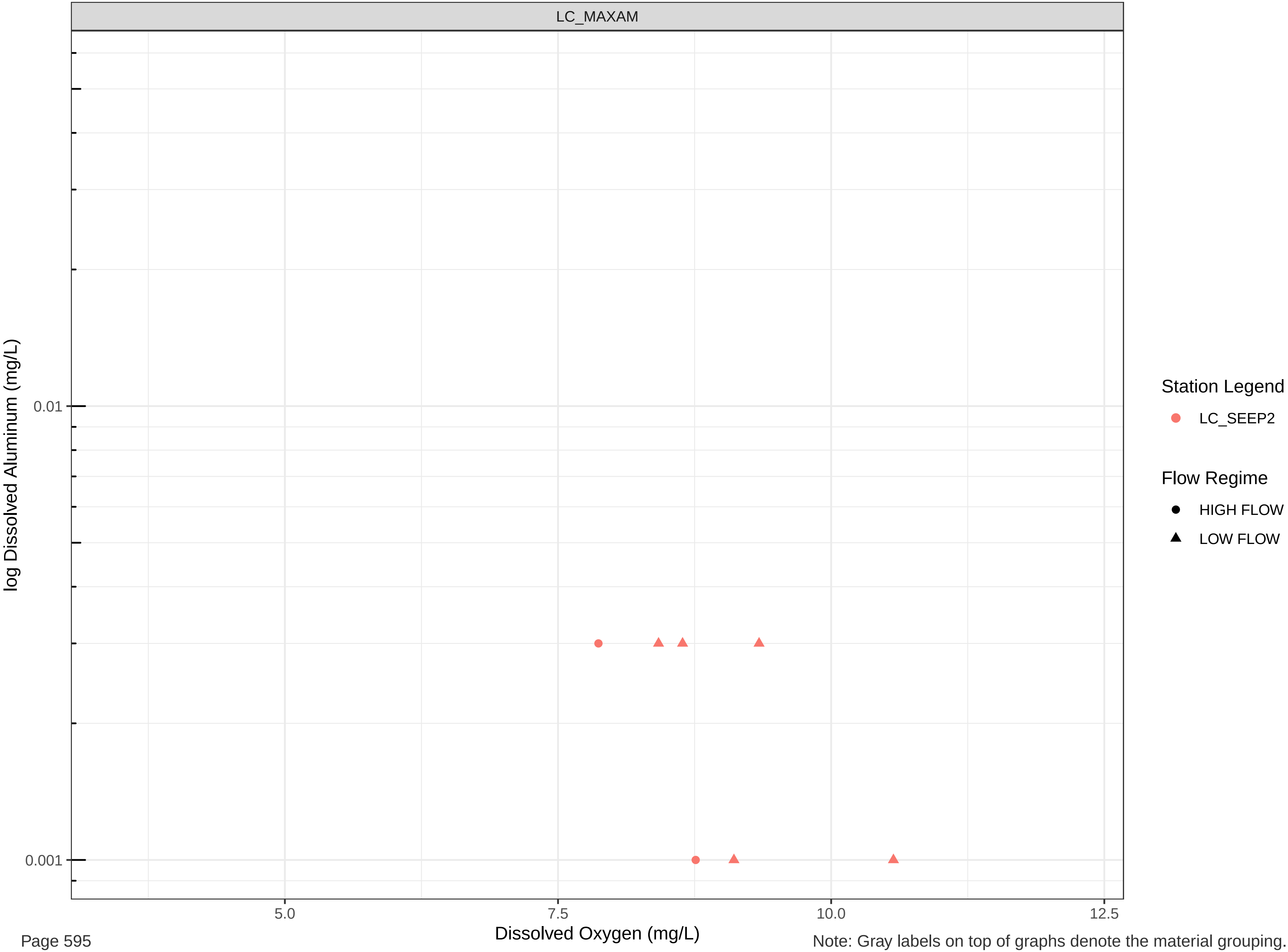

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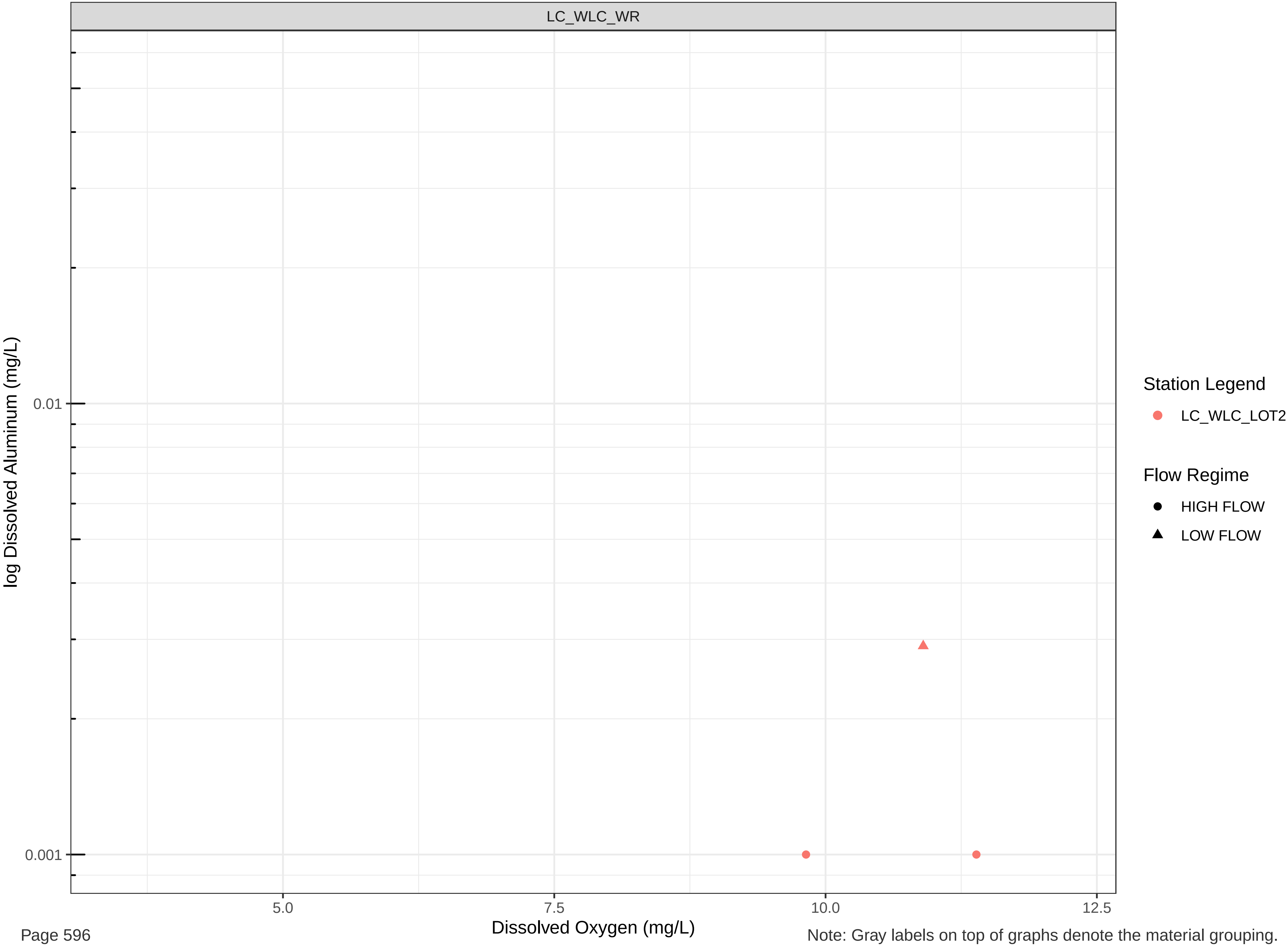

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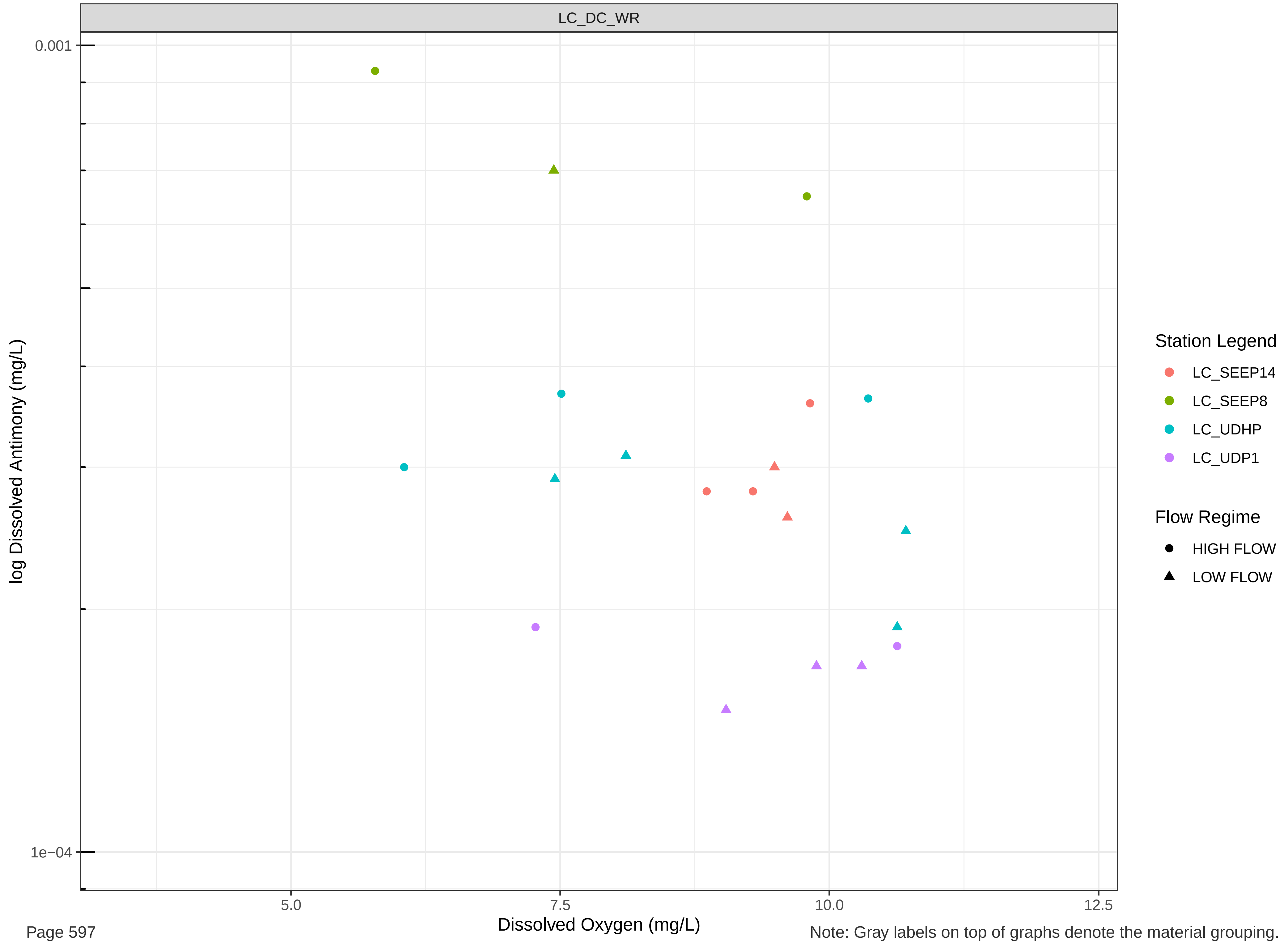

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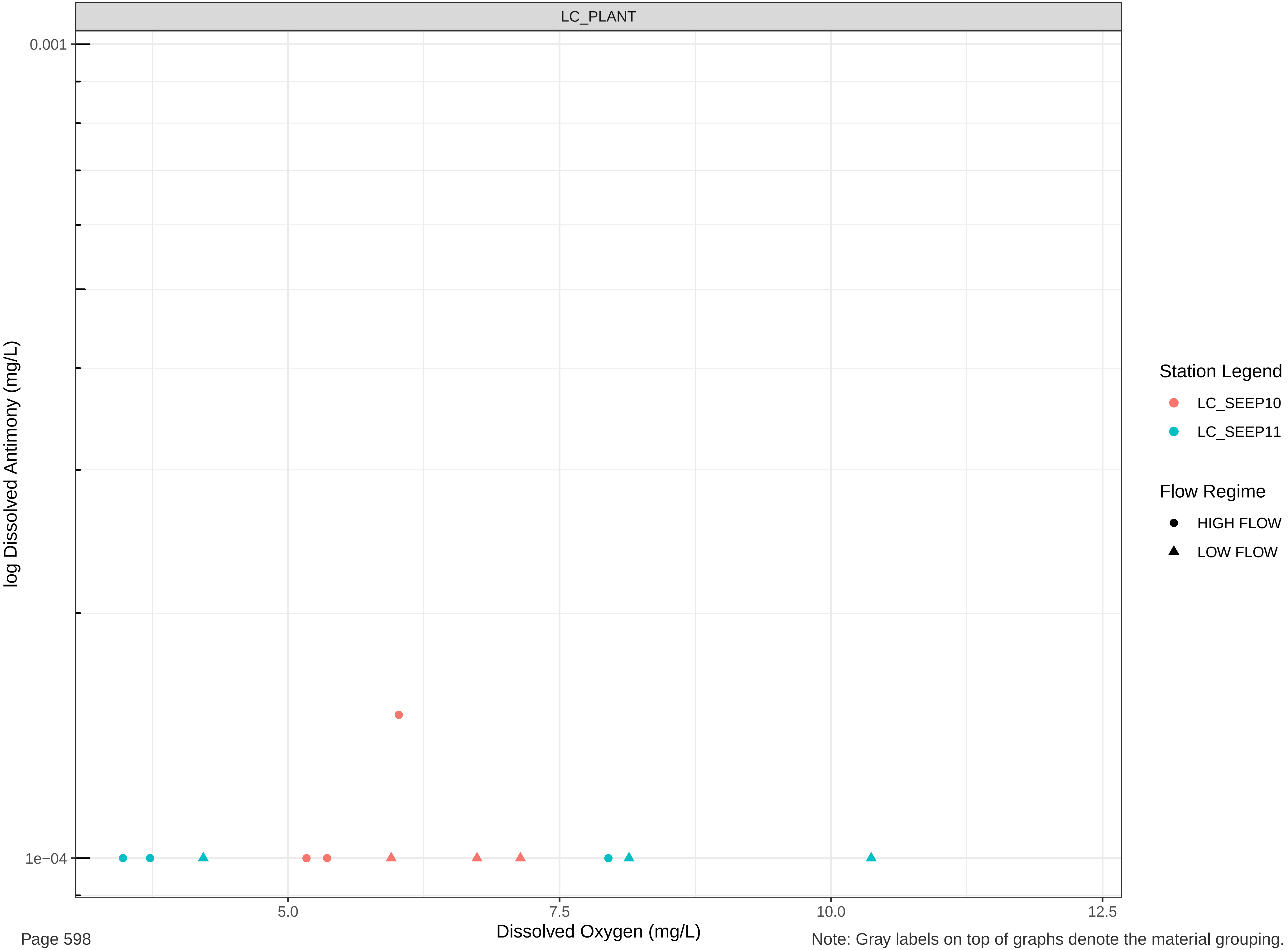

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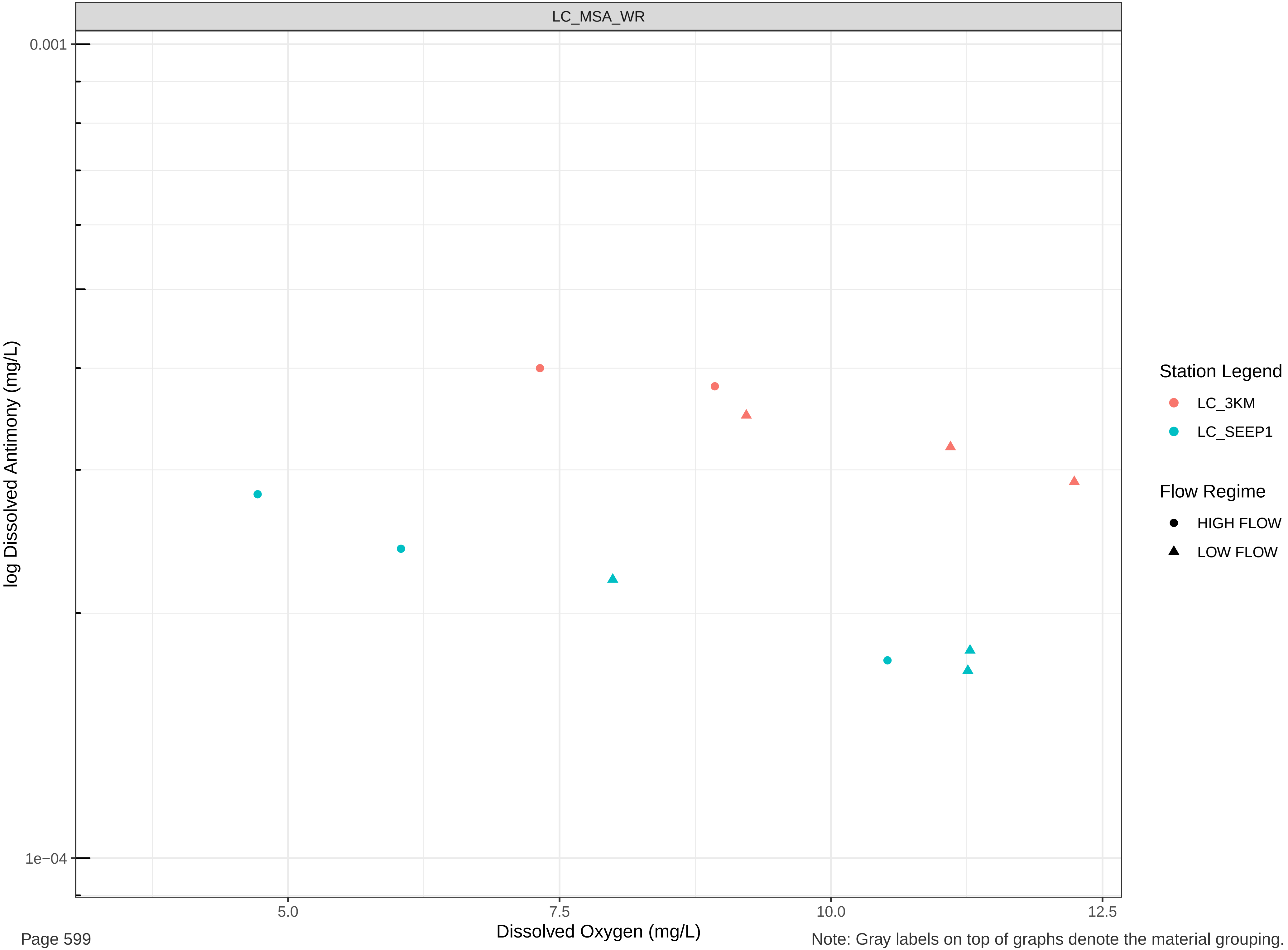

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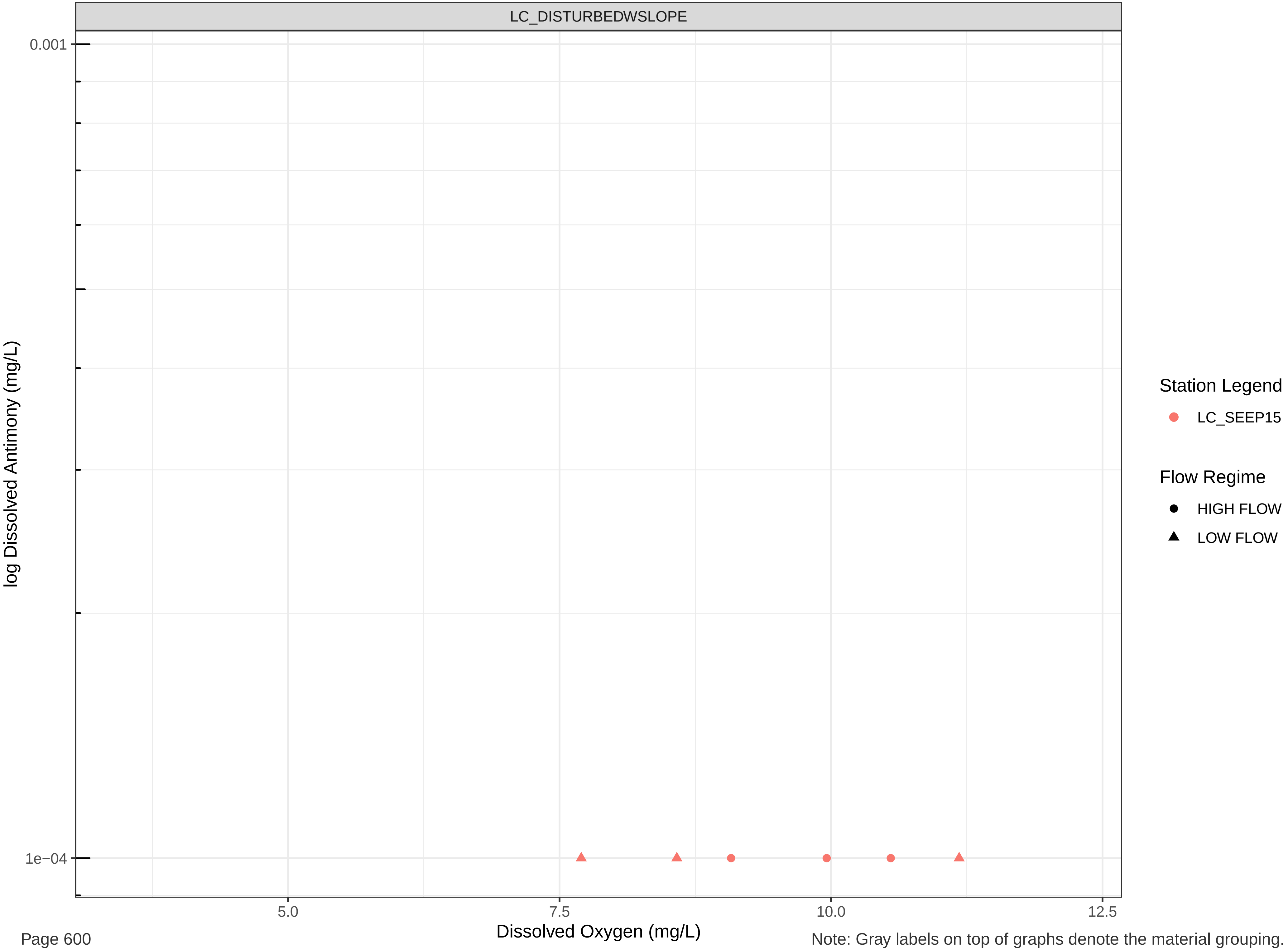

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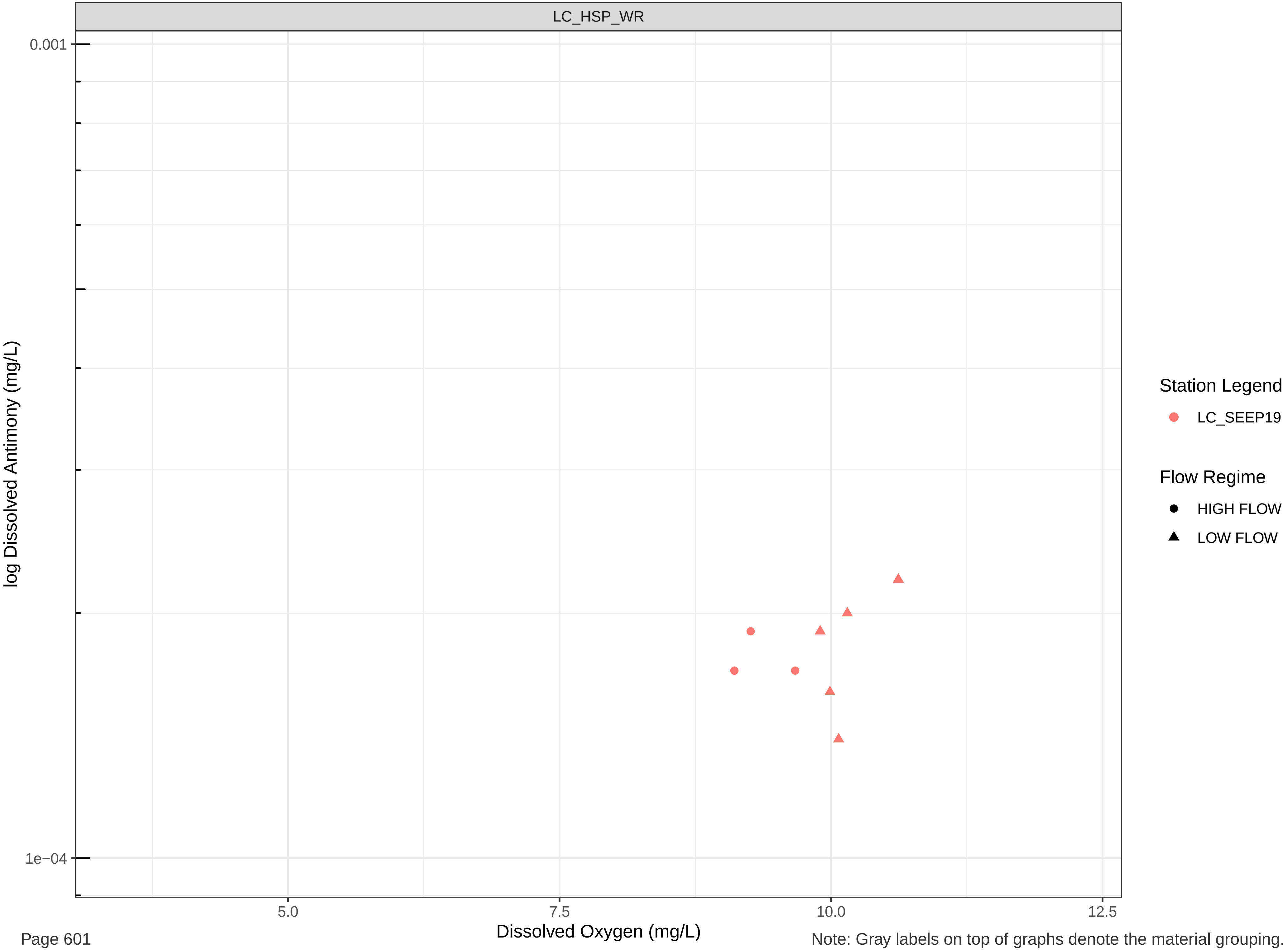

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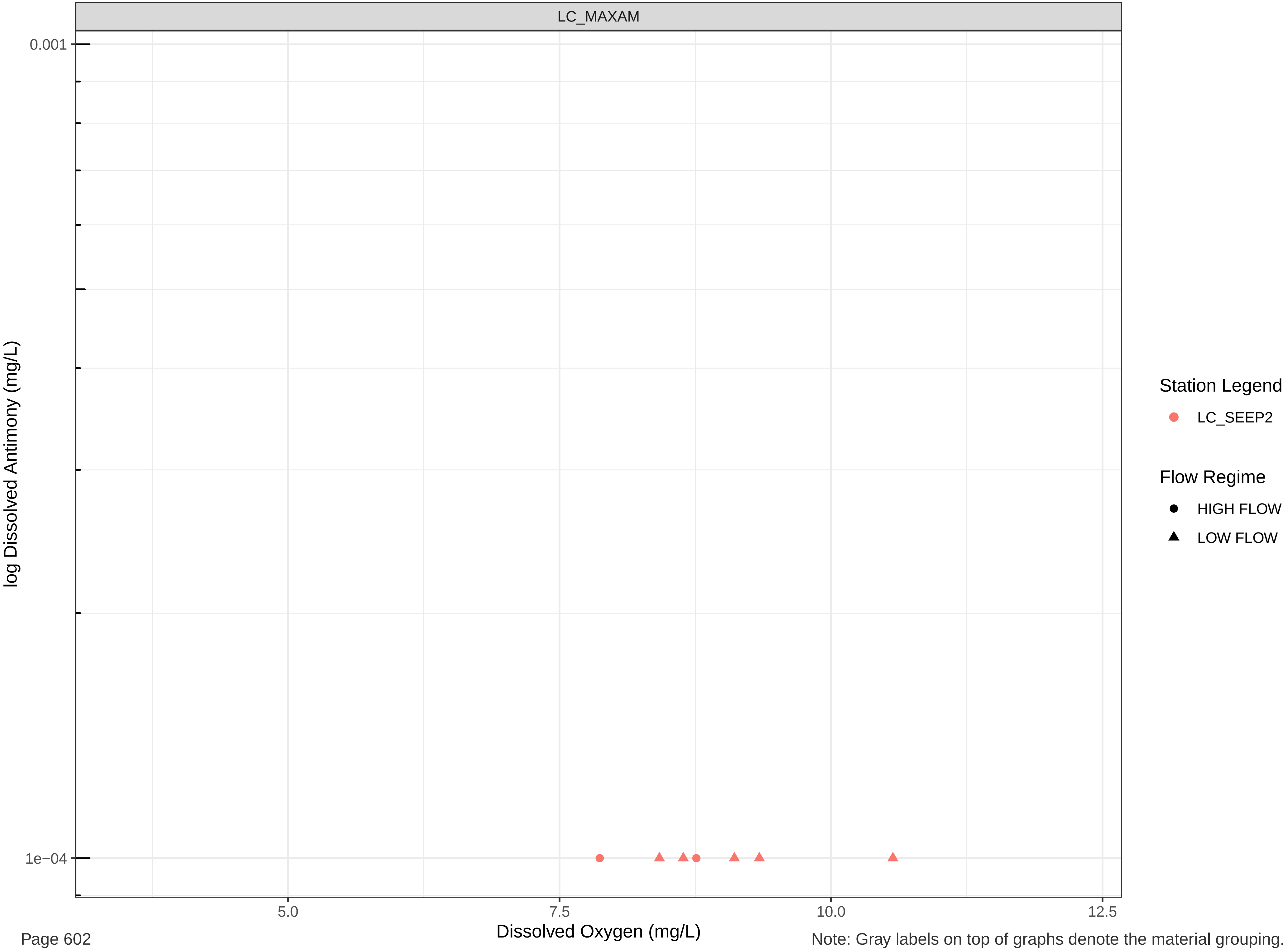

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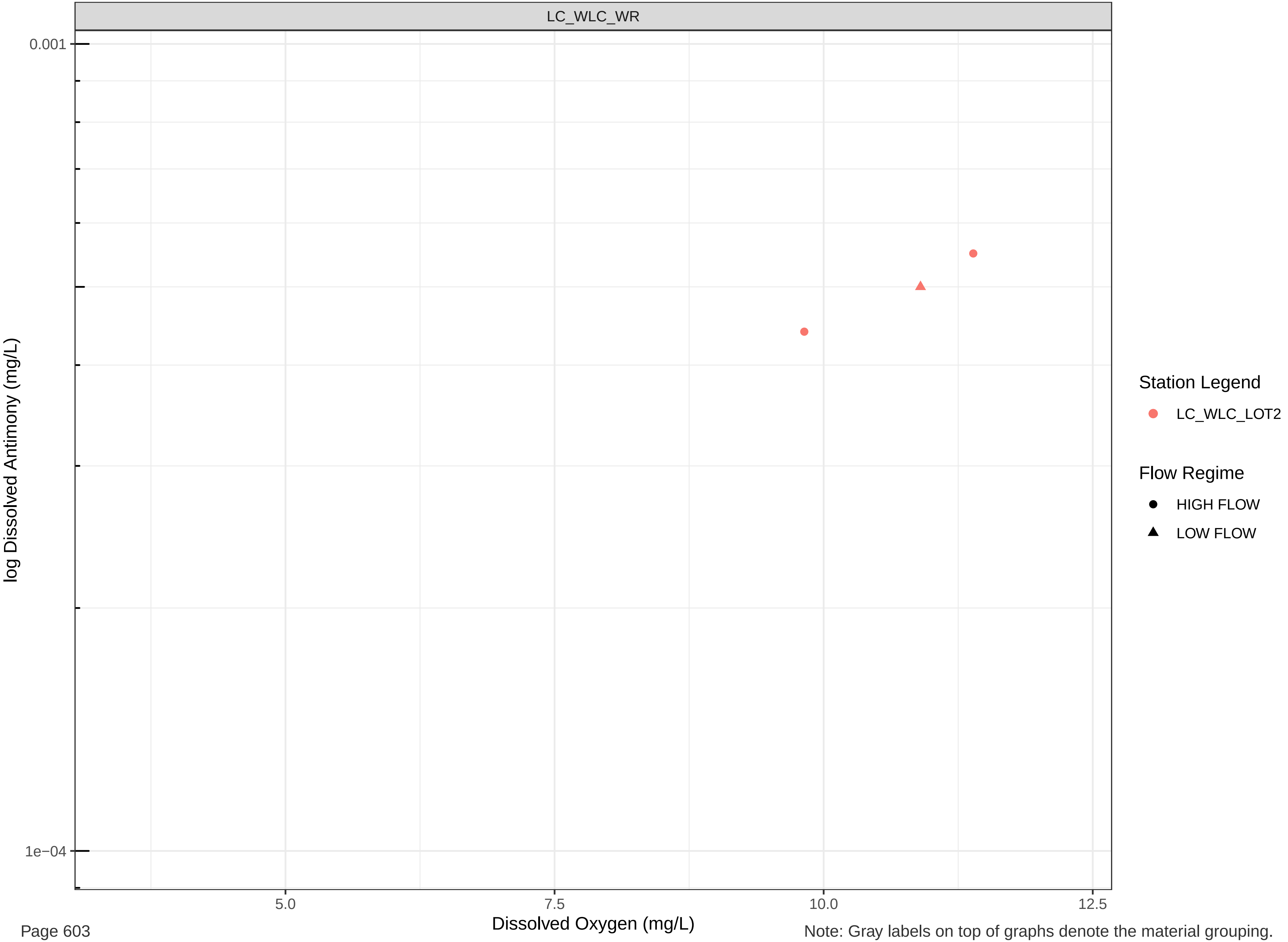

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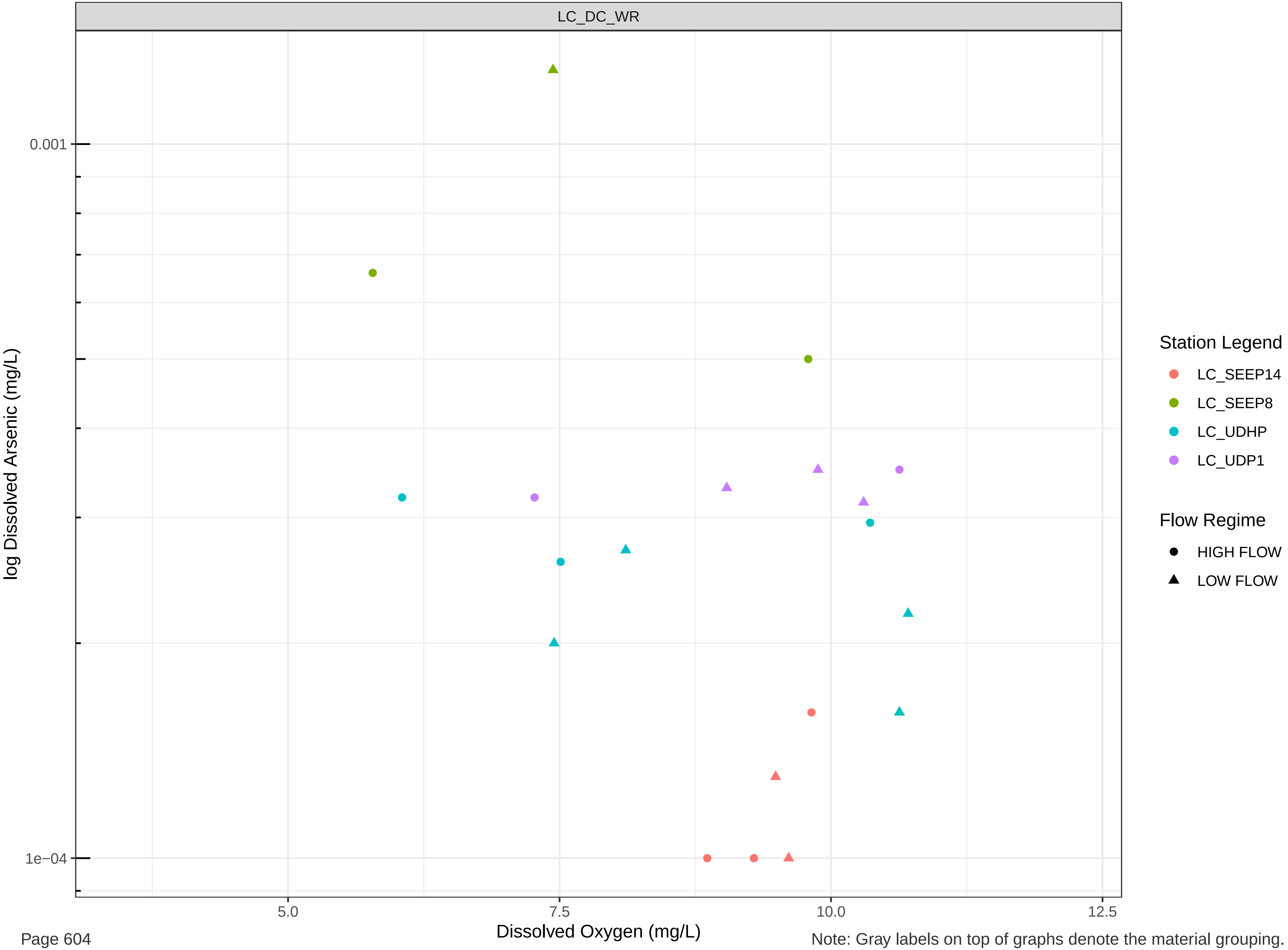

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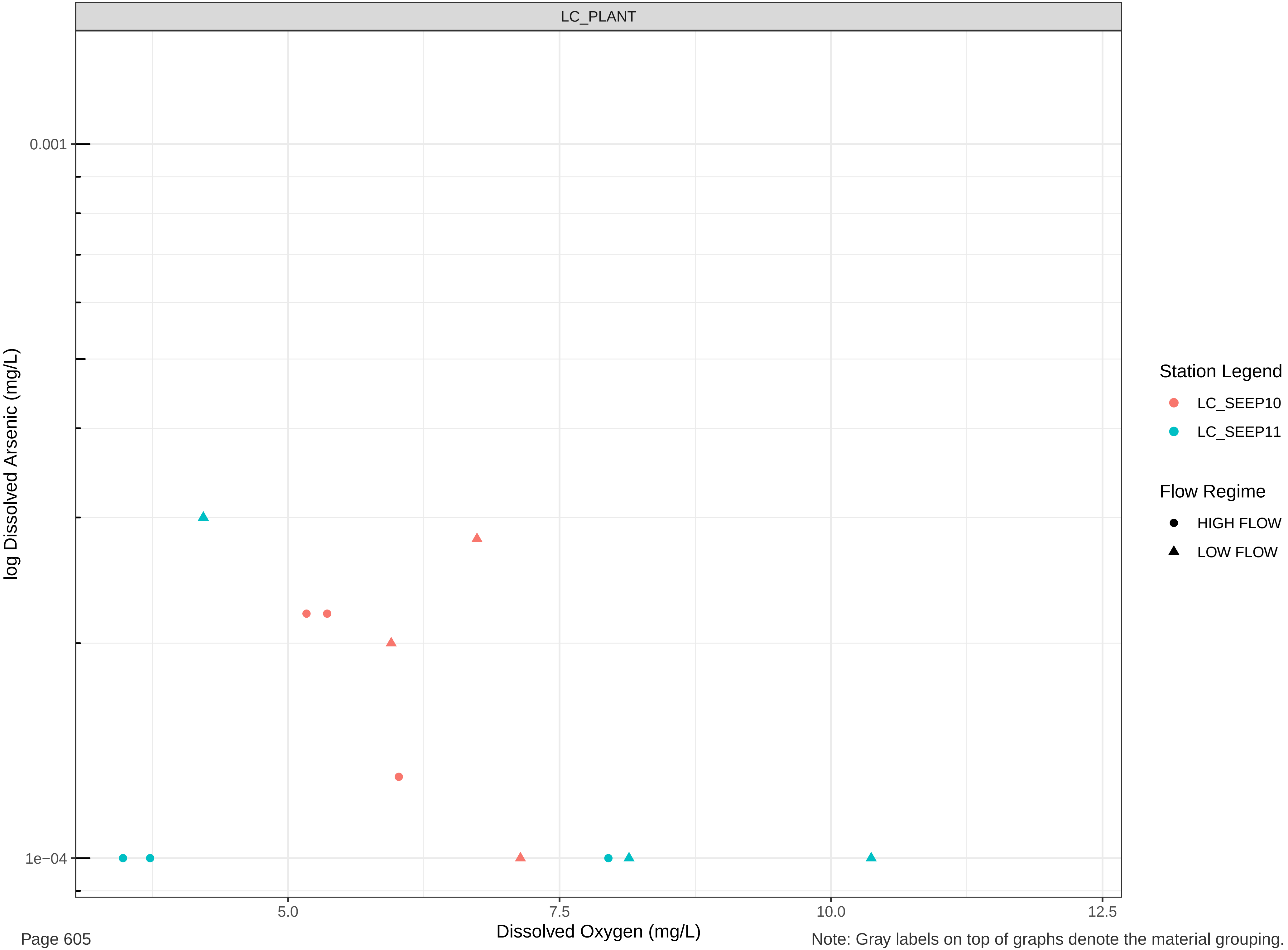

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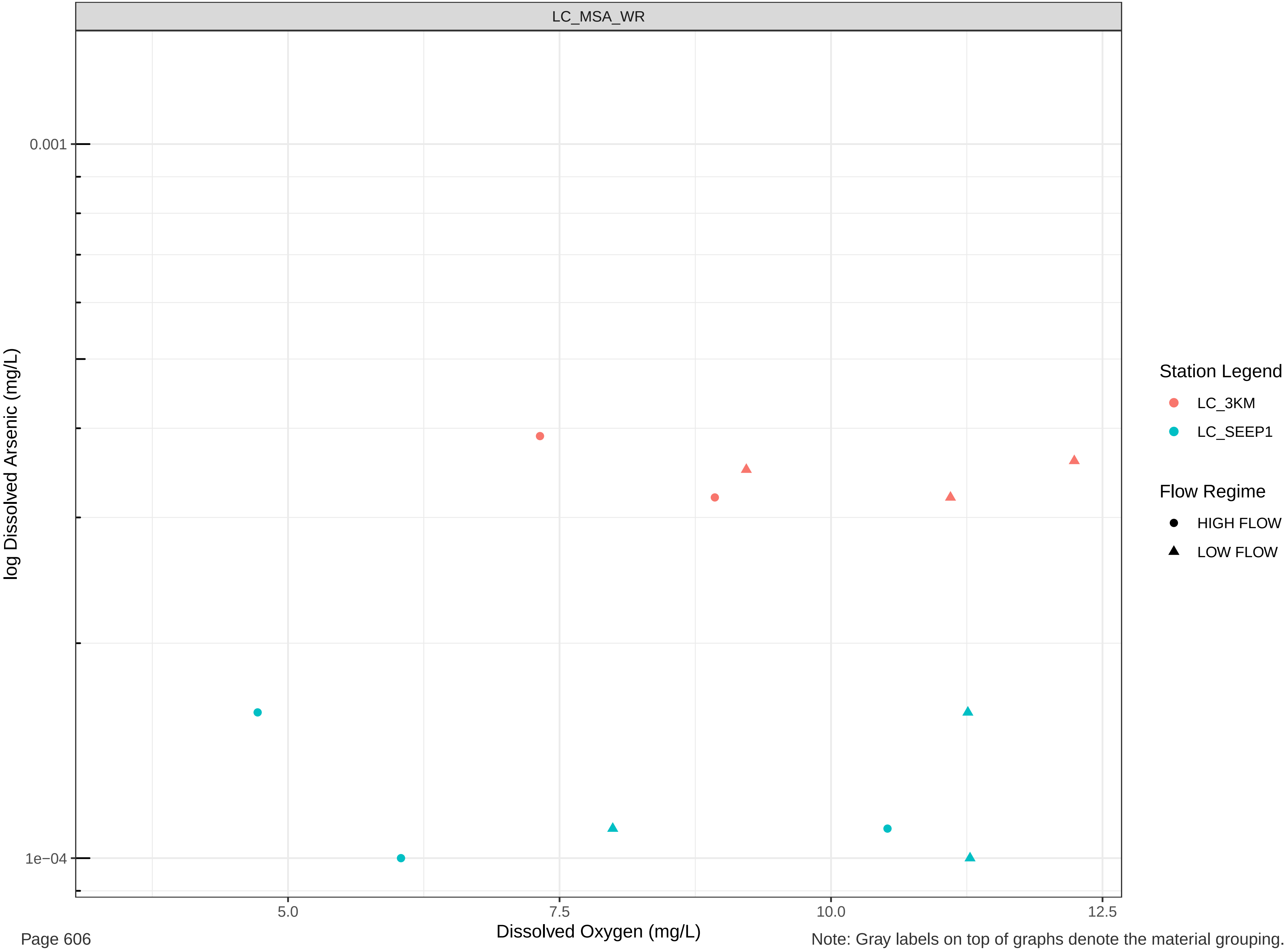

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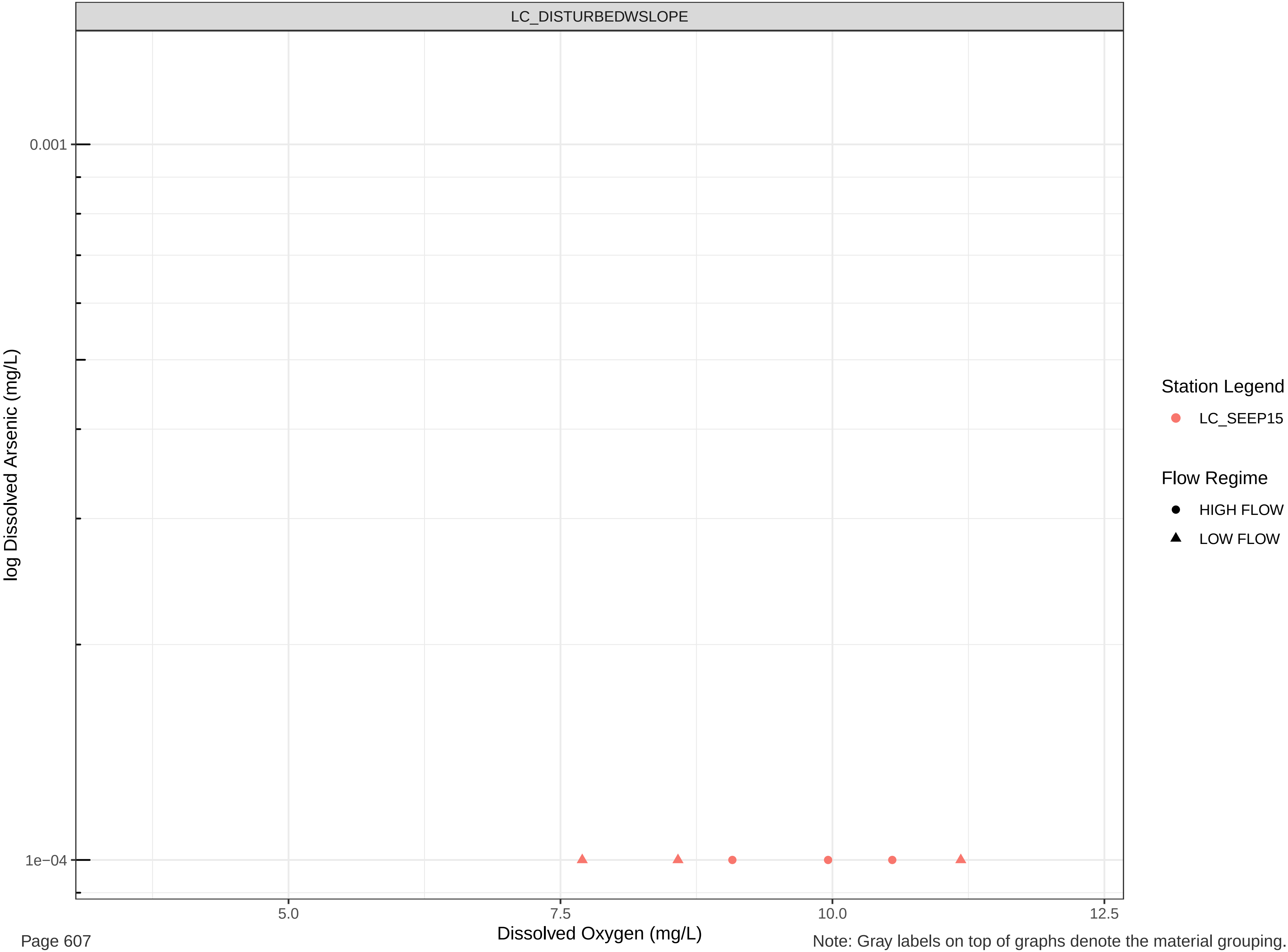

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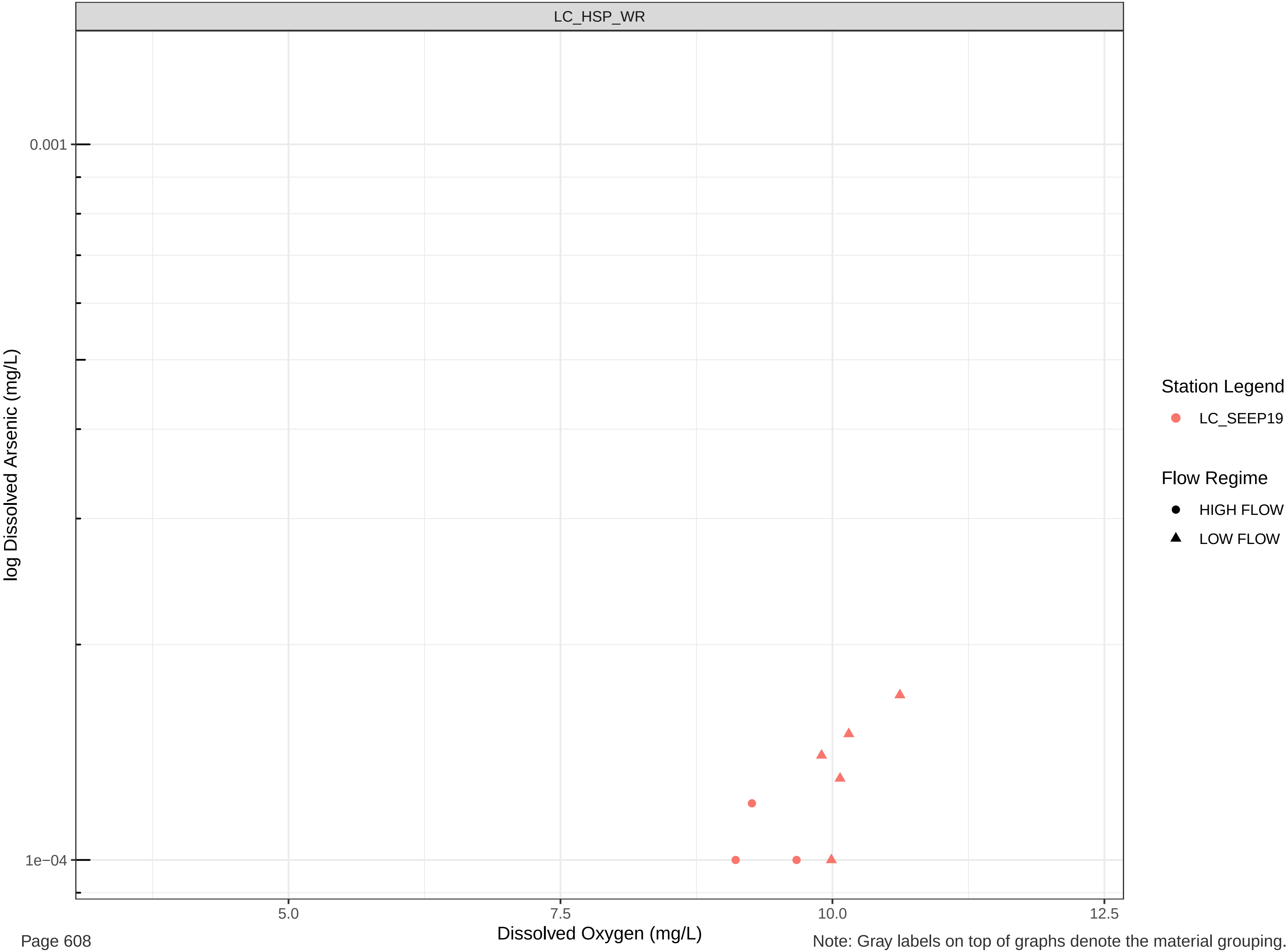

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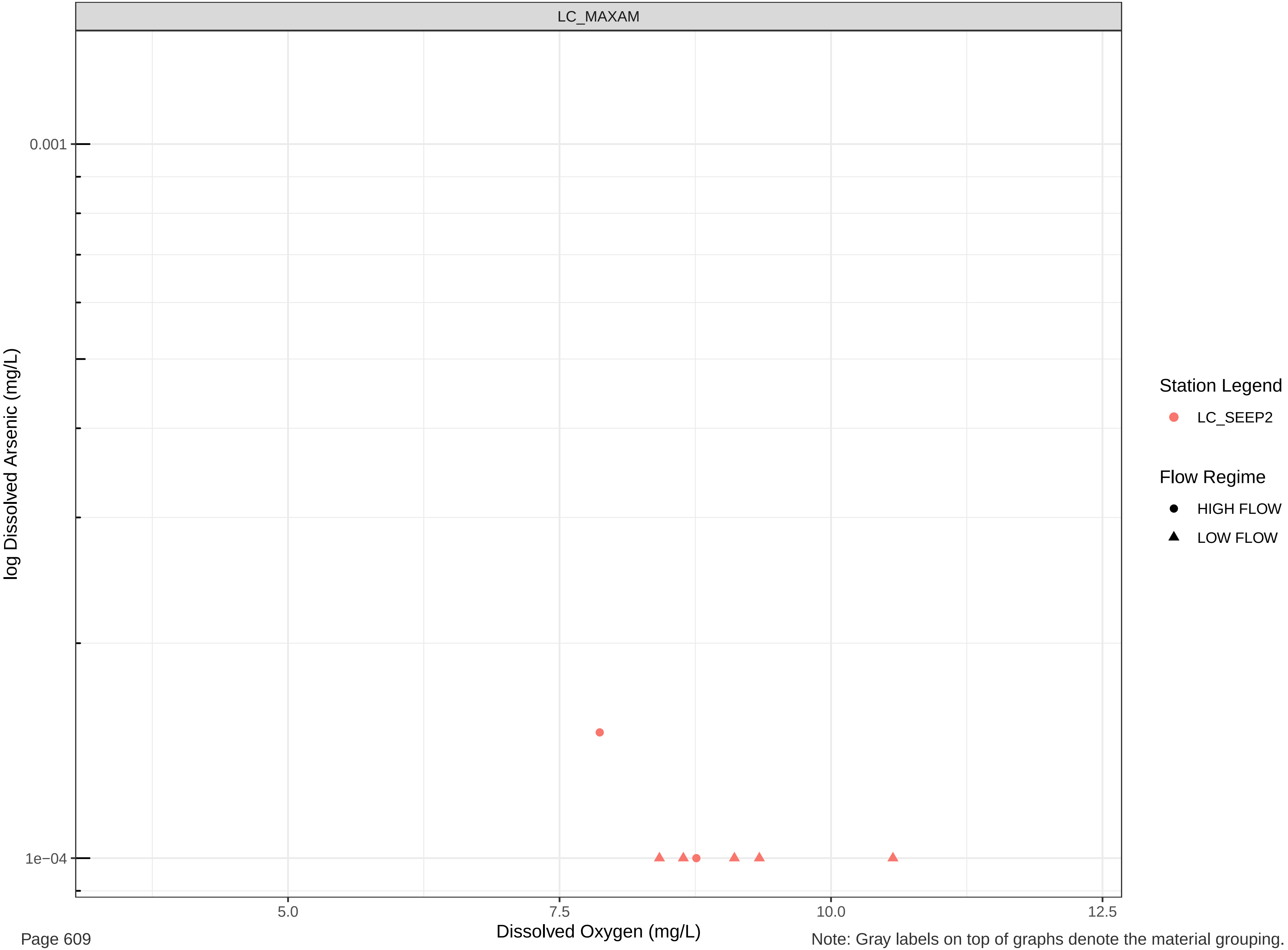

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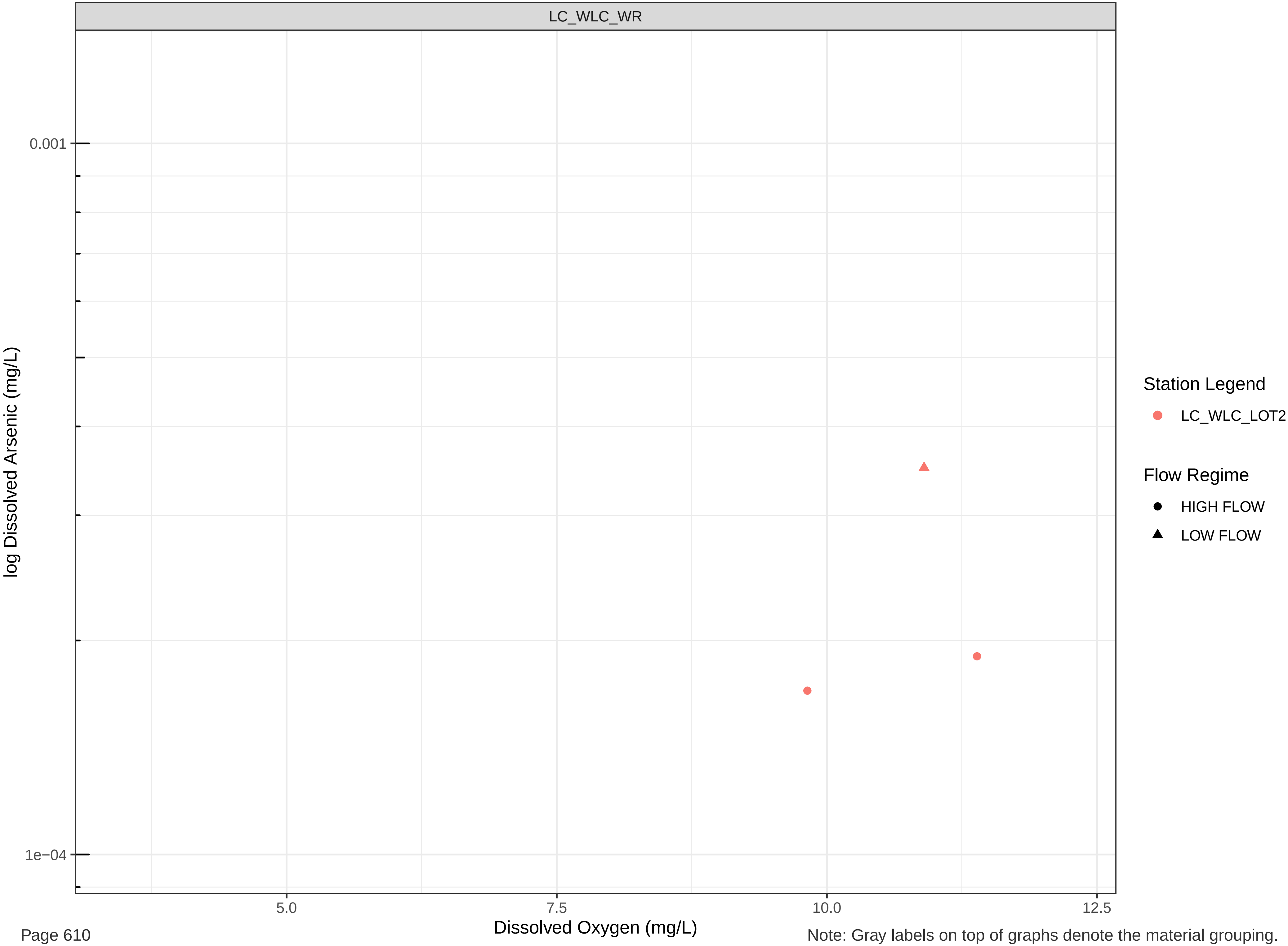

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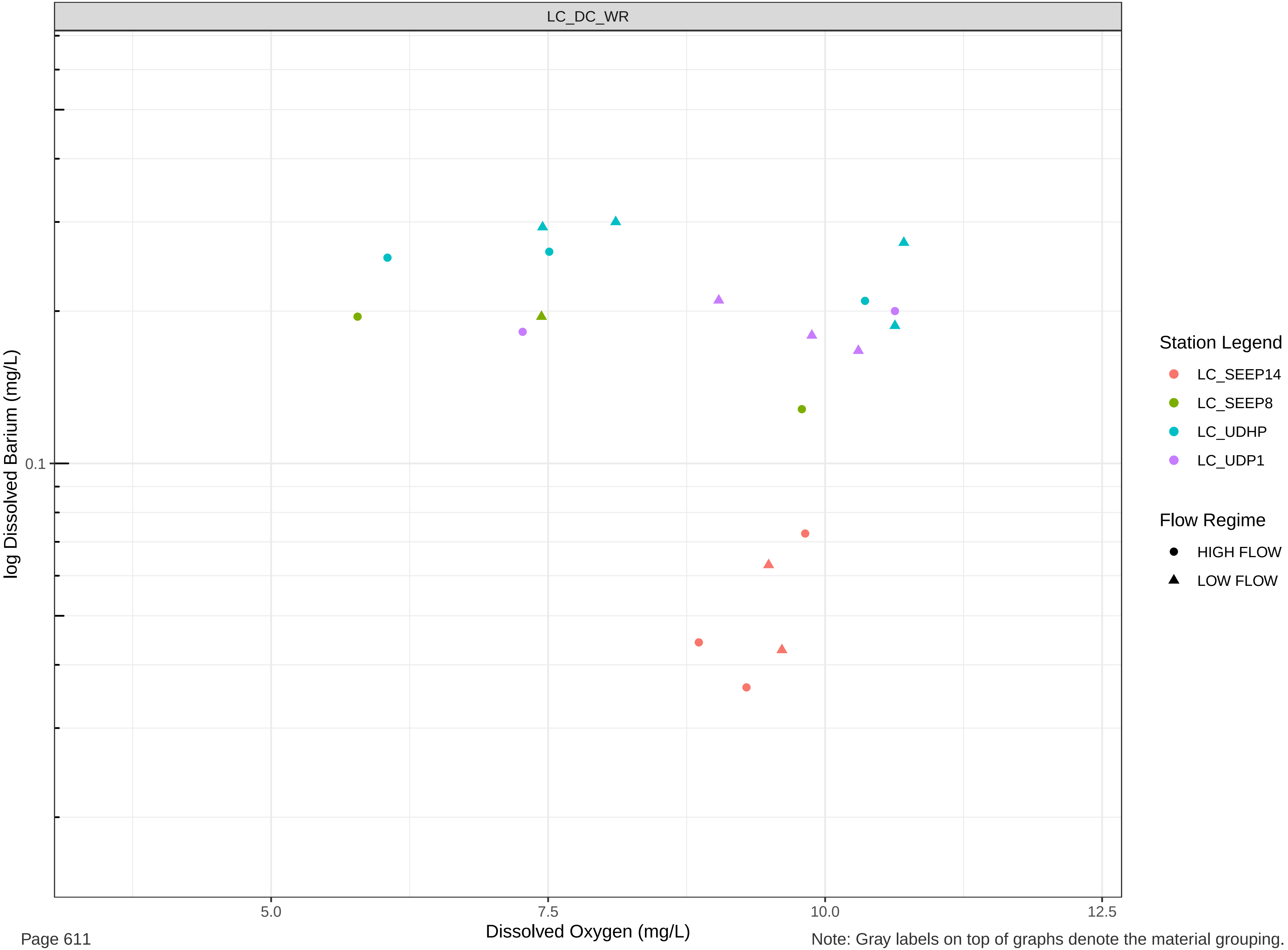

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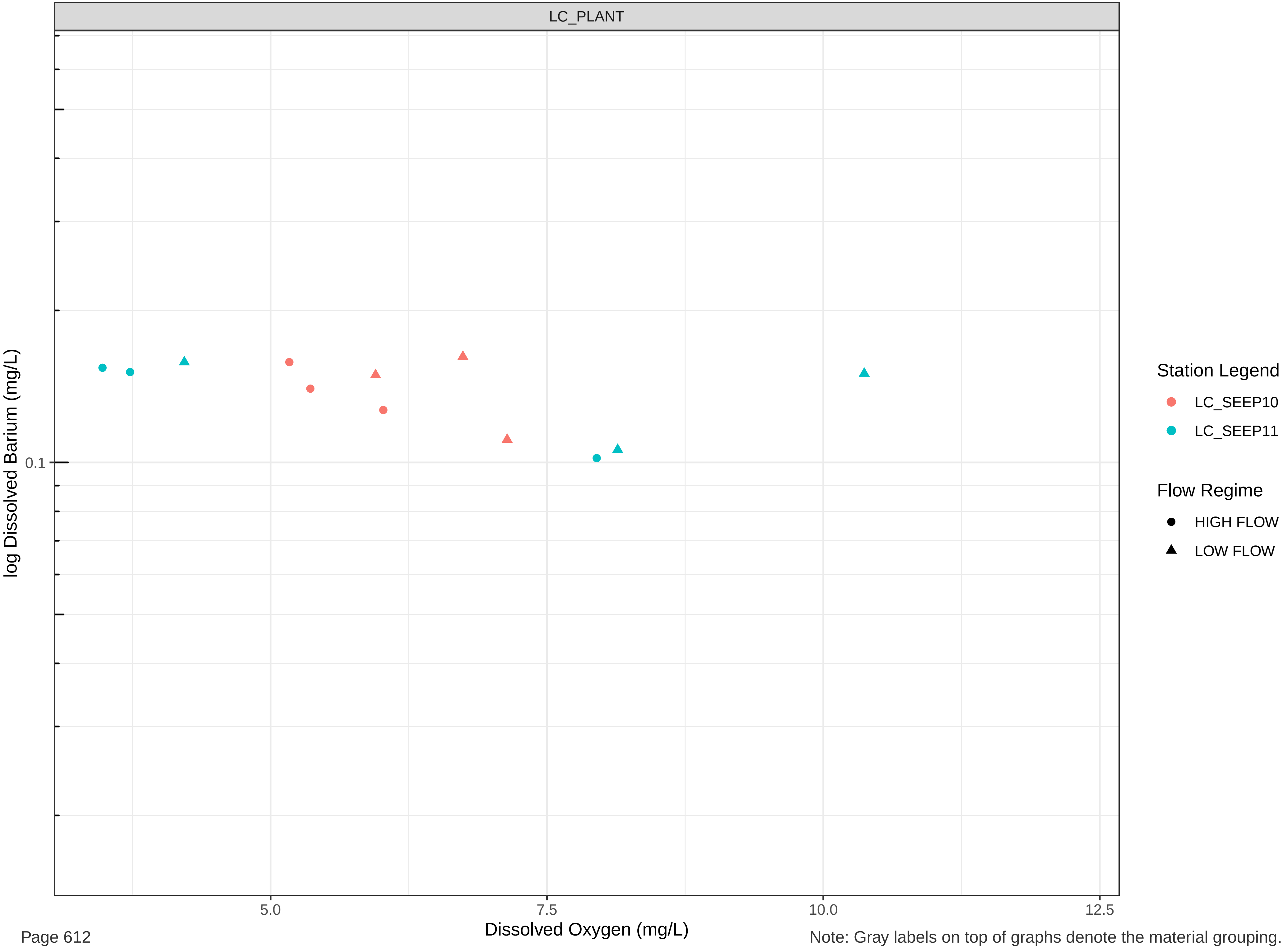

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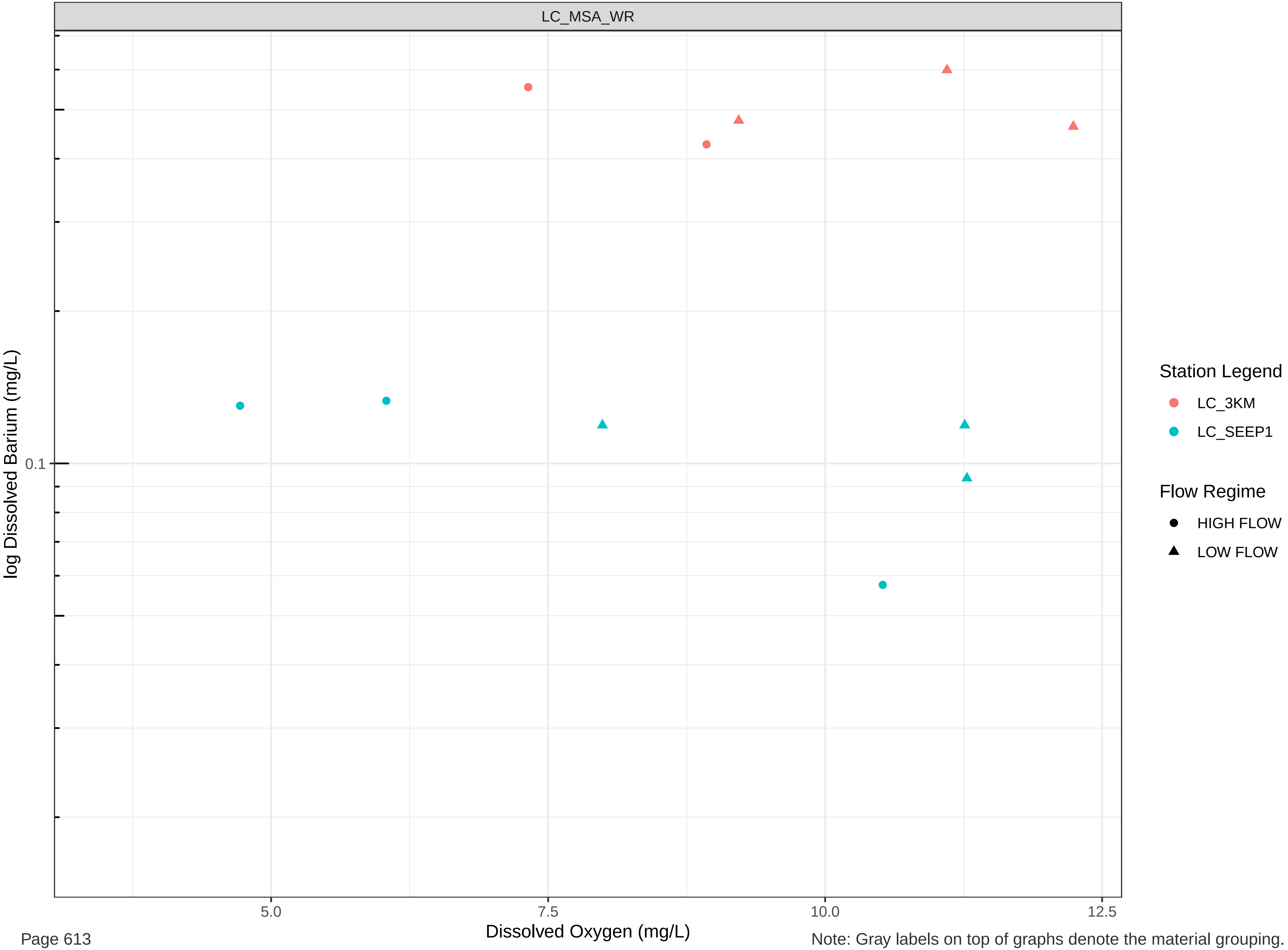

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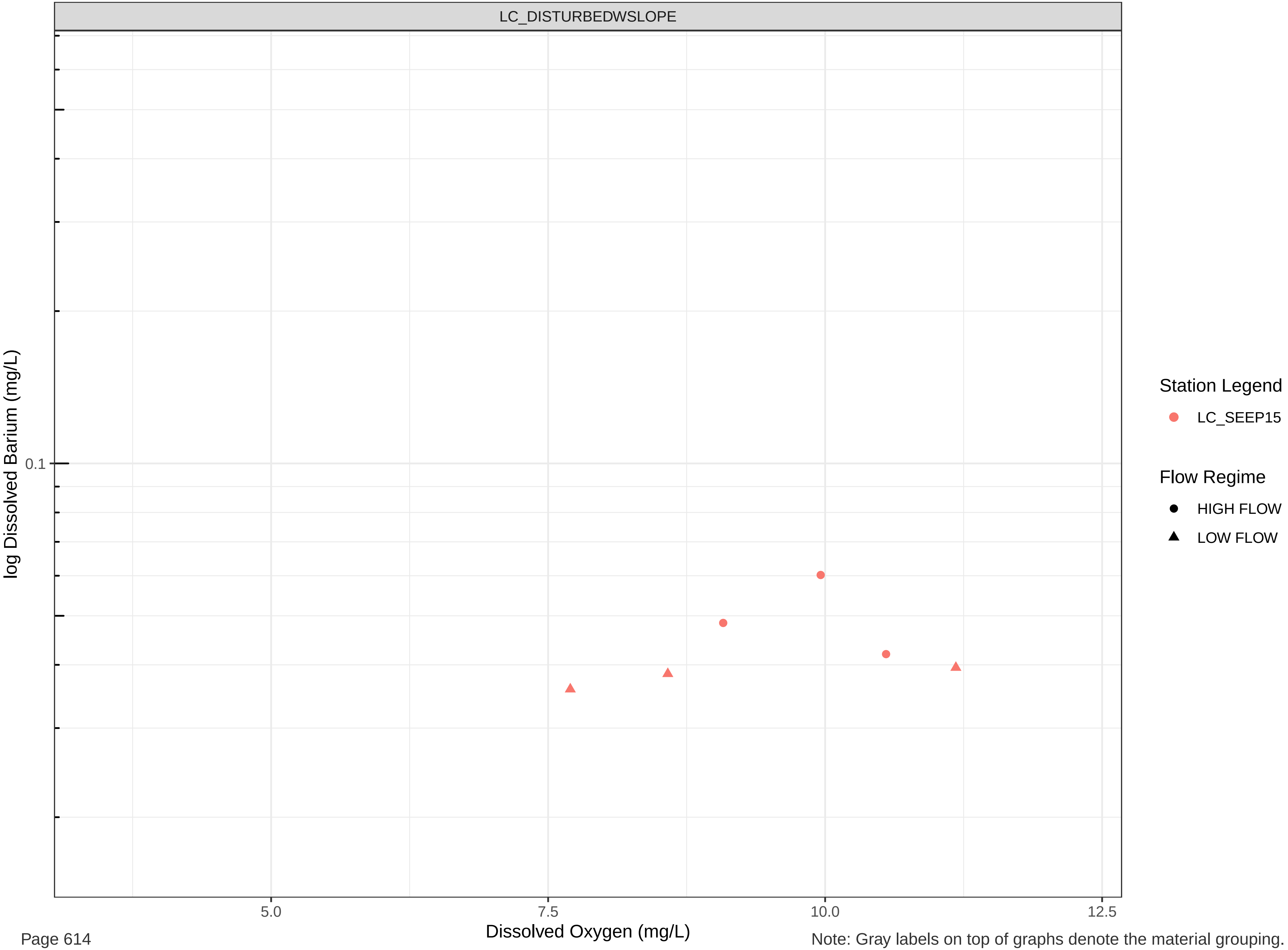

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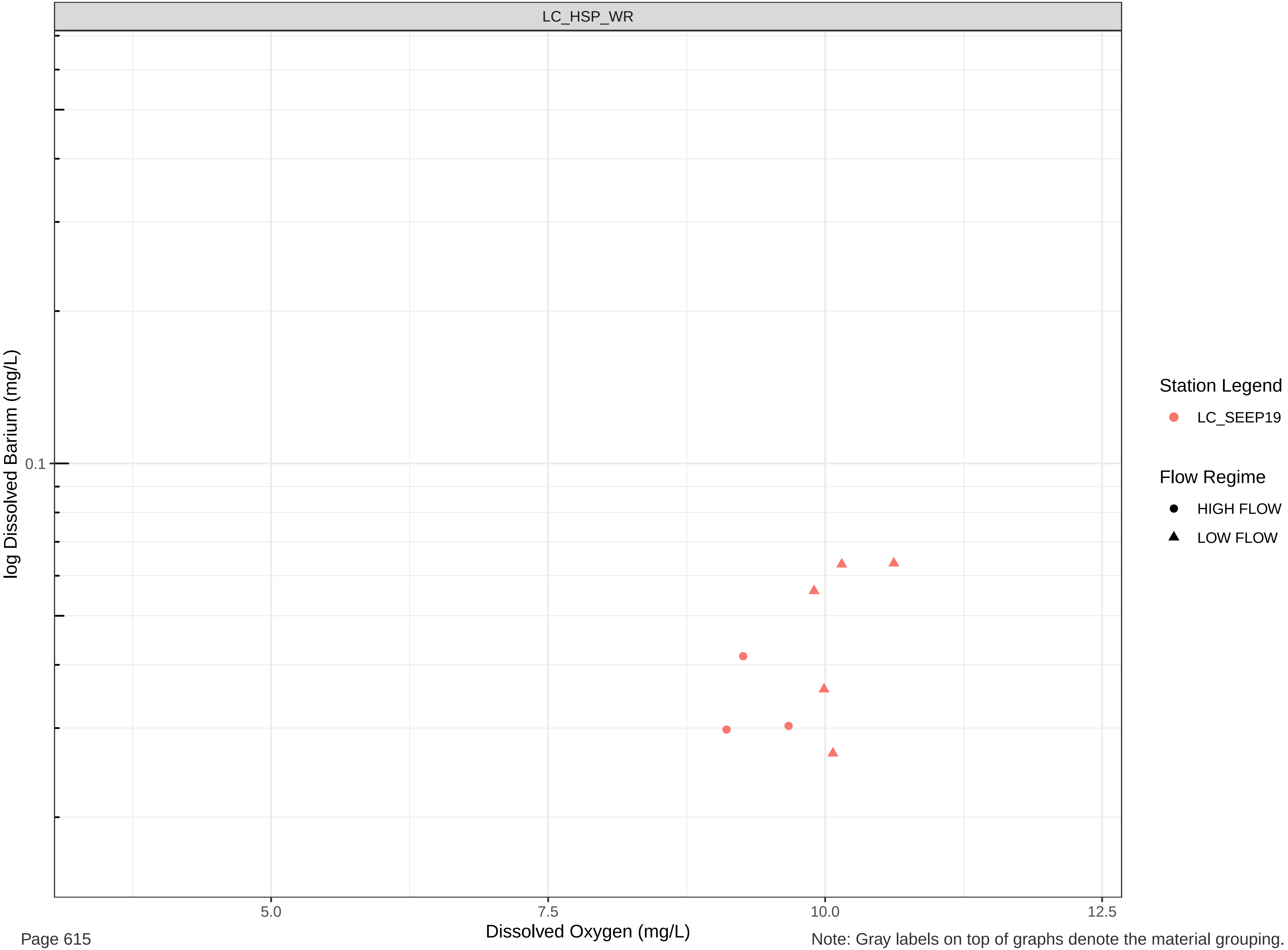

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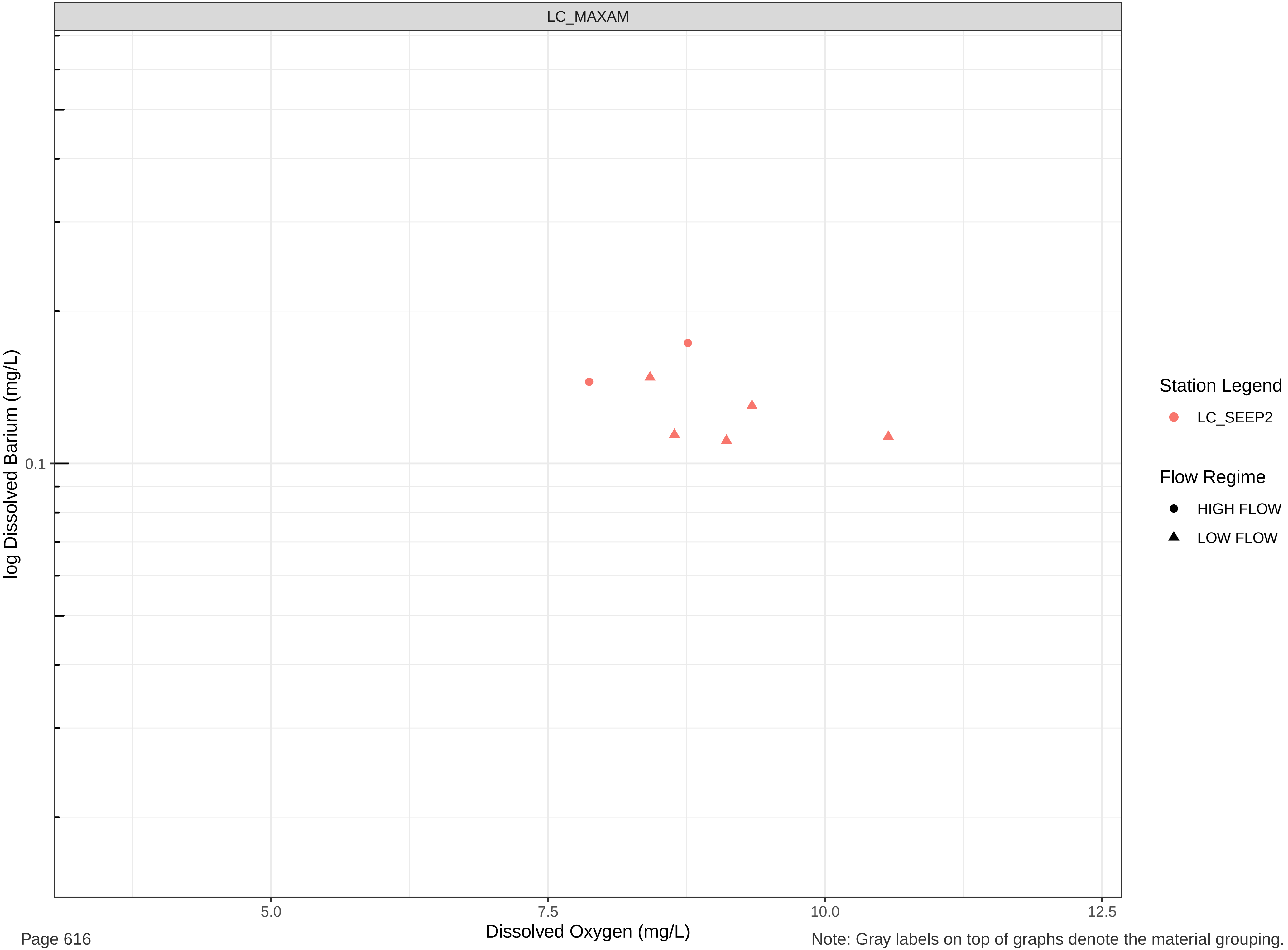

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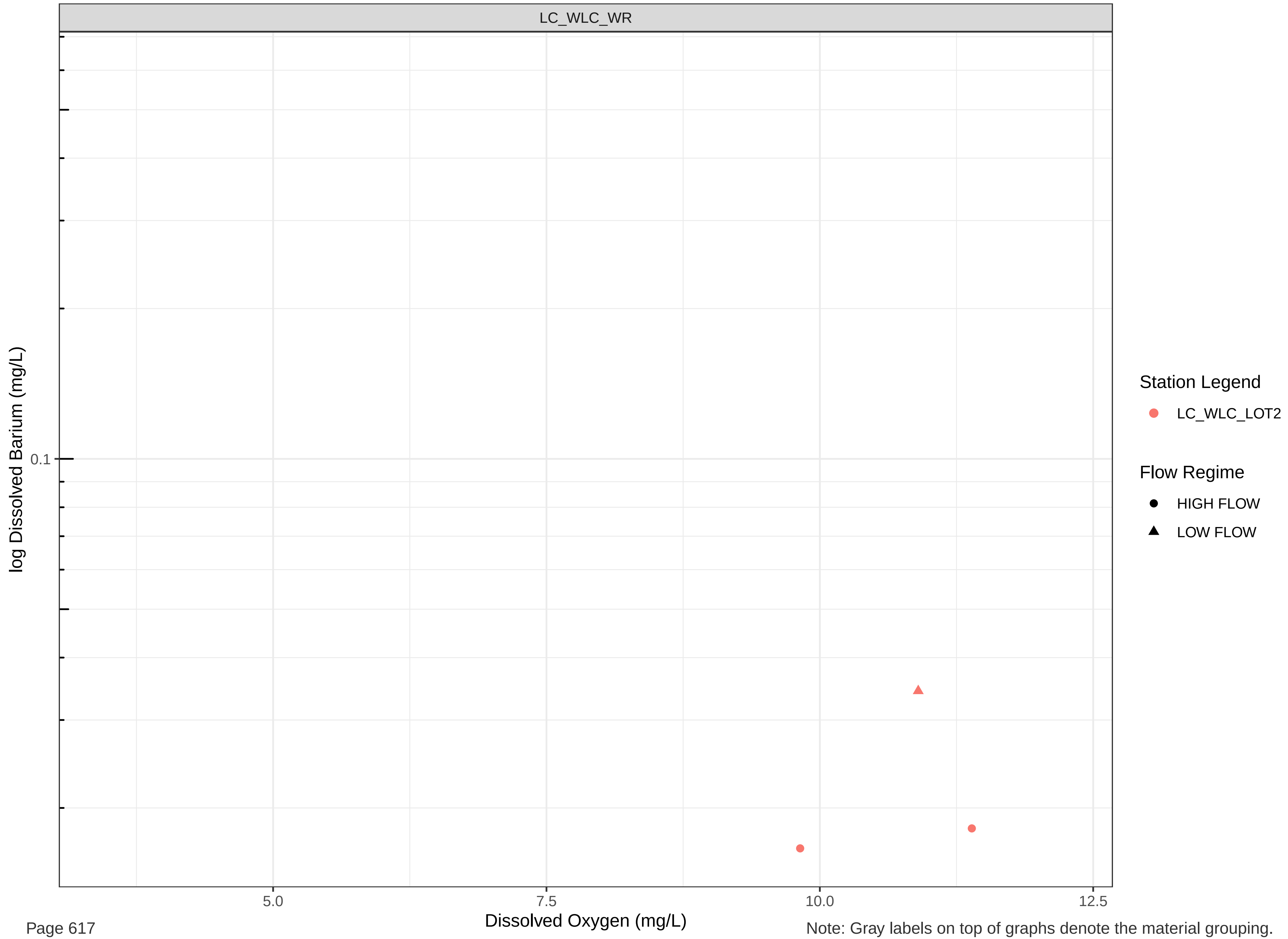

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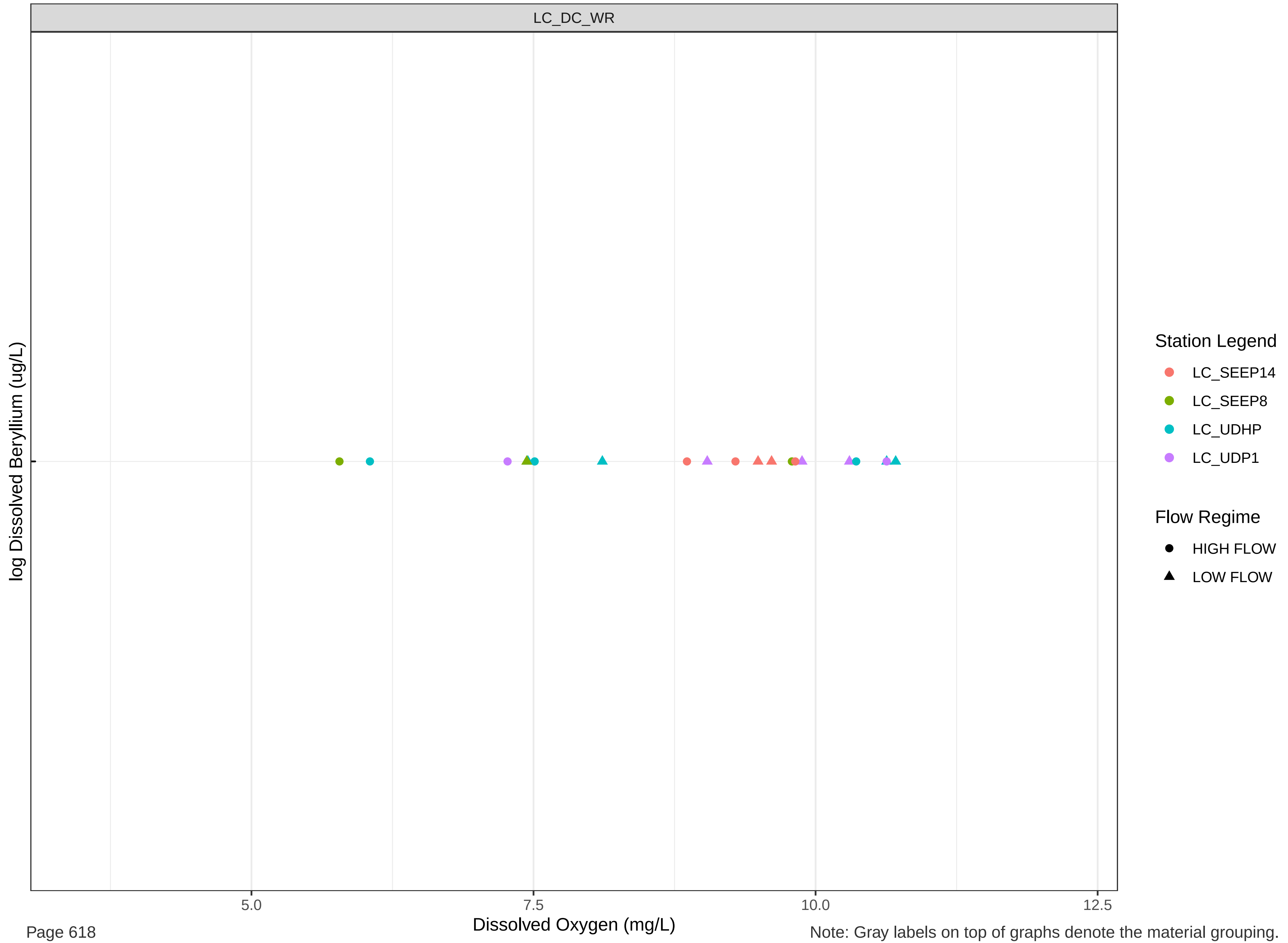

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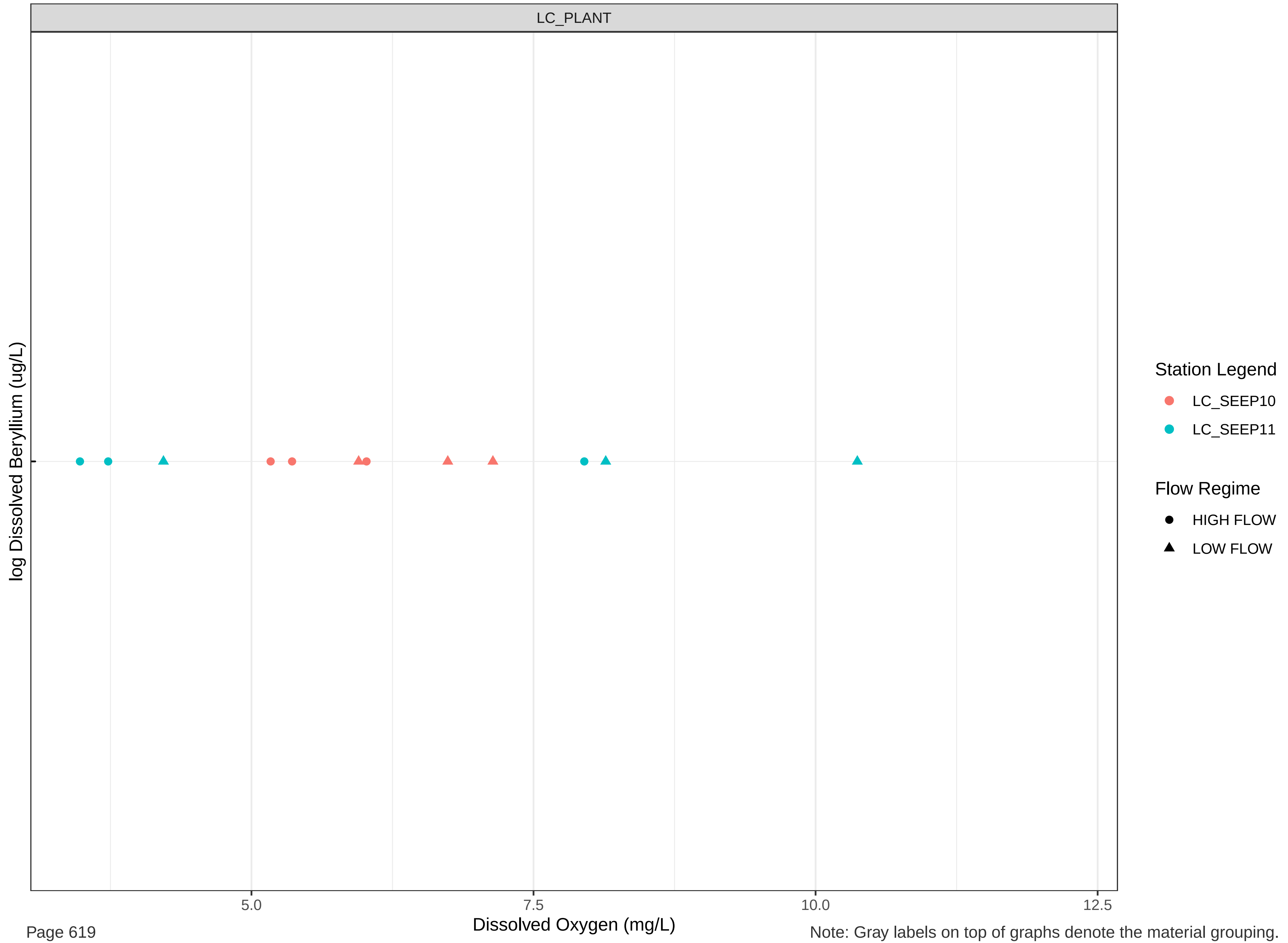

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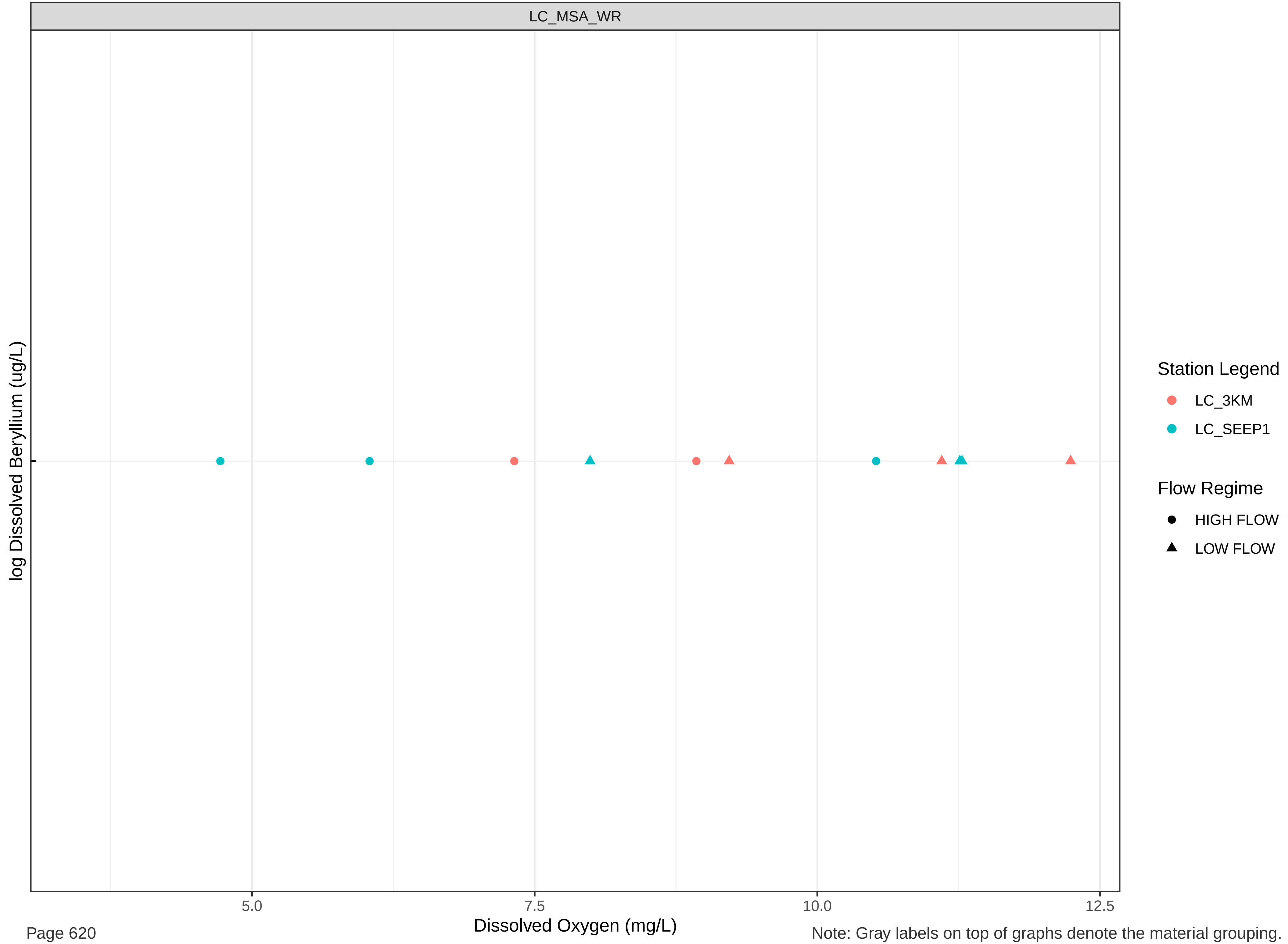

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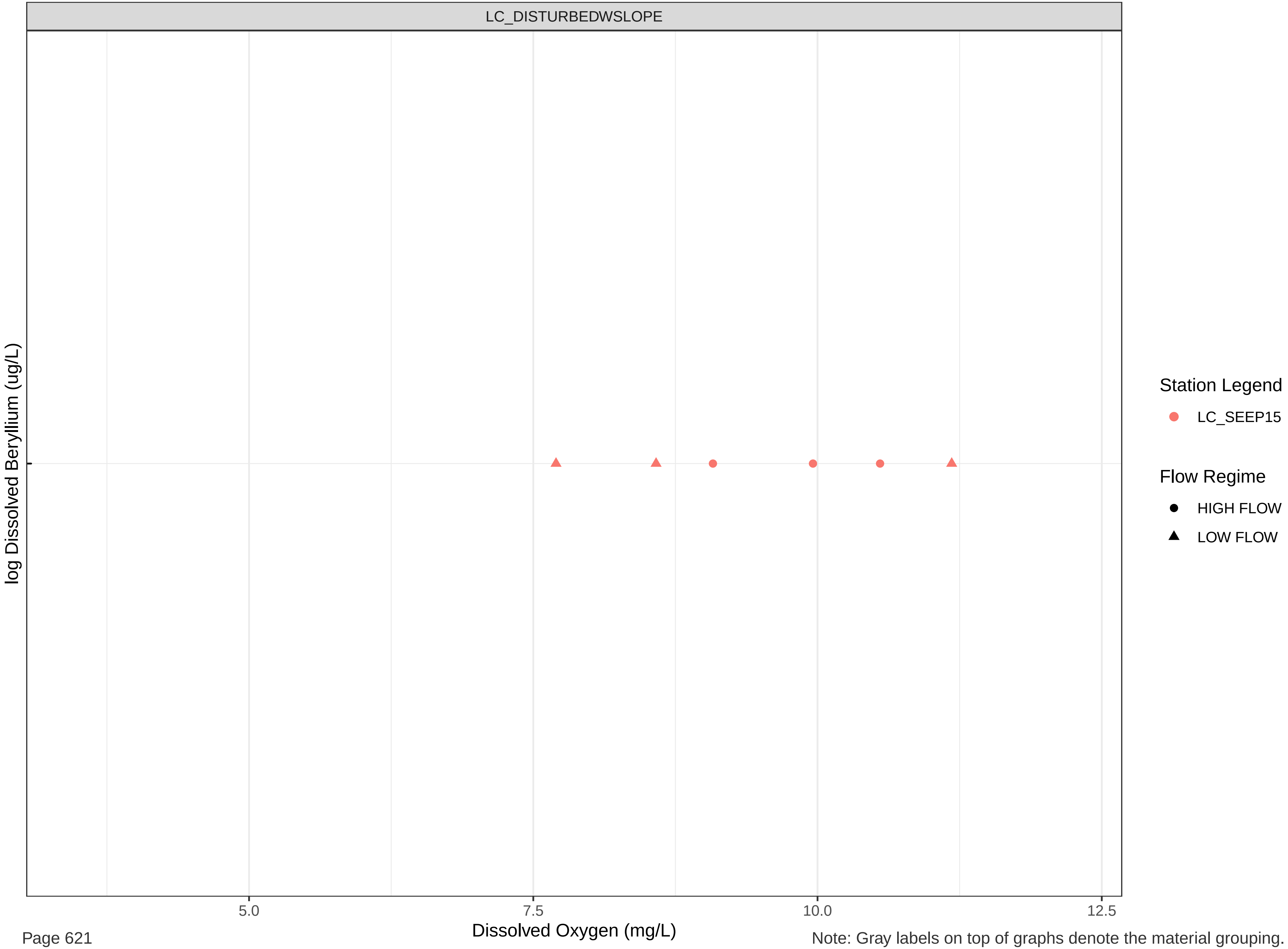

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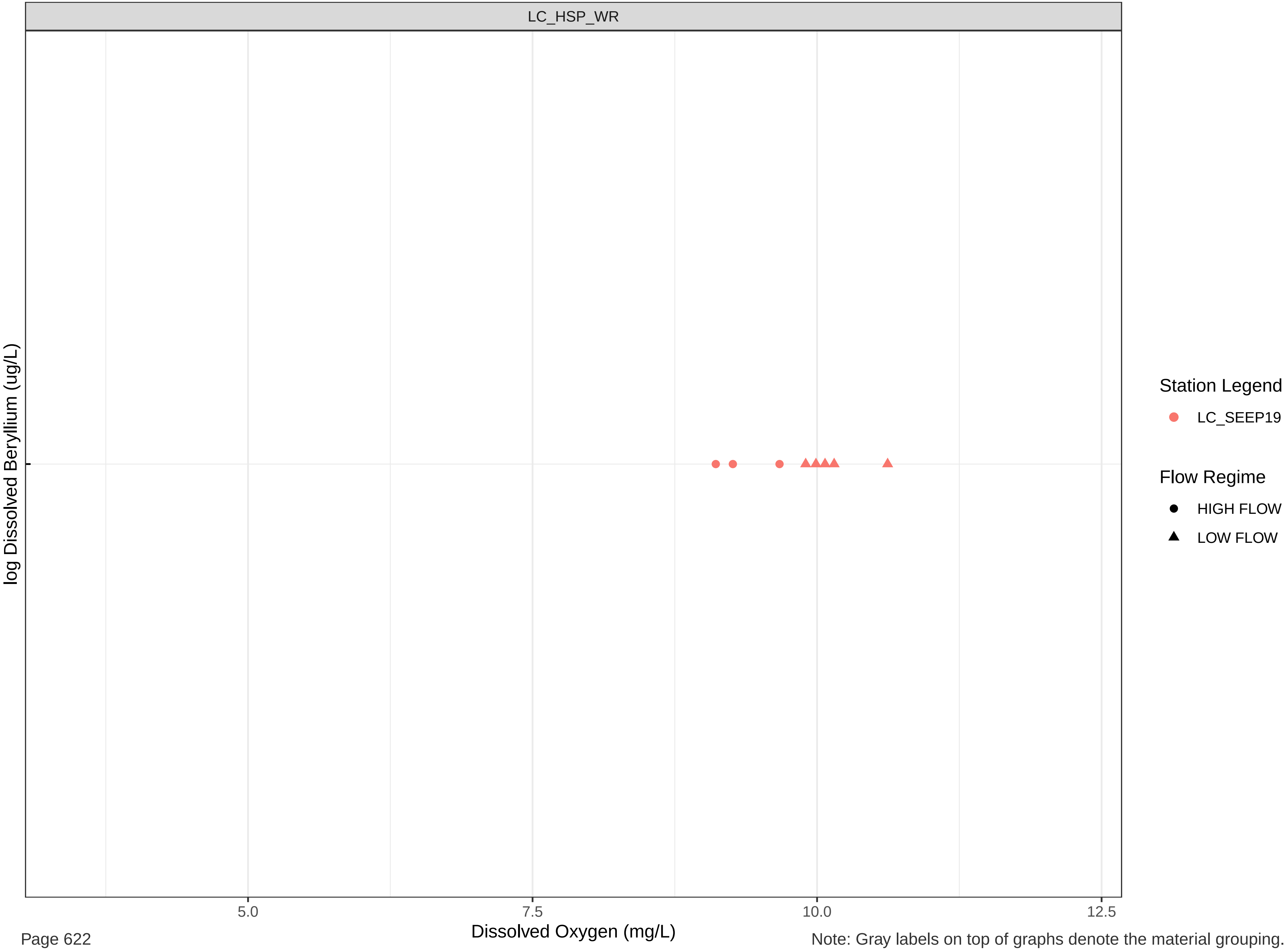

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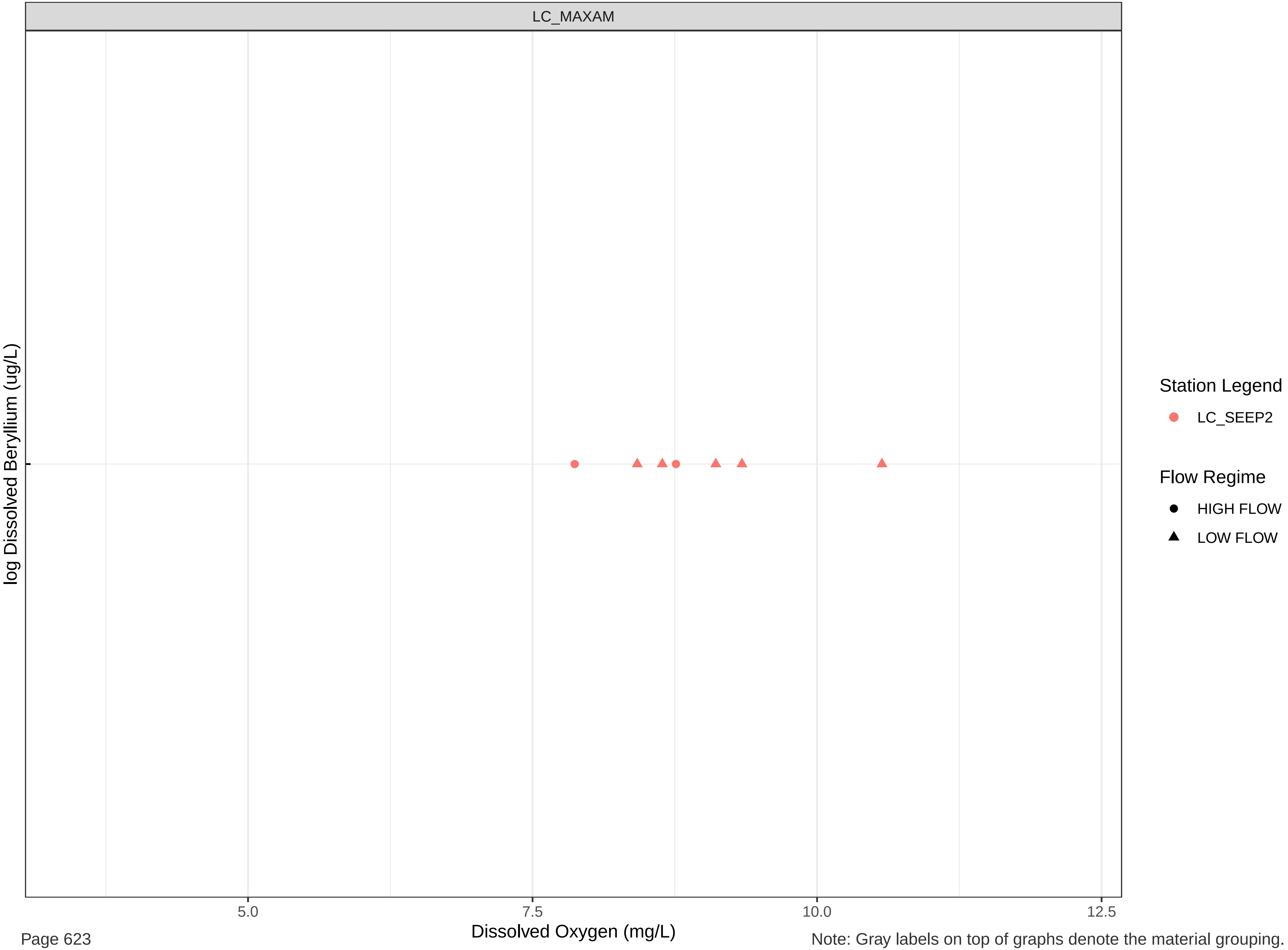

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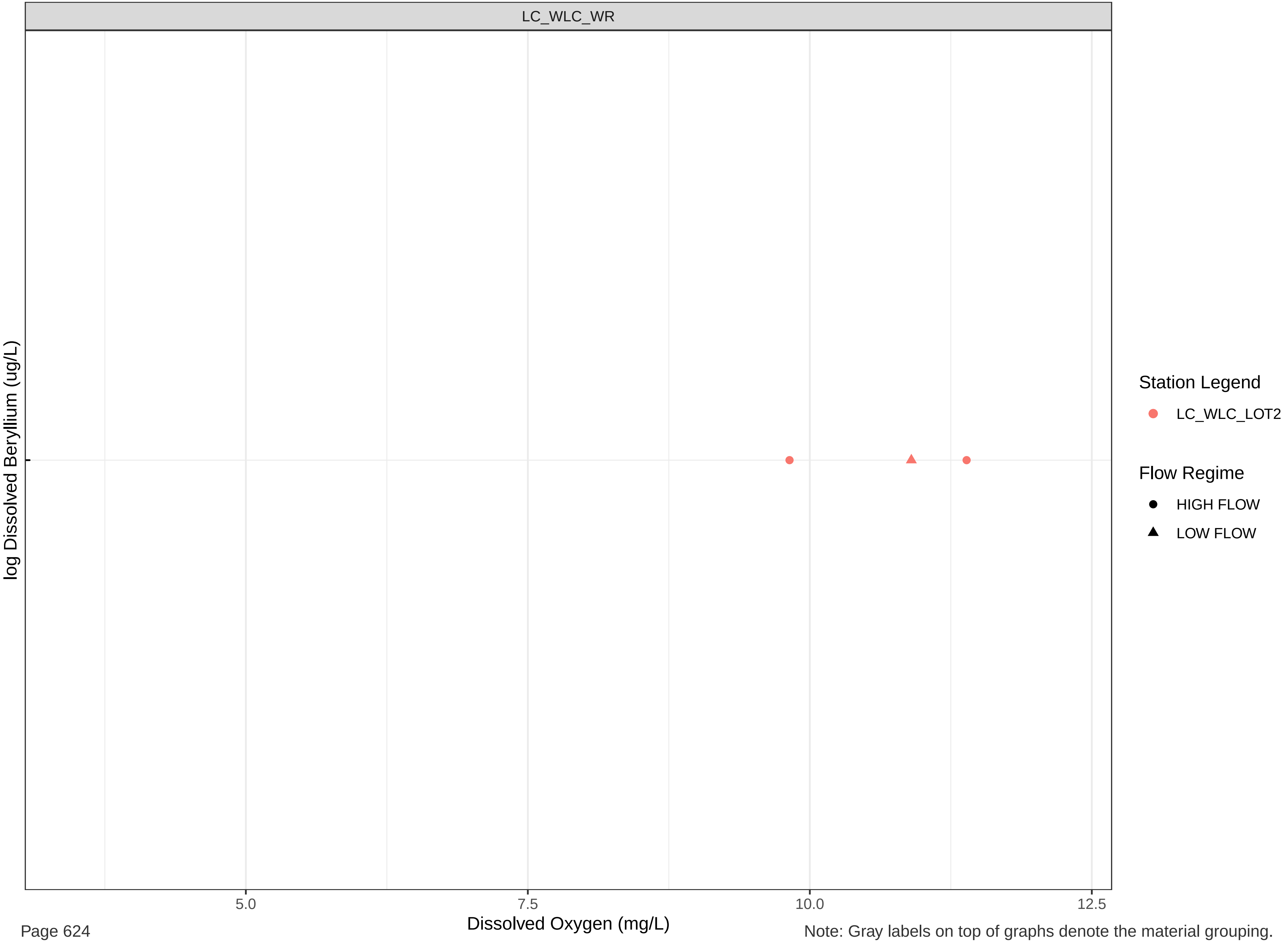

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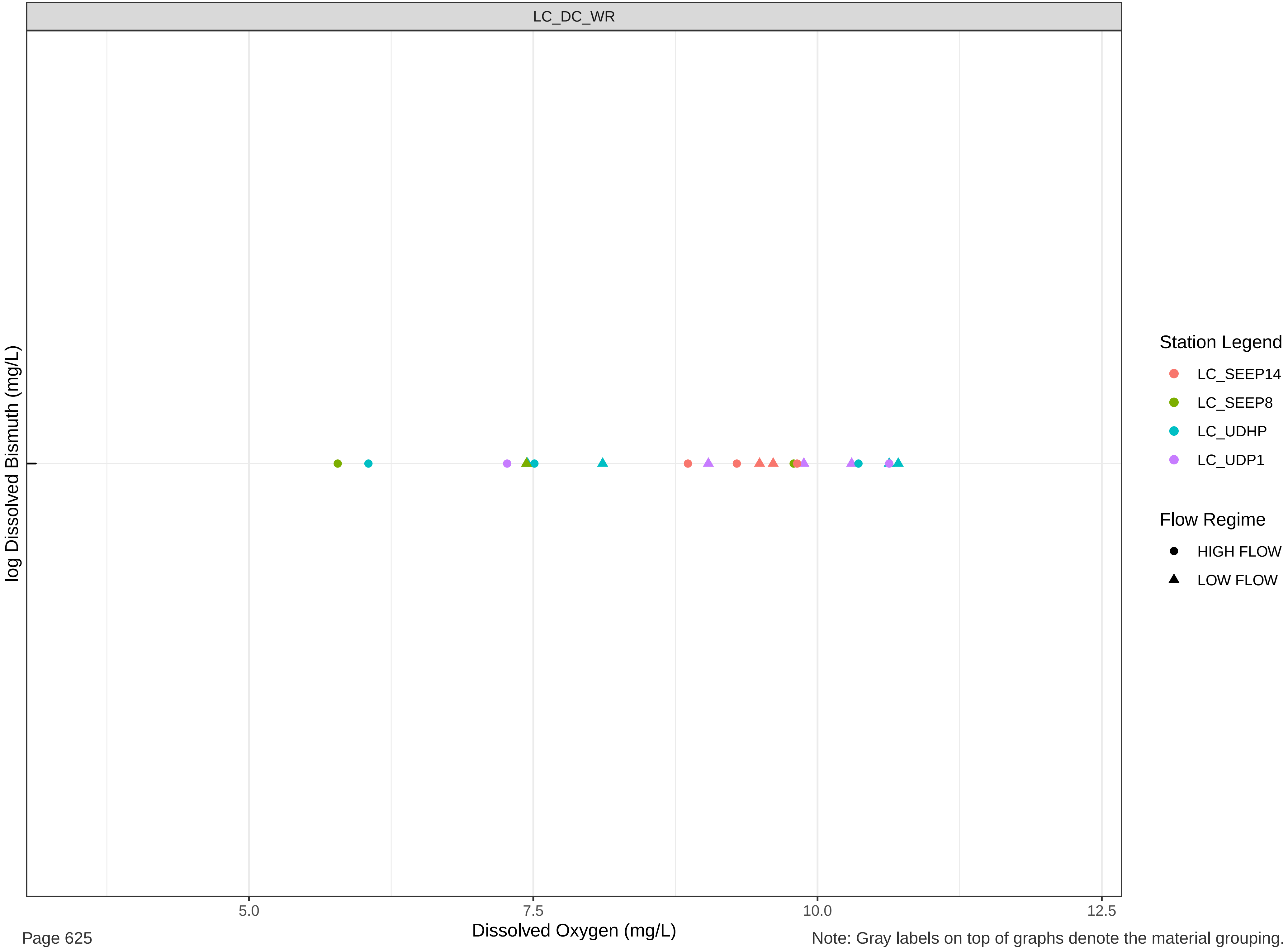

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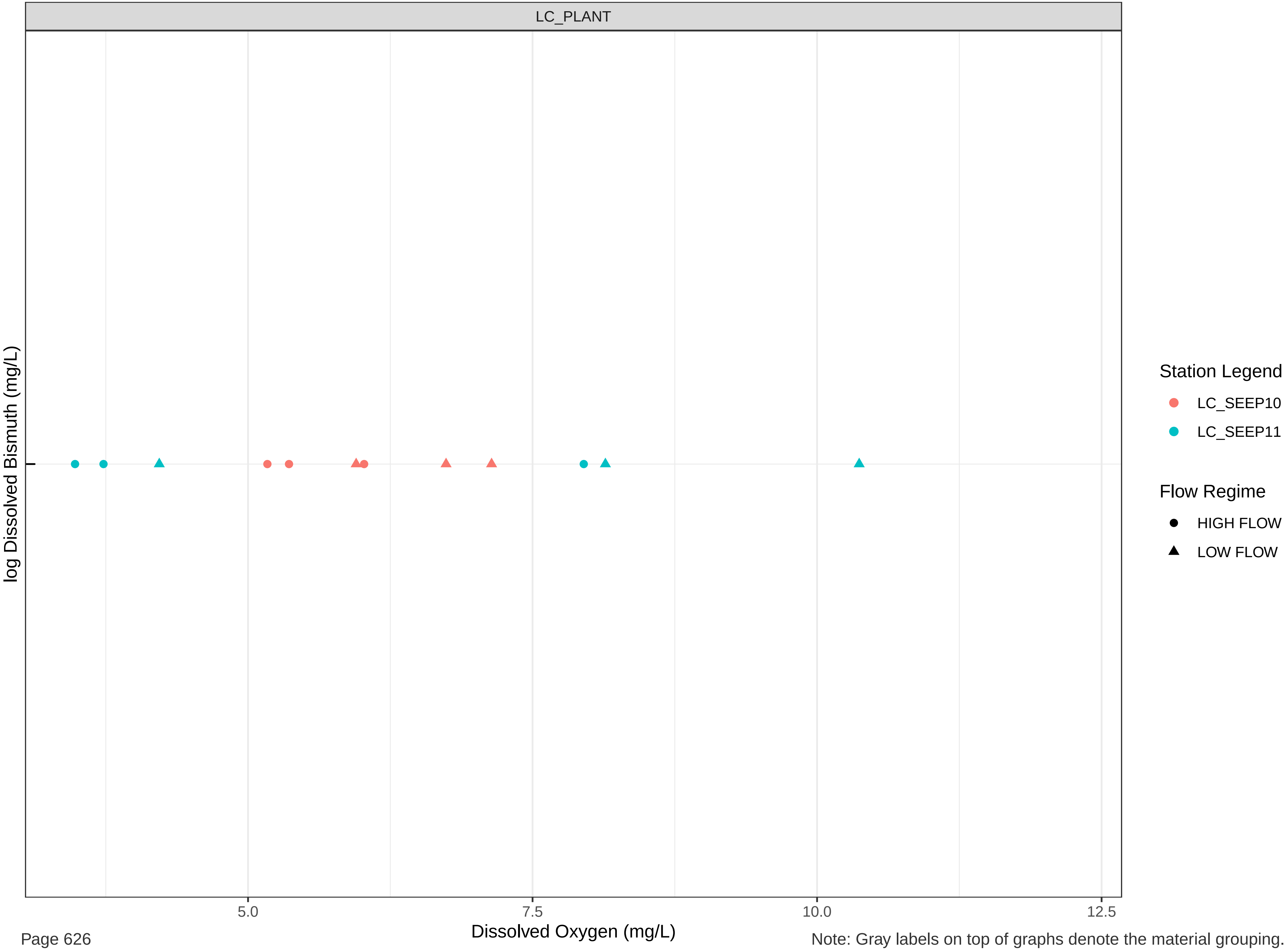

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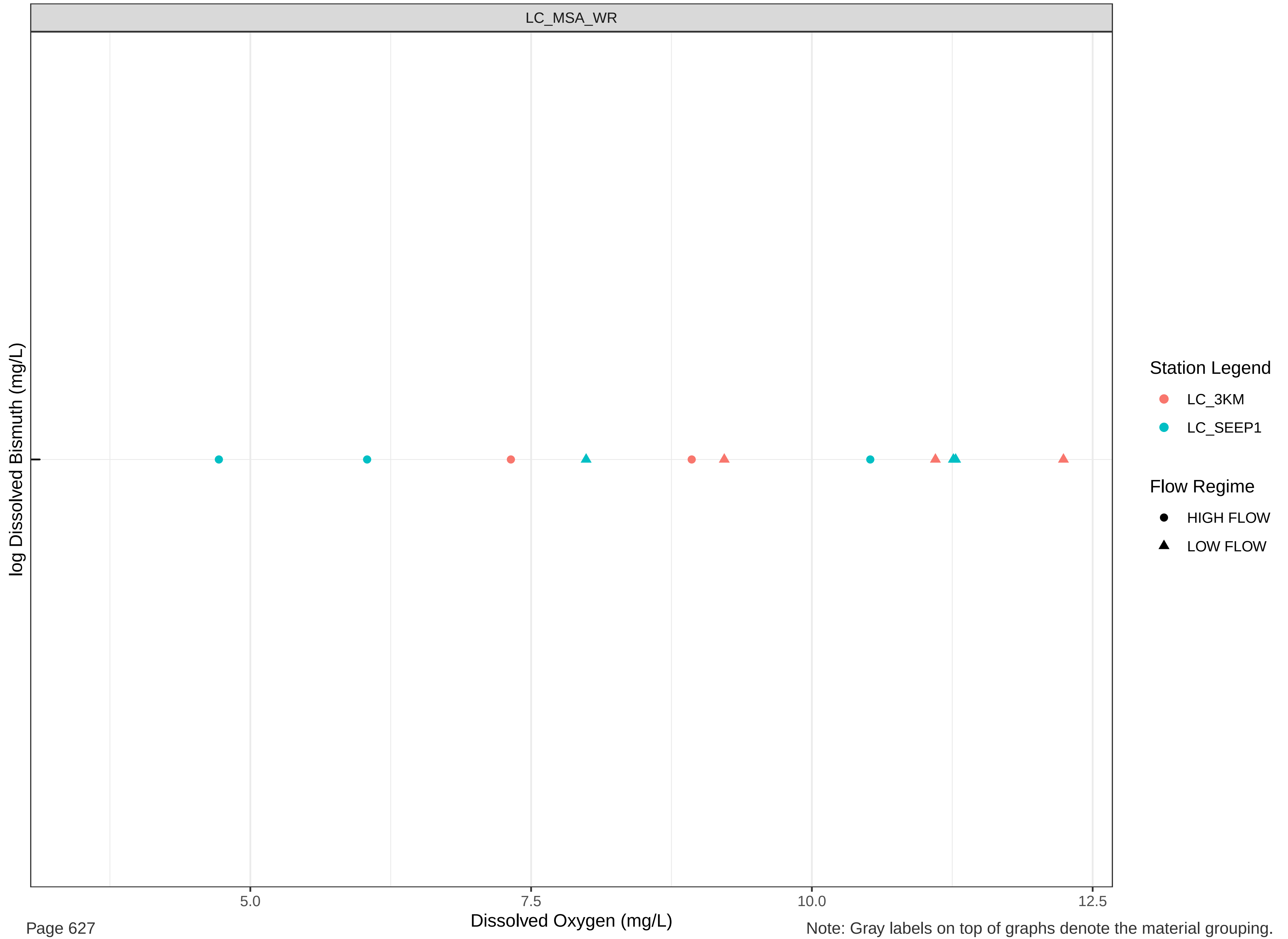

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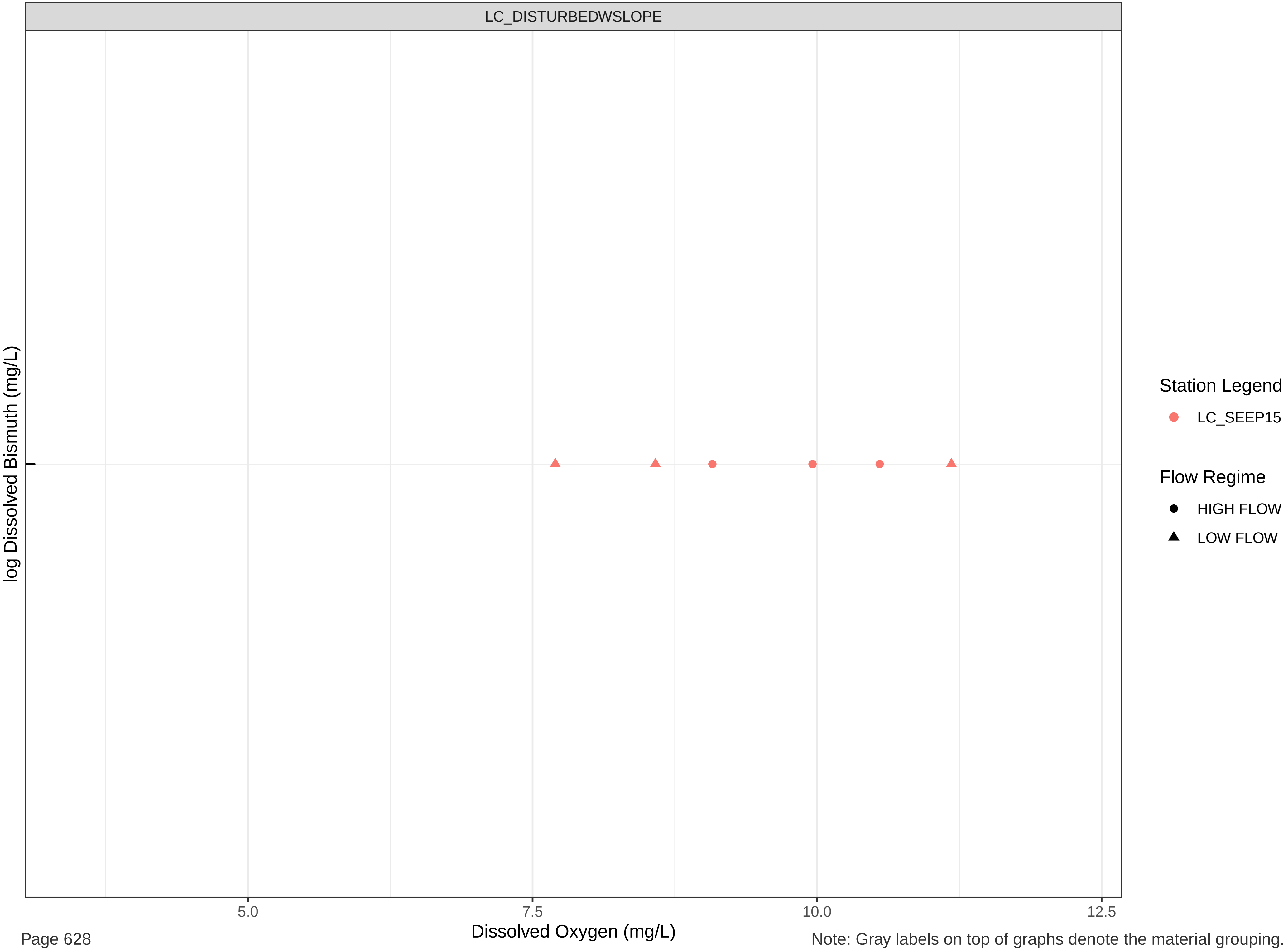

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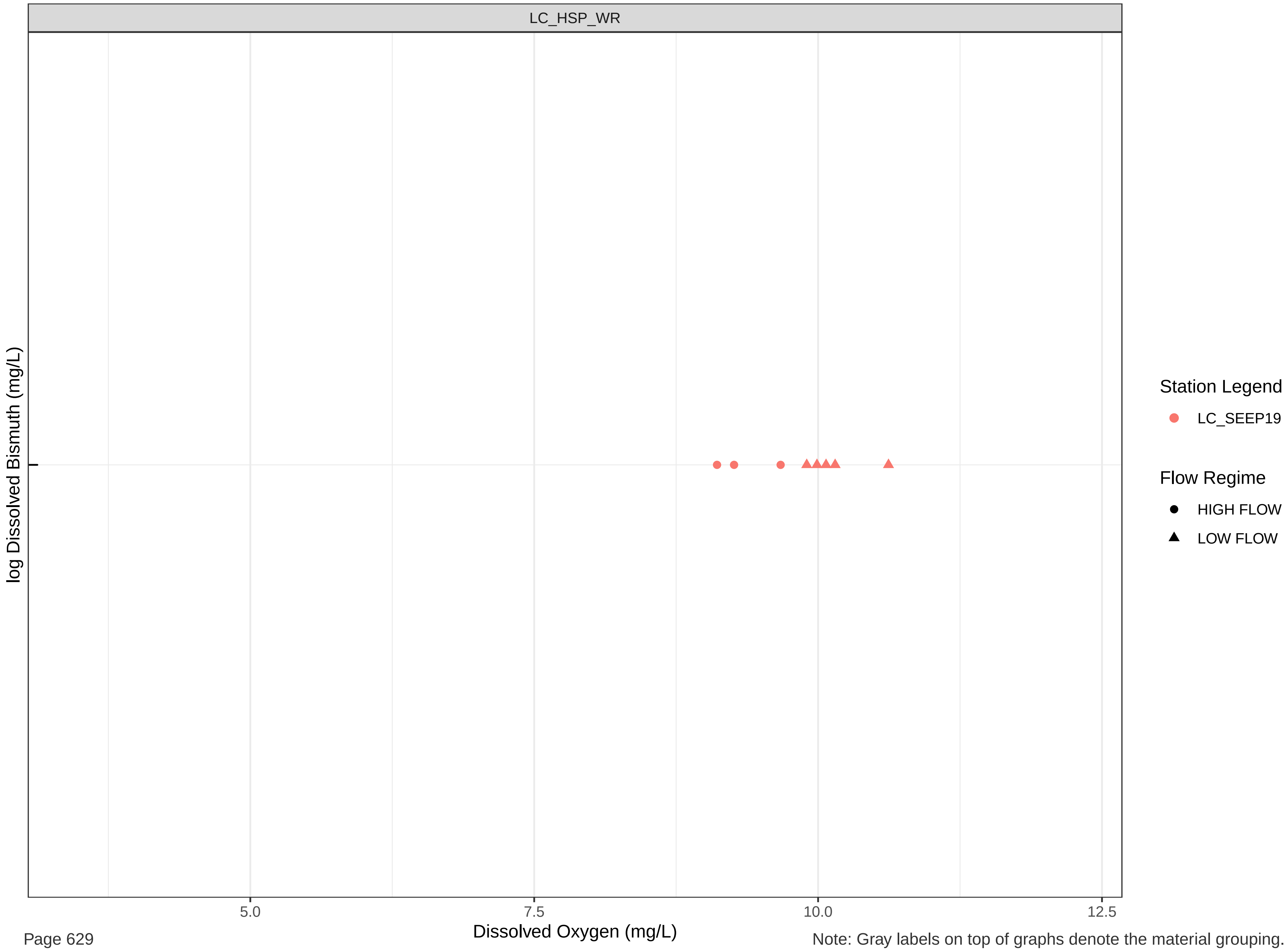

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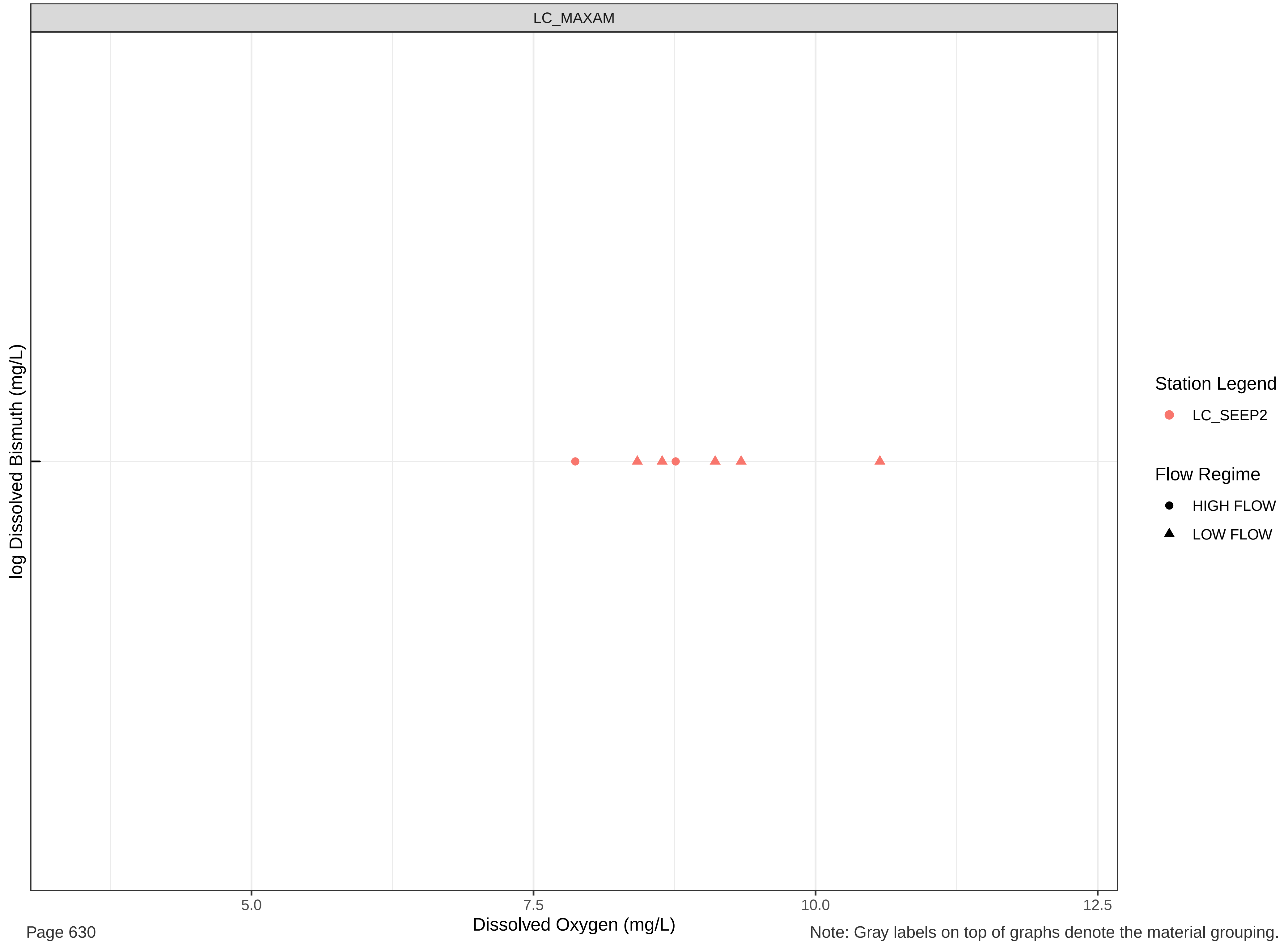

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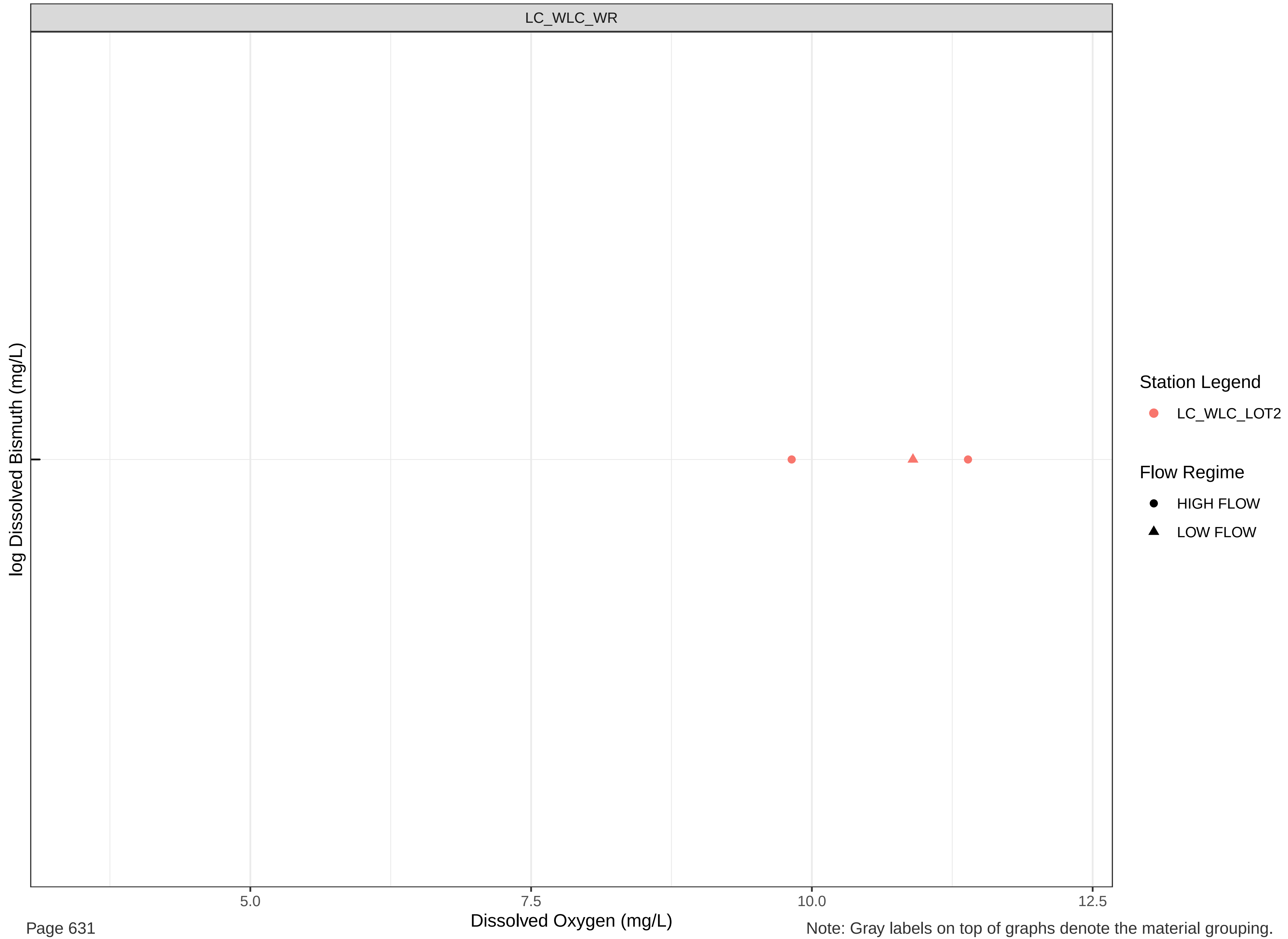

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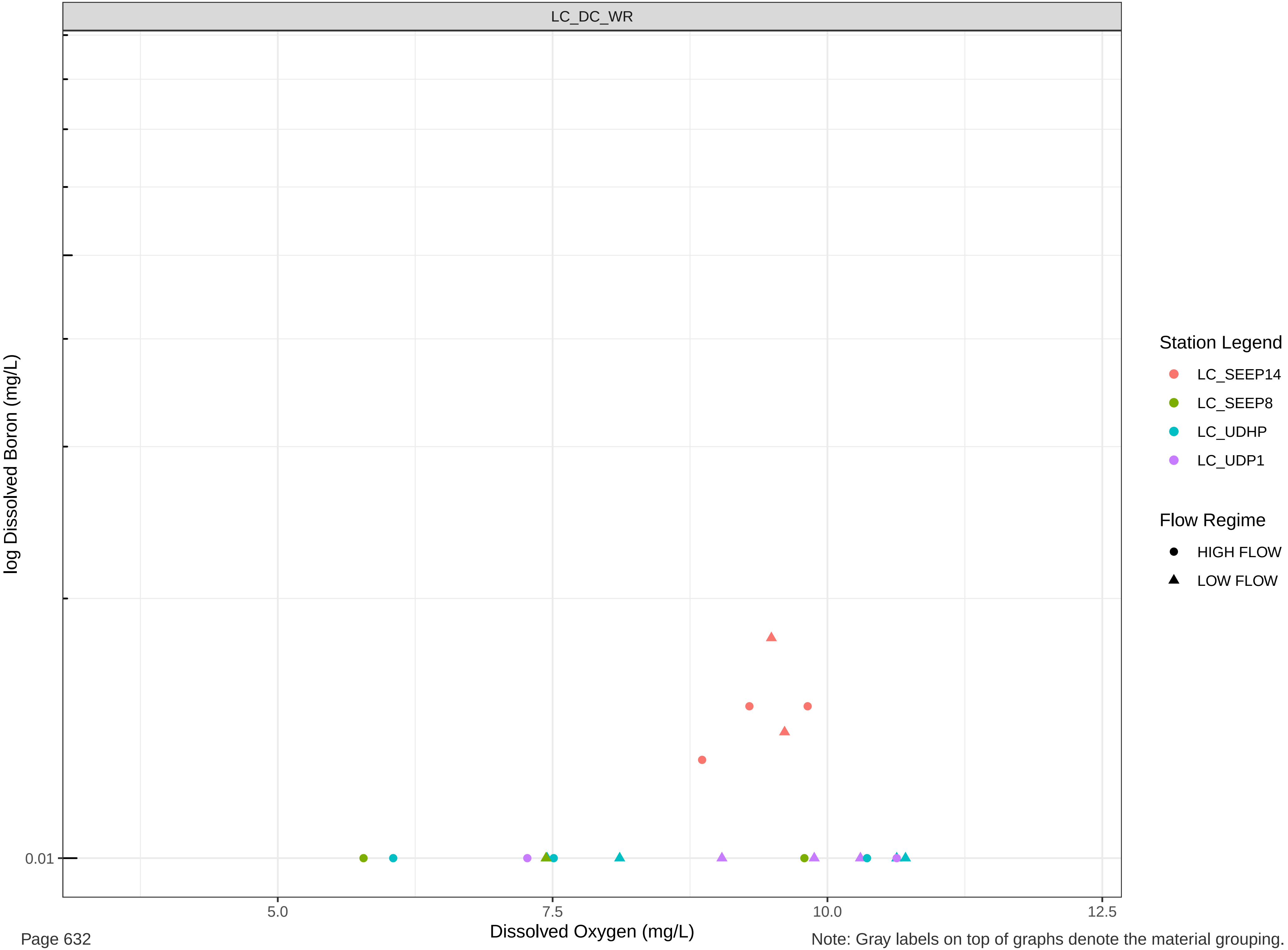

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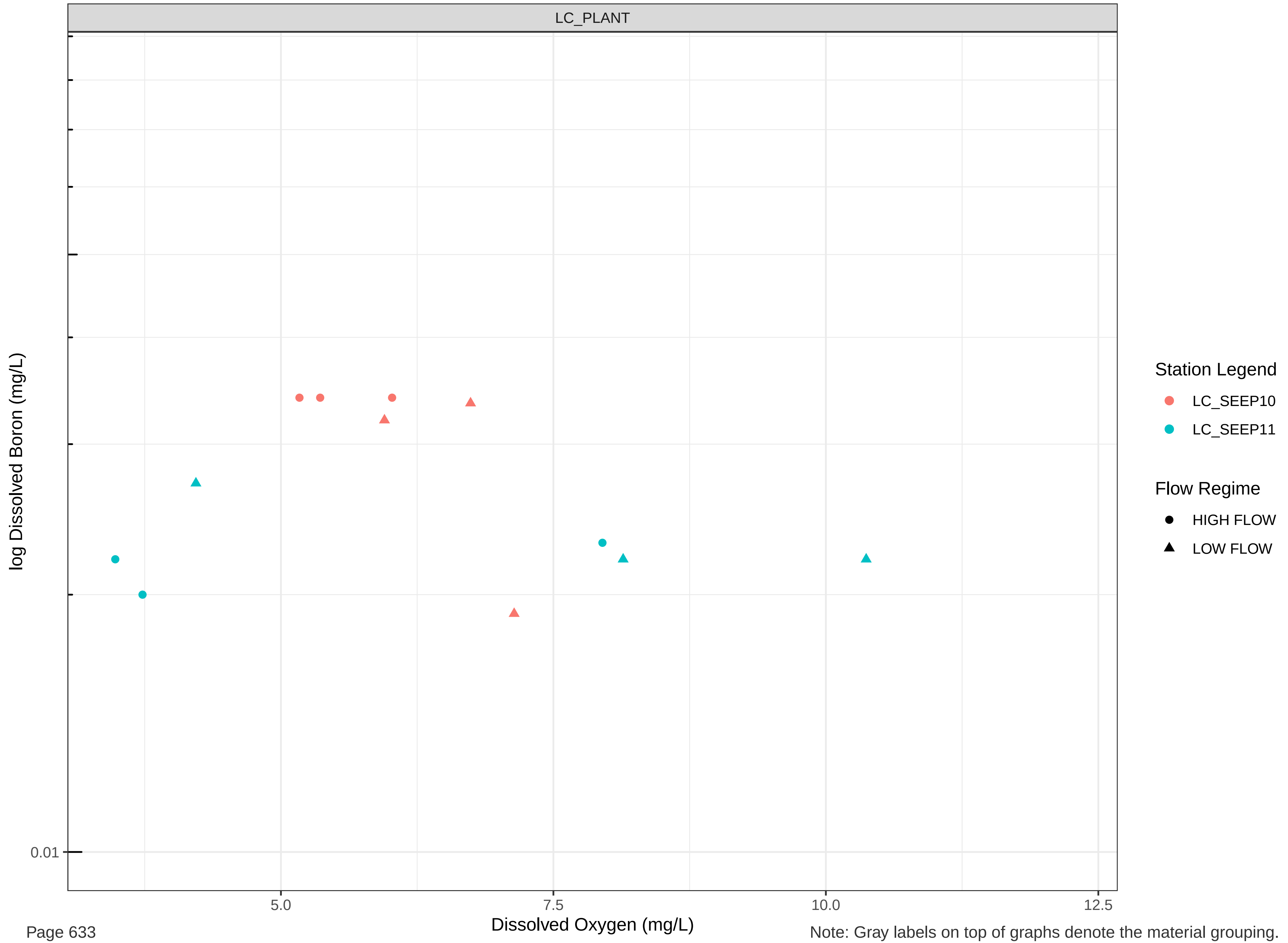

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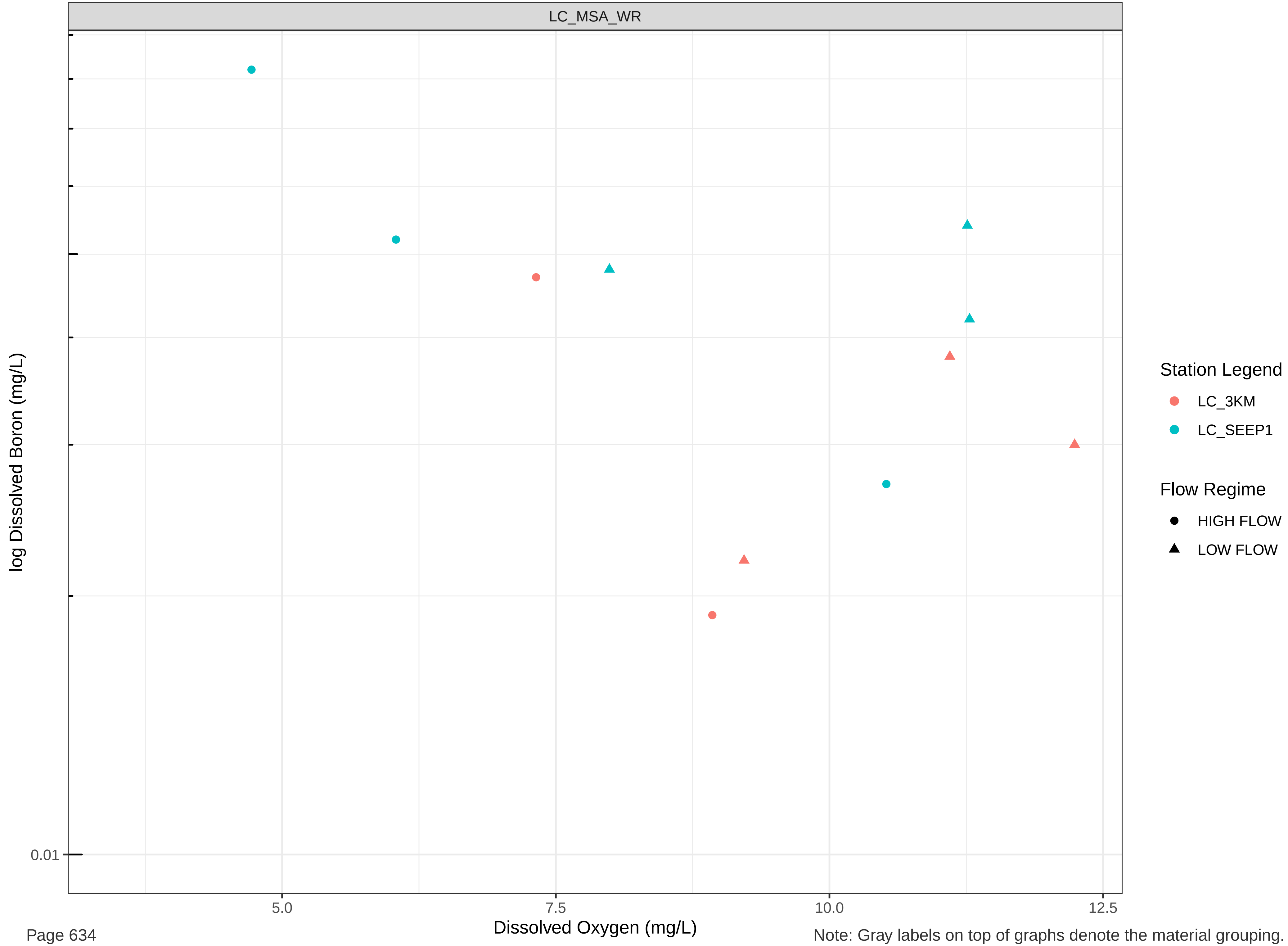

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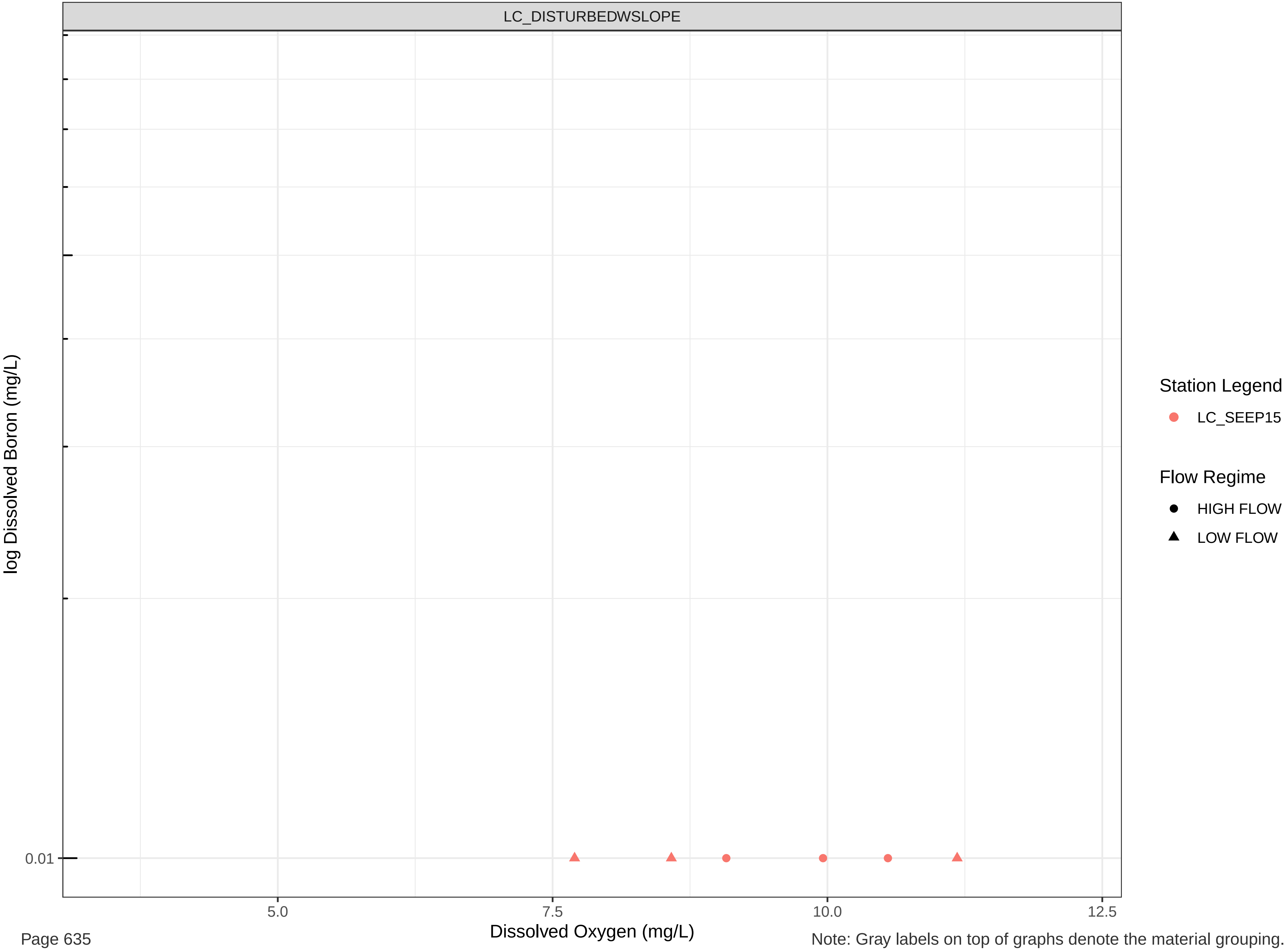
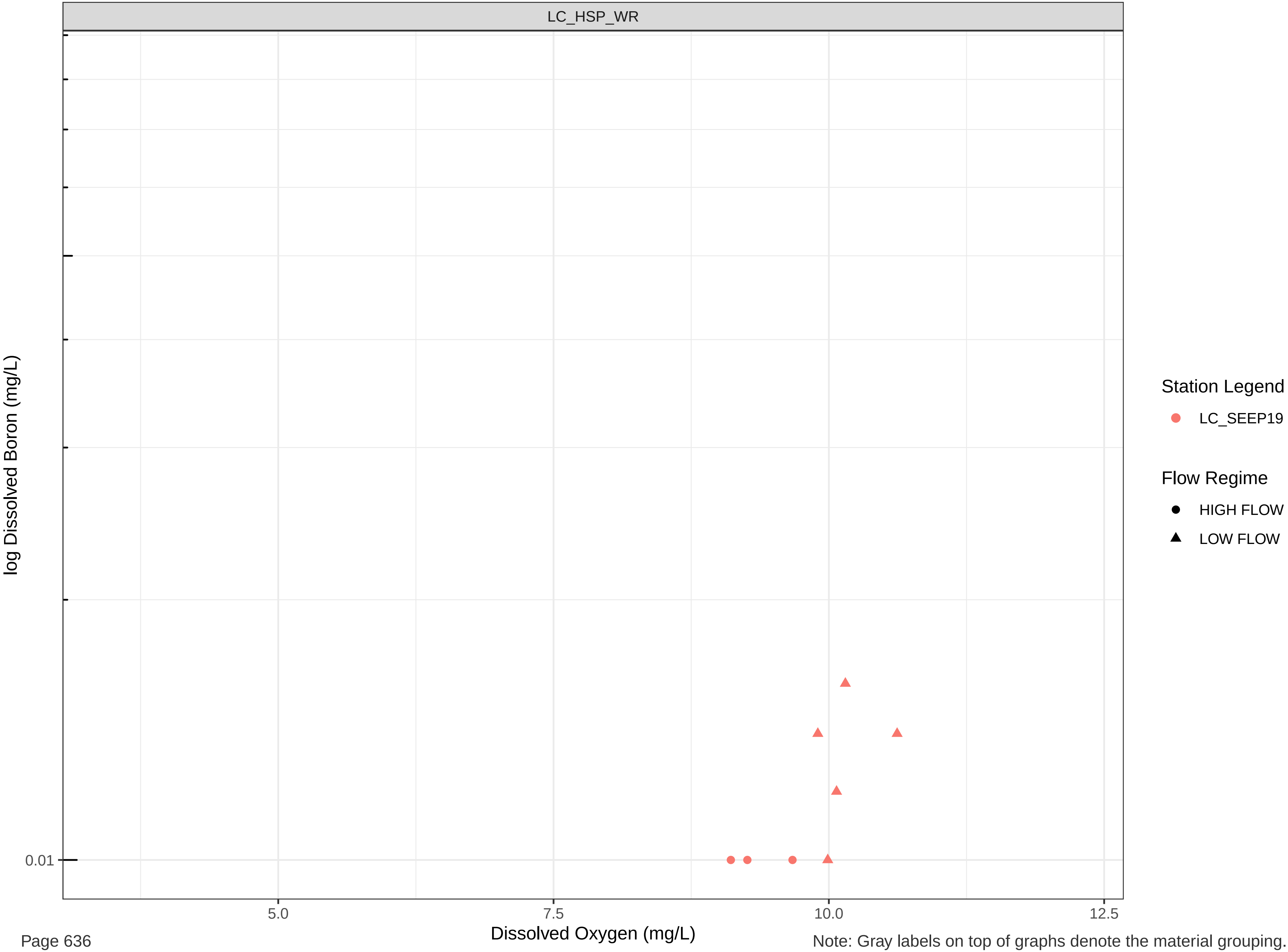

LC_DISTURBEDWSLOPE
log Dissolved Boron (mg/L)
0.01
5.0
7.5
10.0
12.5
Dissolved Oxygen (mg/L)
Station Legend
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



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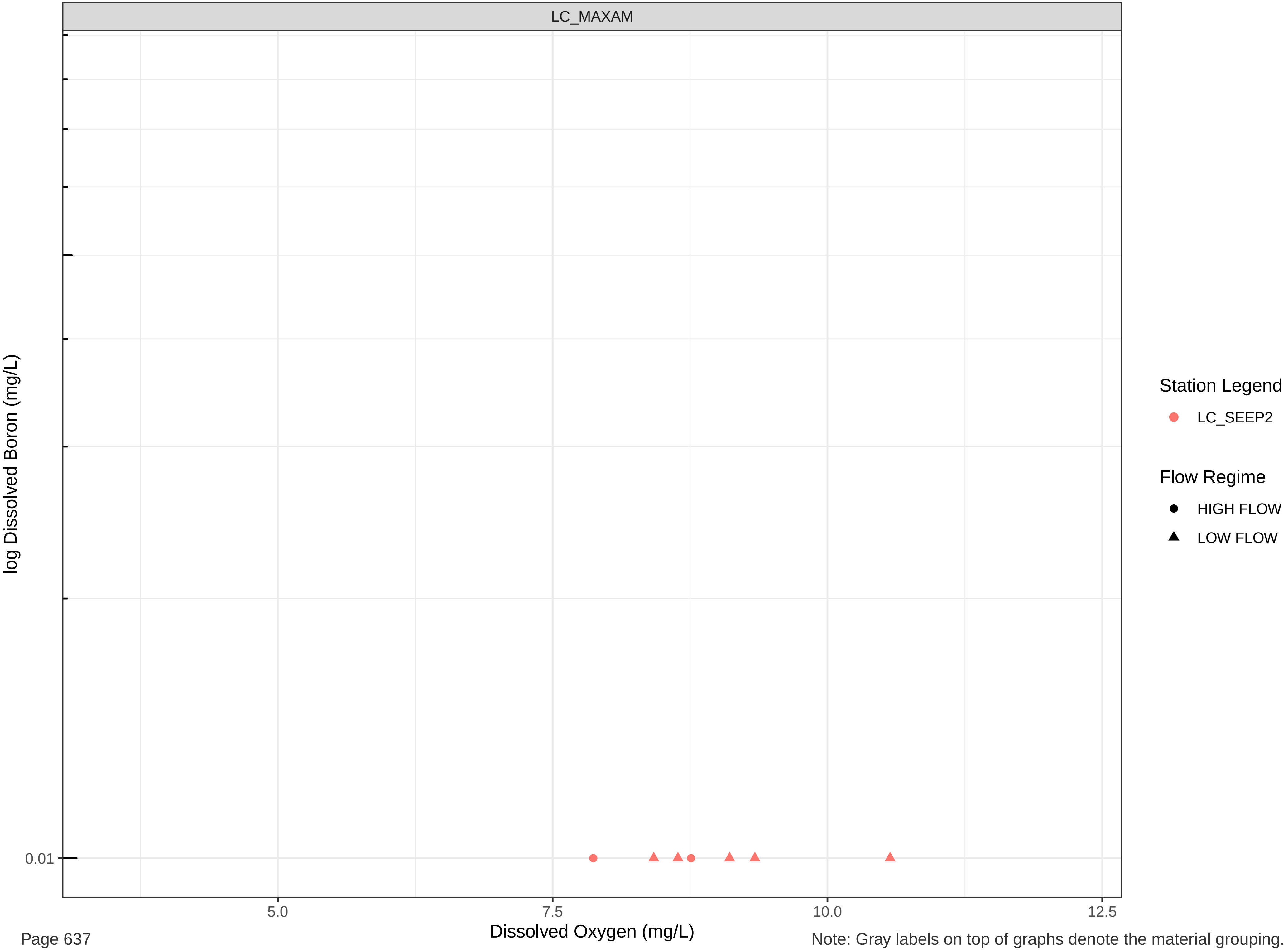

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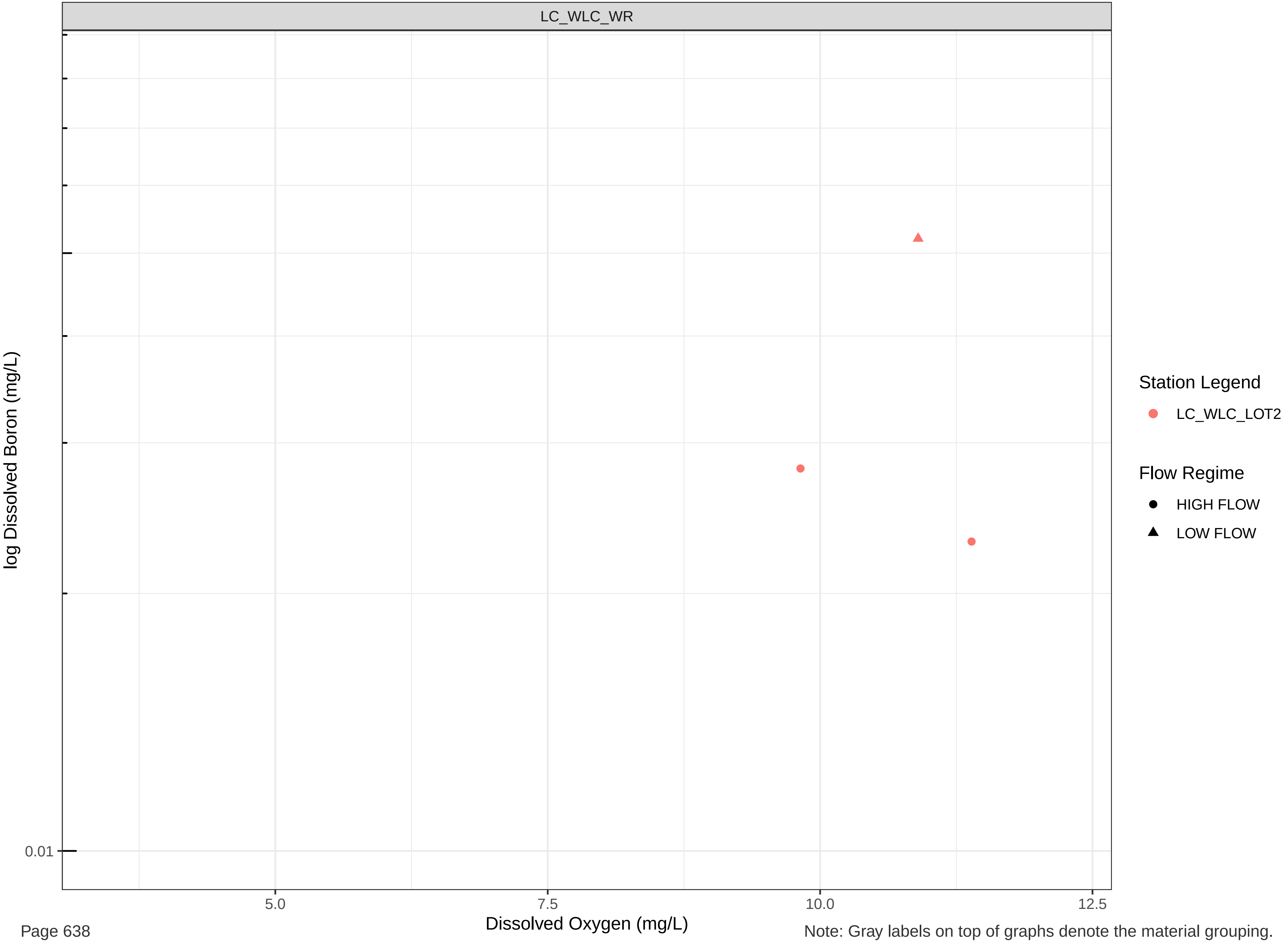

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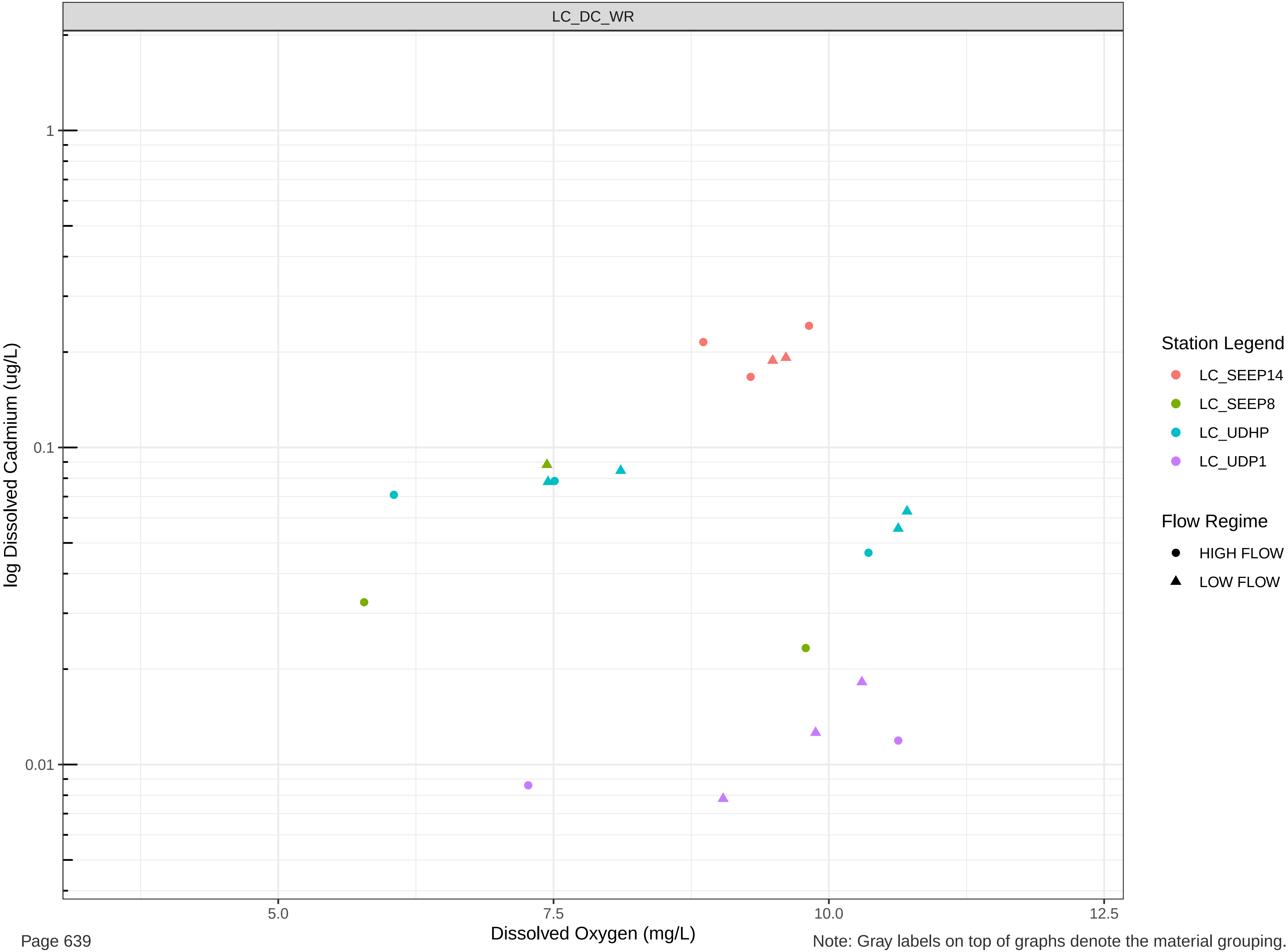

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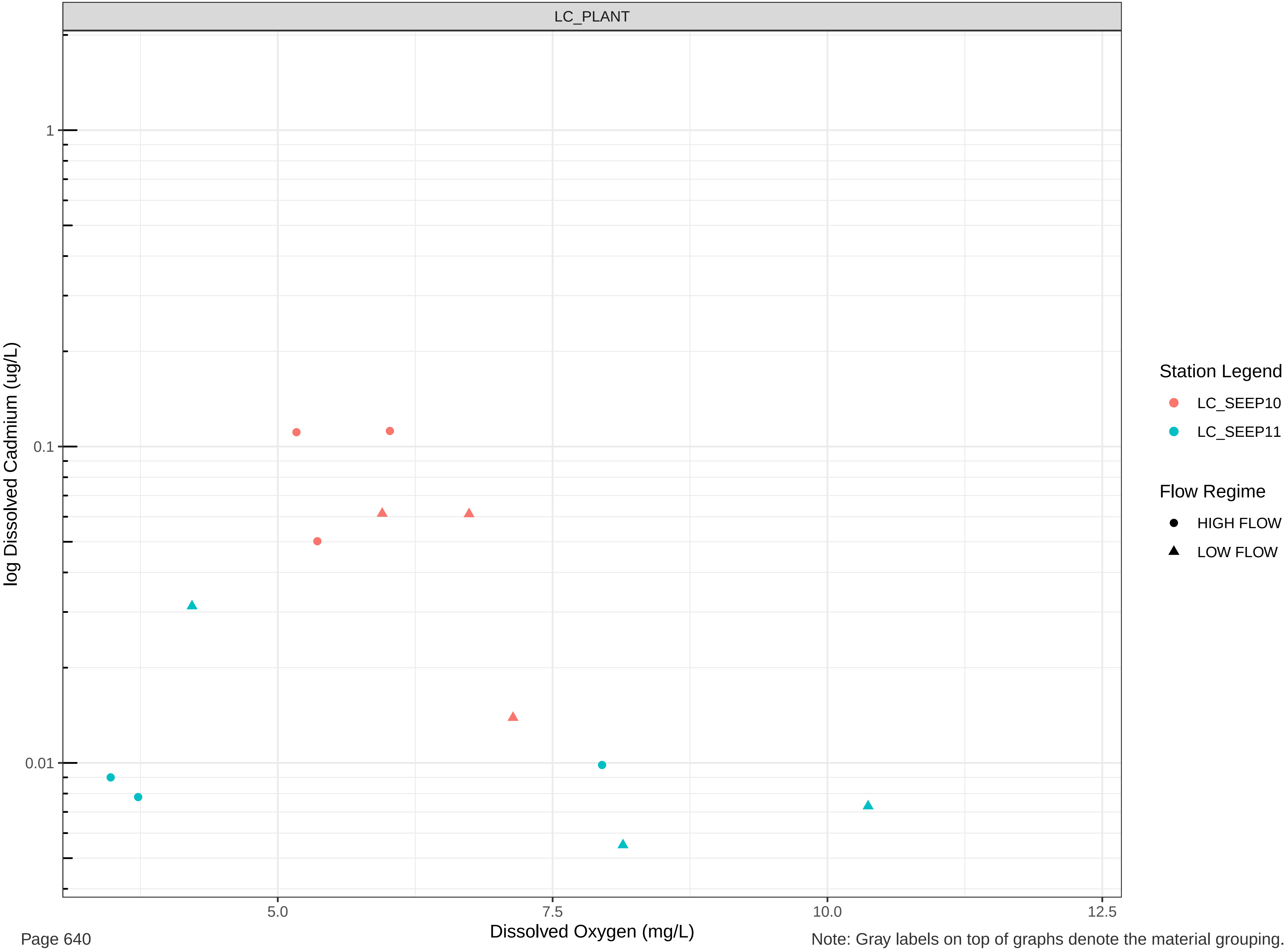

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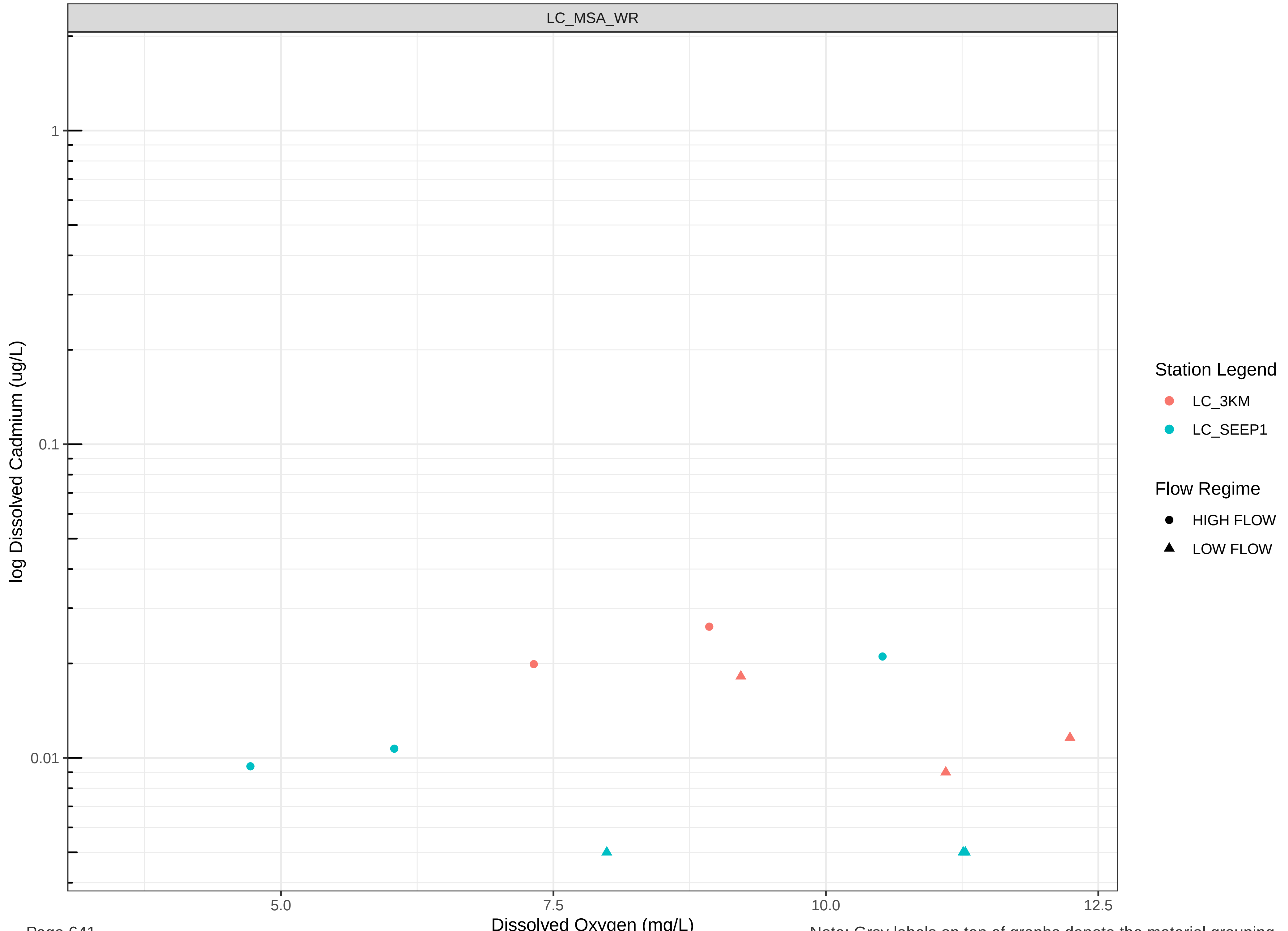

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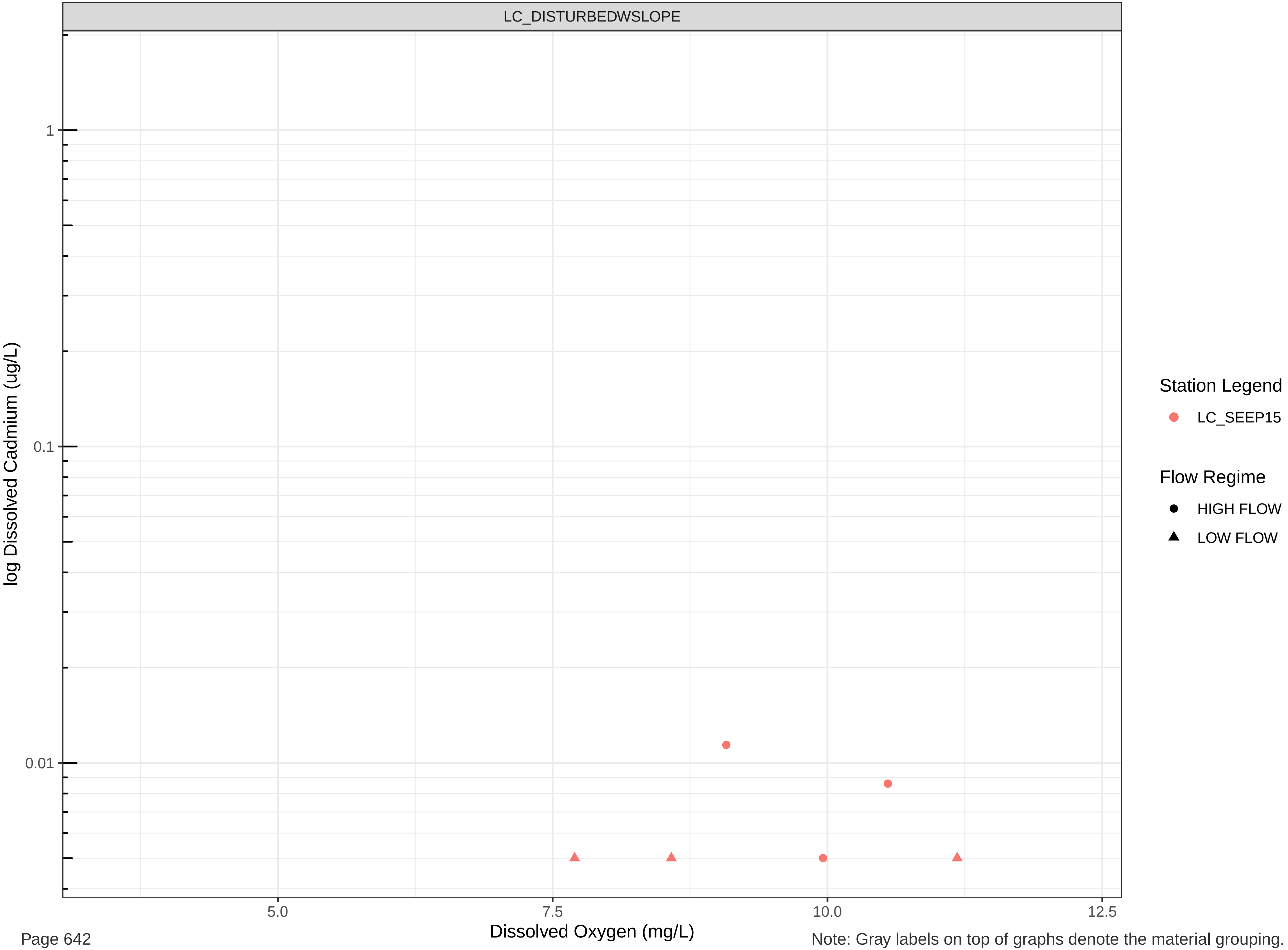

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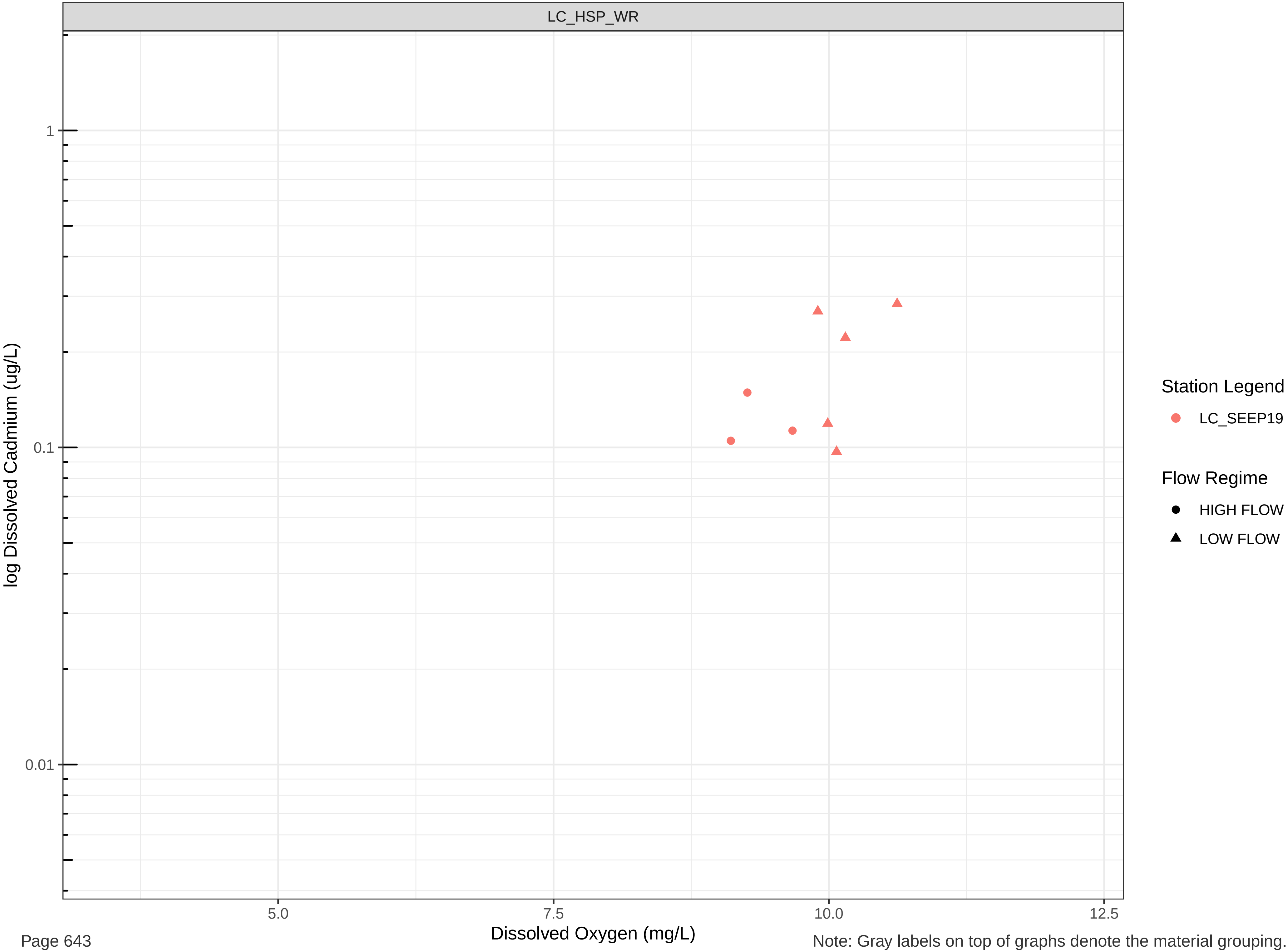

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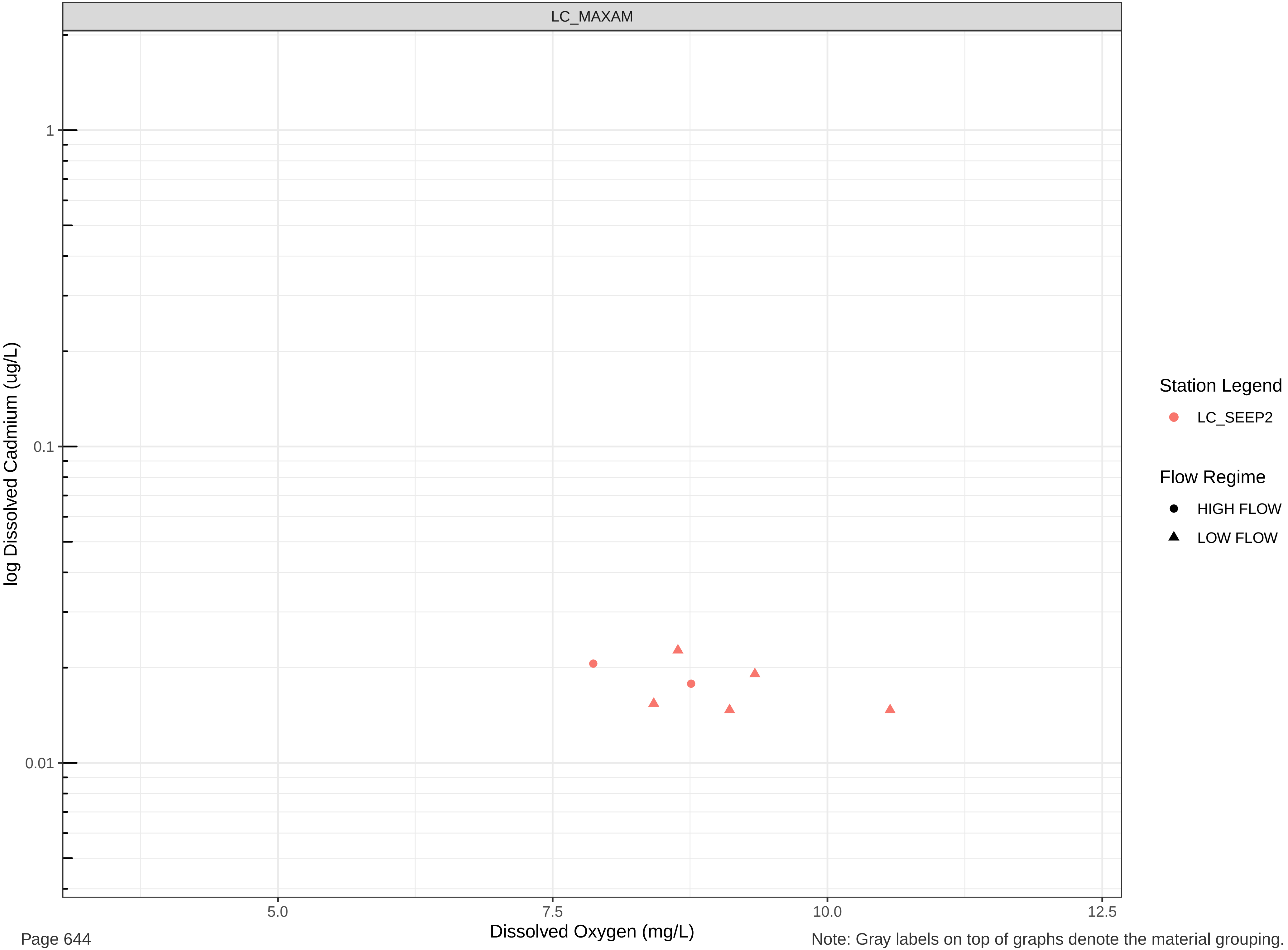

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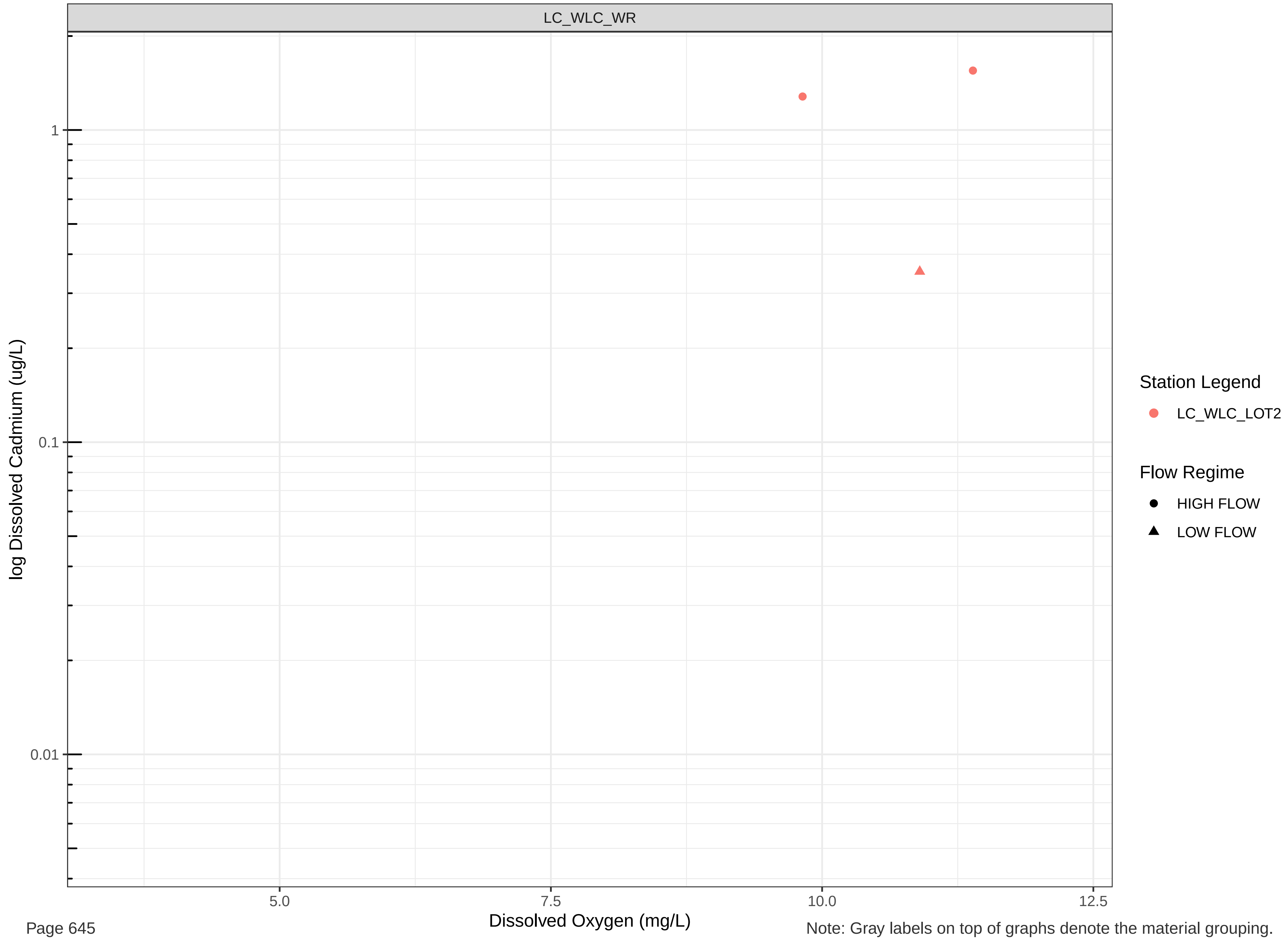

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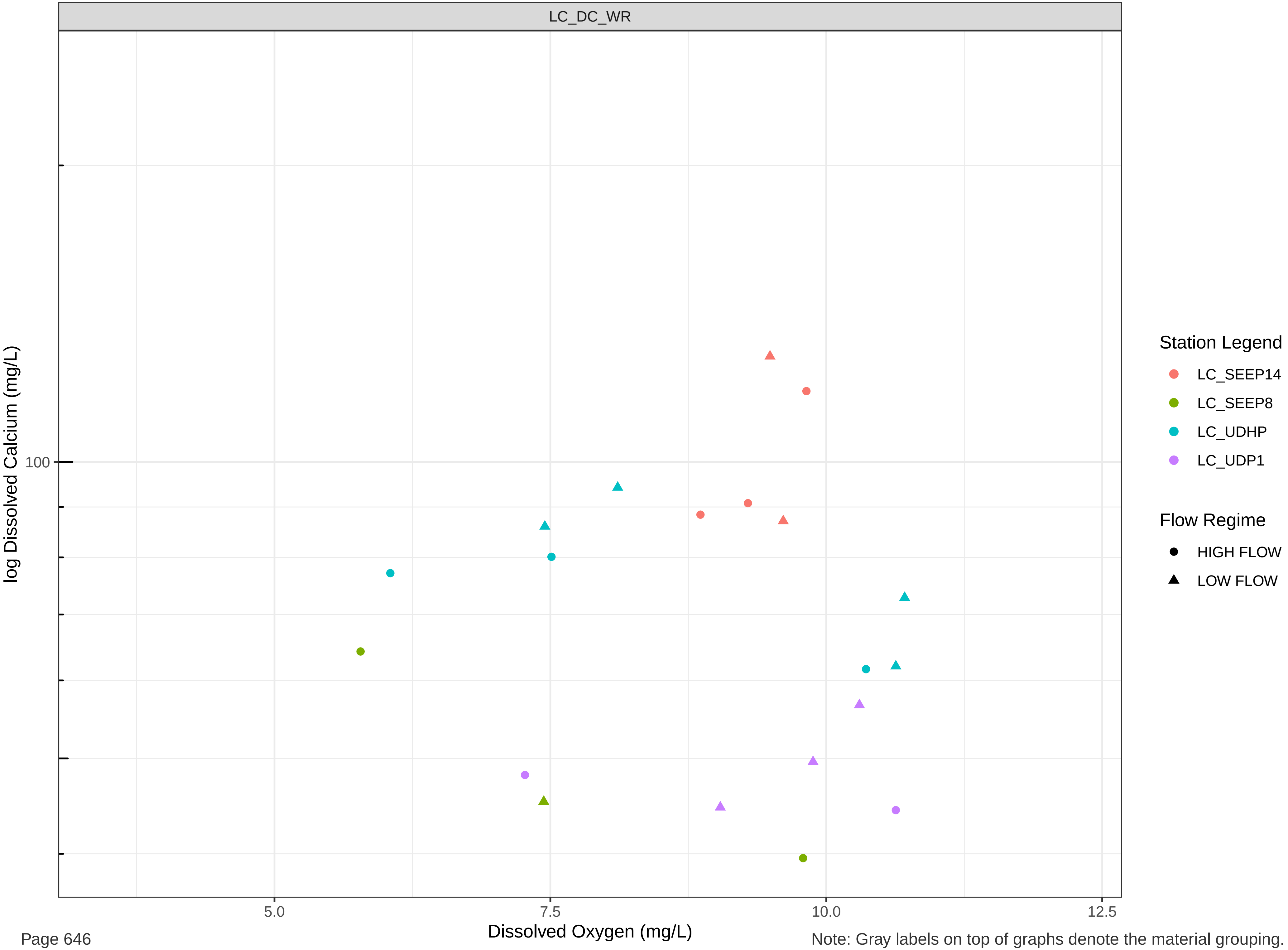

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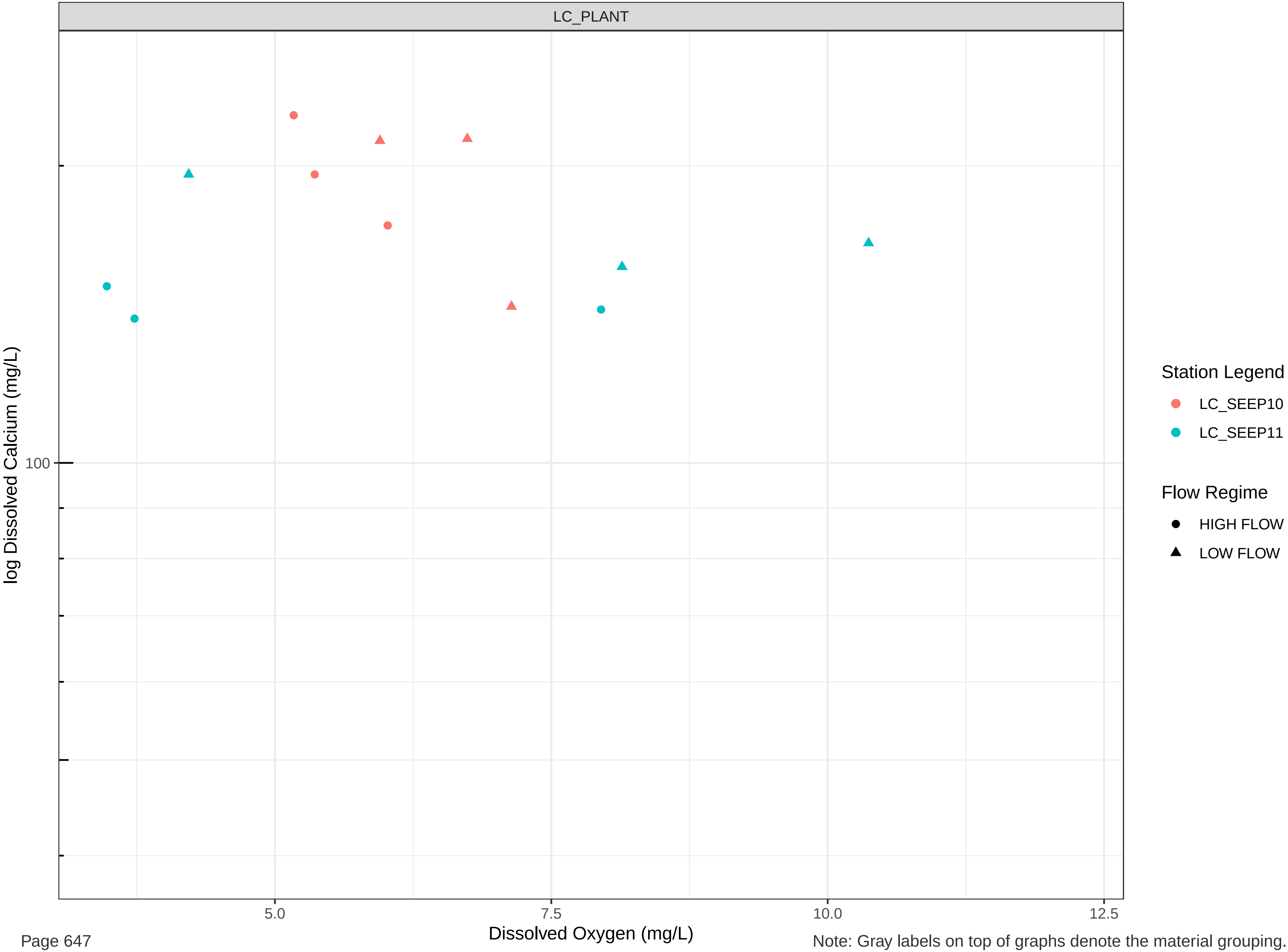

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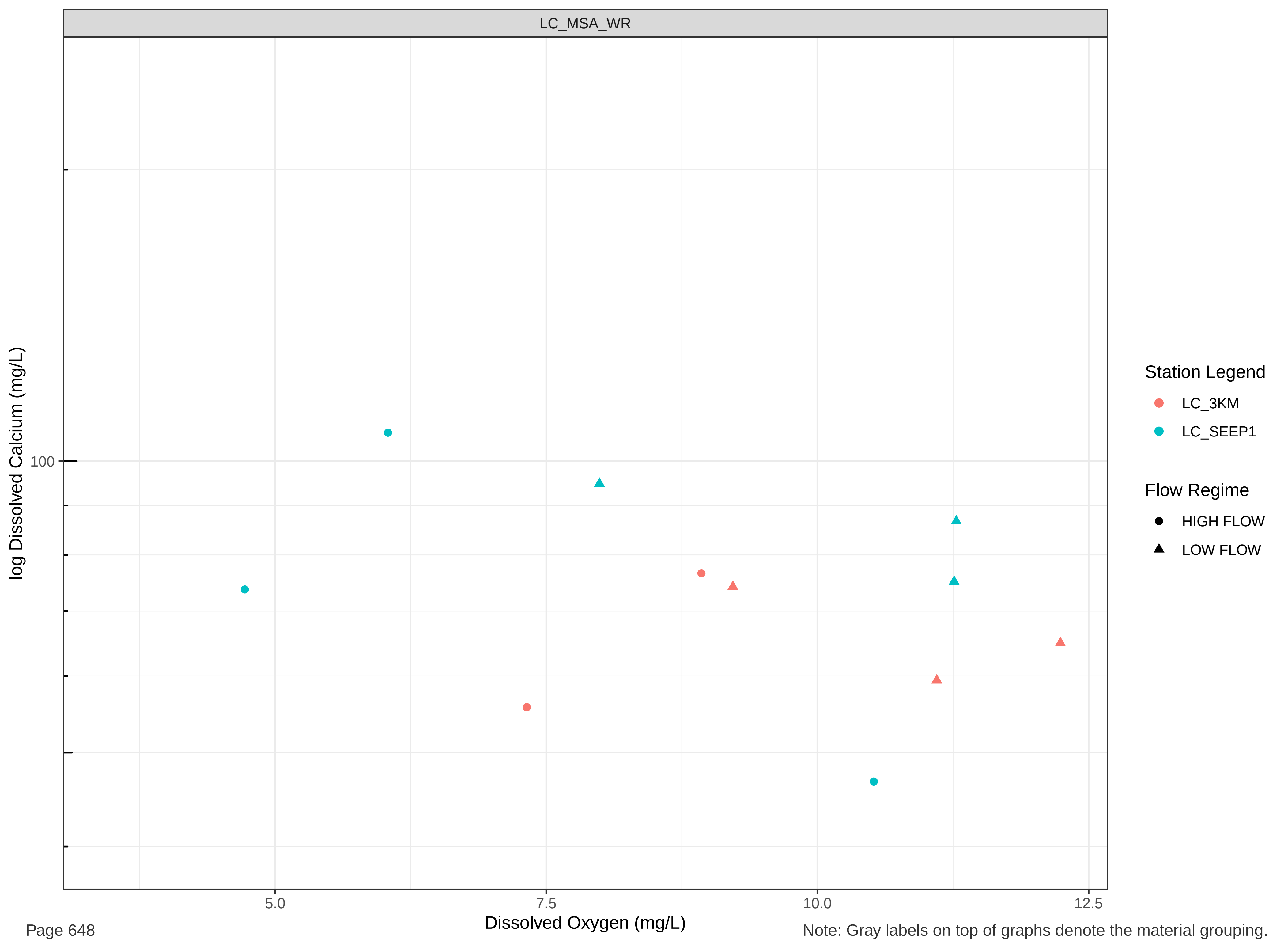

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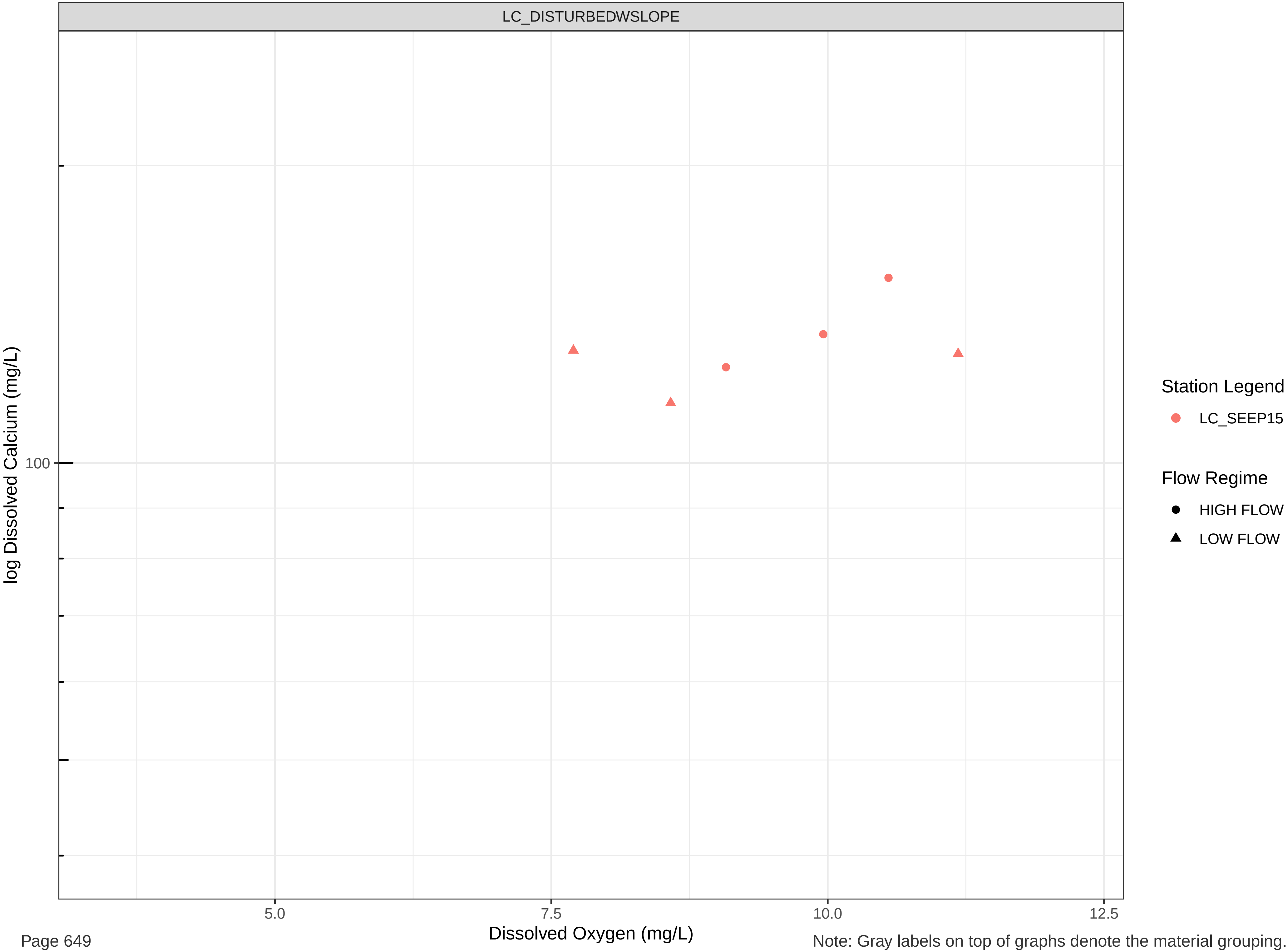

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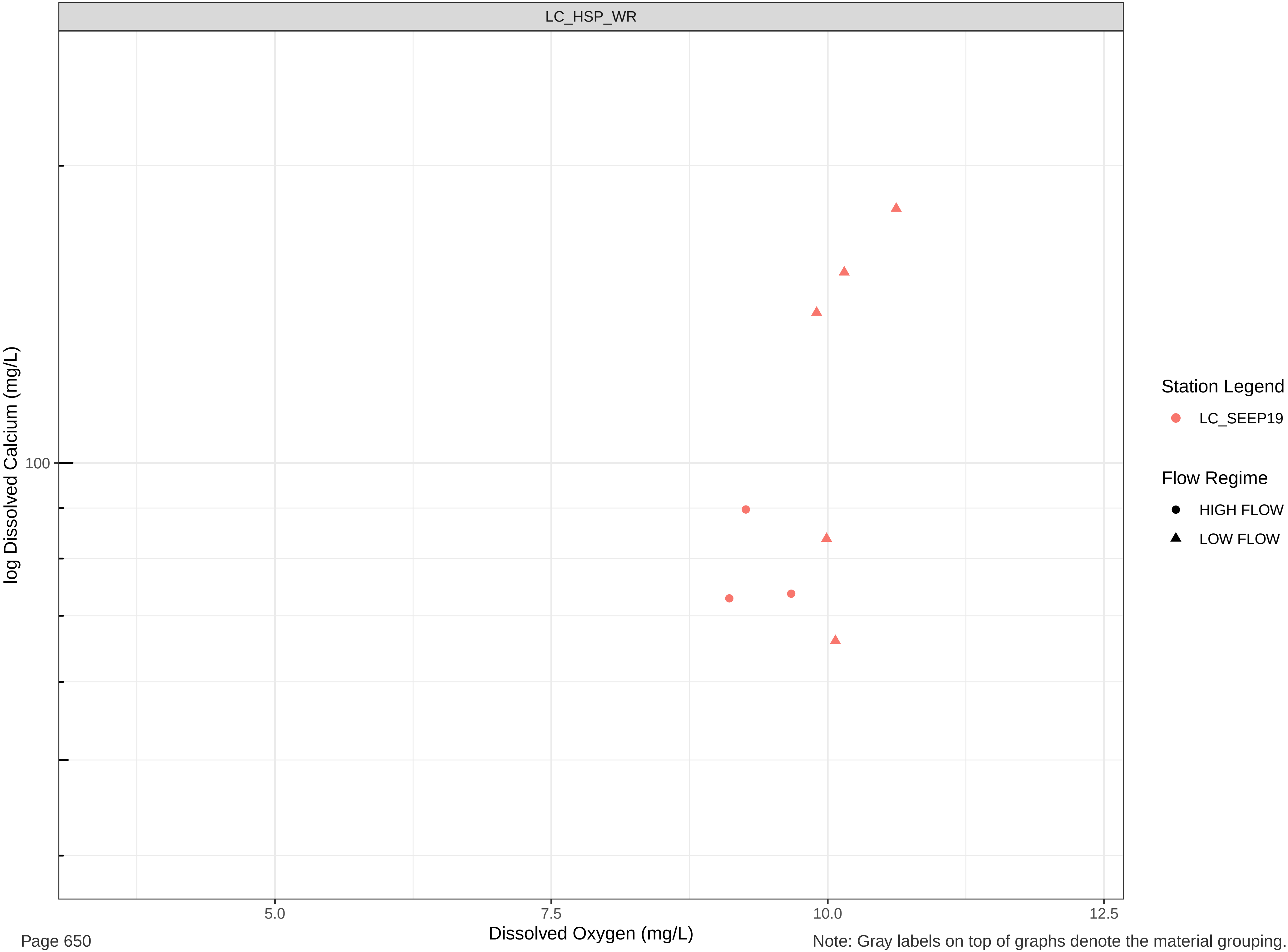

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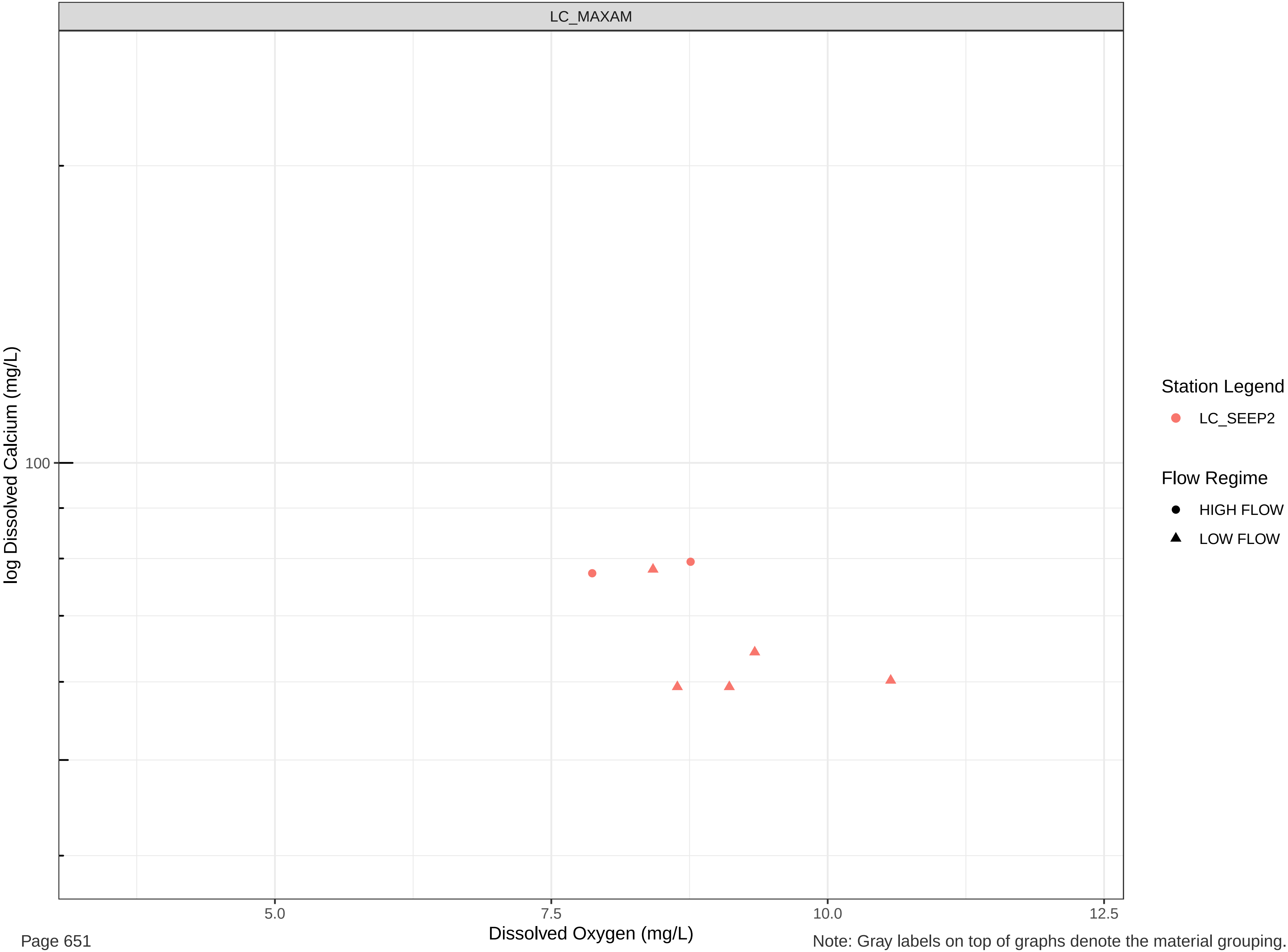

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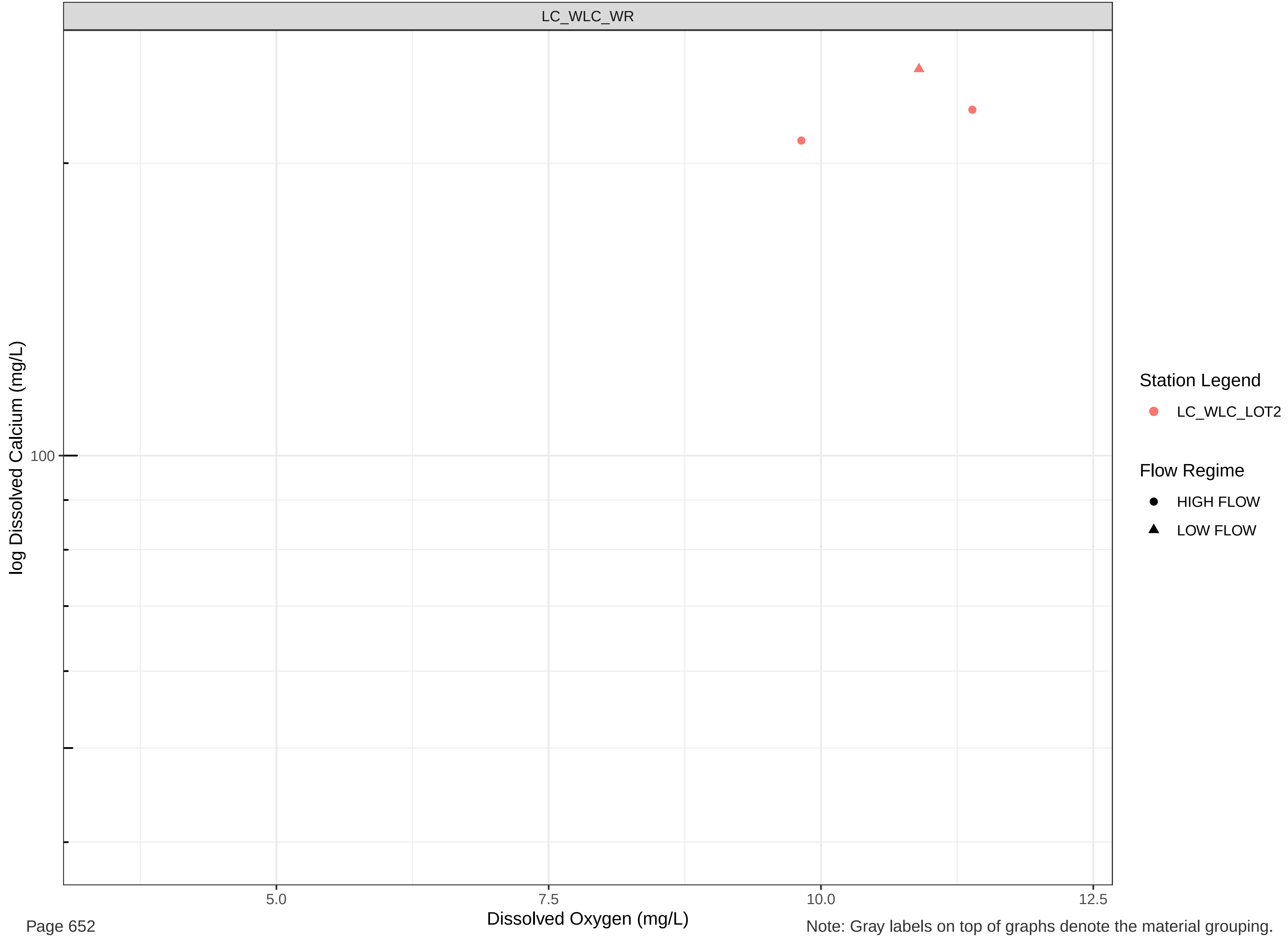

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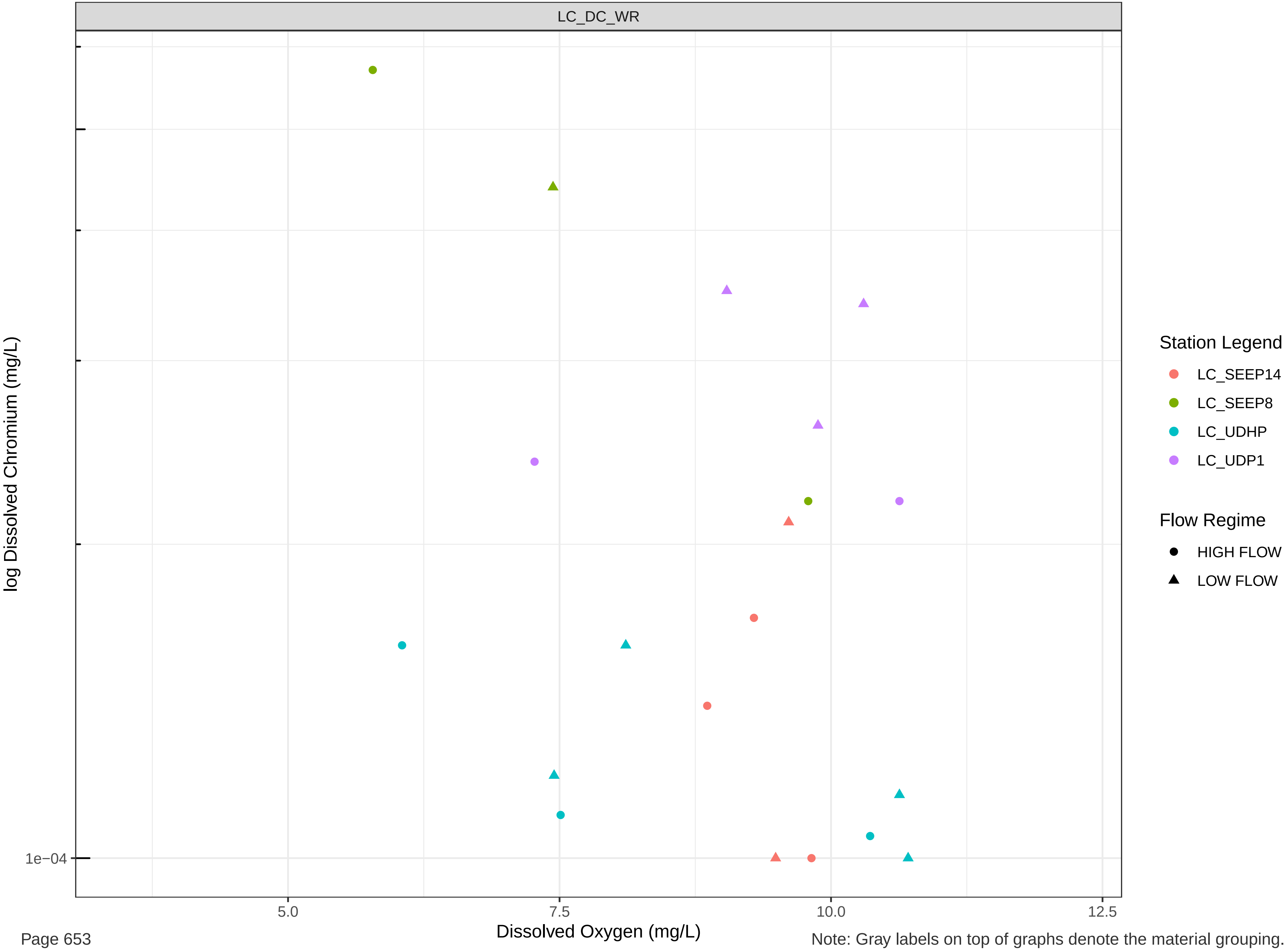

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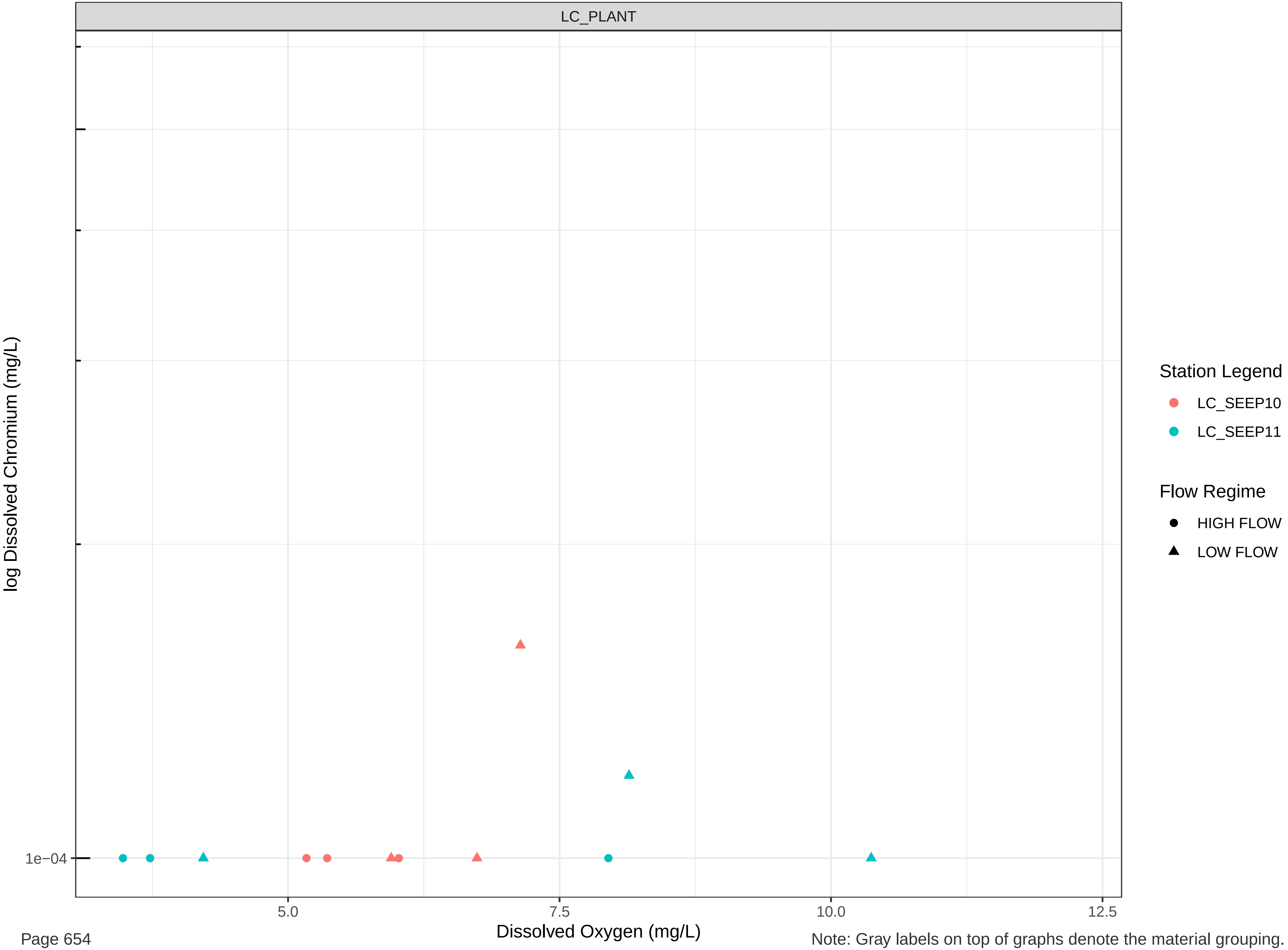

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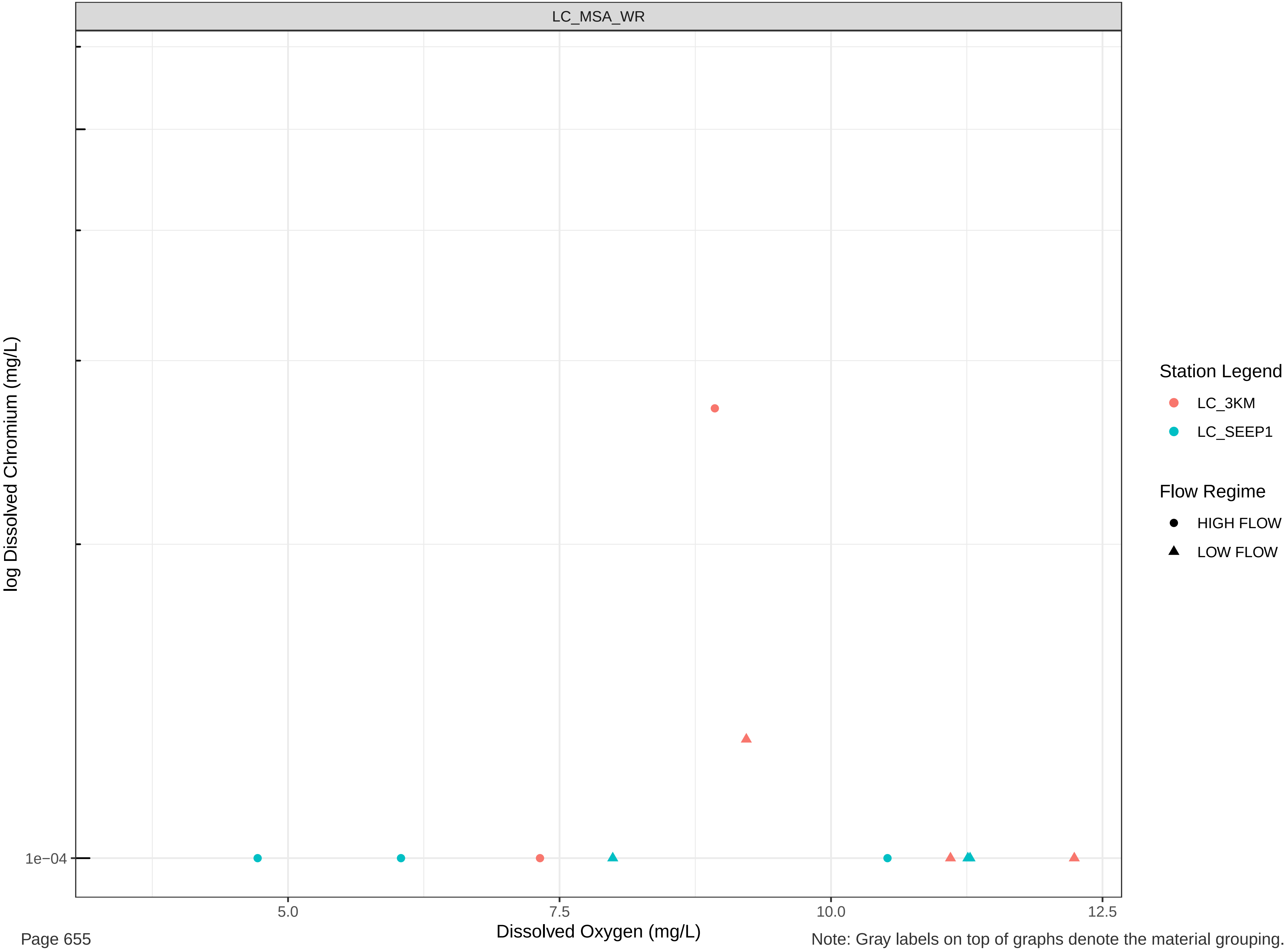

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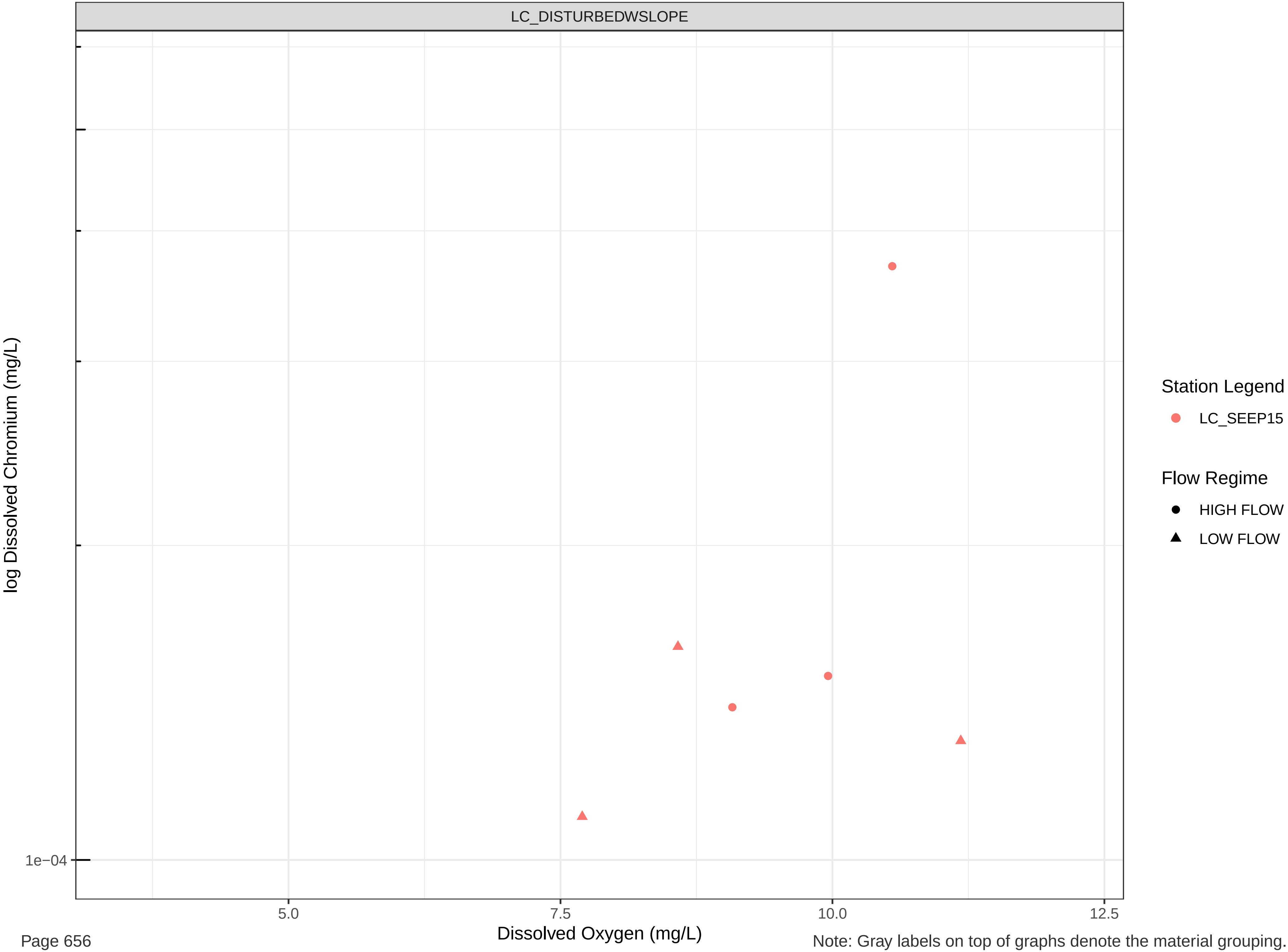

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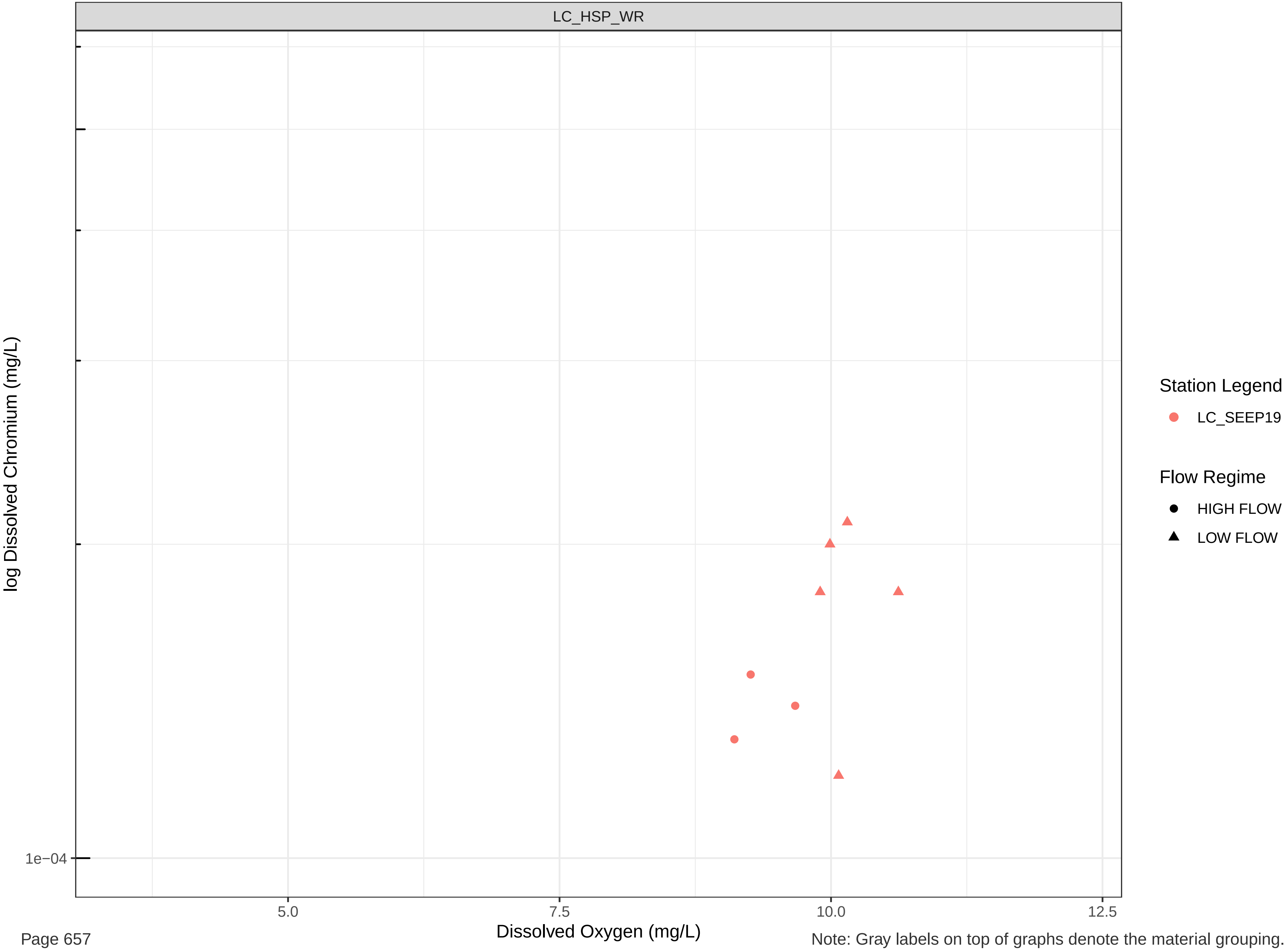

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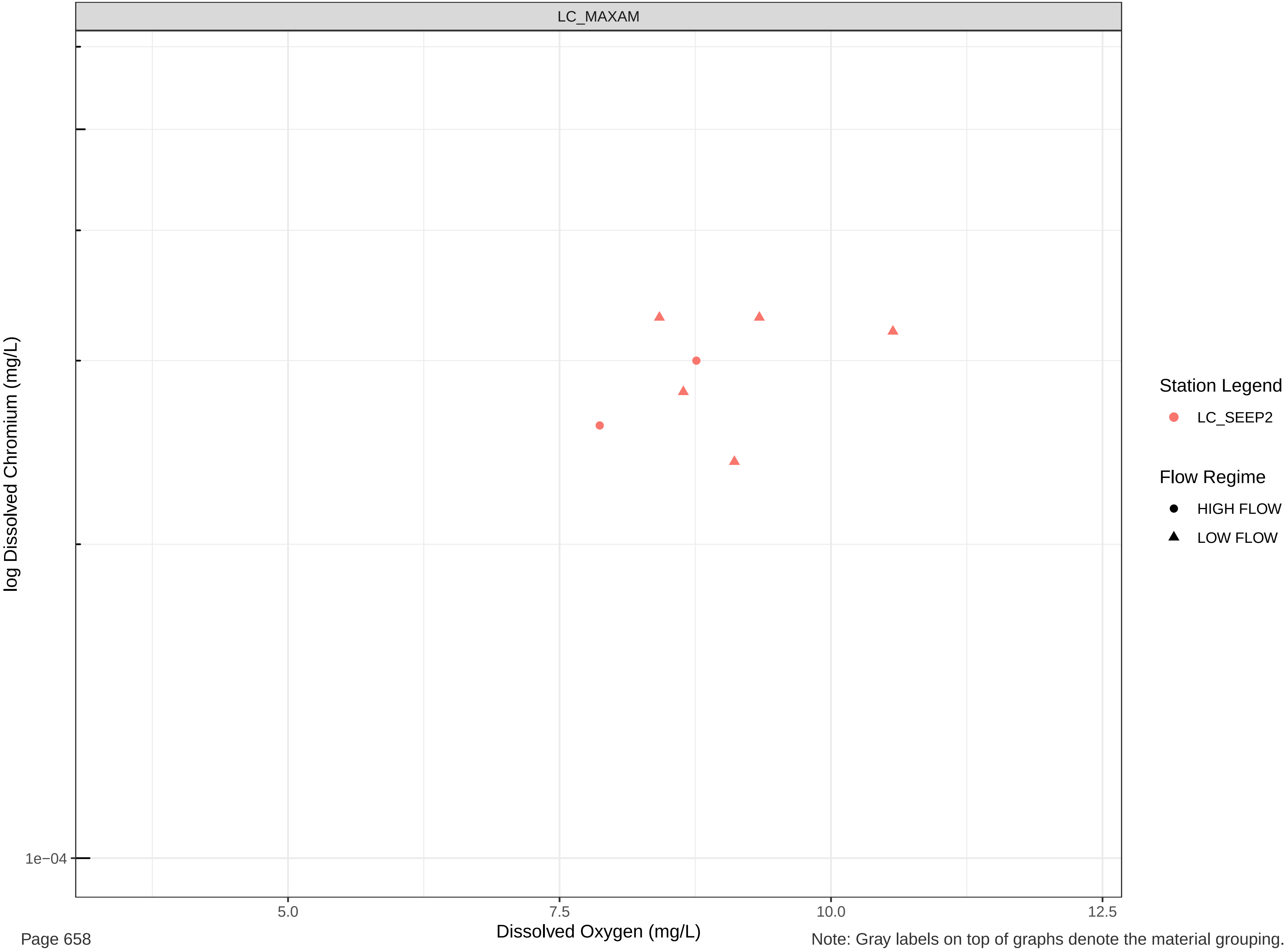

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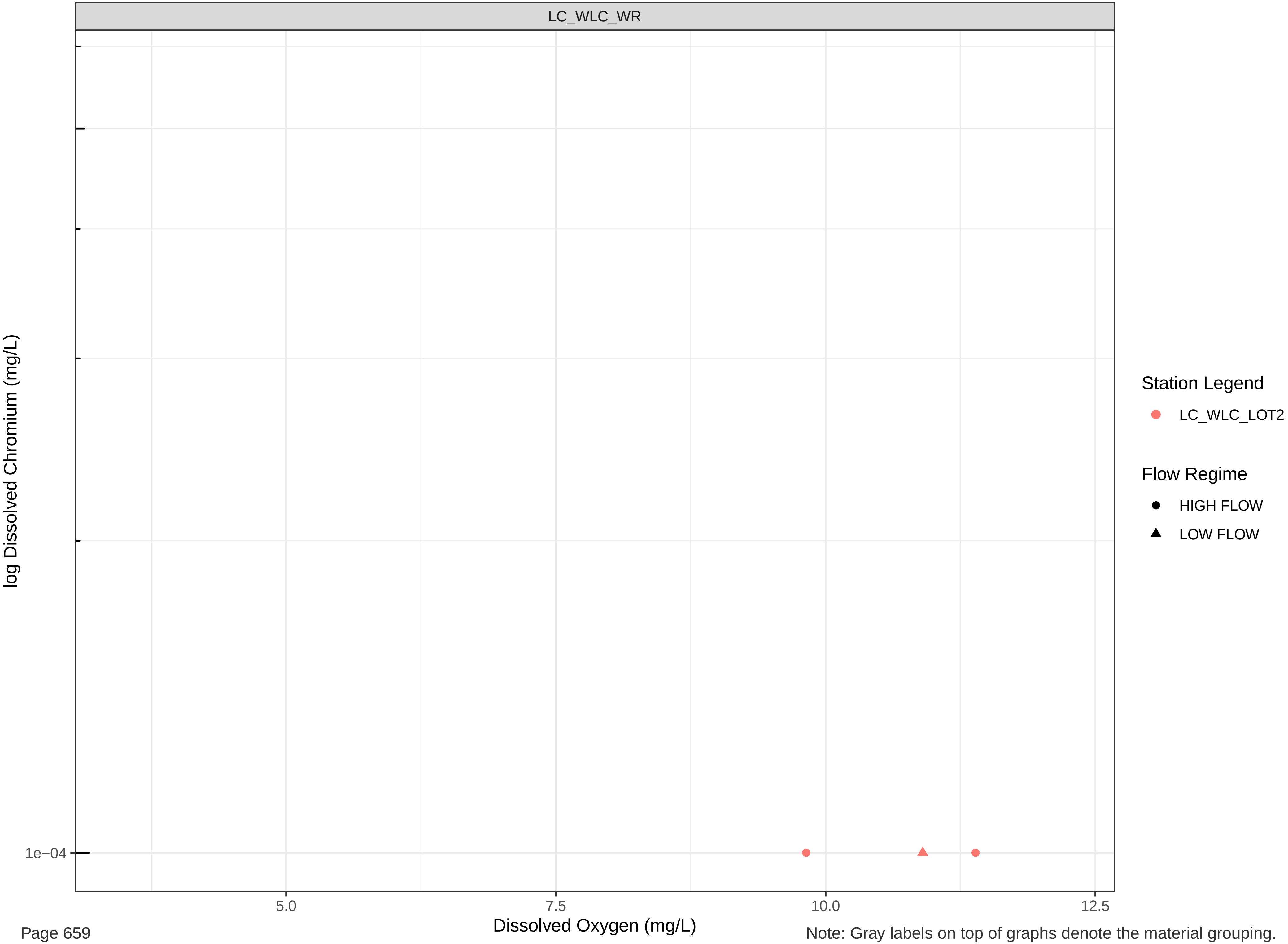

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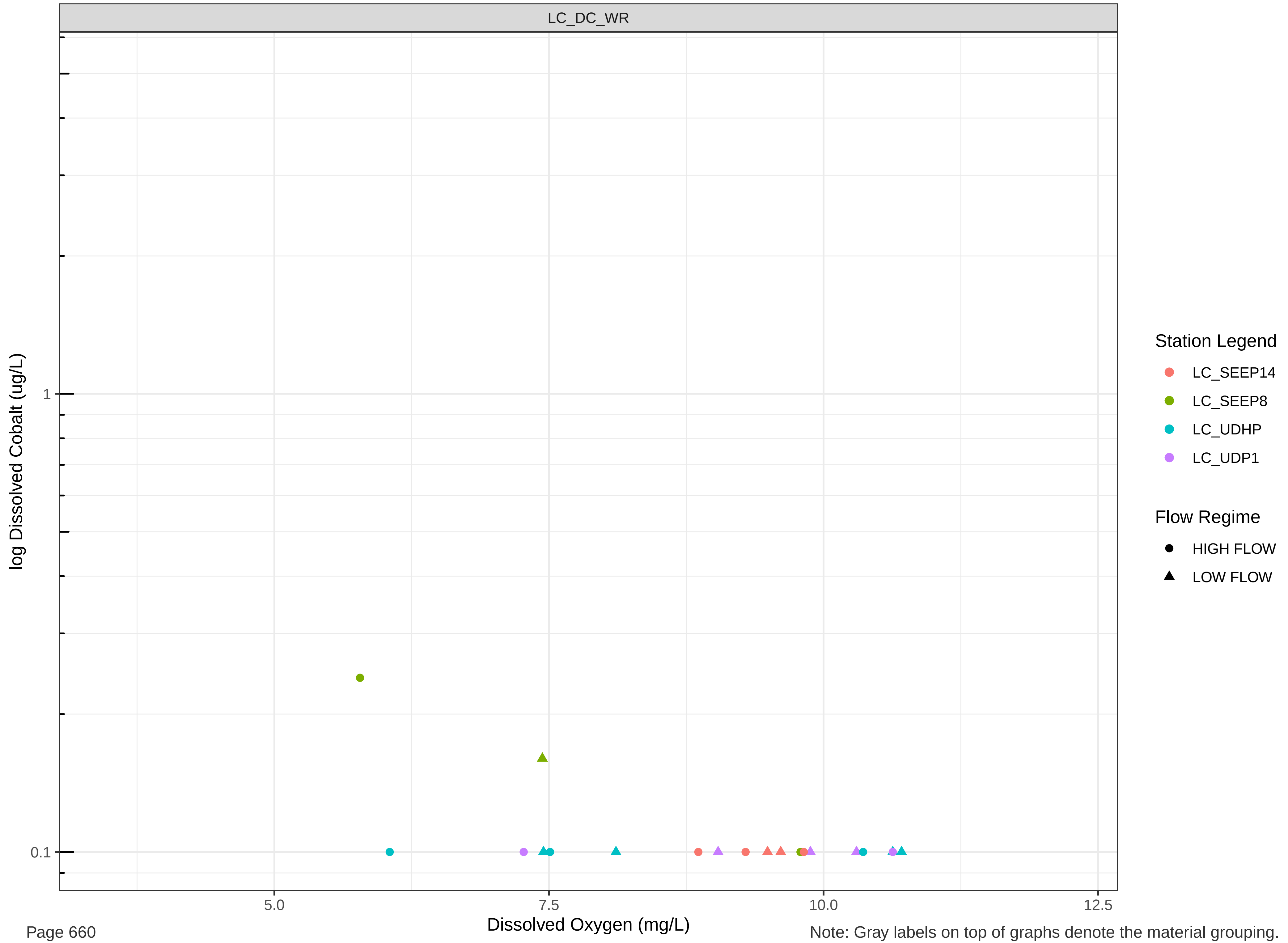

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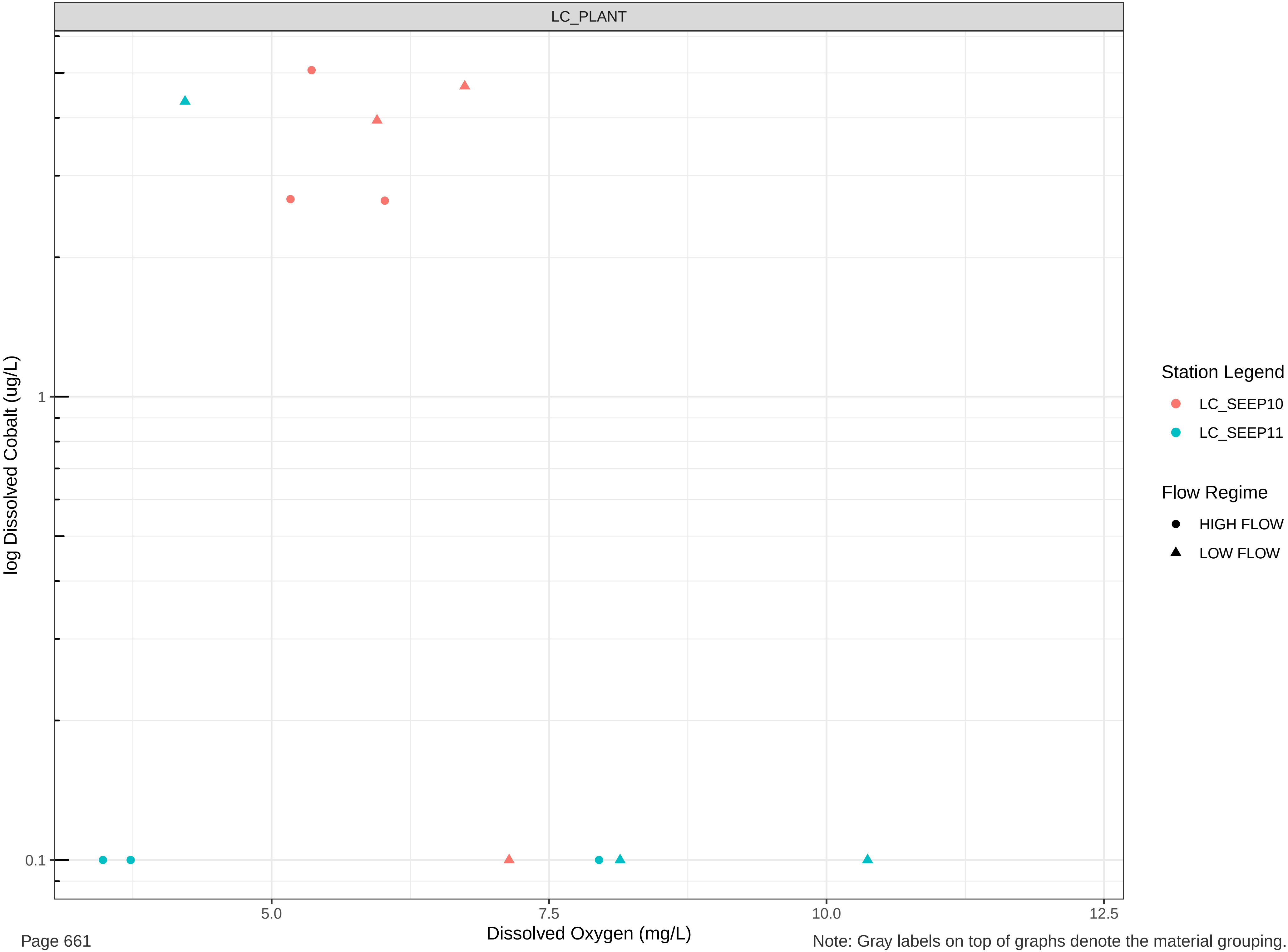

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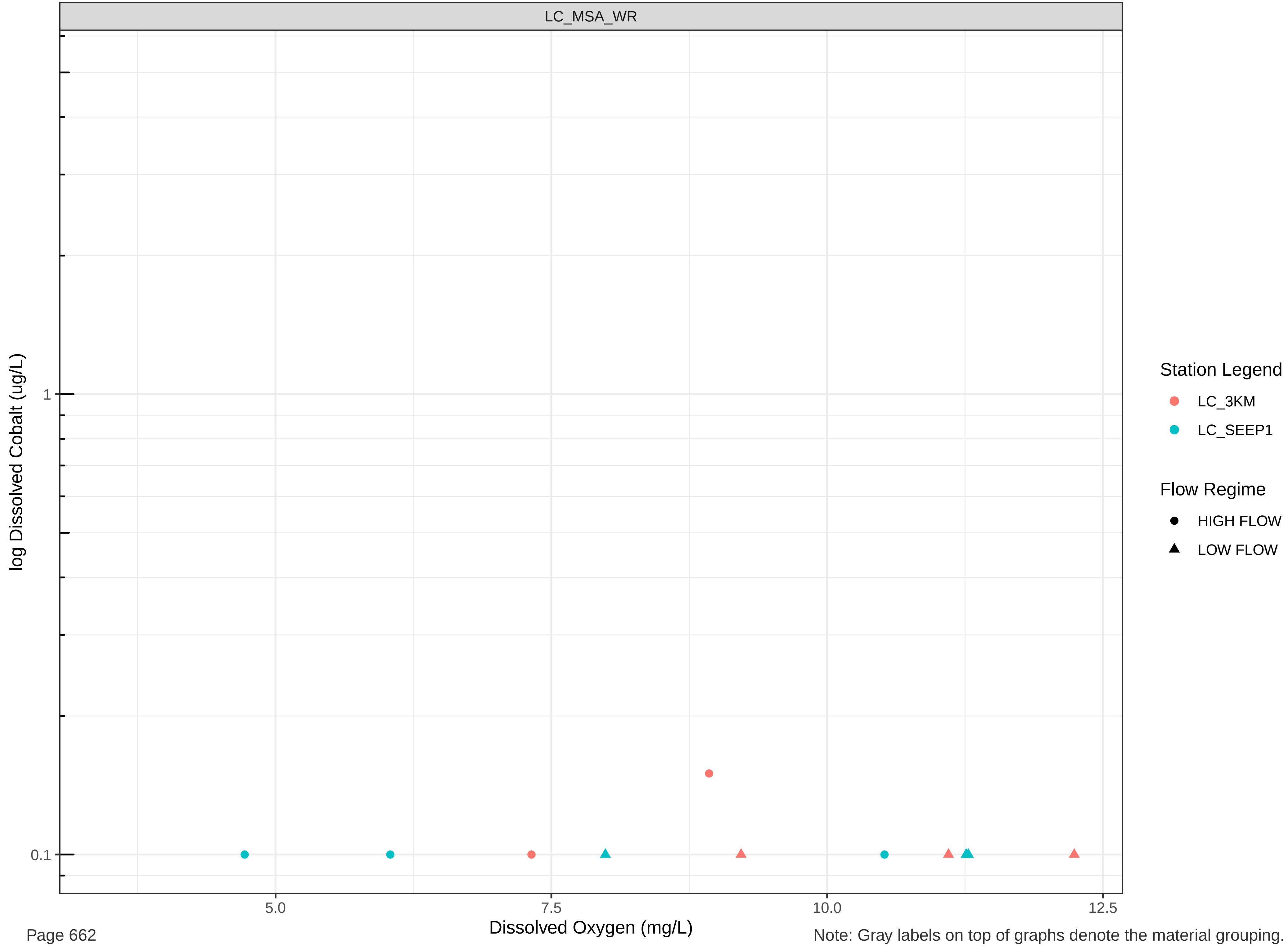

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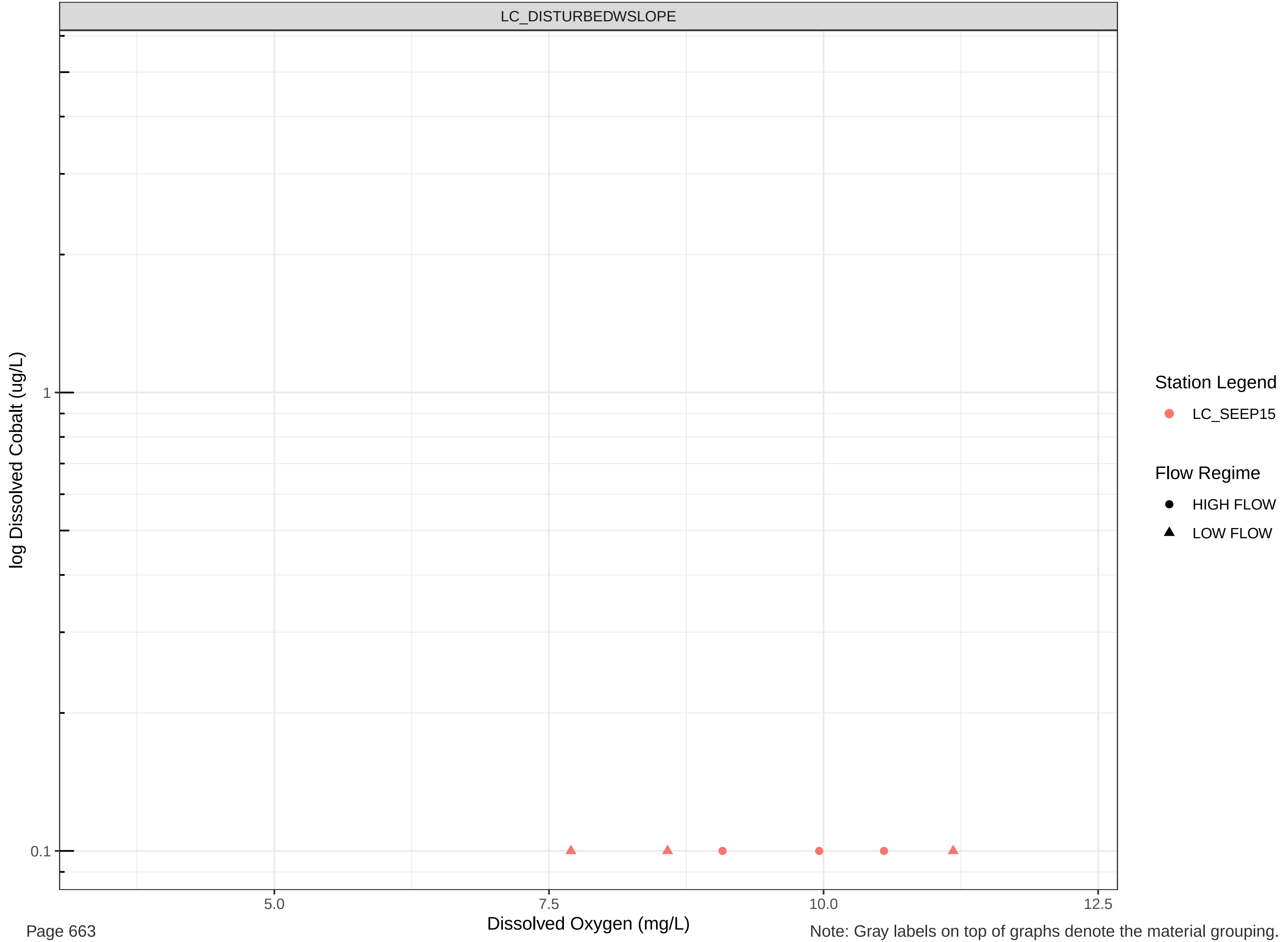

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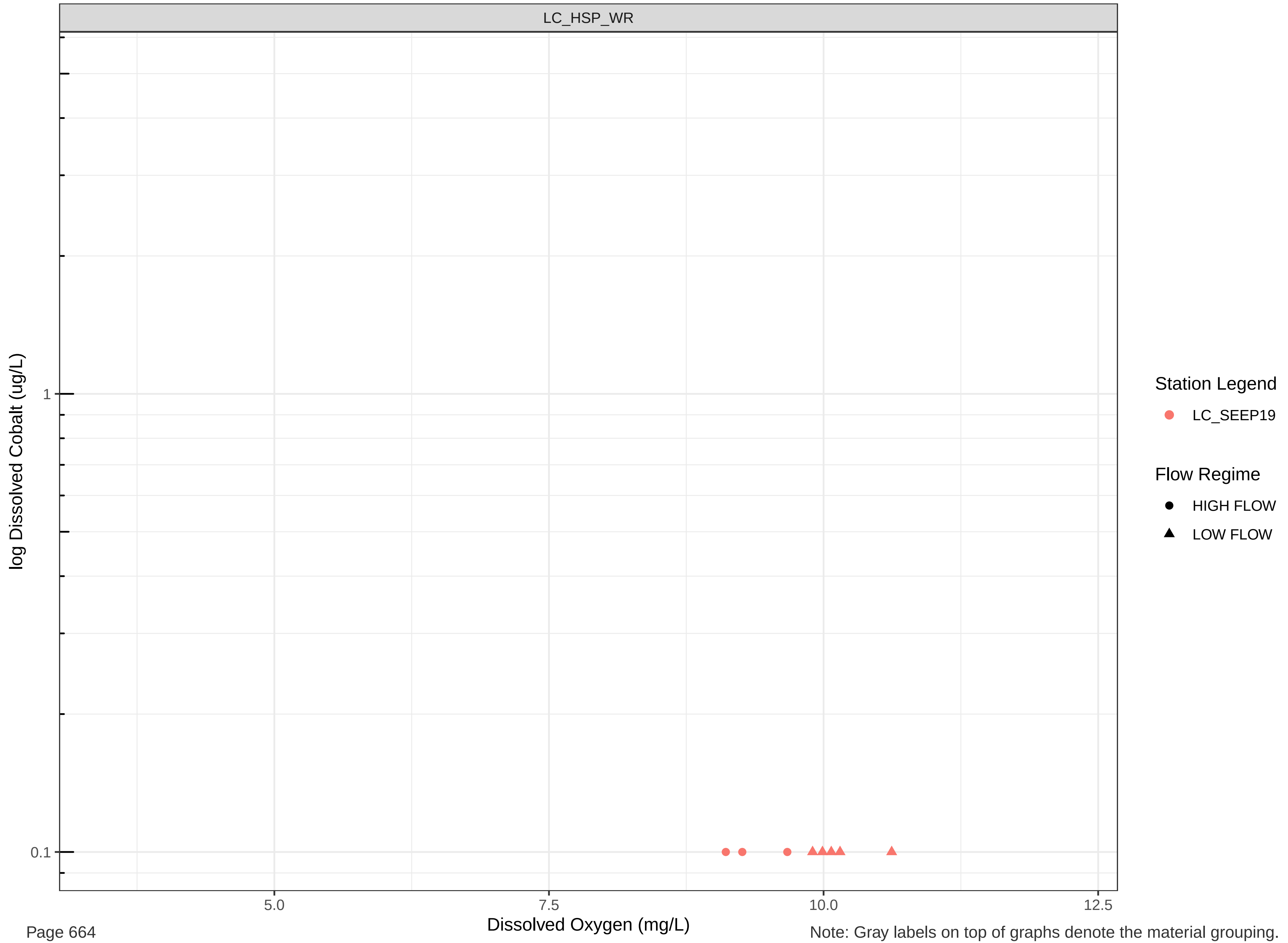
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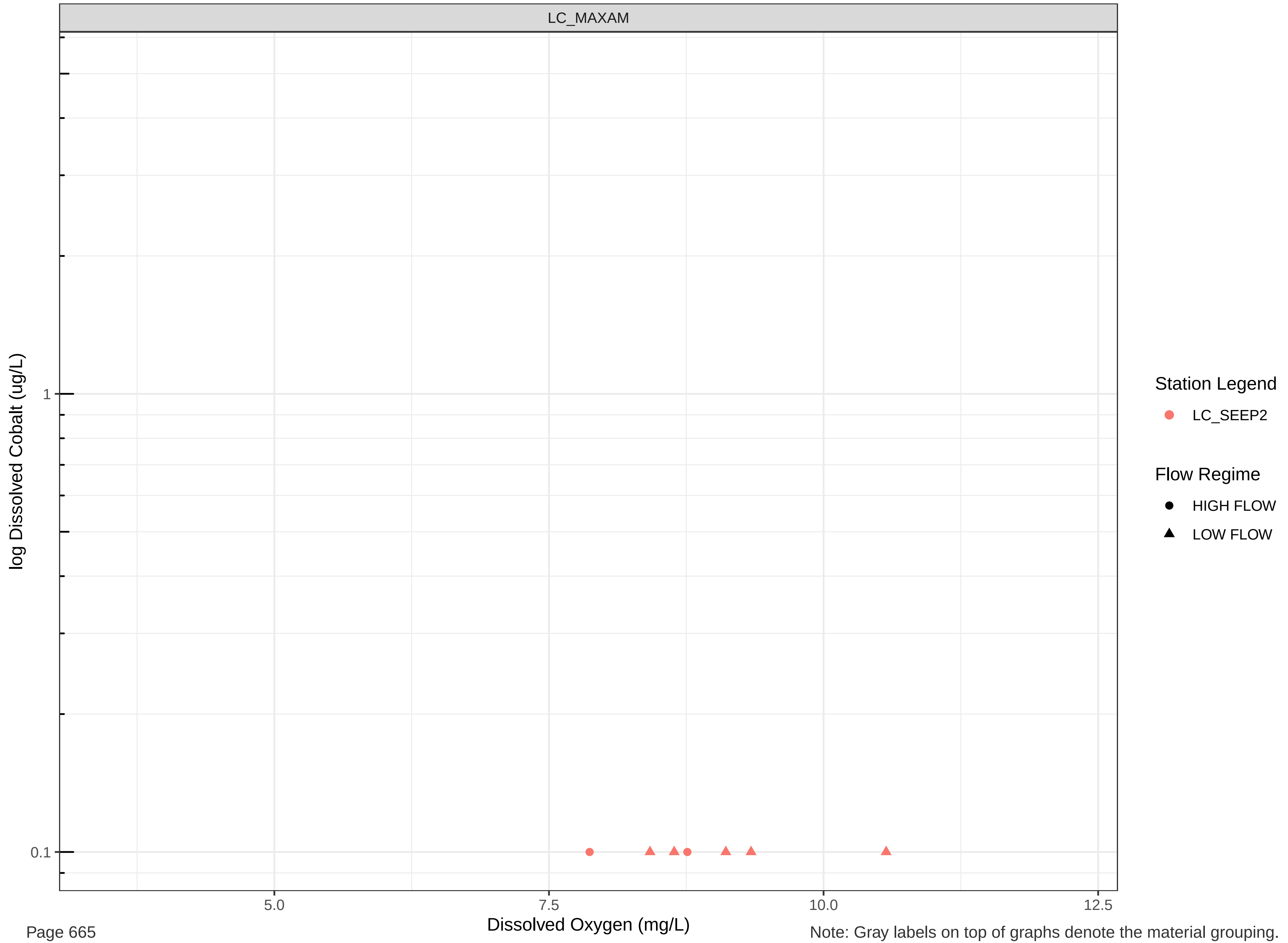
1
0.1
5.0
7.5
10.0
12.5
Dissolved Oxygen (mg/L)
Station Legend
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



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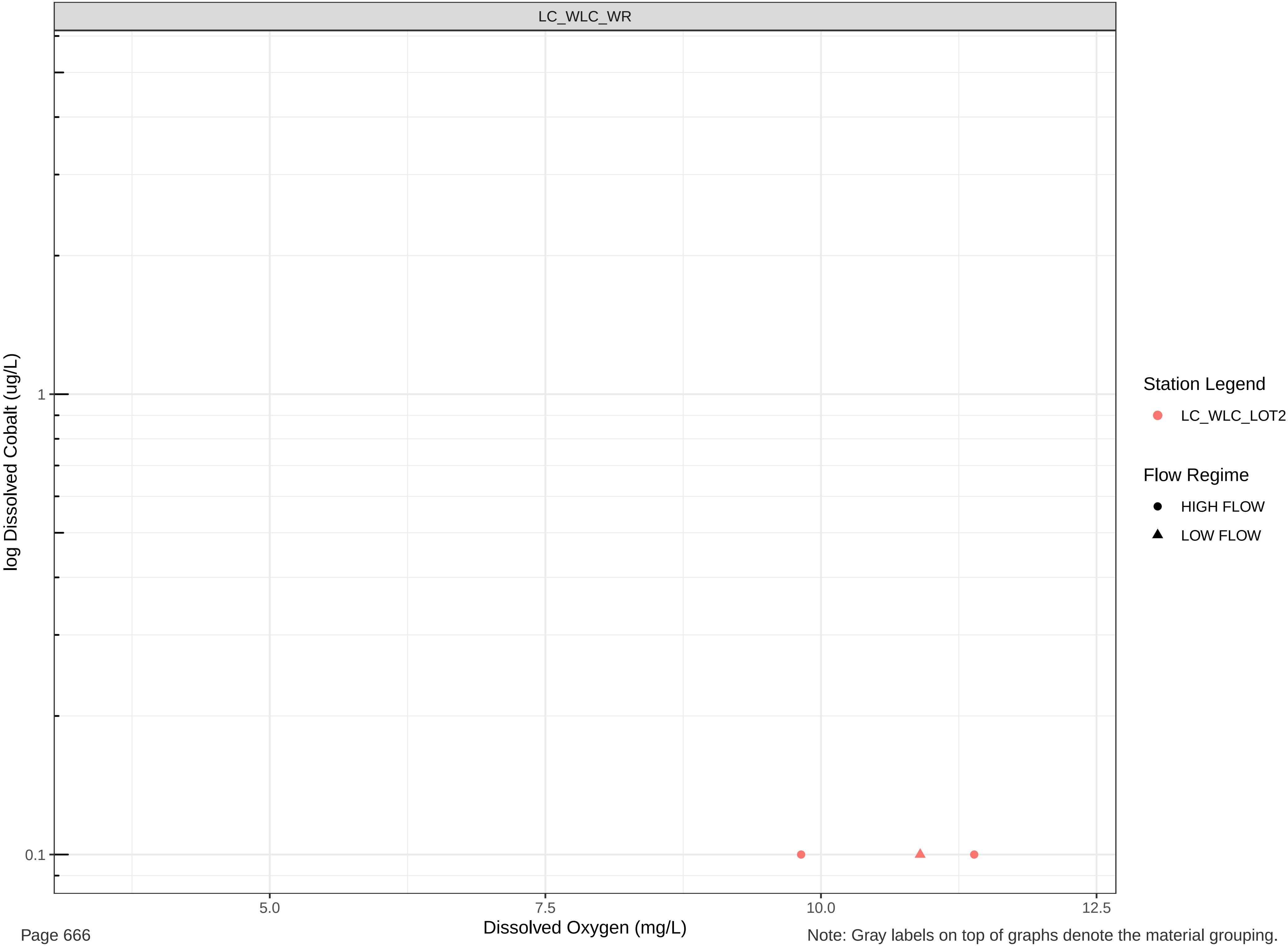

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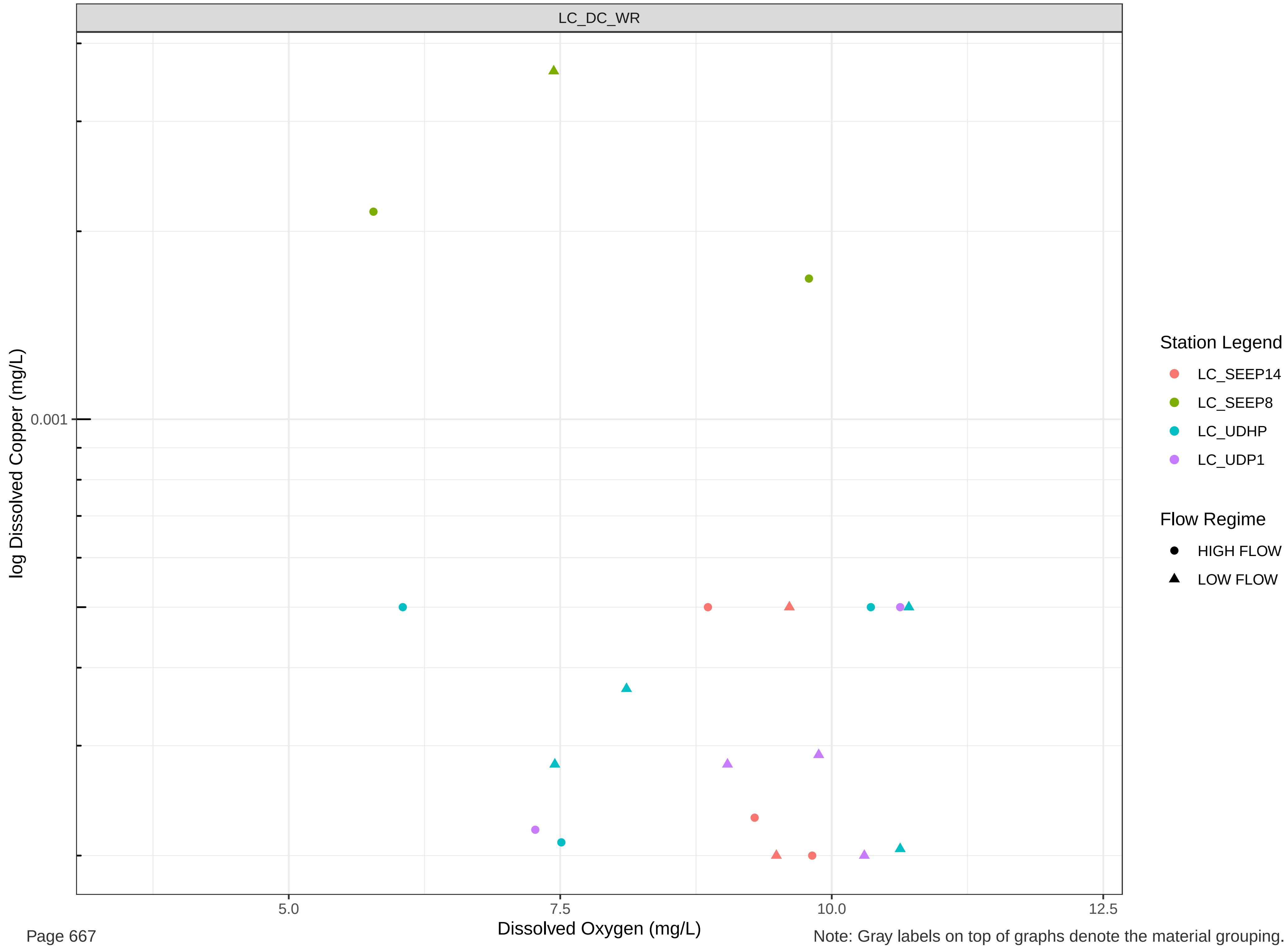

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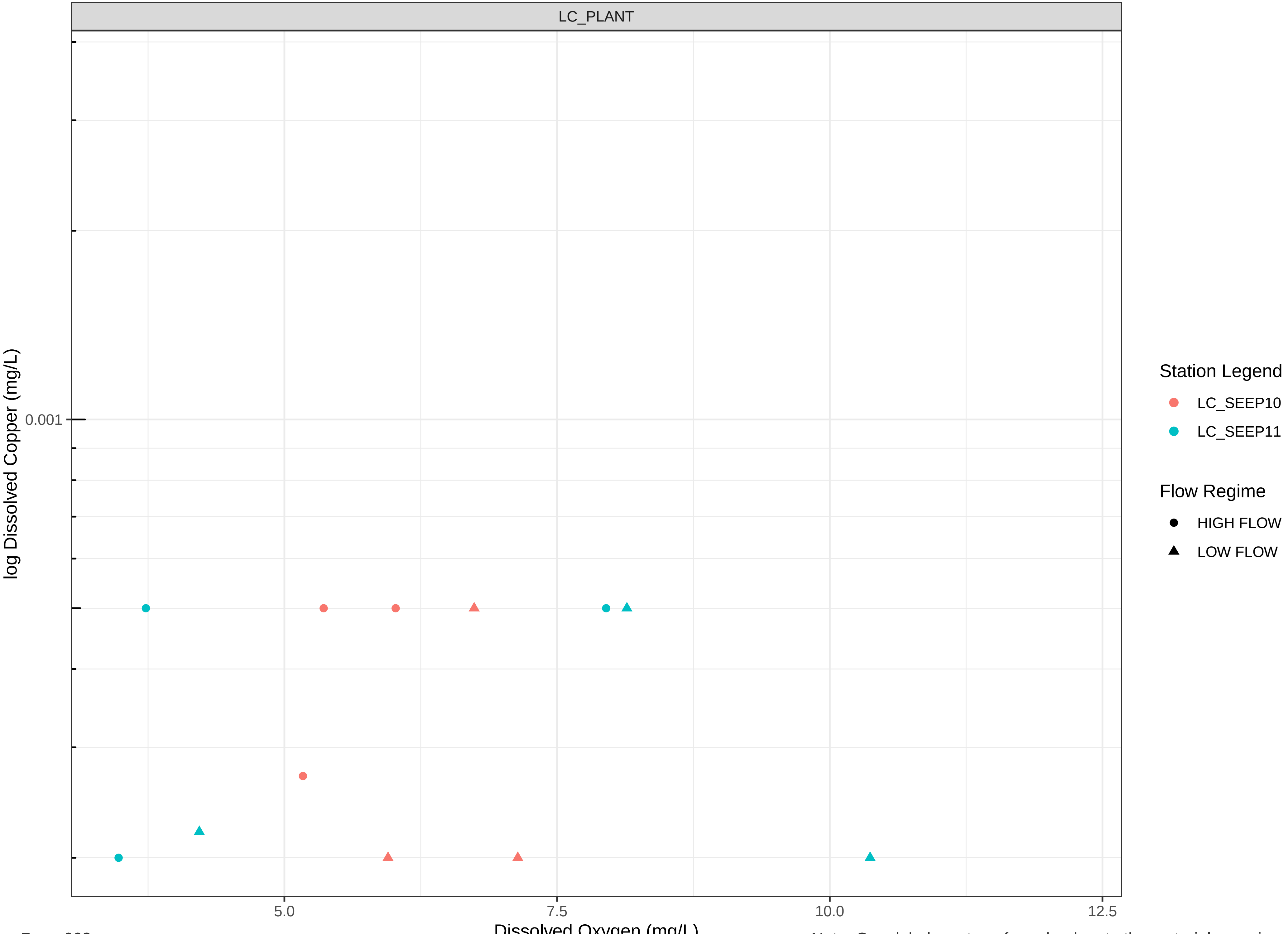

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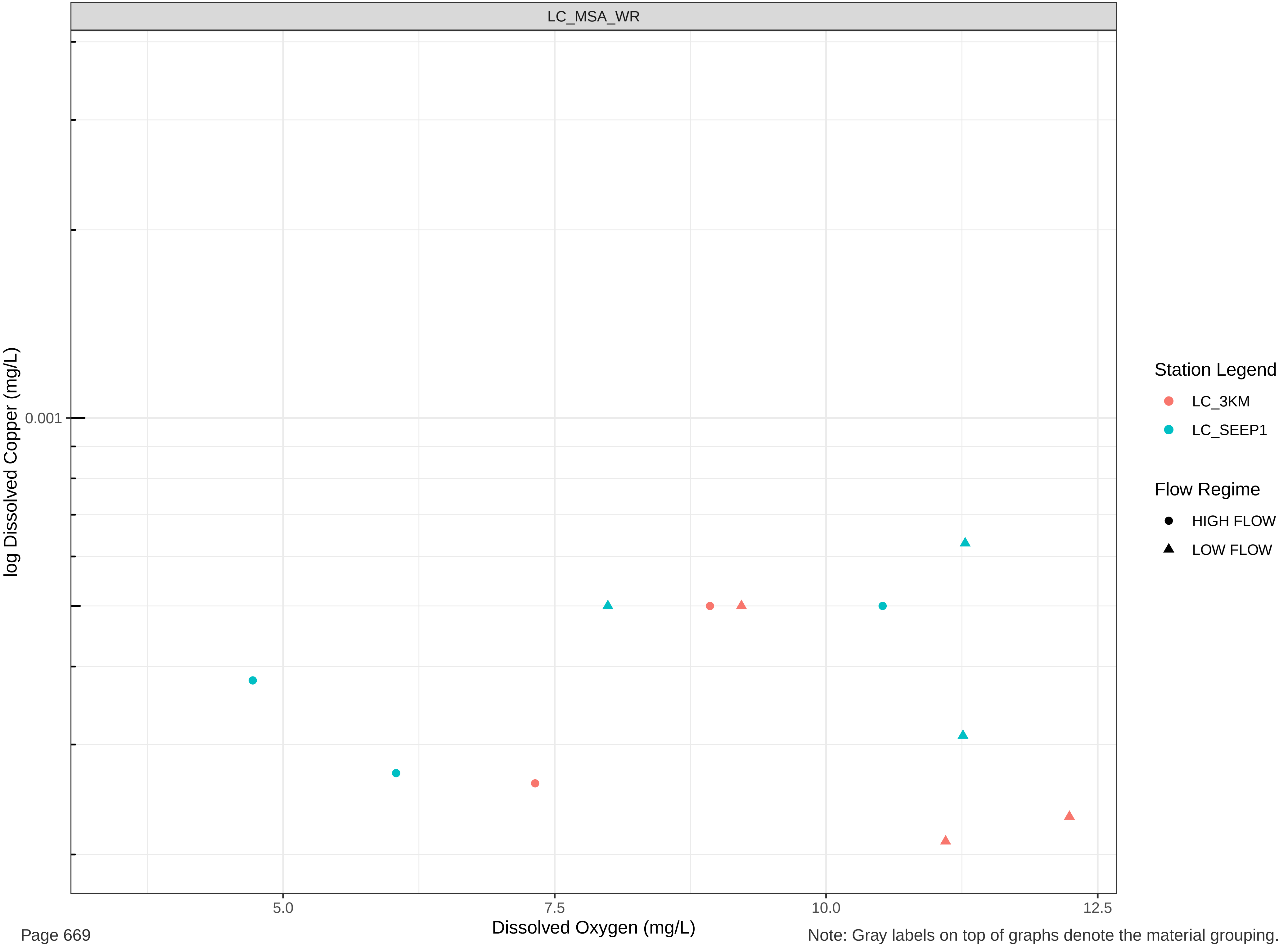

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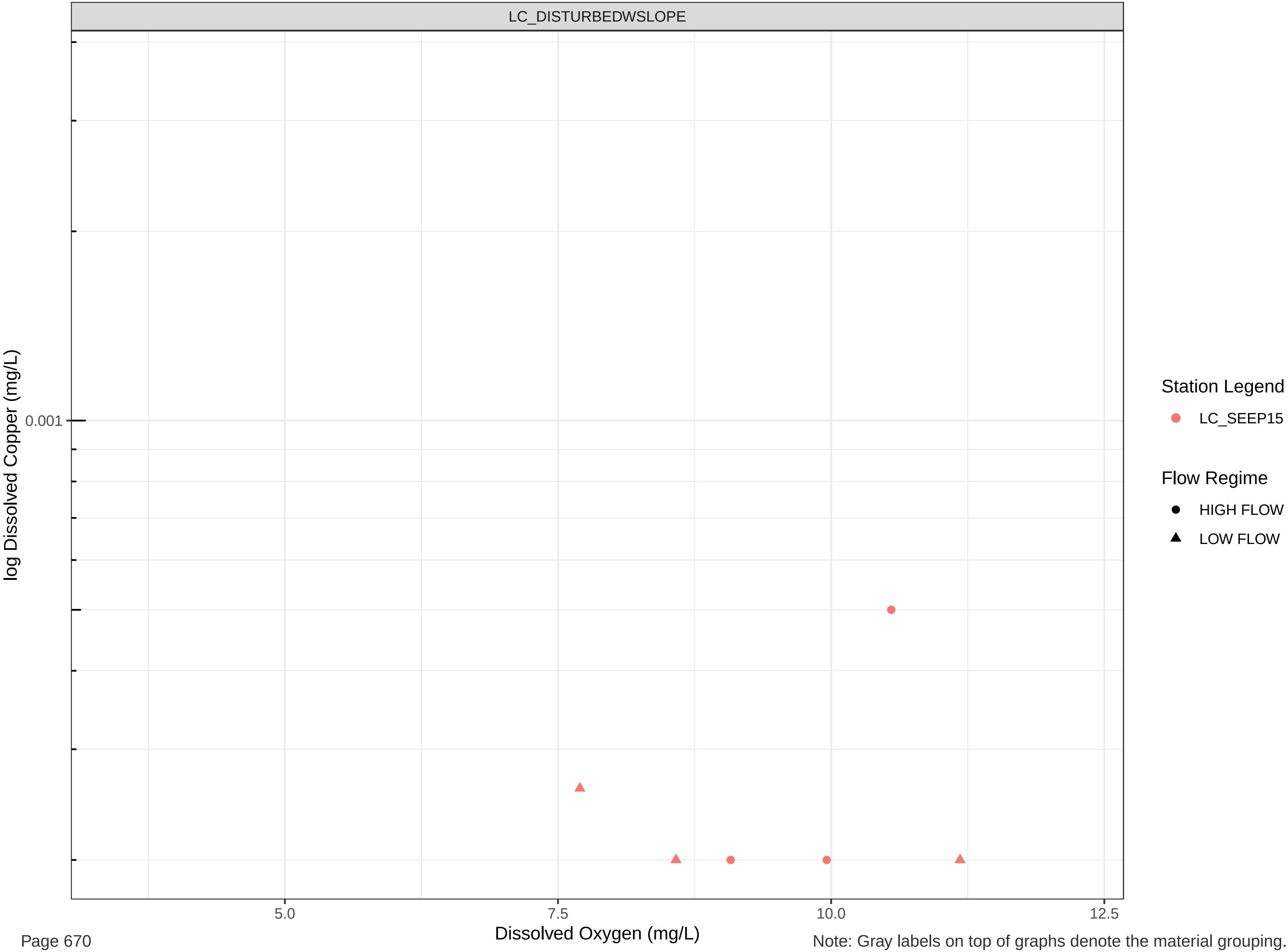

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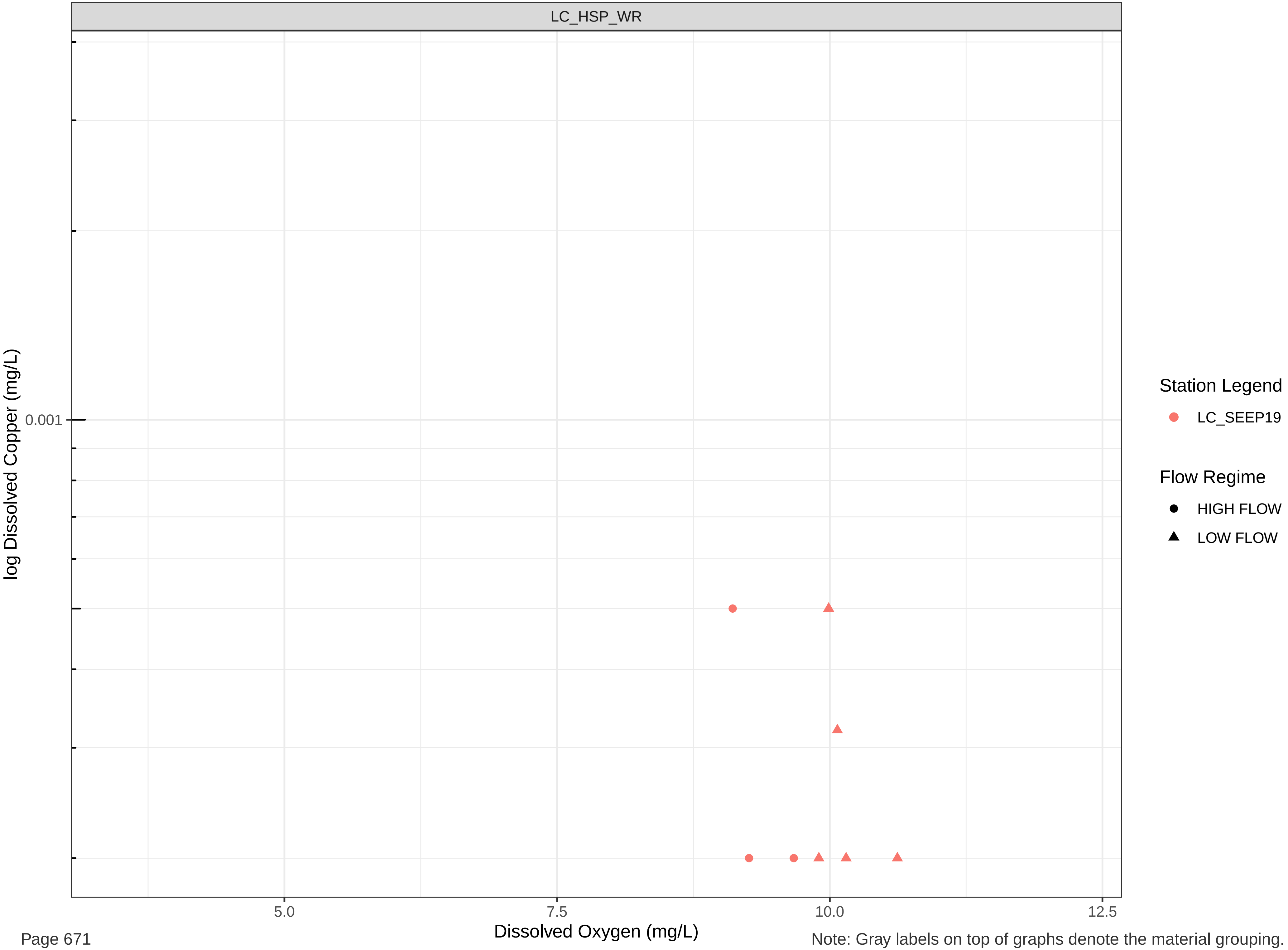

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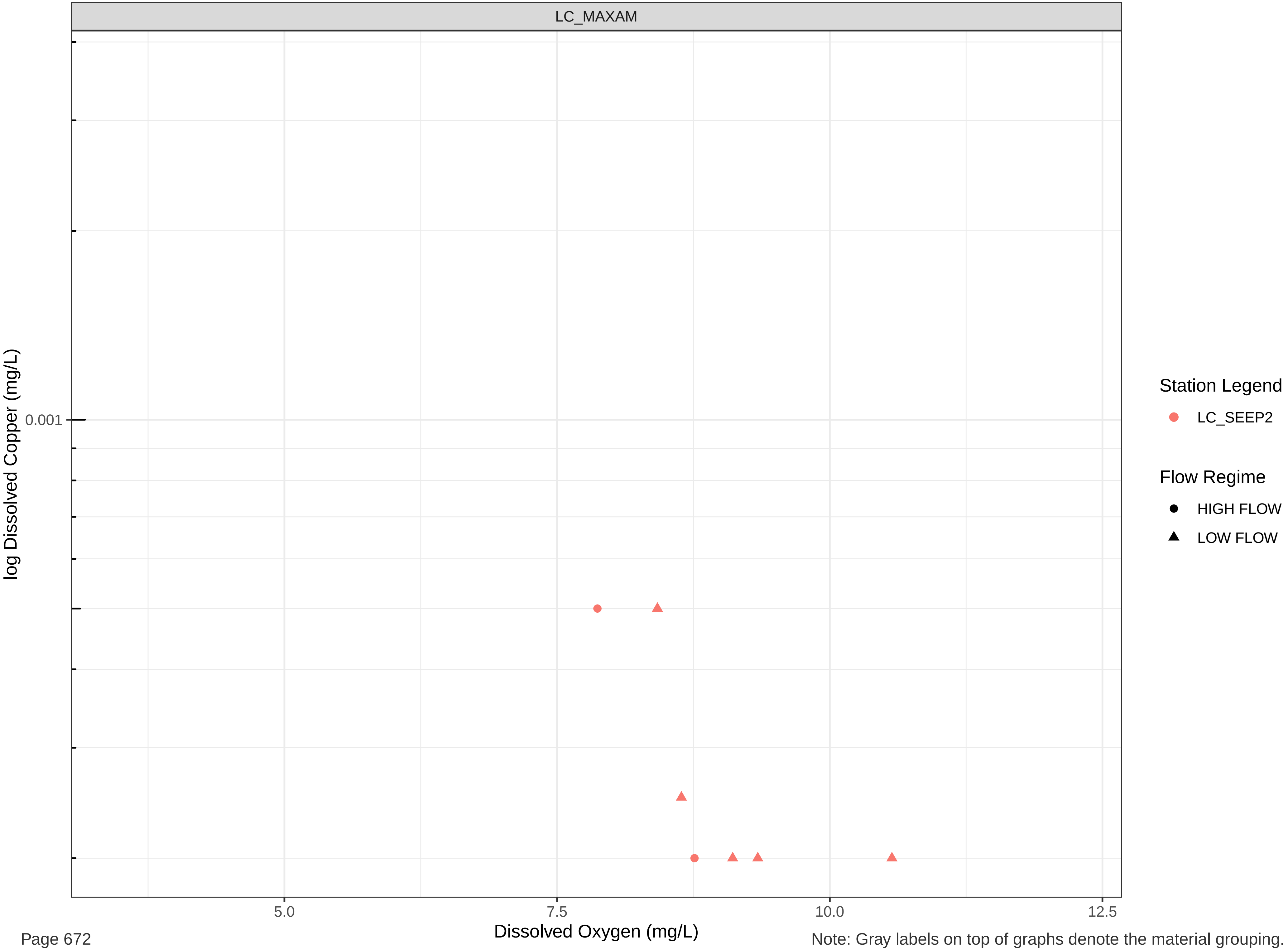

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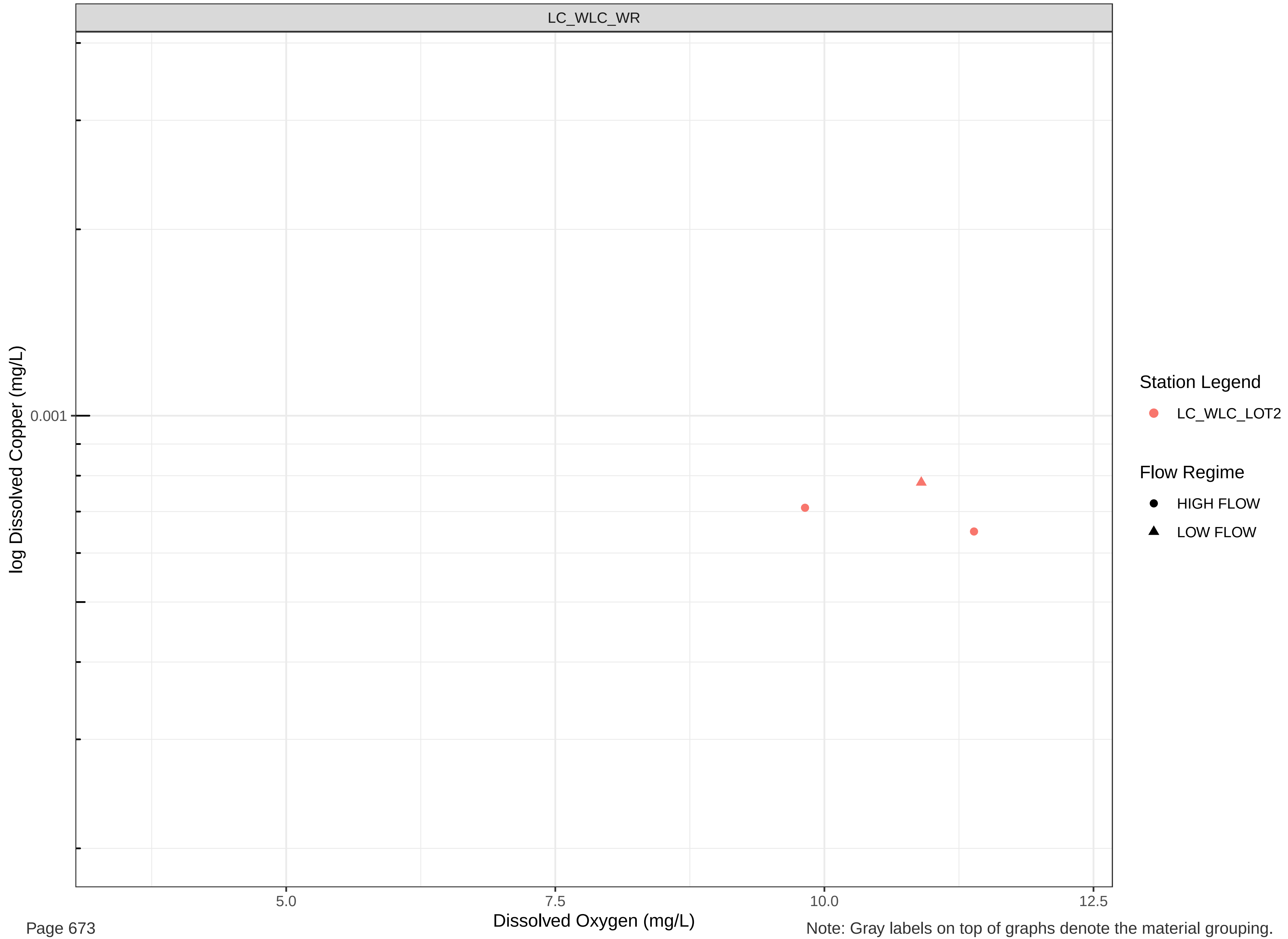

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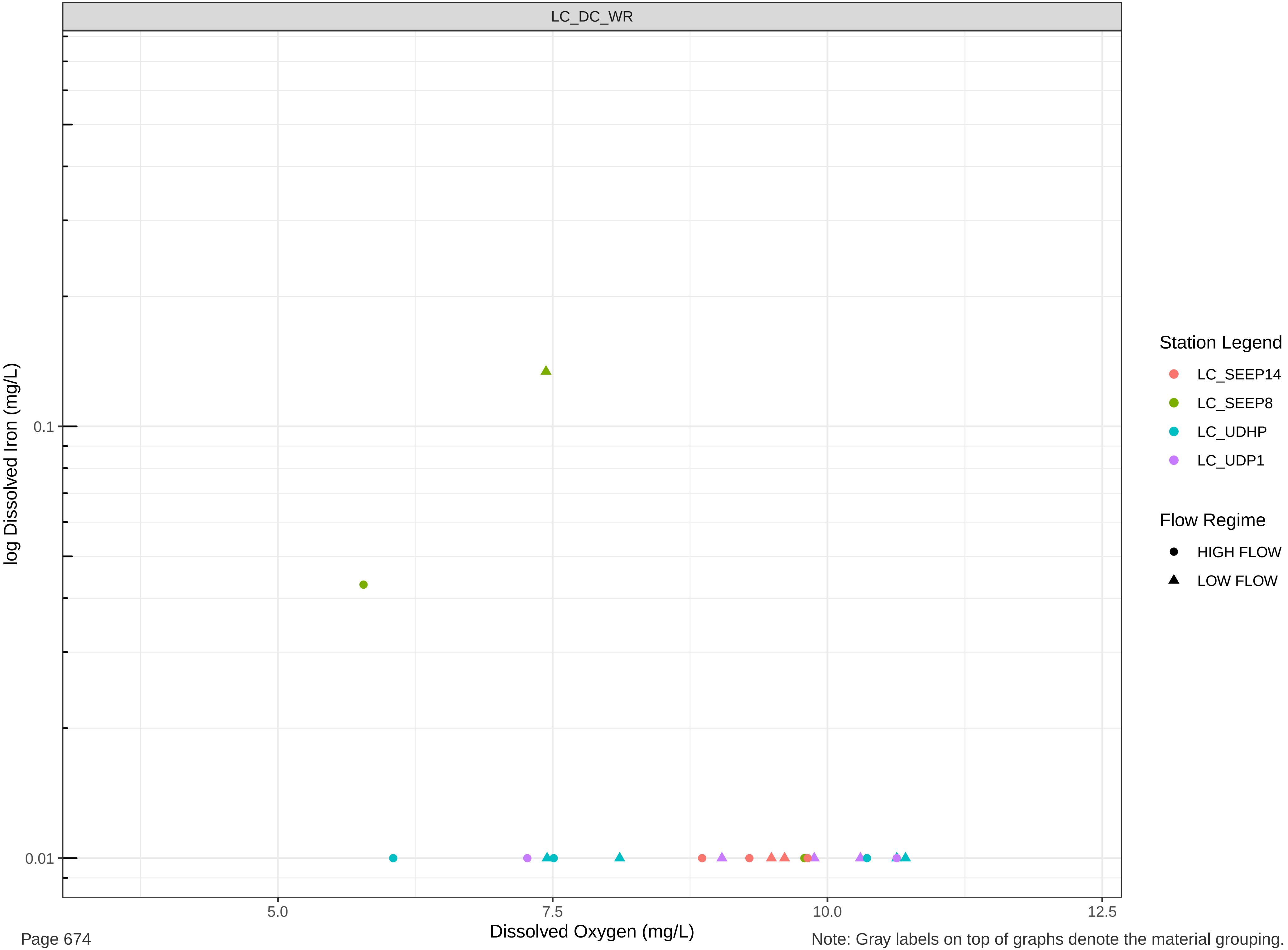

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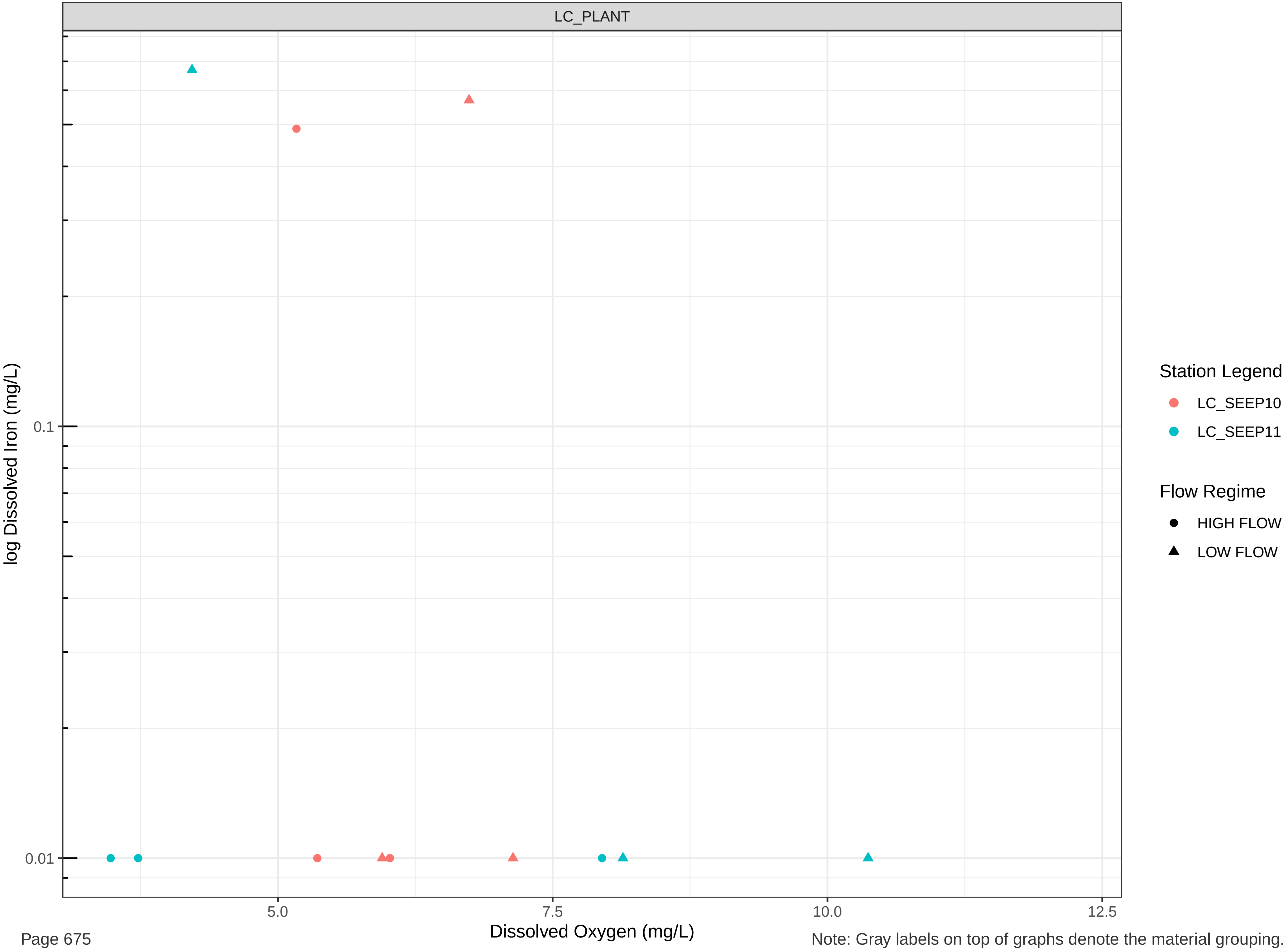

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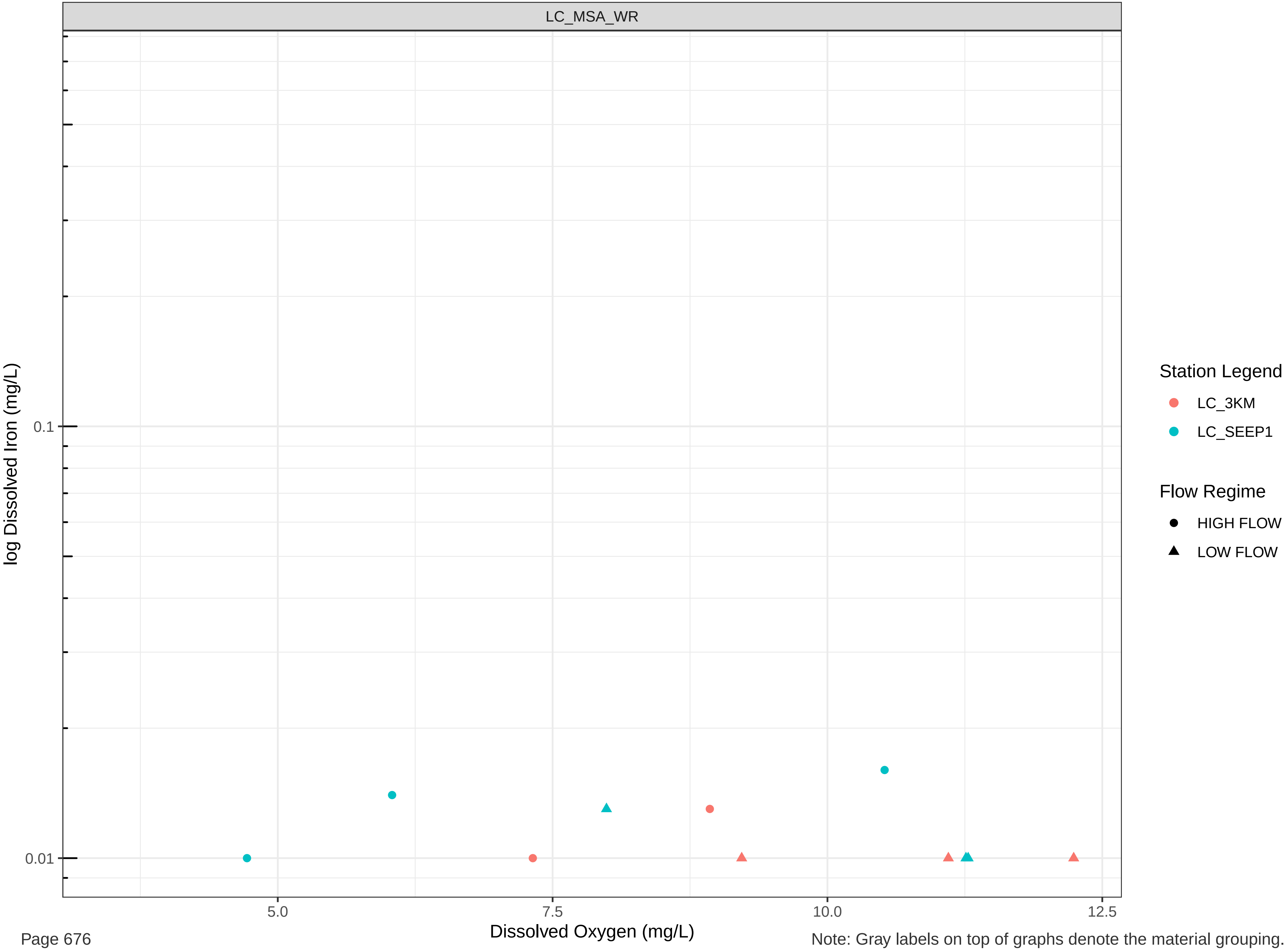

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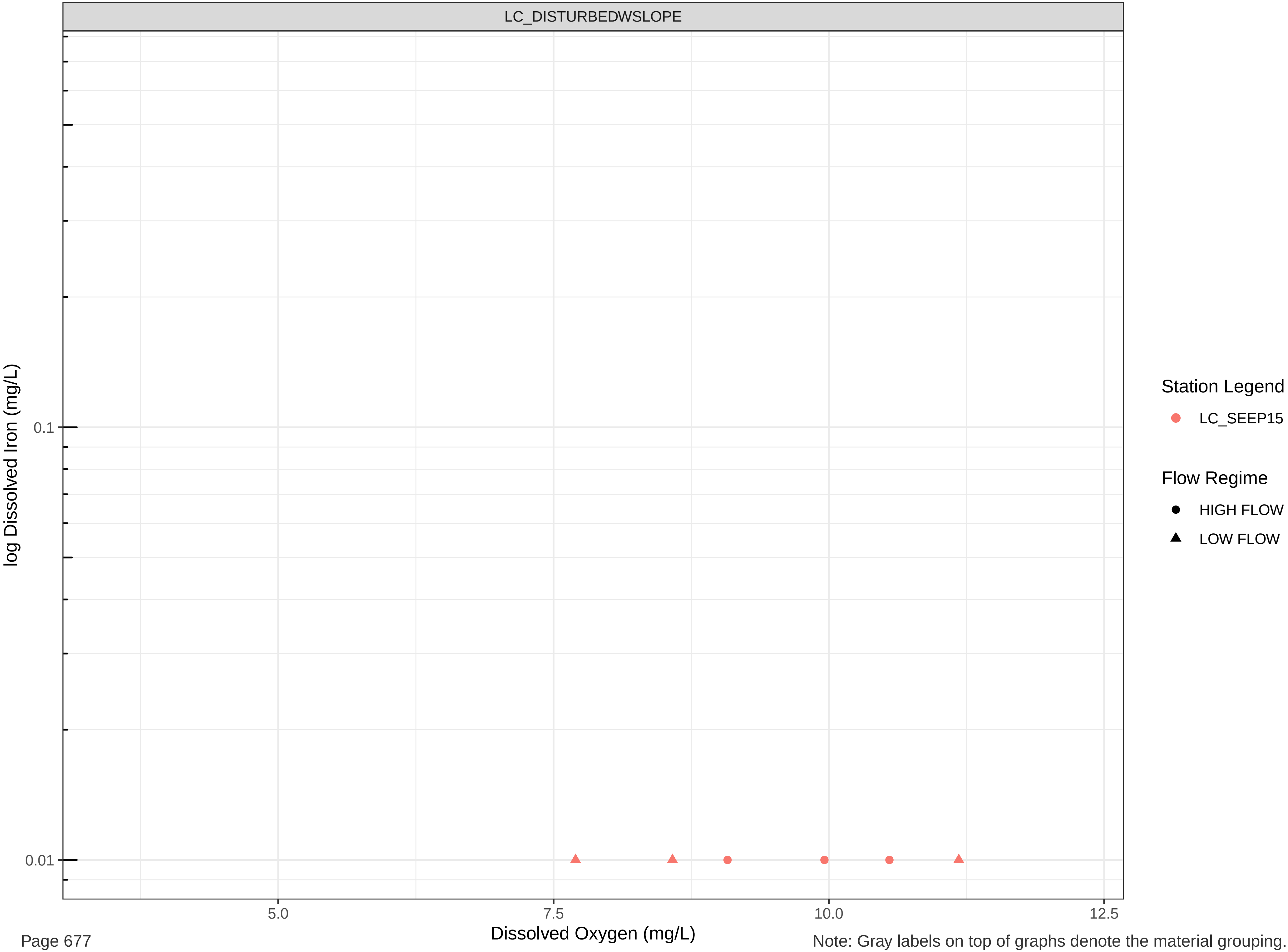

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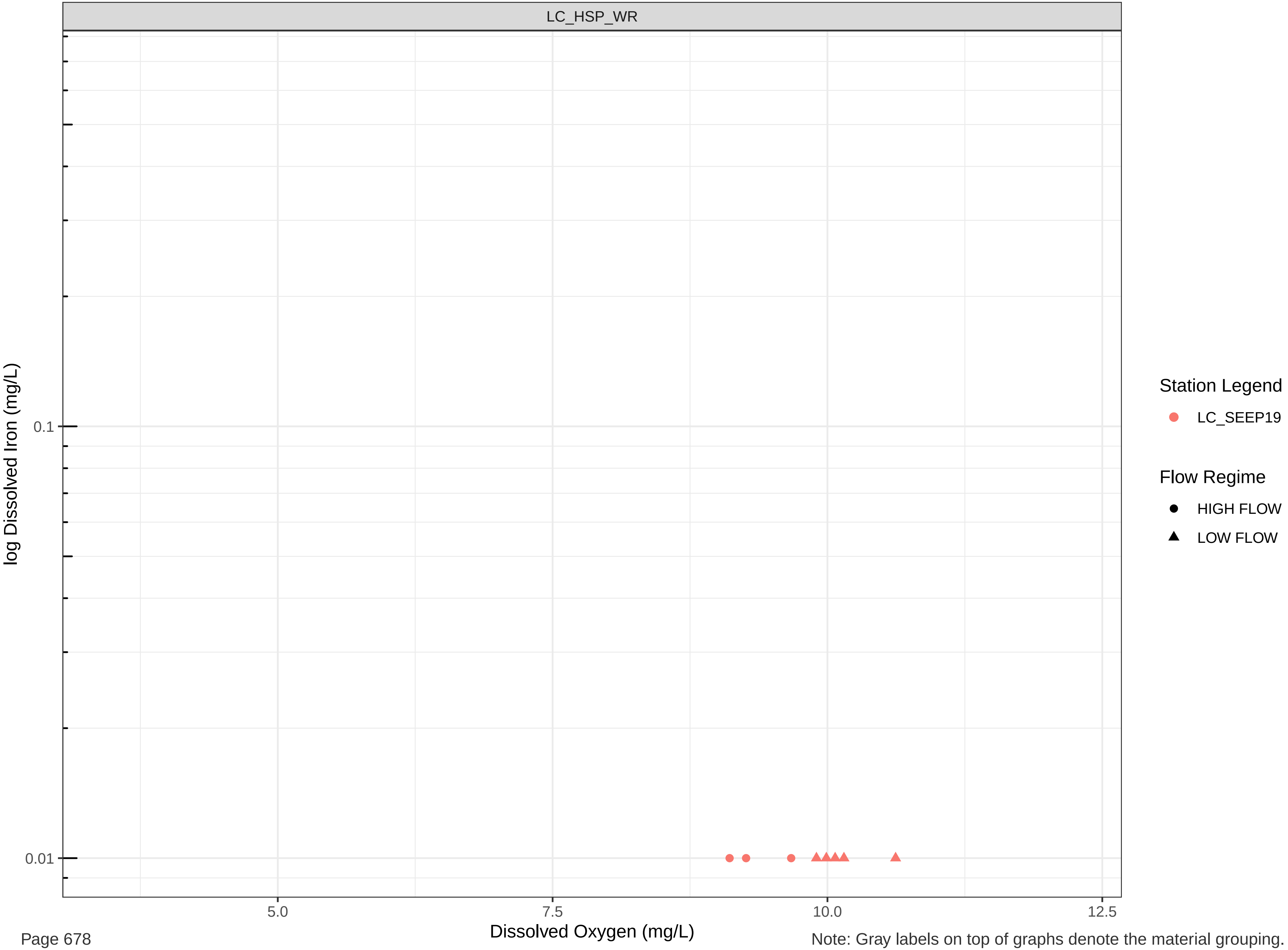

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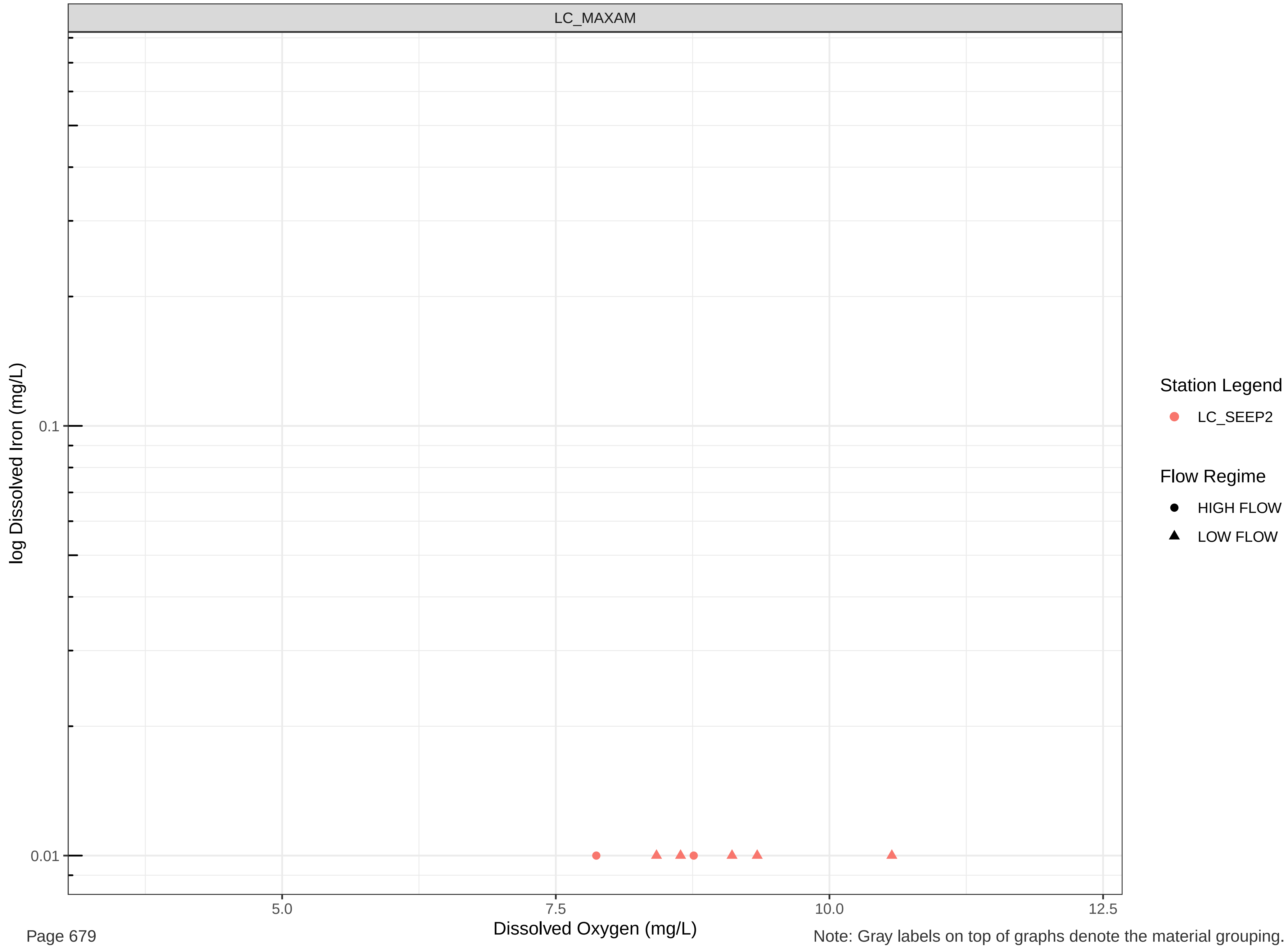

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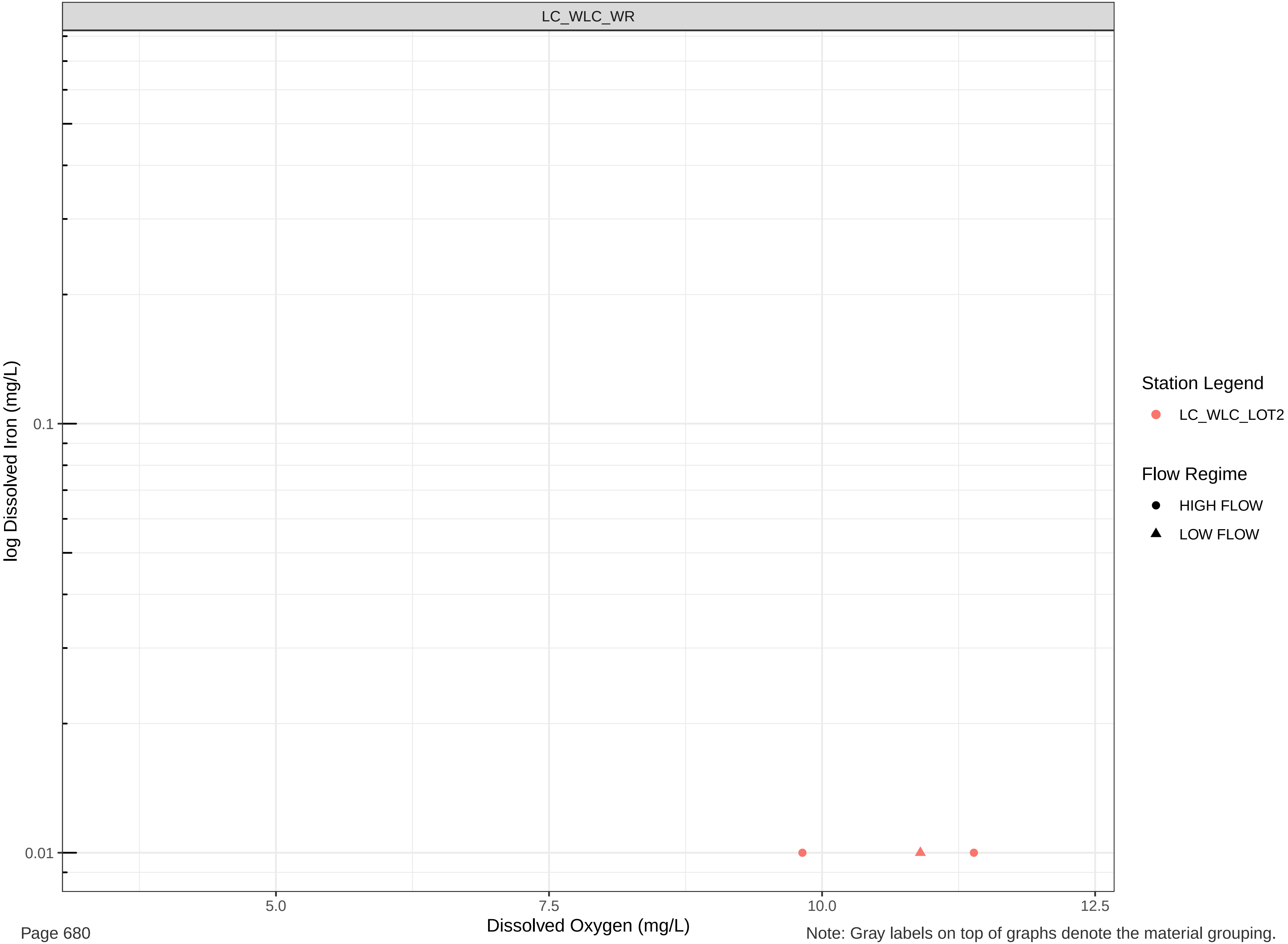

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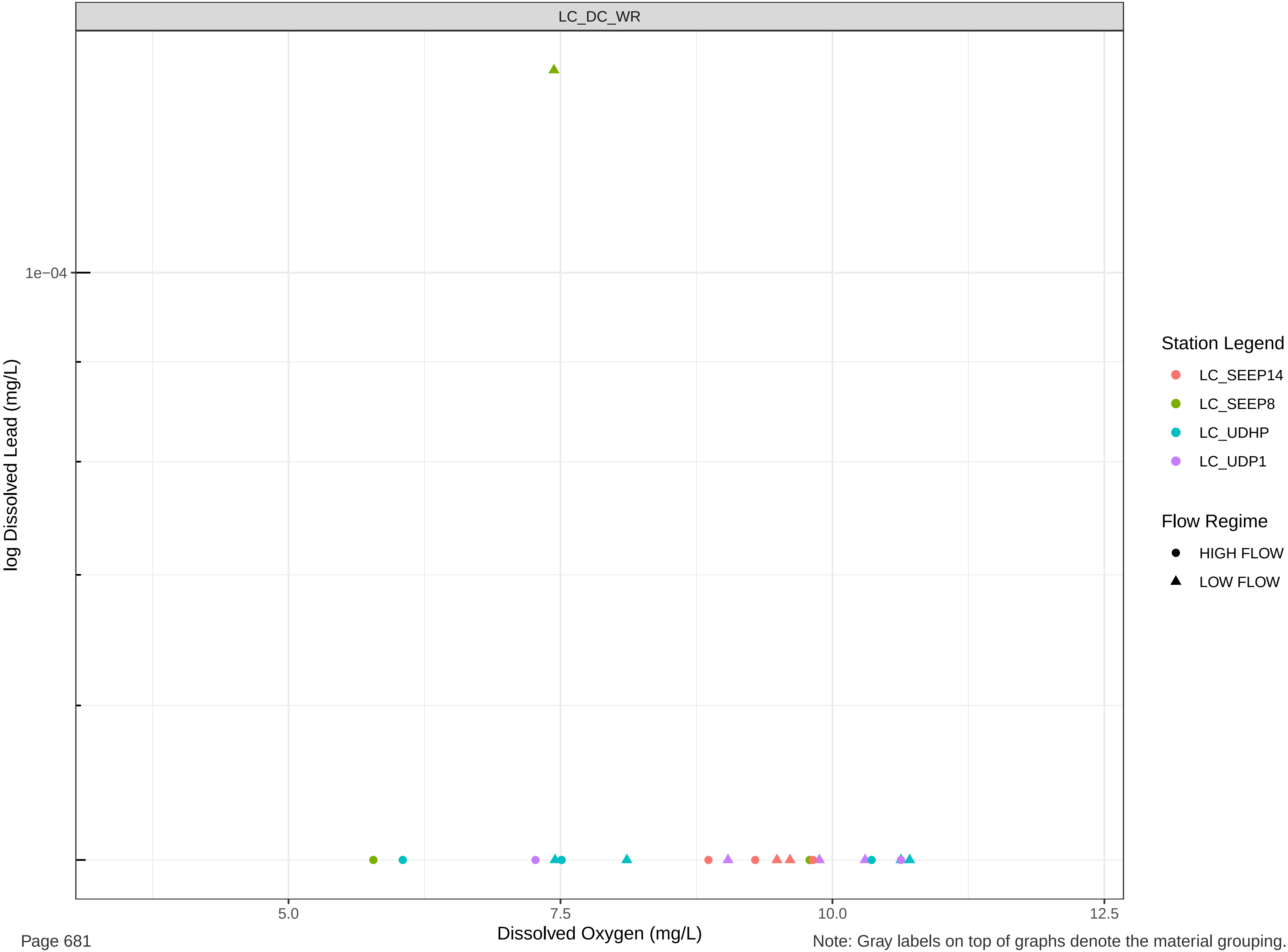

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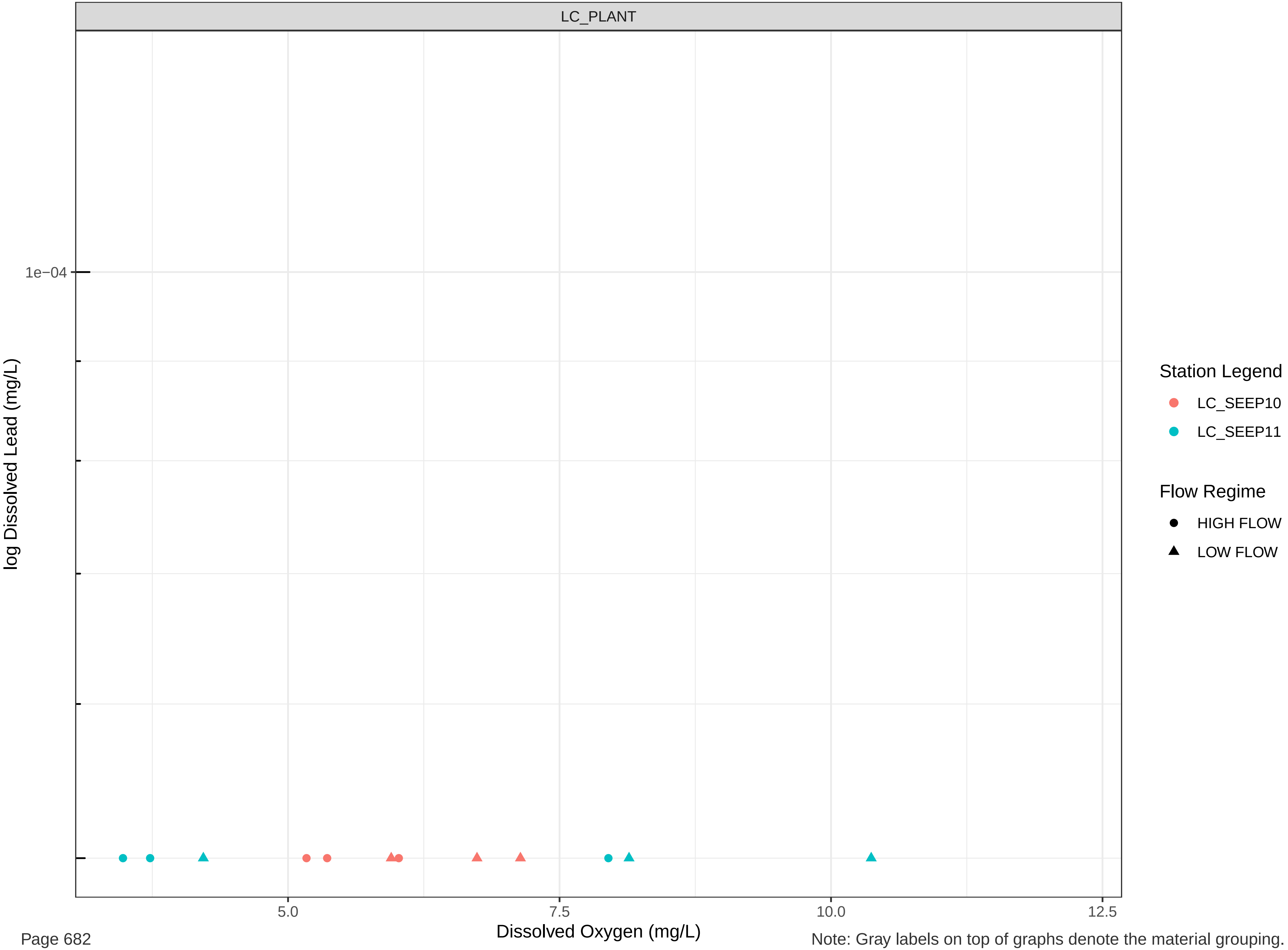

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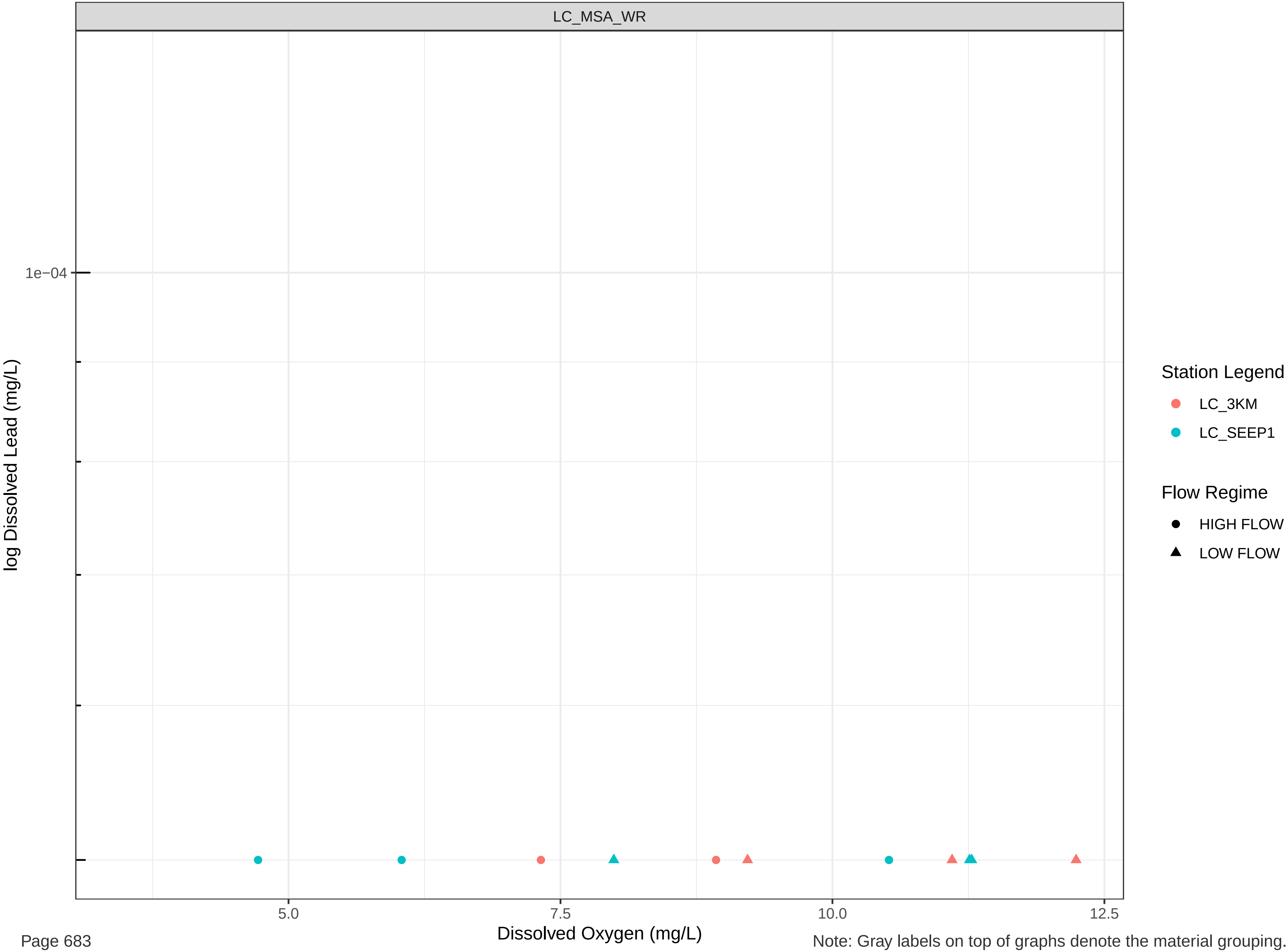

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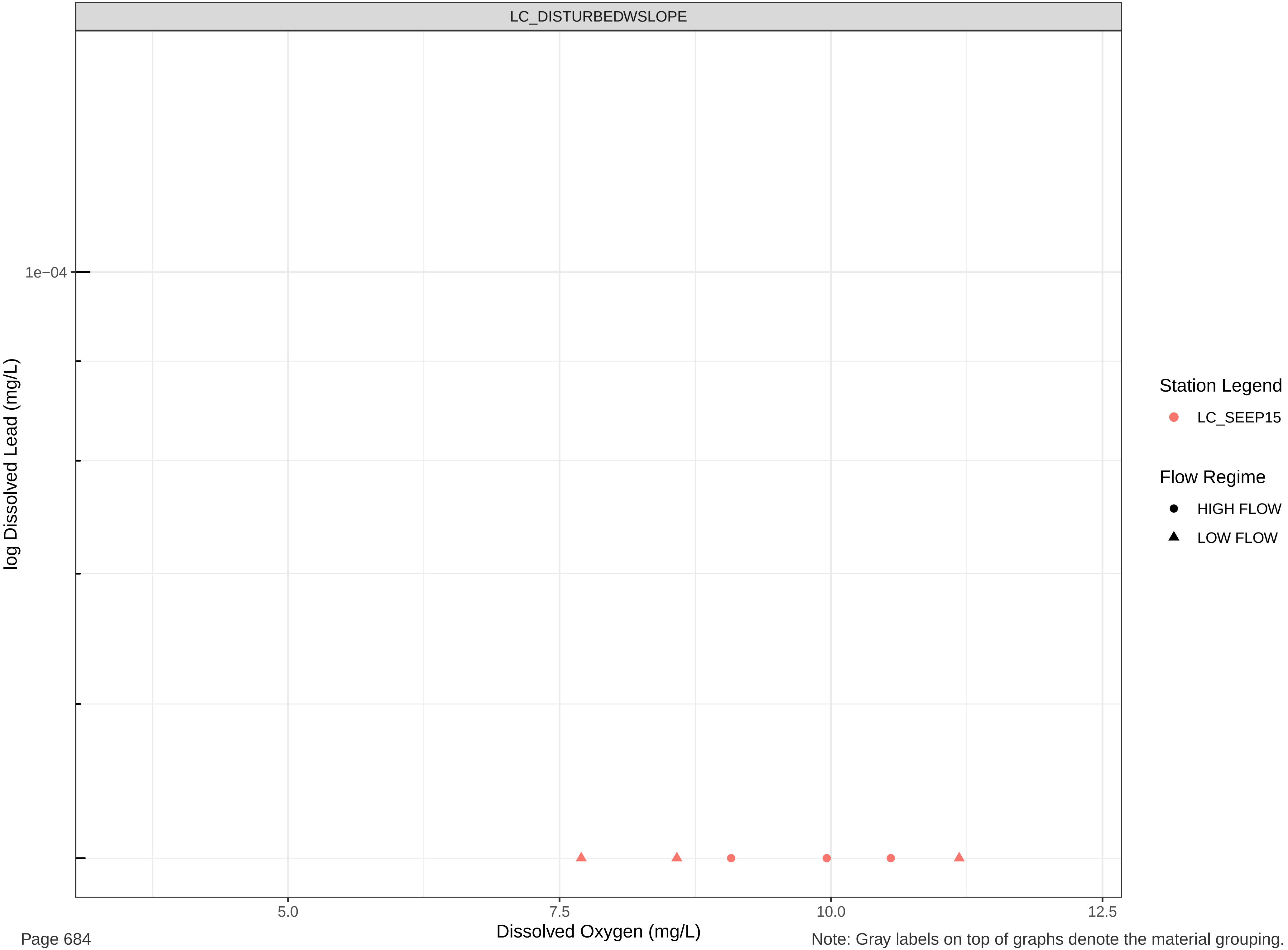
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Dissolved Oxygen (mg/L)
Station Legend
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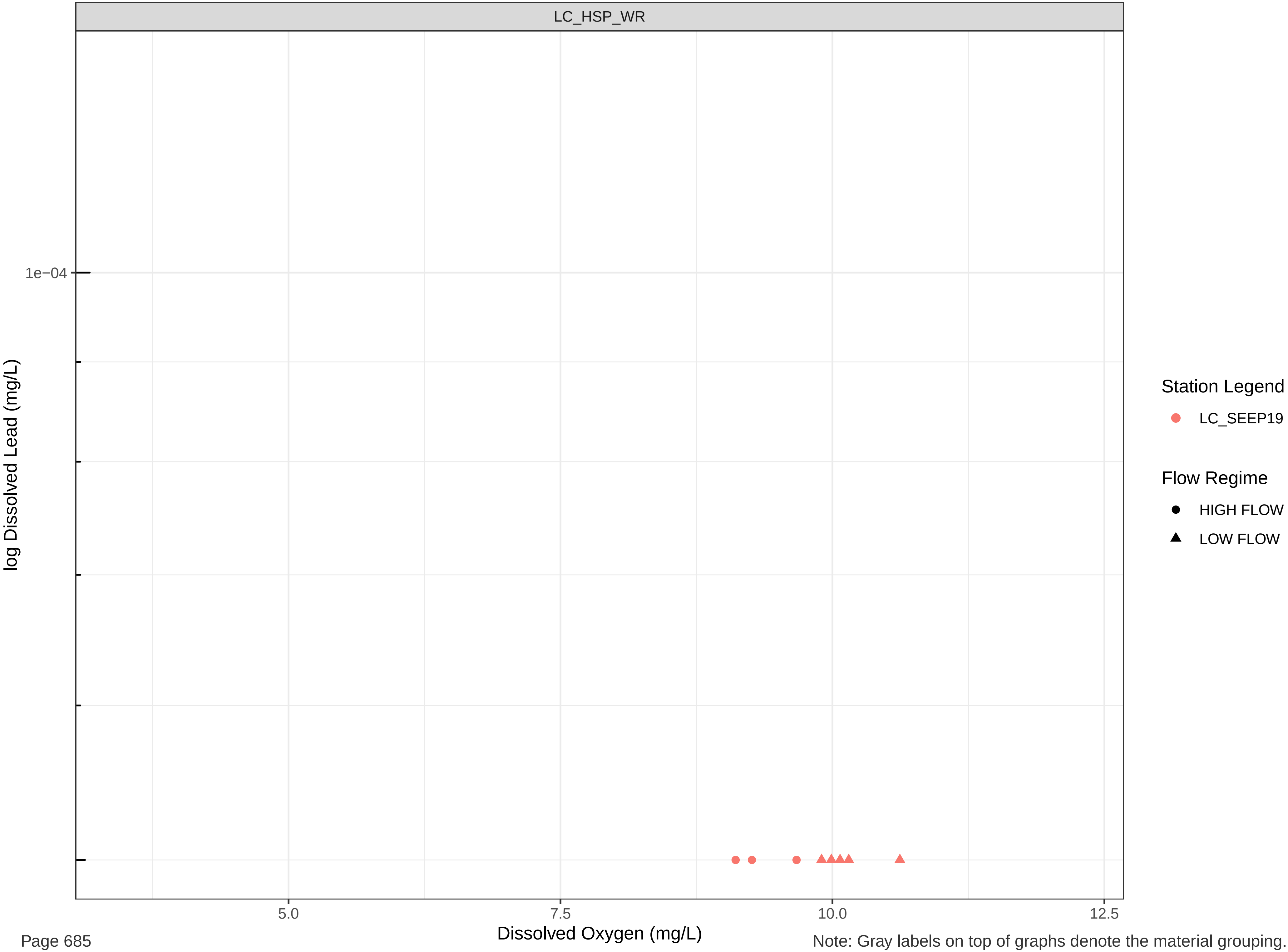
LOW FLOW



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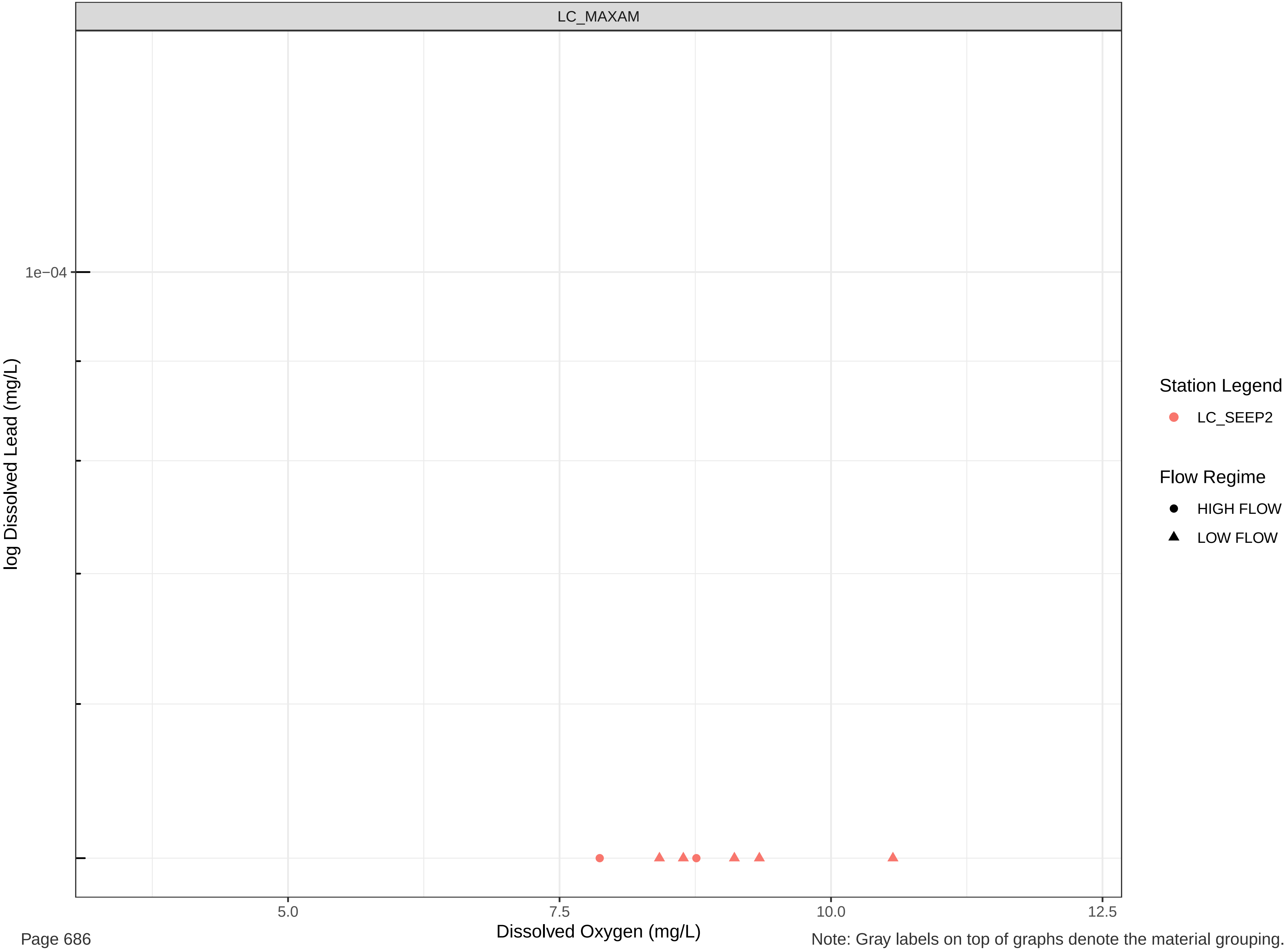

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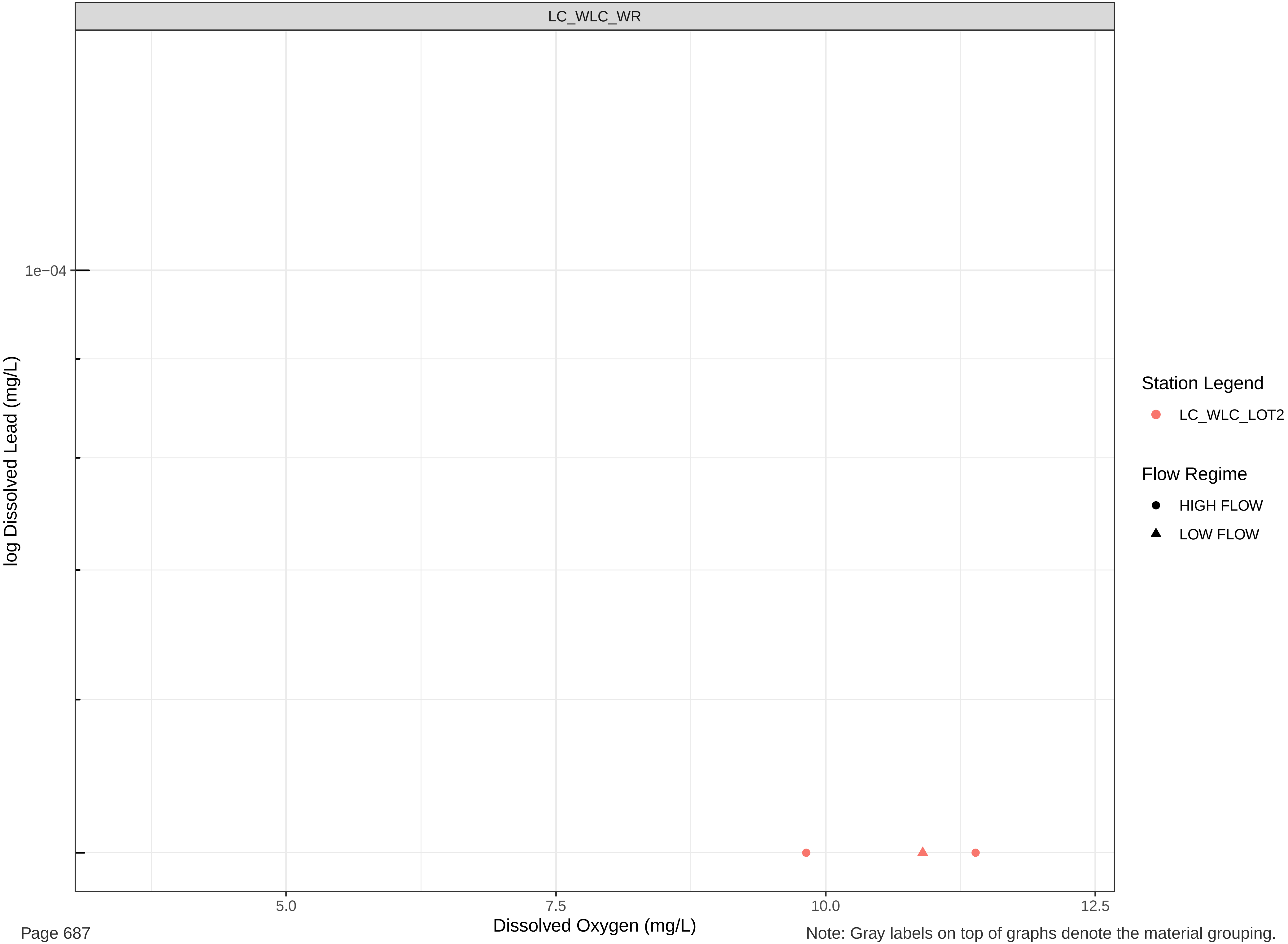

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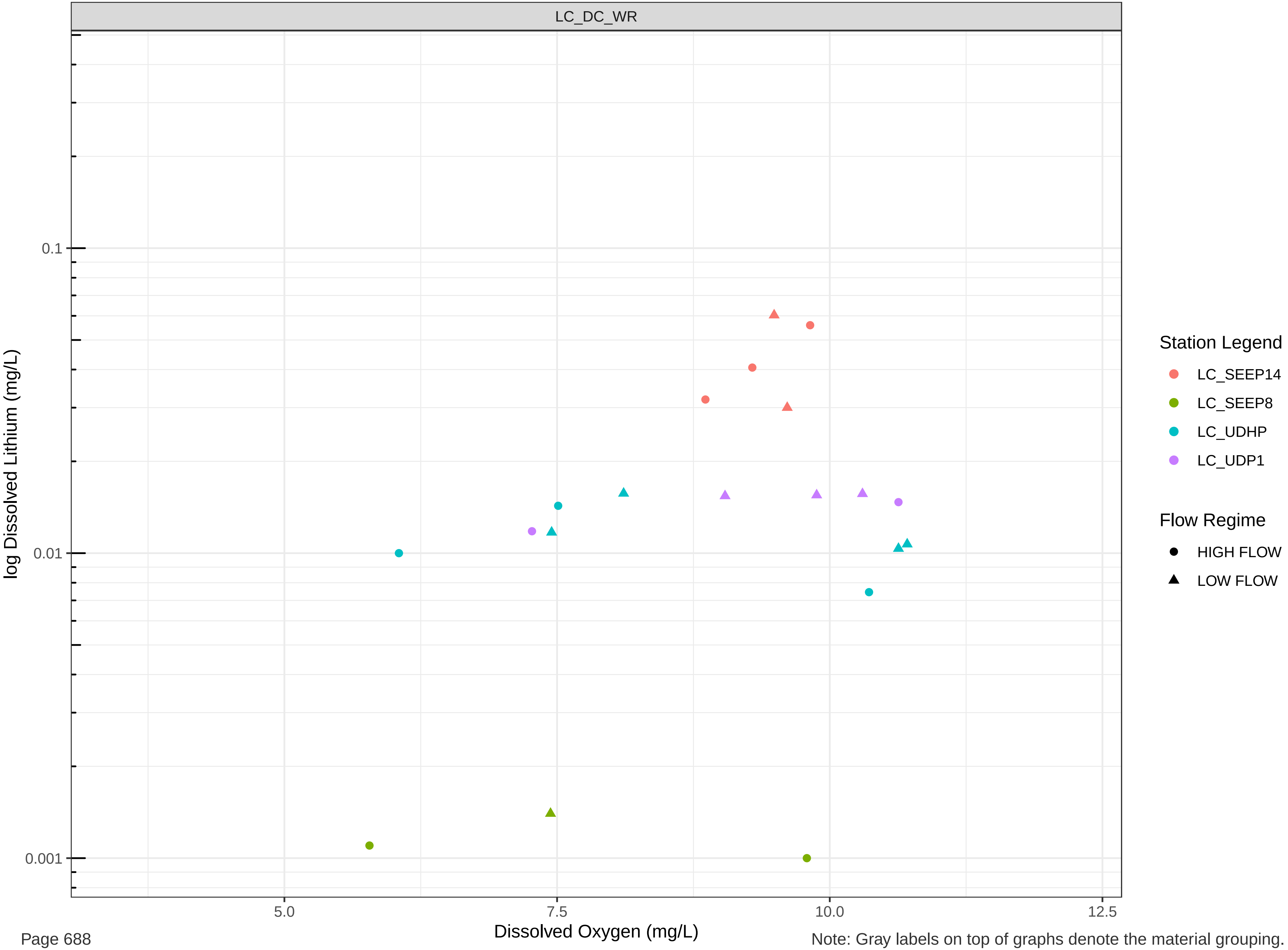

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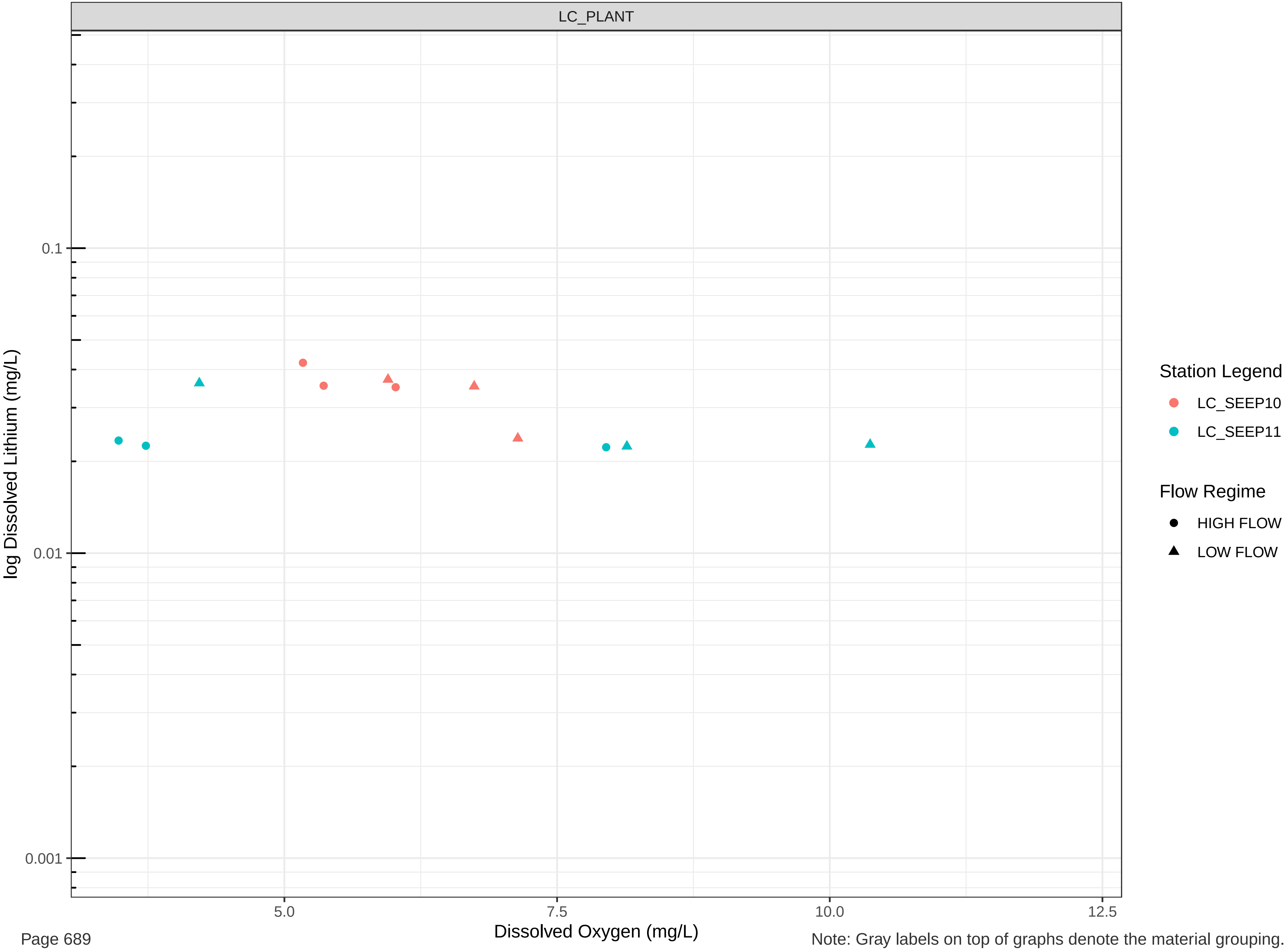

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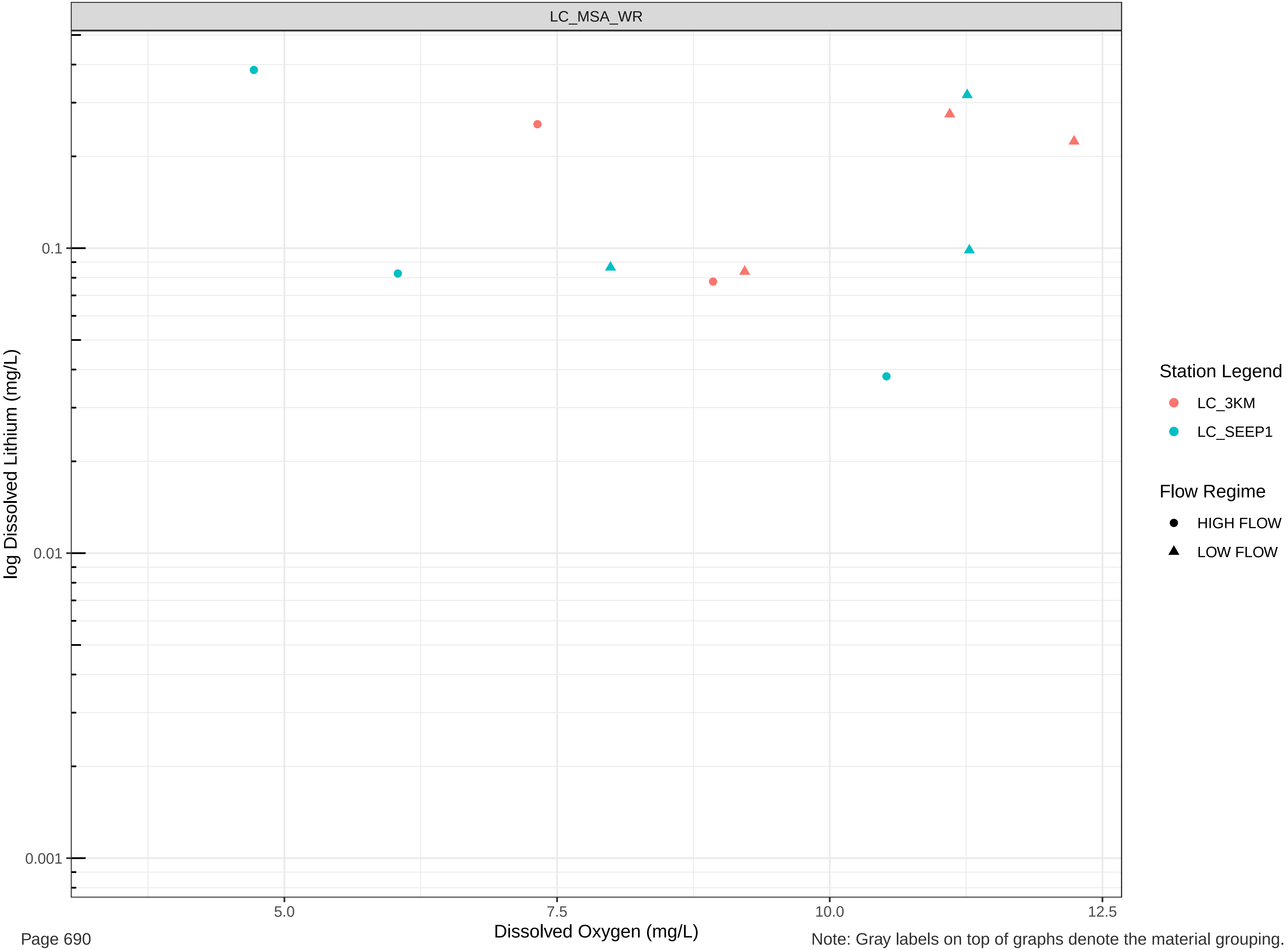

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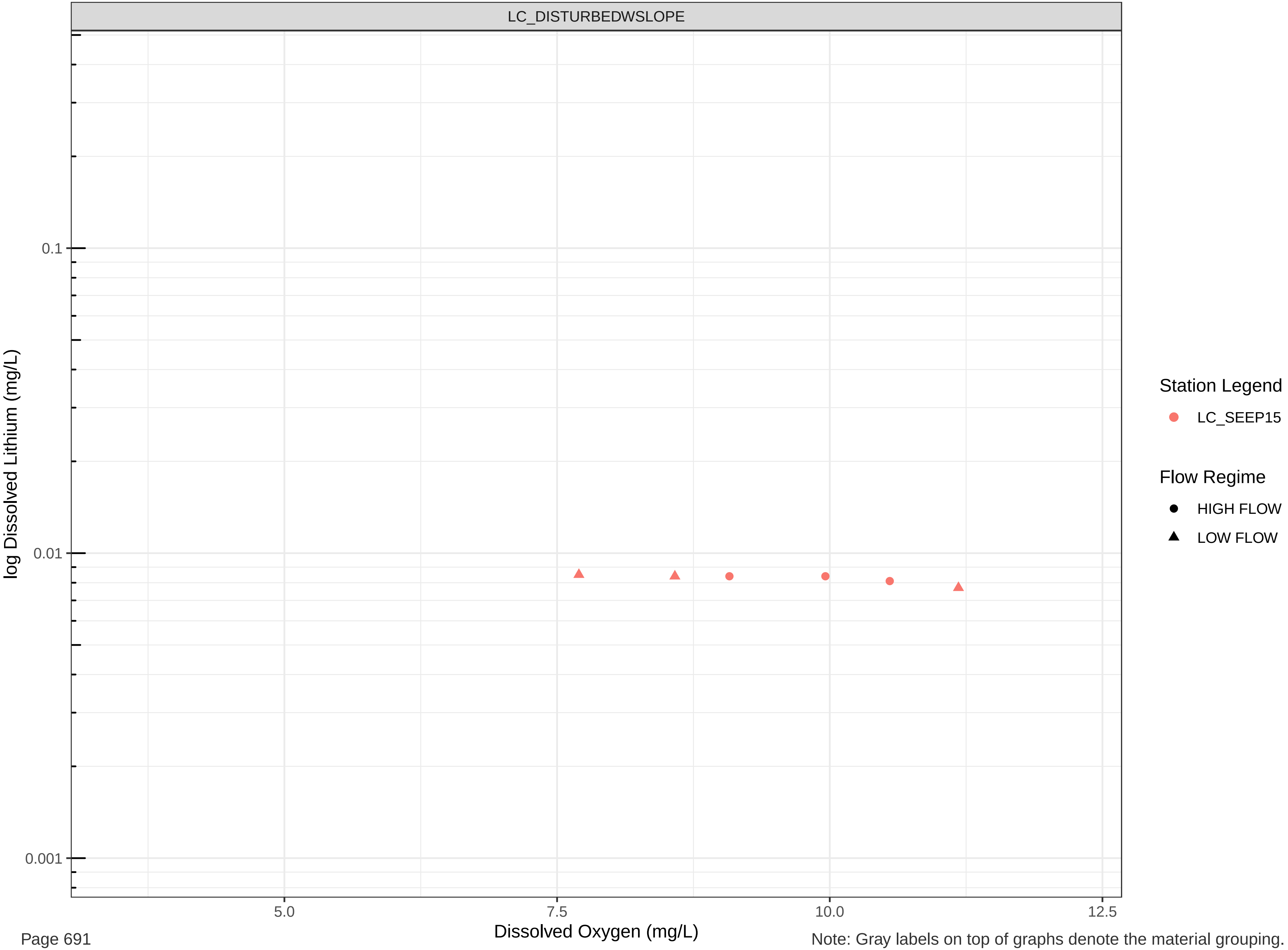

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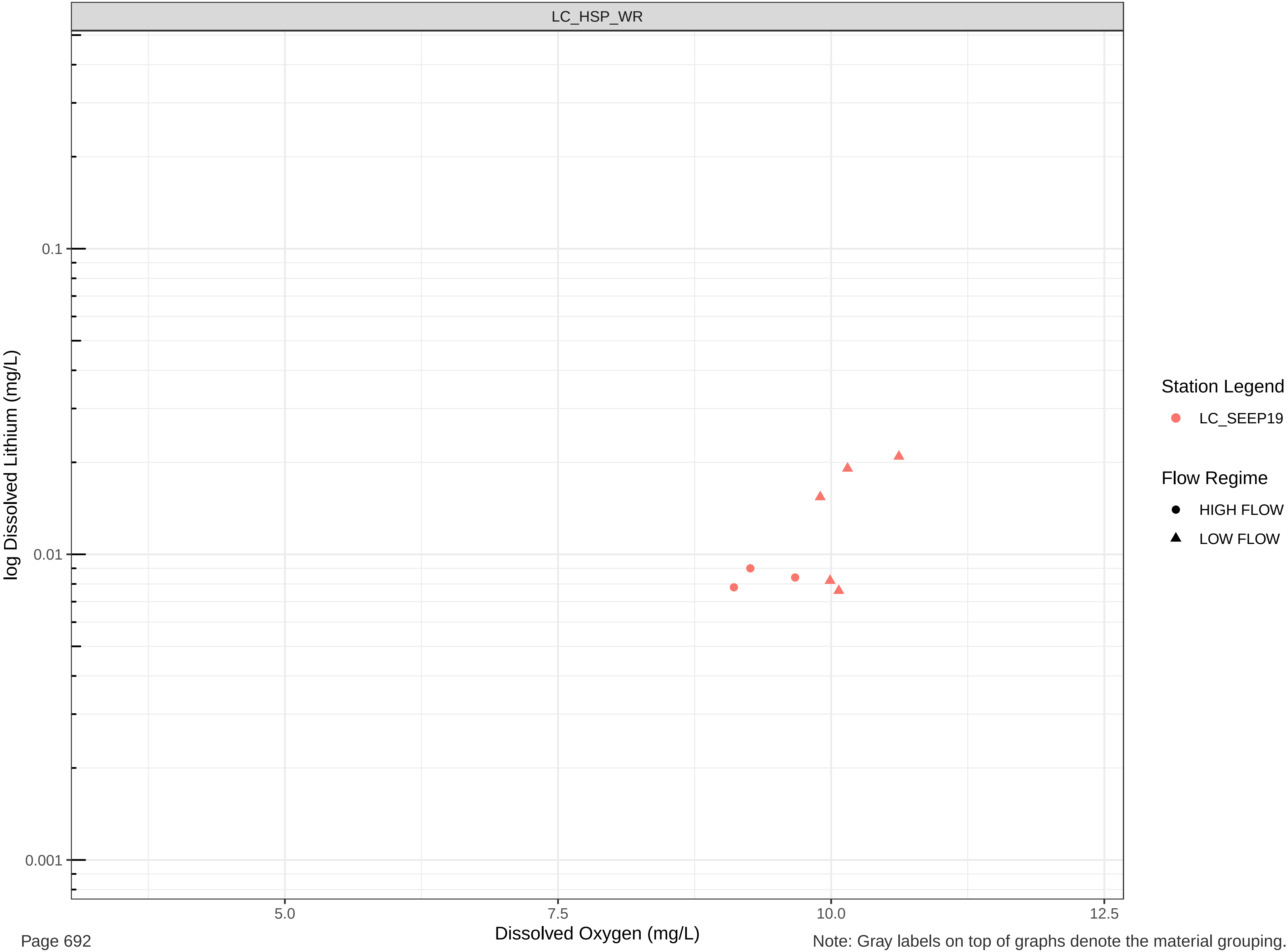

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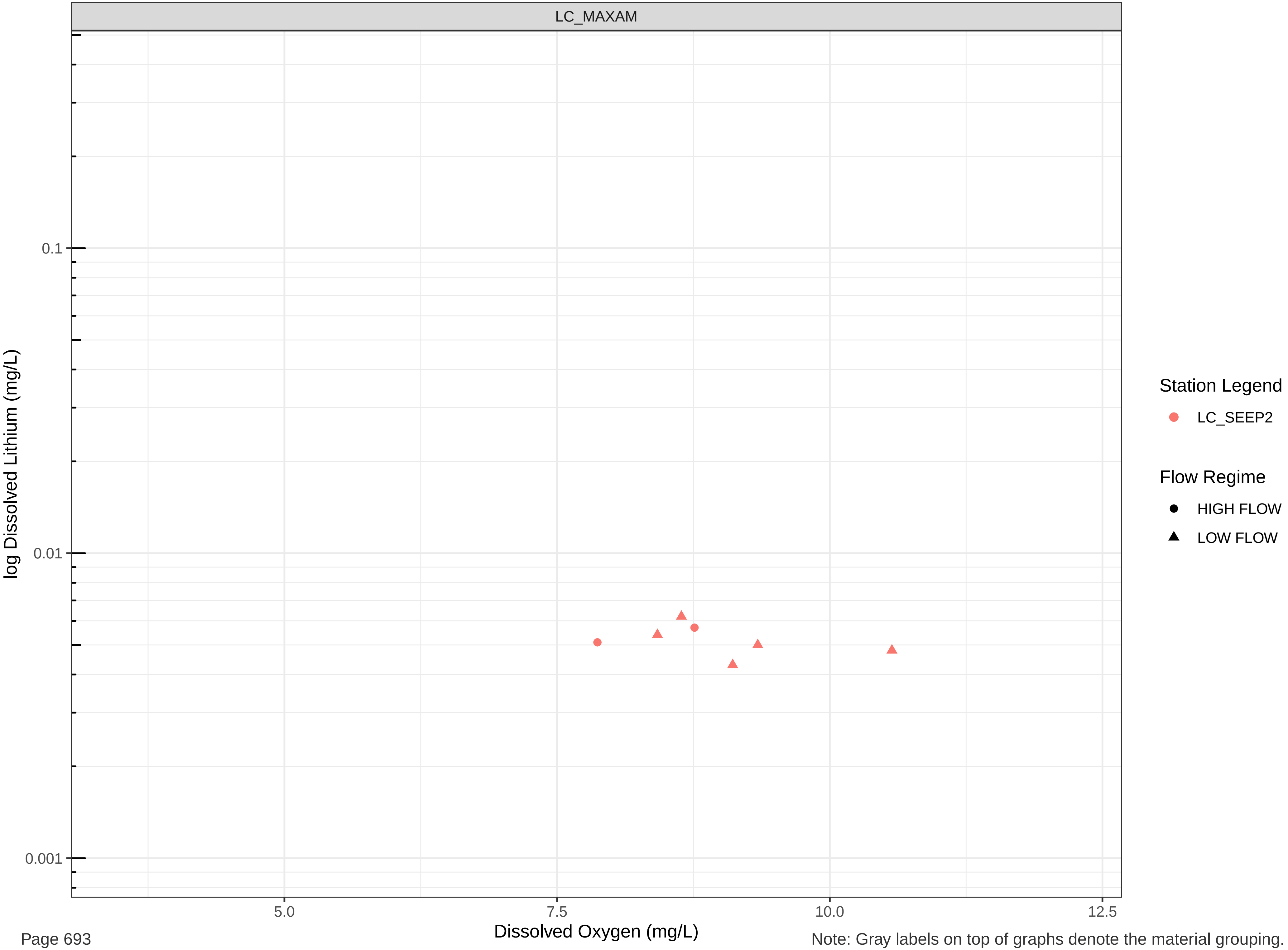

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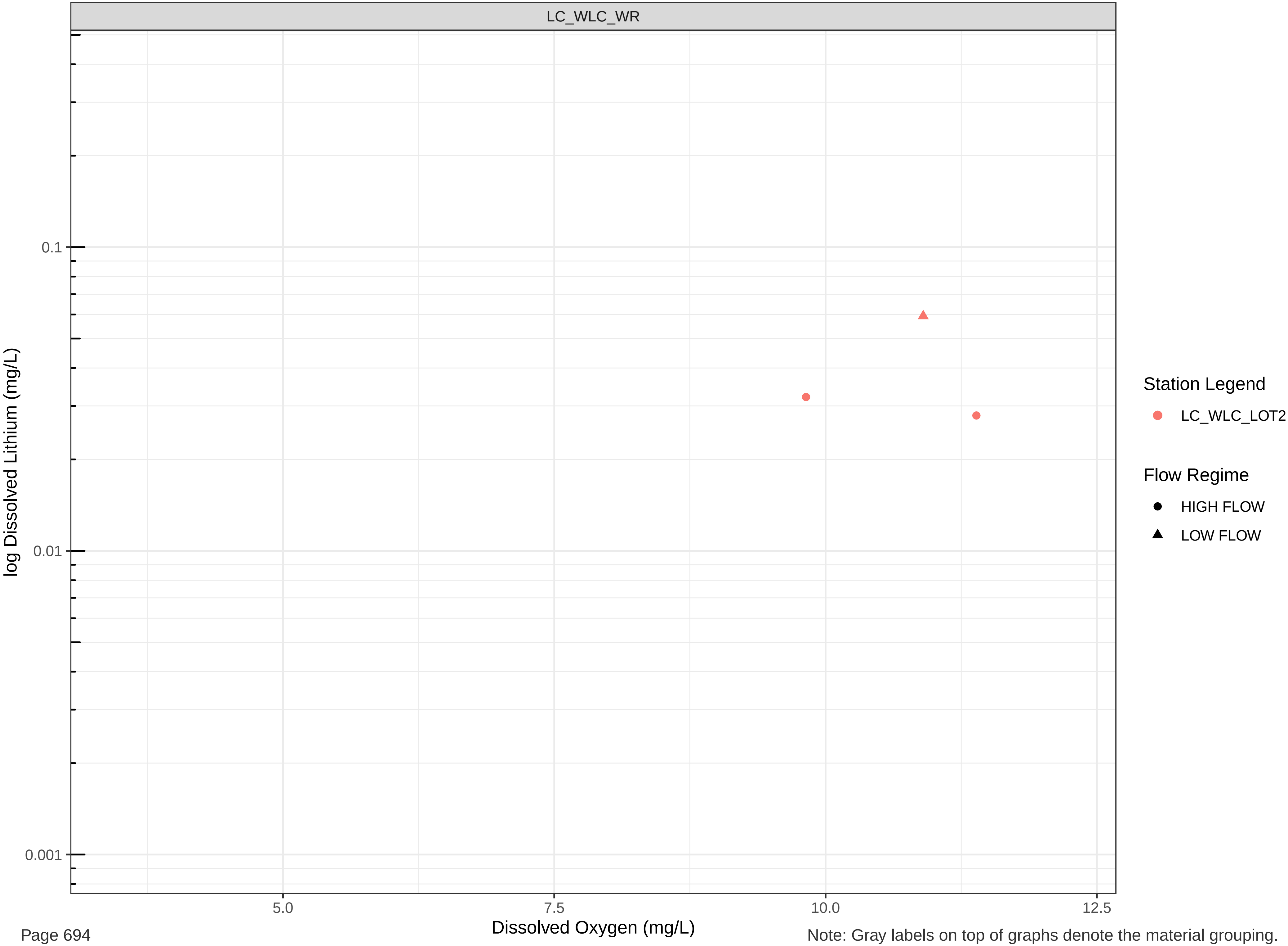

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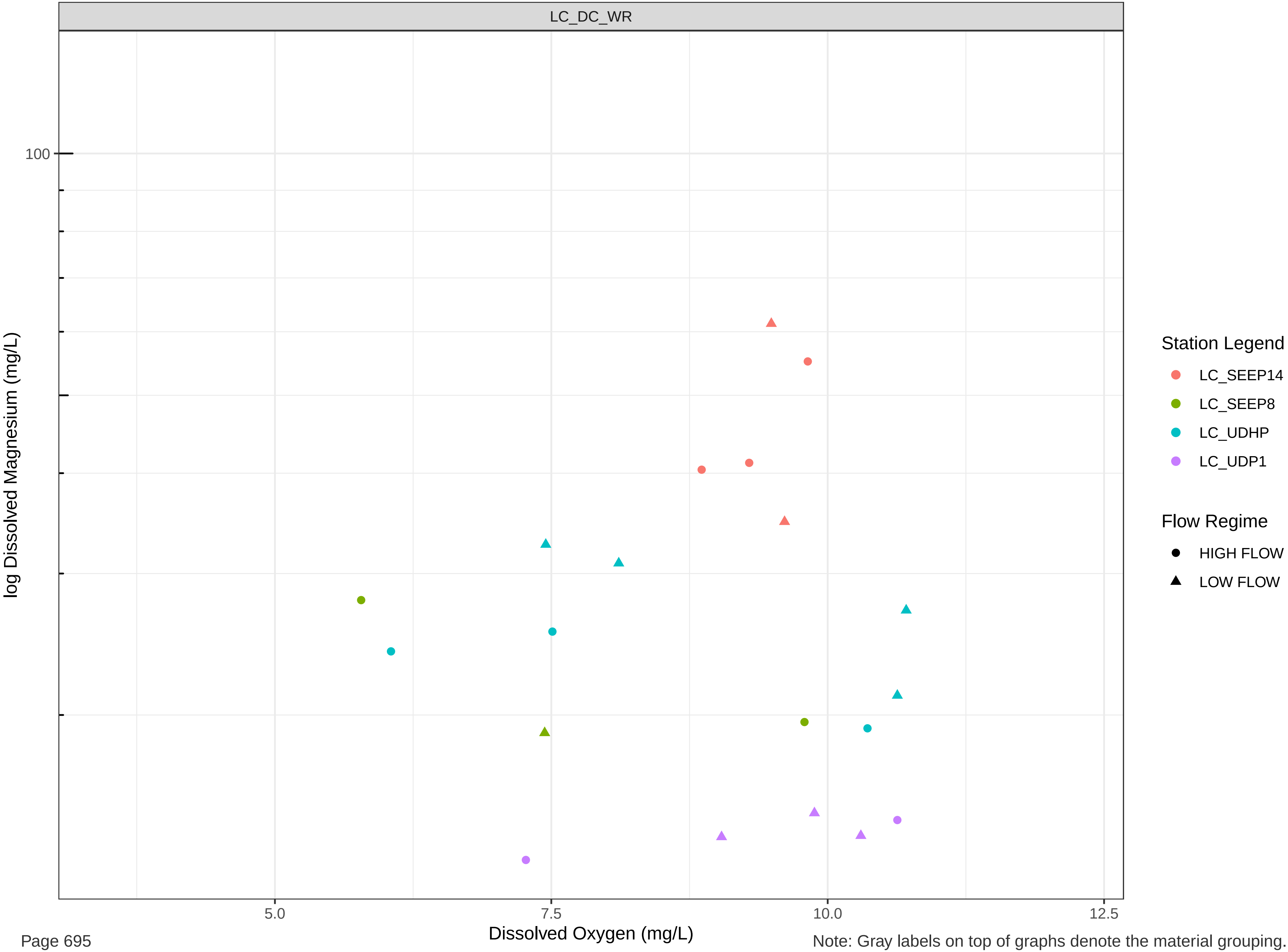

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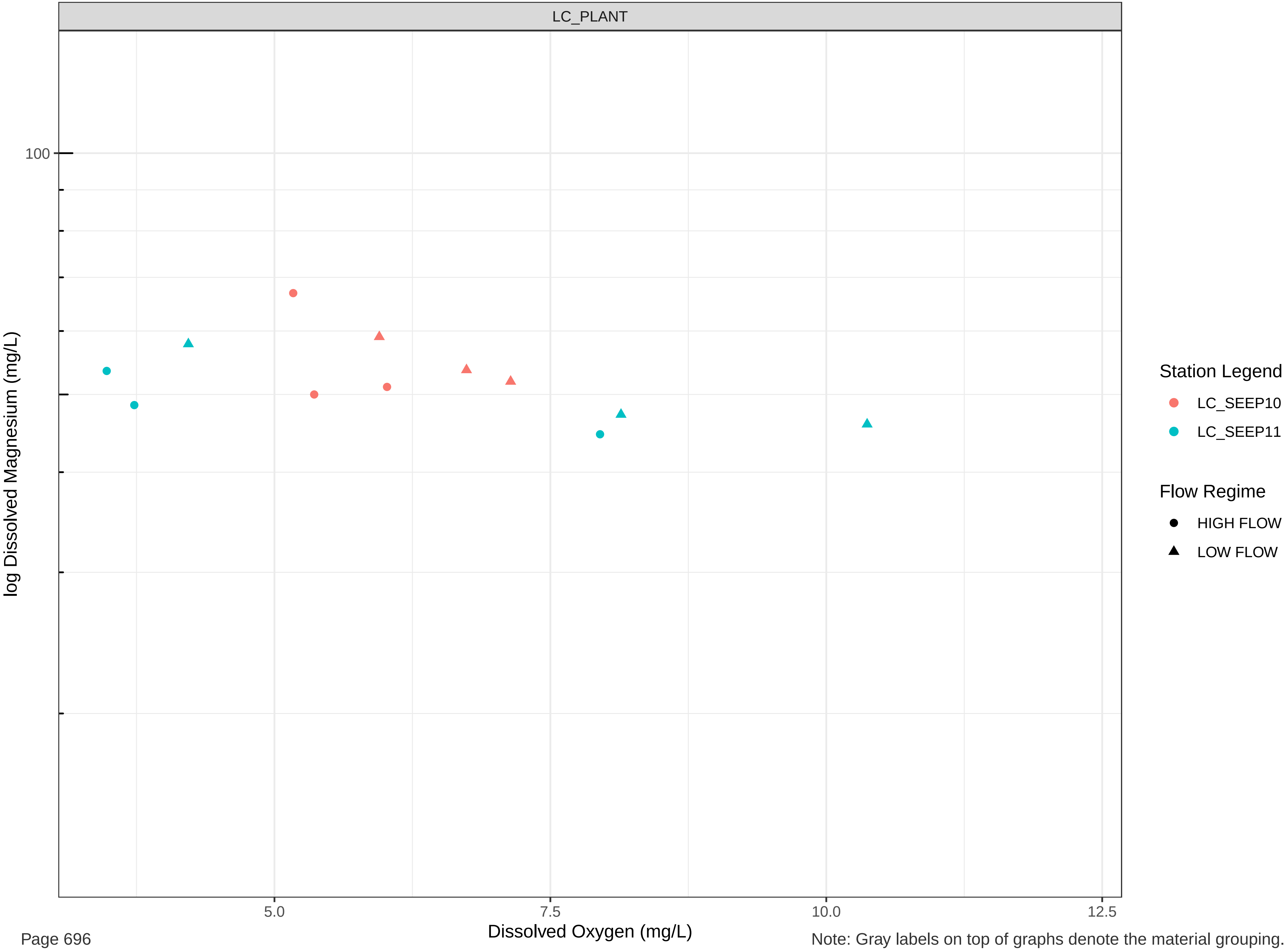

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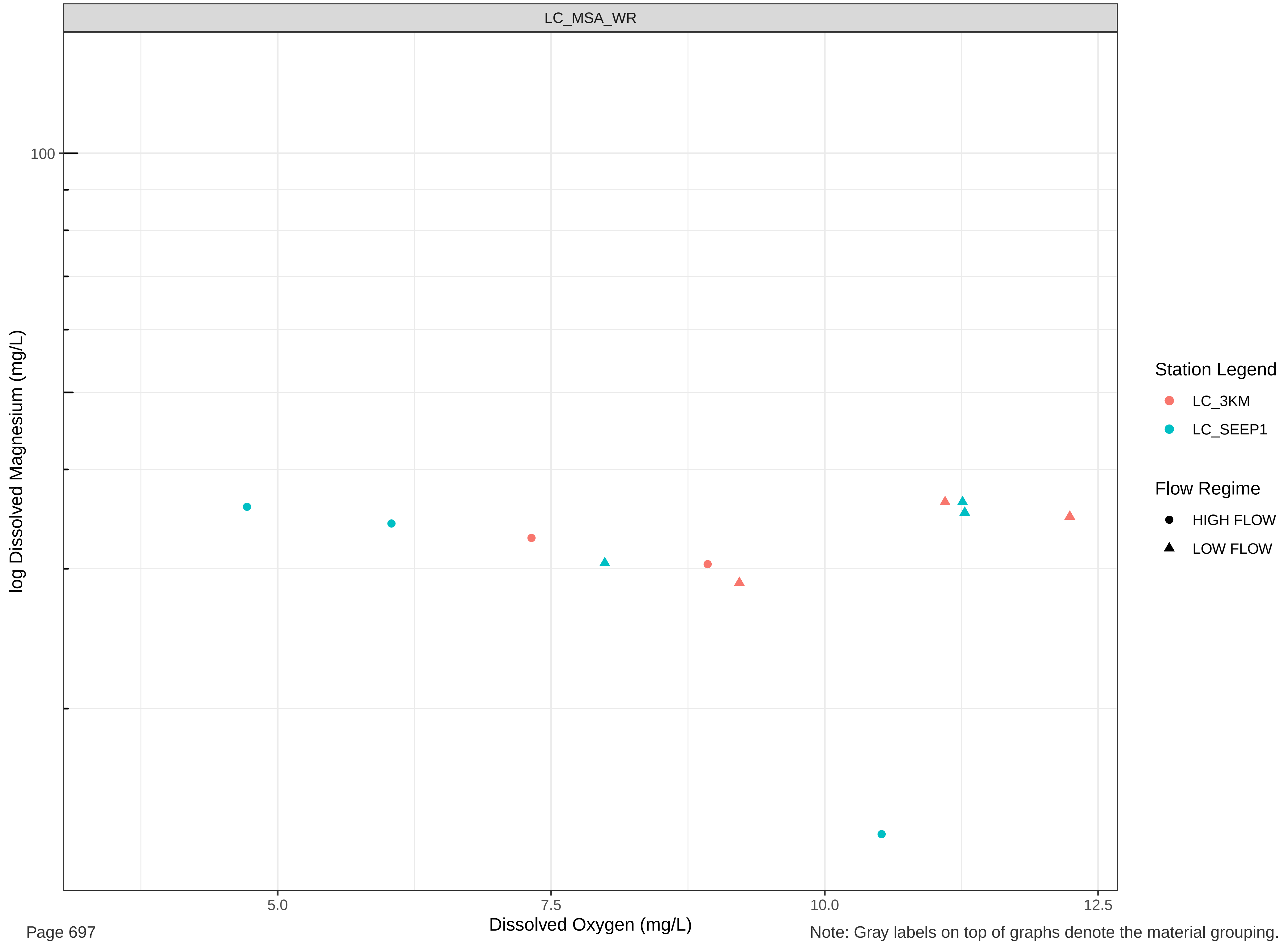

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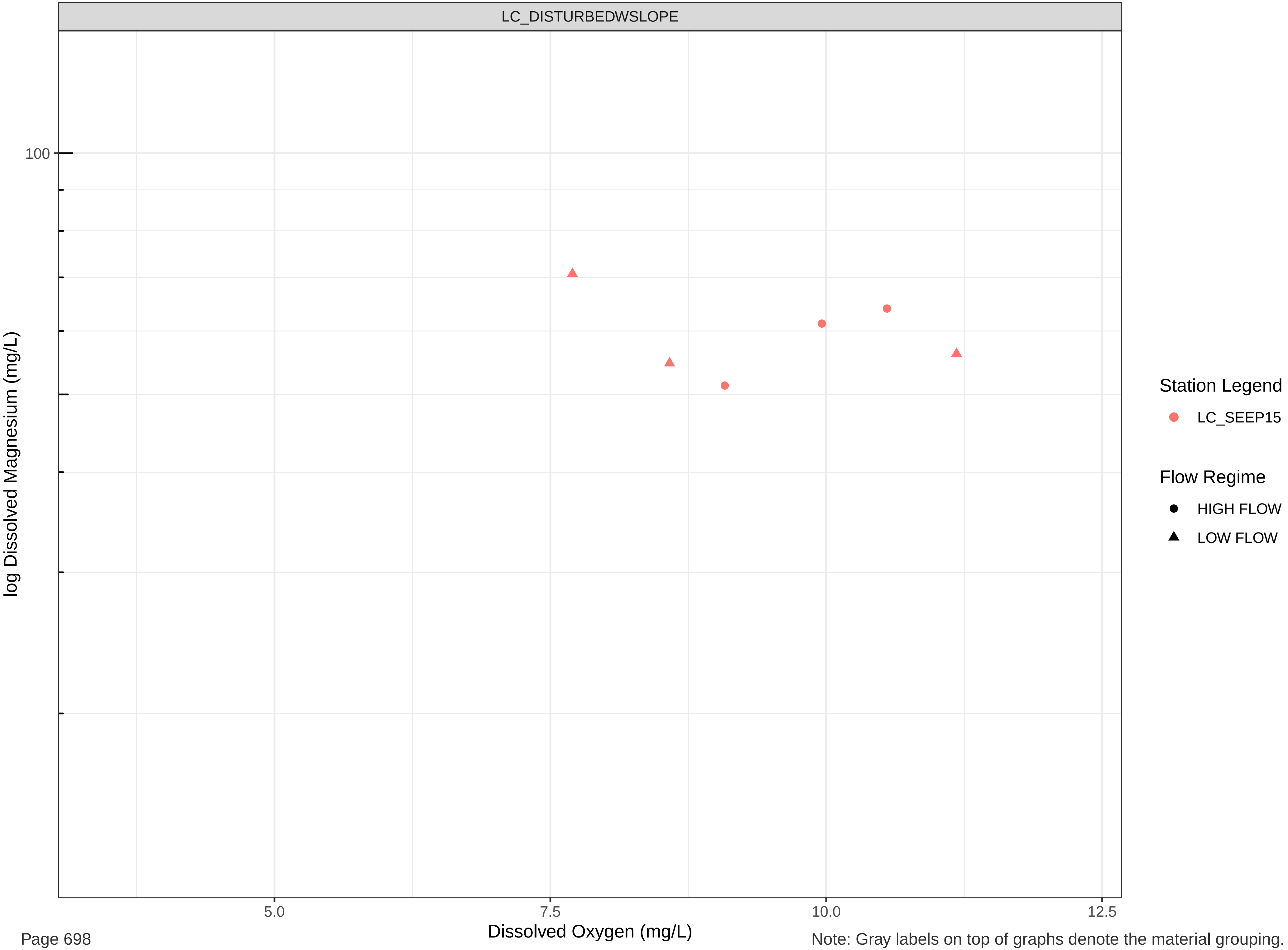

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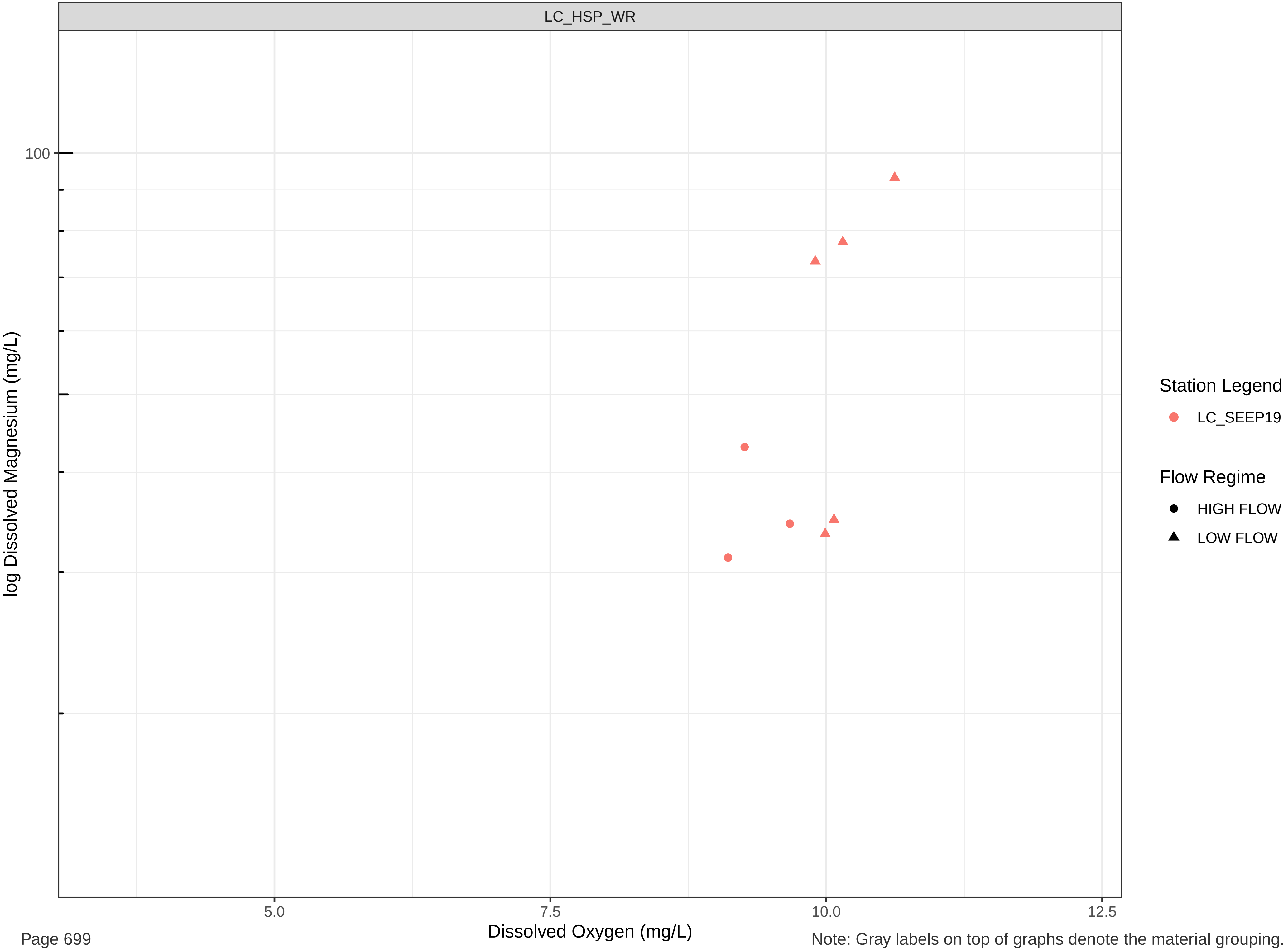

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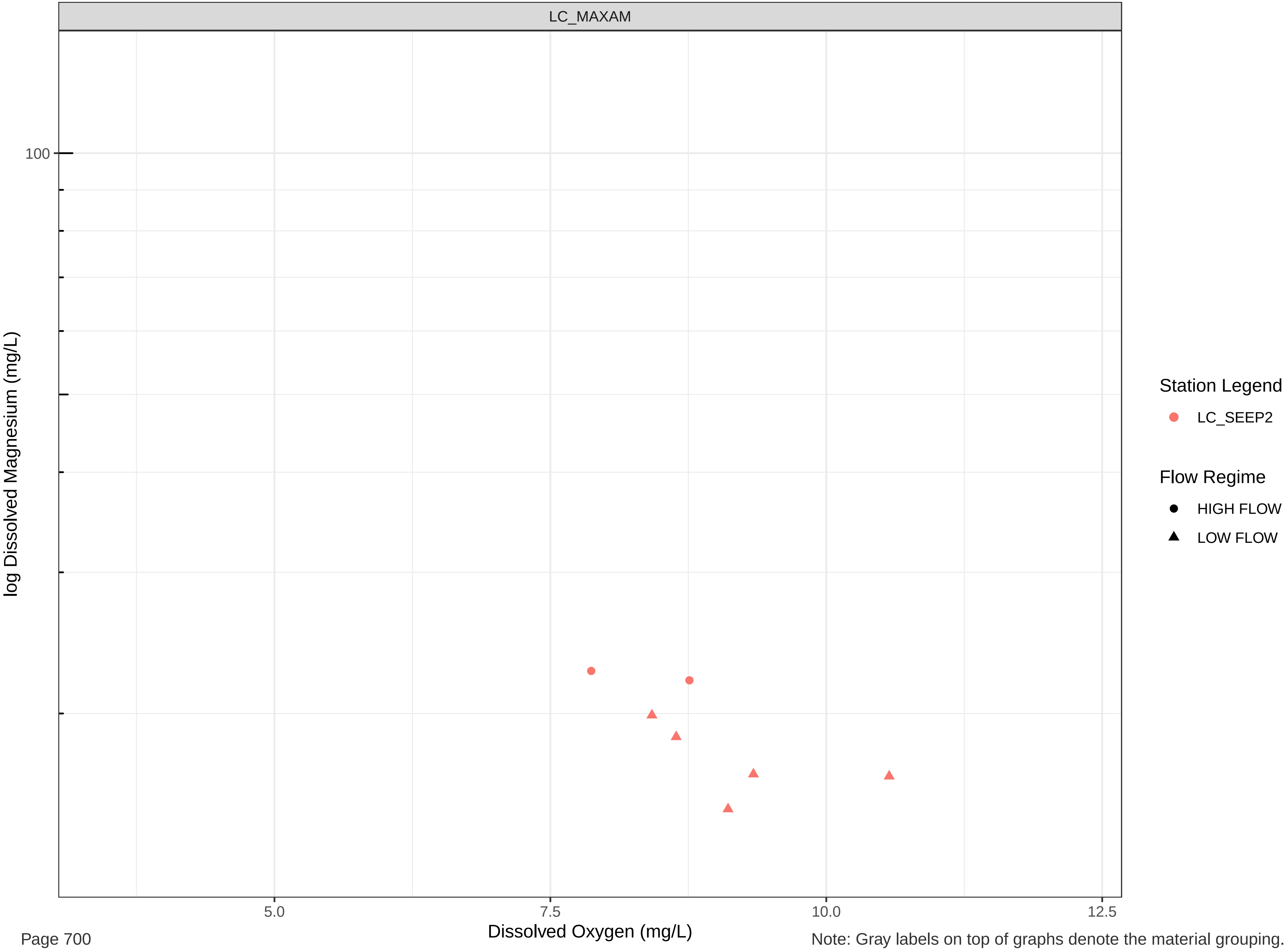

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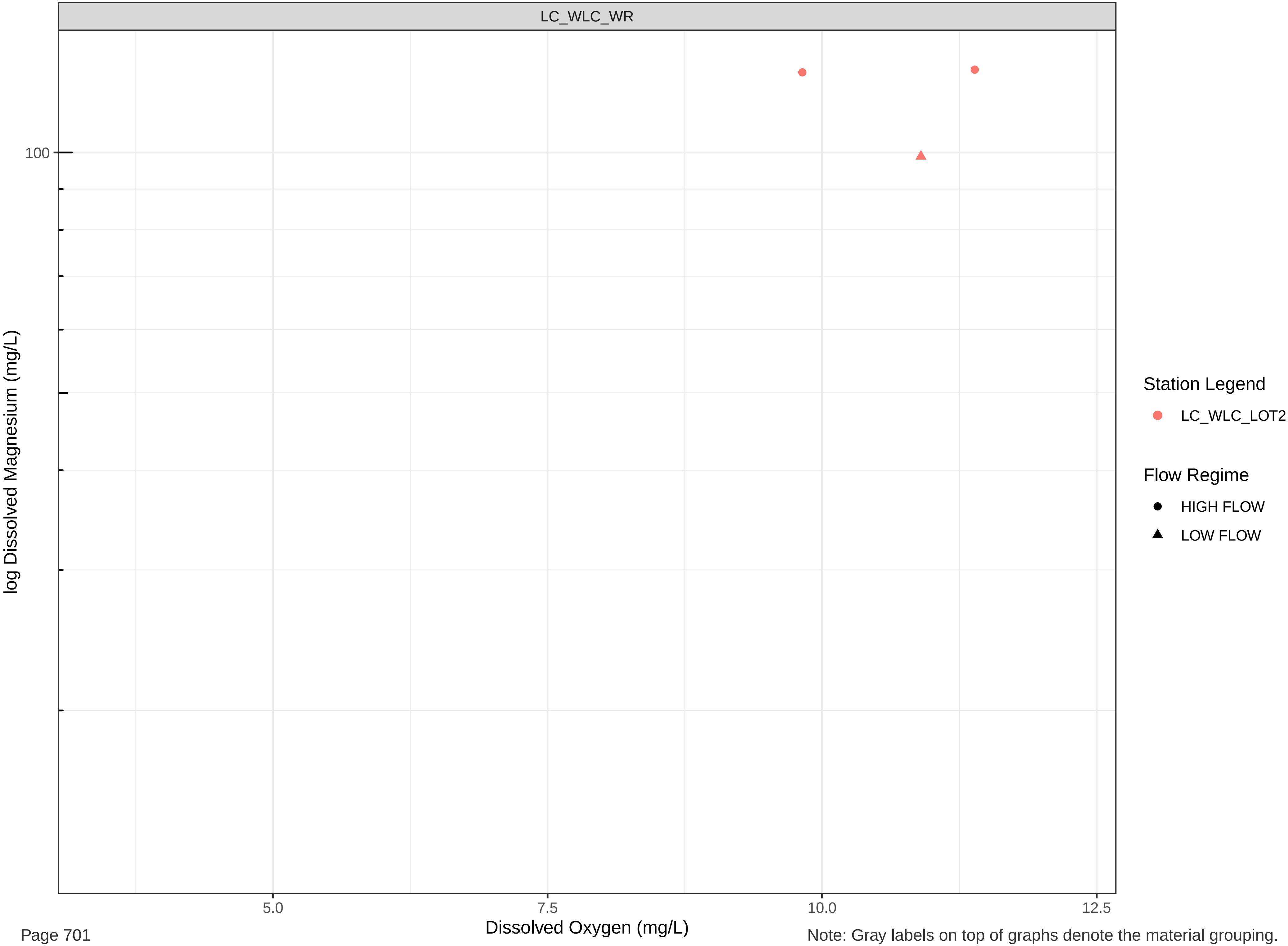

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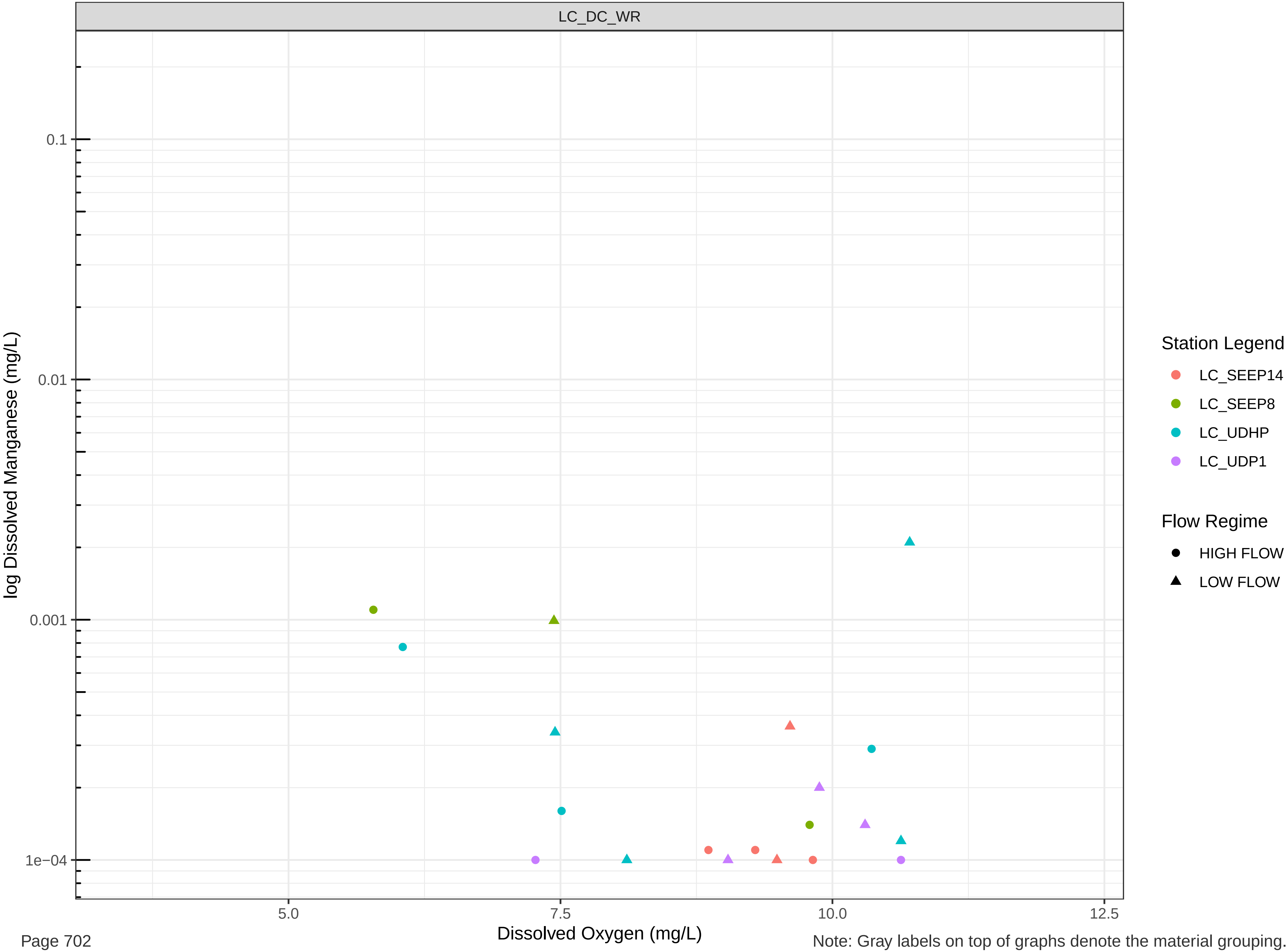

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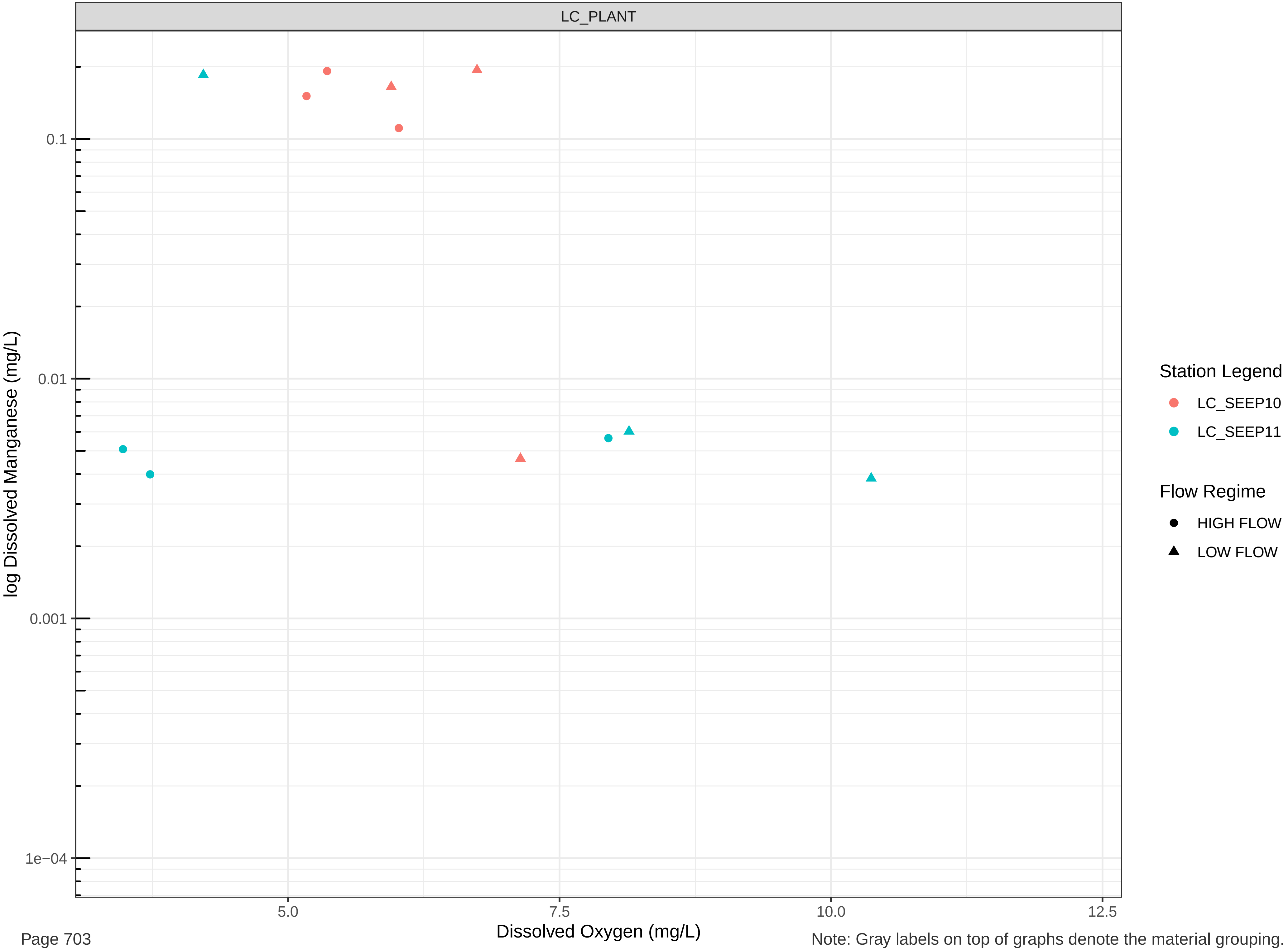

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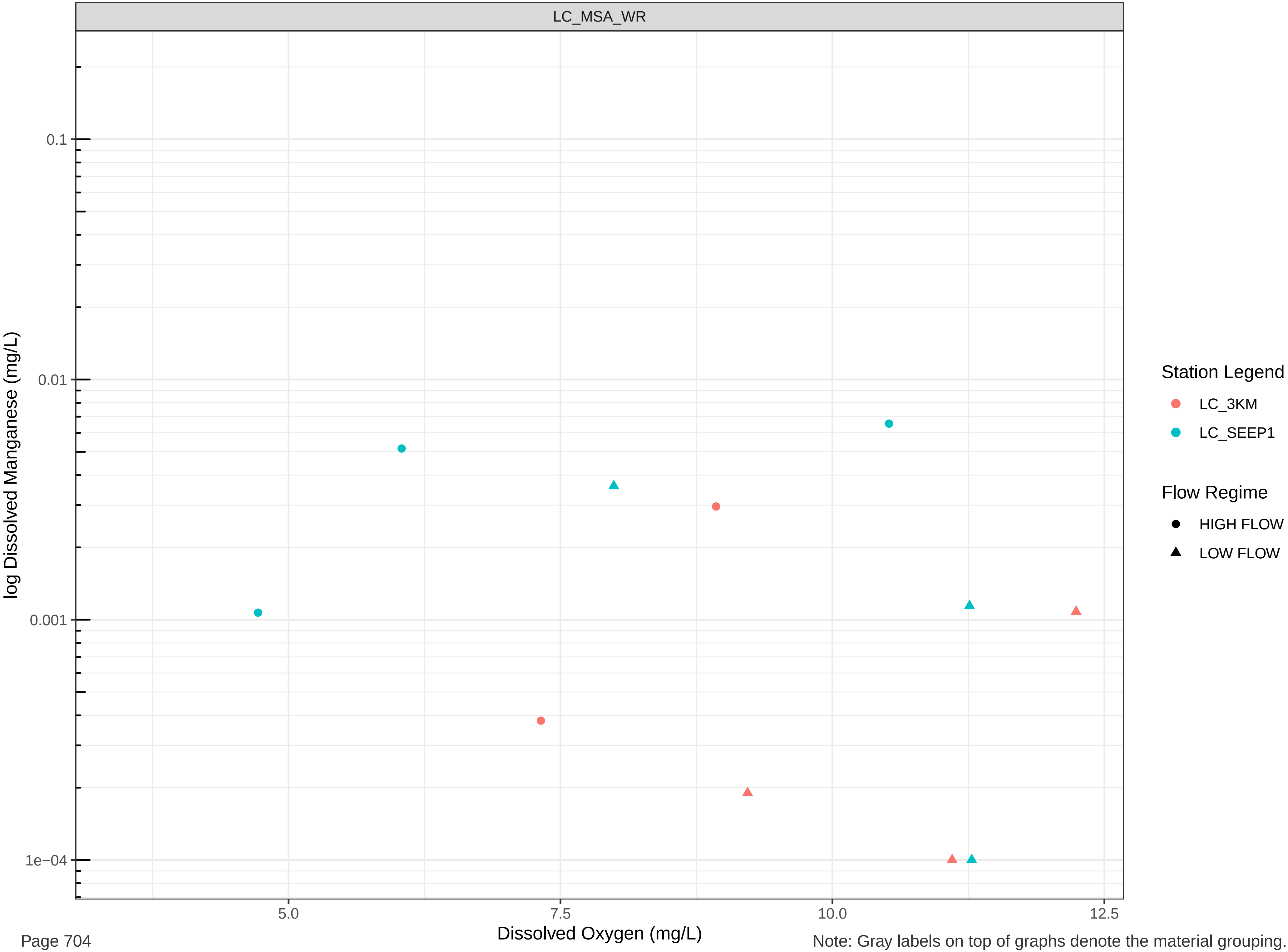

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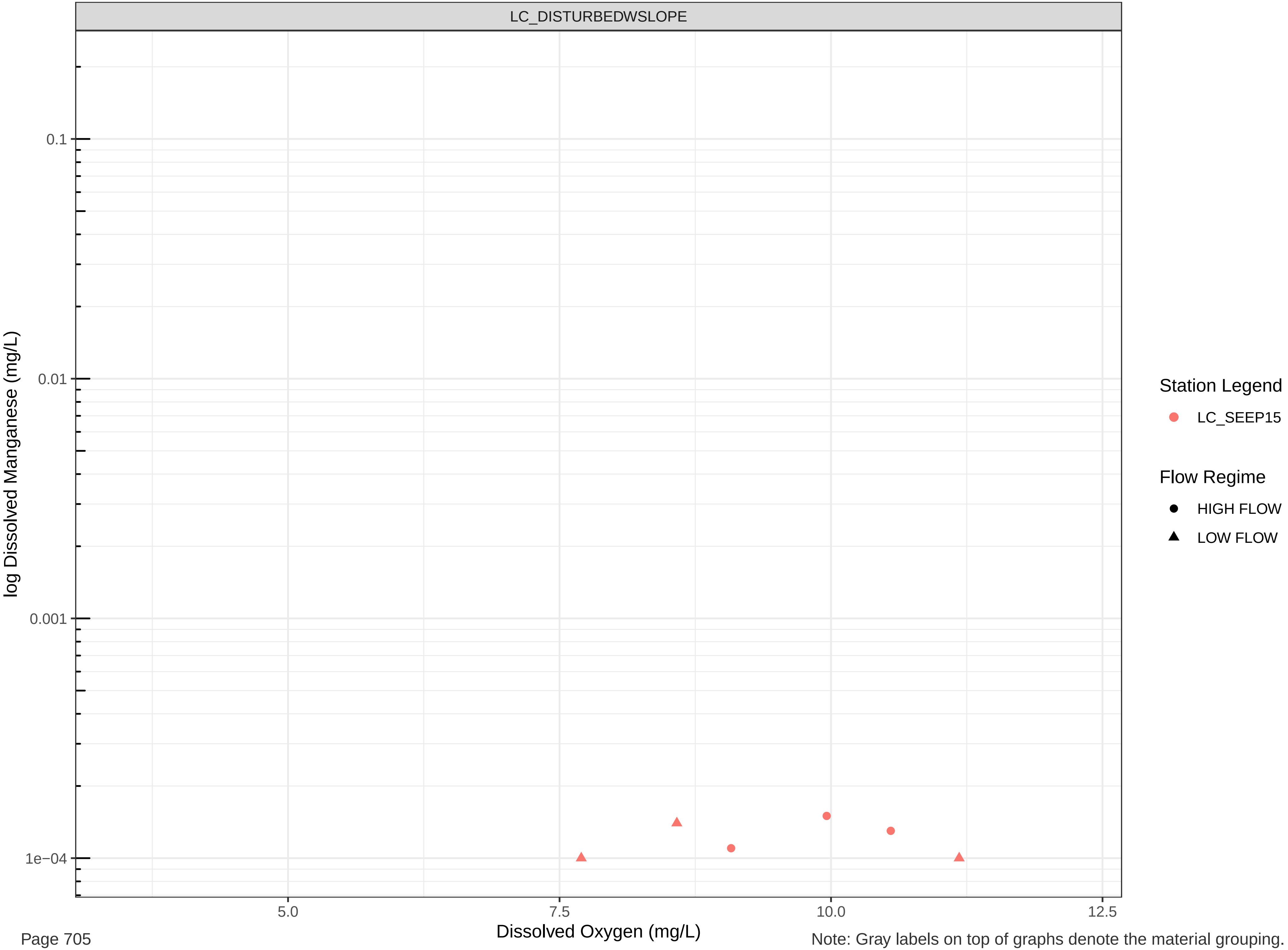

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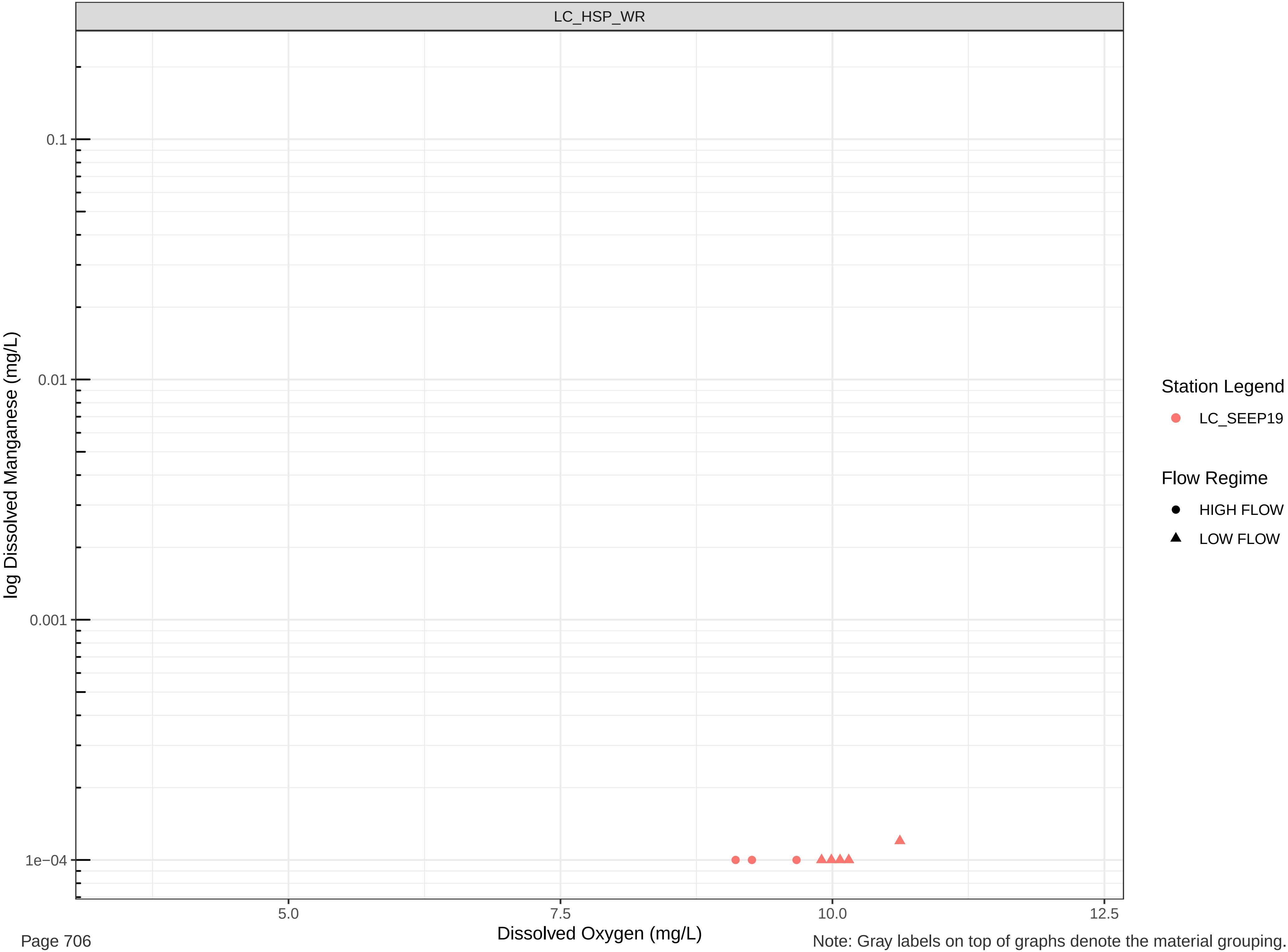

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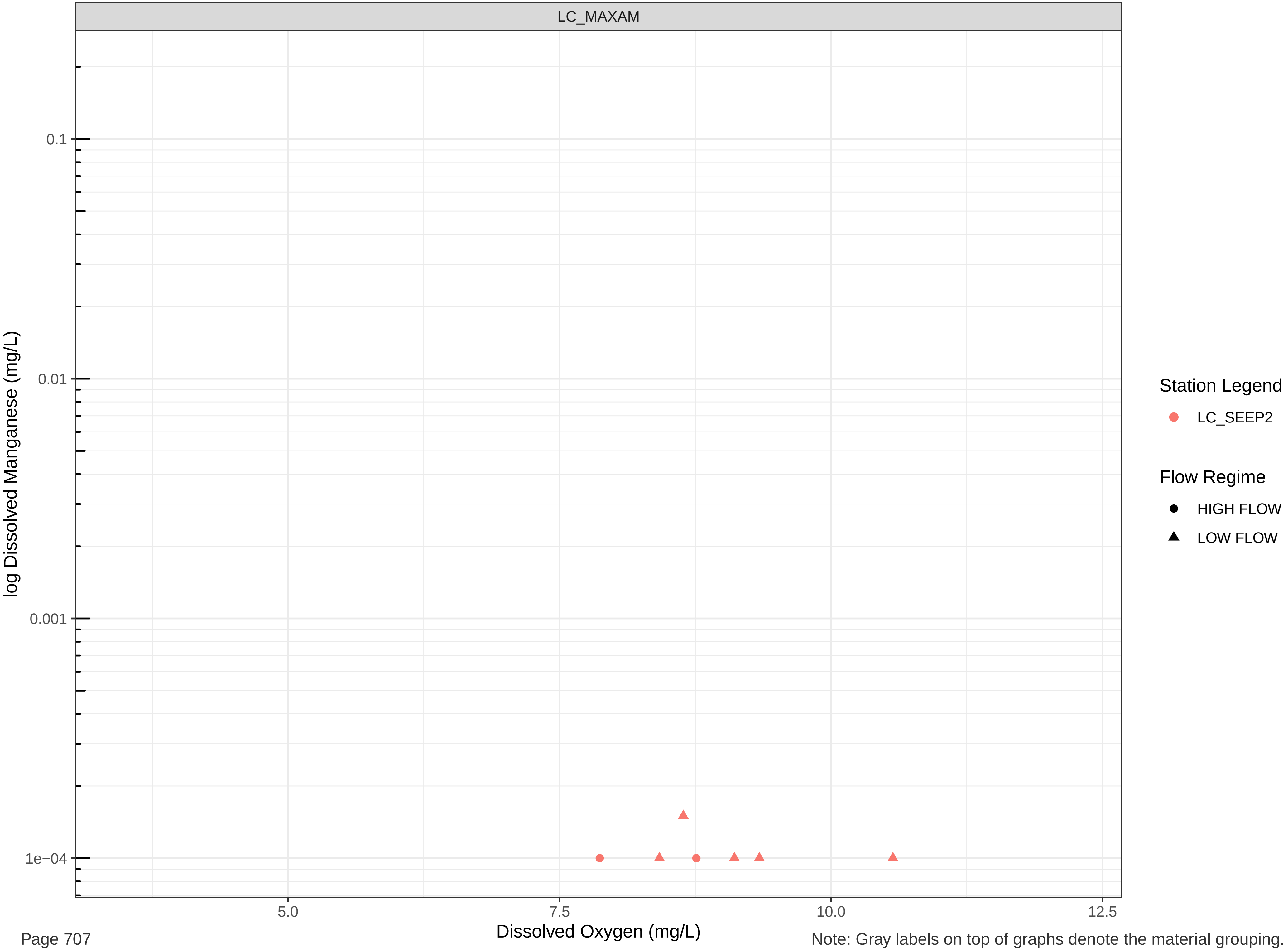

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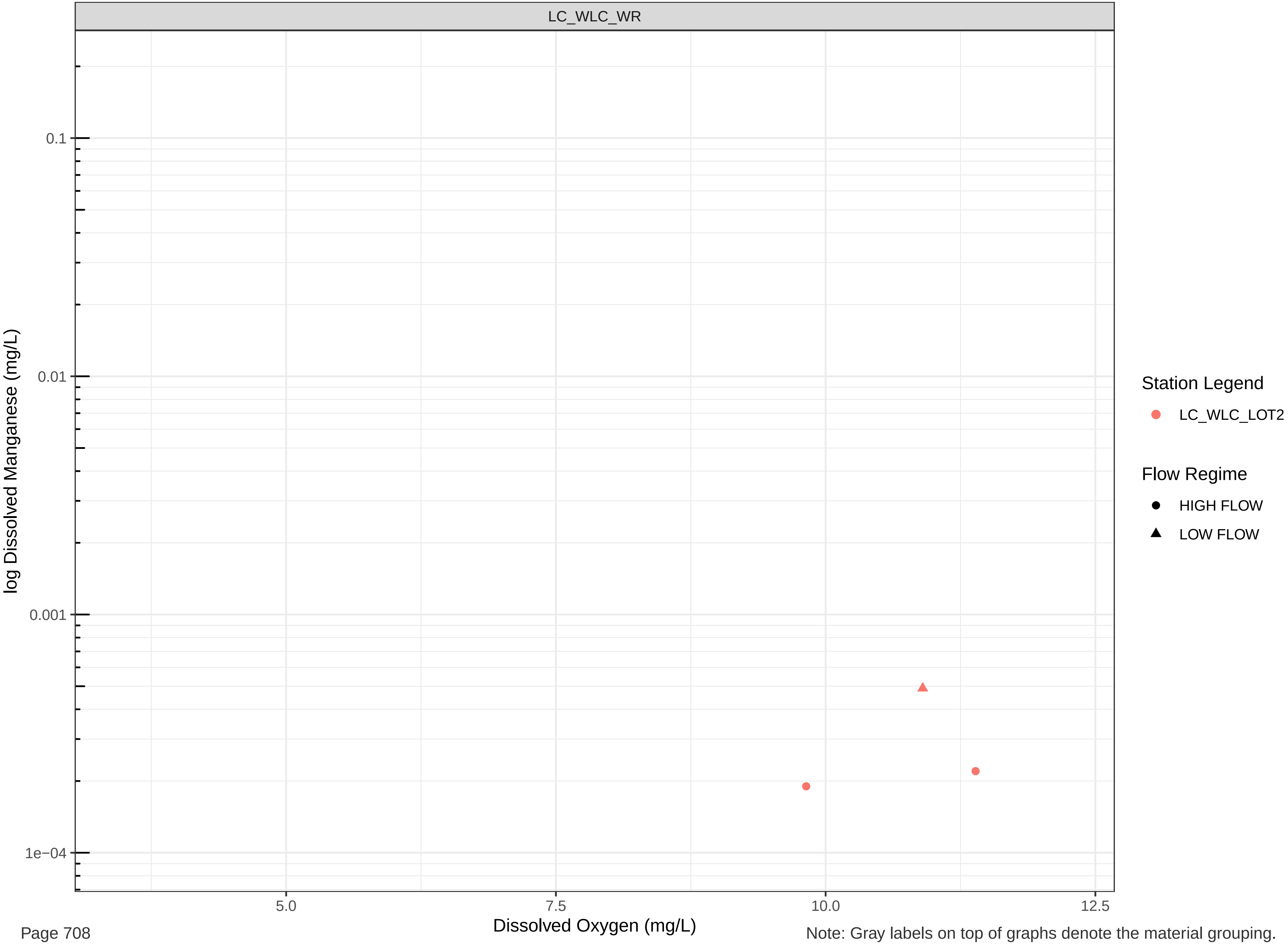

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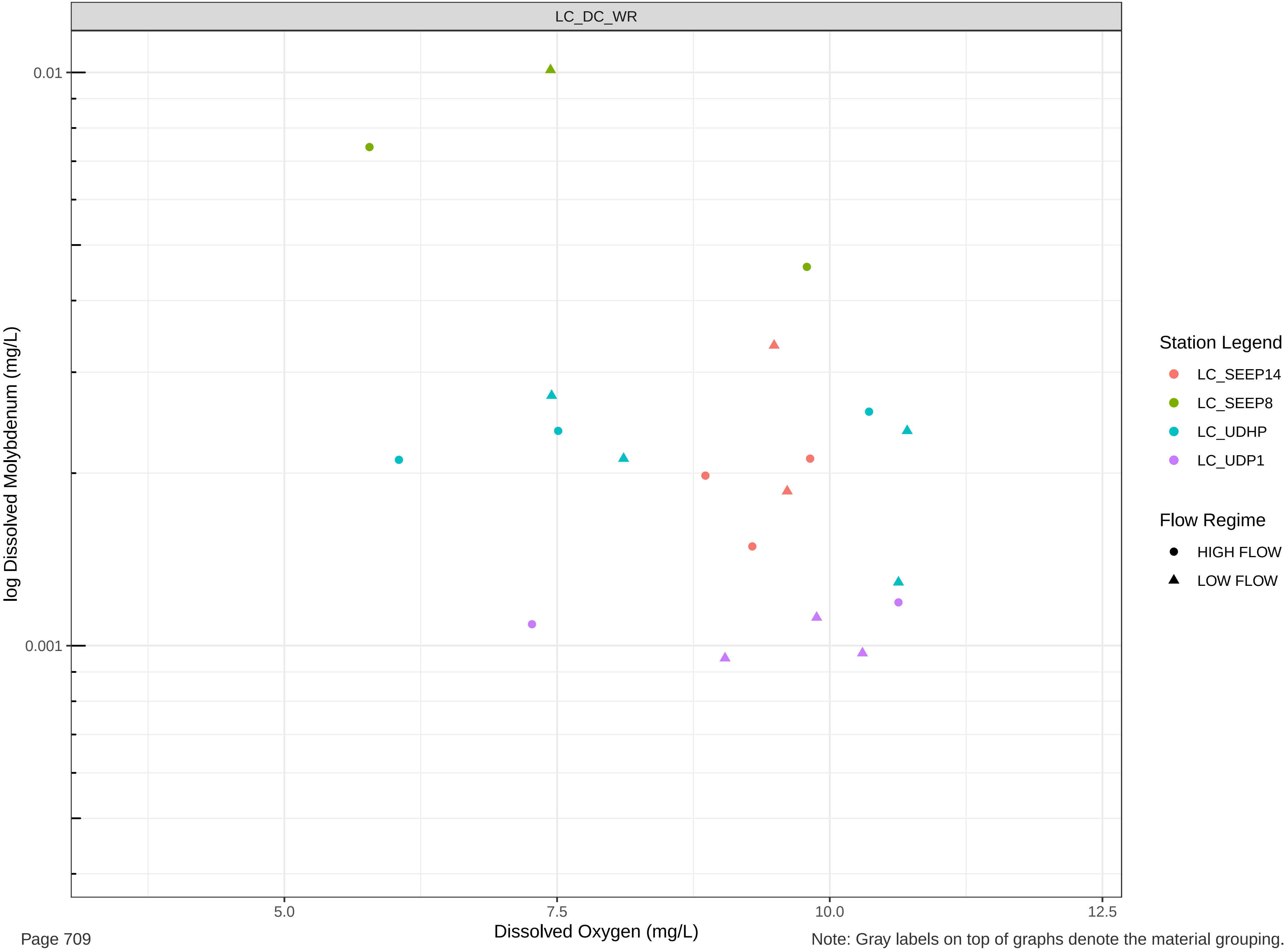

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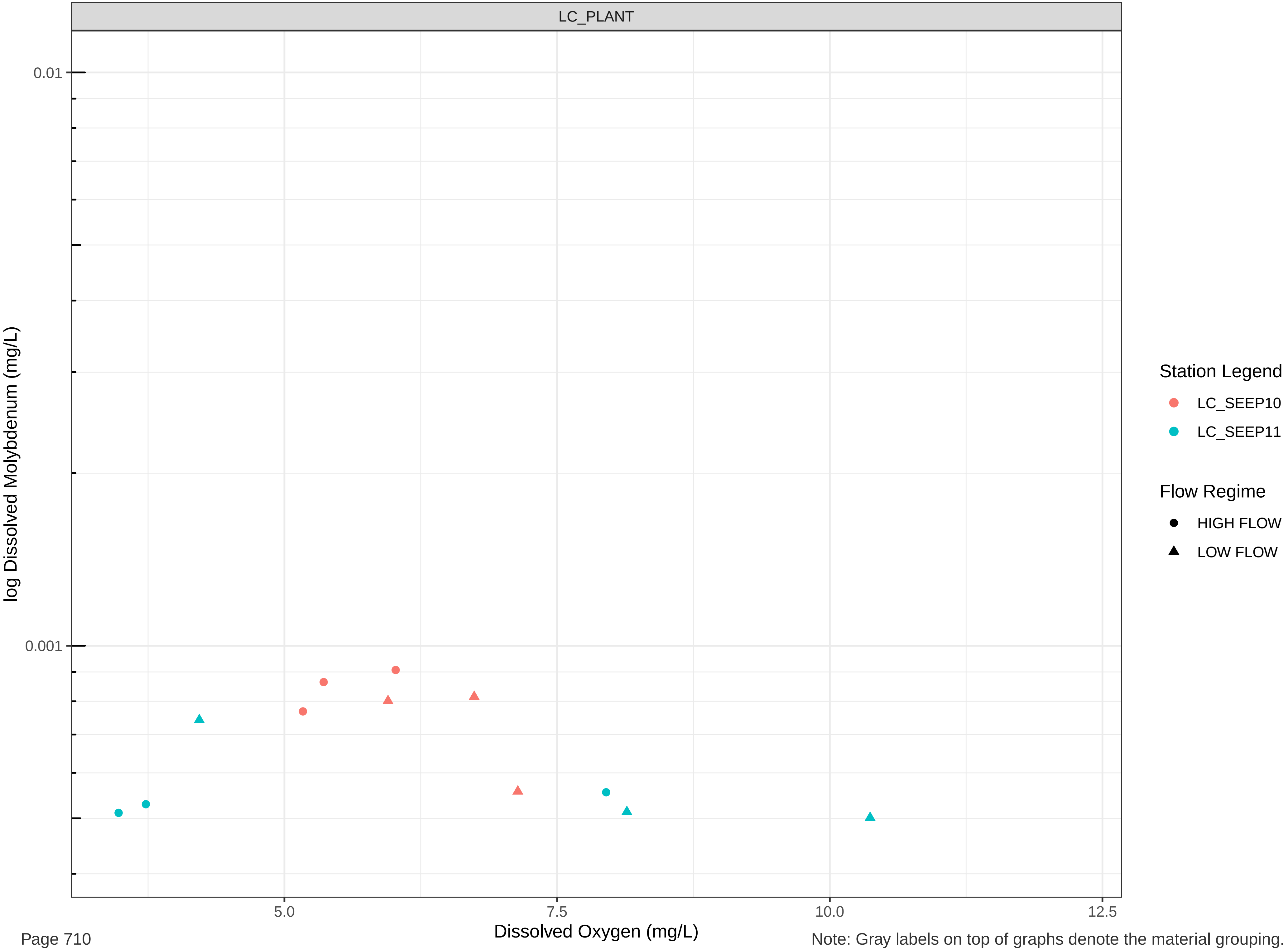

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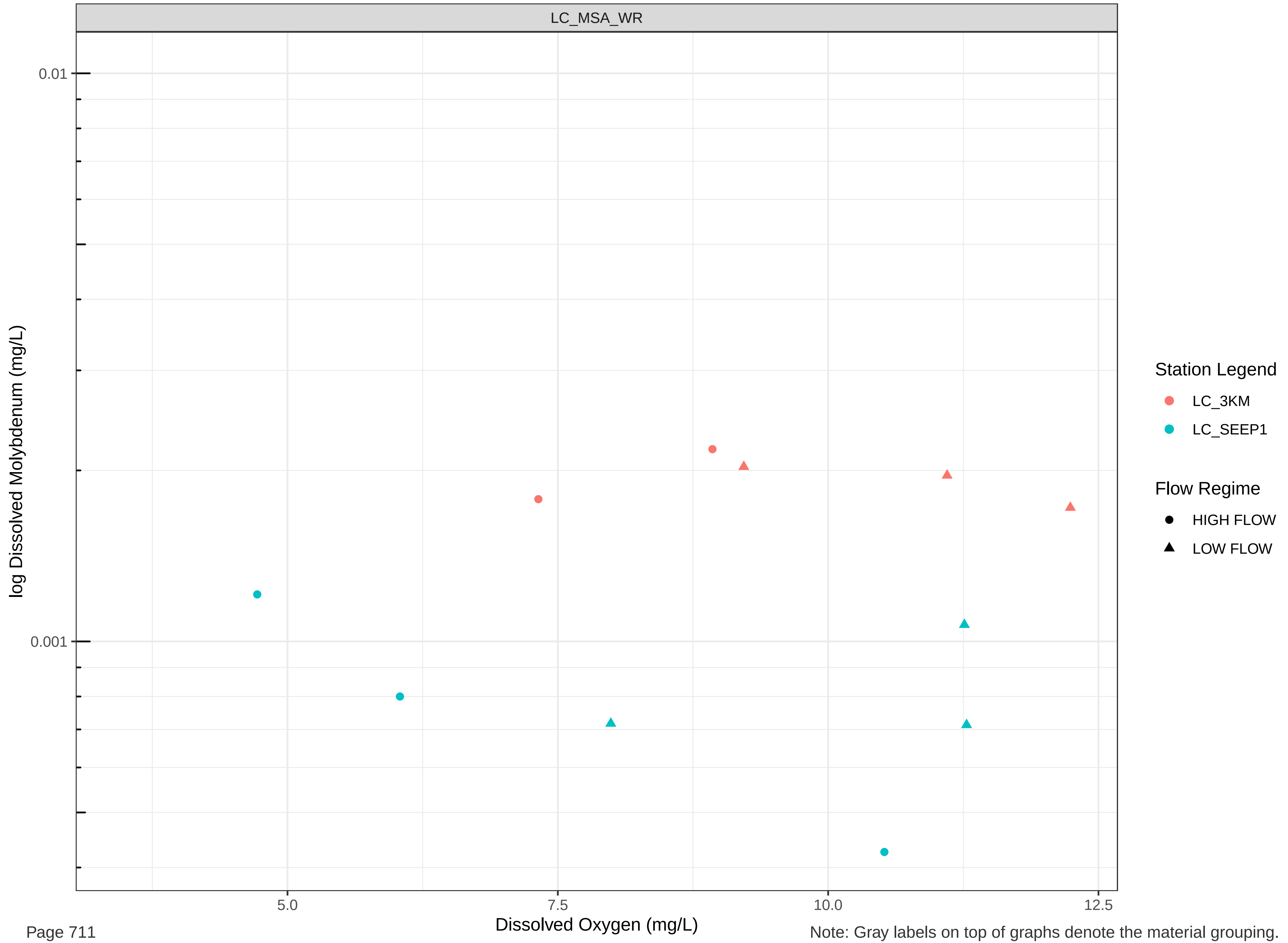

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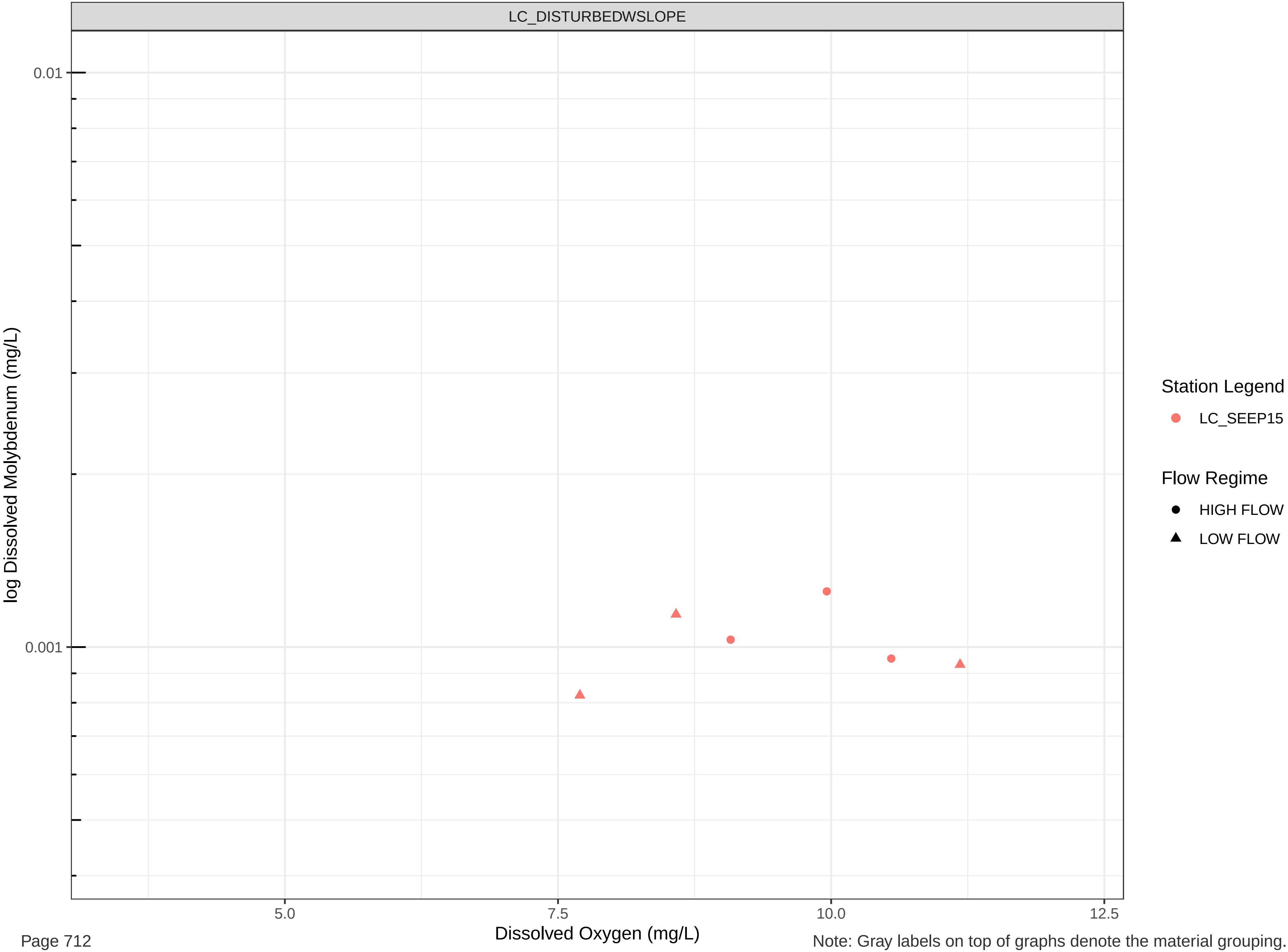

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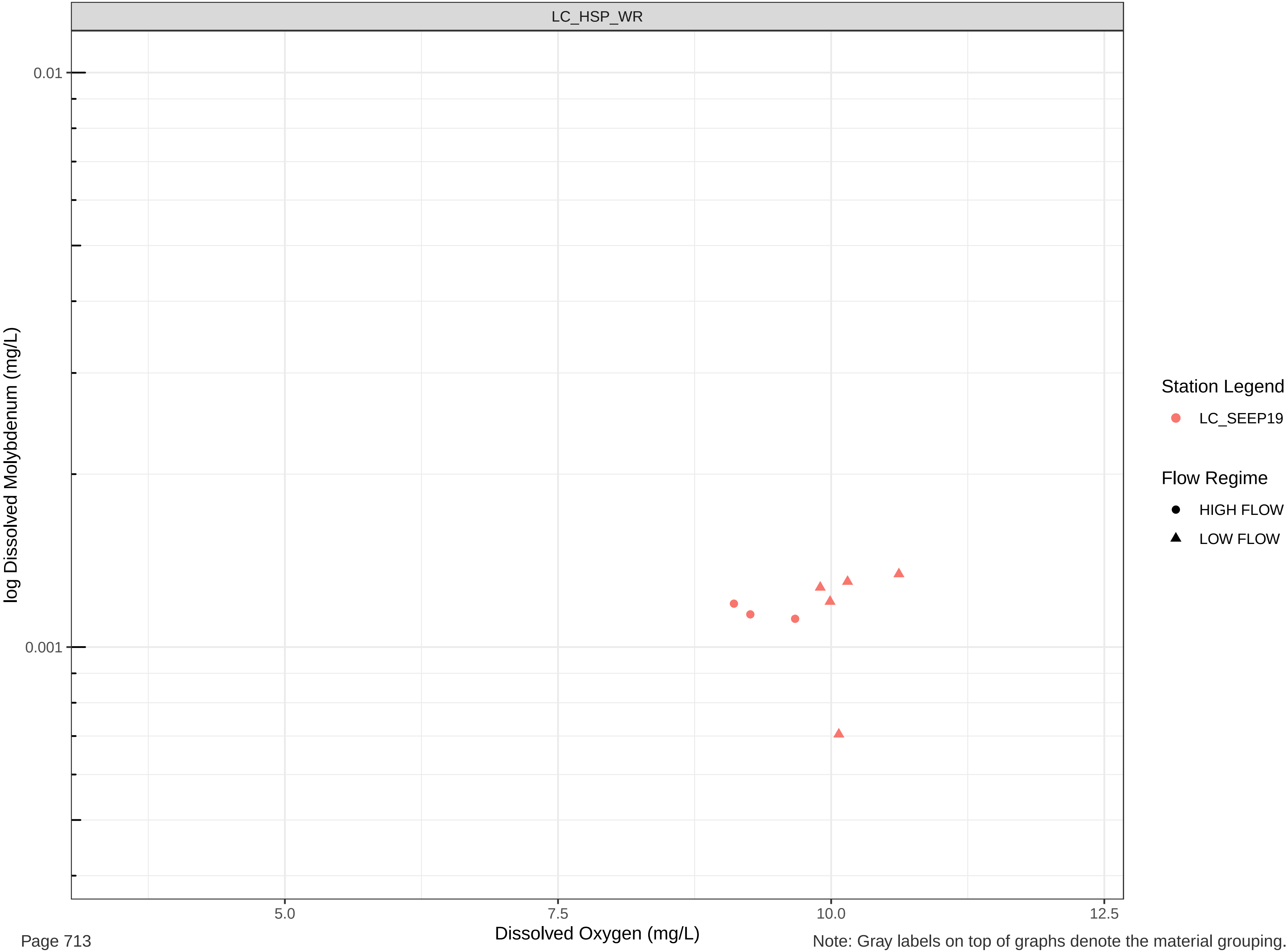

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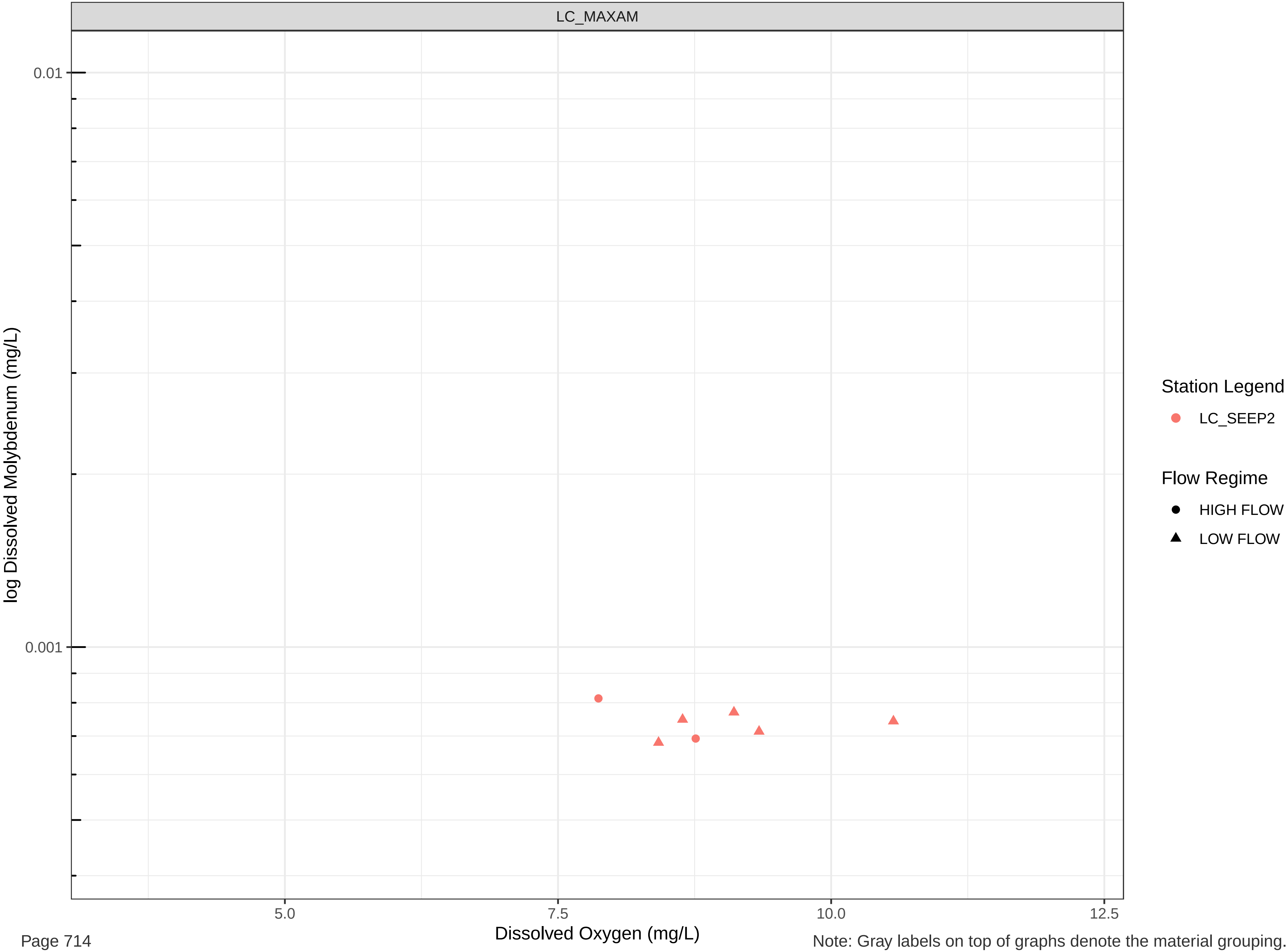

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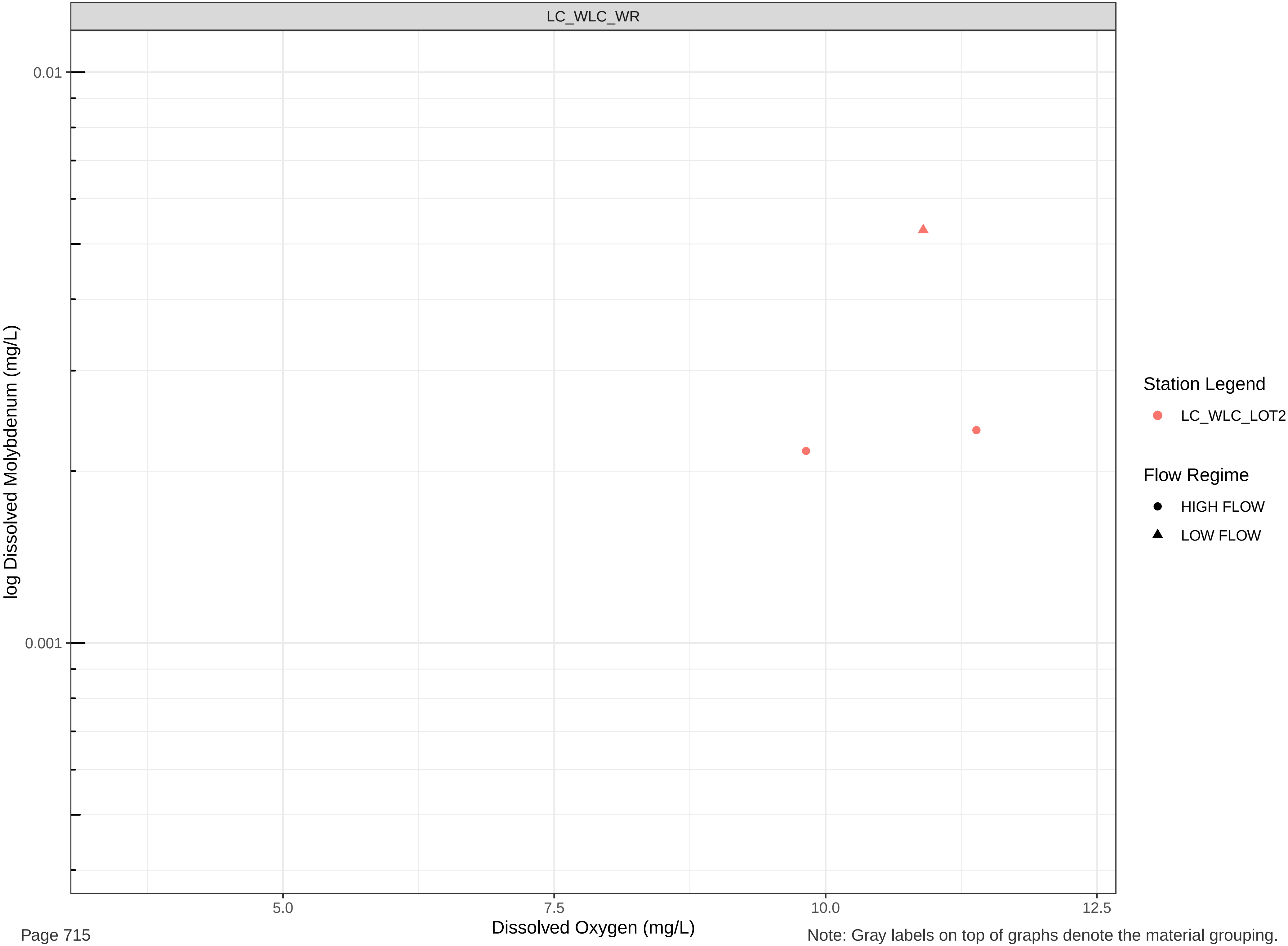

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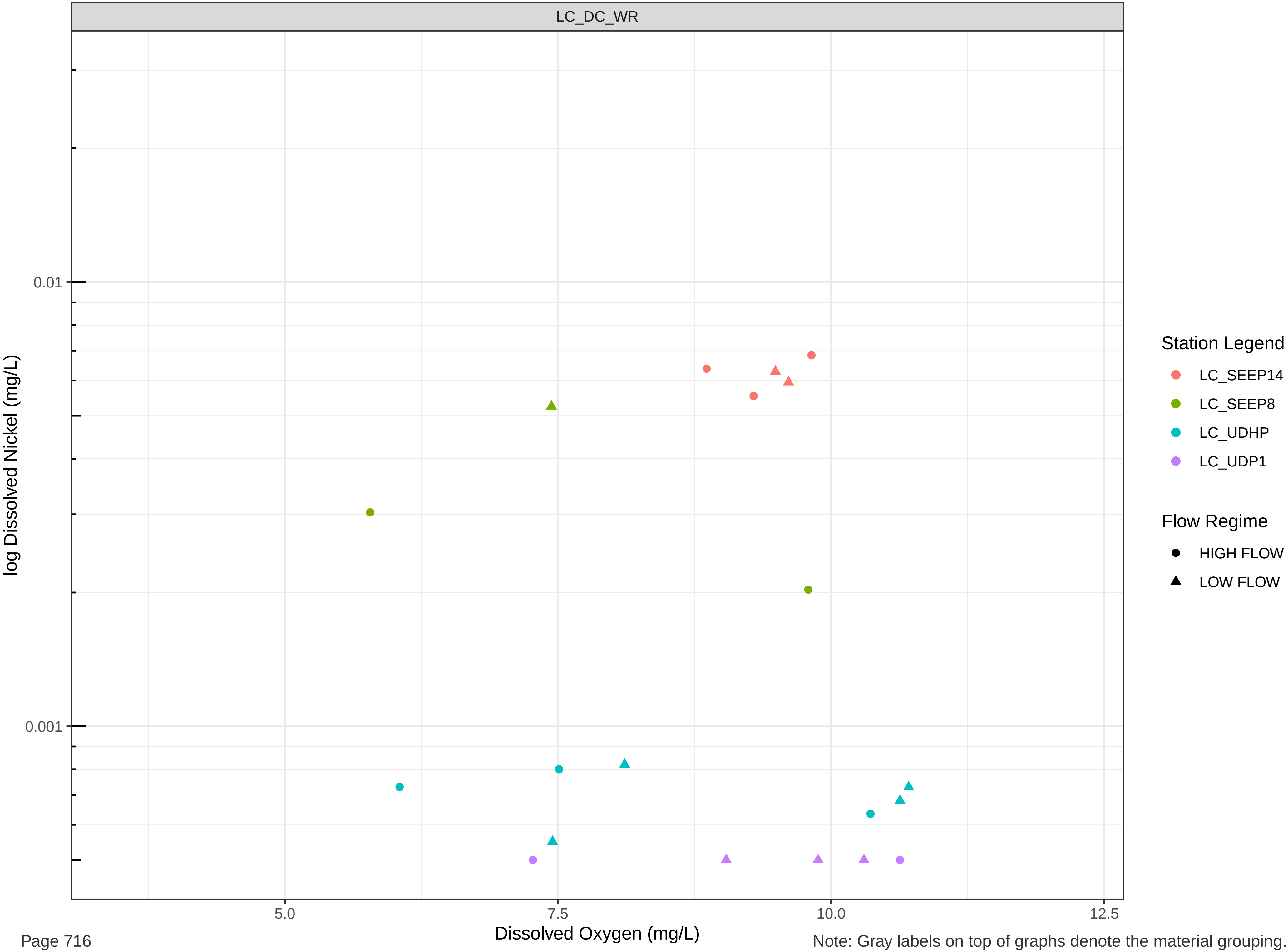

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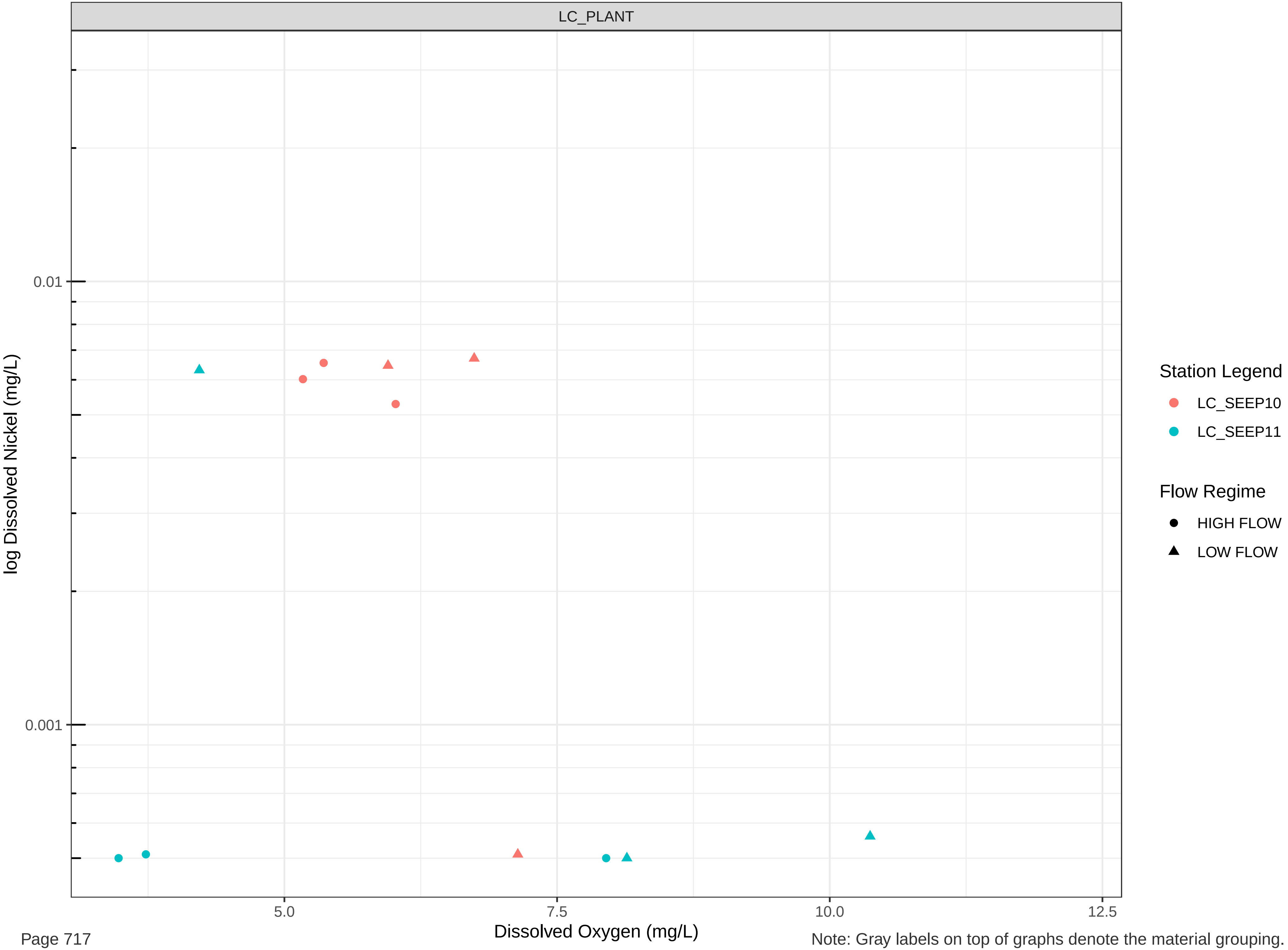

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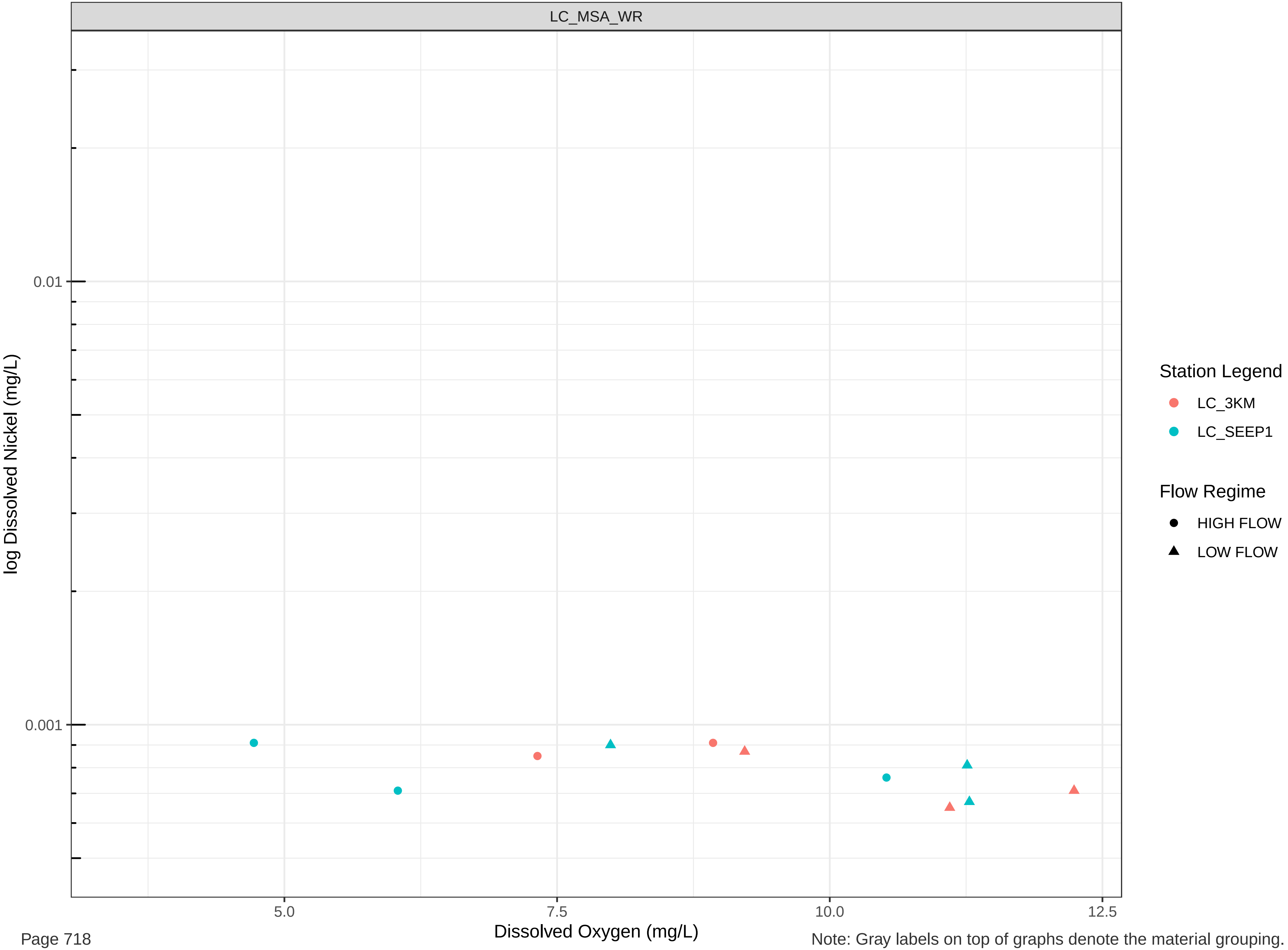

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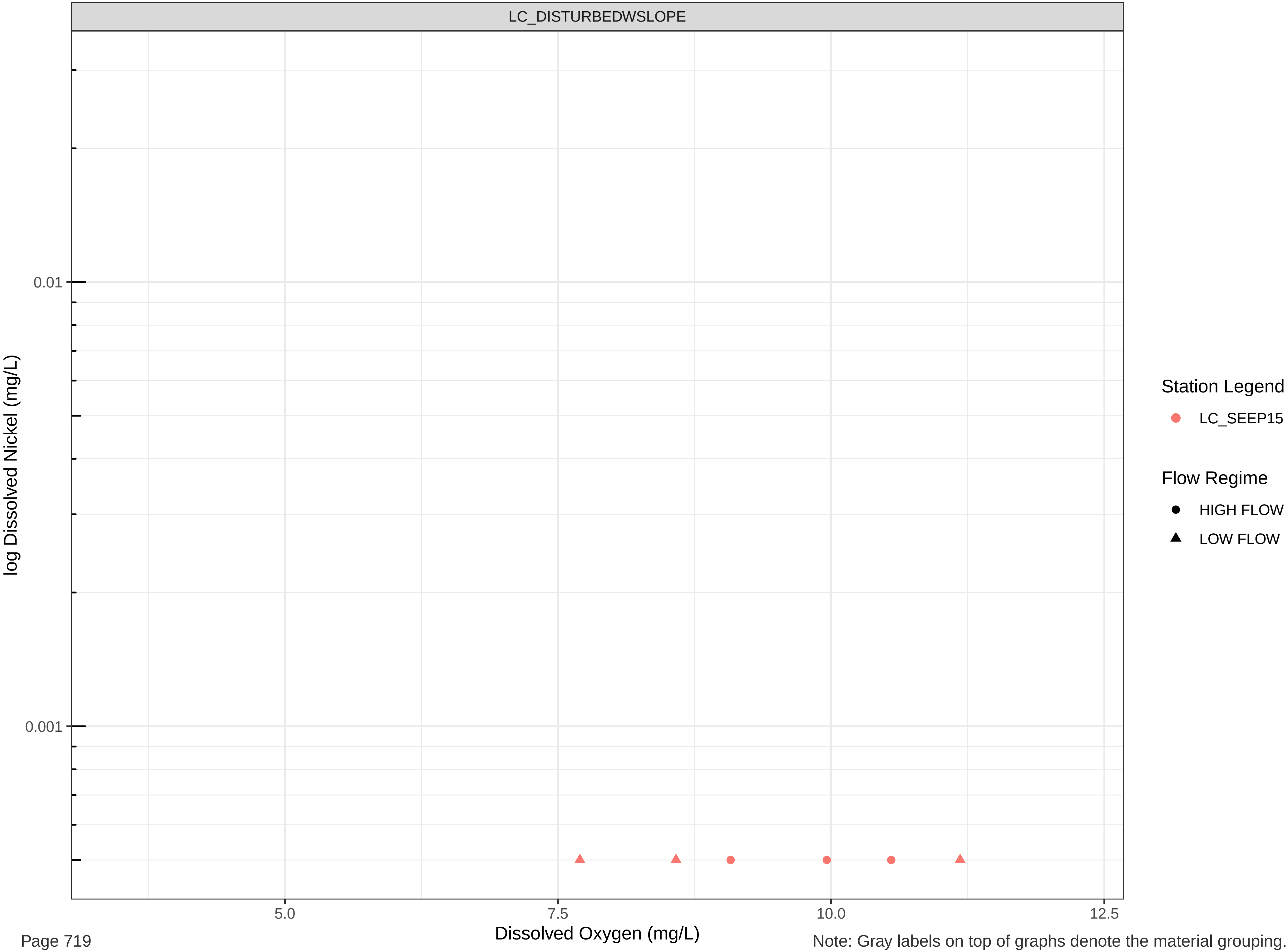

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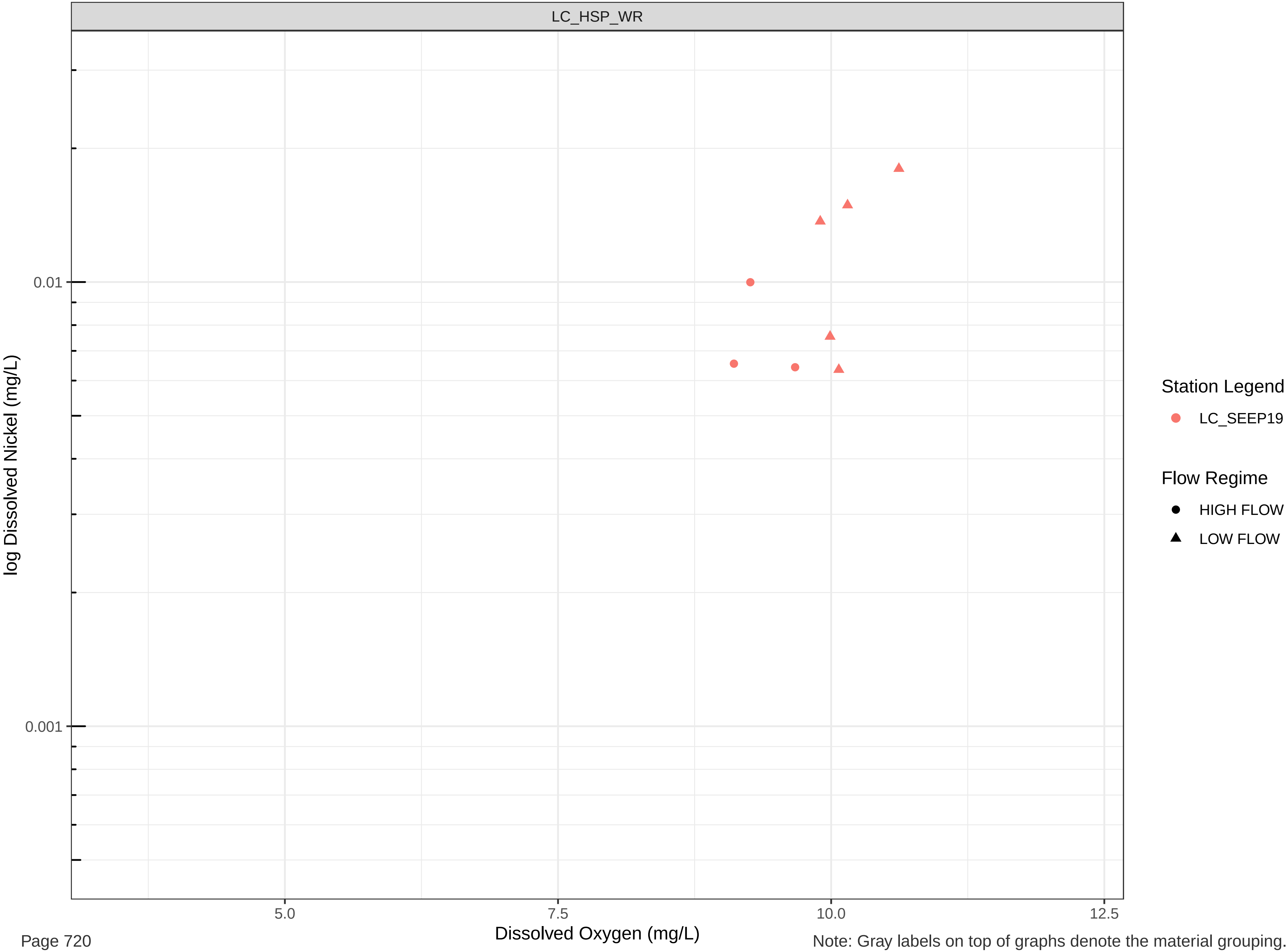

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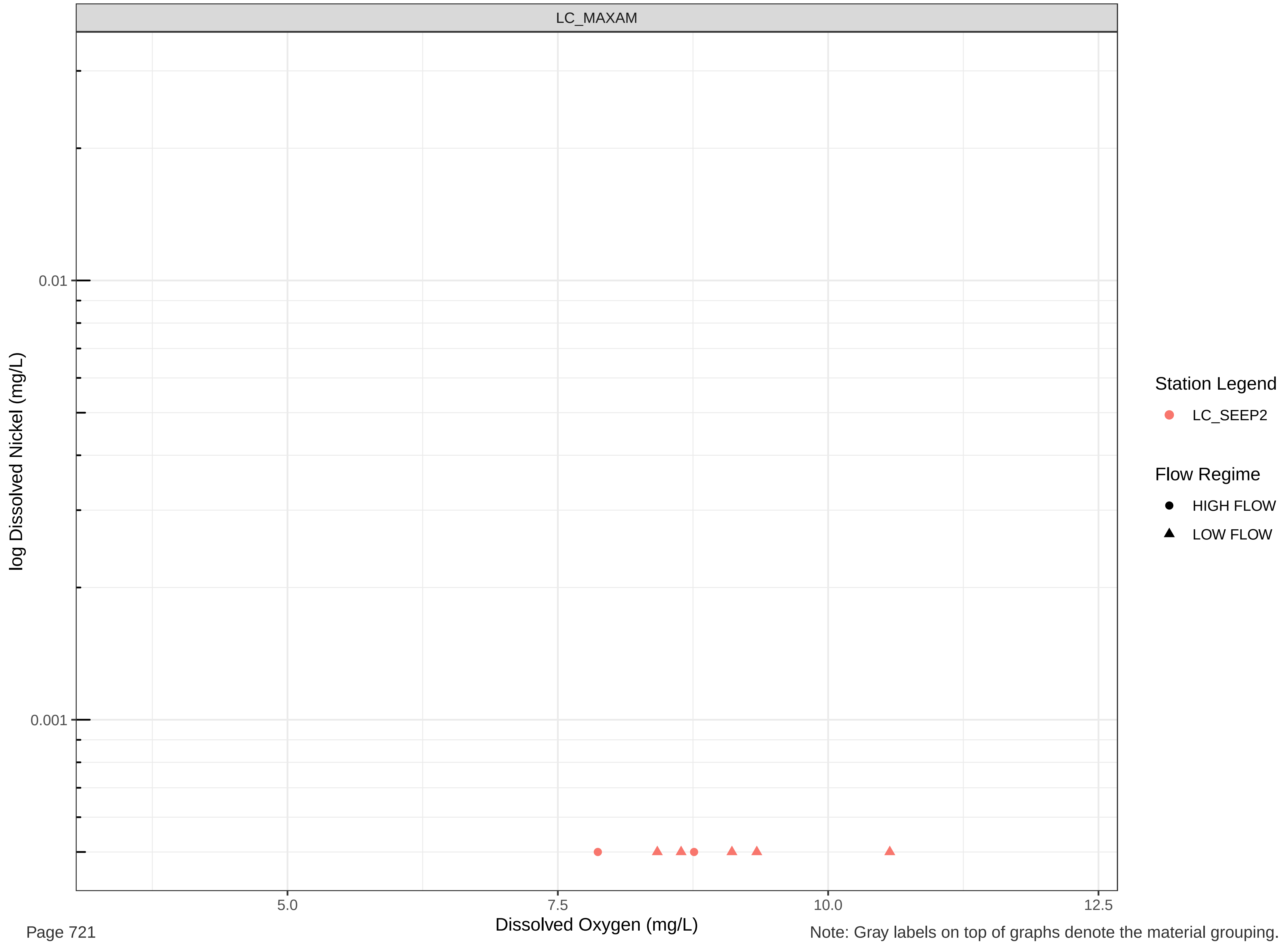

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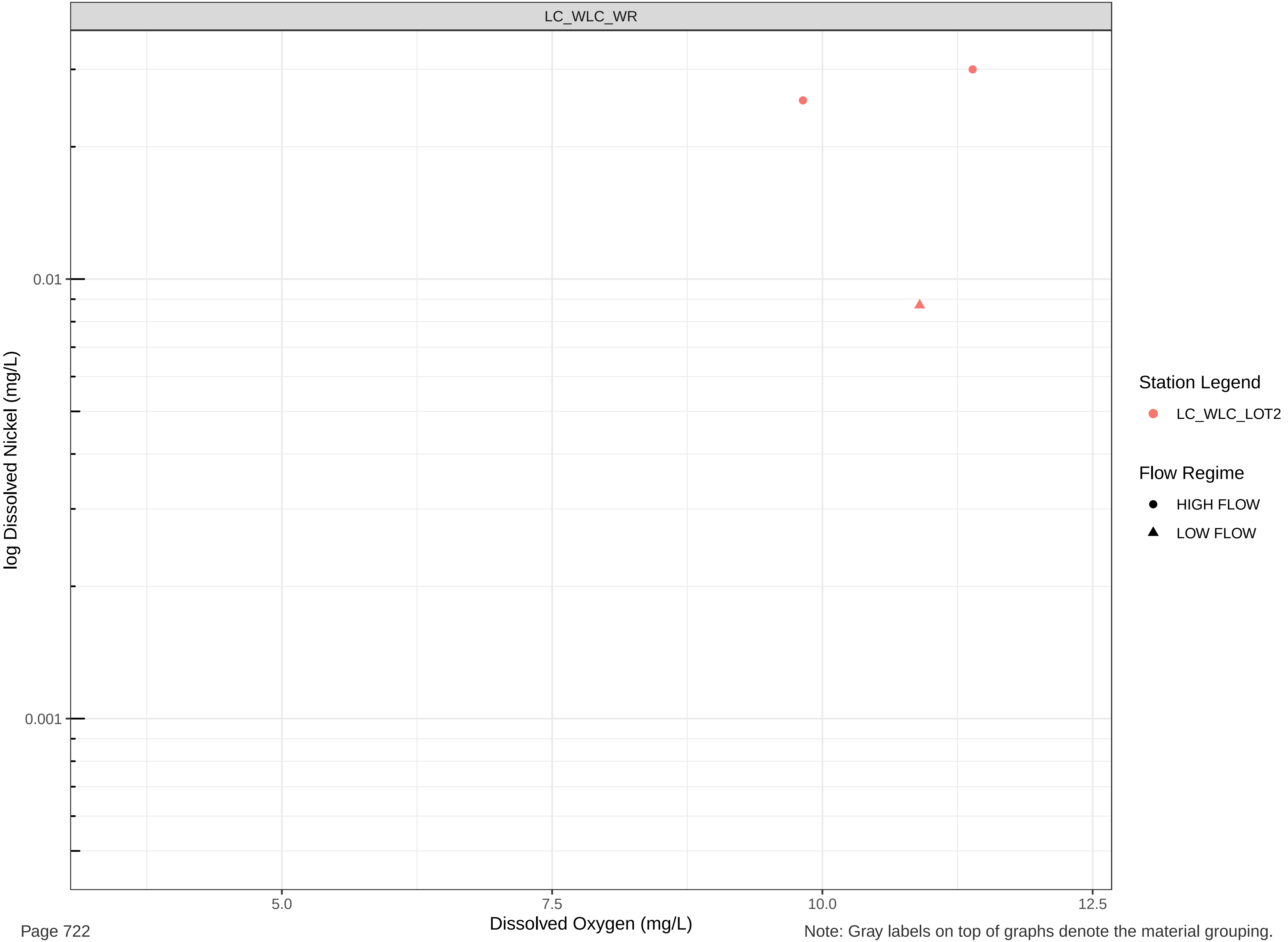

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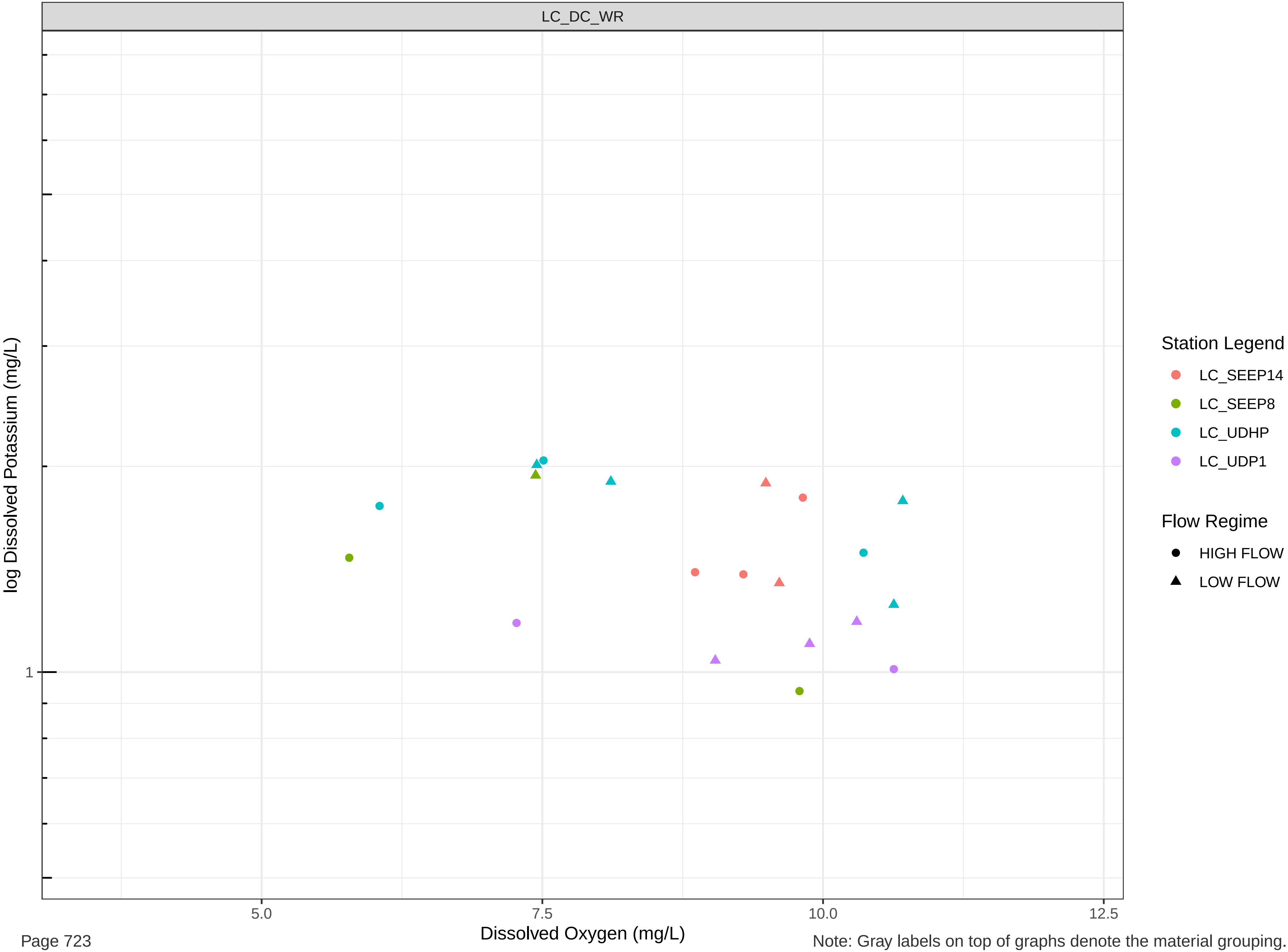

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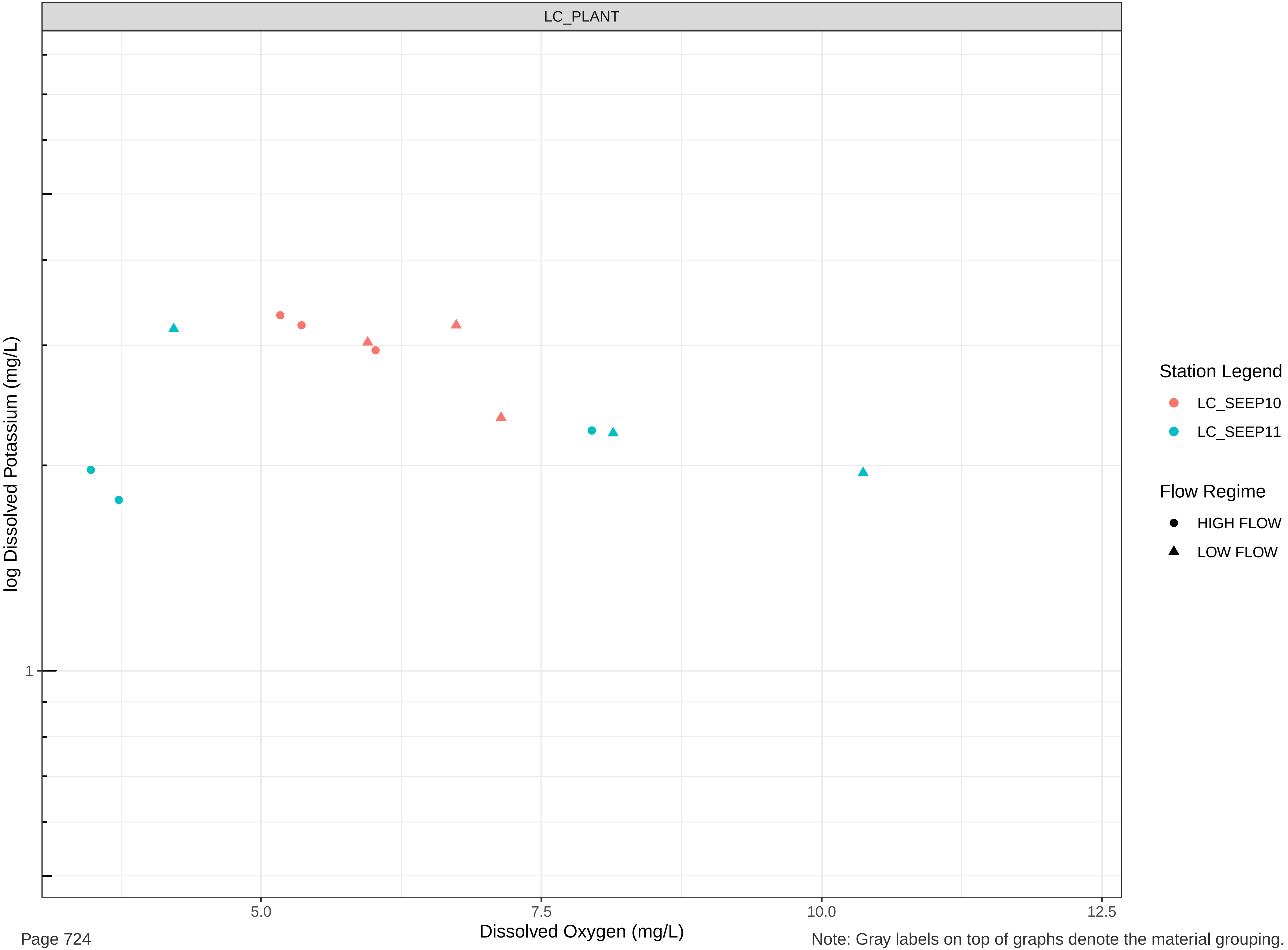

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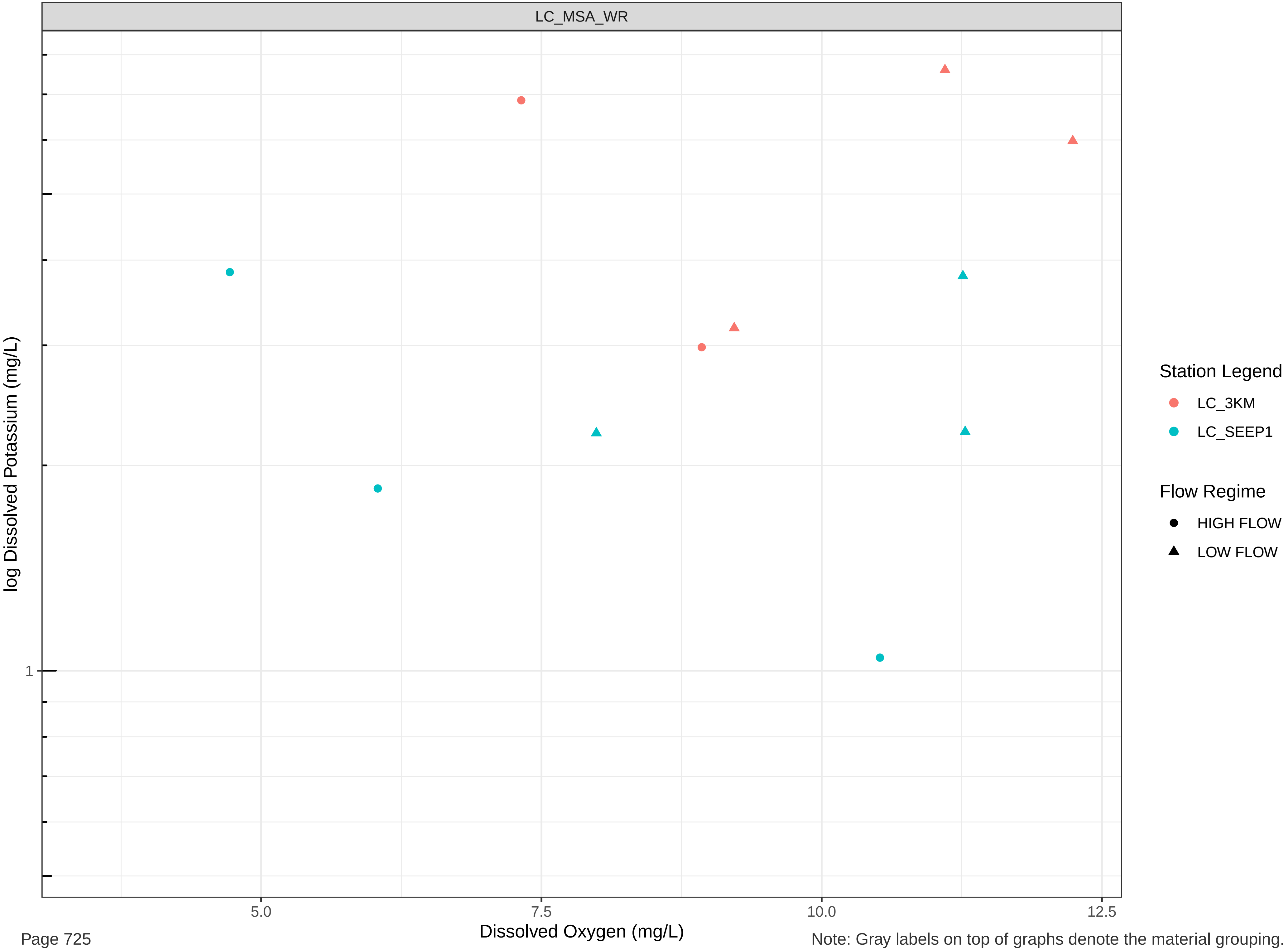

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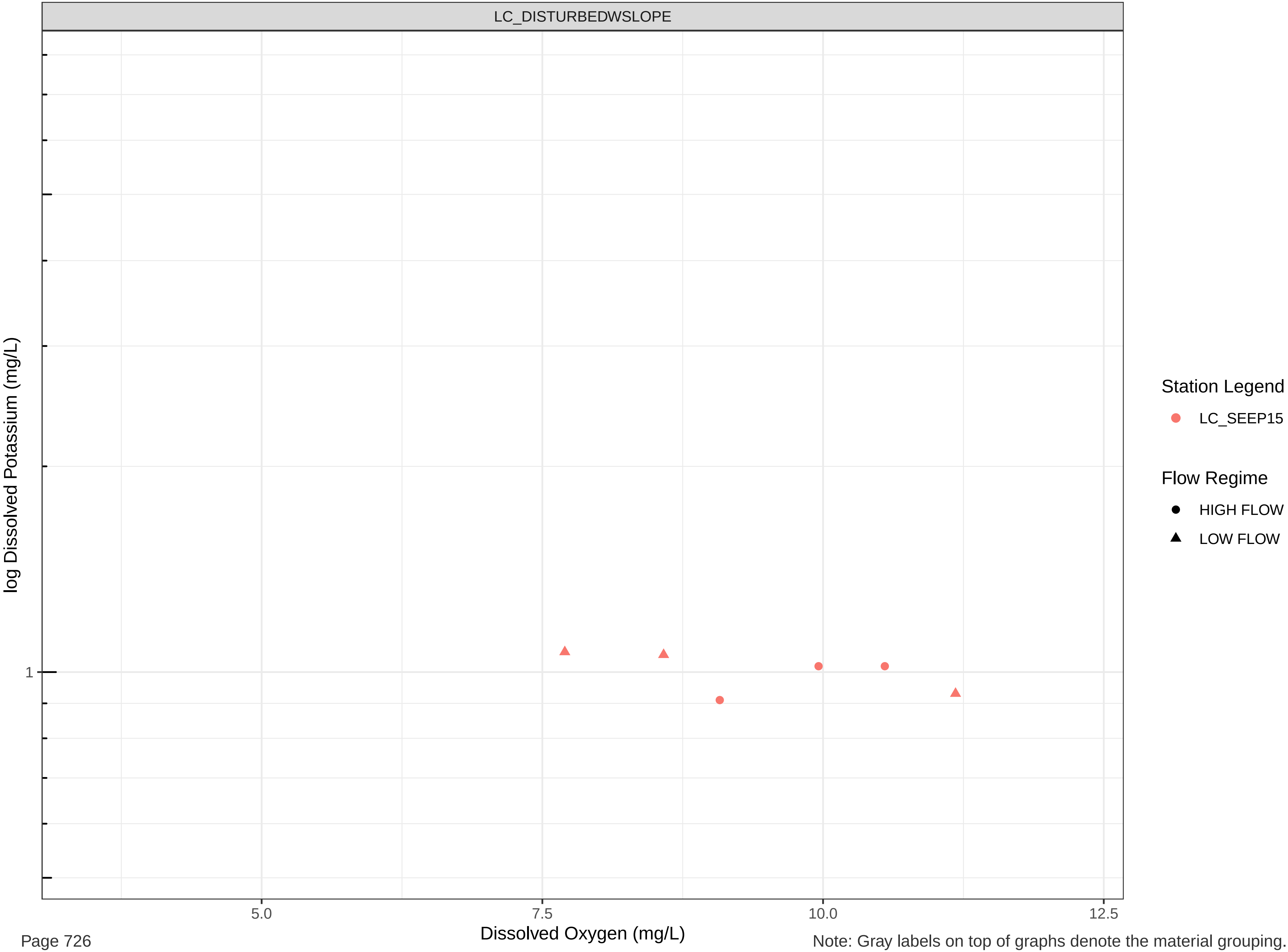

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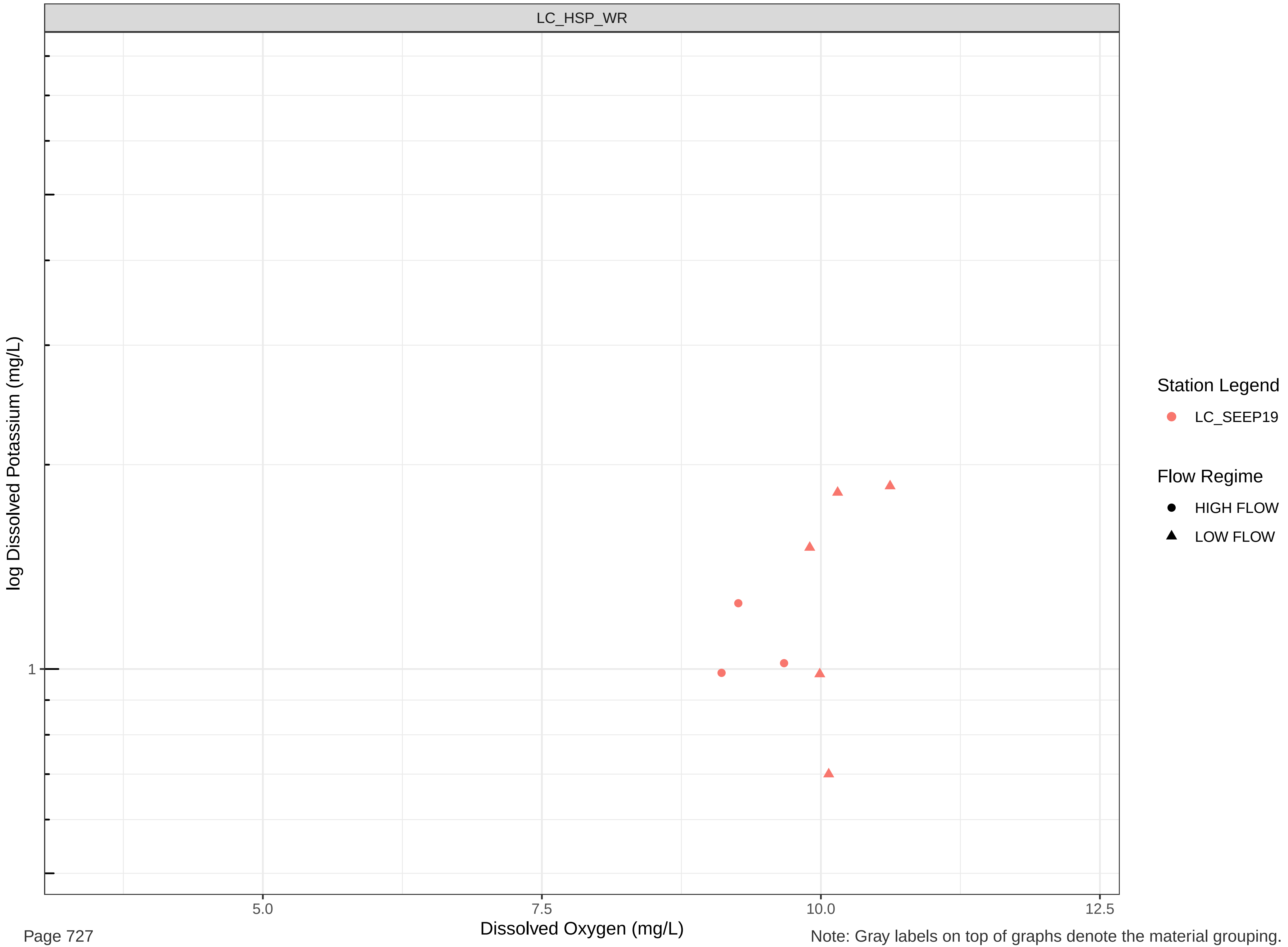
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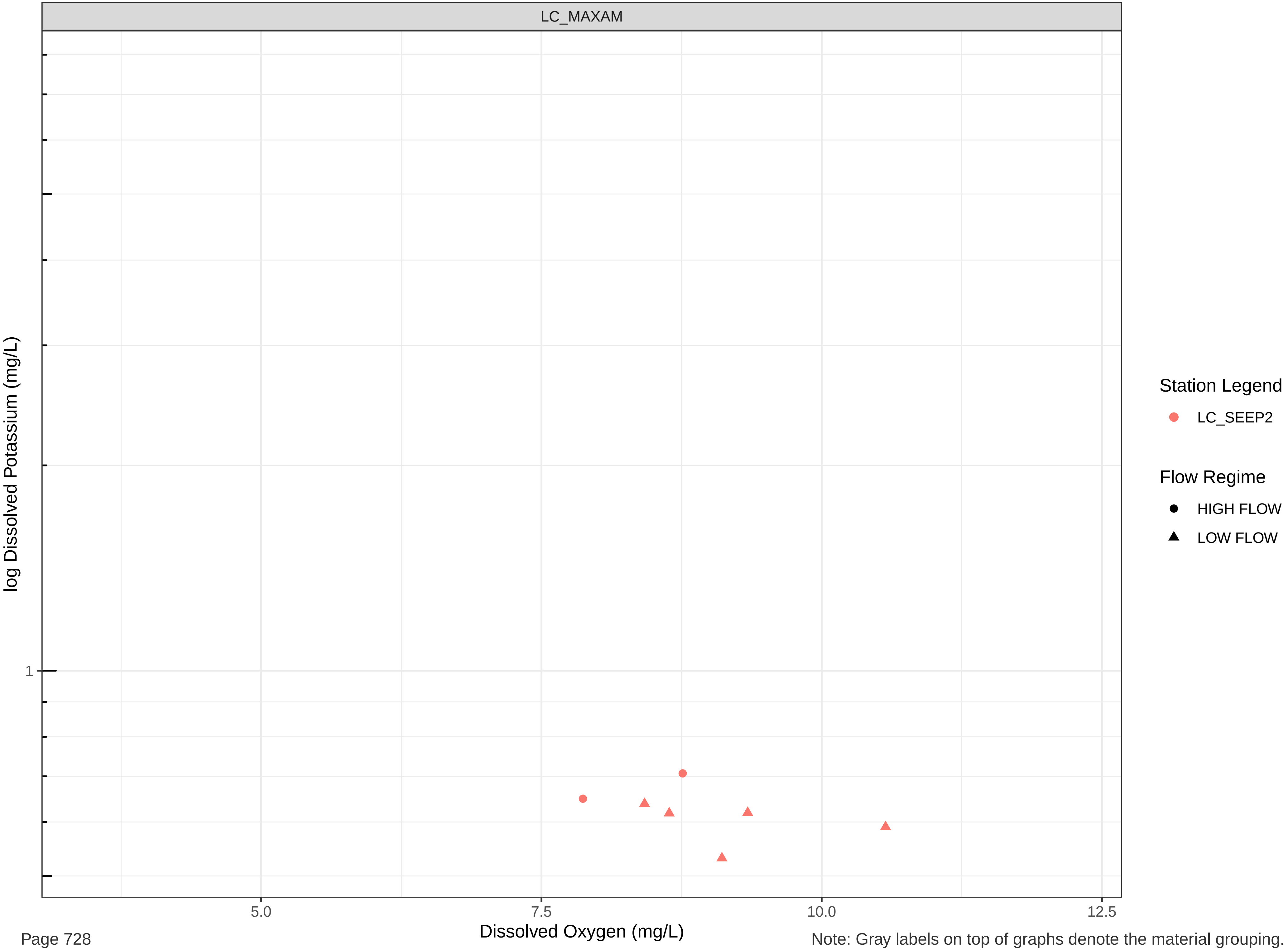
Dissolved Oxygen (mg/L)
Station Legend
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



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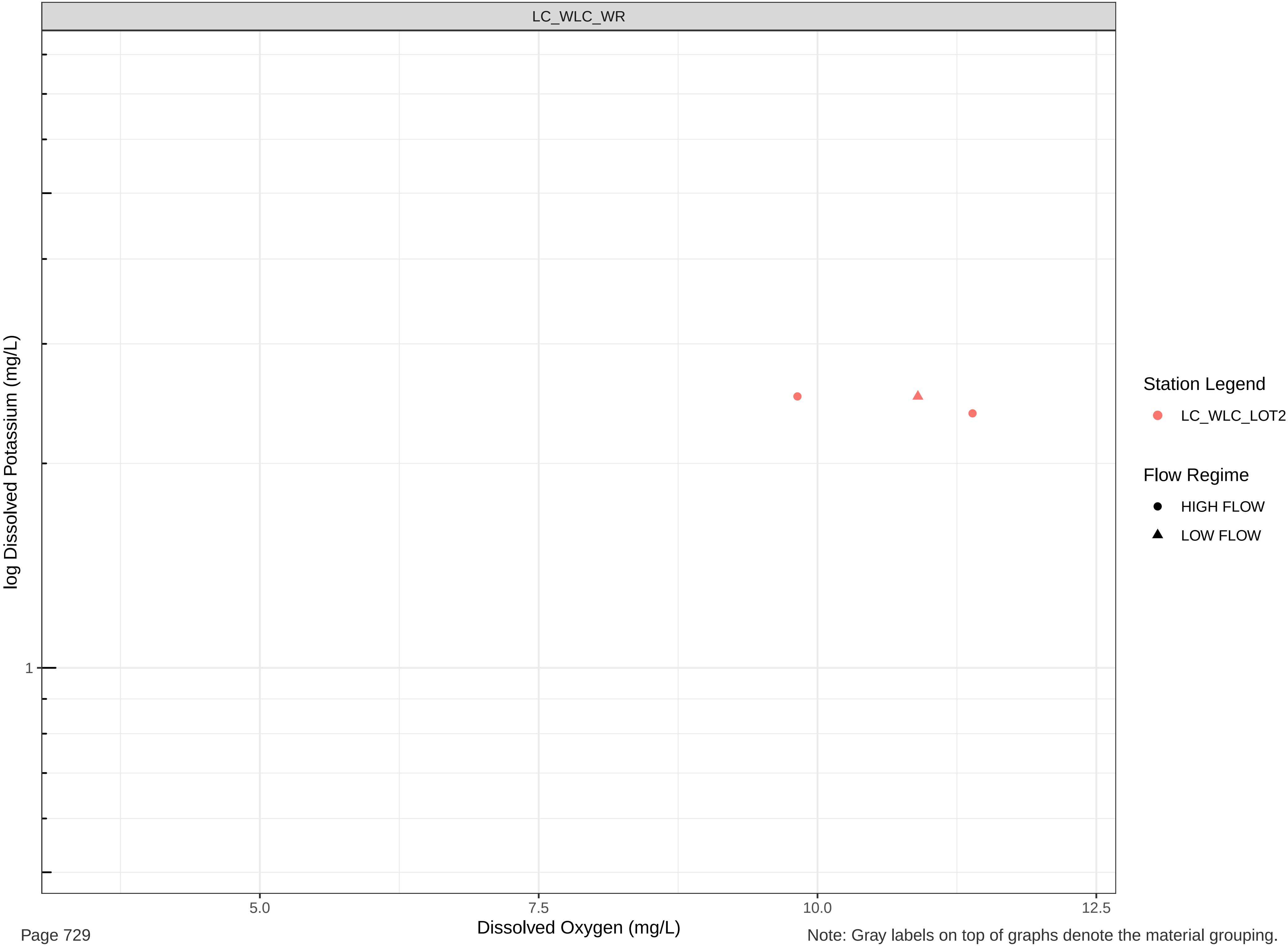

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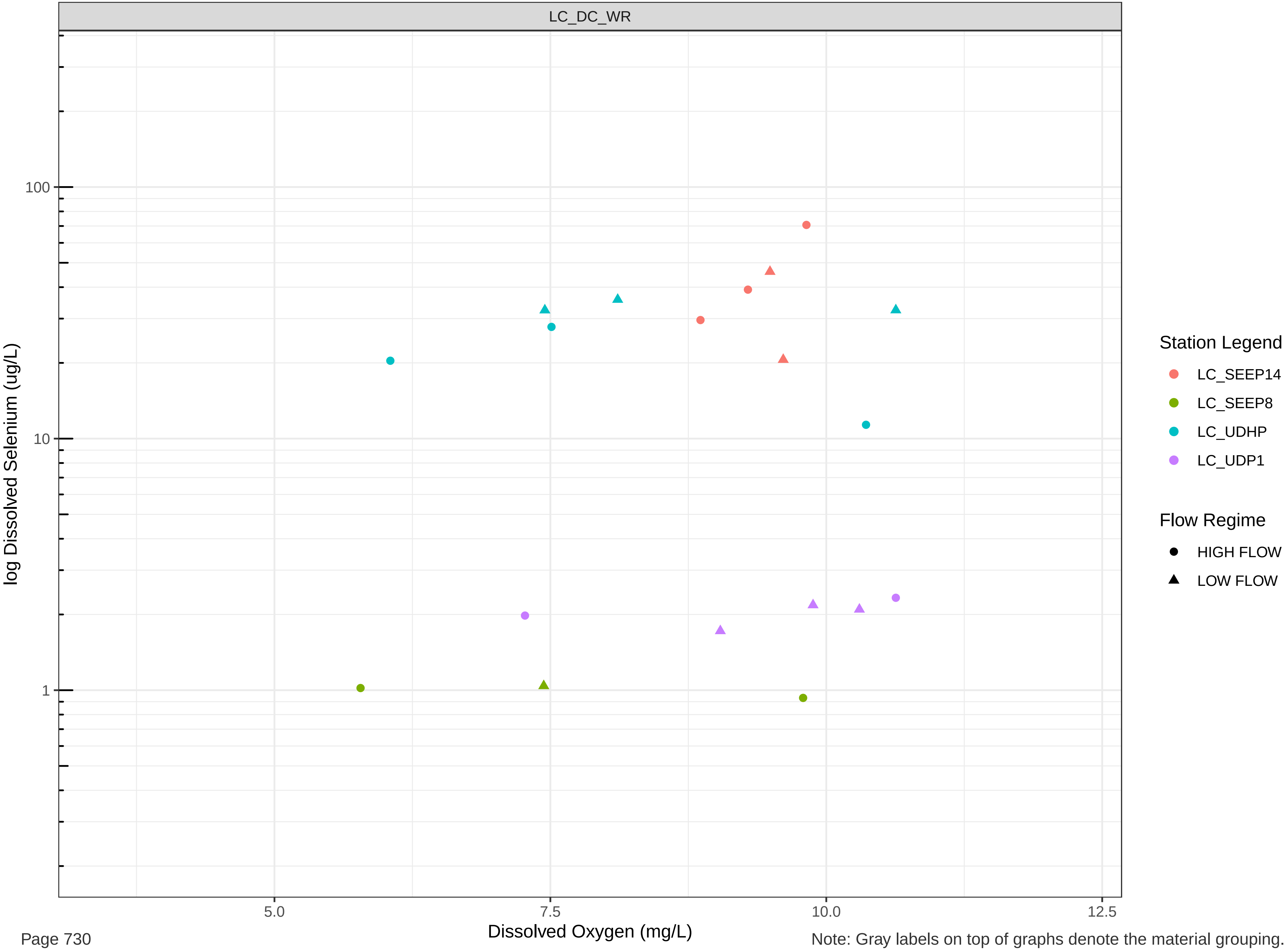

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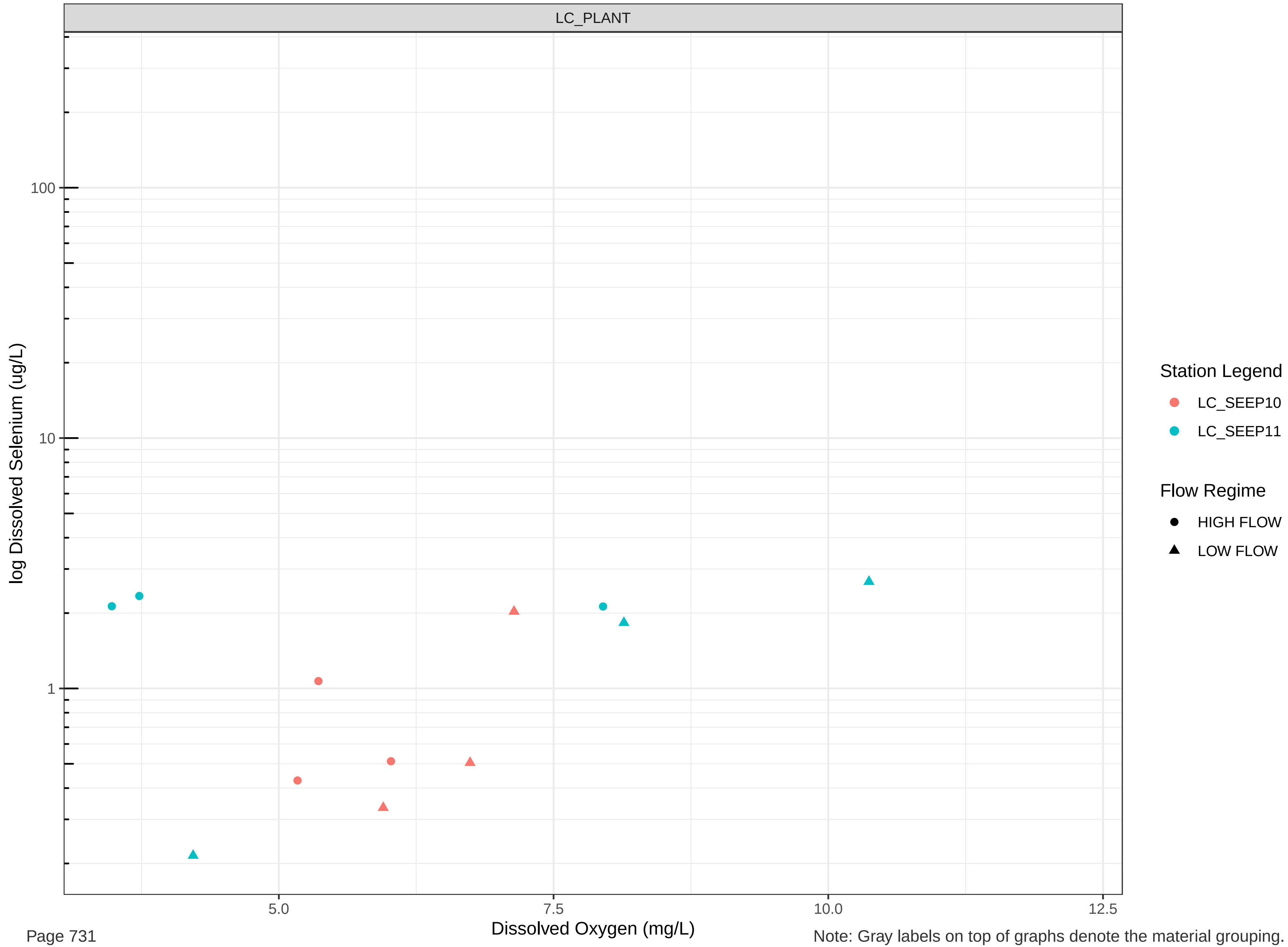

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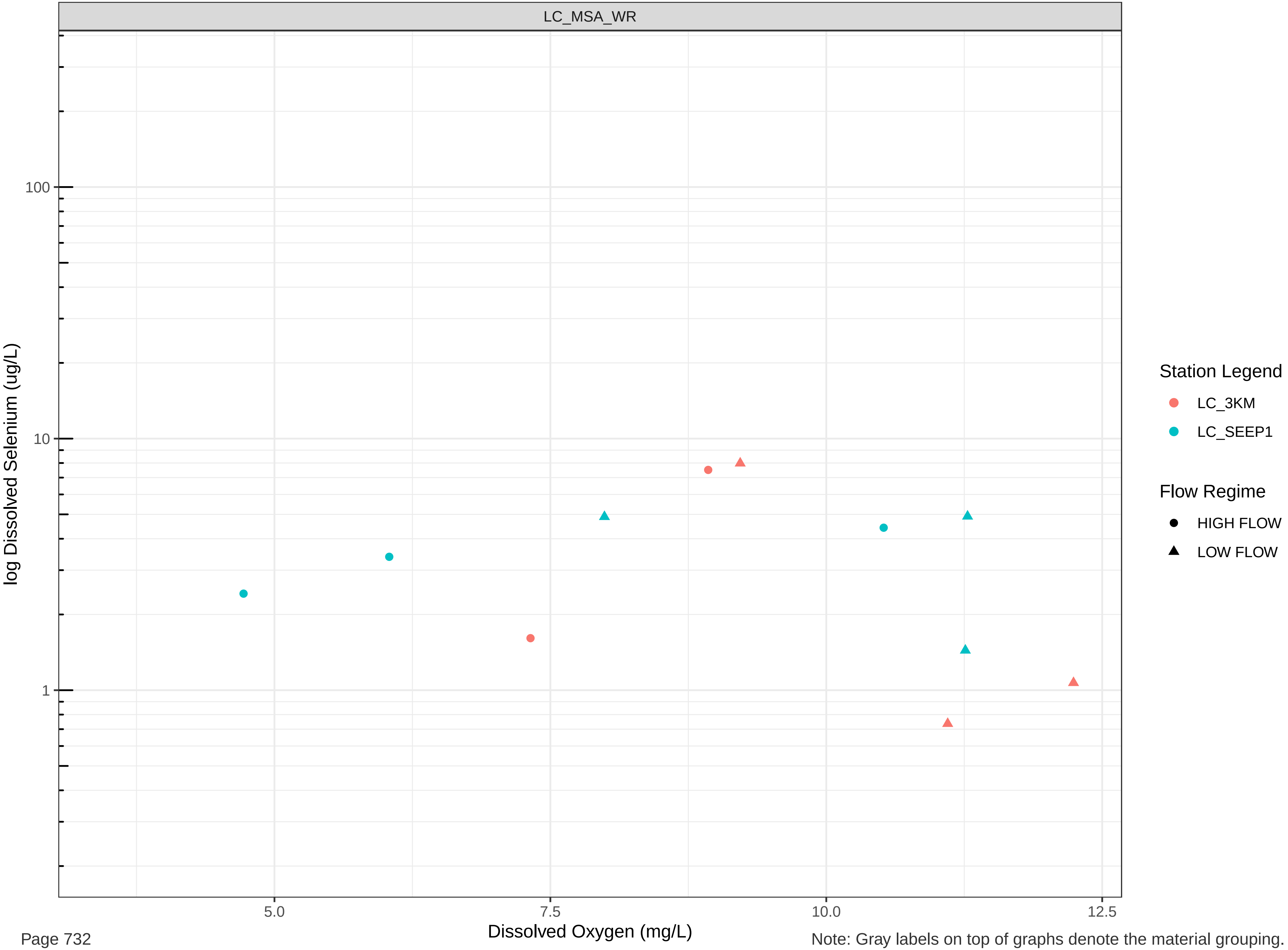

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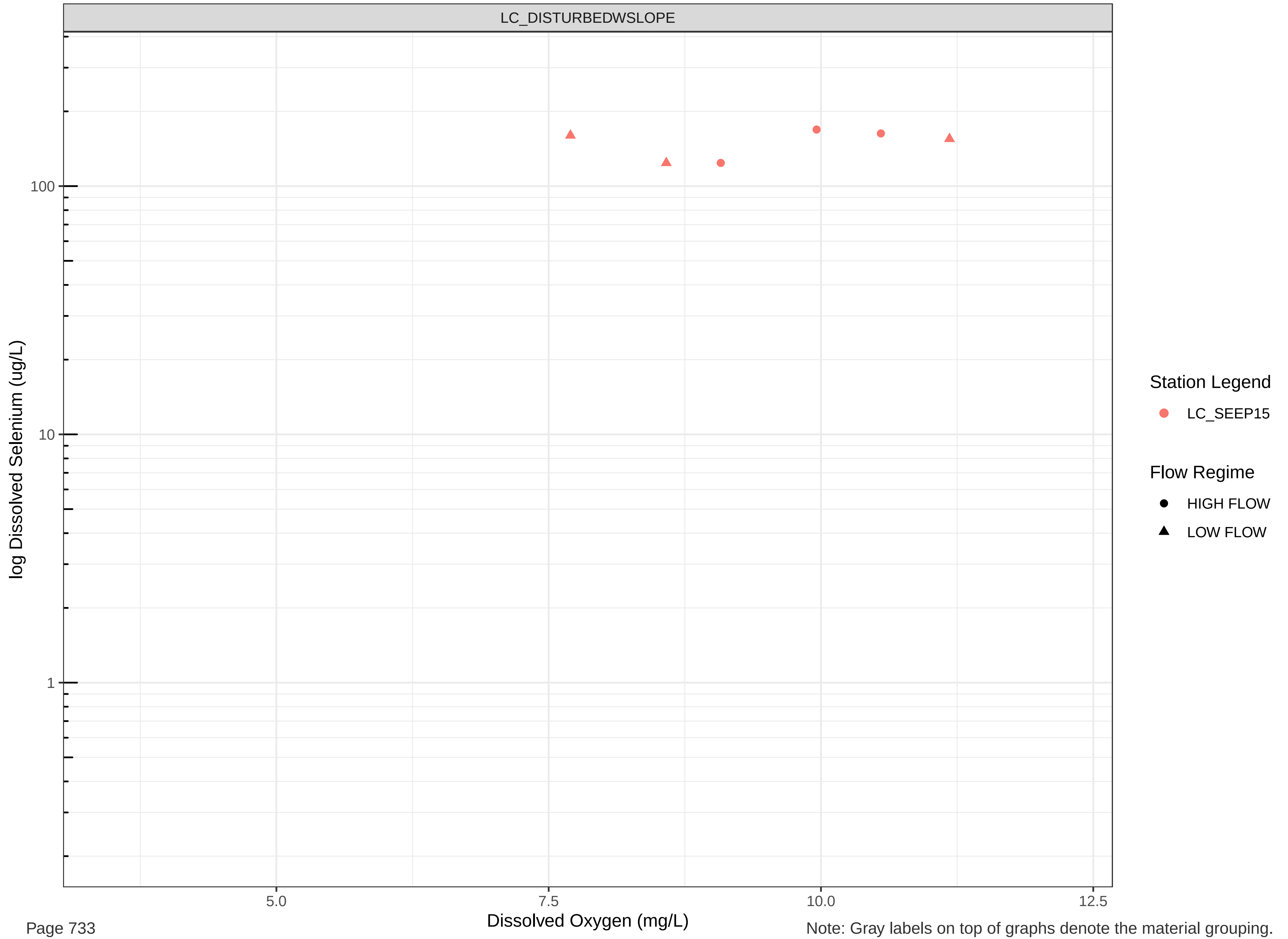
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1
log Dissolved Selenium (ug/L)
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Dissolved Oxygen (mg/L)
Station Legend
LC_SEEP15
Flow Regime
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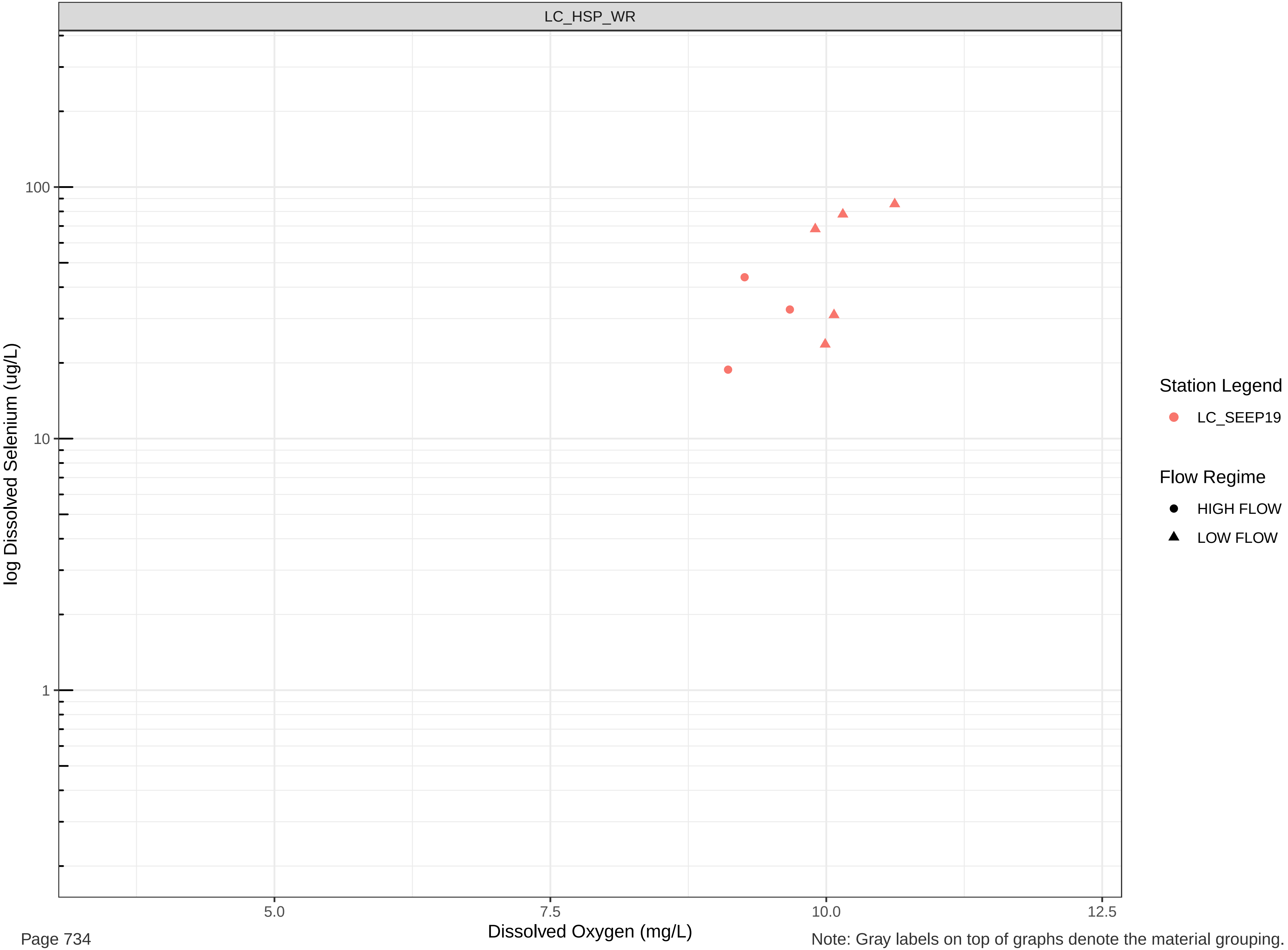
LOW FLOW



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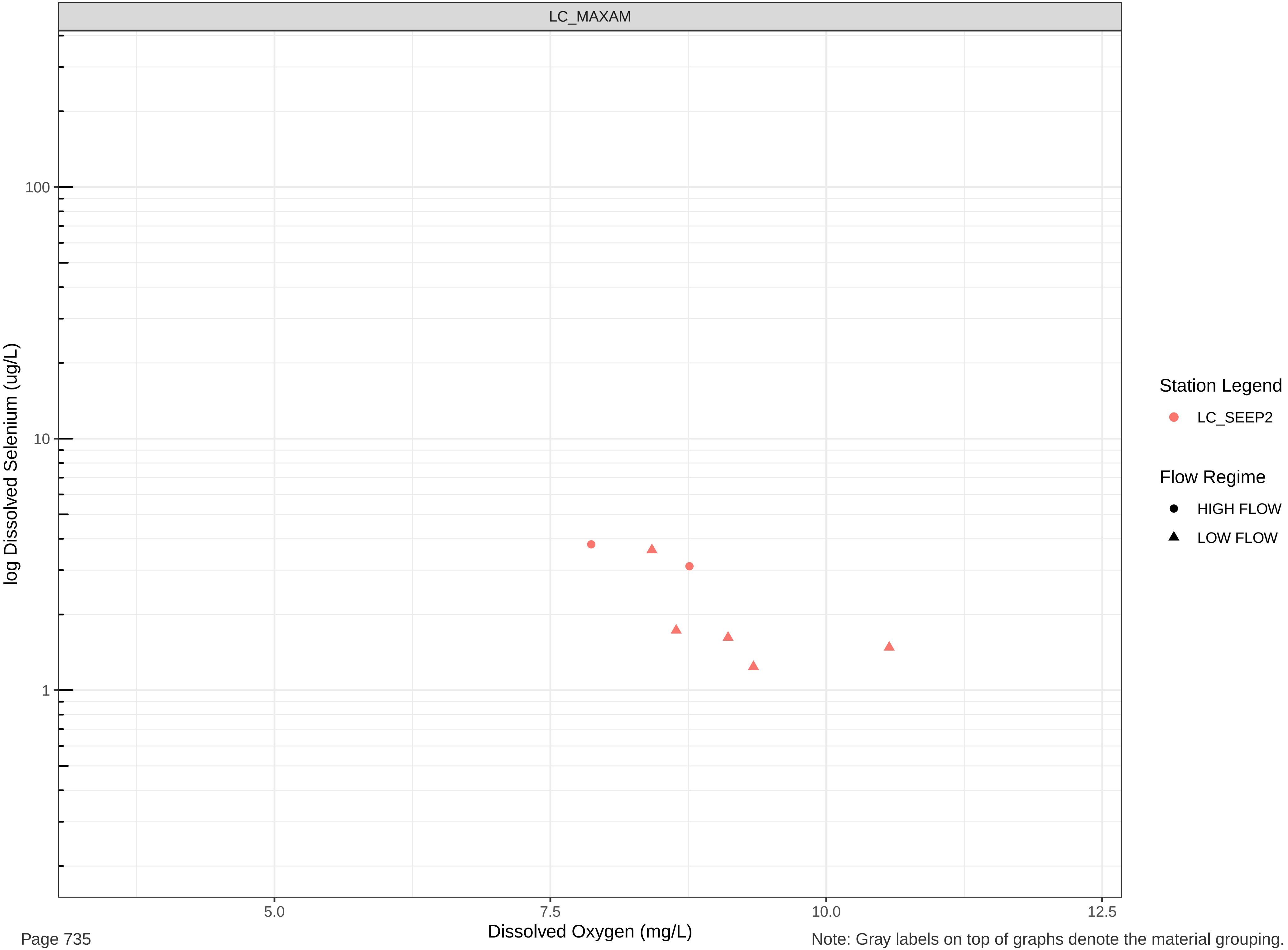

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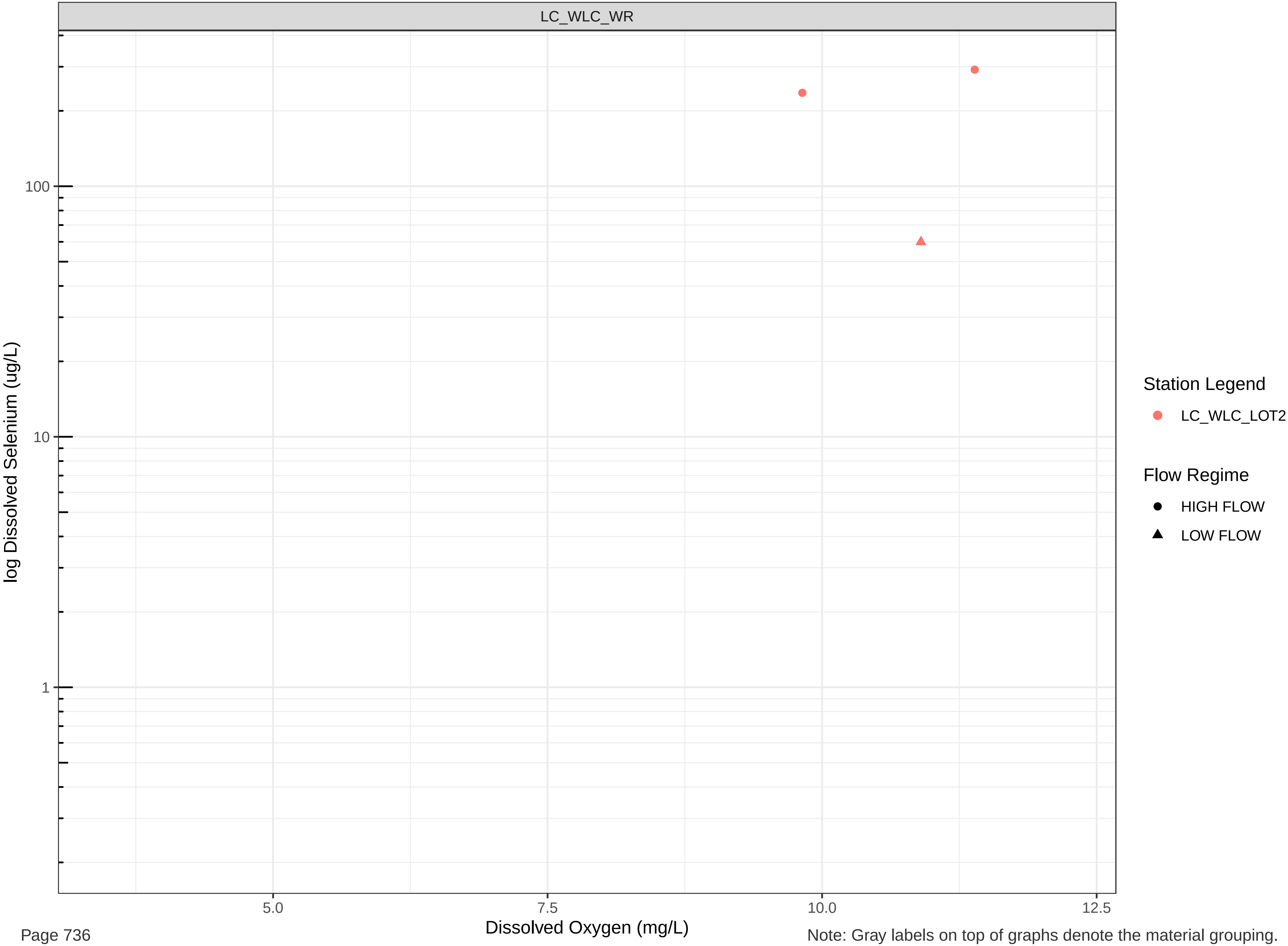

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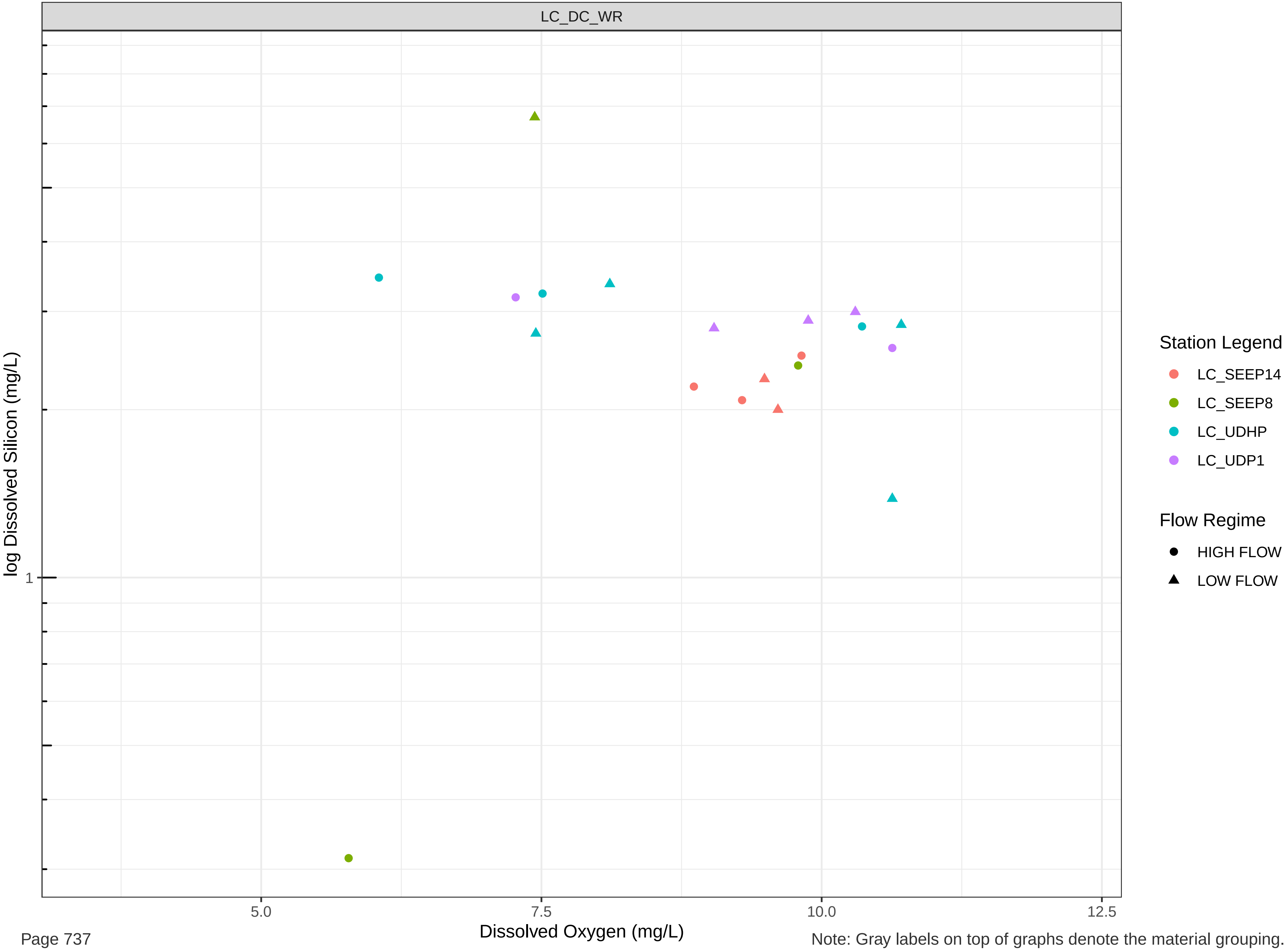

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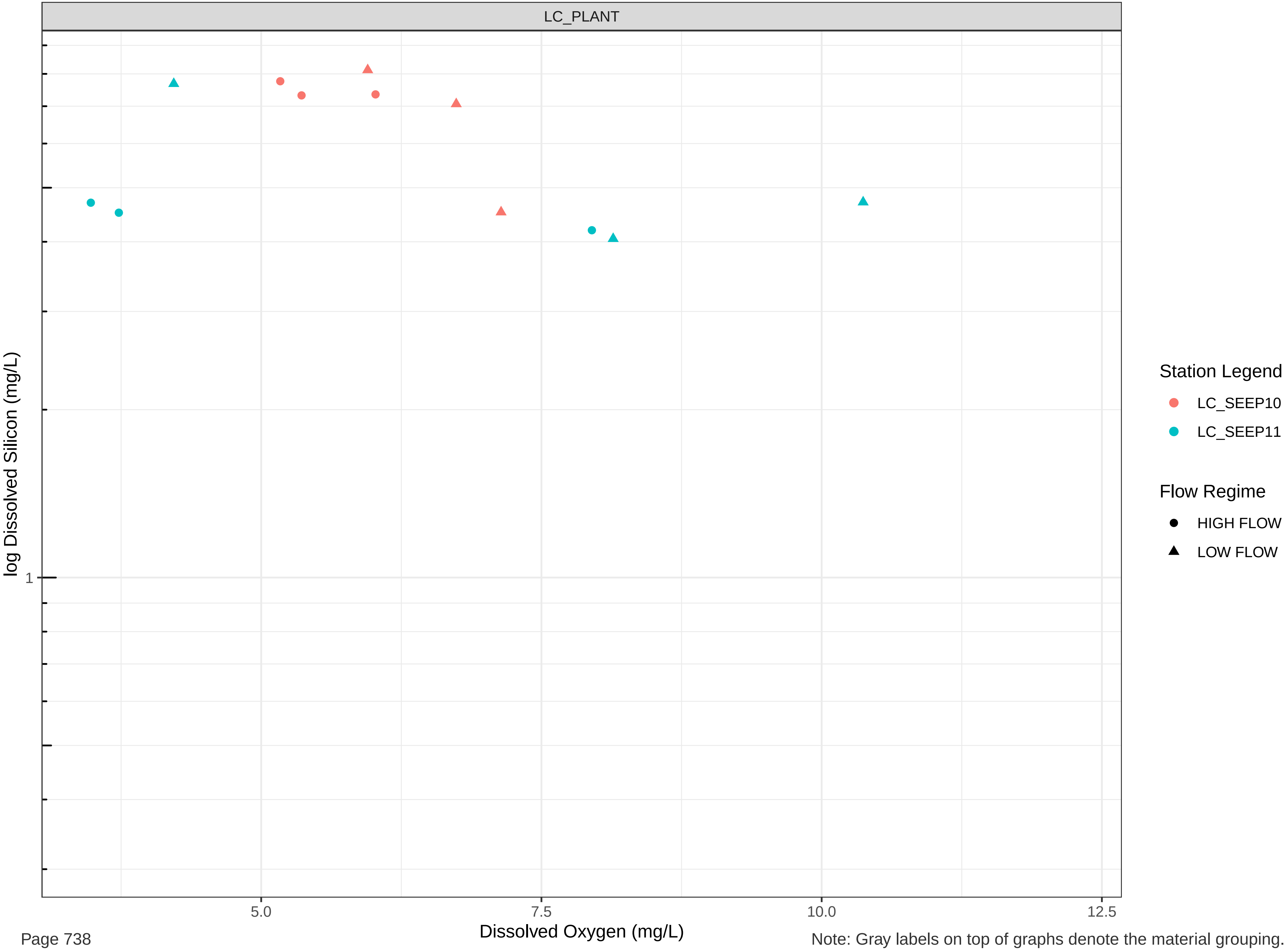
LC_PLANT
log Dissolved Silicon (mg/L)
1
5.0
7.5
10.0
12.5
Dissolved Oxygen (mg/L)
Station Legend
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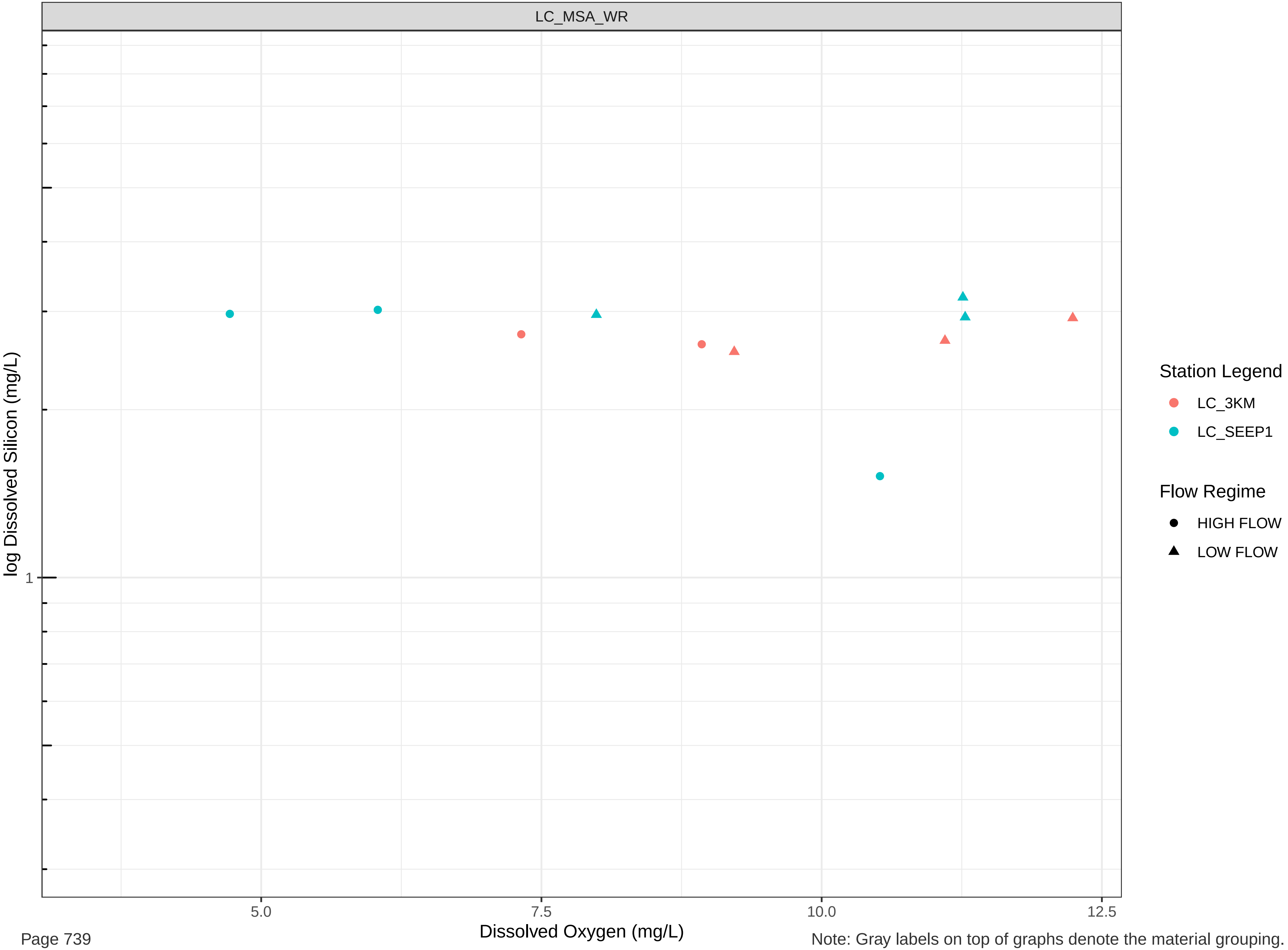
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



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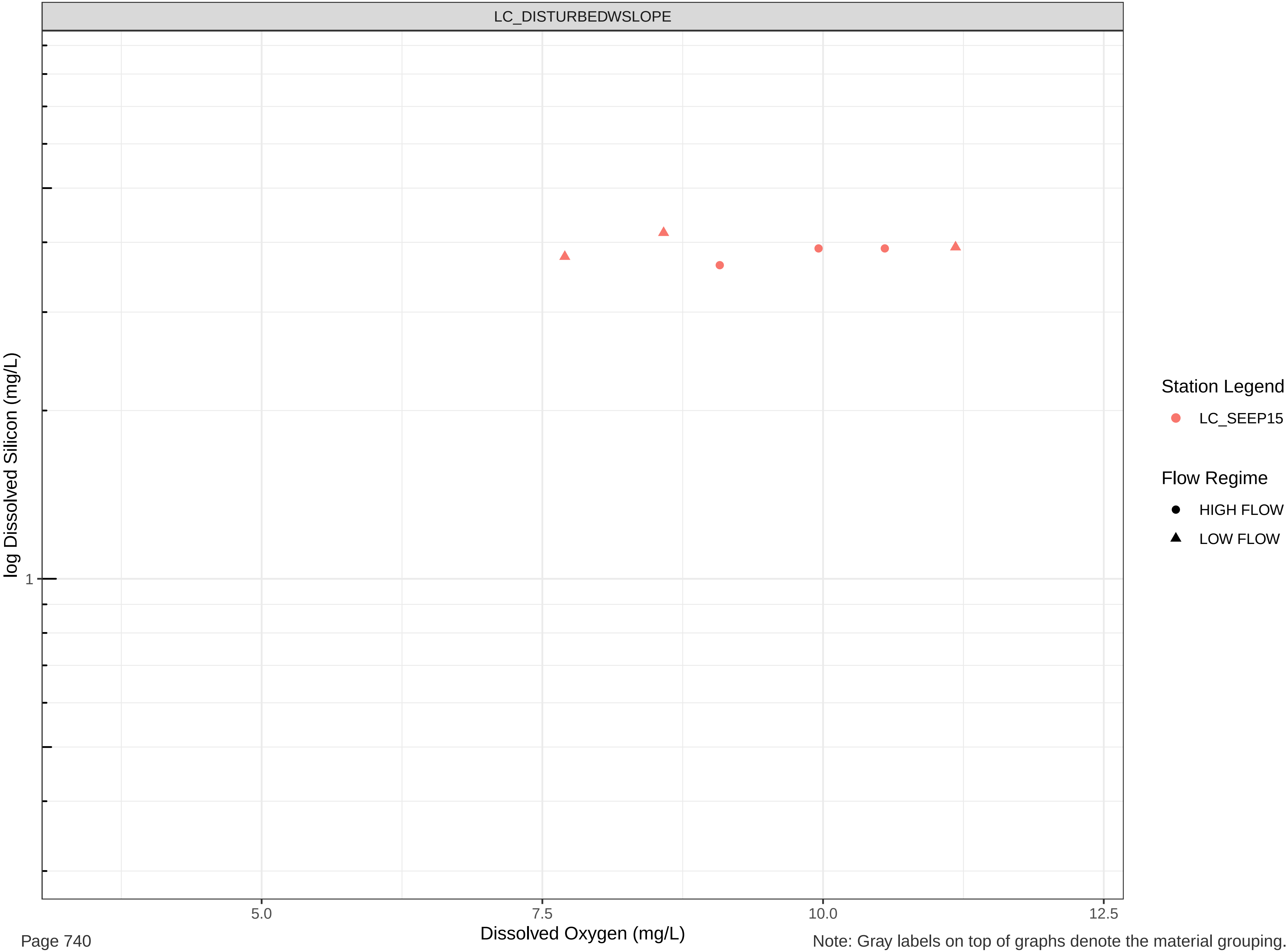

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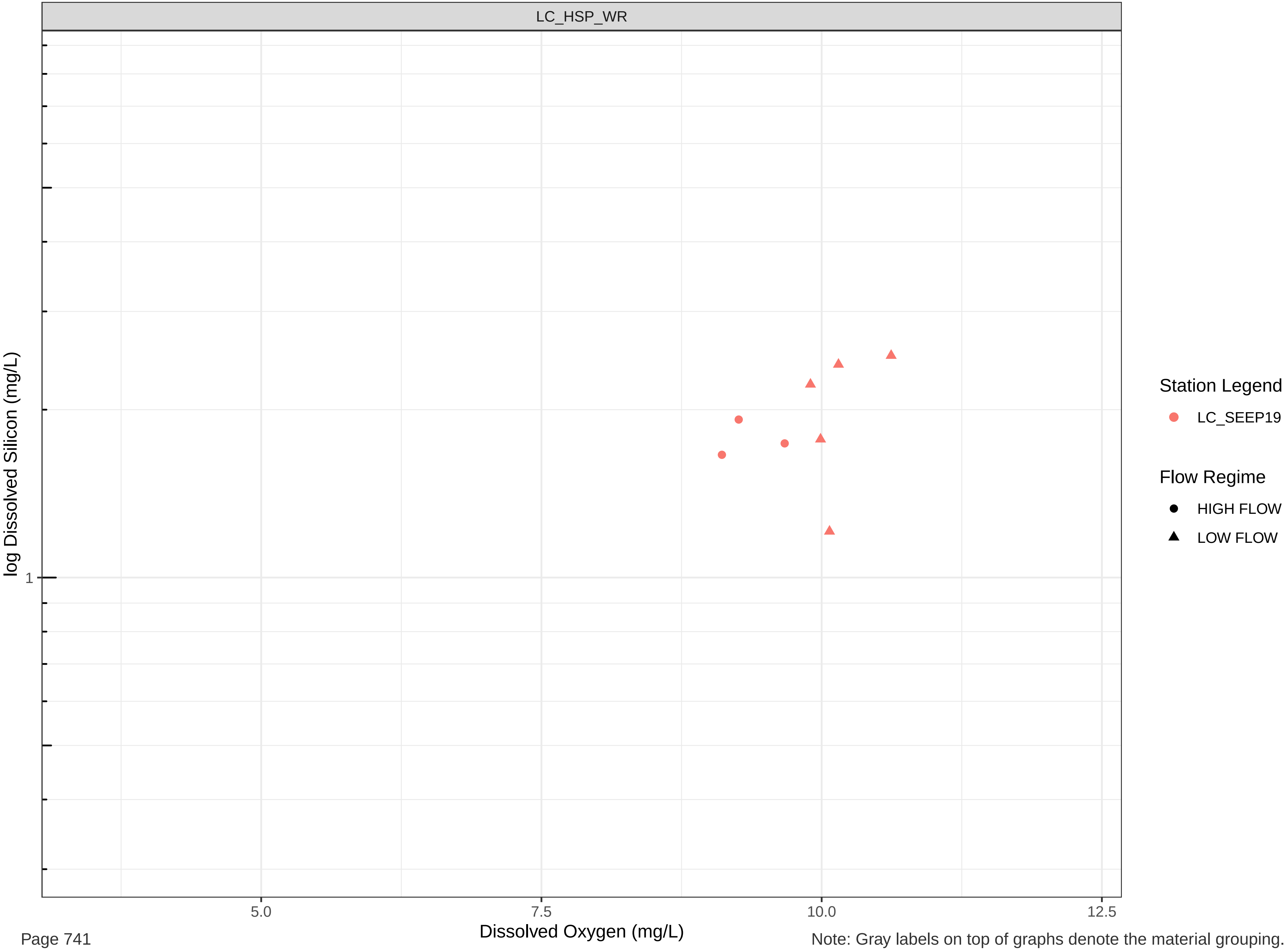

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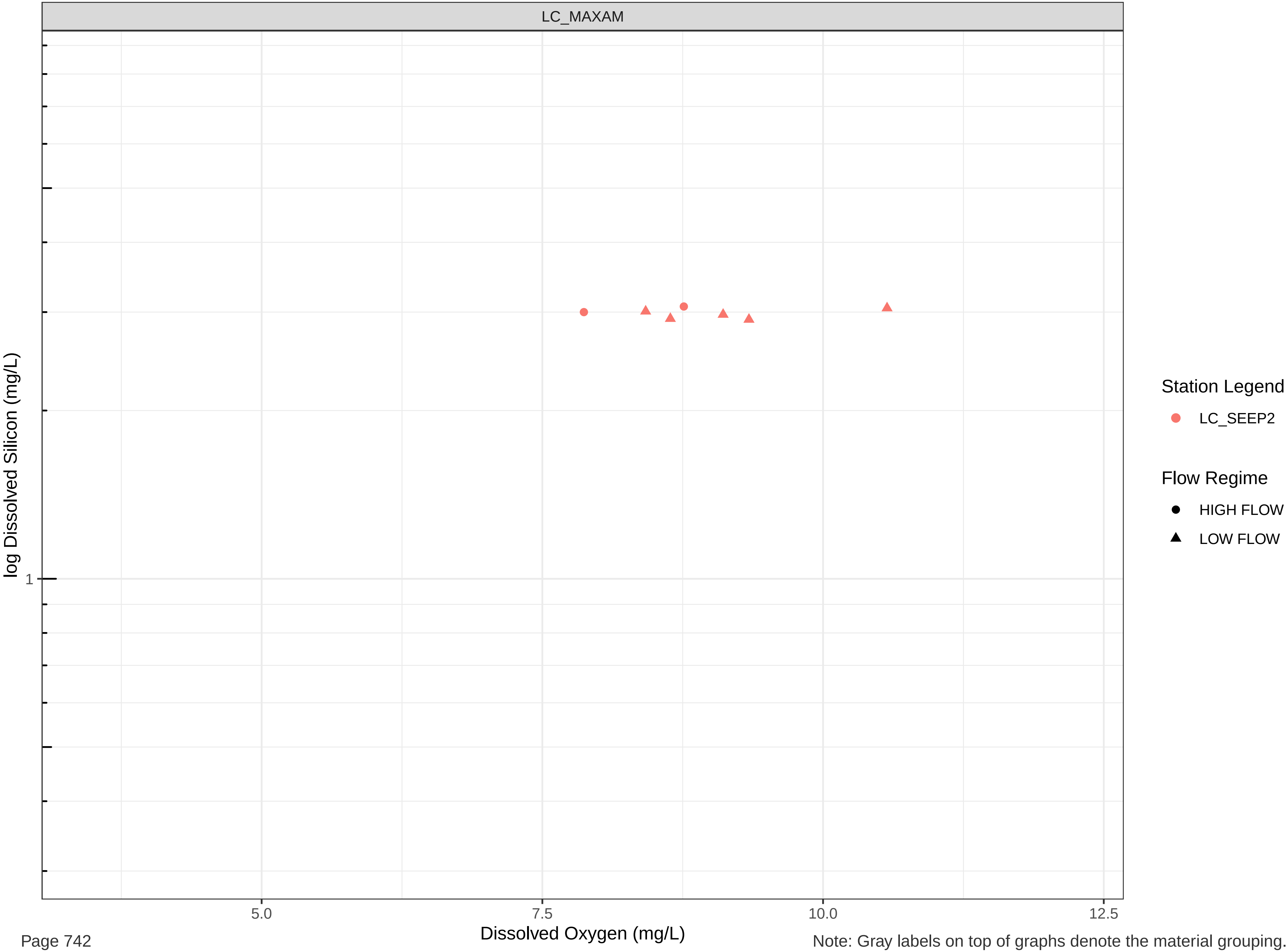

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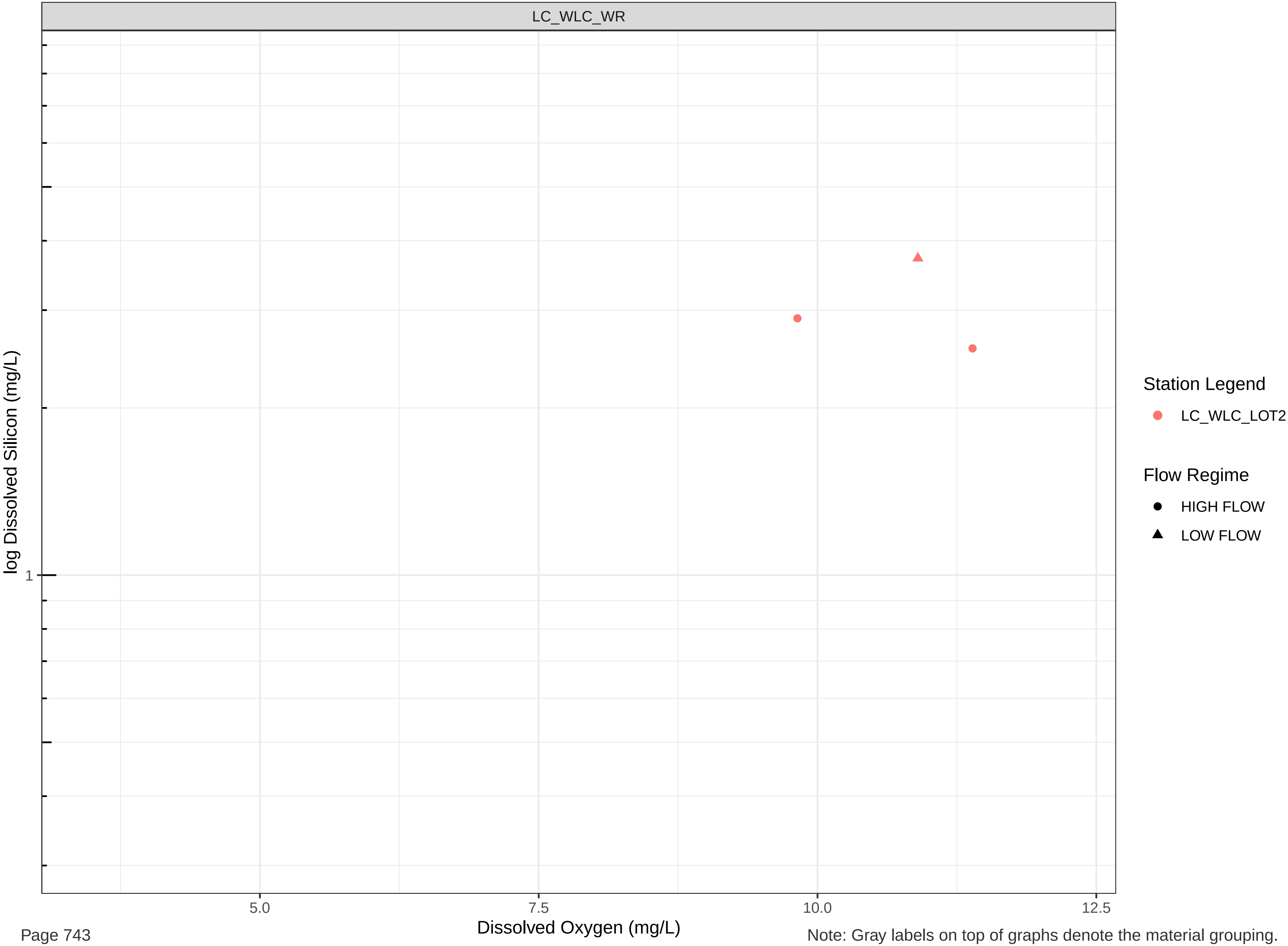

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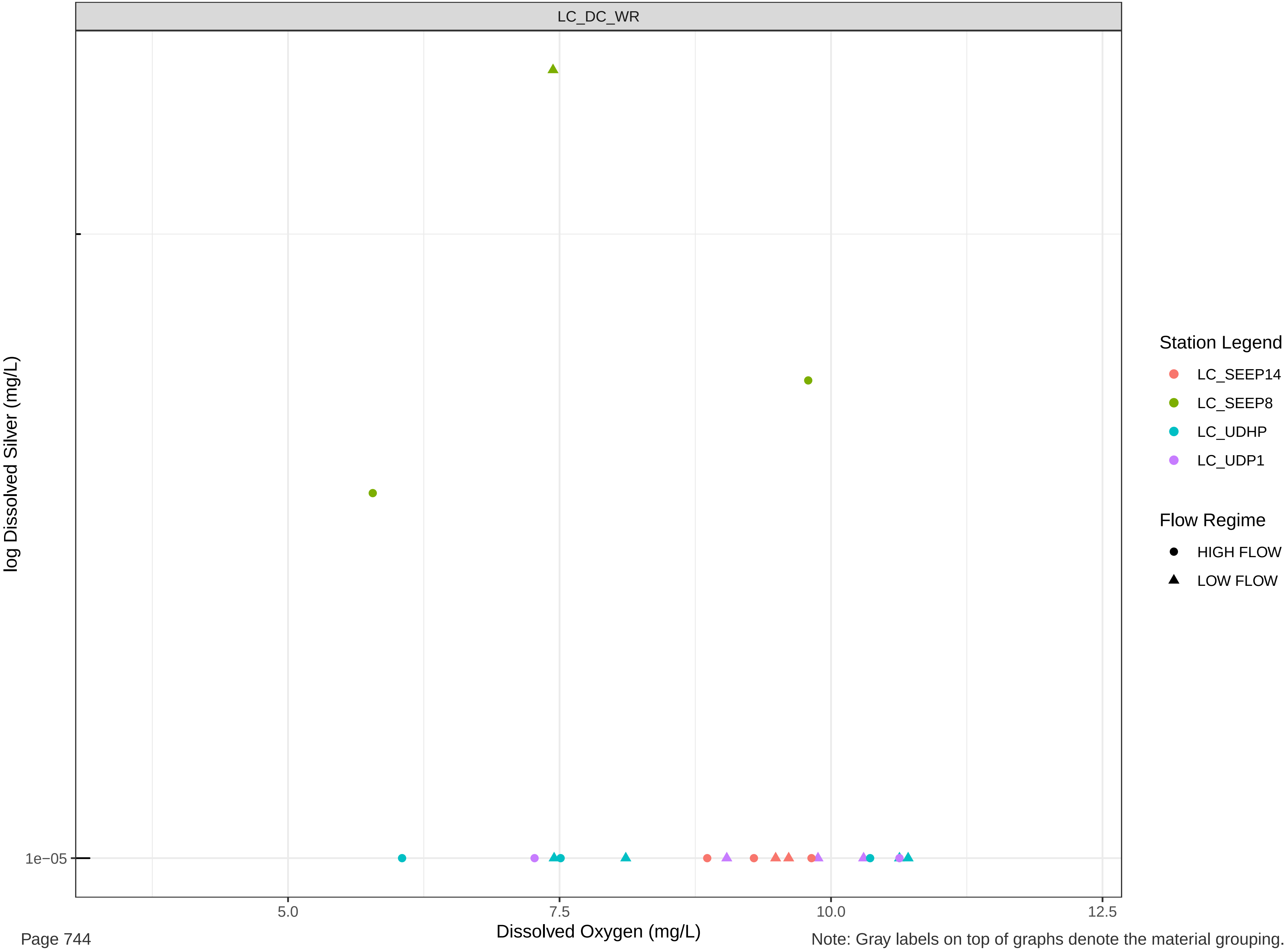

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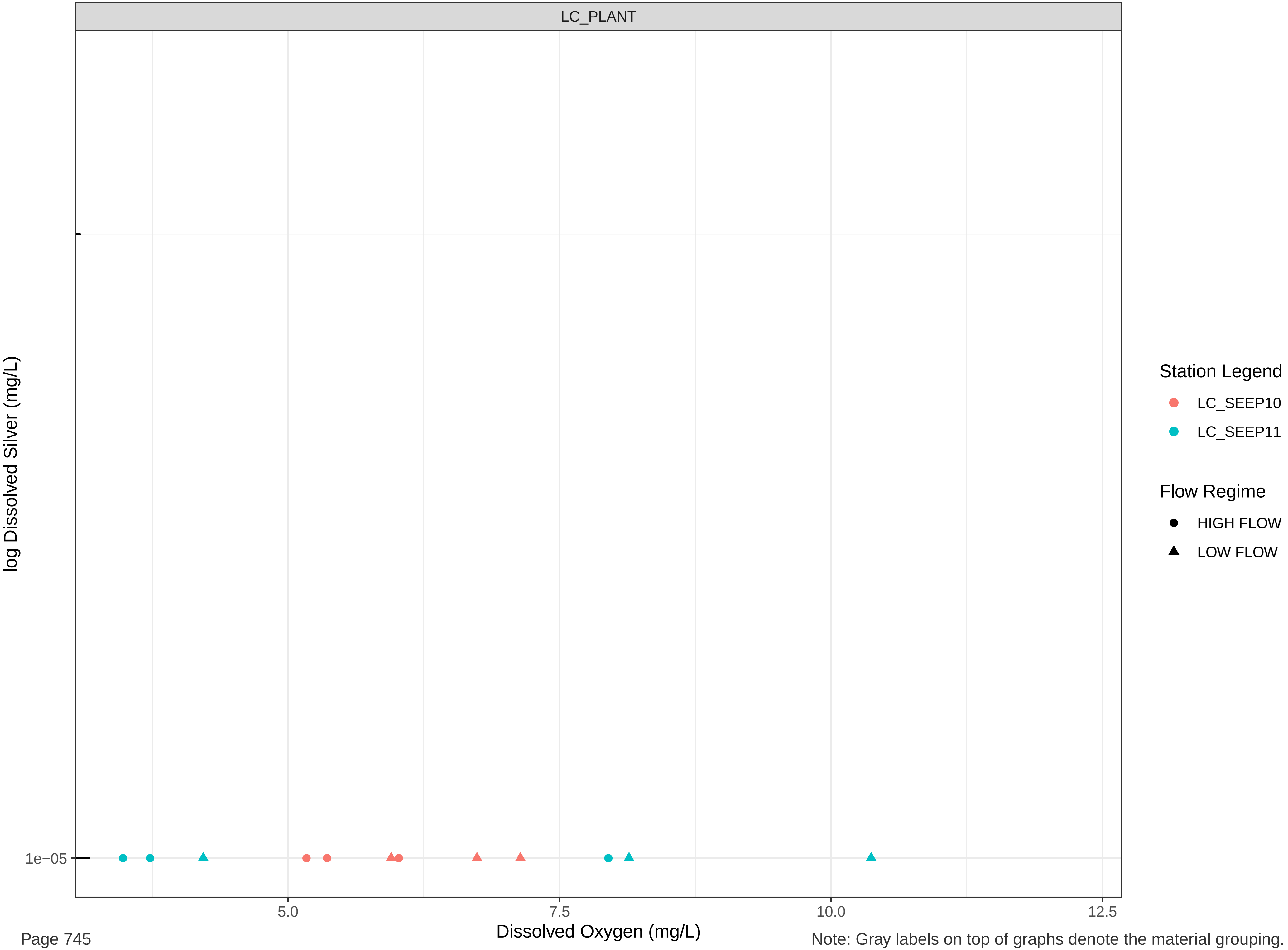

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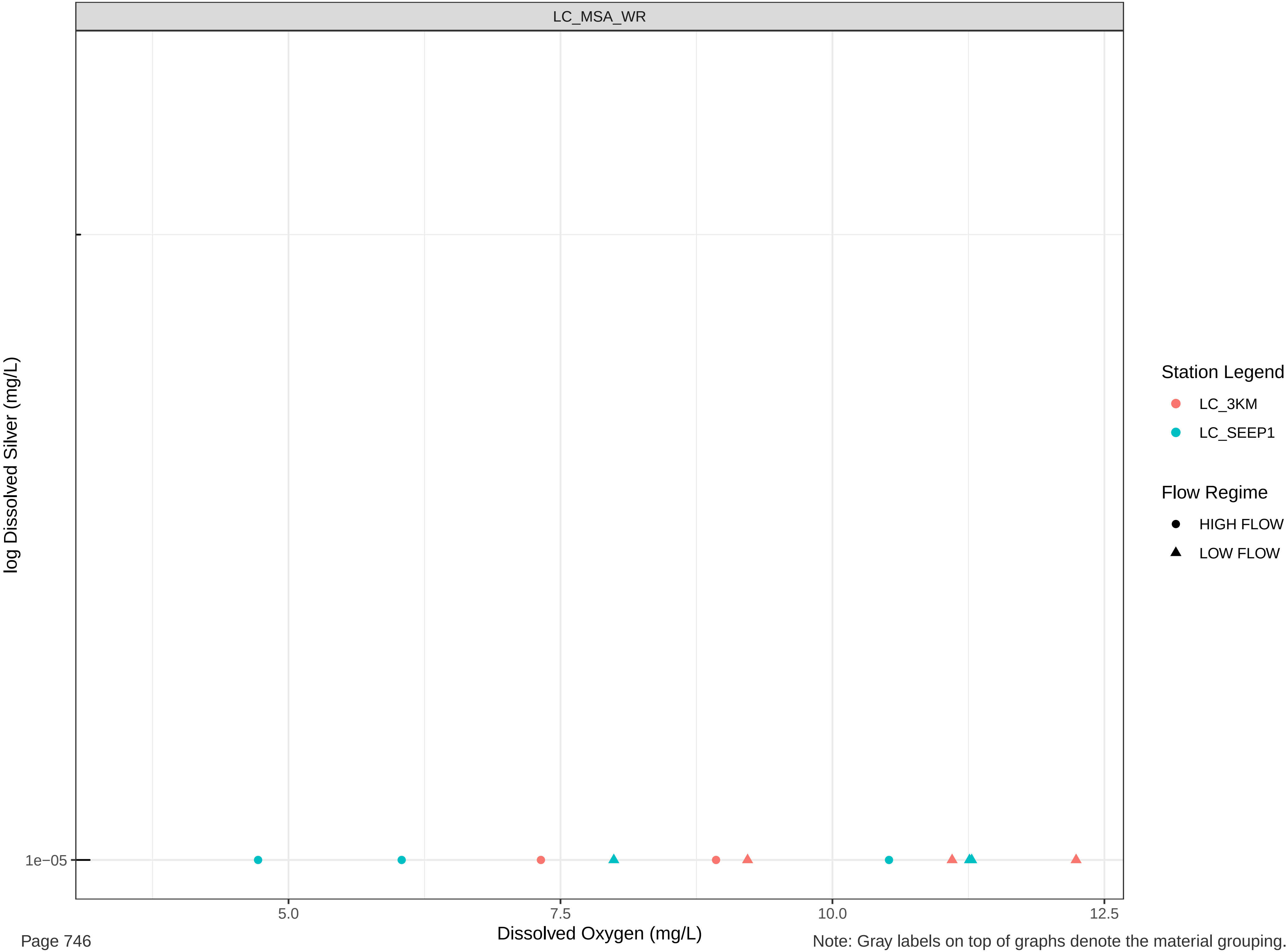

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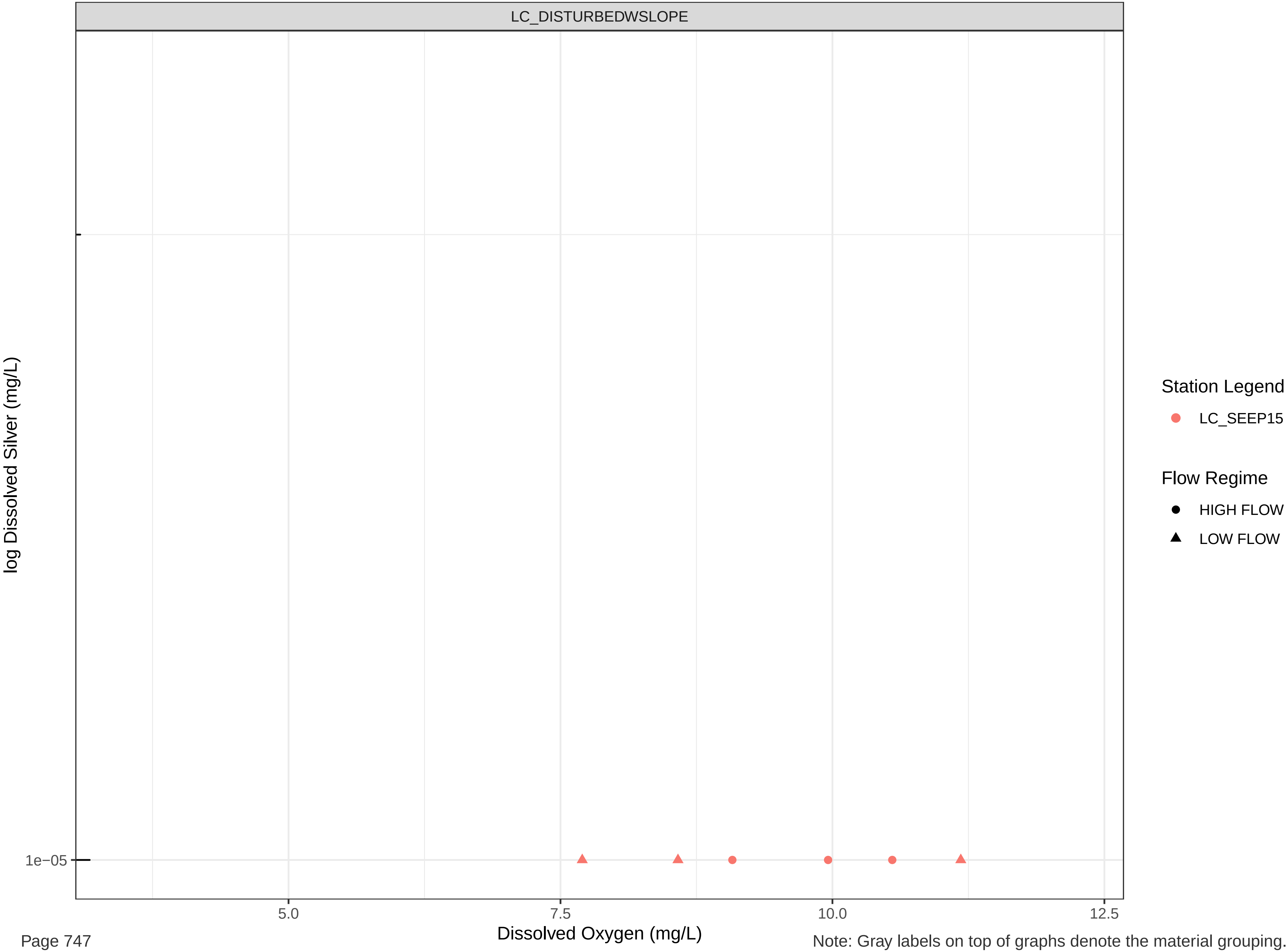

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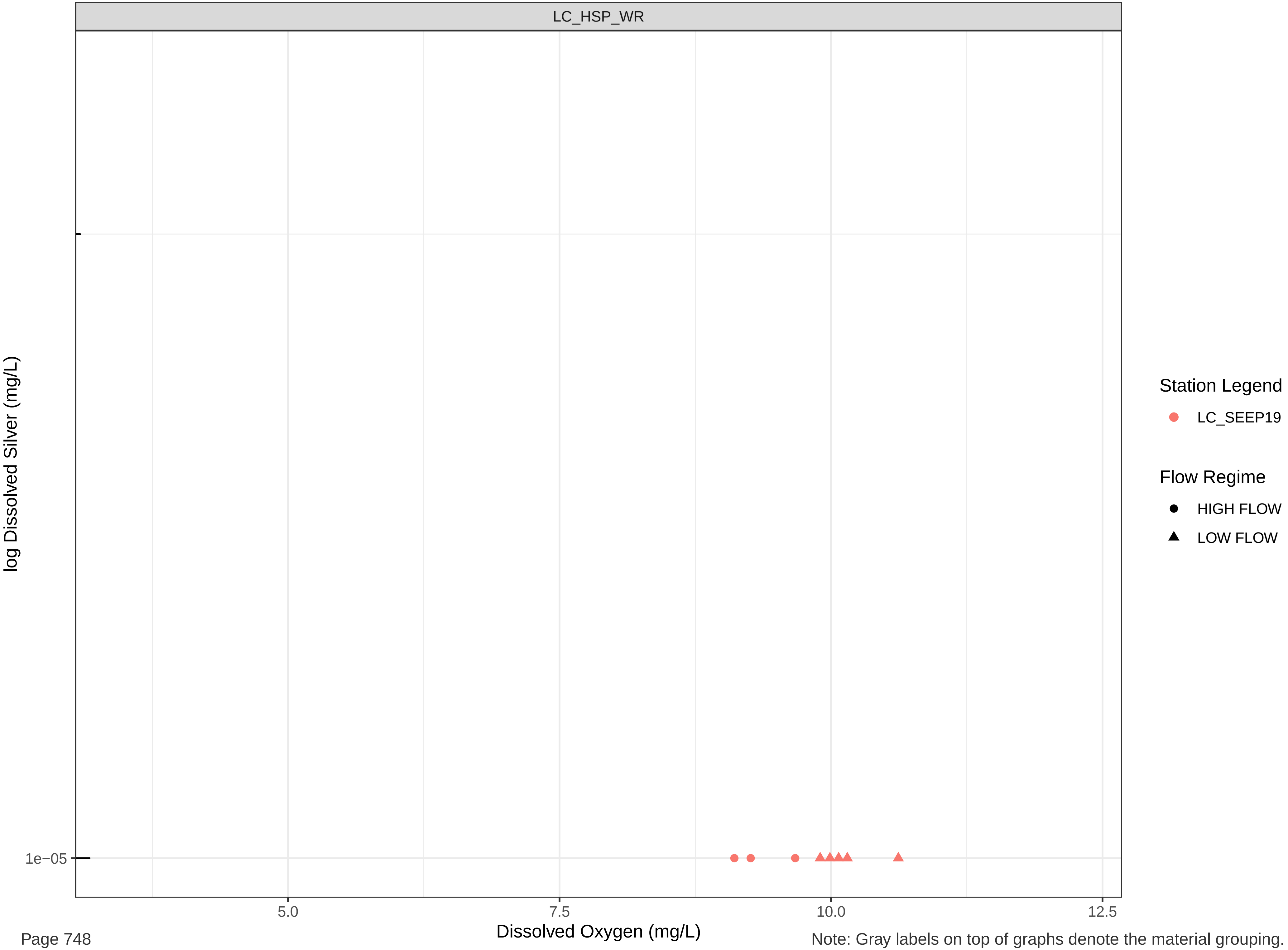

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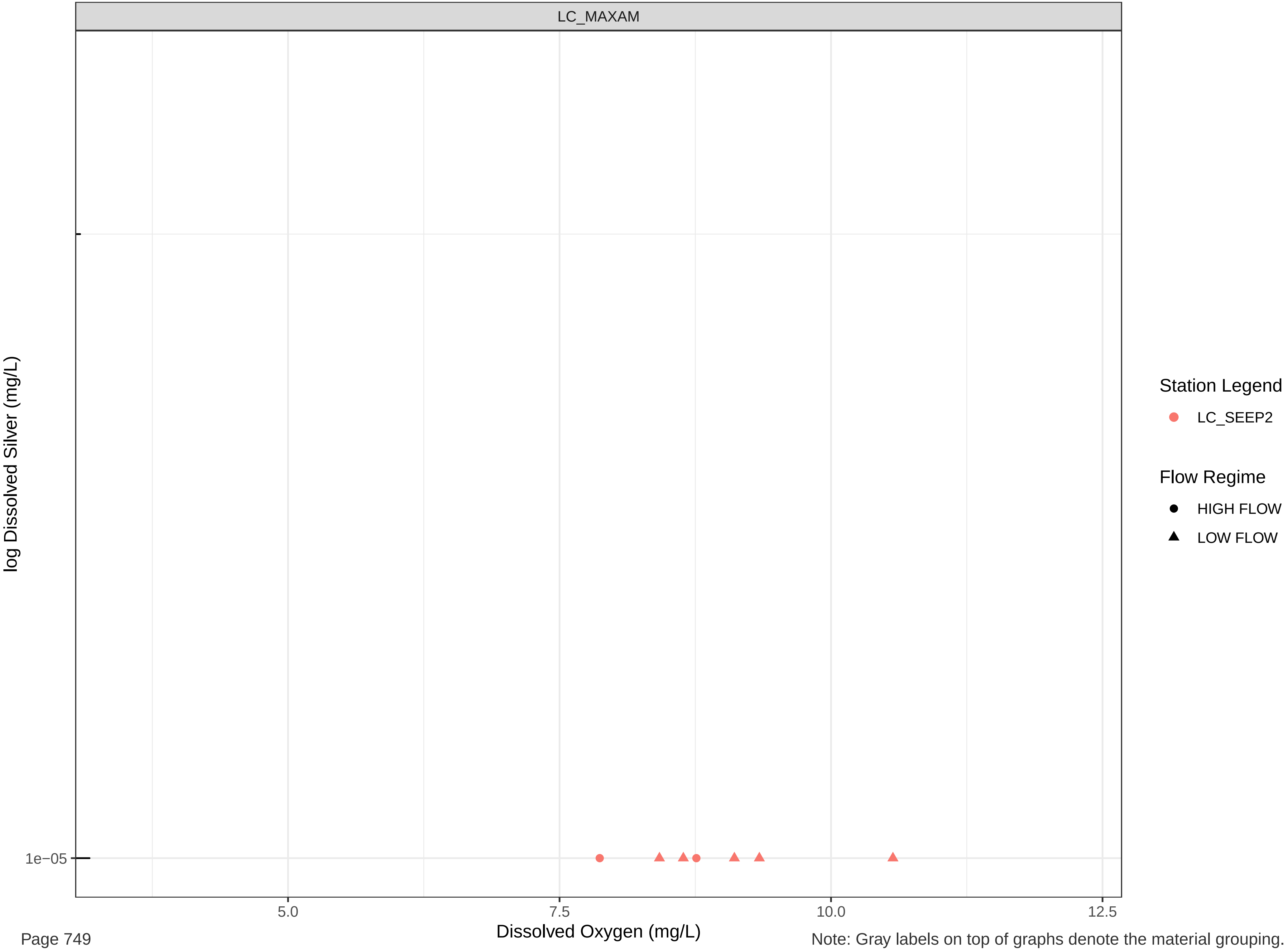

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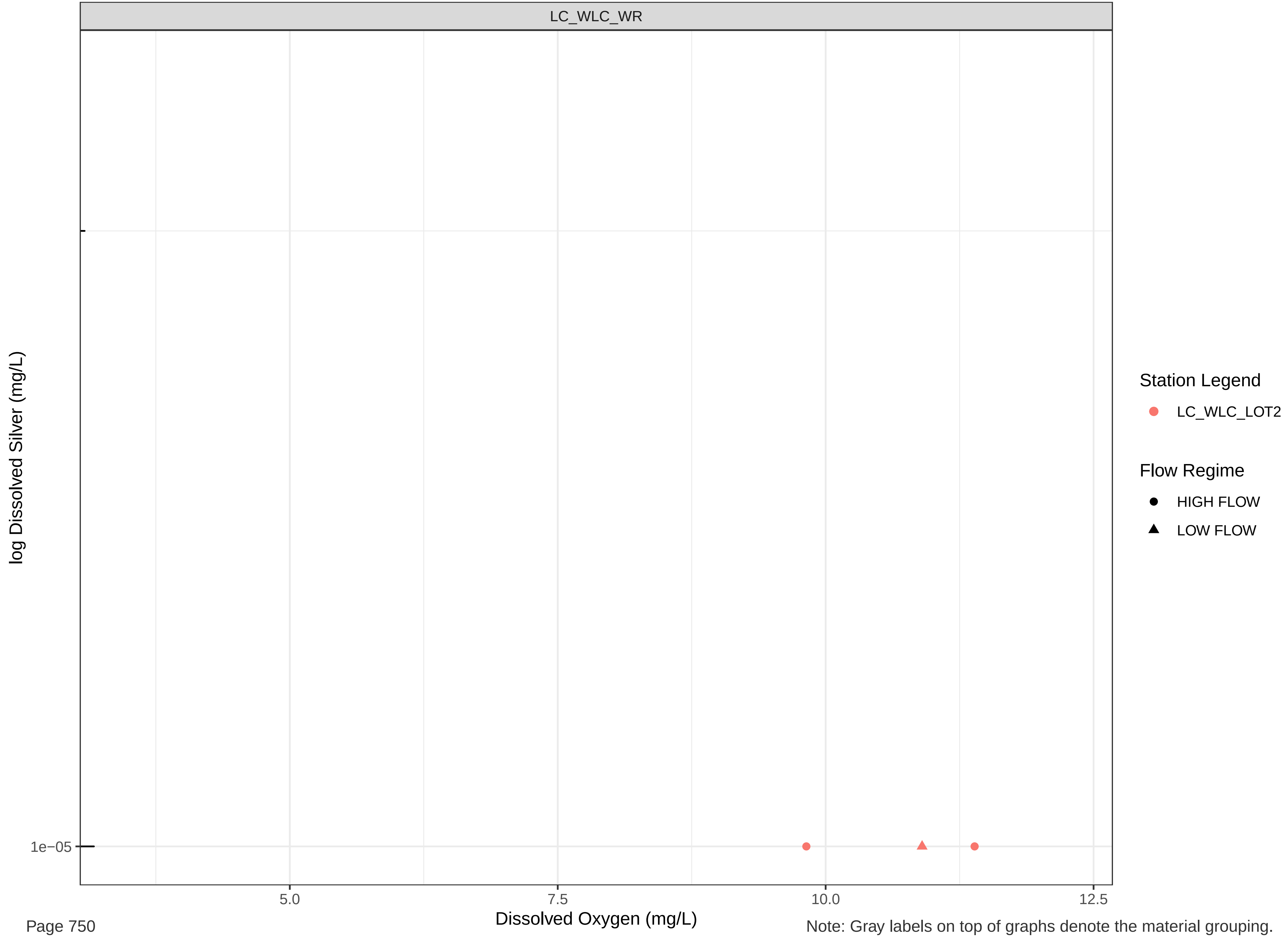

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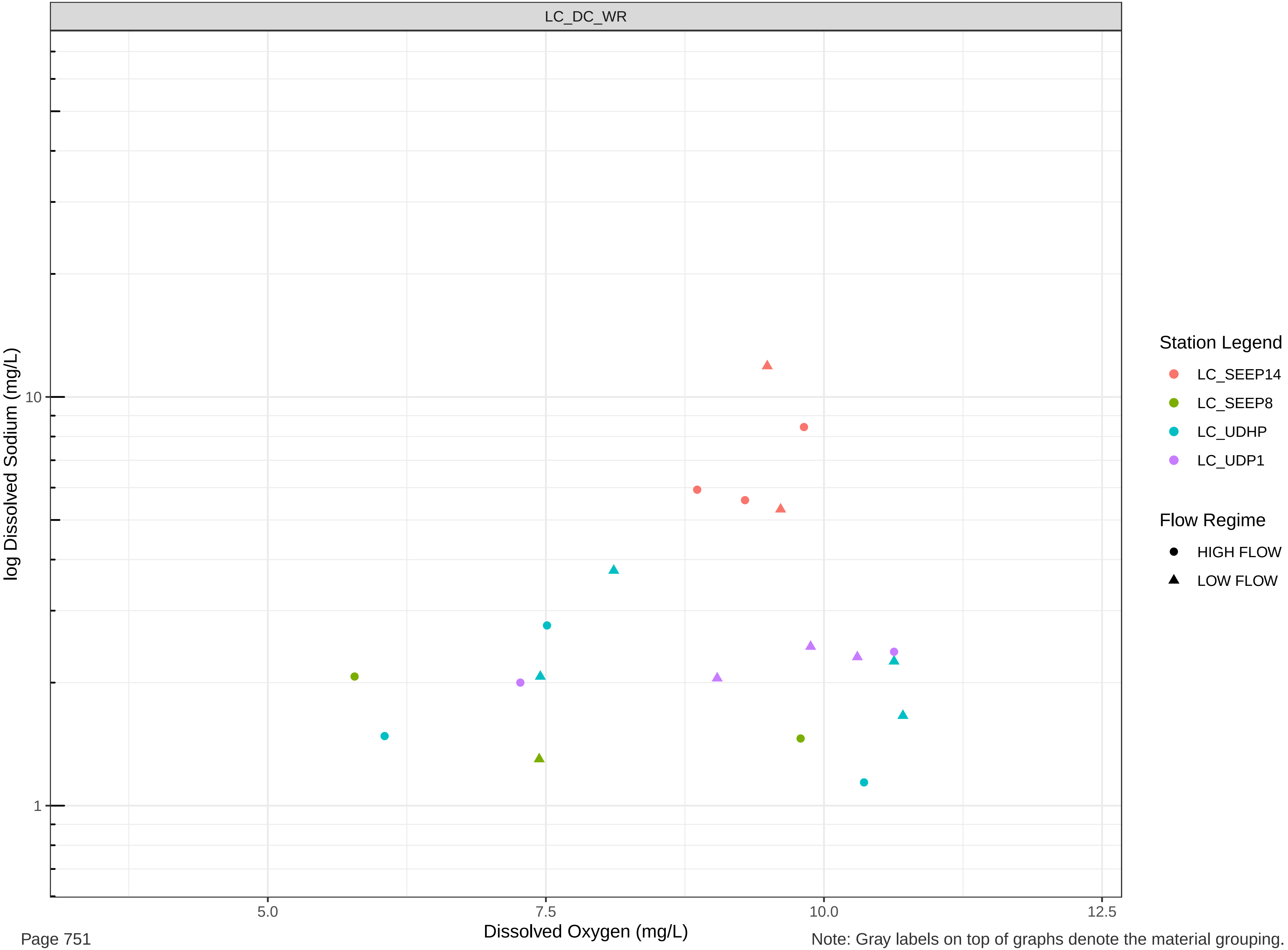

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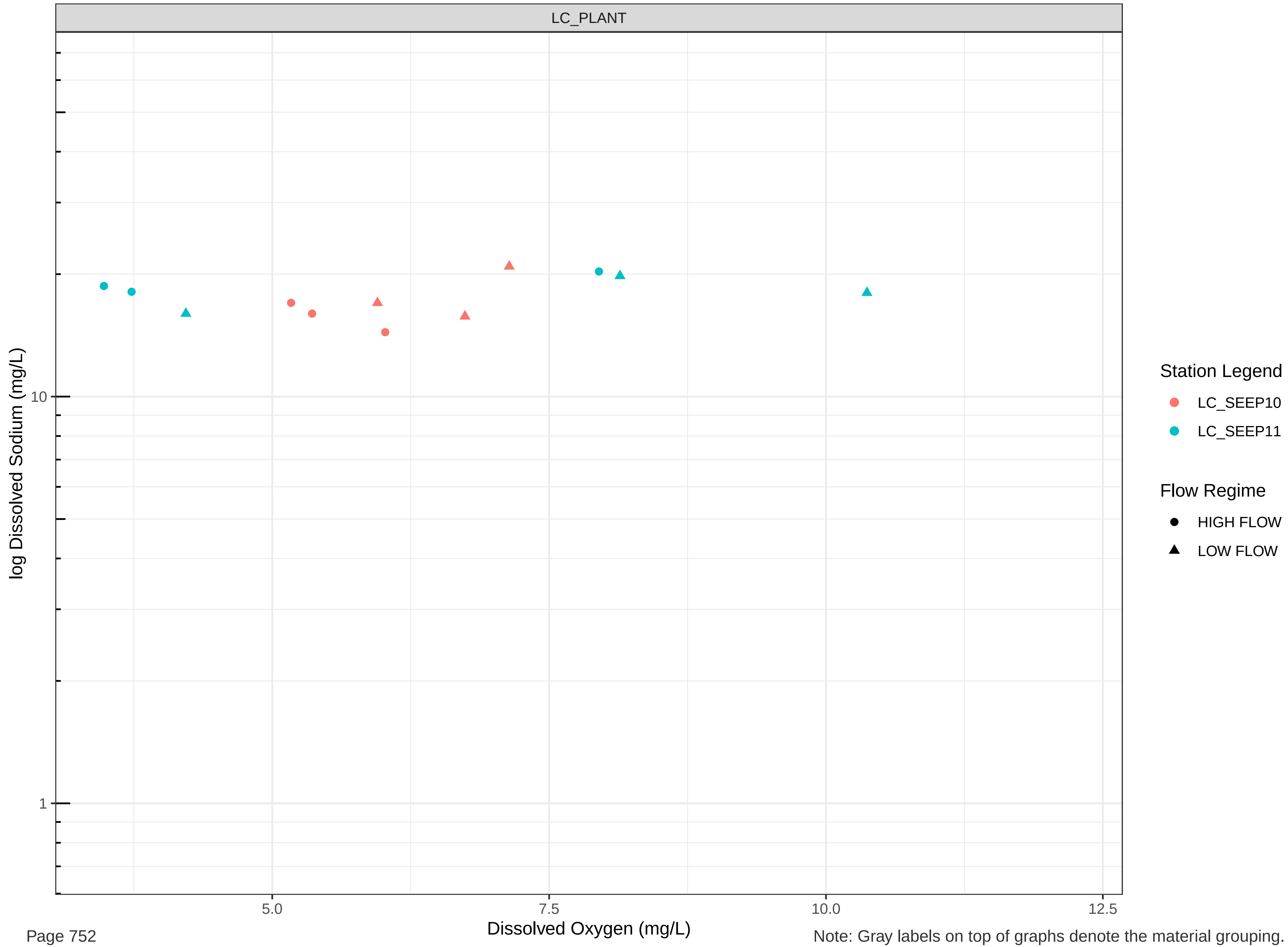

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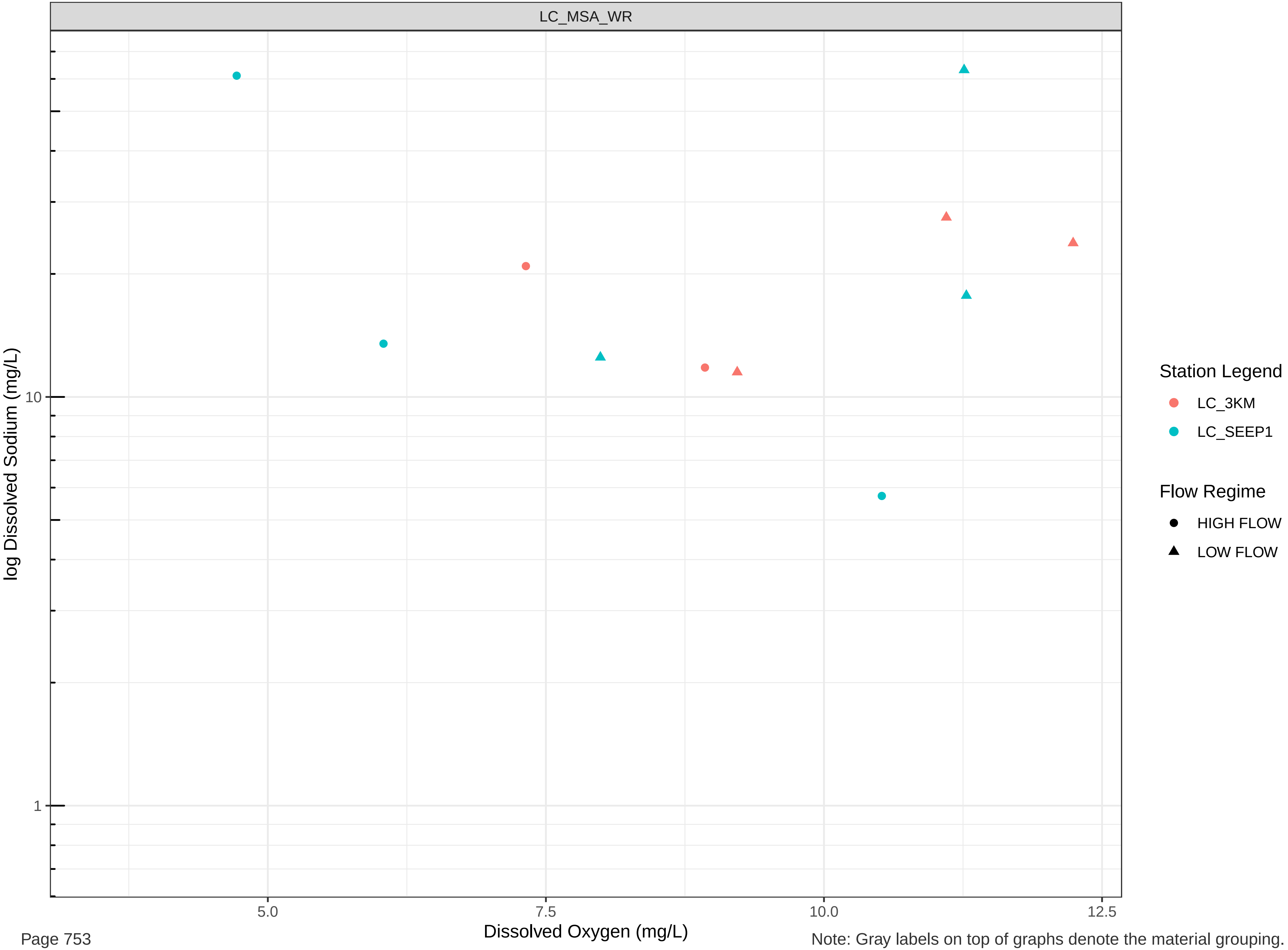

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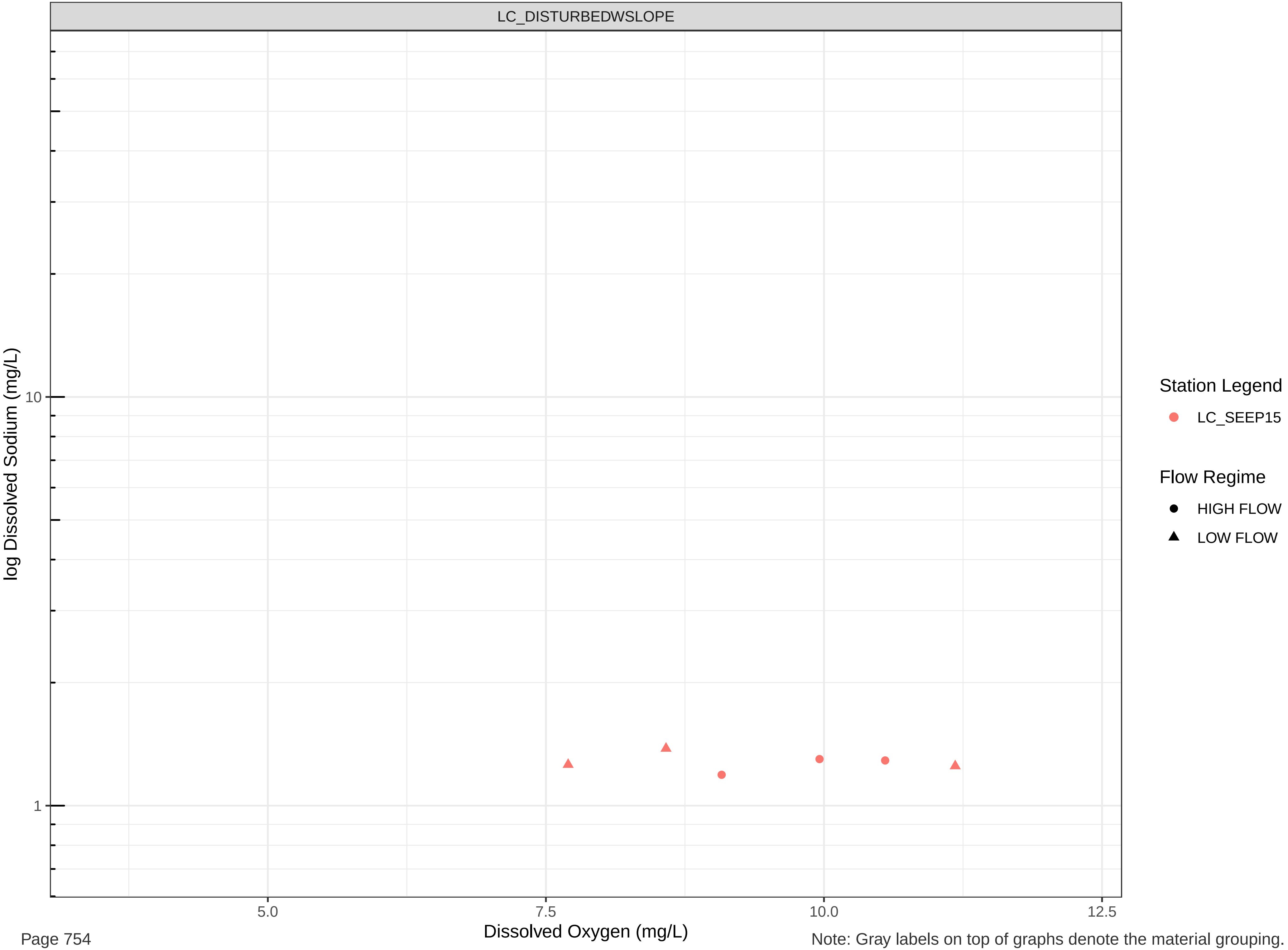

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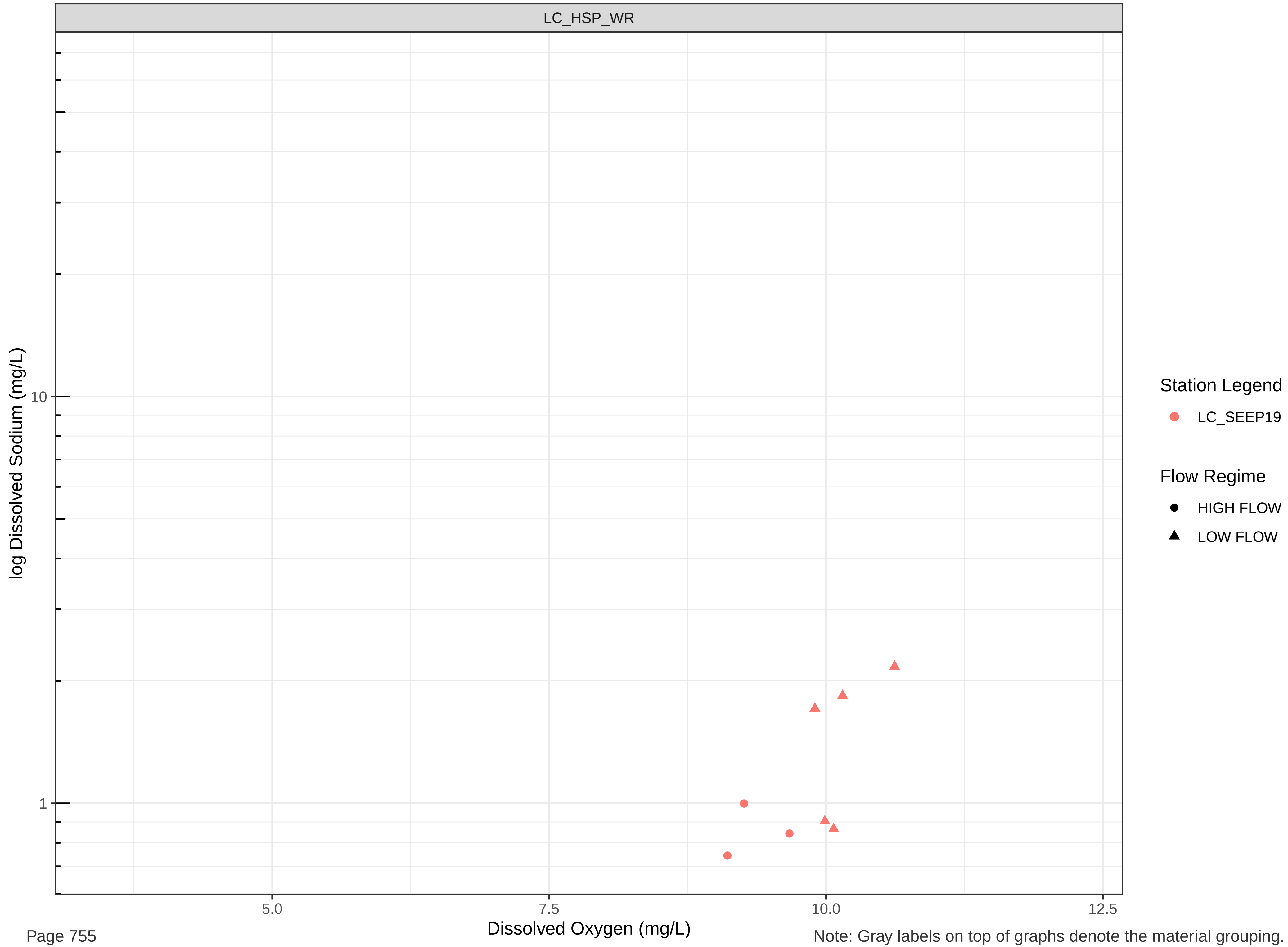

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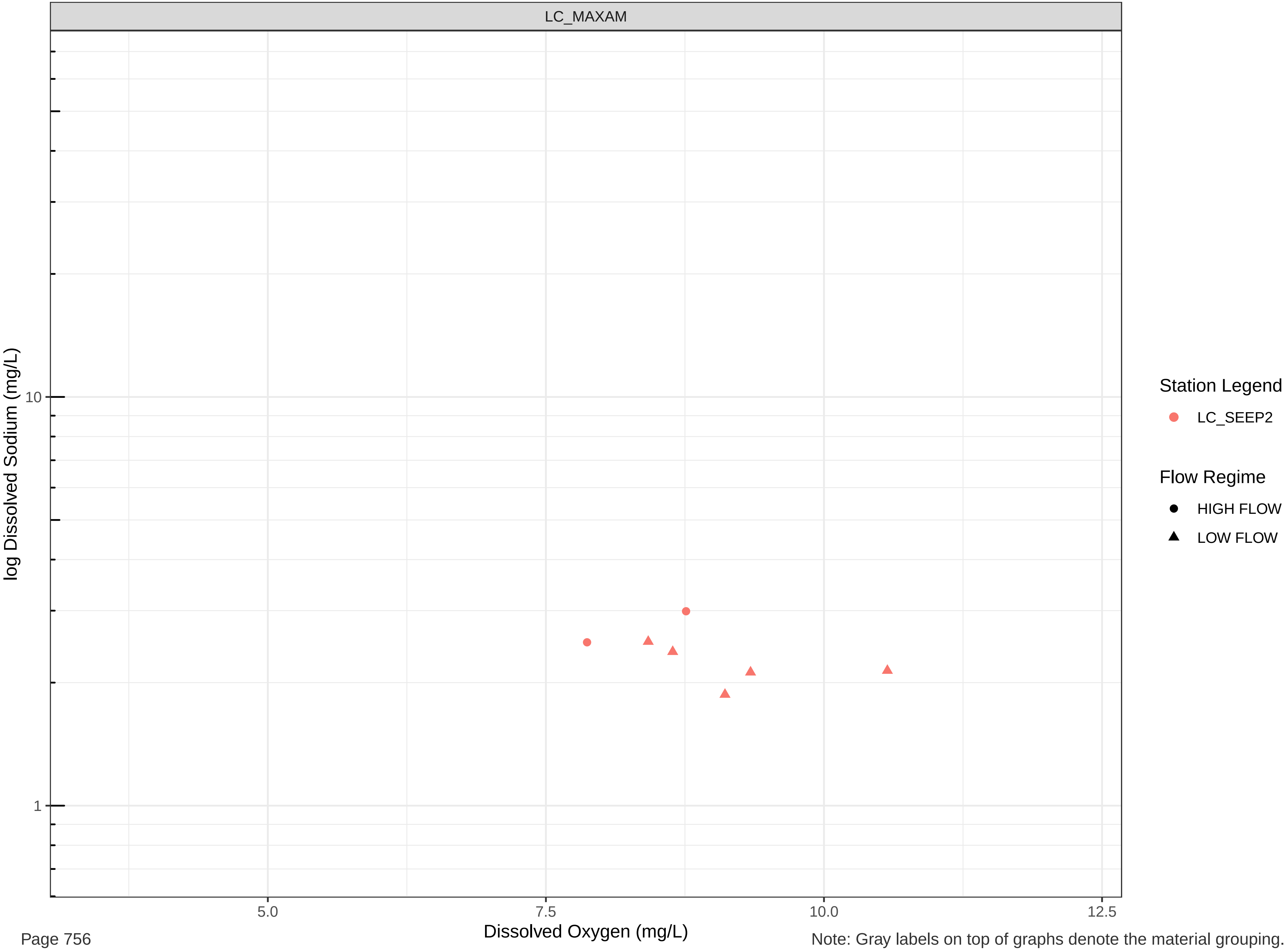

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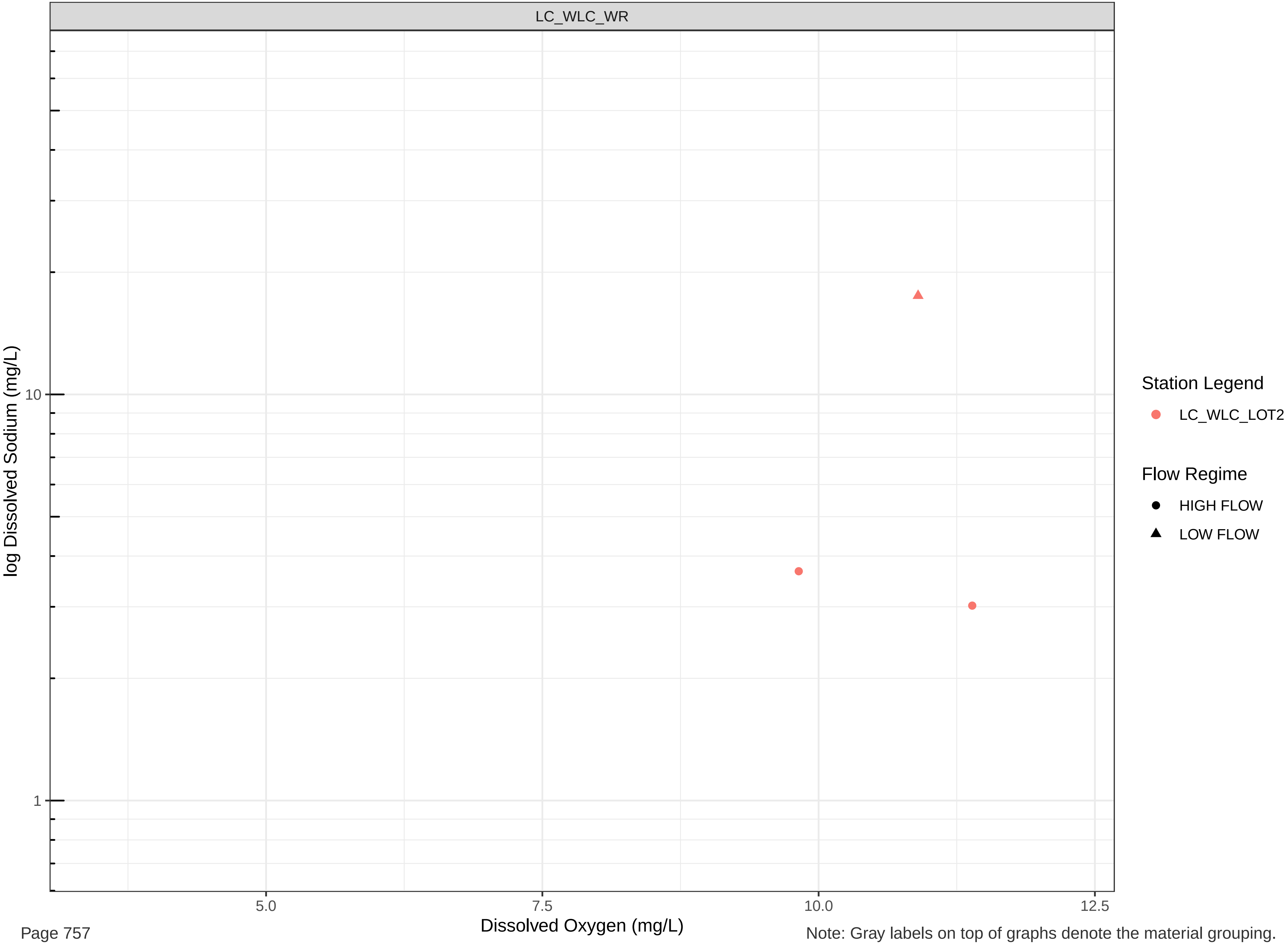

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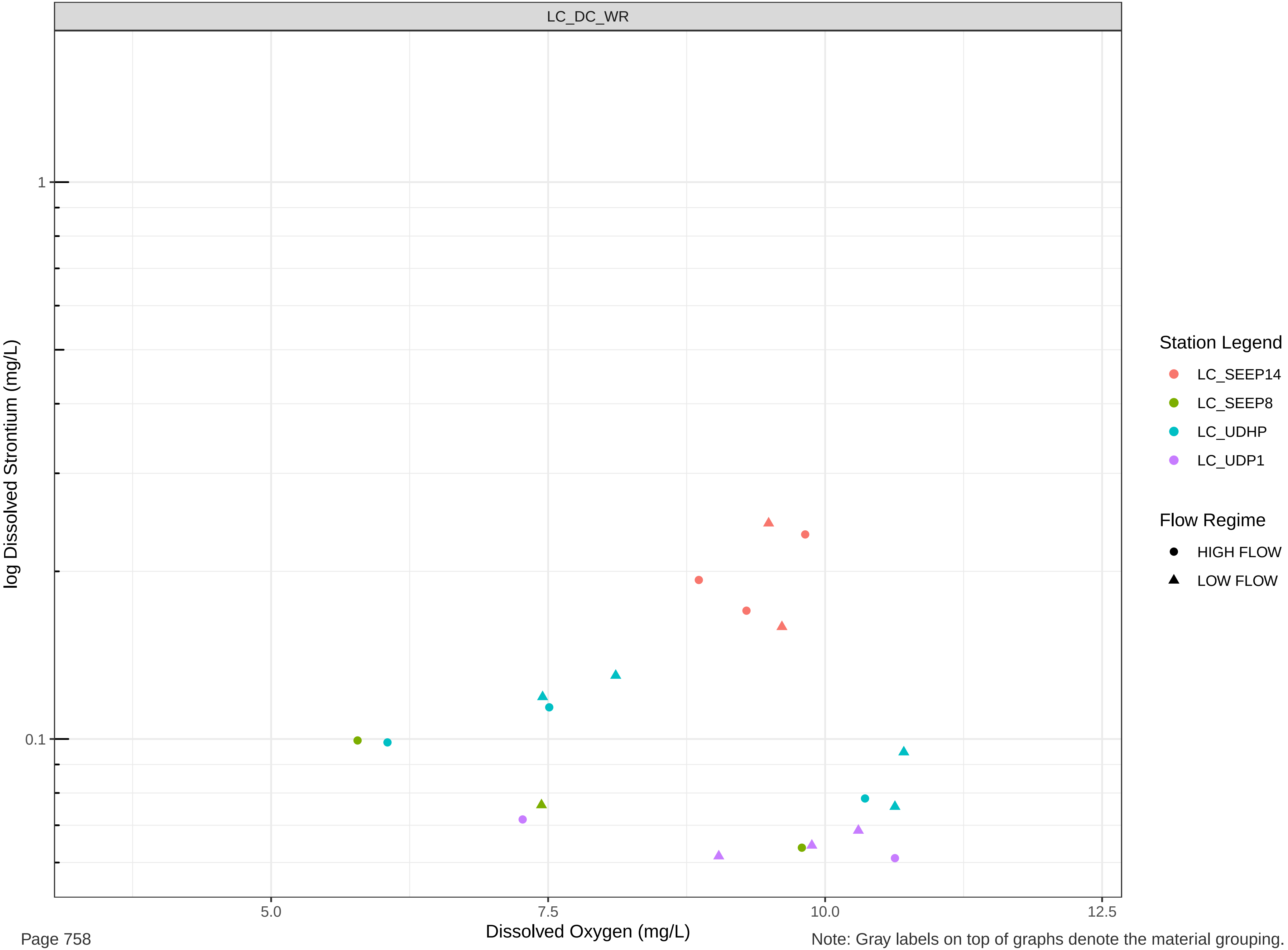

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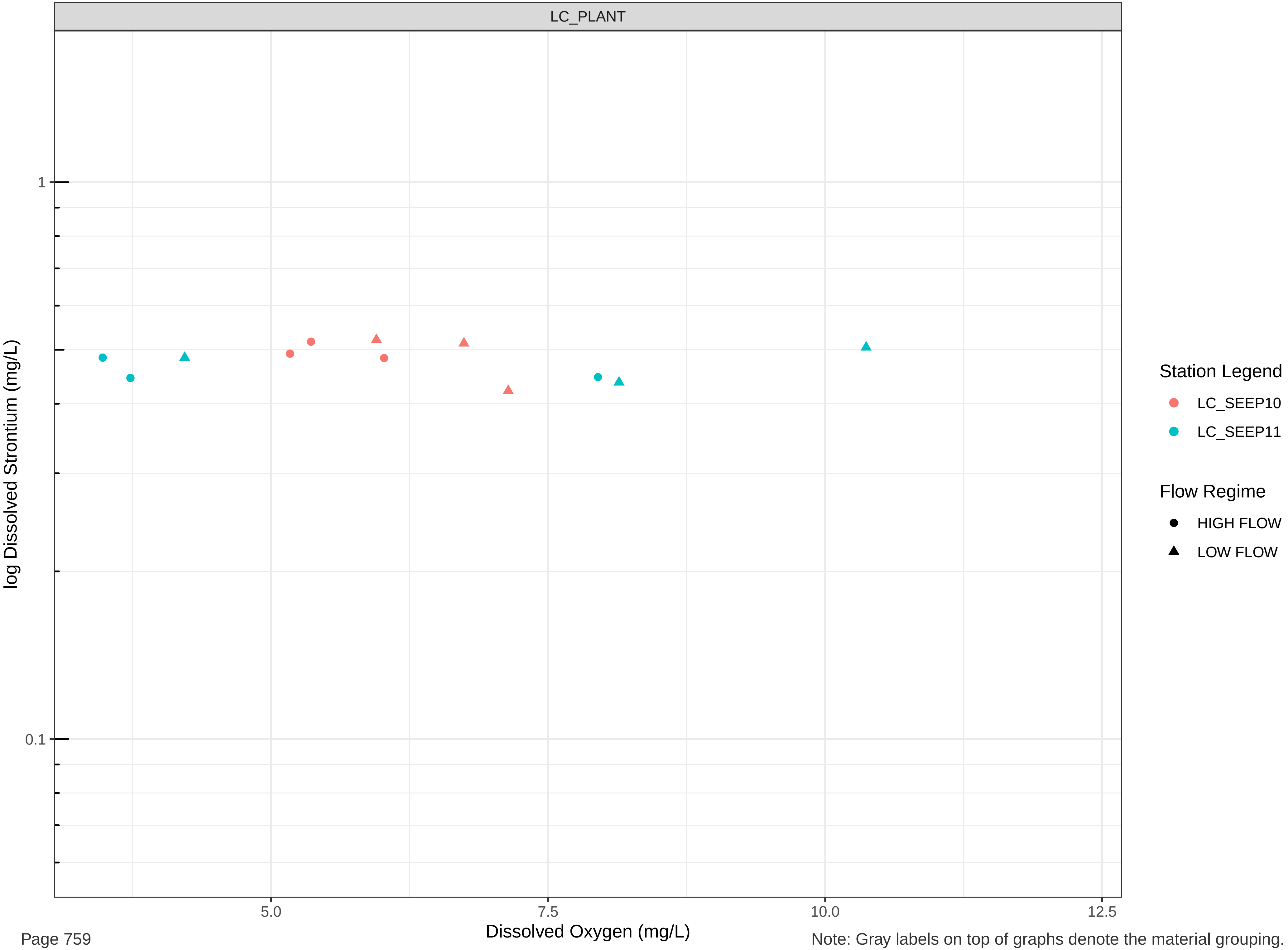

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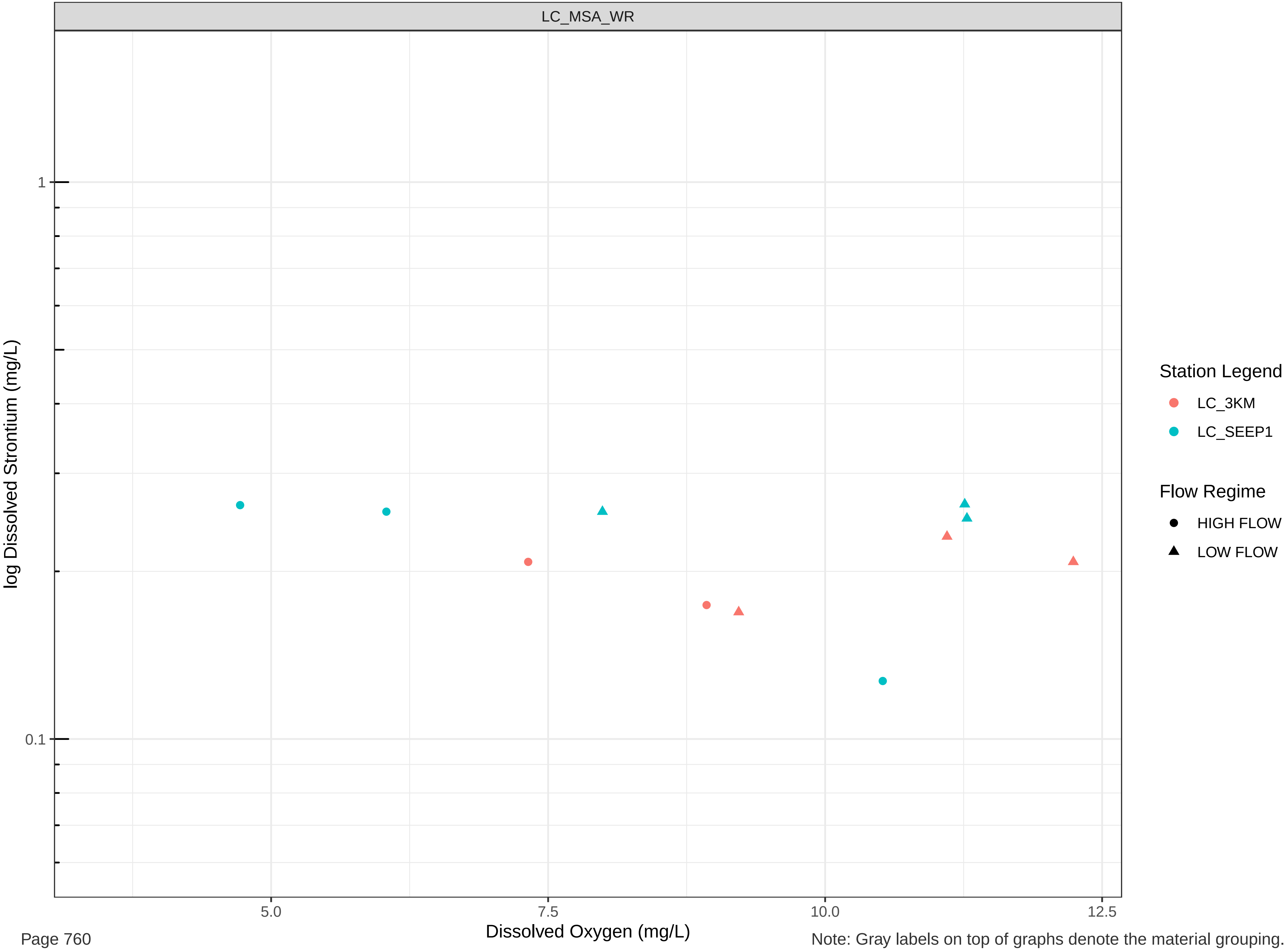

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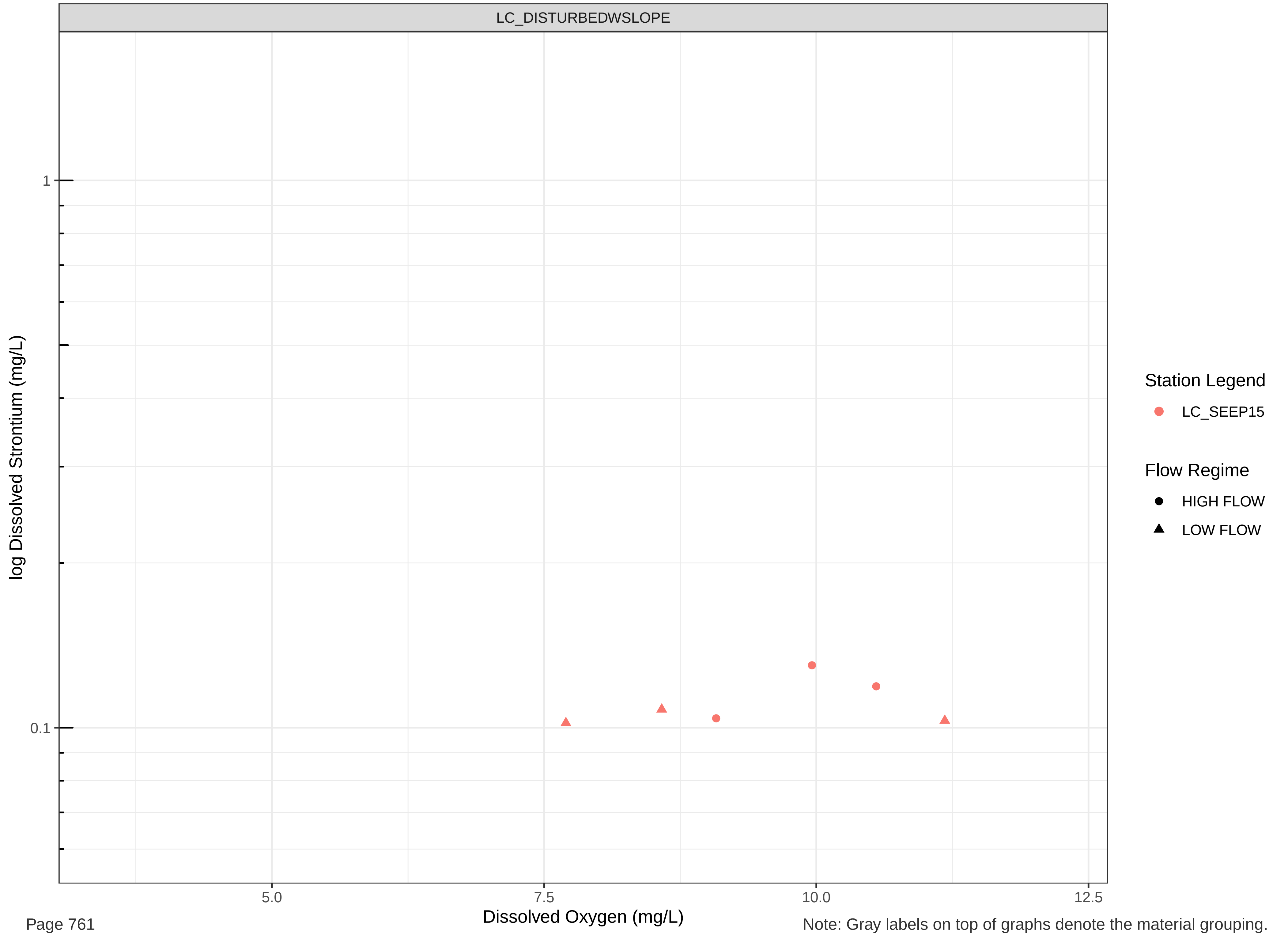

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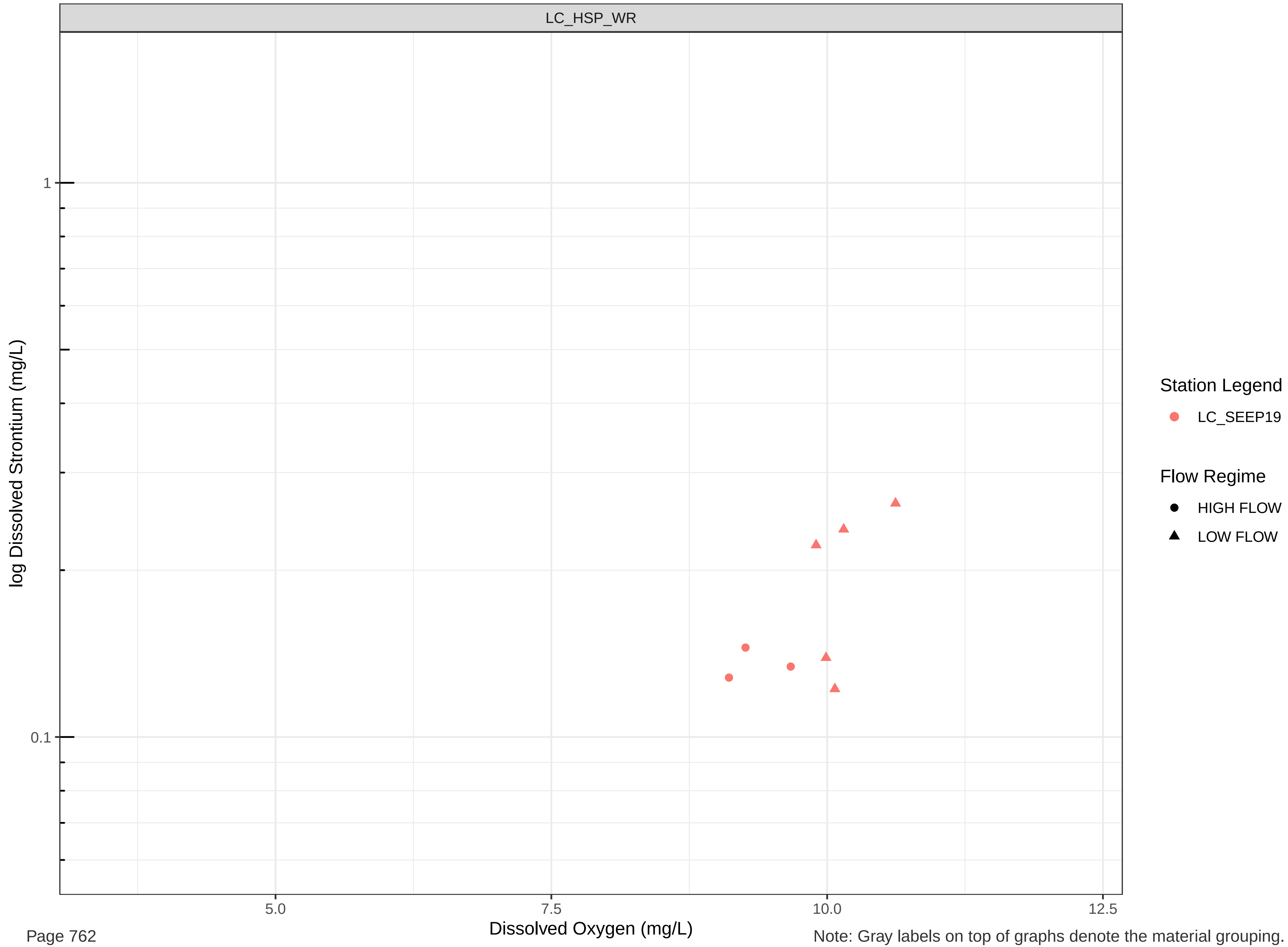

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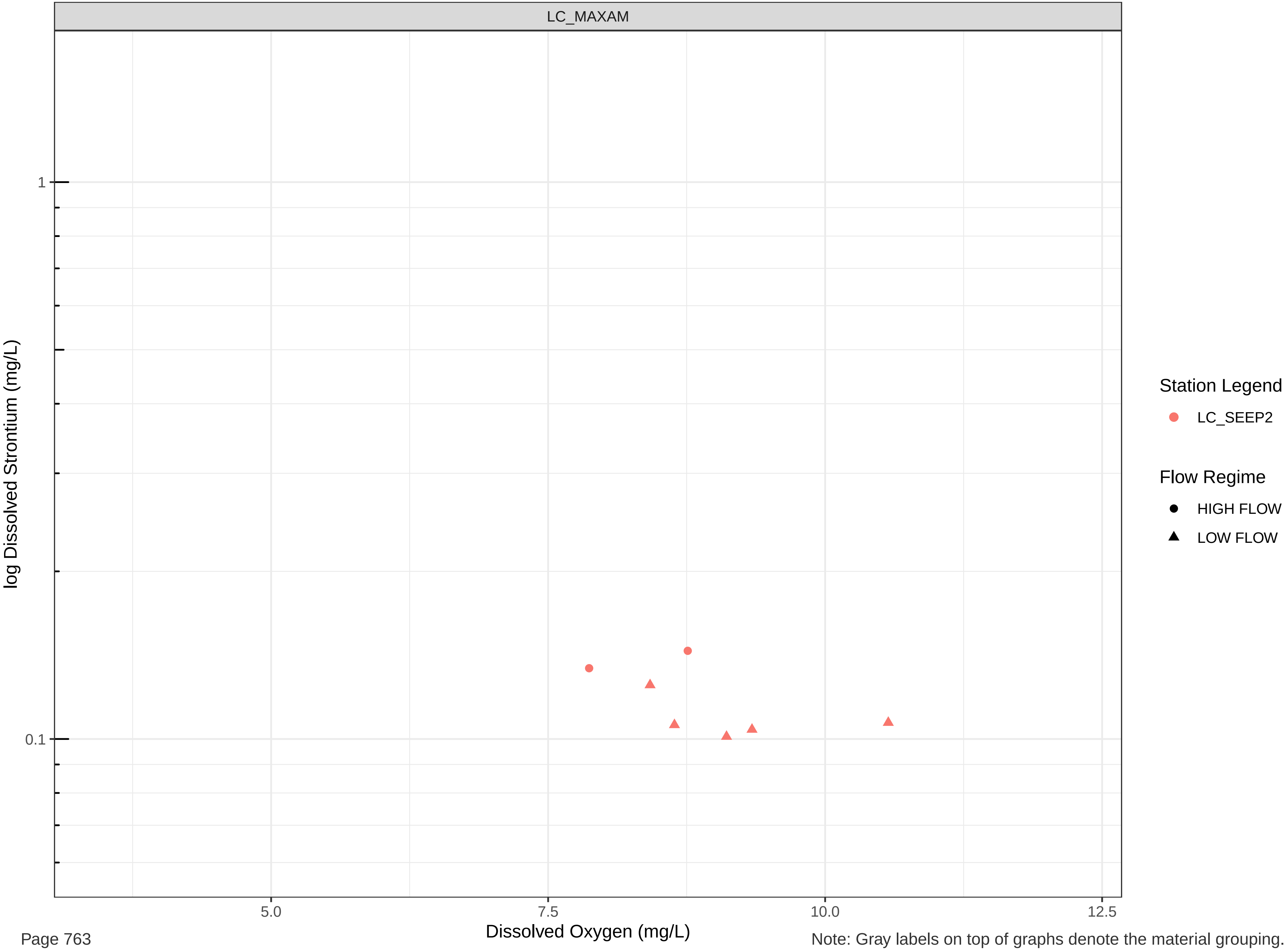

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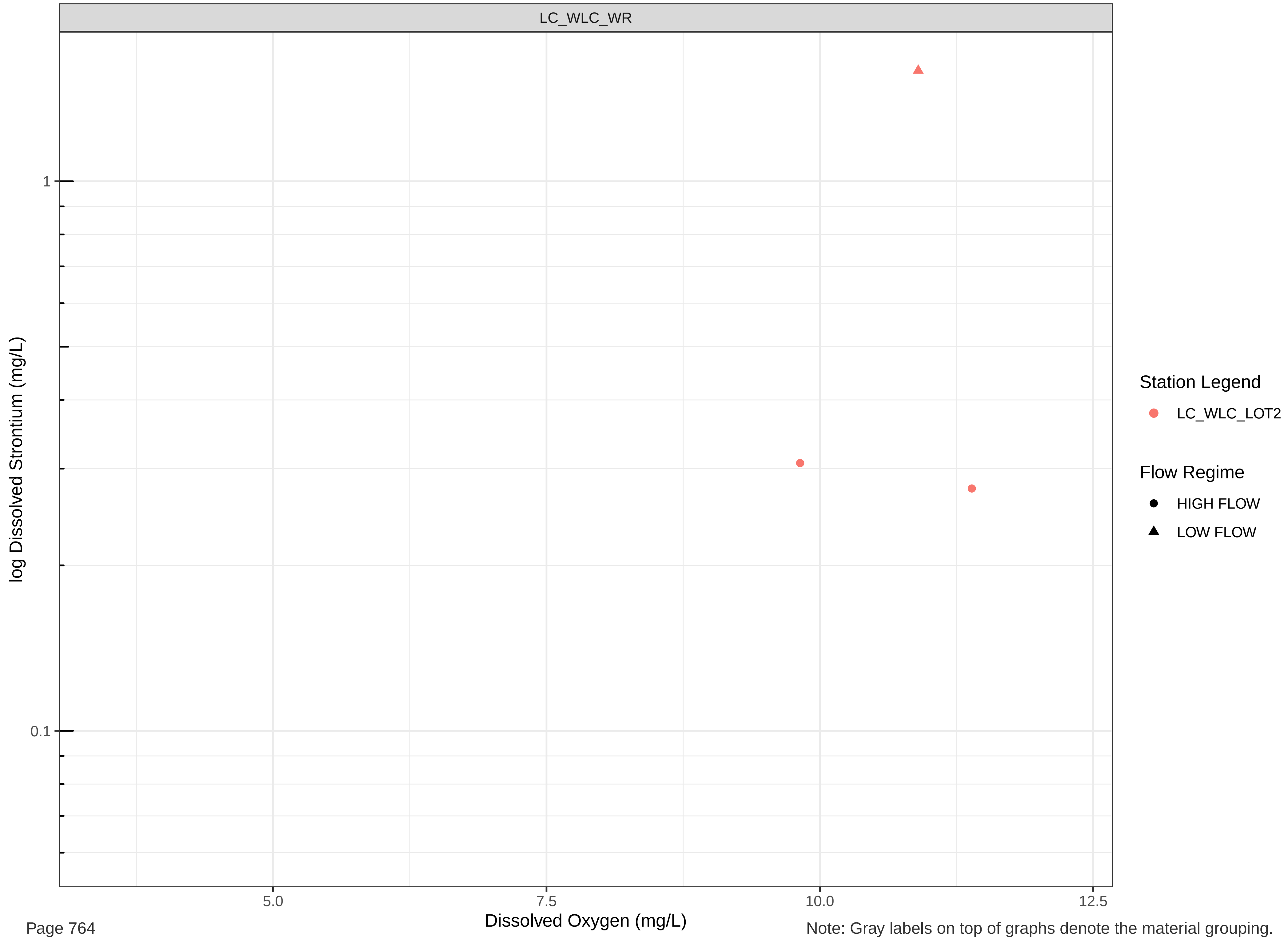

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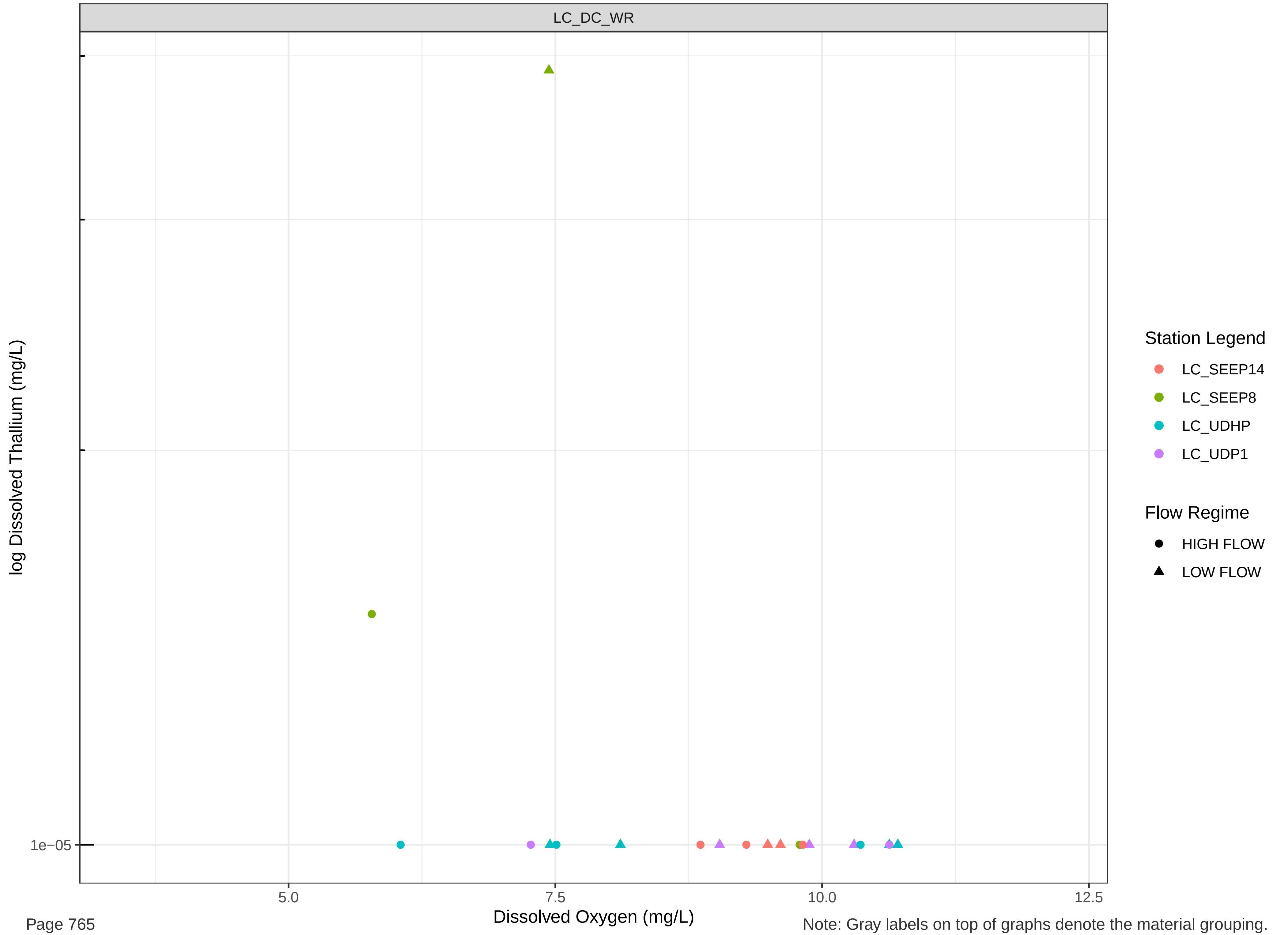

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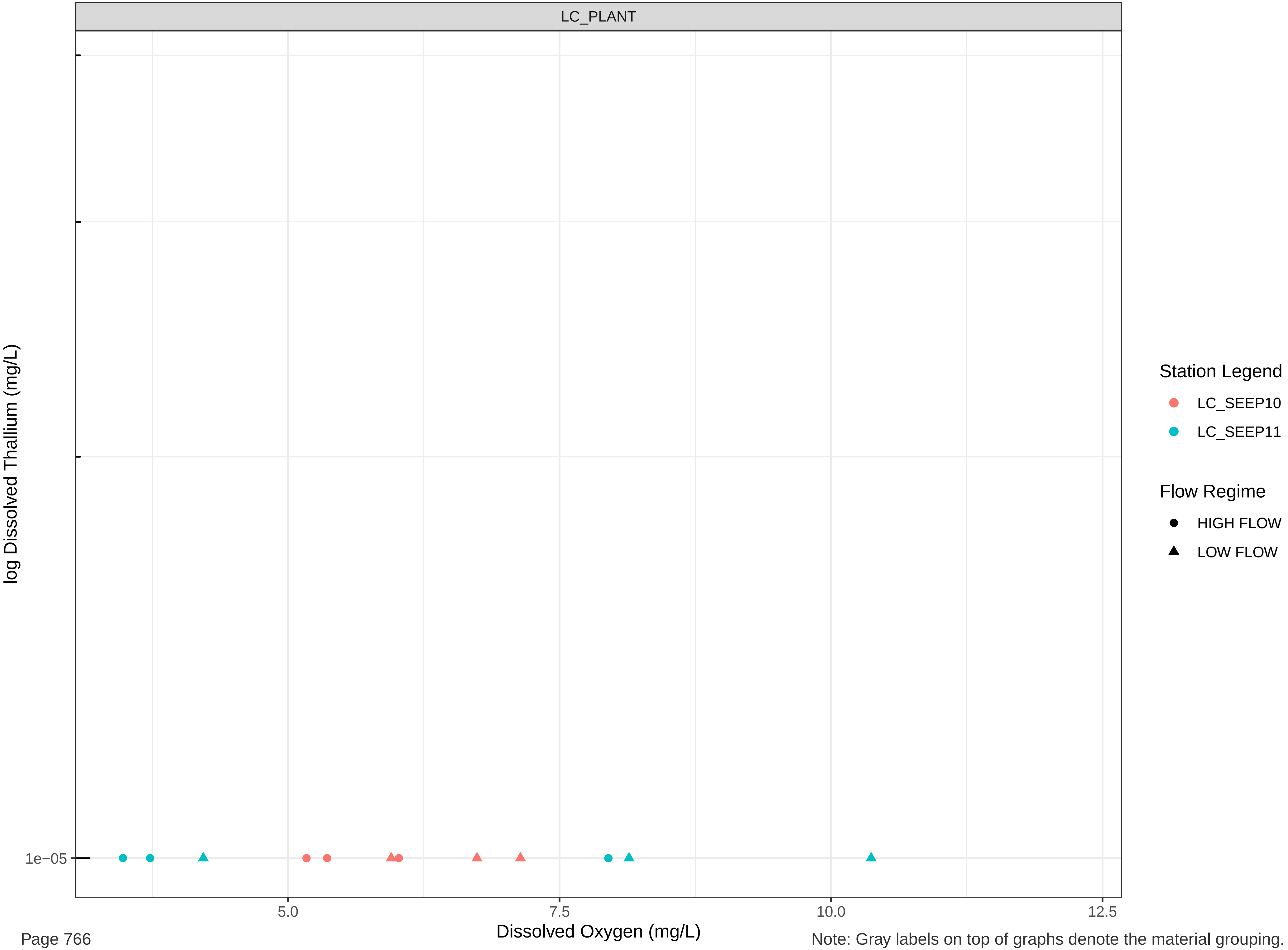

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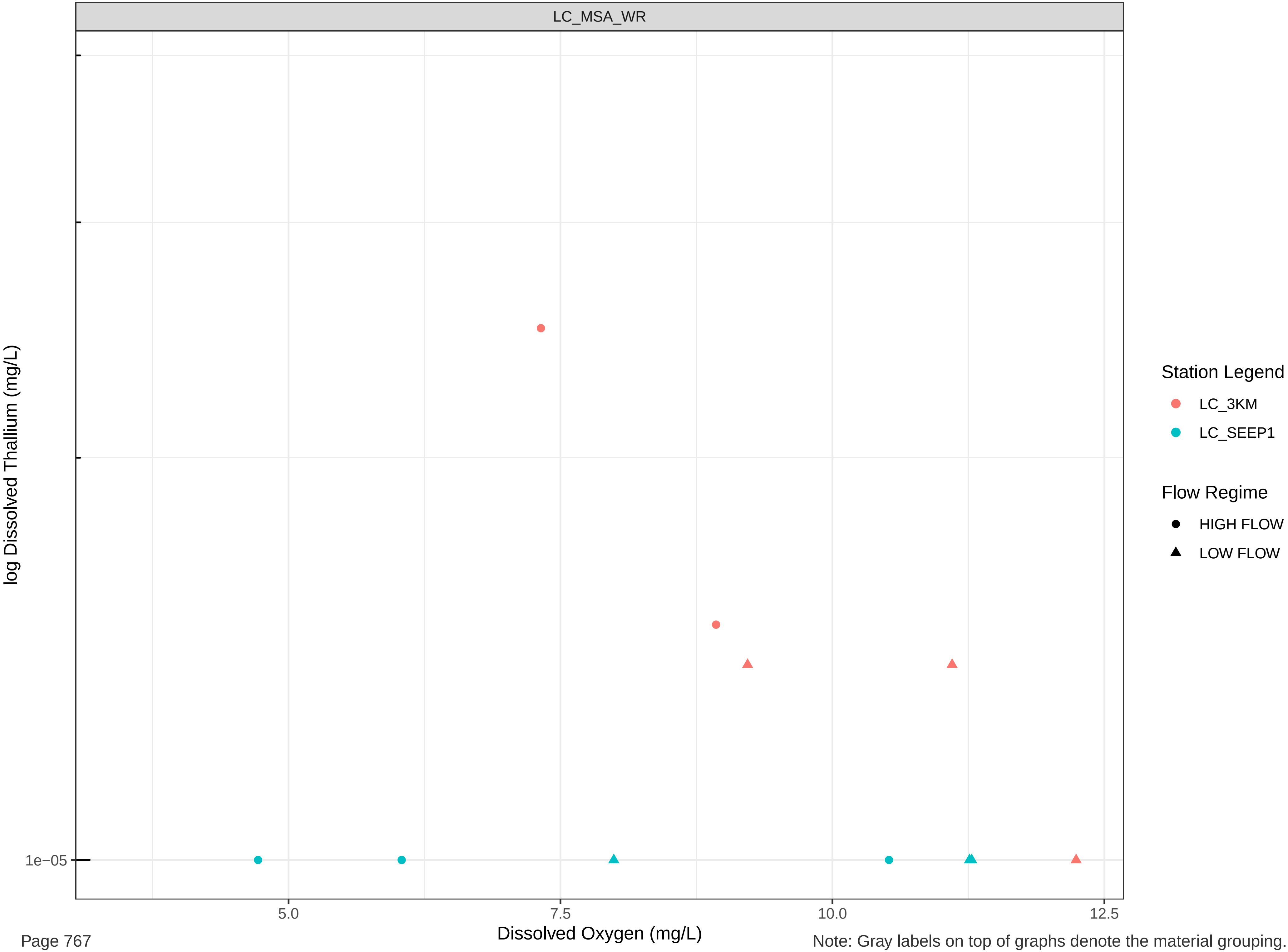

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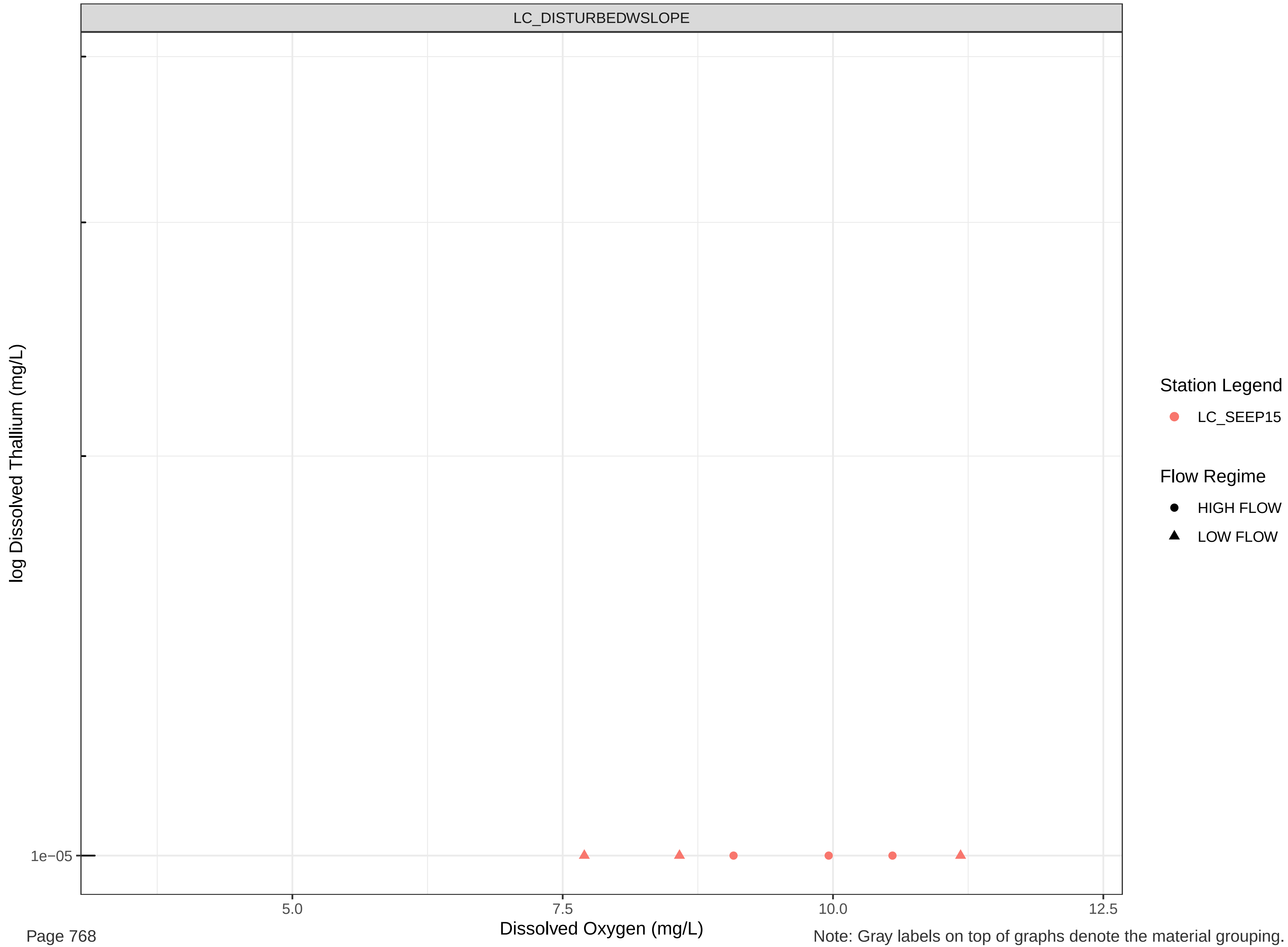

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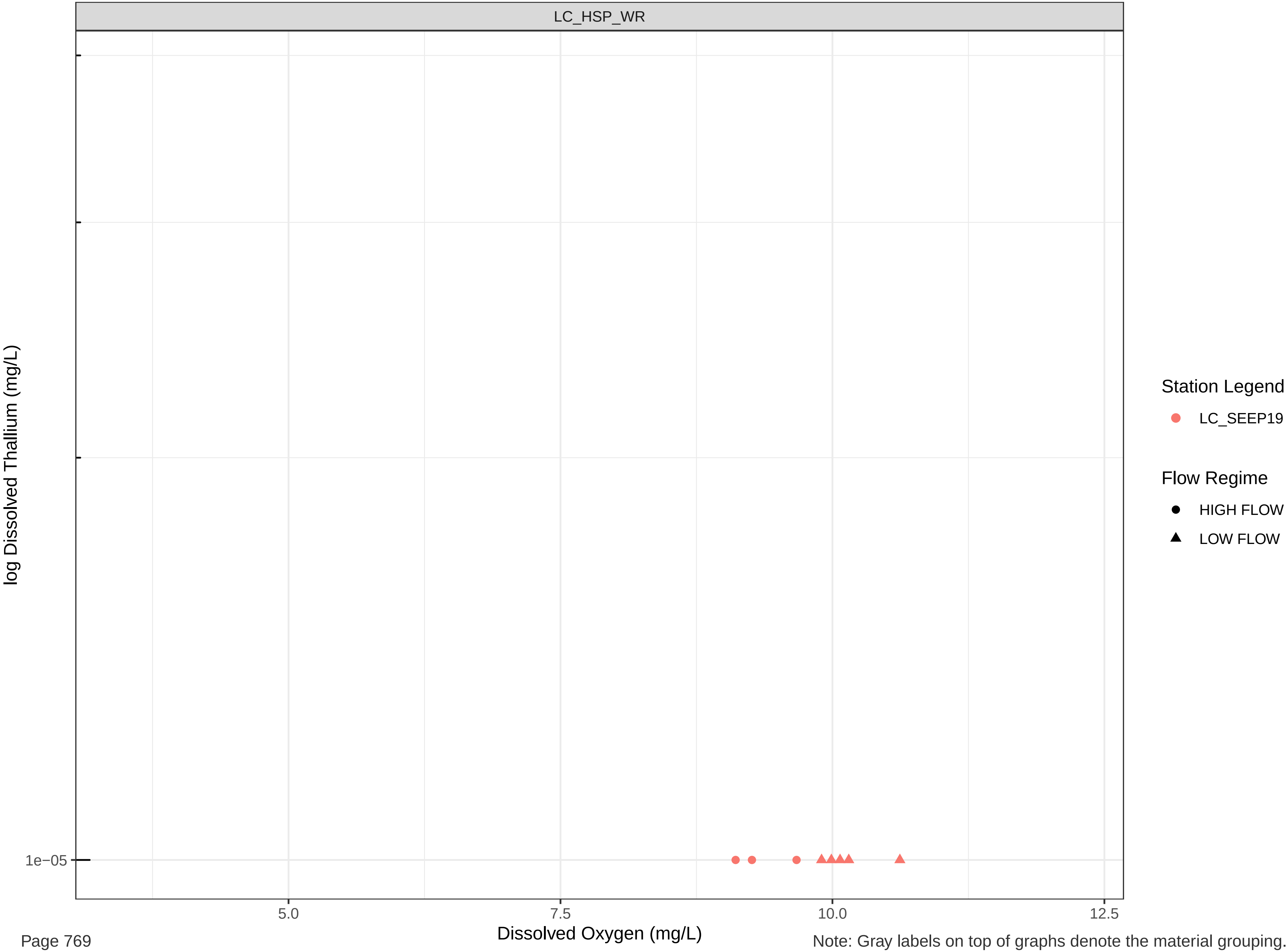

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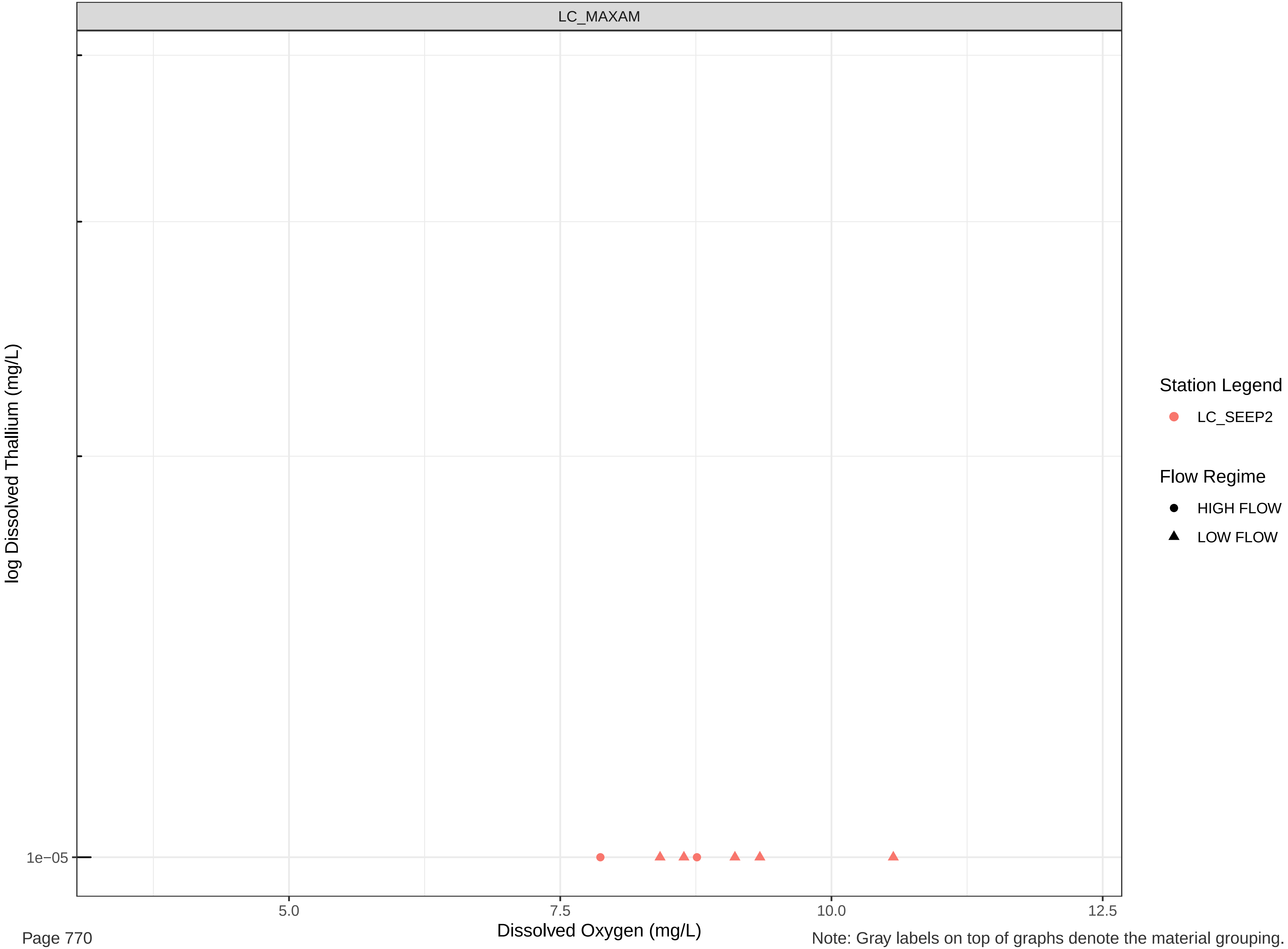

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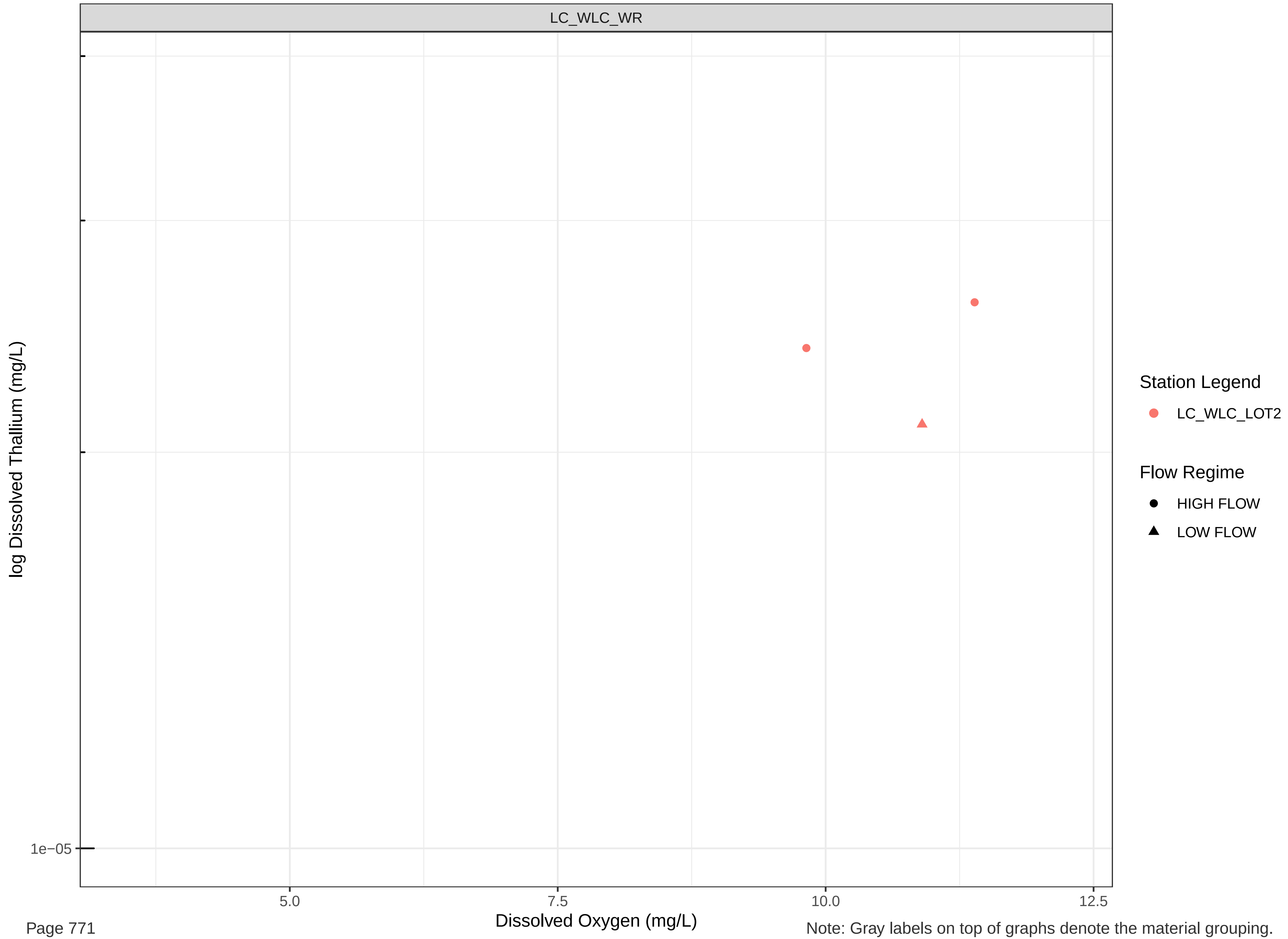

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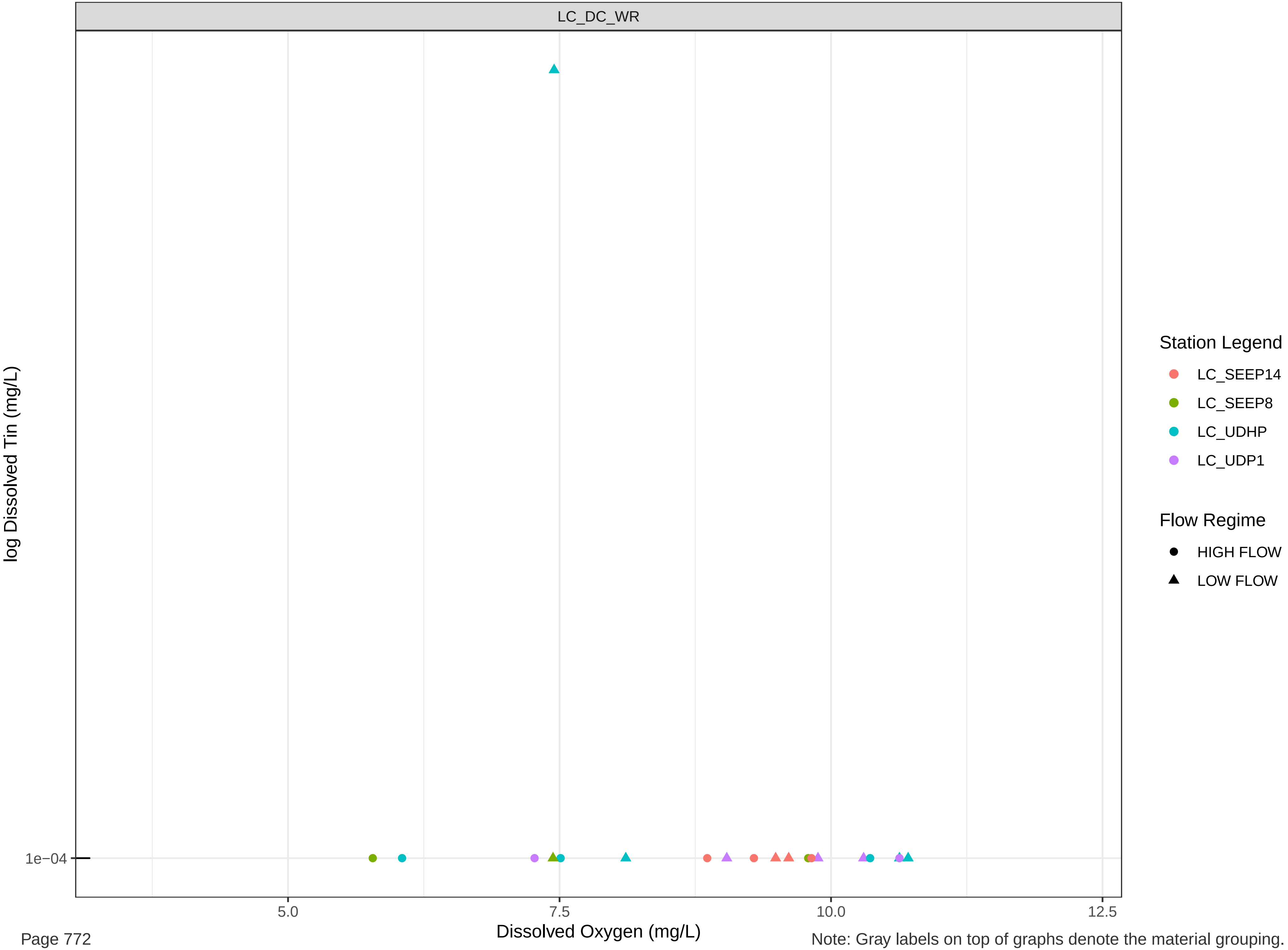

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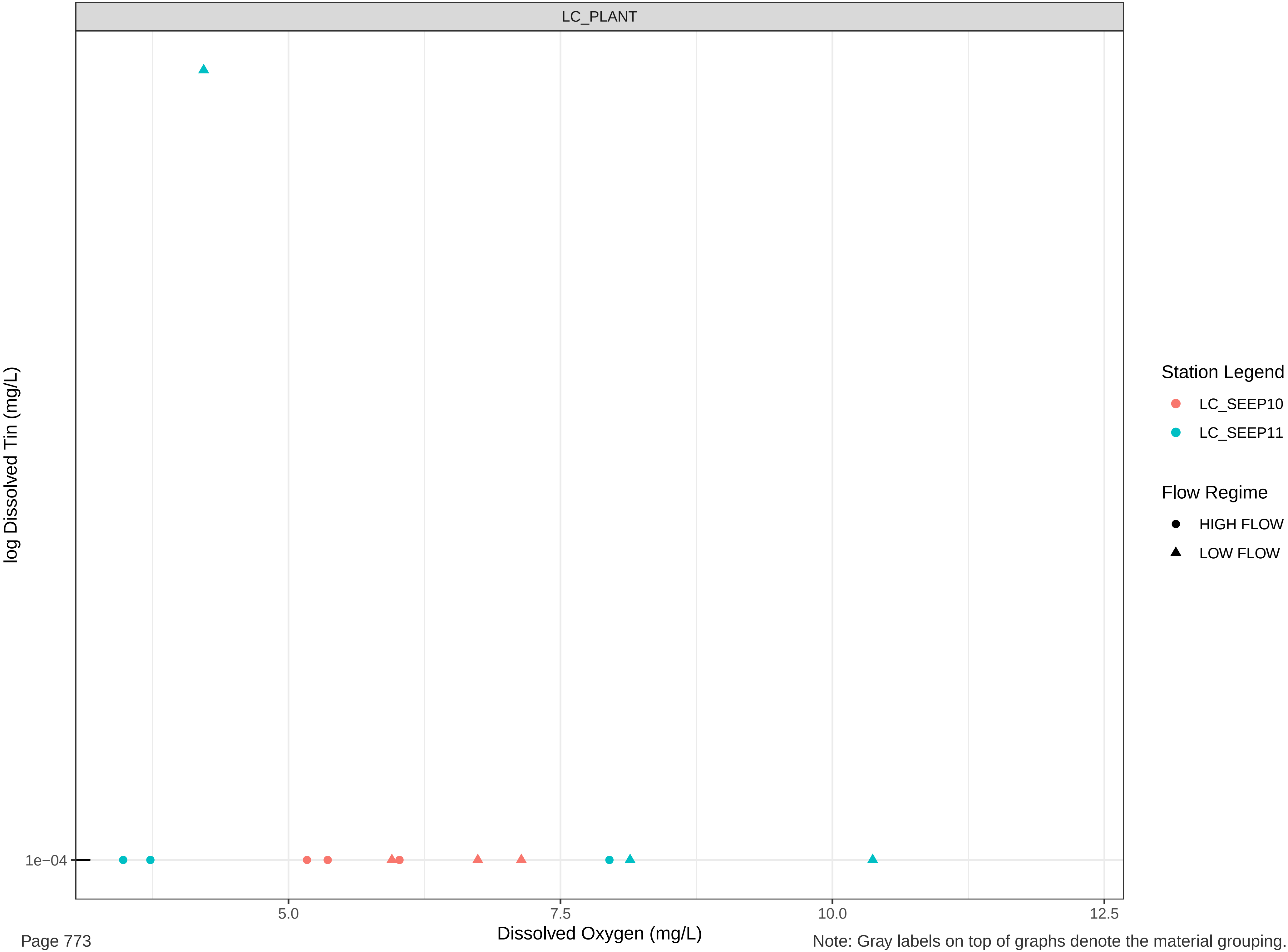

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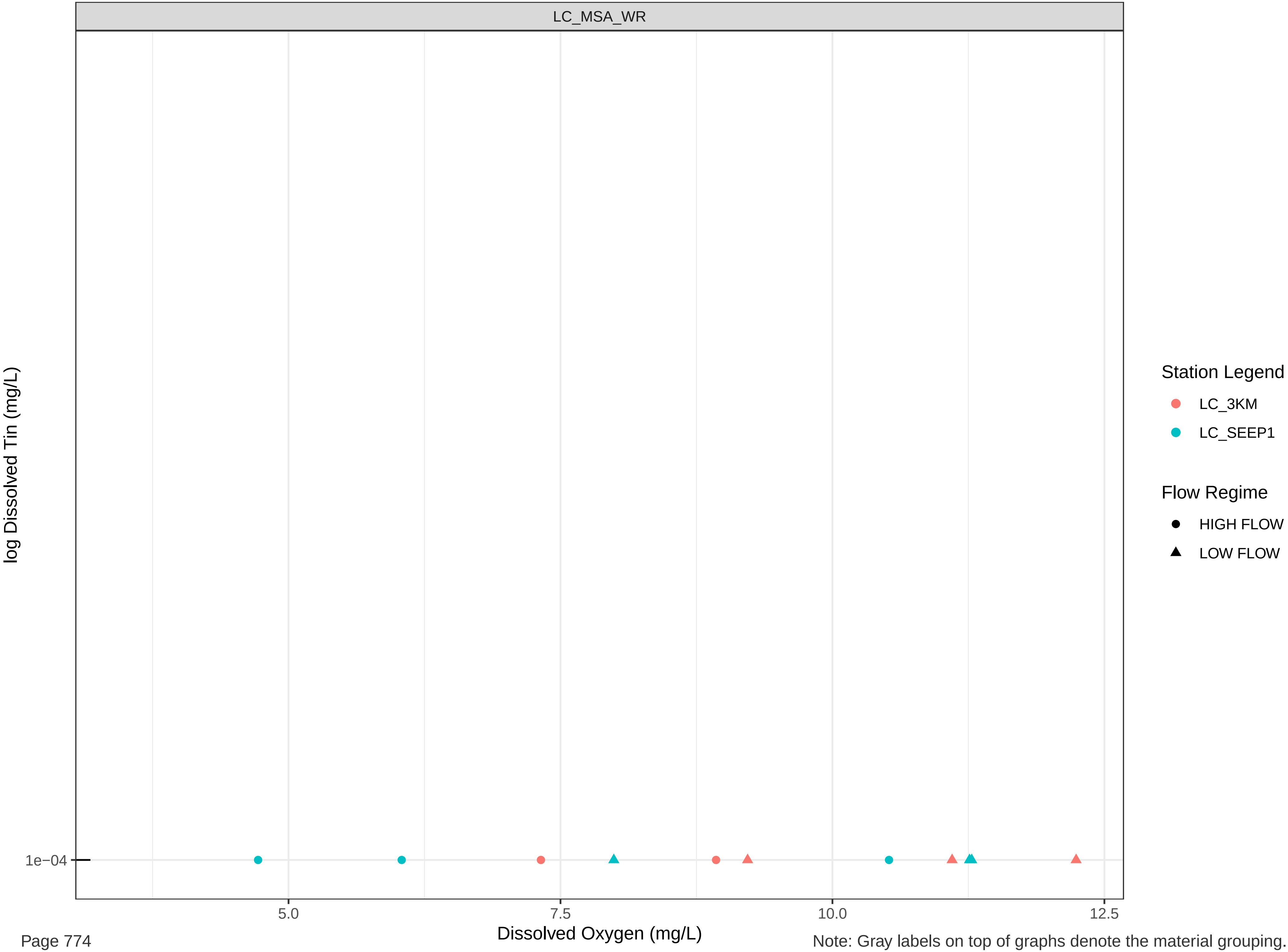

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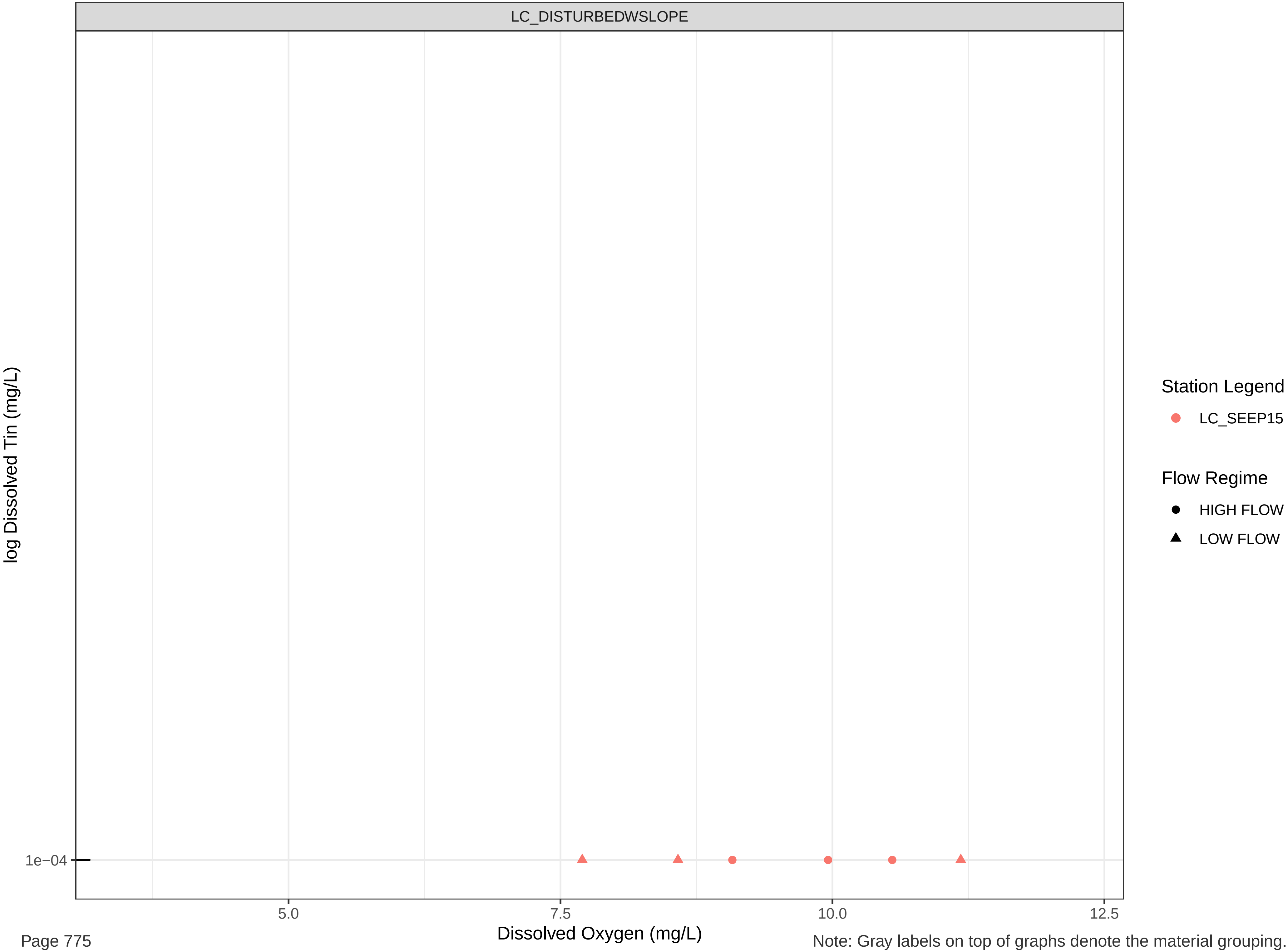

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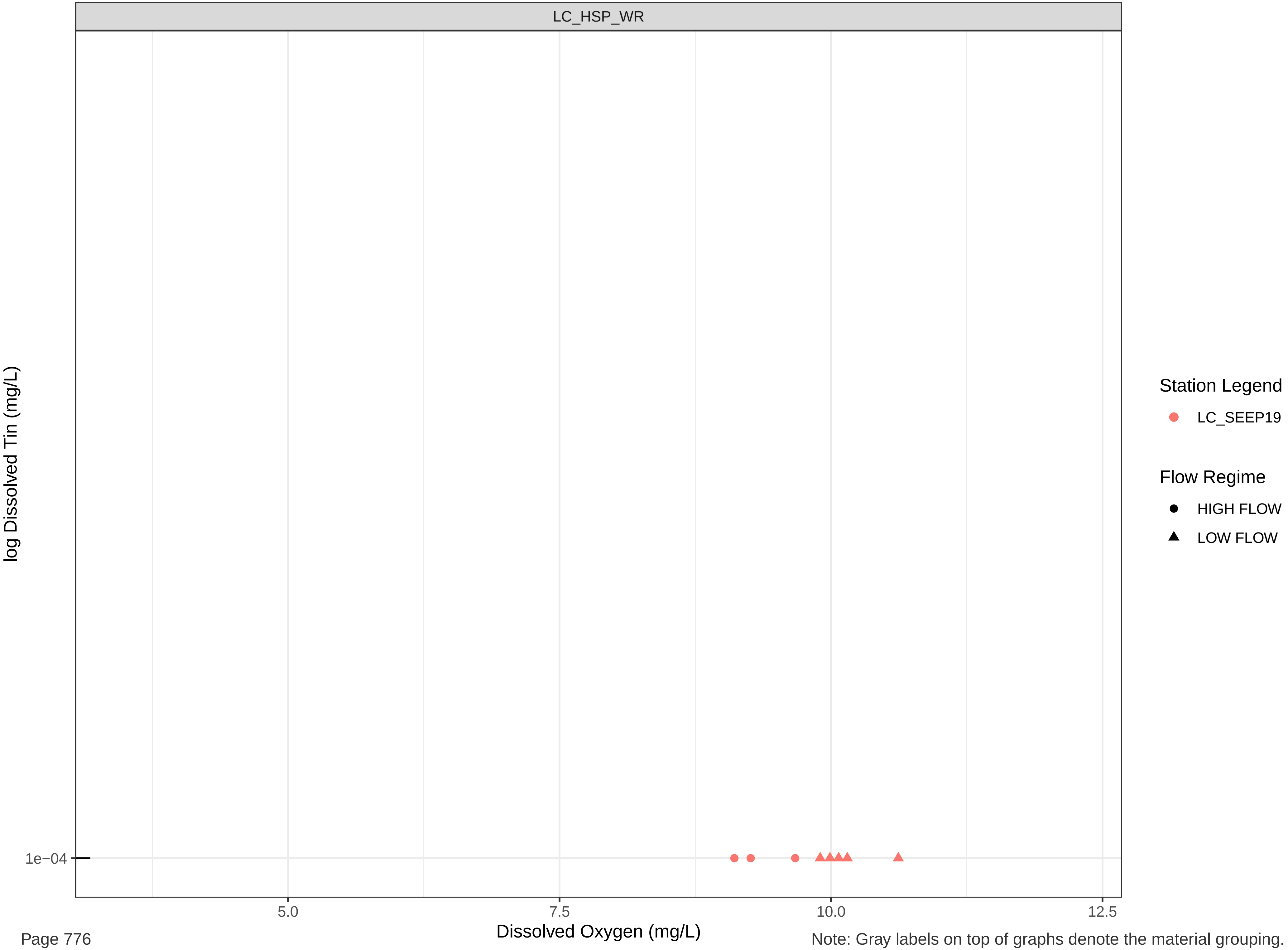

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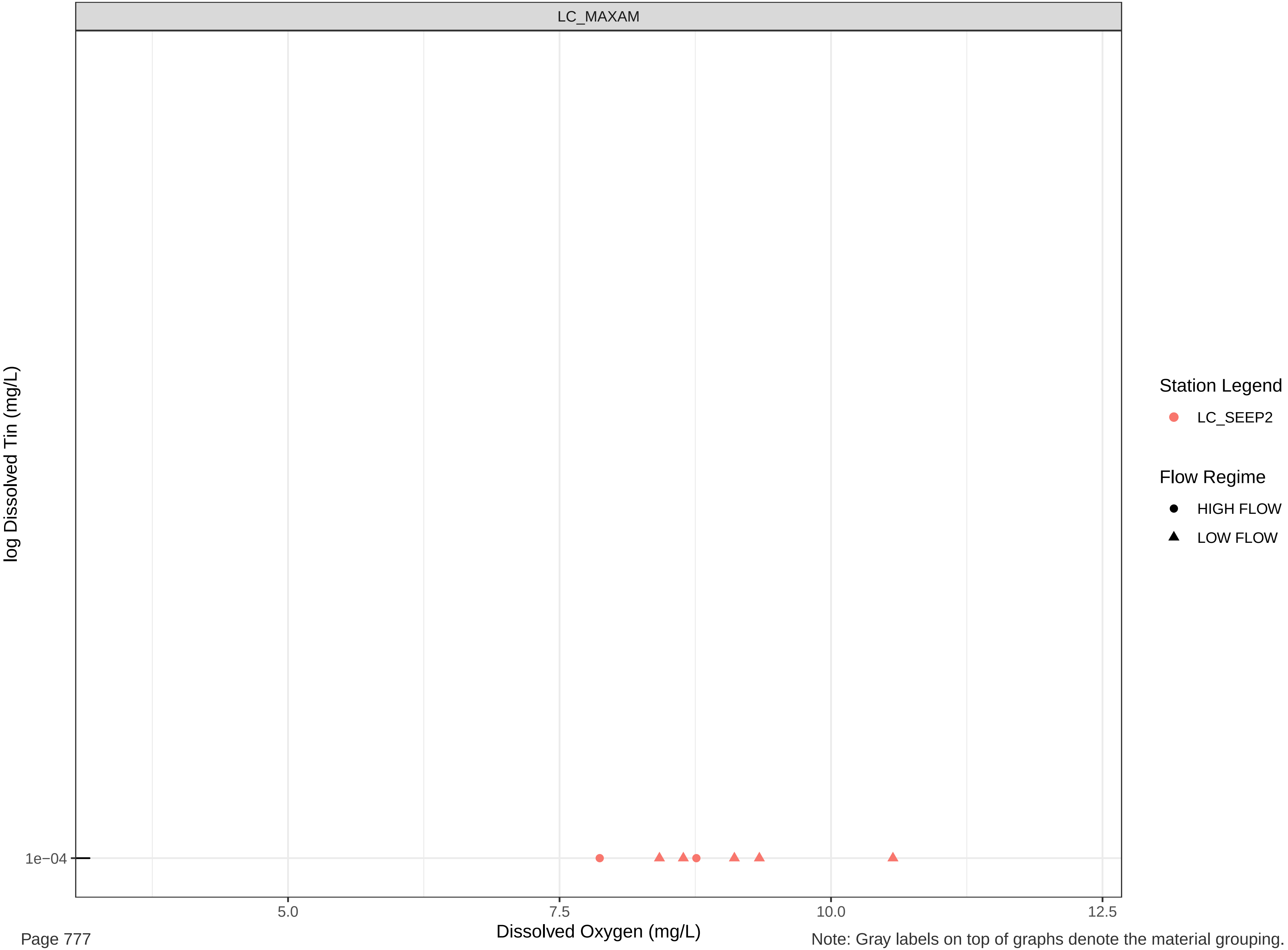

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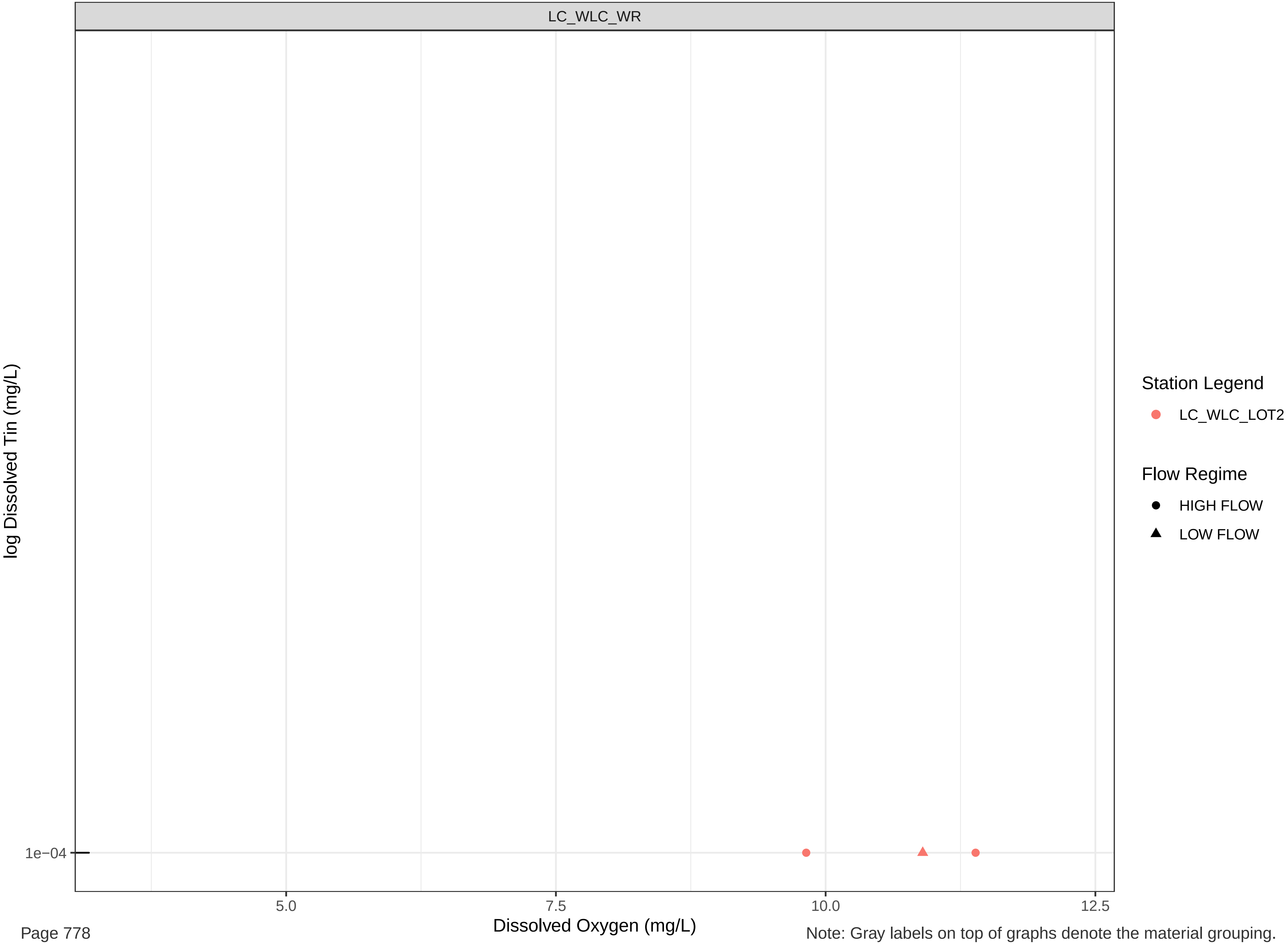

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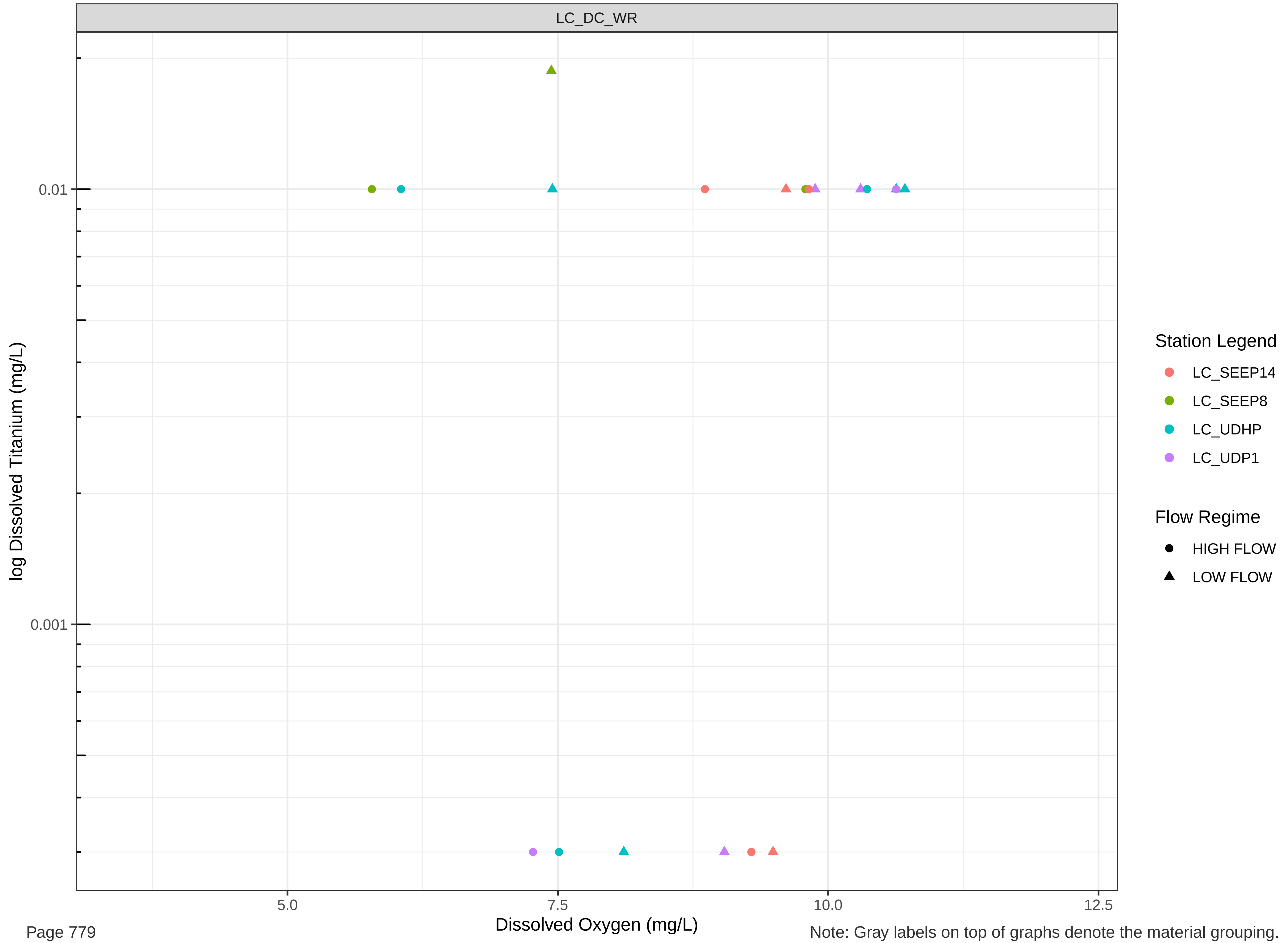

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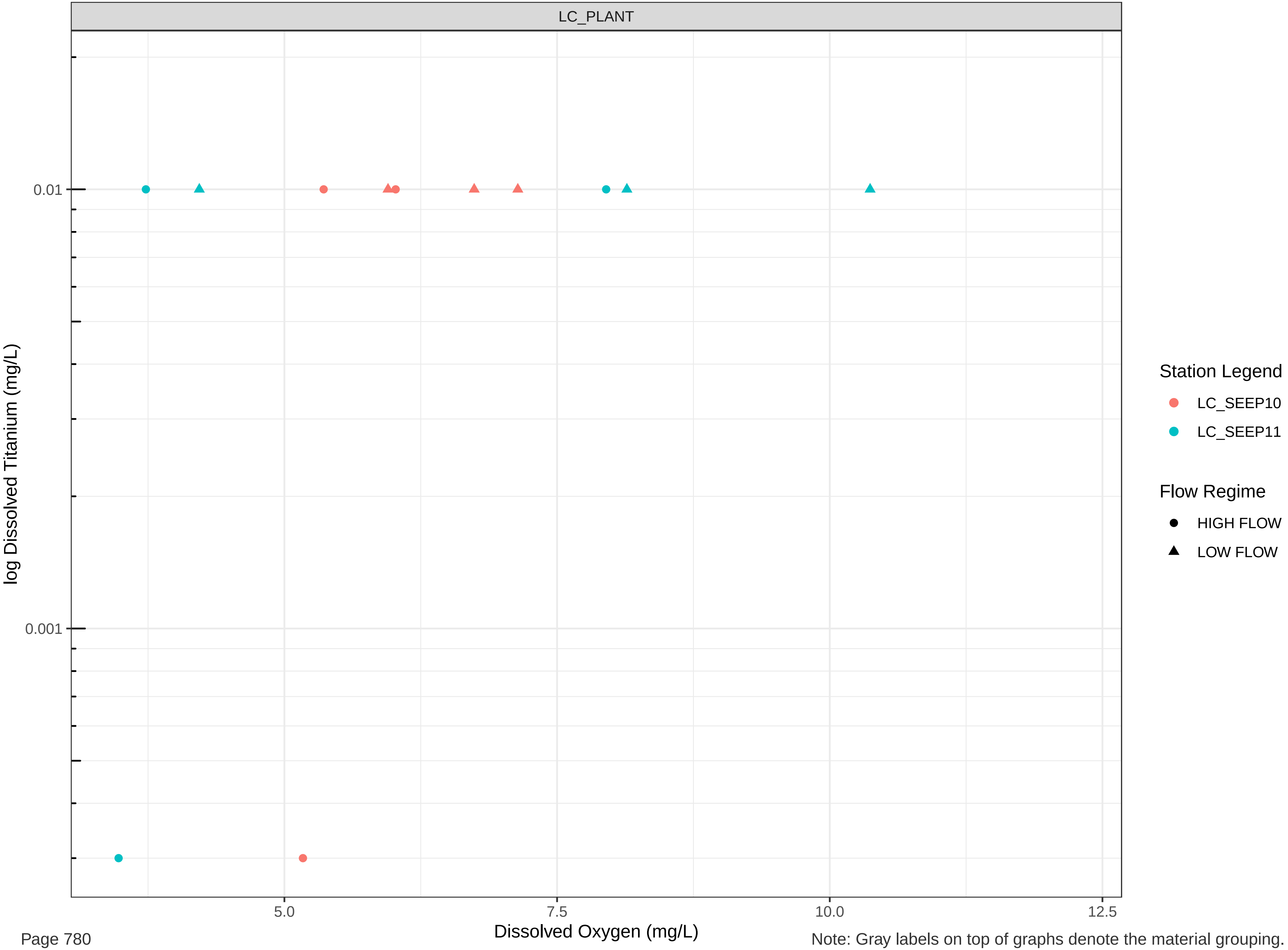

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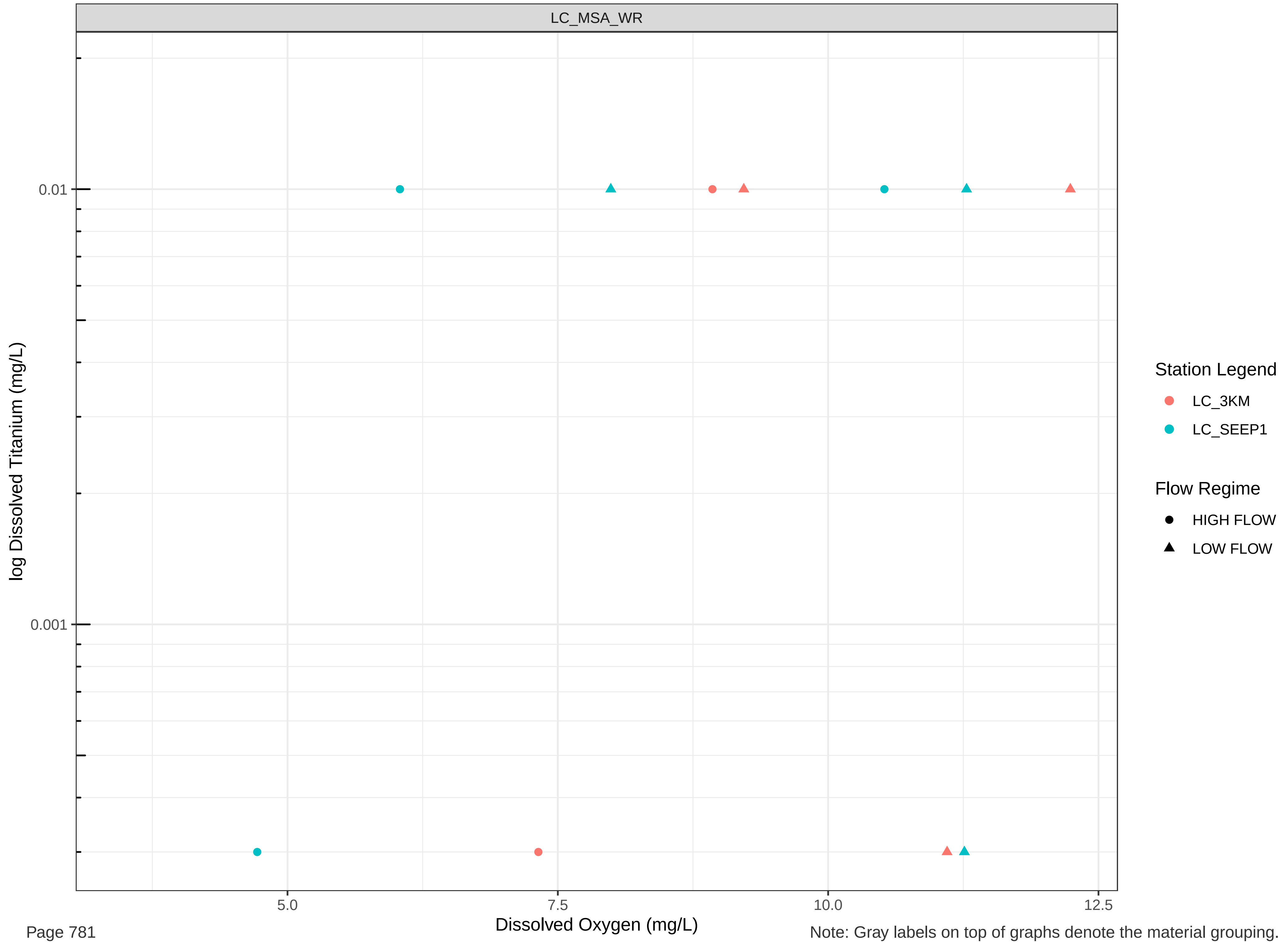

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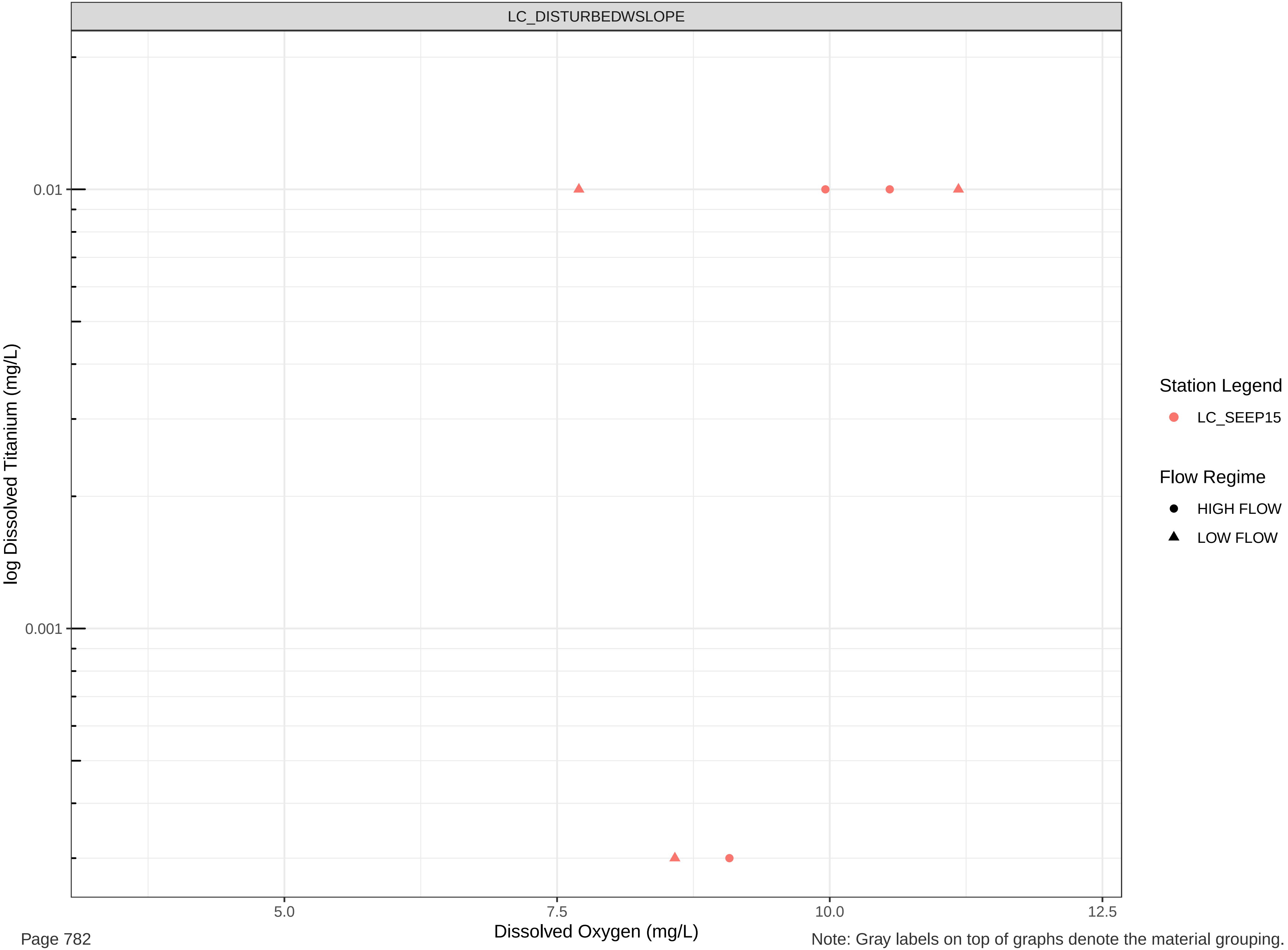

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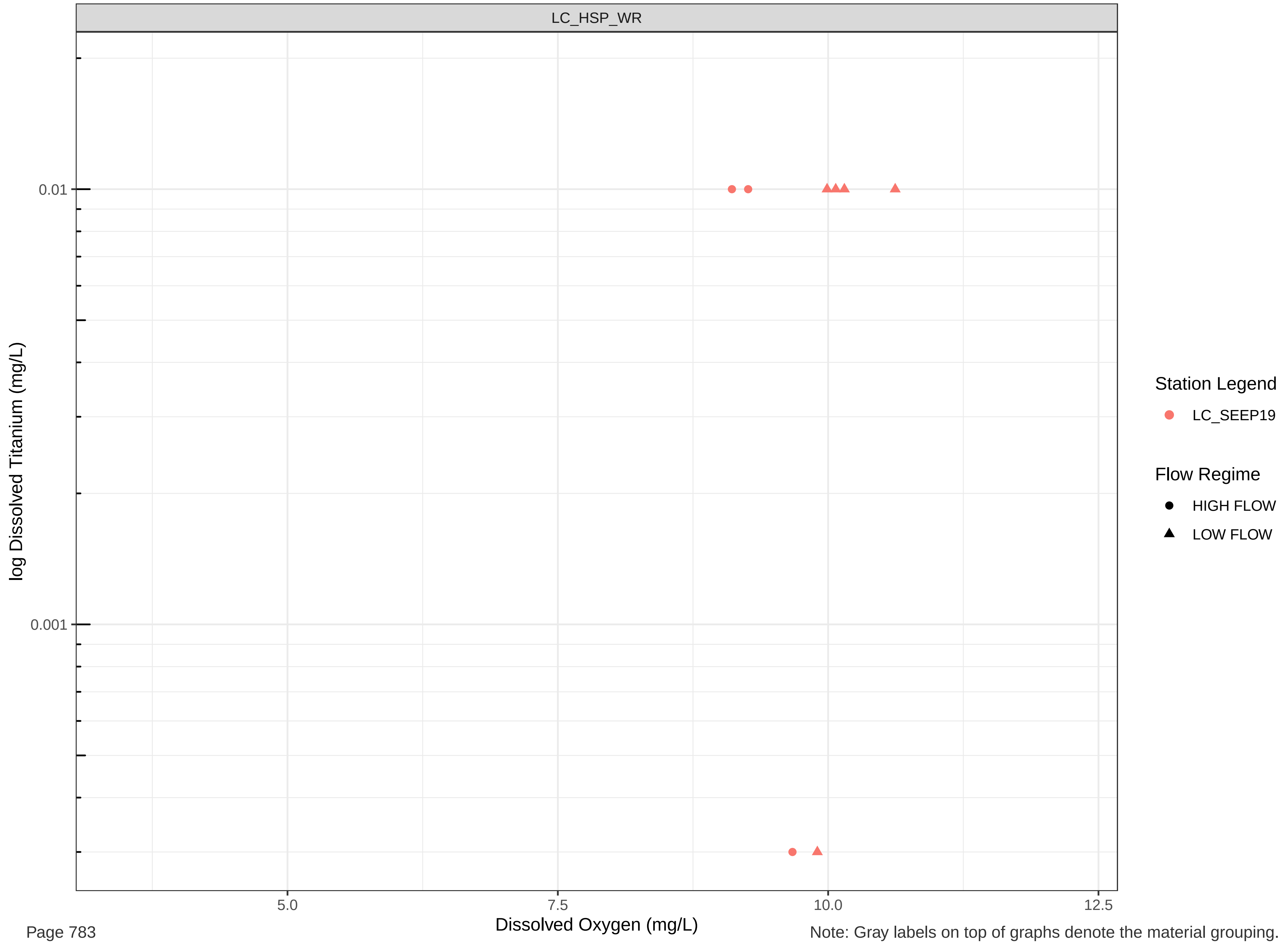

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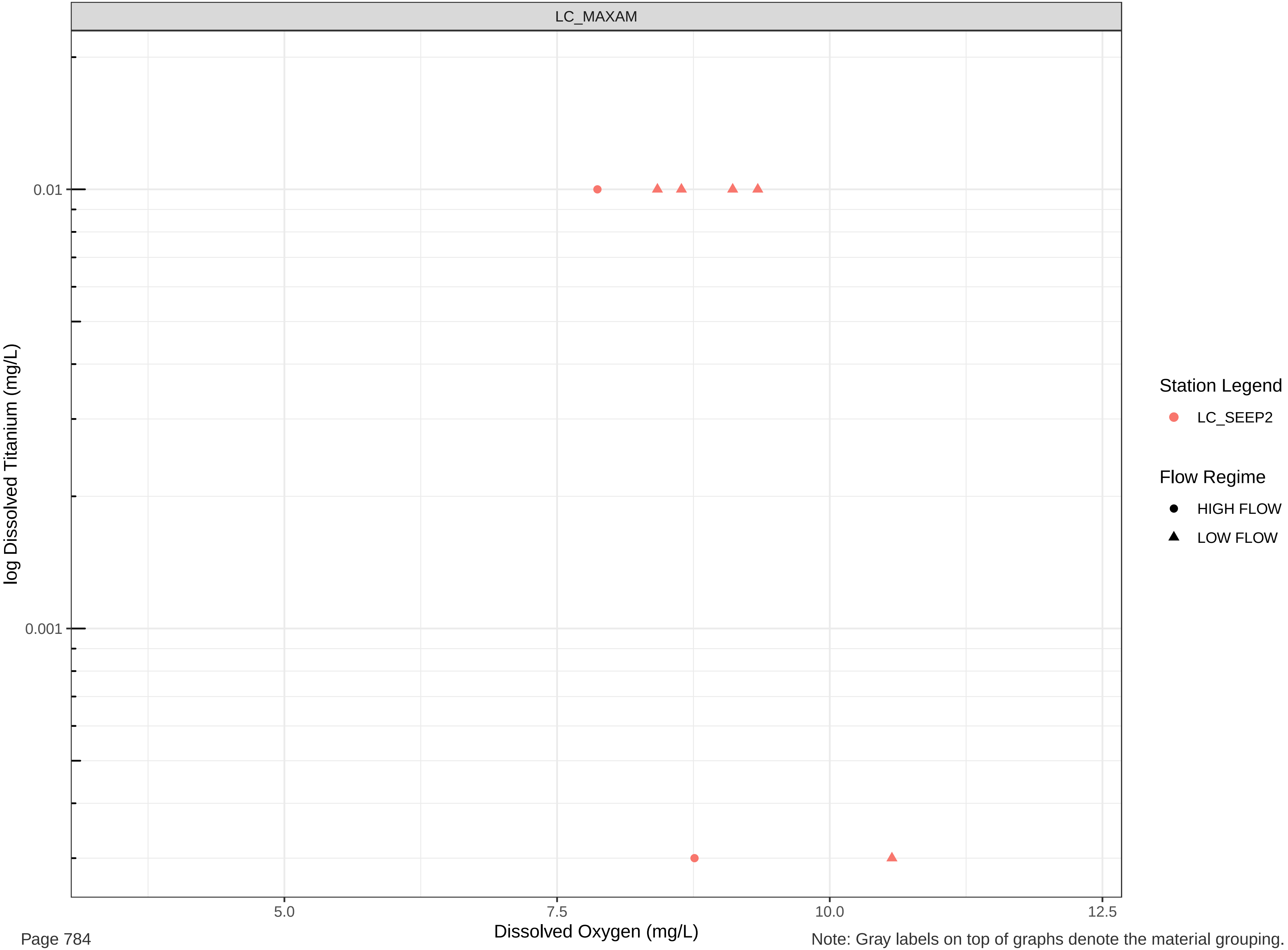

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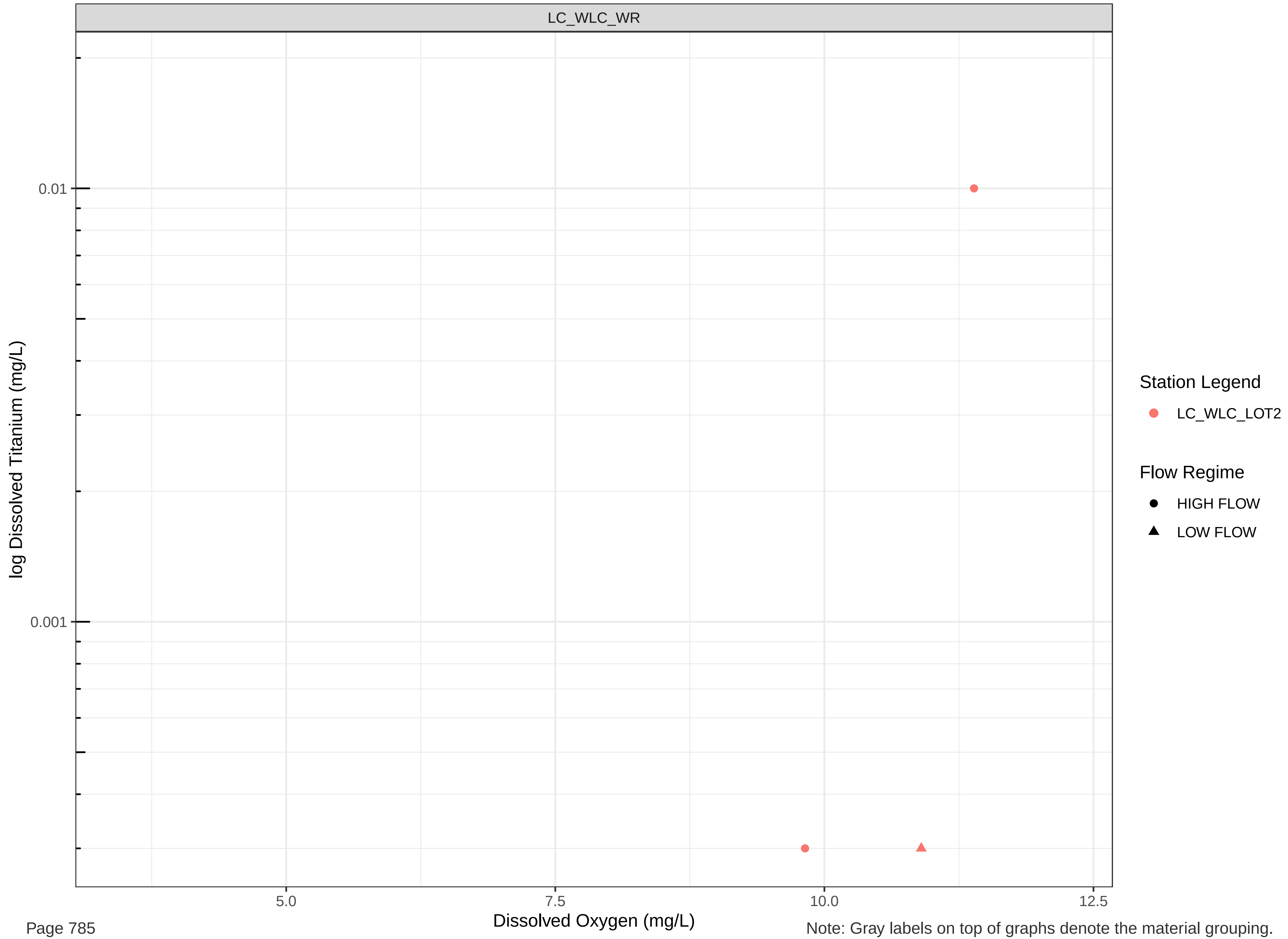

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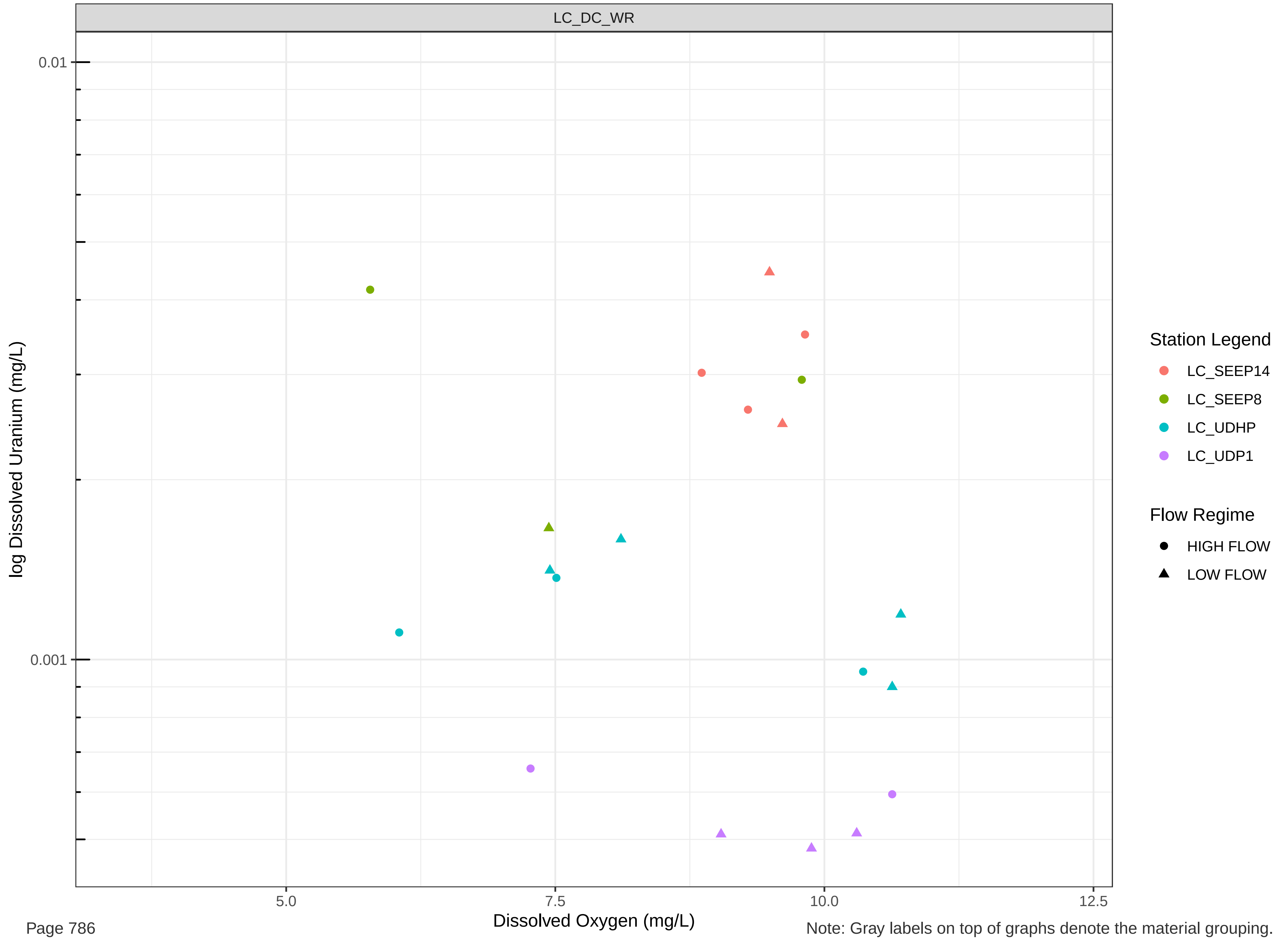

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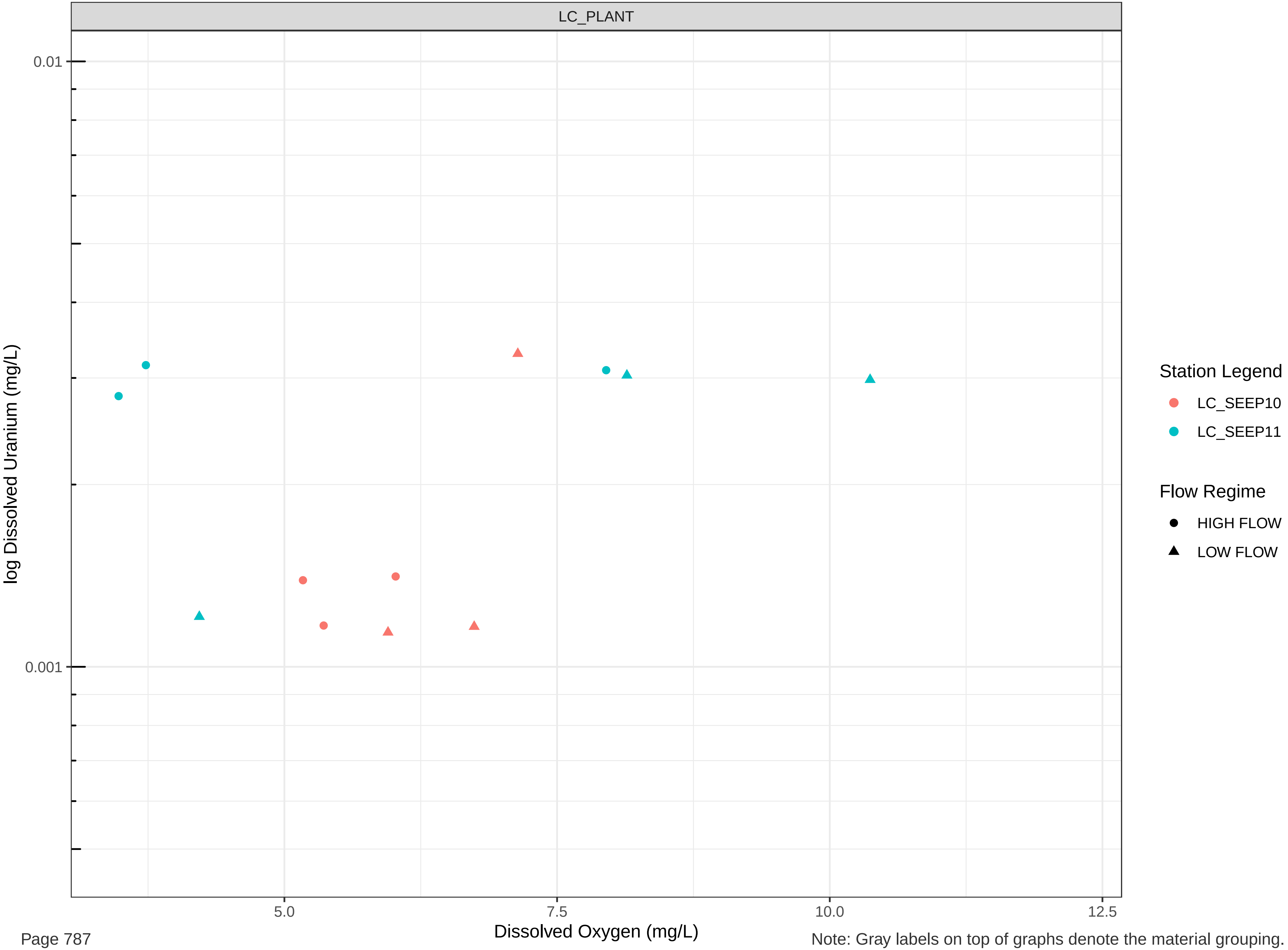

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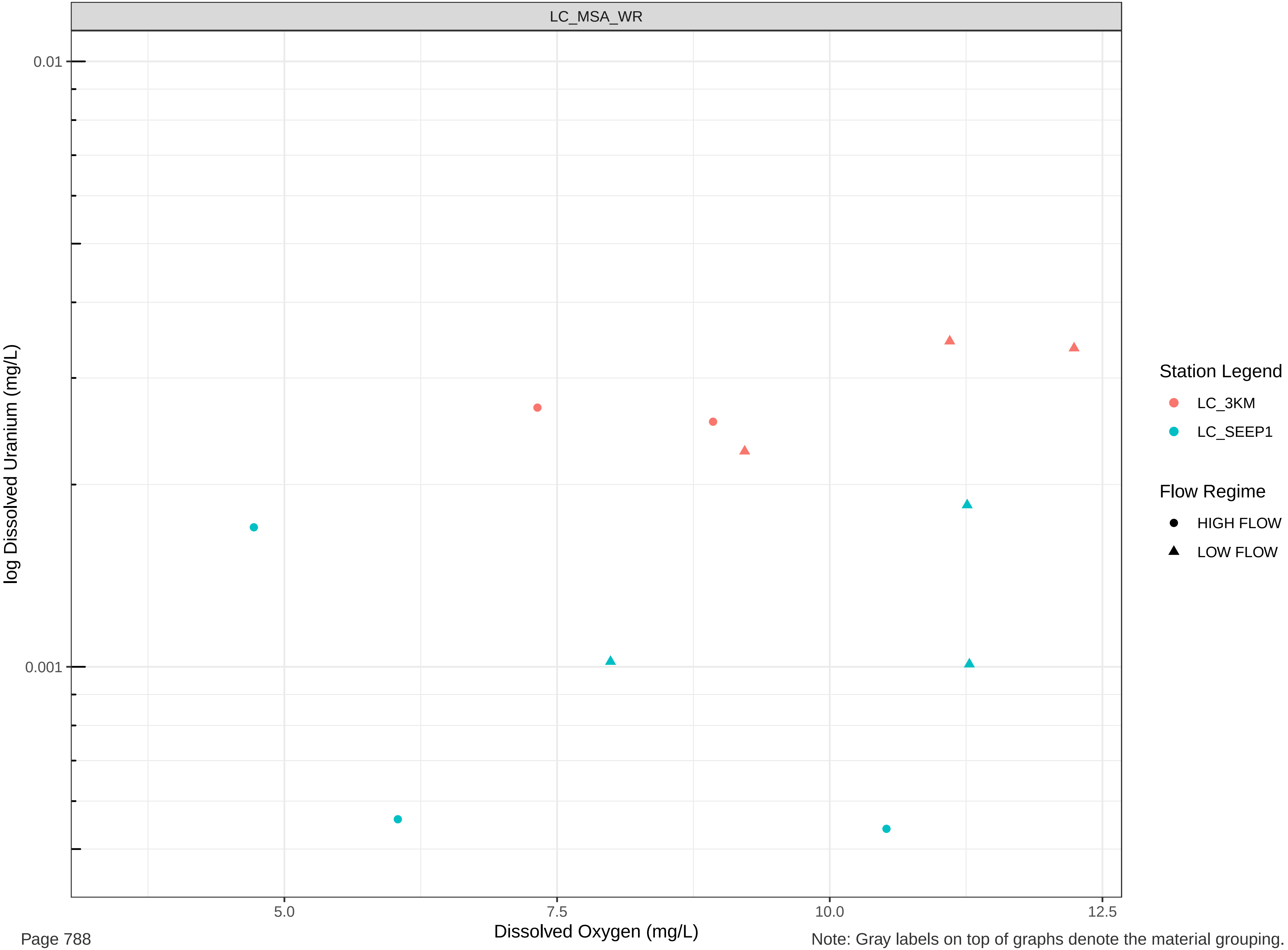

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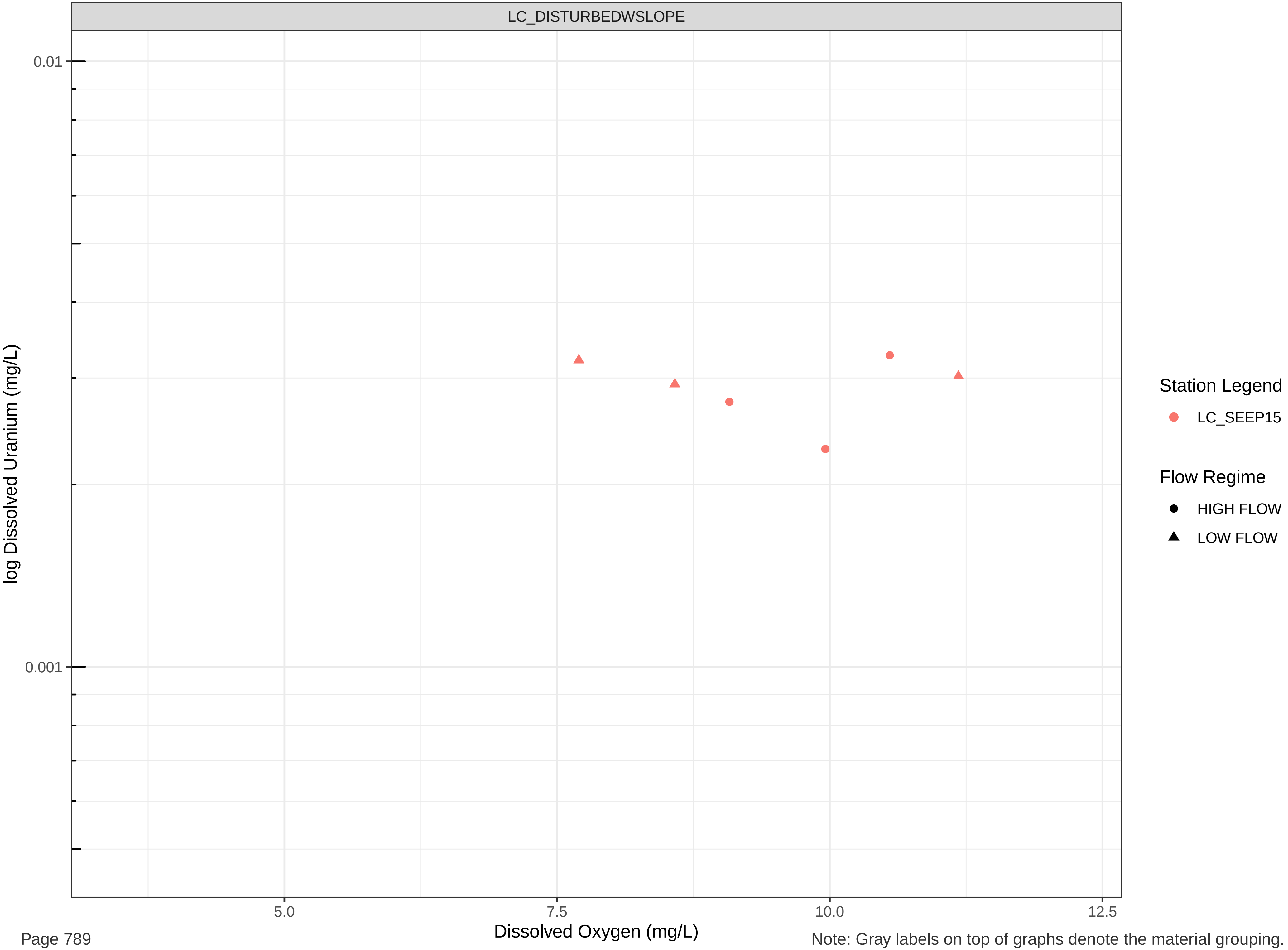

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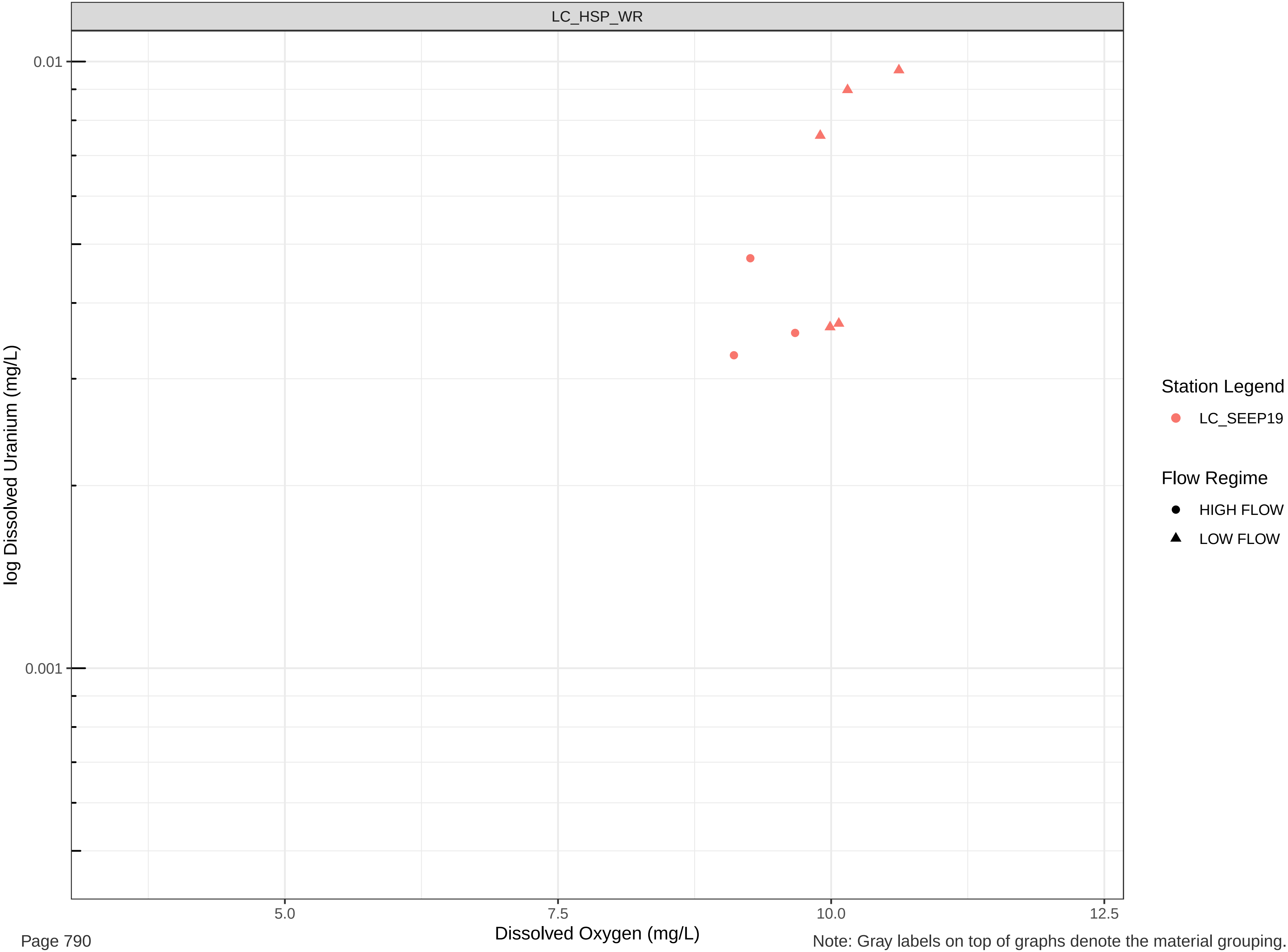

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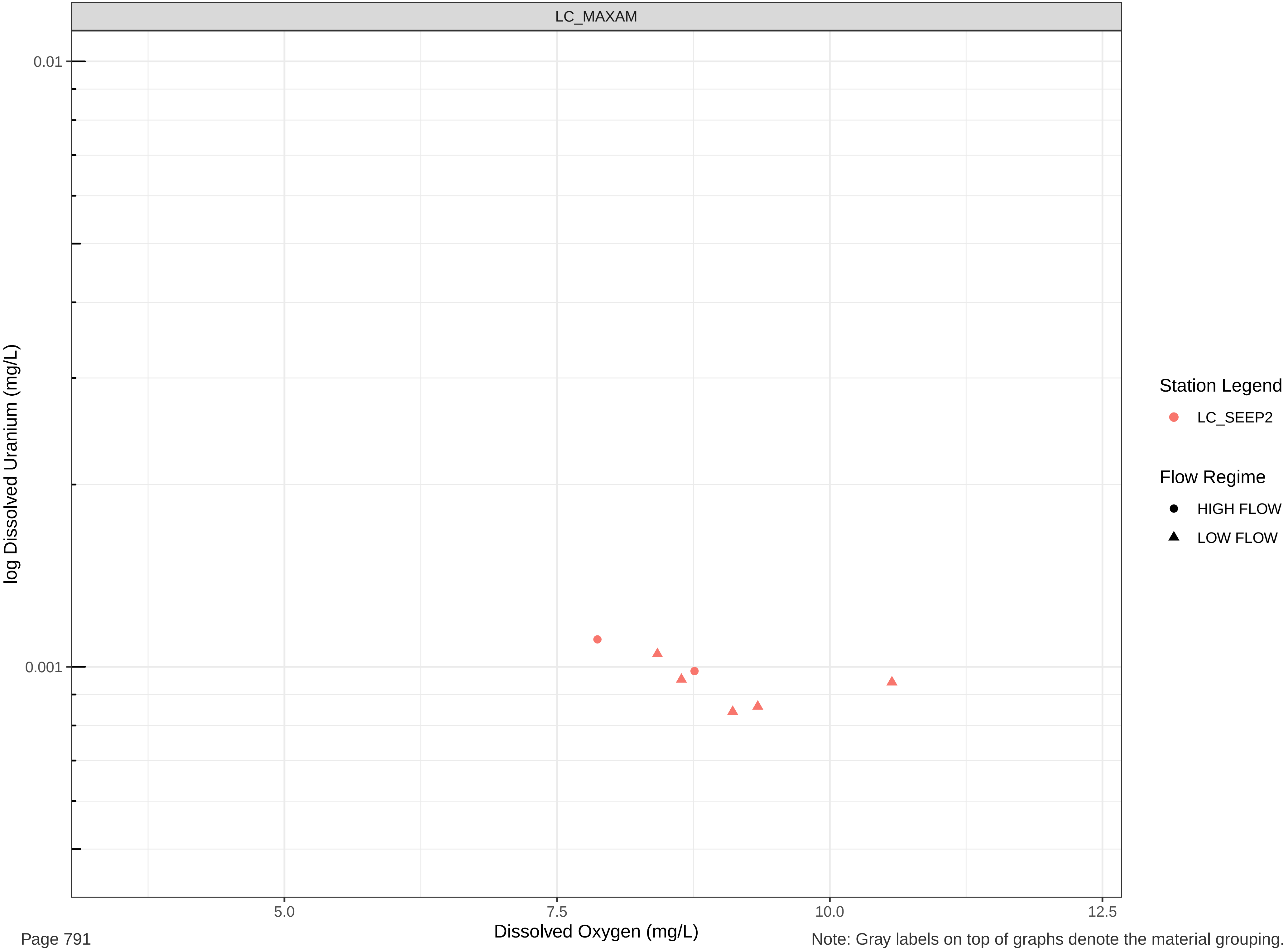

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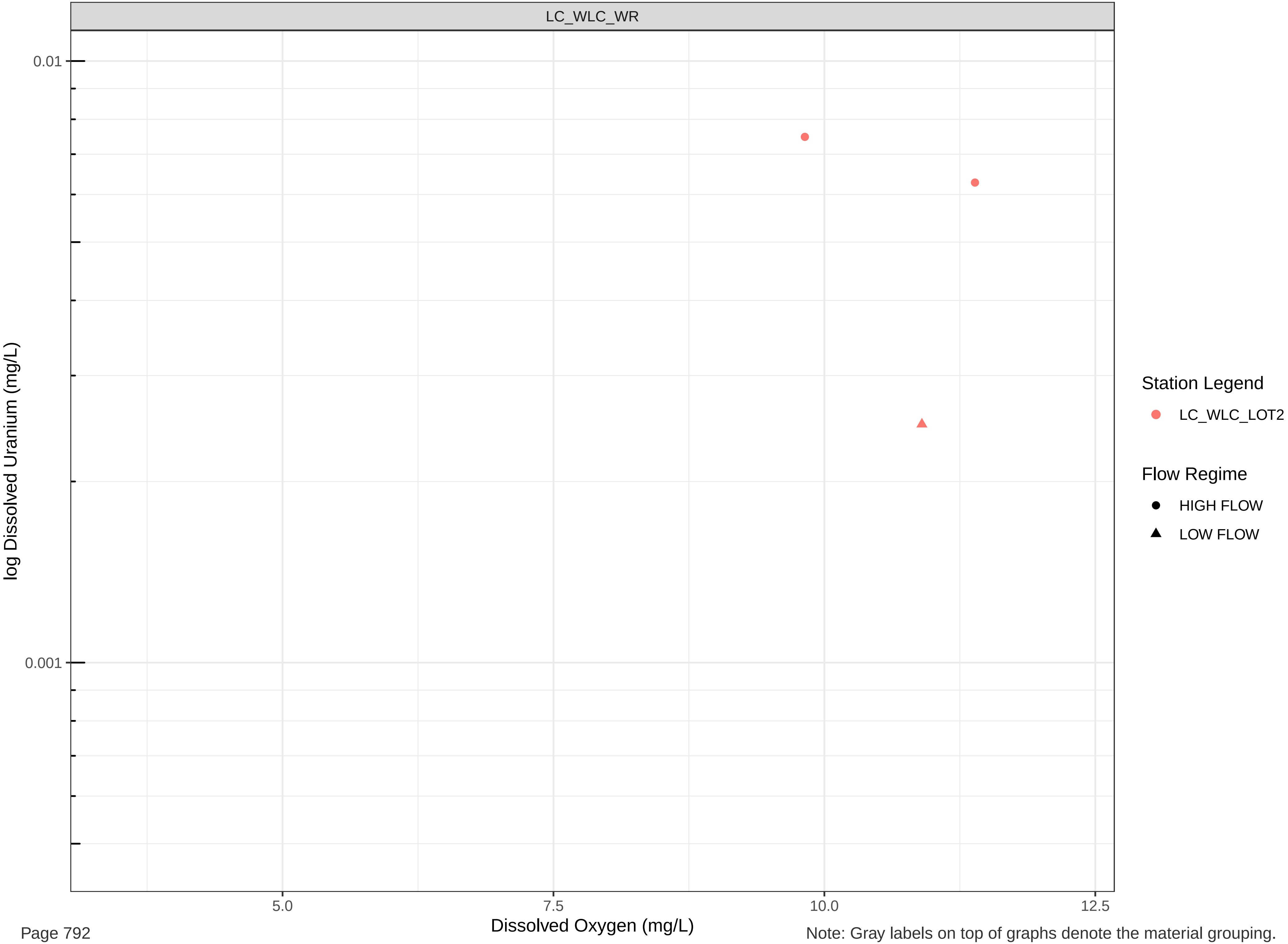

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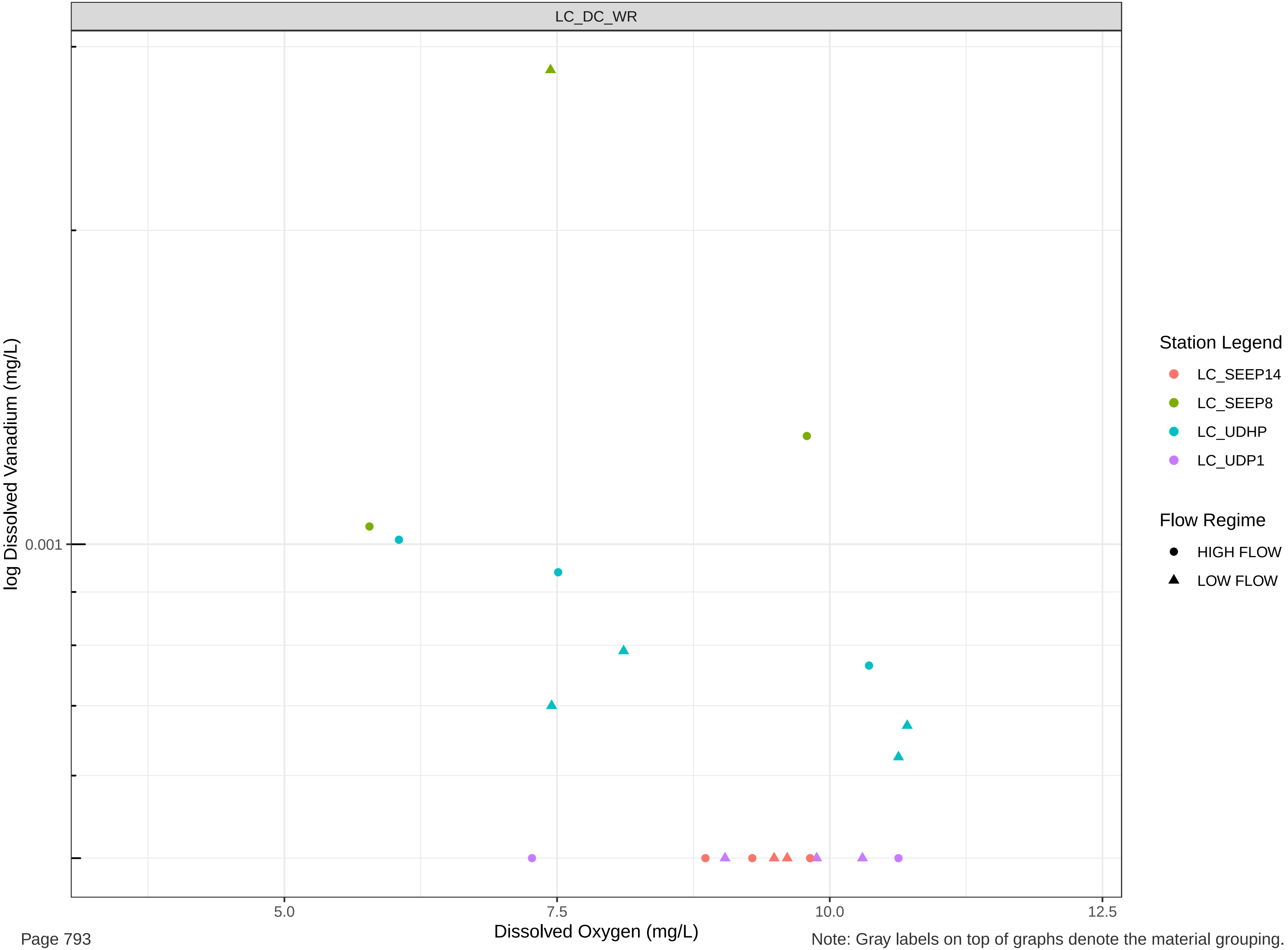

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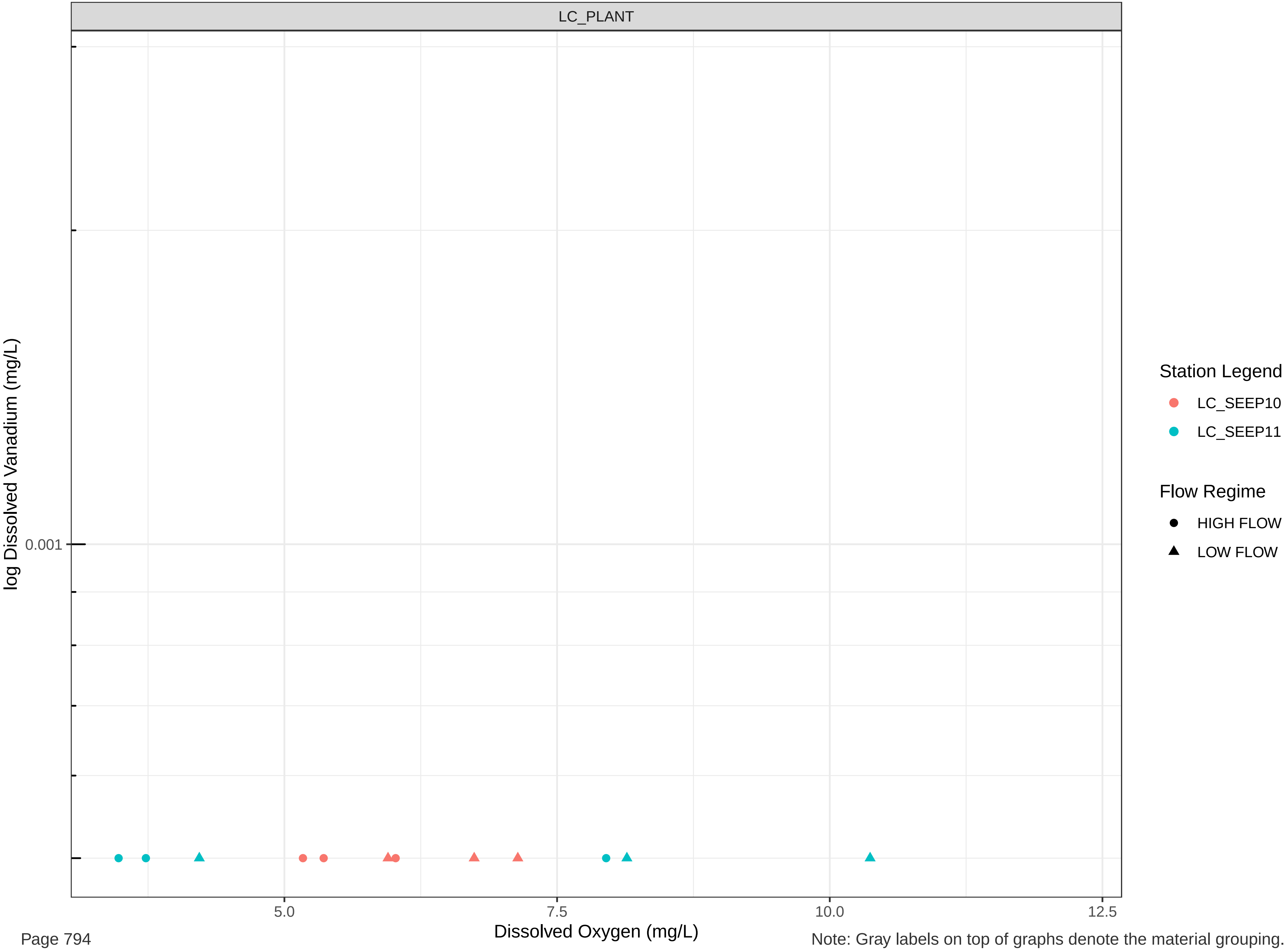

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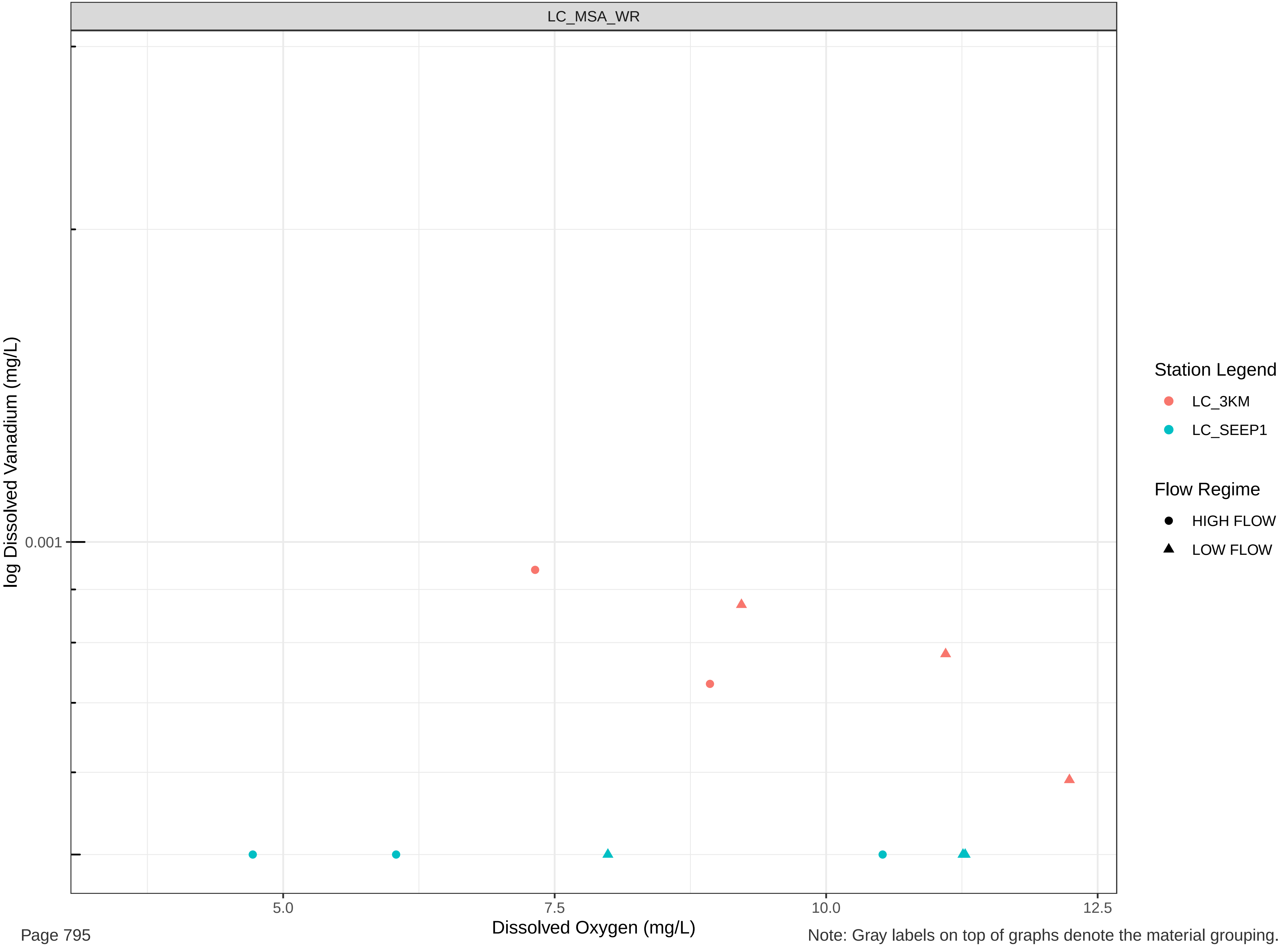

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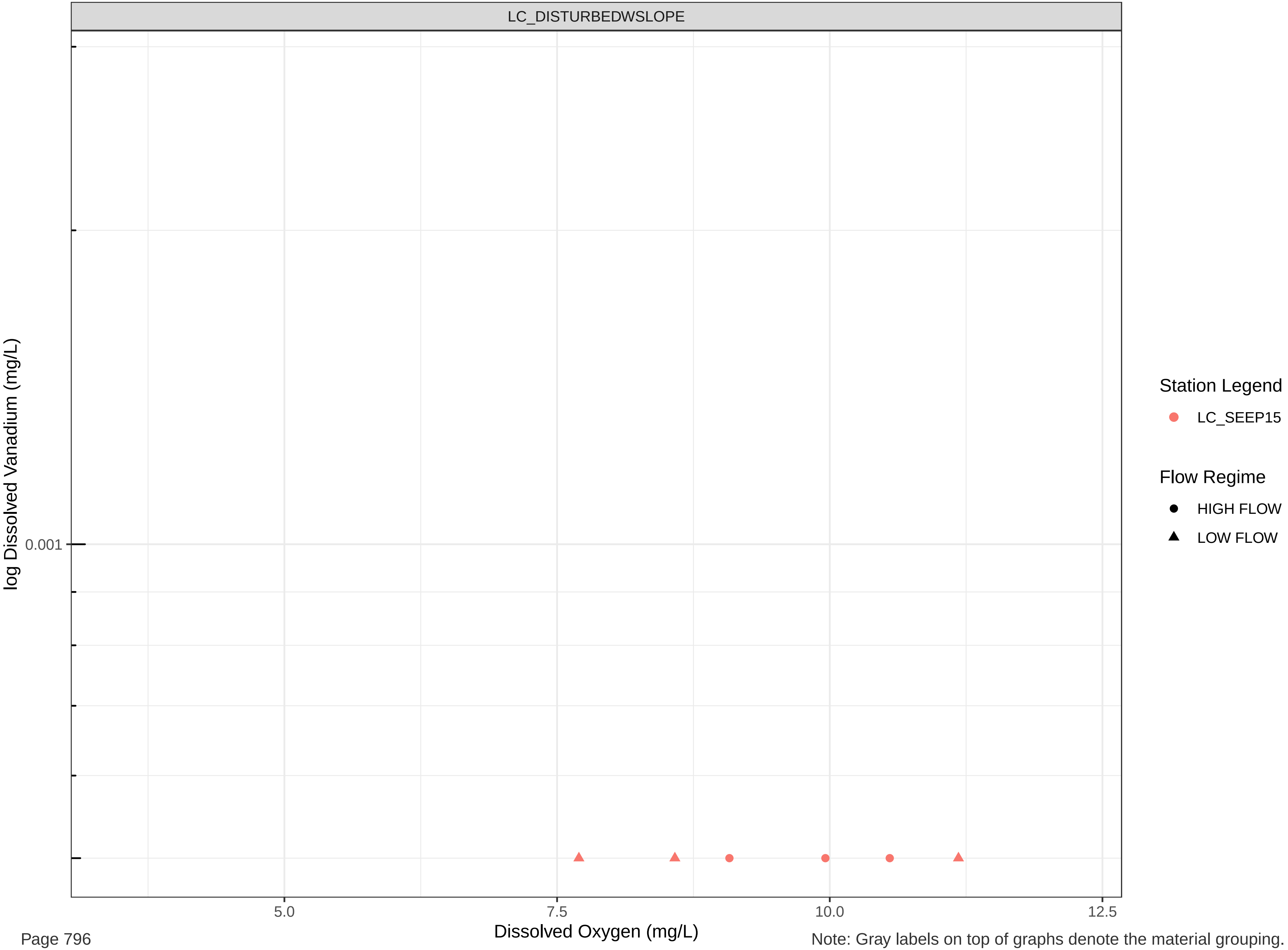

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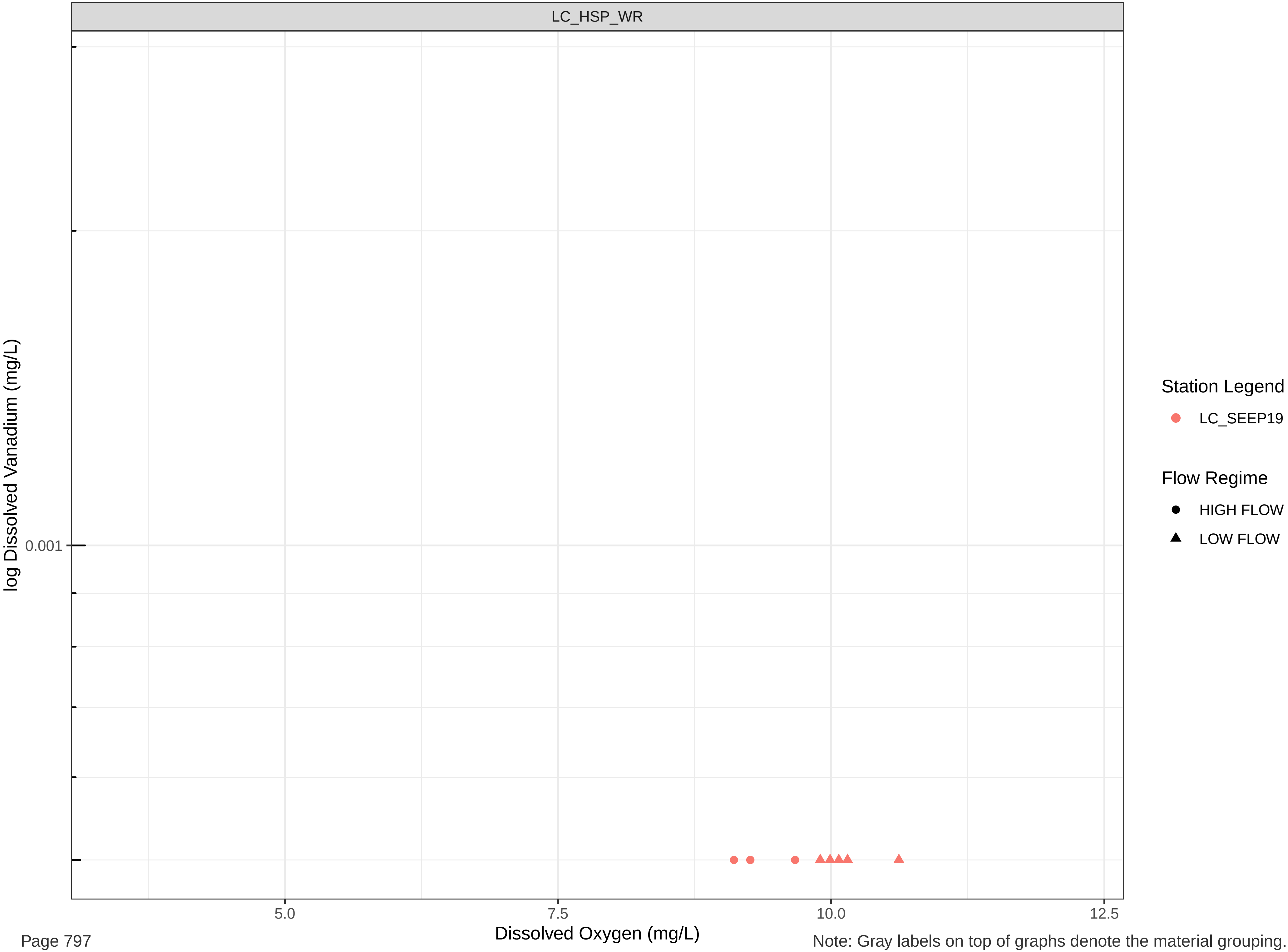

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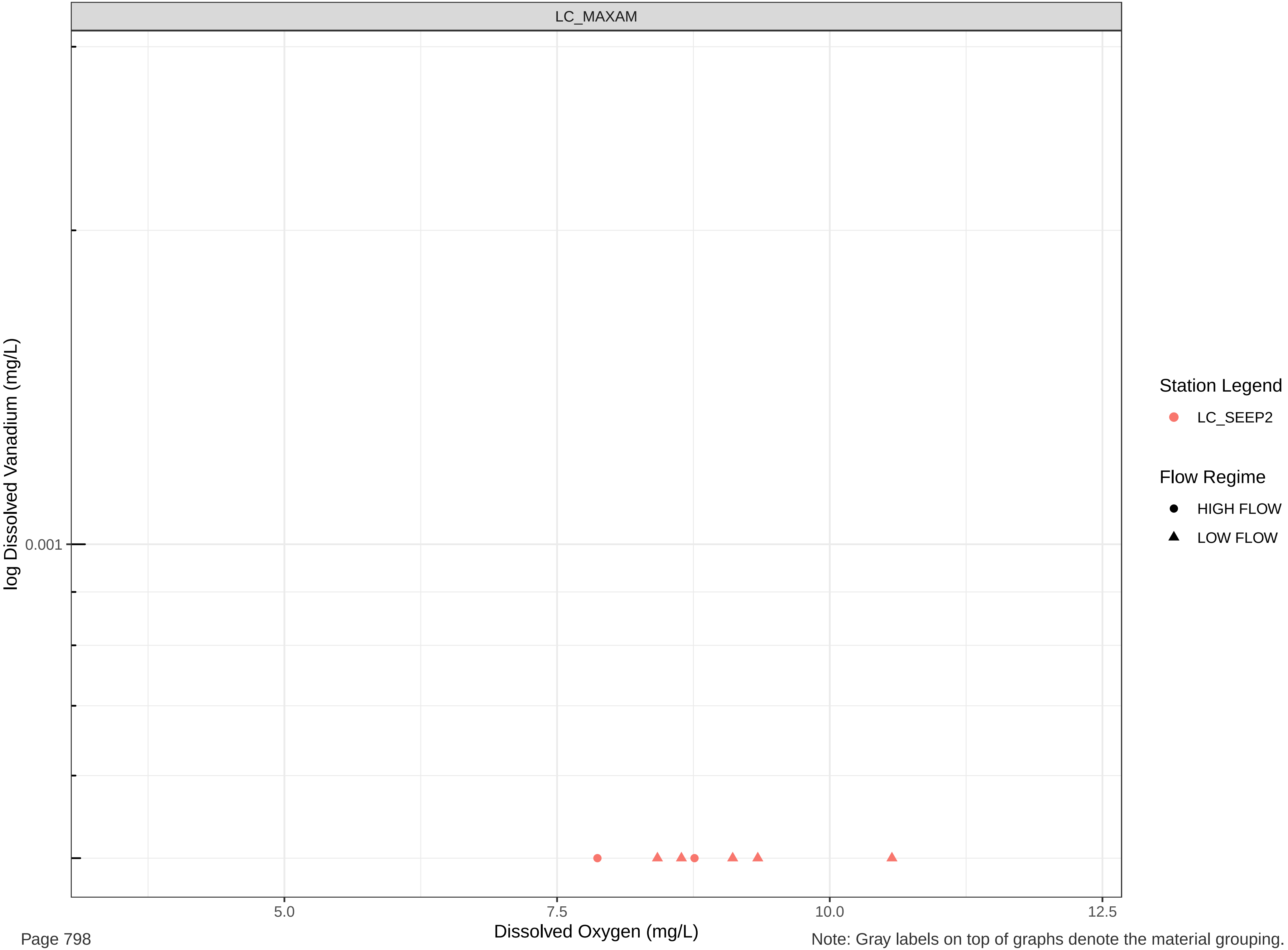

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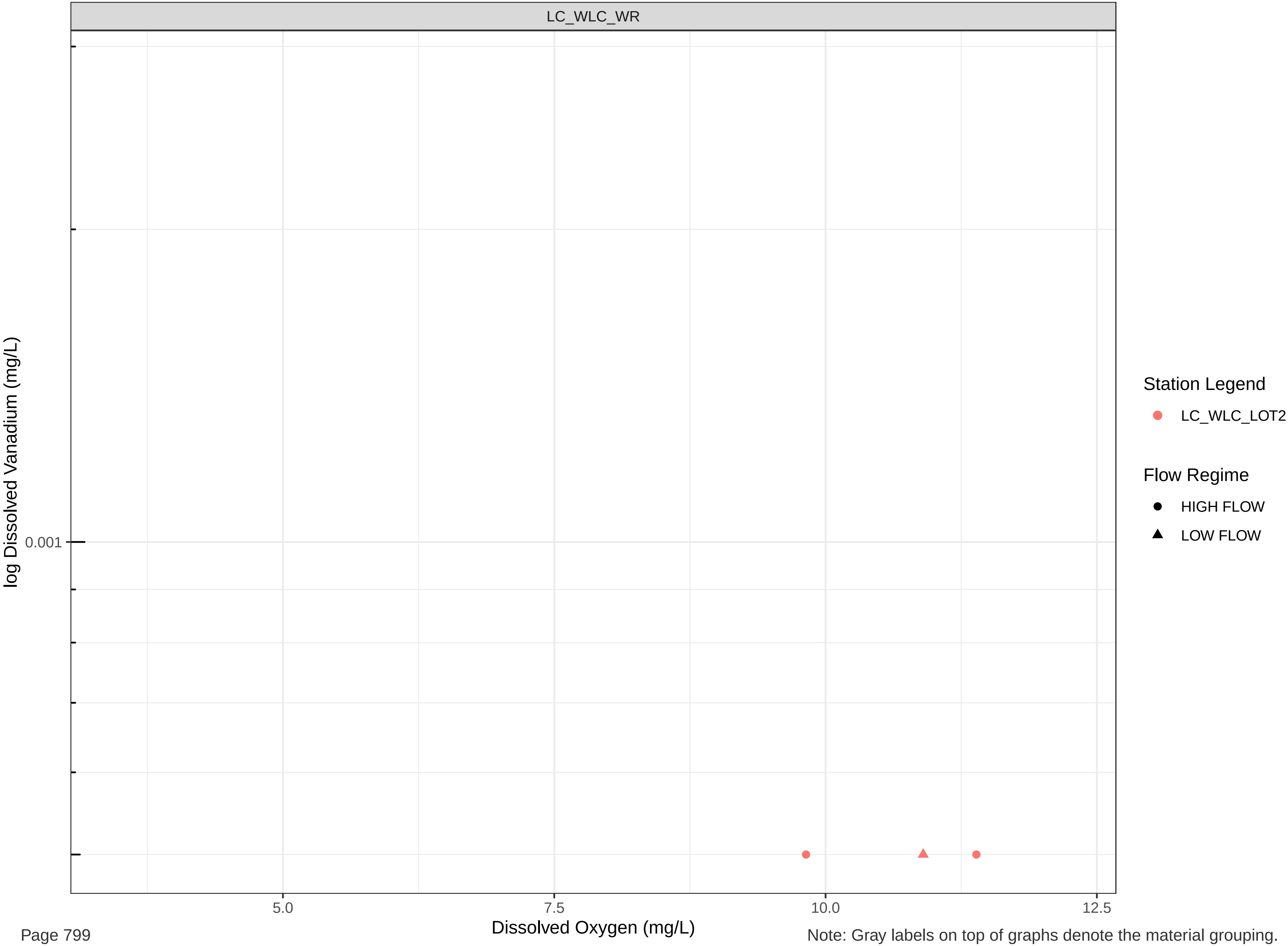

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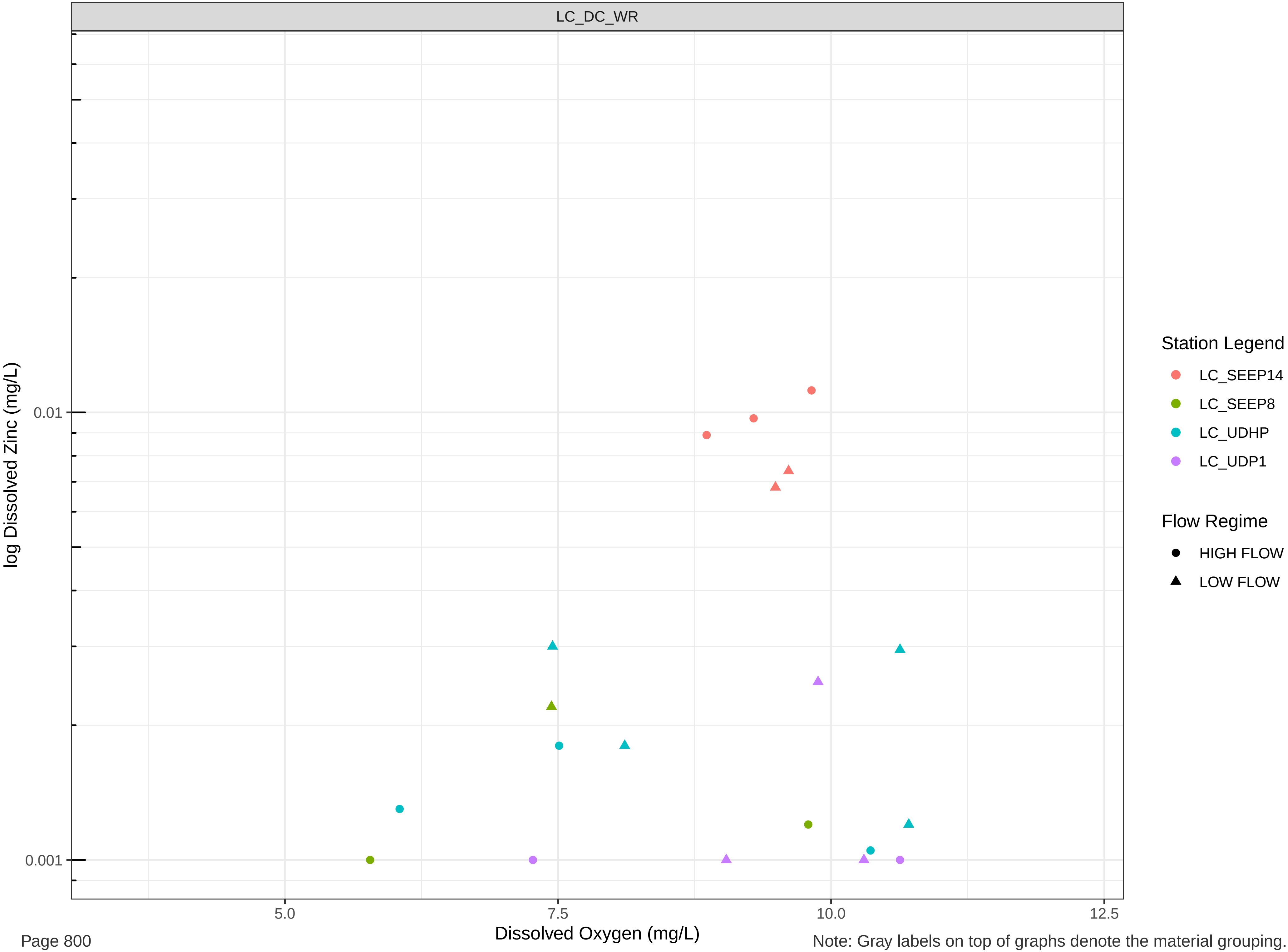

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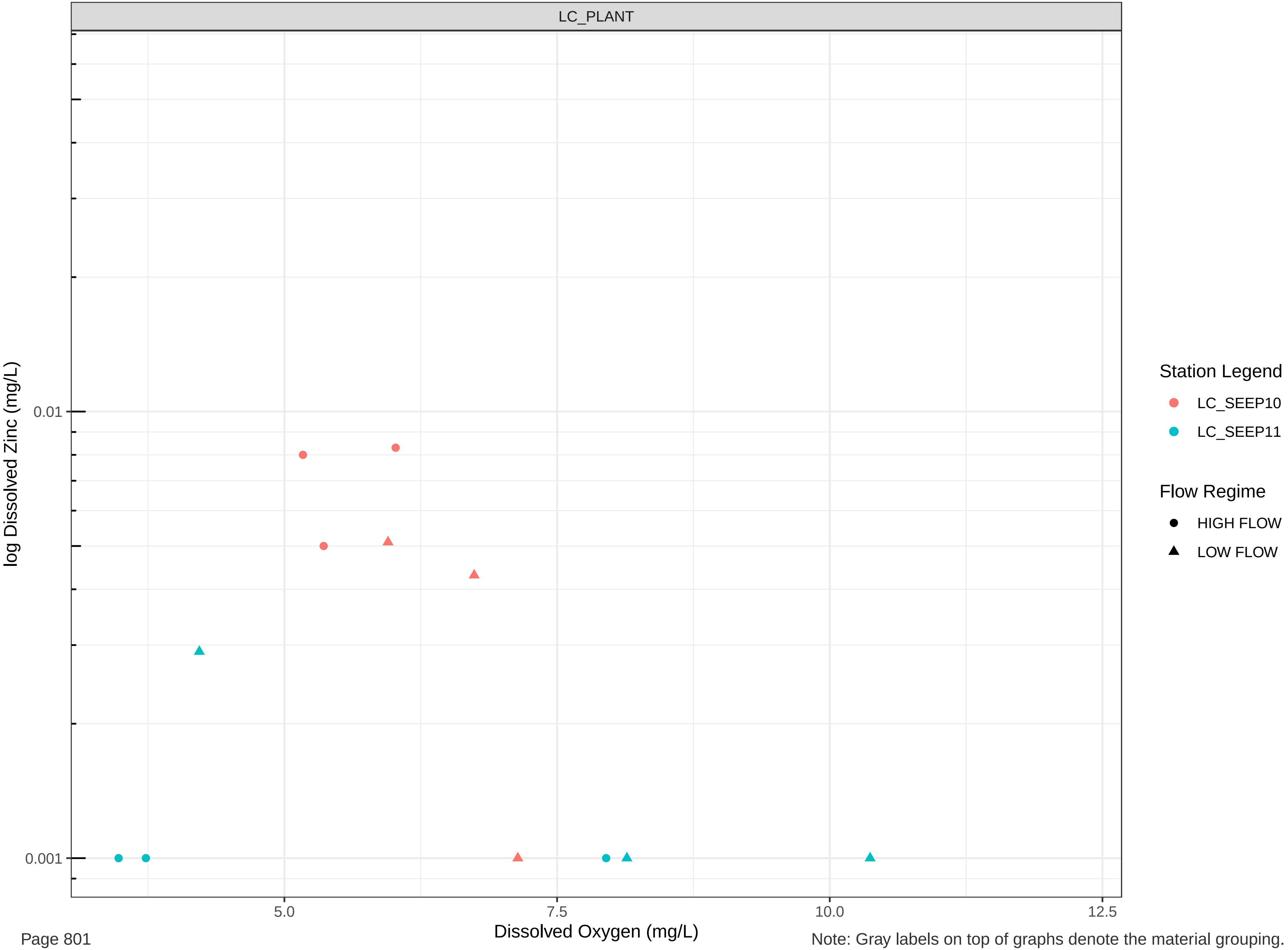

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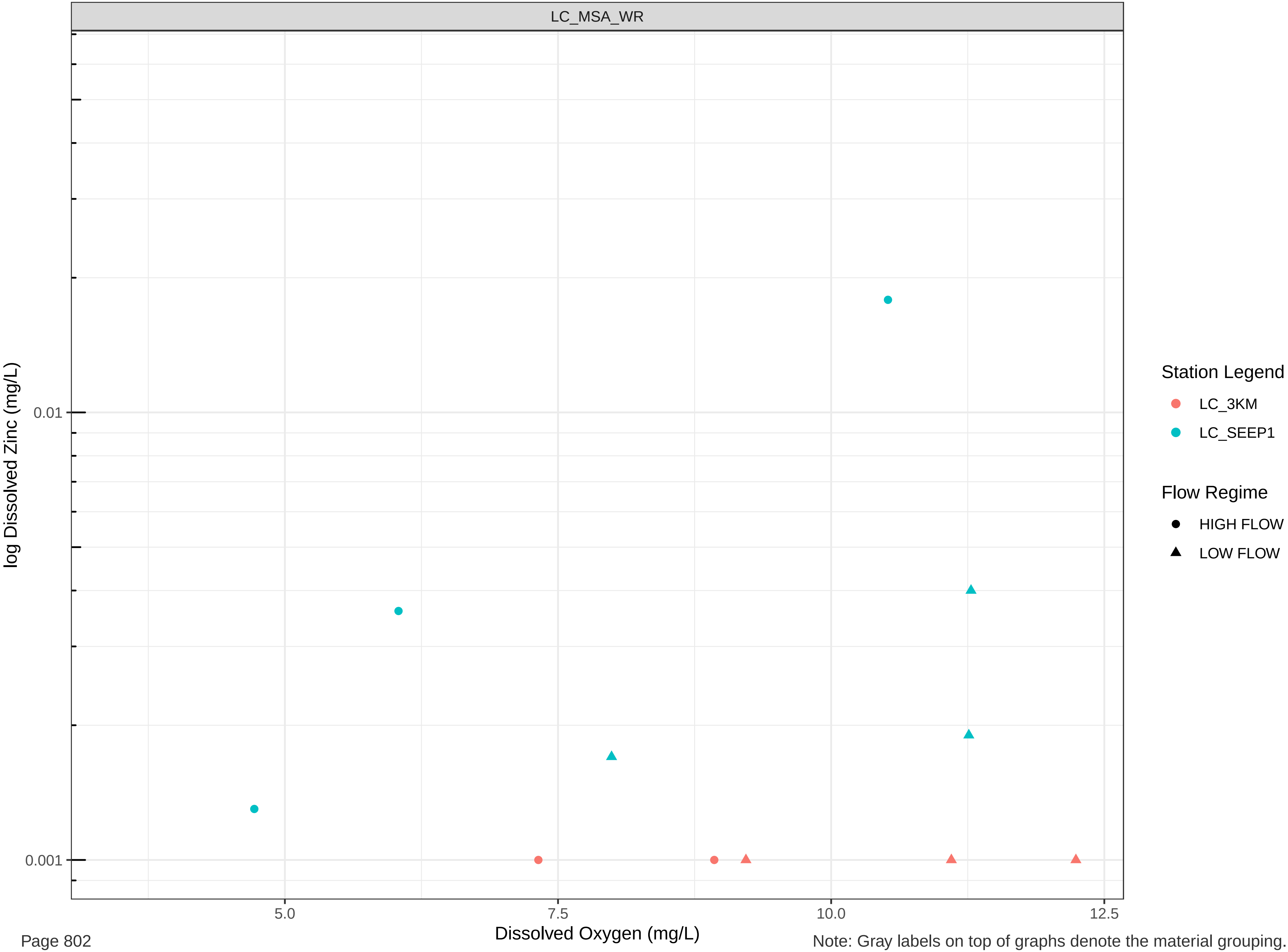

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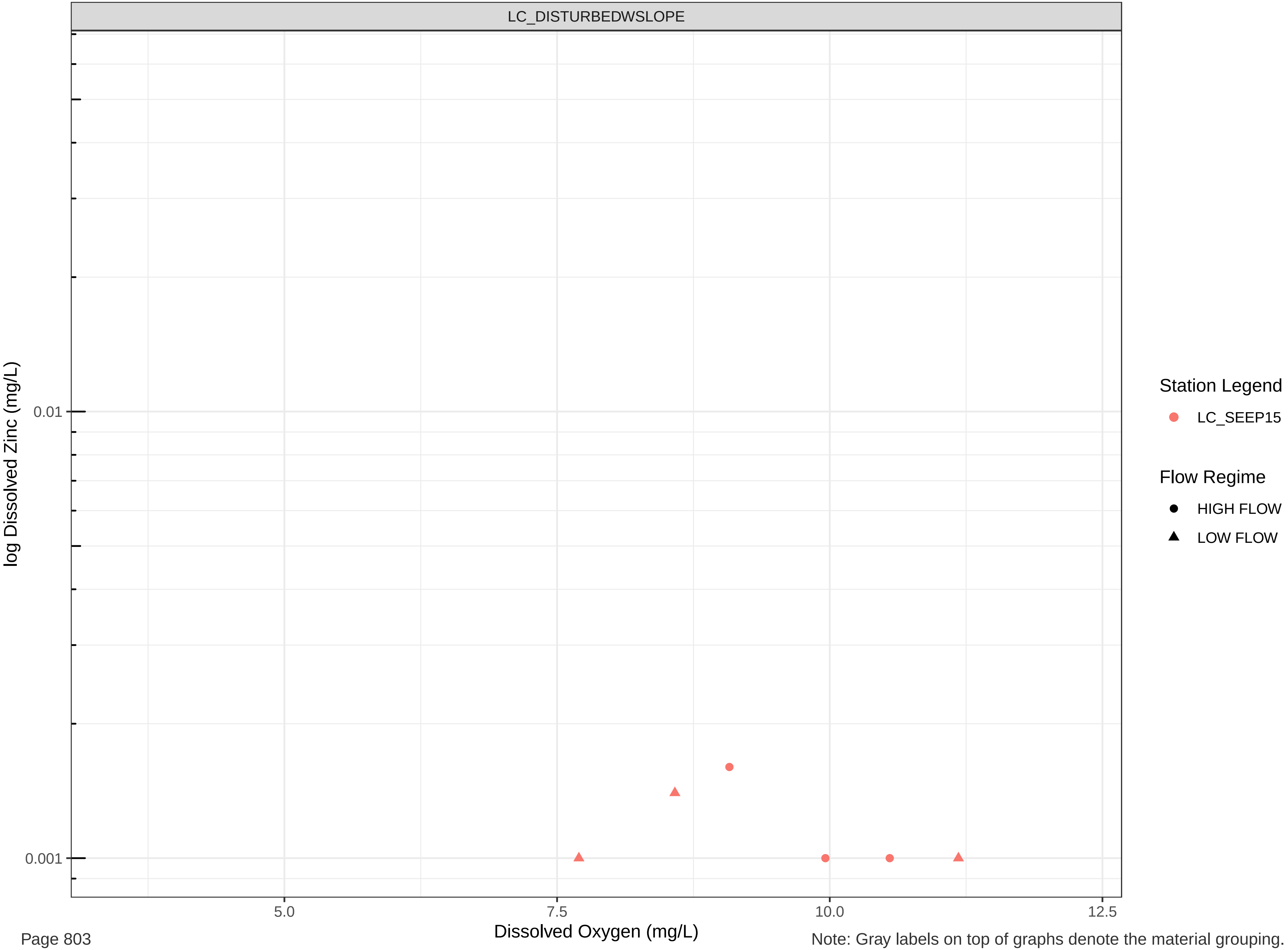

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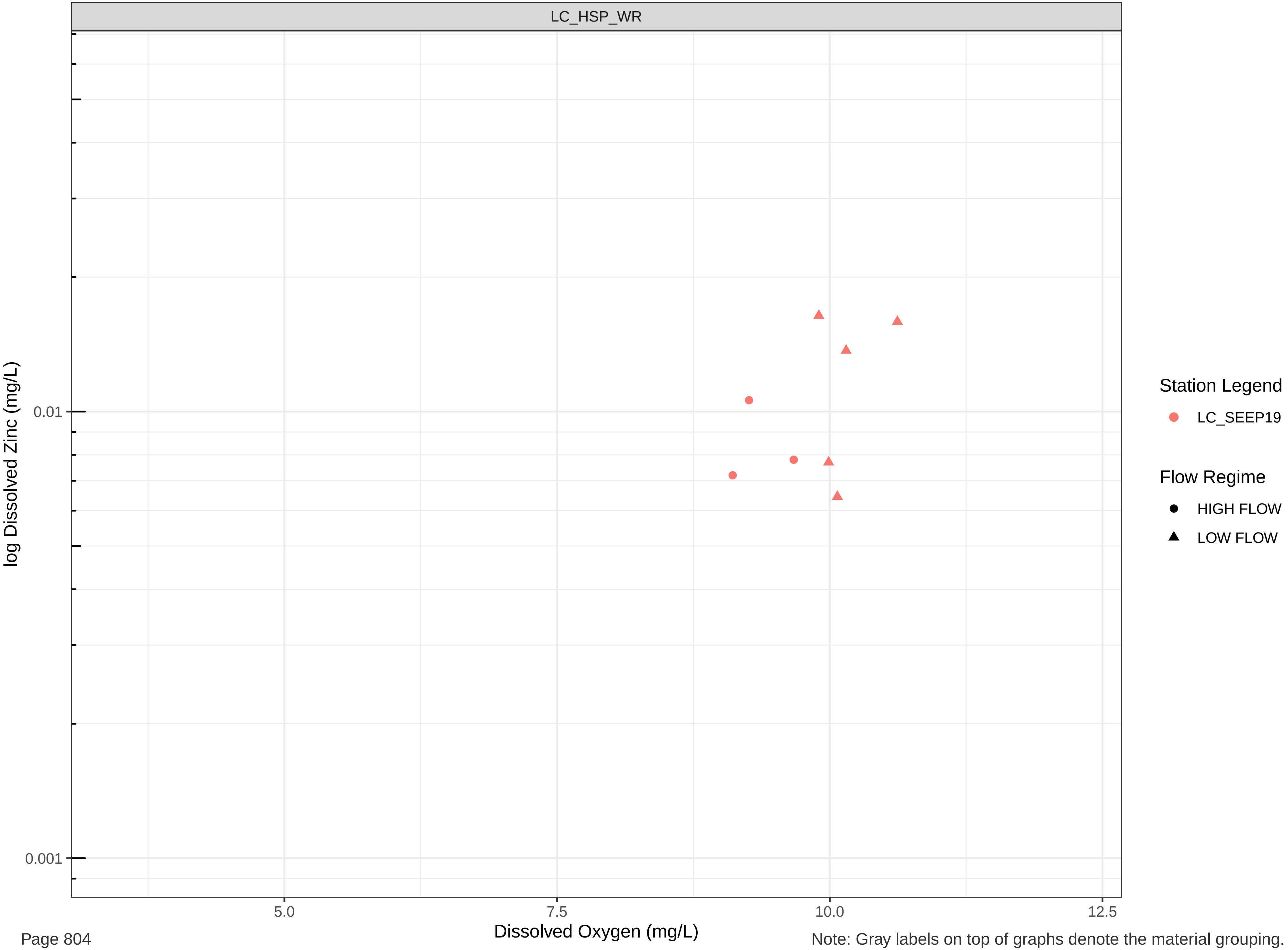

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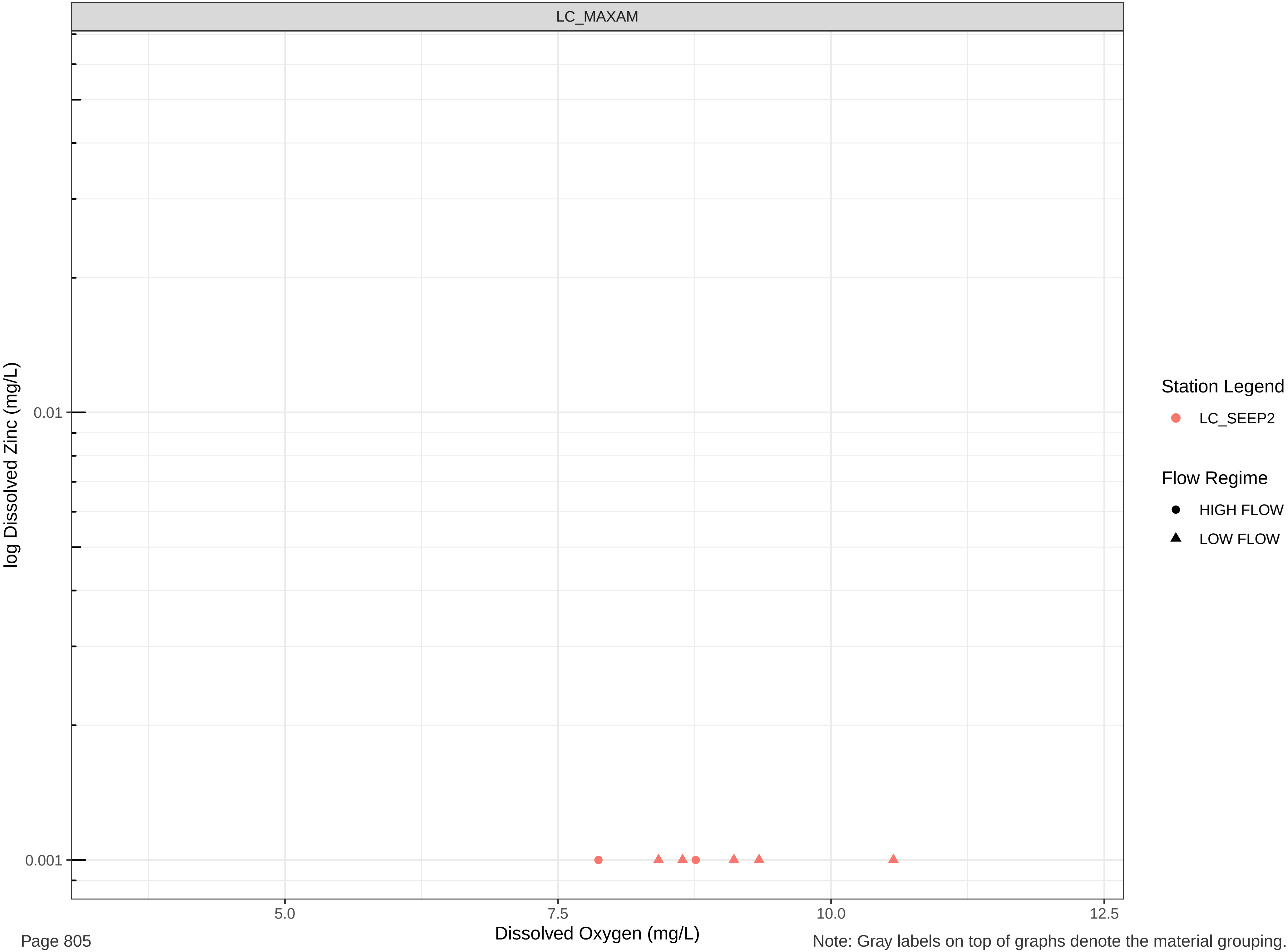

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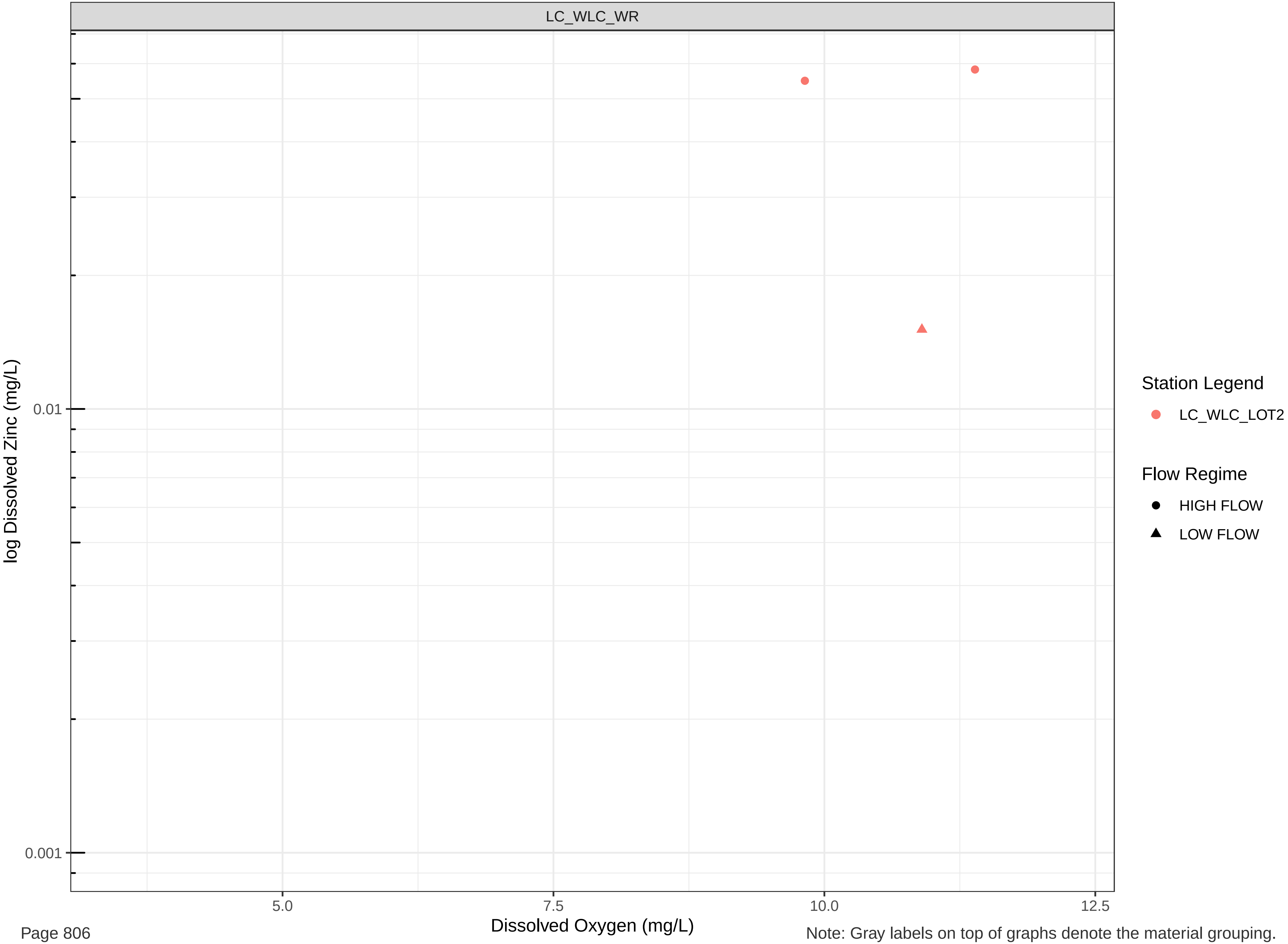

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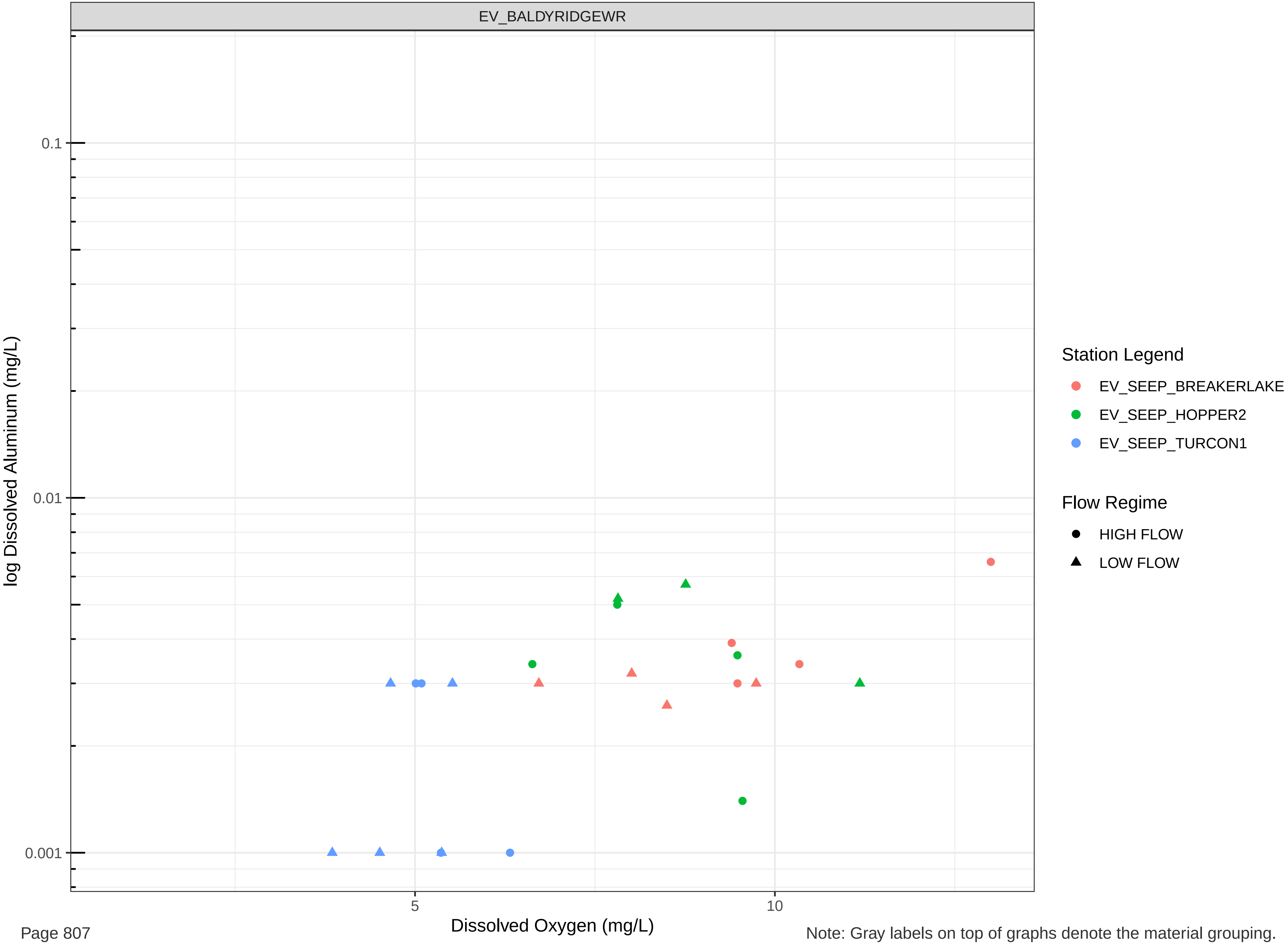

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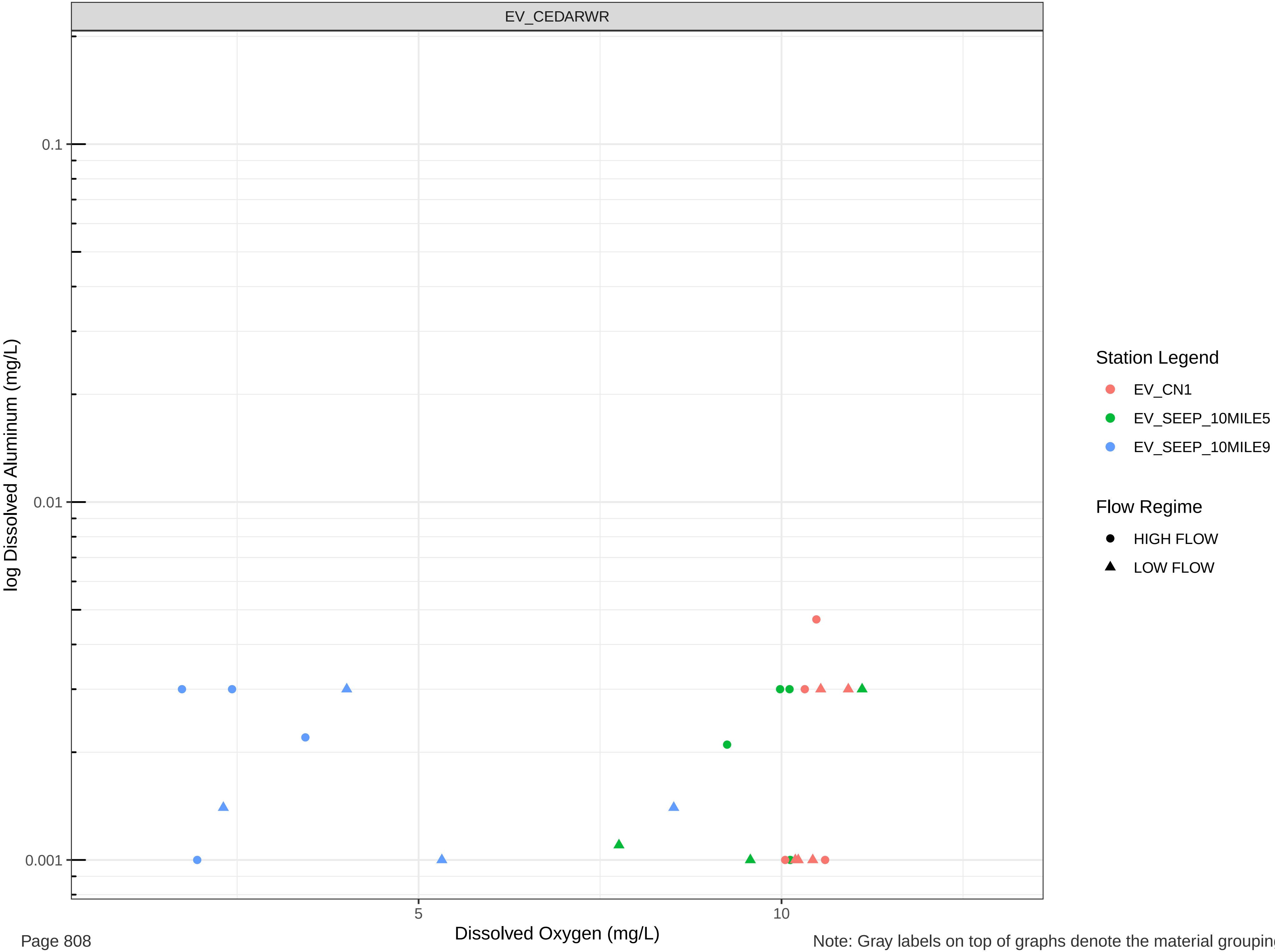

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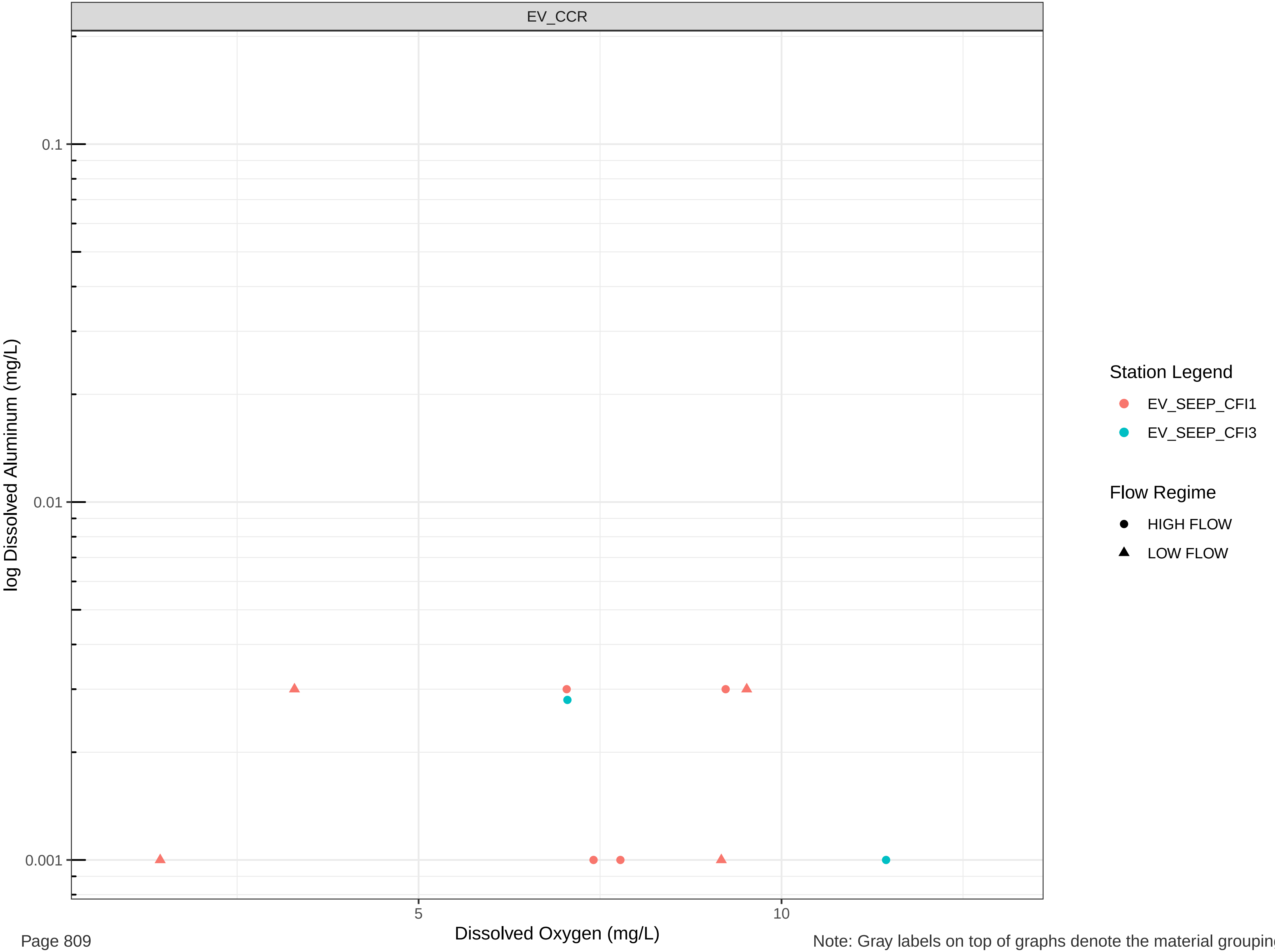

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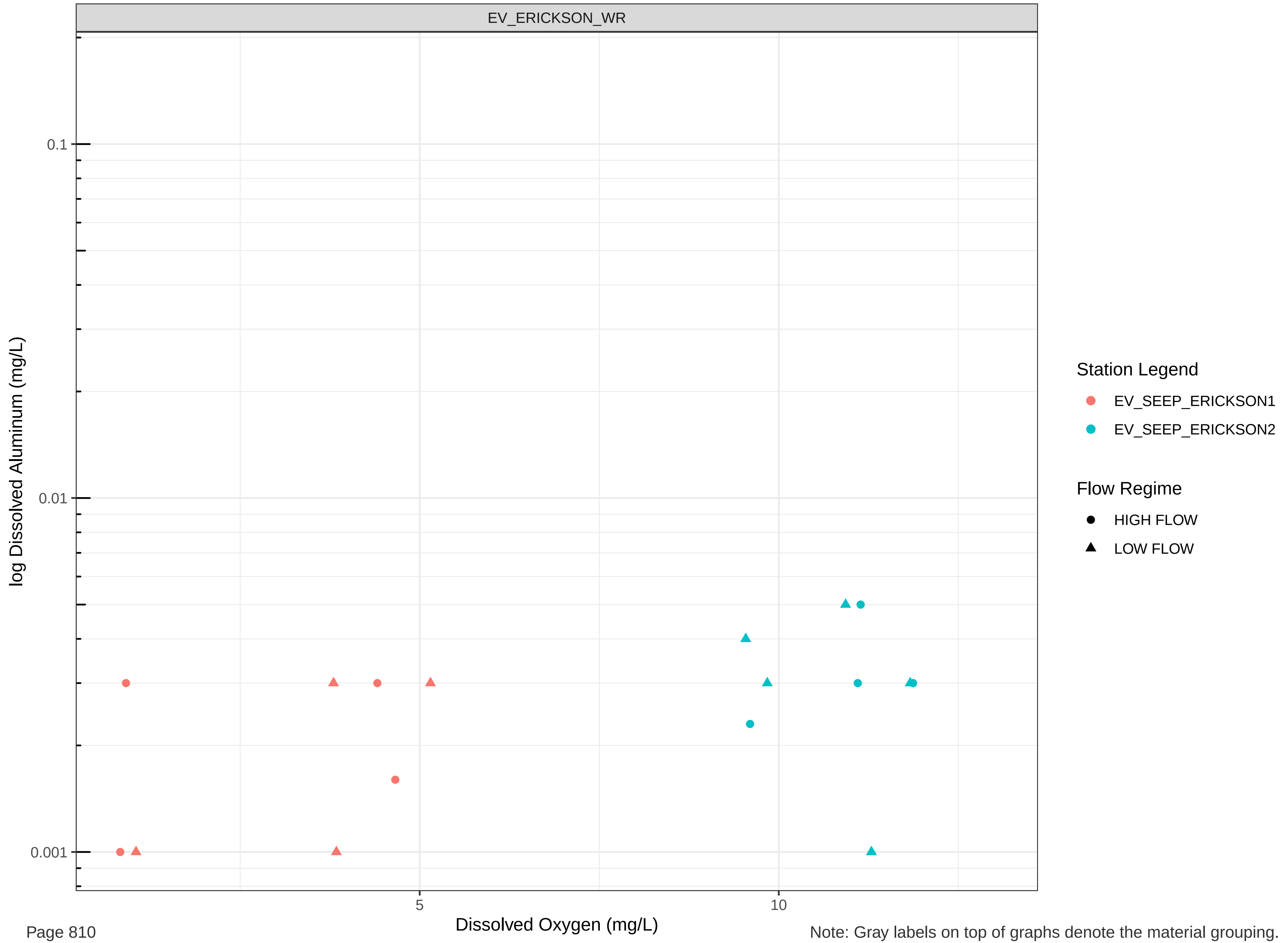

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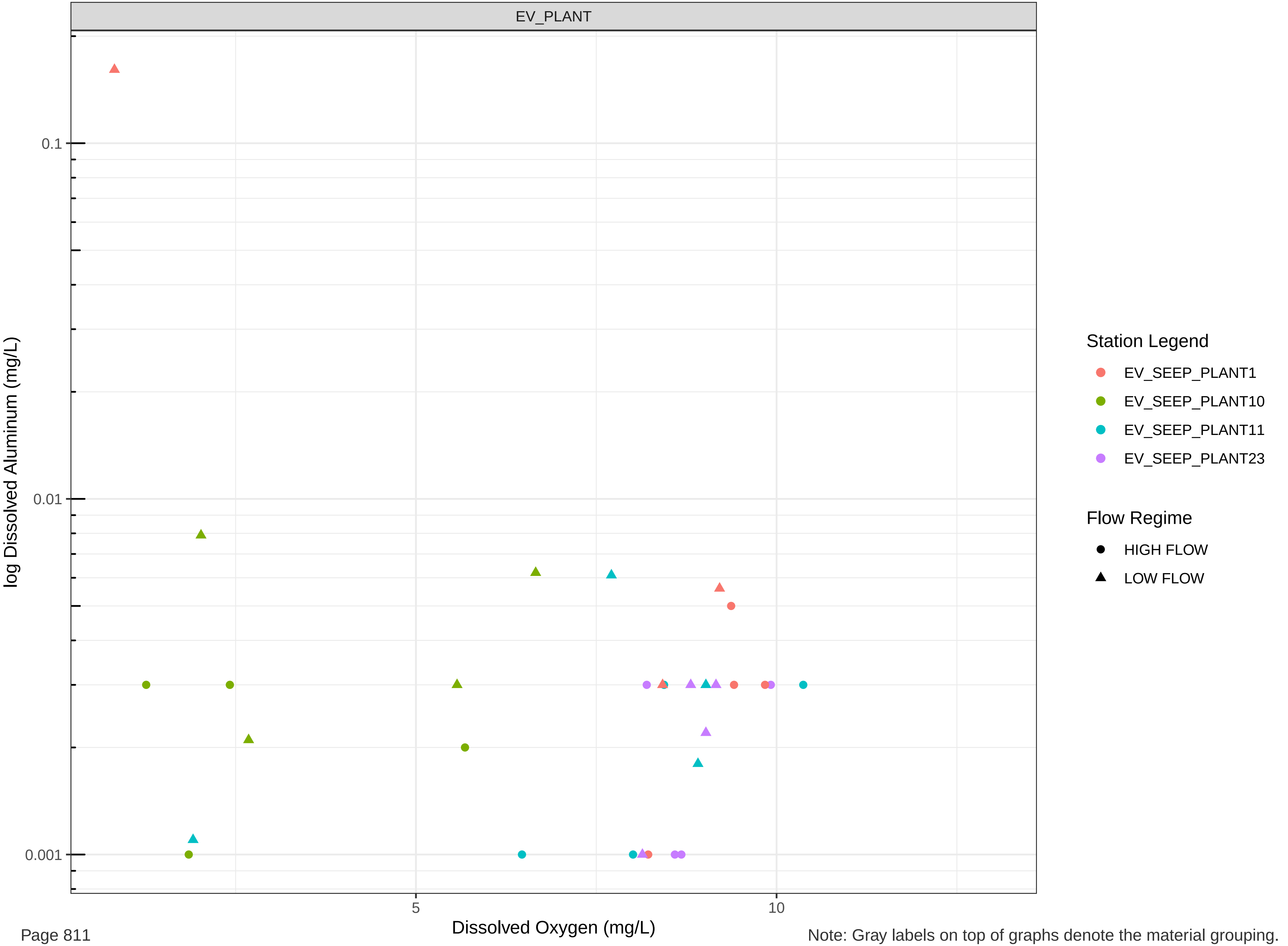

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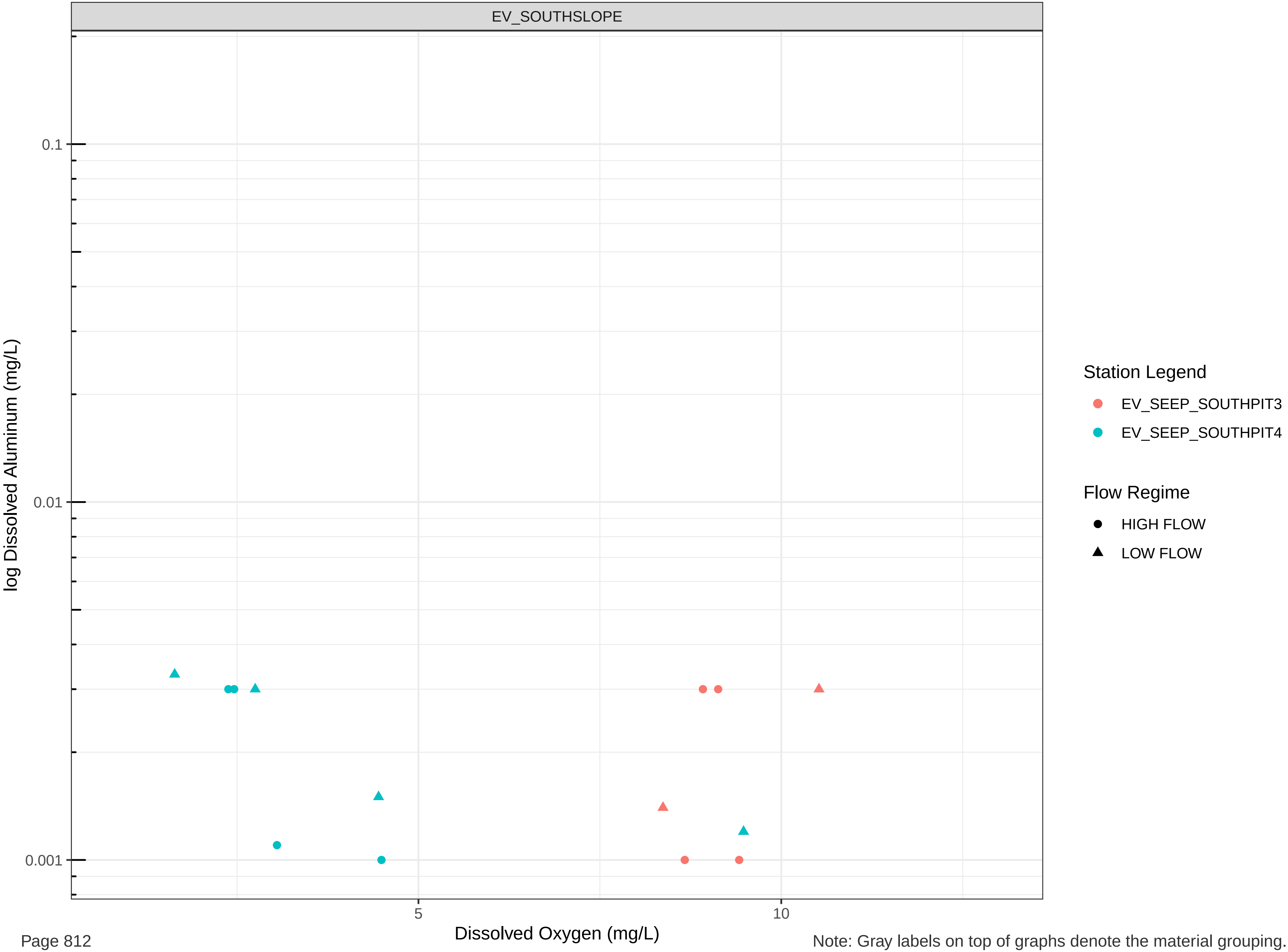

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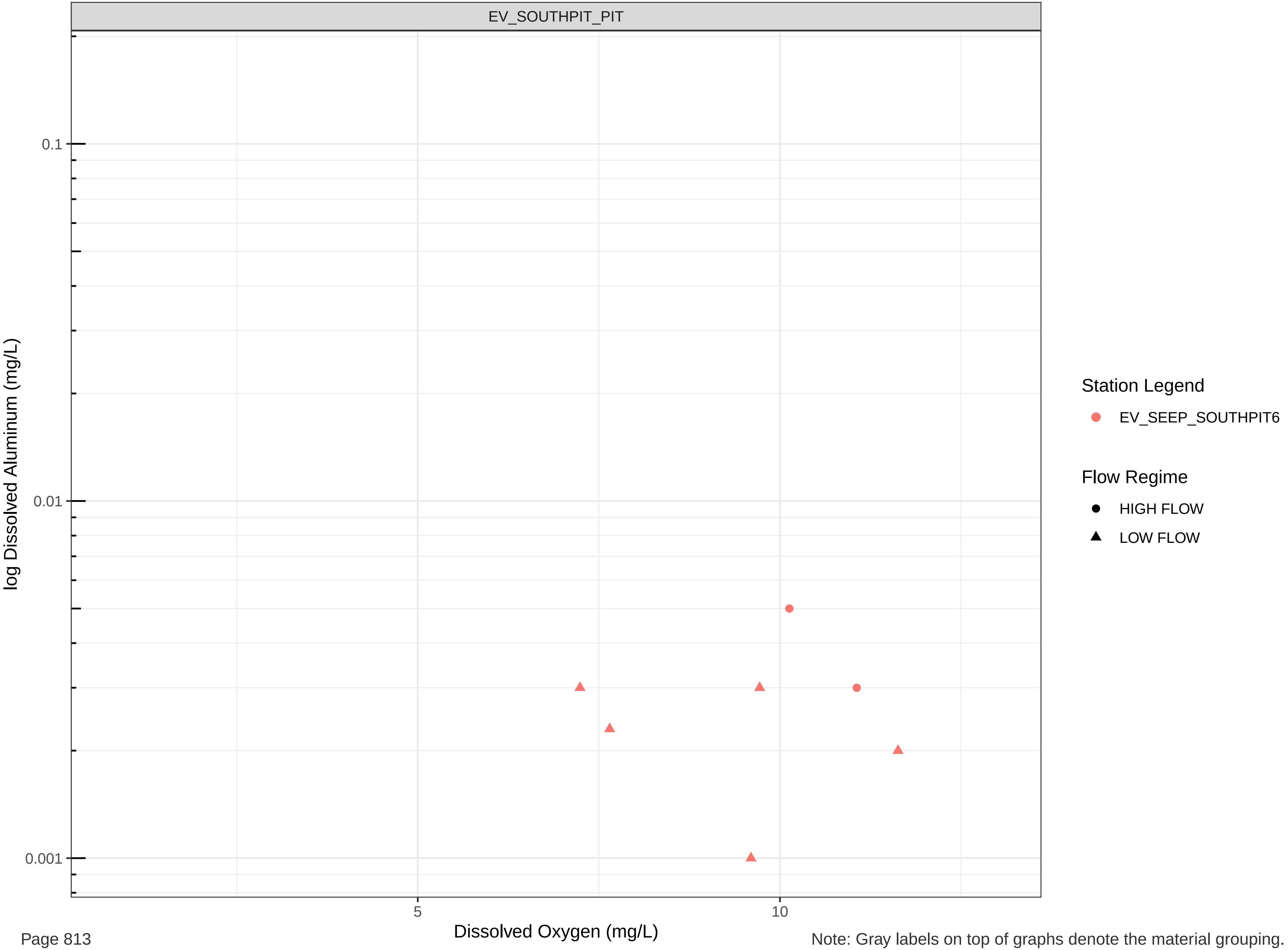

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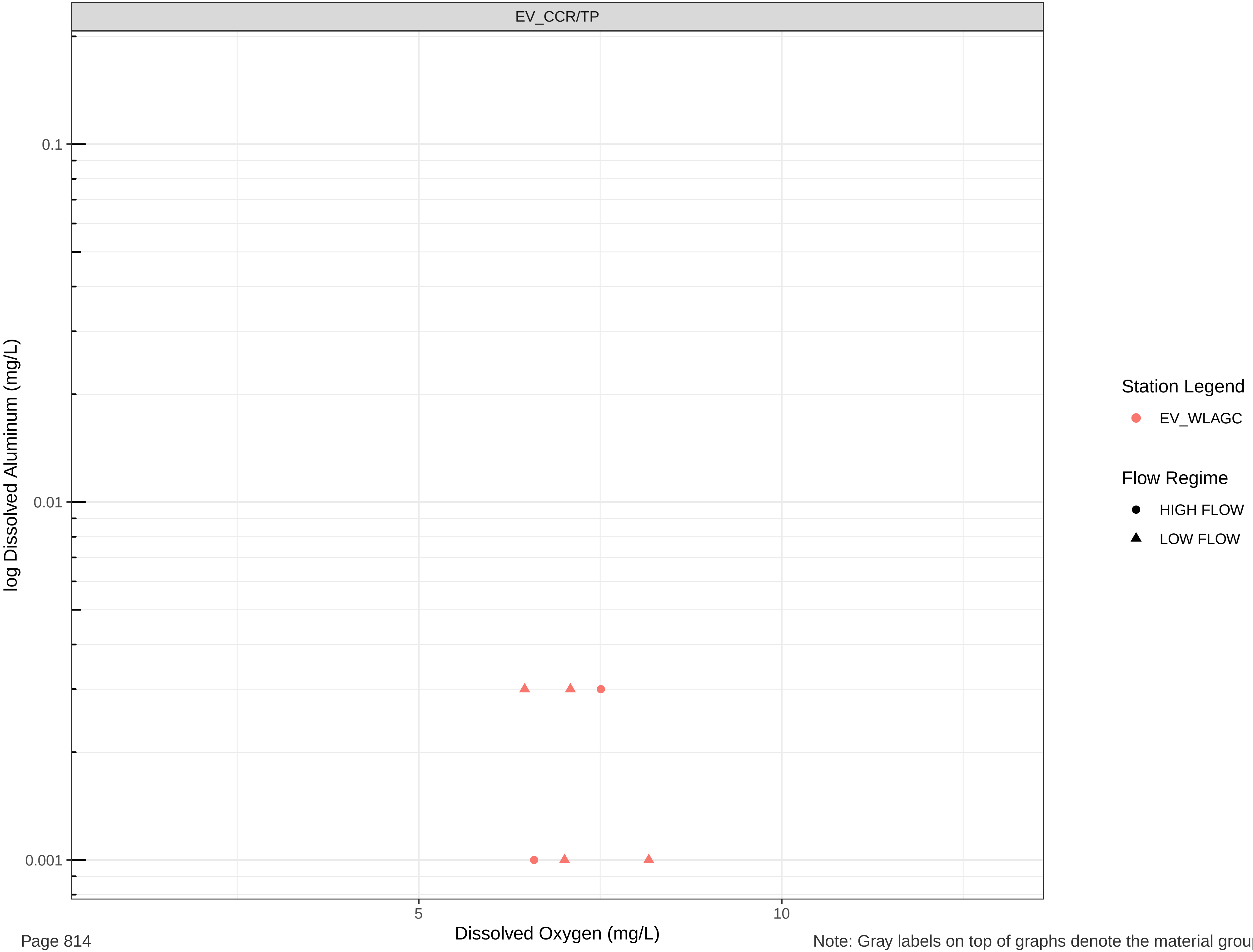

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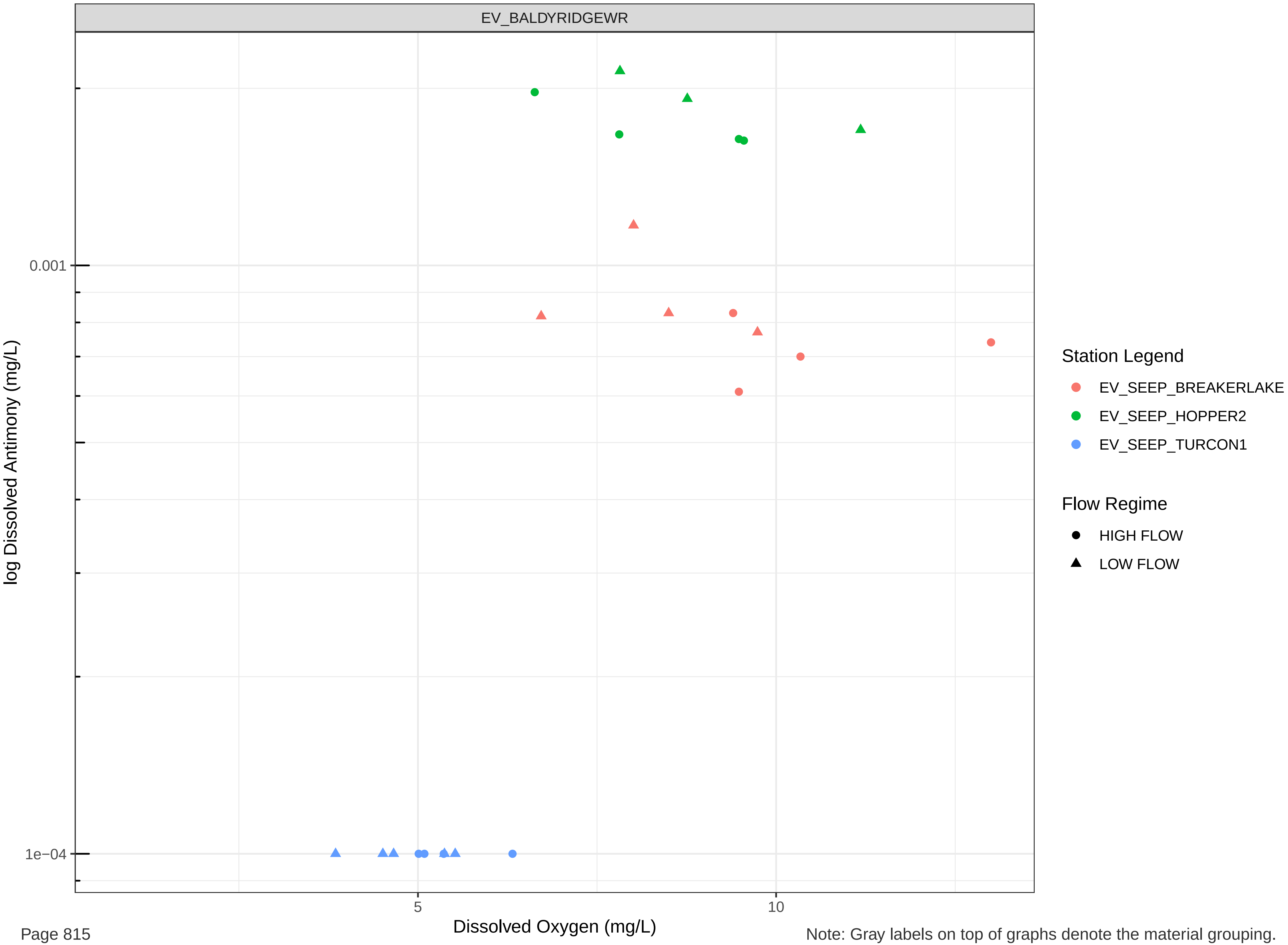
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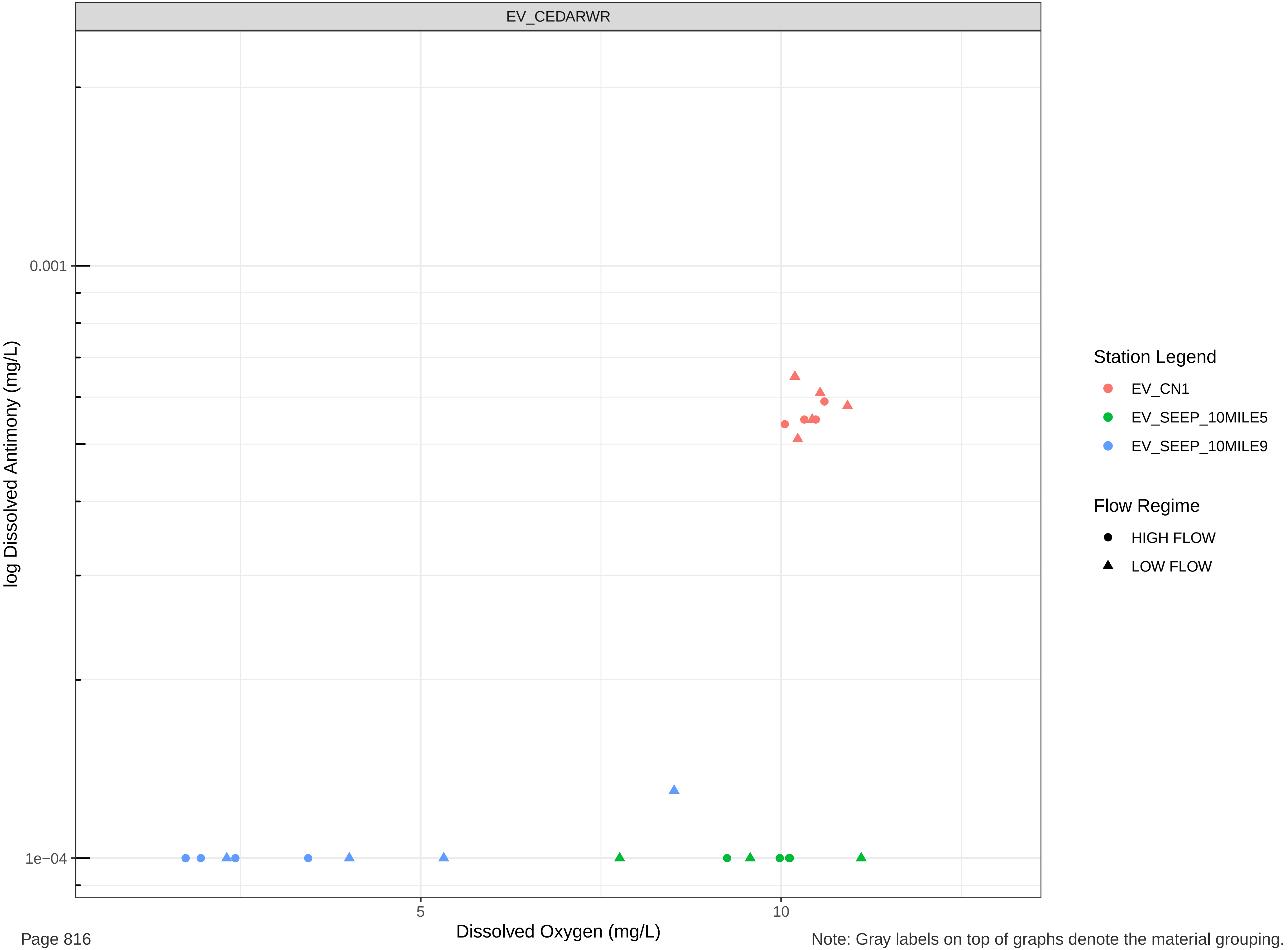

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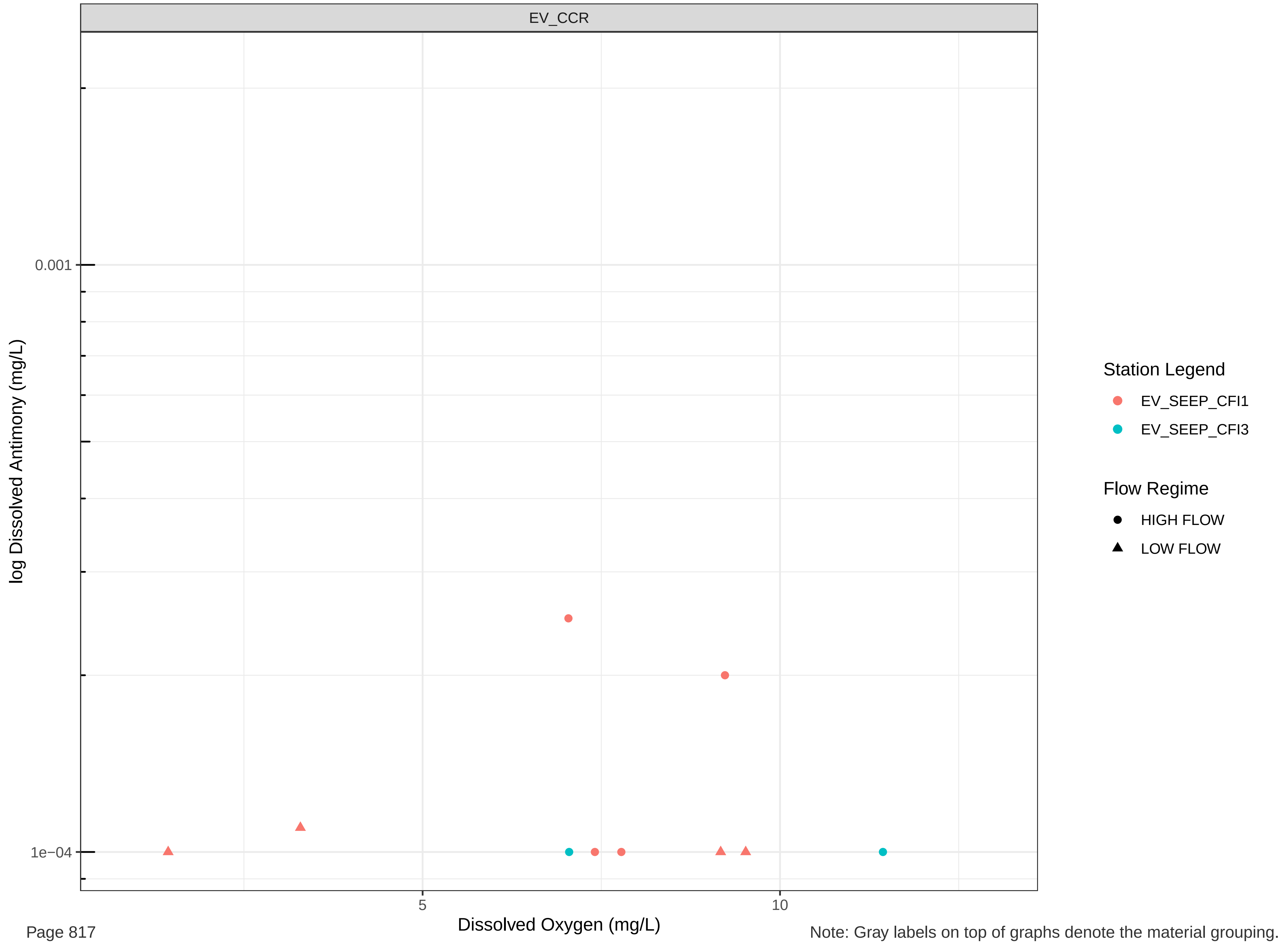

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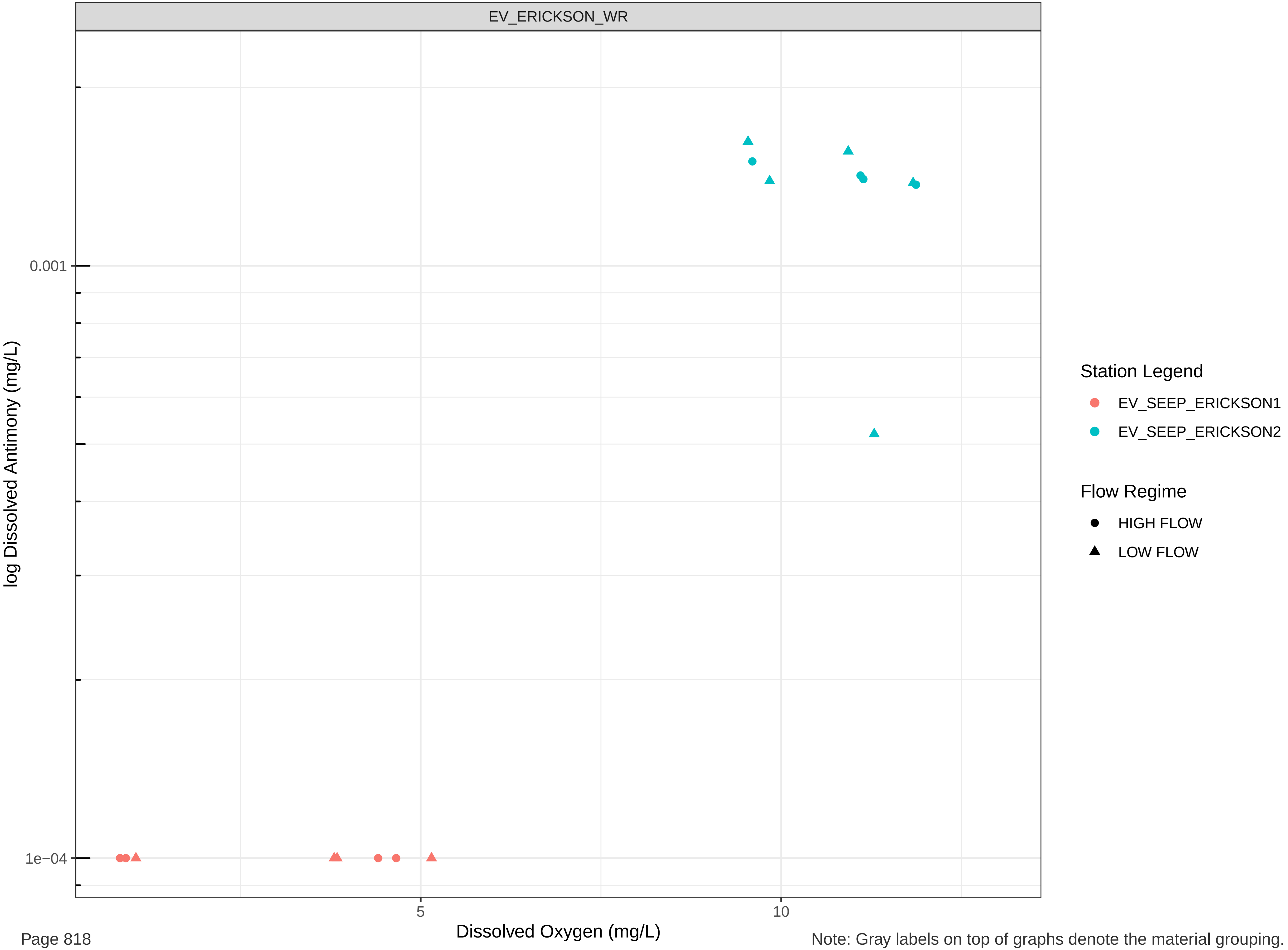

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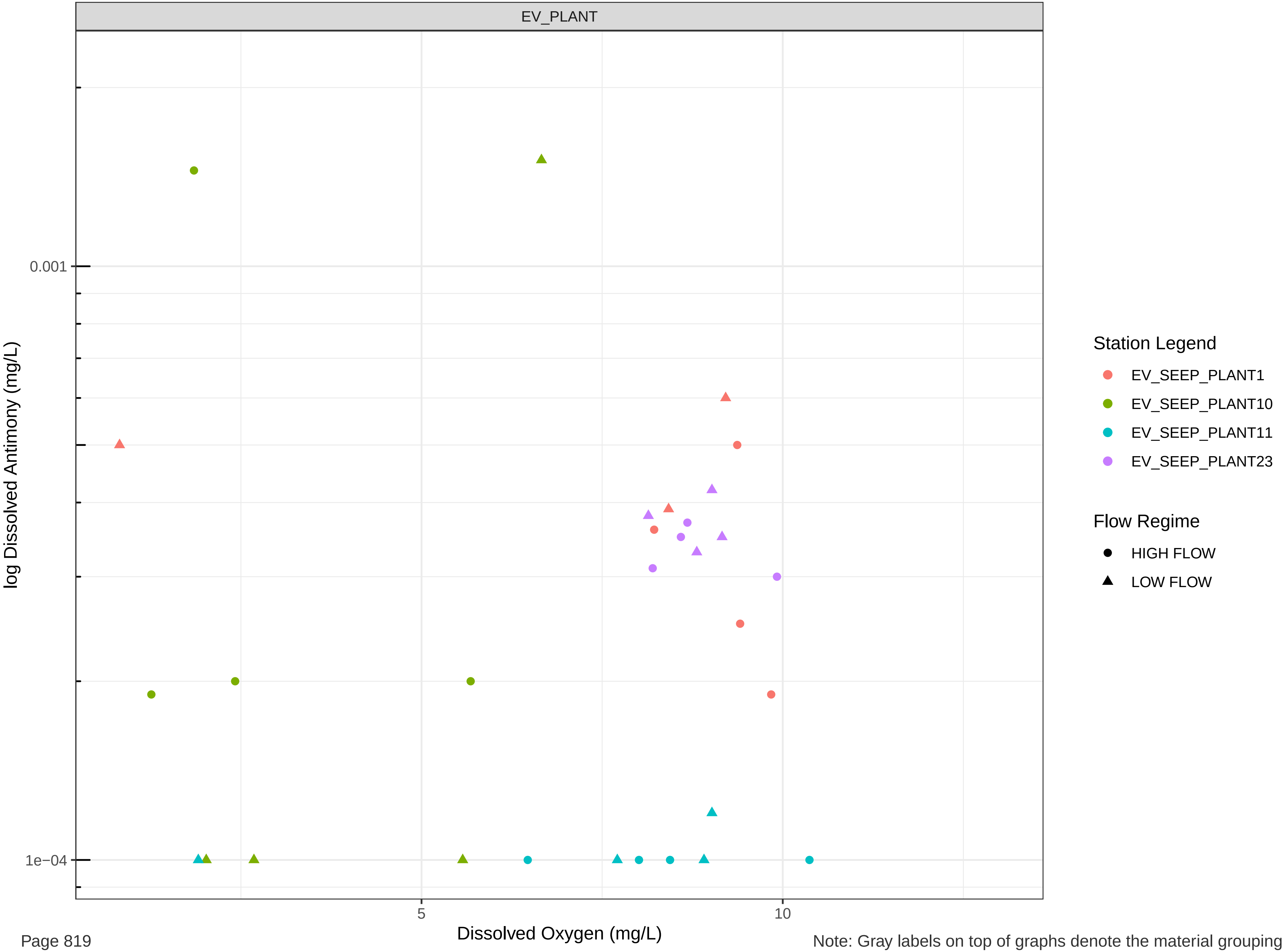

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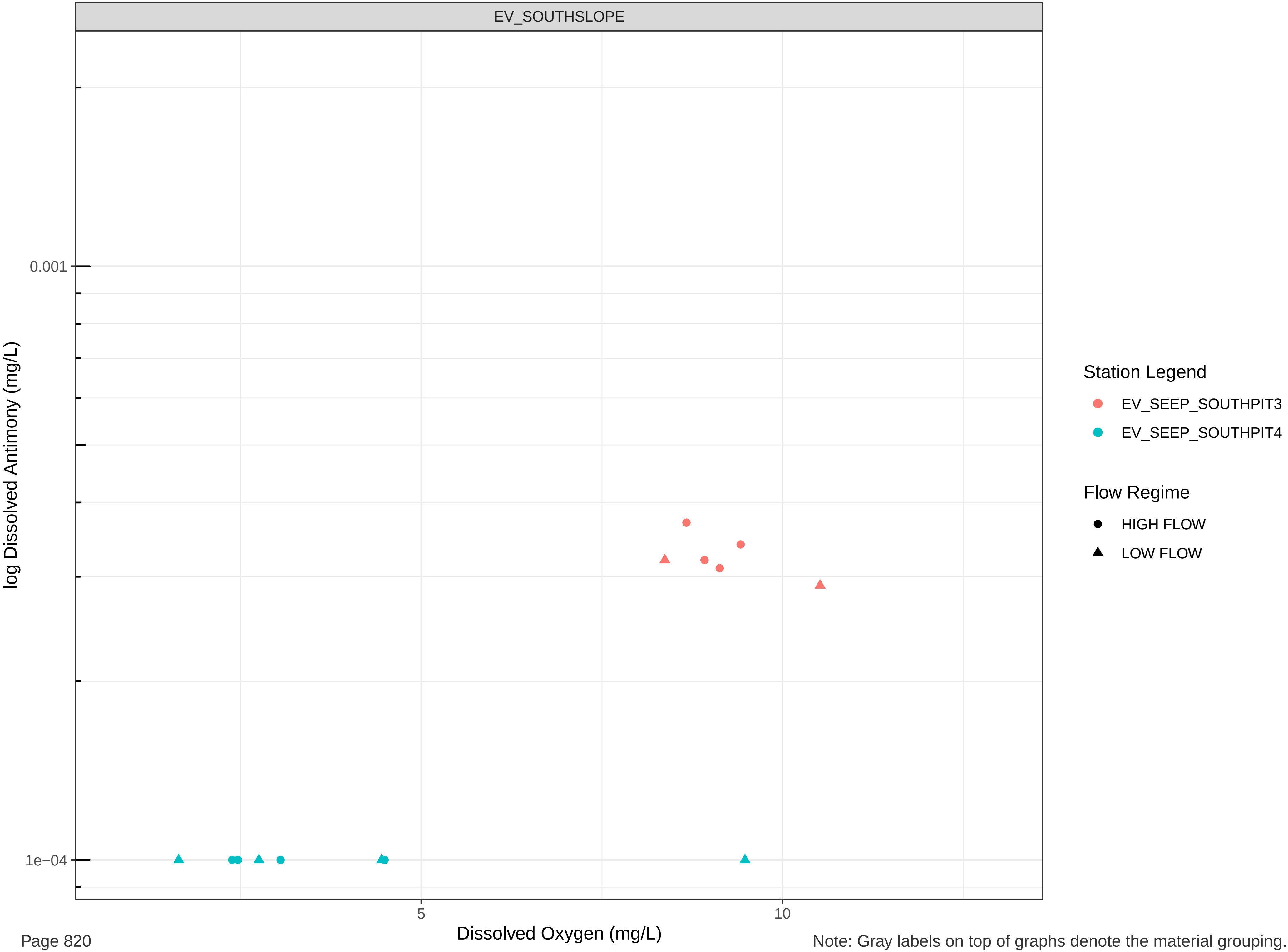

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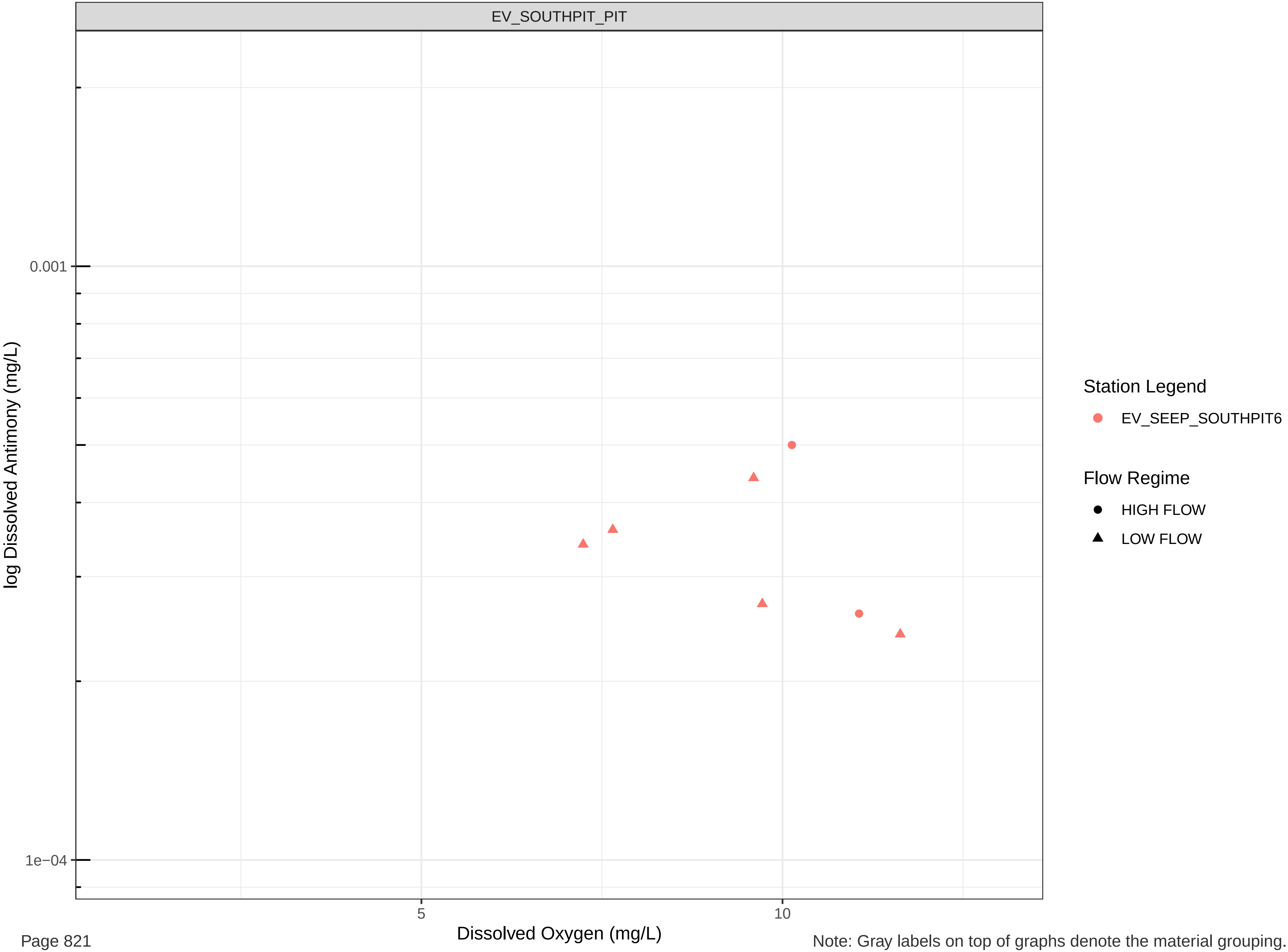
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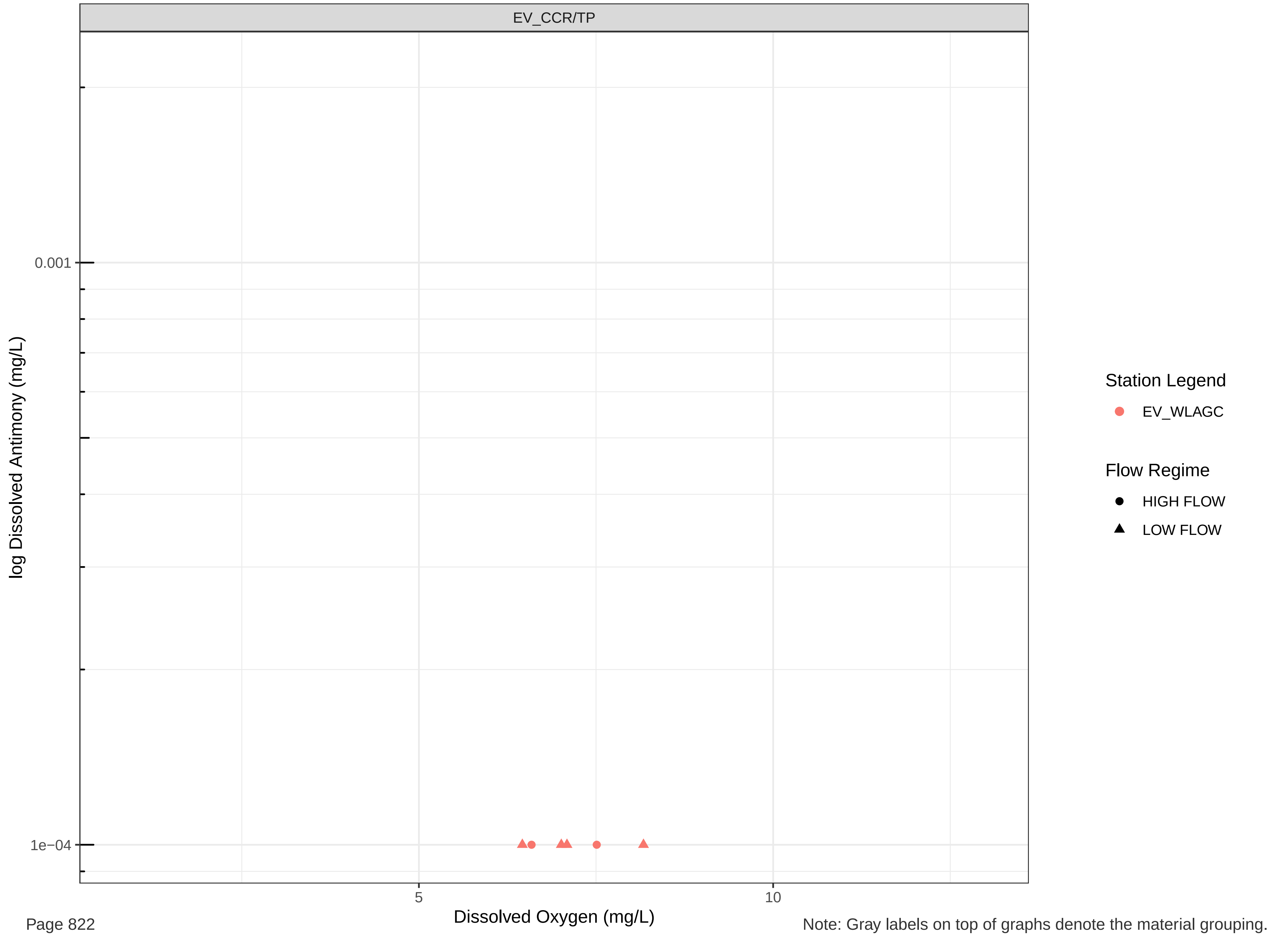

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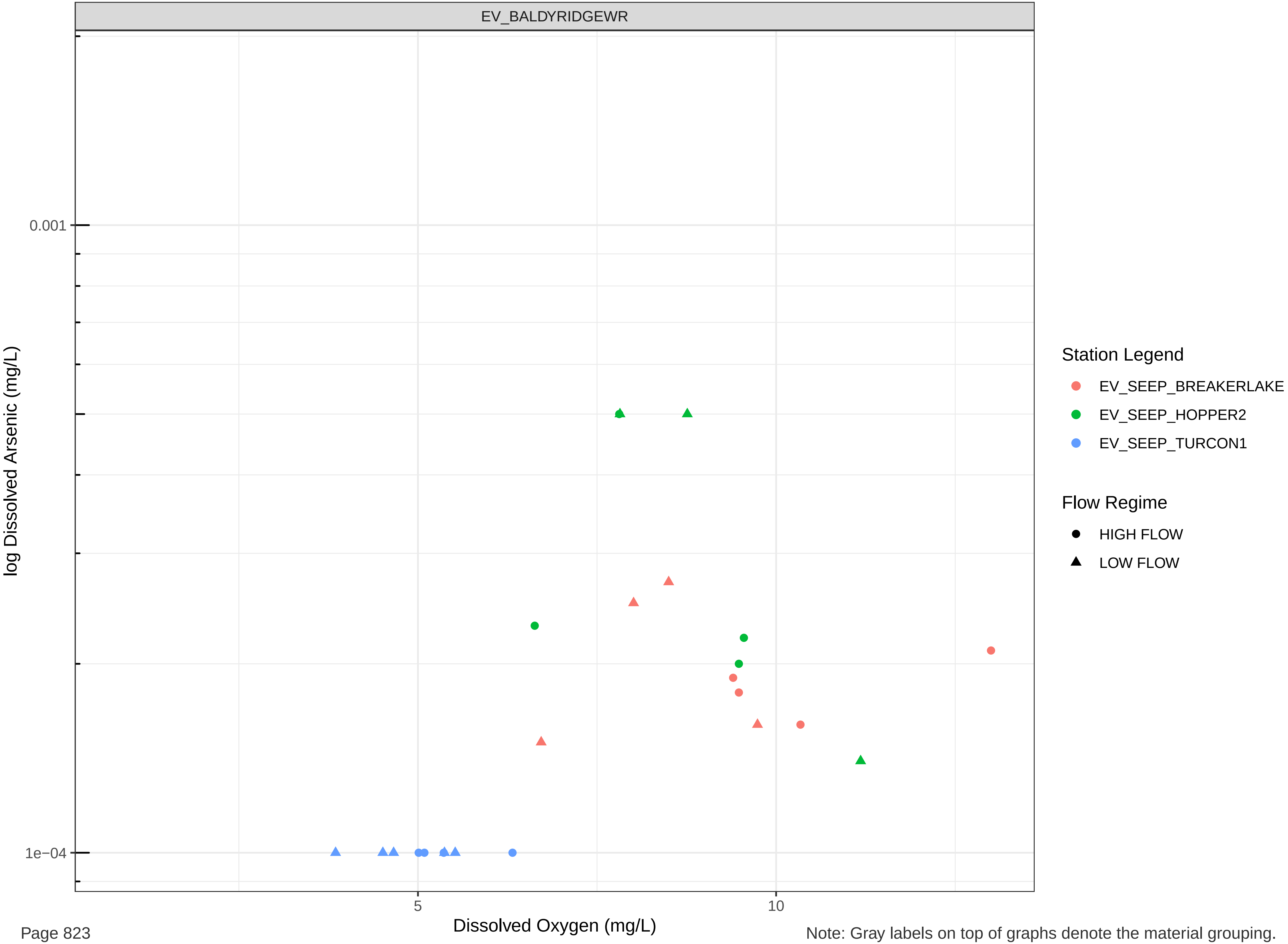

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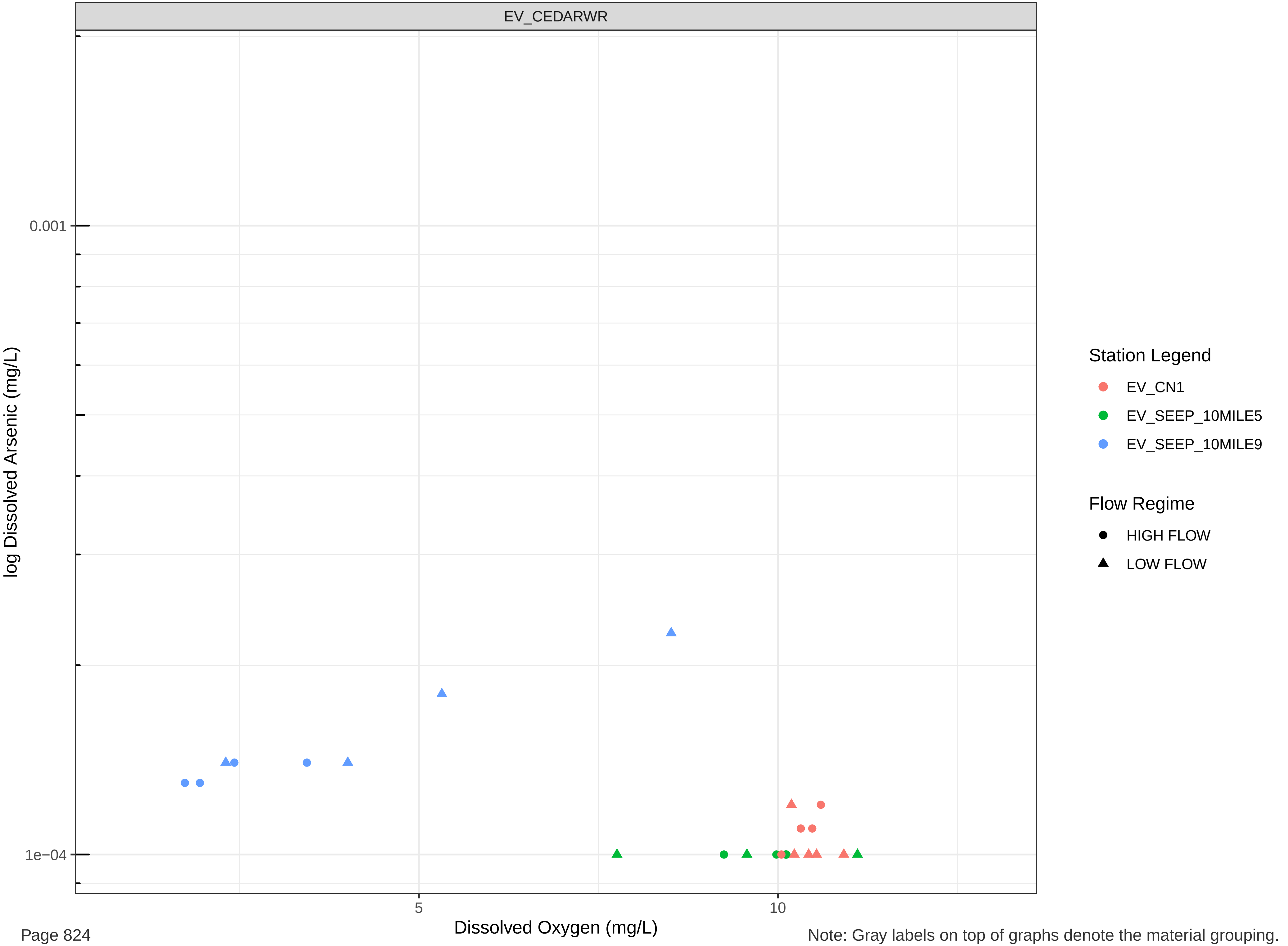

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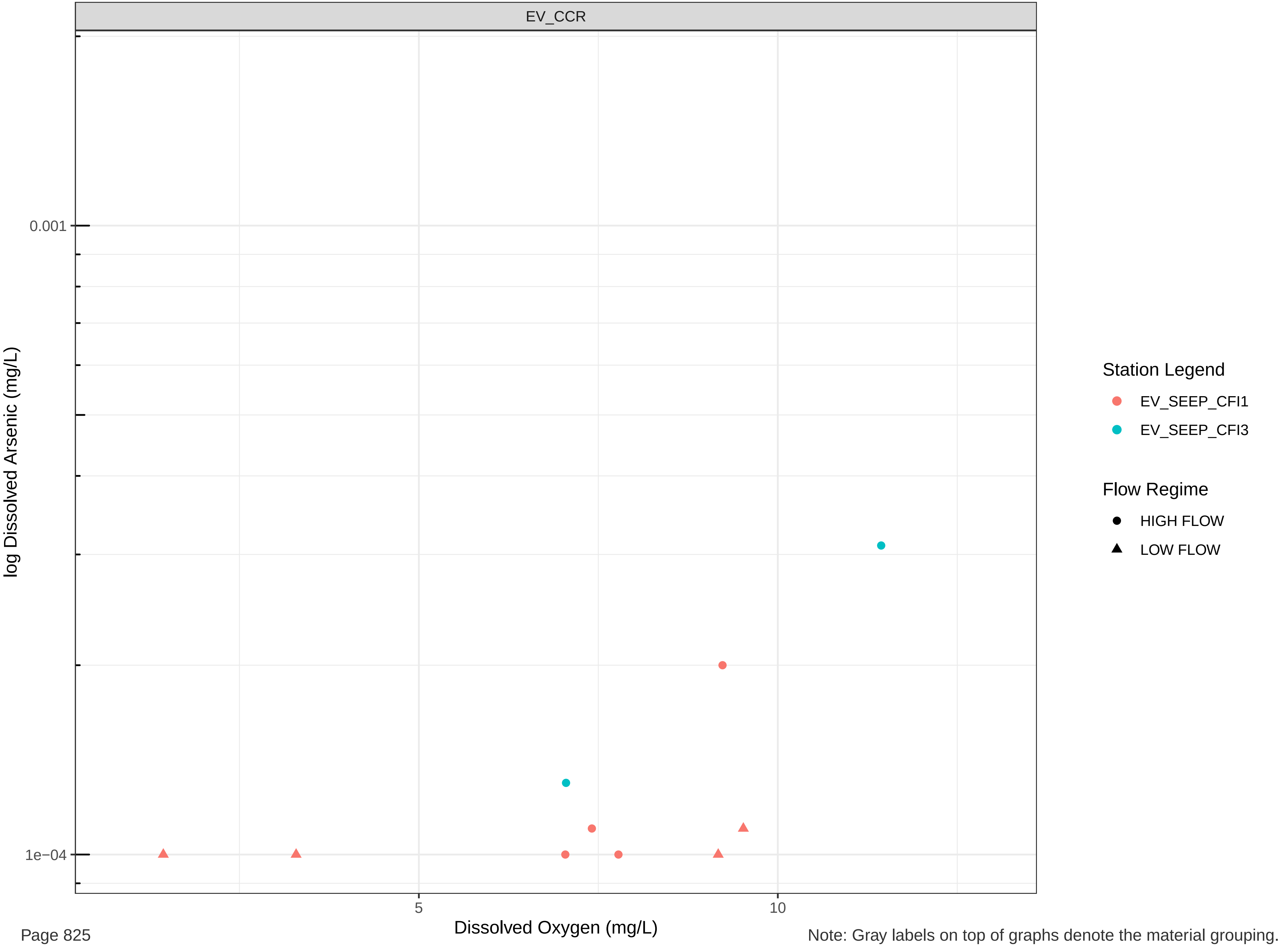

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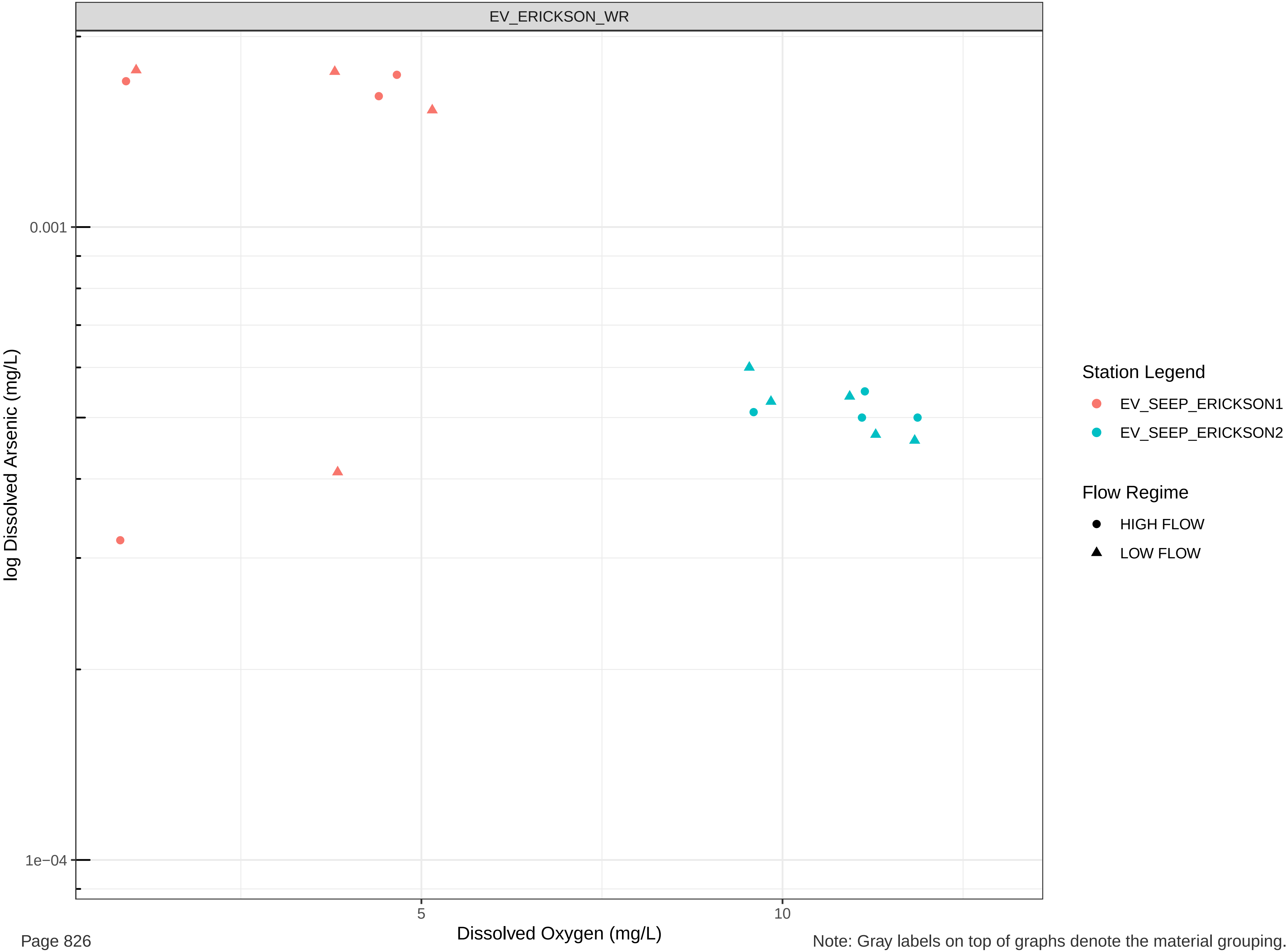

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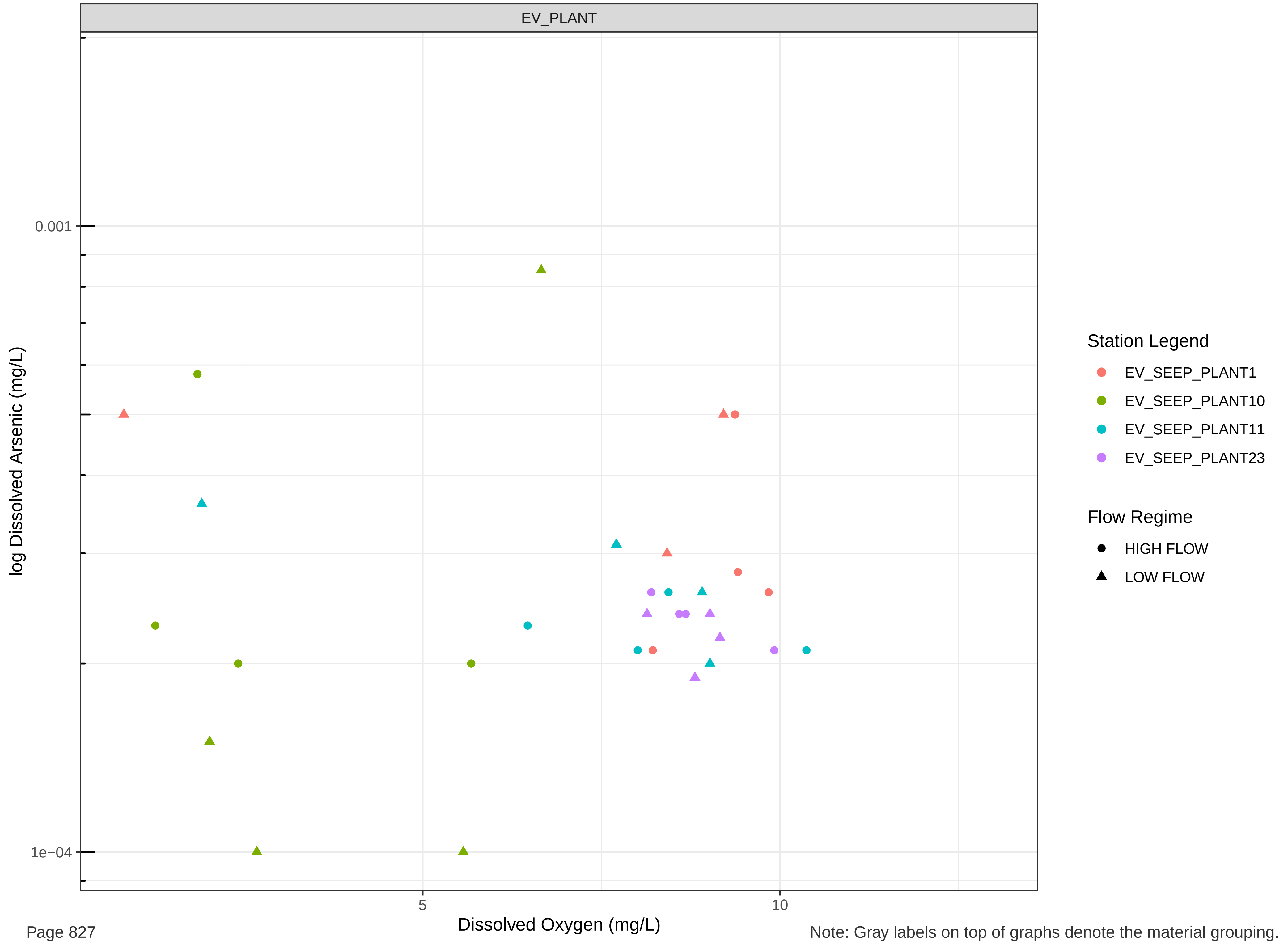

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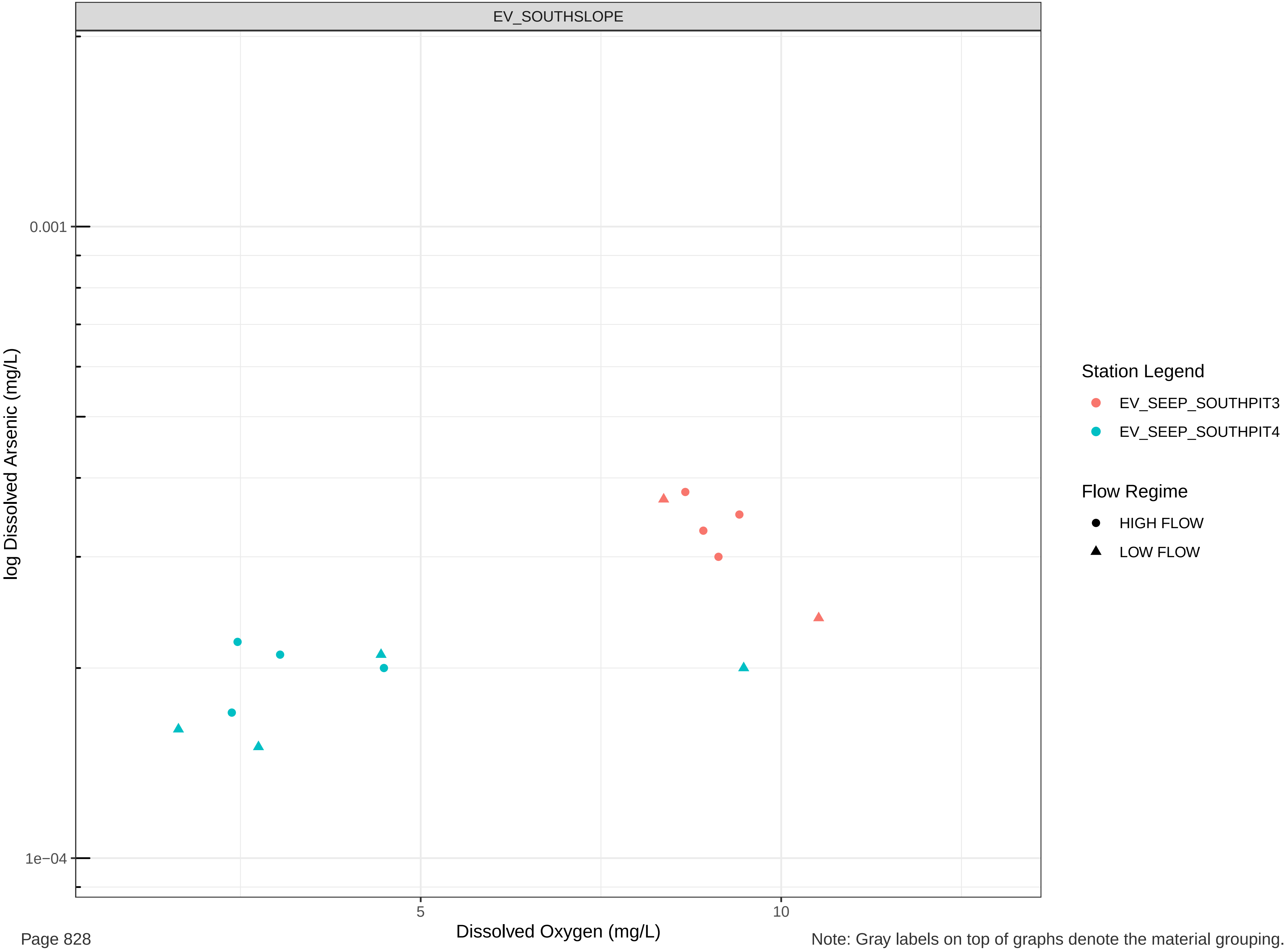

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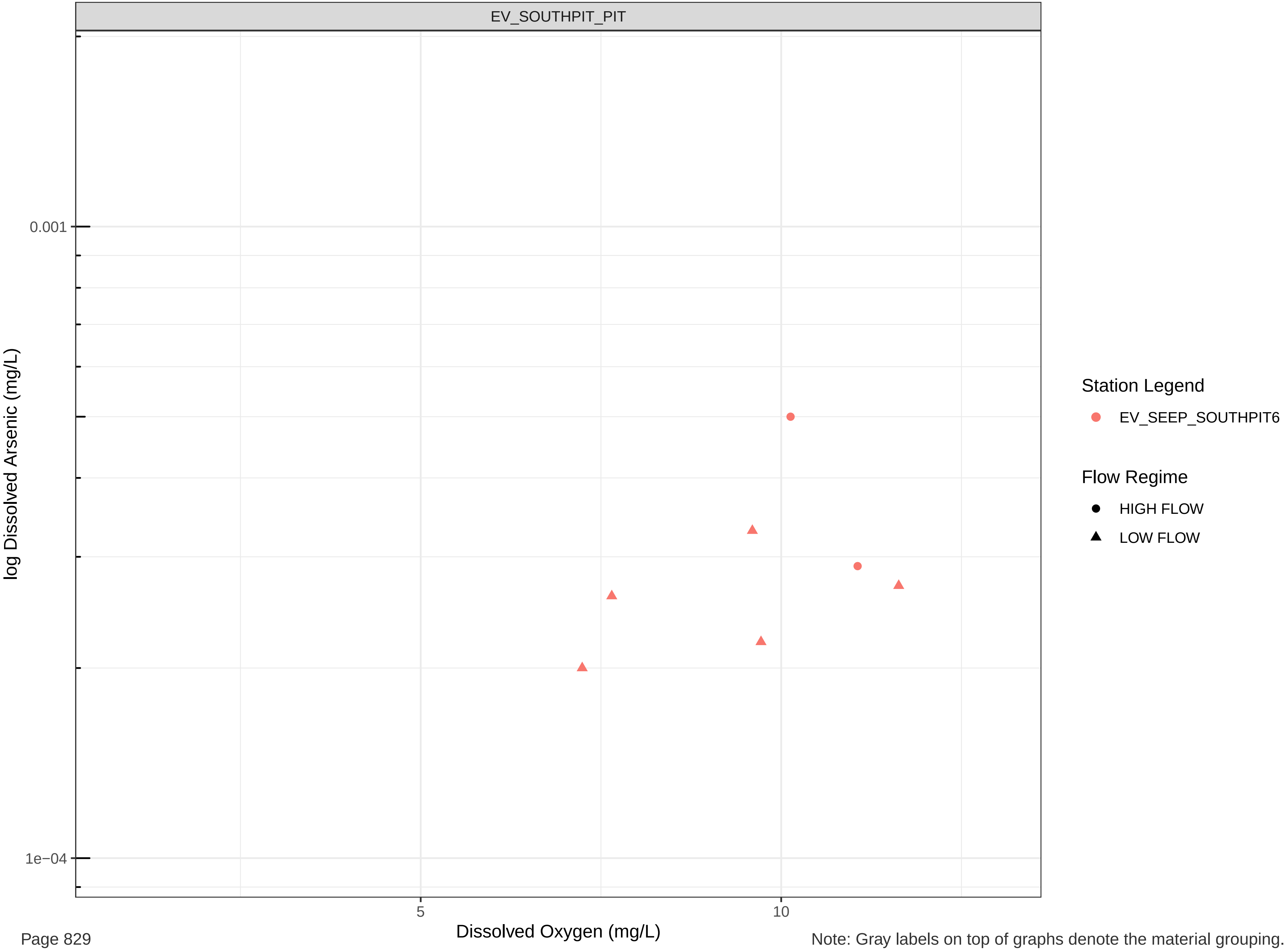

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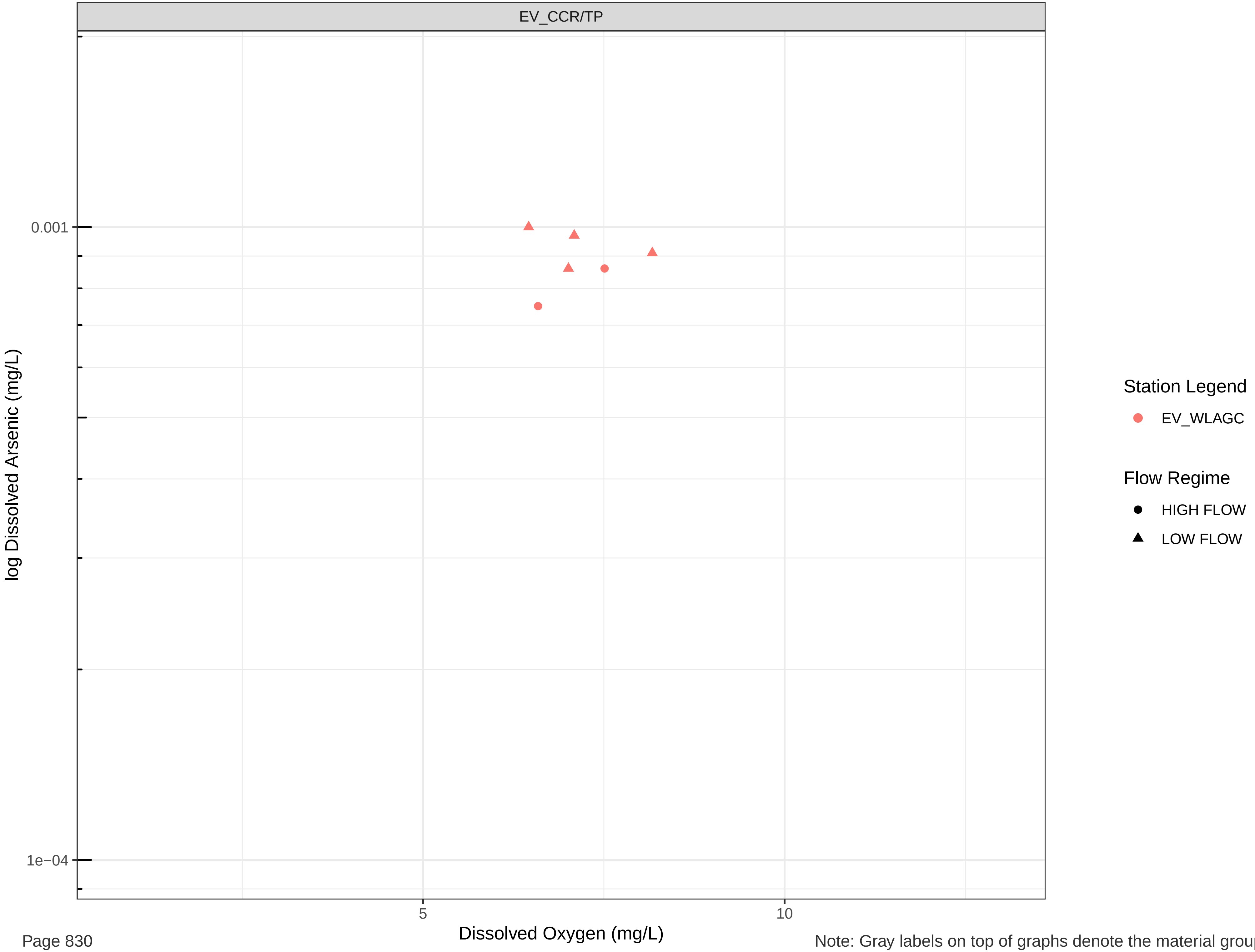

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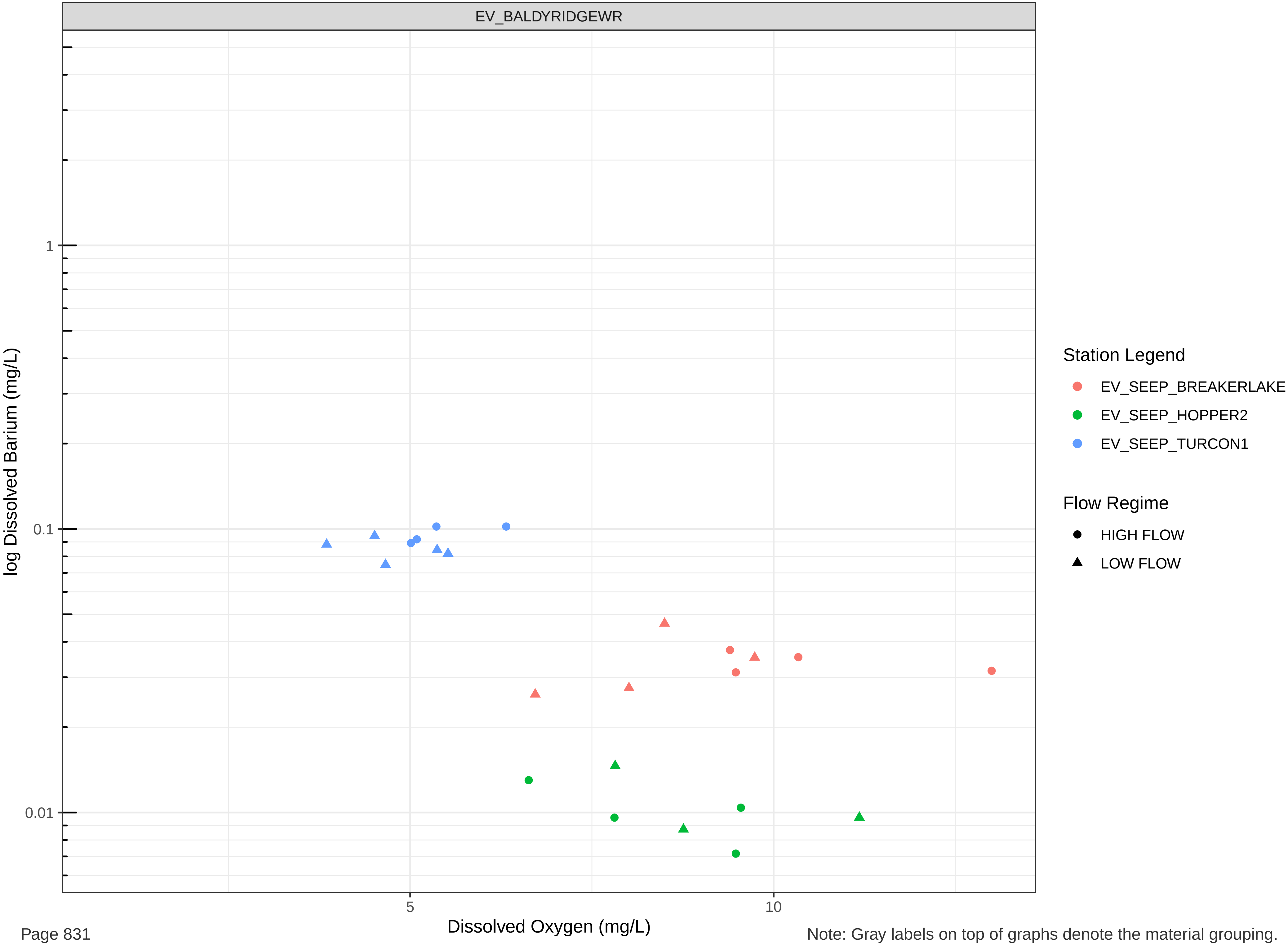

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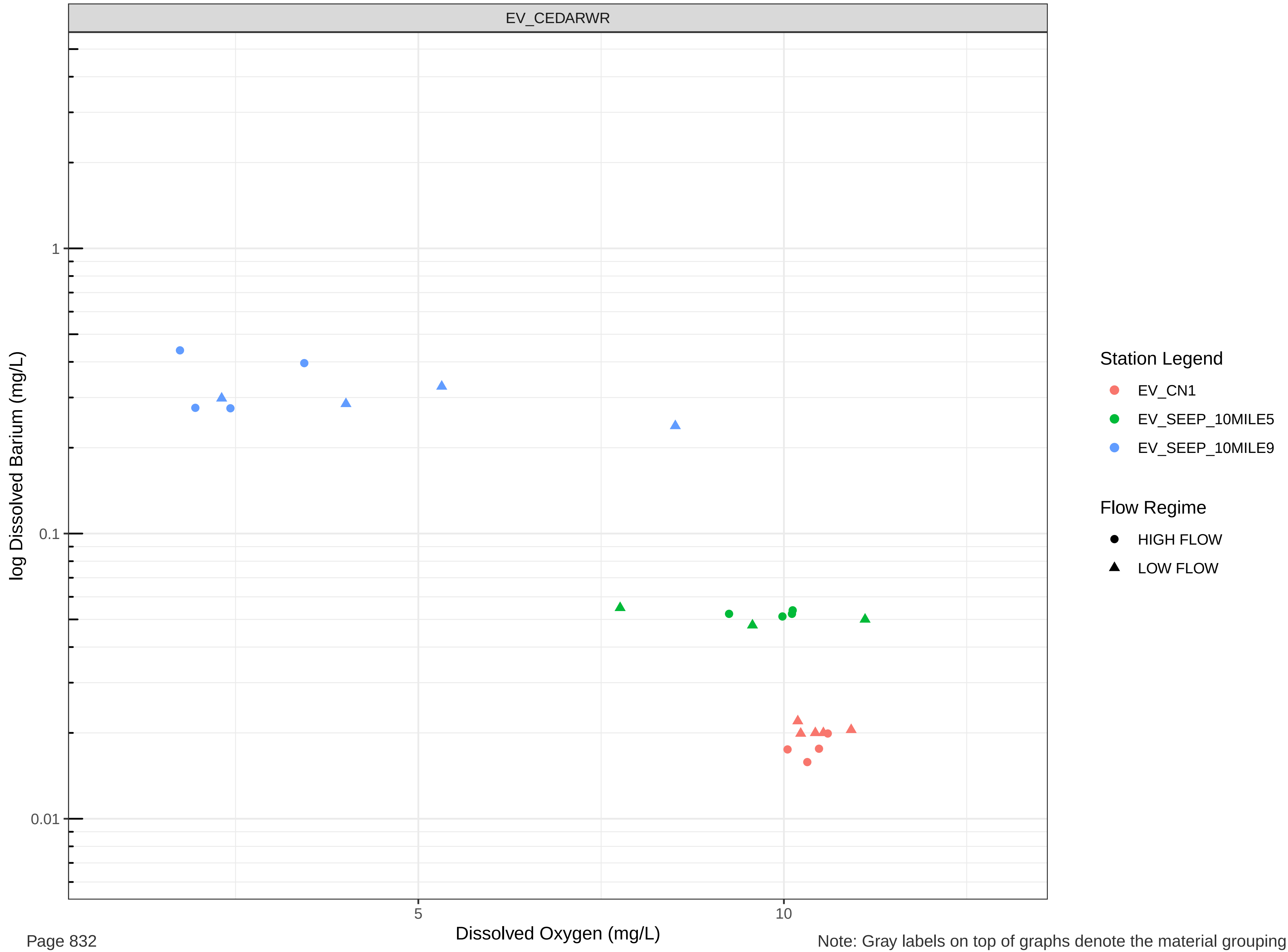

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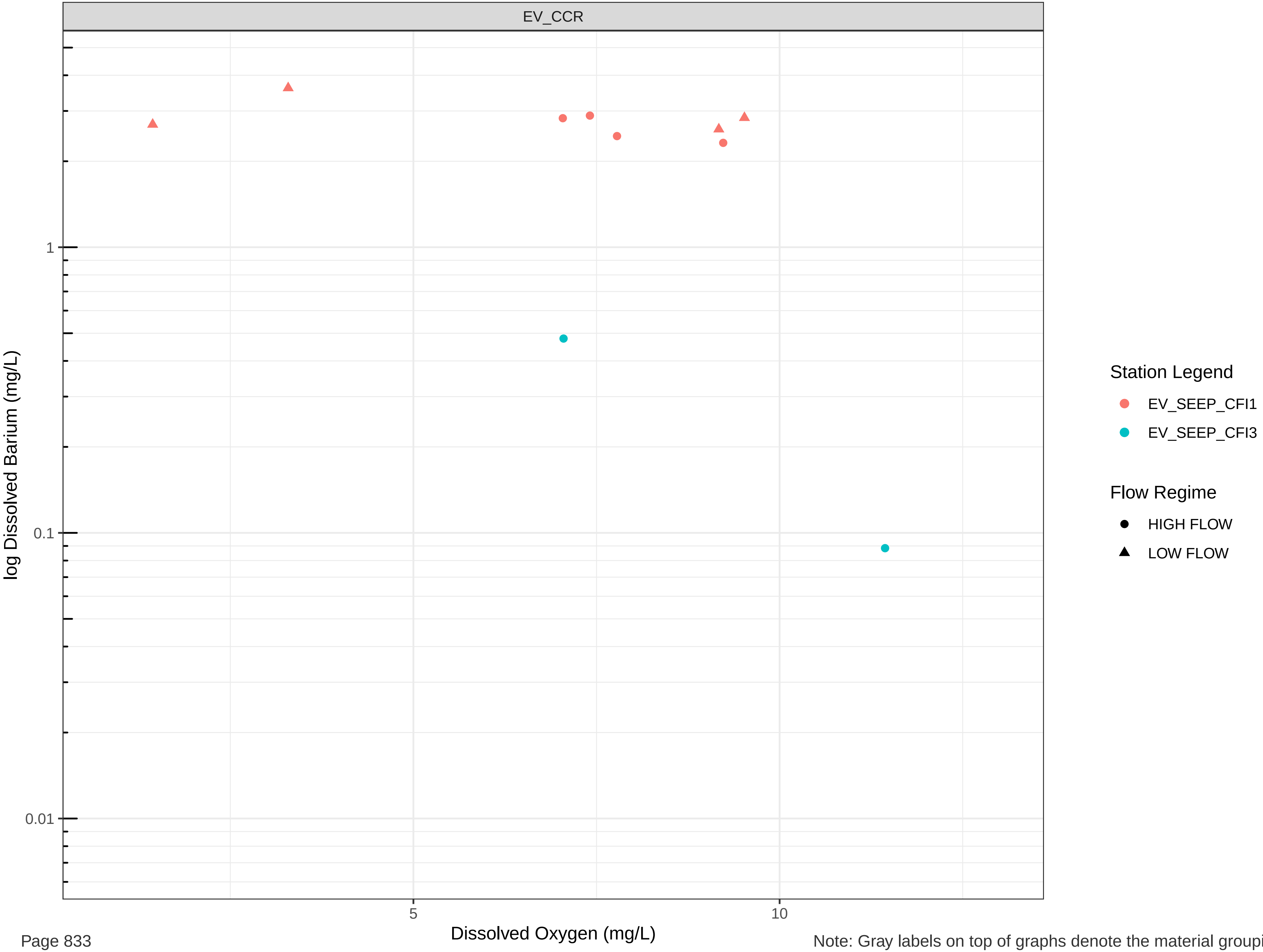

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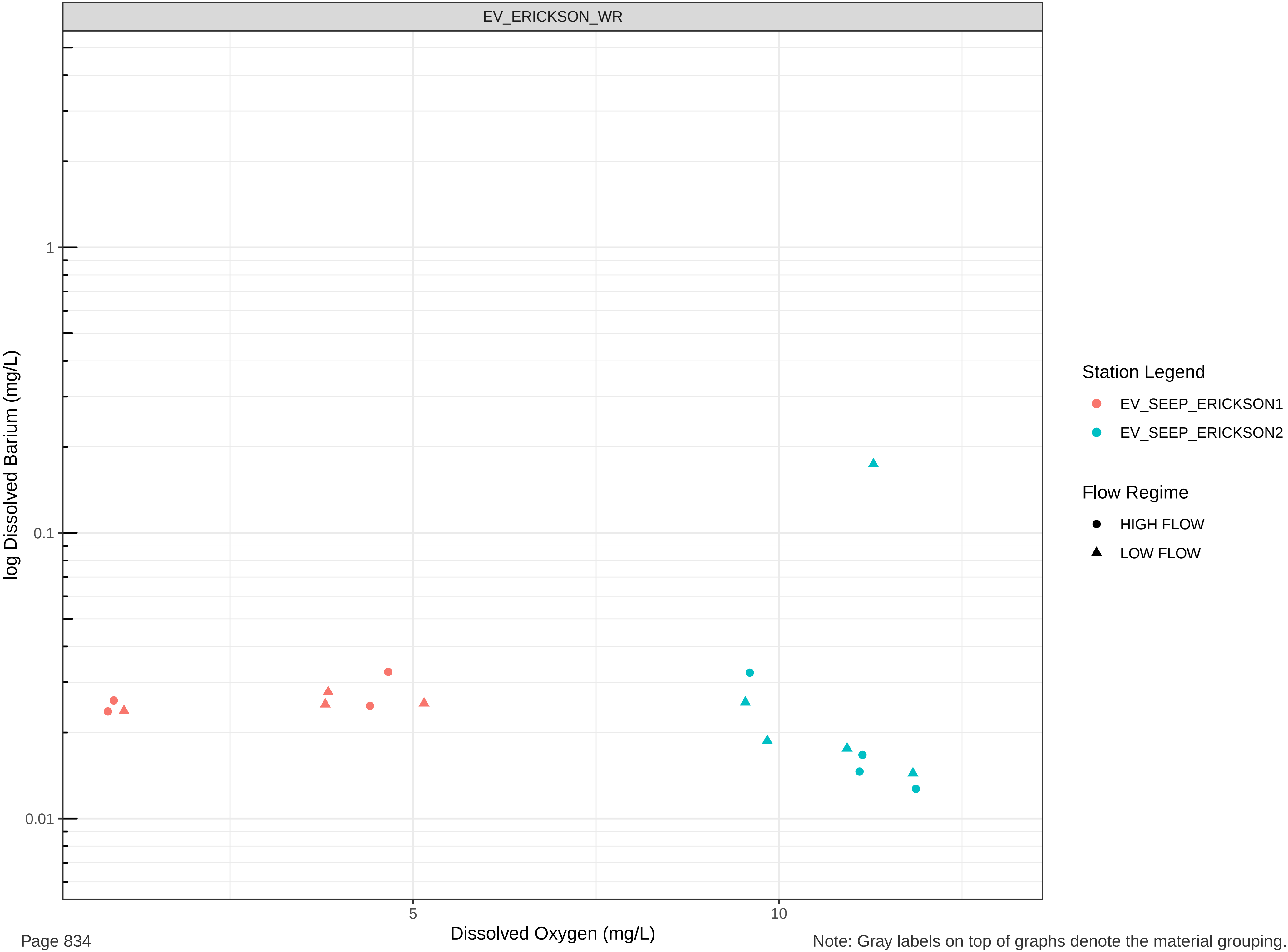

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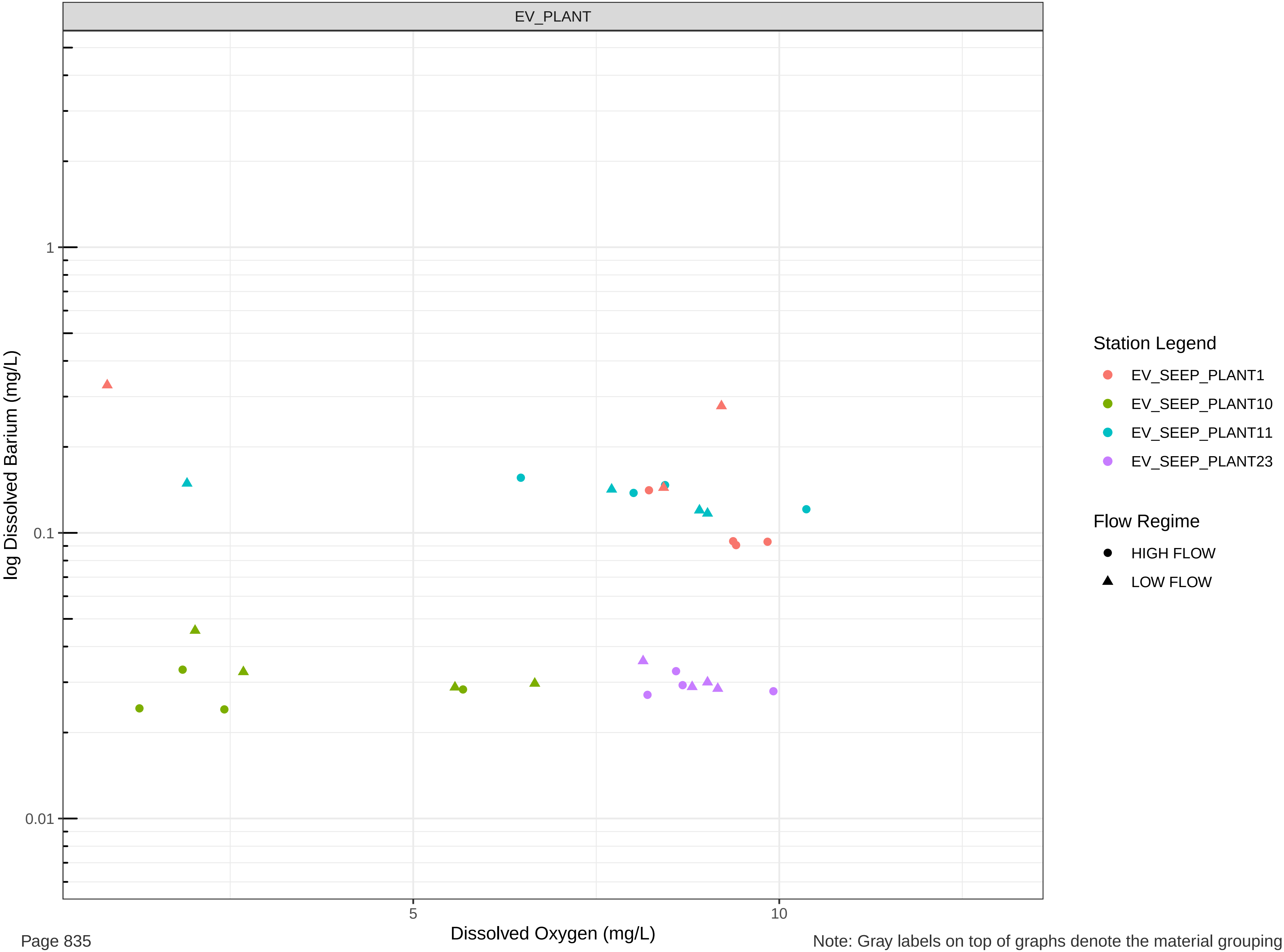

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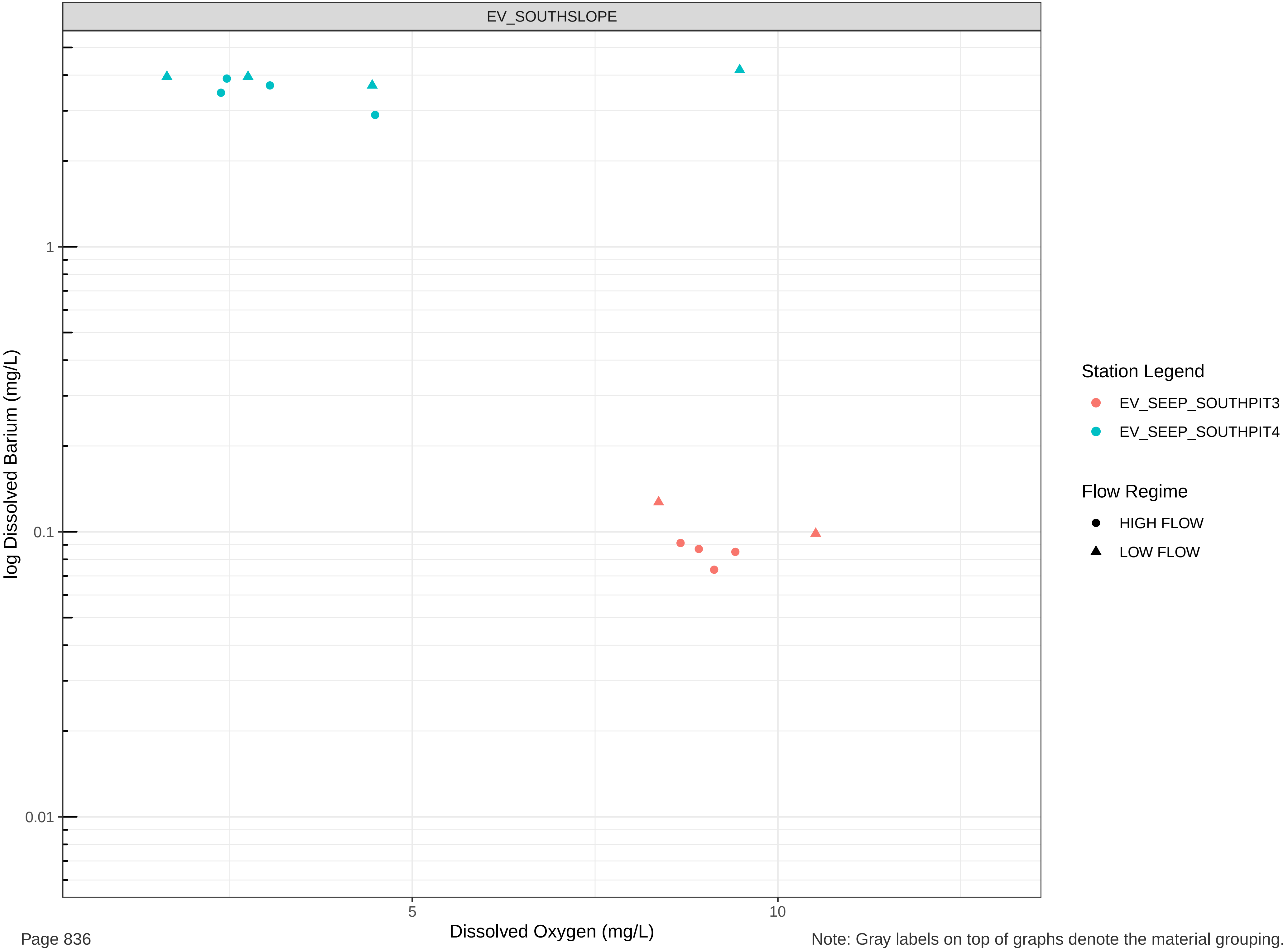

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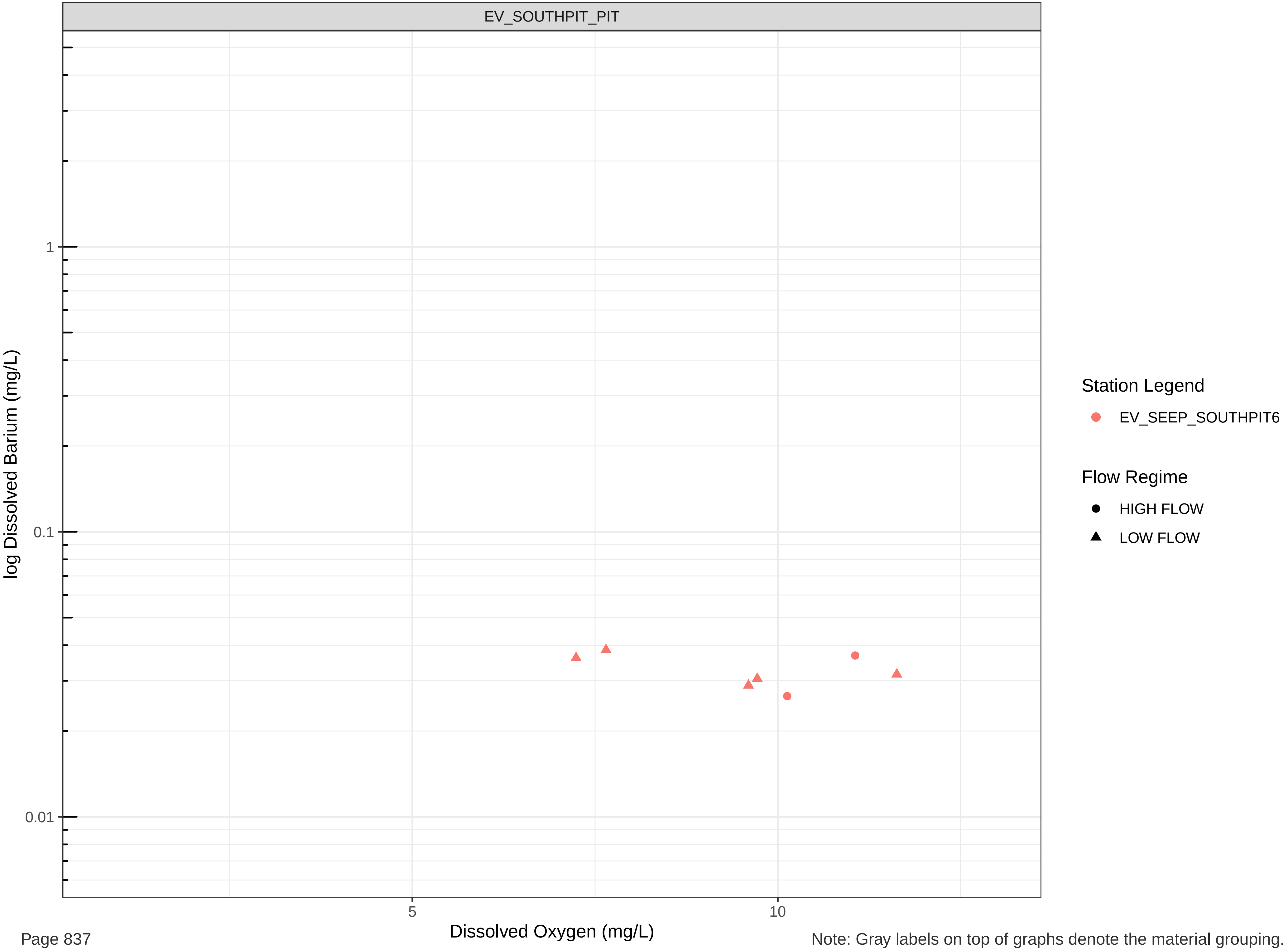

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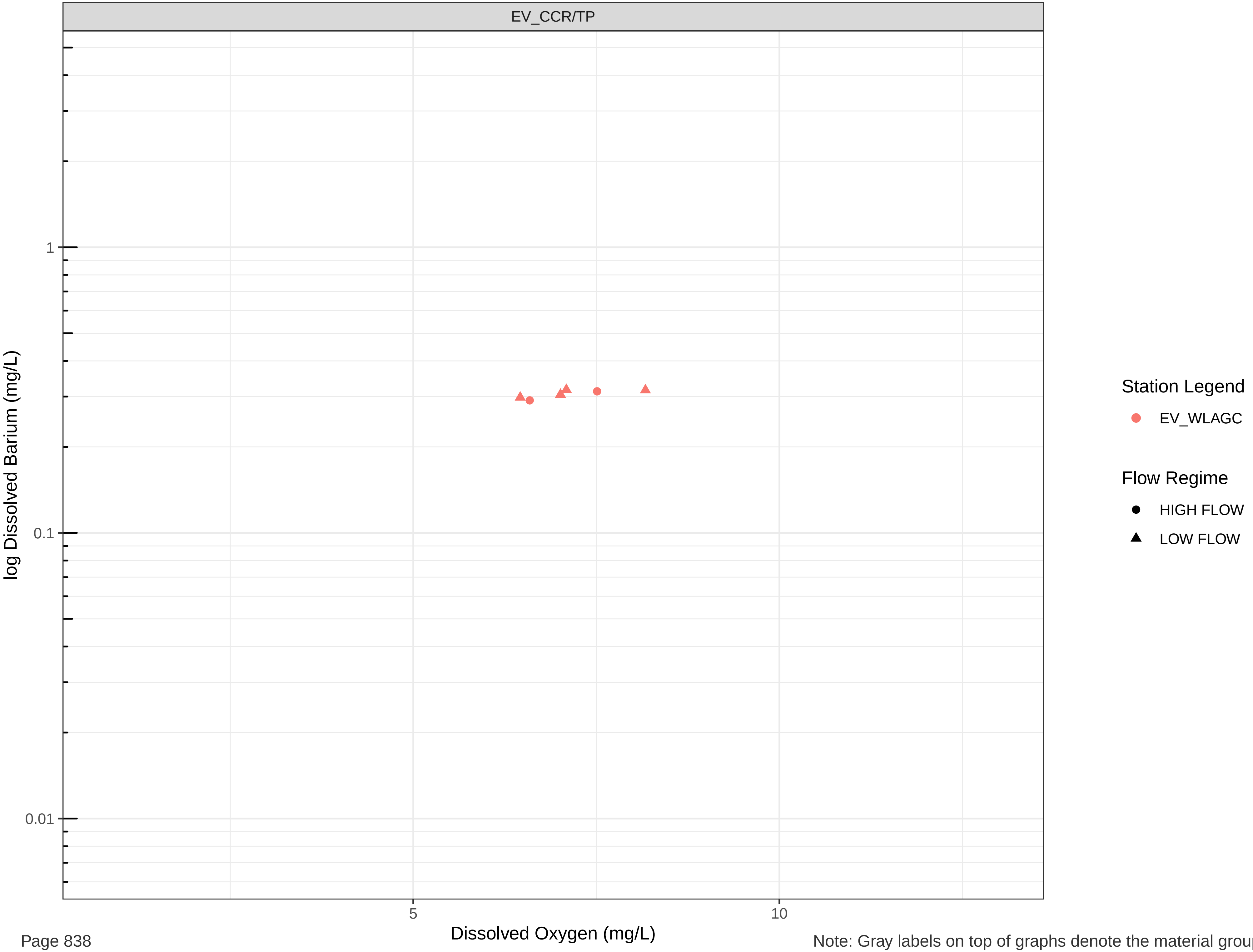

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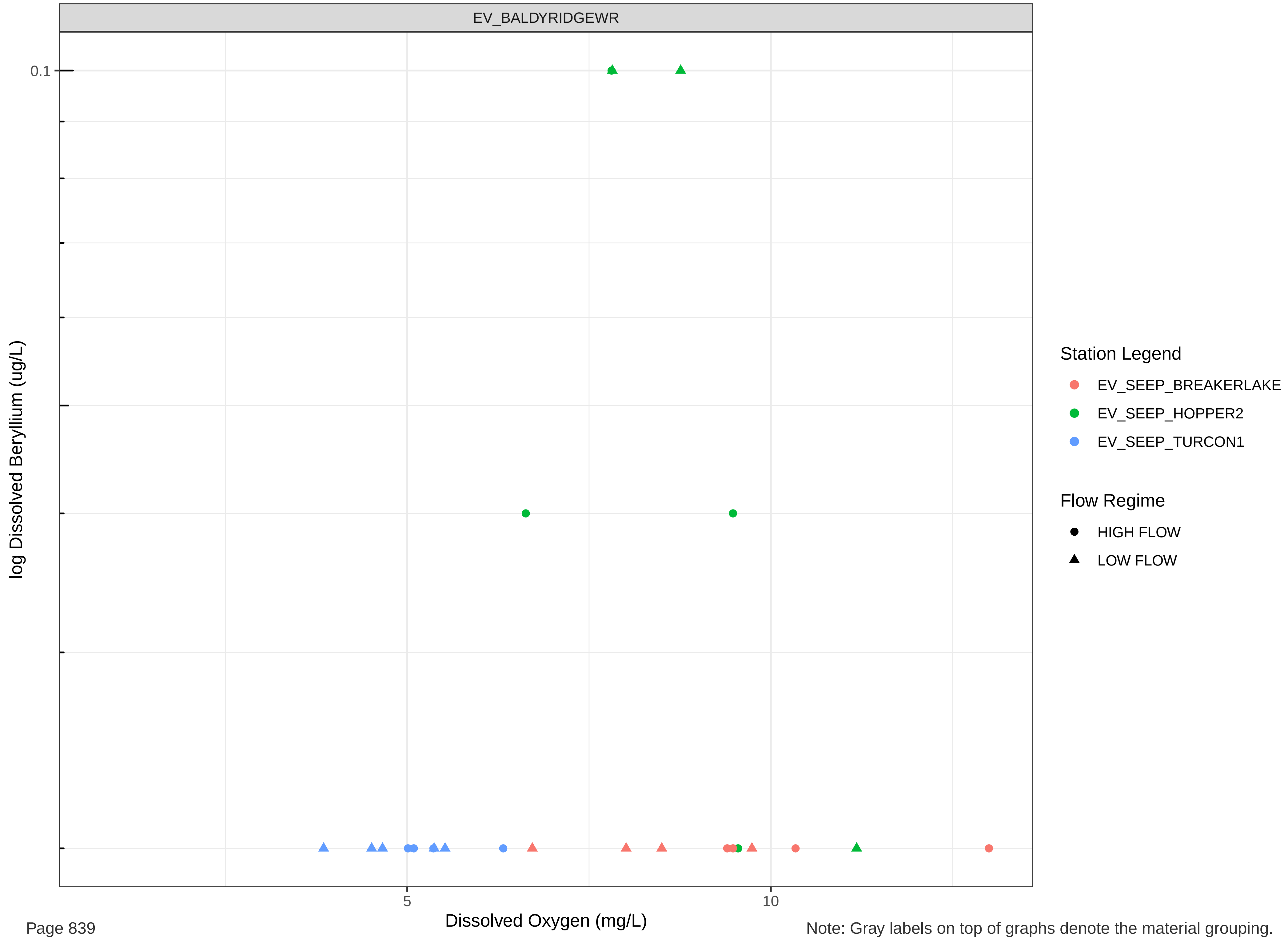

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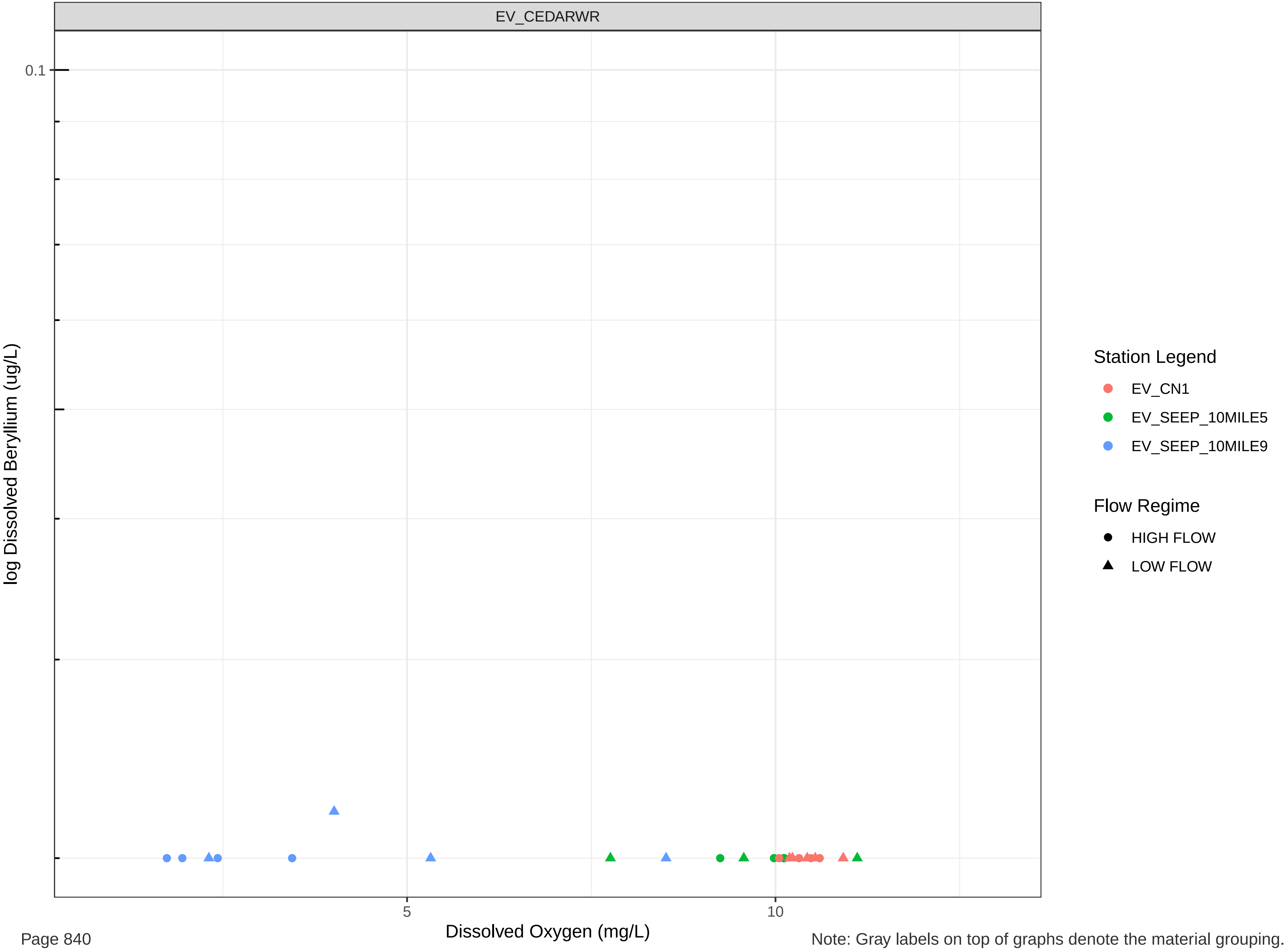

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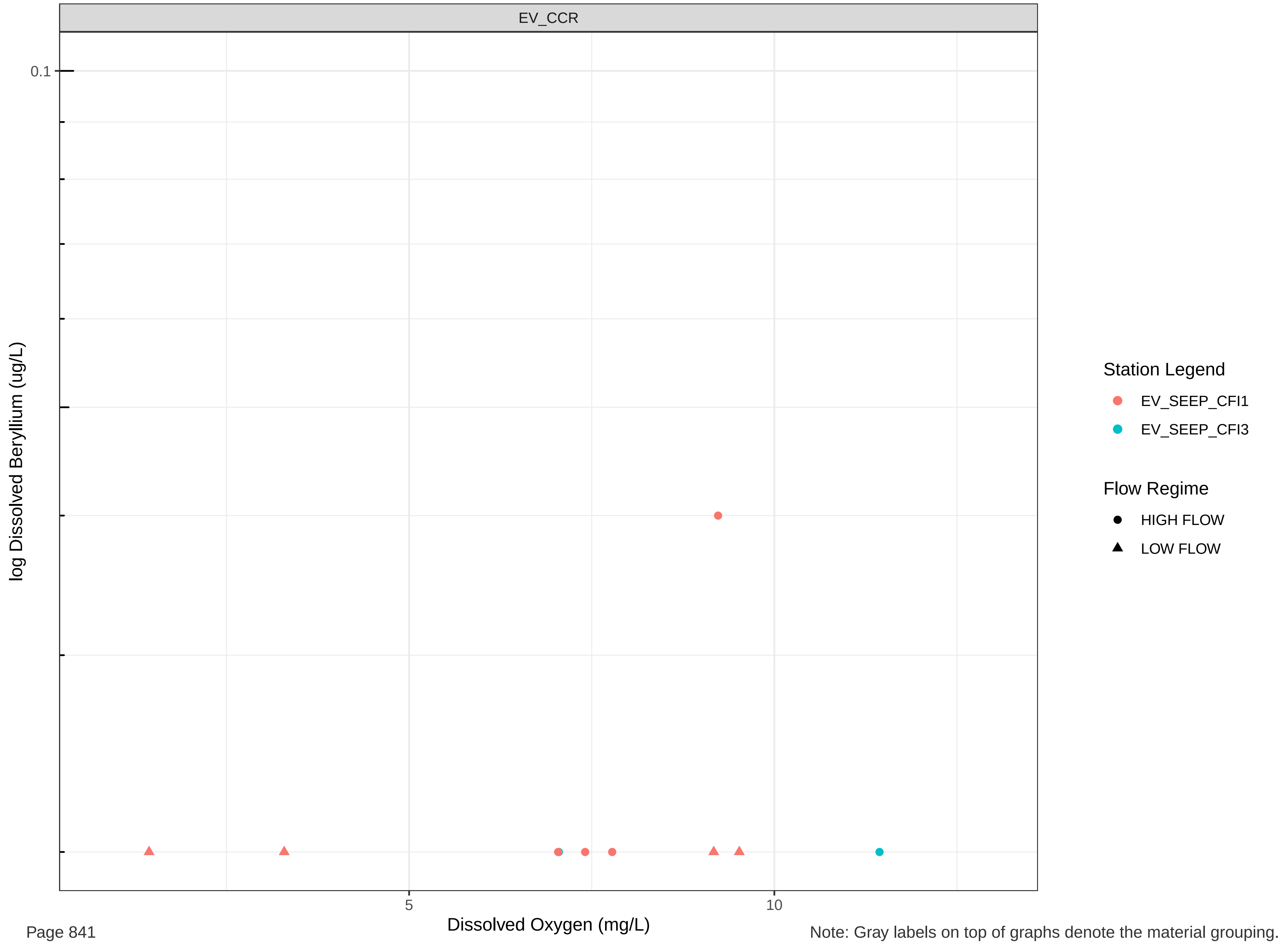

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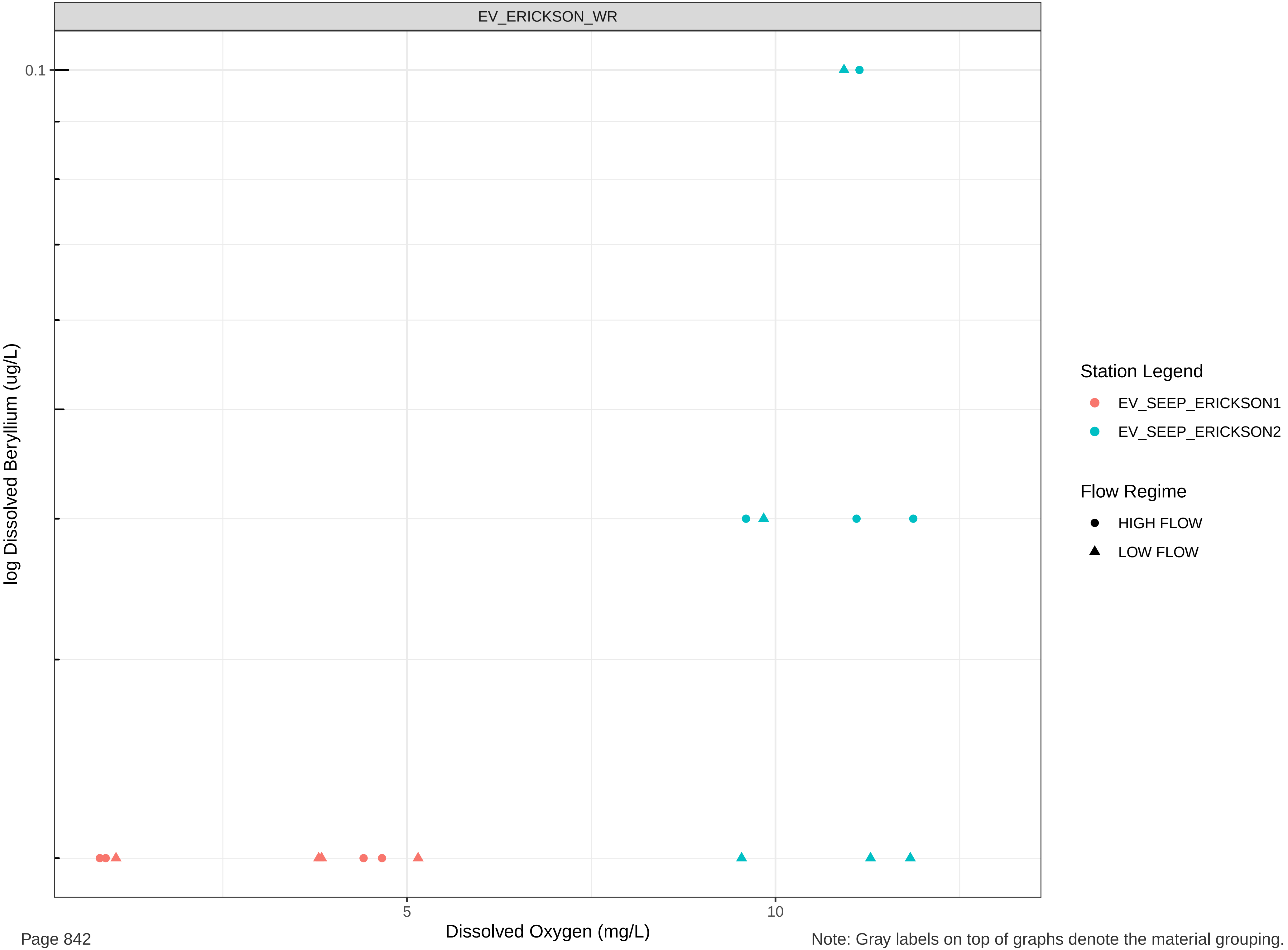

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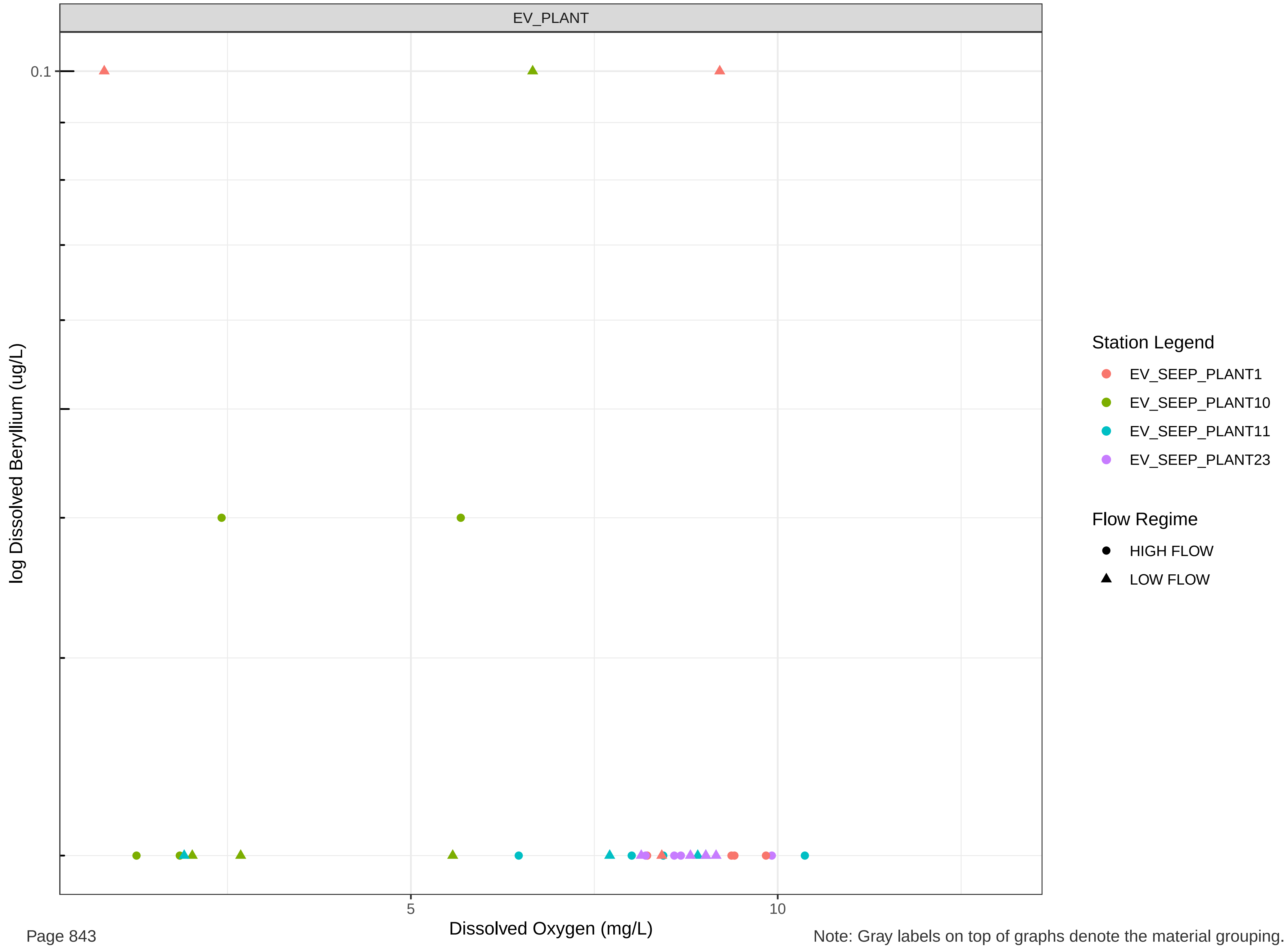

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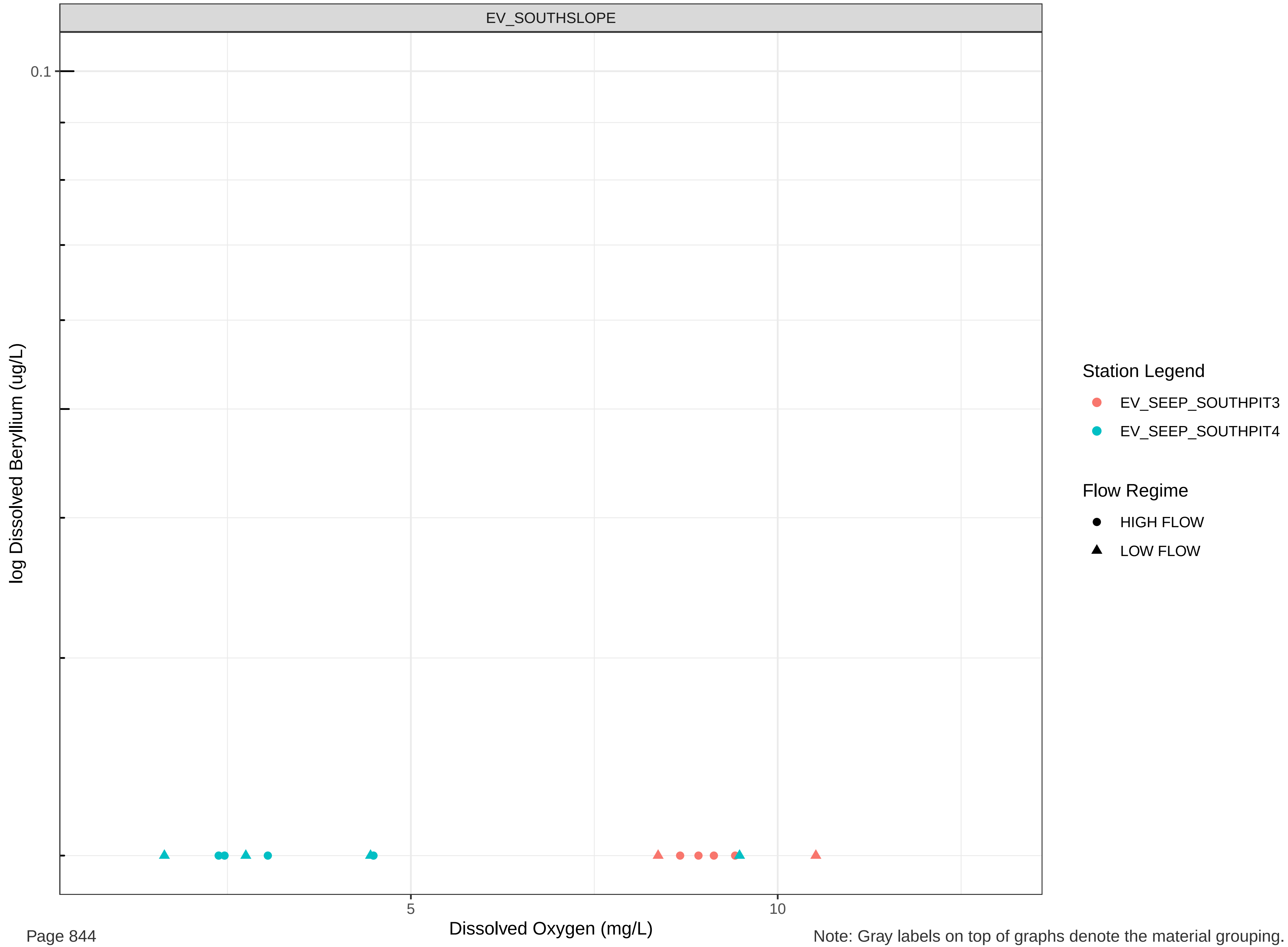

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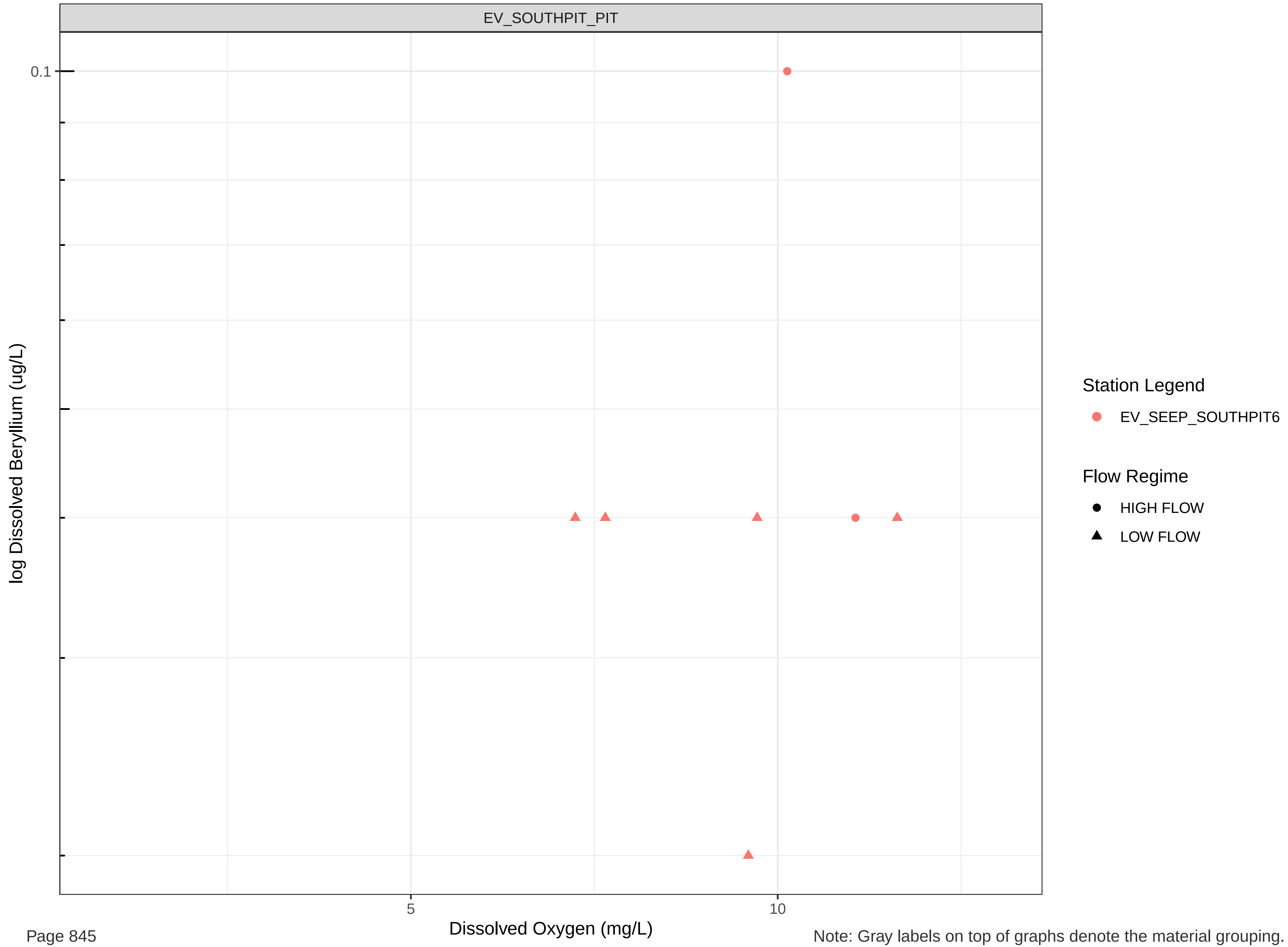

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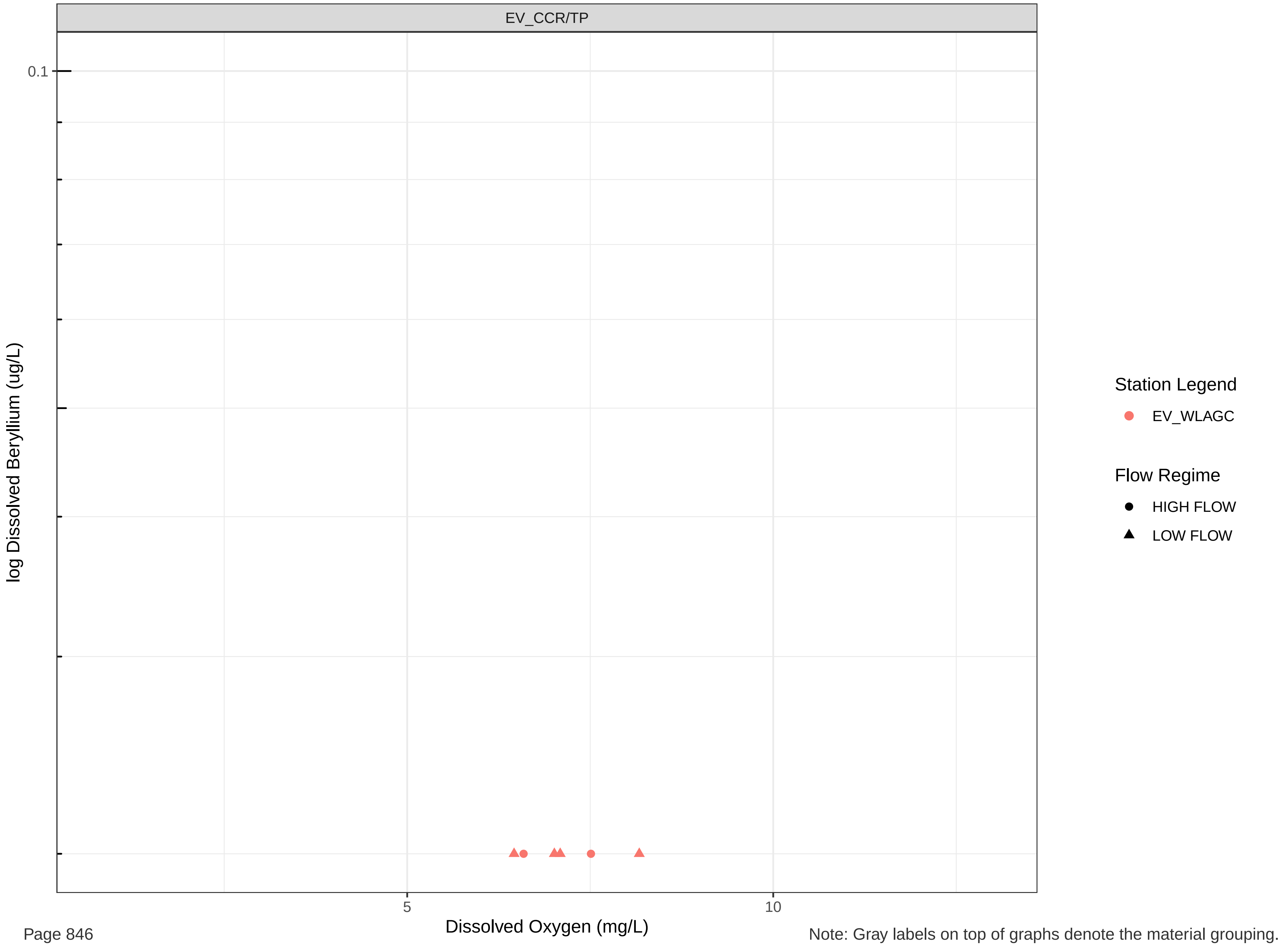

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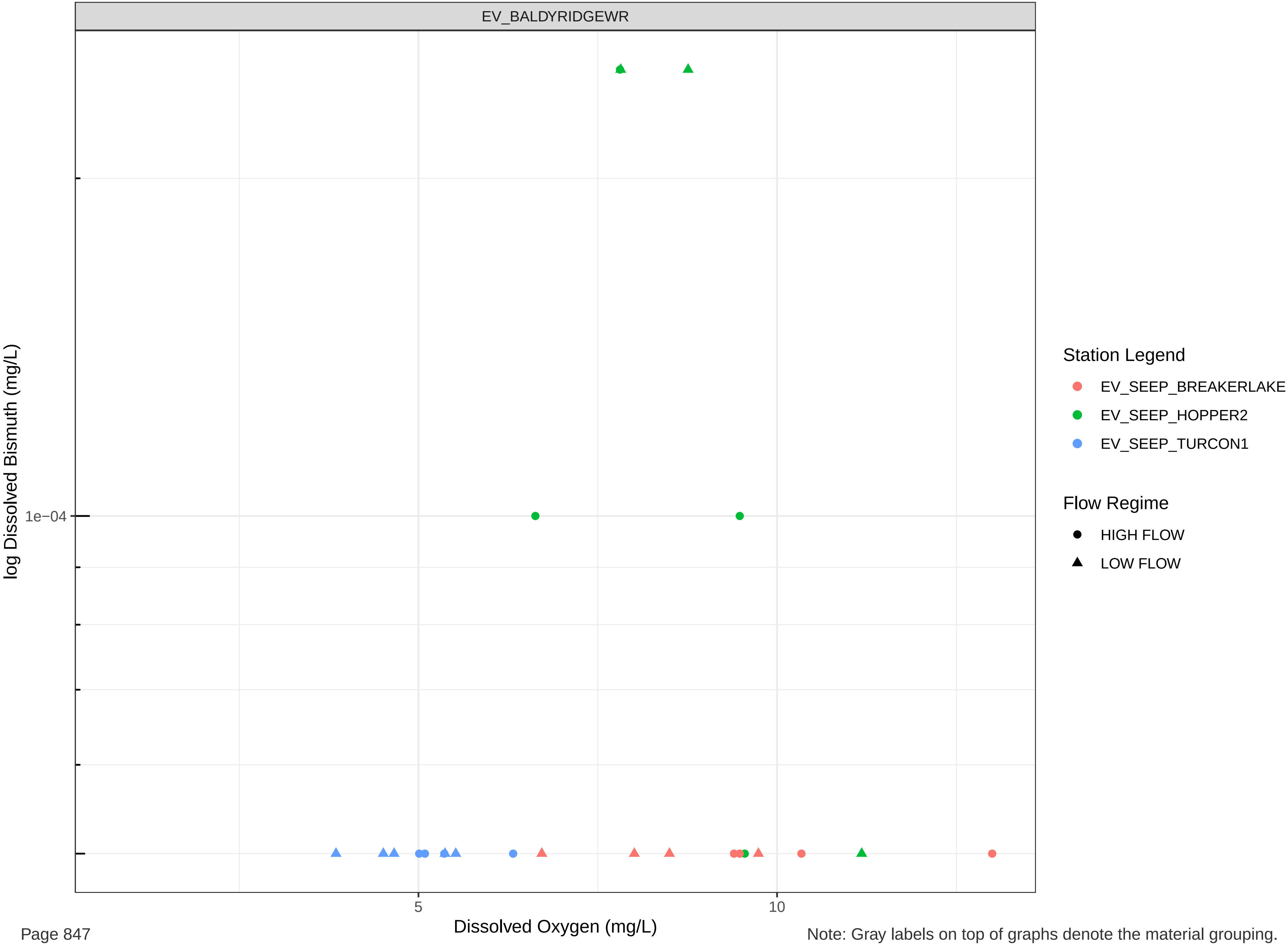

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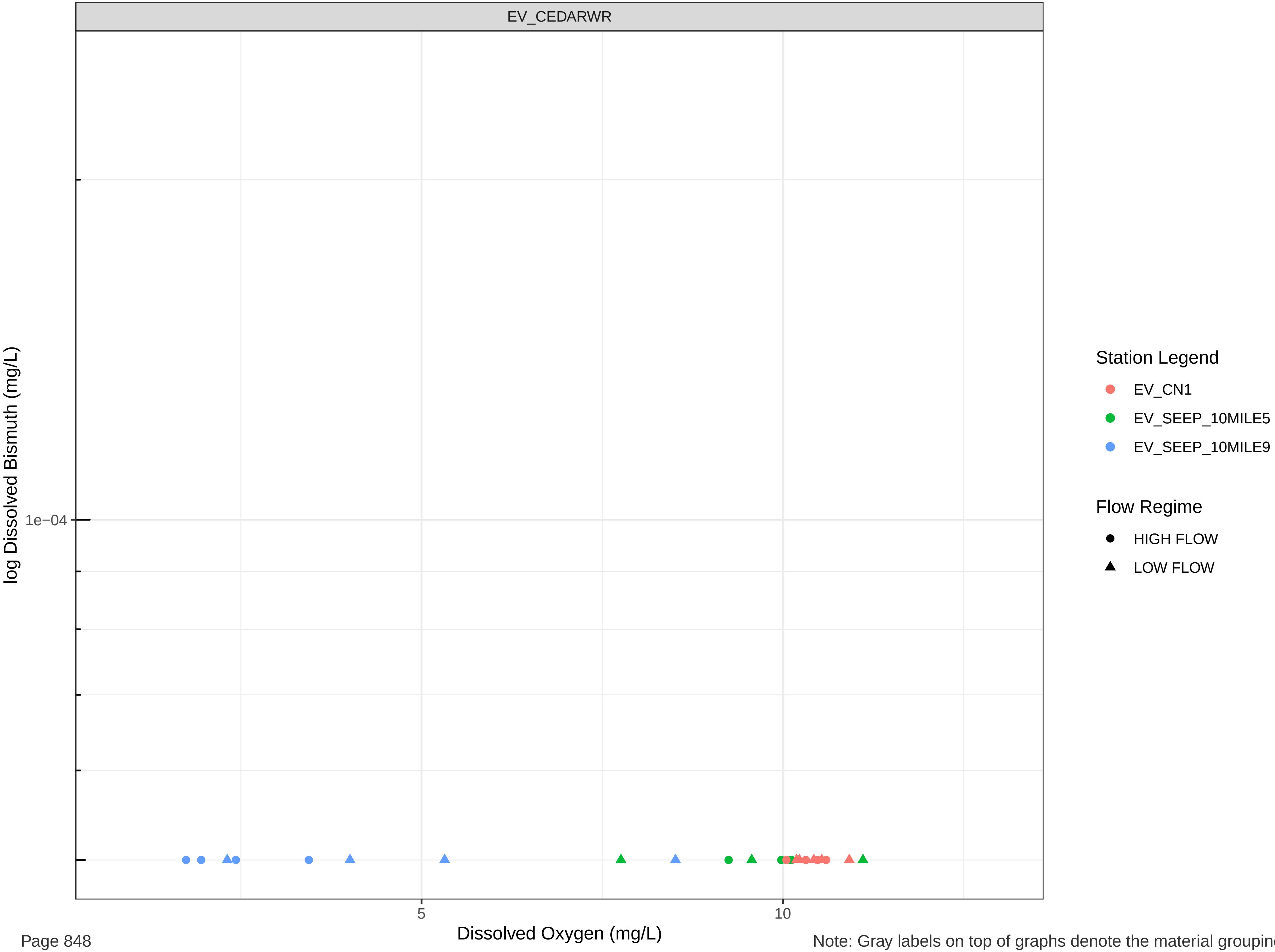

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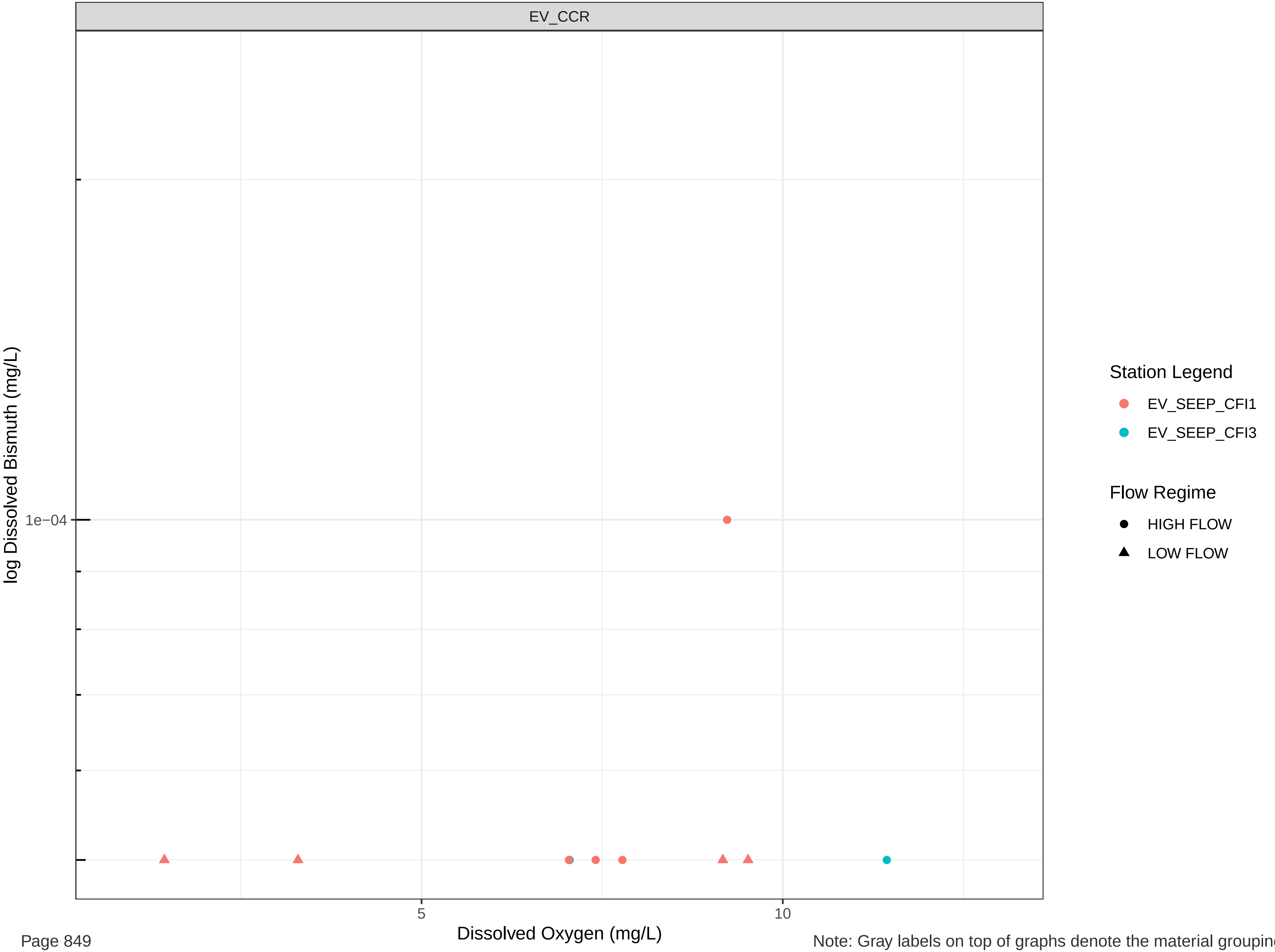

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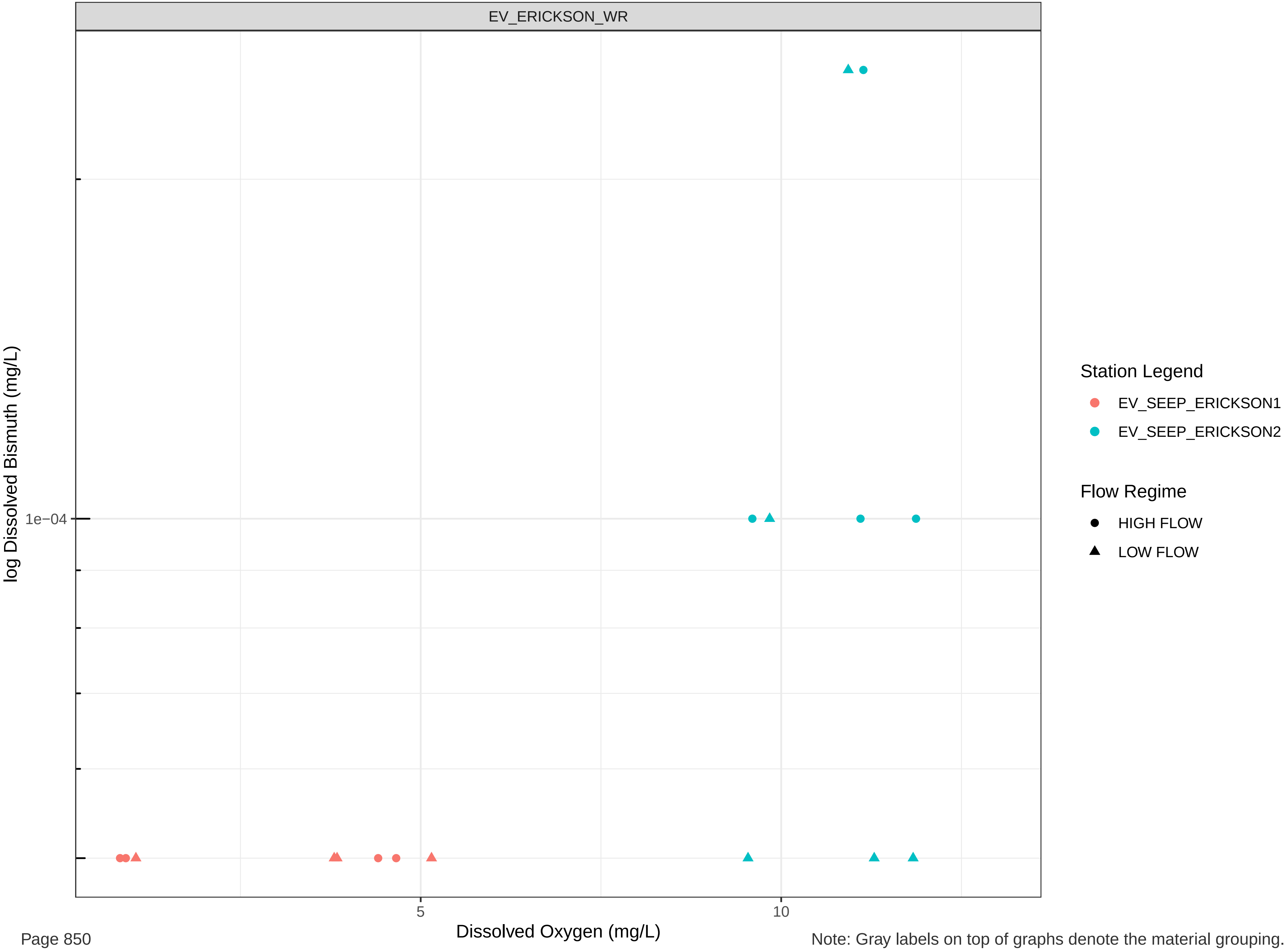

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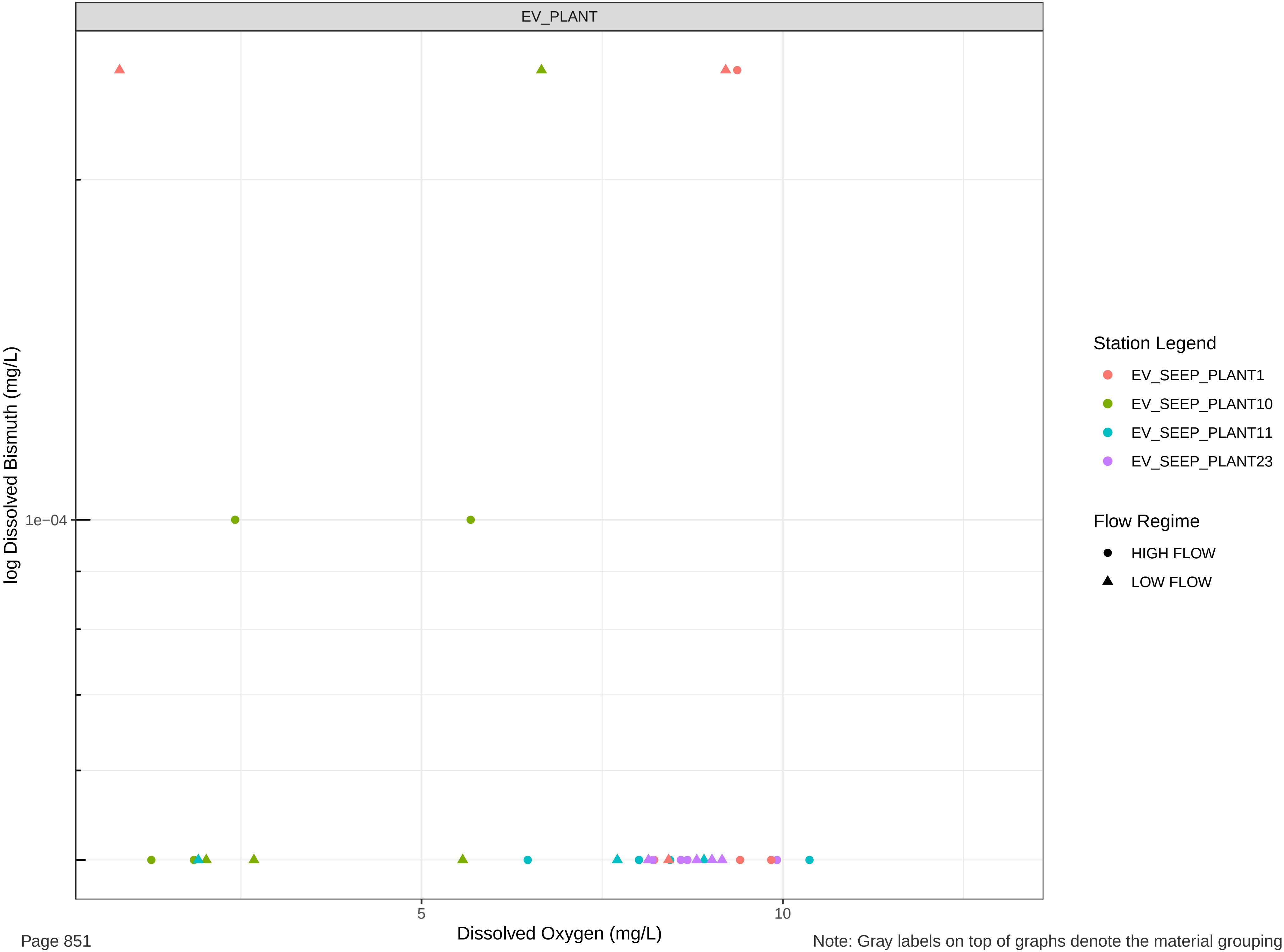

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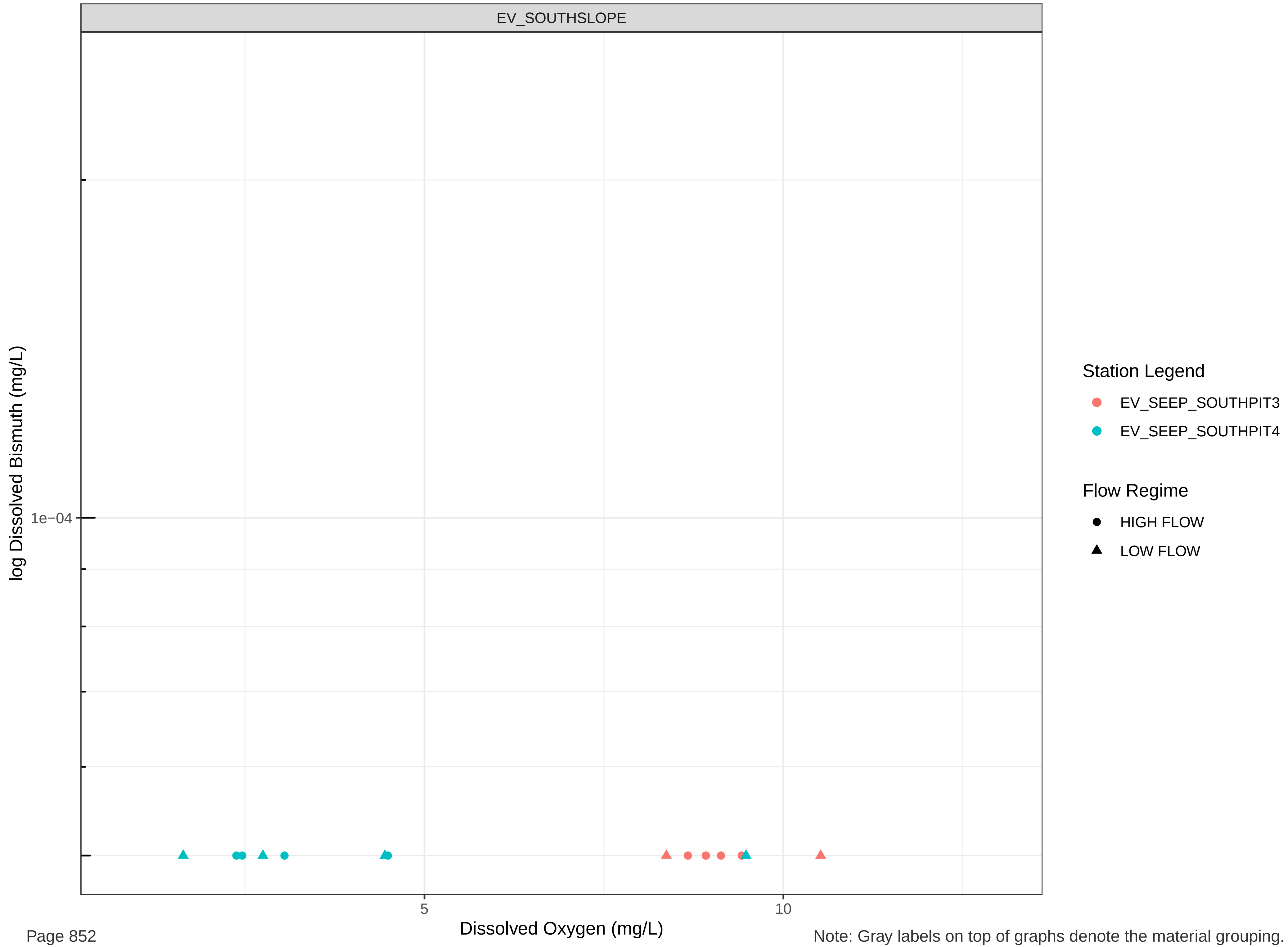

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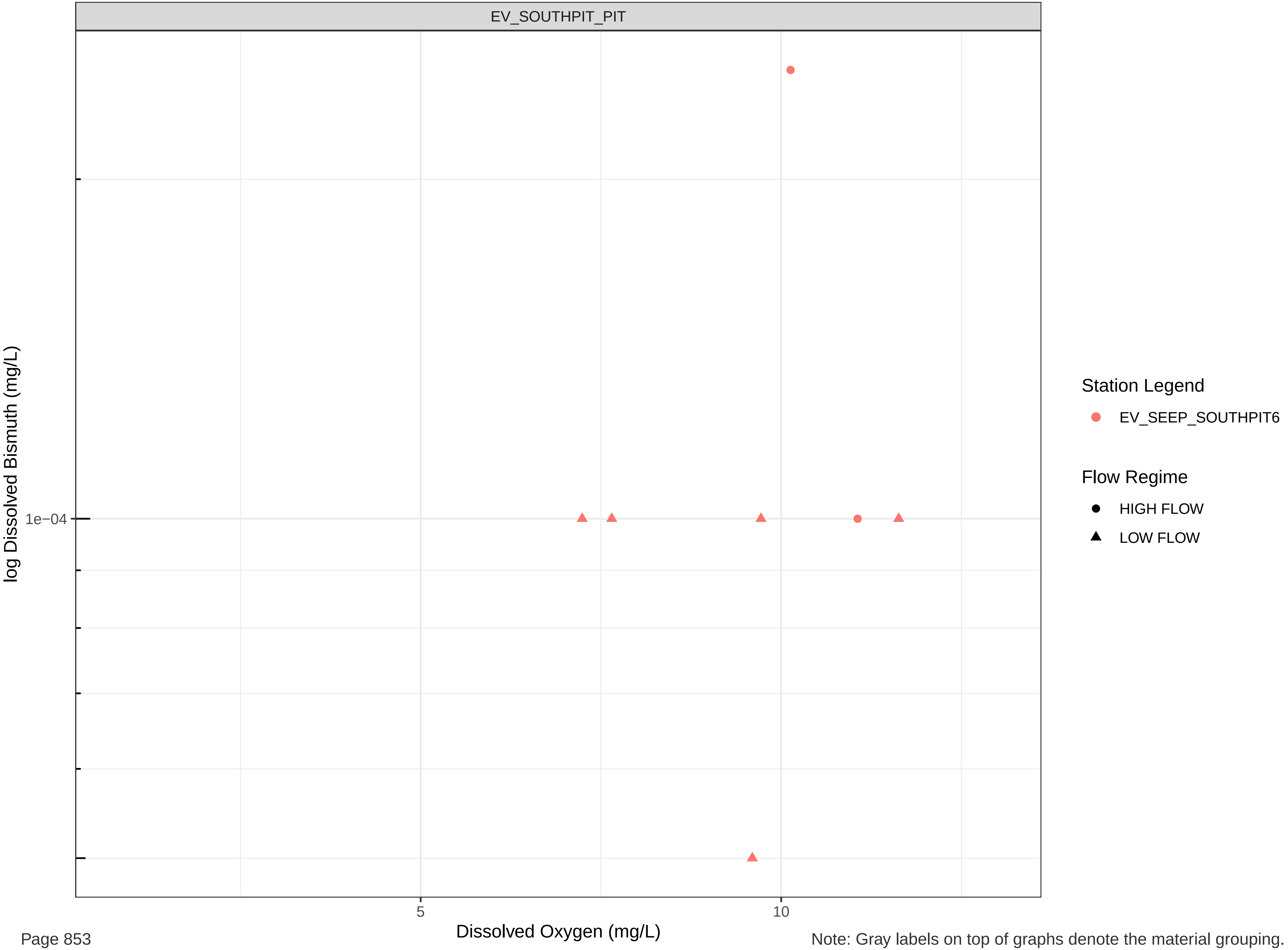

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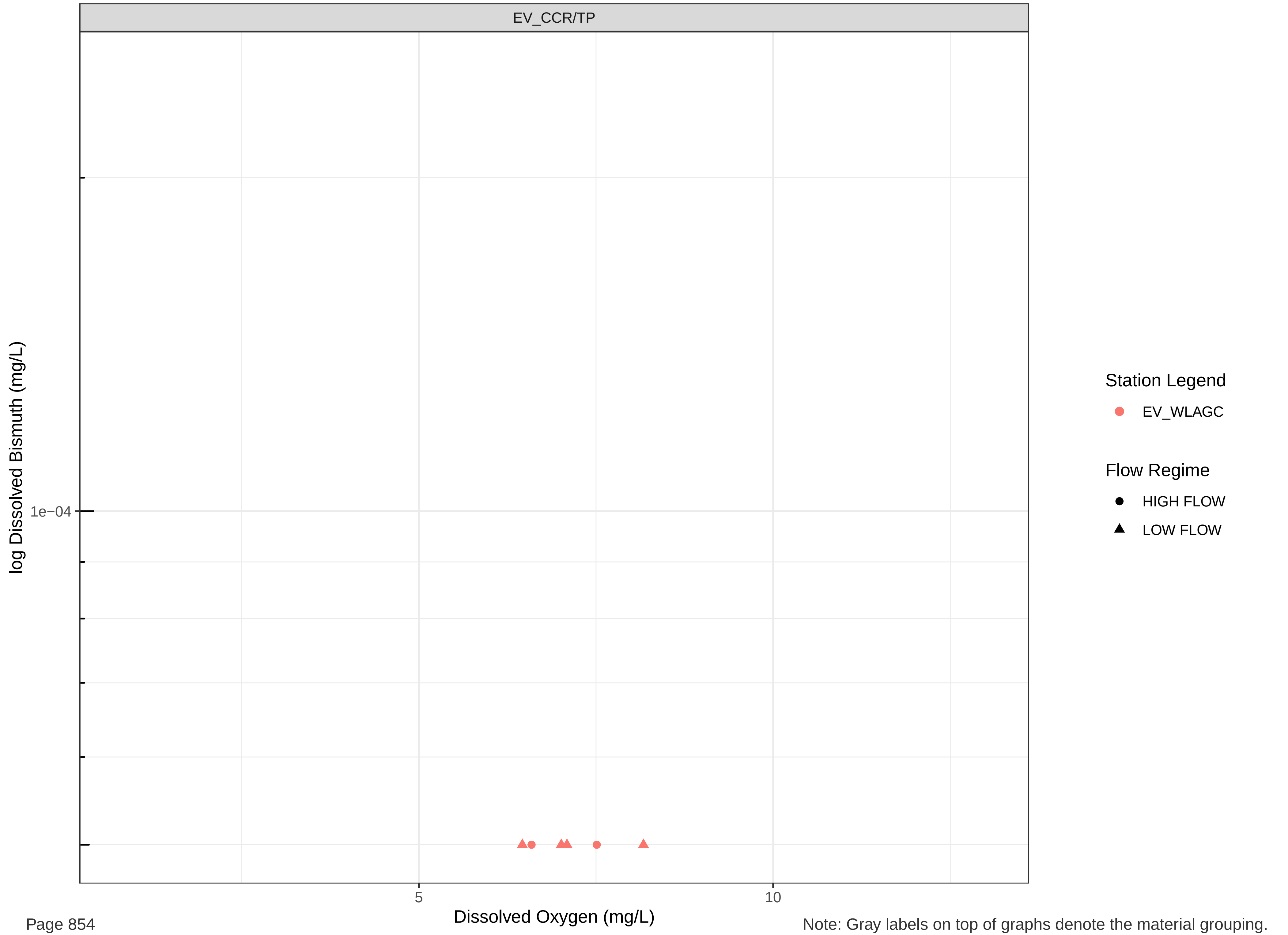

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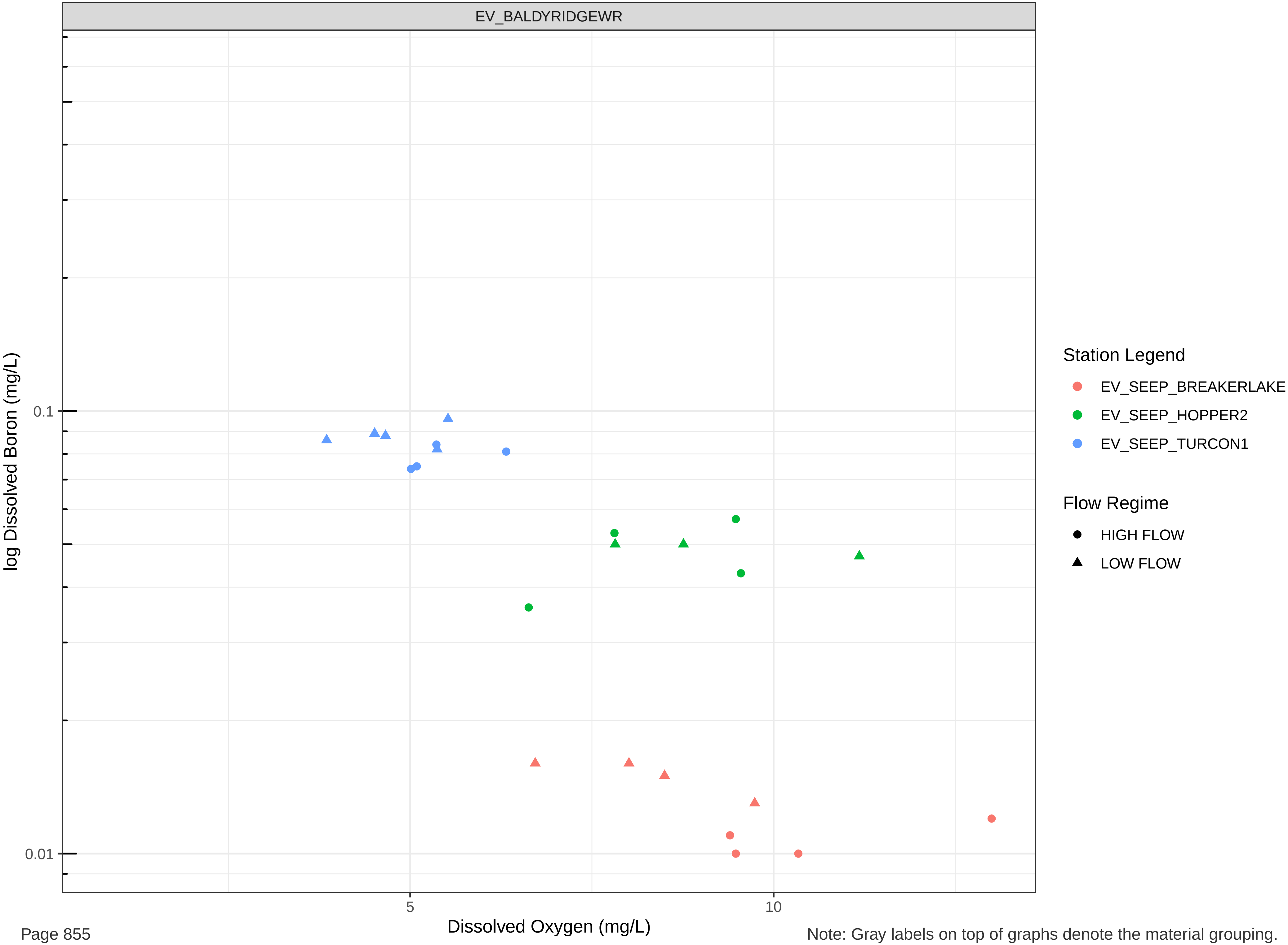

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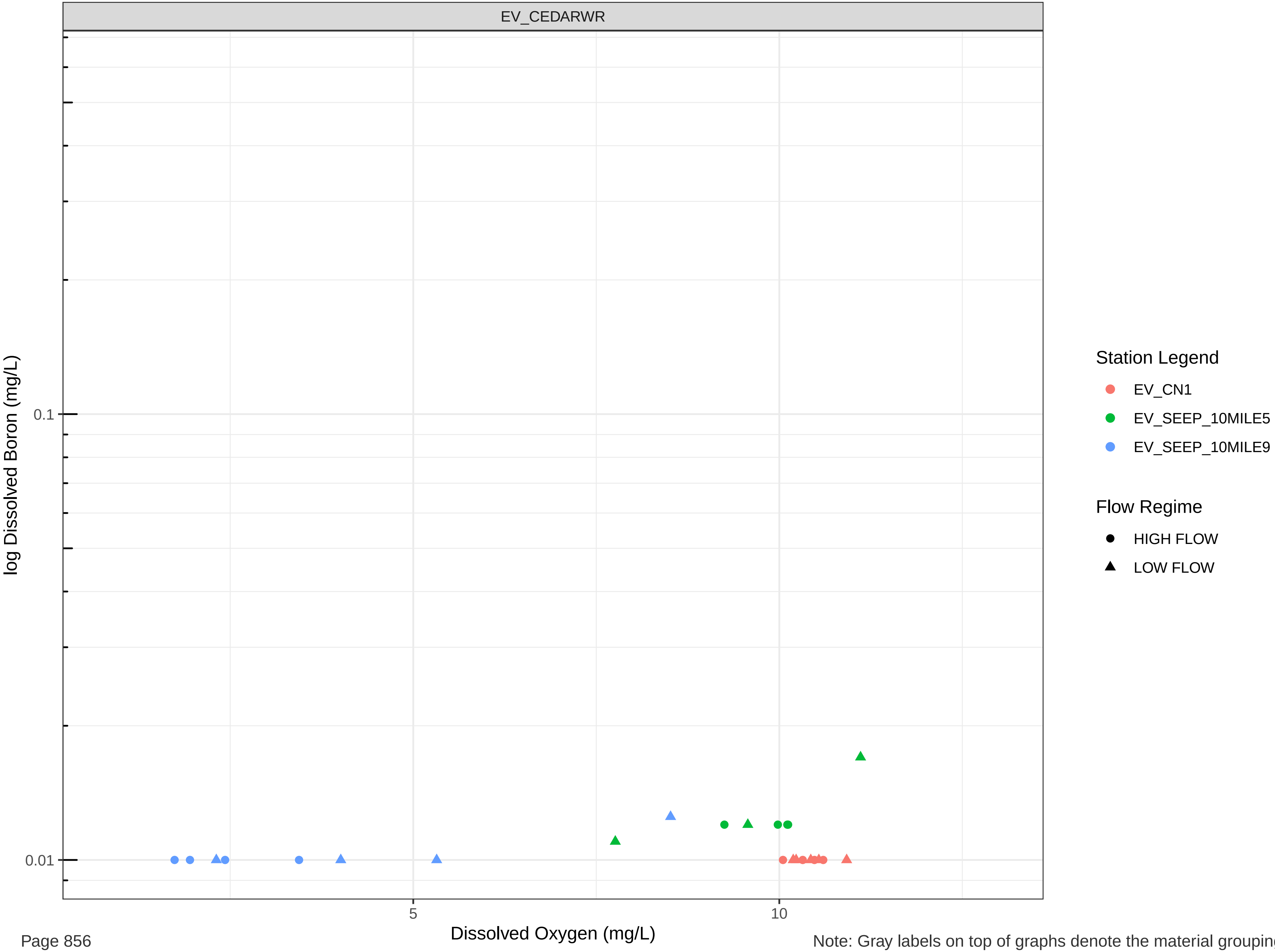

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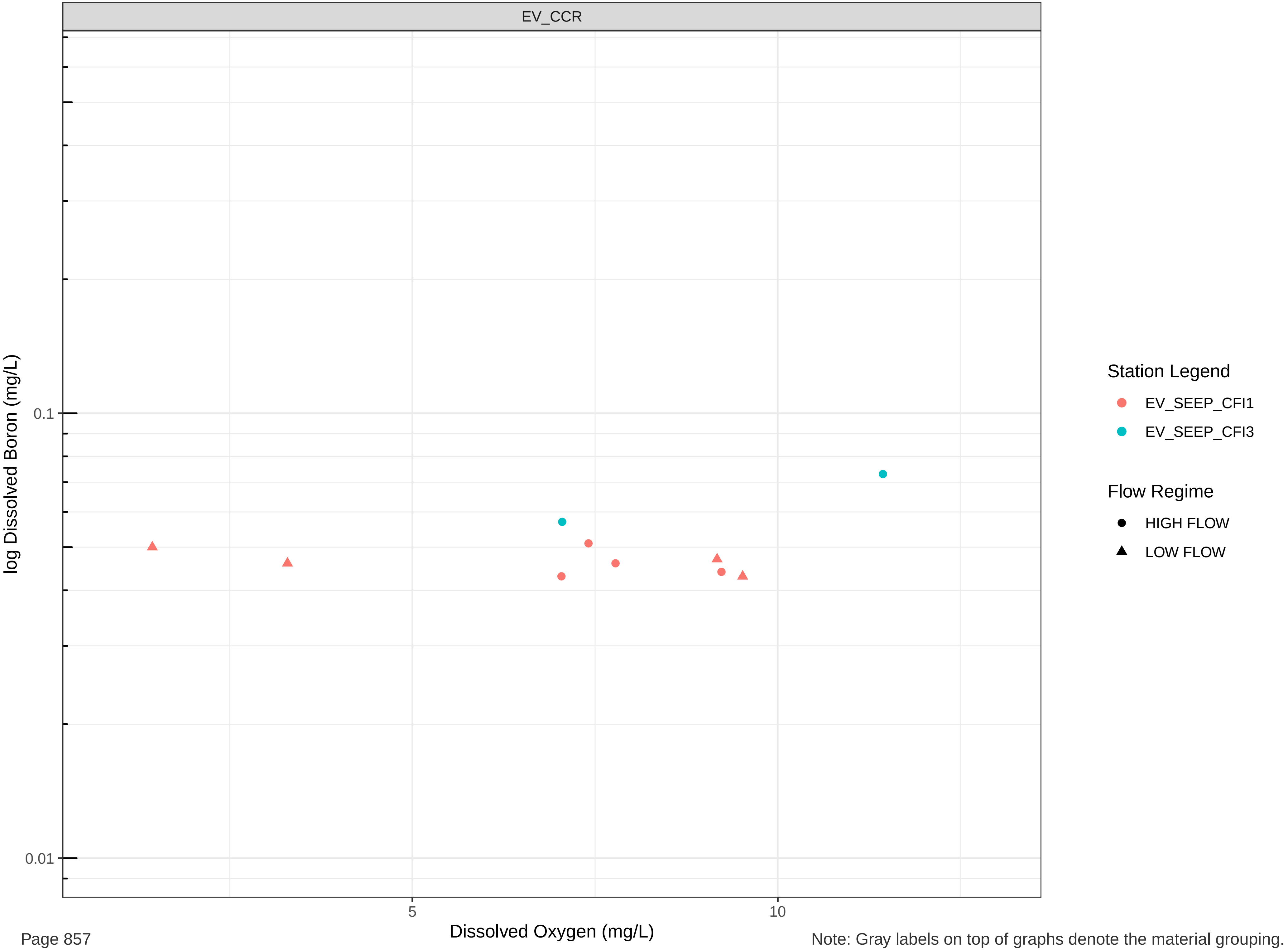

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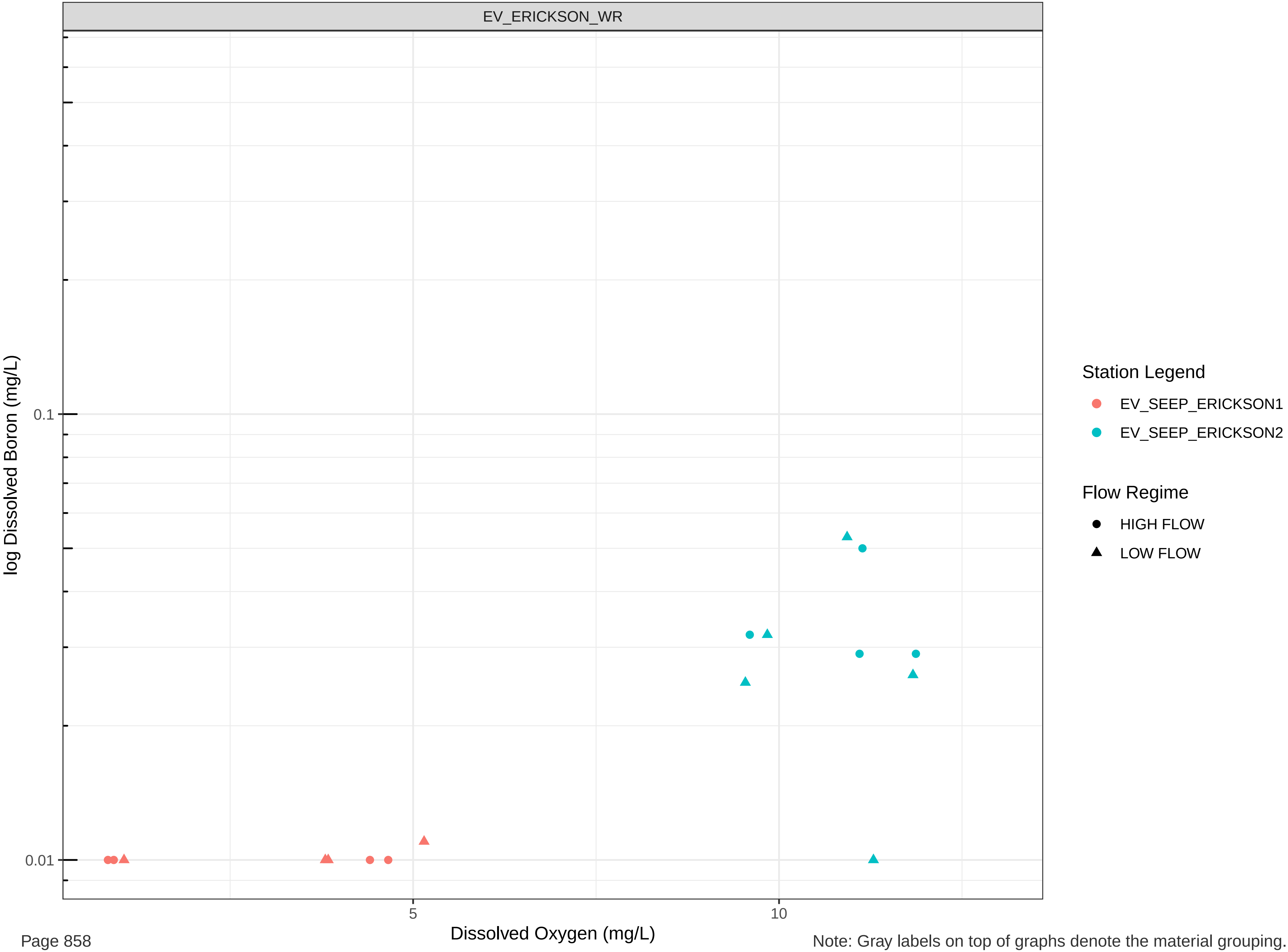

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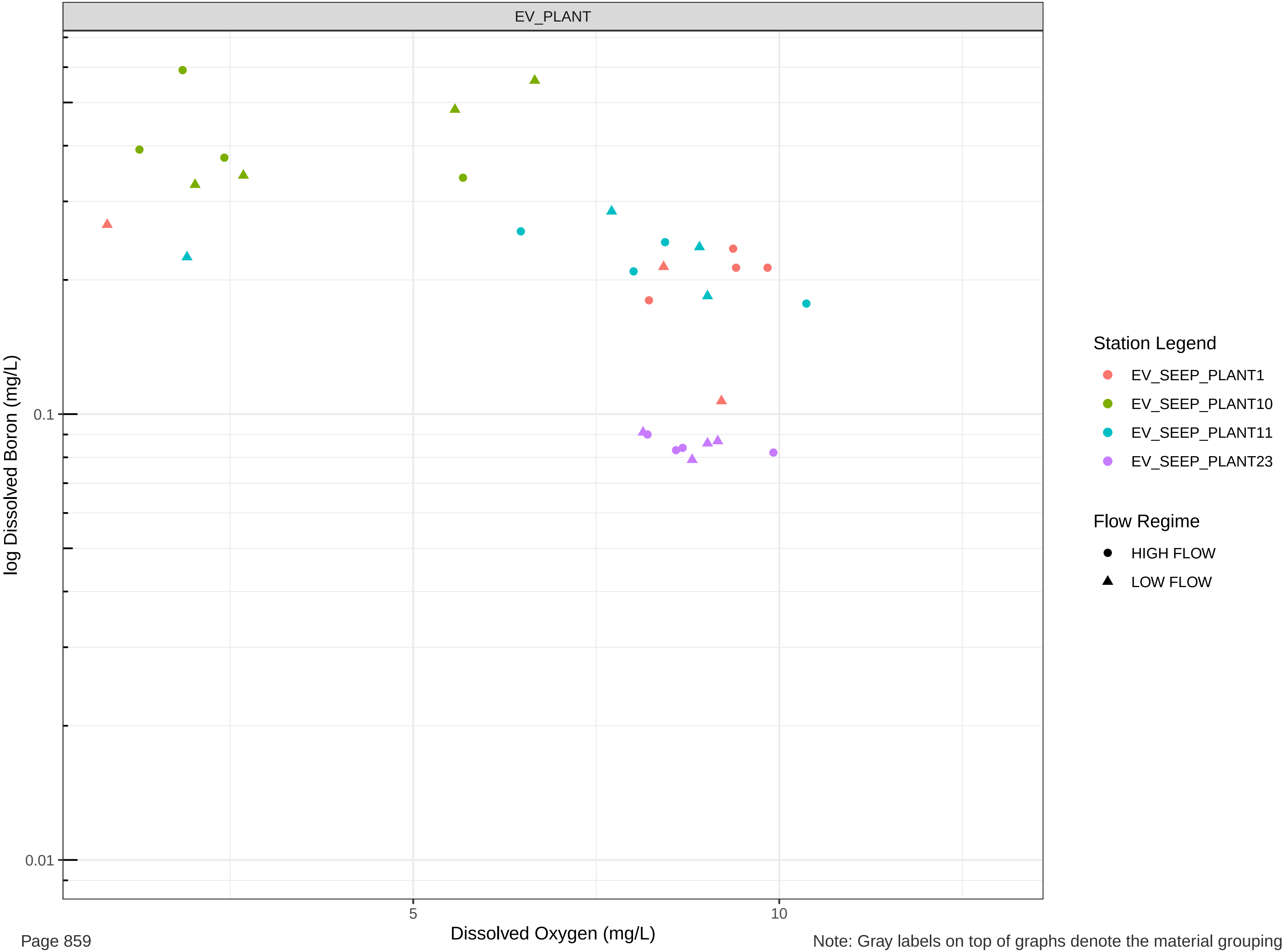

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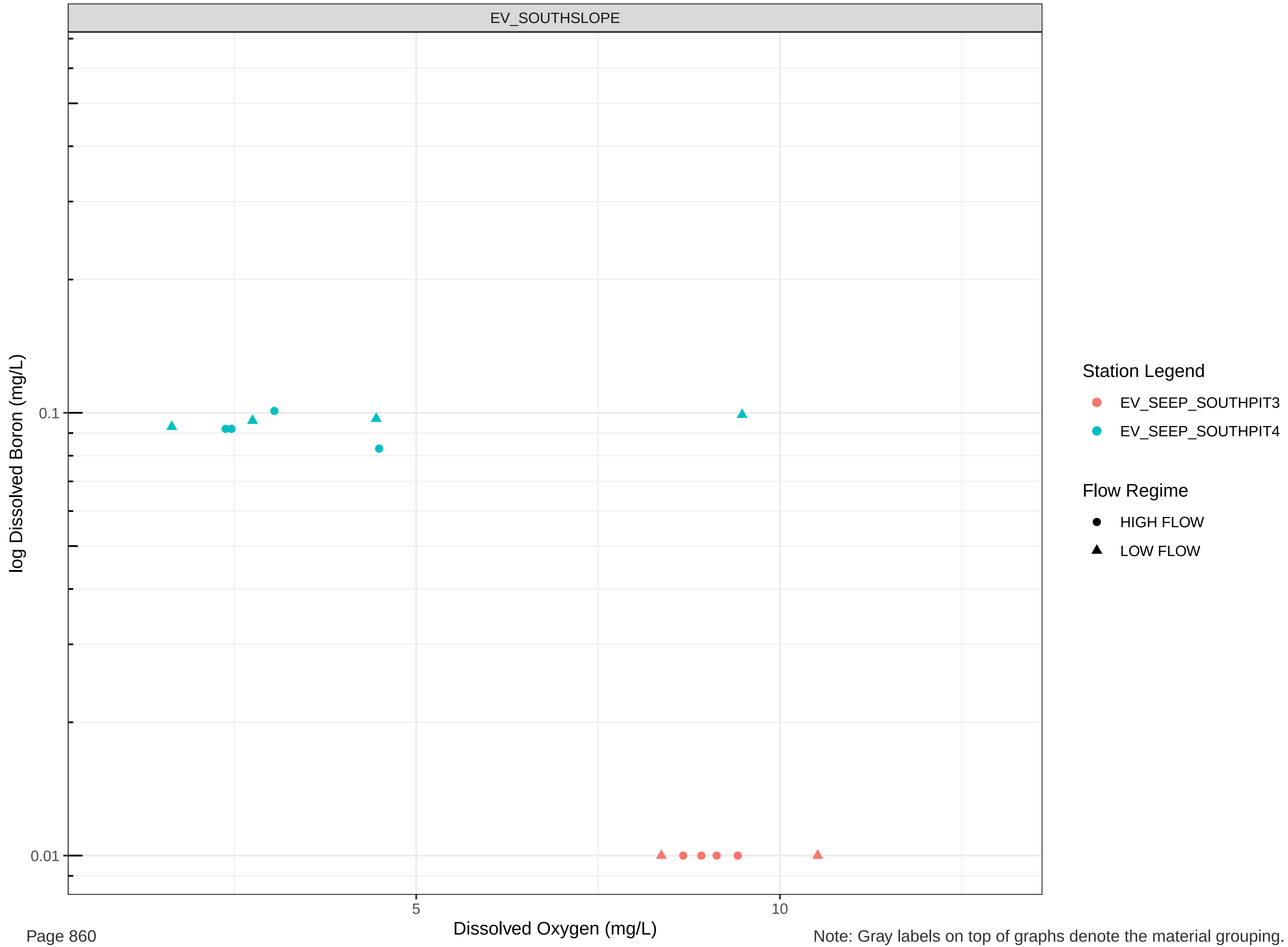

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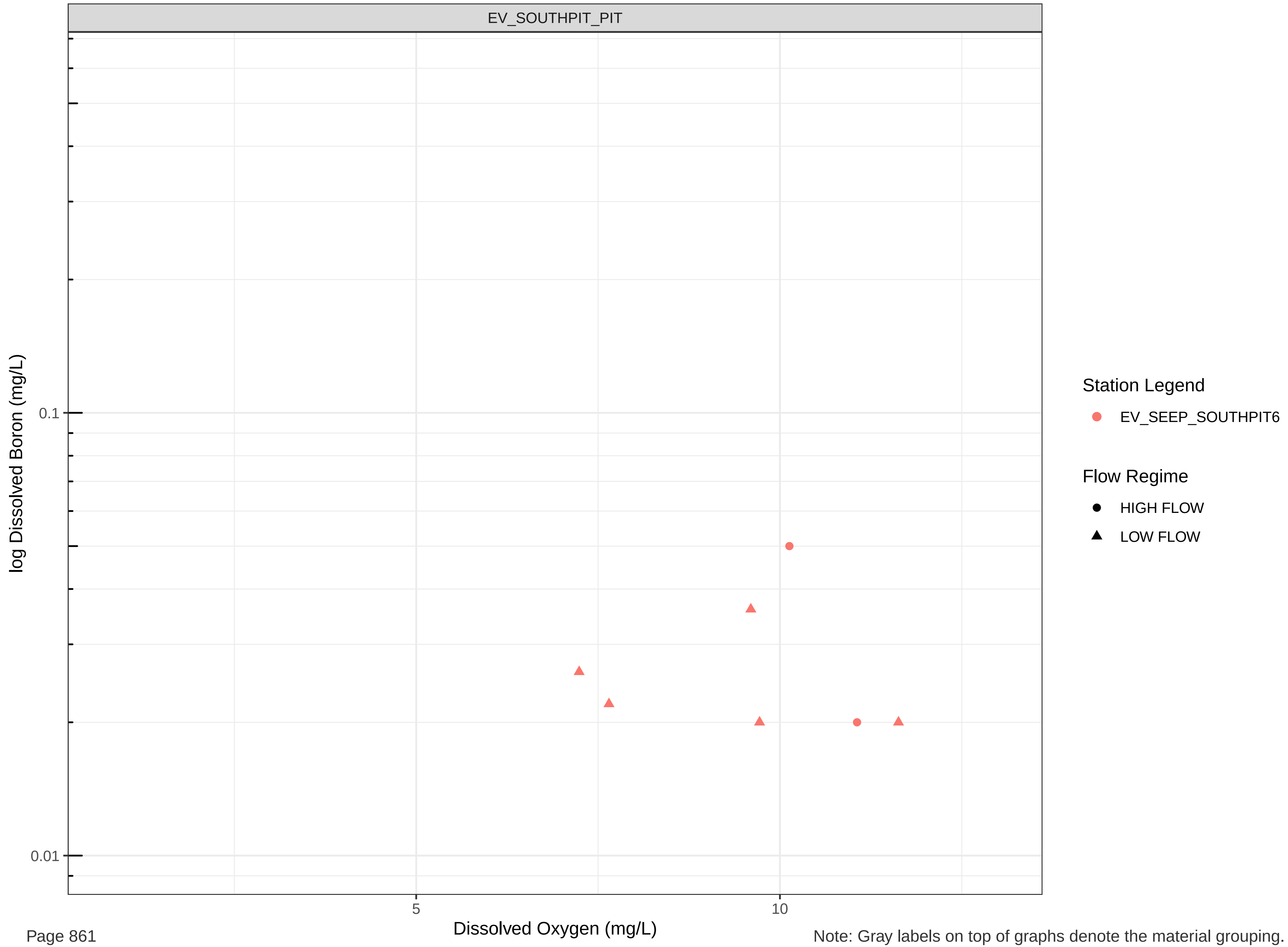

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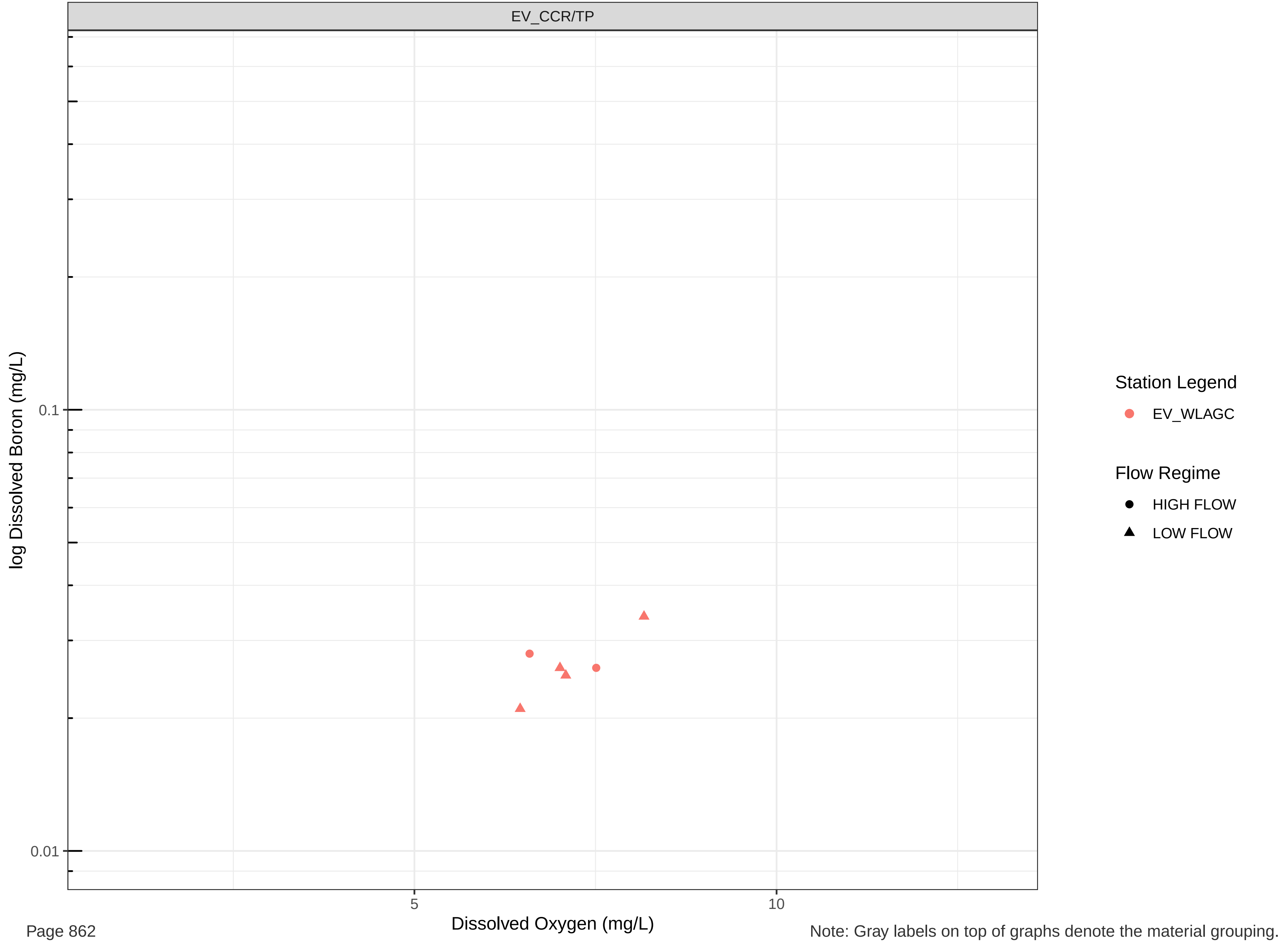

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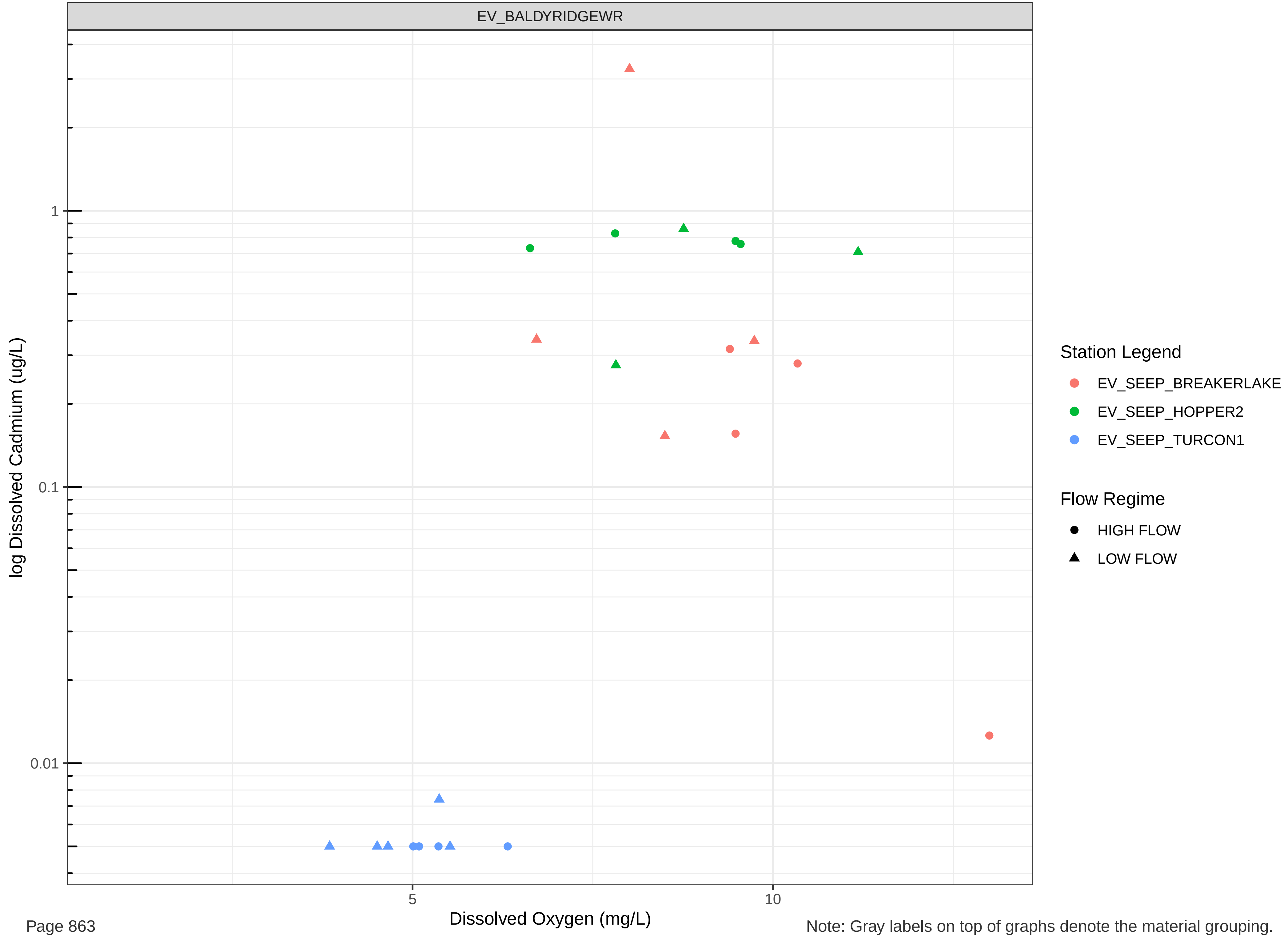

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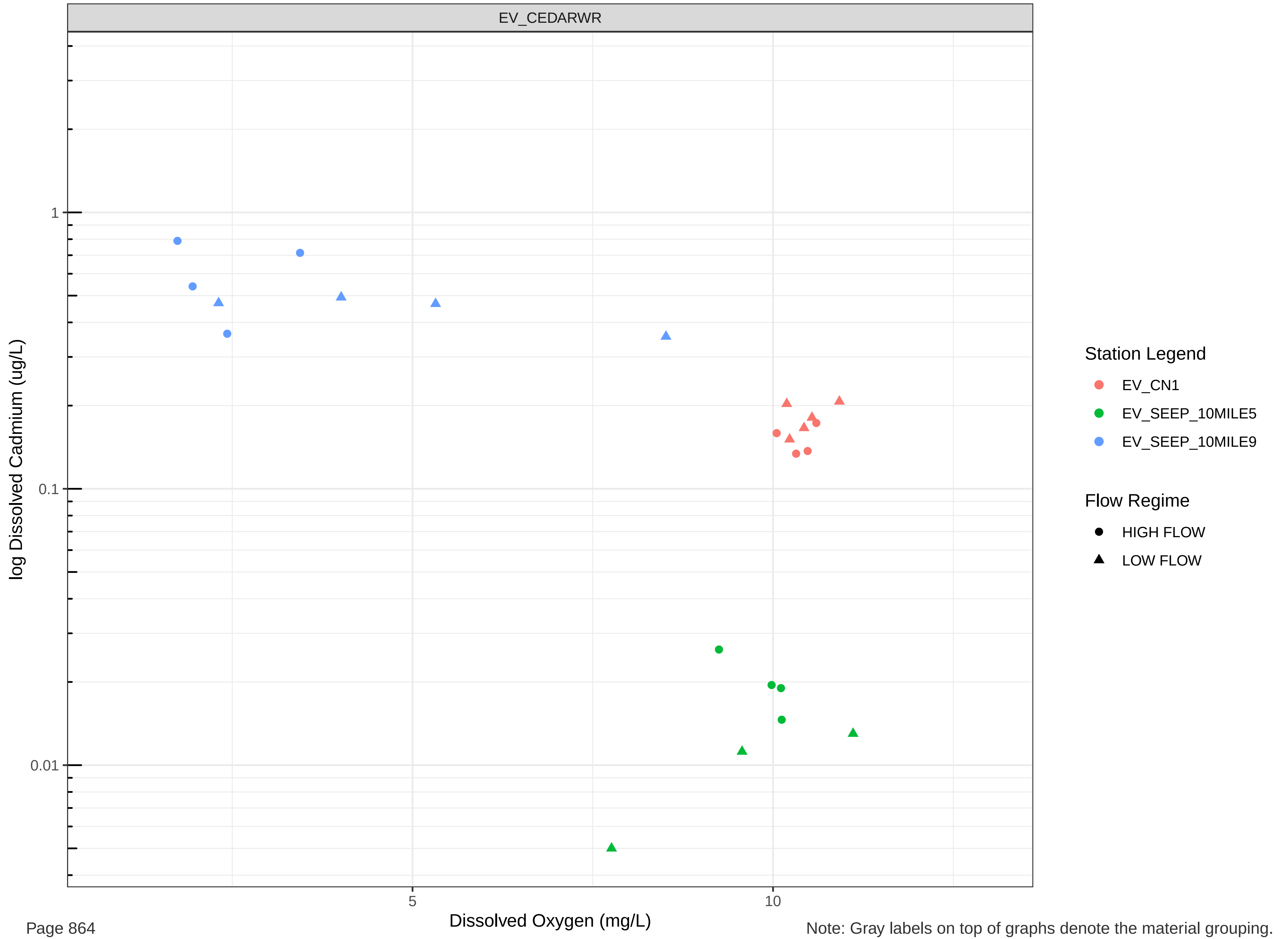

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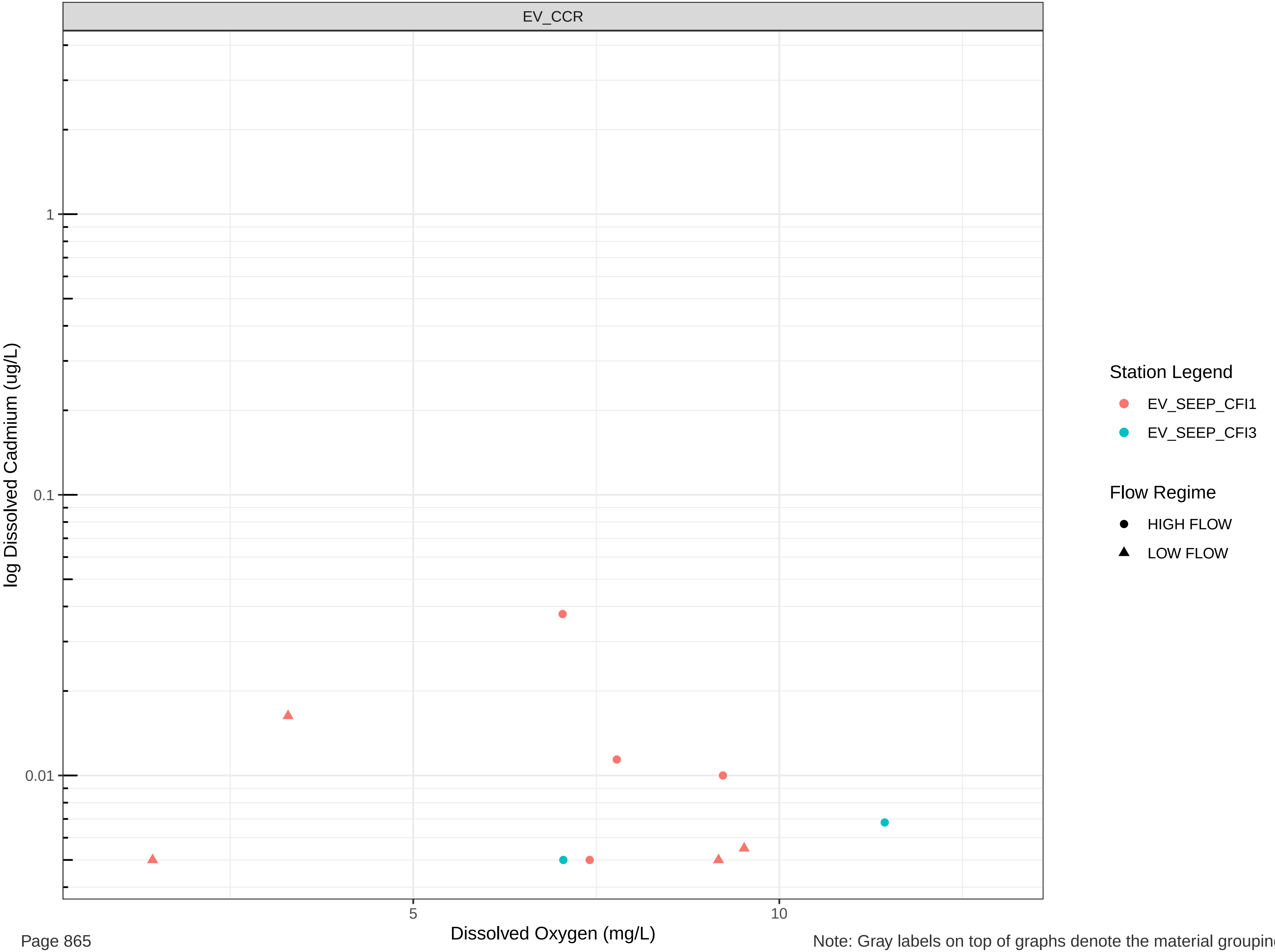

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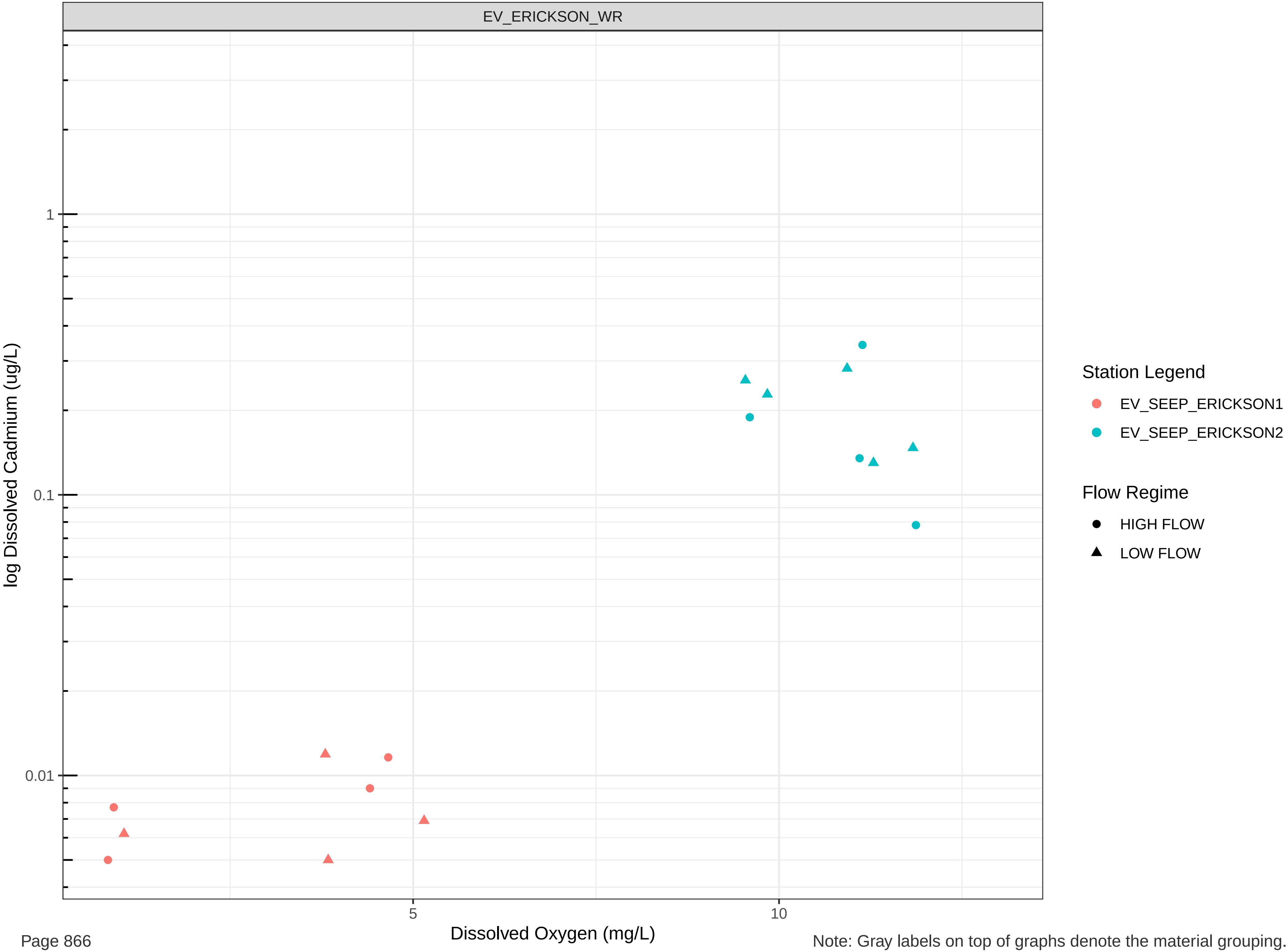
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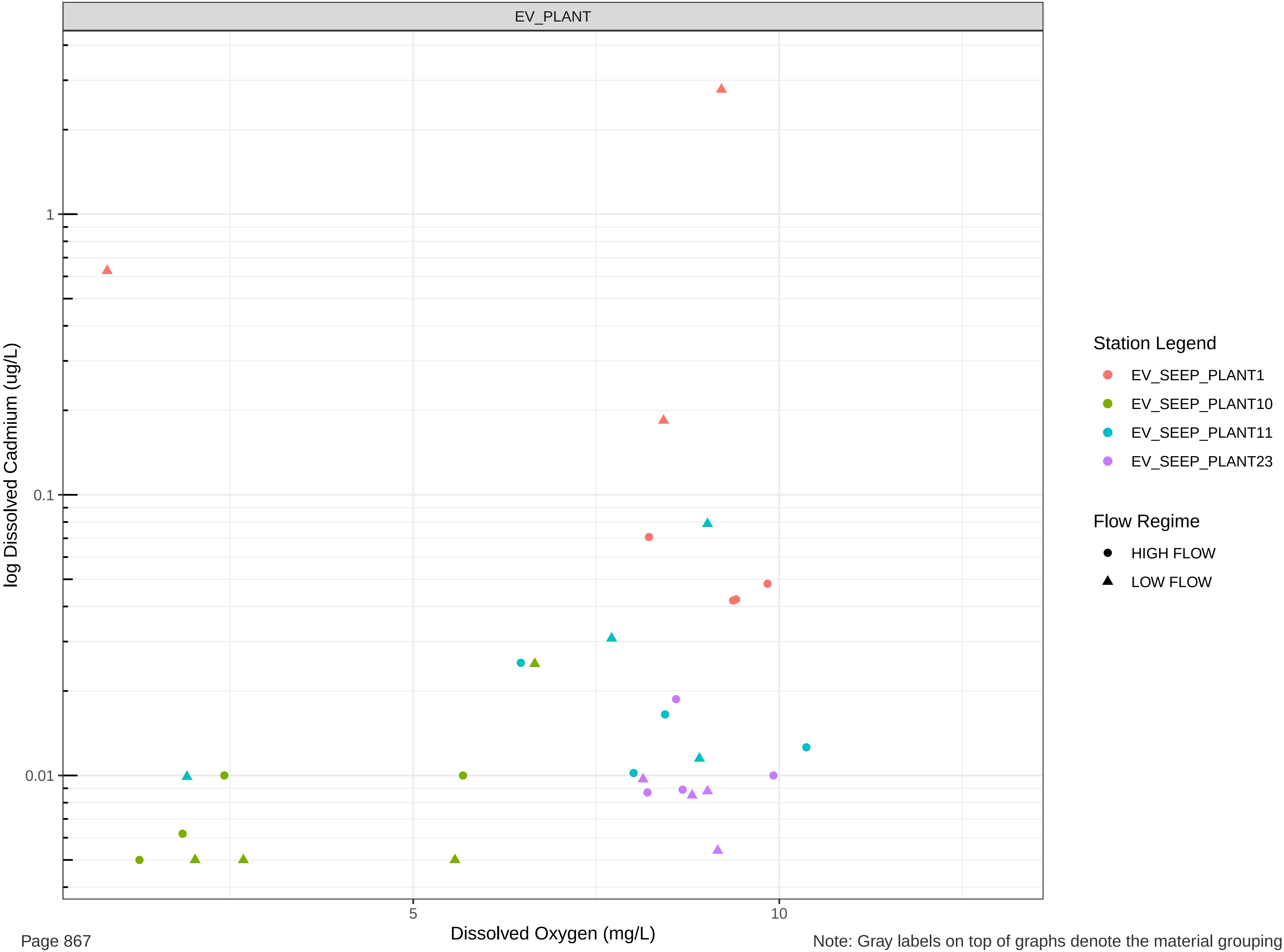

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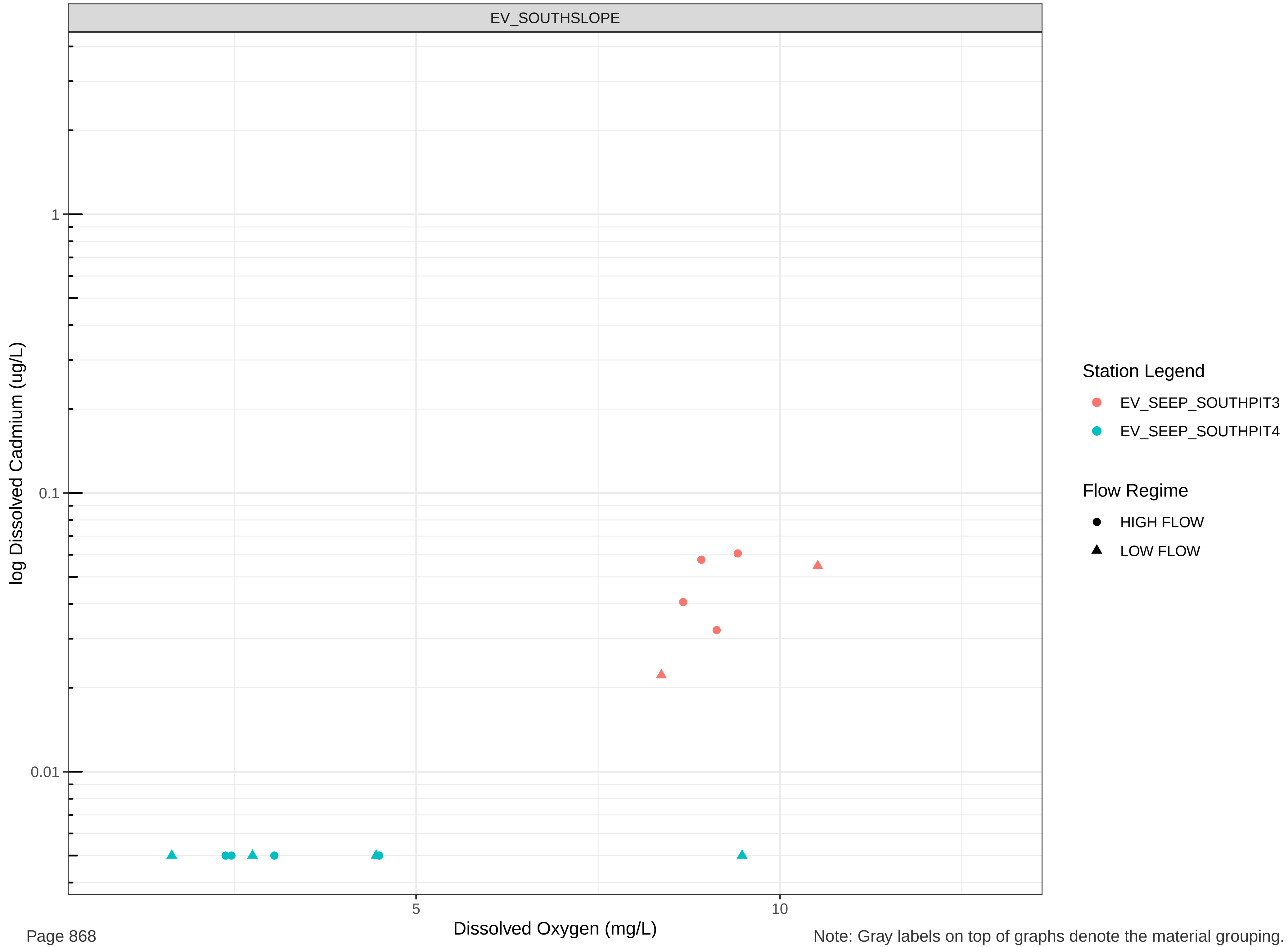

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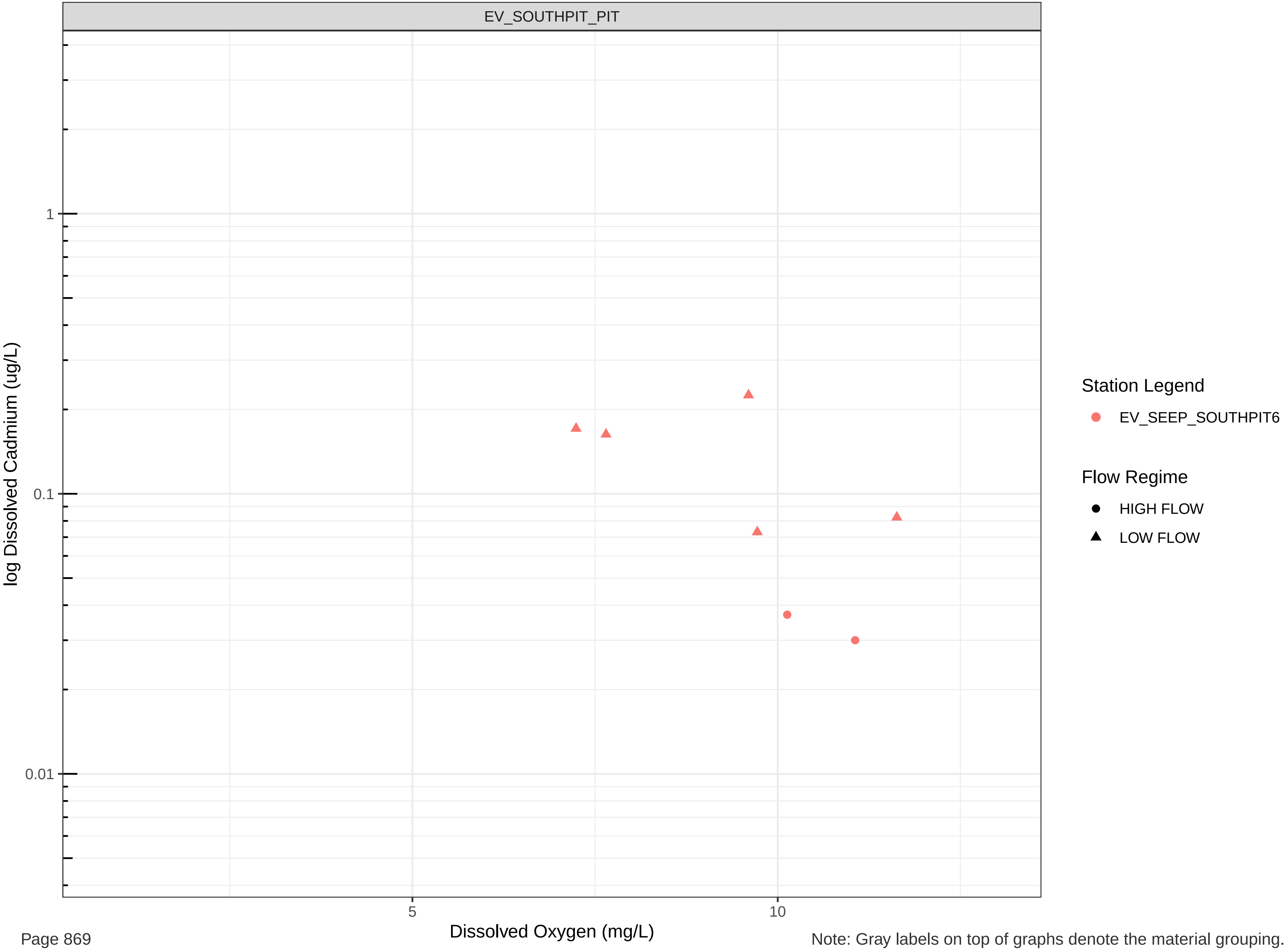

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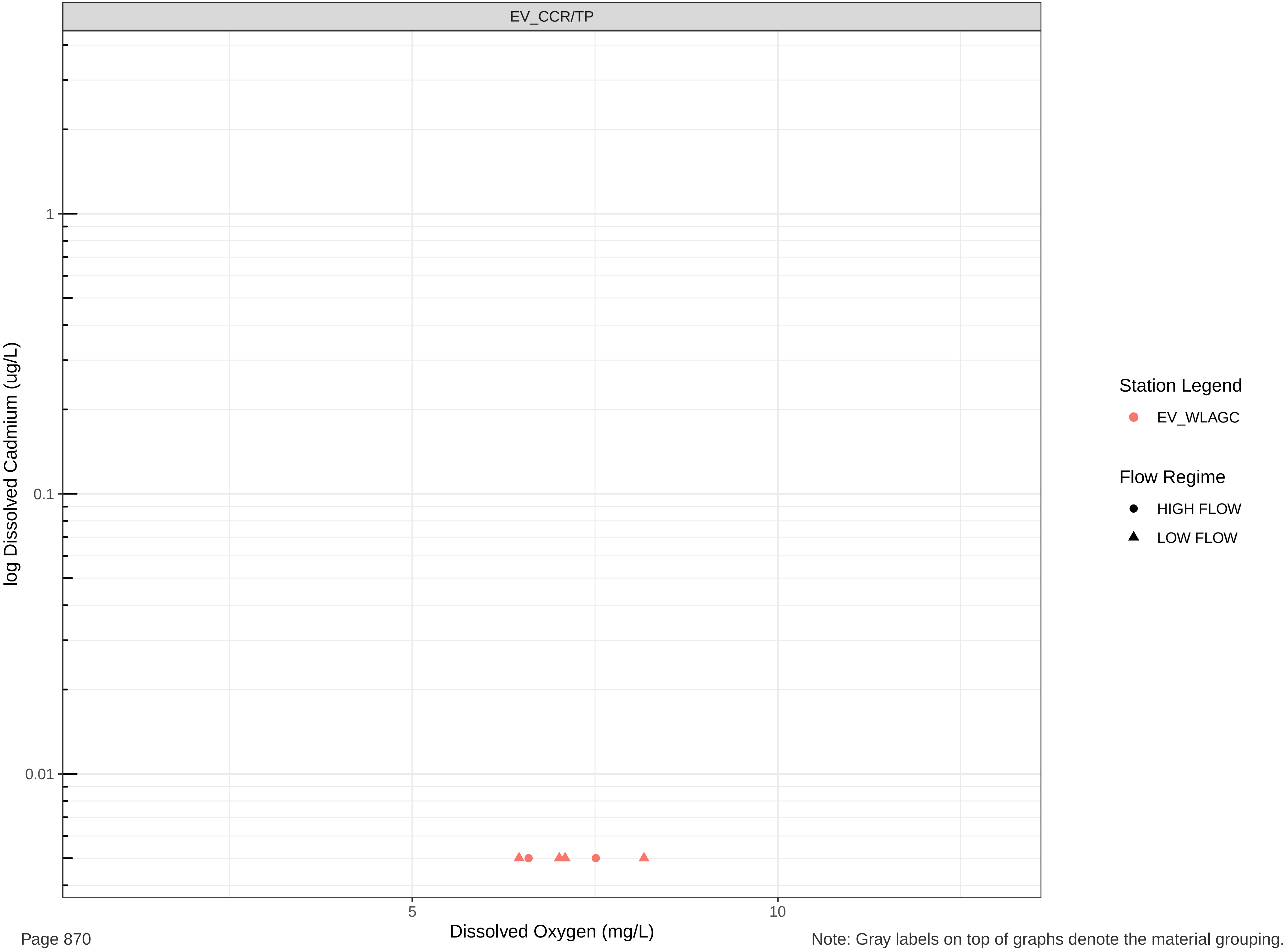

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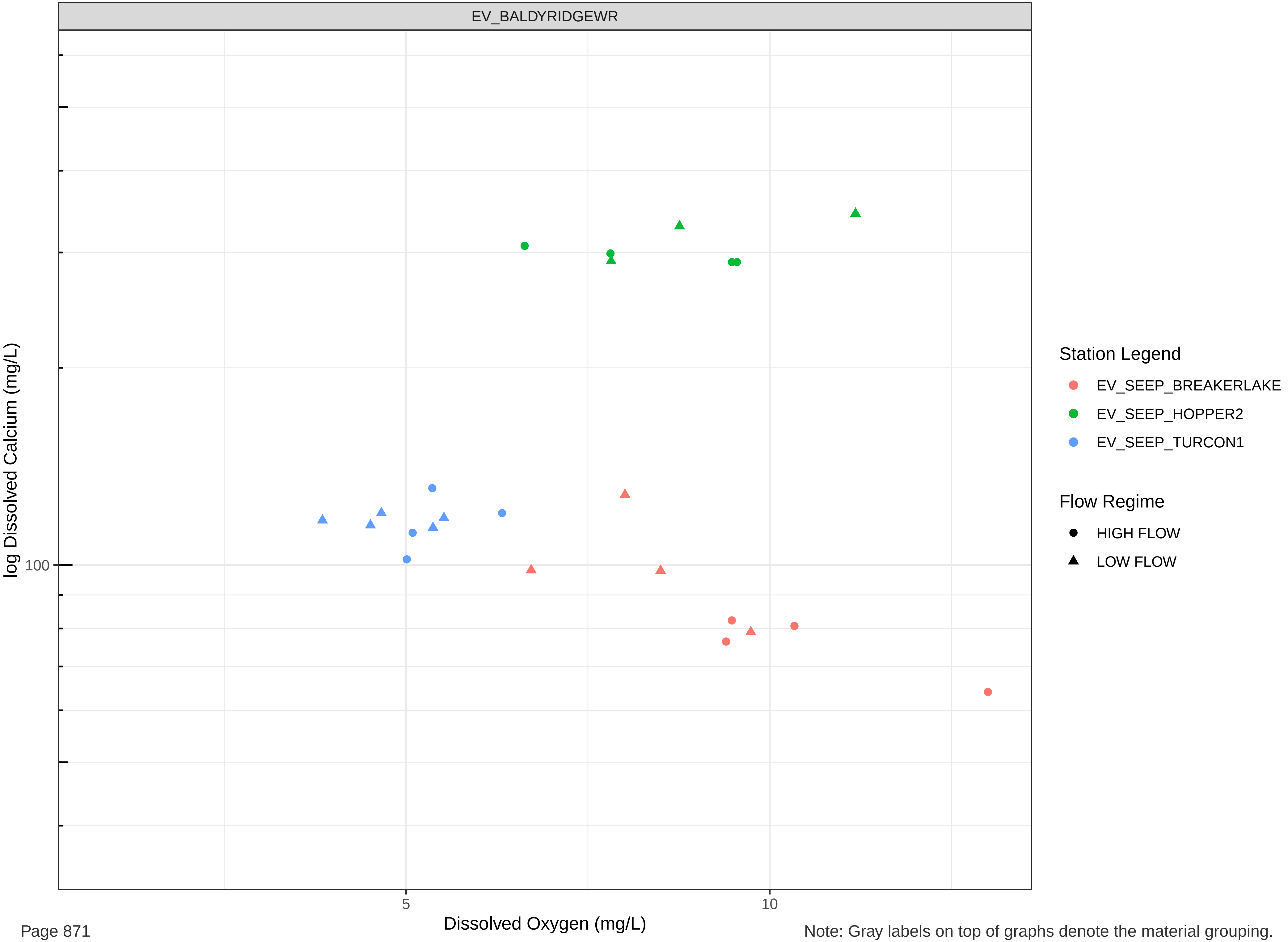

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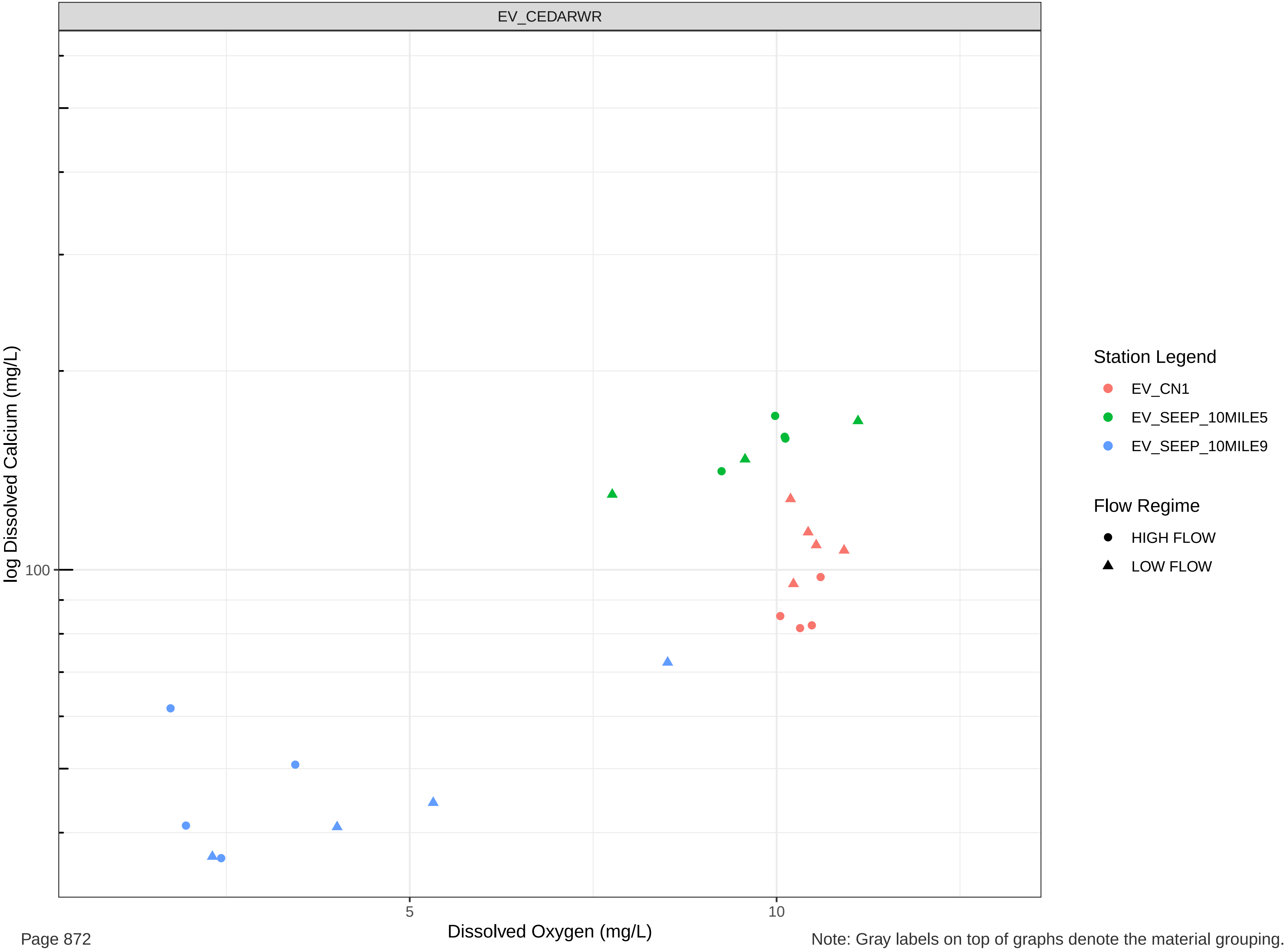

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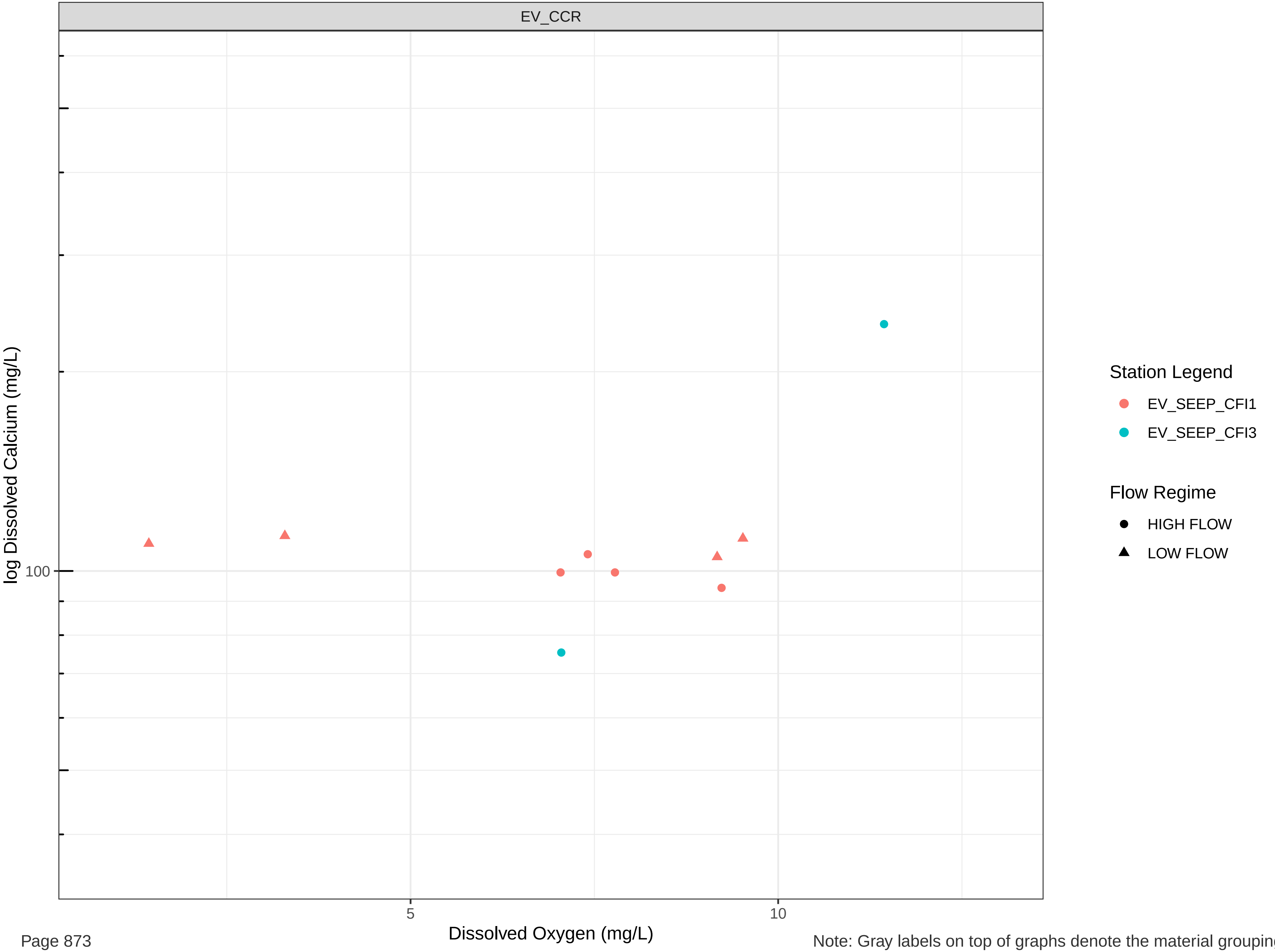

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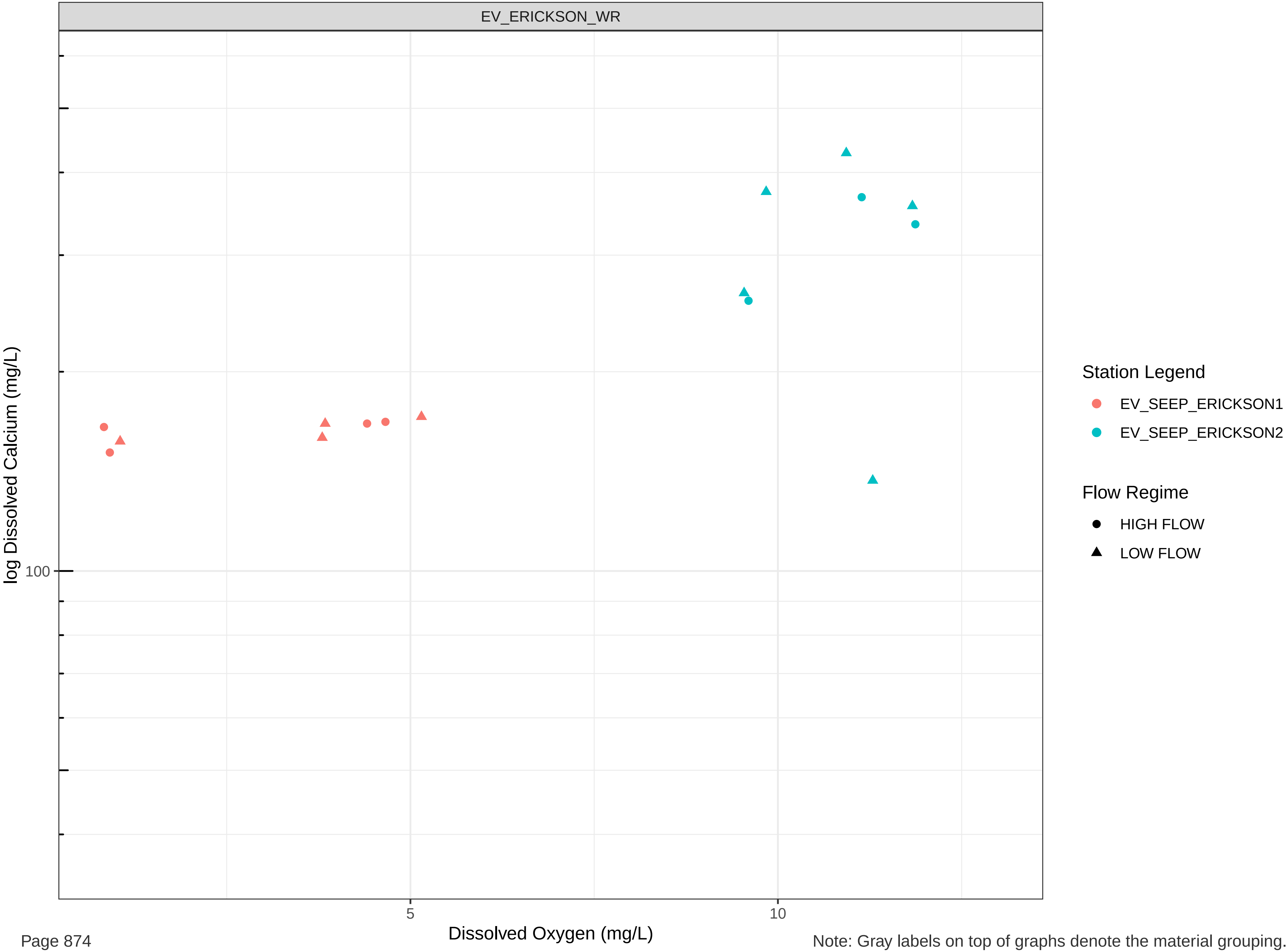

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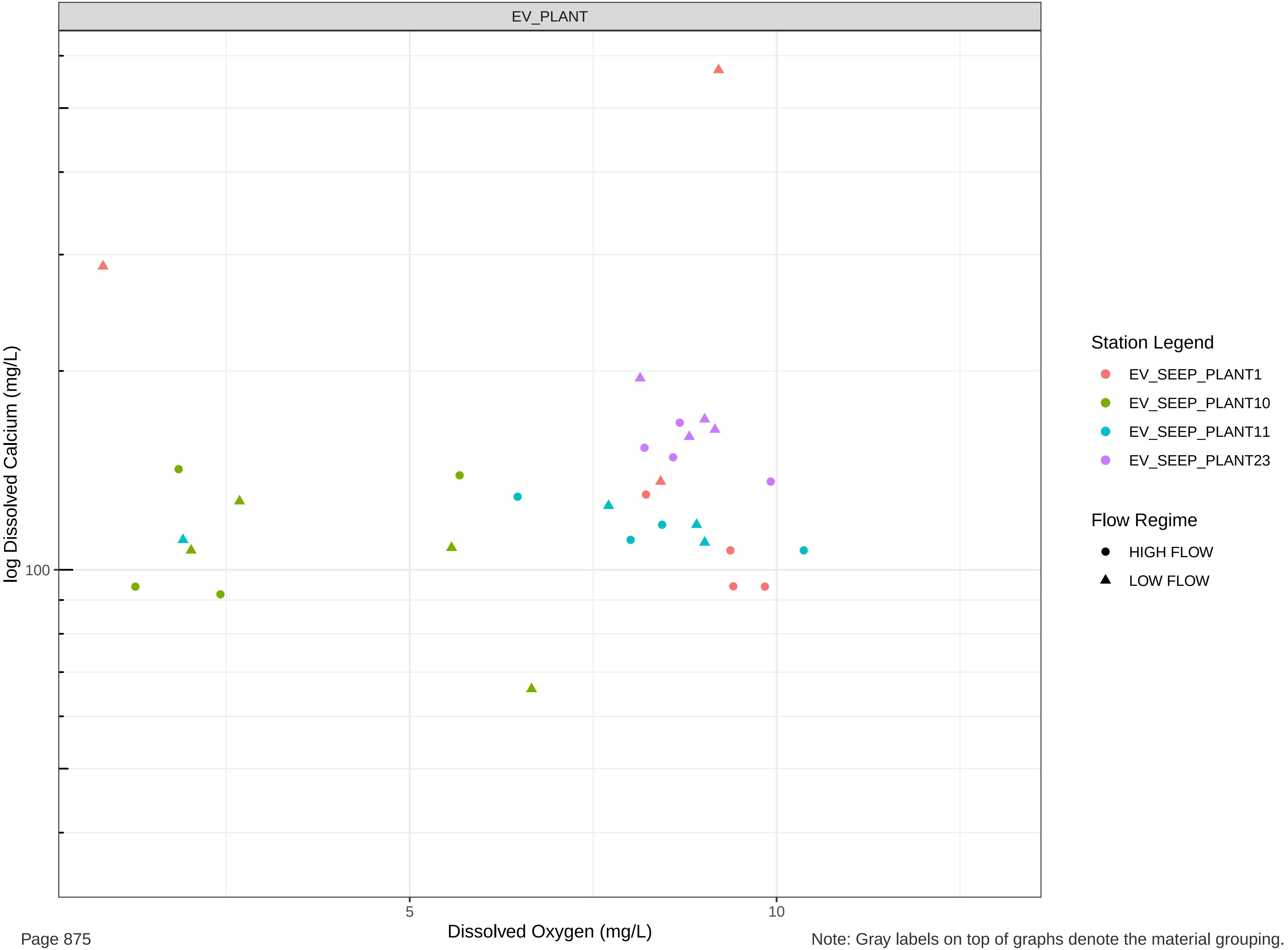

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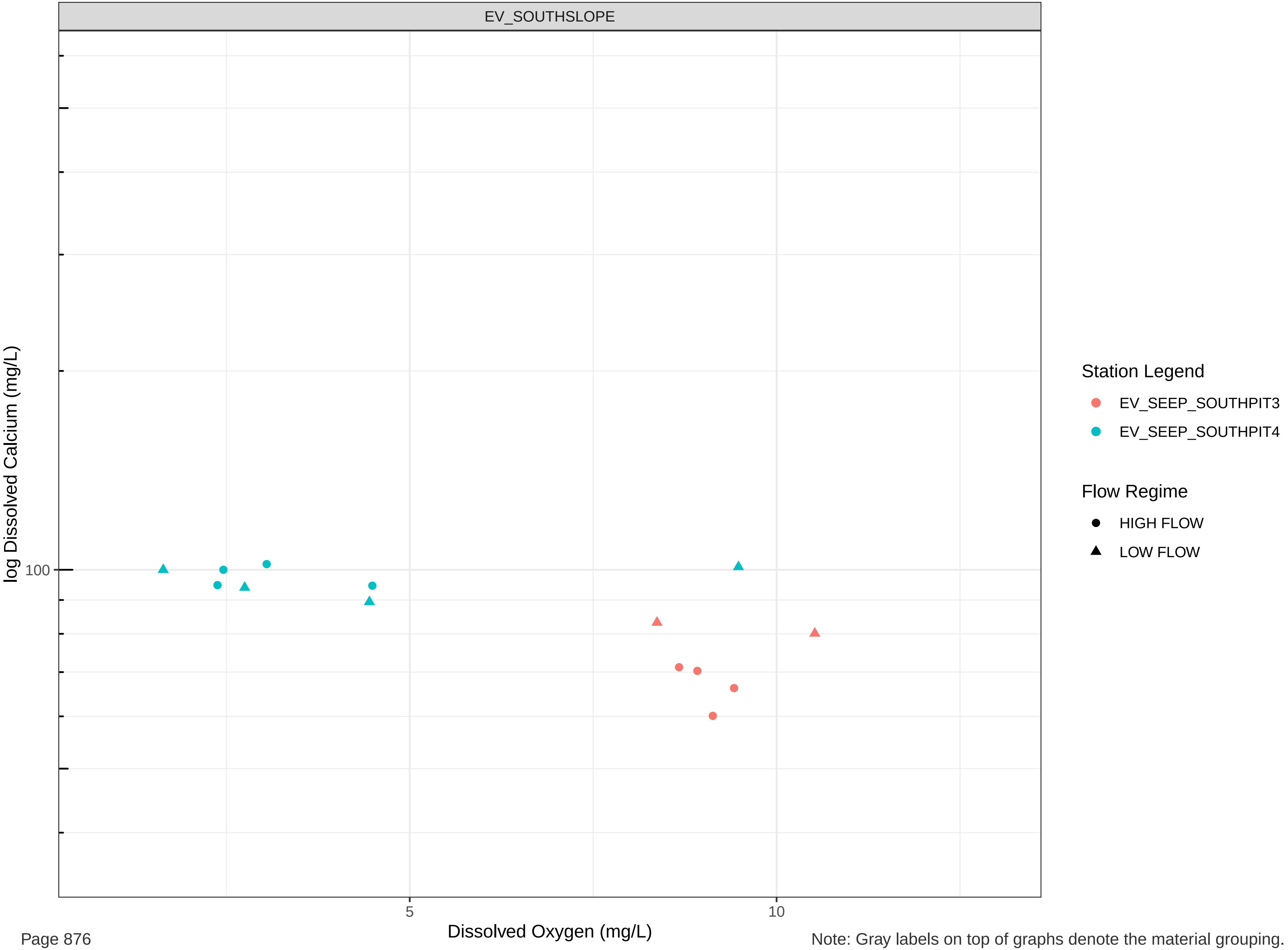

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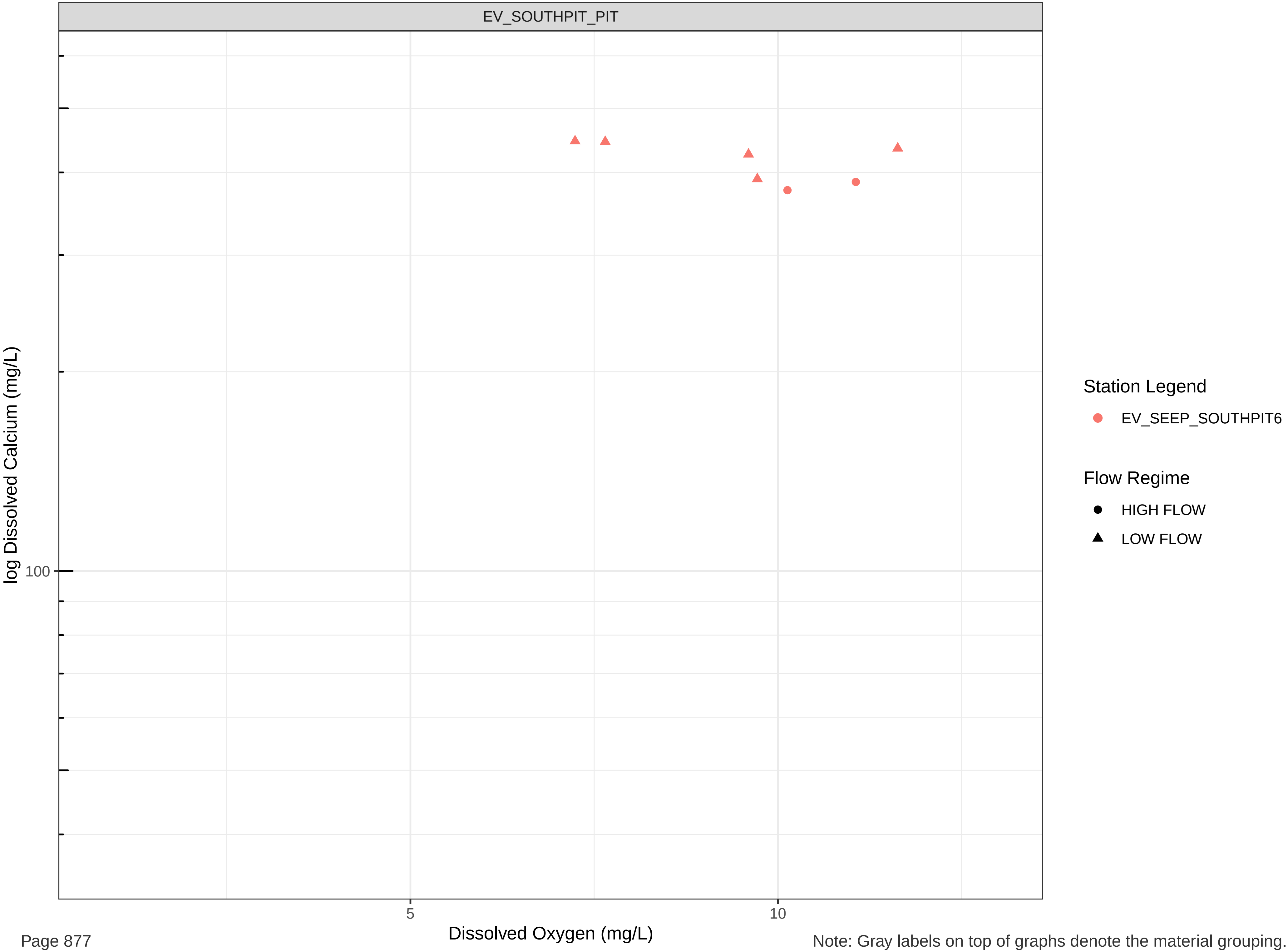

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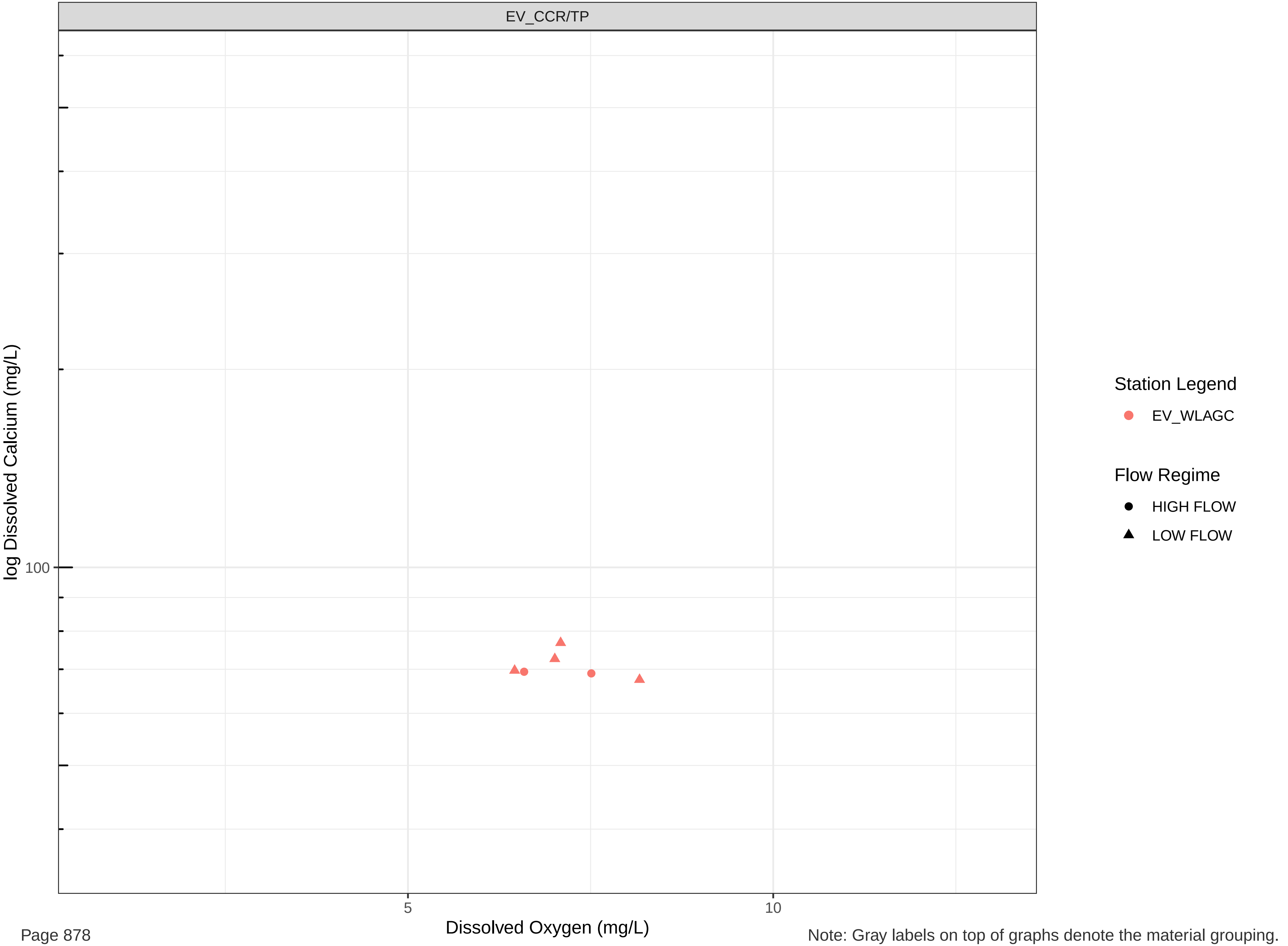

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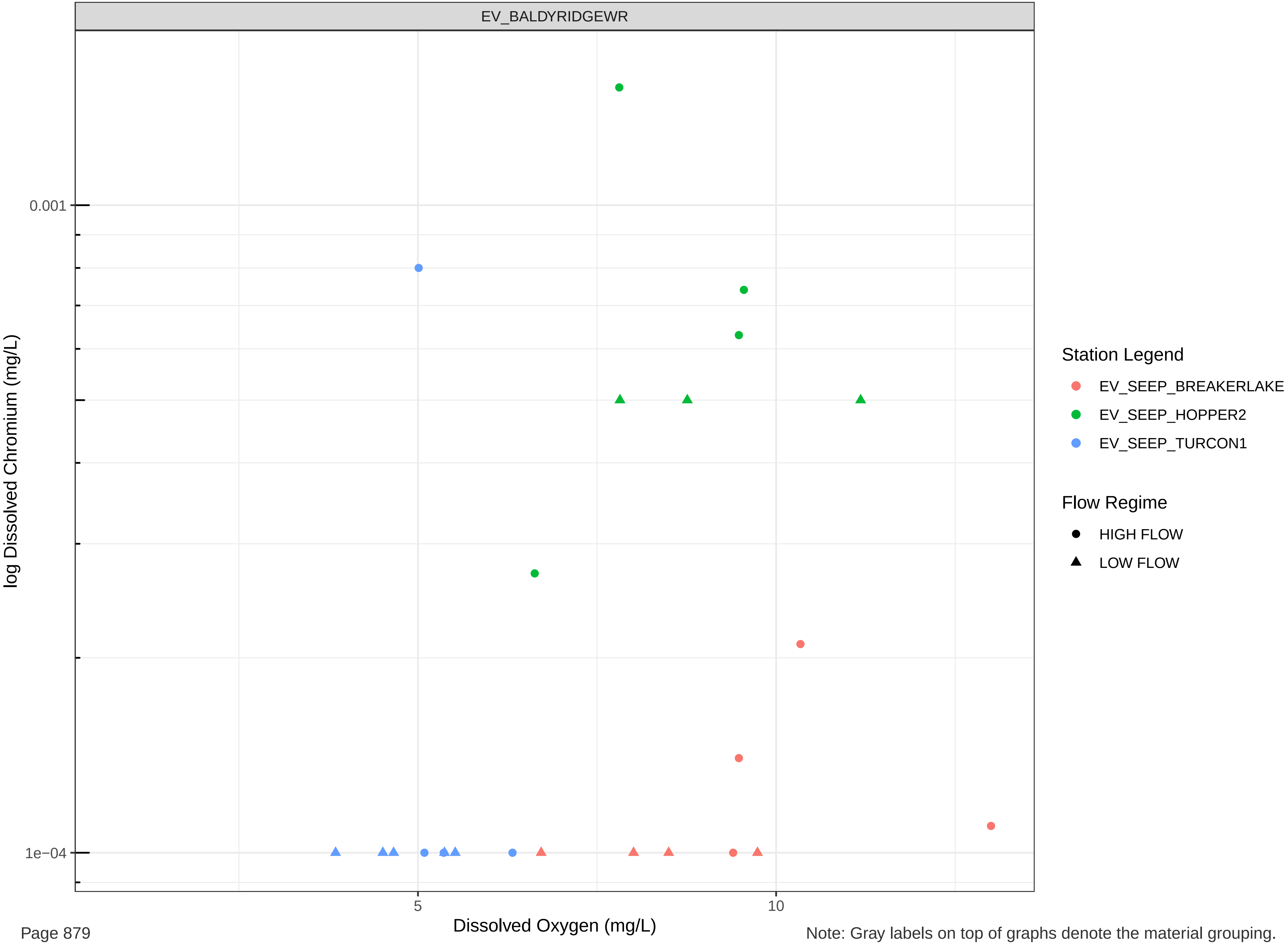

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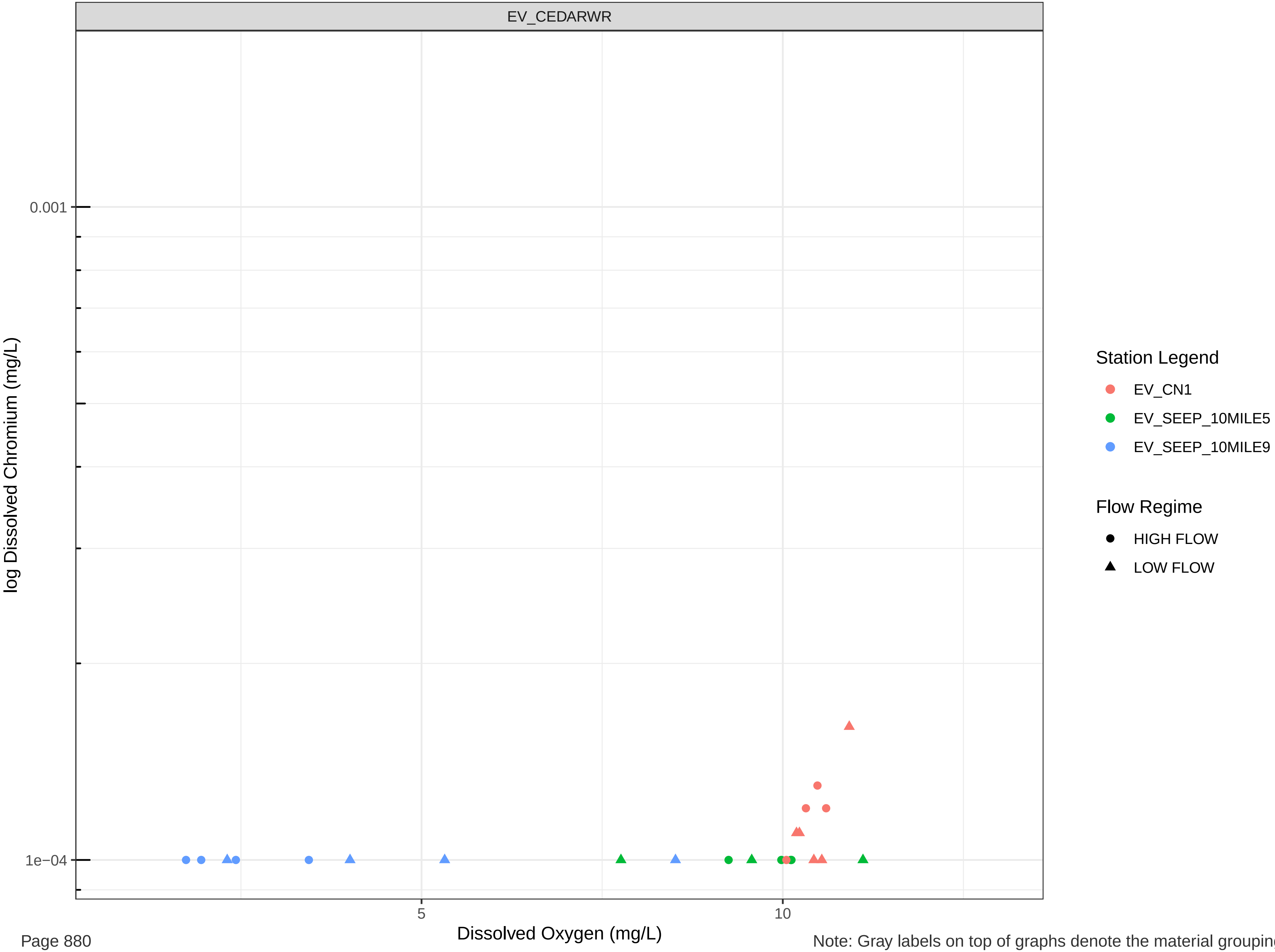

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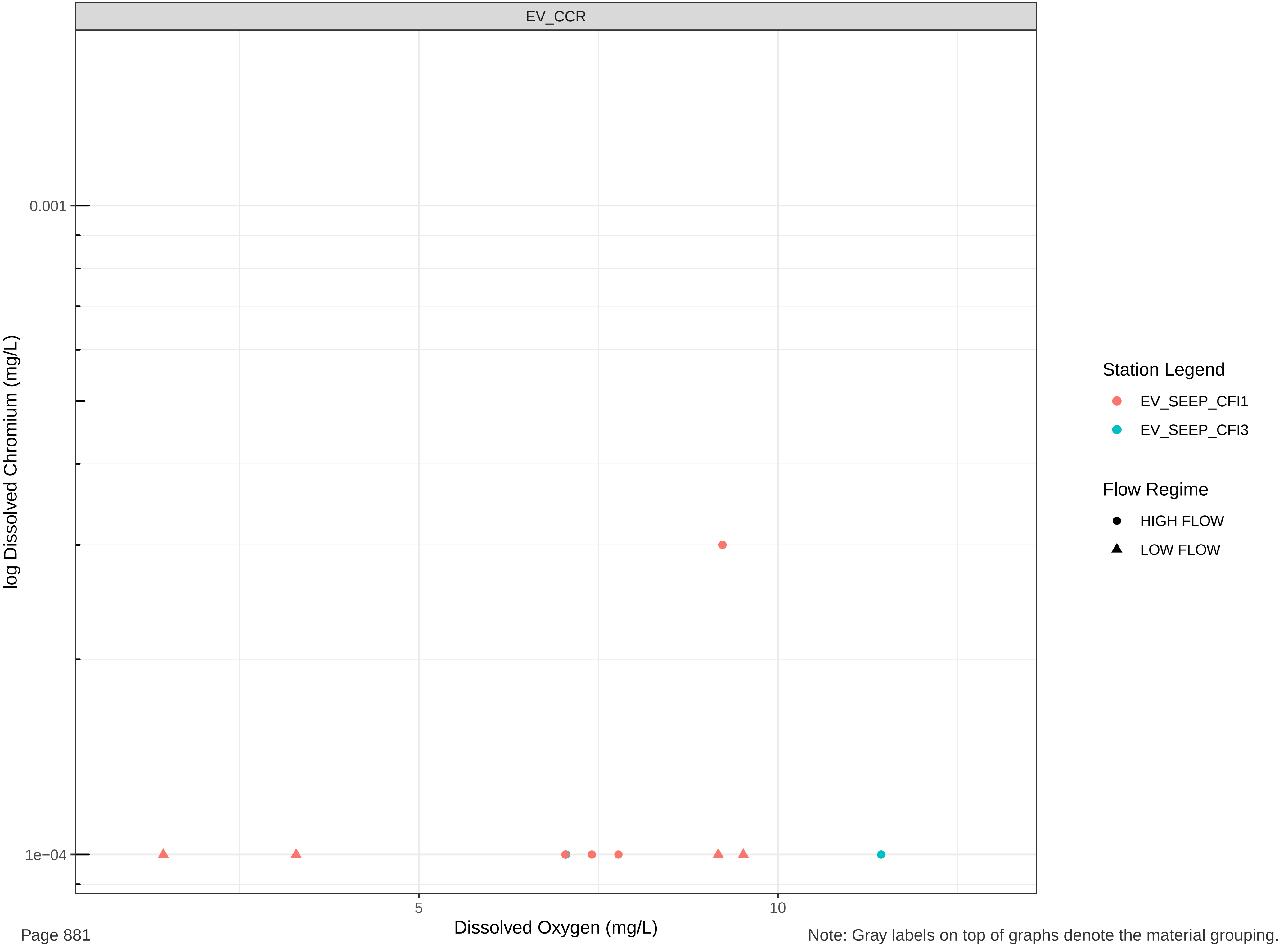

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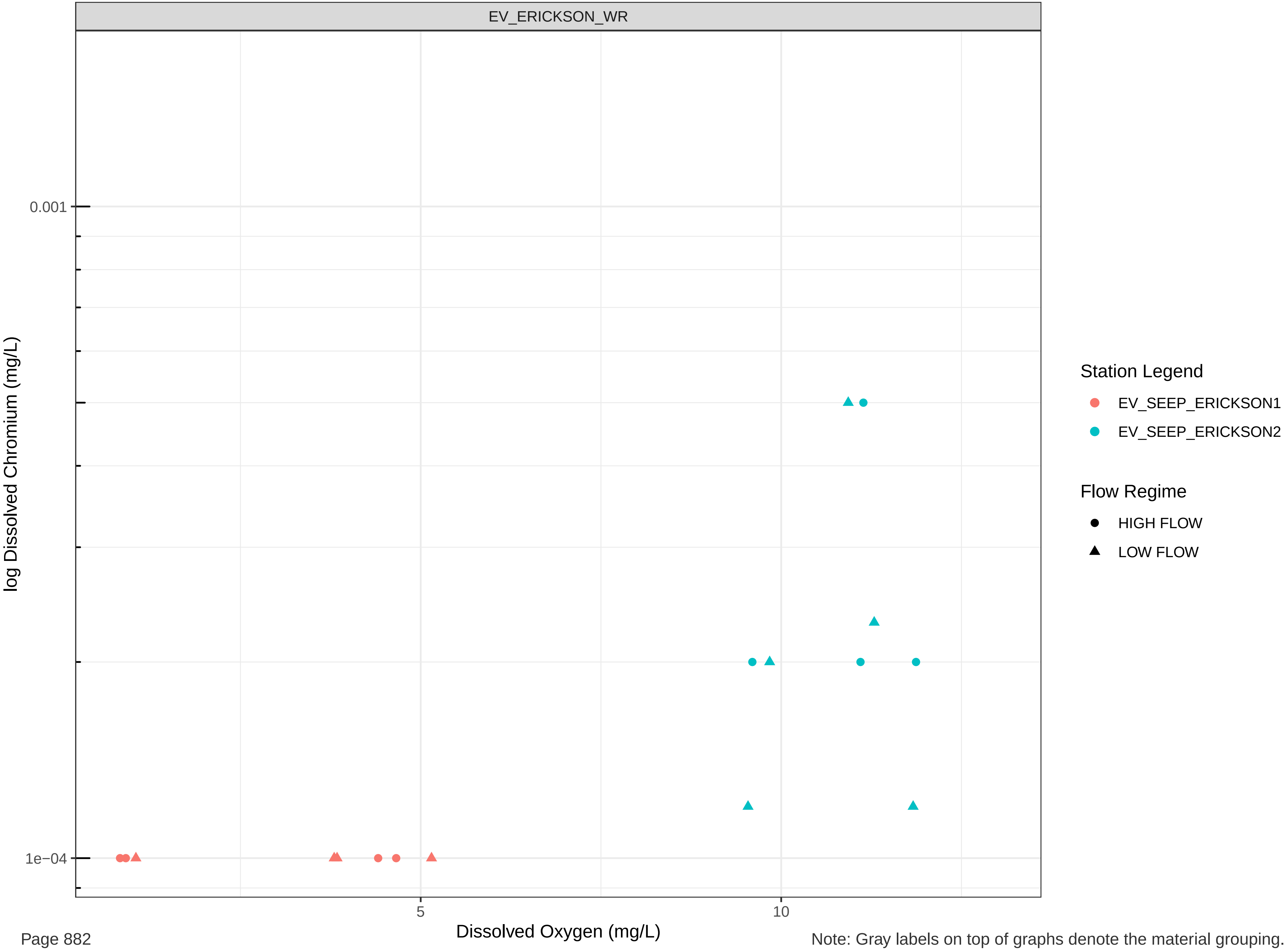

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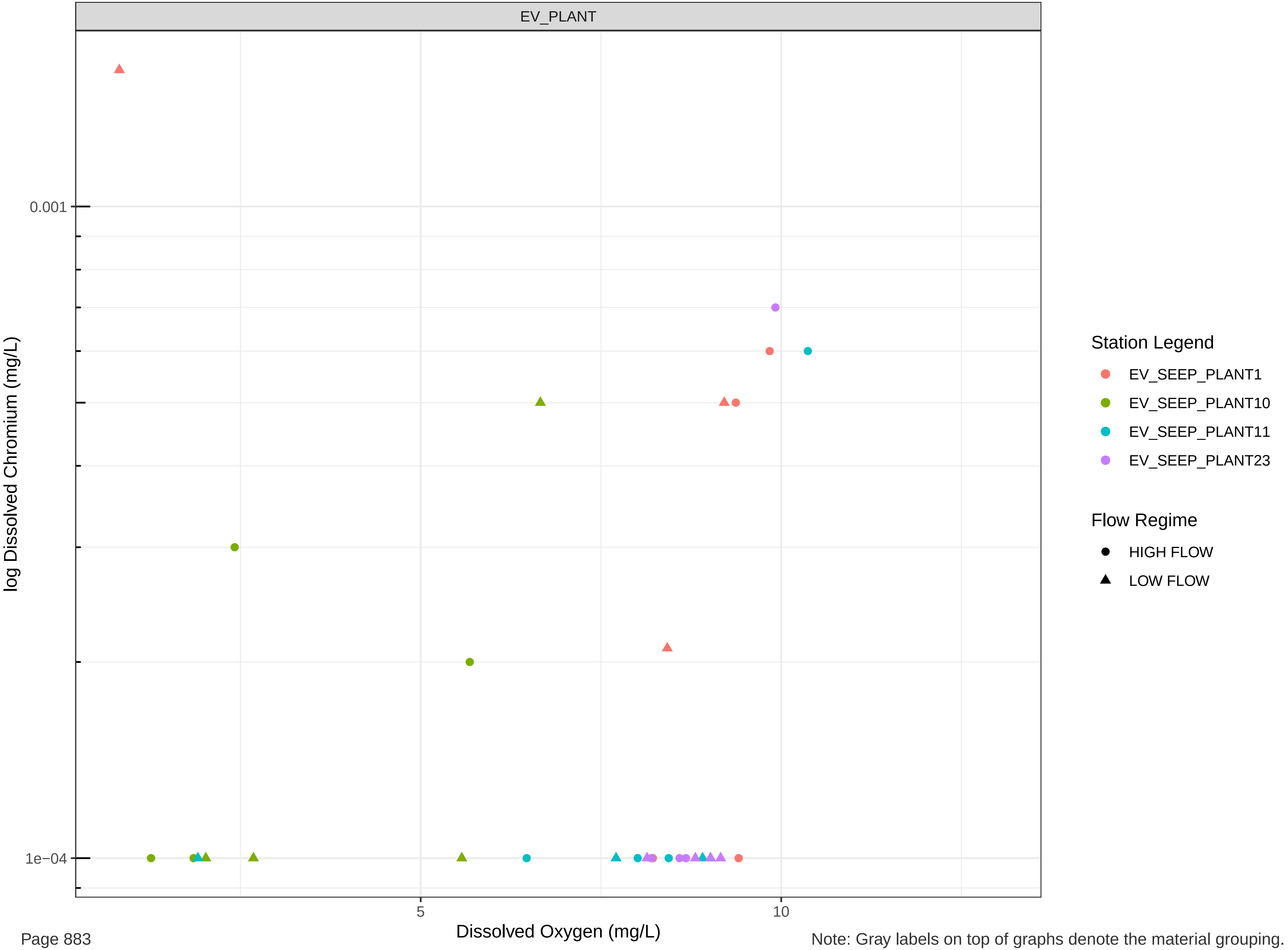

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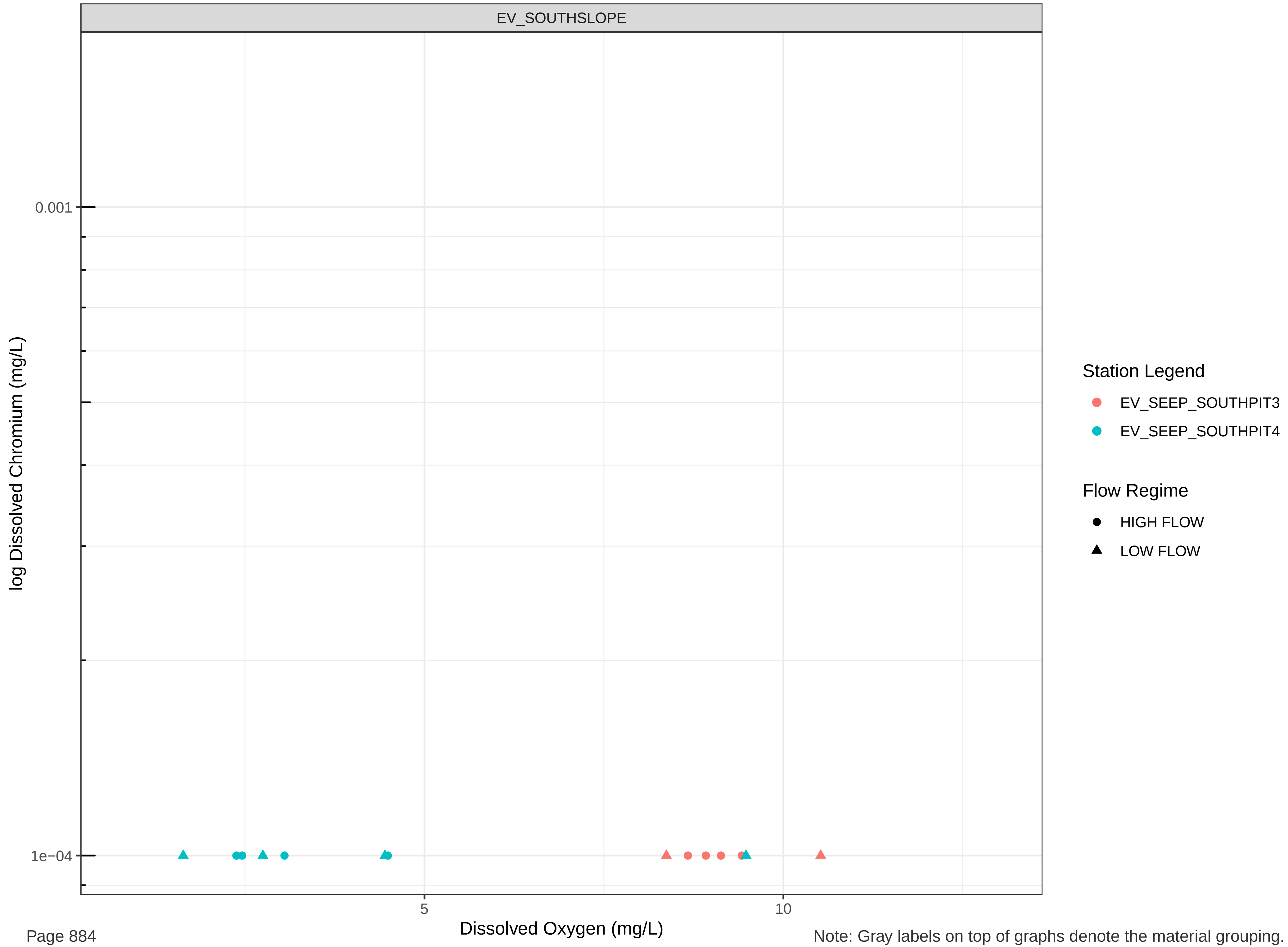

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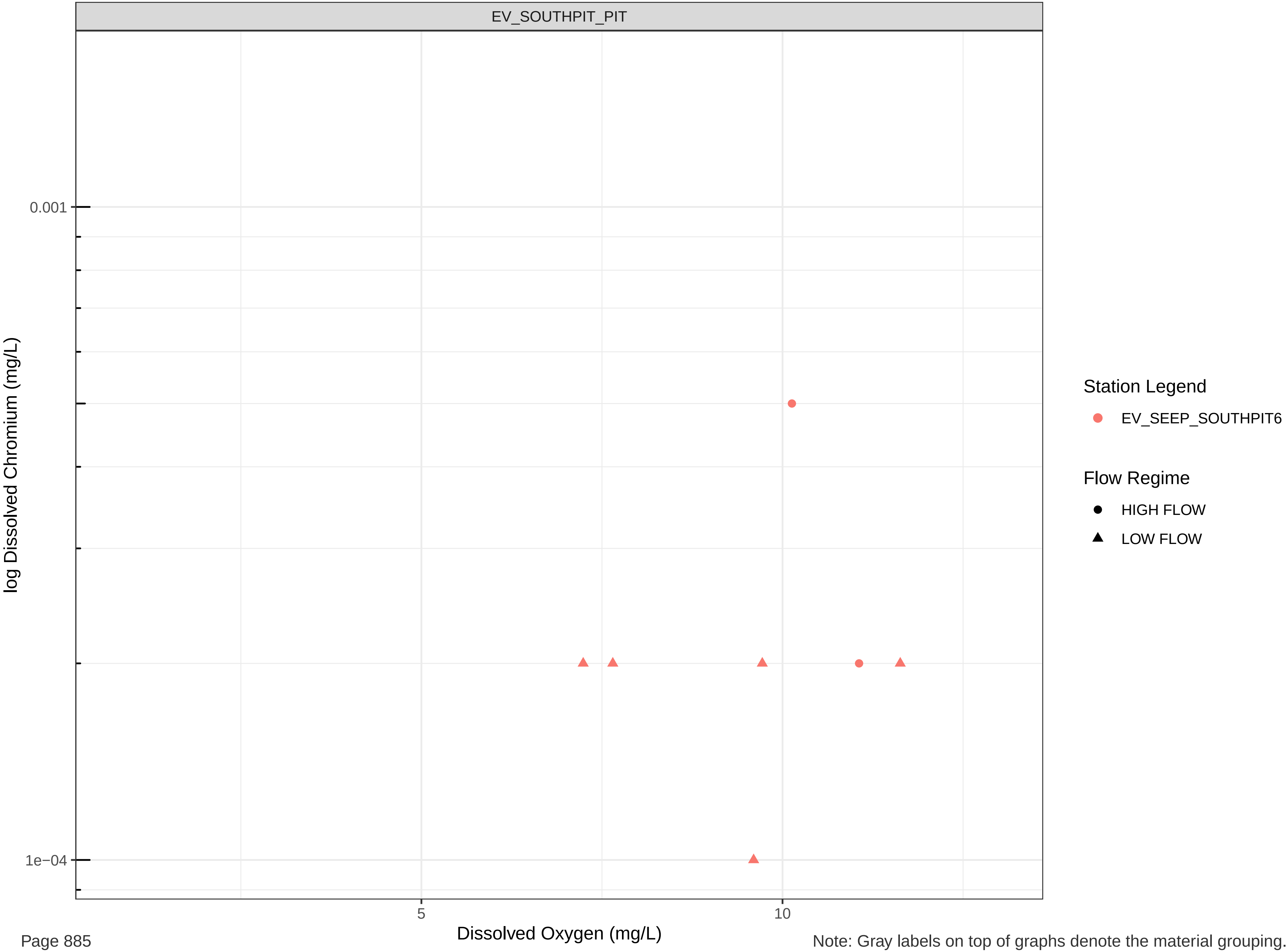

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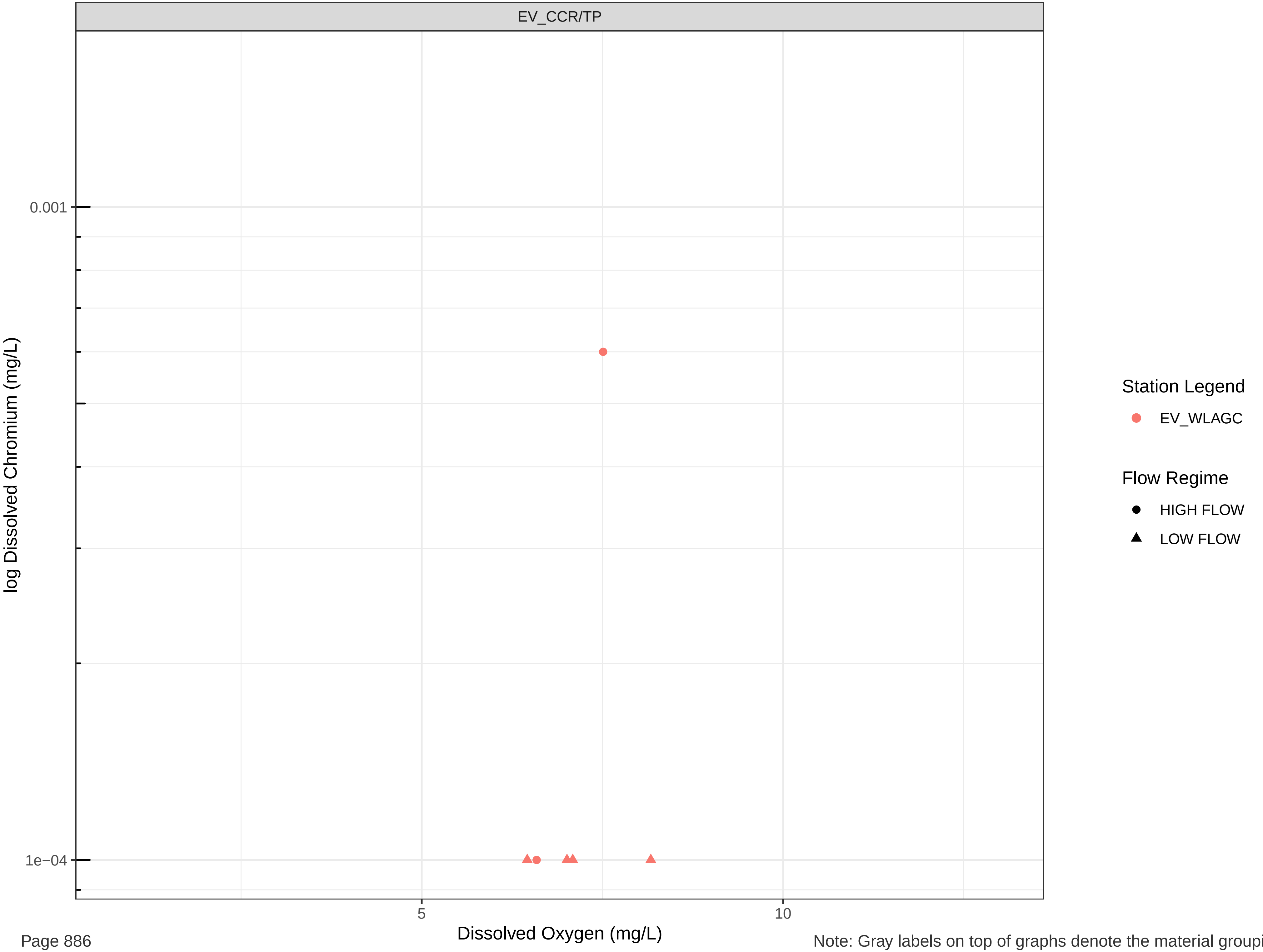

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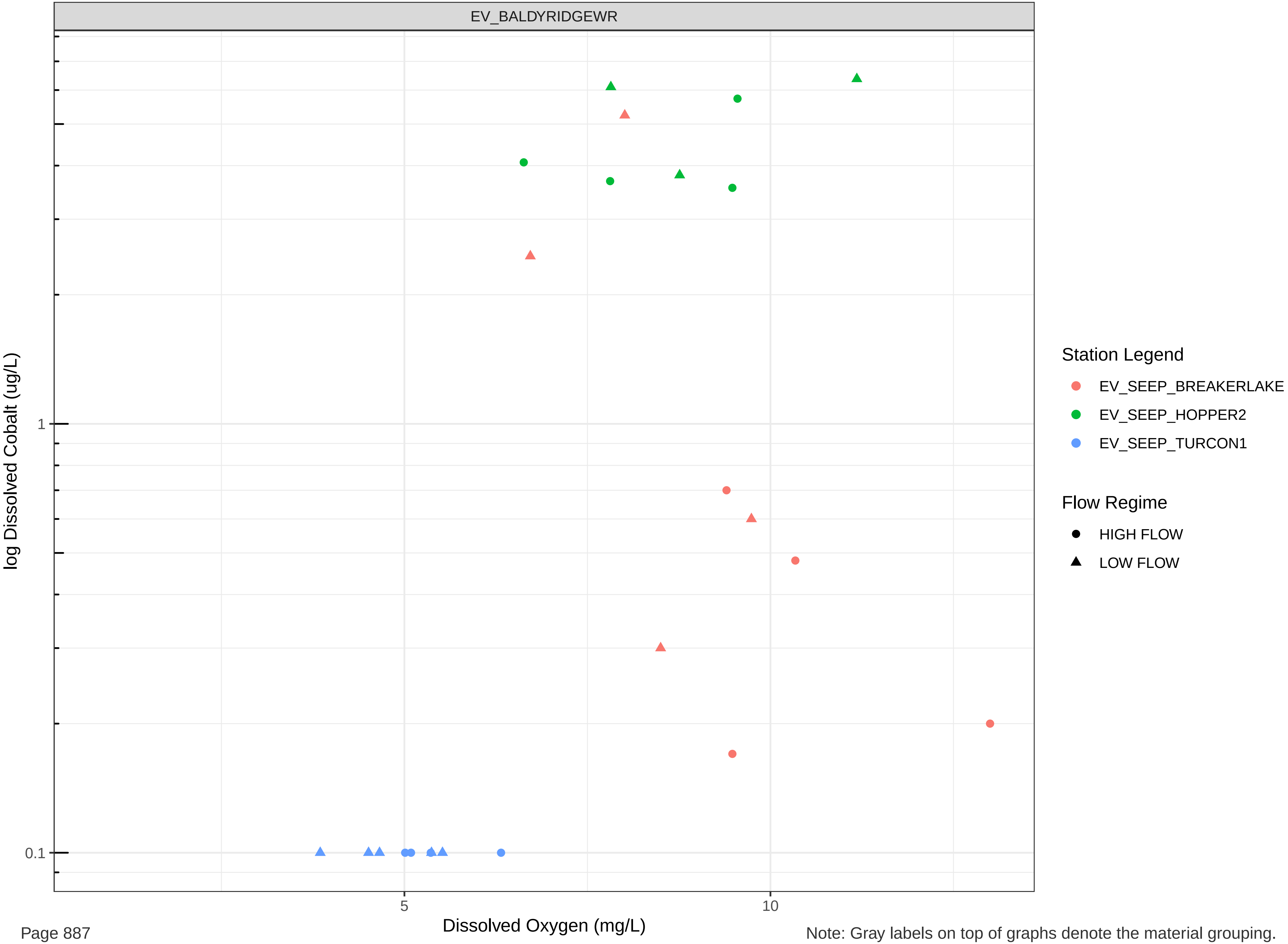

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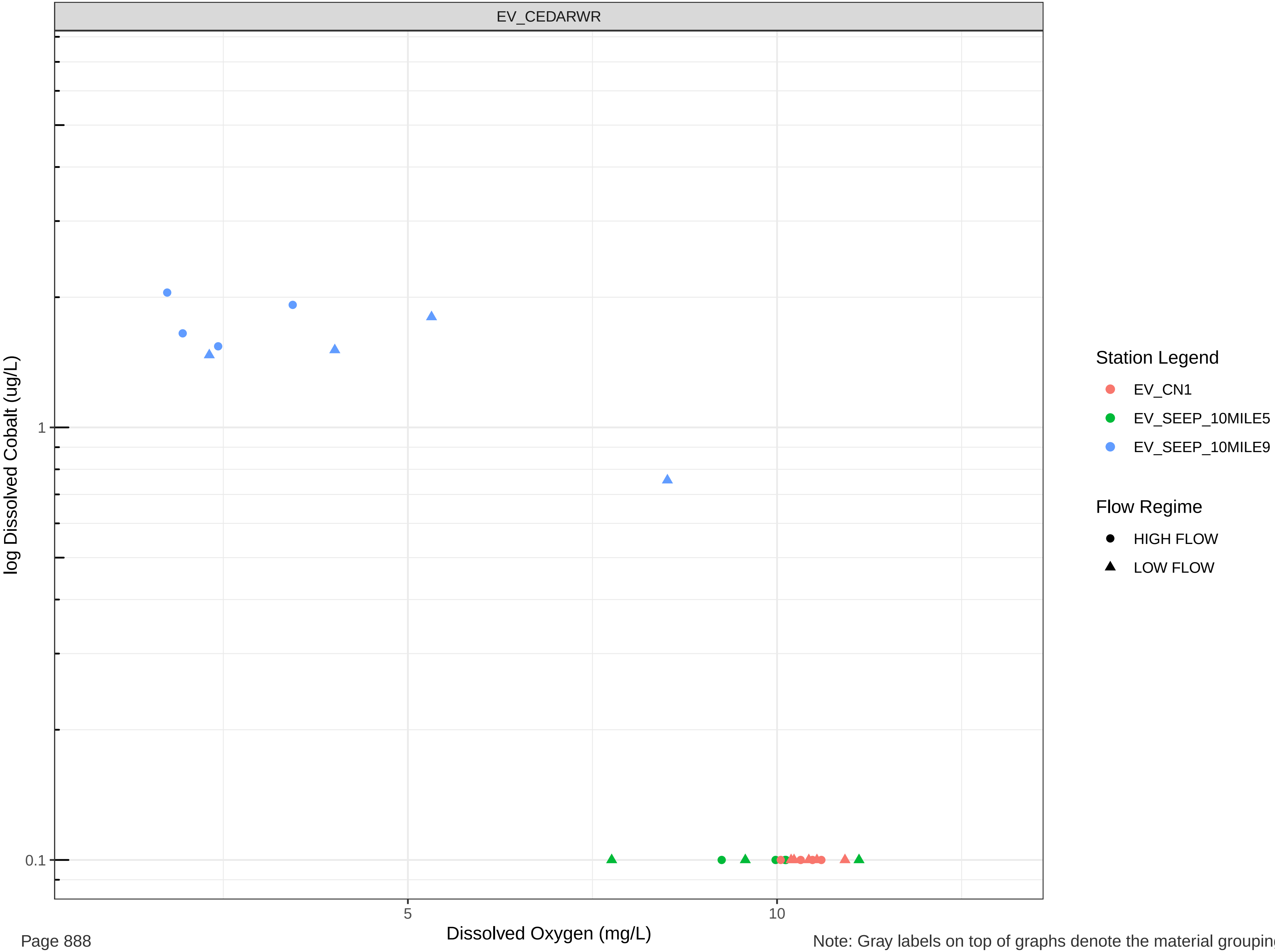

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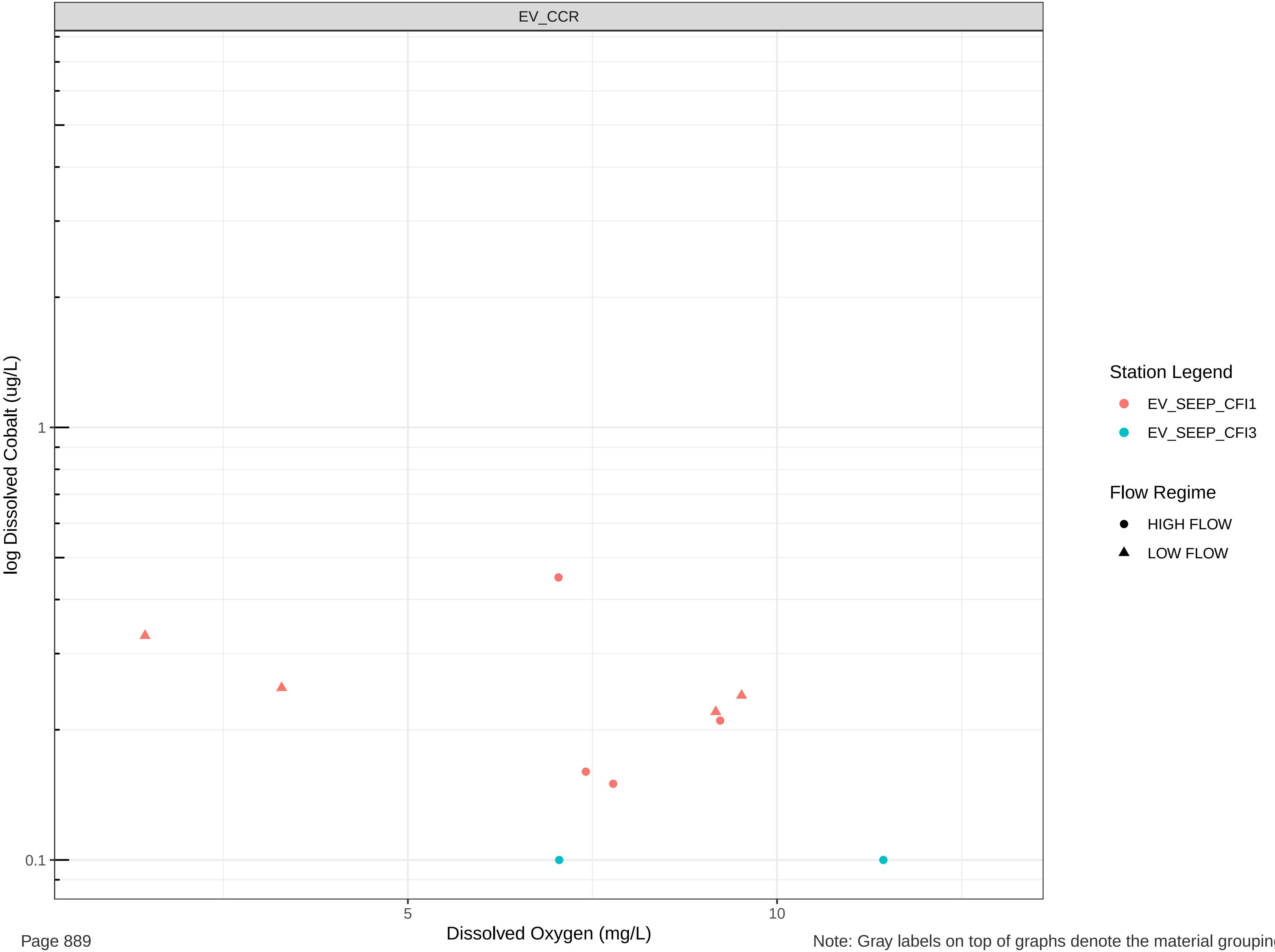

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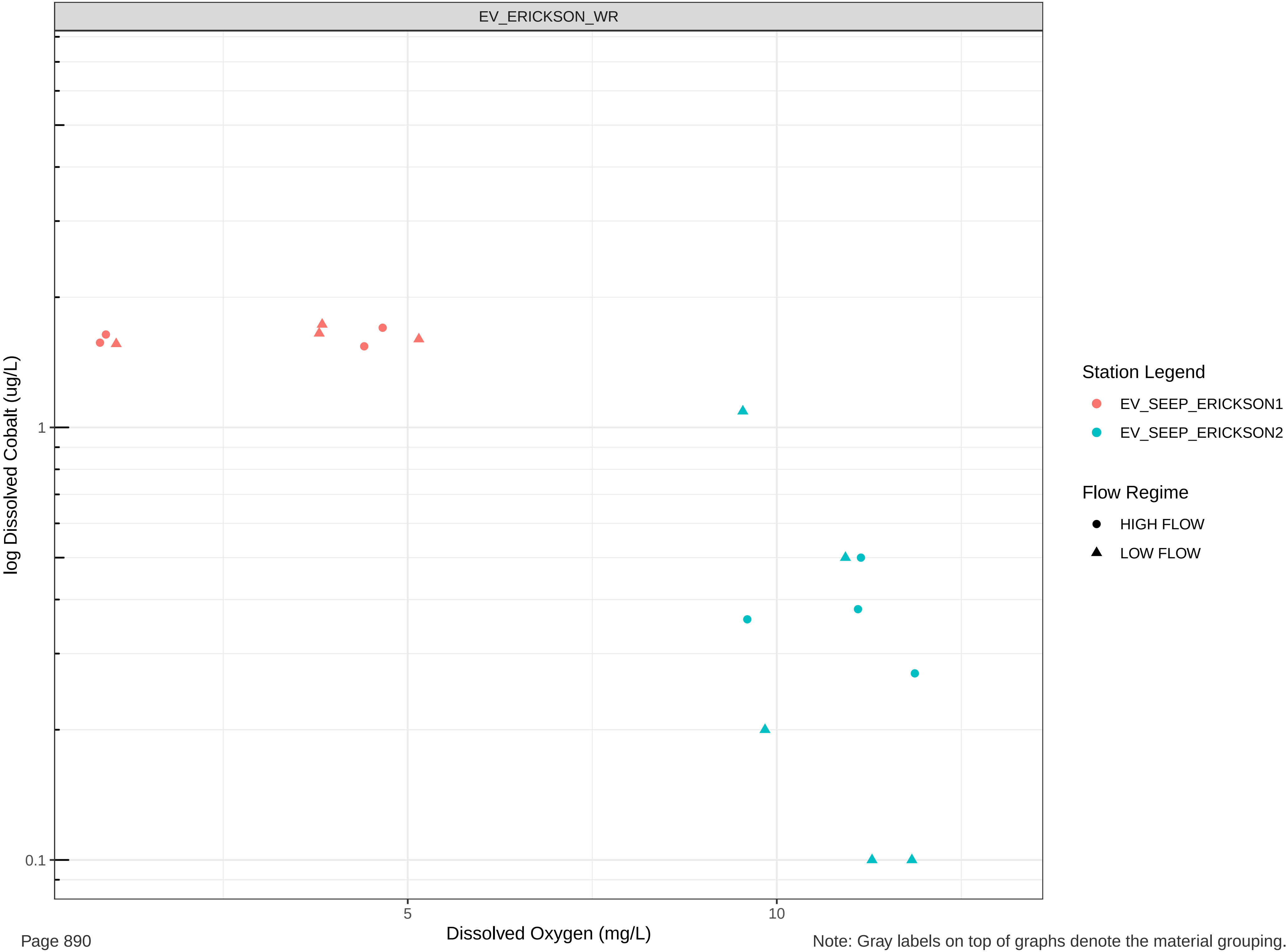

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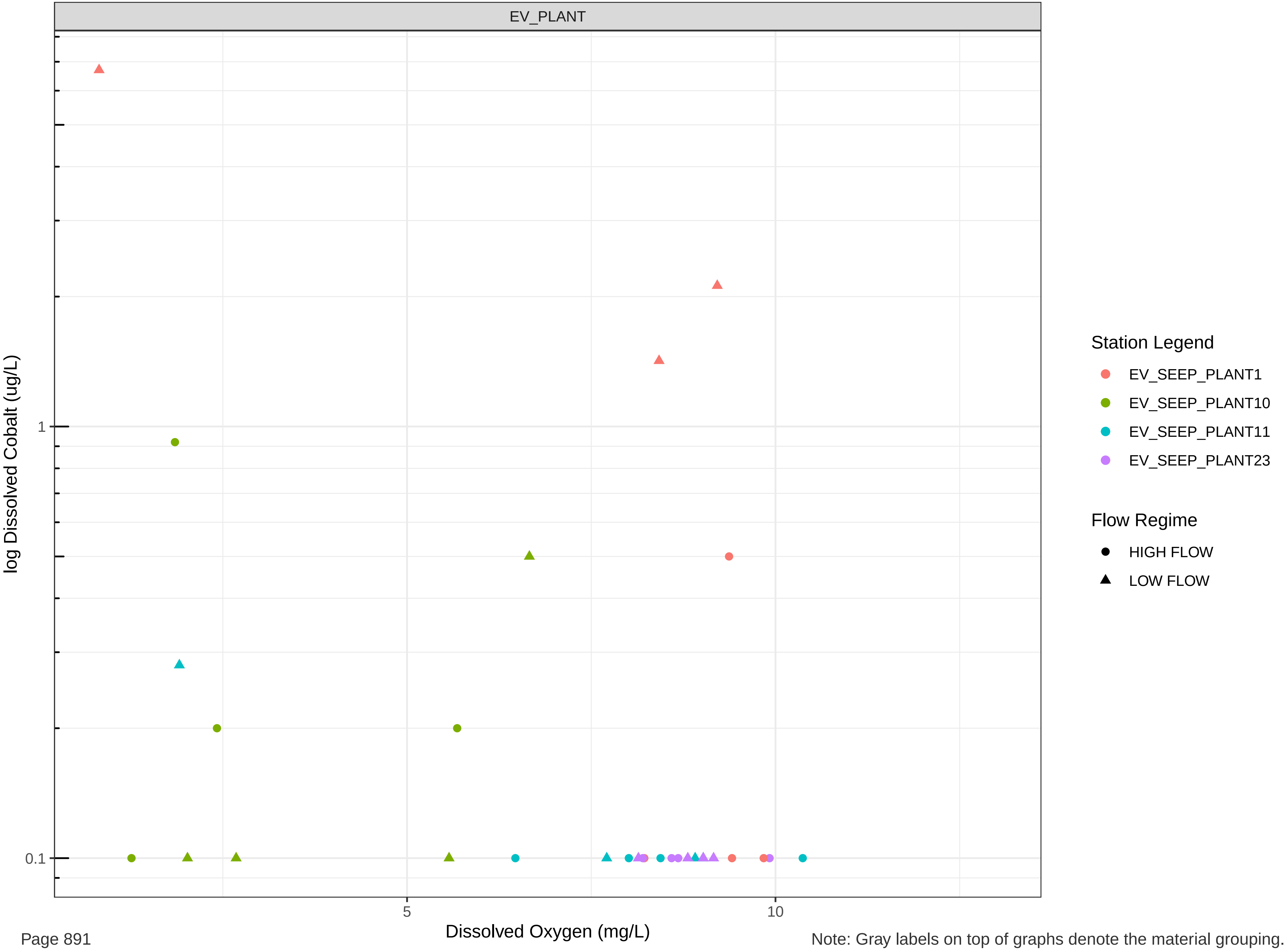

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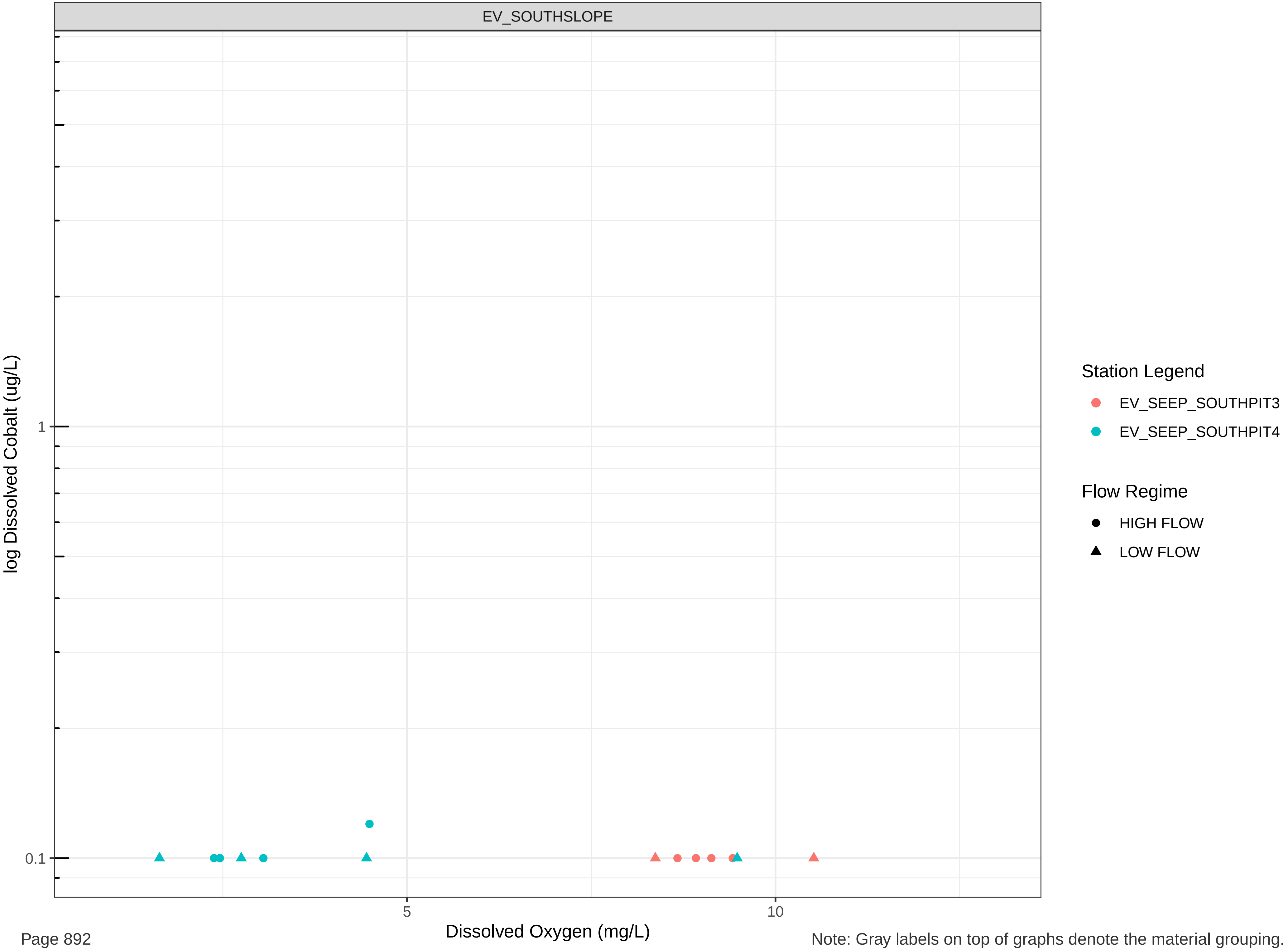

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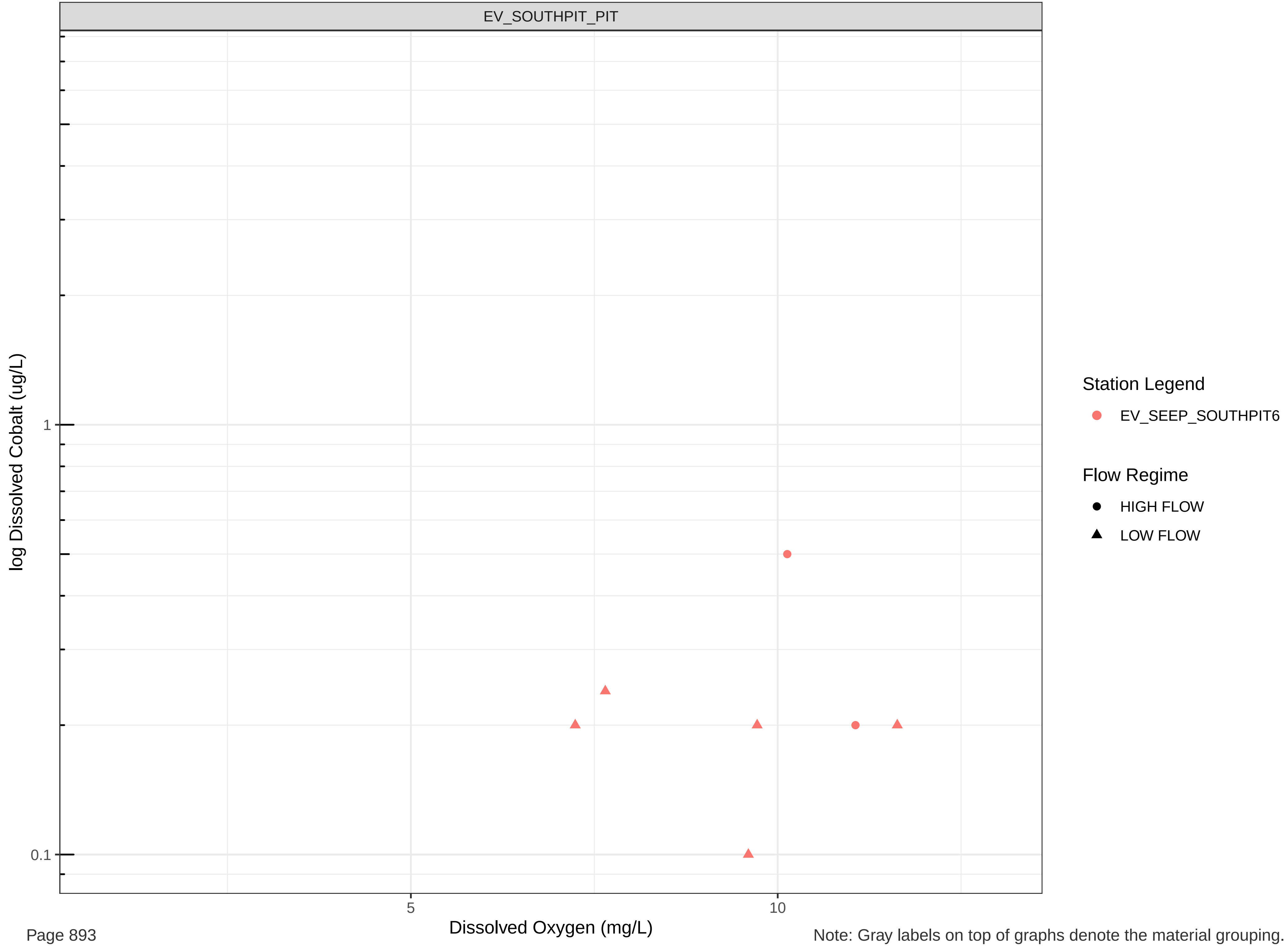

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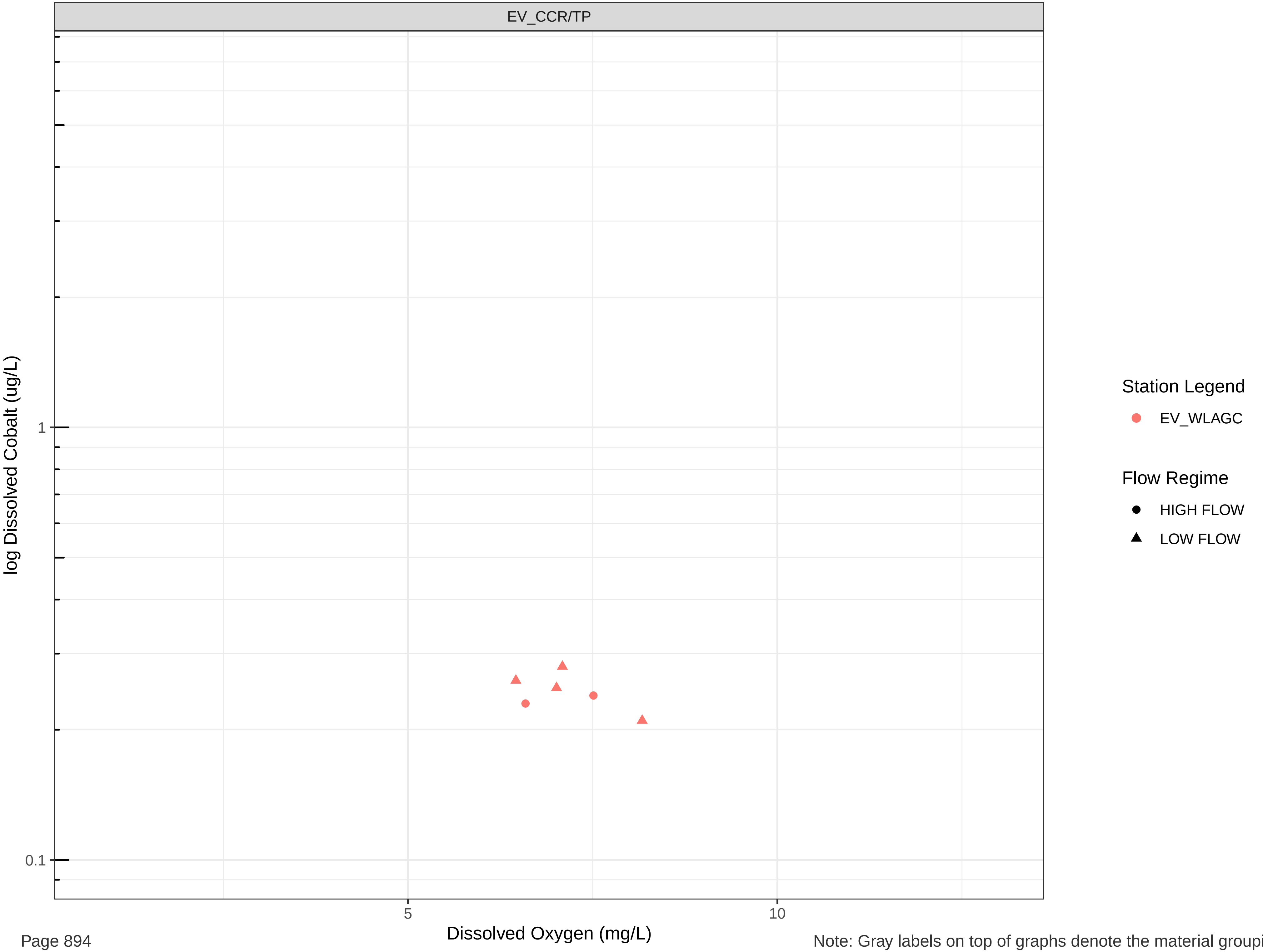

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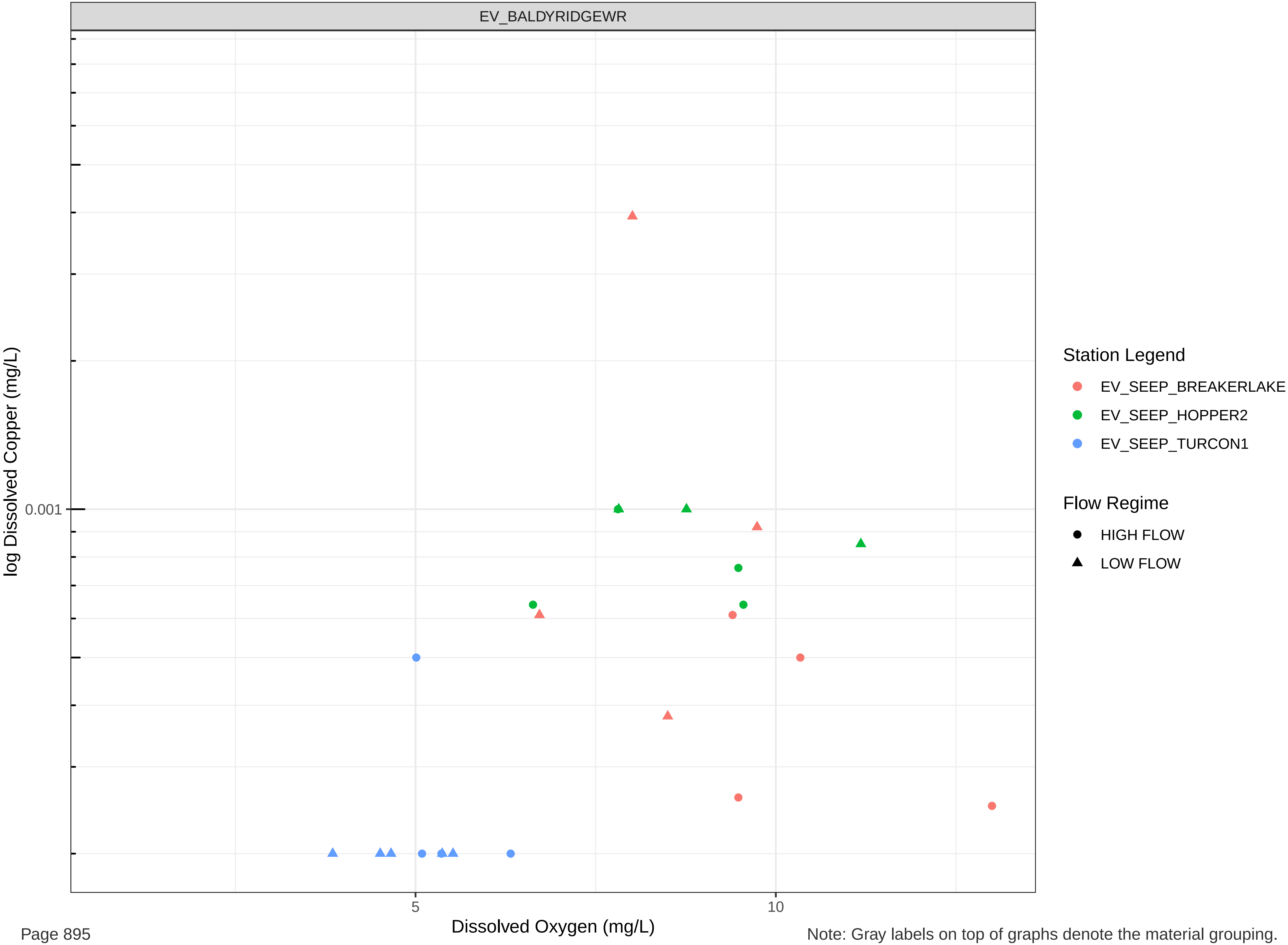

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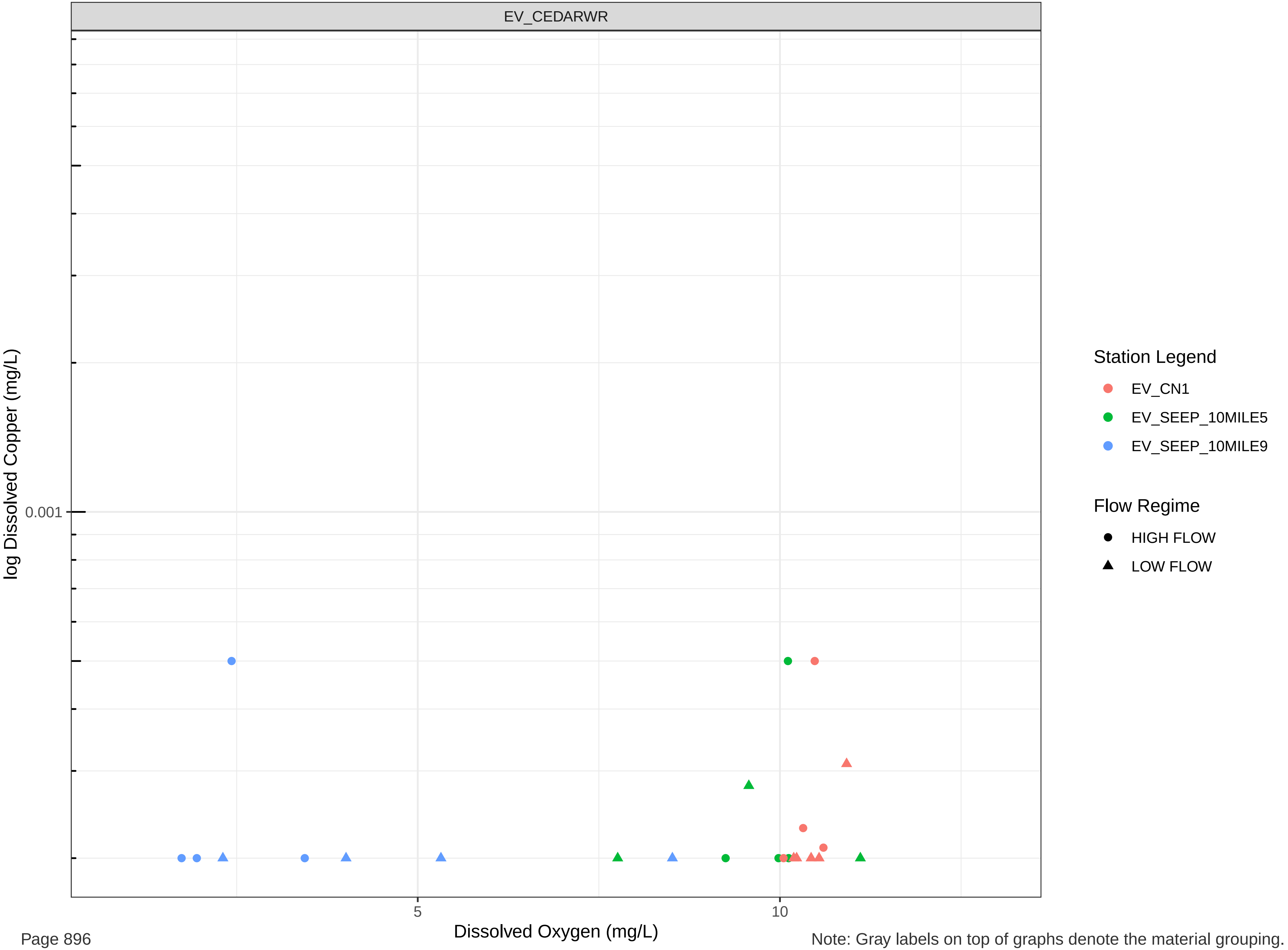

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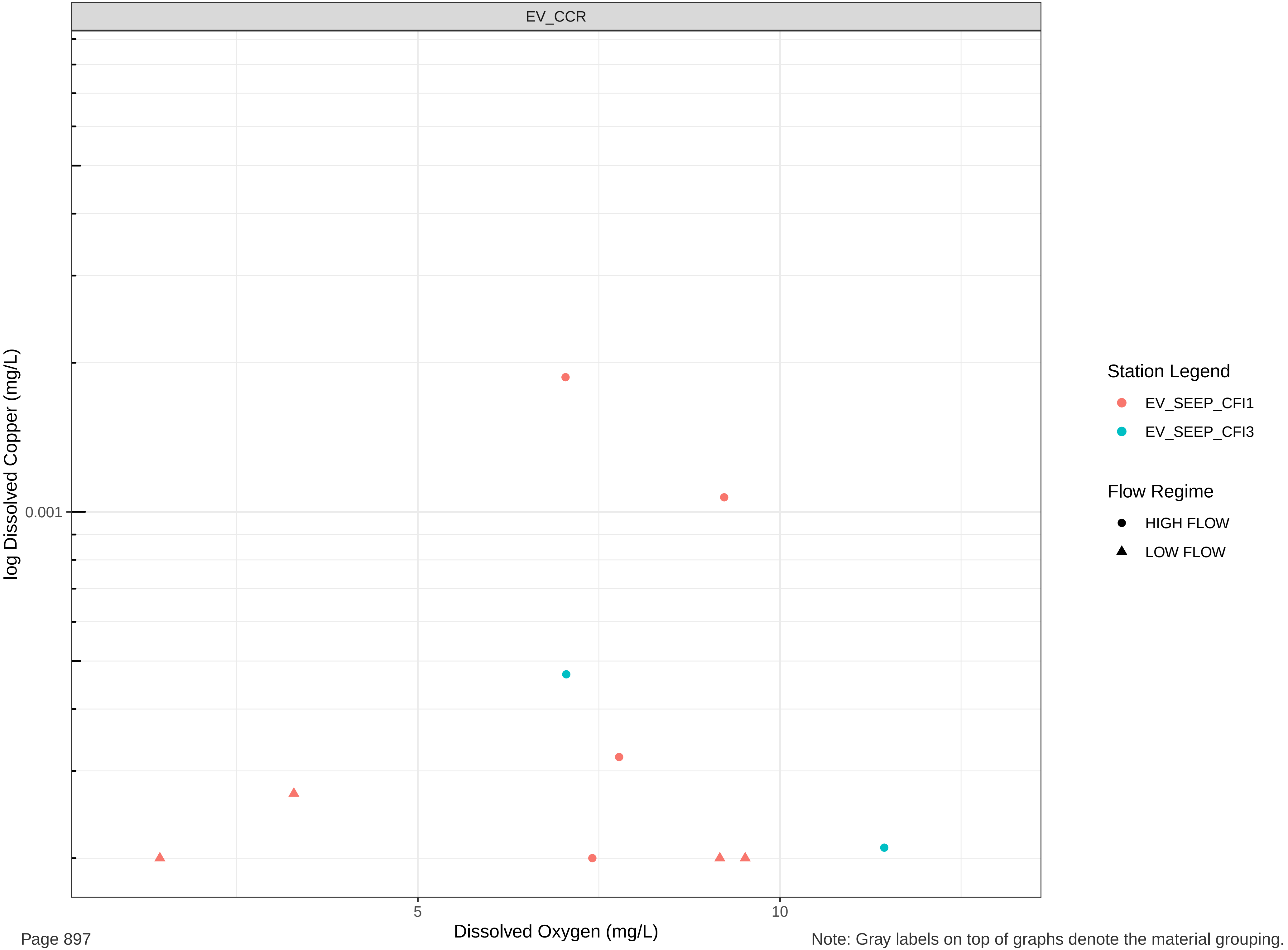

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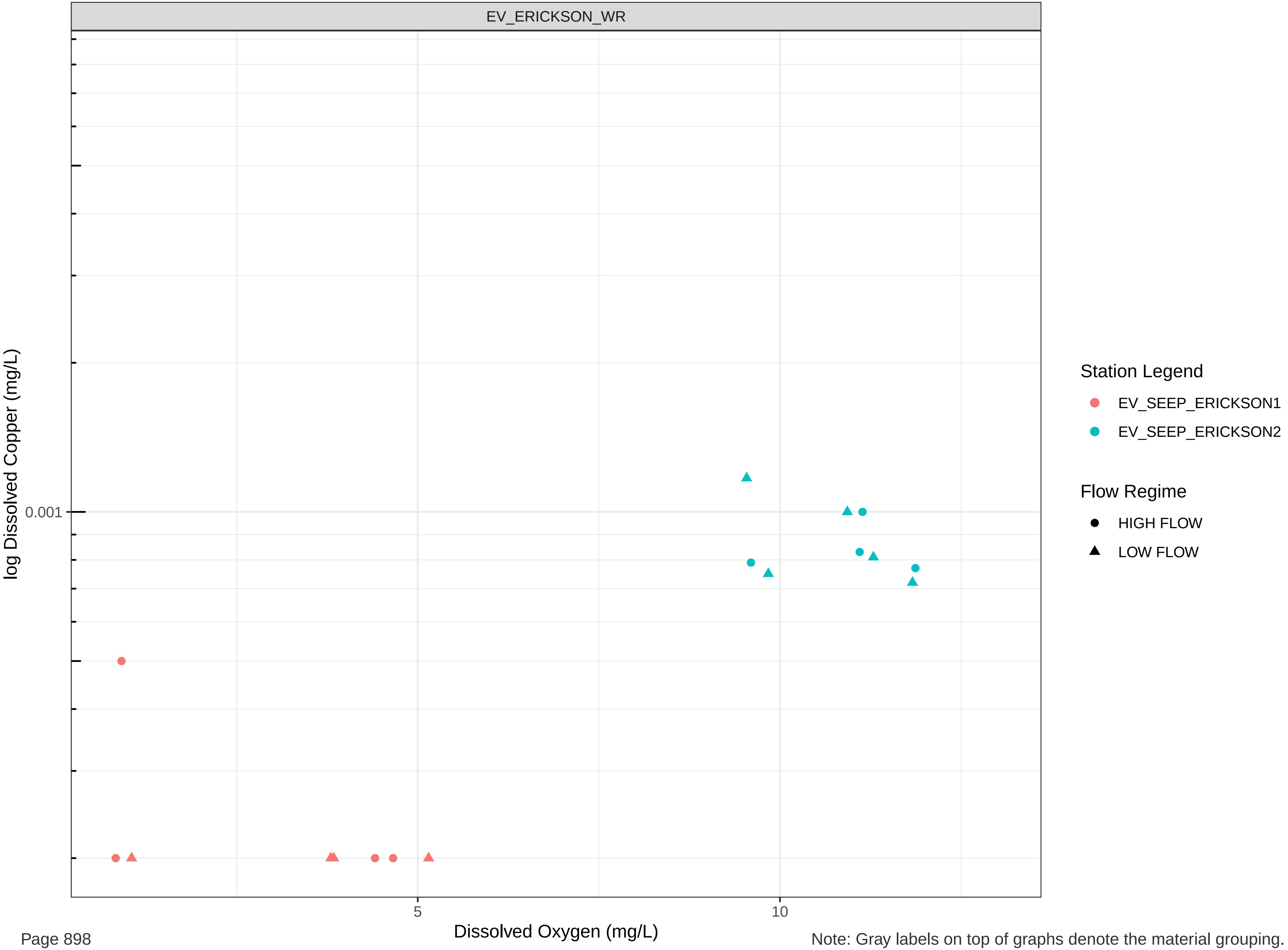

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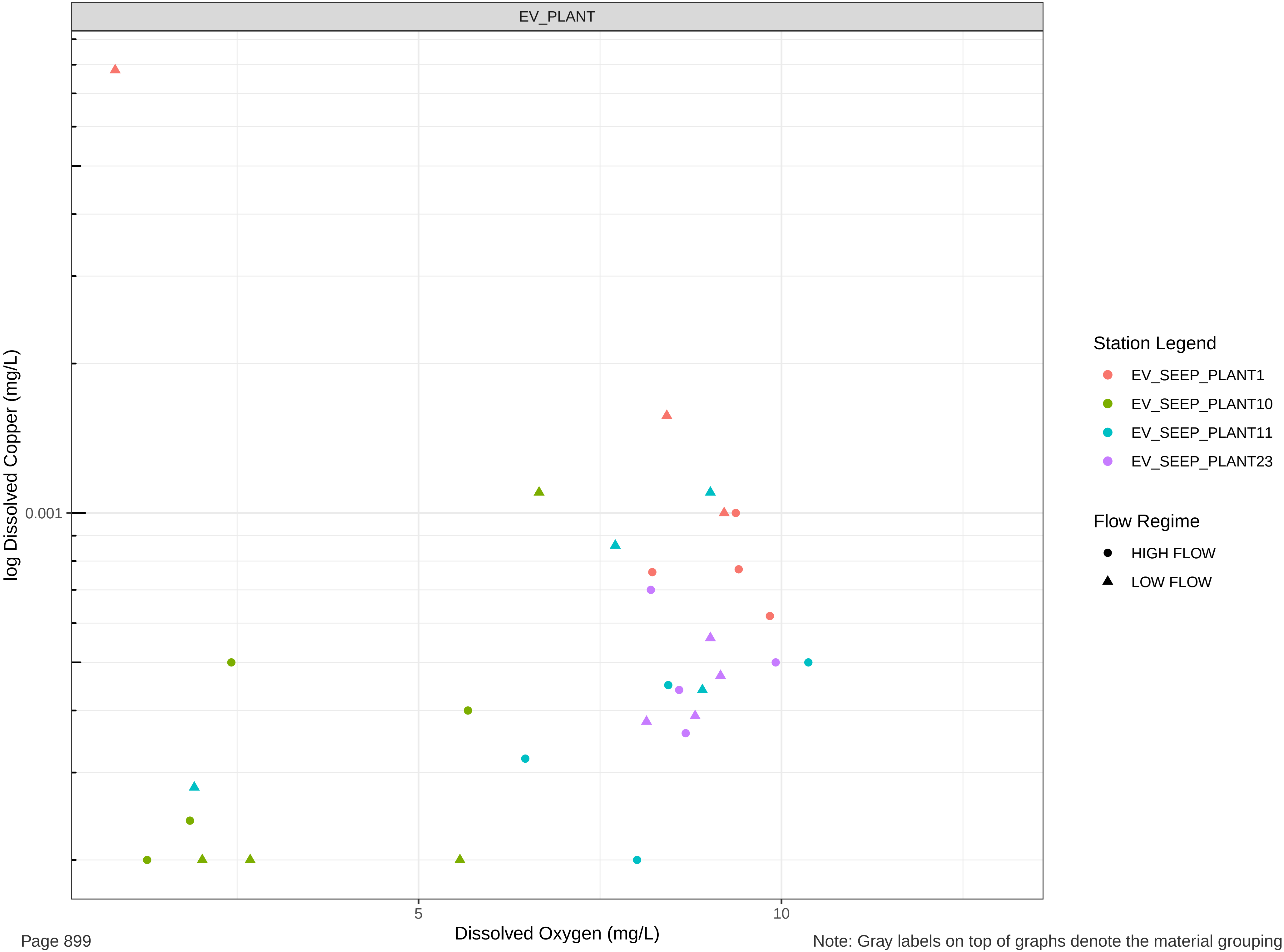

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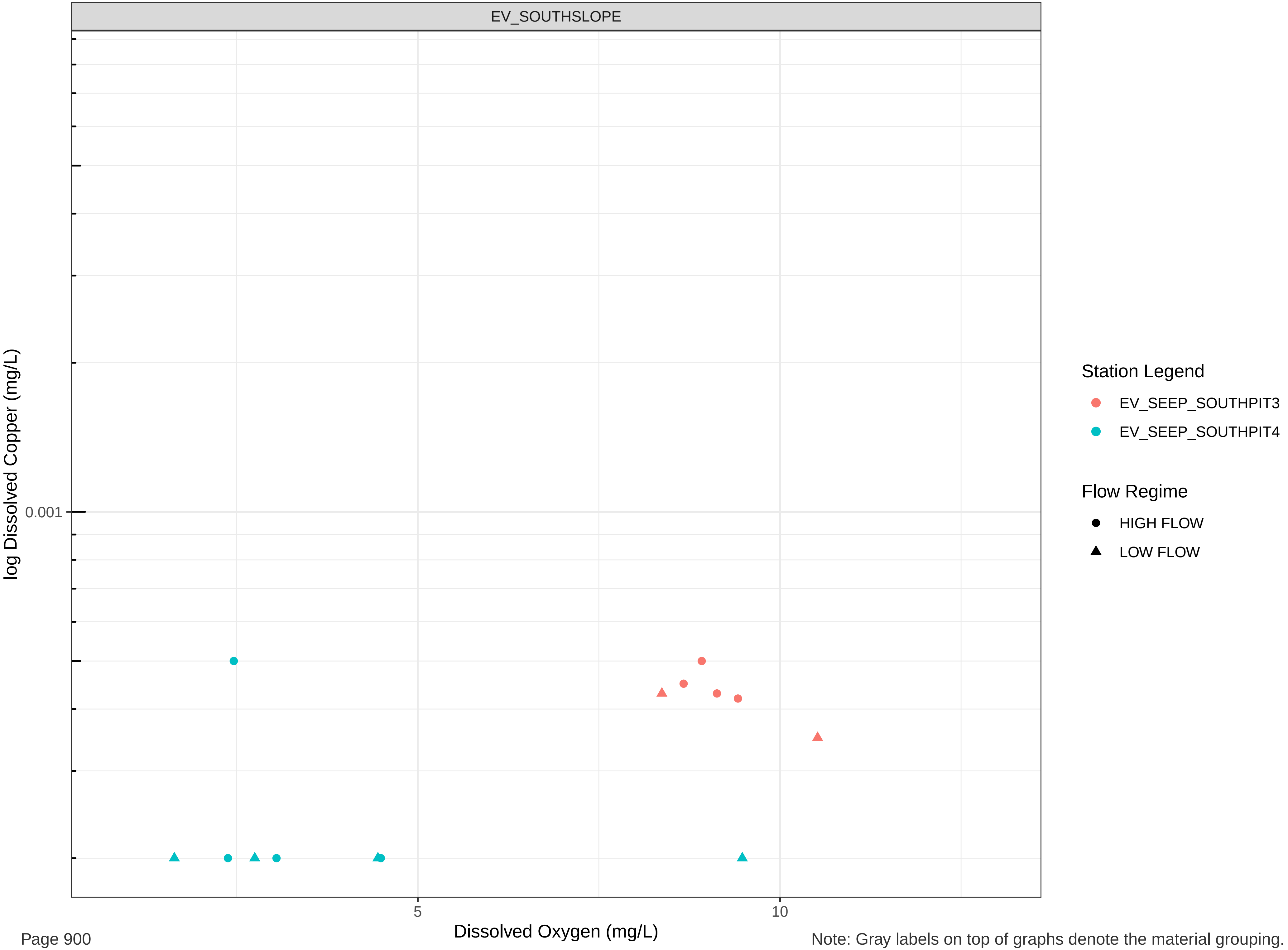

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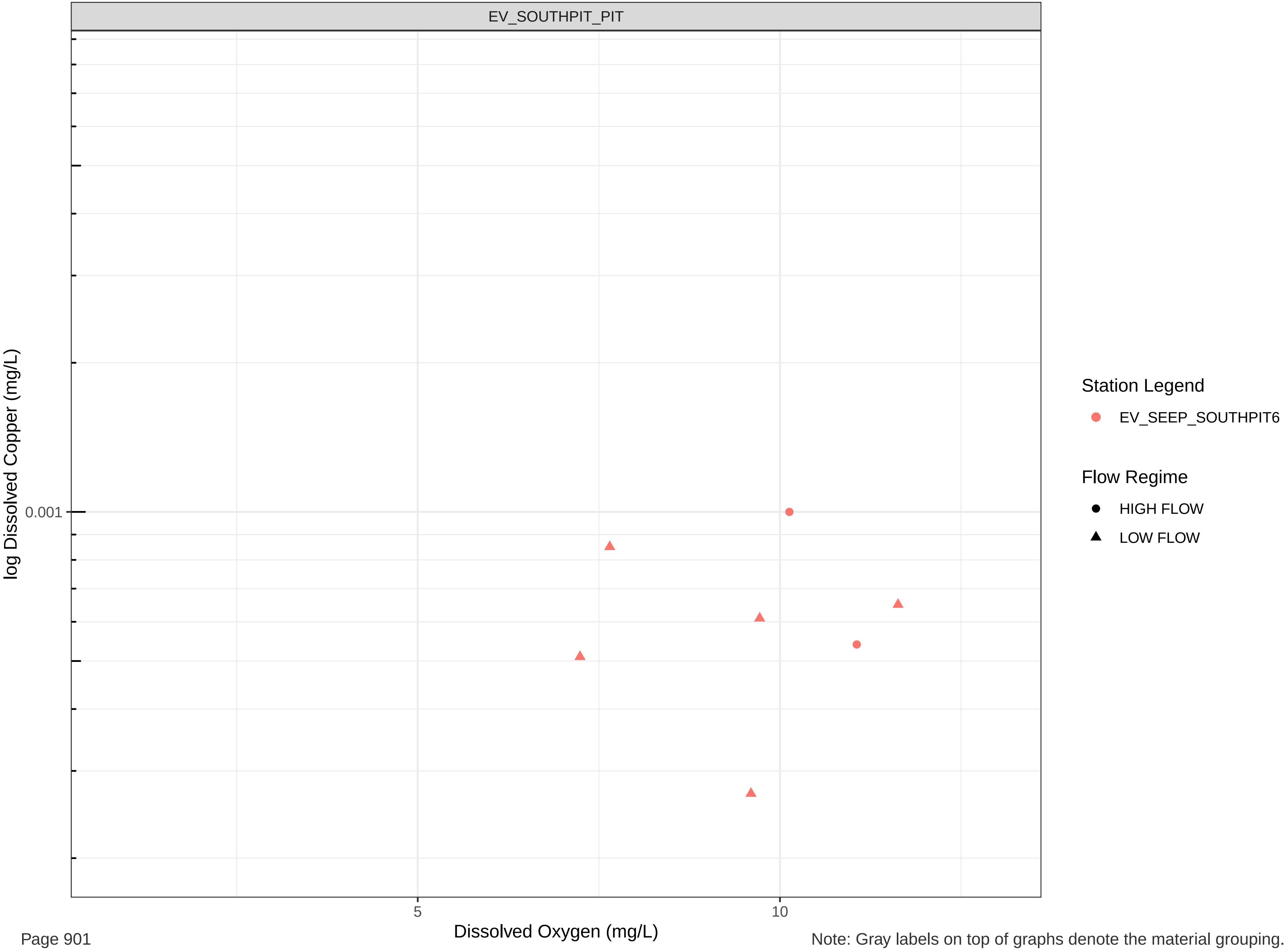

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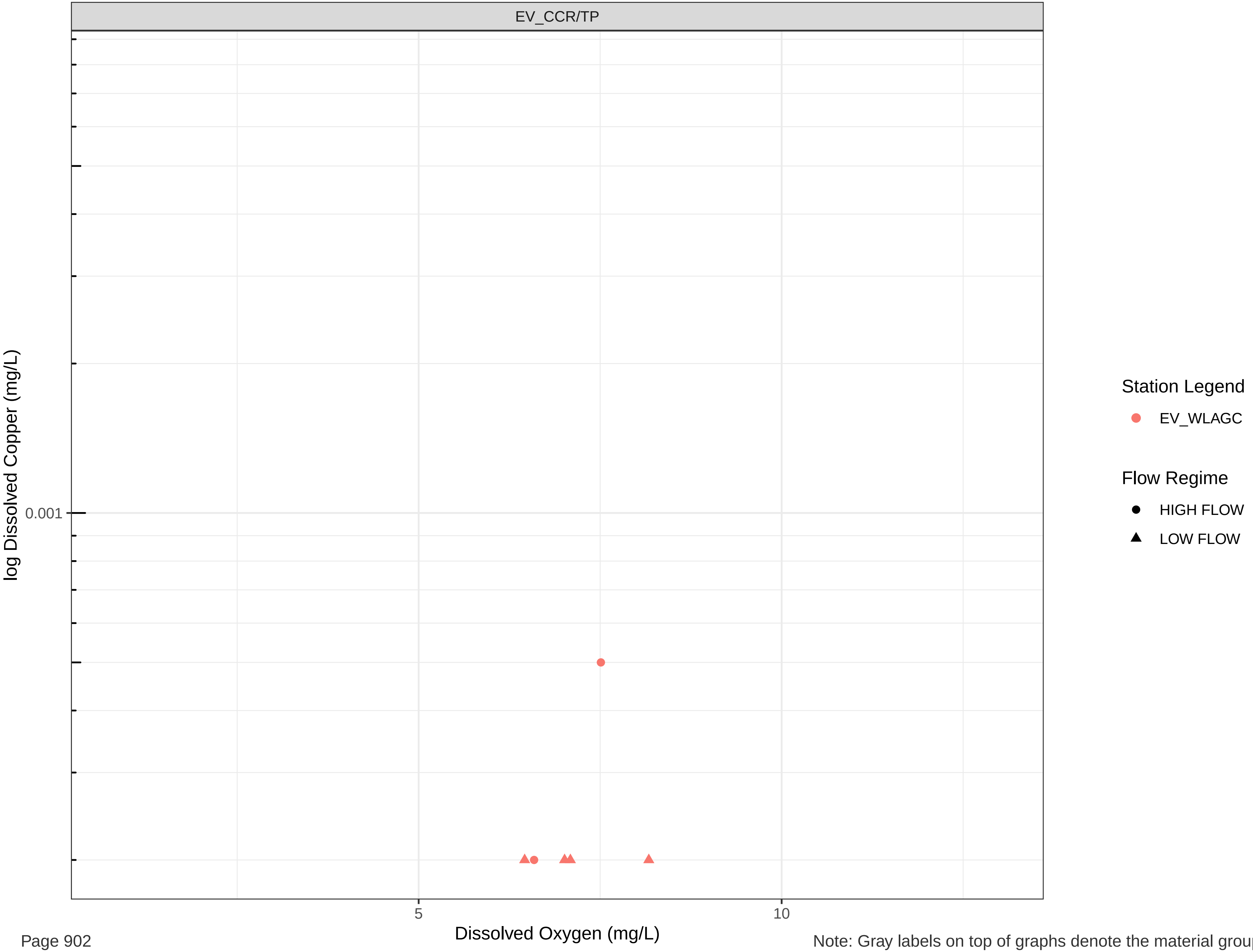

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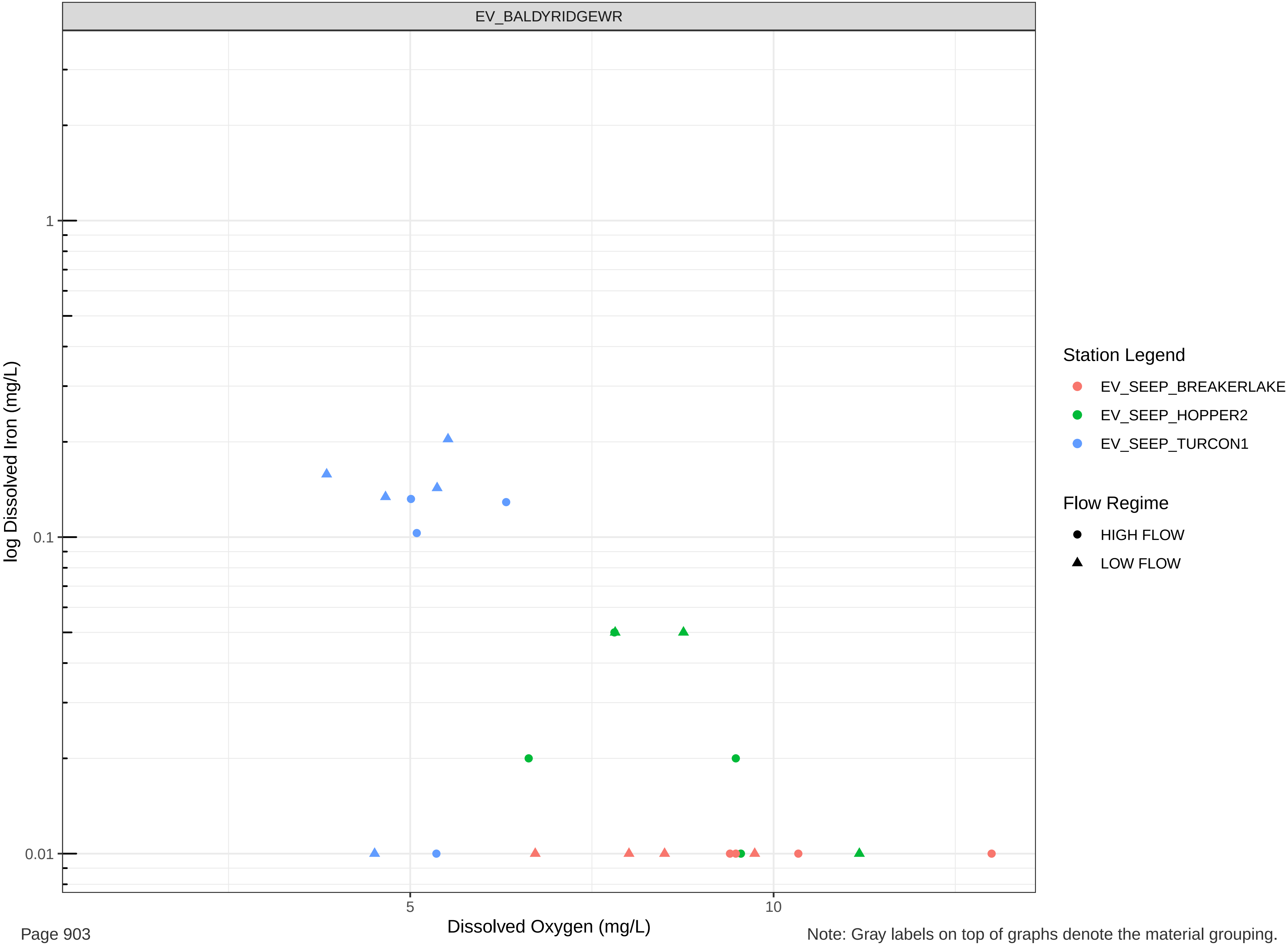

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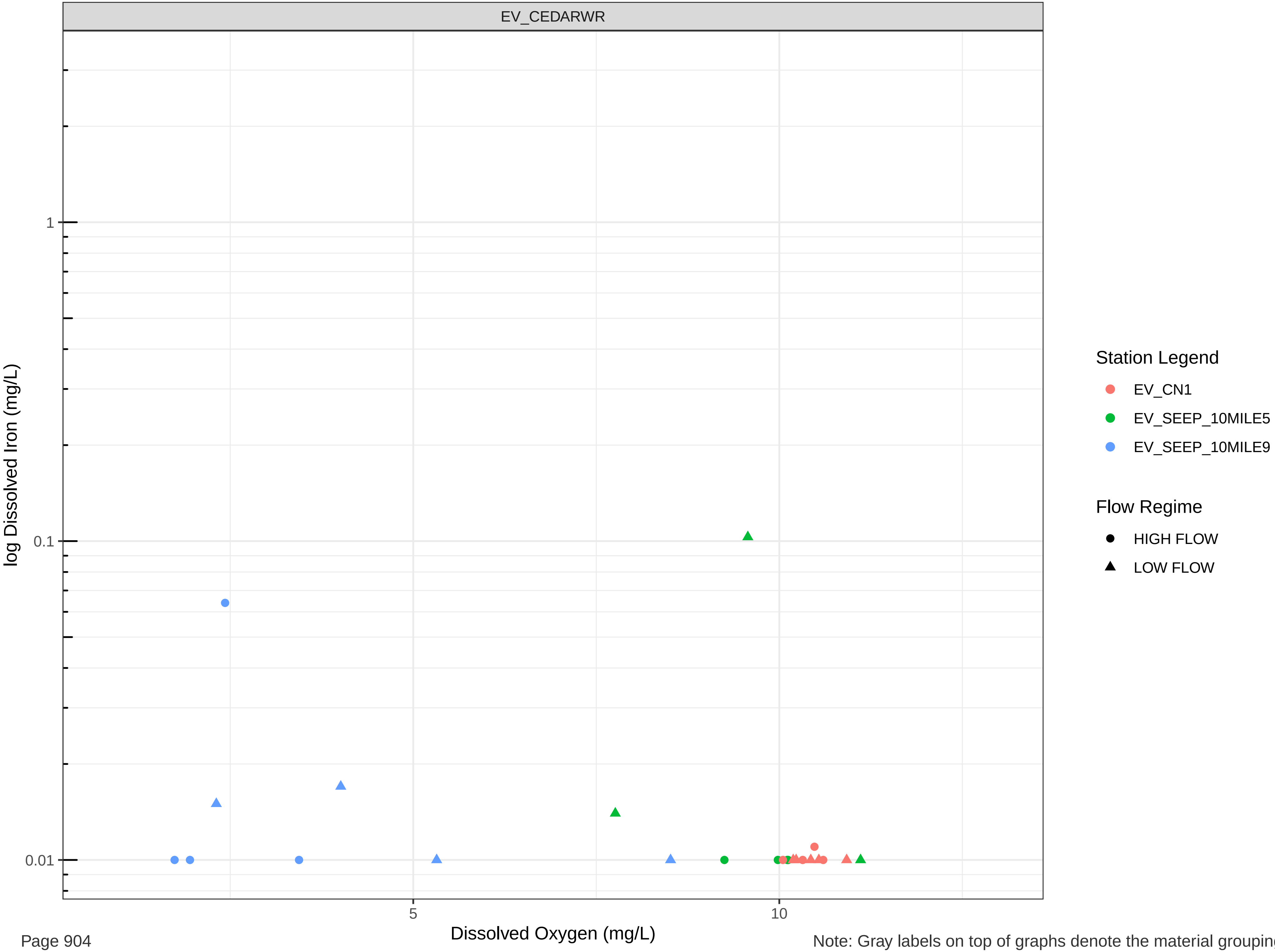

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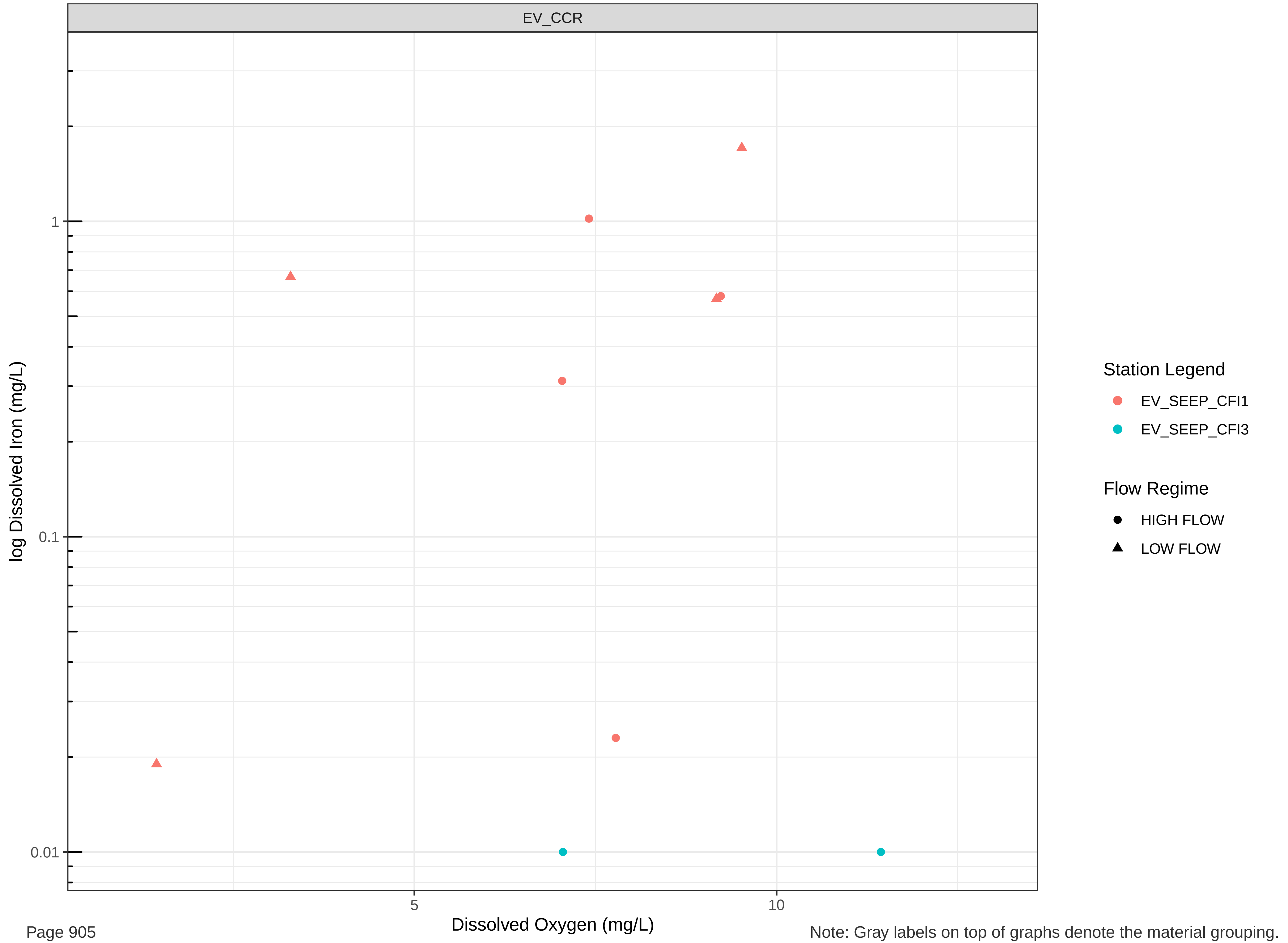

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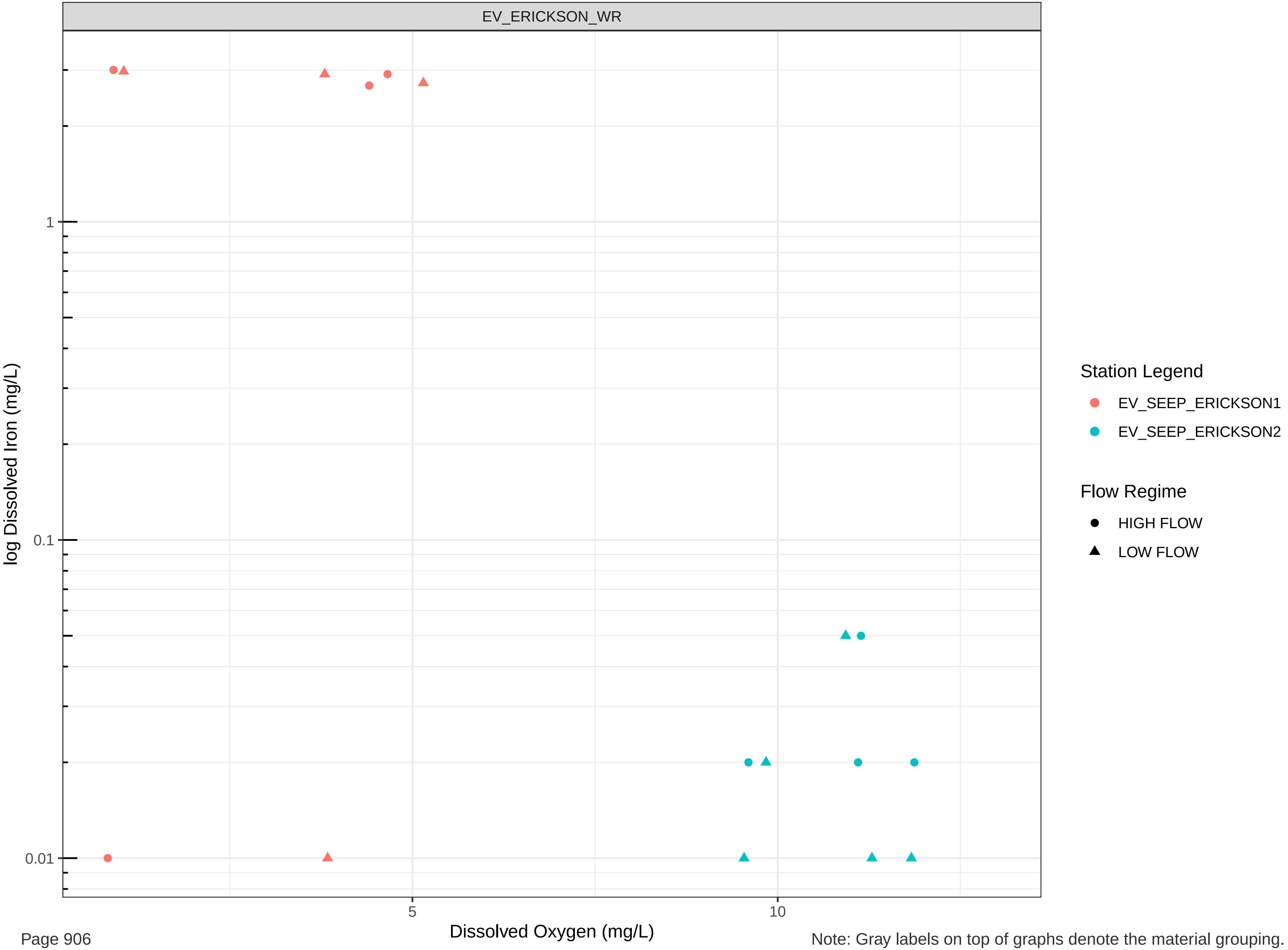

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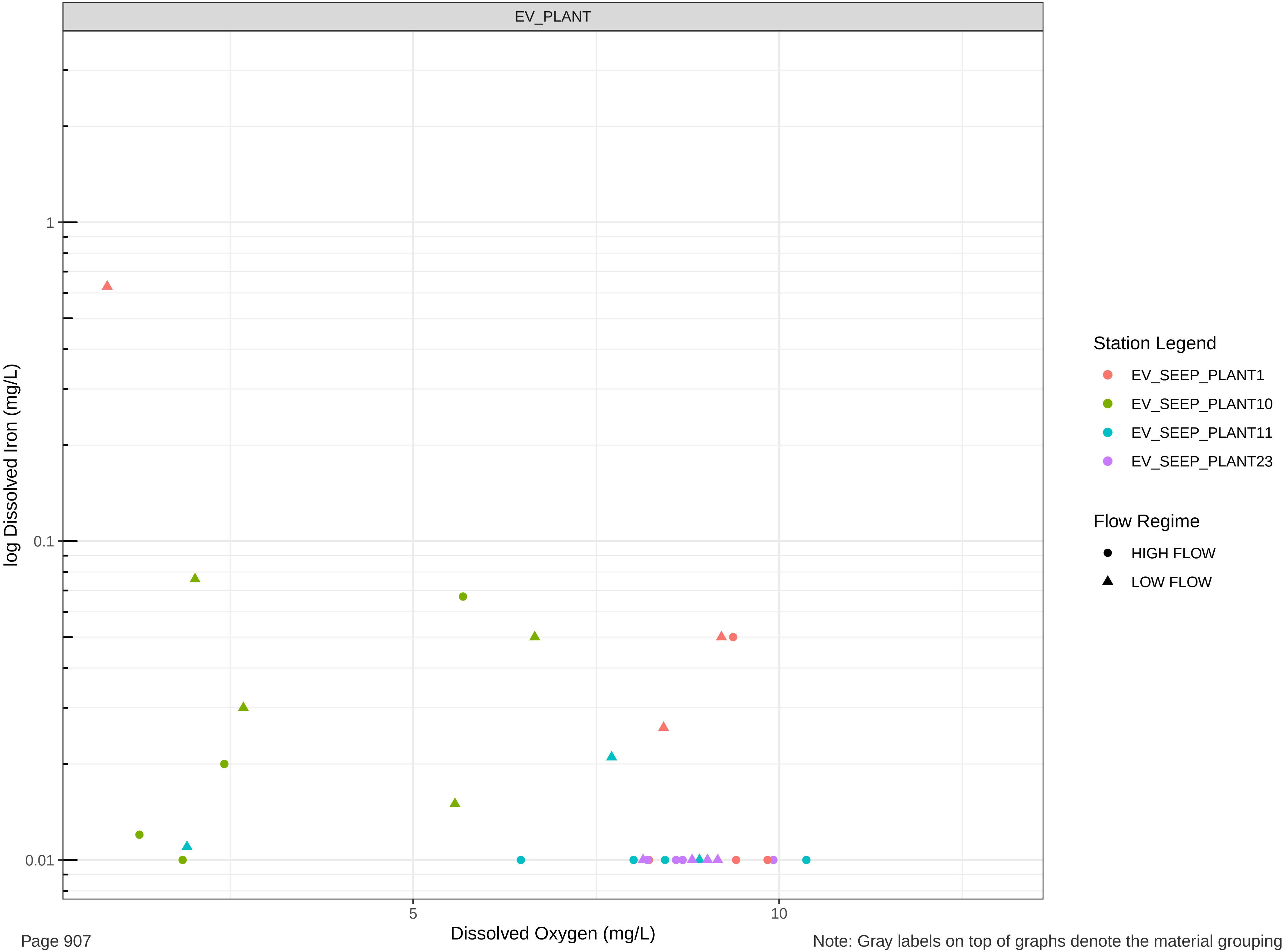

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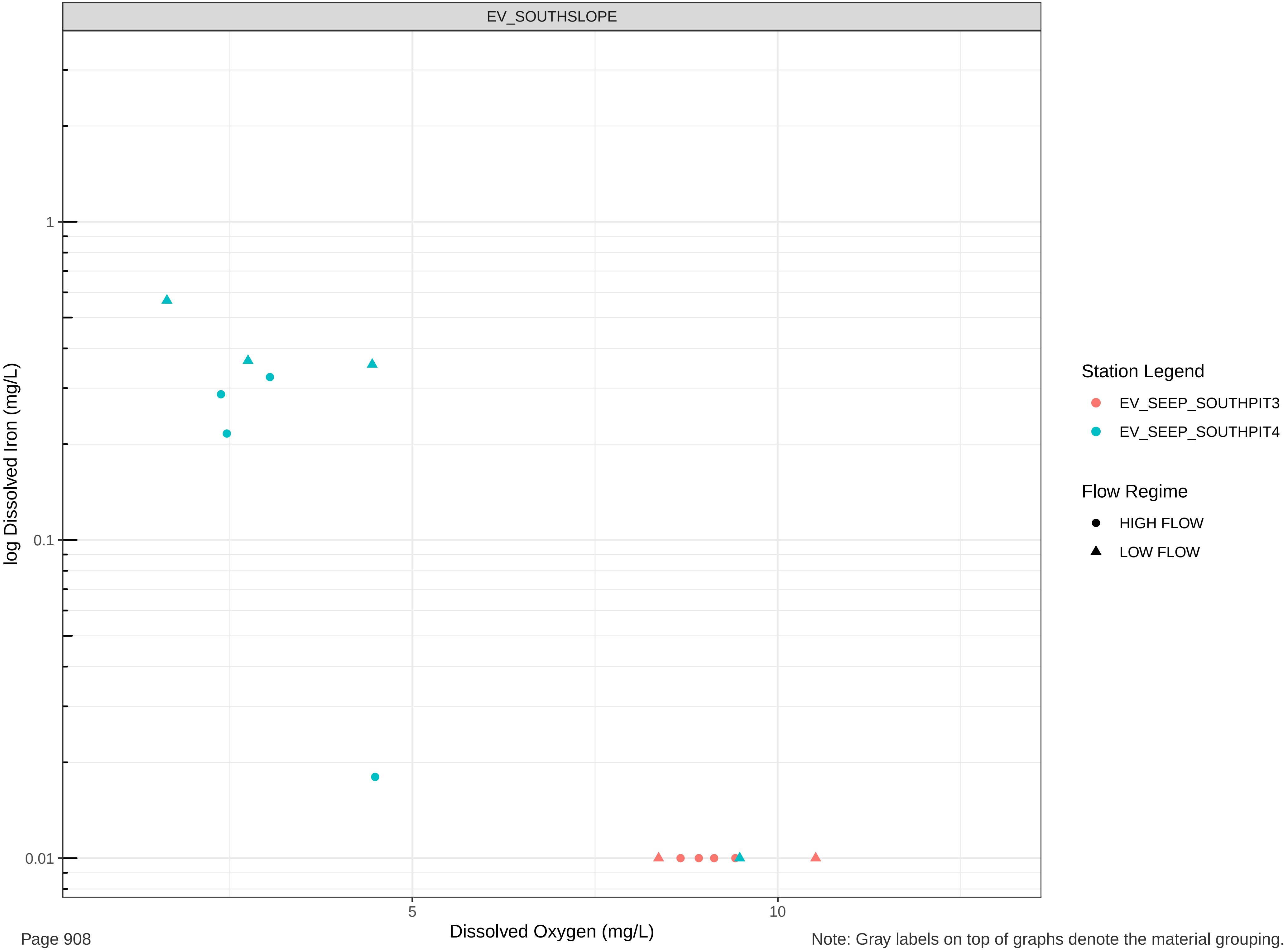

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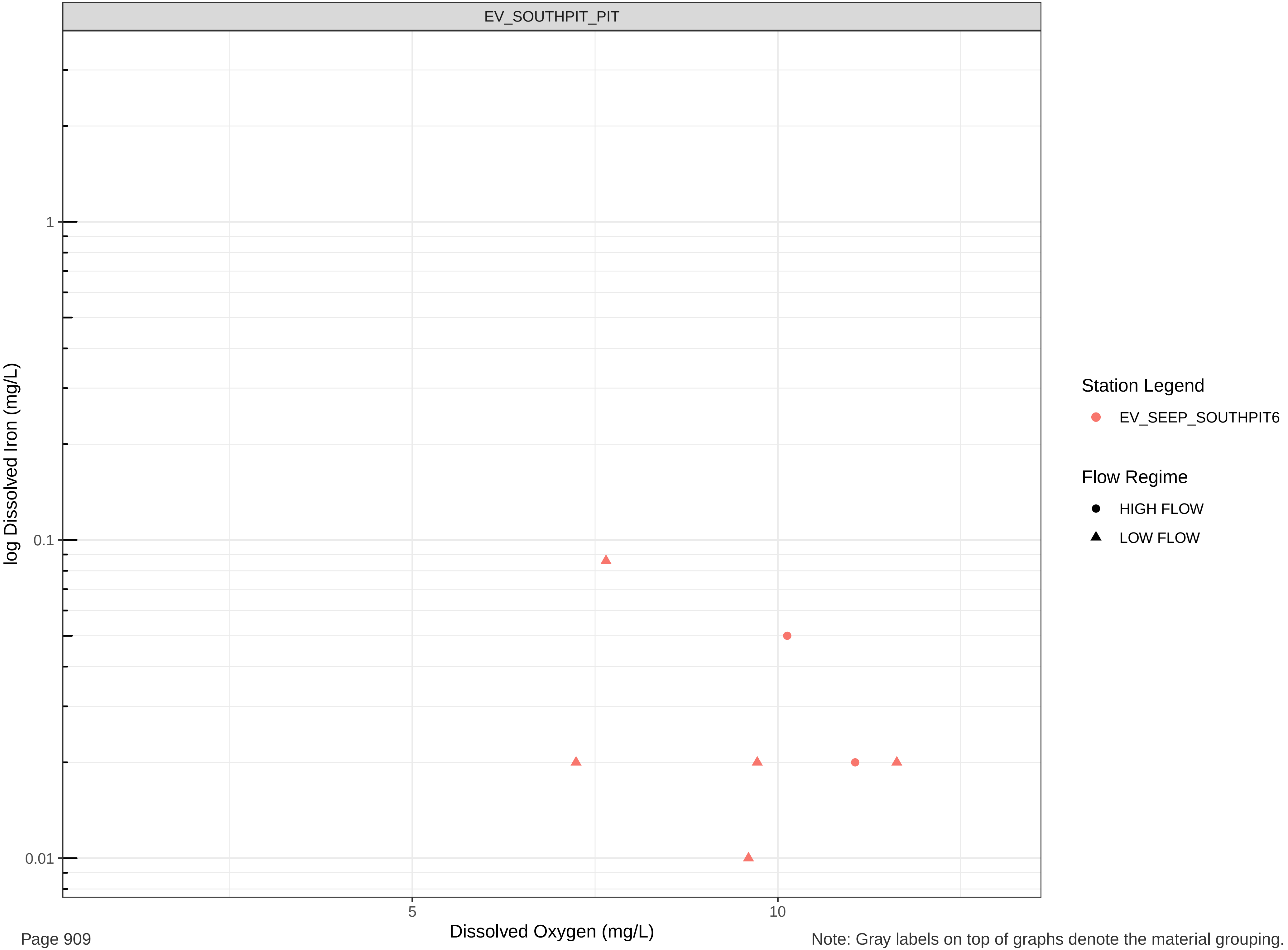

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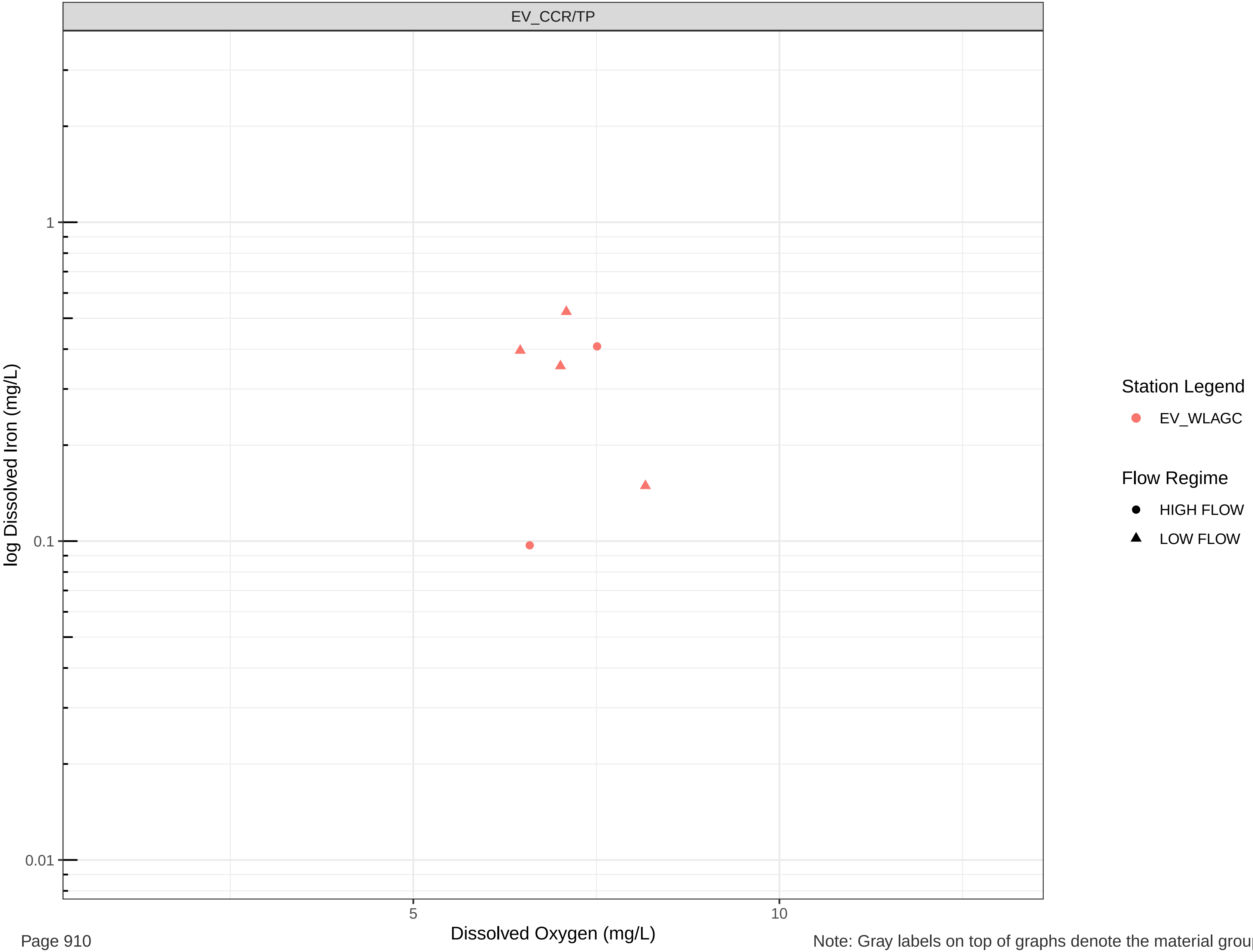

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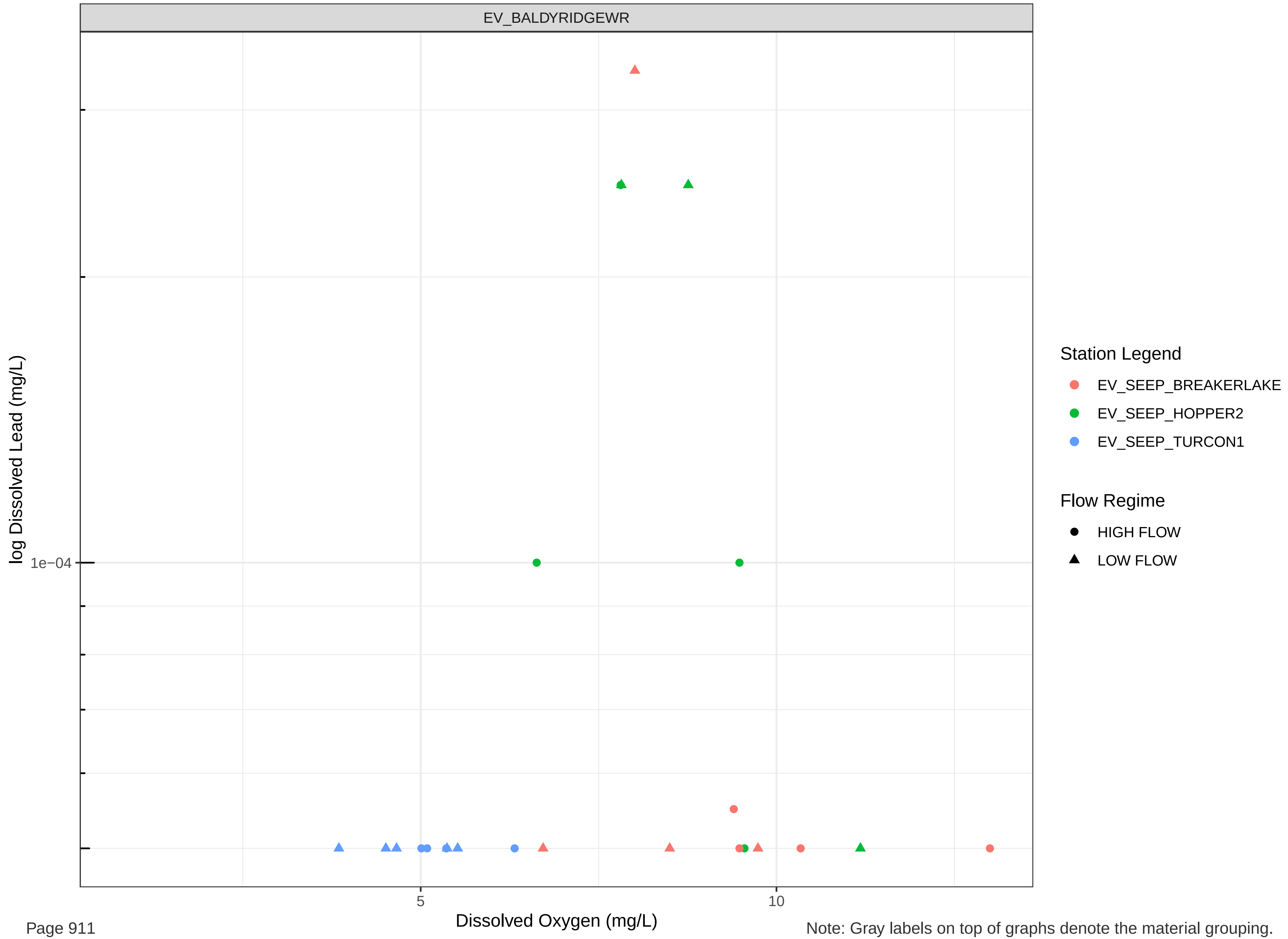

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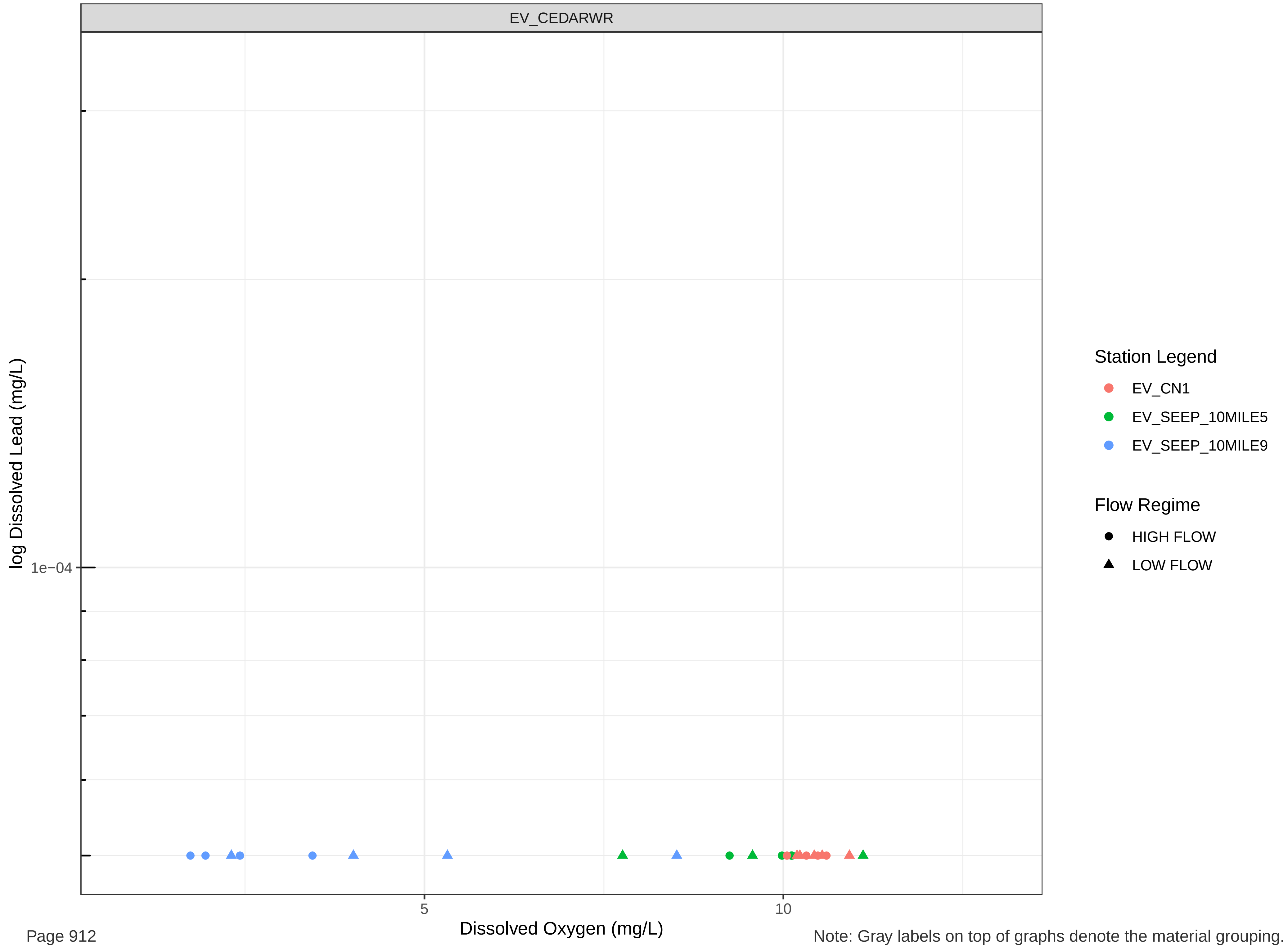

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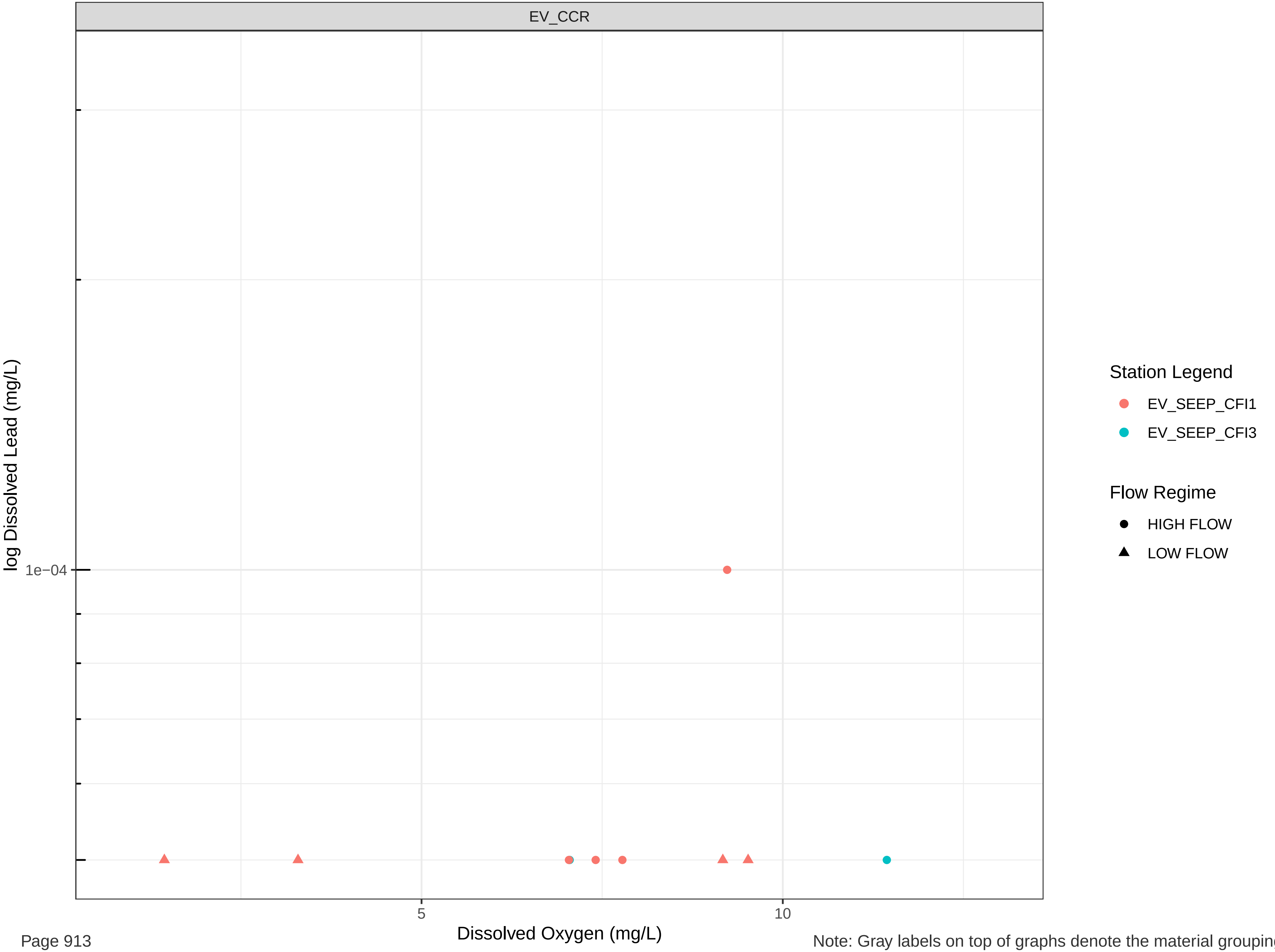

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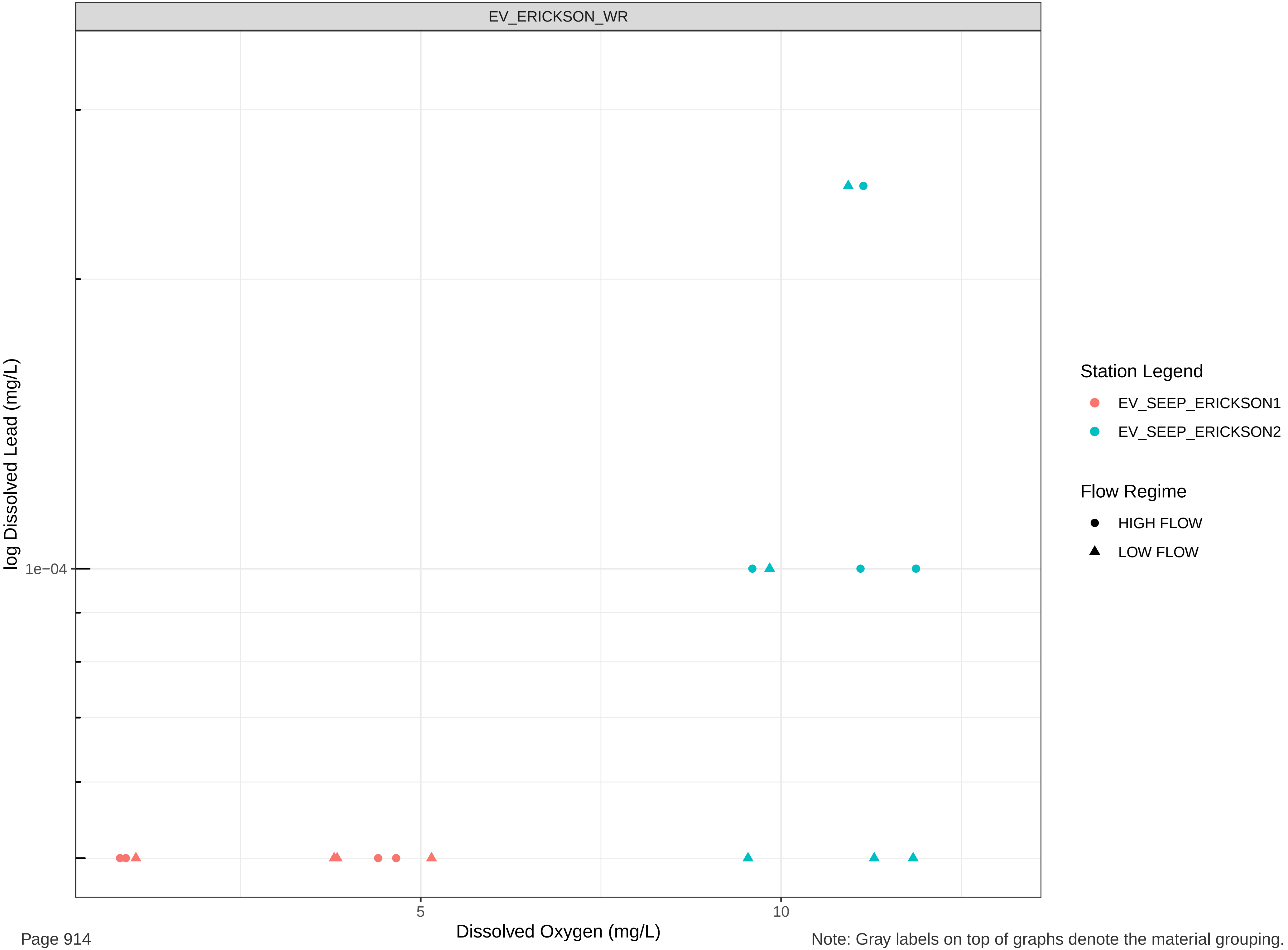

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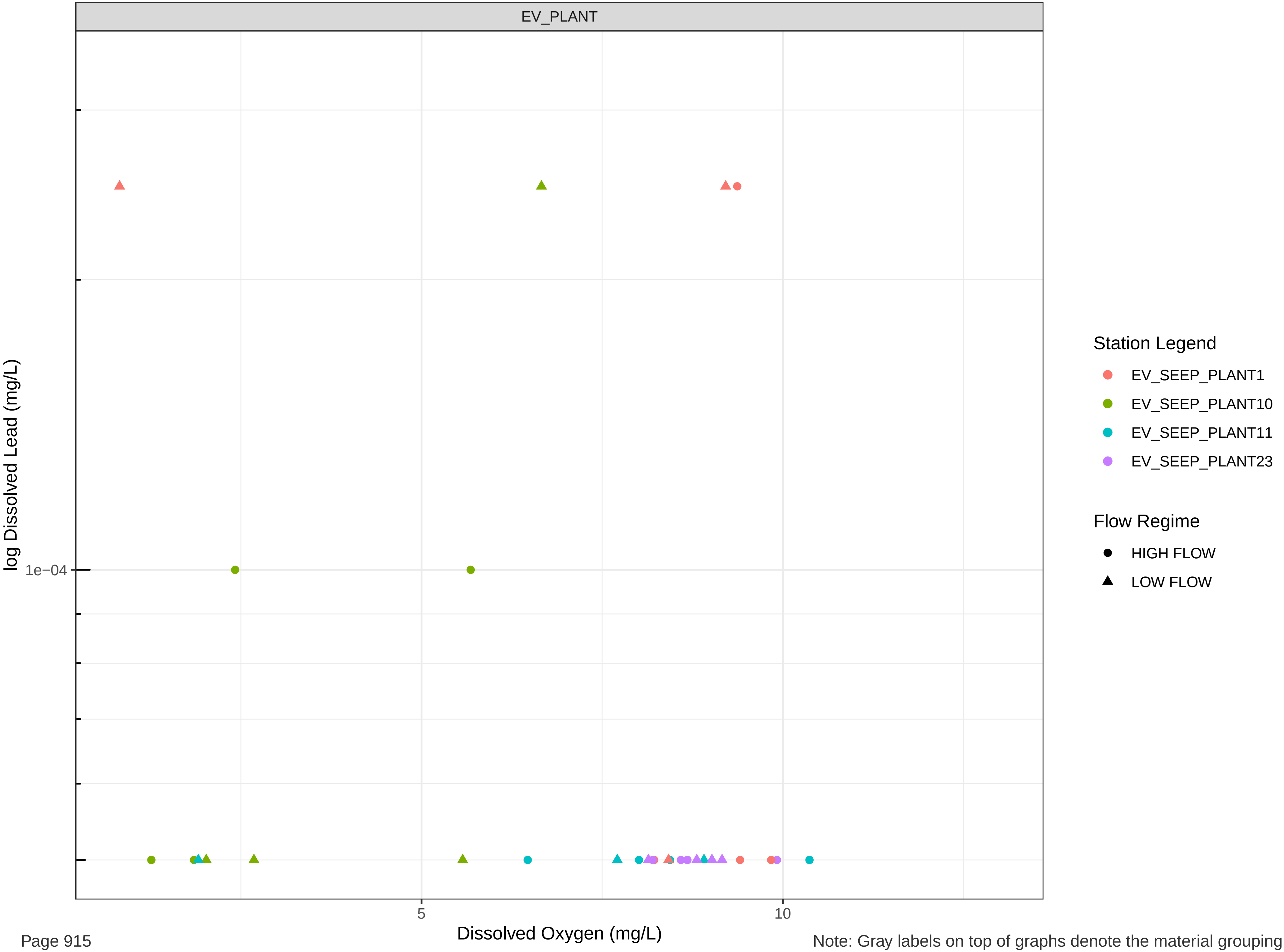

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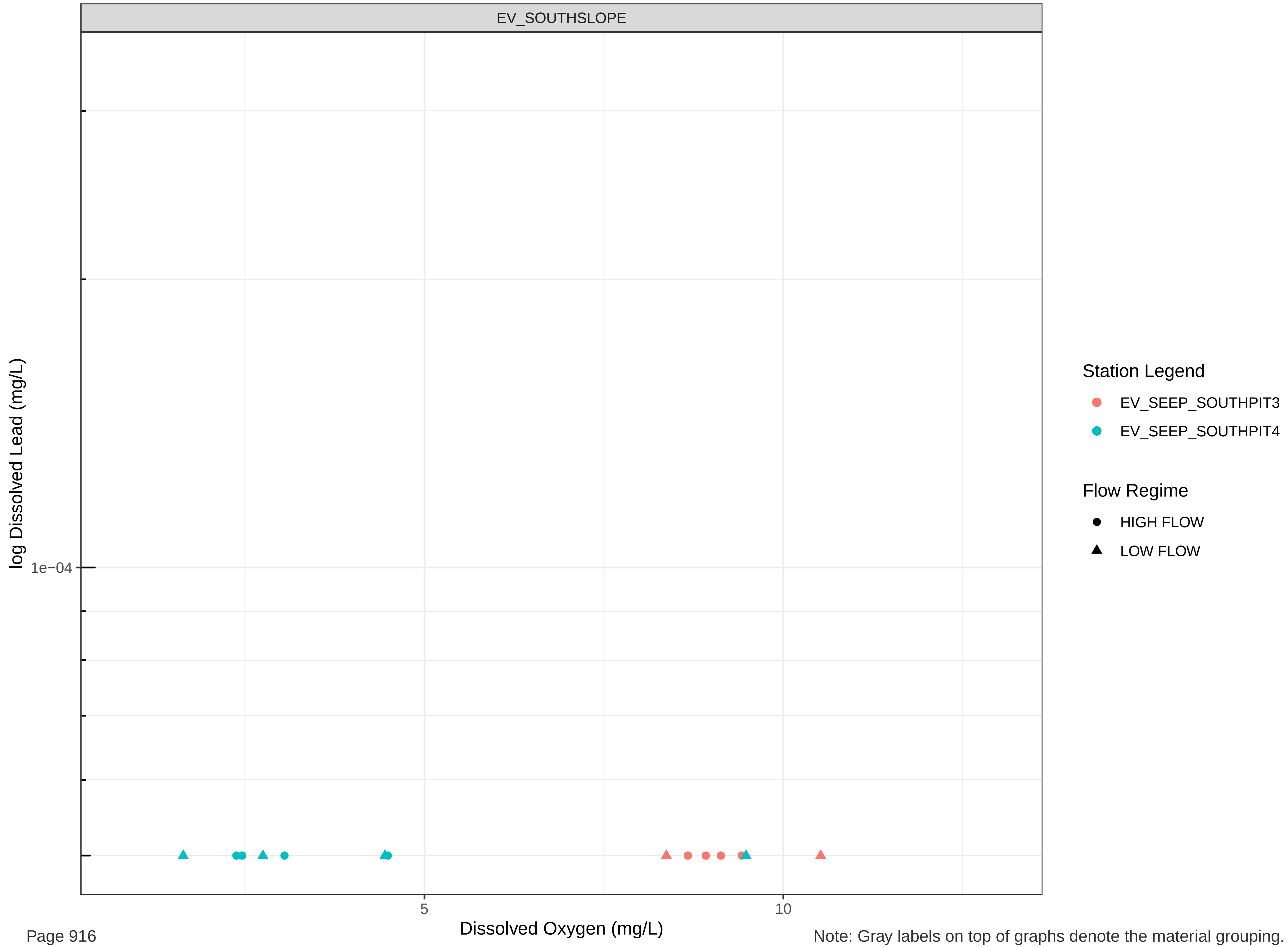

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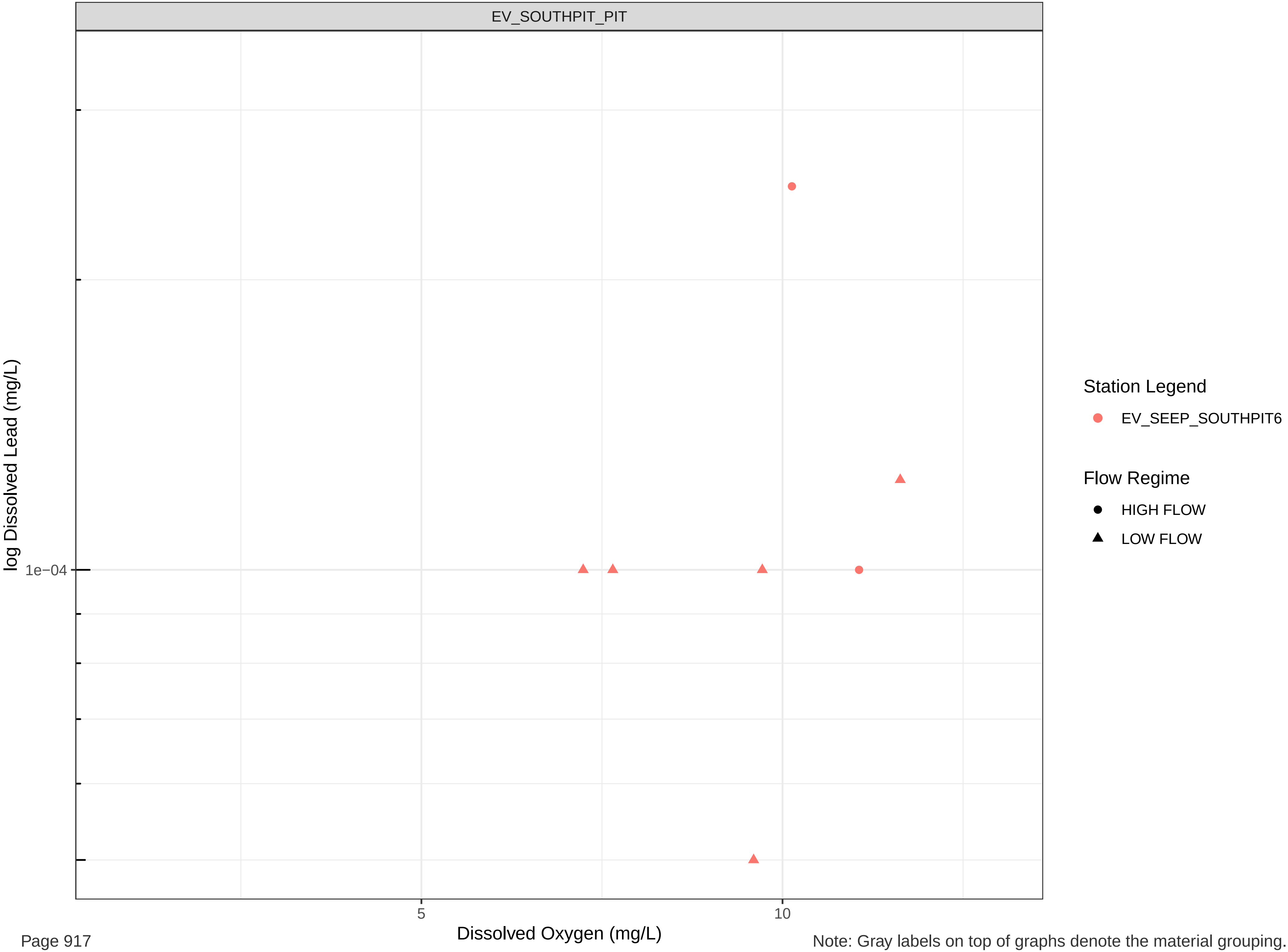

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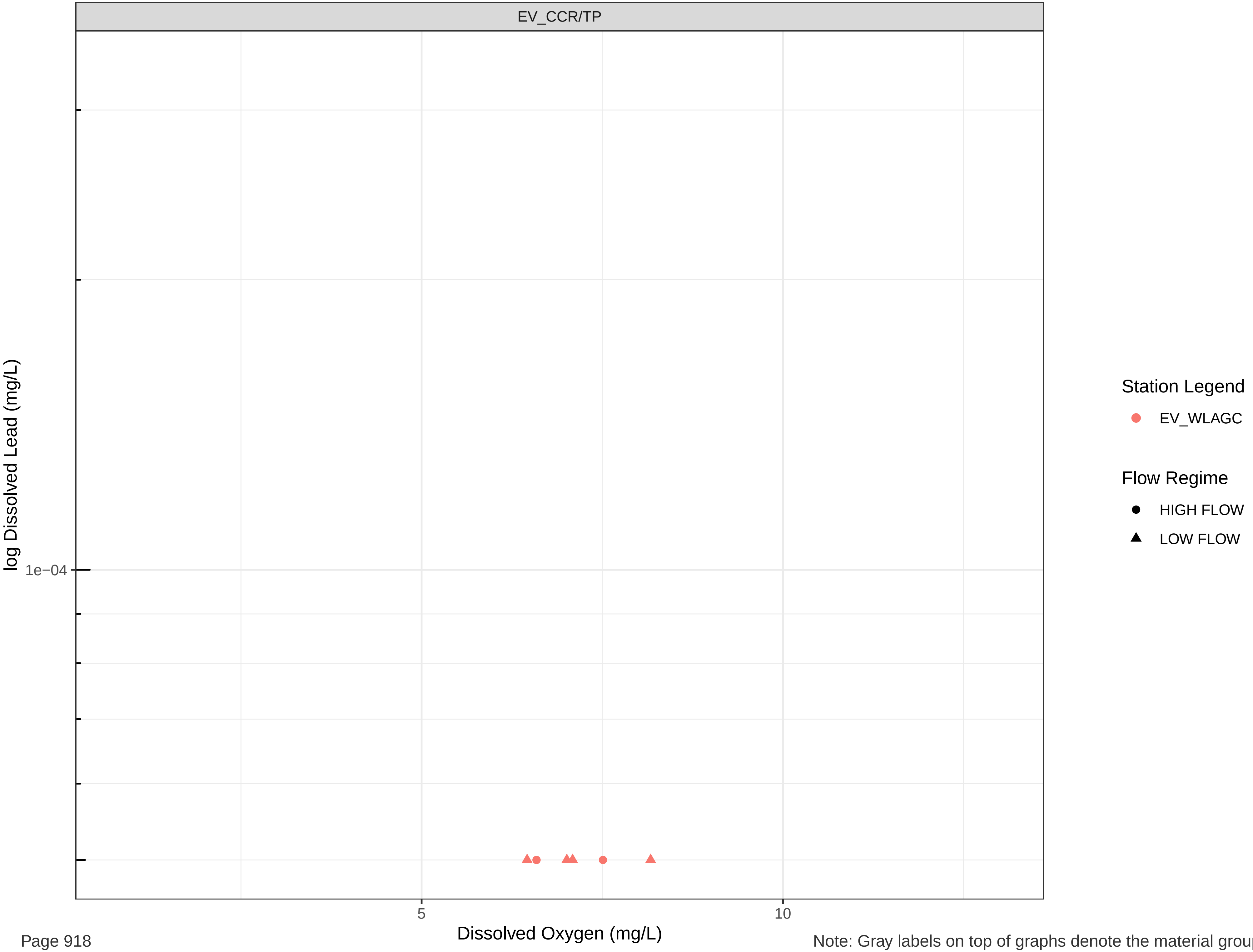

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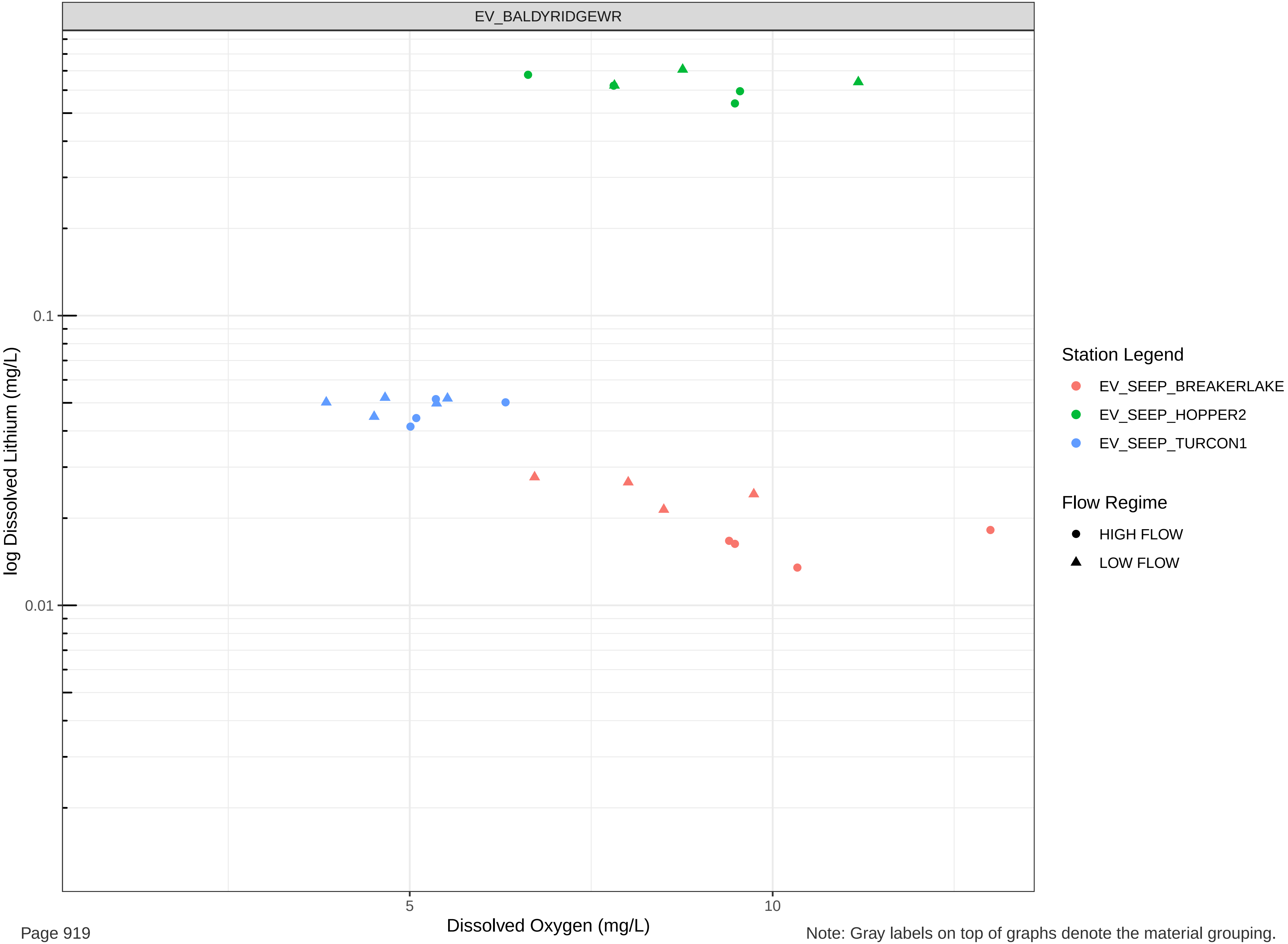

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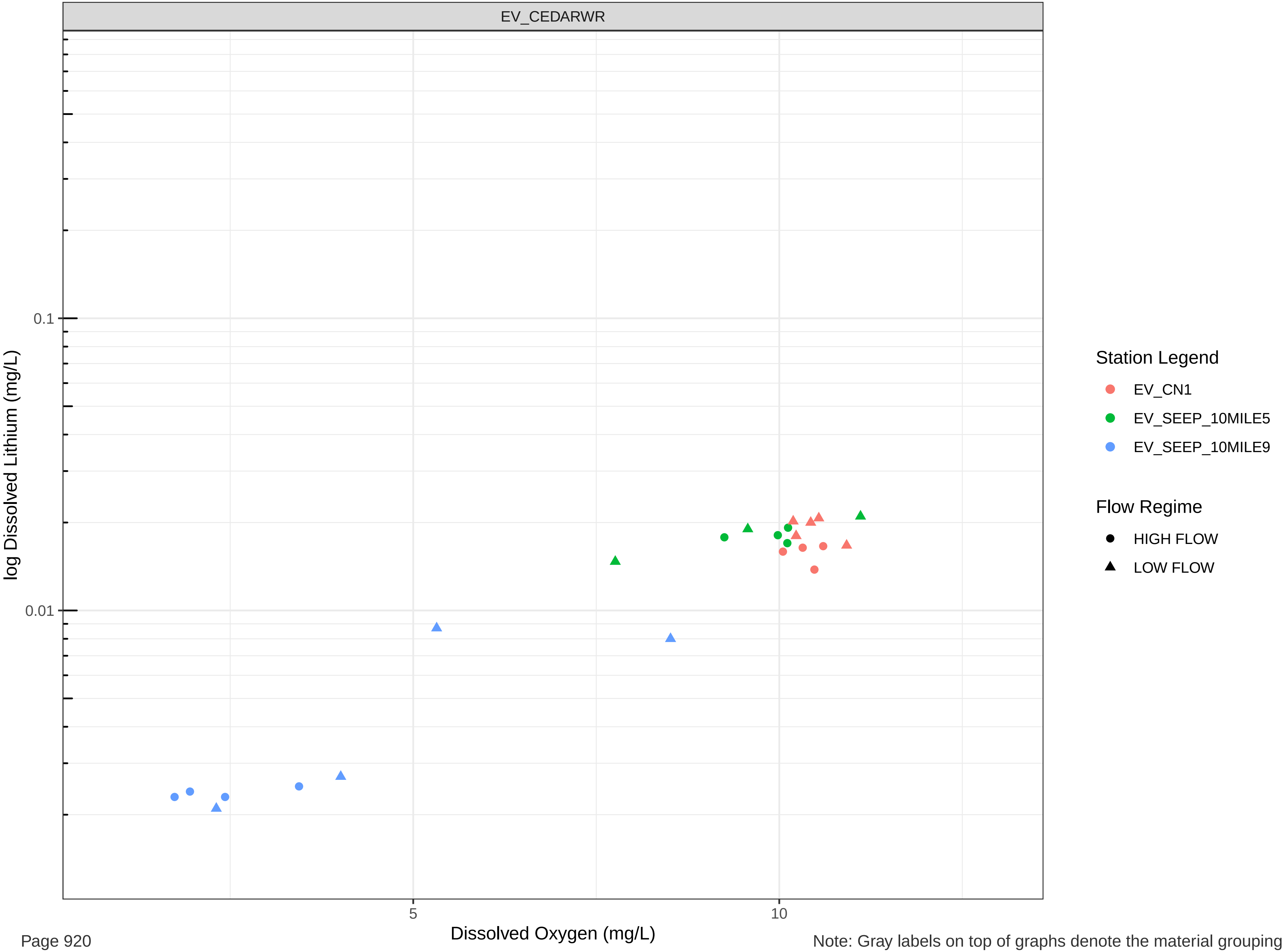

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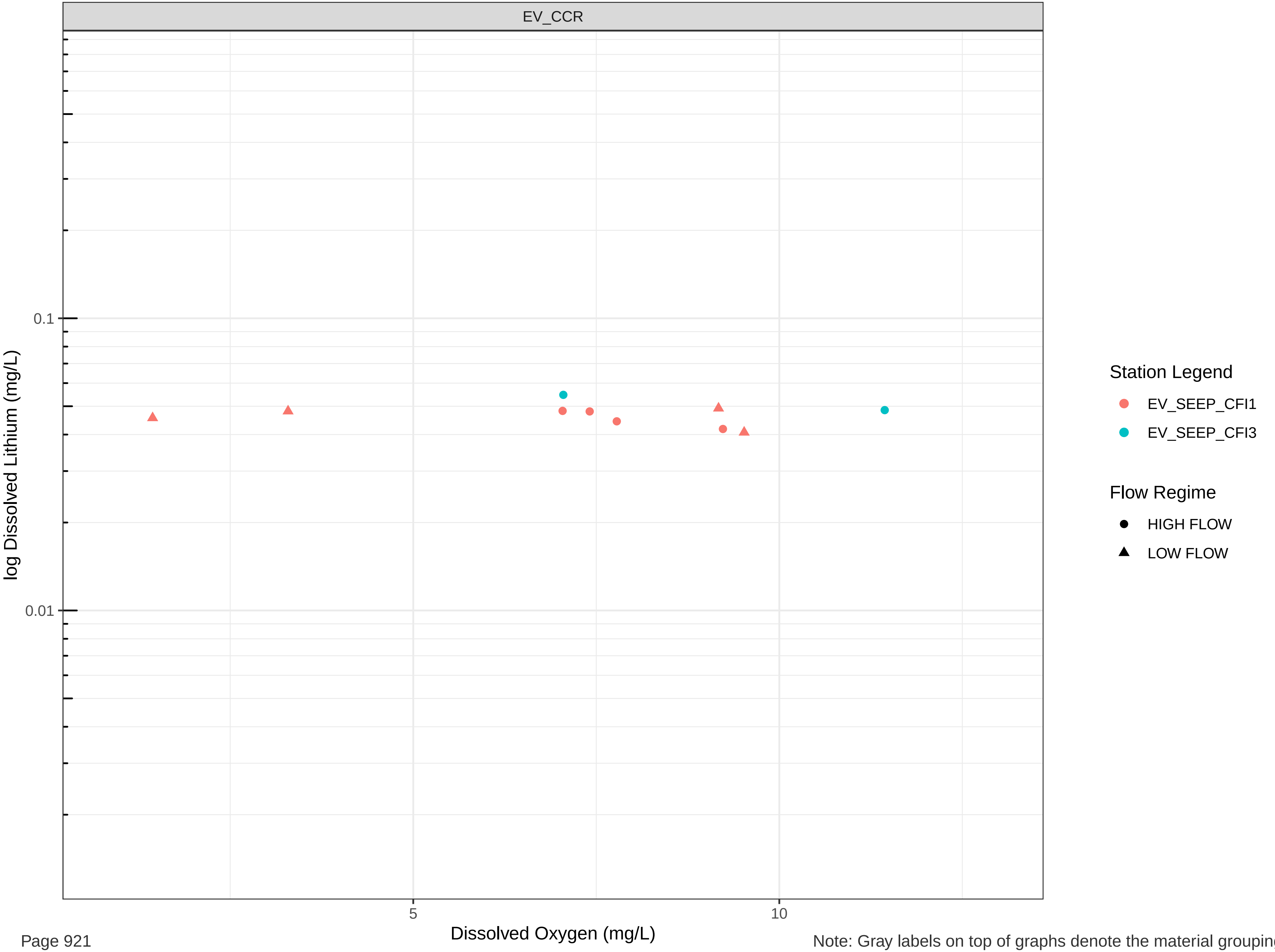

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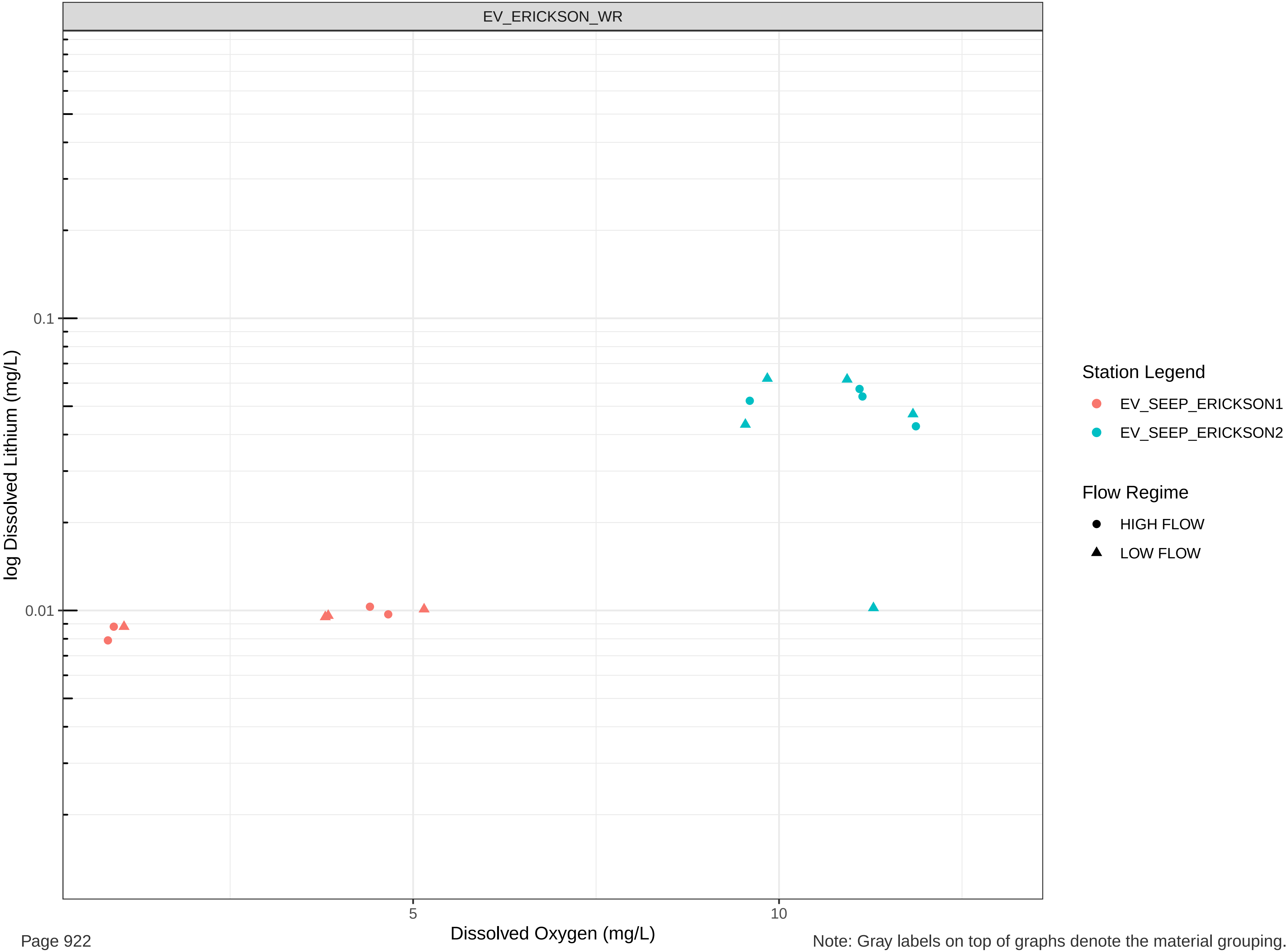

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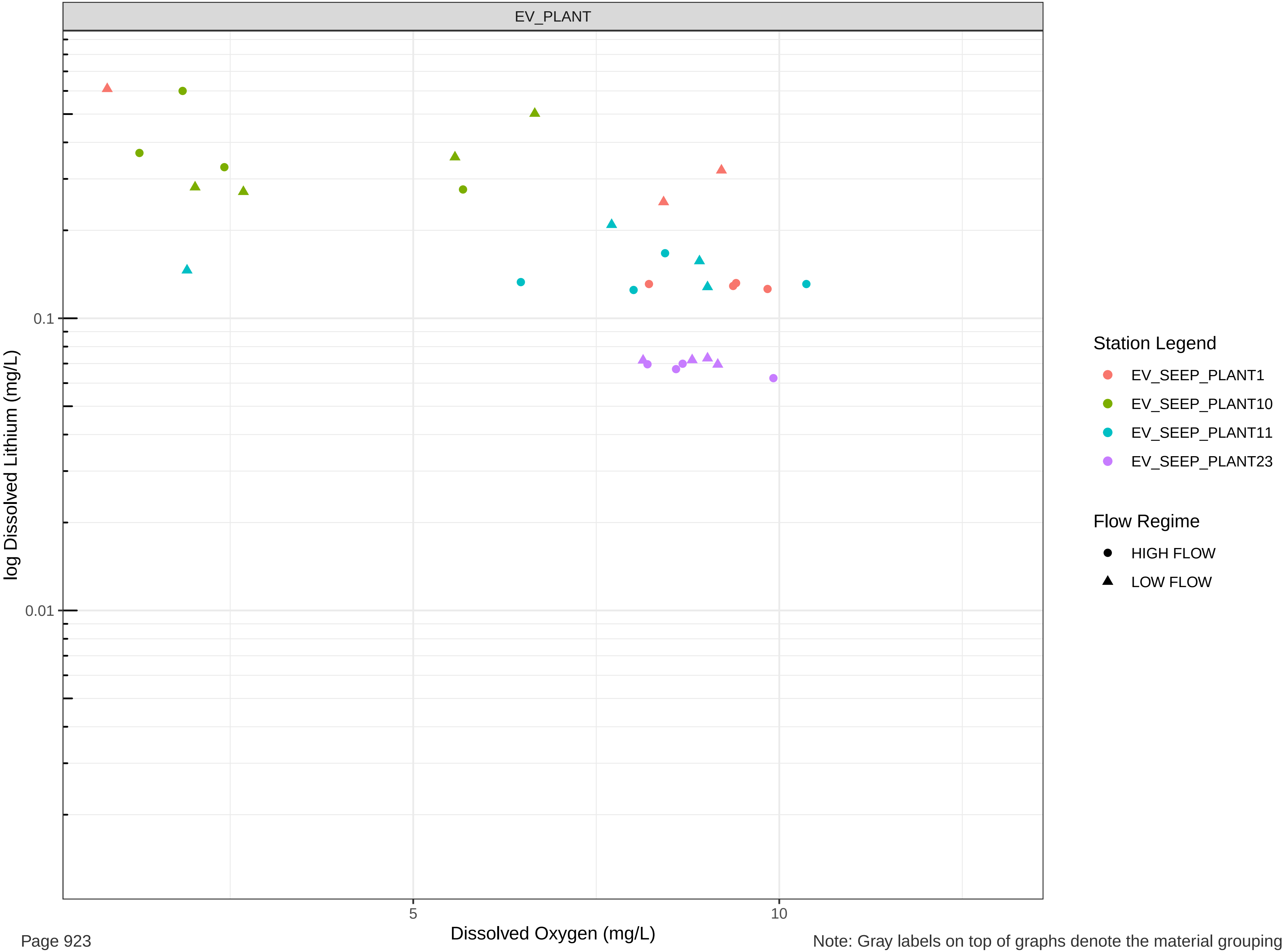

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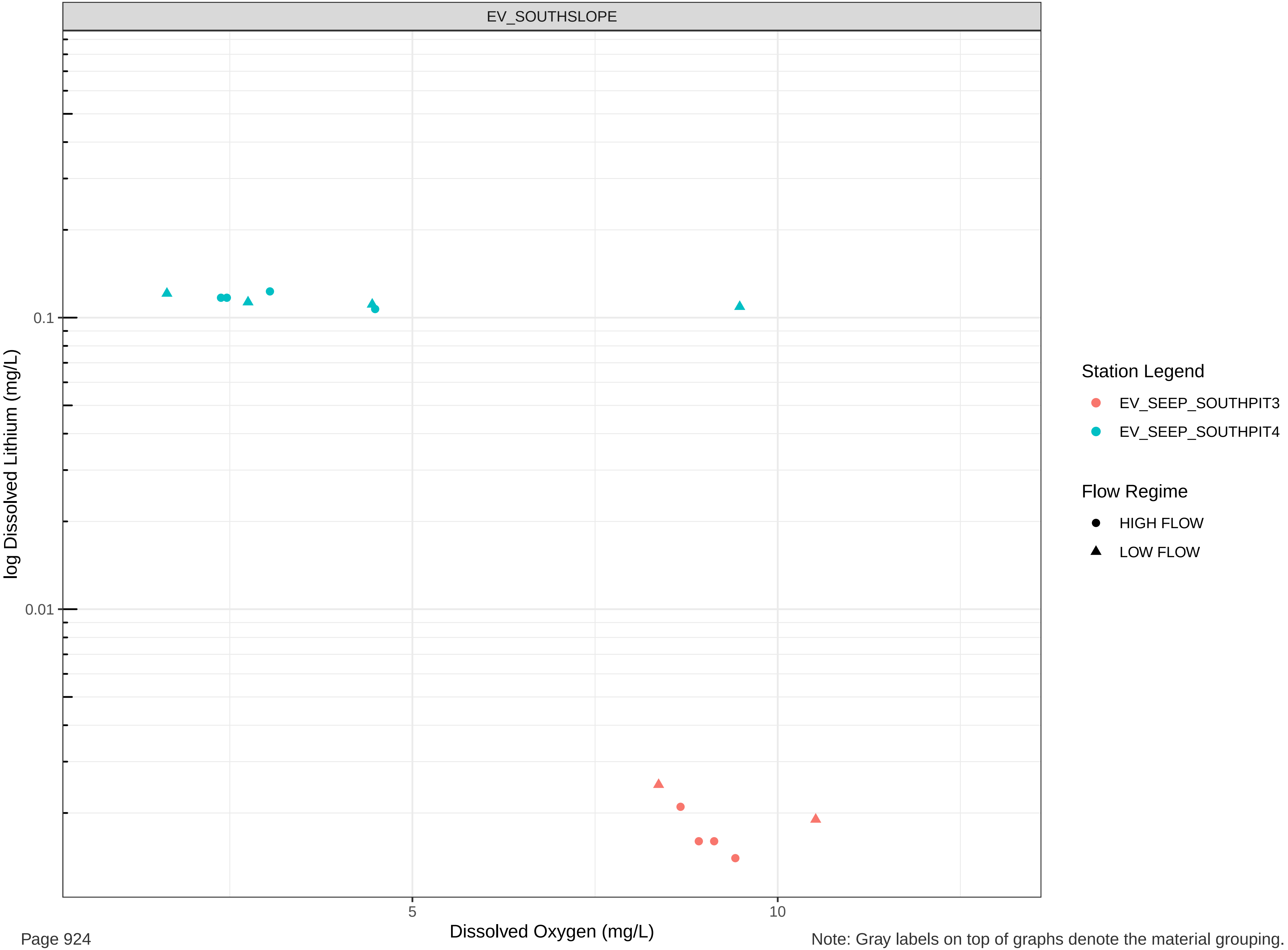

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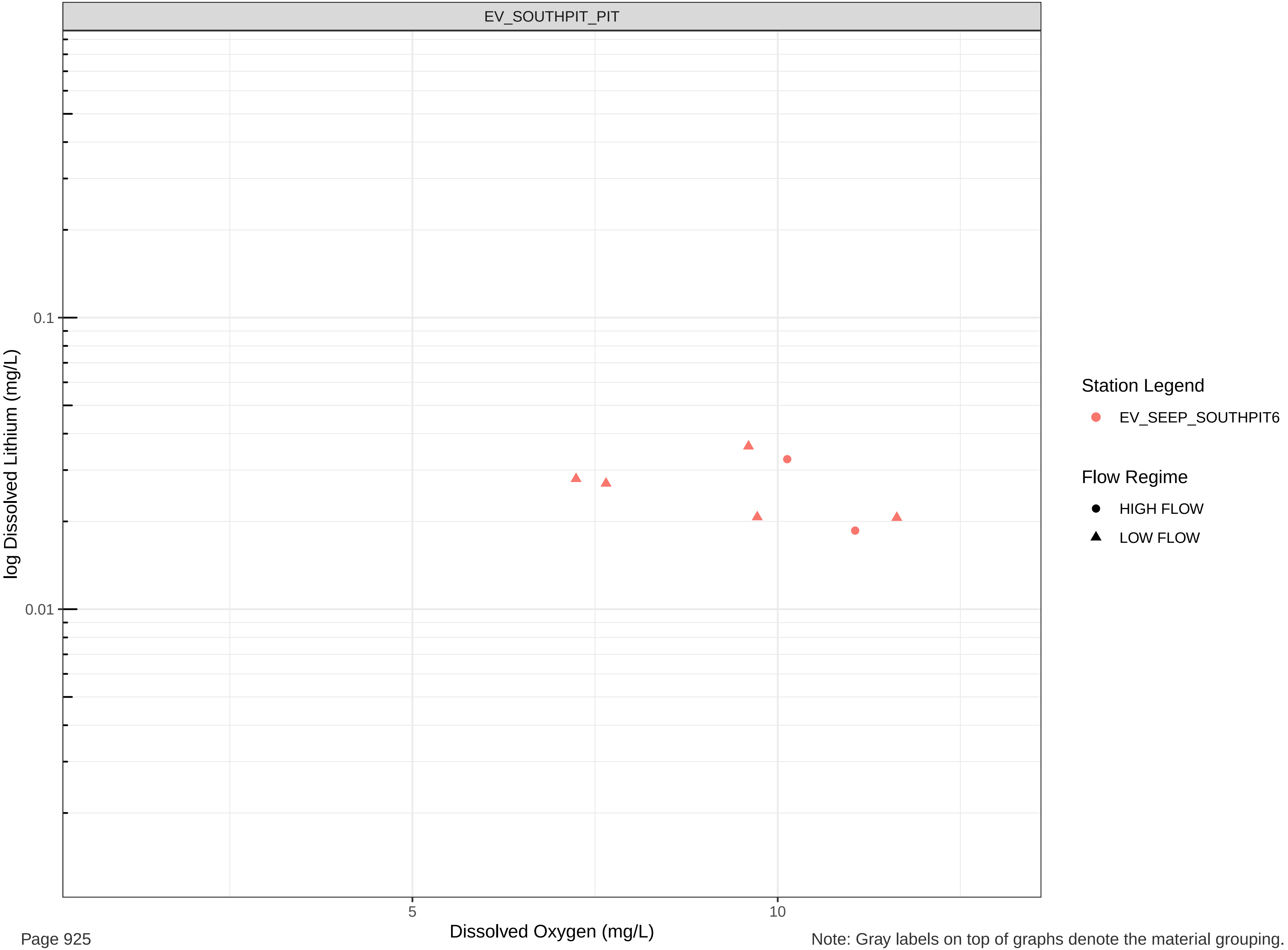

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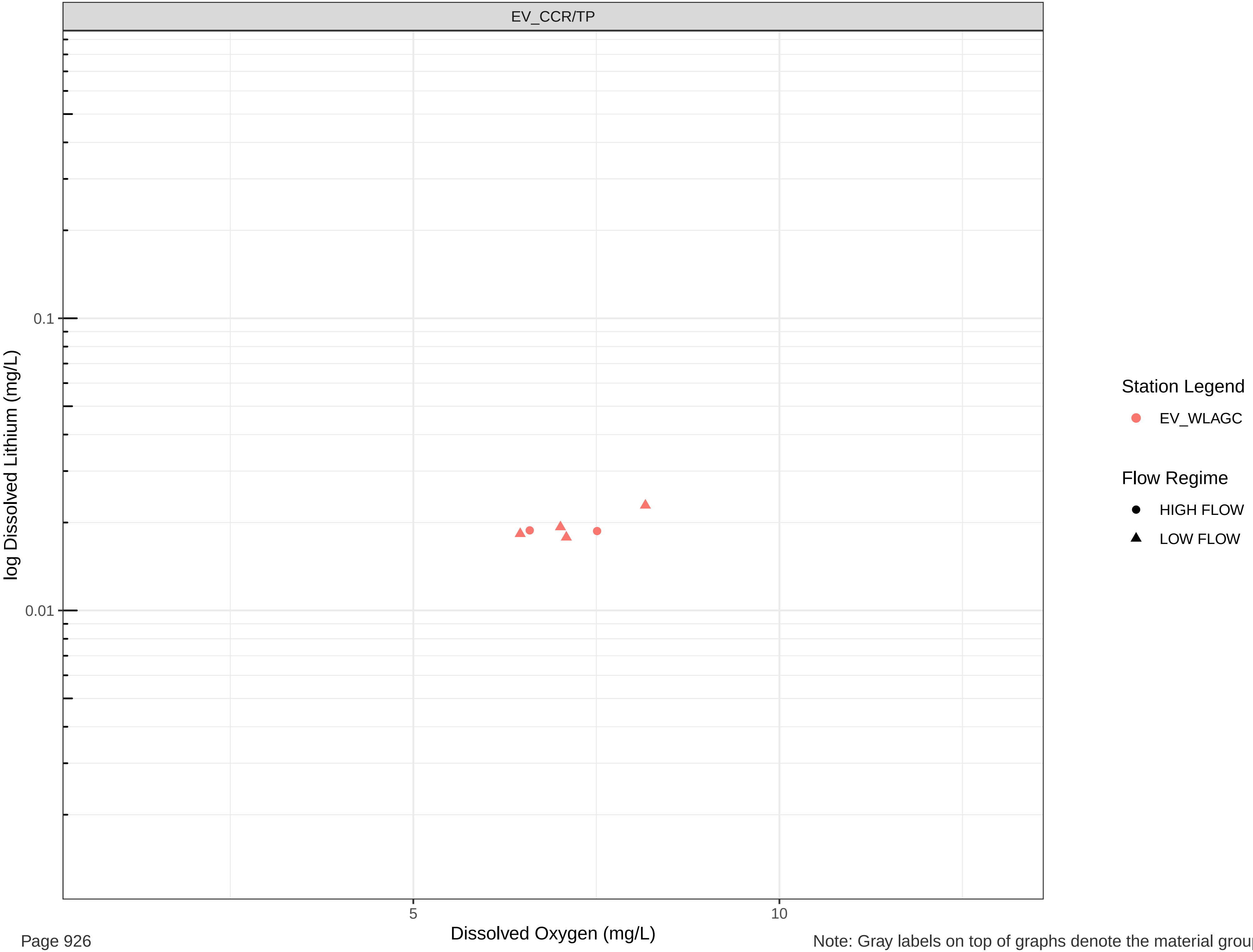

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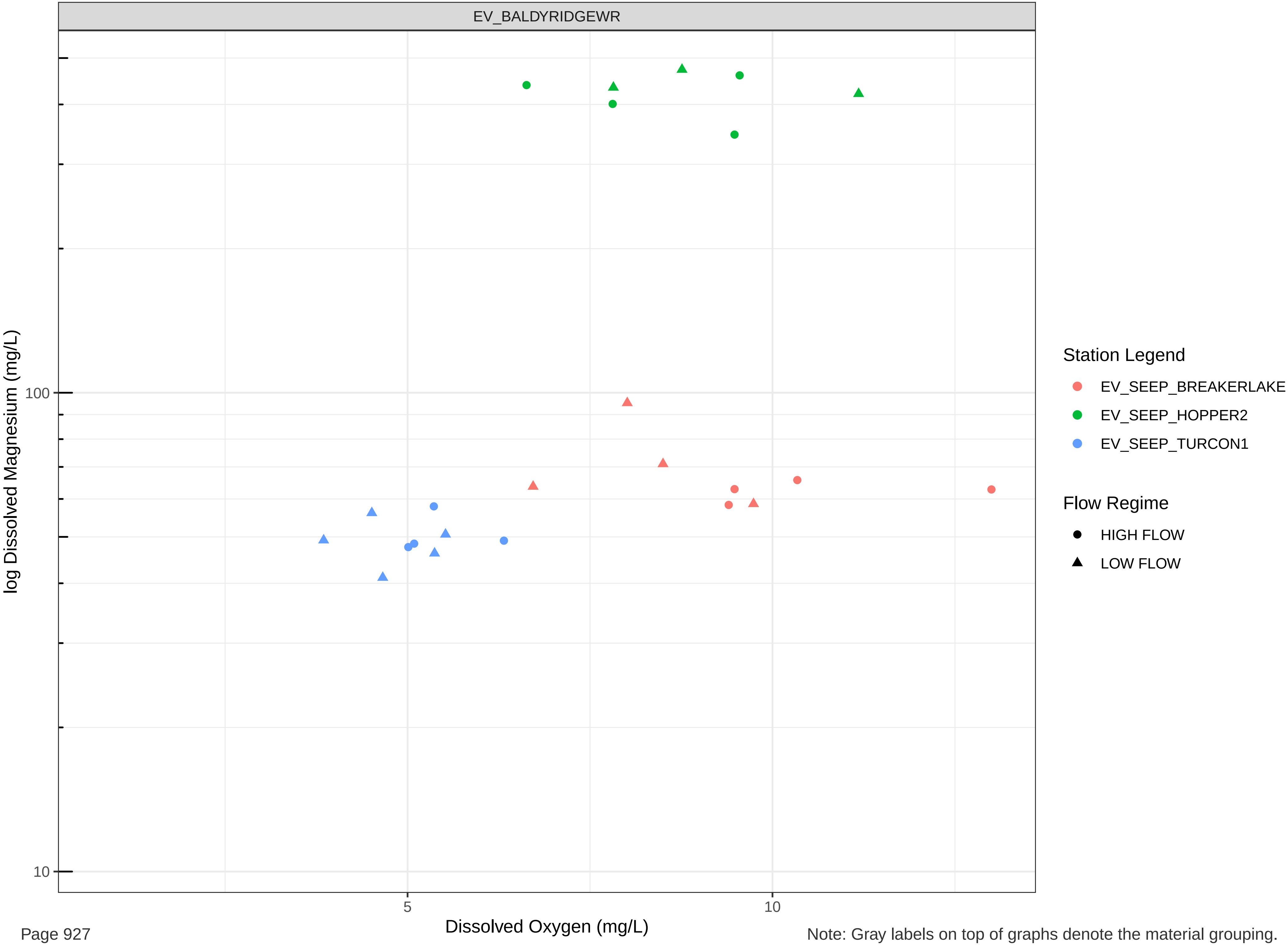

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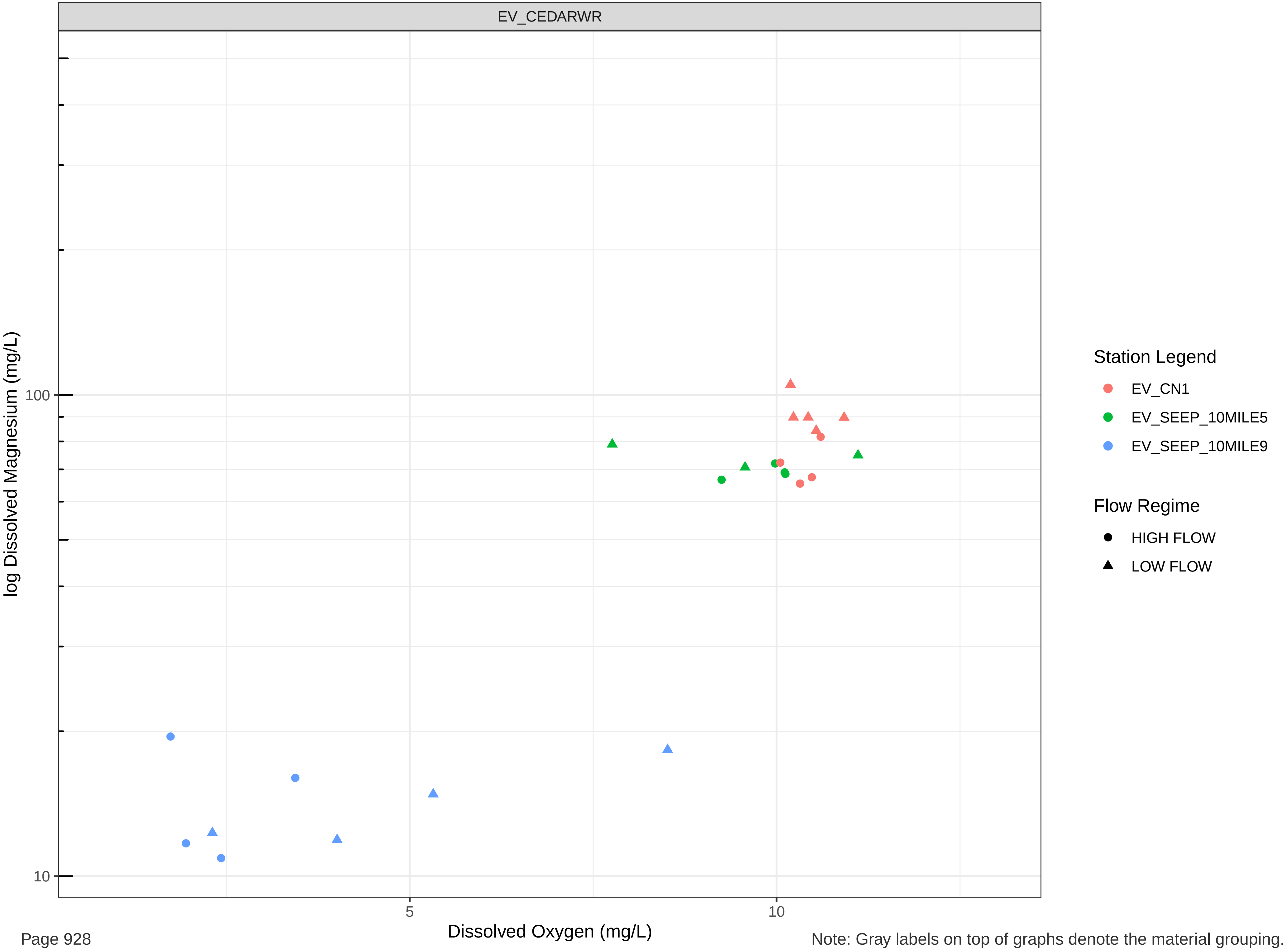

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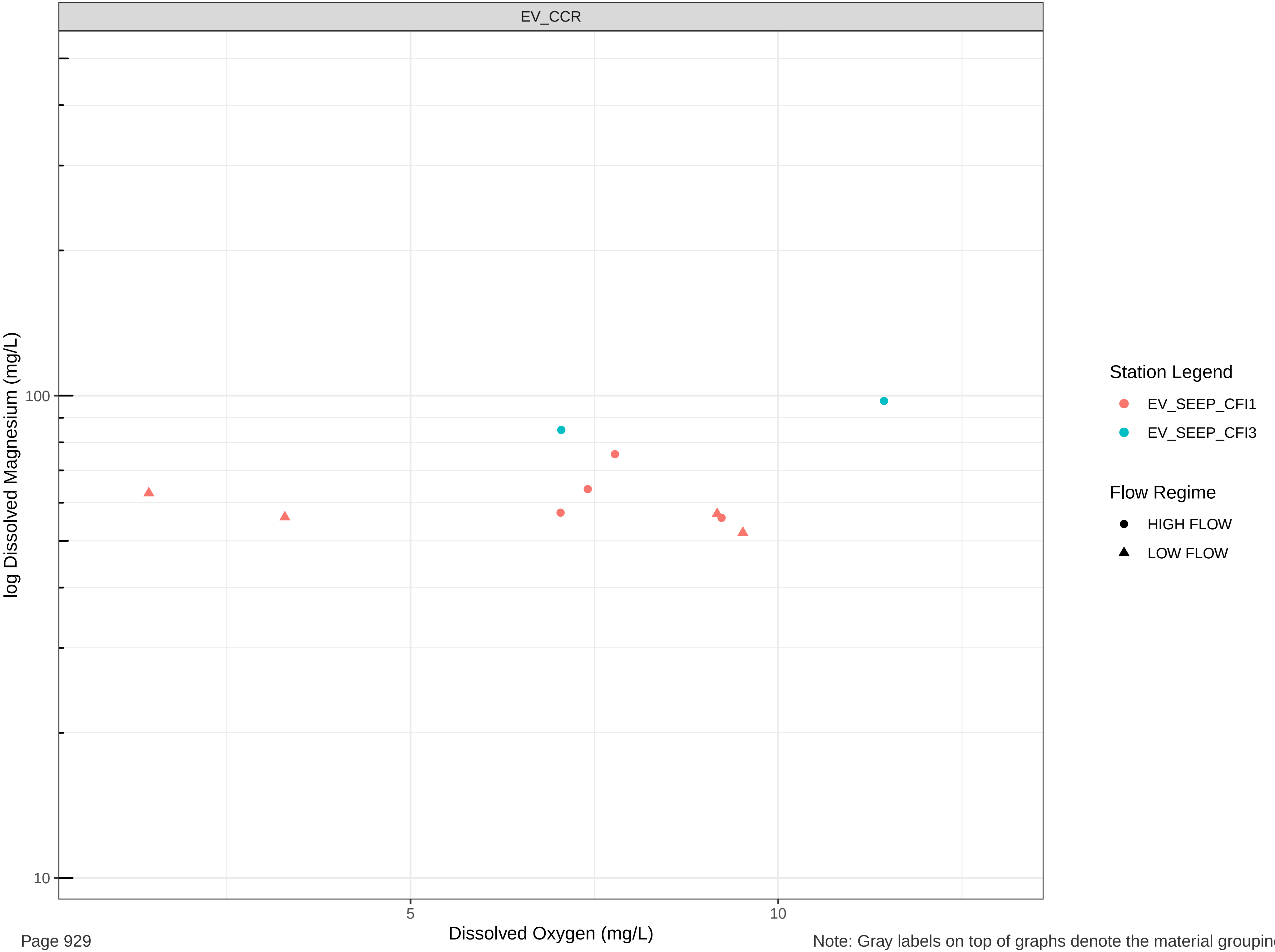

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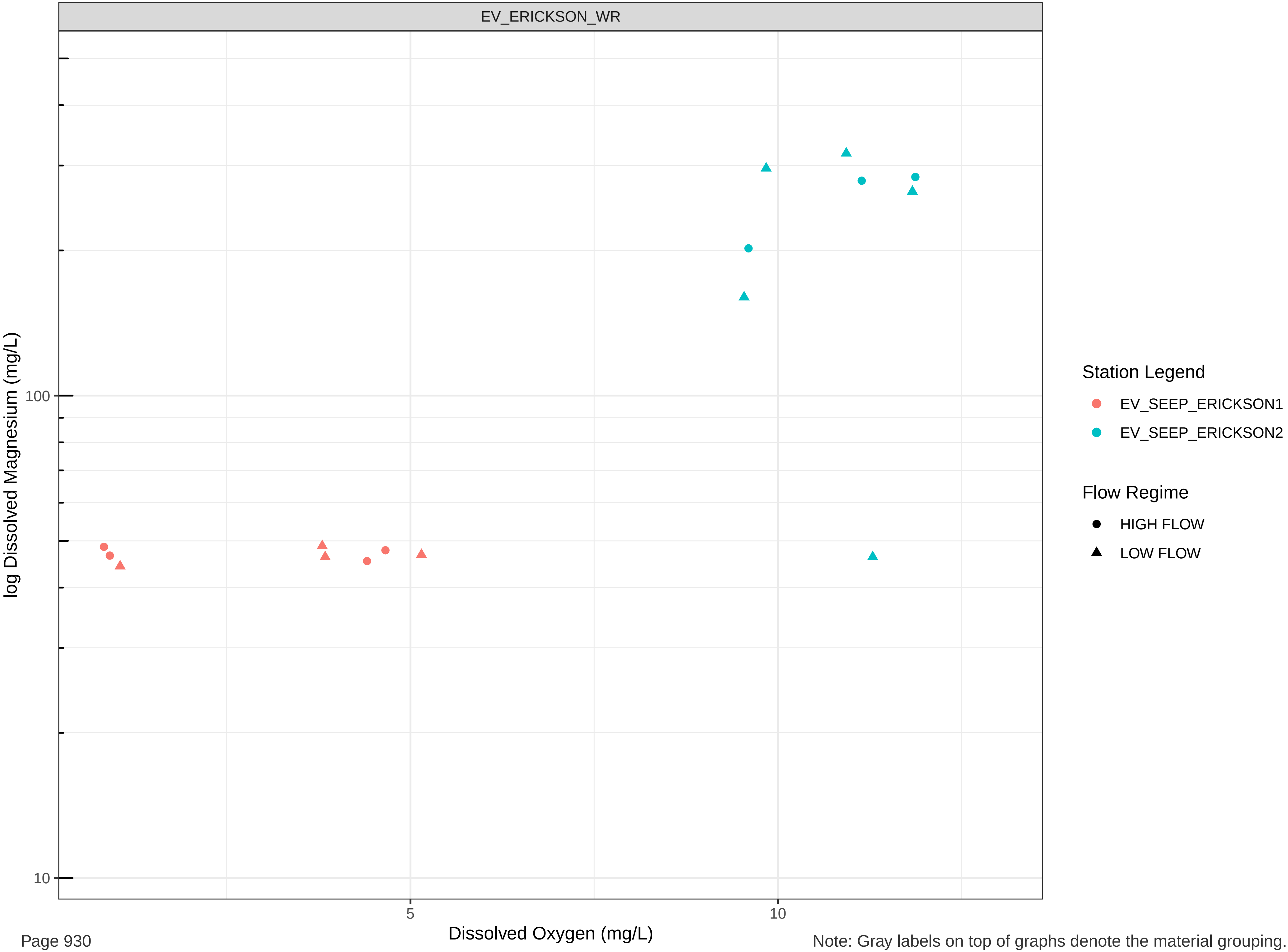

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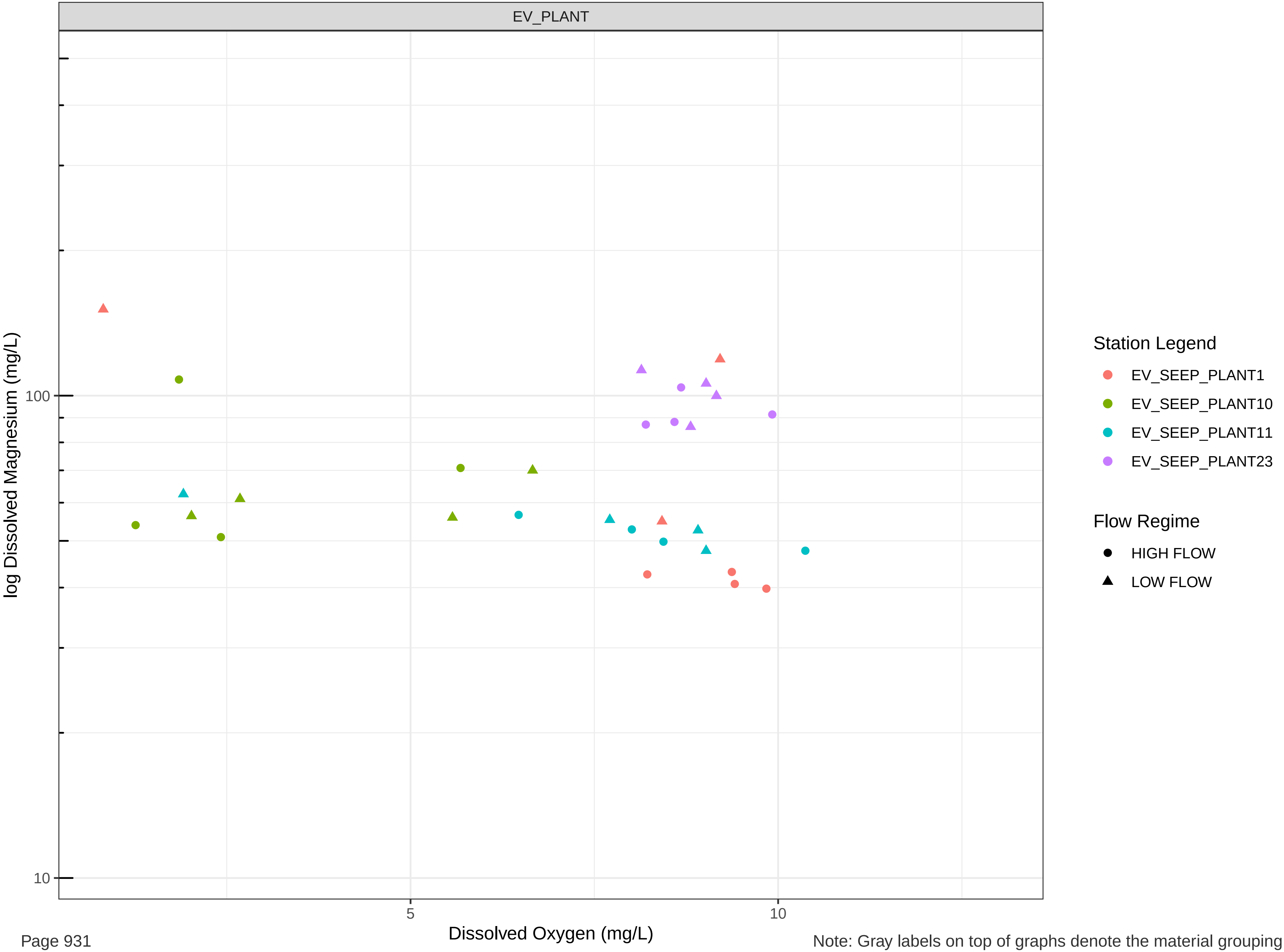

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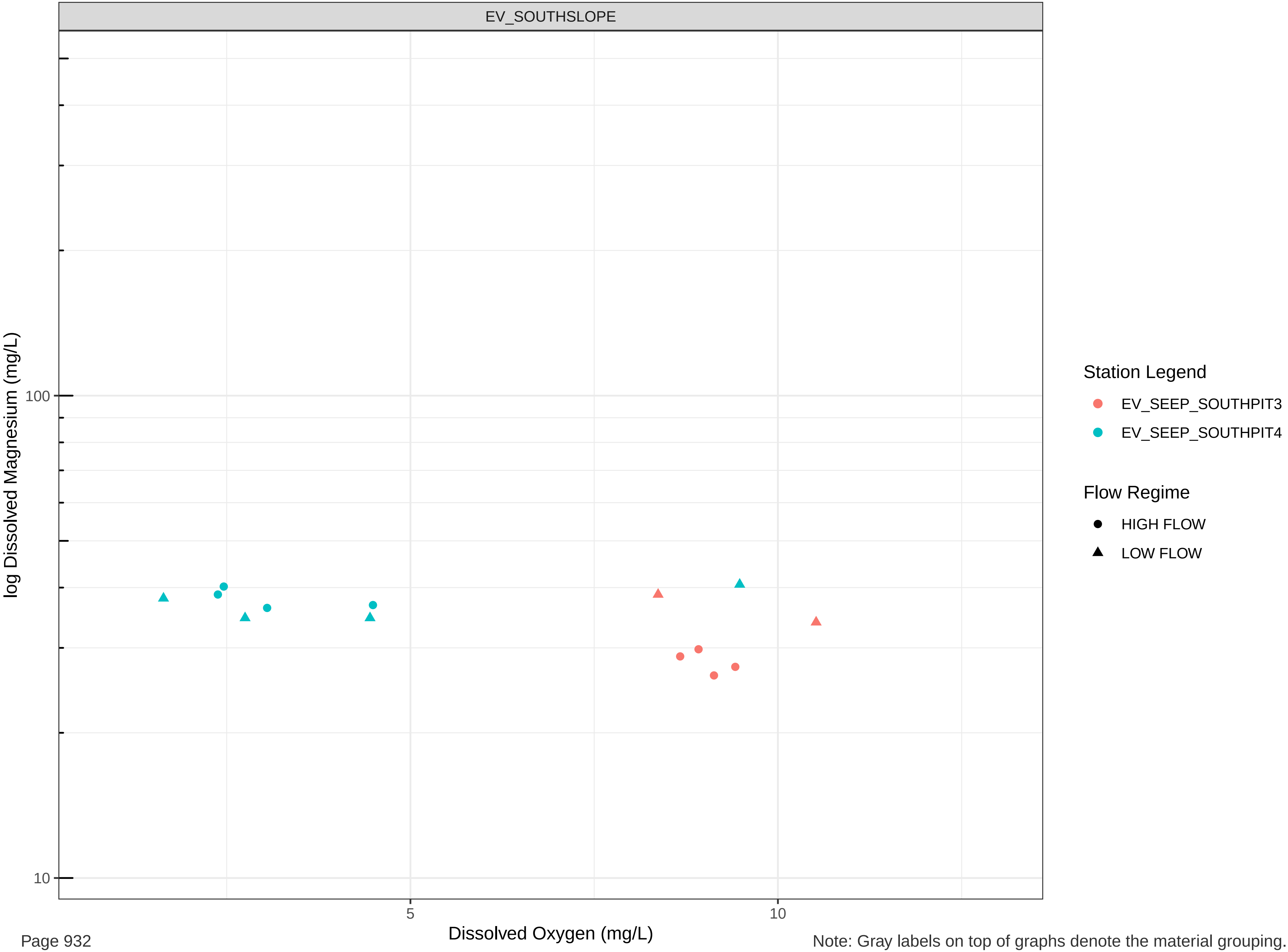

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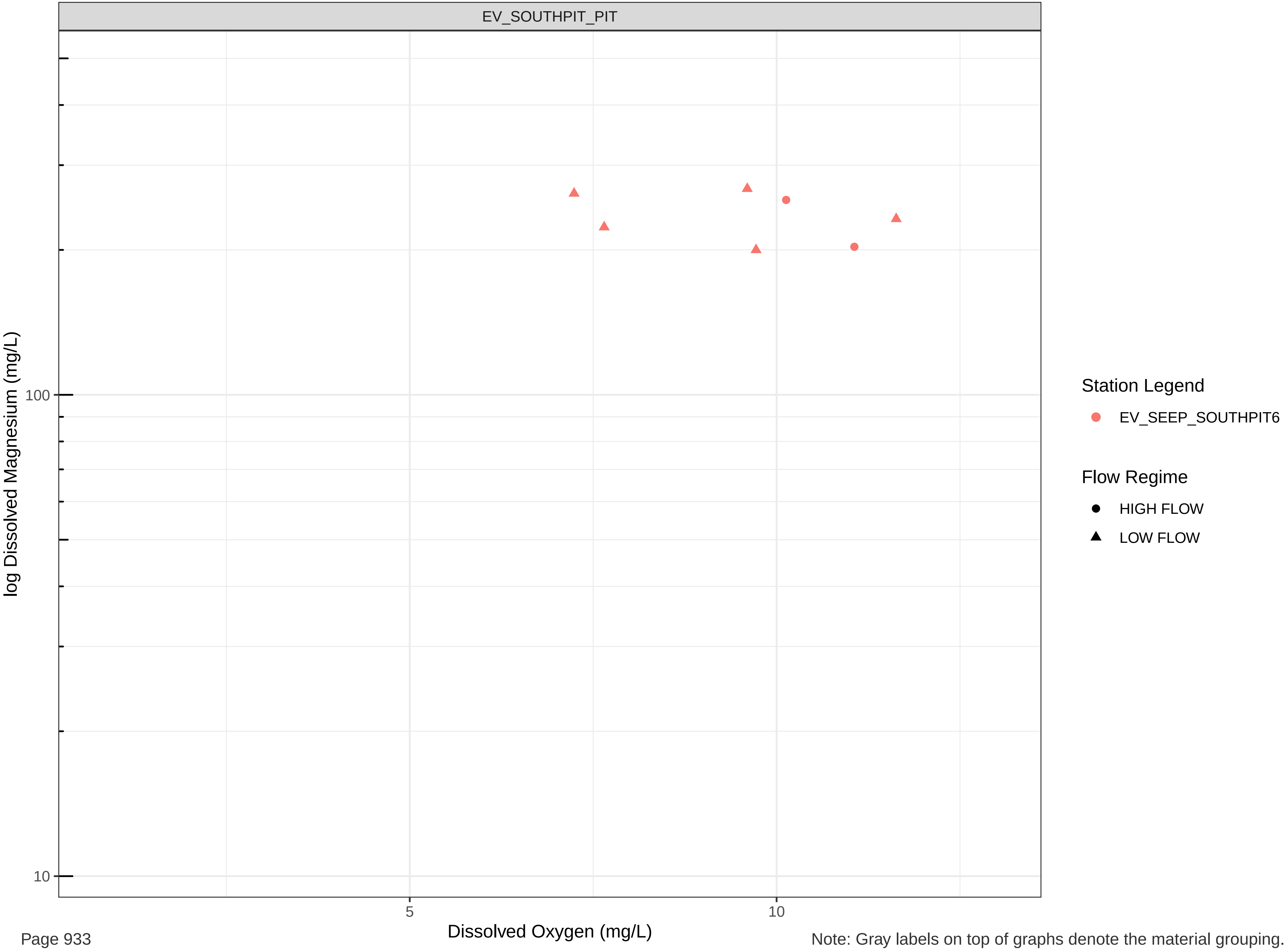

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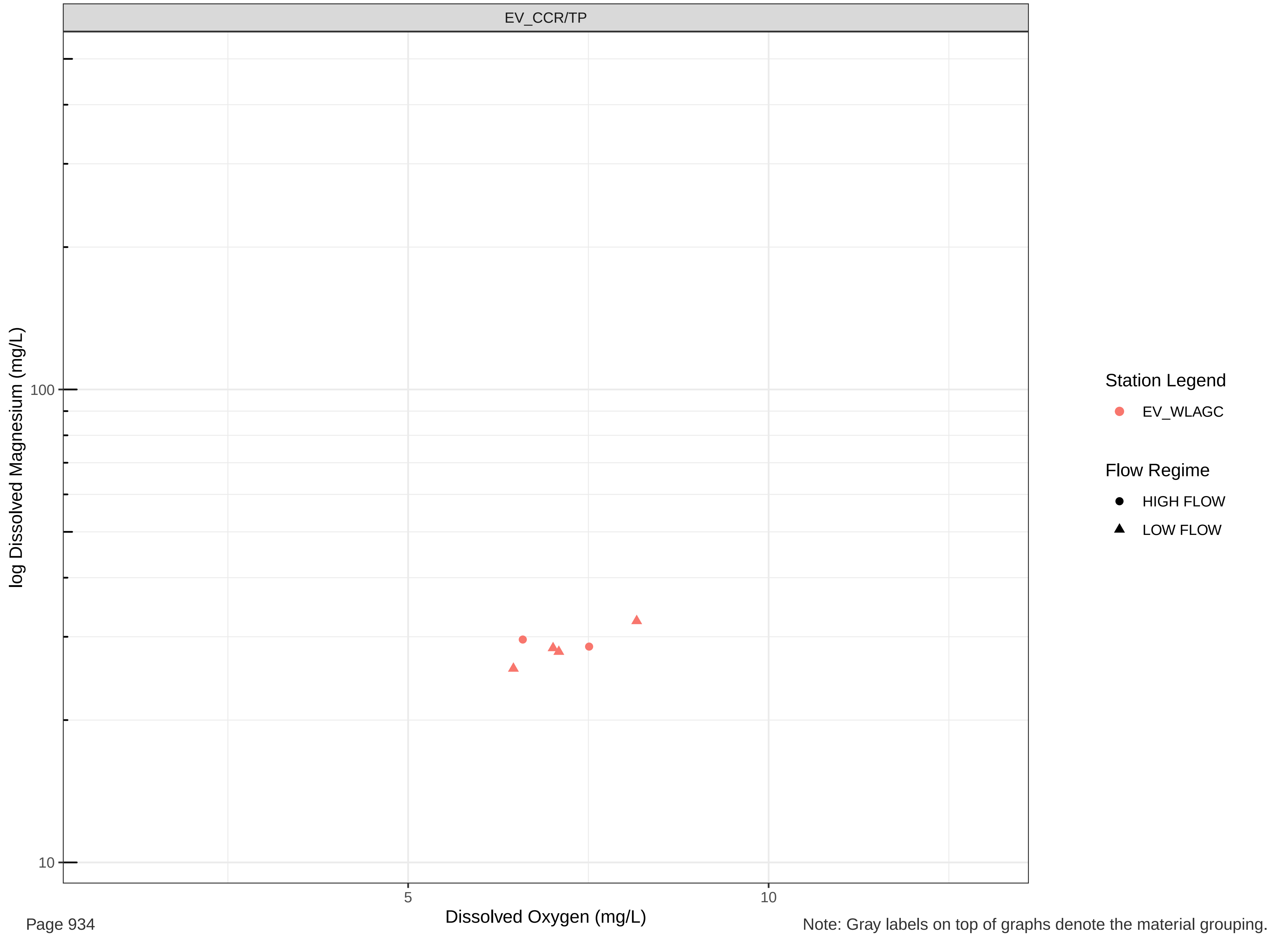

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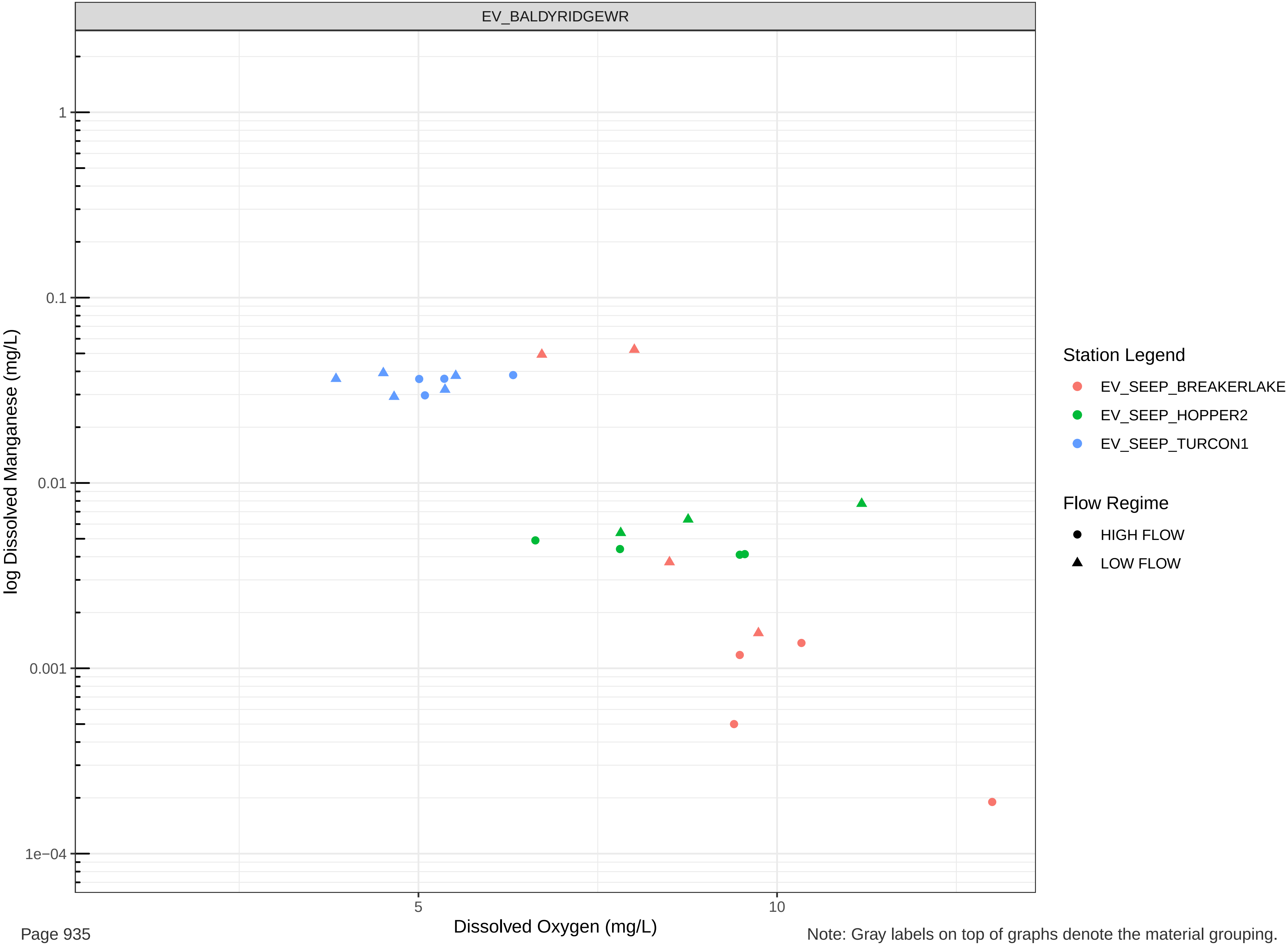

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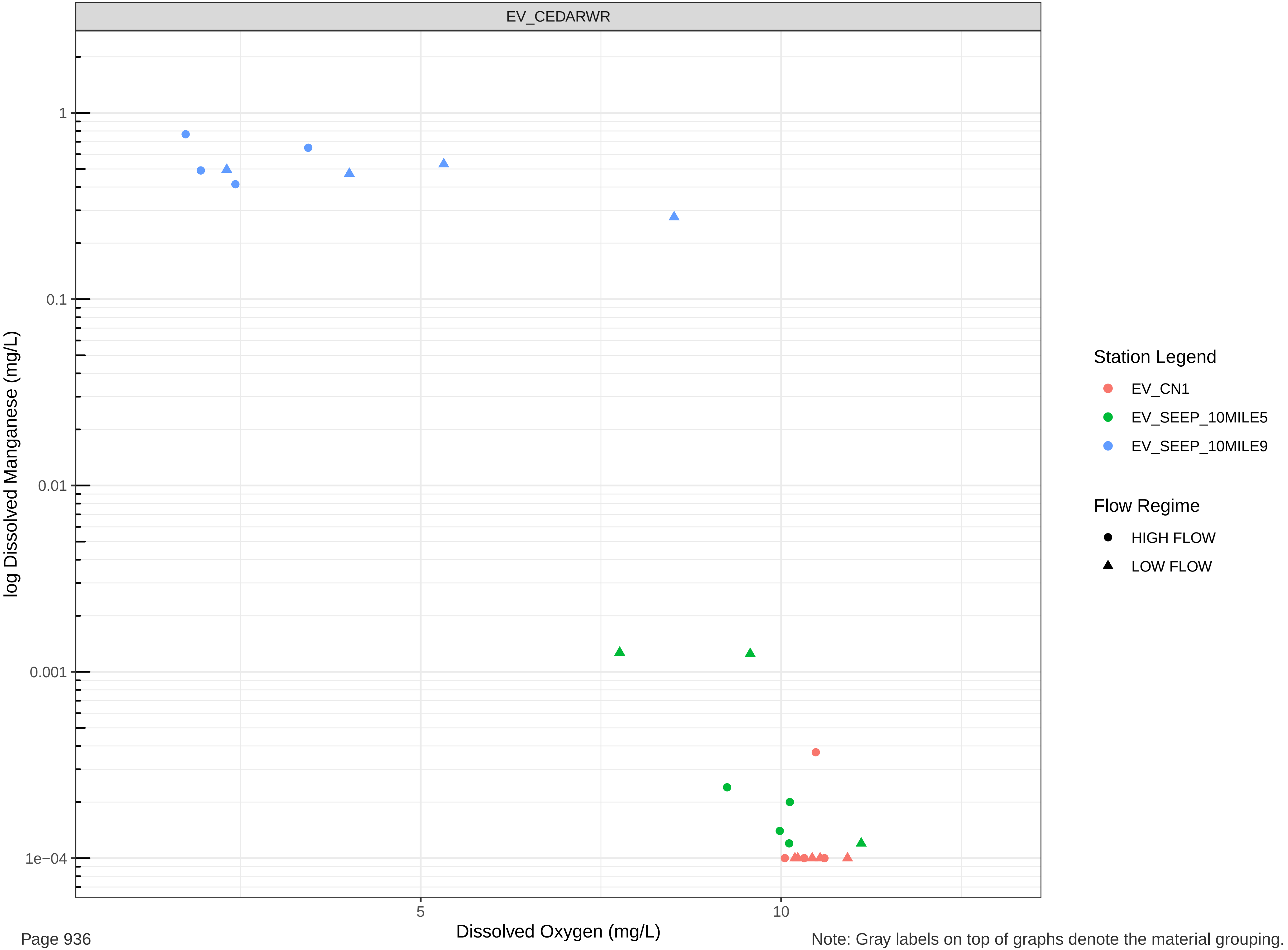

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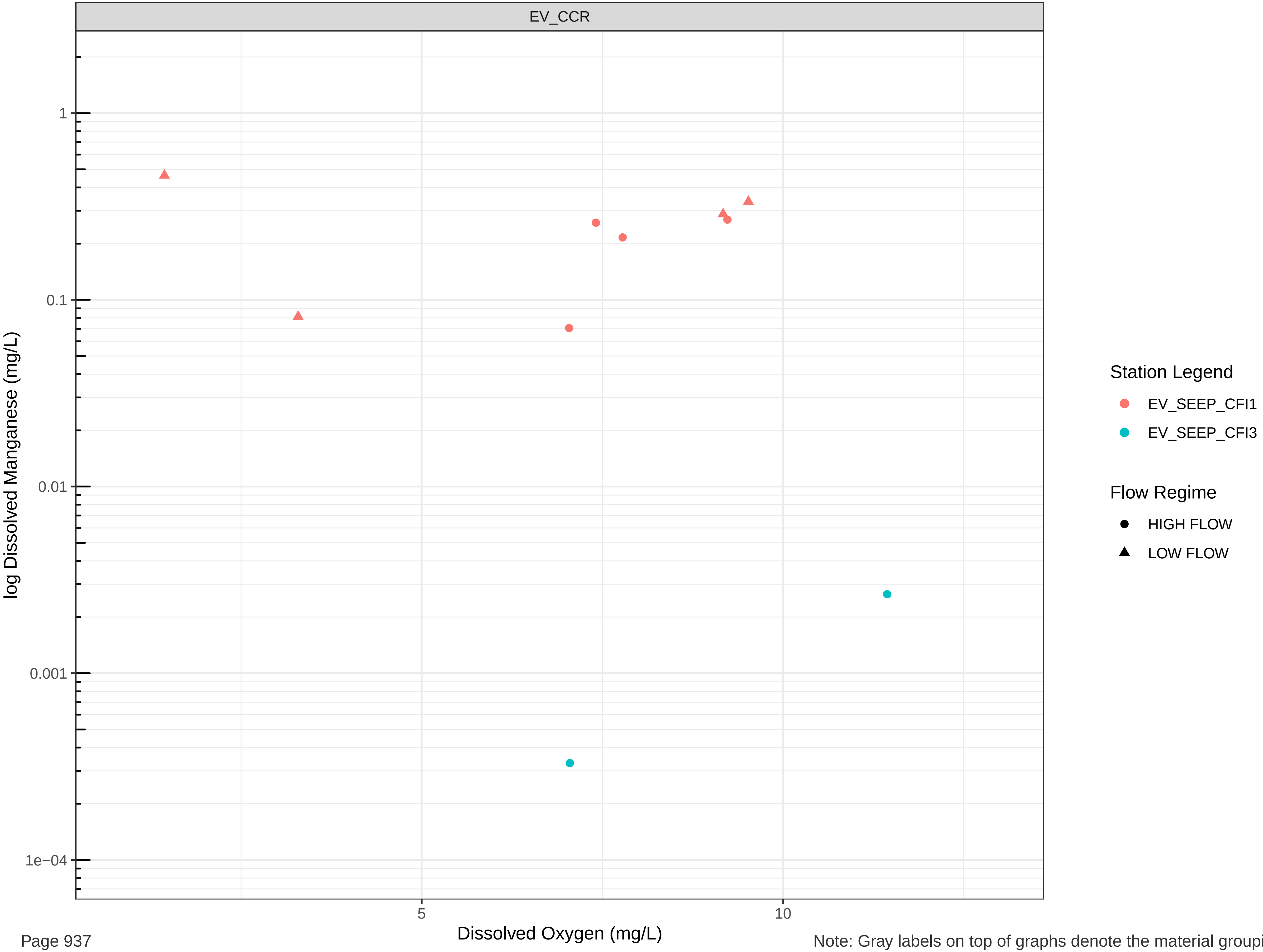

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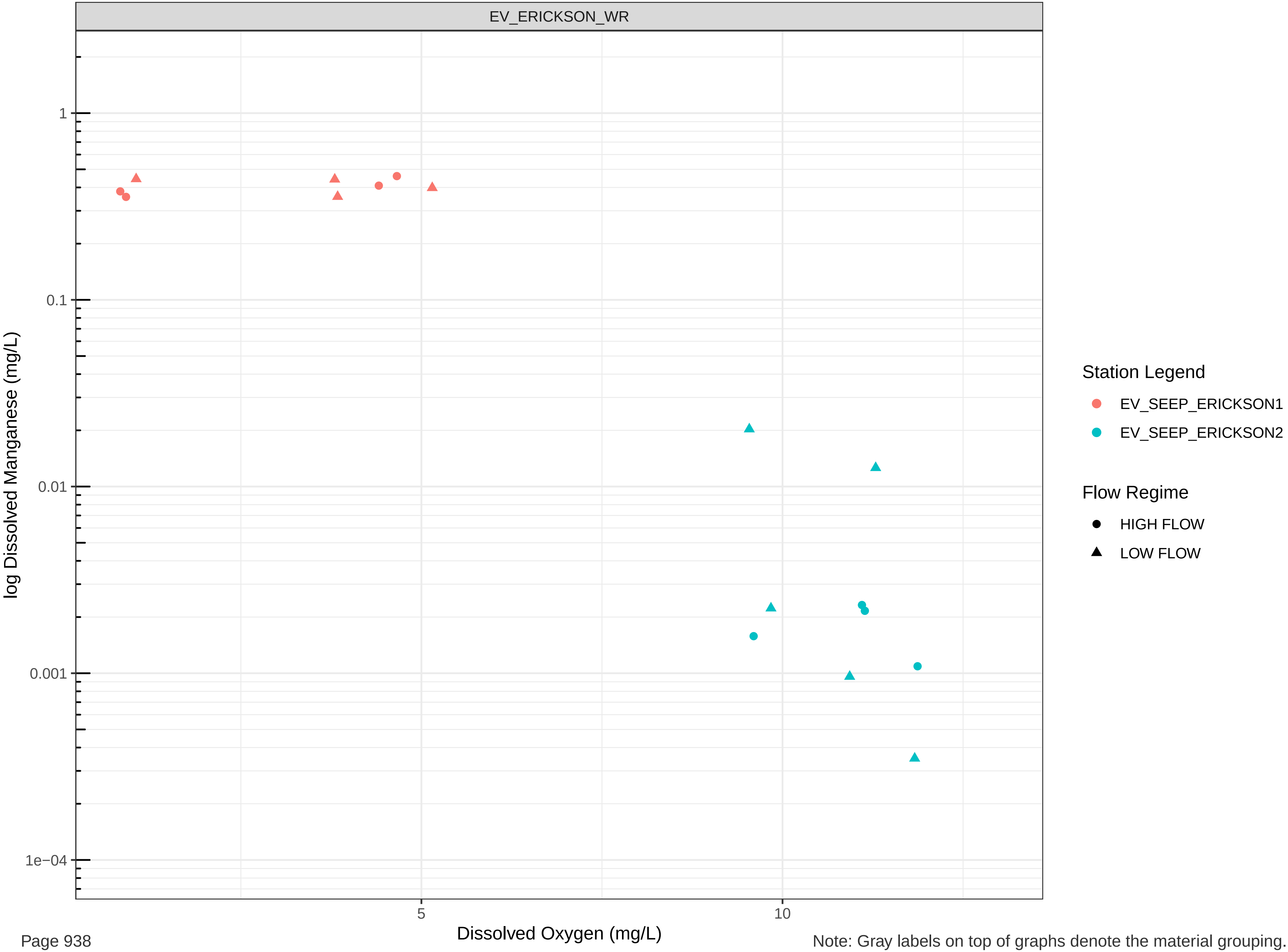

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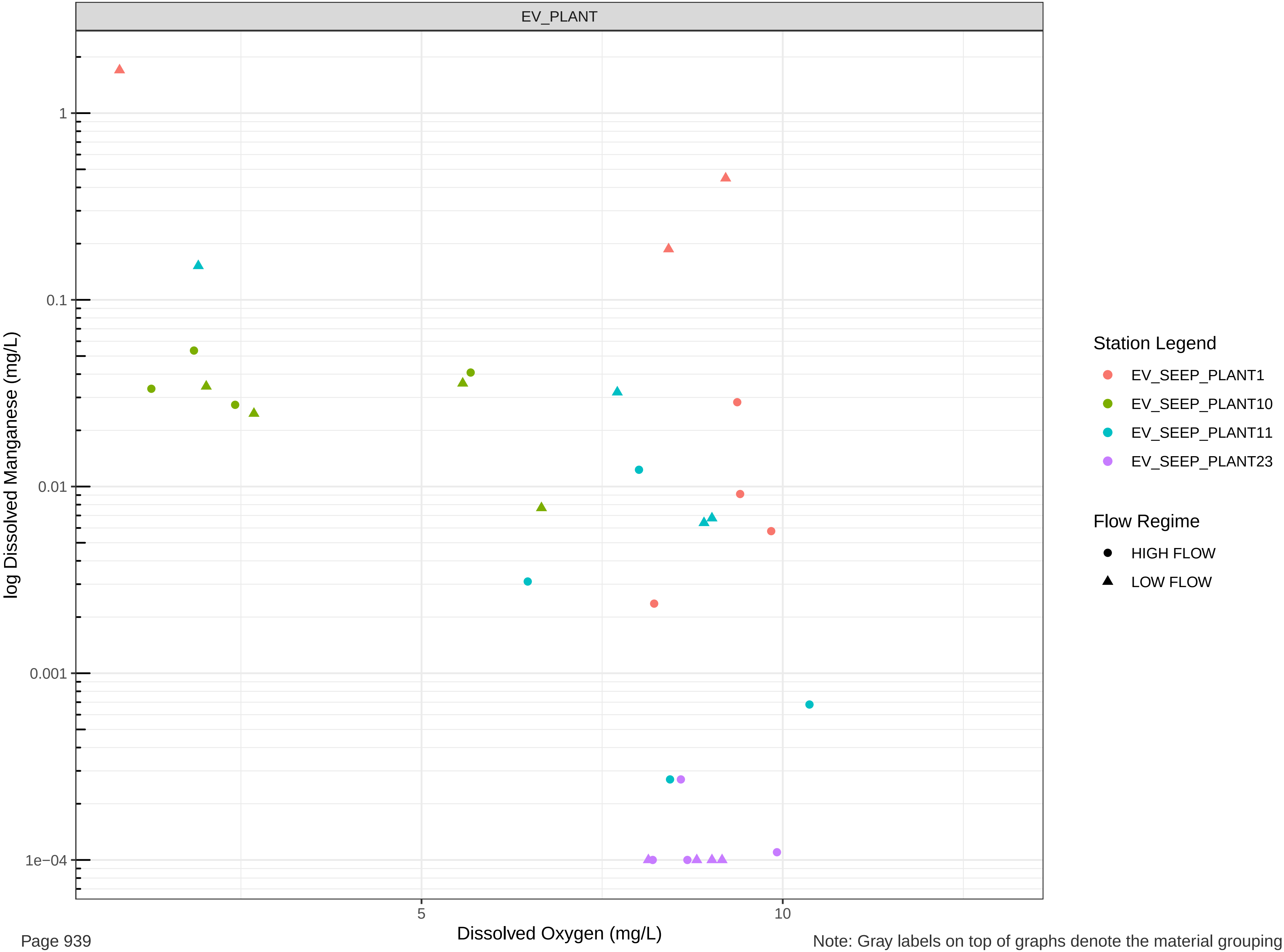

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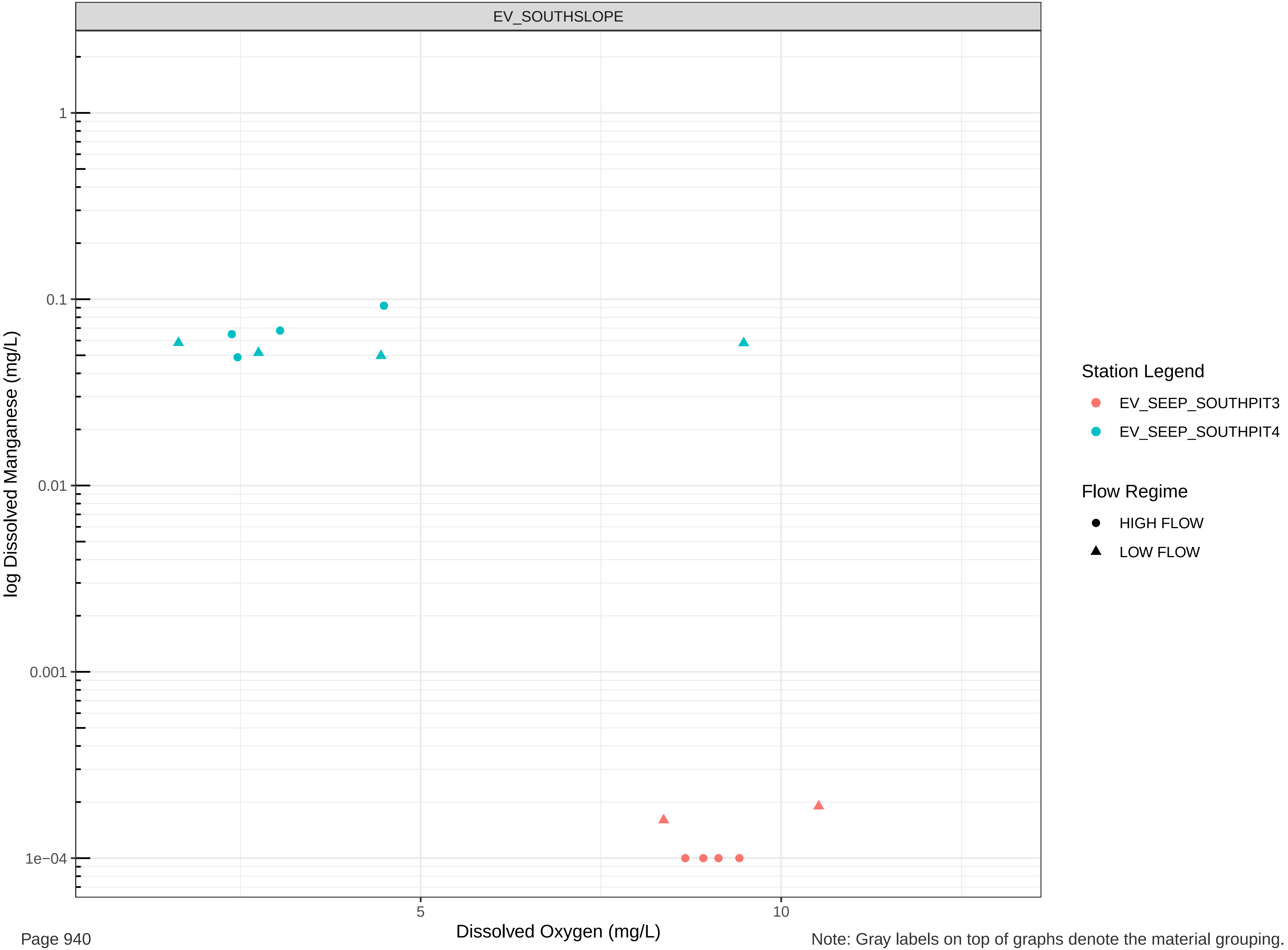

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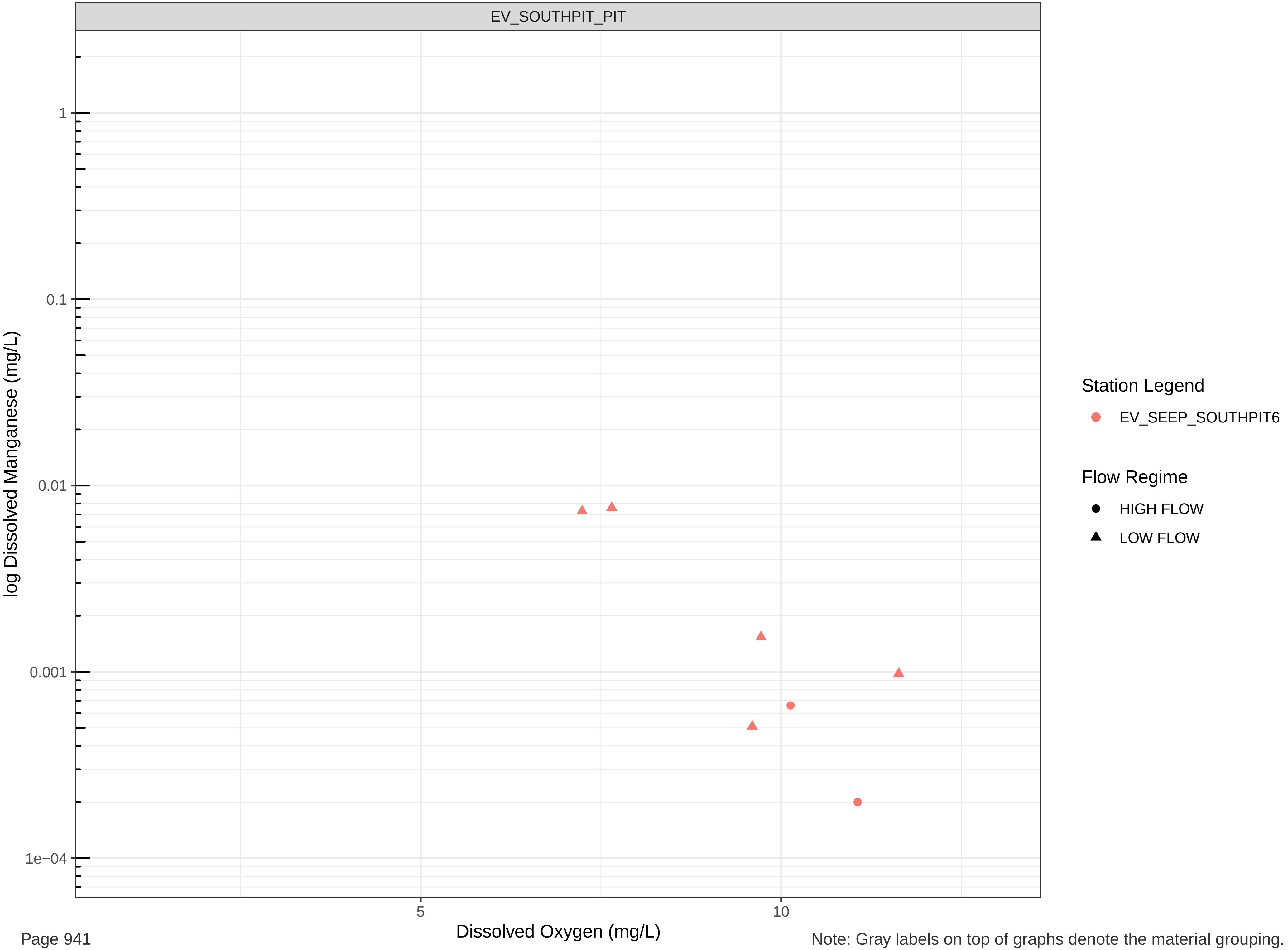

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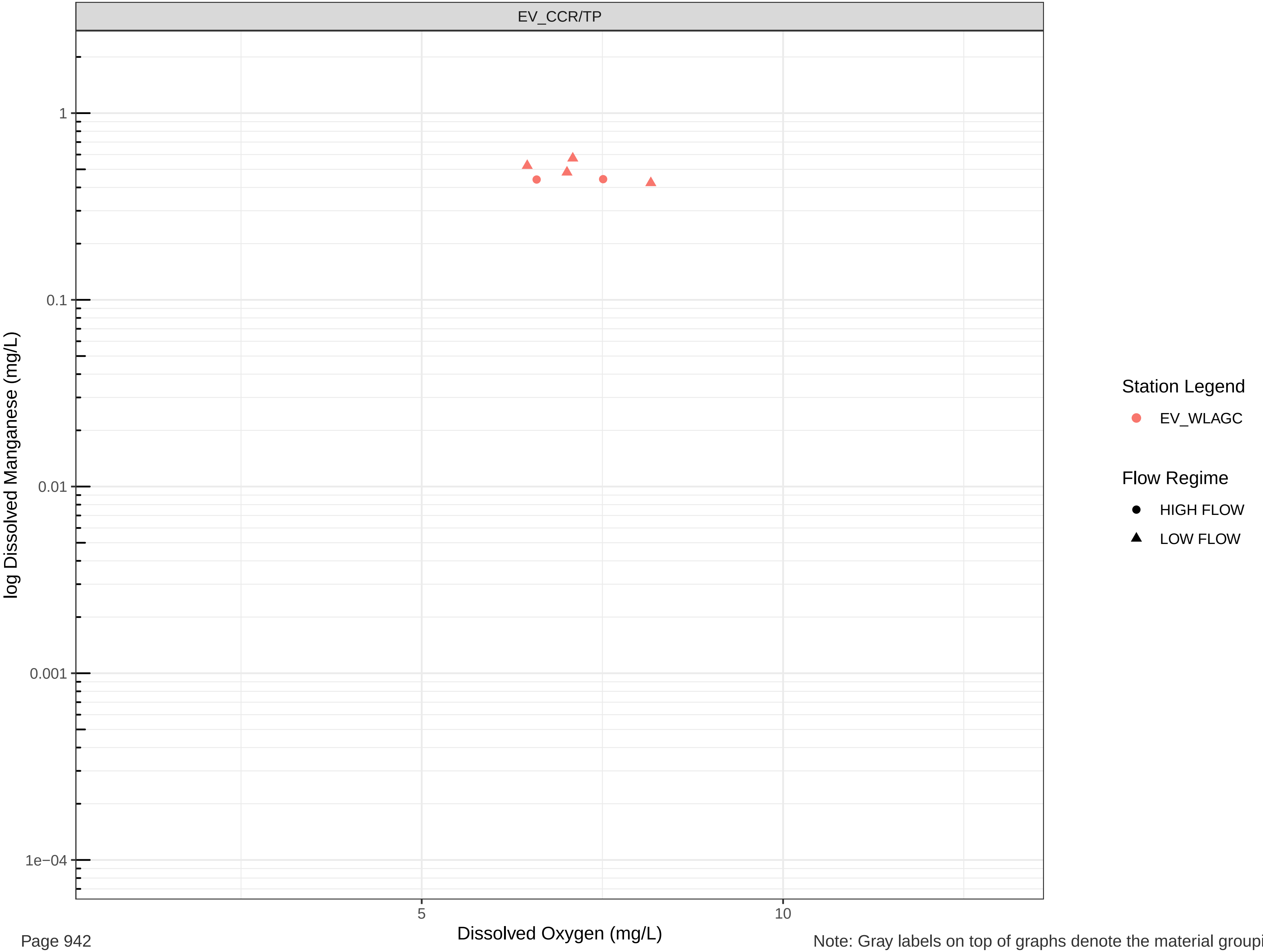

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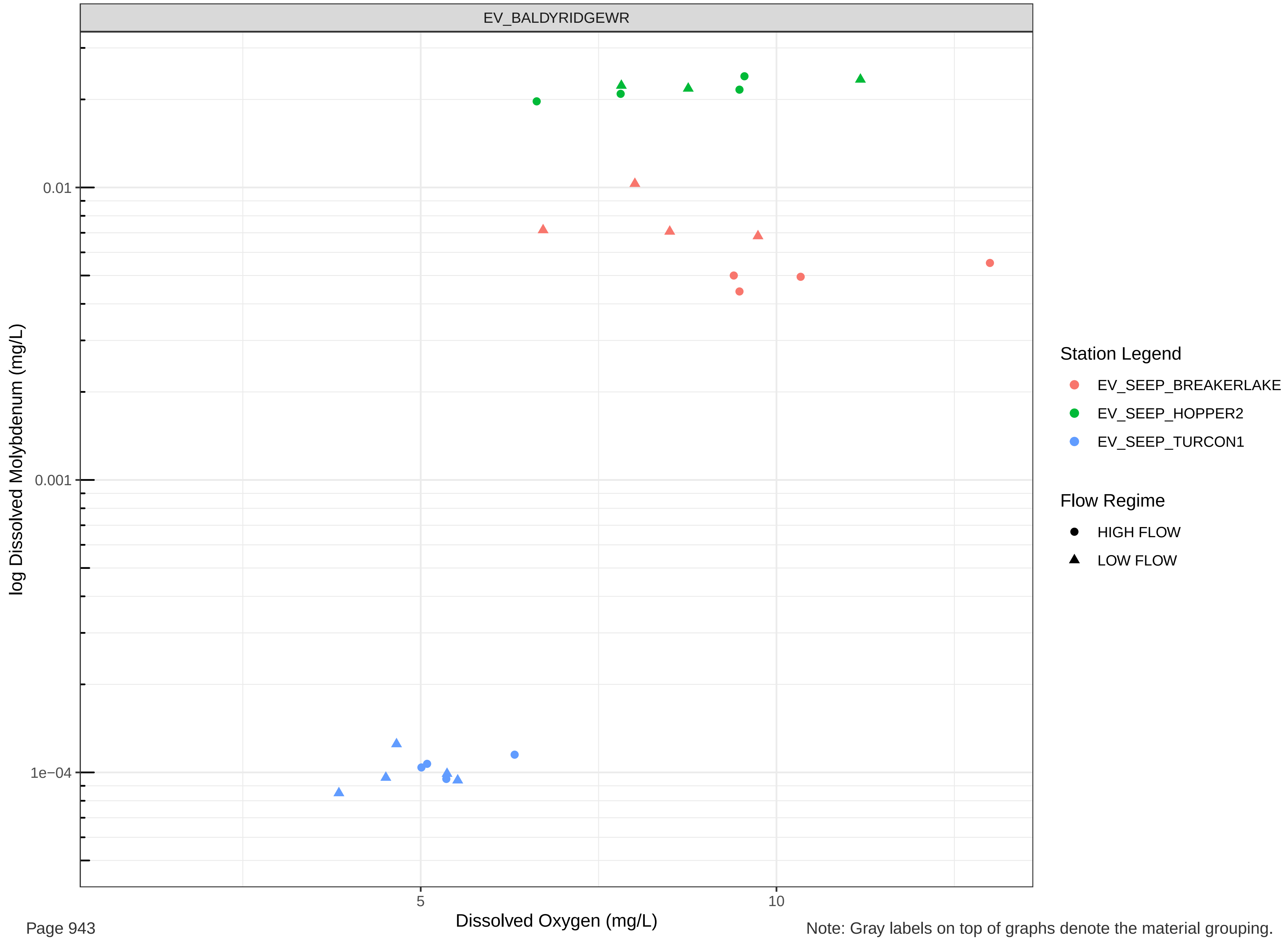
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0.01
0.001
1e−04
5
10
Dissolved Oxygen (mg/L)
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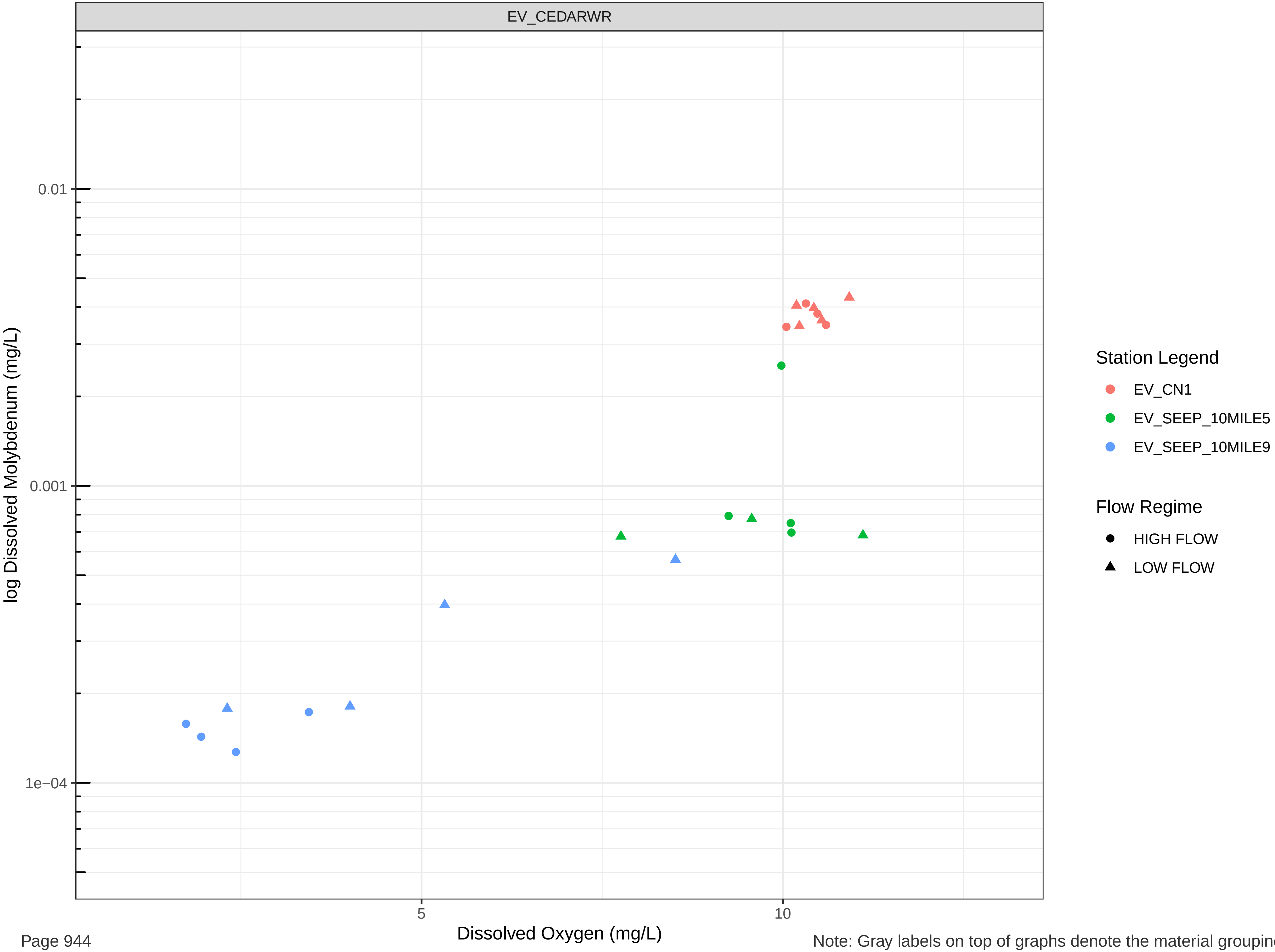

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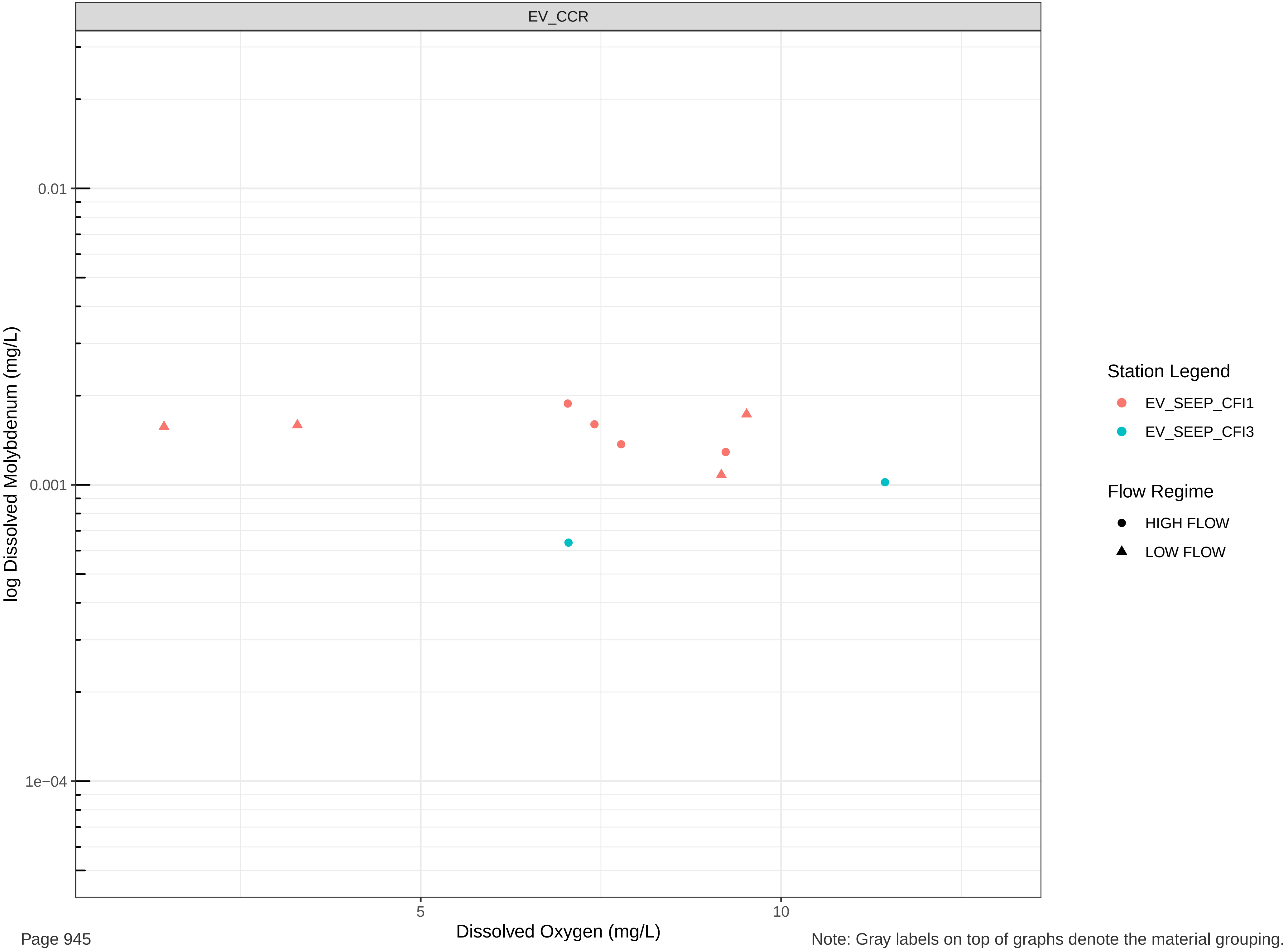

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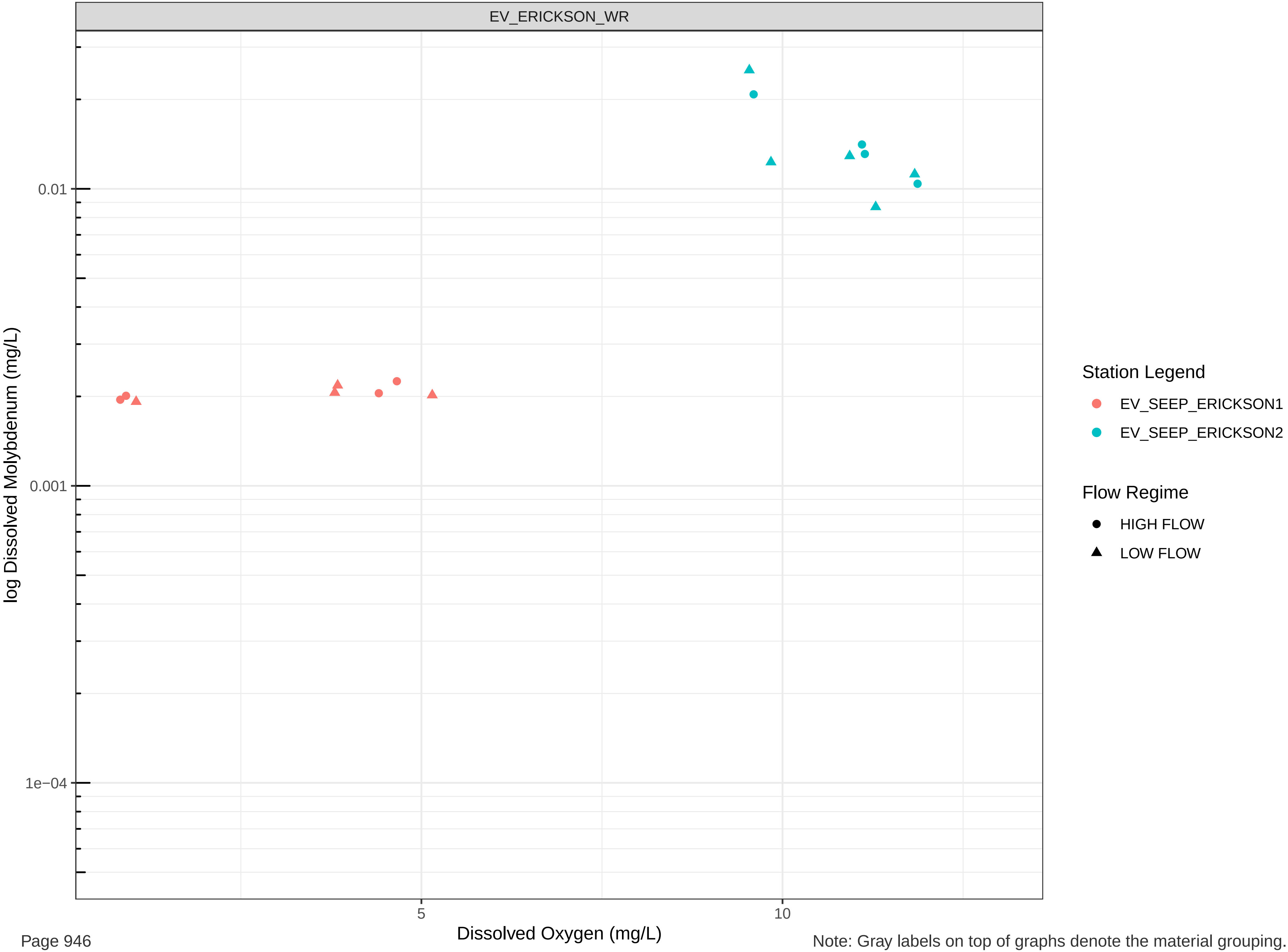

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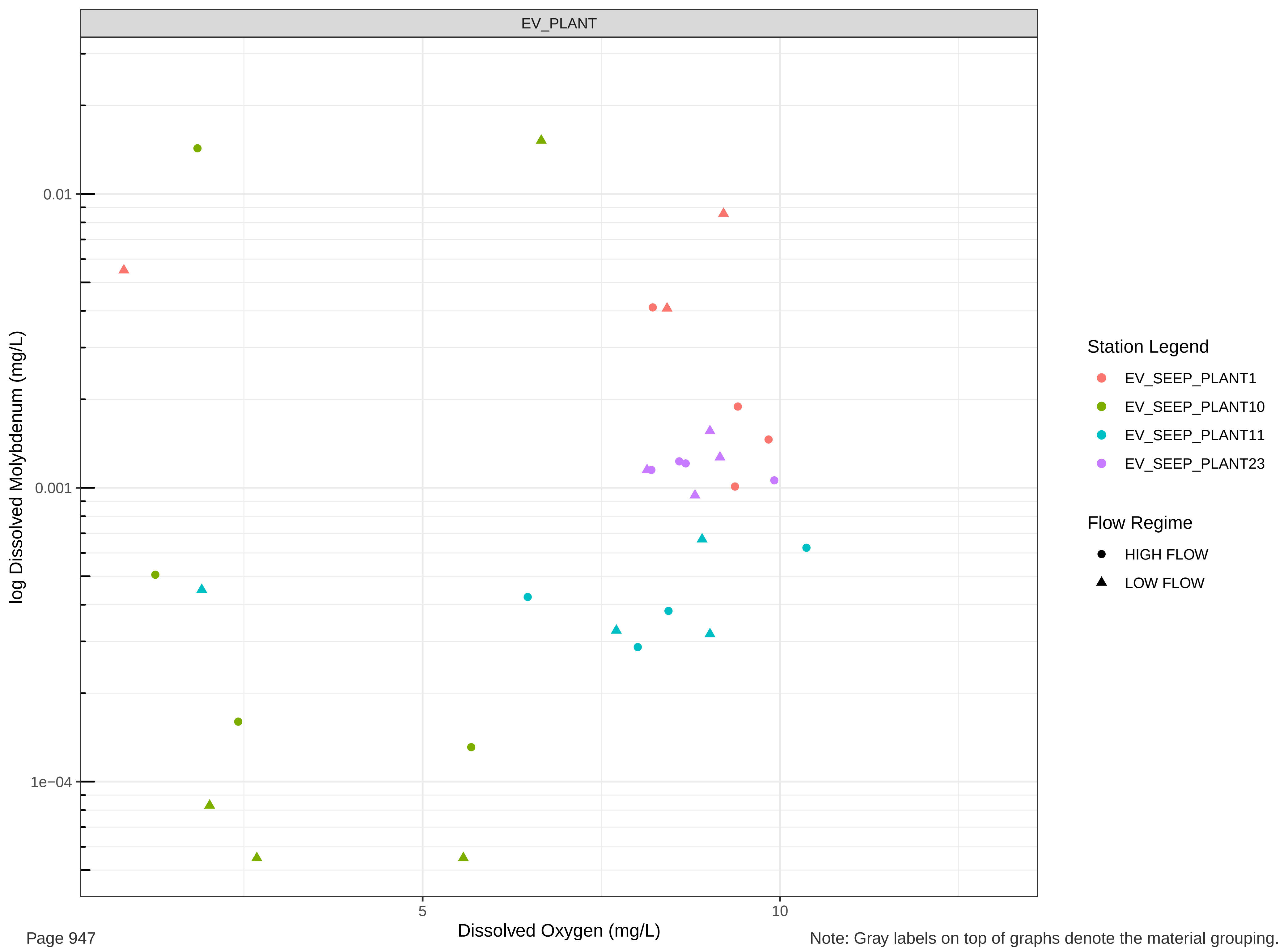

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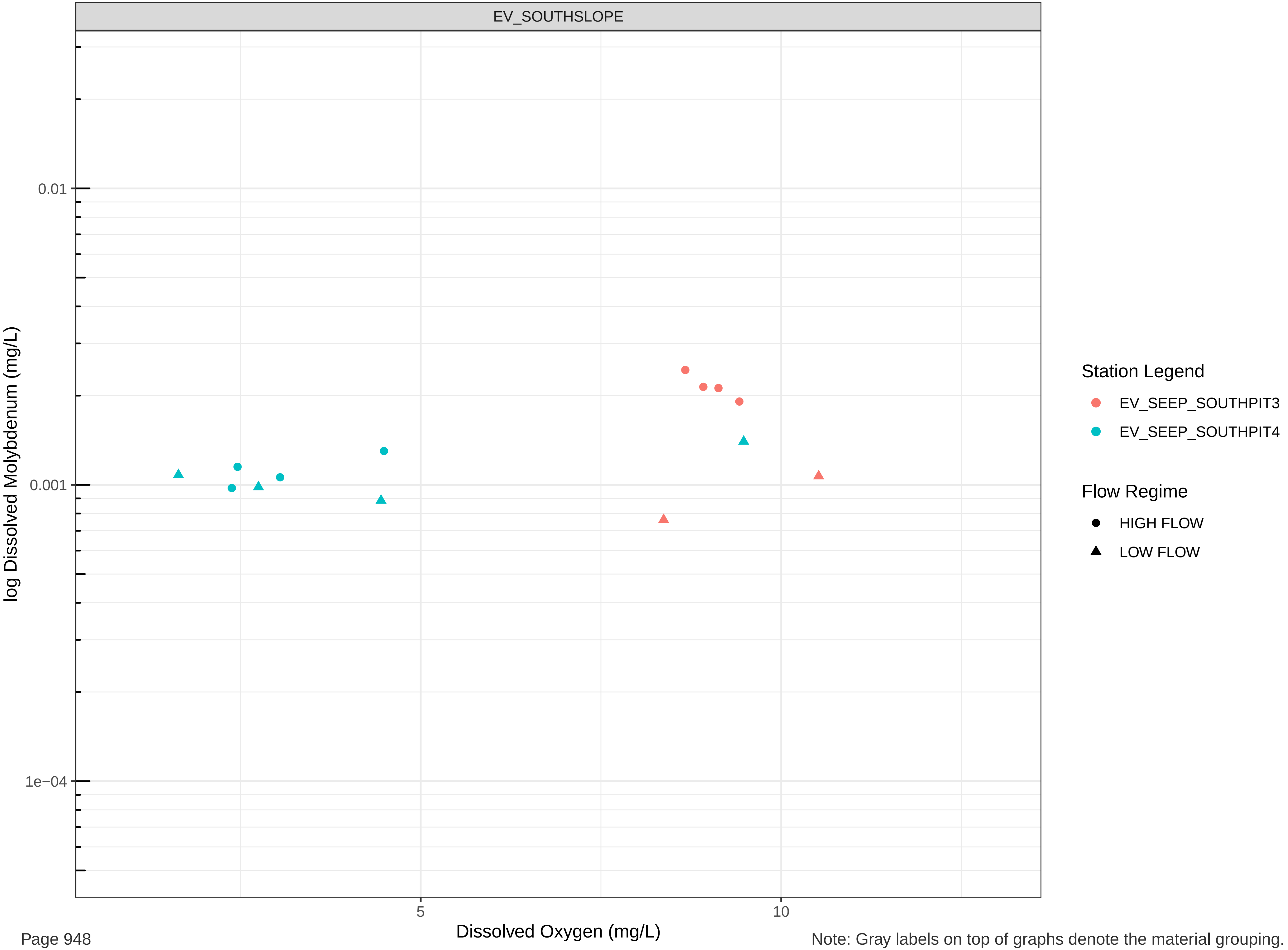

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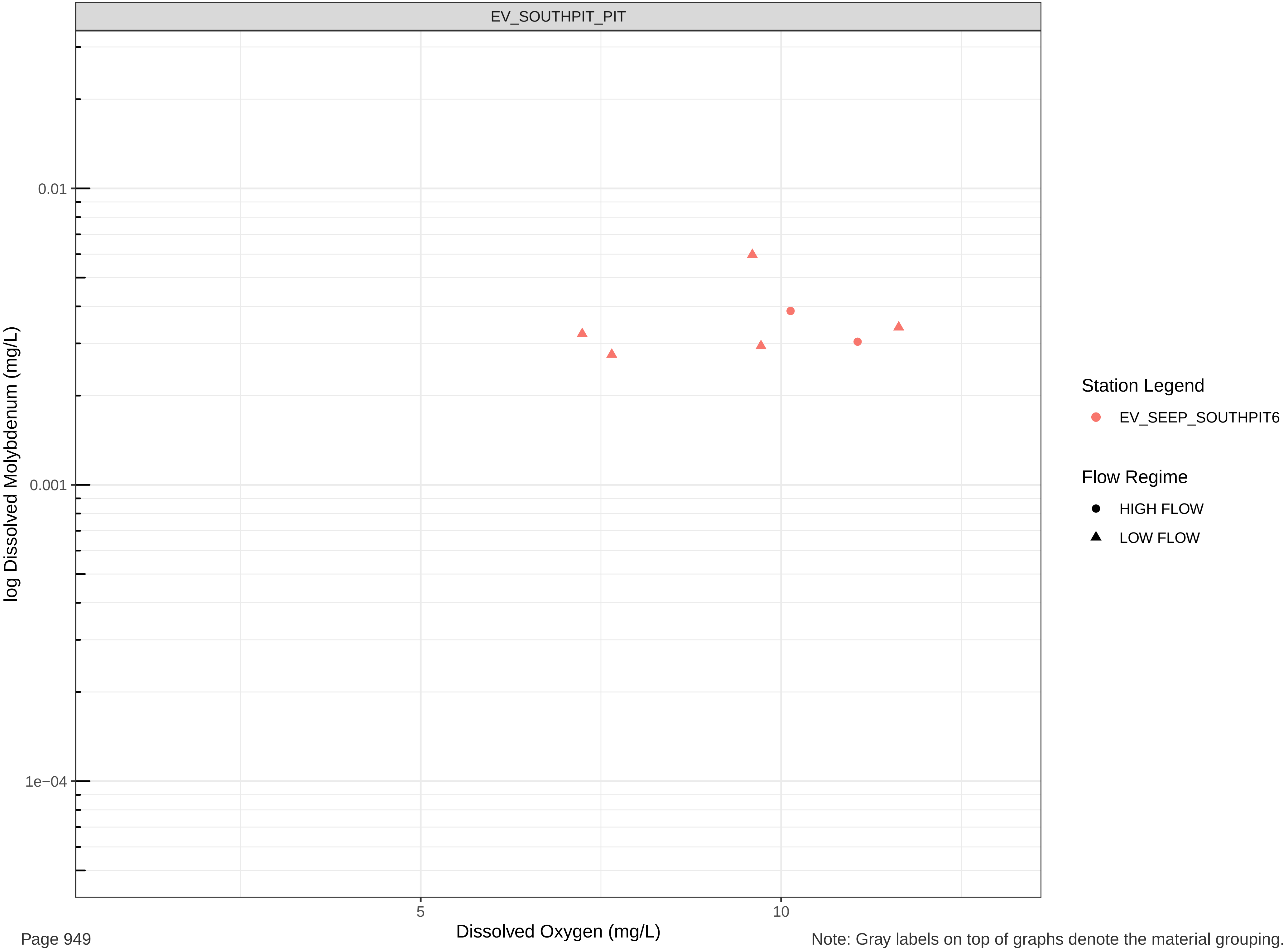

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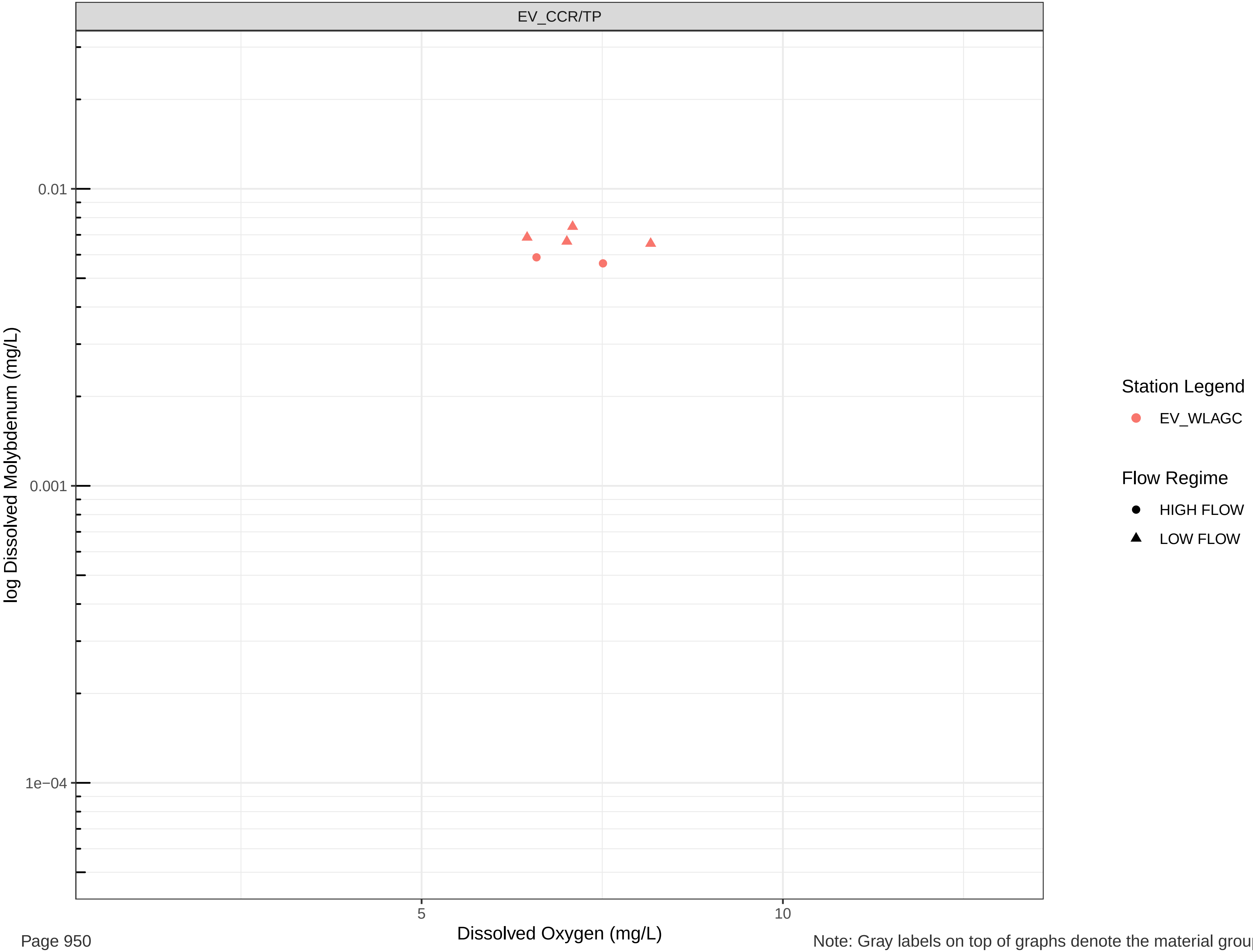

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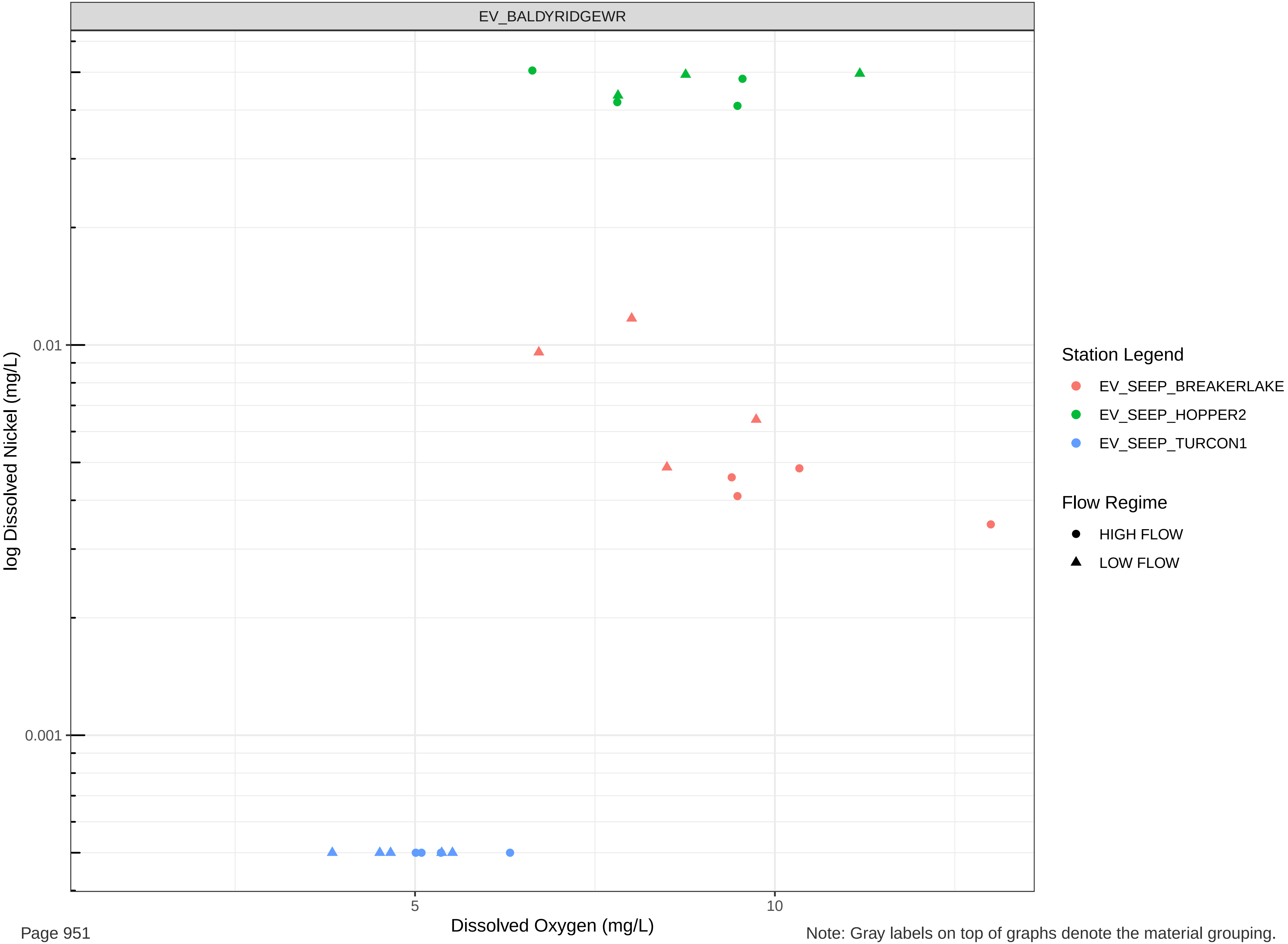

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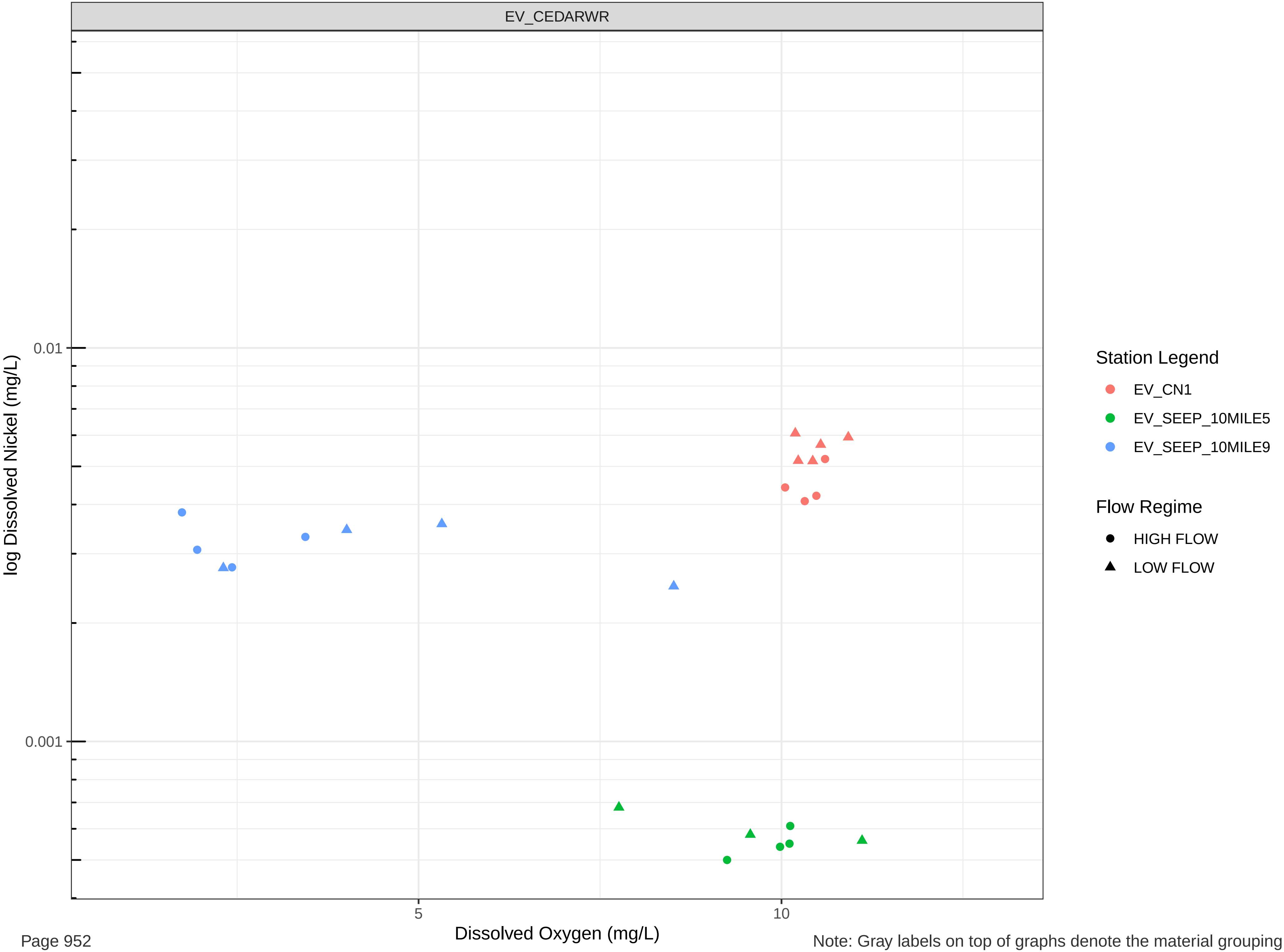

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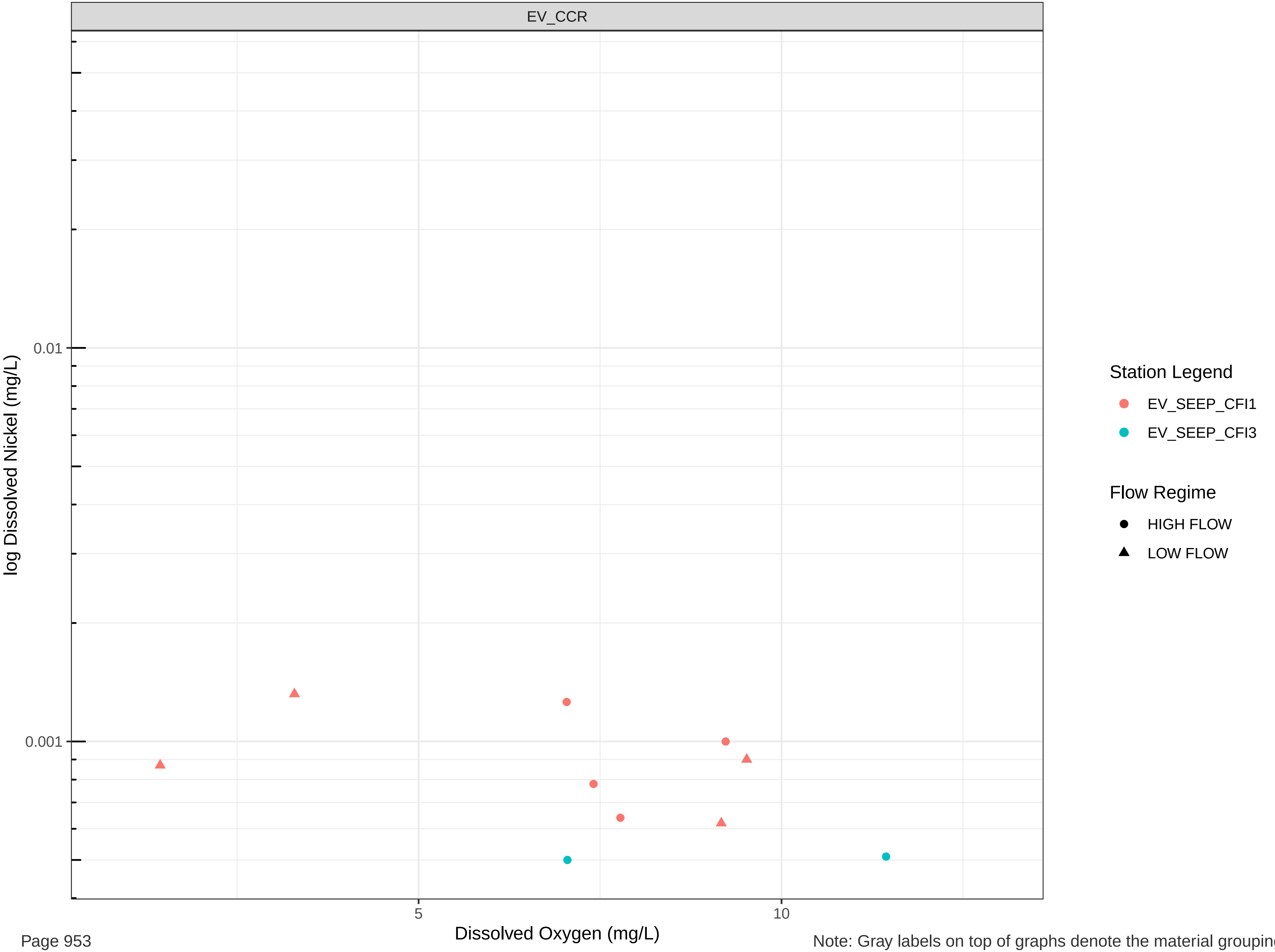

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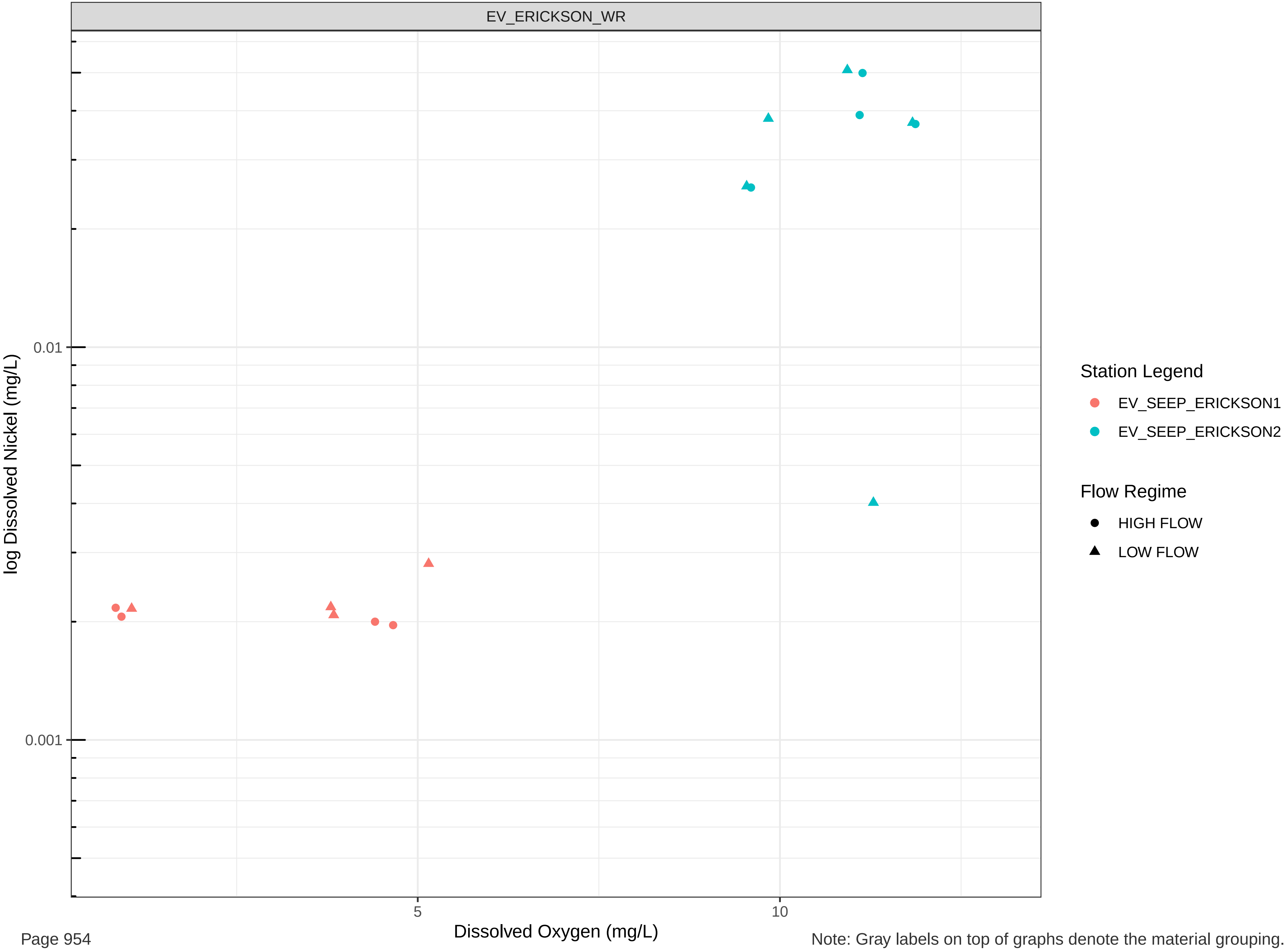

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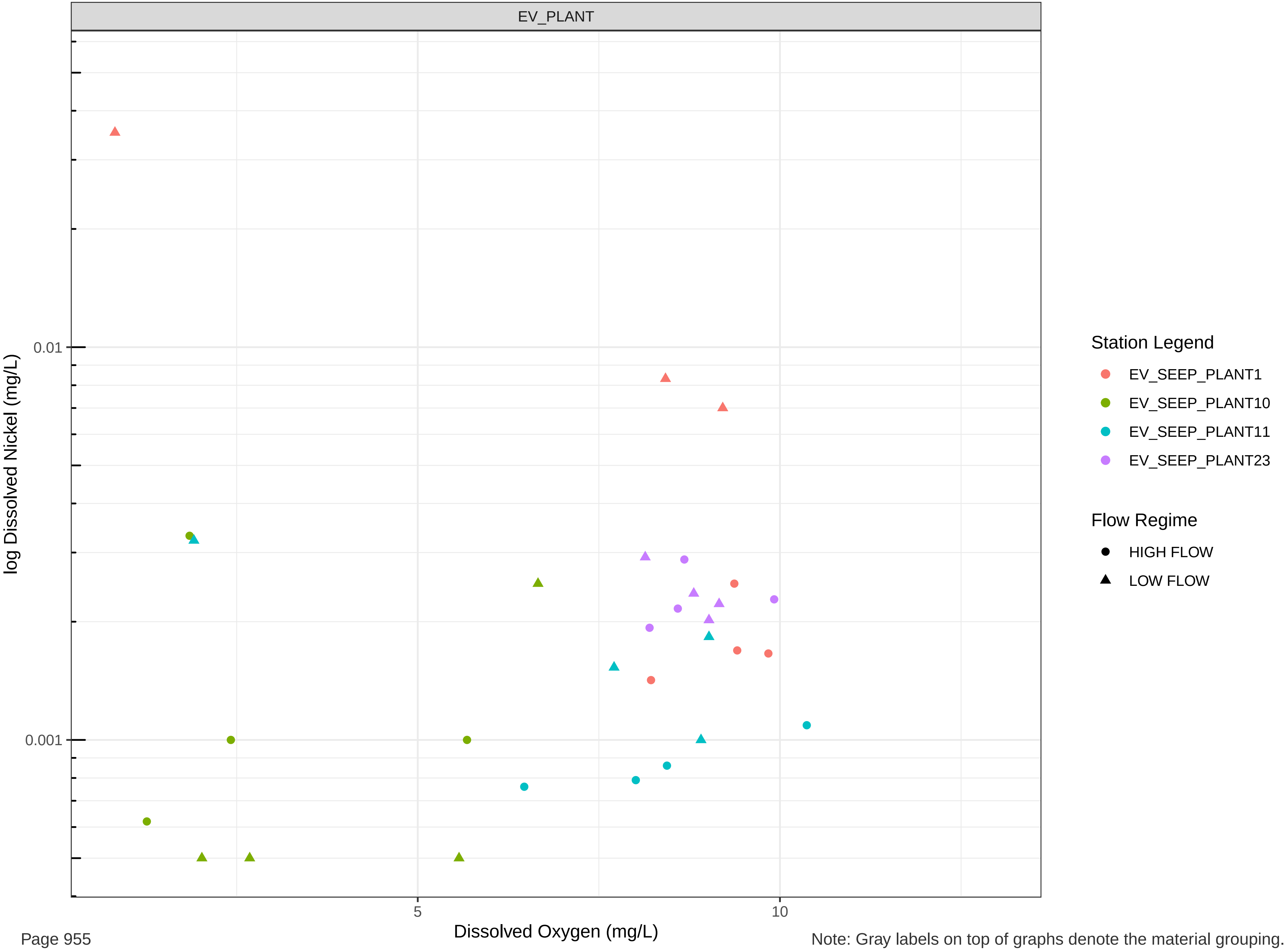

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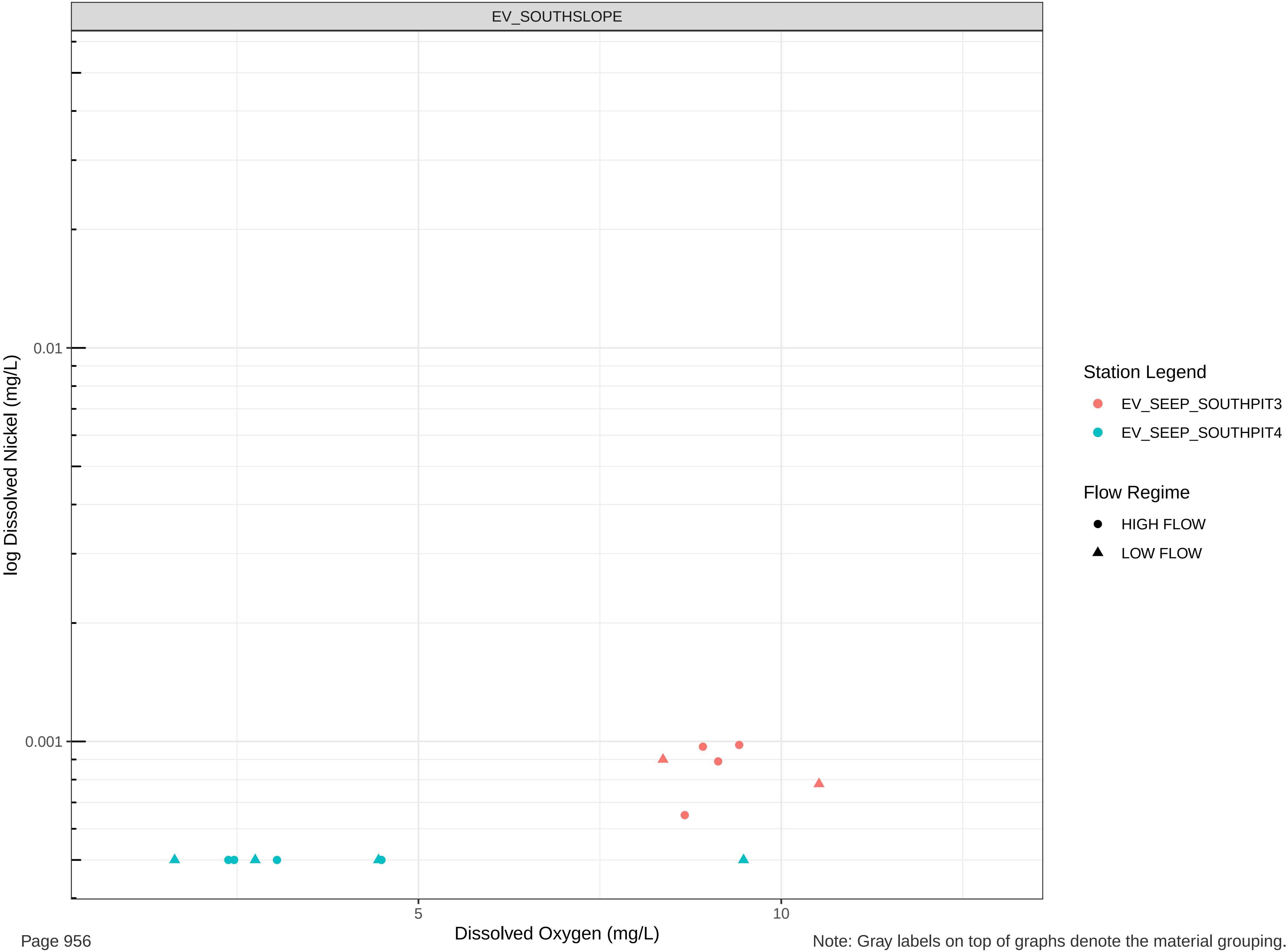

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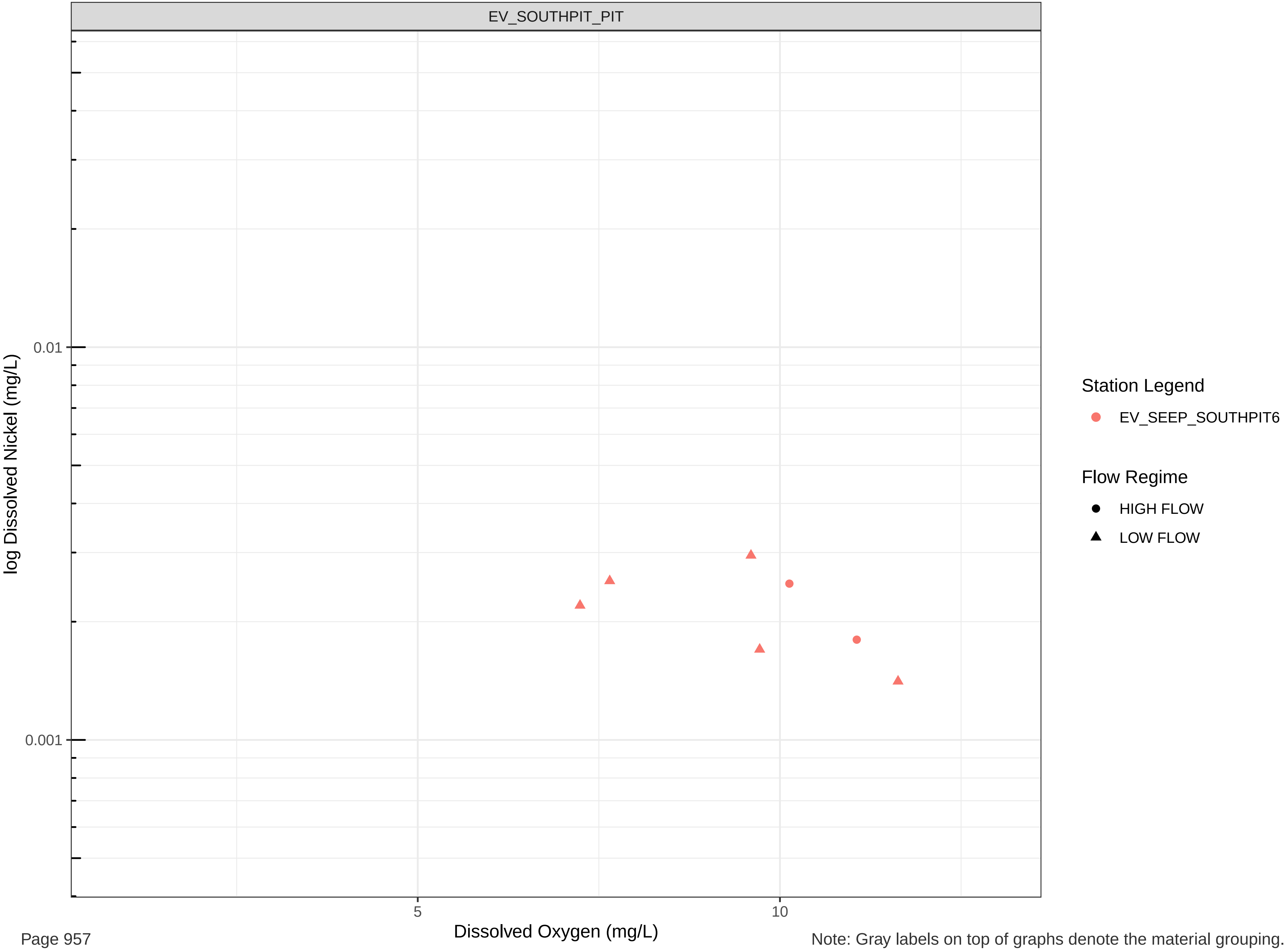

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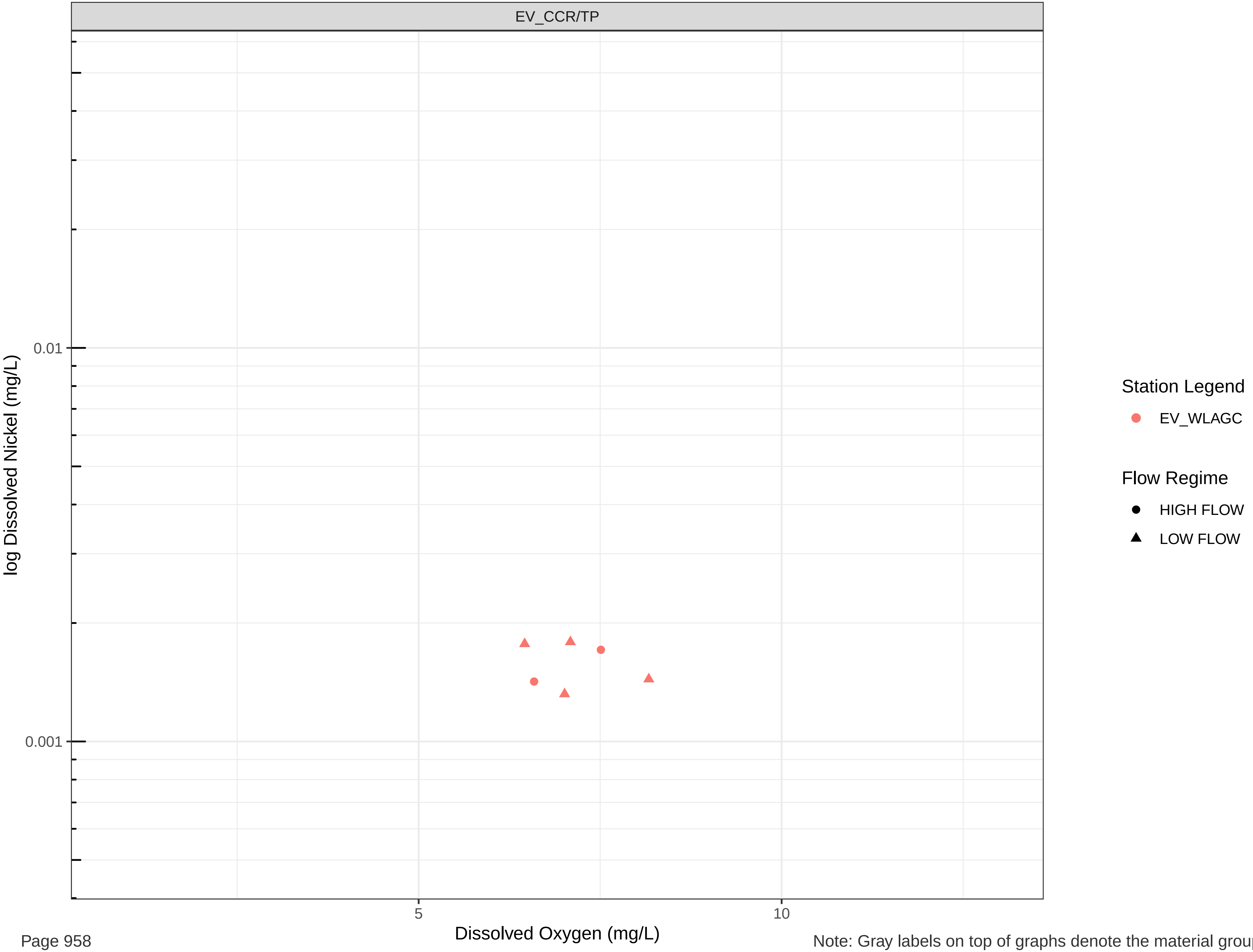

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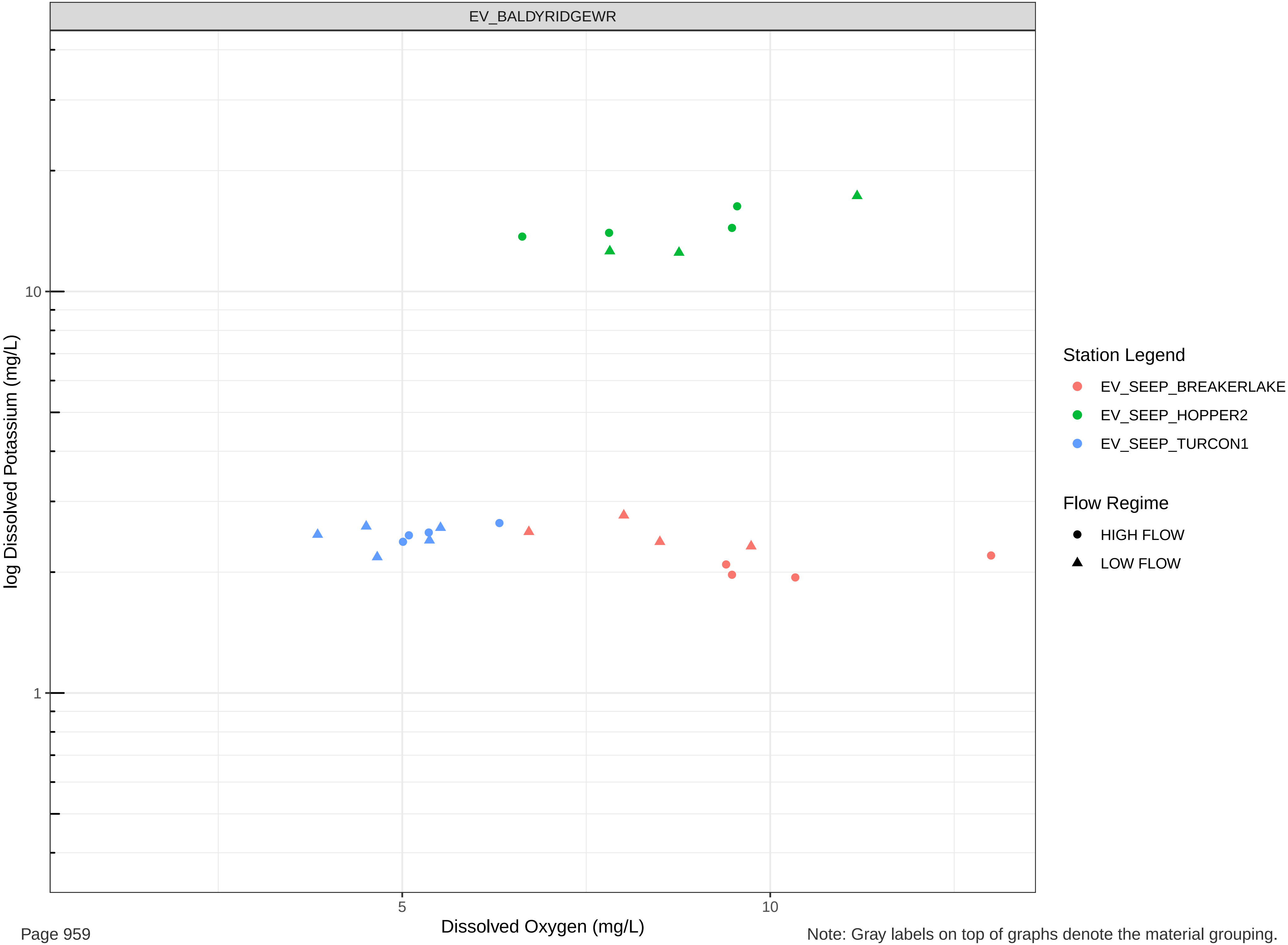

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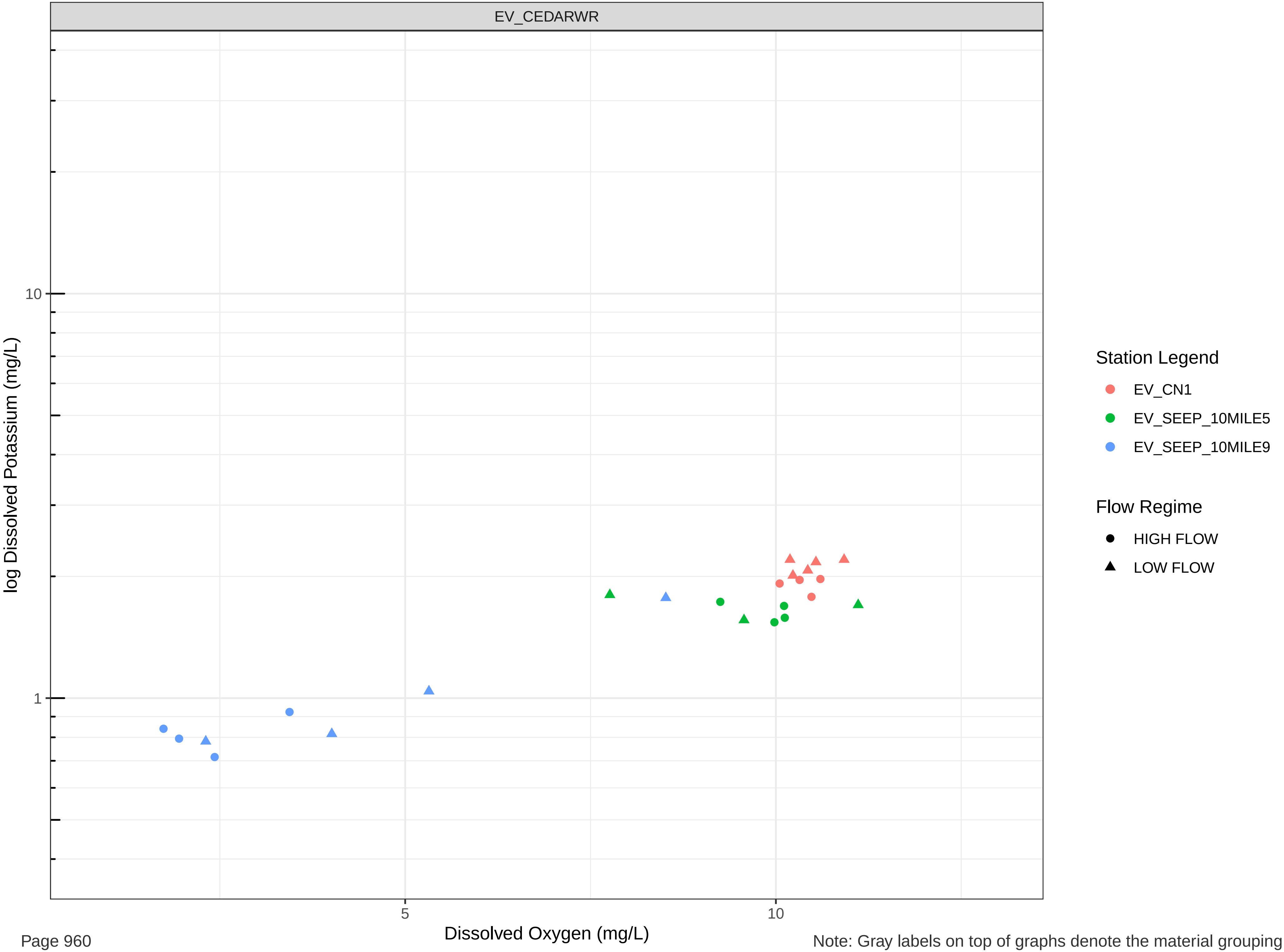

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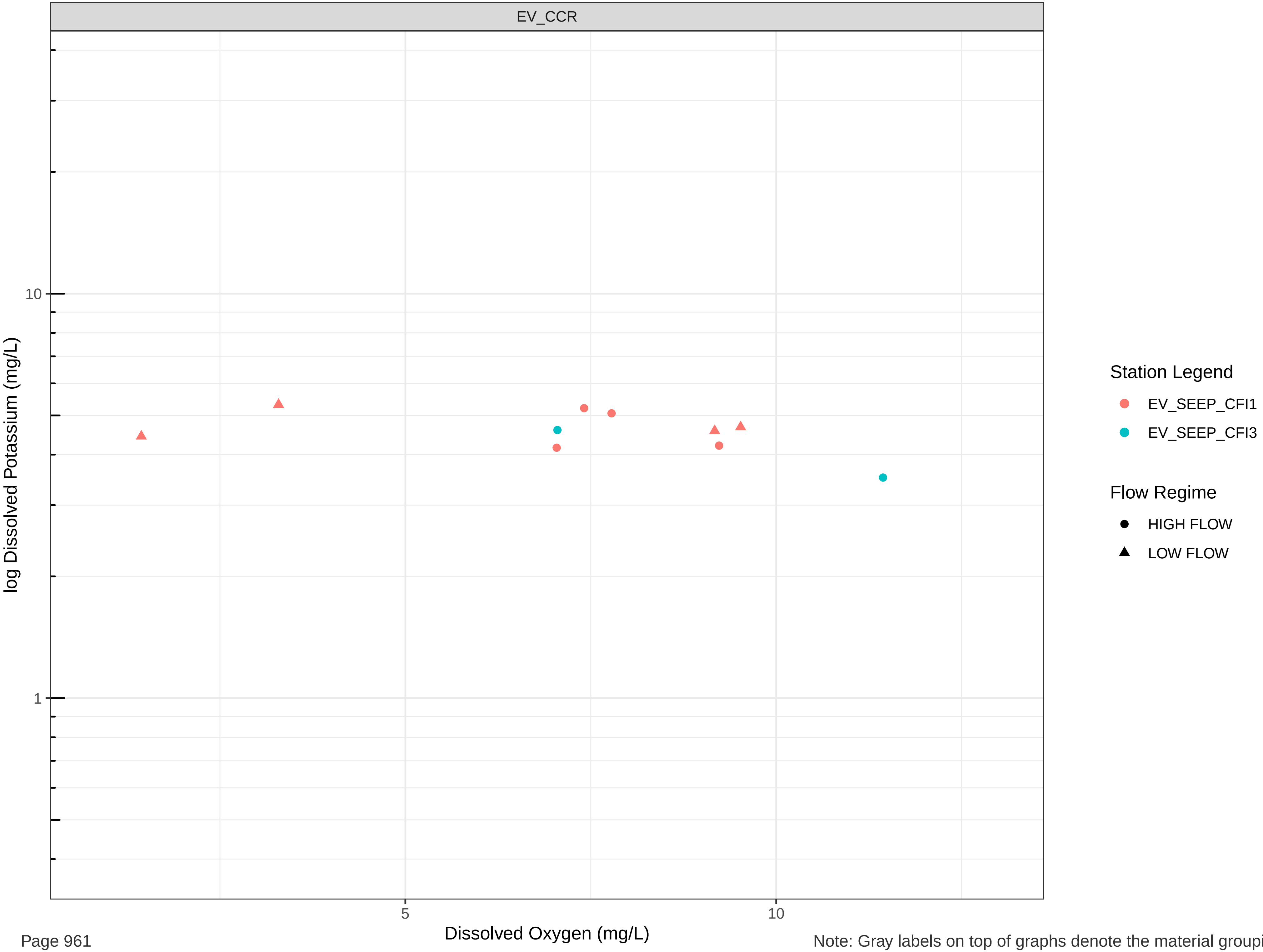

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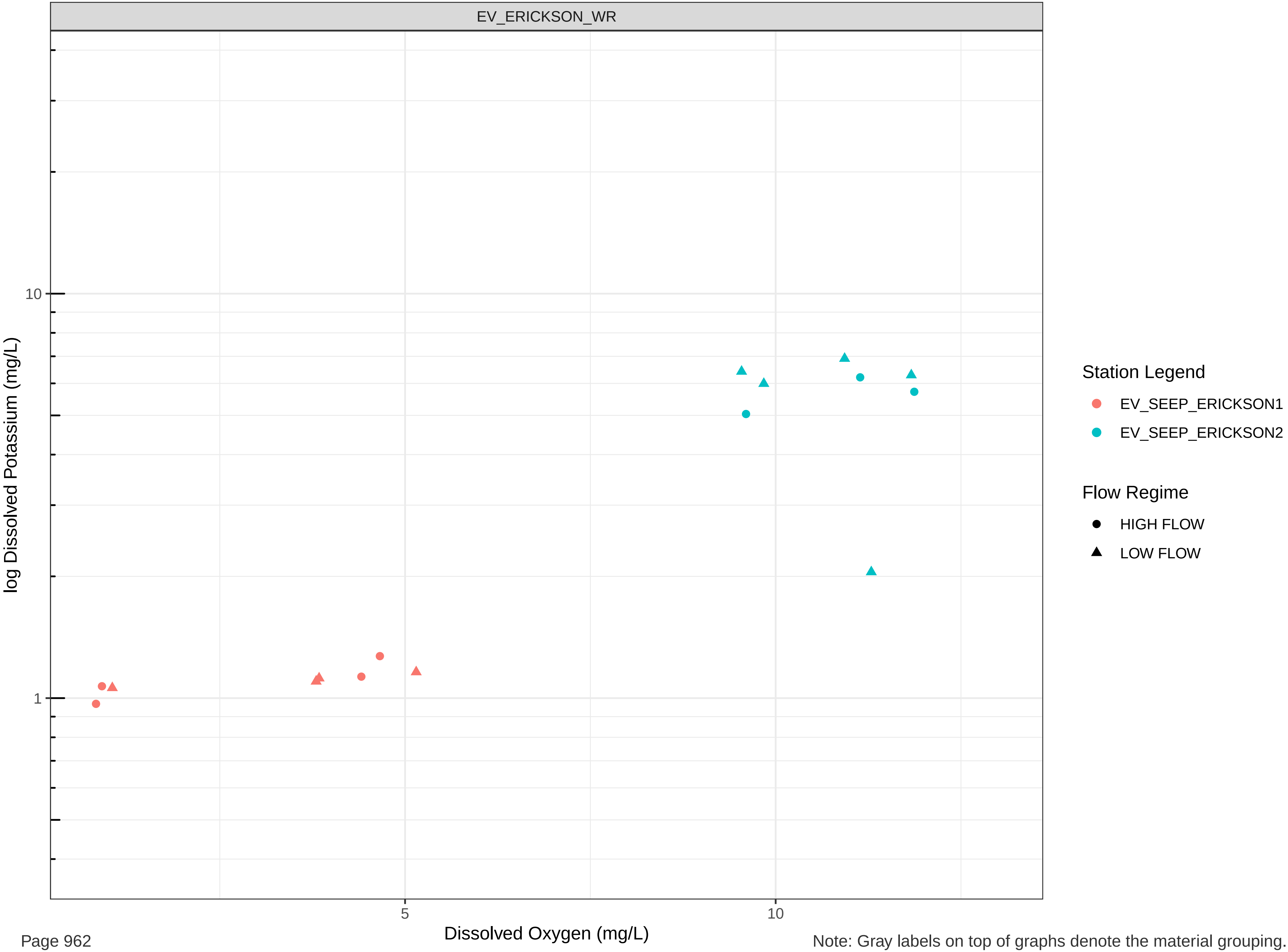

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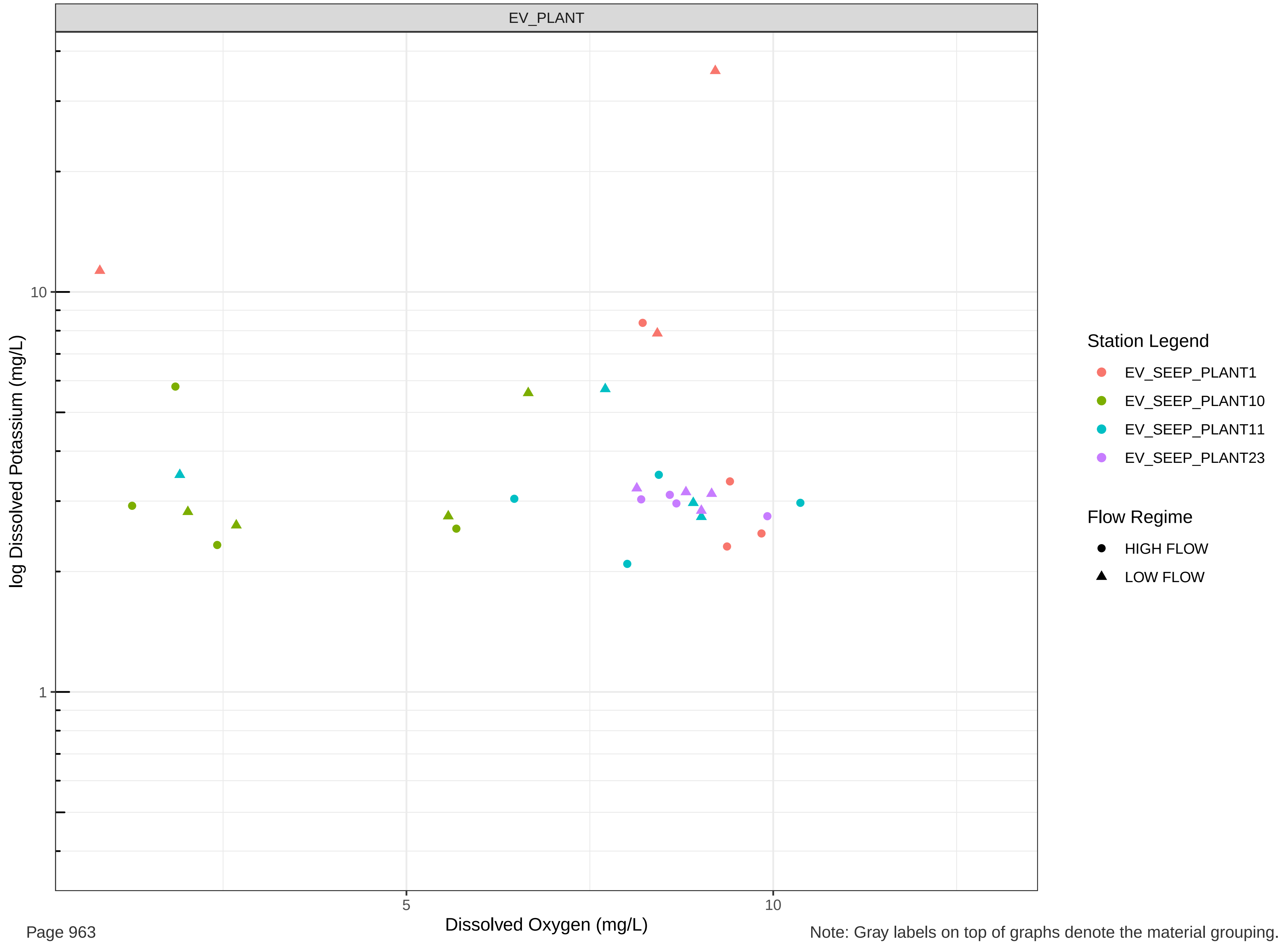

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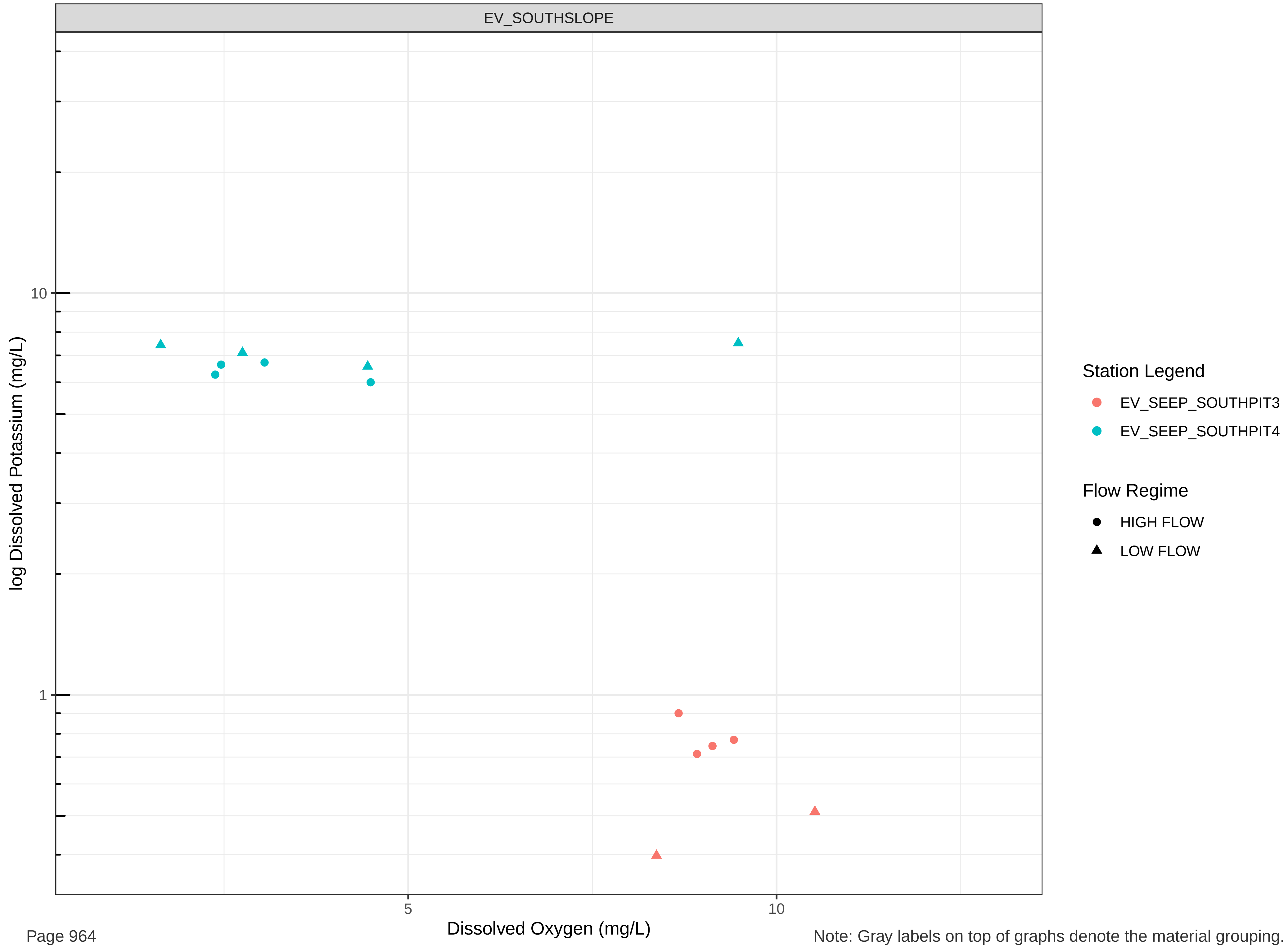

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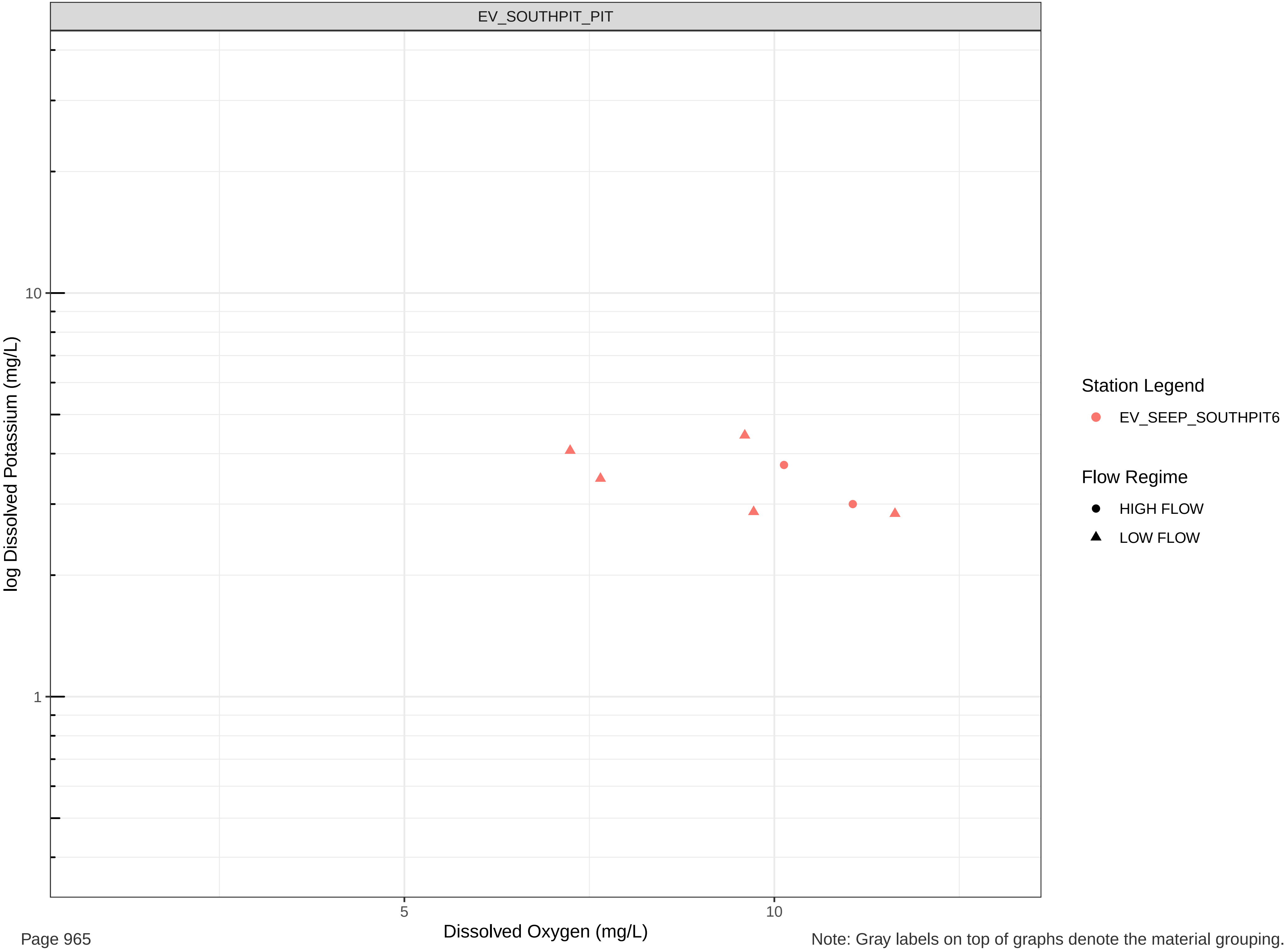

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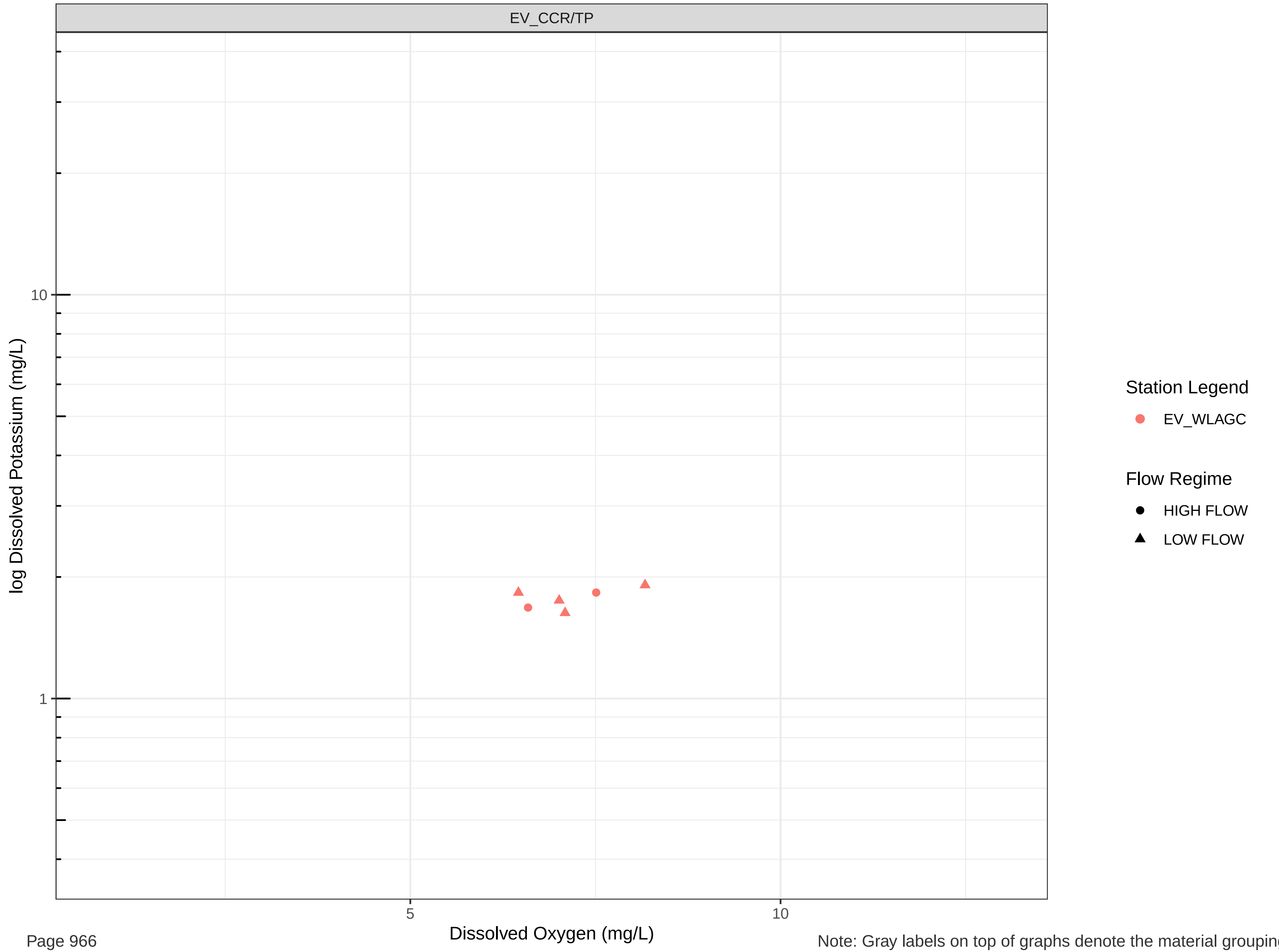
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Station Legend
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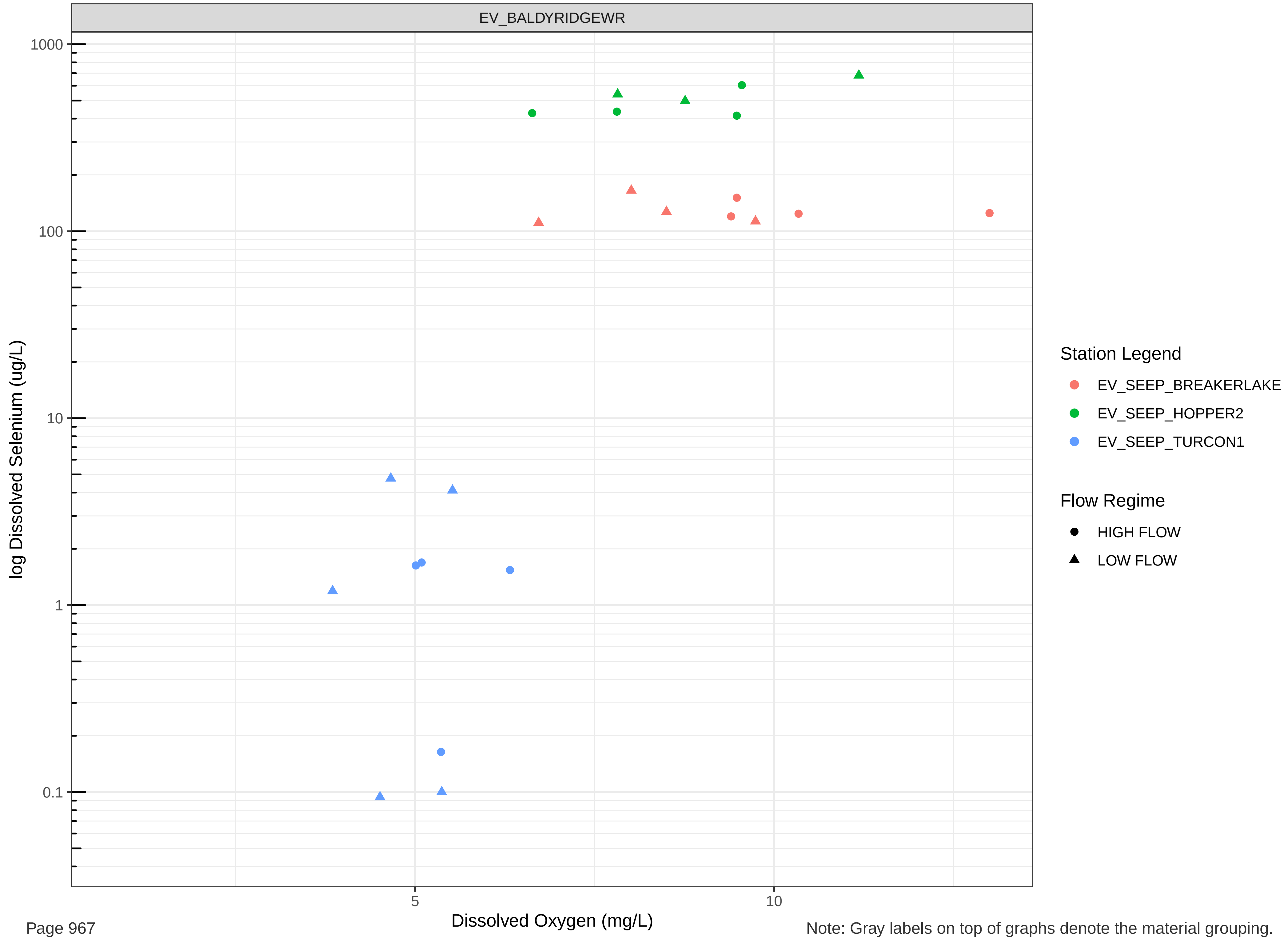

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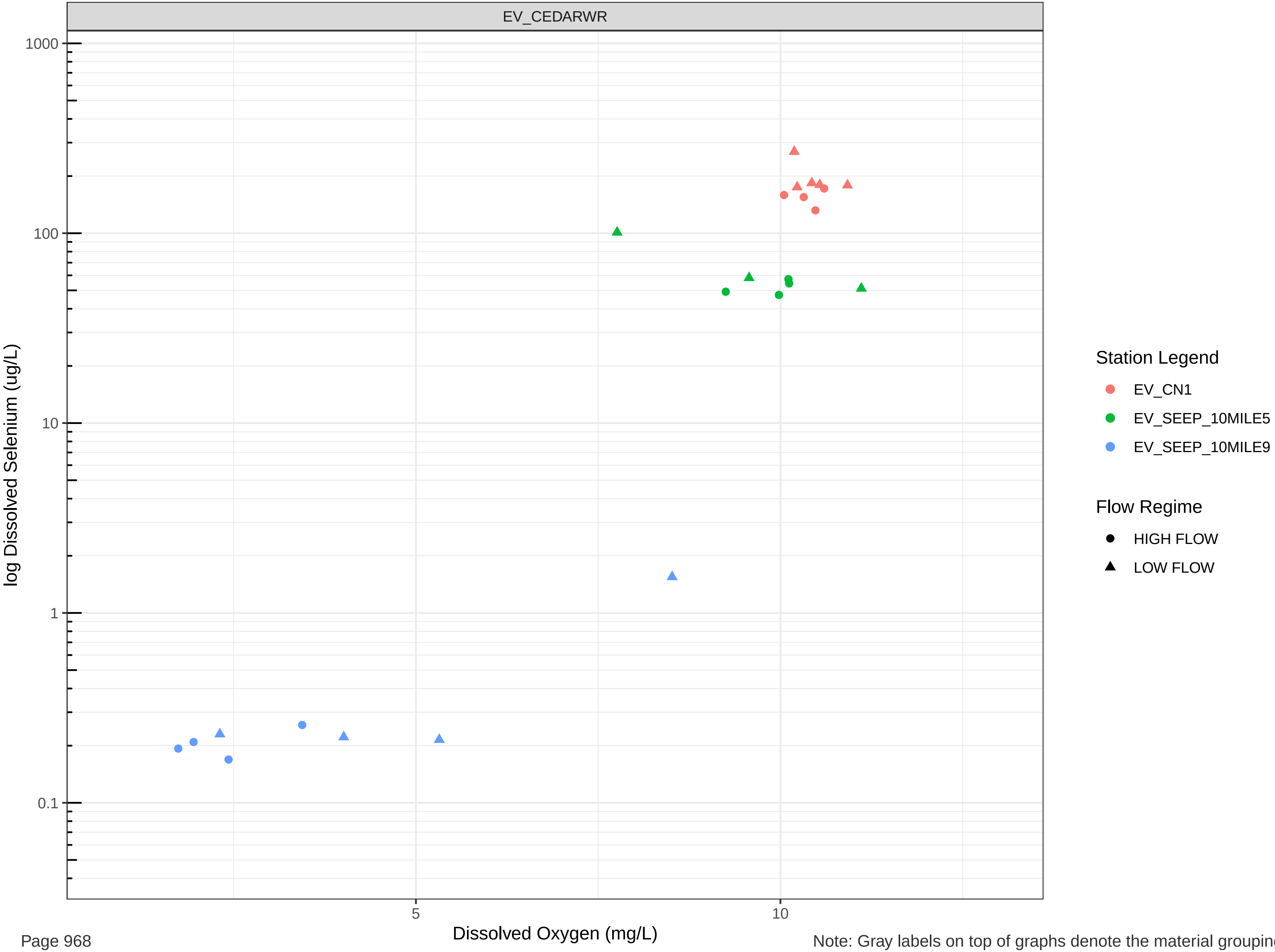

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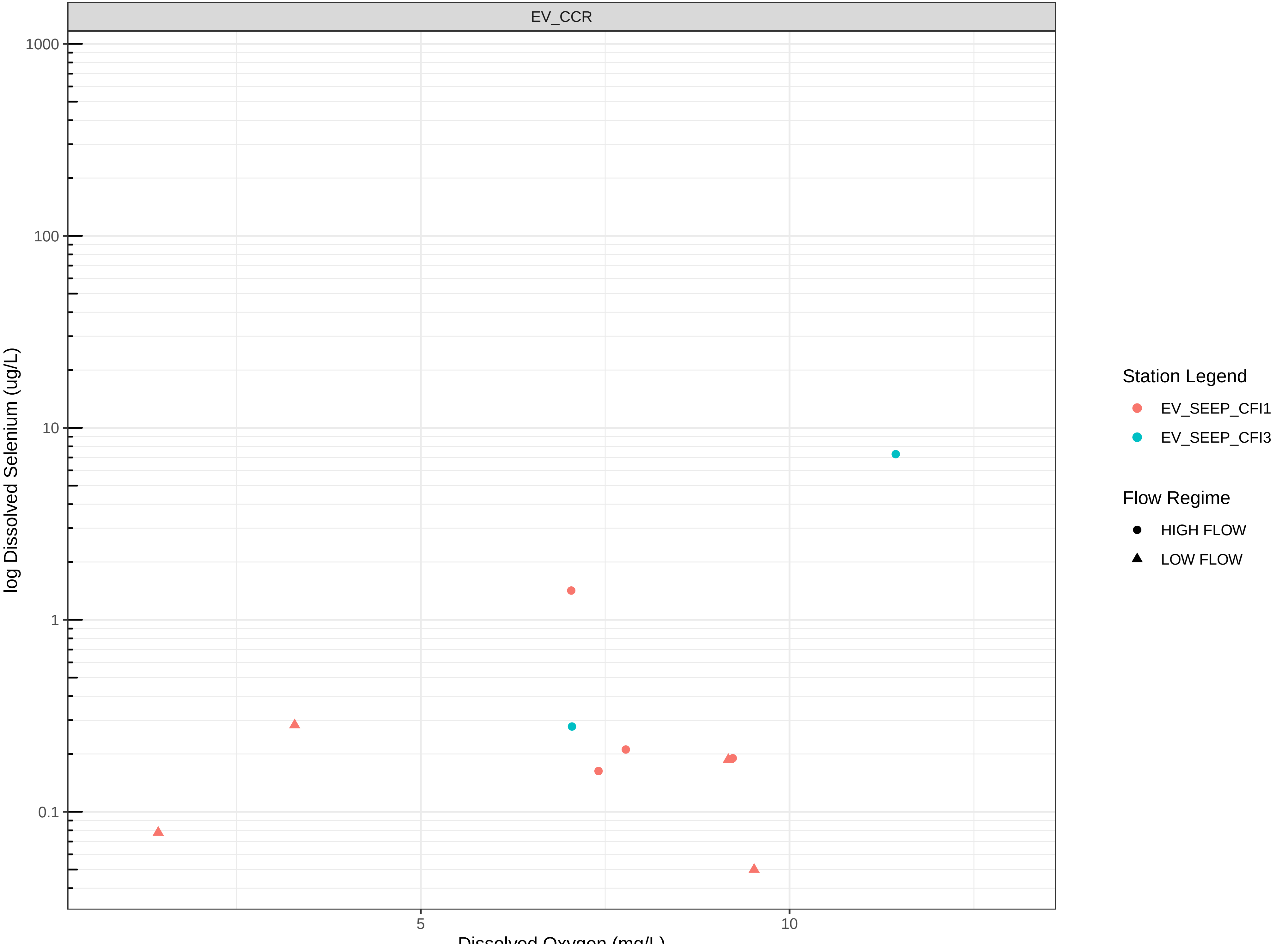

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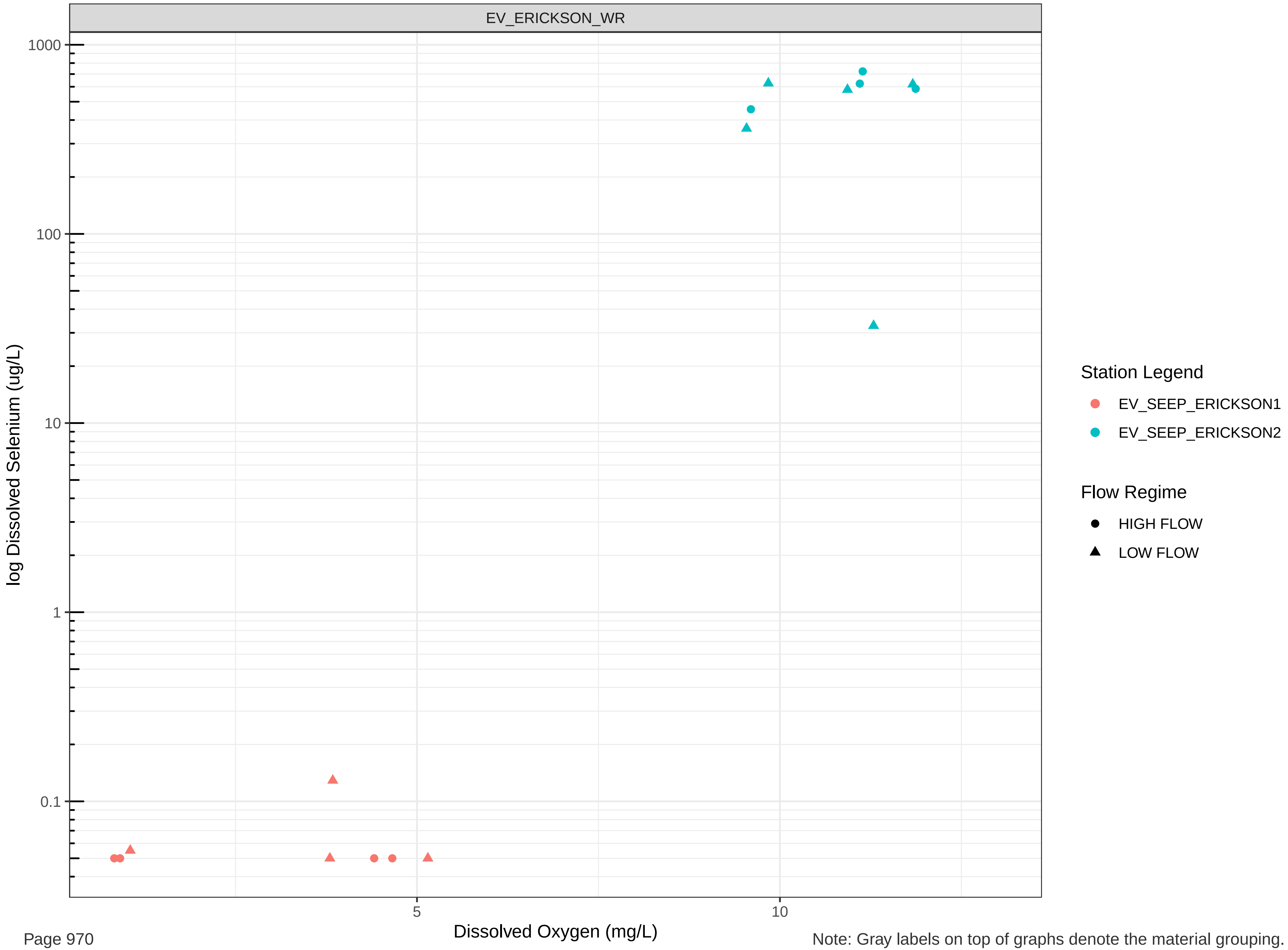

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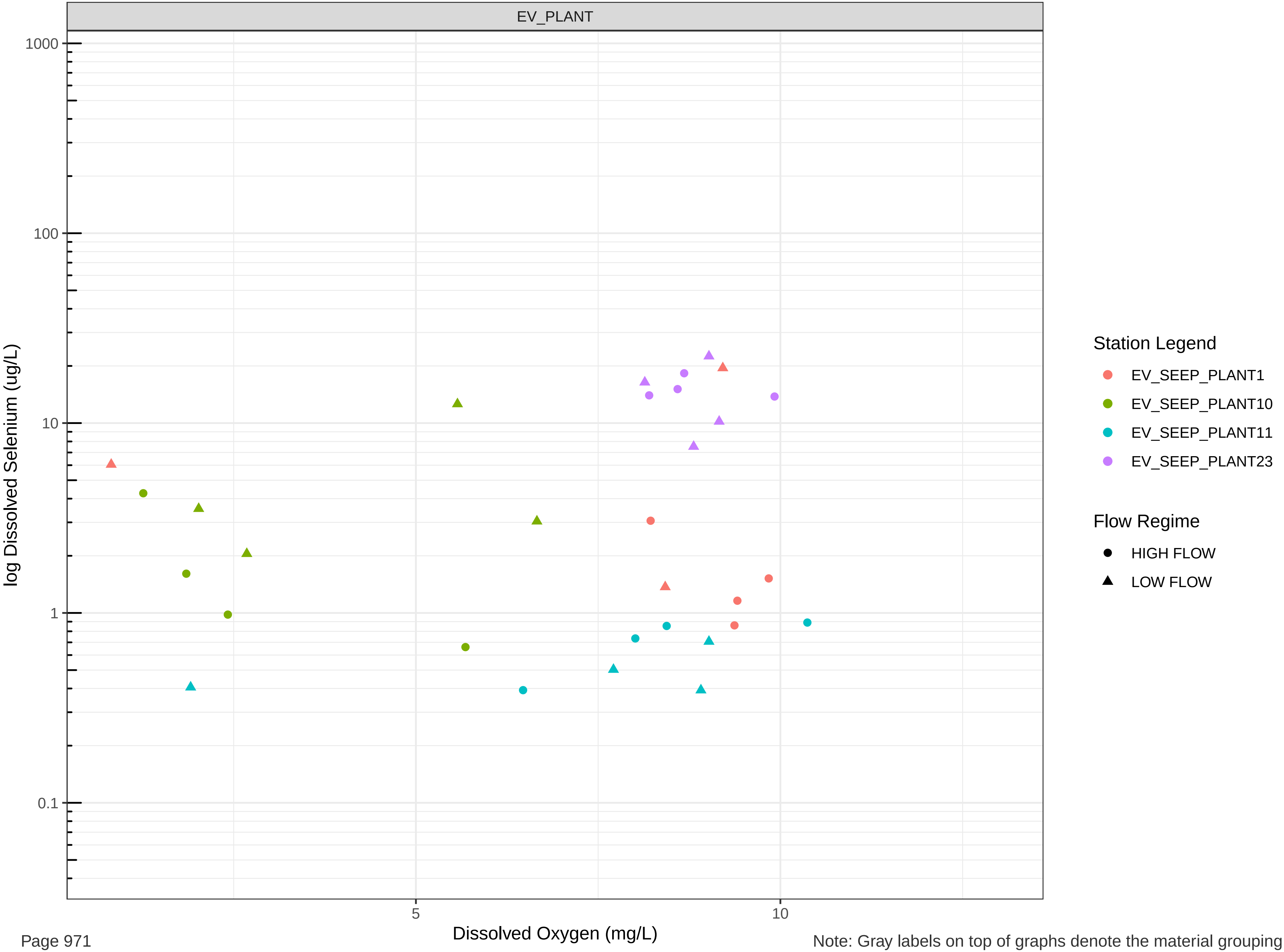

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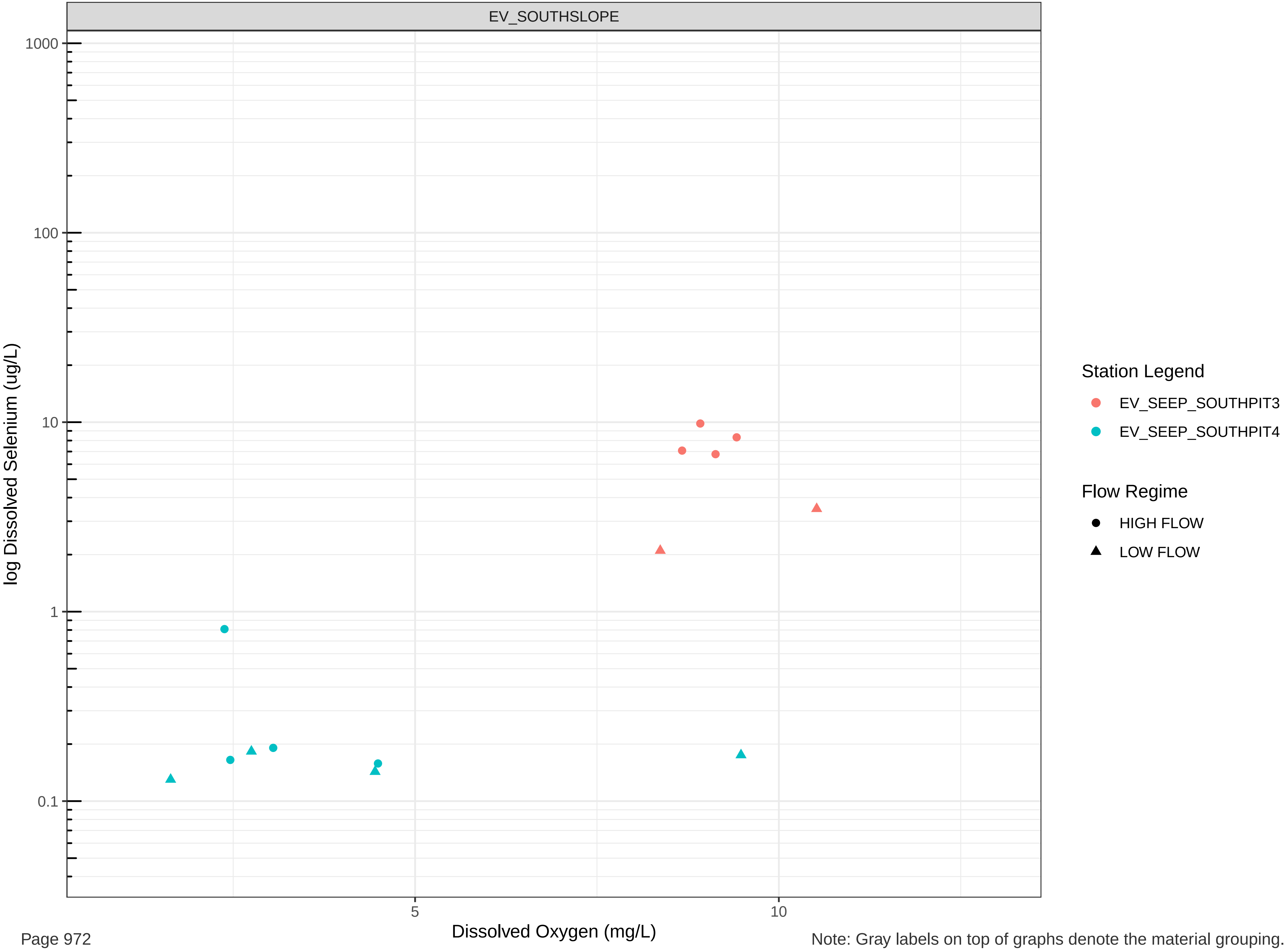

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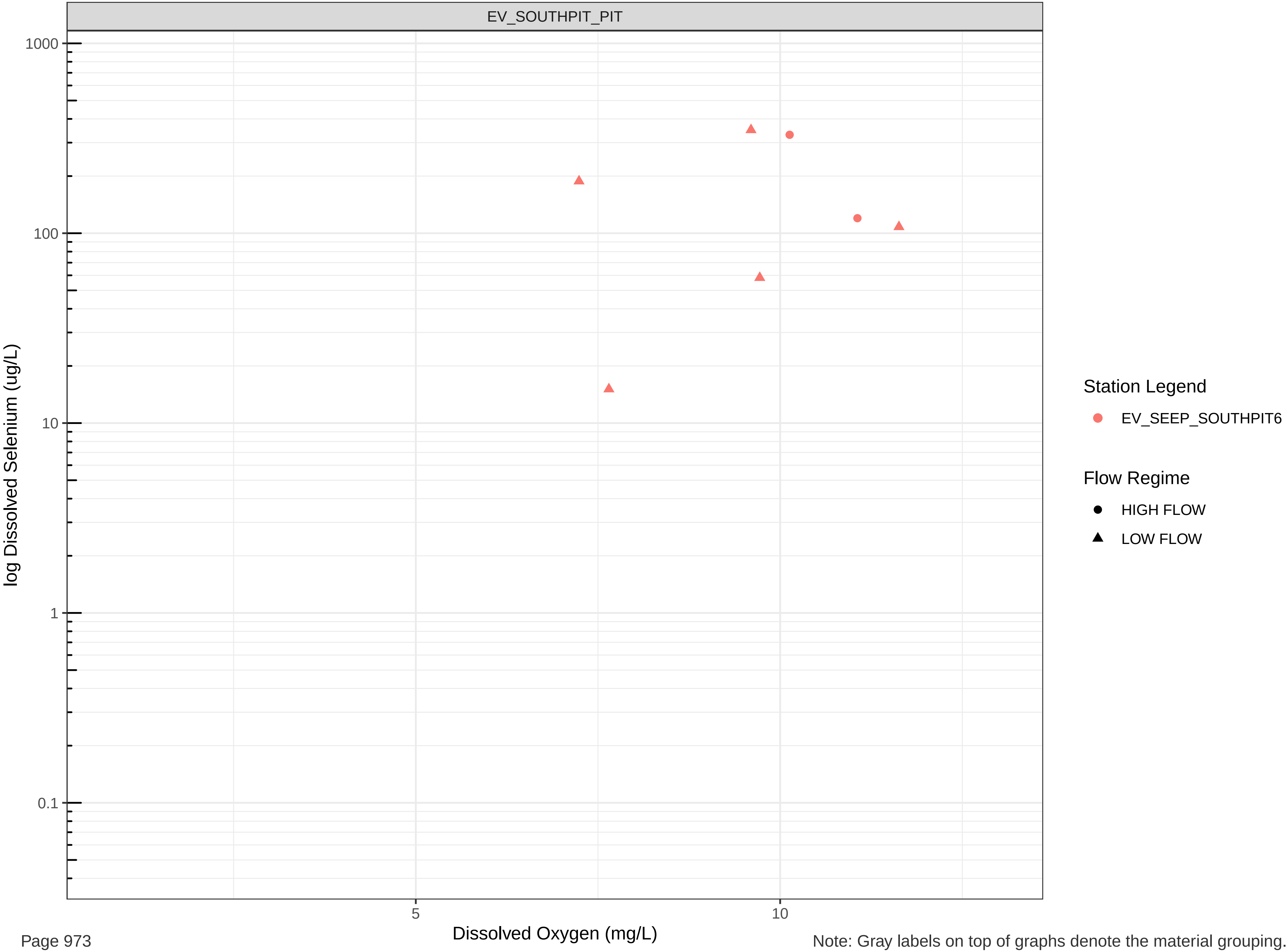

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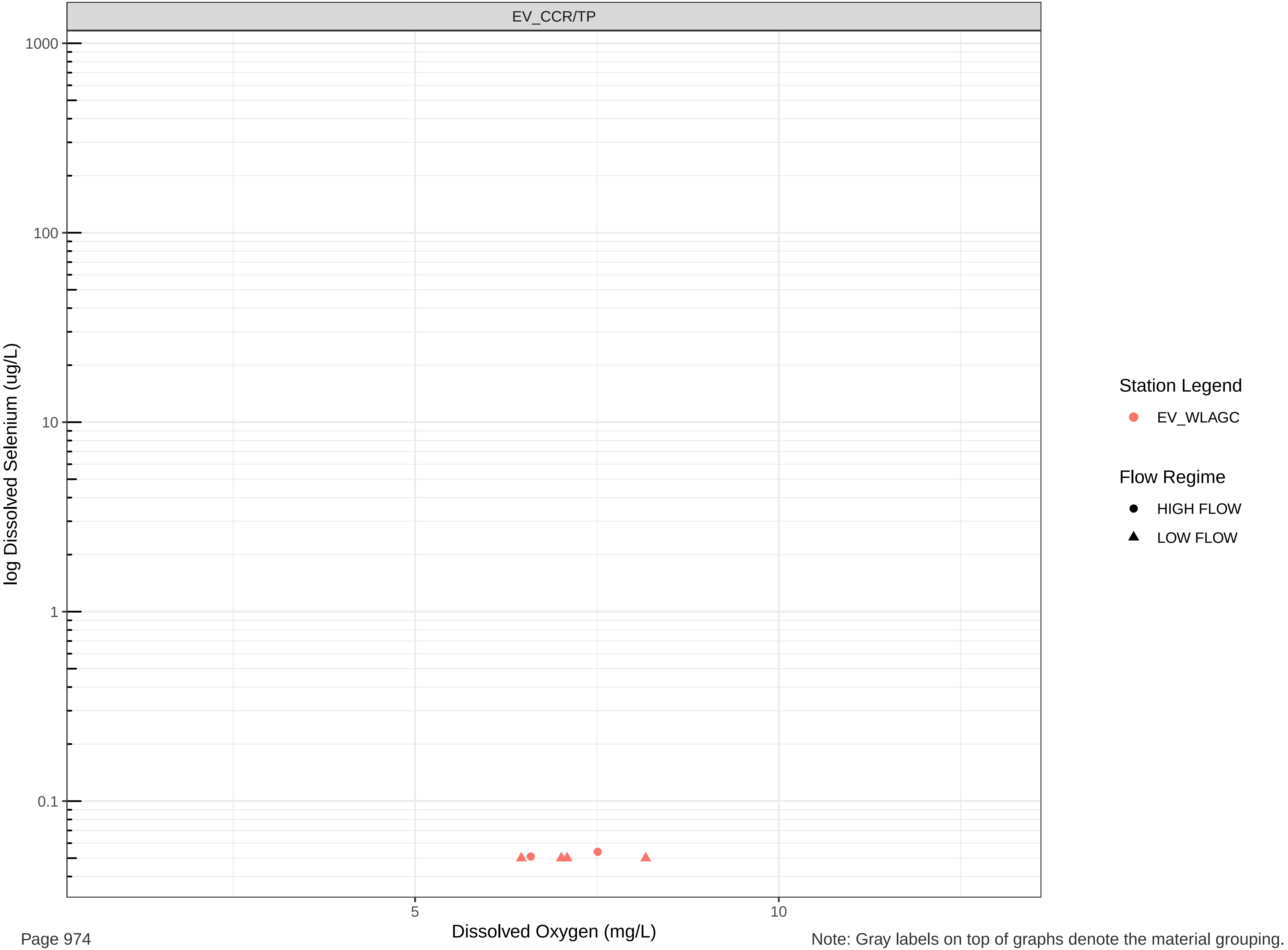

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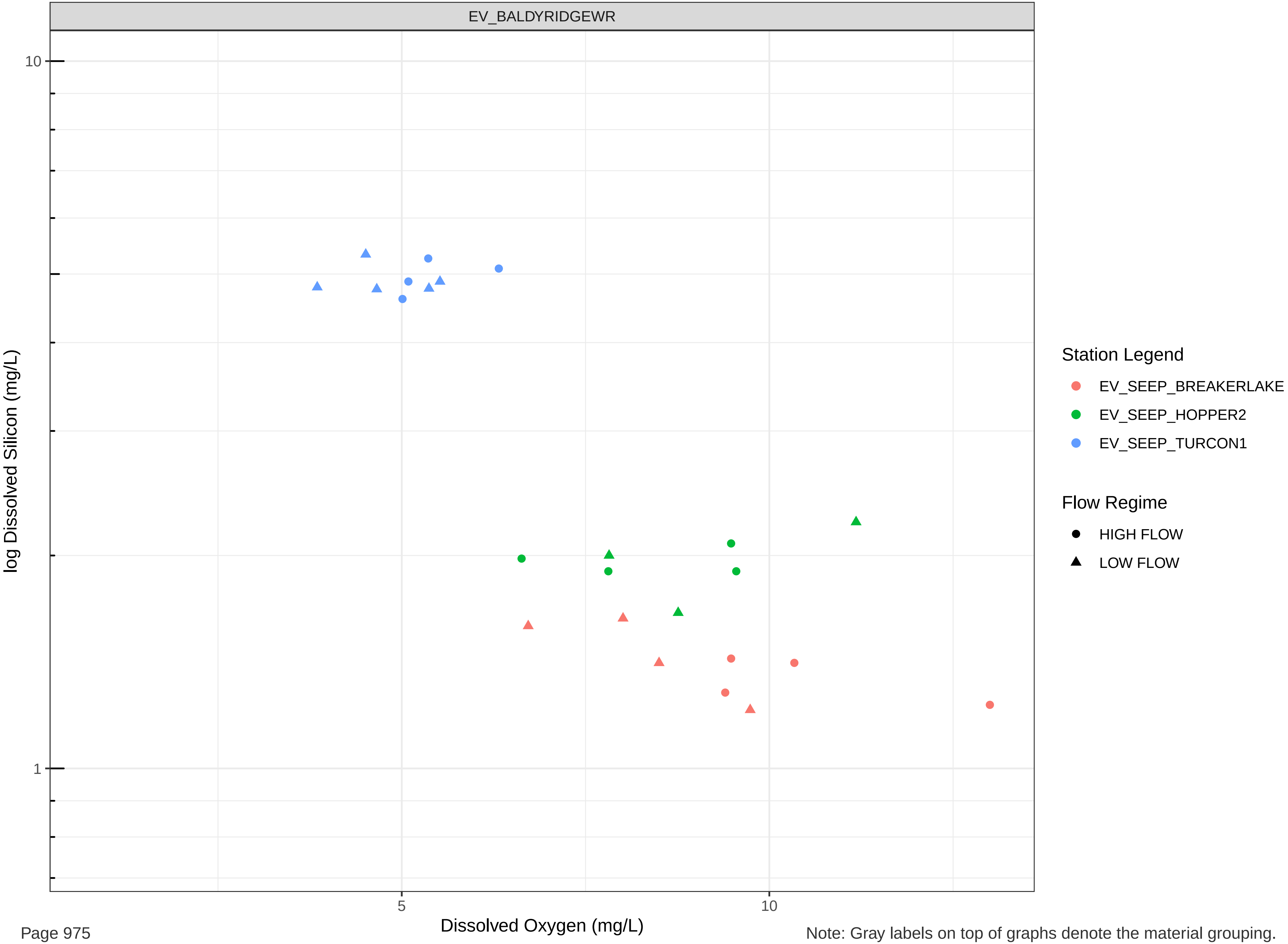

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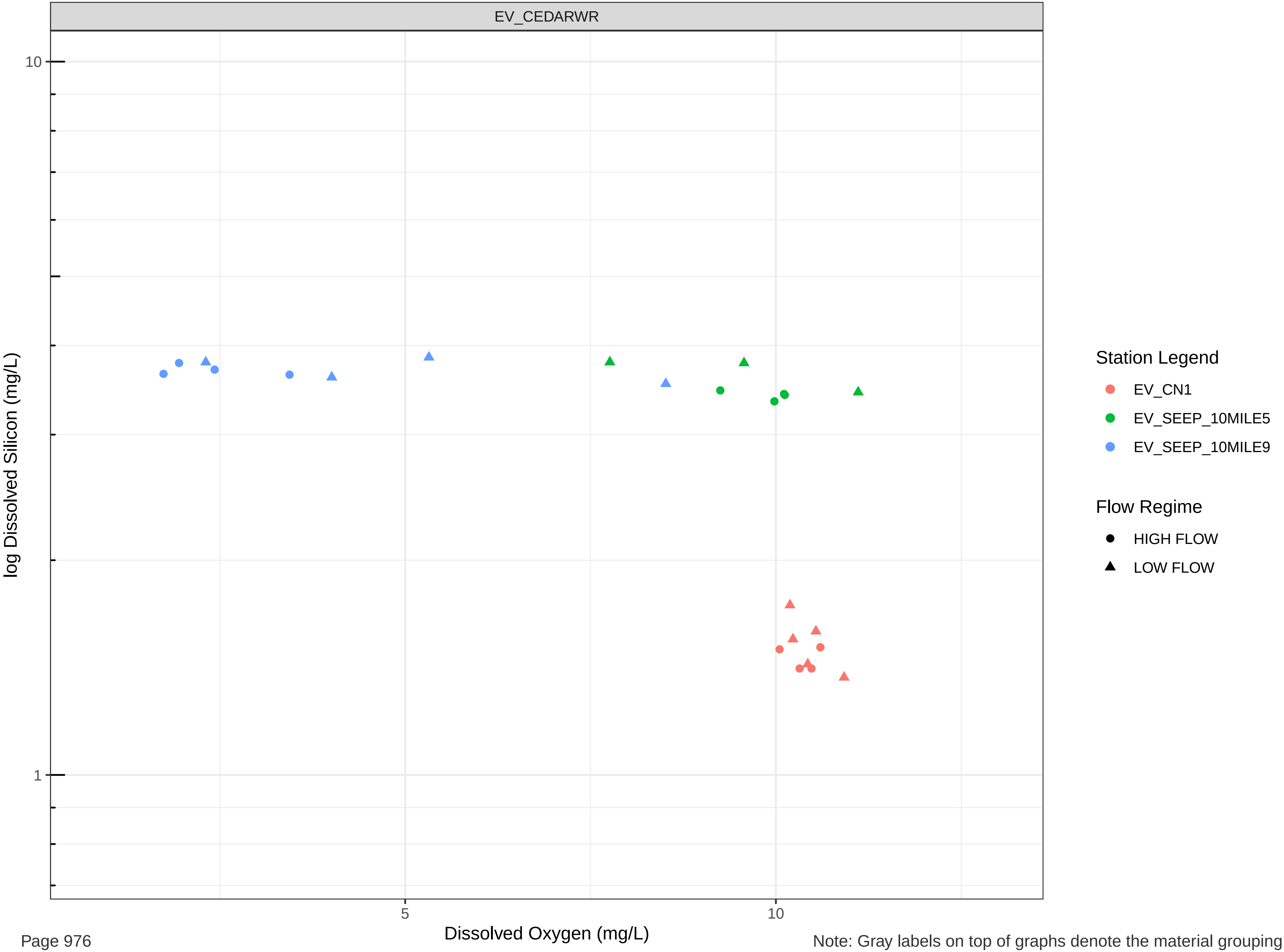

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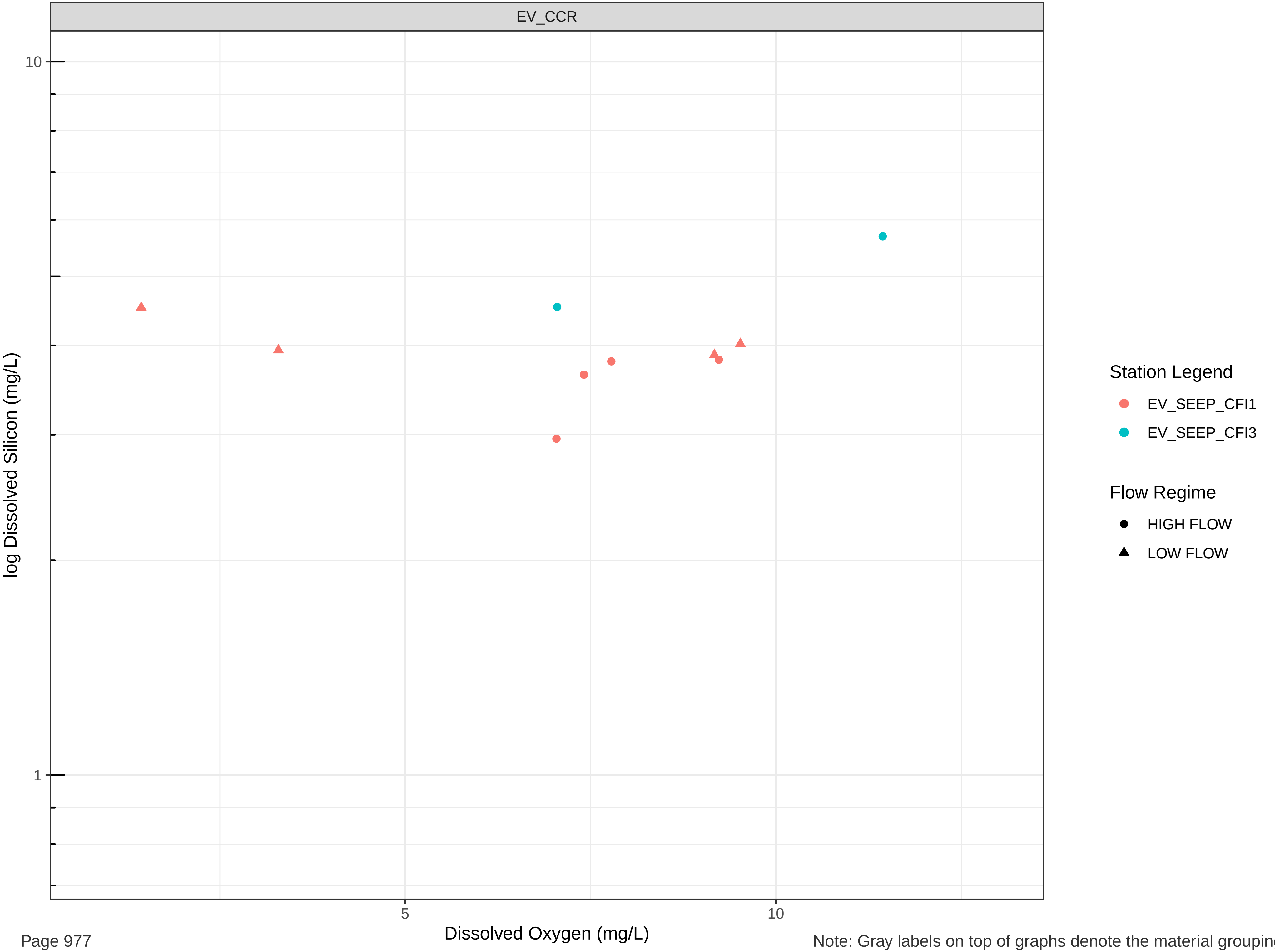

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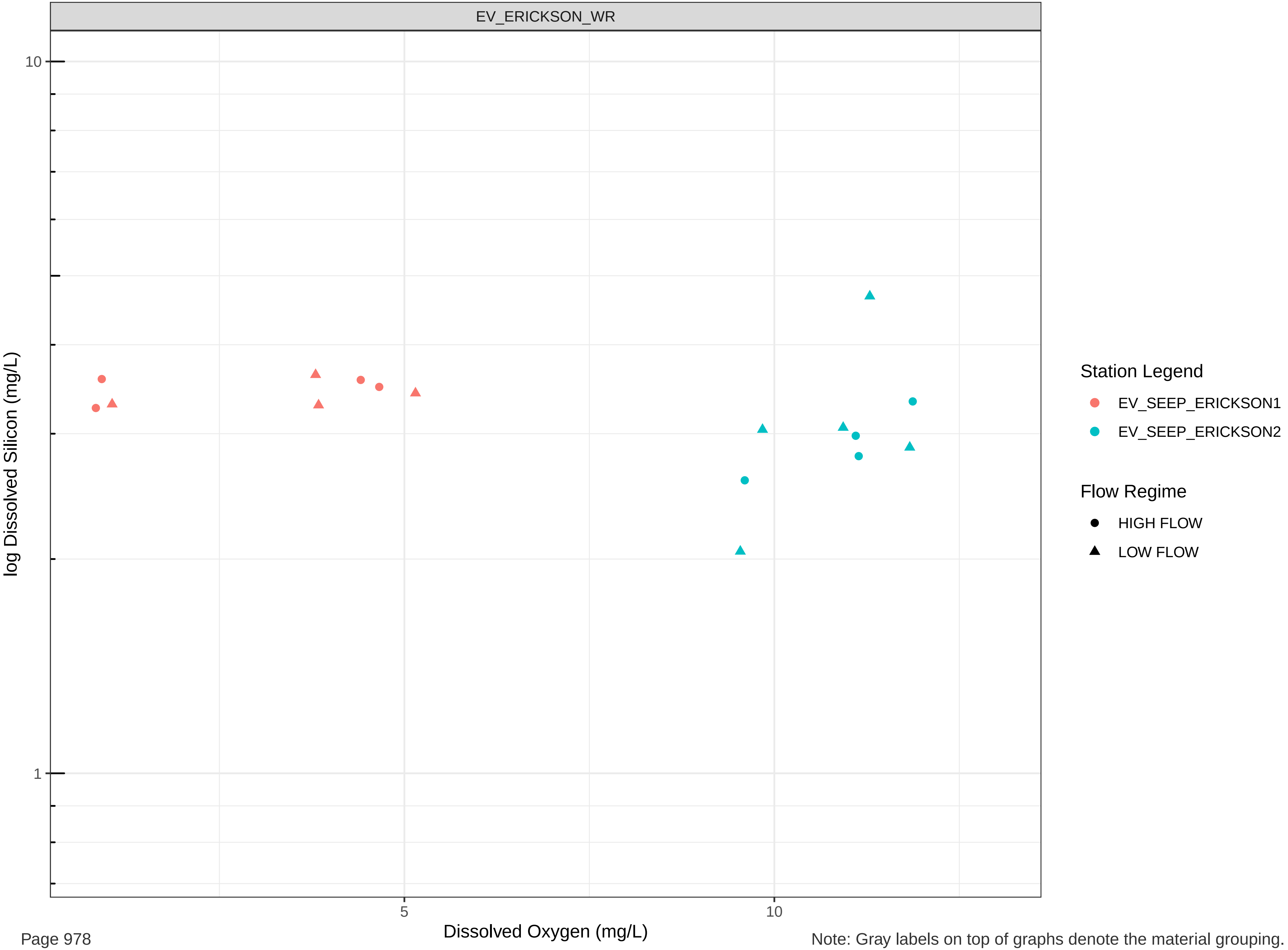

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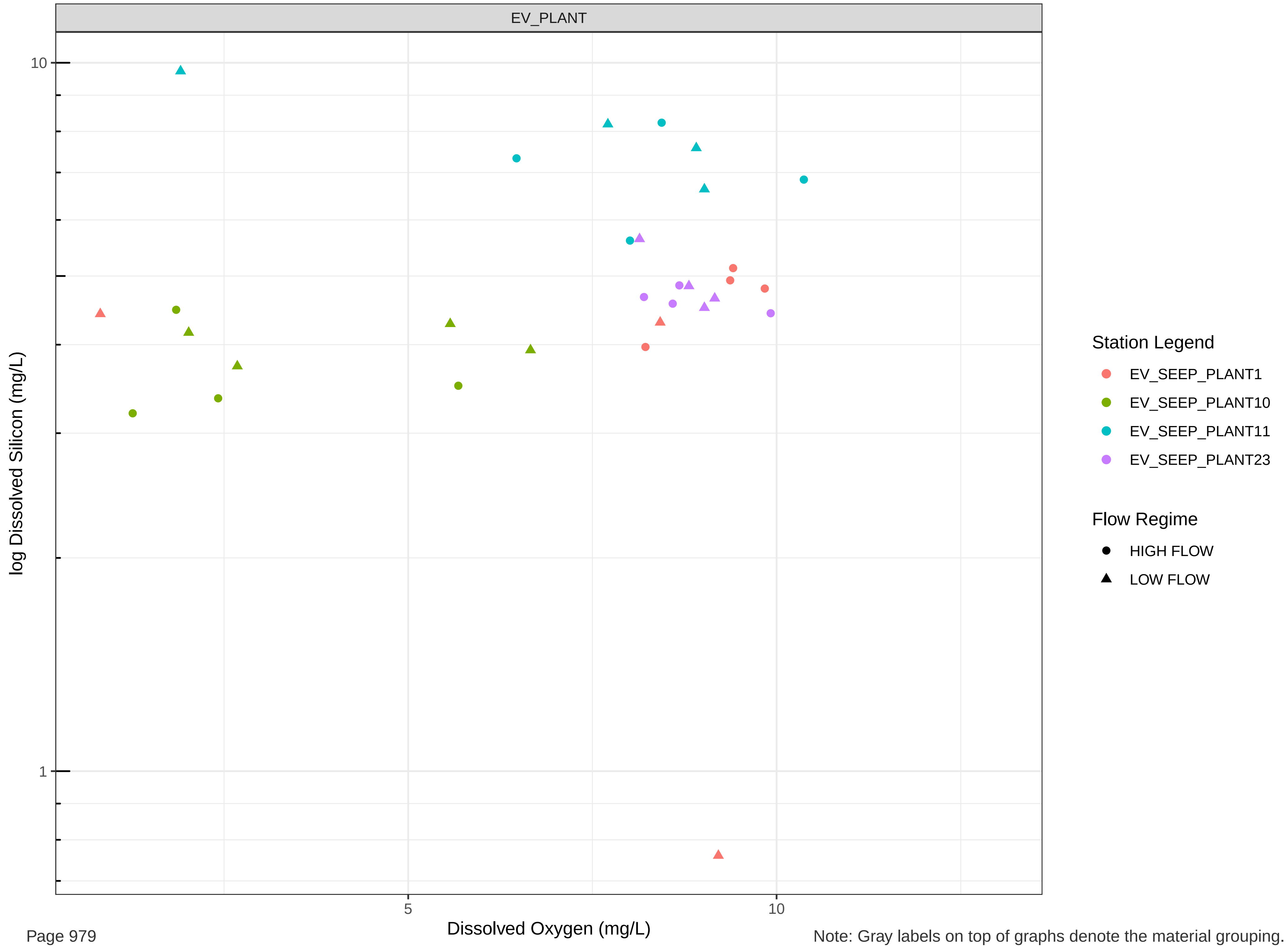

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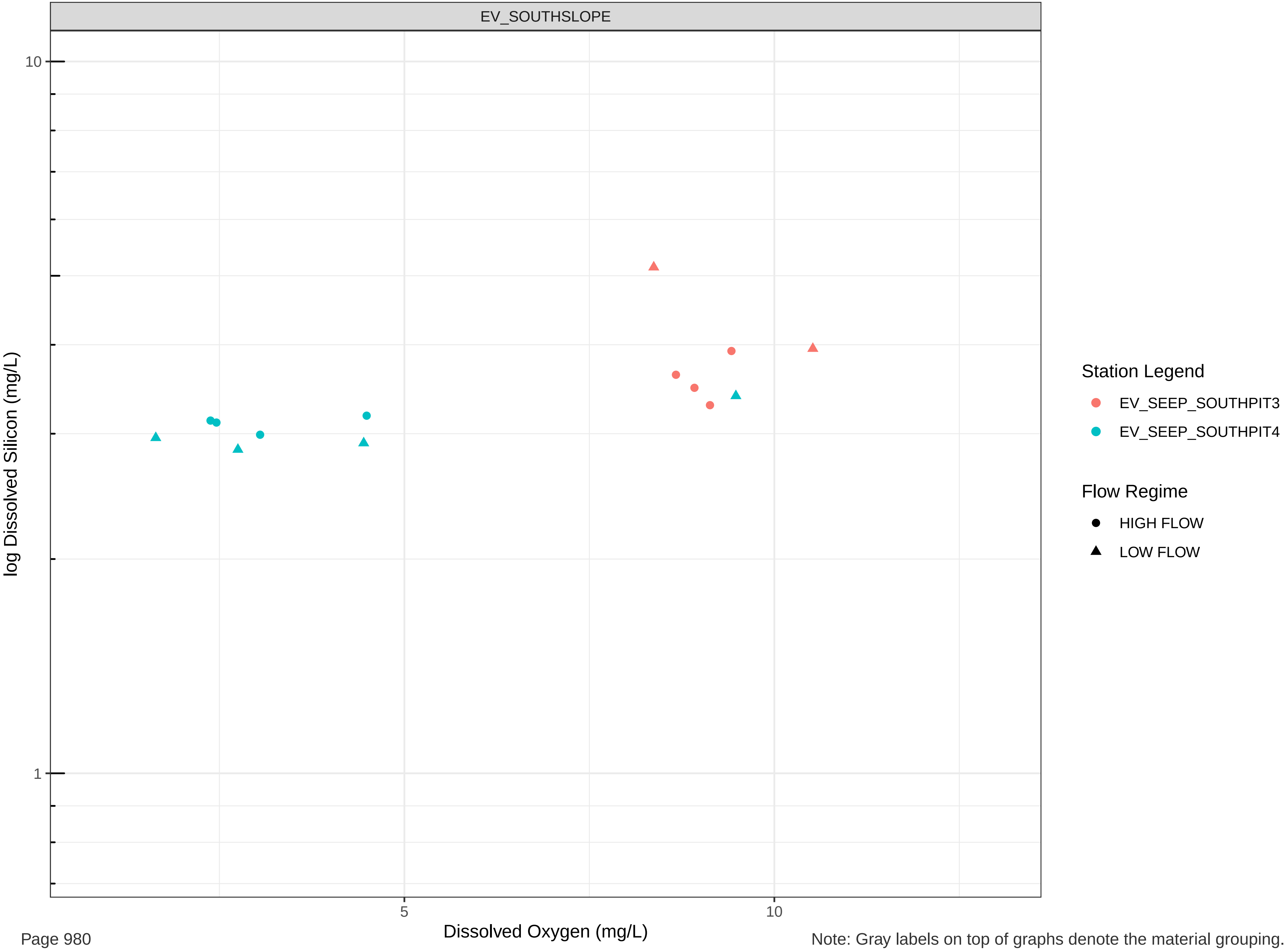

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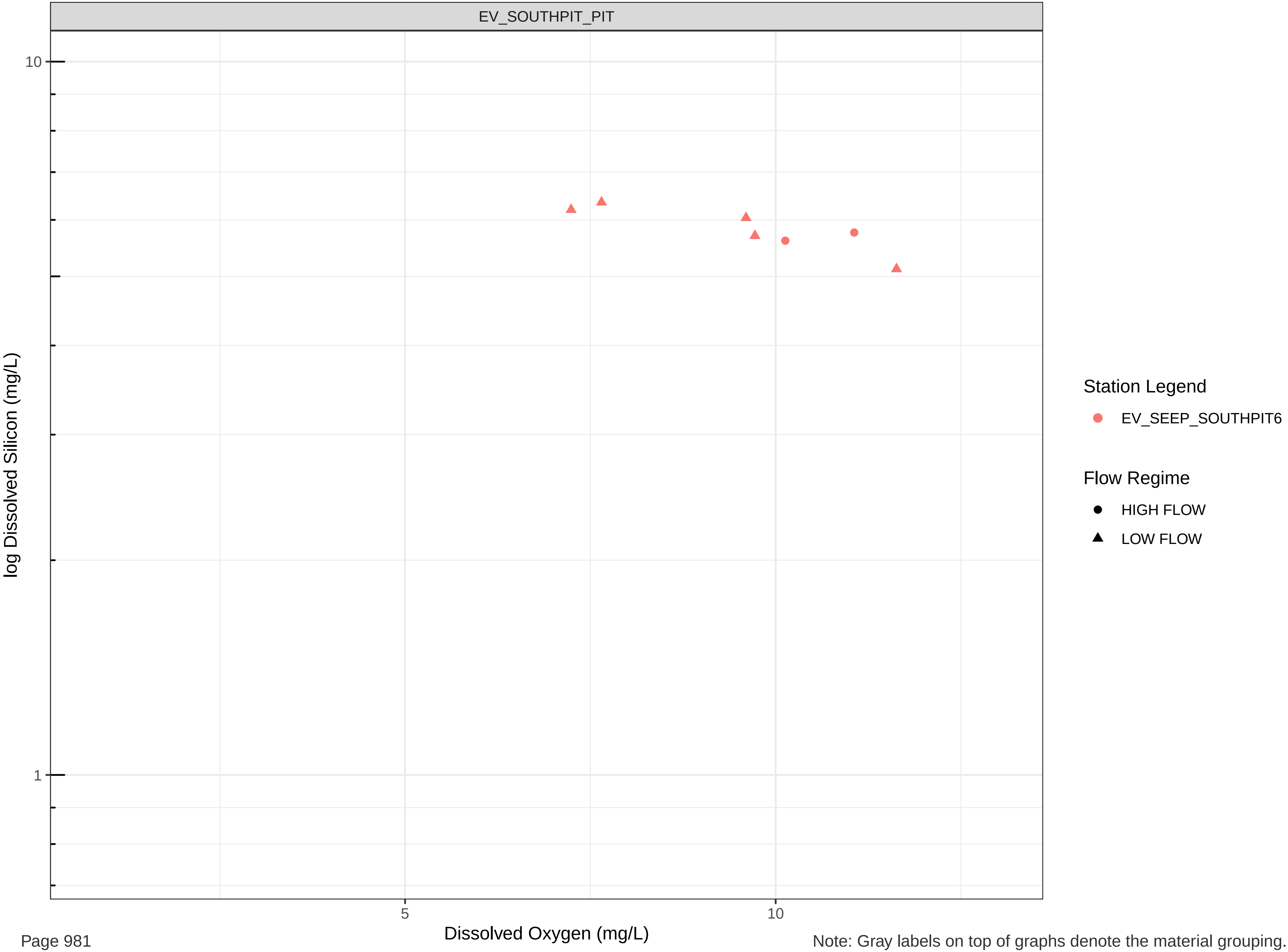

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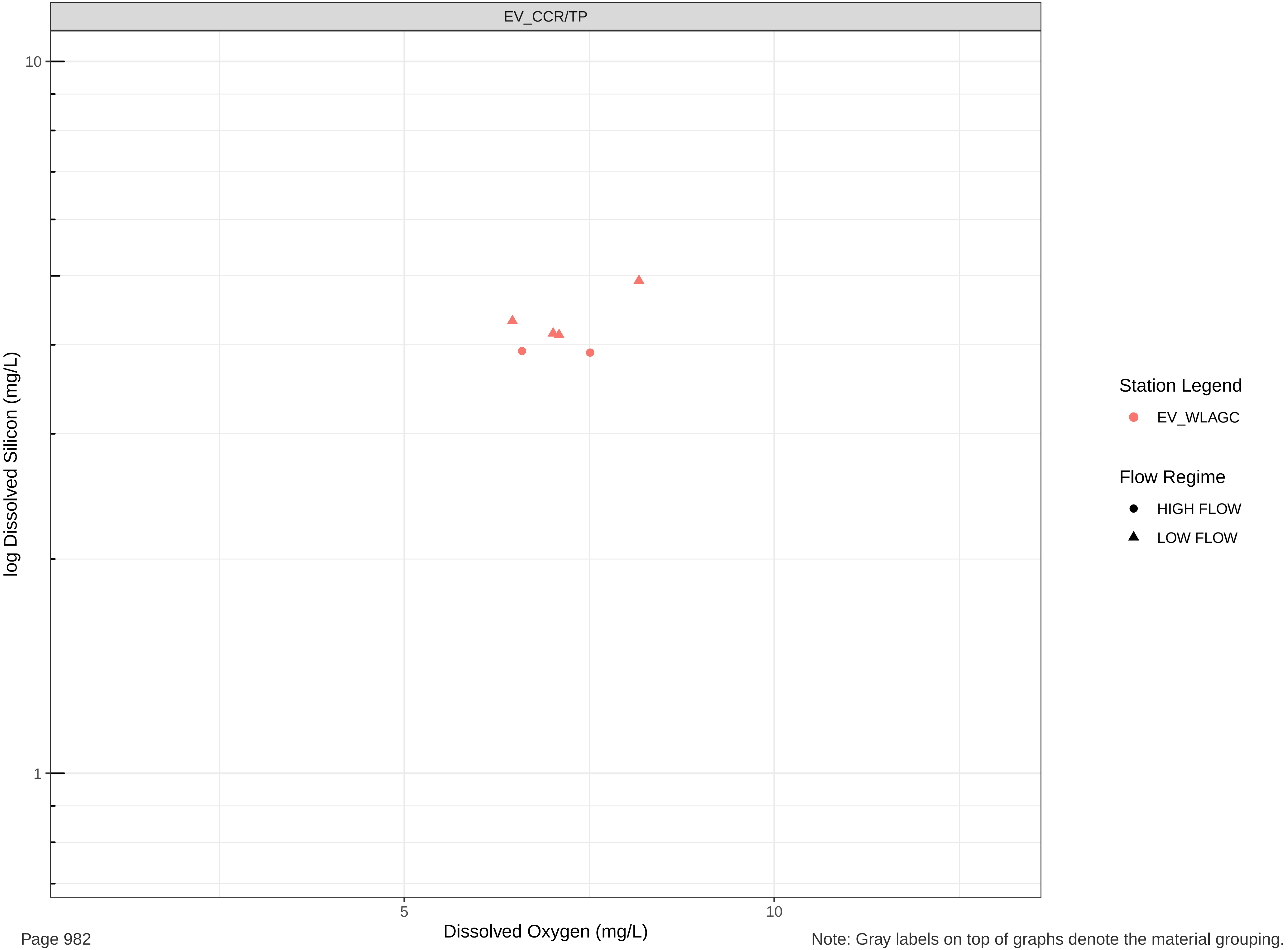

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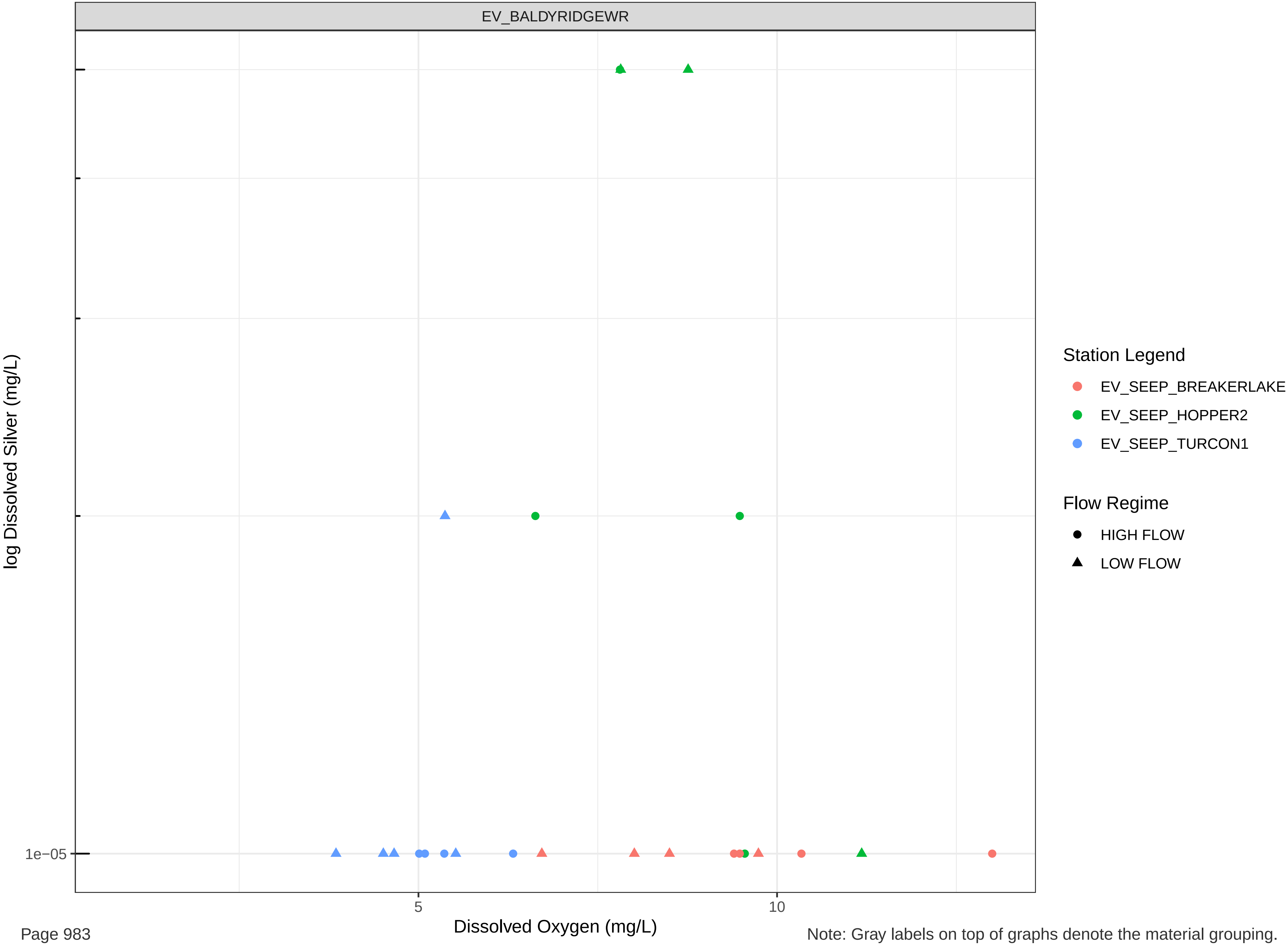

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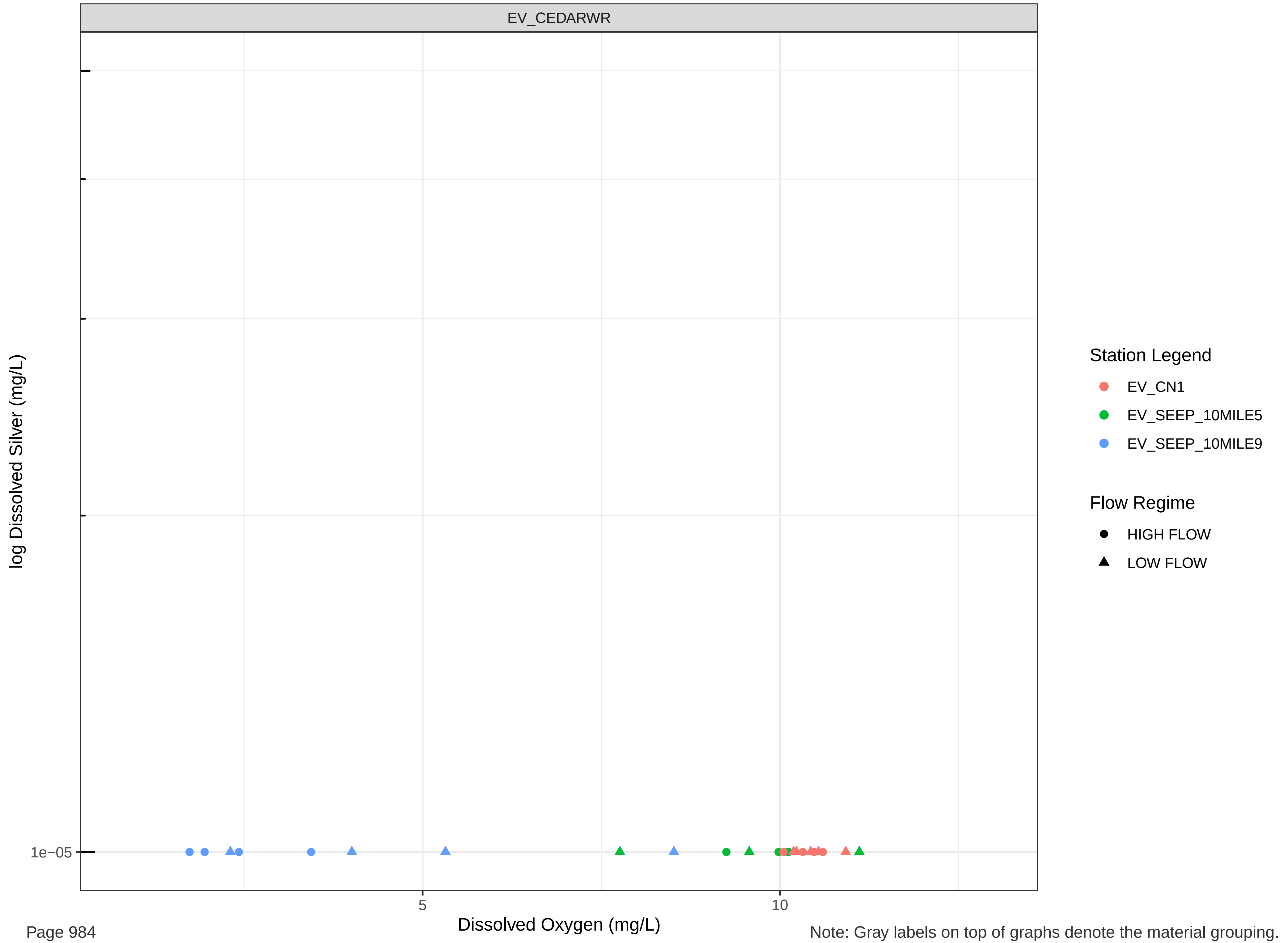

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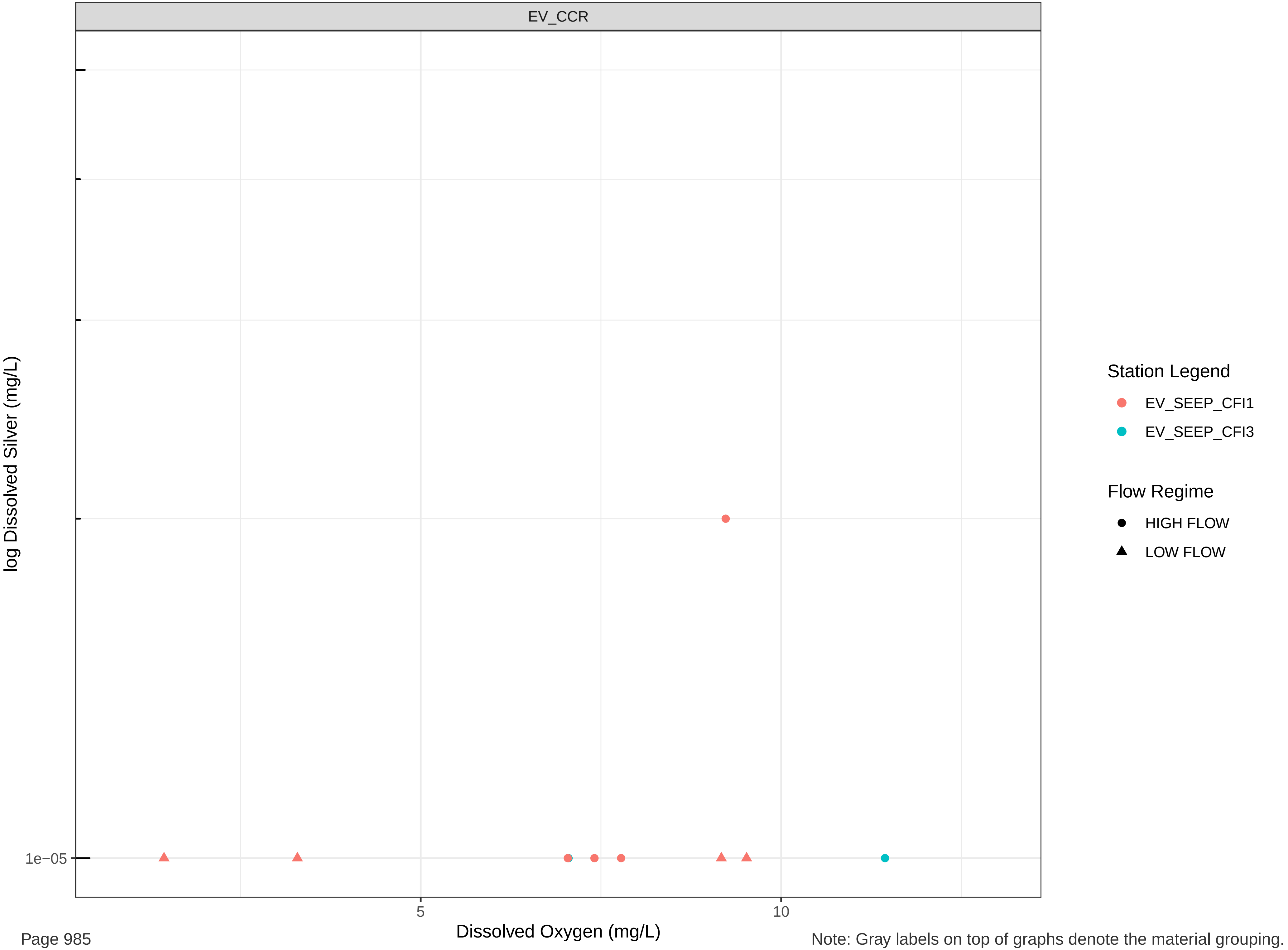

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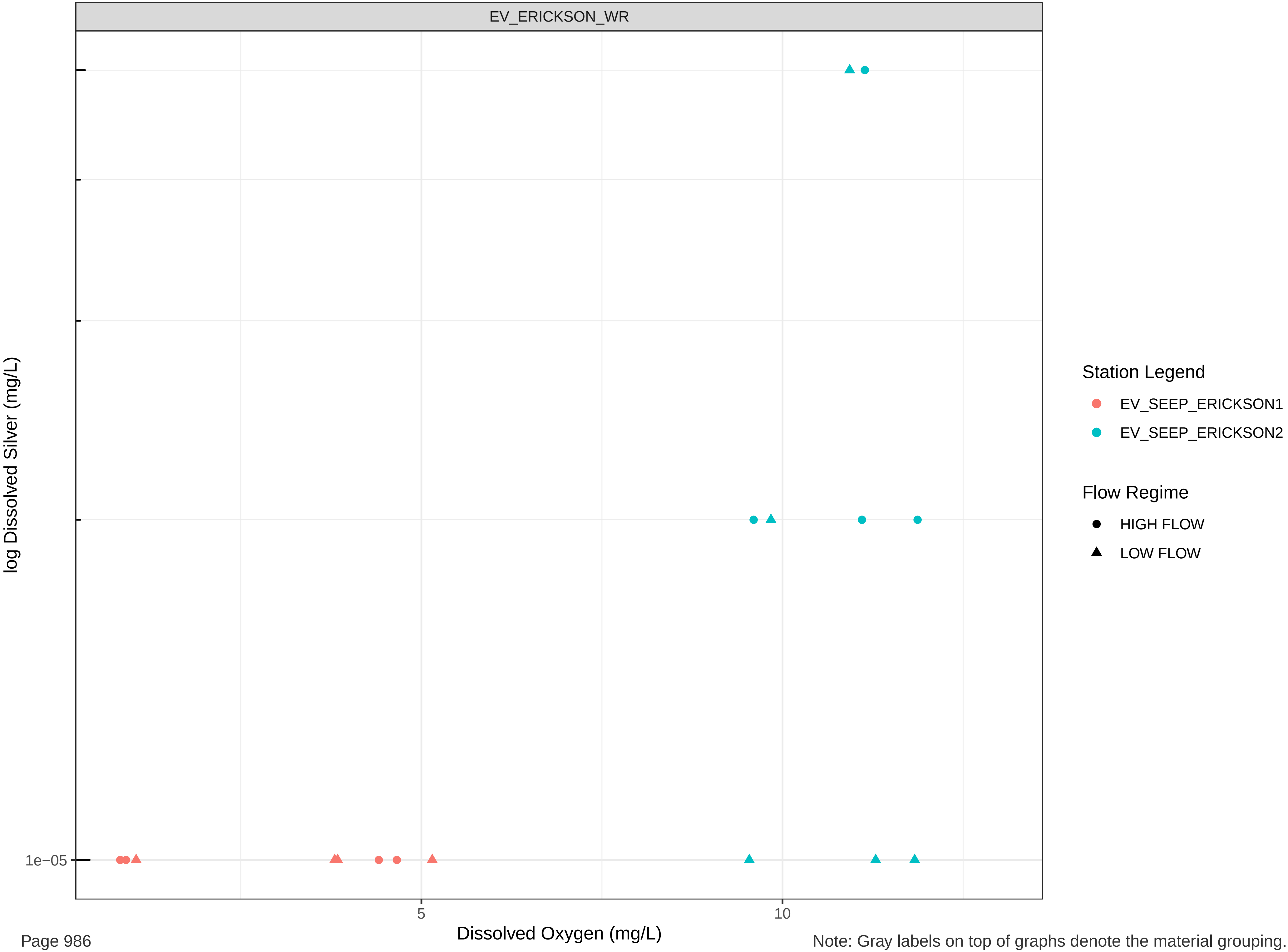

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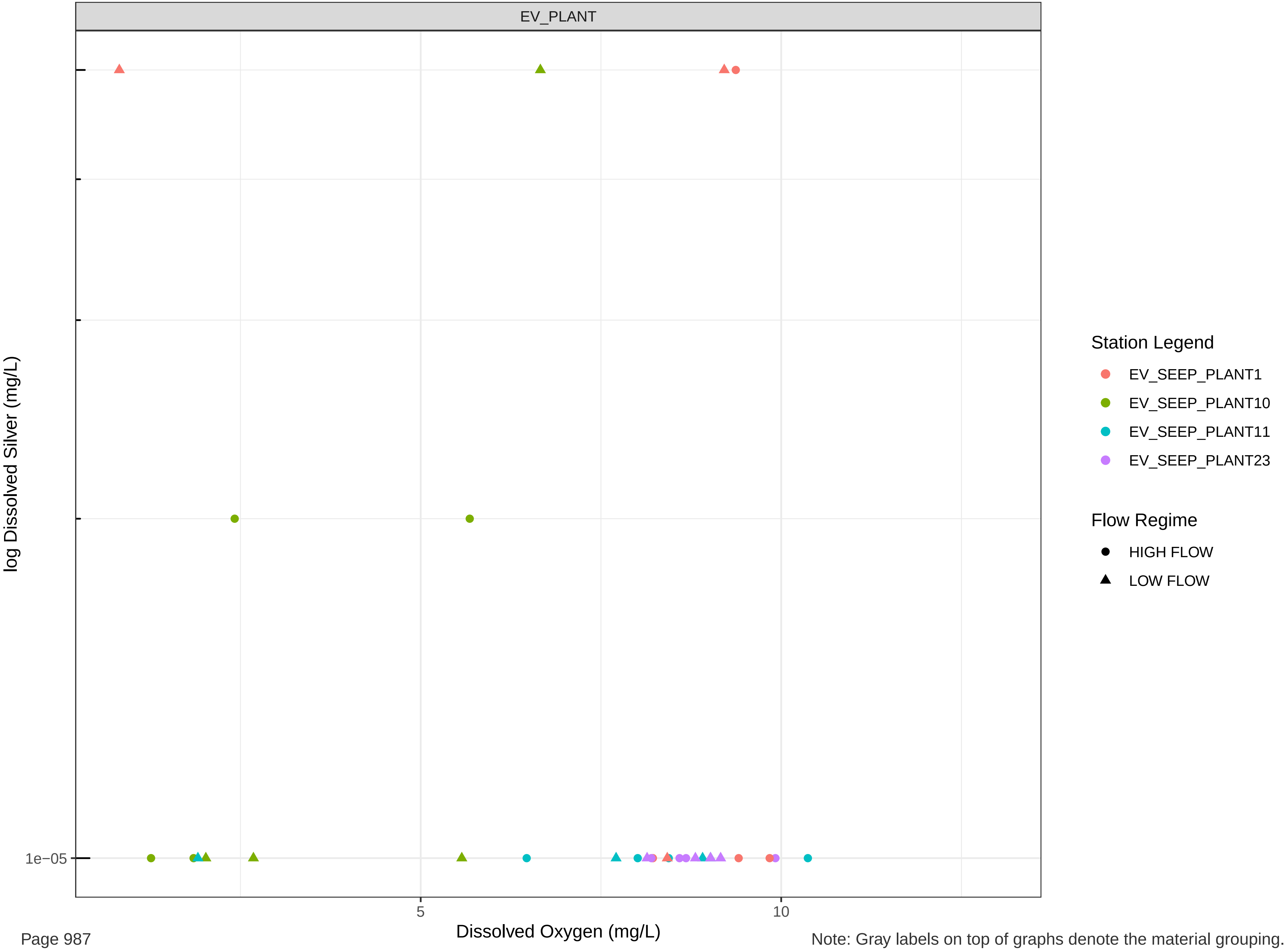

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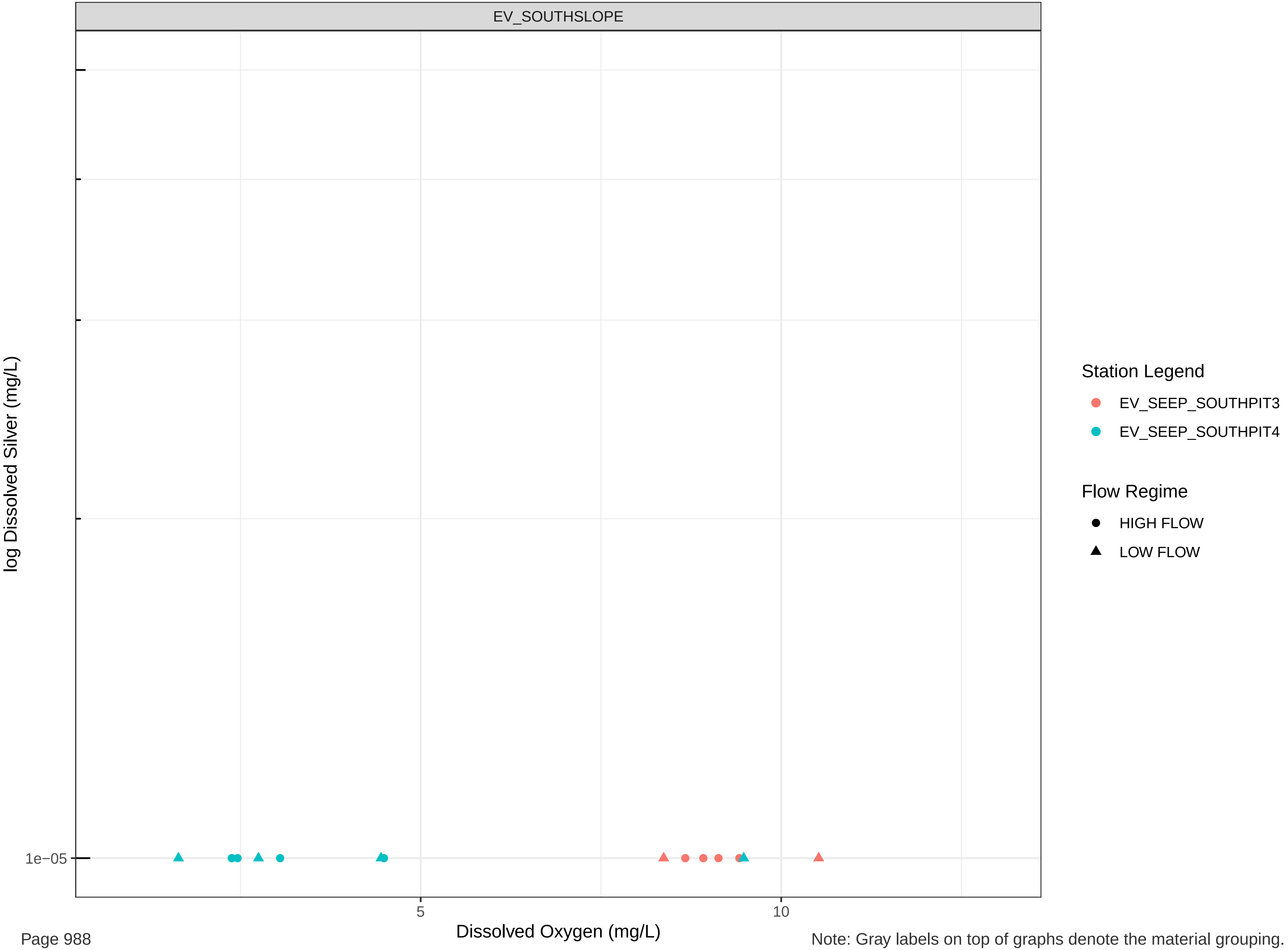

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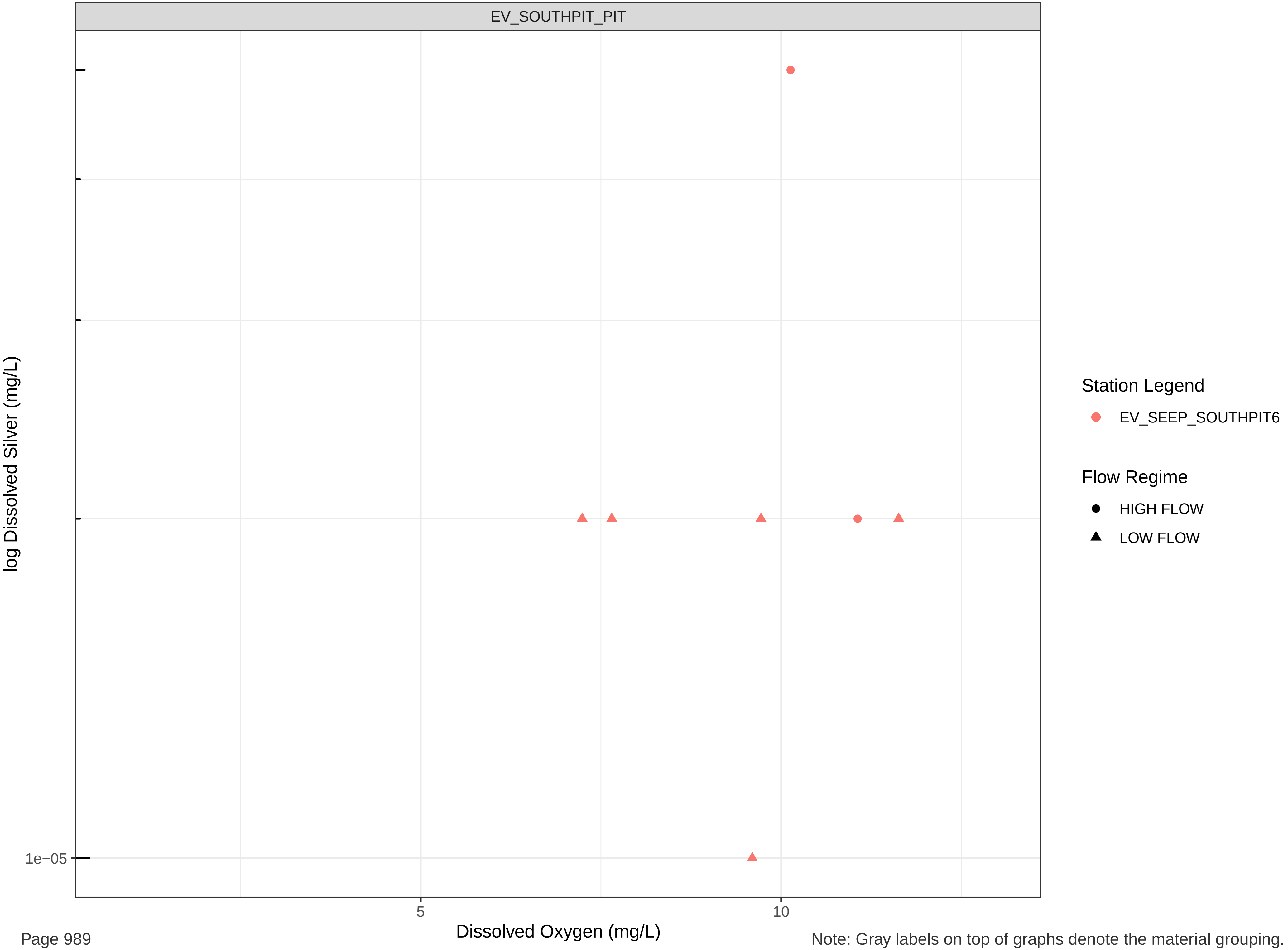

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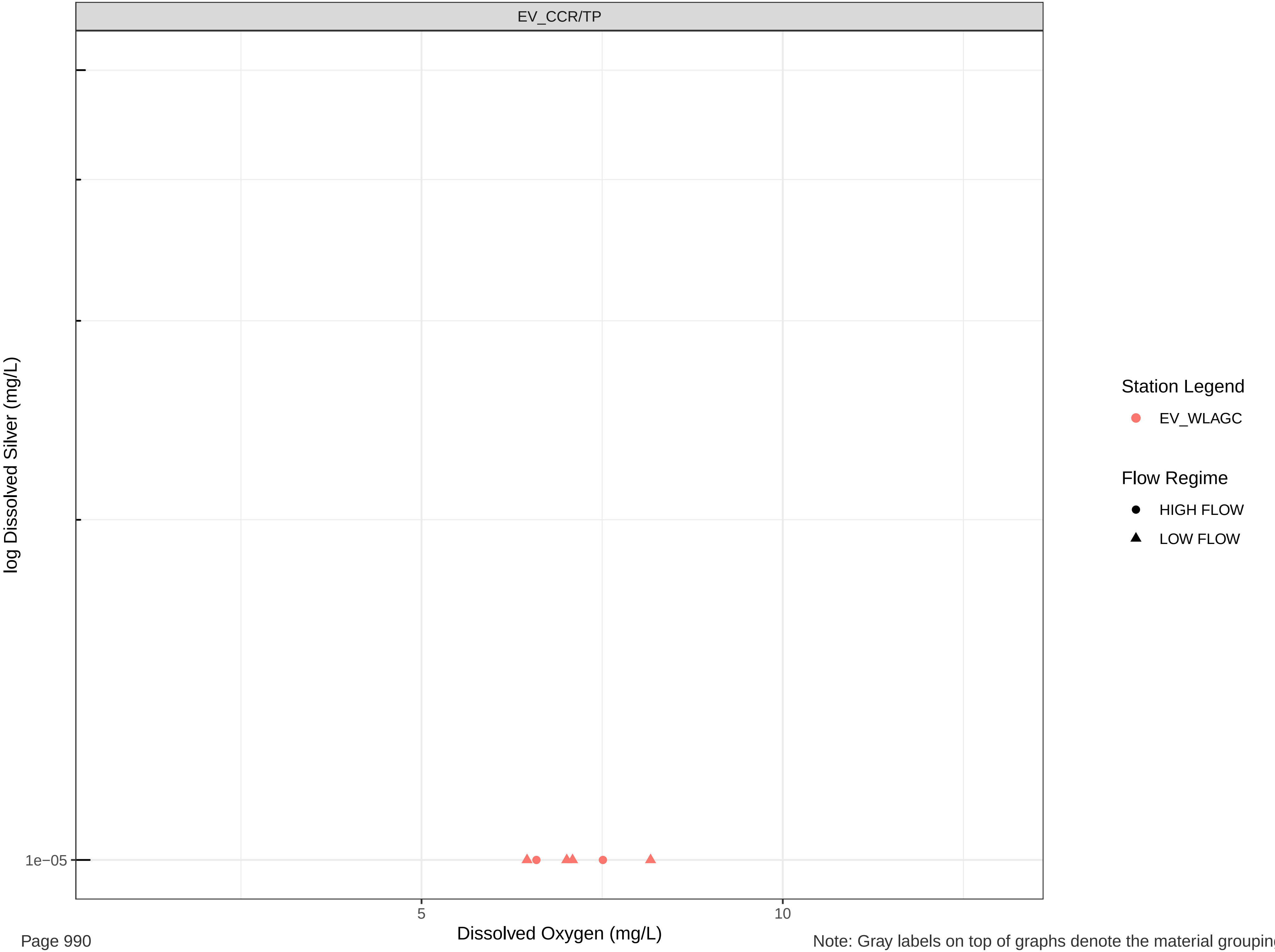

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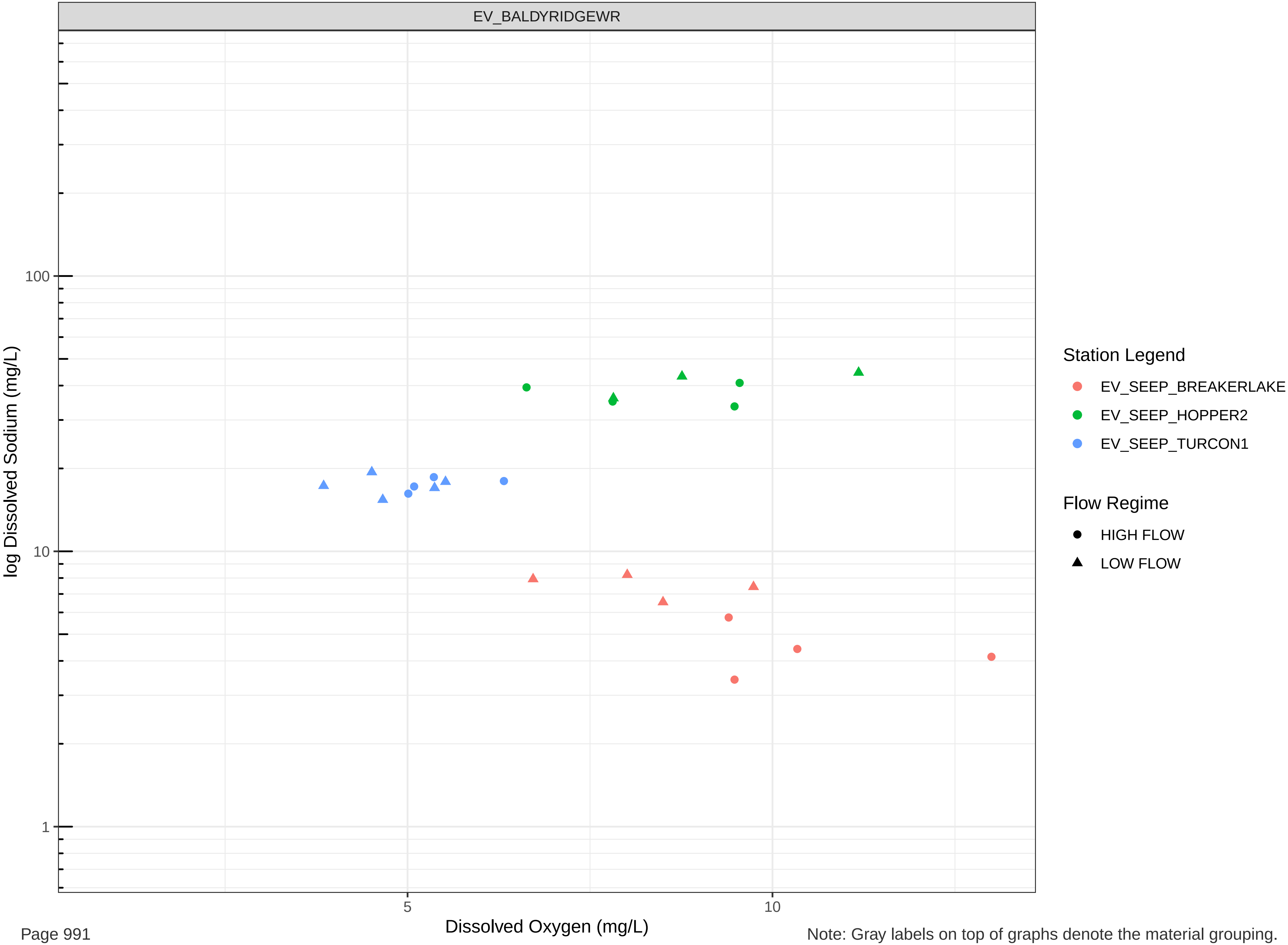

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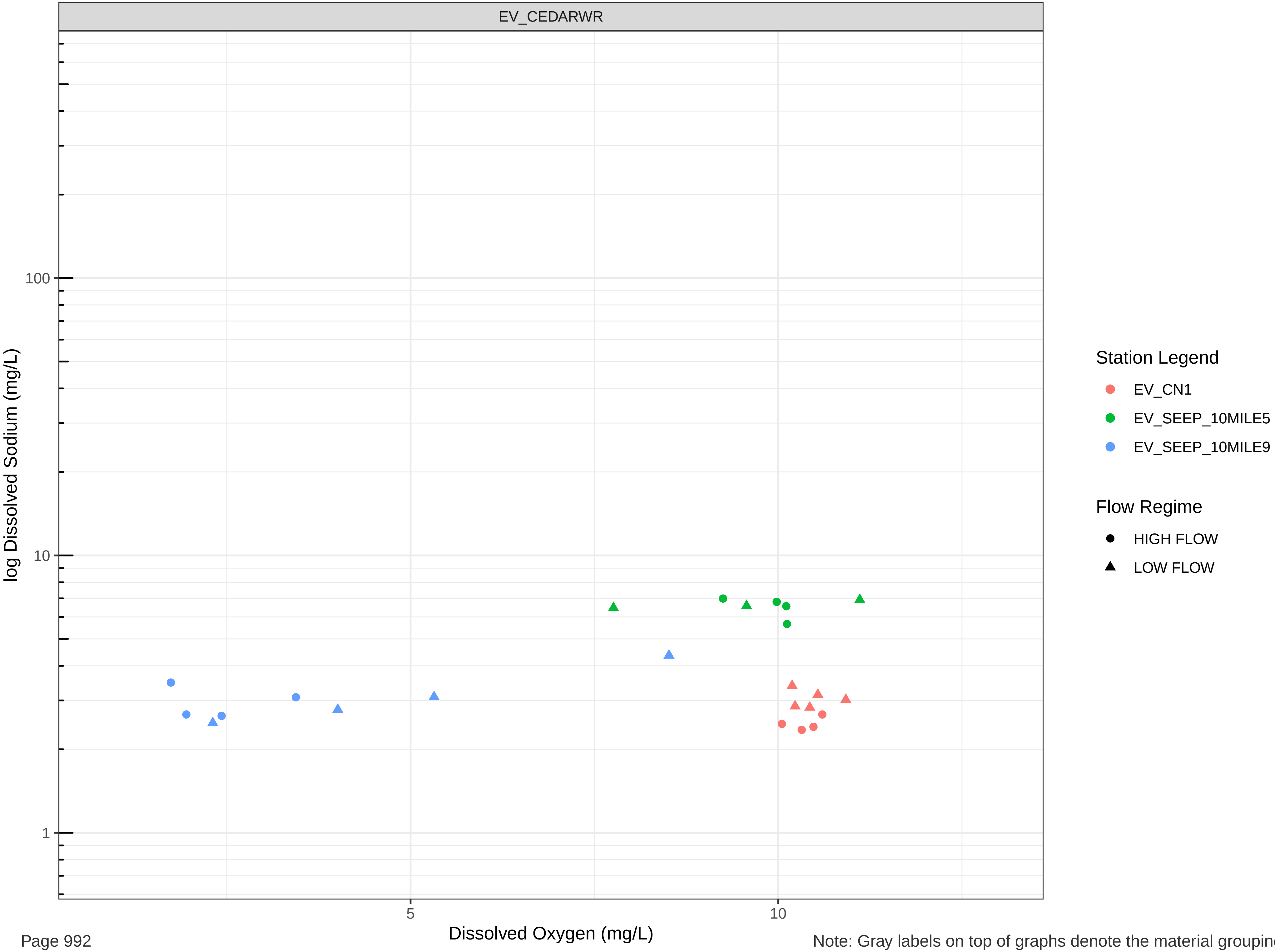

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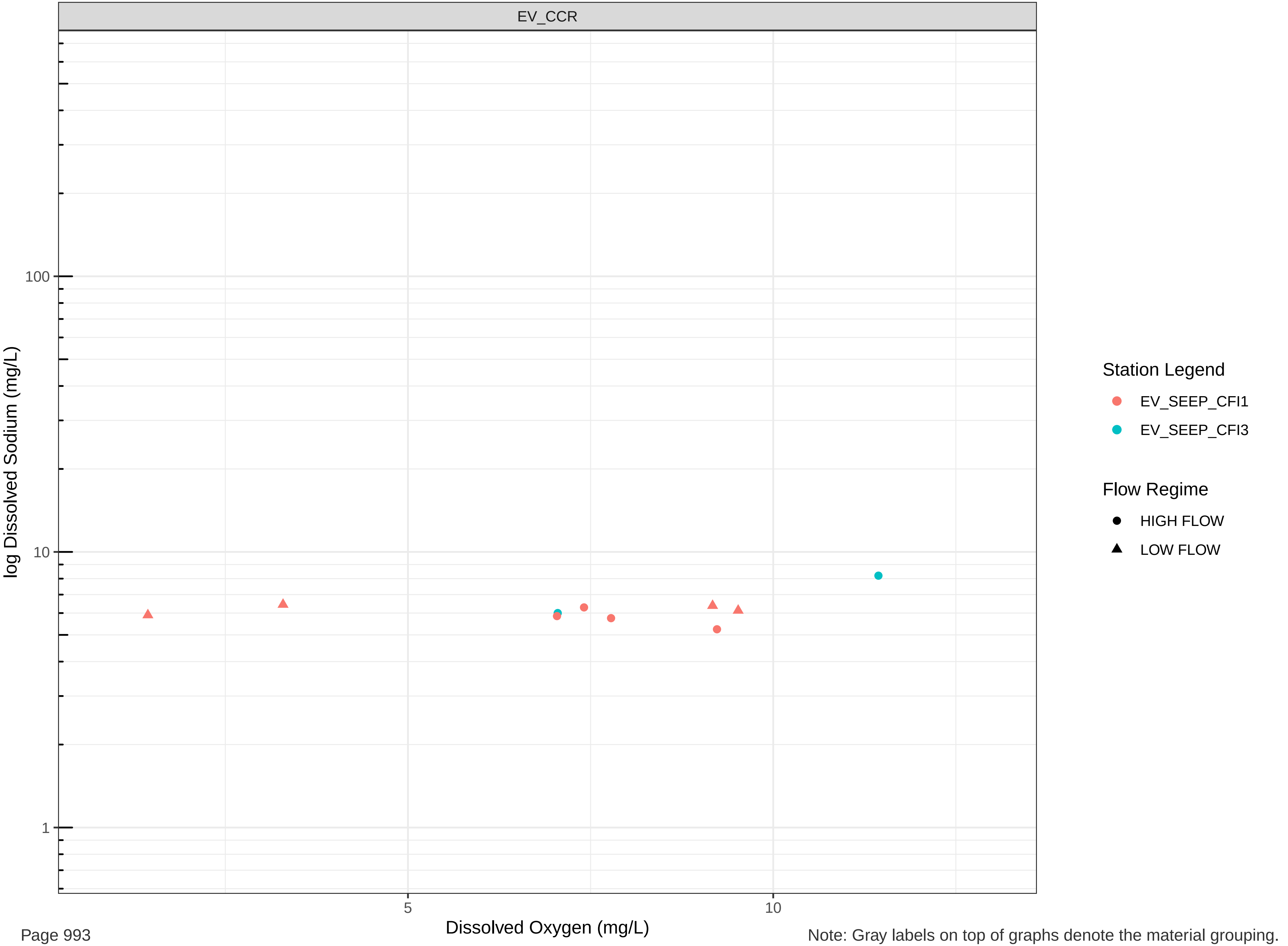

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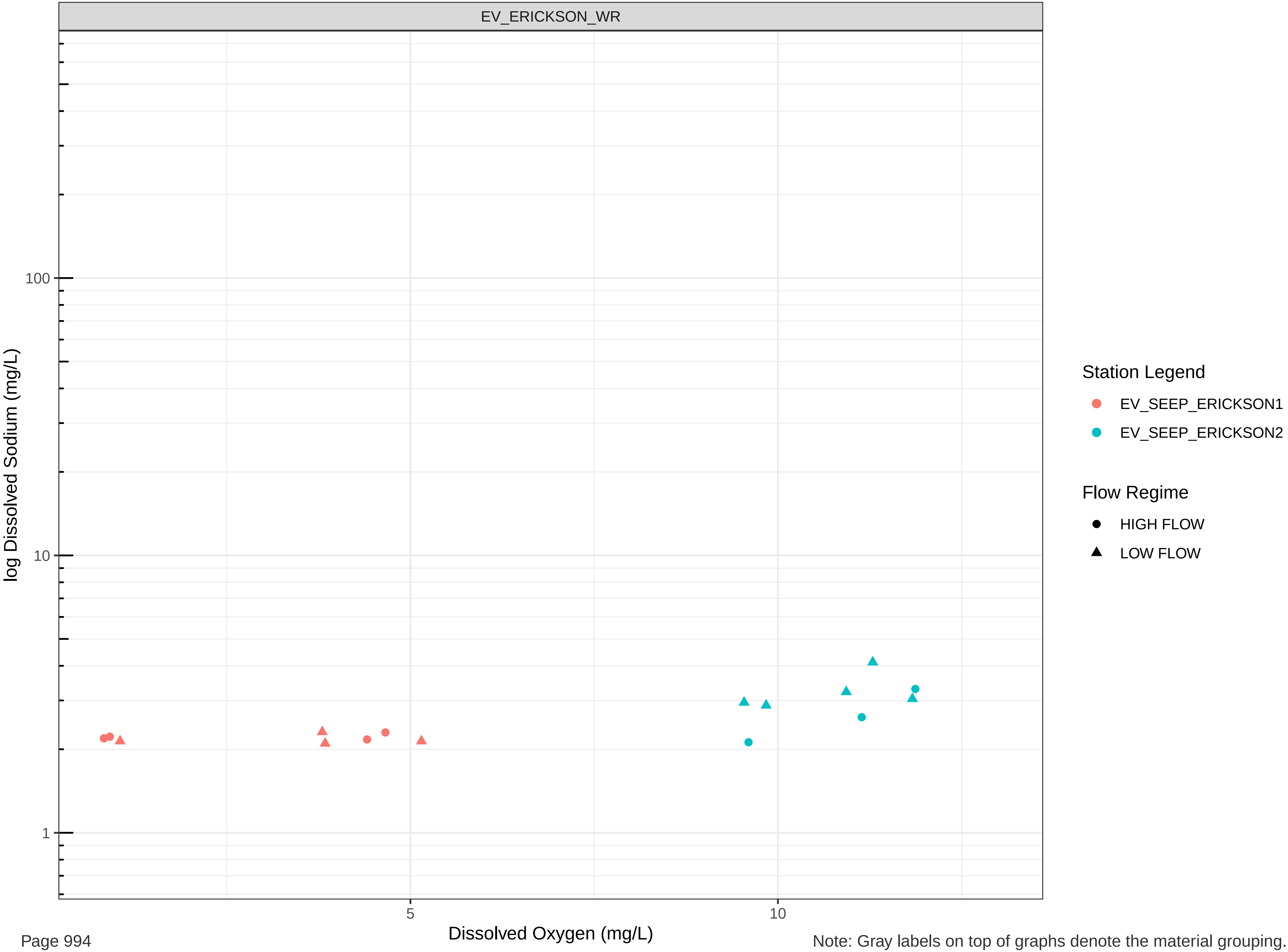

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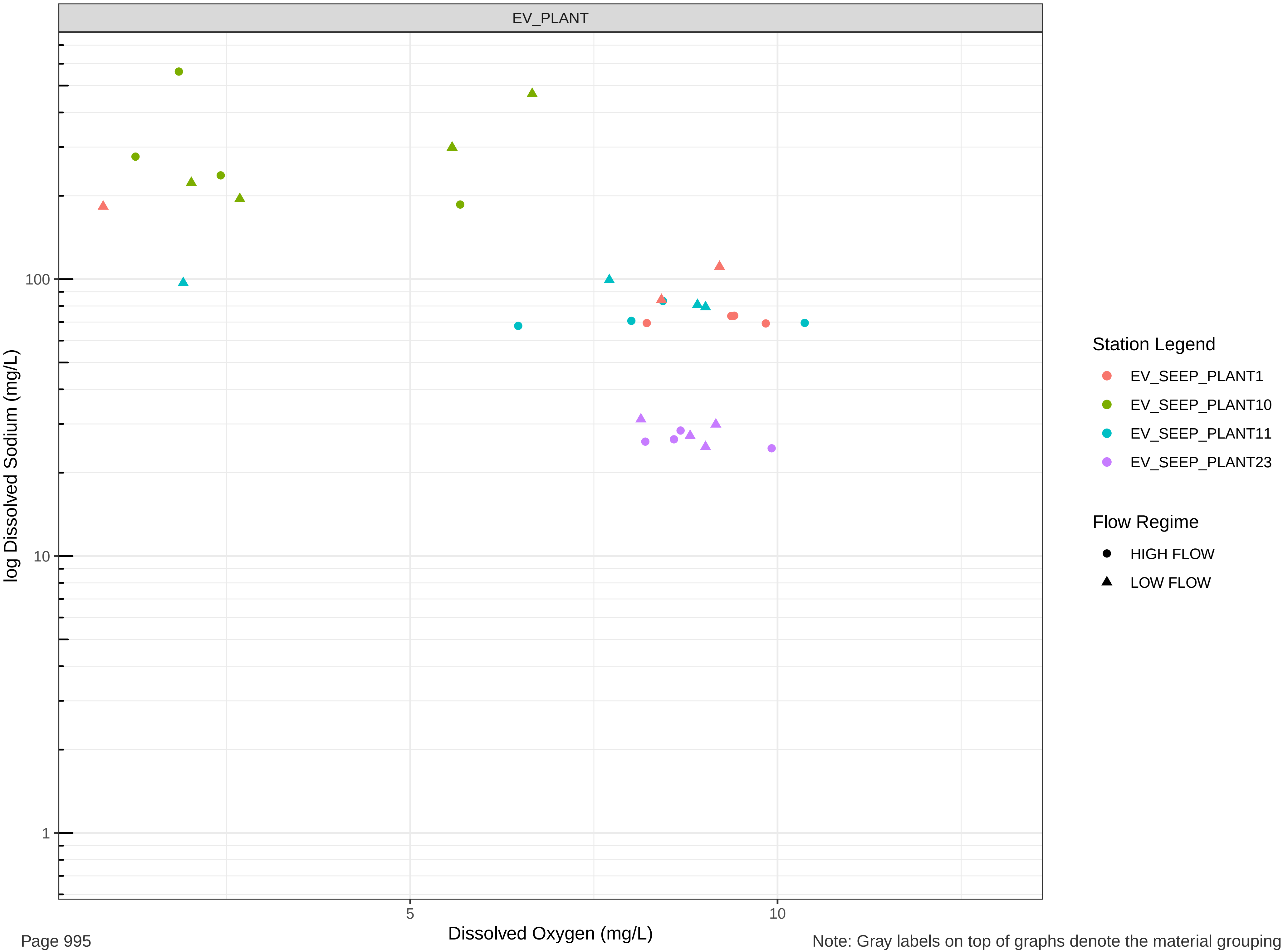

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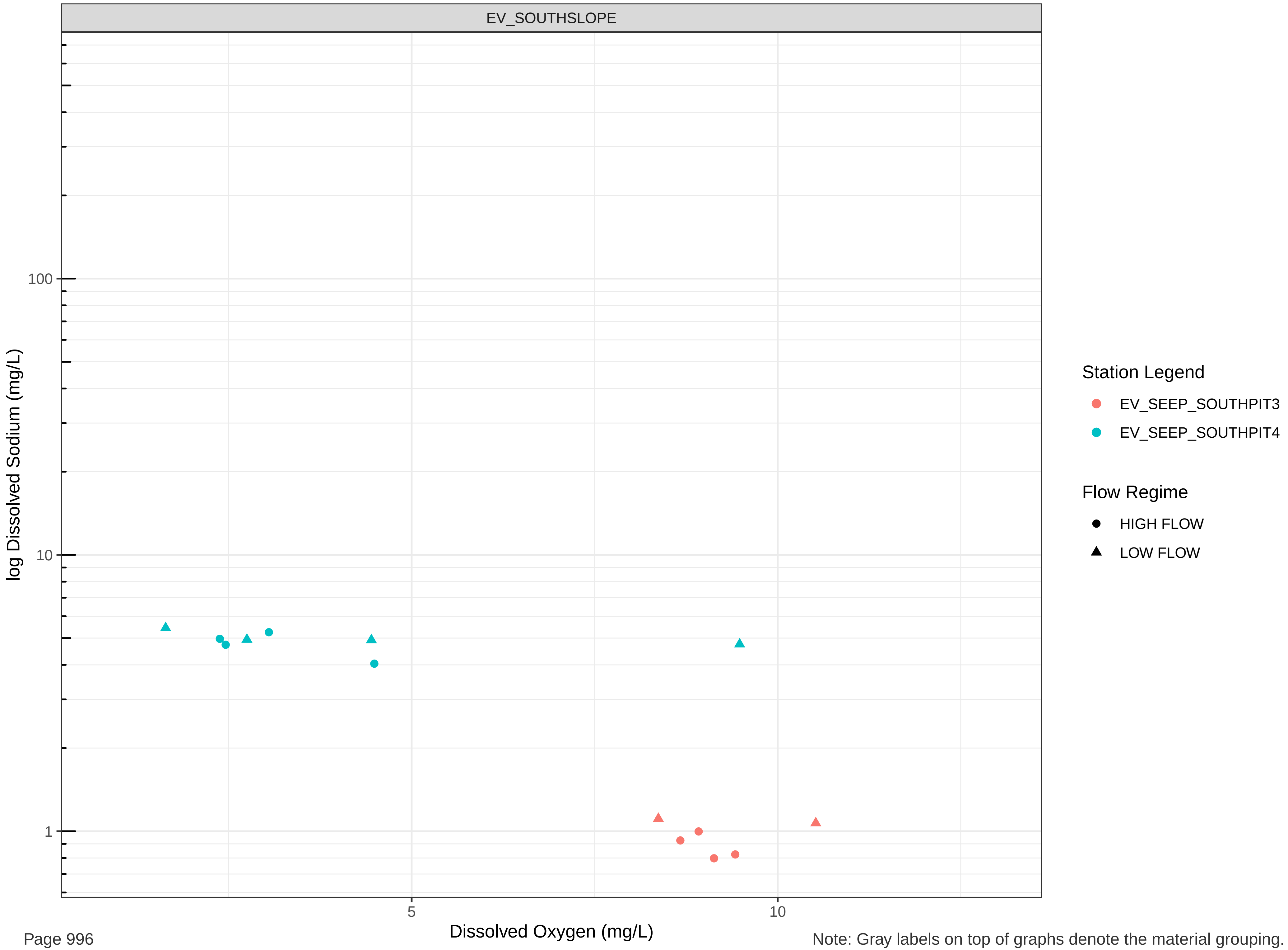

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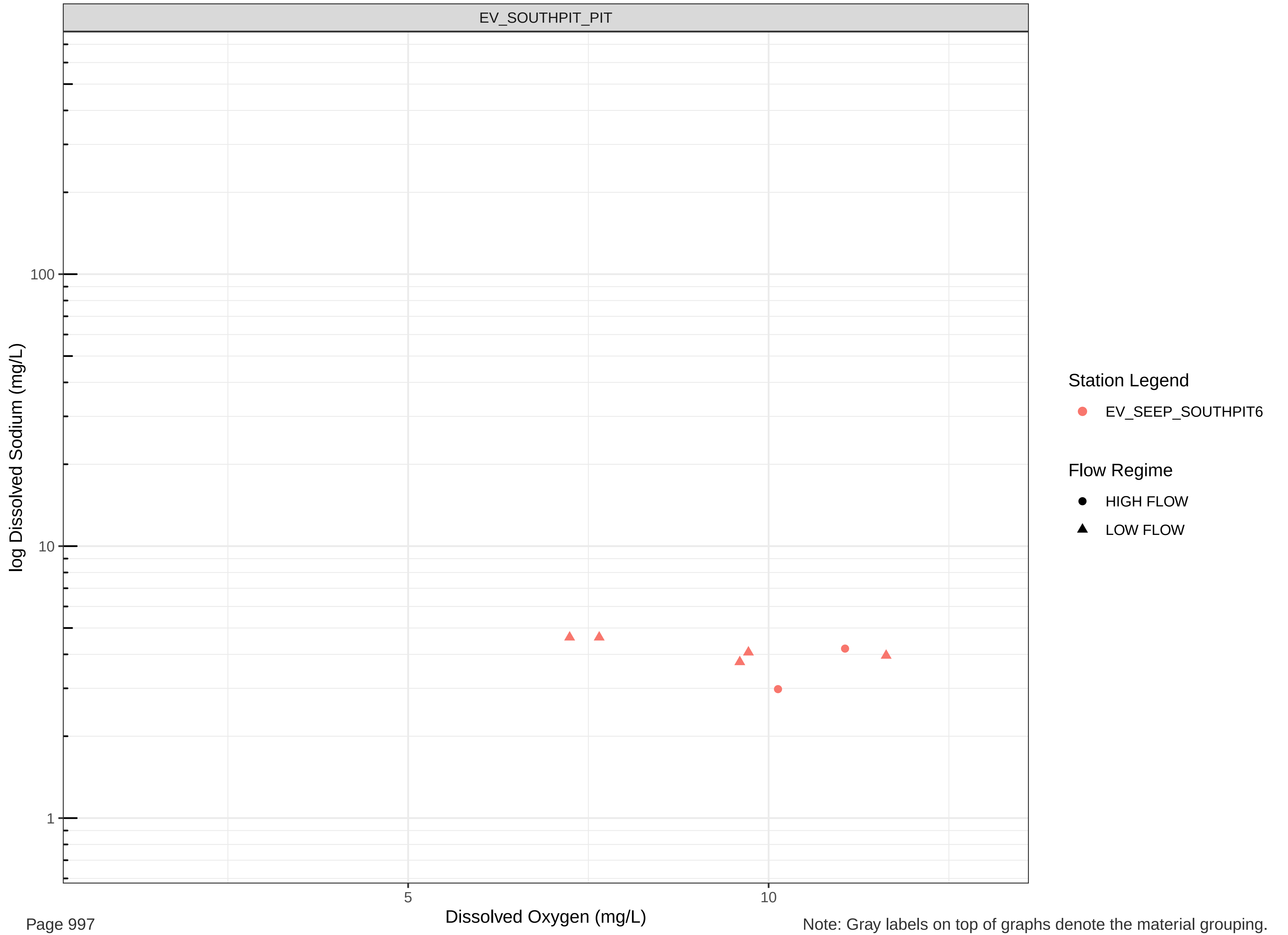

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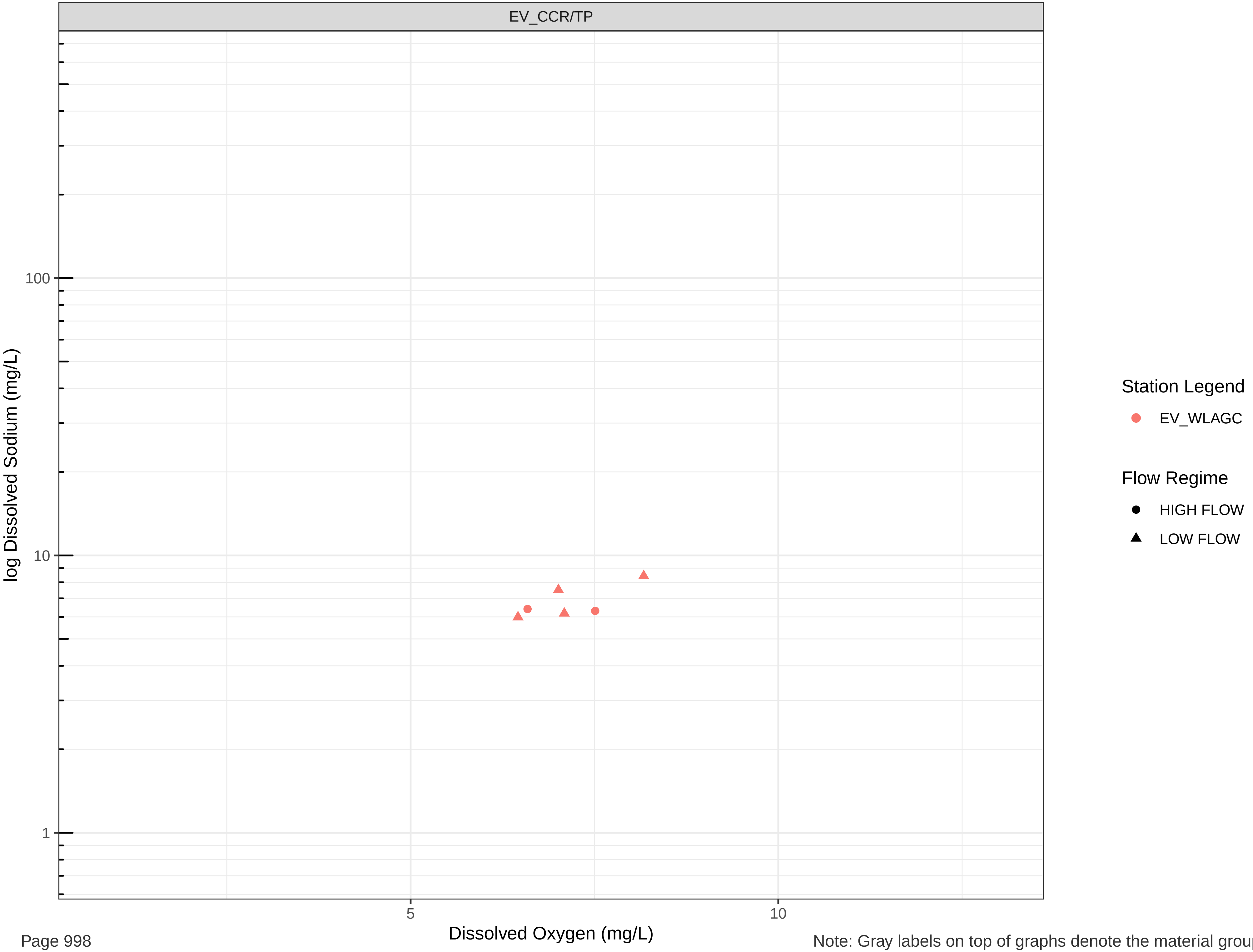

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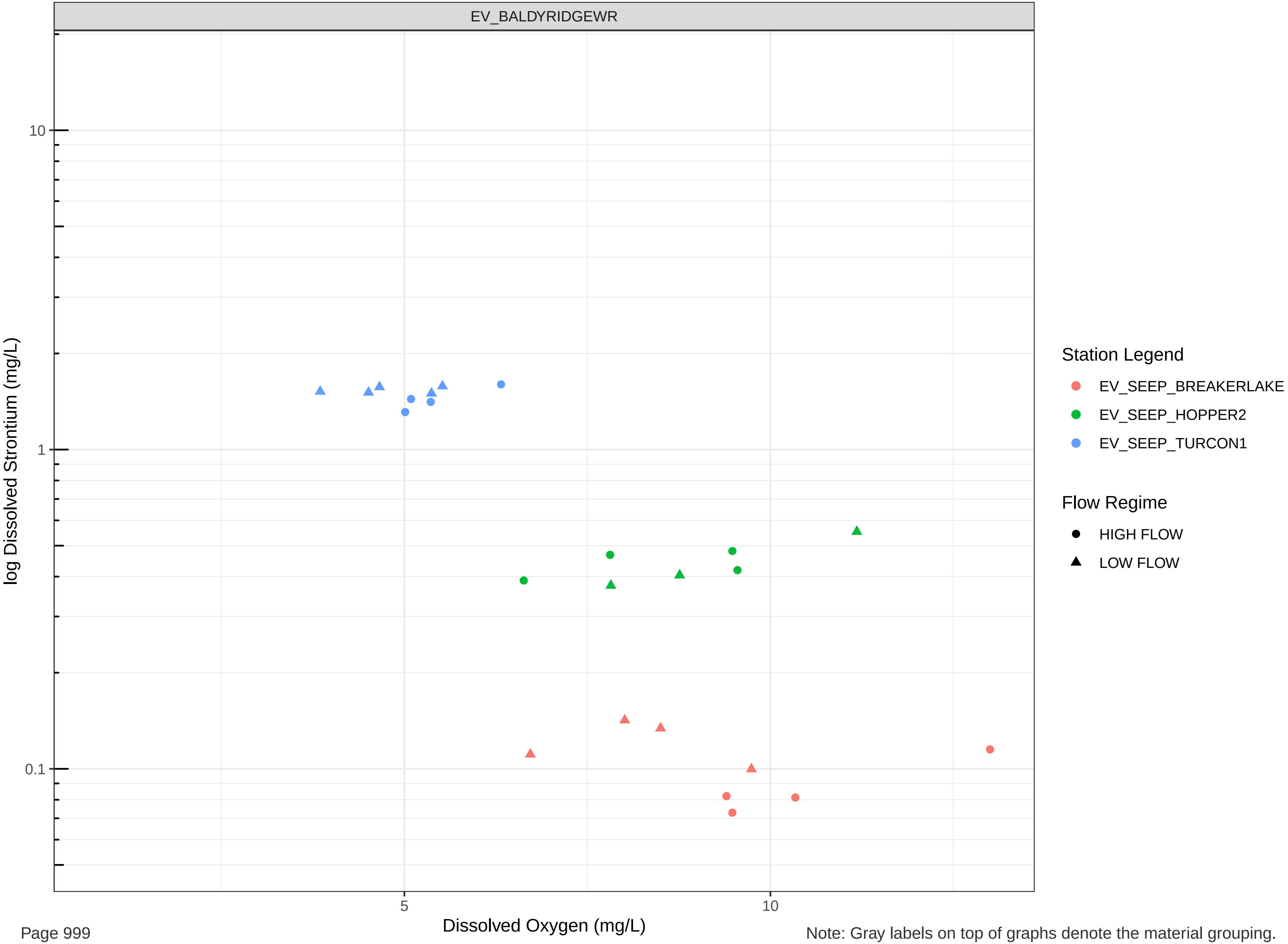

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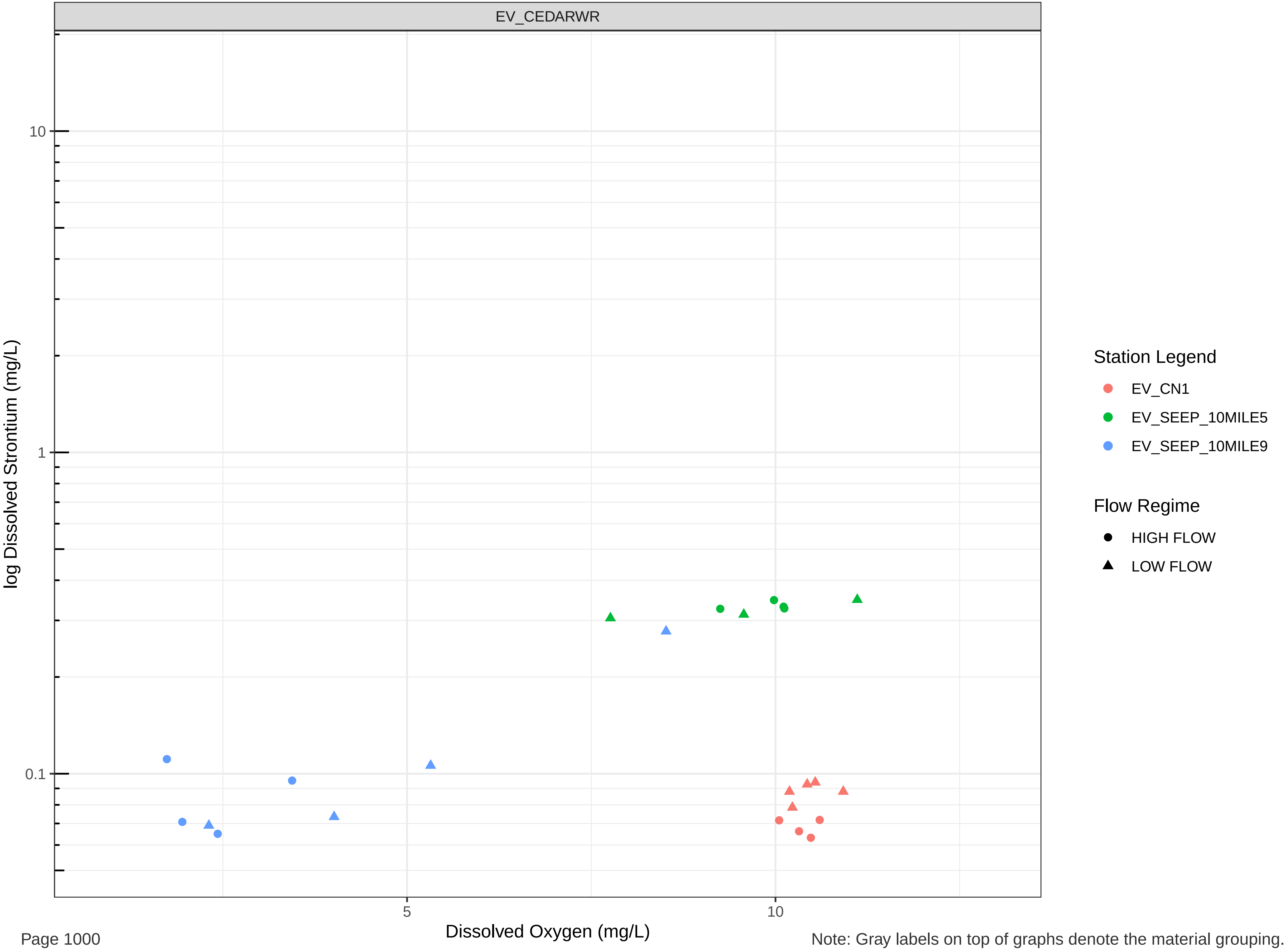

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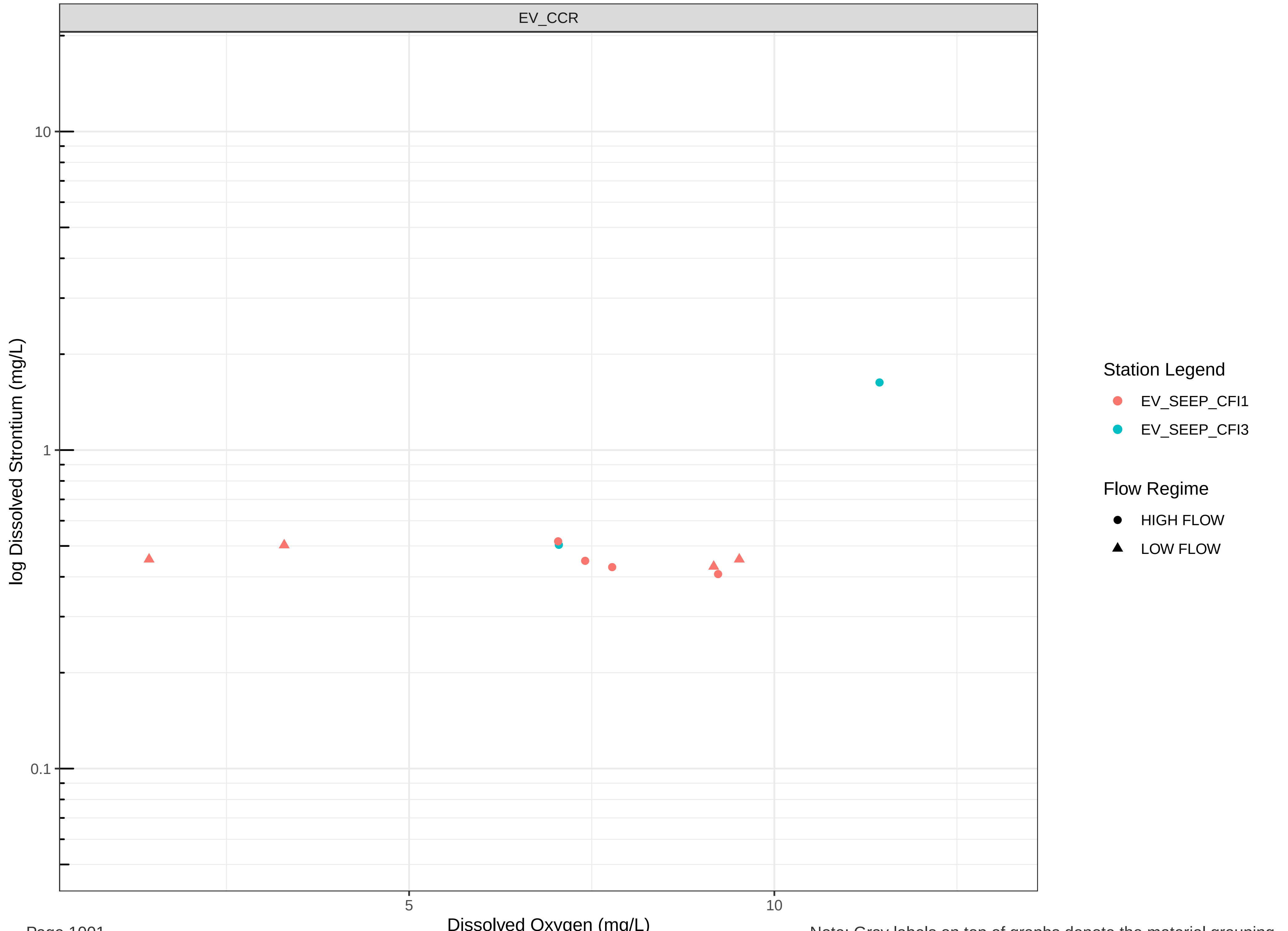

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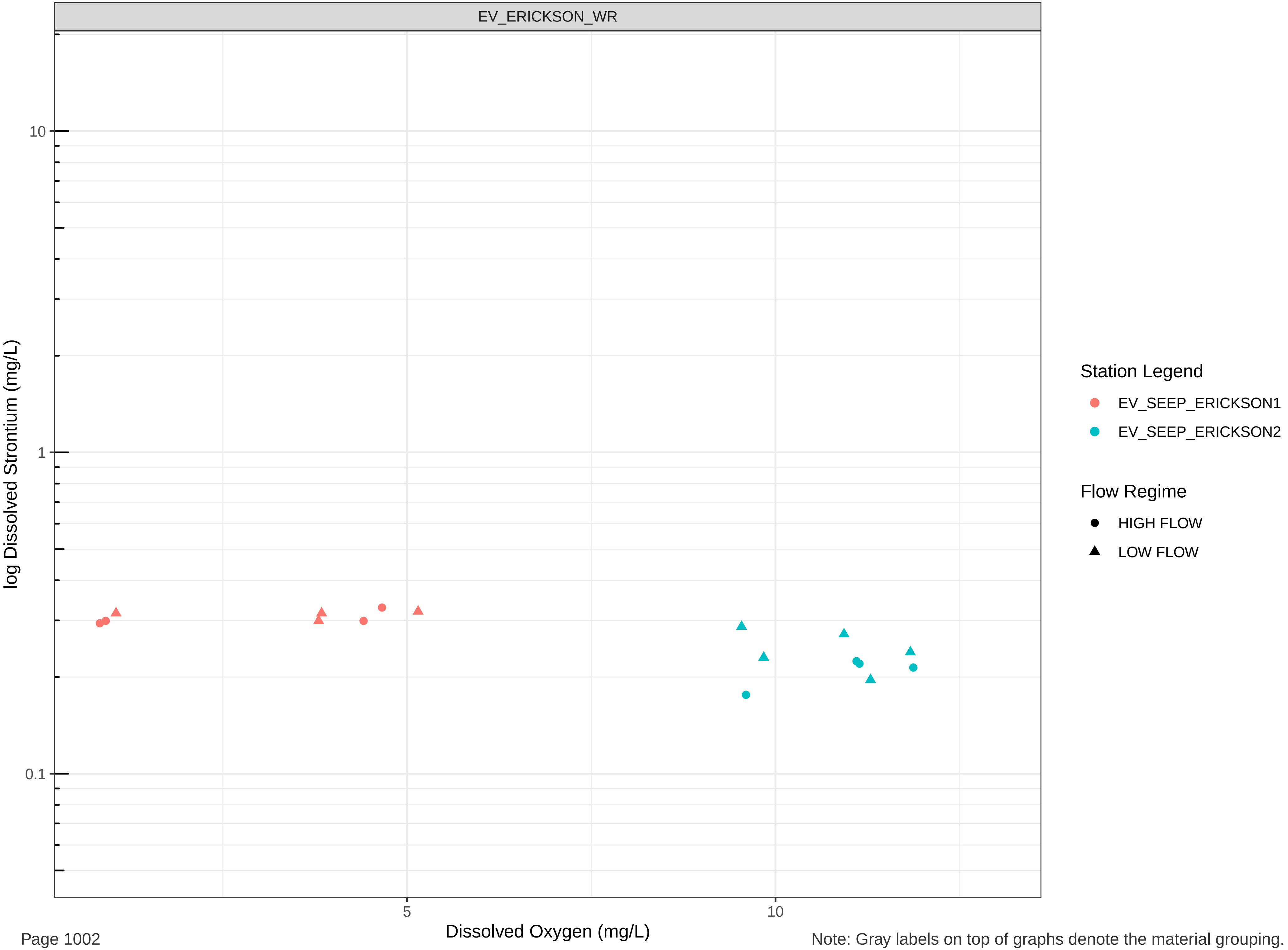

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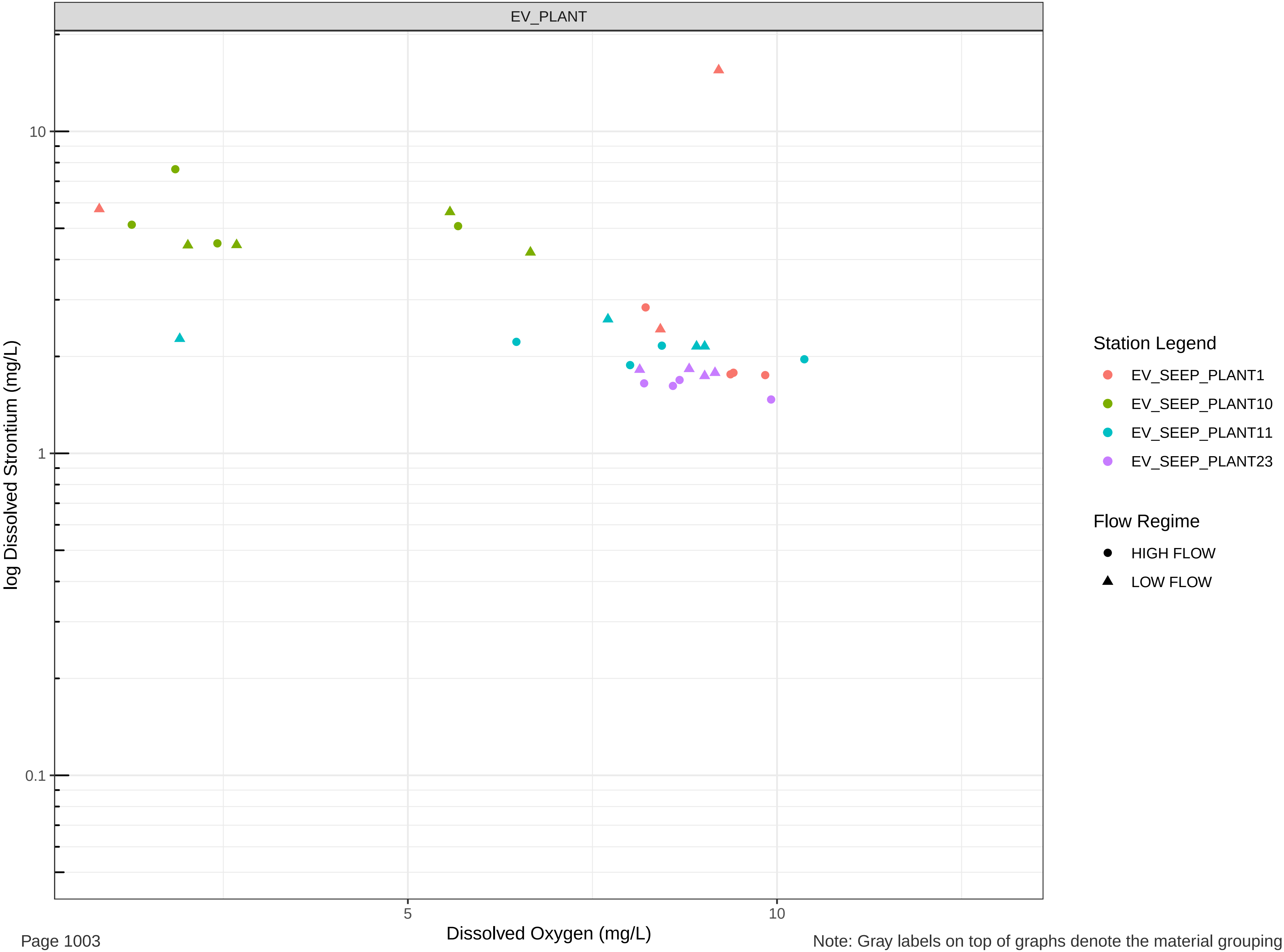

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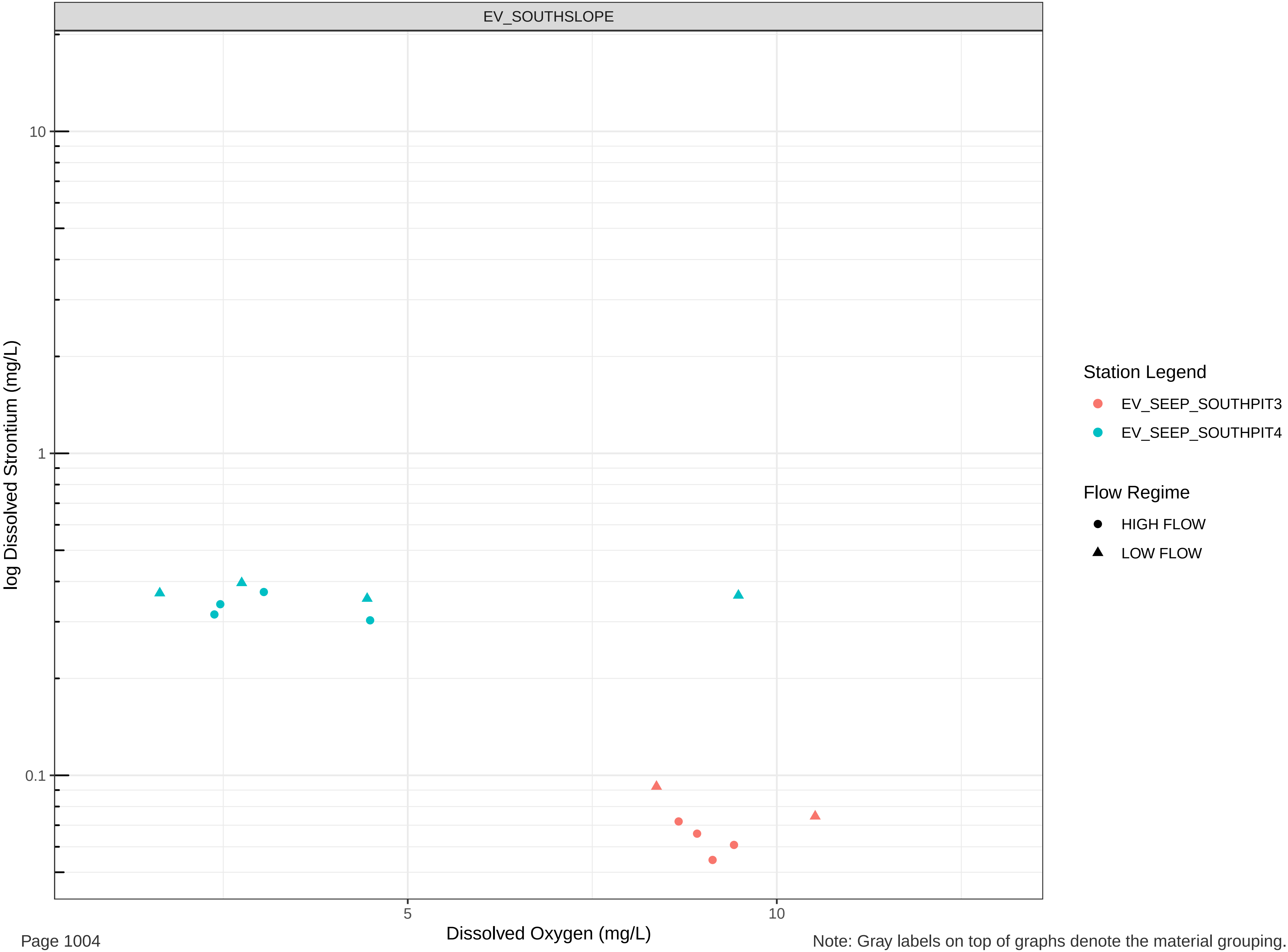

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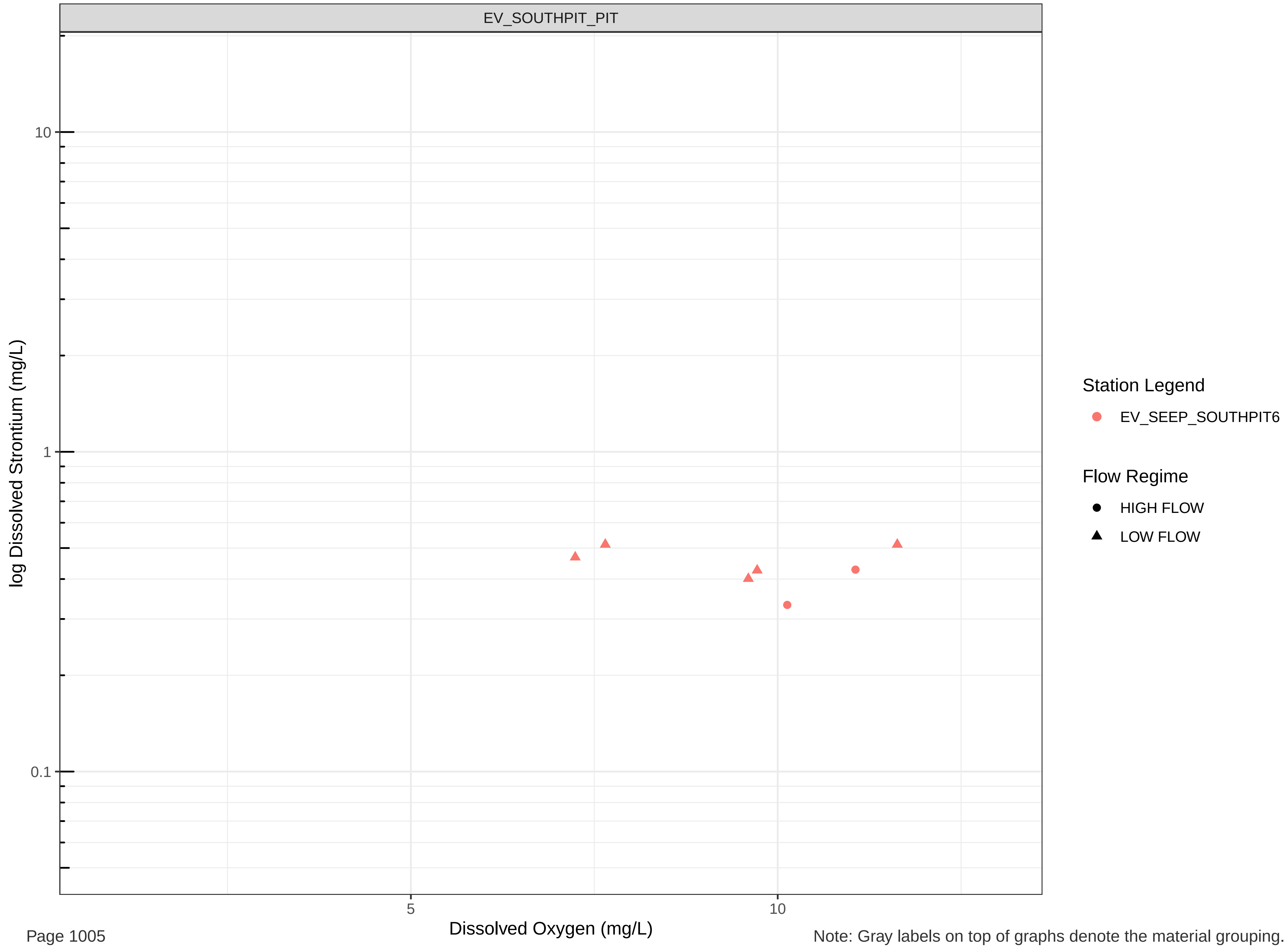

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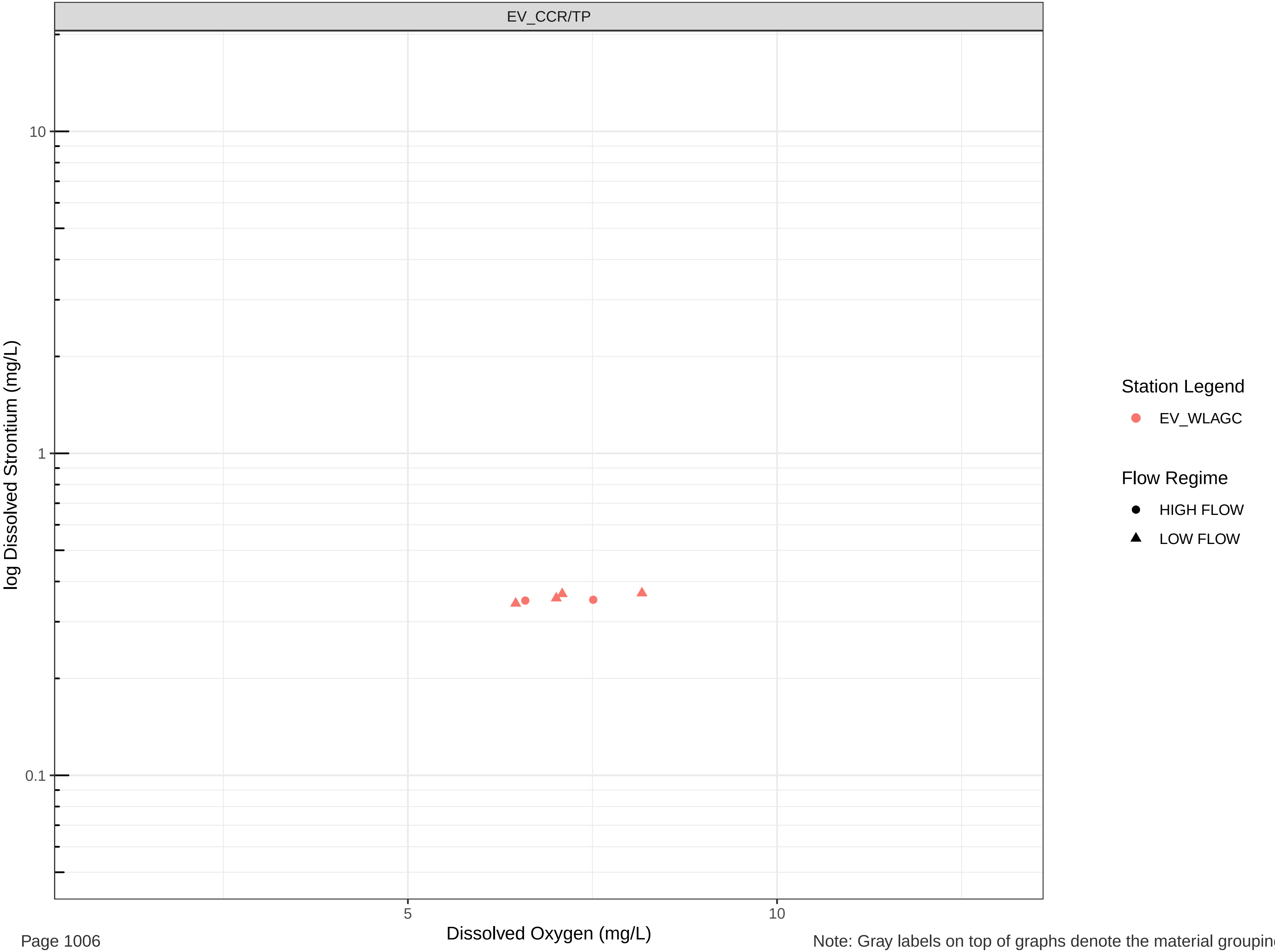

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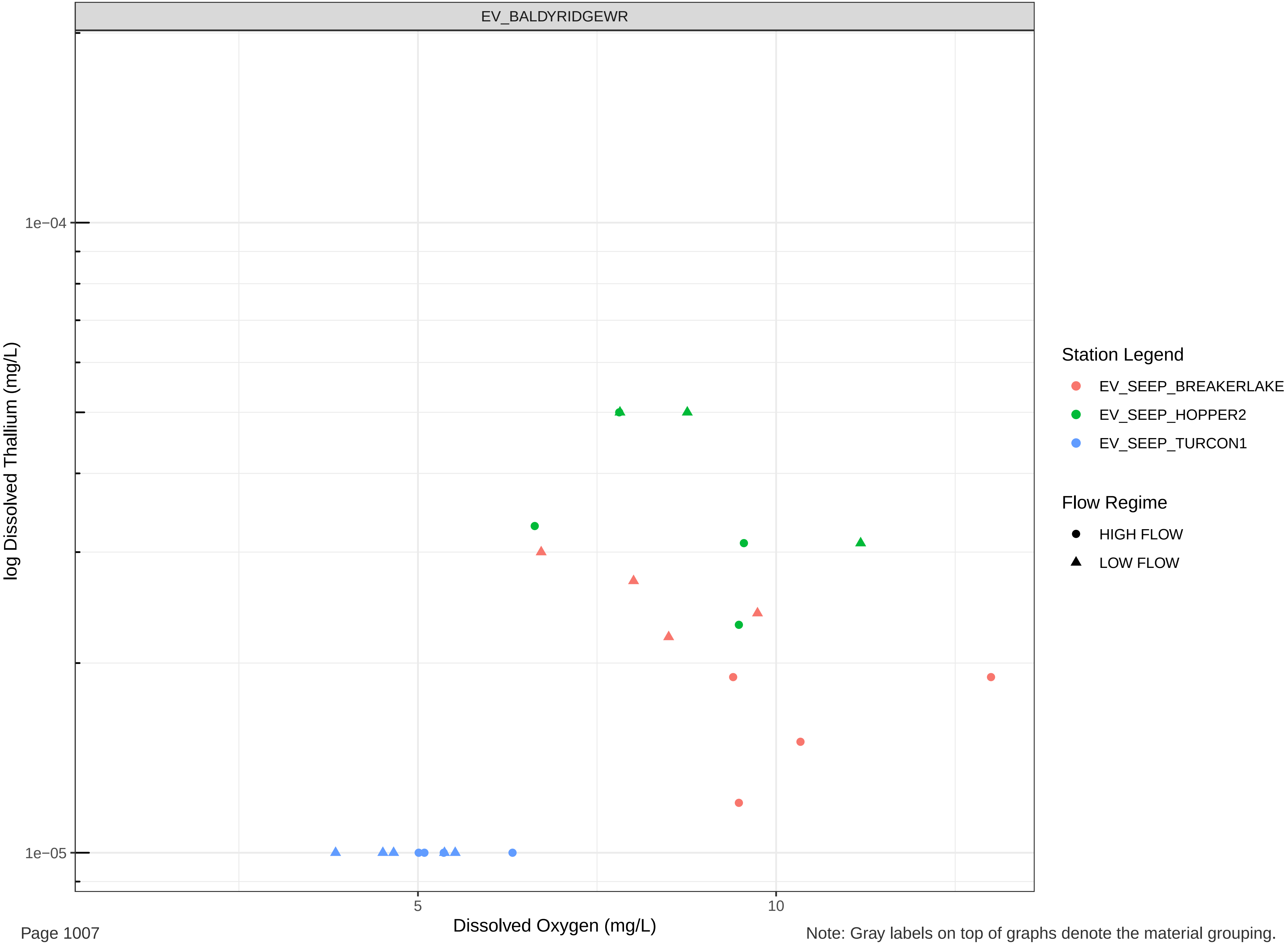

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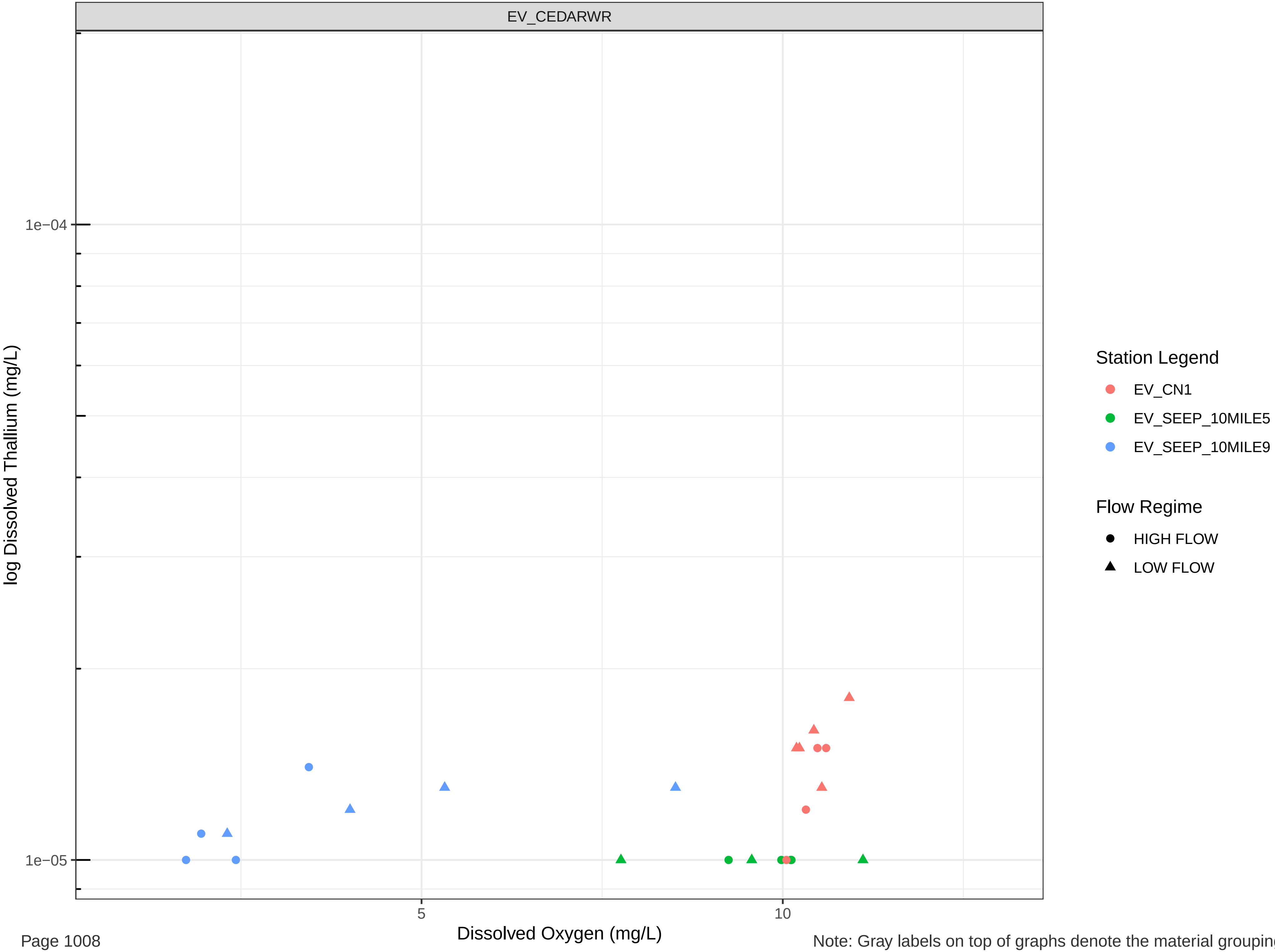

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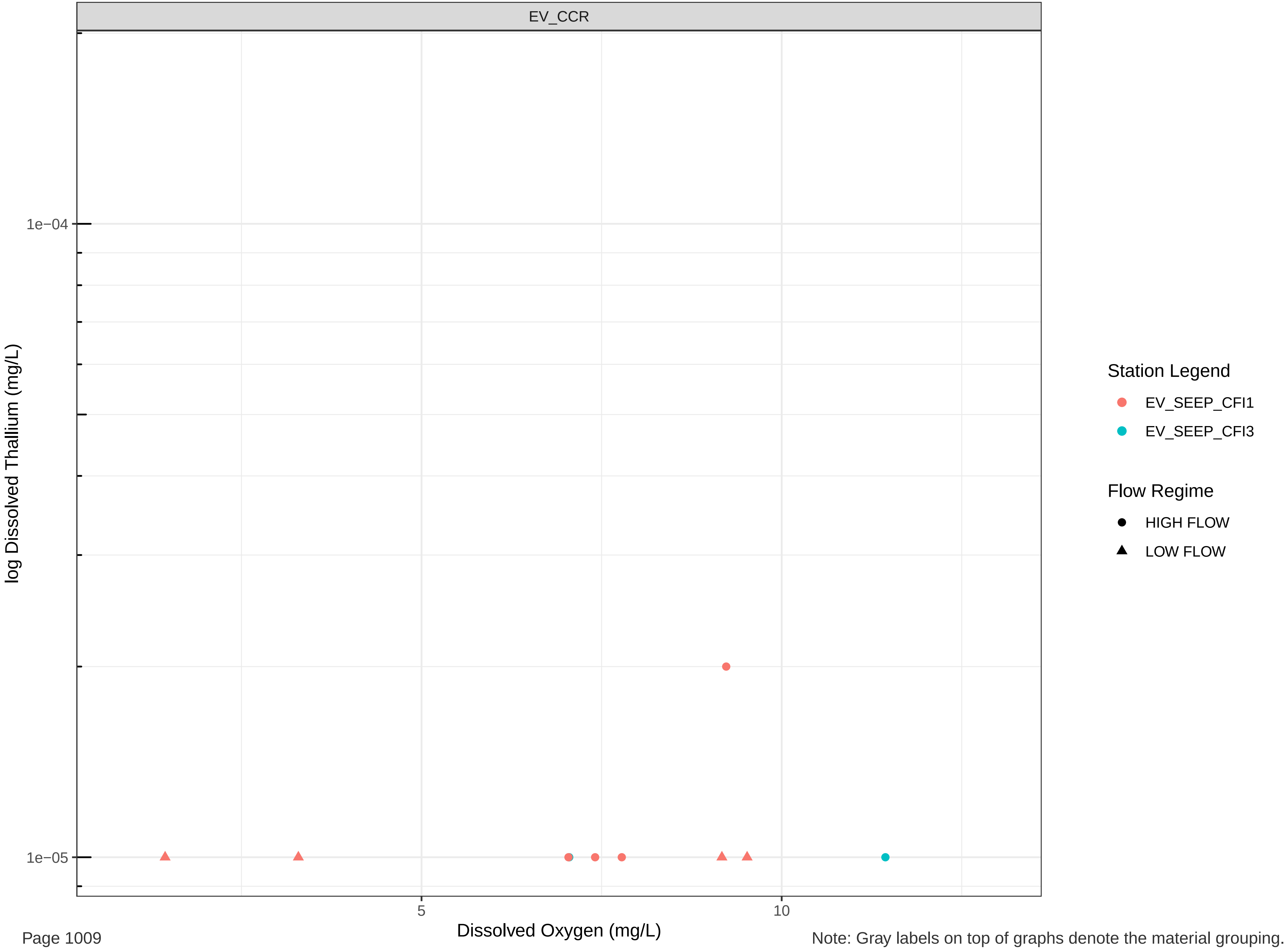

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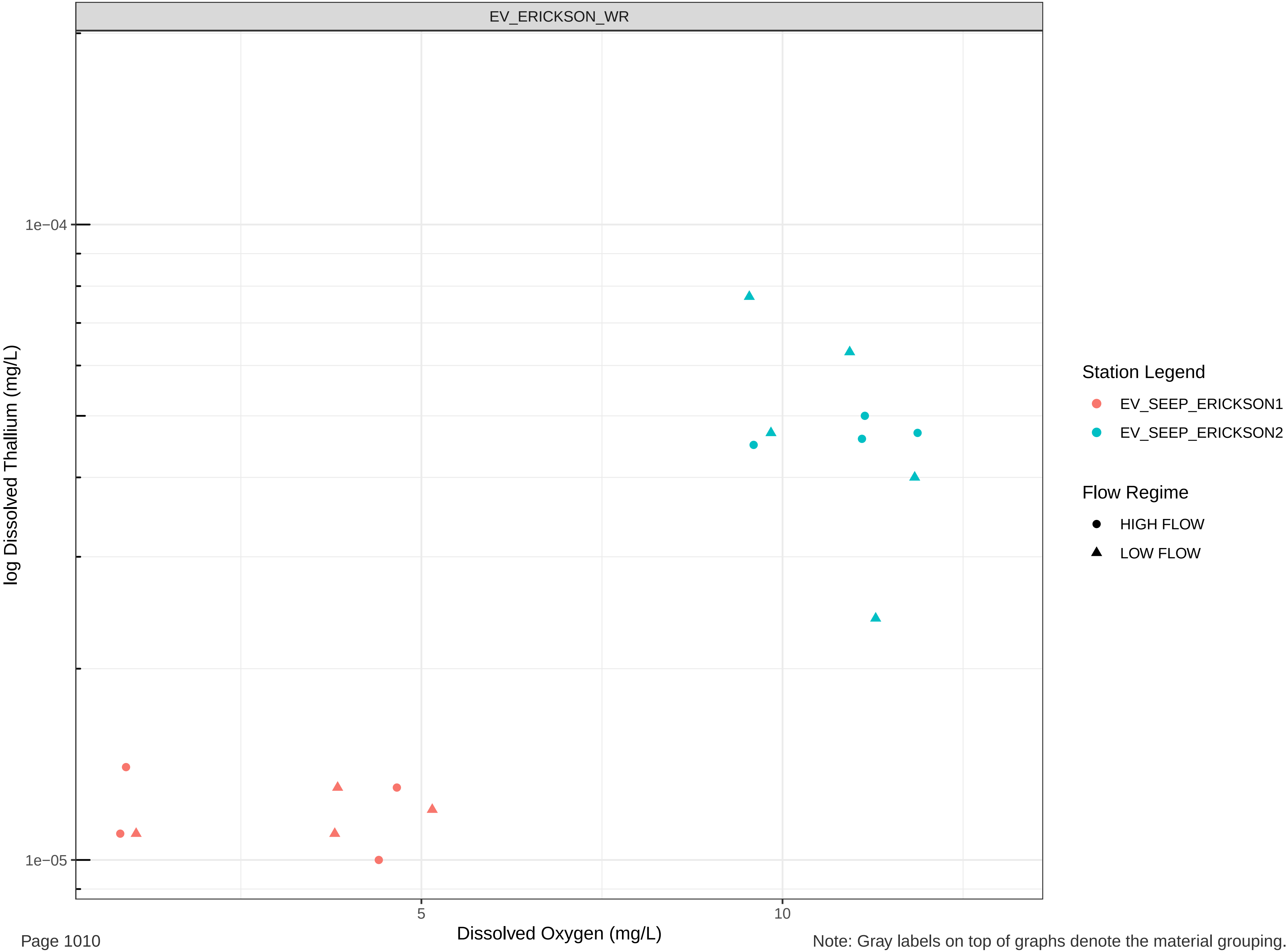

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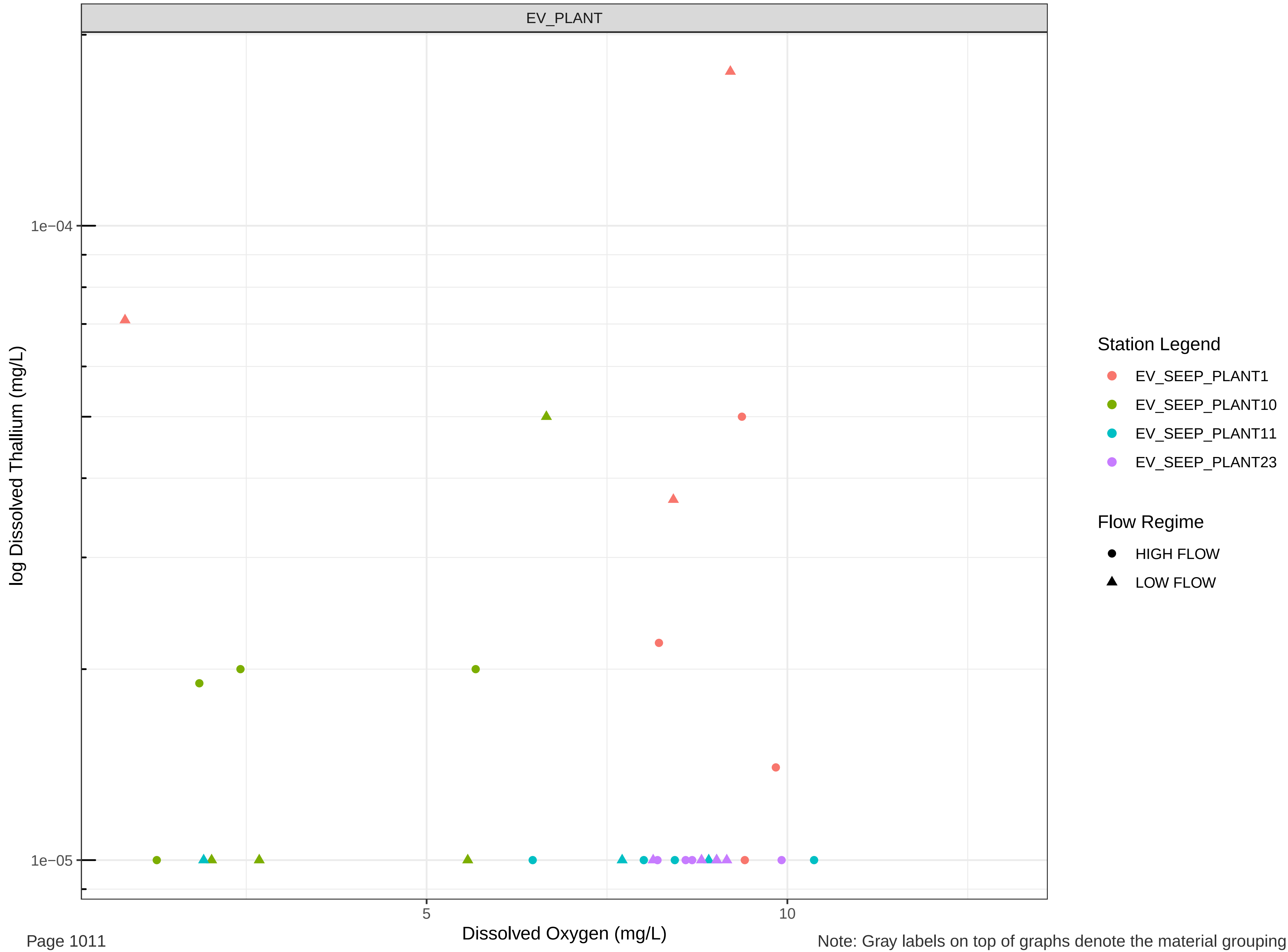

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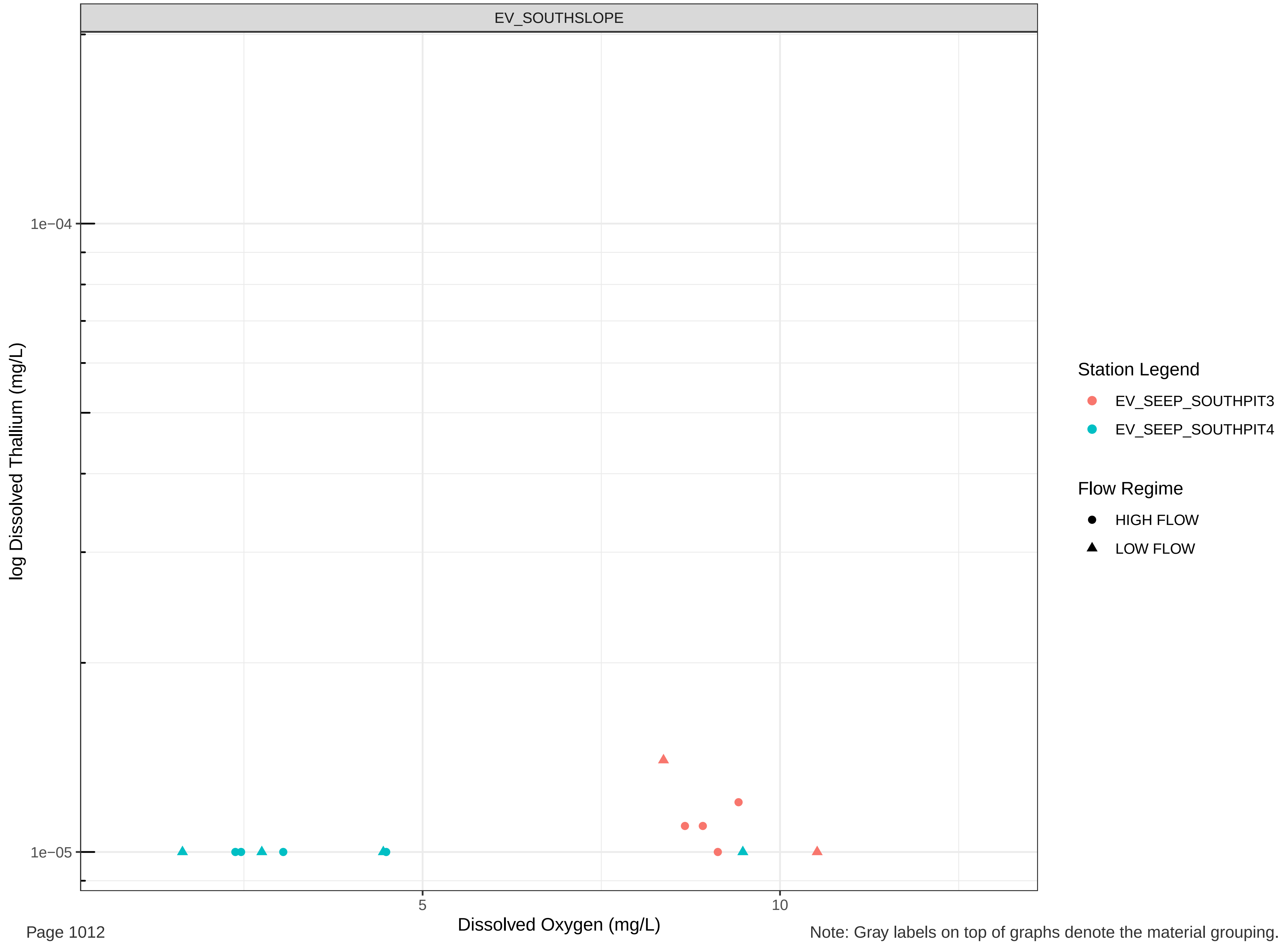

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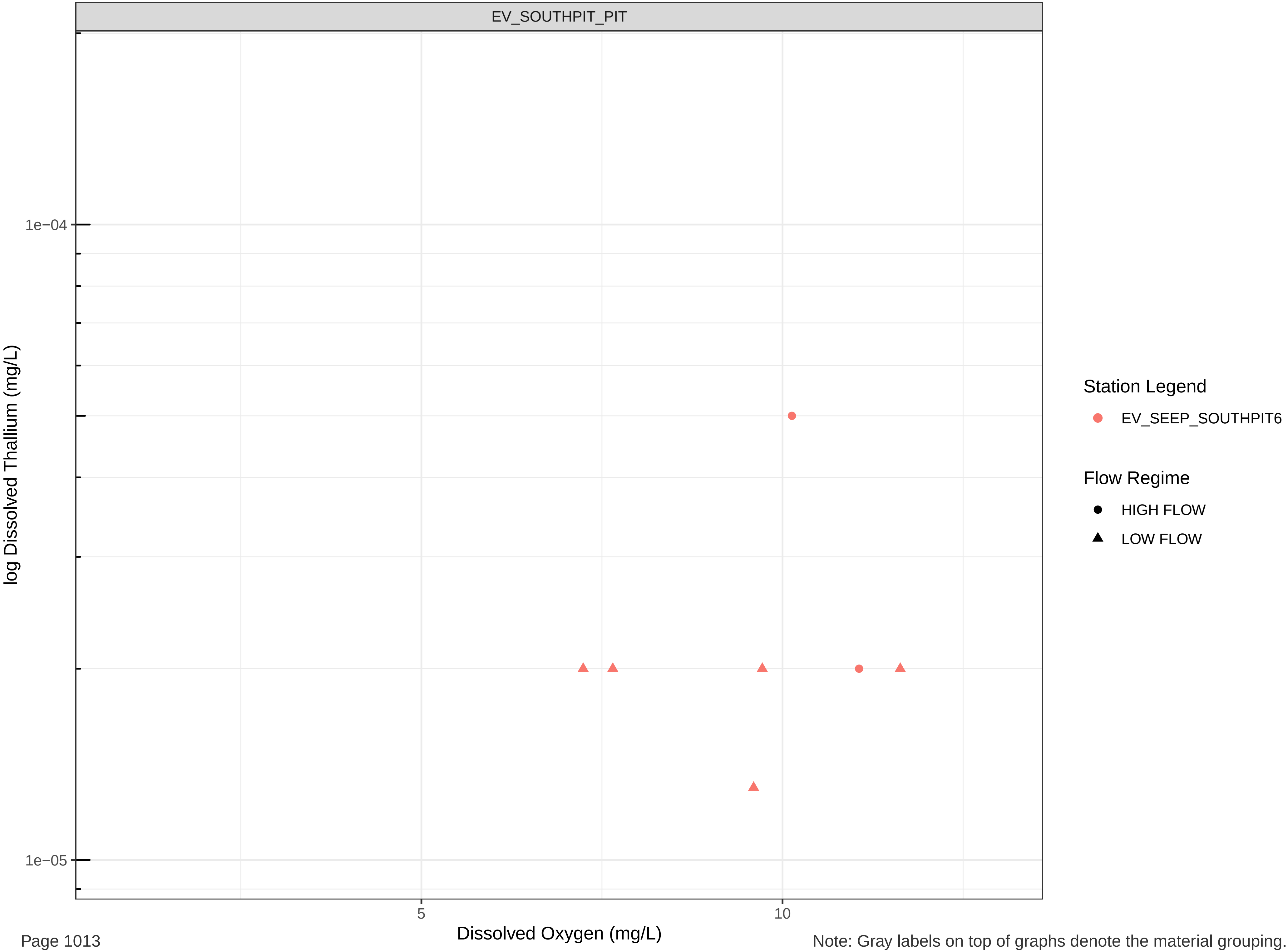

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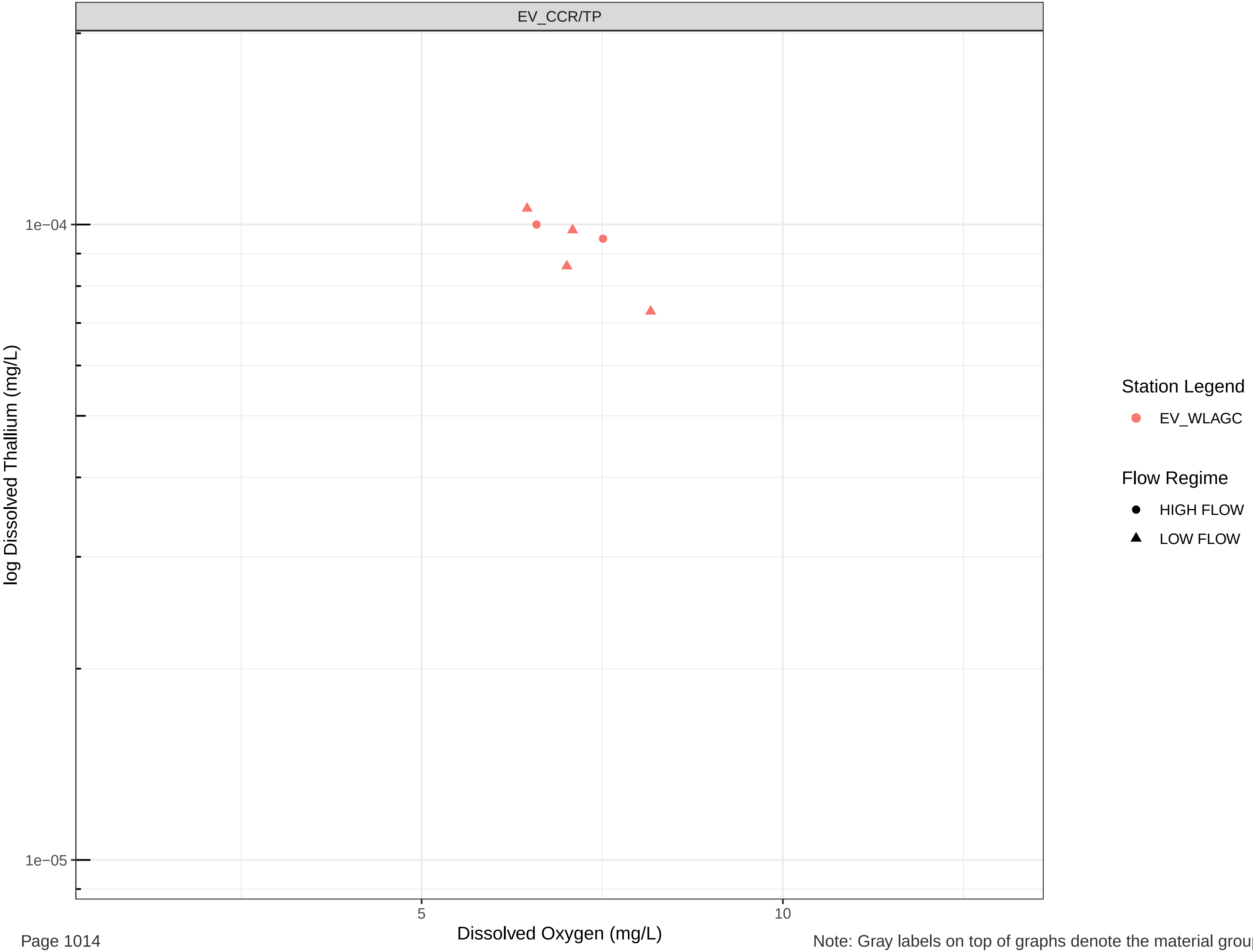

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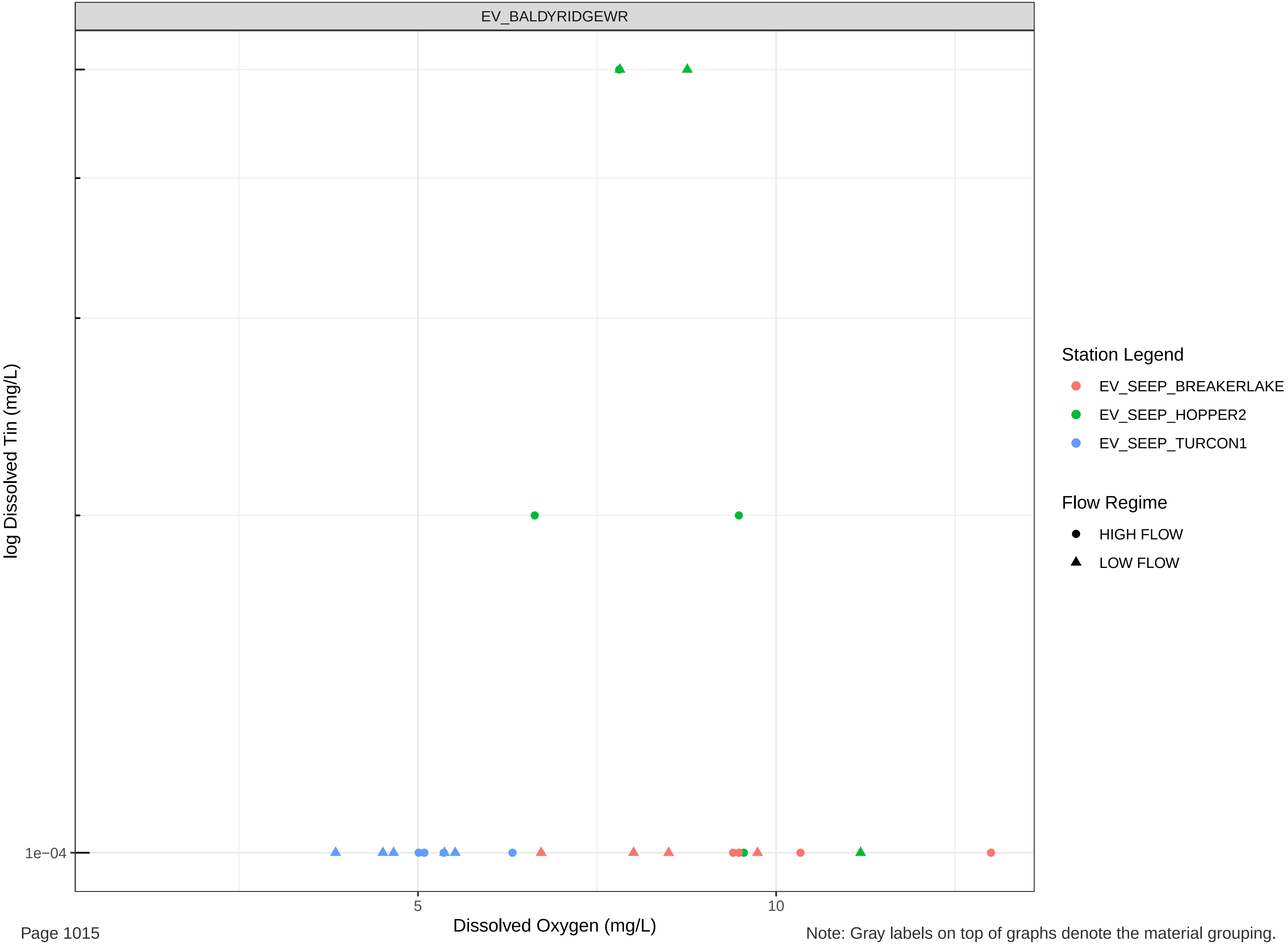

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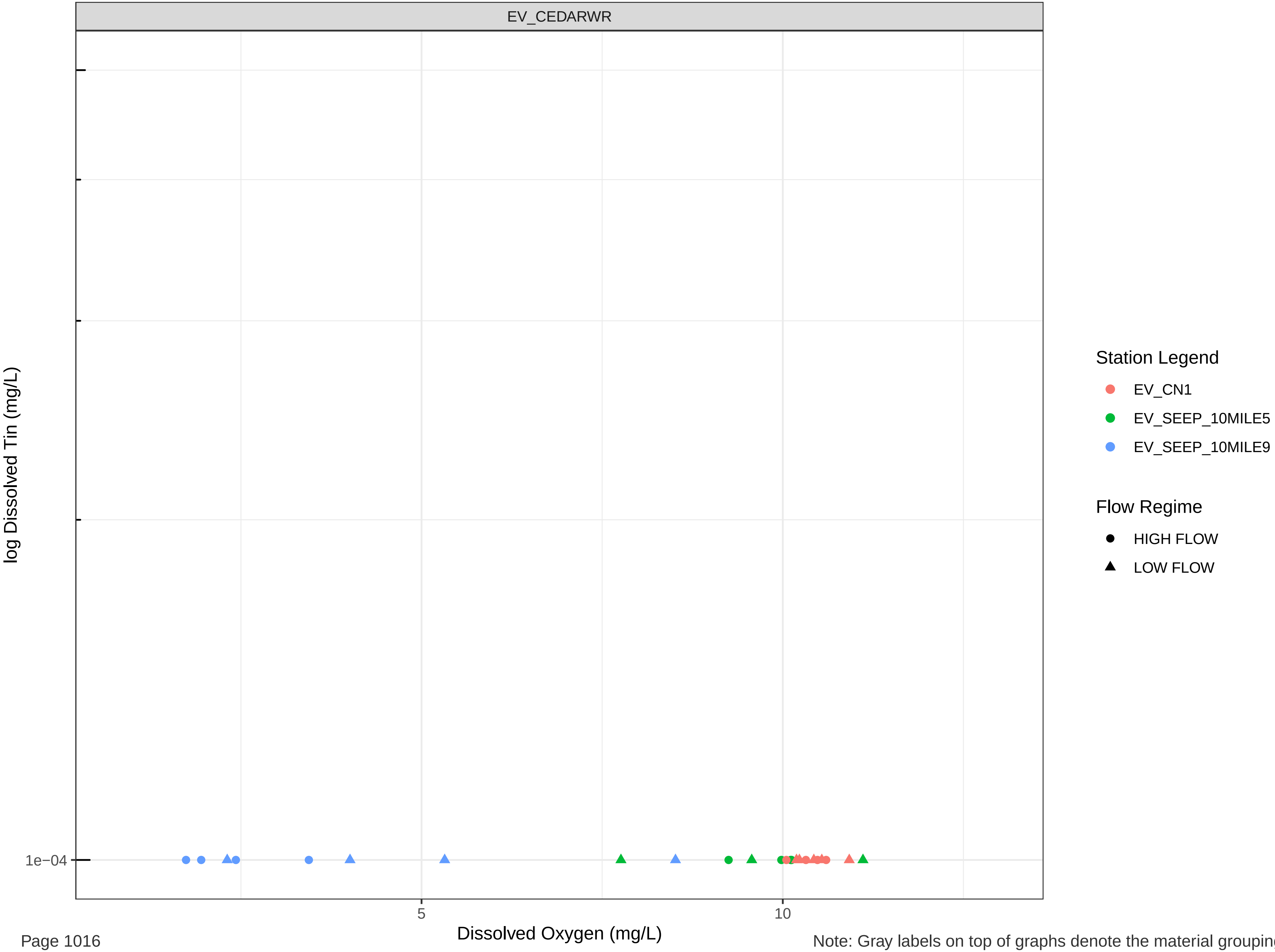

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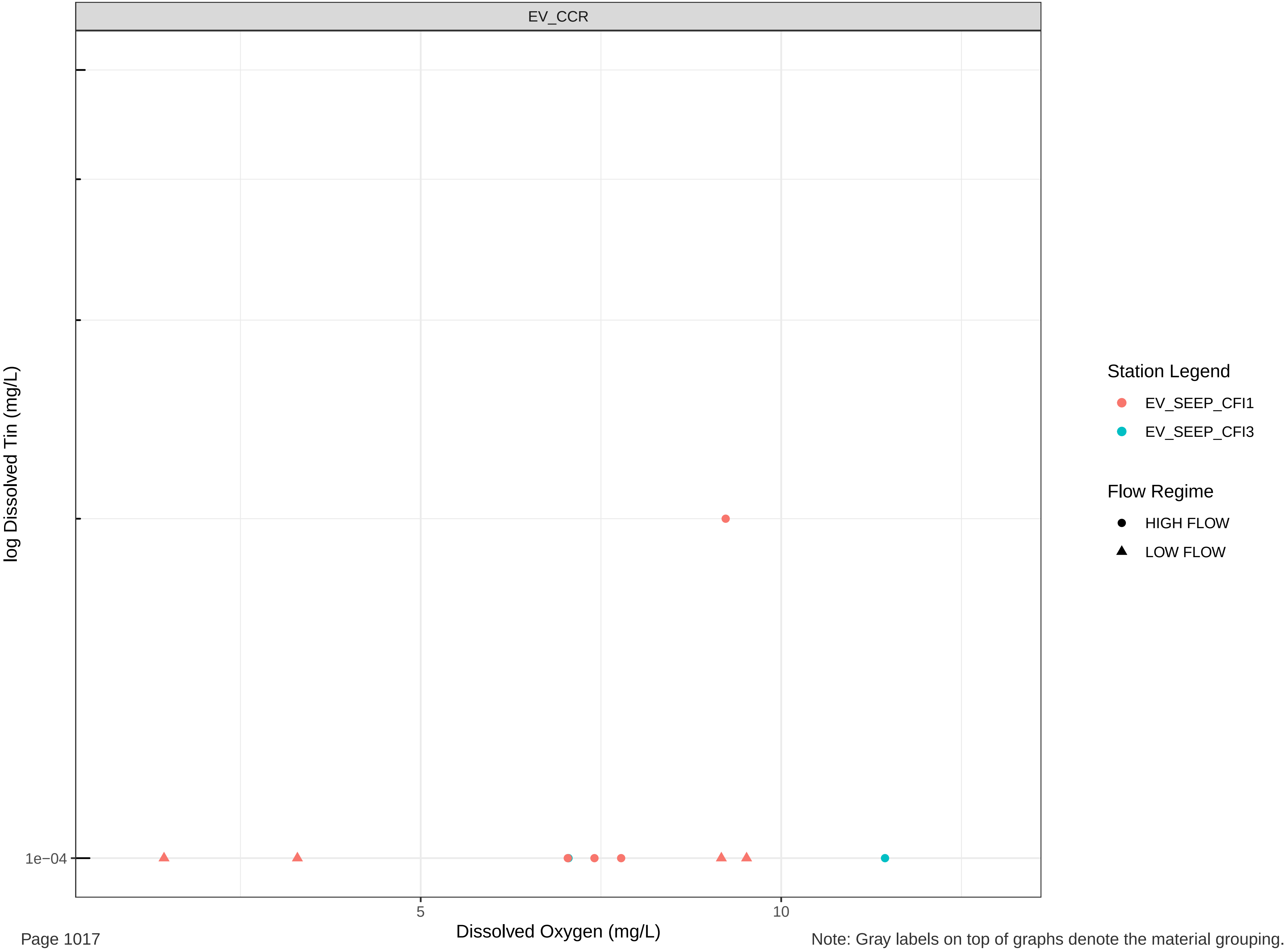

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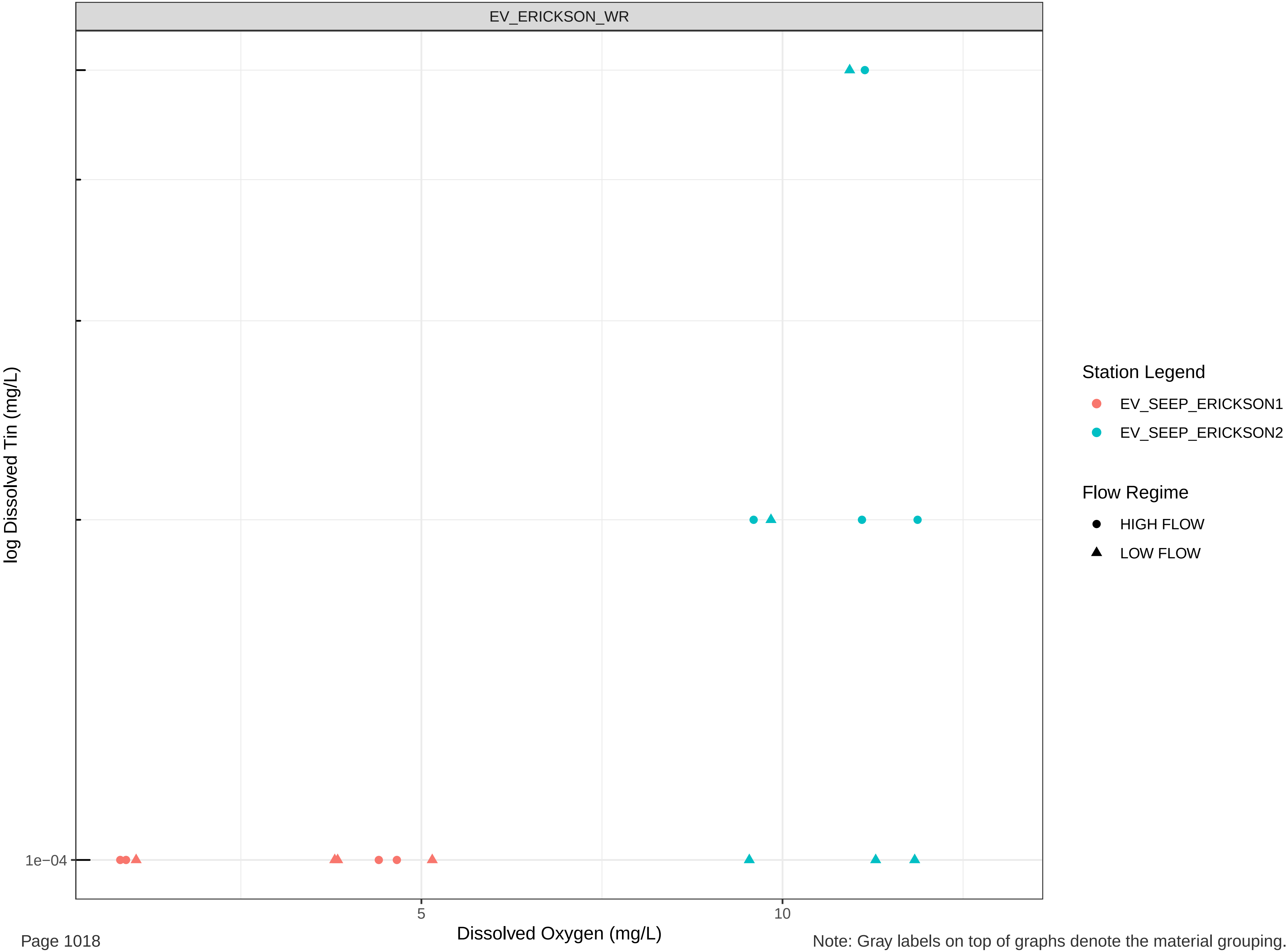

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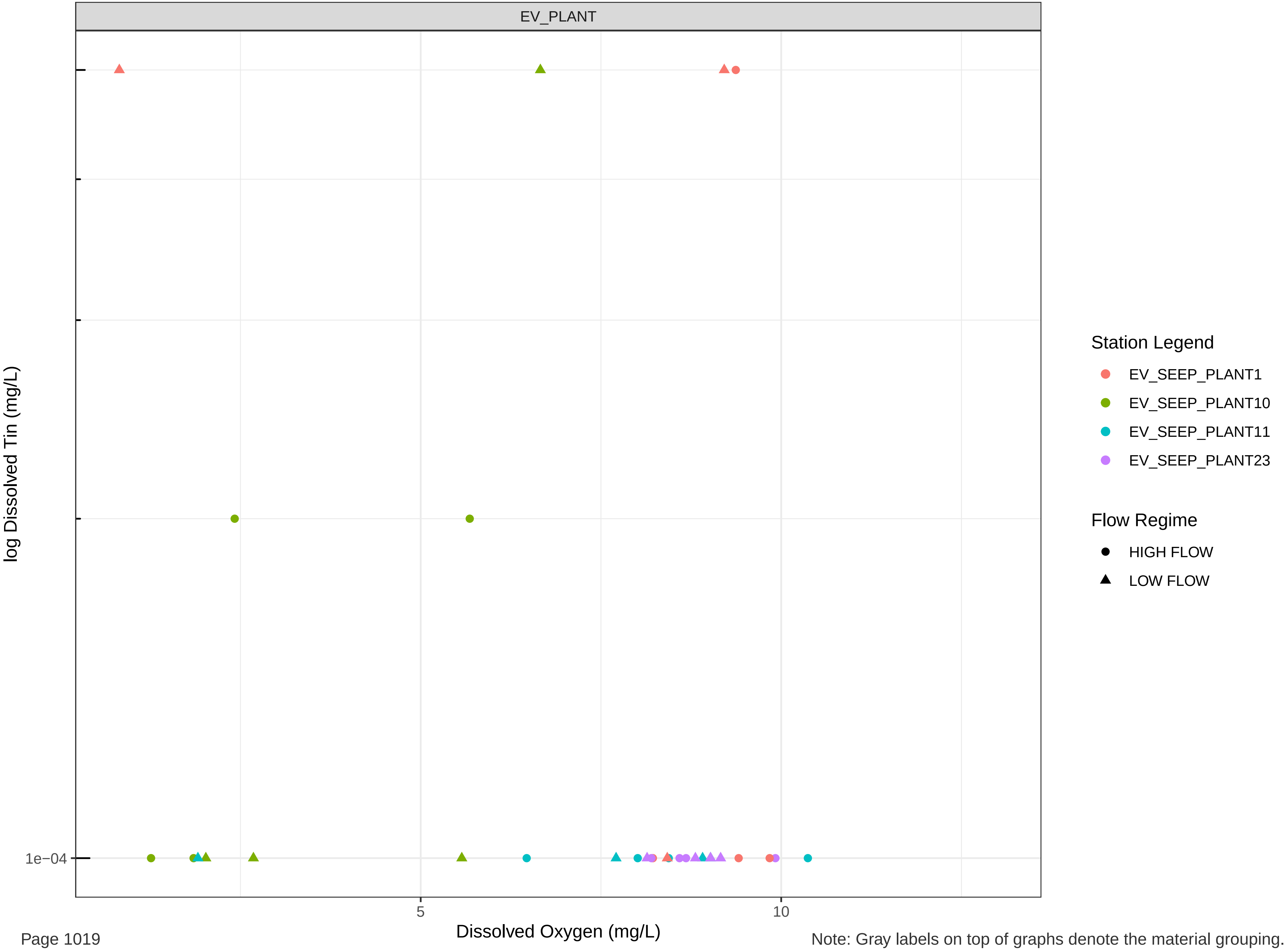

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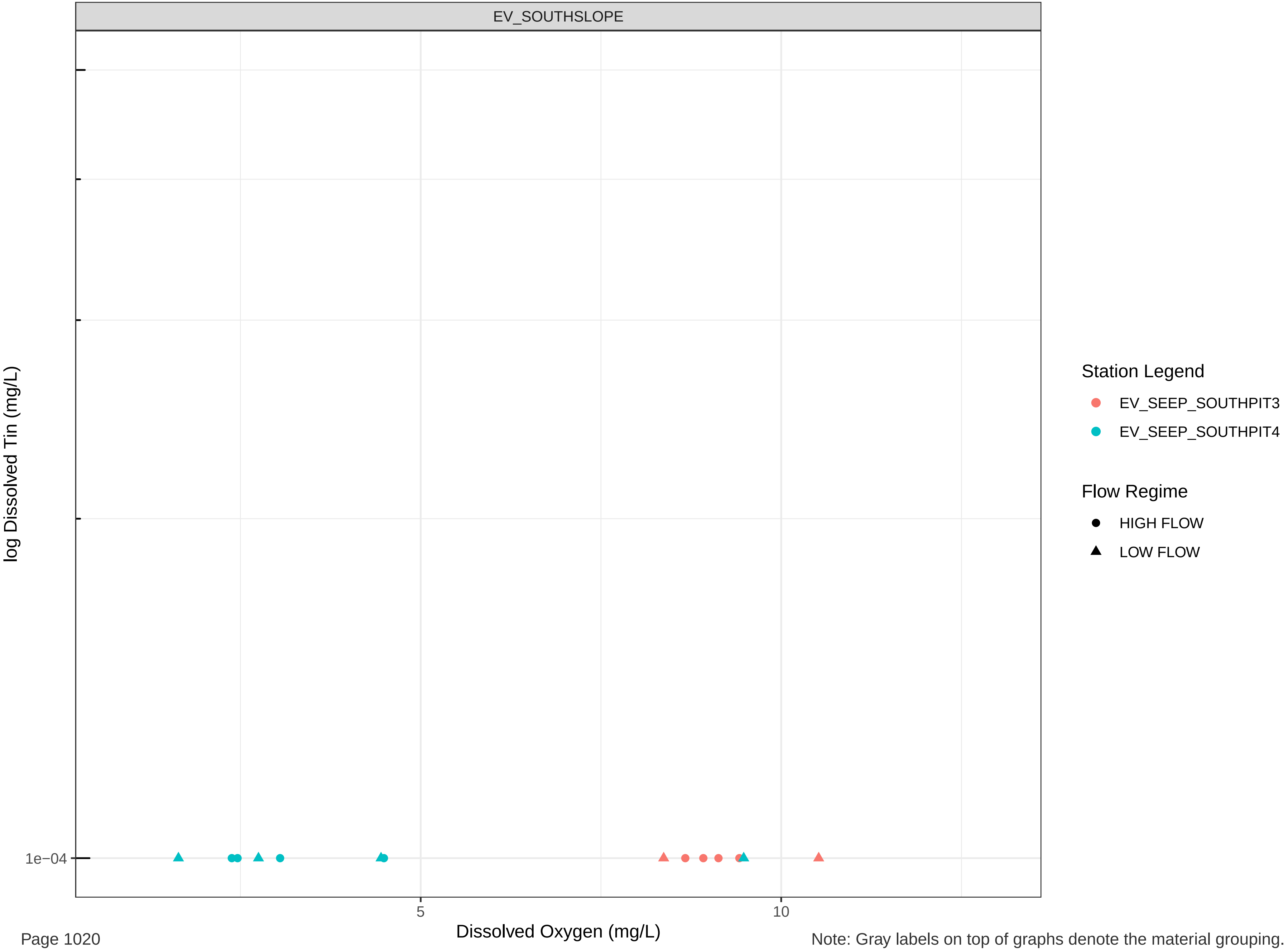

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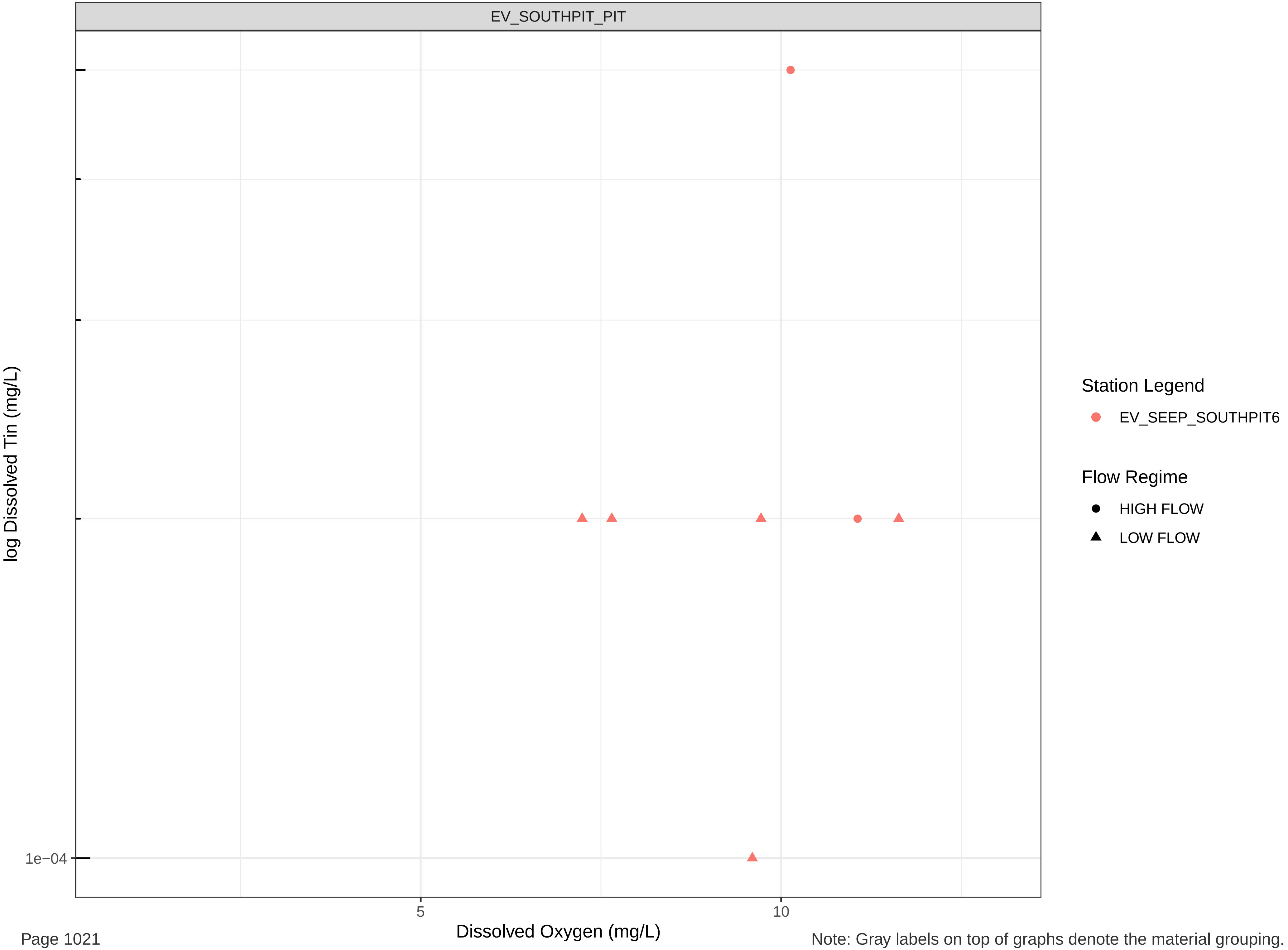

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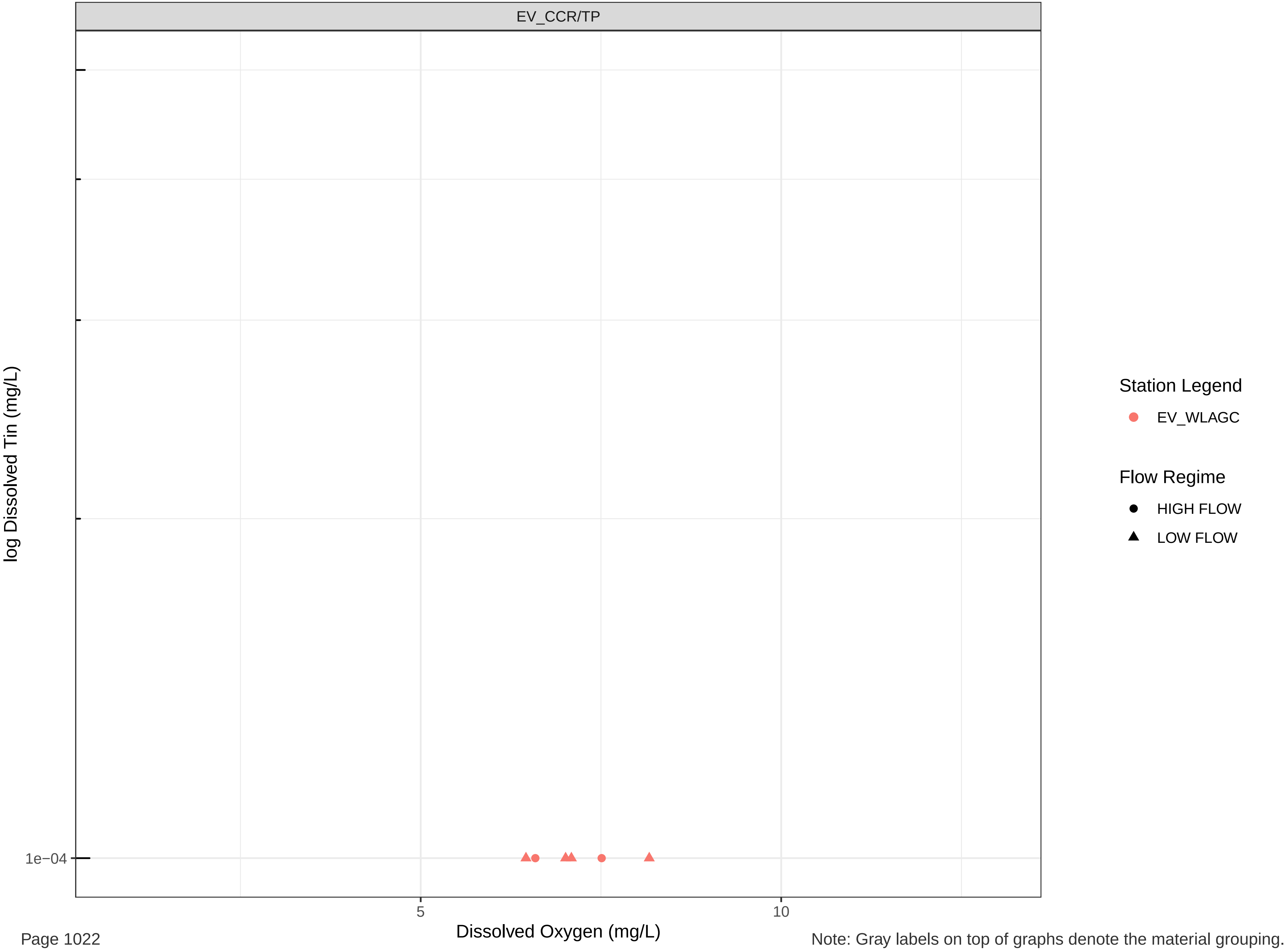

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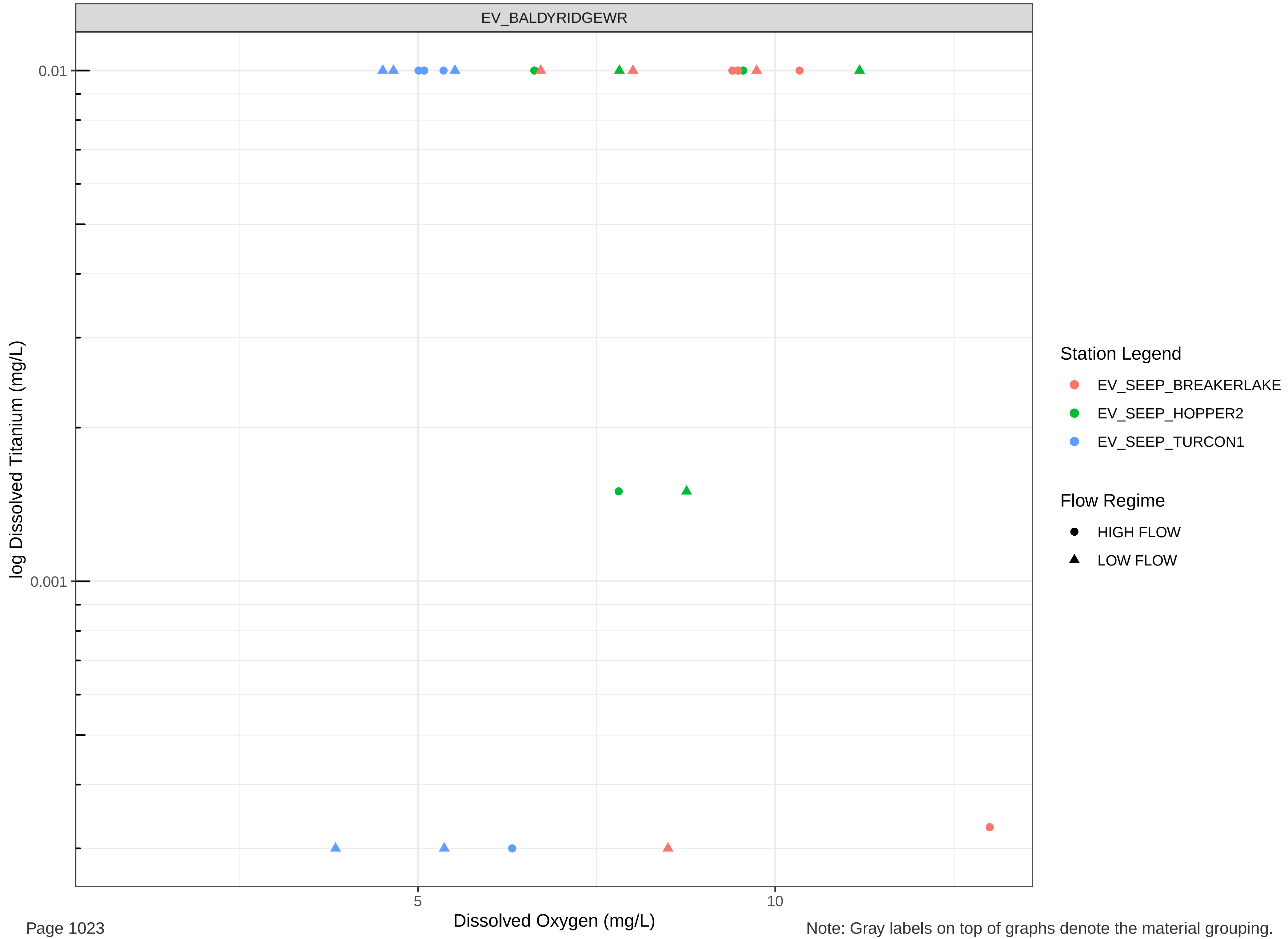

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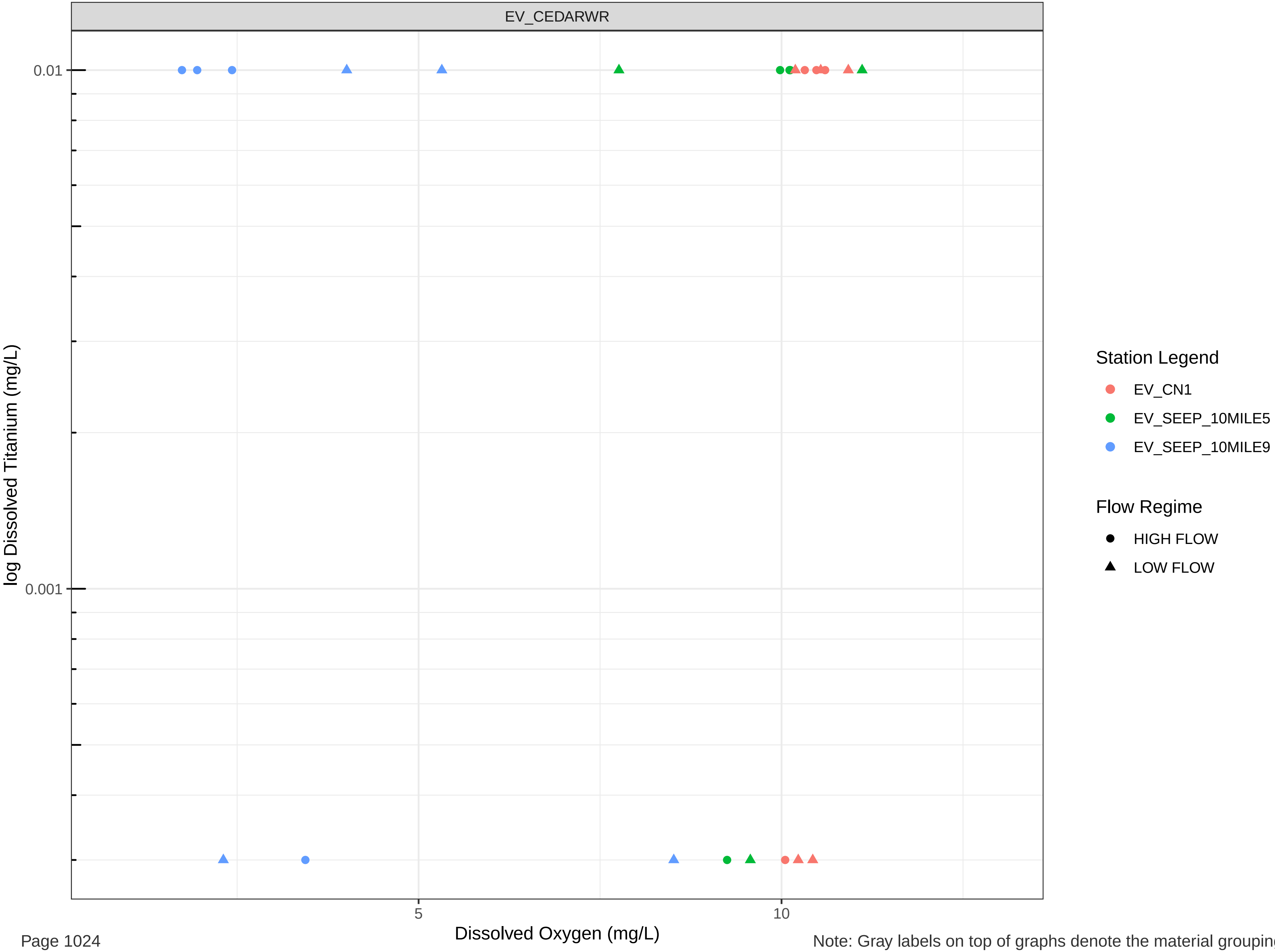

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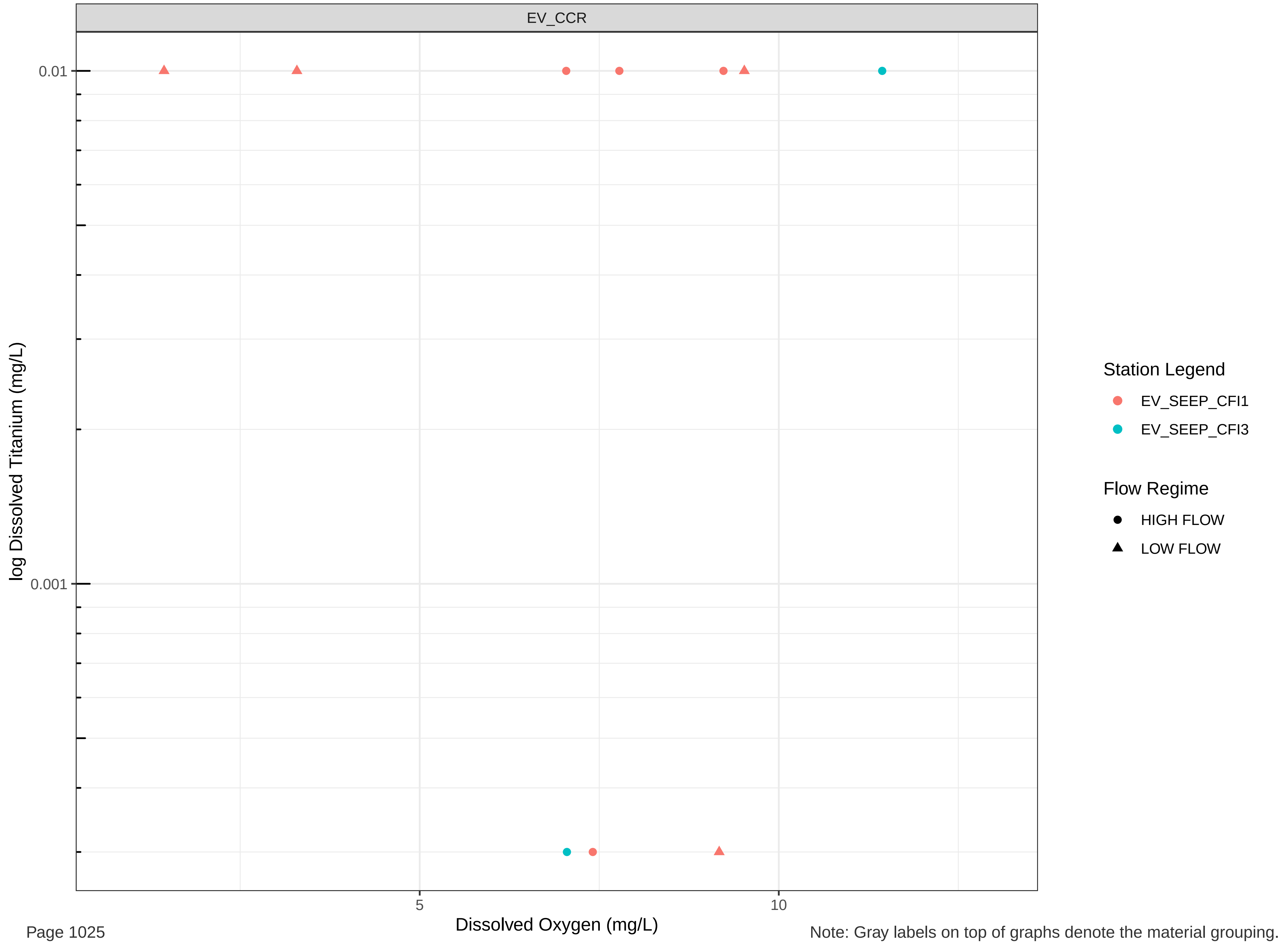

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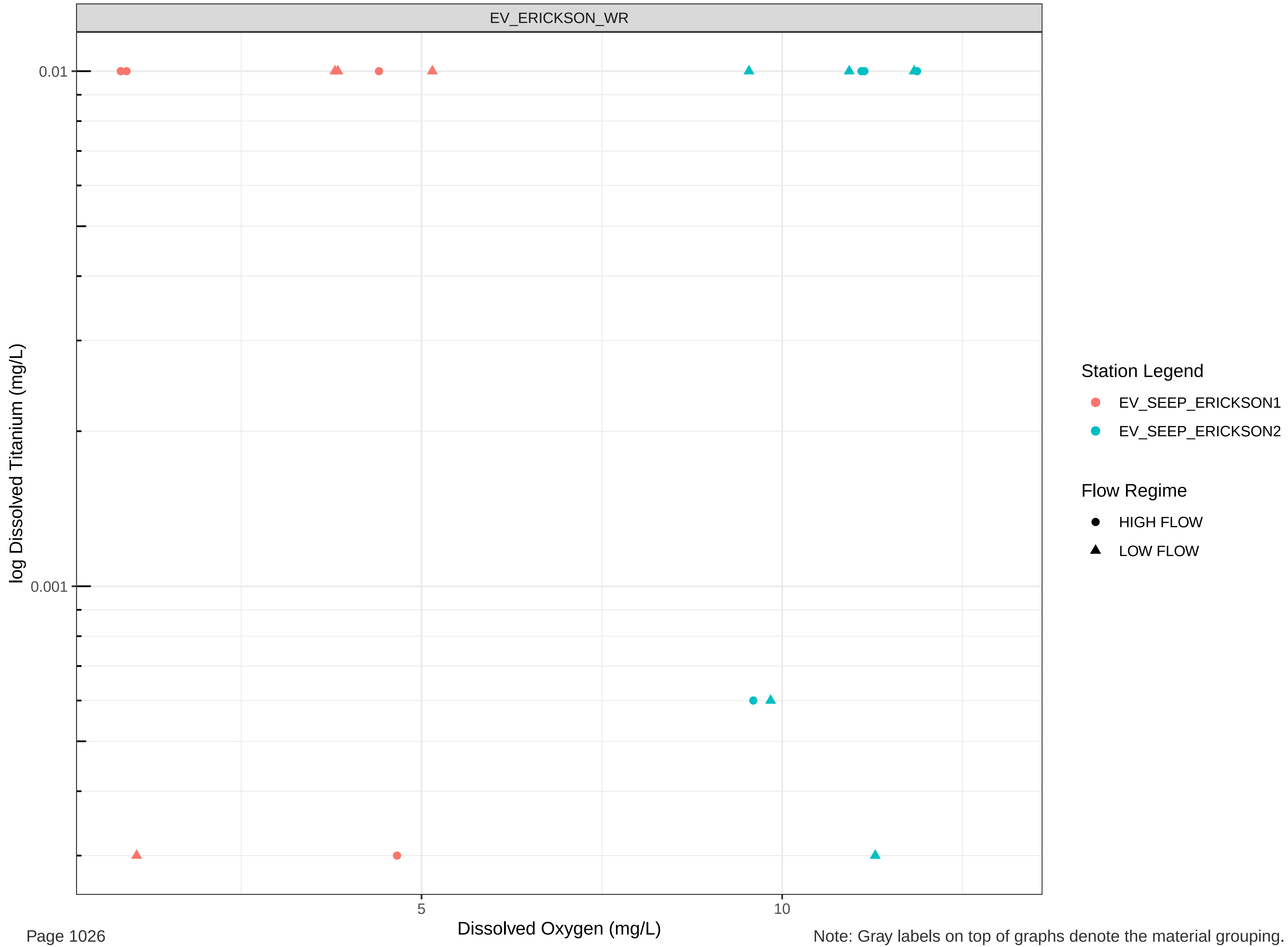

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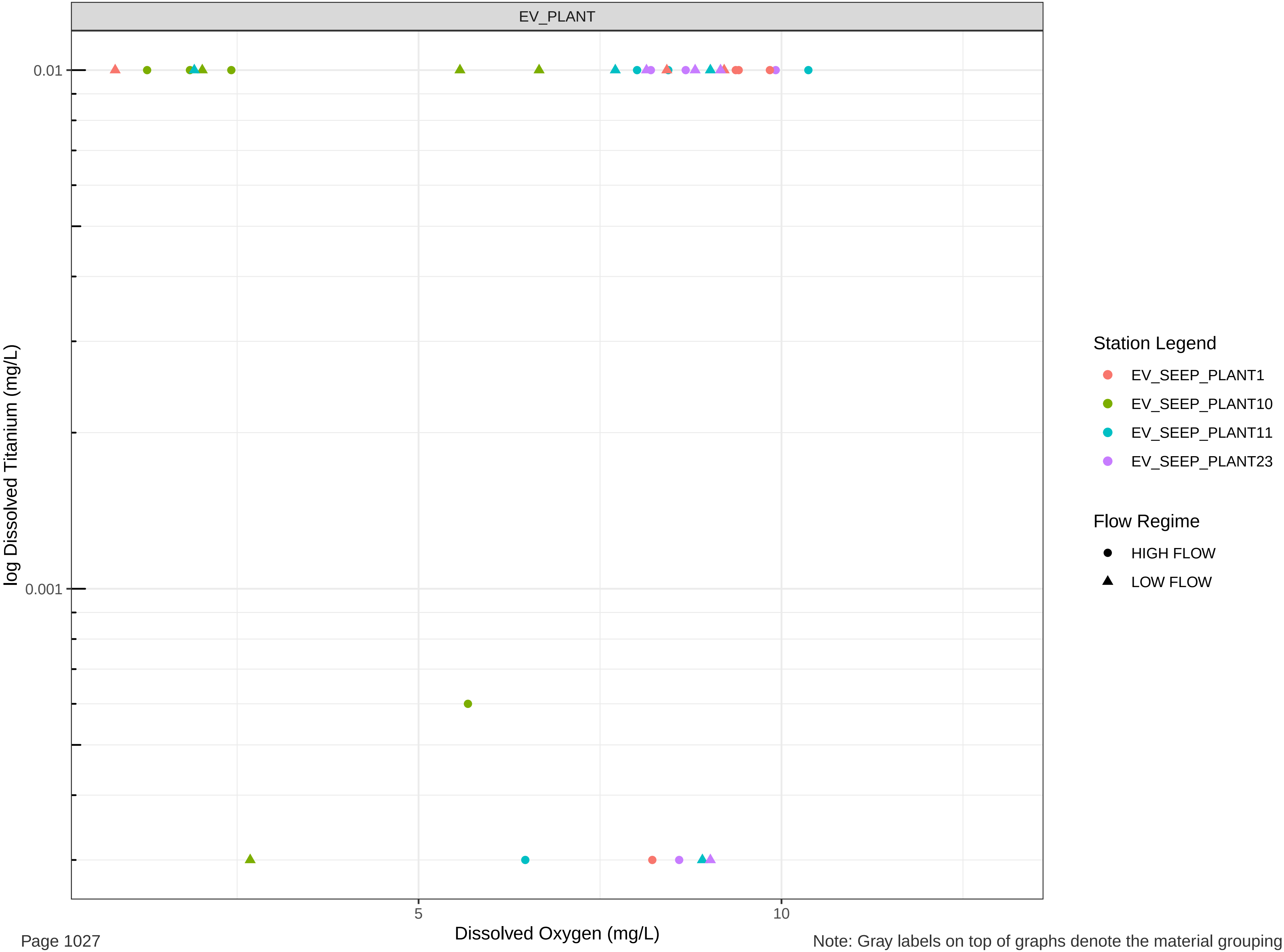

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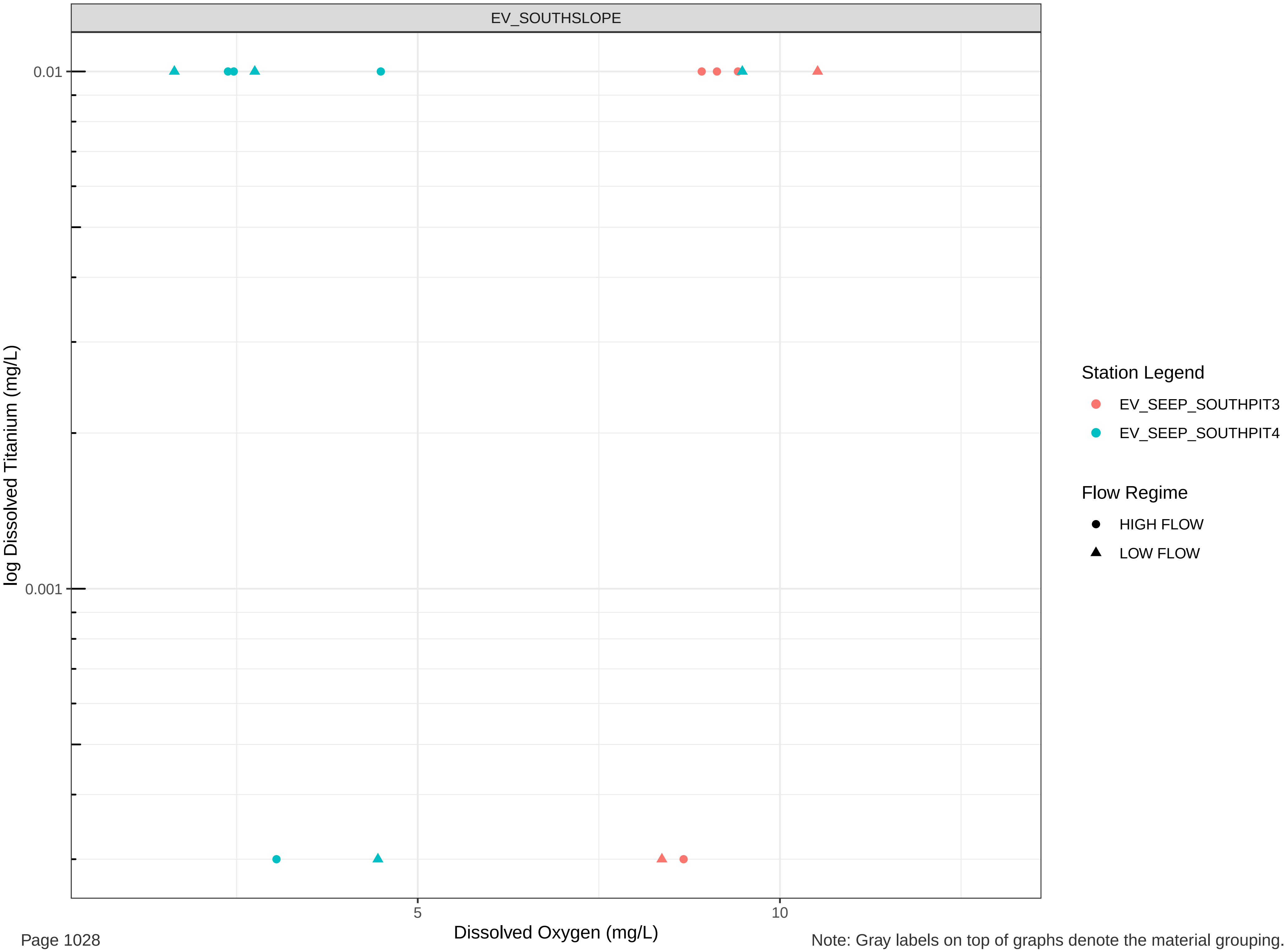
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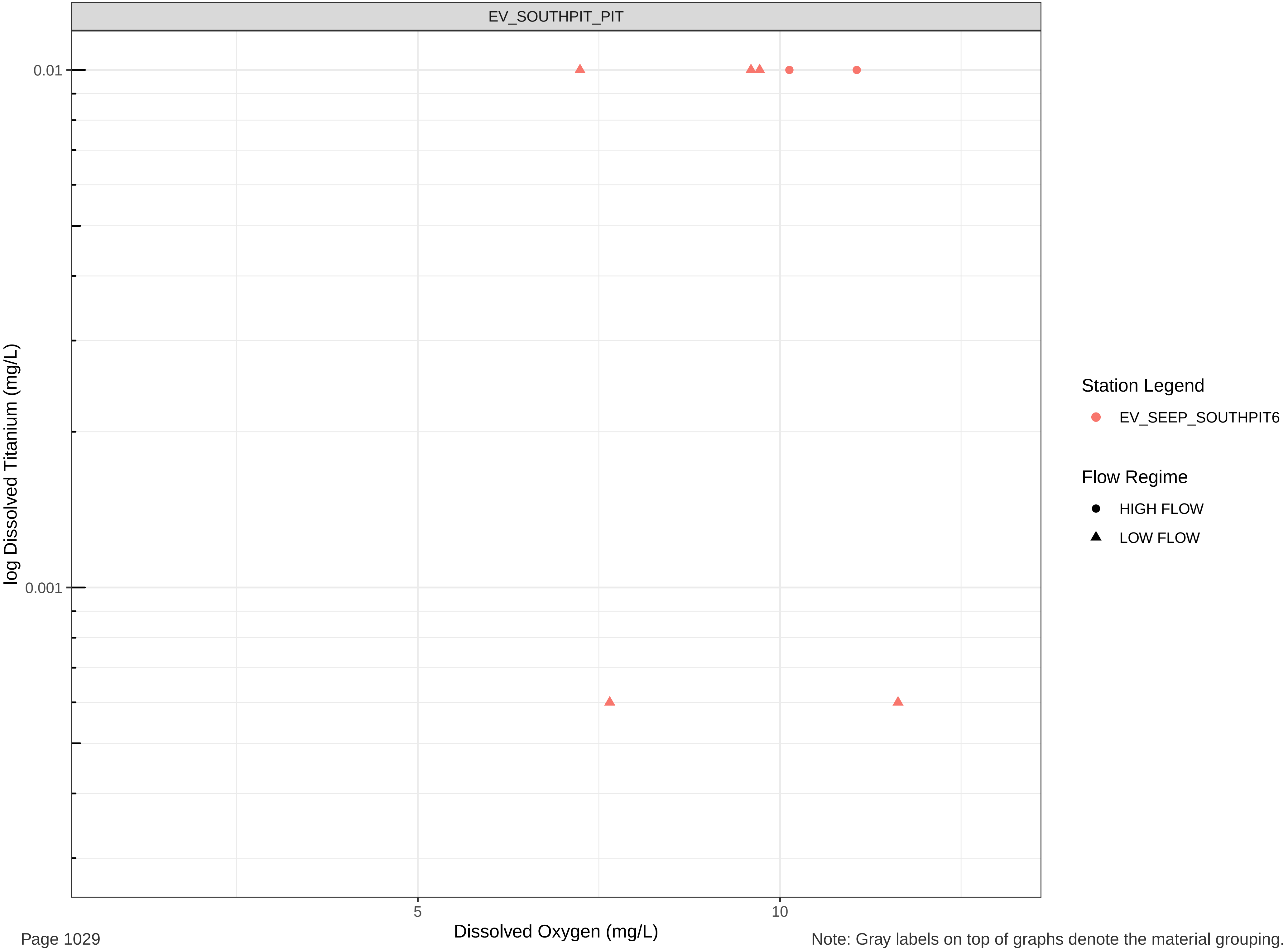

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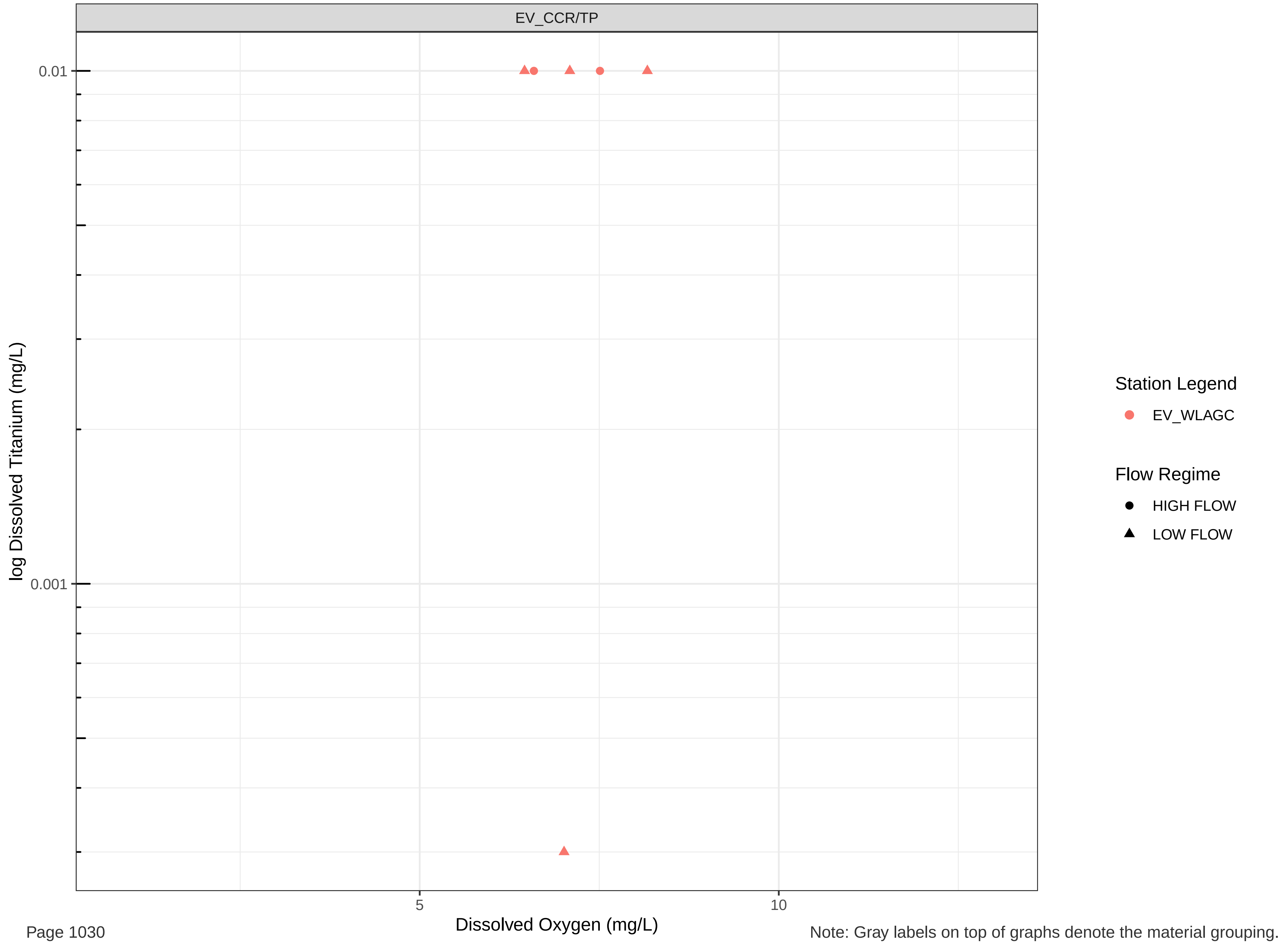

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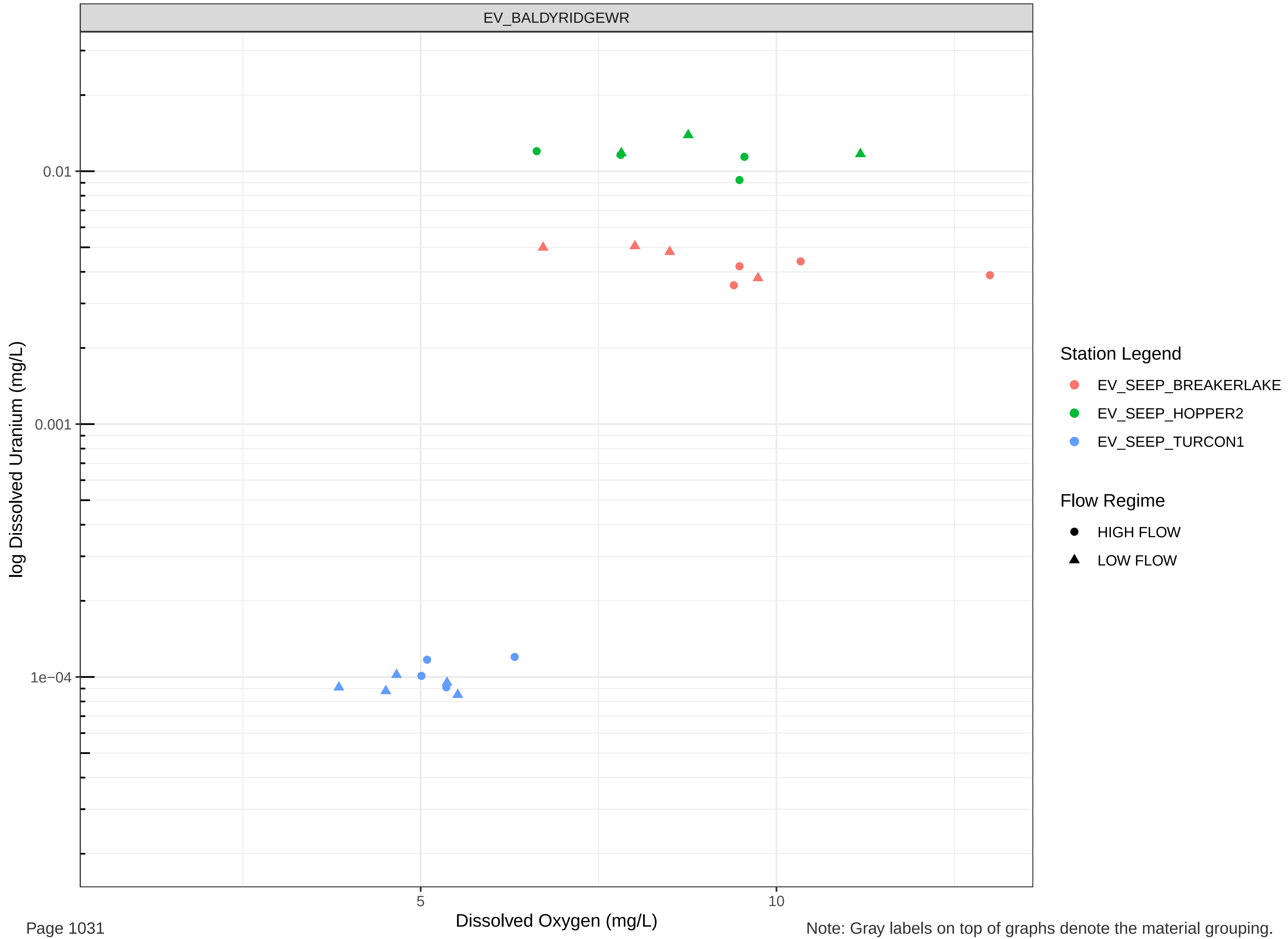

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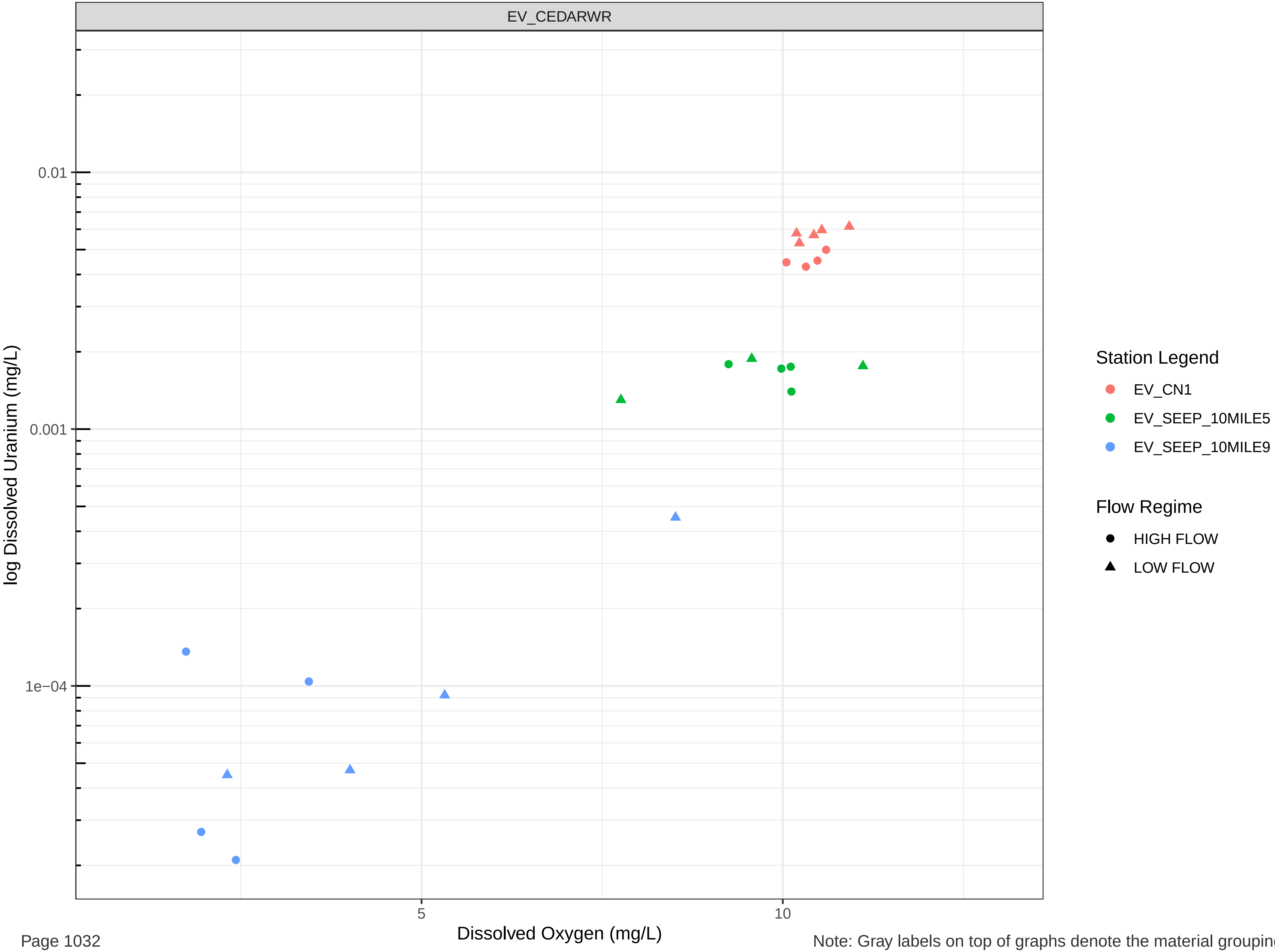

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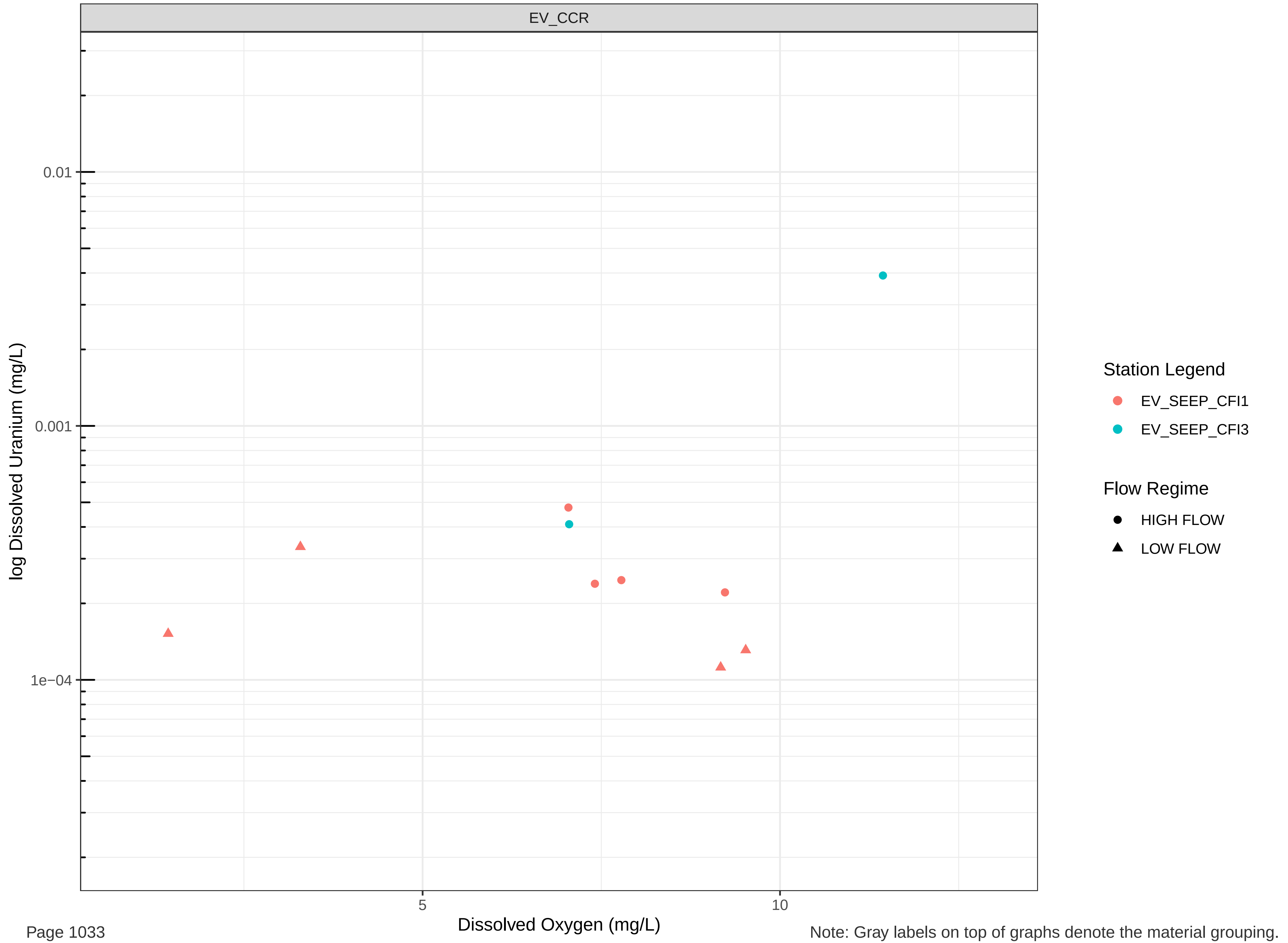

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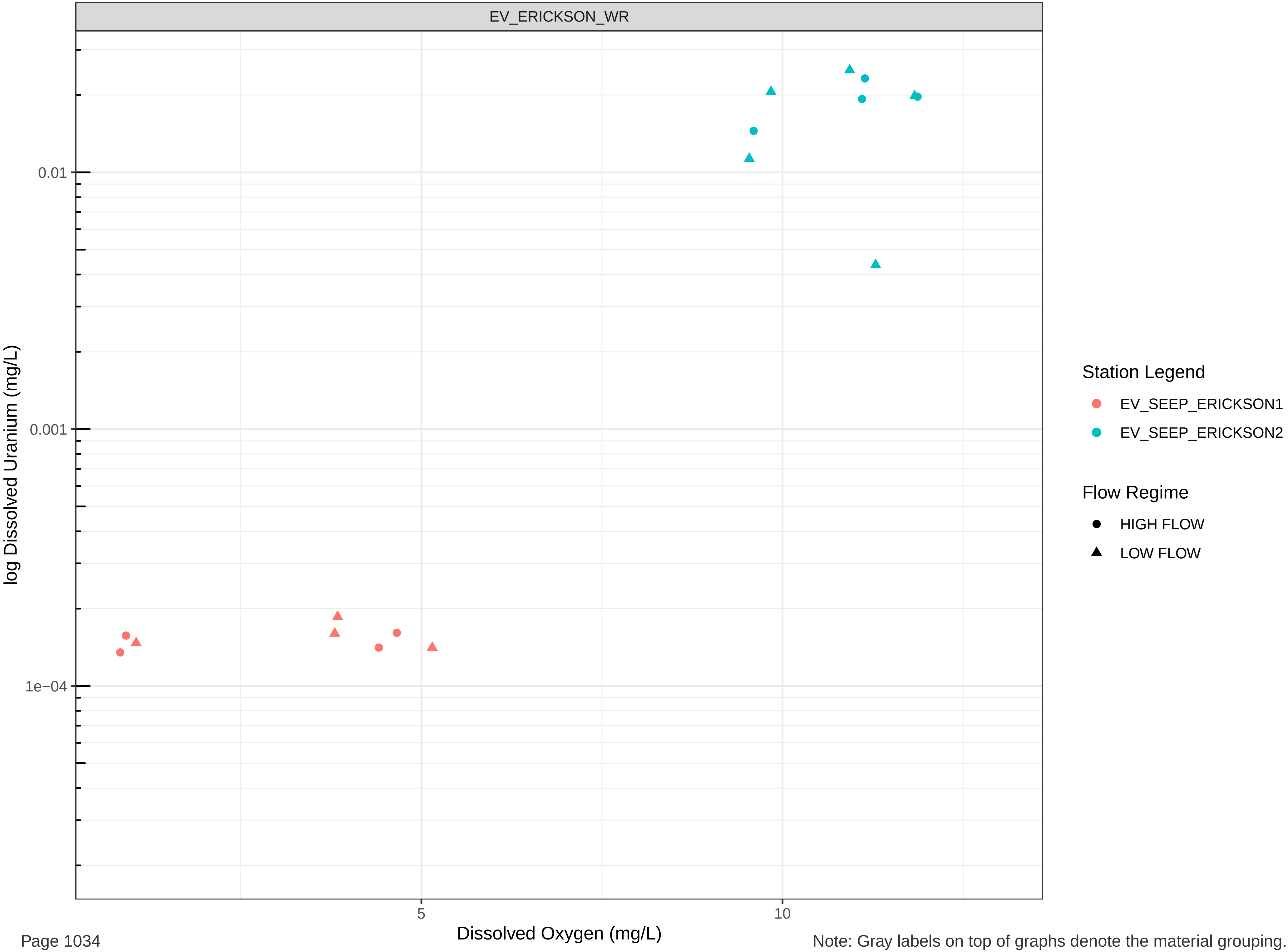

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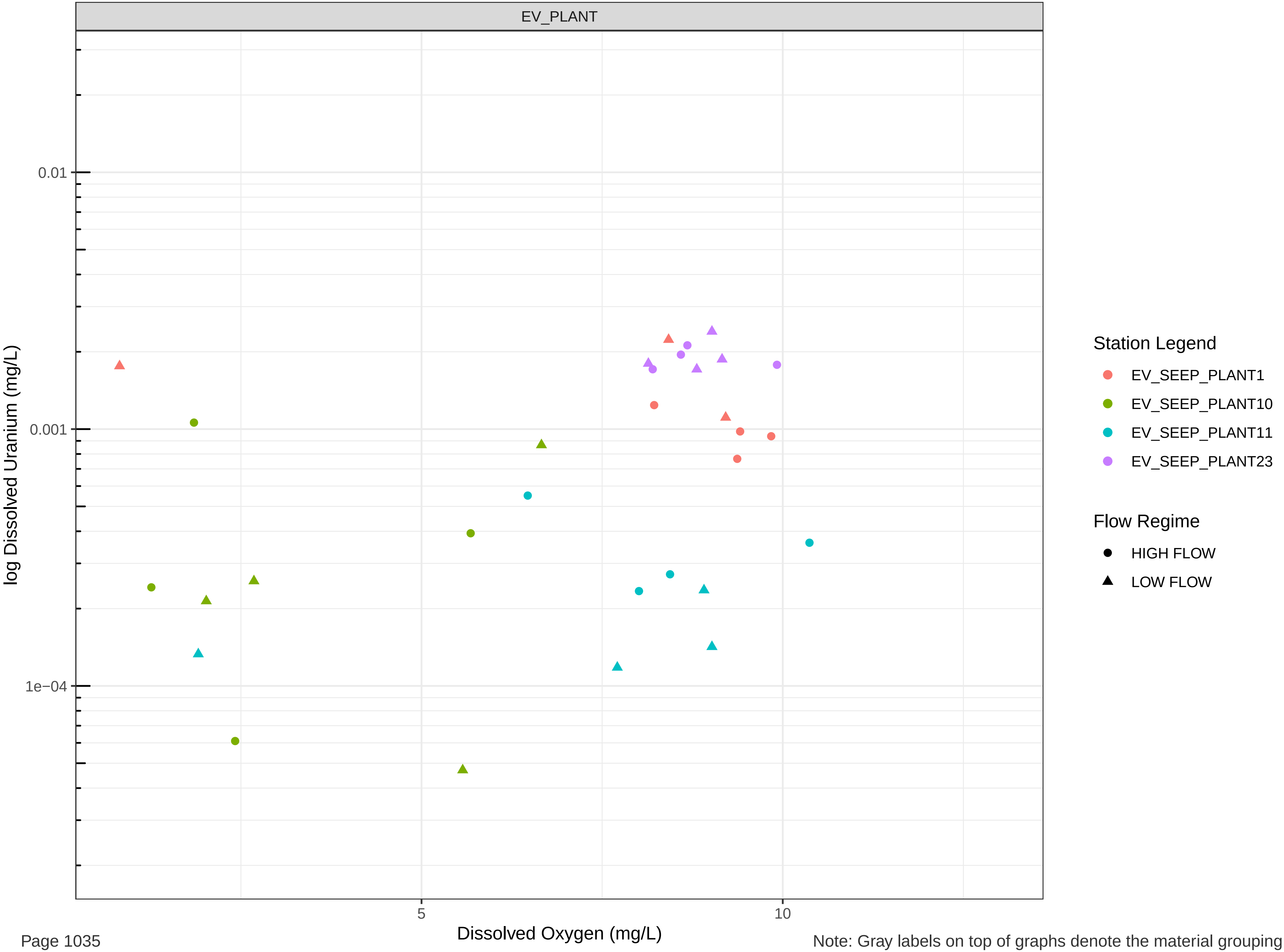

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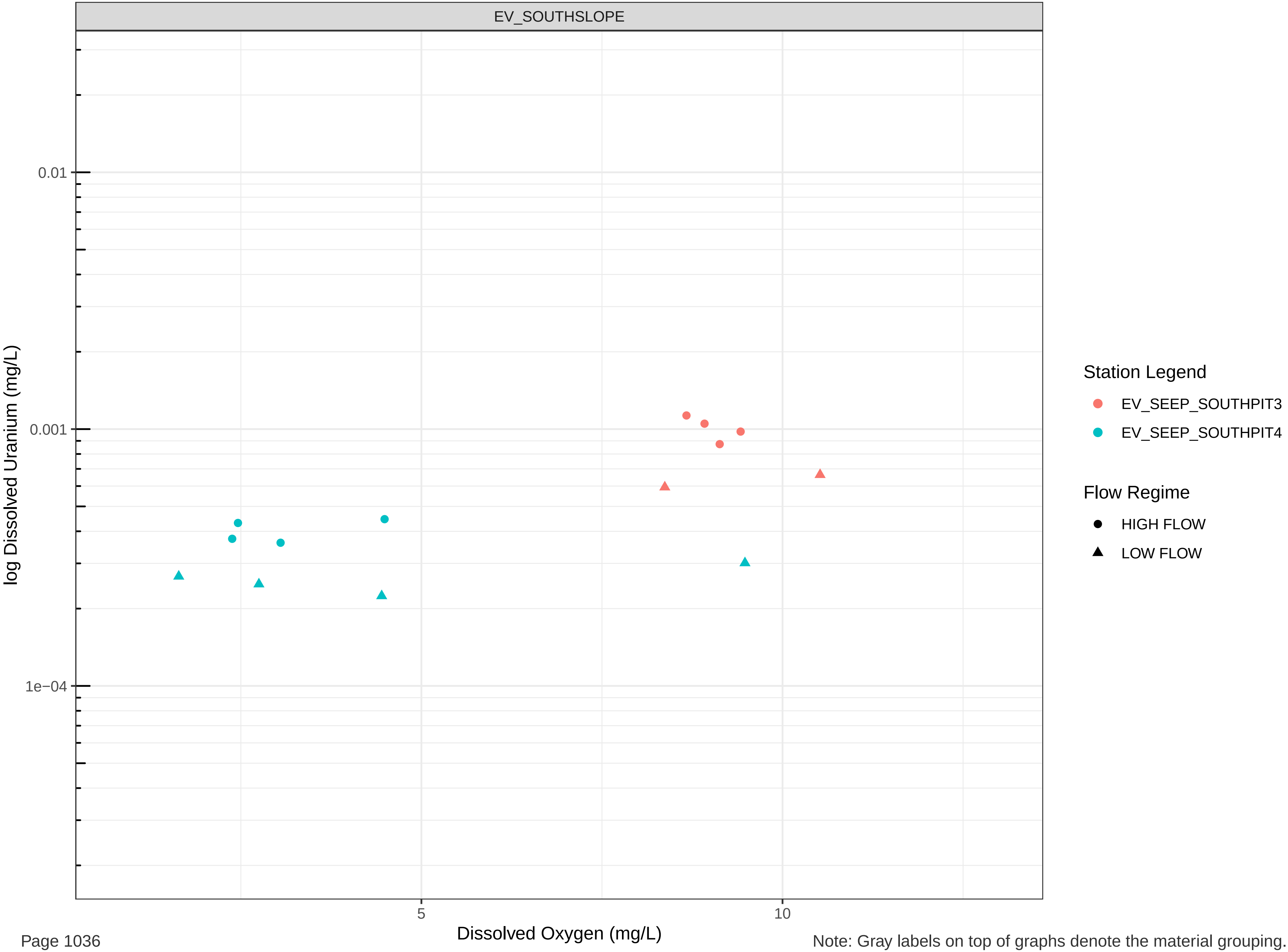

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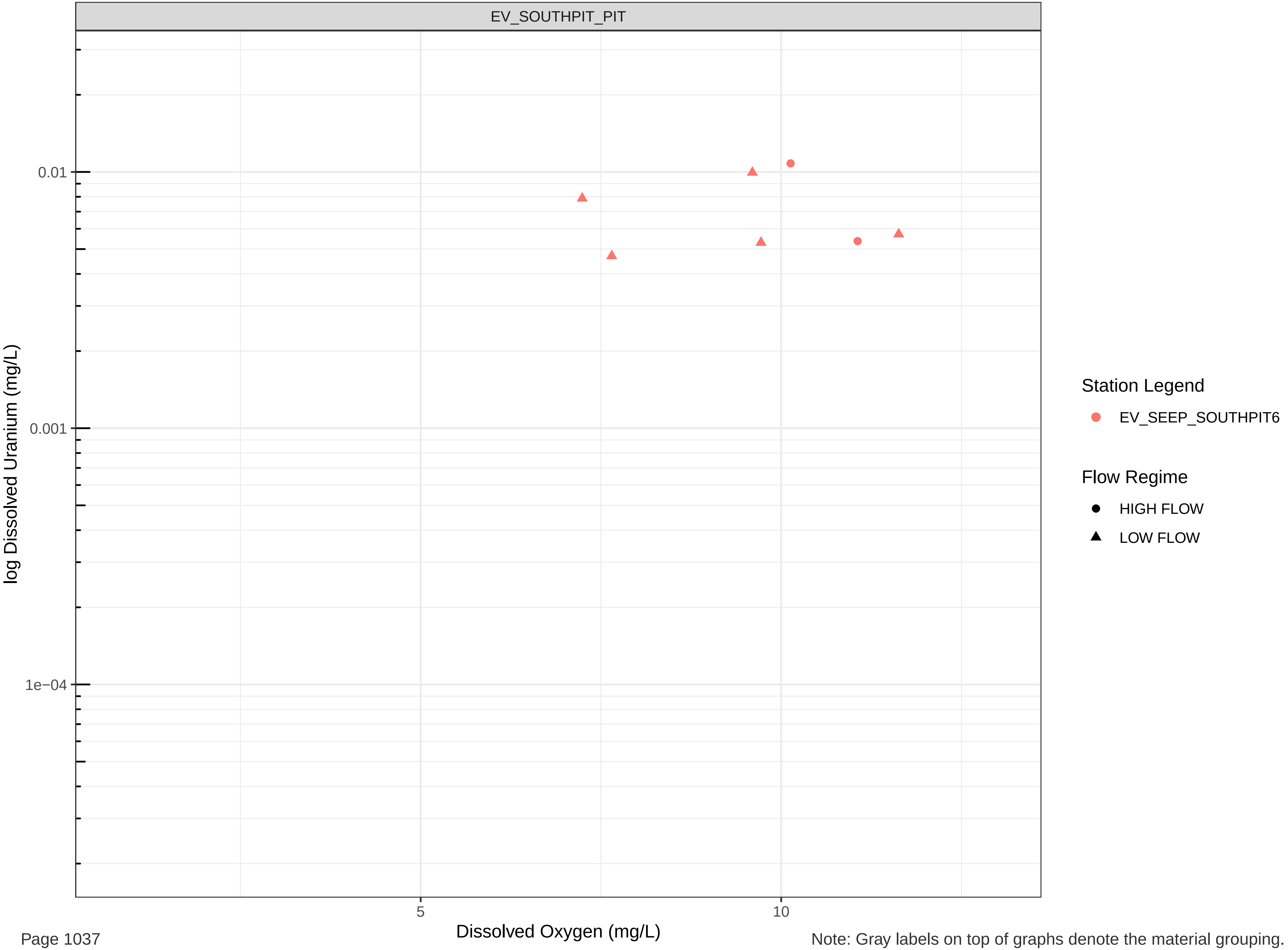

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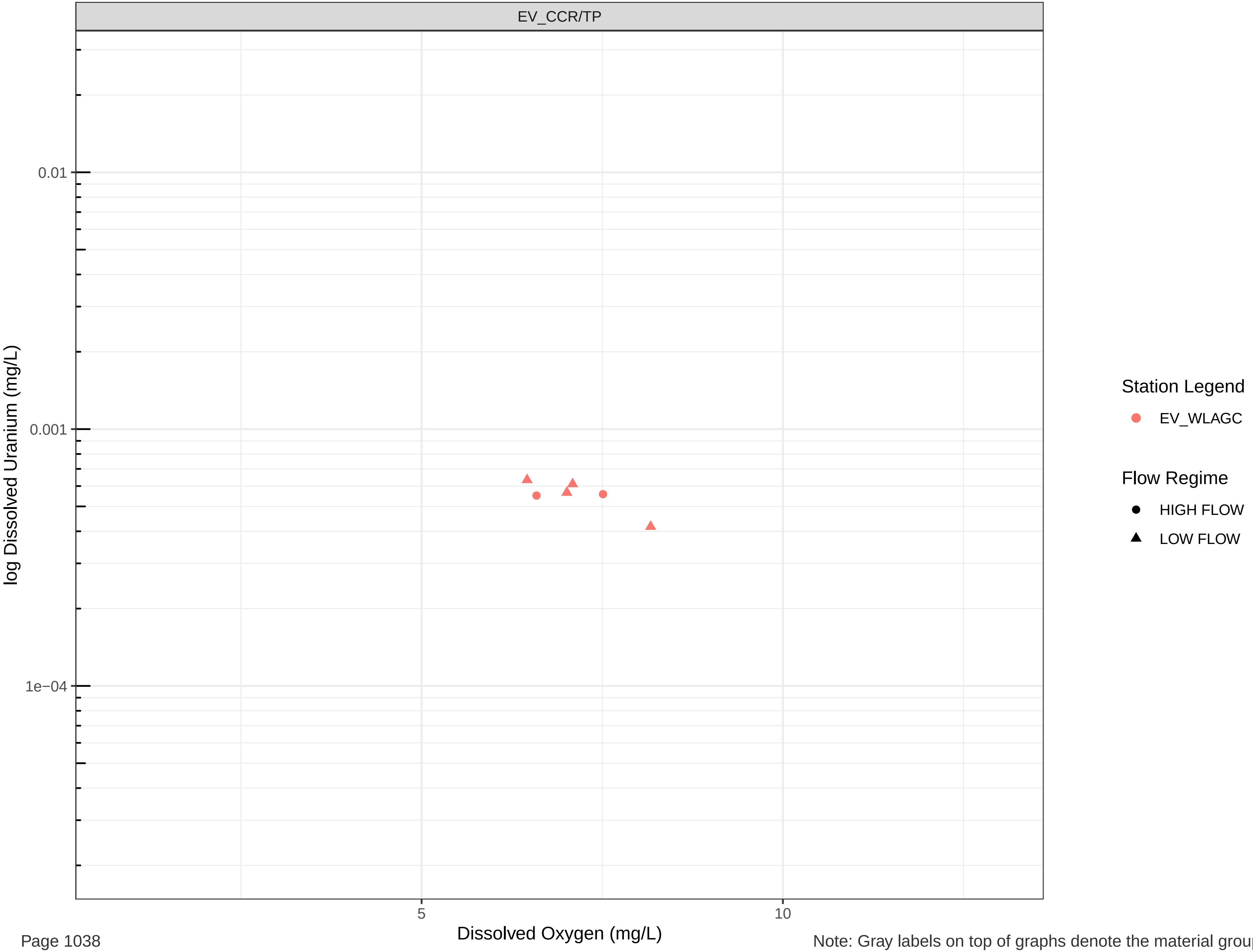

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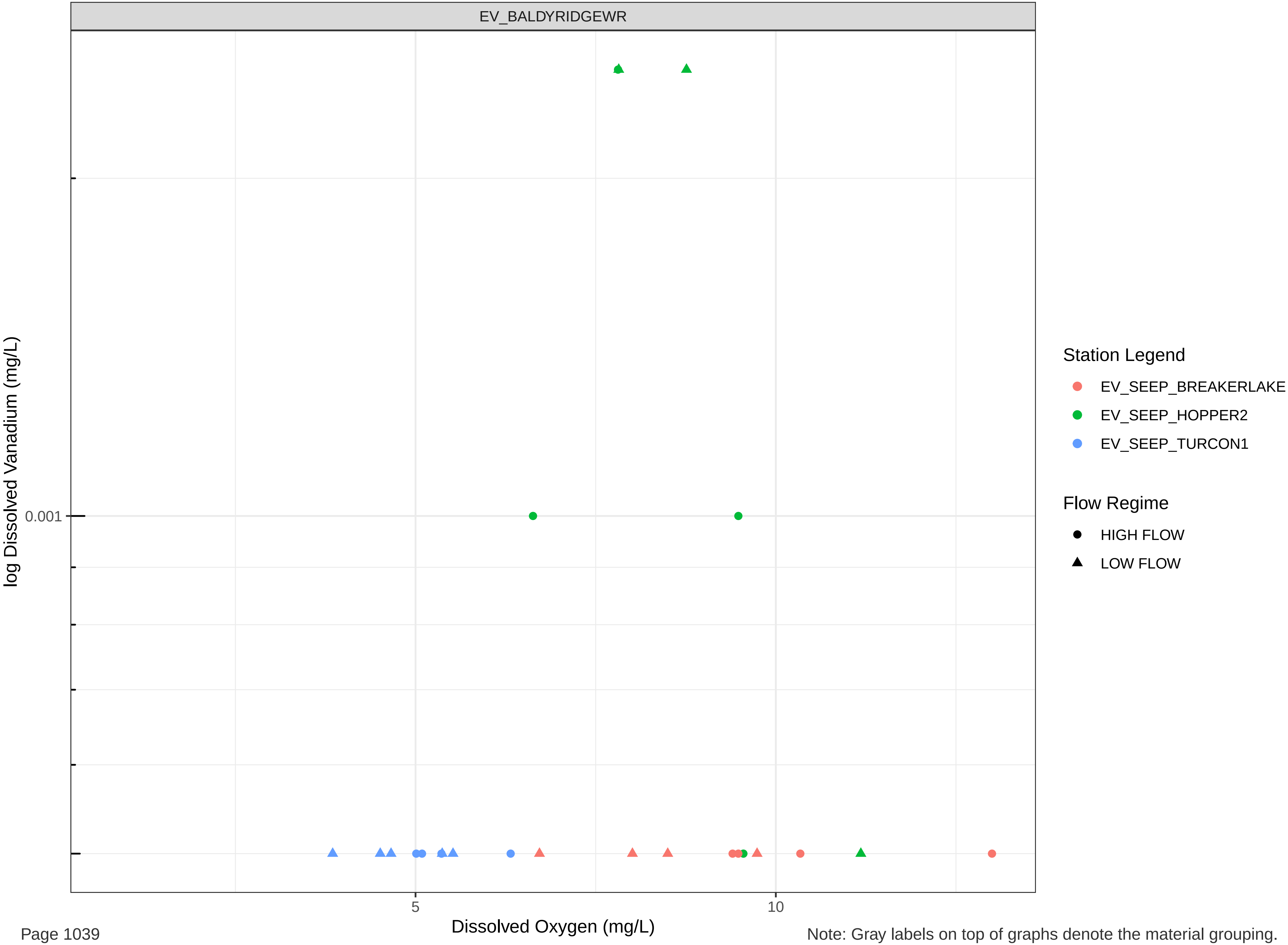

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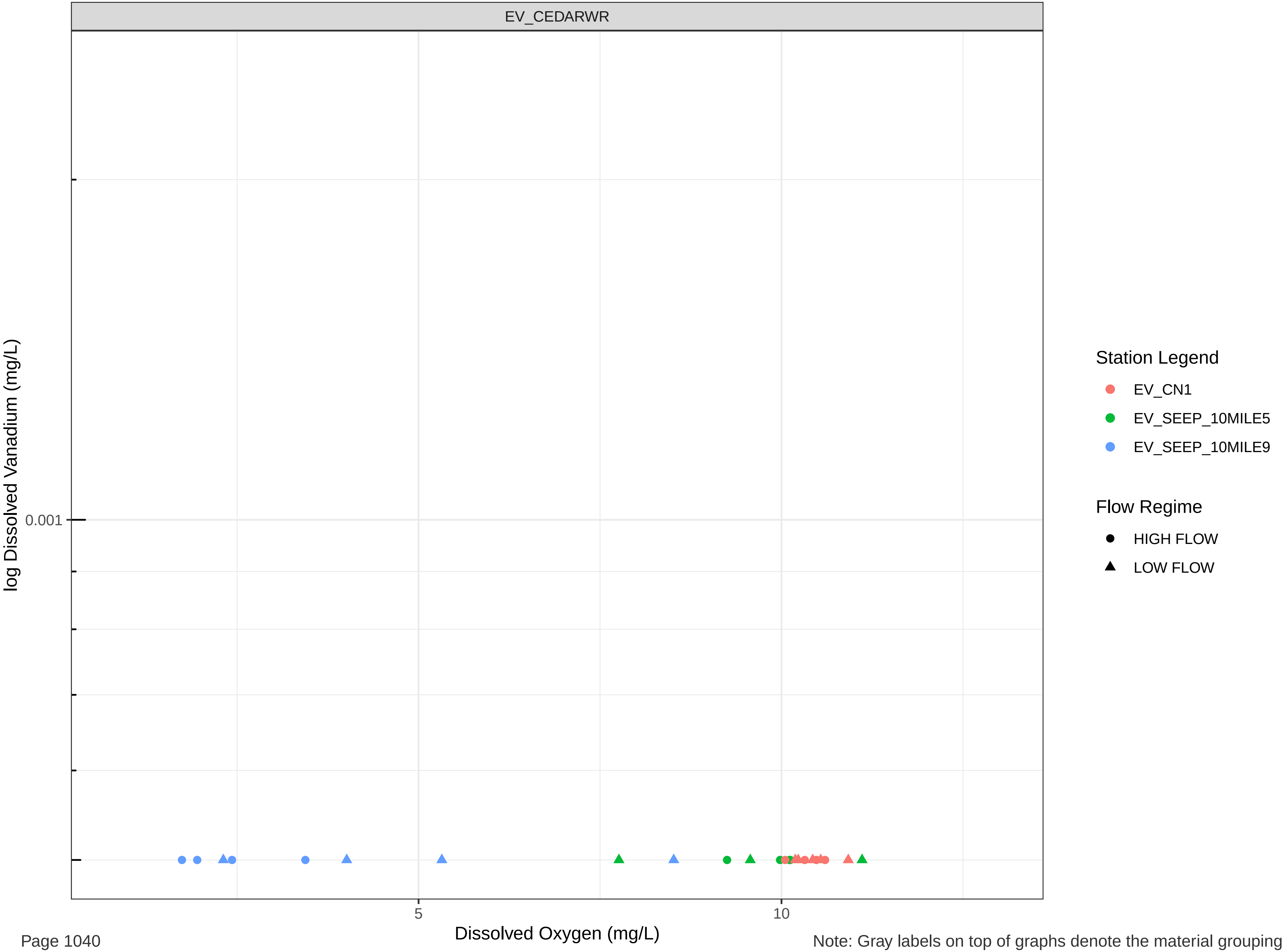

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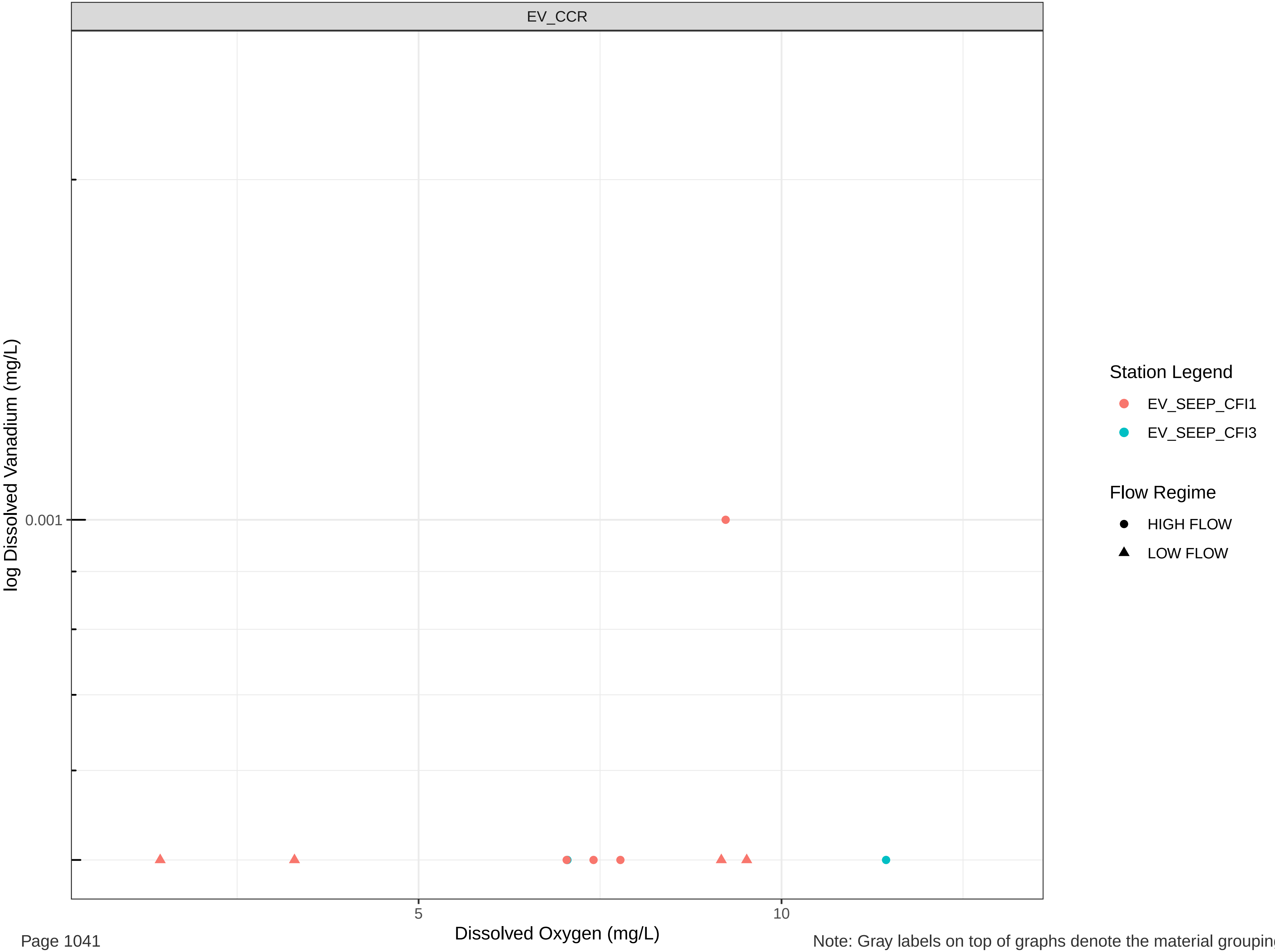

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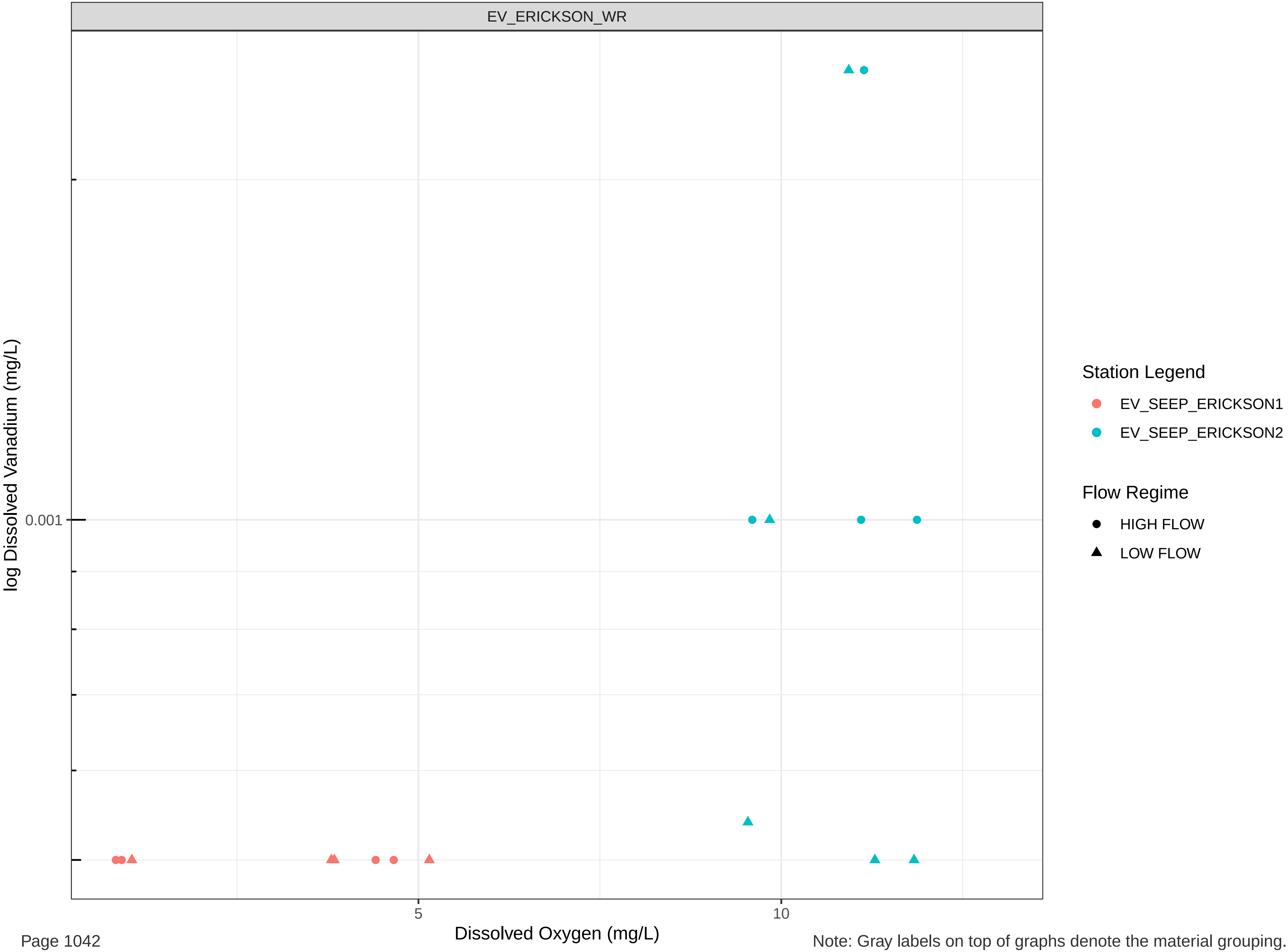

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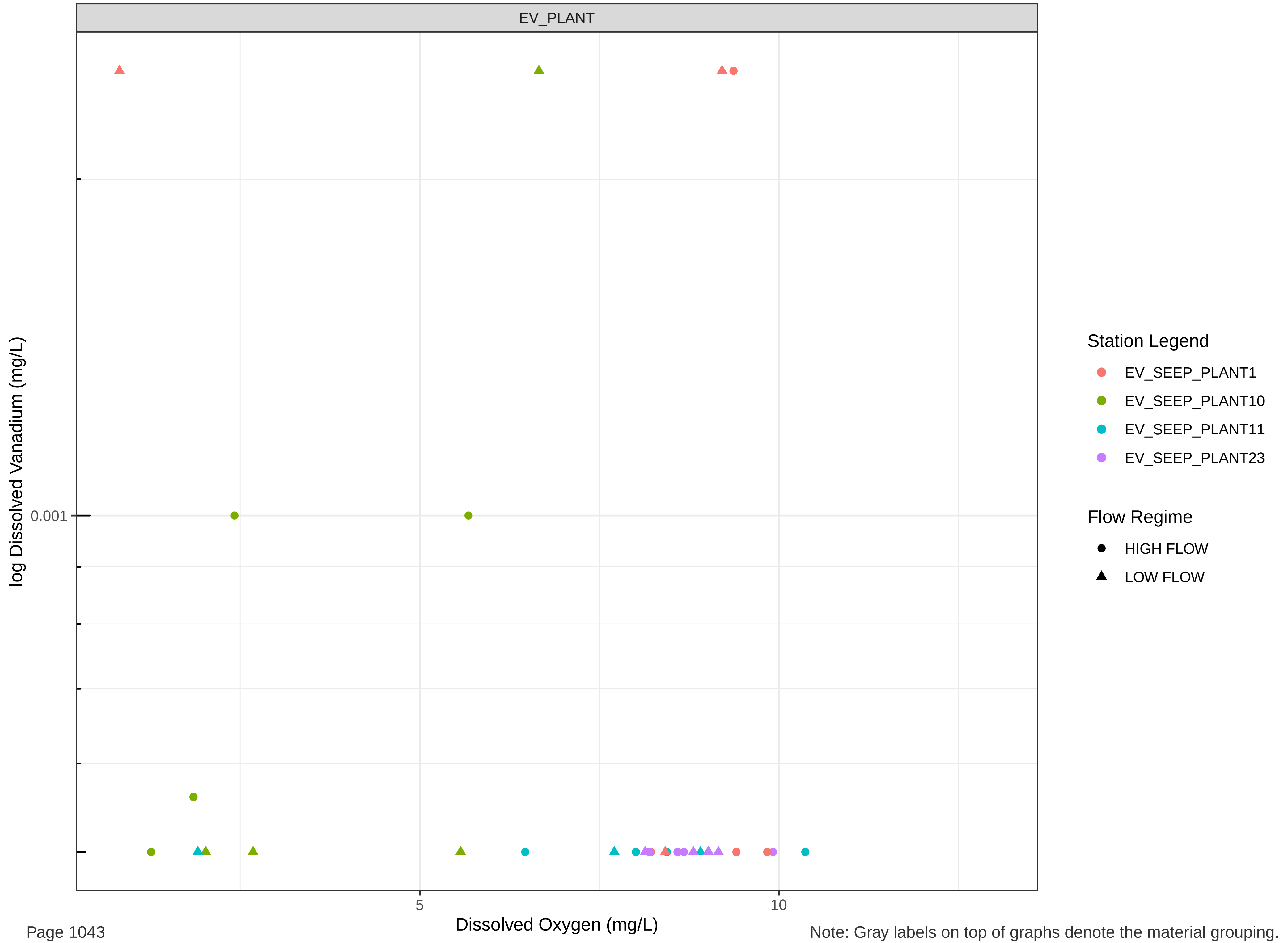

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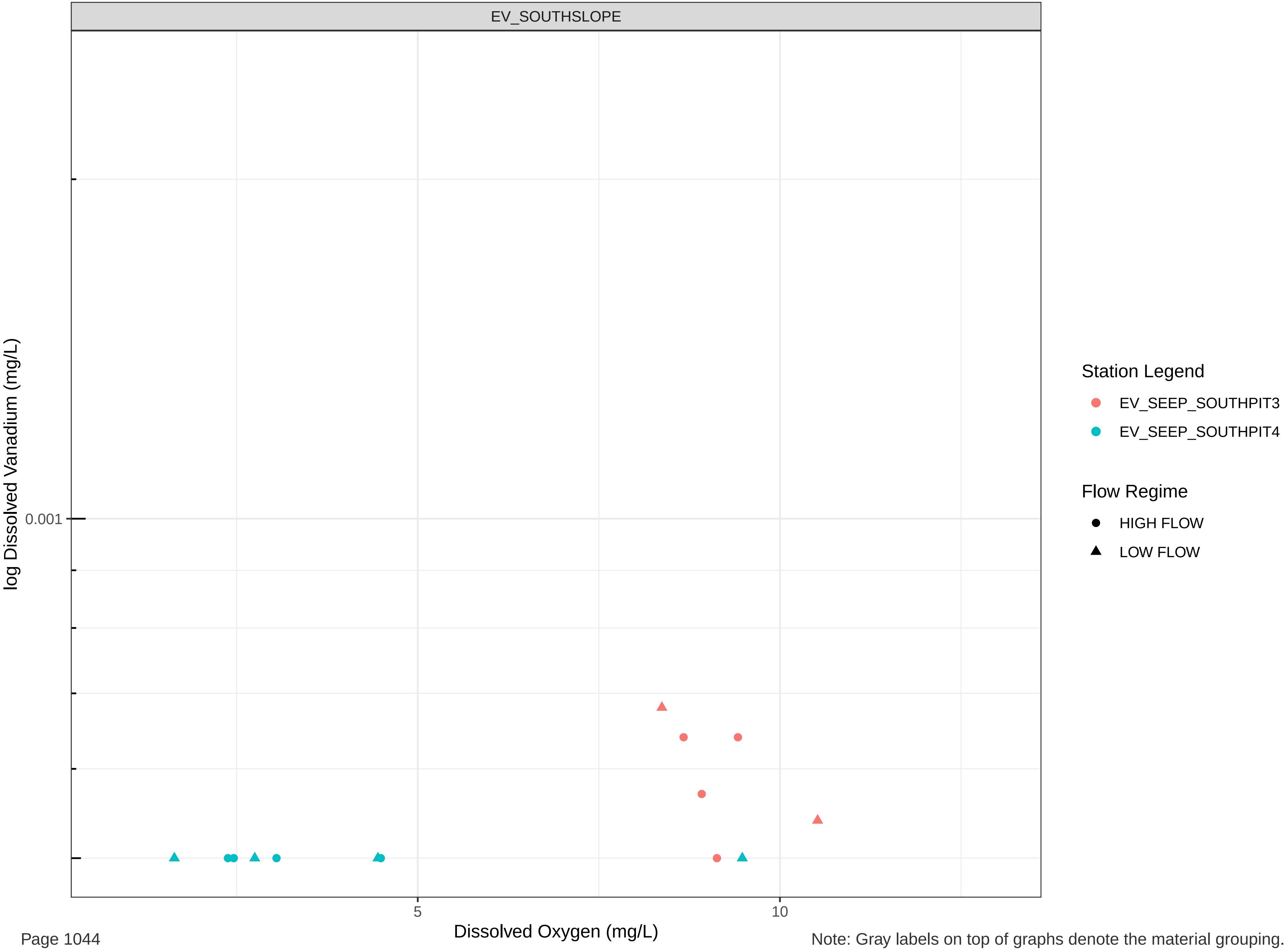

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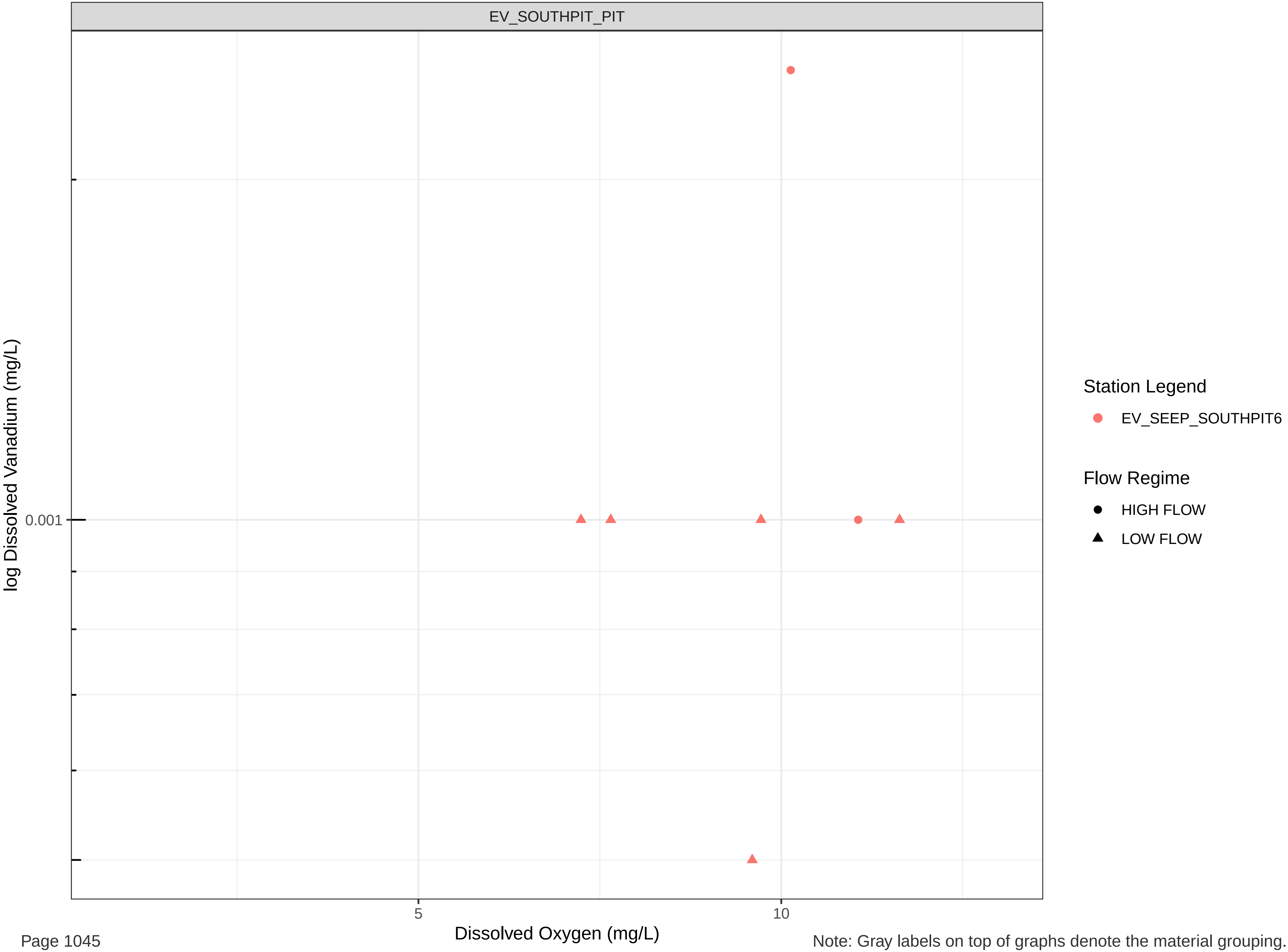

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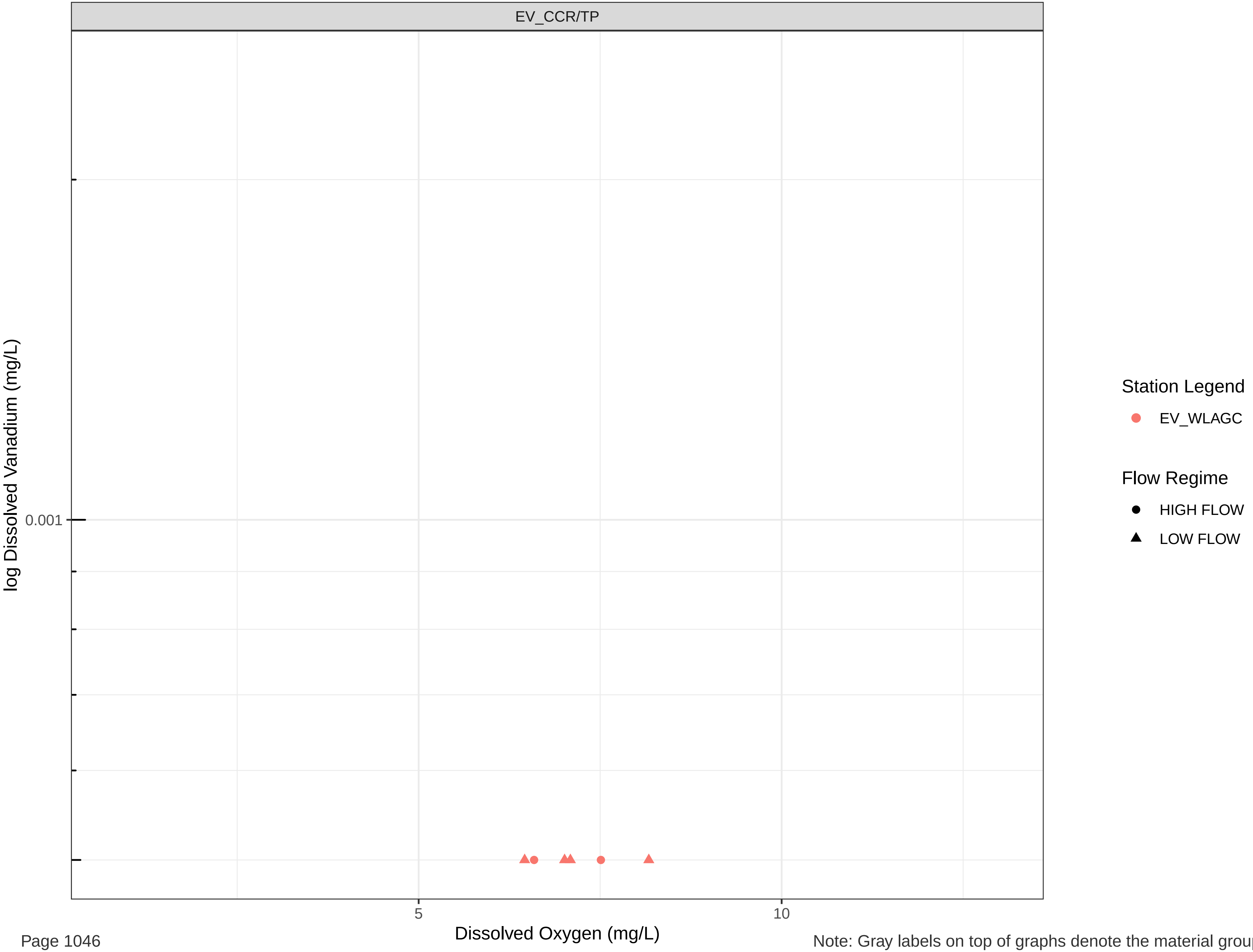

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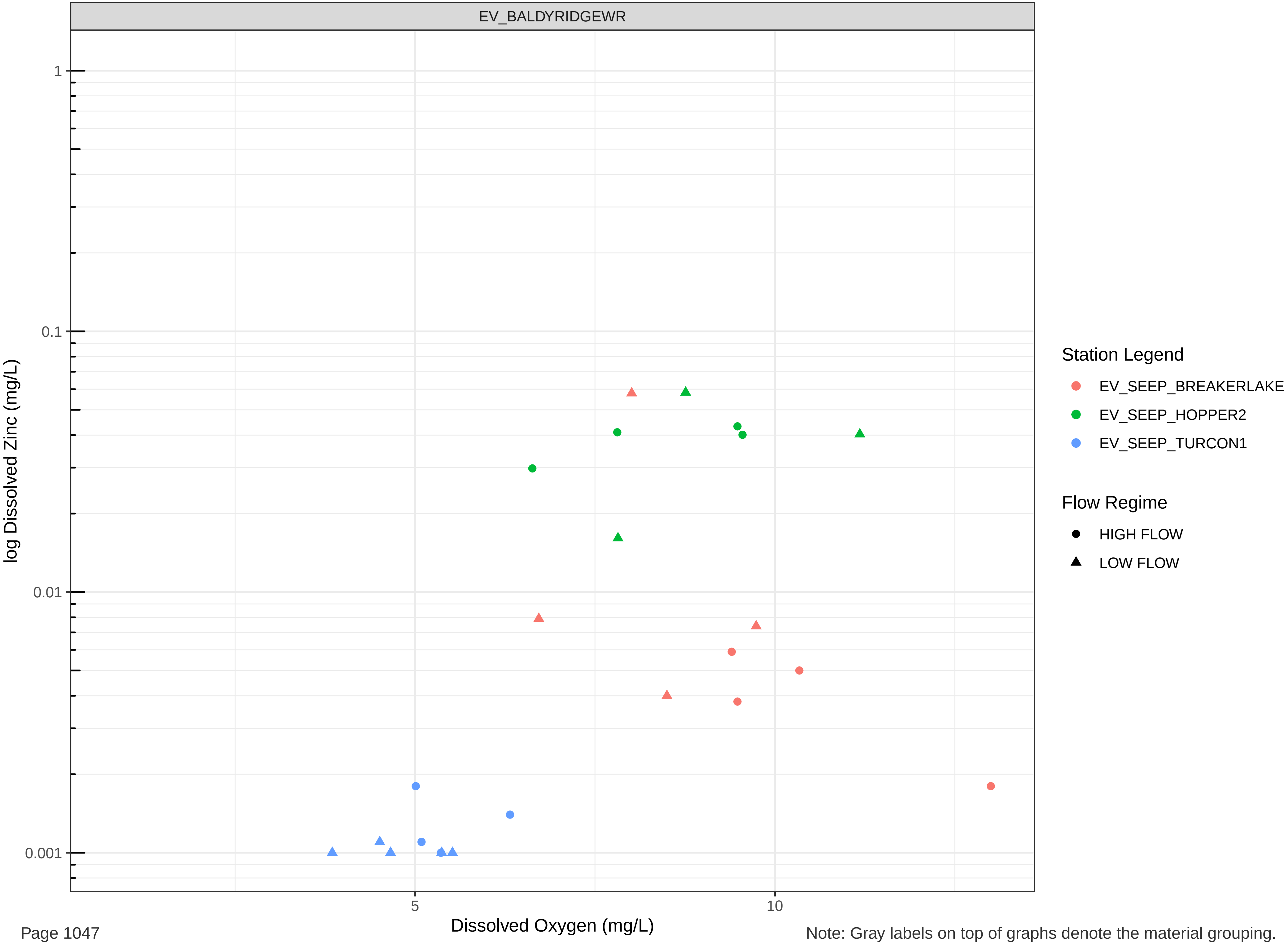

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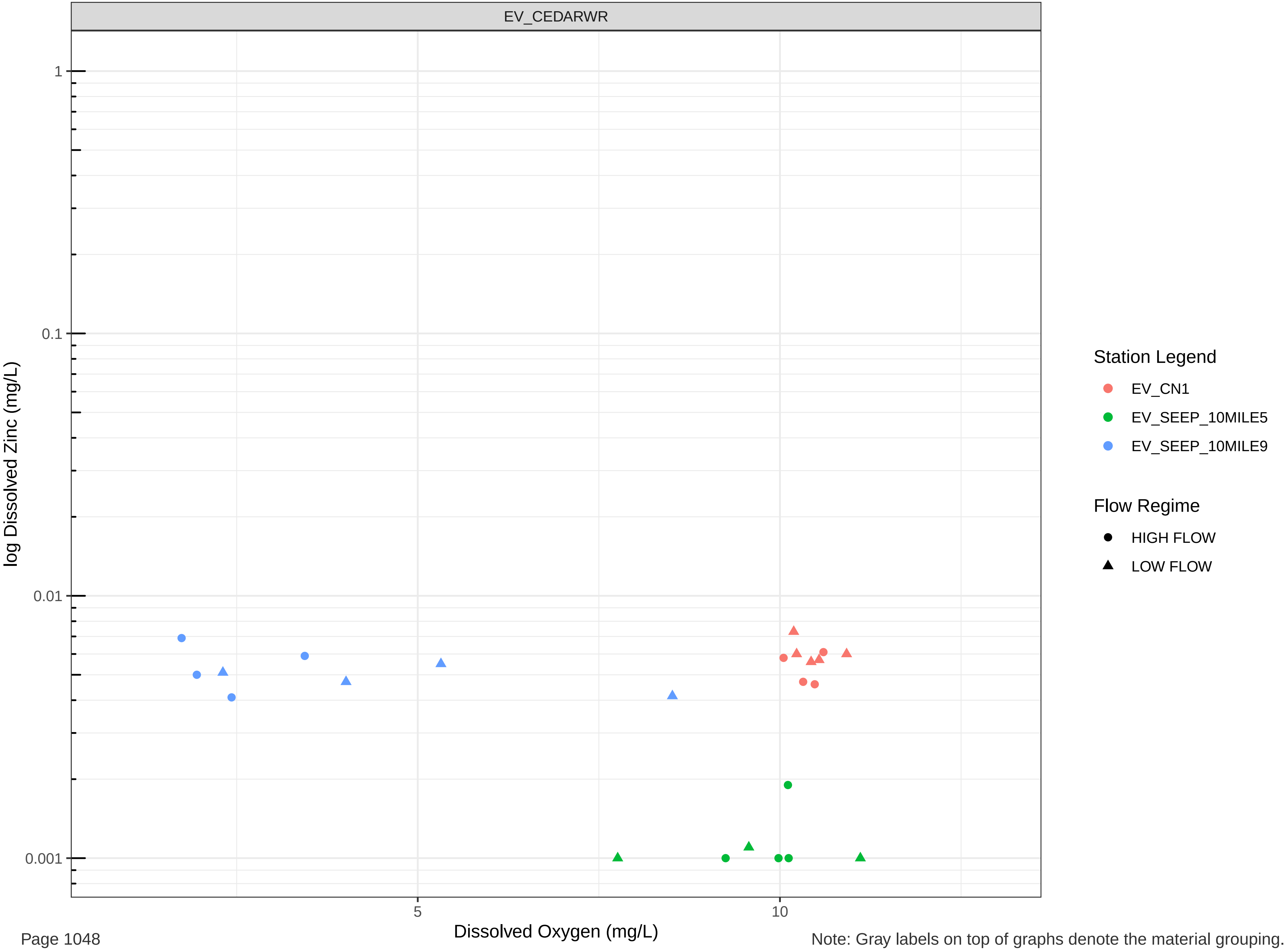

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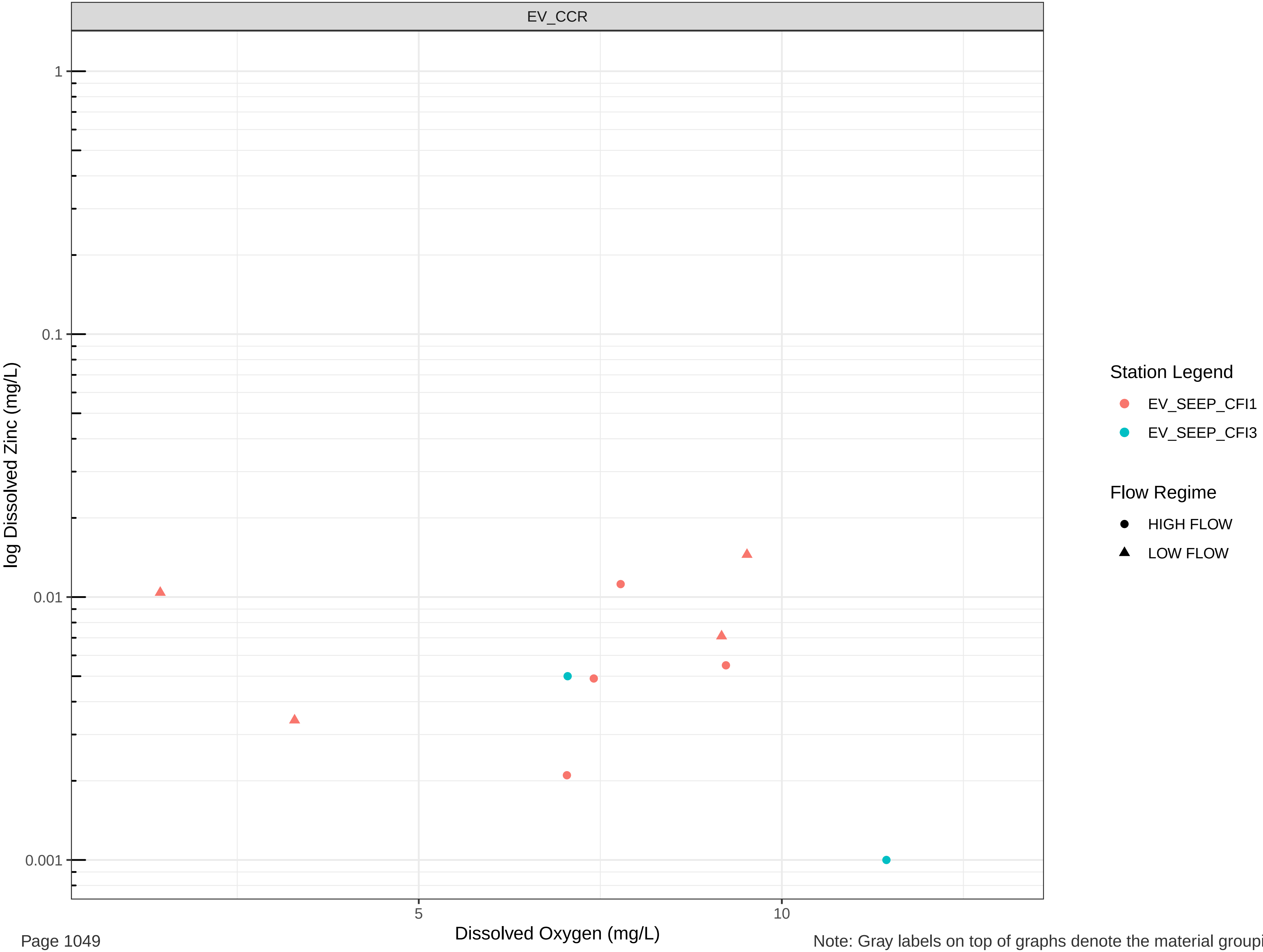

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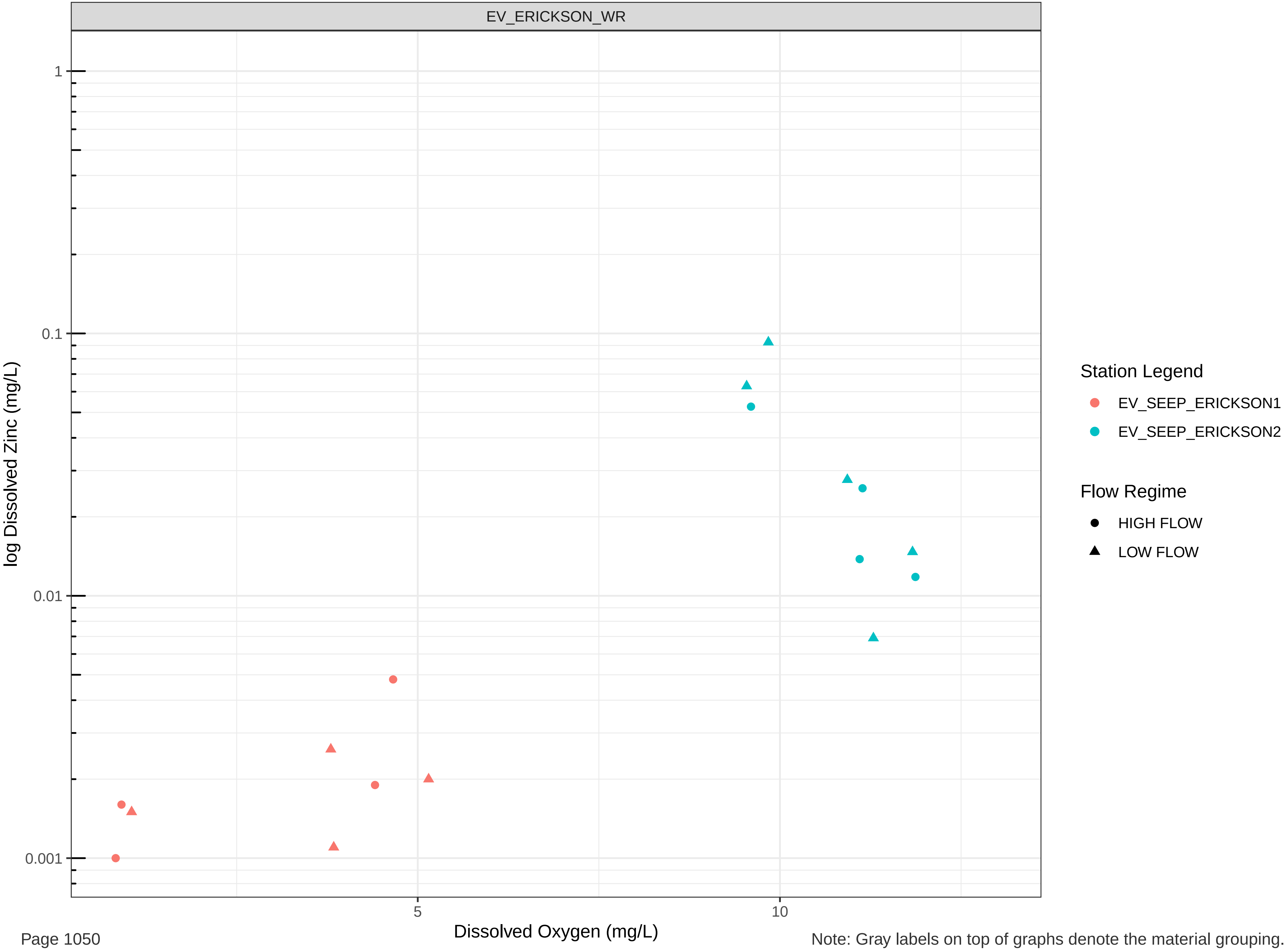

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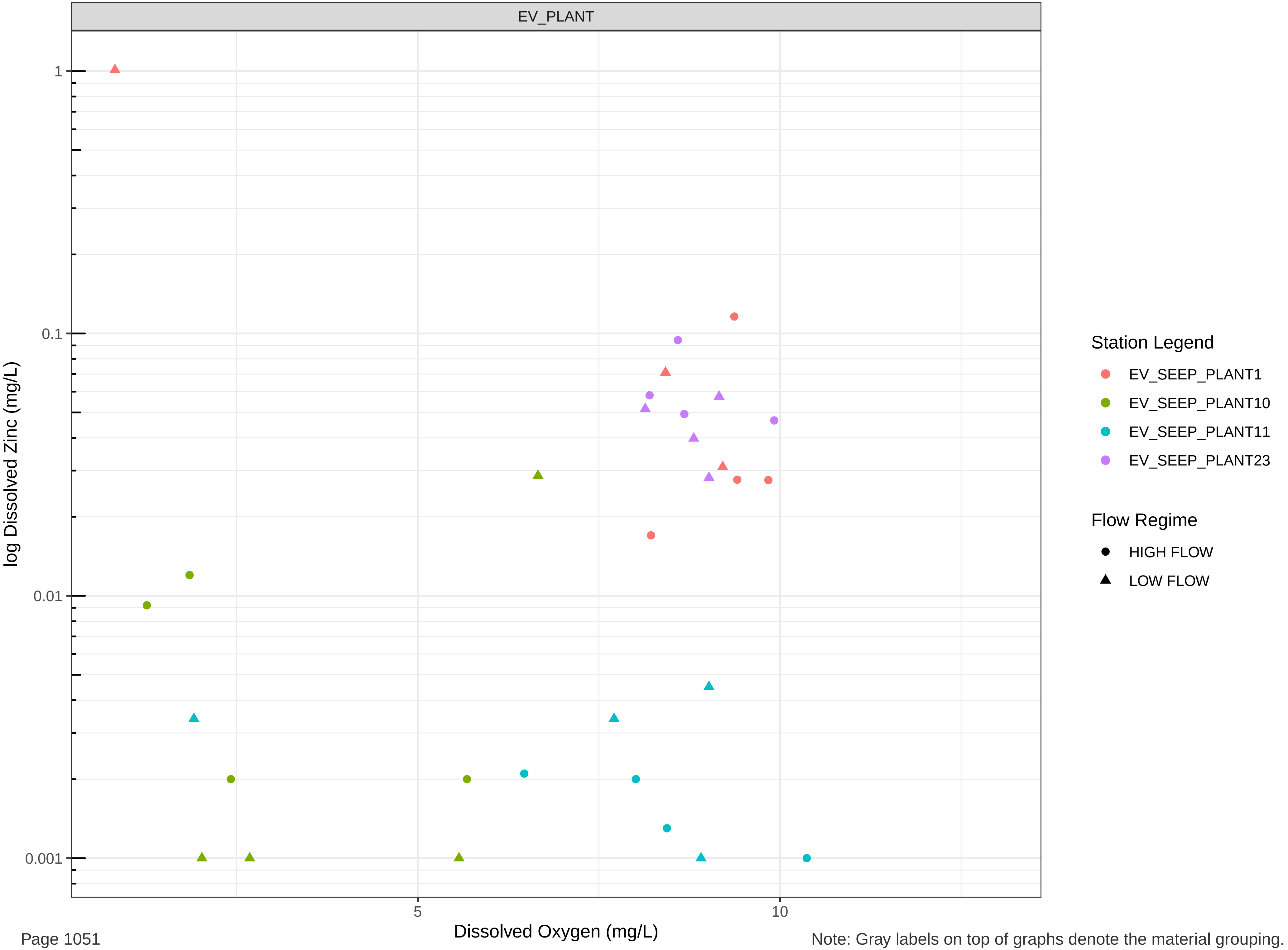

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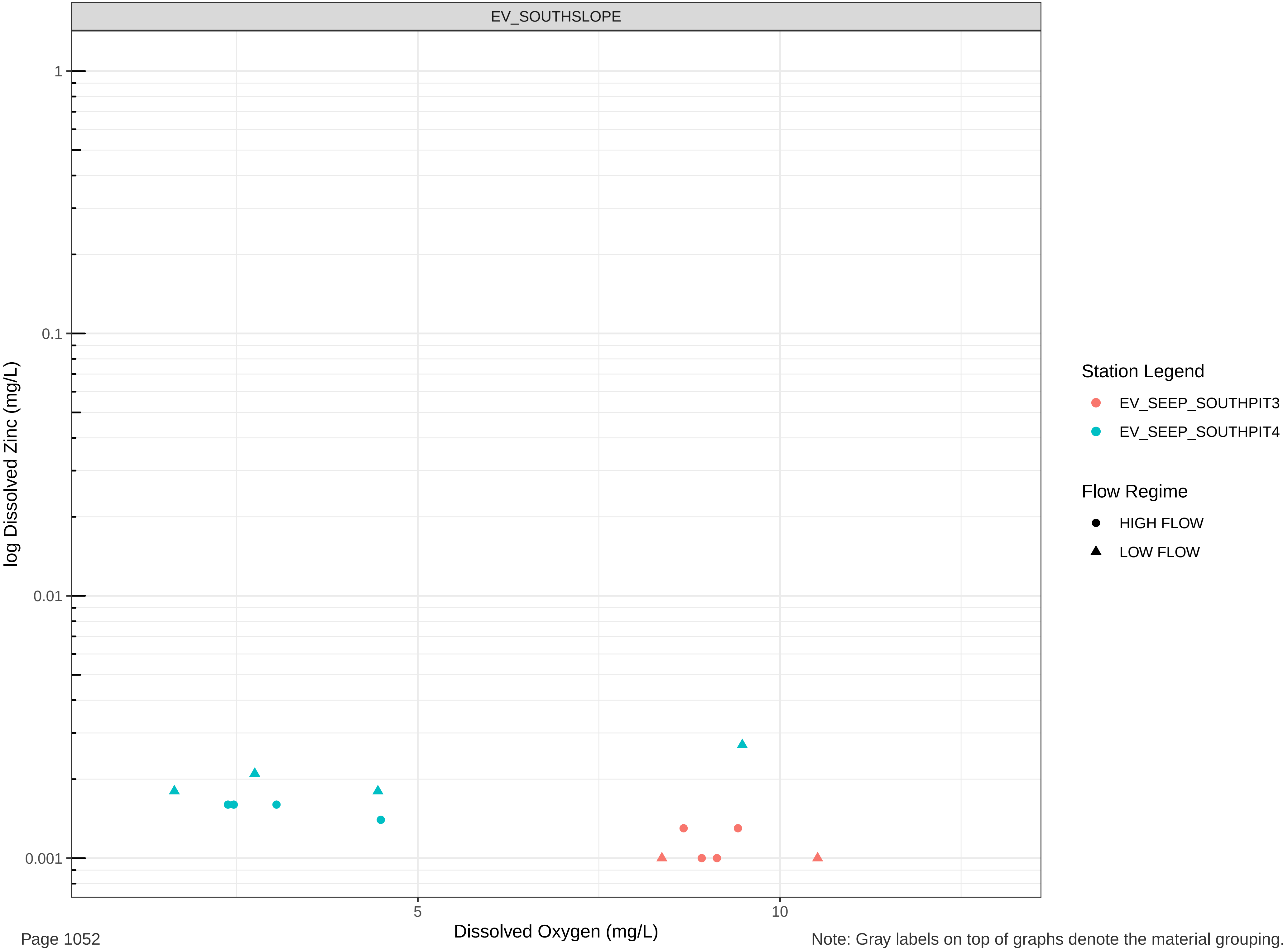

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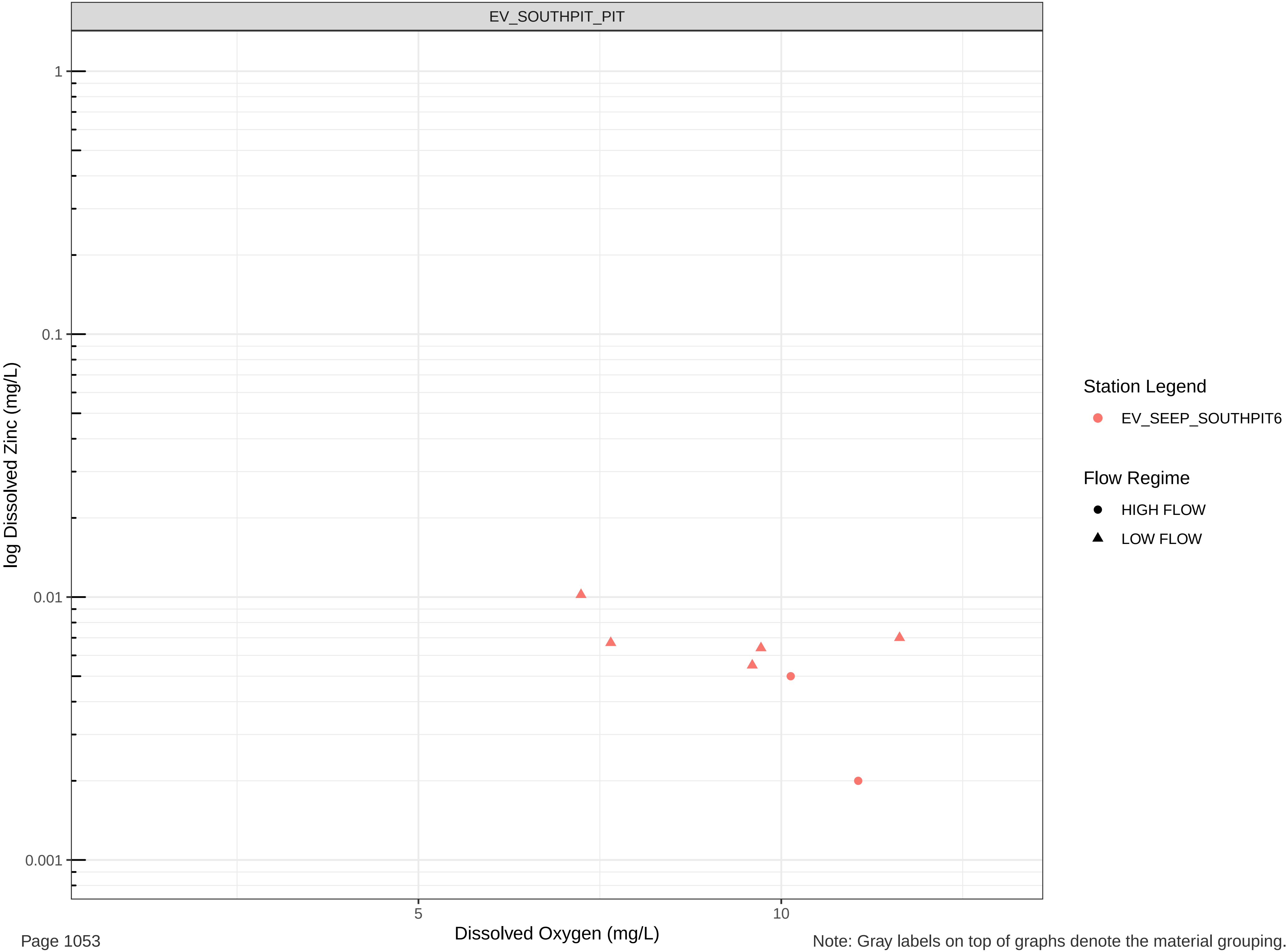

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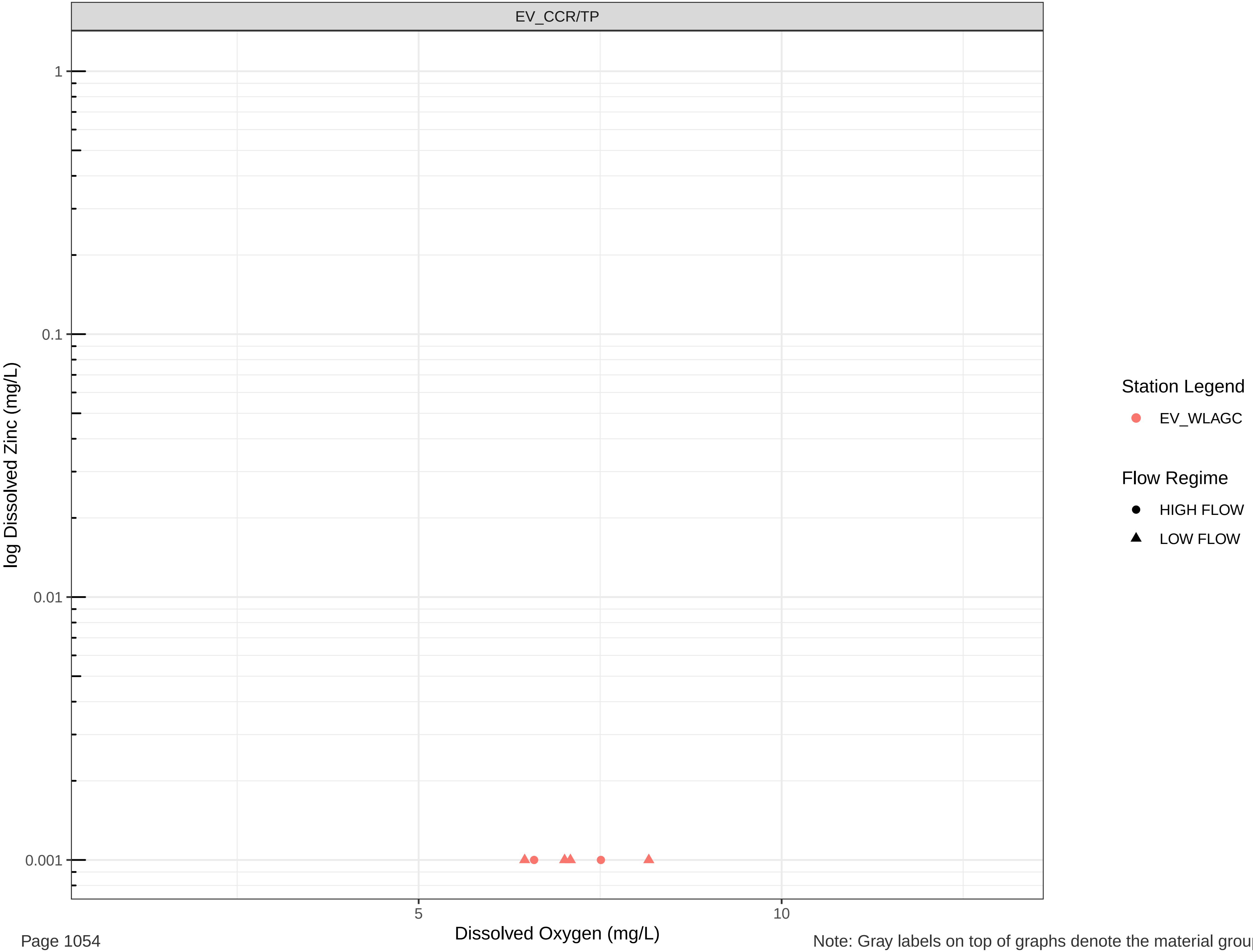

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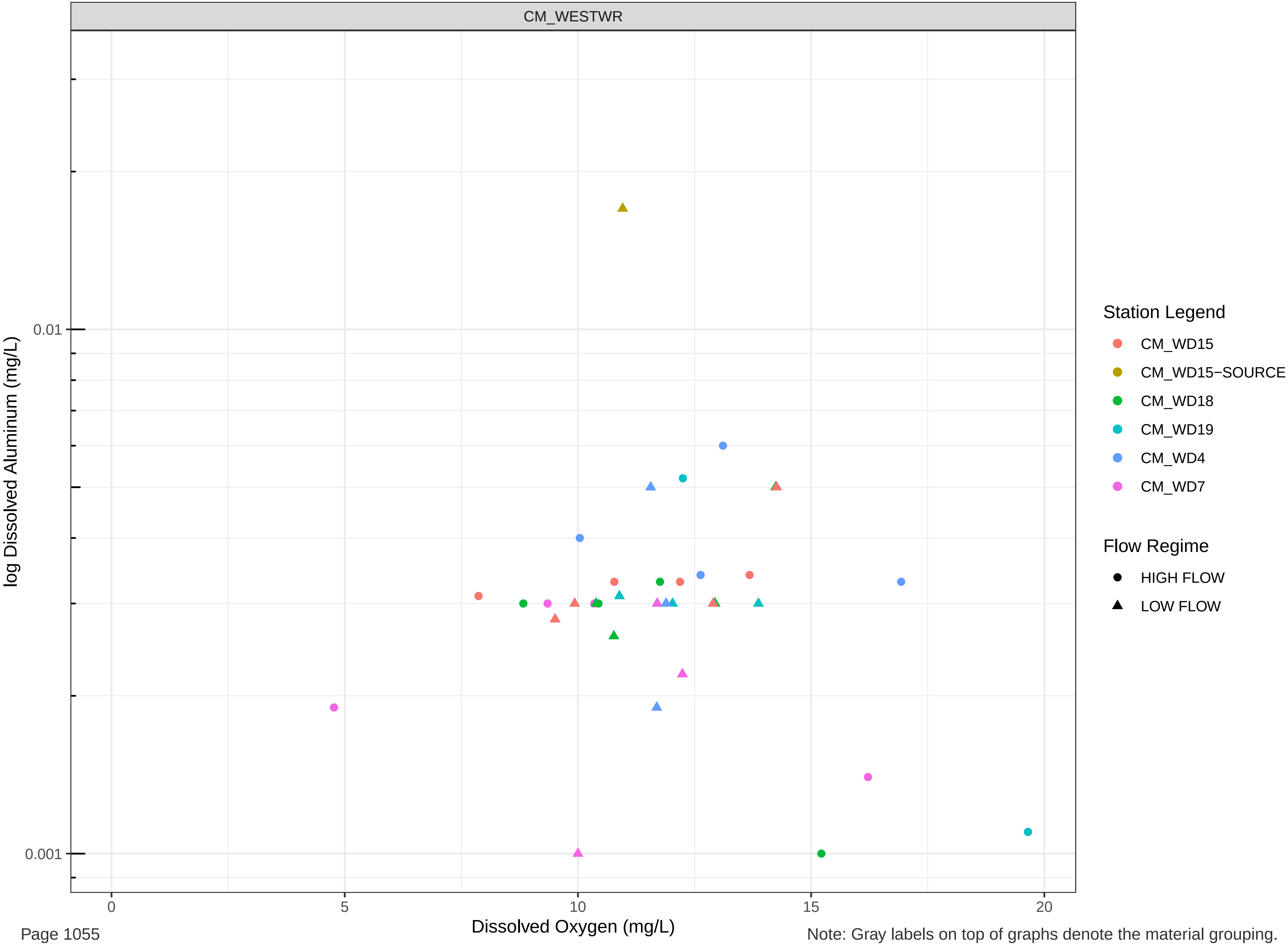

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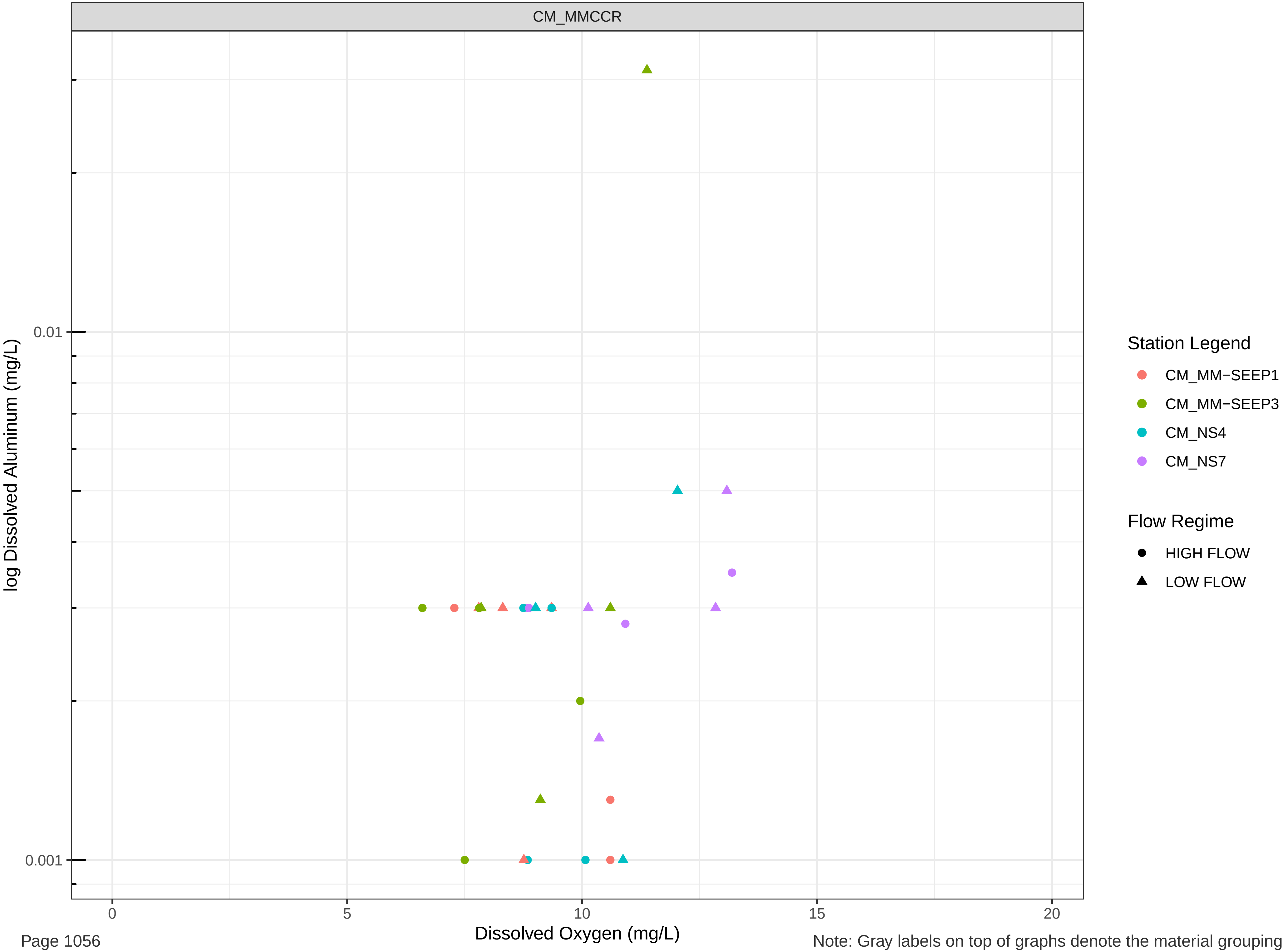

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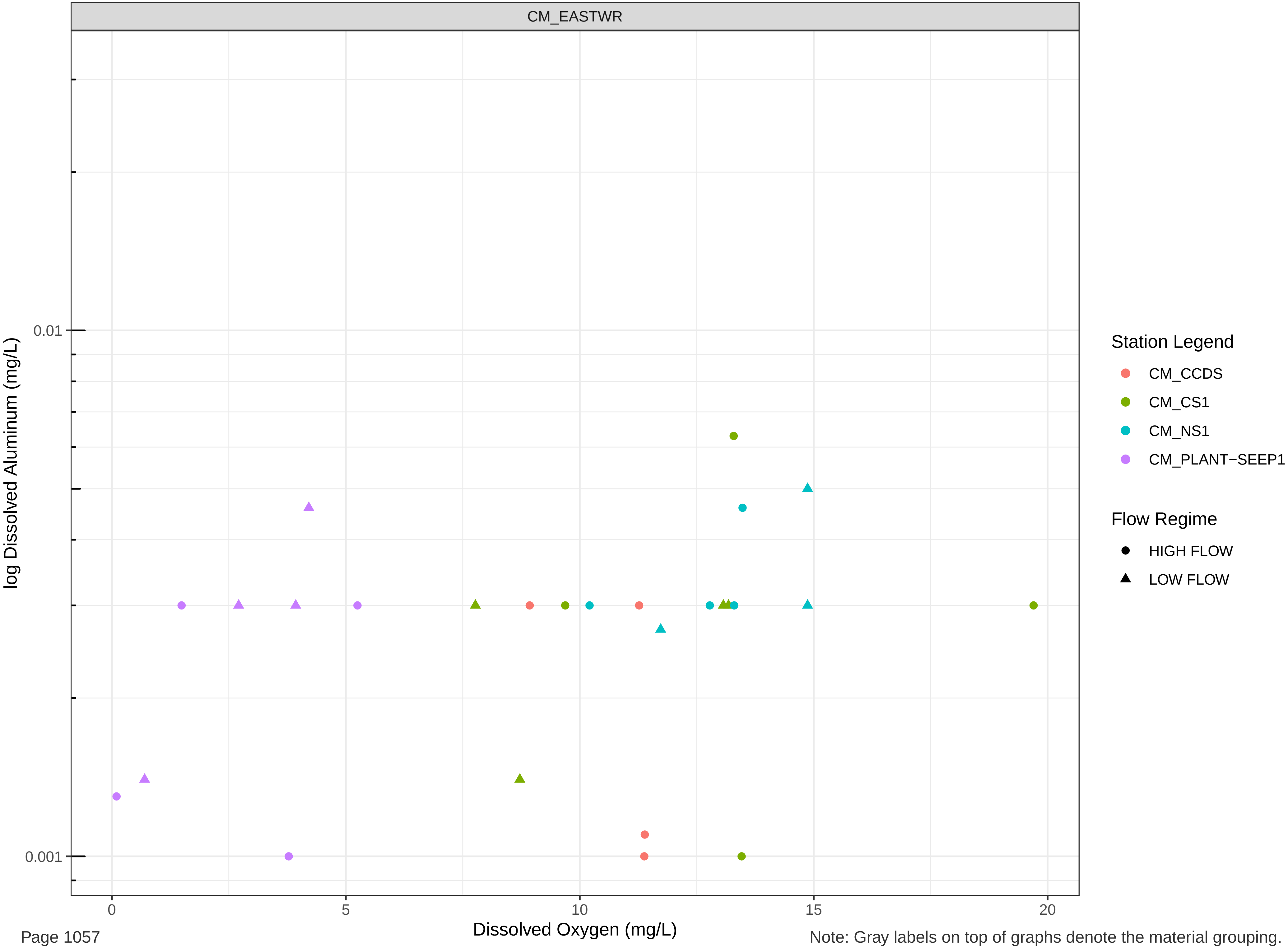

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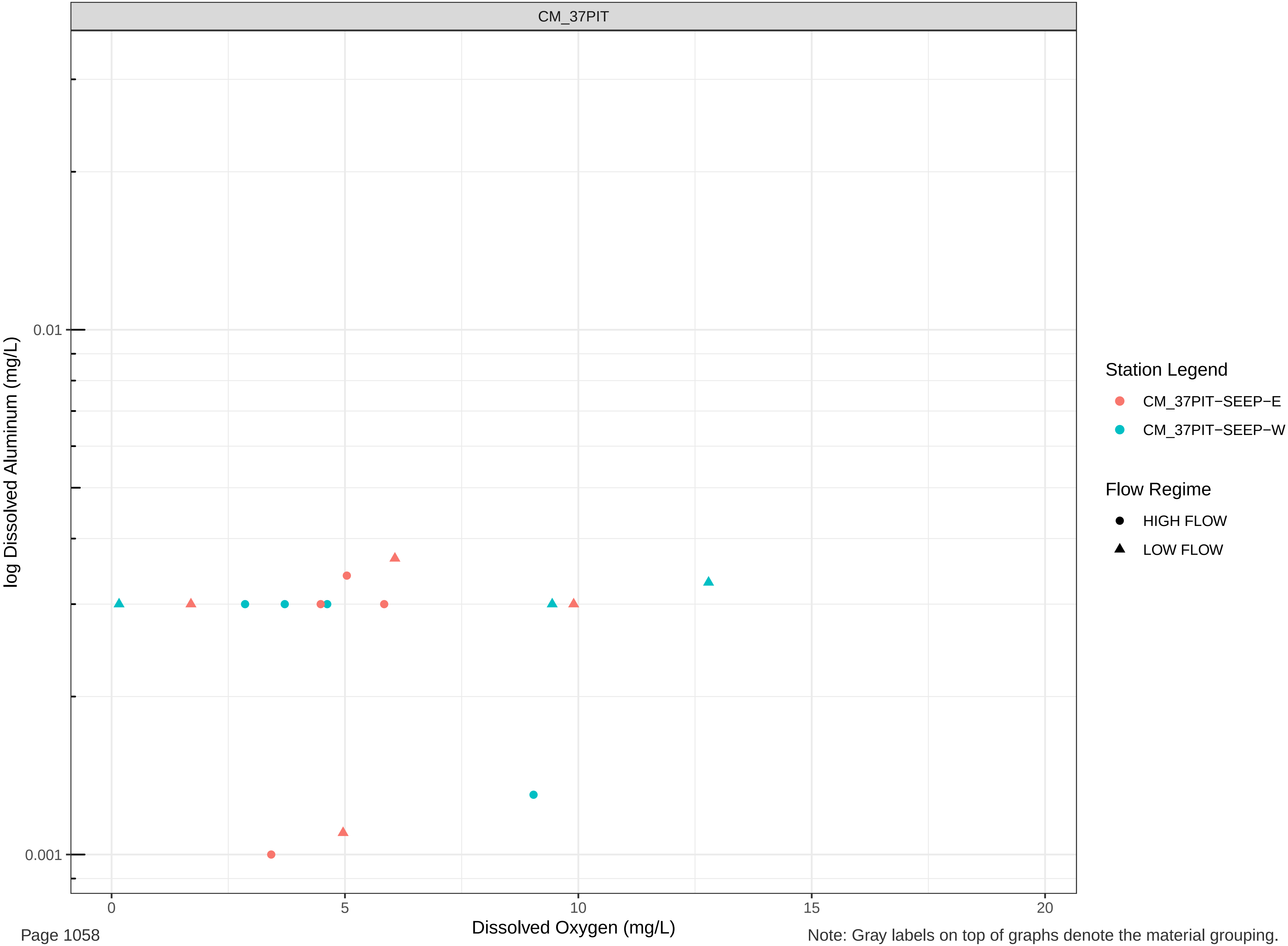

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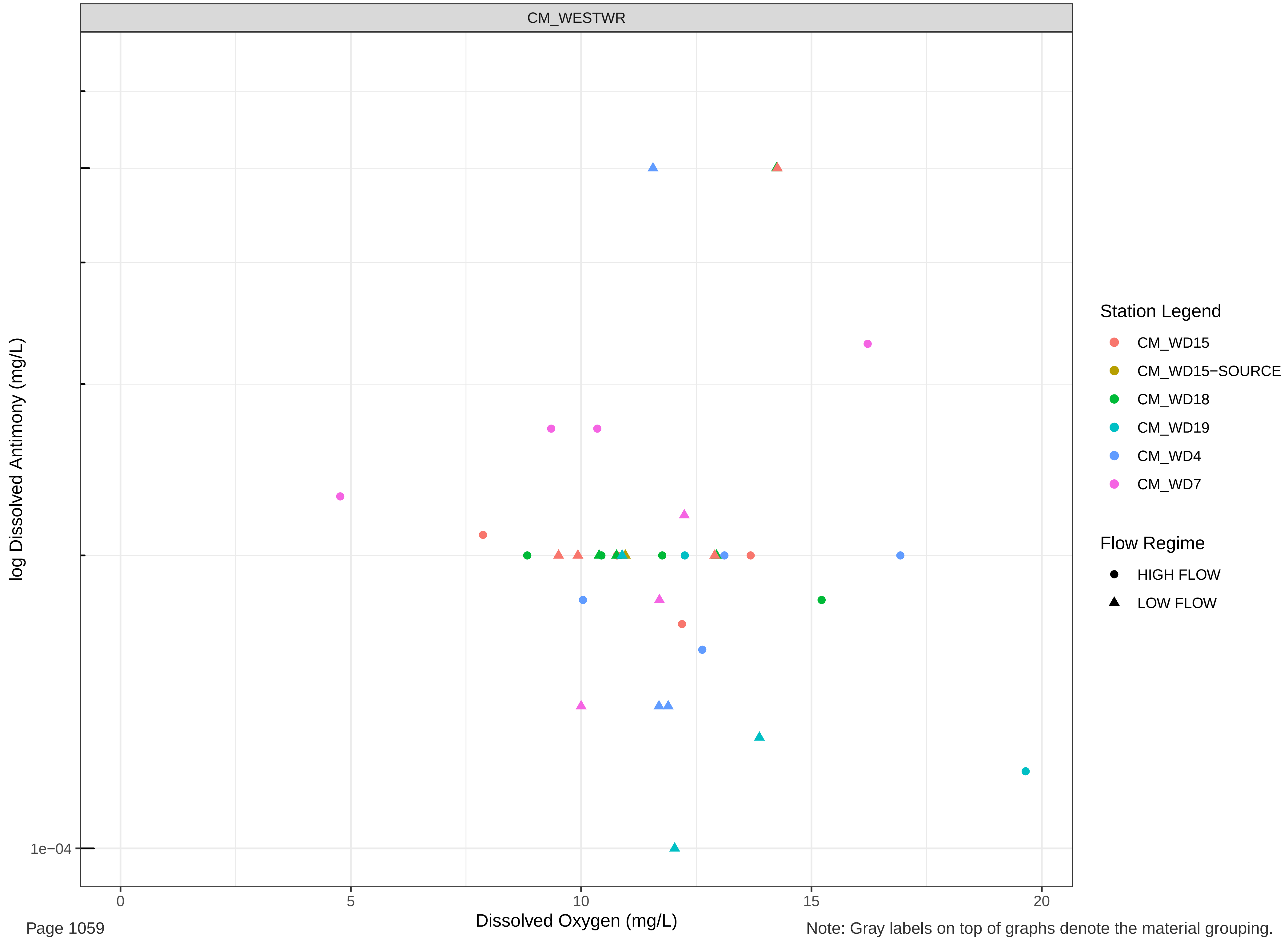

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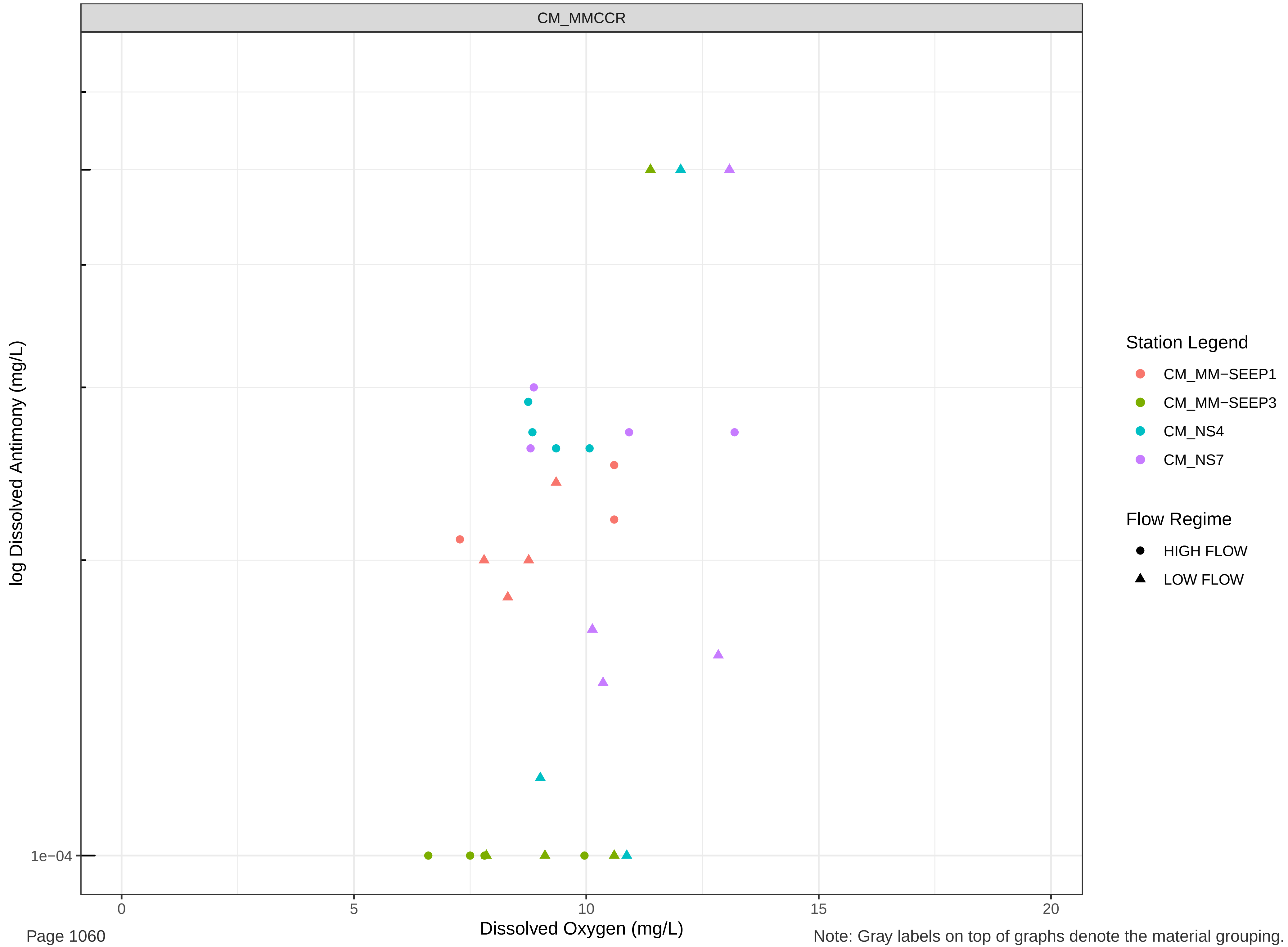

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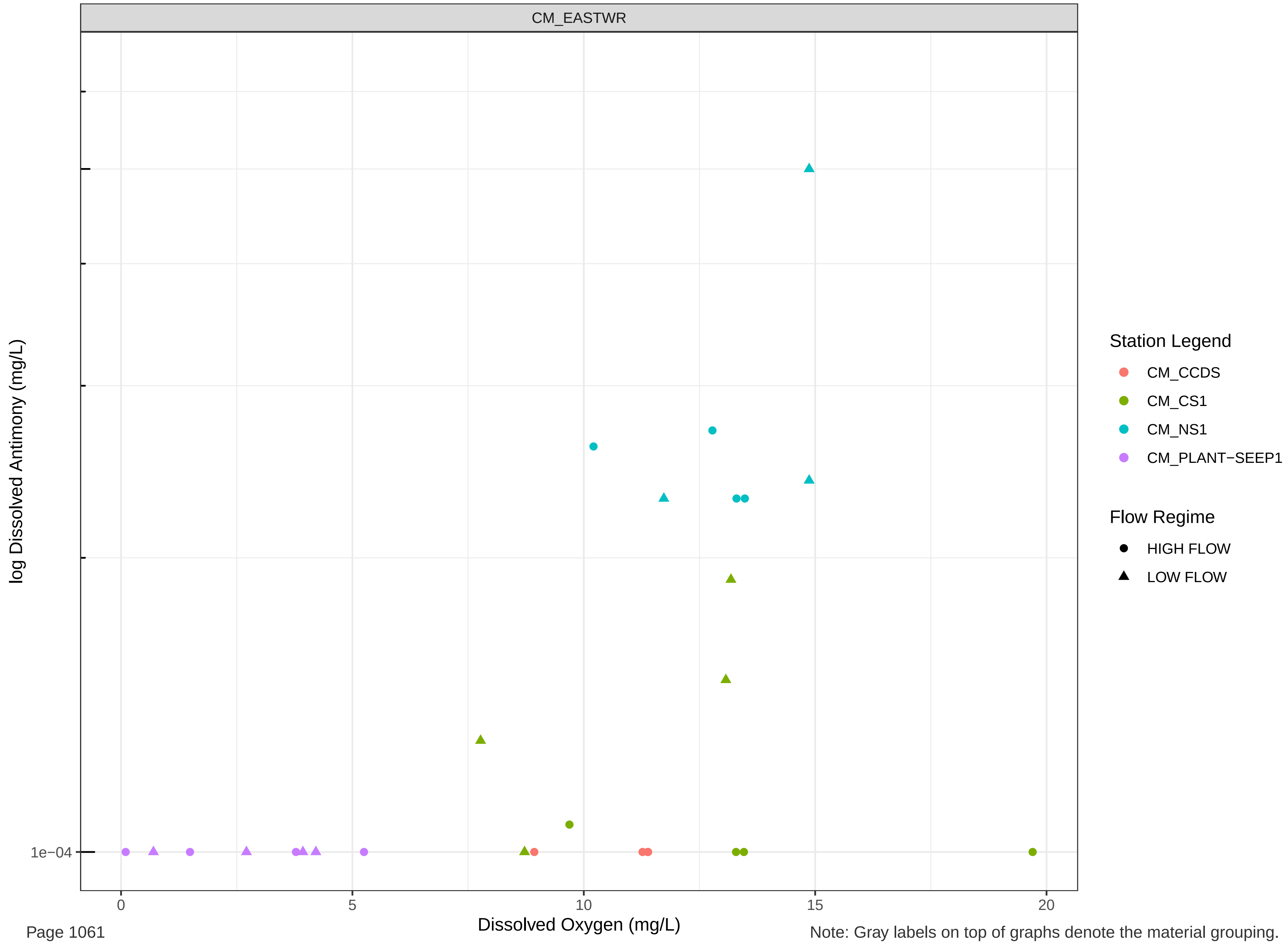

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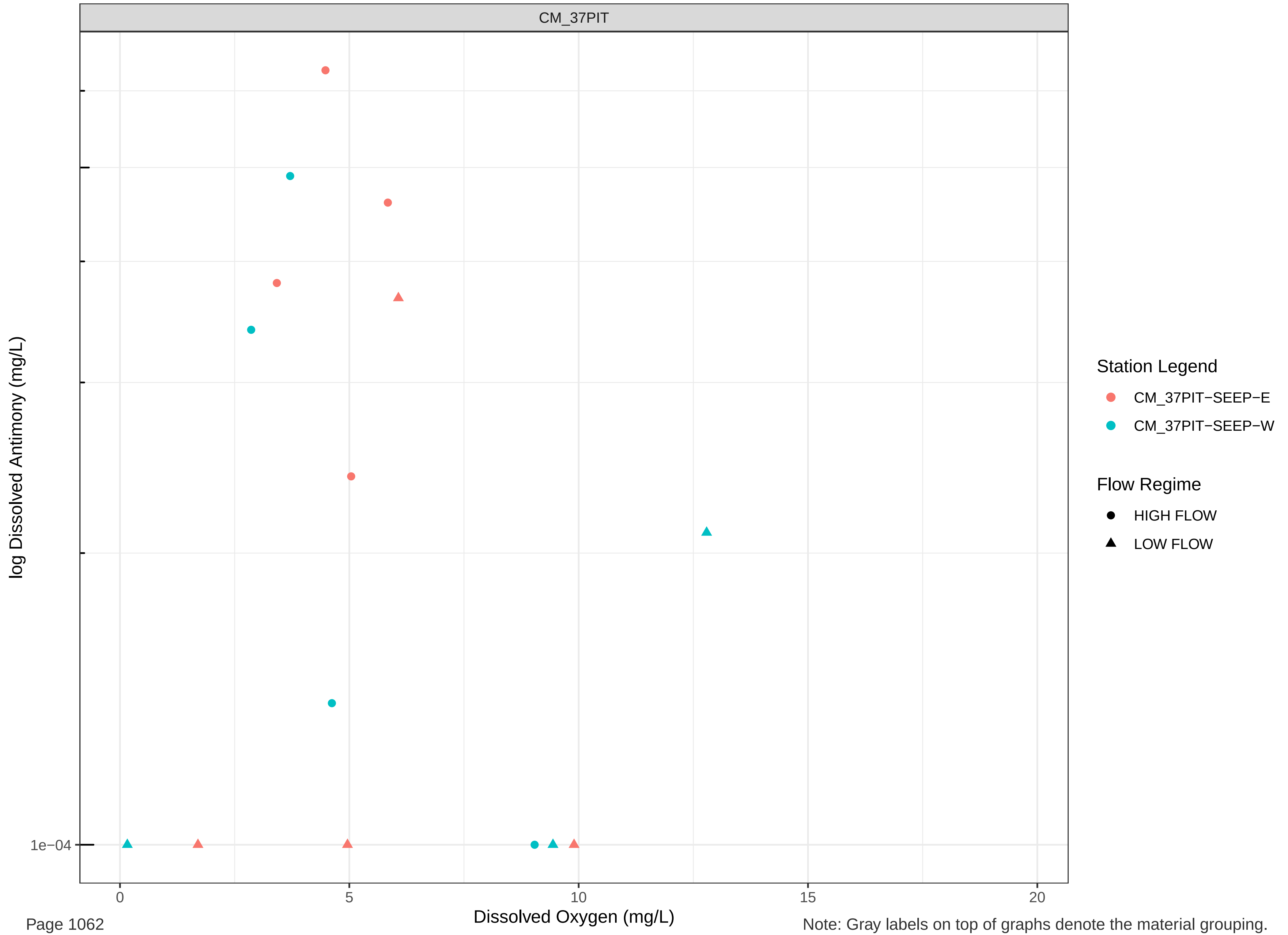

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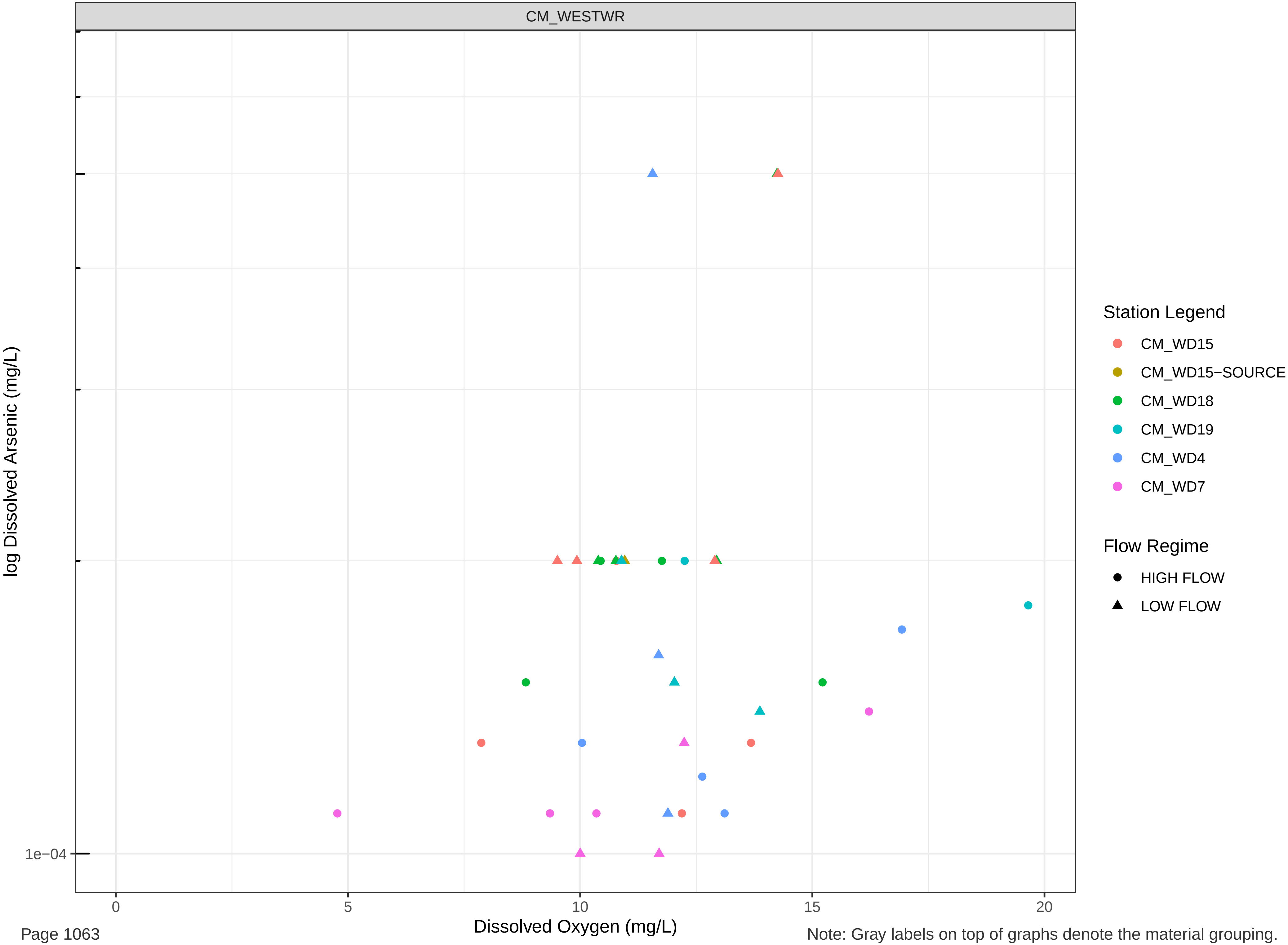

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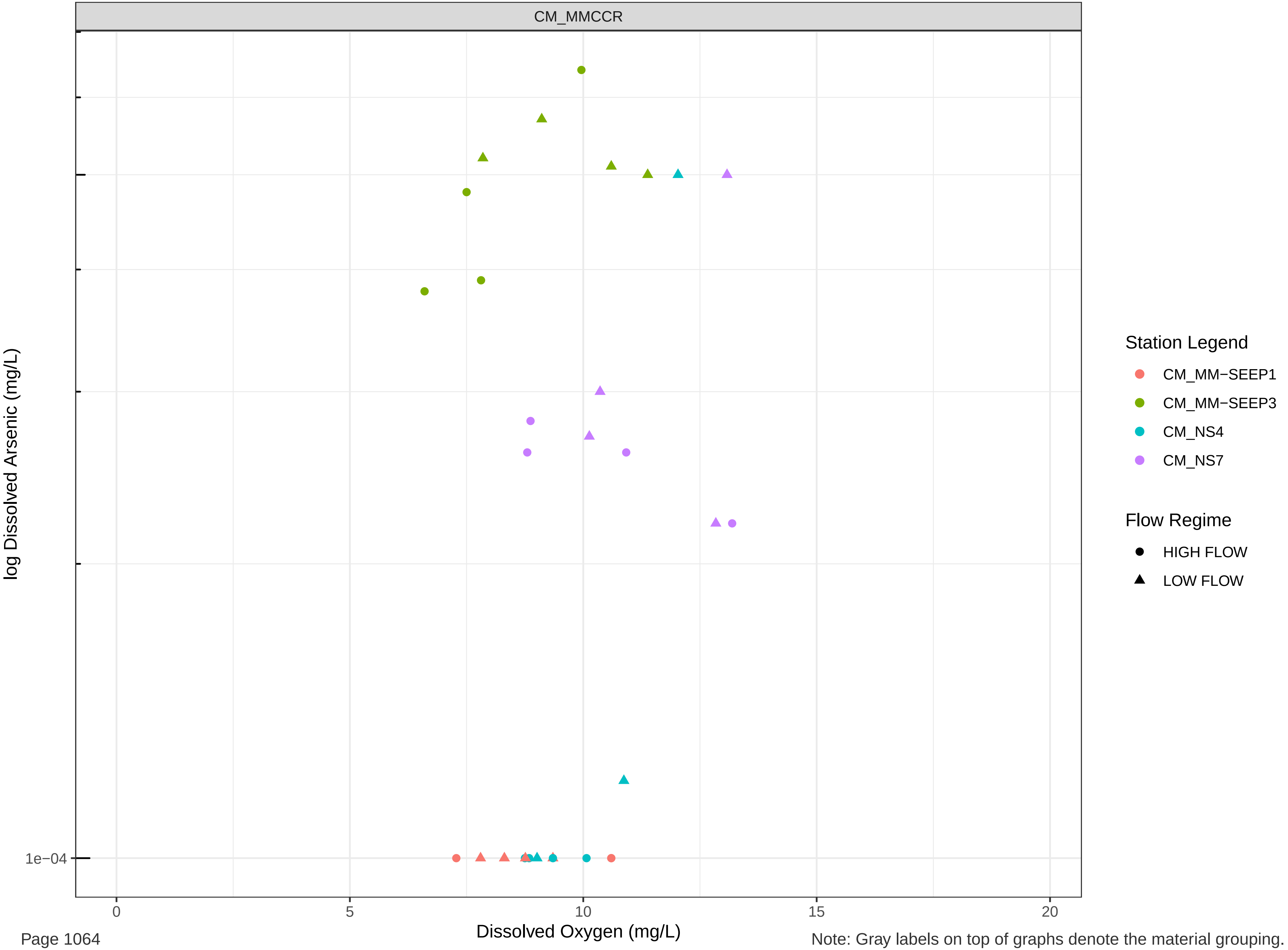

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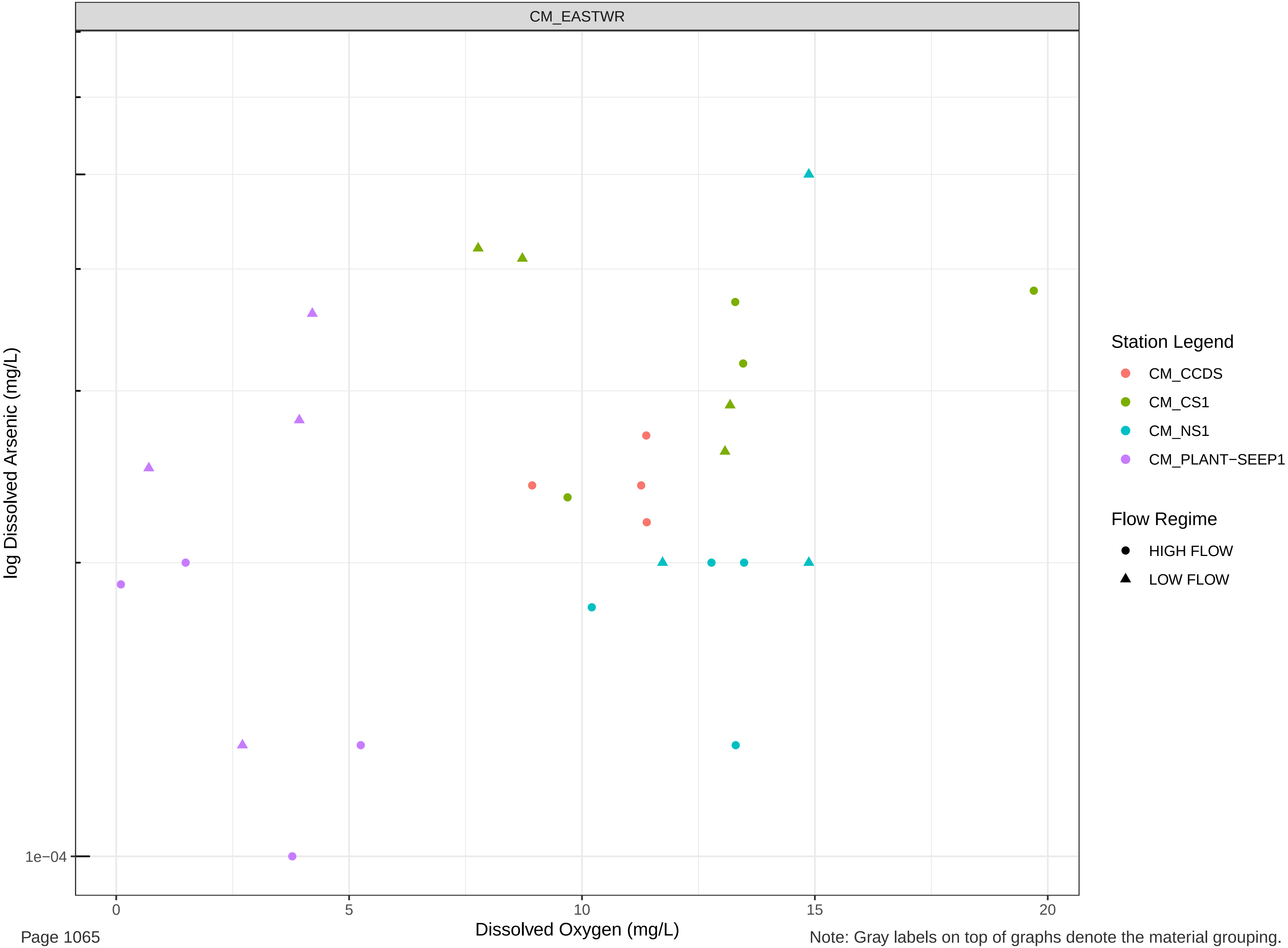

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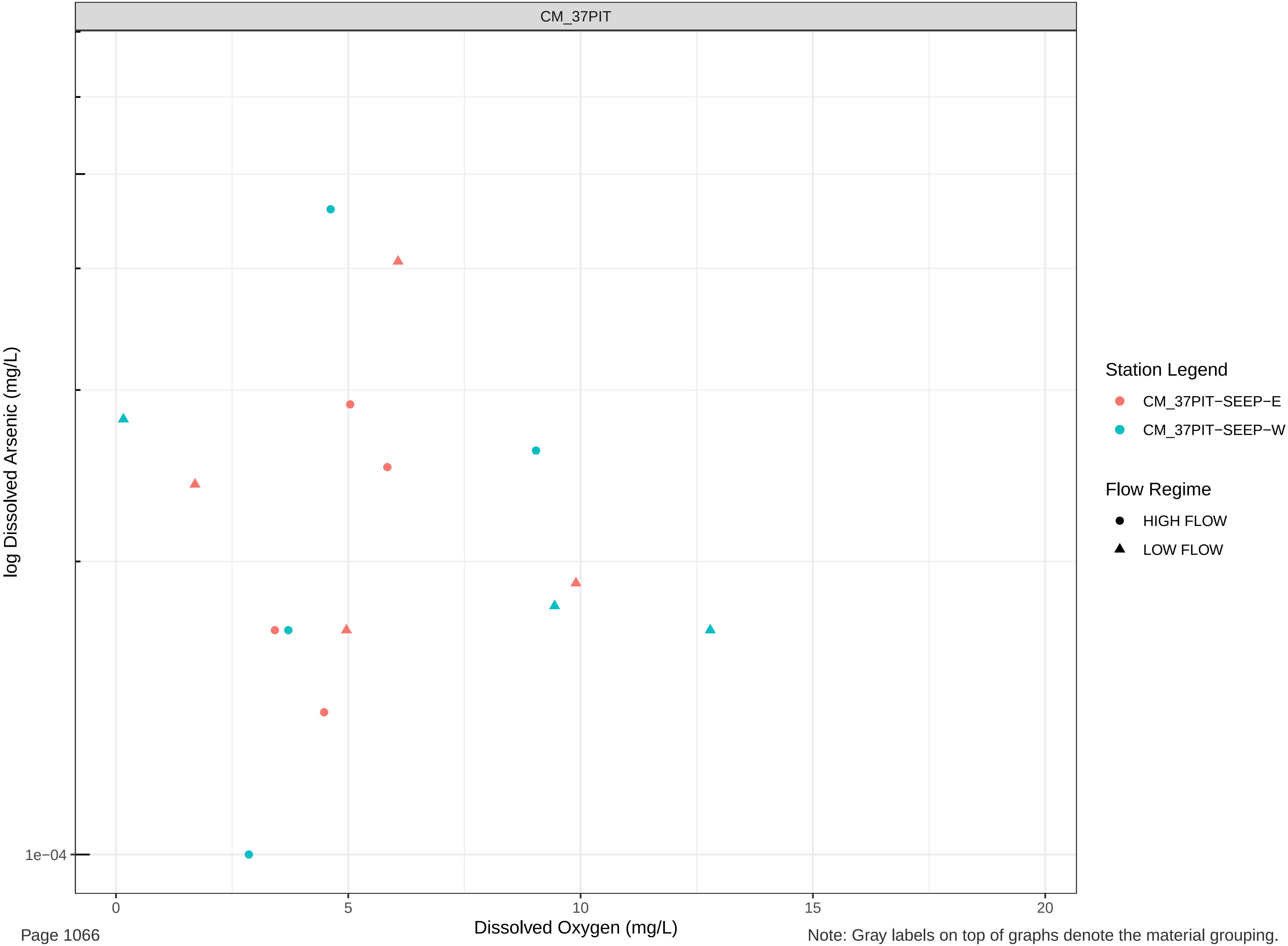

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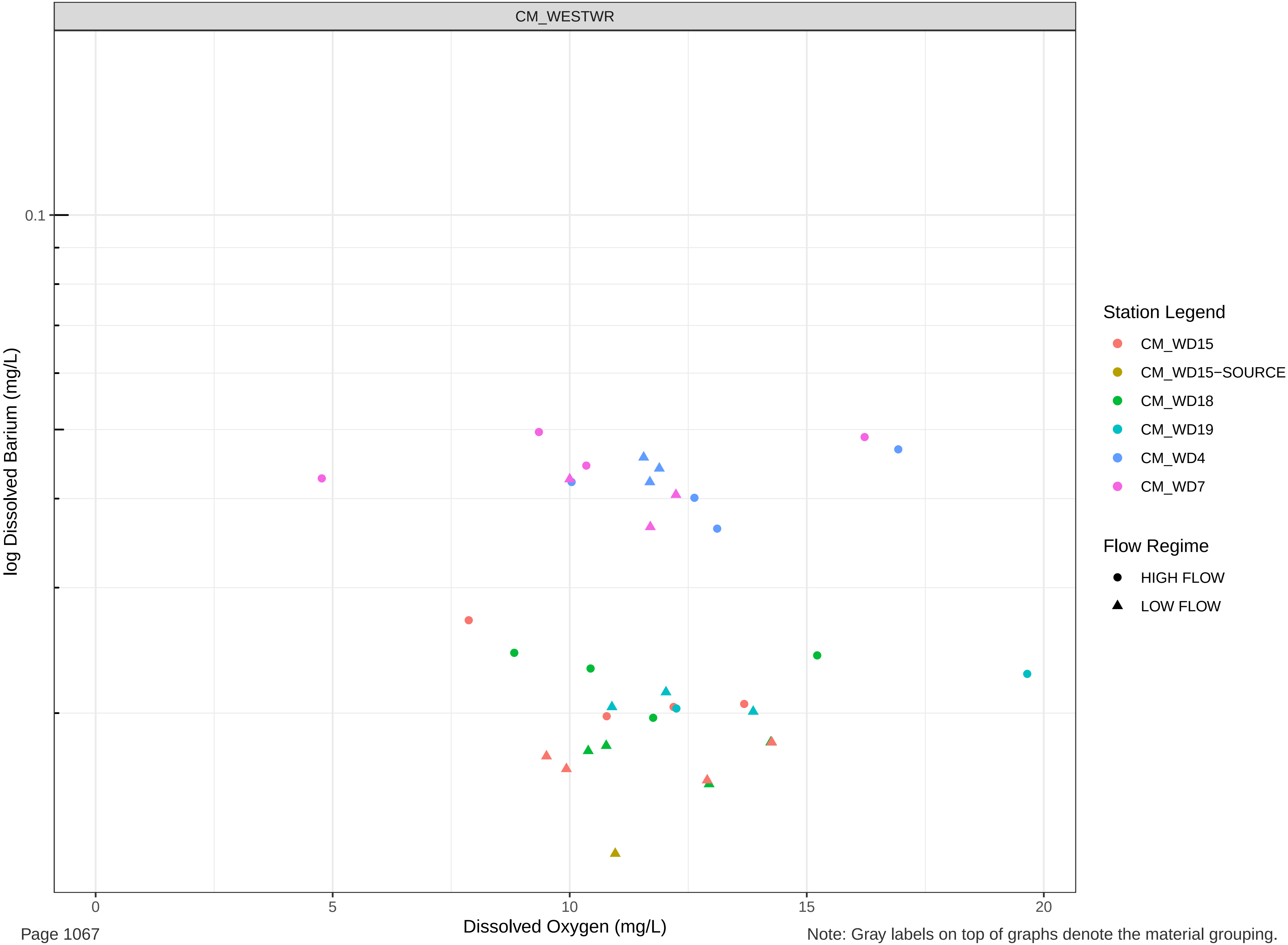

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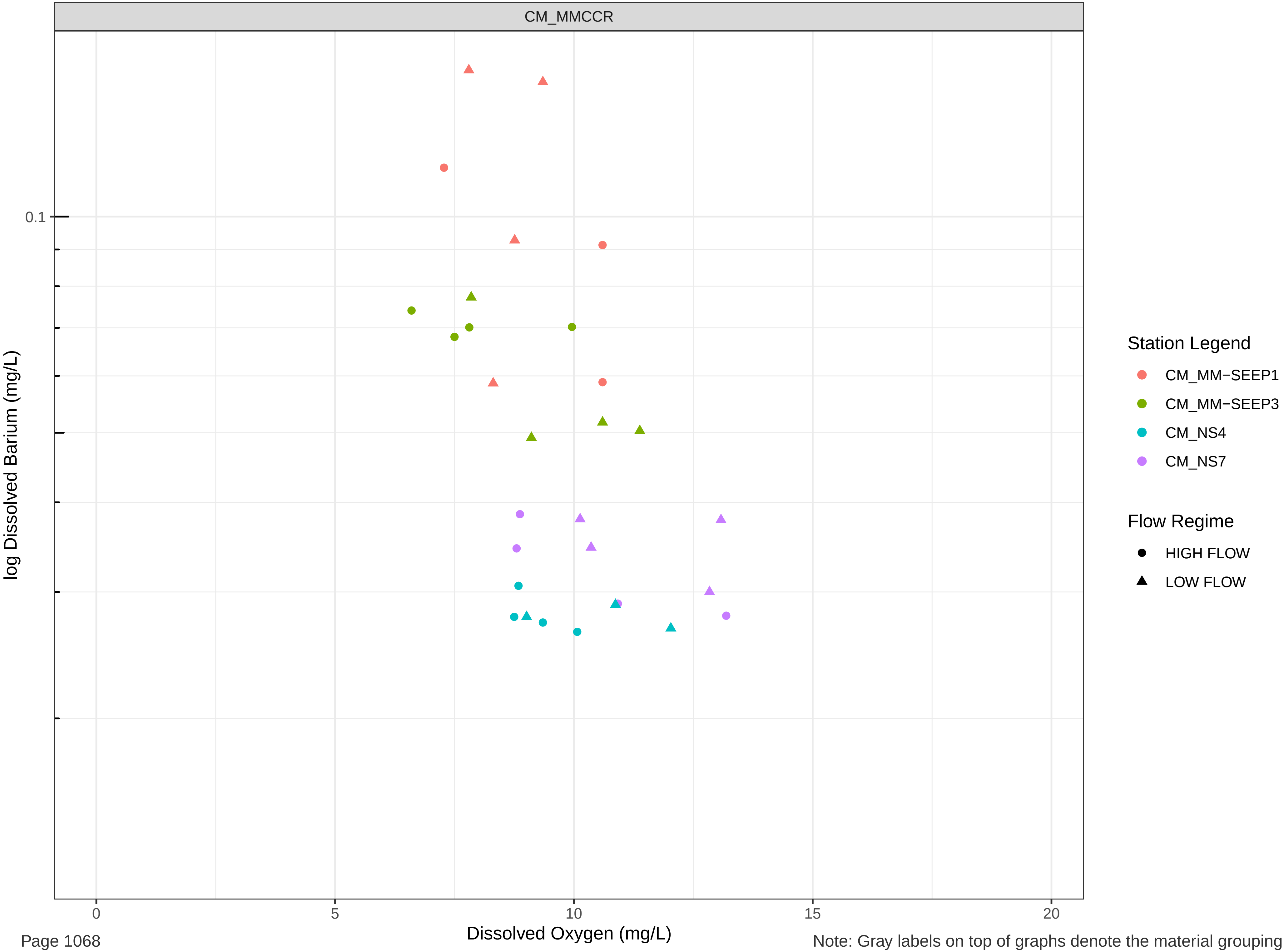

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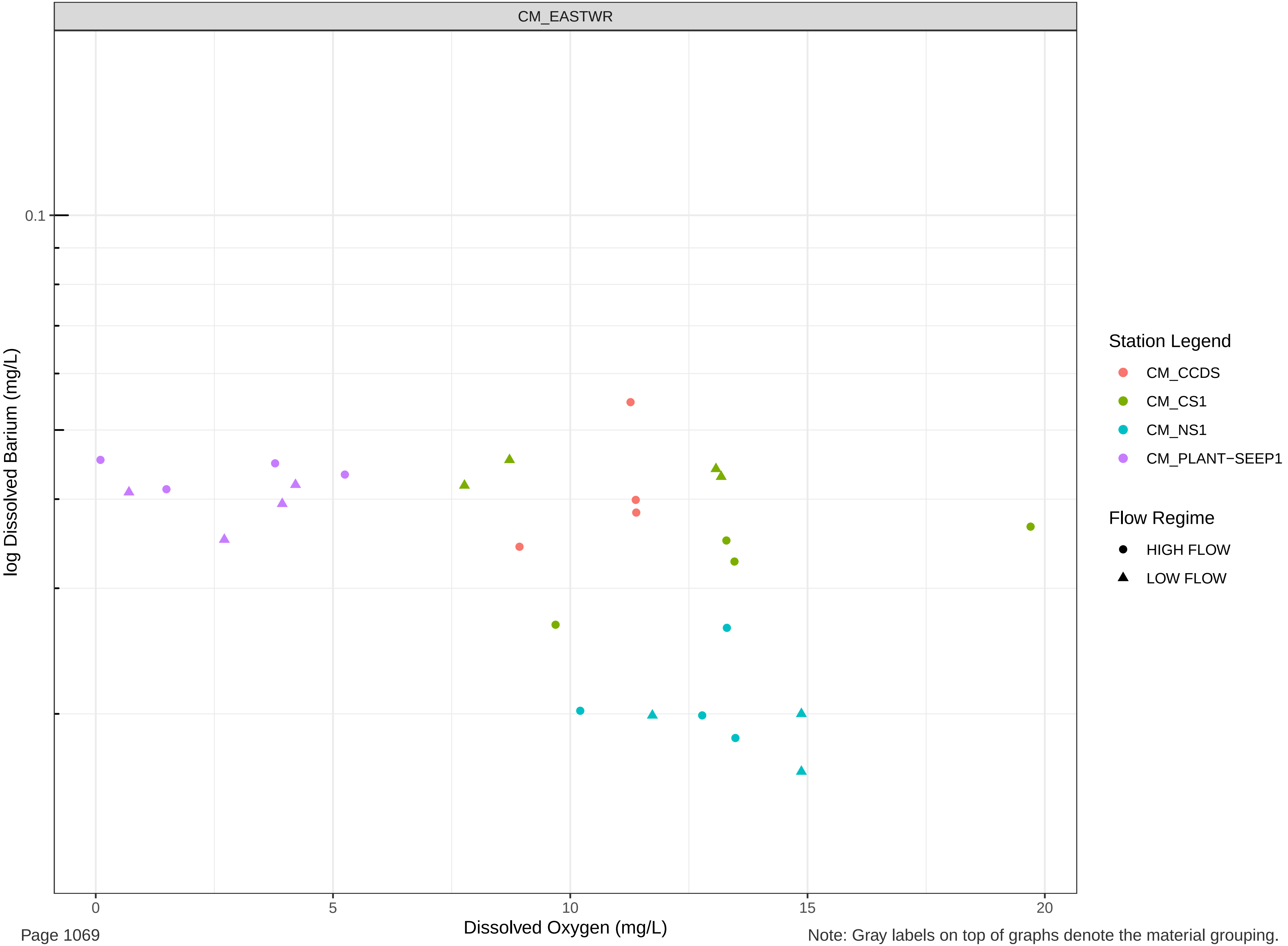

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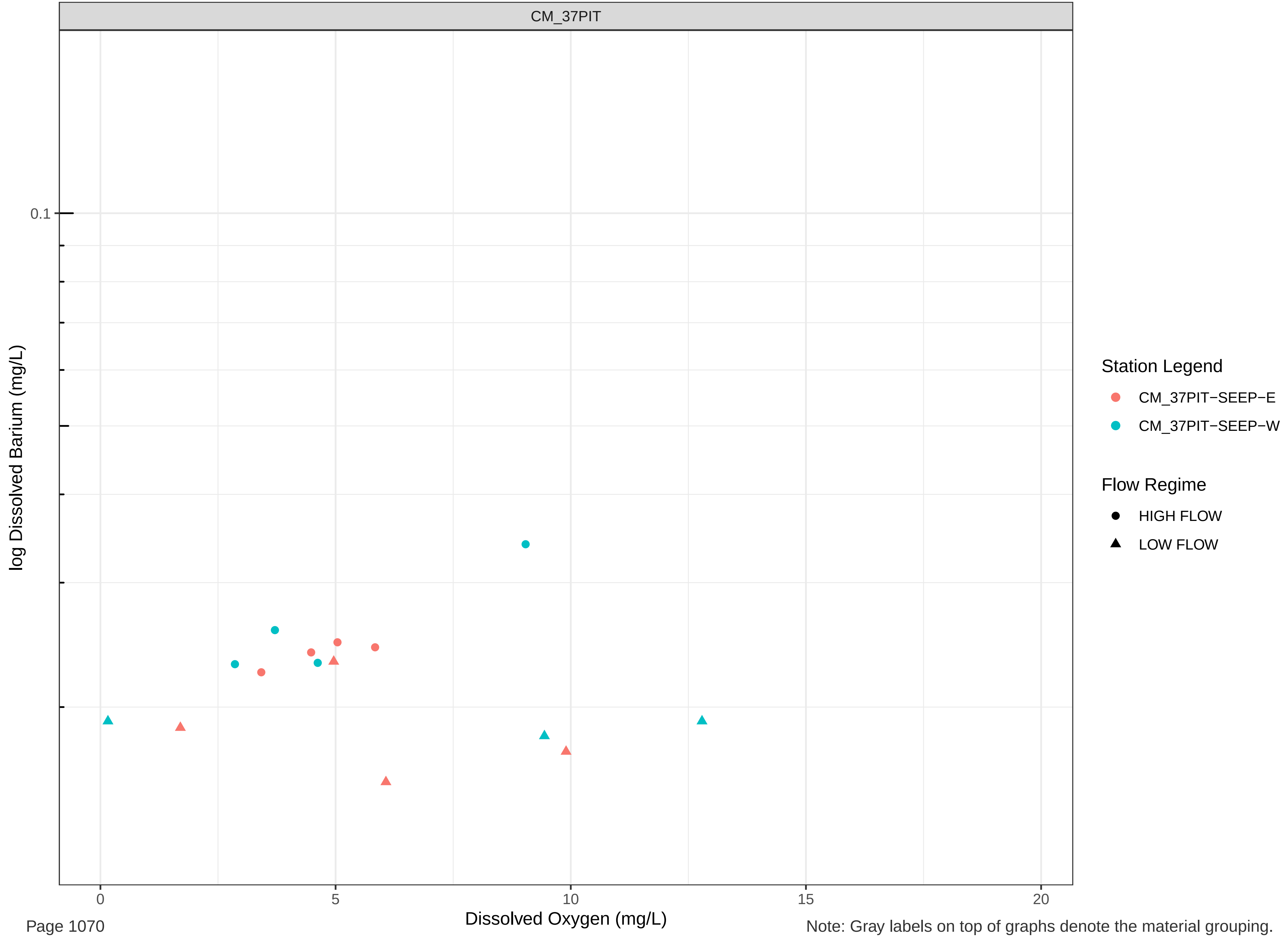

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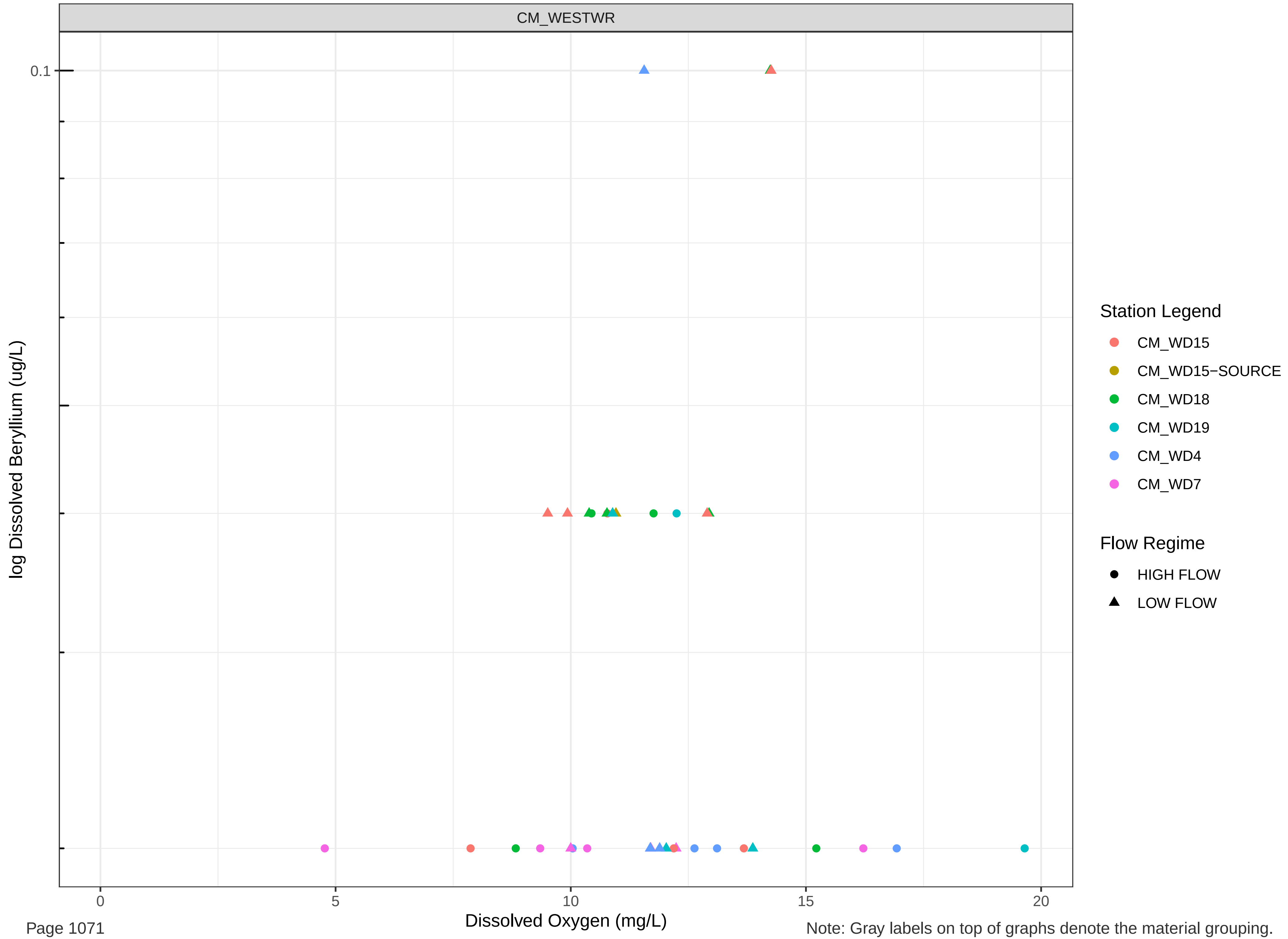

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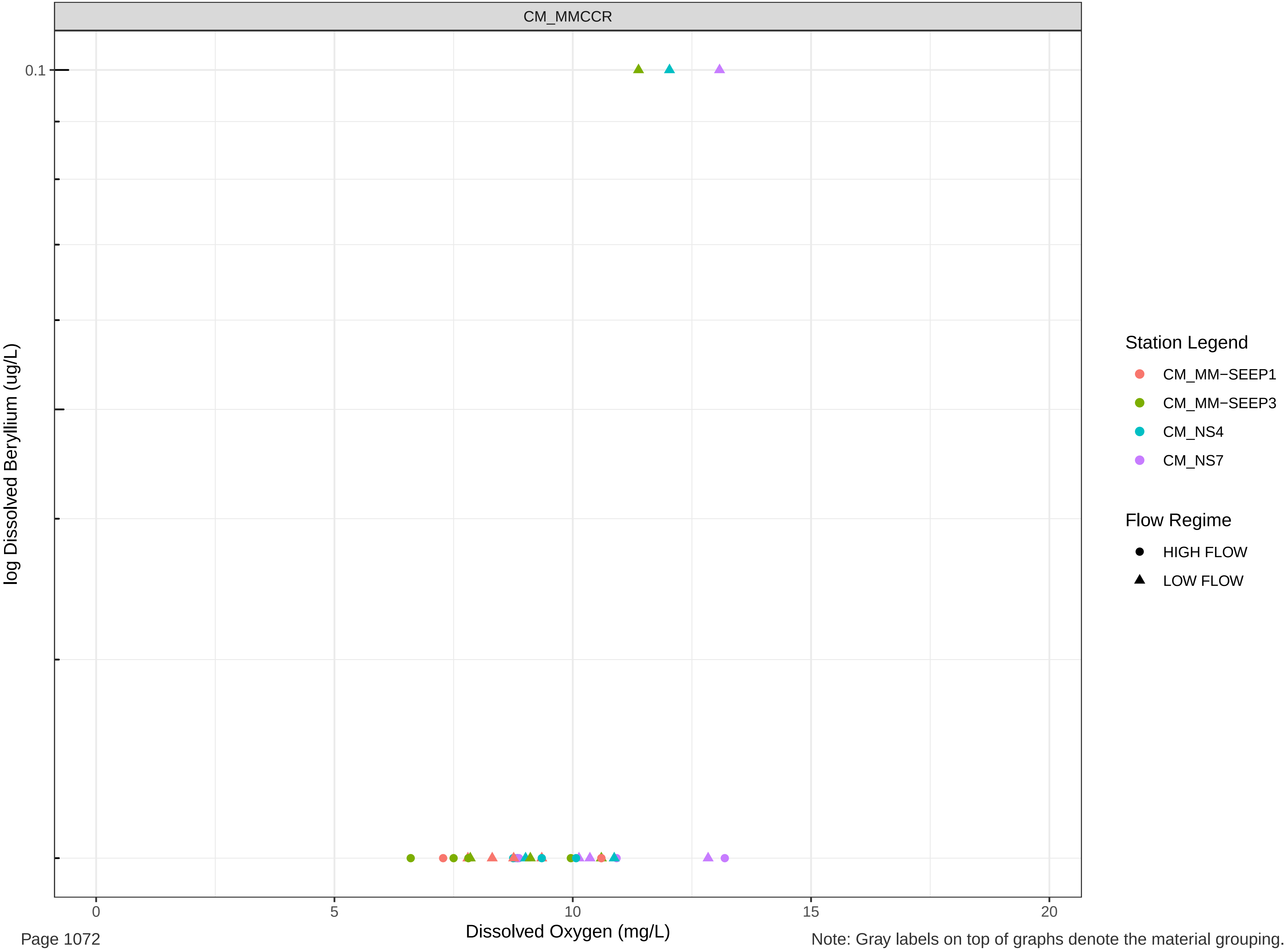

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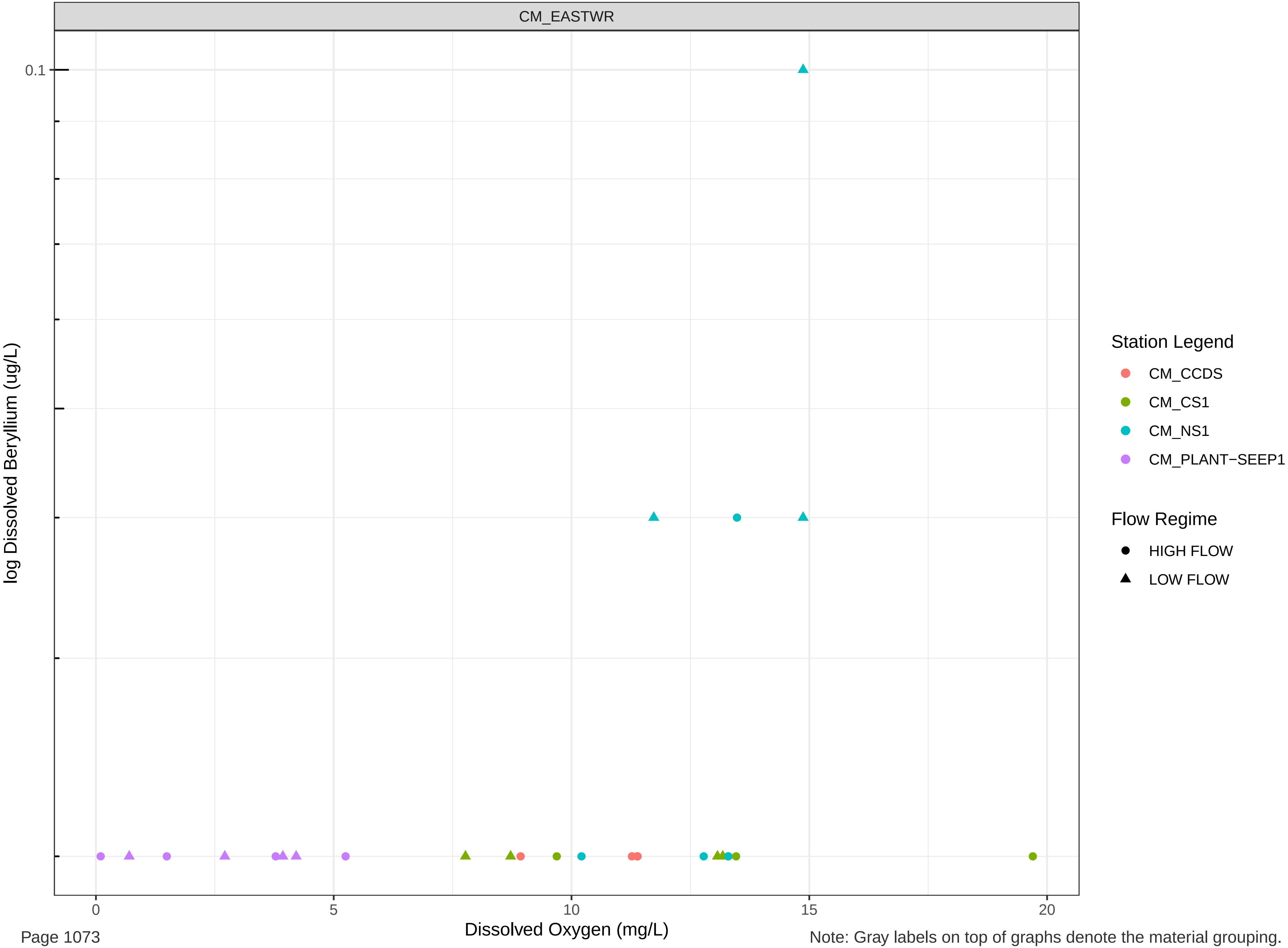

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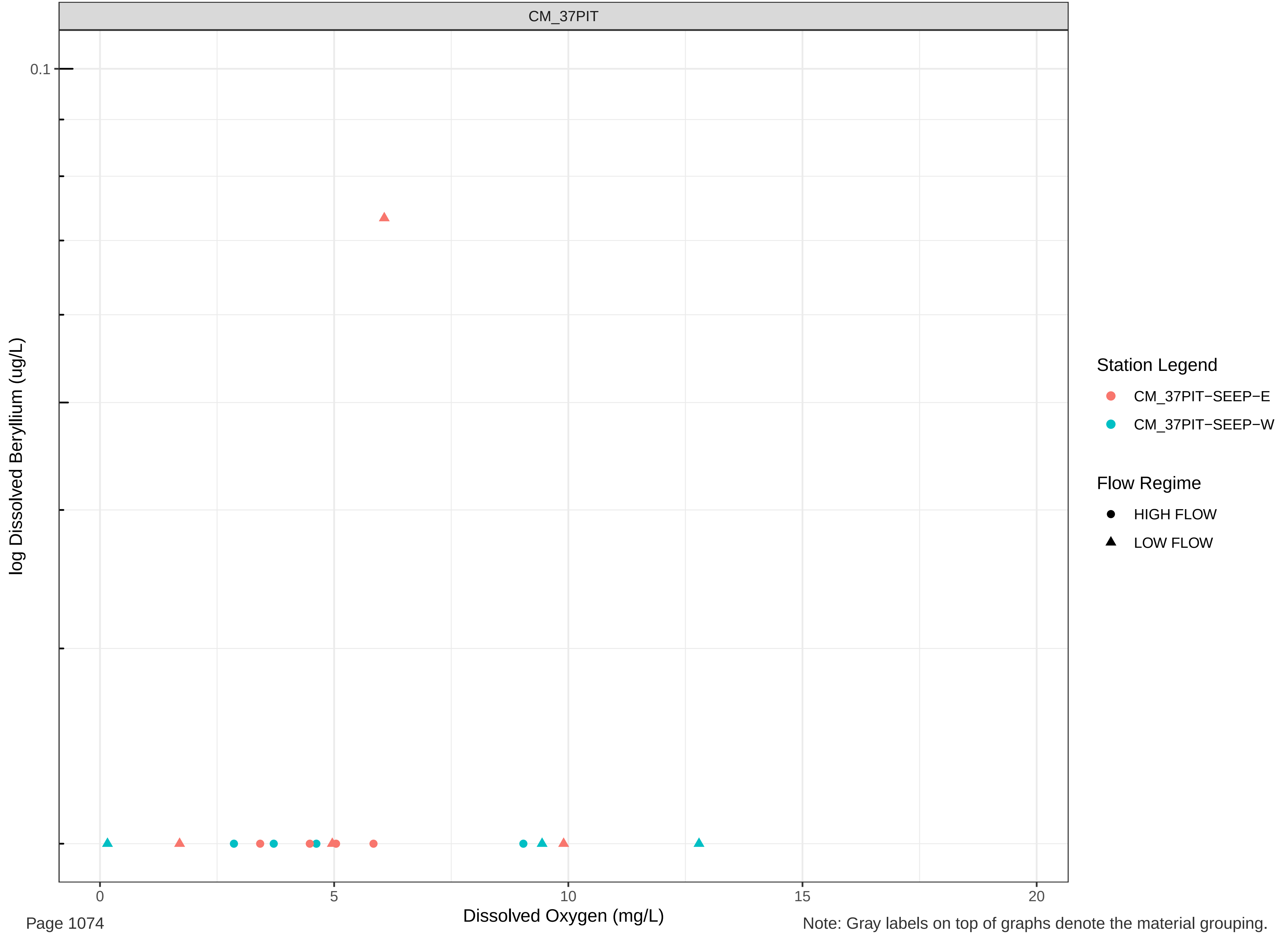

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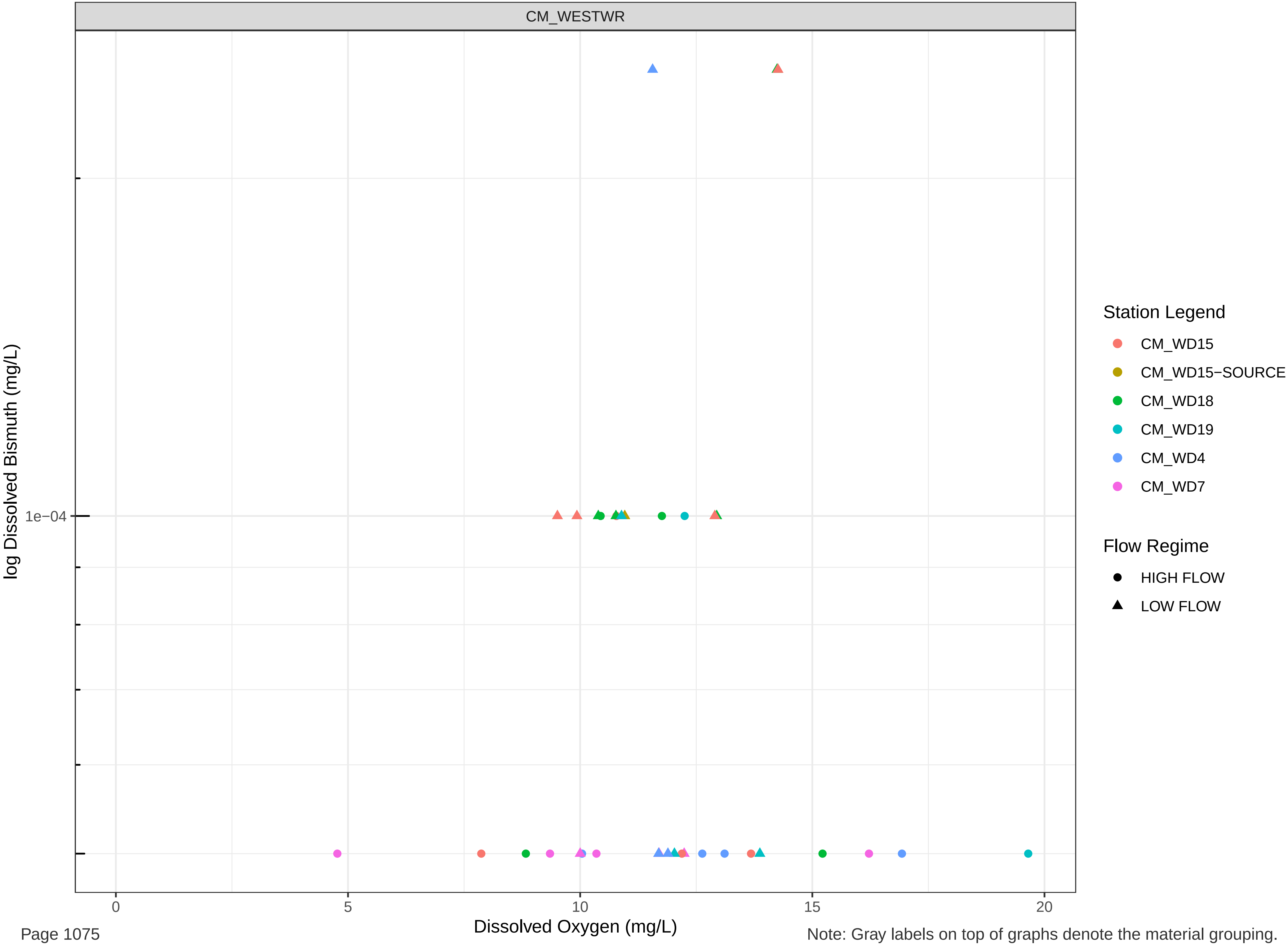

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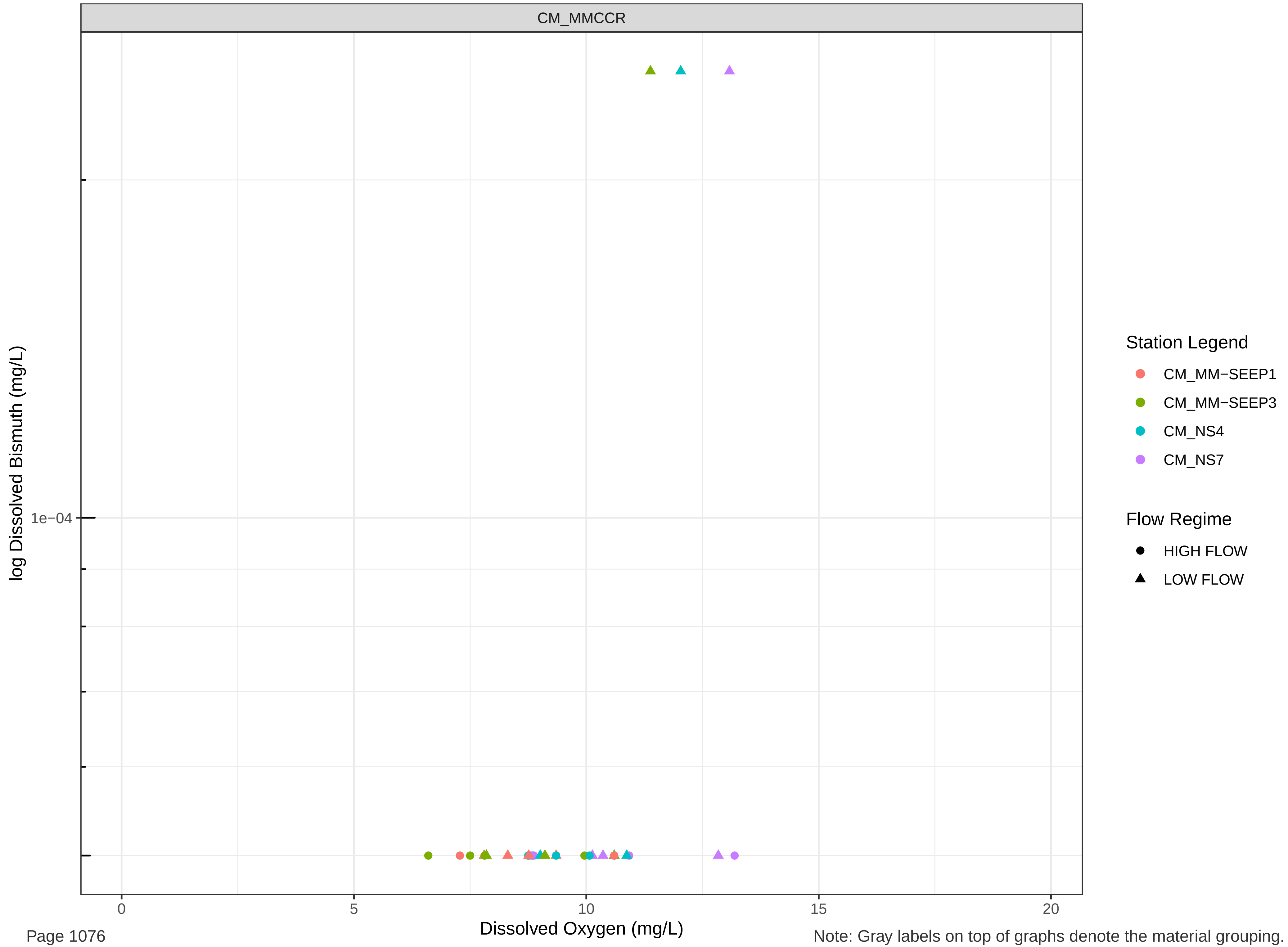

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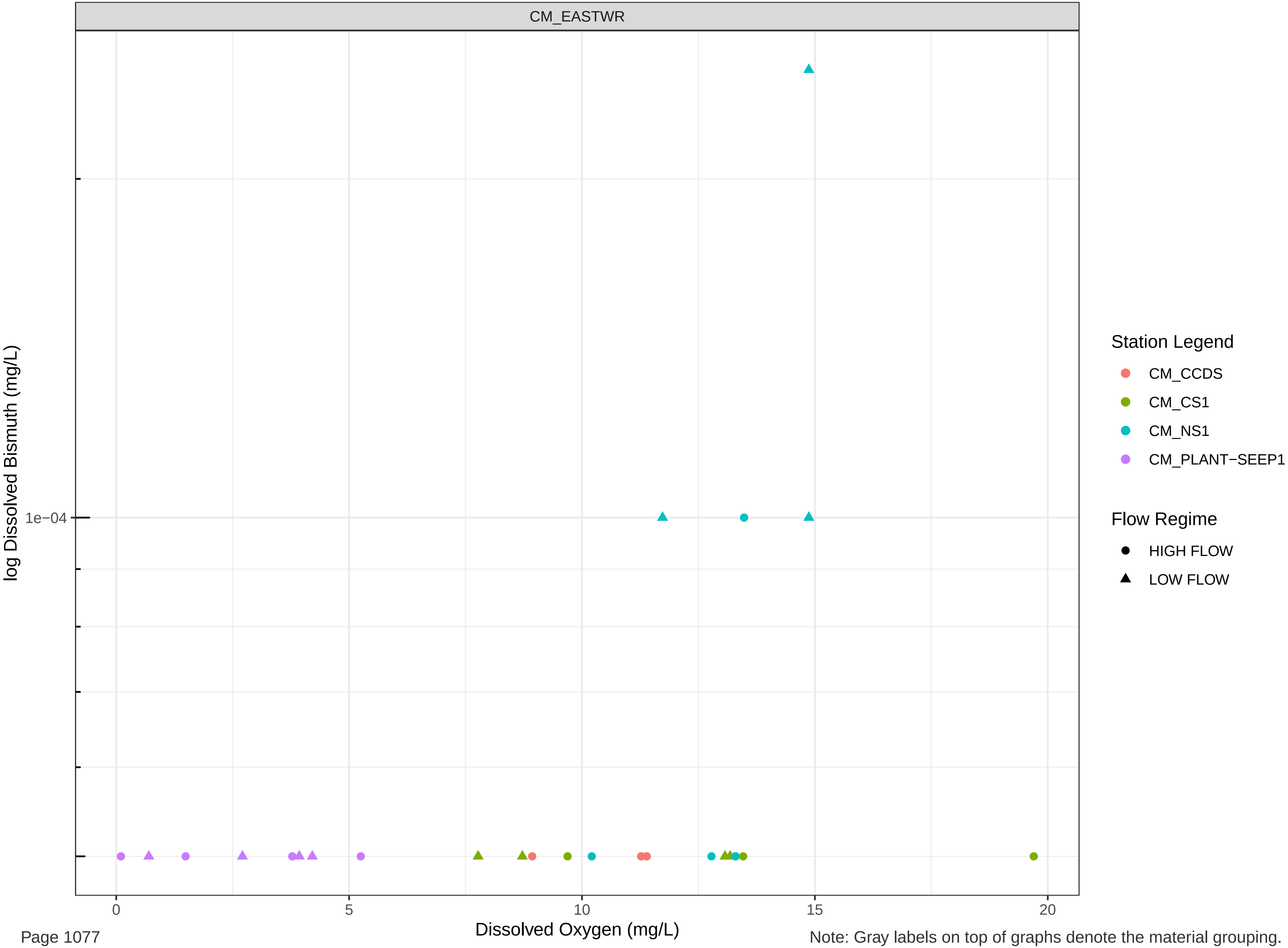

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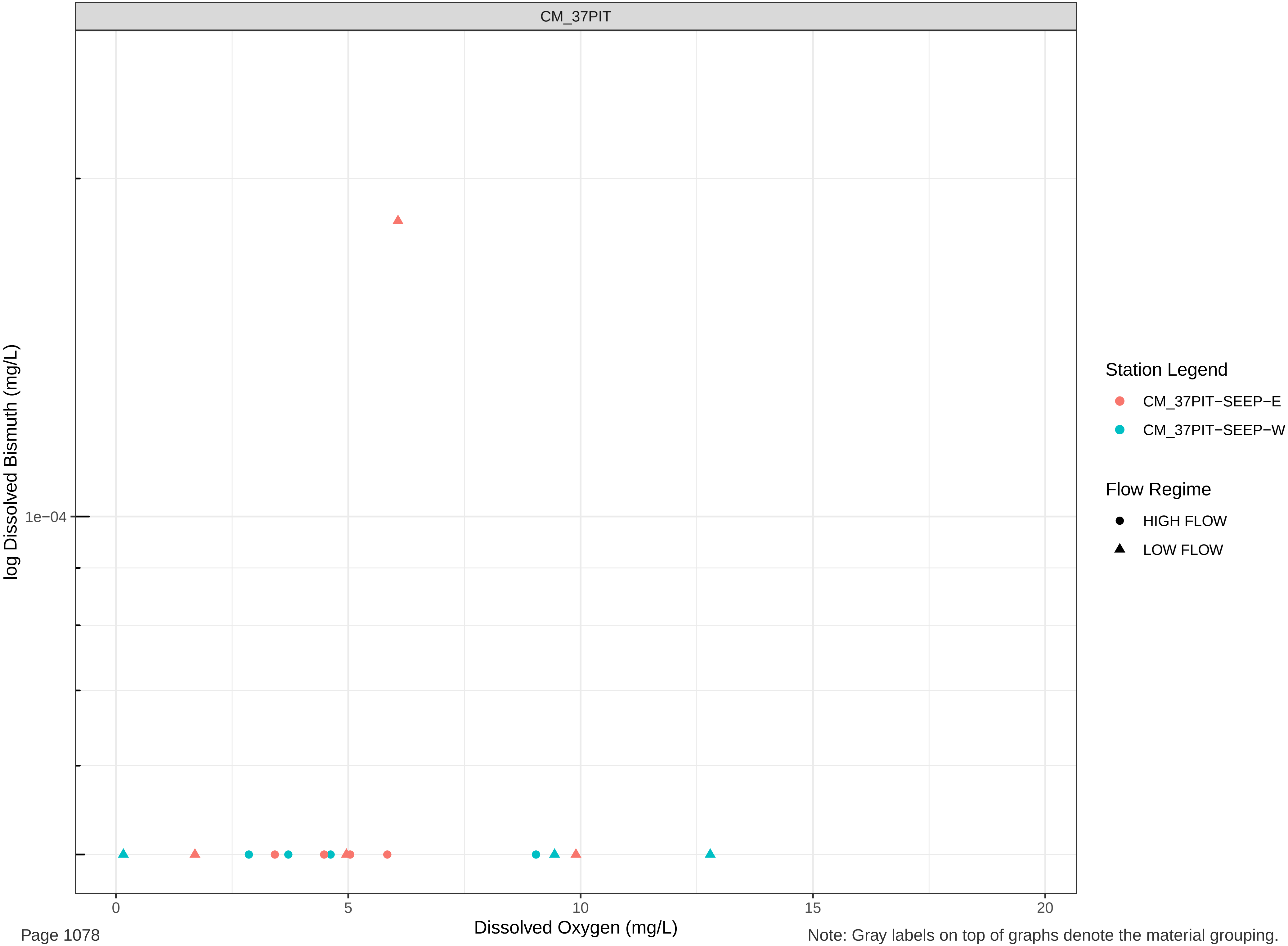

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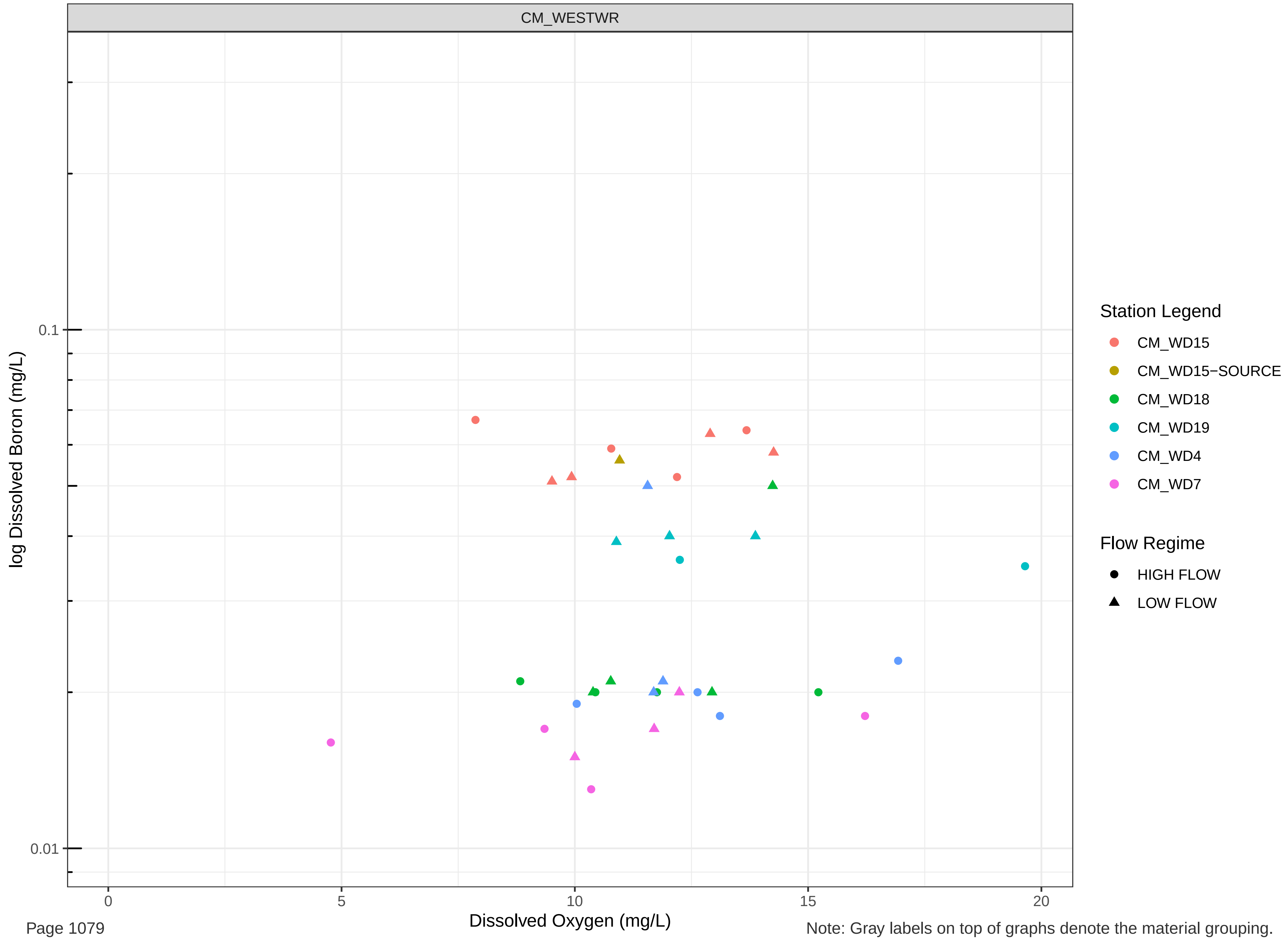

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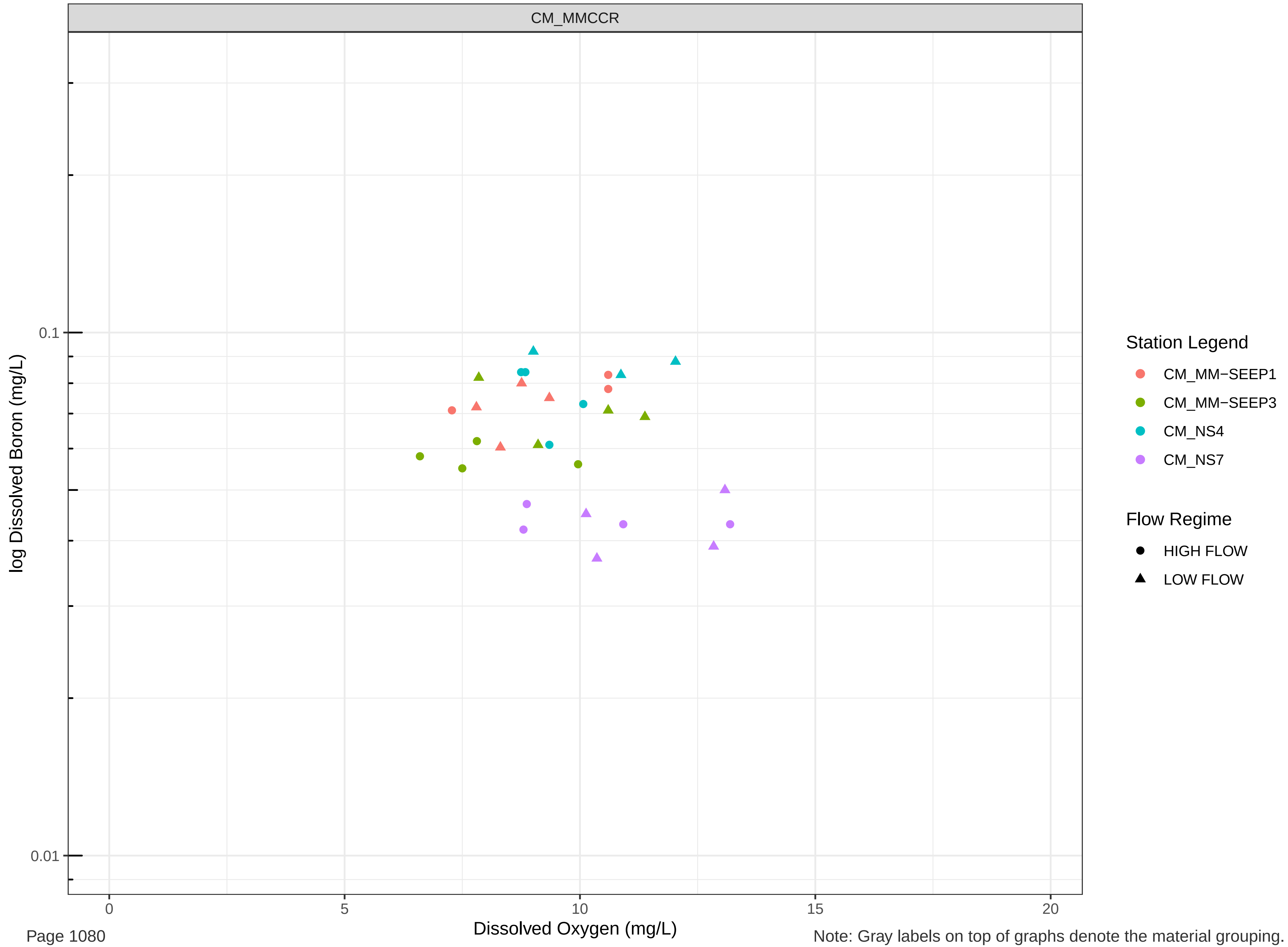

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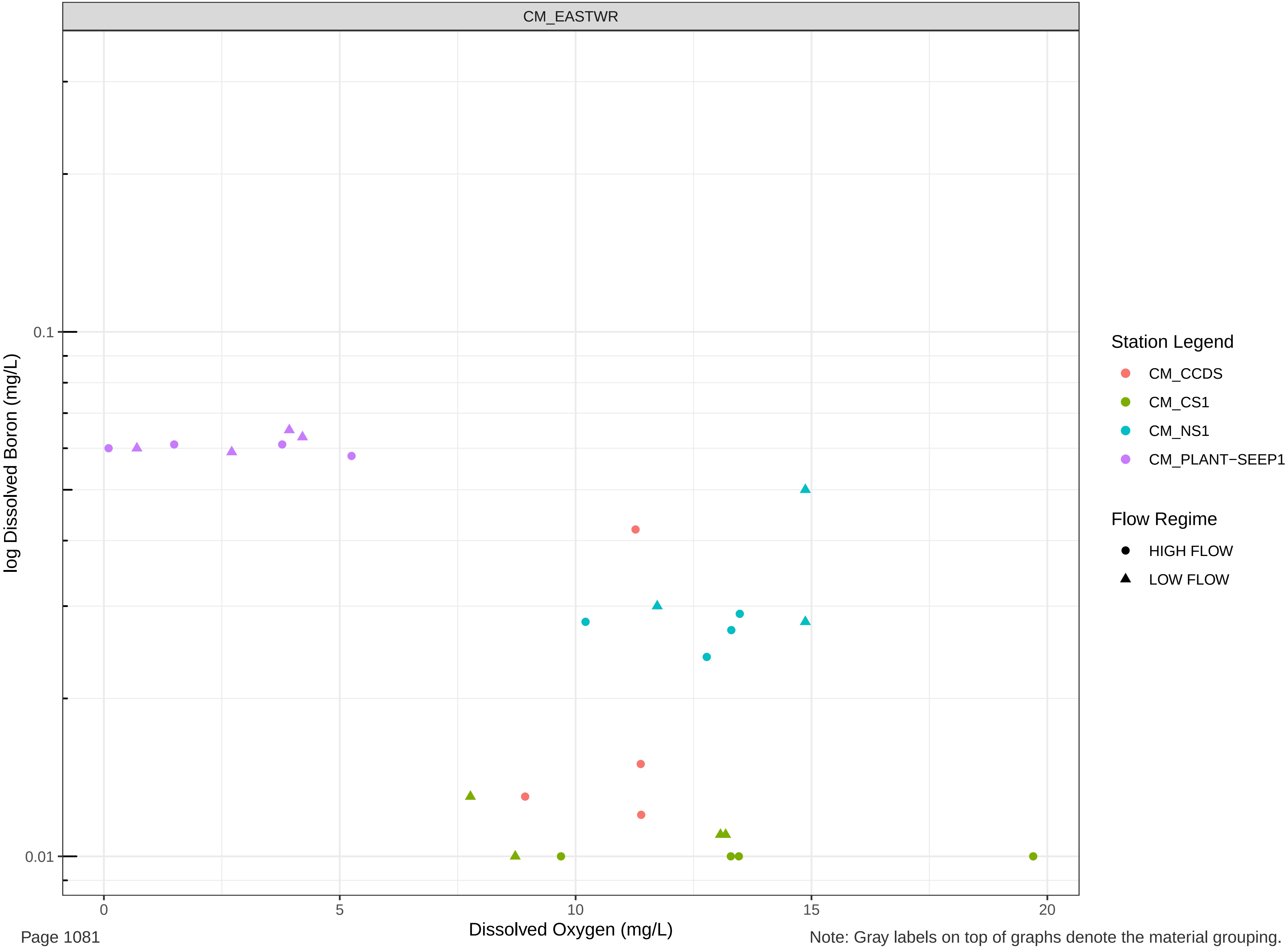

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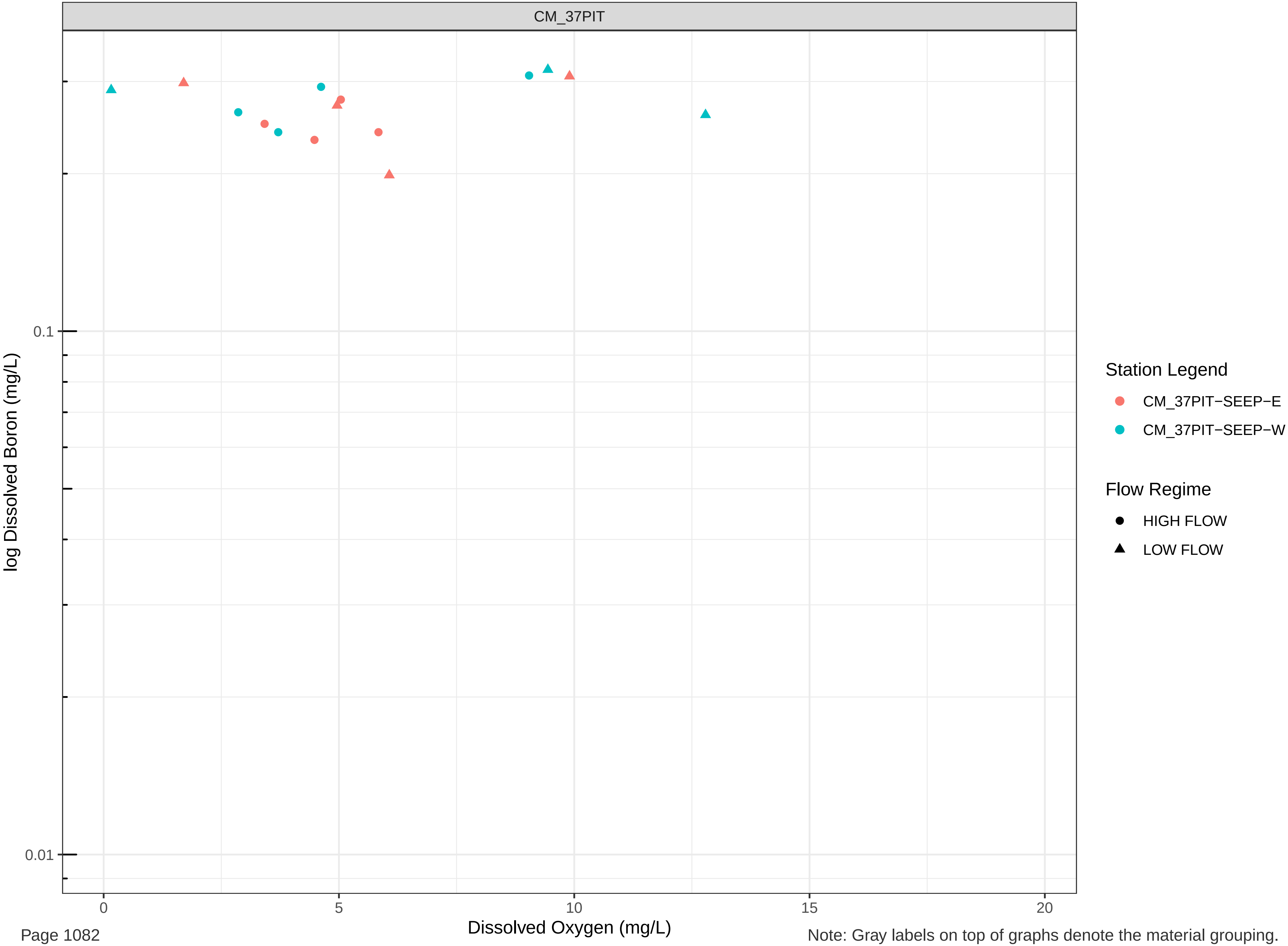

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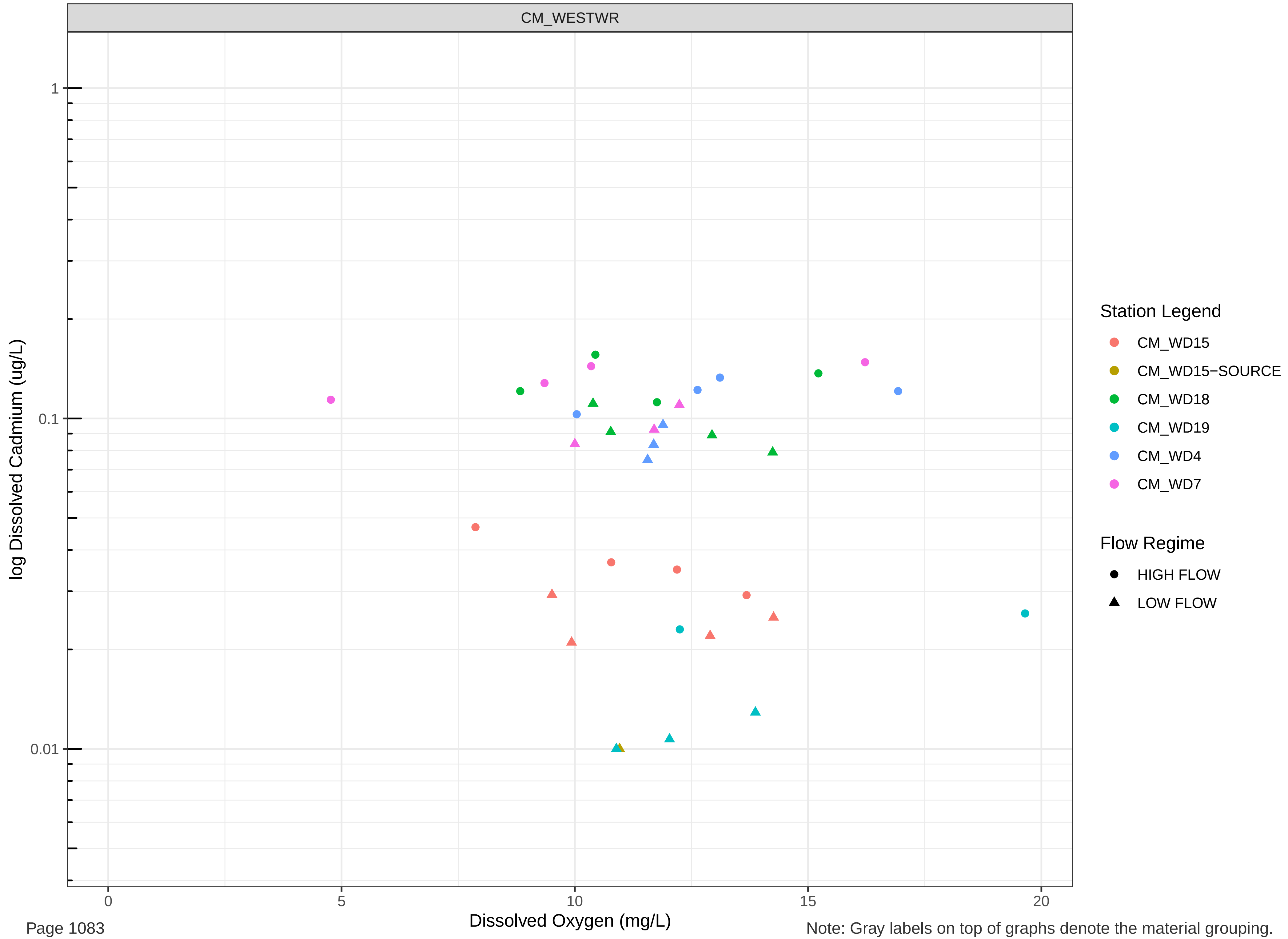

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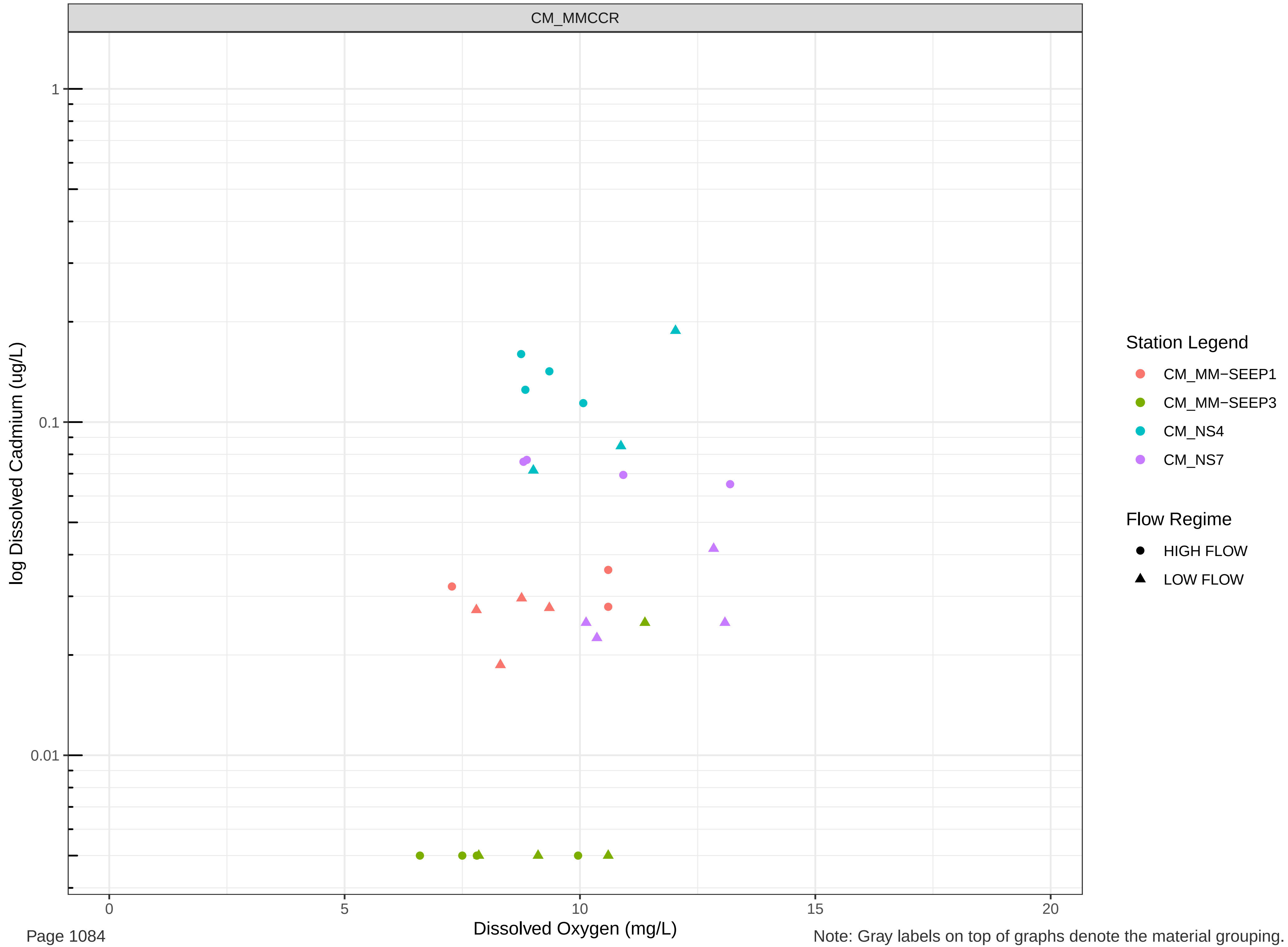

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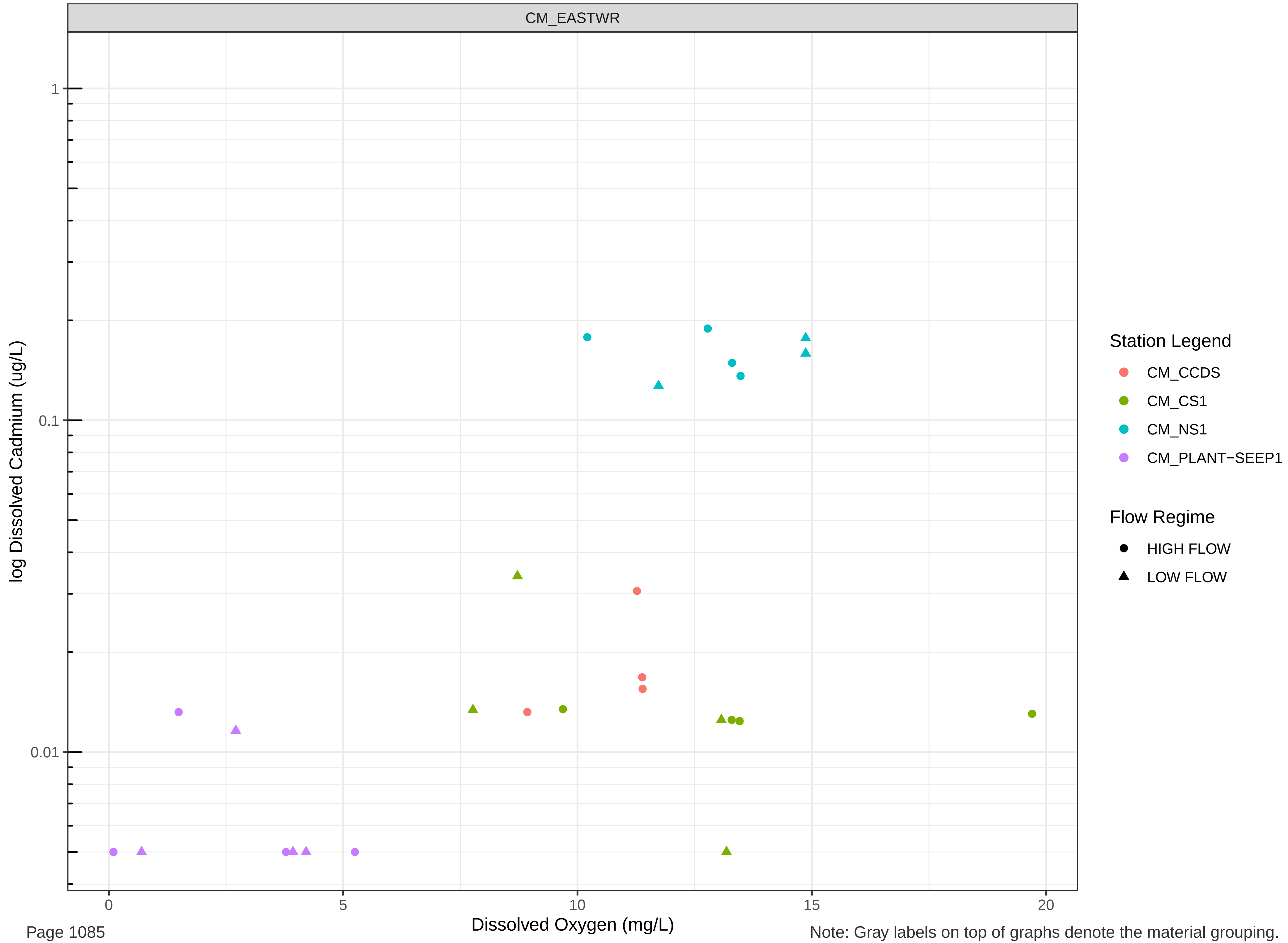

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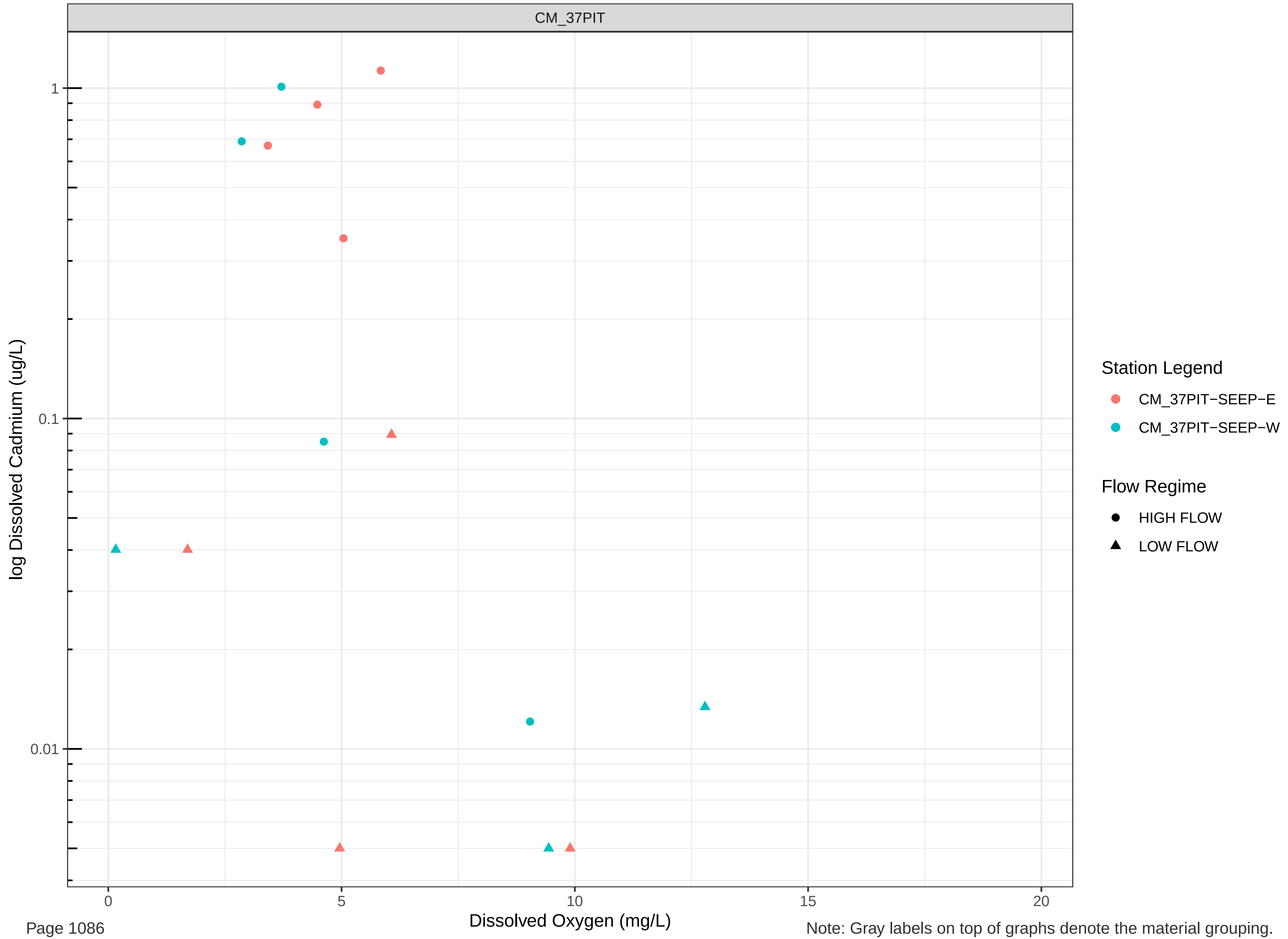

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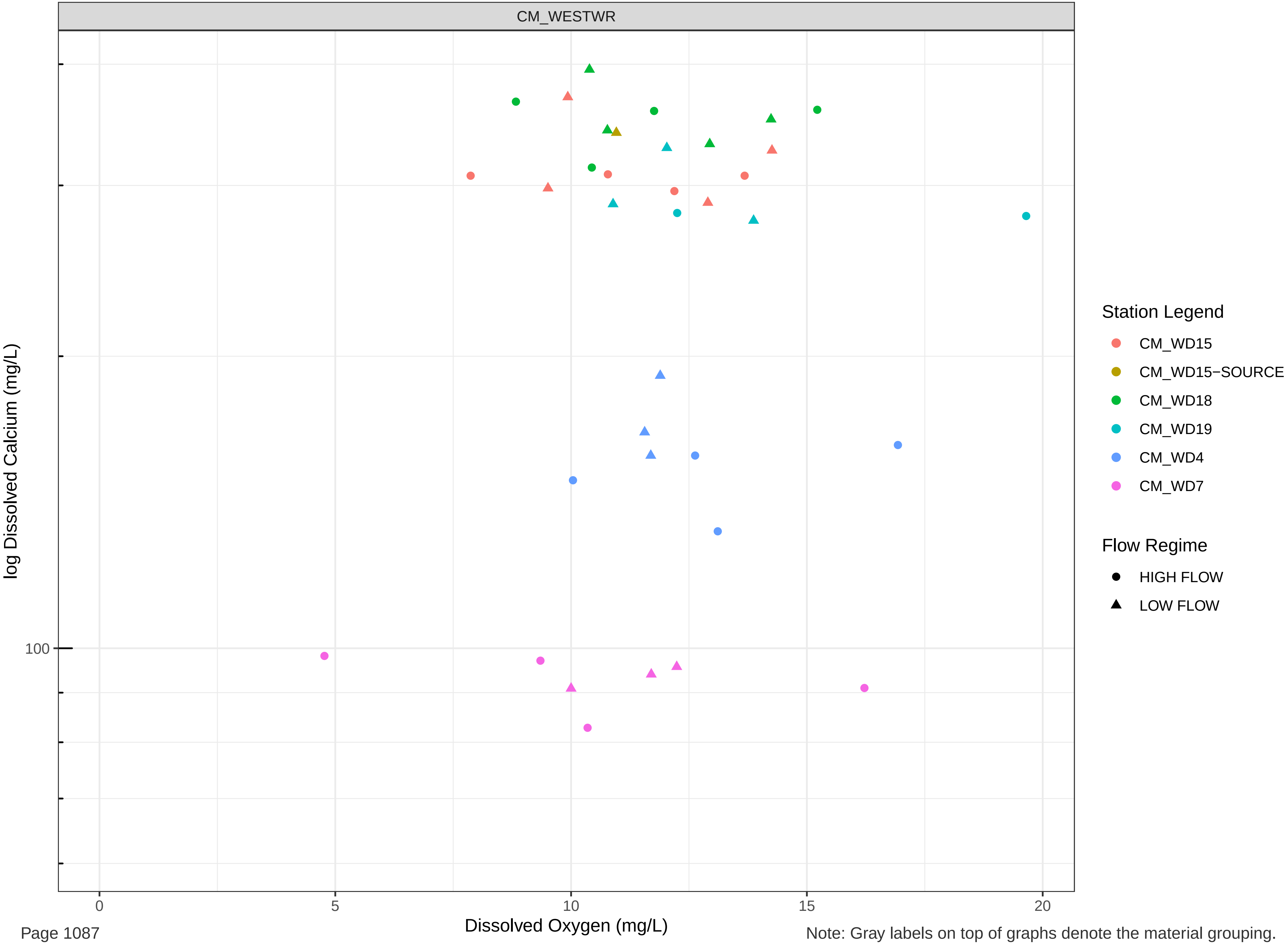

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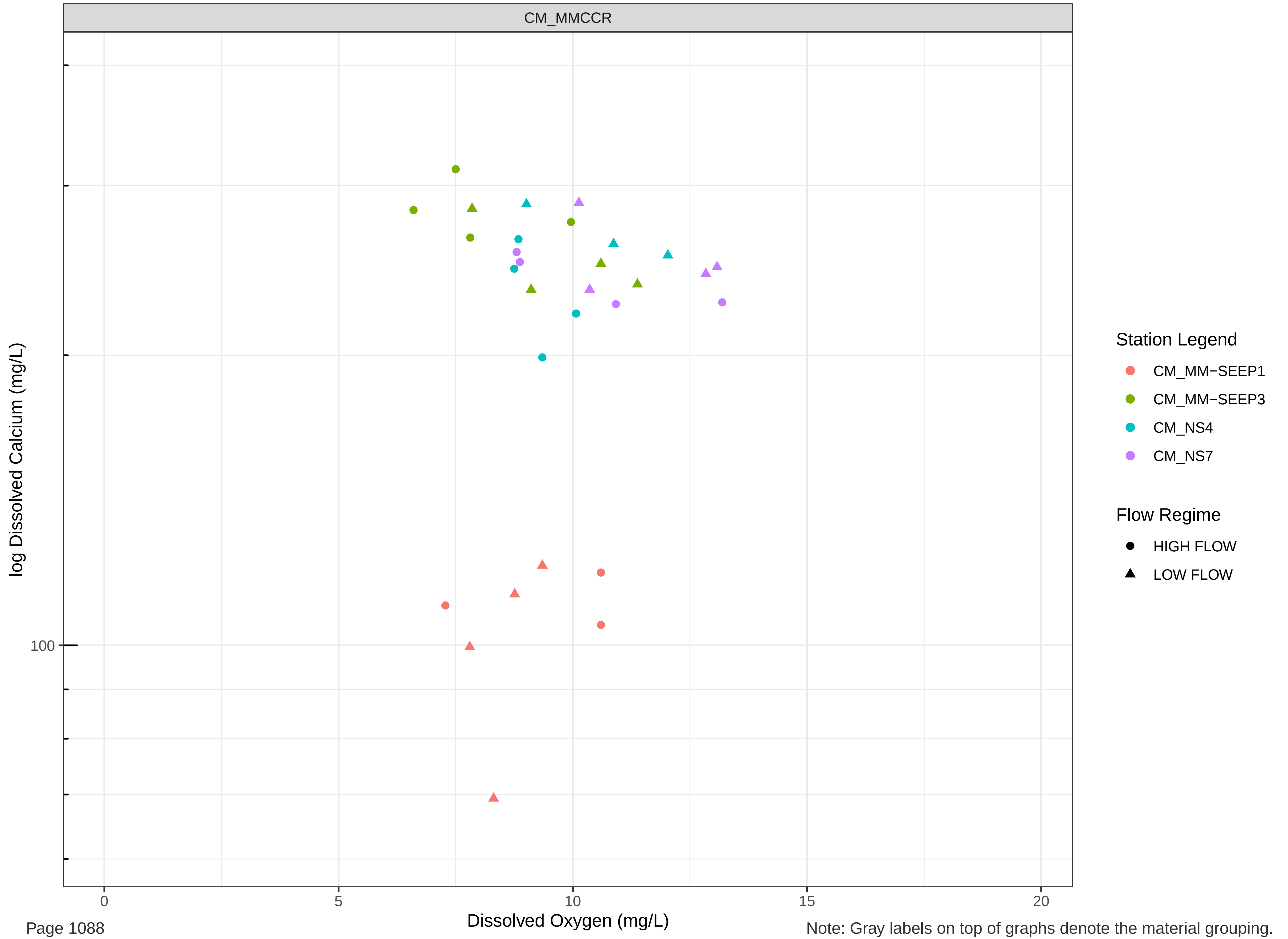

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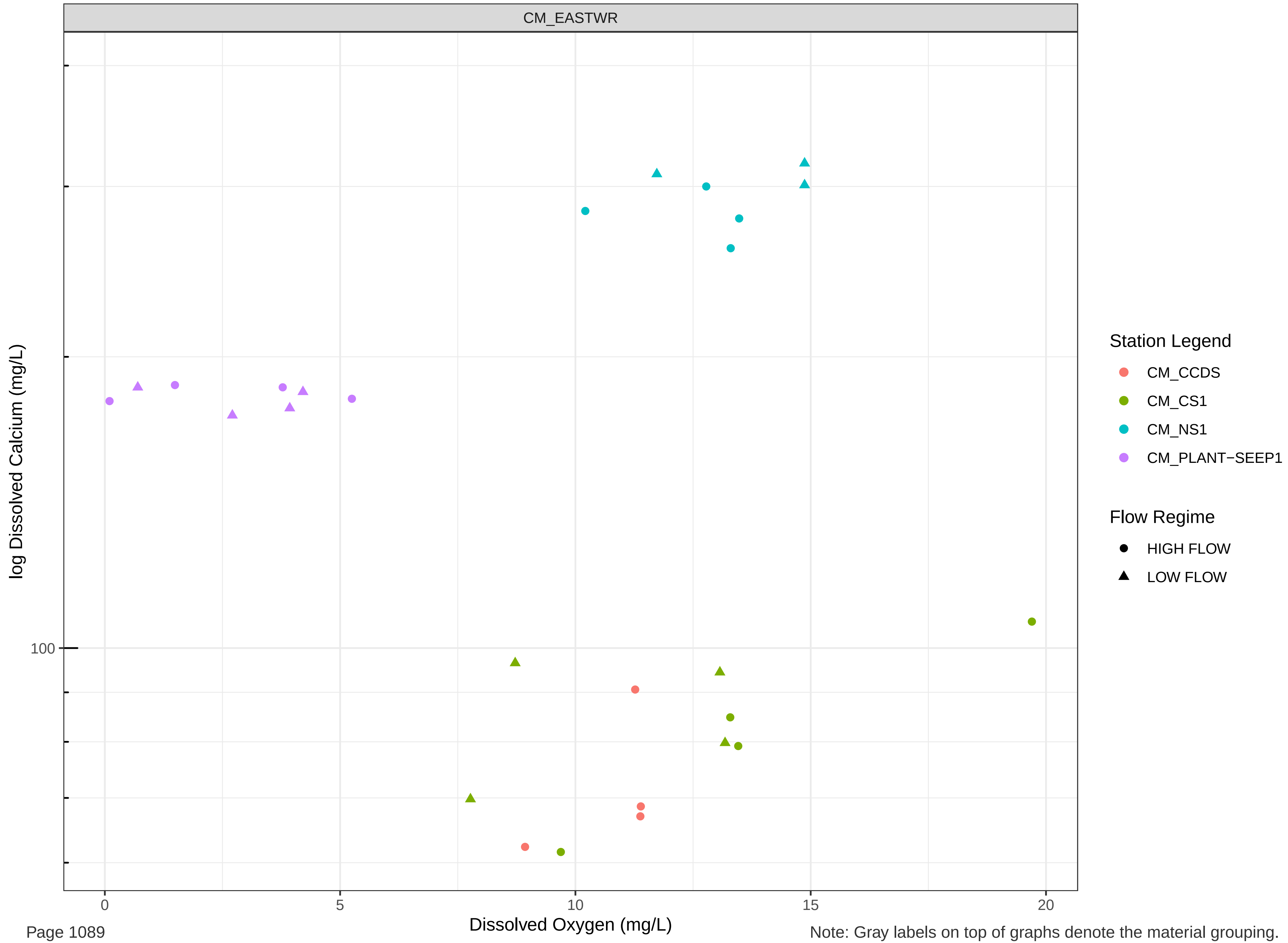

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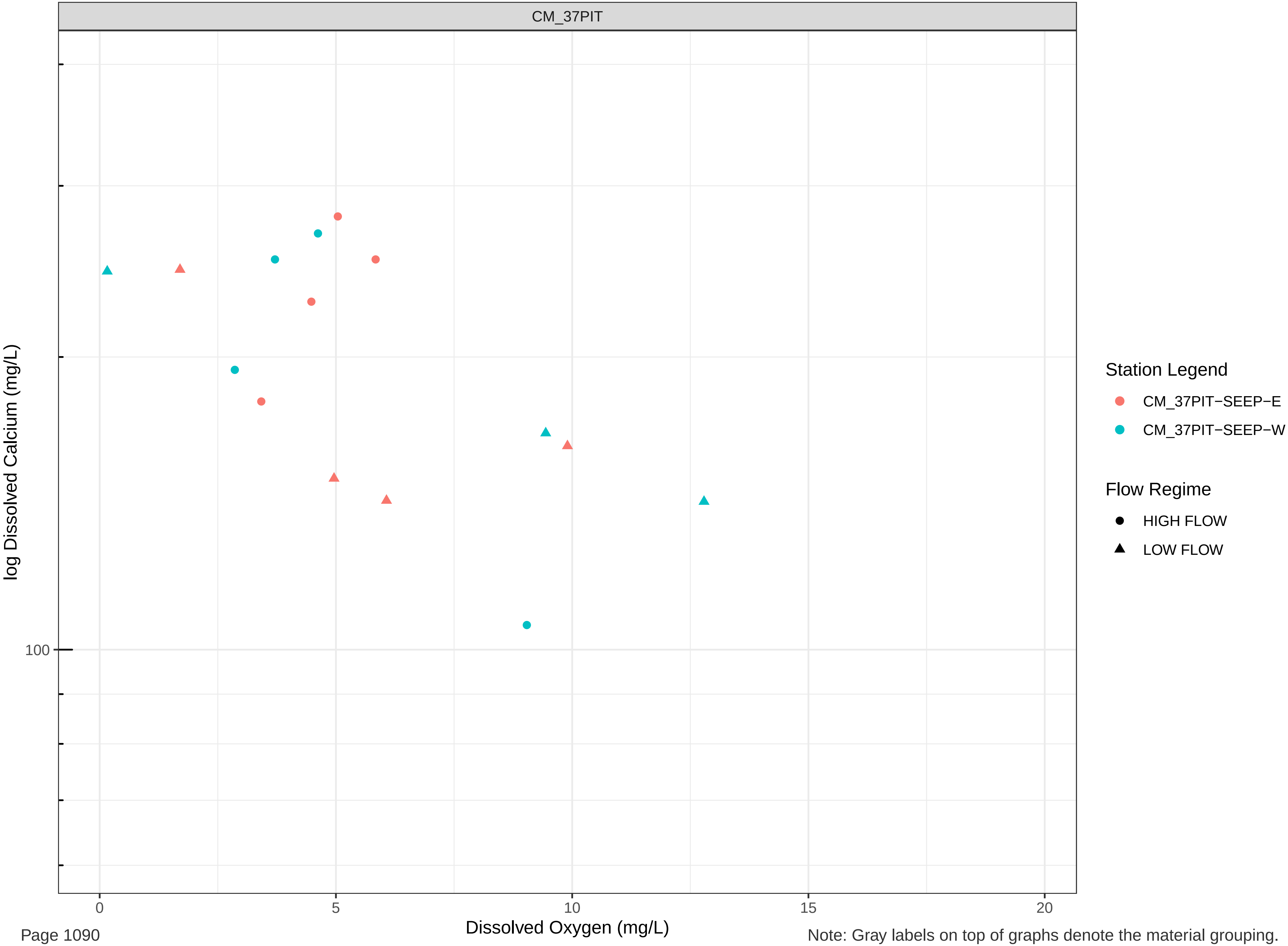

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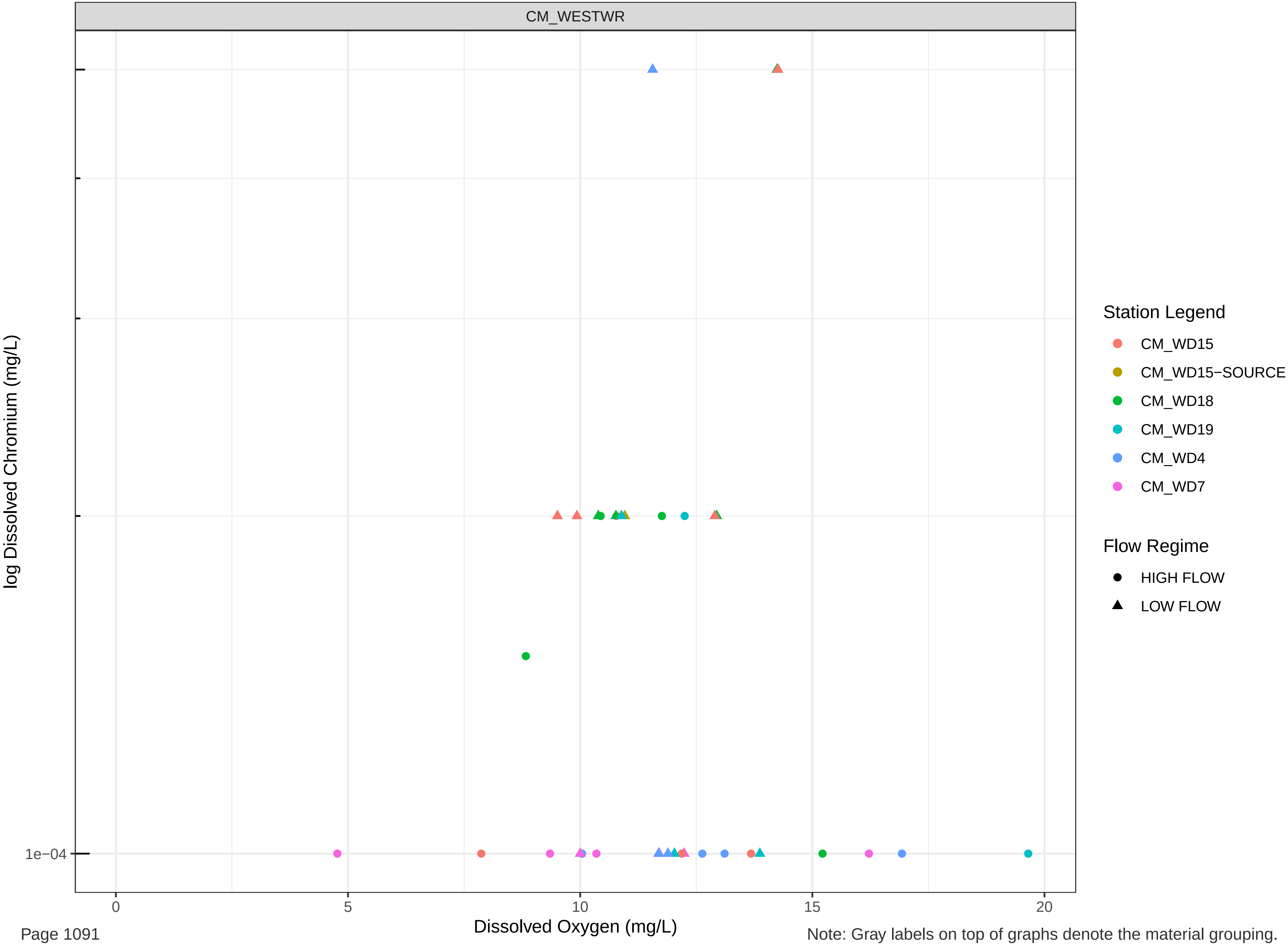

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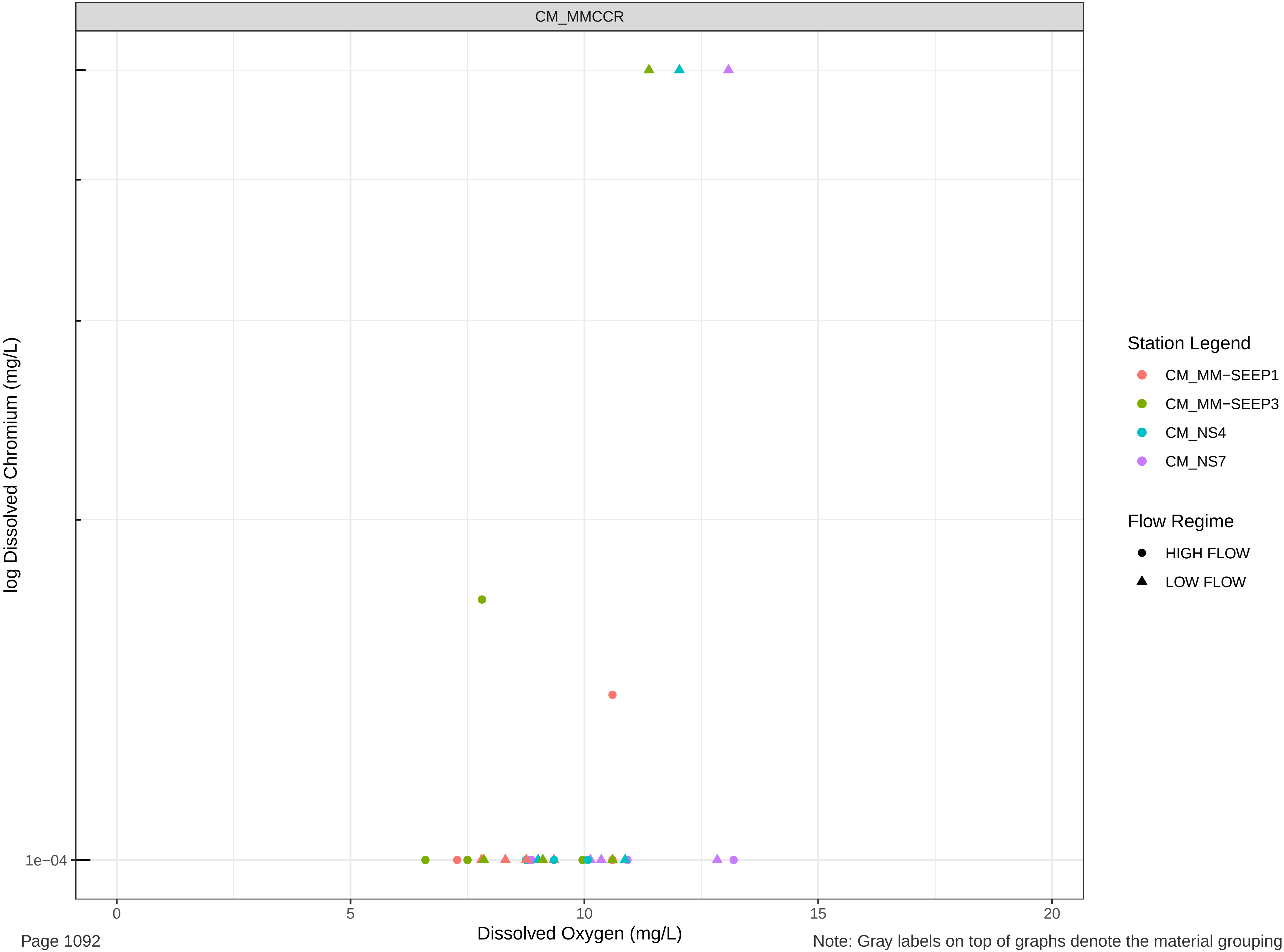

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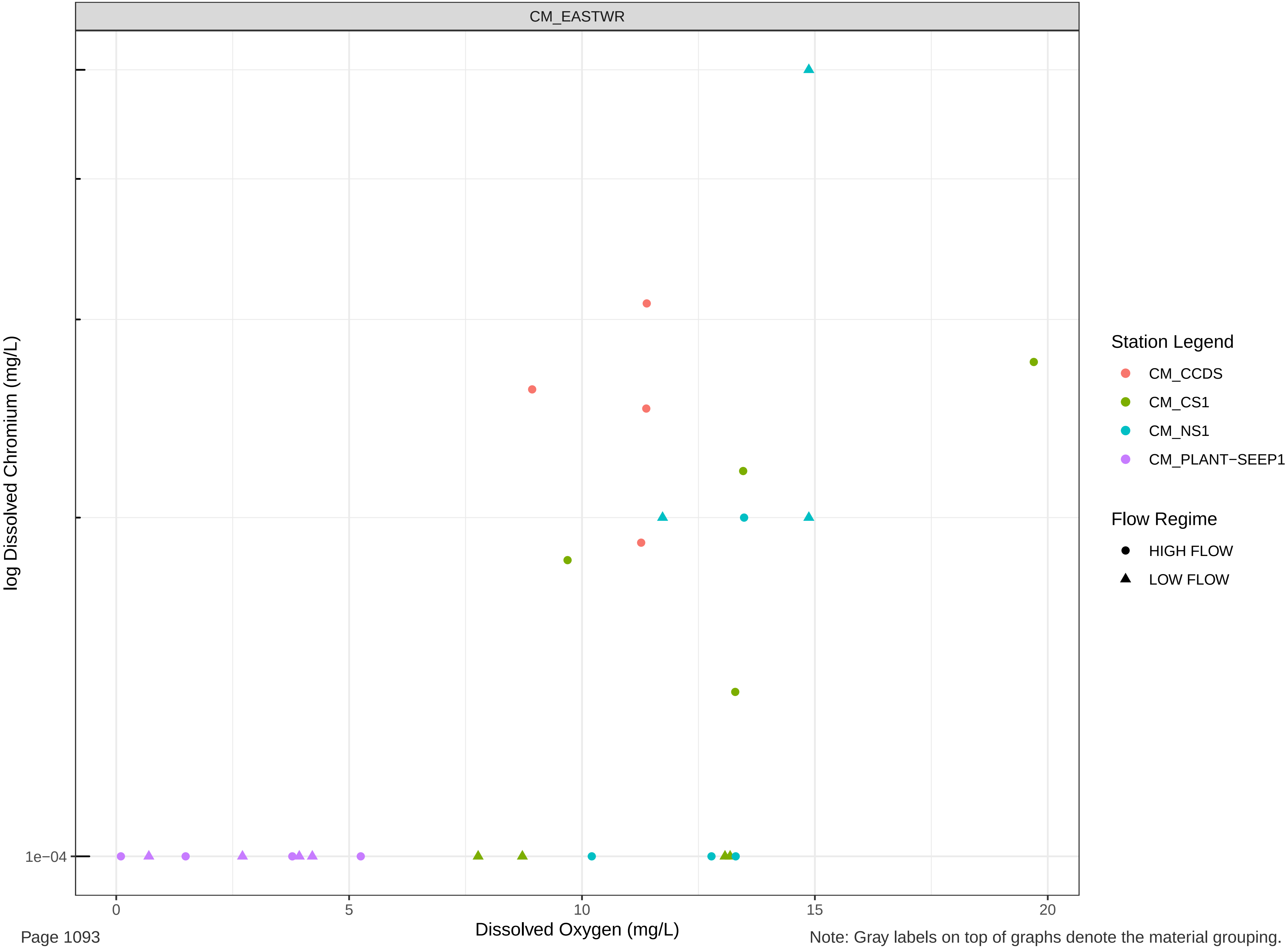

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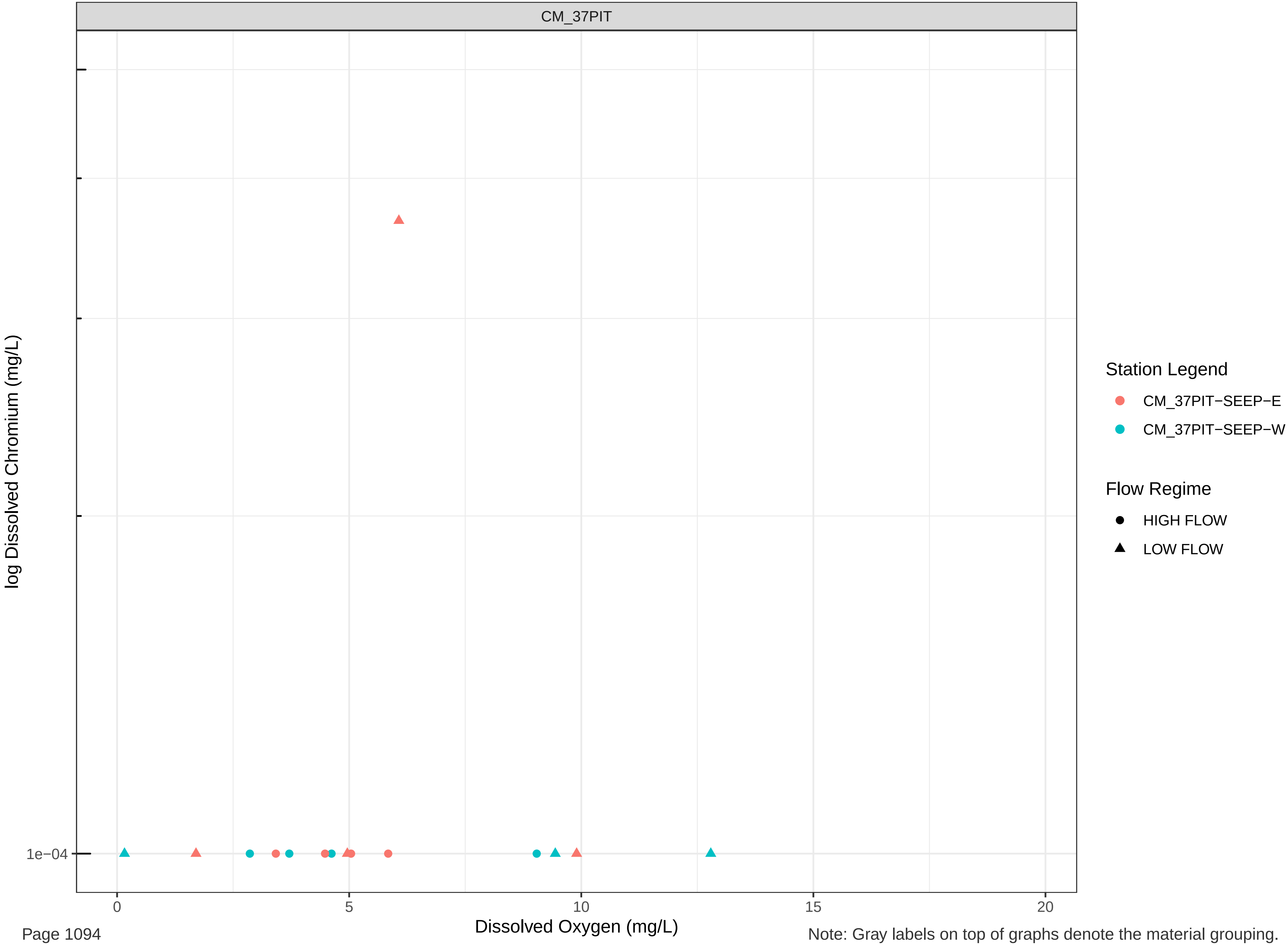

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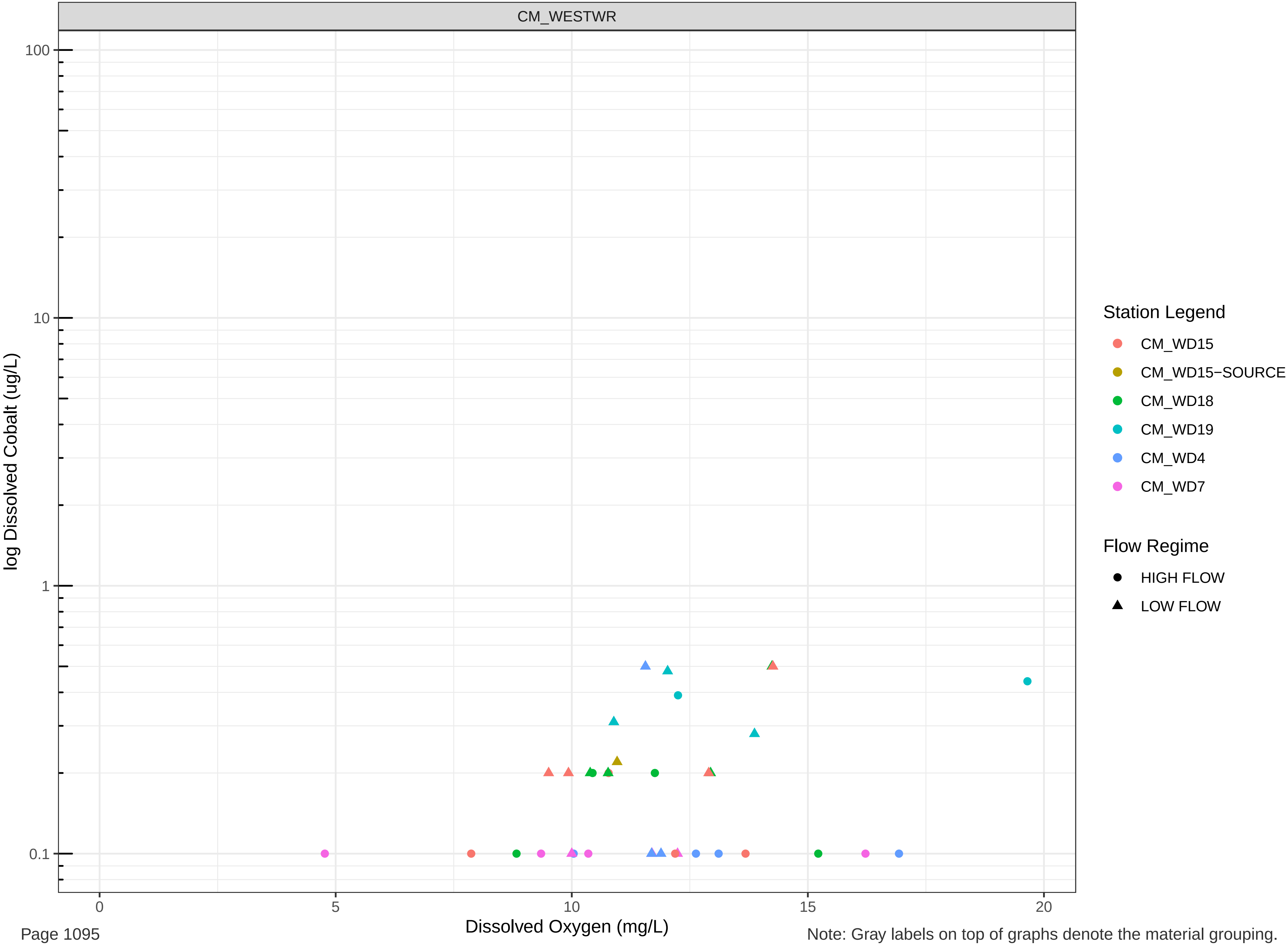

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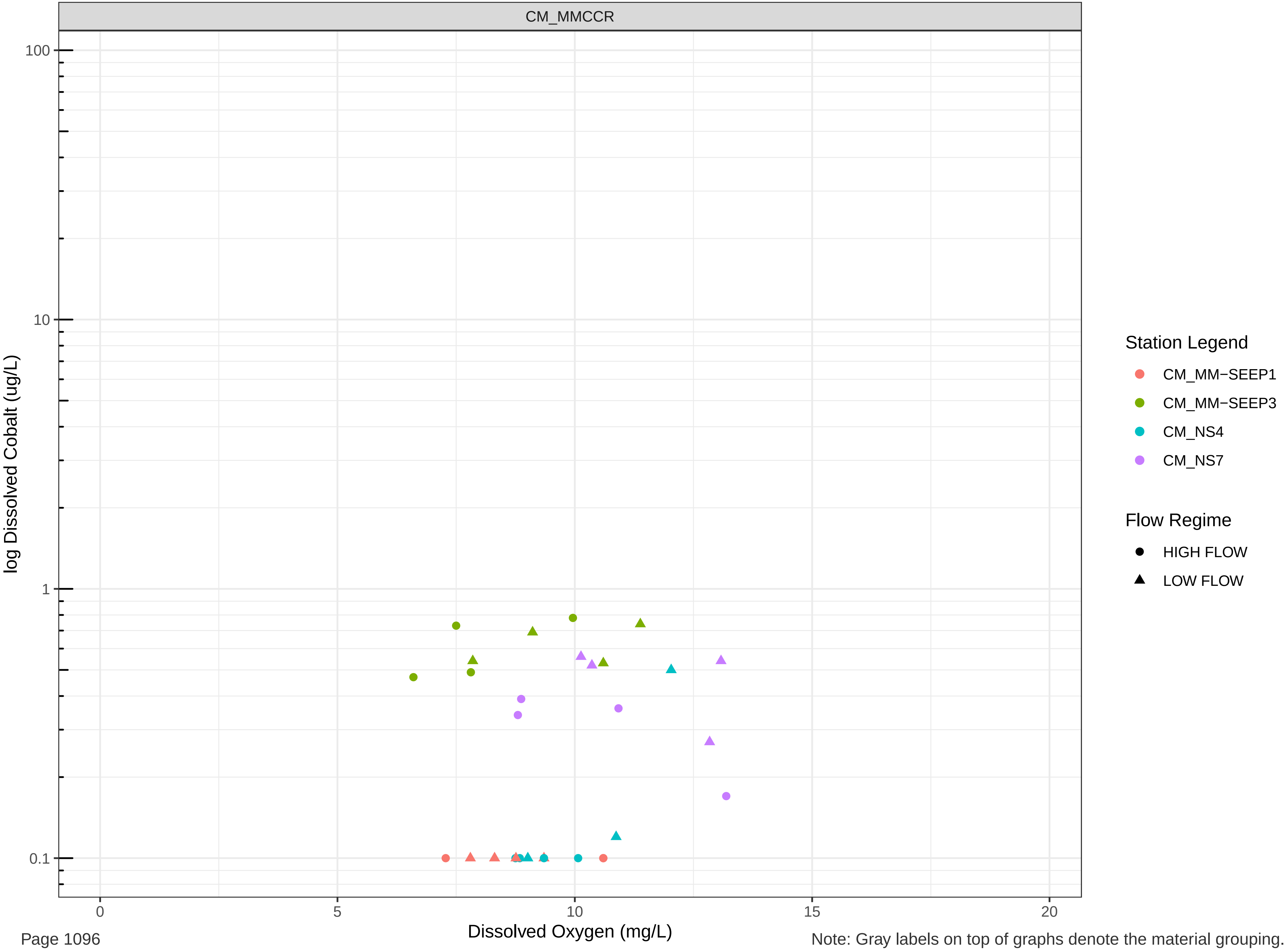

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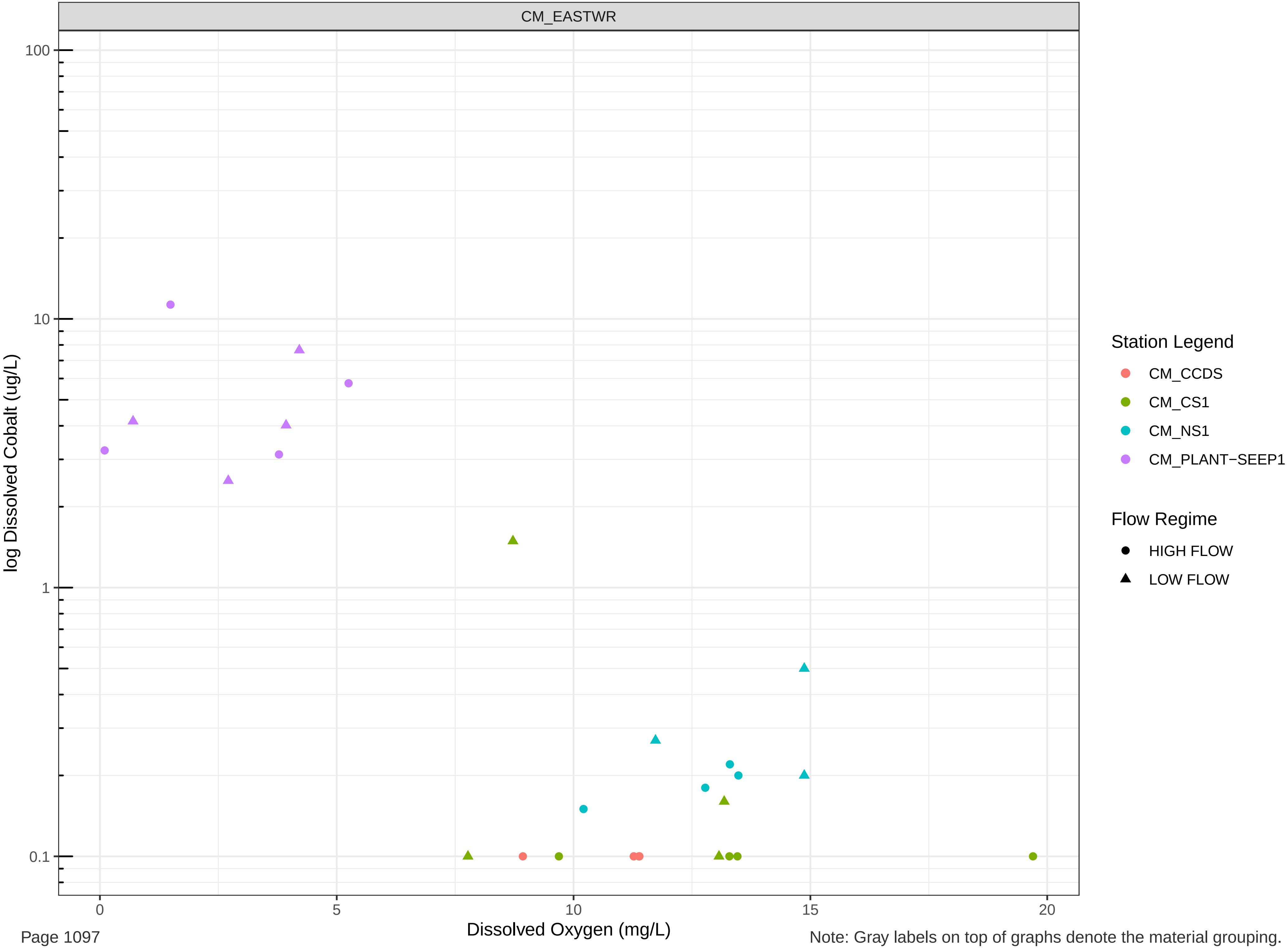

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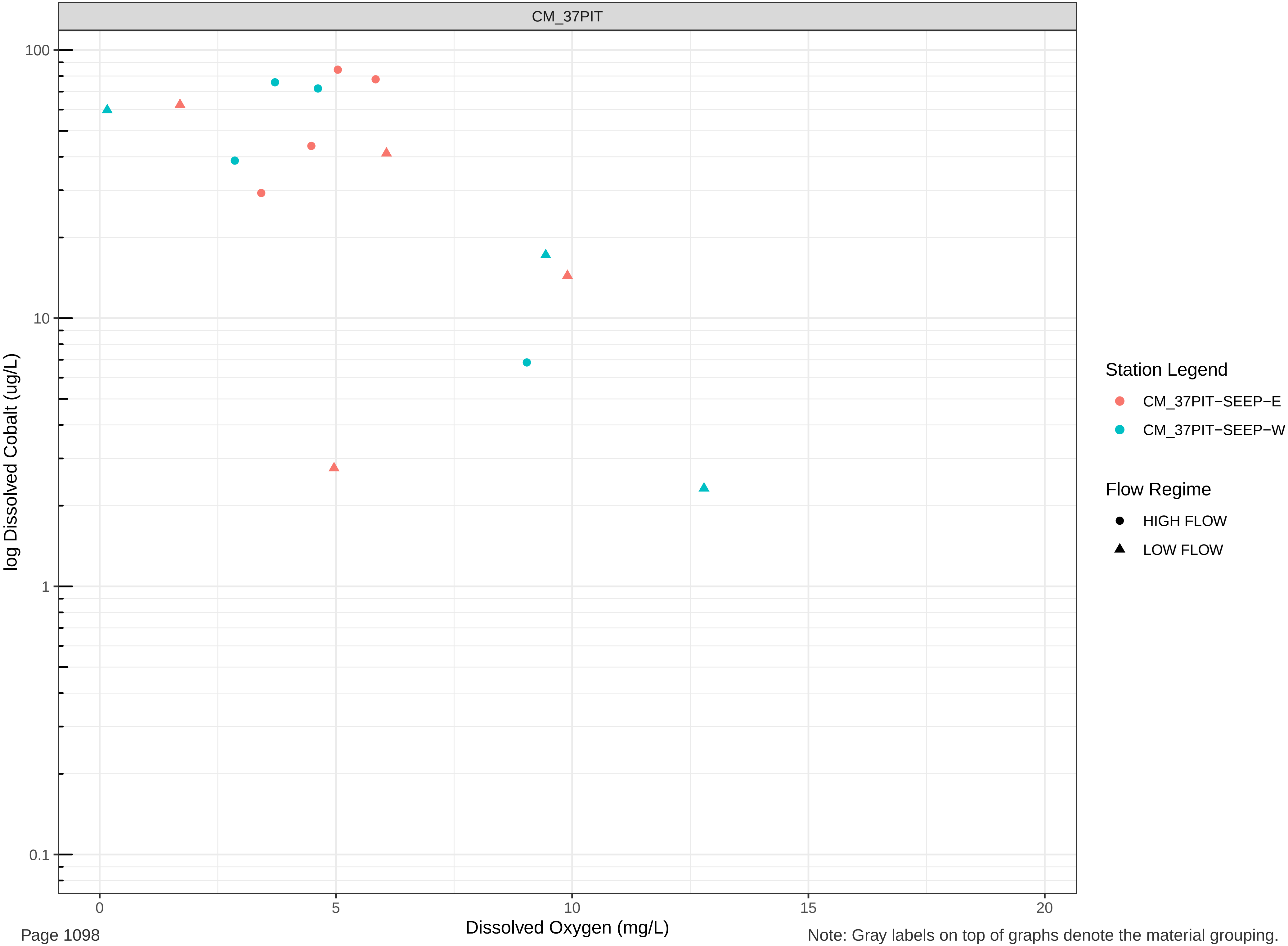

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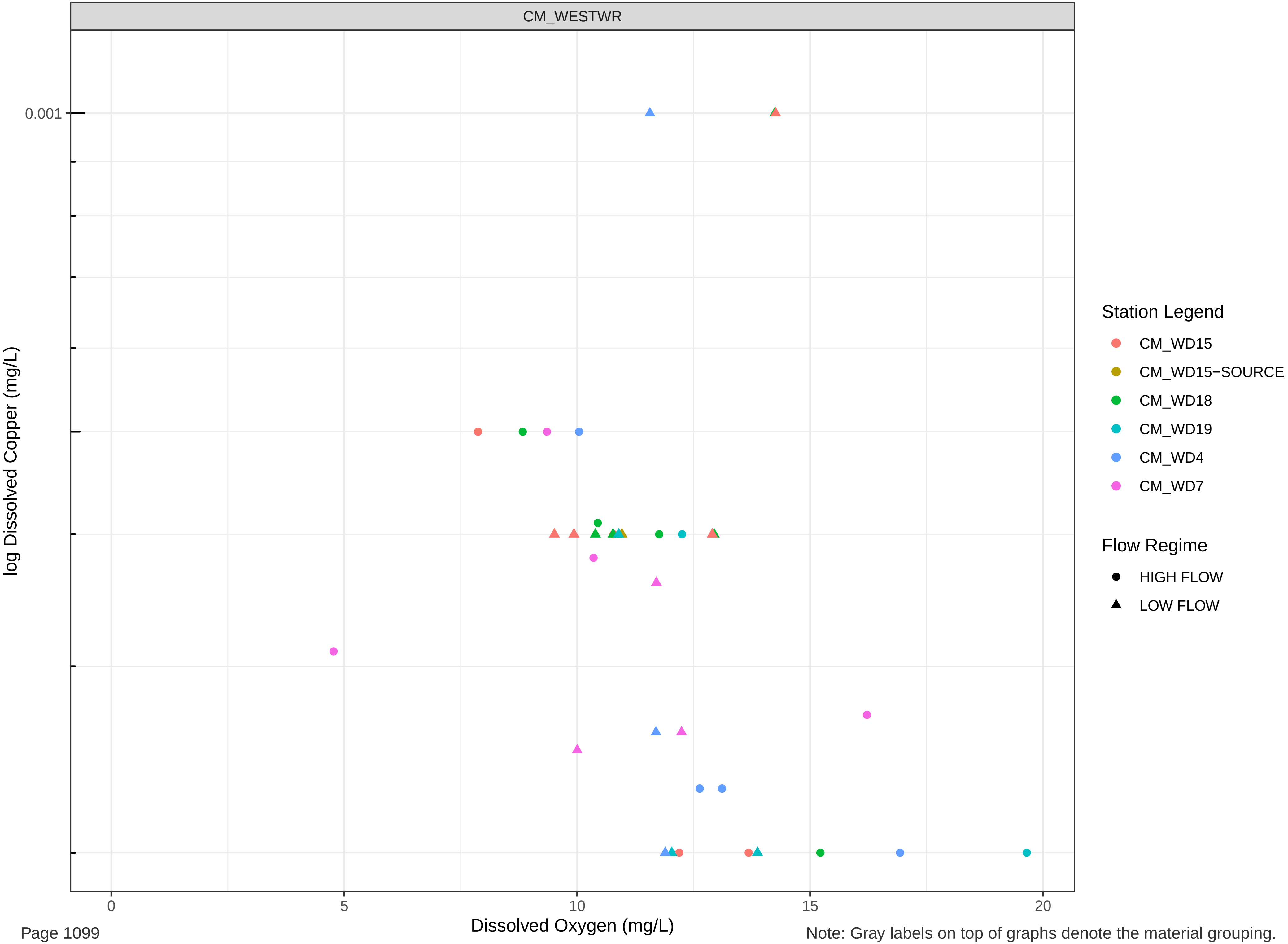

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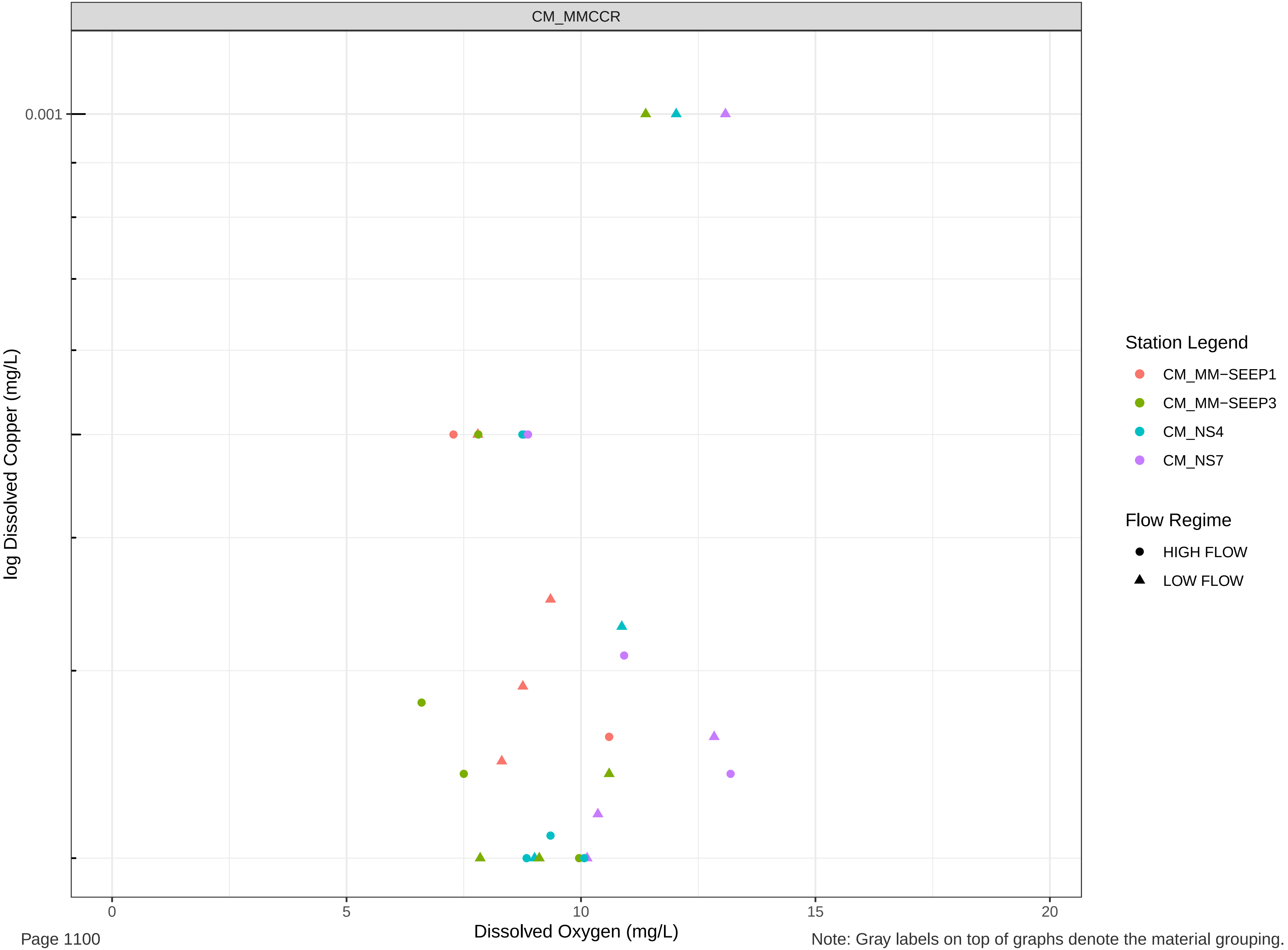

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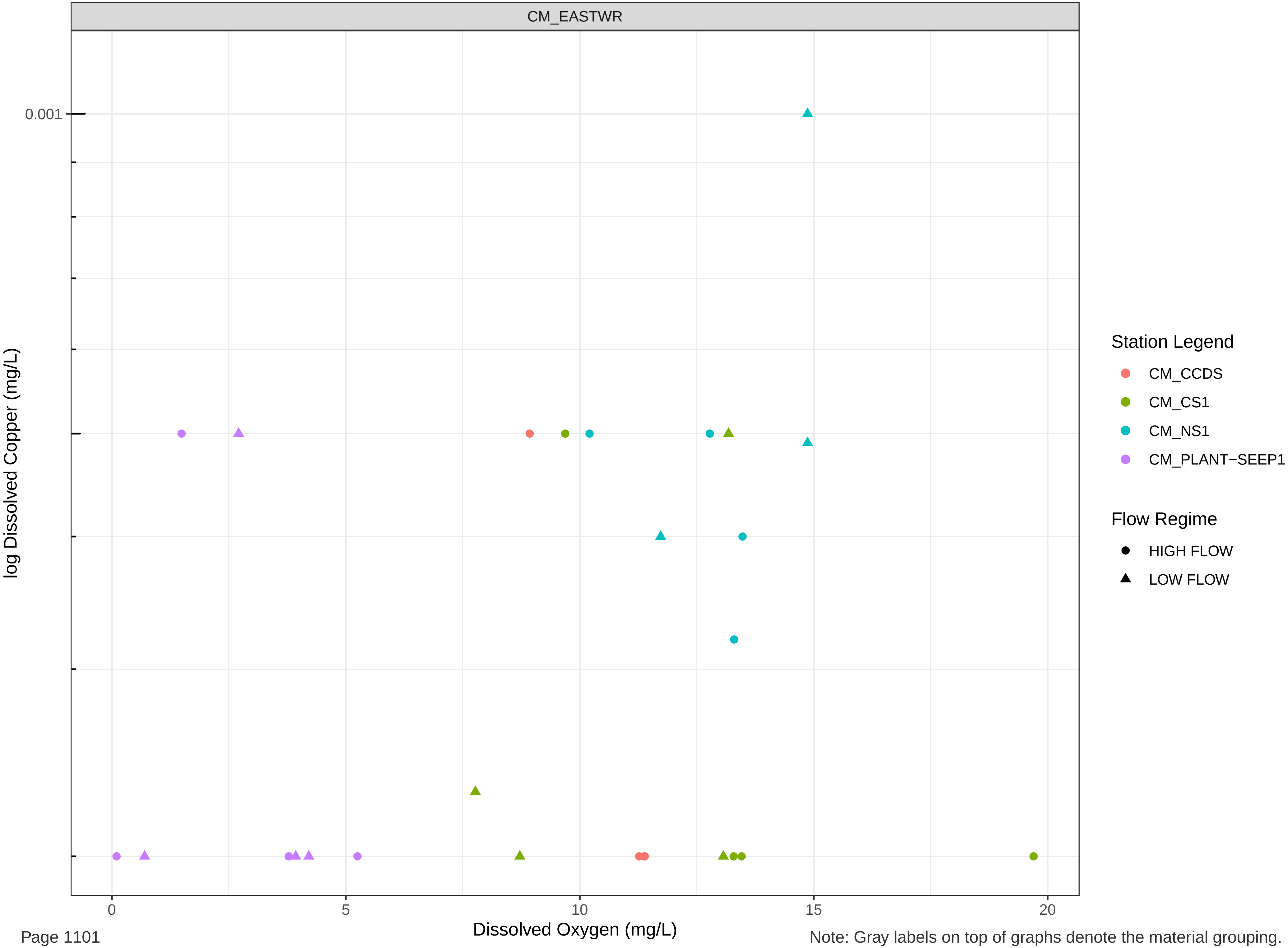

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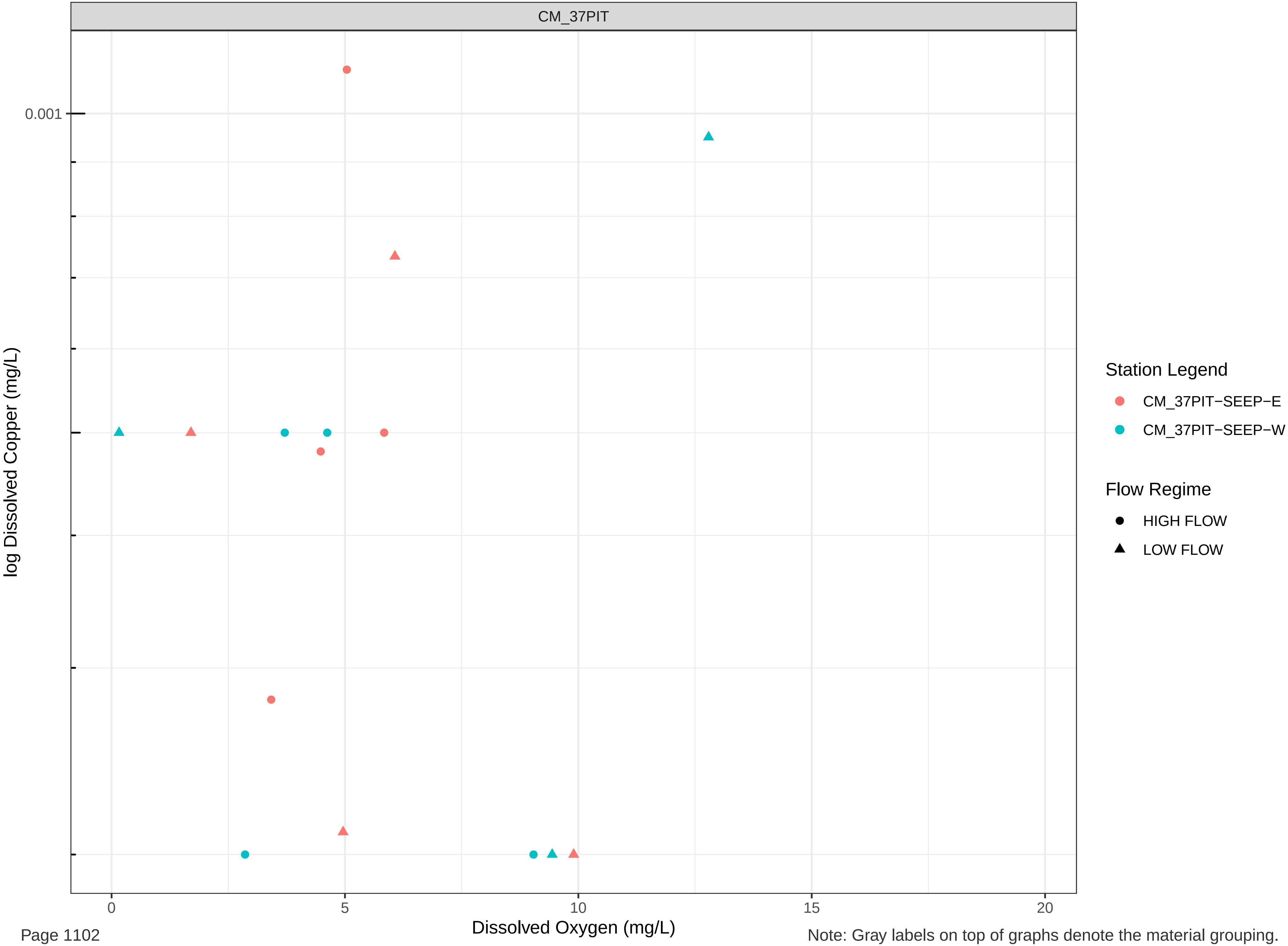

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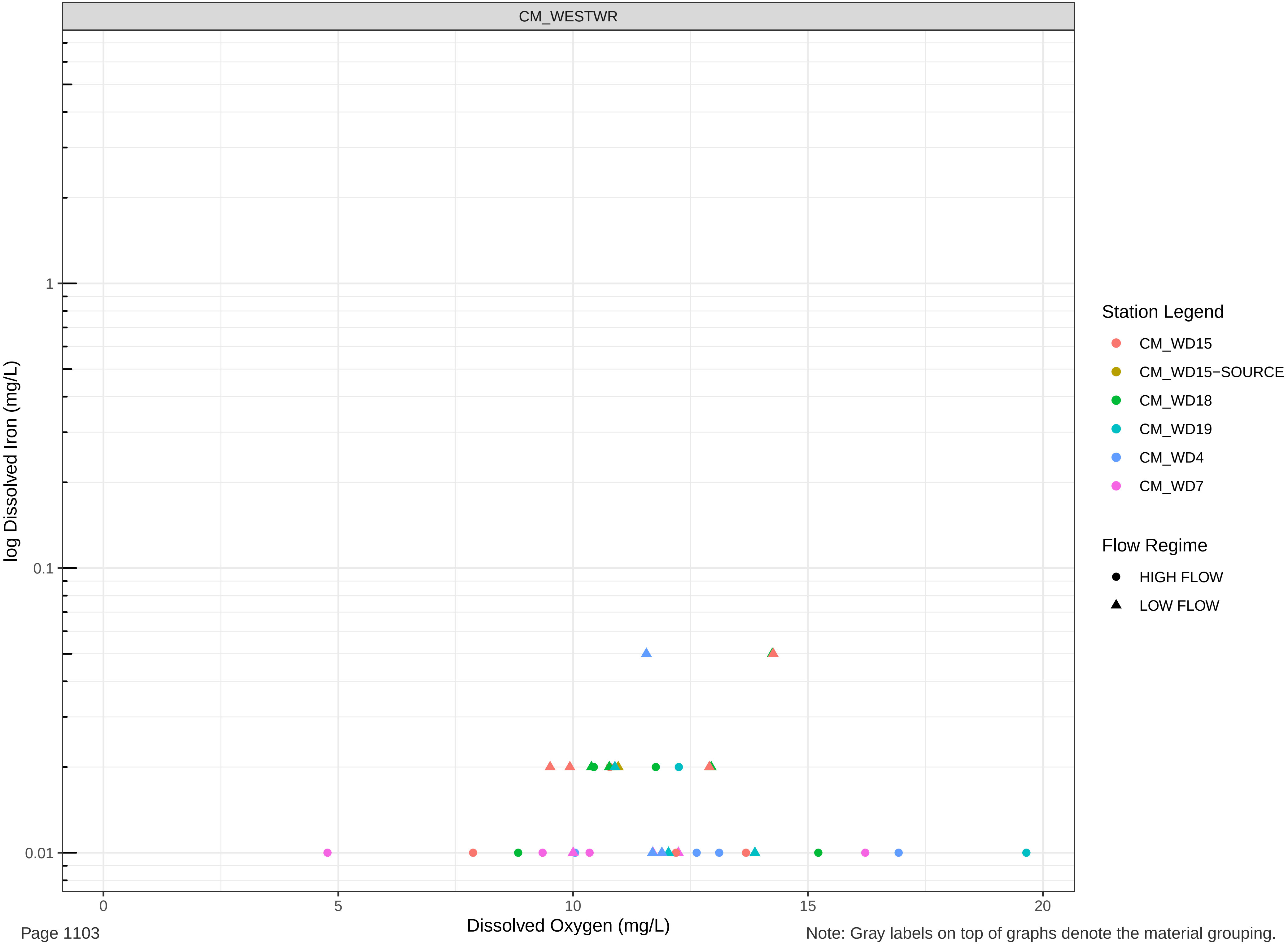

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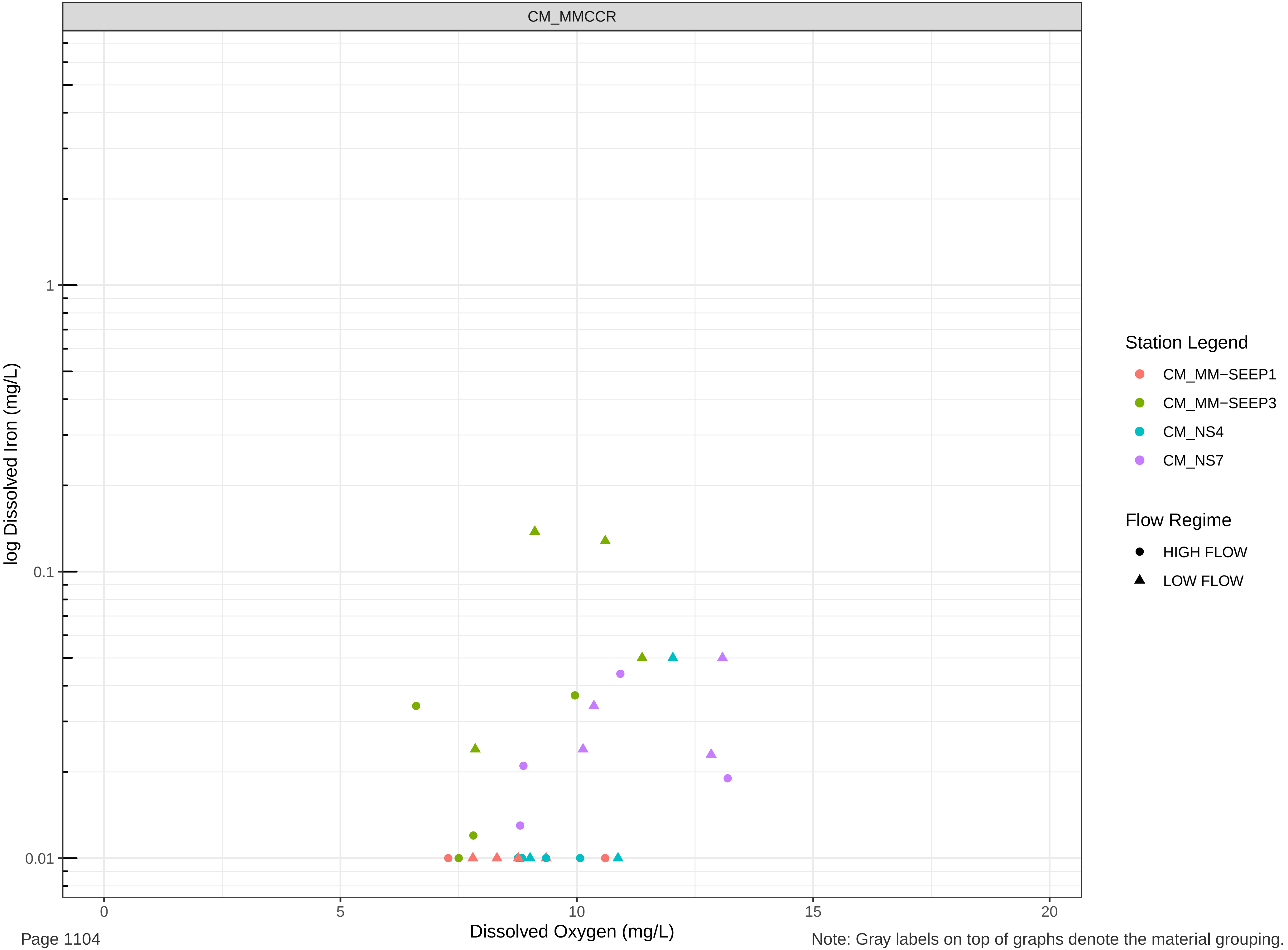

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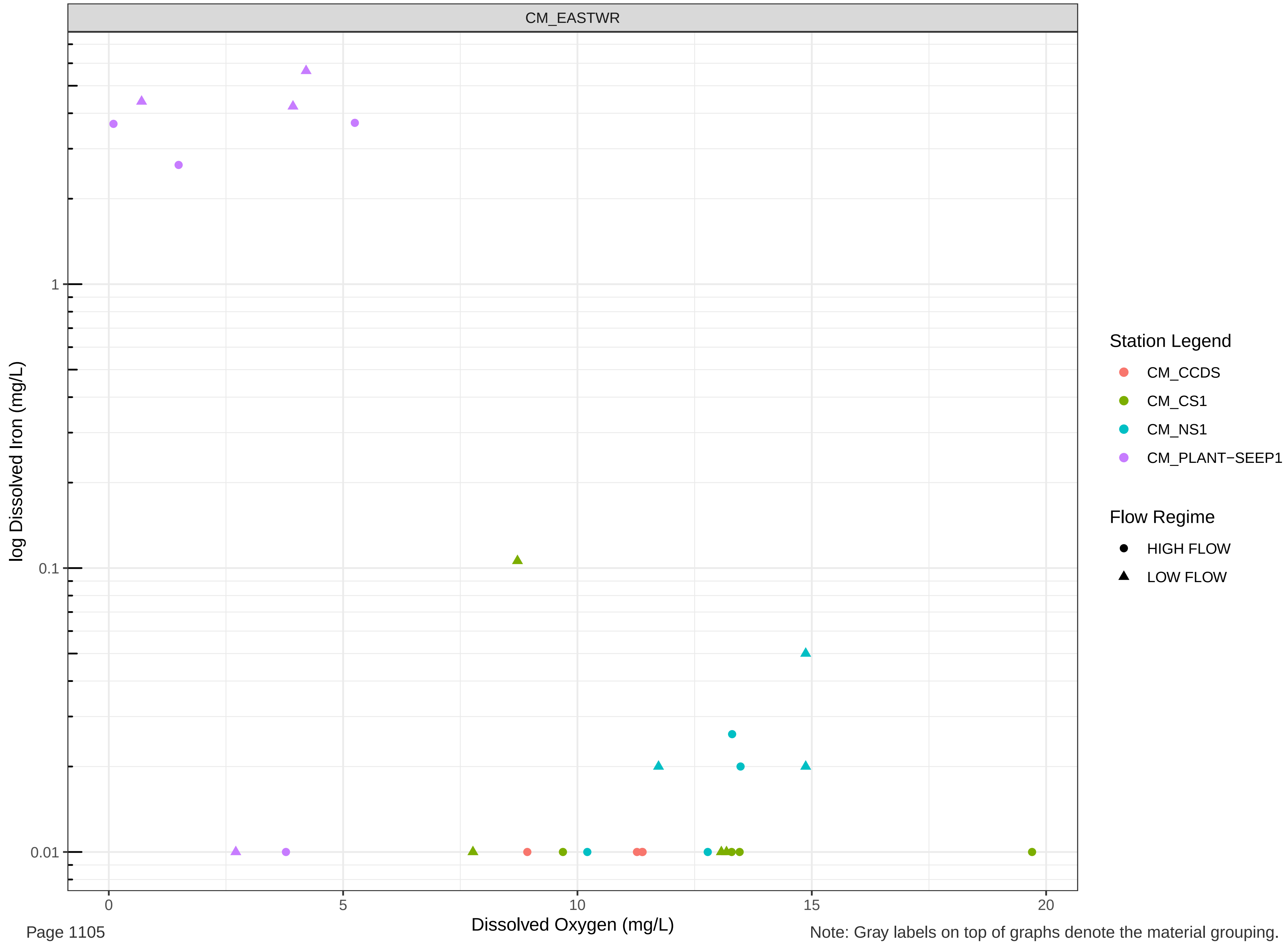

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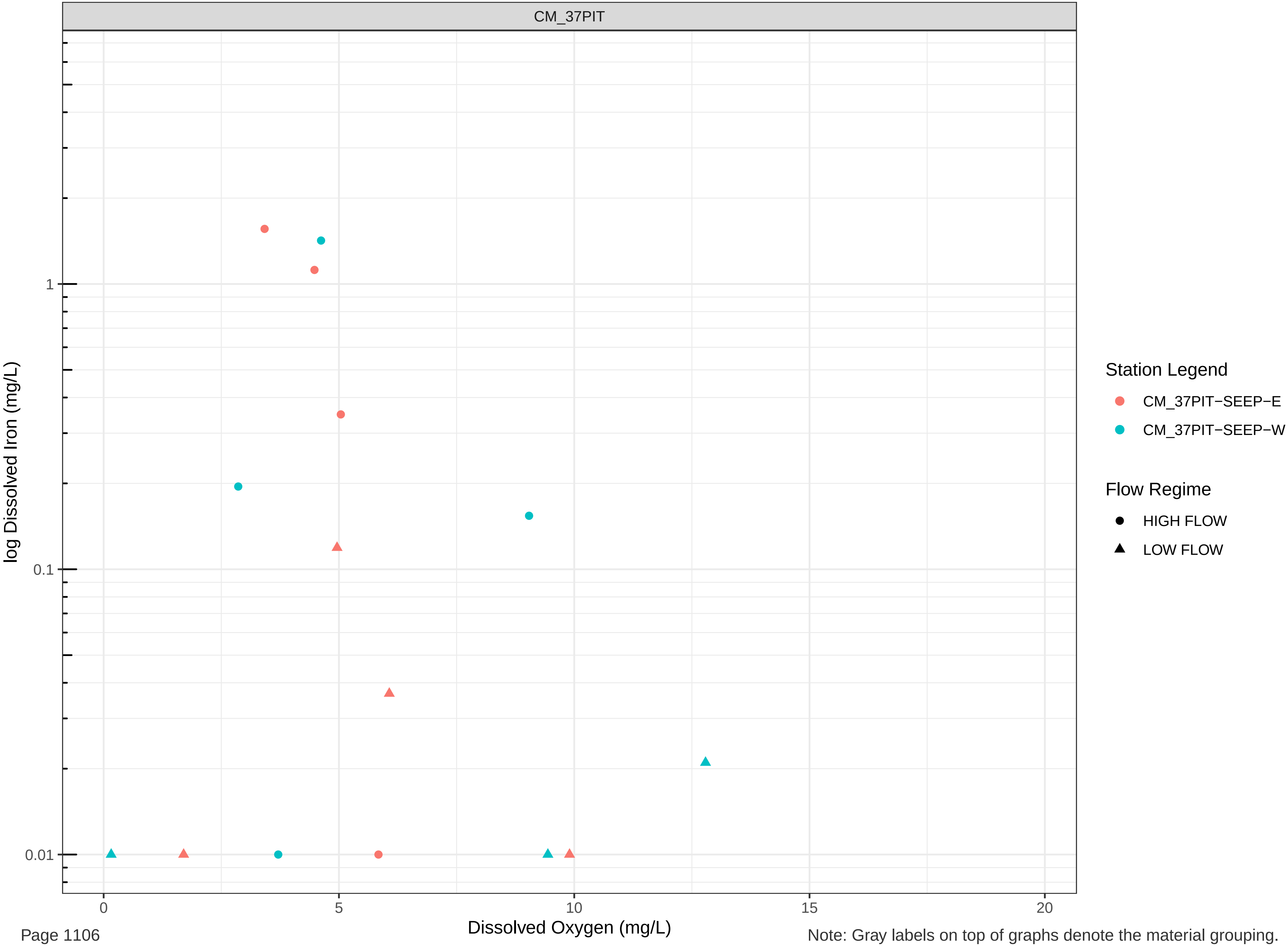

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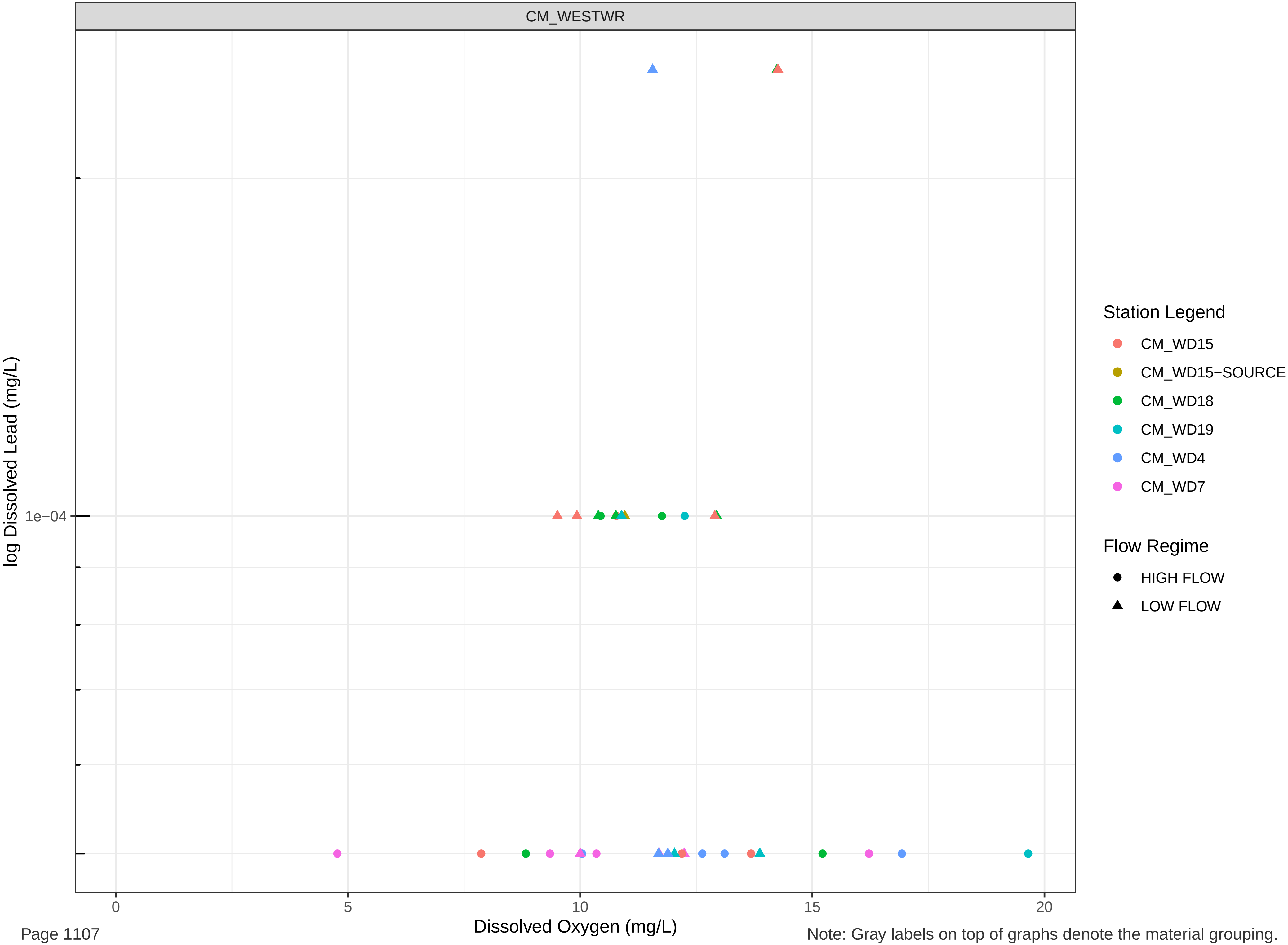

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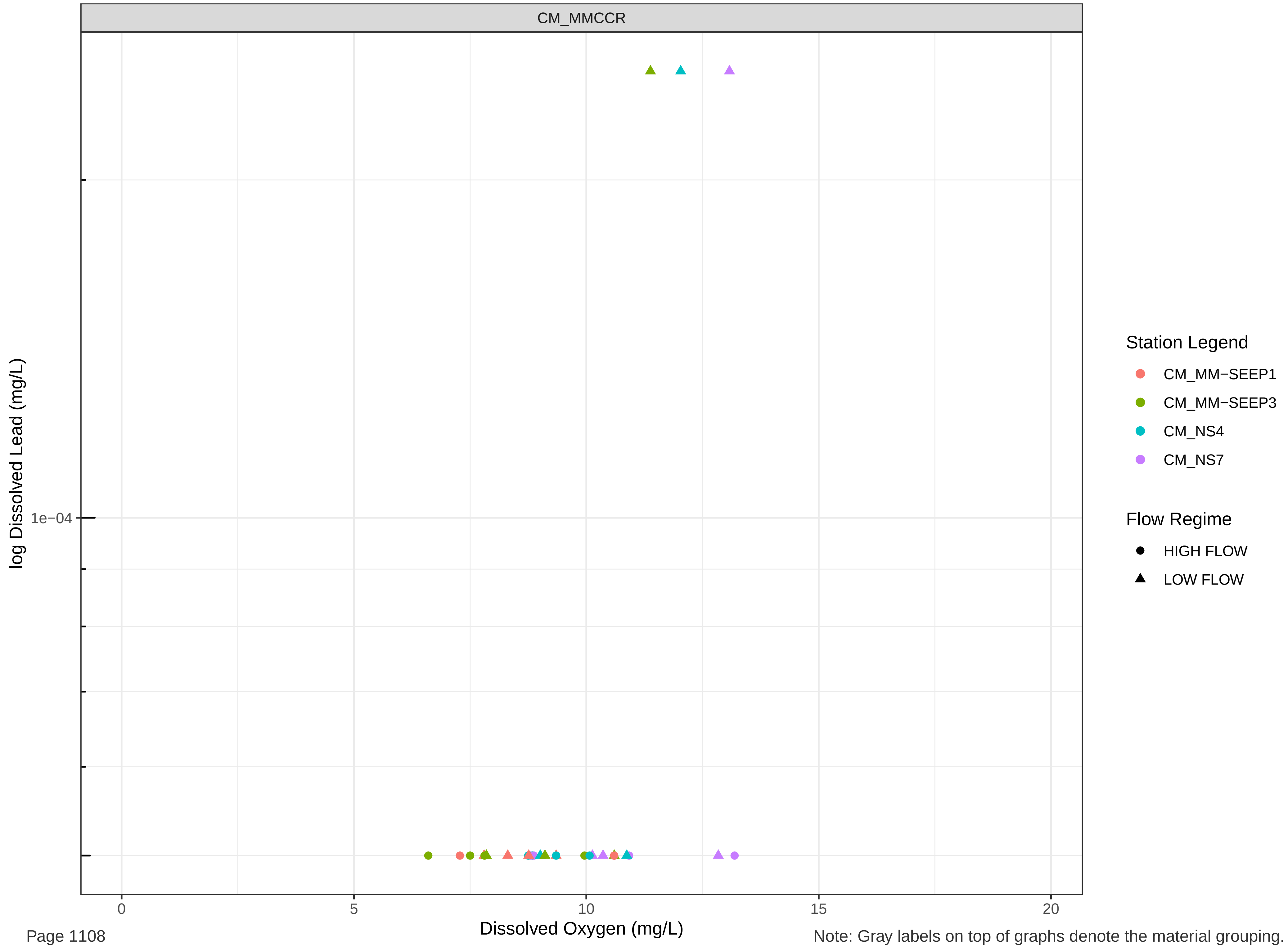

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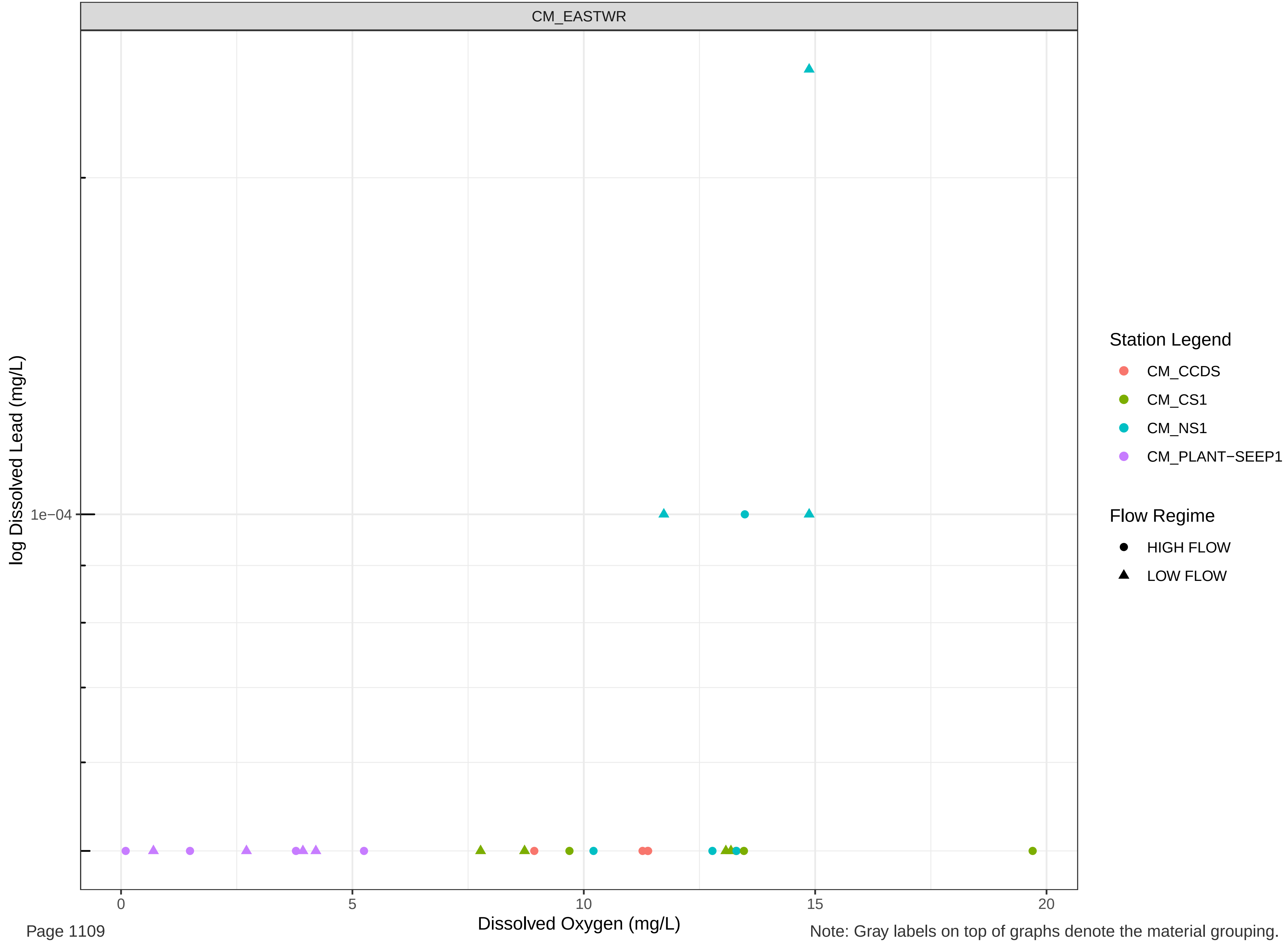

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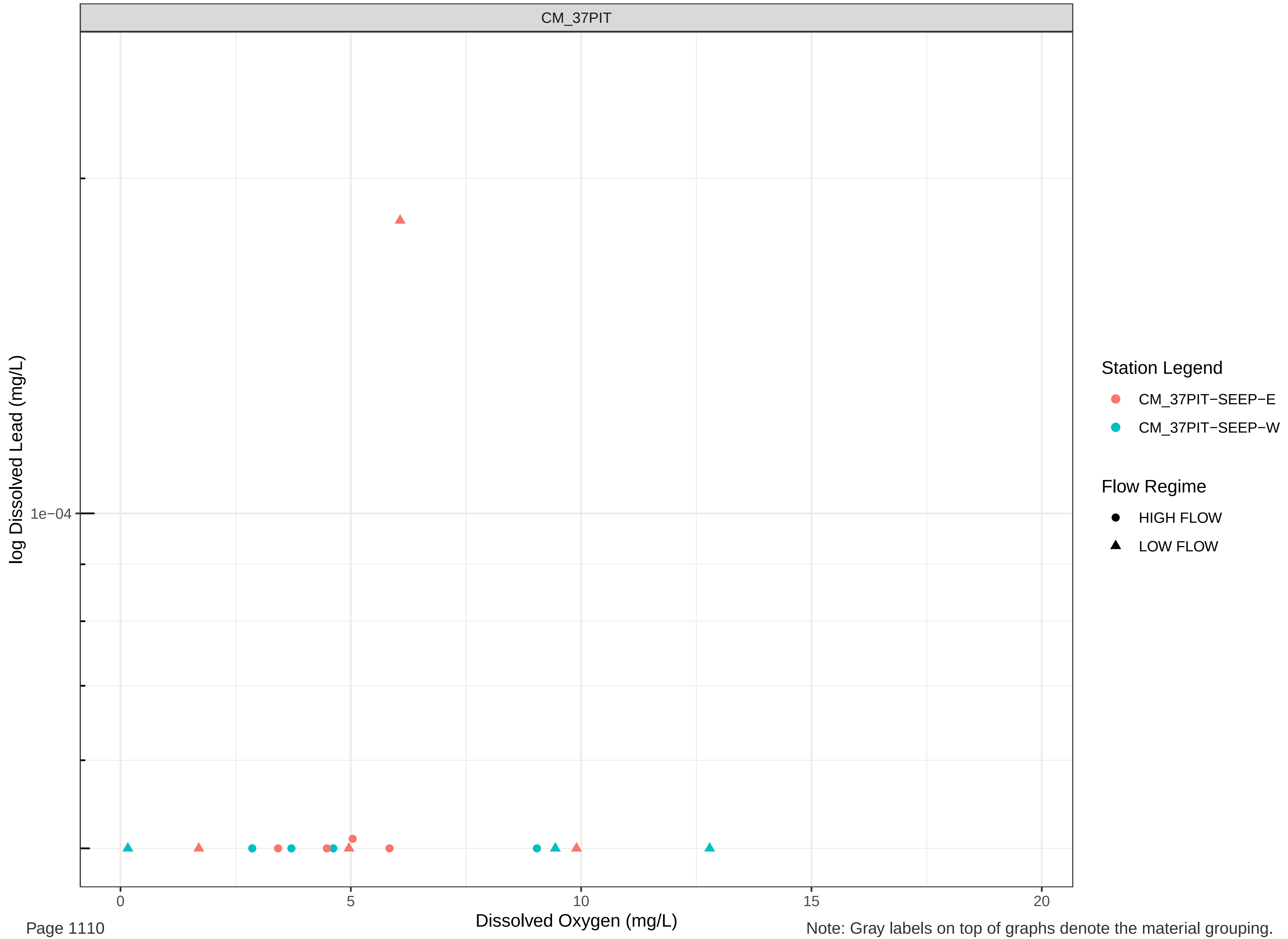

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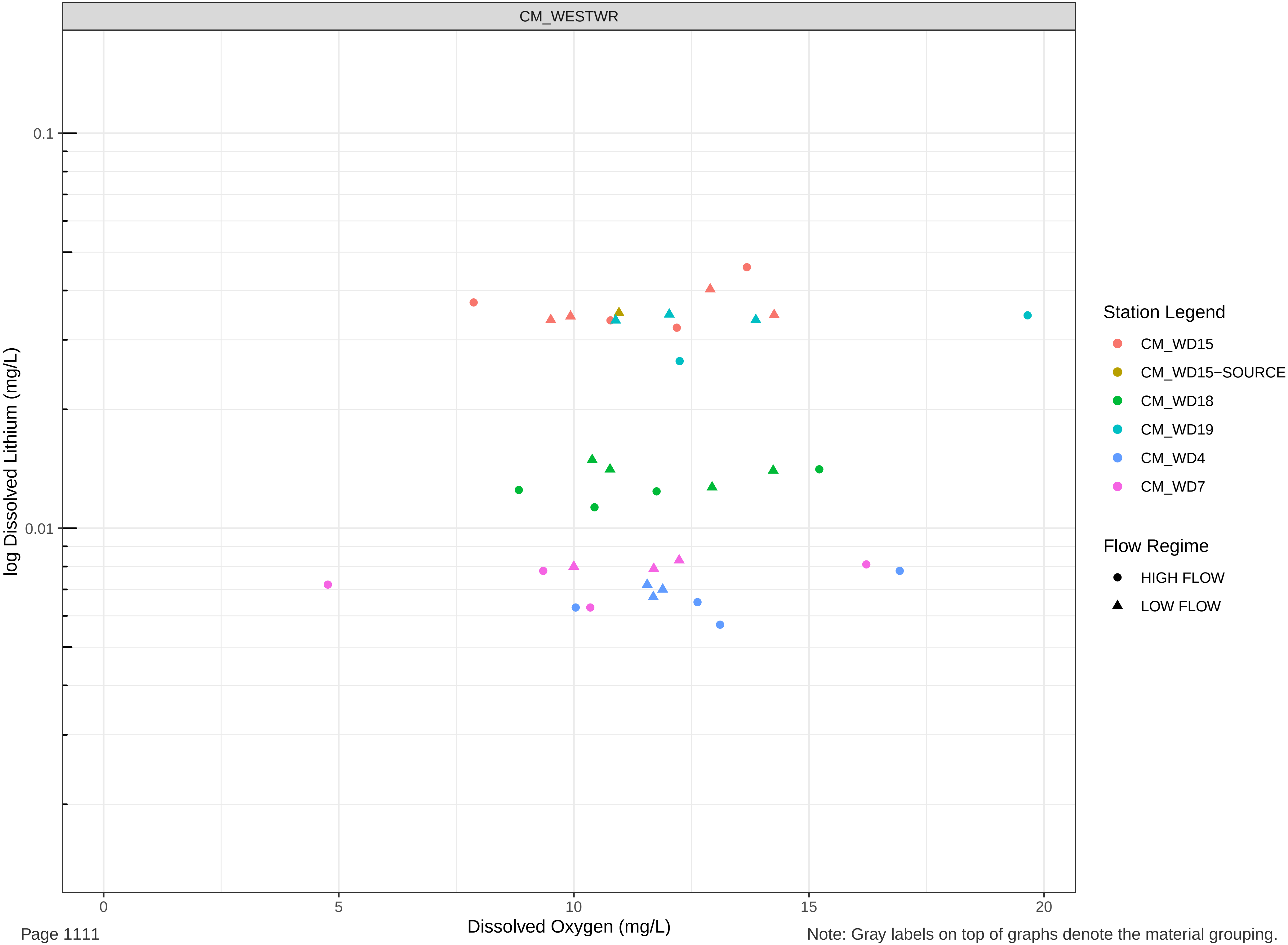

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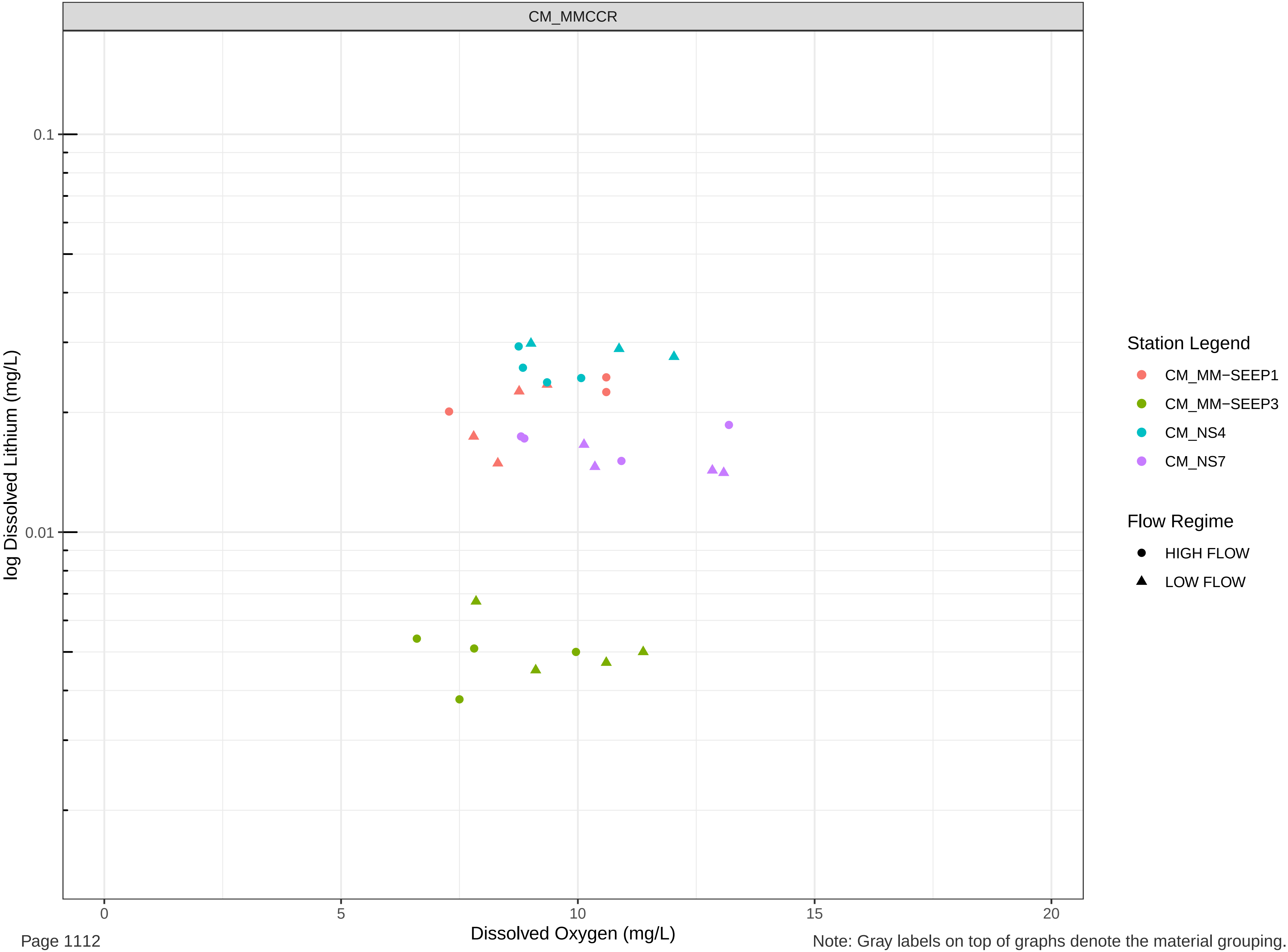

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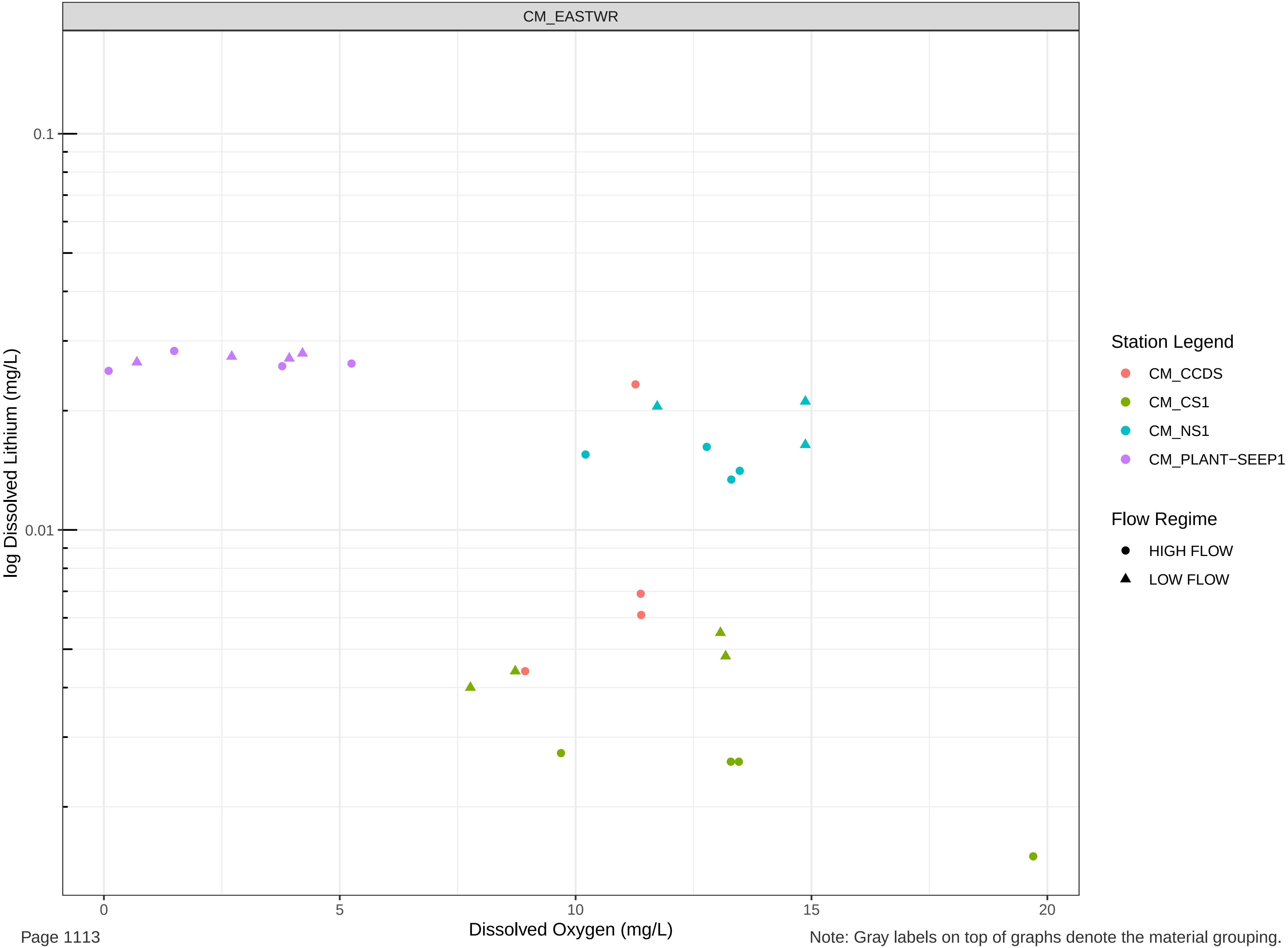

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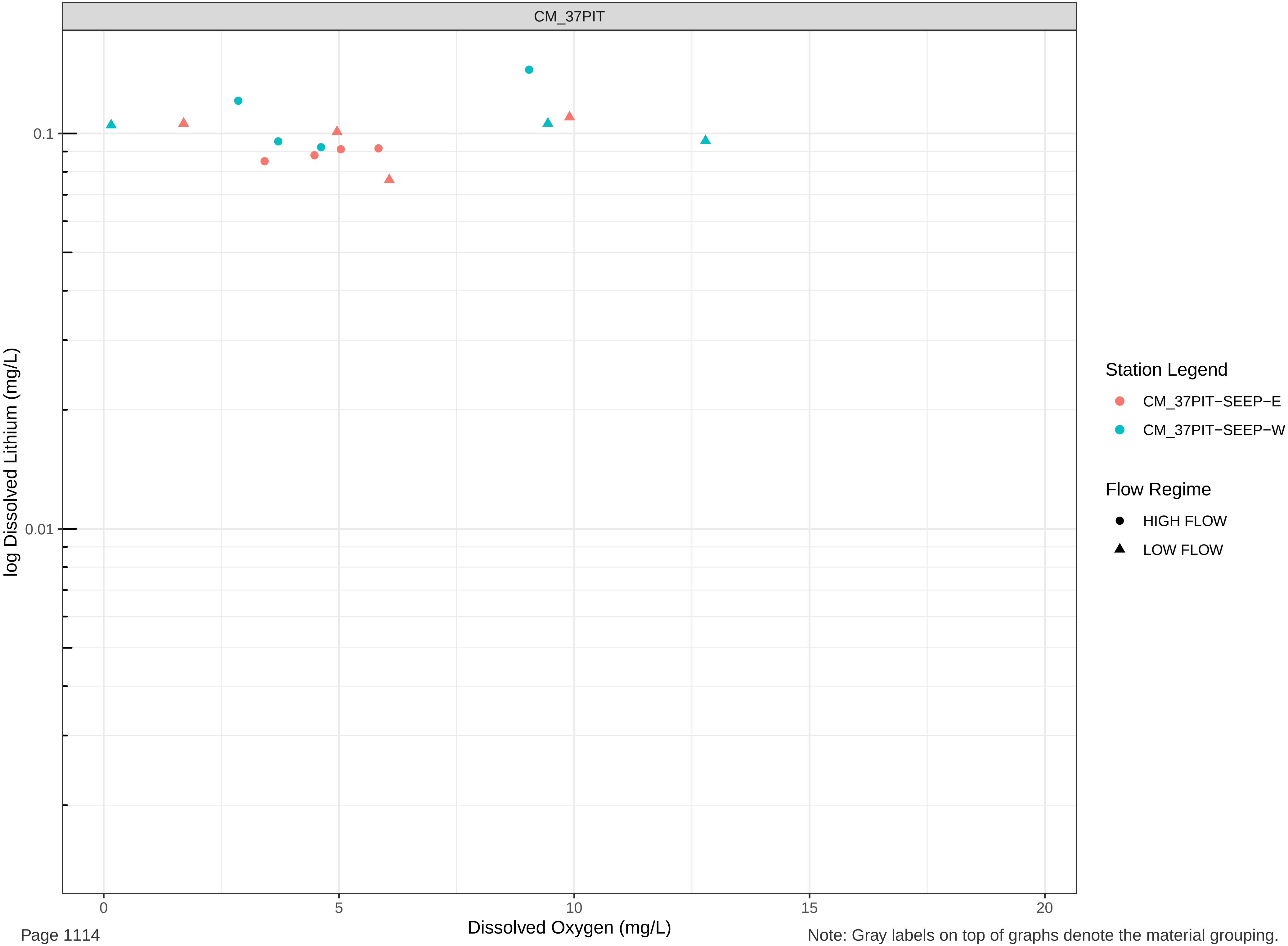

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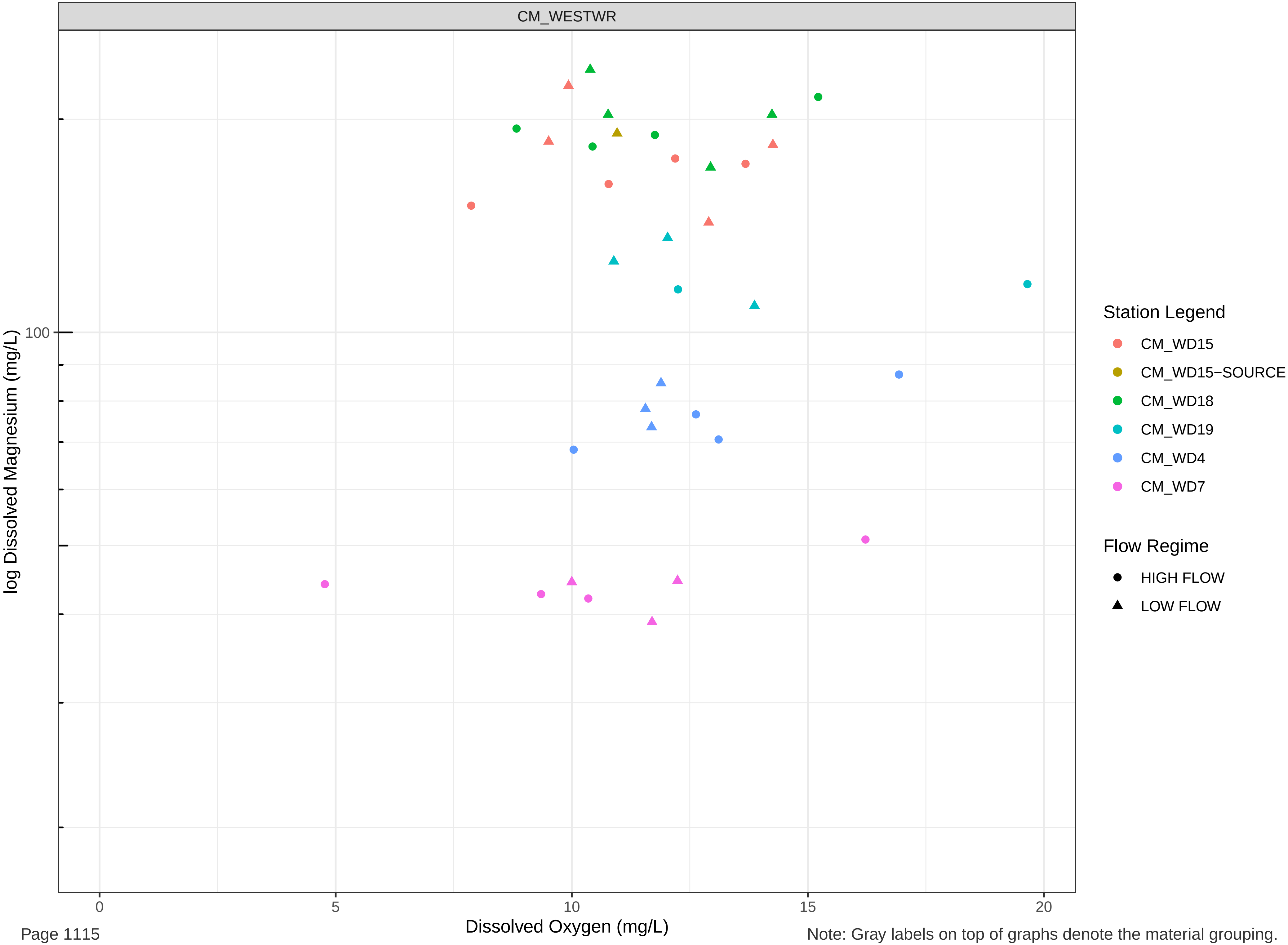

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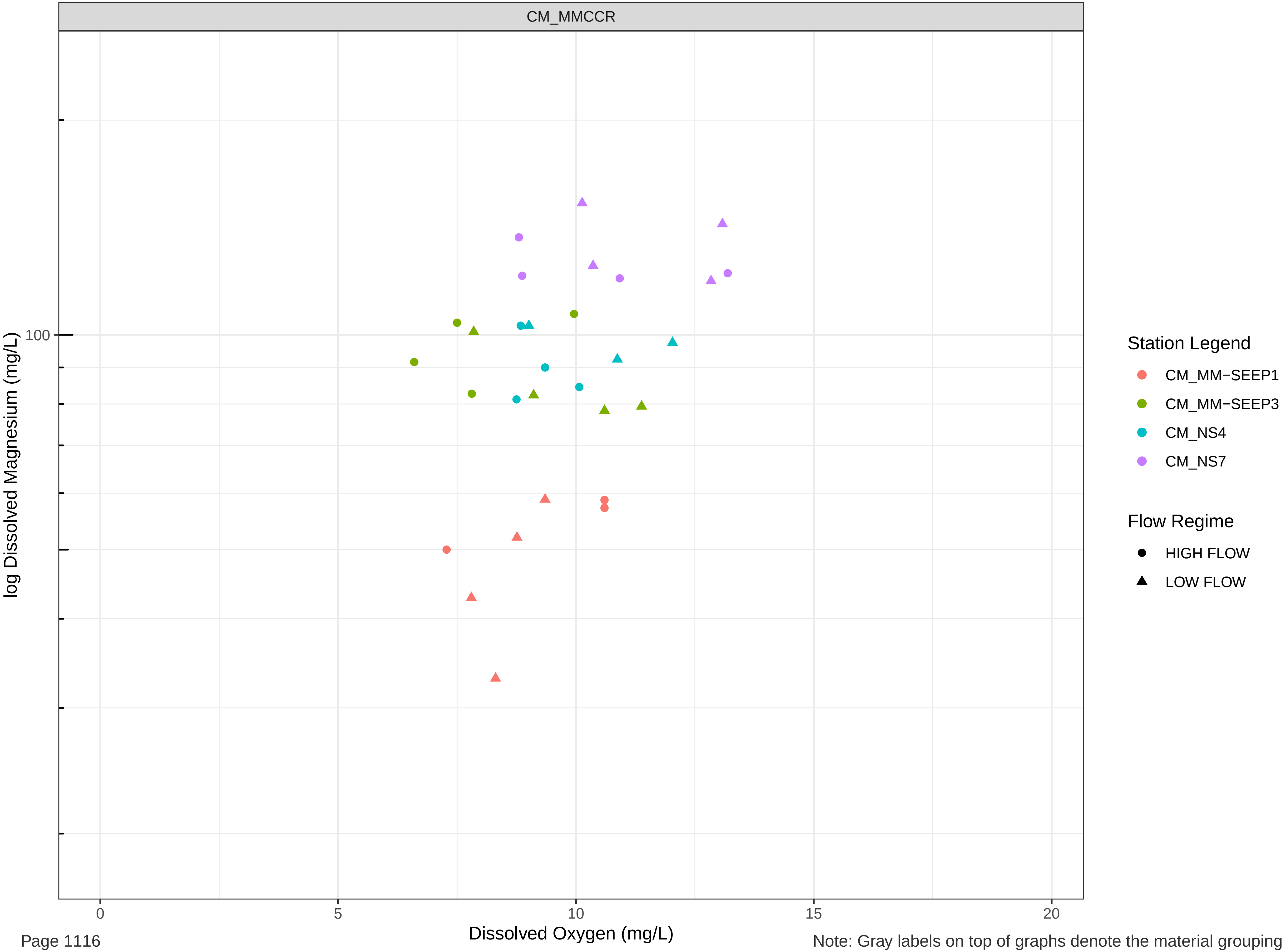

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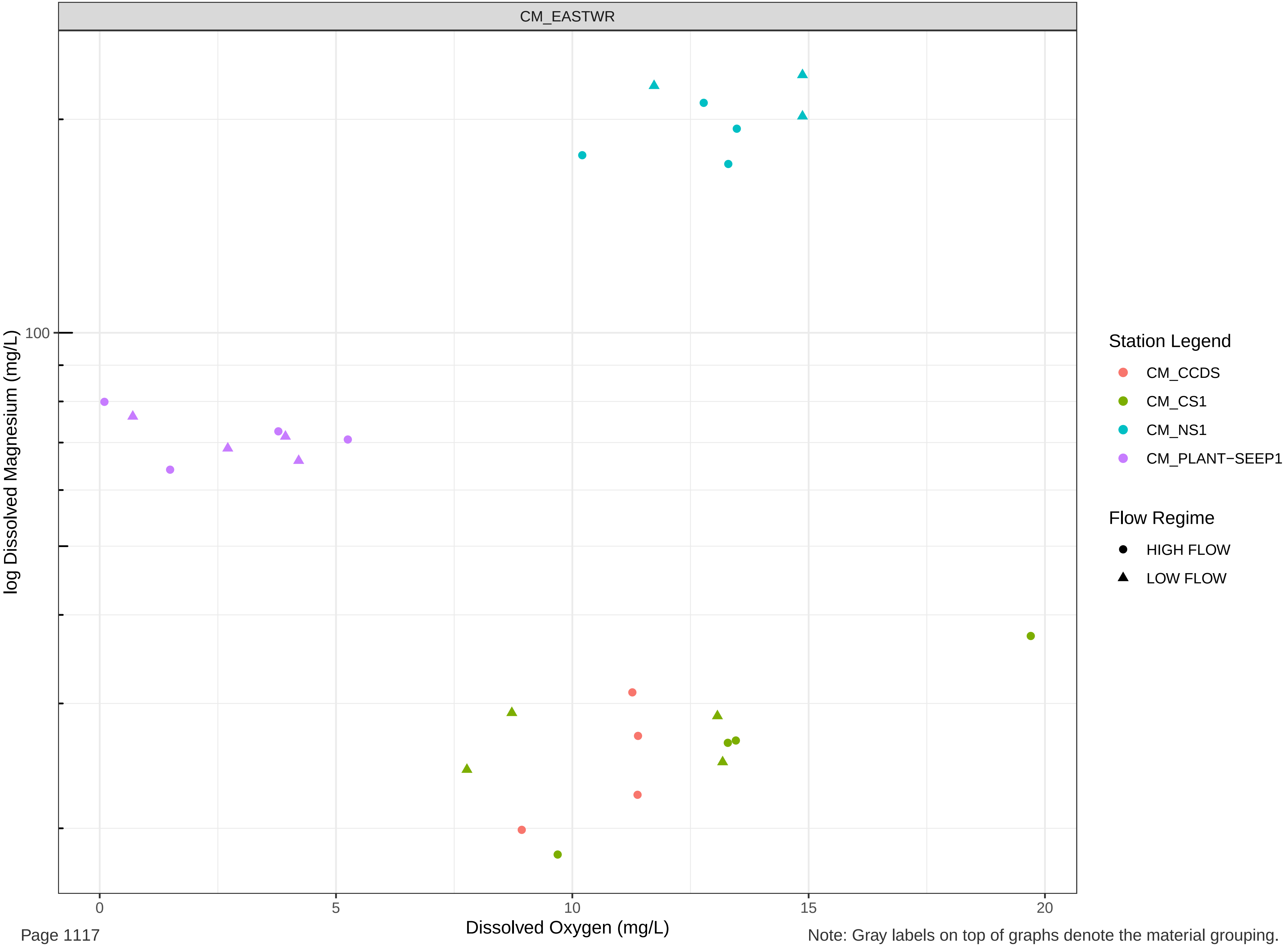

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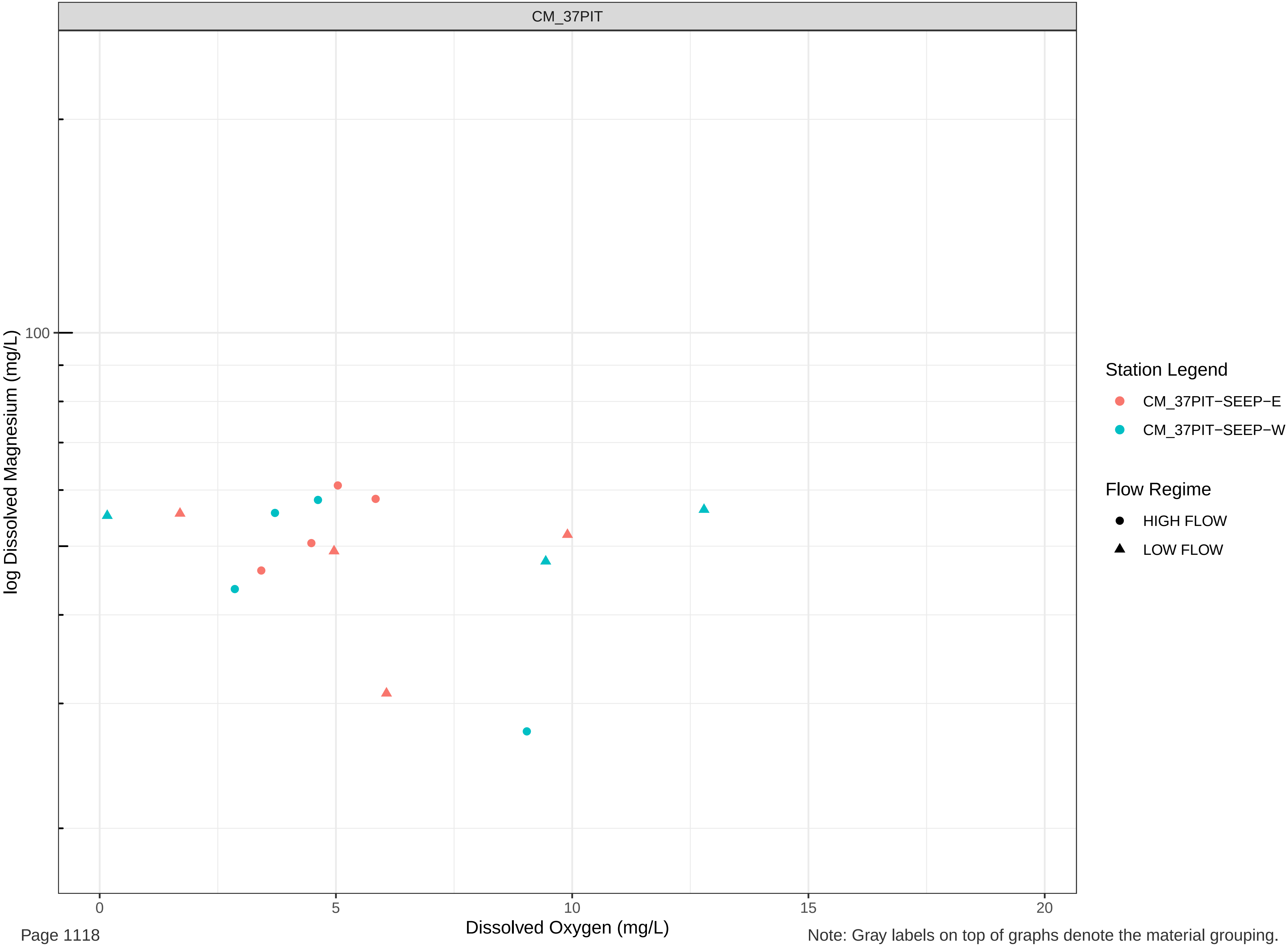

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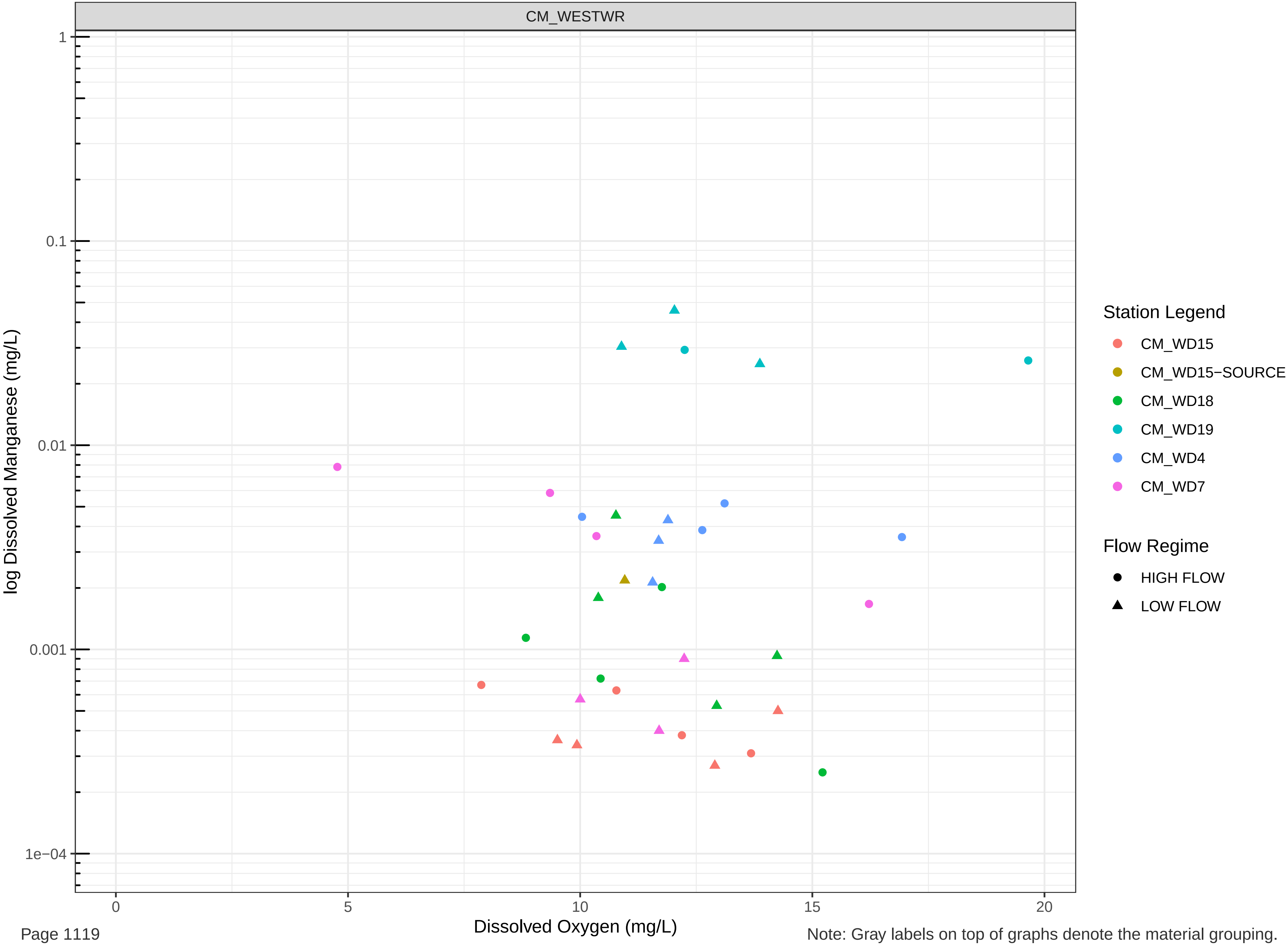

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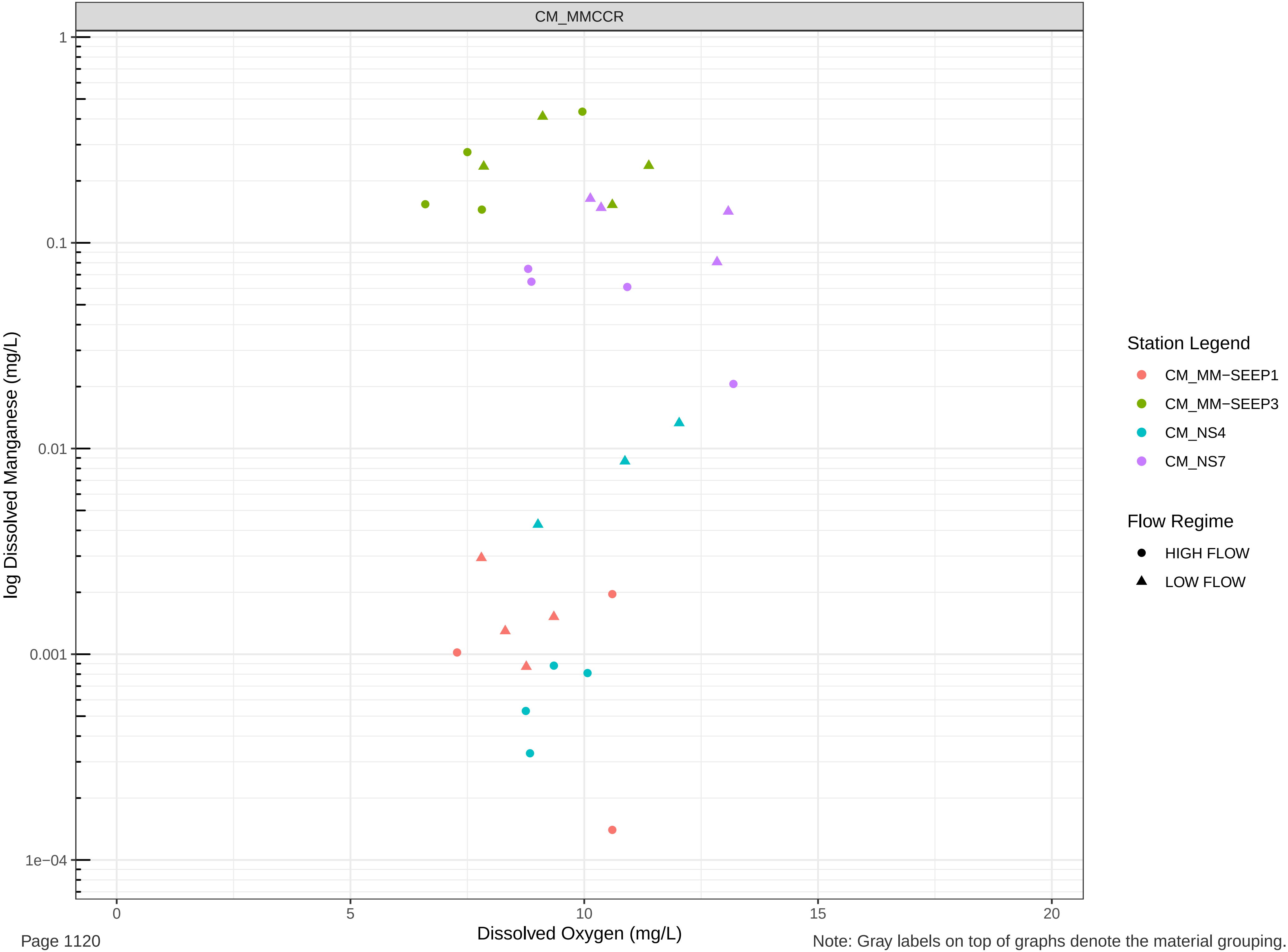

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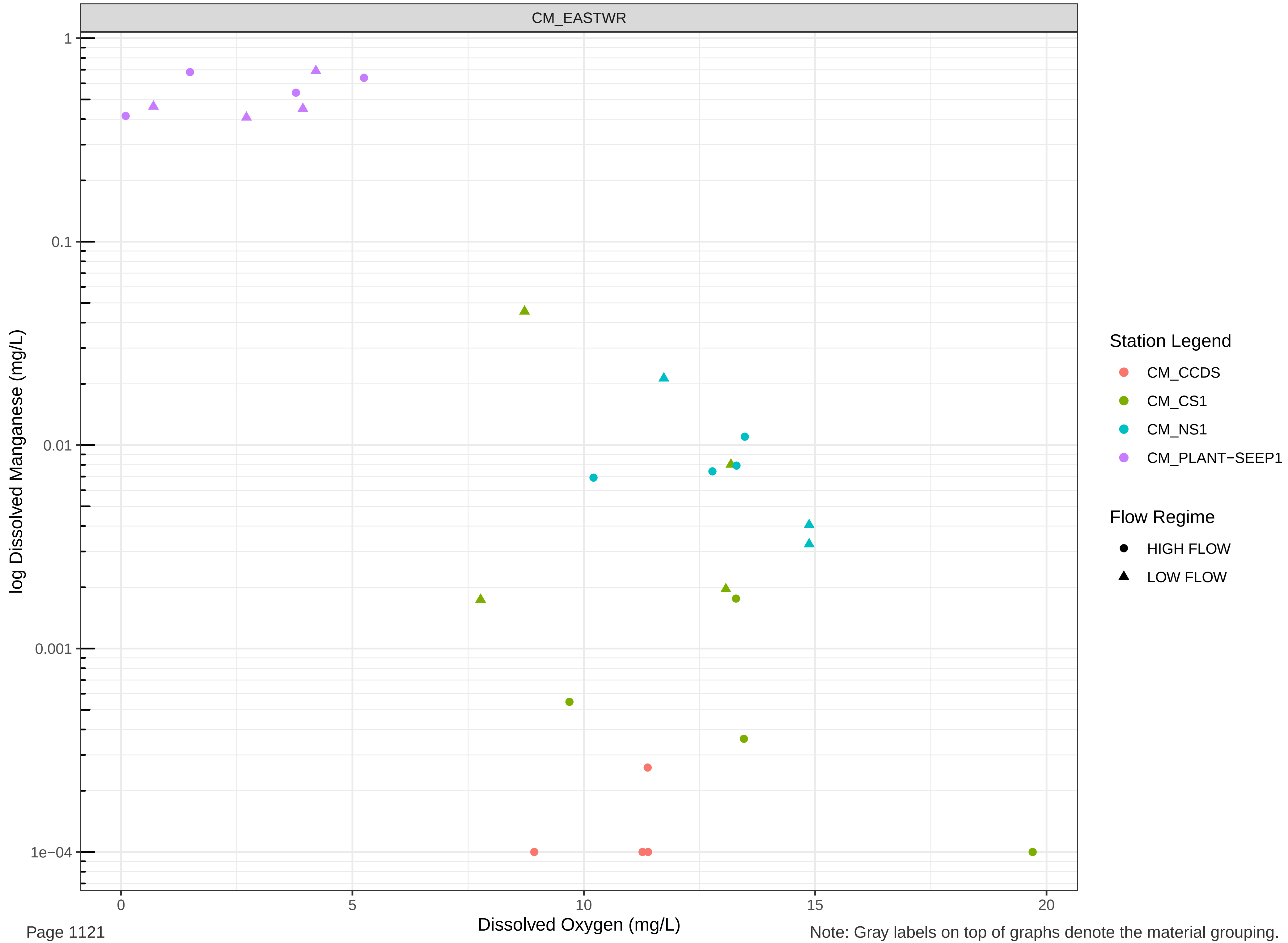

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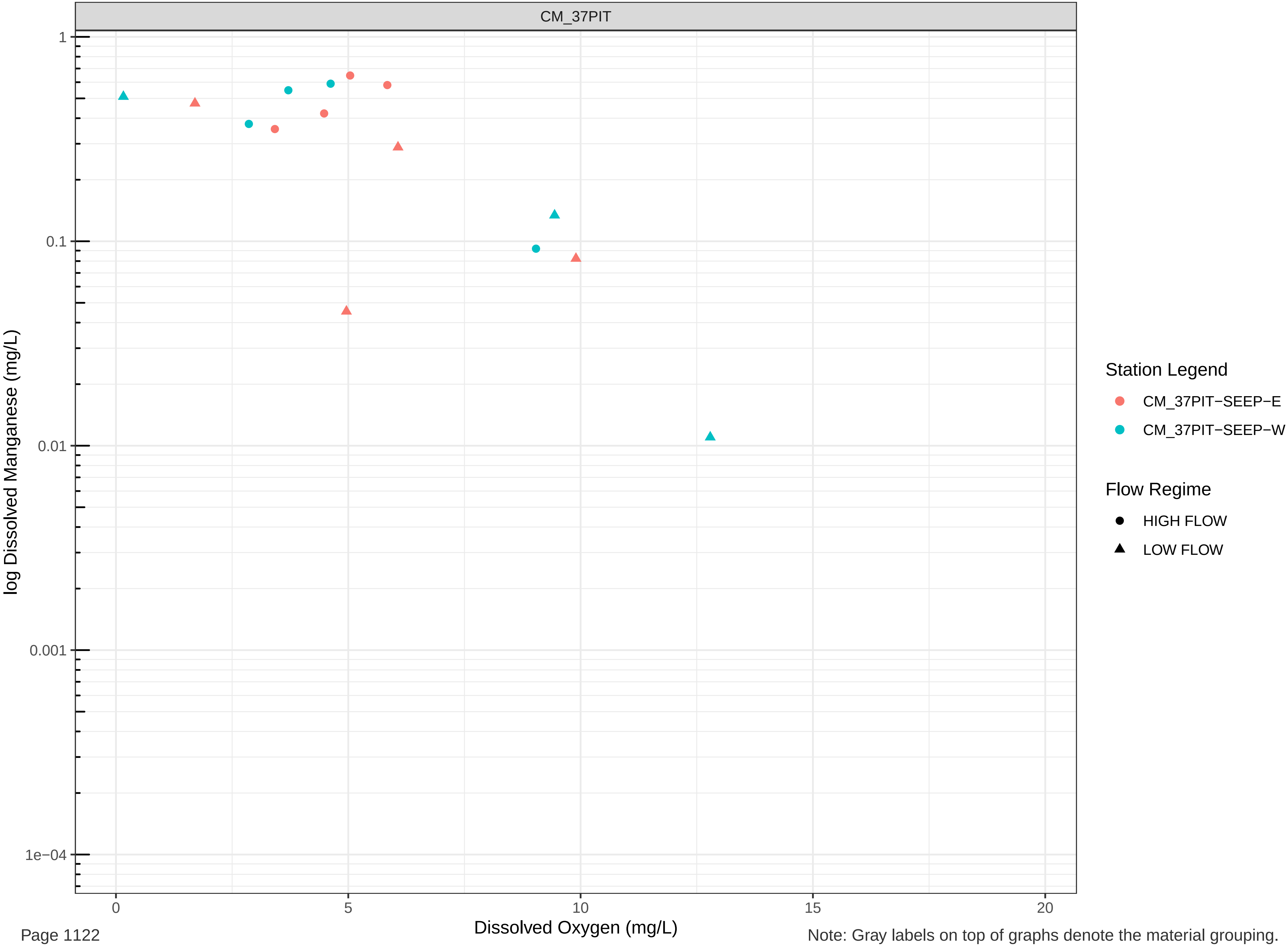

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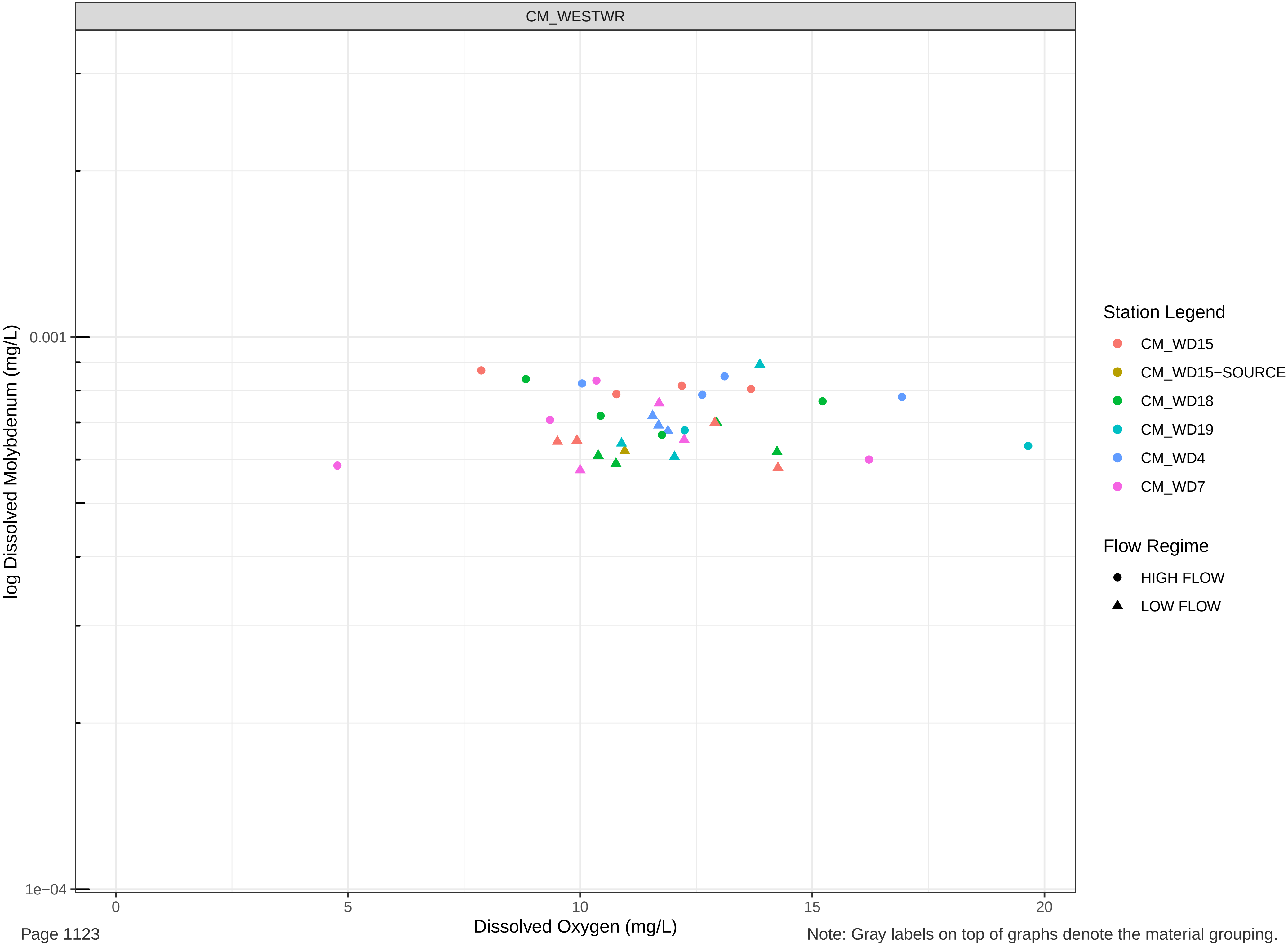

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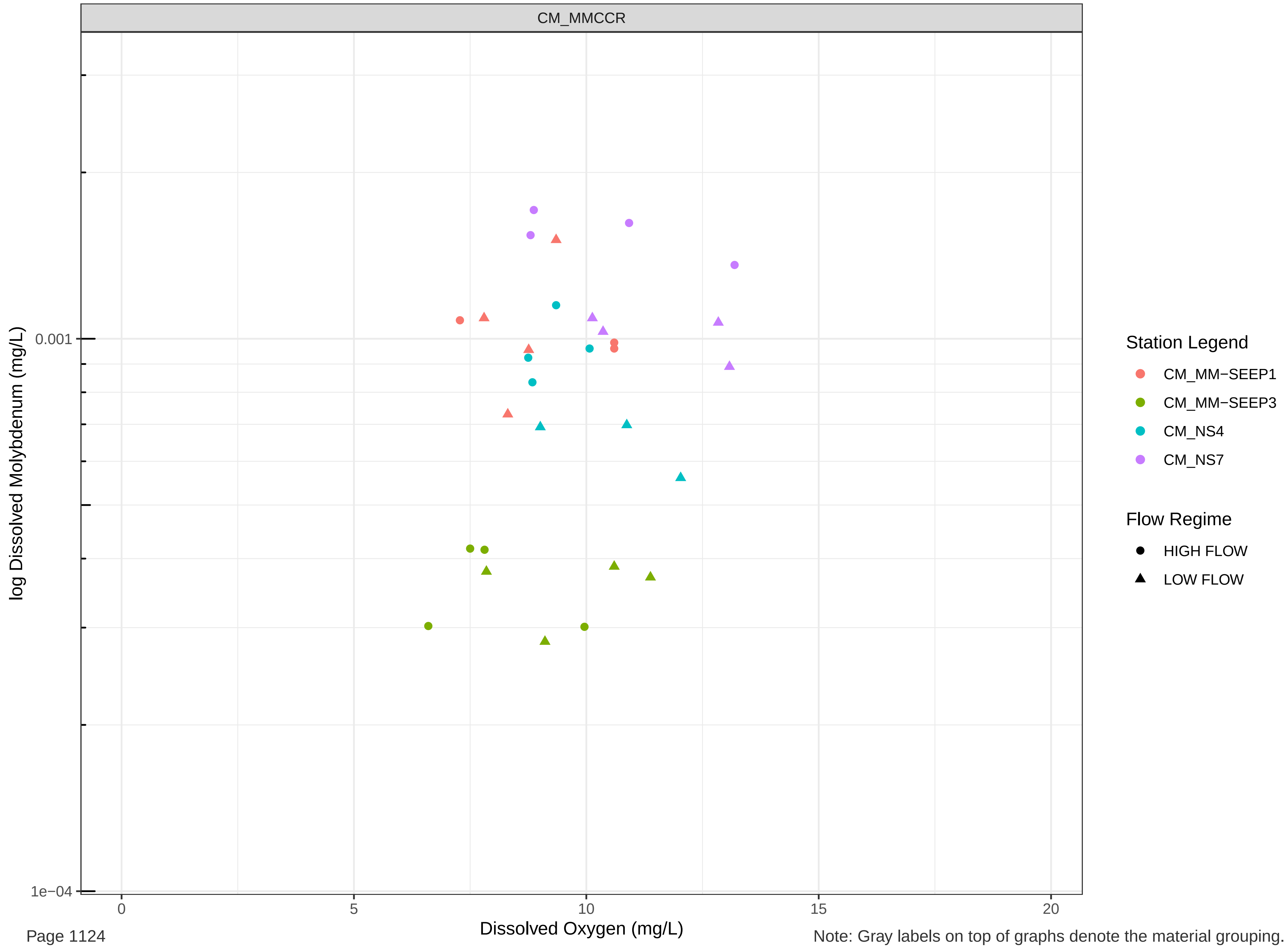

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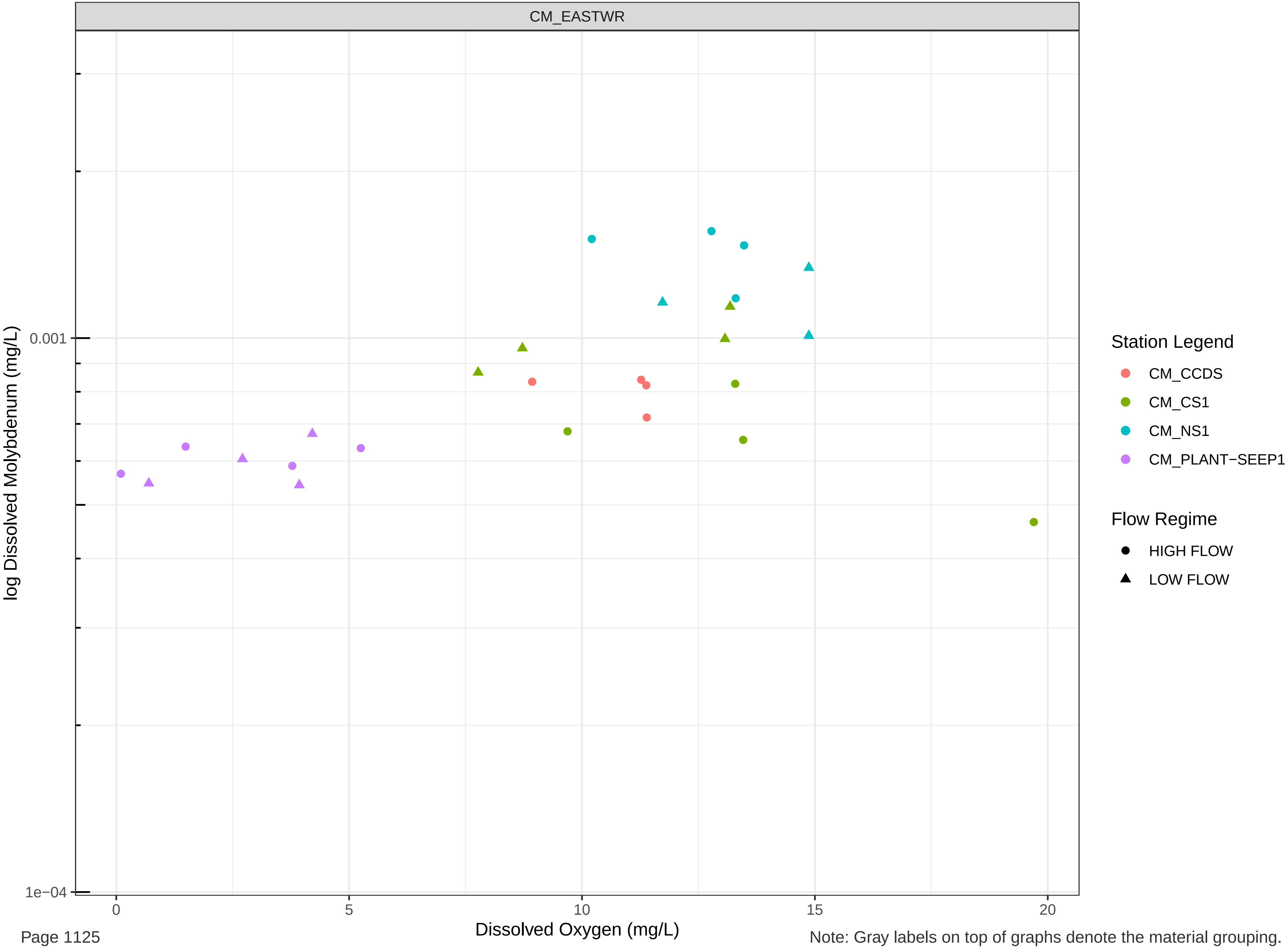

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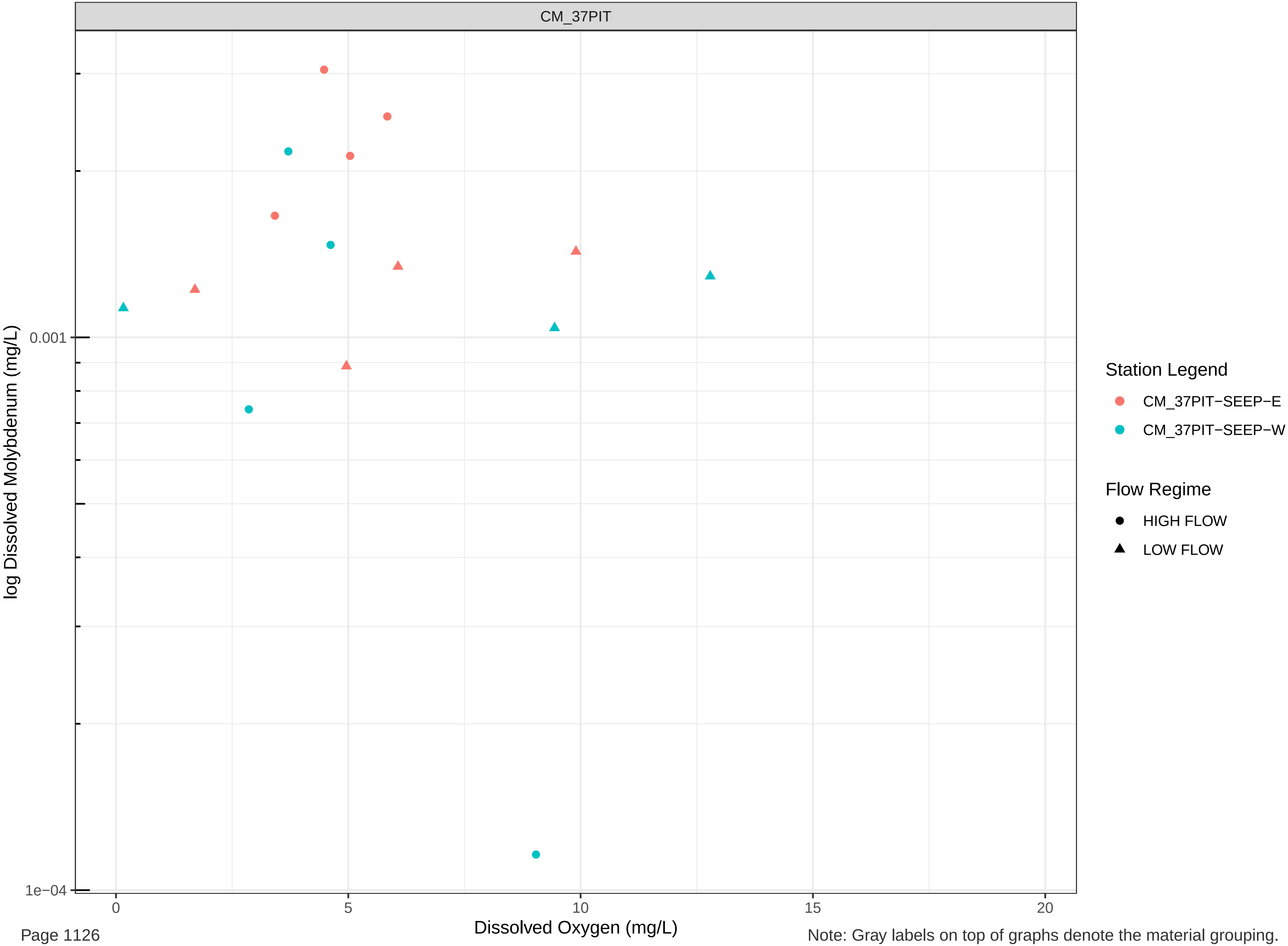

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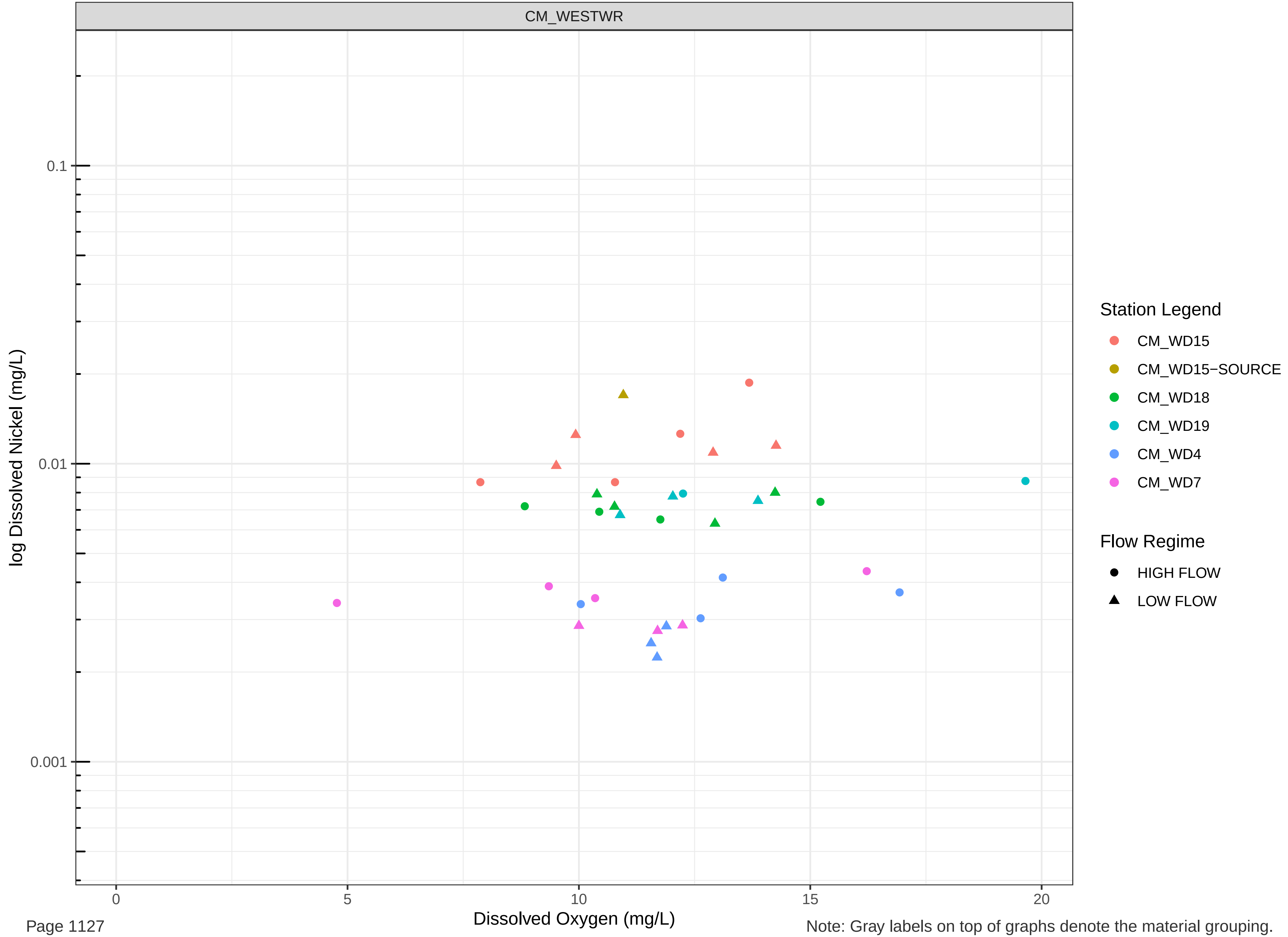

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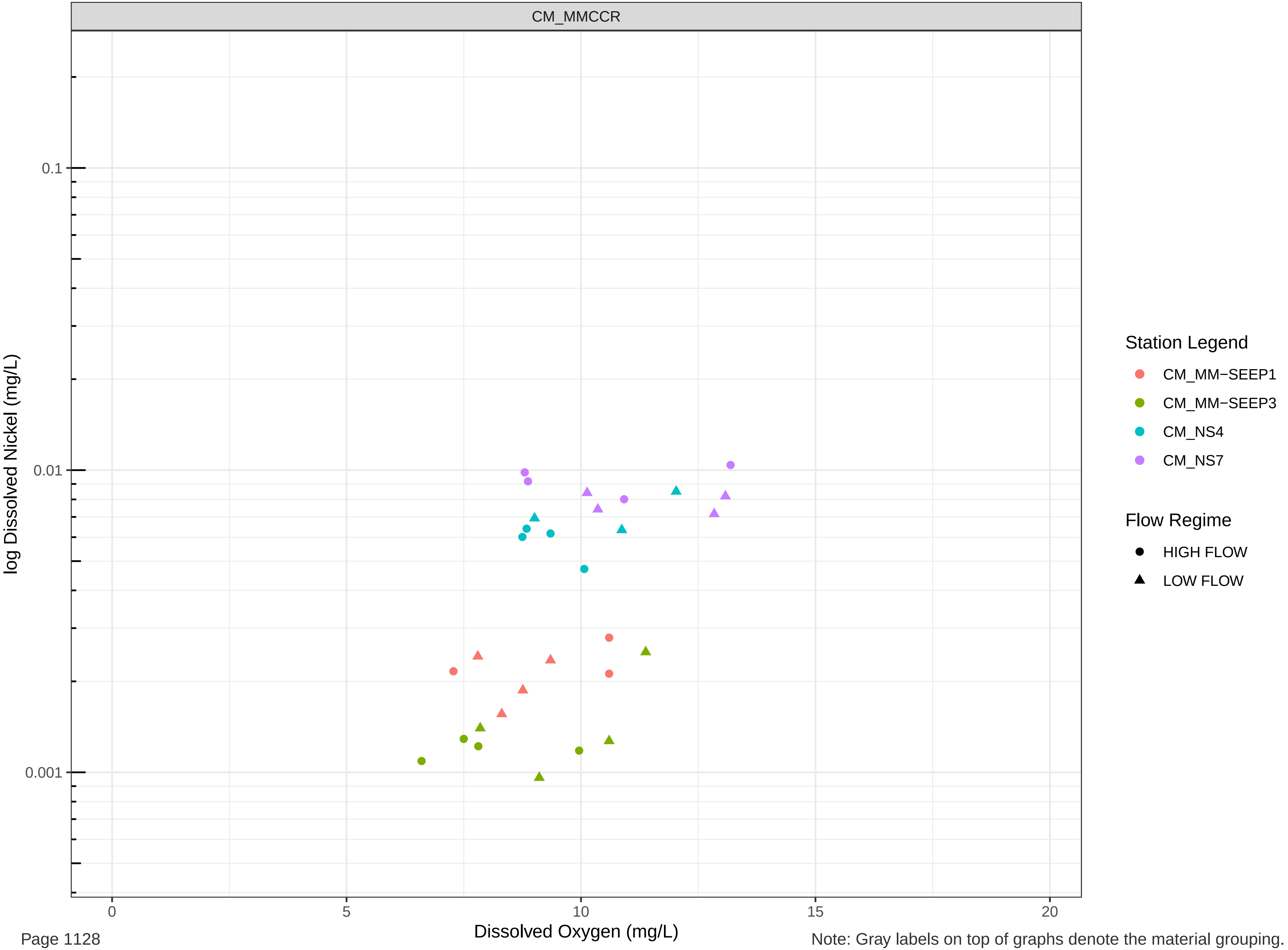

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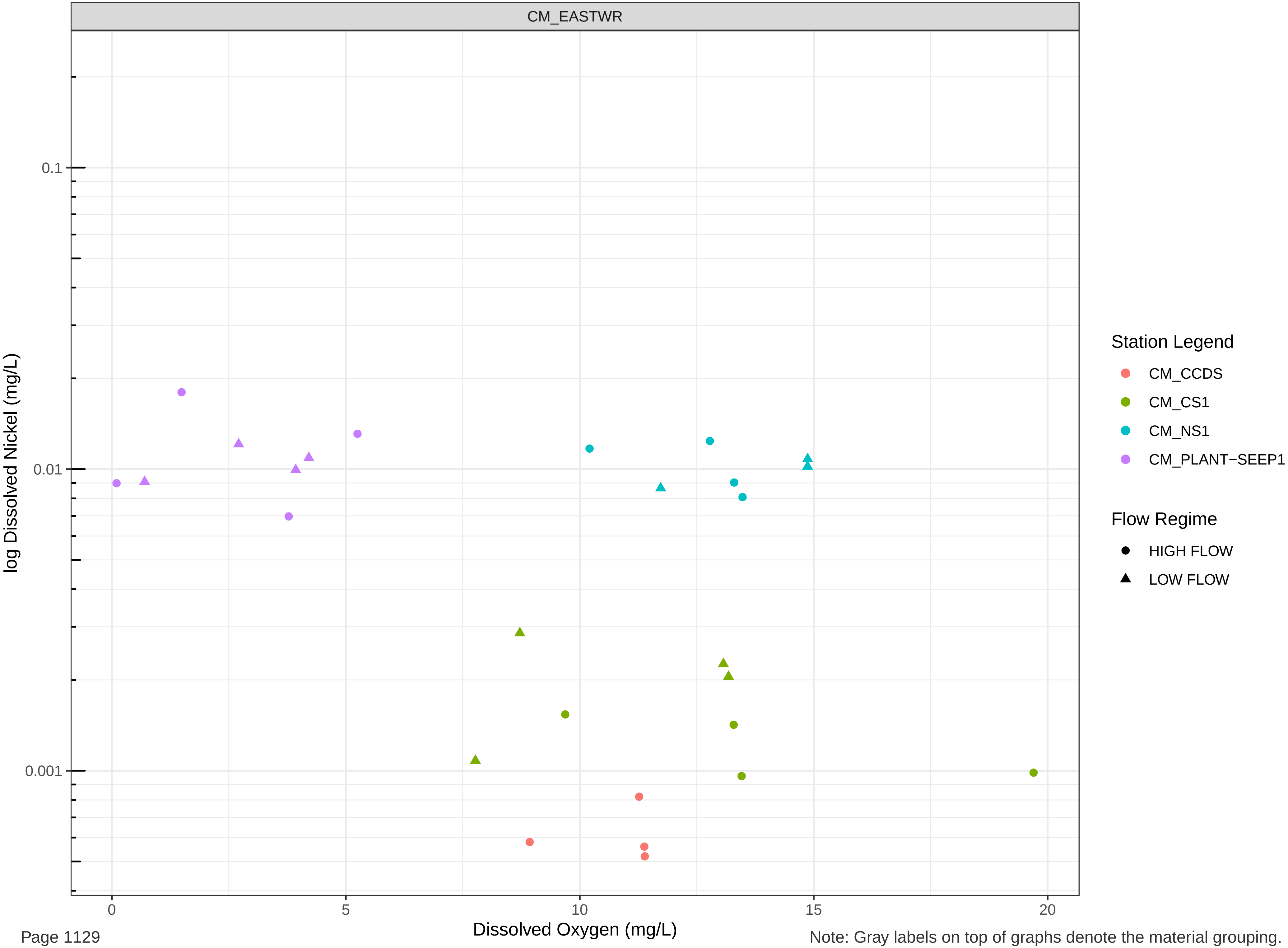

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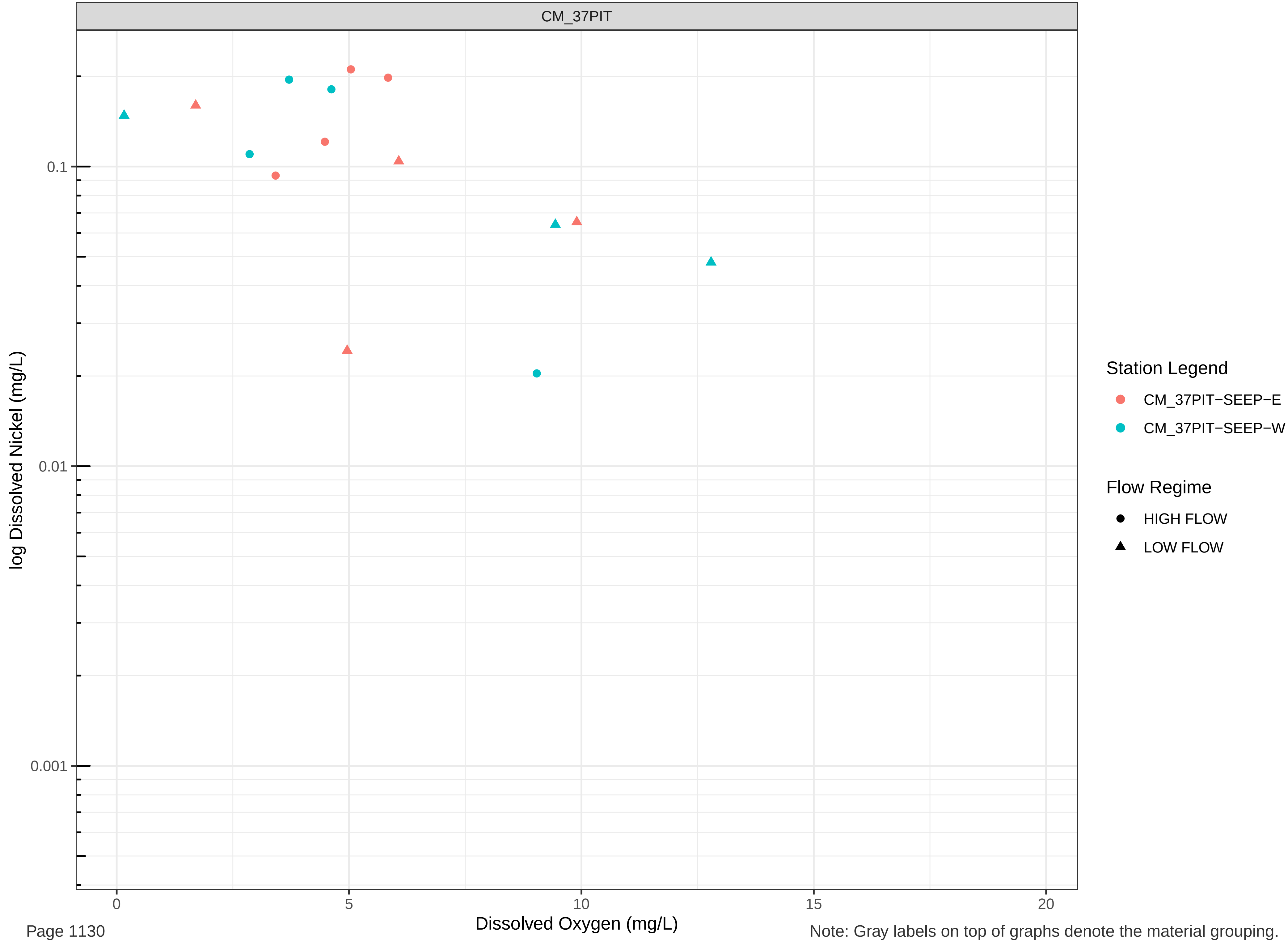

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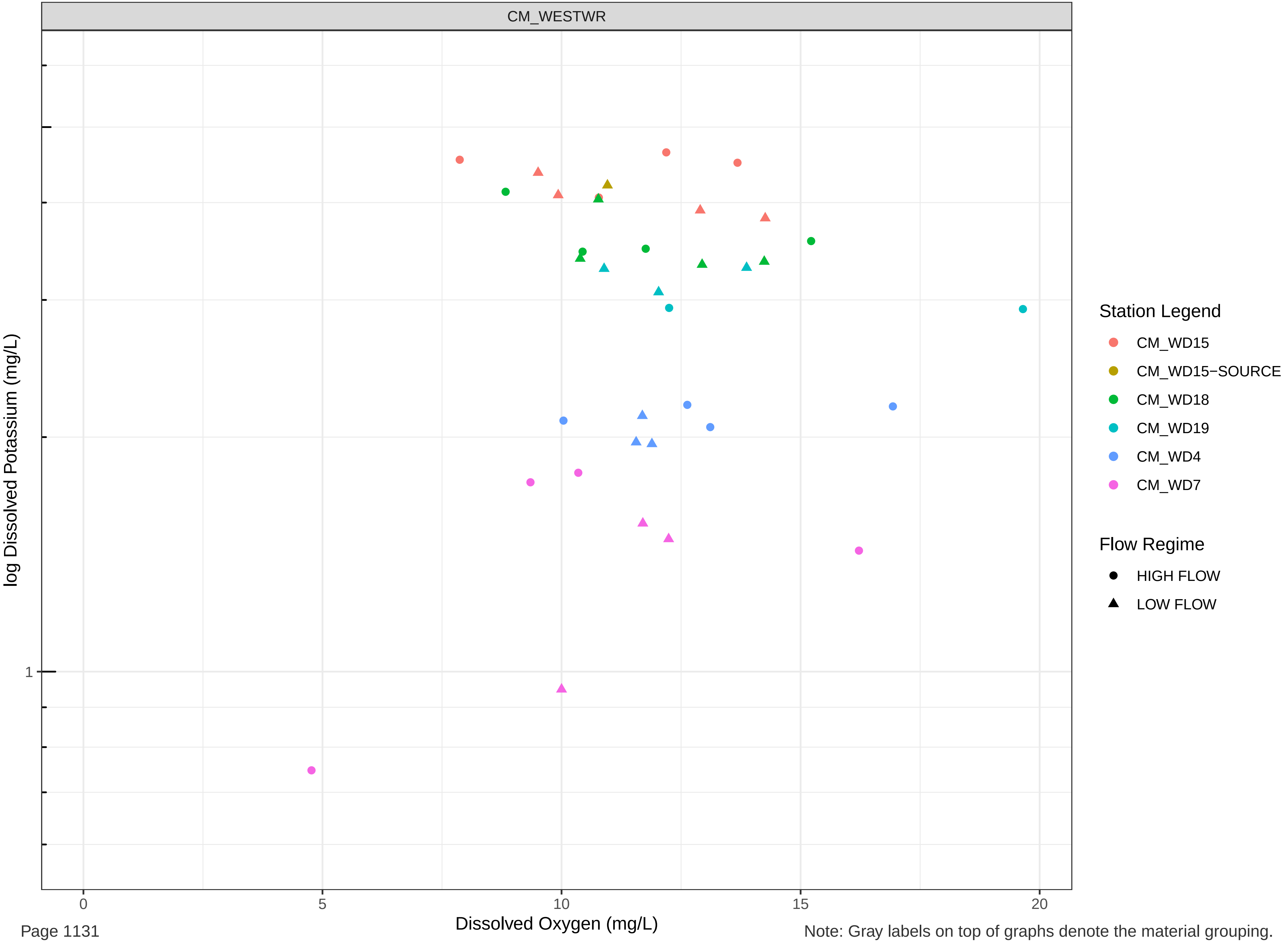

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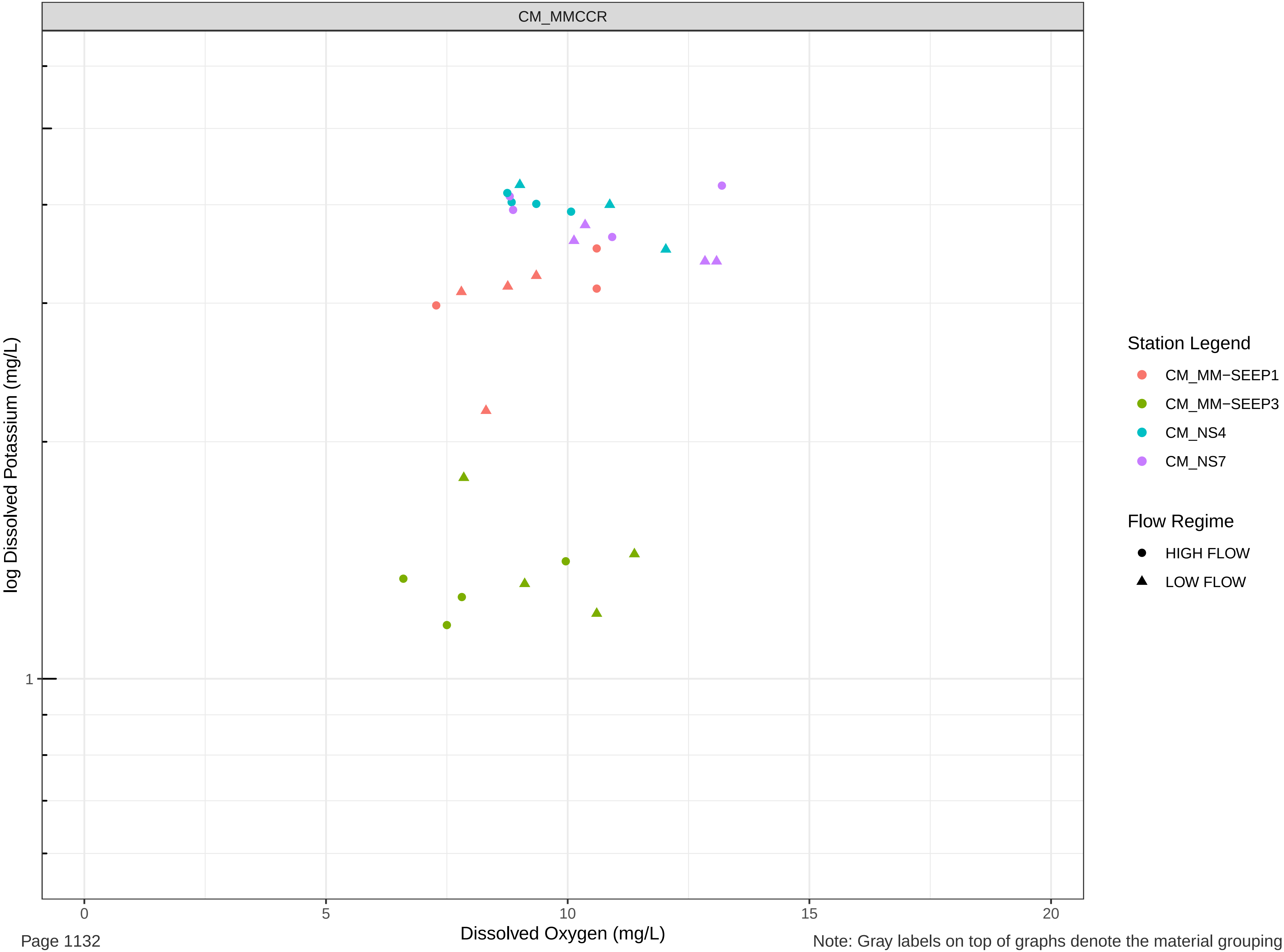

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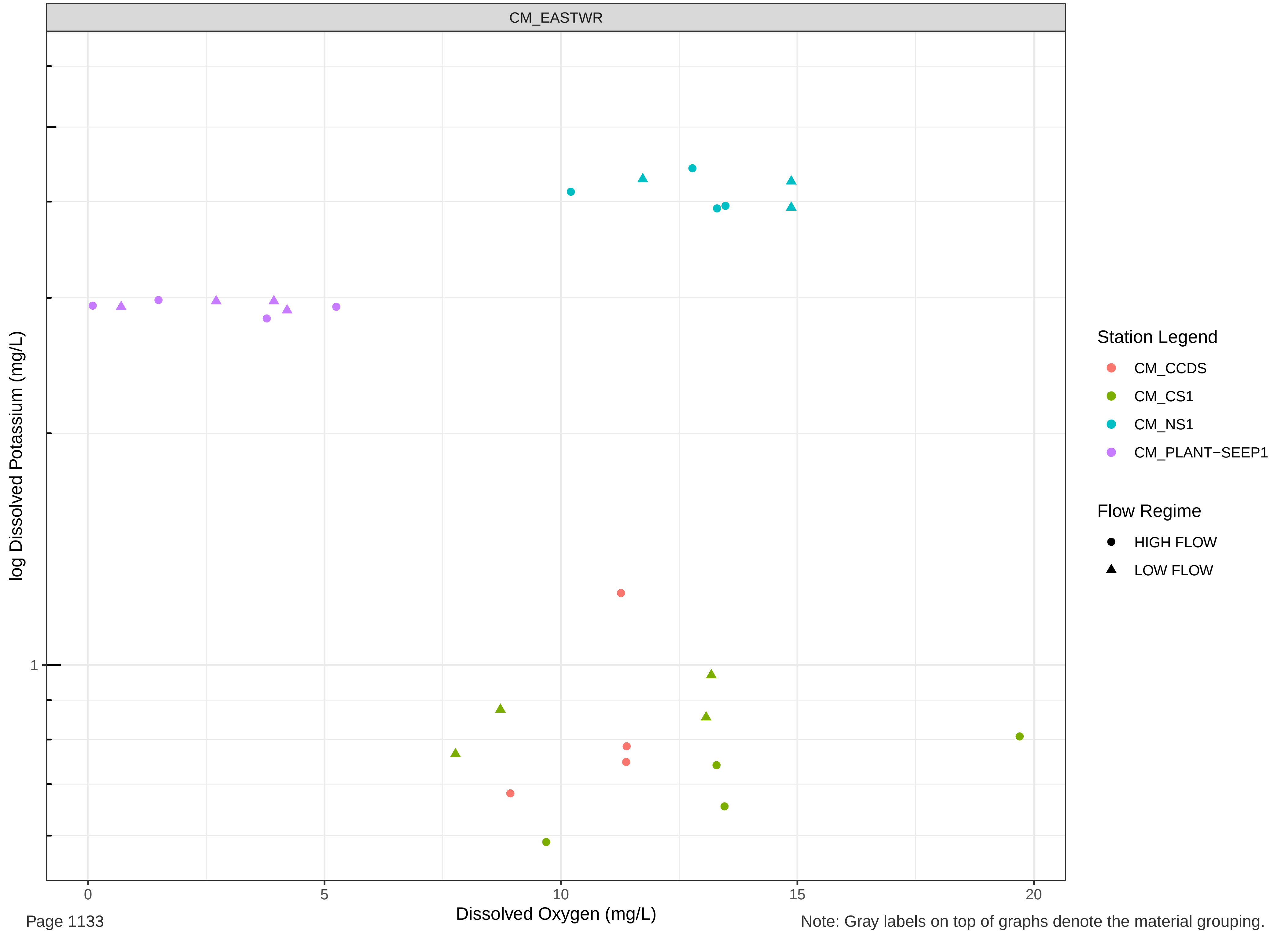

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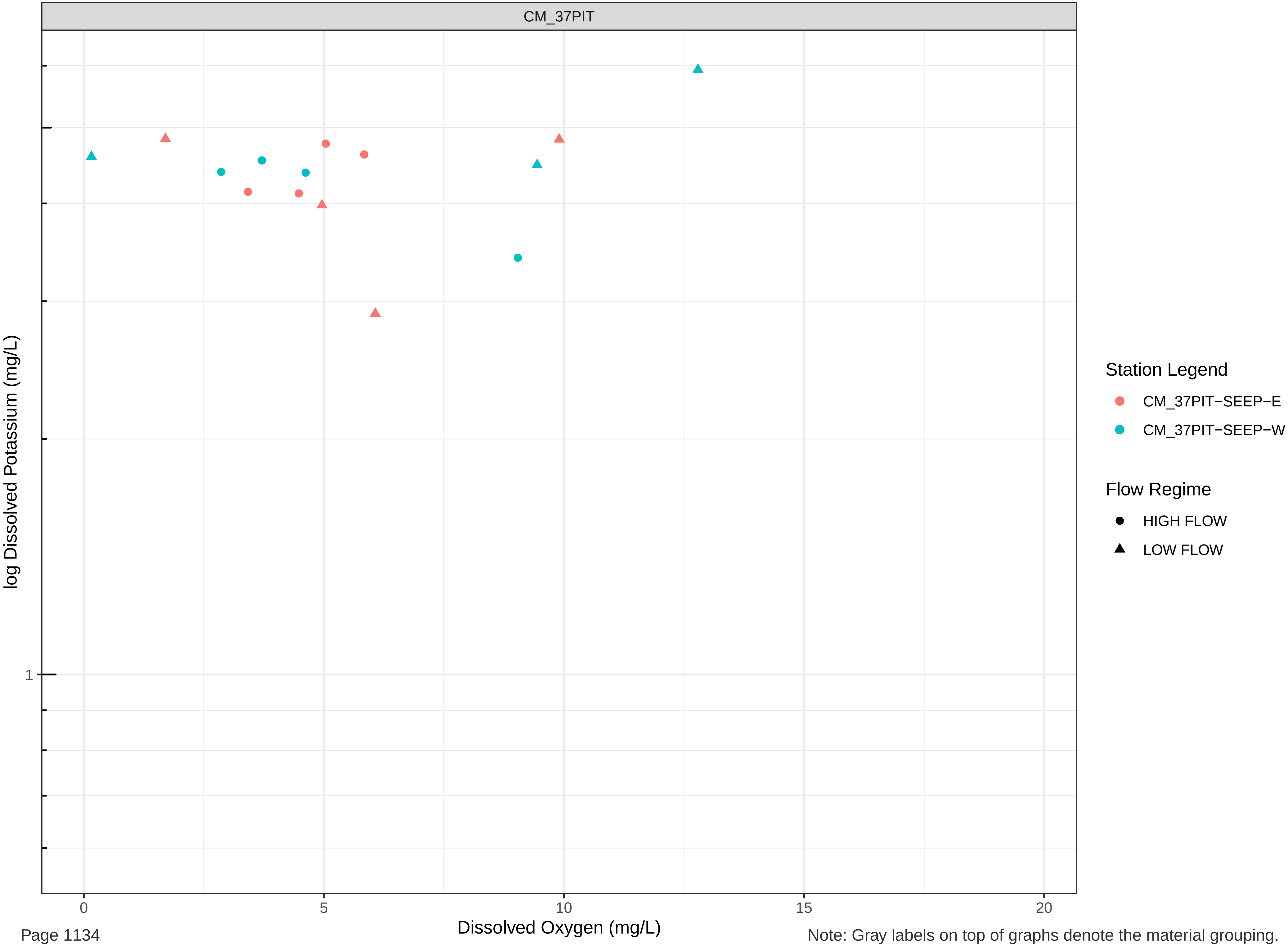

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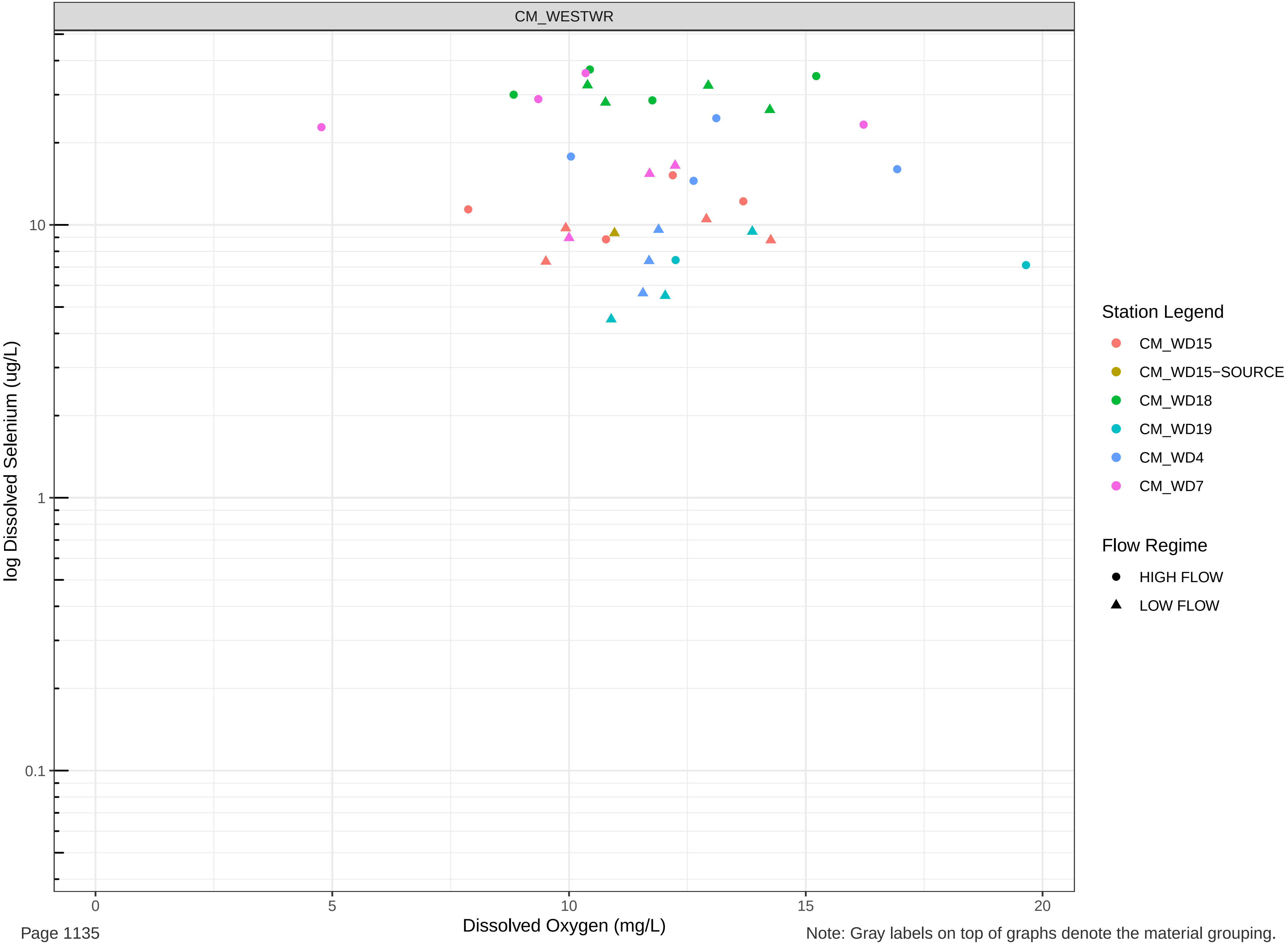

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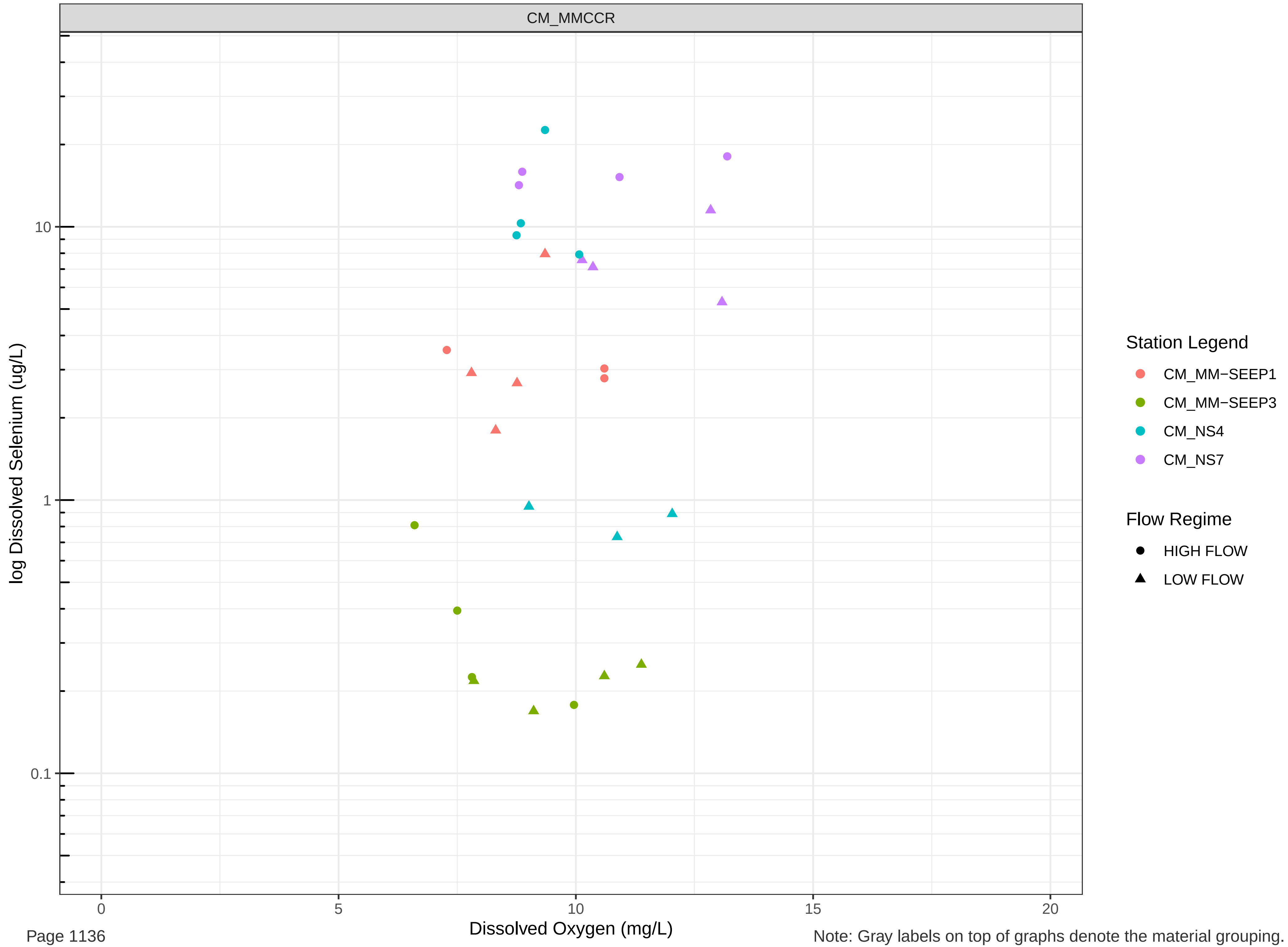

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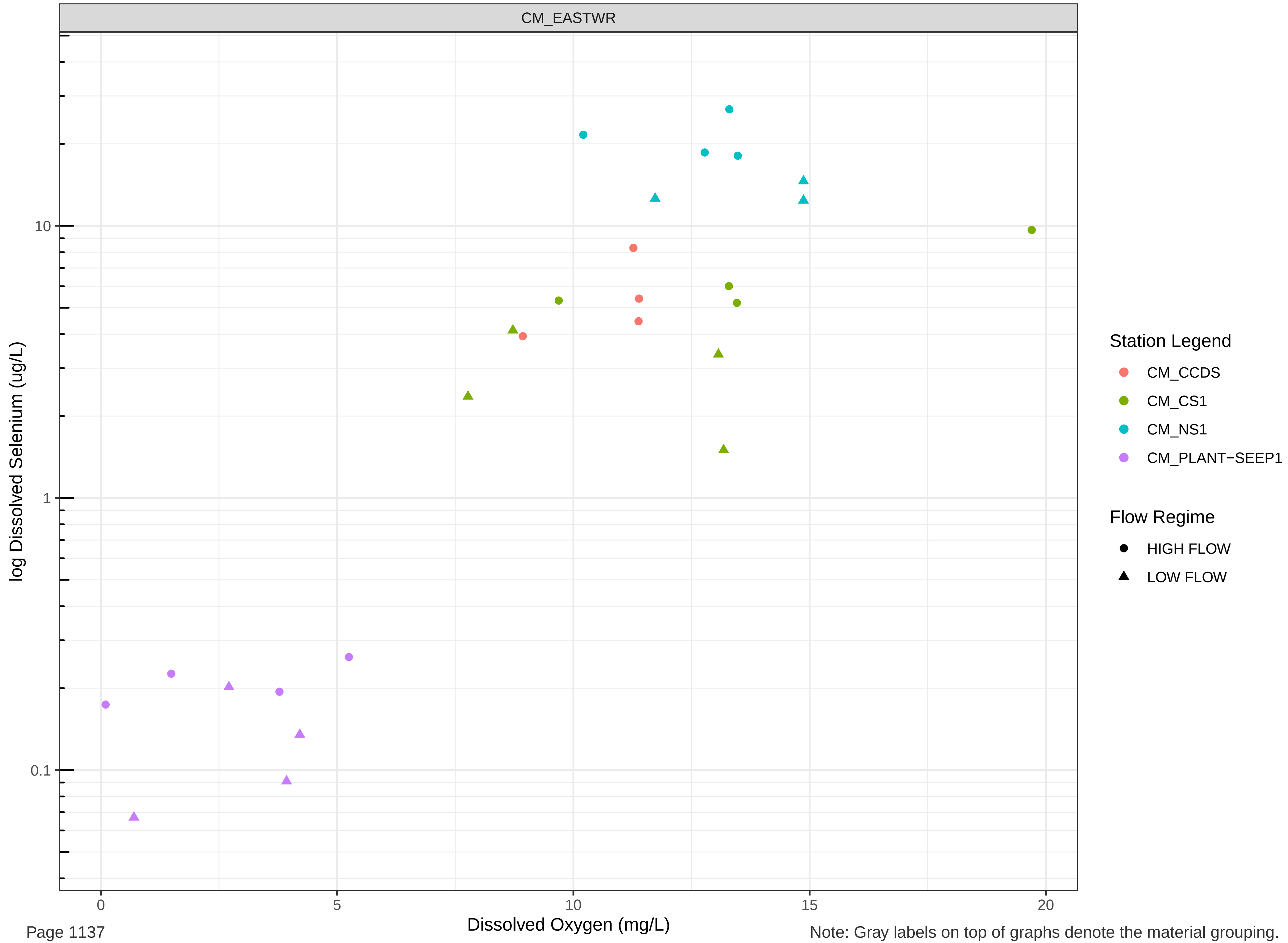
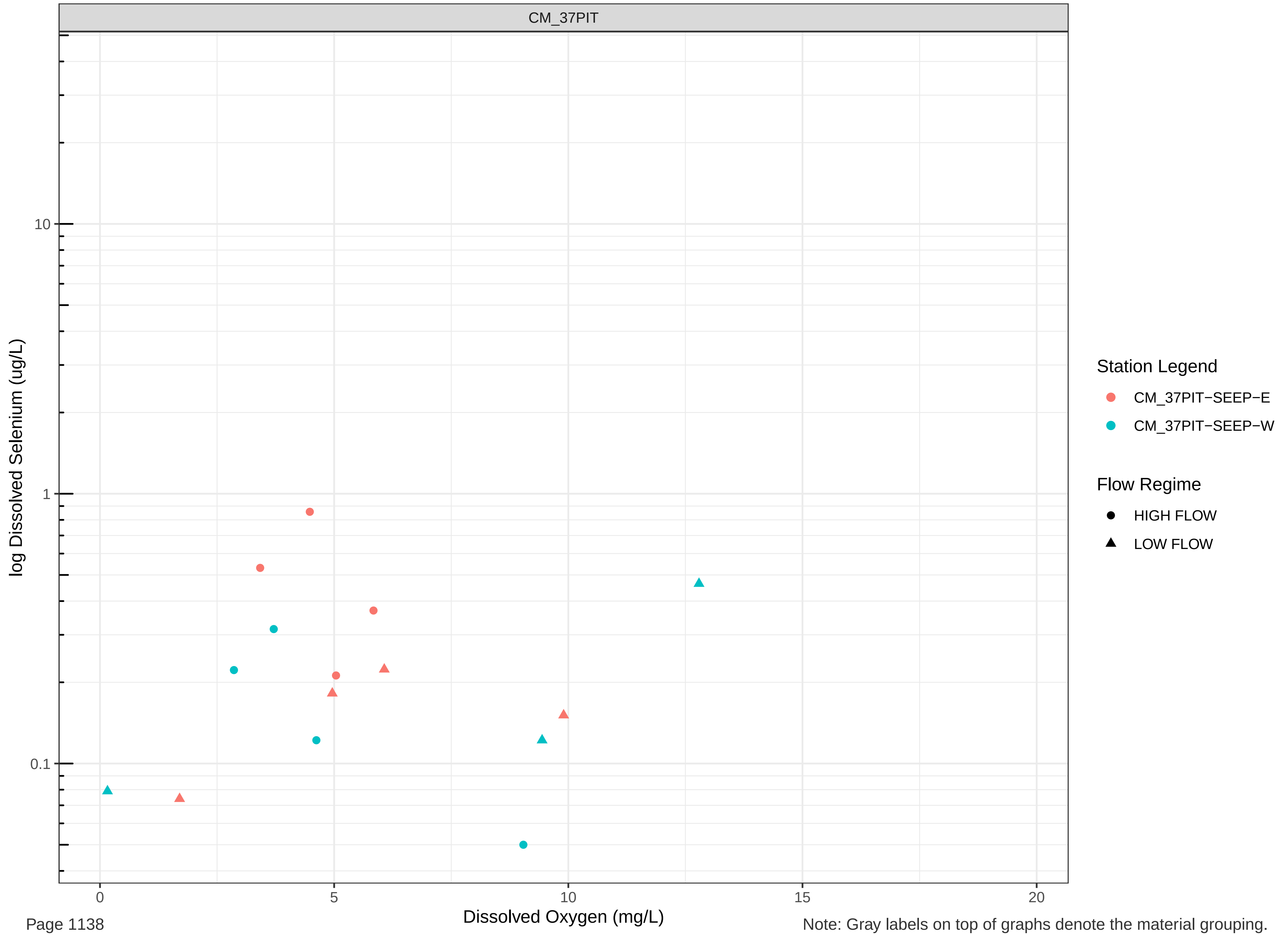
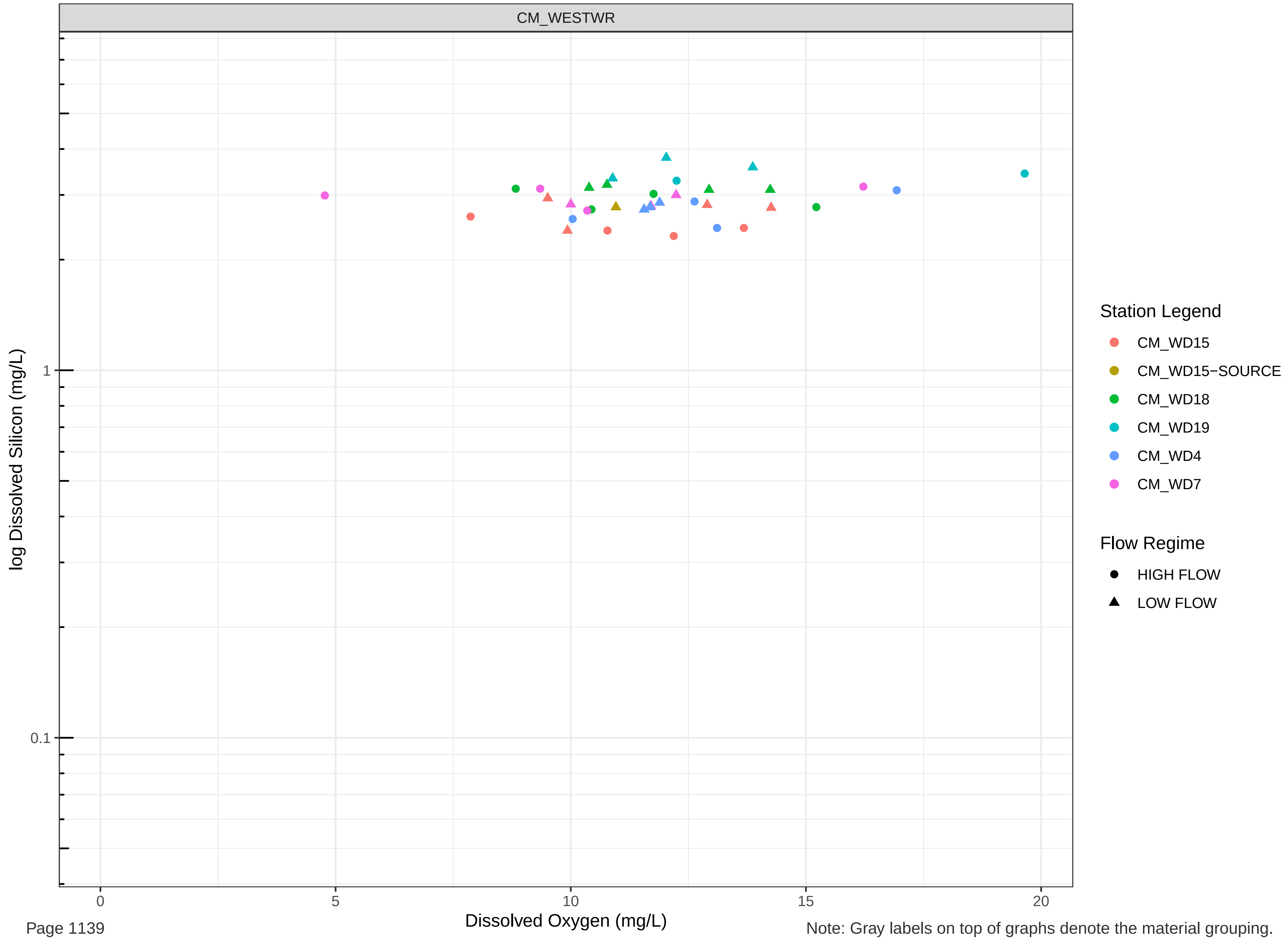


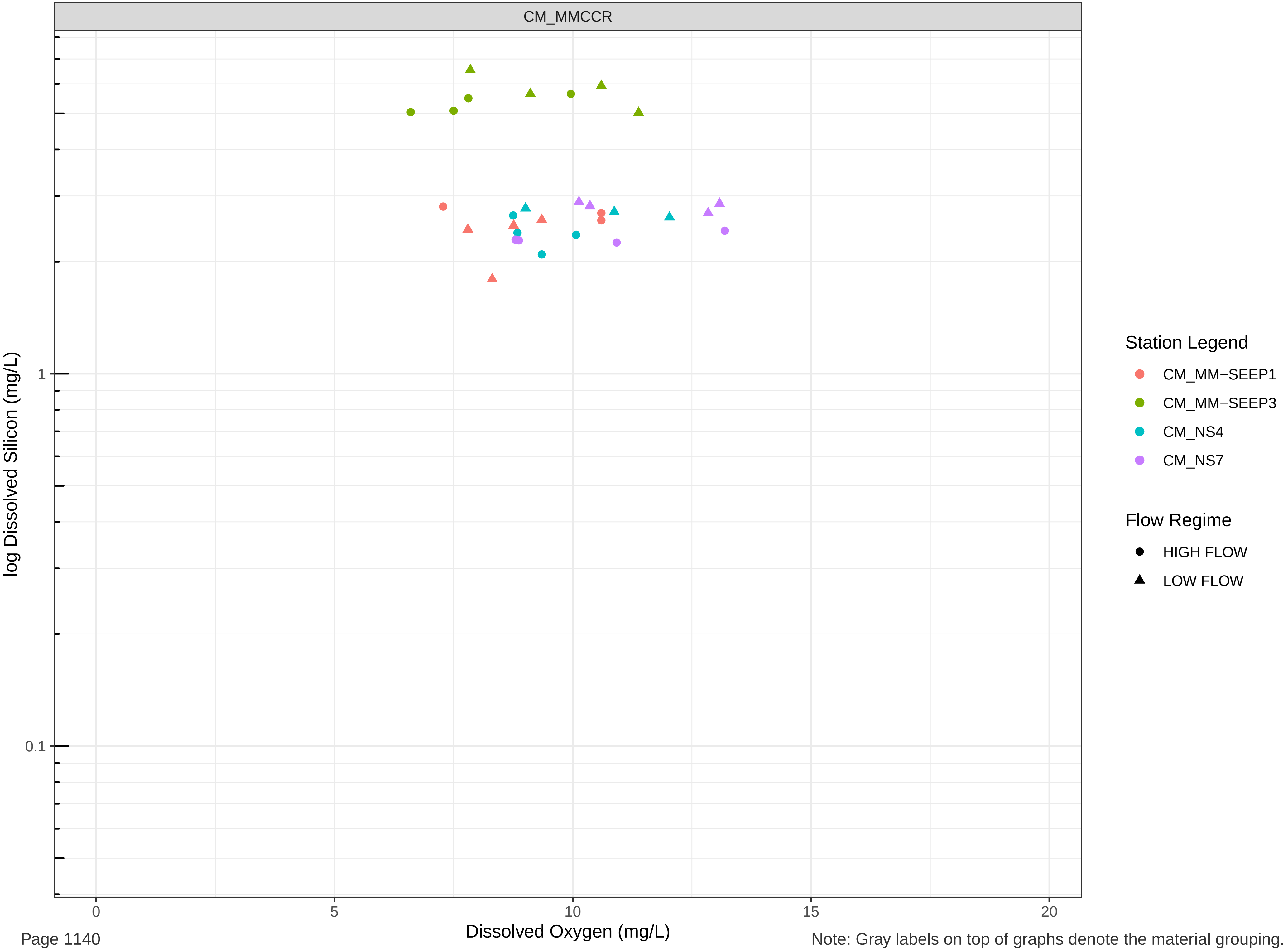
Note: Gray labels on top of graphs denote the material grouping.



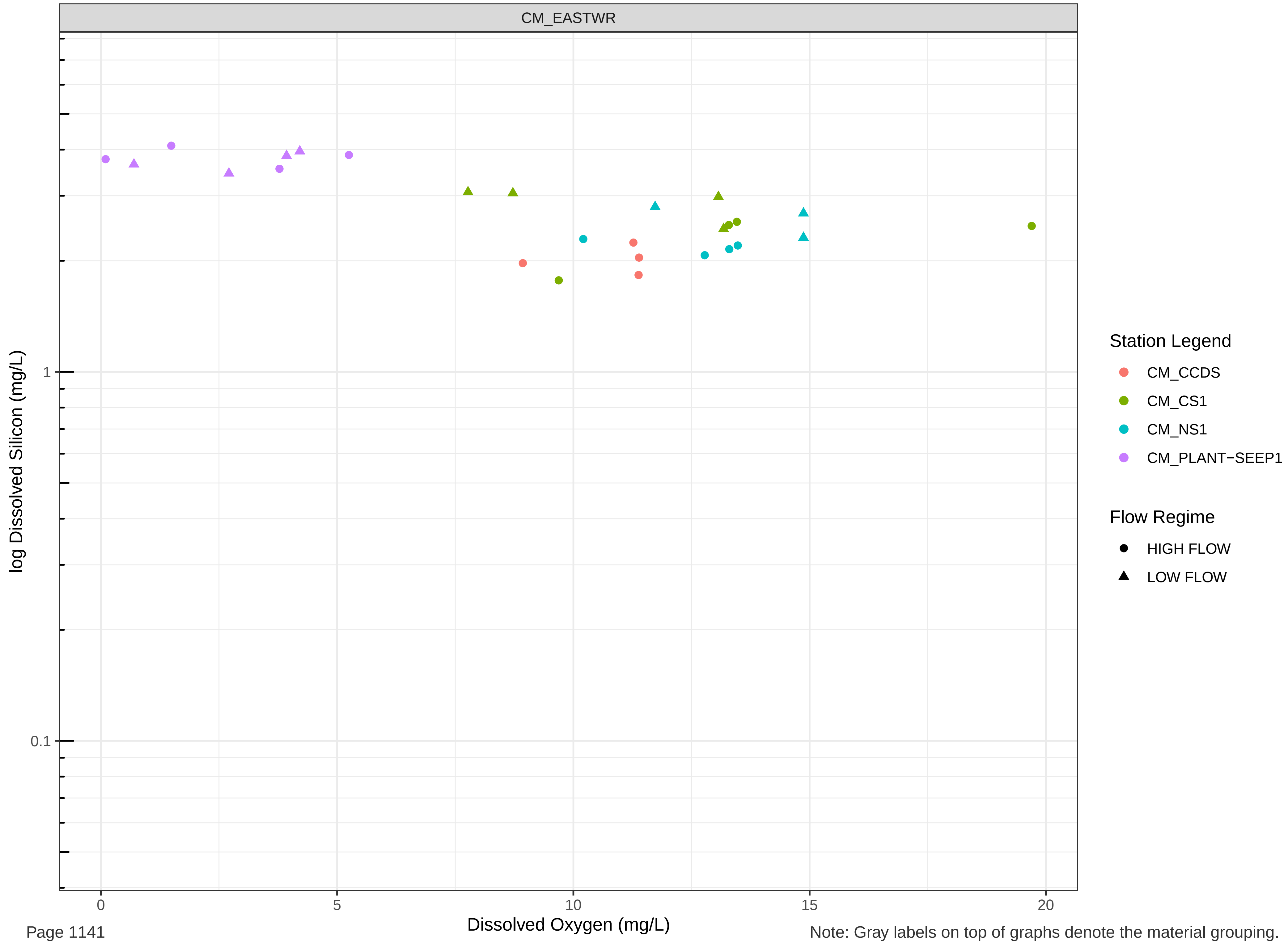
Note: Gray labels on top of graphs denote the material grouping.



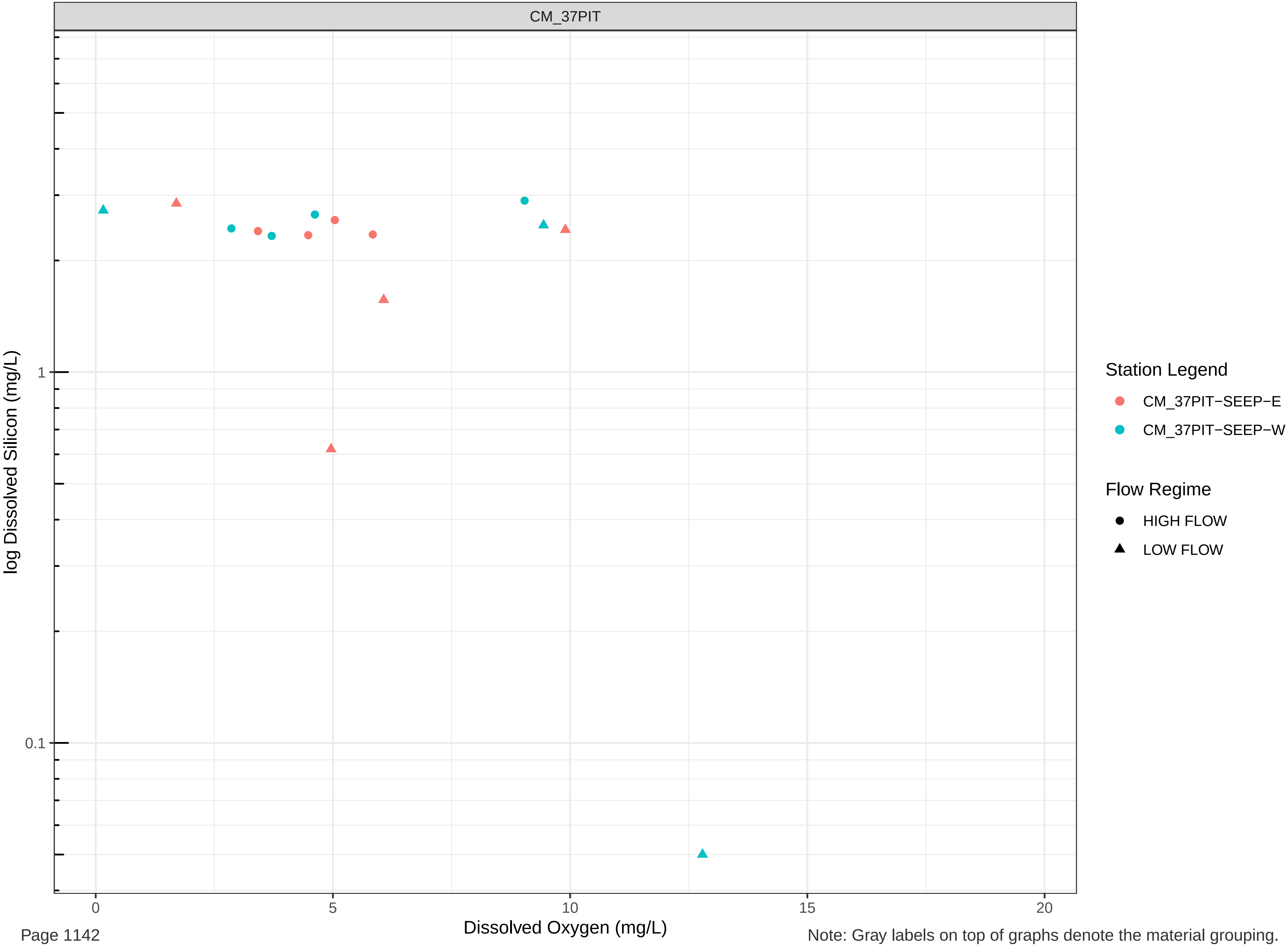
Note: Gray labels on top of graphs denote the material grouping.



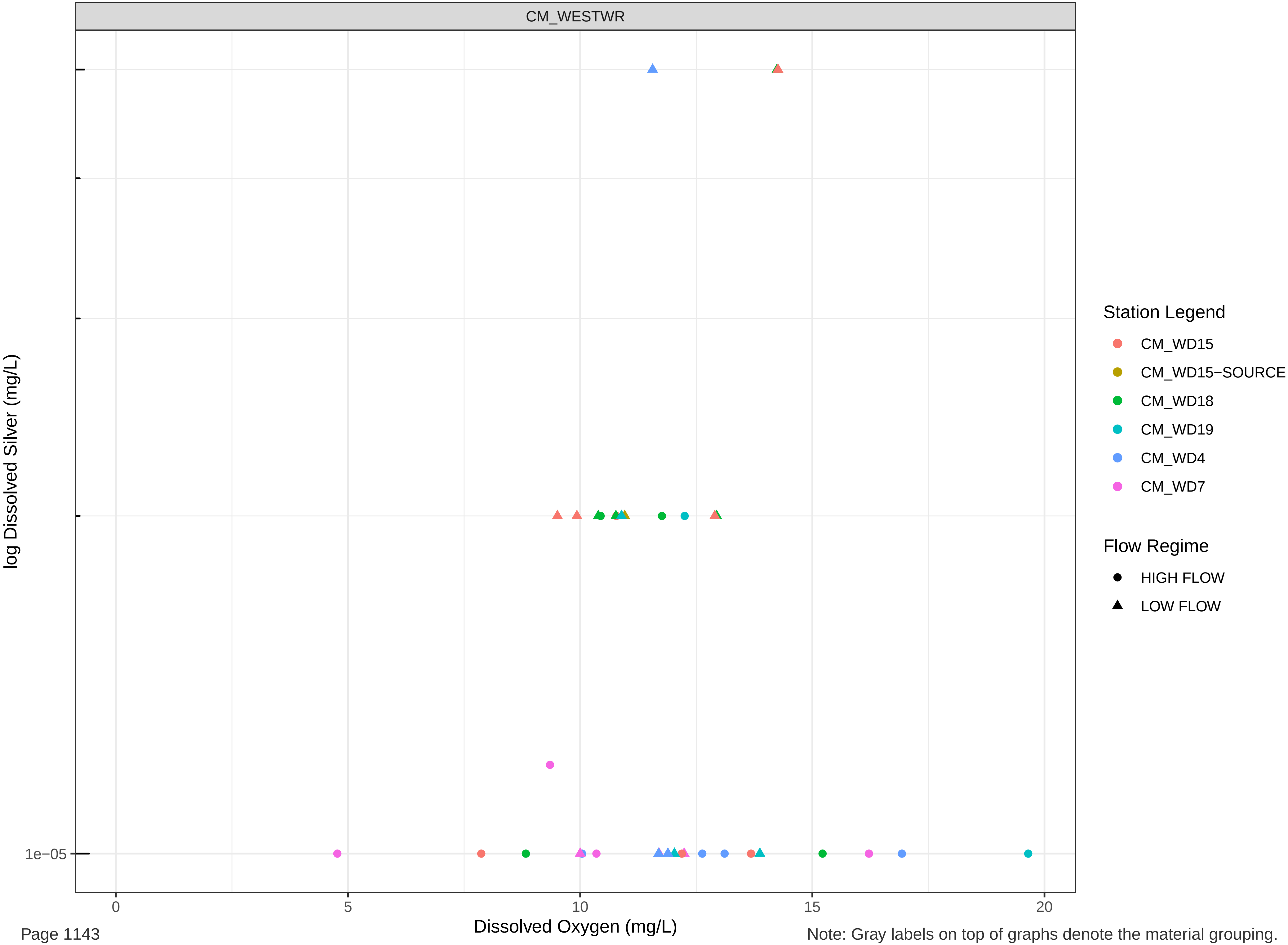
Note: Gray labels on top of graphs denote the material grouping.



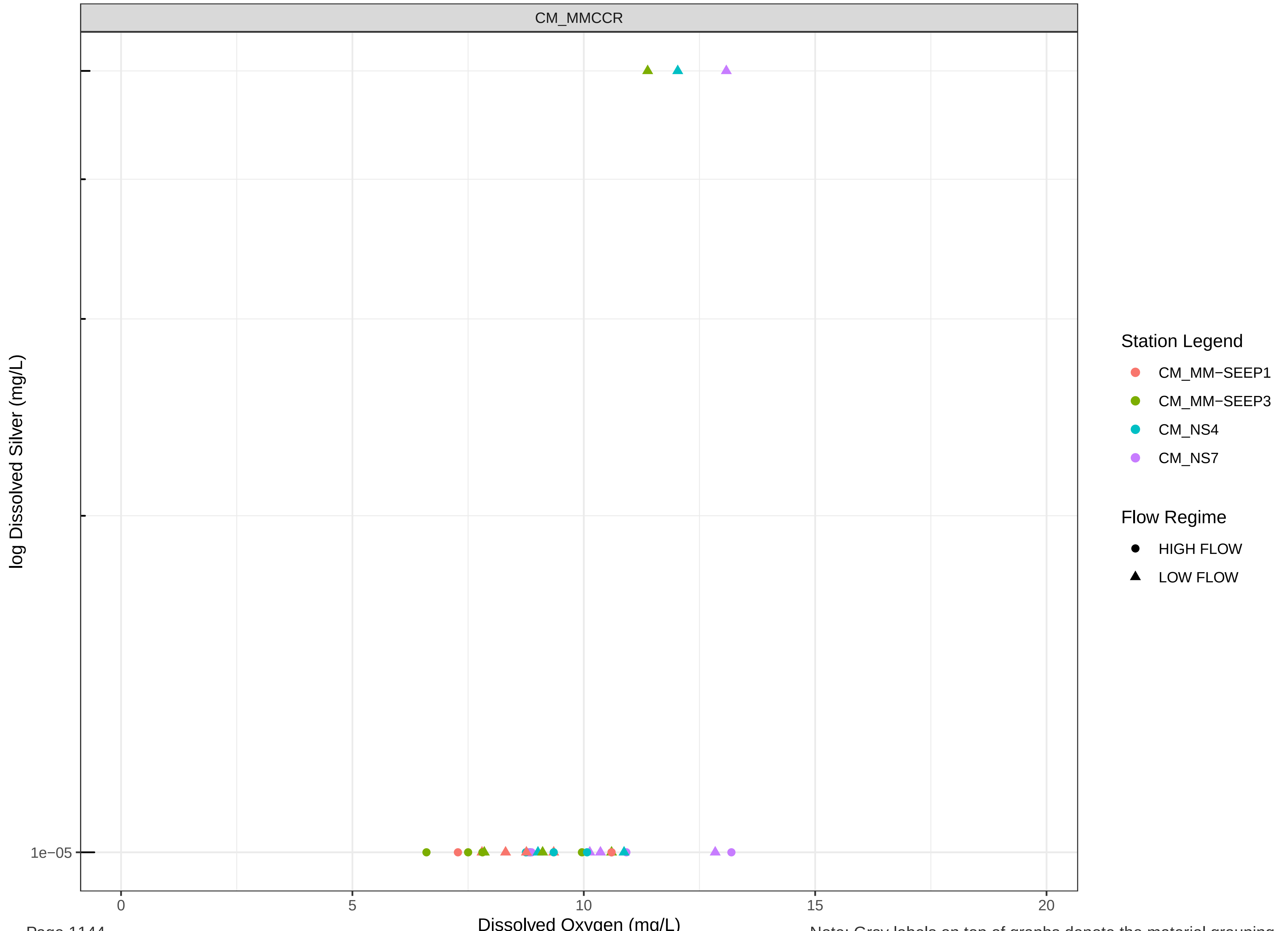
Note: Gray labels on top of graphs denote the material grouping.



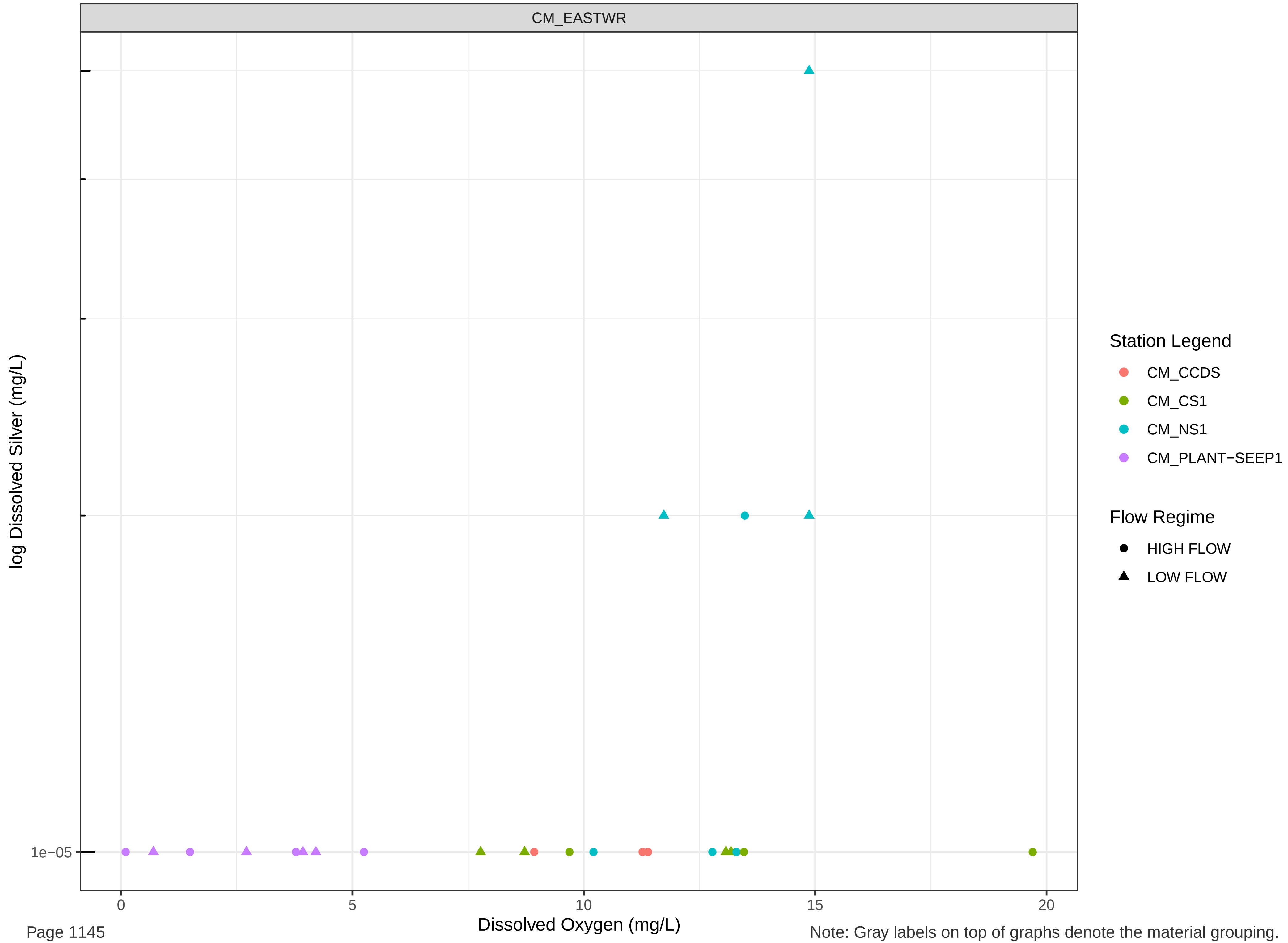
Note: Gray labels on top of graphs denote the material grouping.



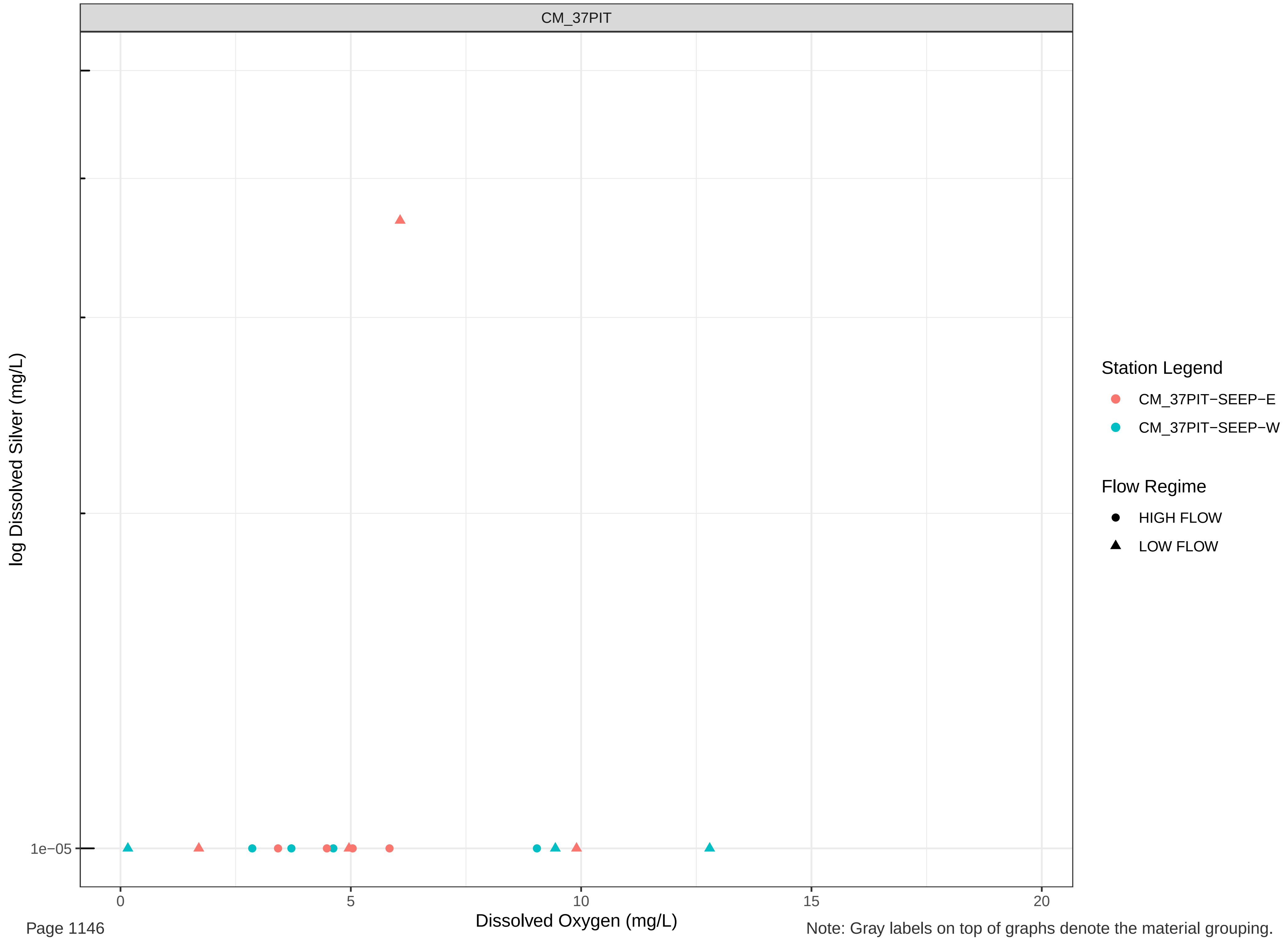
Note: Gray labels on top of graphs denote the material grouping.



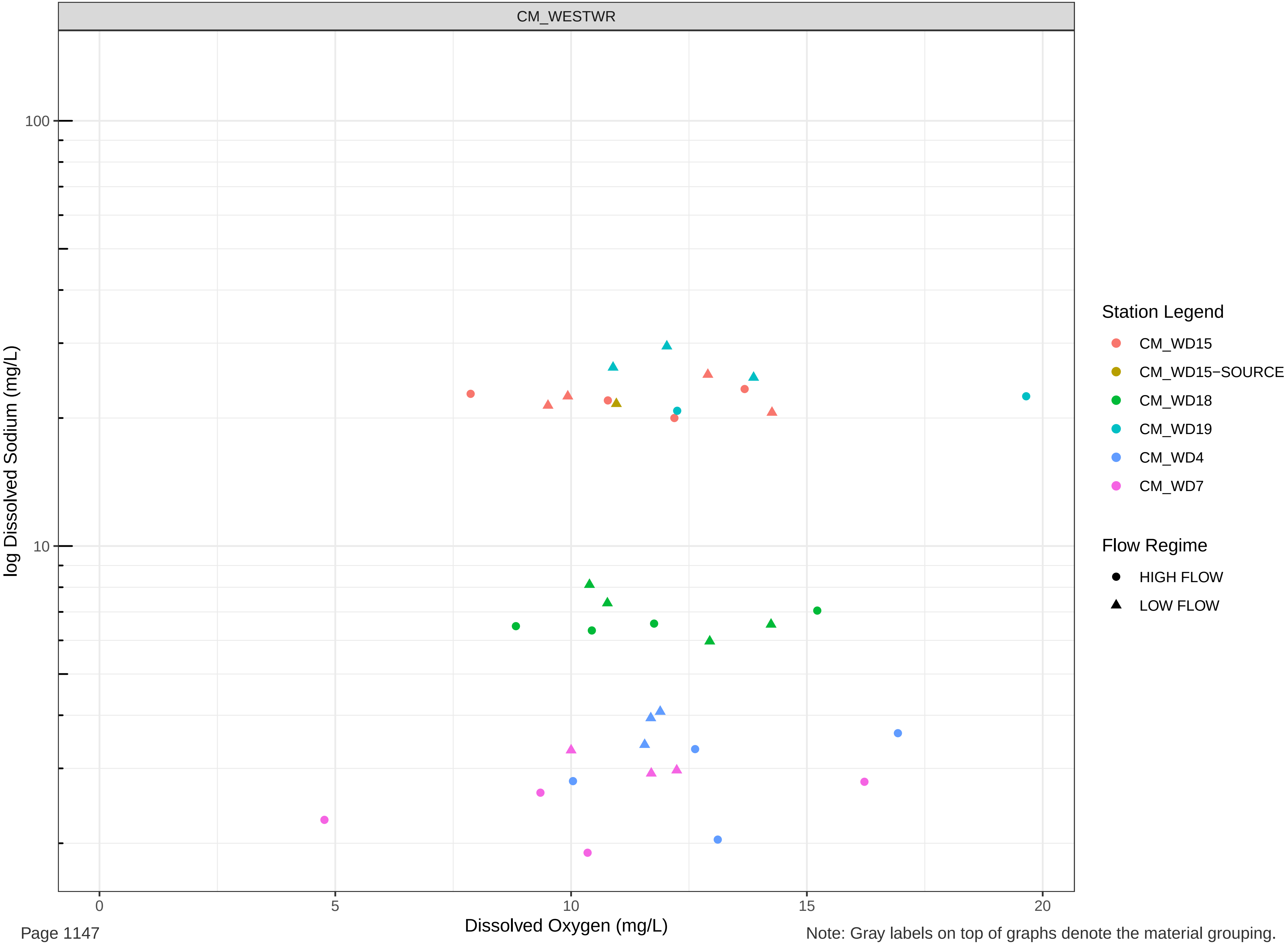
Note: Gray labels on top of graphs denote the material grouping.



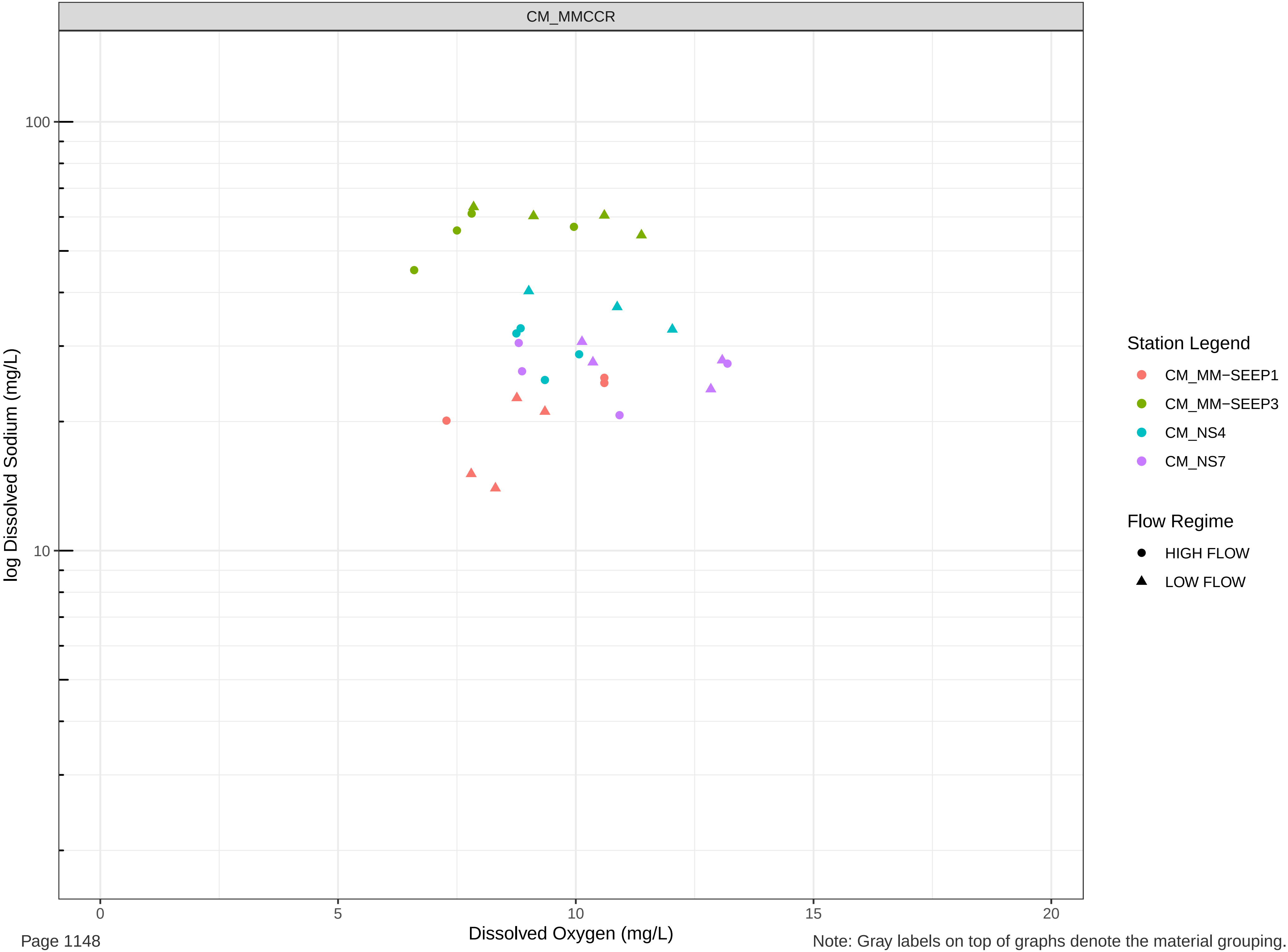
Note: Gray labels on top of graphs denote the material grouping.



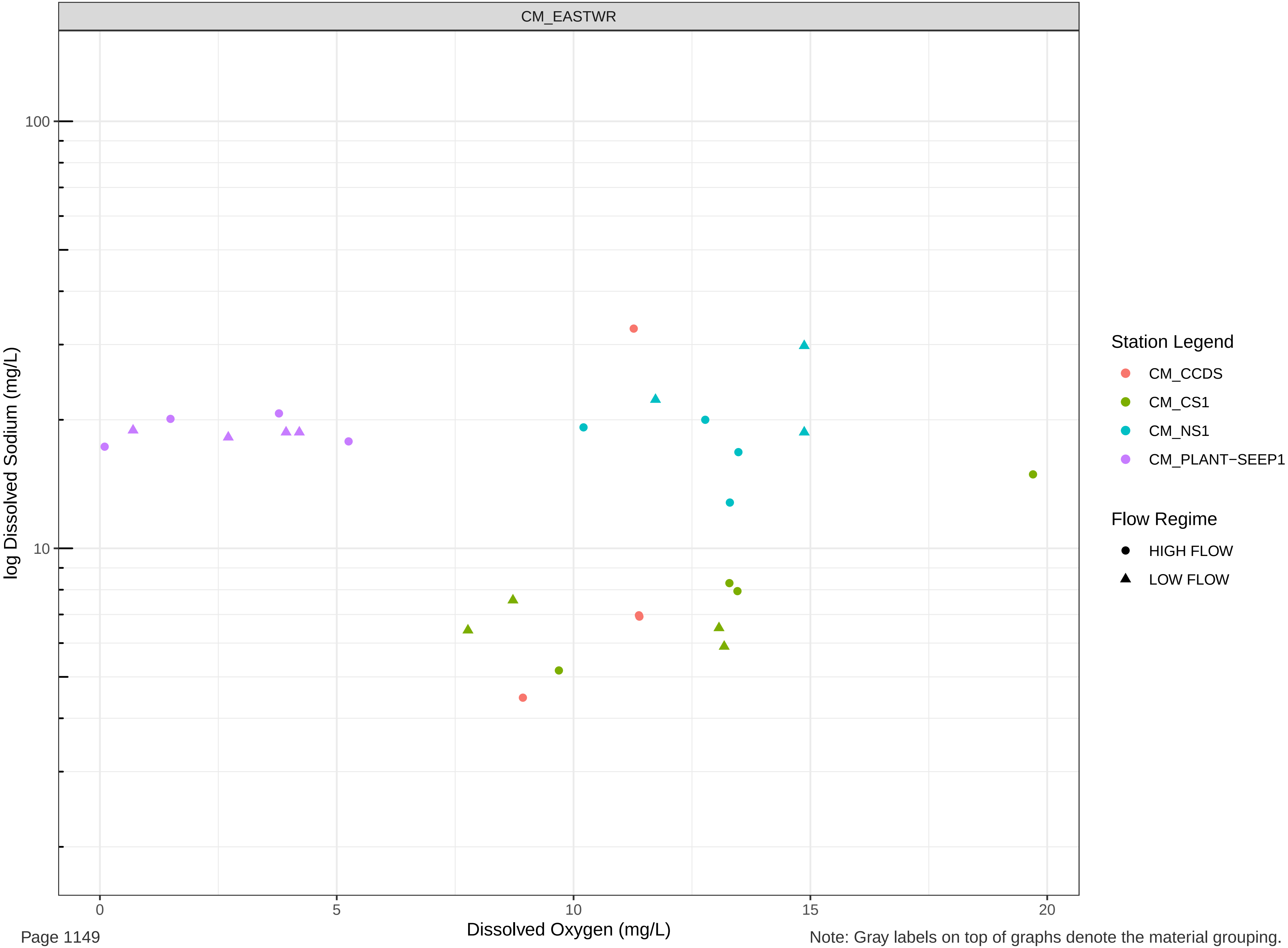
Note: Gray labels on top of graphs denote the material grouping.



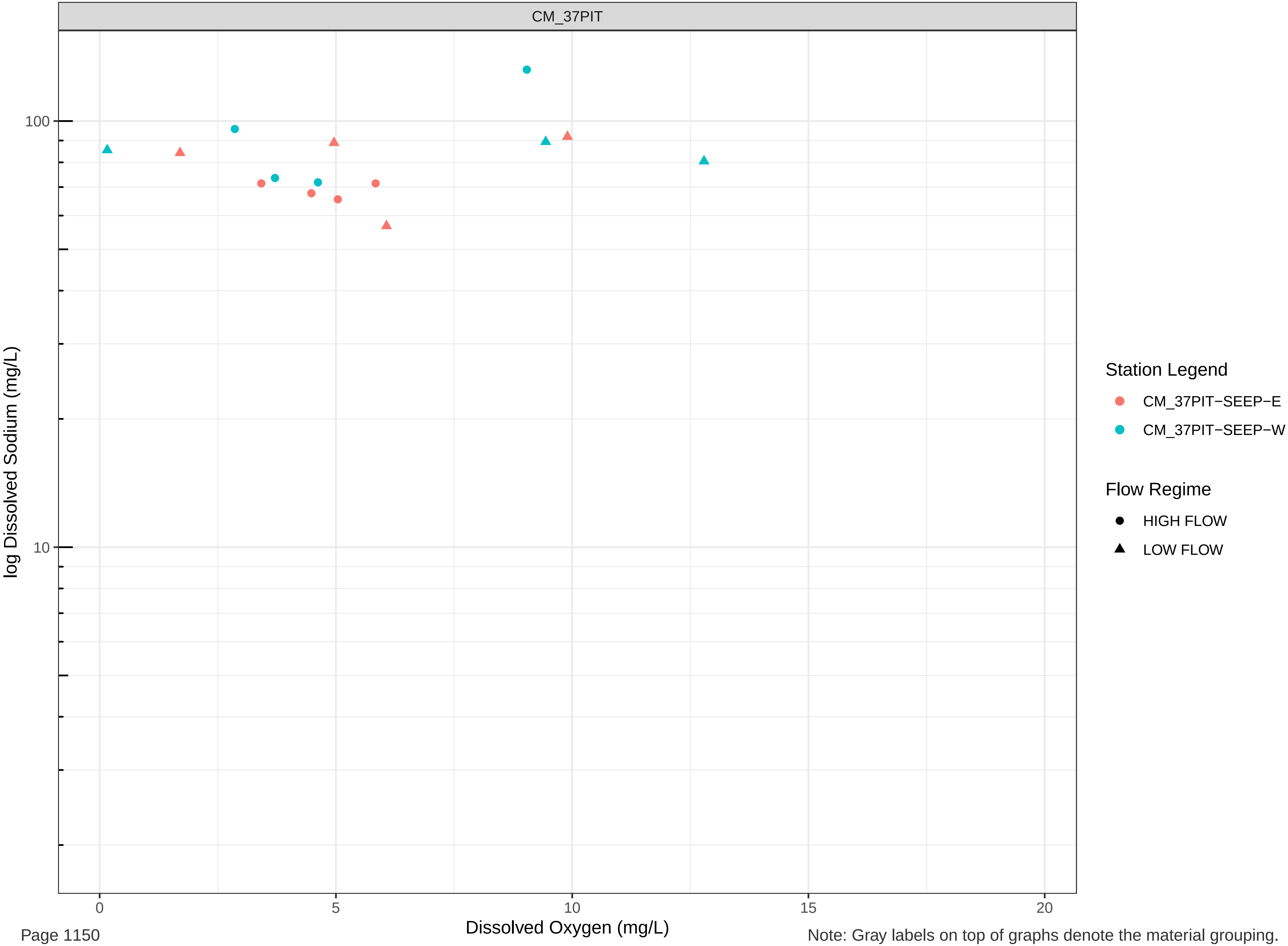
Note: Gray labels on top of graphs denote the material grouping.



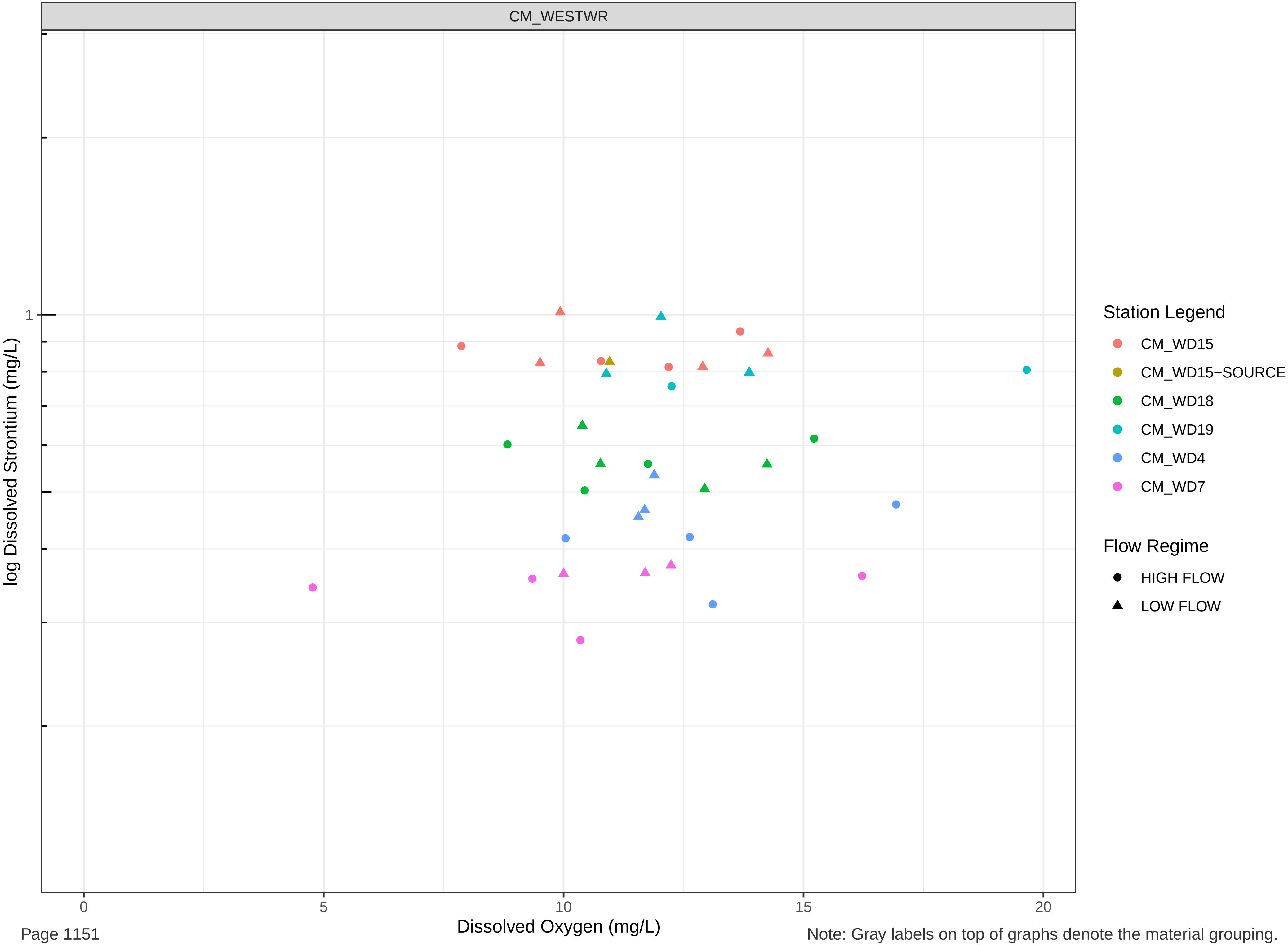
Note: Gray labels on top of graphs denote the material grouping.

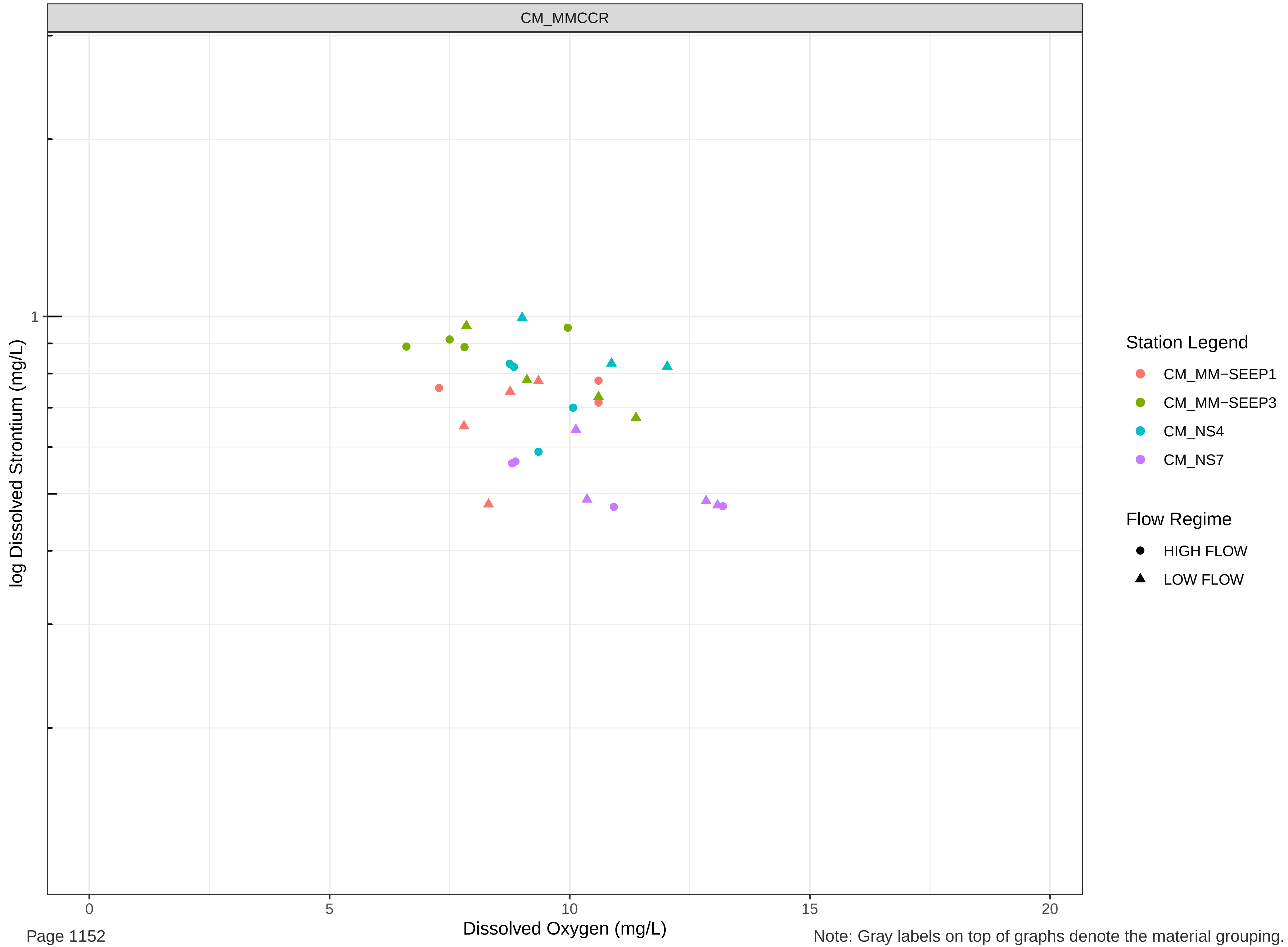


Note: Gray labels on top of graphs denote the material grouping.

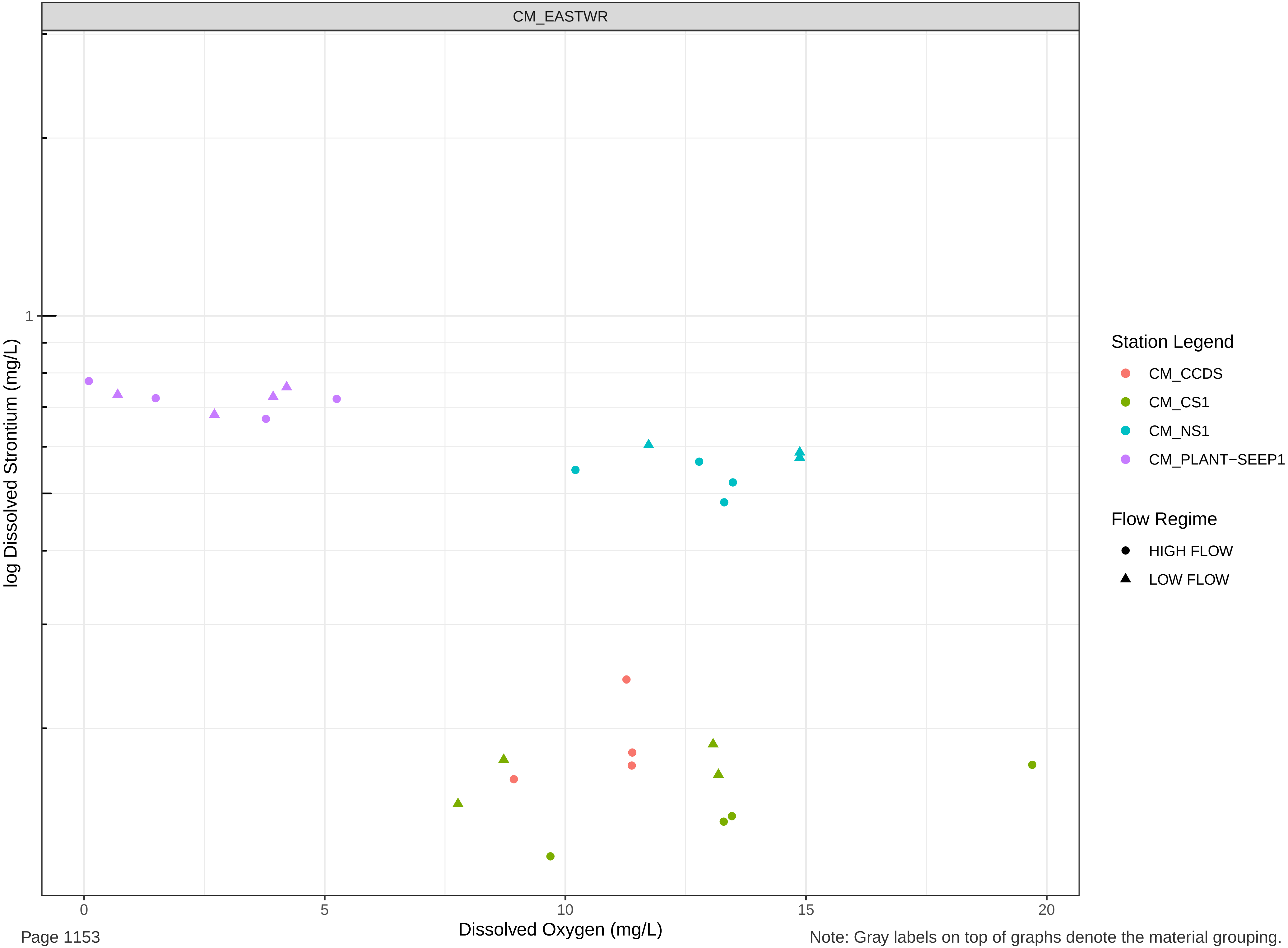


Note: Gray labels on top of graphs denote the material grouping.

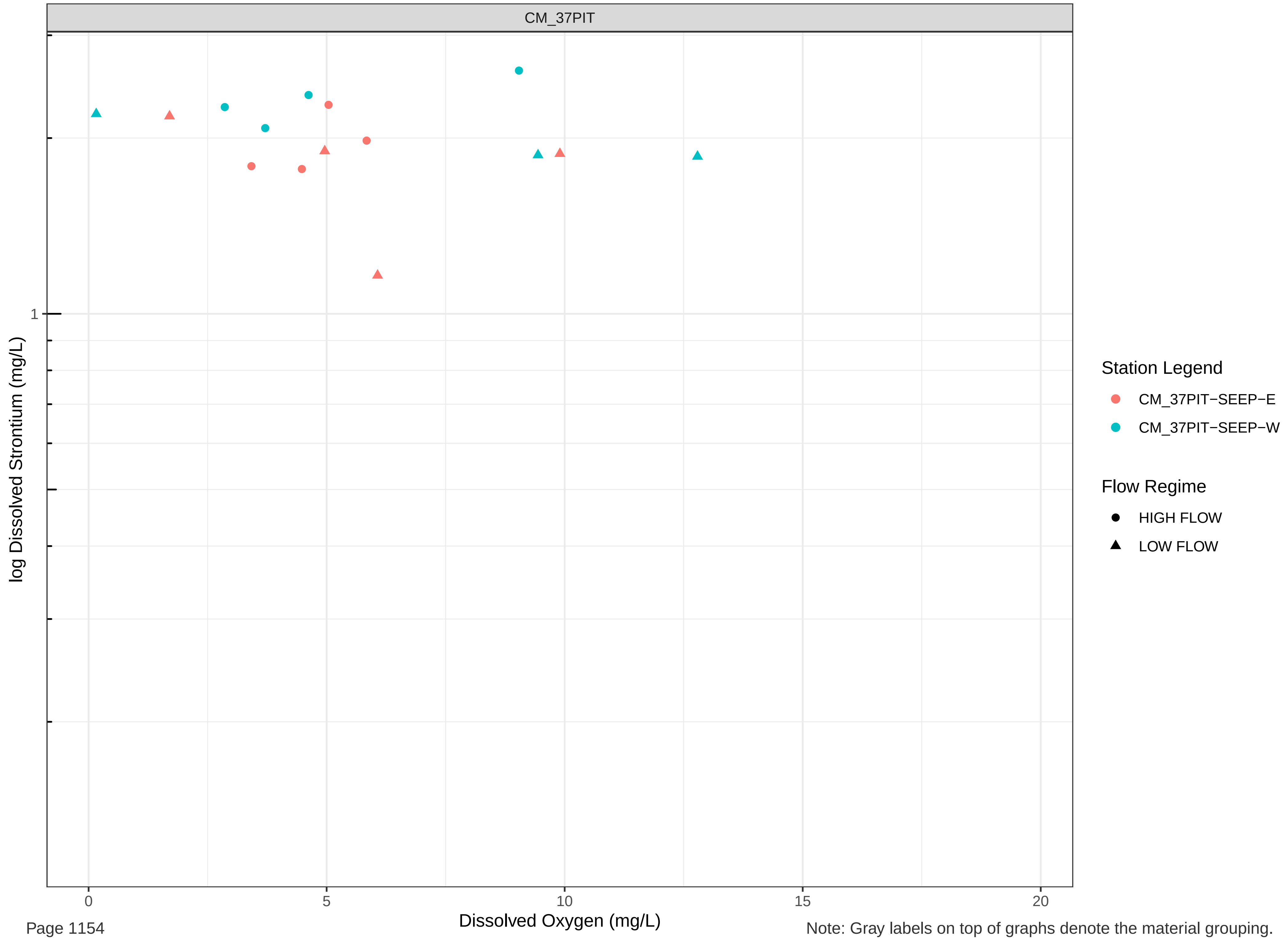

CM_WESTWR
log Dissolved Strontium (mg/L)
1
0
5
10
15
20
Dissolved Oxygen (mg/L)
Station Legend
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



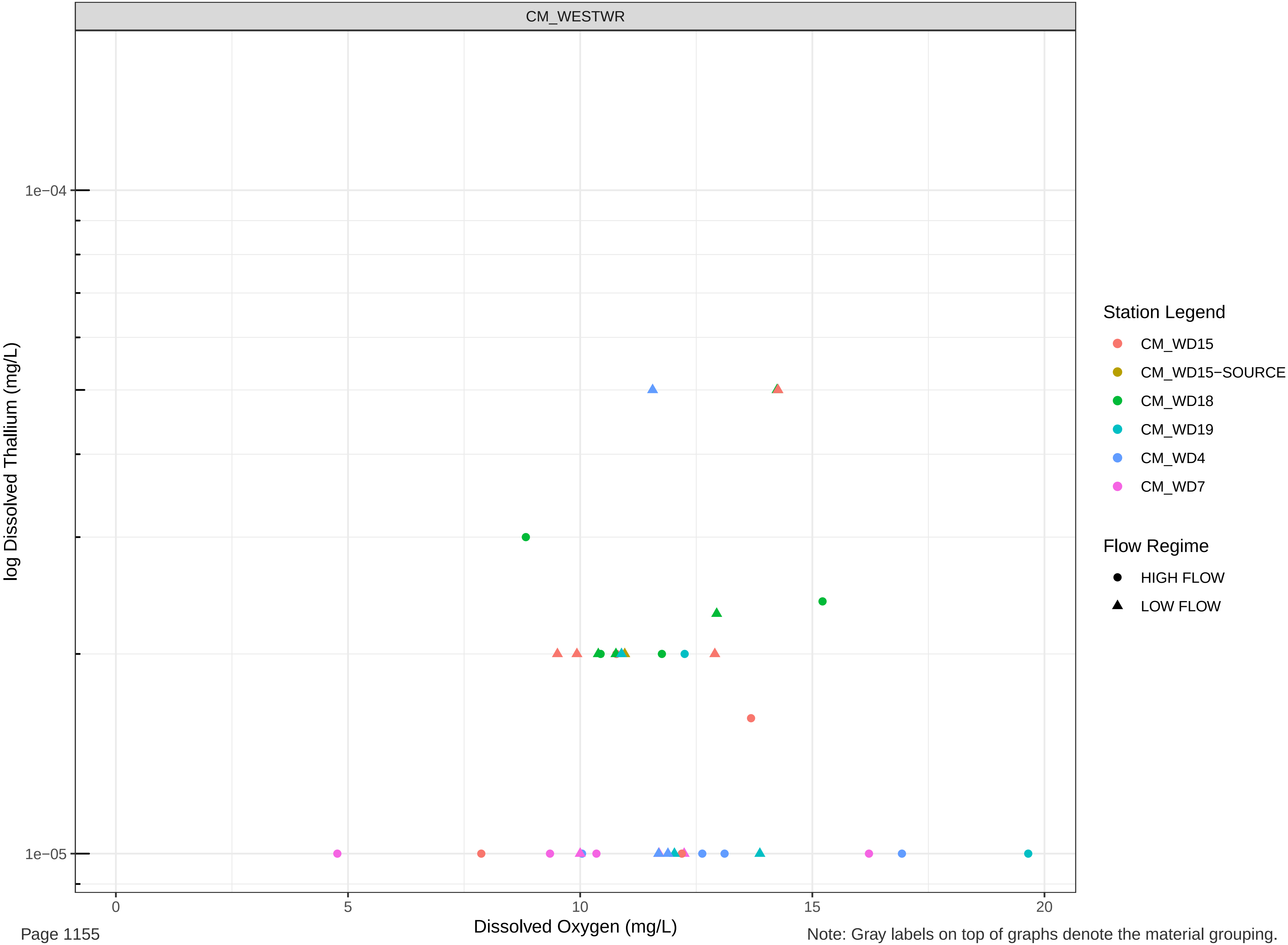
Note: Gray labels on top of graphs denote the material grouping.



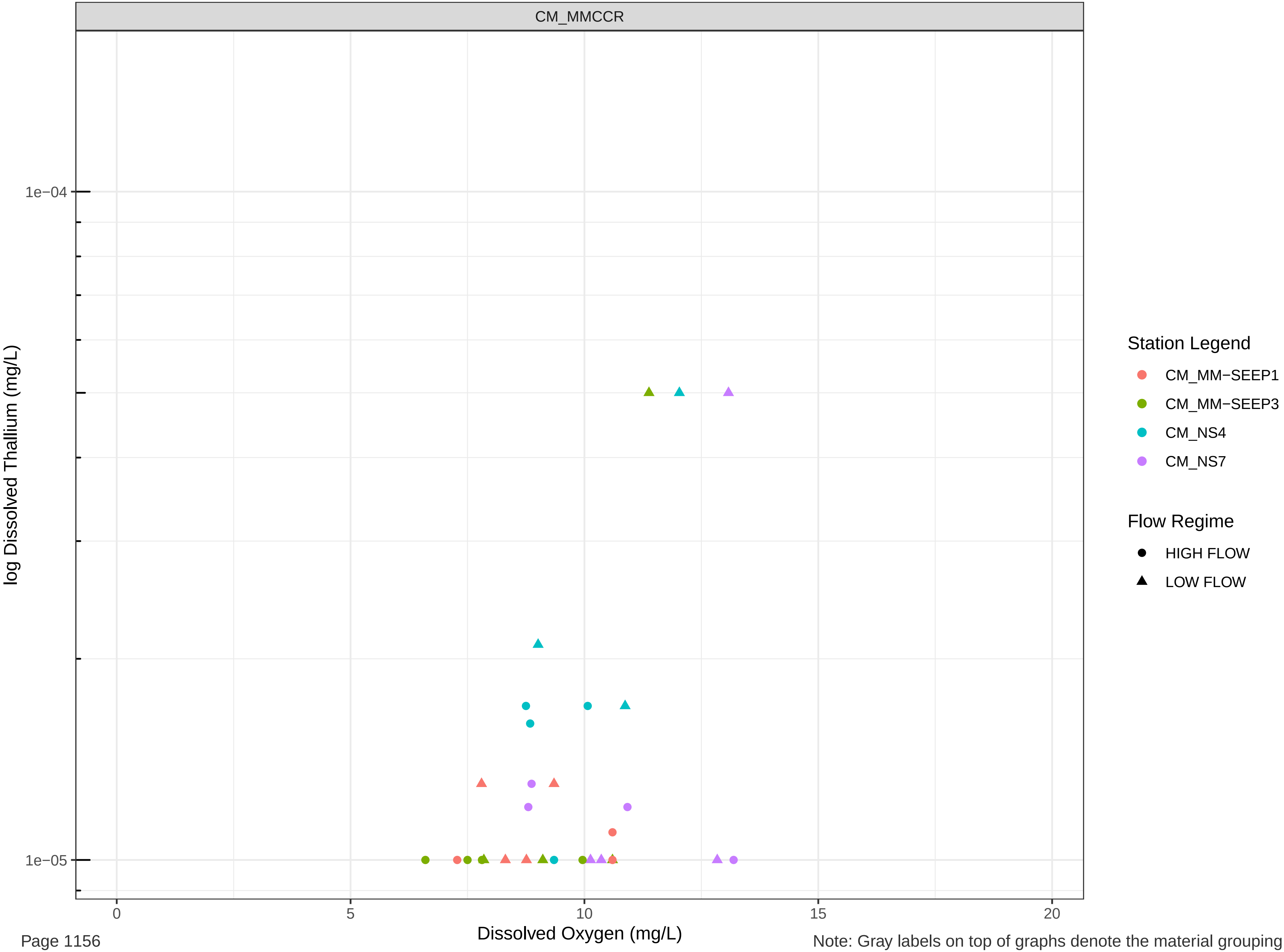
Note: Gray labels on top of graphs denote the material grouping.



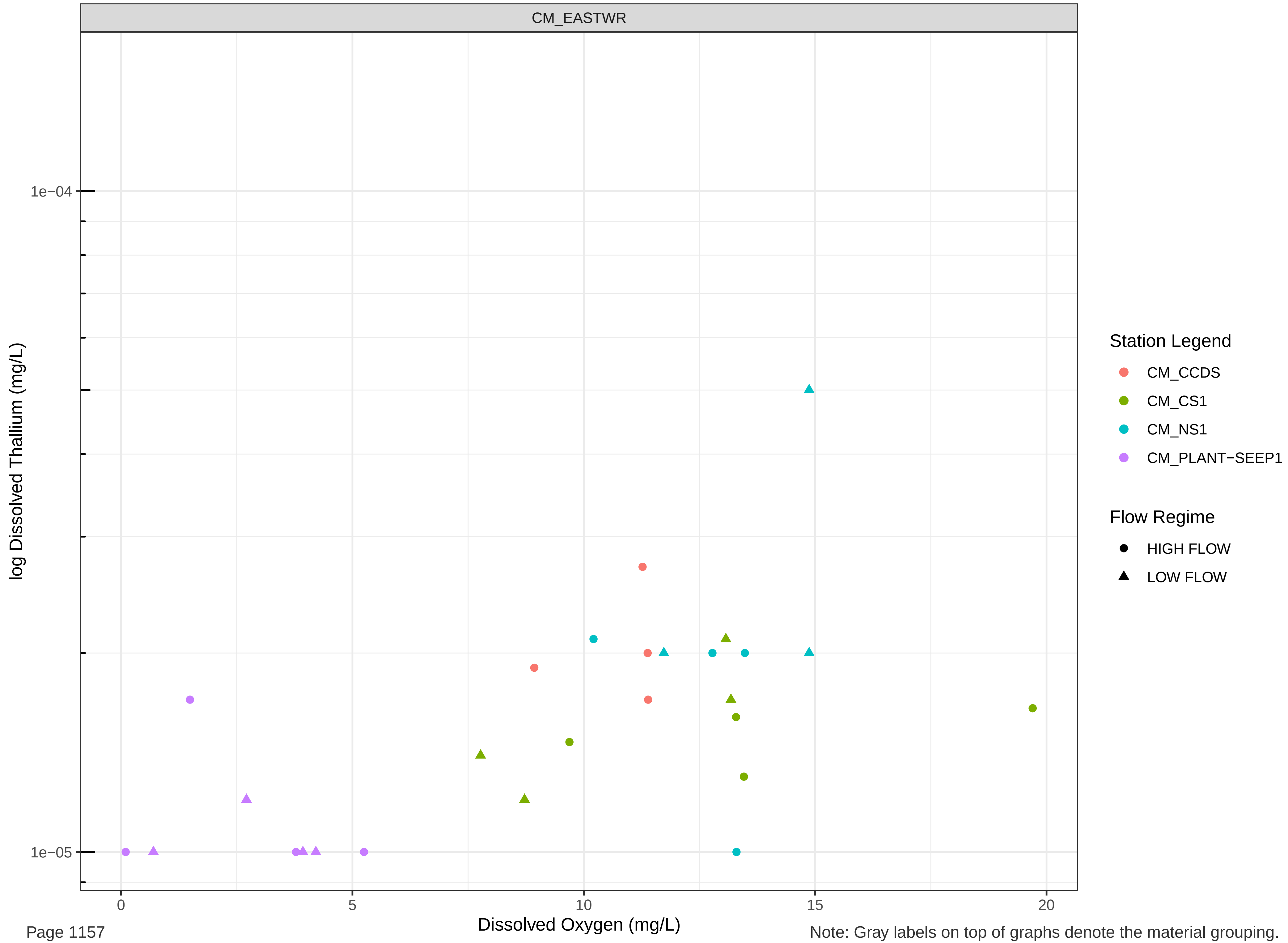
Note: Gray labels on top of graphs denote the material grouping.



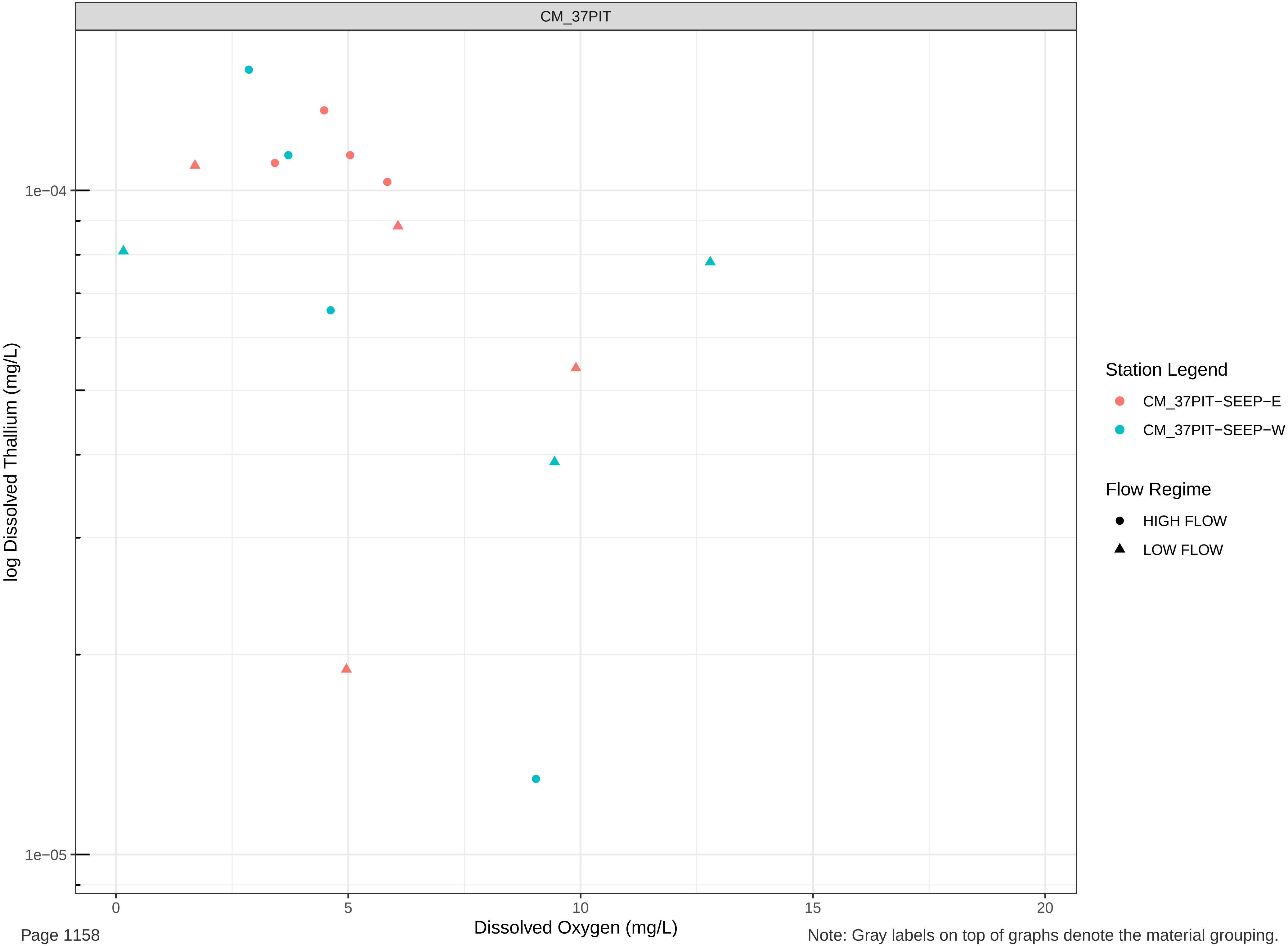
Note: Gray labels on top of graphs denote the material grouping.



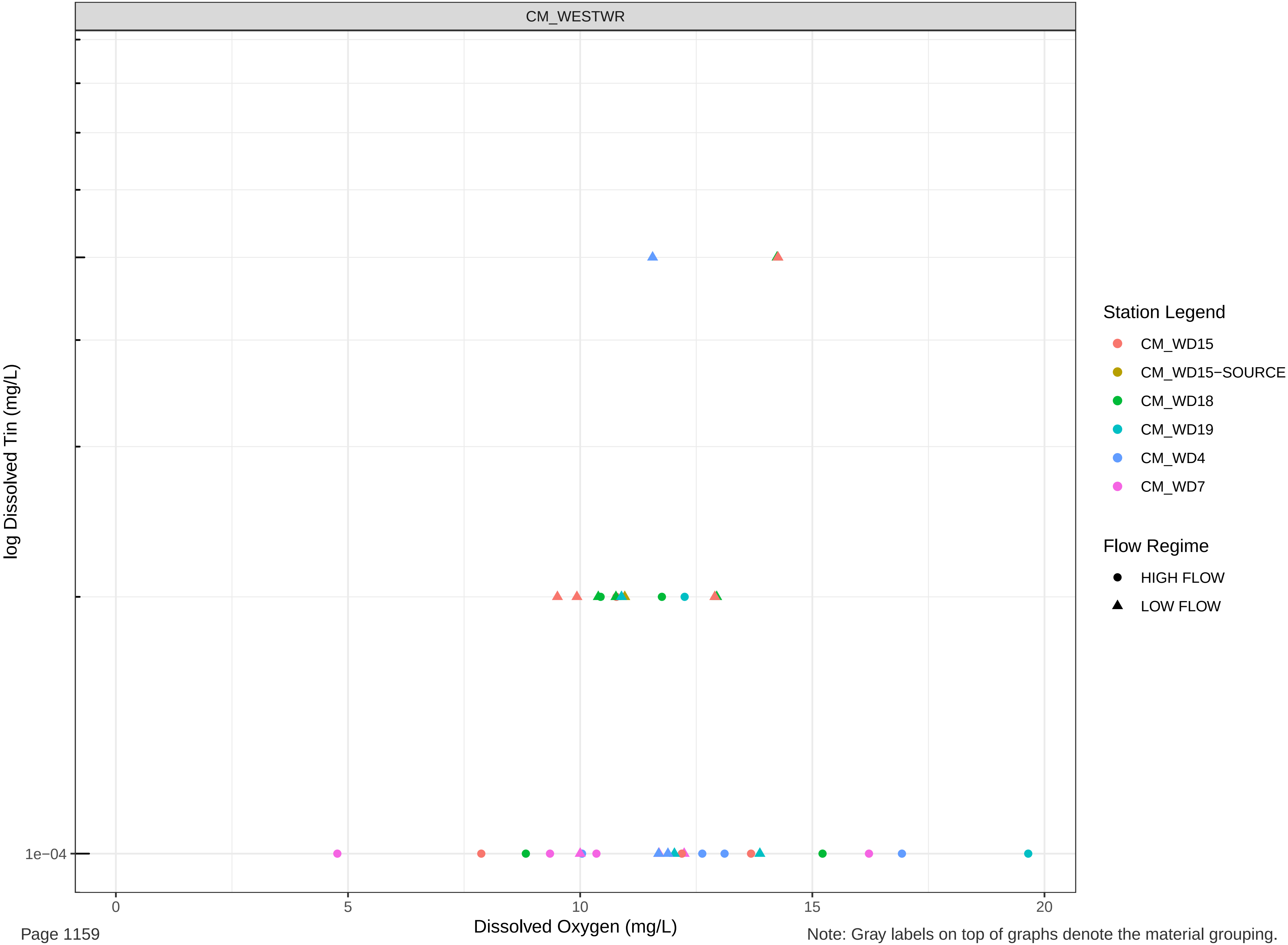
Note: Gray labels on top of graphs denote the material grouping.



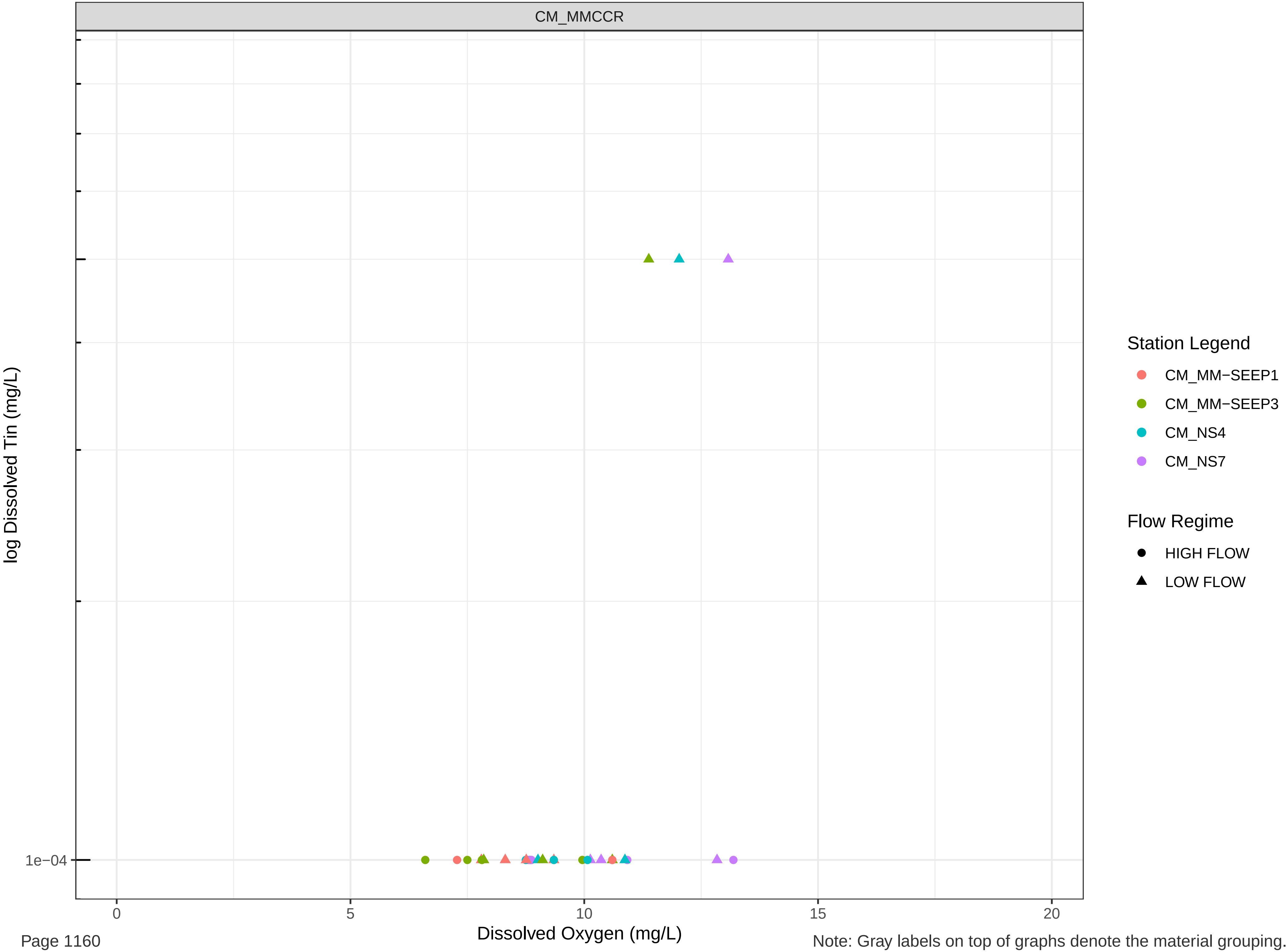
Note: Gray labels on top of graphs denote the material grouping.



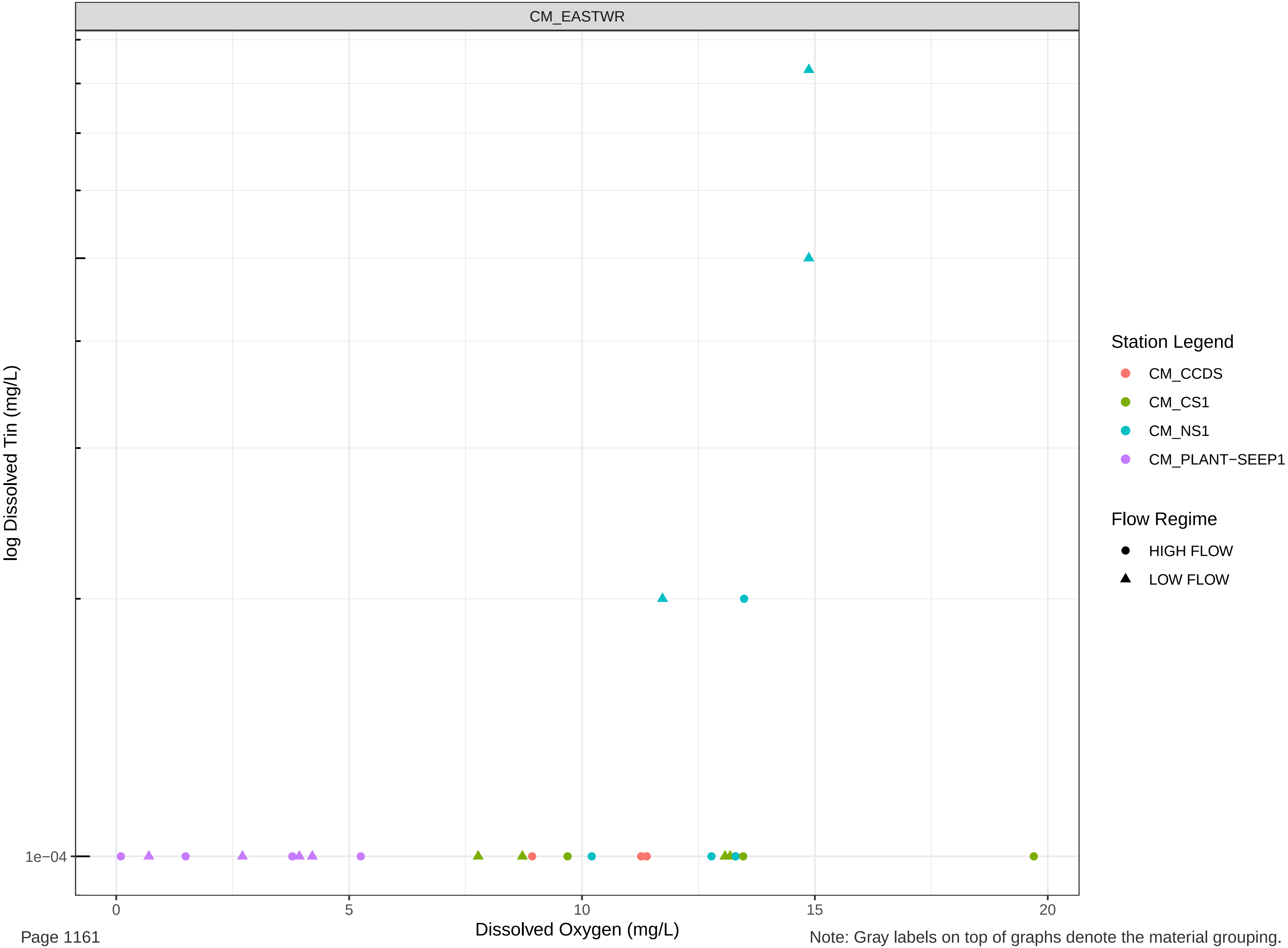
Note: Gray labels on top of graphs denote the material grouping.



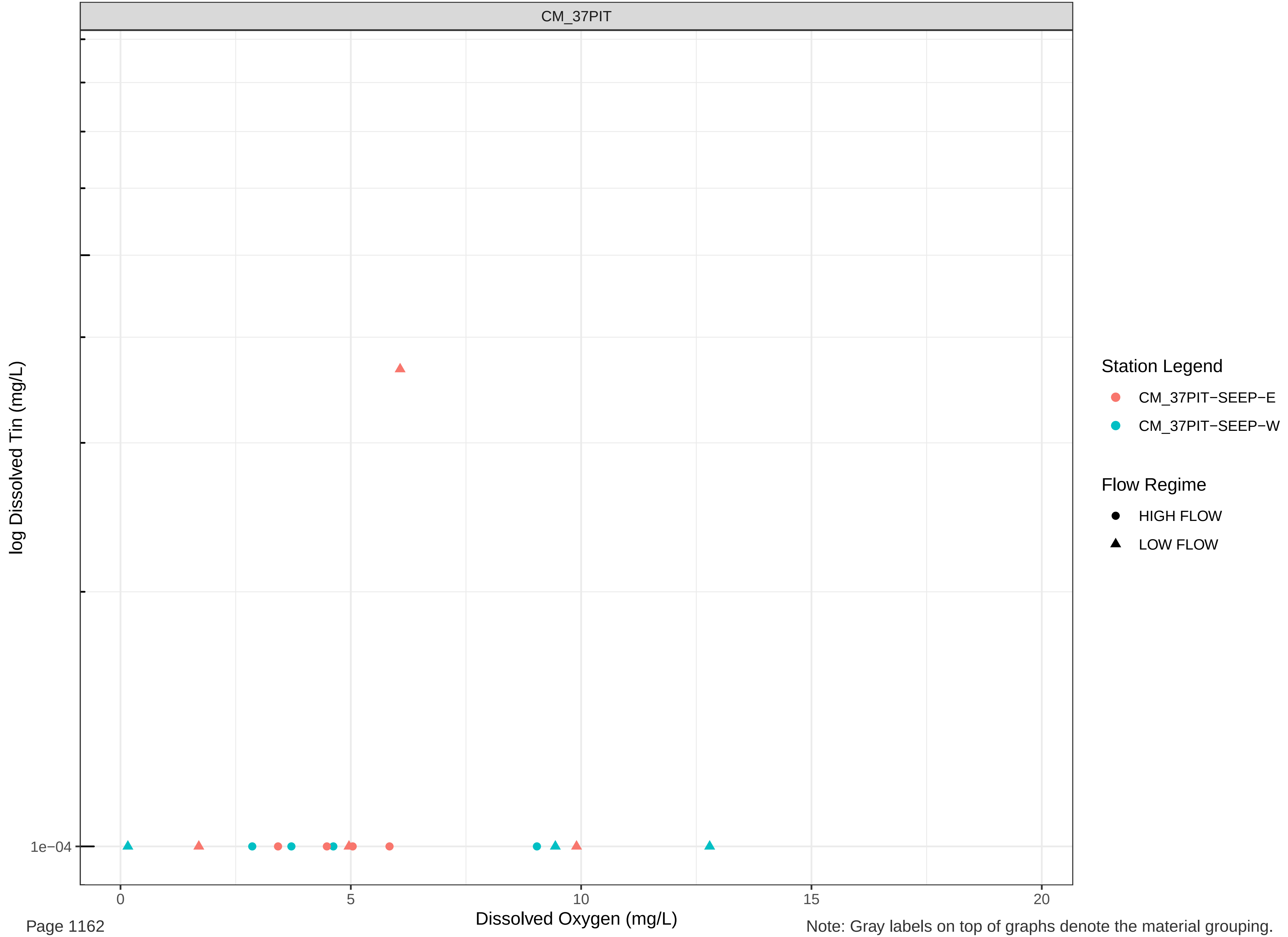
Note: Gray labels on top of graphs denote the material grouping.



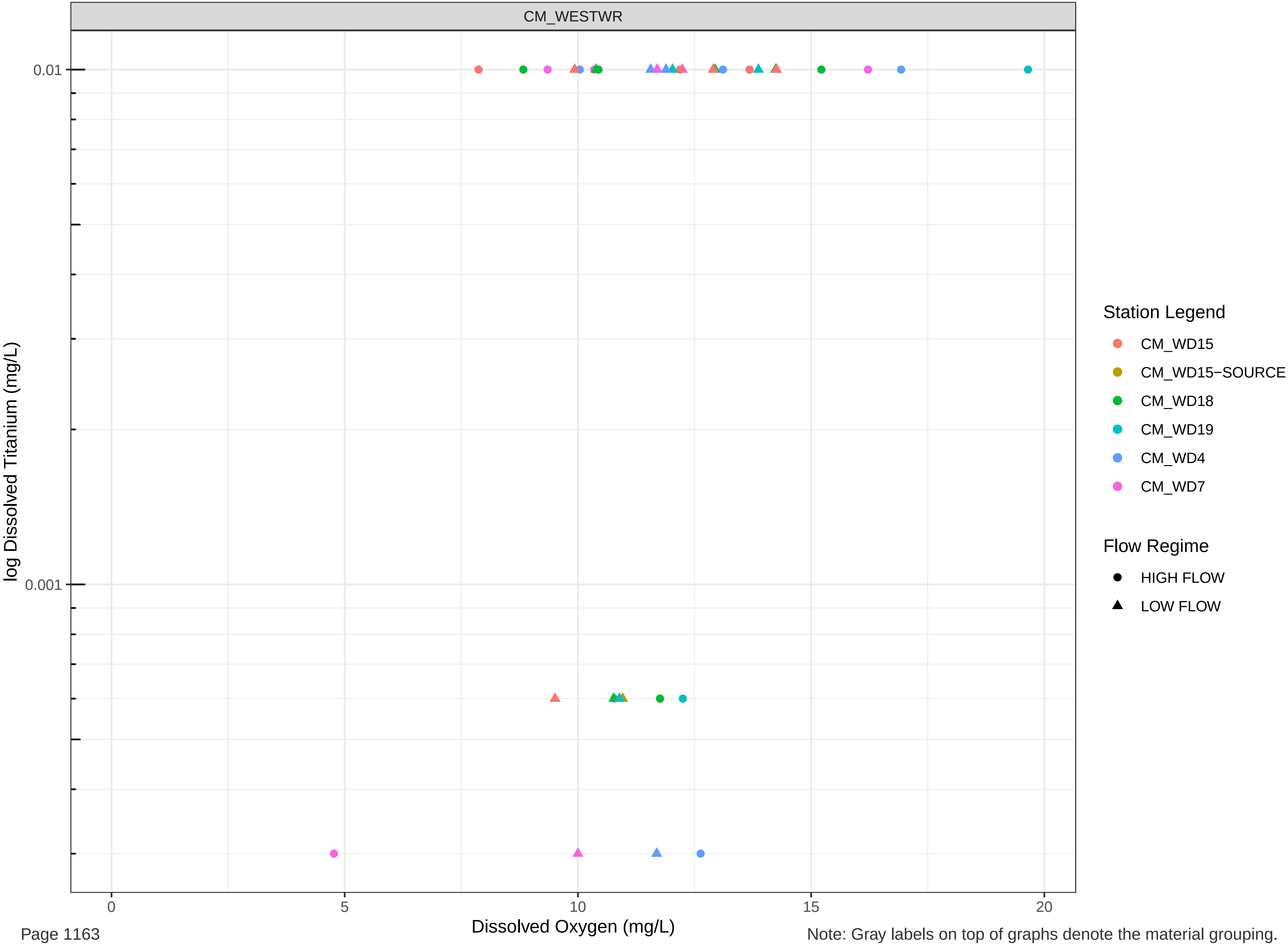
Note: Gray labels on top of graphs denote the material grouping.



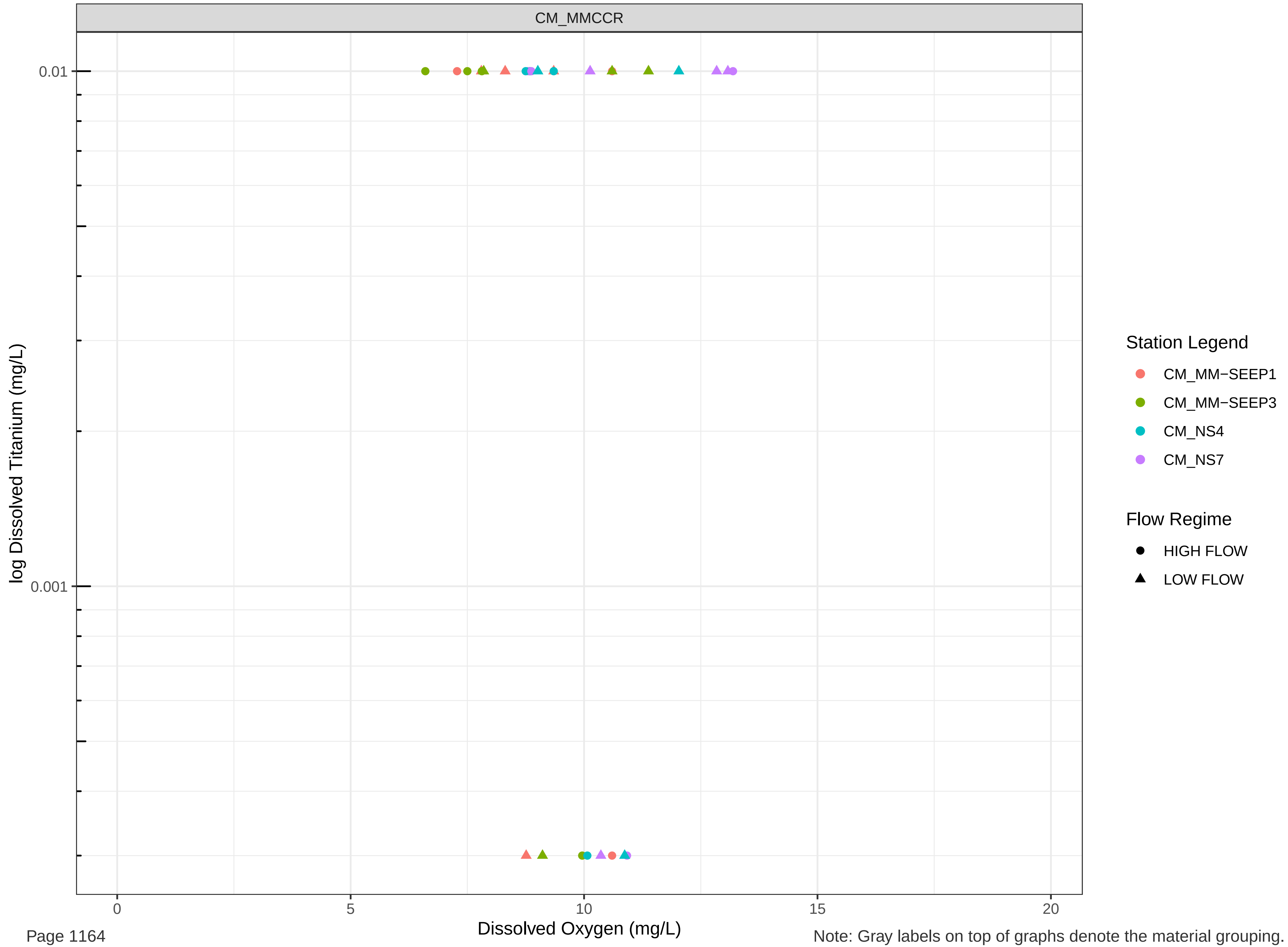
Note: Gray labels on top of graphs denote the material grouping.



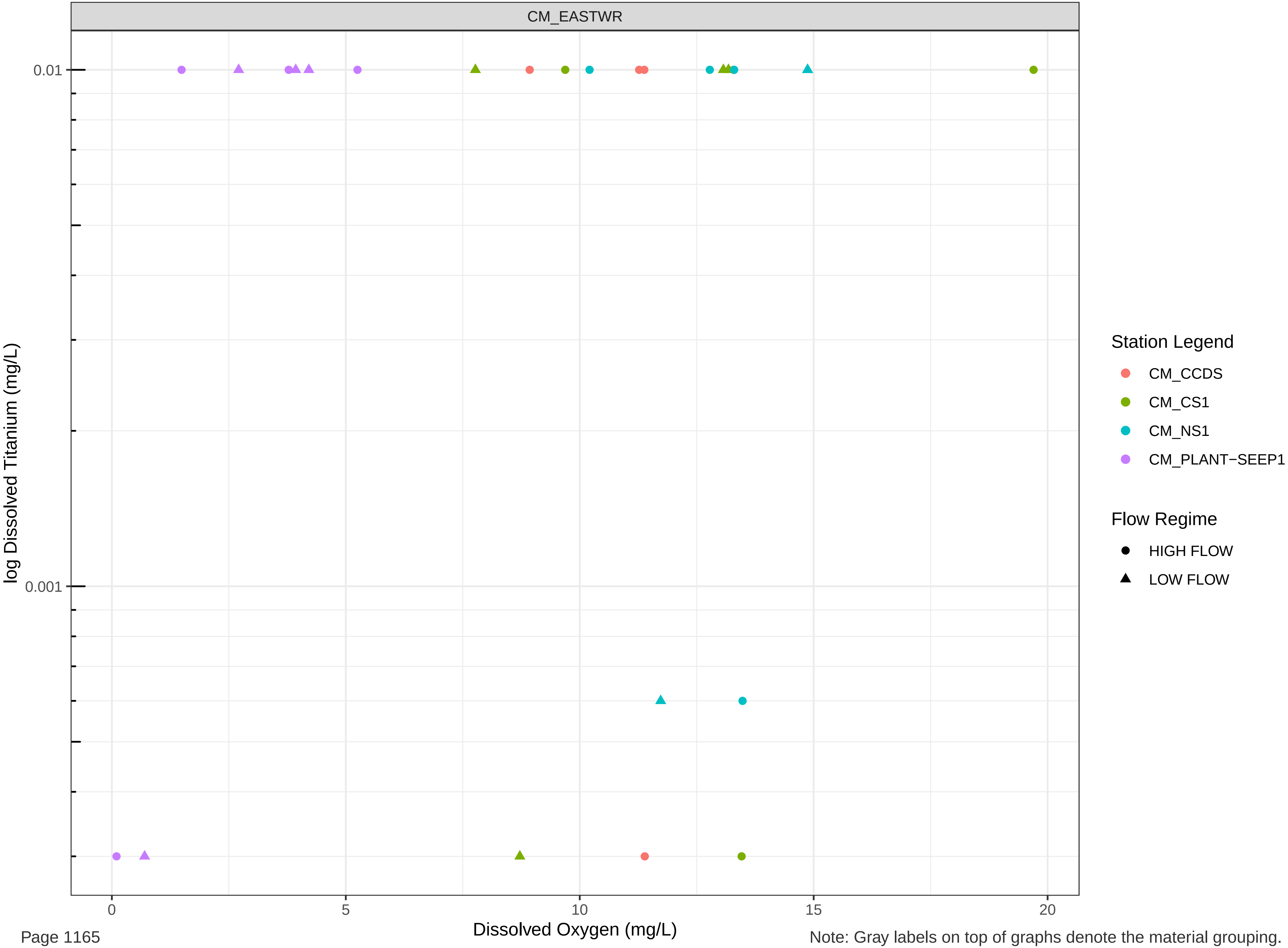
Note: Gray labels on top of graphs denote the material grouping.



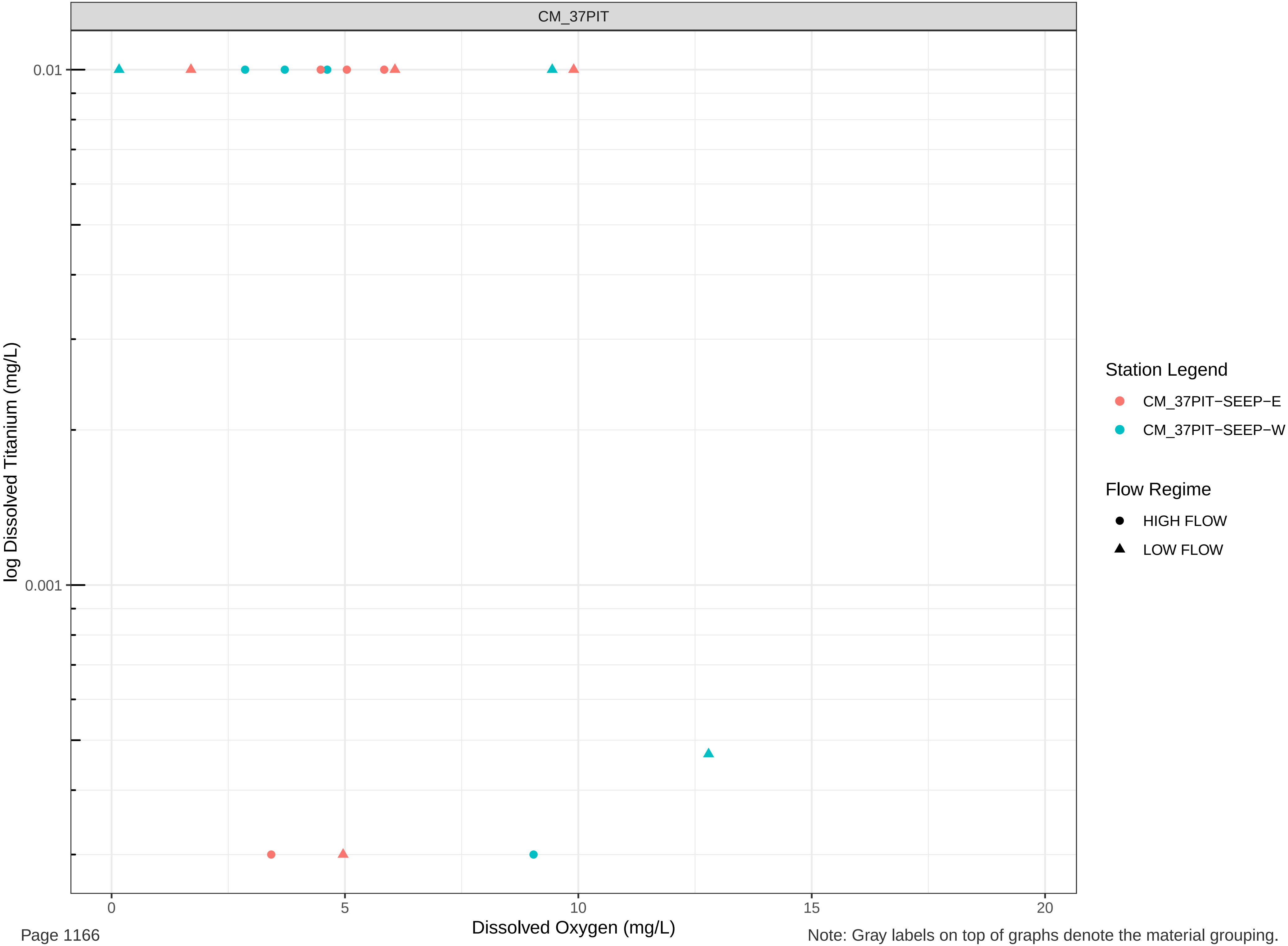
Note: Gray labels on top of graphs denote the material grouping.



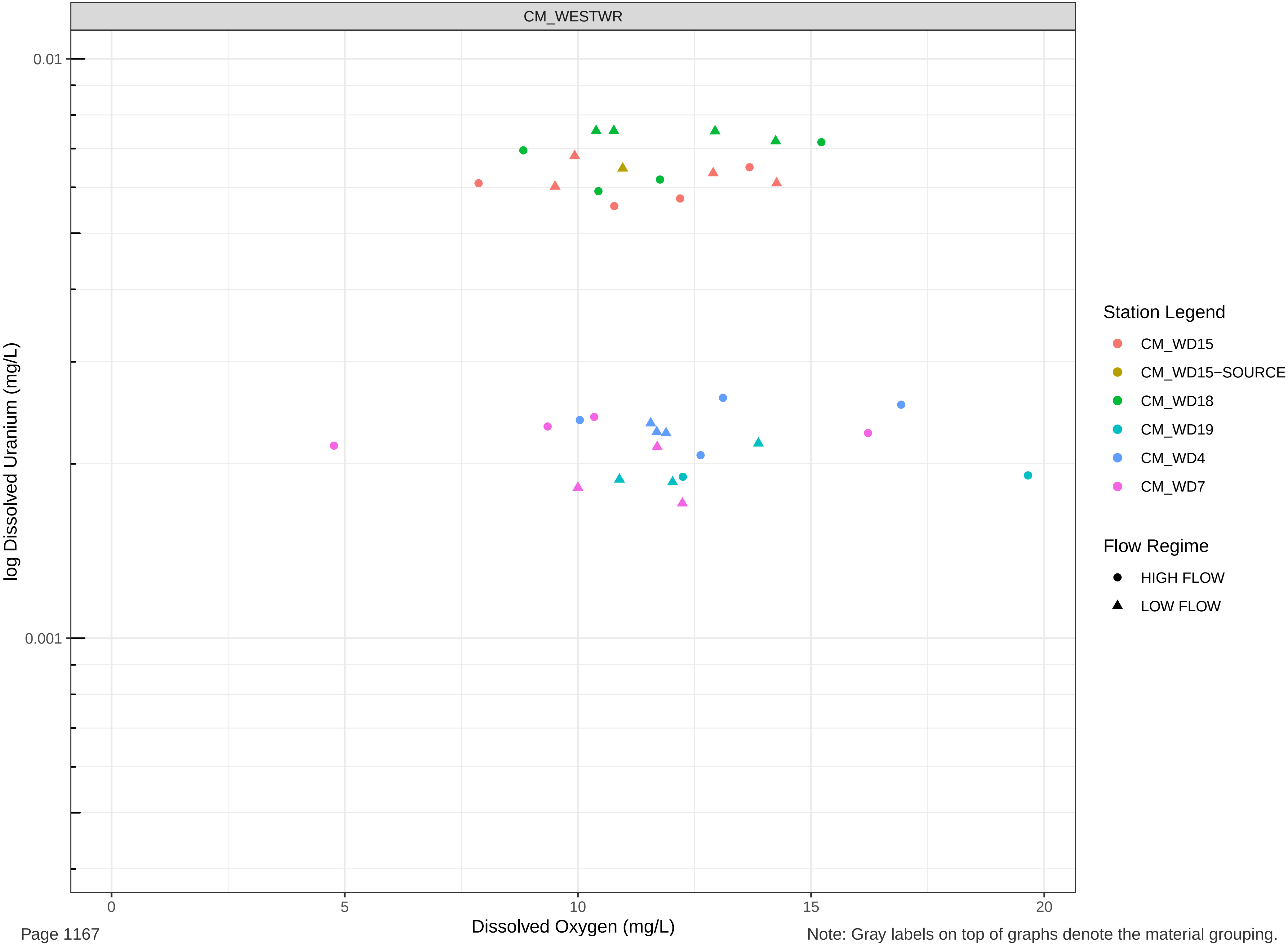
Note: Gray labels on top of graphs denote the material grouping.



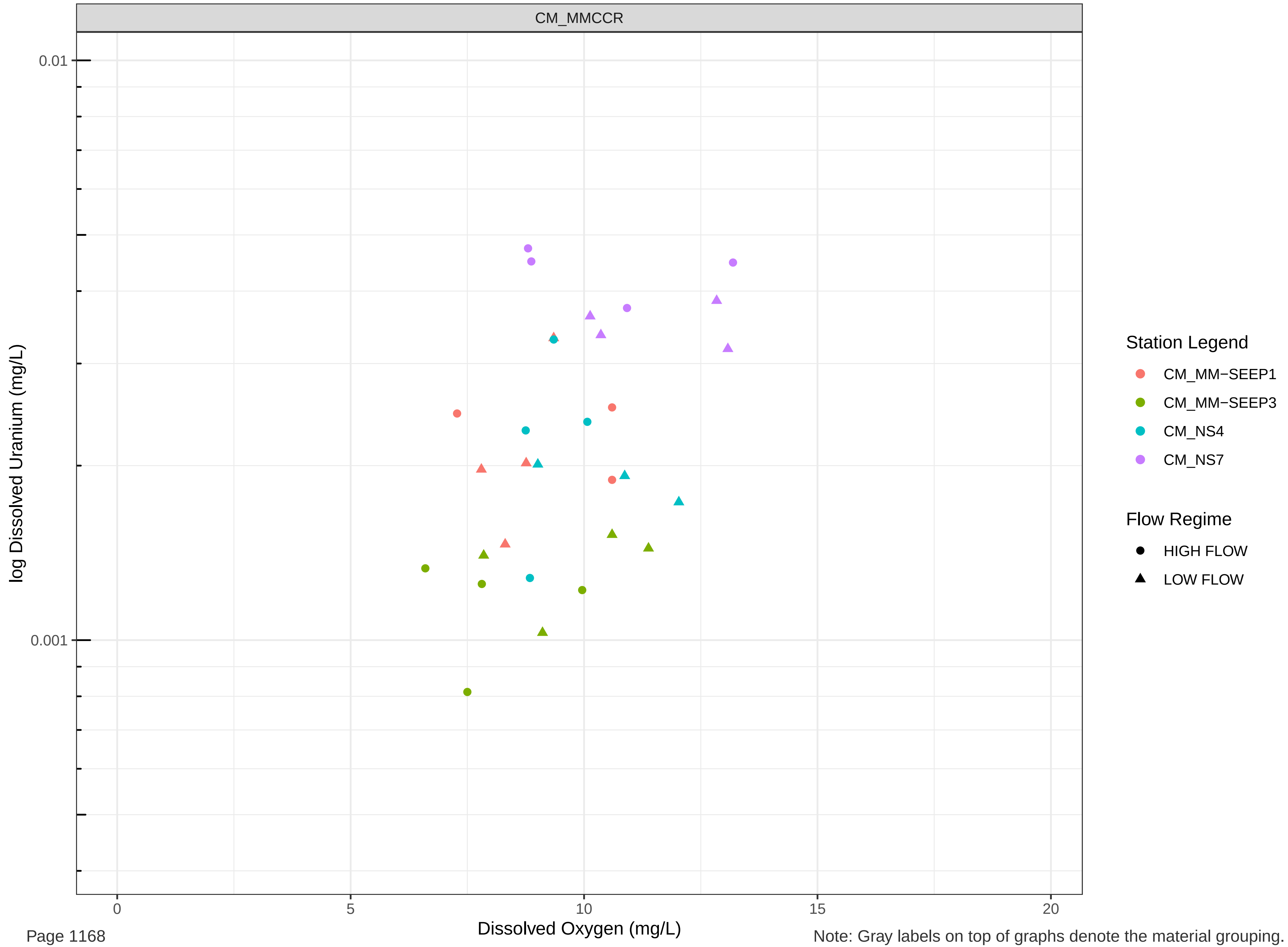
Note: Gray labels on top of graphs denote the material grouping.



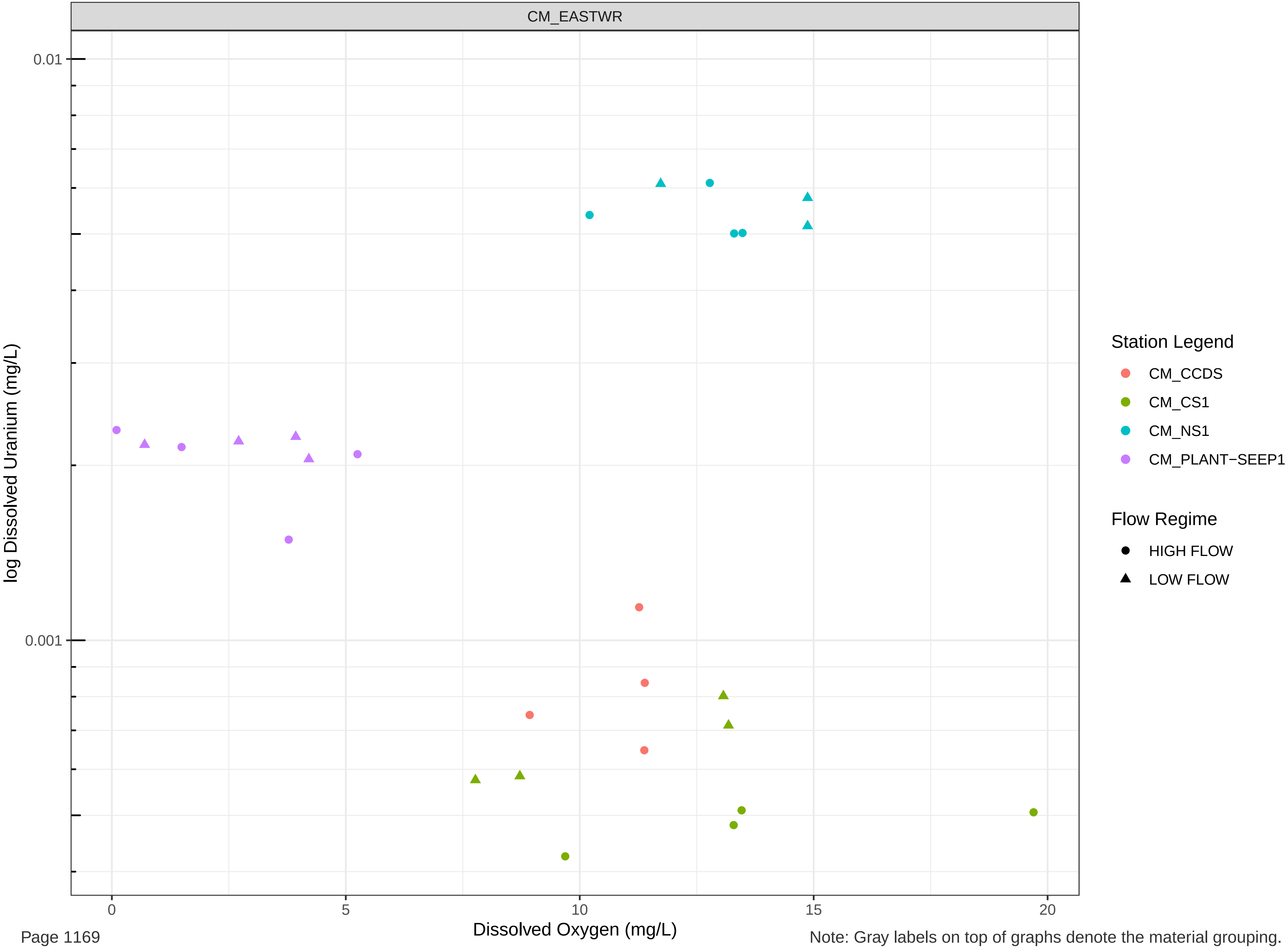
Note: Gray labels on top of graphs denote the material grouping.



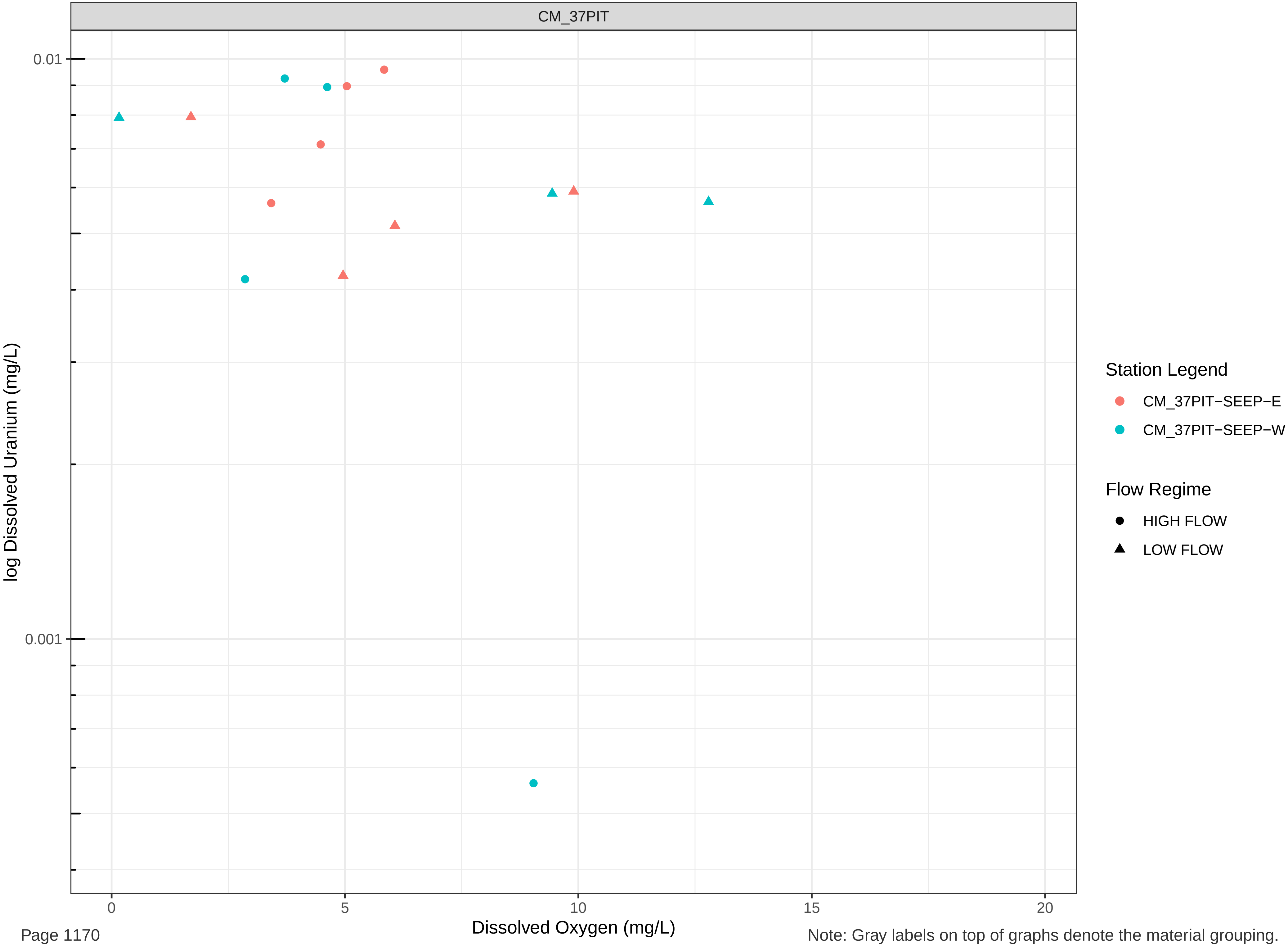
Note: Gray labels on top of graphs denote the material grouping.



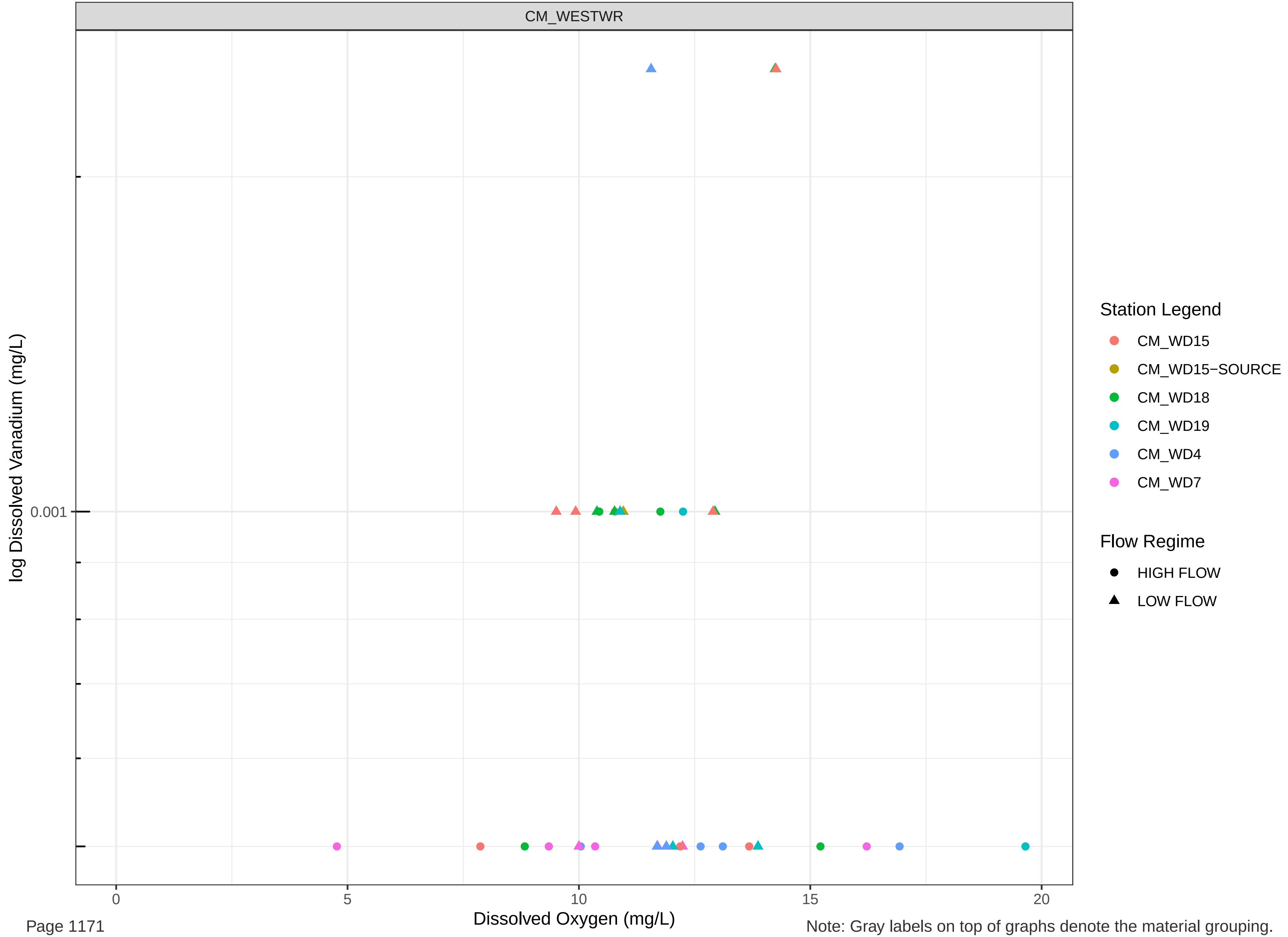
Note: Gray labels on top of graphs denote the material grouping.



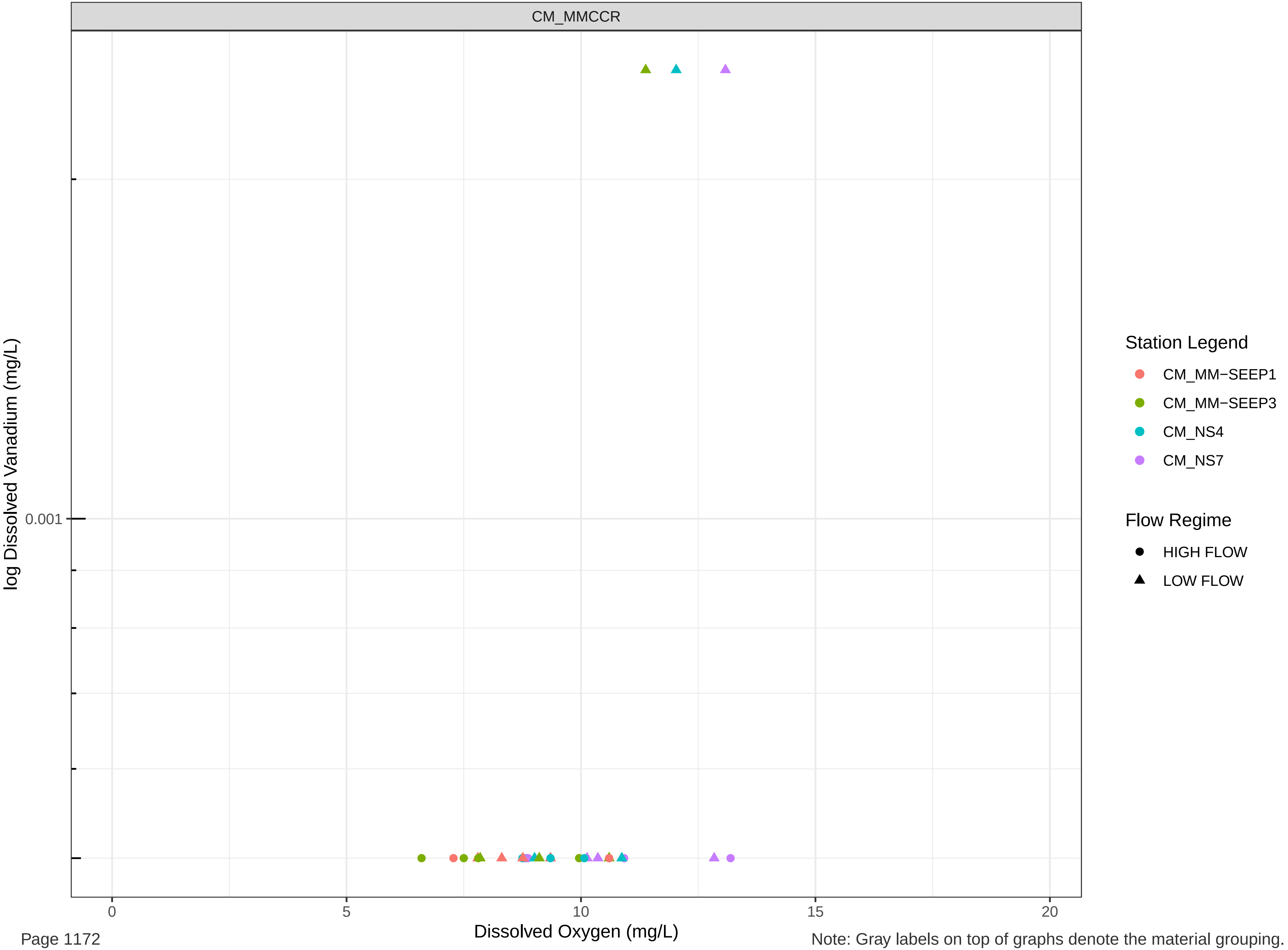
Note: Gray labels on top of graphs denote the material grouping.



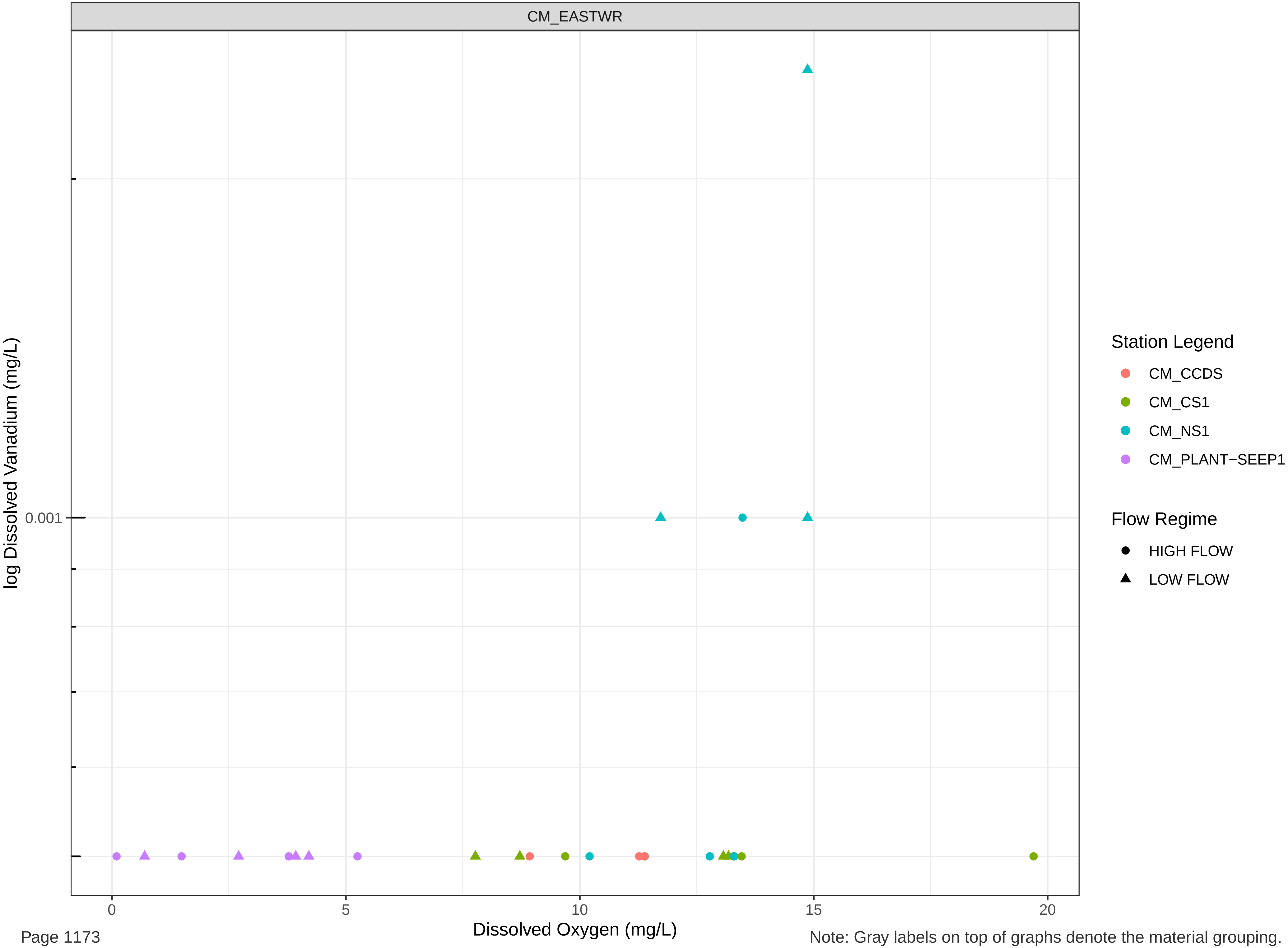
Note: Gray labels on top of graphs denote the material grouping.



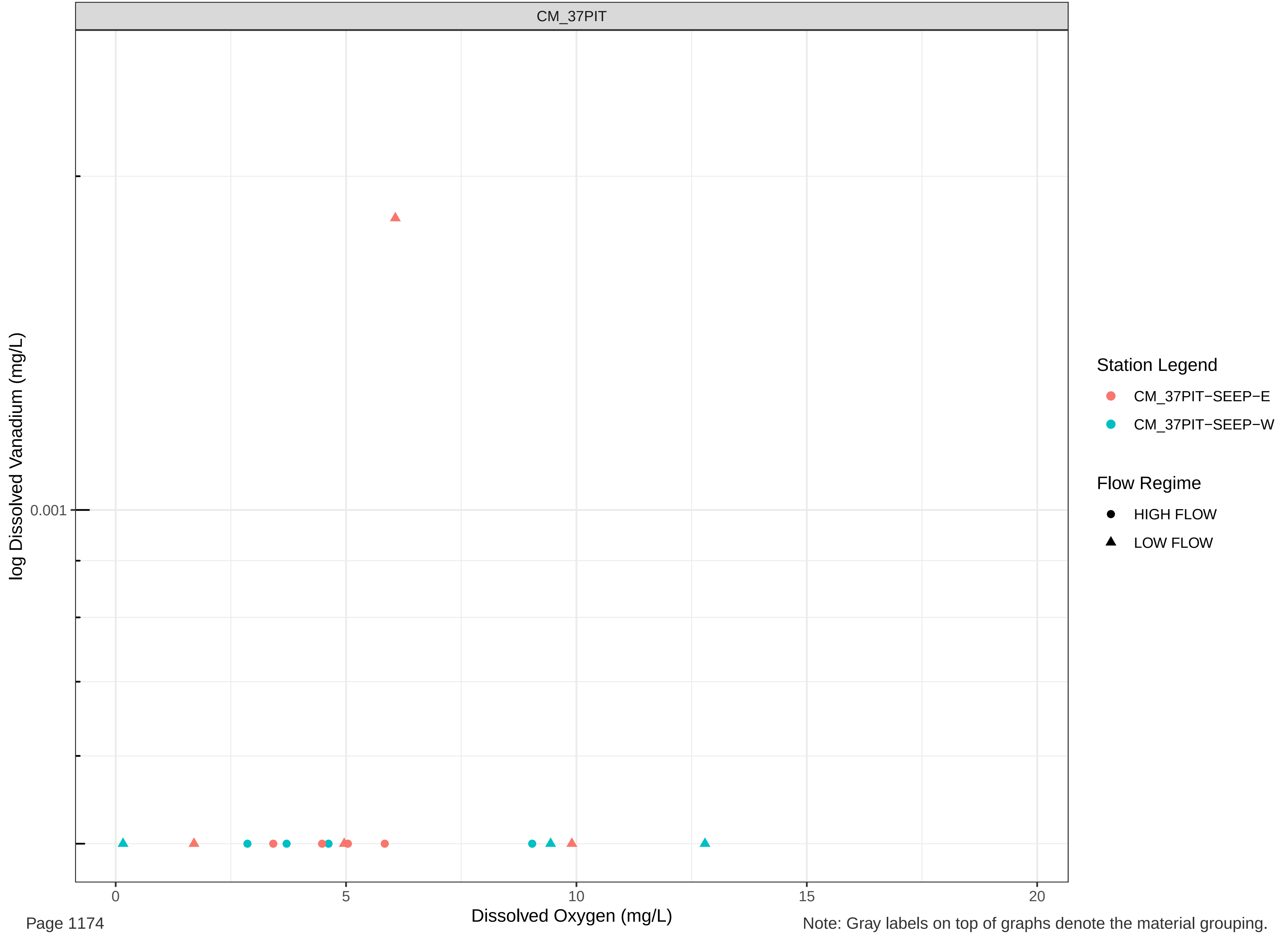
Note: Gray labels on top of graphs denote the material grouping.



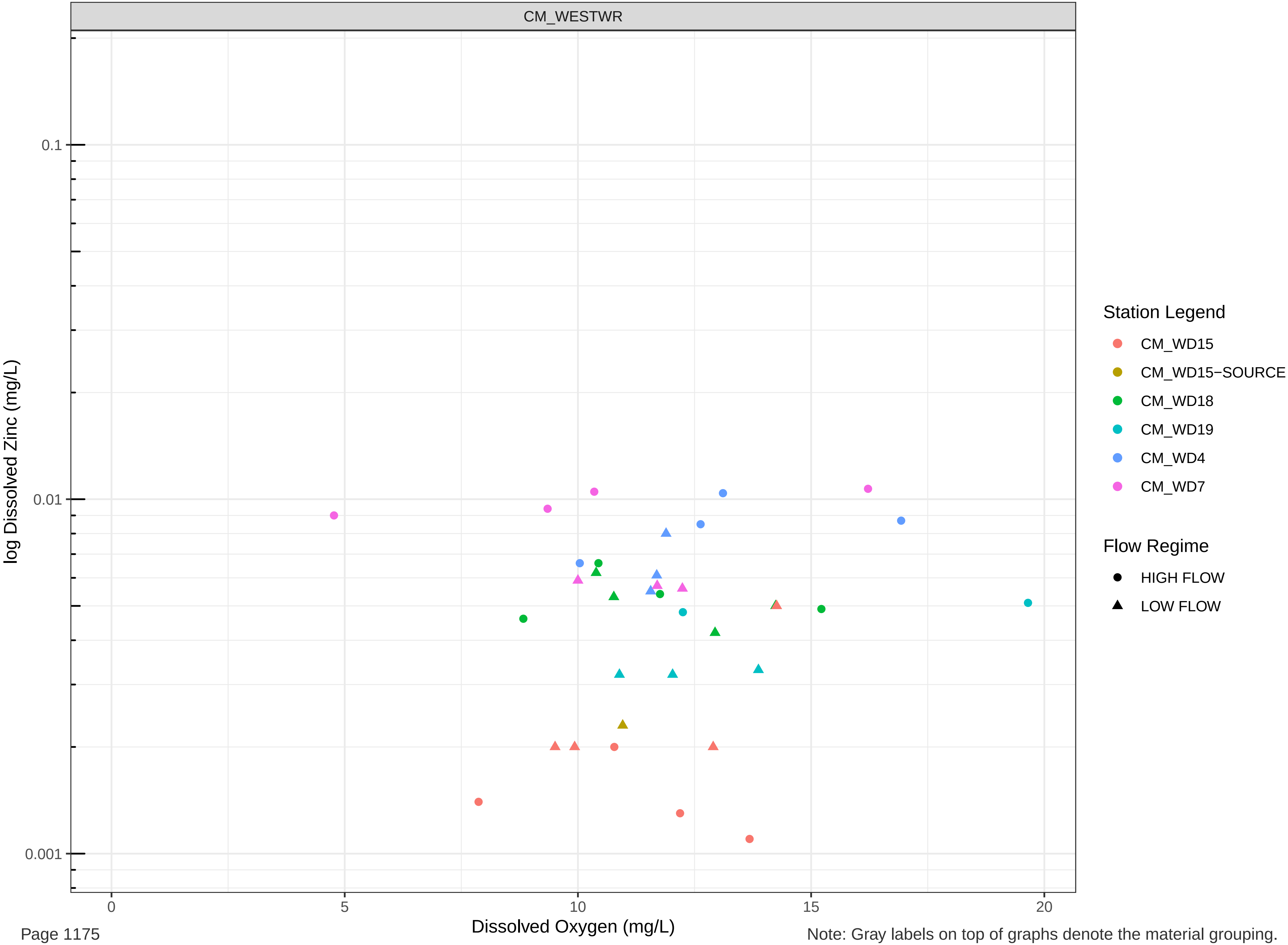
Note: Gray labels on top of graphs denote the material grouping.



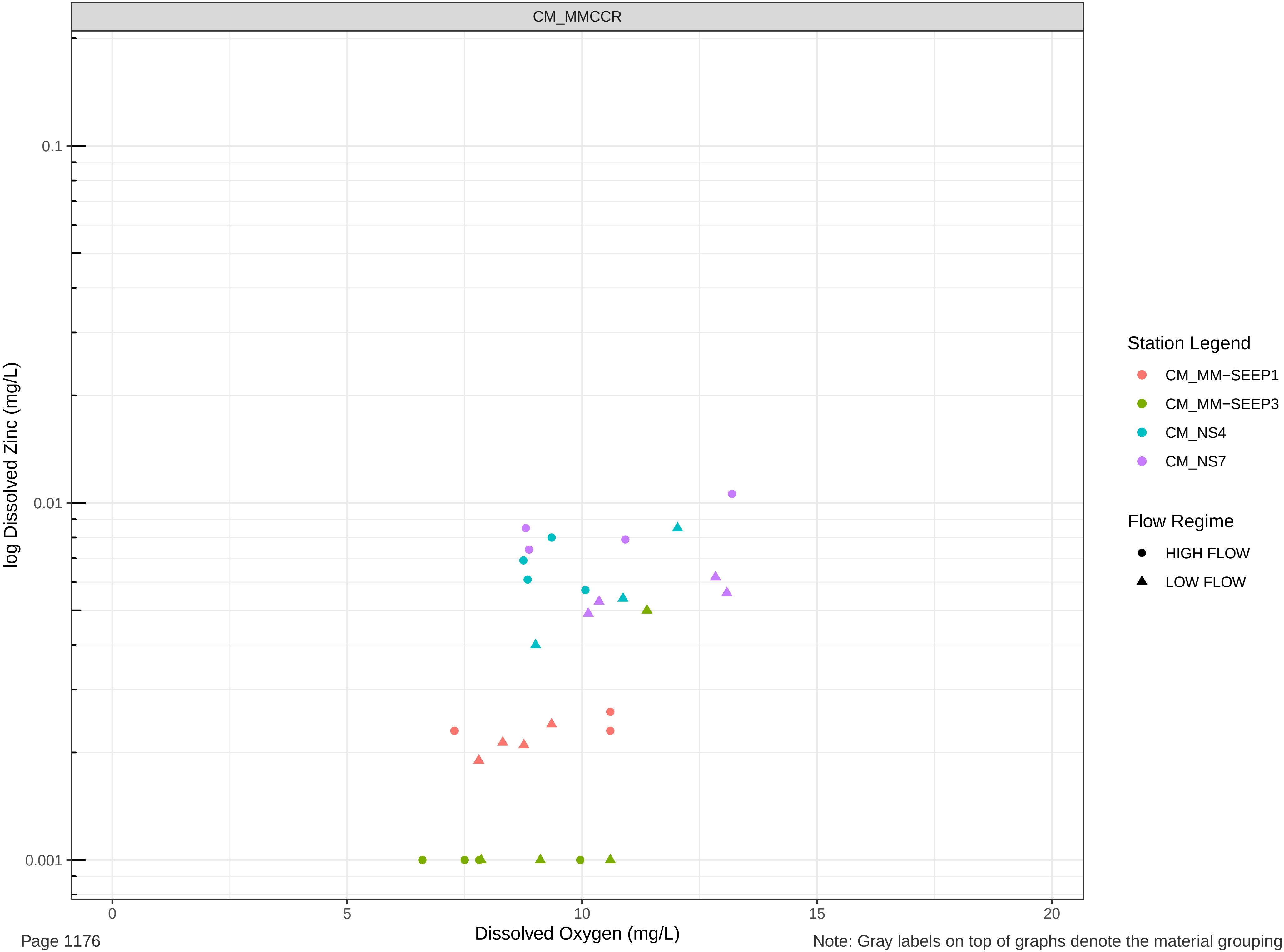
Note: Gray labels on top of graphs denote the material grouping.



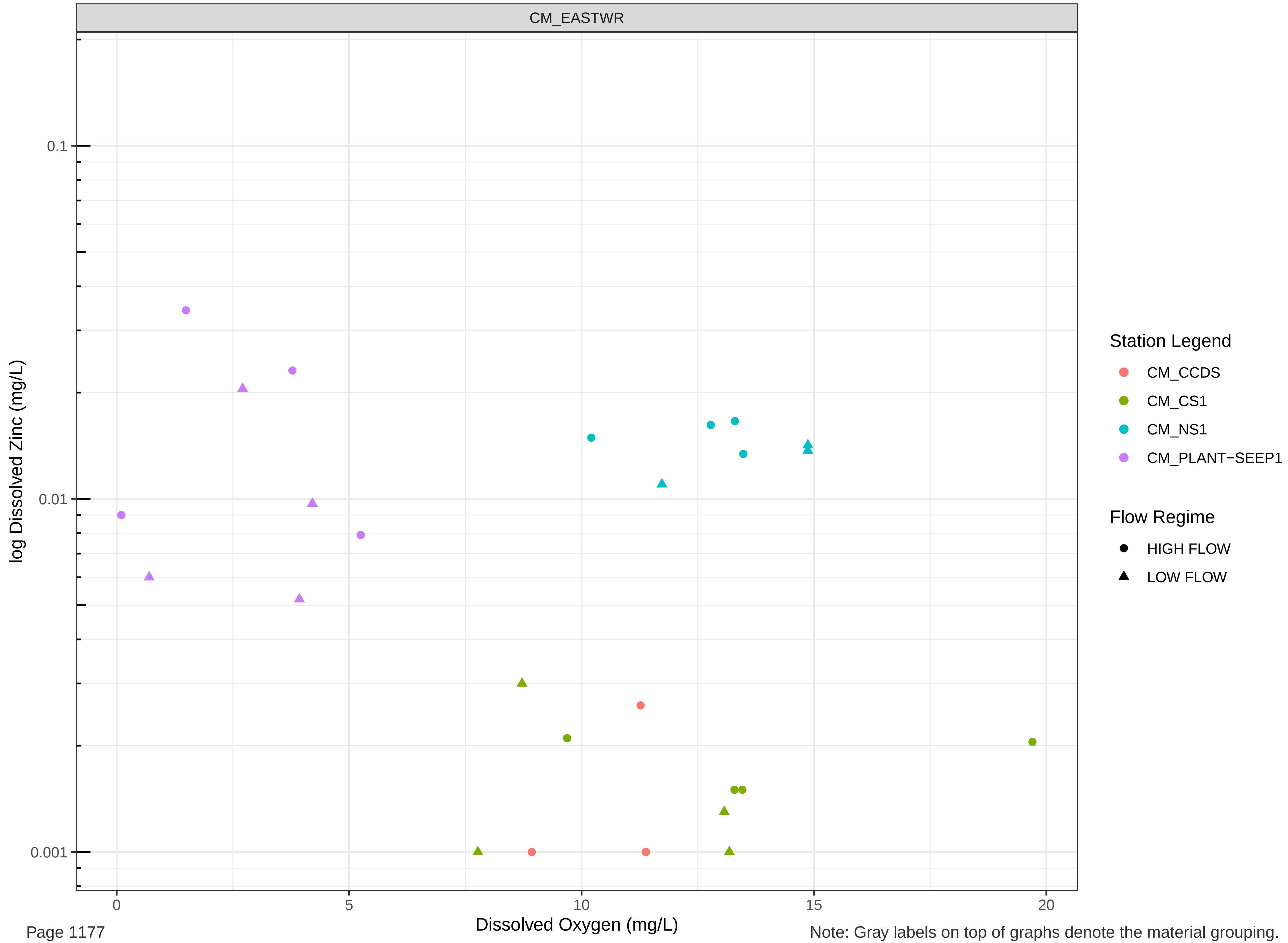
Note: Gray labels on top of graphs denote the material grouping.



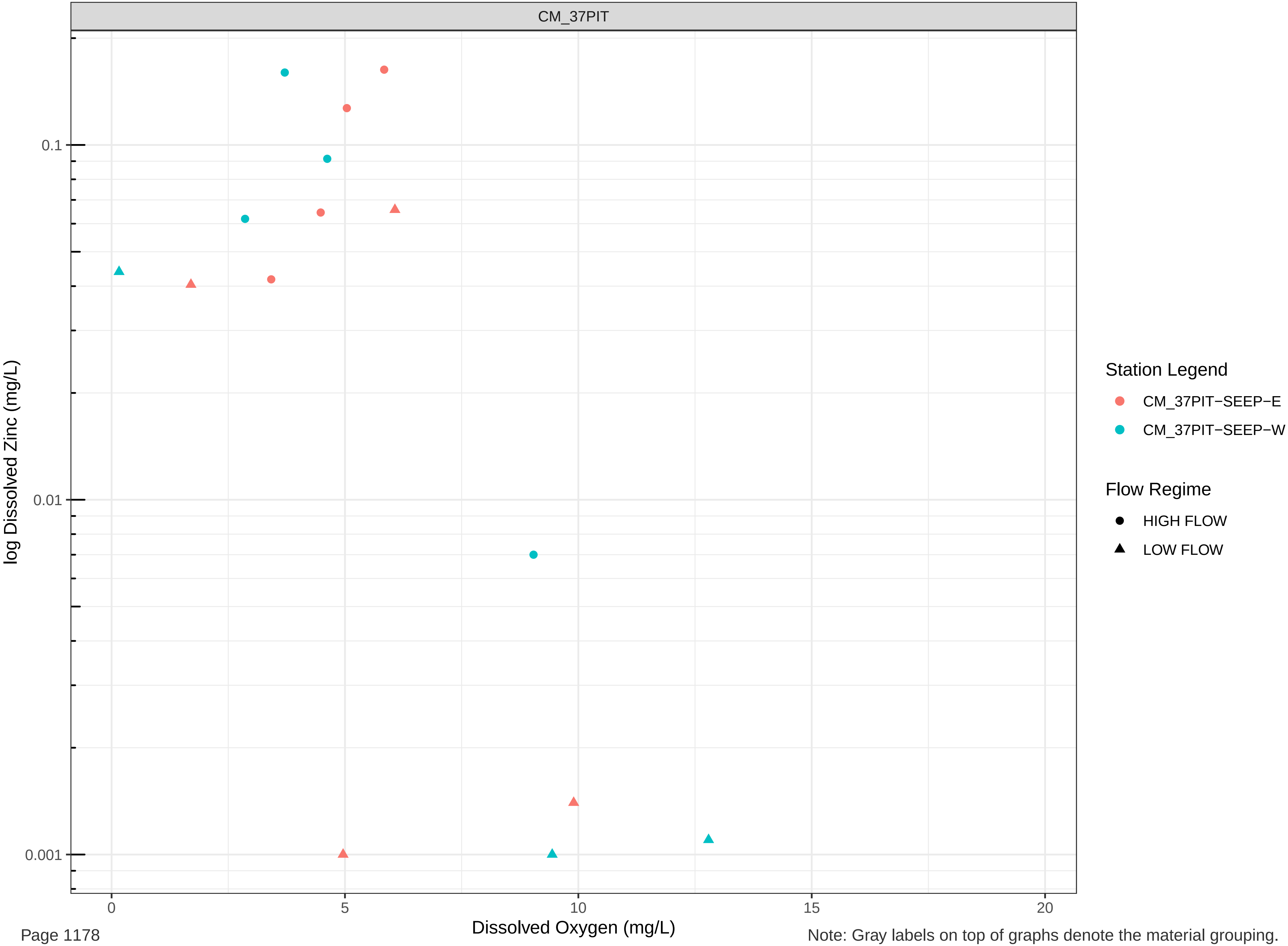
Note: Gray labels on top of graphs denote the material grouping.



Note: Gray labels on top of graphs denote the material grouping.

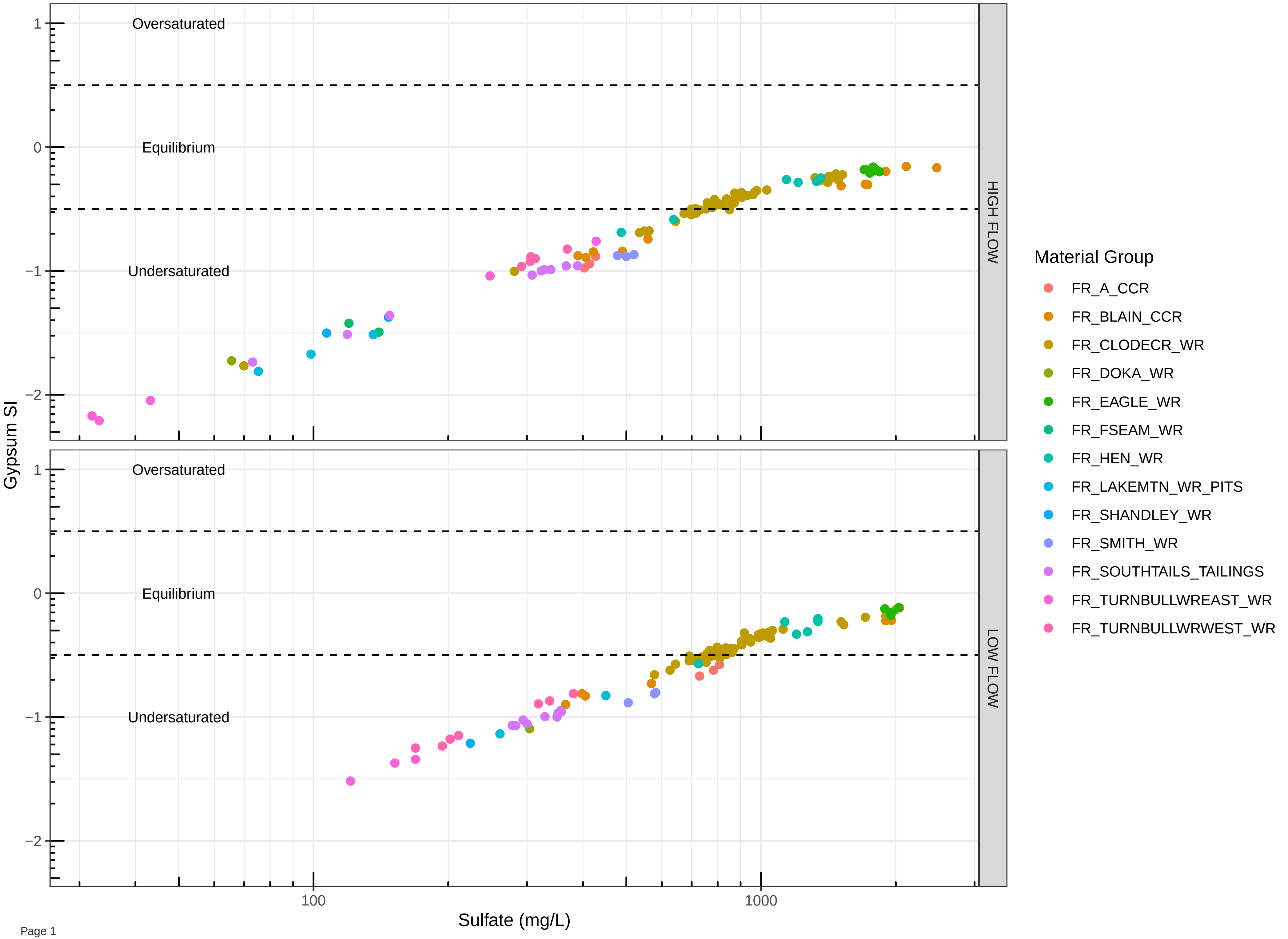


Note: Gray labels on top of graphs denote the material grouping.

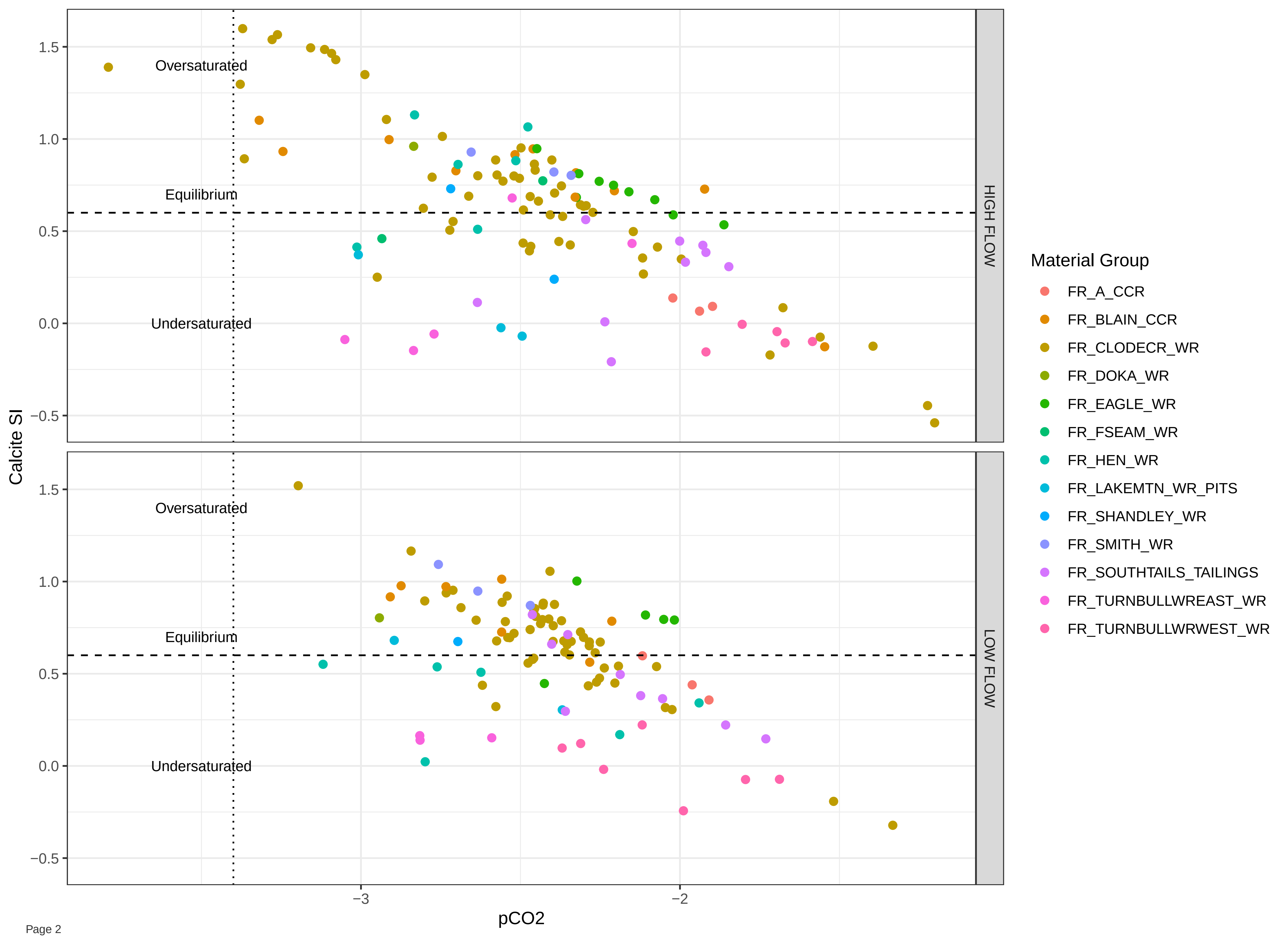


Note: Gray labels on top of graphs denote the material grouping.

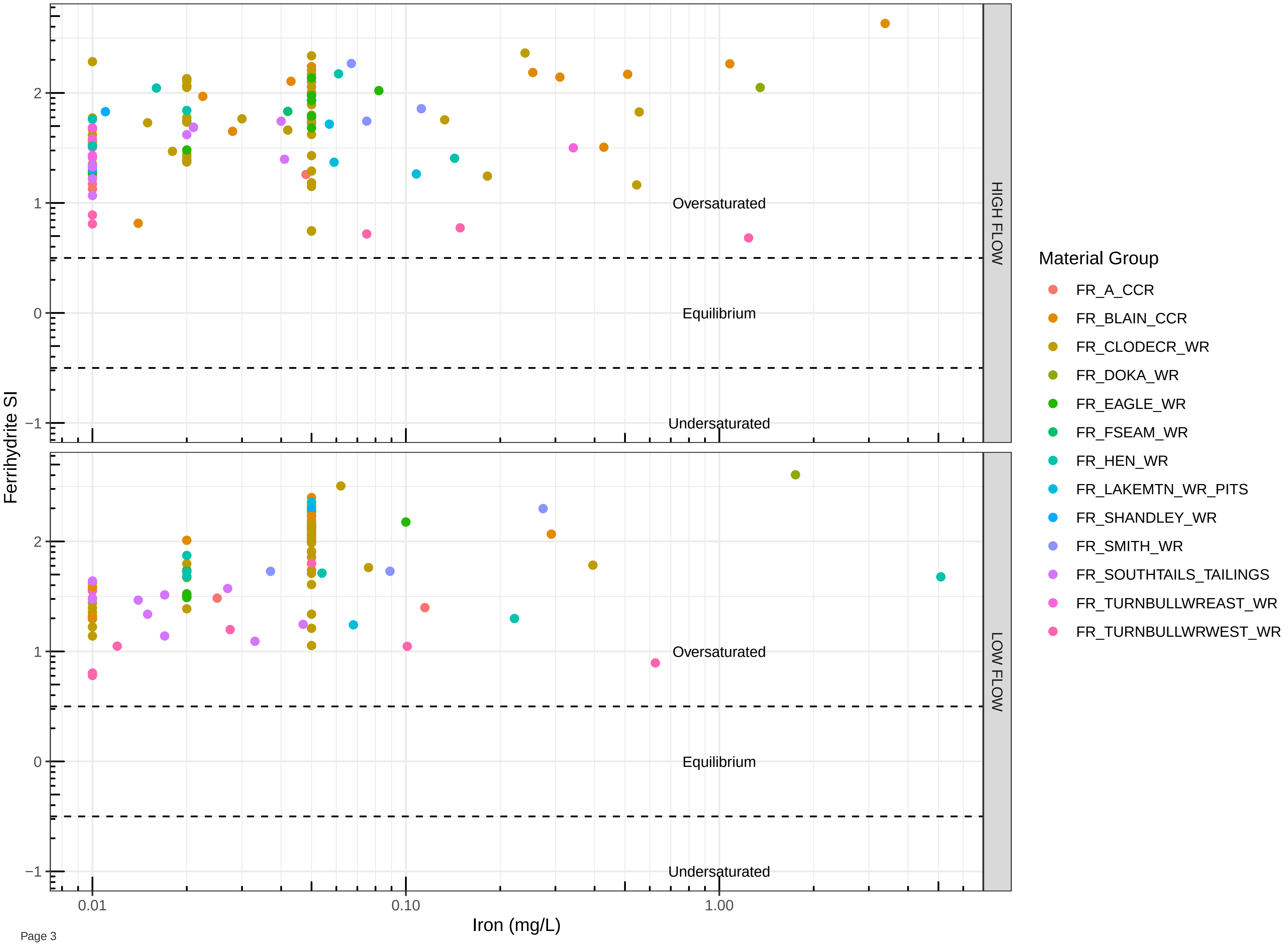
Appendix D Modelled Mineral Saturation Indices Plots



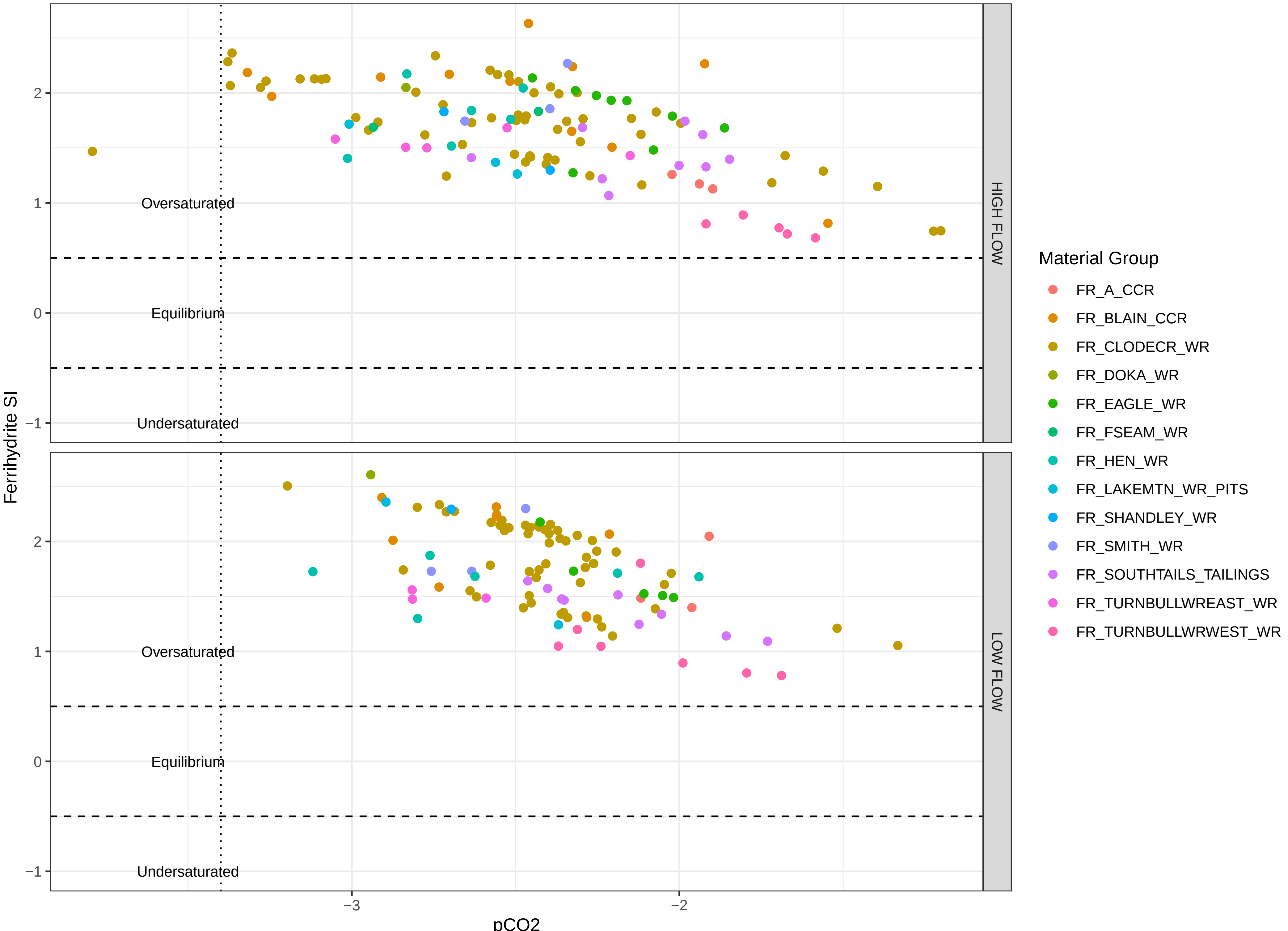
Gypsum SI
Sulfate (mg/L)
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
1
0
−1
−2
100
1000
Material Group
FR_A_CCR
FR_BLAIN_CCR
FR_CLODECR_WR
FR_DOKA_WR
FR_EAGLE_WR
FR_FSEAM_WR
FR_HEN_WR
FR_LAKEMTN_WR_PITS
FR_SHANDLEY_WR
FR_SMITH_WR
FR_SOUTHTAILS_TAILINGS
FR_TURNBULLWREAST_WR
FR_TURNBULLWRWEST_WR



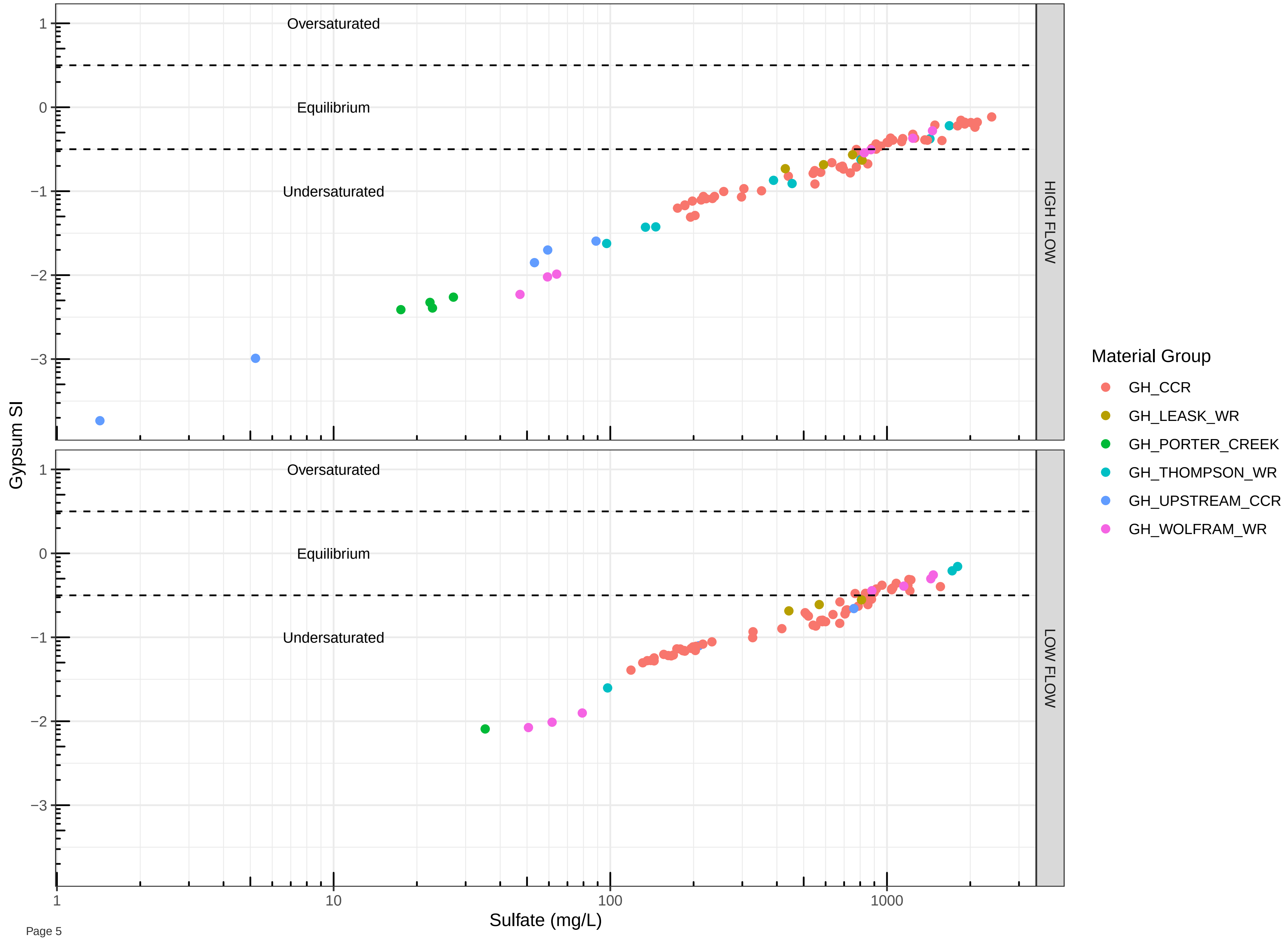
Calcite SI
pCO2
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
1.5
1.0
0.5
0.0
−0.5
−3
−2
Material Group
FR_A_CCR
FR_BLAIN_CCR
FR_CLODECR_WR
FR_DOKA_WR
FR_EAGLE_WR
FR_FSEAM_WR
FR_HEN_WR
FR_LAKEMTN_WR_PITS
FR_SHANDLEY_WR
FR_SMITH_WR
FR_SOUTHTAILS_TAILINGS
FR_TURNBULLWREAST_WR
FR_TURNBULLWRWEST_WR



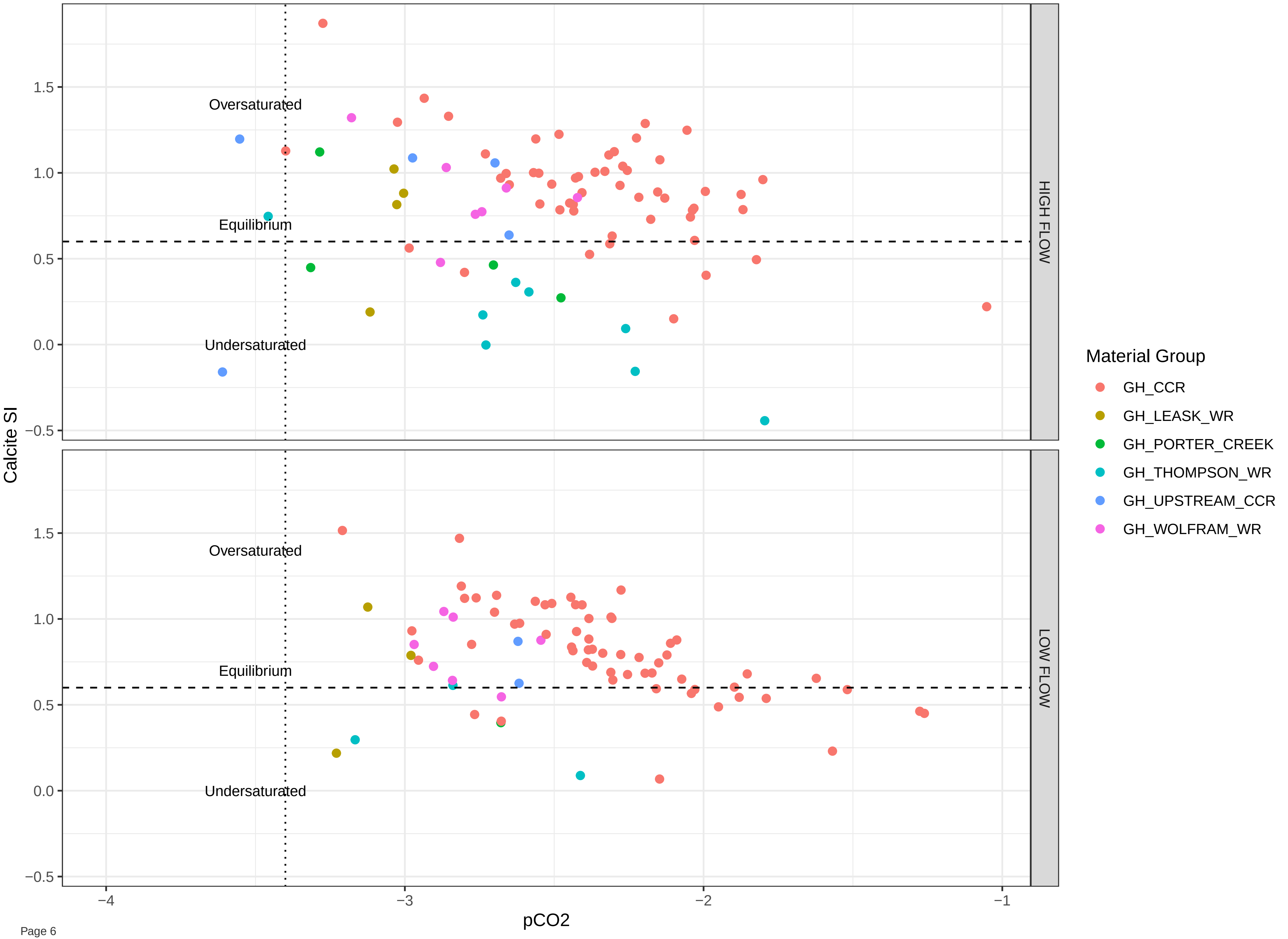
Ferrihydrite SI
Iron (mg/L)
0.01
0.10
1.00
2
1
0
−1
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Material Group
FR_A_CCR
FR_BLAIN_CCR
FR_CLODECR_WR
FR_DOKA_WR
FR_EAGLE_WR
FR_FSEAM_WR
FR_HEN_WR
FR_LAKEMTN_WR_PITS
FR_SHANDLEY_WR
FR_SMITH_WR
FR_SOUTHTAILS_TAILINGS
FR_TURNBULLWREAST_WR
FR_TURNBULLWRWEST_WR

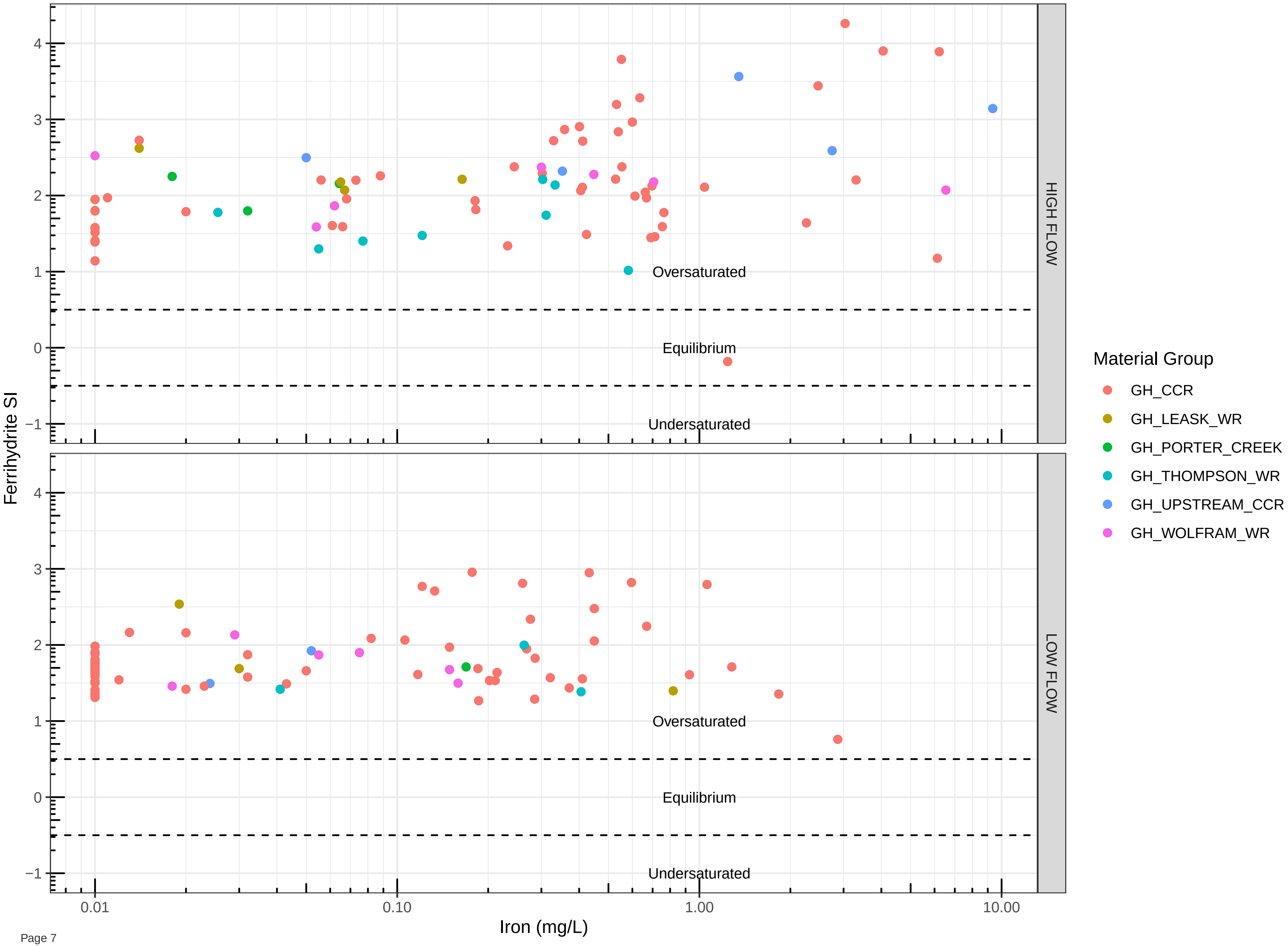


Ferrihydrite SI
pCO2
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Material Group
FR_A_CCR
FR_BLAIN_CCR
FR_CLODECR_WR
FR_DOKA_WR
FR_EAGLE_WR
FR_FSEAM_WR
FR_HEN_WR
FR_LAKEMTN_WR_PITS
FR_SHANDLEY_WR
FR_SMITH_WR
FR_SOUTHTAILS_TAILINGS
FR_TURNBULLWREAST_WR
FR_TURNBULLWRWEST_WR

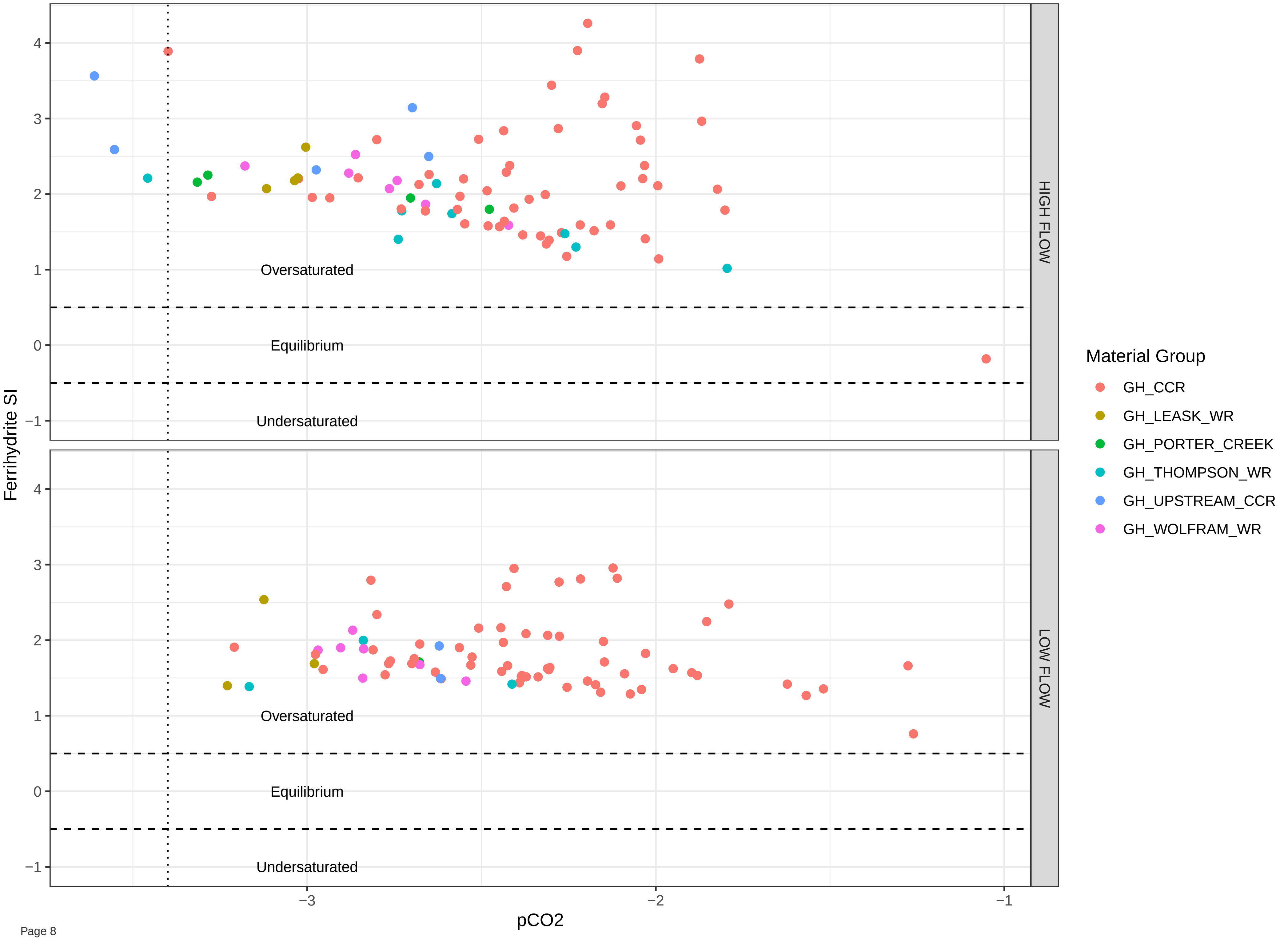


Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
Oversaturated
Equilibrium
Undersaturated
LOW FLOW
Gypsum SI
1
0
−1
−2
−3
1
10
100
1000
Sulfate (mg/L)
Material Group
GH_CCR
GH_LEASK_WR
GH_PORTER_CREEK
GH_THOMPSON_WR
GH_UPSTREAM_CCR
GH_WOLFRAM_WR

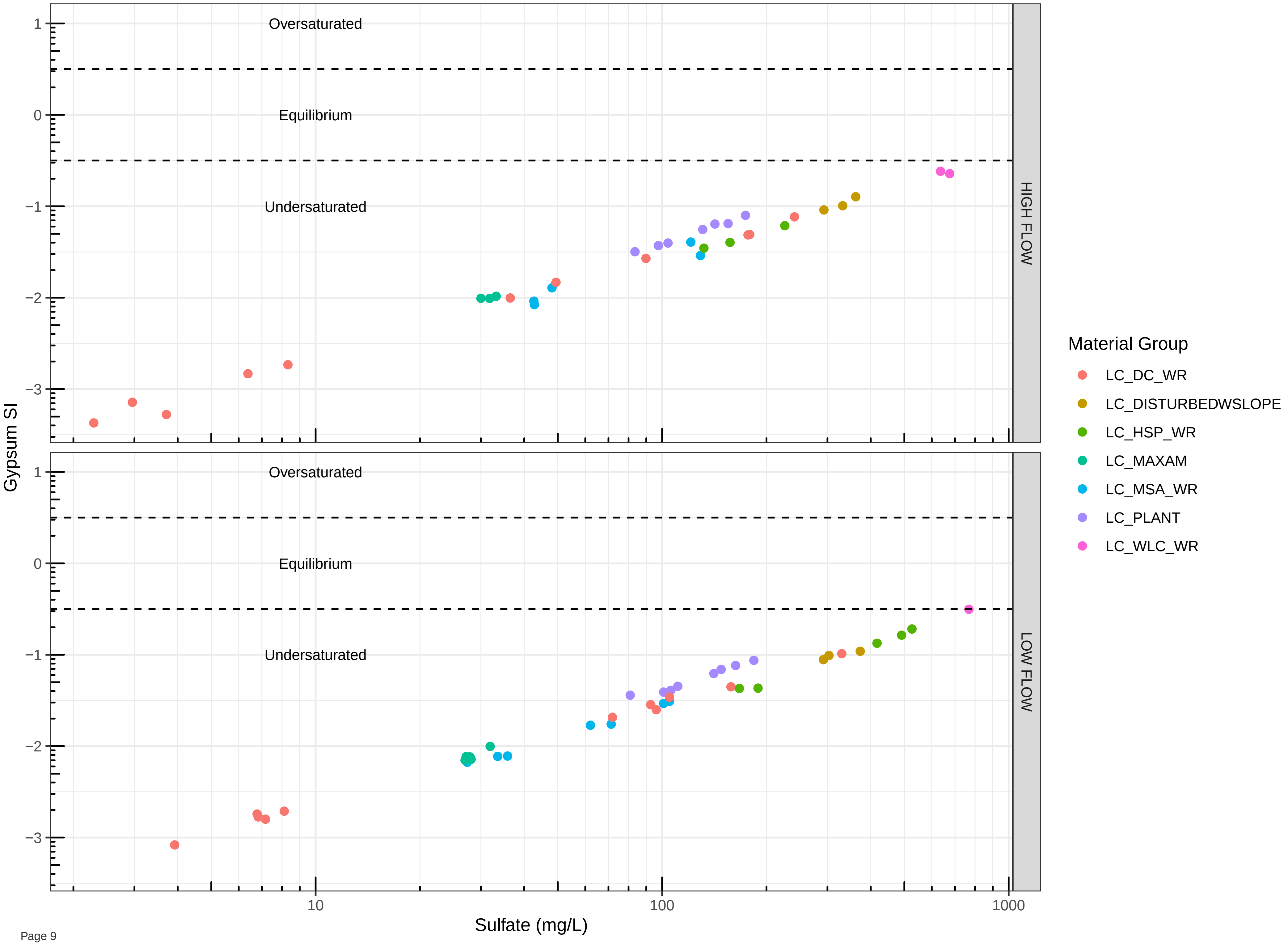

Calcite SI
pCO2
HIGH FLOW
LOW FLOW
Oversaturated
Equilibrium
Undersaturated
Oversaturated
Equilibrium
Undersaturated
1.5
1.0
0.5
0.0
−0.5
1.5
1.0
0.5
0.0
−0.5
−4
−3
−2
−1
Material Group
GH_CCR
GH_LEASK_WR
GH_PORTER_CREEK
GH_THOMPSON_WR
GH_UPSTREAM_CCR
GH_WOLFRAM_WR

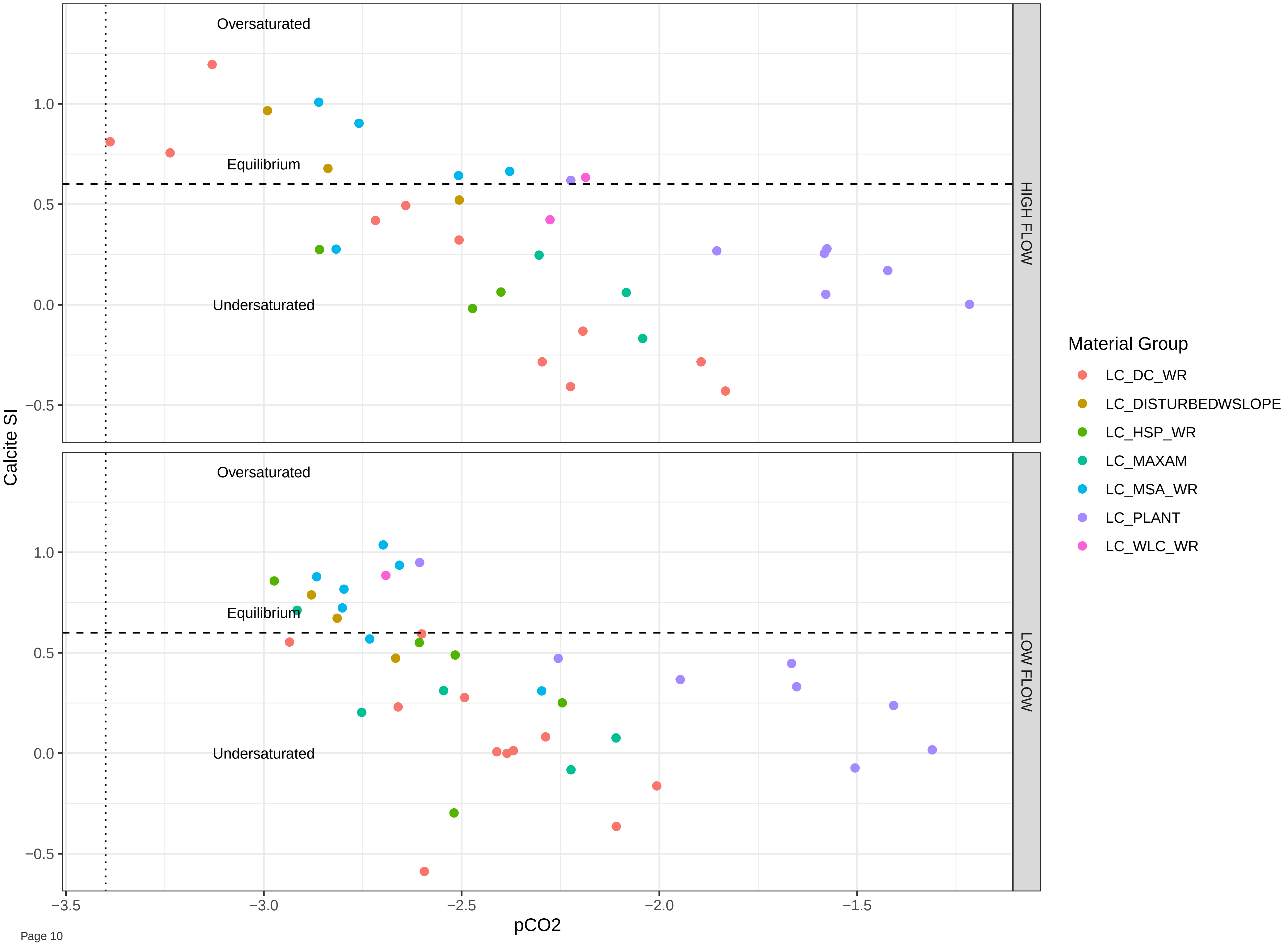


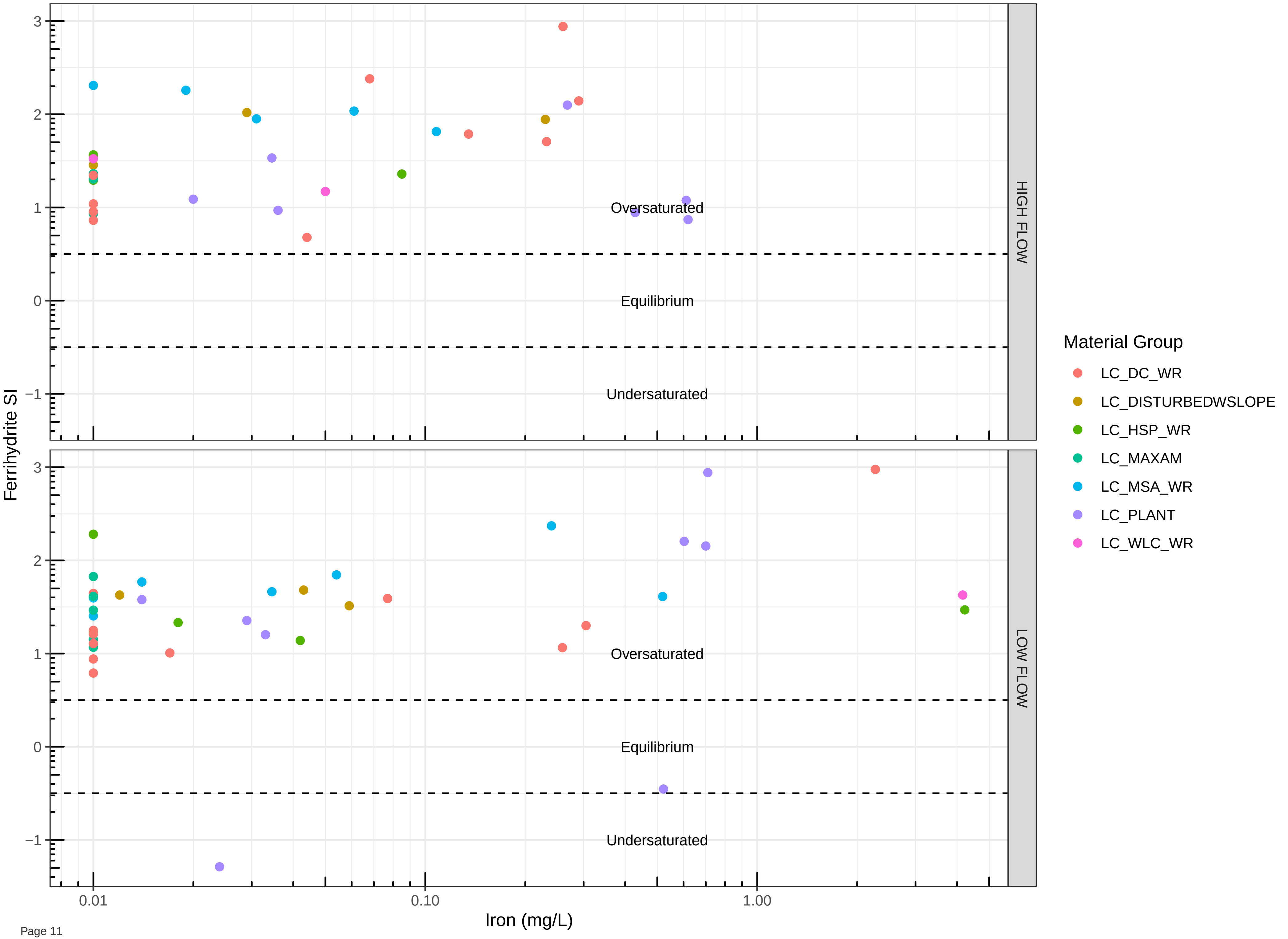
HIGH FLOW
LOW FLOW
Oversaturated
Equilibrium
Undersaturated
Ferrihydrite SI
Iron (mg/L)
0.01
0.10
1.00
10.00
4
3
2
1
0
−1
Material Group
GH_CCR
GH_LEASK_WR
GH_PORTER_CREEK
GH_THOMPSON_WR
GH_UPSTREAM_CCR
GH_WOLFRAM_WR



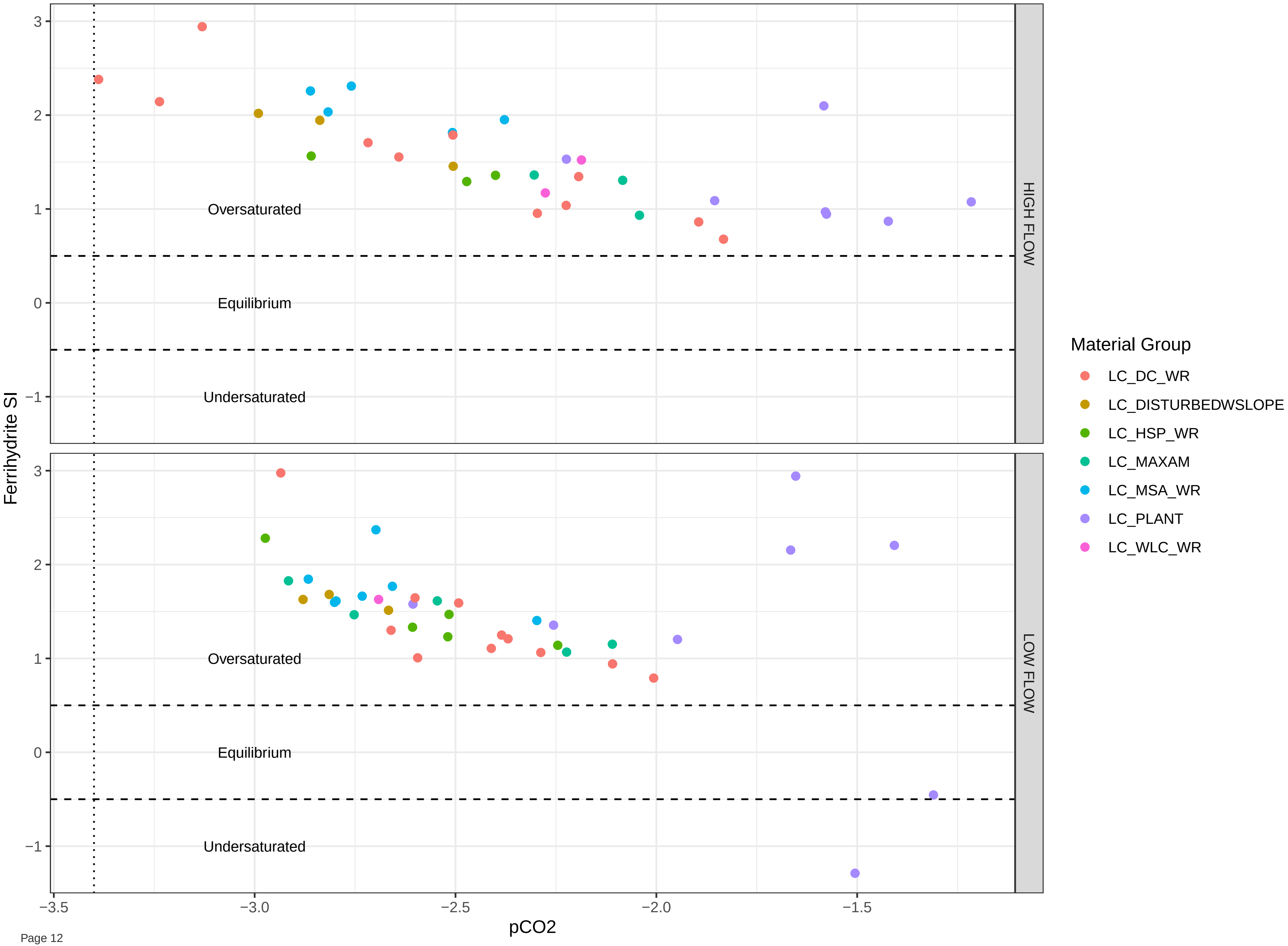
Ferrihydrite SI
pCO2
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Material Group
GH_CCR
GH_LEASK_WR
GH_PORTER_CREEK
GH_THOMPSON_WR
GH_UPSTREAM_CCR
GH_WOLFRAM_WR

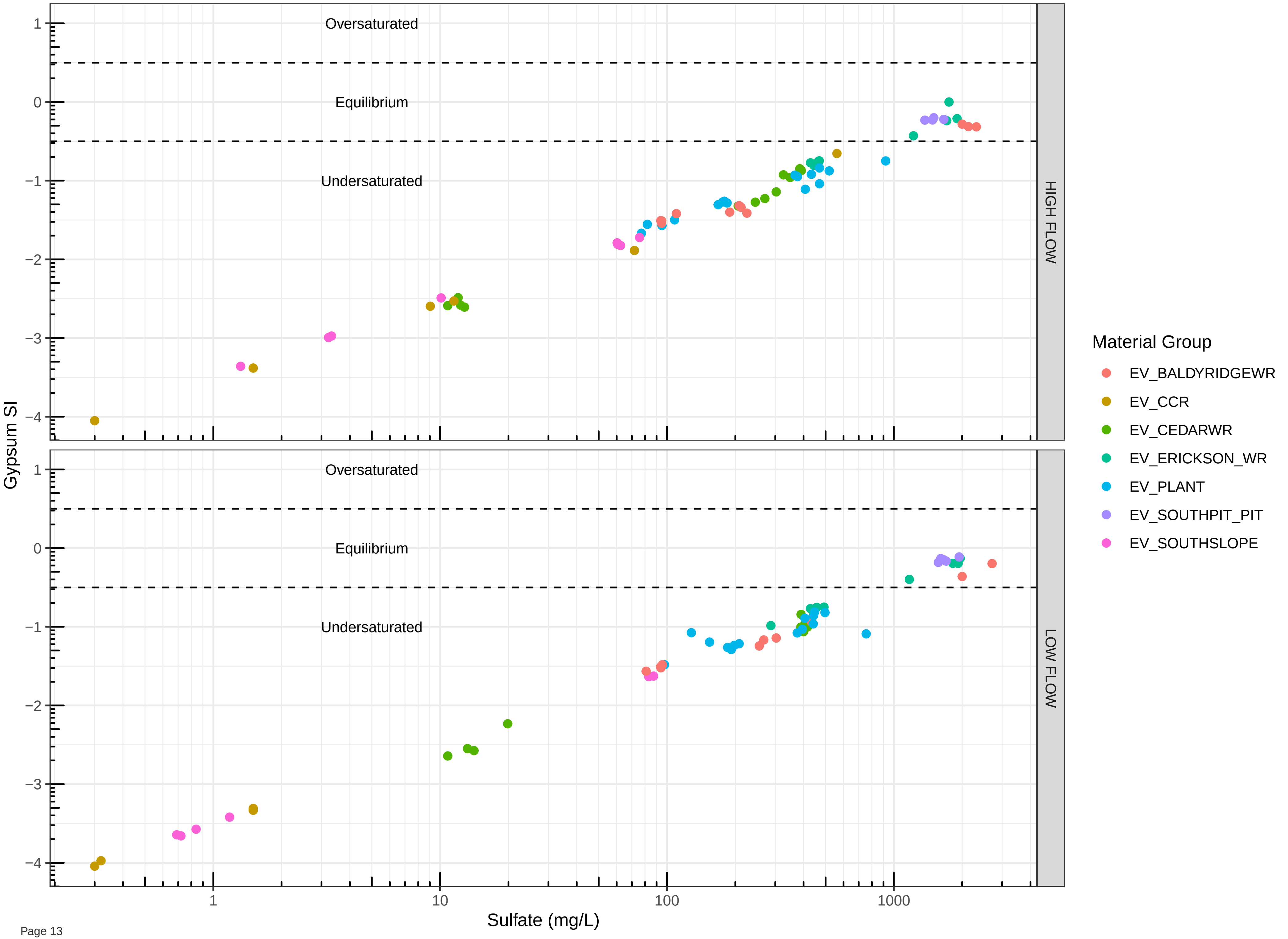

Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Gypsum SI
Sulfate (mg/L)
1
0
−1
−2
−3
10
100
1000
Material Group
LC_DC_WR
LC_DISTURBEDWSLOPE
LC_HSP_WR
LC_MAXAM
LC_MSA_WR
LC_PLANT
LC_WLC_WR


Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Calcite SI
pCO2
1.0
0.5
0.0
−0.5
−3.5
−3.0
−2.5
−2.0
−1.5
Material Group
LC_DC_WR
LC_DISTURBEDWSLOPE
LC_HSP_WR
LC_MAXAM
LC_MSA_WR
LC_PLANT
LC_WLC_WR

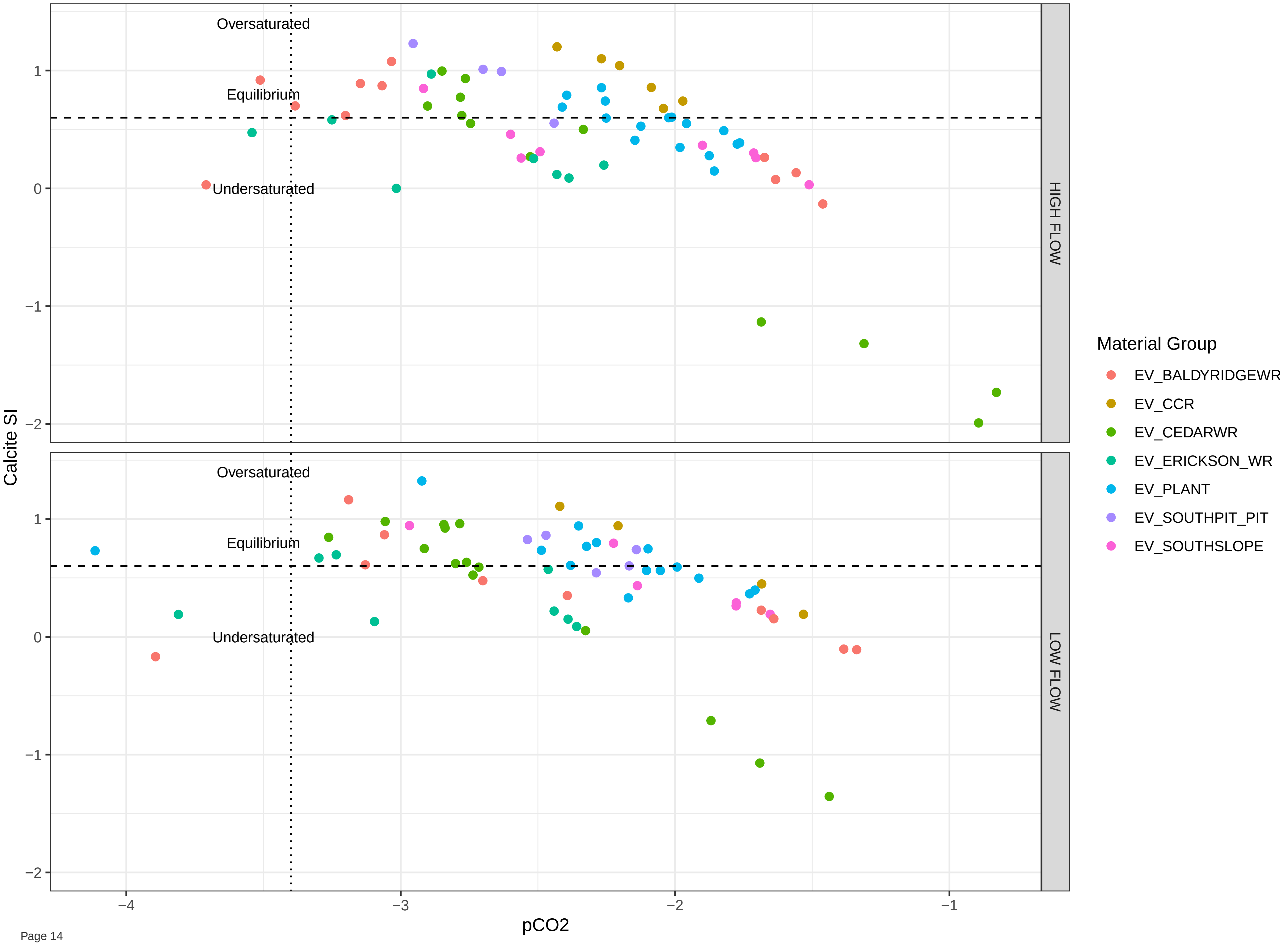


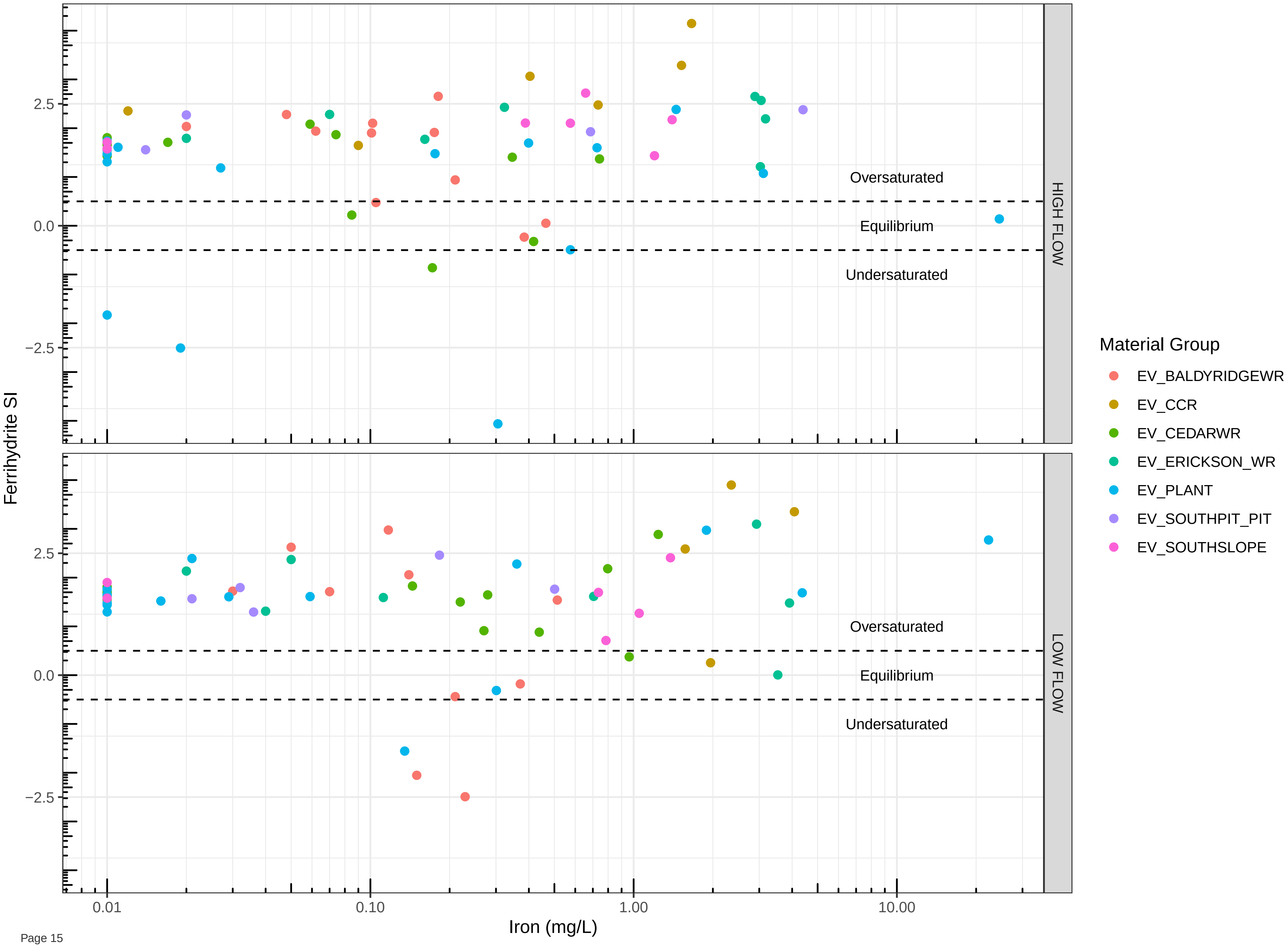
3
2
1
0
−1
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Ferrihydrite SI
0.01
0.10
1.00
Iron (mg/L)
Material Group
LC_DC_WR
LC_DISTURBEDWSLOPE
LC_HSP_WR
LC_MAXAM
LC_MSA_WR
LC_PLANT
LC_WLC_WR

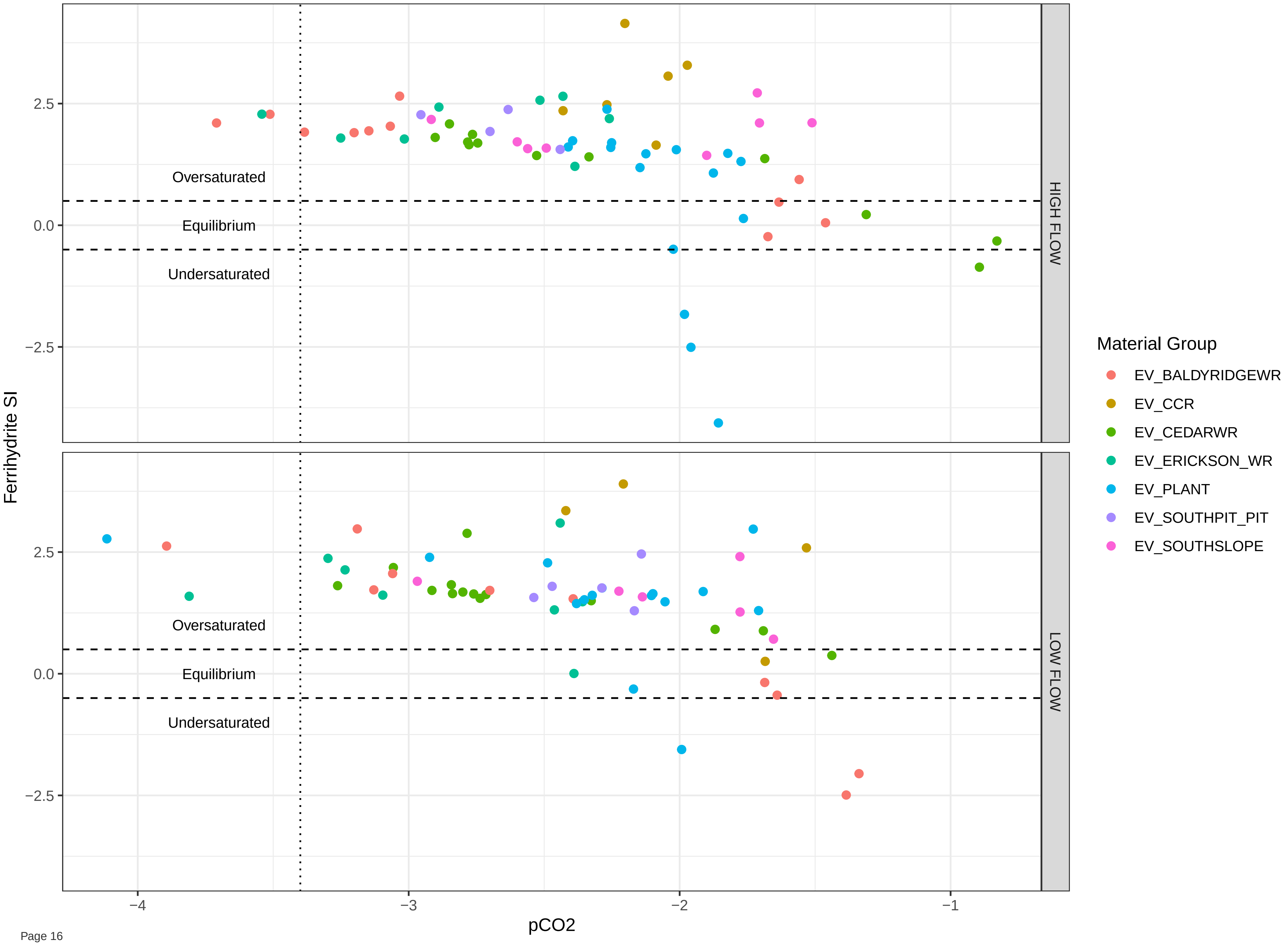

Ferrihydrite SI
pCO2
HIGH FLOW
LOW FLOW
Oversaturated
Equilibrium
Undersaturated
Oversaturated
Equilibrium
Undersaturated
3
2
1
0
−1
−3.5
−3.0
−2.5
−2.0
−1.5
Material Group
LC_DC_WR
LC_DISTURBEDWSLOPE
LC_HSP_WR
LC_MAXAM
LC_MSA_WR
LC_PLANT
LC_WLC_WR



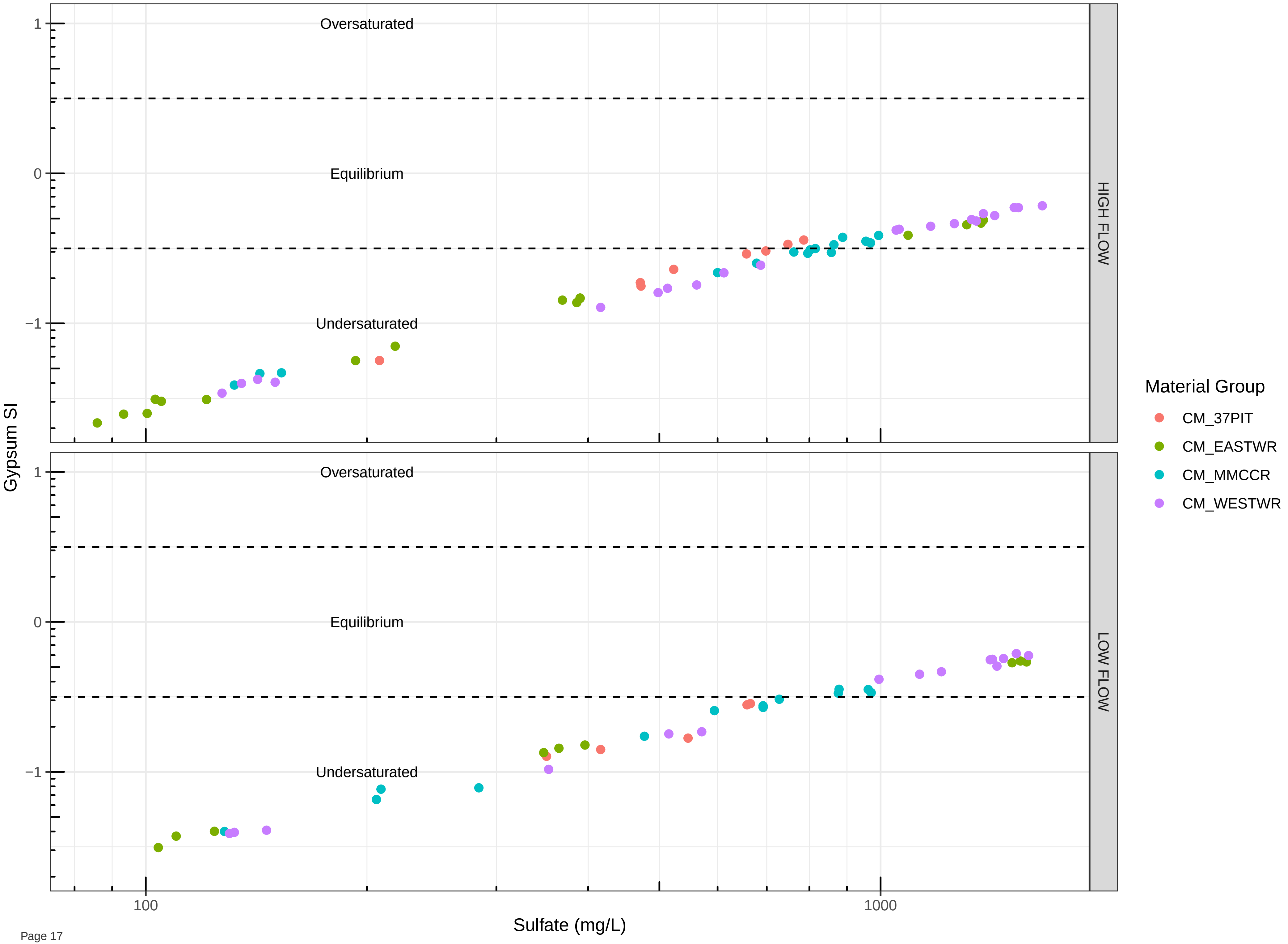
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Gypsum SI
Sulfate (mg/L)
1
0
−1
−2
−3
−4
1
10
100
1000
Material Group
EV_BALDYRIDGEWR
EV_CCR
EV_CEDARWR
EV_ERICKSON_WR
EV_PLANT
EV_SOUTHPIT_PIT
EV_SOUTHSLOPE

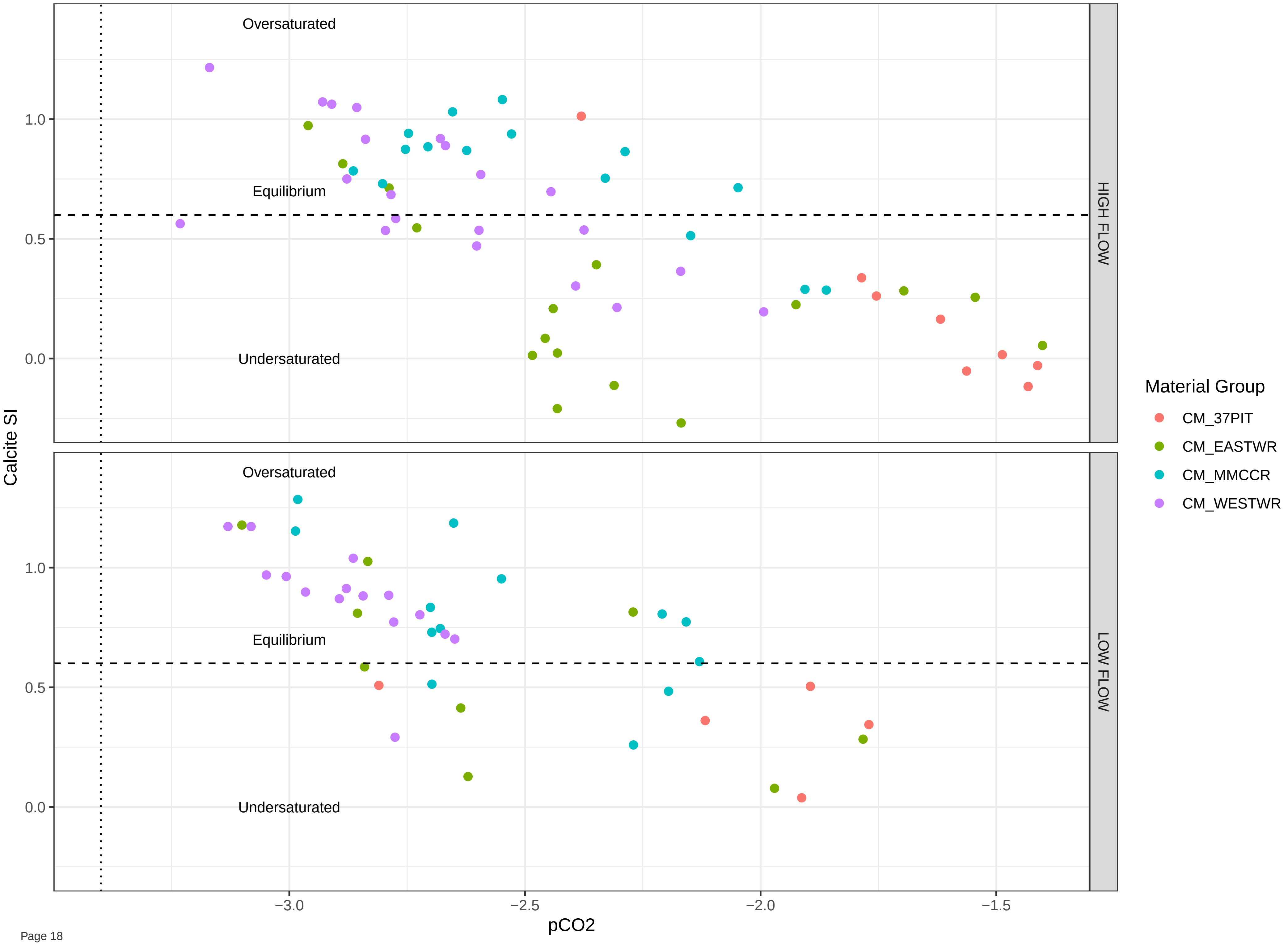

Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Calcite SI
pCO2
Material Group
EV_BALDYRIDGEWR
EV_CCR
EV_CEDARWR
EV_ERICKSON_WR
EV_PLANT
EV_SOUTHPIT_PIT
EV_SOUTHSLOPE


Ferrihydrite SI
2.5
0.0
−2.5
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
0.01
0.10
1.00
10.00
Iron (mg/L)
Material Group
EV_BALDYRIDGEWR
EV_CCR
EV_CEDARWR
EV_ERICKSON_WR
EV_PLANT
EV_SOUTHPIT_PIT
EV_SOUTHSLOPE

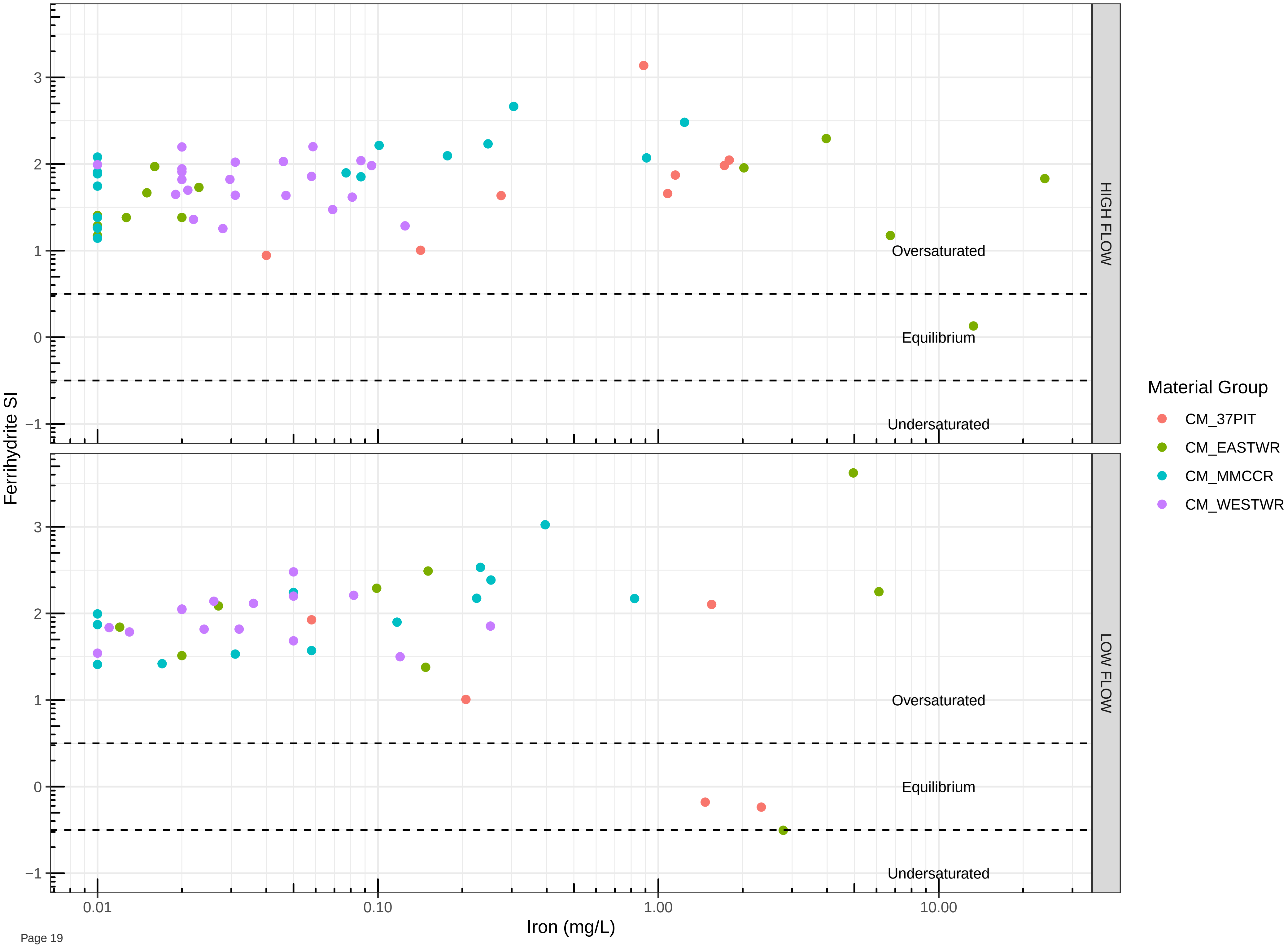


Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
2.5
0.0
−2.5
−4
−3
−2
−1
Ferrihydrite SI
pCO2
Material Group
EV_BALDYRIDGEWR
EV_CCR
EV_CEDARWR
EV_ERICKSON_WR
EV_PLANT
EV_SOUTHPIT_PIT
EV_SOUTHSLOPE

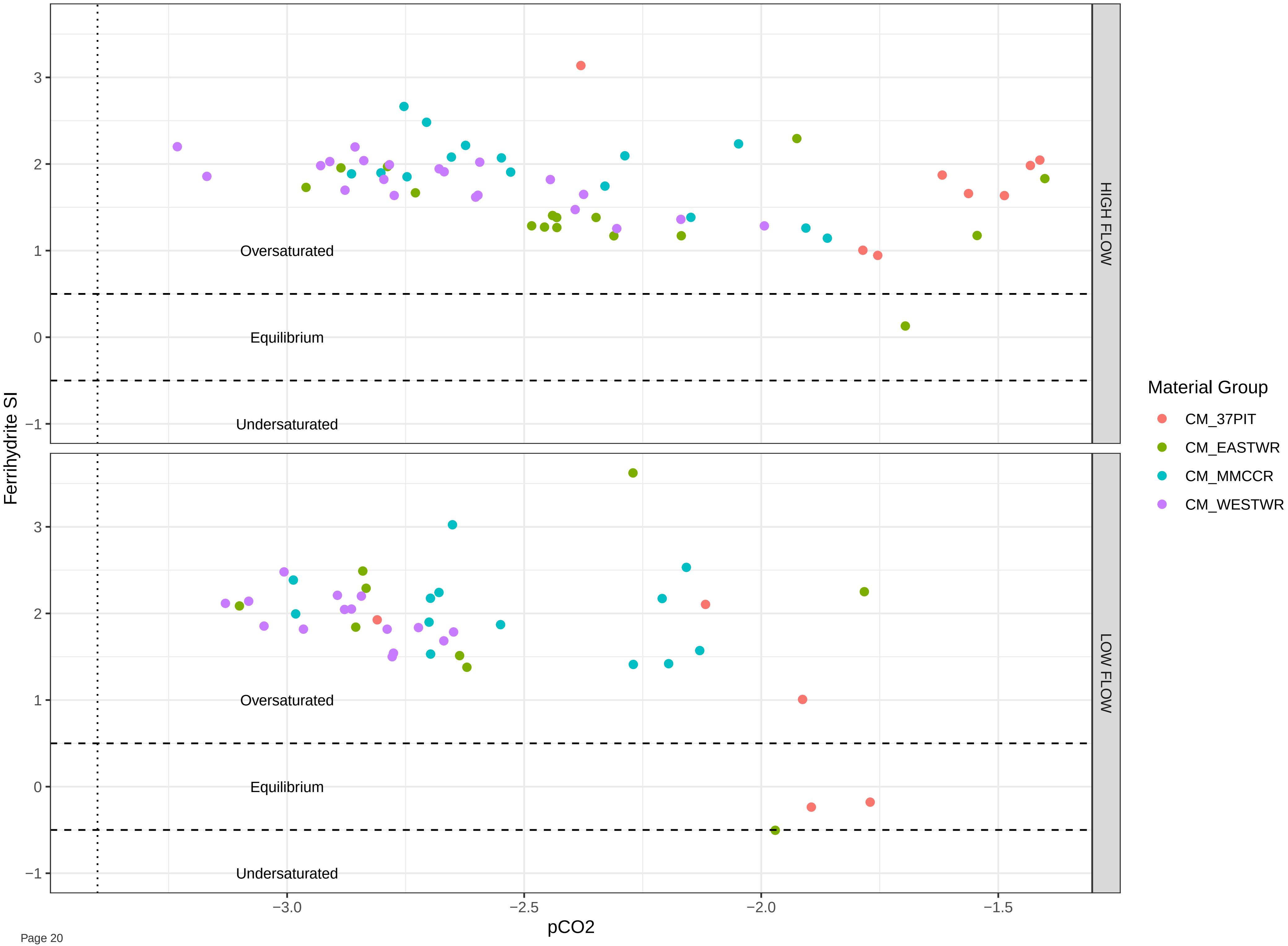

Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Gypsum SI
Sulfate (mg/L)
1
0
−1
100
1000
Material Group
CM_37PIT
CM_EASTWR
CM_MMCCR
CM_WESTWR



Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
Calcite SI
pCO2
1.0
0.5
0.0
−3.0
−2.5
−2.0
−1.5
Material Group
CM_37PIT
CM_EASTWR
CM_MMCCR
CM_WESTWR

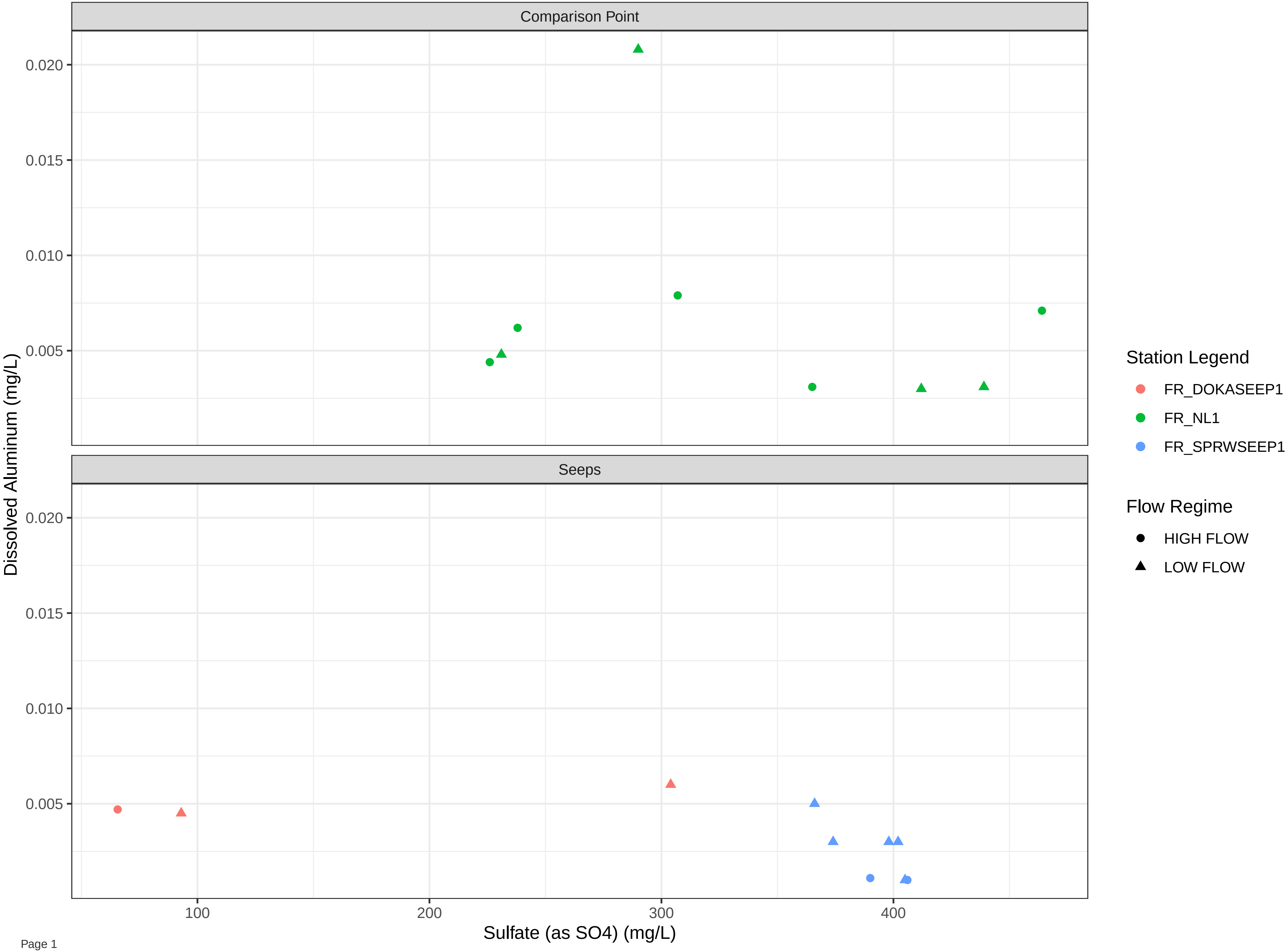


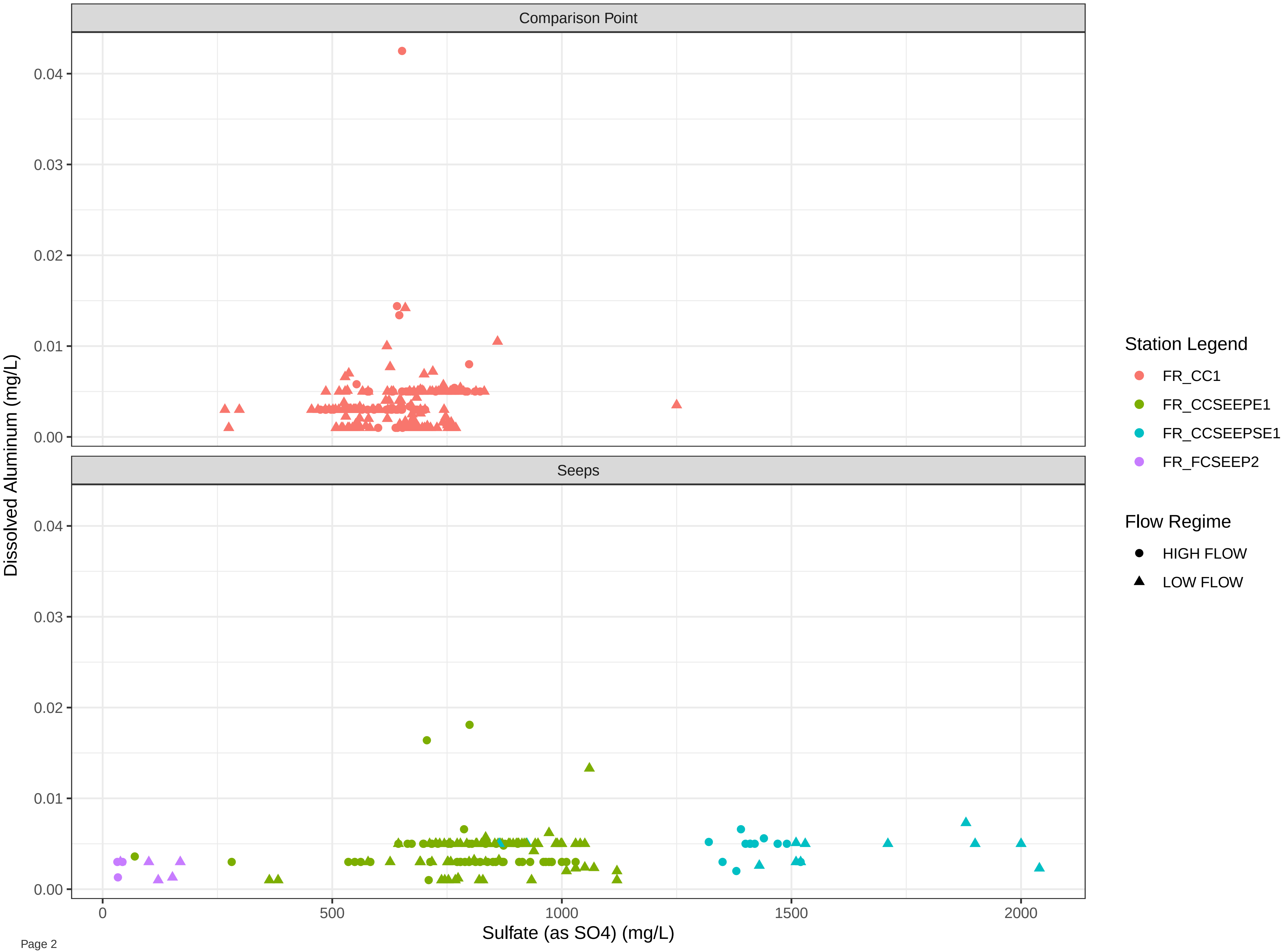
Ferrihydrite SI
Iron (mg/L)
HIGH FLOW
LOW FLOW
Oversaturated
Equilibrium
Undersaturated
Oversaturated
Equilibrium
Undersaturated
3
2
1
0
−1
3
2
1
0
−1
0.01
0.10
1.00
10.00
Material Group
CM_37PIT
CM_EASTWR
CM_MMCCR
CM_WESTWR

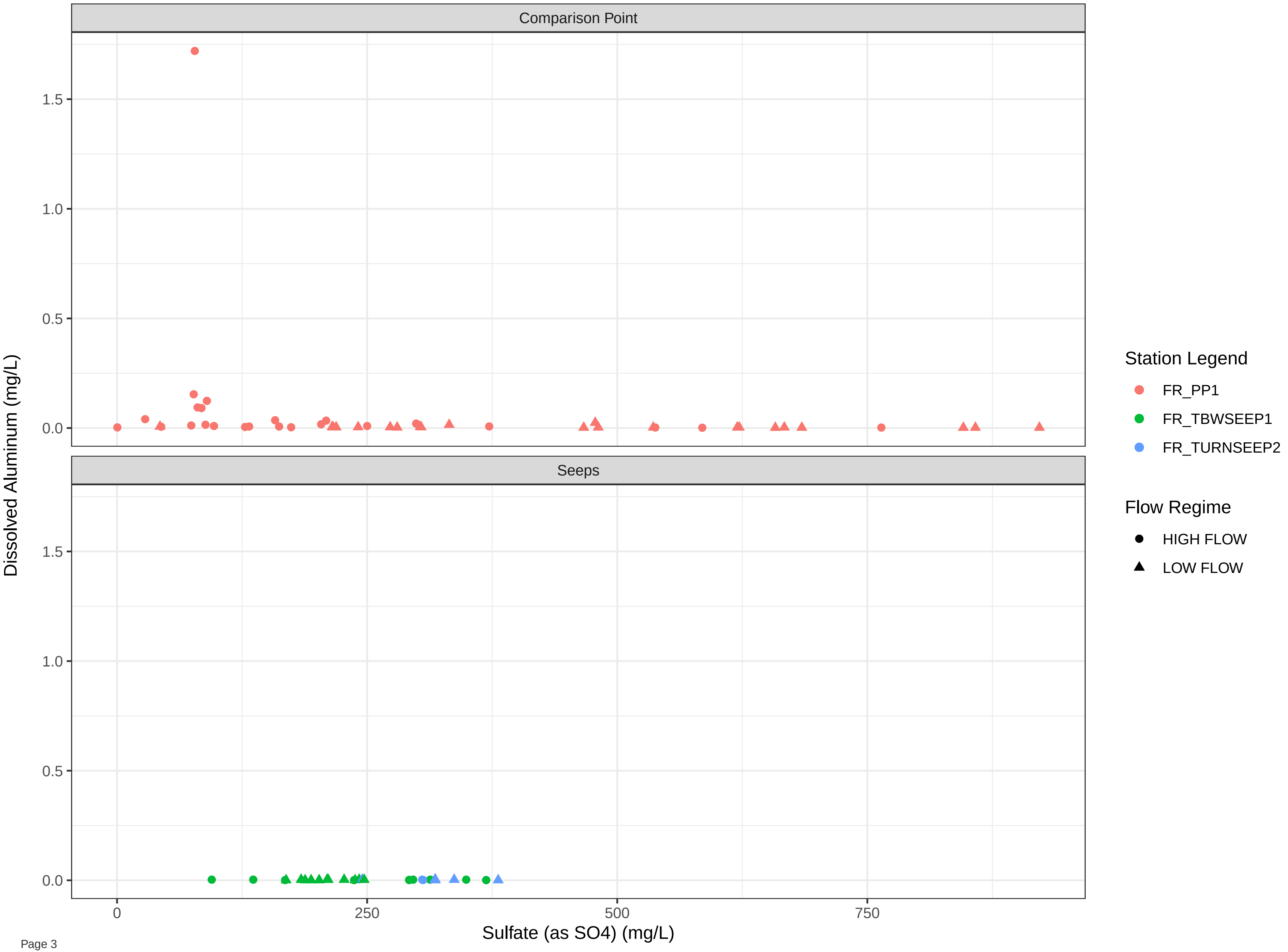


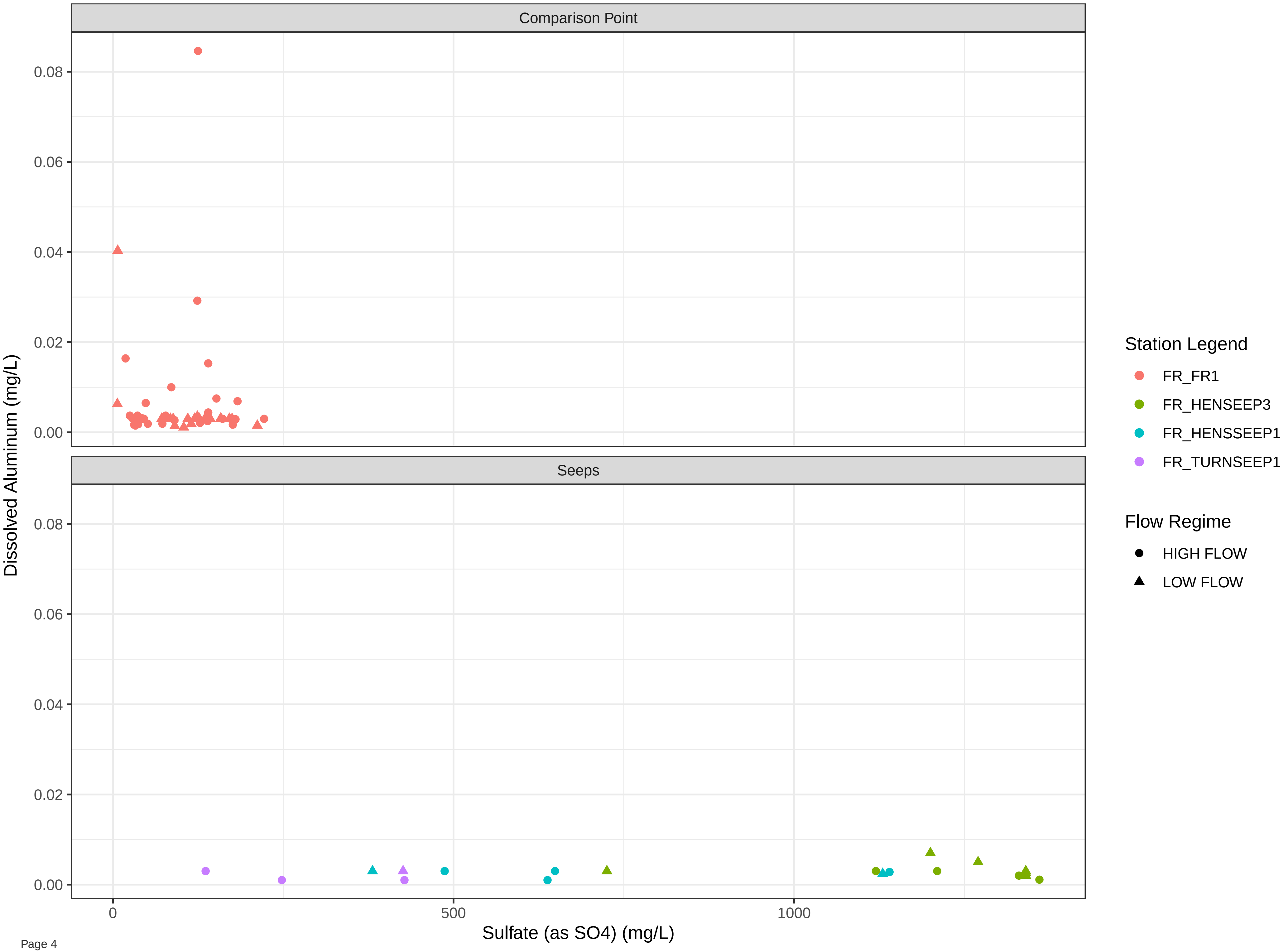
Ferrihydrite SI
pCO2
Oversaturated
Equilibrium
Undersaturated
HIGH FLOW
LOW FLOW
3
2
1
0
−1
−3.0
−2.5
−2.0
−1.5
Material Group
CM_37PIT
CM_EASTWR
CM_MMCCR
CM_WESTWR

Appendix E Comparison to Permitted Surface Water Monitoring Locations for Metals versus Sulfate

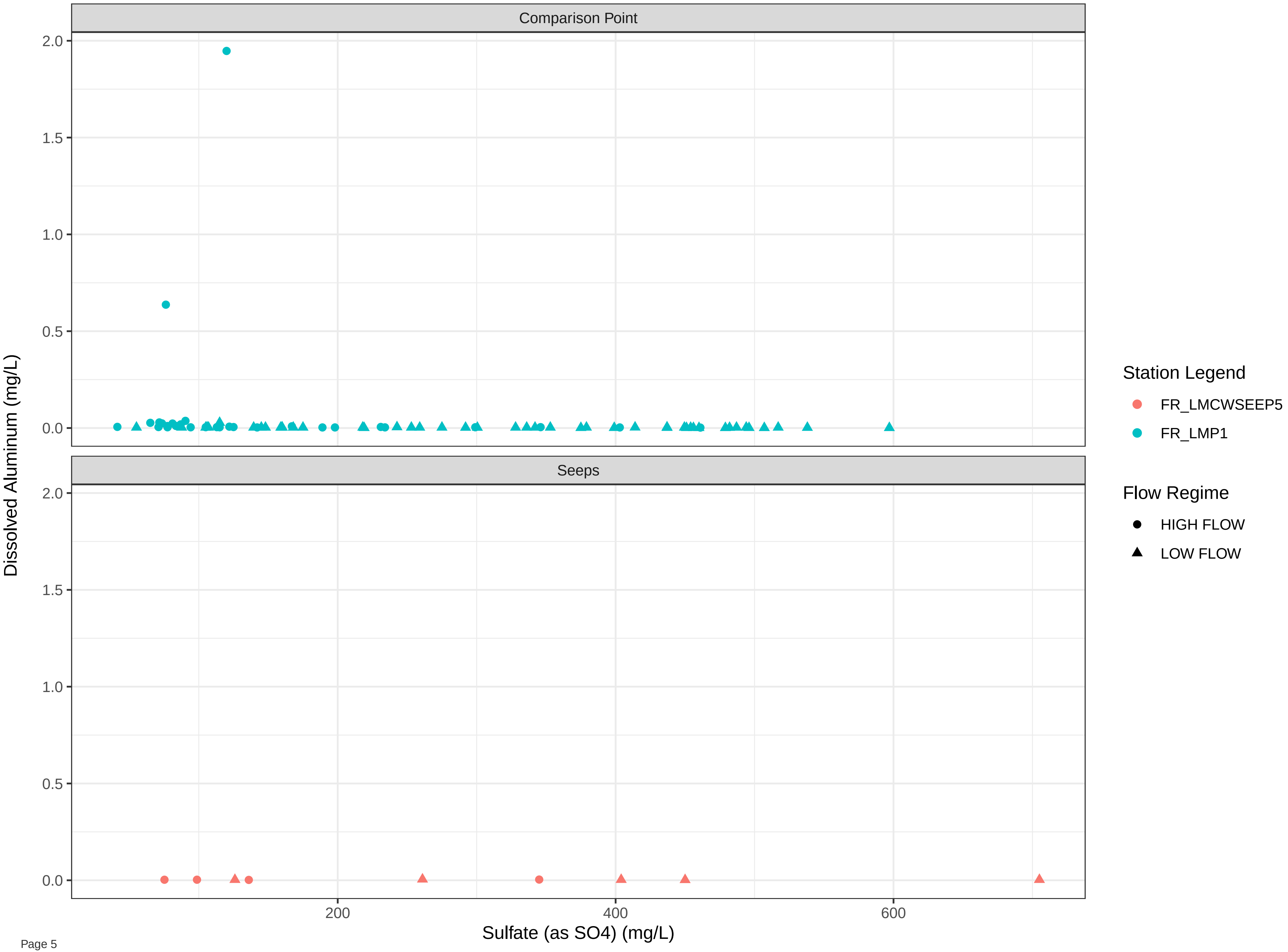

Comparison Point
Seeps
0.020
0.015
0.010
0.005
100
200
300
400
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.00
0.01
0.02
0.03
0.04
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

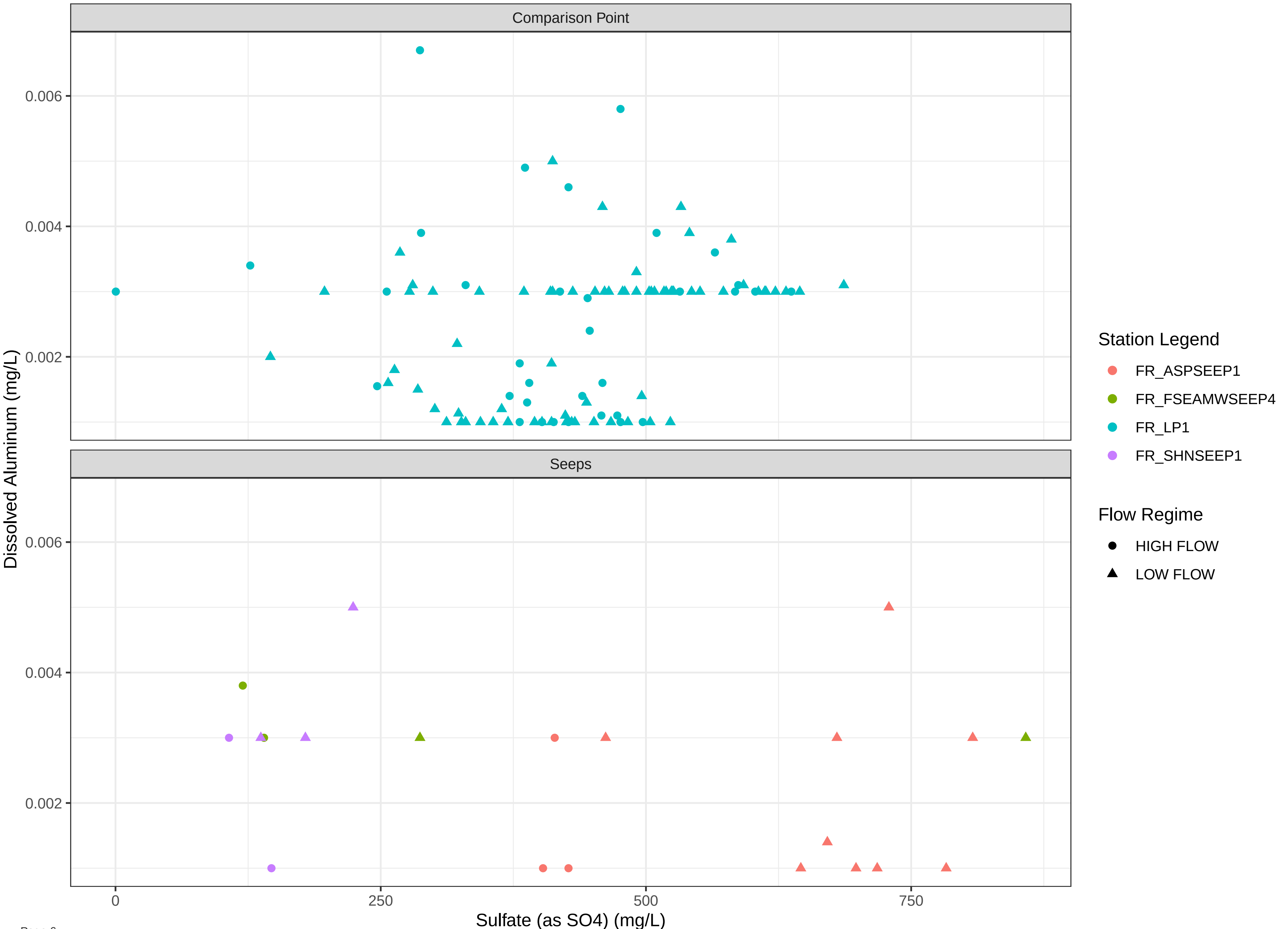

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.0
0.5
1.0
1.5
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



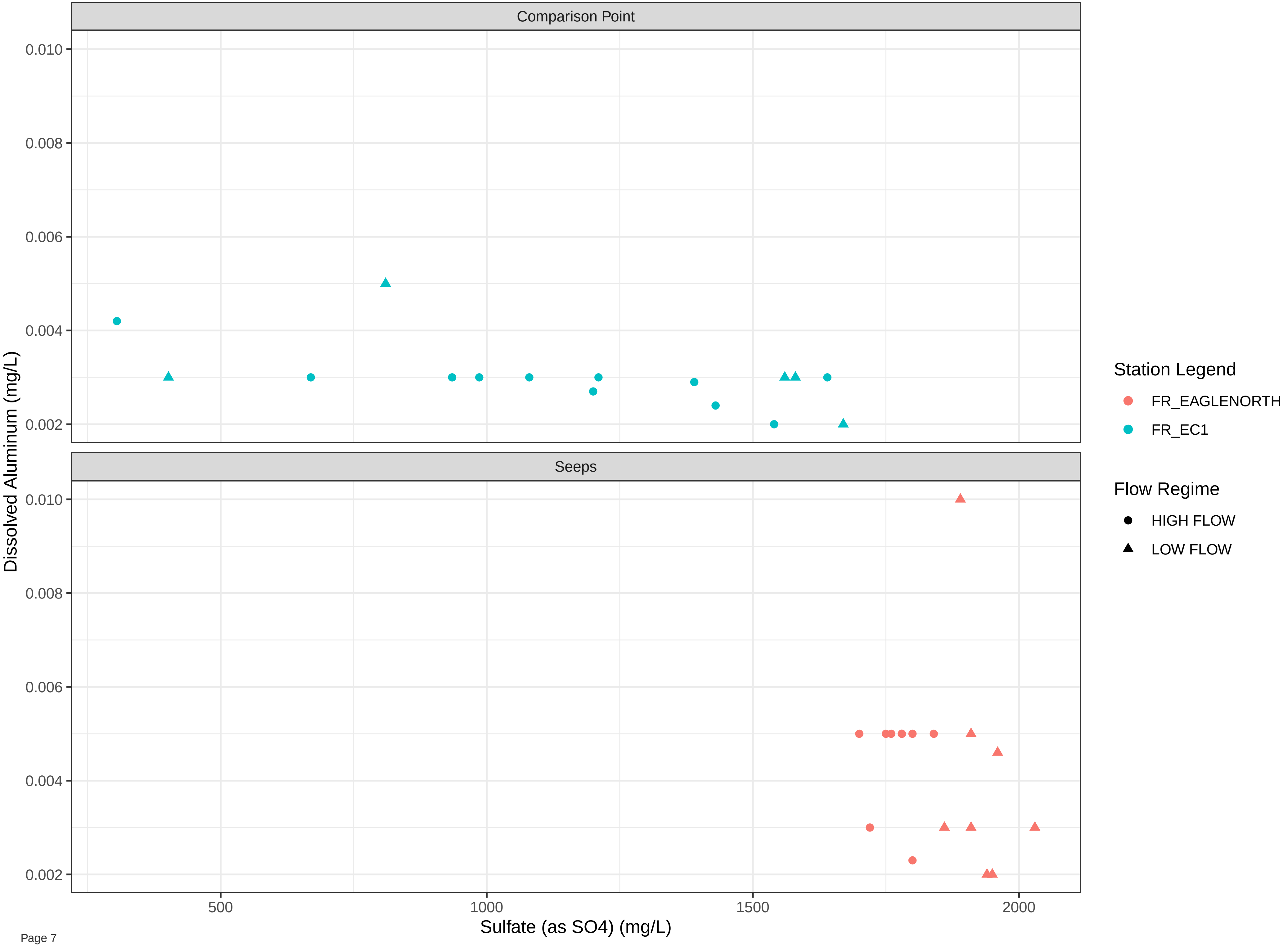
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.00
0.02
0.04
0.06
0.08
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



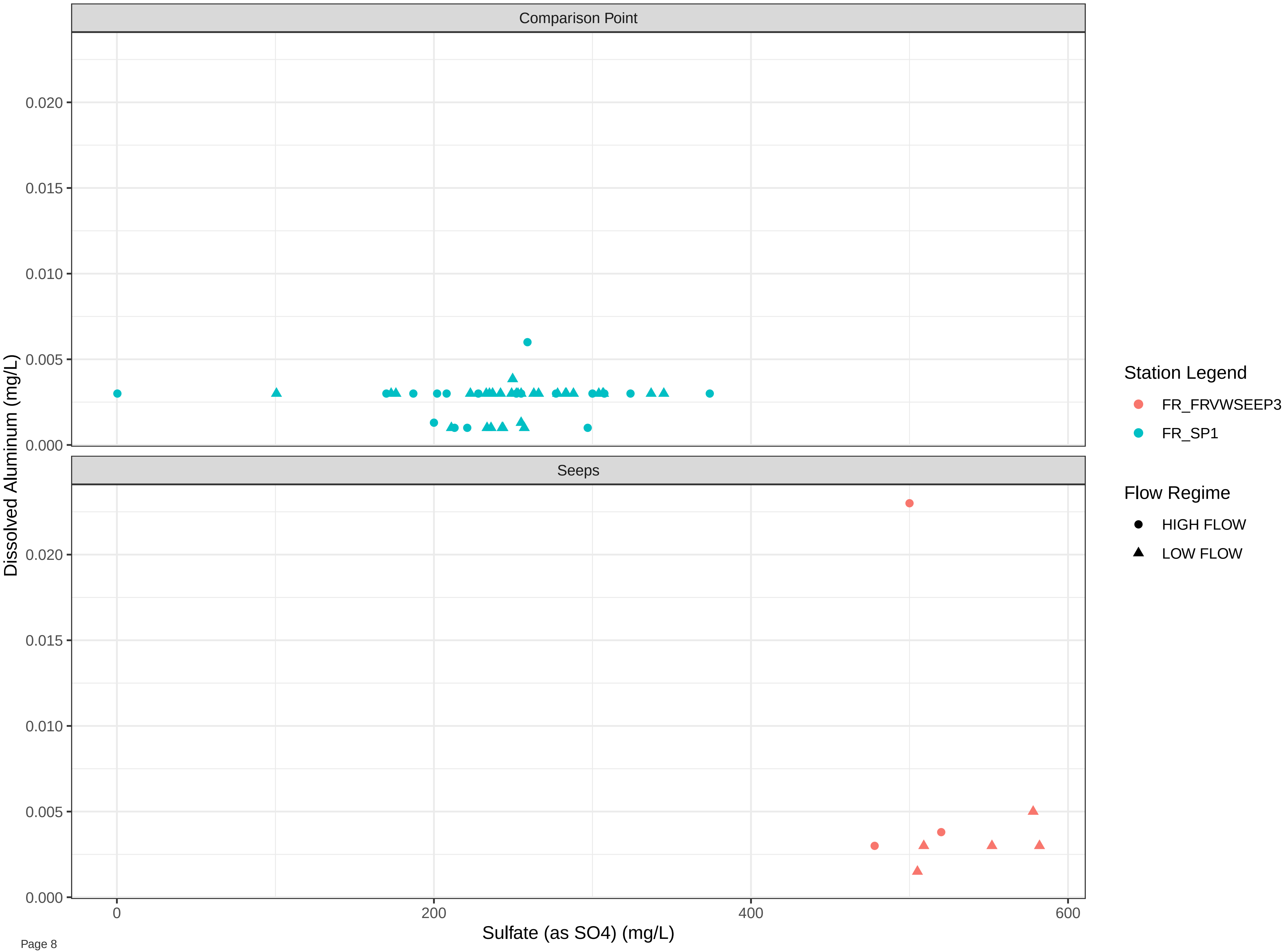
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
2.0
1.5
1.0
0.5
0.0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



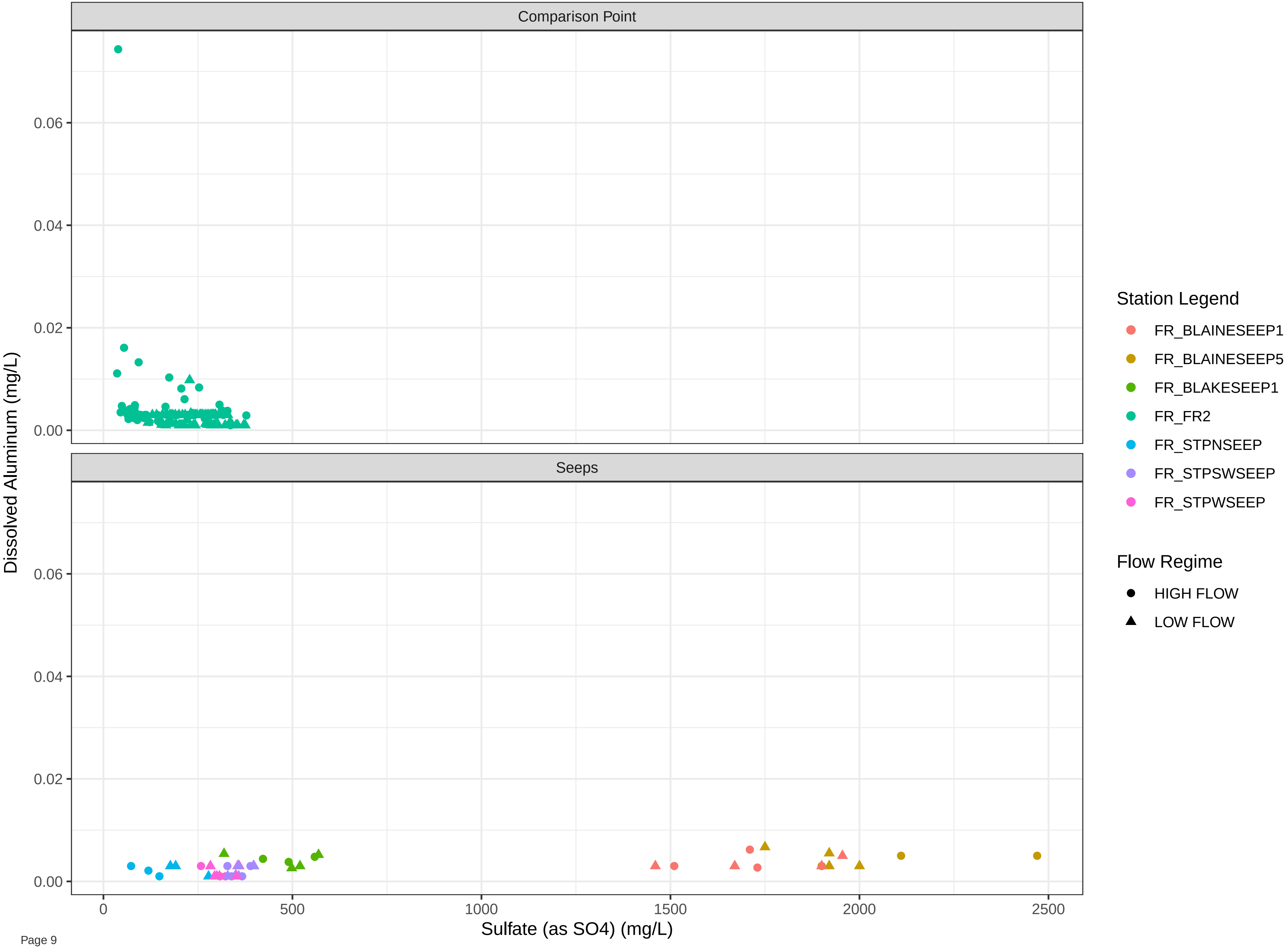
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.006
0.004
0.002
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

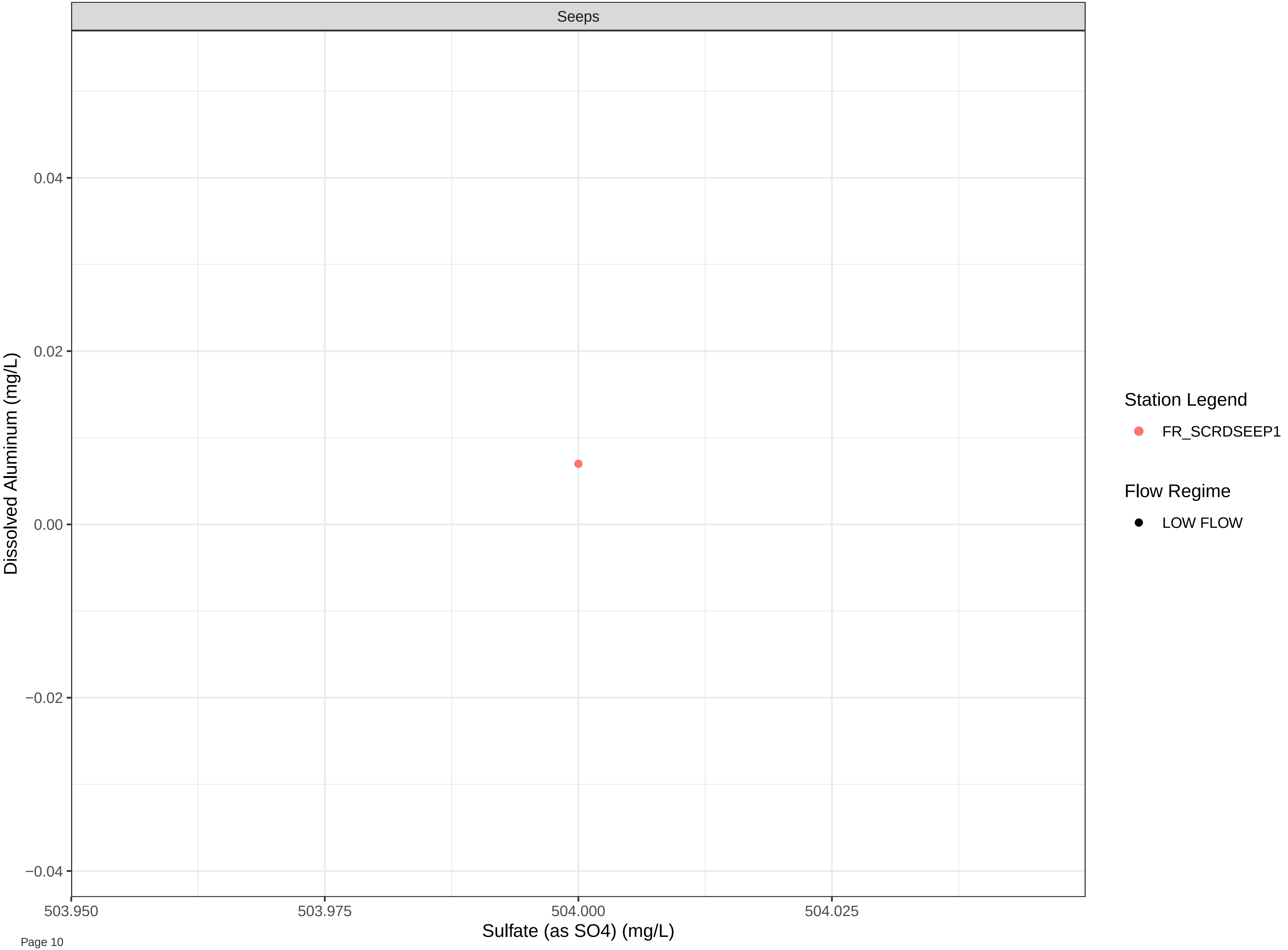


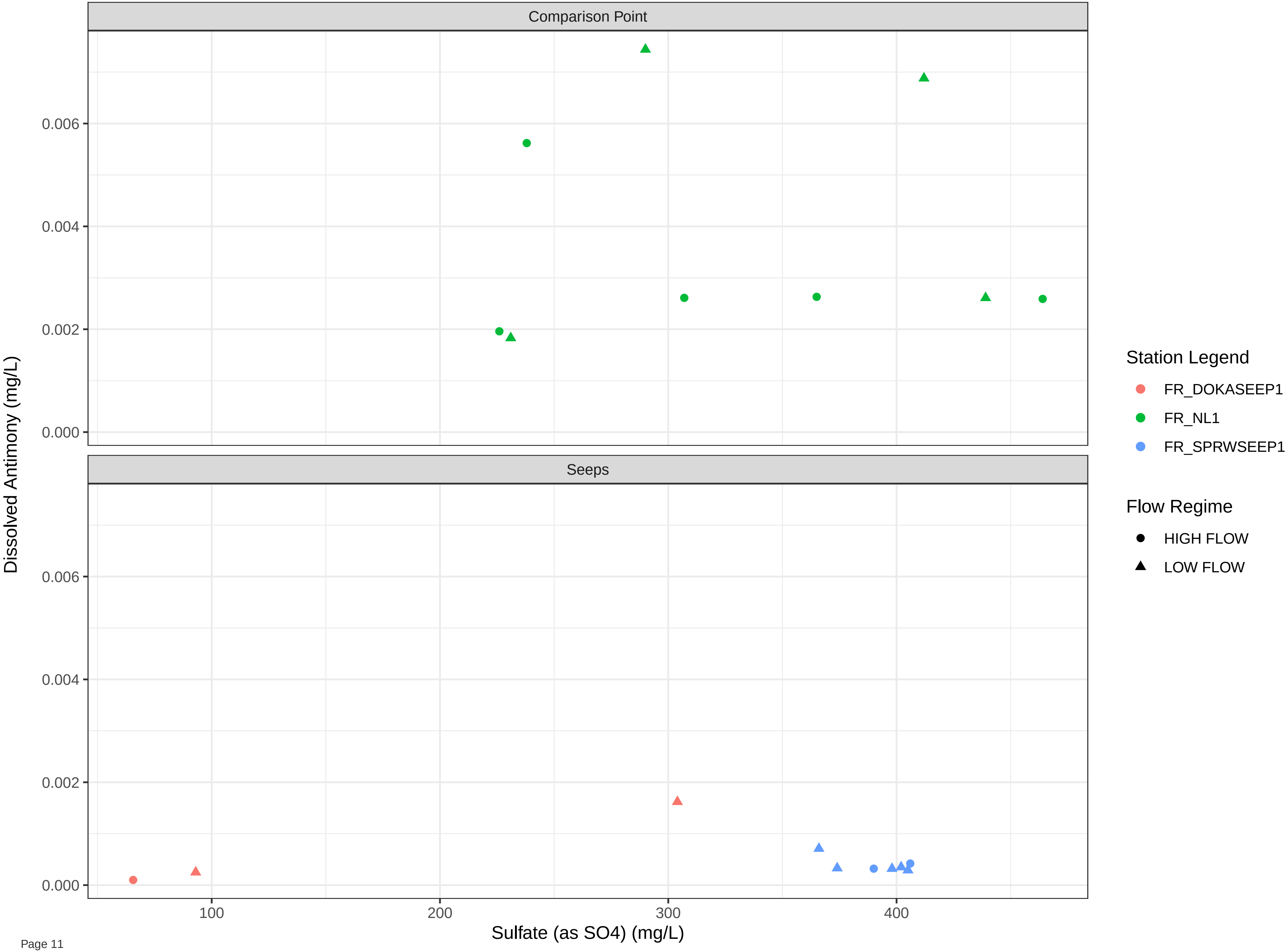
Comparison Point
Seeps
0.010
0.008
0.006
0.004
0.002
500
1000
1500
2000
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



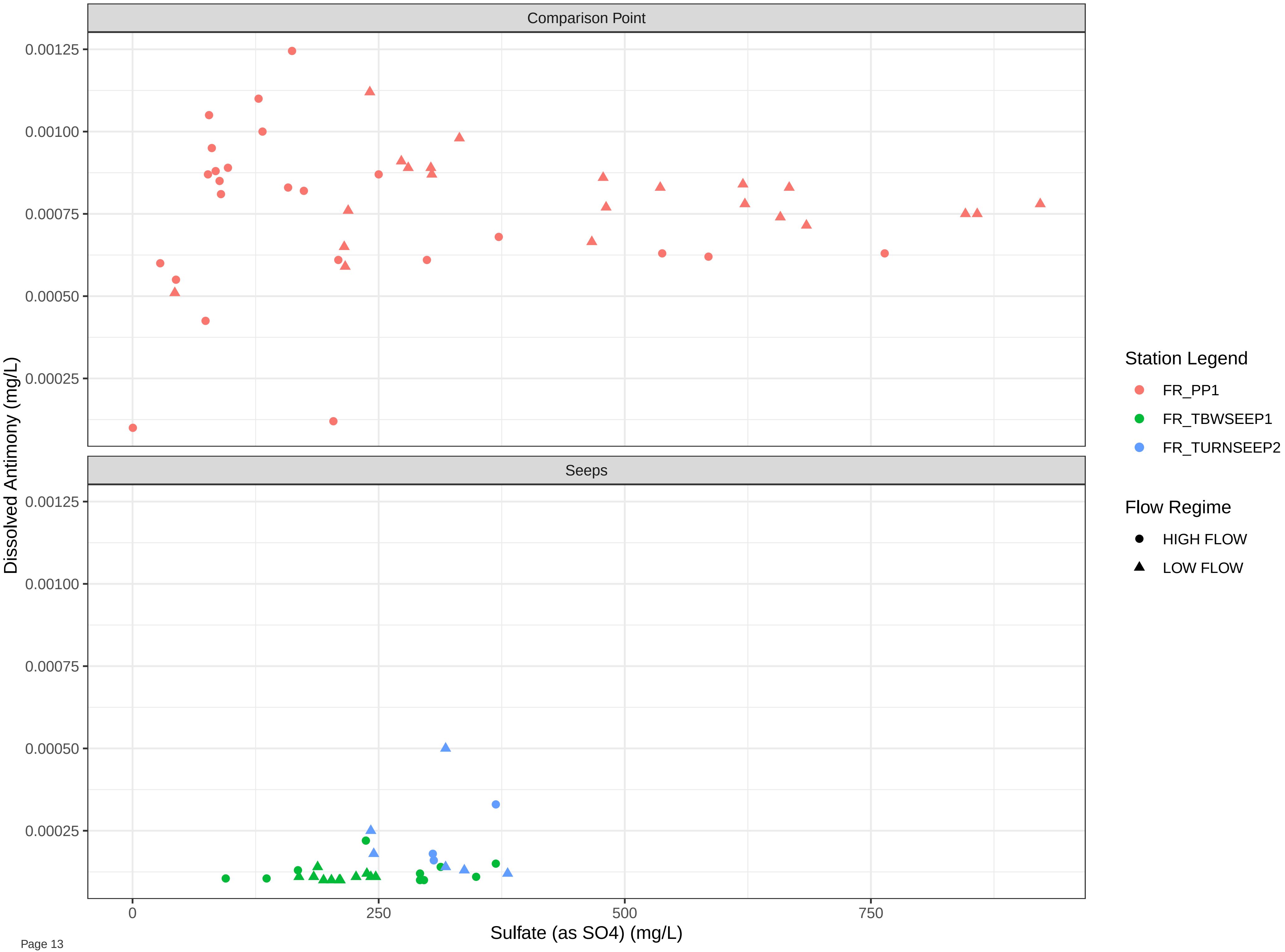
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.000
0.005
0.010
0.015
0.020
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

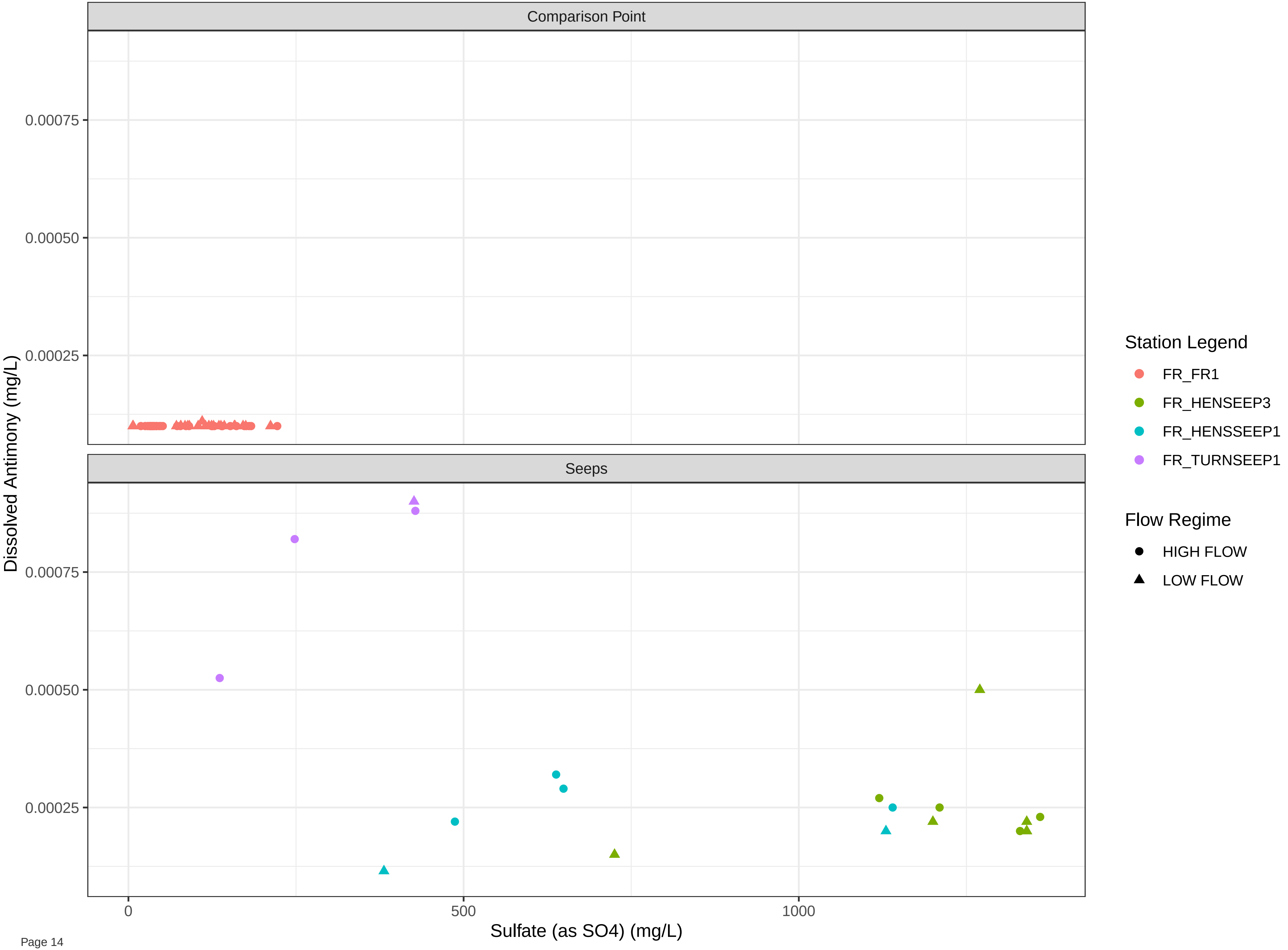

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.00
0.02
0.04
0.06
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

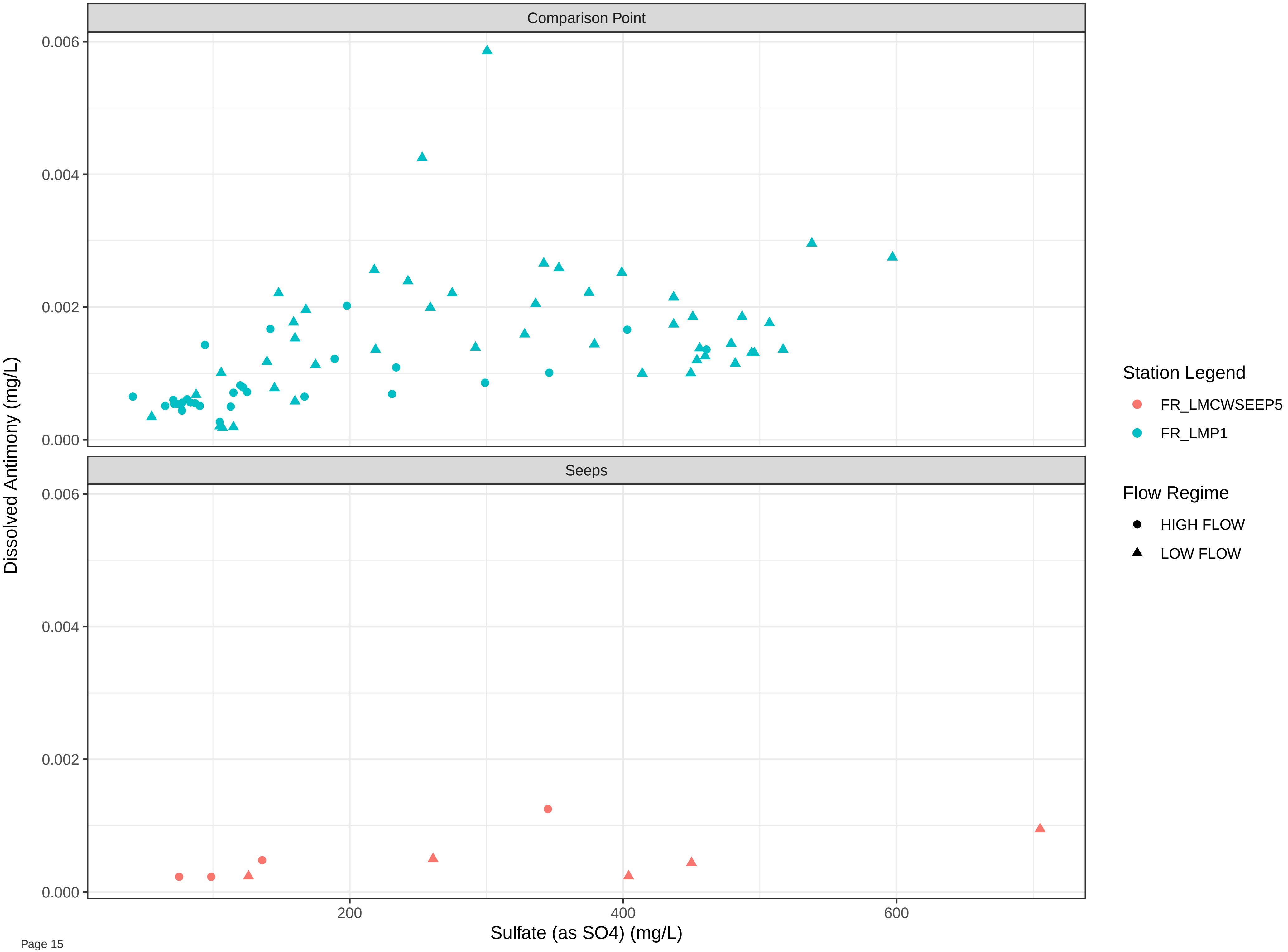

Seeps
Dissolved Aluminum (mg/L)
0.04
0.02
0.00
−0.02
−0.04
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW


Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
0.000
0.002
0.004
0.006
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

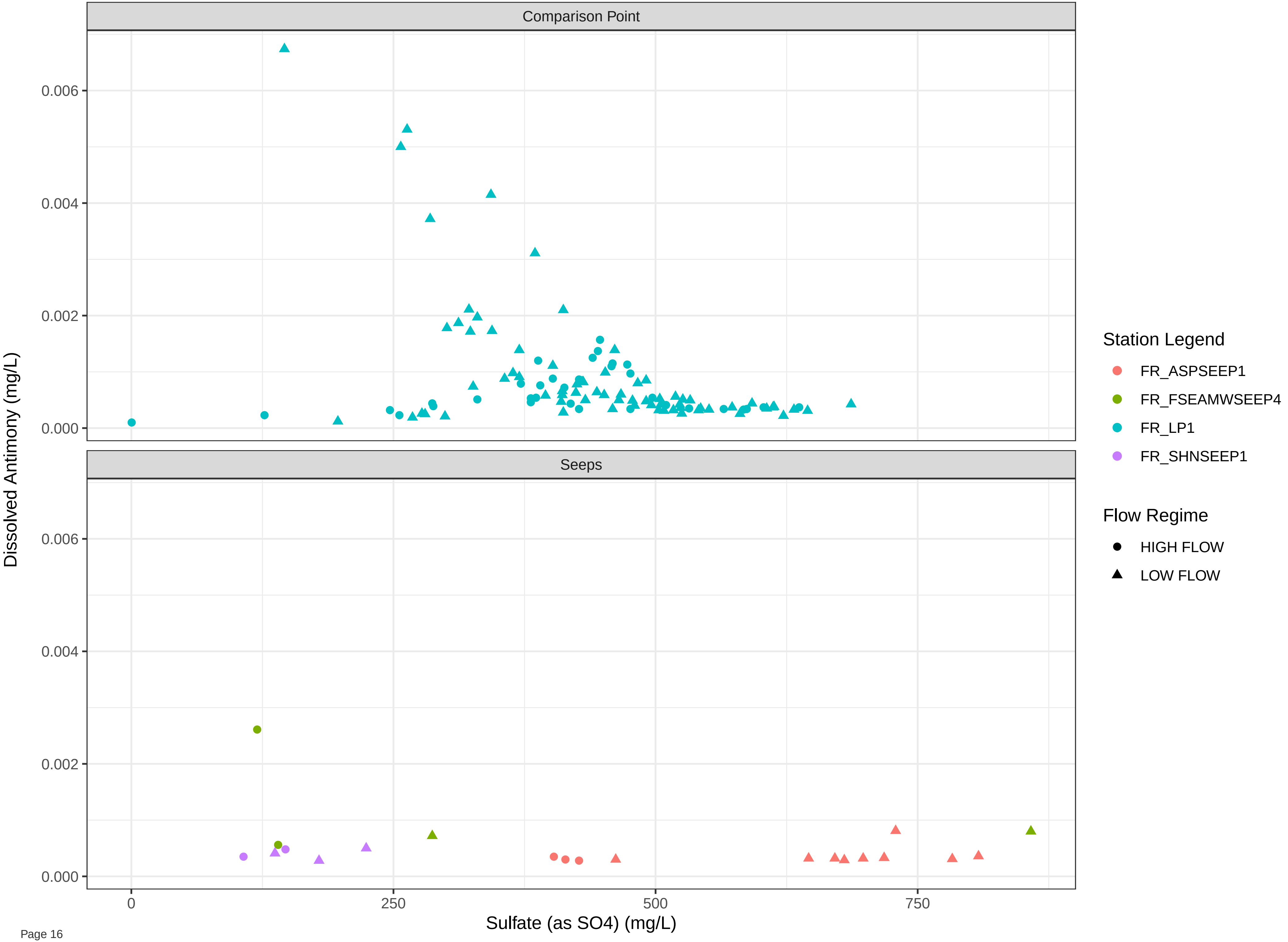

Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.00125
0.00100
0.00075
0.00050
0.00025
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

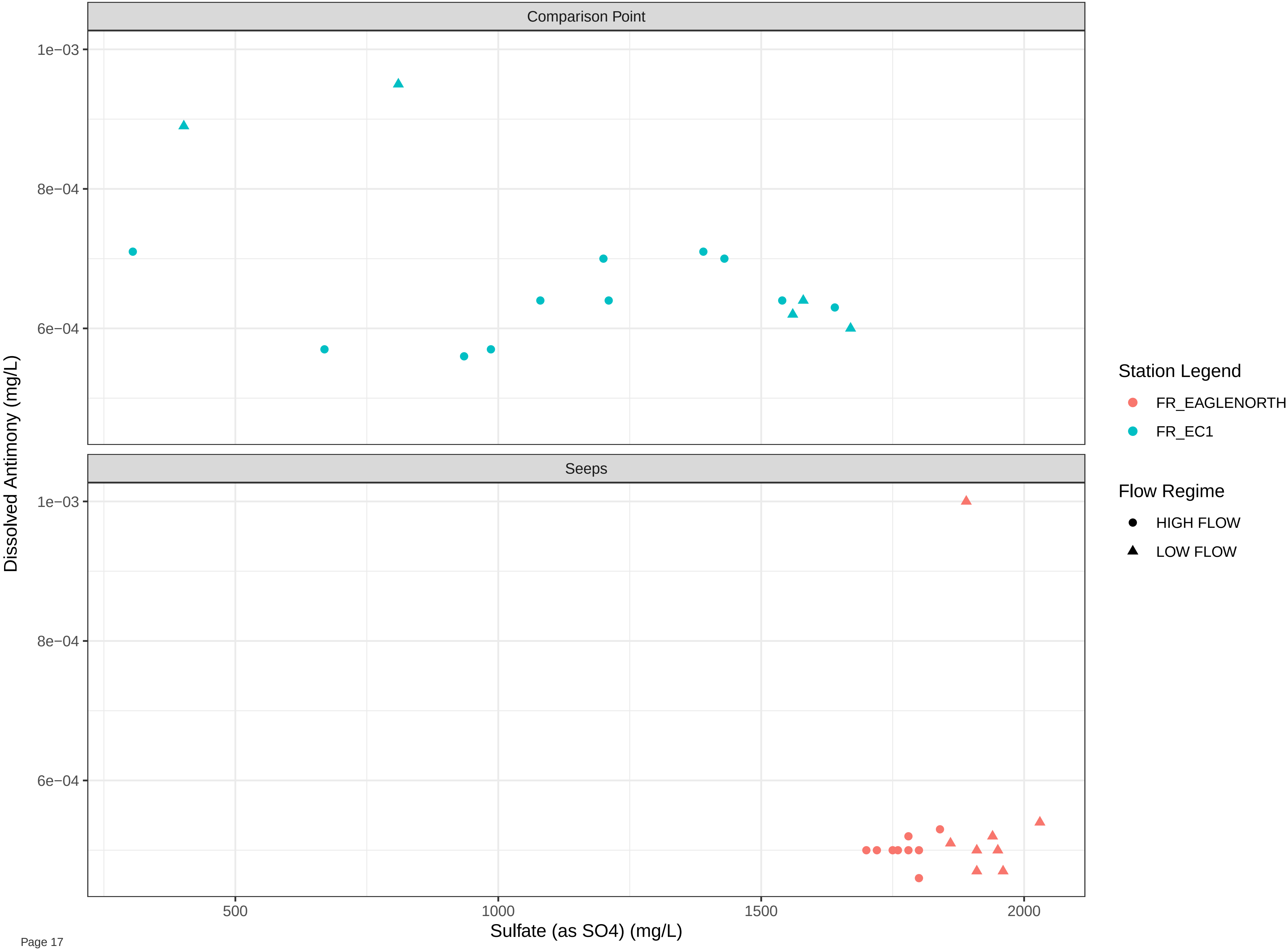

Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
0.00125
0.00100
0.00075
0.00050
0.00025
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

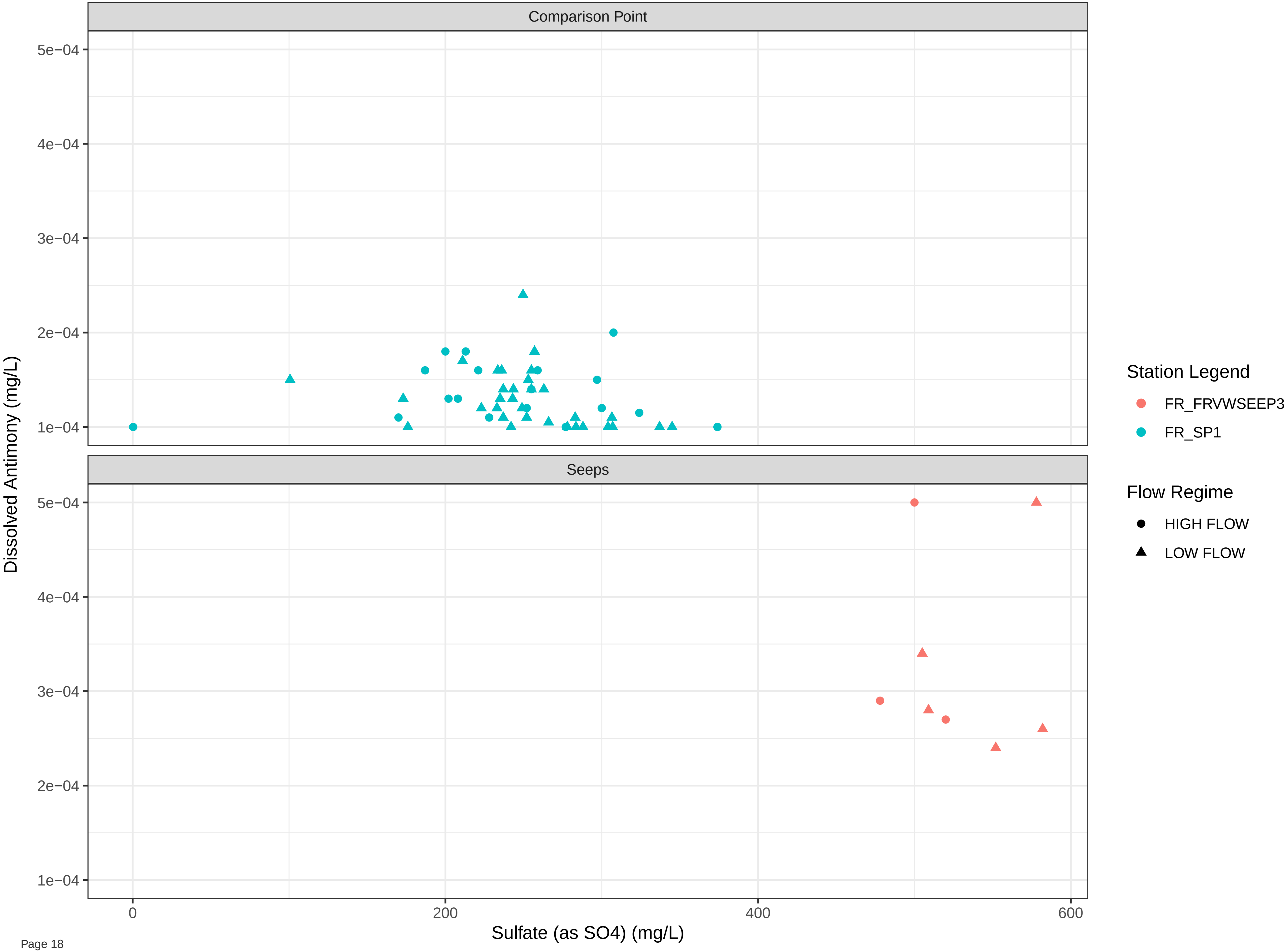

Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.00075
0.00050
0.00025
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

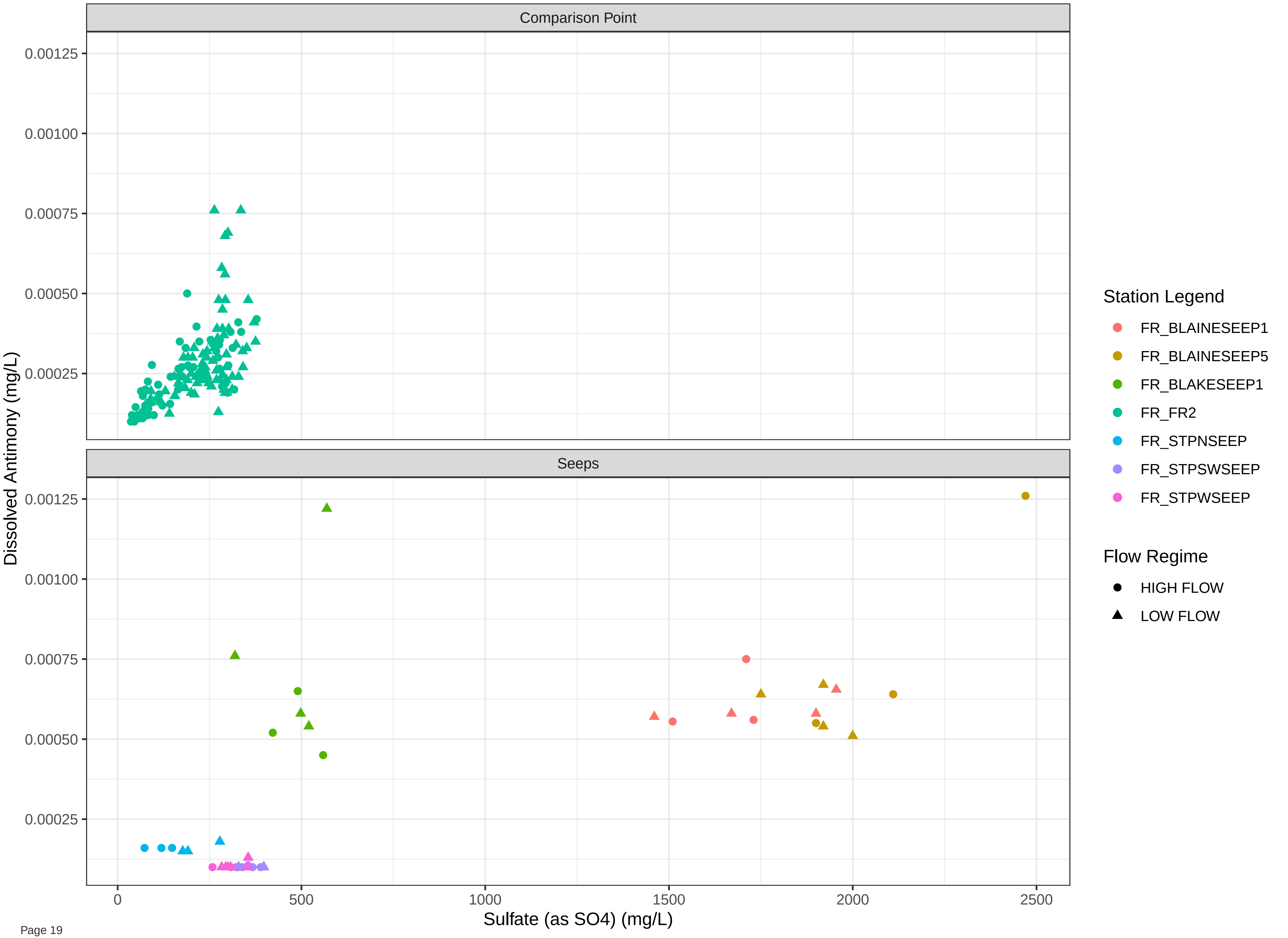


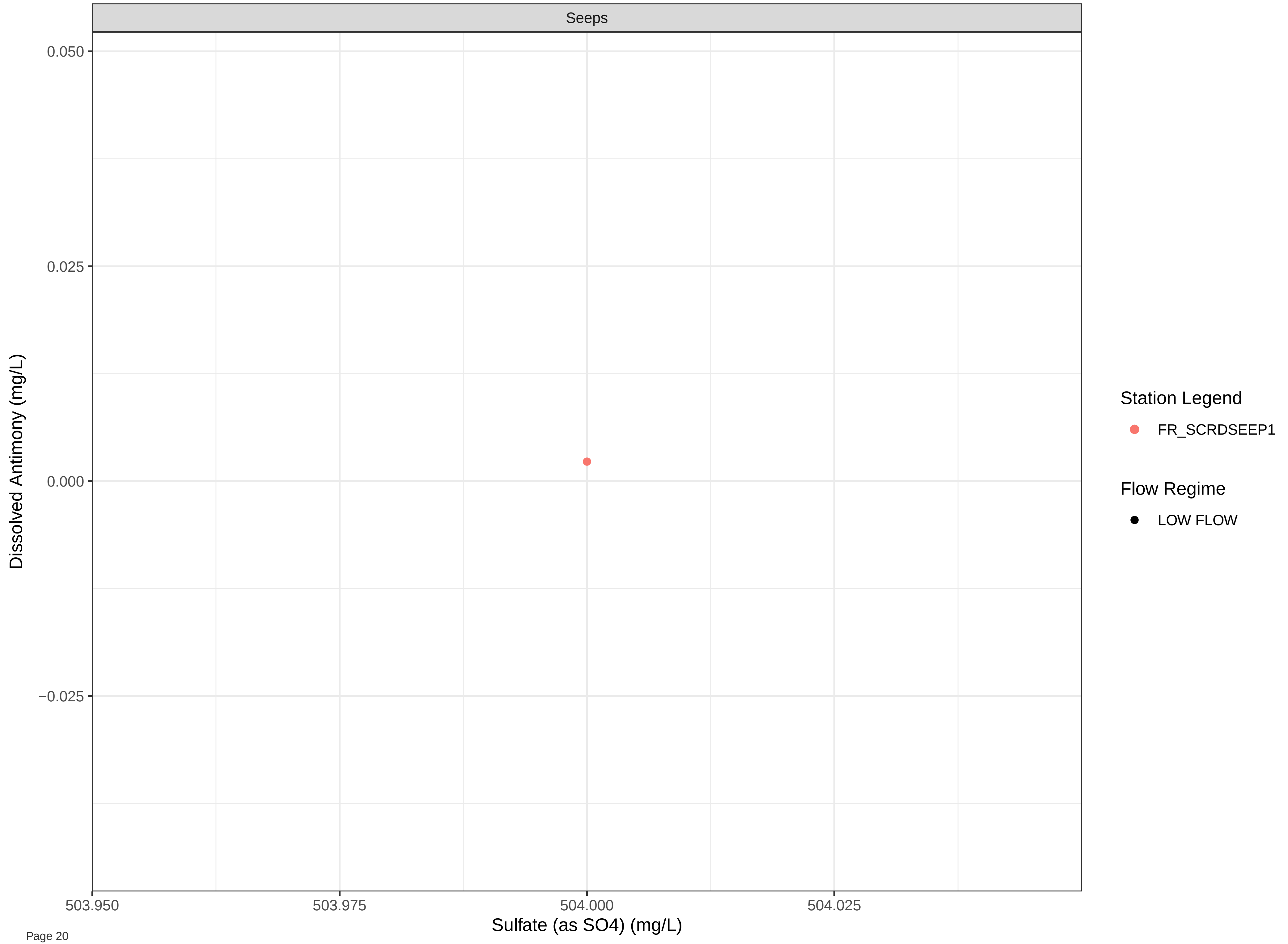
Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.000
0.002
0.004
0.006
Sulfate (as SO4) (mg/L)
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
0.000
0.002
0.004
0.006
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

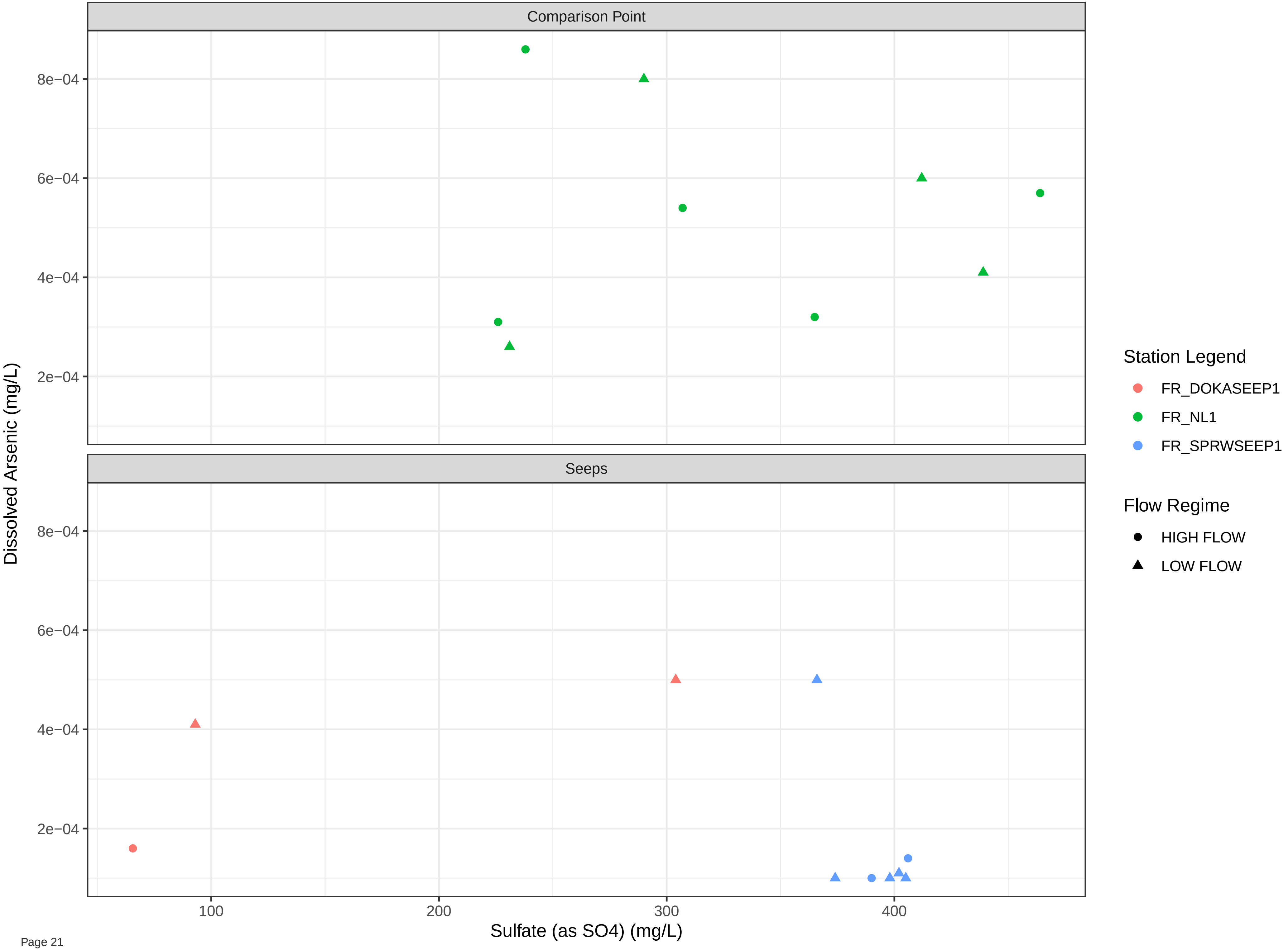

Comparison Point
Seeps
1e−03
8e−04
6e−04
Dissolved Antimony (mg/L)
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

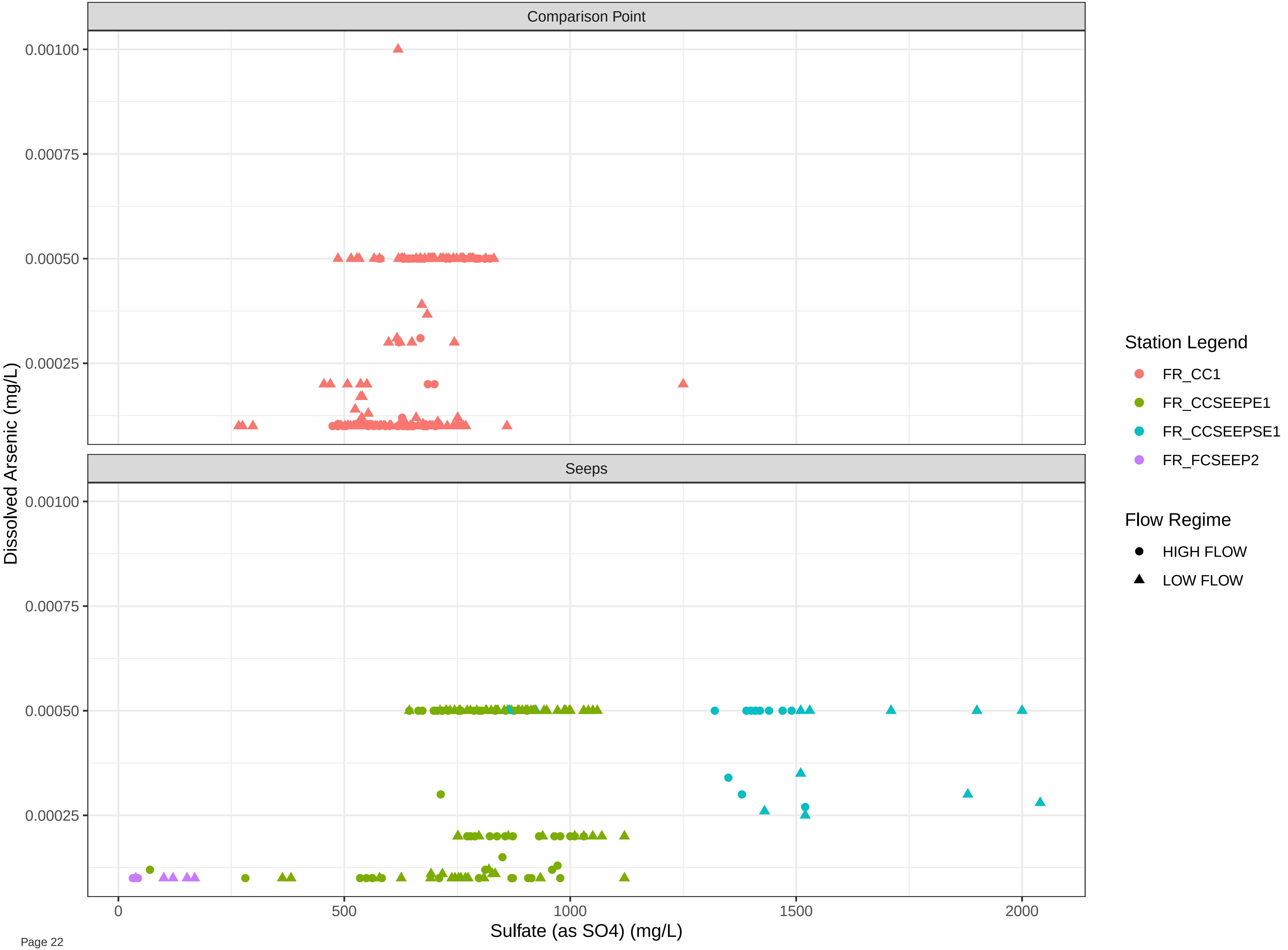

Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.00125
0.00100
0.00075
0.00050
0.00025
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

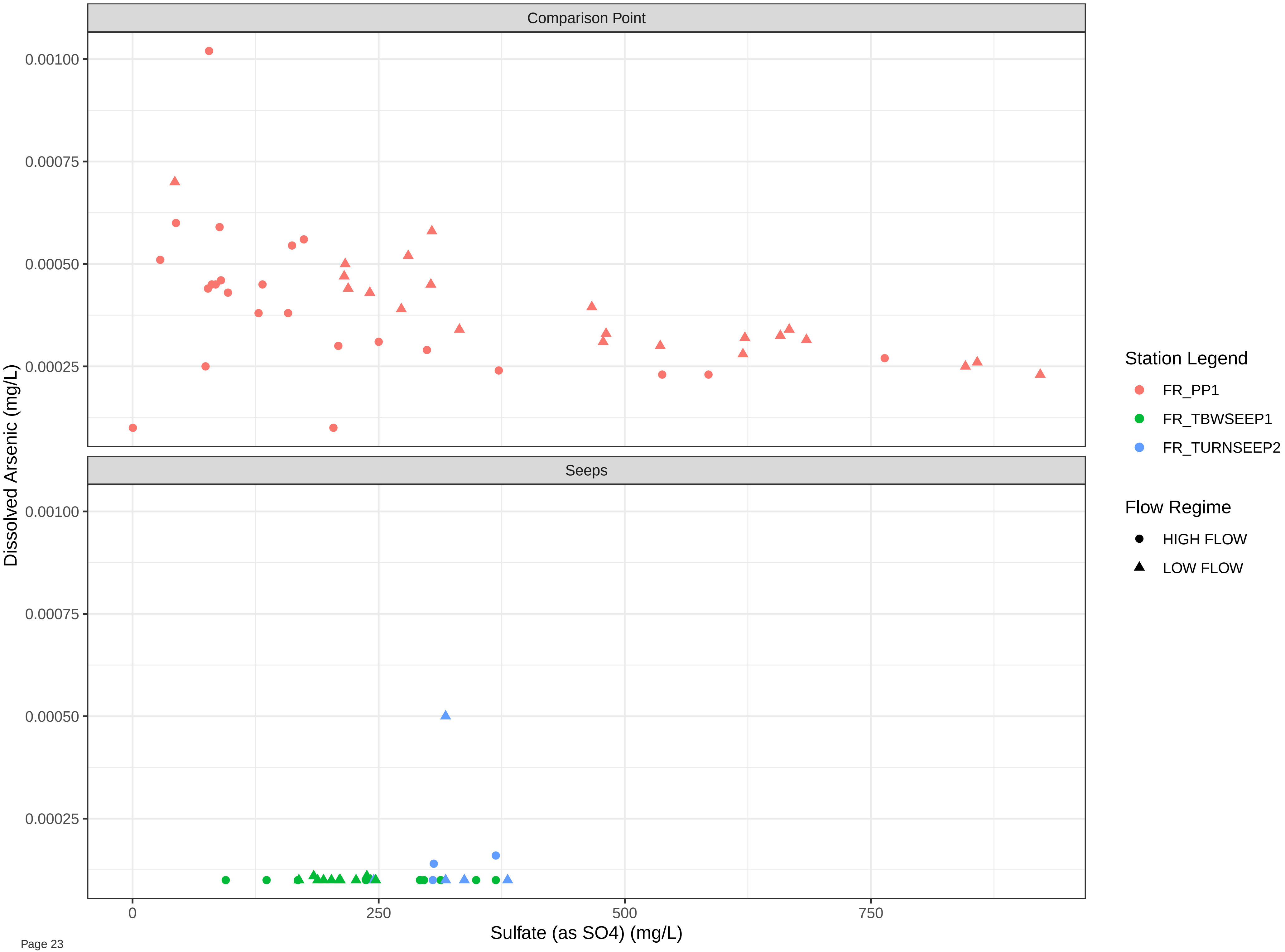


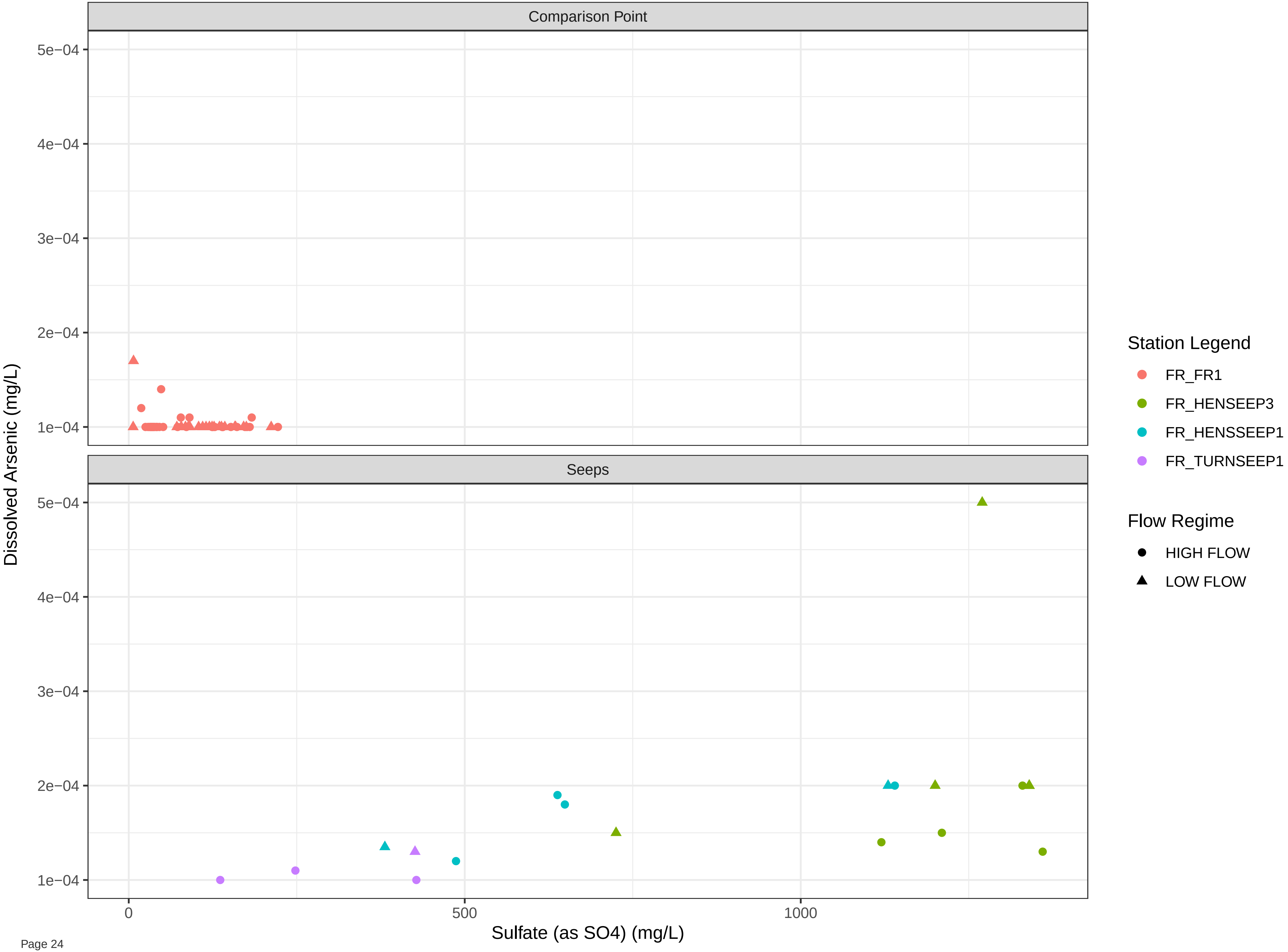
Seeps
0.050
0.025
0.000
−0.025
Dissolved Antimony (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW



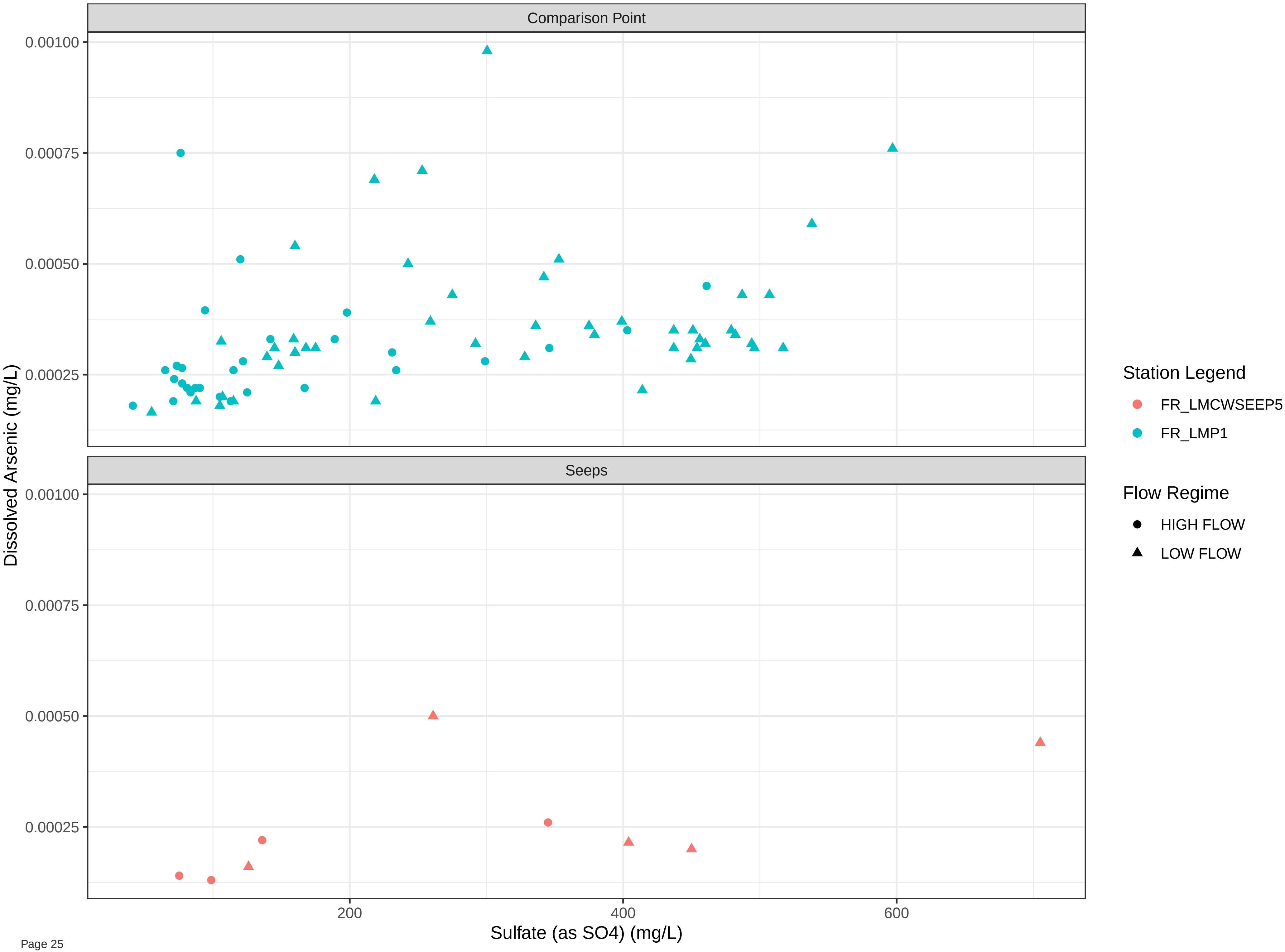
Comparison Point
Seeps
8e−04
6e−04
4e−04
2e−04
100
200
300
400
Dissolved Arsenic (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

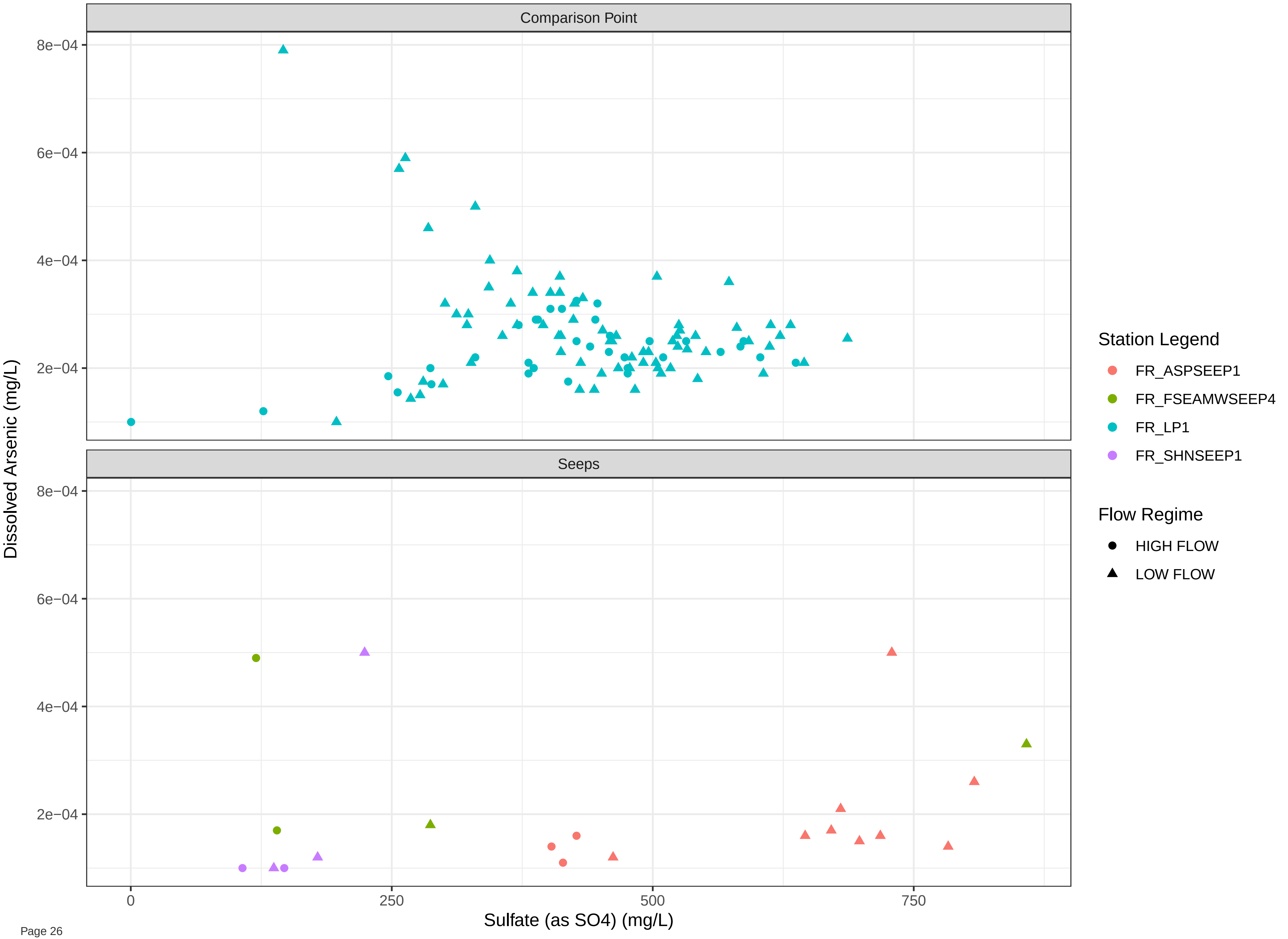

Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00100
0.00075
0.00050
0.00025
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00100
0.00075
0.00050
0.00025
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

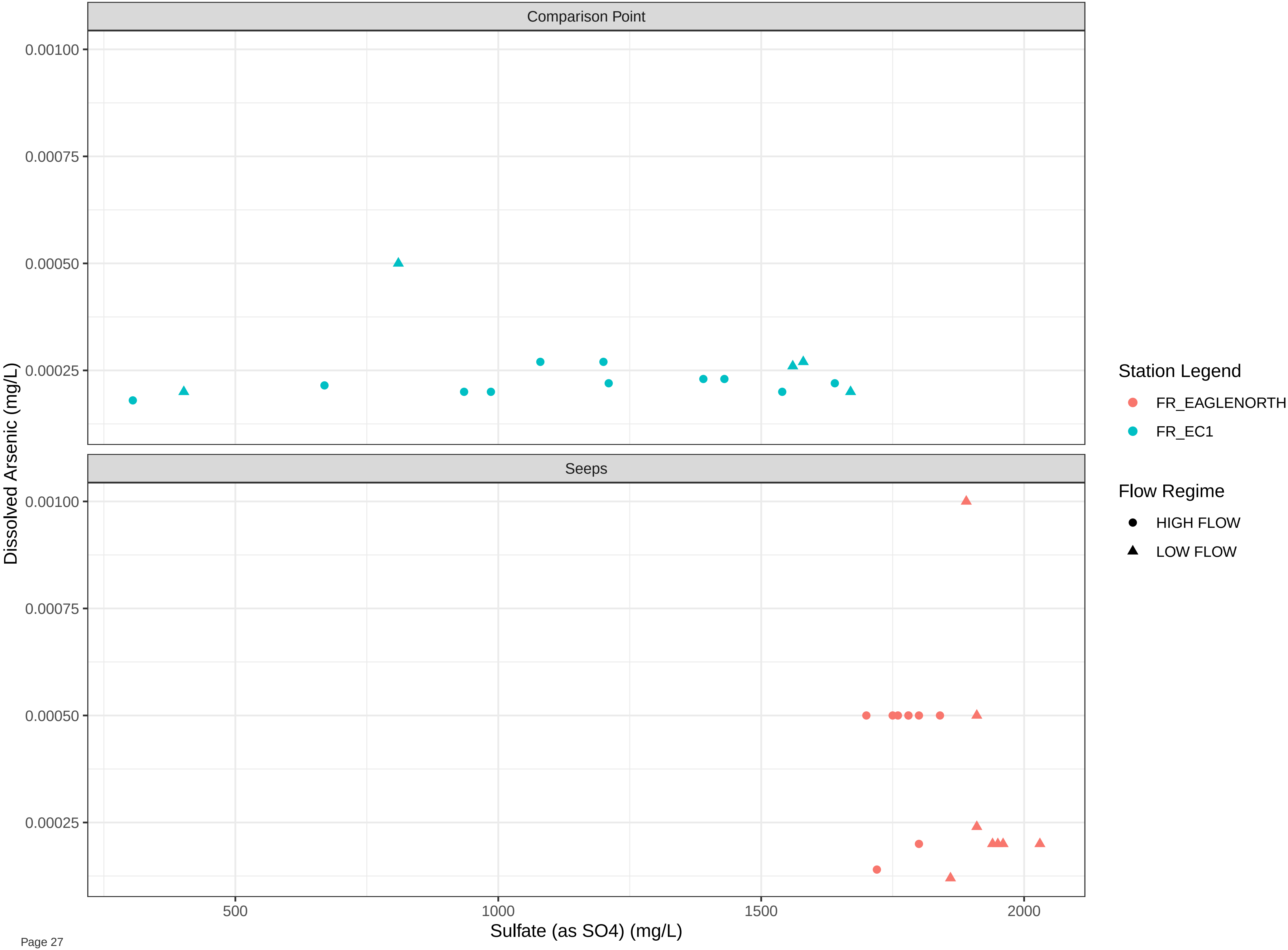


Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Arsenic (mg/L)
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

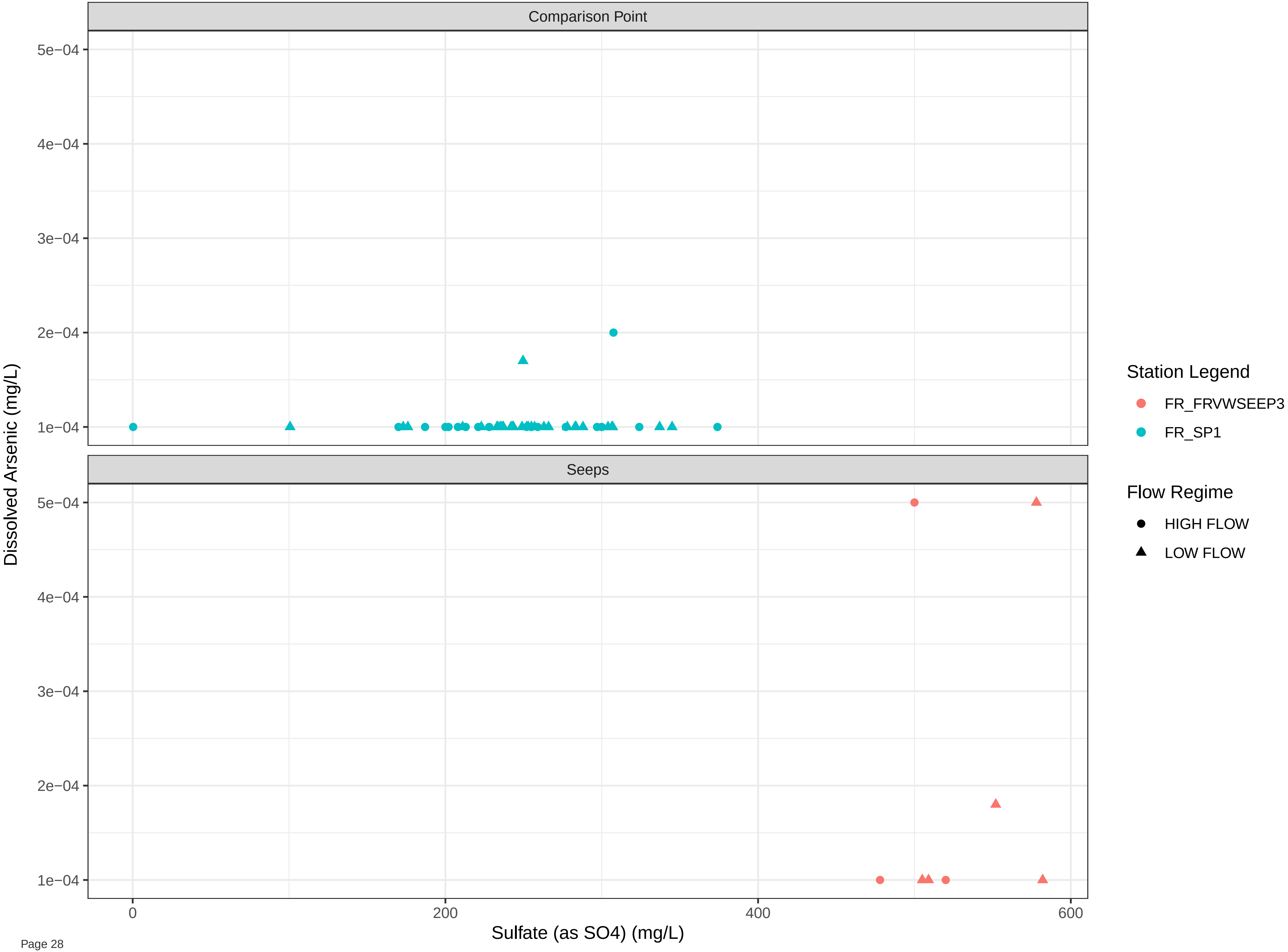

Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00100
0.00075
0.00050
0.00025
Sulfate (as SO4) (mg/L)
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

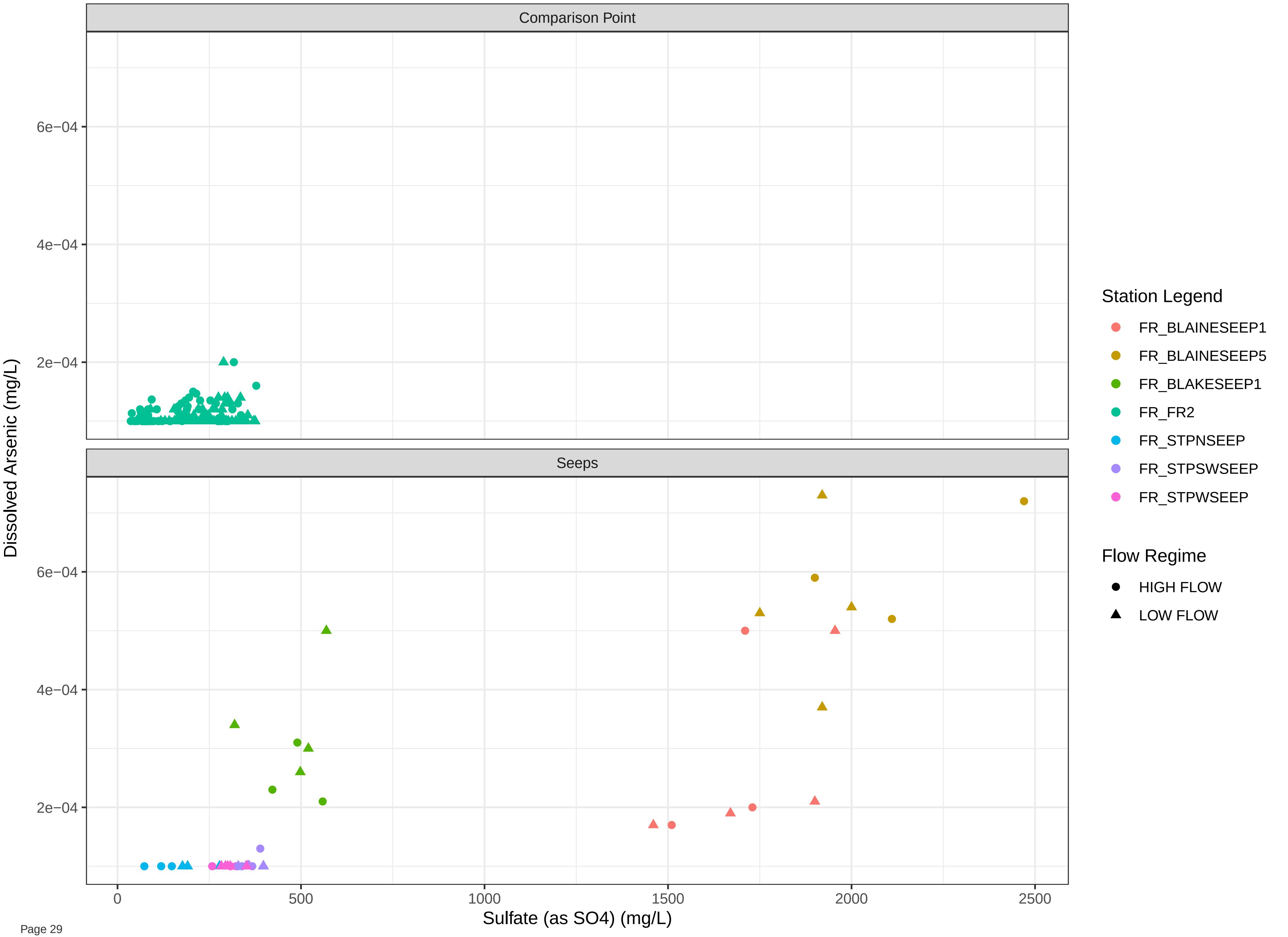


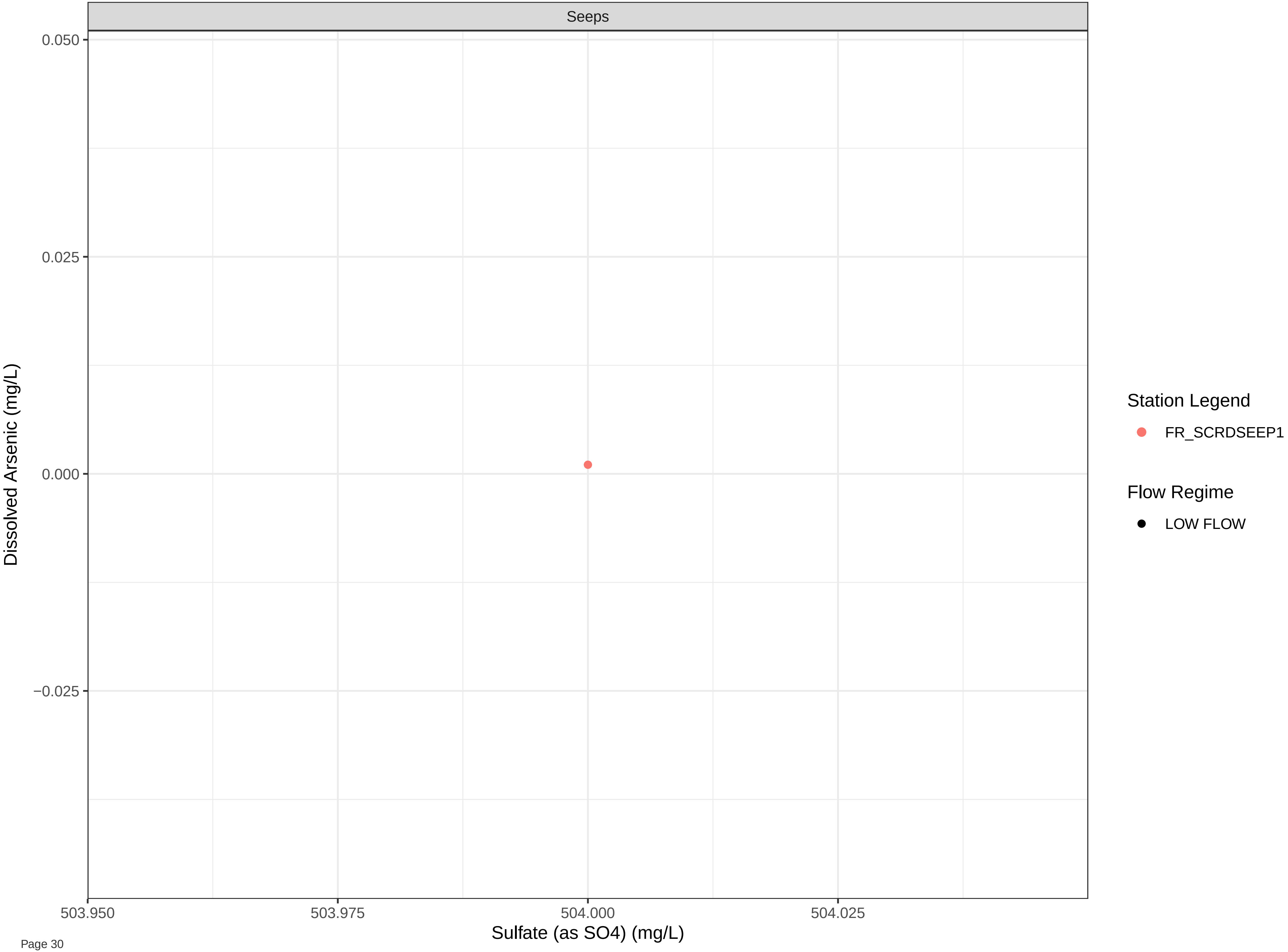
Comparison Point
Seeps
8e−04
6e−04
4e−04
2e−04
0
250
500
750
Dissolved Arsenic (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

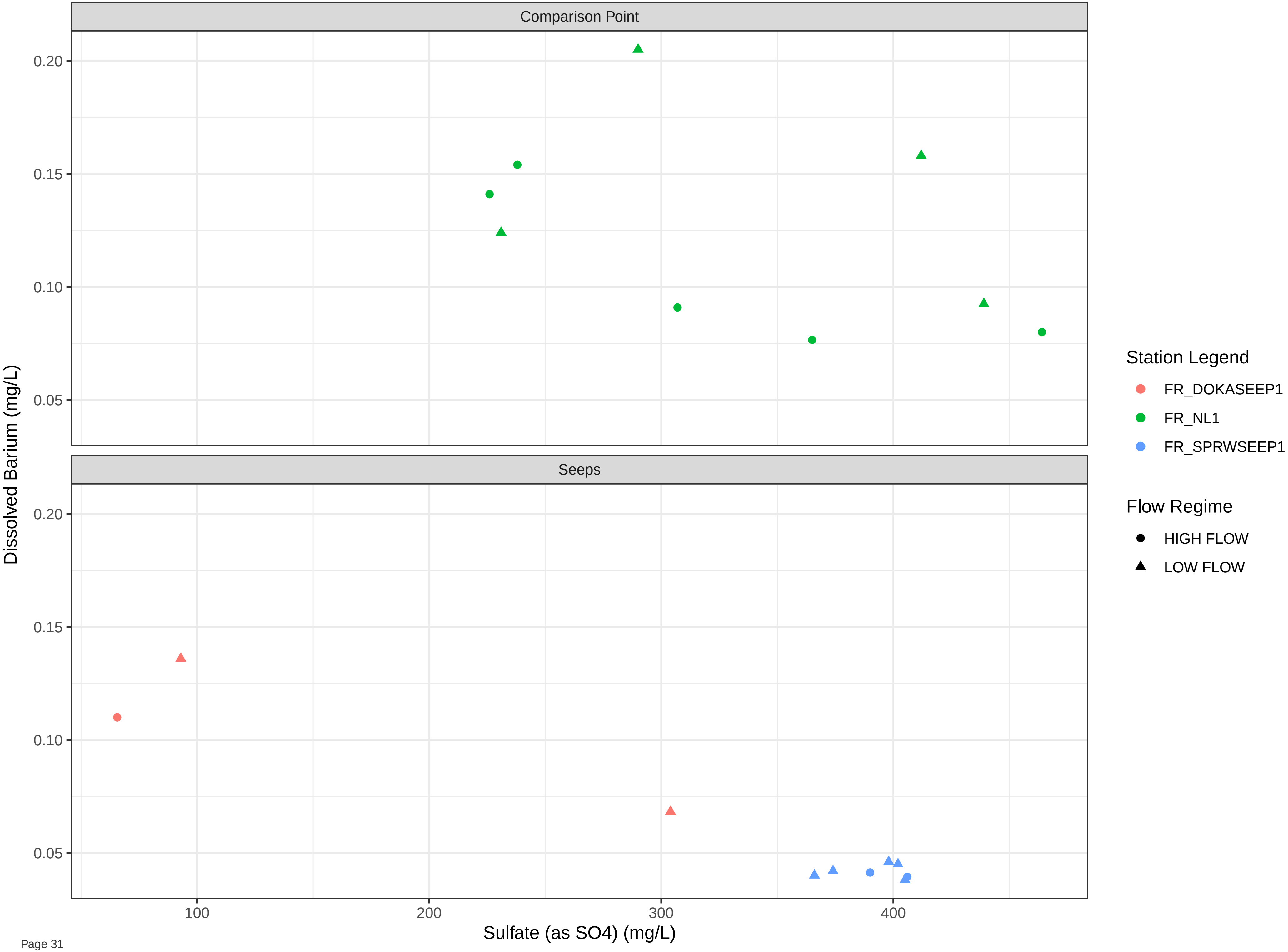


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00100
0.00075
0.00050
0.00025
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

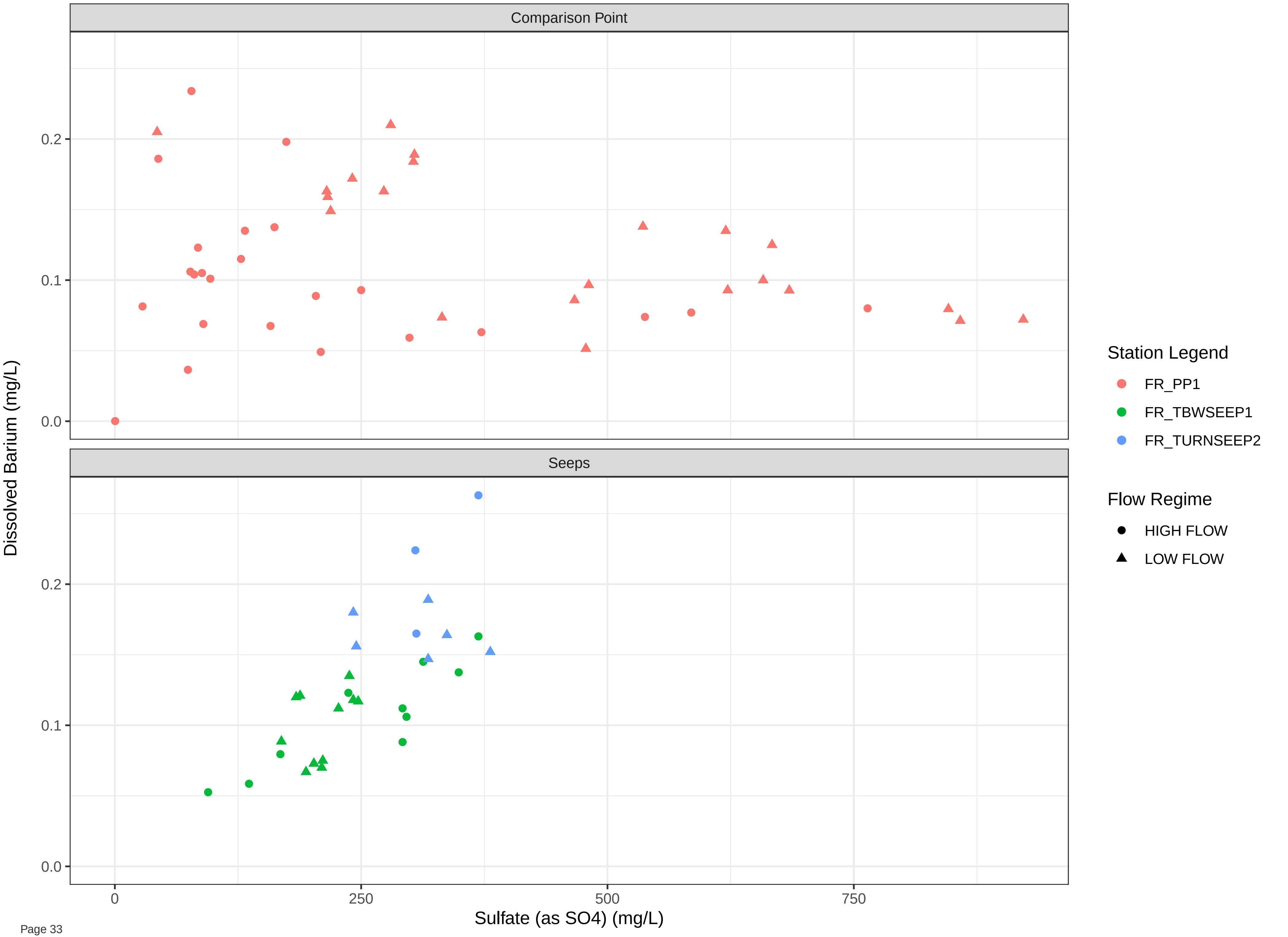

Comparison Point
Seeps
Dissolved Arsenic (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
6e−04
4e−04
2e−04
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

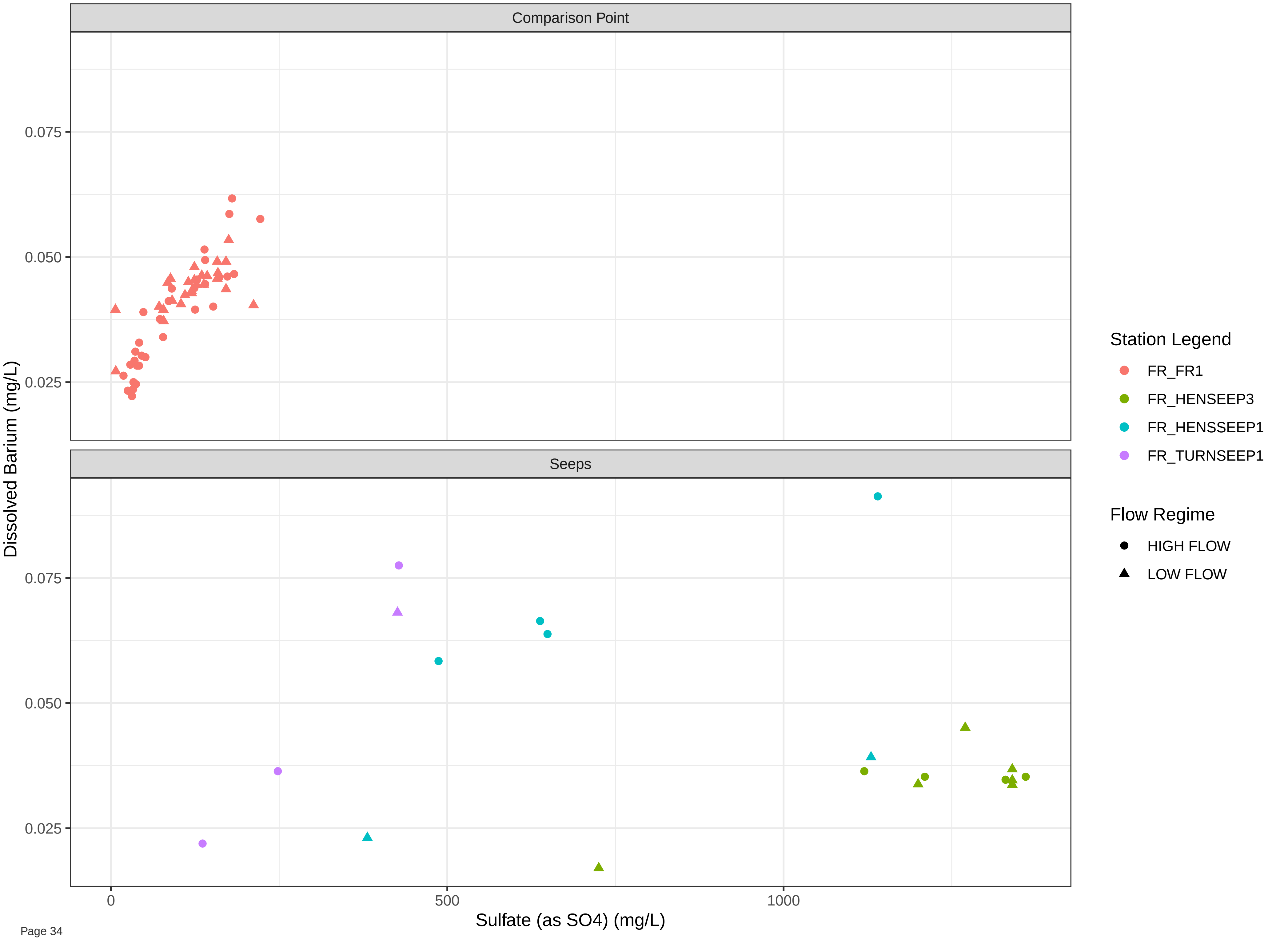

Seeps
0.050
0.025
0.000
−0.025
Dissolved Arsenic (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

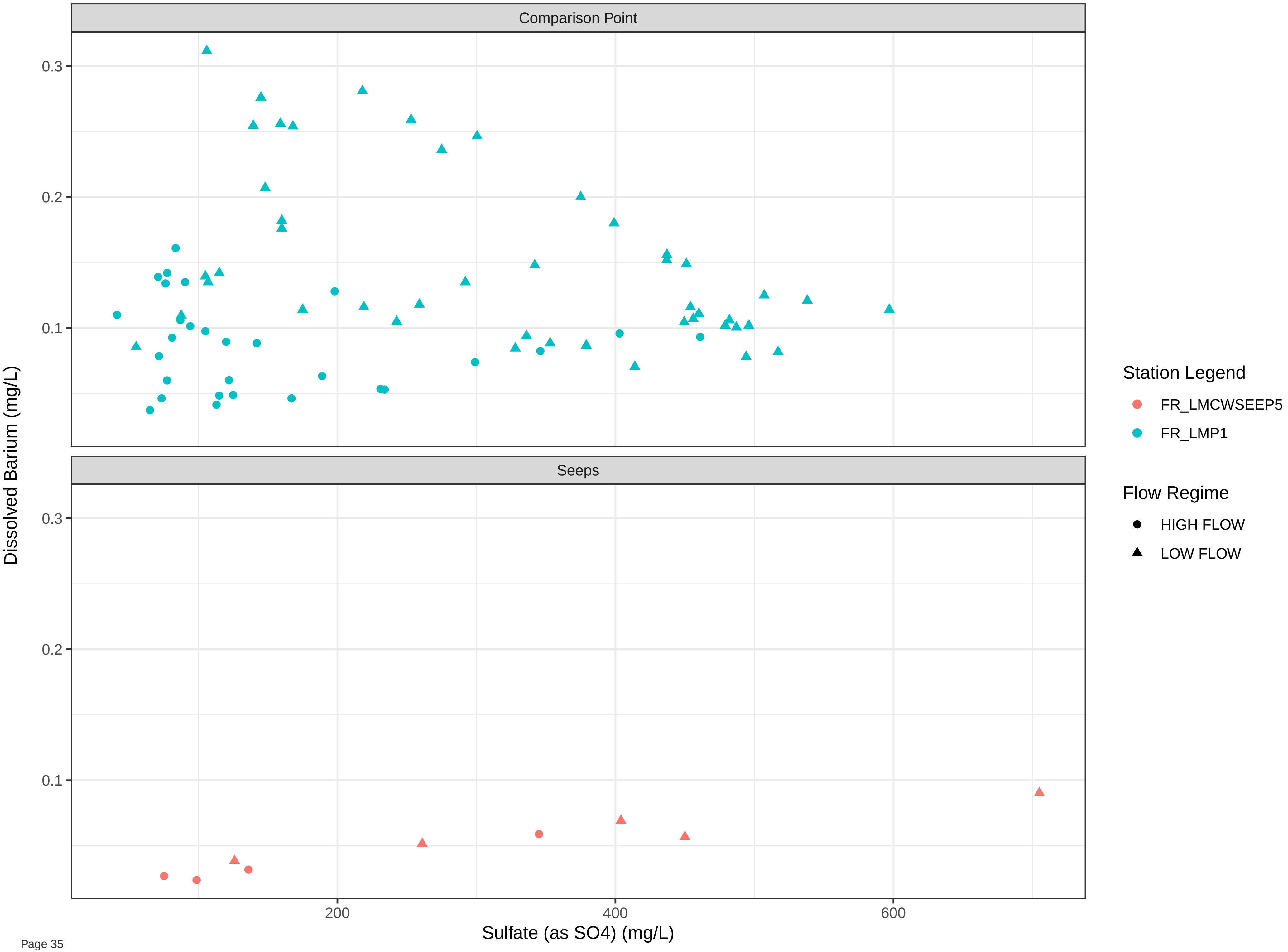

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.20
0.15
0.10
0.05
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

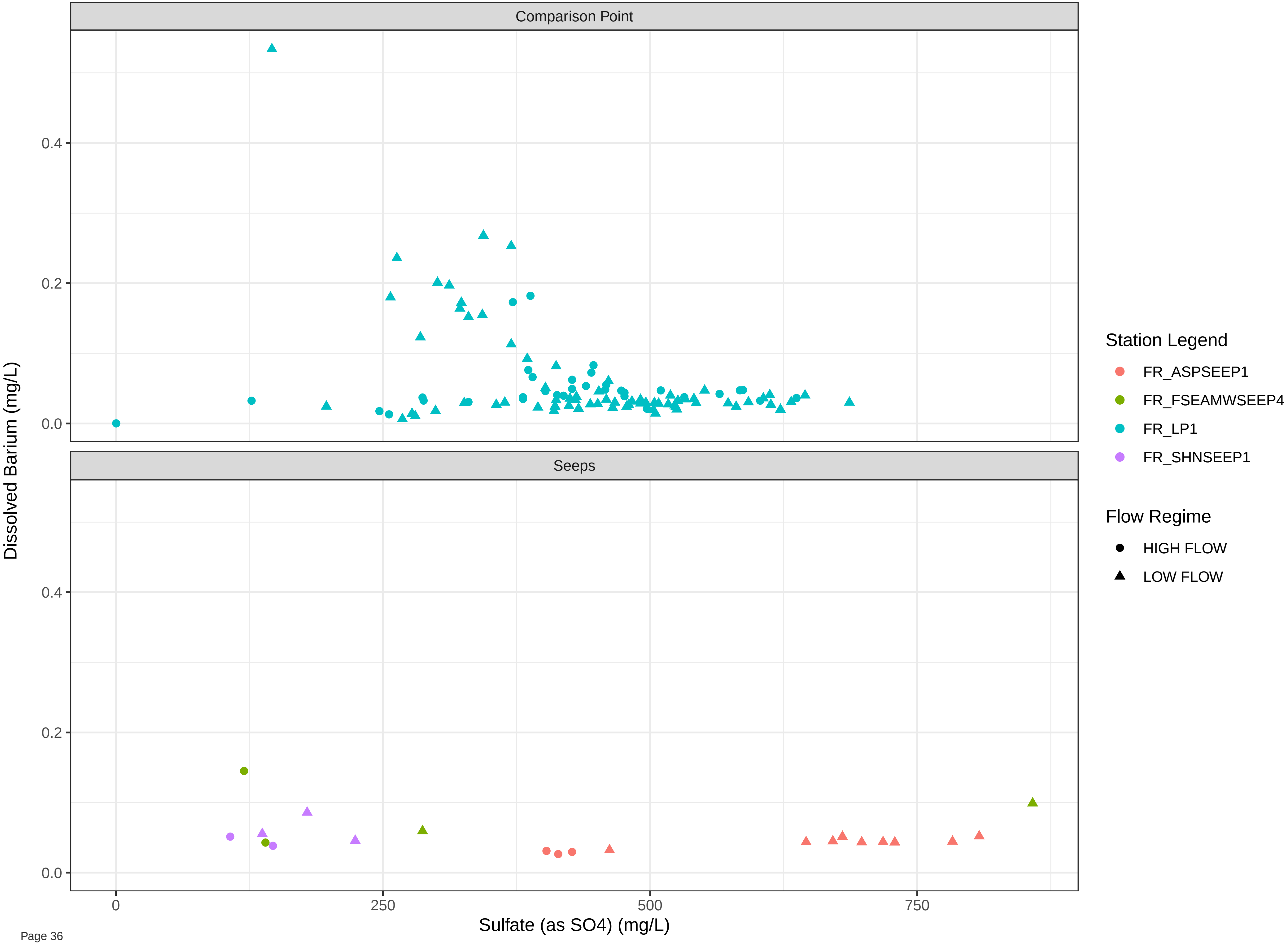
Comparison Point
Seeps
Dissolved Barium (mg/L)
0.100
0.075
0.050
0.025
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

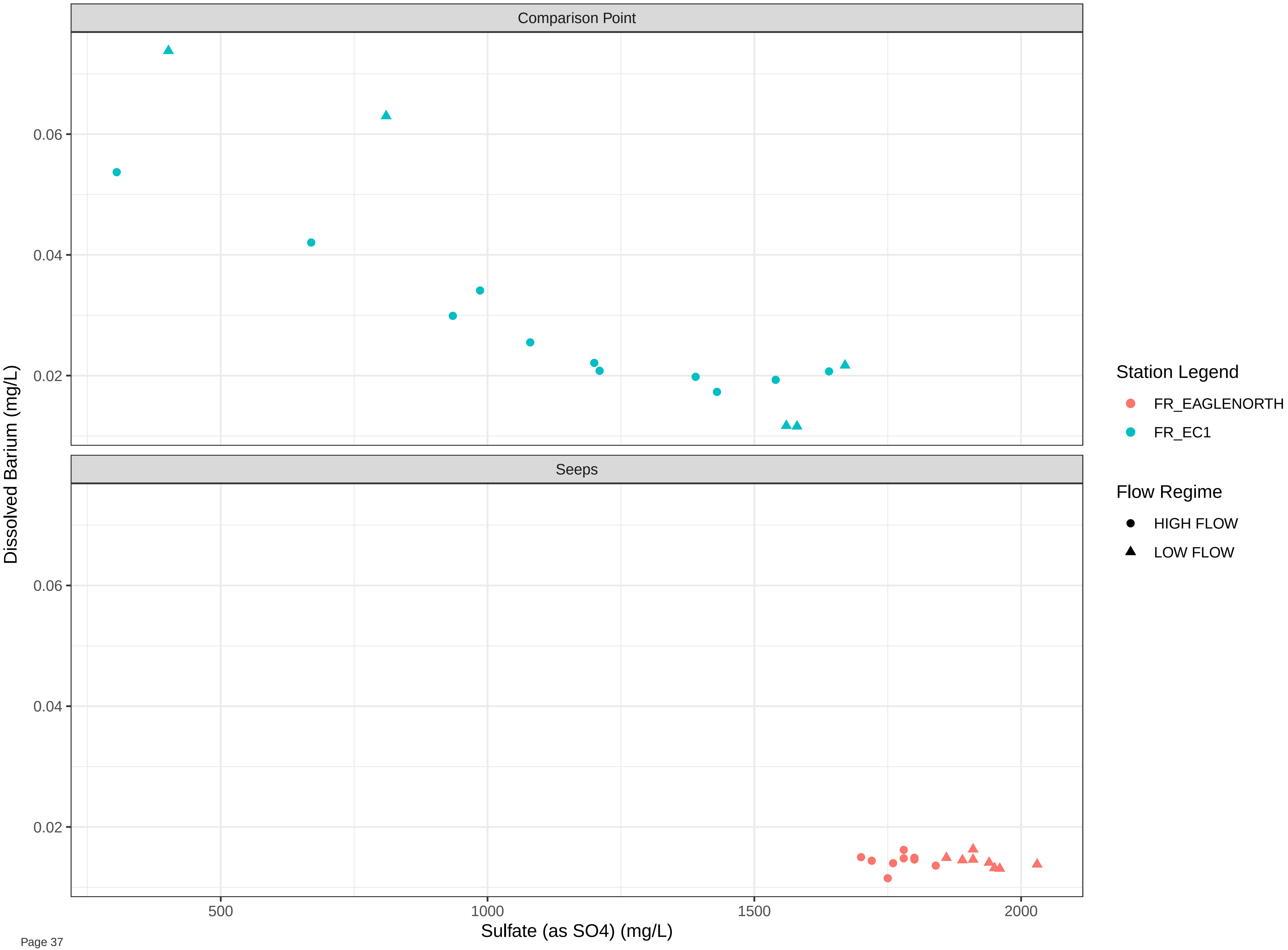


Comparison Point
Seeps
Dissolved Barium (mg/L)
0.0
0.1
0.2
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

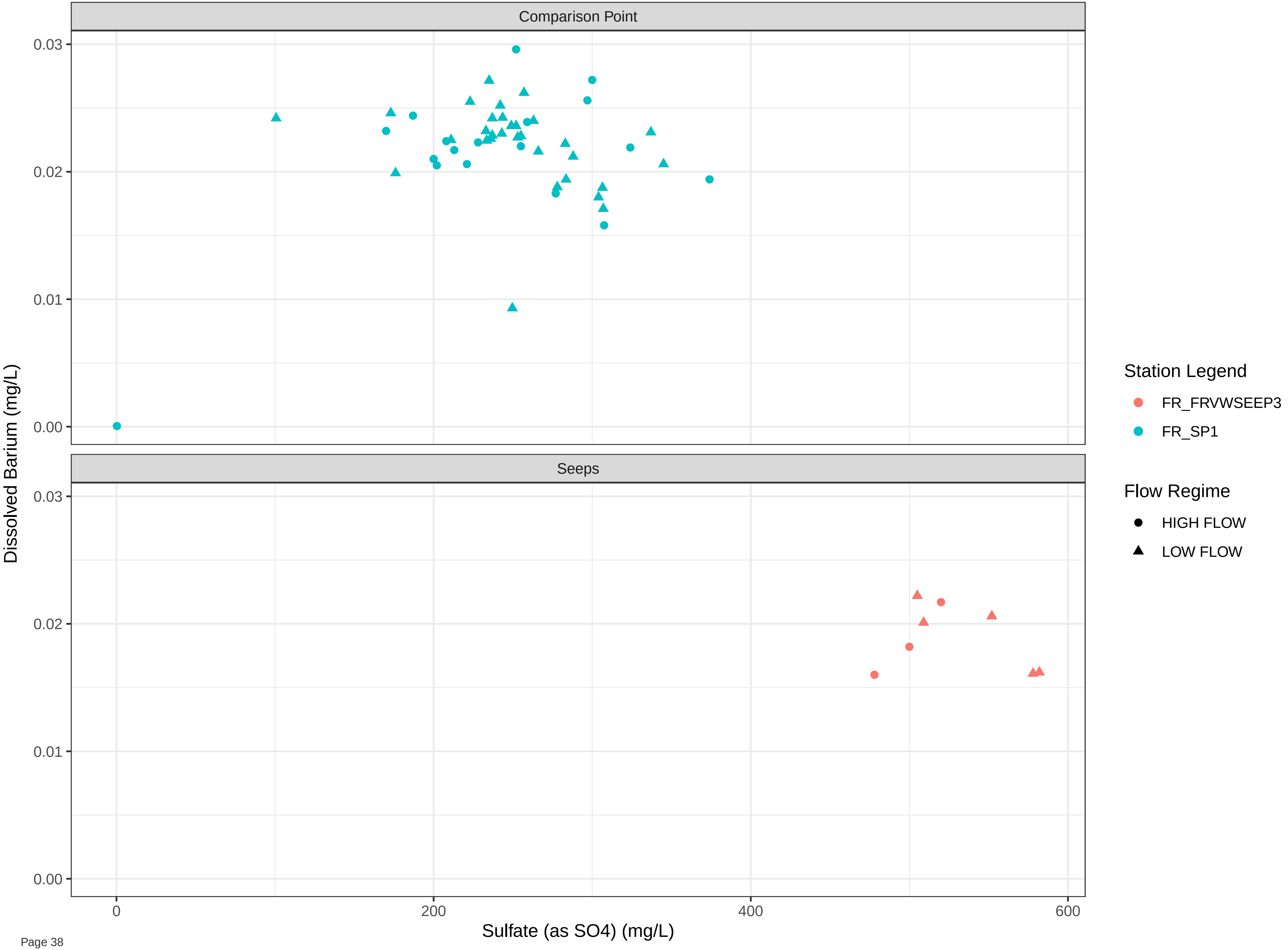

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.075
0.050
0.025
0.075
0.050
0.025
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

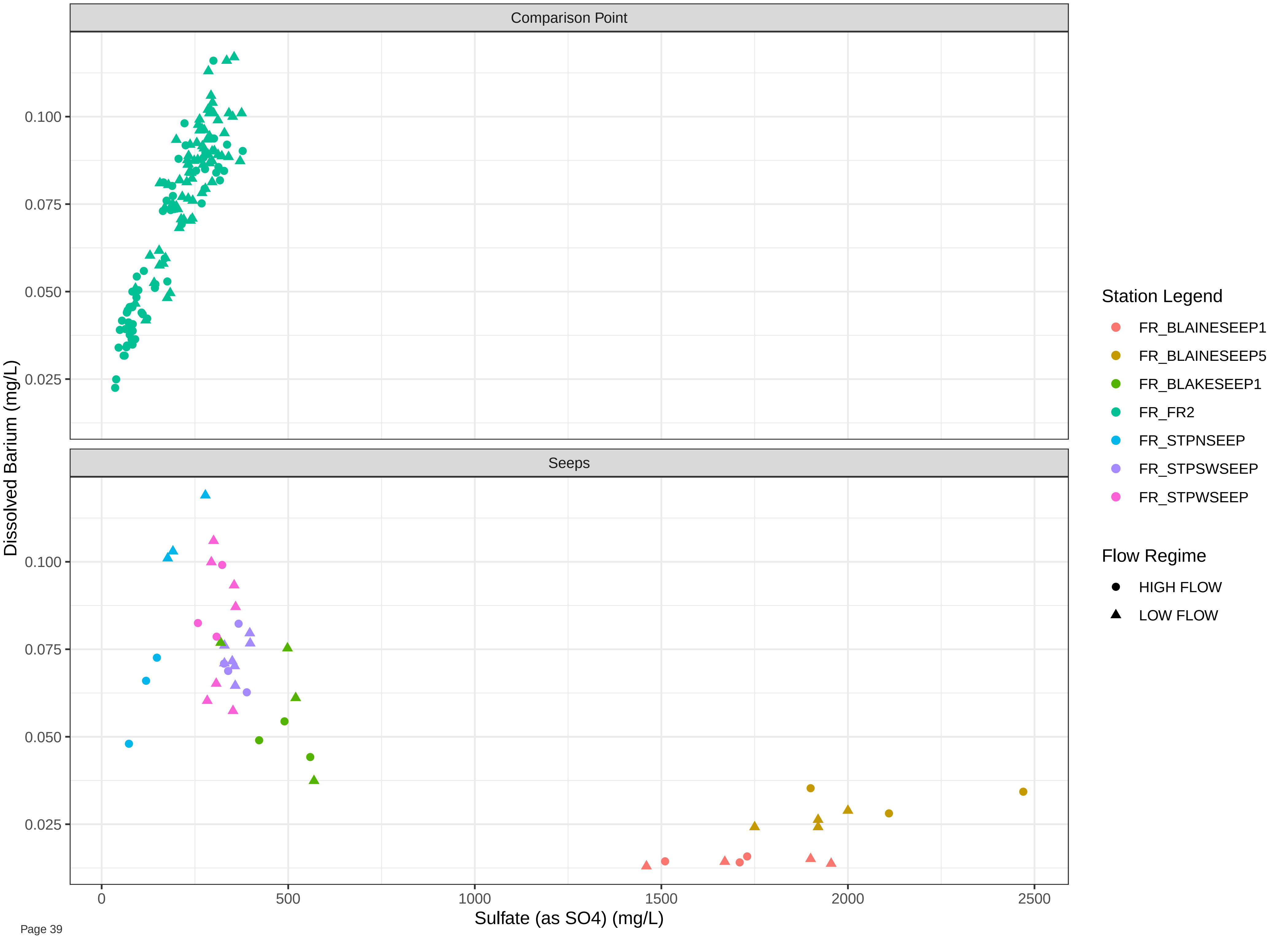

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.3
0.2
0.1
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.2
0.4
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

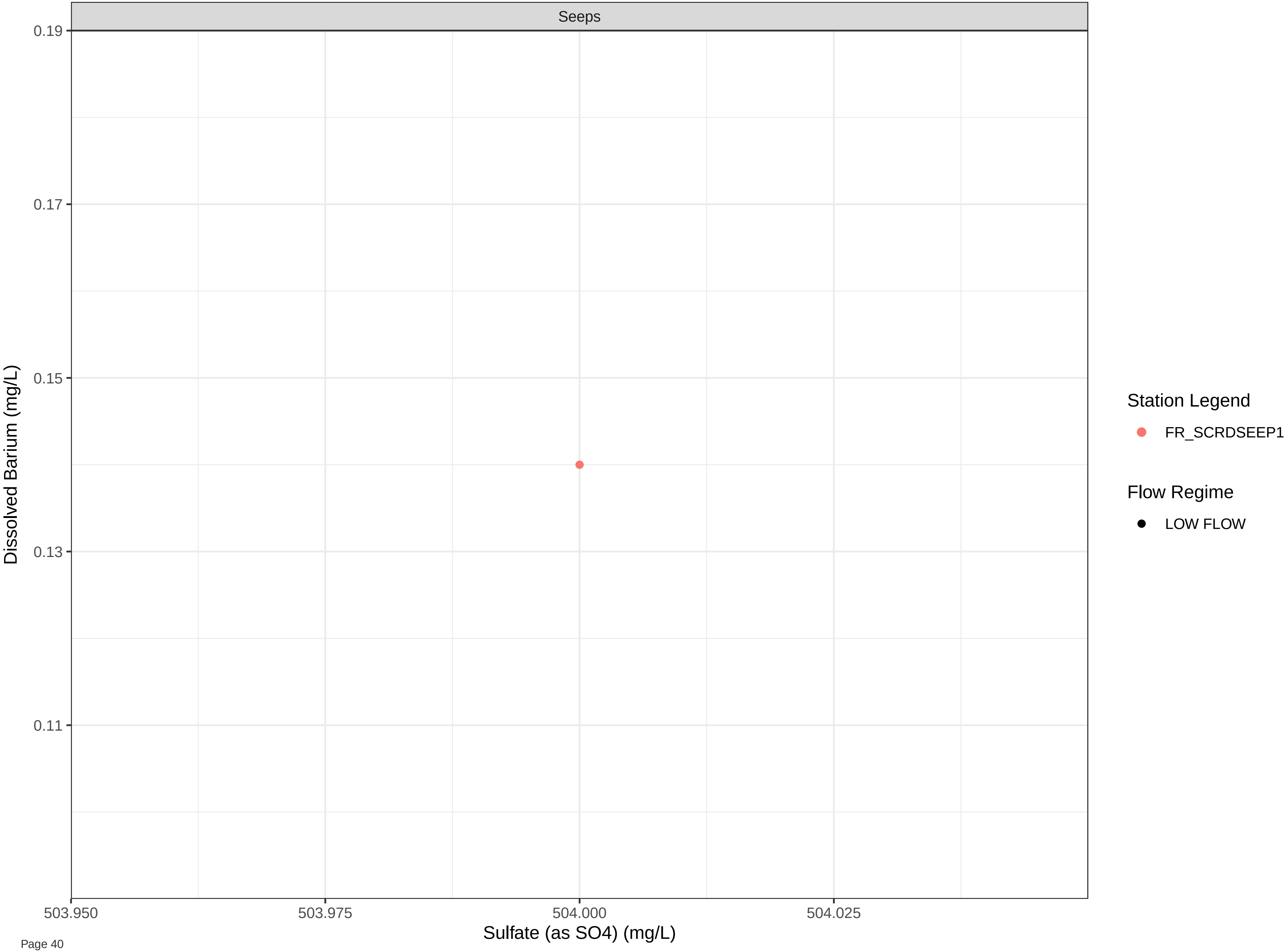


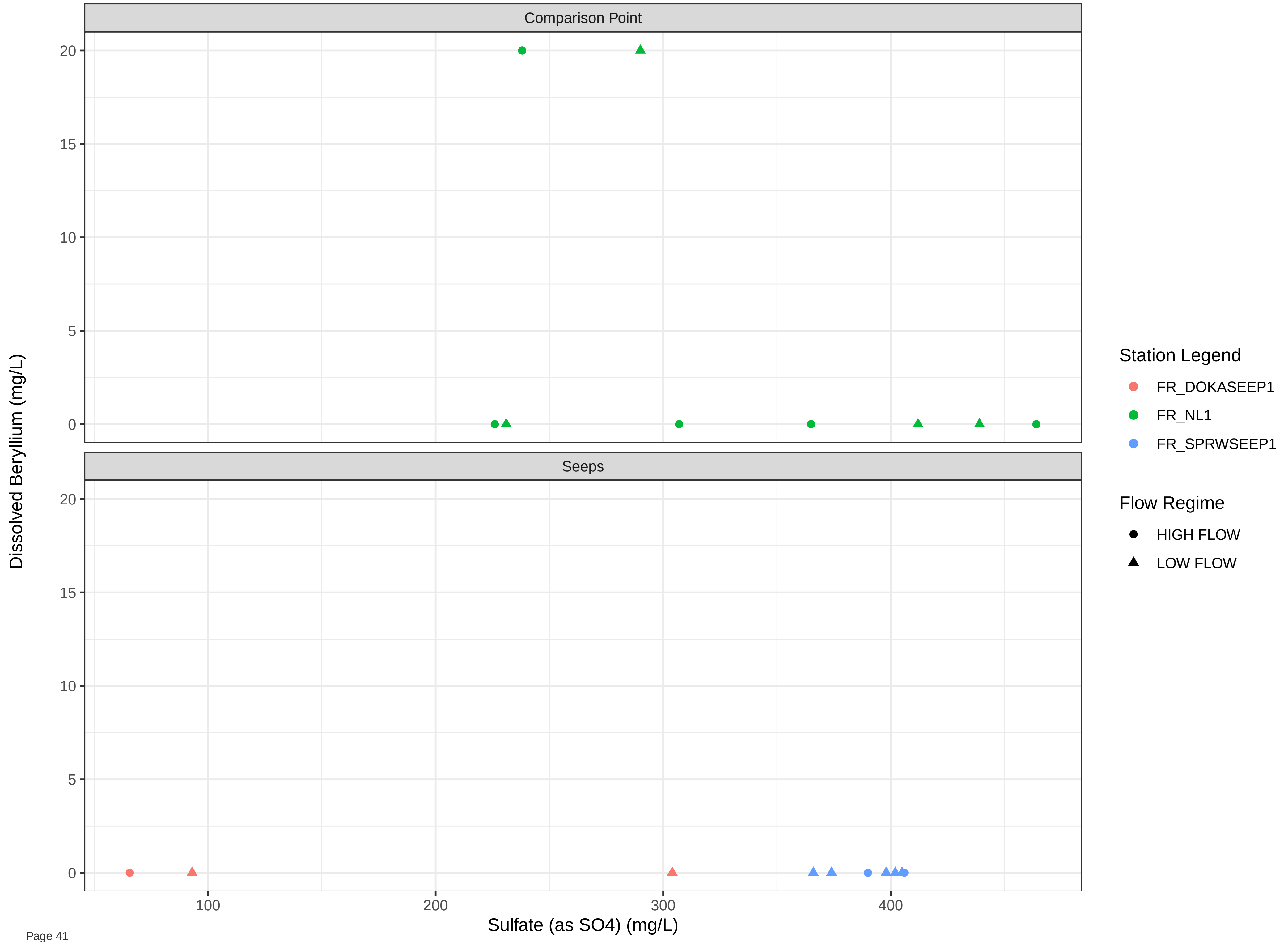
Comparison Point
Seeps
Dissolved Barium (mg/L)
0.06
0.04
0.02
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

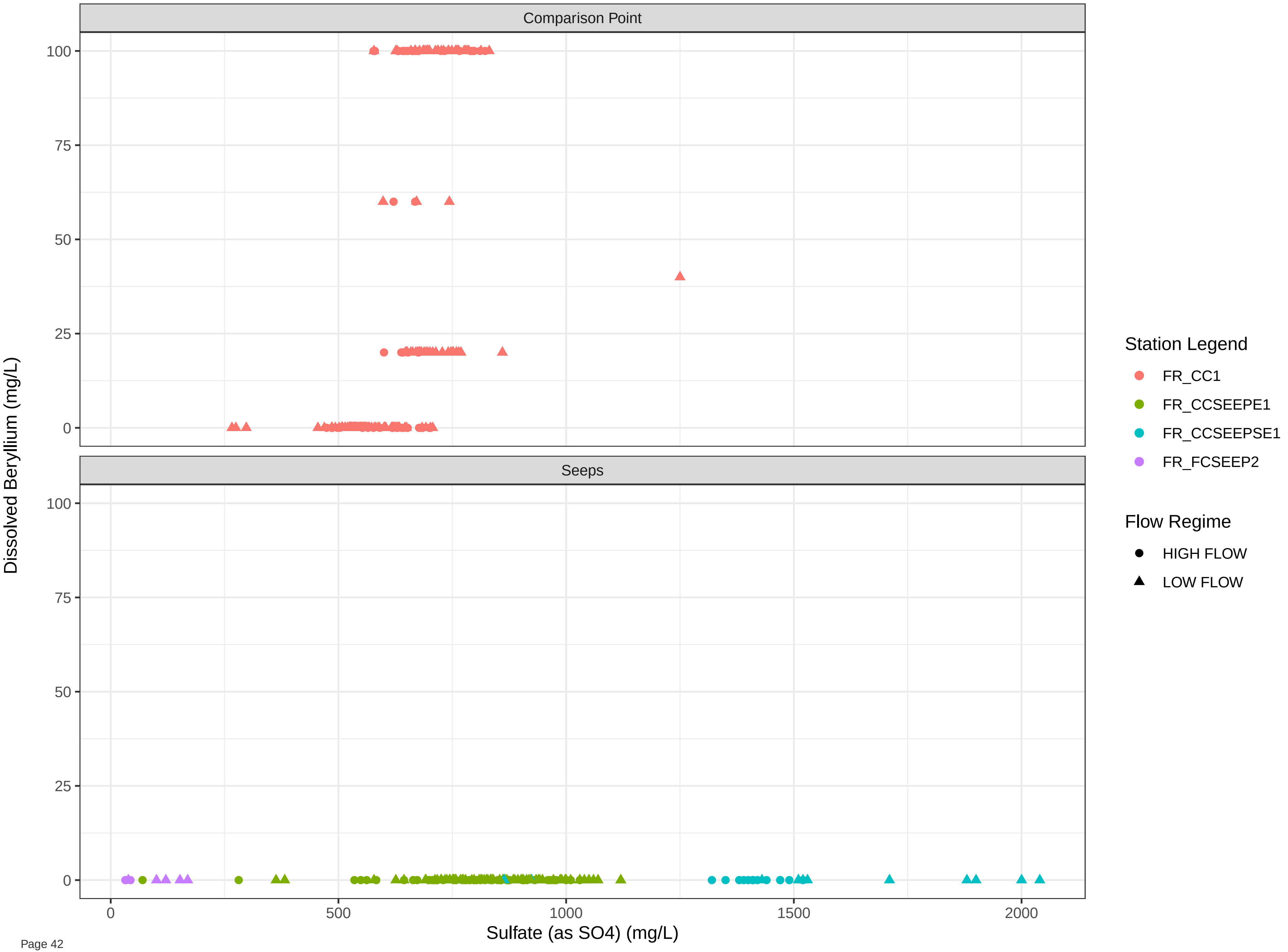

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.00
0.01
0.02
0.03
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

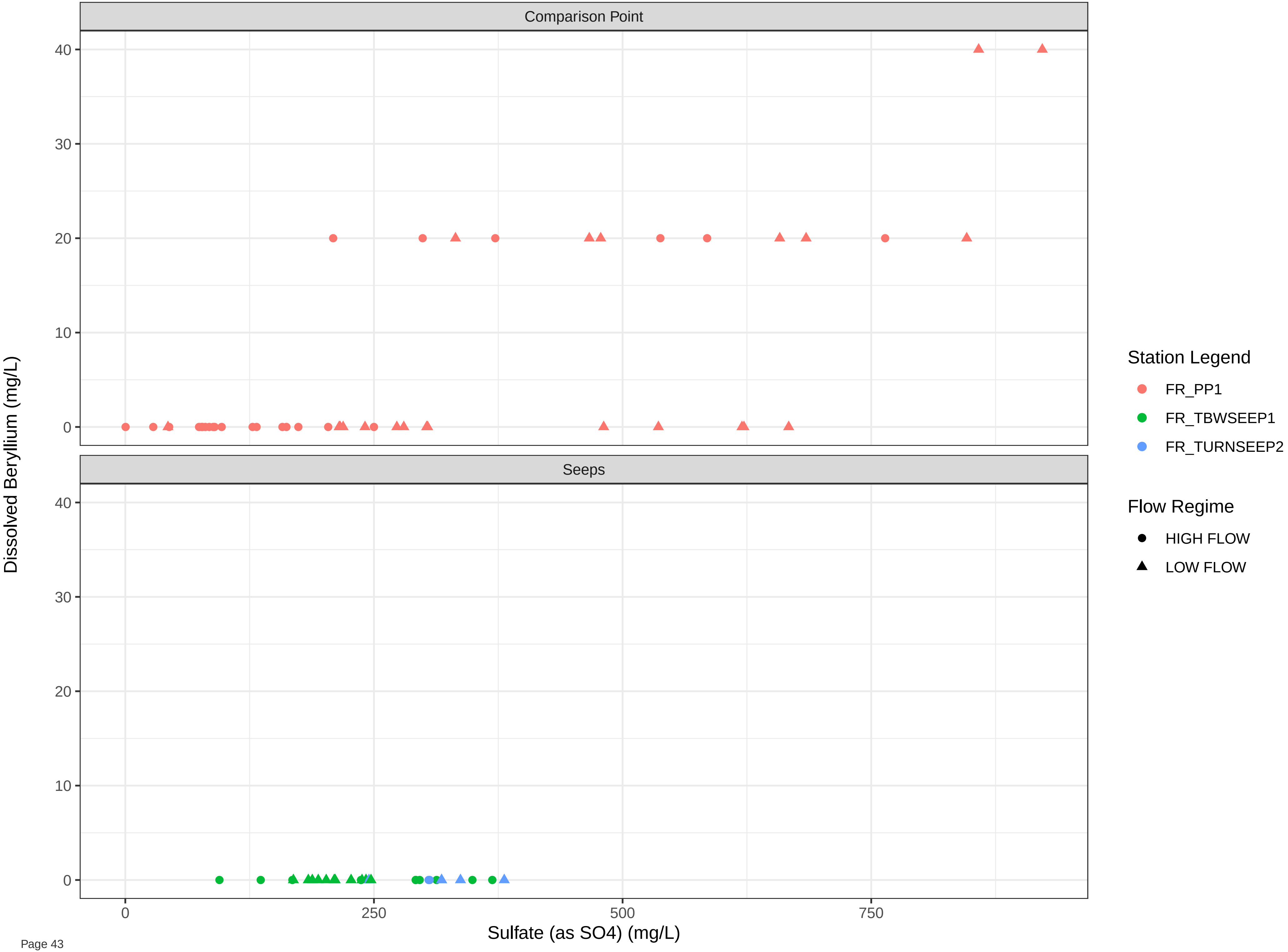


Comparison Point
Seeps
Dissolved Barium (mg/L)
0.100
0.075
0.050
0.025
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

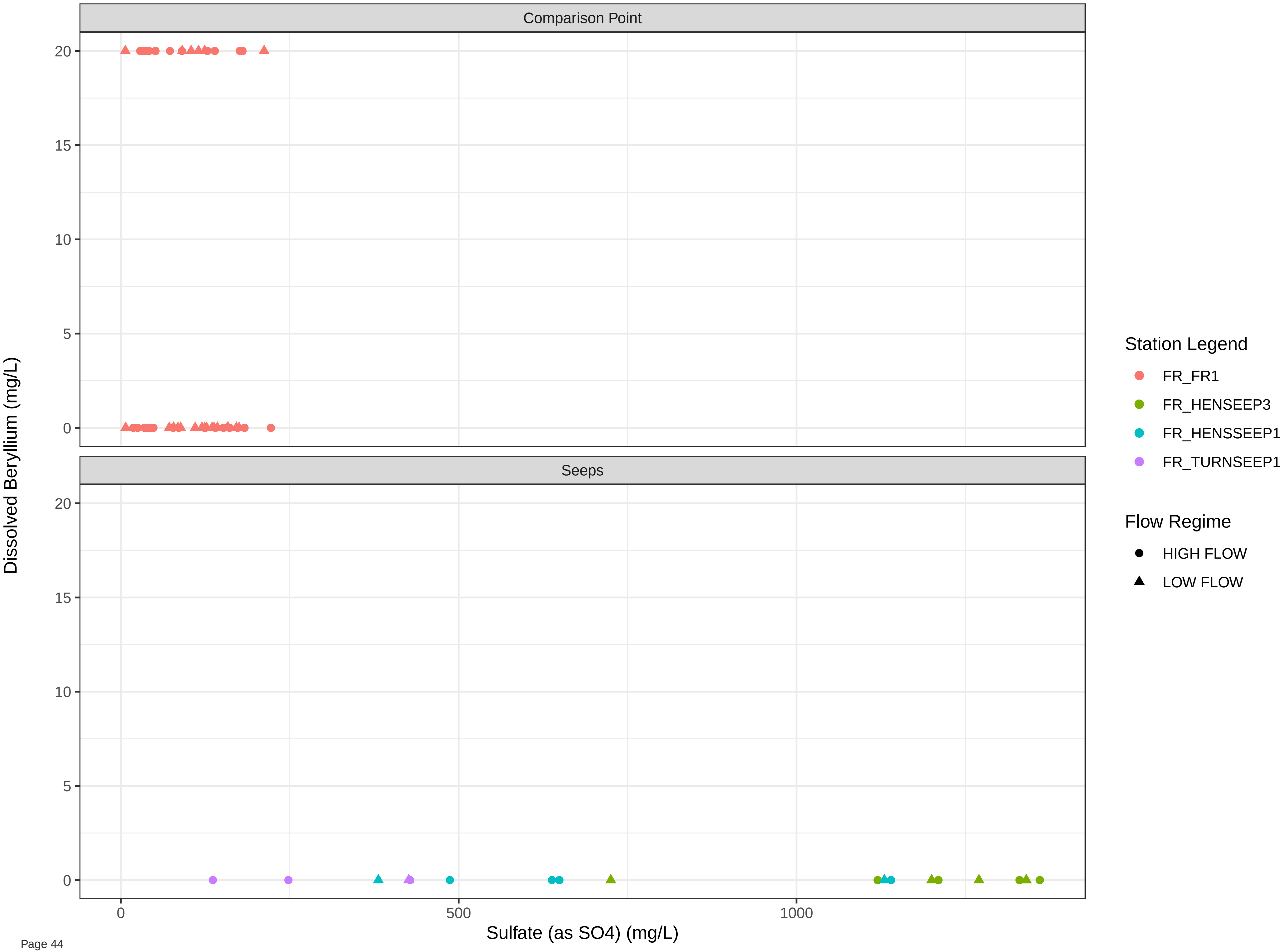

Seeps
0.19
0.17
0.15
0.13
0.11
Dissolved Barium (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

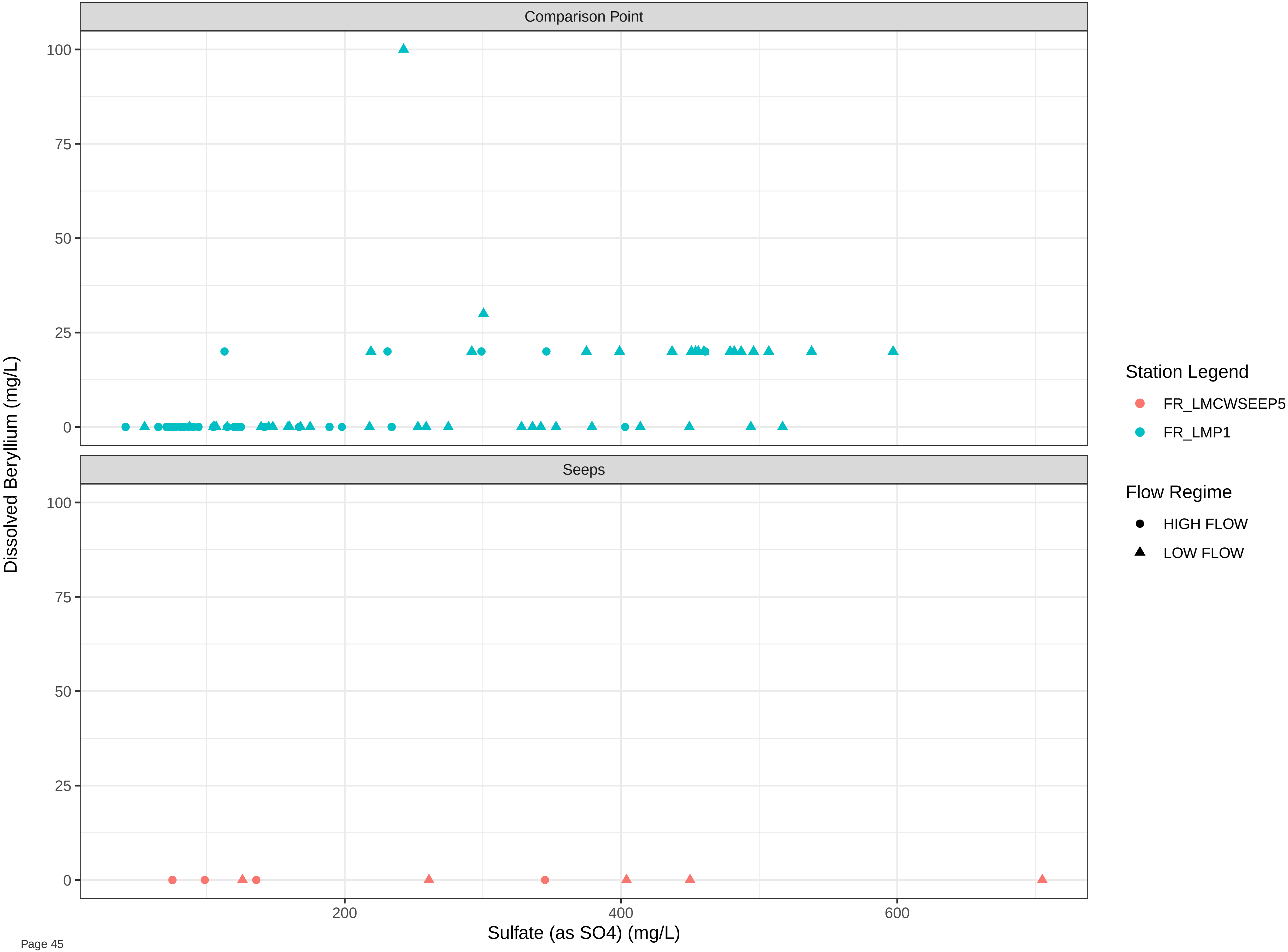

Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

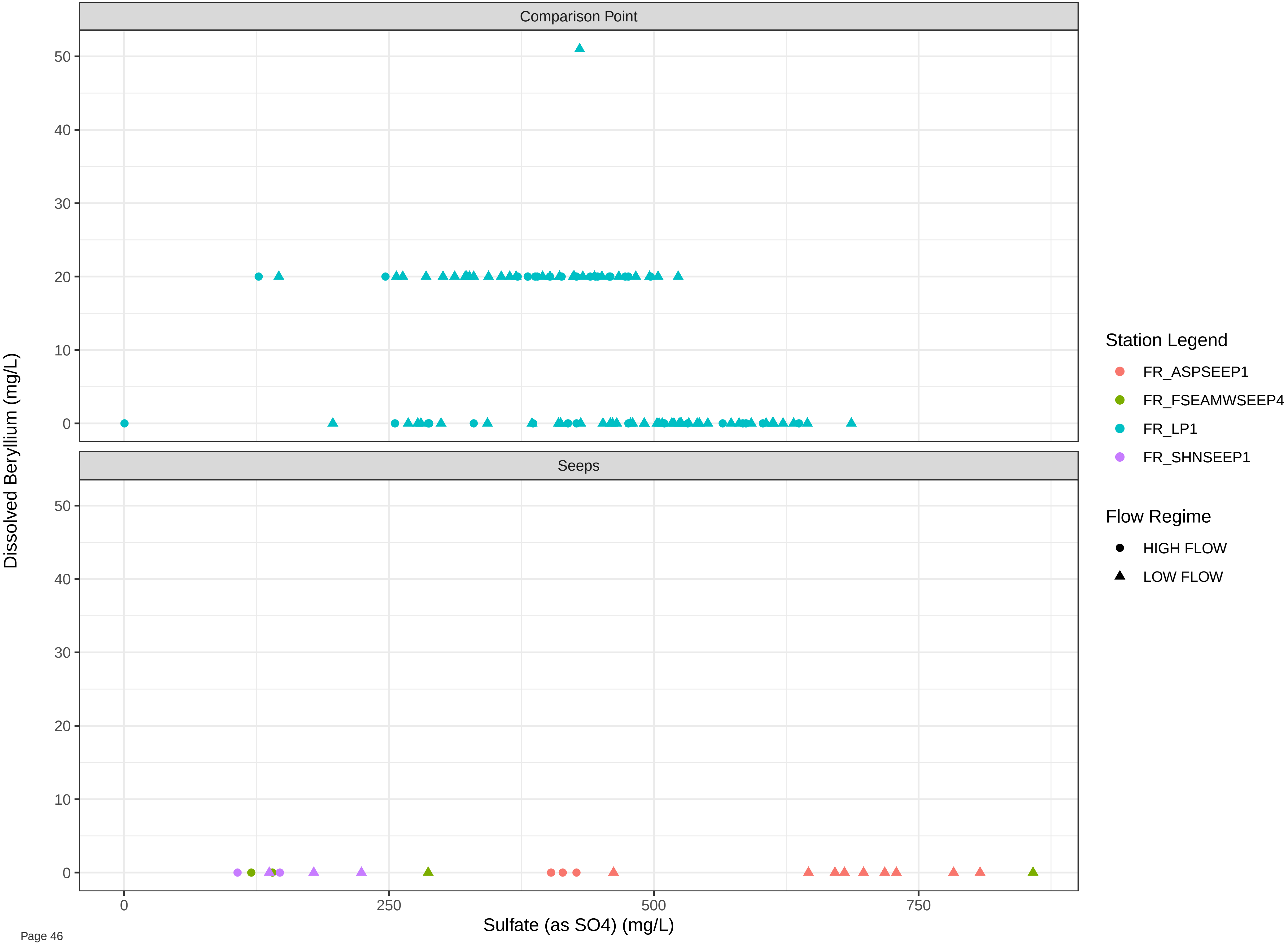


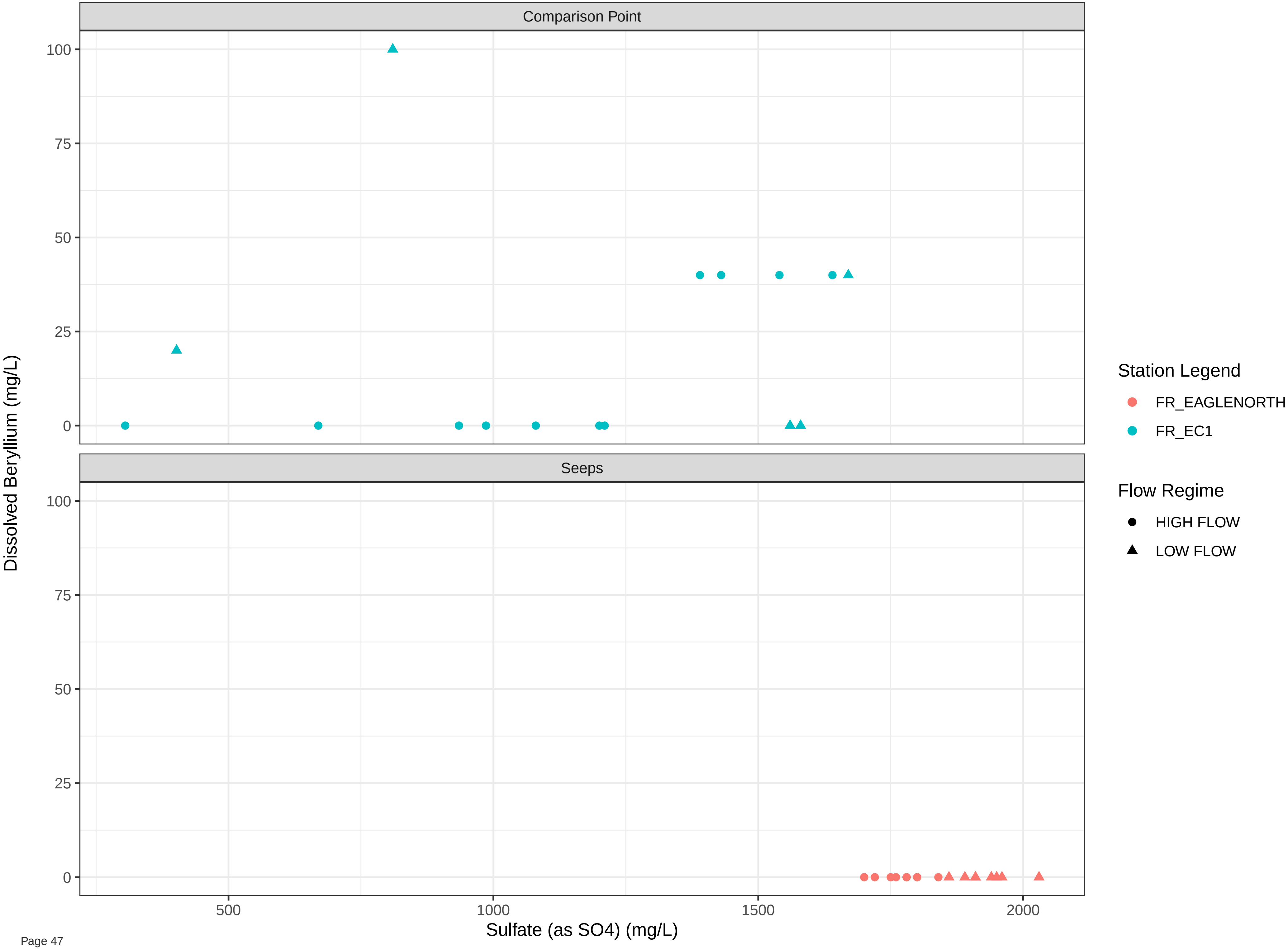
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
40
30
20
10
0
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

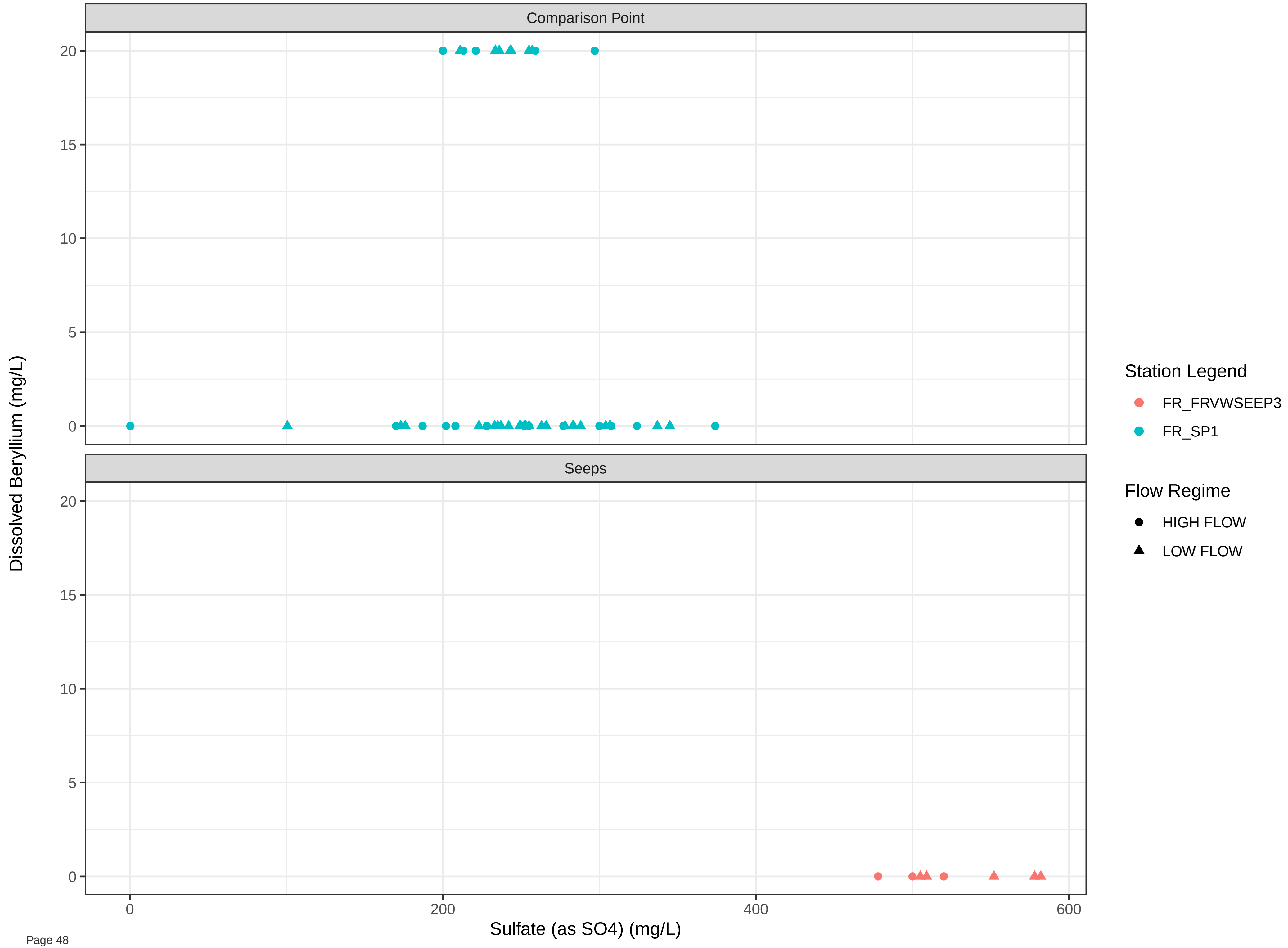


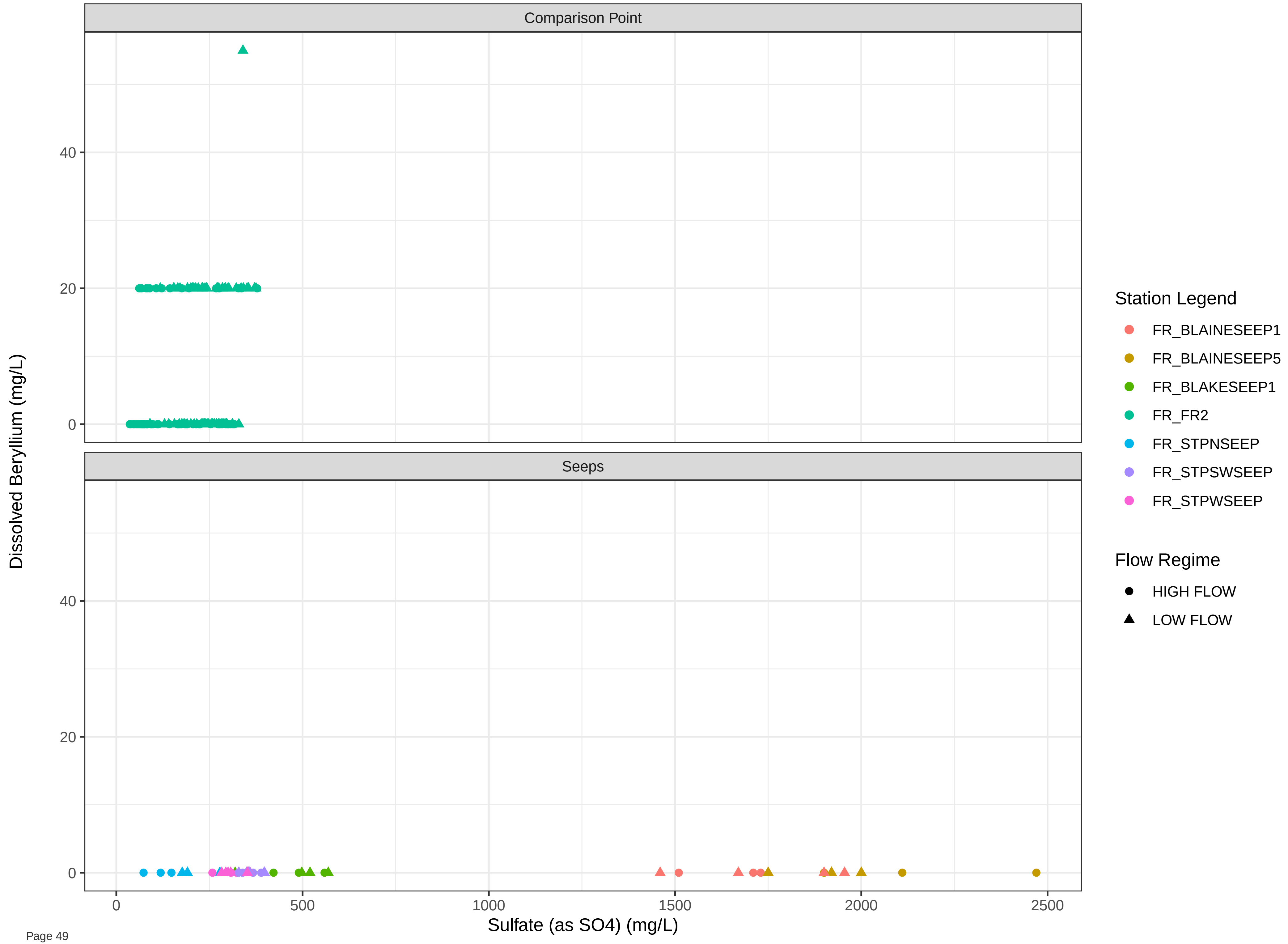
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
100
75
50
25
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
40
50
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

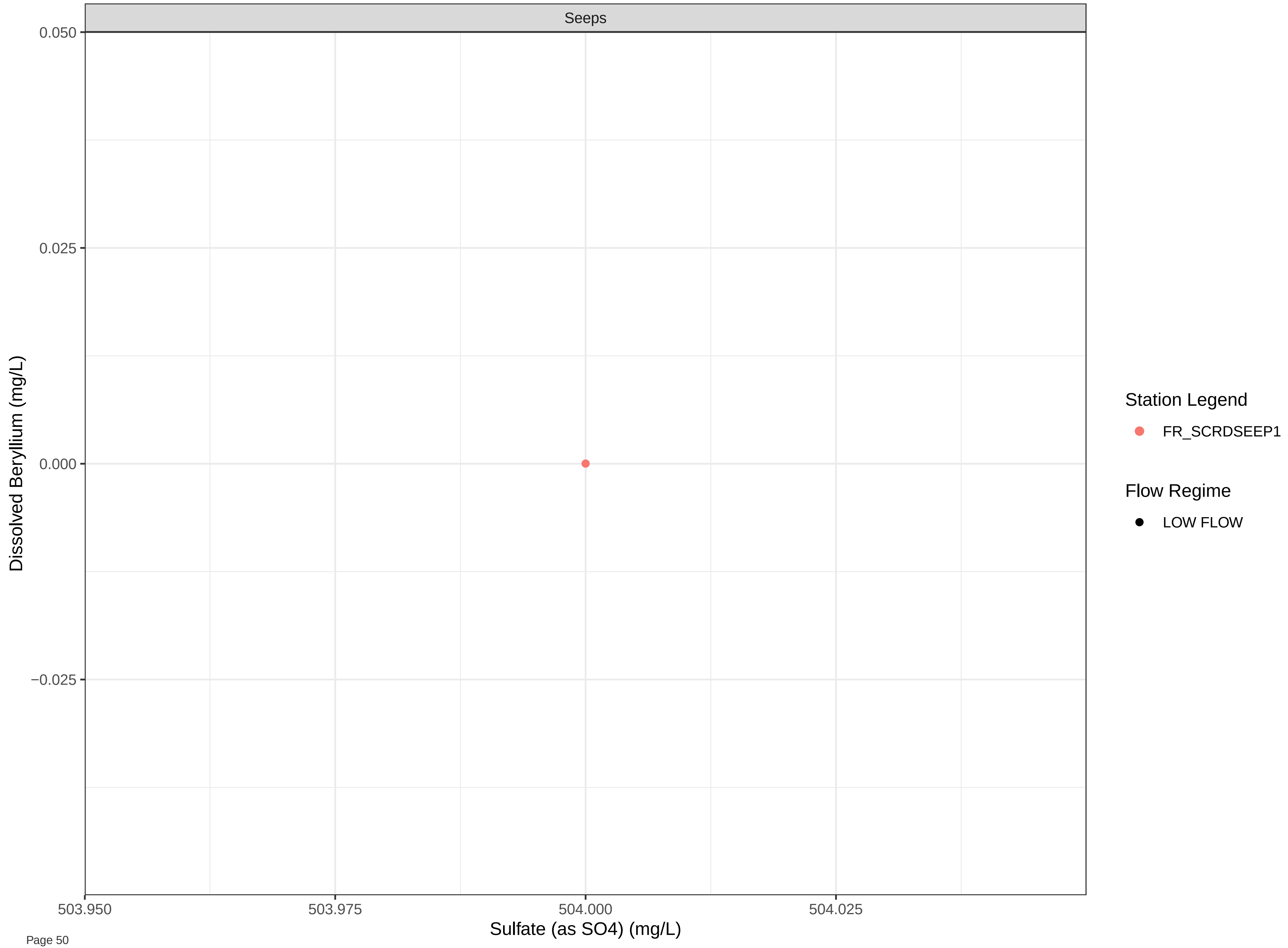


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

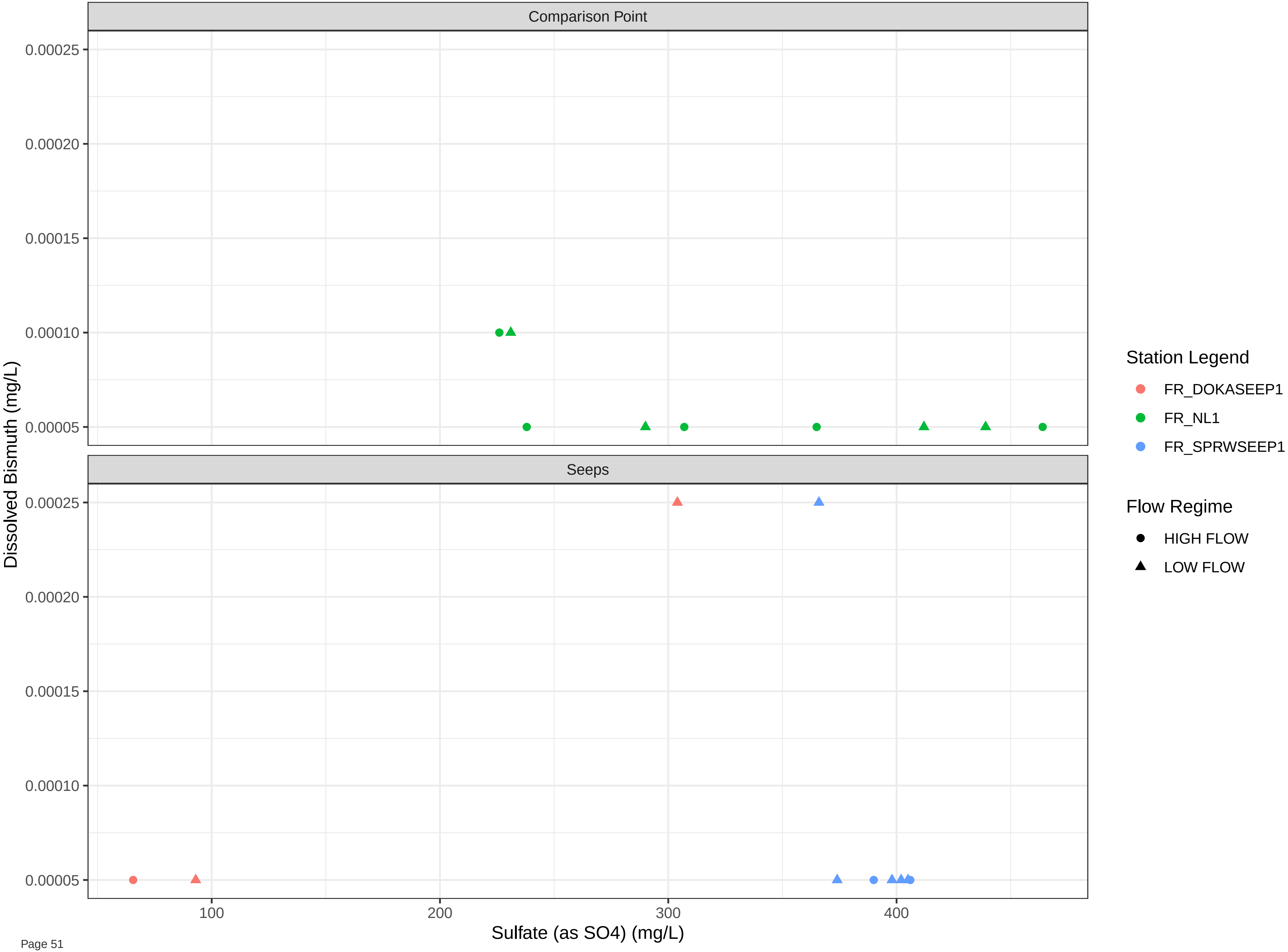

Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



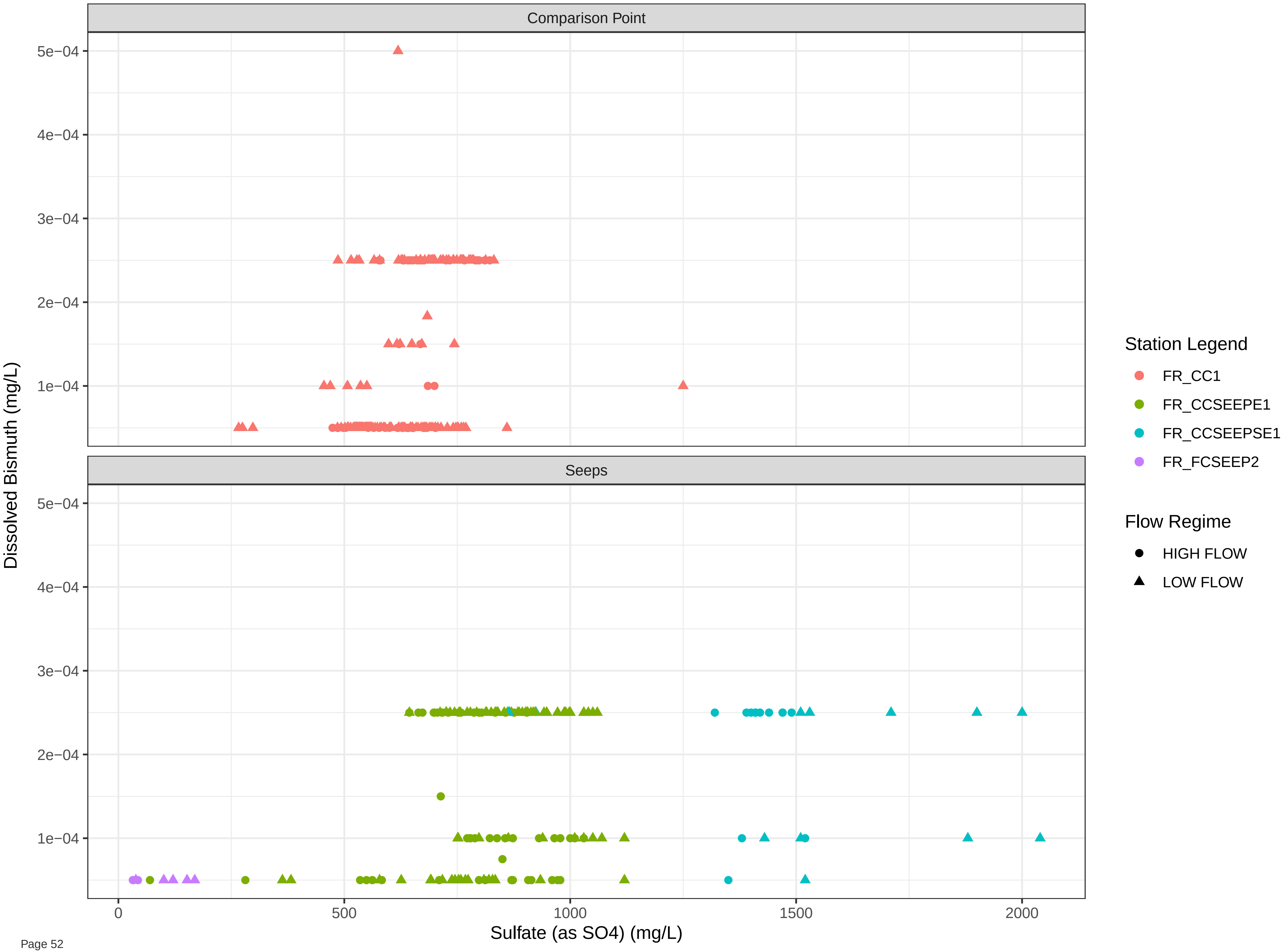
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
0
20
40
0
20
40
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW



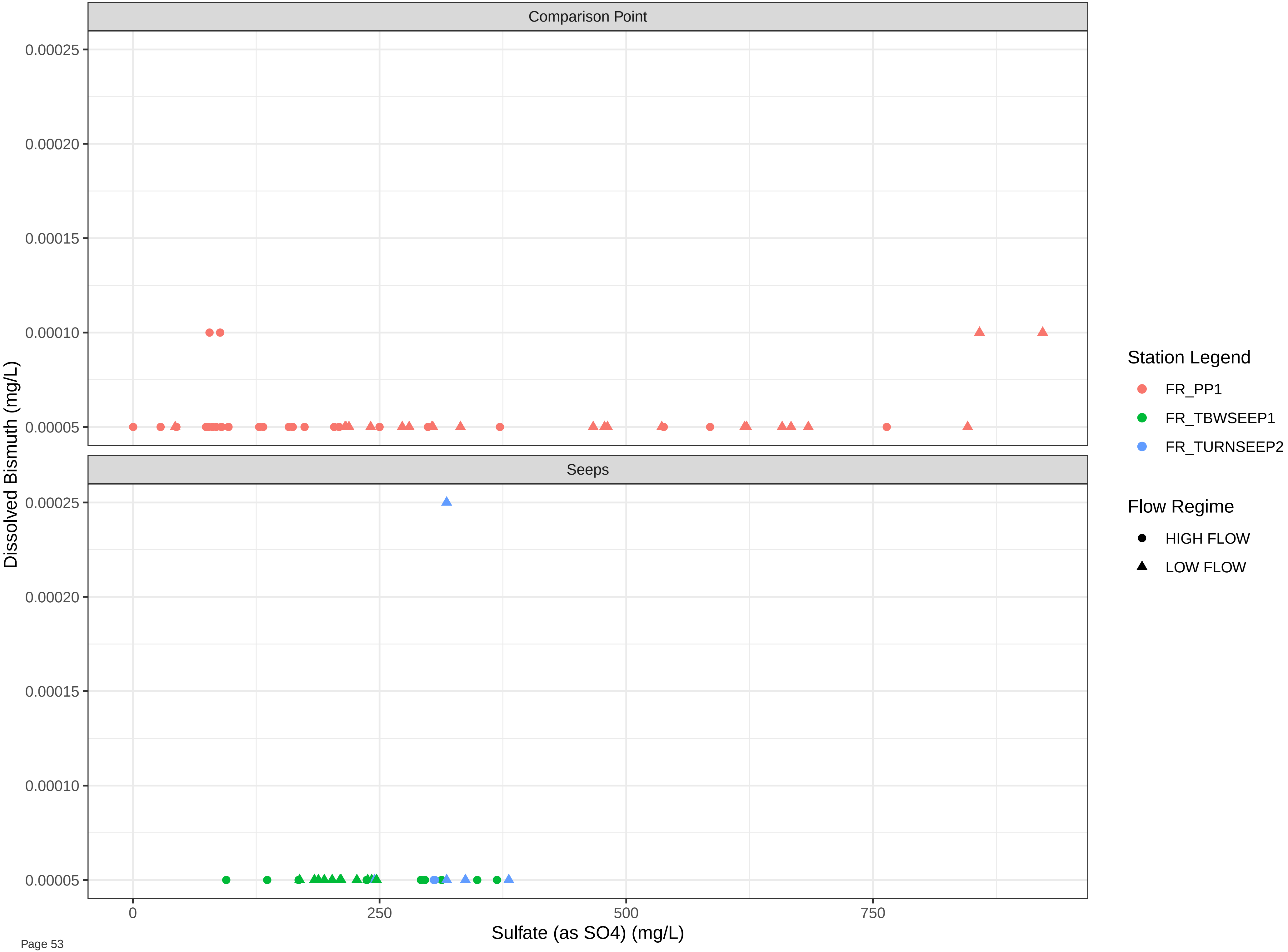
Seeps
0.050
0.025
0.000
−0.025
Dissolved Beryllium (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW



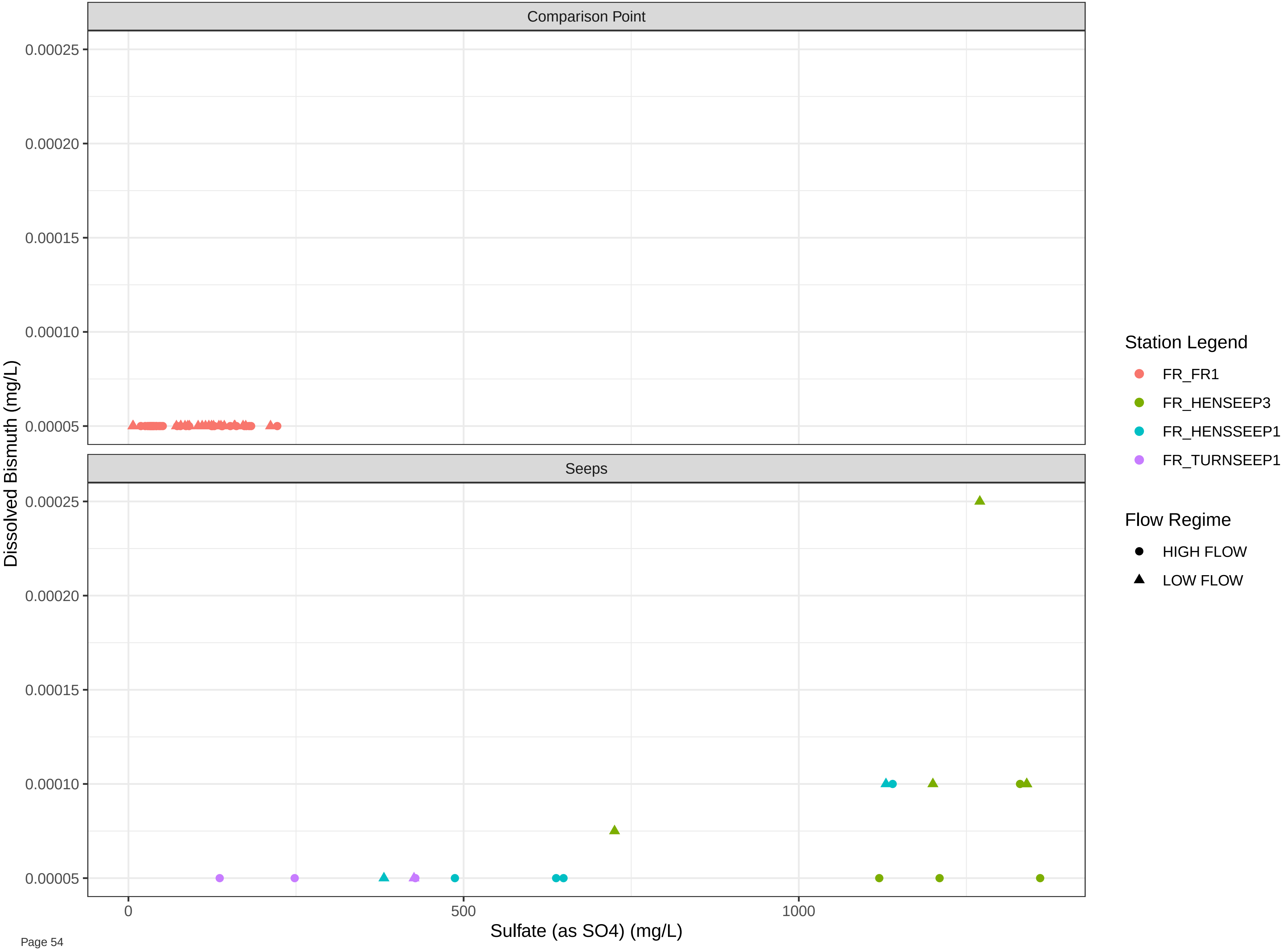
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



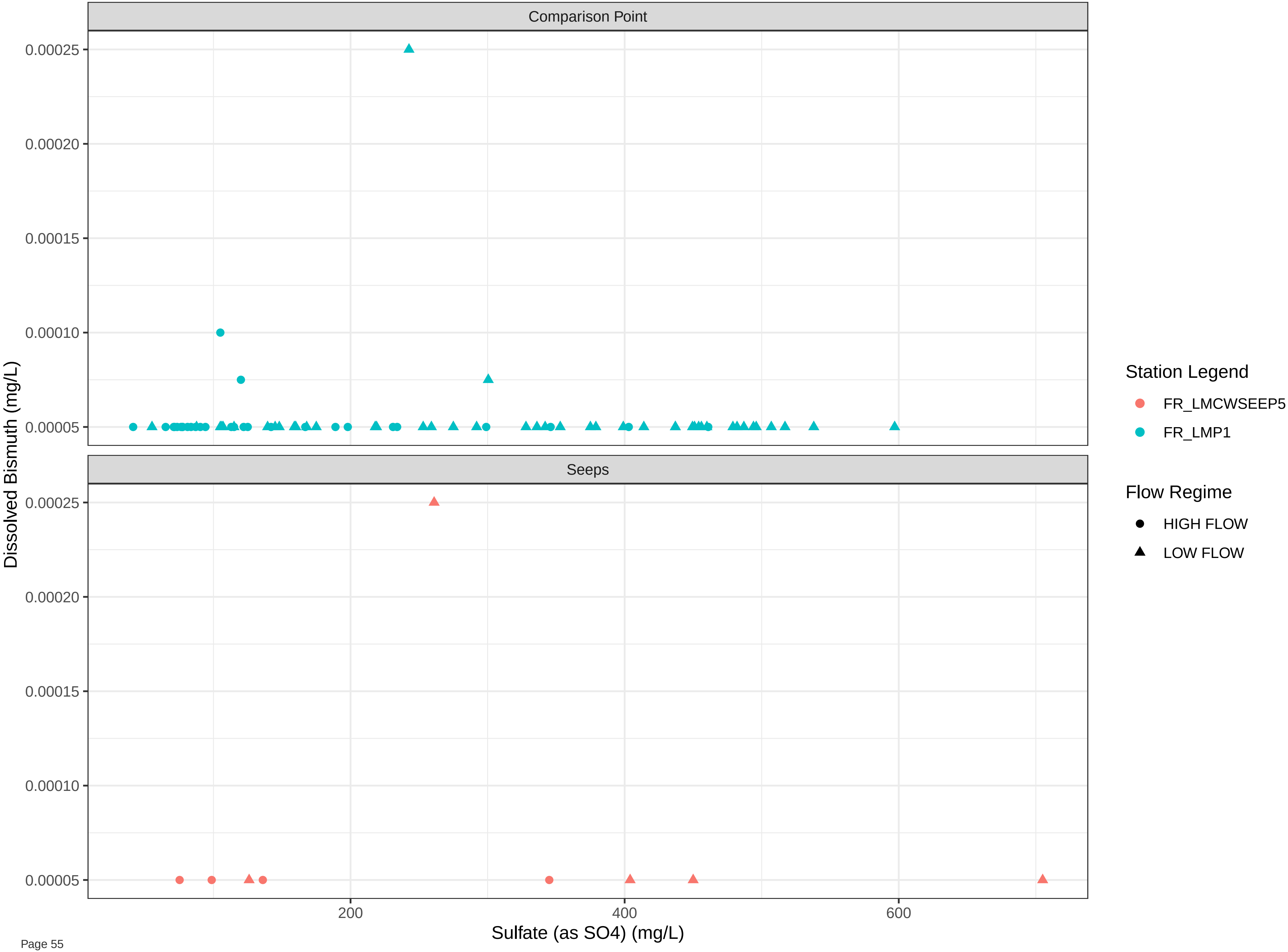
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

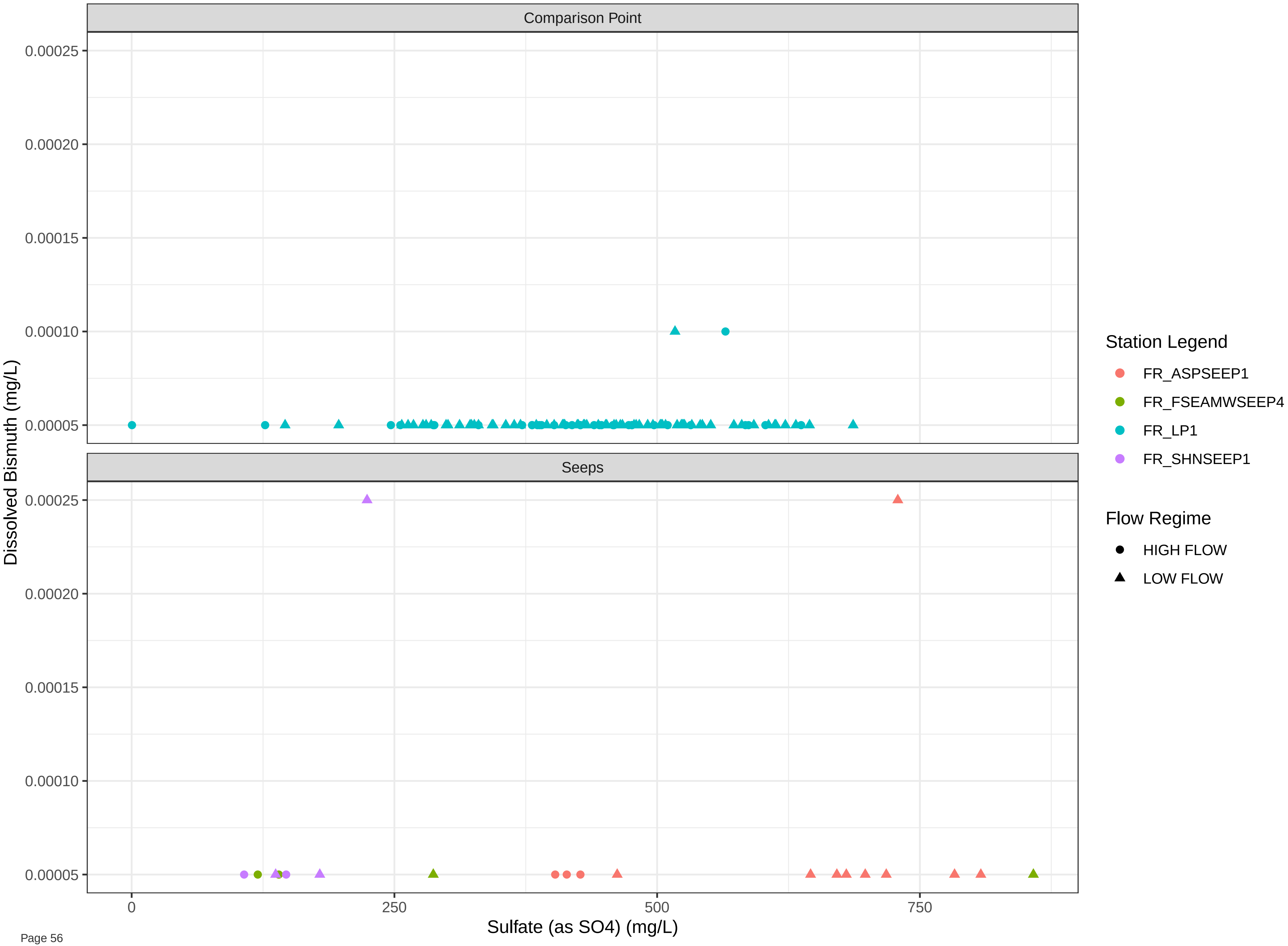


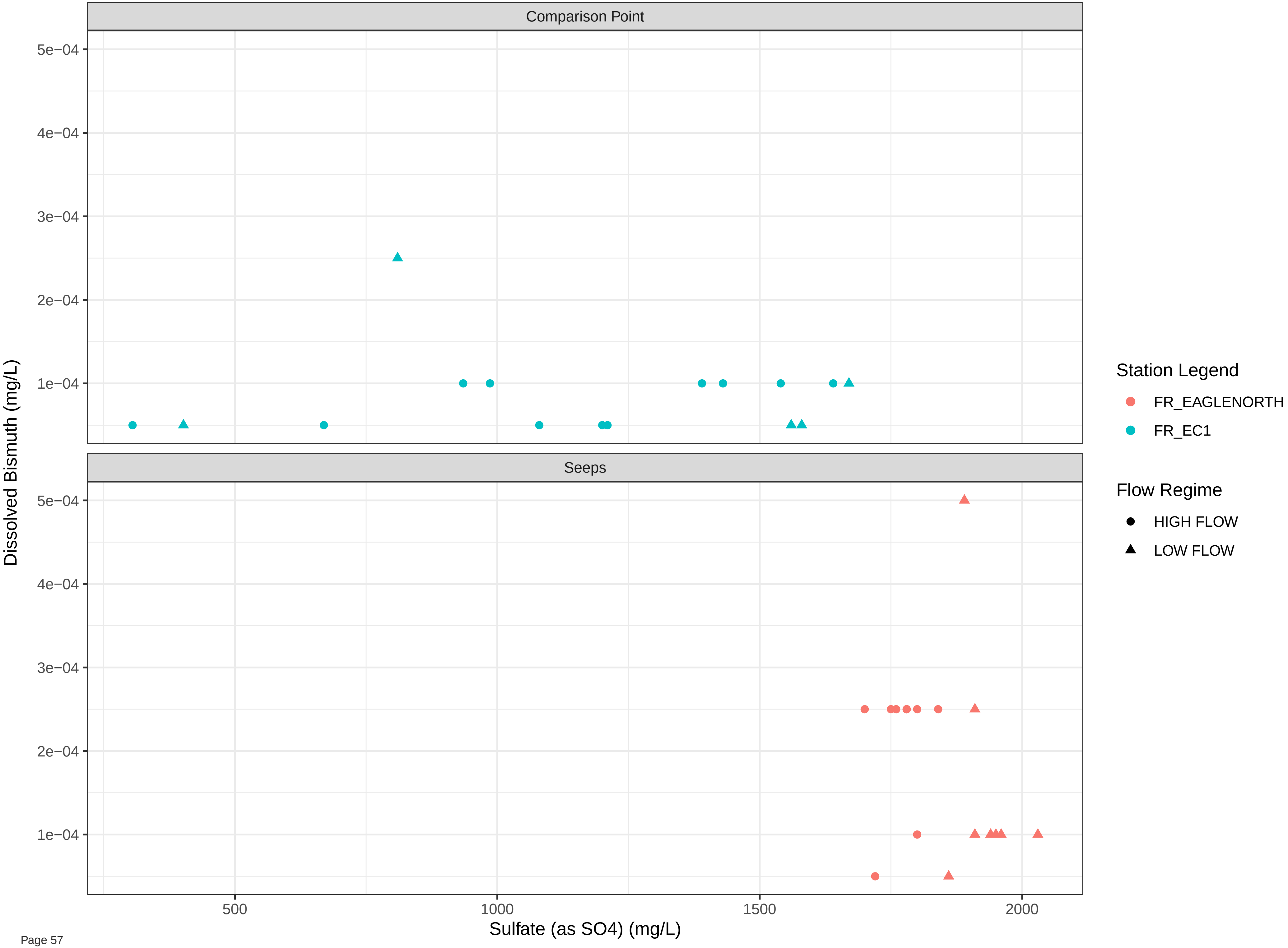
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



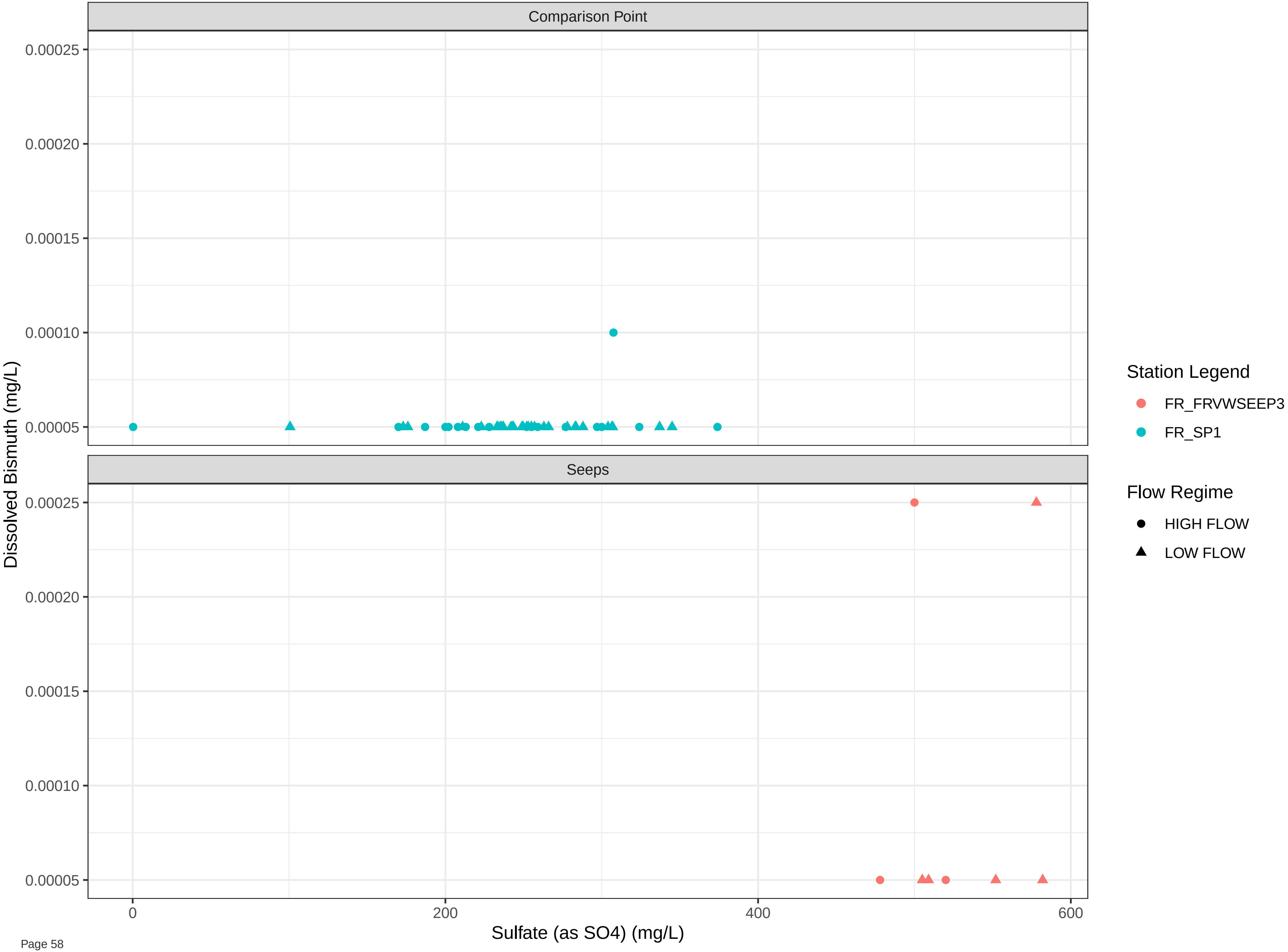
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
Sulfate (as SO4) (mg/L)
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

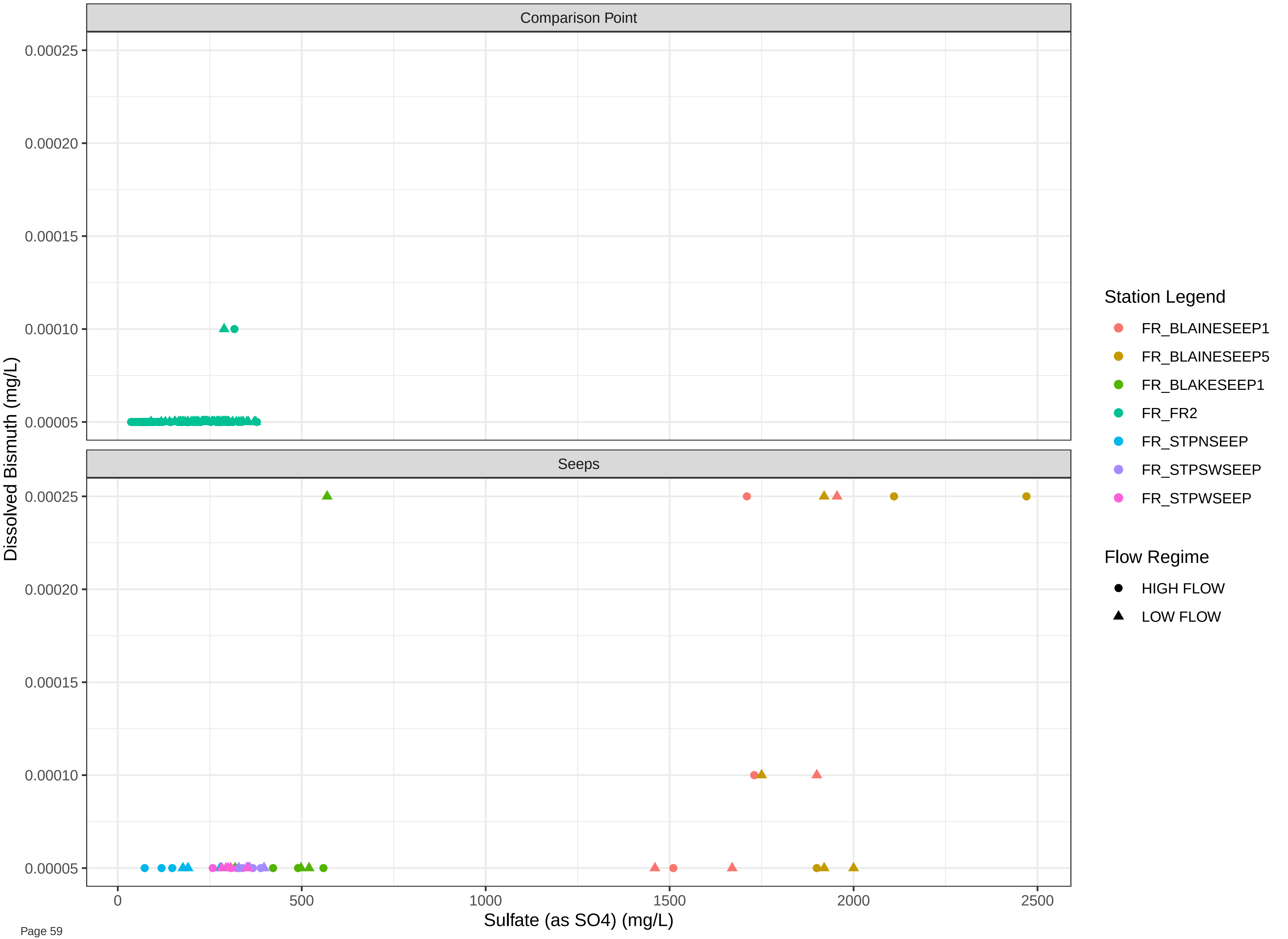

Comparison Point
Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
Dissolved Bismuth (mg/L)
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



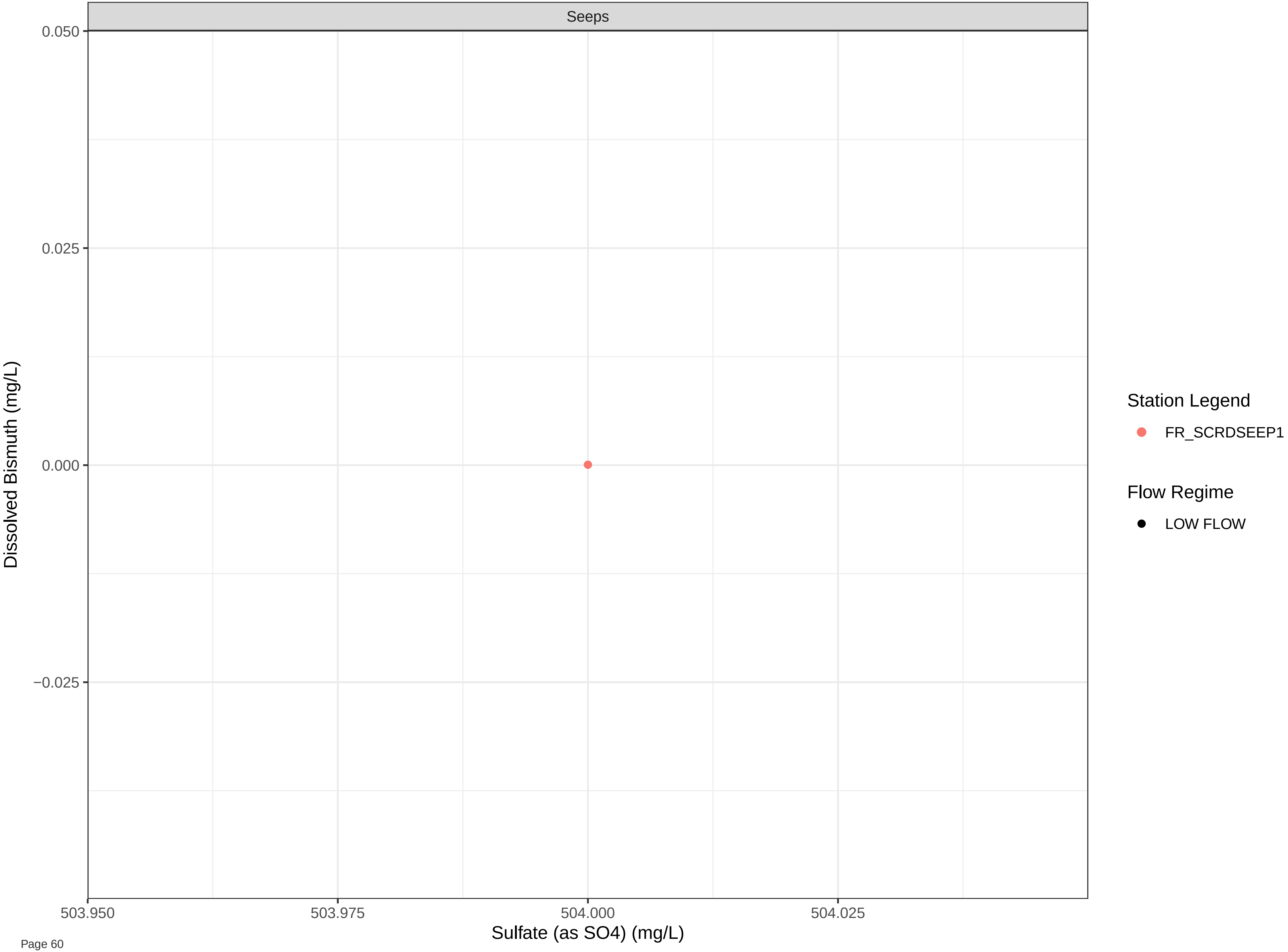
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



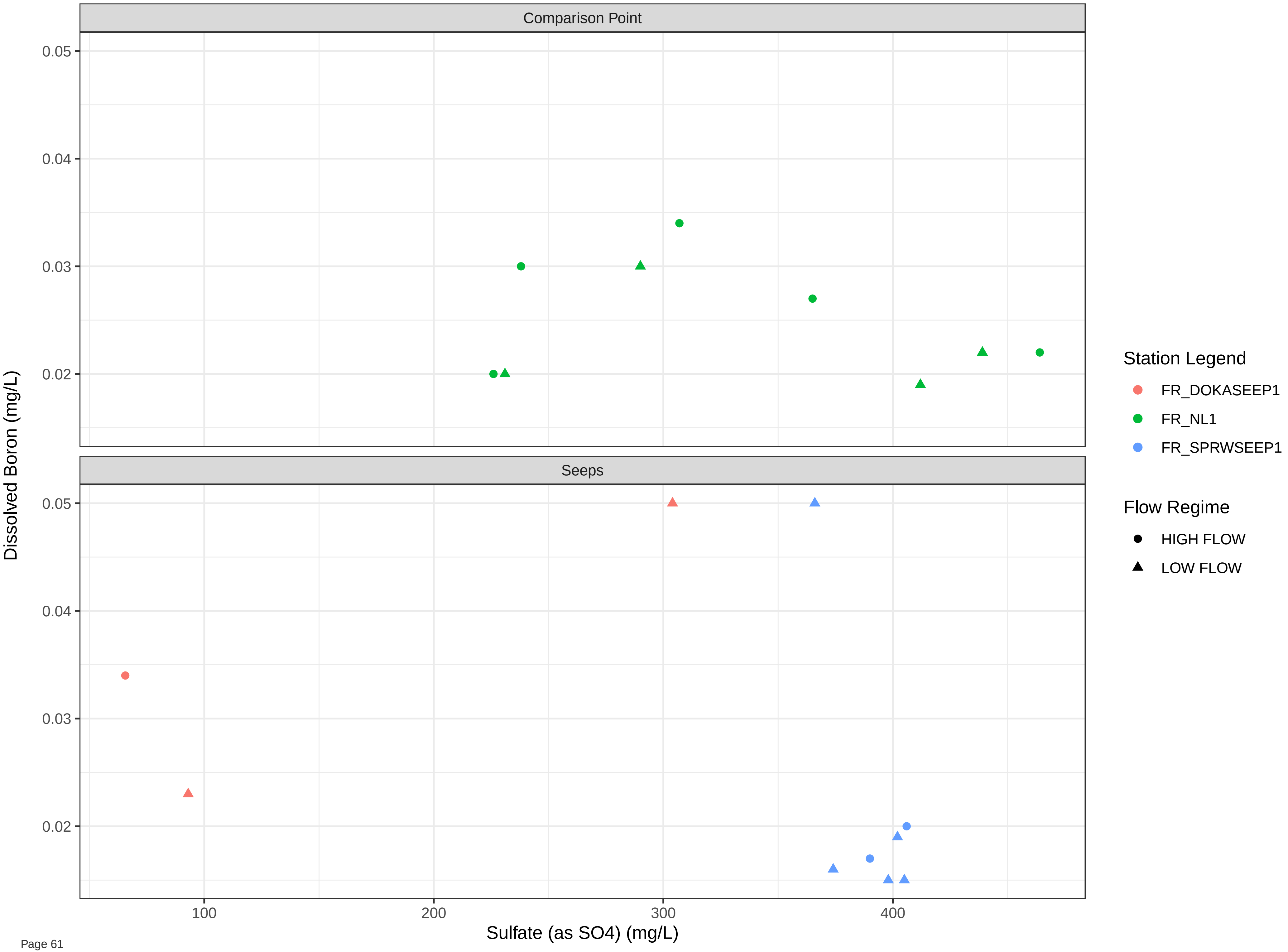
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



Comparison Point
Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
Dissolved Bismuth (mg/L)
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

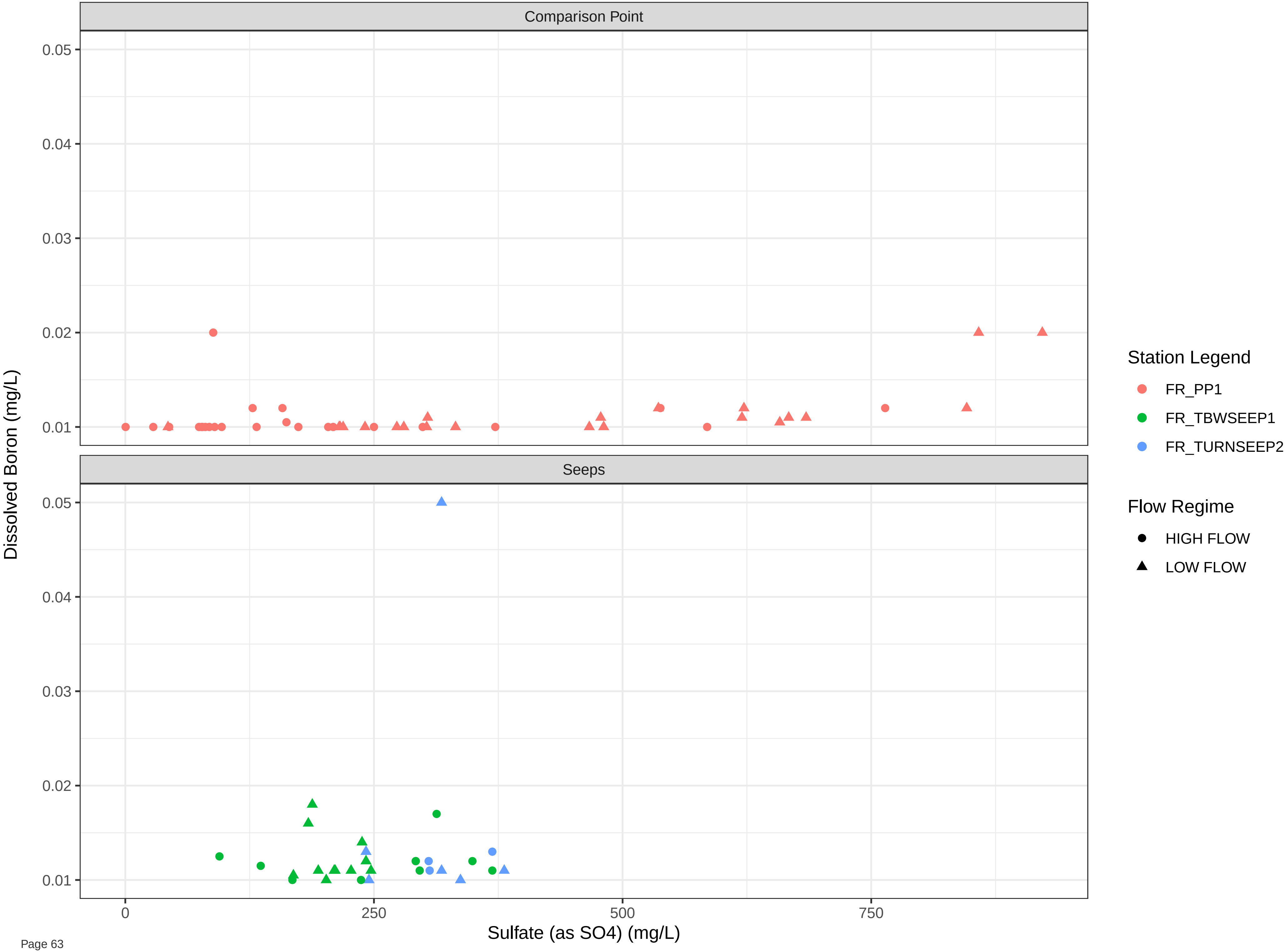


Seeps
0.050
0.025
0.000
−0.025
Dissolved Bismuth (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

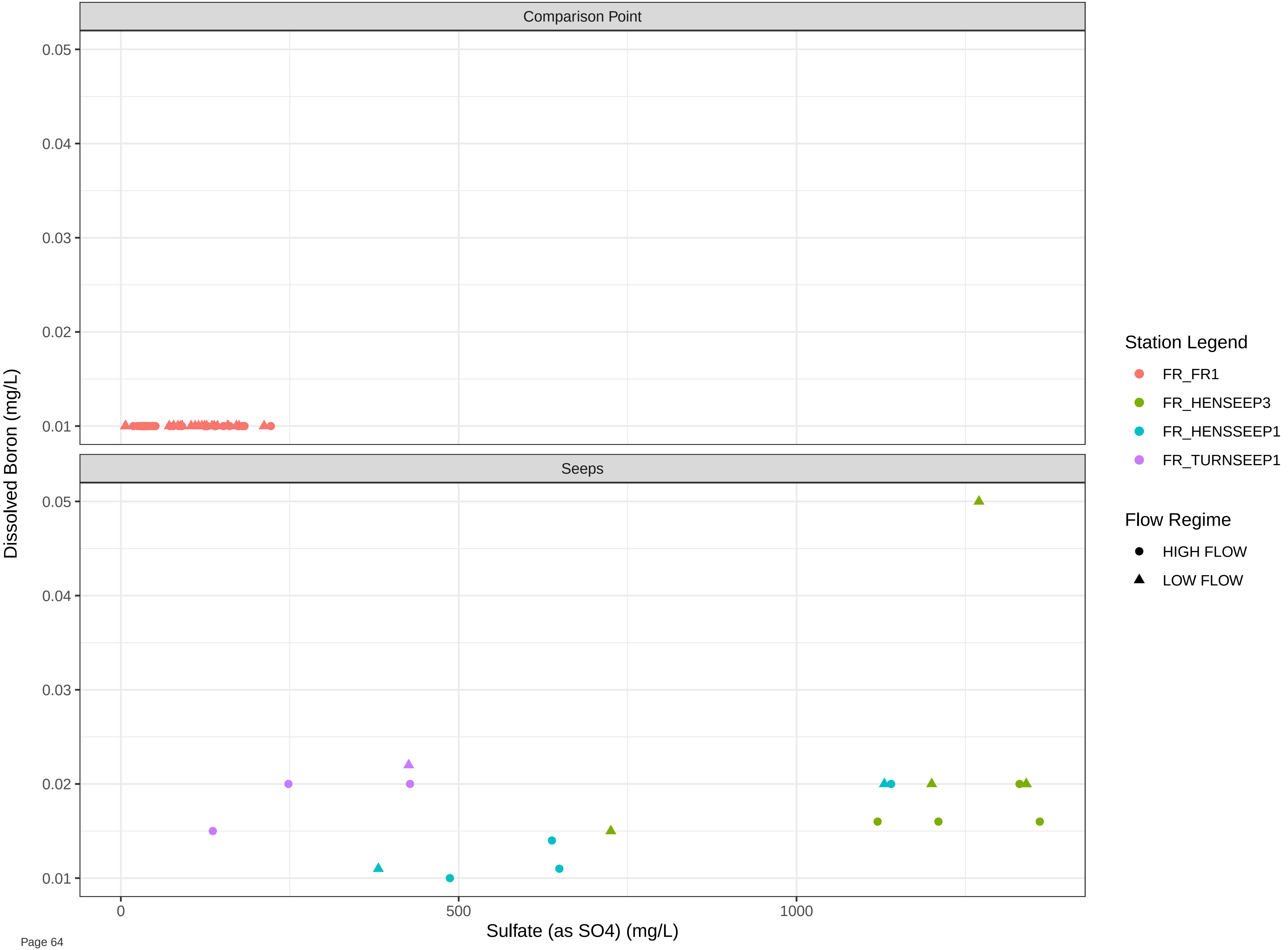


Comparison Point
Seeps
0.05
0.04
0.03
0.02
100
200
300
400
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

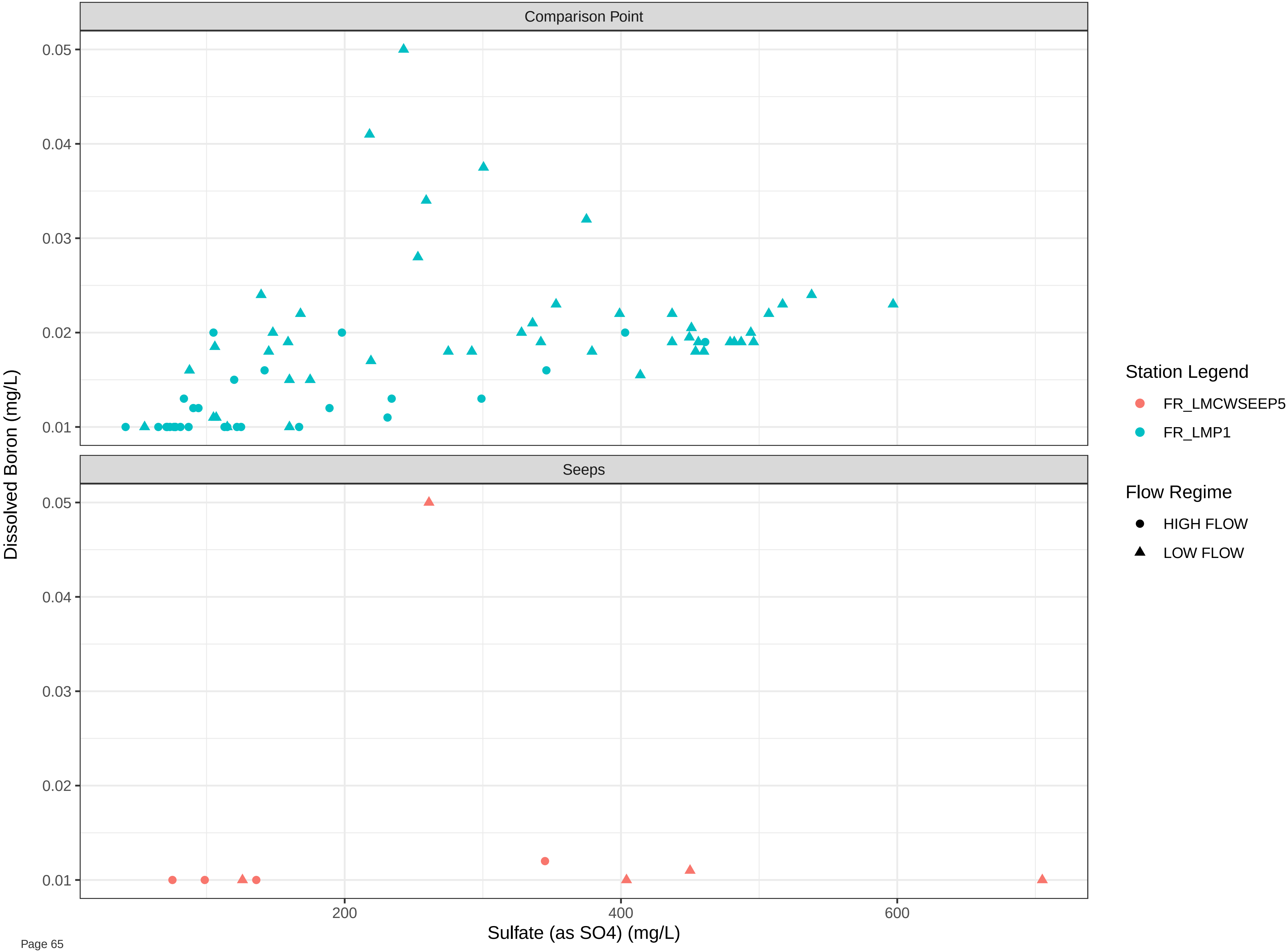

Comparison Point
Seeps
Dissolved Boron (mg/L)
0.100
0.075
0.050
0.025
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

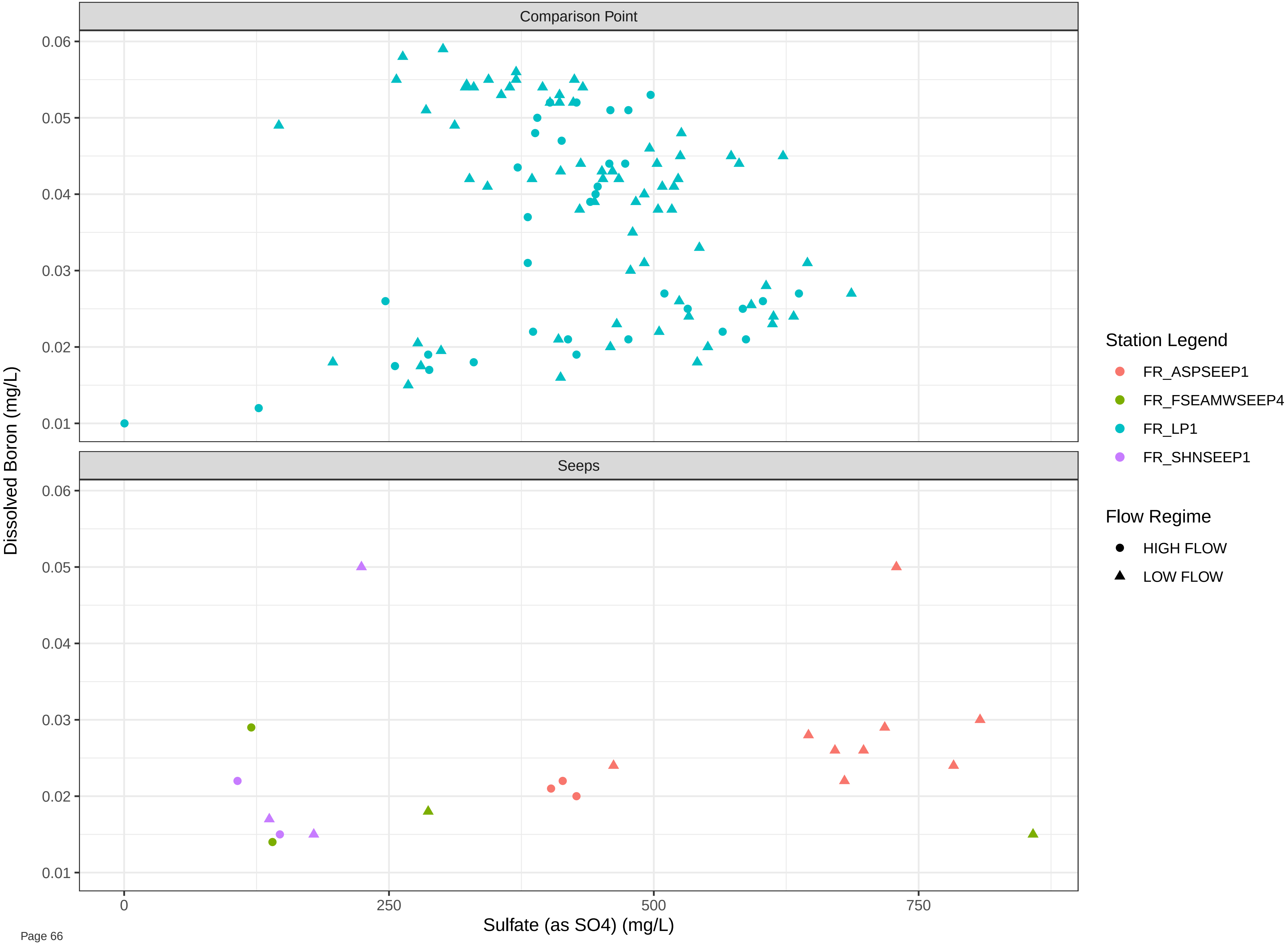


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.01
0.02
0.03
0.04
0.05
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

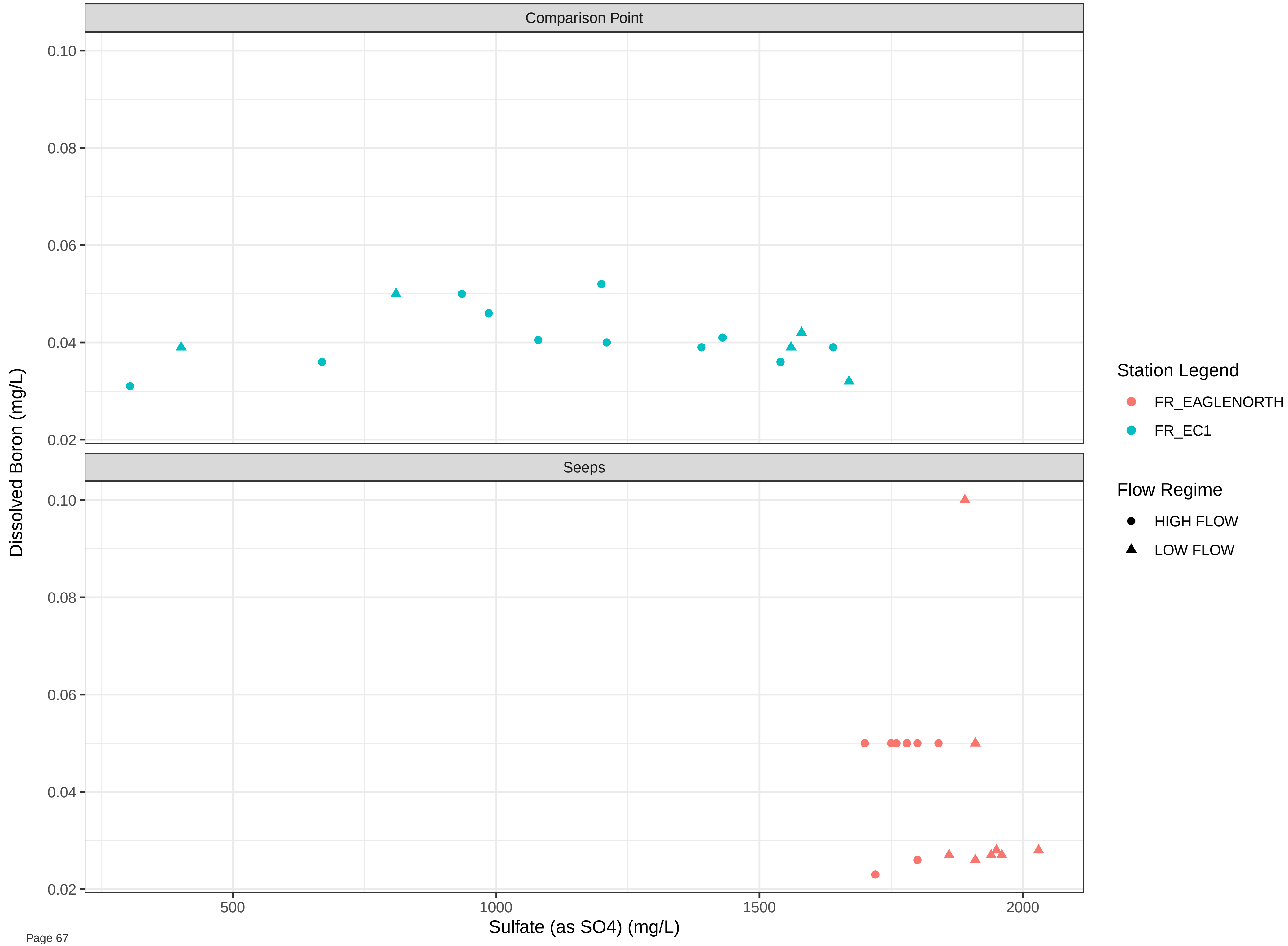


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.05
0.04
0.03
0.02
0.01
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

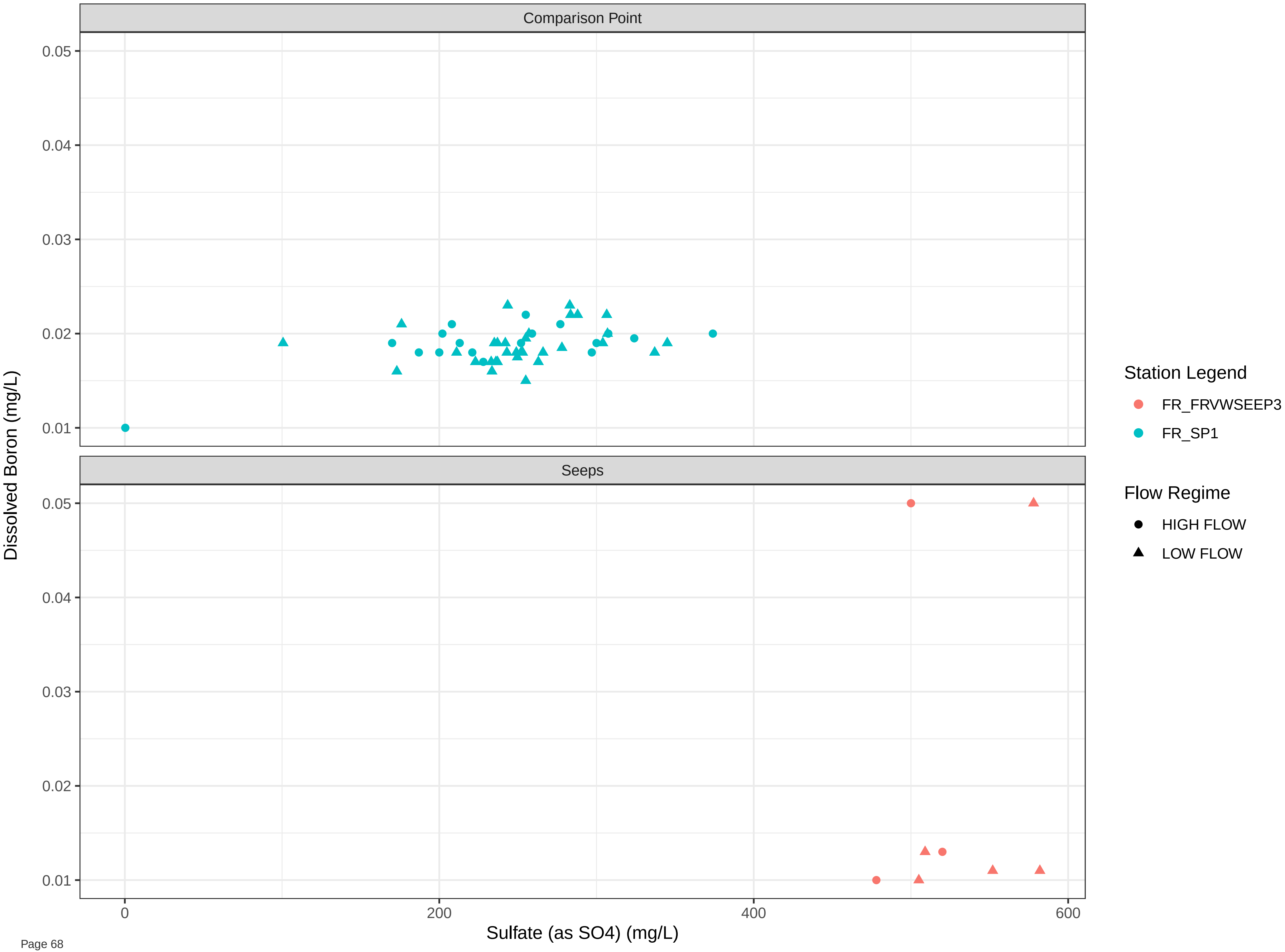

Comparison Point
Seeps
0.05
0.04
0.03
0.02
0.01
Dissolved Boron (mg/L)
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



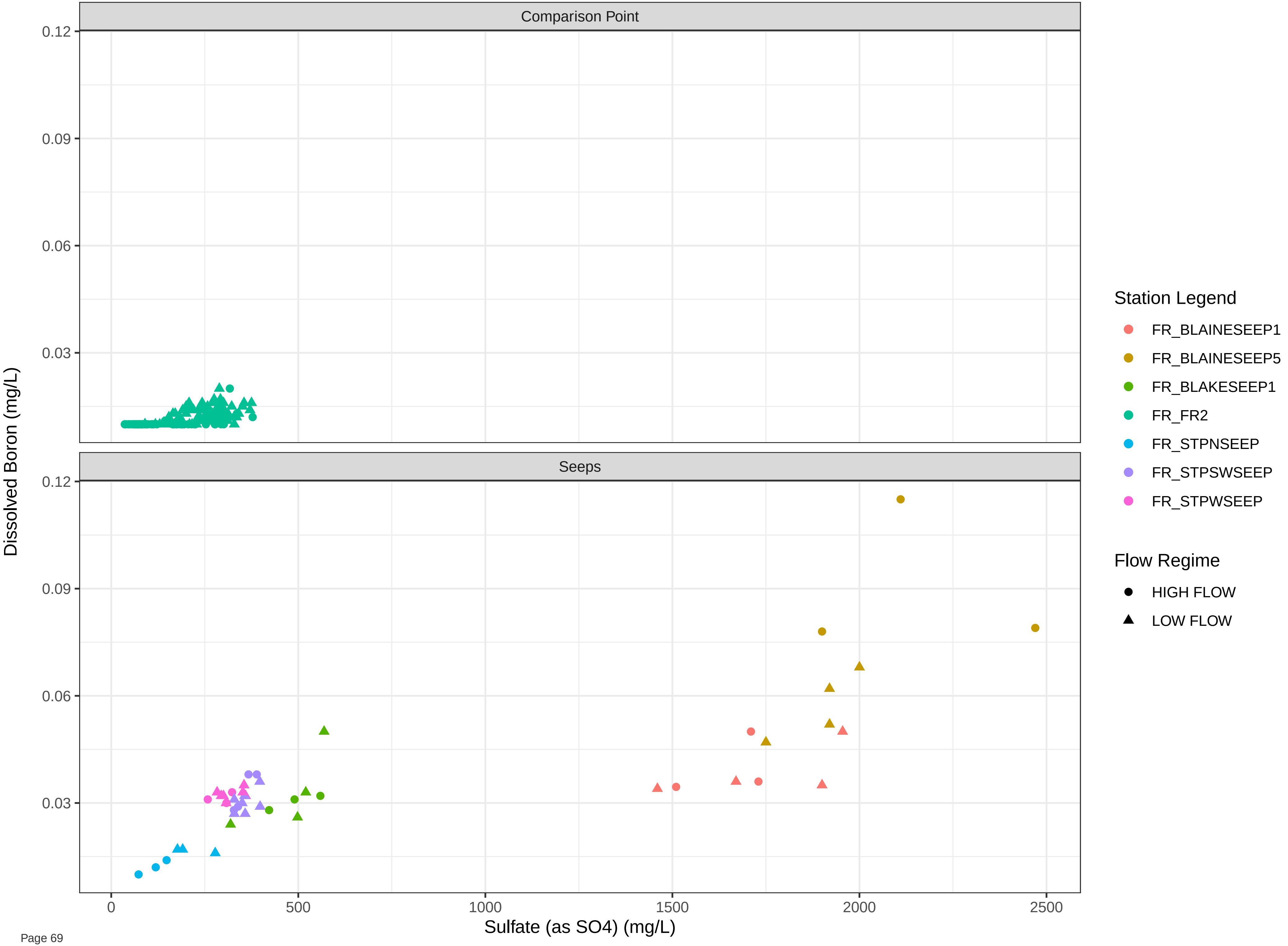
Comparison Point
Seeps
0.06
0.05
0.04
0.03
0.02
0.01
Dissolved Boron (mg/L)
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

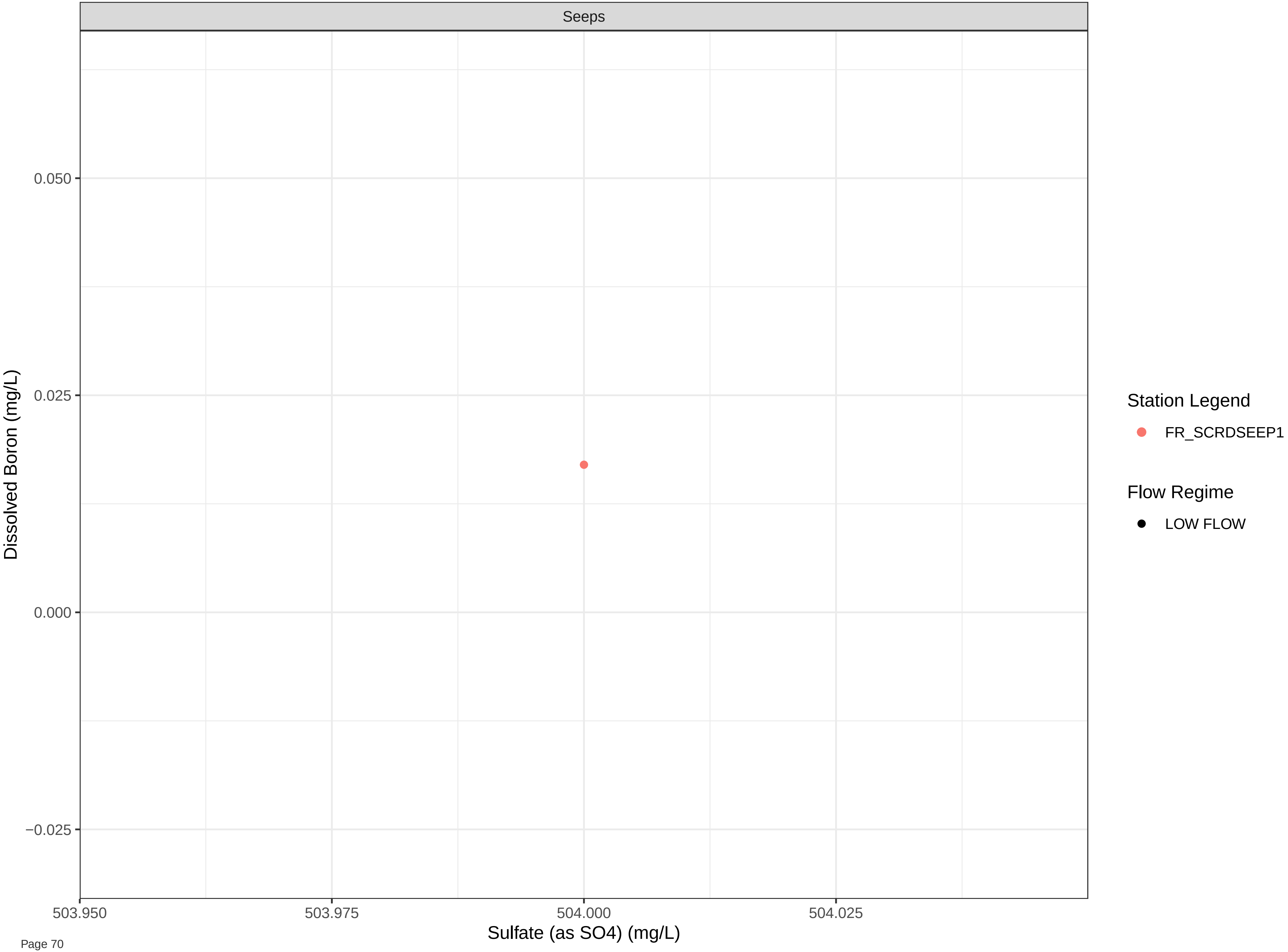


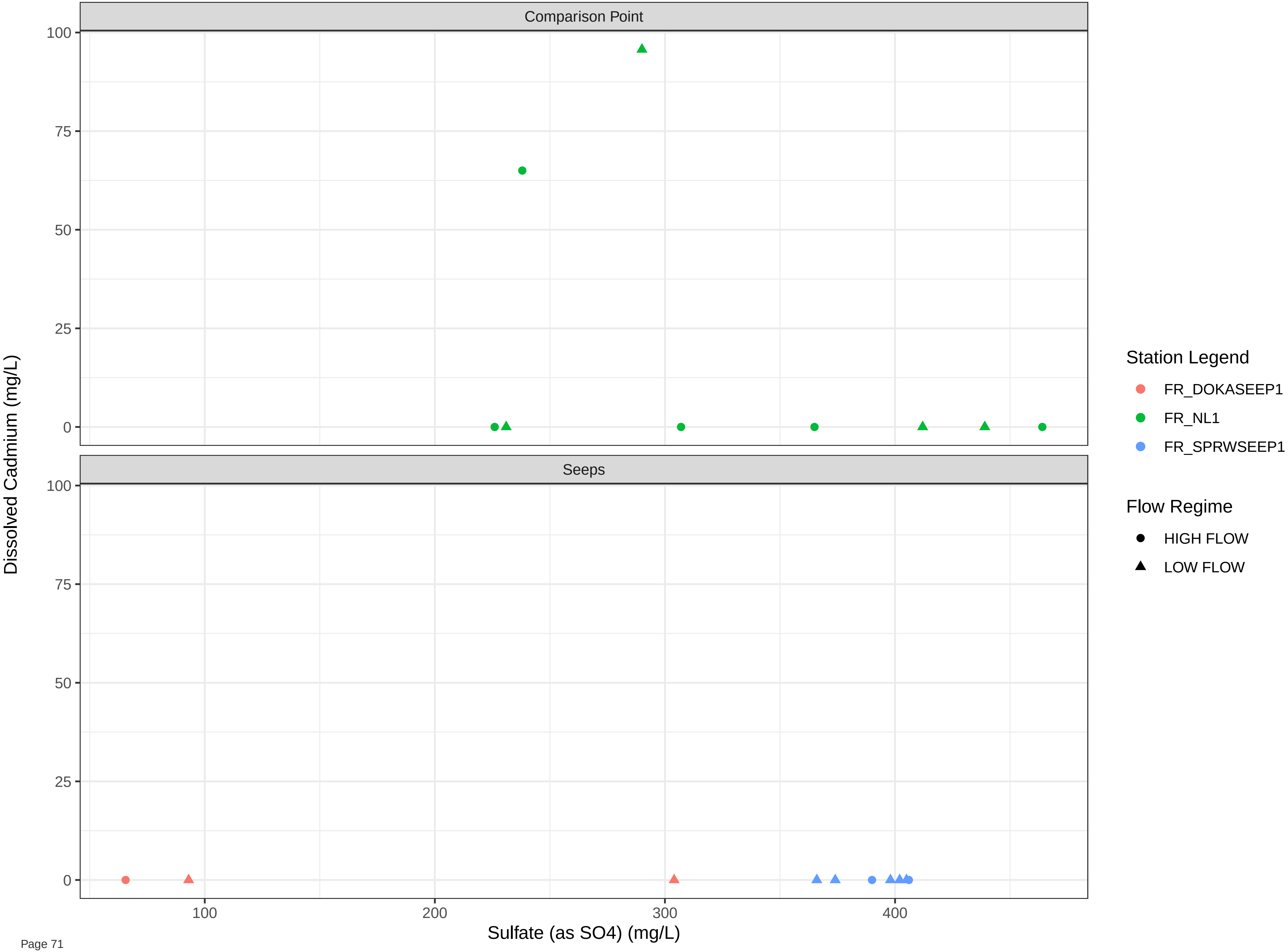
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.10
0.08
0.06
0.04
0.02
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



Comparison Point
Seeps
Dissolved Boron (mg/L)
0.05
0.04
0.03
0.02
0.01
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

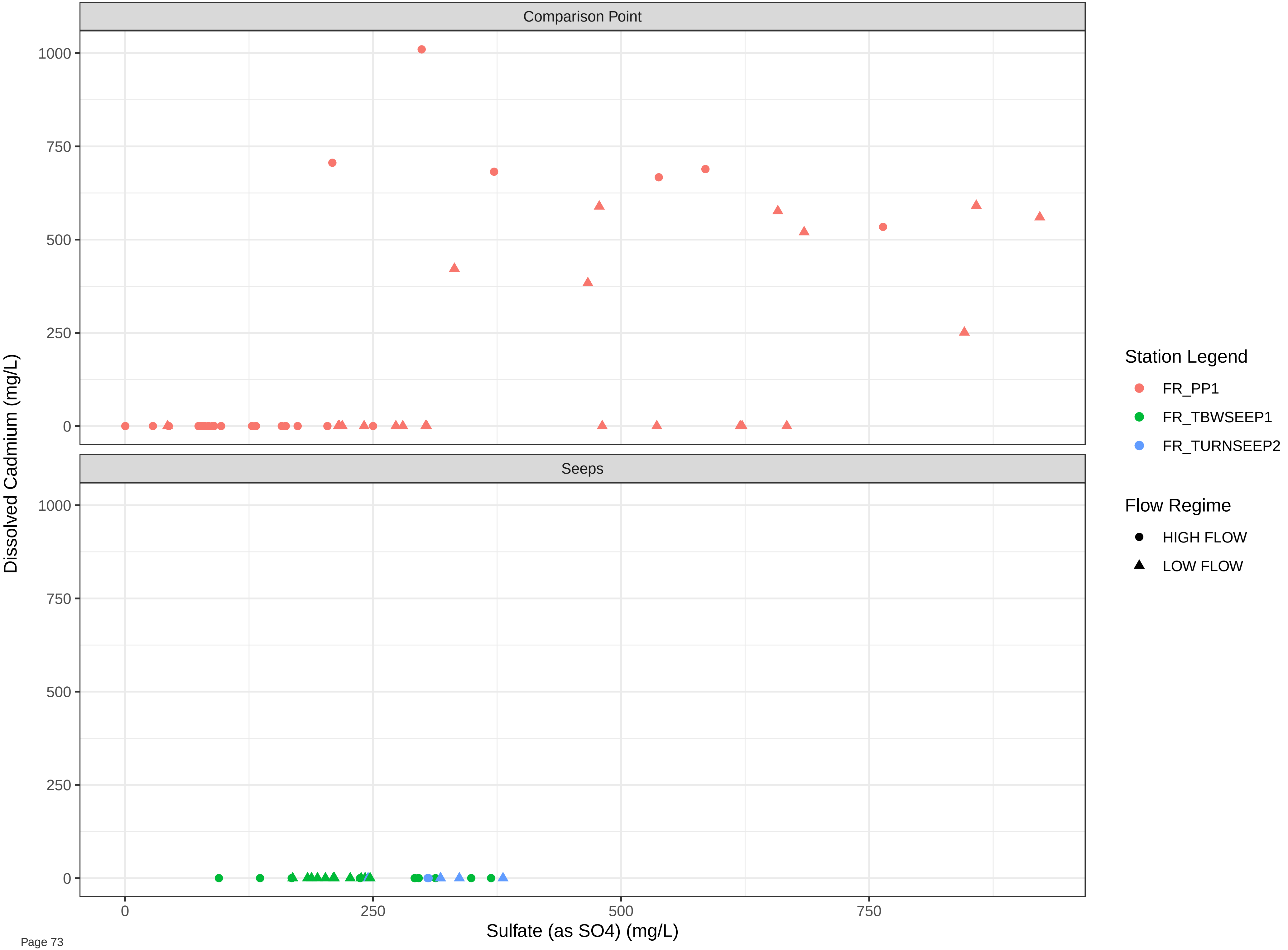

Comparison Point
Seeps
0.12
0.09
0.06
0.03
Dissolved Boron (mg/L)
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
Dissolved Boron (mg/L)
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW



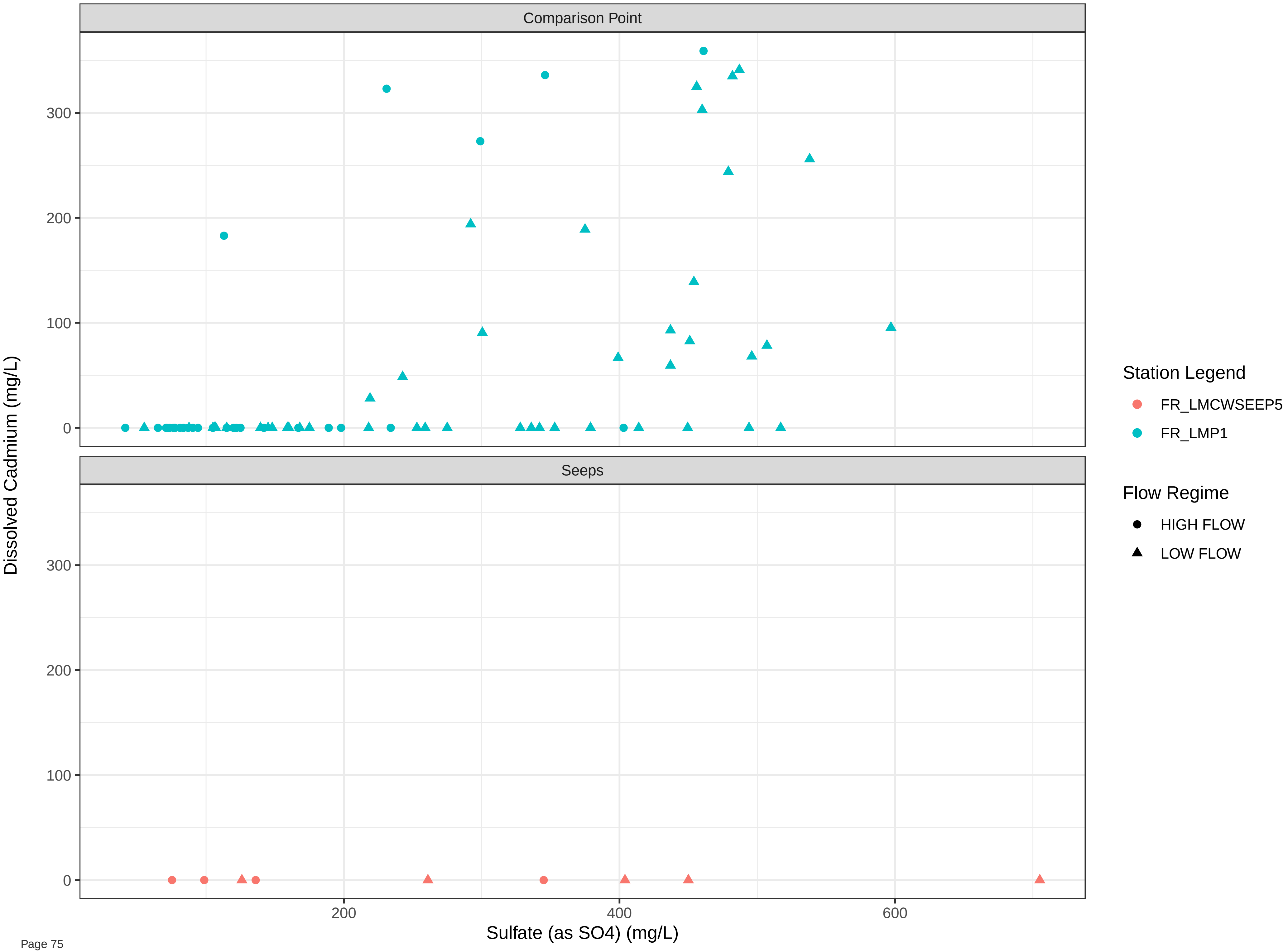
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
100
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

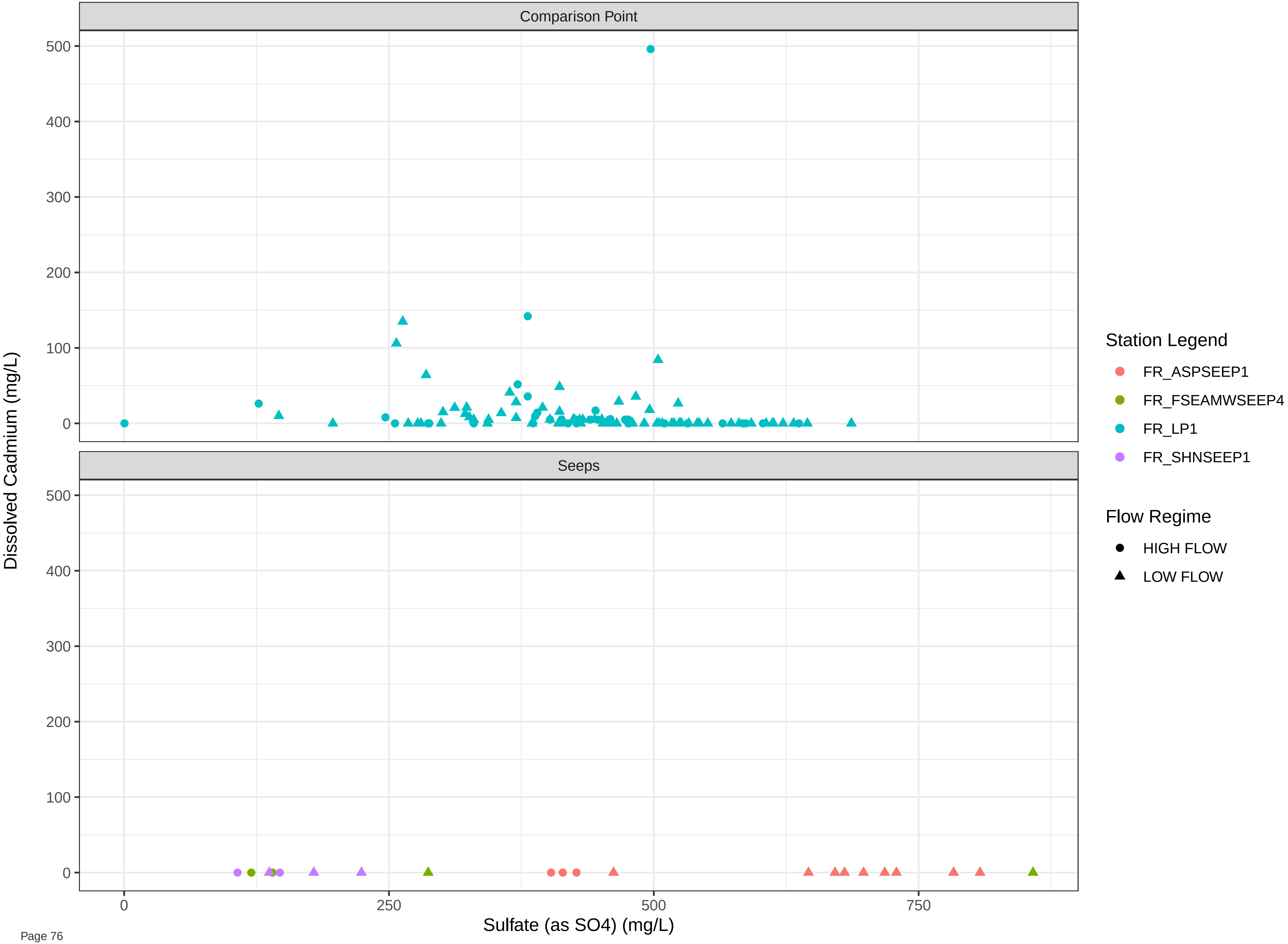
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
250
500
750
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

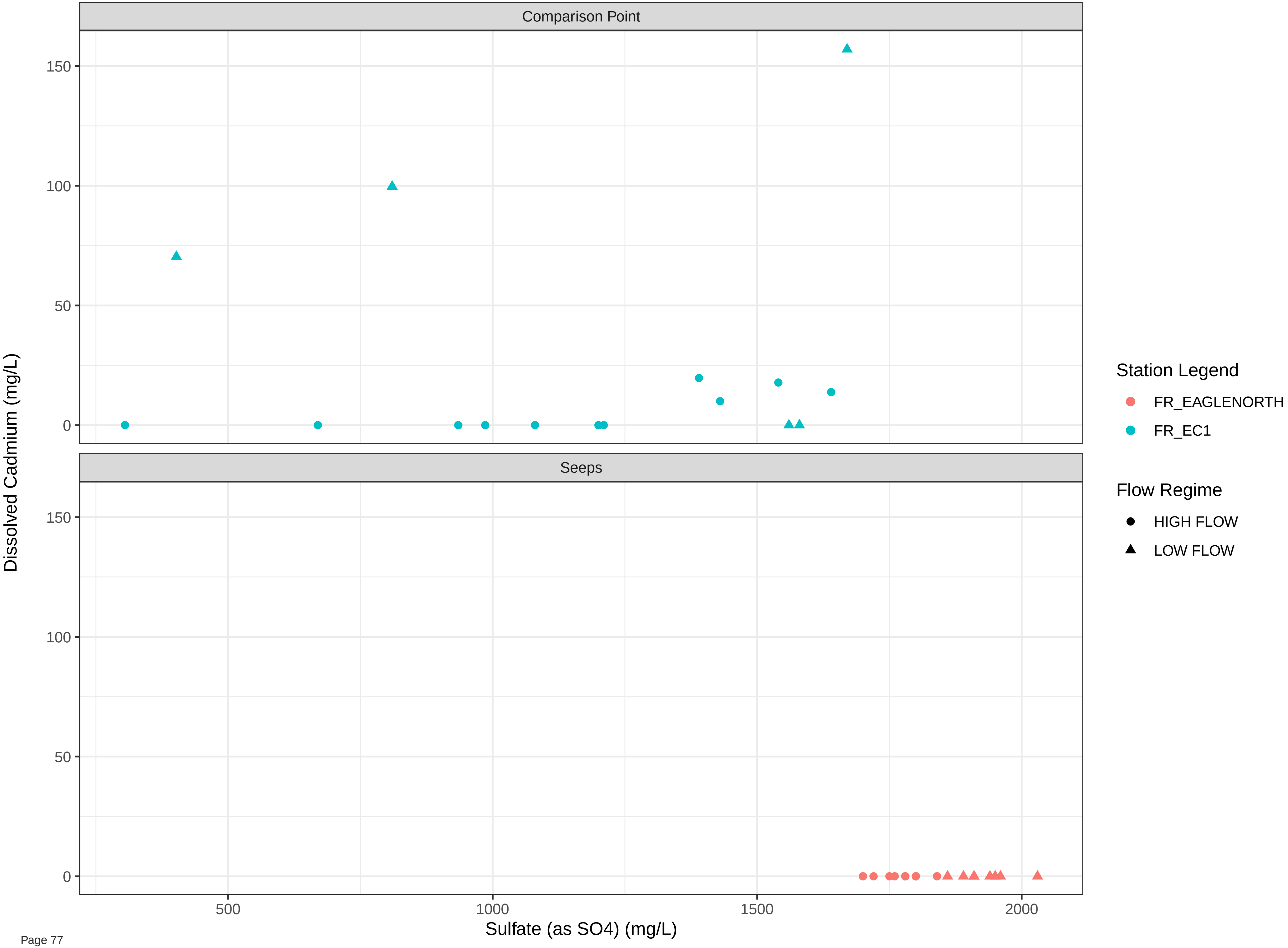


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
1000
750
500
250
0
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

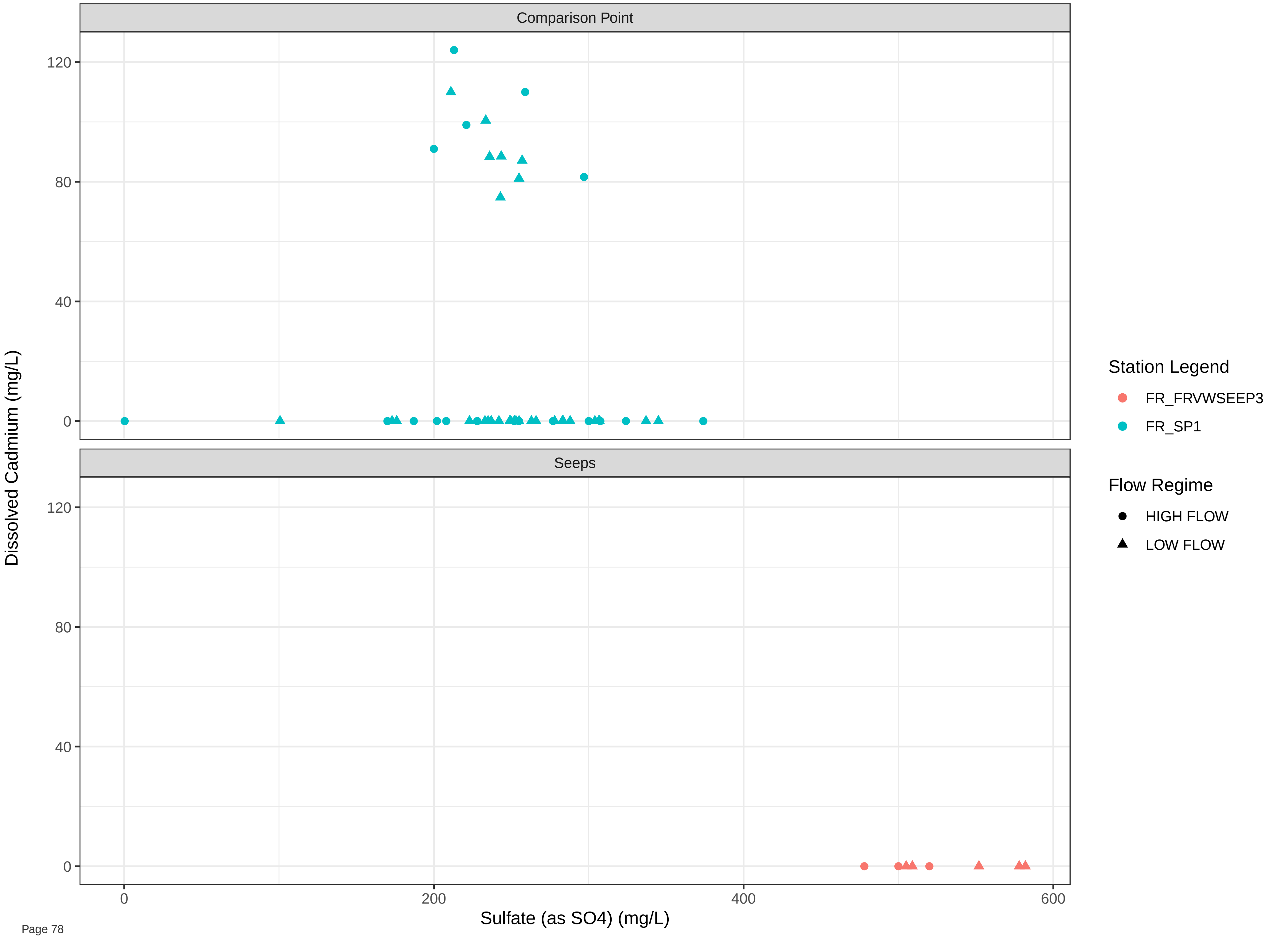

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

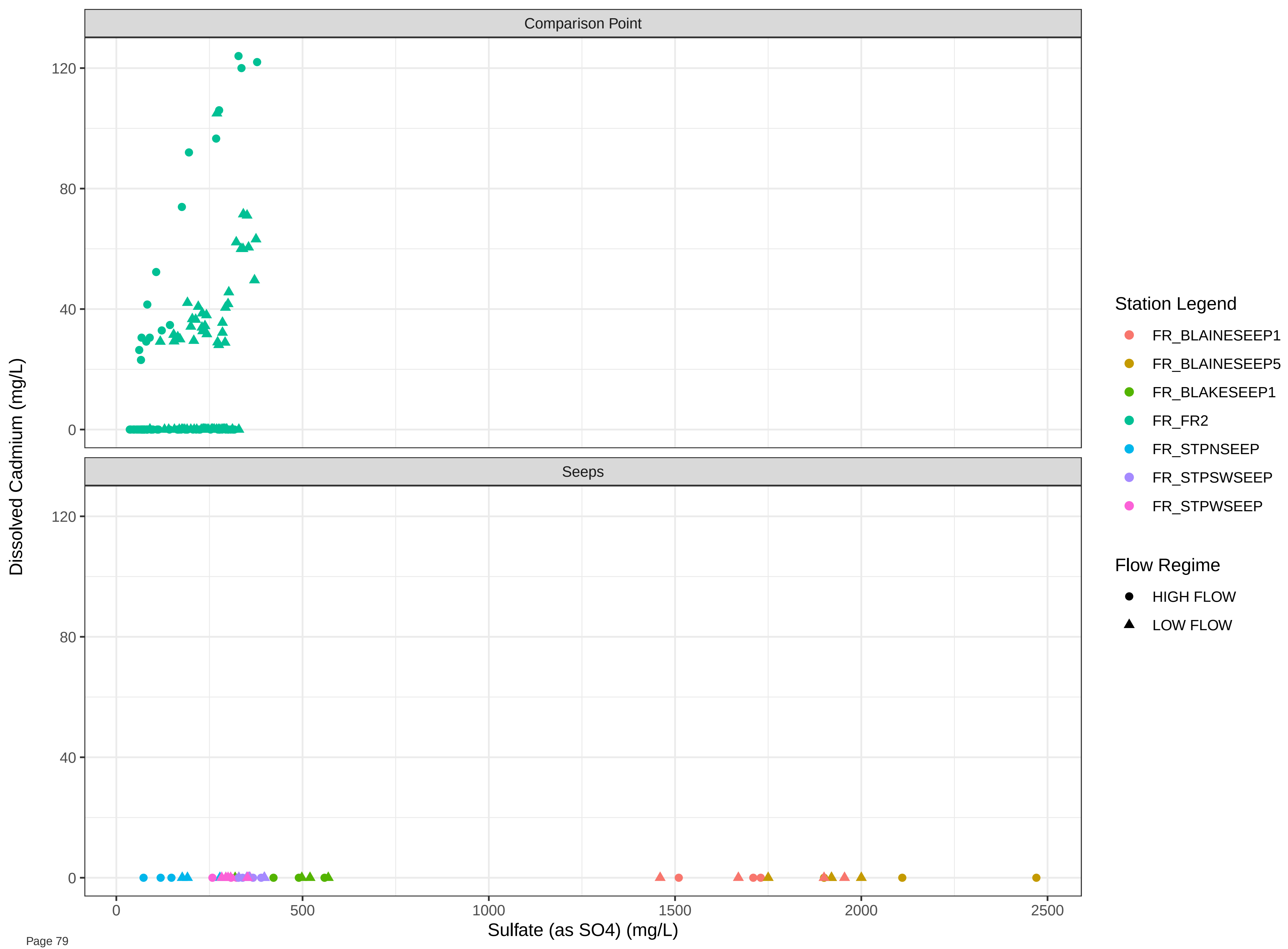

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
300
200
100
0
300
200
100
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

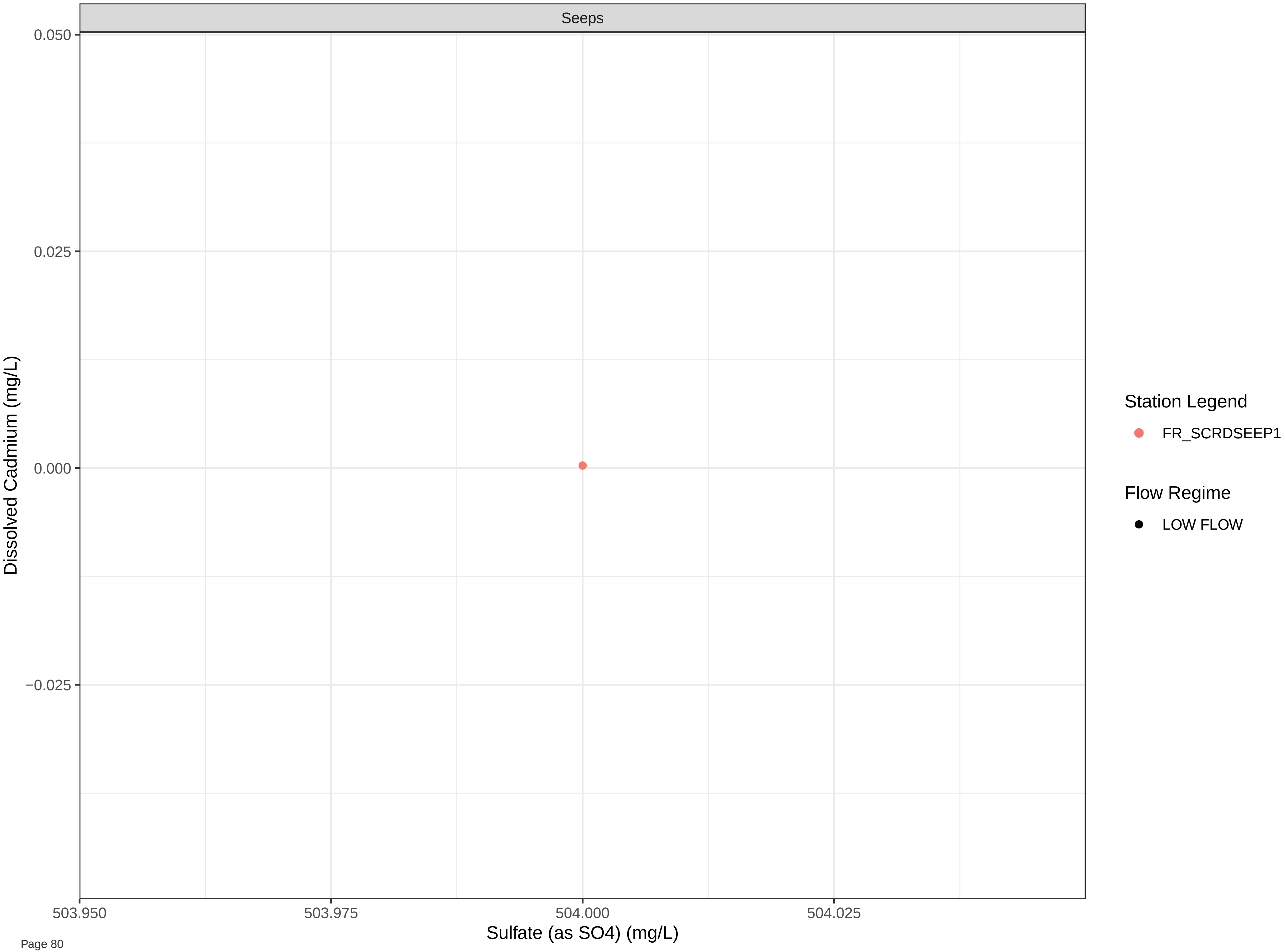


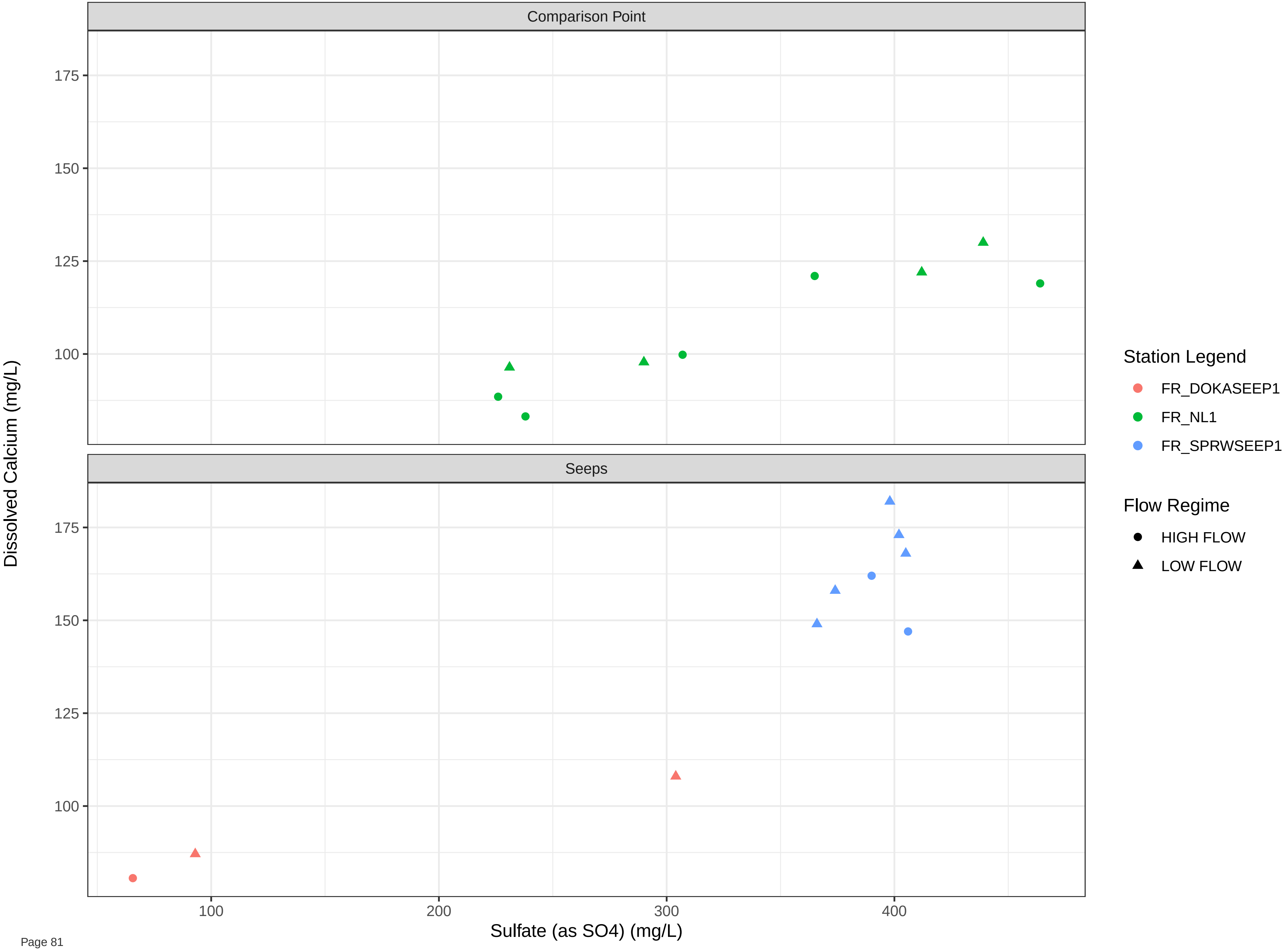
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
120
80
40
0
120
80
40
0
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

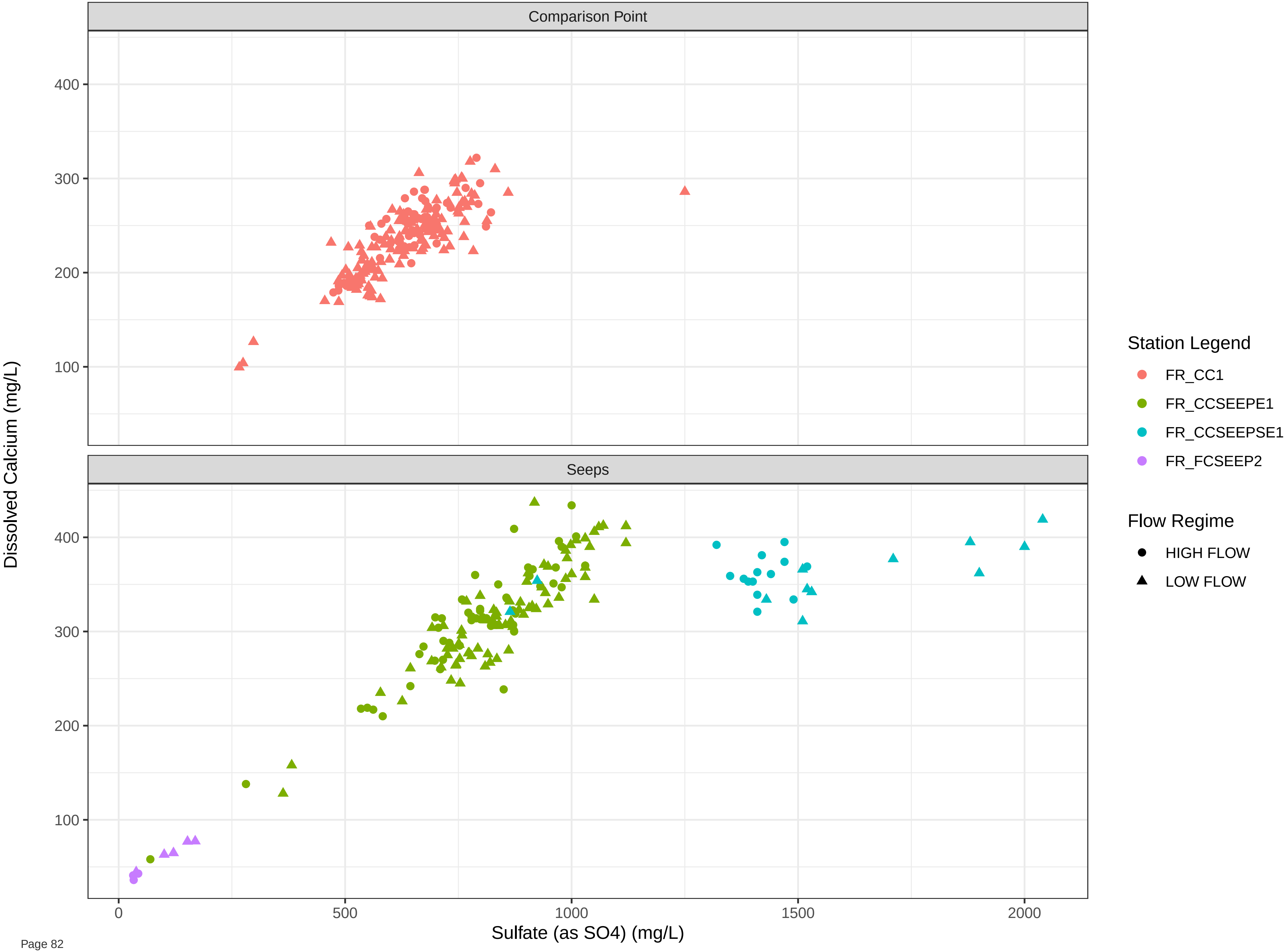


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
40
80
120
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

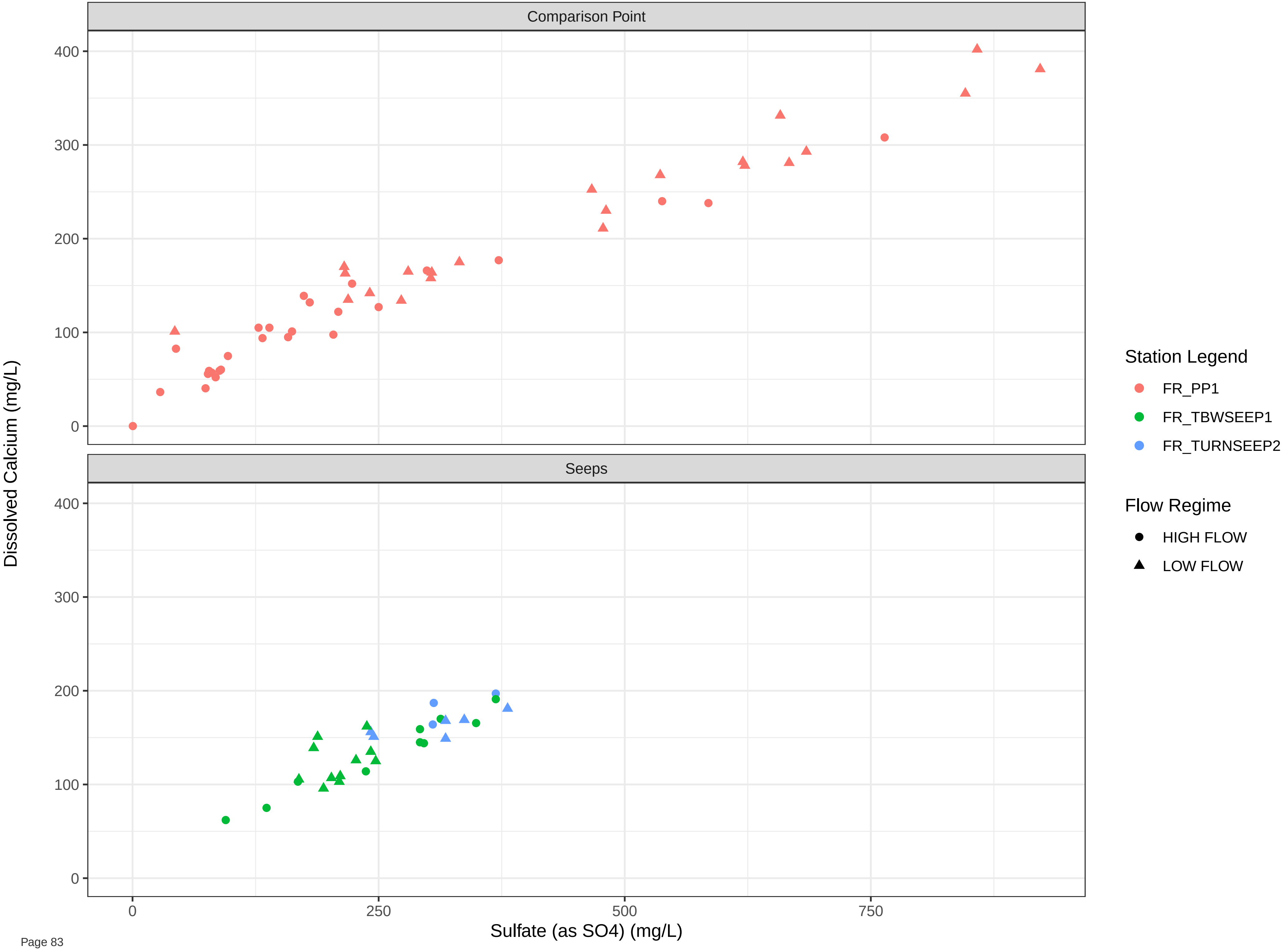

Seeps
0.050
0.025
0.000
−0.025
Dissolved Cadmium (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

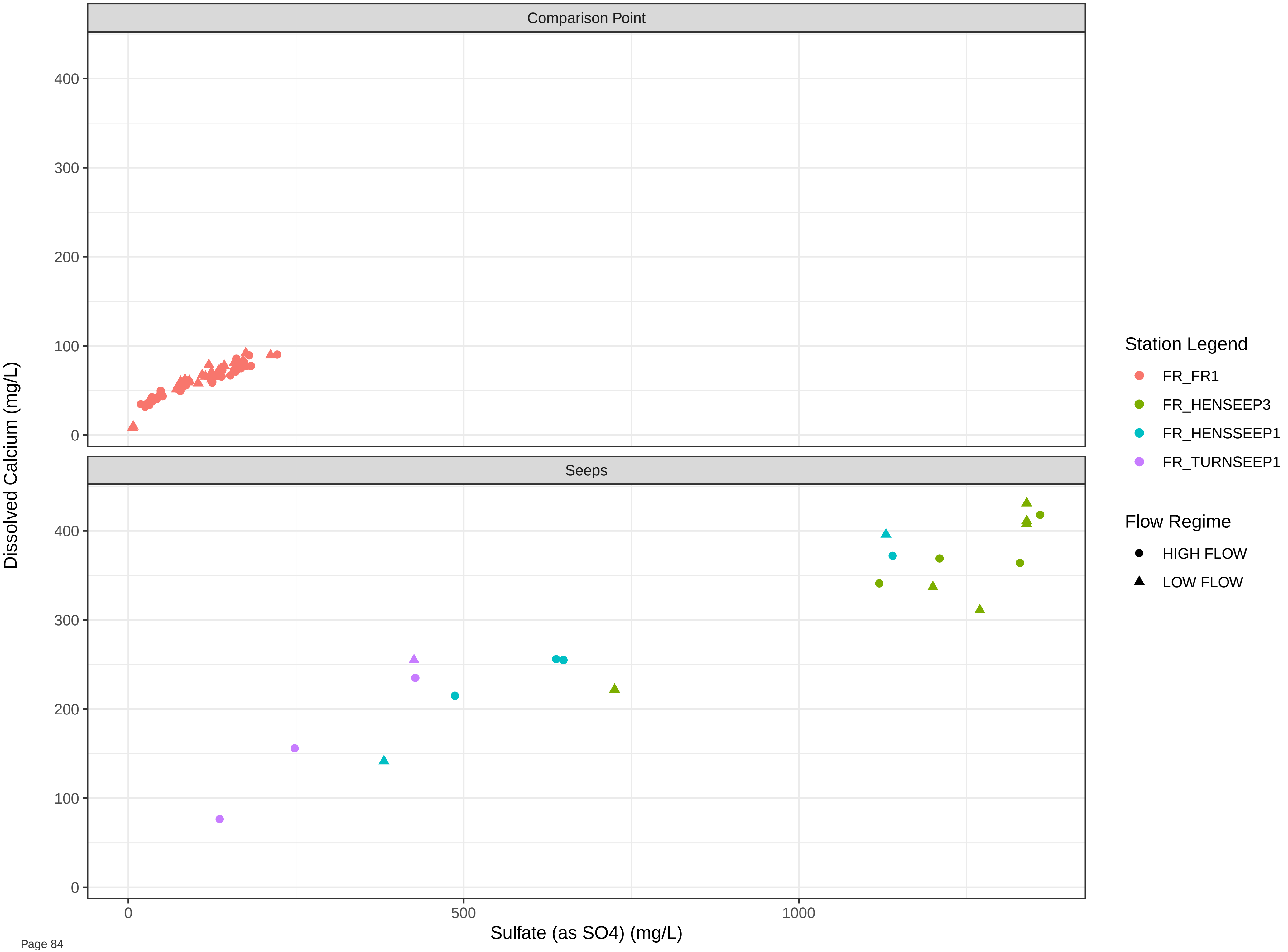


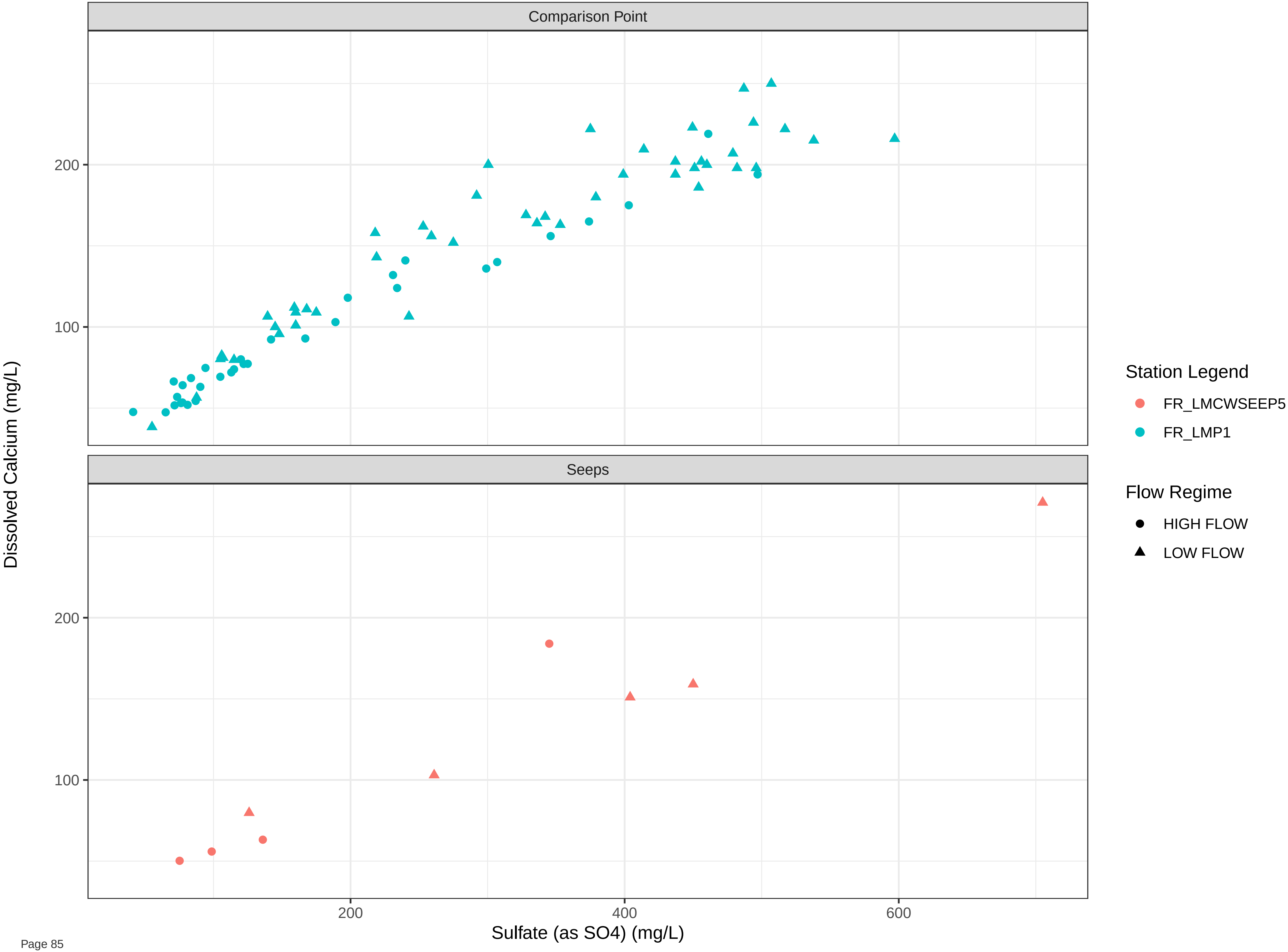
Comparison Point
Seeps
Dissolved Calcium (mg/L)
175
150
125
100
Sulfate (as SO4) (mg/L)
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

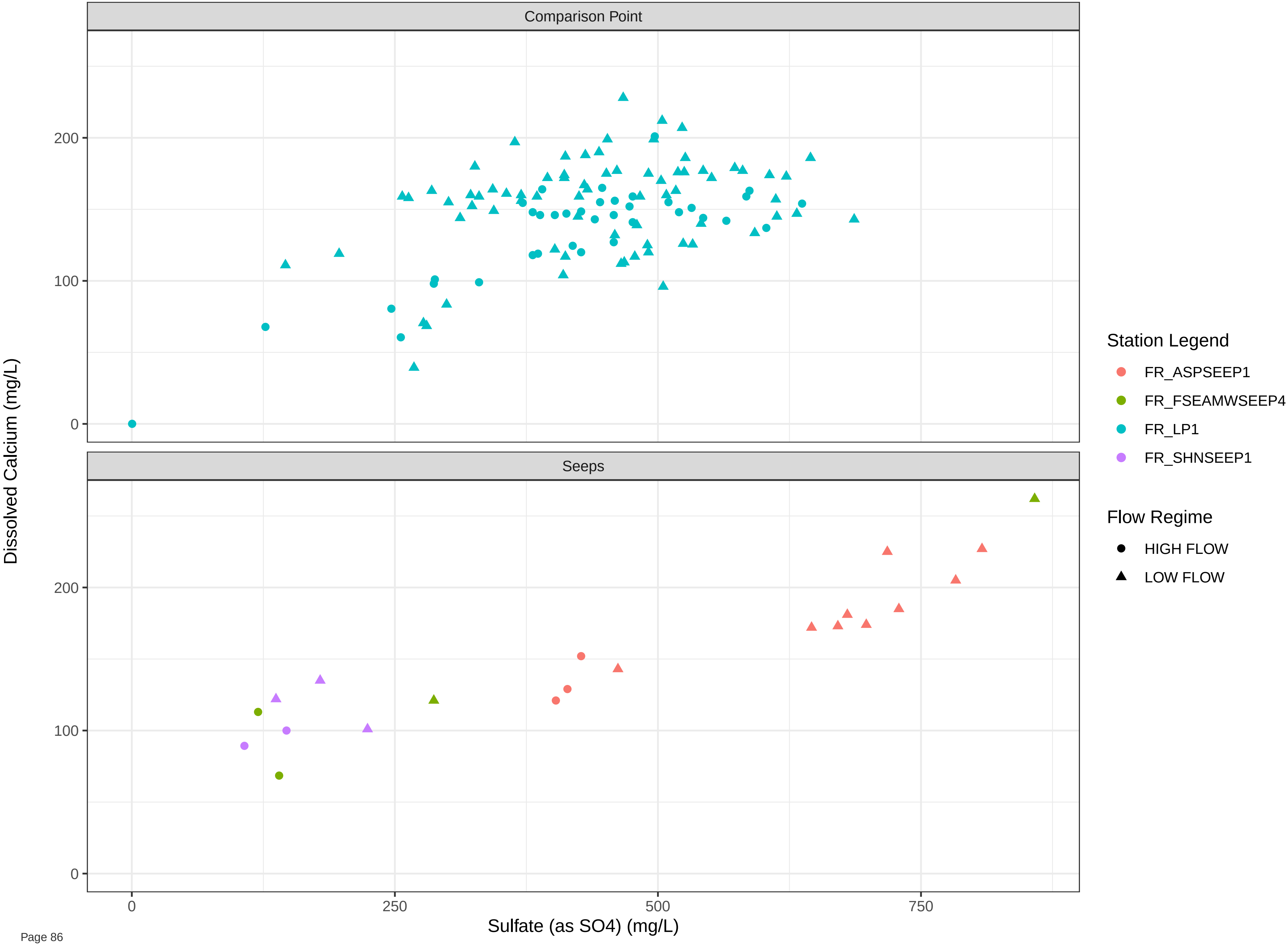


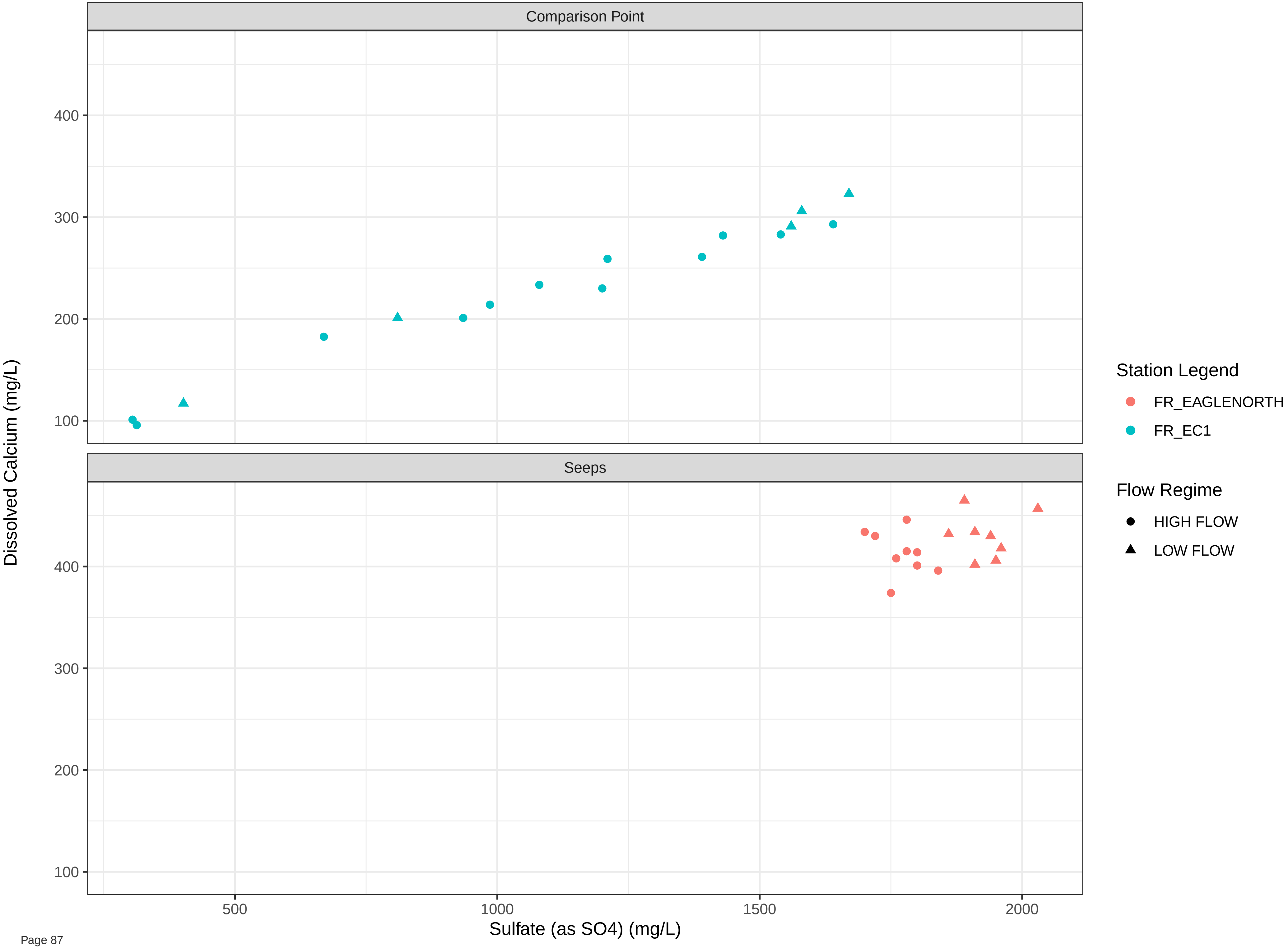
Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
400
300
200
100
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

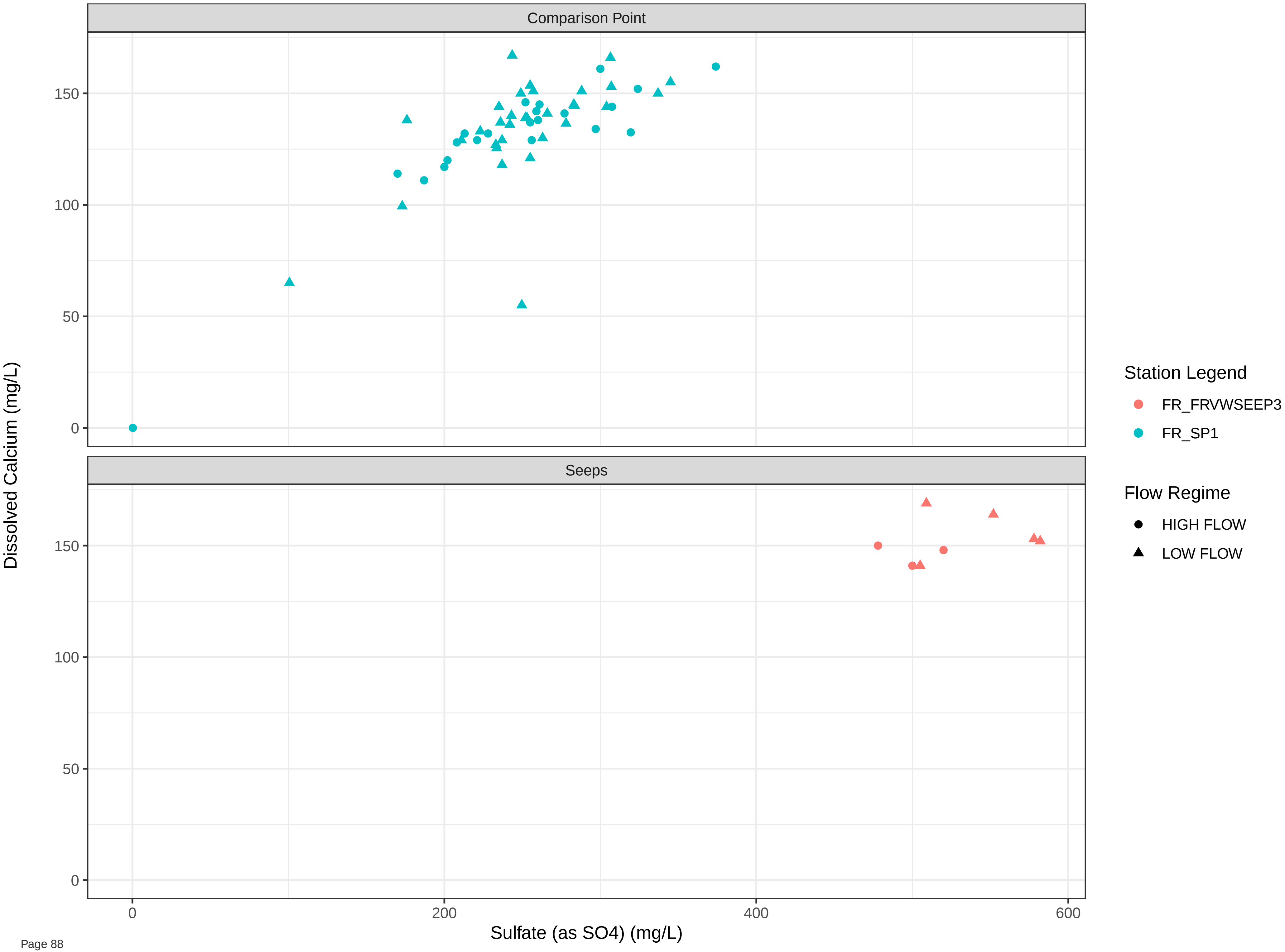

Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

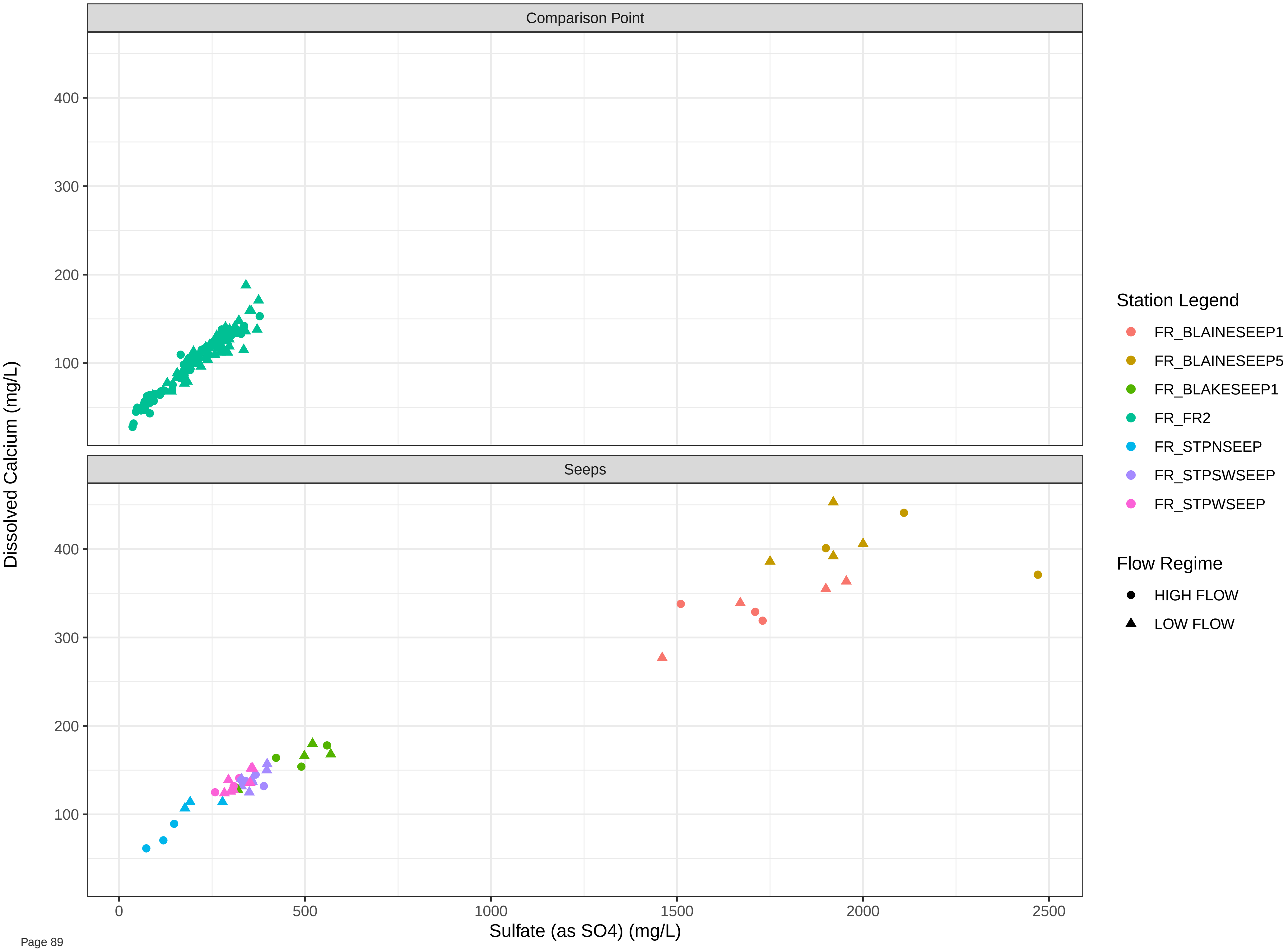

Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
100
200
100
200
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

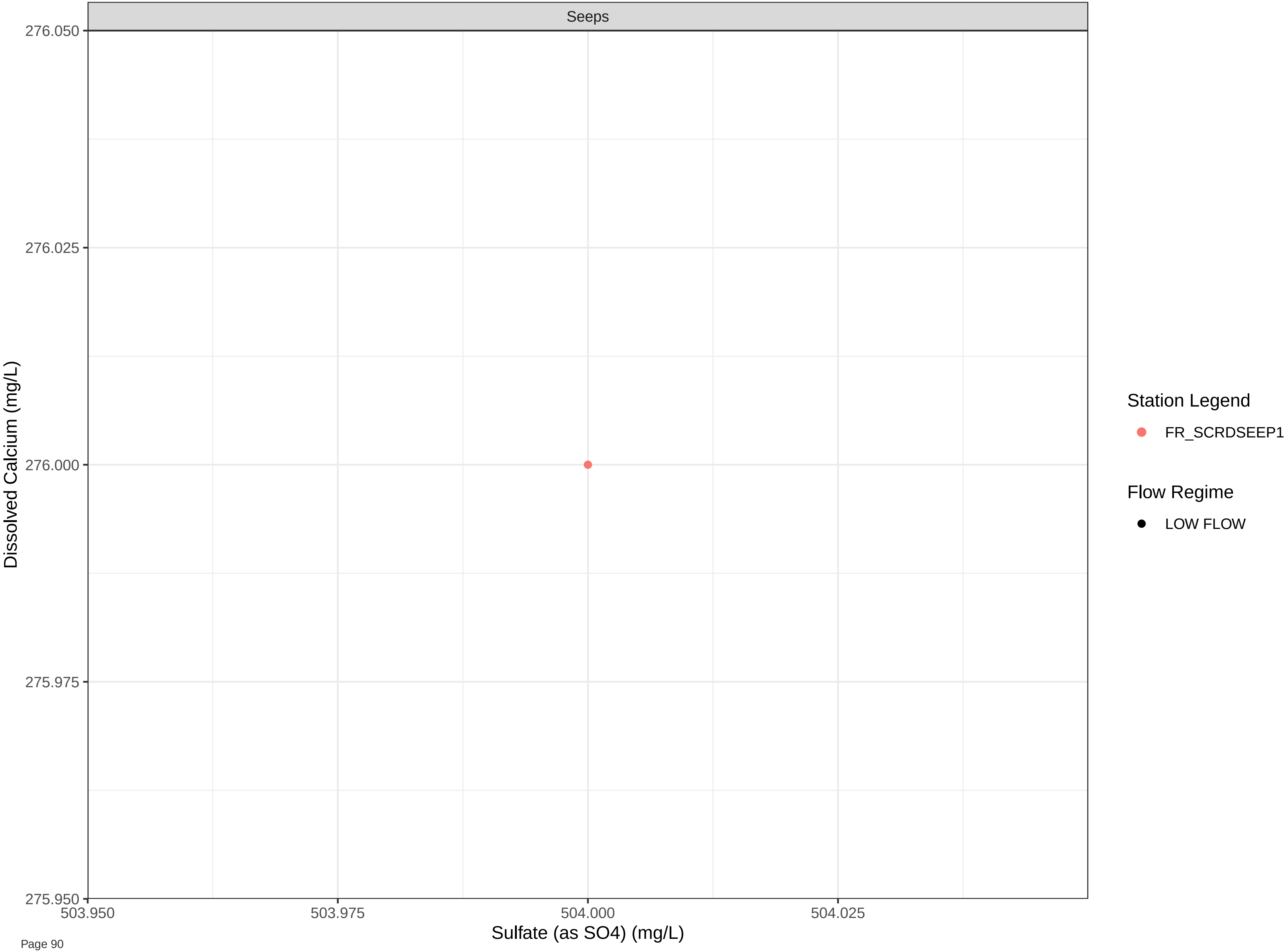

Comparison Point
Seeps
Dissolved Calcium (mg/L)
100
200
300
400
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



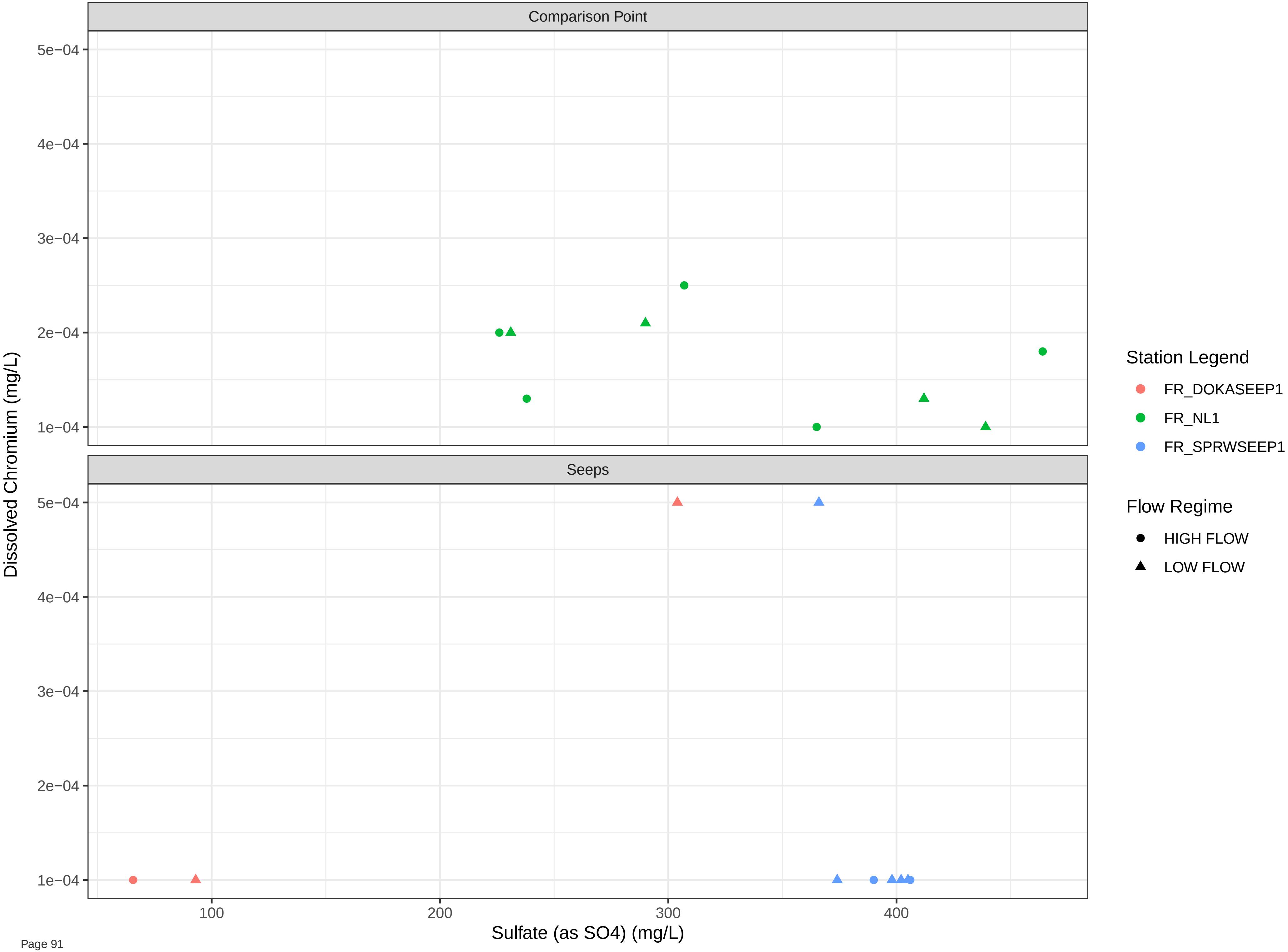
Comparison Point
Seeps
Dissolved Calcium (mg/L)
0
50
100
150
0
50
100
150
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

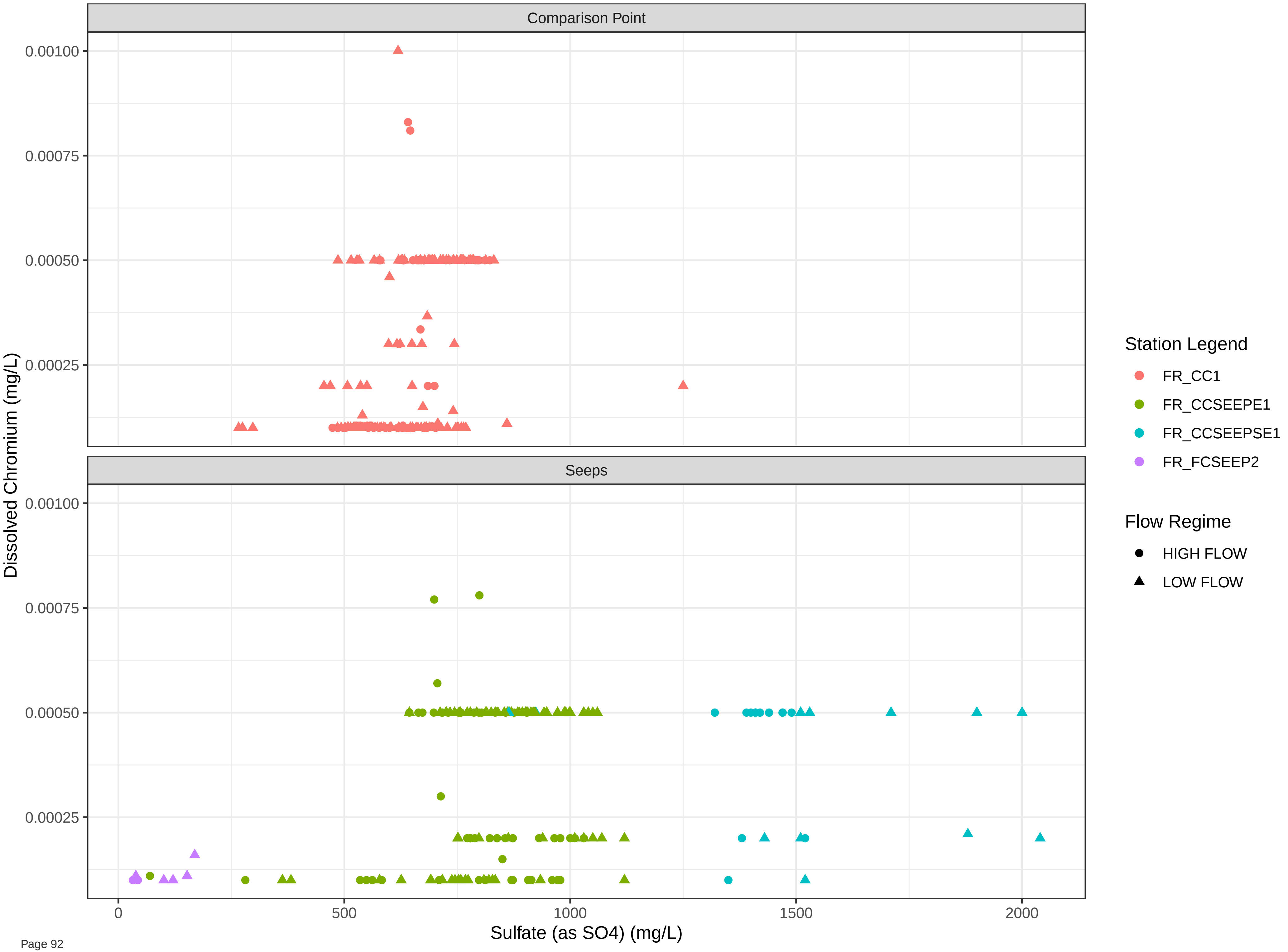


Comparison Point
Seeps
400
300
200
100
0
500
1000
1500
2000
2500
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

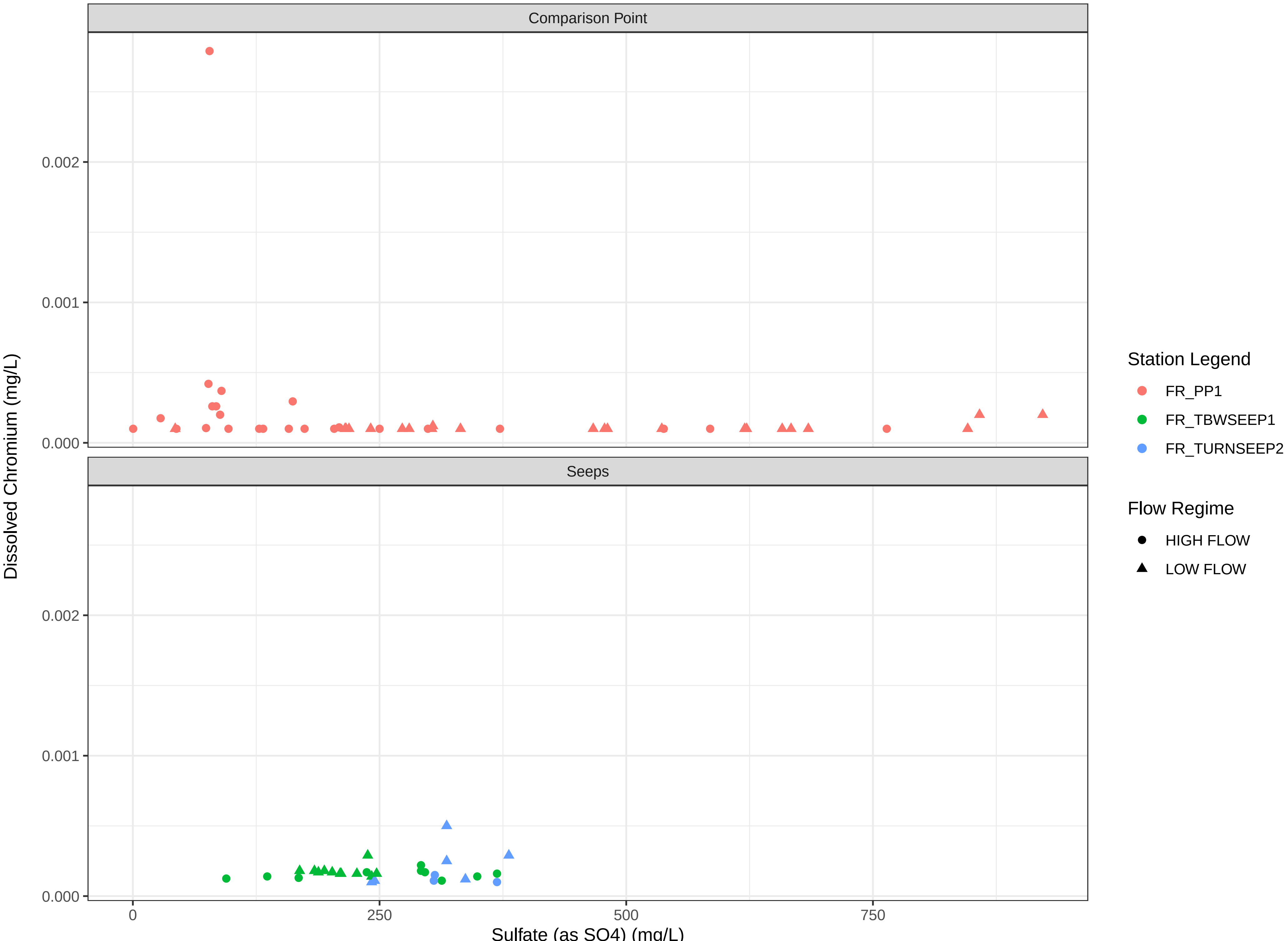


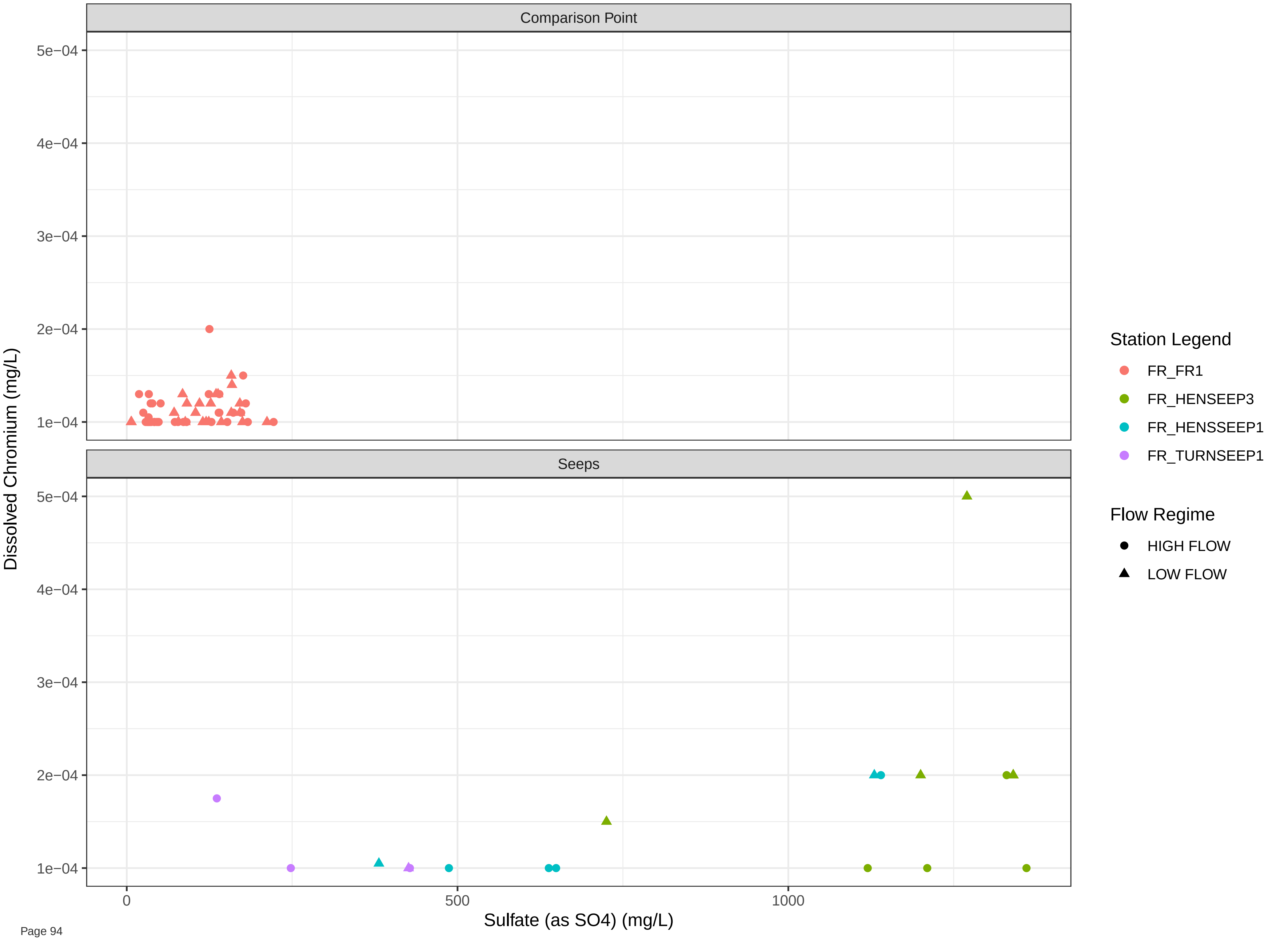
Seeps
276.050
276.025
276.000
275.975
275.950
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Dissolved Calcium (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

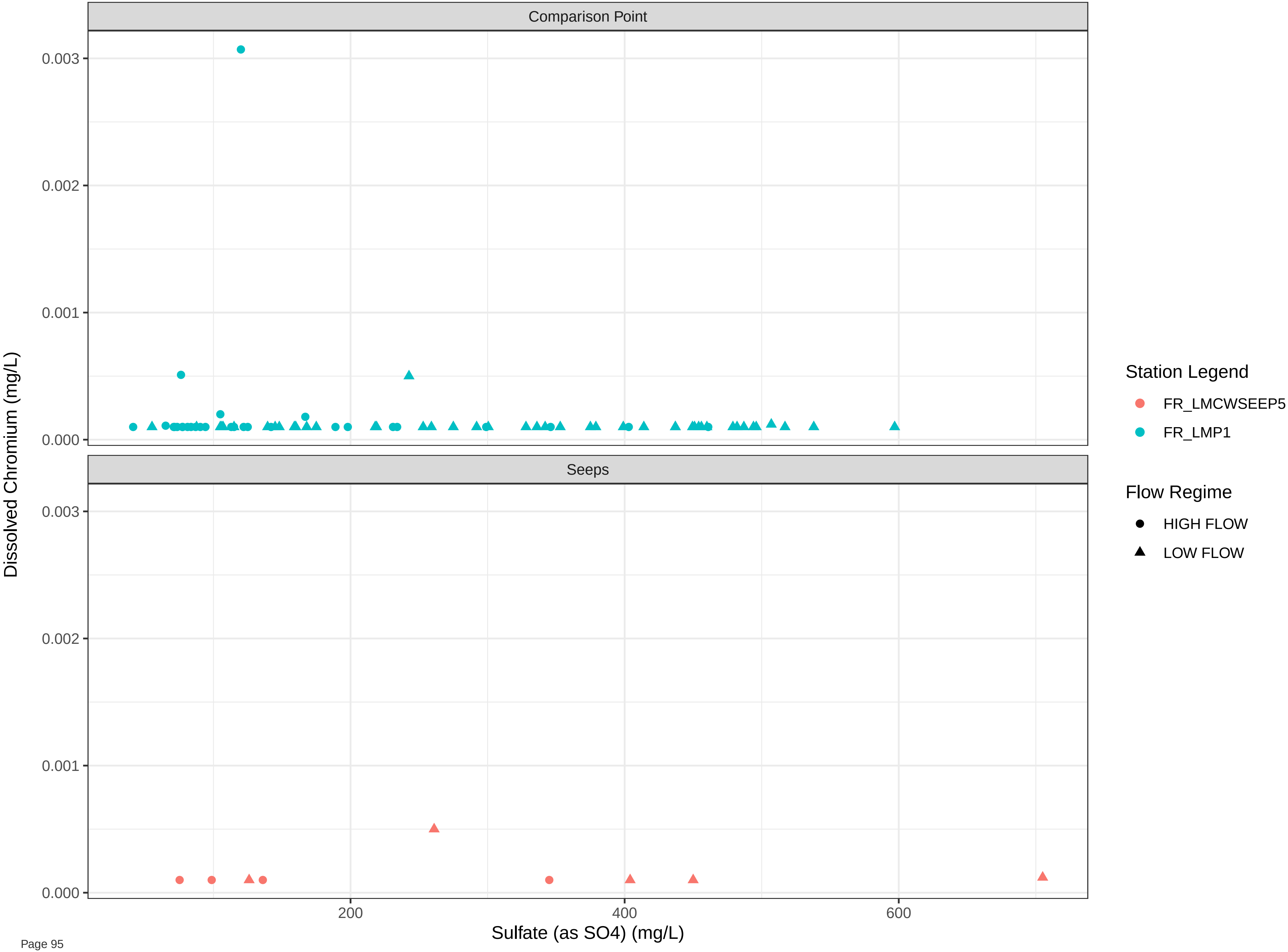

Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
100
200
300
400
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

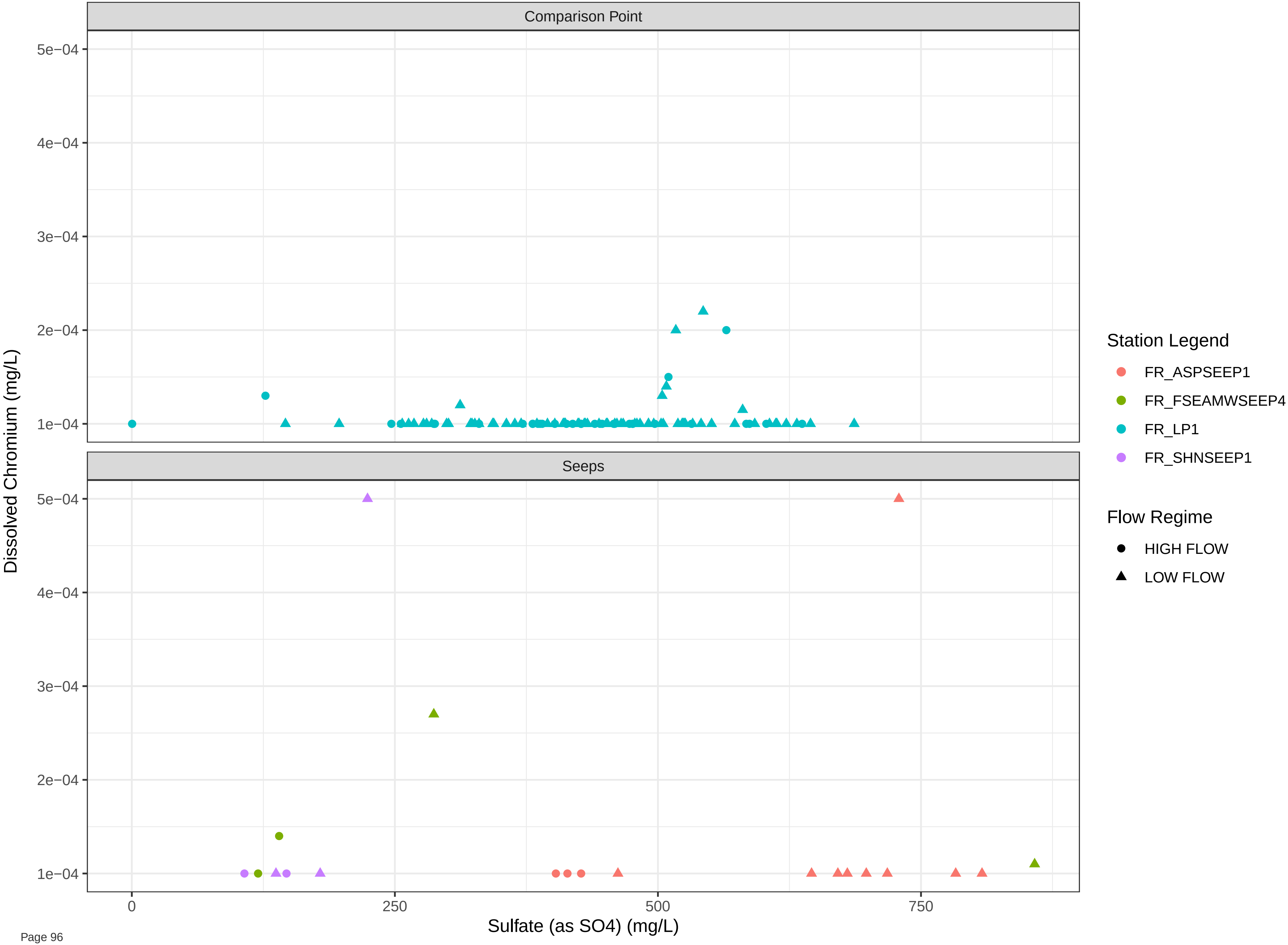


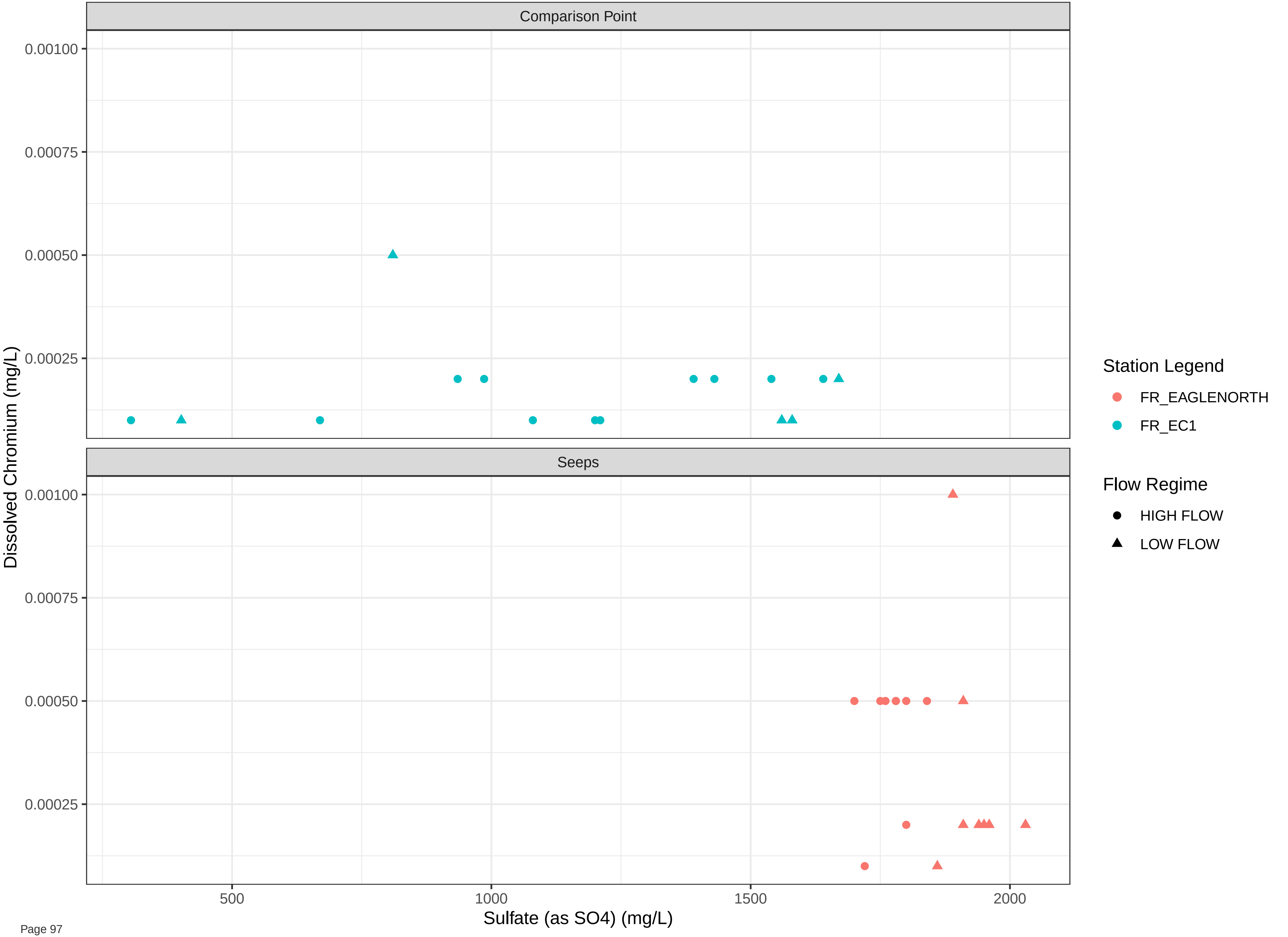
Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.00100
0.00075
0.00050
0.00025
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.000
0.001
0.002
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

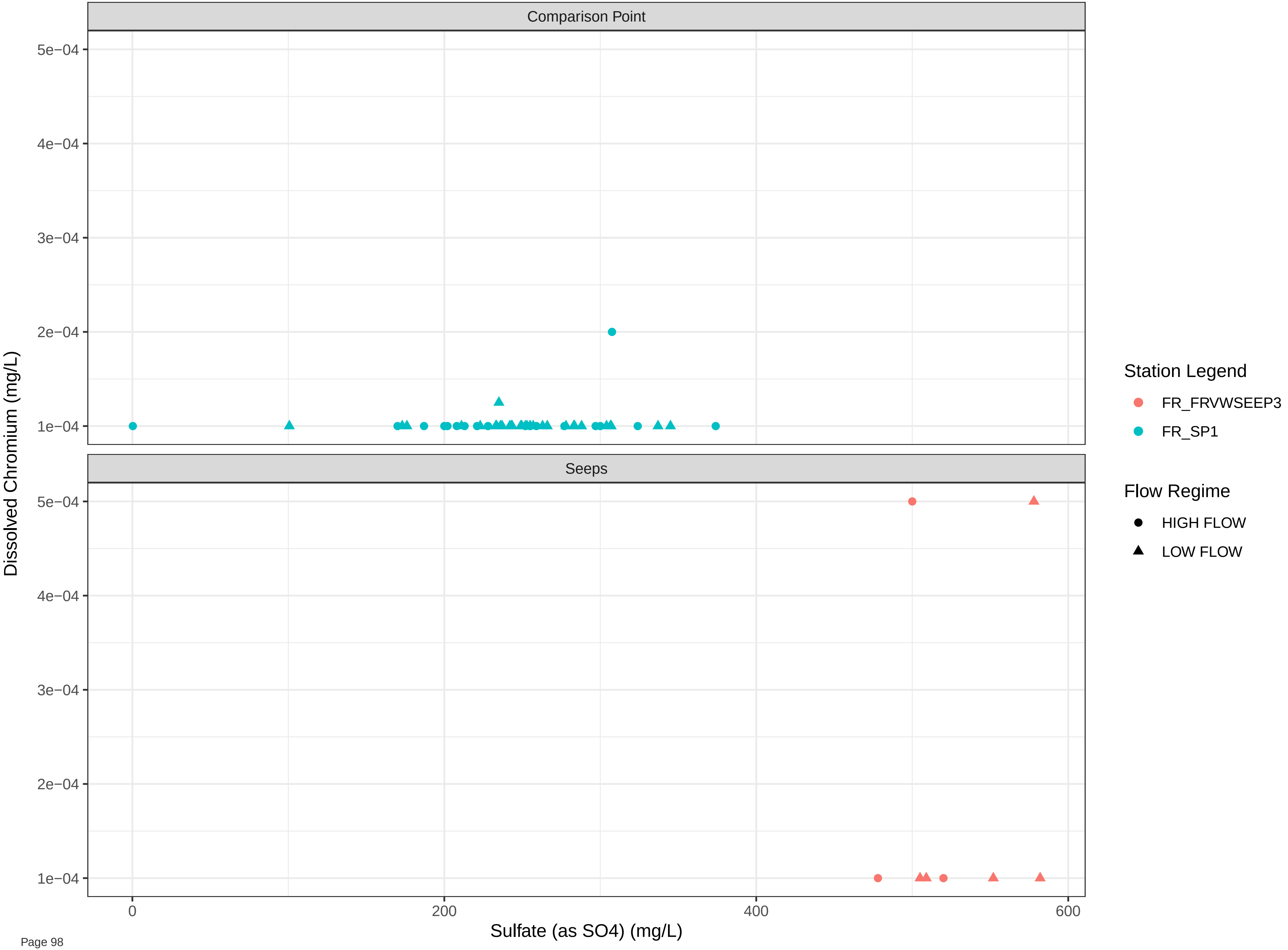

Comparison Point
Seeps
Dissolved Chromium (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.003
0.002
0.001
0.000
200
400
600
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

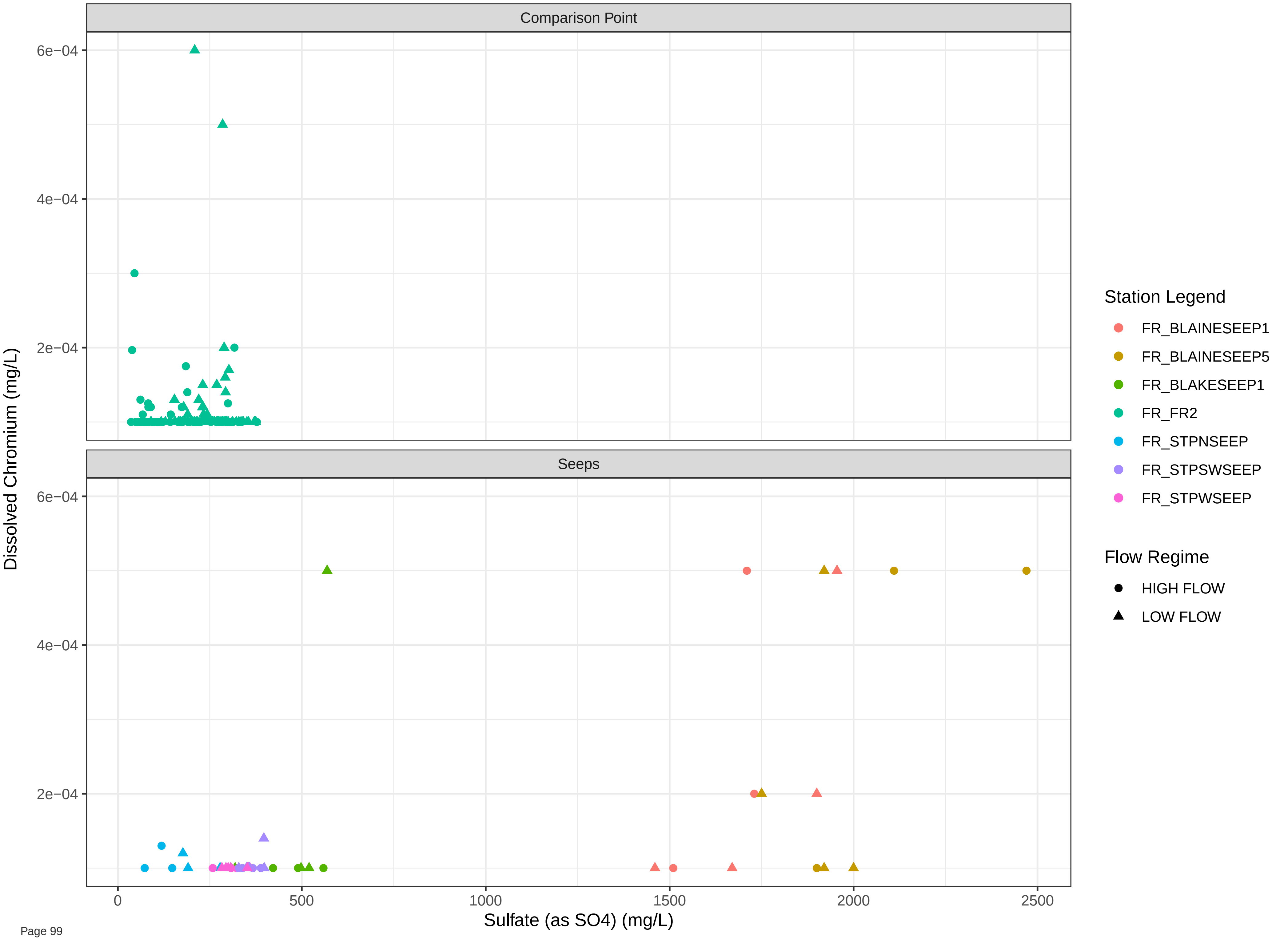

Comparison Point
Seeps
Dissolved Chromium (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

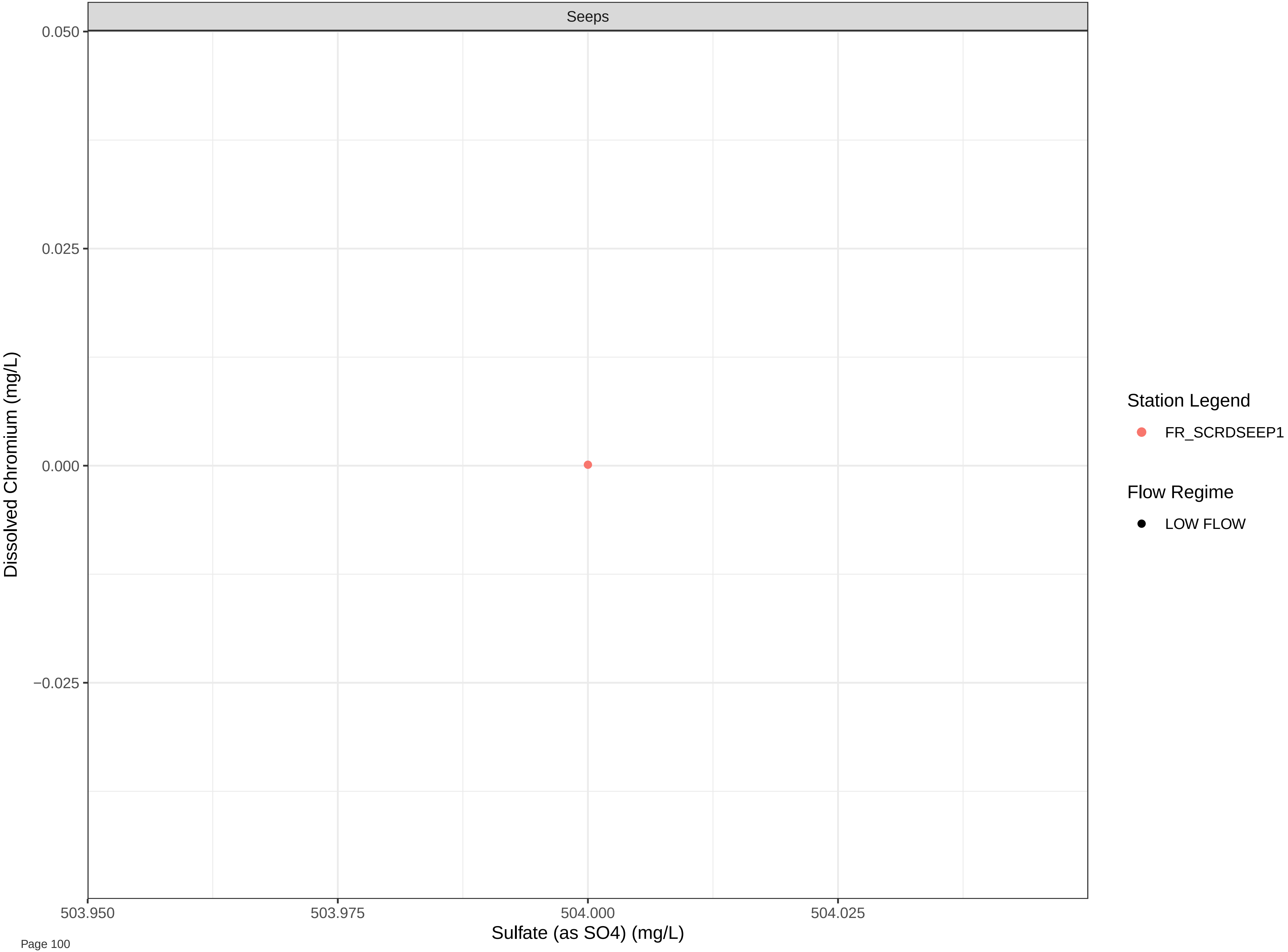


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.00100
0.00075
0.00050
0.00025
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

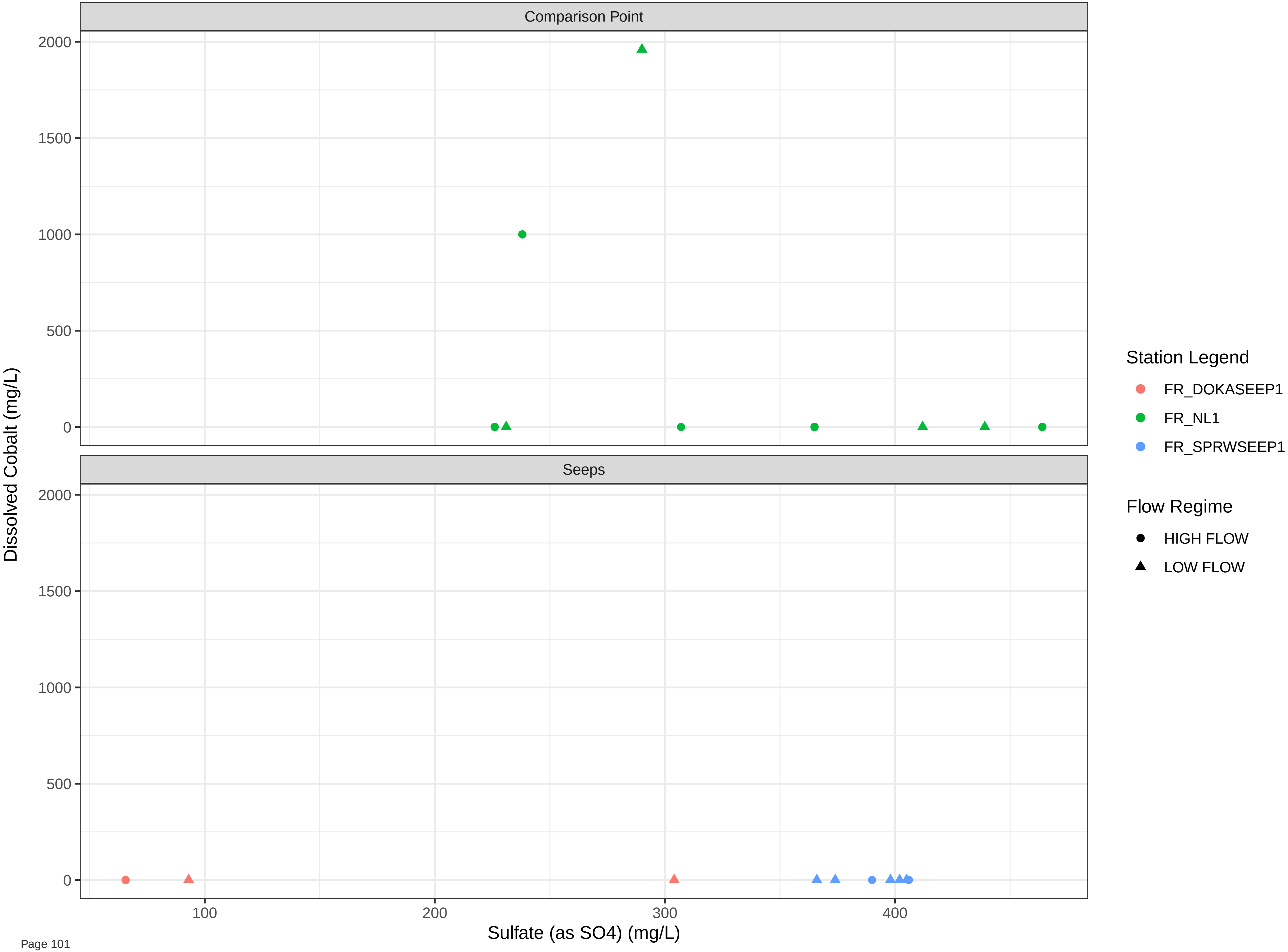


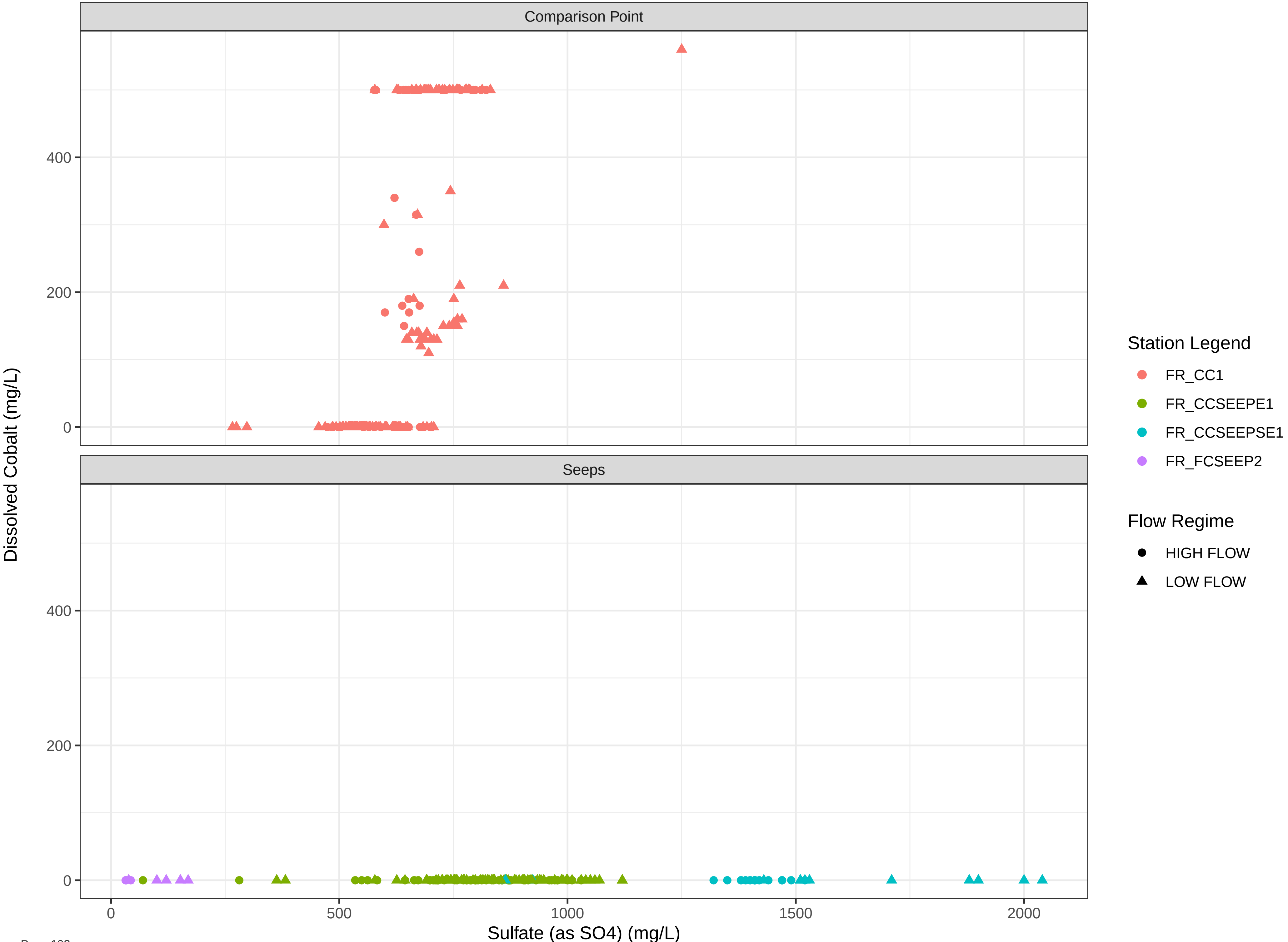
Comparison Point
Seeps
Dissolved Chromium (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Chromium (mg/L)
6e−04
4e−04
2e−04
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

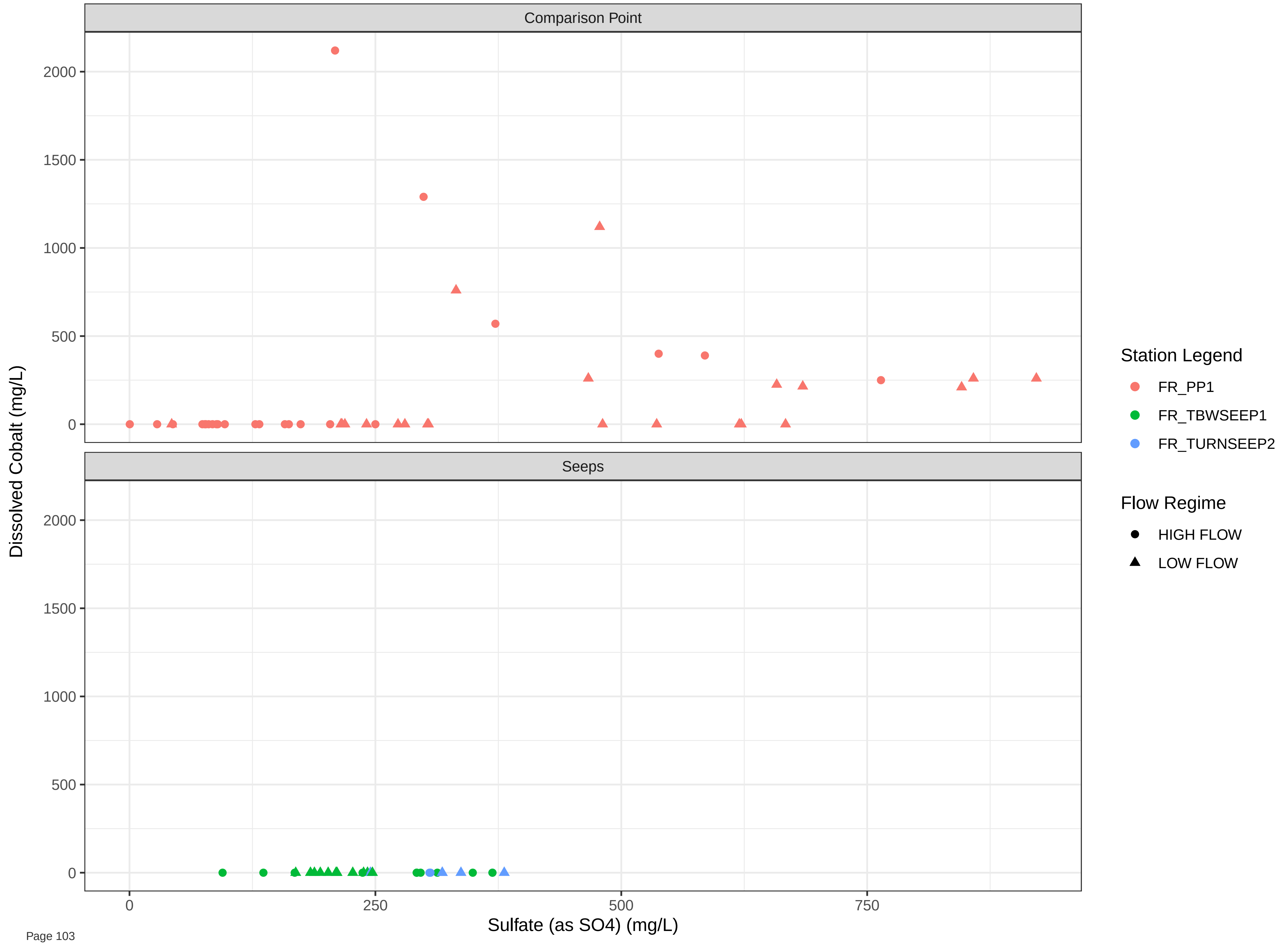


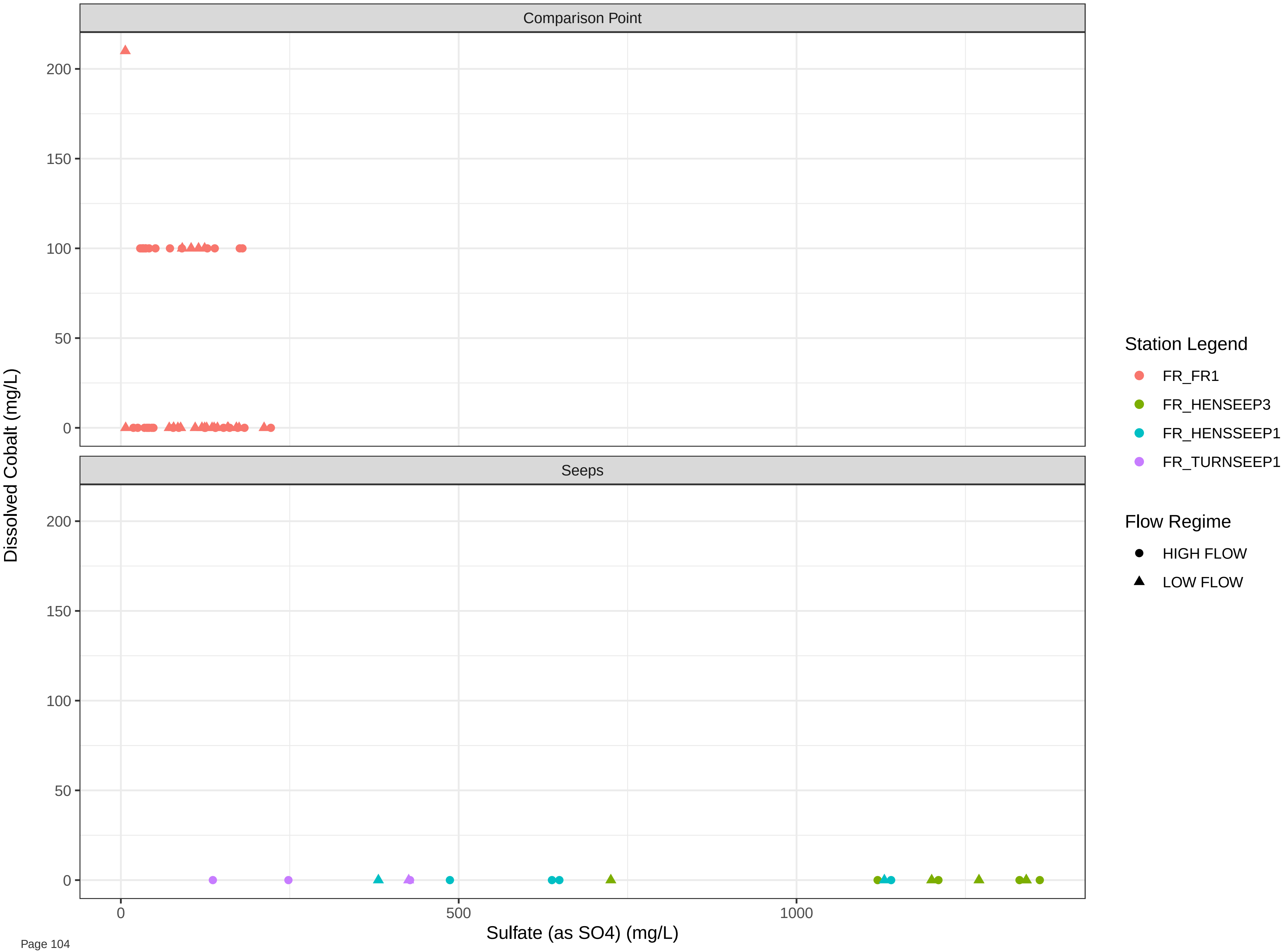
Seeps
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Dissolved Chromium (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

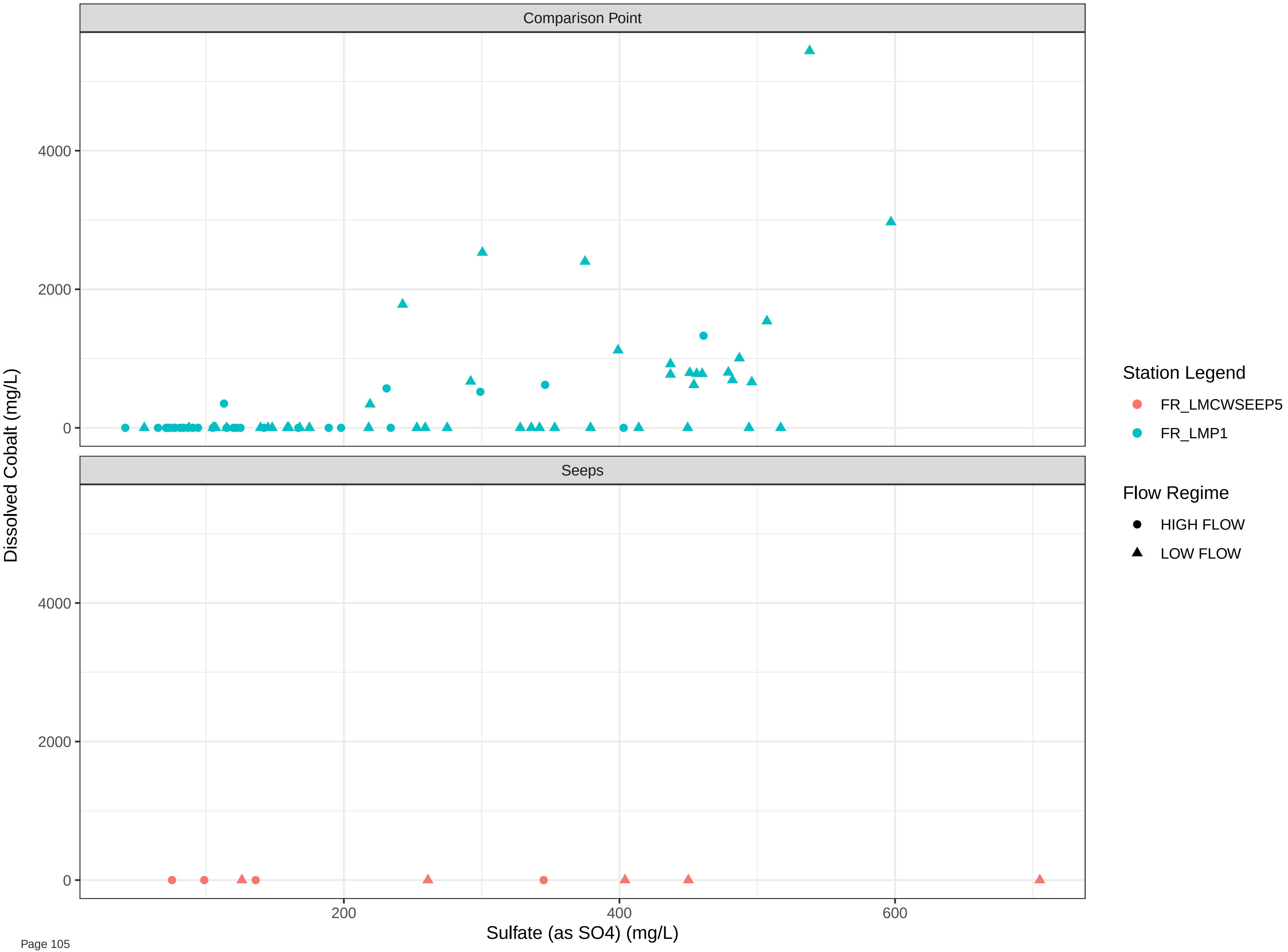

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

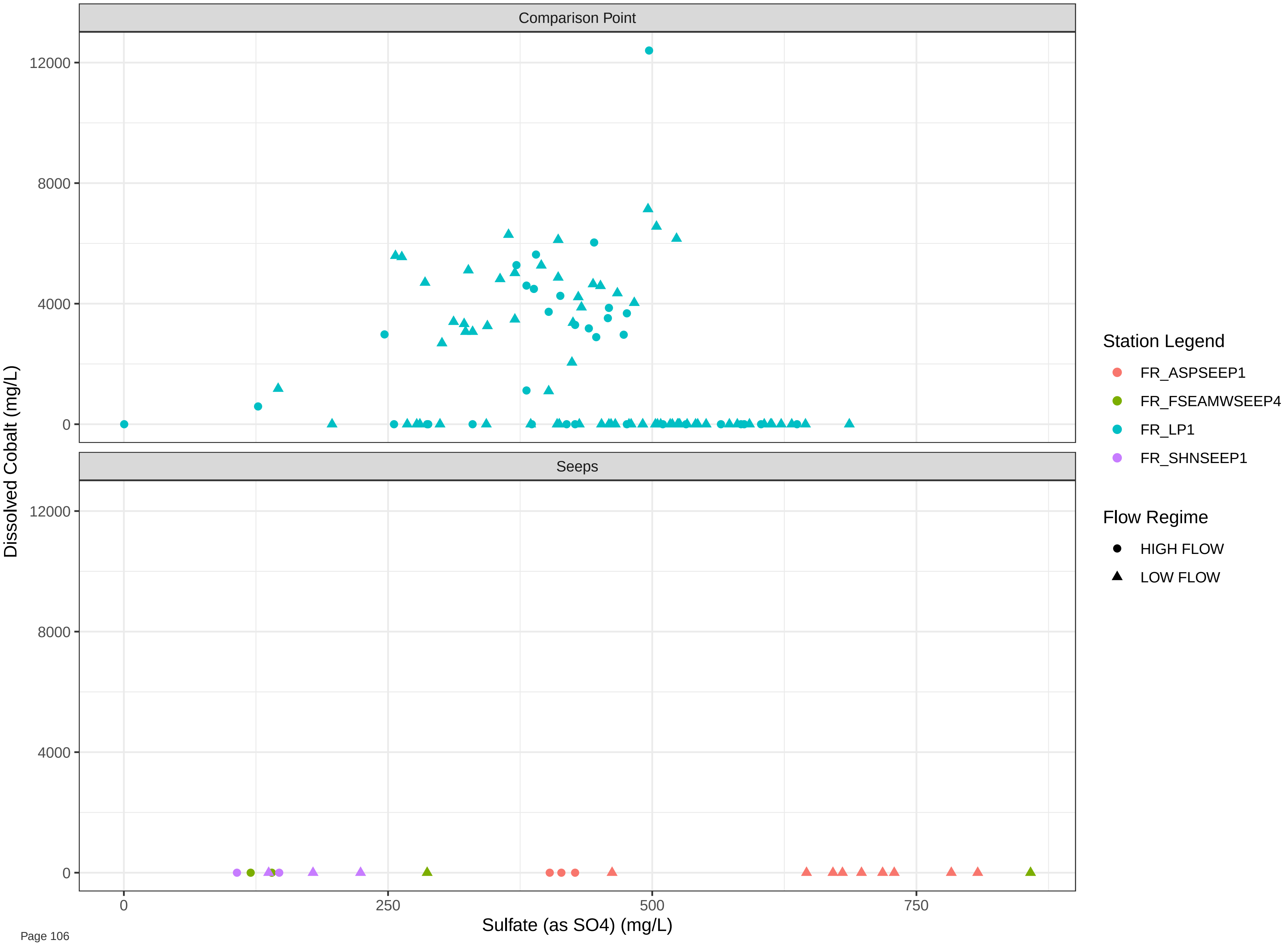


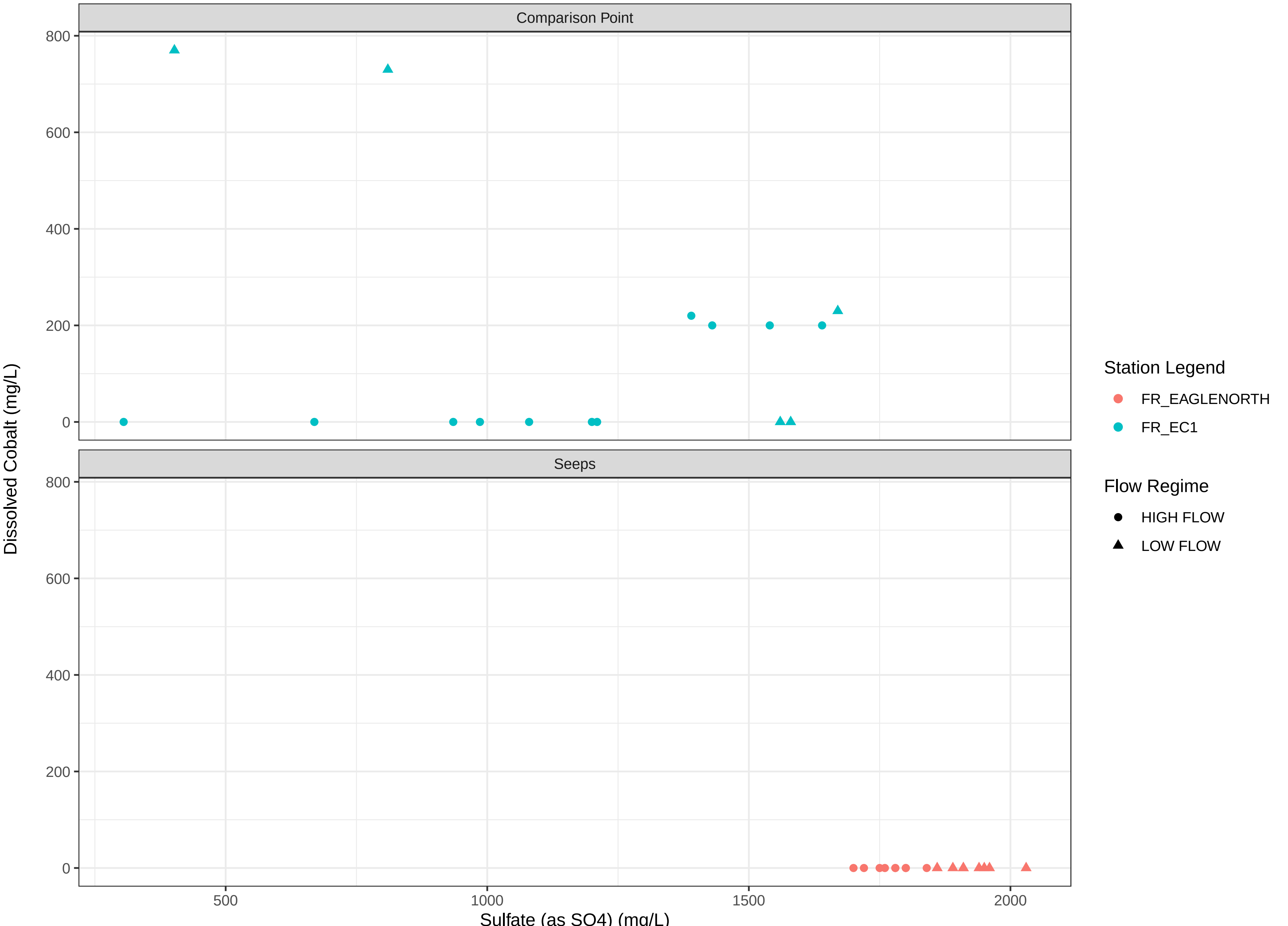
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
0
200
400
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

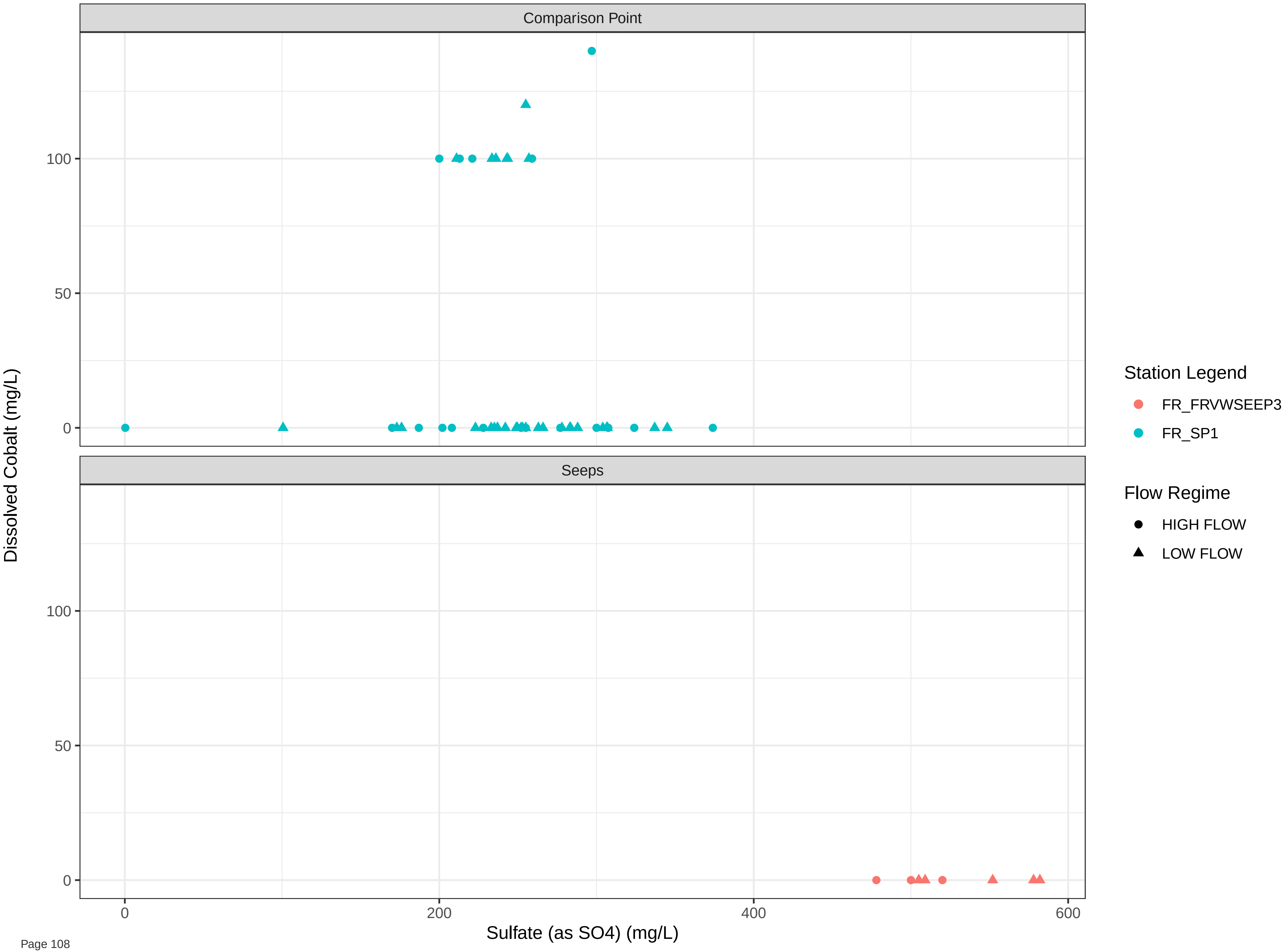

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

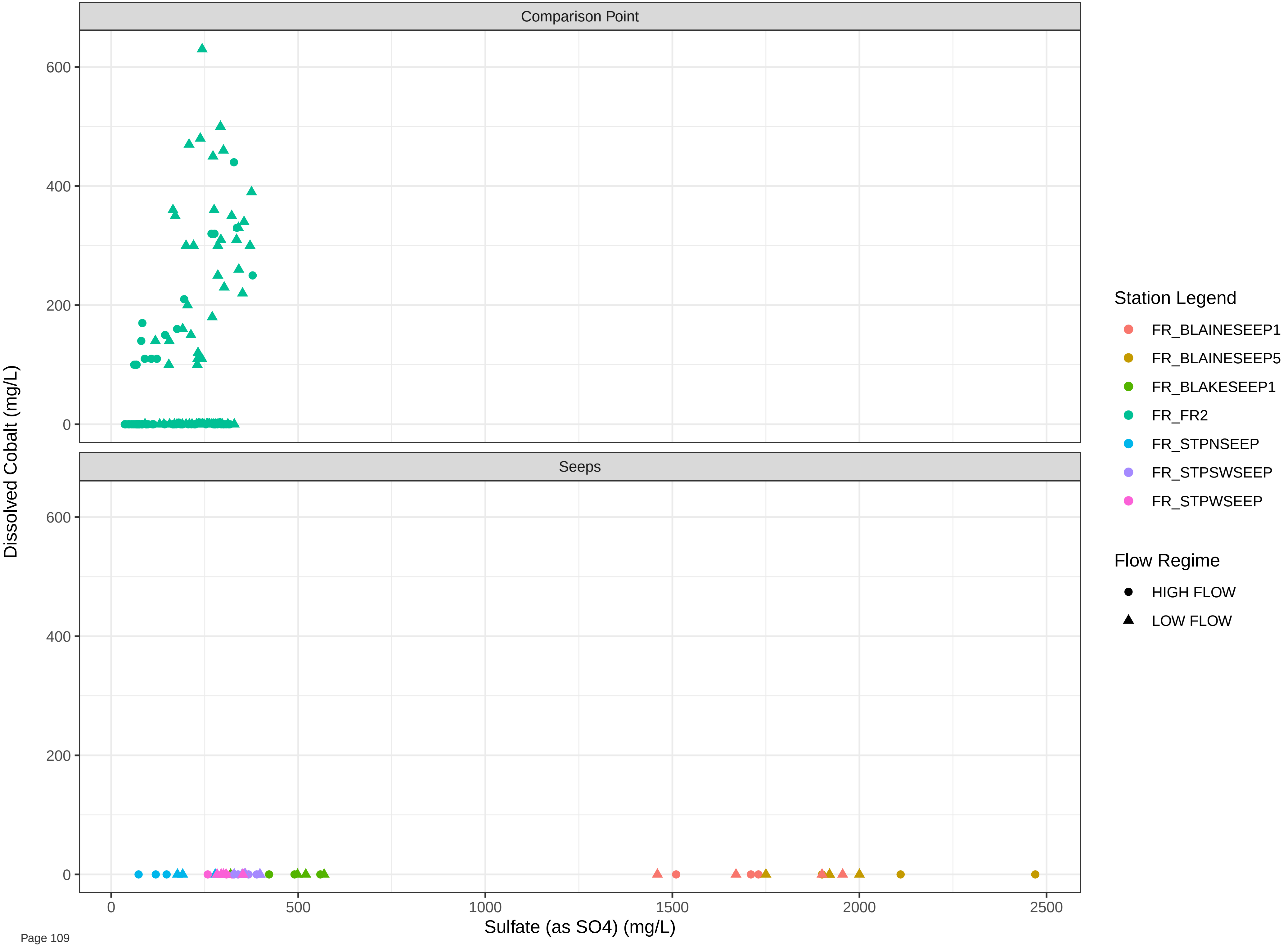

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
0
2000
4000
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
12000
8000
4000
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

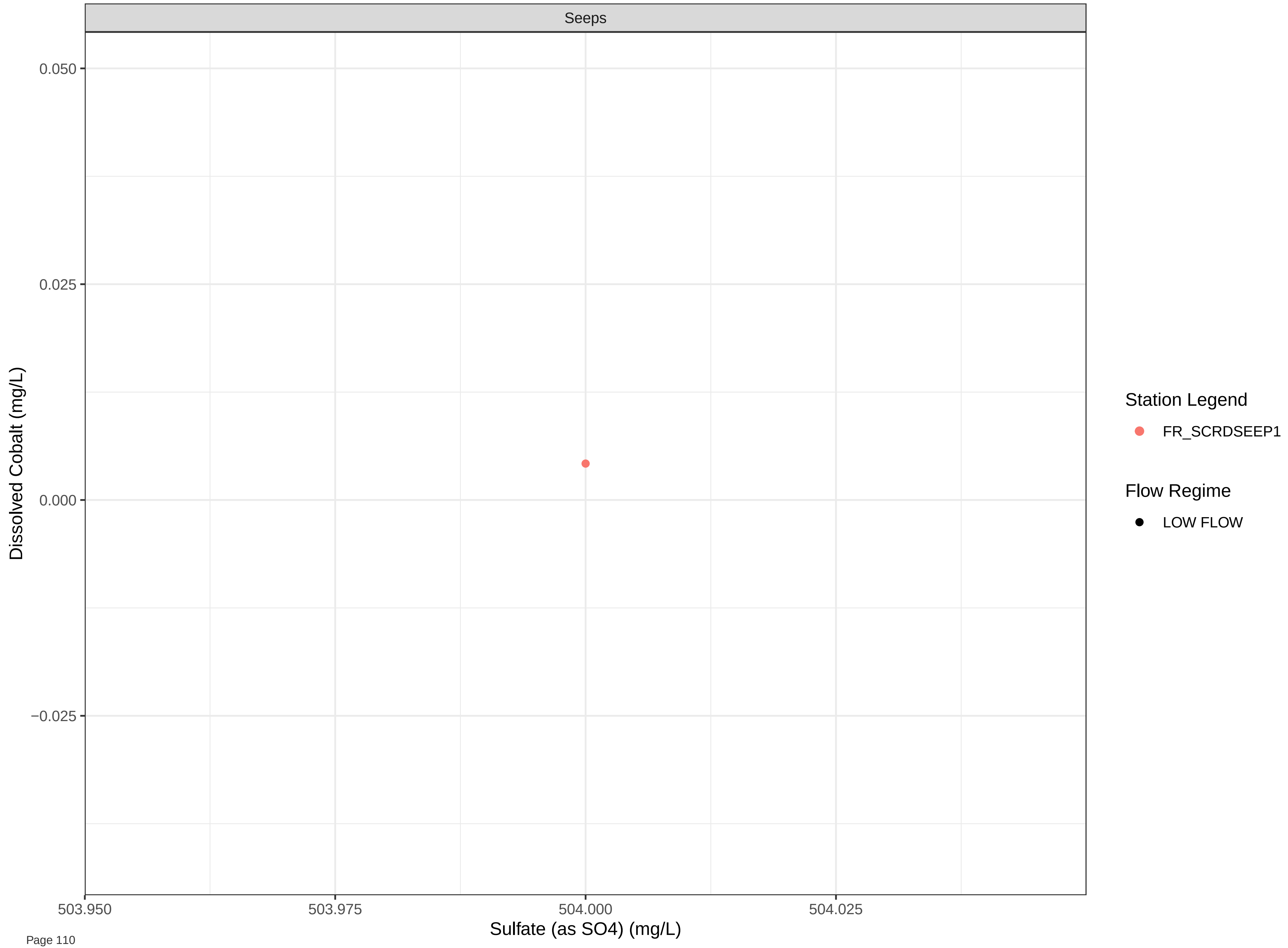

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
800
600
400
200
0
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



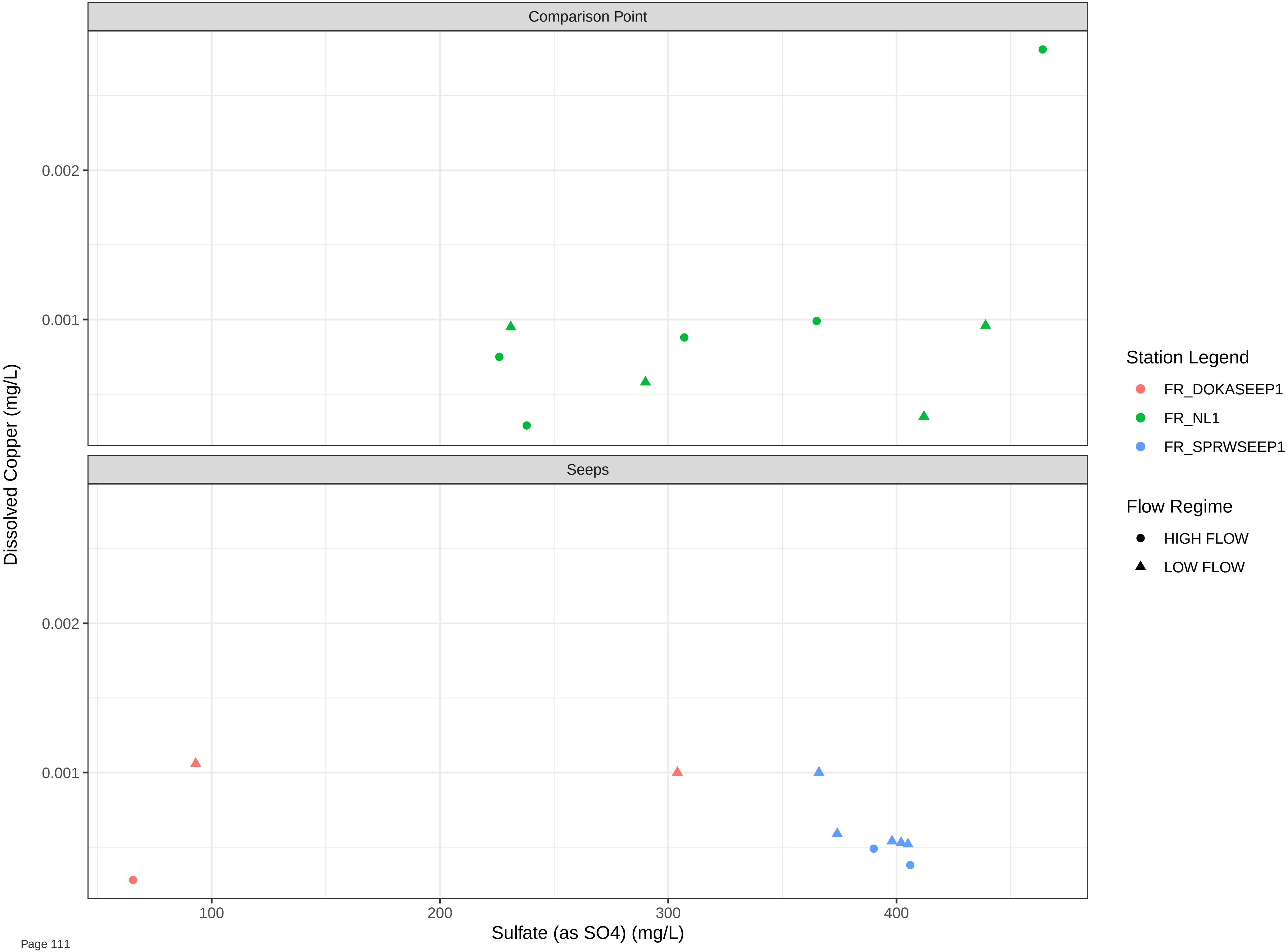
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
100
50
0
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

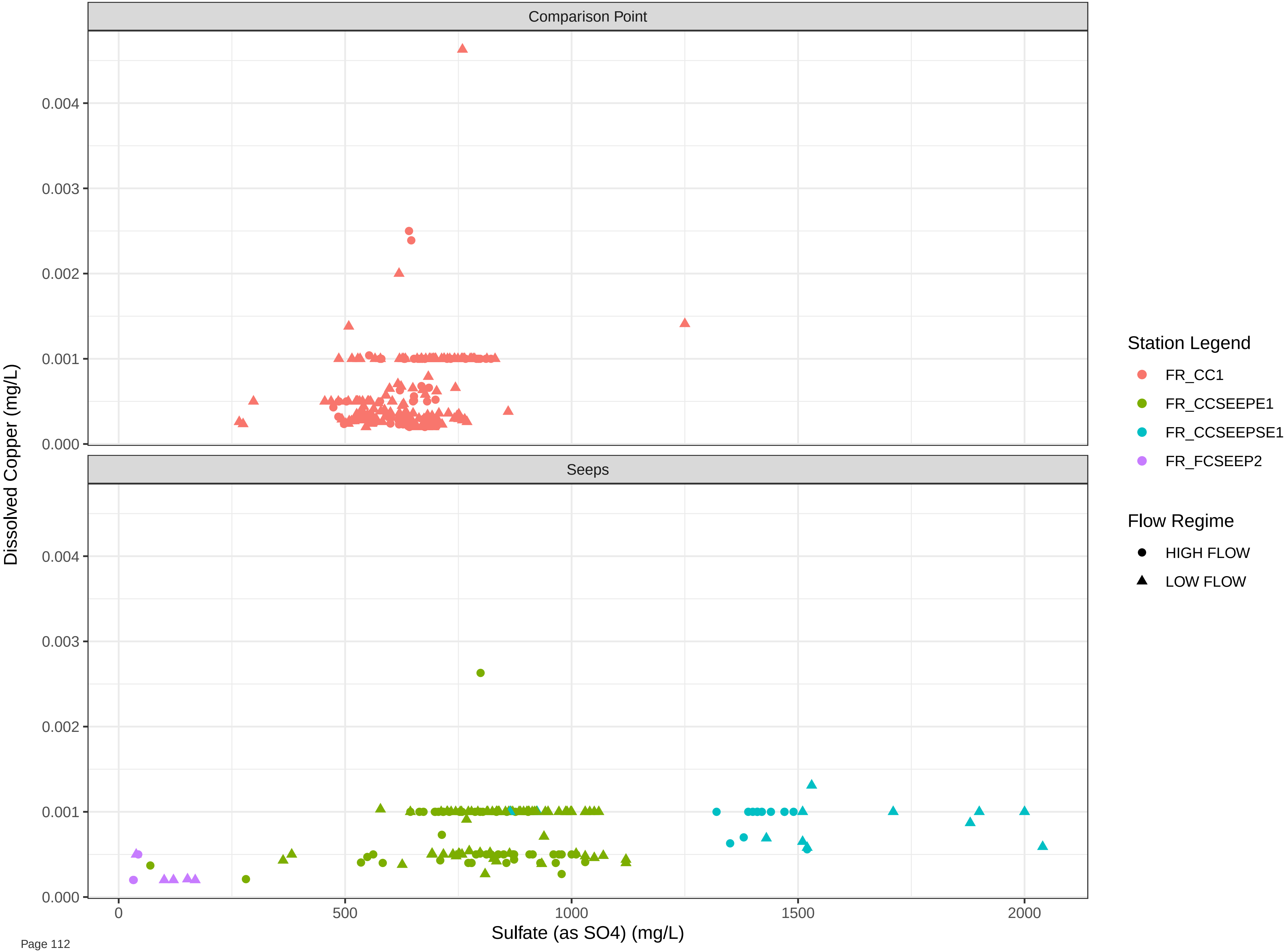


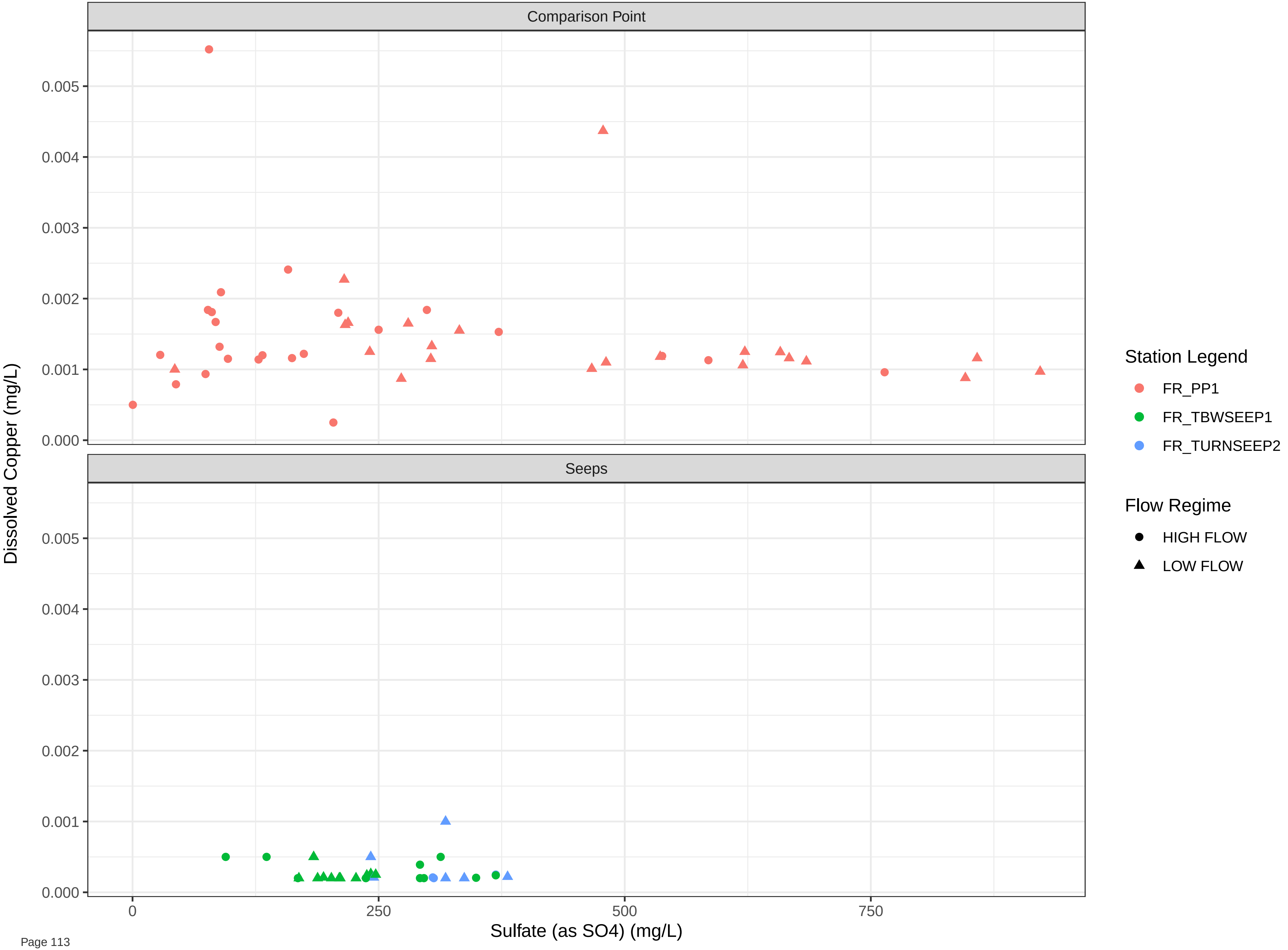
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
200
400
600
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

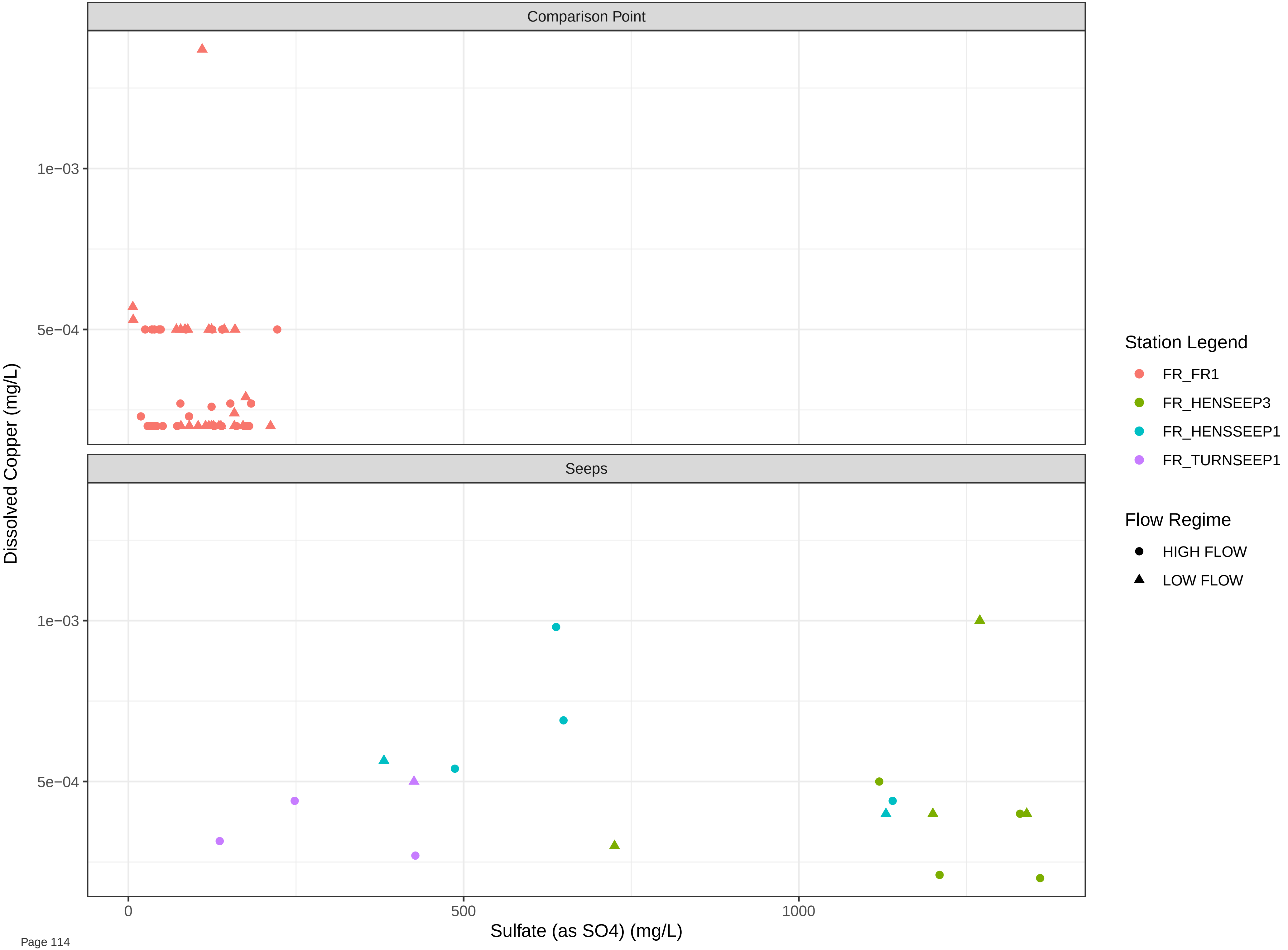


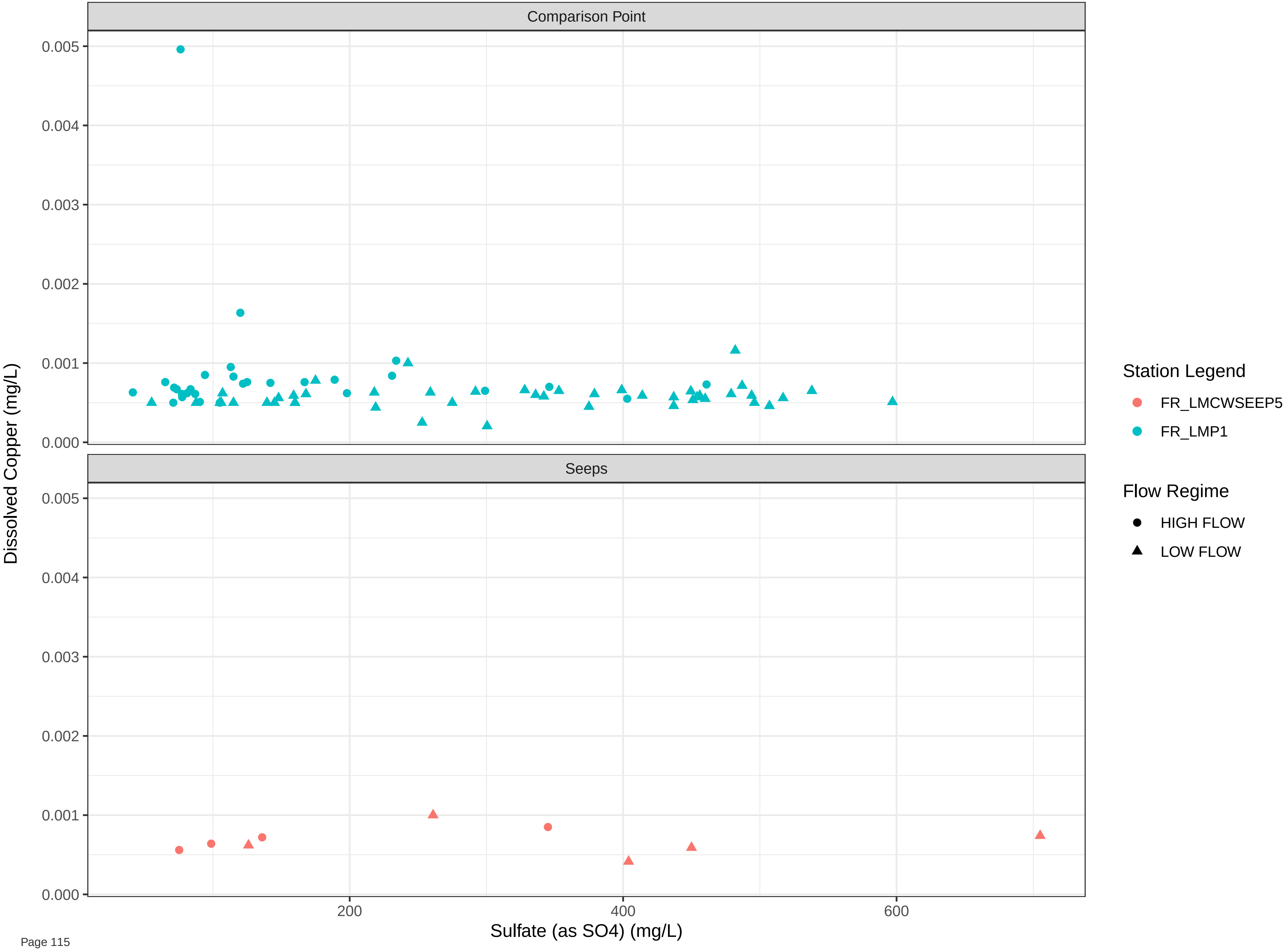
Seeps
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Dissolved Cobalt (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

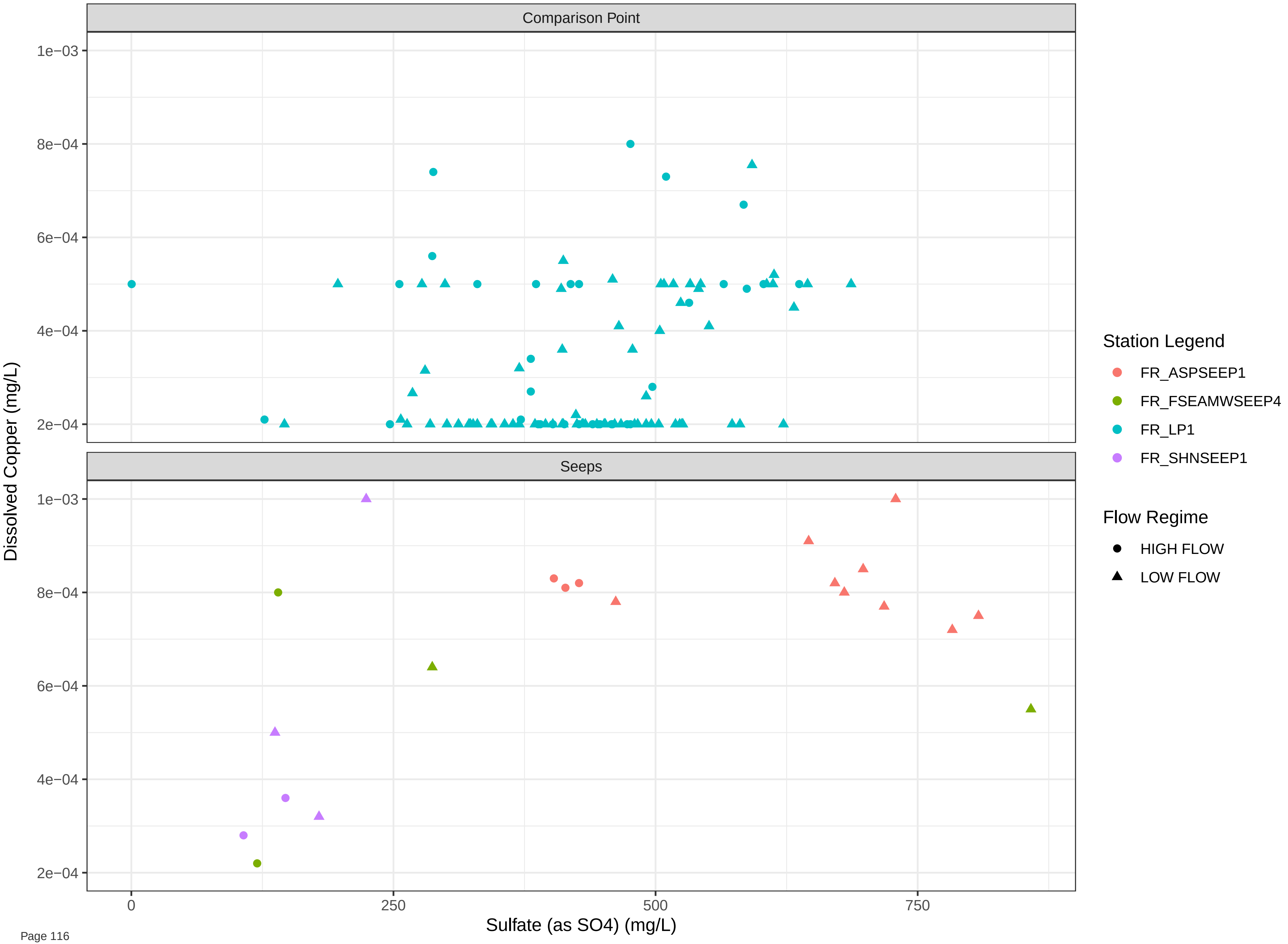

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.002
0.001
0.002
0.001
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Copper (mg/L)
0.000
0.001
0.002
0.003
0.004
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

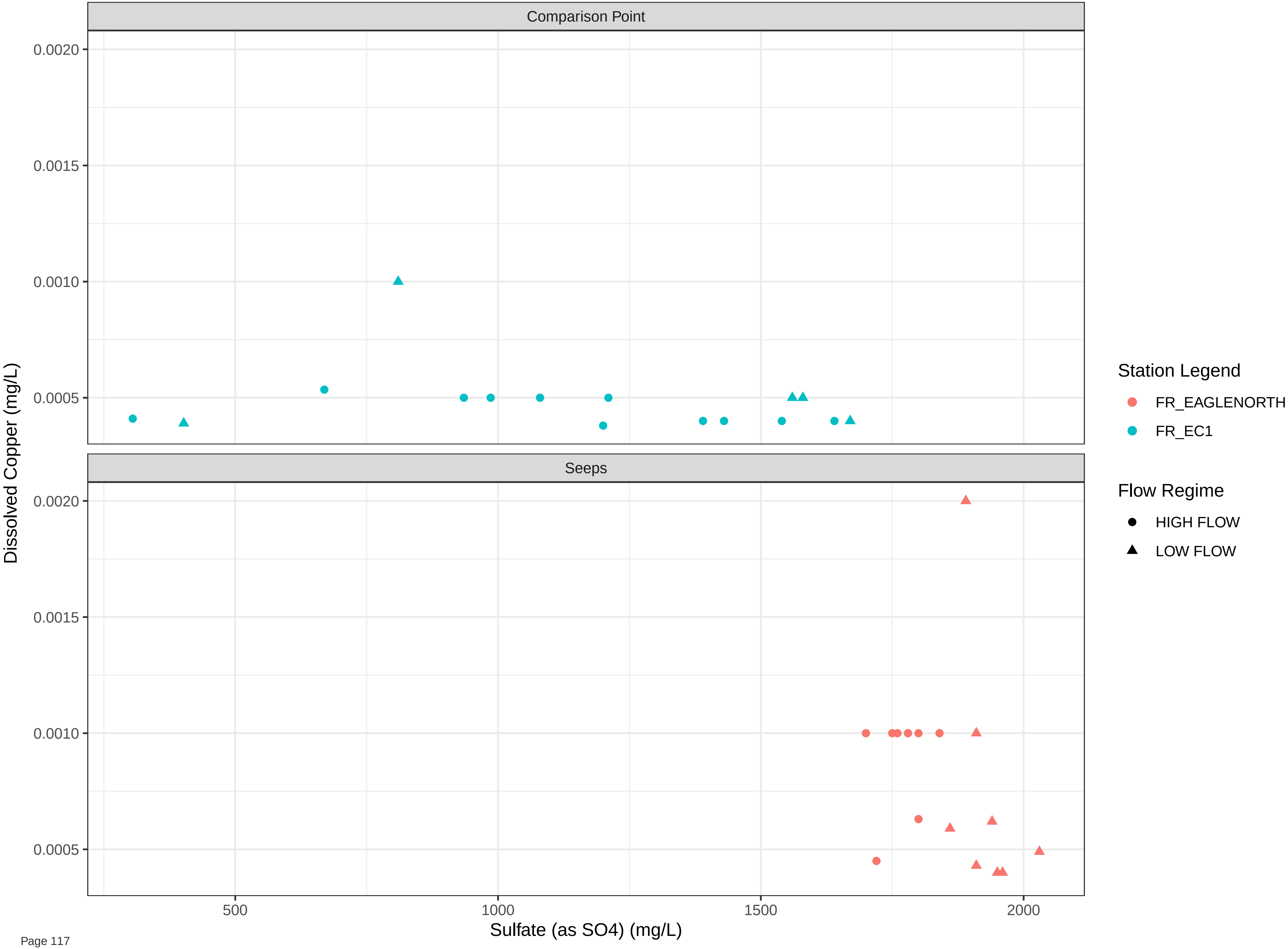

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.000
0.001
0.002
0.003
0.004
0.005
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Copper (mg/L)
1e−03
5e−04
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

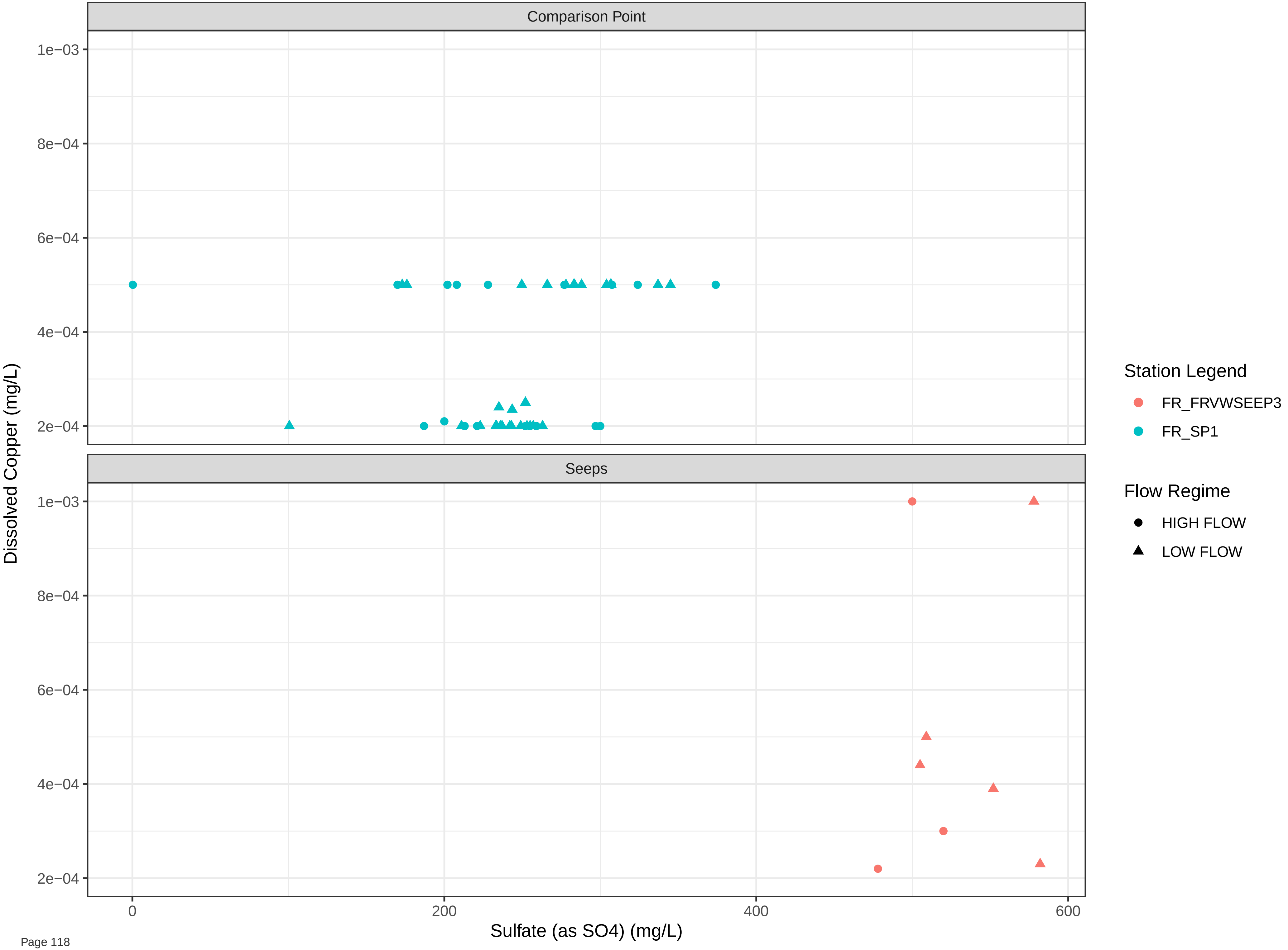

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.005
0.004
0.003
0.002
0.001
0.000
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

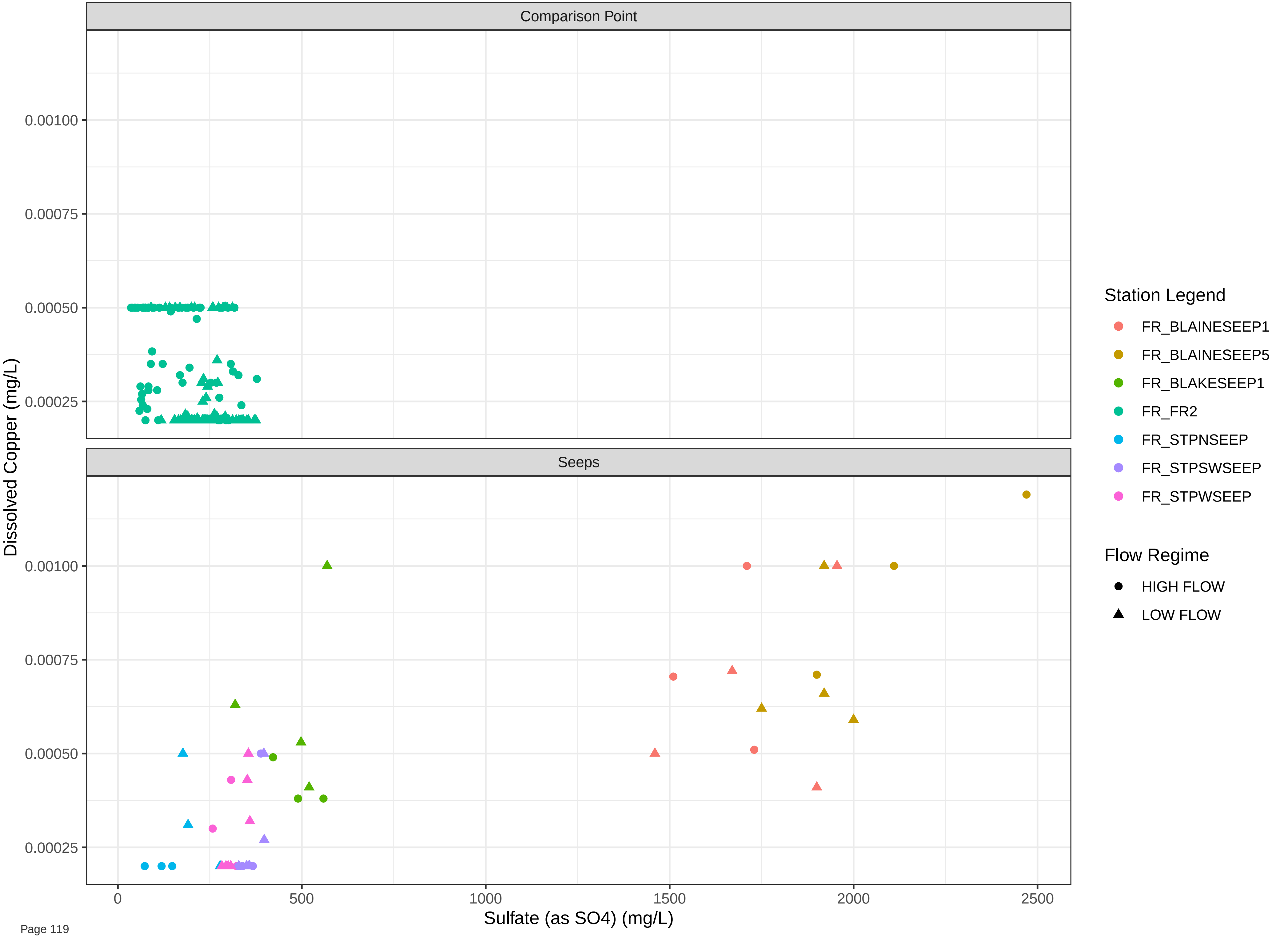


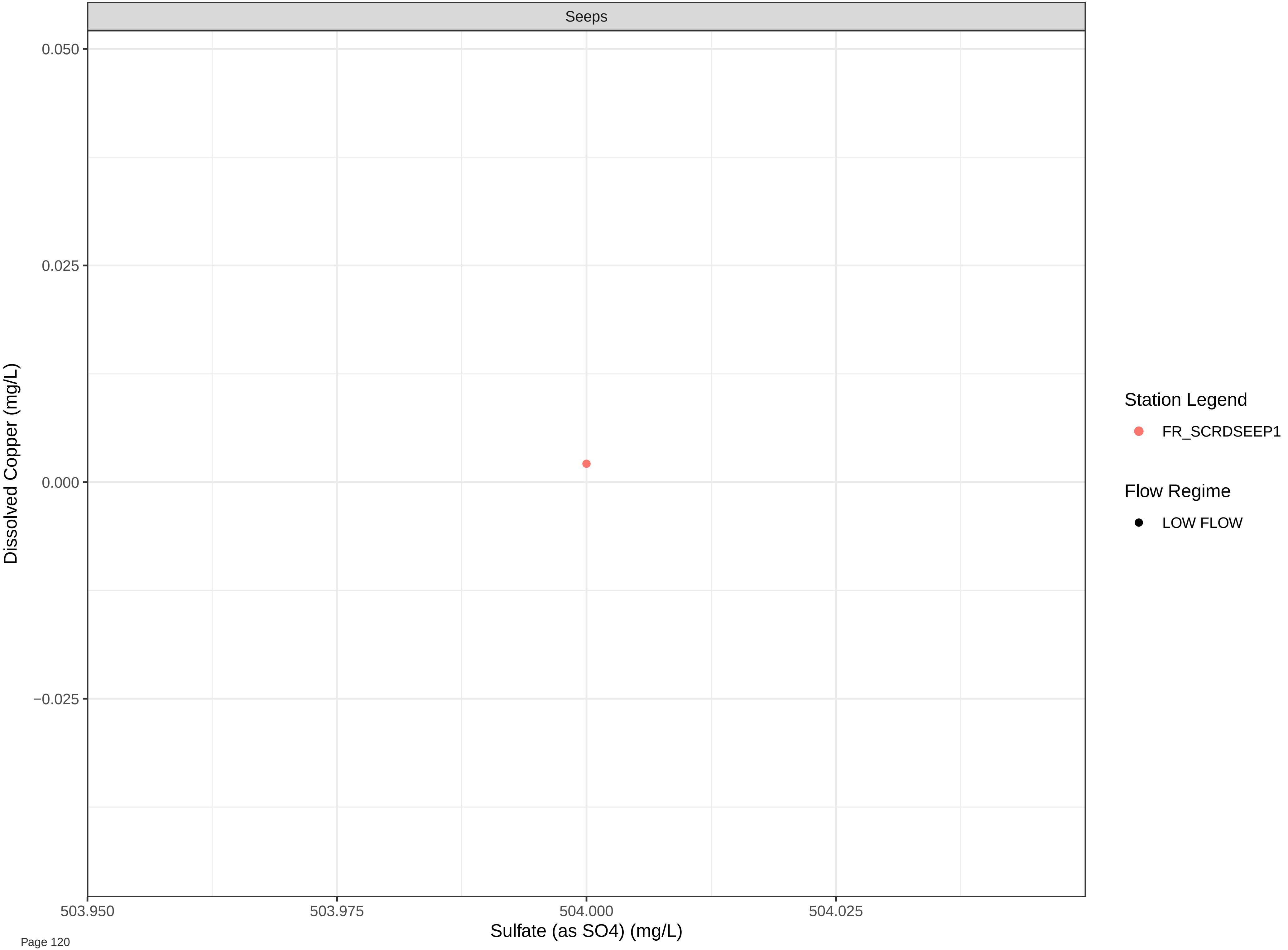
Comparison Point
Seeps
Dissolved Copper (mg/L)
1e−03
8e−04
6e−04
4e−04
2e−04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



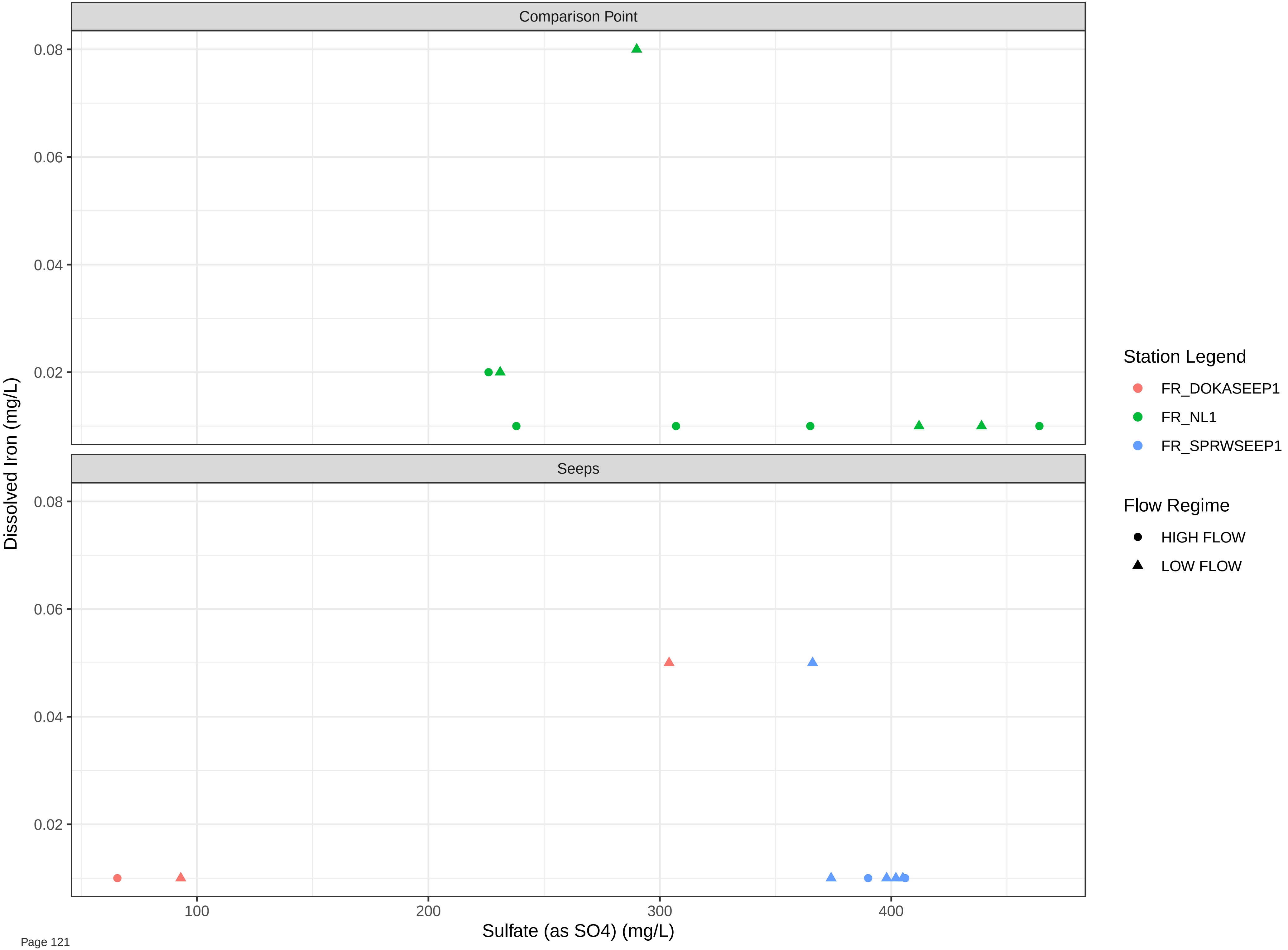
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.0020
0.0015
0.0010
0.0005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

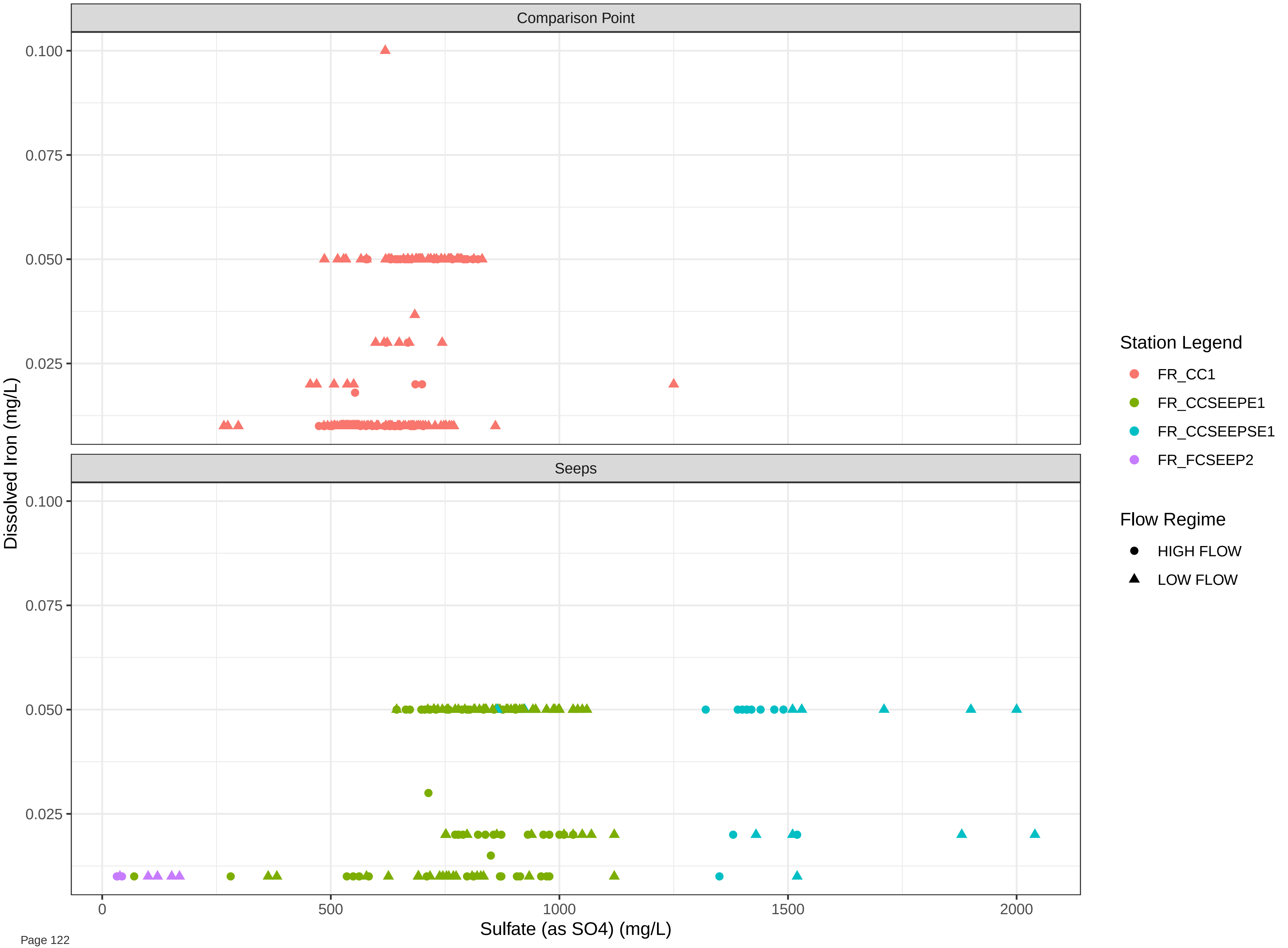

Comparison Point
Seeps
Dissolved Copper (mg/L)
1e−03
8e−04
6e−04
4e−04
2e−04
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

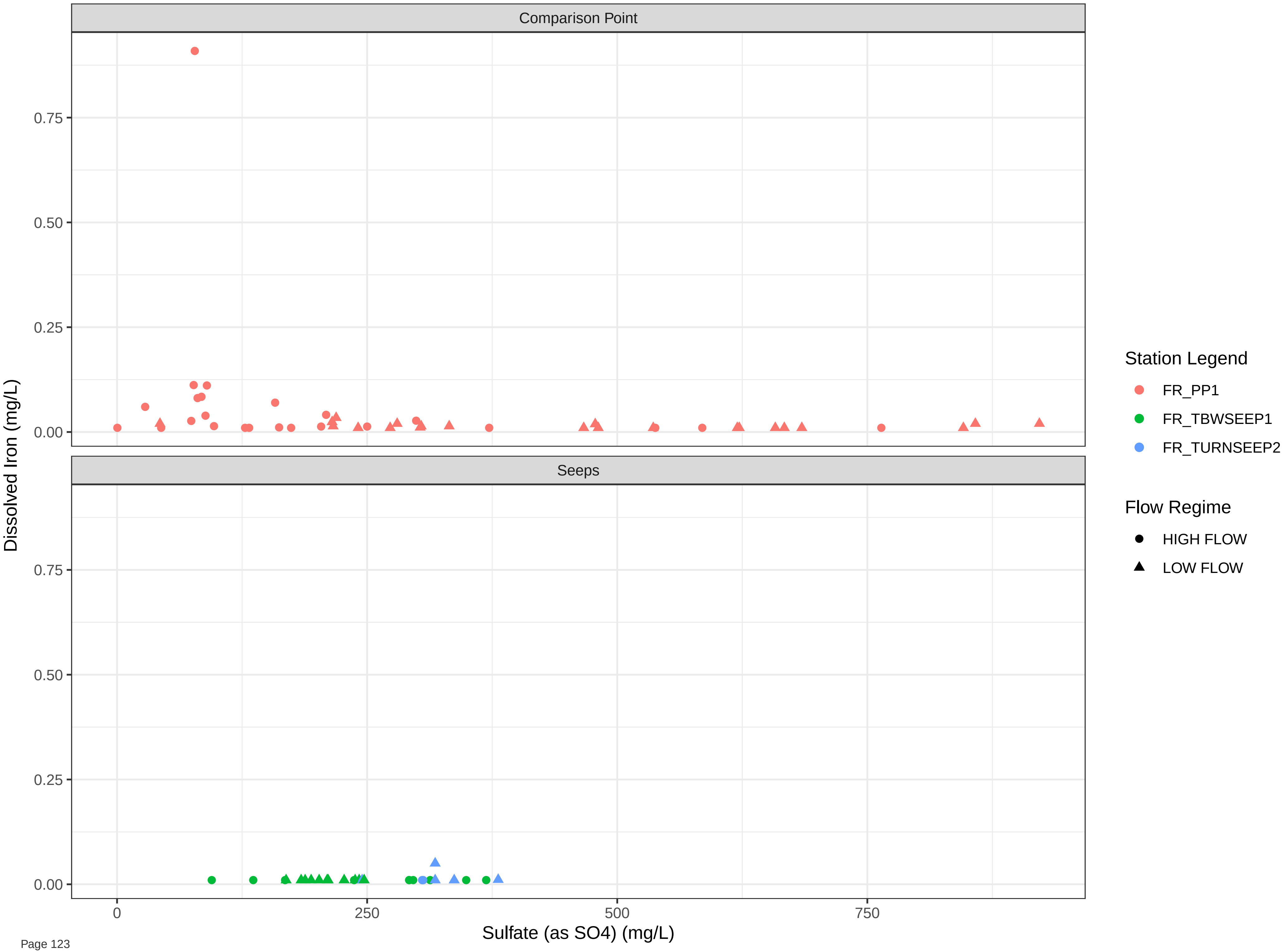

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.00100
0.00075
0.00050
0.00025
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

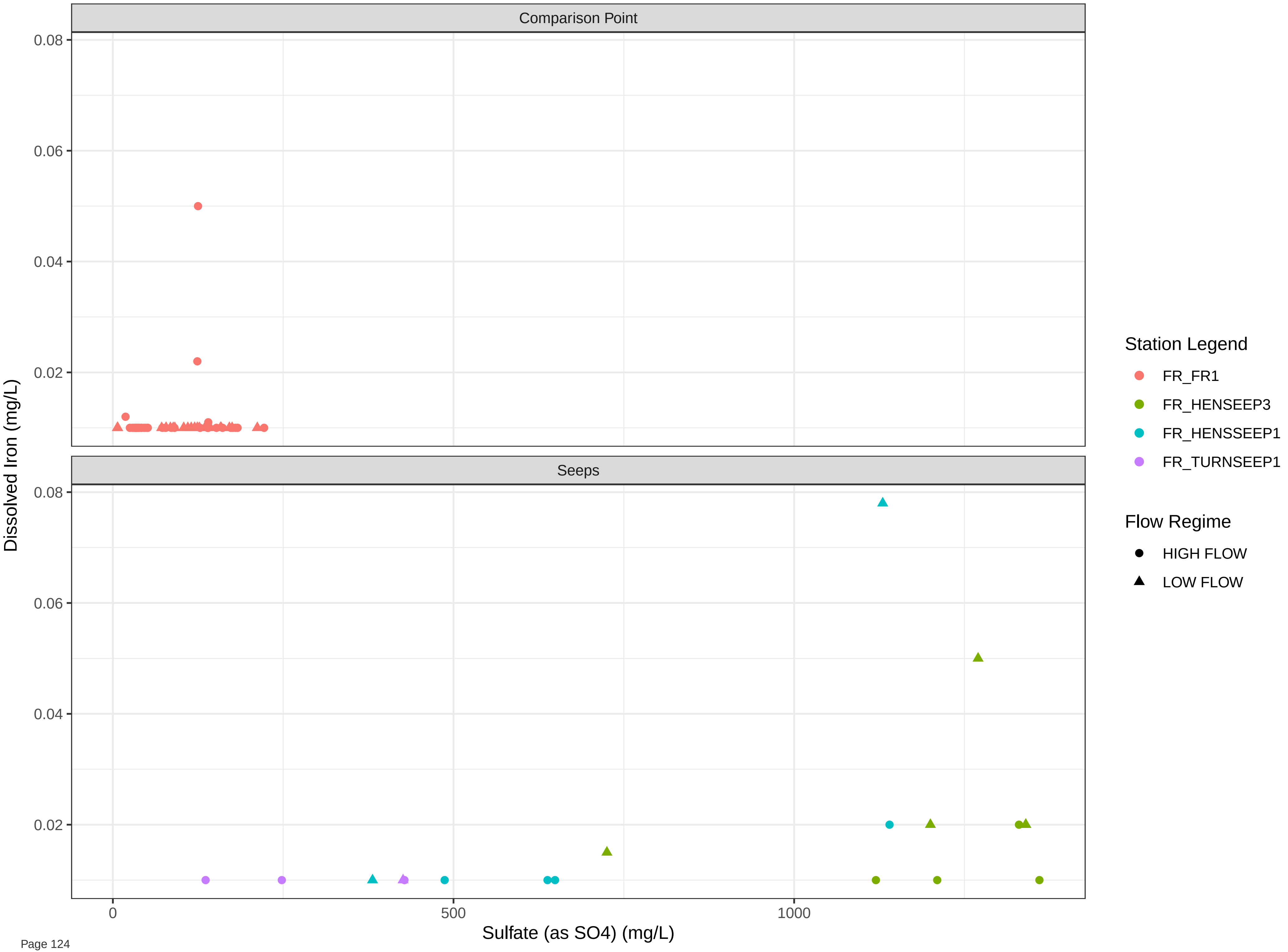


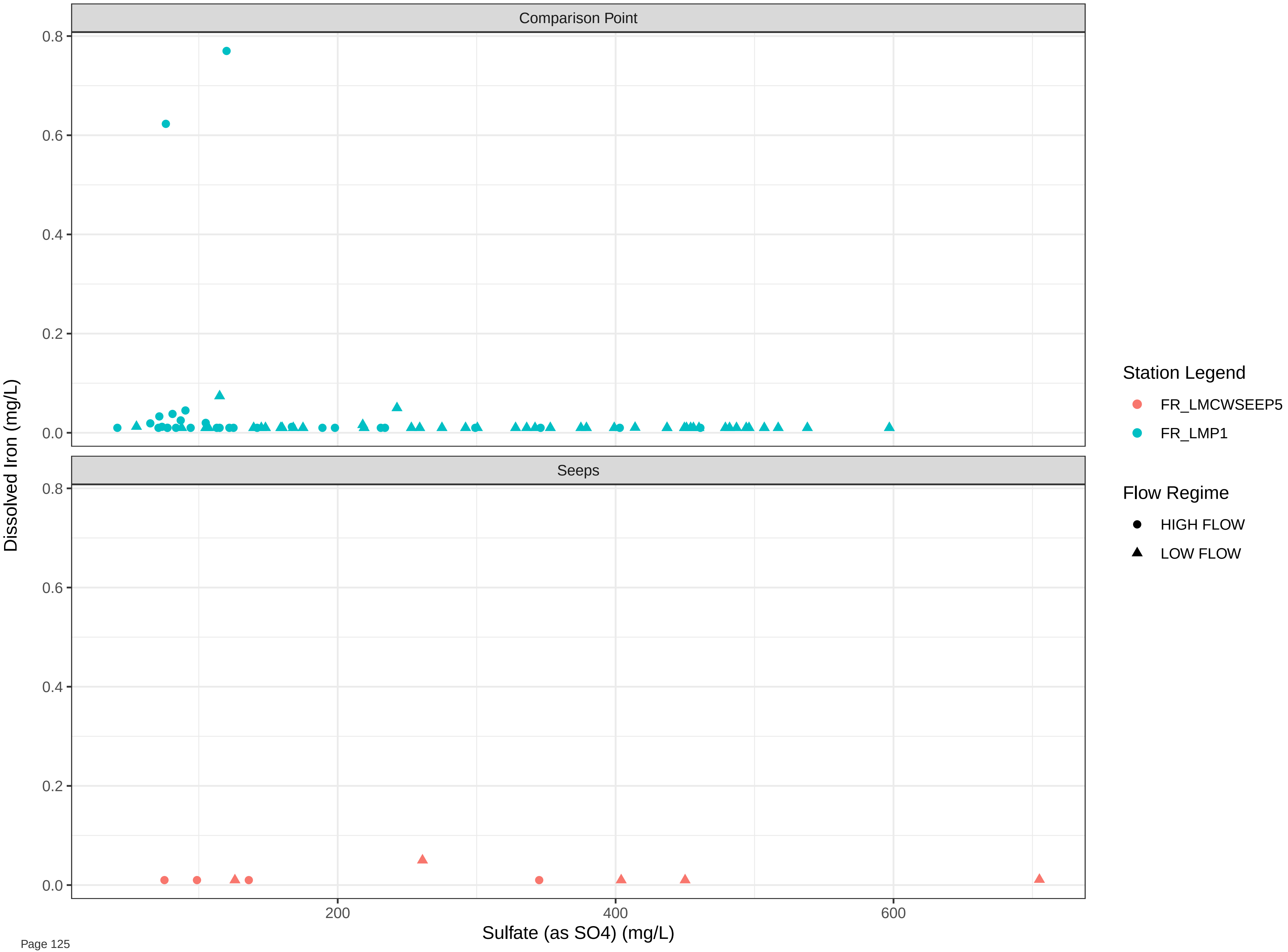
Seeps
0.050
0.025
0.000
−0.025
Dissolved Copper (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

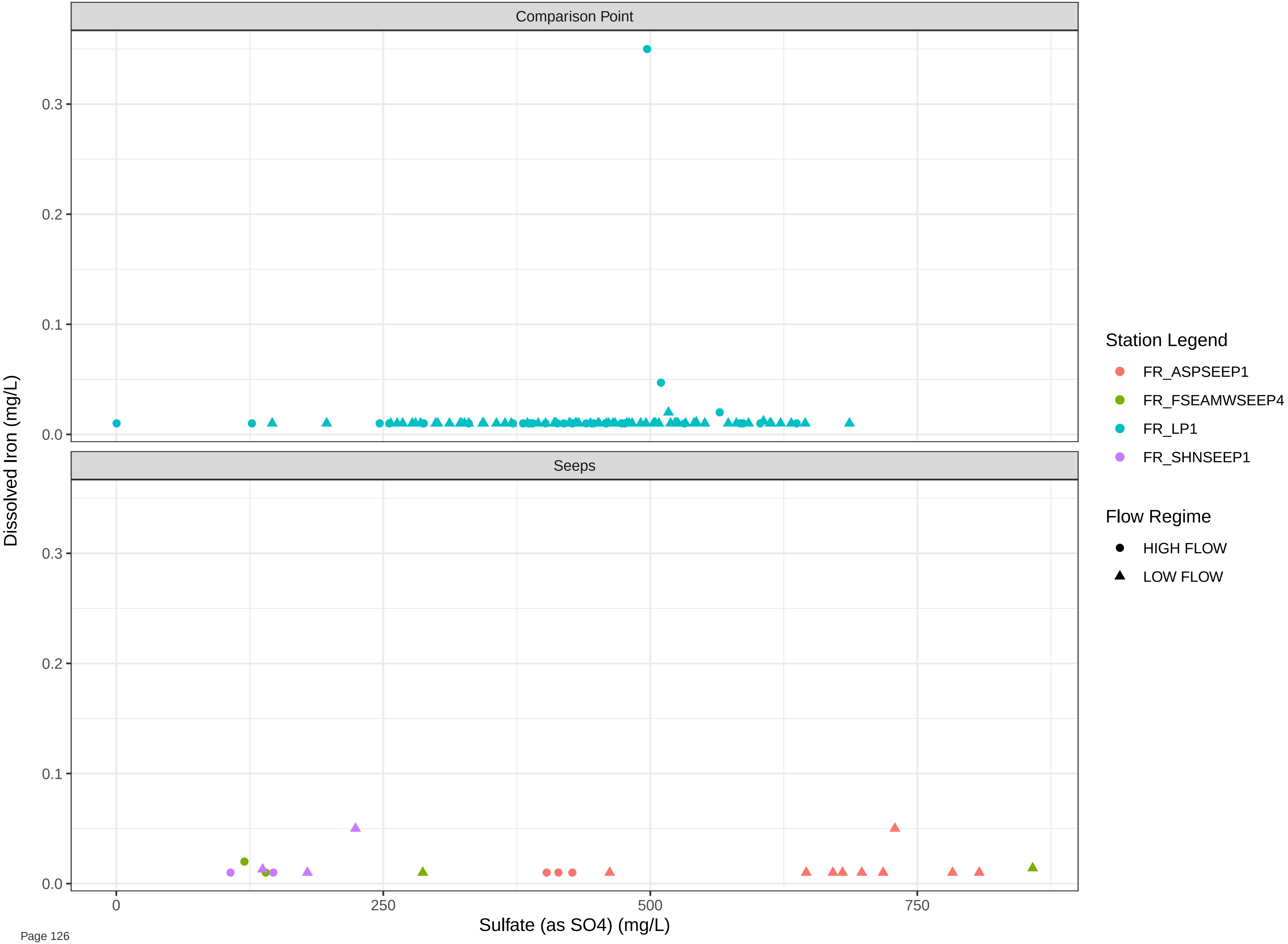

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.08
0.06
0.04
0.02
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

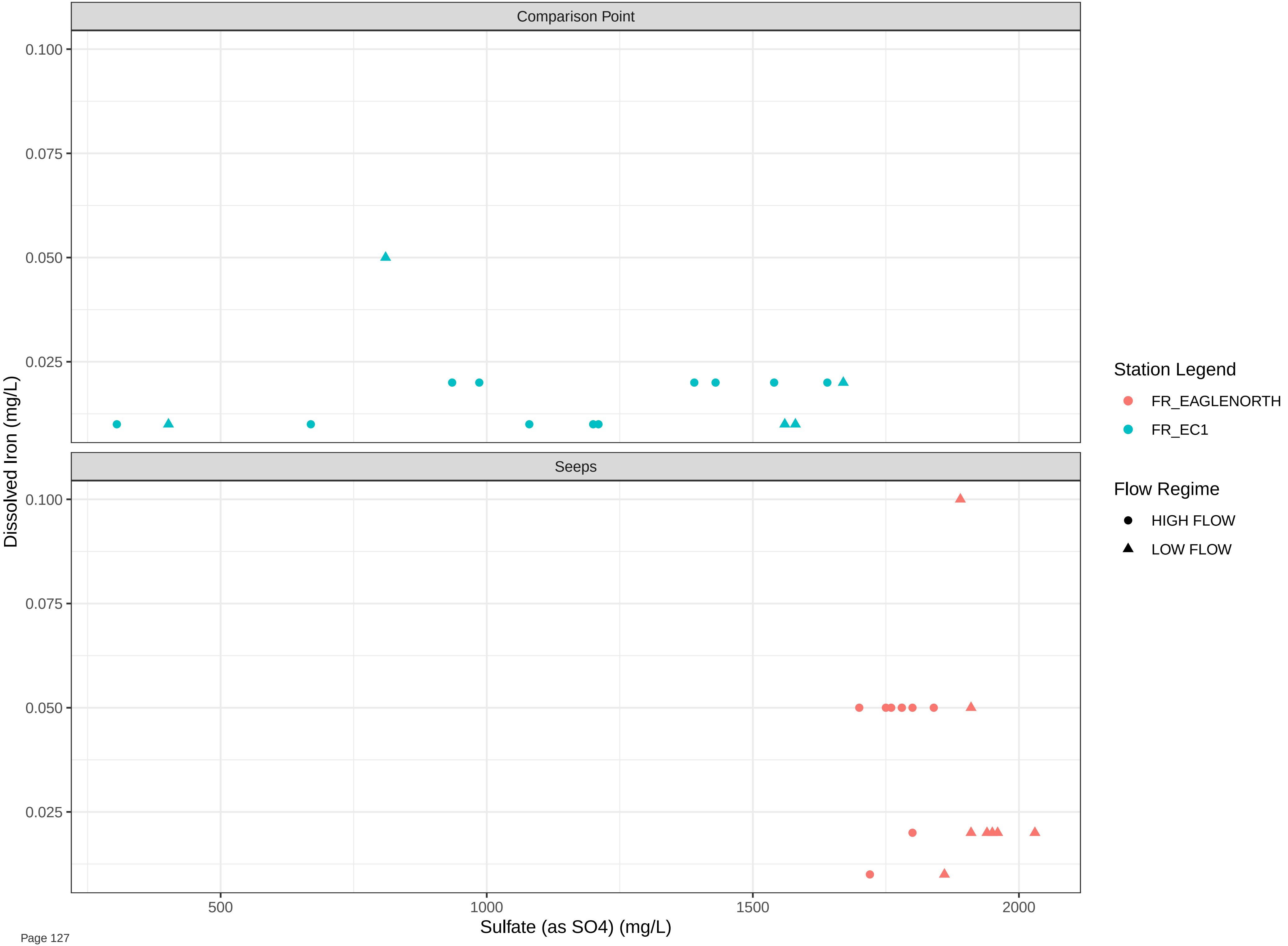

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.100
0.075
0.050
0.025
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

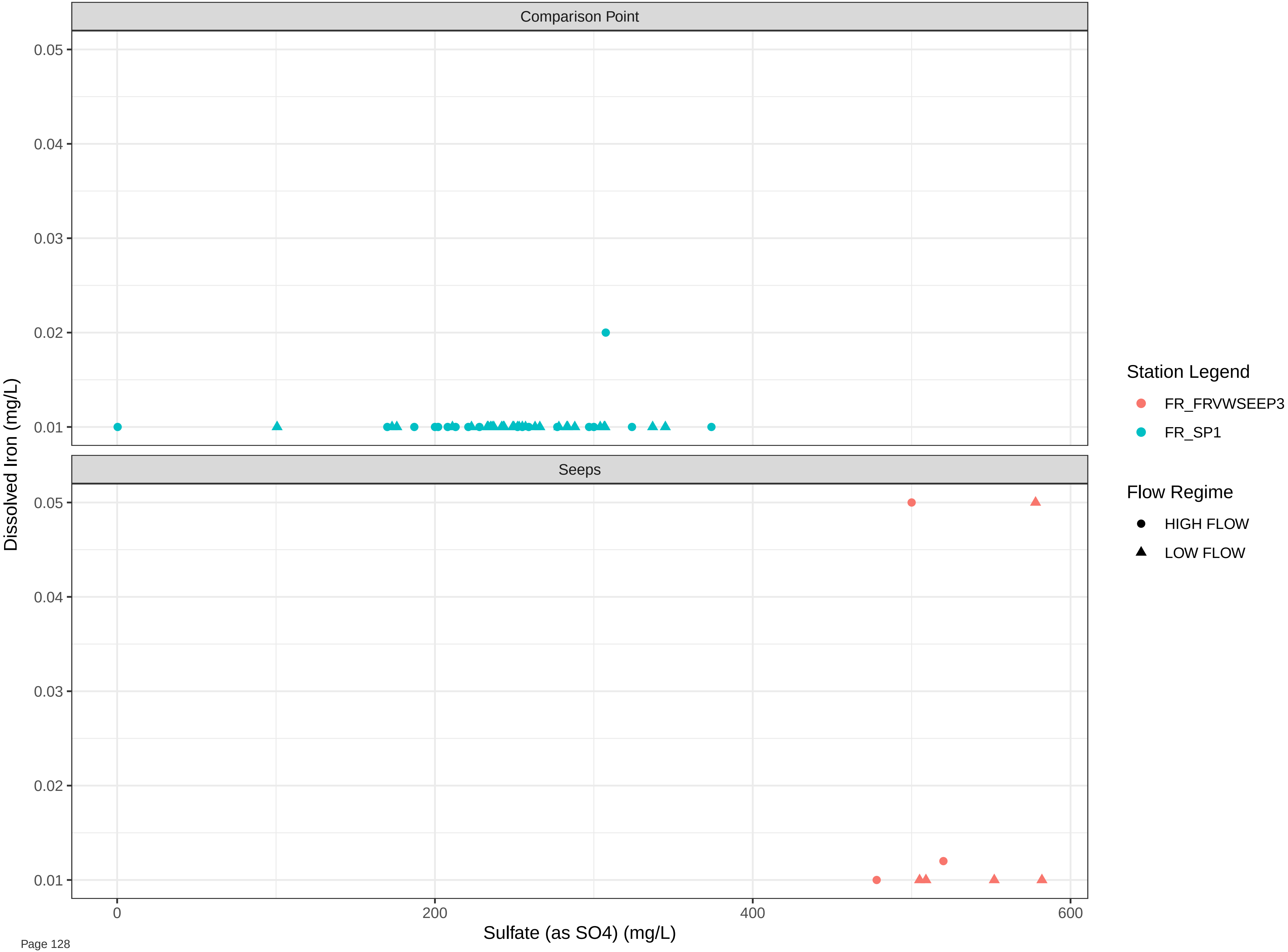

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.00
0.25
0.50
0.75
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Iron (mg/L)
0.08
0.06
0.04
0.02
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

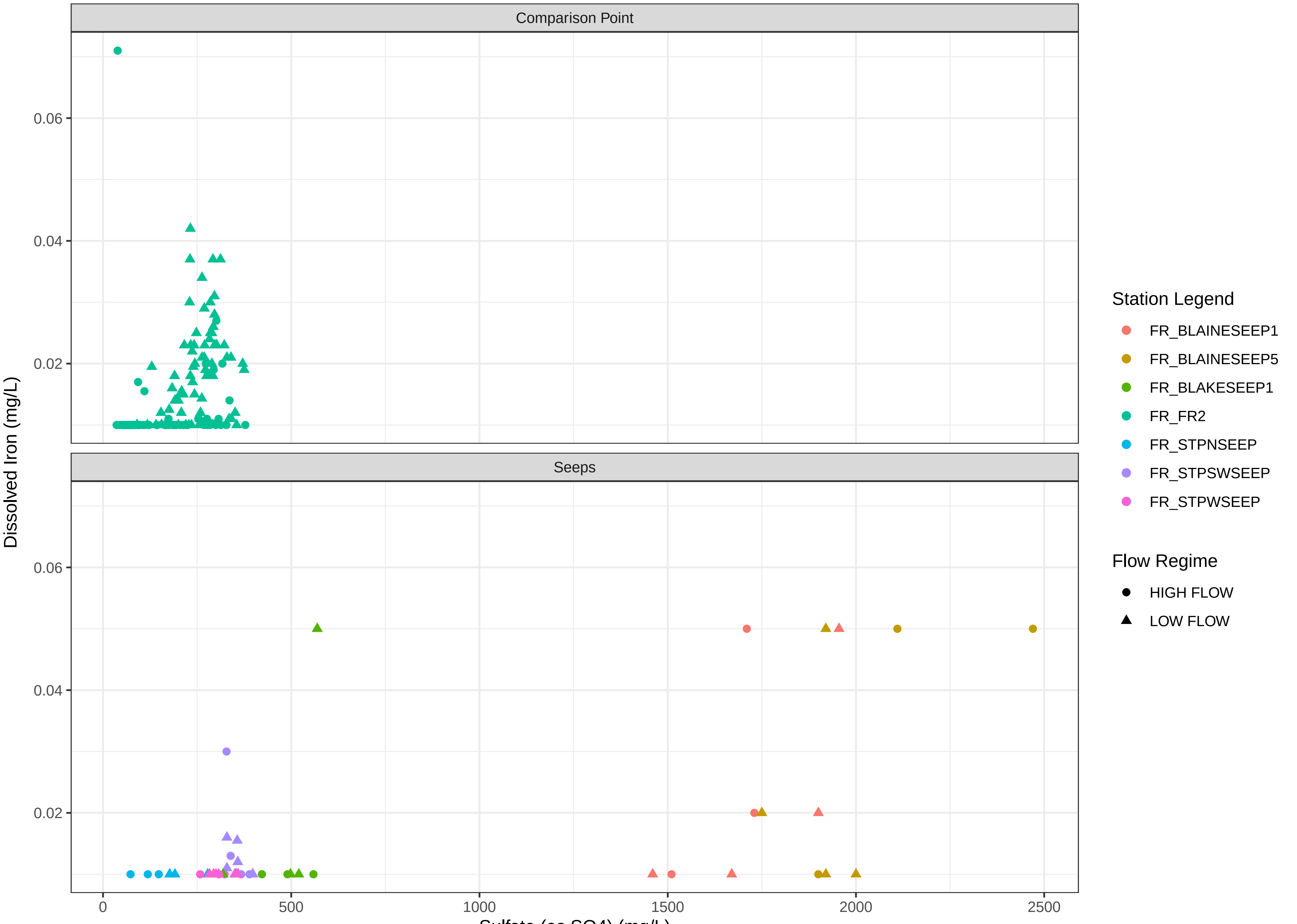

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0
0.2
0.4
0.6
0.8
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

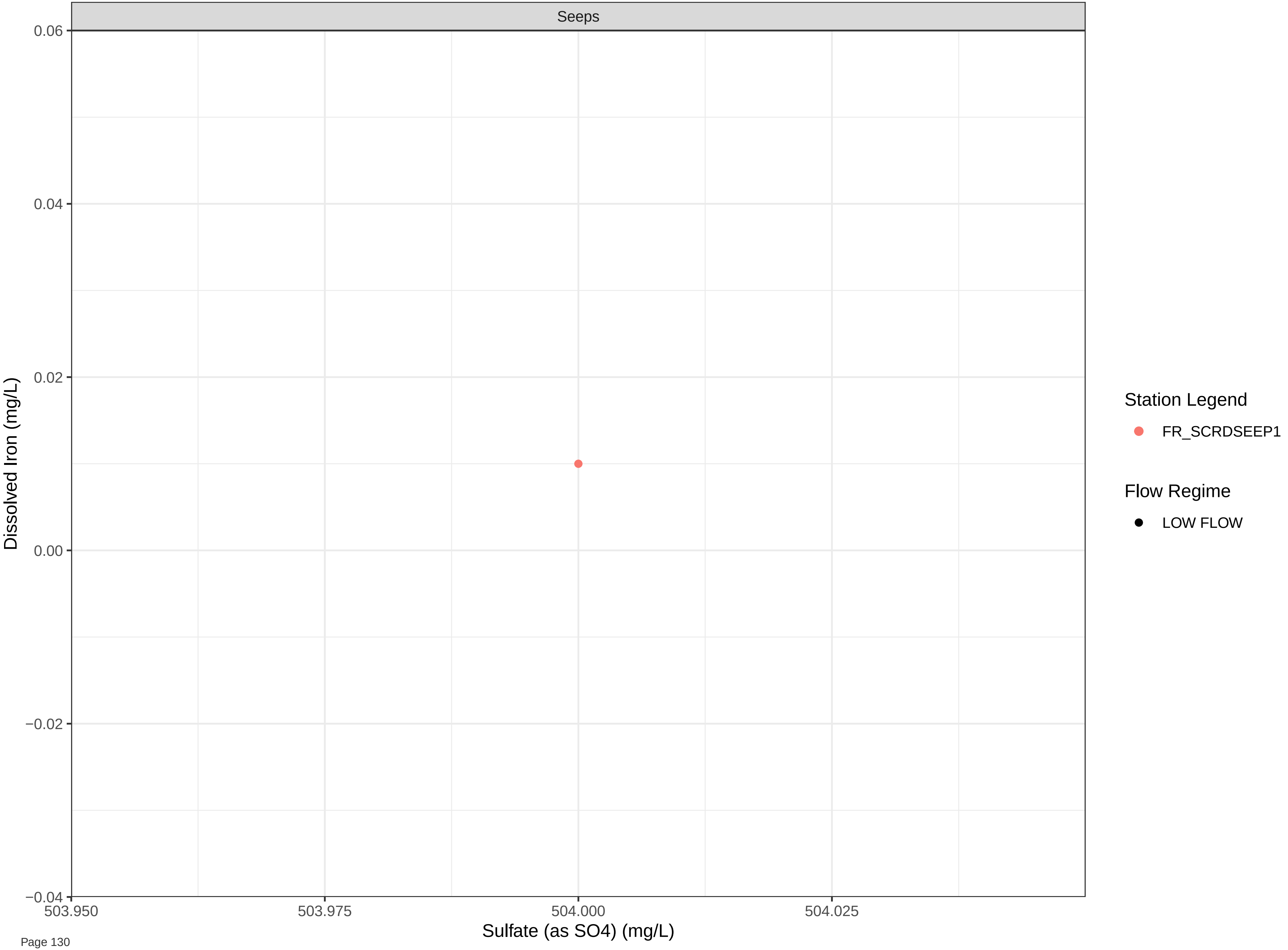

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0
0.1
0.2
0.3
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.100
0.075
0.050
0.025
500
1000
1500
2000
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

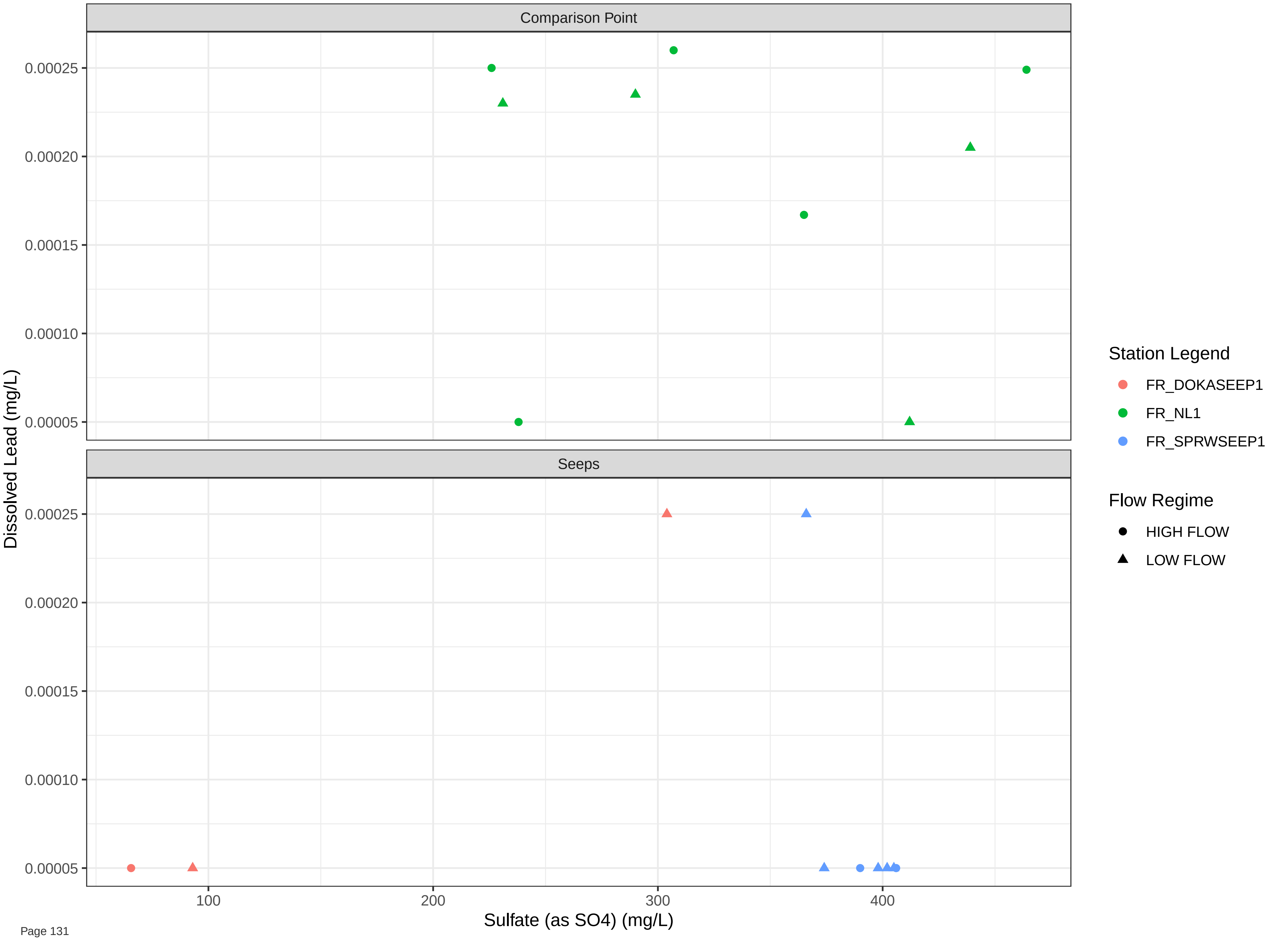


Comparison Point
Seeps
Dissolved Iron (mg/L)
0.05
0.04
0.03
0.02
0.01
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

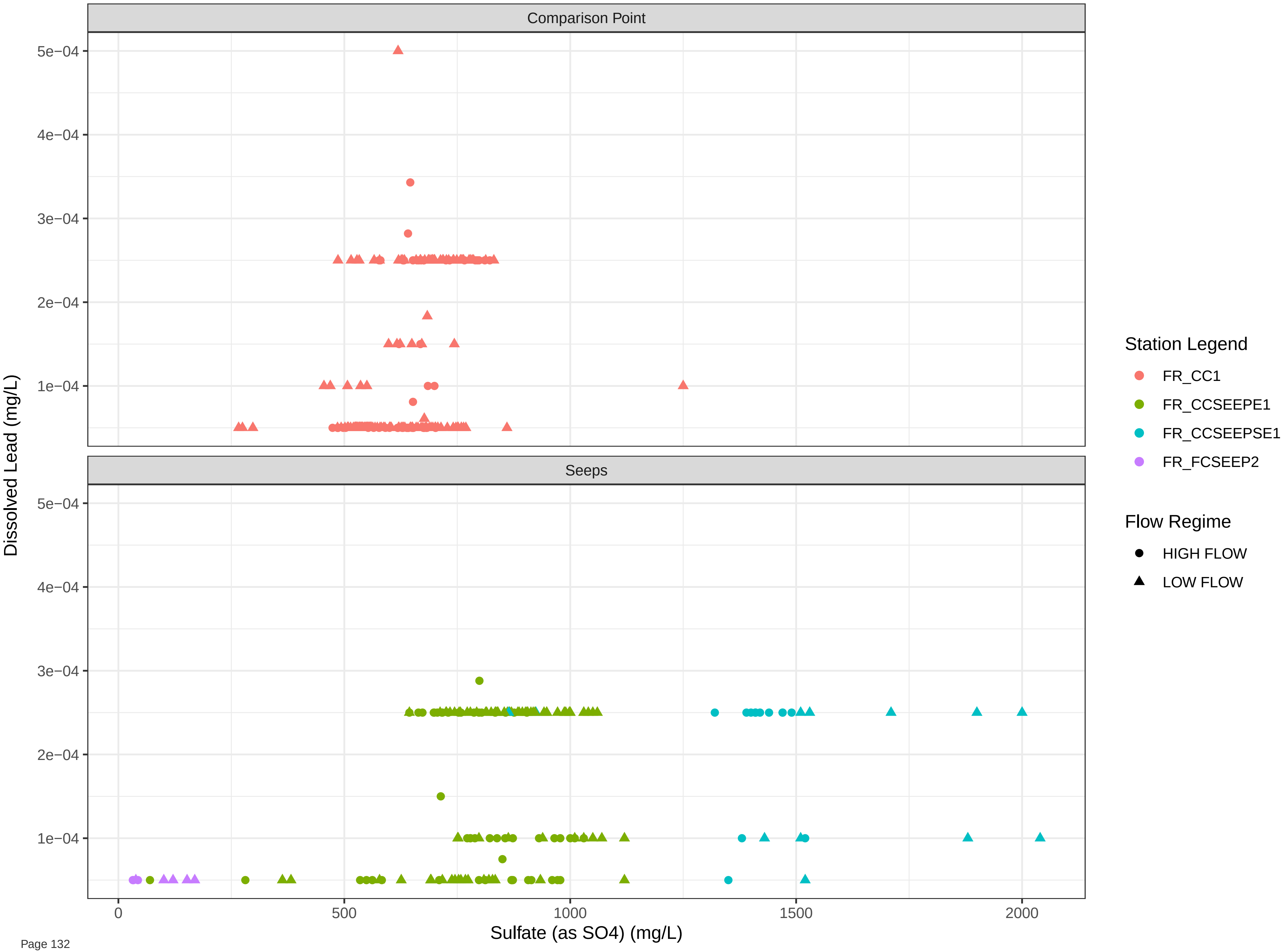

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.06
0.04
0.02
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

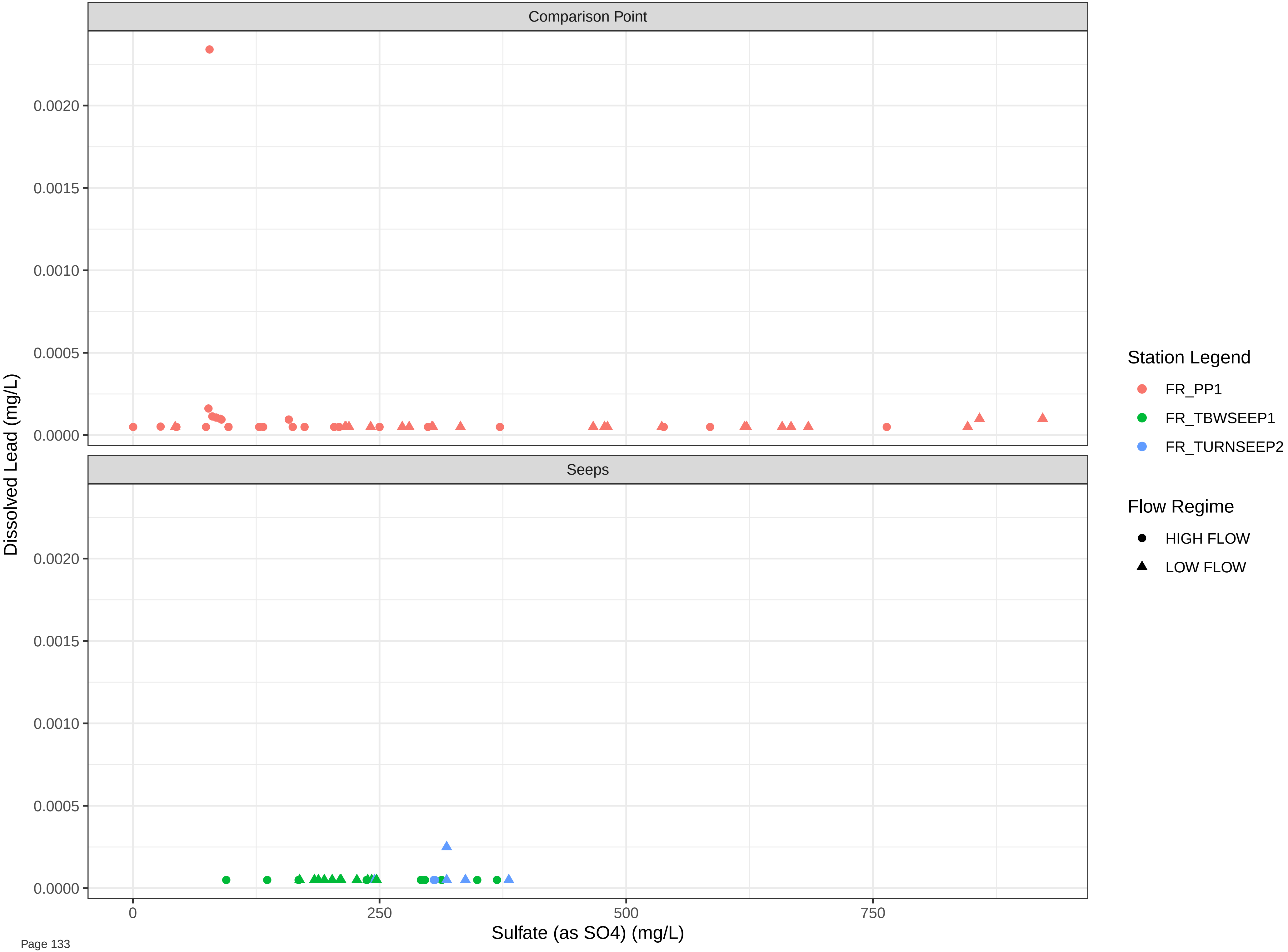


Seeps
0.06
0.04
0.02
0.00
−0.02
−0.04
Dissolved Iron (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

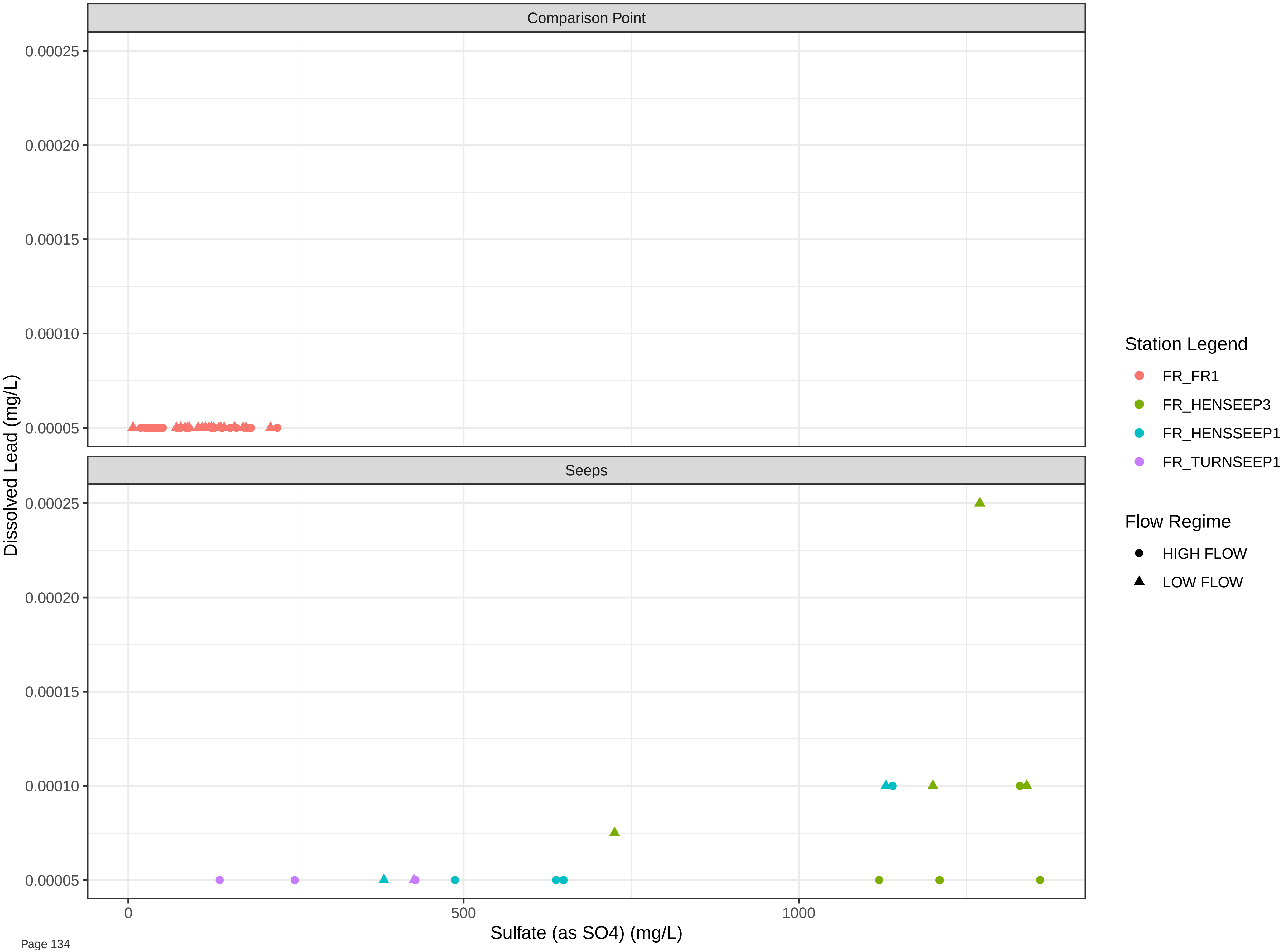


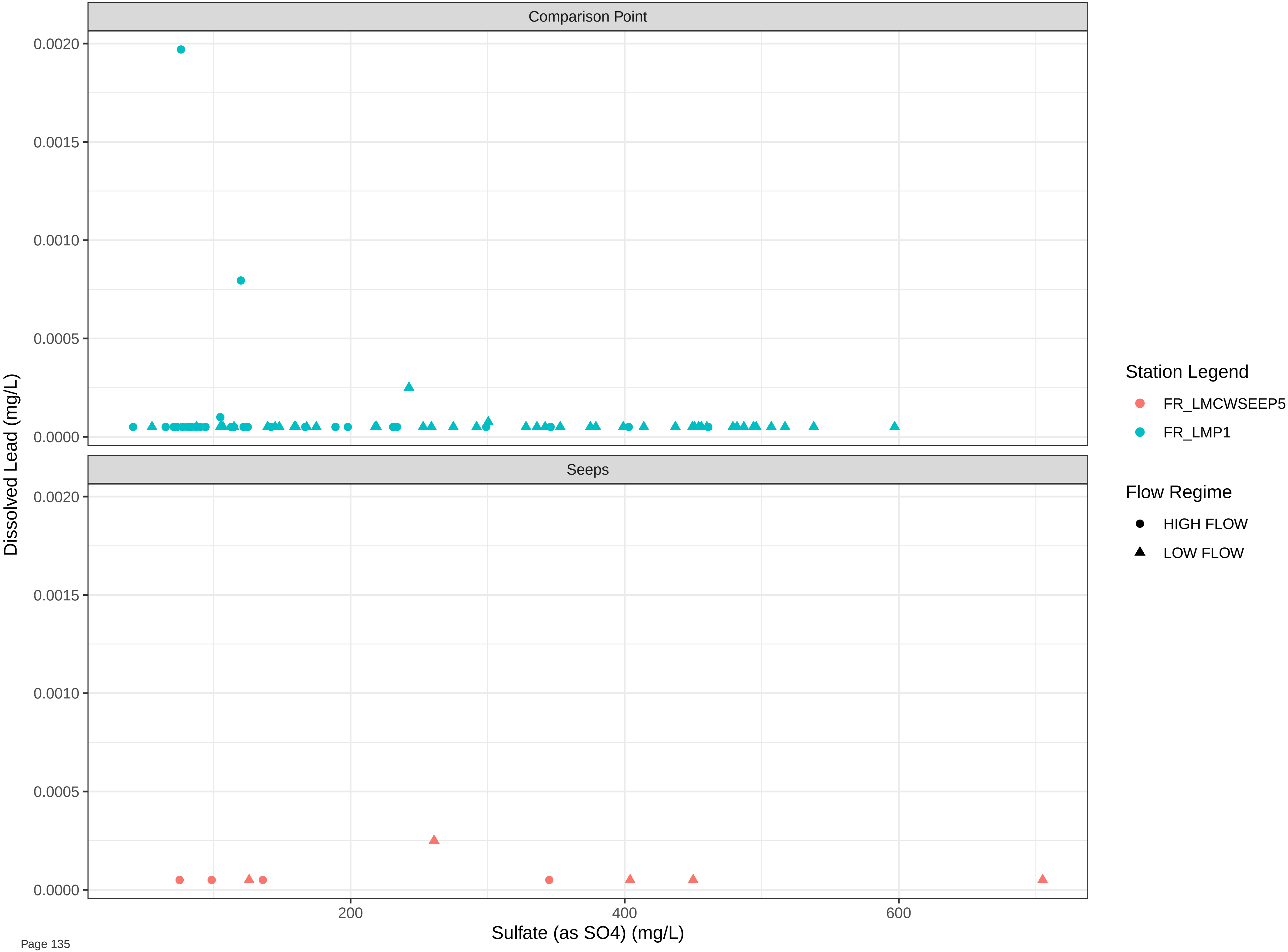
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
Sulfate (as SO4) (mg/L)
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lead (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

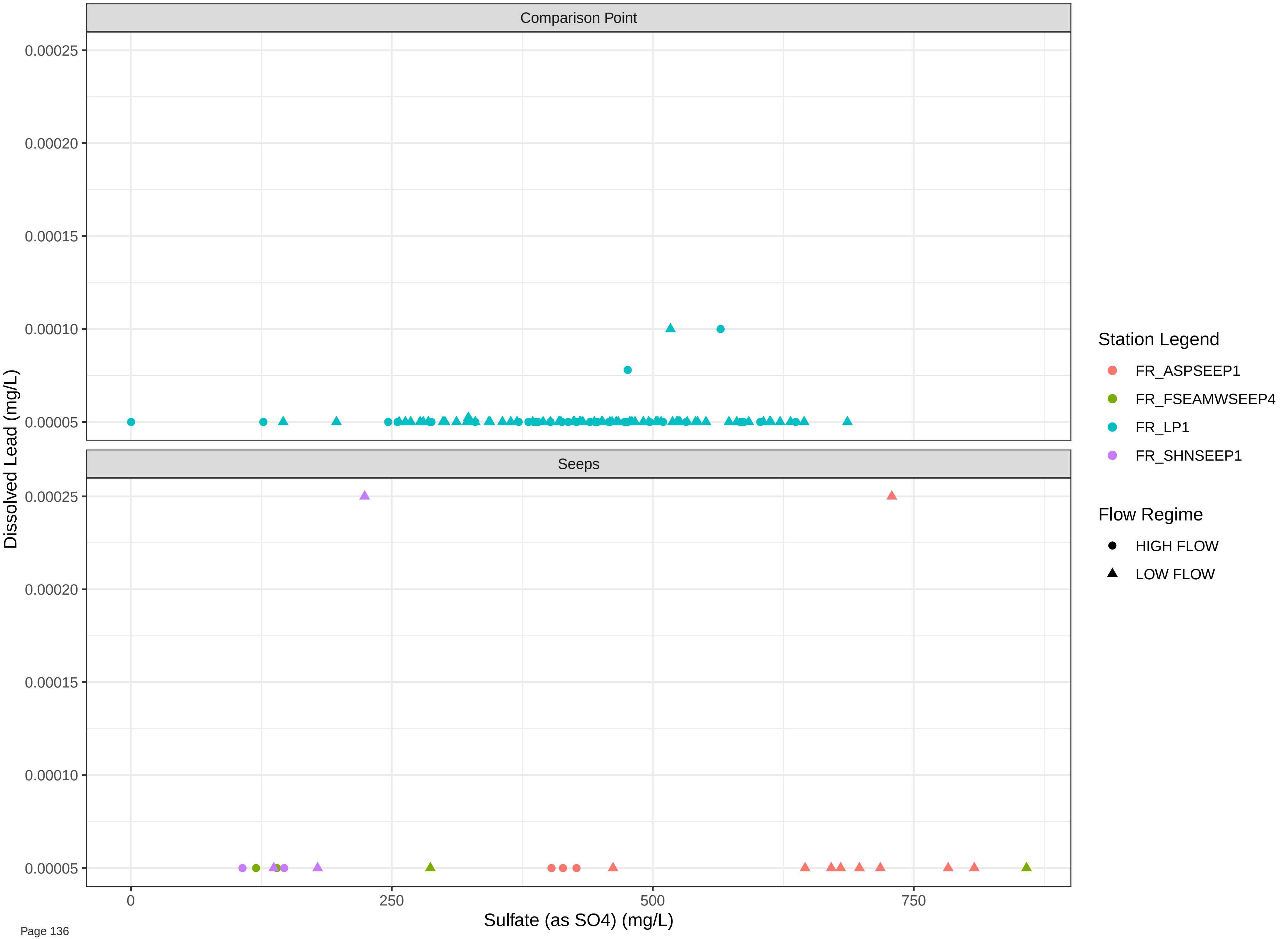


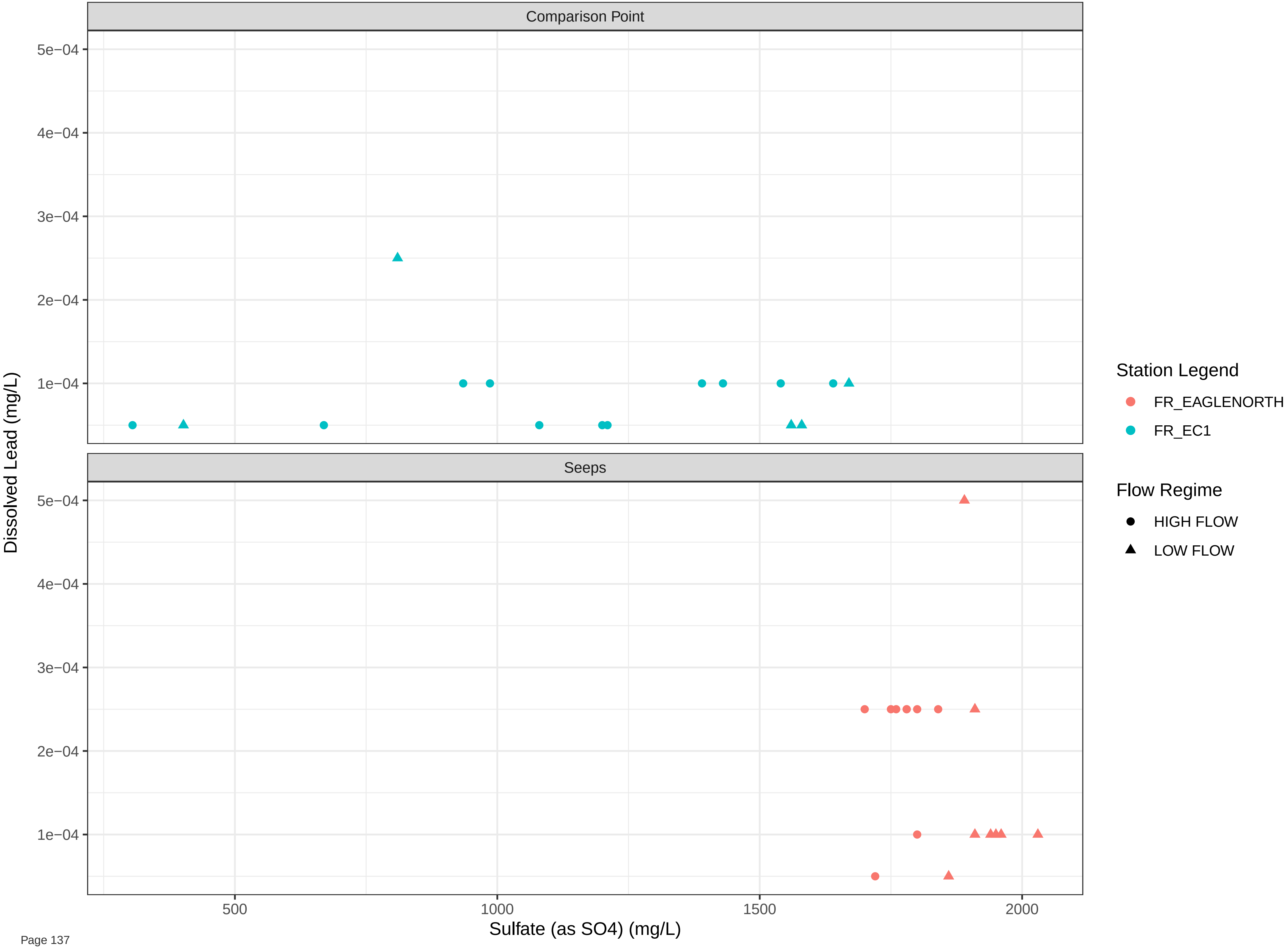
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.0000
0.0005
0.0010
0.0015
0.0020
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

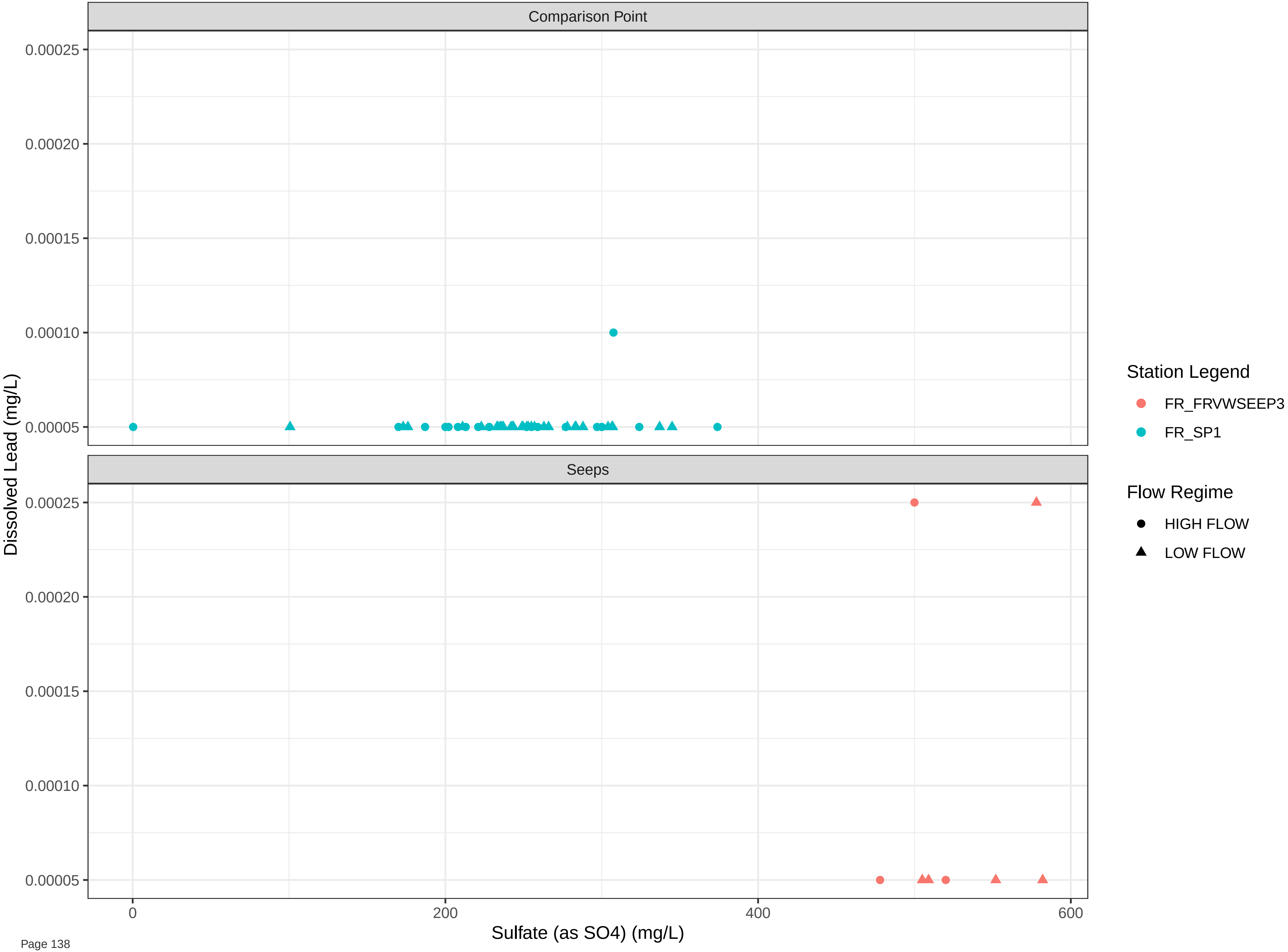


Comparison Point
Seeps
0.0020
0.0015
0.0010
0.0005
0.0000
200
400
600
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

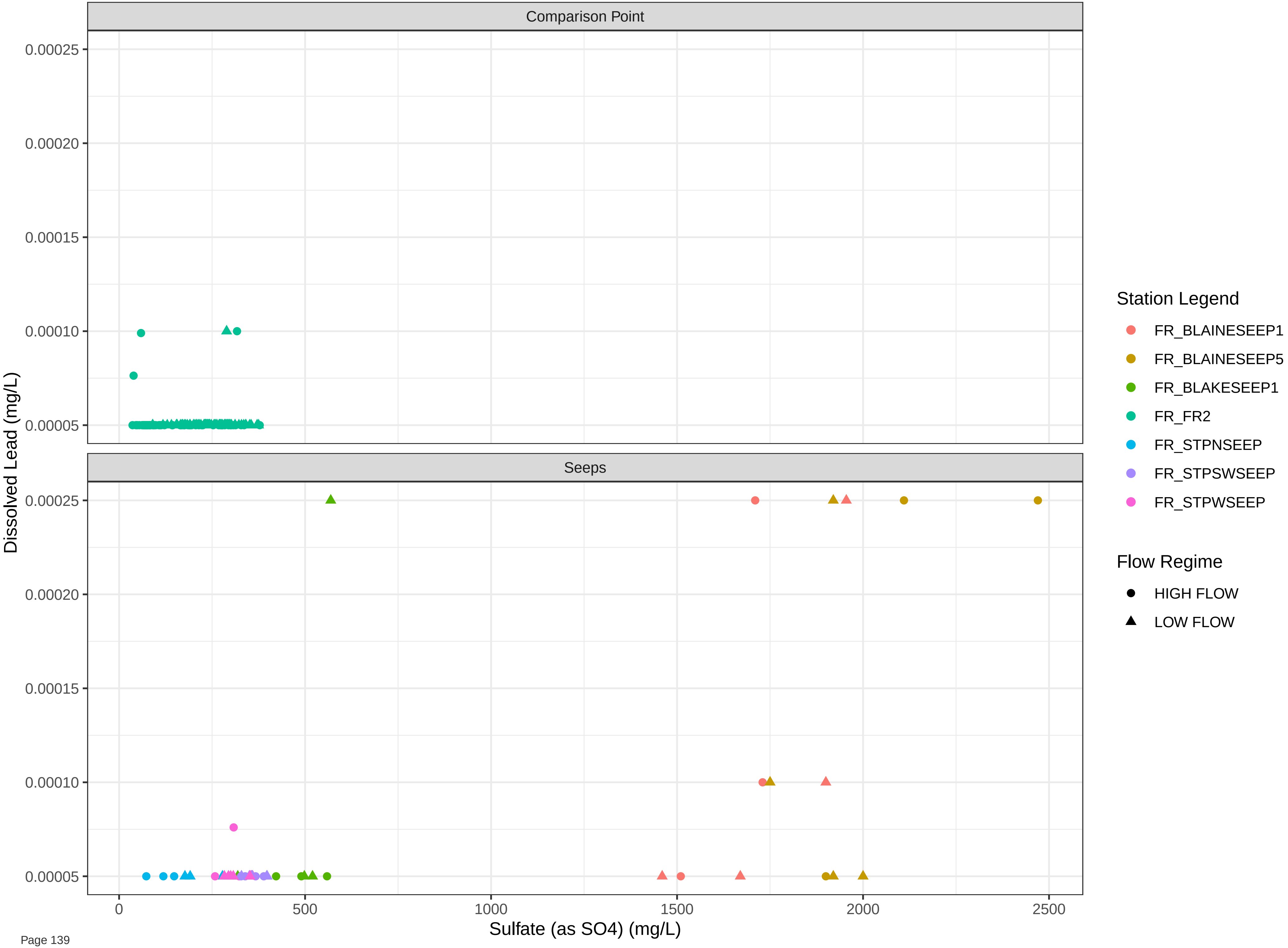

Comparison Point
Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
0
250
500
750
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



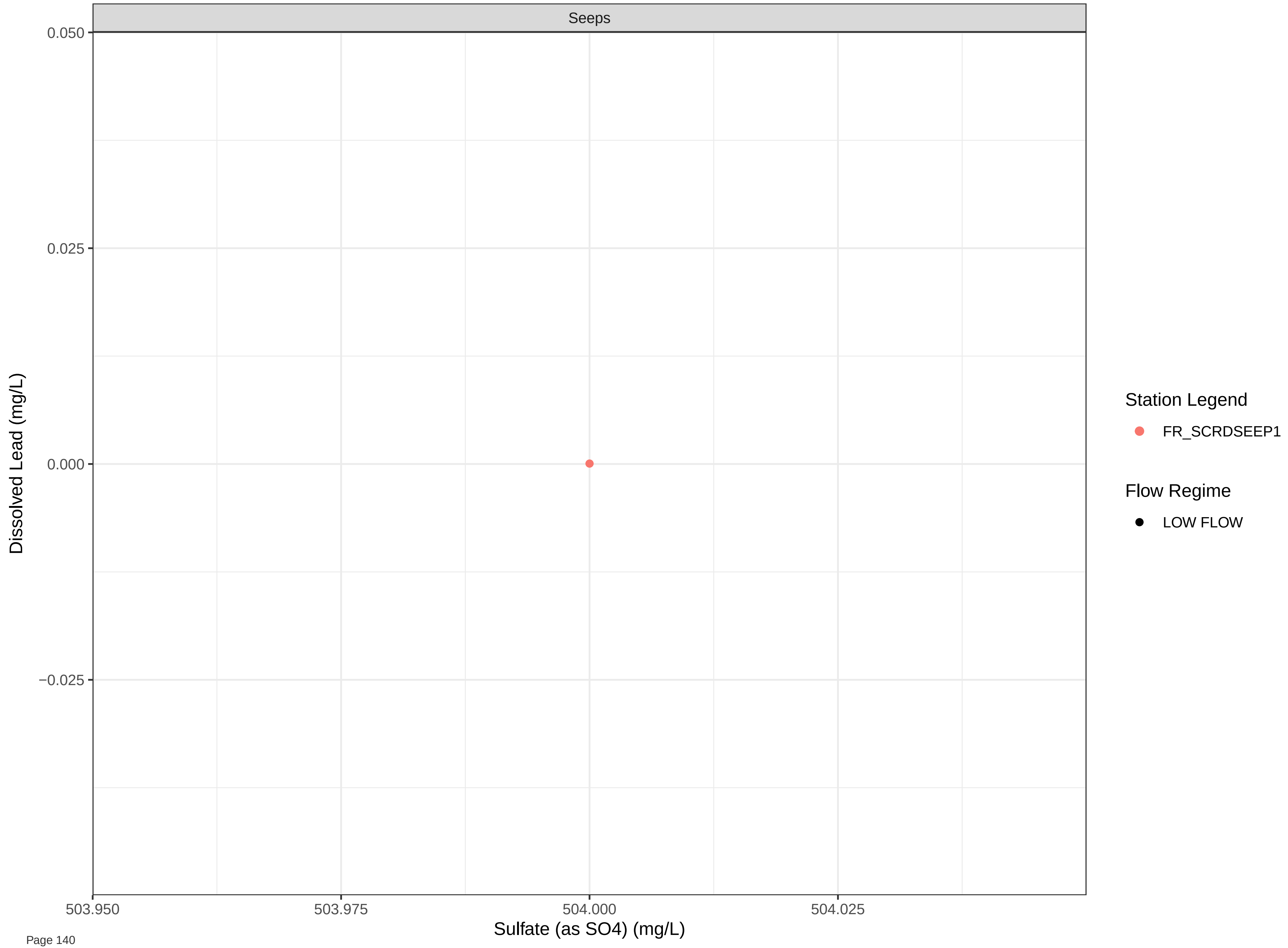
Comparison Point
Seeps
Dissolved Lead (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

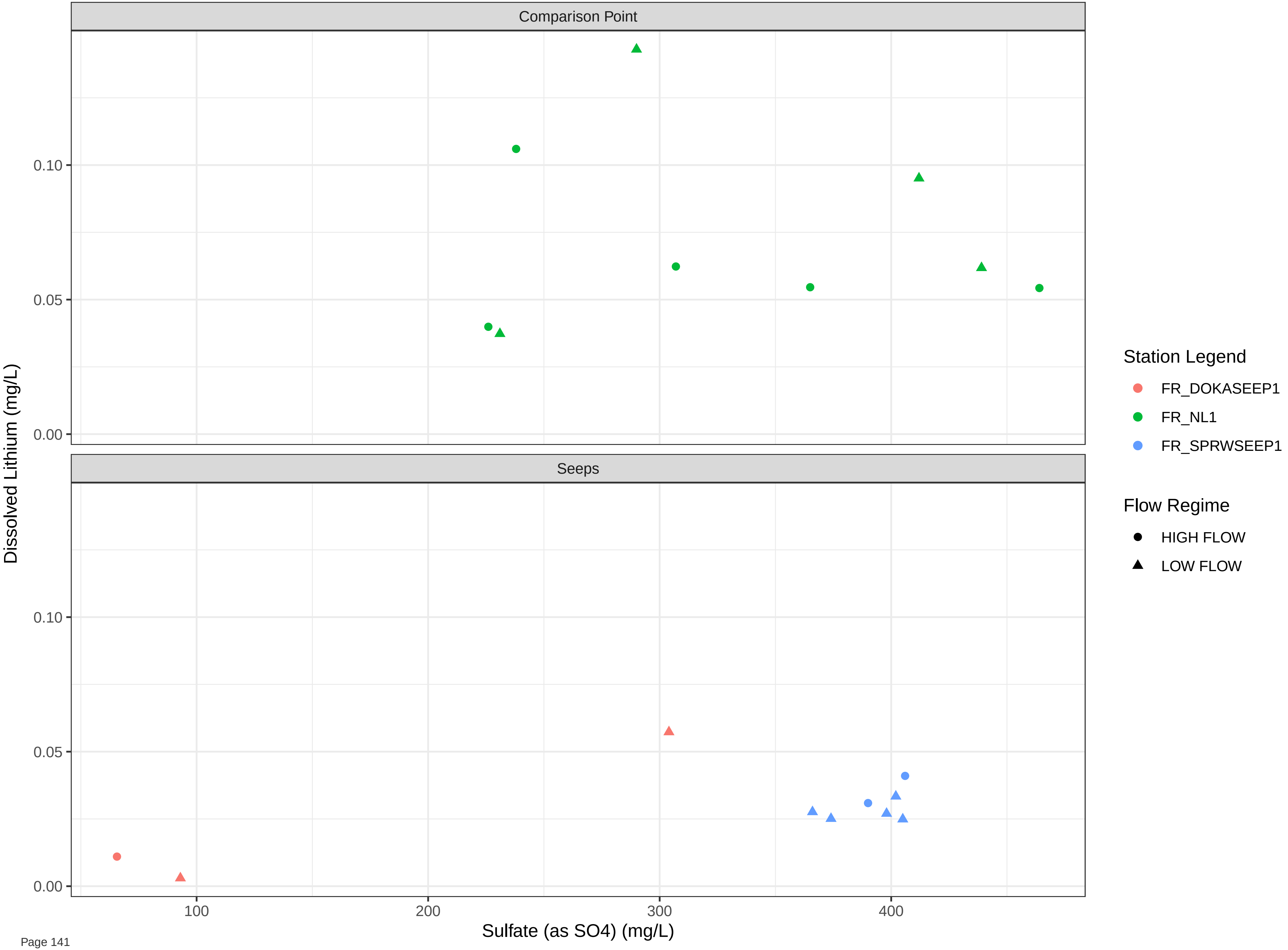


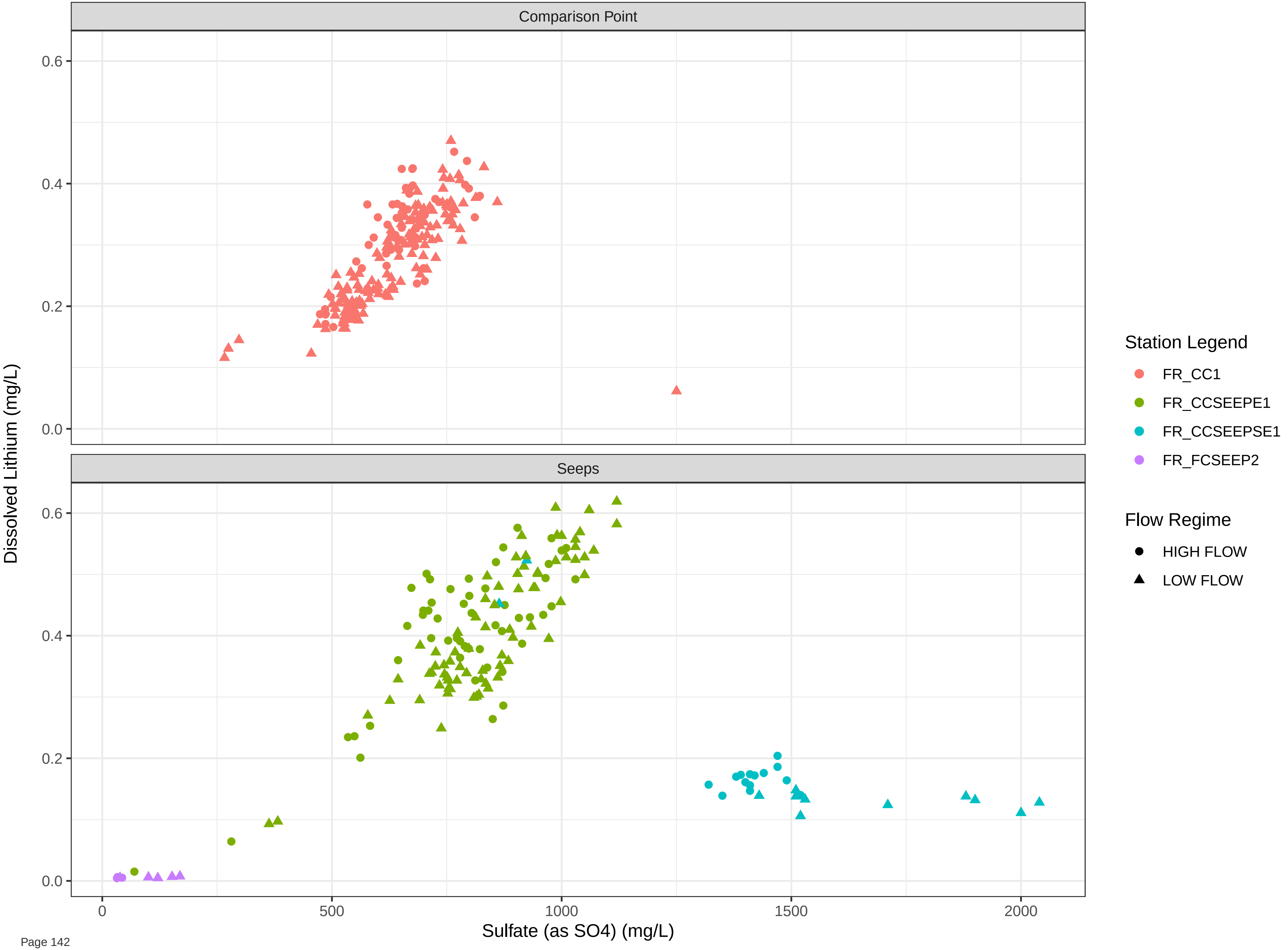
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00005
0.00010
0.00015
0.00020
0.00025
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



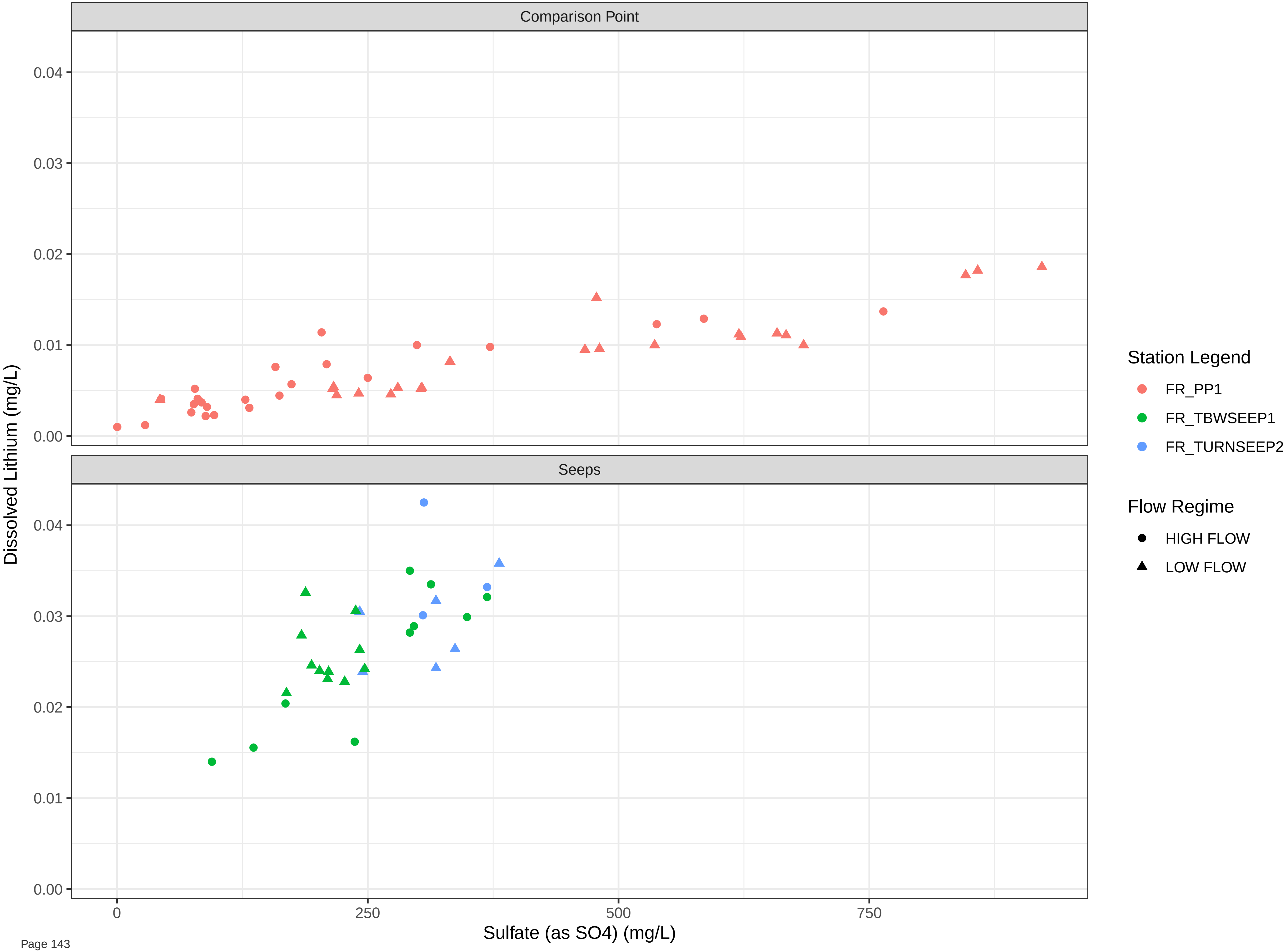
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

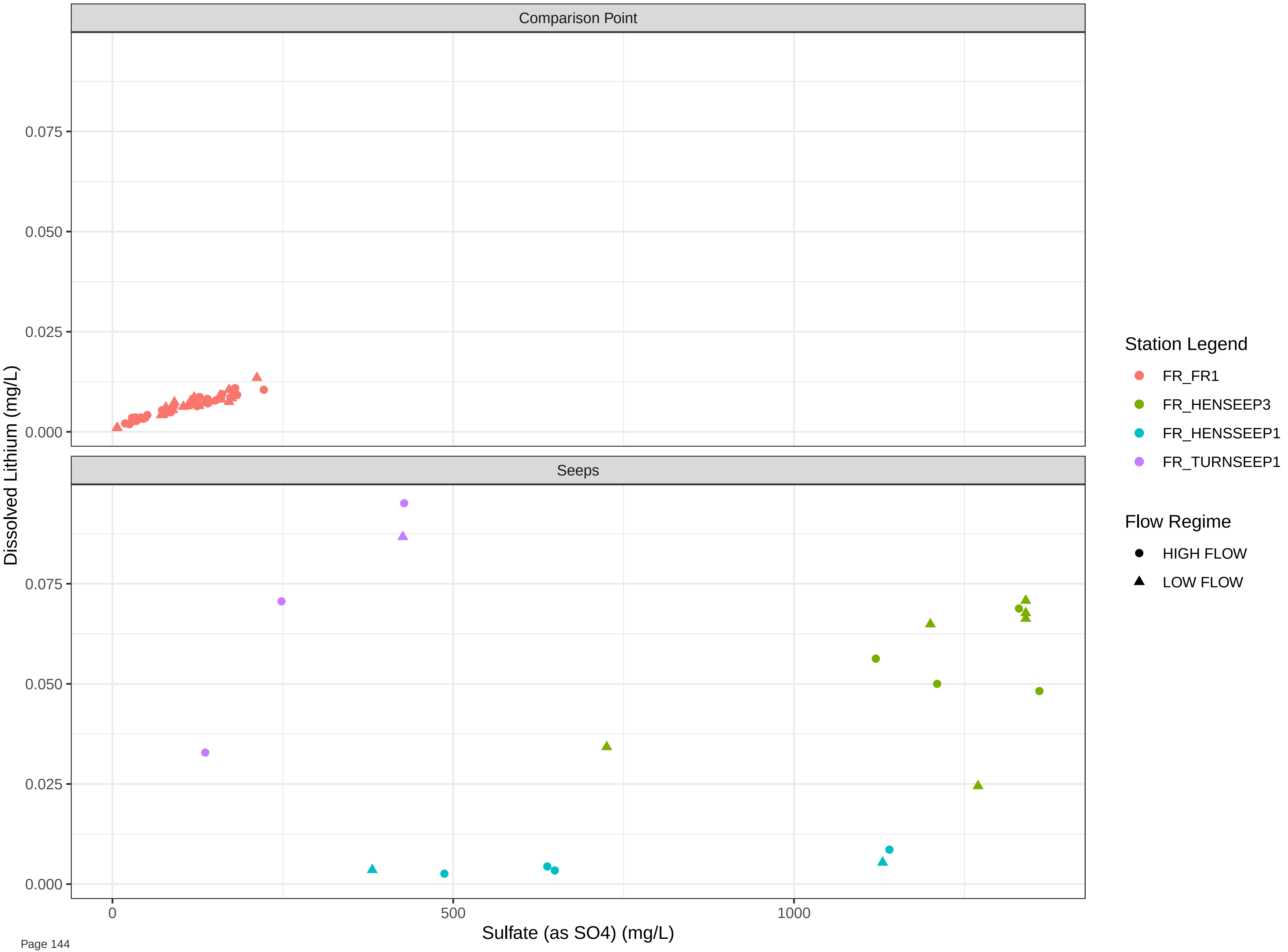

Seeps
0.050
0.025
0.000
−0.025
Dissolved Lead (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW


Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.10
0.05
0.00
0.10
0.05
0.00
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

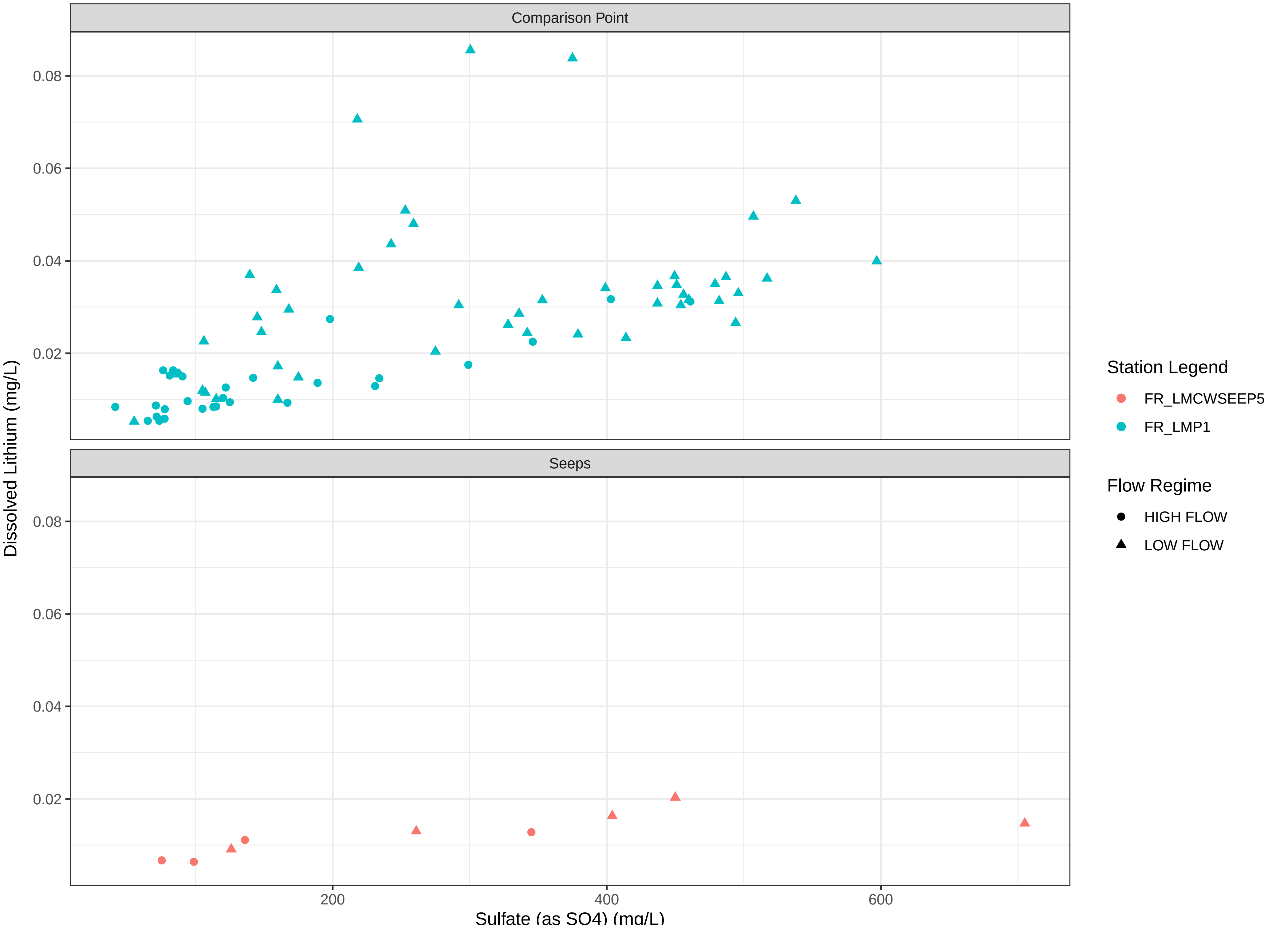


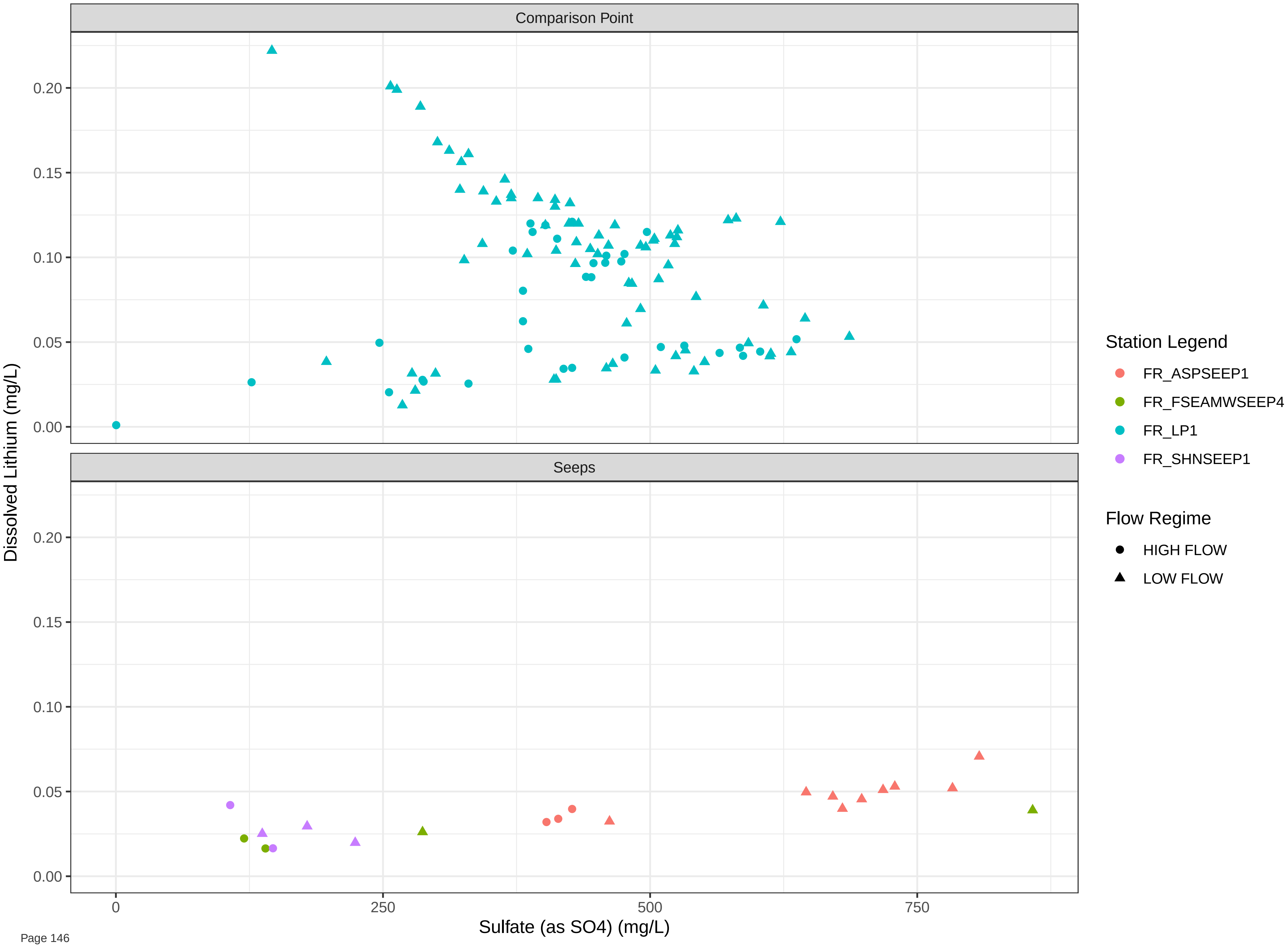
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.0
0.2
0.4
0.6
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

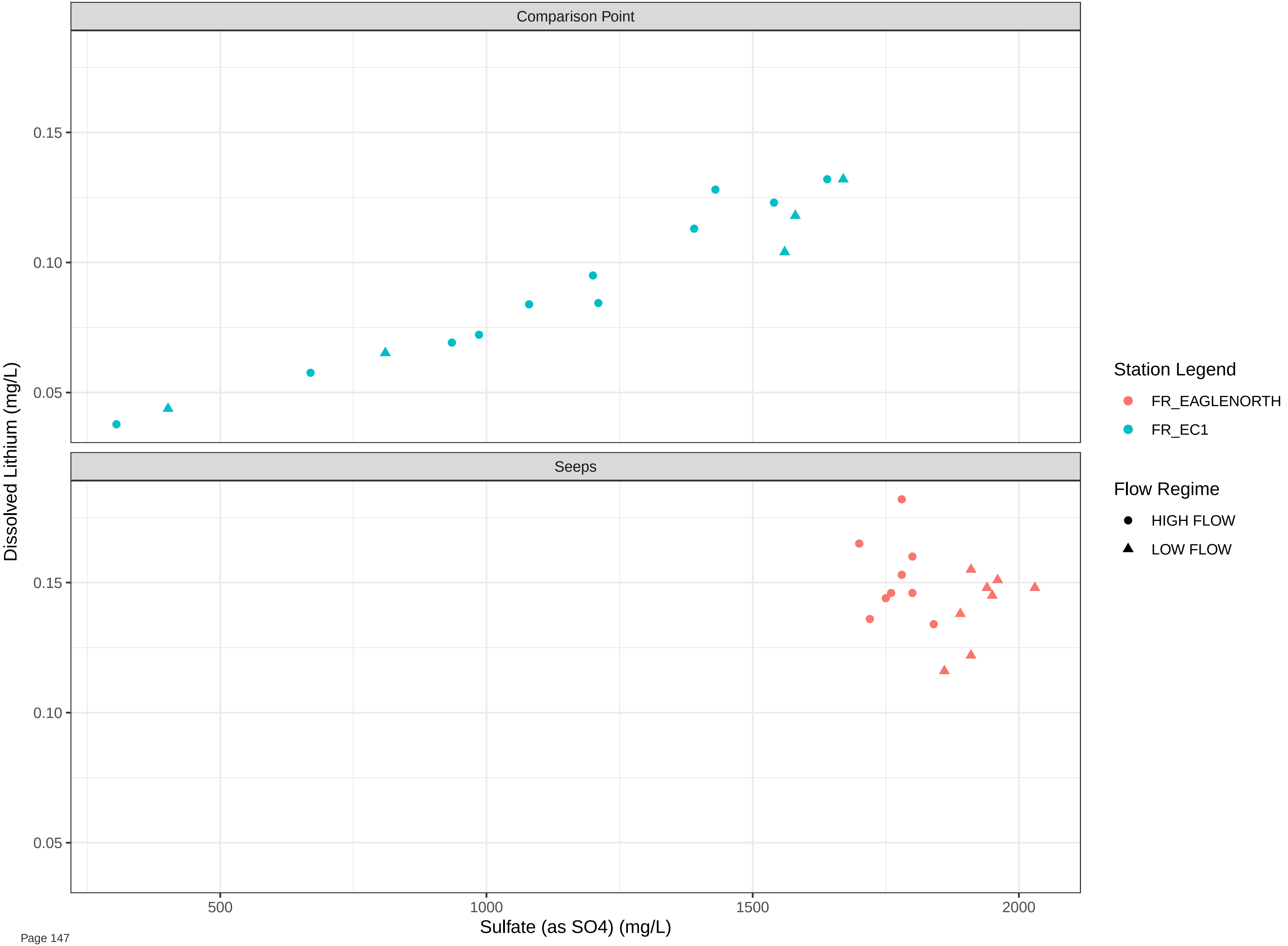

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.00
0.01
0.02
0.03
0.04
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

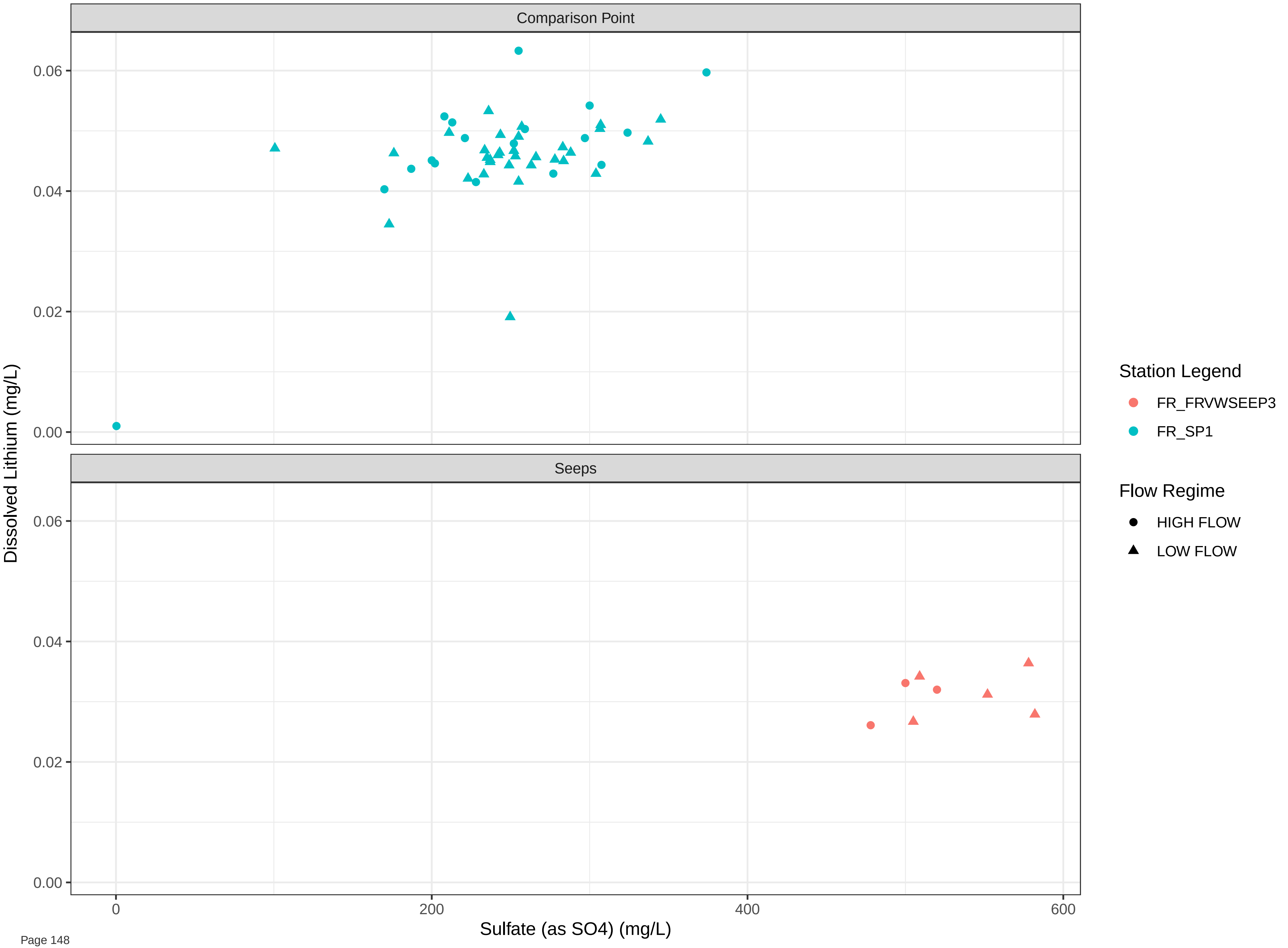


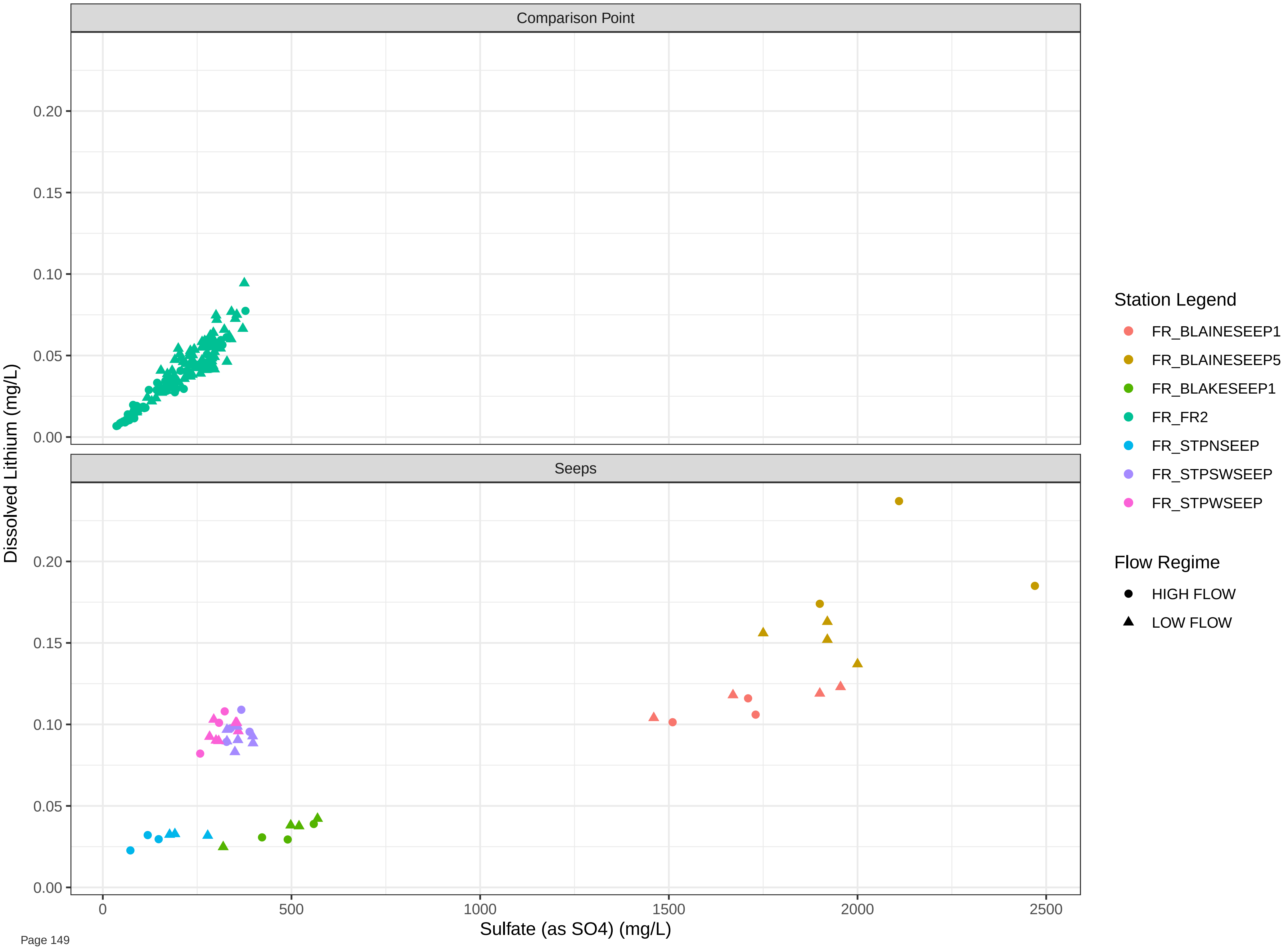
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.000
0.025
0.050
0.075
Sulfate (as SO4) (mg/L)
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.08
0.06
0.04
0.02
200
400
600
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

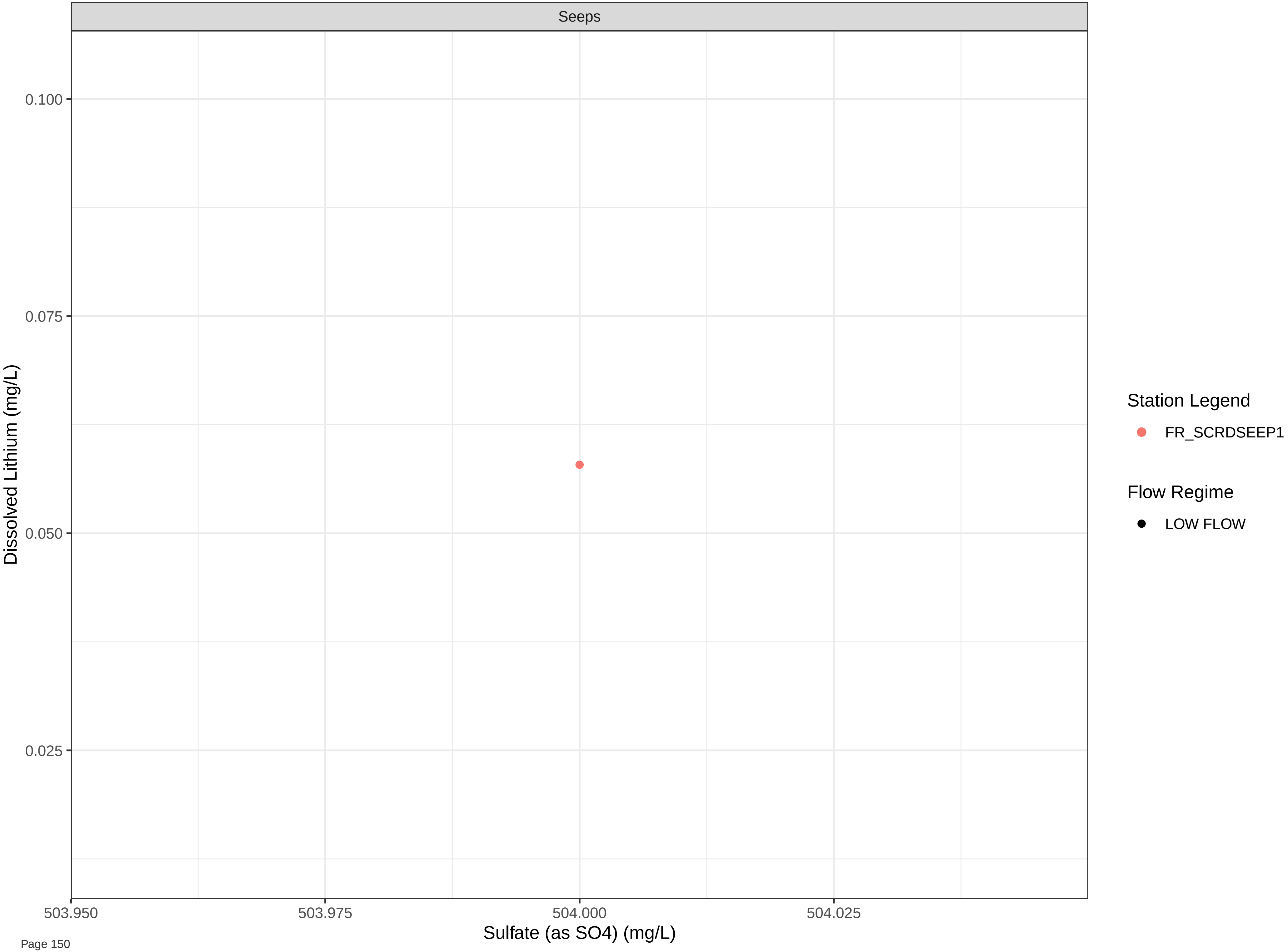

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.00
0.05
0.10
0.15
0.20
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

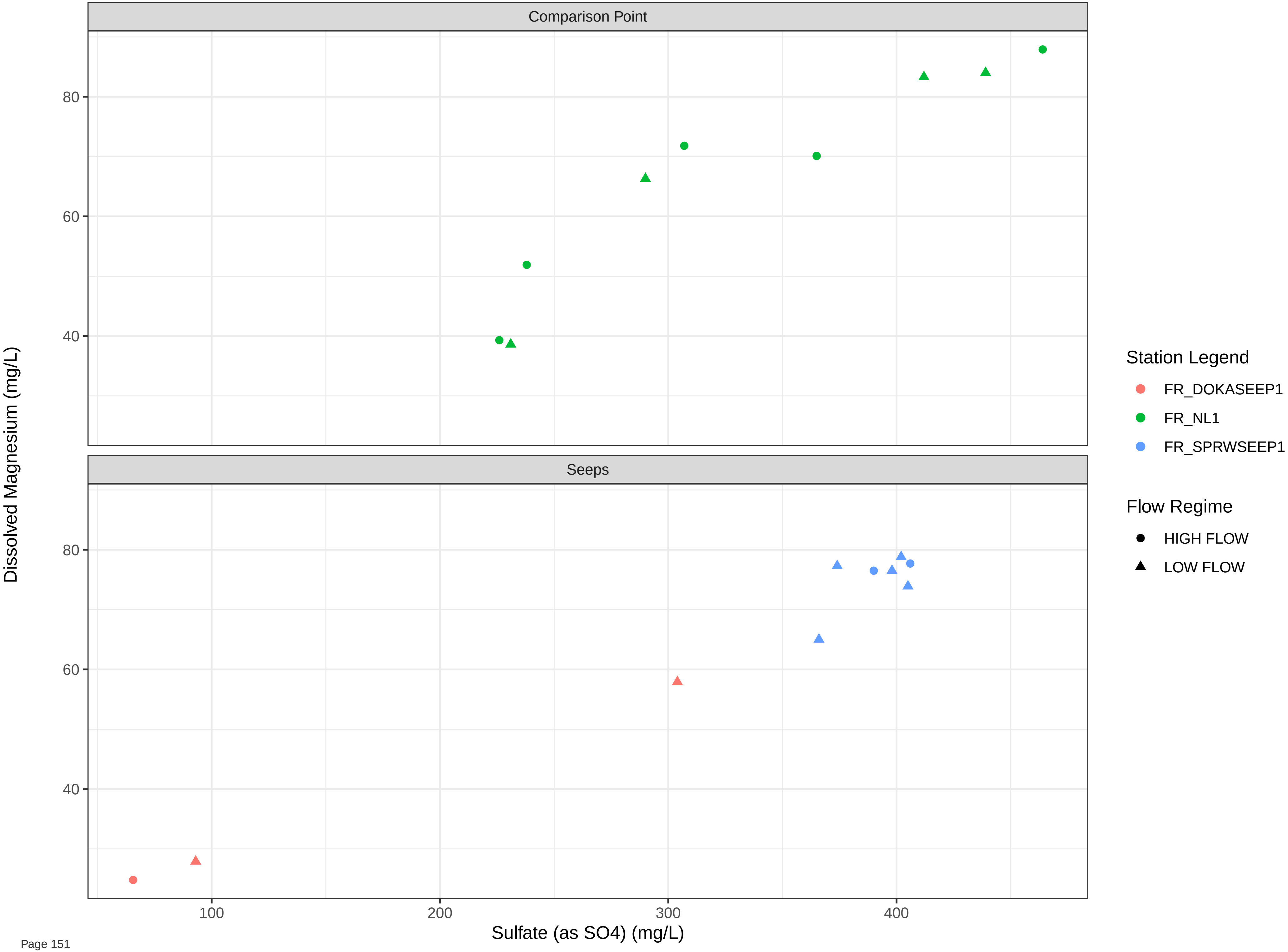

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.15
0.10
0.05
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.06
0.04
0.02
0.00
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

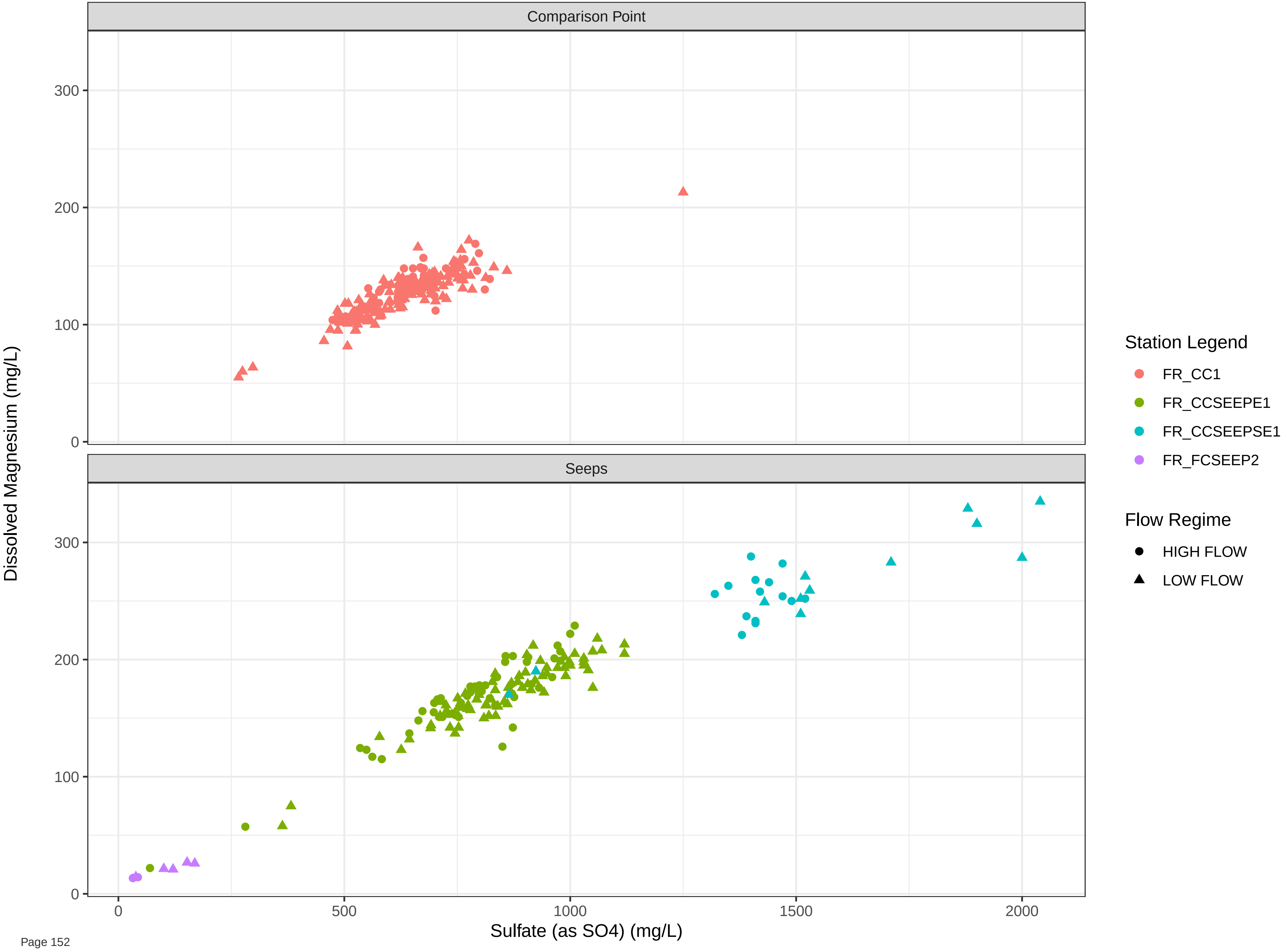


Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.00
0.05
0.10
0.15
0.20
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

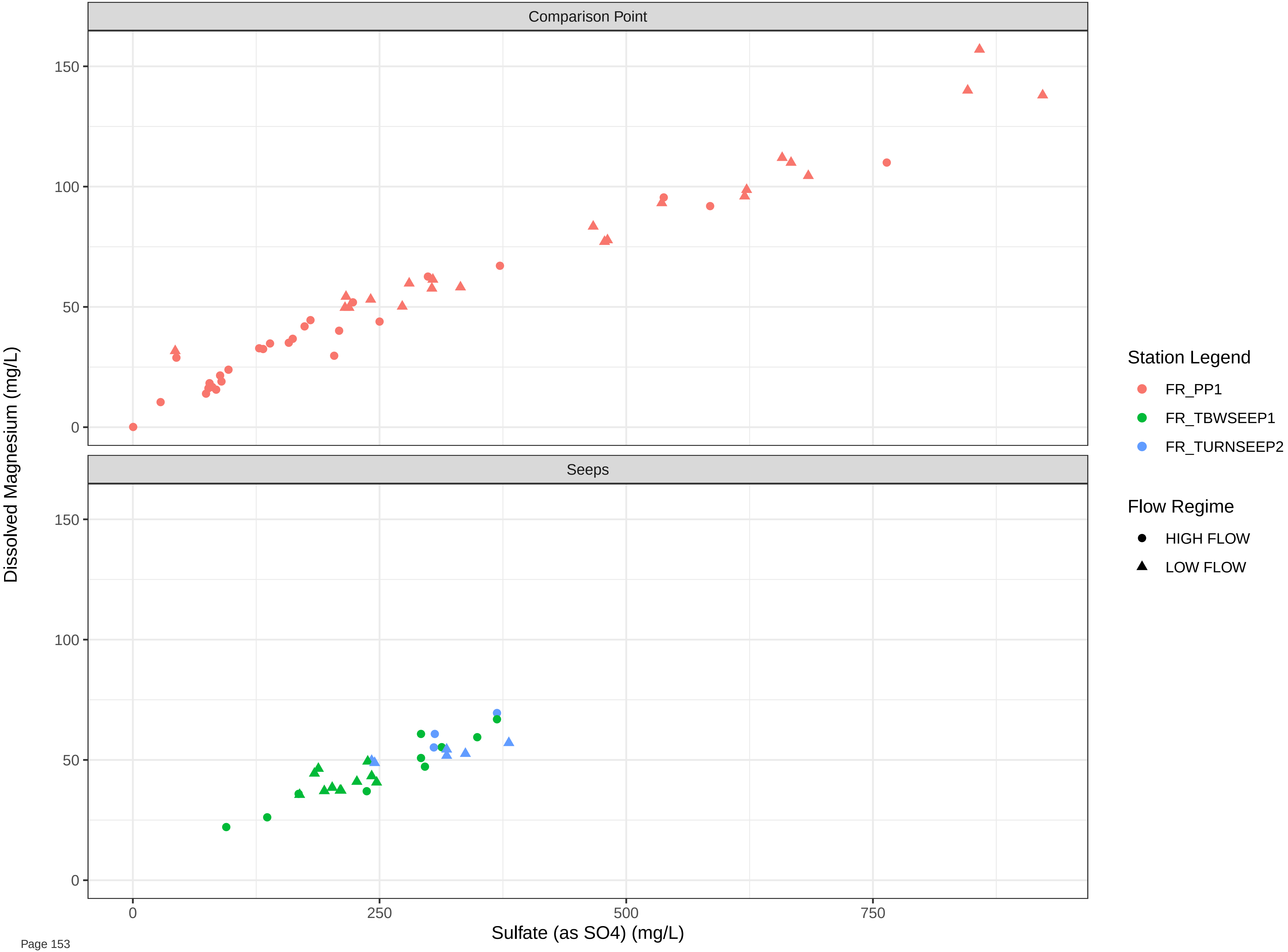

Seeps
0.100
0.075
0.050
0.025
503.950
503.975
504.000
504.025
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW



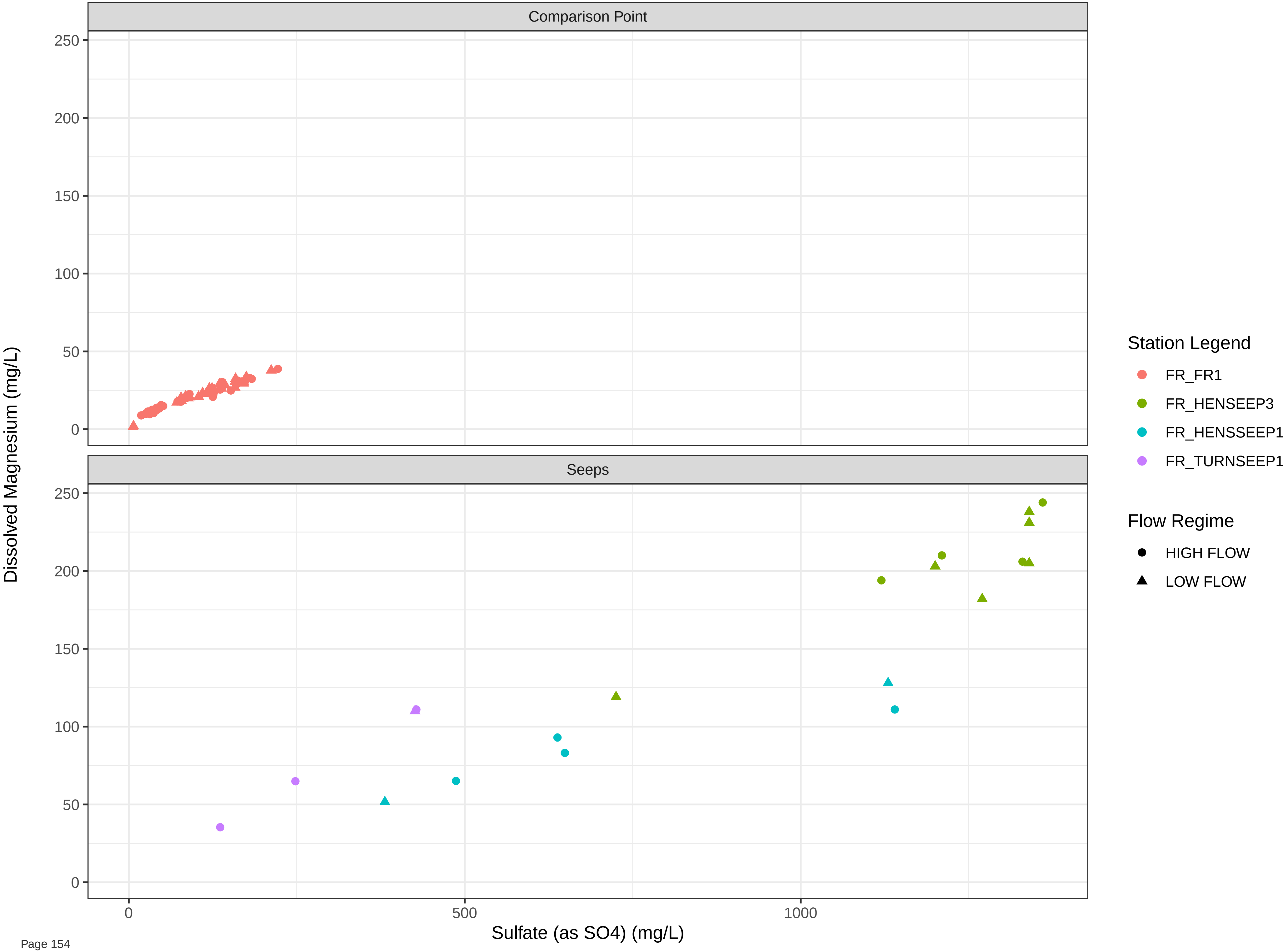
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
80
60
40
80
60
40
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



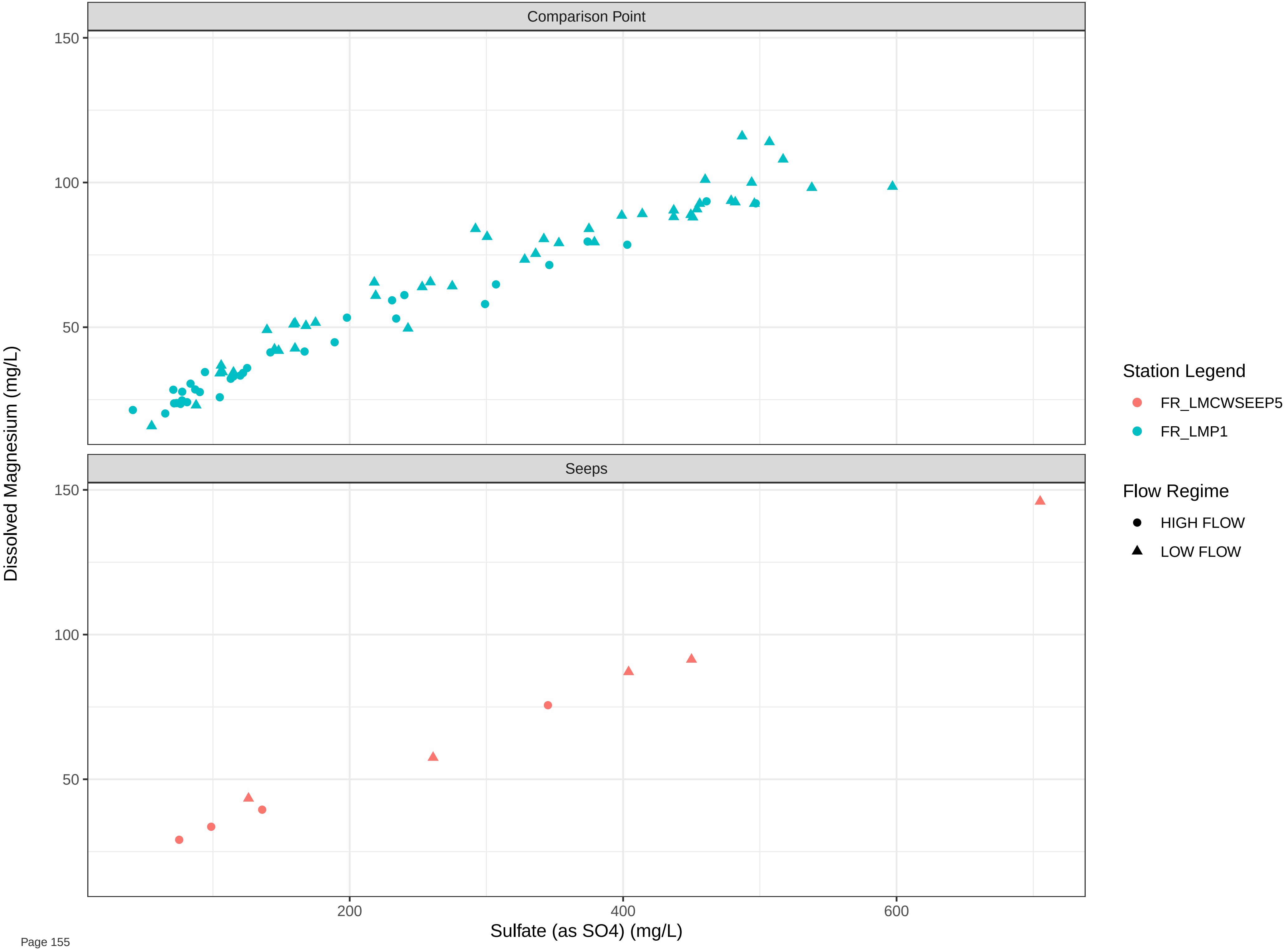
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



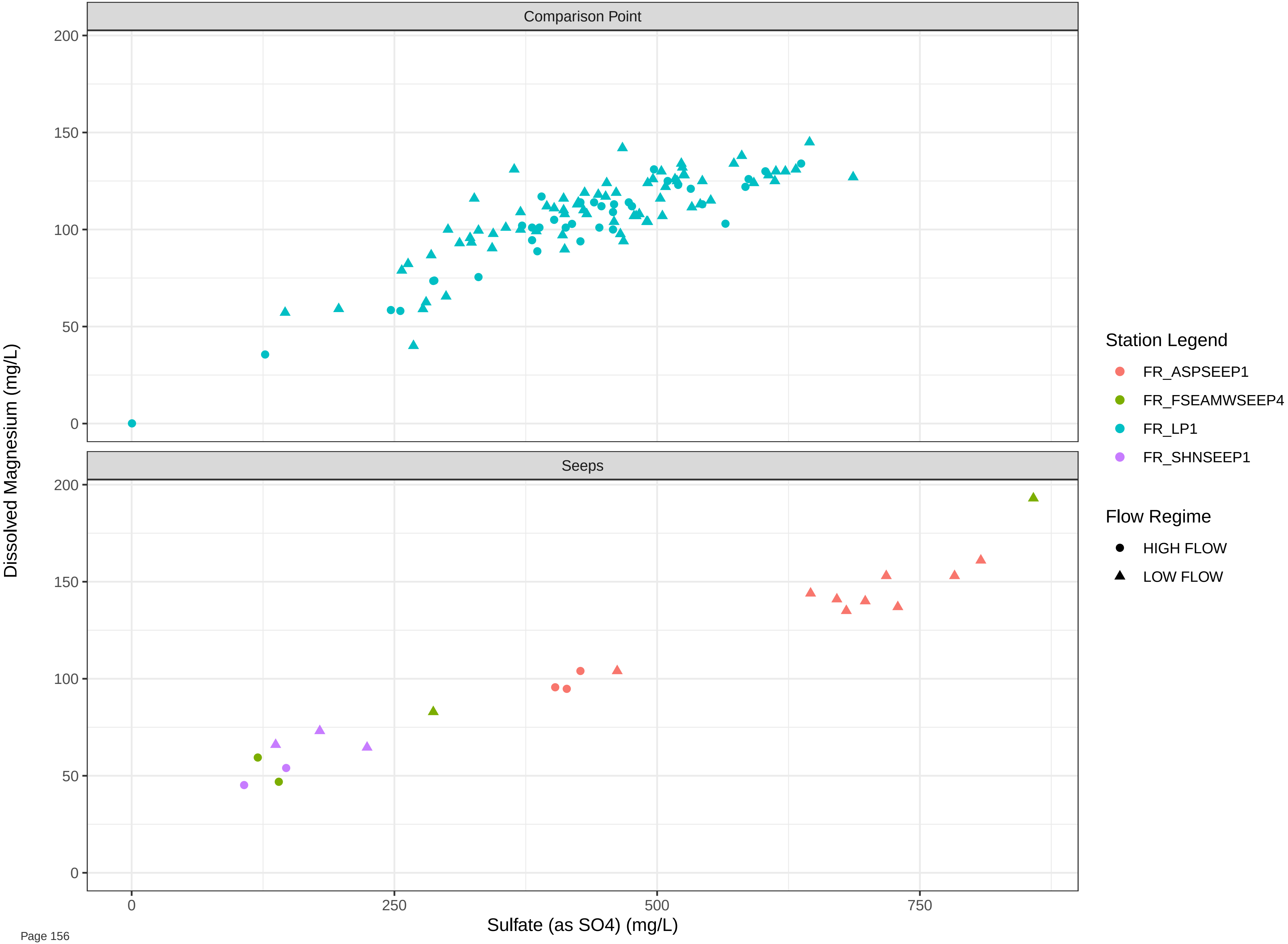
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



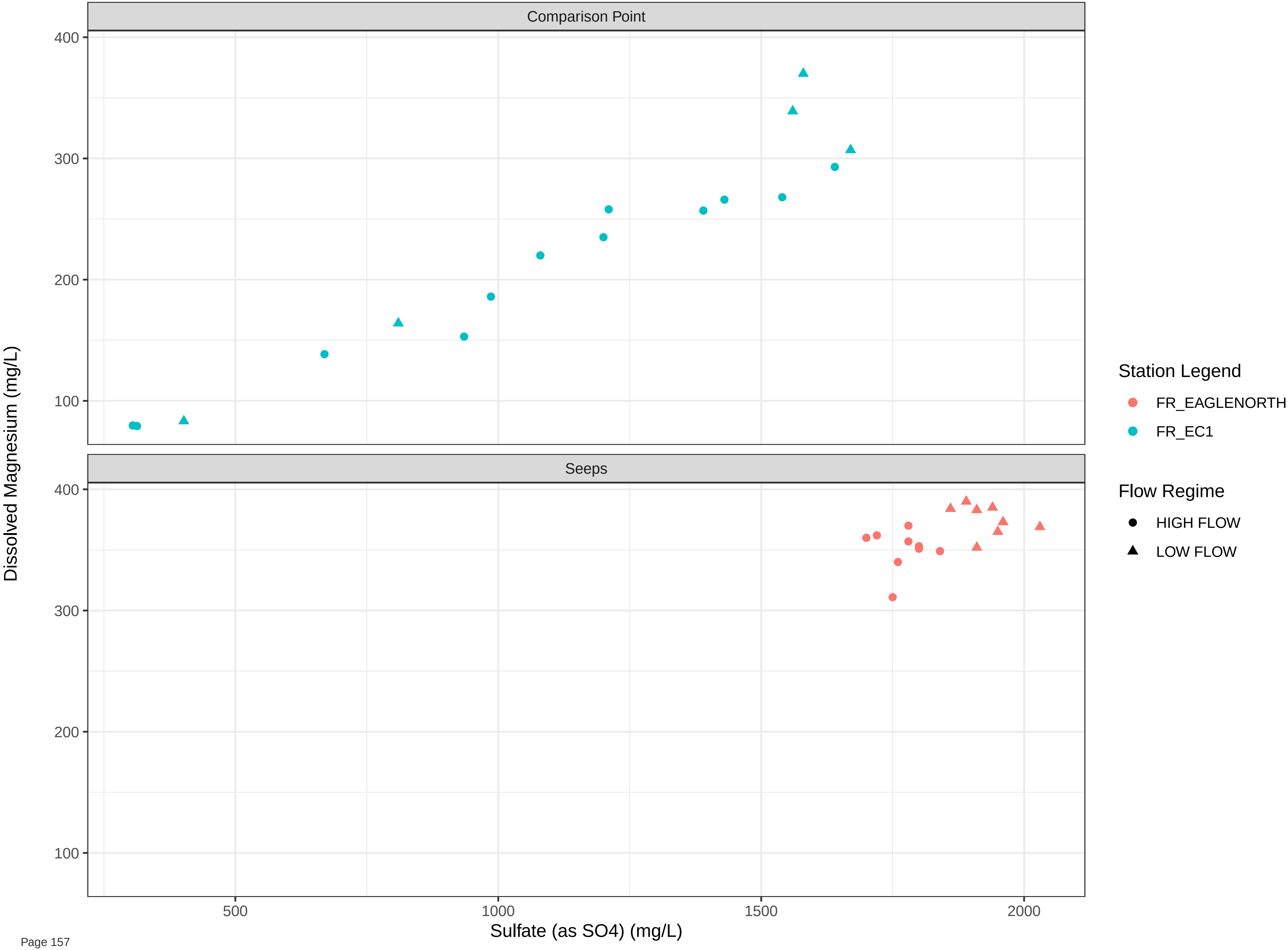
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
250
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



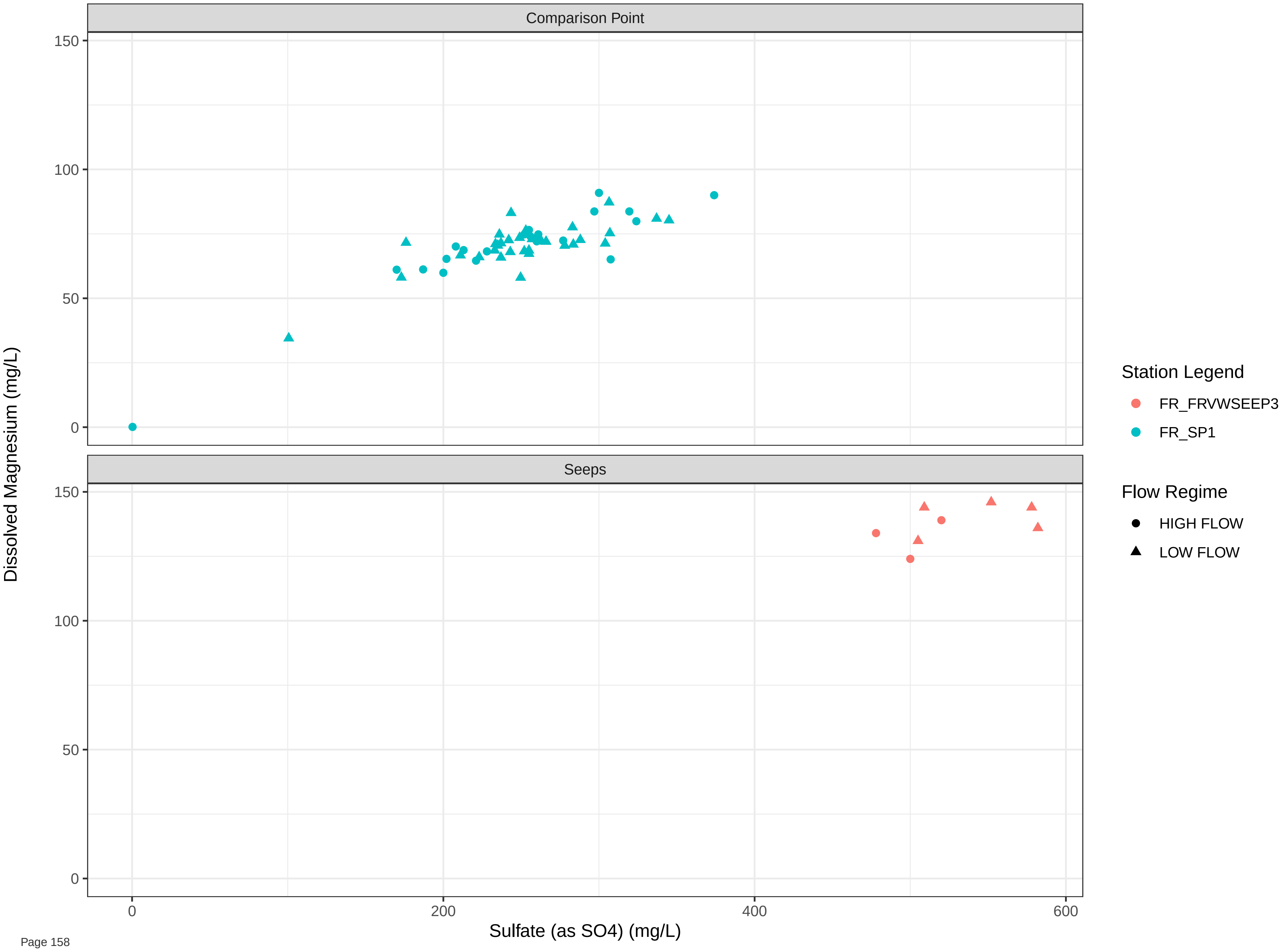
Comparison Point
Seeps
150
100
50
200
400
600
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



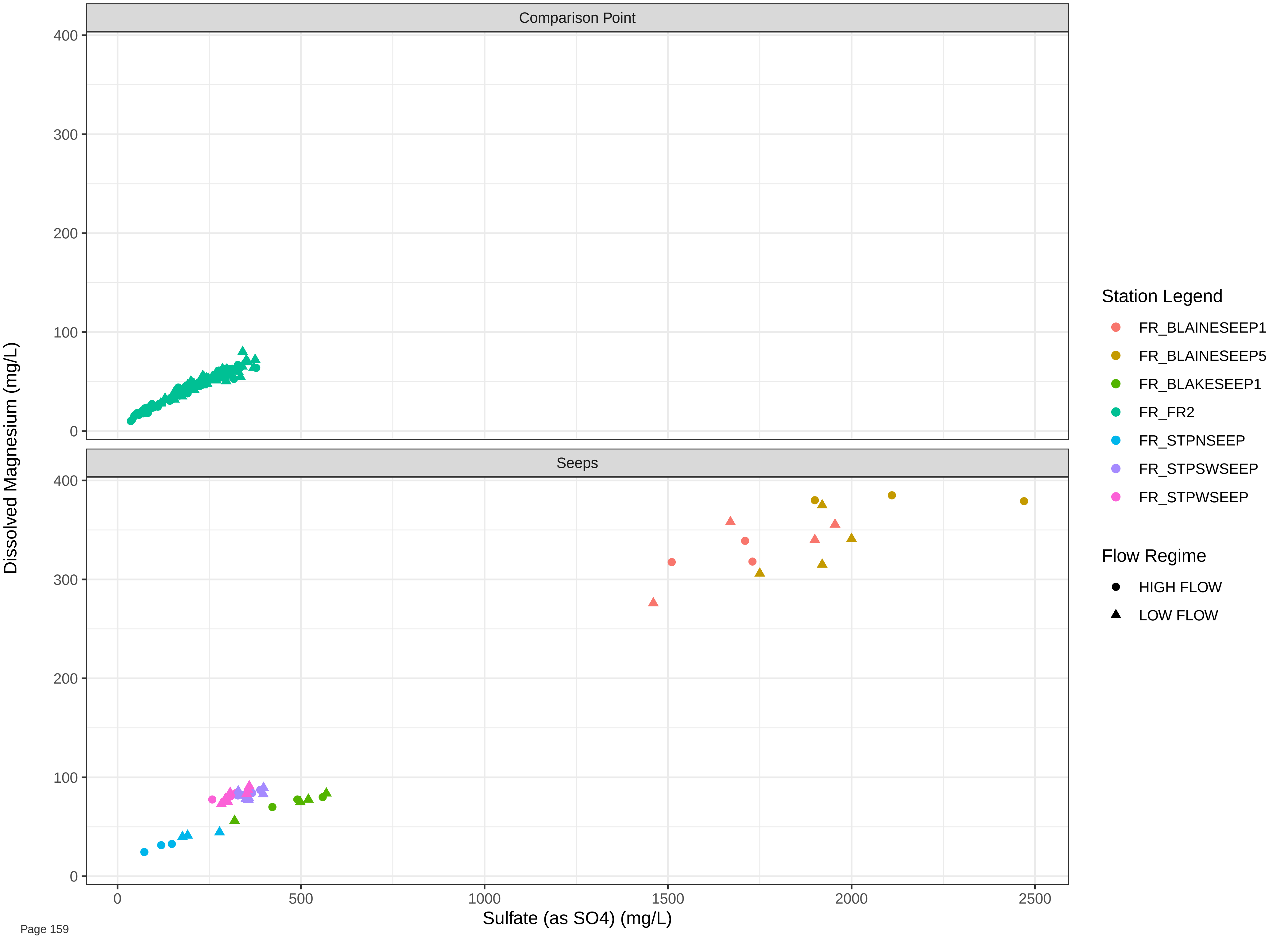
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

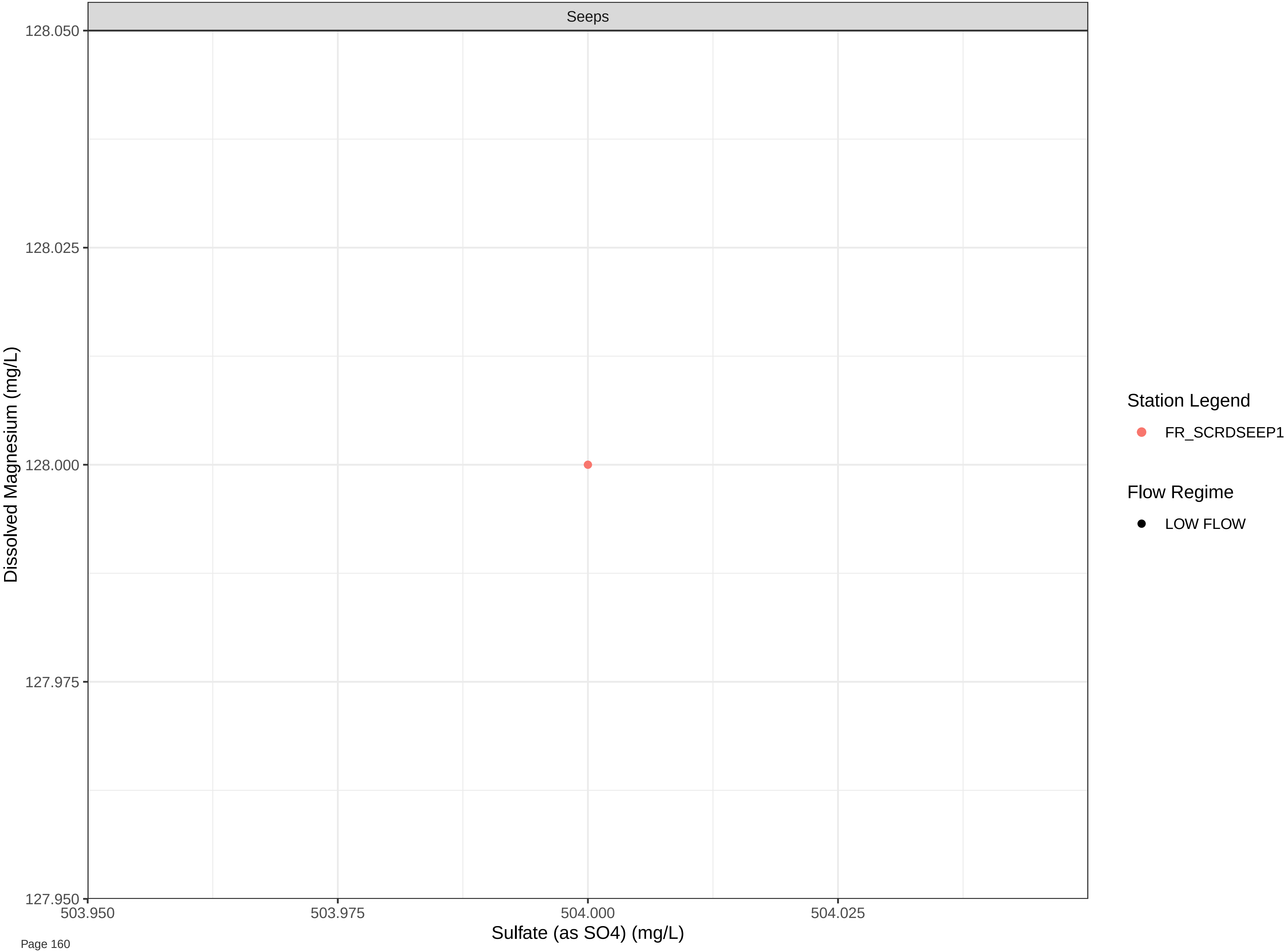


Comparison Point
Seeps
400
300
200
100
500
1000
1500
2000
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

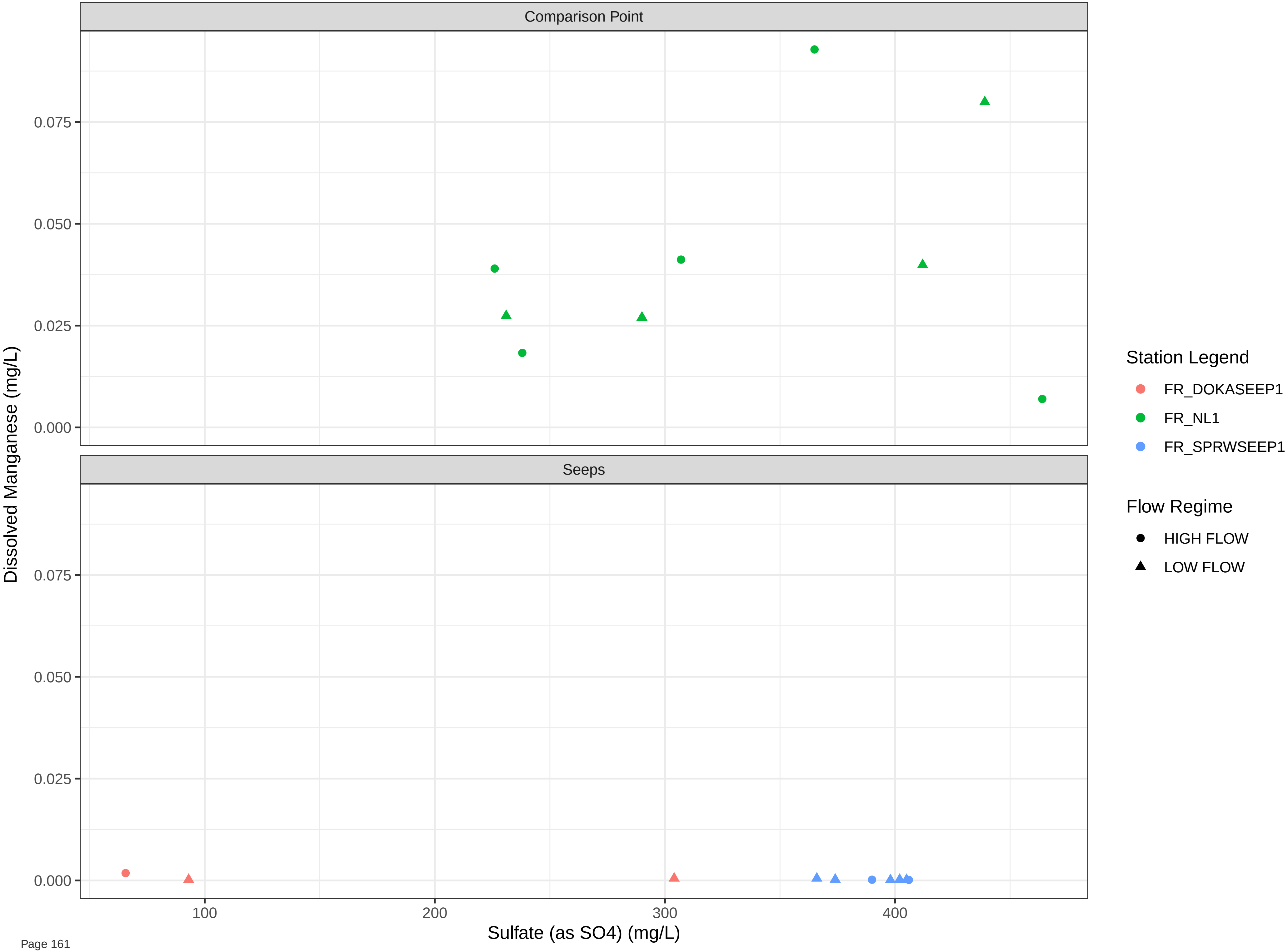


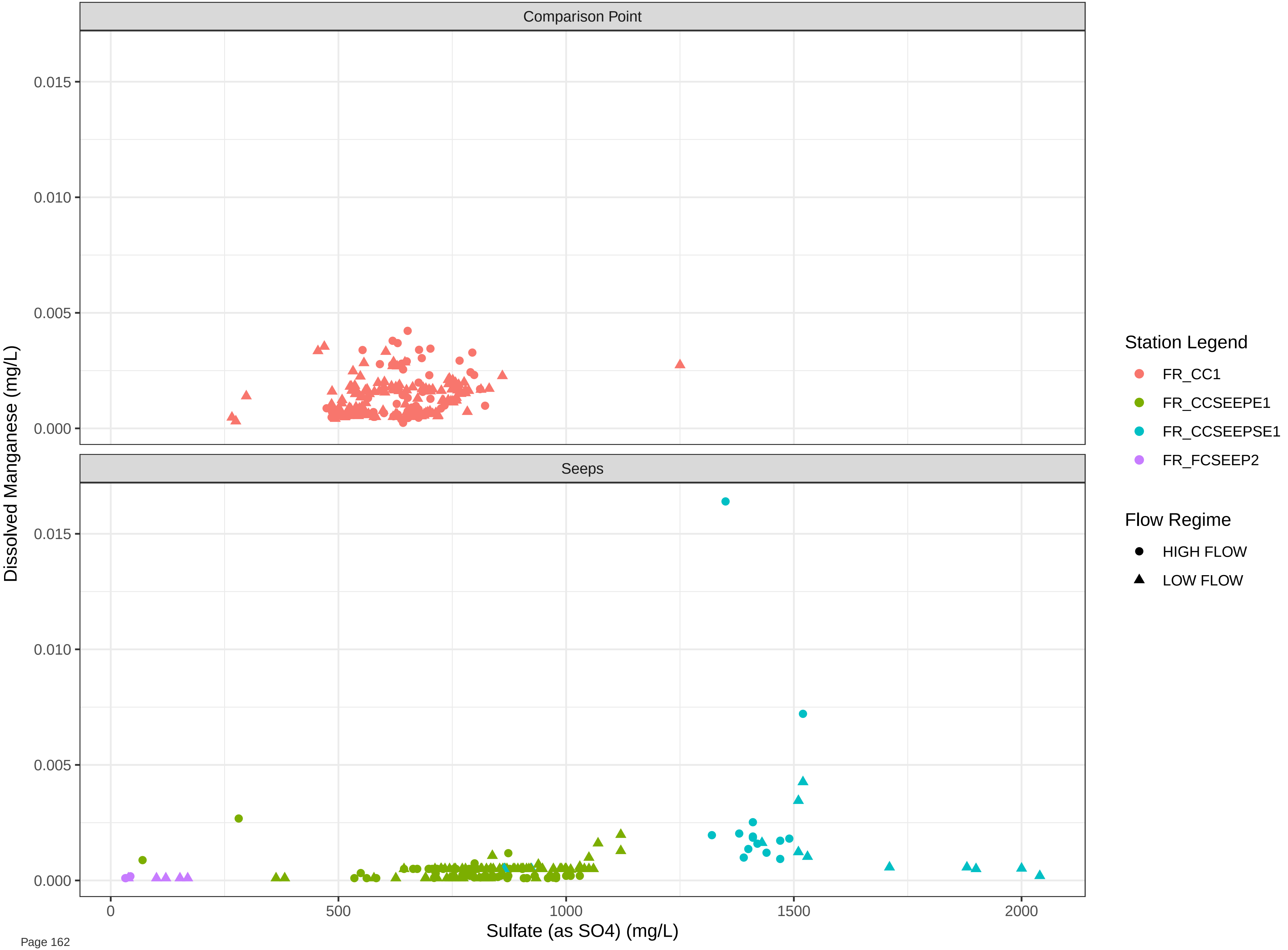
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
150
100
50
0
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

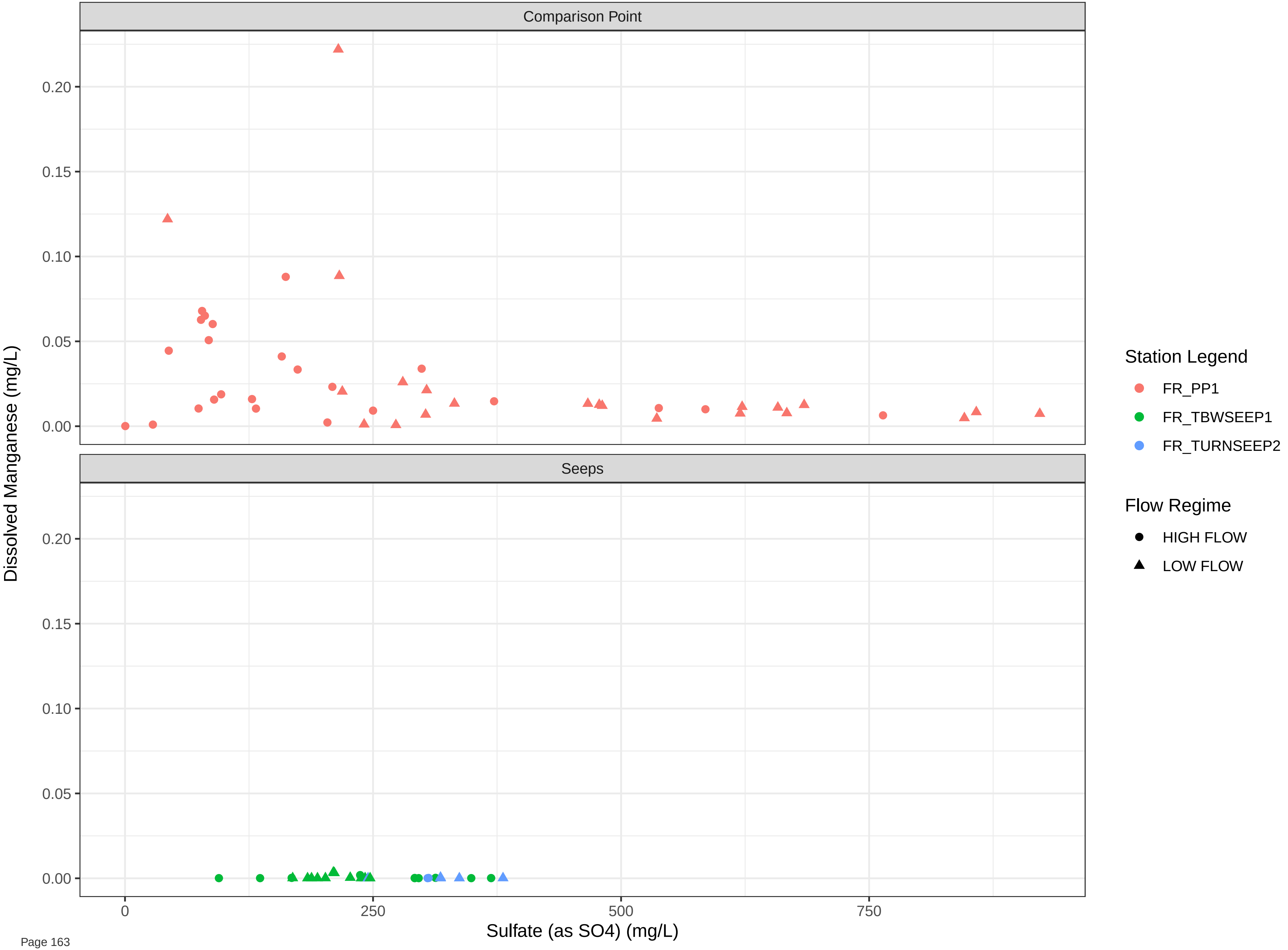


Seeps
128.050
128.025
128.000
127.975
127.950
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Dissolved Magnesium (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

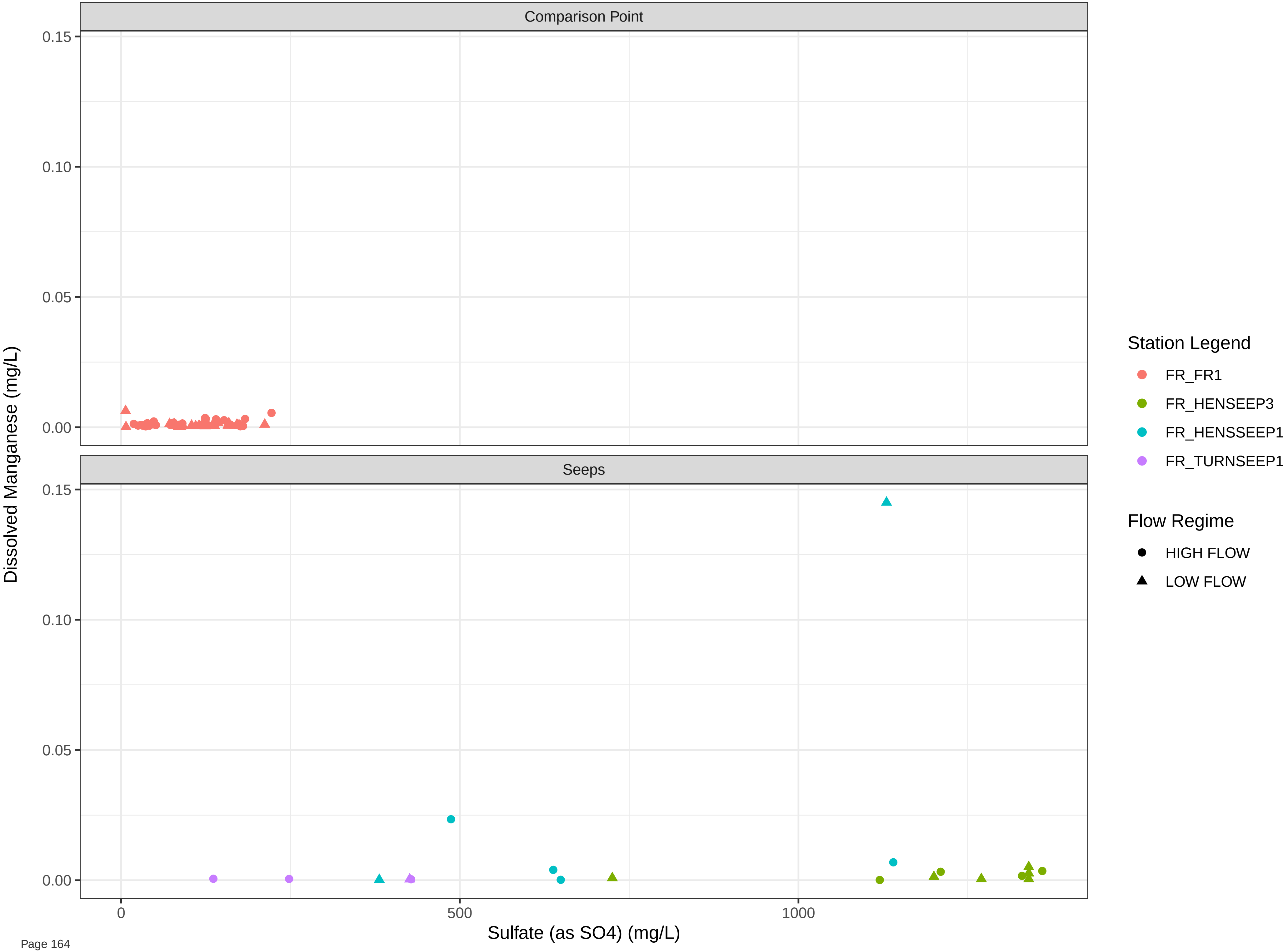

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.000
0.025
0.050
0.075
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



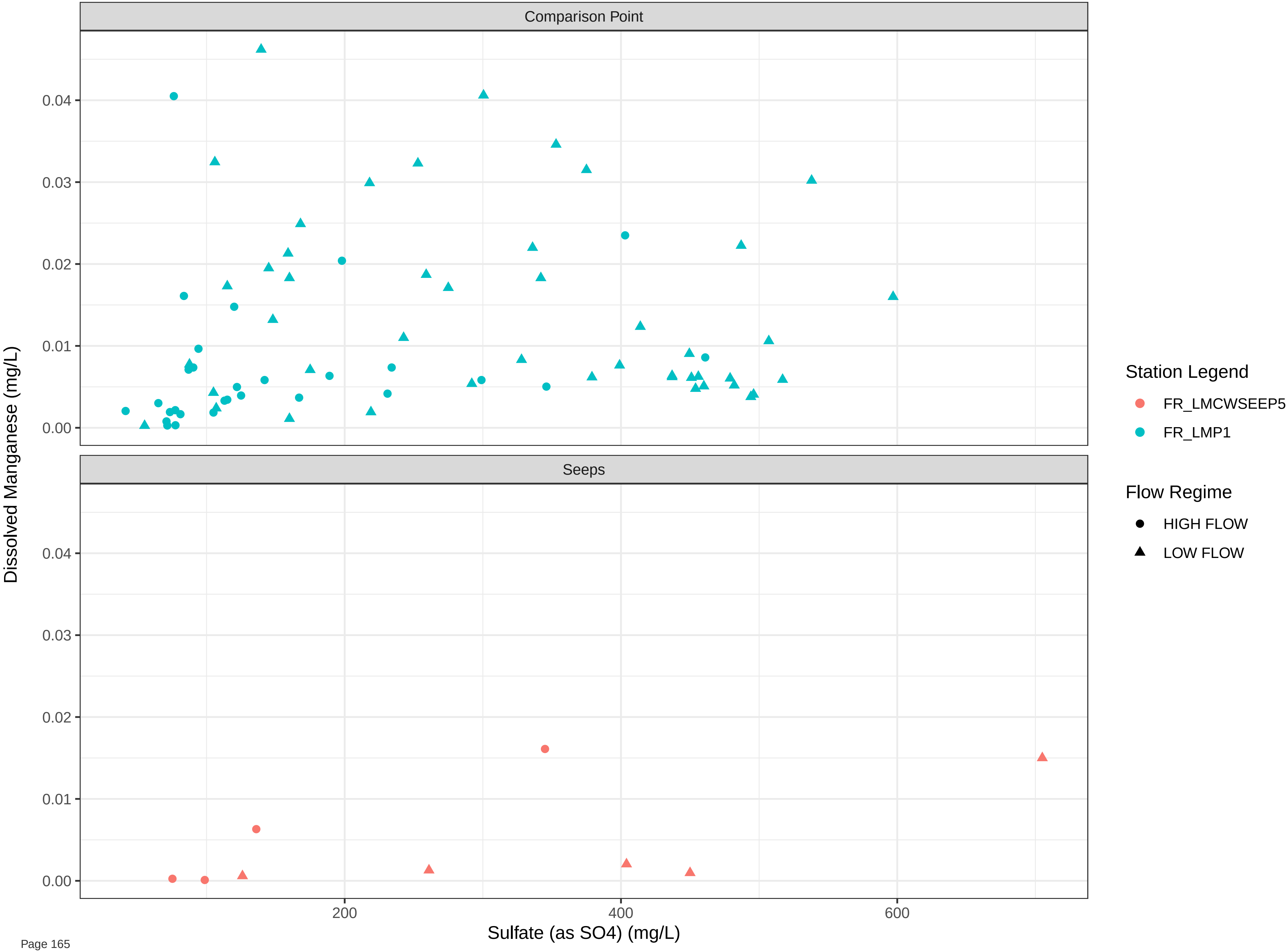
Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.000
0.005
0.010
0.015
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

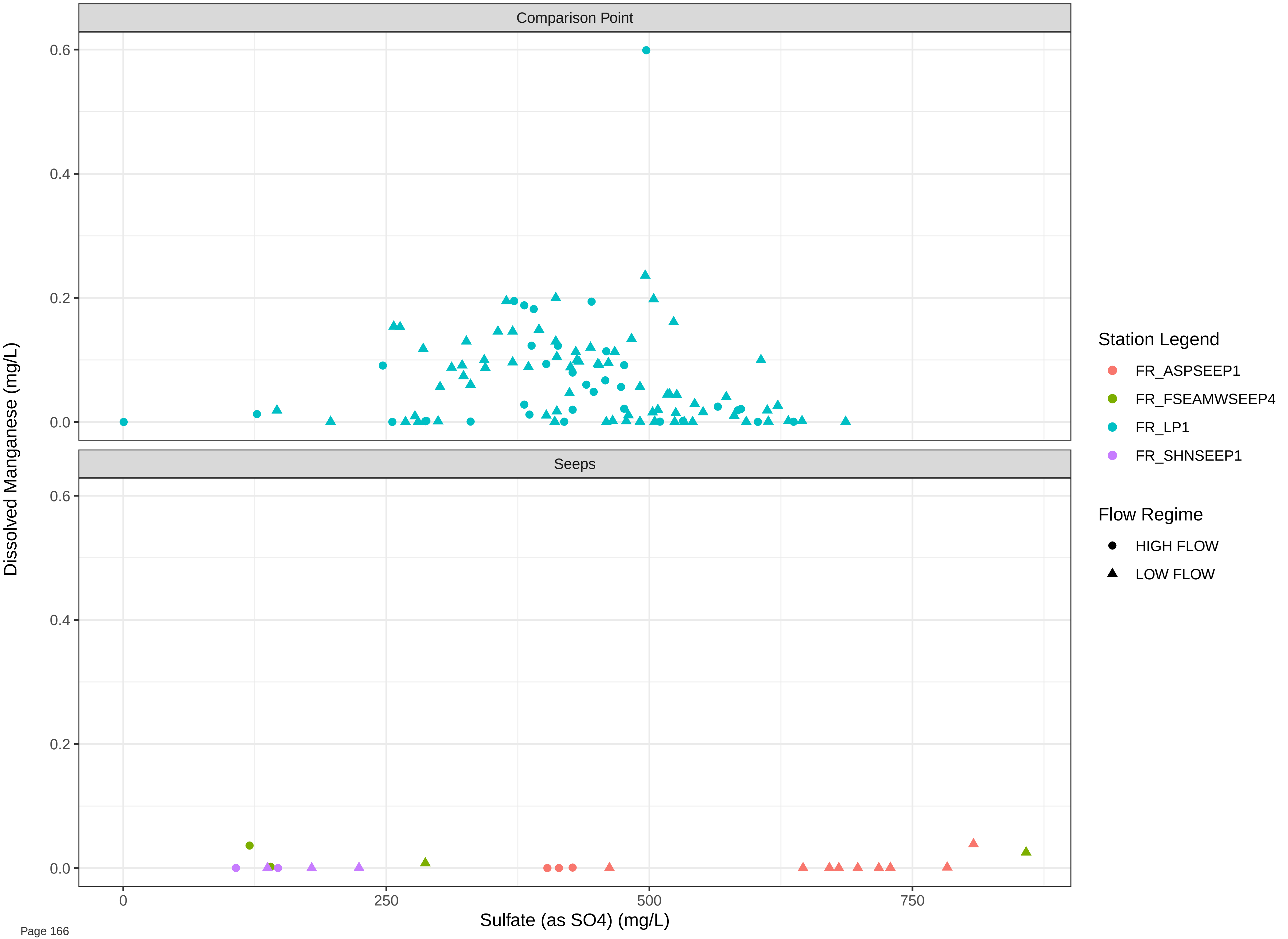


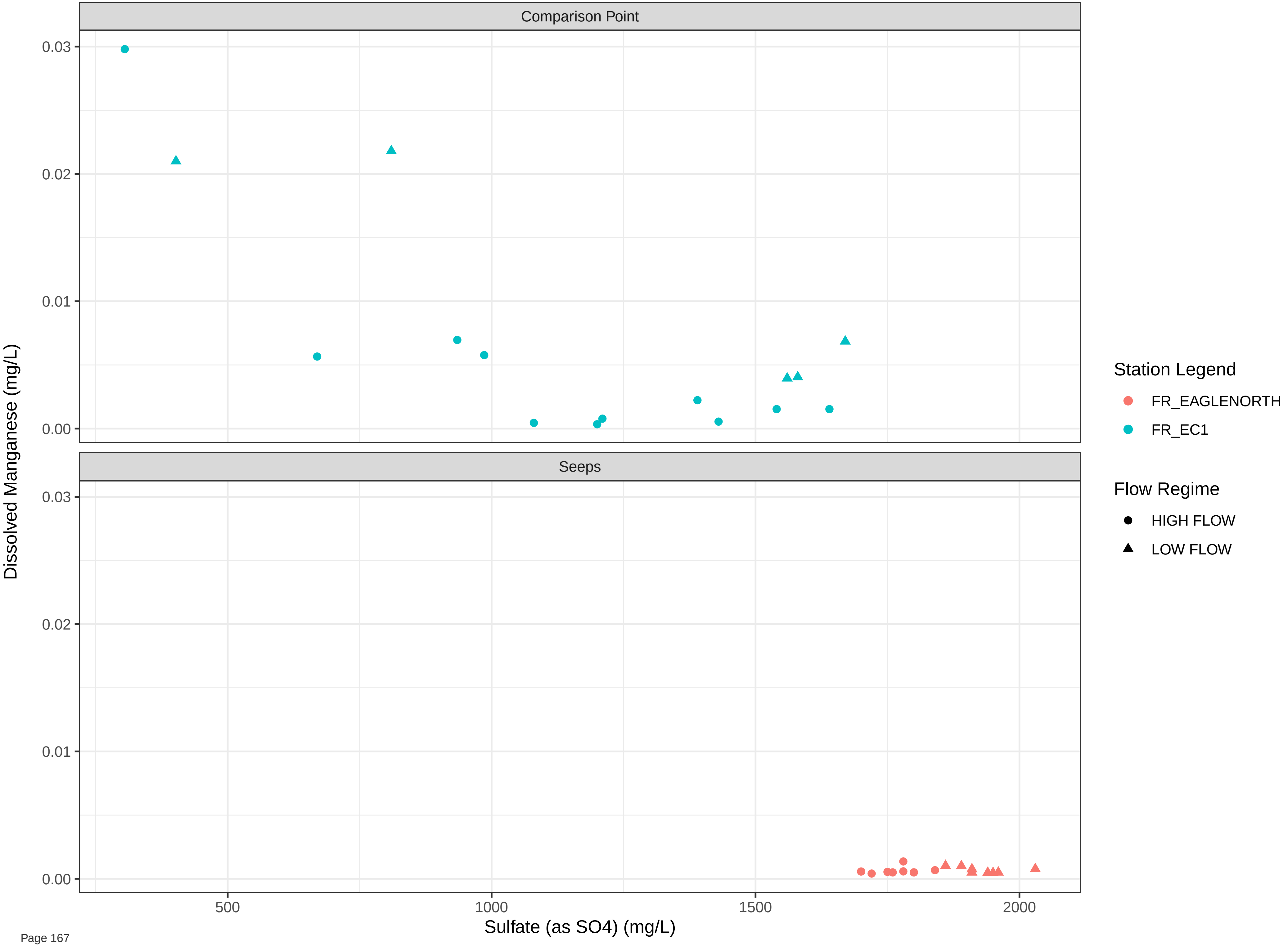
Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00
0.05
0.10
0.15
0.20
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



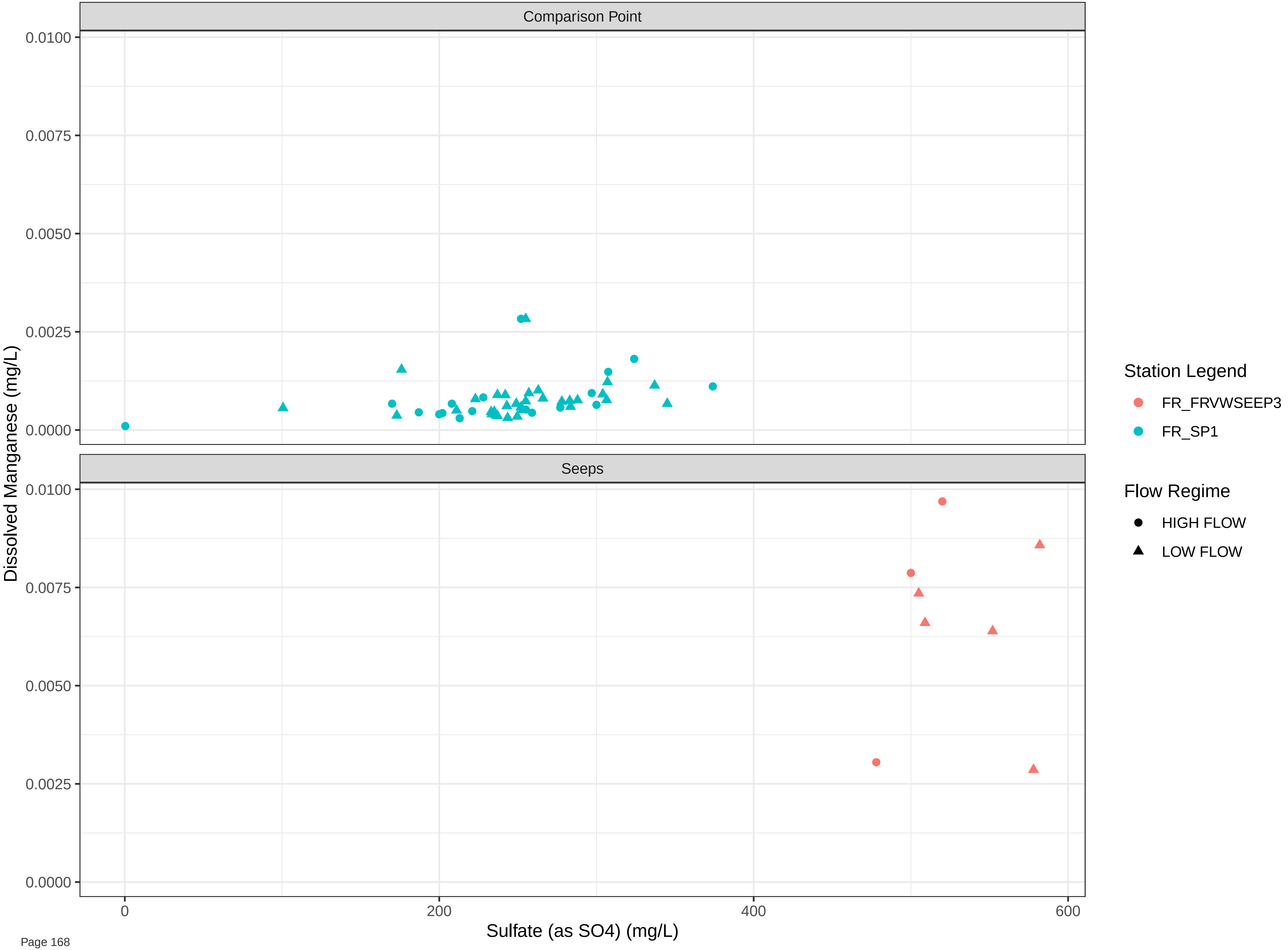
Comparison Point
Seeps
0.15
0.10
0.05
0.00
0
500
1000
Dissolved Manganese (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

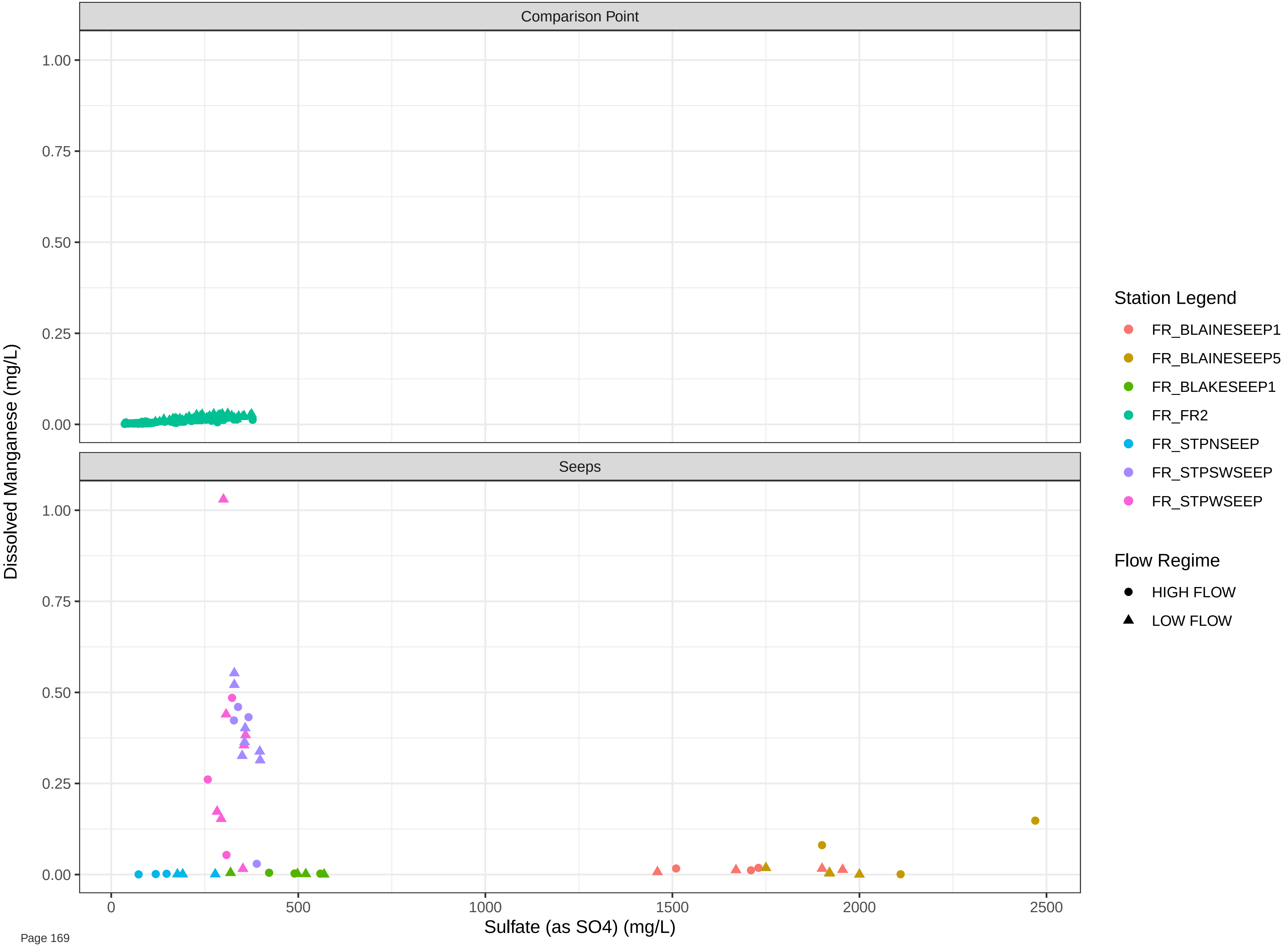

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00
0.01
0.02
0.03
0.04
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

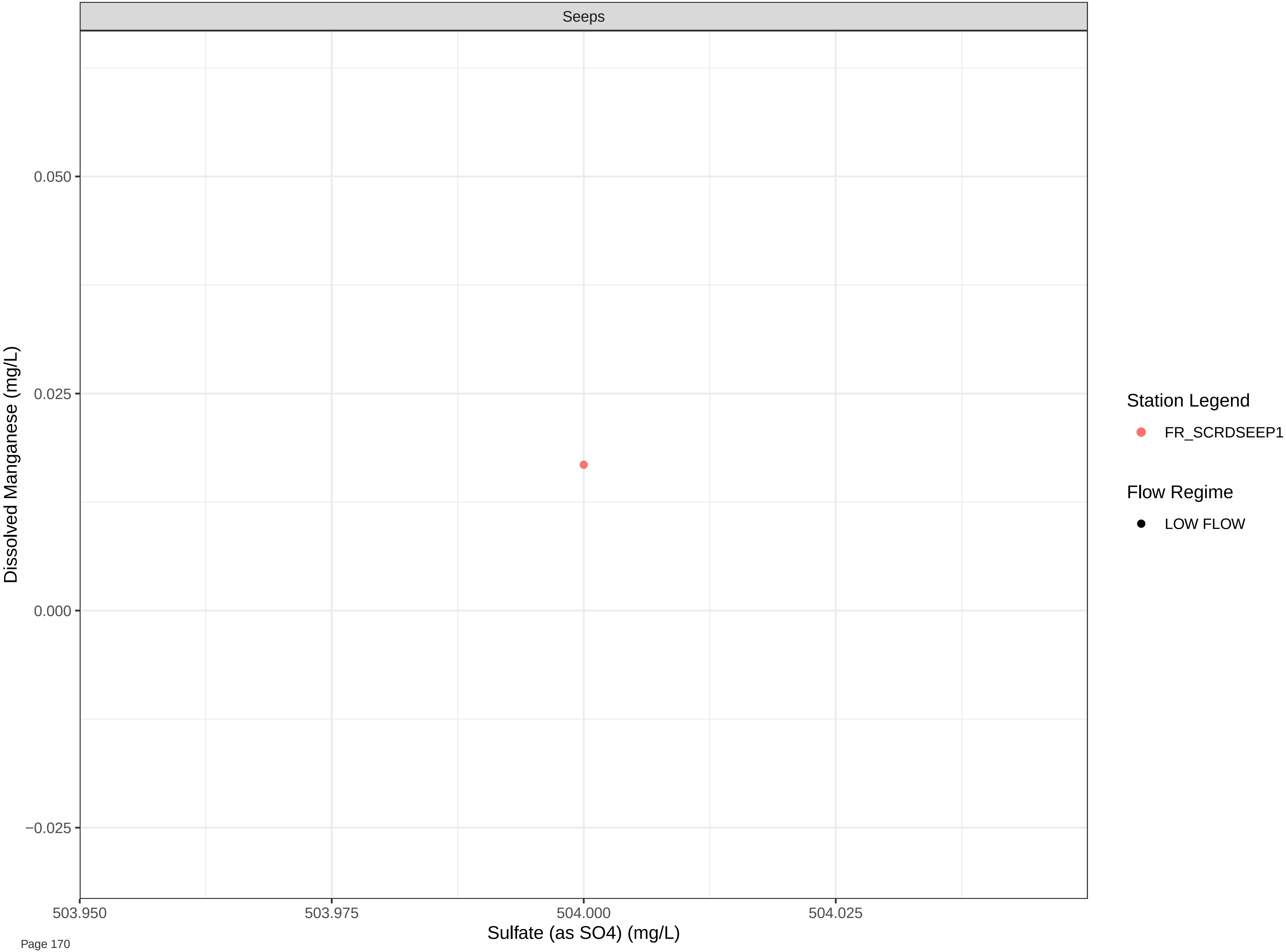

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.0
0.2
0.4
0.6
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



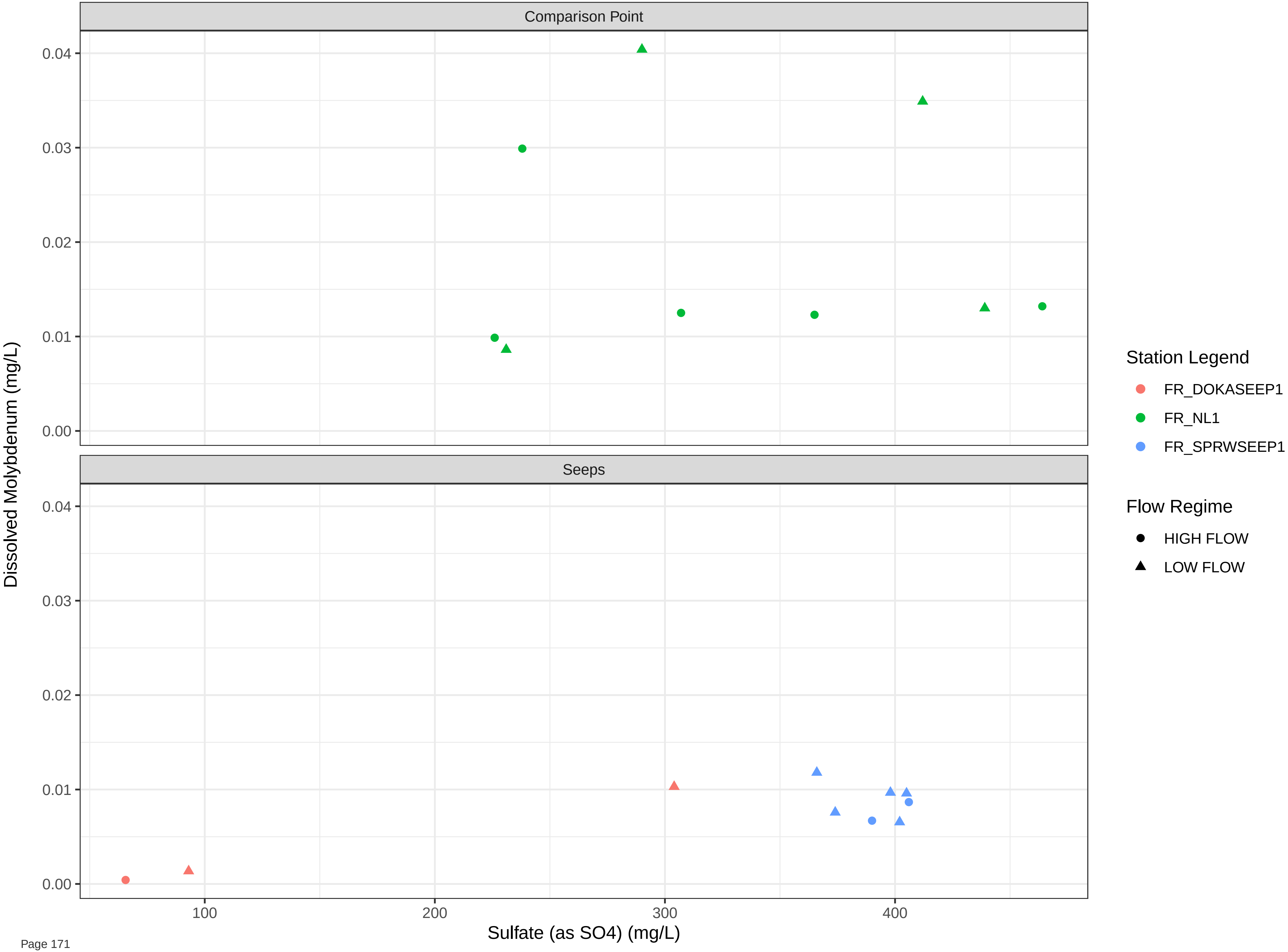
Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00
0.01
0.02
0.03
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

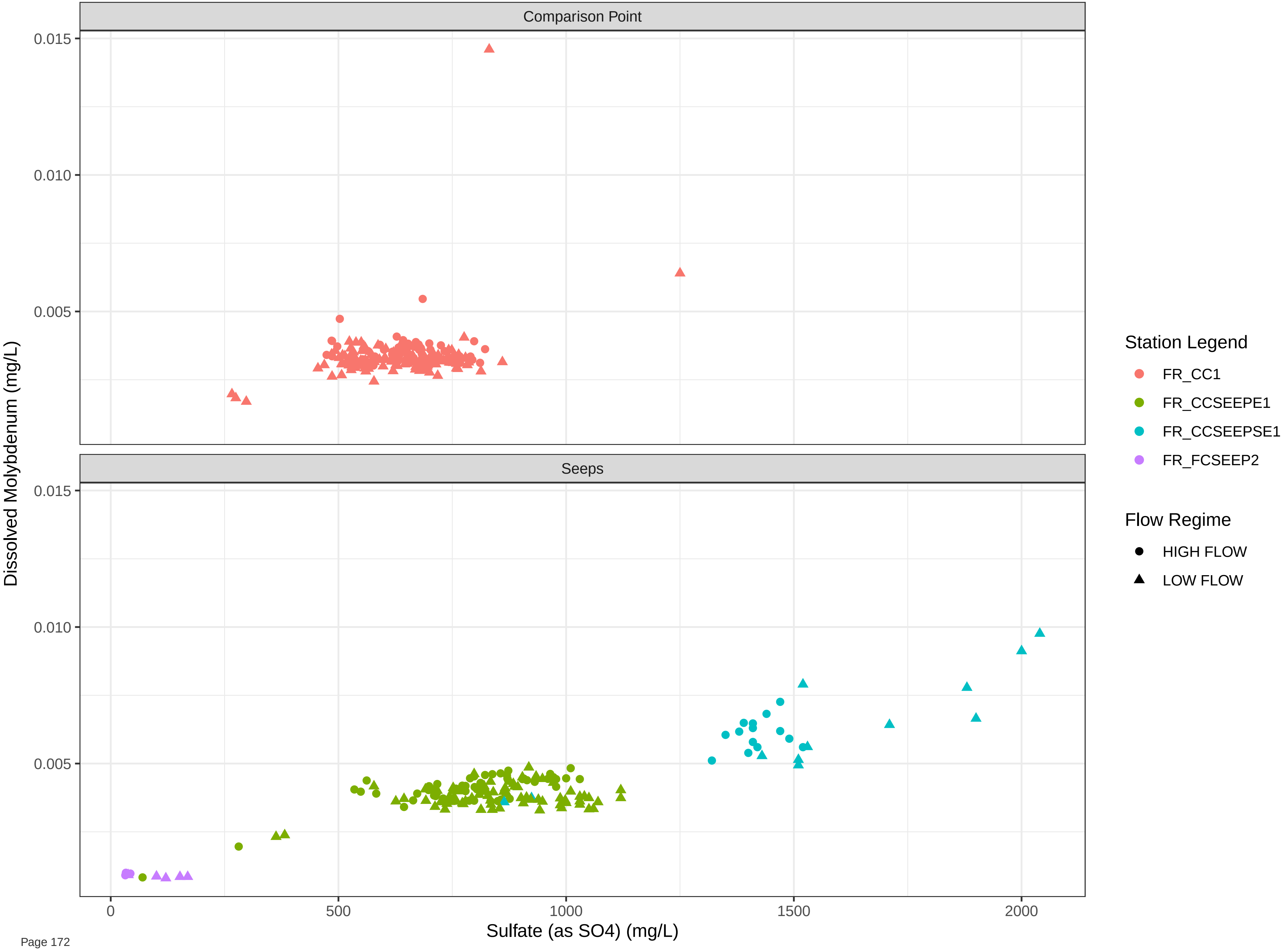

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Manganese (mg/L)
1.00
0.75
0.50
0.25
0.00
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

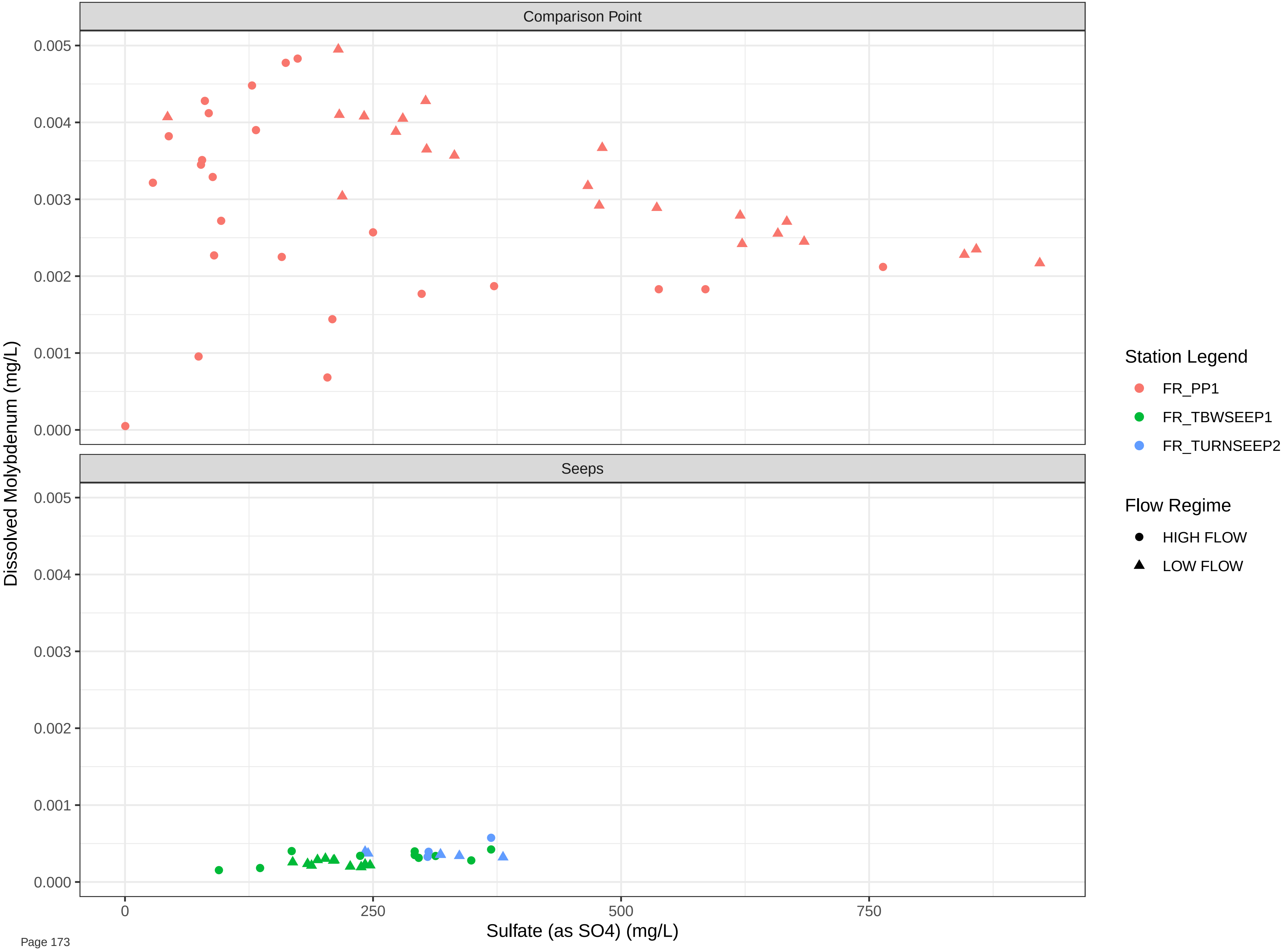


Seeps
Dissolved Manganese (mg/L)
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

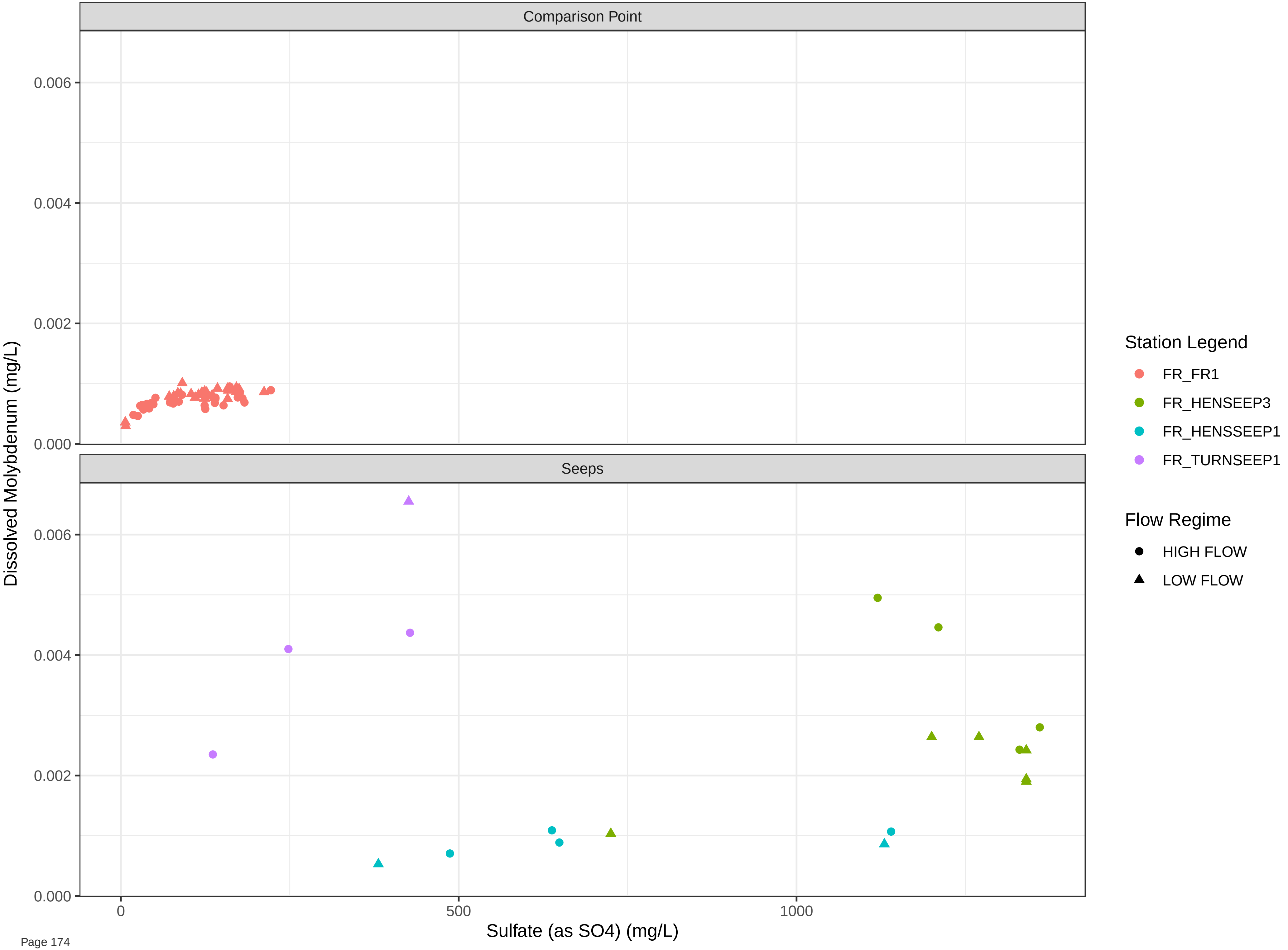

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.04
0.03
0.02
0.01
0.00
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

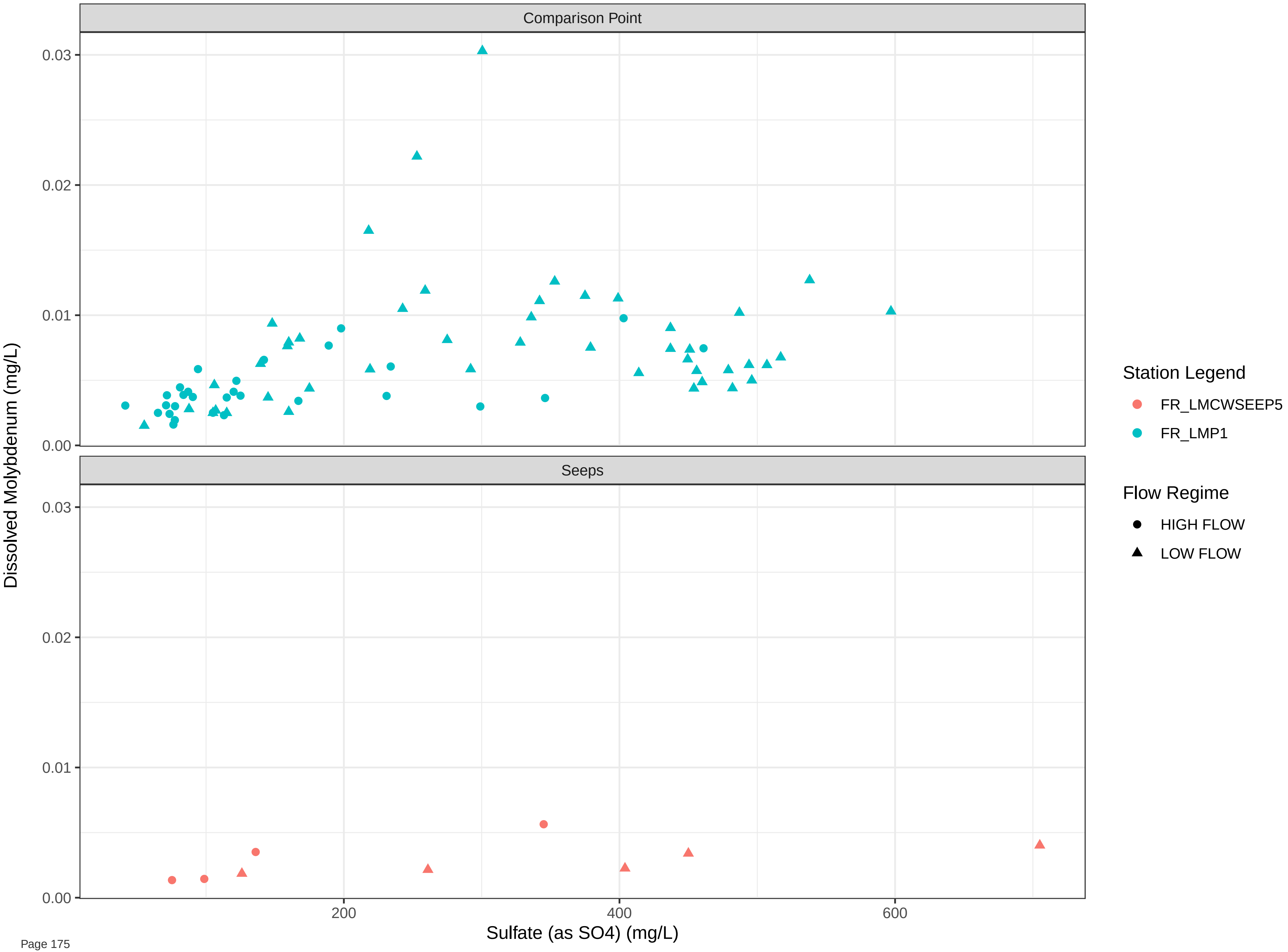


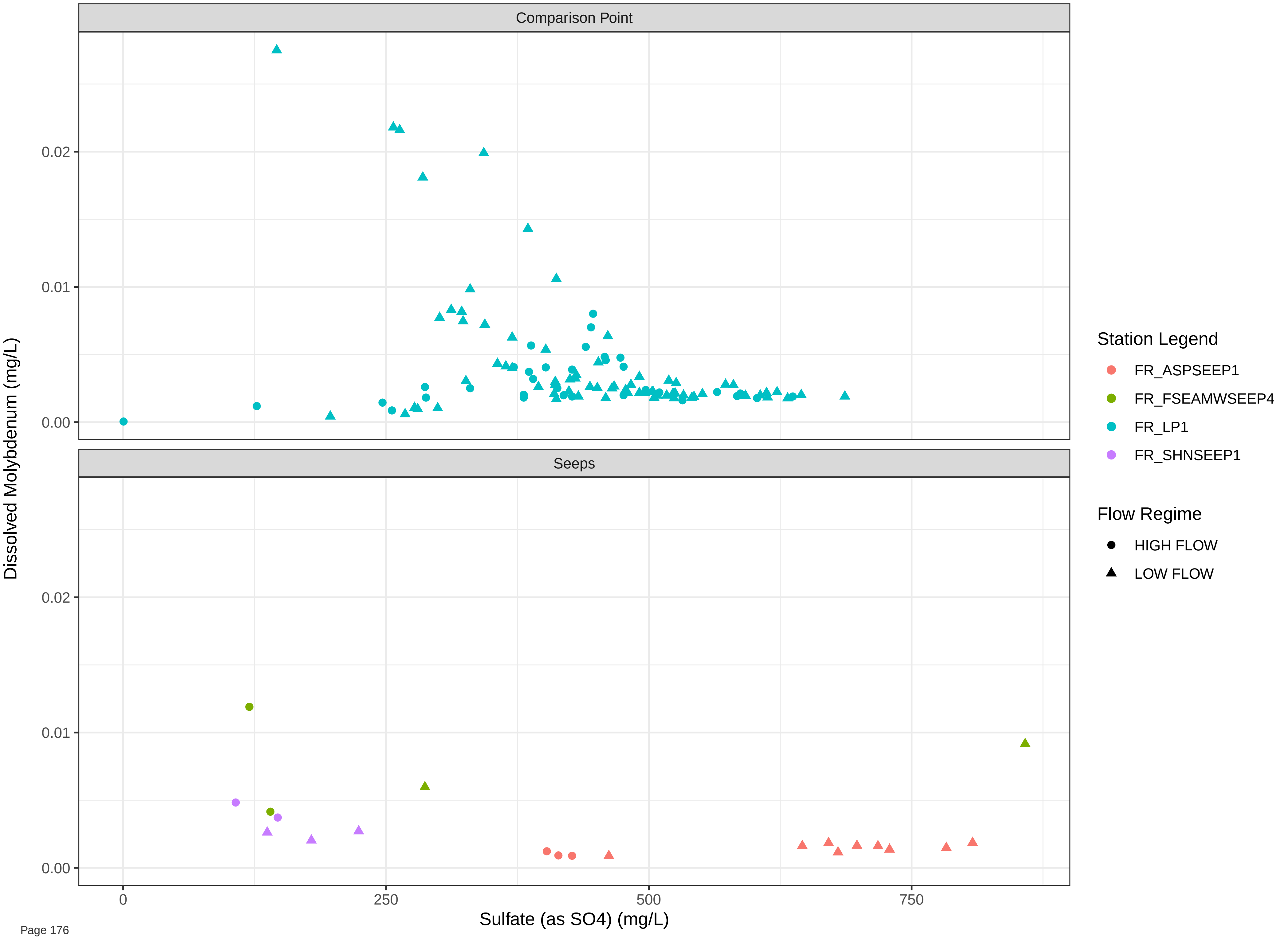
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.015
0.010
0.005
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

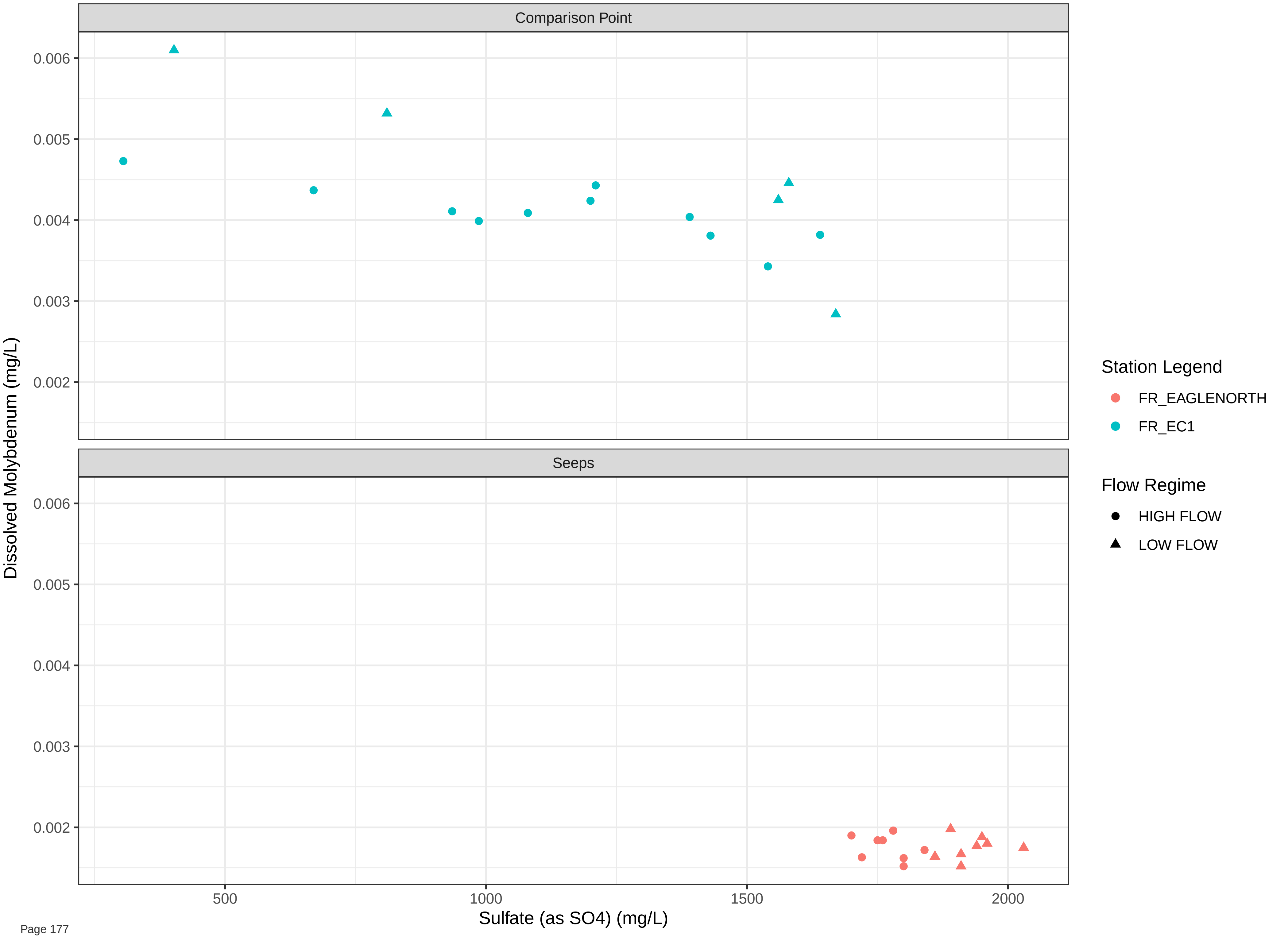


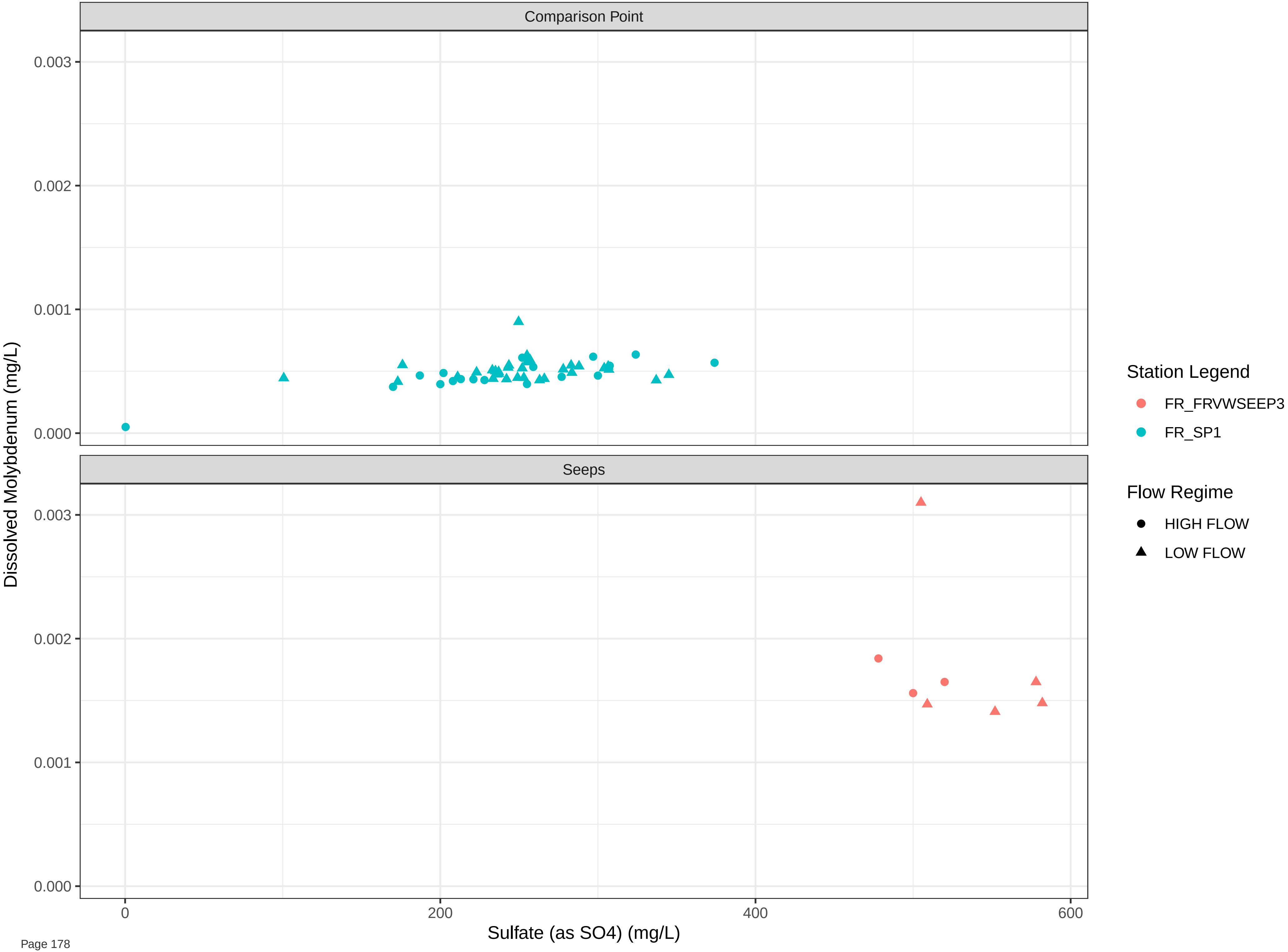
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.000
0.001
0.002
0.003
0.004
0.005
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.000
0.002
0.004
0.006
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

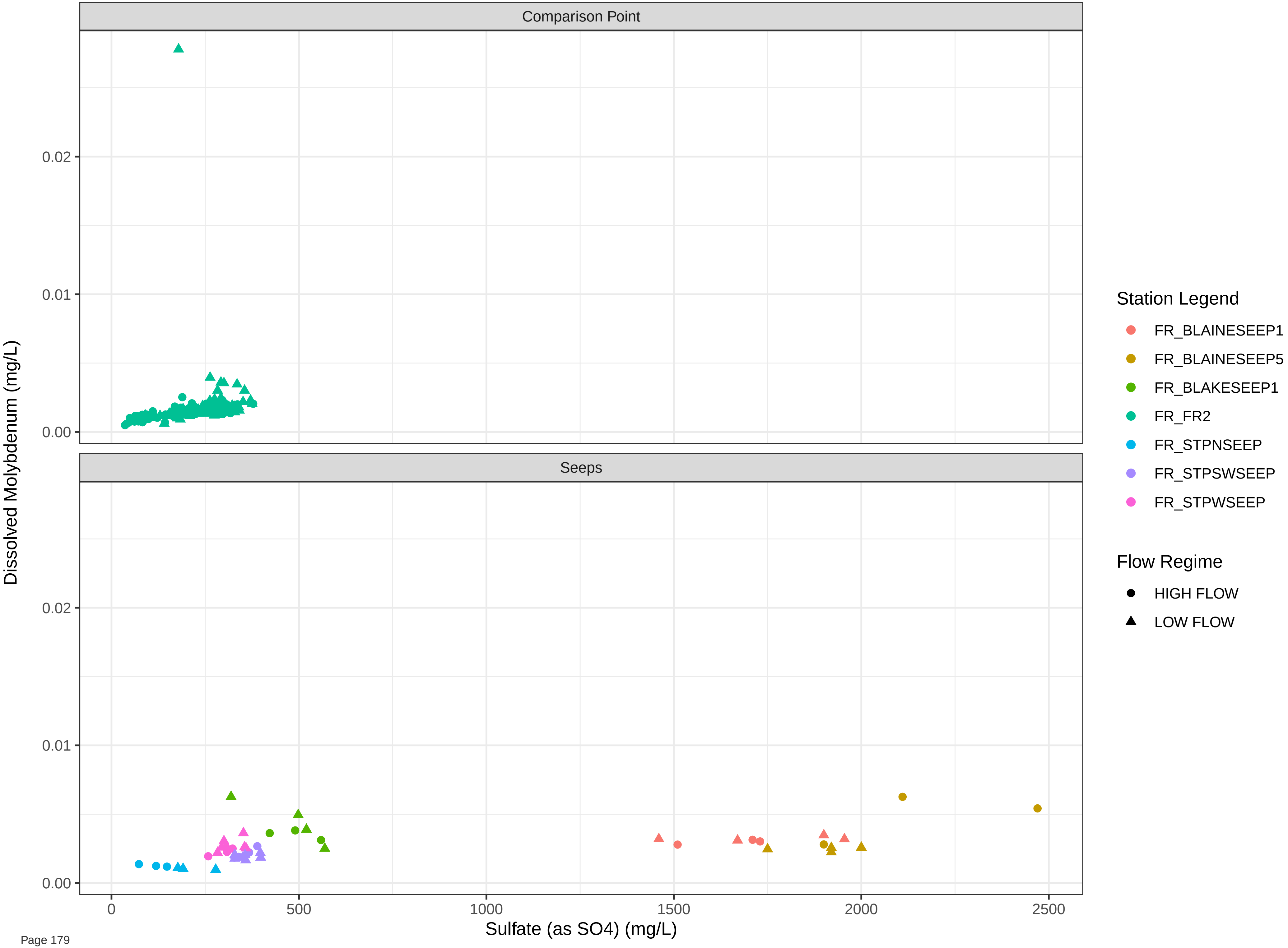

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.00
0.01
0.02
0.03
Sulfate (as SO4) (mg/L)
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
0.00
0.01
0.02
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

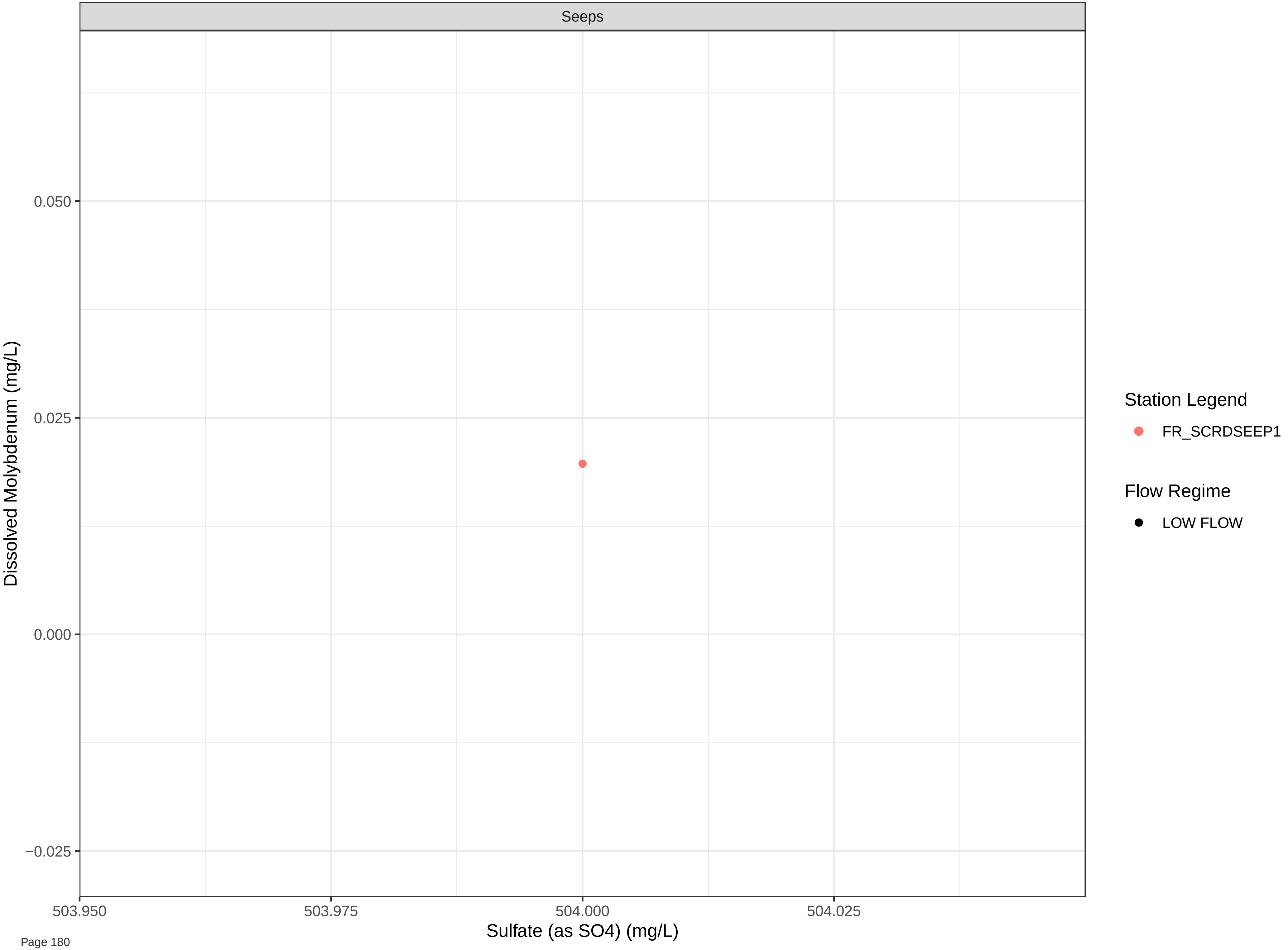

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.006
0.005
0.004
0.003
0.002
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

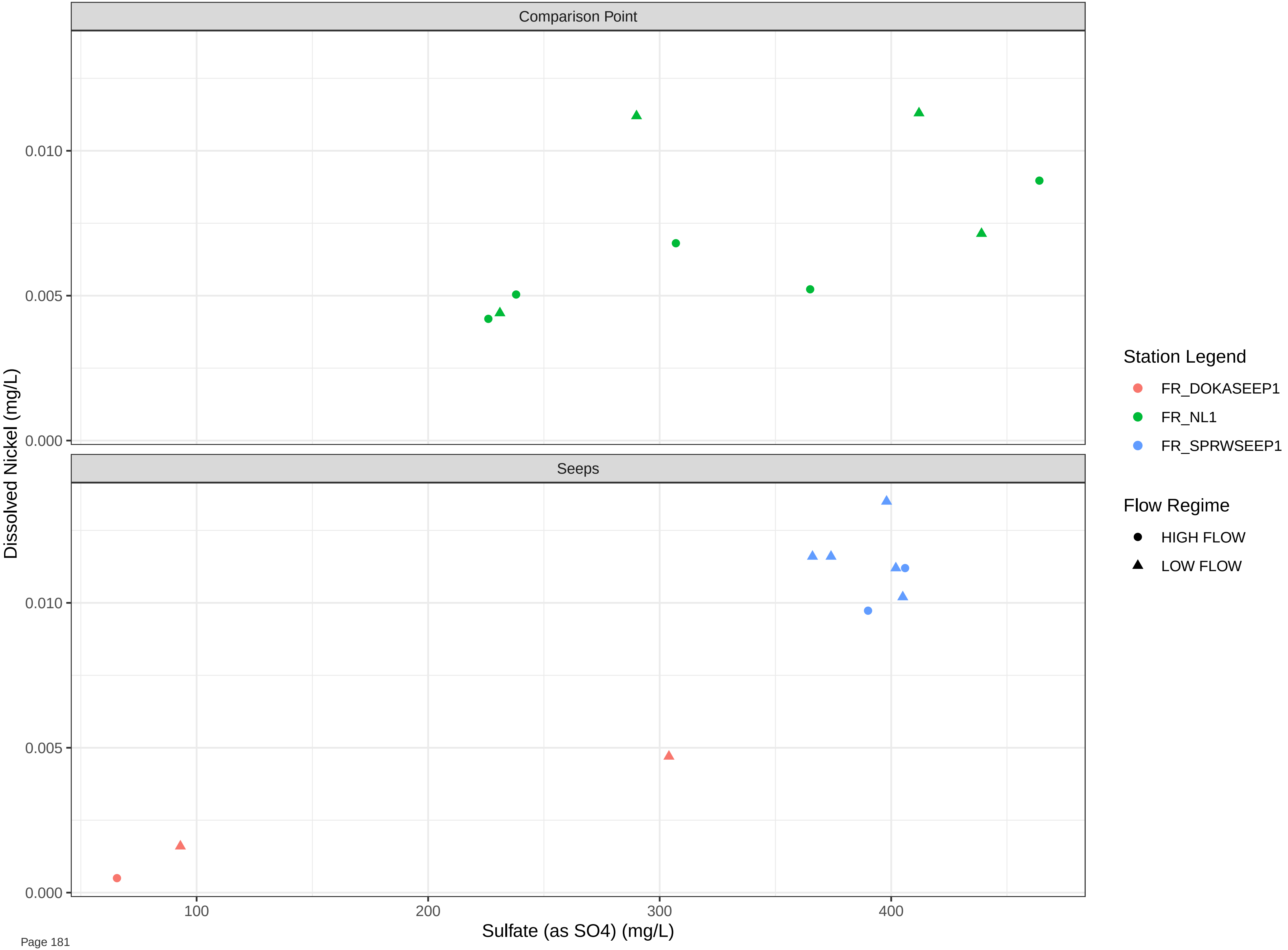


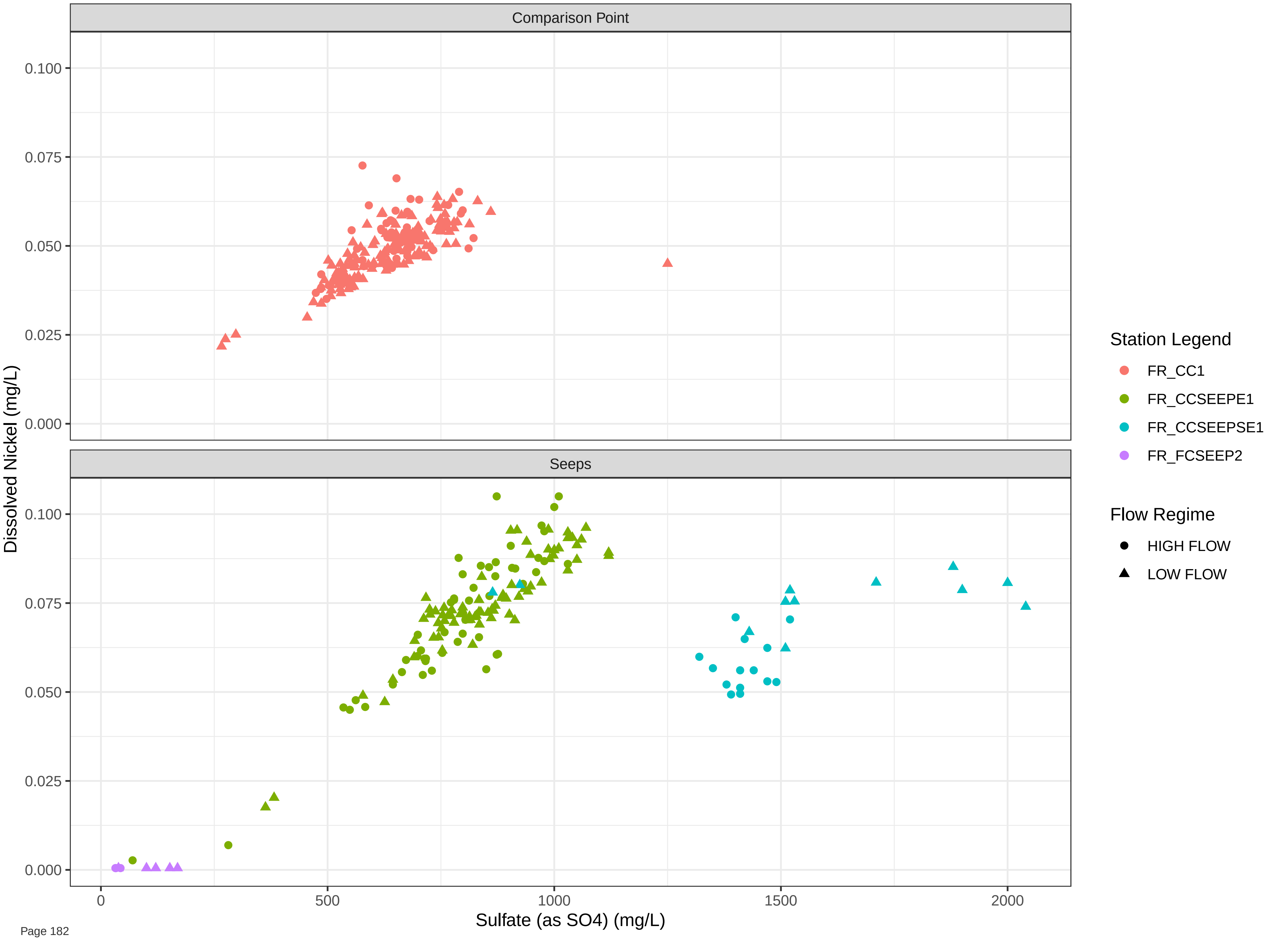
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.000
0.001
0.002
0.003
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

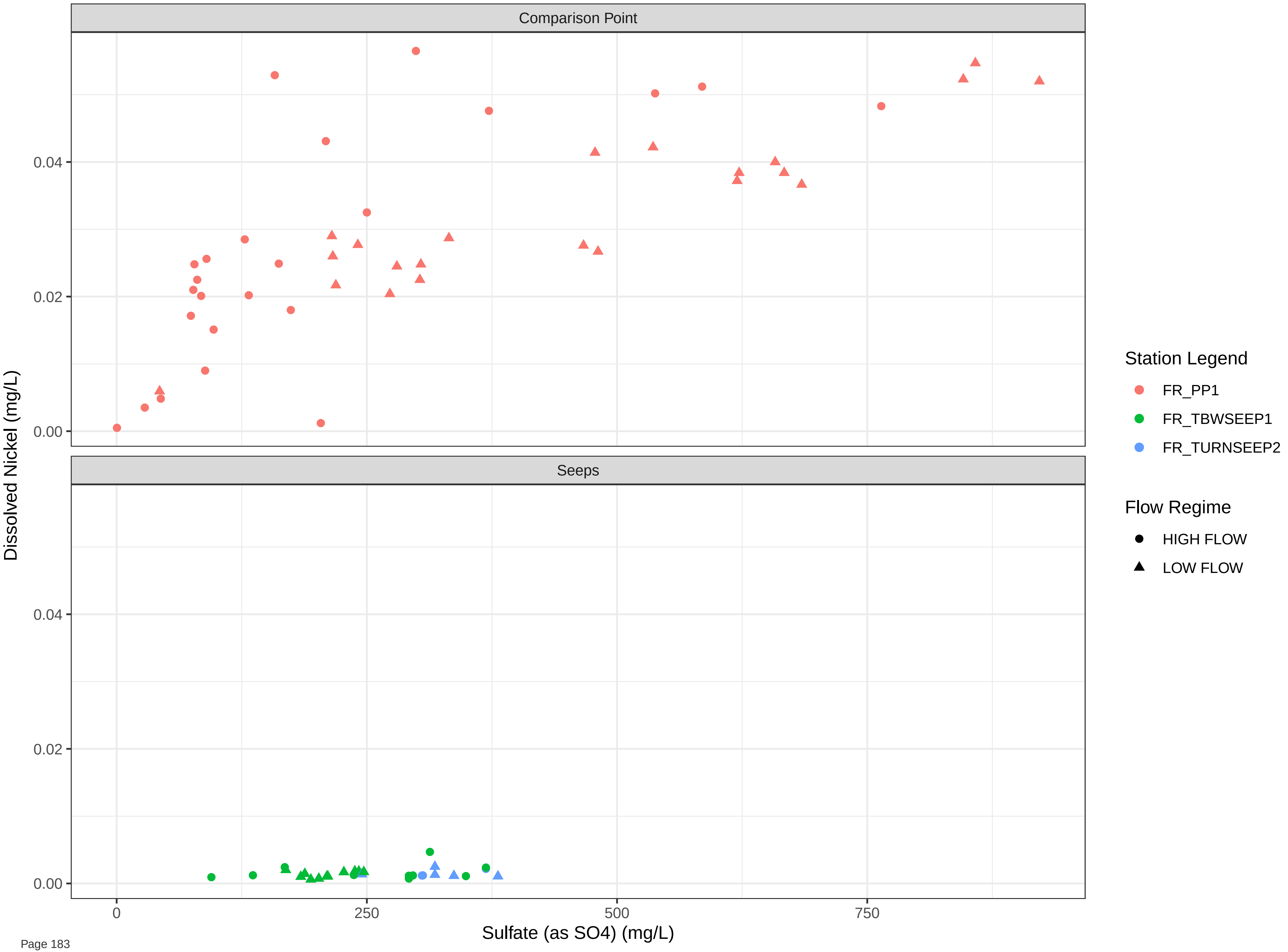


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.00
0.01
0.02
0.00
0.01
0.02
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

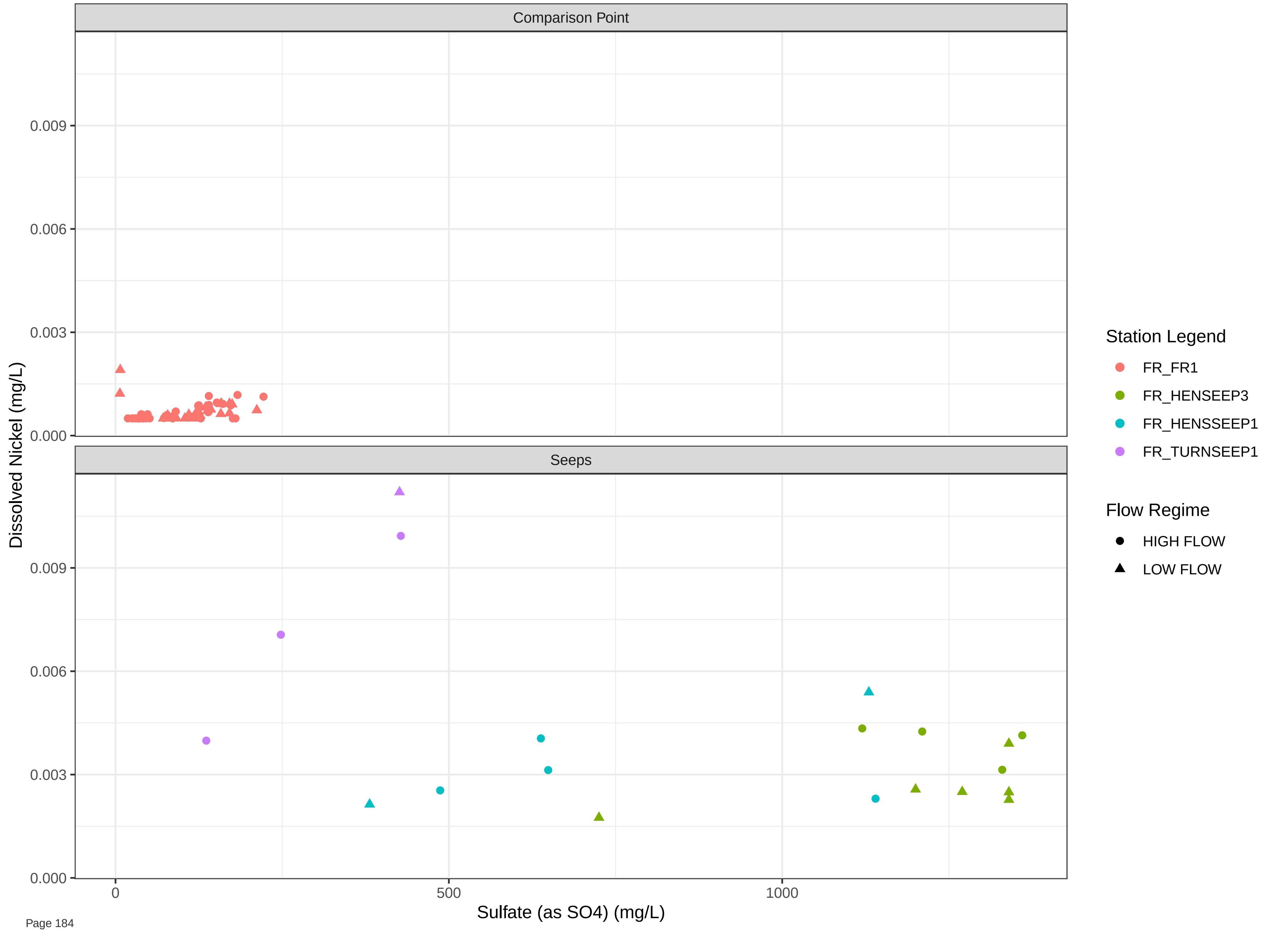

Seeps
Dissolved Molybdenum (mg/L)
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

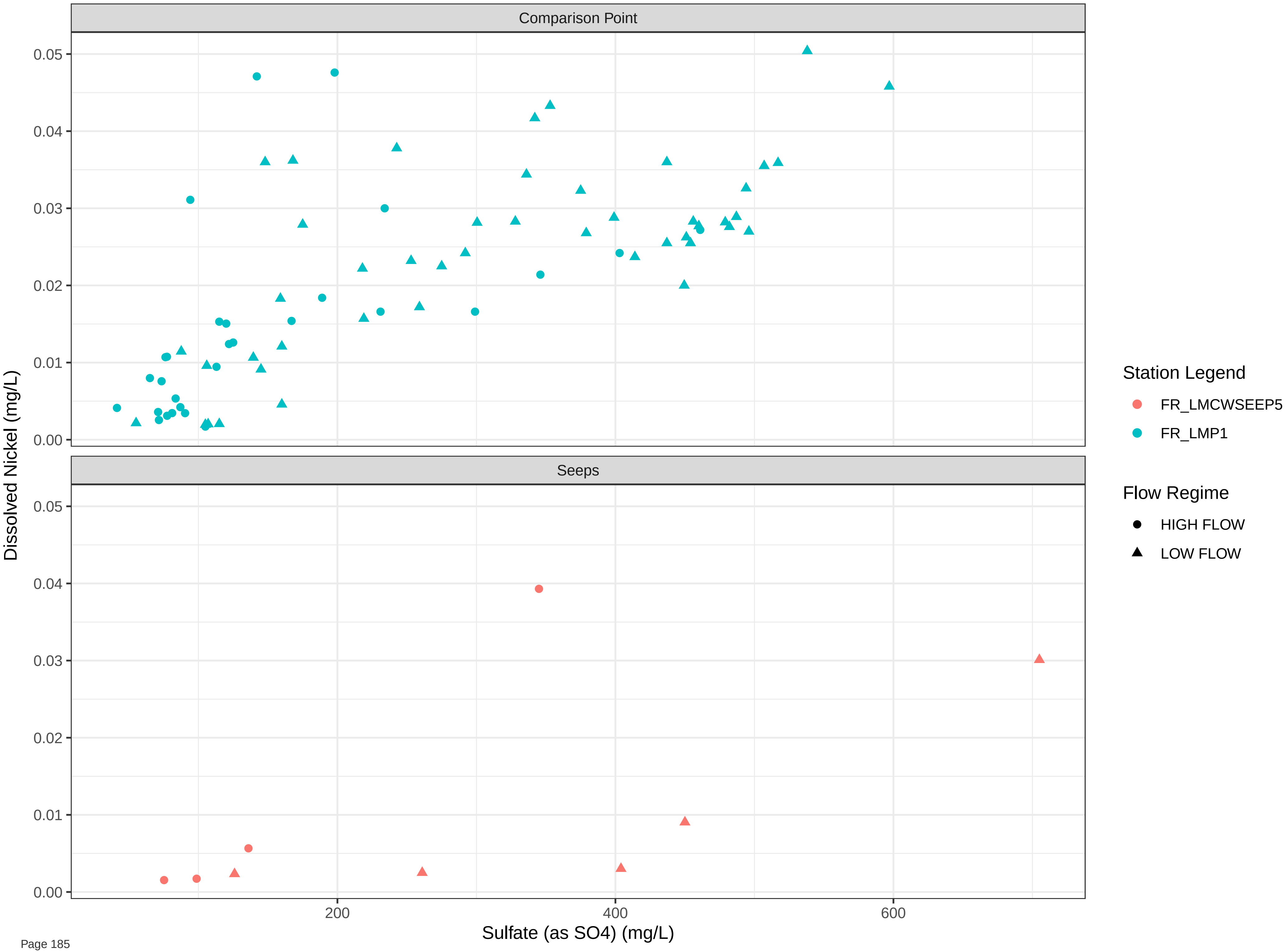

Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.000
0.005
0.010
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.000
0.025
0.050
0.075
0.100
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

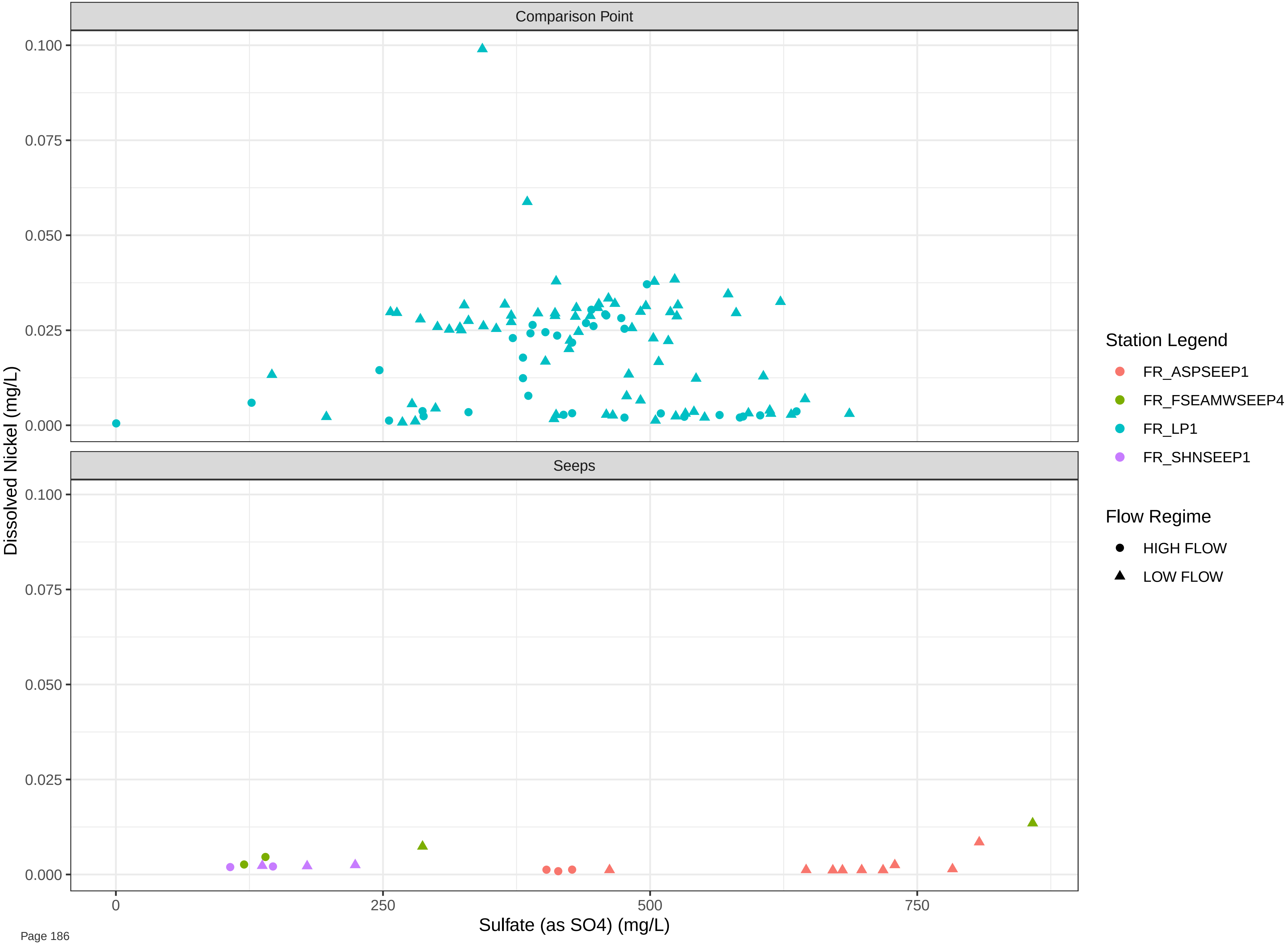


Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.00
0.02
0.04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

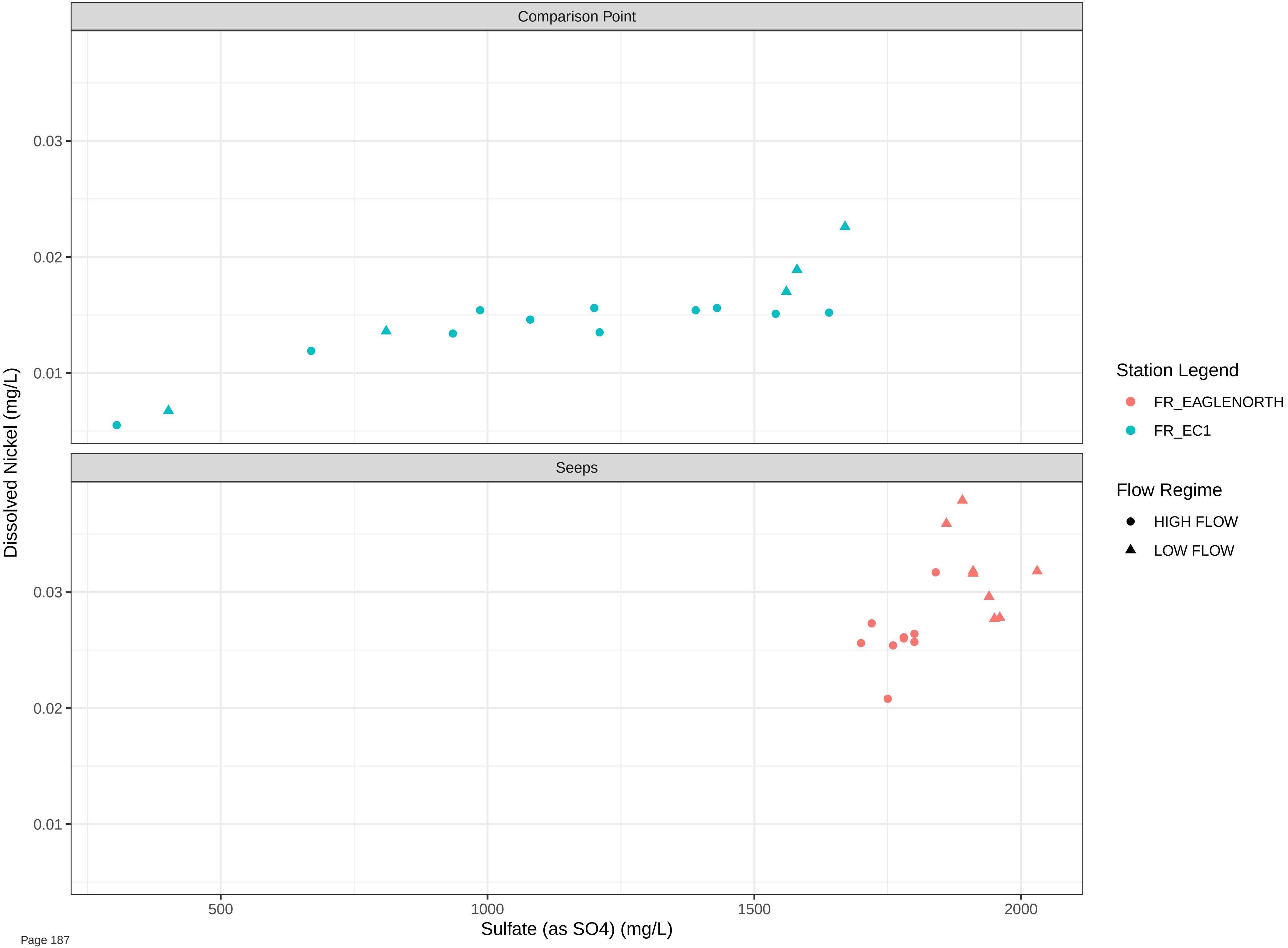

Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.000
0.003
0.006
0.009
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



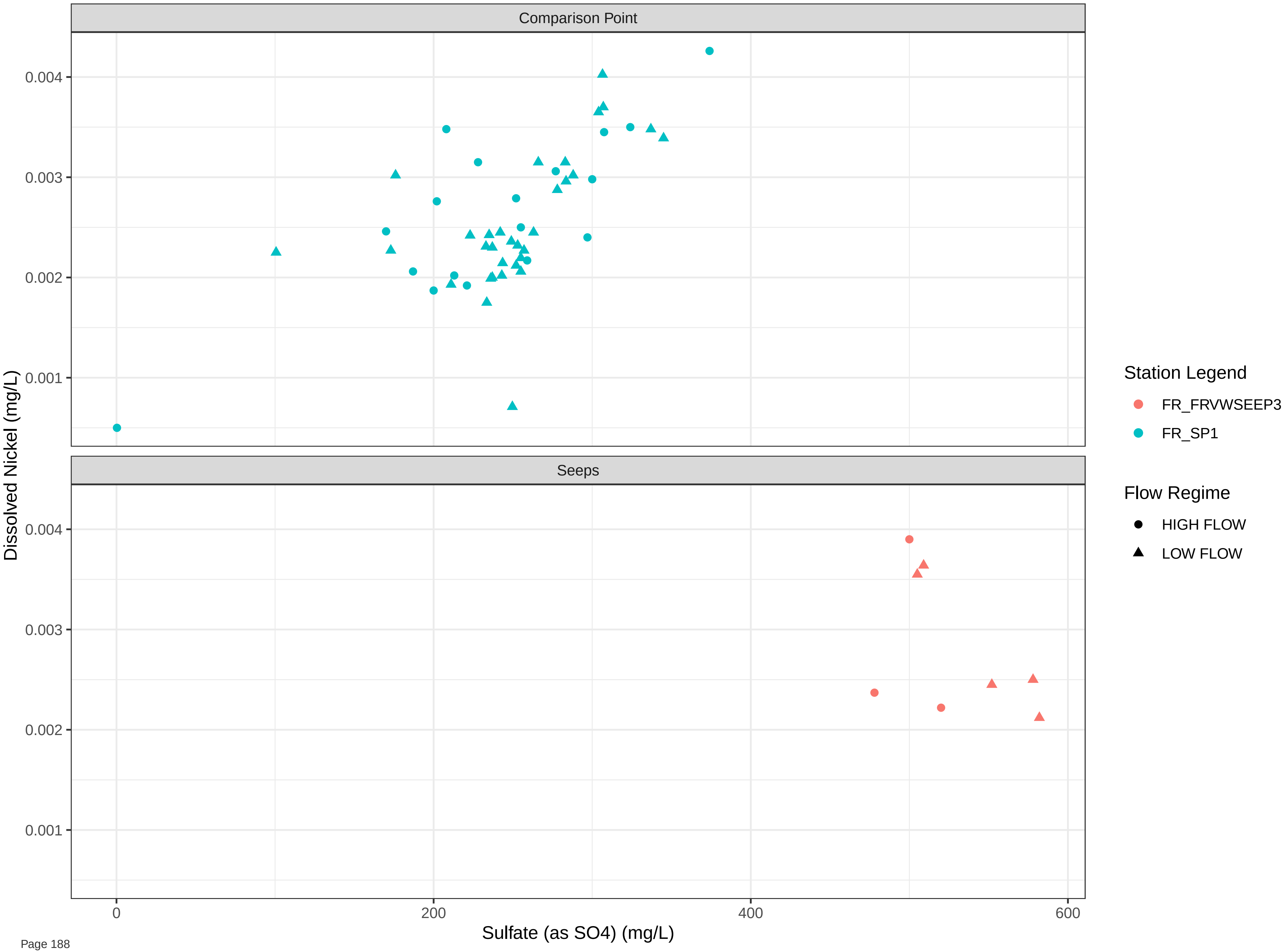
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



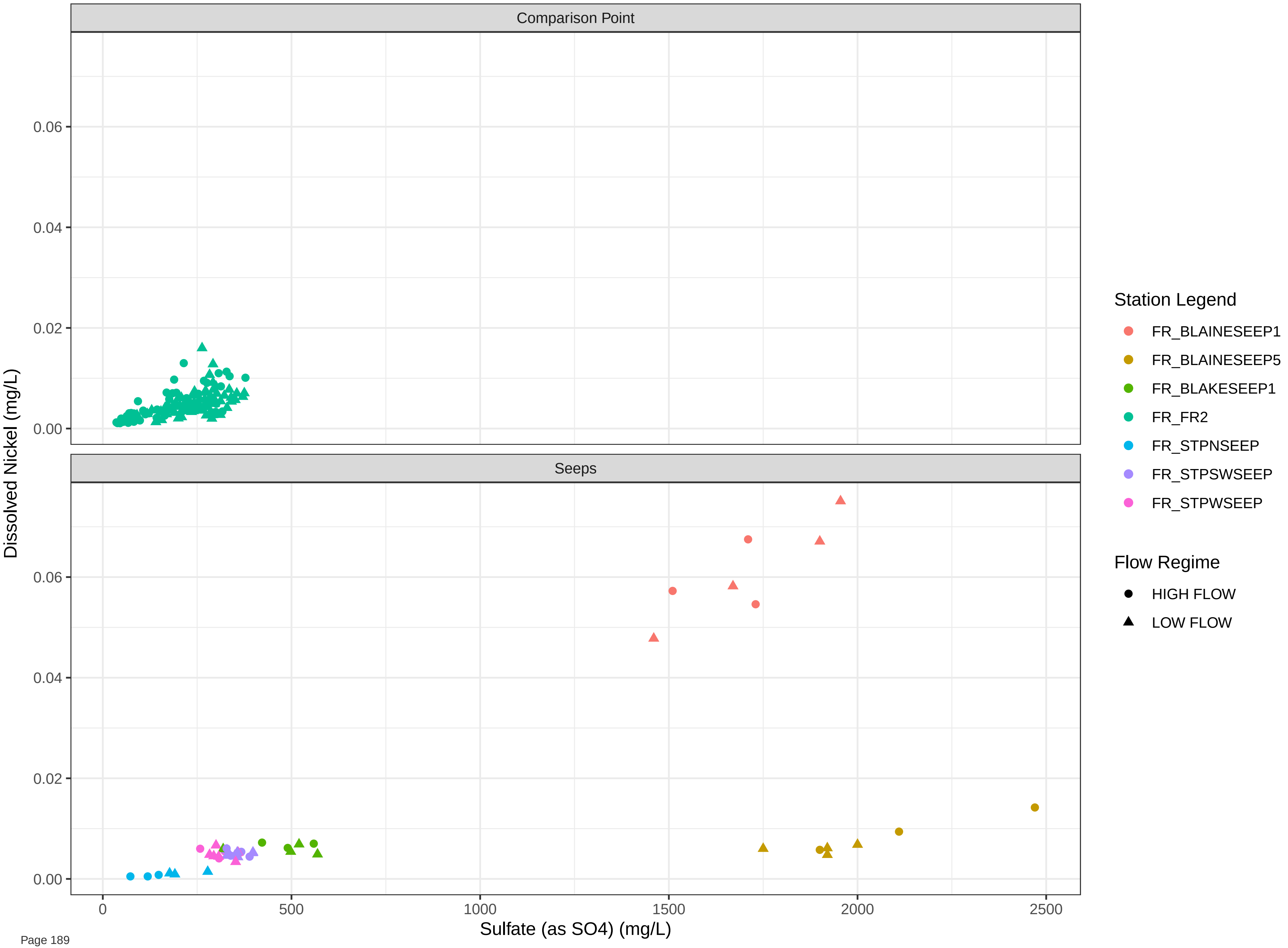
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.100
0.075
0.050
0.025
0.000
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



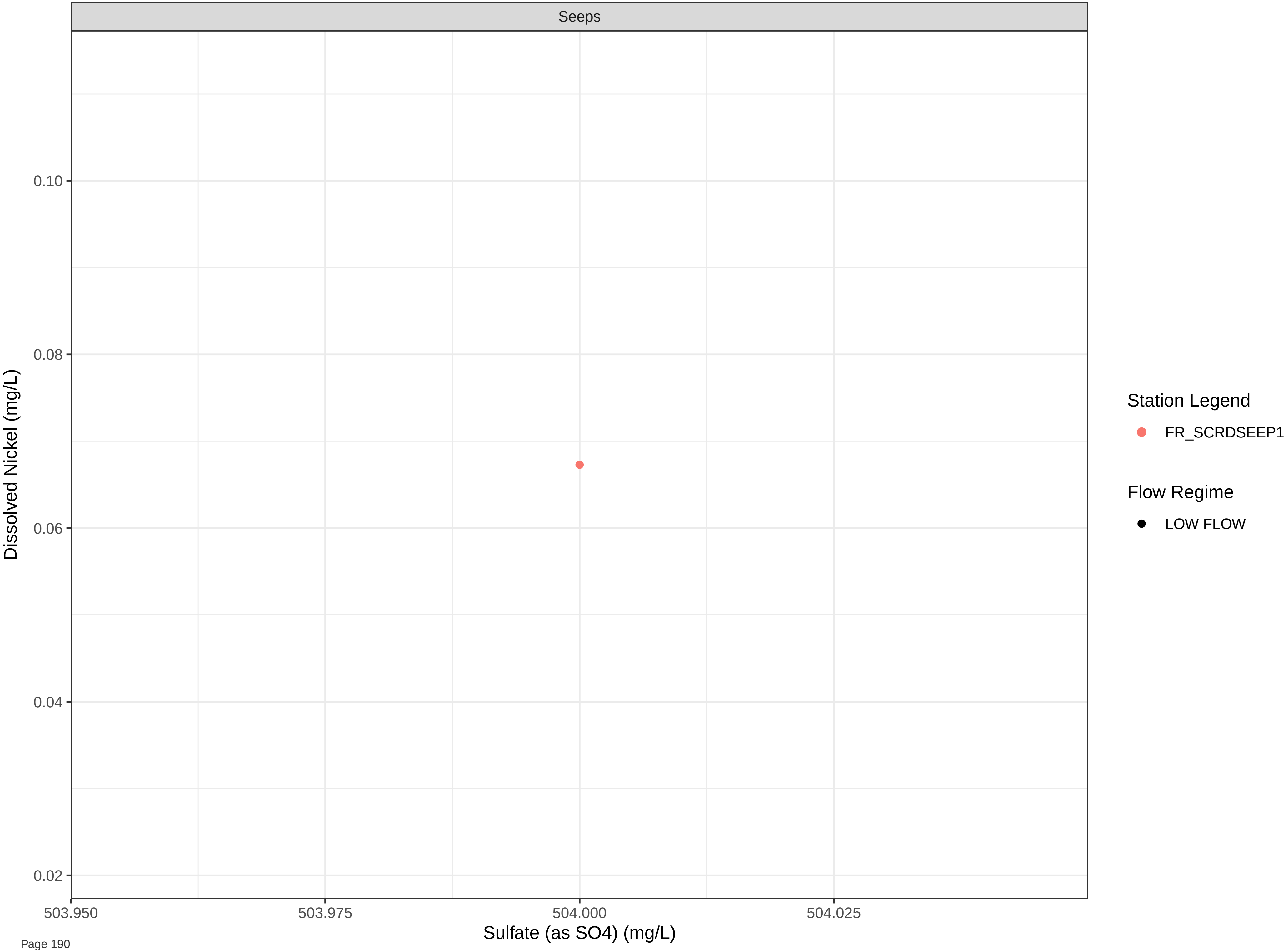
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.03
0.02
0.01
0.03
0.02
0.01
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



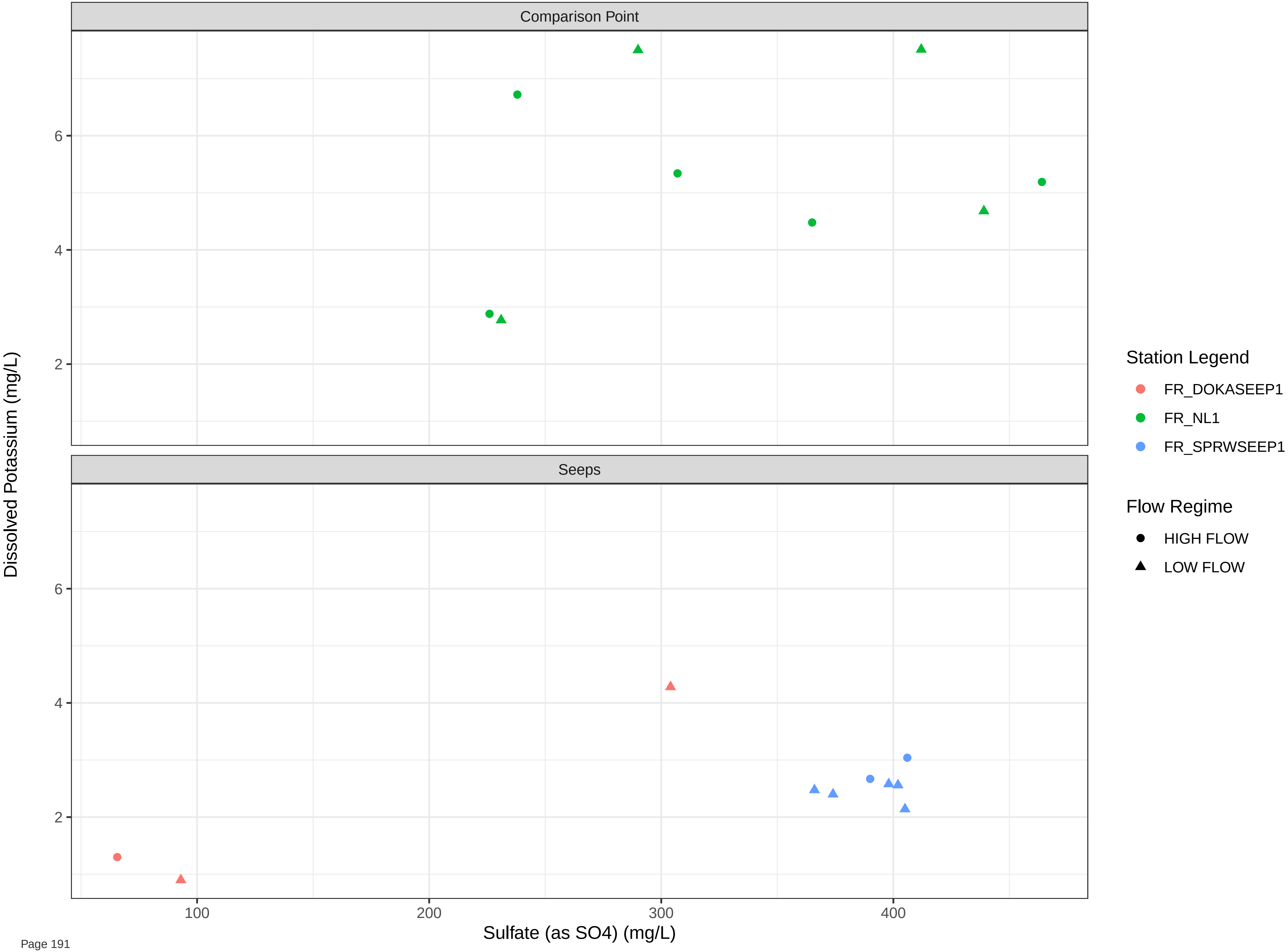
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.004
0.003
0.002
0.001
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



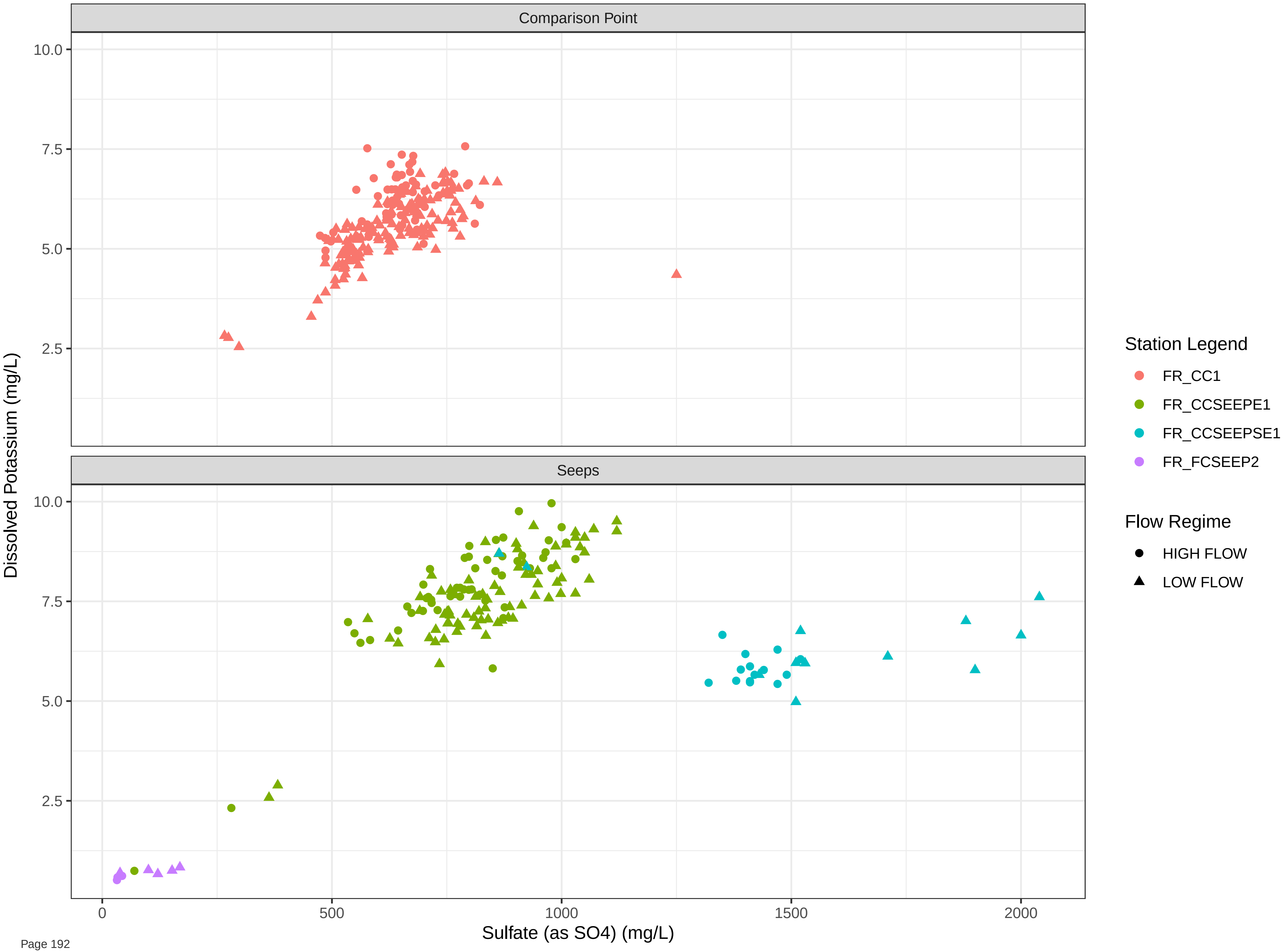
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.06
0.04
0.02
0.00
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

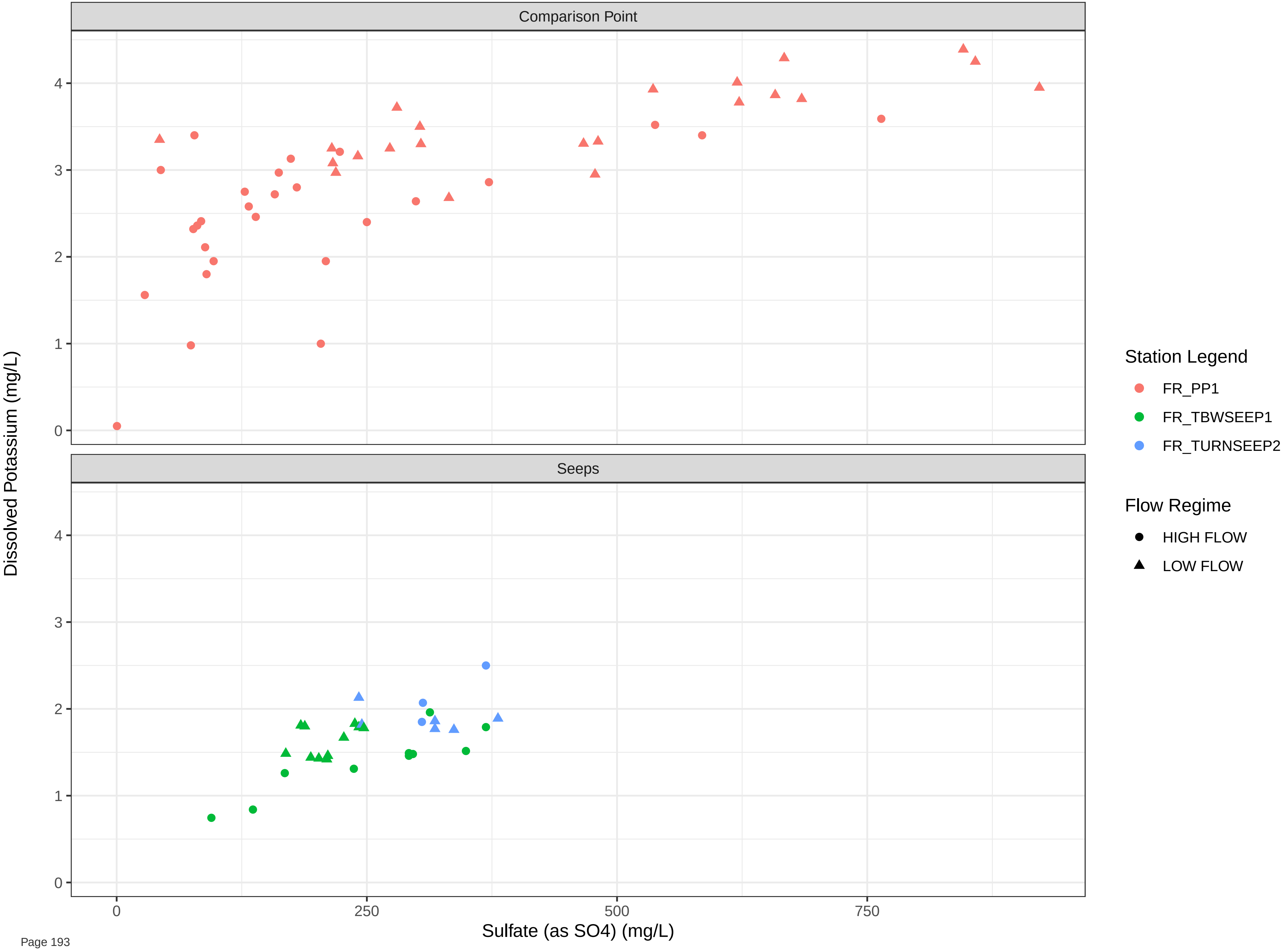


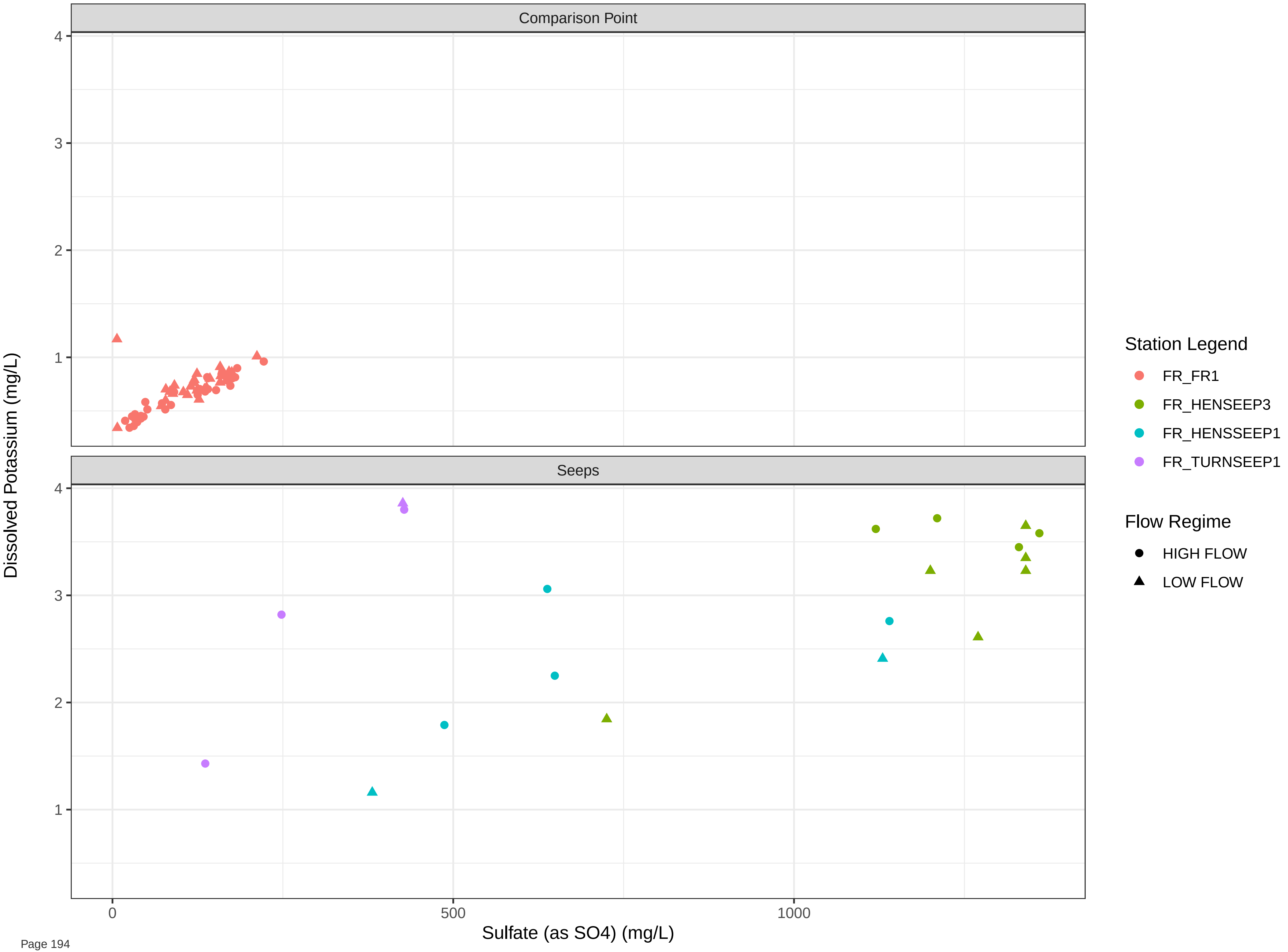
Seeps
0.10
0.08
0.06
0.04
0.02
Dissolved Nickel (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

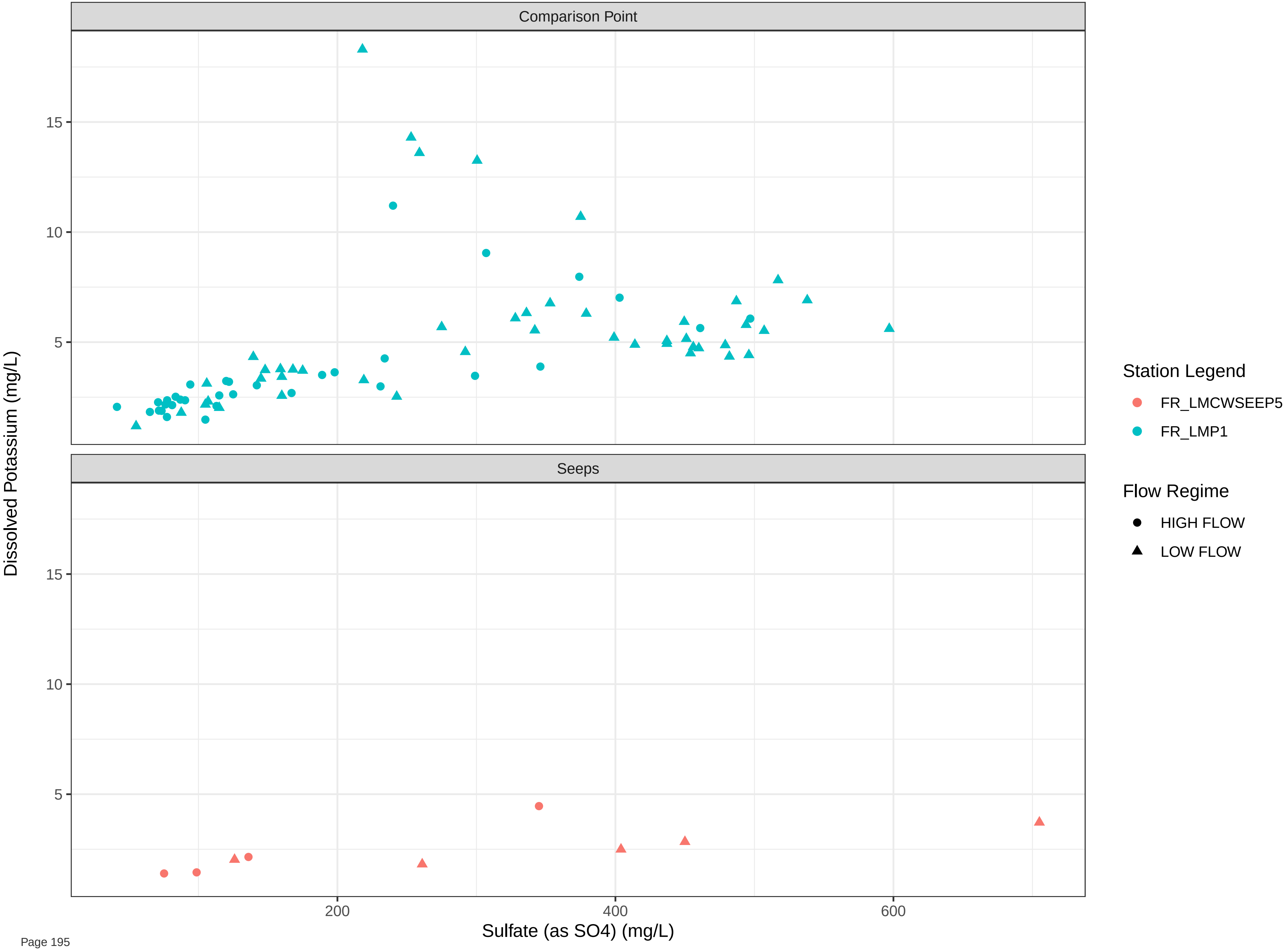


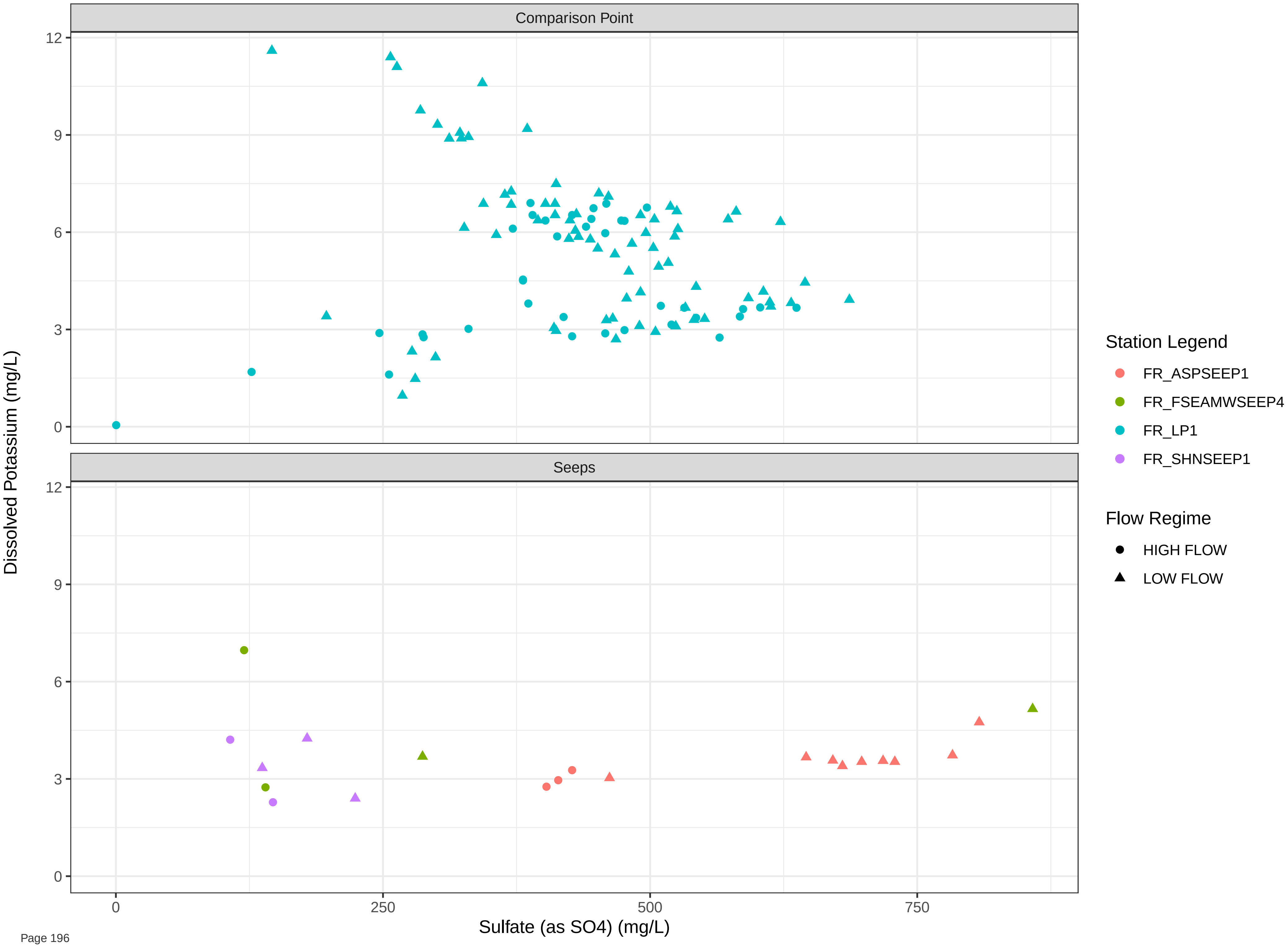
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
2
4
6
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
10.0
7.5
5.0
2.5
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

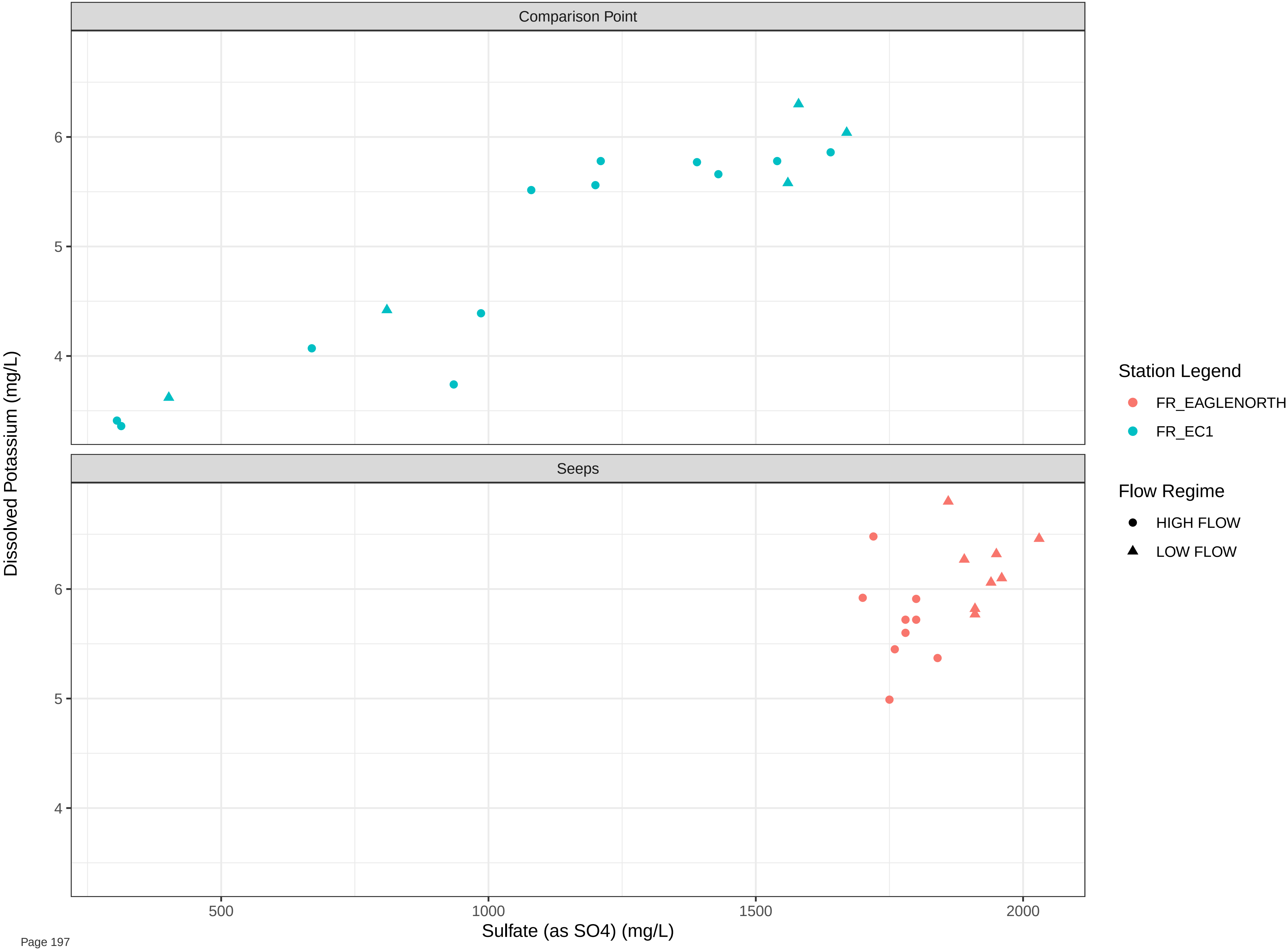

Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
1
2
3
4
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

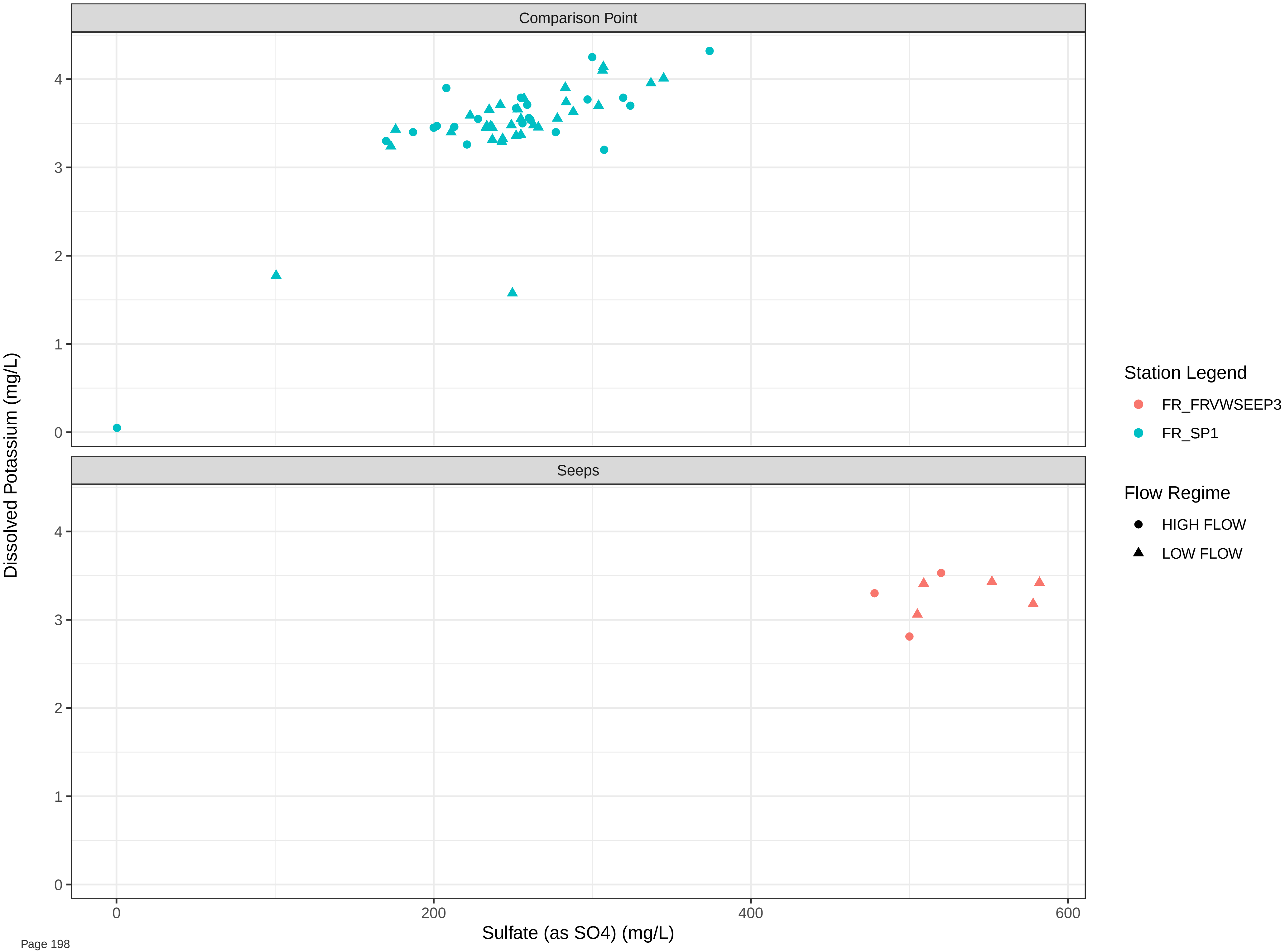

Comparison Point
Seeps
15
10
5
200
400
600
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

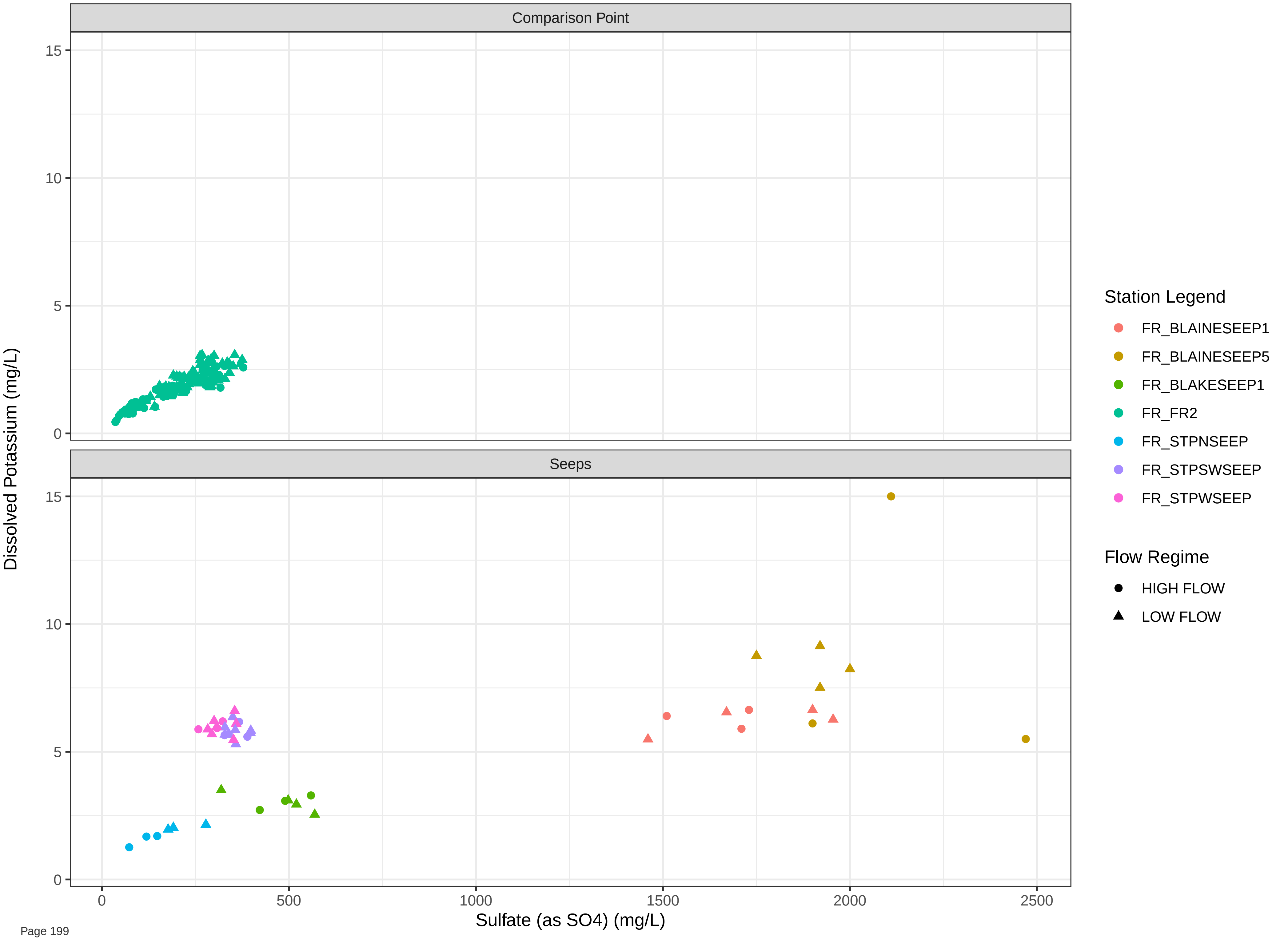


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
3
6
9
12
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

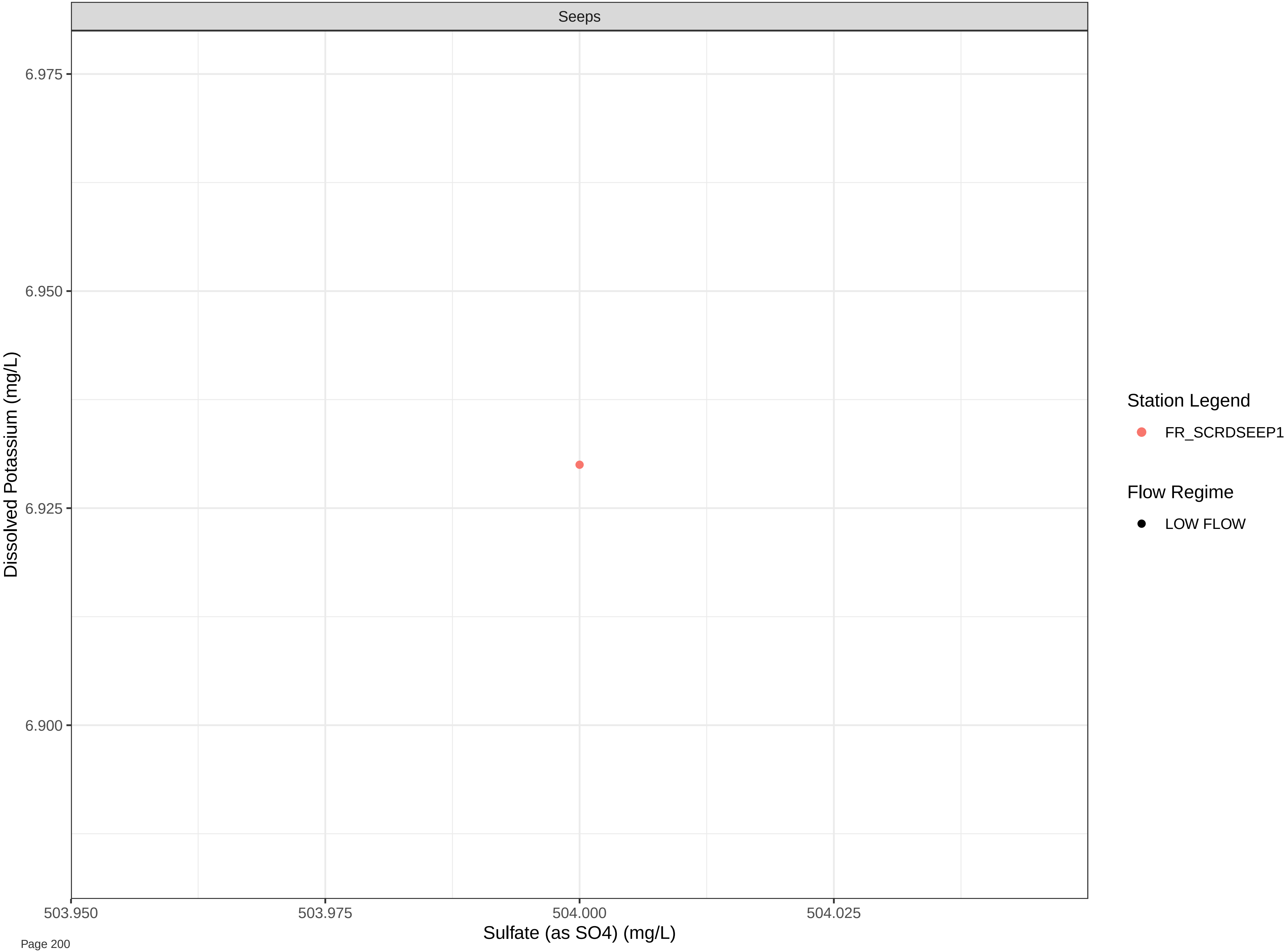


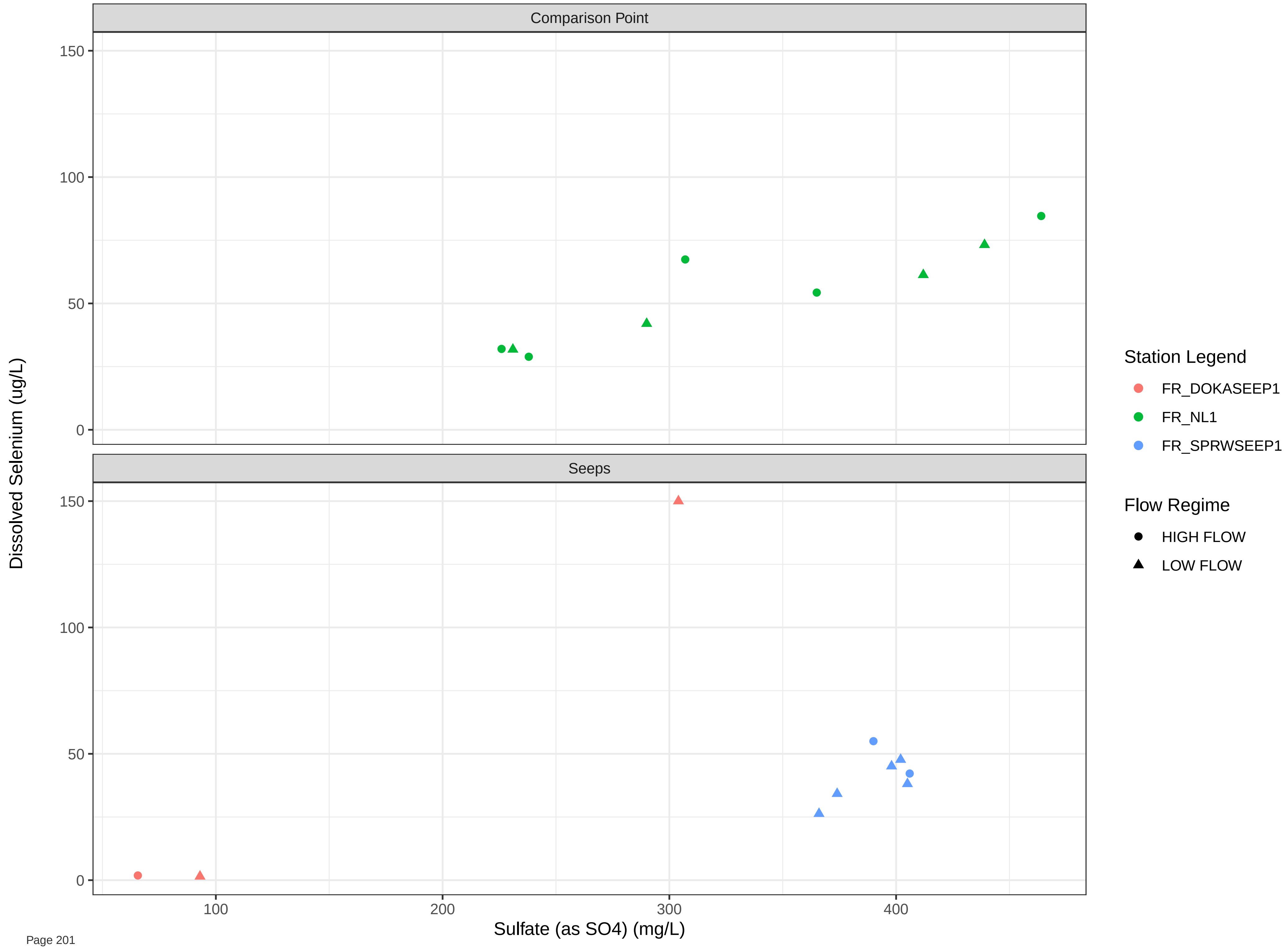
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
6
5
4
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



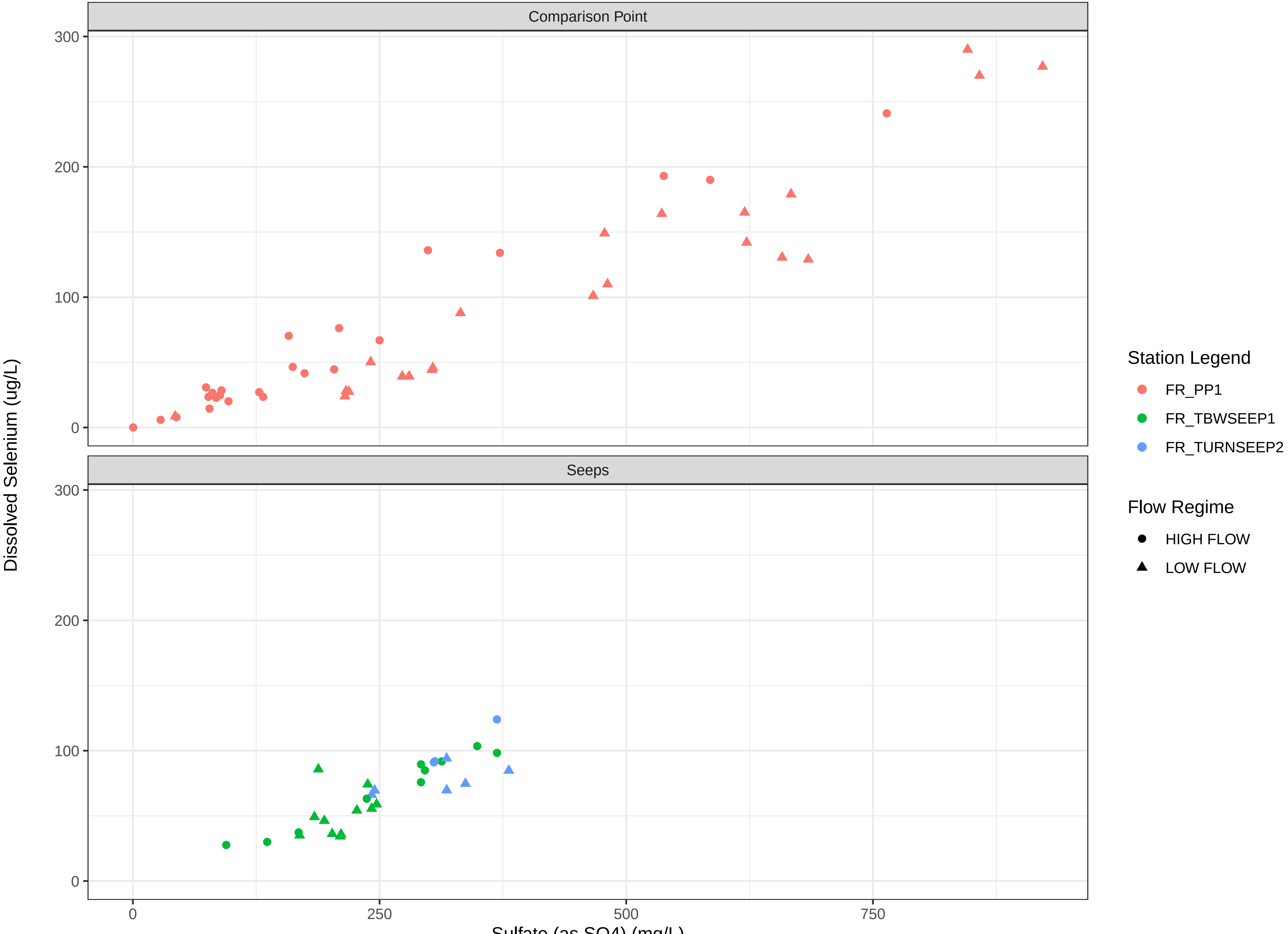
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
6.975
6.950
6.925
6.900
Dissolved Potassium (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

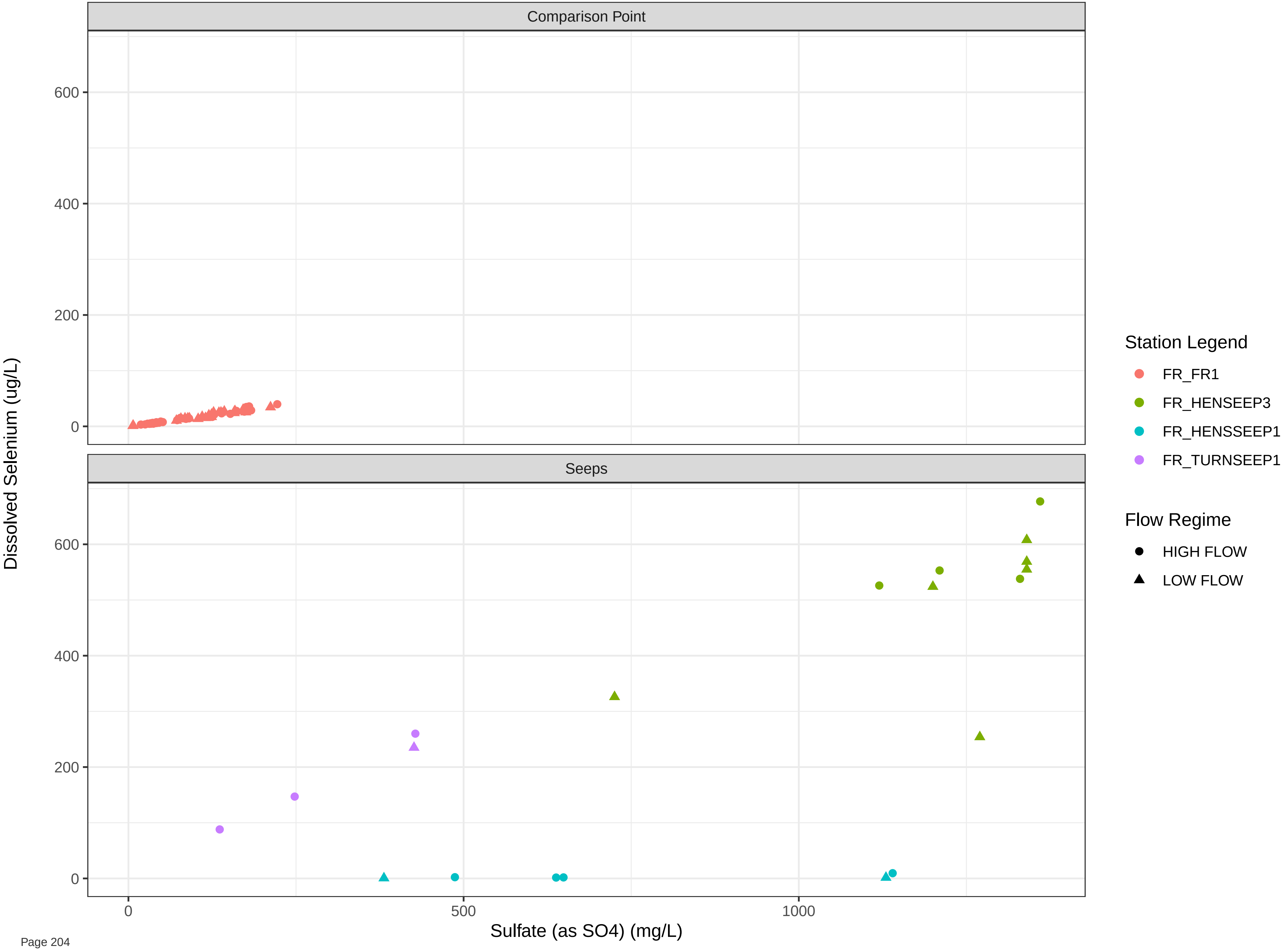


Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
150
100
50
0
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

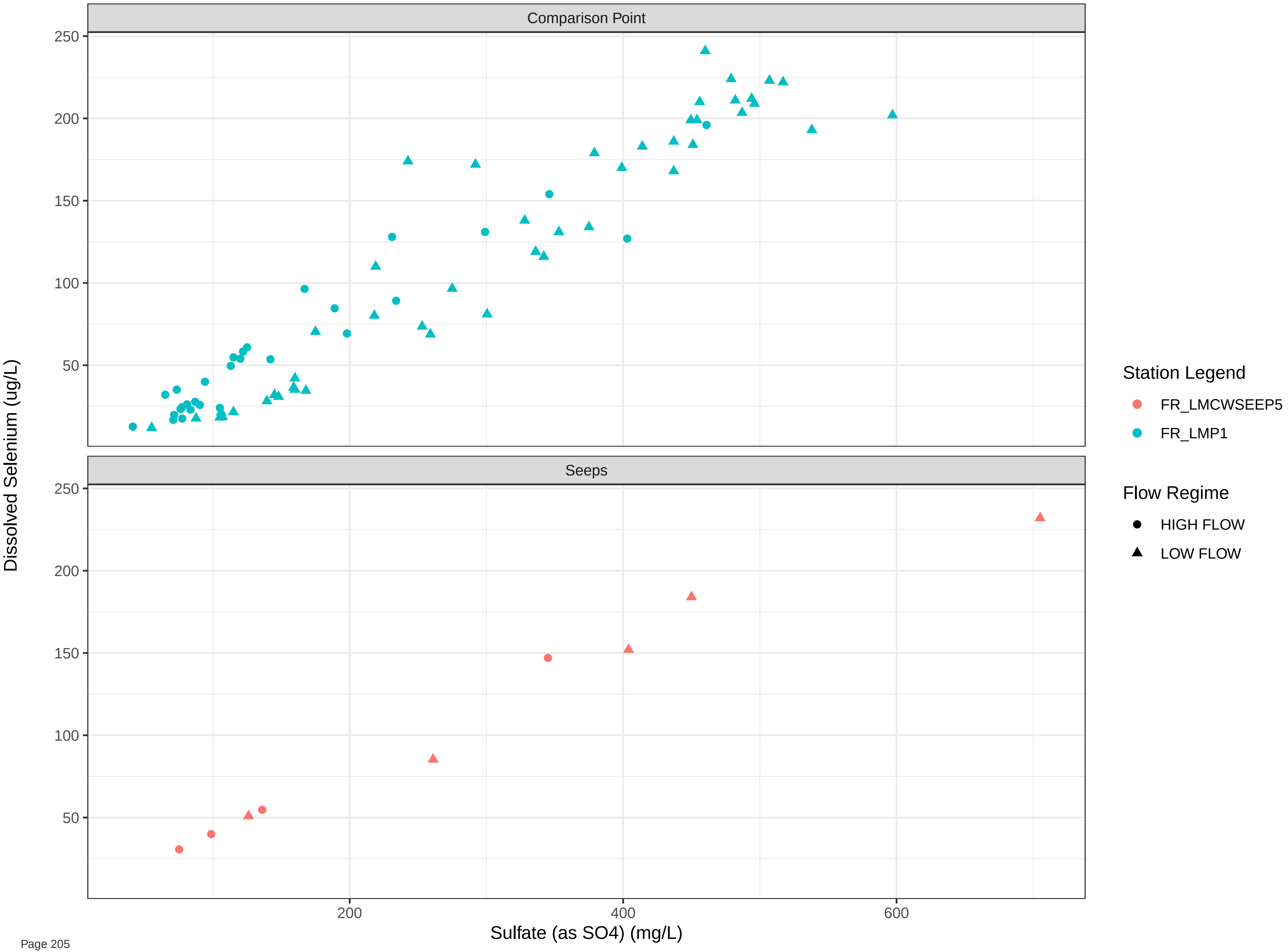
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
200
400
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



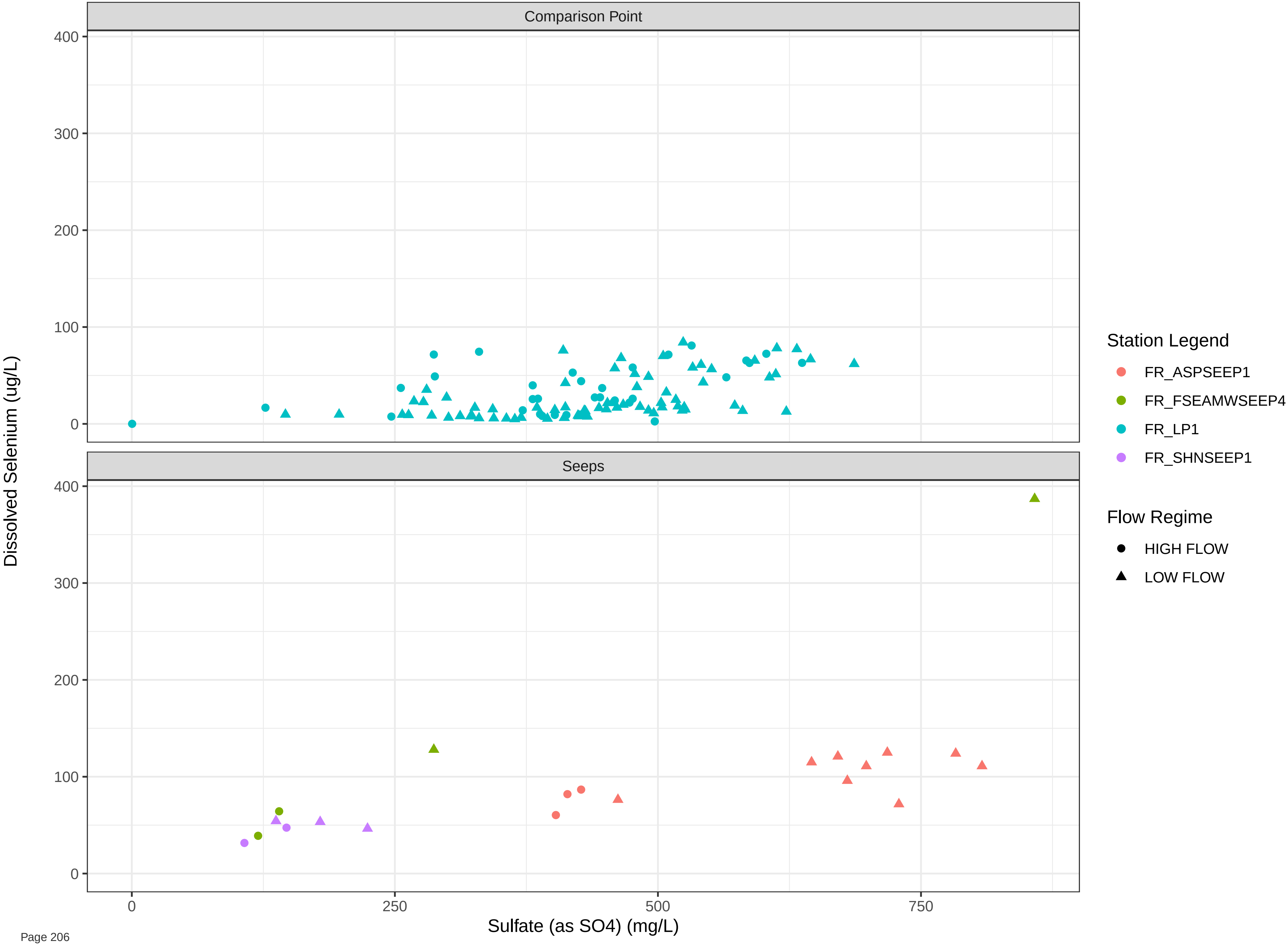
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



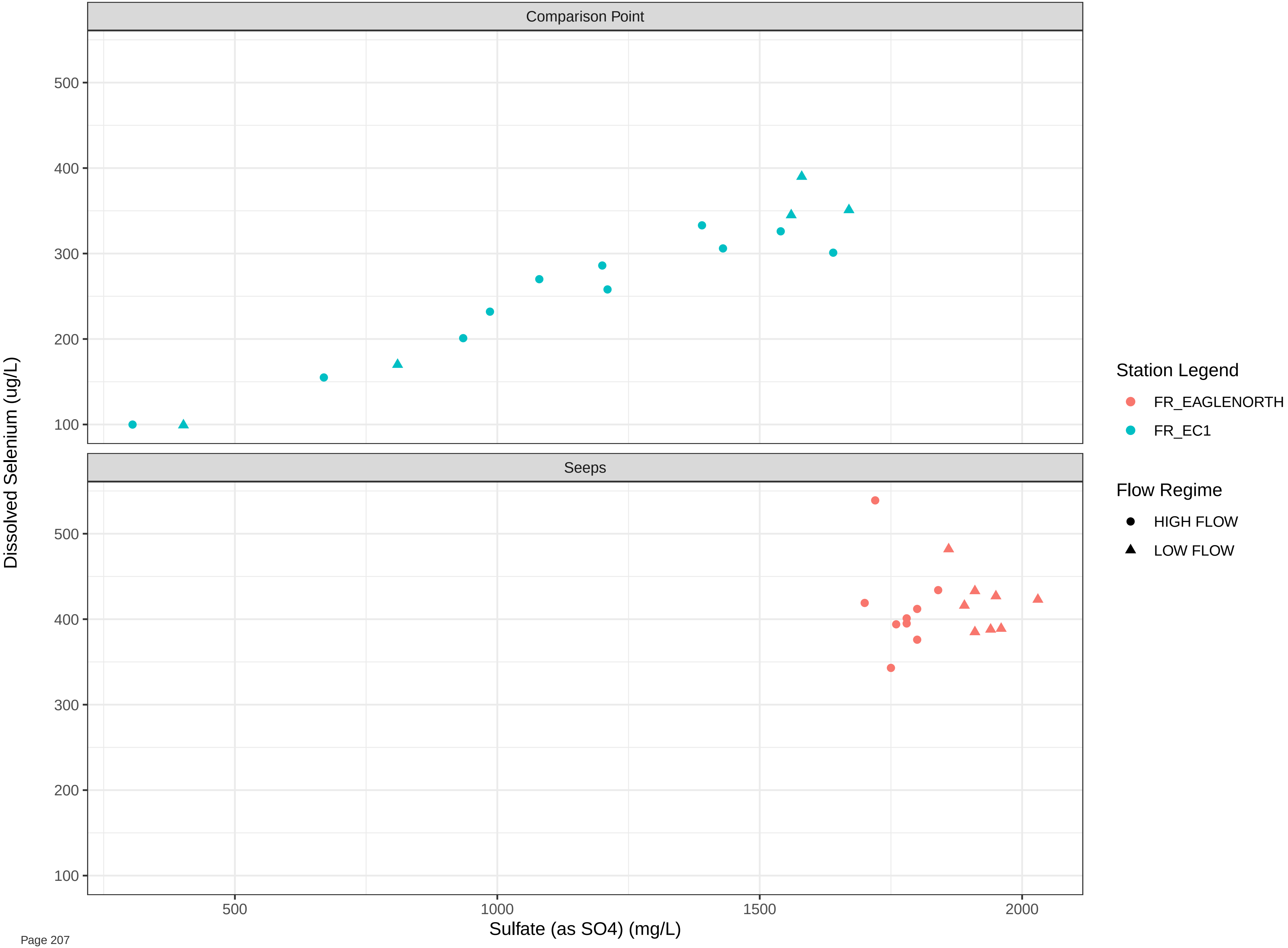
Comparison Point
Seeps
Dissolved Selenium (ug/L)
600
400
200
0
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



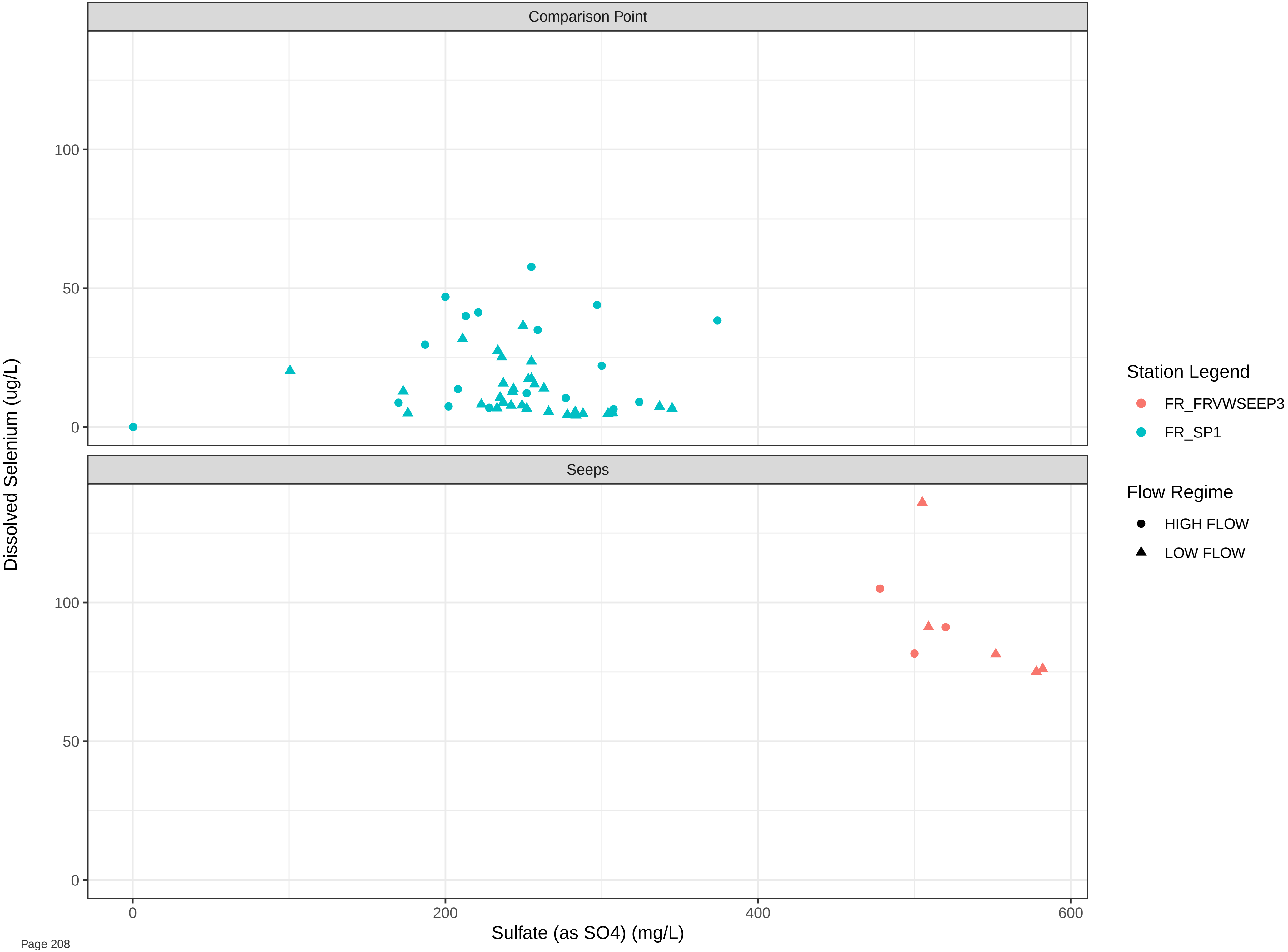
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
250
200
150
100
50
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



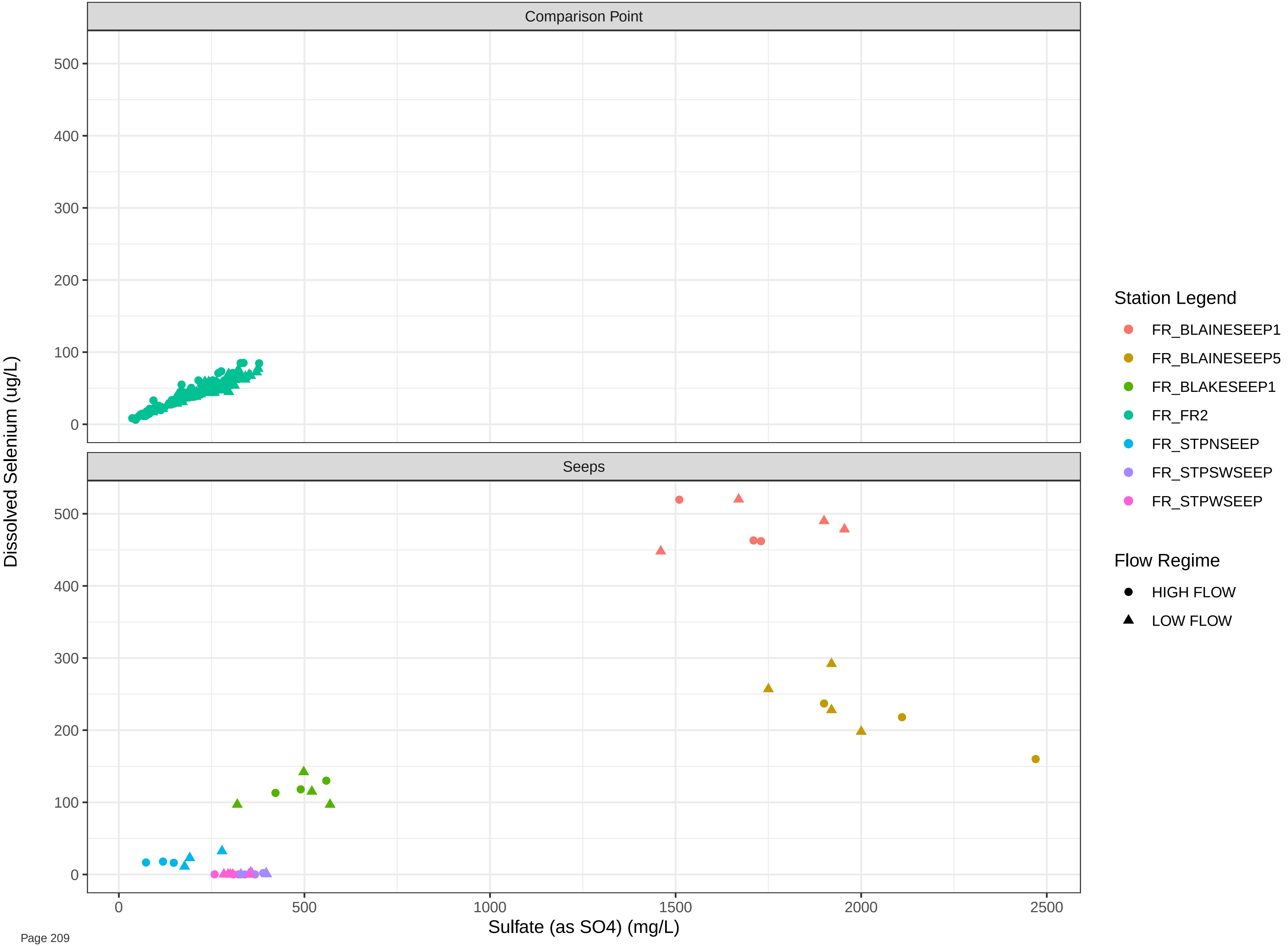
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



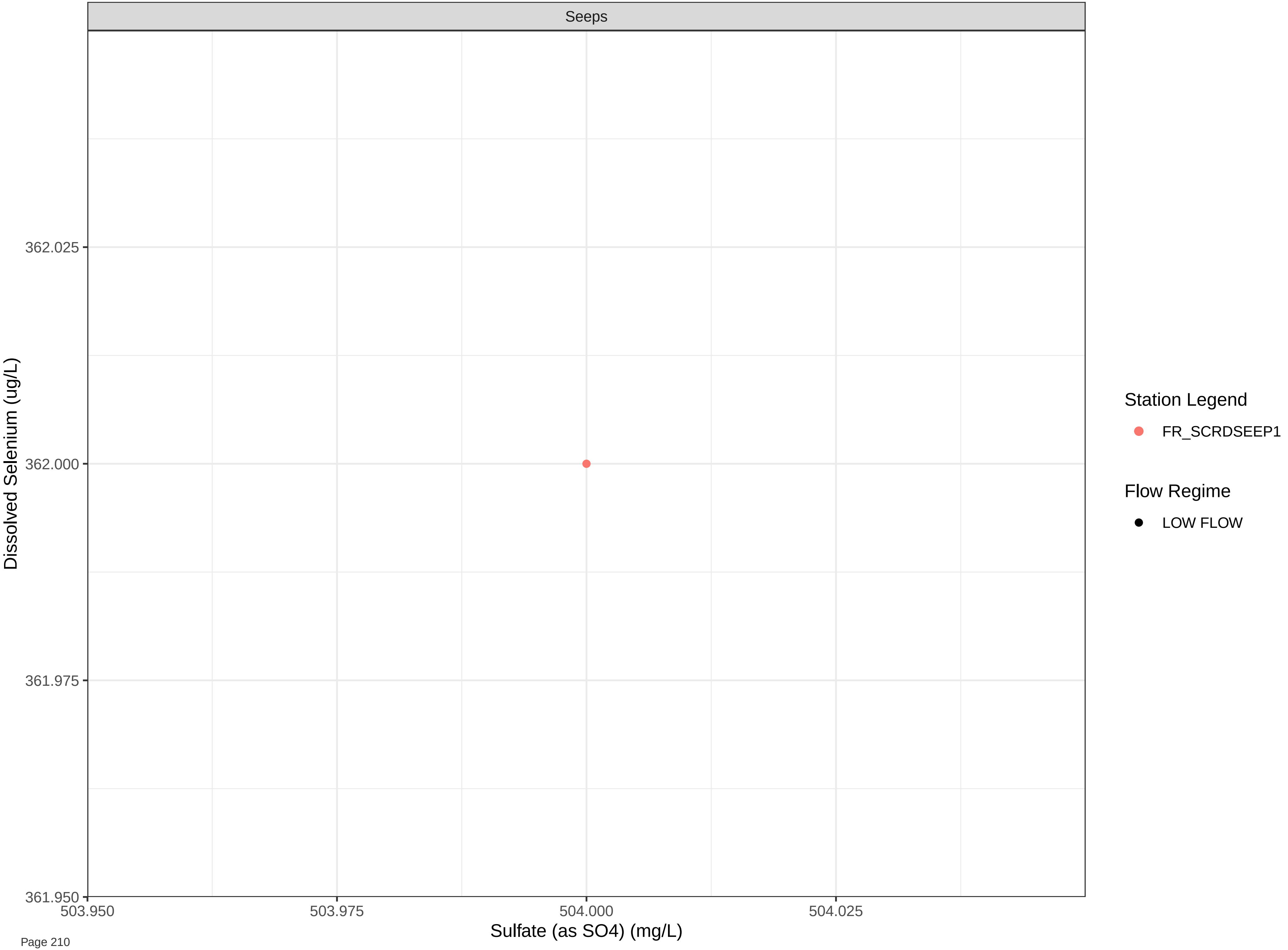
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
100
200
300
400
500
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



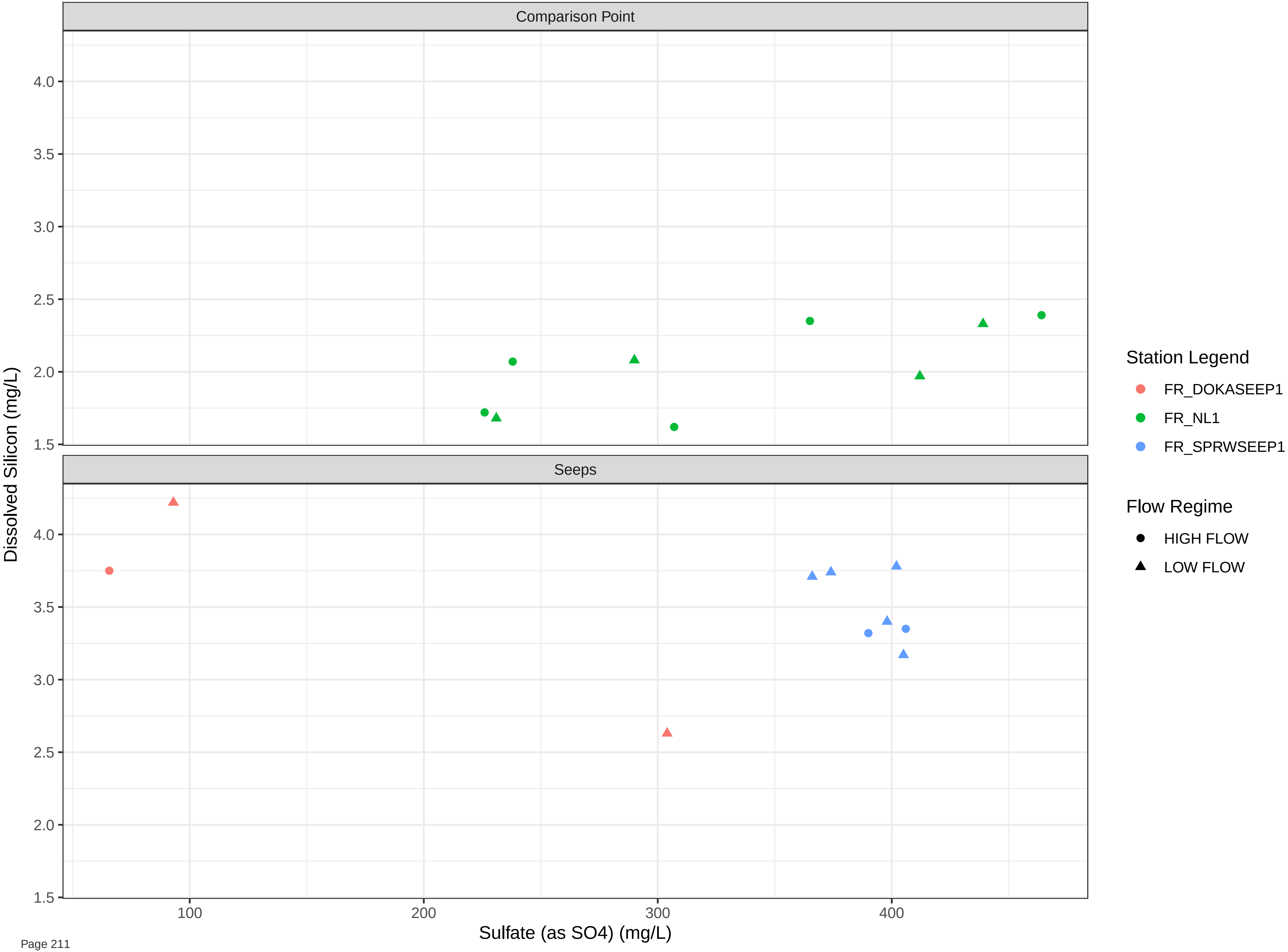
Comparison Point
Seeps
Dissolved Selenium (ug/L)
100
50
0
100
50
0
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



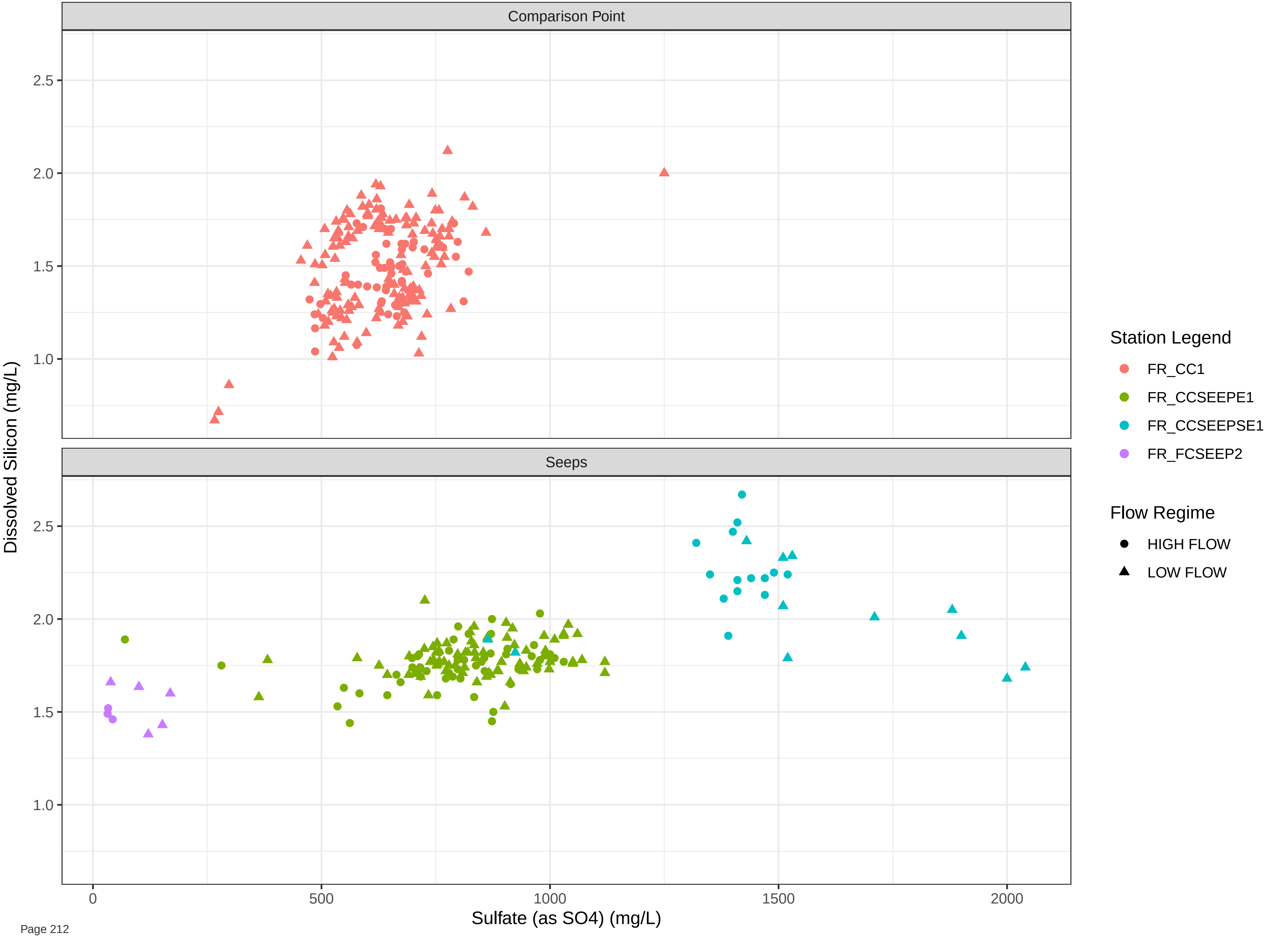
Comparison Point
Seeps
Dissolved Selenium (ug/L)
0
100
200
300
400
500
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW



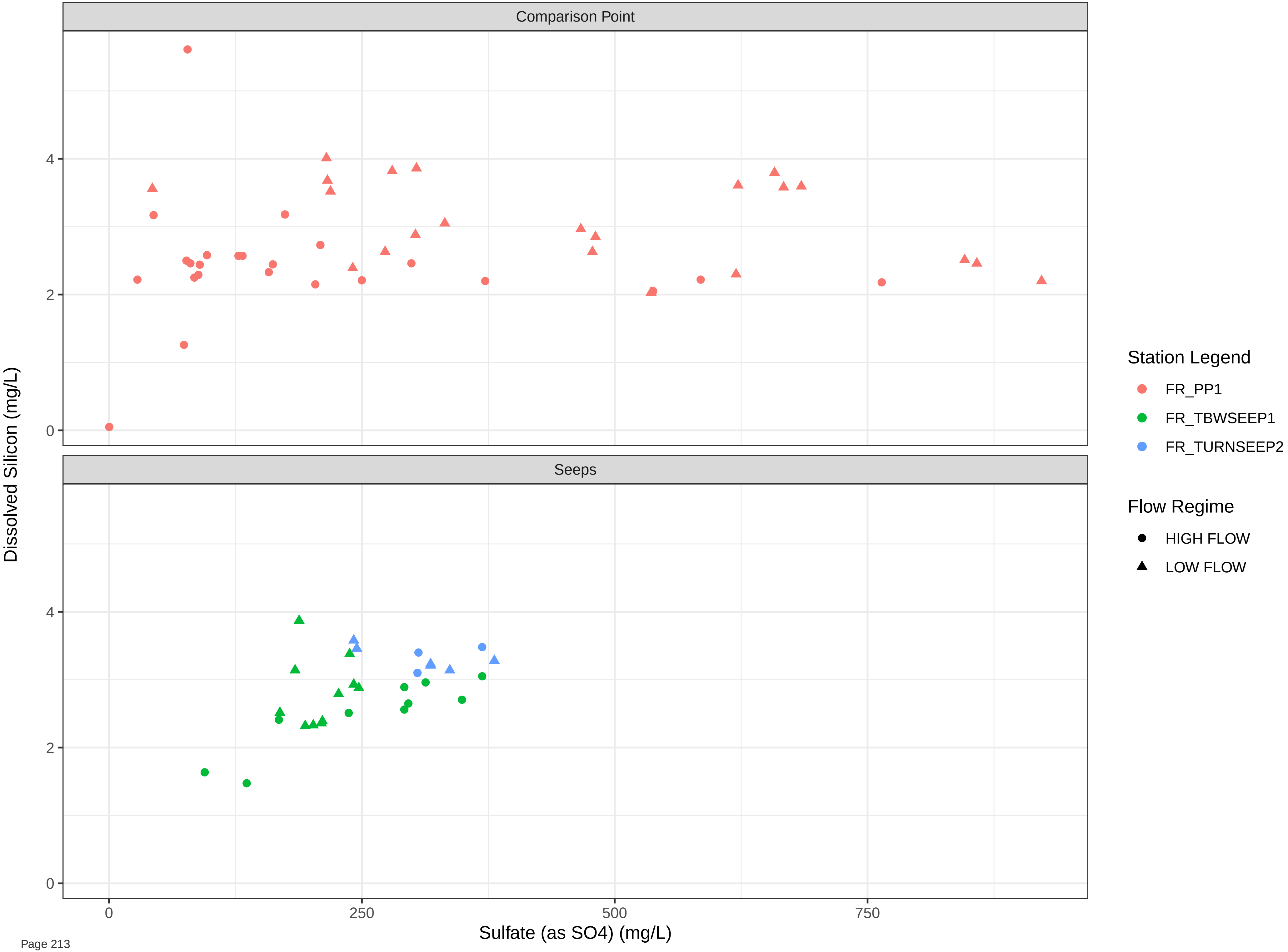
Seeps
362.025
362.000
361.975
361.950
503.950
503.975
504.000
504.025
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

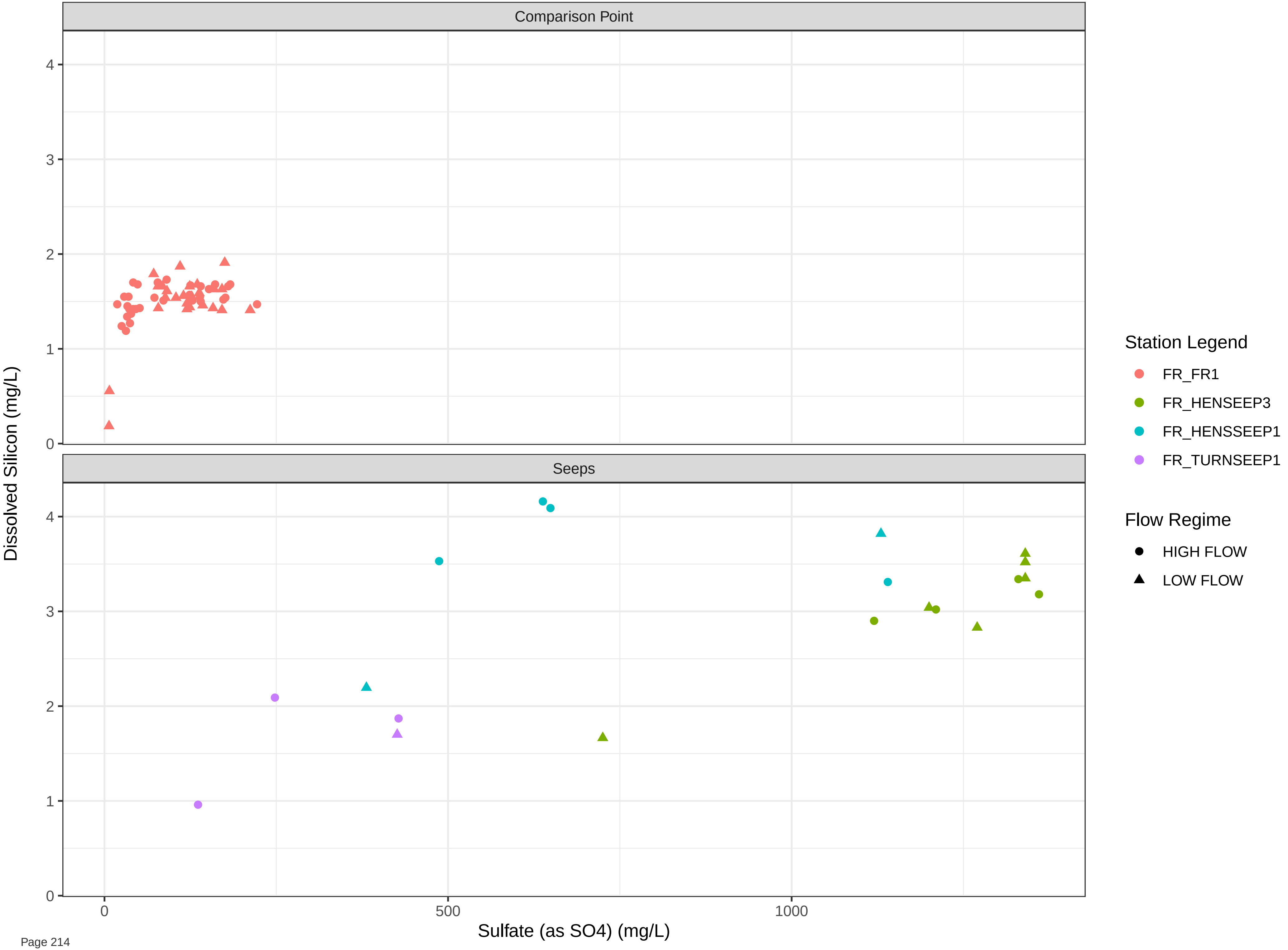


Comparison Point
Seeps
Dissolved Silicon (mg/L)
4.0
3.5
3.0
2.5
2.0
1.5
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

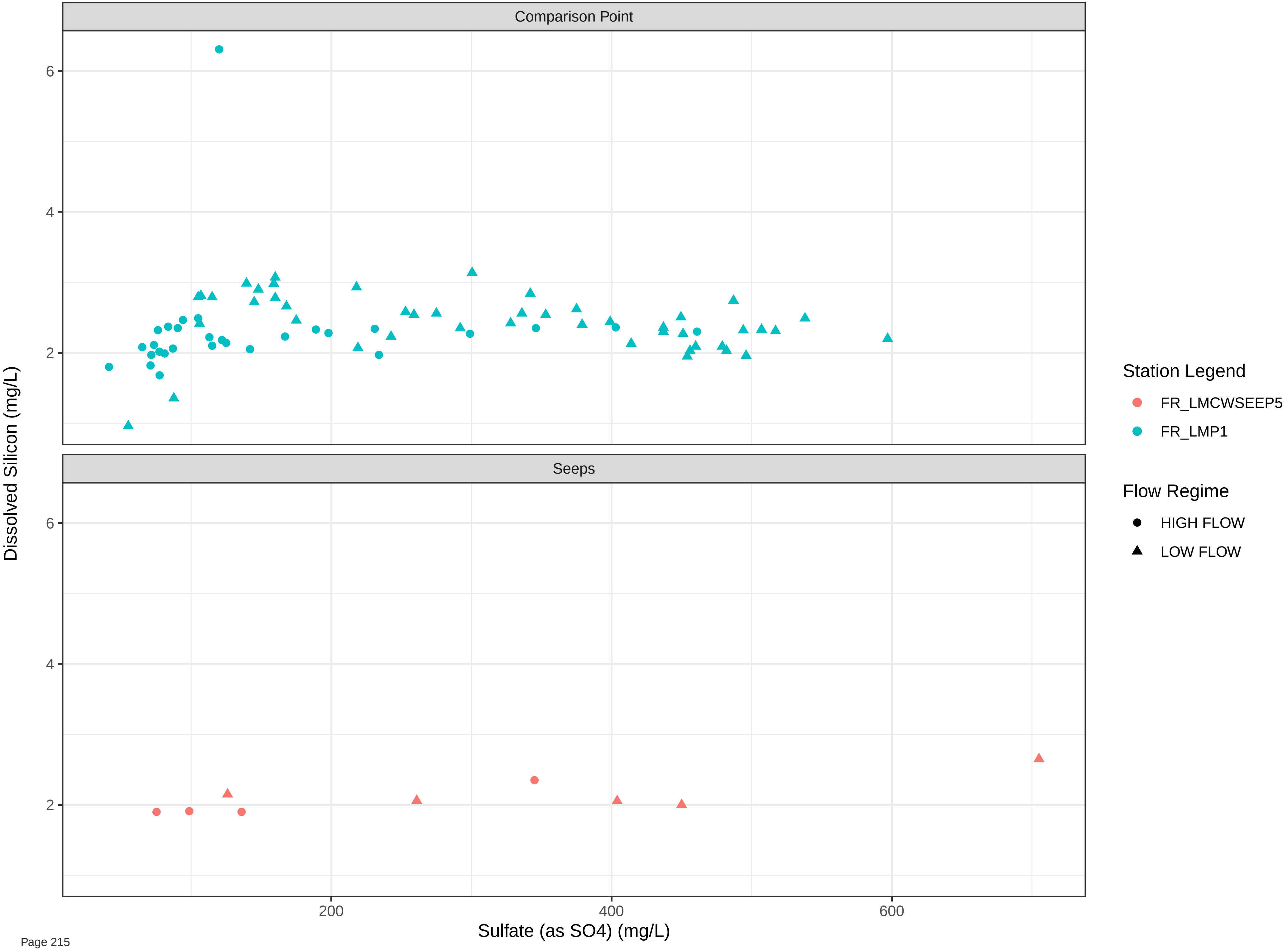


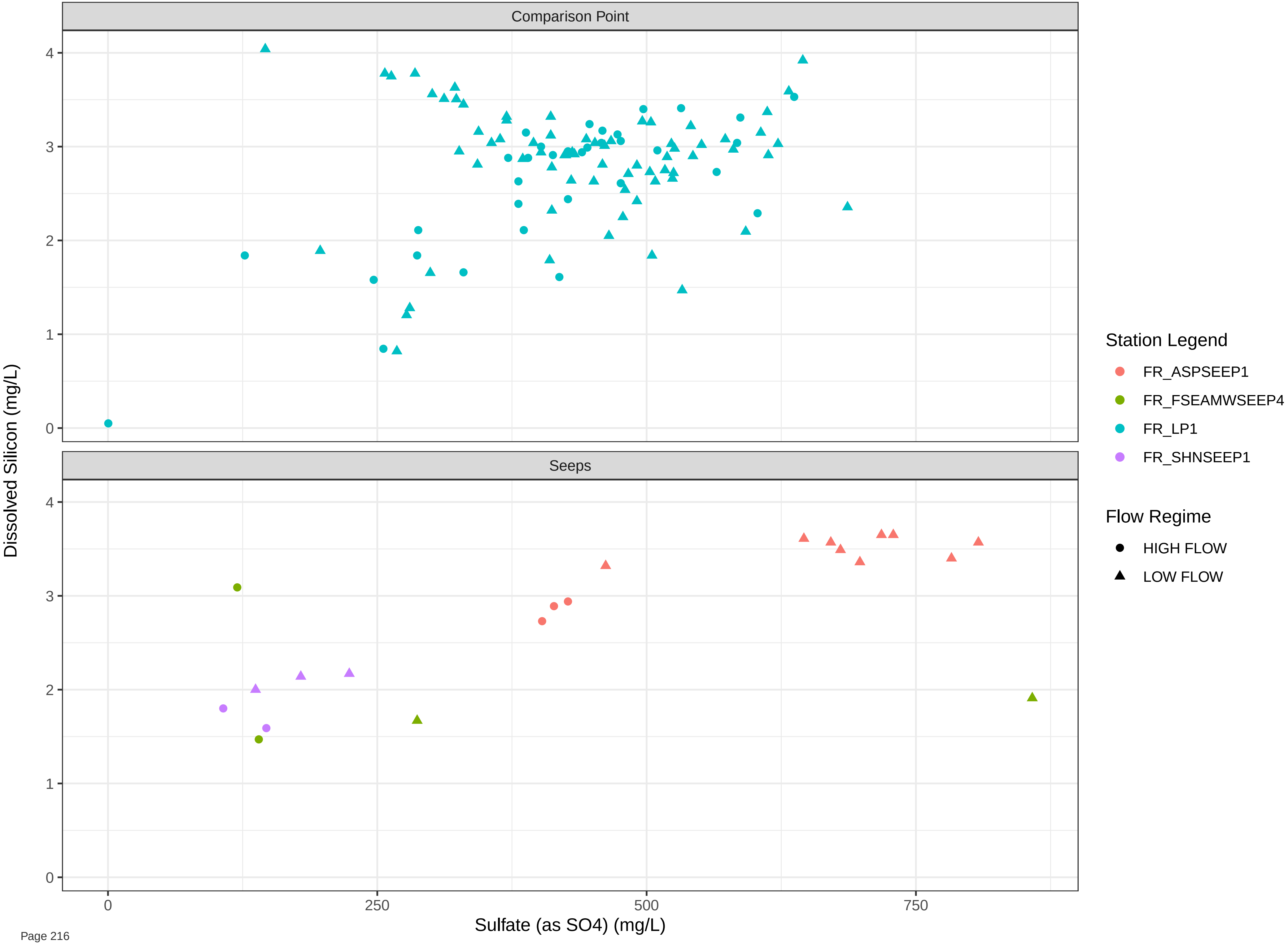
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
2.5
2.0
1.5
1.0
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

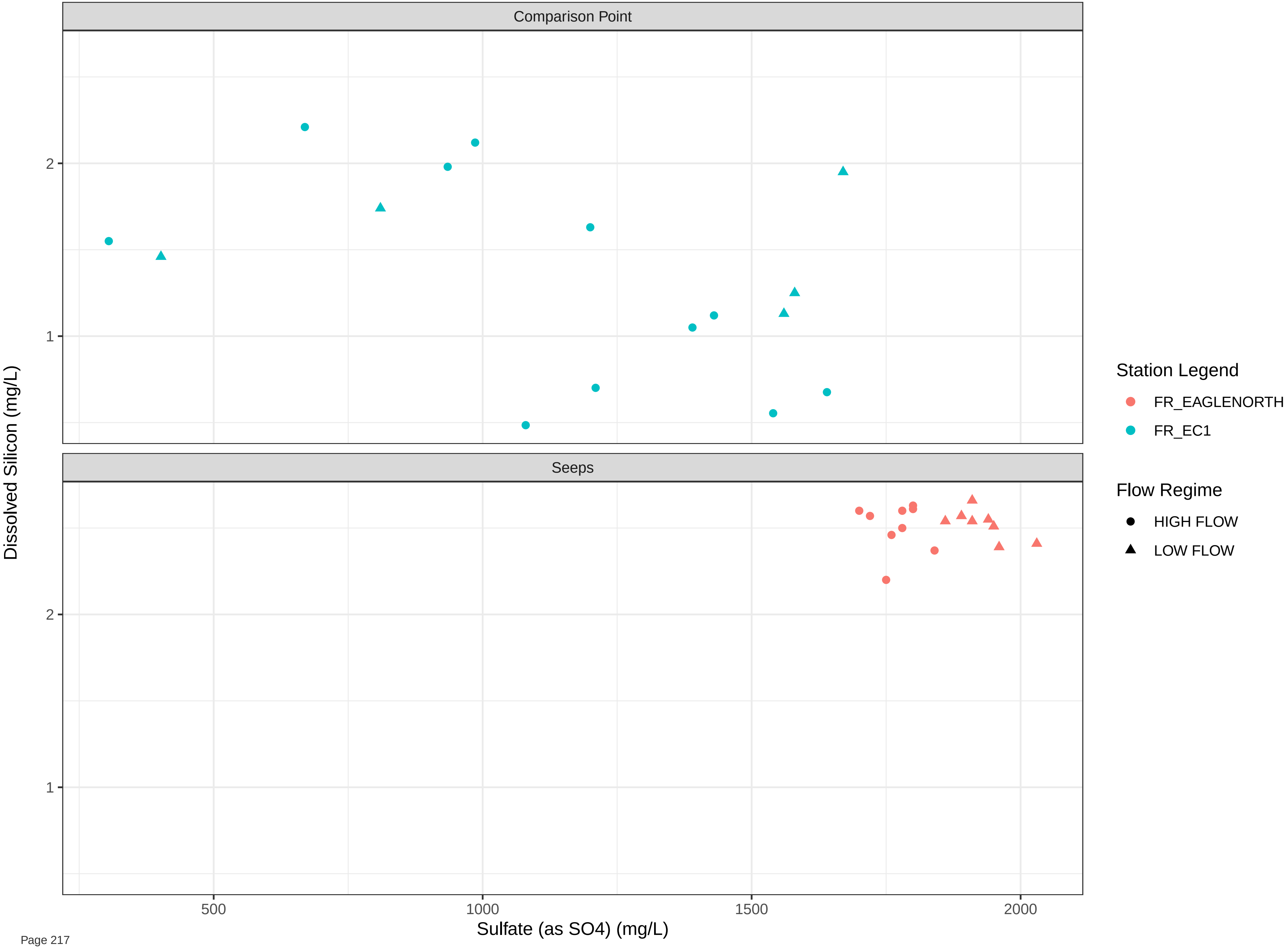

Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



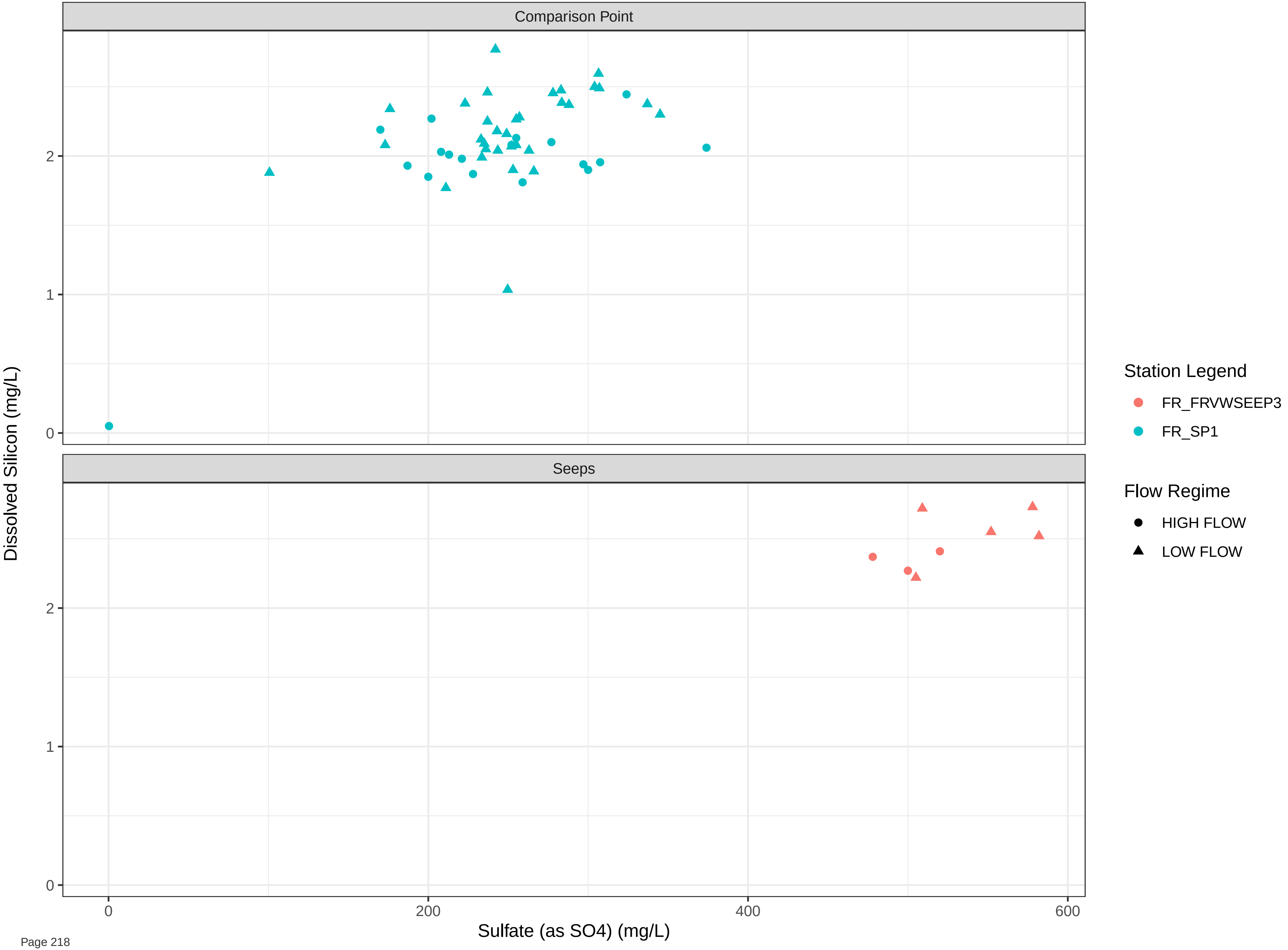
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

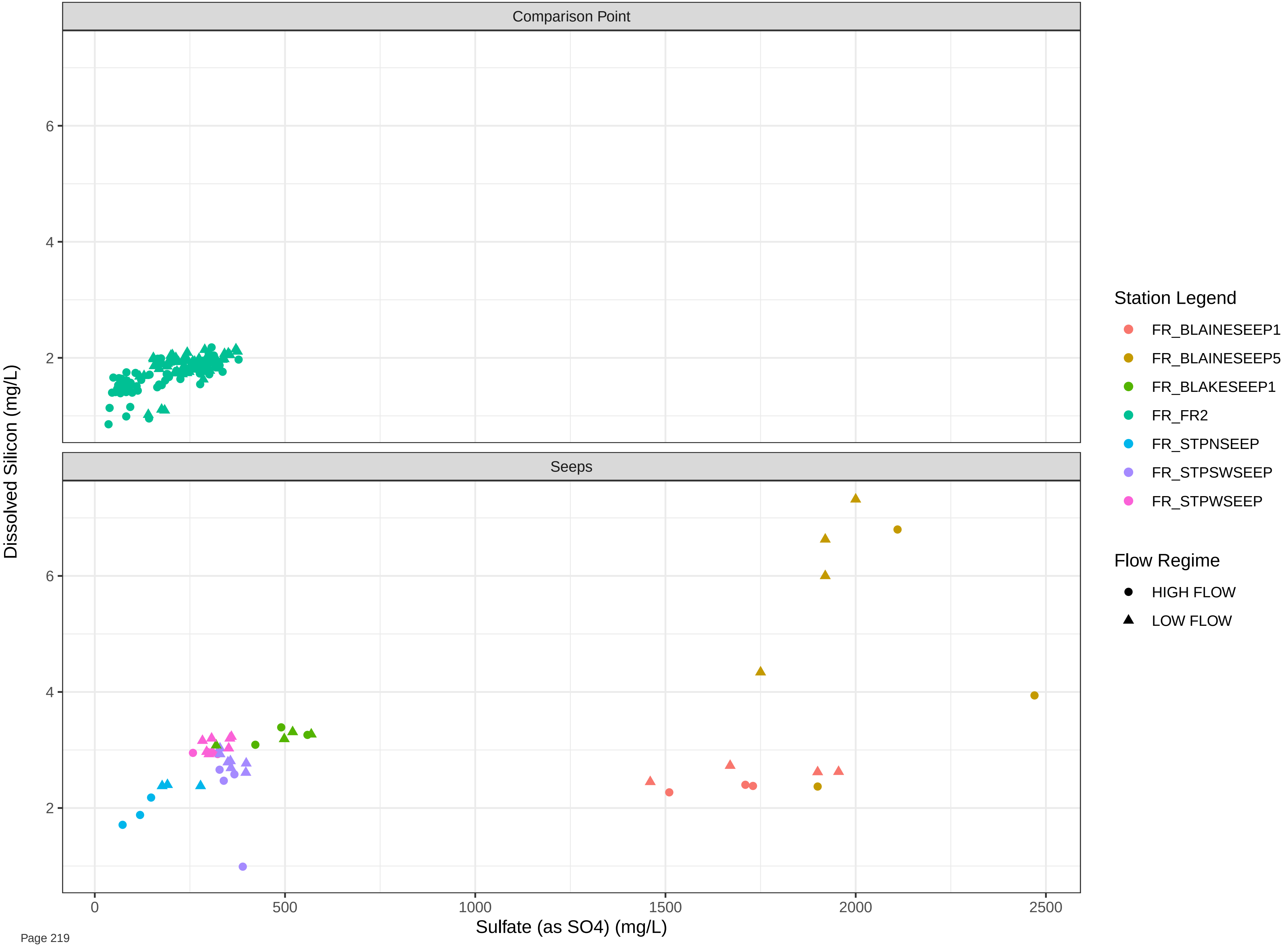

Comparison Point
Seeps
Dissolved Silicon (mg/L)
6
4
2
6
4
2
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

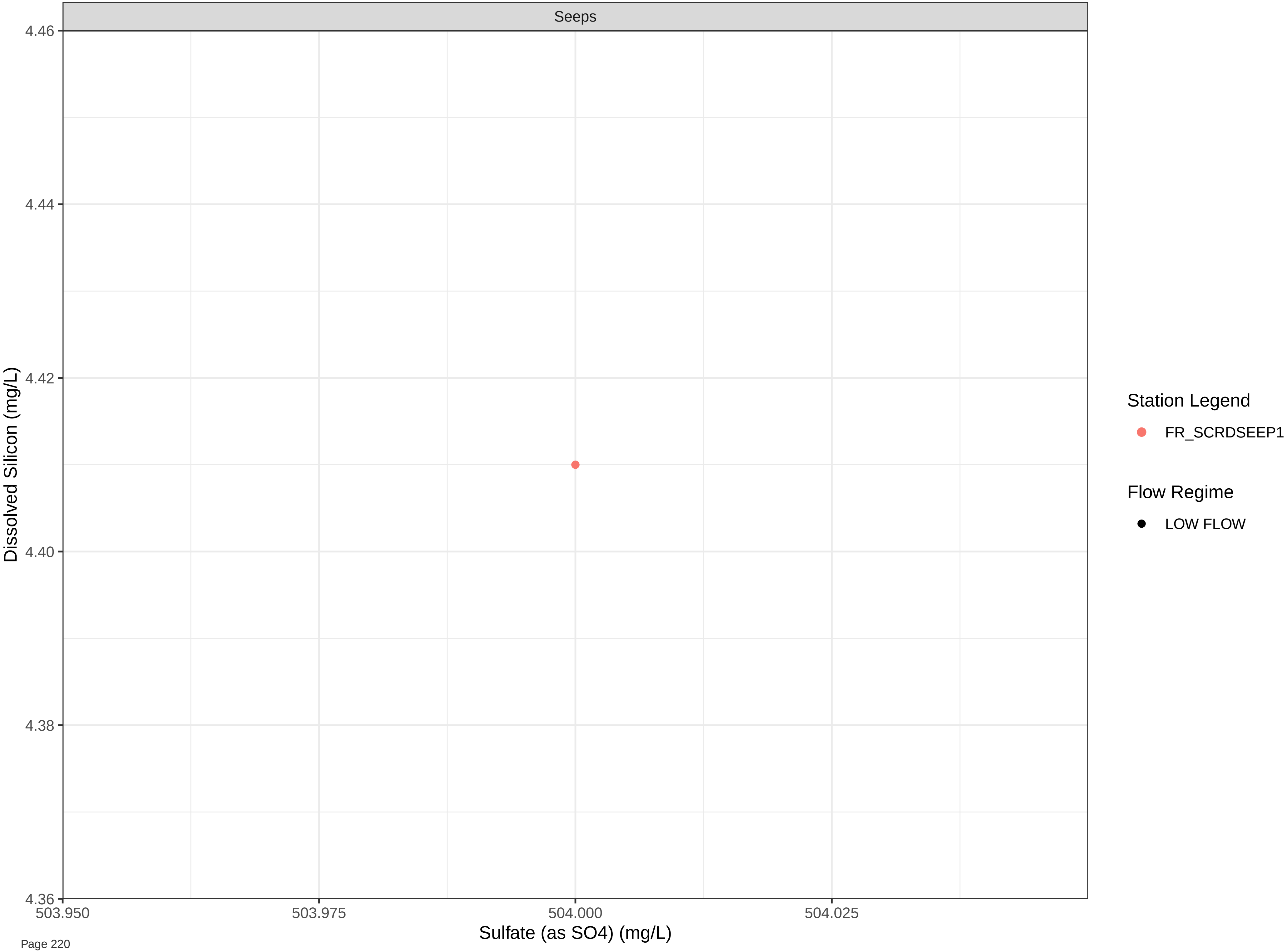


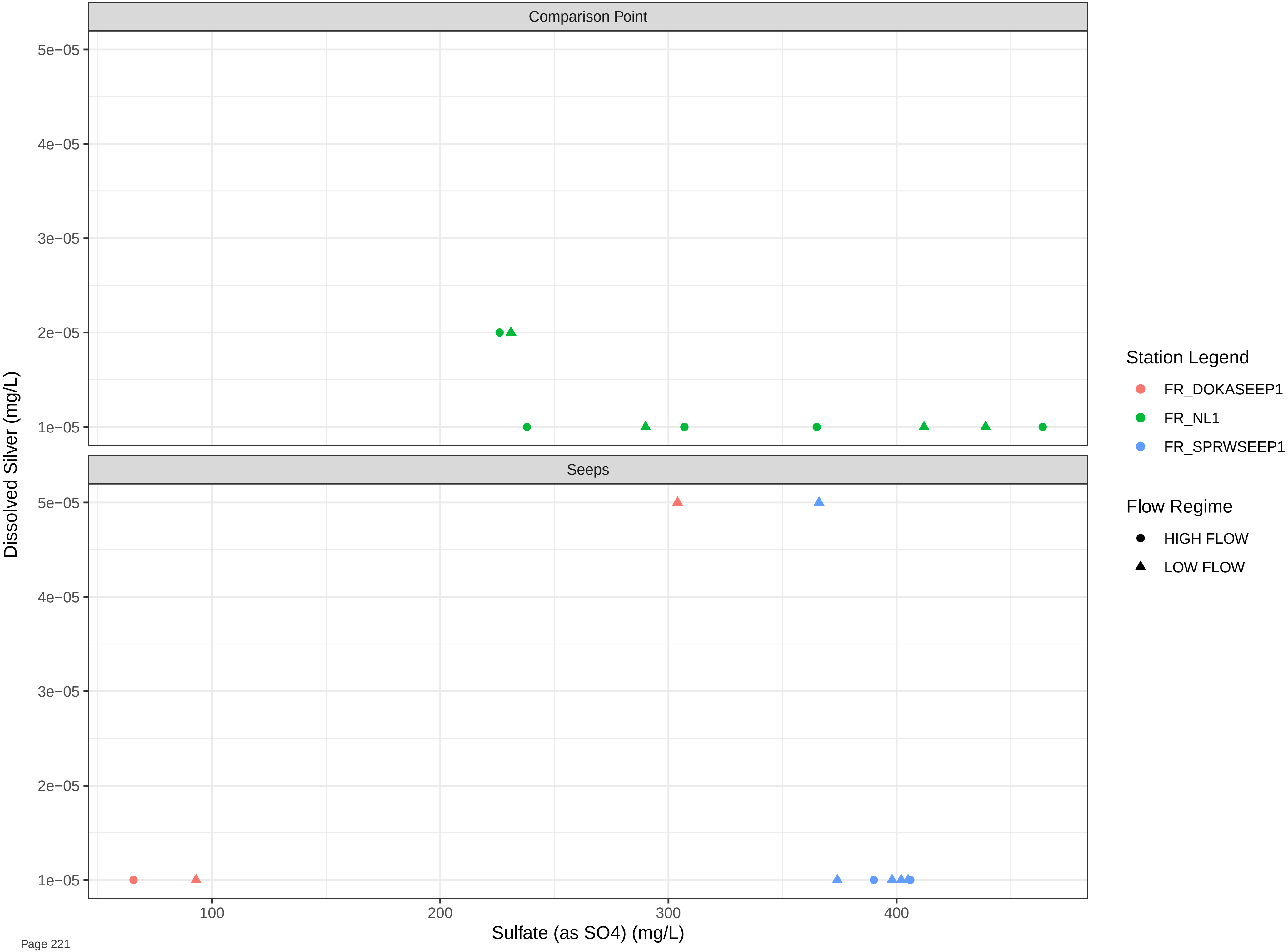
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
2
1
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

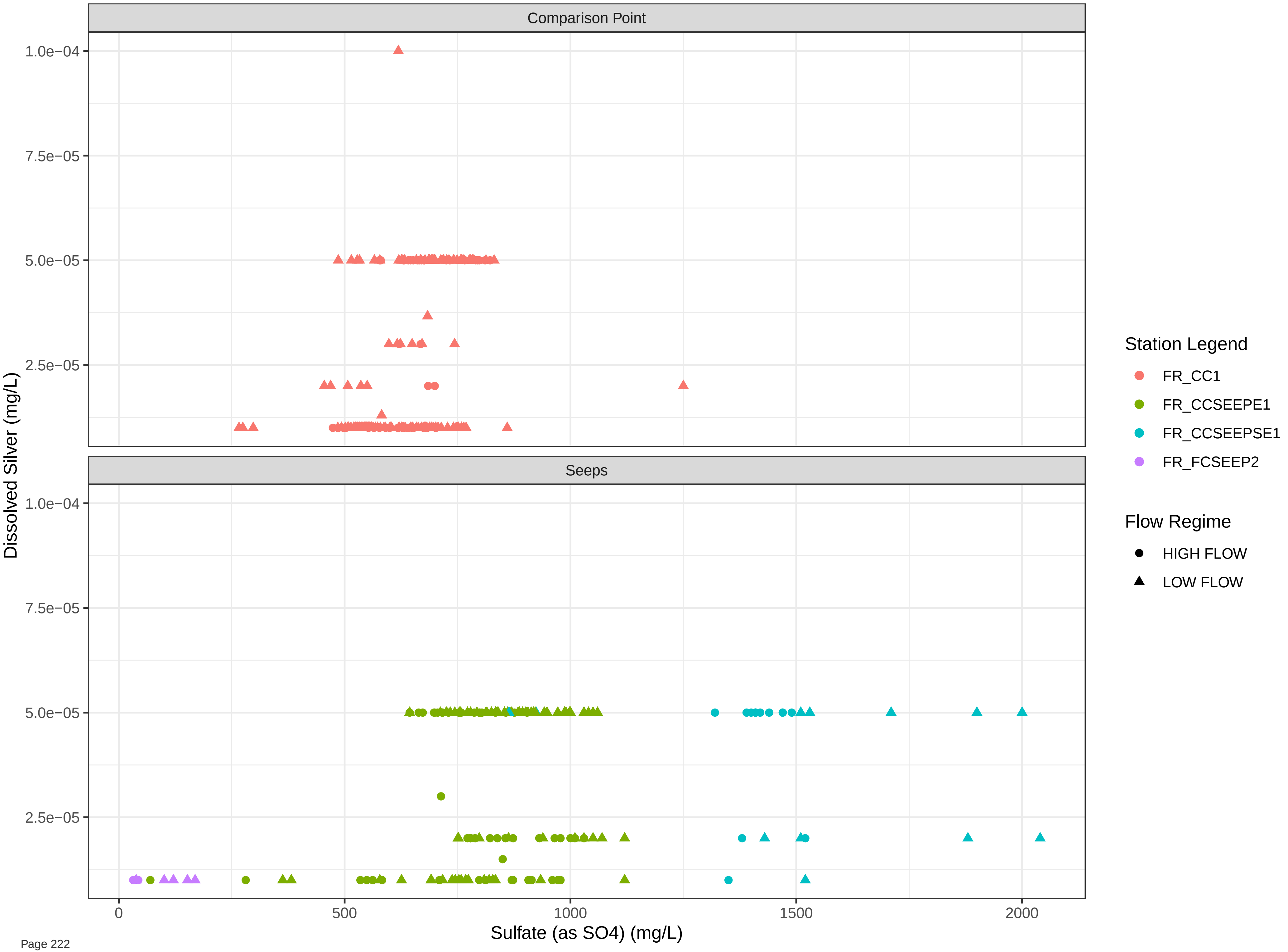


Comparison Point
Seeps
Dissolved Silicon (mg/L)
6
4
2
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

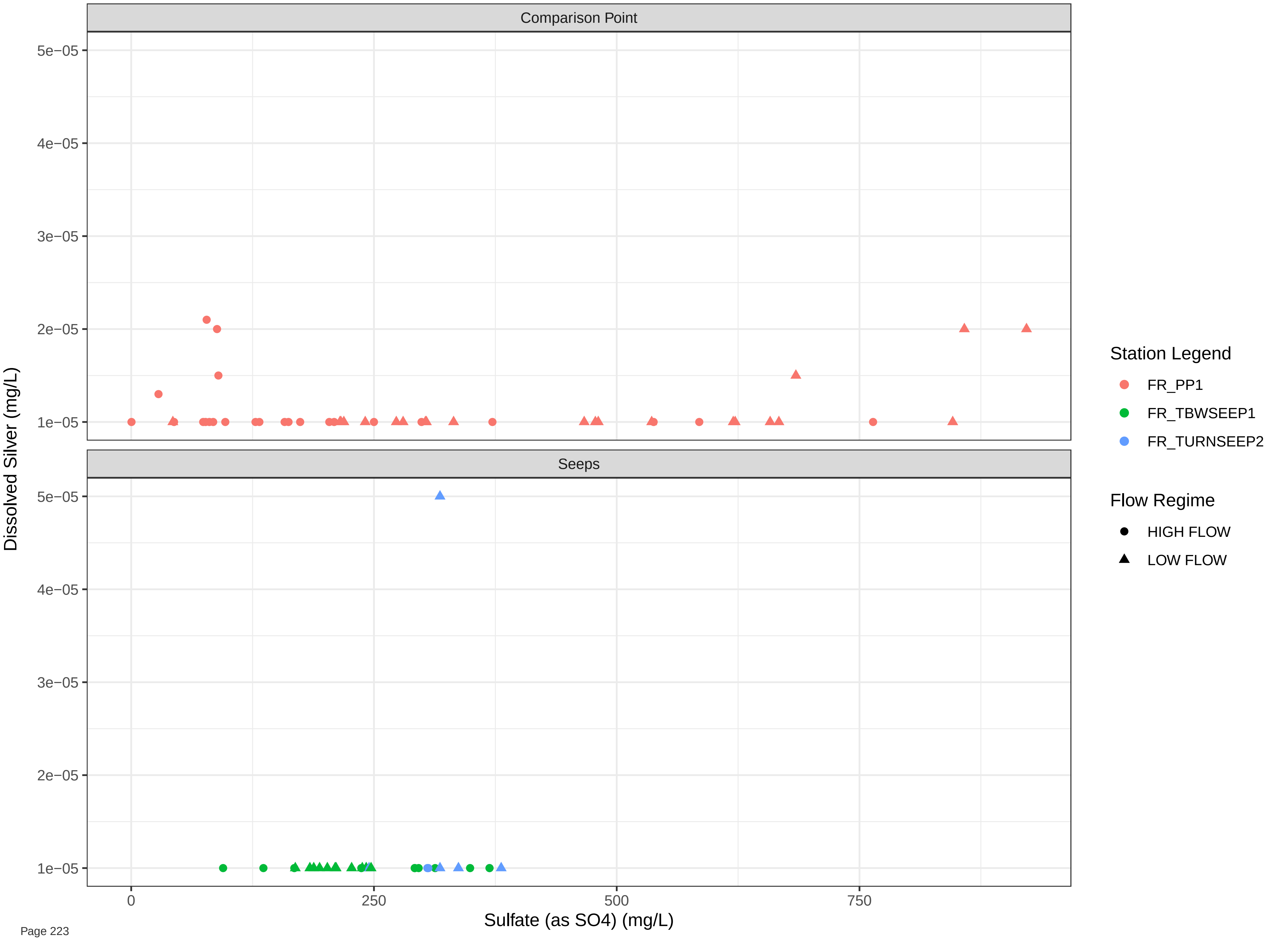

Seeps
Dissolved Silicon (mg/L)
4.46
4.44
4.42
4.40
4.38
4.36
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

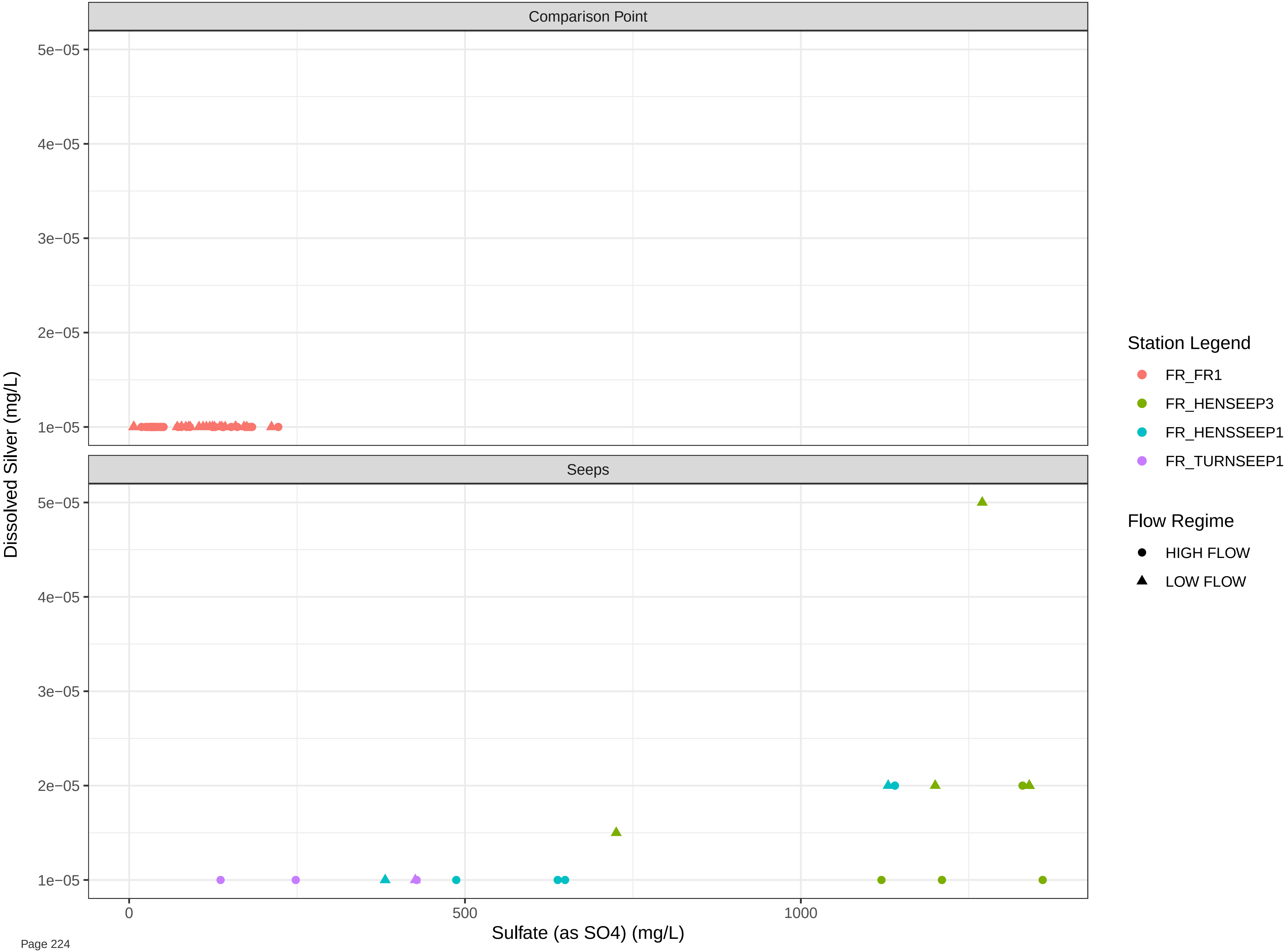


Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

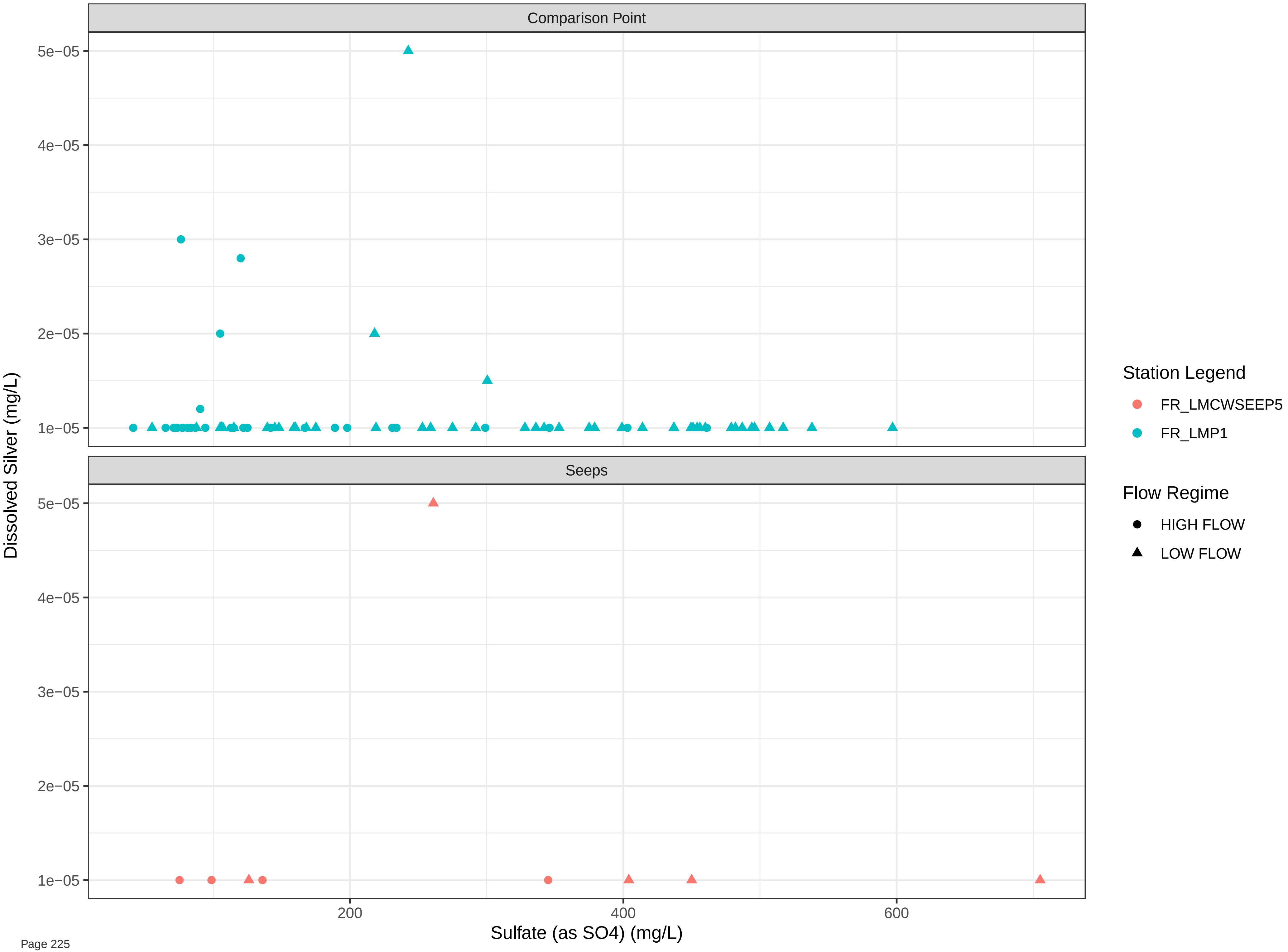


Comparison Point
Seeps
1.0e−04
7.5e−05
5.0e−05
2.5e−05
0
500
1000
1500
2000
Dissolved Silver (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

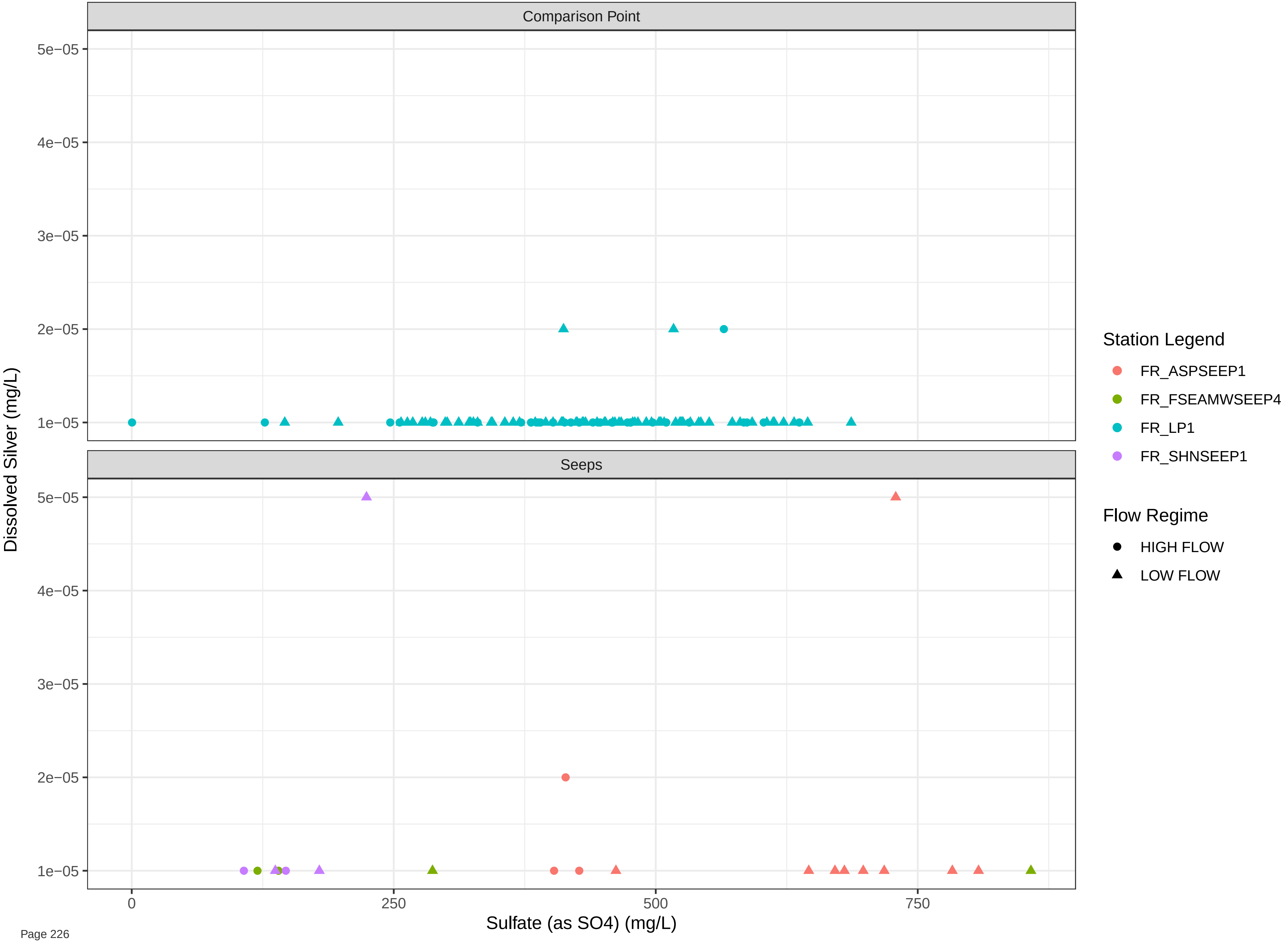

Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

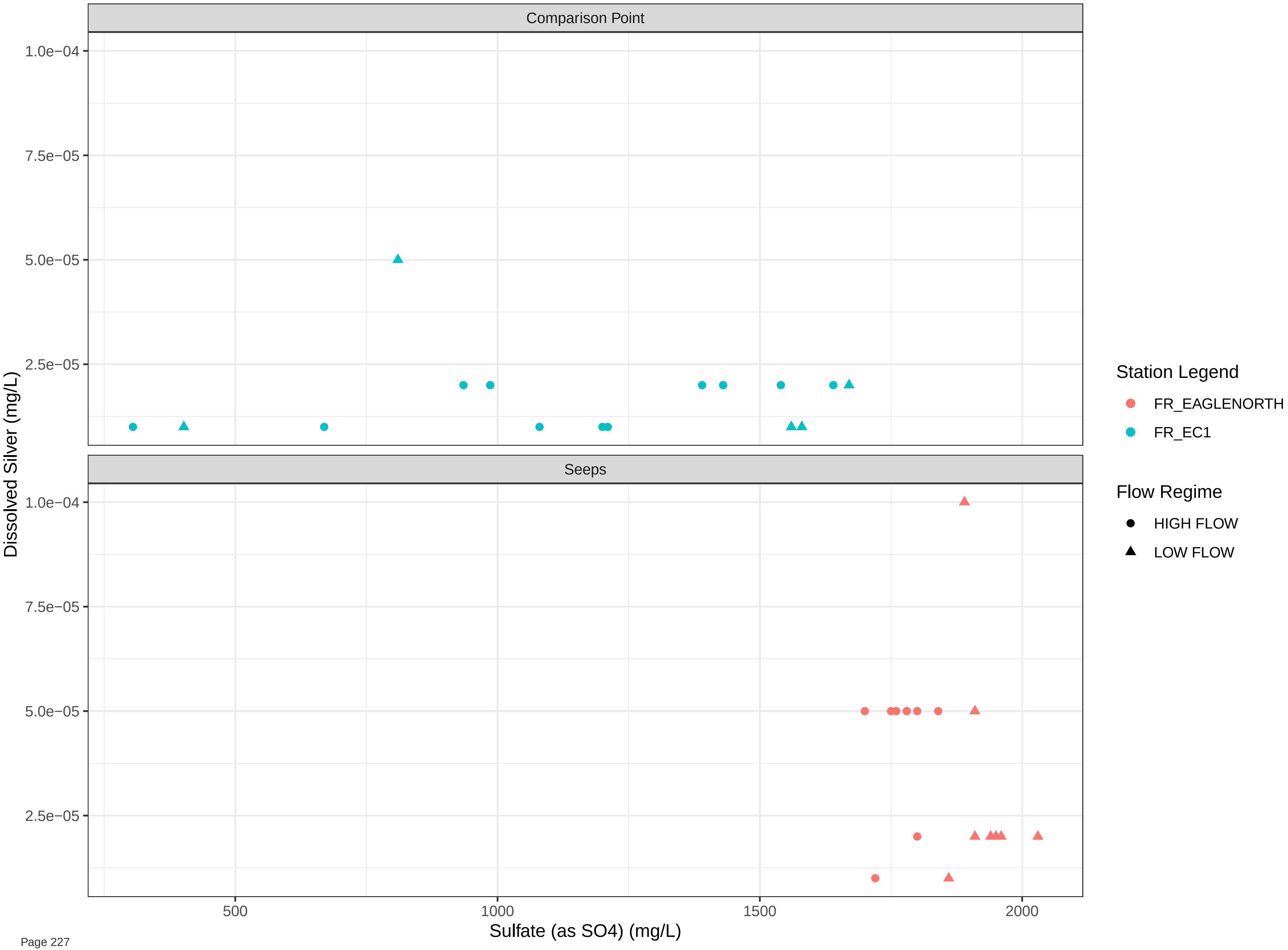


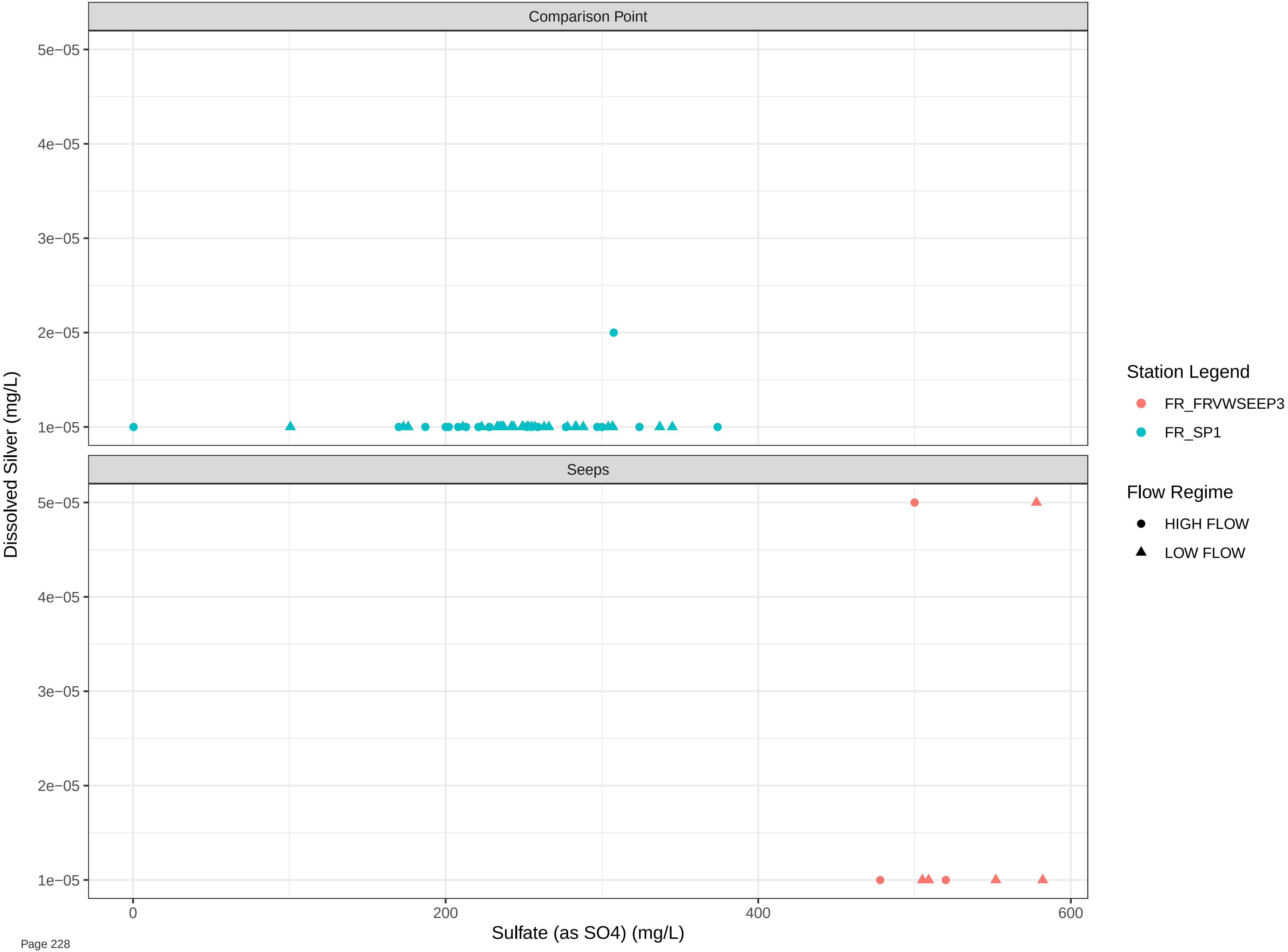
Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



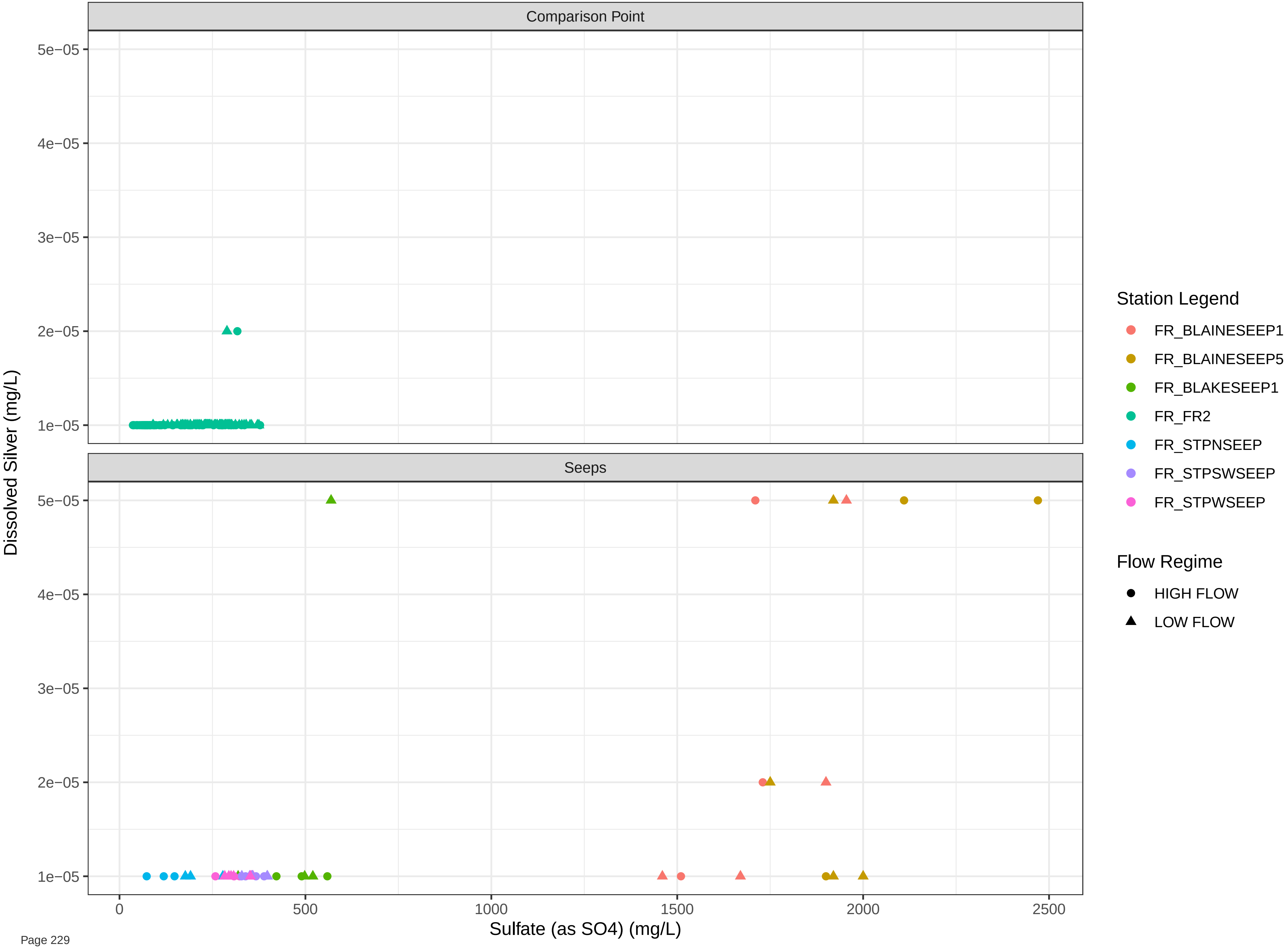
Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

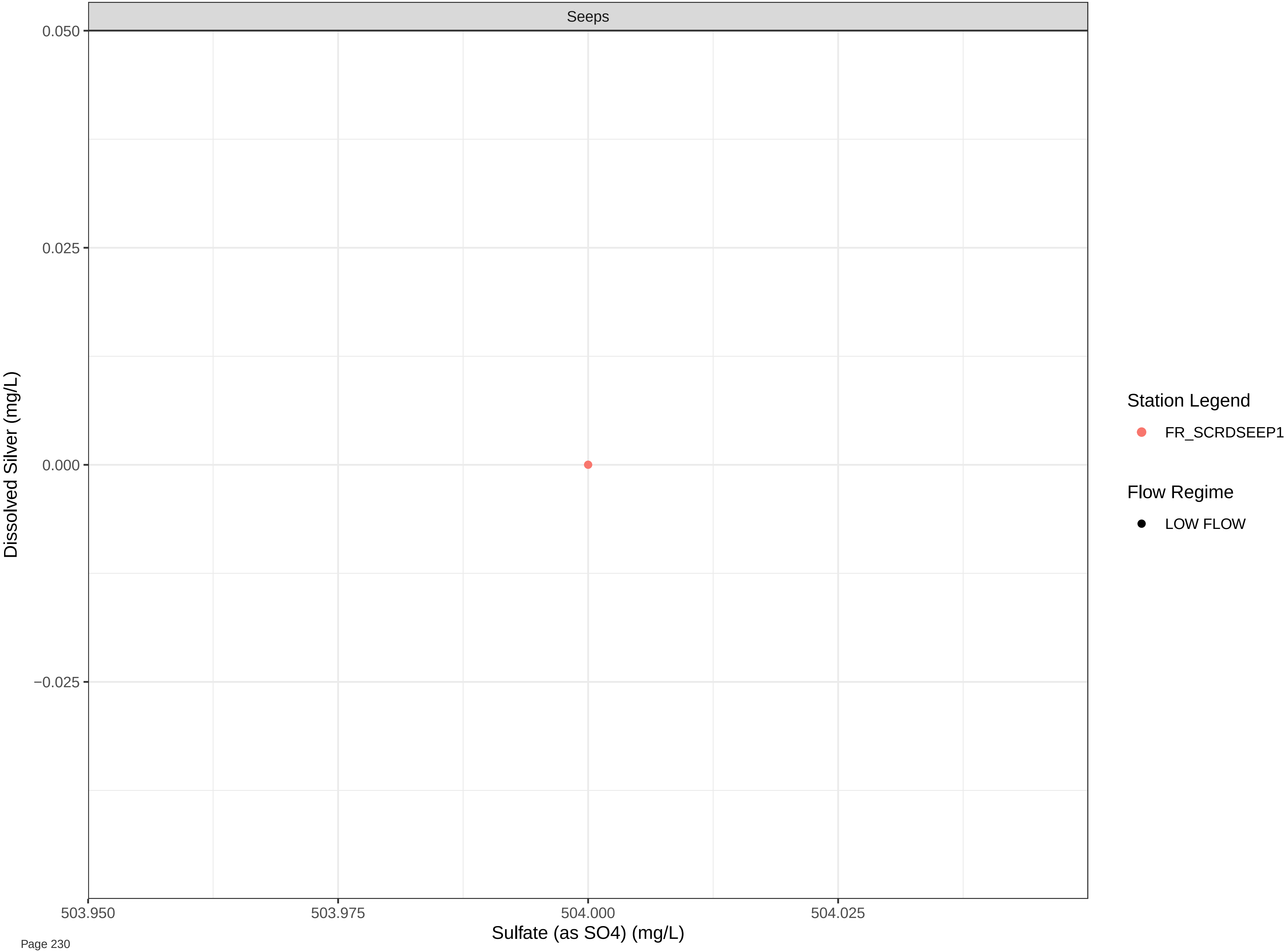

Comparison Point
Seeps
Dissolved Silver (mg/L)
1.0e−04
7.5e−05
5.0e−05
2.5e−05
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

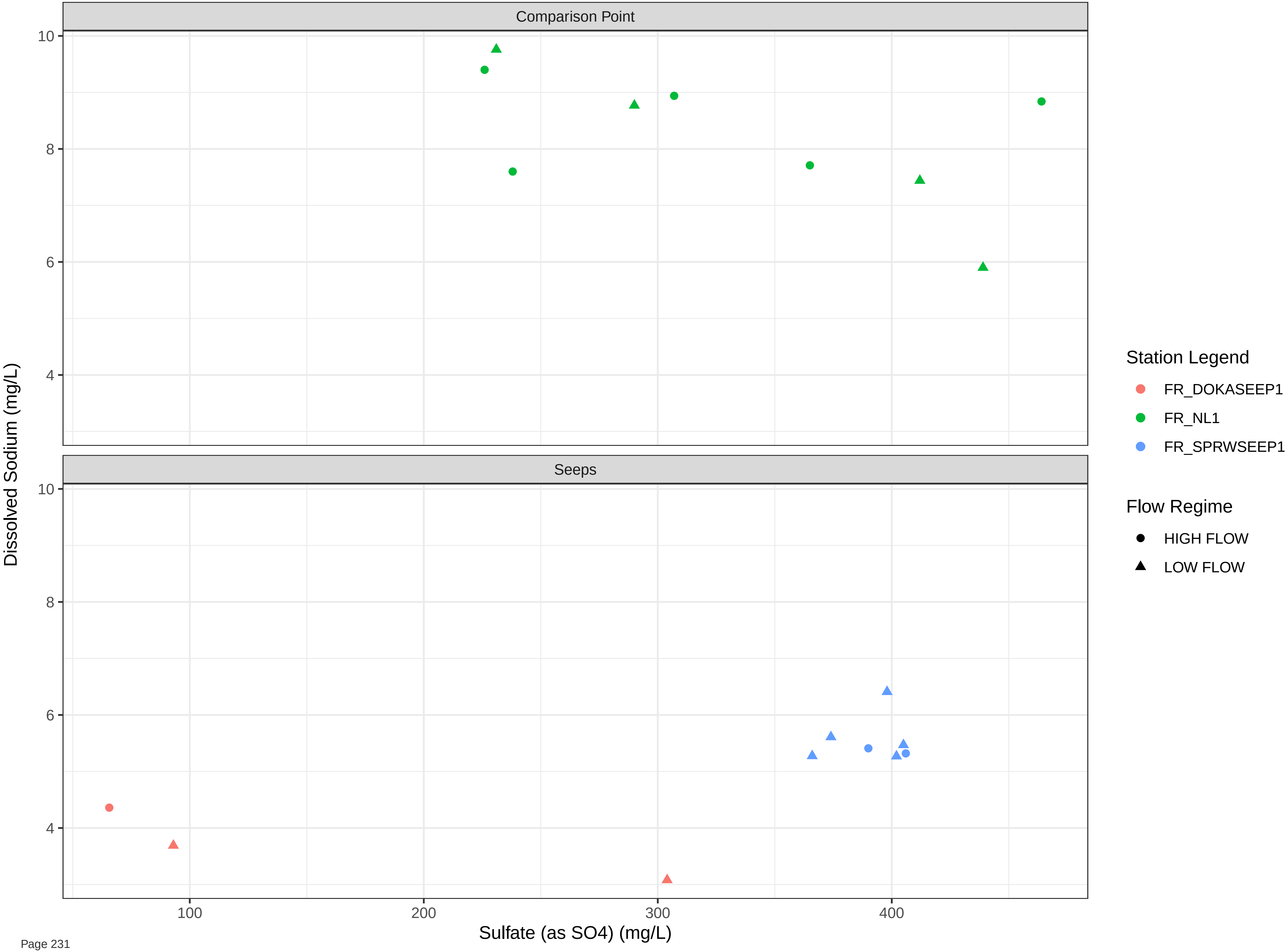


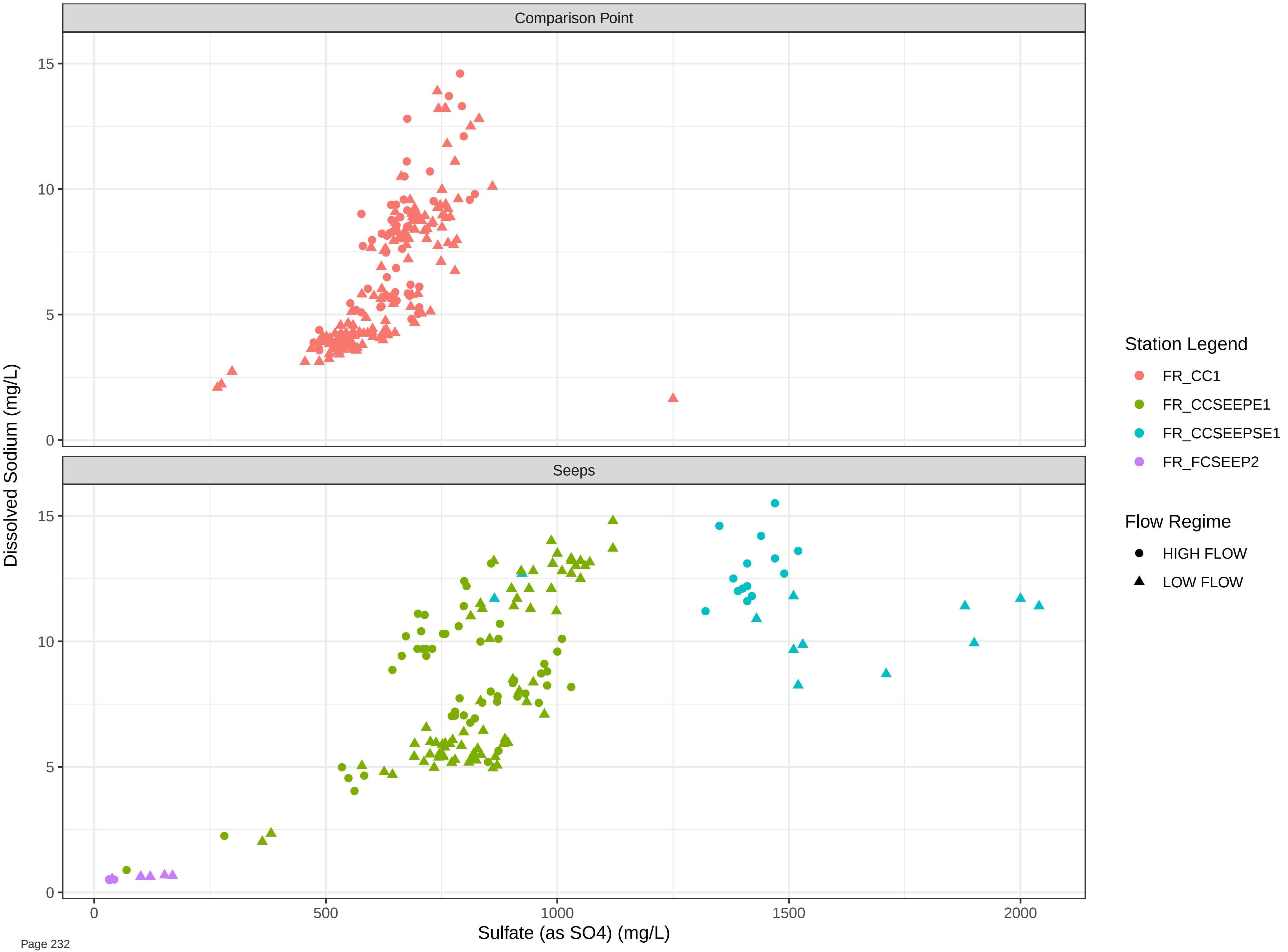
Comparison Point
Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
0
200
400
600
Dissolved Silver (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



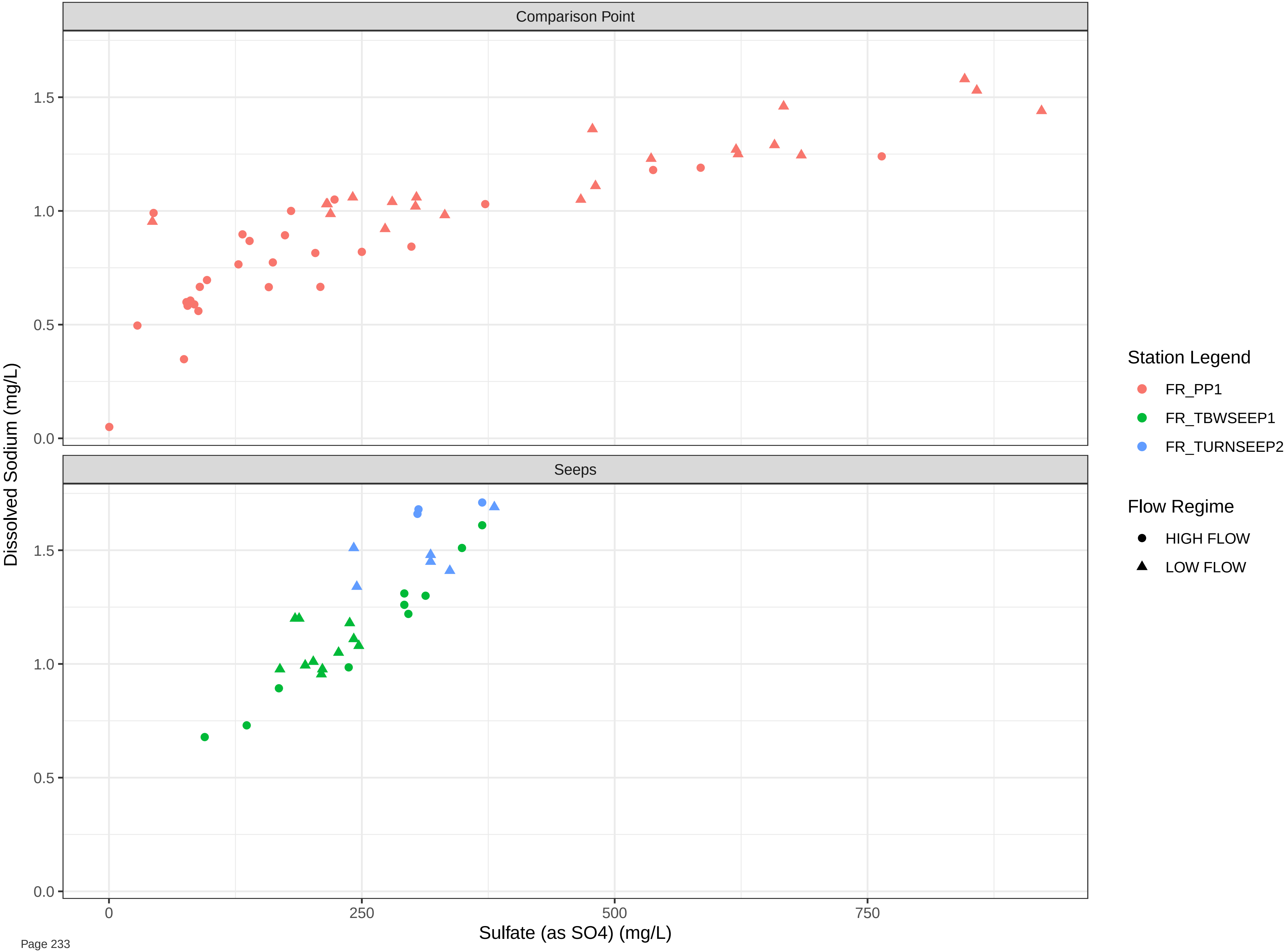
Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

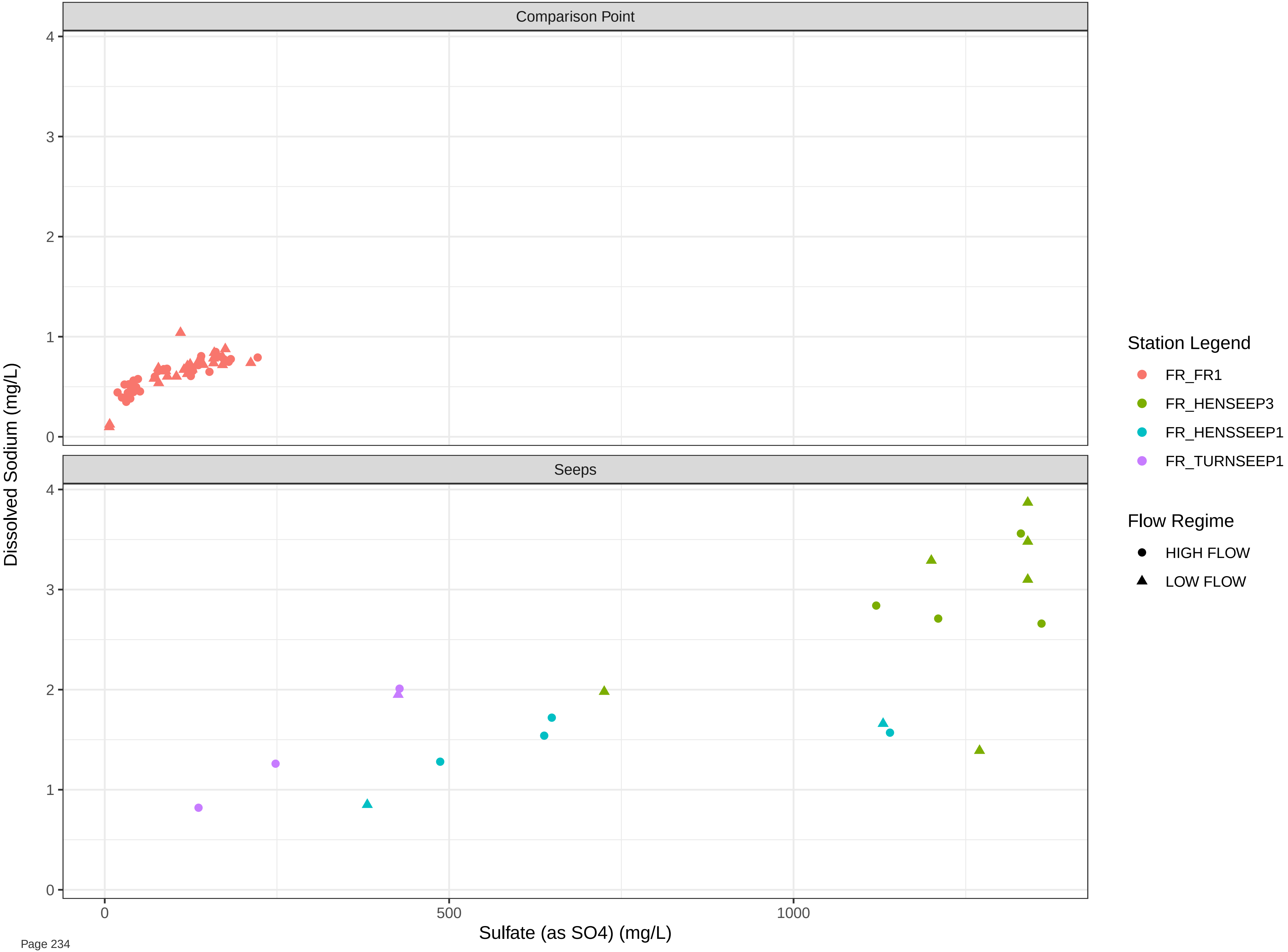

Seeps
Dissolved Silver (mg/L)
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW


Comparison Point
Seeps
Dissolved Sodium (mg/L)
10
8
6
4
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

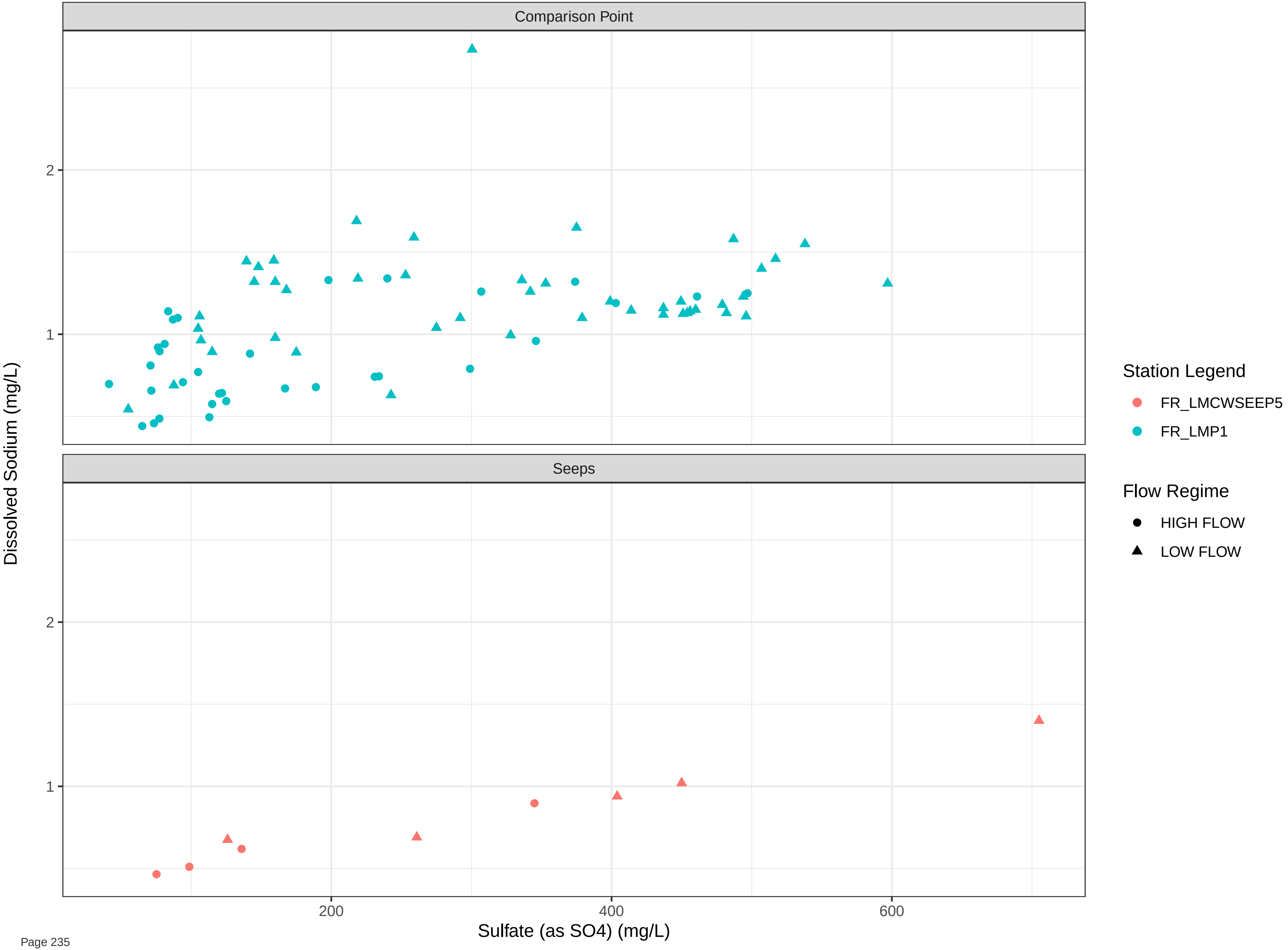


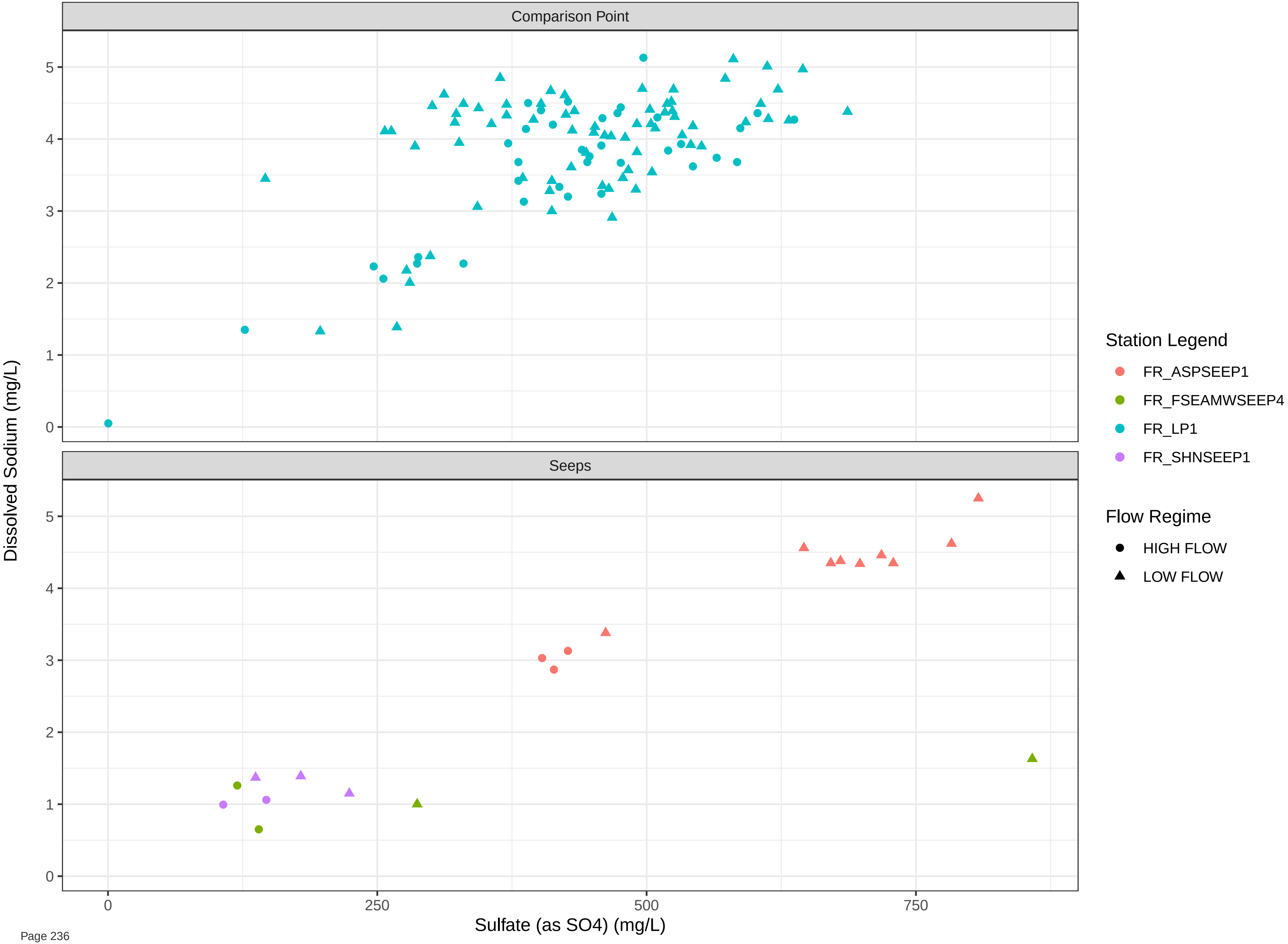
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
15
10
5
0
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.5
1.0
1.5
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

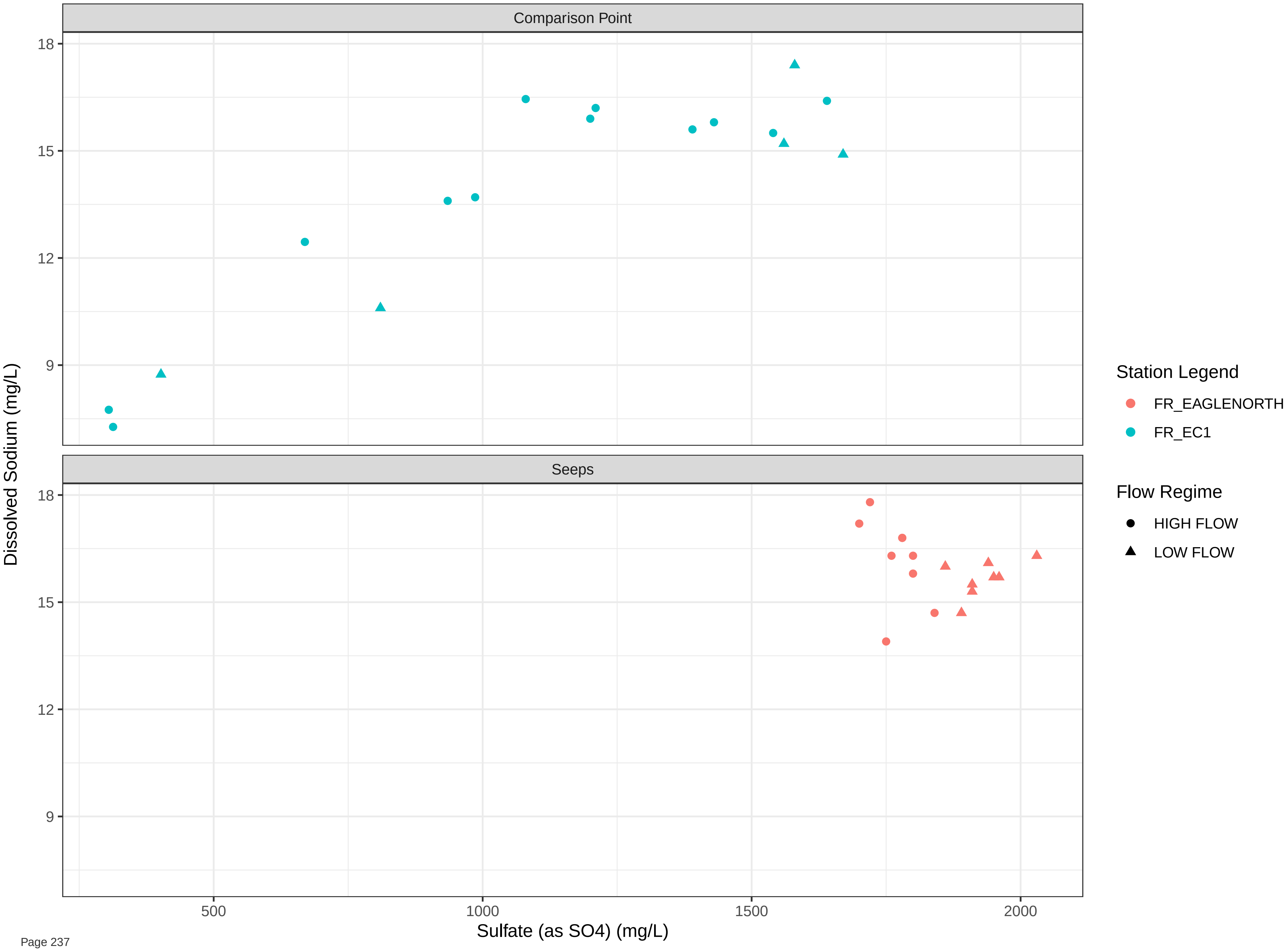


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
0
500
1000
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

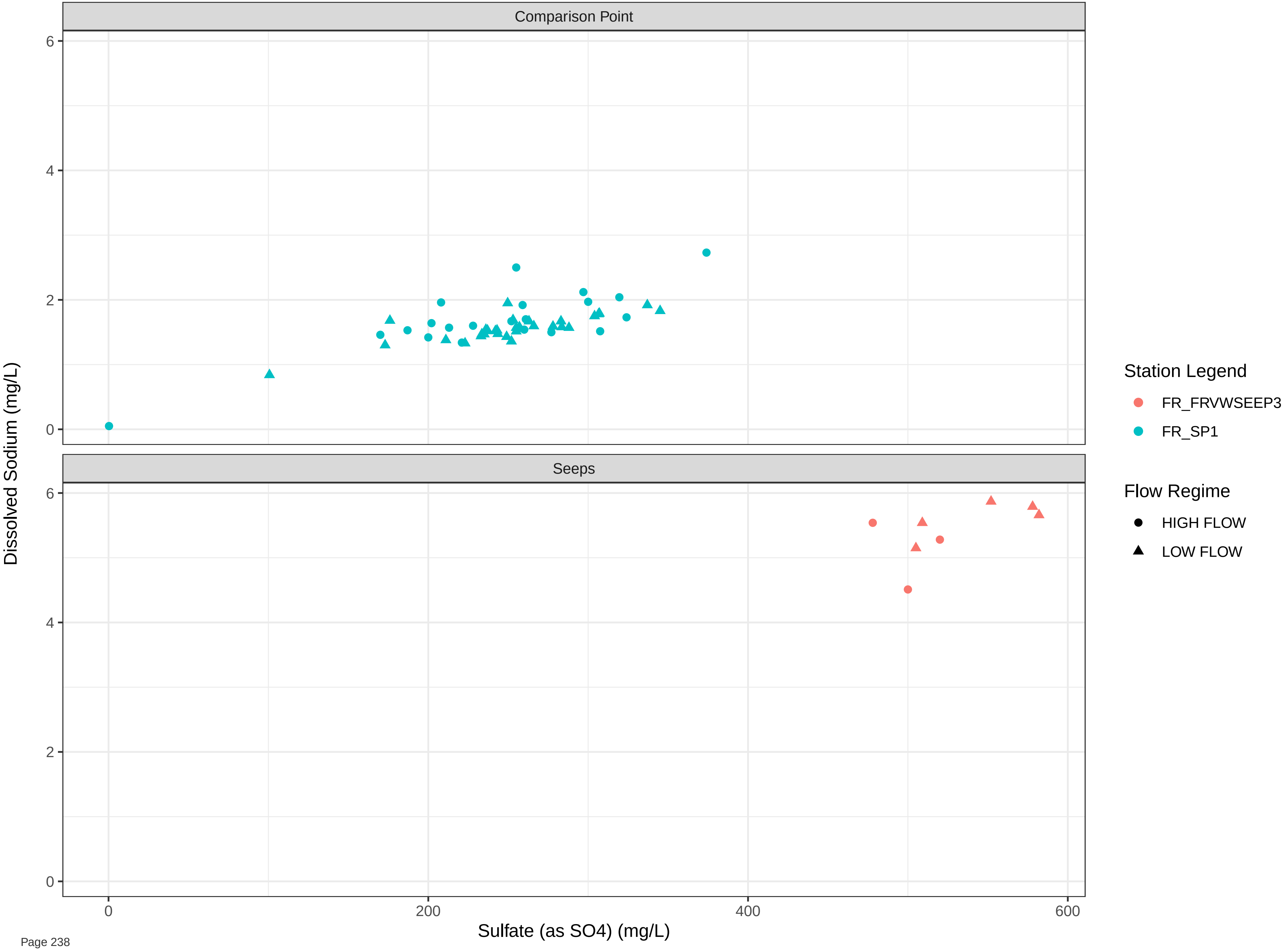

Comparison Point
Seeps
Dissolved Sodium (mg/L)
2
1
2
1
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



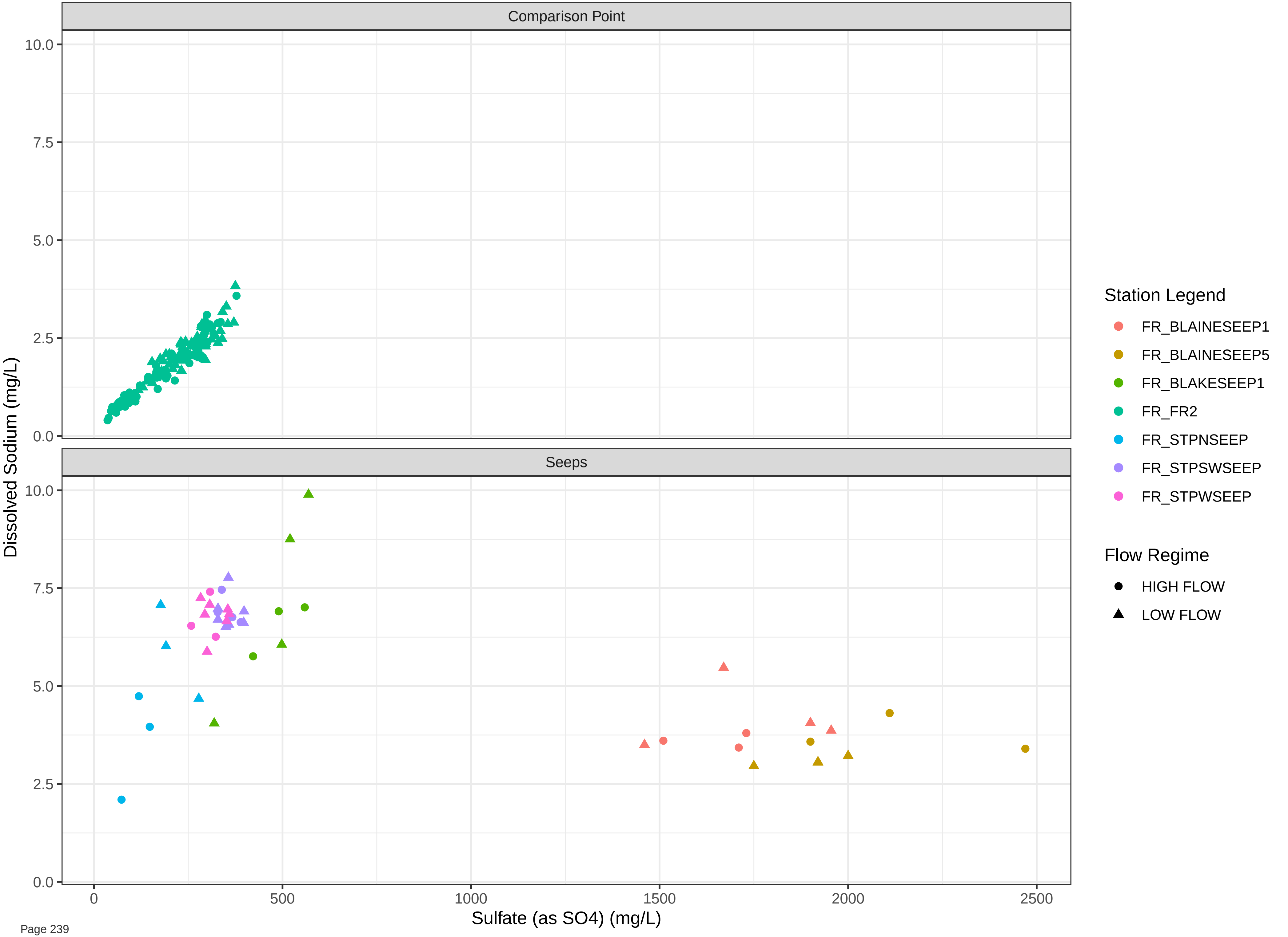
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
5
0
250
500
750
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



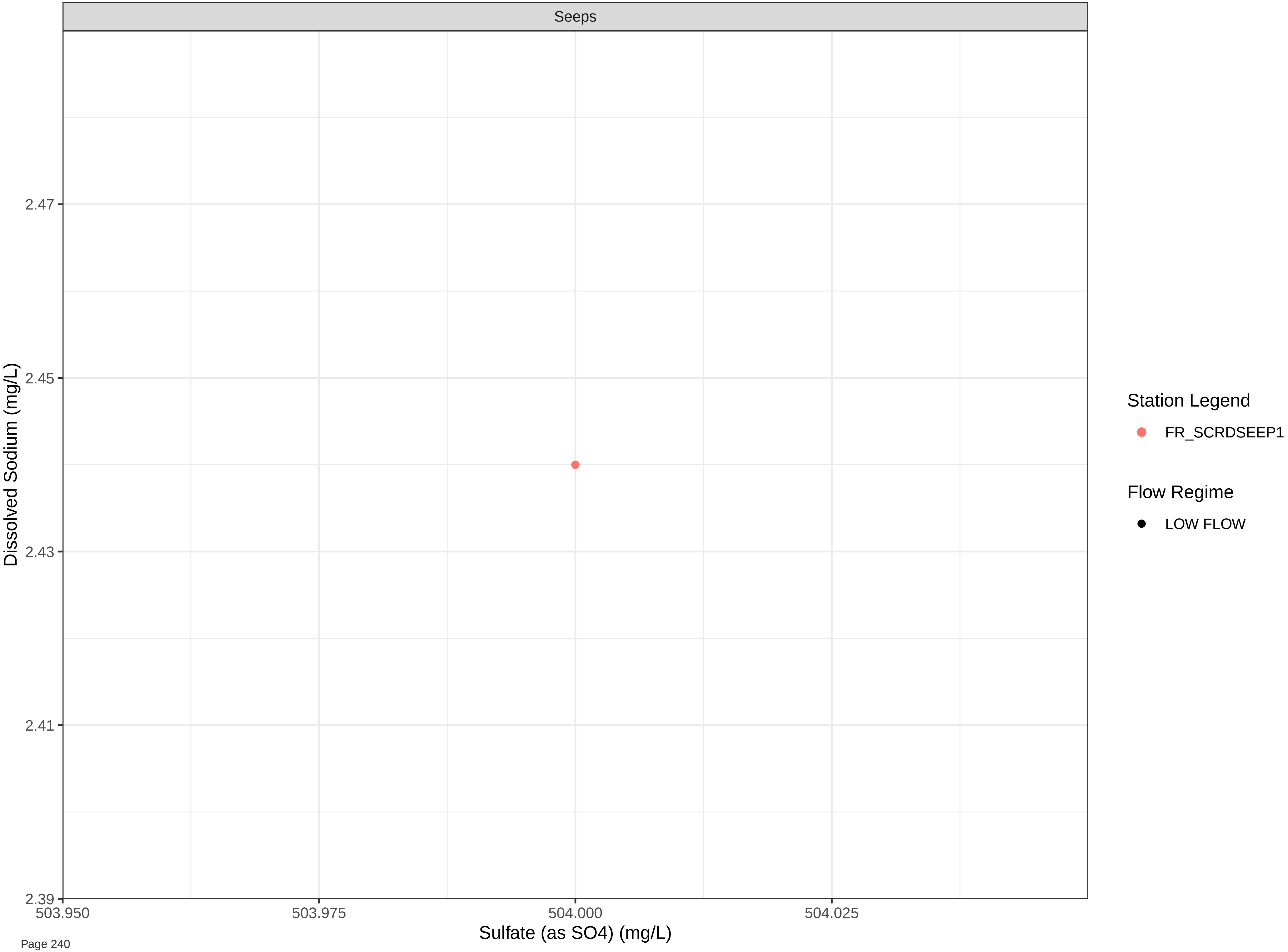
Comparison Point
Seeps
Dissolved Sodium (mg/L)
18
15
12
9
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



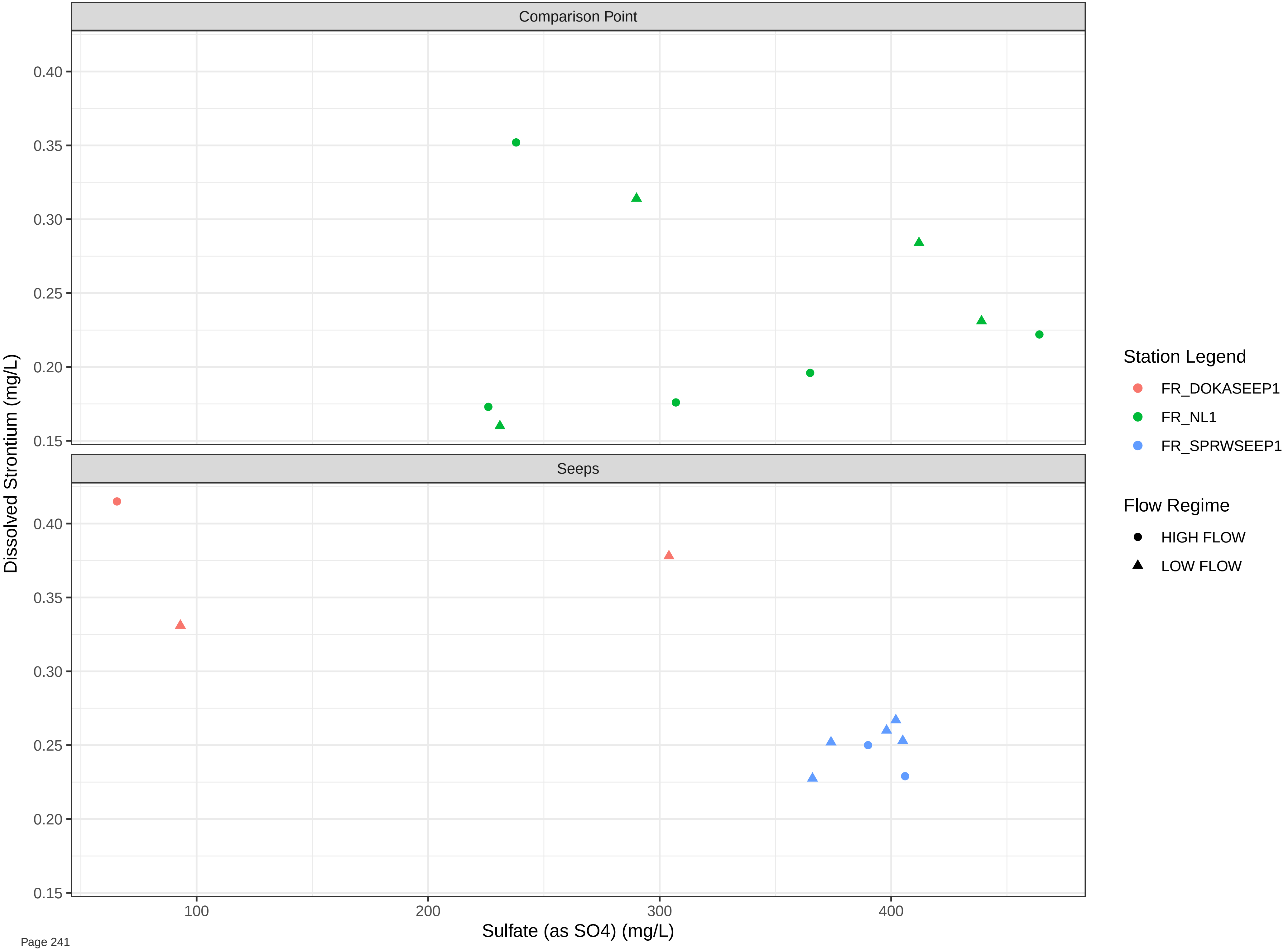
Comparison Point
Seeps
Dissolved Sodium (mg/L)
0
2
4
6
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

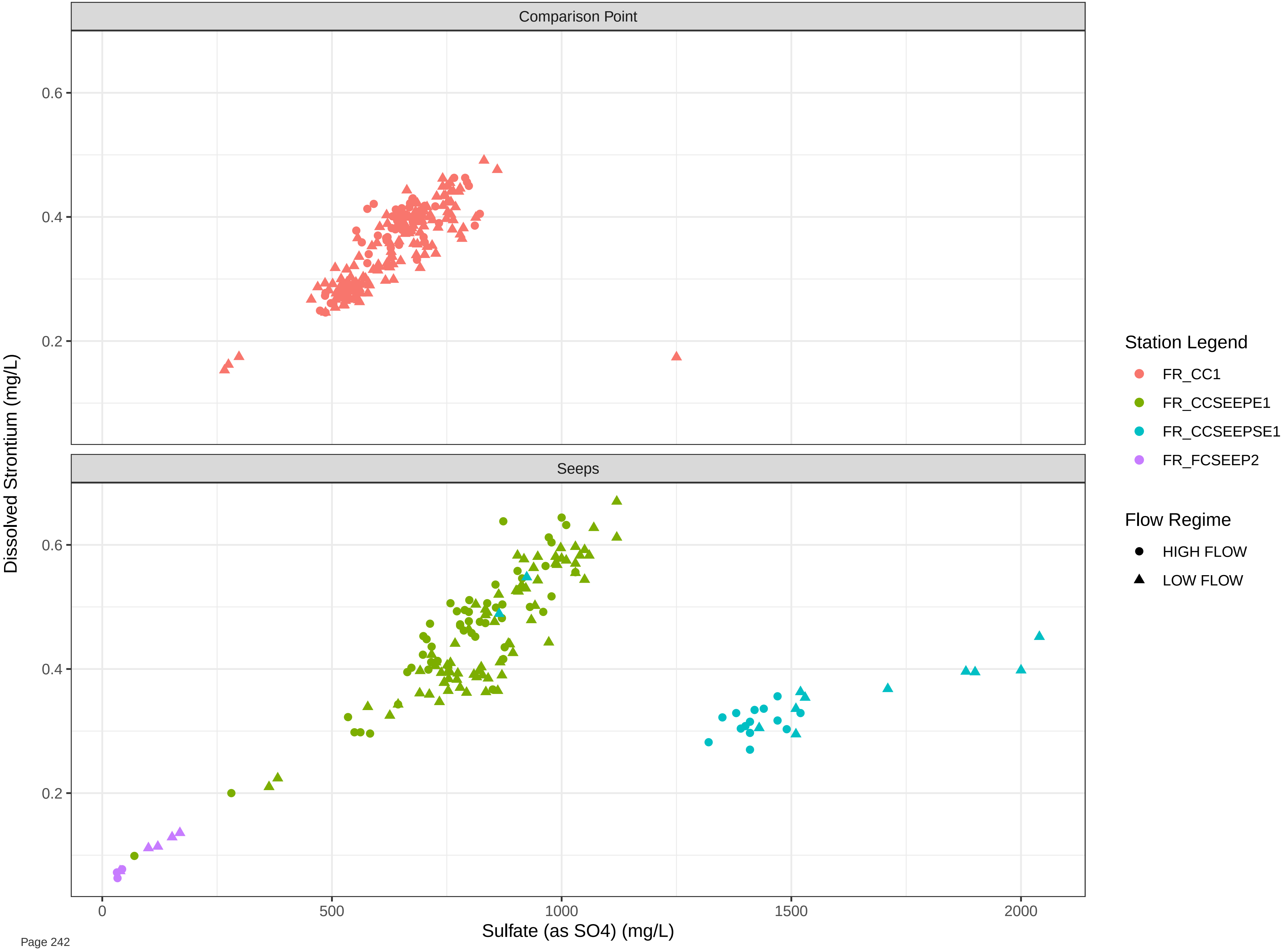


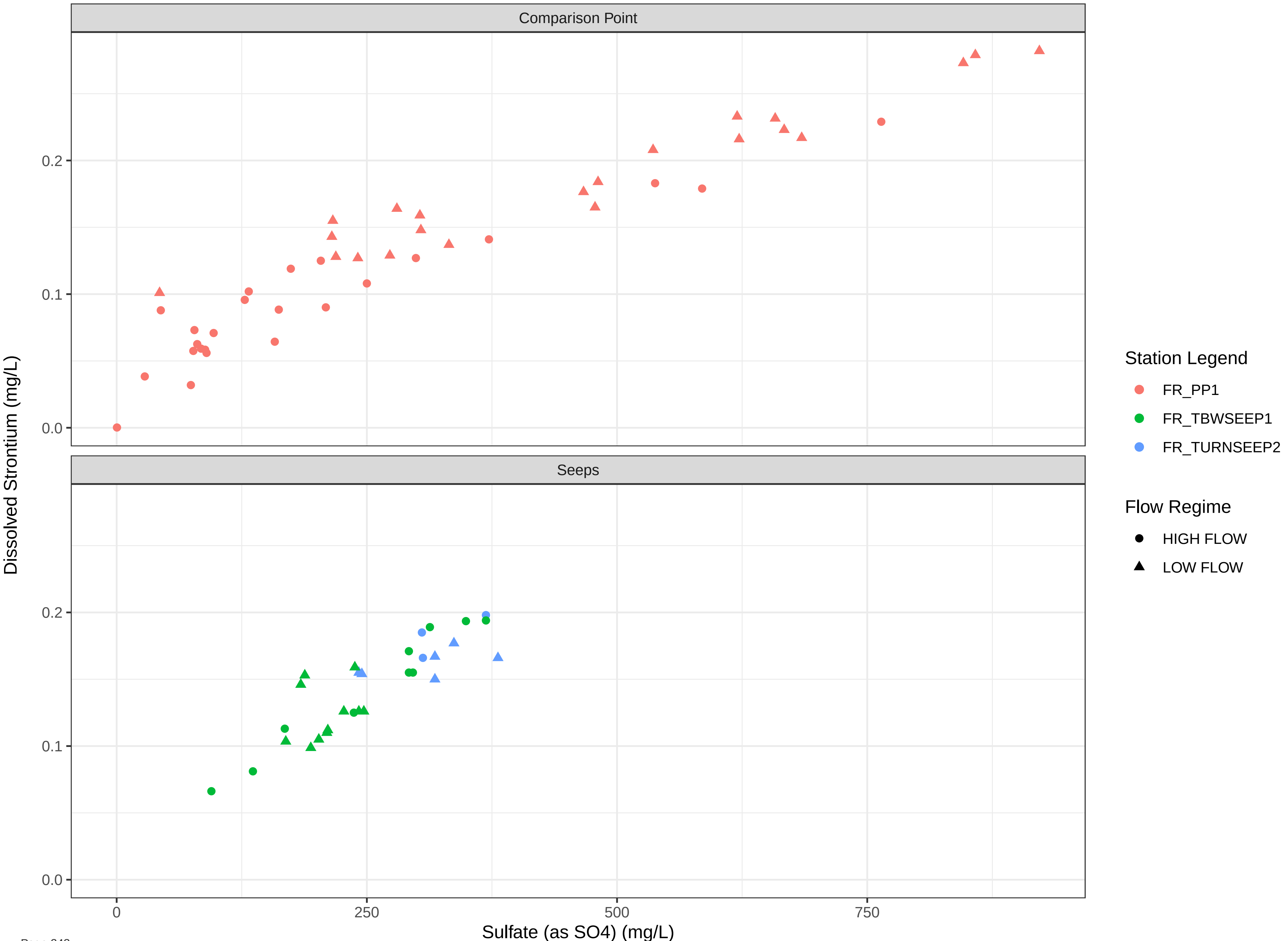
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
2.5
5.0
7.5
10.0
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

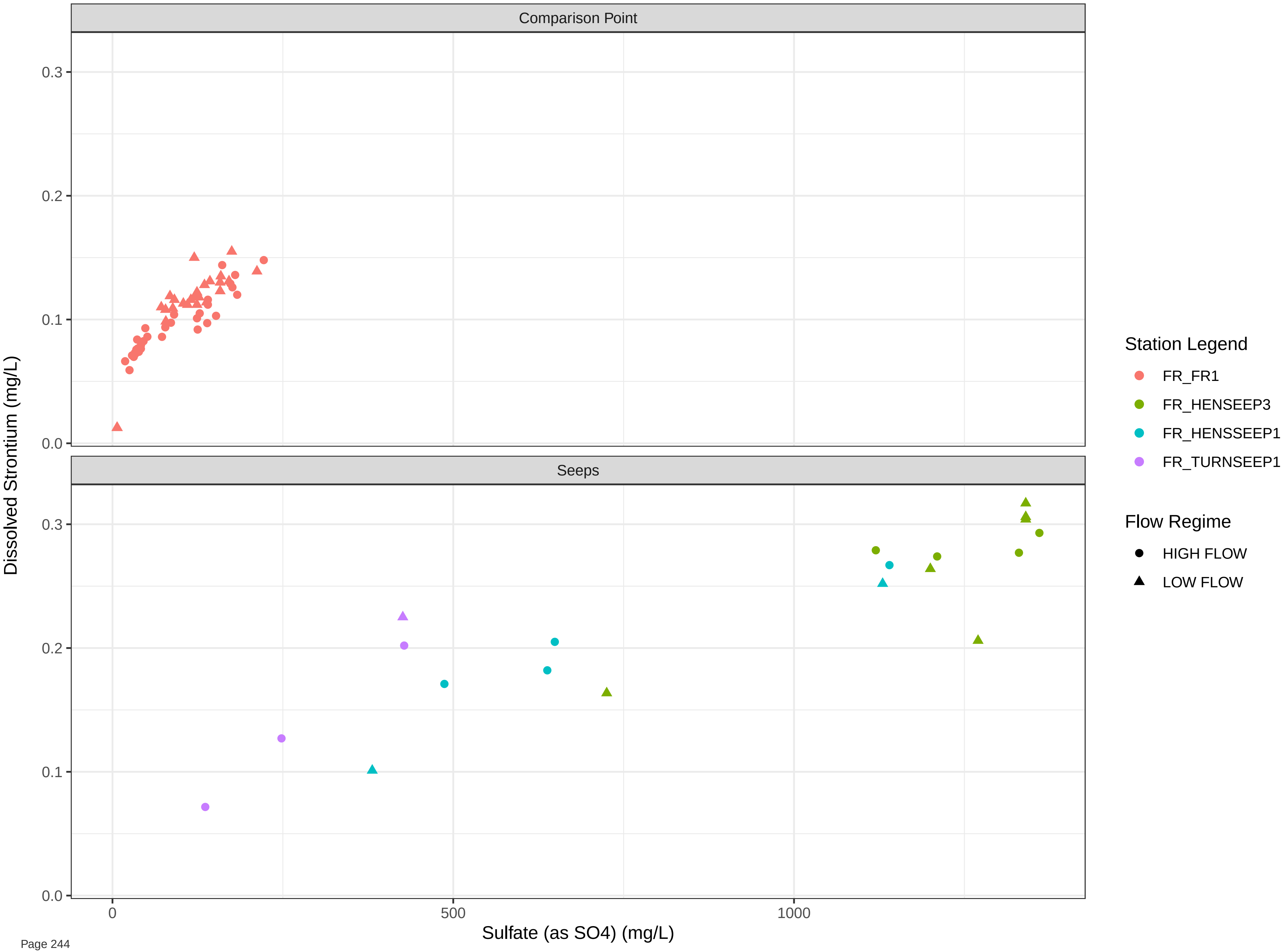


Seeps
Dissolved Sodium (mg/L)
2.47
2.45
2.43
2.41
2.39
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

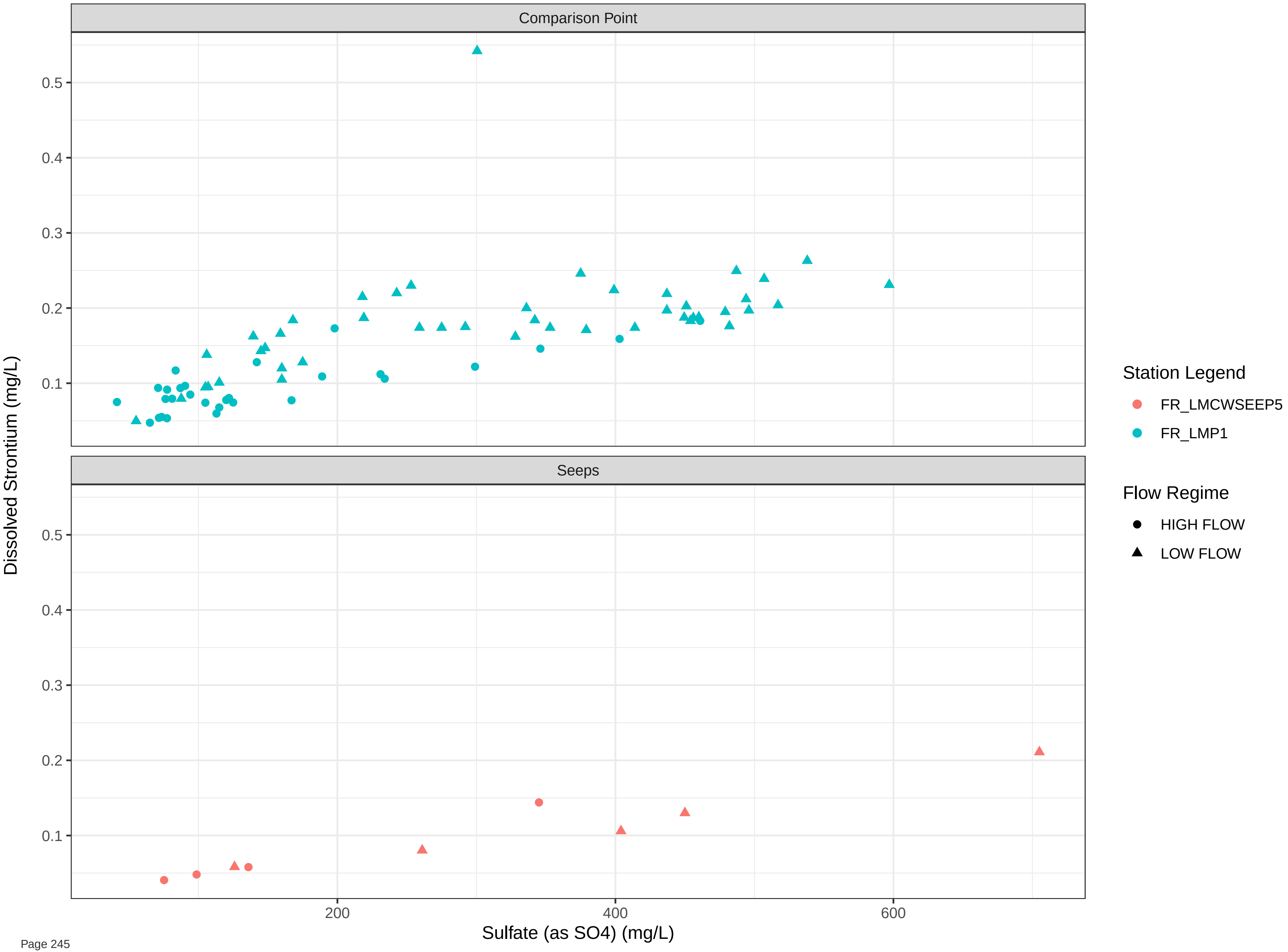

Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.15
0.20
0.25
0.30
0.35
0.40
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.6
0.4
0.2
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

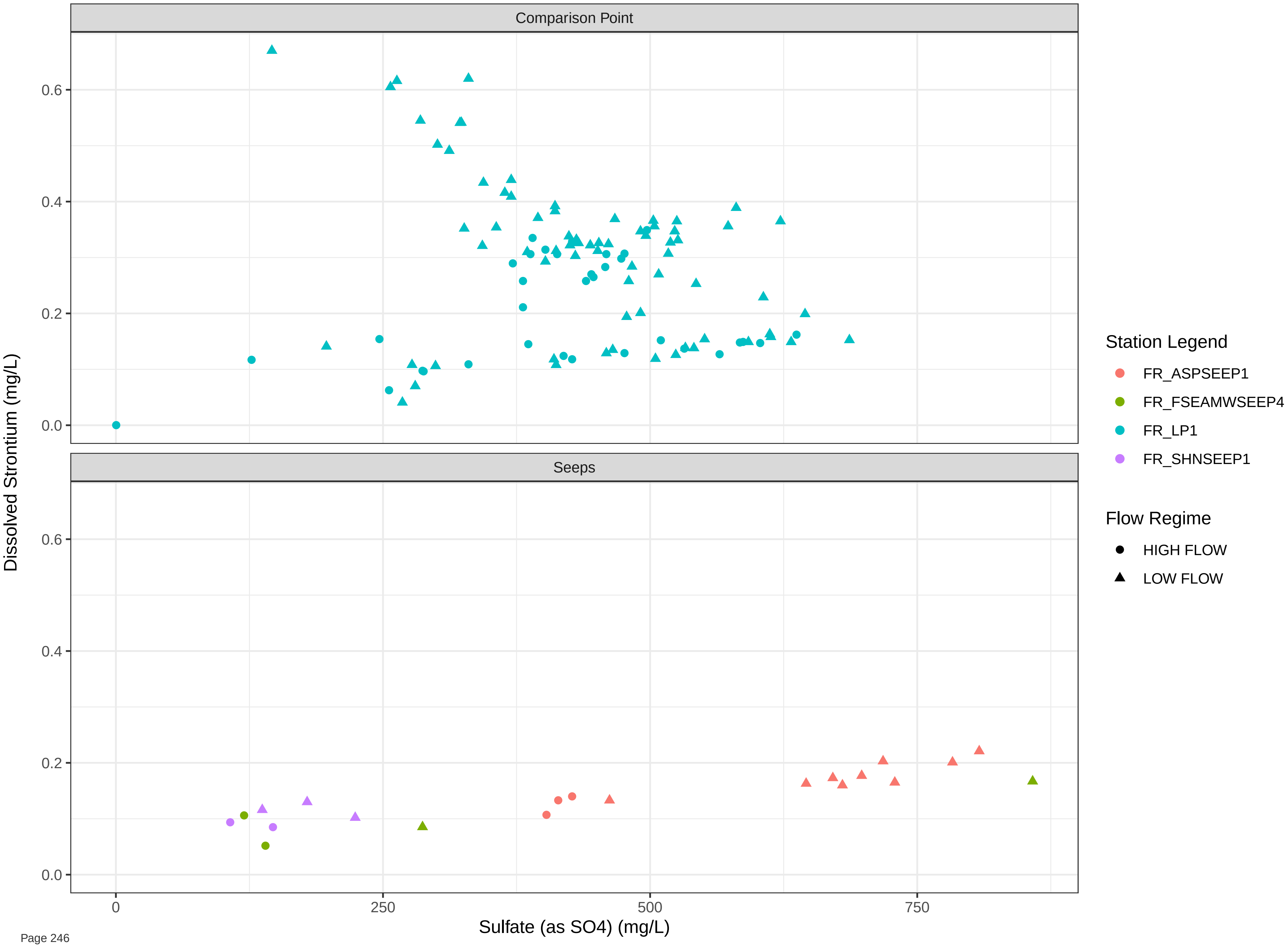

Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



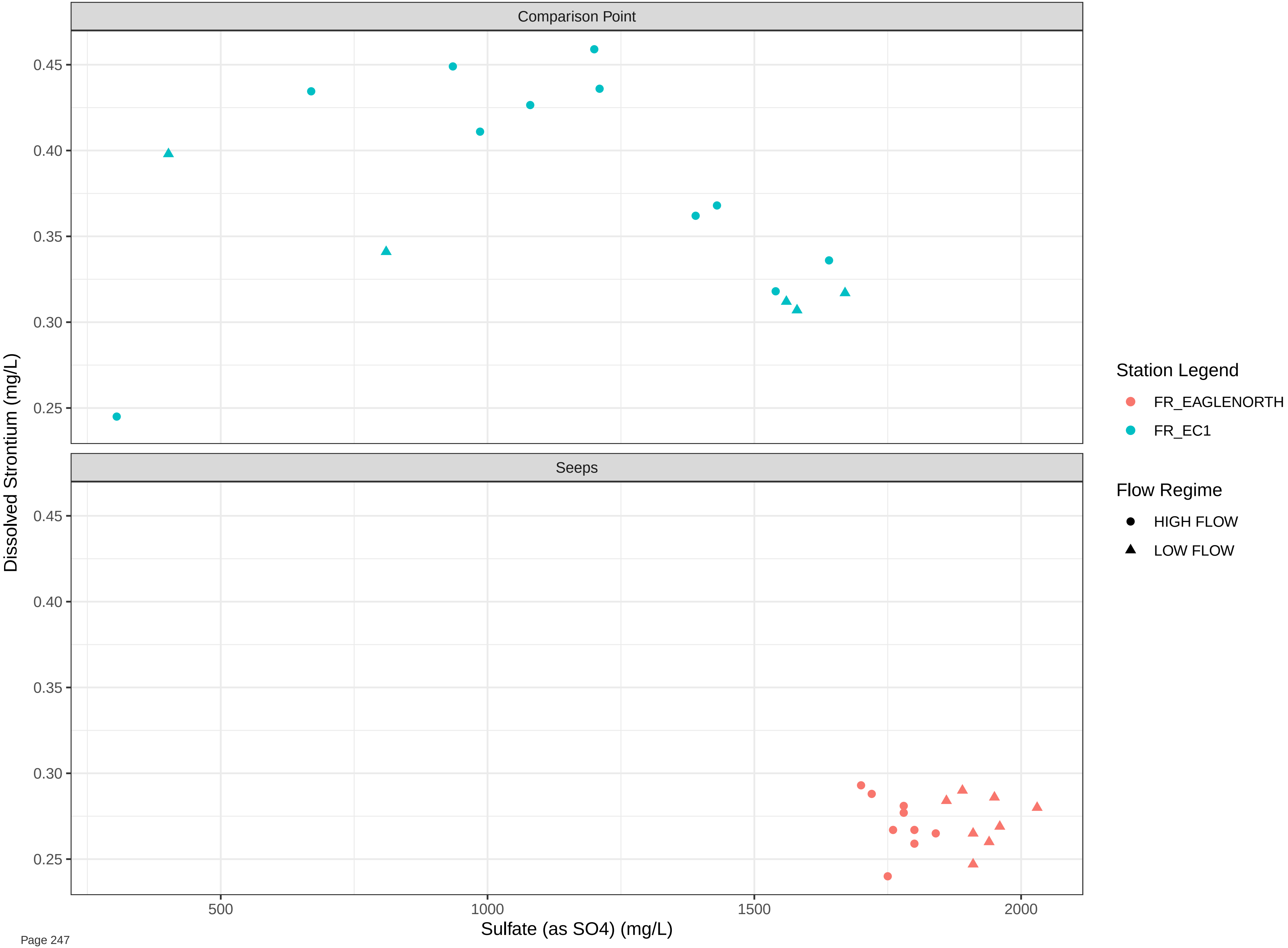
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.0
0.1
0.2
0.3
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



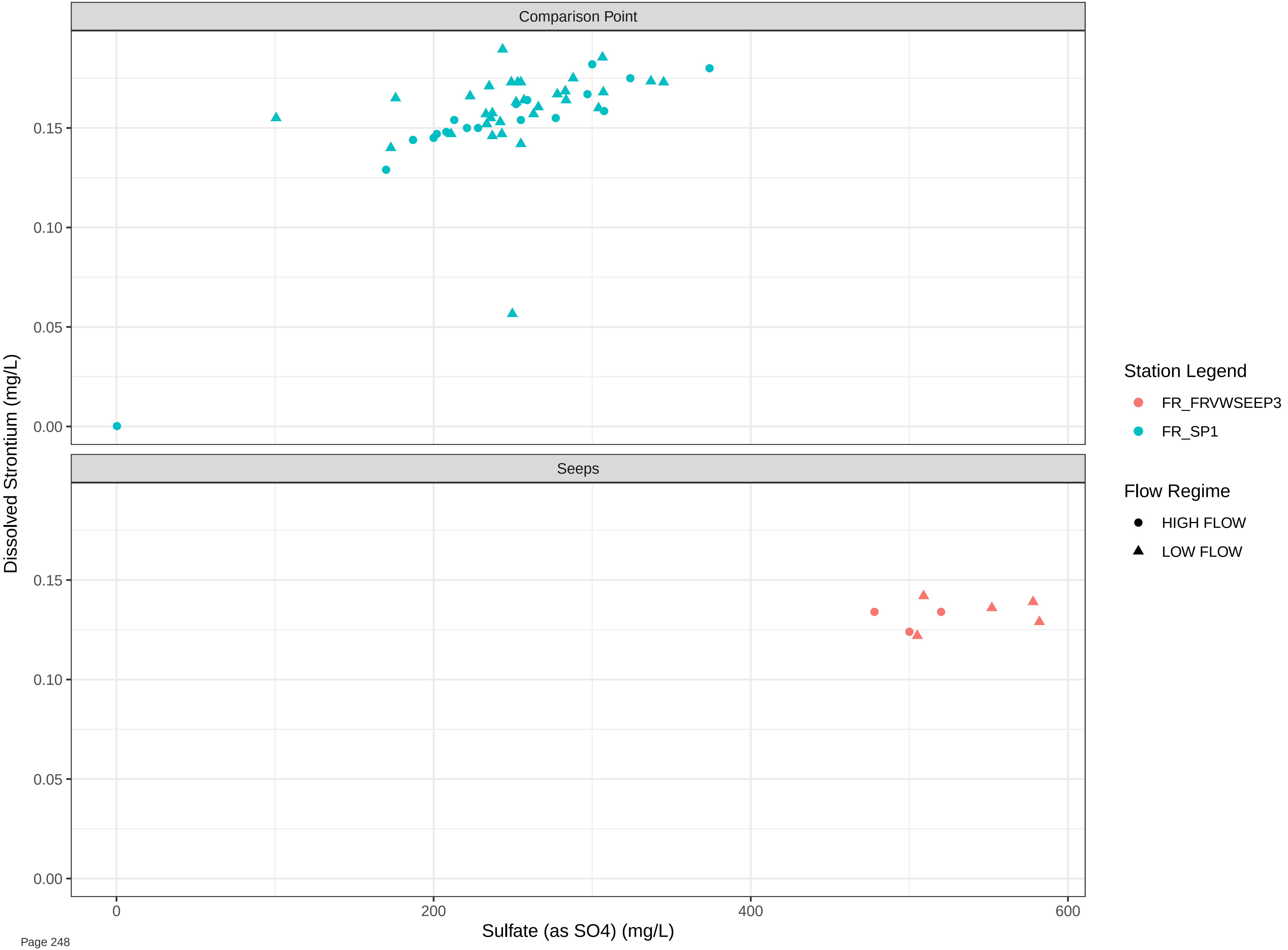
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.1
0.2
0.3
0.4
0.5
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



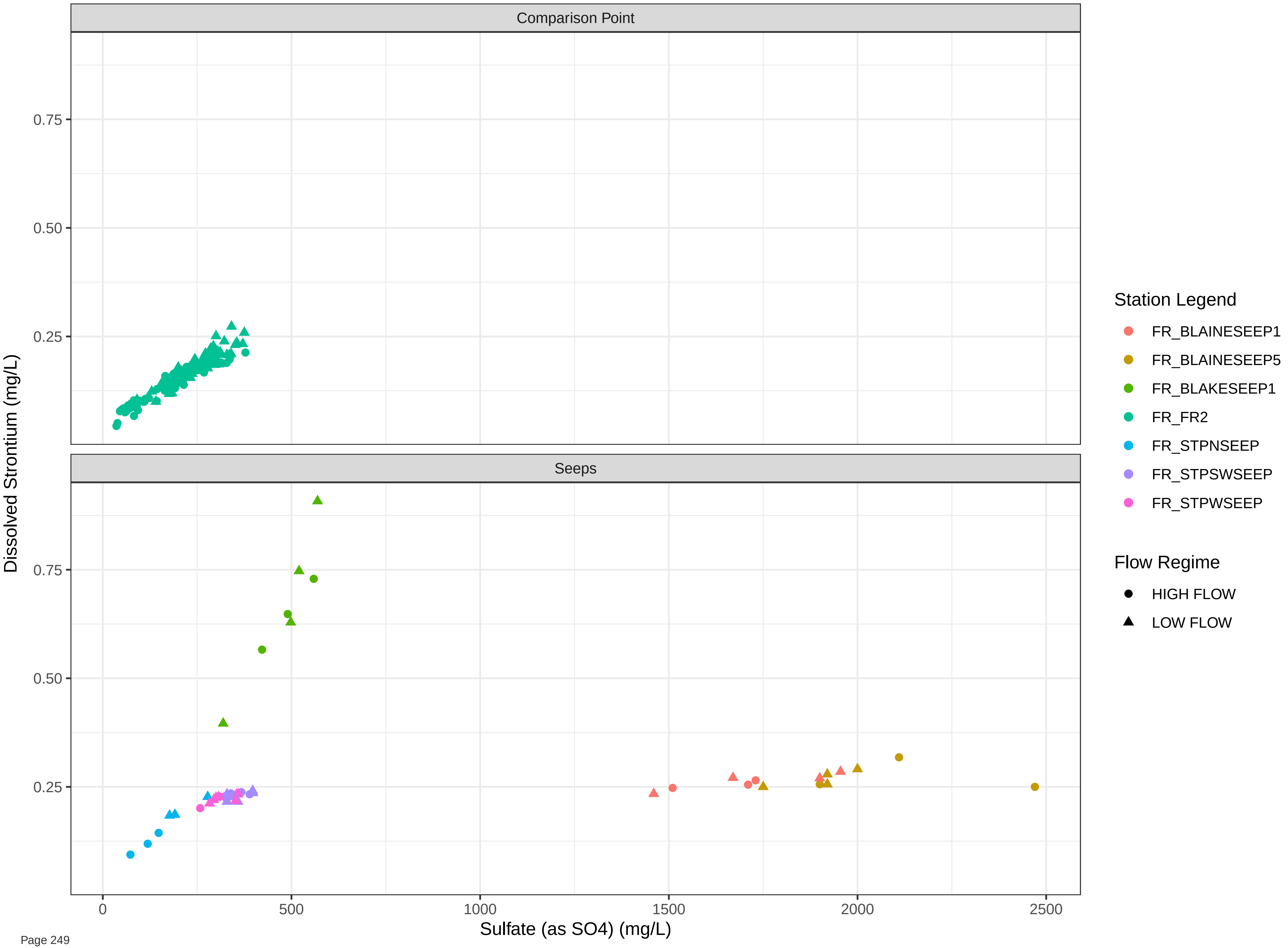
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.0
0.2
0.4
0.6
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



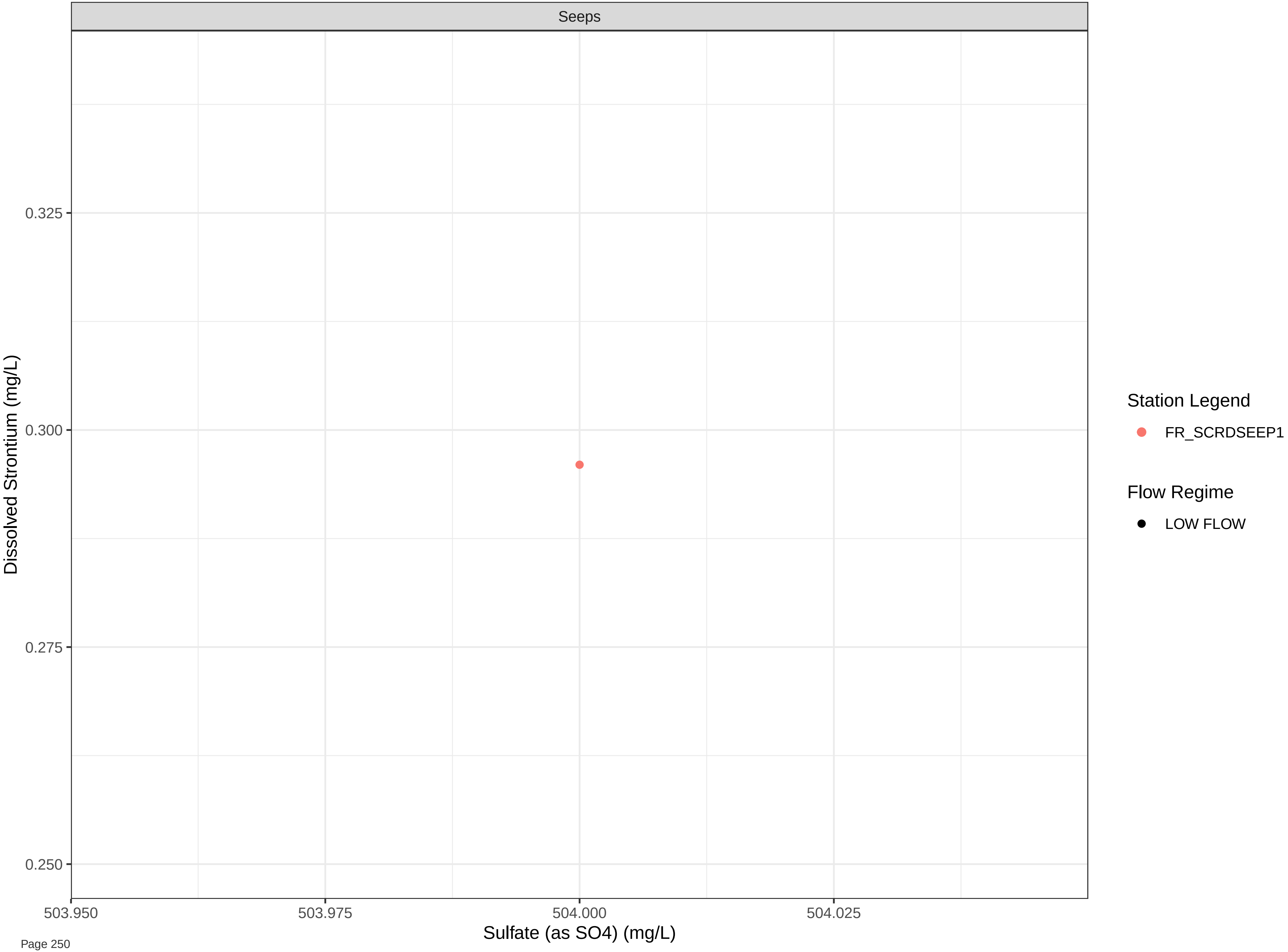
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.45
0.40
0.35
0.30
0.25
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



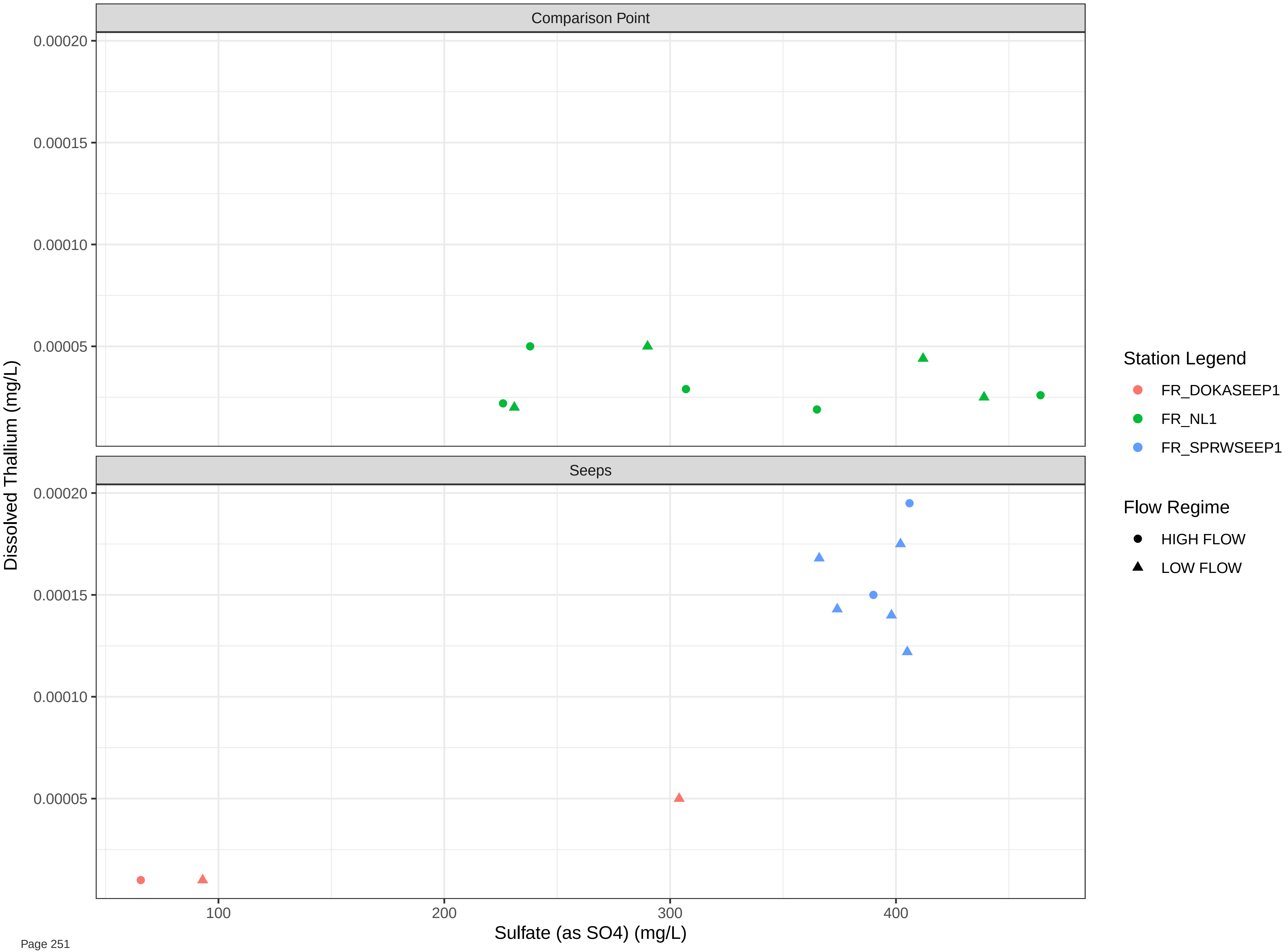
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.00
0.05
0.10
0.15
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



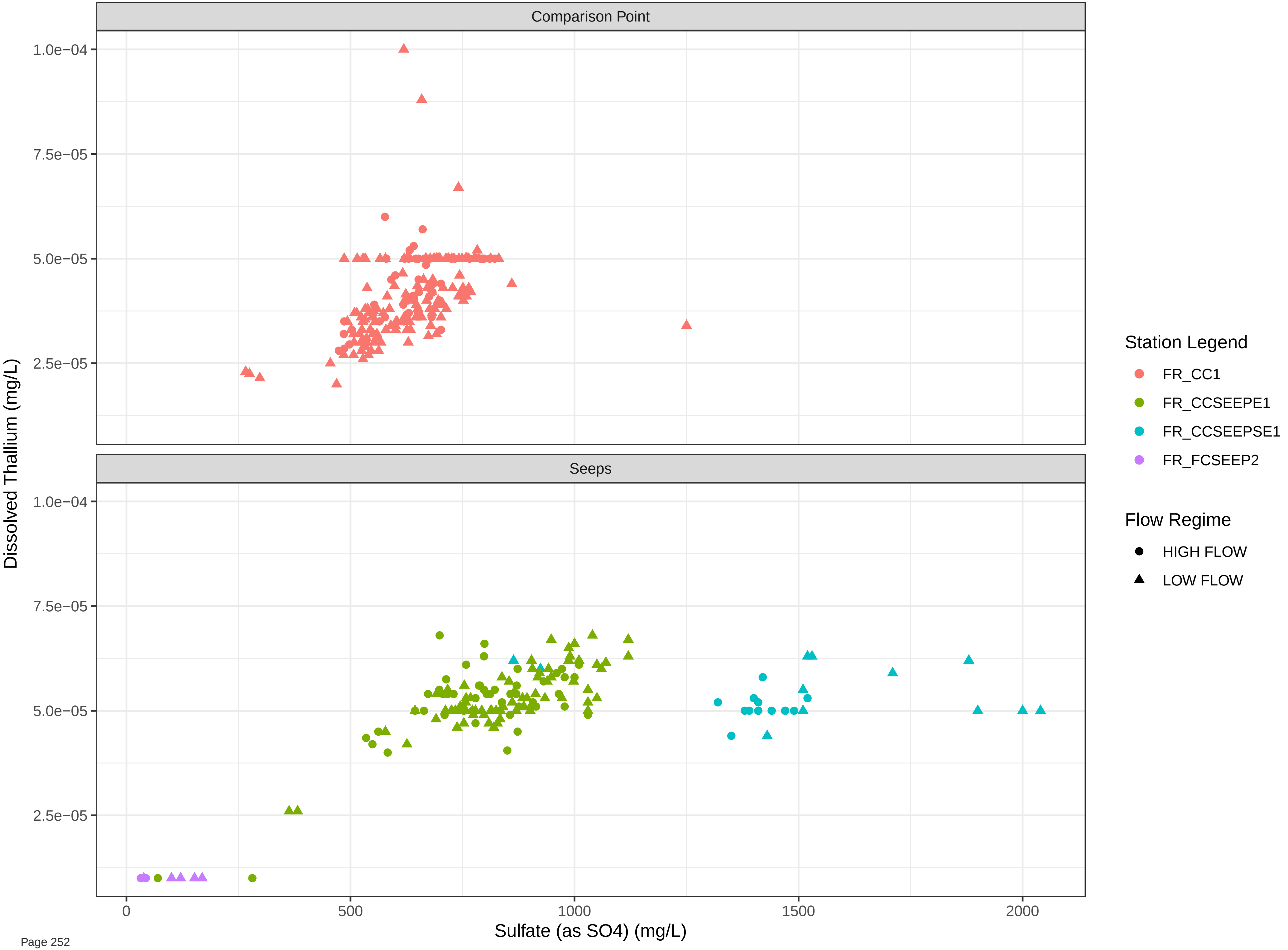
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.25
0.50
0.75
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW



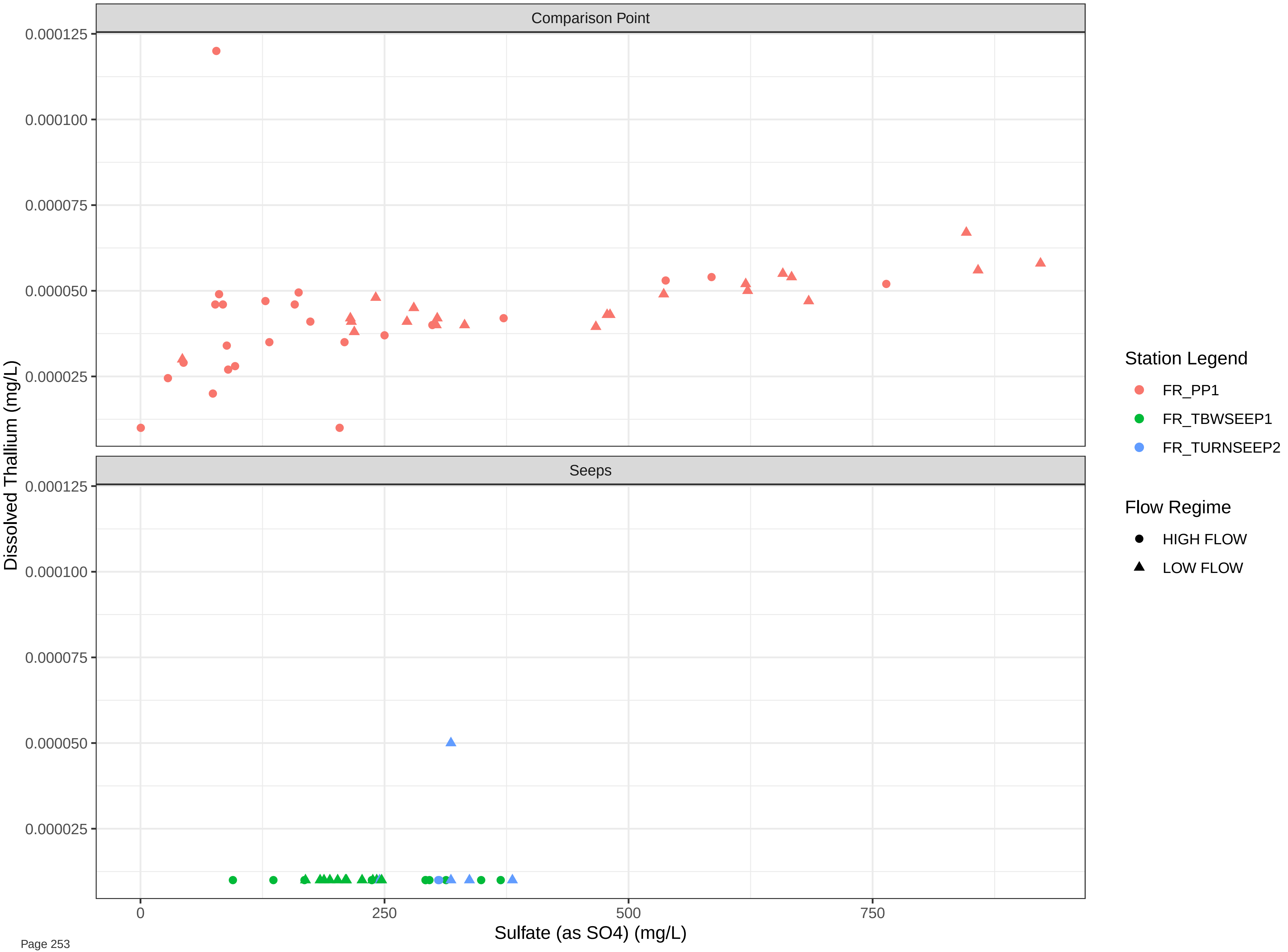
Seeps
Dissolved Strontium (mg/L)
0.325
0.300
0.275
0.250
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

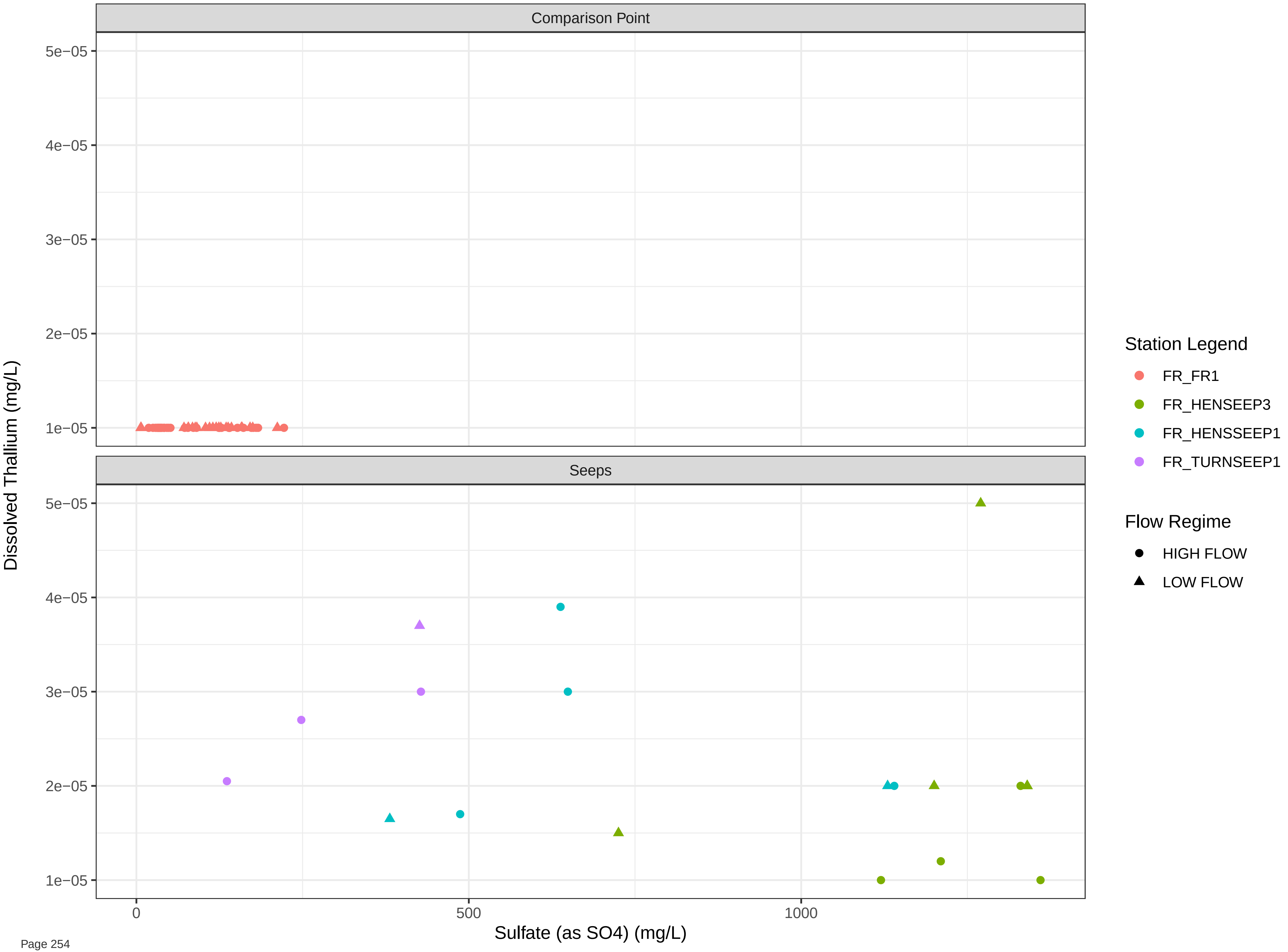


Comparison Point
Seeps
0.00020
0.00015
0.00010
0.00005
100
200
300
400
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

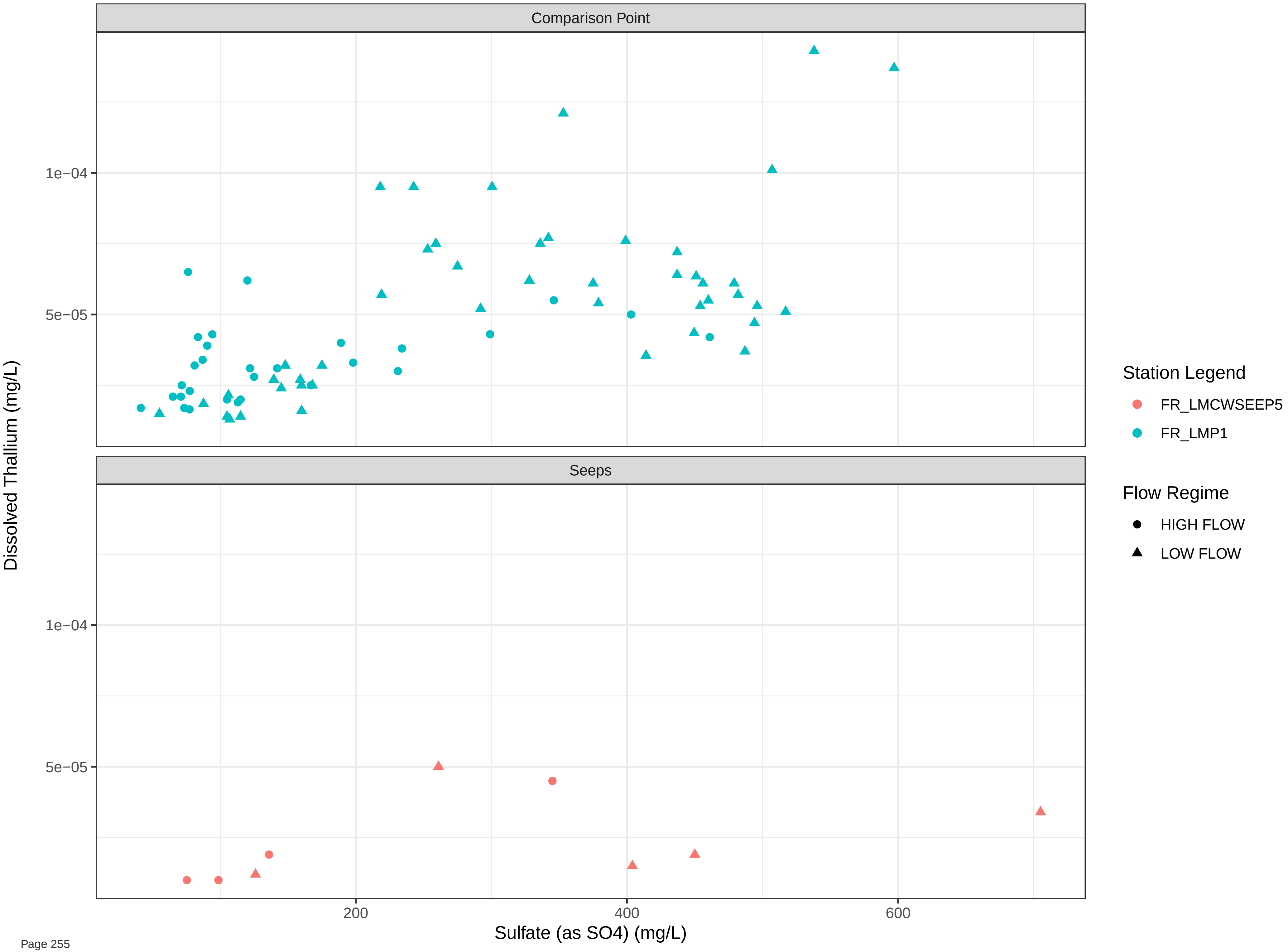


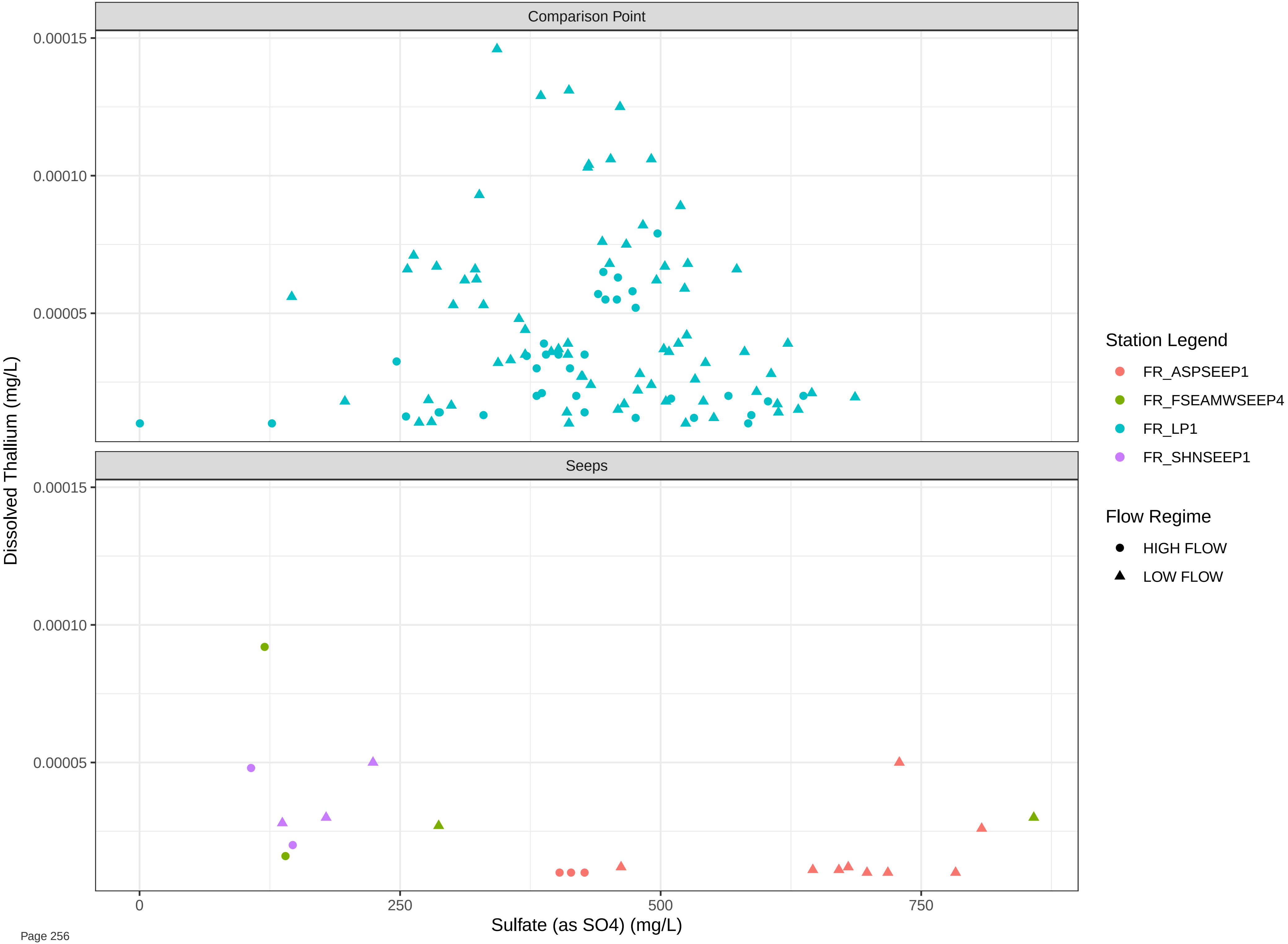
Comparison Point
Seeps
Dissolved Thallium (mg/L)
1.0e−04
7.5e−05
5.0e−05
2.5e−05
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
0.000125
0.000100
0.000075
0.000050
0.000025
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

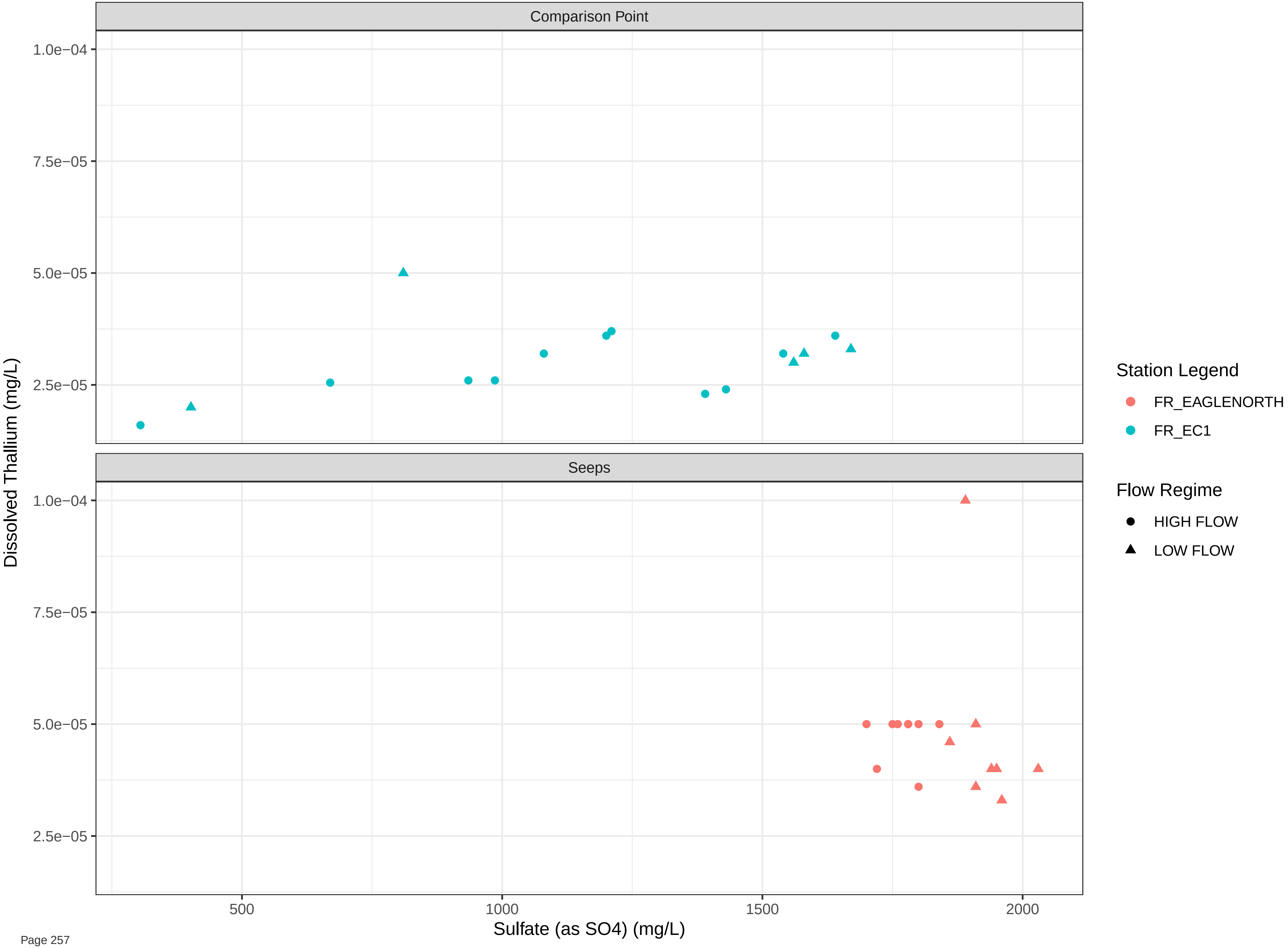


Comparison Point
Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
Dissolved Thallium (mg/L)
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

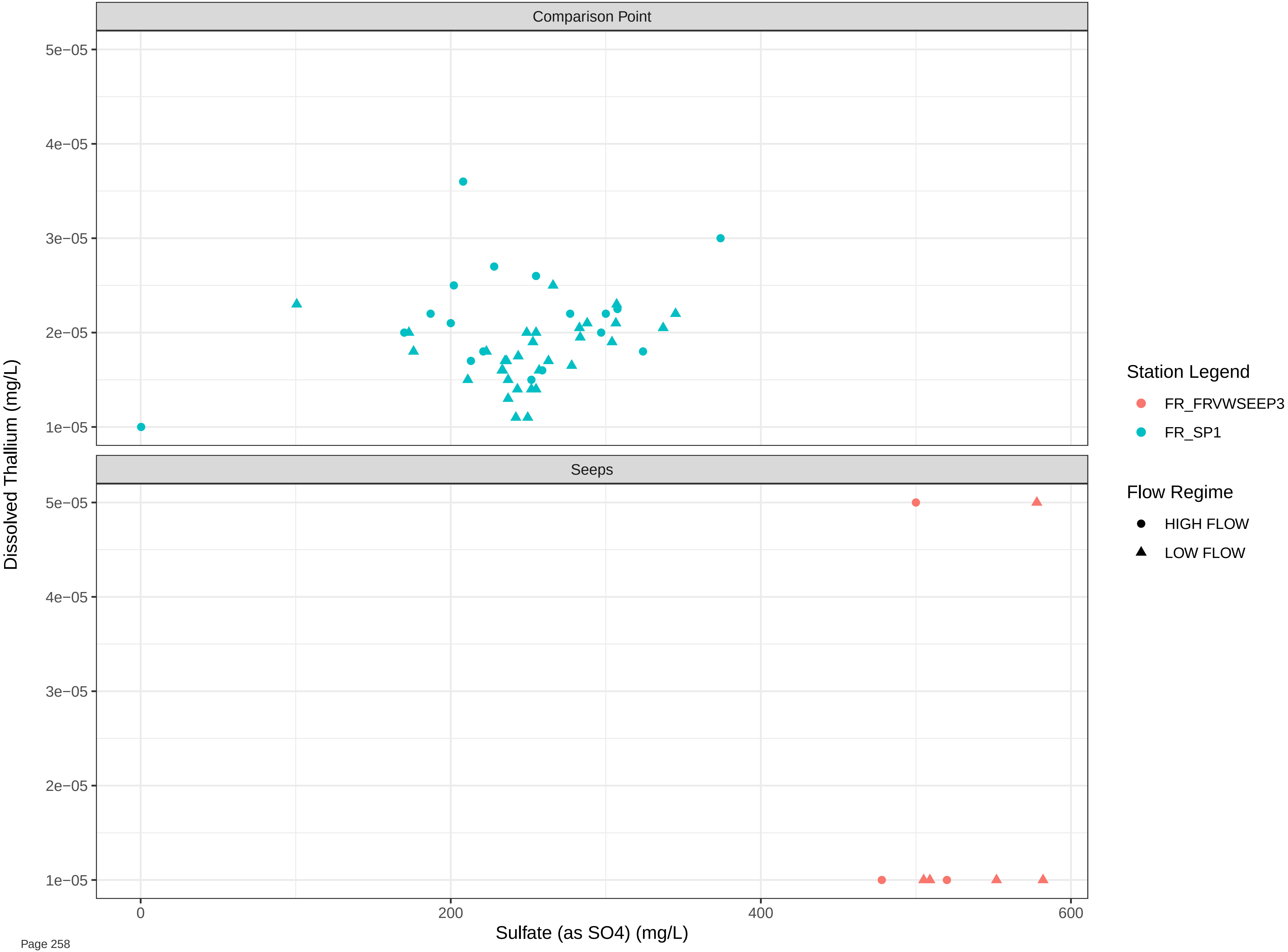

Comparison Point
Seeps
1e−04
5e−05
1e−04
5e−05
200
400
600
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



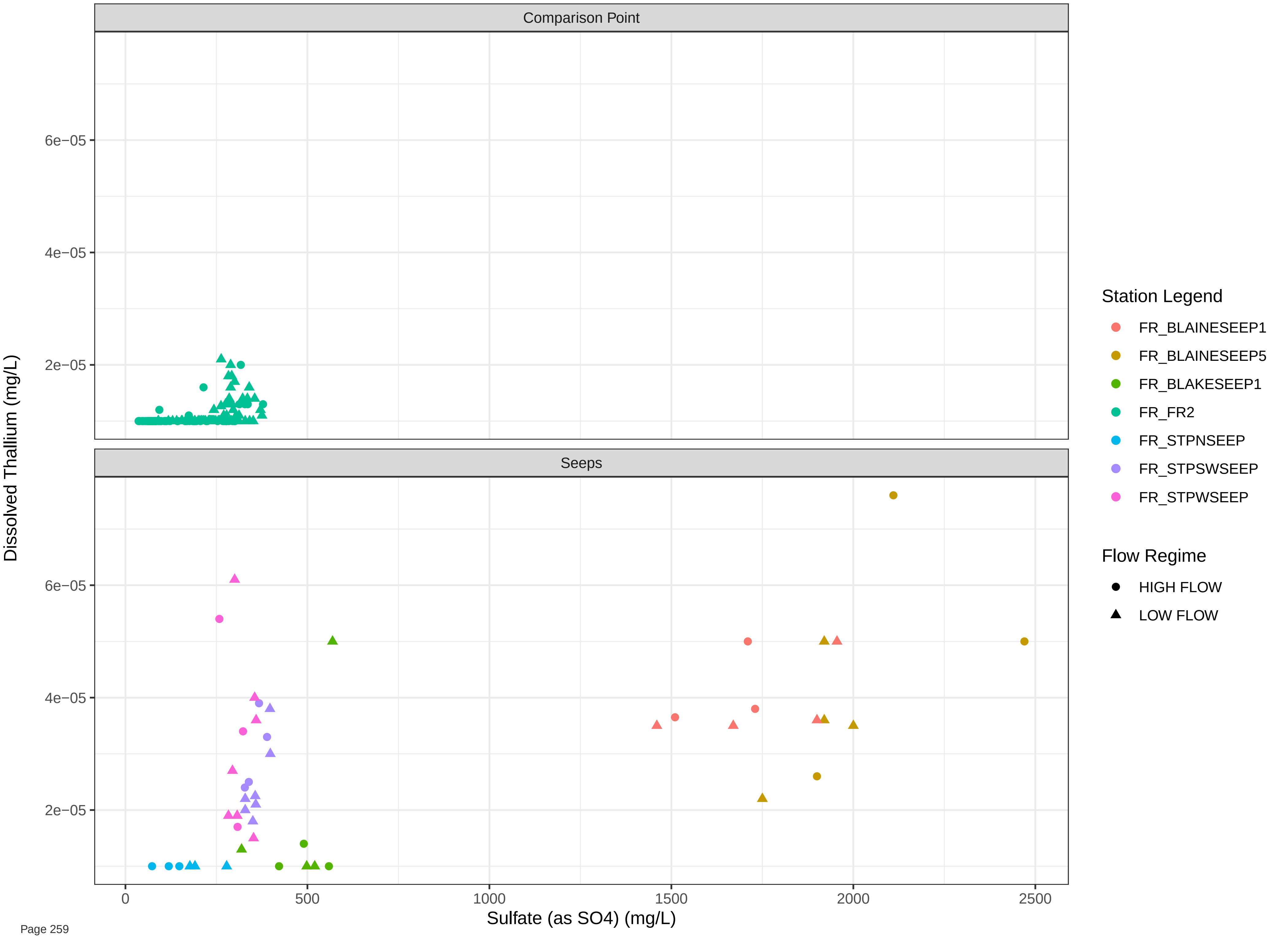
Comparison Point
Seeps
Dissolved Thallium (mg/L)
0.00015
0.00010
0.00005
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



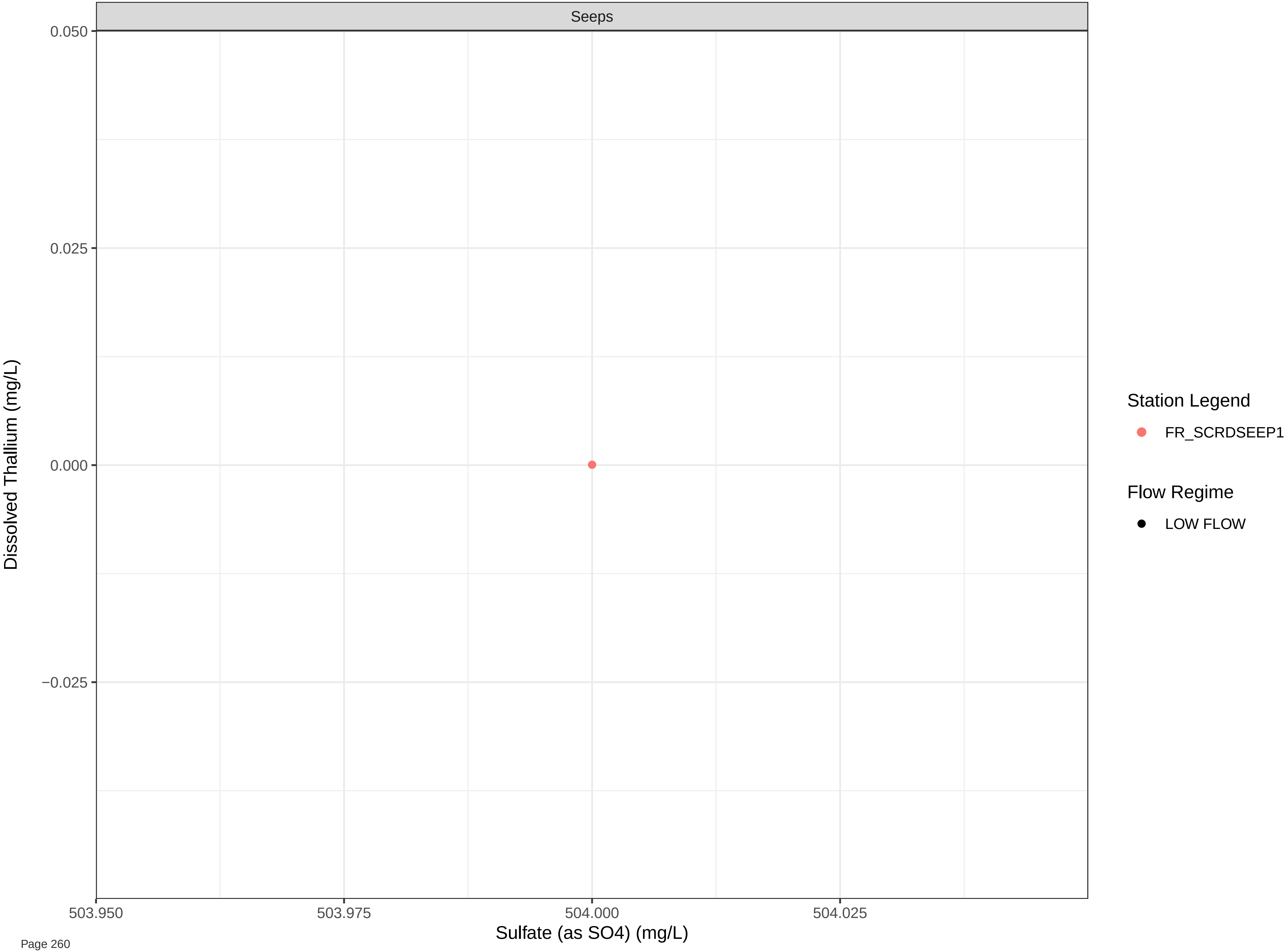
Comparison Point
Seeps
Dissolved Thallium (mg/L)
1.0e−04
7.5e−05
5.0e−05
2.5e−05
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

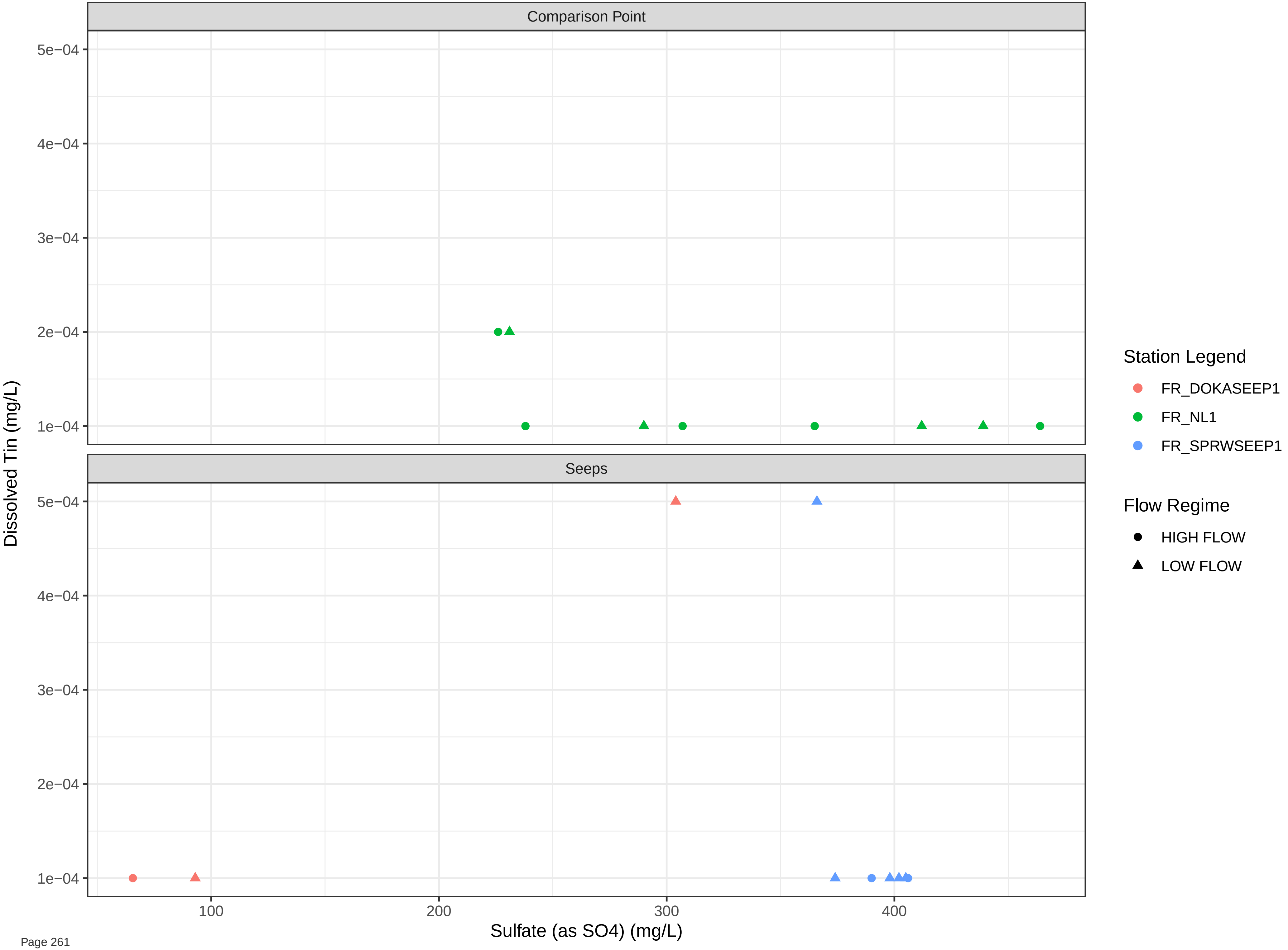


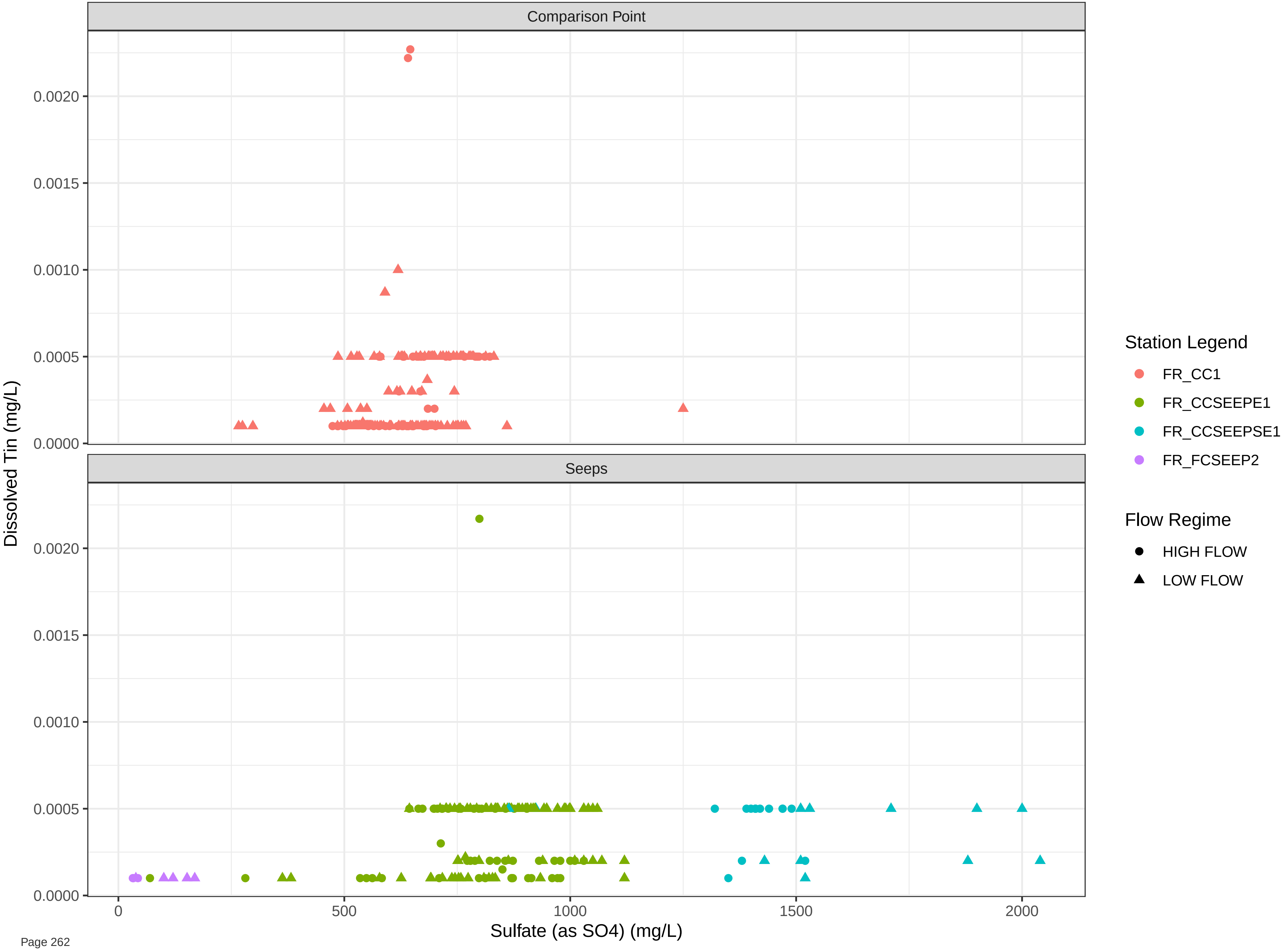
Comparison Point
Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
0
200
400
600
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

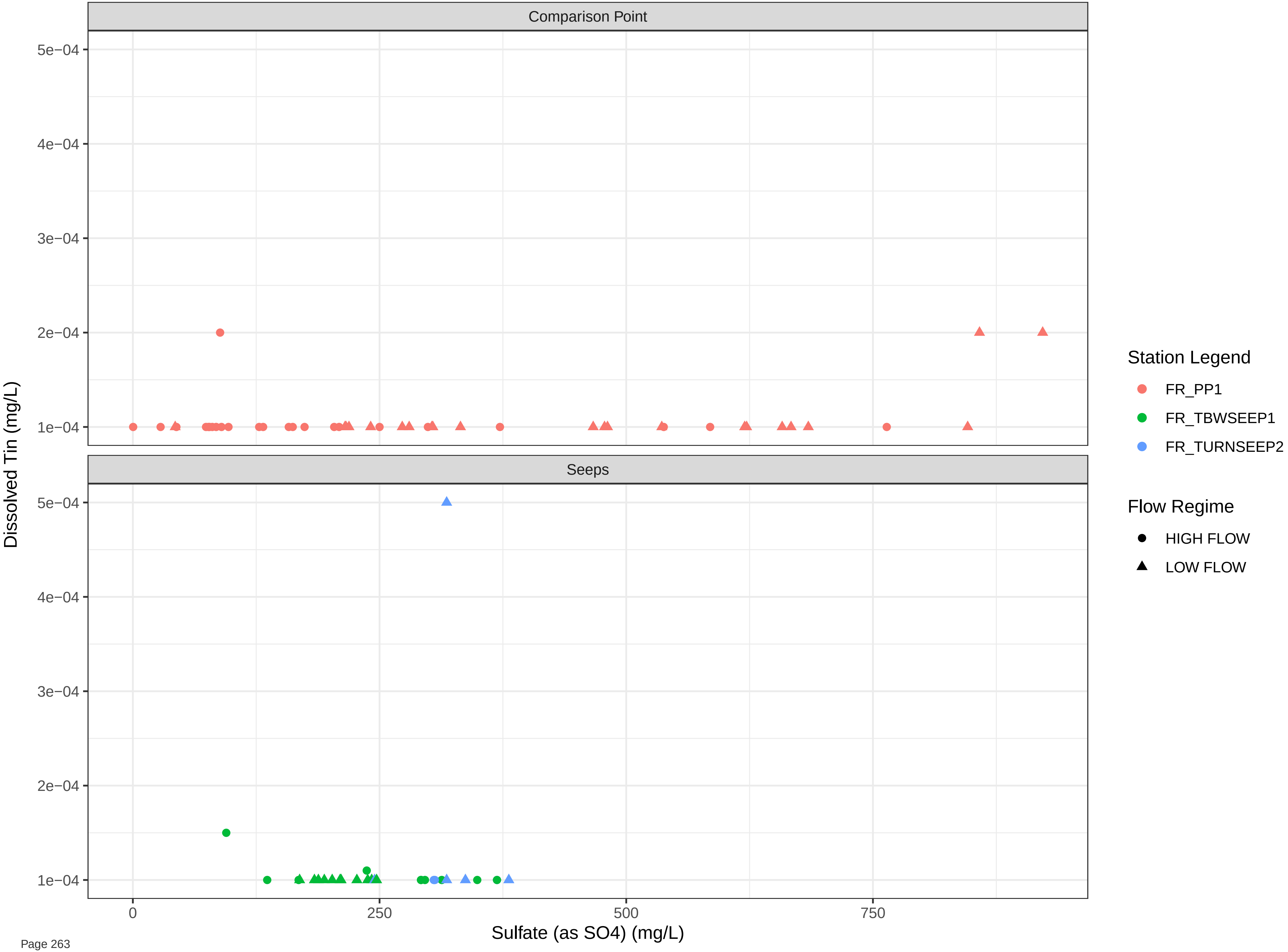


Comparison Point
Seeps
6e−05
4e−05
2e−05
0
500
1000
1500
2000
2500
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

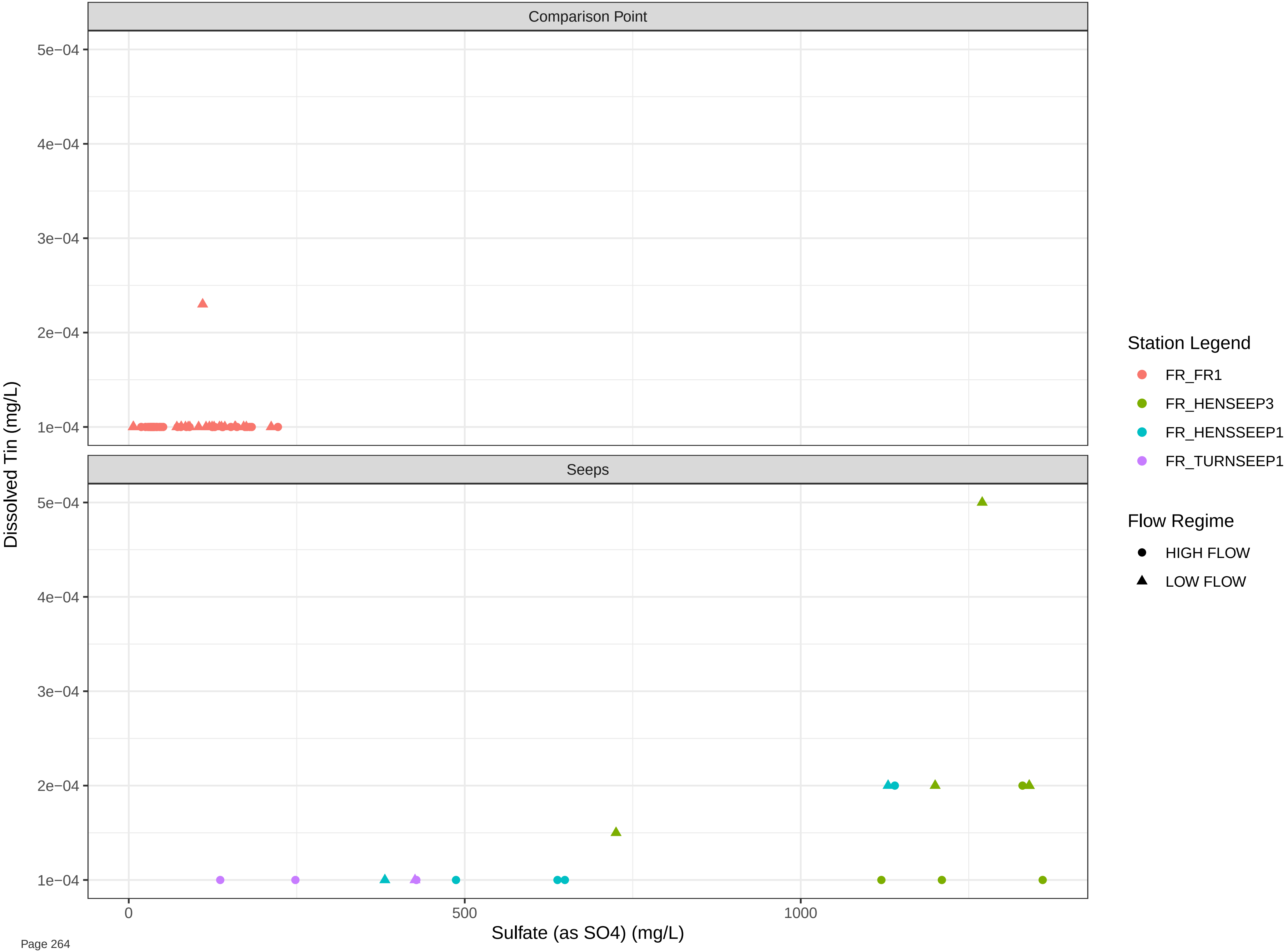

Seeps
0.050
0.025
0.000
−0.025
Dissolved Thallium (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW


Comparison Point
Seeps
Dissolved Tin (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

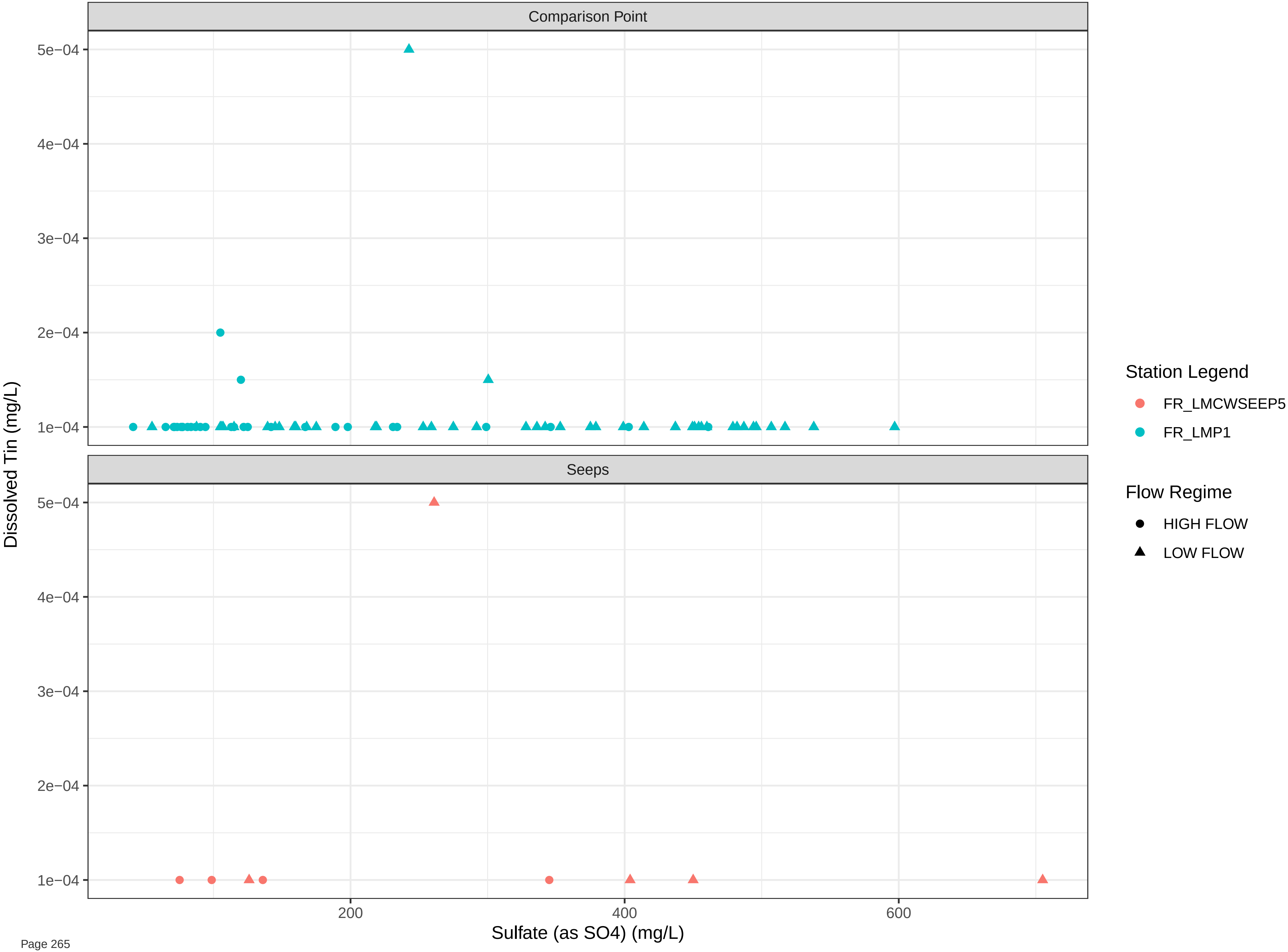

Comparison Point
Seeps
Dissolved Tin (mg/L)
0.0000
0.0005
0.0010
0.0015
0.0020
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



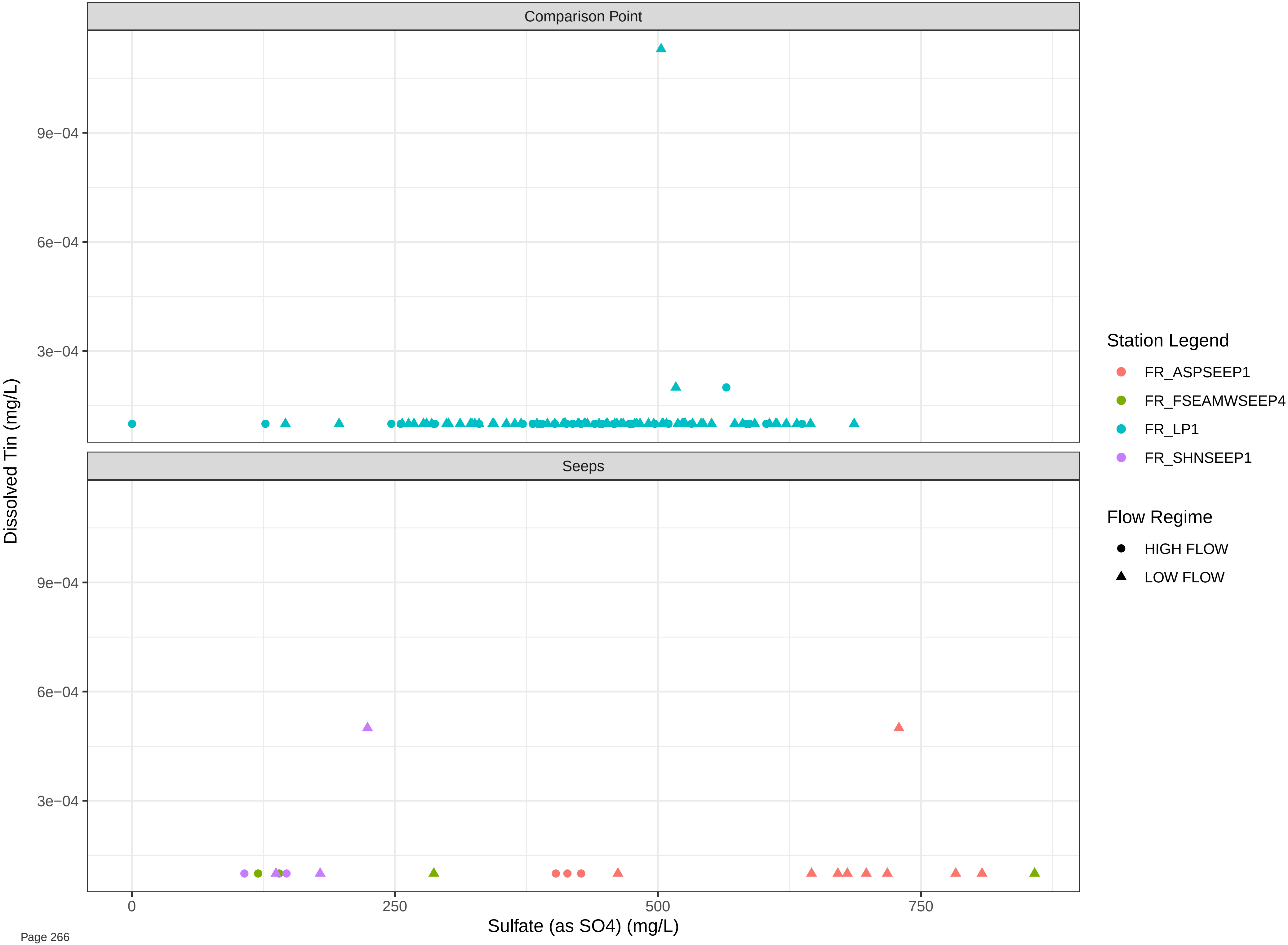
Comparison Point
Seeps
Dissolved Tin (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



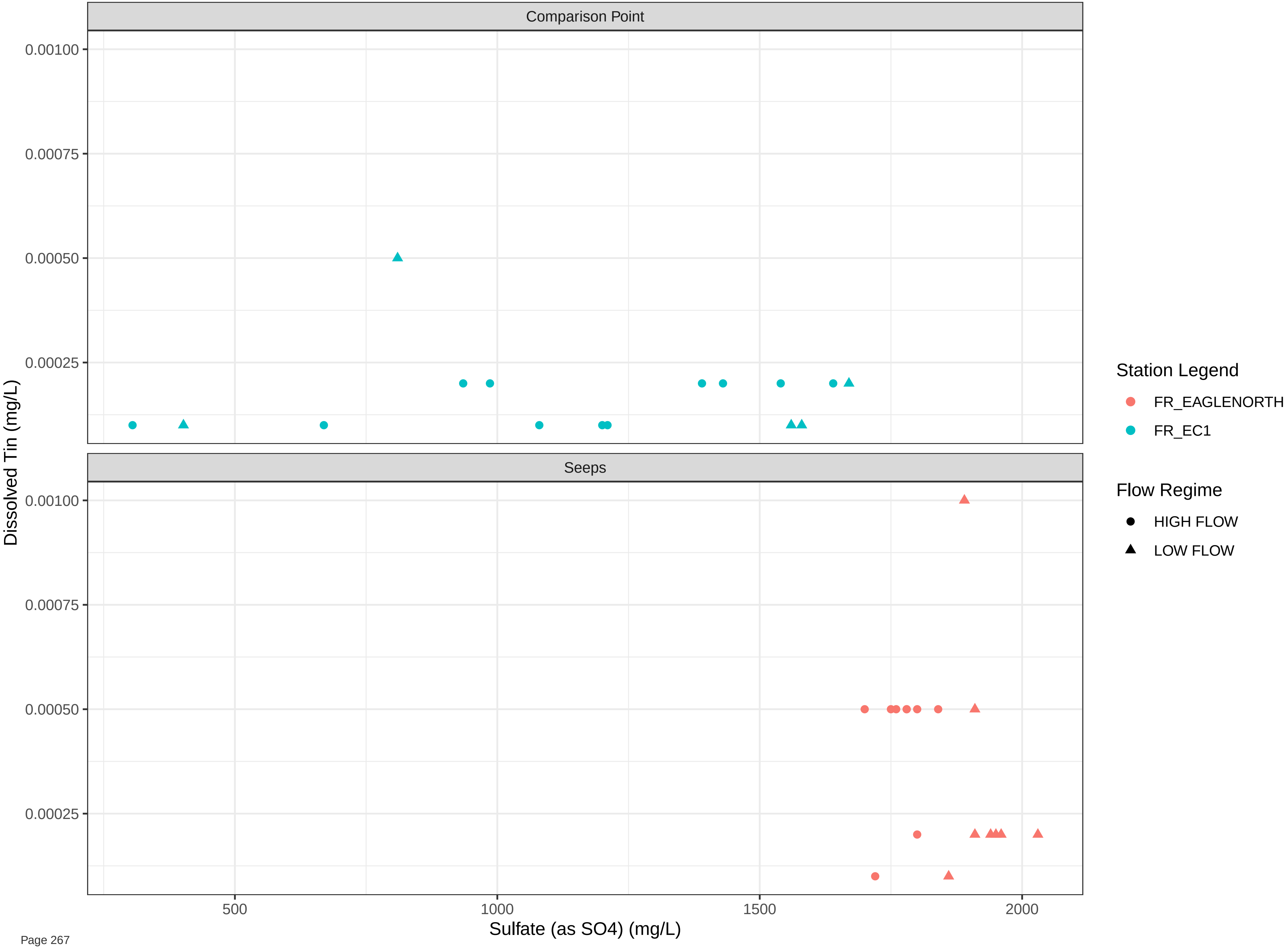
Comparison Point
Seeps
Dissolved Tin (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



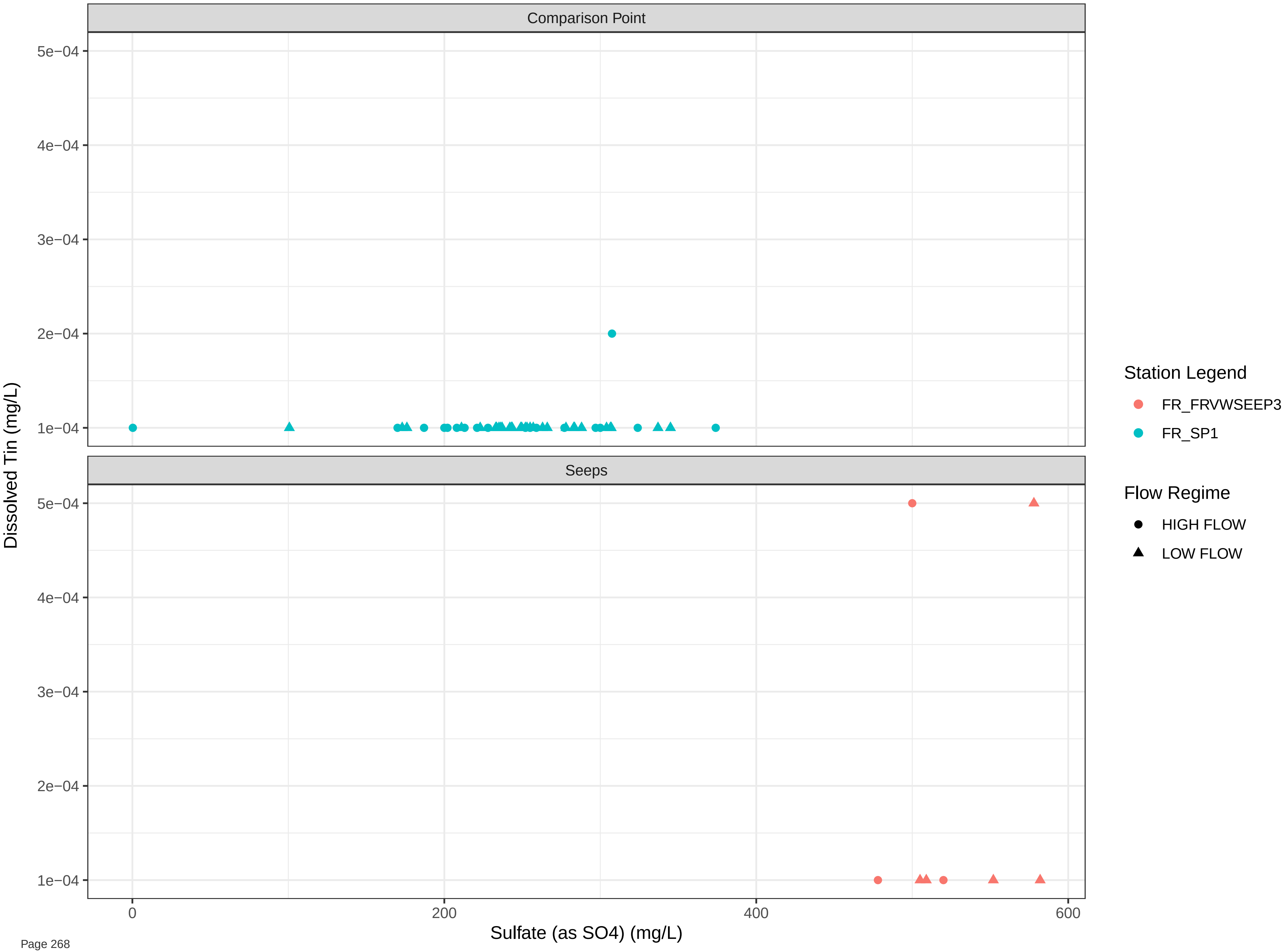
Comparison Point
Seeps
Dissolved Tin (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
Sulfate (as SO4) (mg/L)
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



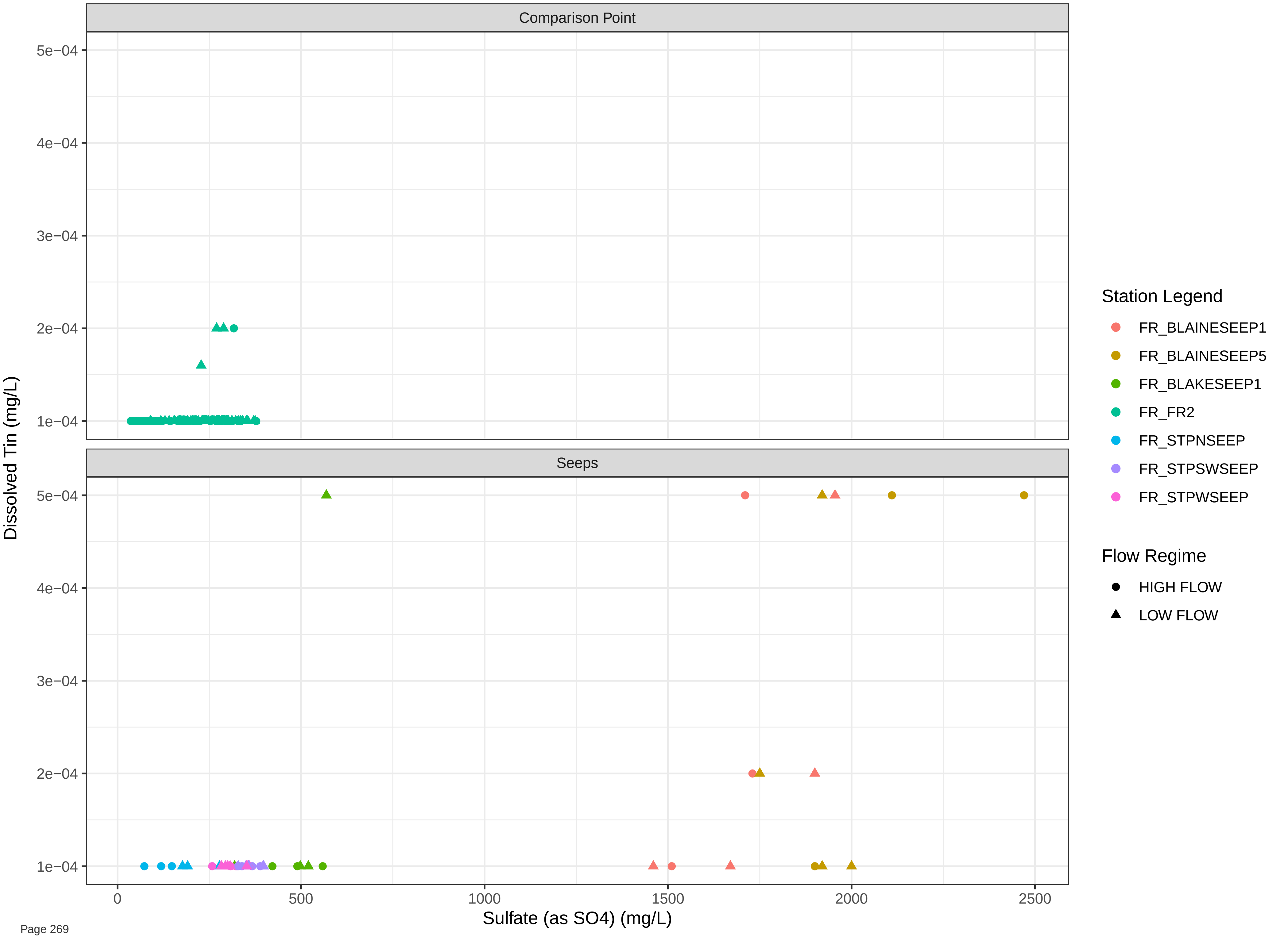
Comparison Point
Seeps
9e−04
6e−04
3e−04
0
250
500
750
Dissolved Tin (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



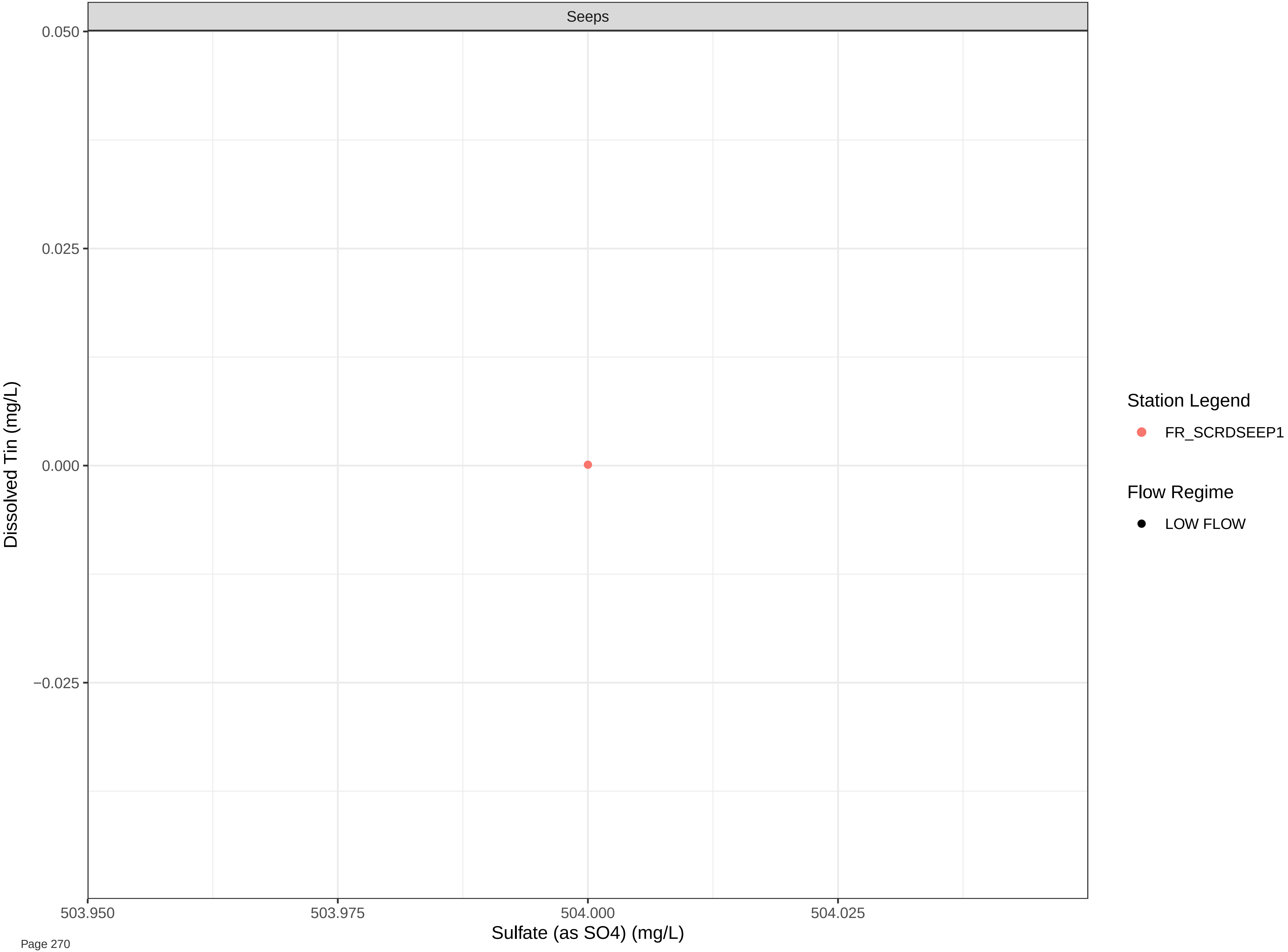
Comparison Point
Seeps
0.00100
0.00075
0.00050
0.00025
500
1000
1500
2000
Dissolved Tin (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

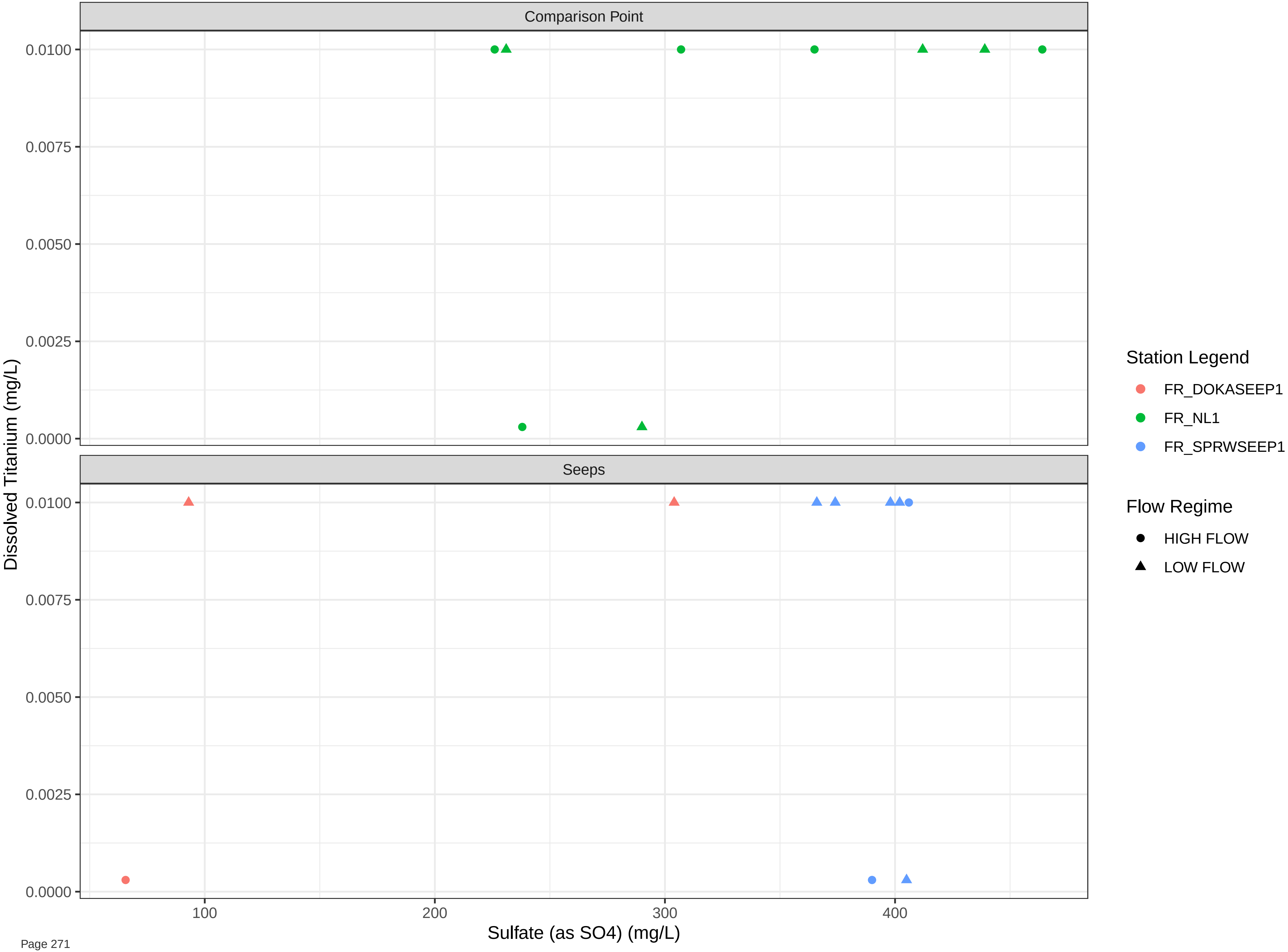


Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Tin (mg/L)
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

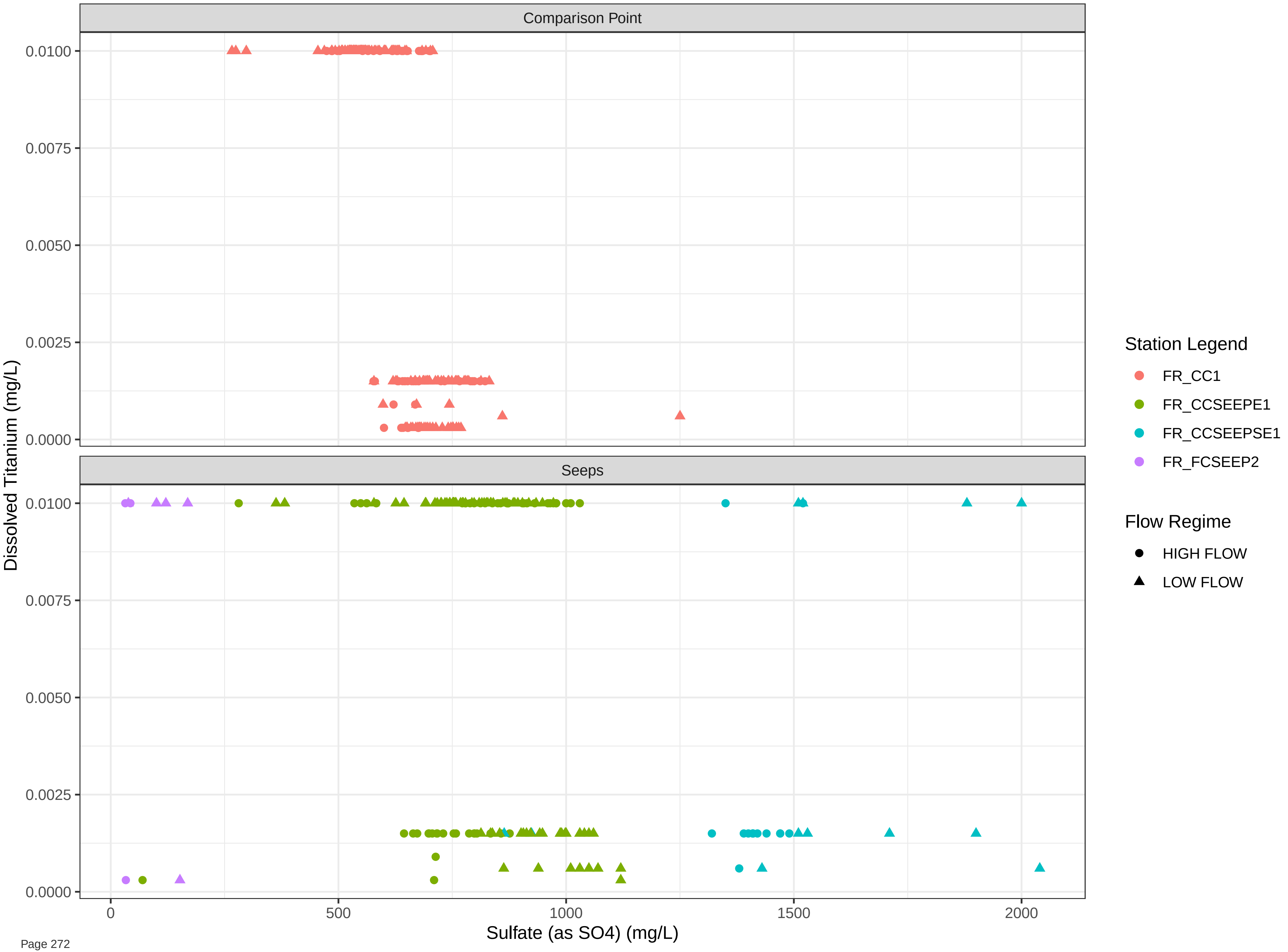


Comparison Point
Seeps
Dissolved Tin (mg/L)
Sulfate (as SO4) (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

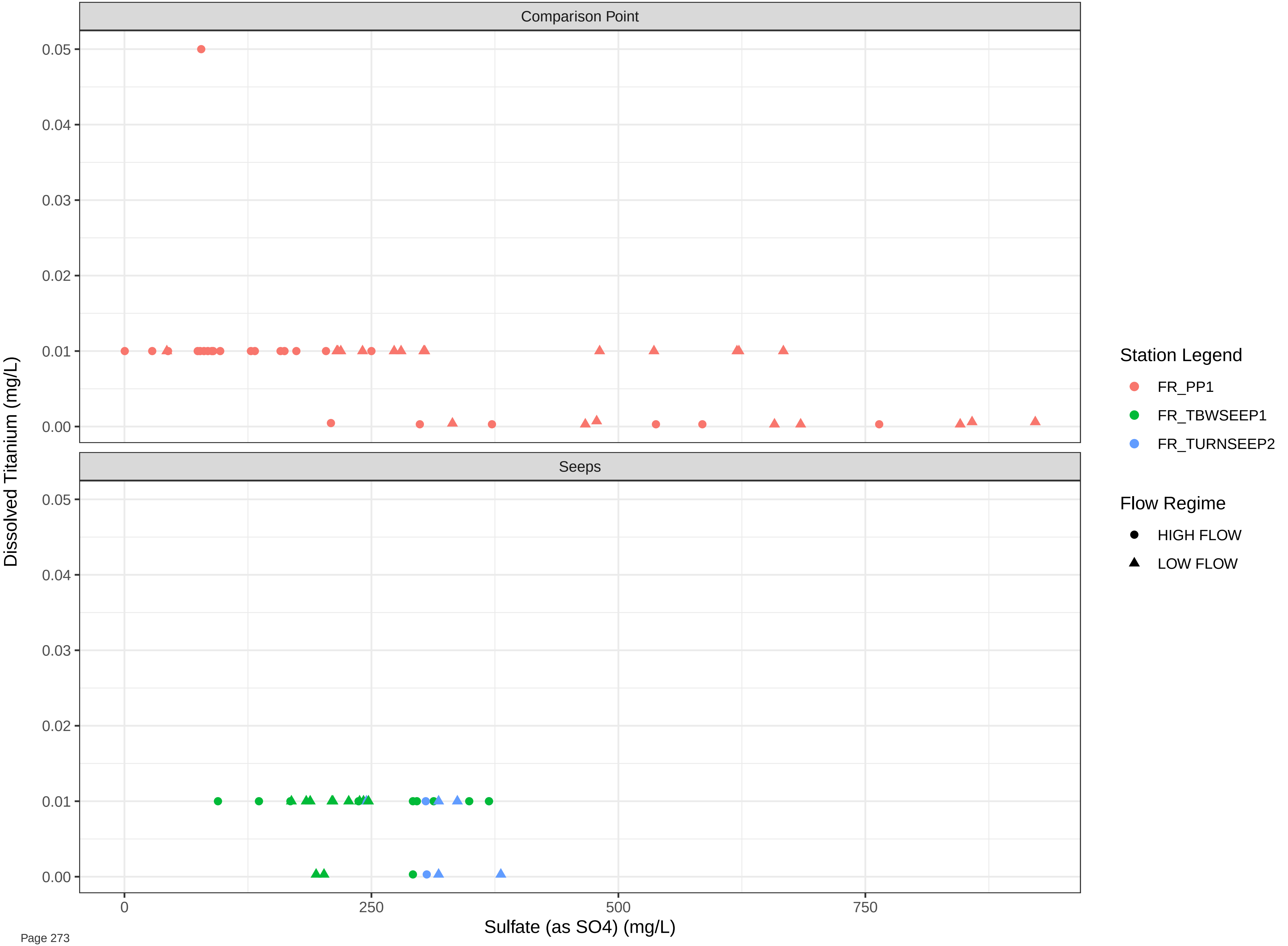

Seeps
0.050
0.025
0.000
−0.025
Dissolved Tin (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

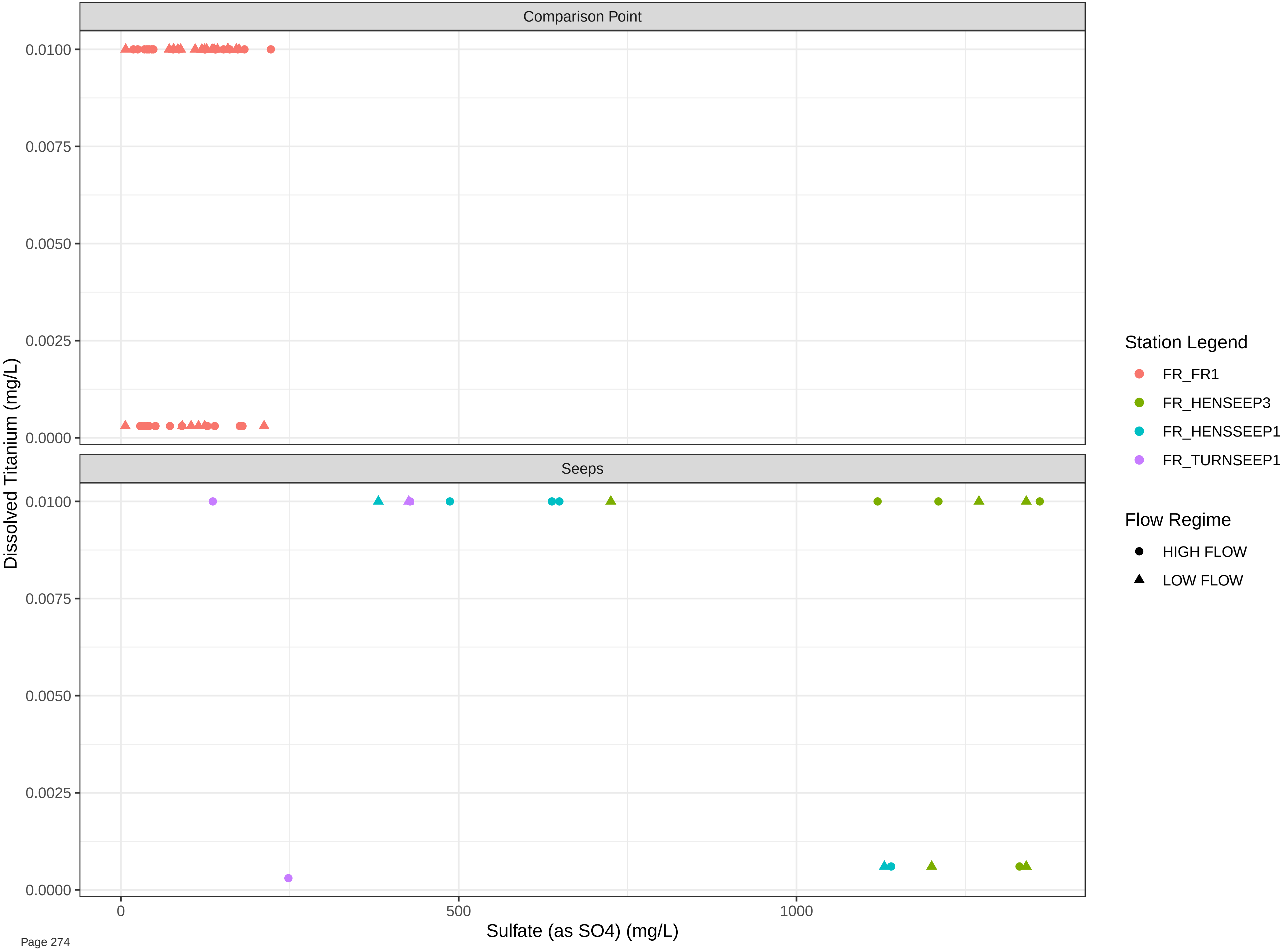


Comparison Point
Seeps
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
0.0000
0.0025
0.0050
0.0075
0.0100
100
200
300
400
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

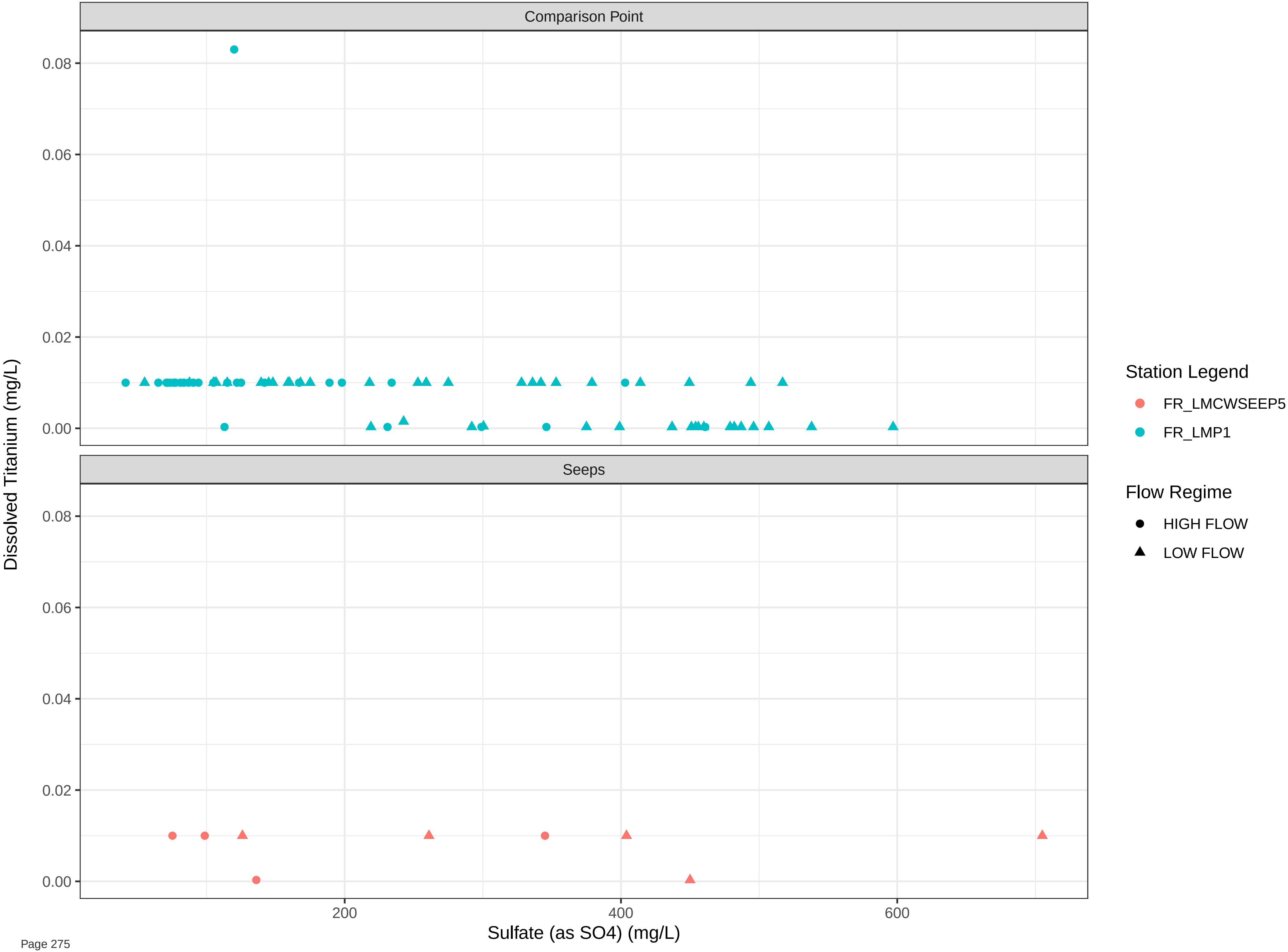


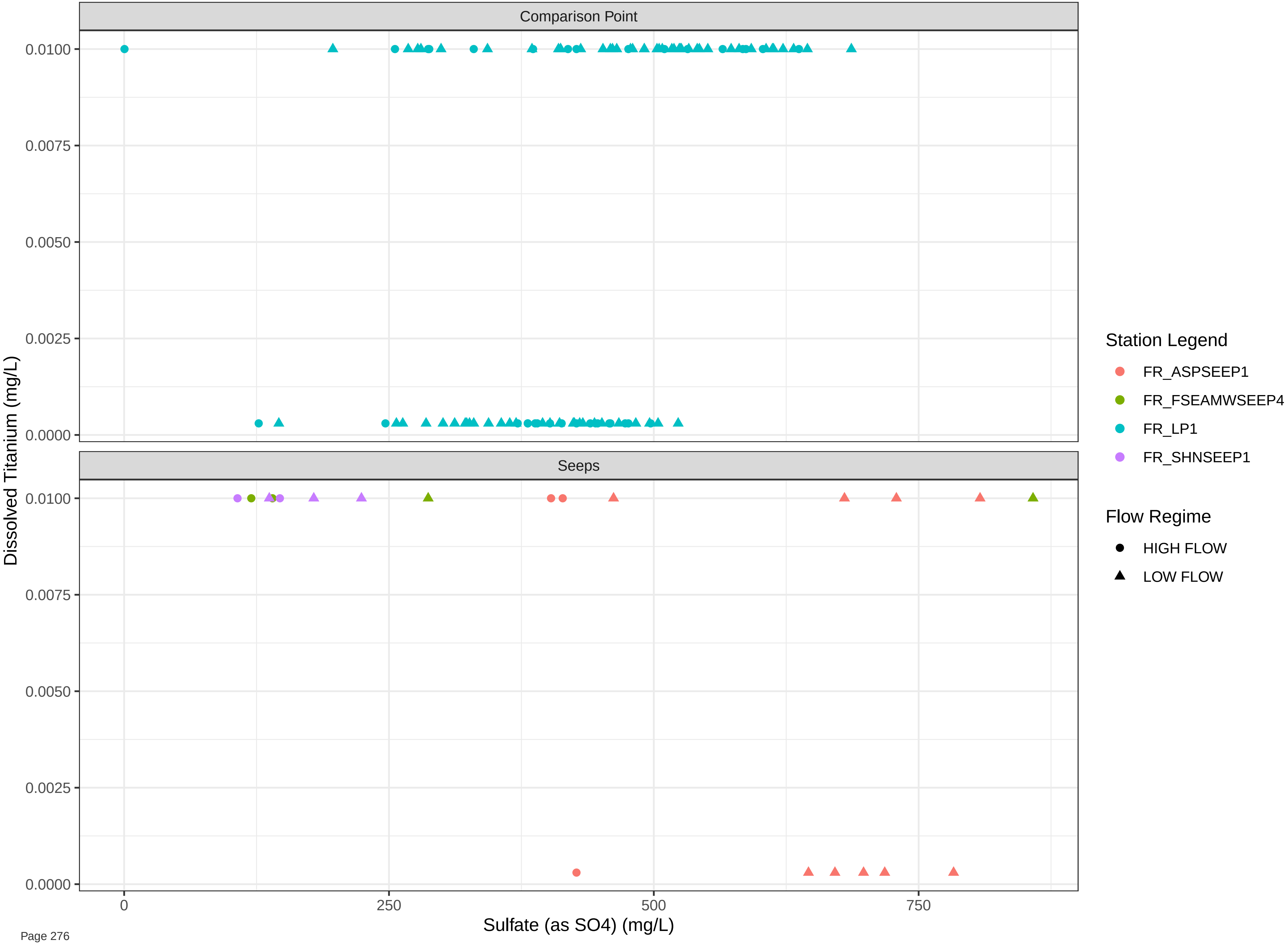
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

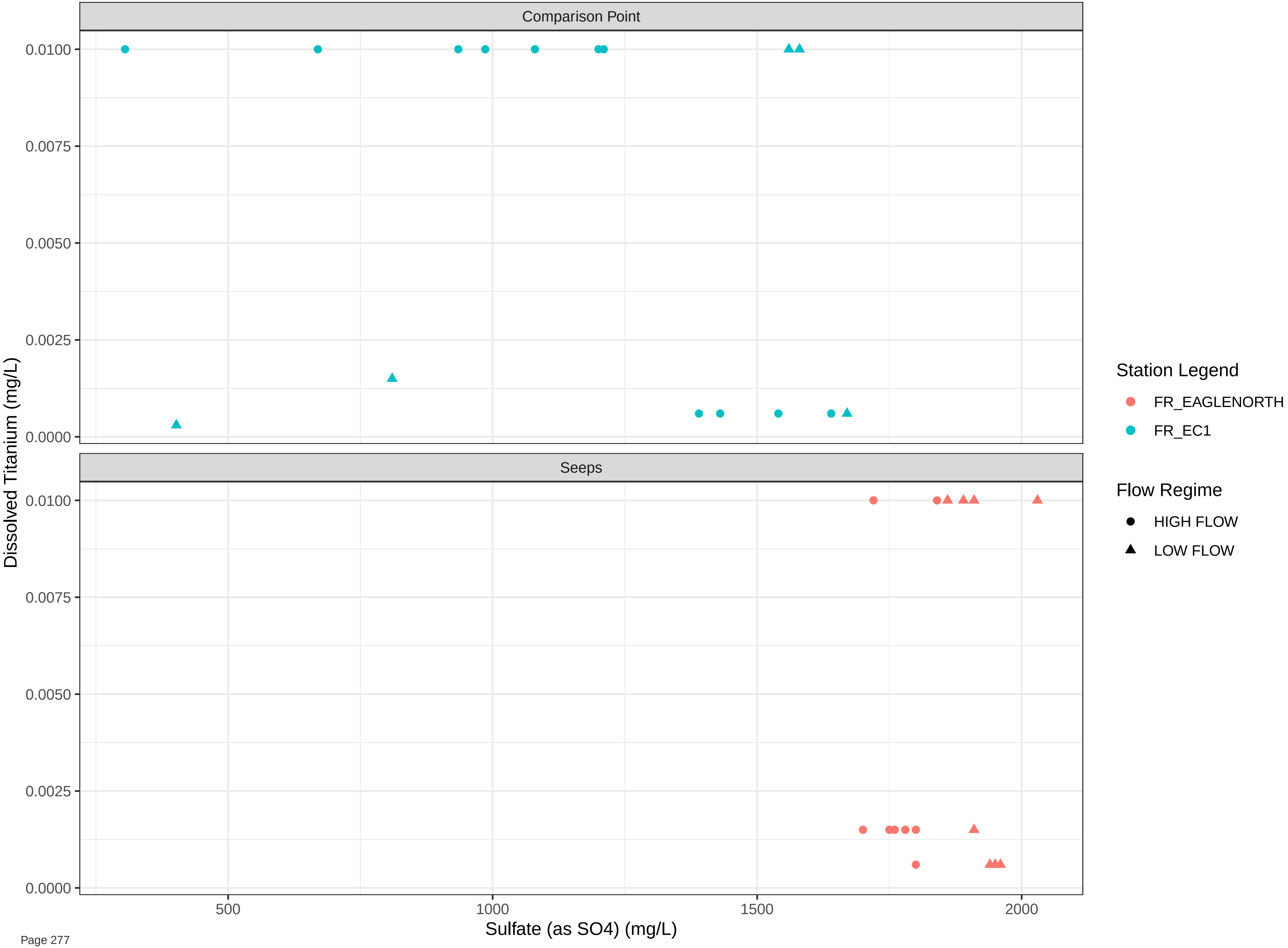


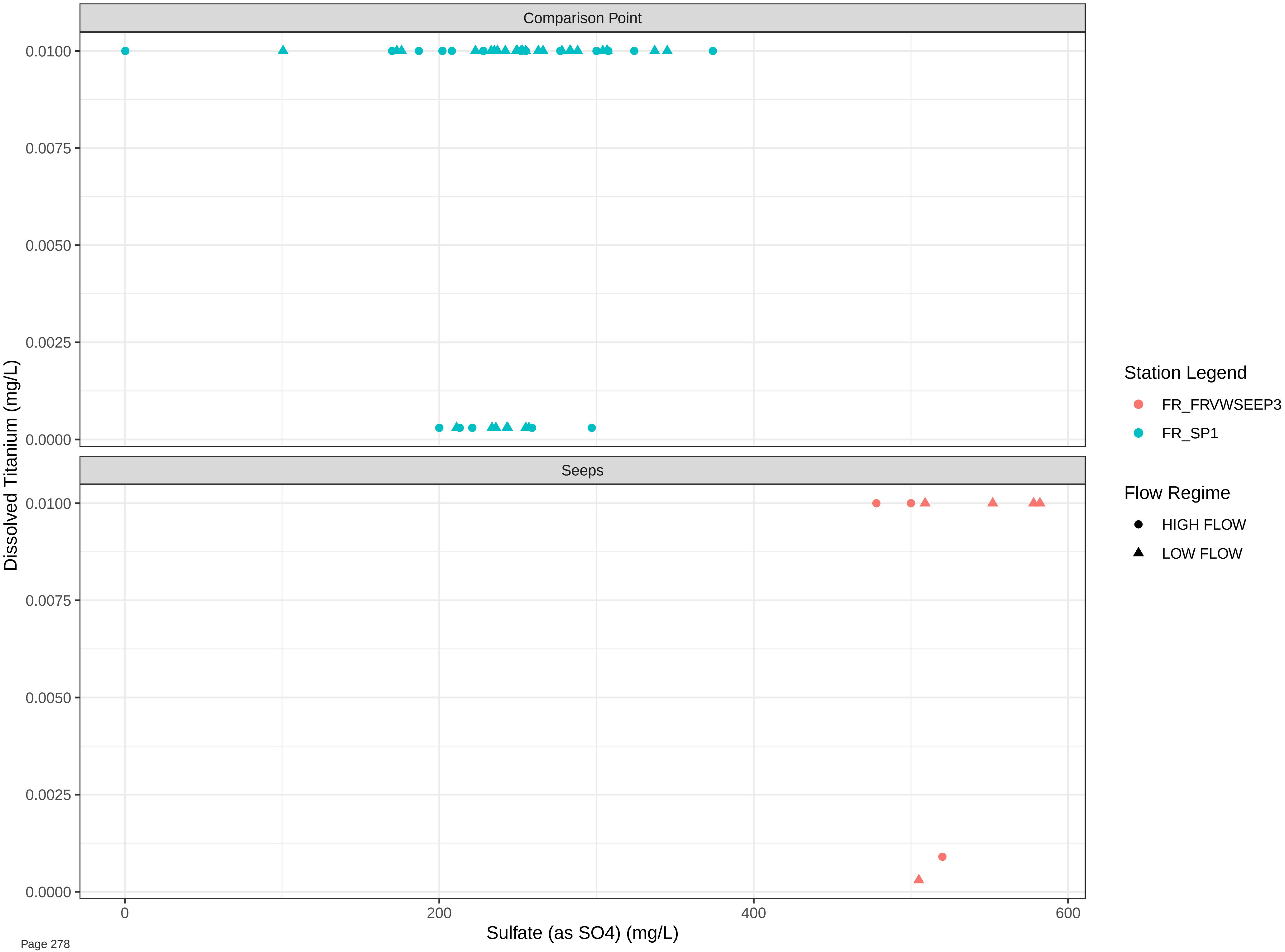
Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
Dissolved Titanium (mg/L)
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

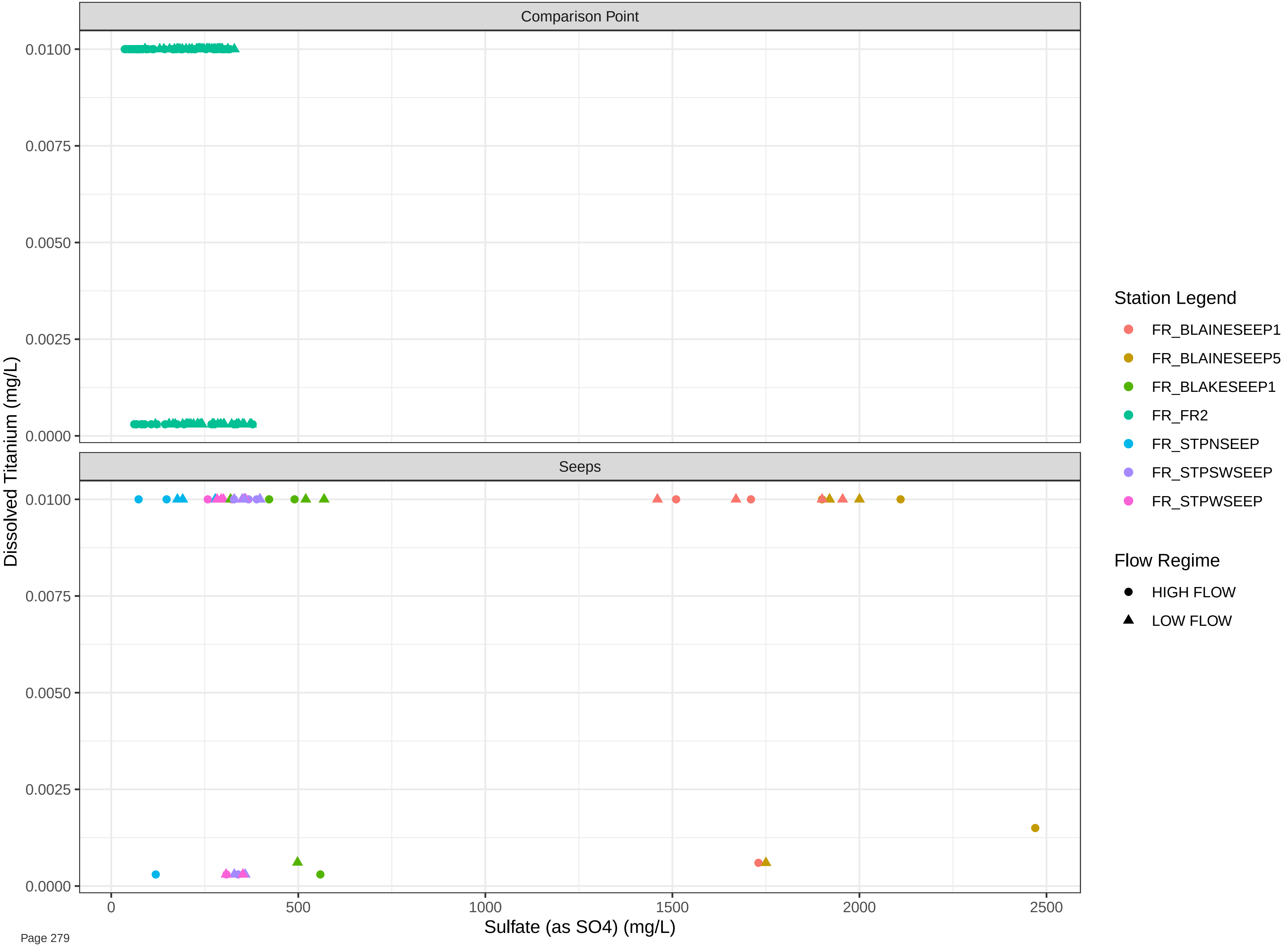

Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.00
0.02
0.04
0.06
0.08
Sulfate (as SO4) (mg/L)
200
400
600
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

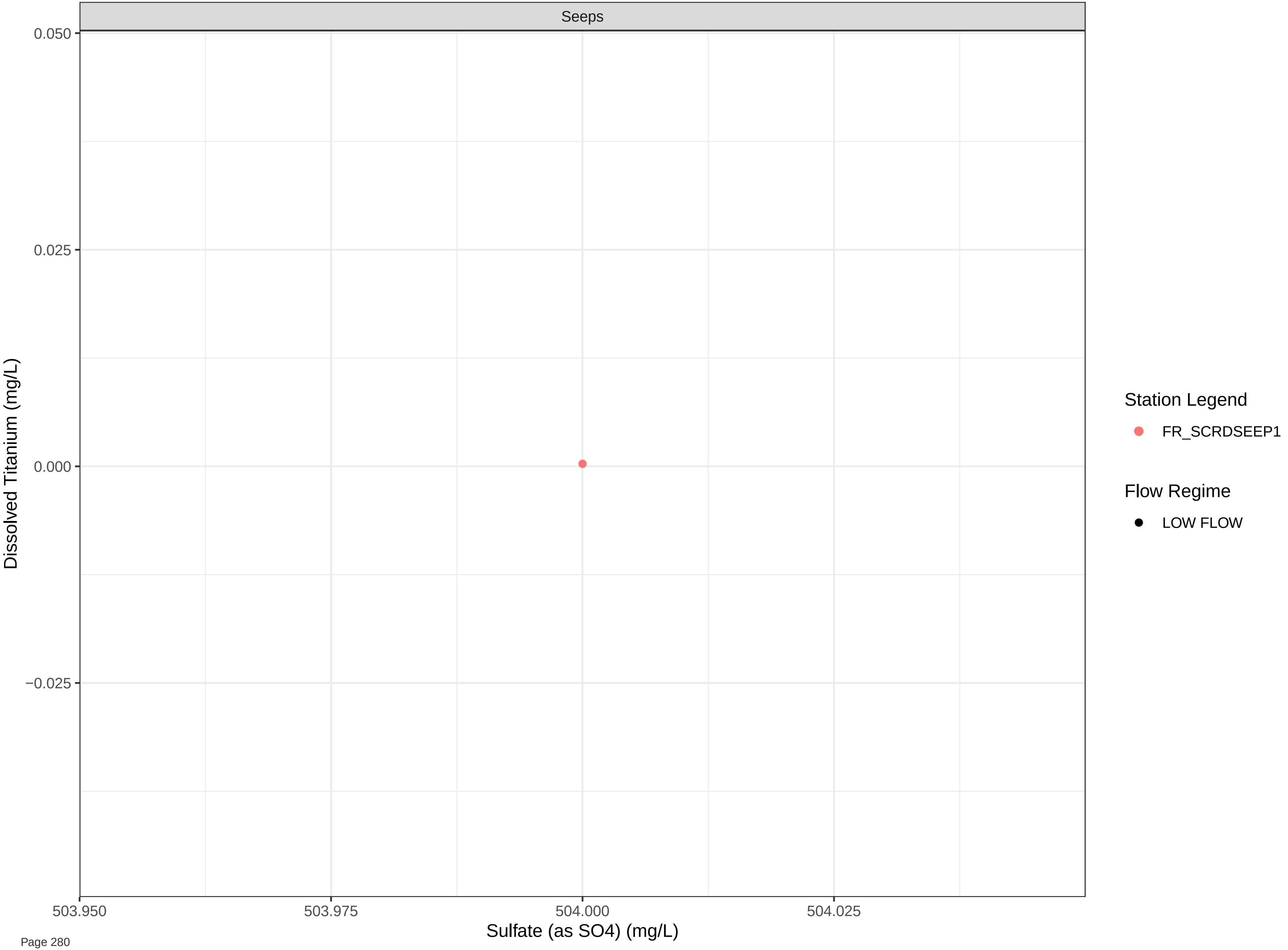


Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

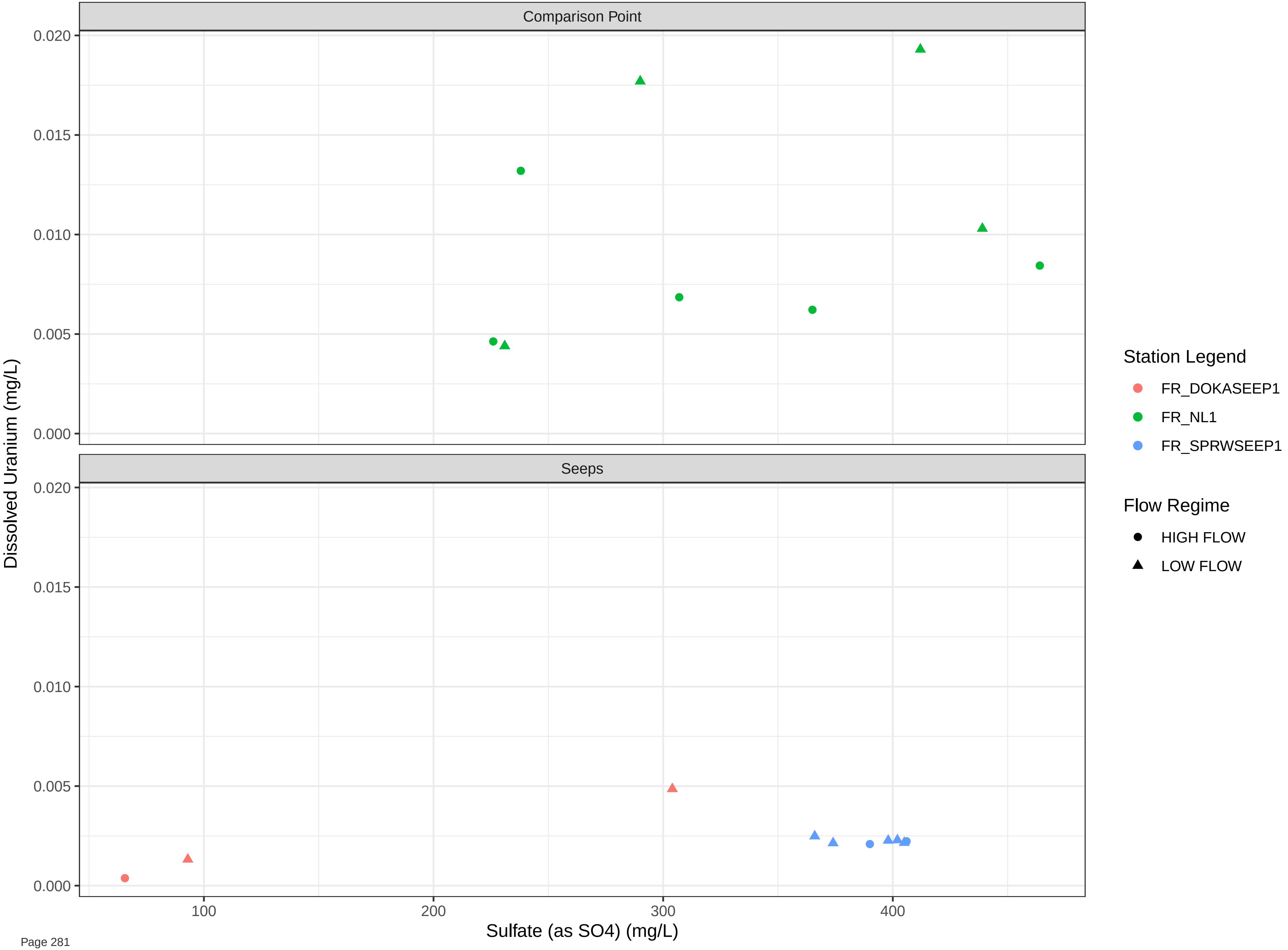

Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
Dissolved Titanium (mg/L)
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

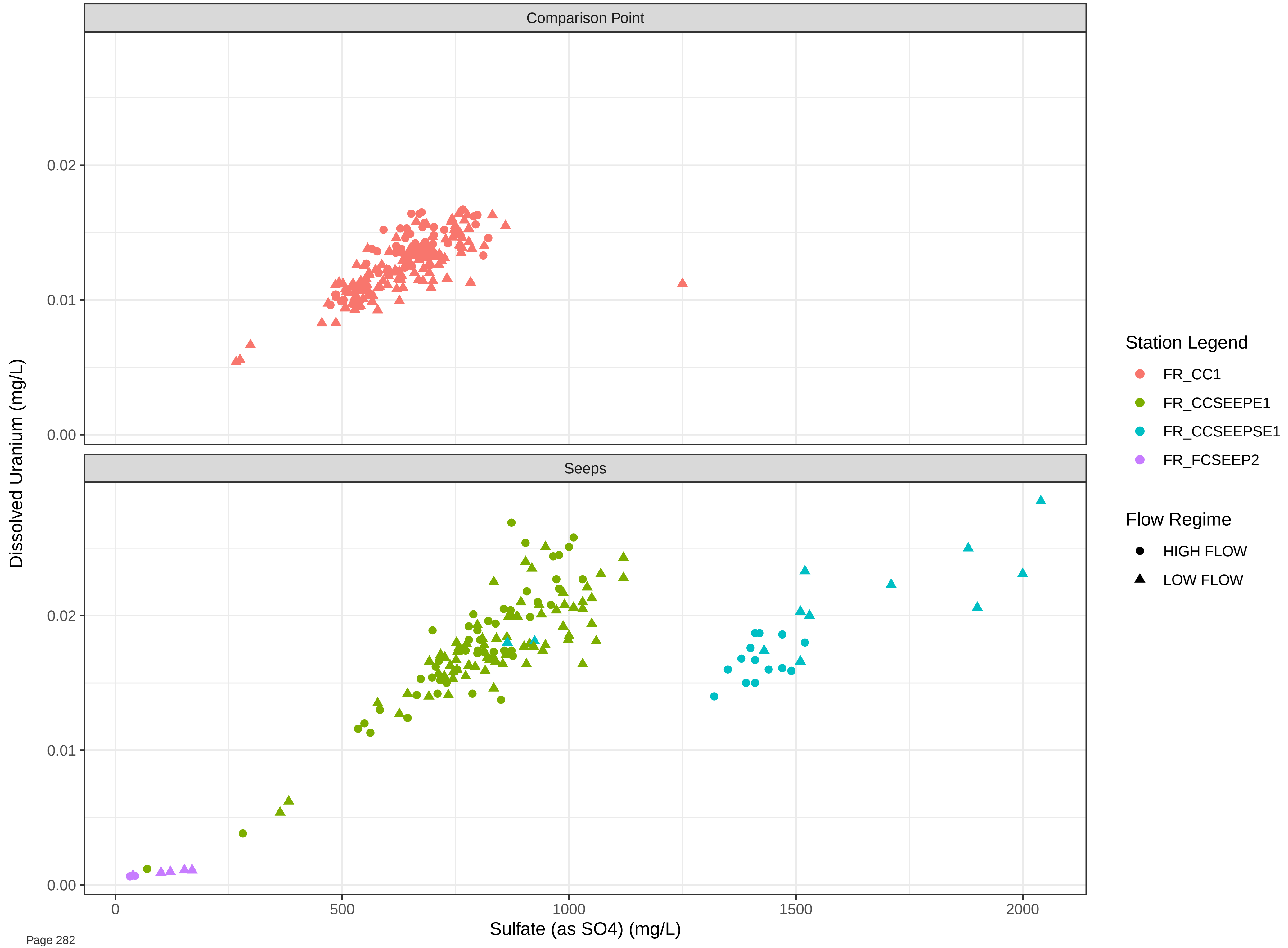

Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW



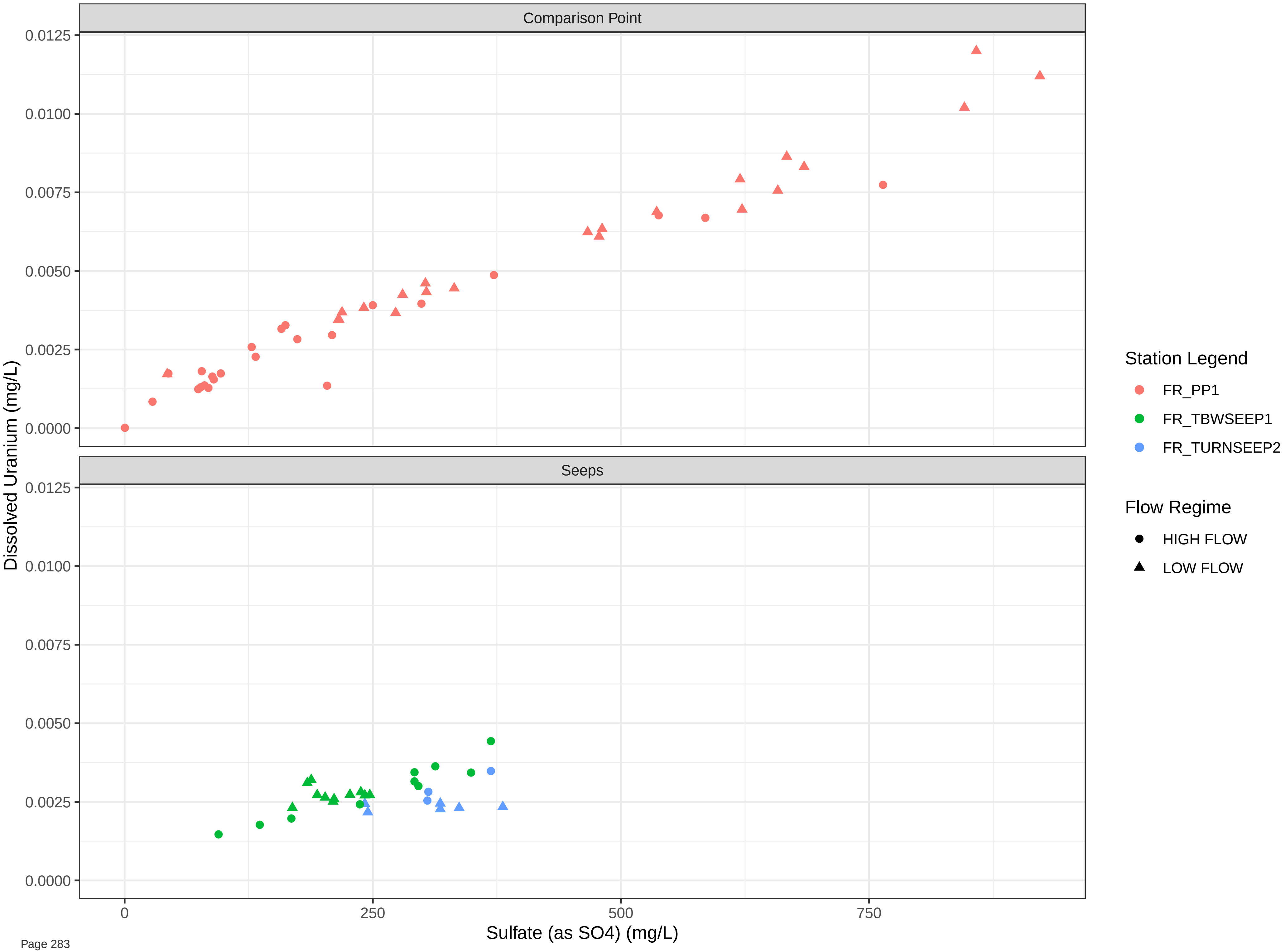
Seeps
0.050
0.025
0.000
−0.025
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Dissolved Titanium (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW



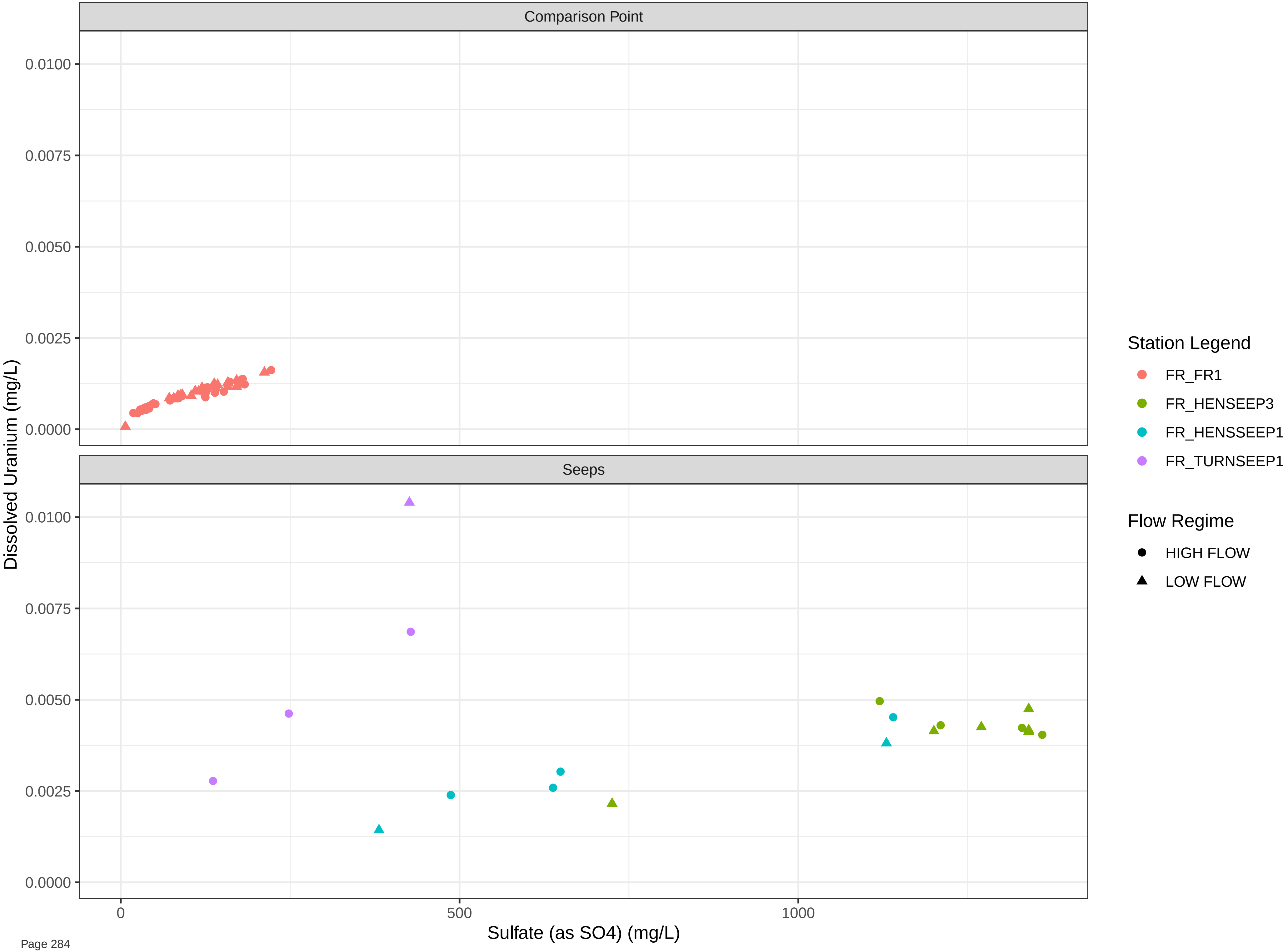
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.000
0.005
0.010
0.015
0.020
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



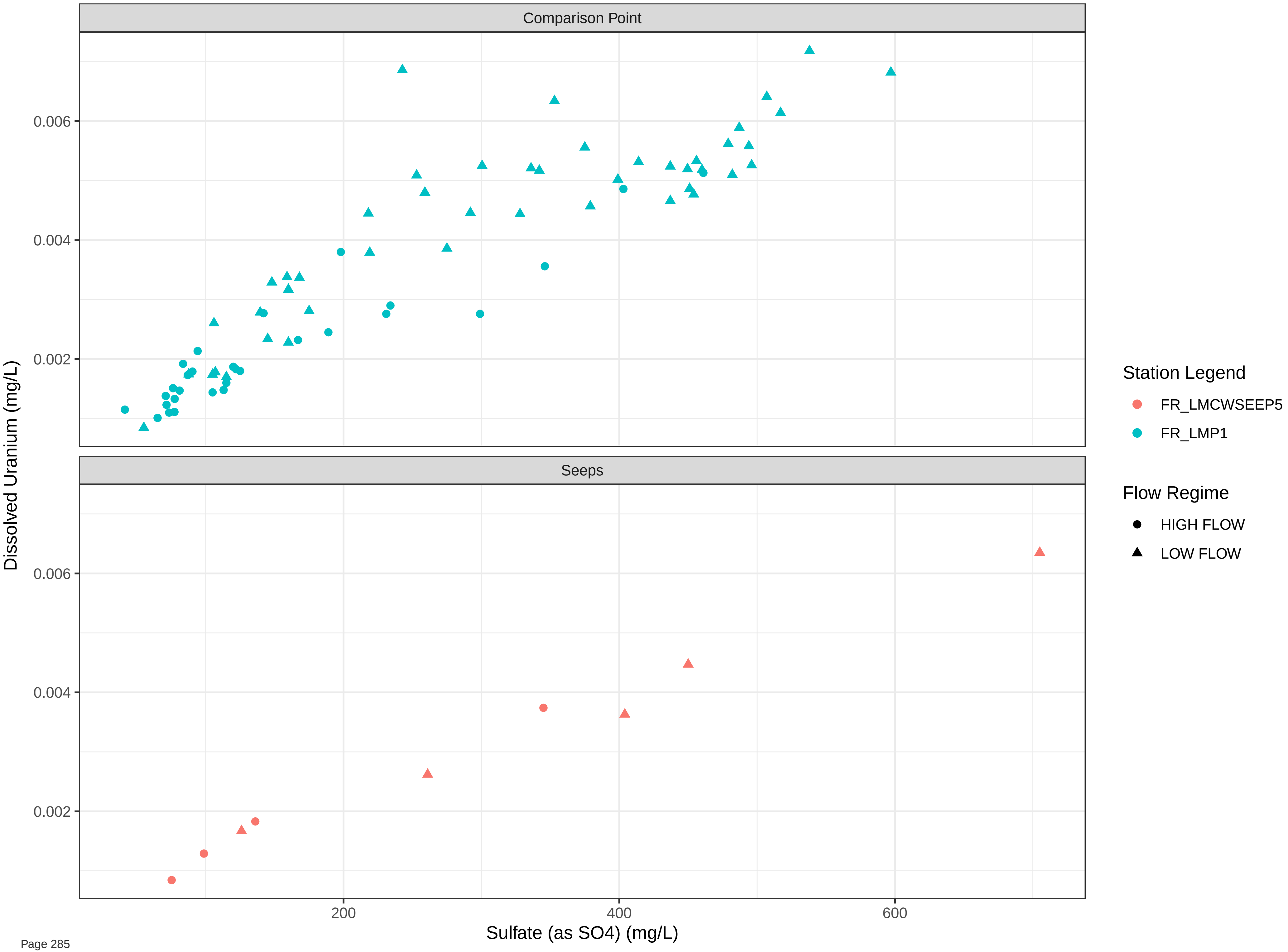
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.00
0.01
0.02
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



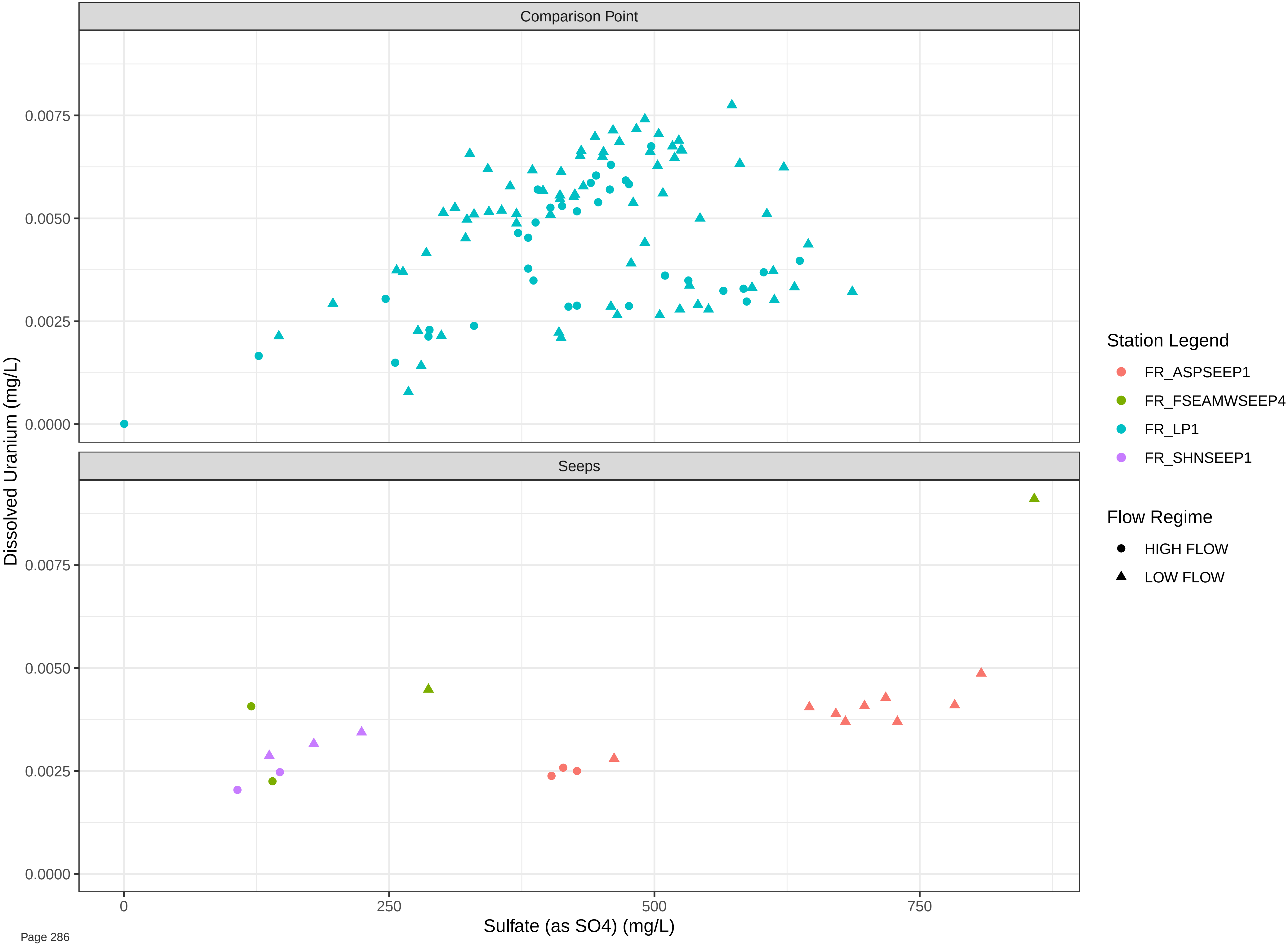
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0000
0.0025
0.0050
0.0075
0.0100
0.0125
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW



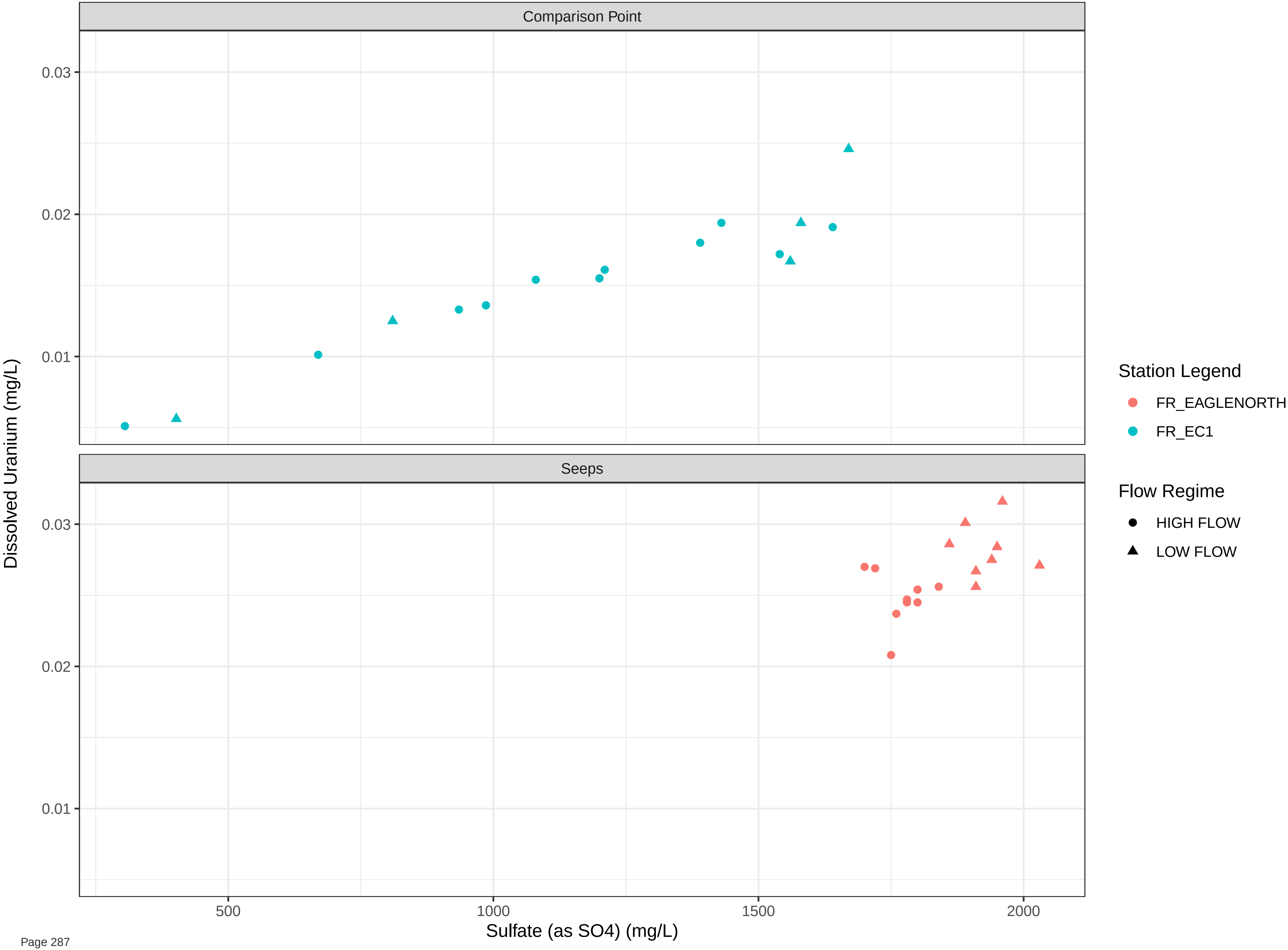
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



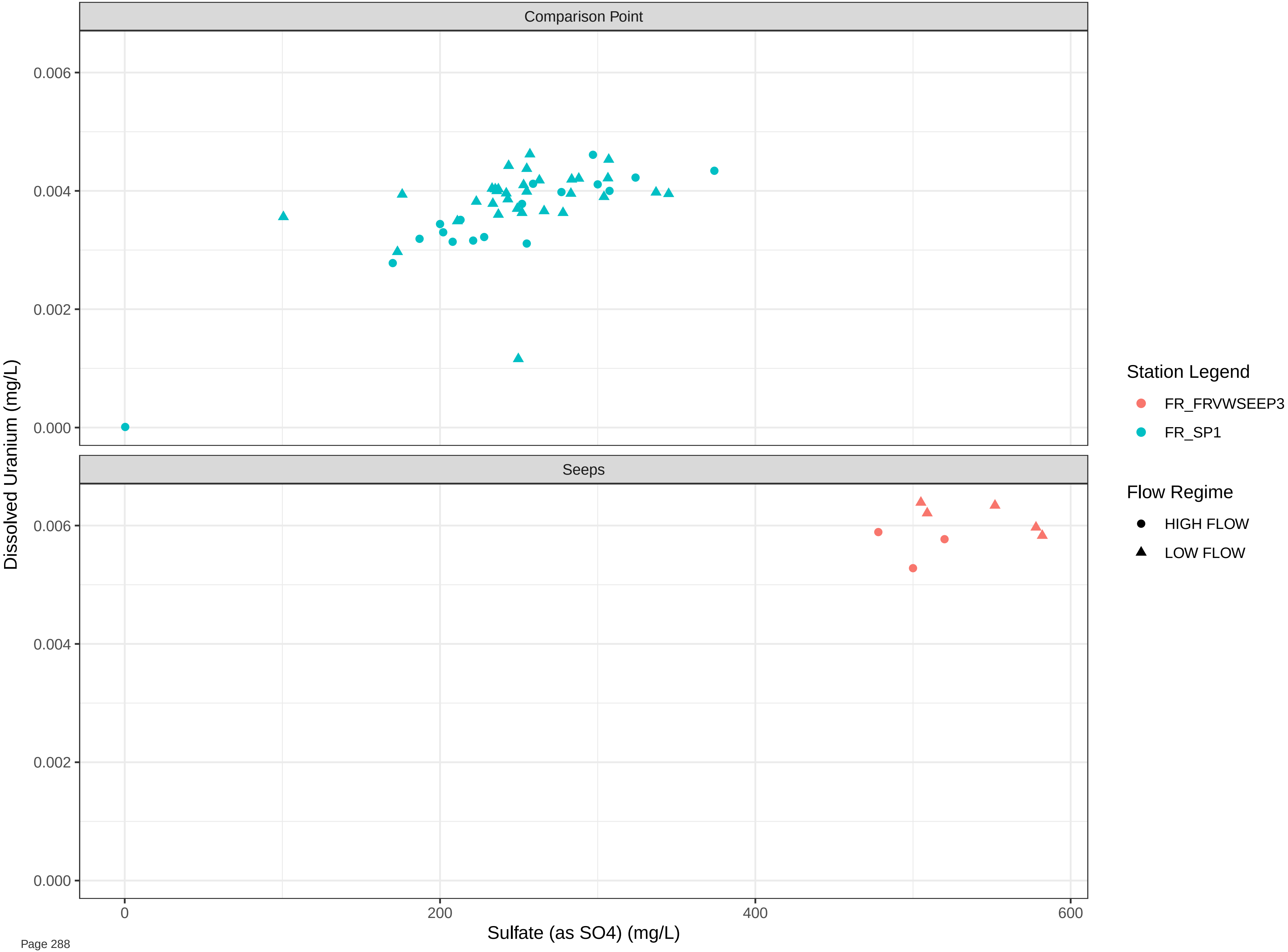
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.006
0.004
0.002
0.006
0.004
0.002
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



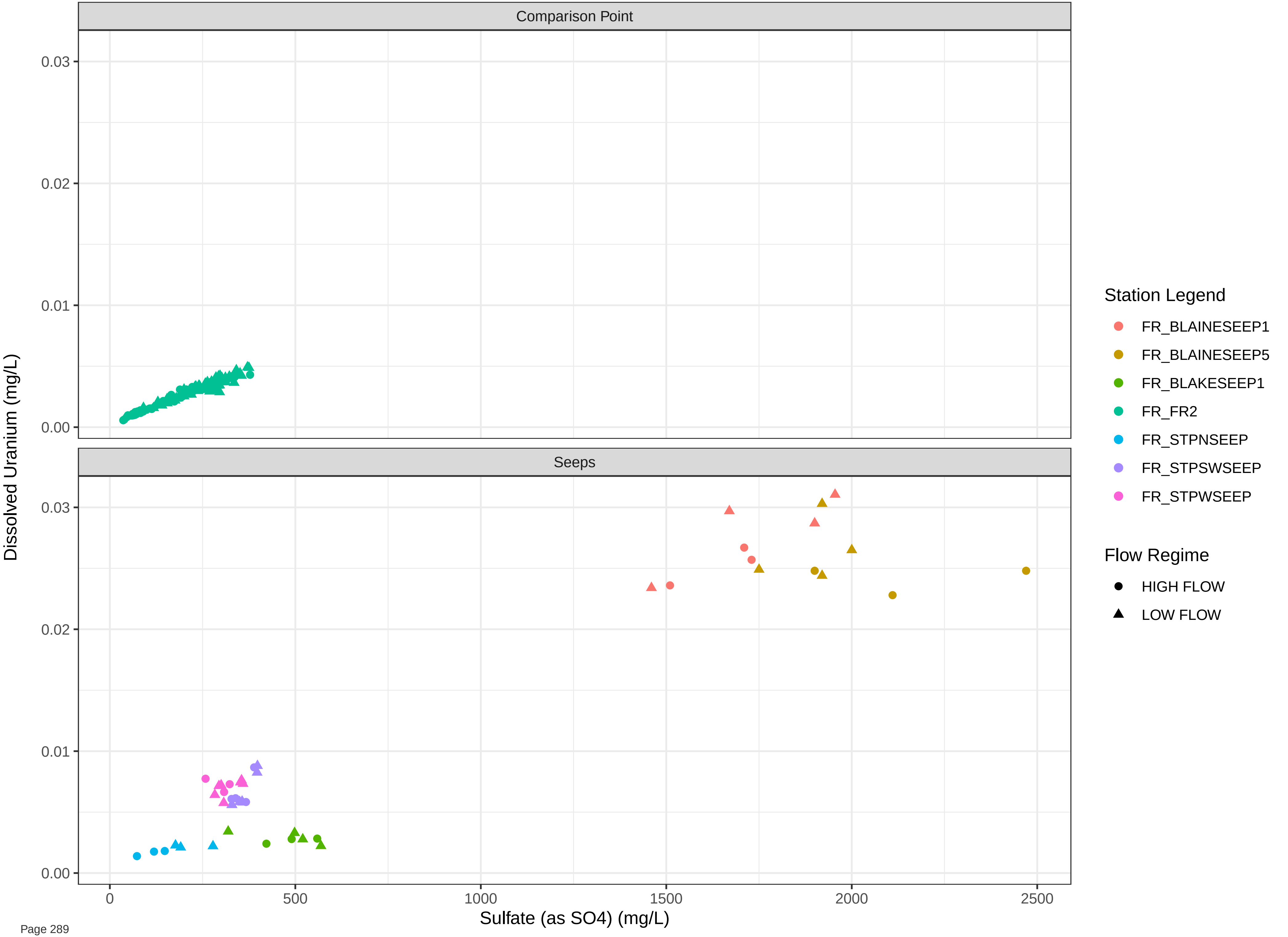
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0075
0.0050
0.0025
0.0000
0.0075
0.0050
0.0025
0.0000
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



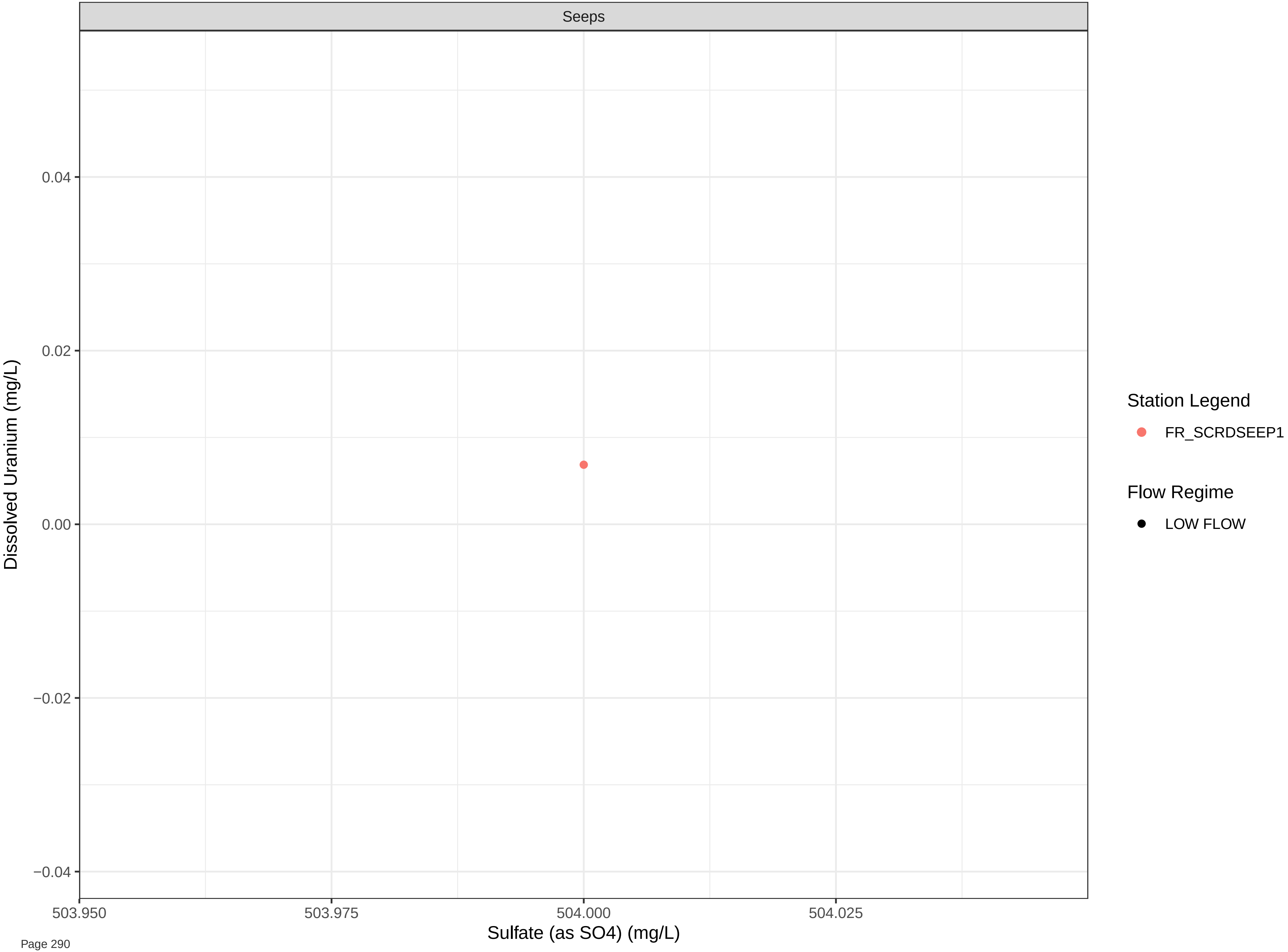
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.03
0.02
0.01
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



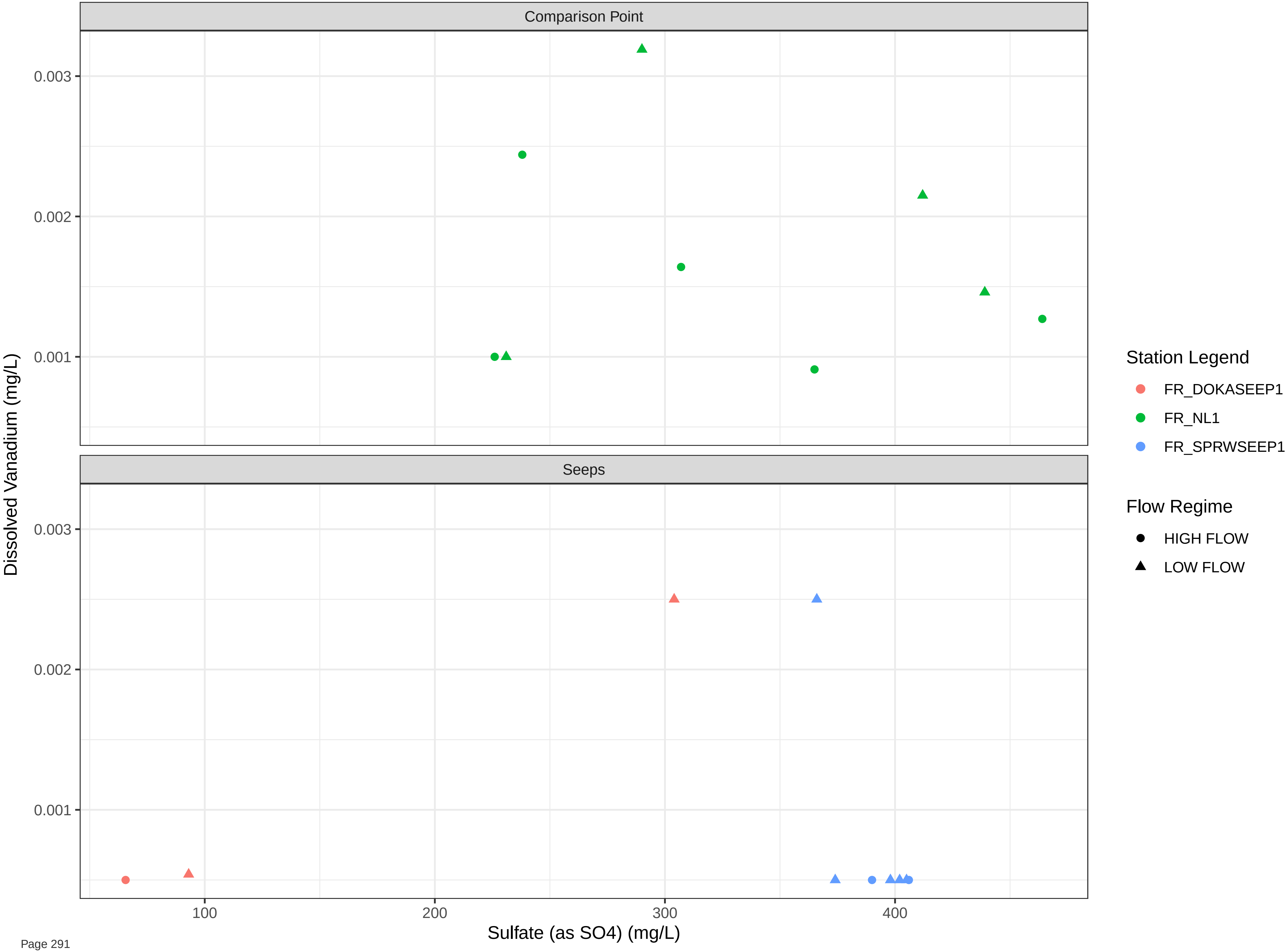
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.000
0.002
0.004
0.006
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW



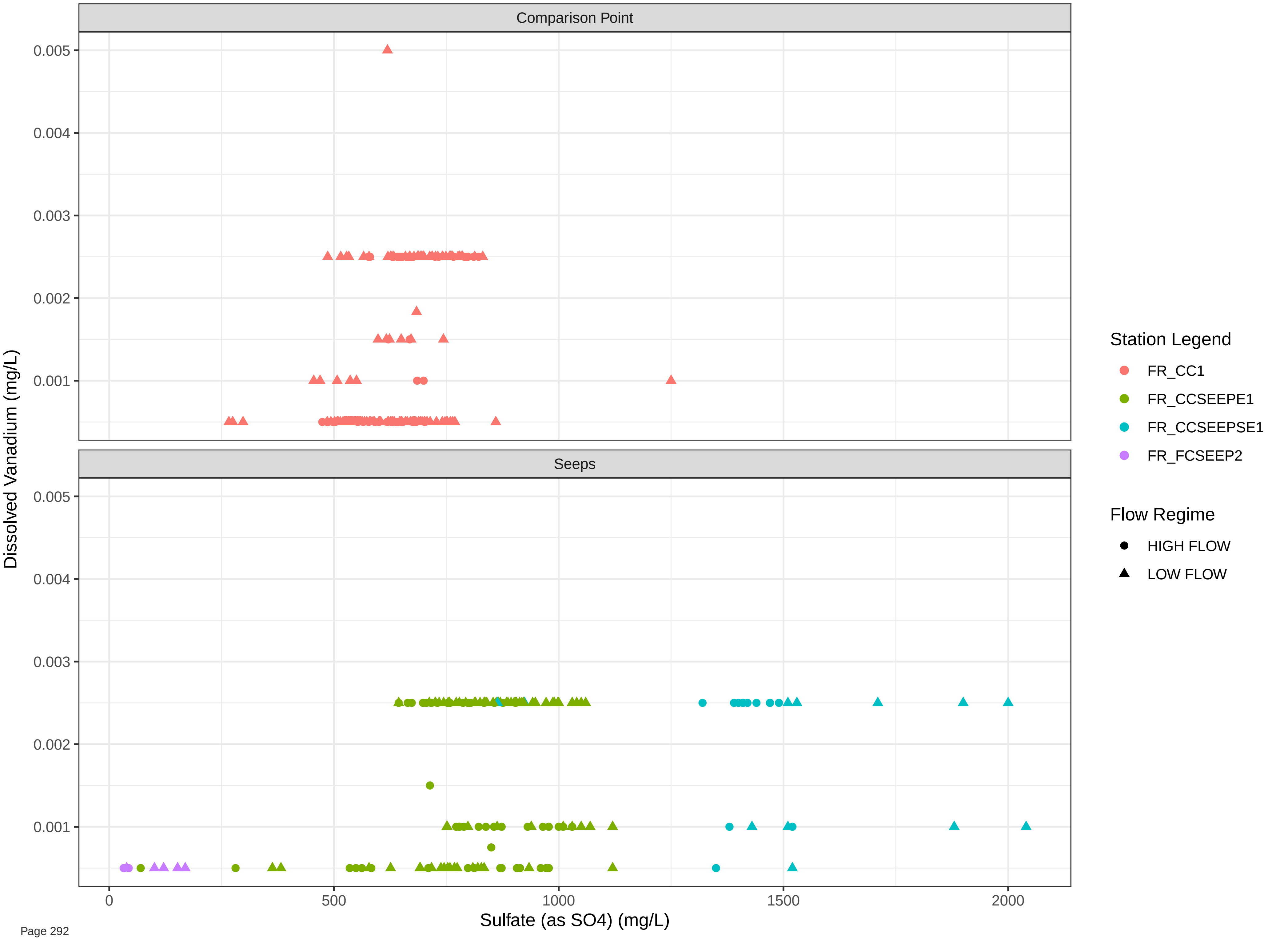
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.00
0.01
0.02
0.03
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

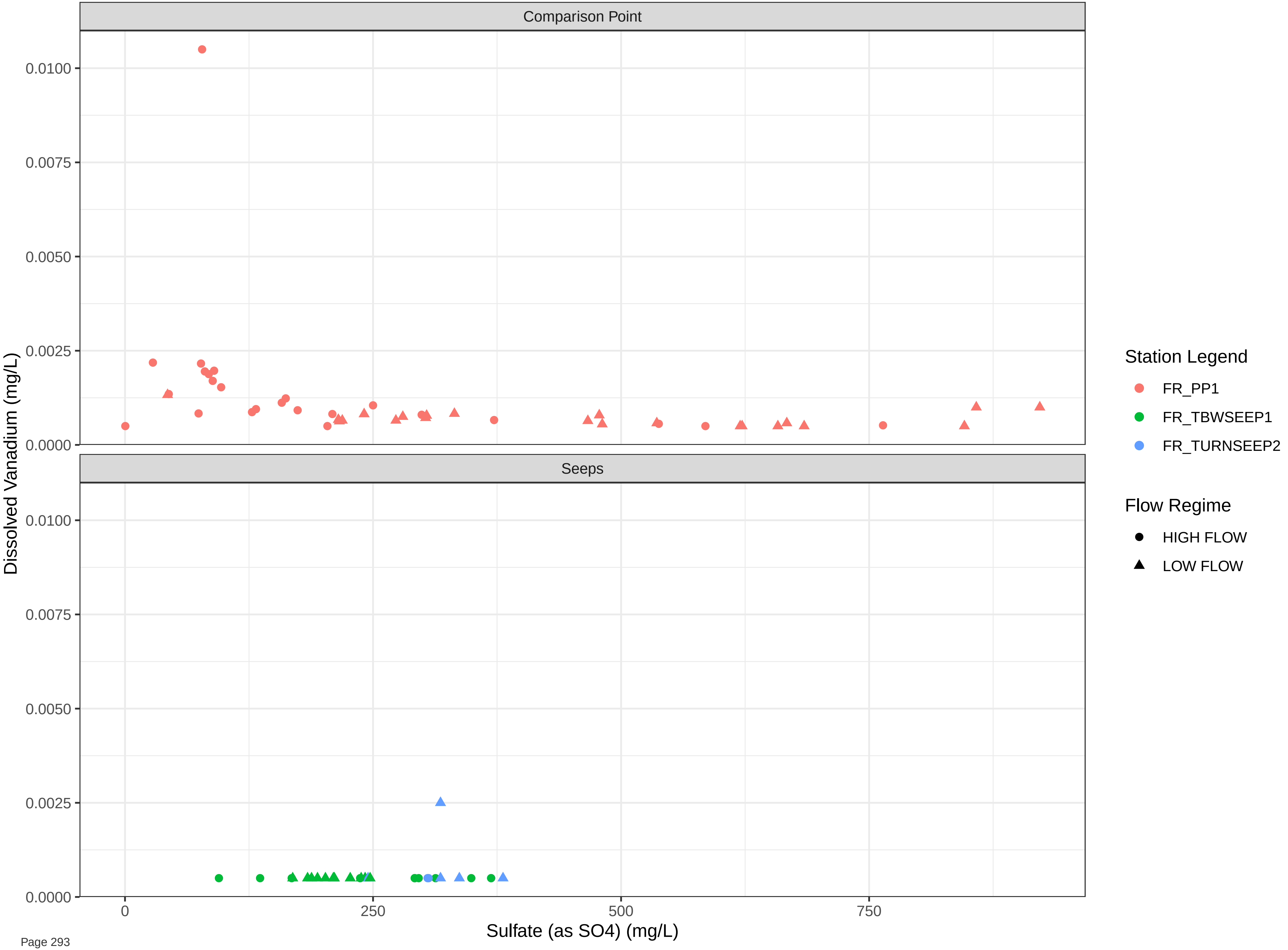


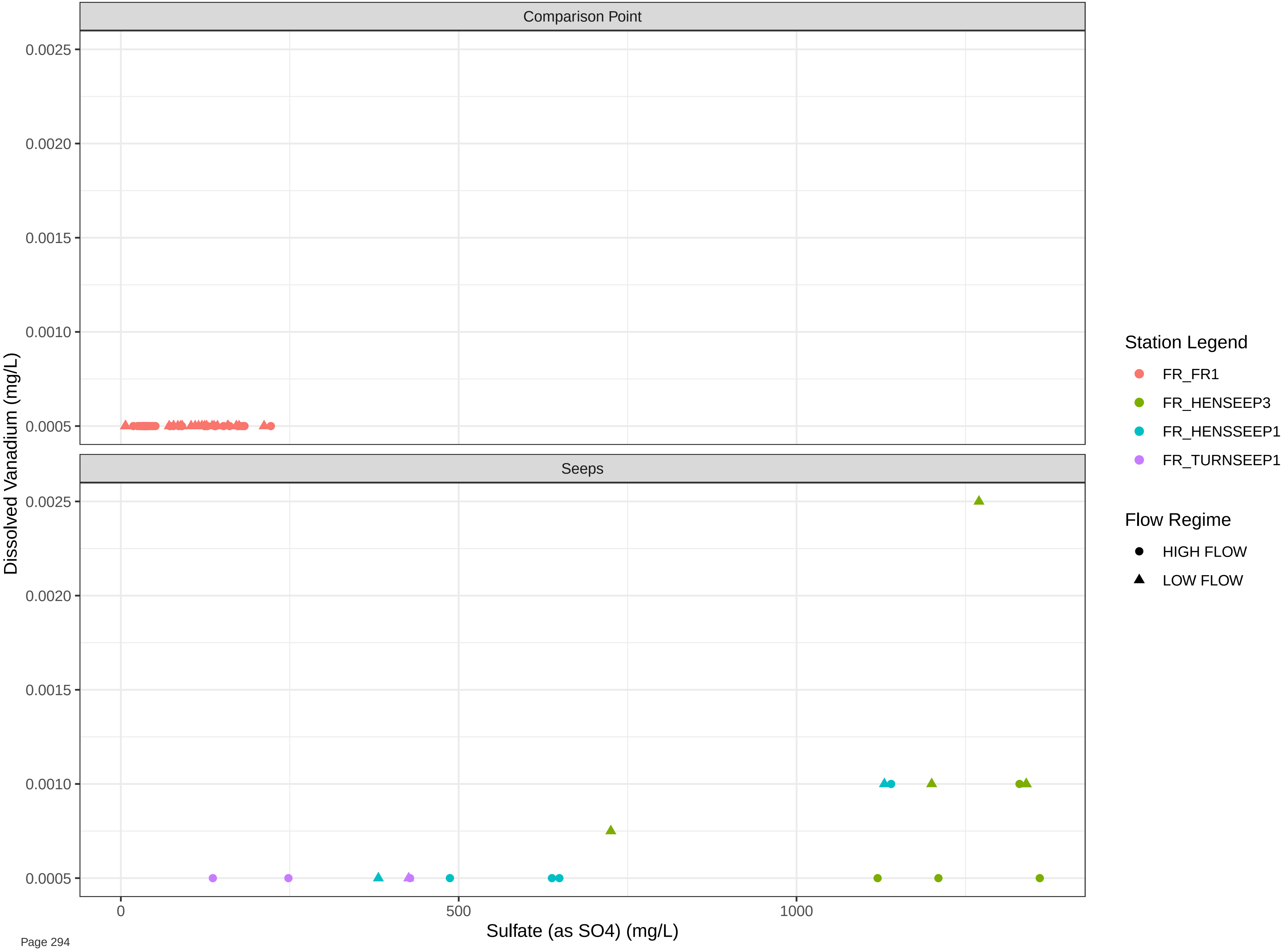
Seeps
Dissolved Uranium (mg/L)
0.04
0.02
0.00
−0.02
−0.04
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

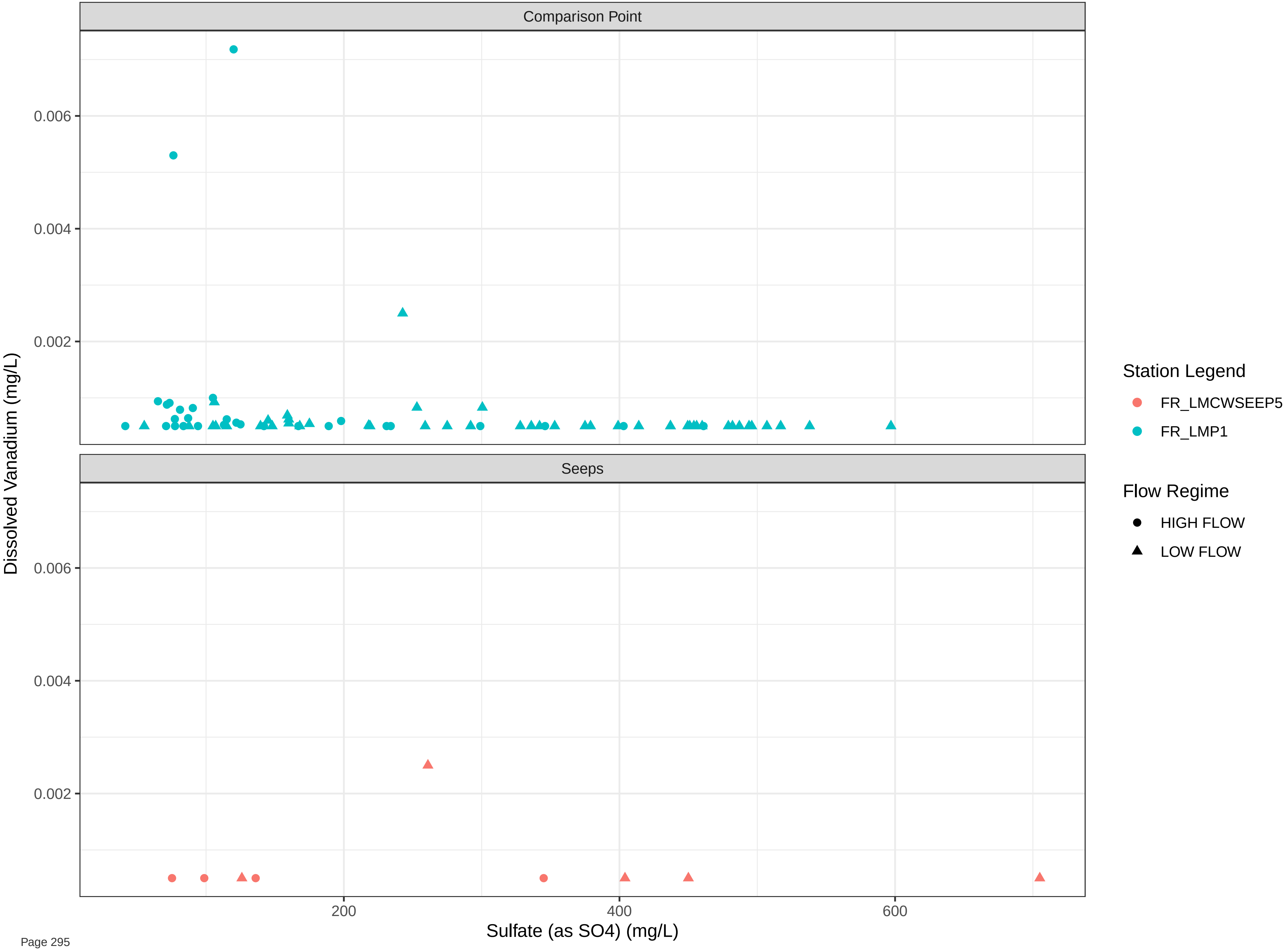


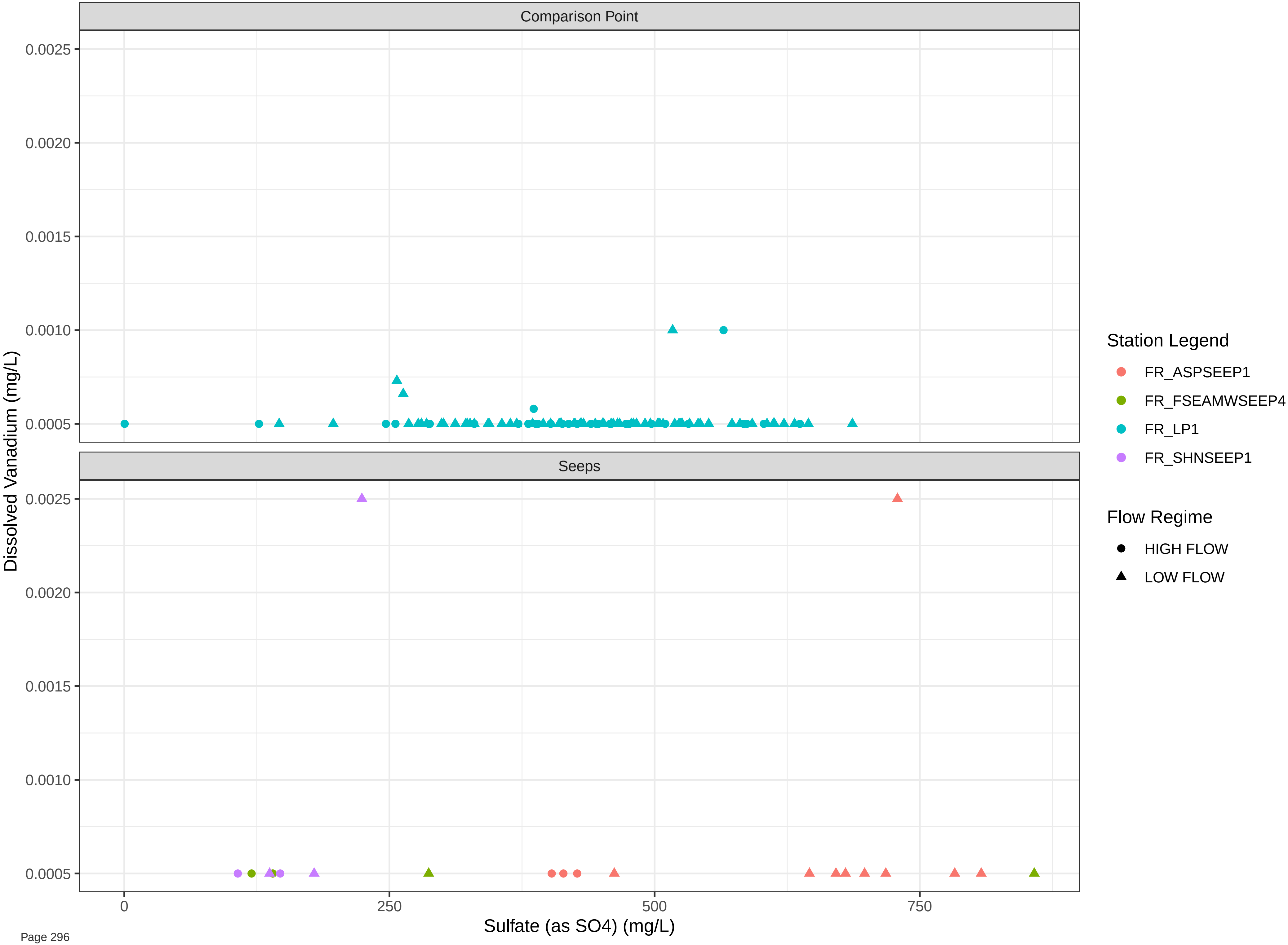
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.003
0.002
0.001
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.005
0.004
0.003
0.002
0.001
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

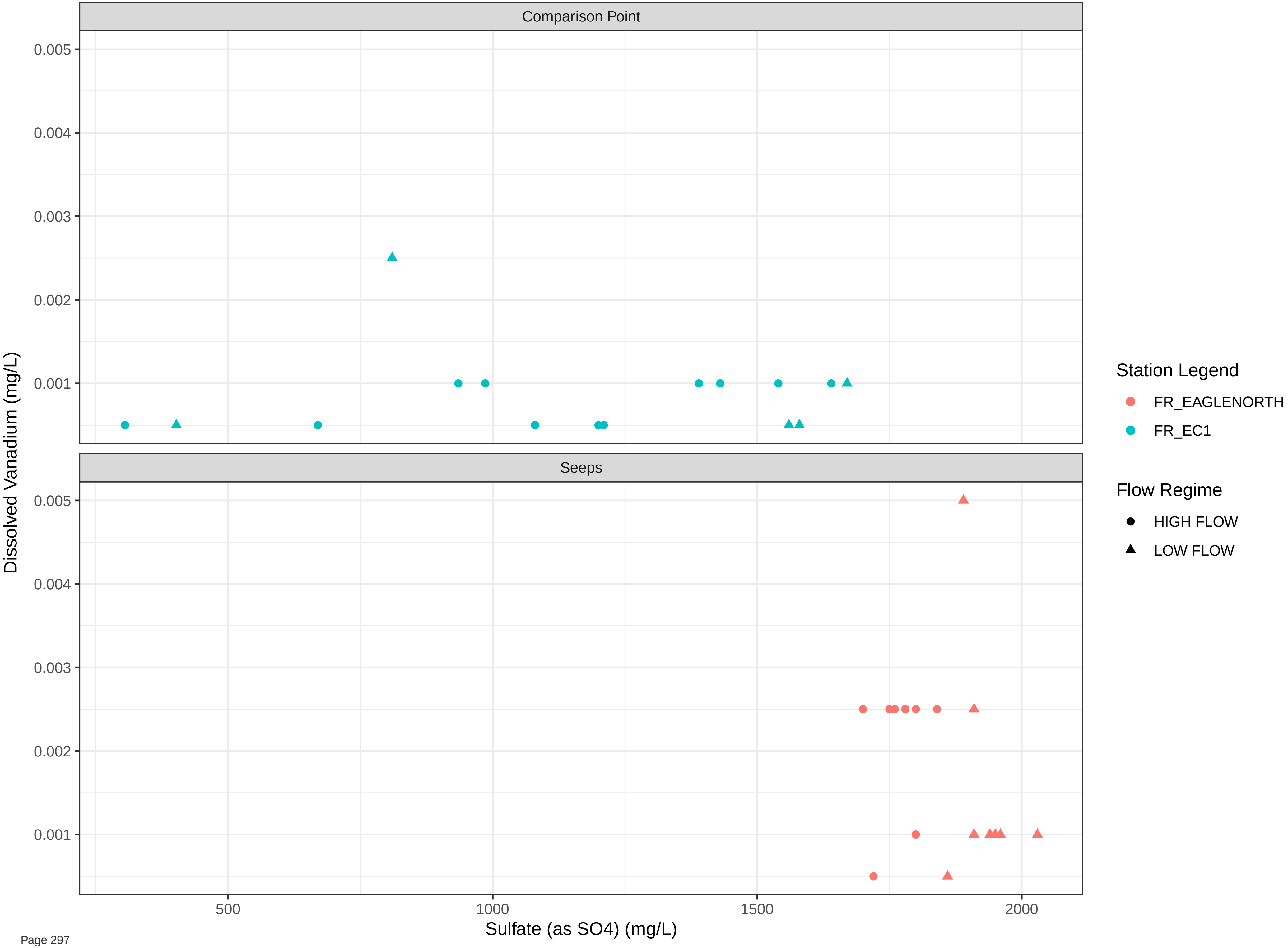

Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.0000
0.0025
0.0050
0.0075
0.0100
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.0025
0.0020
0.0015
0.0010
0.0005
Dissolved Vanadium (mg/L)
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

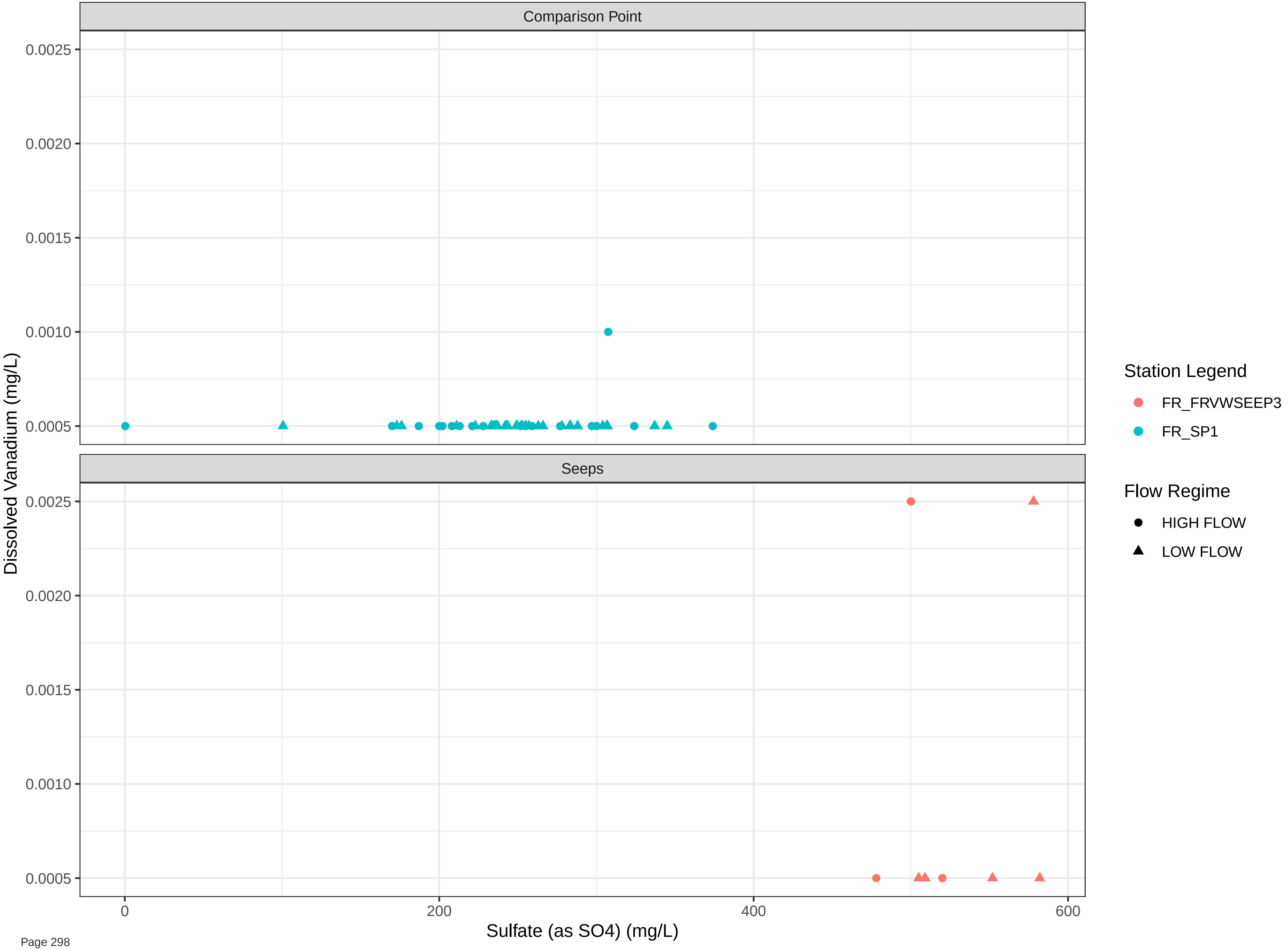

Comparison Point
Seeps
0.006
0.004
0.002
Dissolved Vanadium (mg/L)
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW



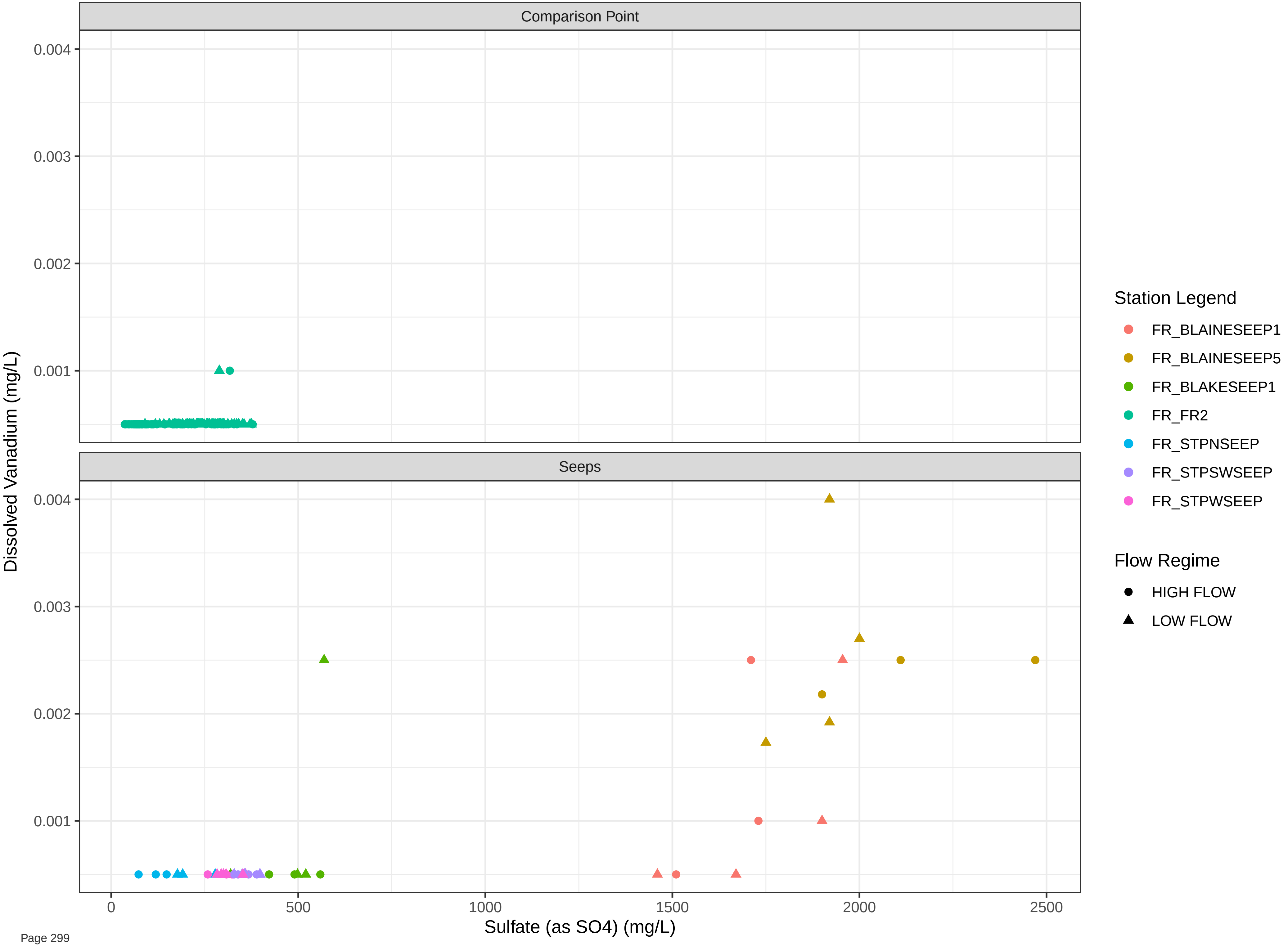
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.0025
0.0020
0.0015
0.0010
0.0005
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

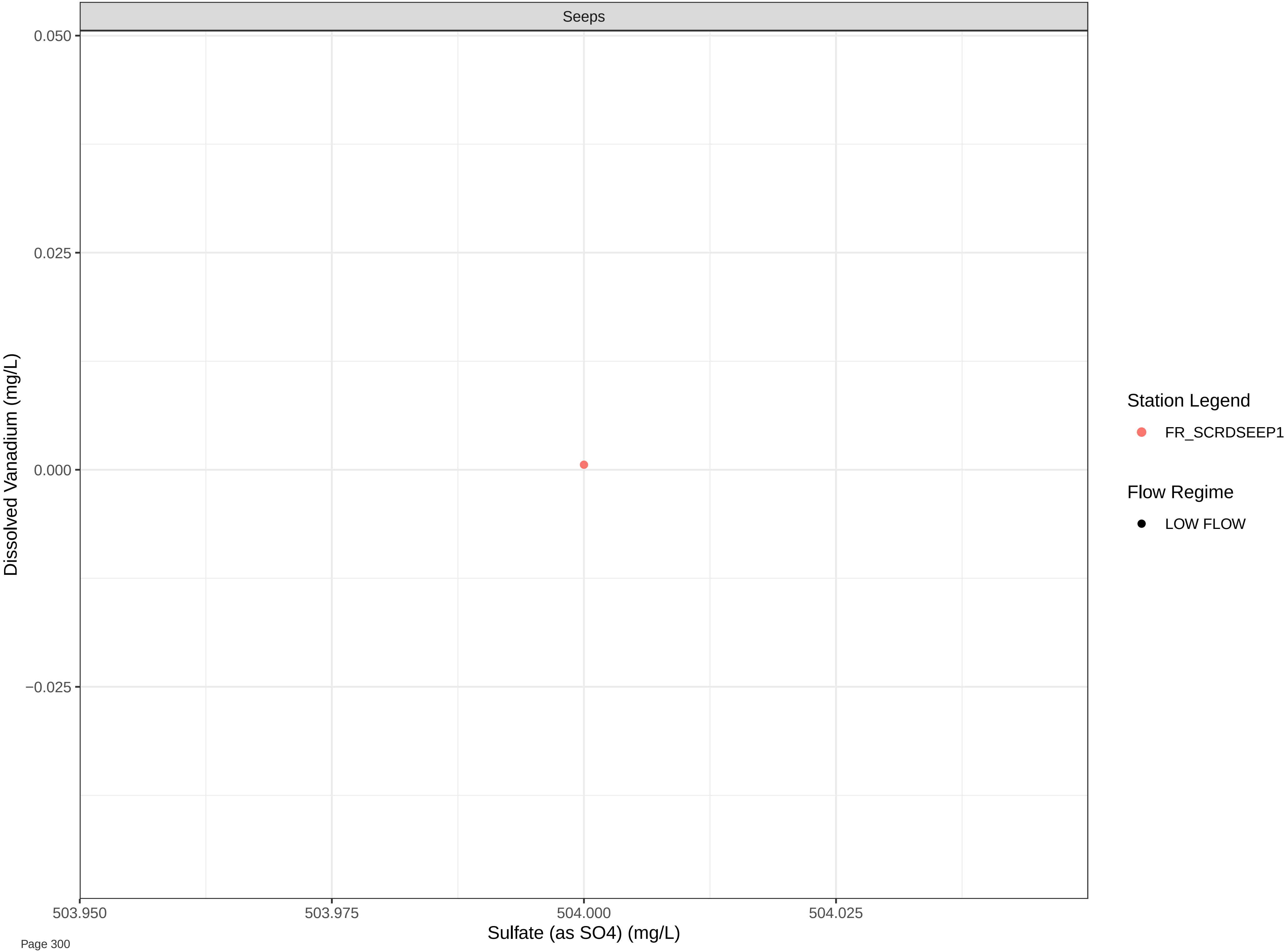


Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.005
0.004
0.003
0.002
0.001
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW

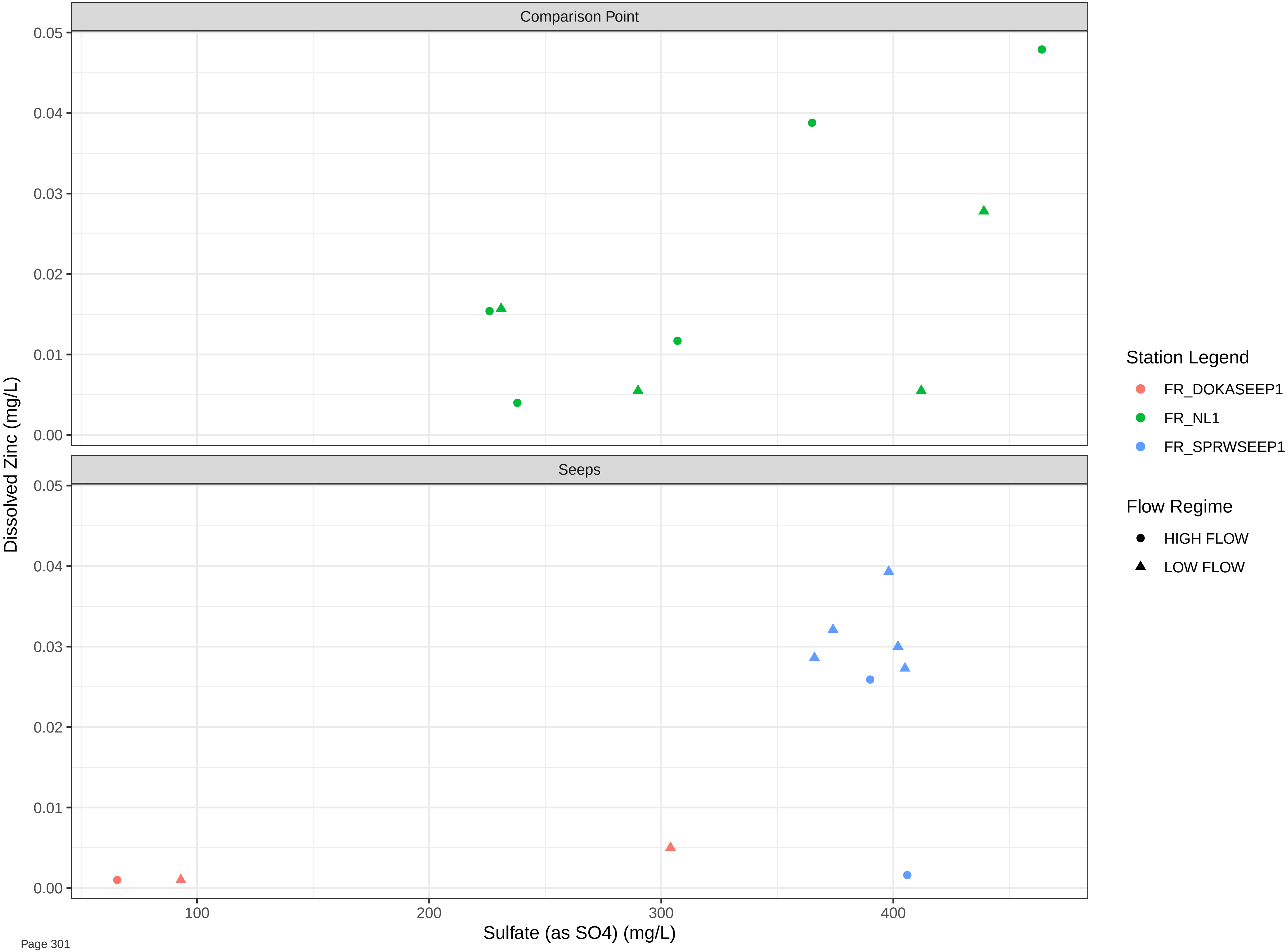


Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.0025
0.0020
0.0015
0.0010
0.0005
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

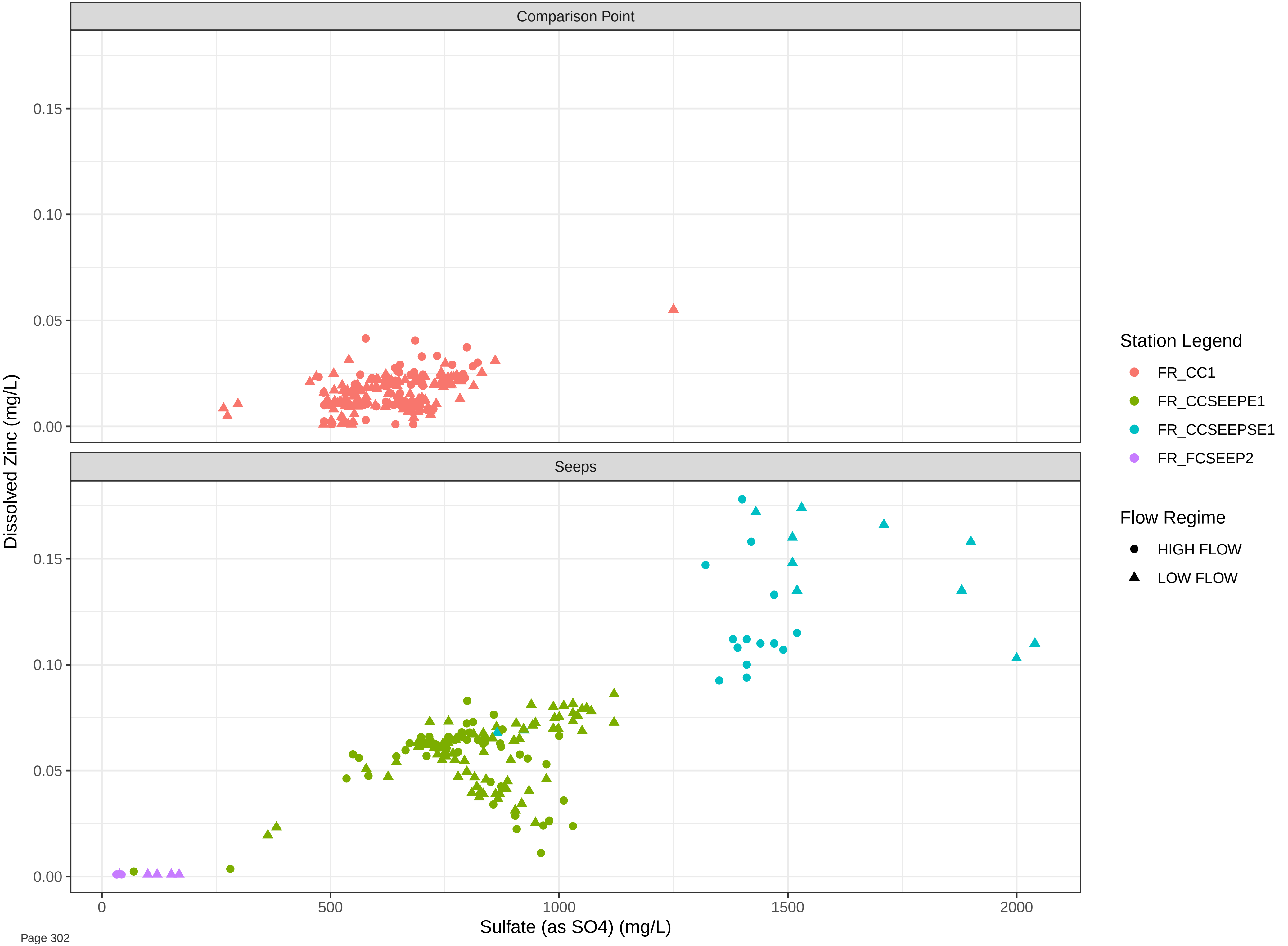

Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.004
0.003
0.002
0.001
0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW



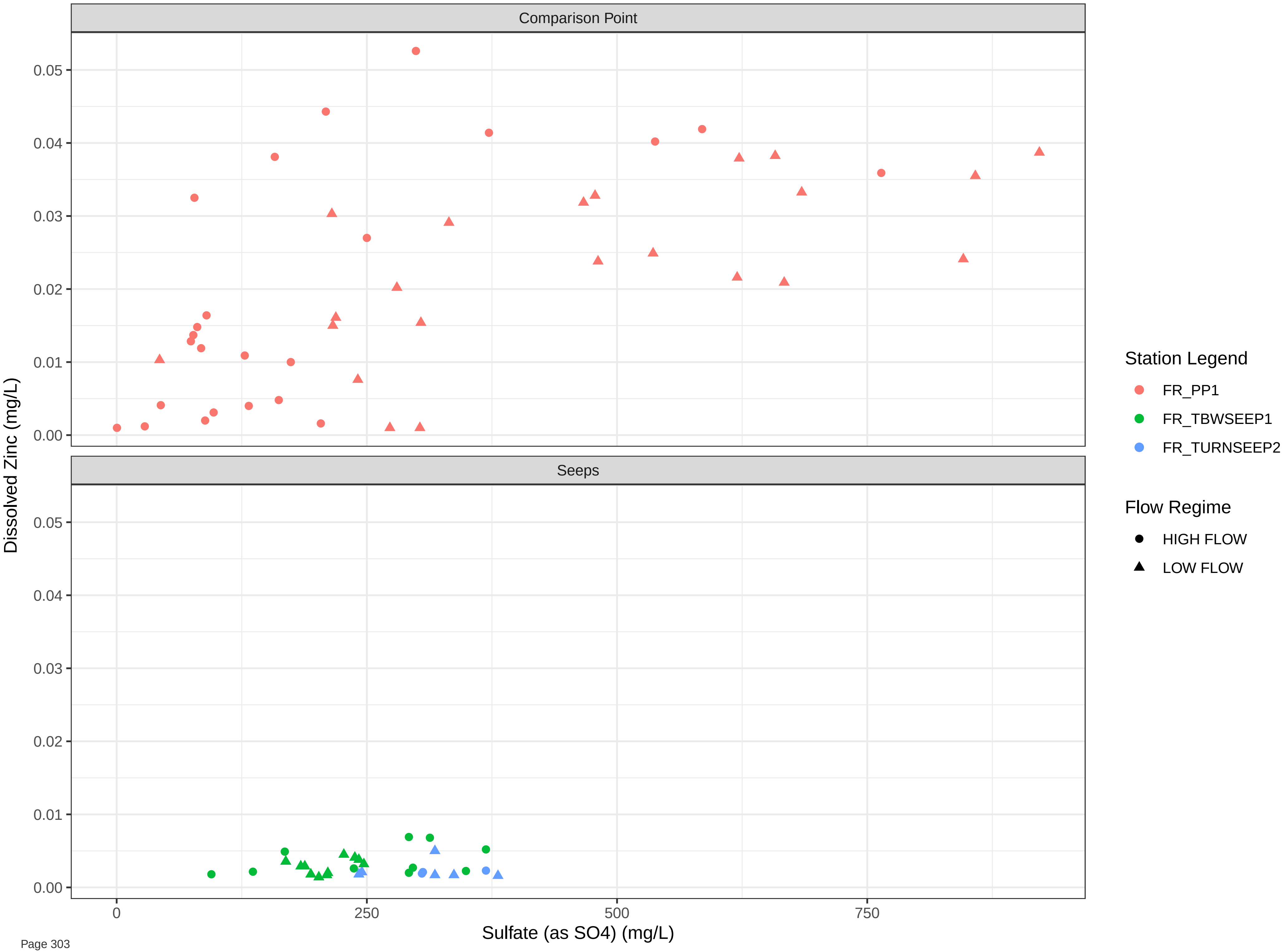
Seeps
0.050
0.025
0.000
−0.025
Dissolved Vanadium (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW



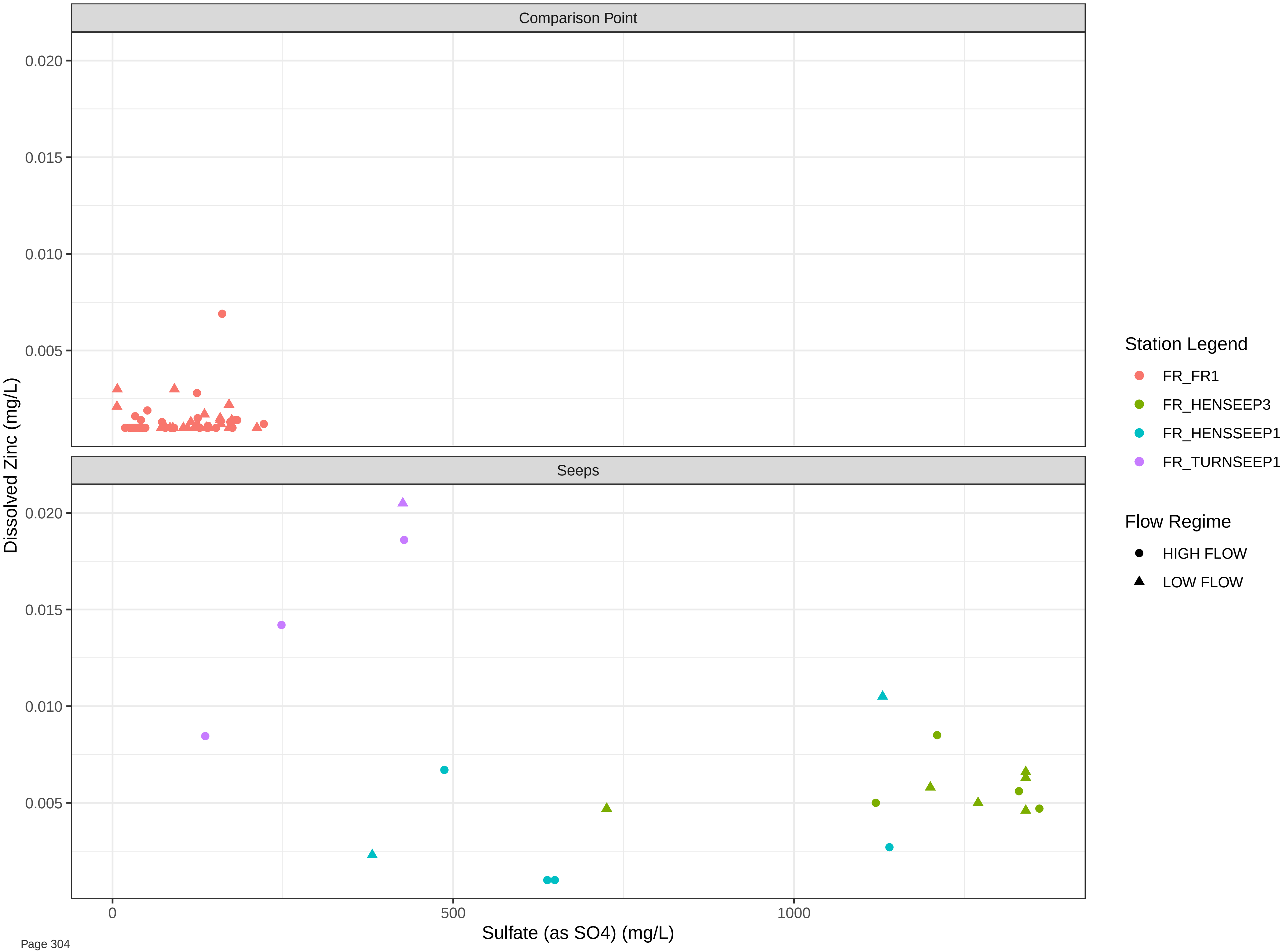
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.05
0.04
0.03
0.02
0.01
0.00
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
FR_DOKASEEP1
FR_NL1
FR_SPRWSEEP1
Flow Regime
HIGH FLOW
LOW FLOW



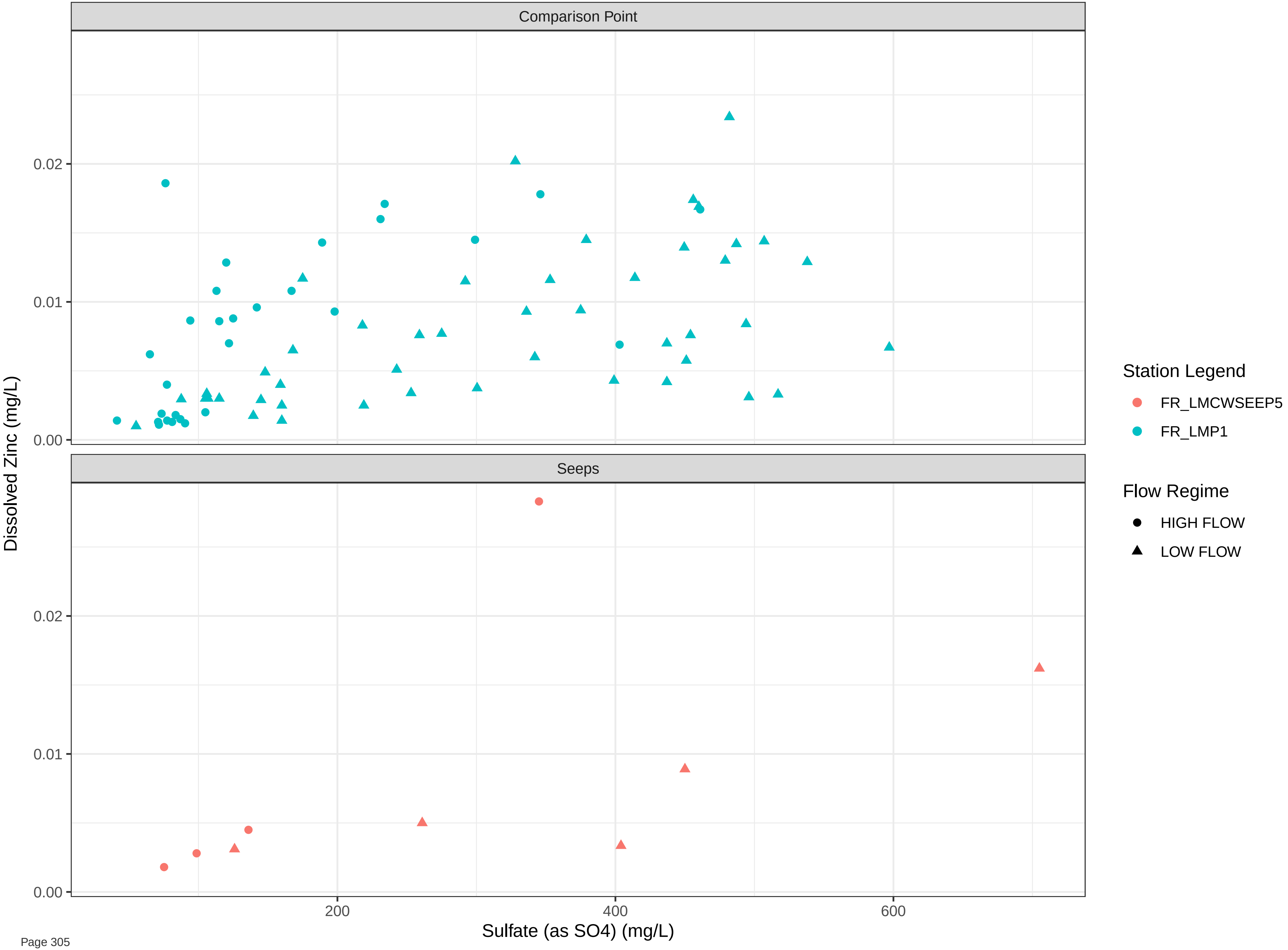
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.05
0.10
0.15
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
FR_CC1
FR_CCSEEPE1
FR_CCSEEPSE1
FR_FCSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

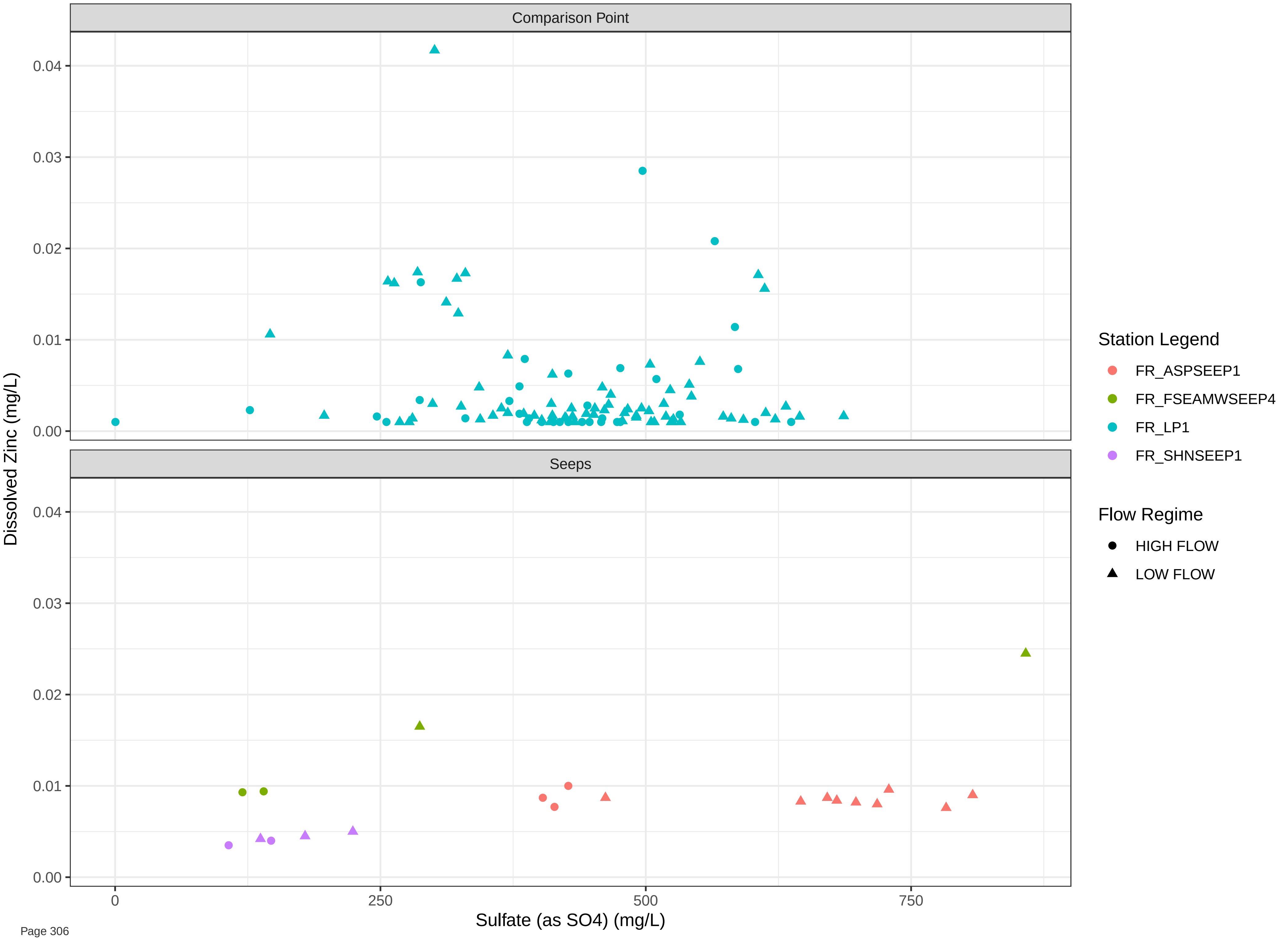


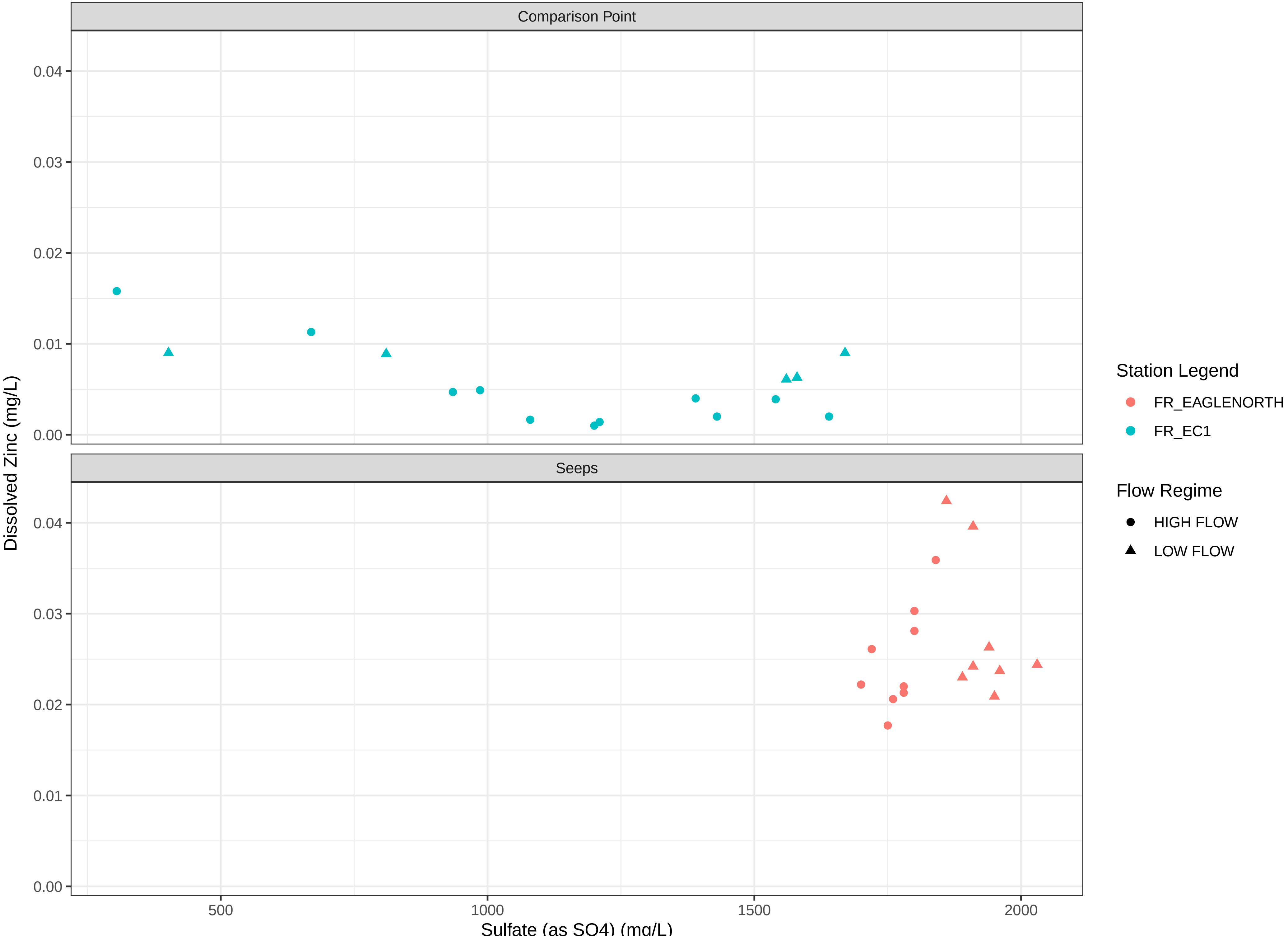
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
FR_PP1
FR_TBWSEEP1
FR_TURNSEEP2
Flow Regime
HIGH FLOW
LOW FLOW

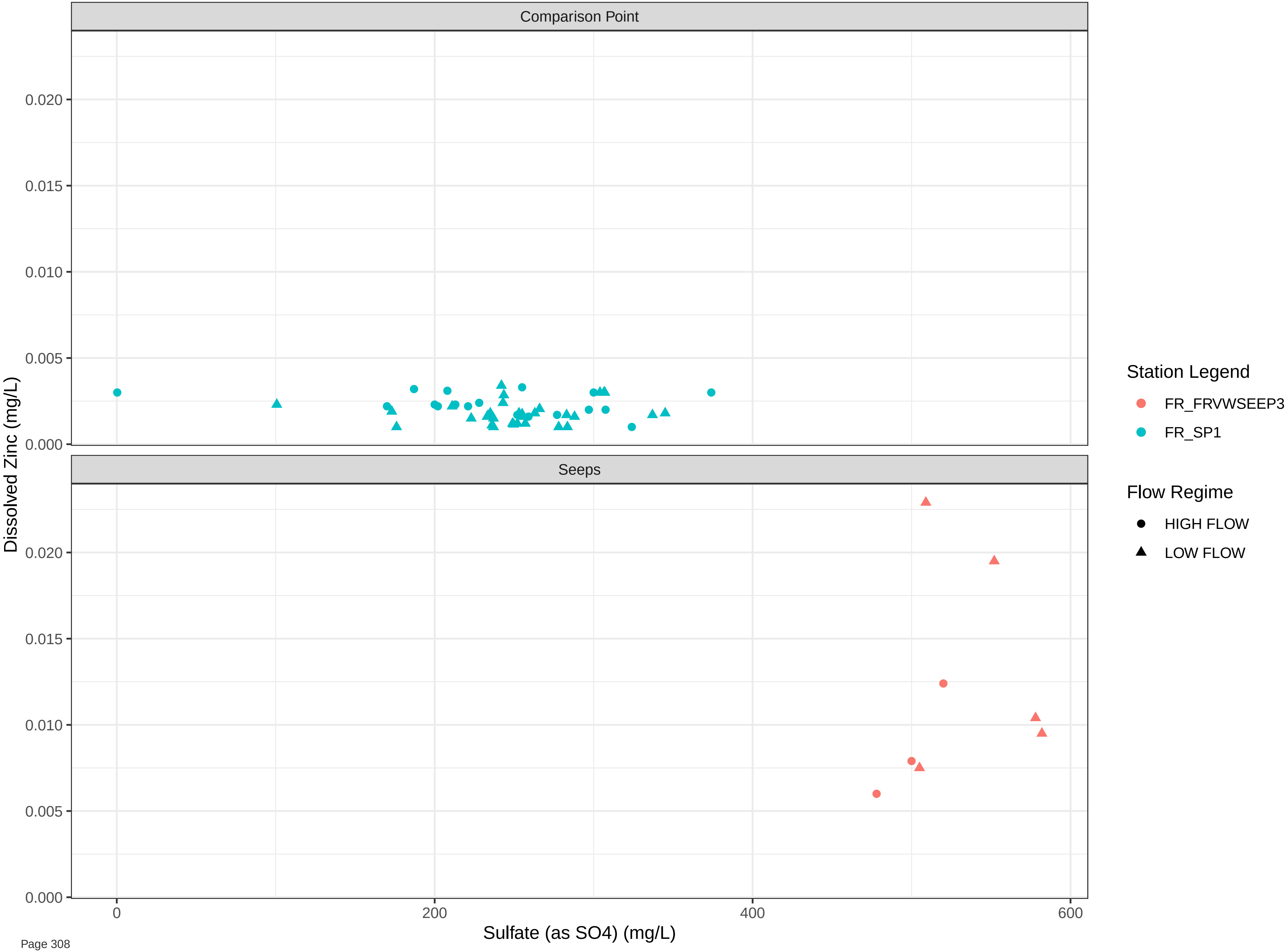


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.020
0.015
0.010
0.005
0
500
1000
Sulfate (as SO4) (mg/L)
Station Legend
FR_FR1
FR_HENSEEP3
FR_HENSSEEP1
FR_TURNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW

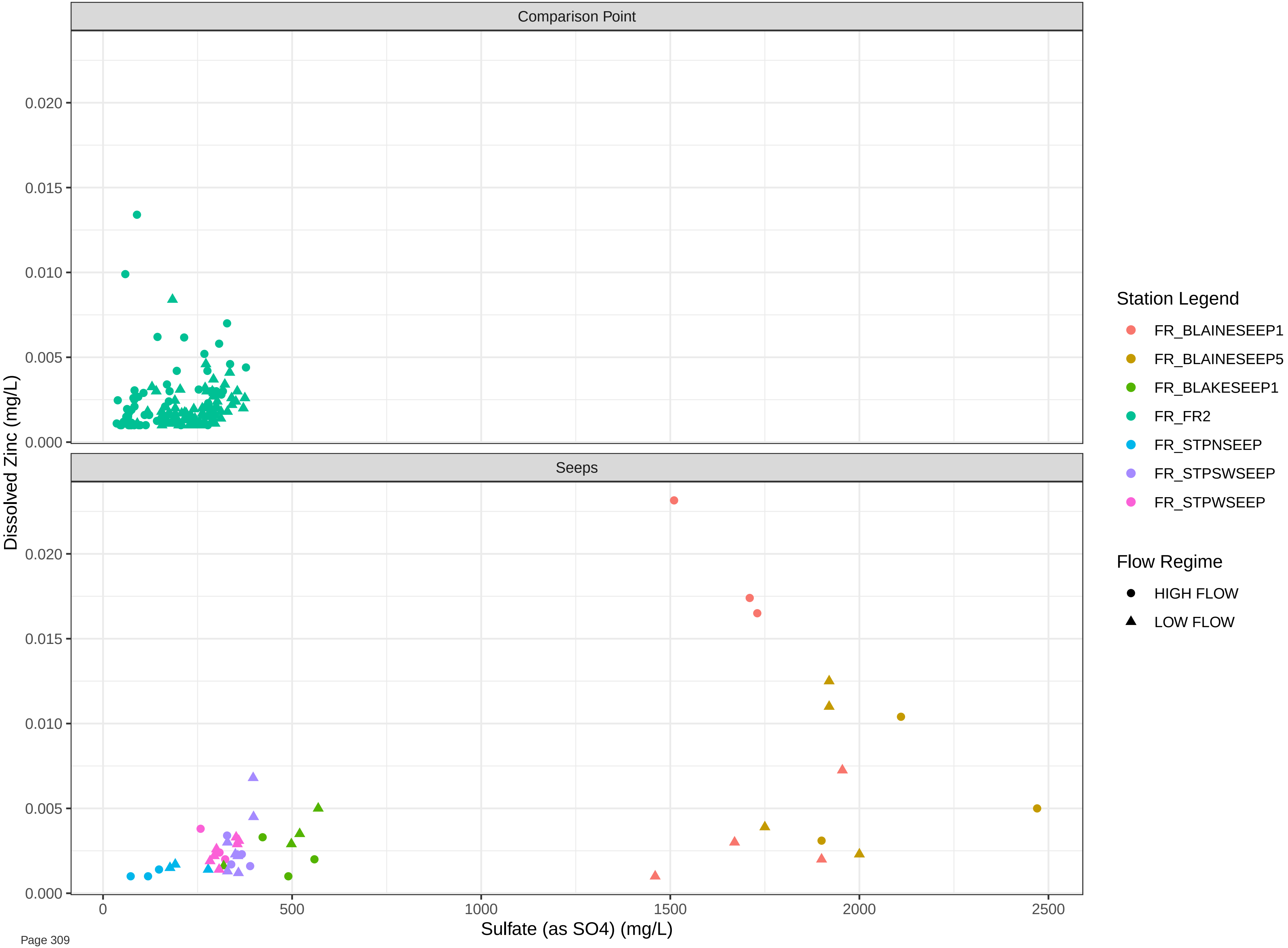

Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
FR_LMCWSEEP5
FR_LMP1
Flow Regime
HIGH FLOW
LOW FLOW

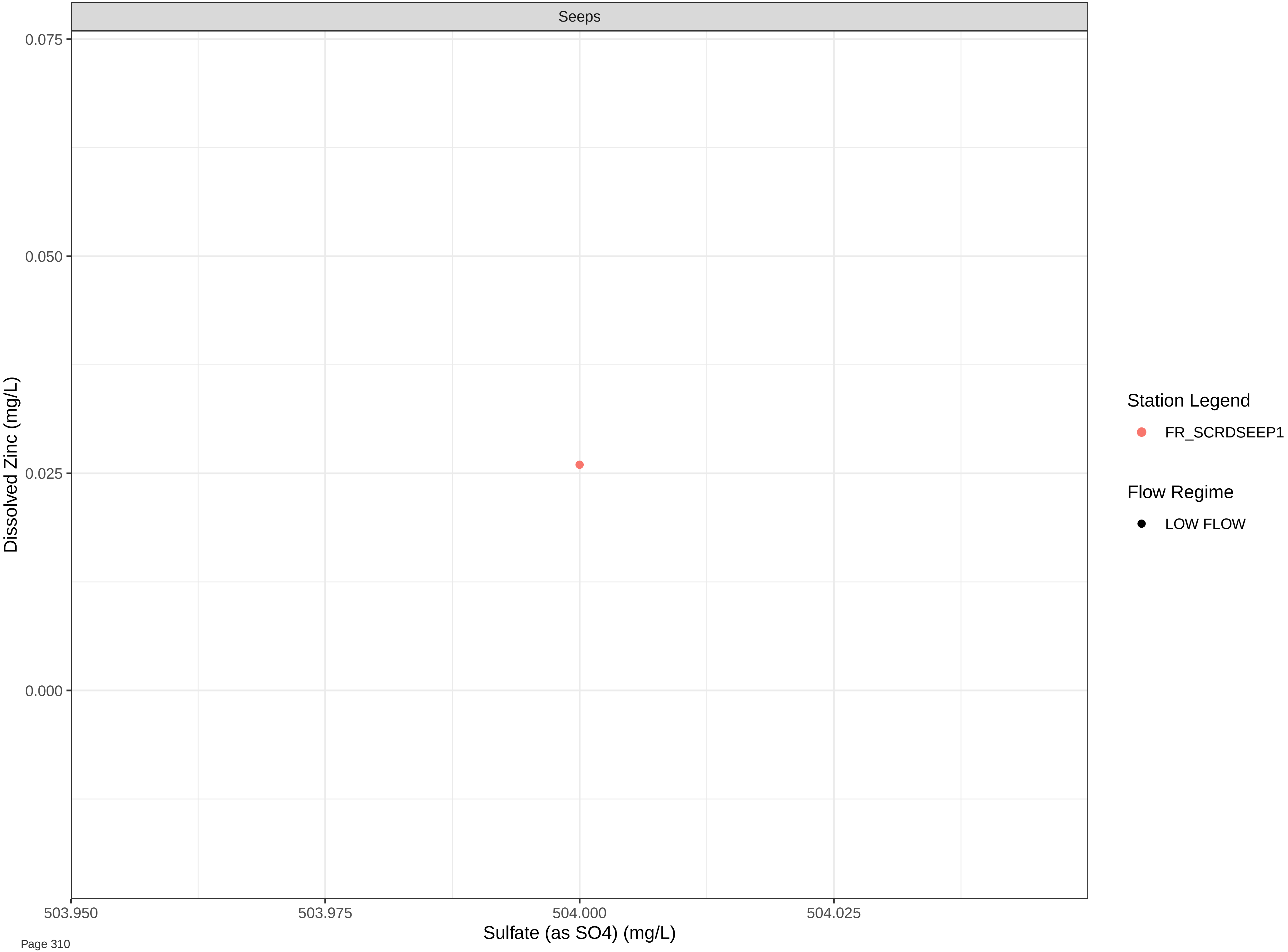

Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
0.03
0.04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
FR_ASPSEEP1
FR_FSEAMWSEEP4
FR_LP1
FR_SHNSEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
0.03
0.04
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
FR_EAGLENORTH
FR_EC1
Flow Regime
HIGH FLOW
LOW FLOW



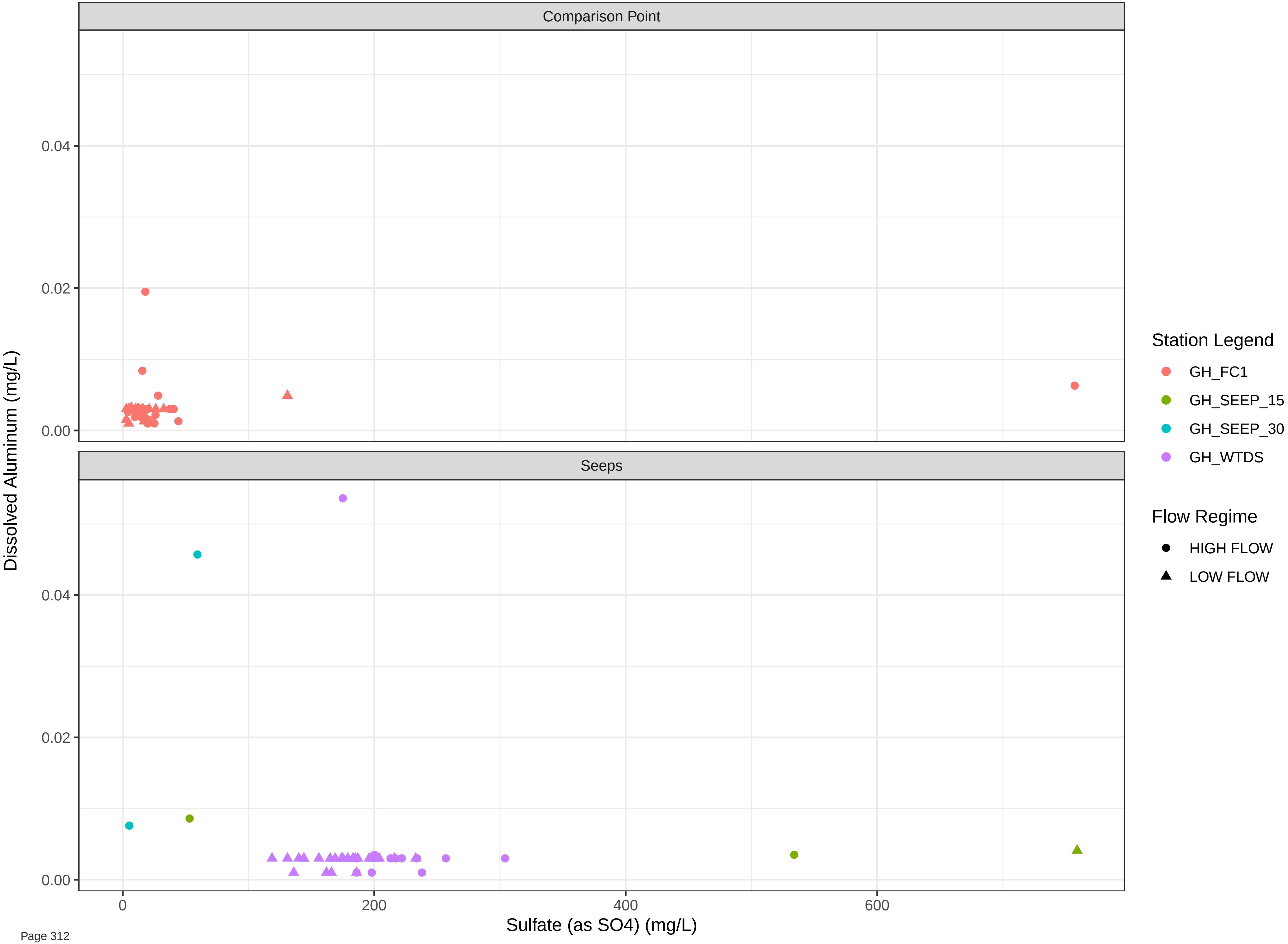
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.000
0.005
0.010
0.015
0.020
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
FR_FRVWSEEP3
FR_SP1
Flow Regime
HIGH FLOW
LOW FLOW

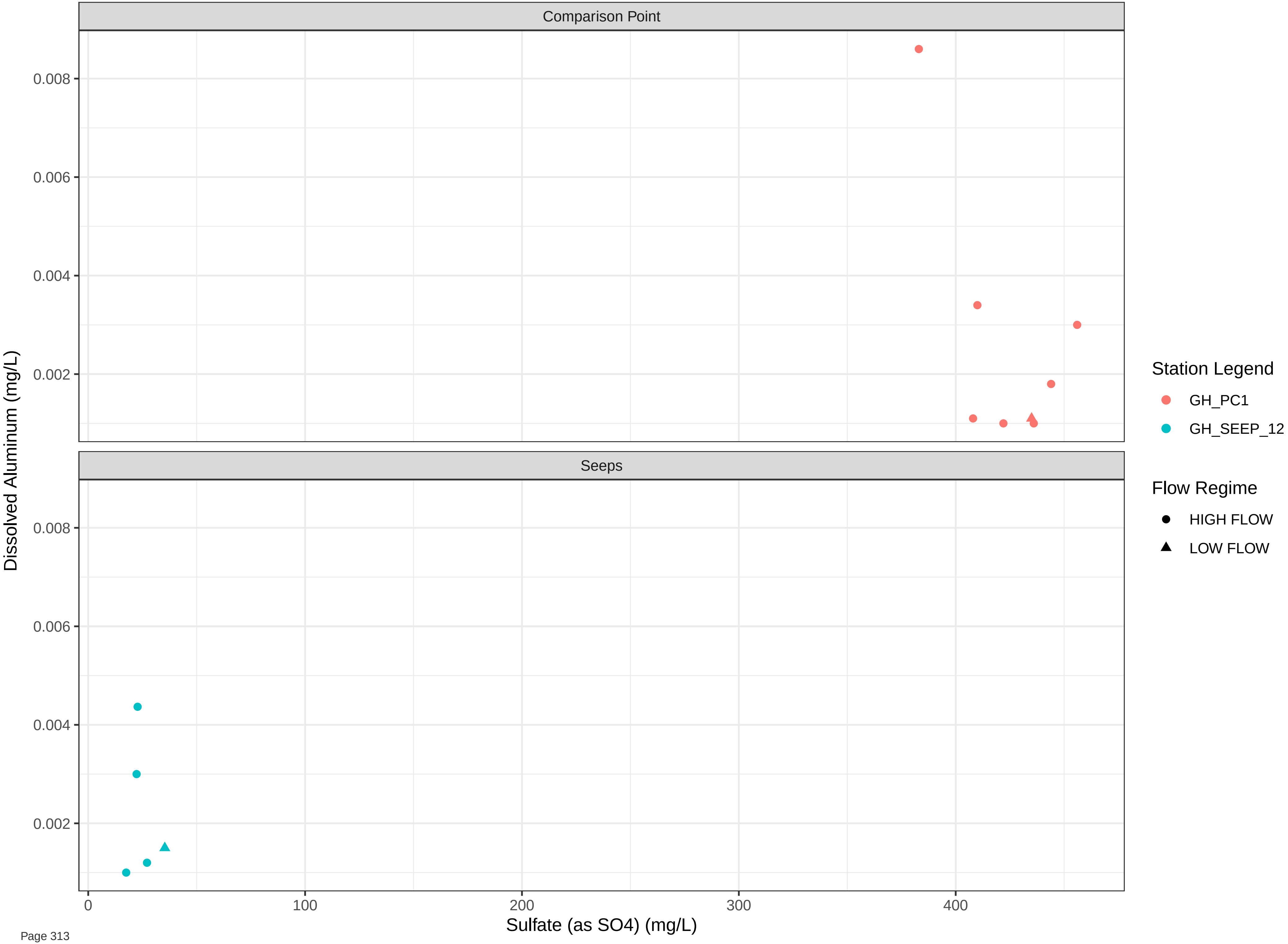

Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.000
0.005
0.010
0.015
0.020
Sulfate (as SO4) (mg/L)
0
500
1000
1500
2000
2500
Station Legend
FR_BLAINESEEP1
FR_BLAINESEEP5
FR_BLAKESEEP1
FR_FR2
FR_STPNSEEP
FR_STPSWSEEP
FR_STPWSEEP
Flow Regime
HIGH FLOW
LOW FLOW

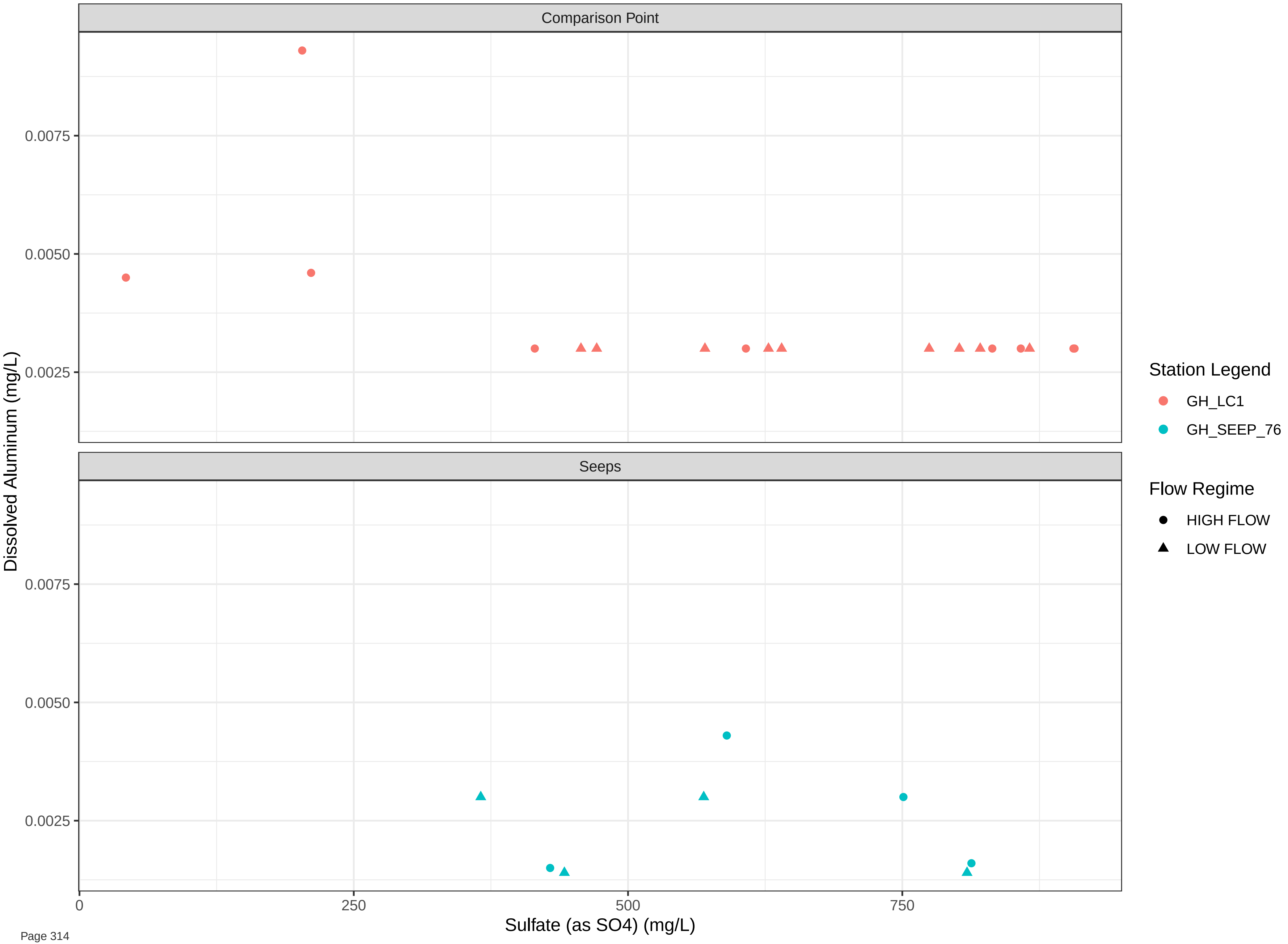


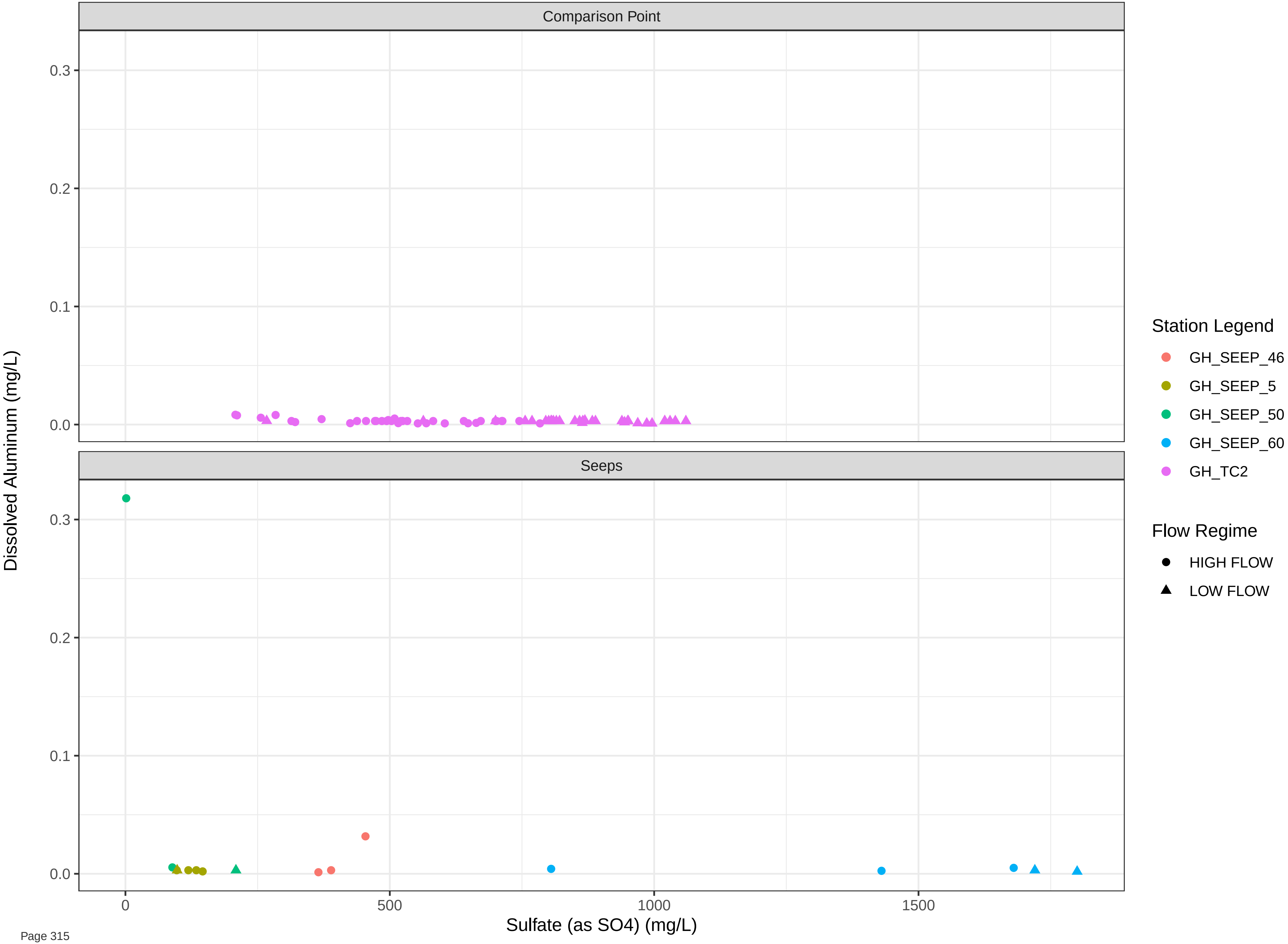
Seeps
0.075
0.050
0.025
0.000
Dissolved Zinc (mg/L)
503.950
503.975
504.000
504.025
Sulfate (as SO4) (mg/L)
Station Legend
FR_SCRDSEEP1
Flow Regime
LOW FLOW

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.12
0.09
0.06
0.03
0.00
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

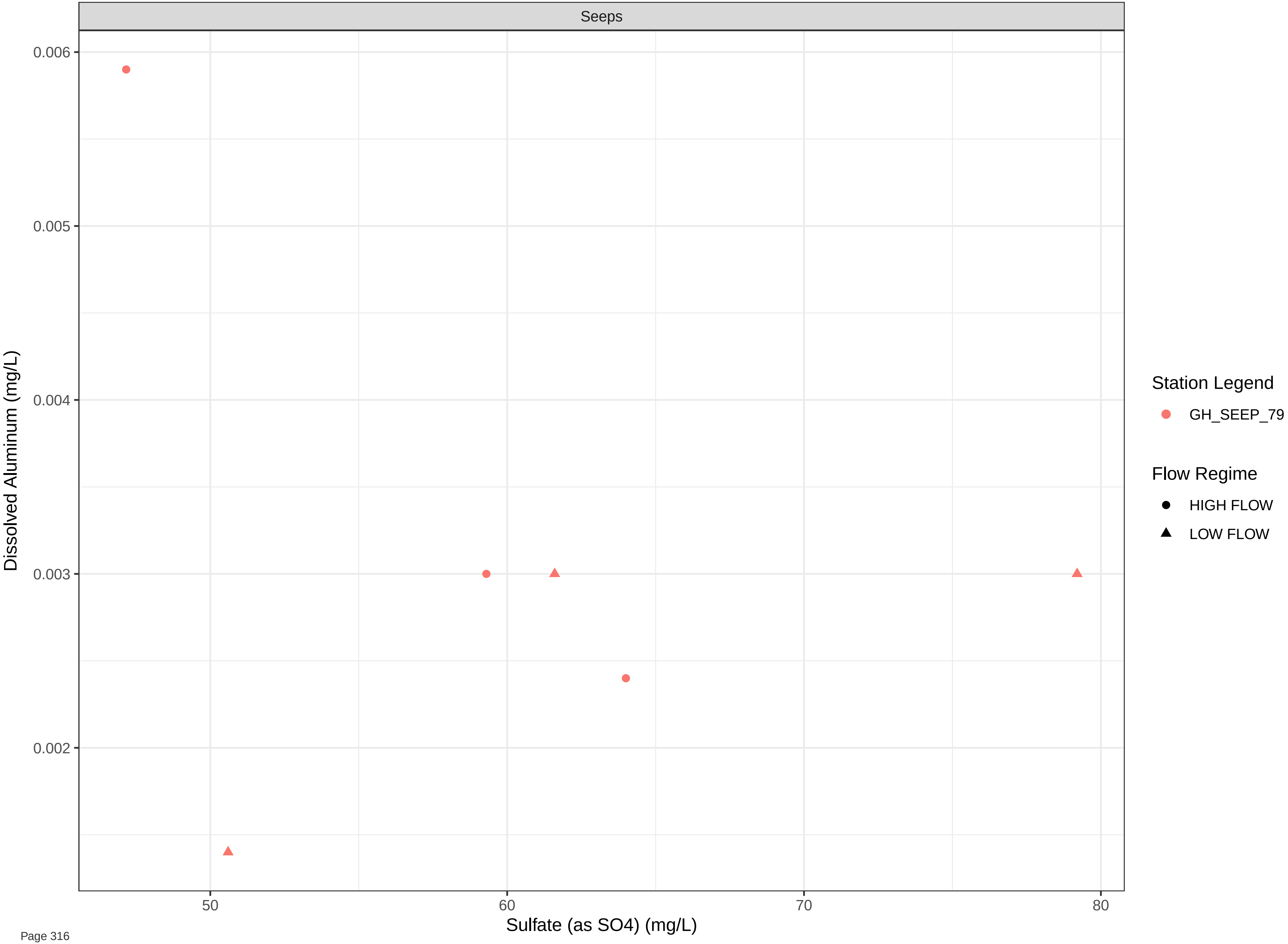

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
0.00
0.02
0.04
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.008
0.006
0.004
0.002
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

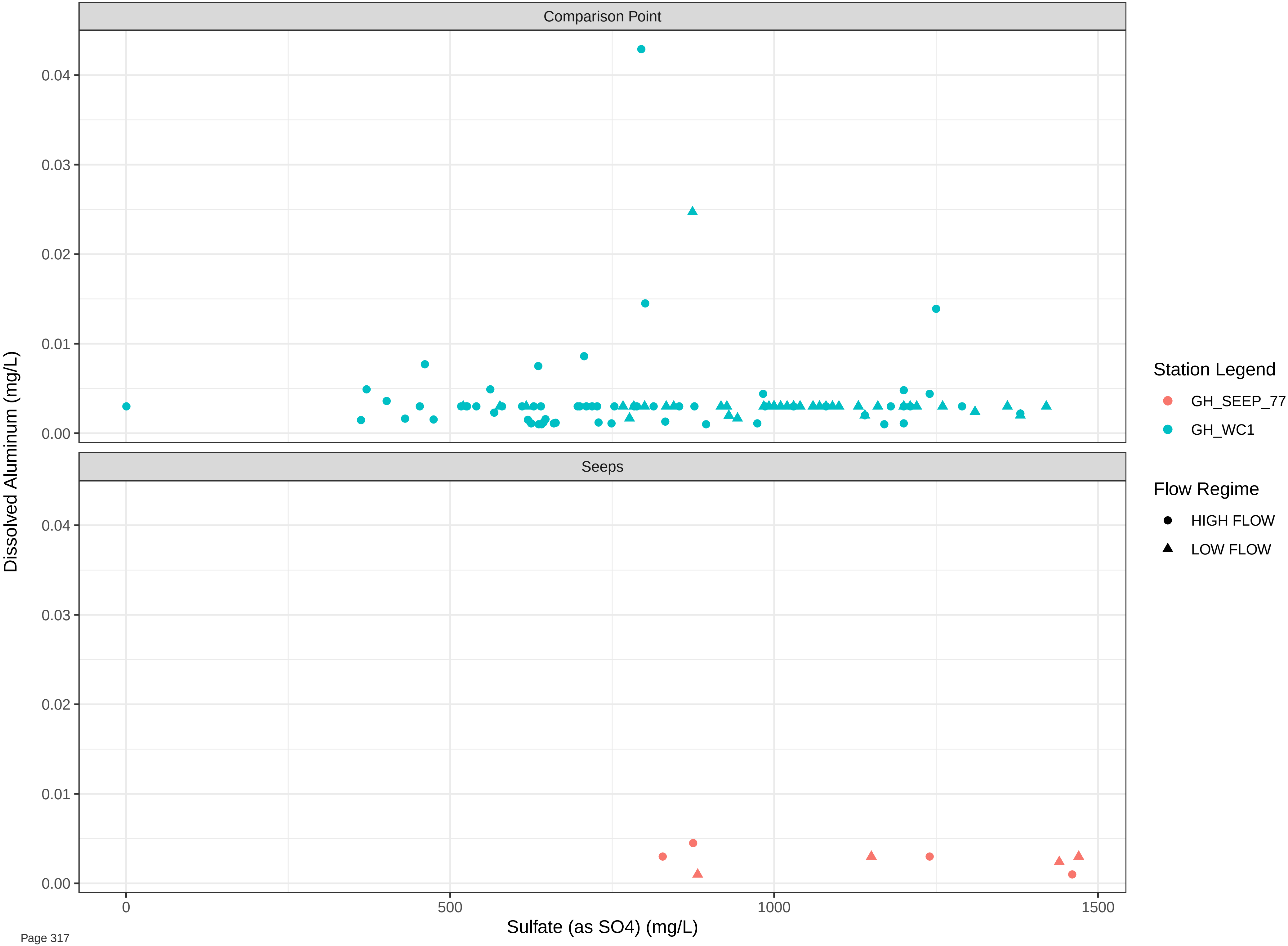

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.0075
0.0050
0.0025
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



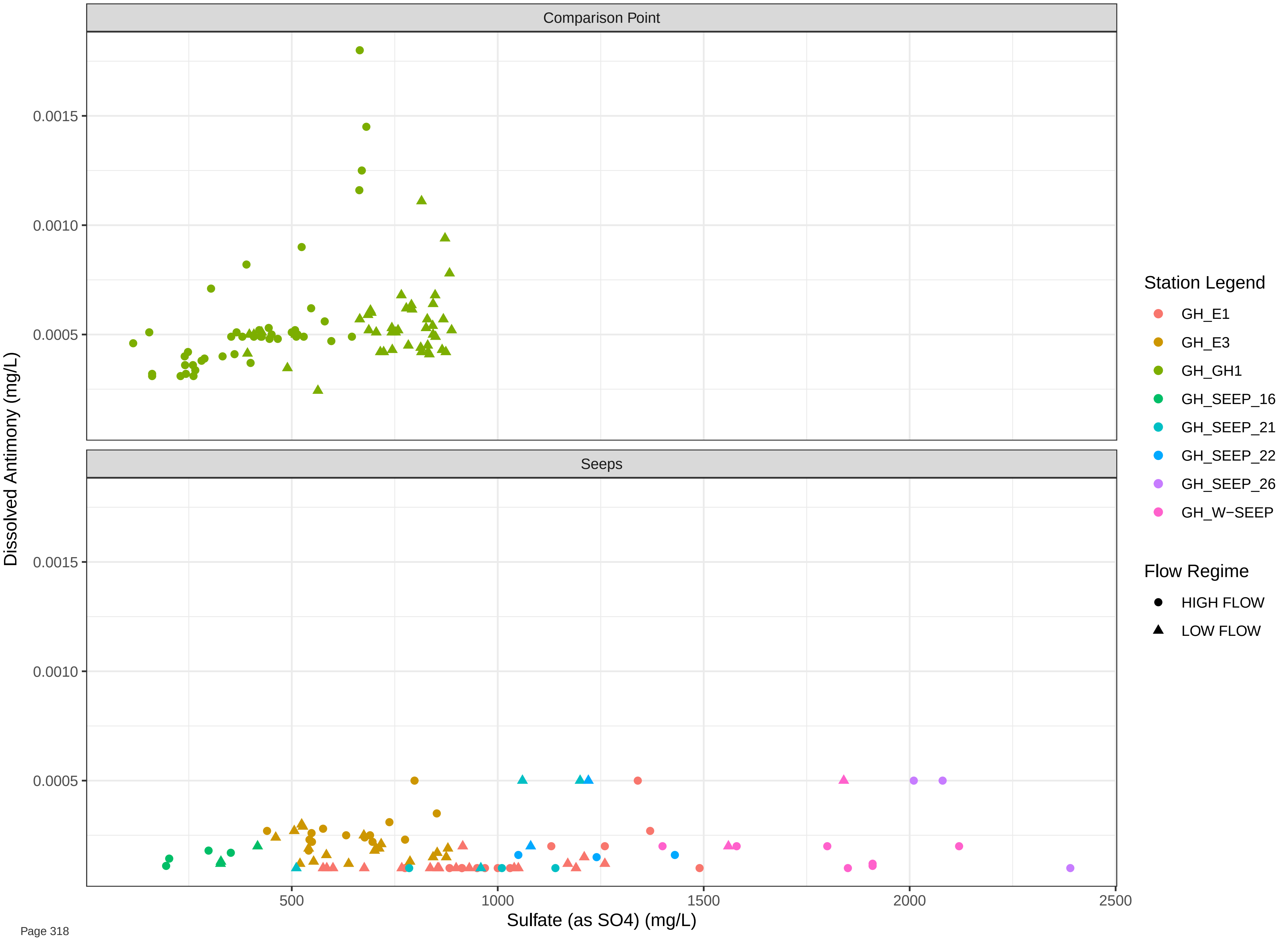
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0.3
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

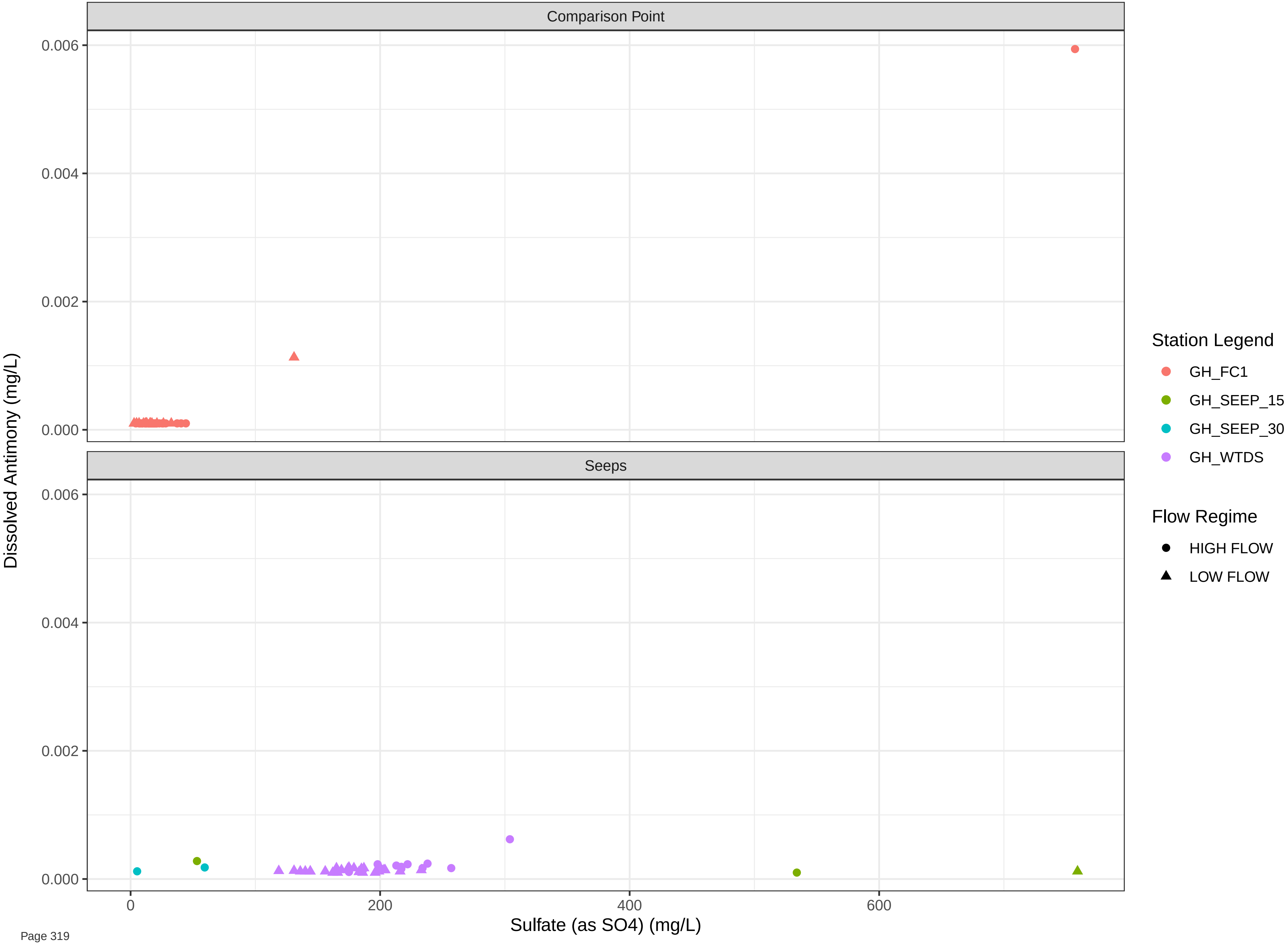


Seeps
0.006
0.005
0.004
0.003
0.002
Dissolved Aluminum (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

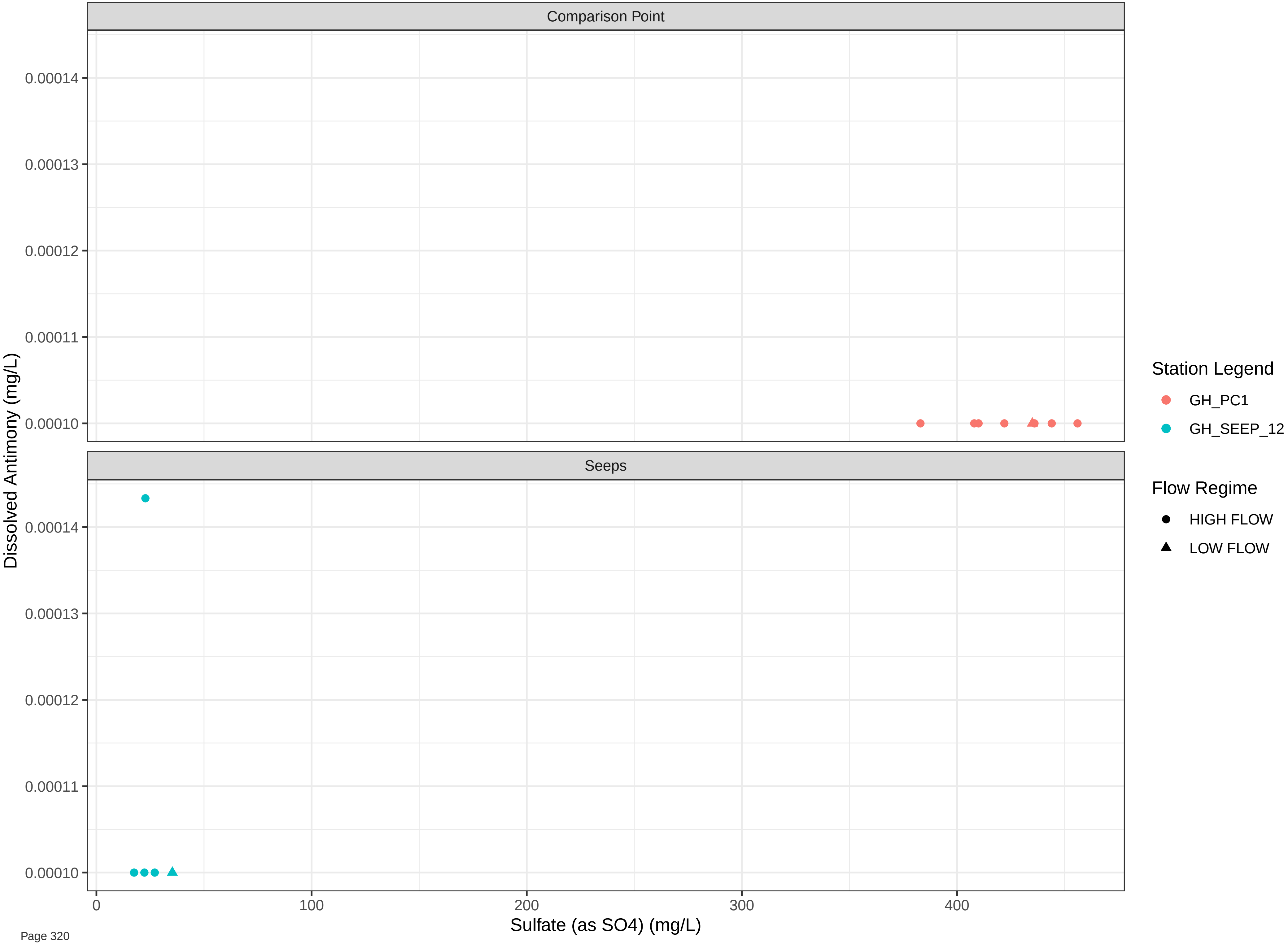


Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.00
0.01
0.02
0.03
0.04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

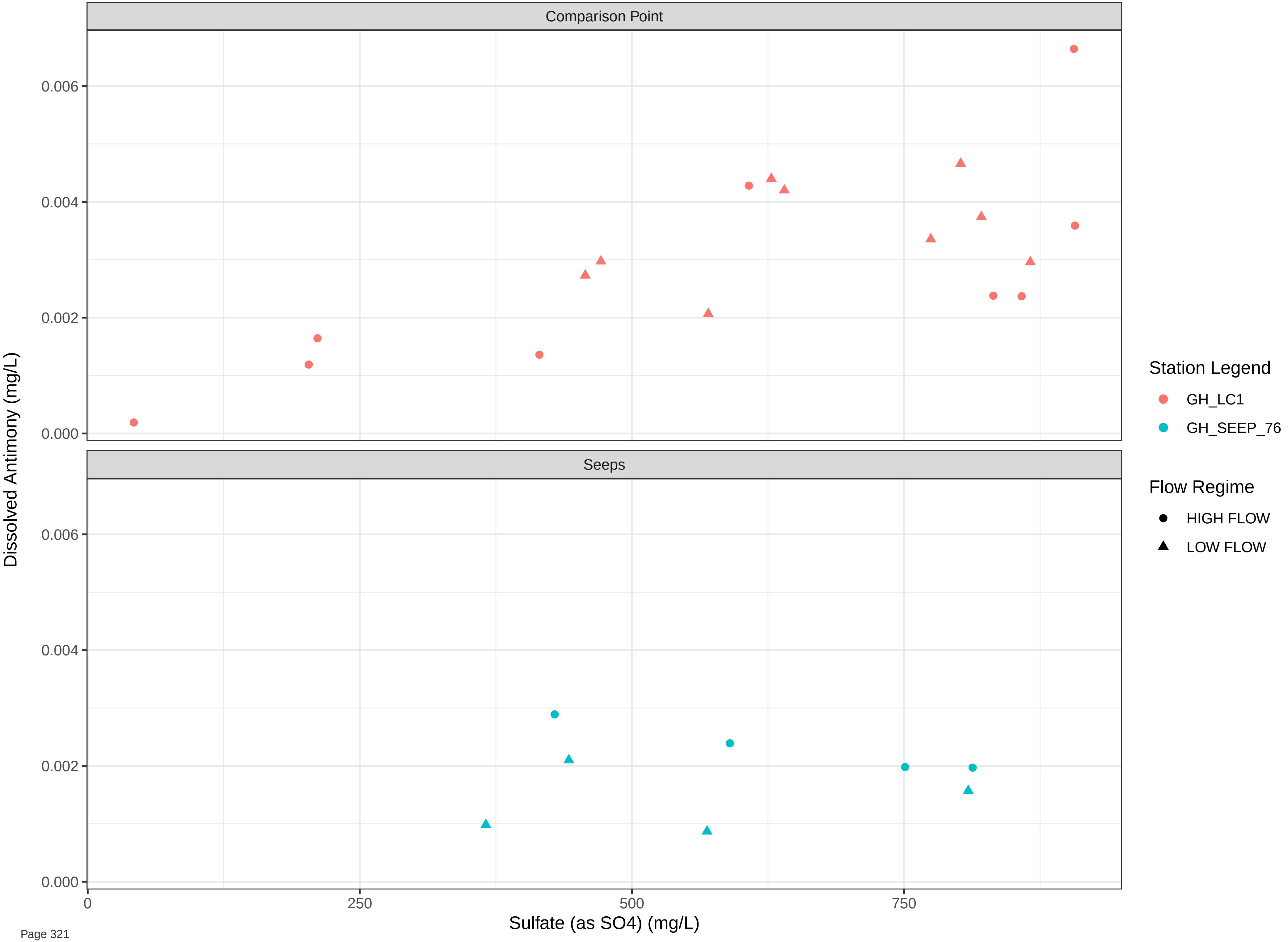

Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.0015
0.0010
0.0005
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

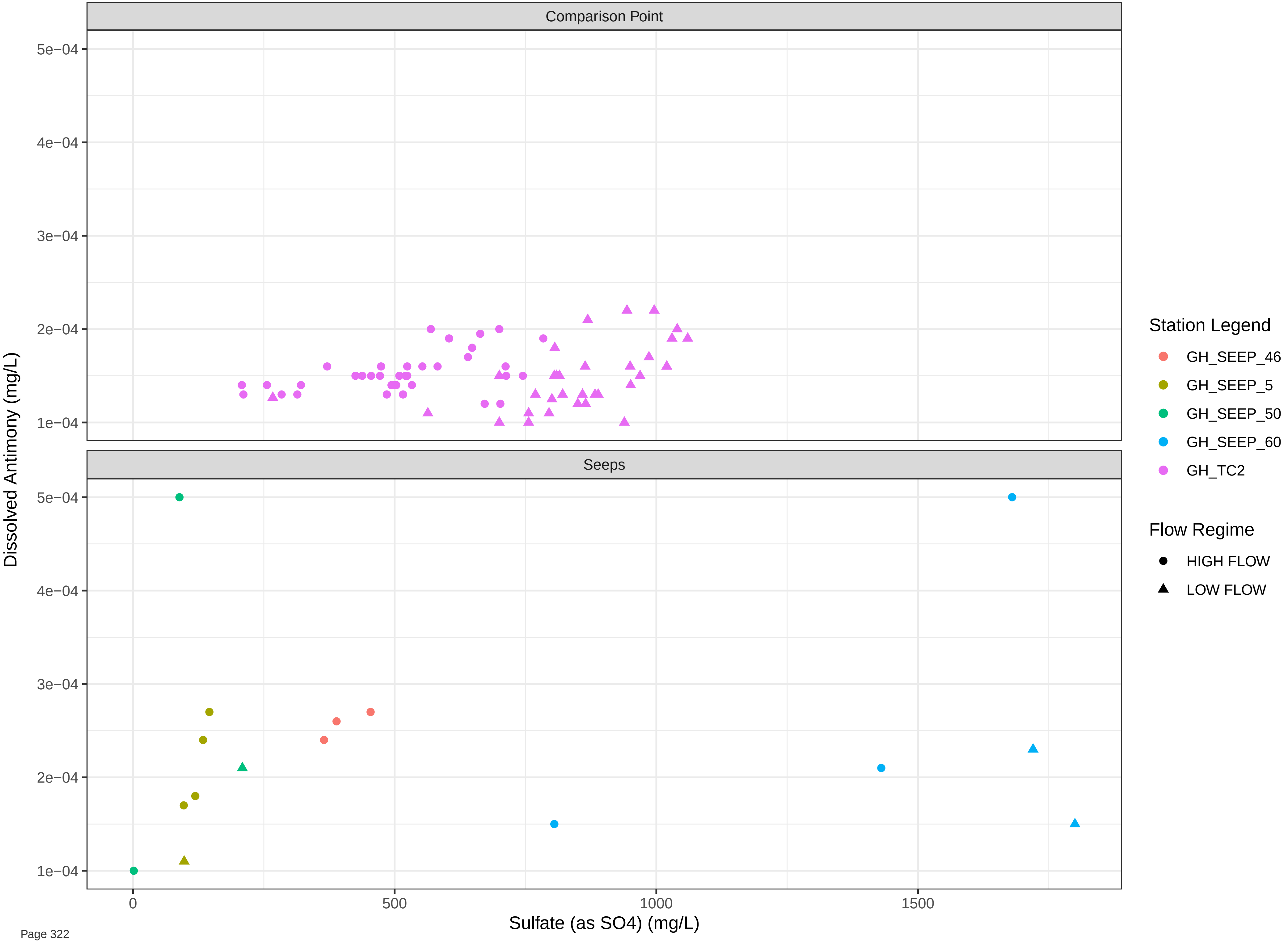


Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.000
0.002
0.004
0.006
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

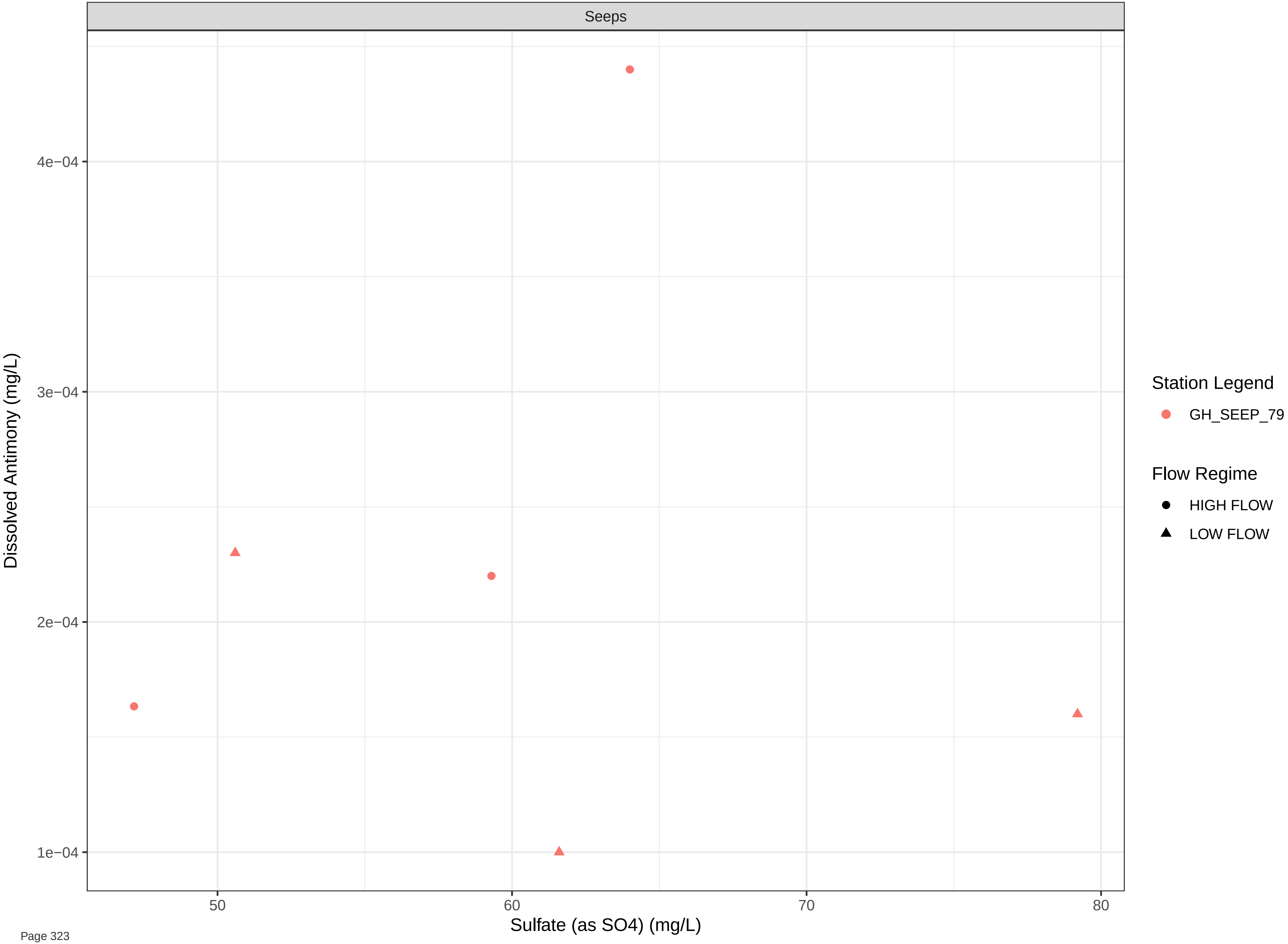


Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
0.00010
0.00011
0.00012
0.00013
0.00014
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

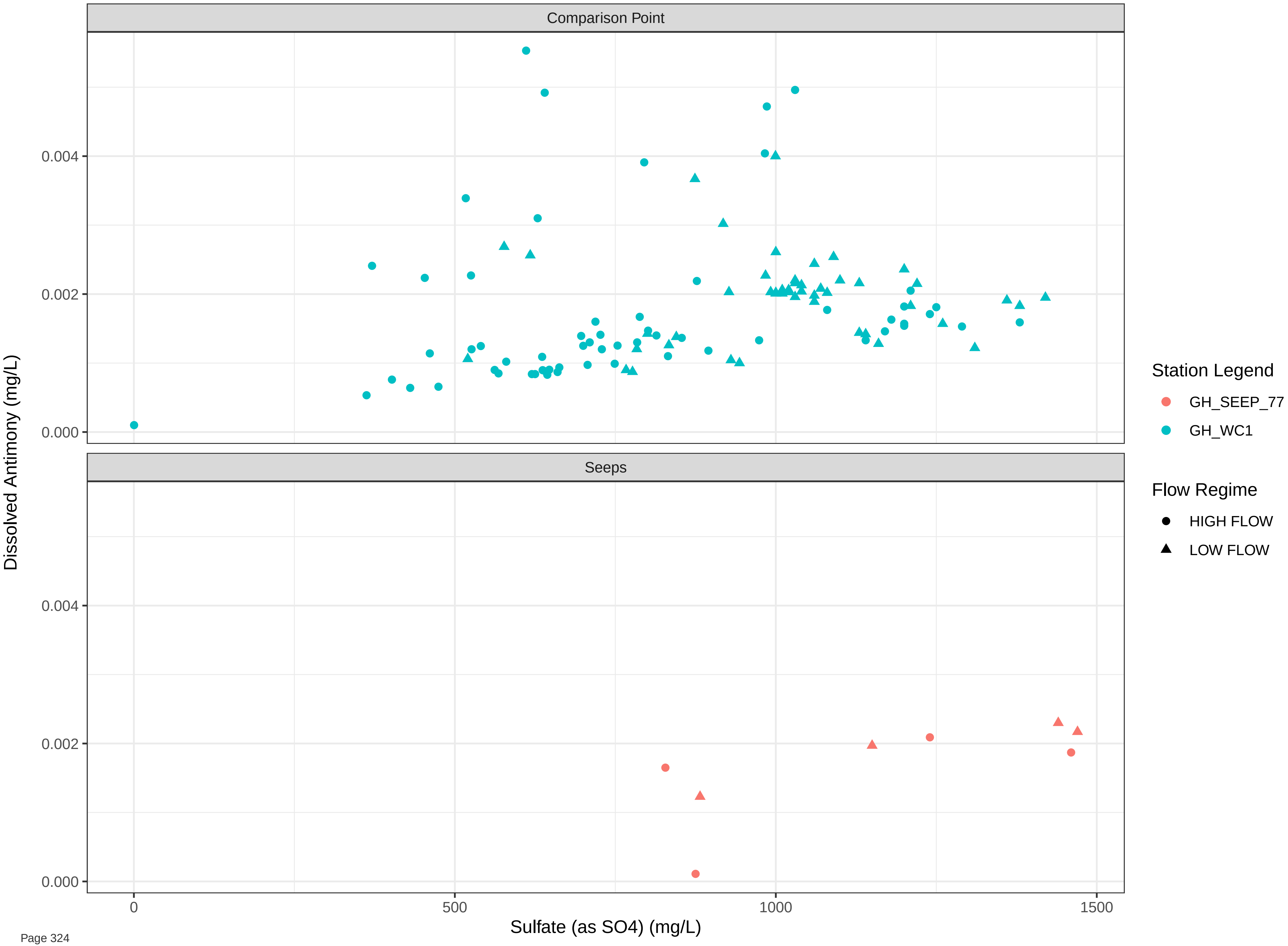

Comparison Point
Seeps
0.000
0.002
0.004
0.006
0
250
500
750
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

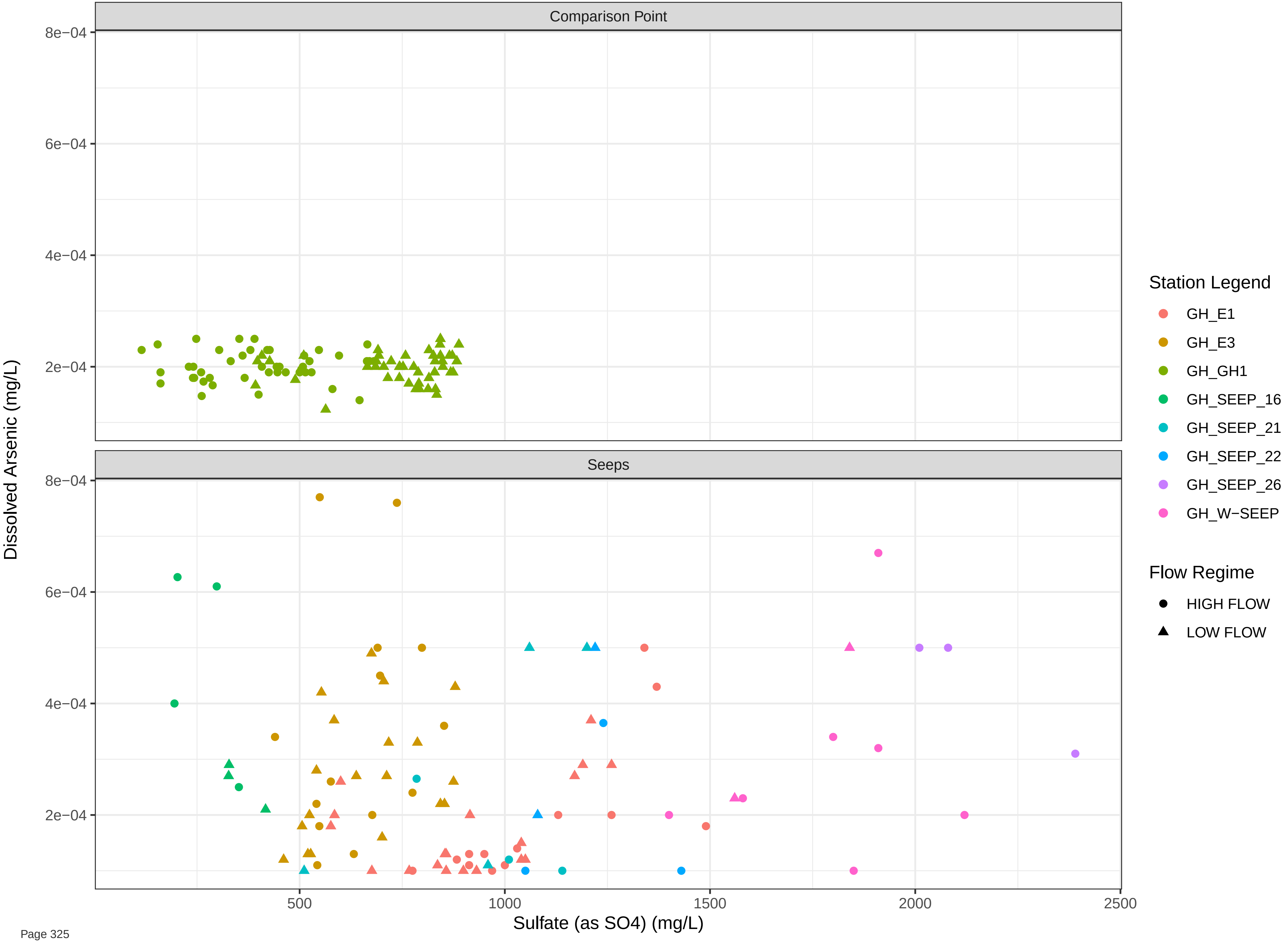


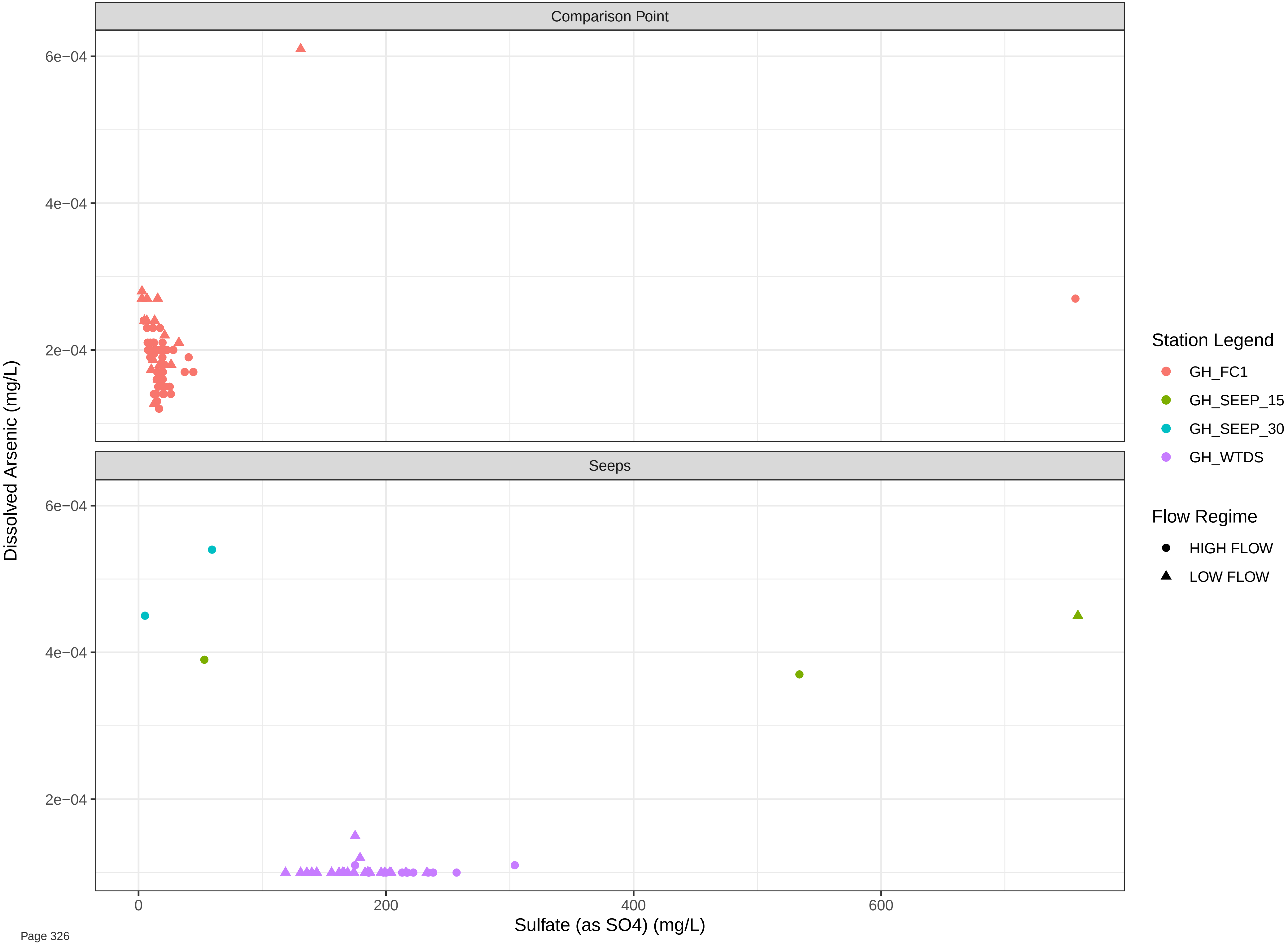
Comparison Point
Seeps
Dissolved Antimony (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

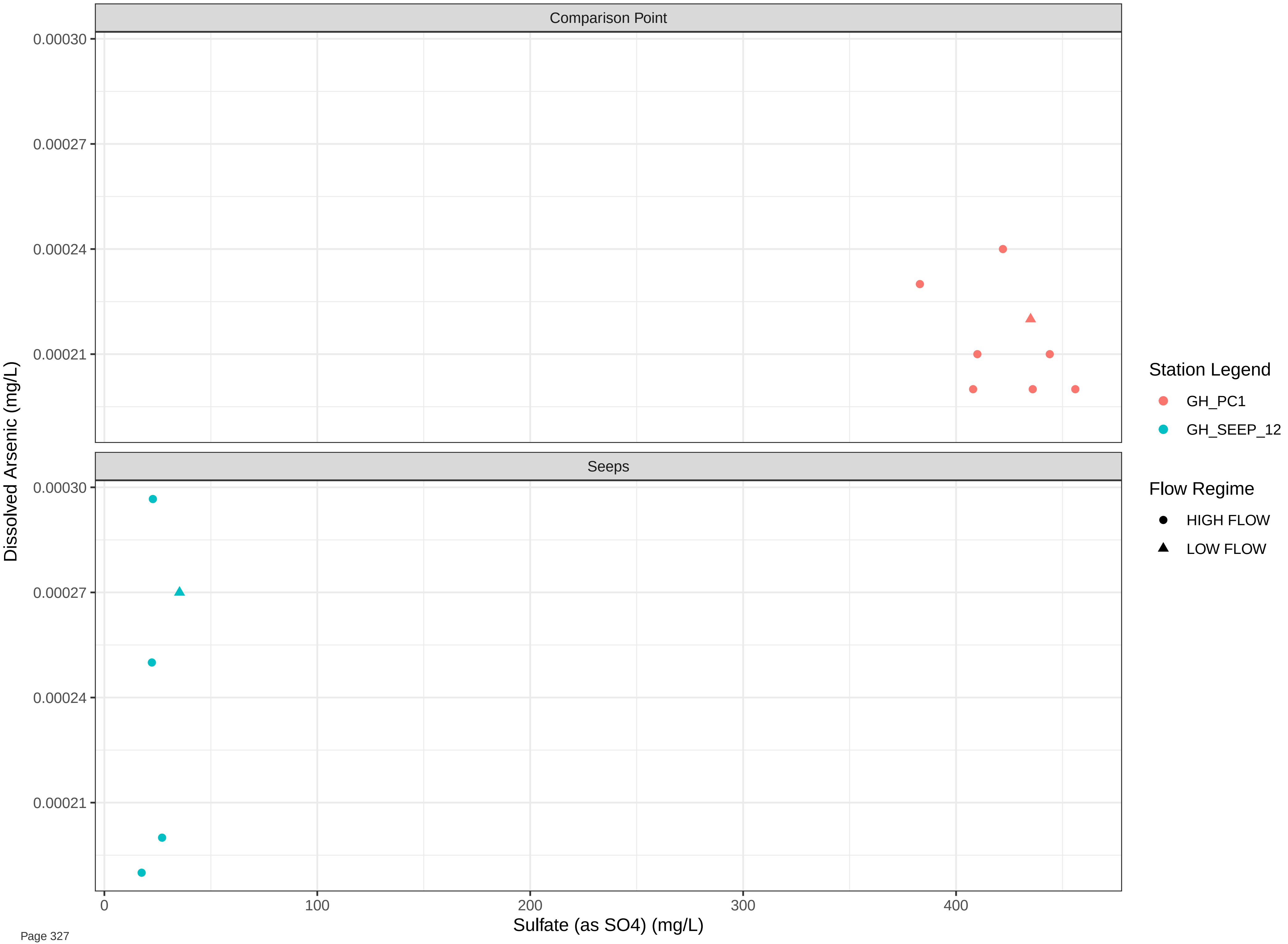


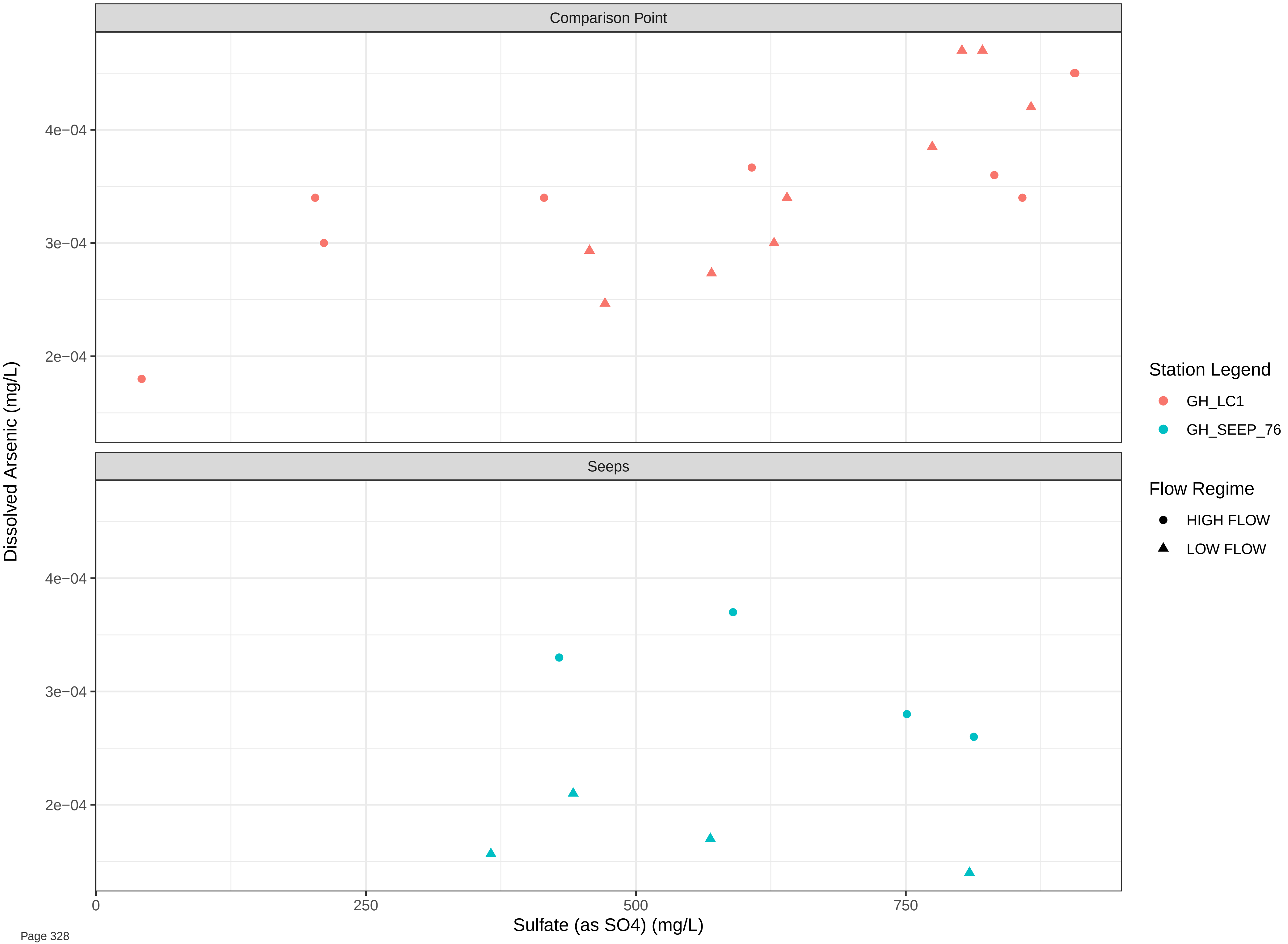
Seeps
4e−04
3e−04
2e−04
1e−04
Dissolved Antimony (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

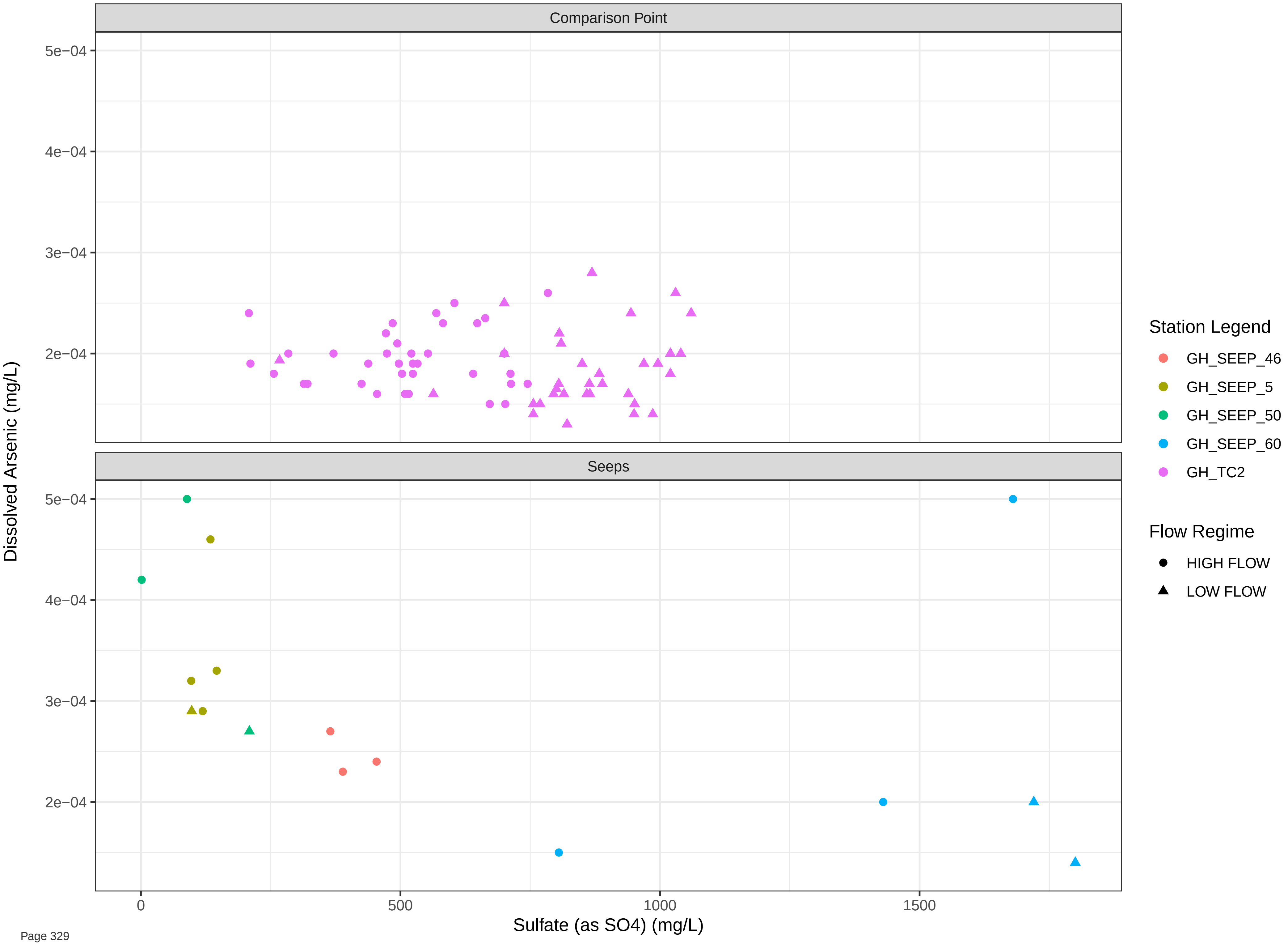

Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.000
0.002
0.004
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
8e−04
6e−04
4e−04
2e−04
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

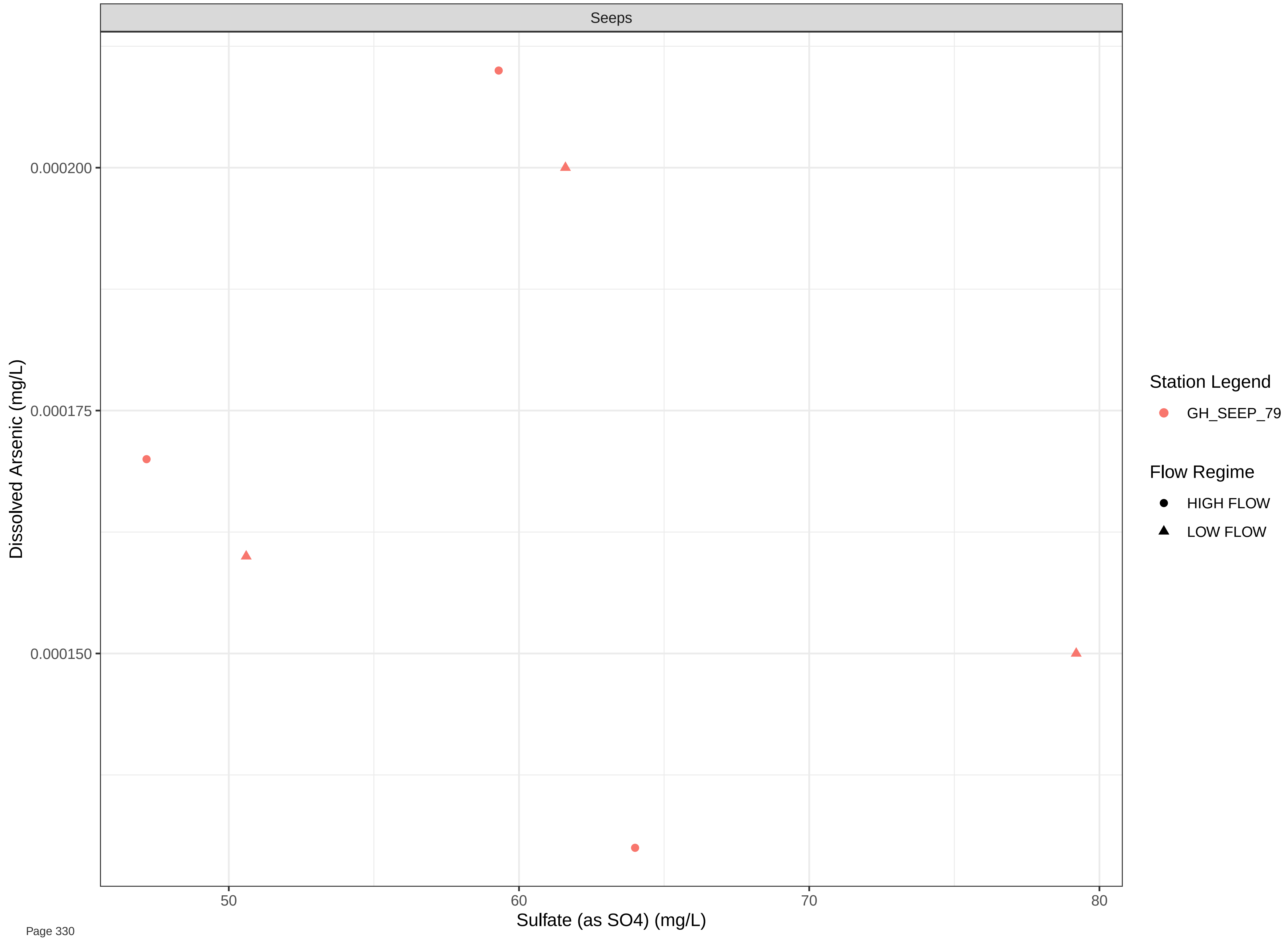

Comparison Point
Seeps
6e−04
4e−04
2e−04
0
200
400
600
Dissolved Arsenic (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00030
0.00027
0.00024
0.00021
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
4e−04
3e−04
2e−04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

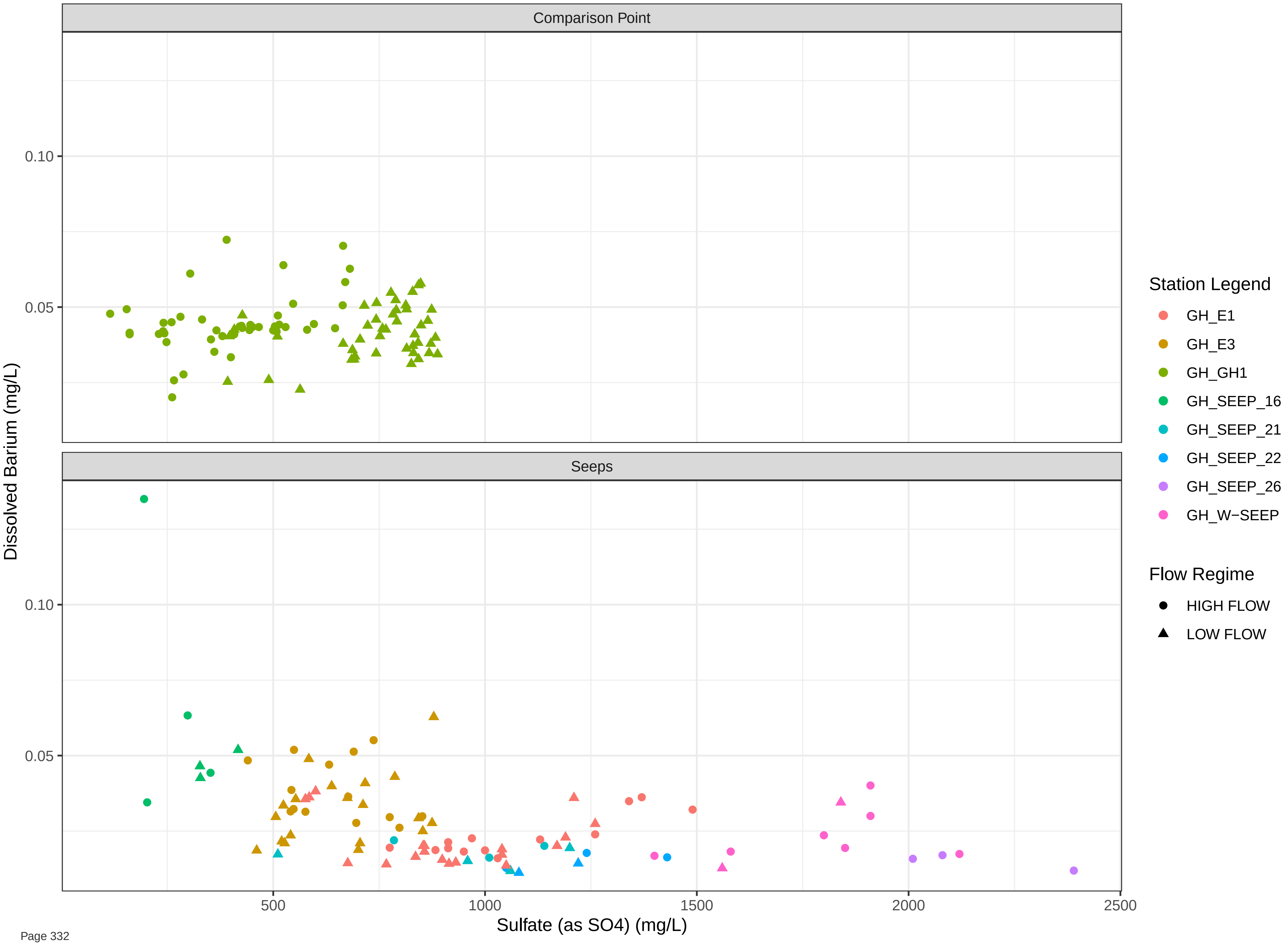


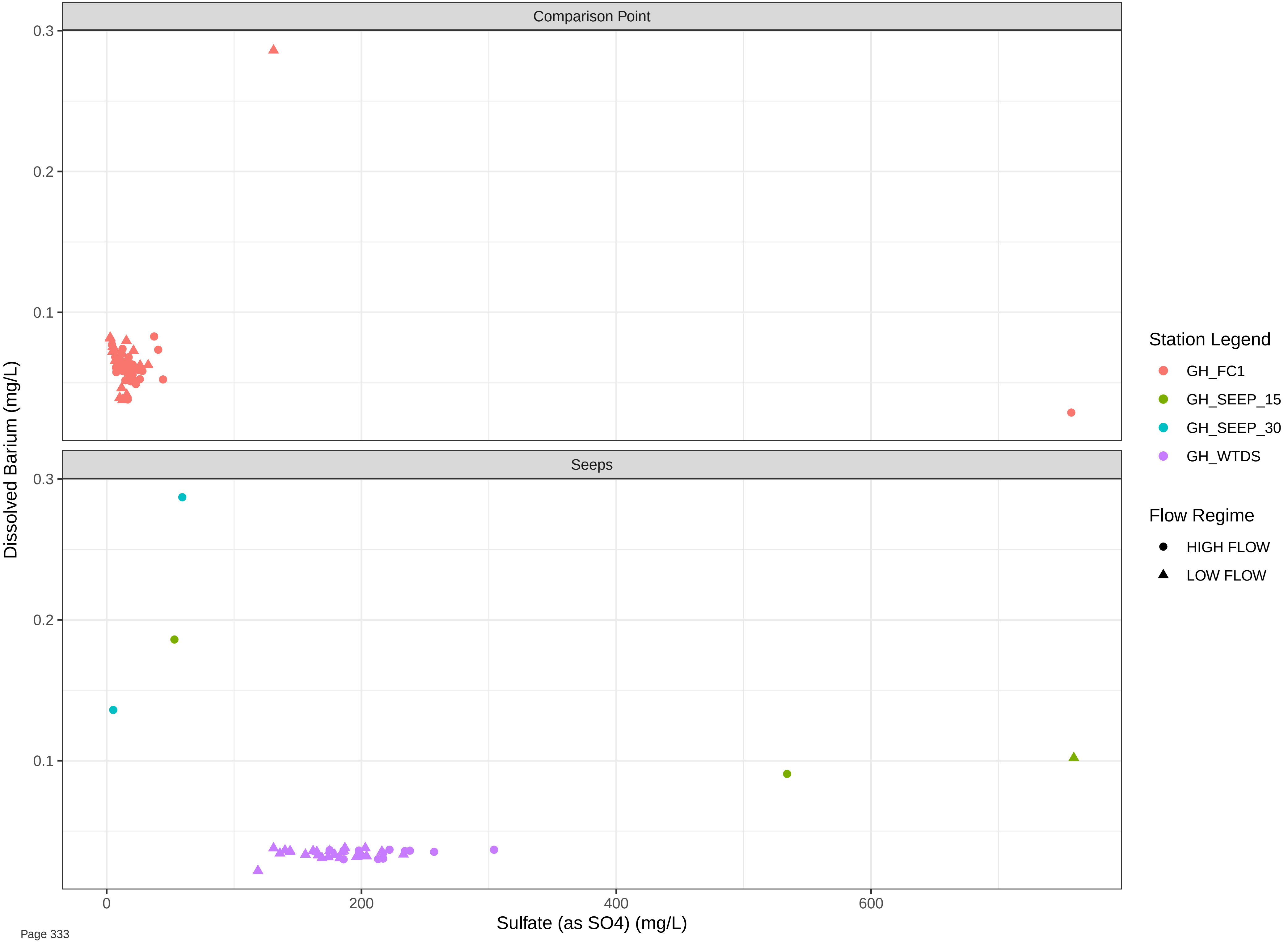
Comparison Point
Seeps
Dissolved Arsenic (mg/L)
5e−04
4e−04
3e−04
2e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

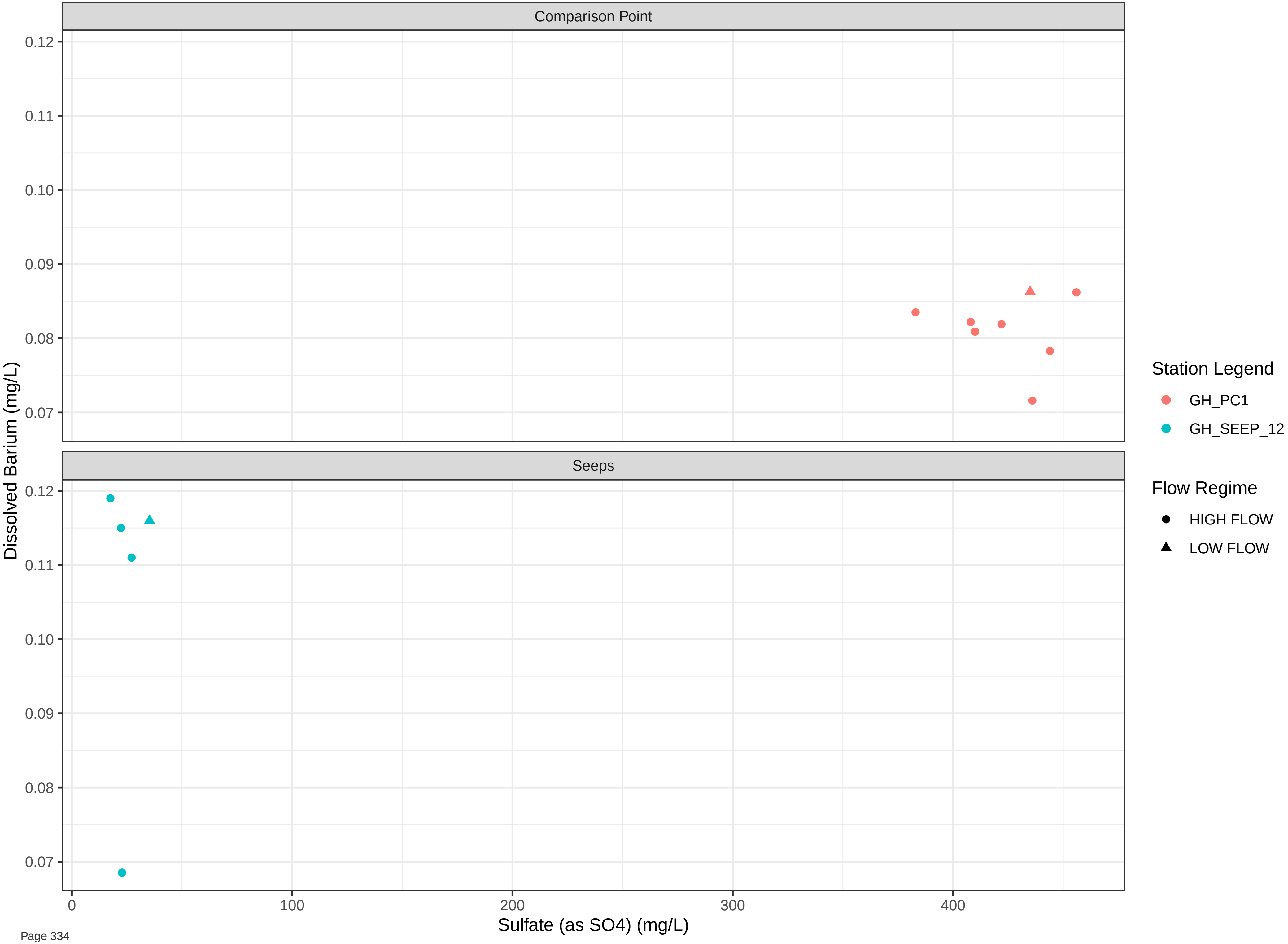


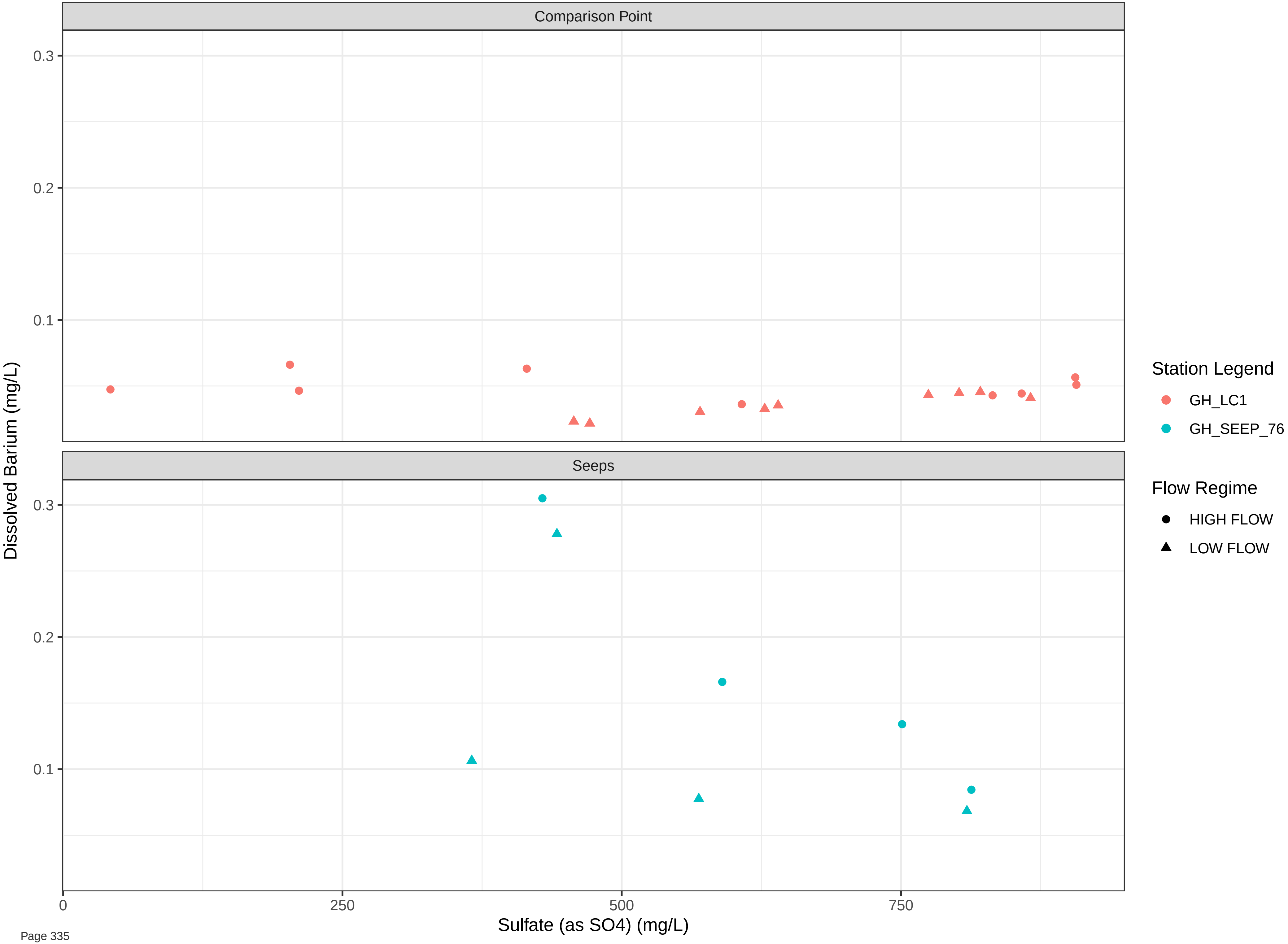
Seeps
Dissolved Arsenic (mg/L)
0.000200
0.000175
0.000150
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Arsenic (mg/L)
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

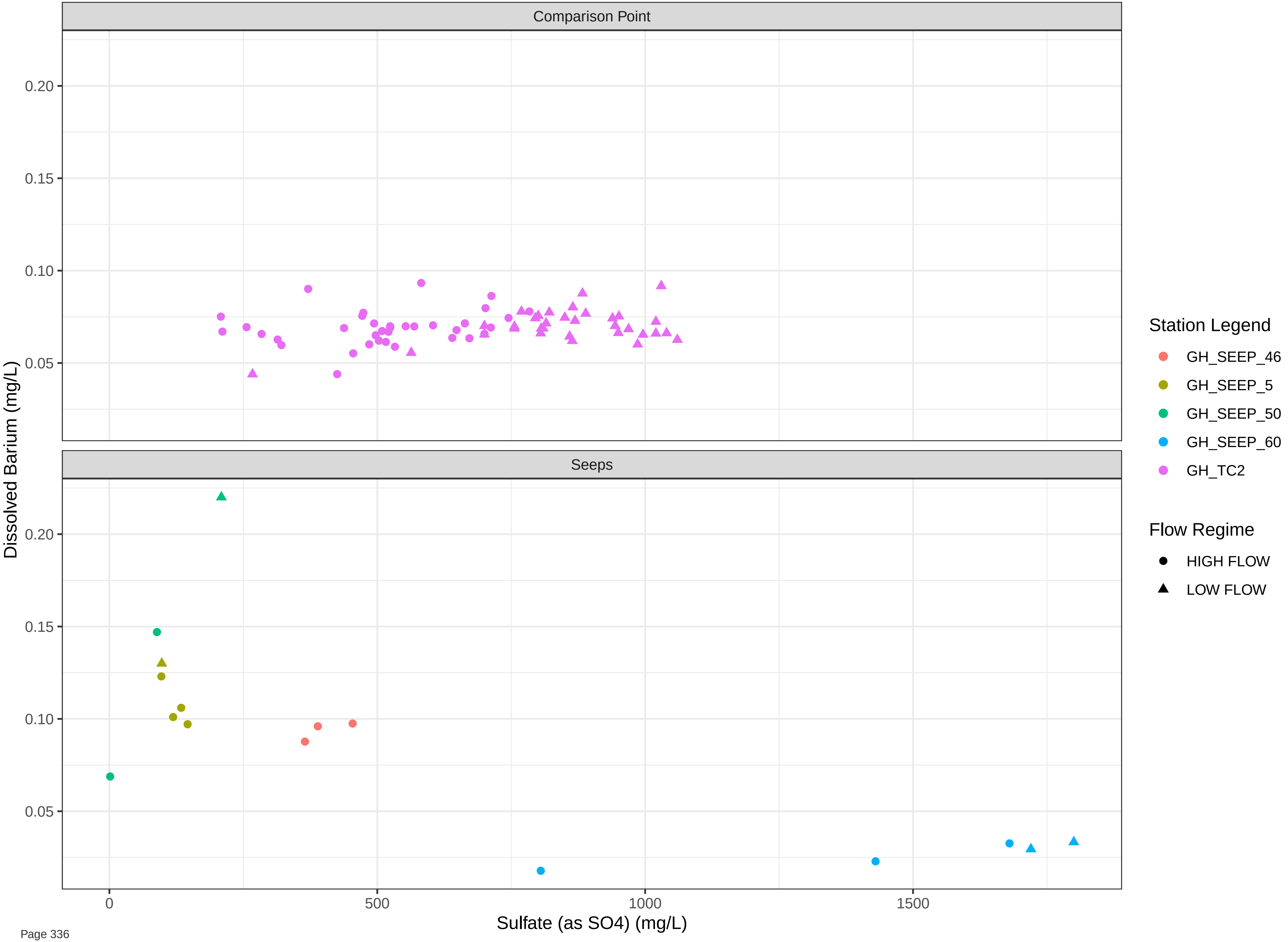

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.10
0.05
0.10
0.05
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

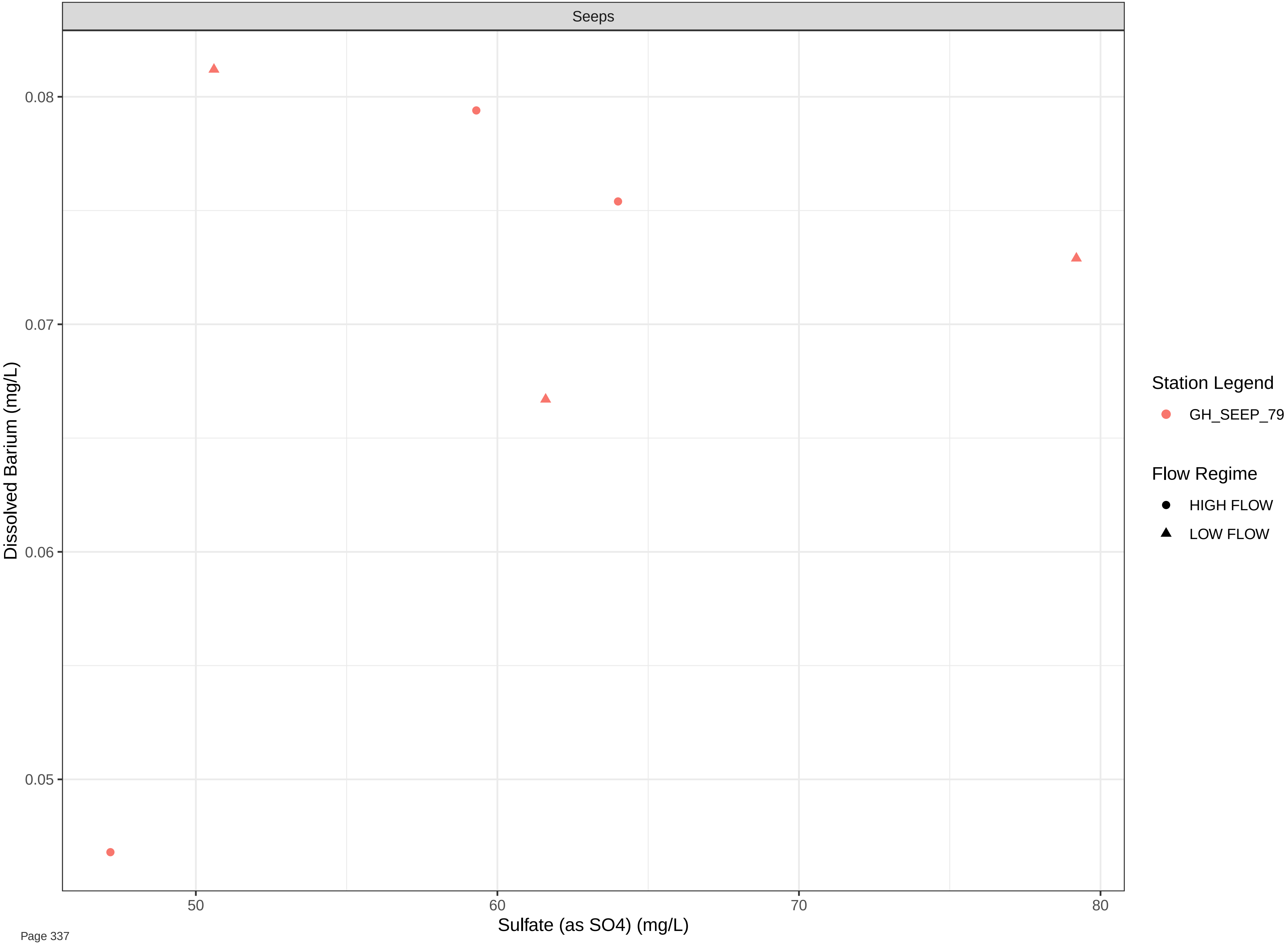

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.1
0.2
0.3
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

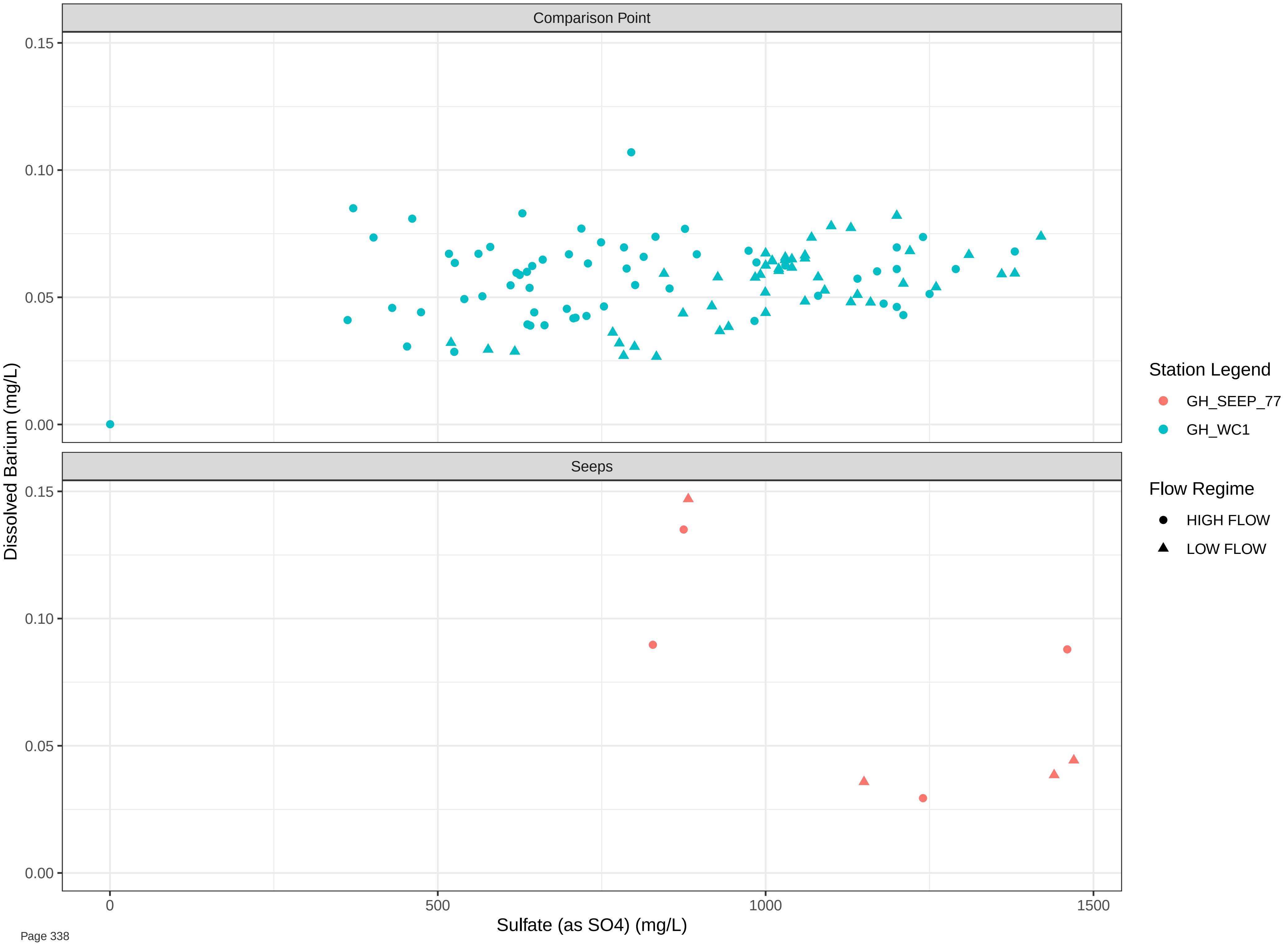

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.12
0.11
0.10
0.09
0.08
0.07
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

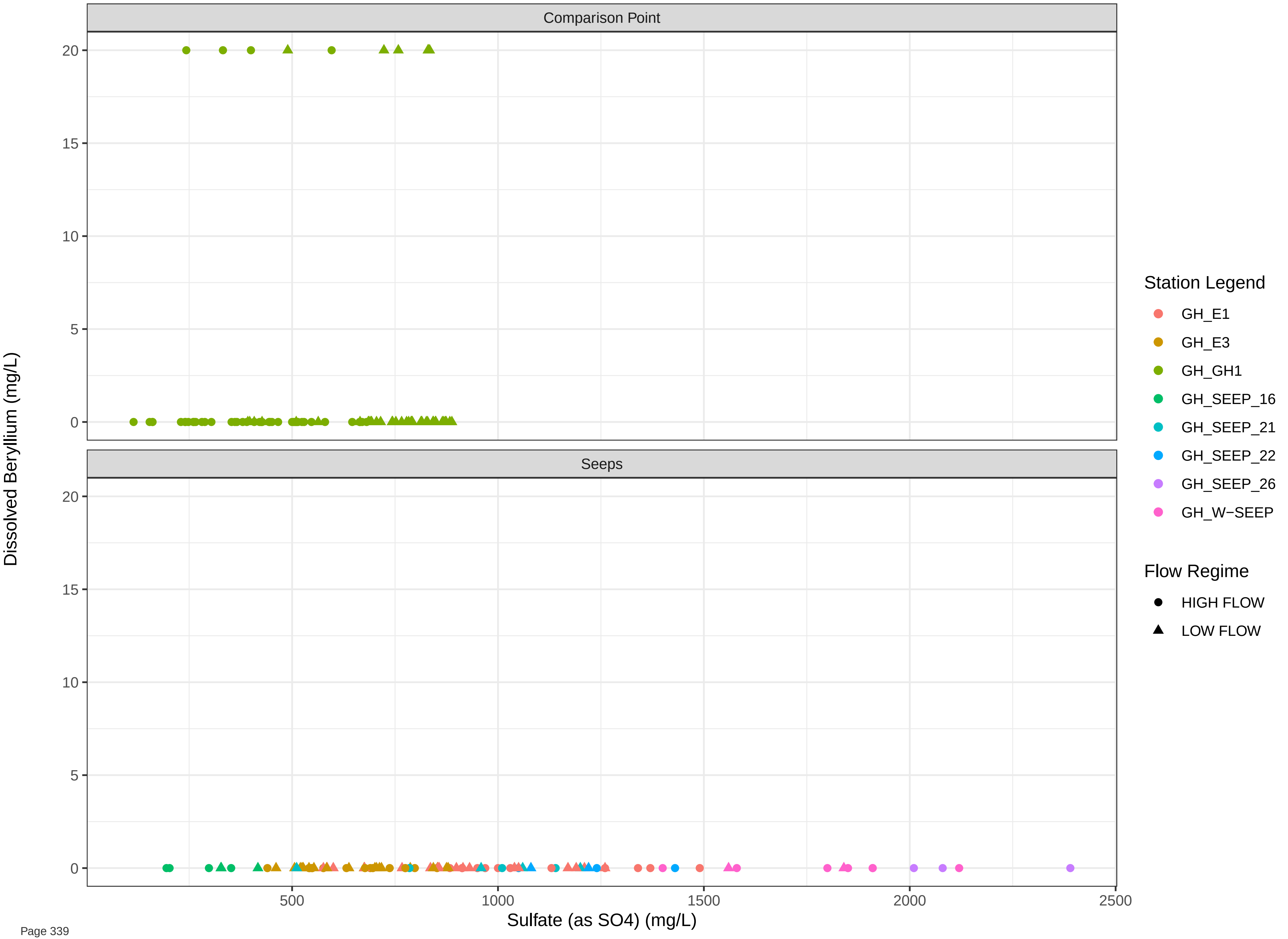


Comparison Point
Seeps
Dissolved Barium (mg/L)
0.3
0.2
0.1
0.3
0.2
0.1
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

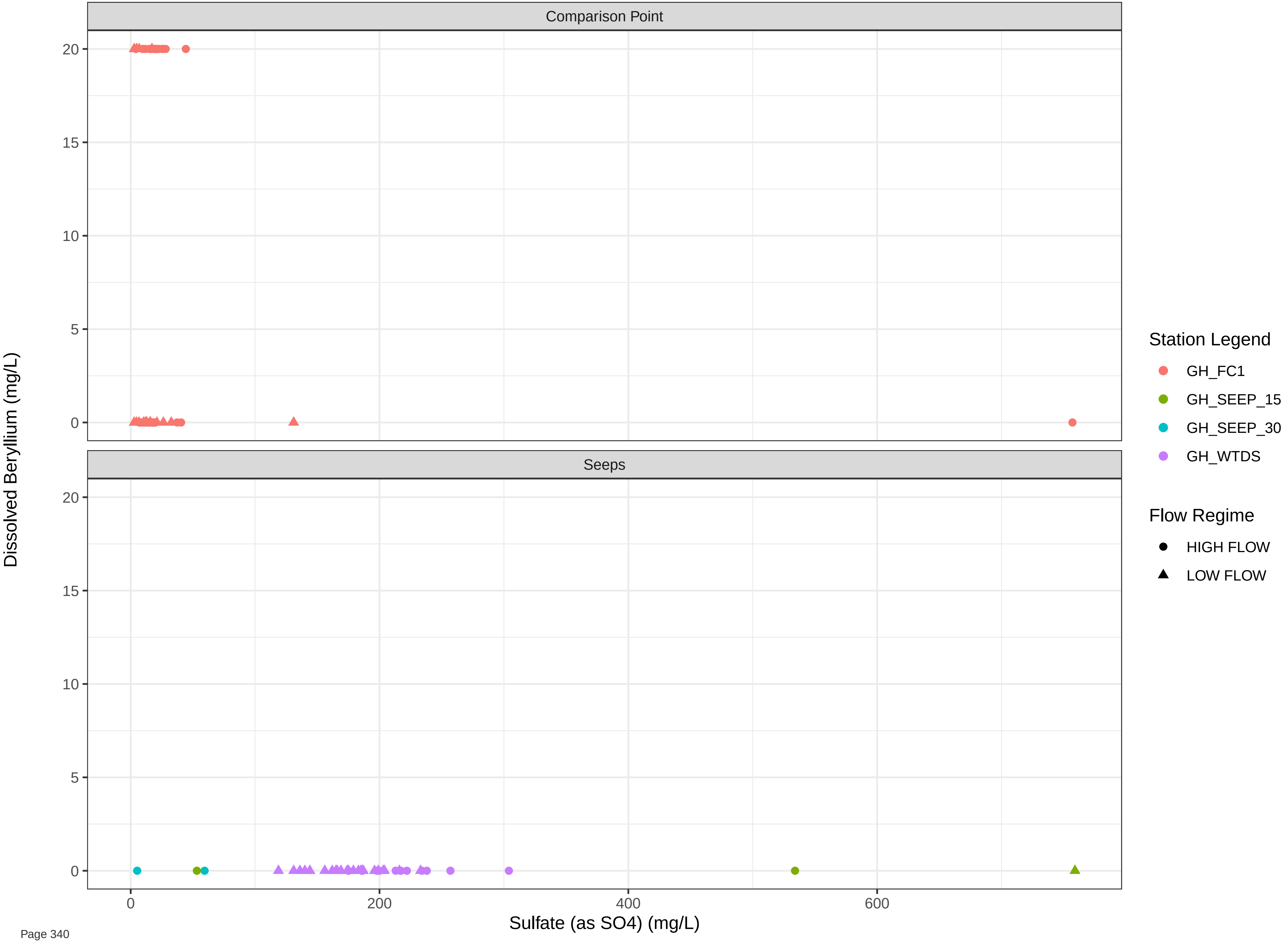

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.05
0.10
0.15
0.20
Sulfate (as SO4) (mg/L)
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.08
0.07
0.06
0.05
Dissolved Barium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

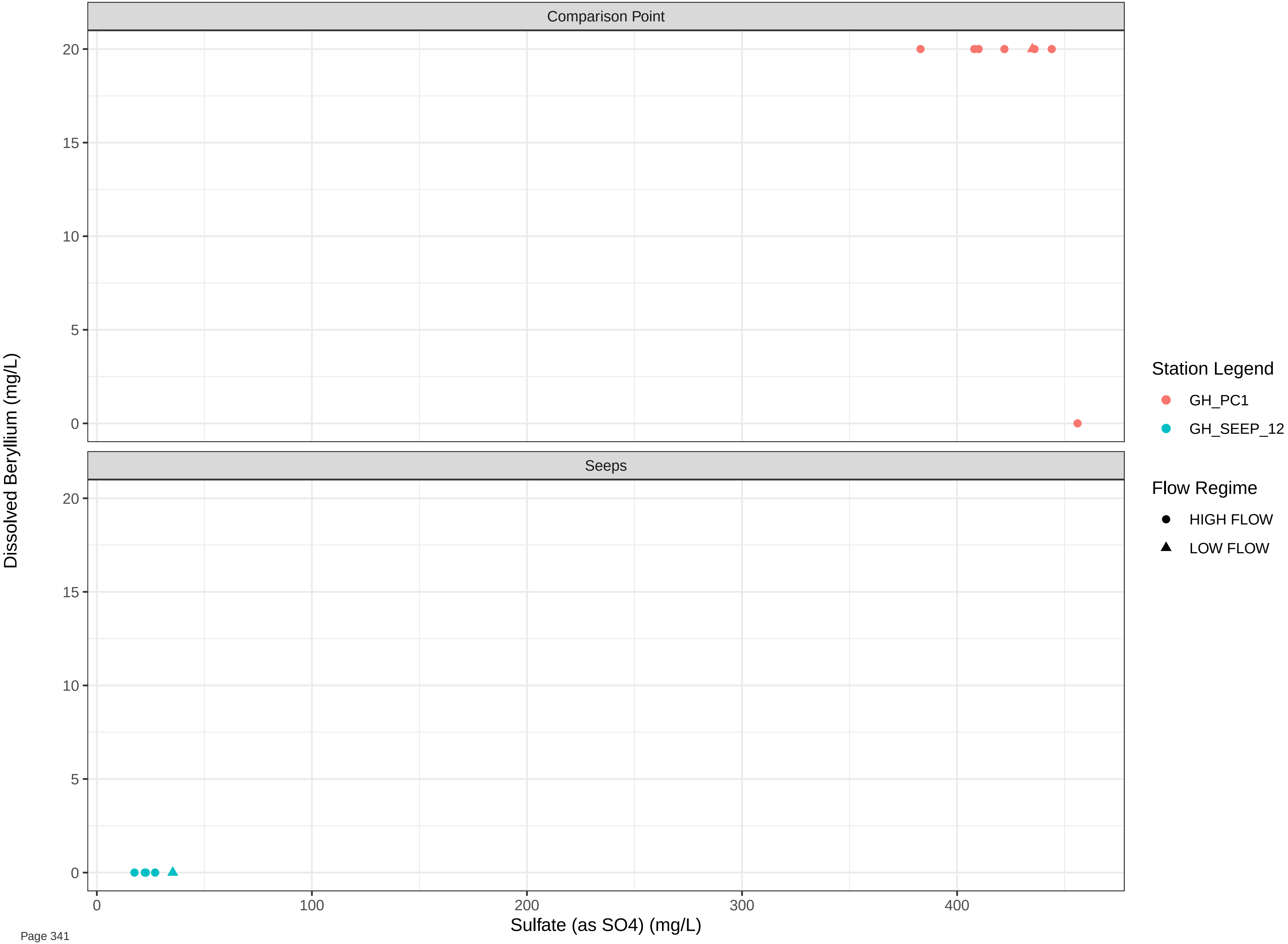

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.00
0.05
0.10
0.15
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



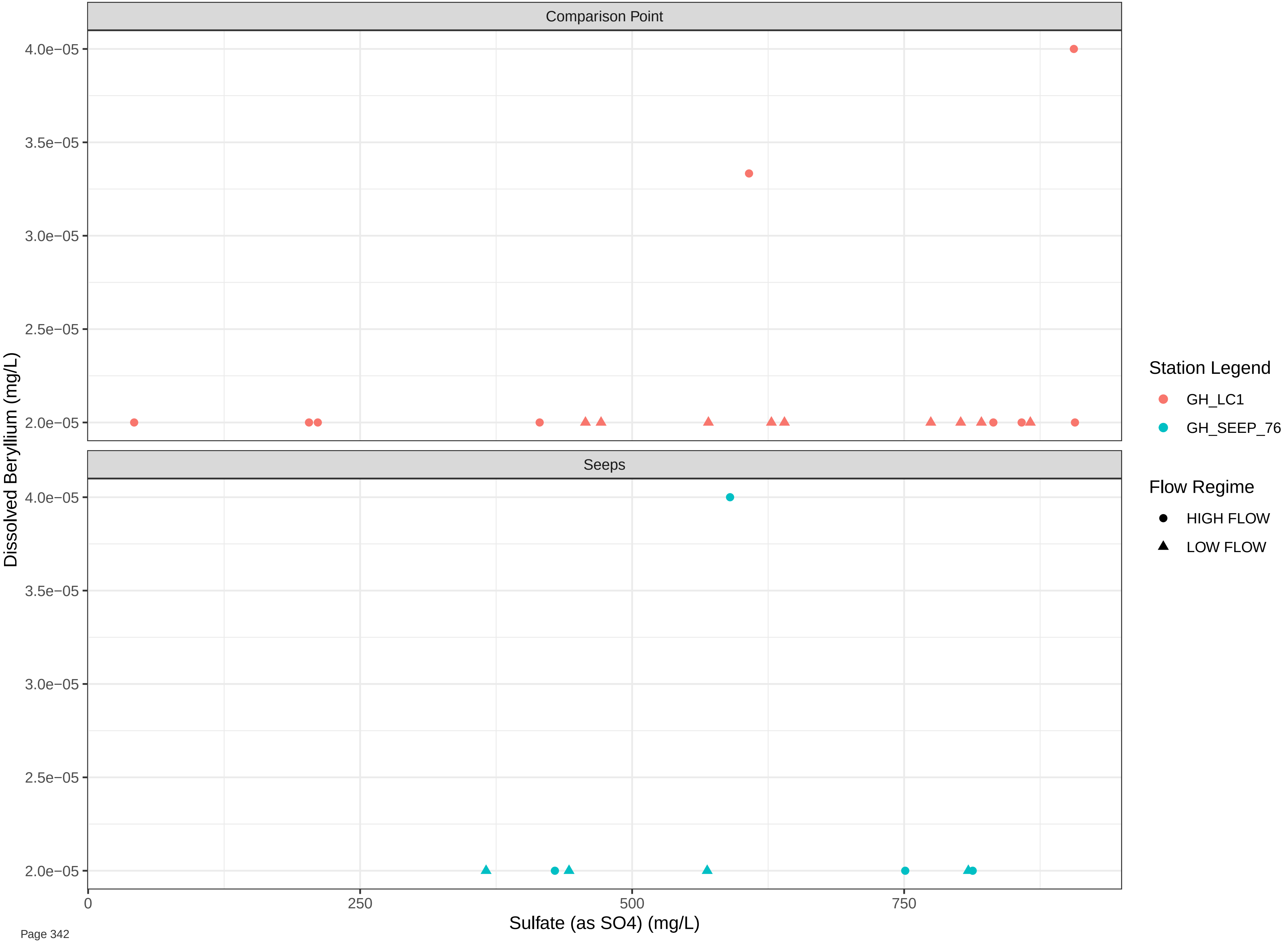
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



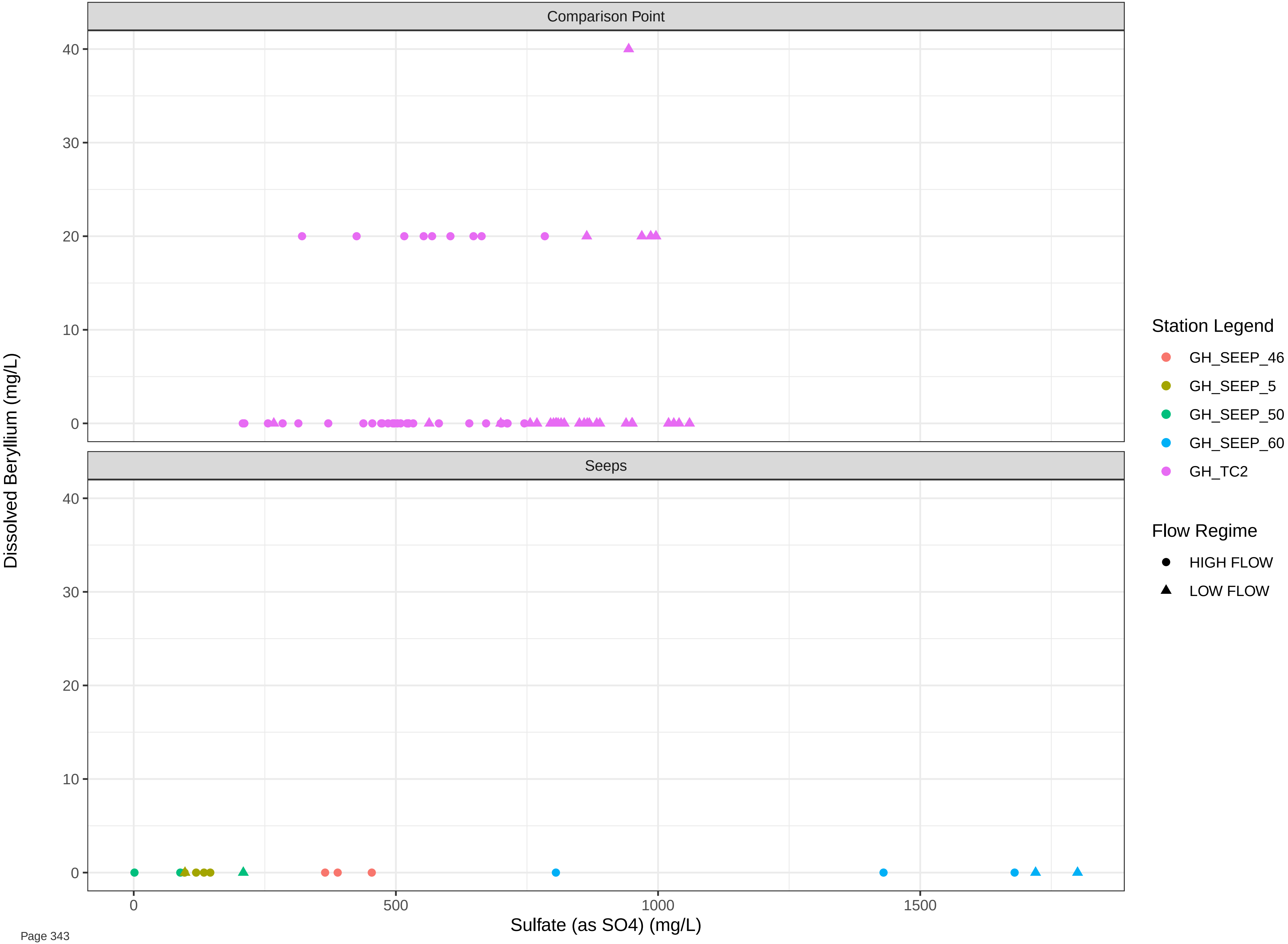
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

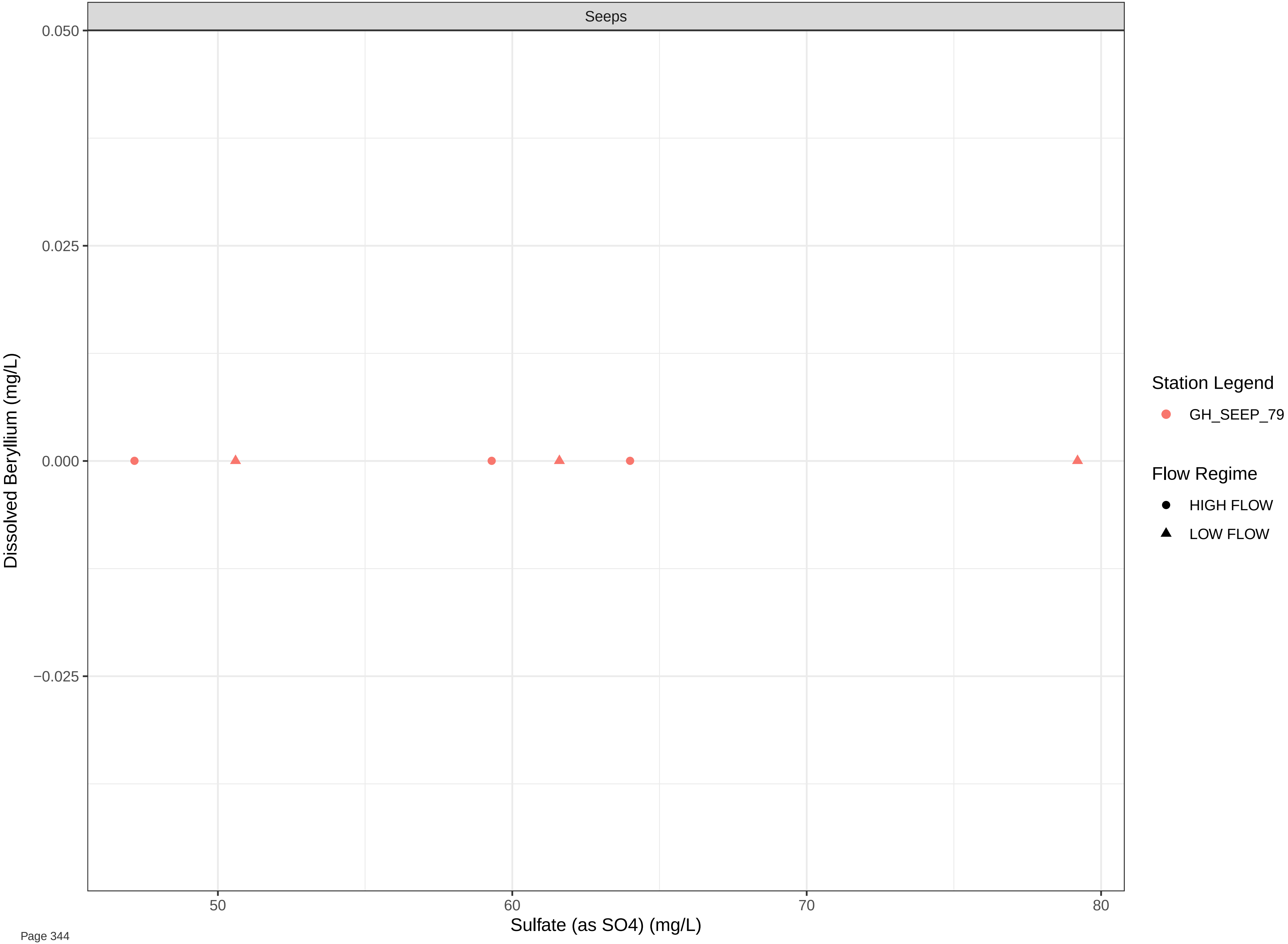


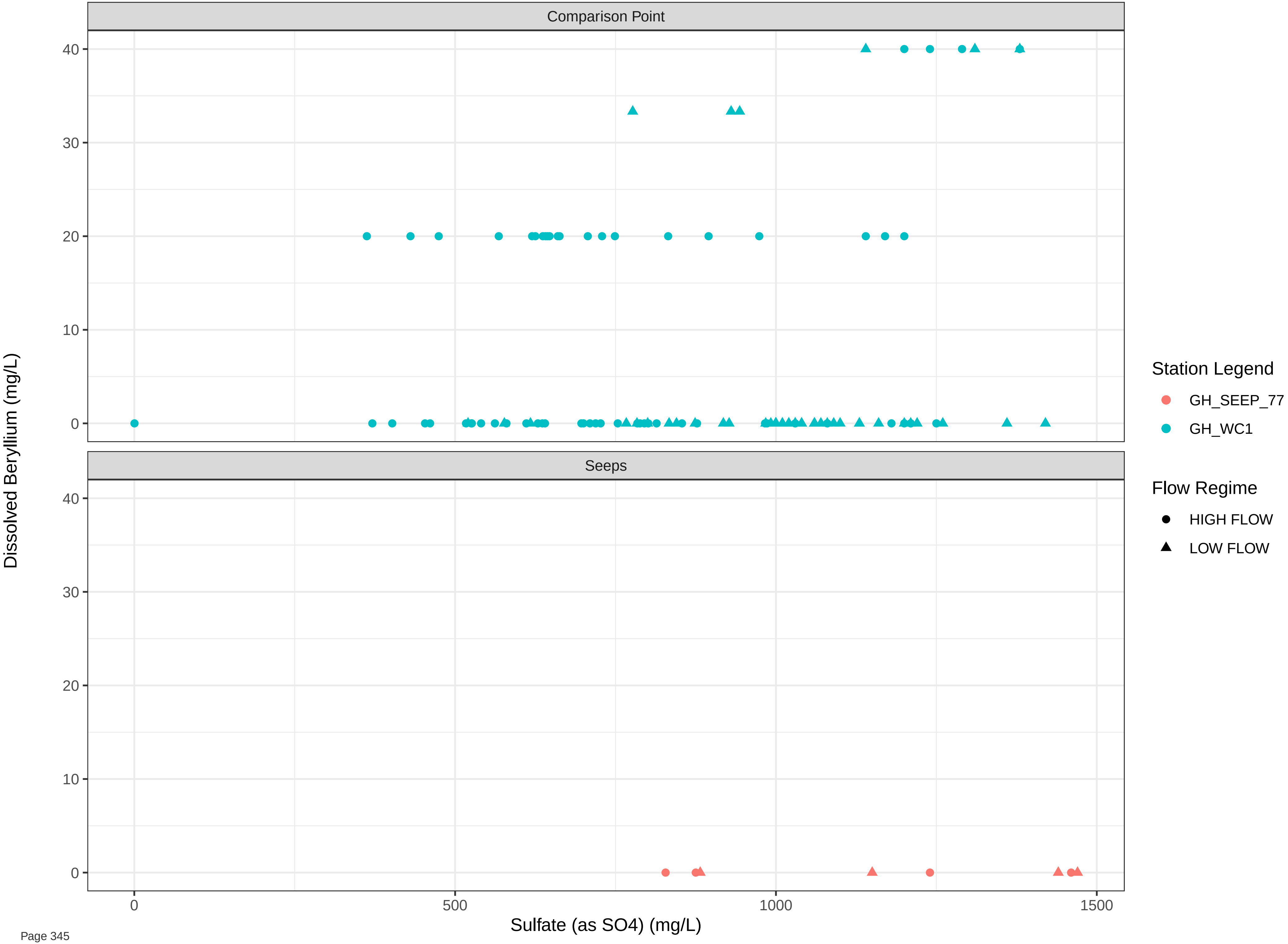
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



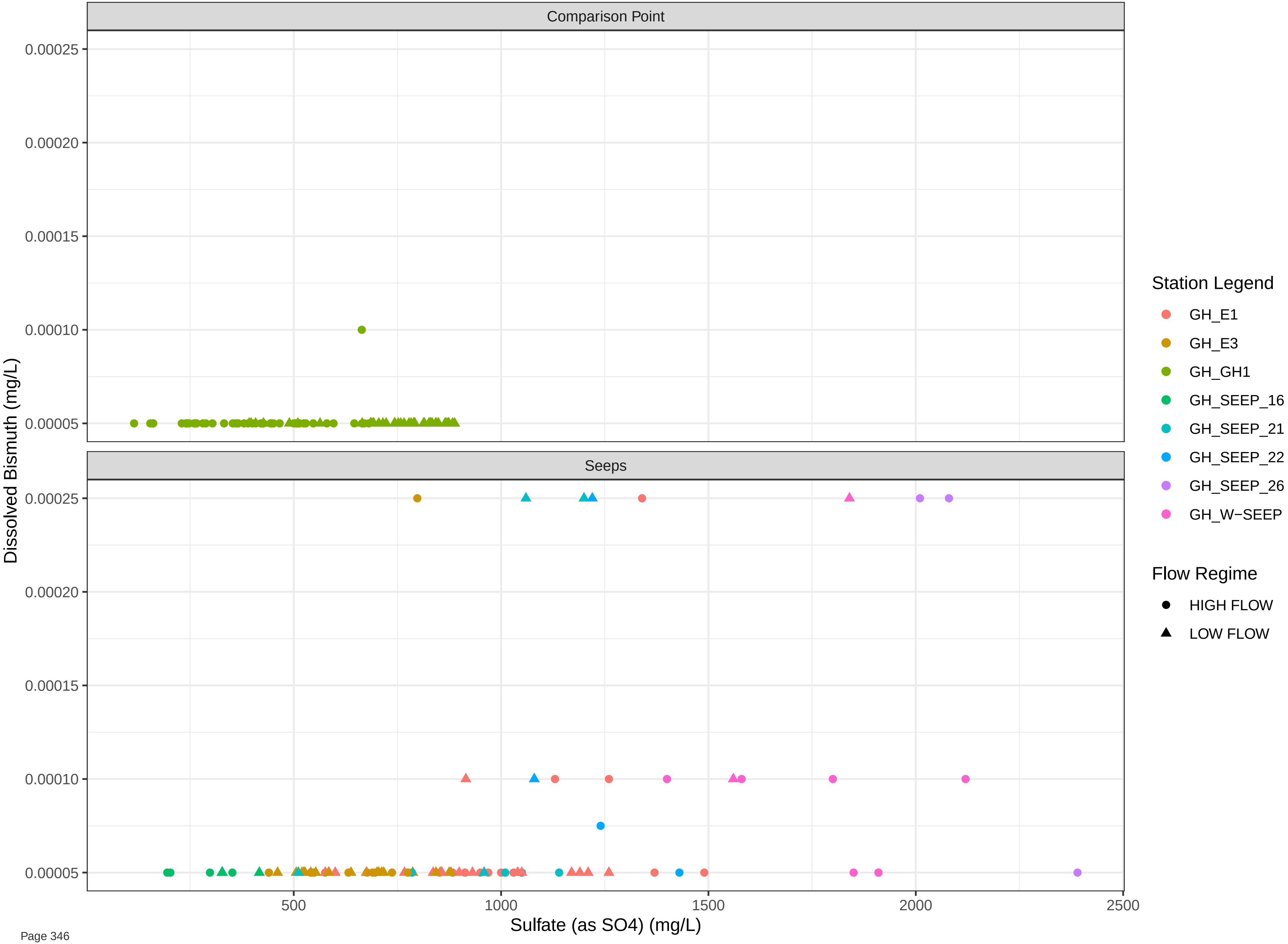
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
4.0e−05
3.5e−05
3.0e−05
2.5e−05
2.0e−05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

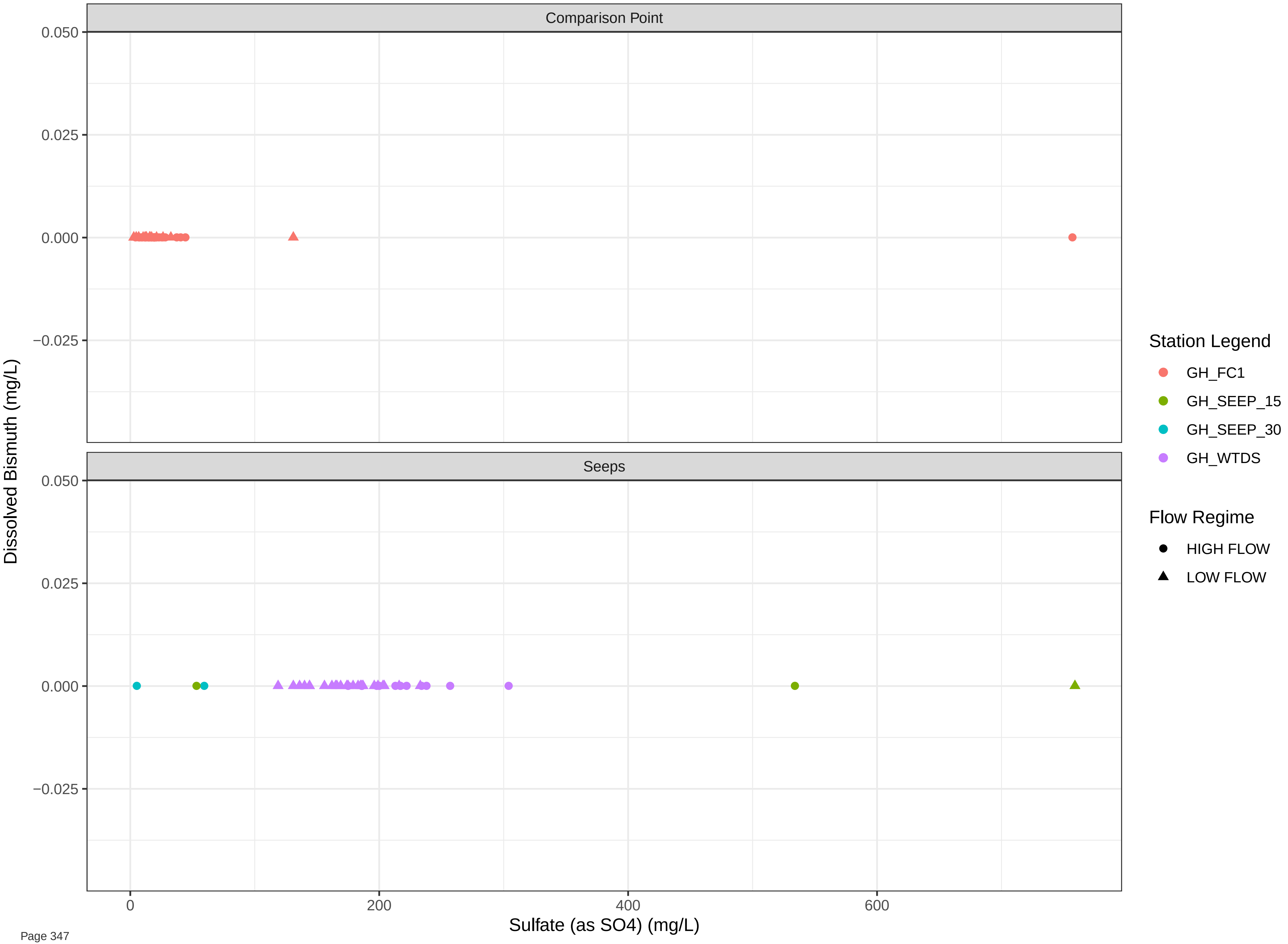

Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
40
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.050
0.025
0.000
−0.025
Dissolved Beryllium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

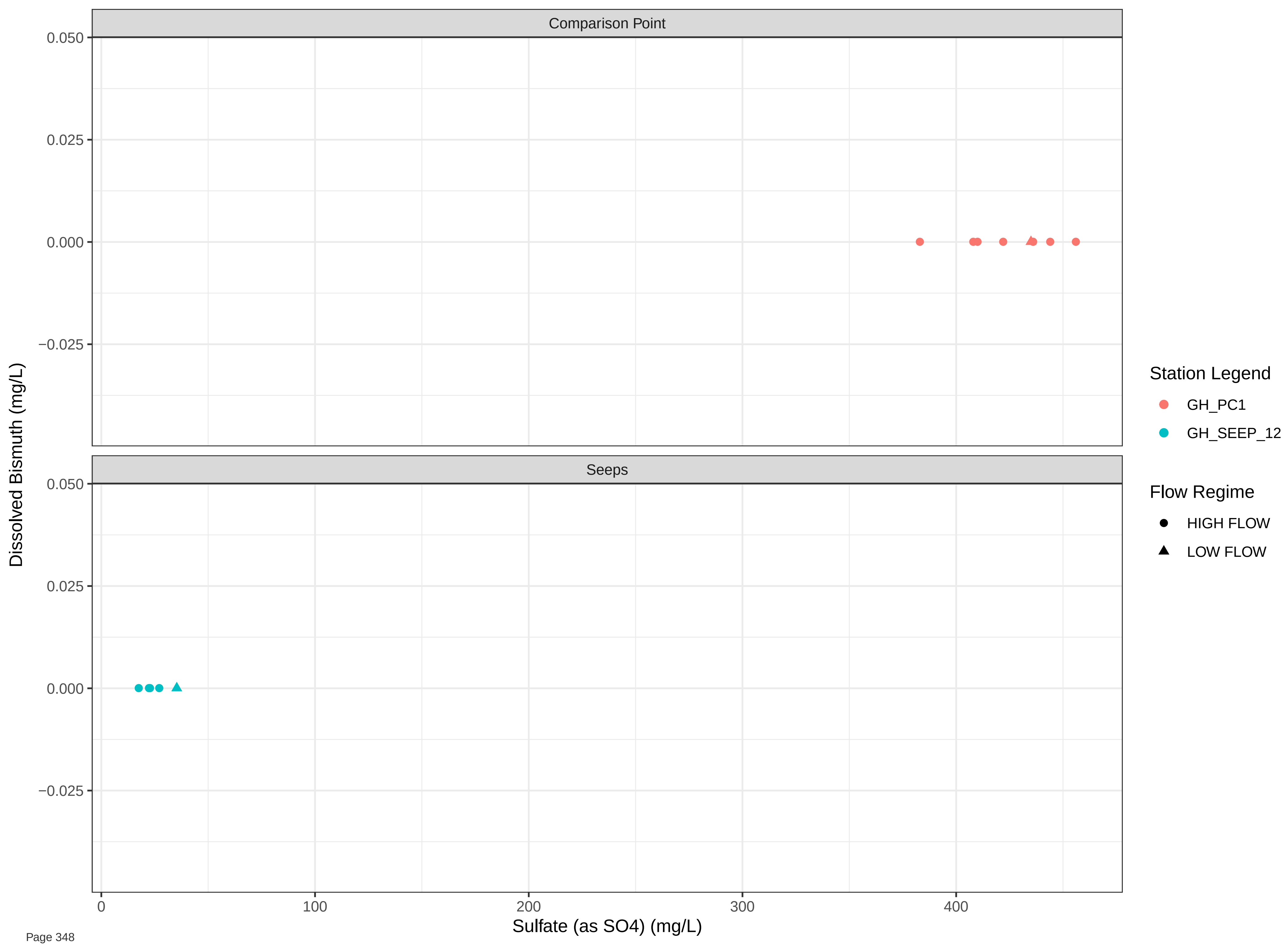


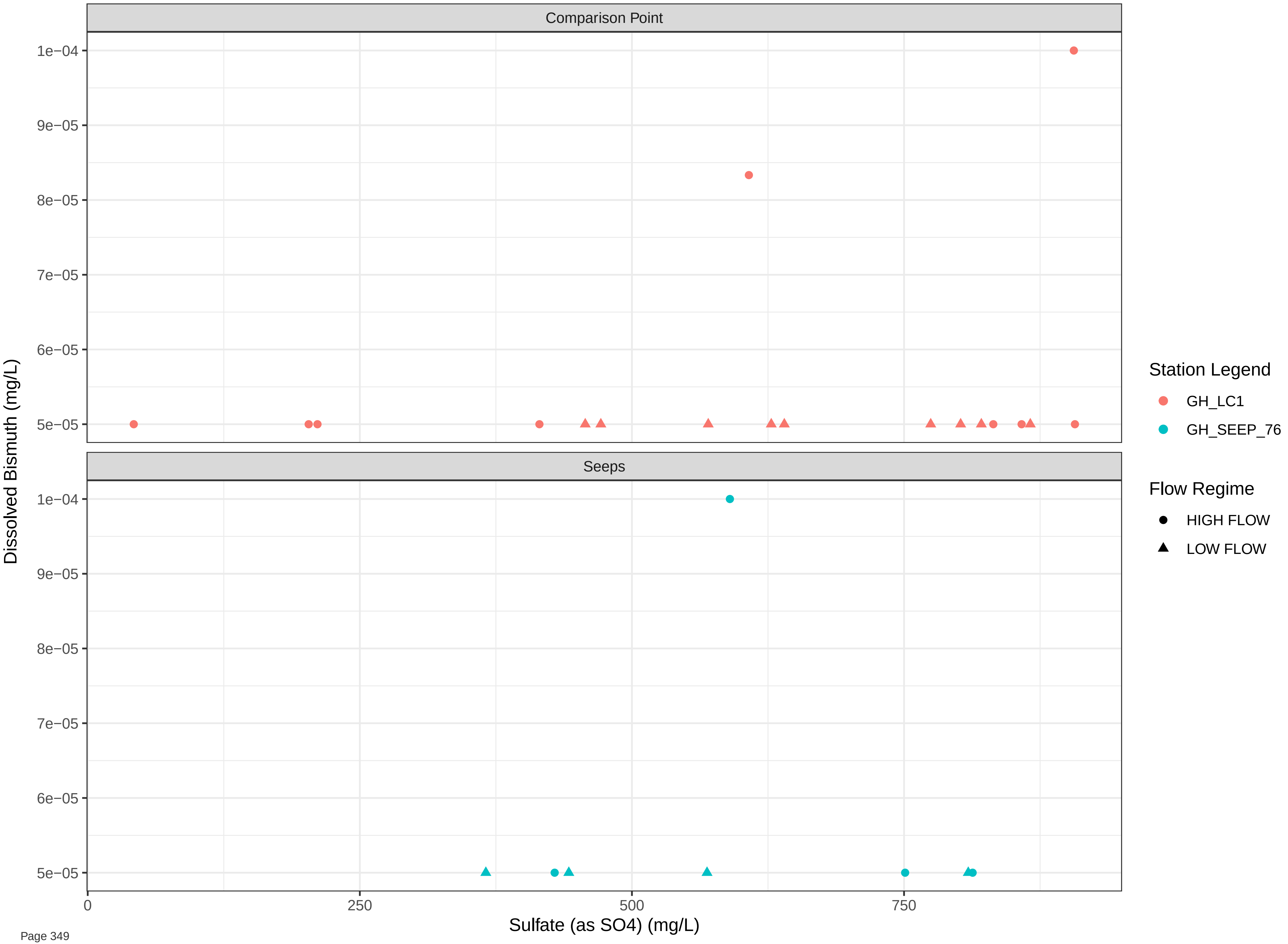
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
40
30
20
10
0
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

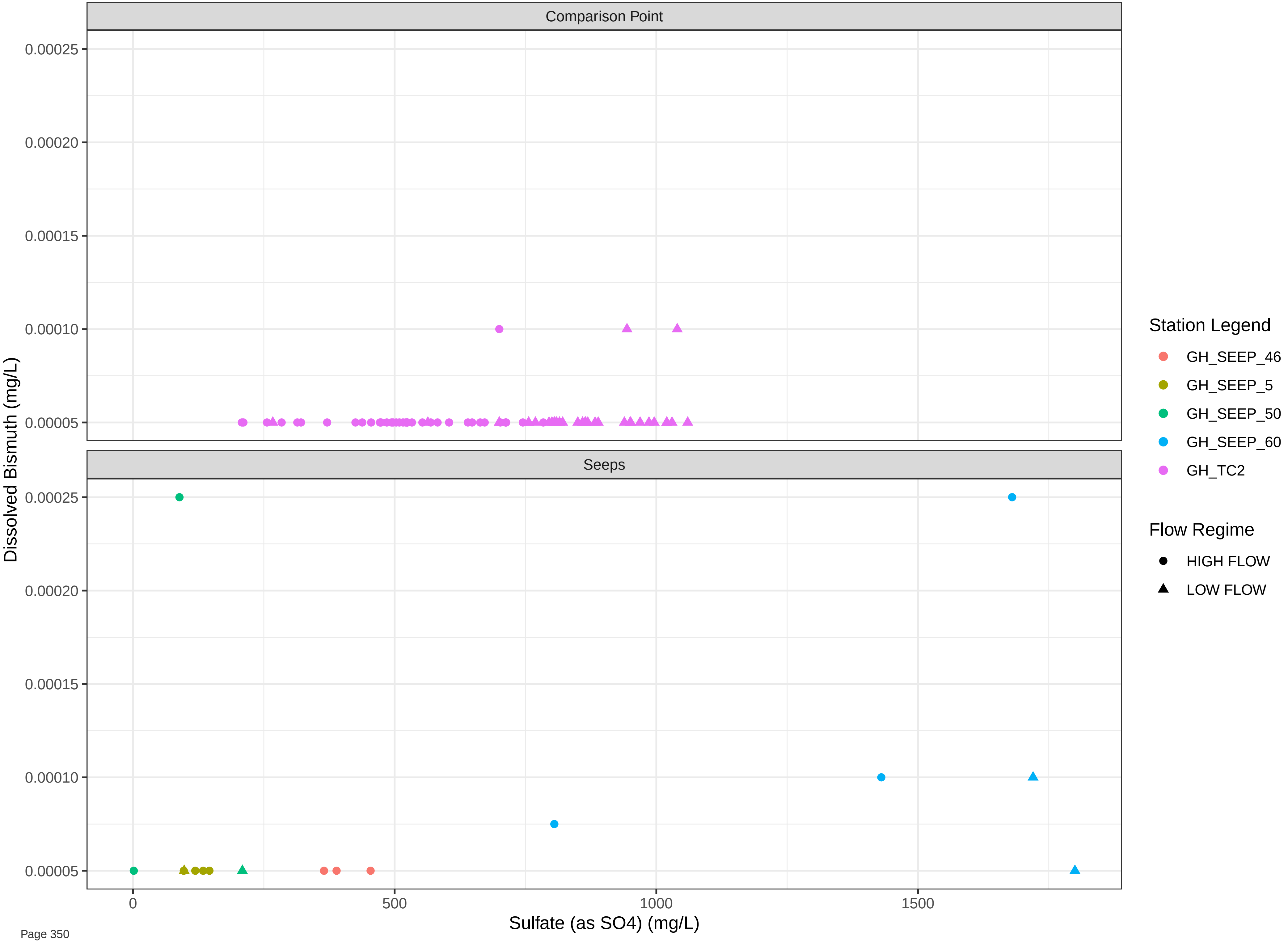

Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



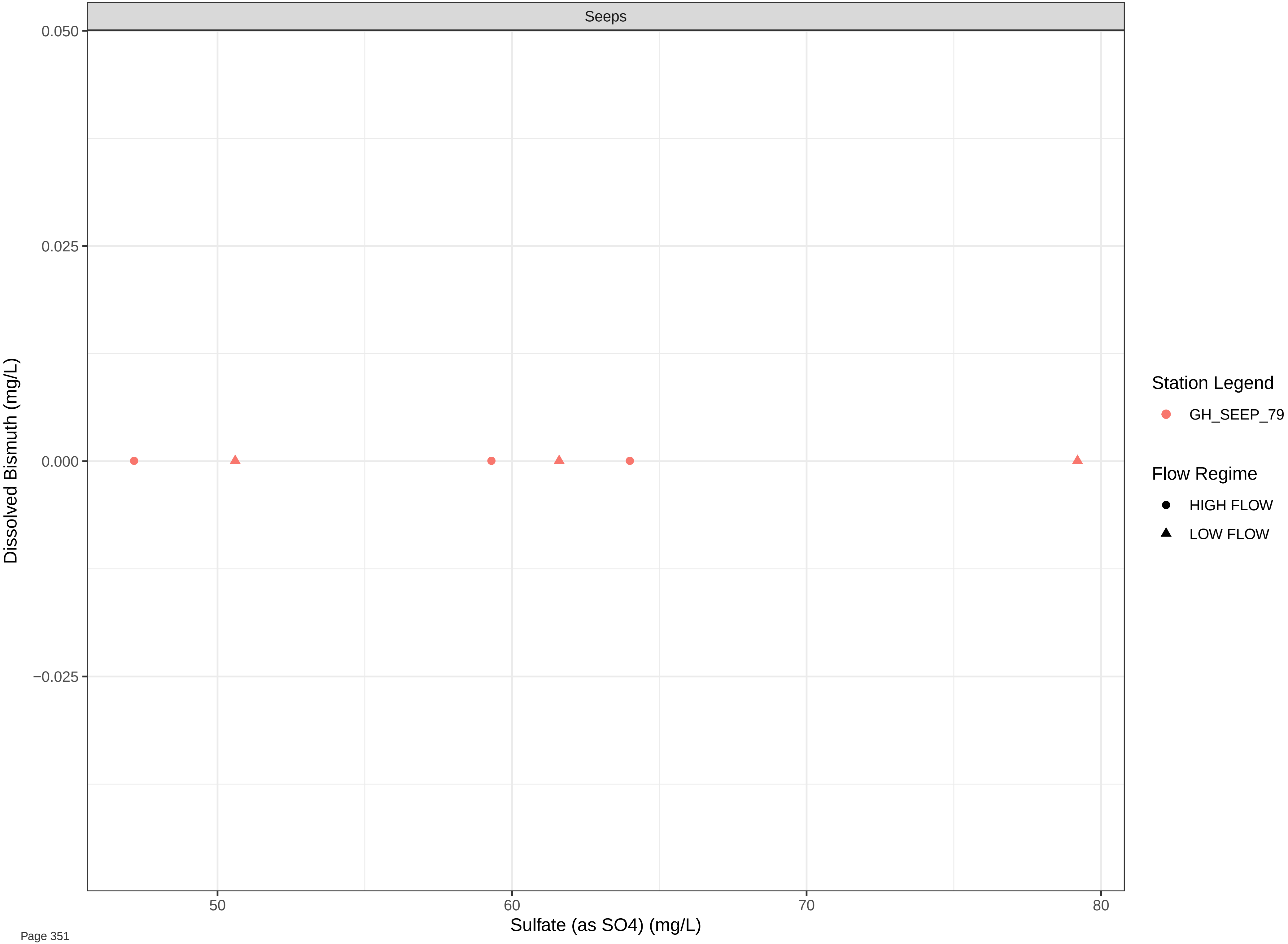
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.050
0.025
0.000
−0.025
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

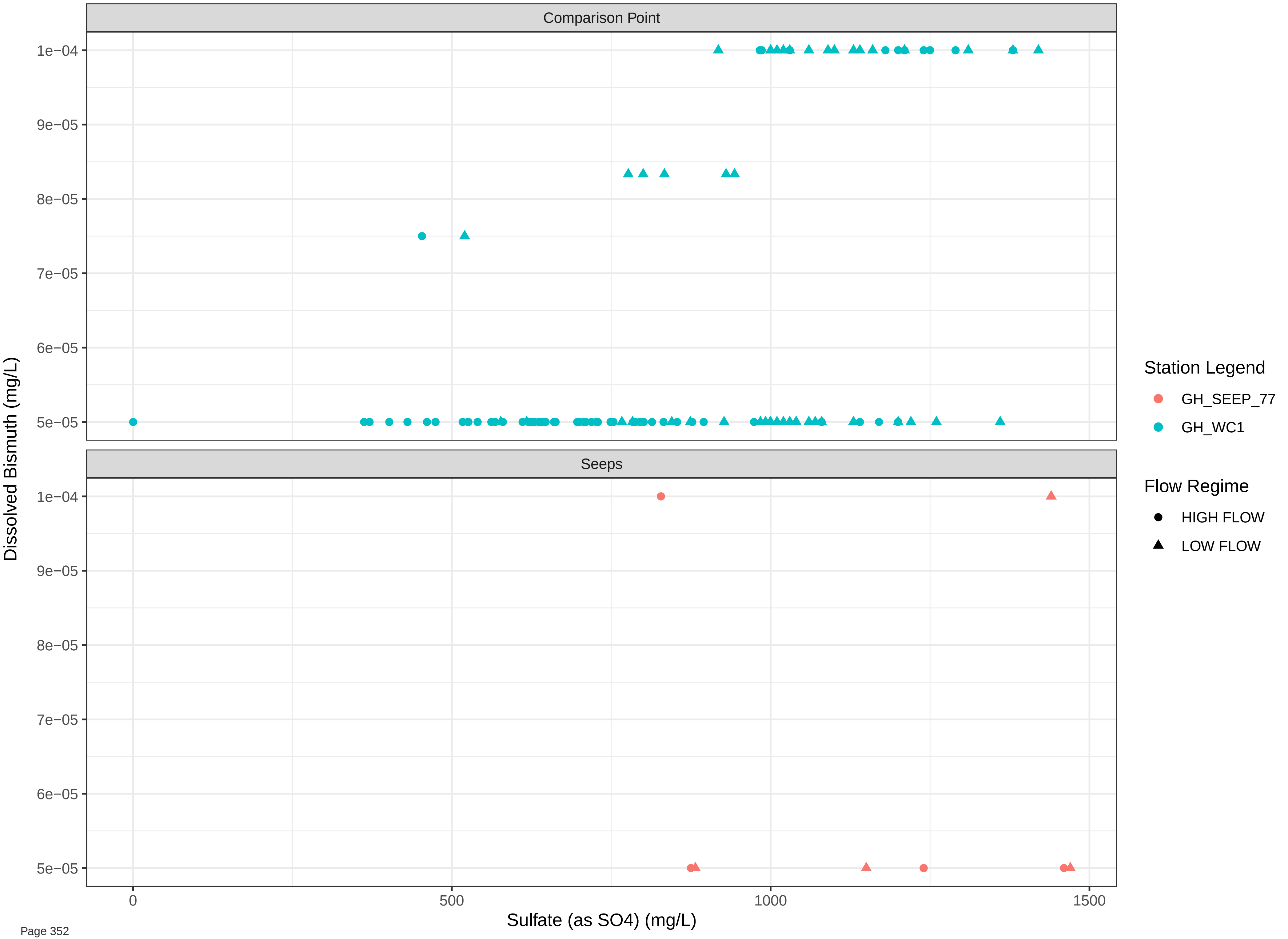

Comparison Point
Seeps
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
0
250
500
750
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



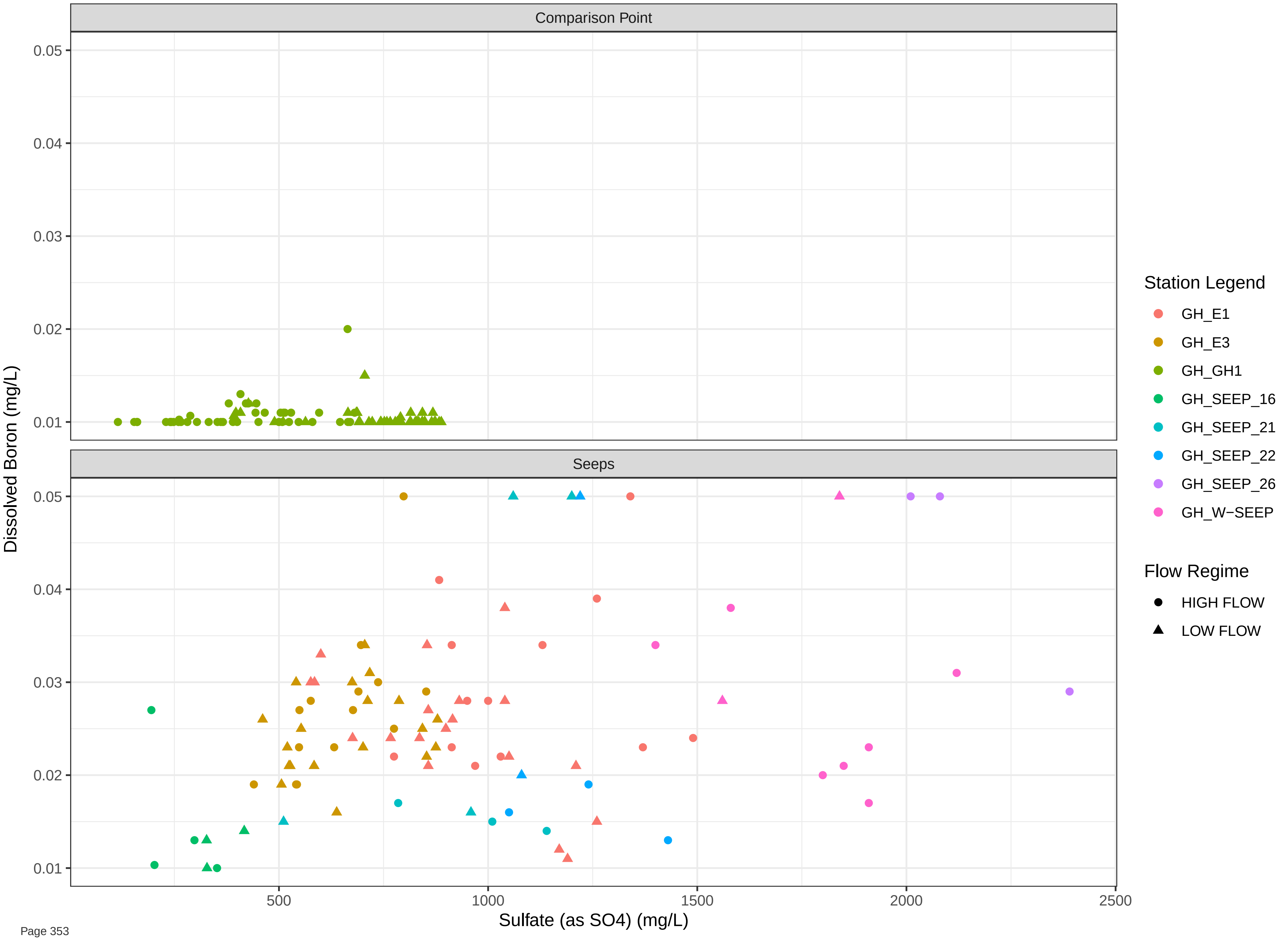
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW



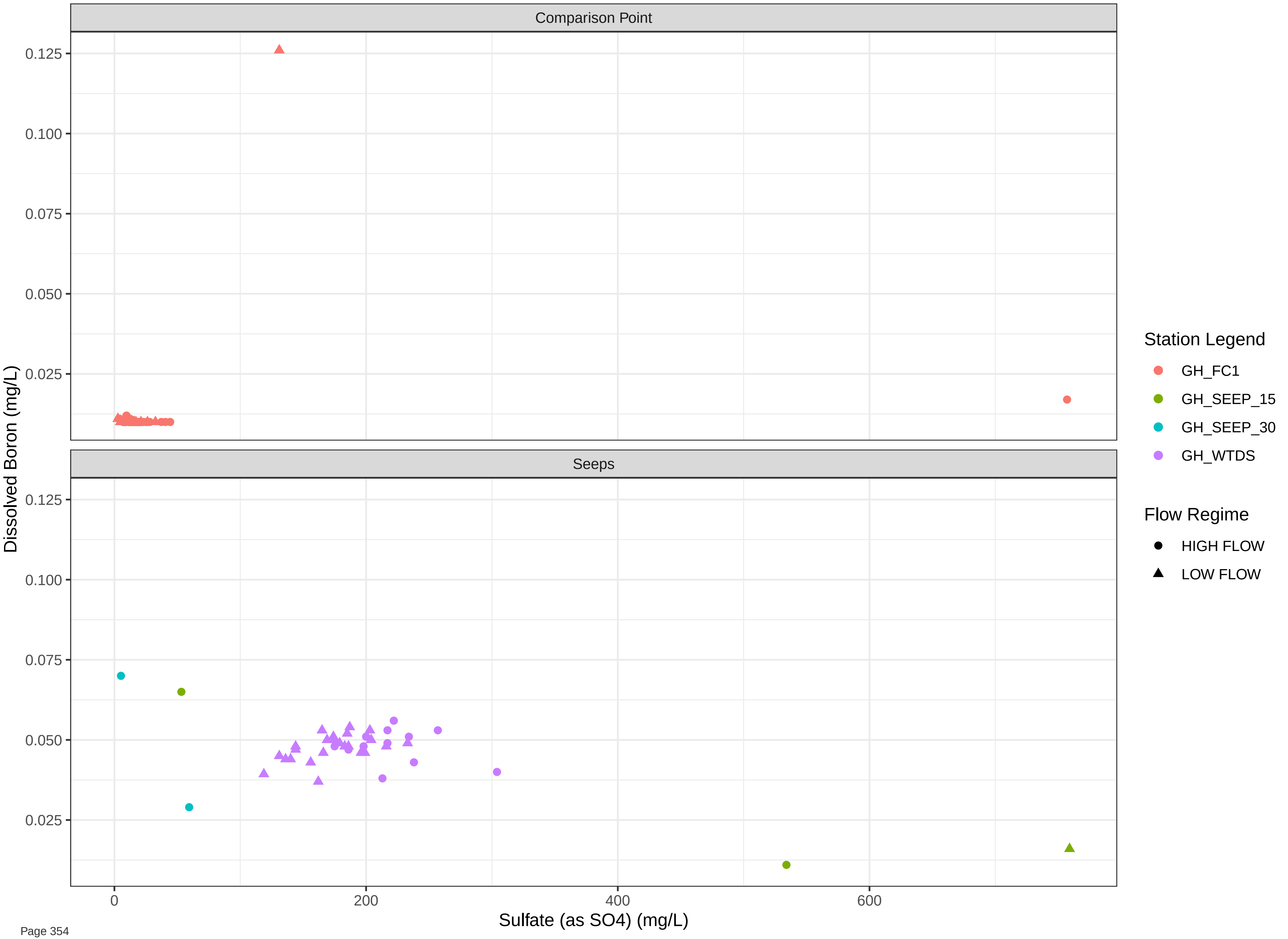
Seeps
0.050
0.025
0.000
−0.025
Dissolved Bismuth (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



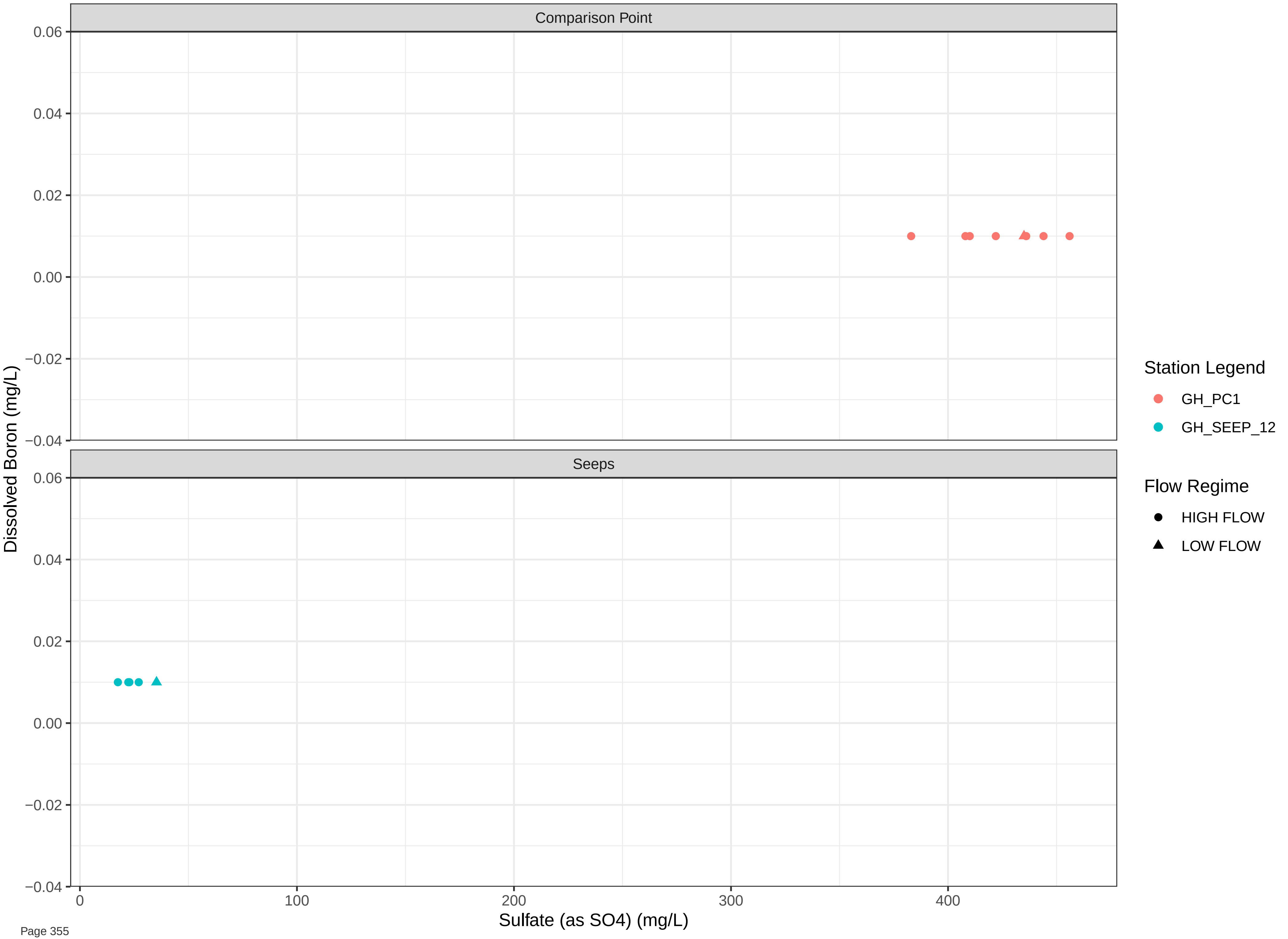
Comparison Point
Seeps
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
0
500
1000
1500
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

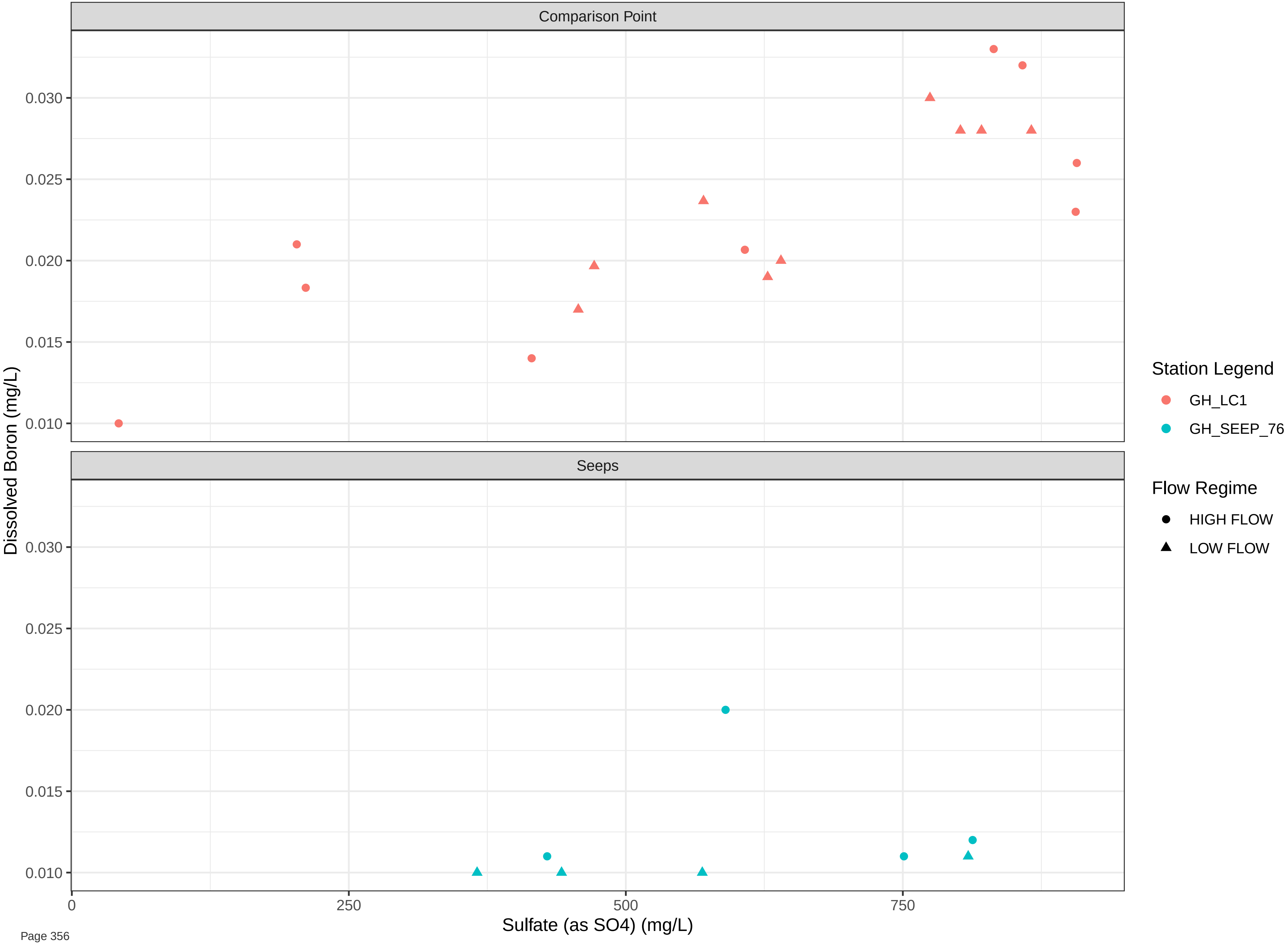


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.05
0.04
0.03
0.02
0.01
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

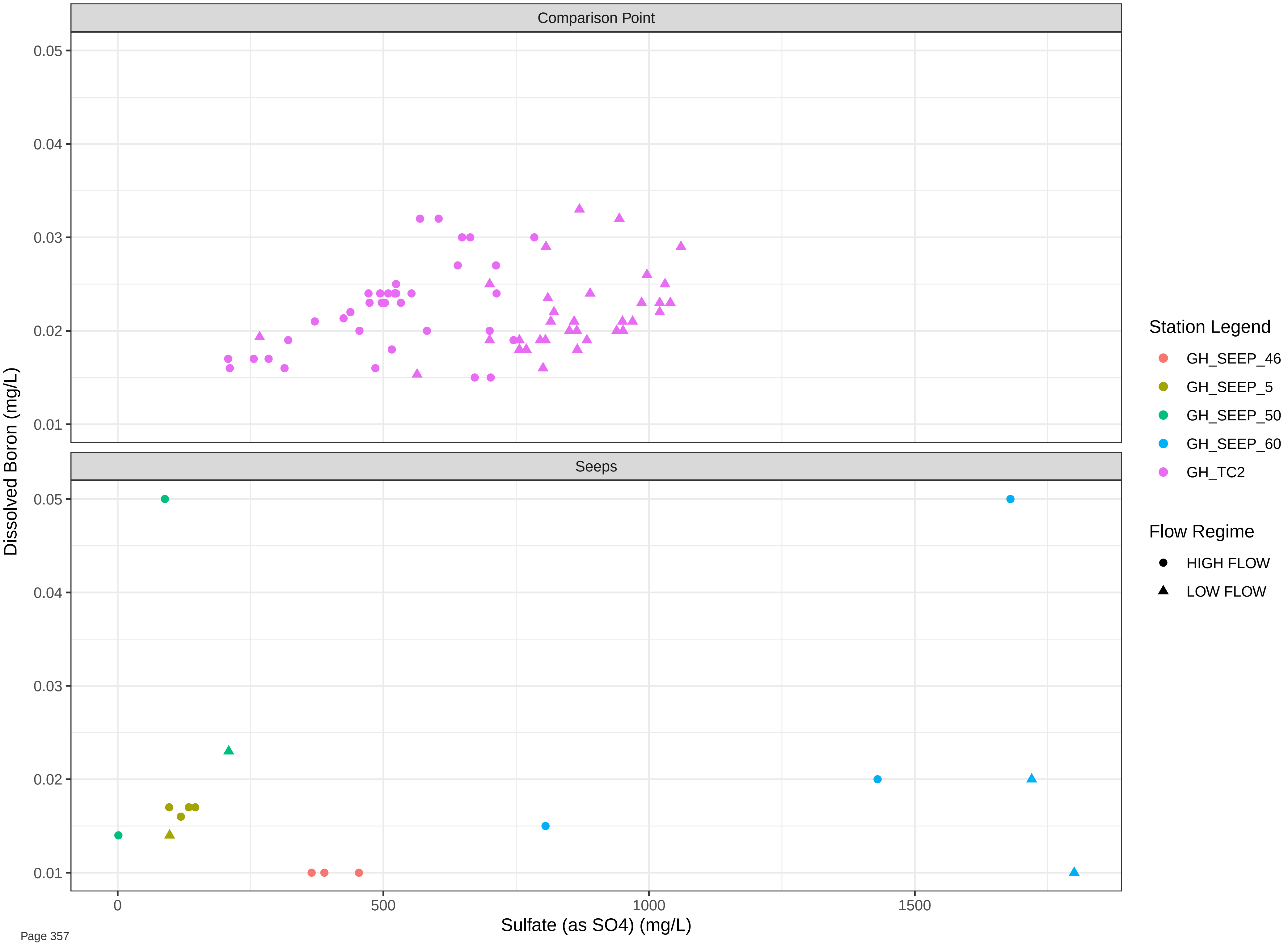


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.125
0.100
0.075
0.050
0.025
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

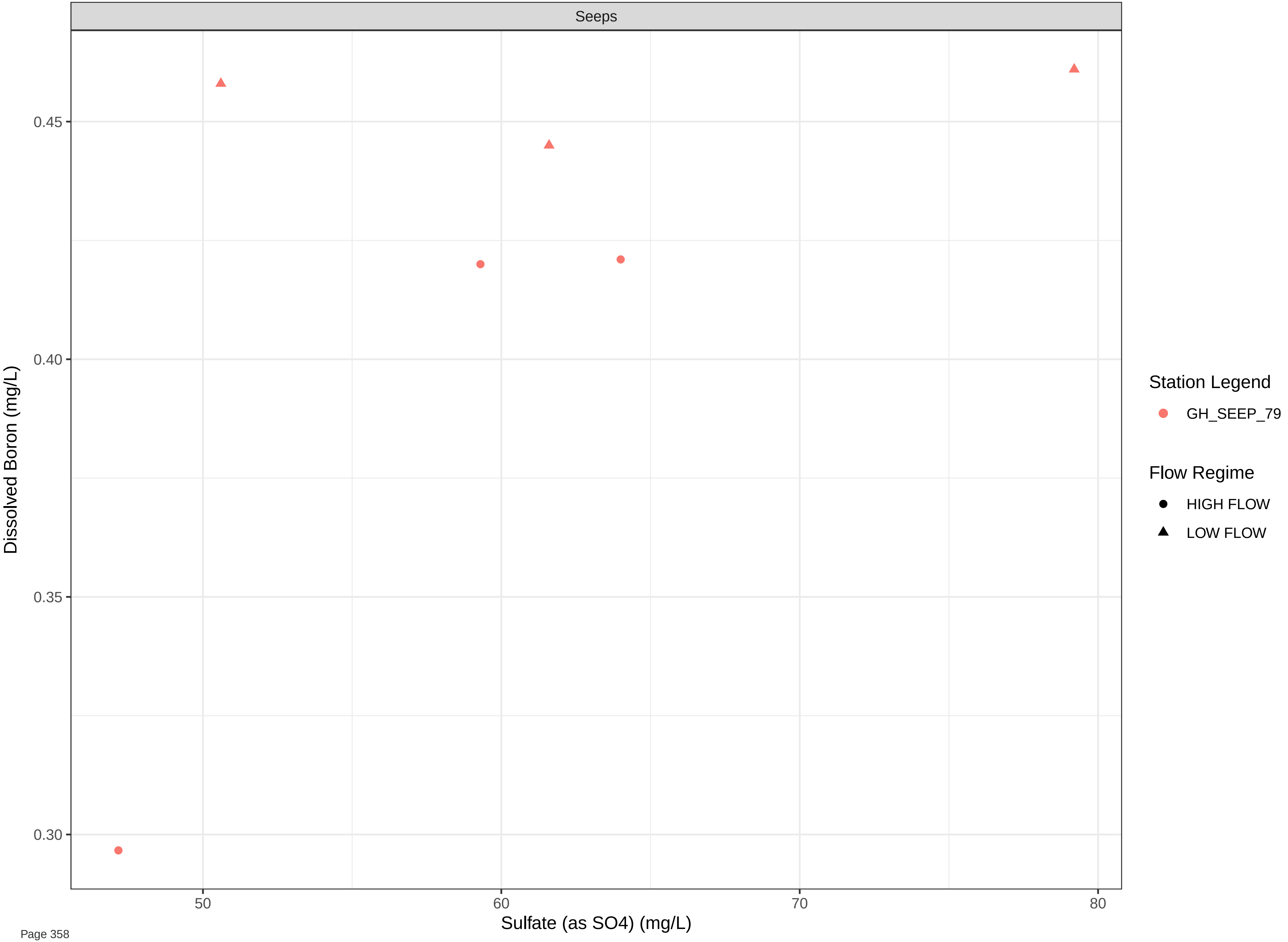

Comparison Point
Seeps
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
0.06
0.04
0.02
0.00
−0.02
−0.04
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



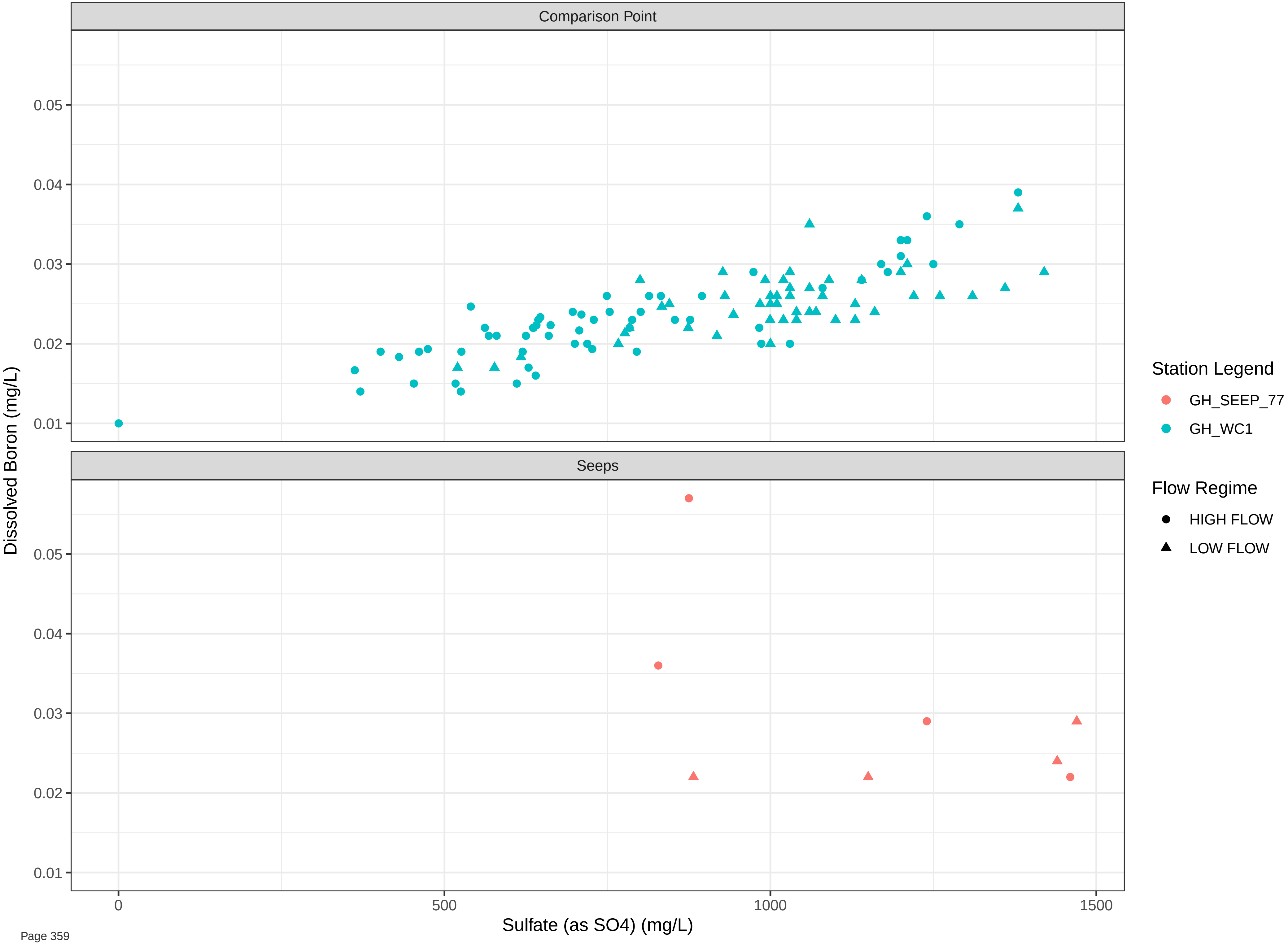
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.010
0.015
0.020
0.025
0.030
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



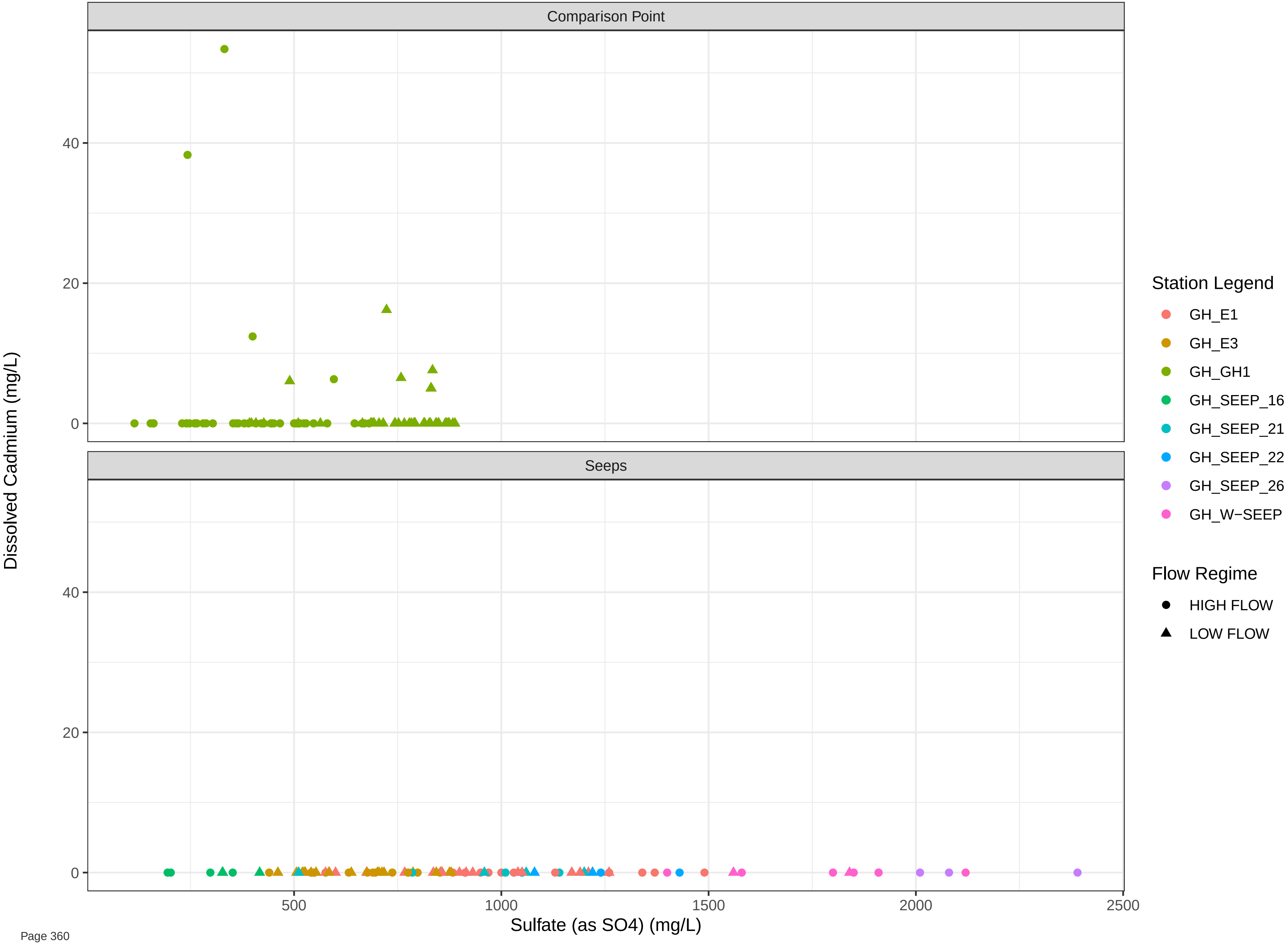
Comparison Point
Seeps
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
0.05
0.04
0.03
0.02
0.01
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW



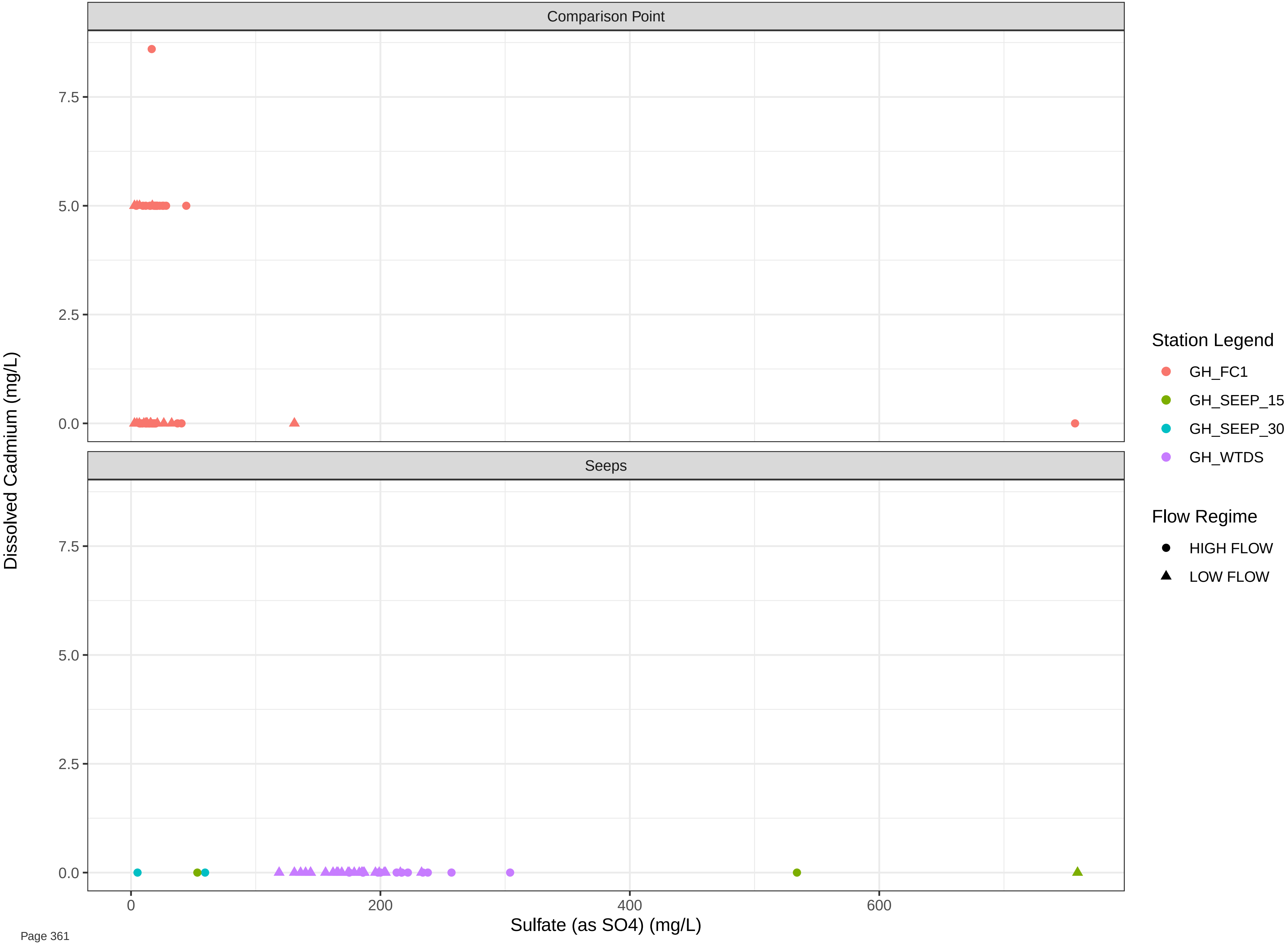
Seeps
Dissolved Boron (mg/L)
0.45
0.40
0.35
0.30
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

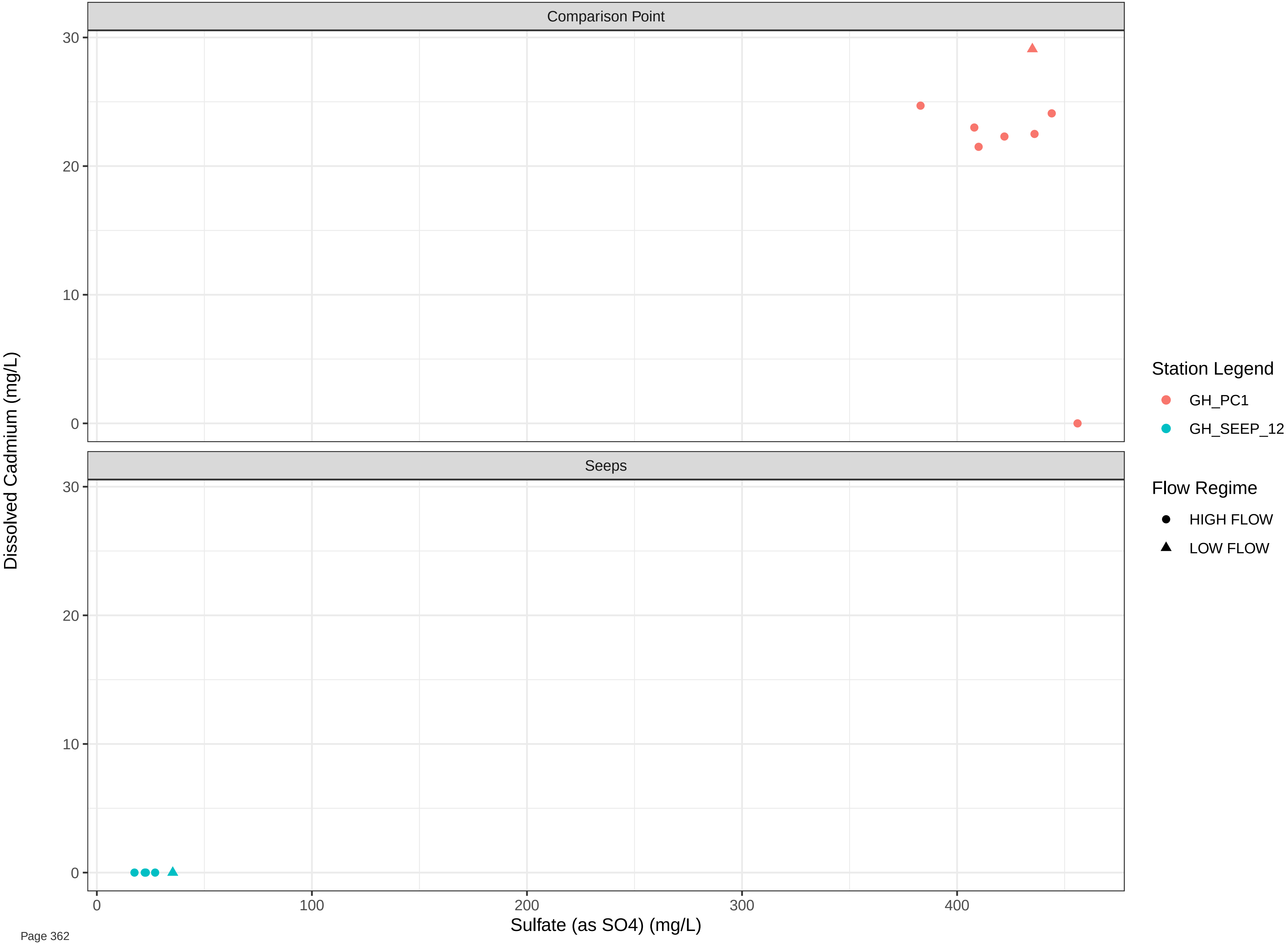


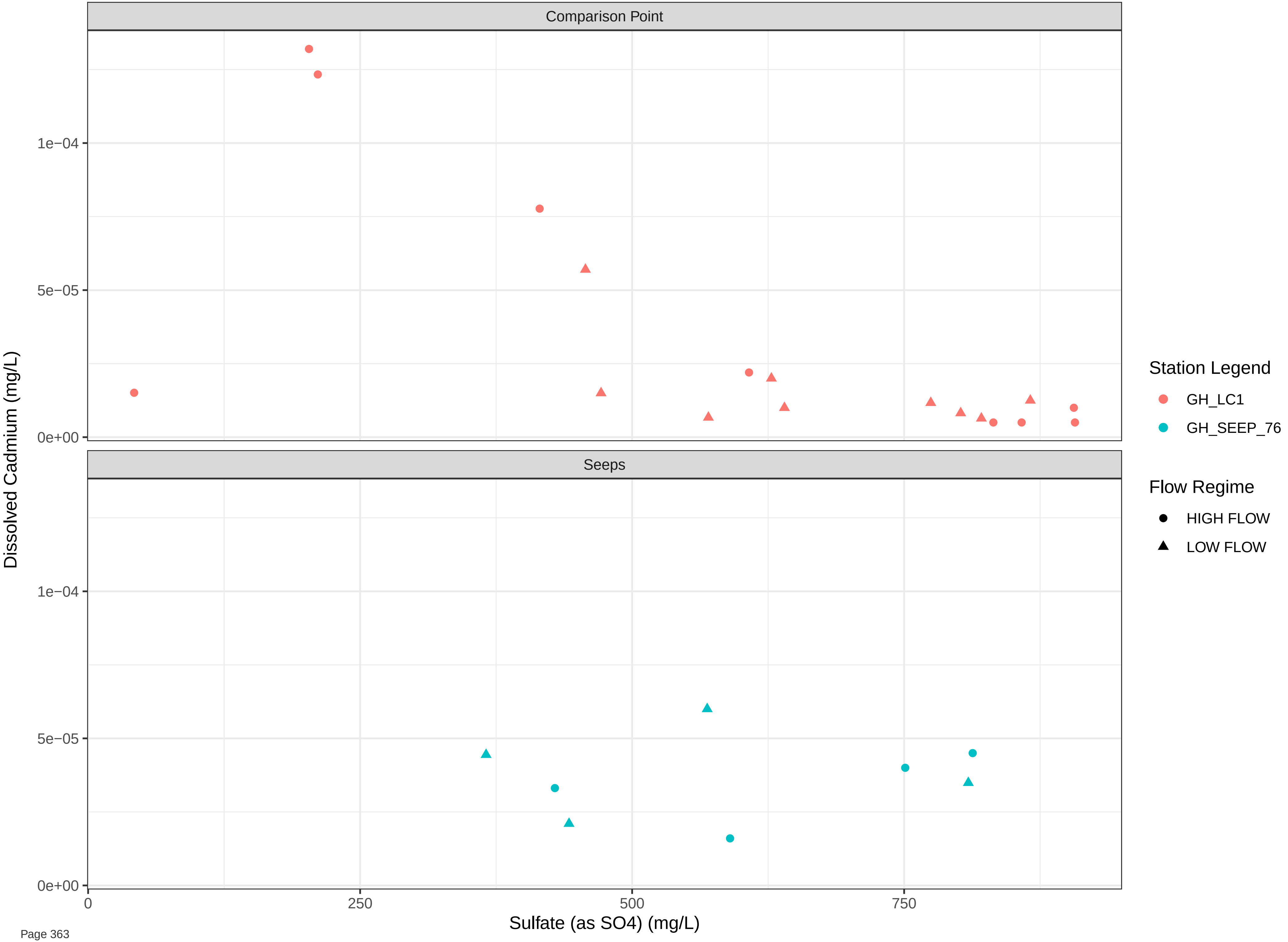
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.05
0.04
0.03
0.02
0.01
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

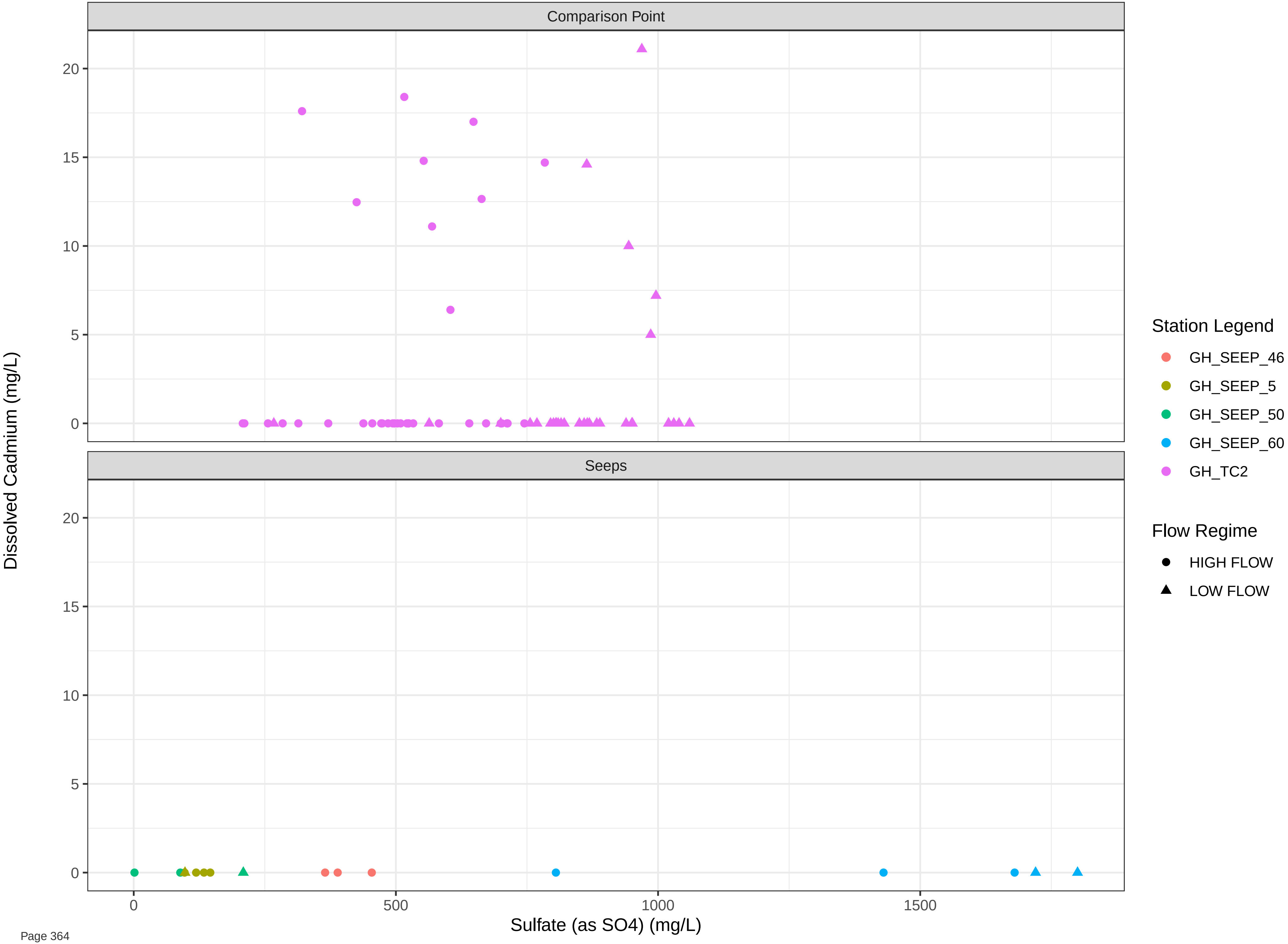


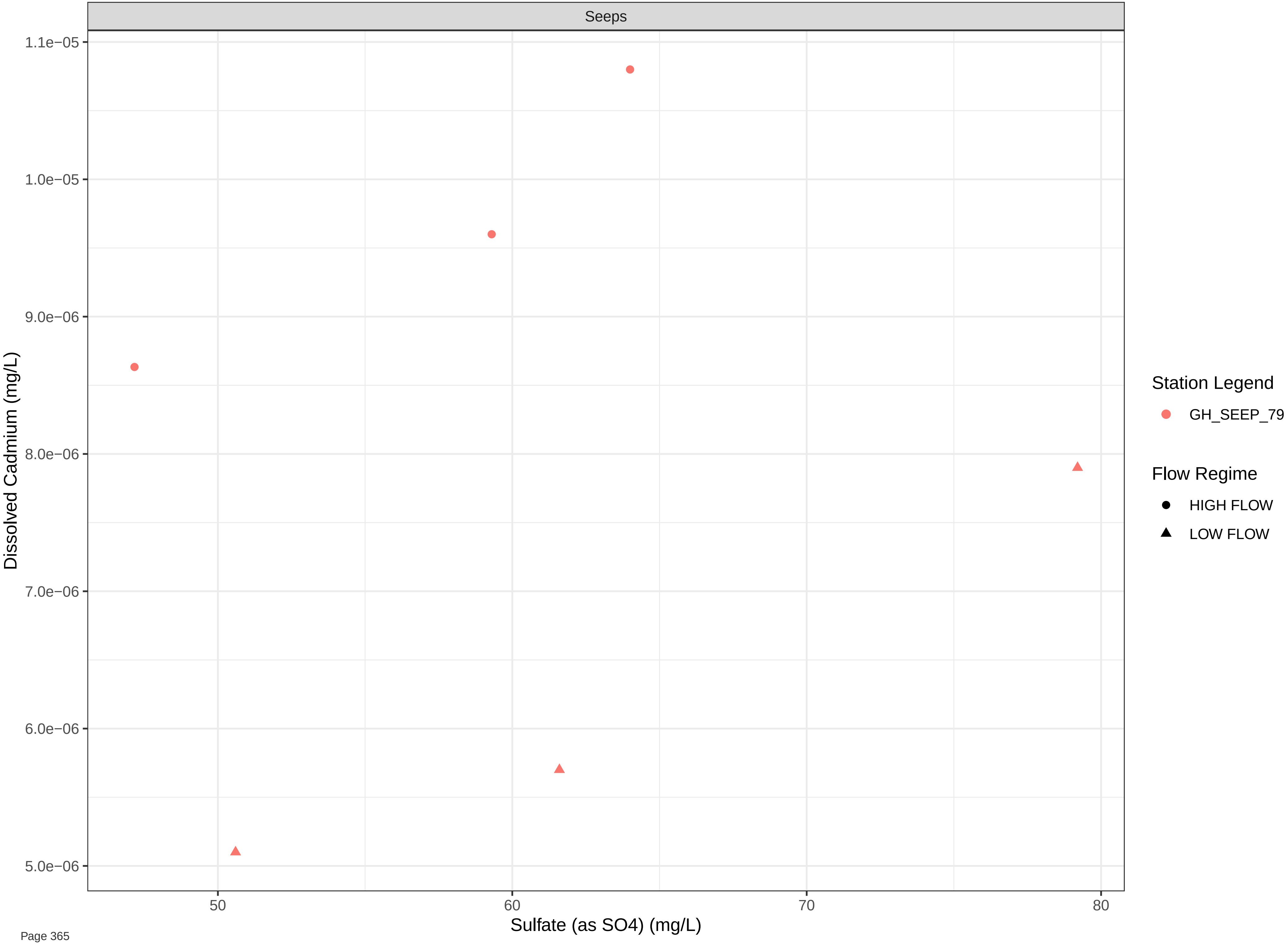
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
0
20
40
0
20
40
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

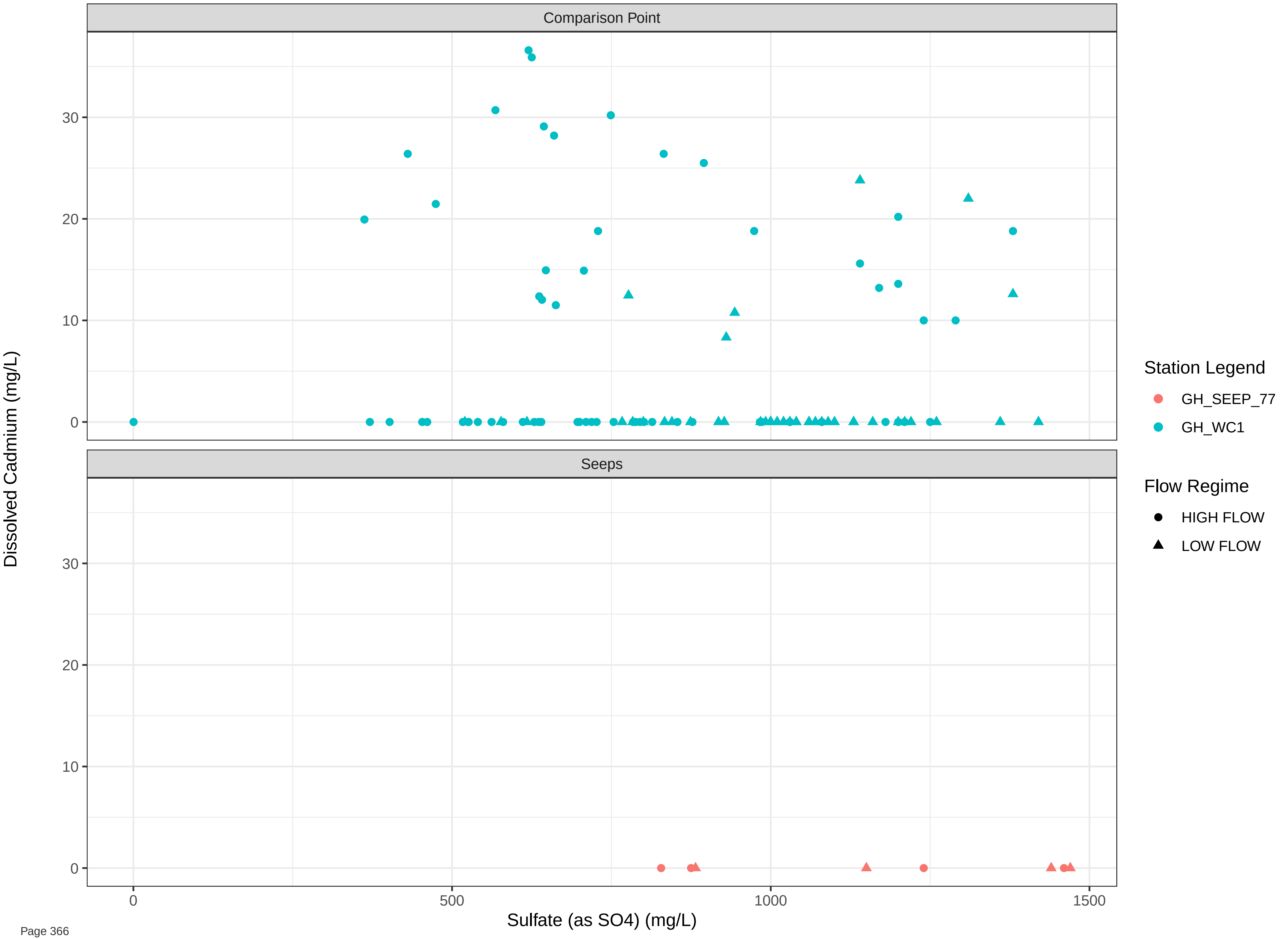

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
2.5
5.0
7.5
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

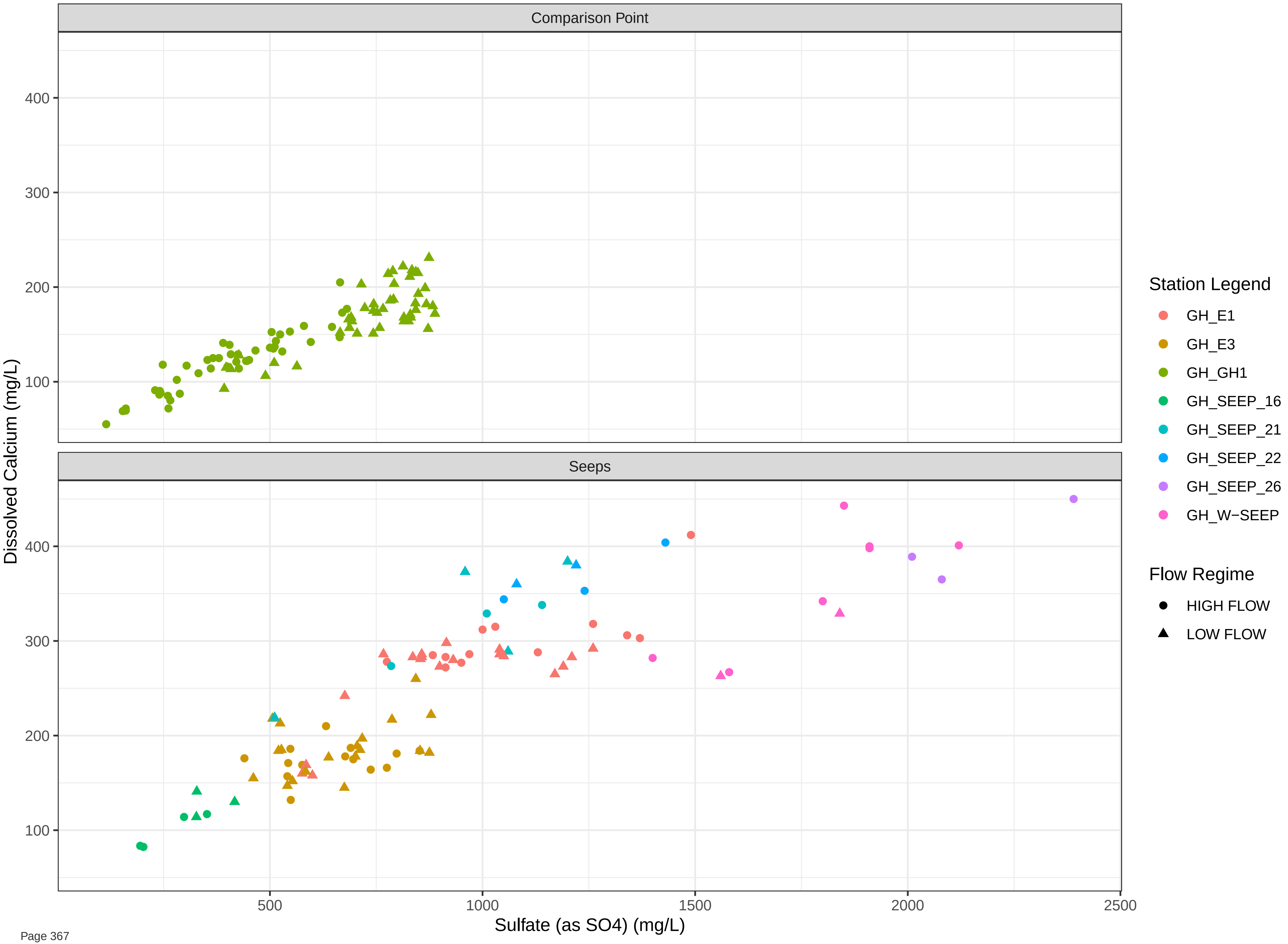

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
1e−04
5e−05
0e+00
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

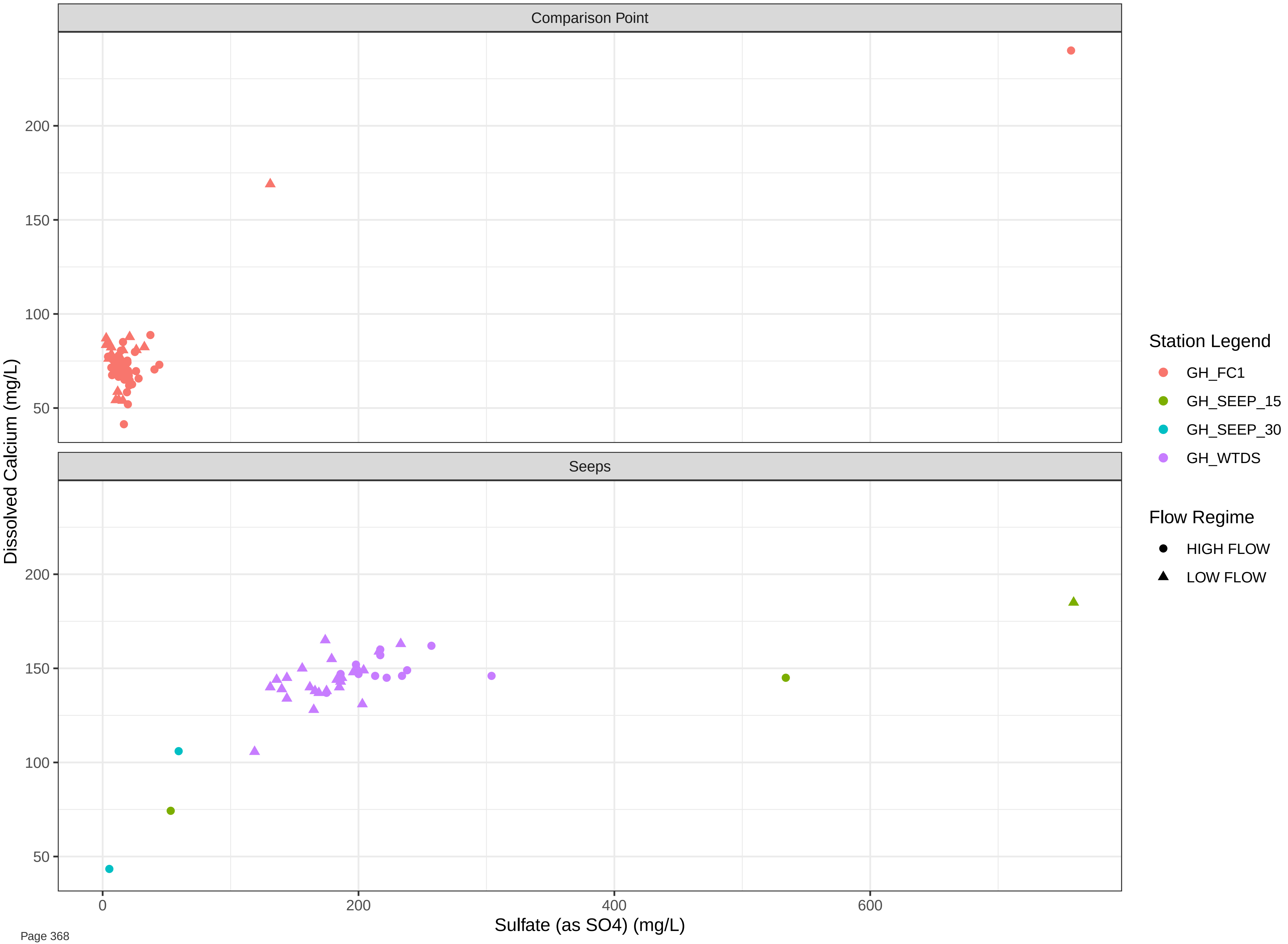

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

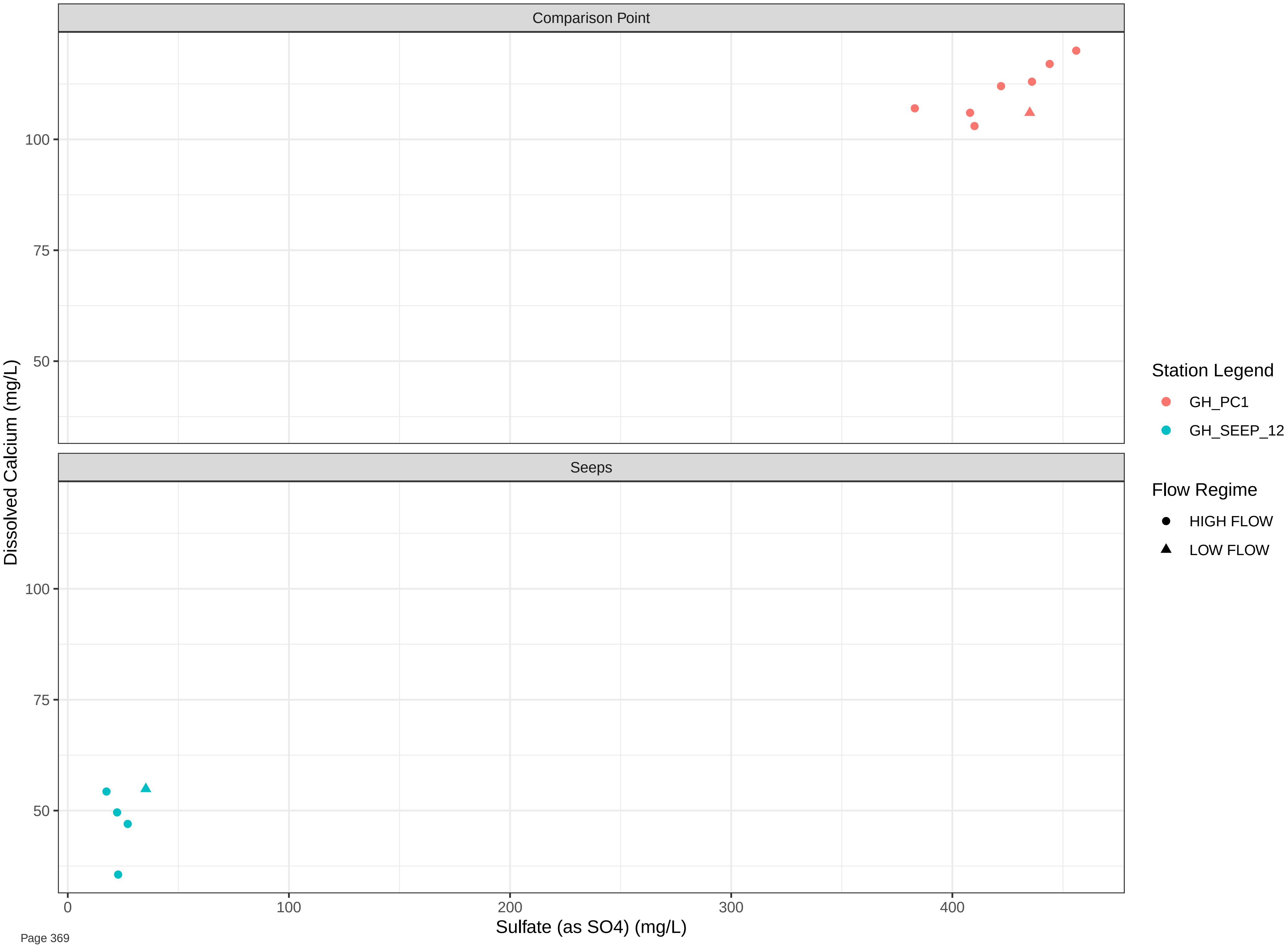

Seeps
1.1e−05
1.0e−05
9.0e−06
8.0e−06
7.0e−06
6.0e−06
5.0e−06
Dissolved Cadmium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

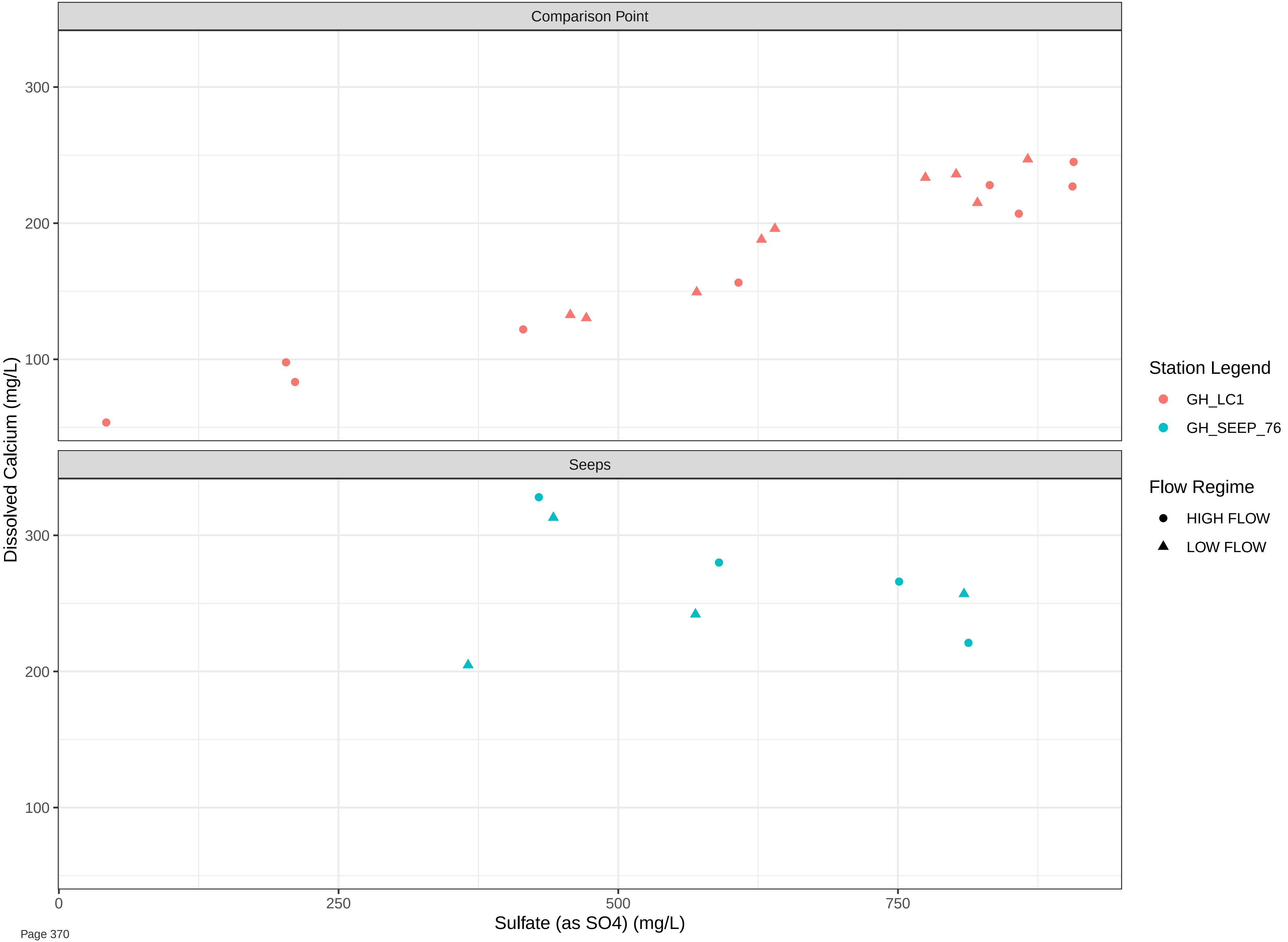


Comparison Point
Seeps
Dissolved Calcium (mg/L)
100
200
300
400
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

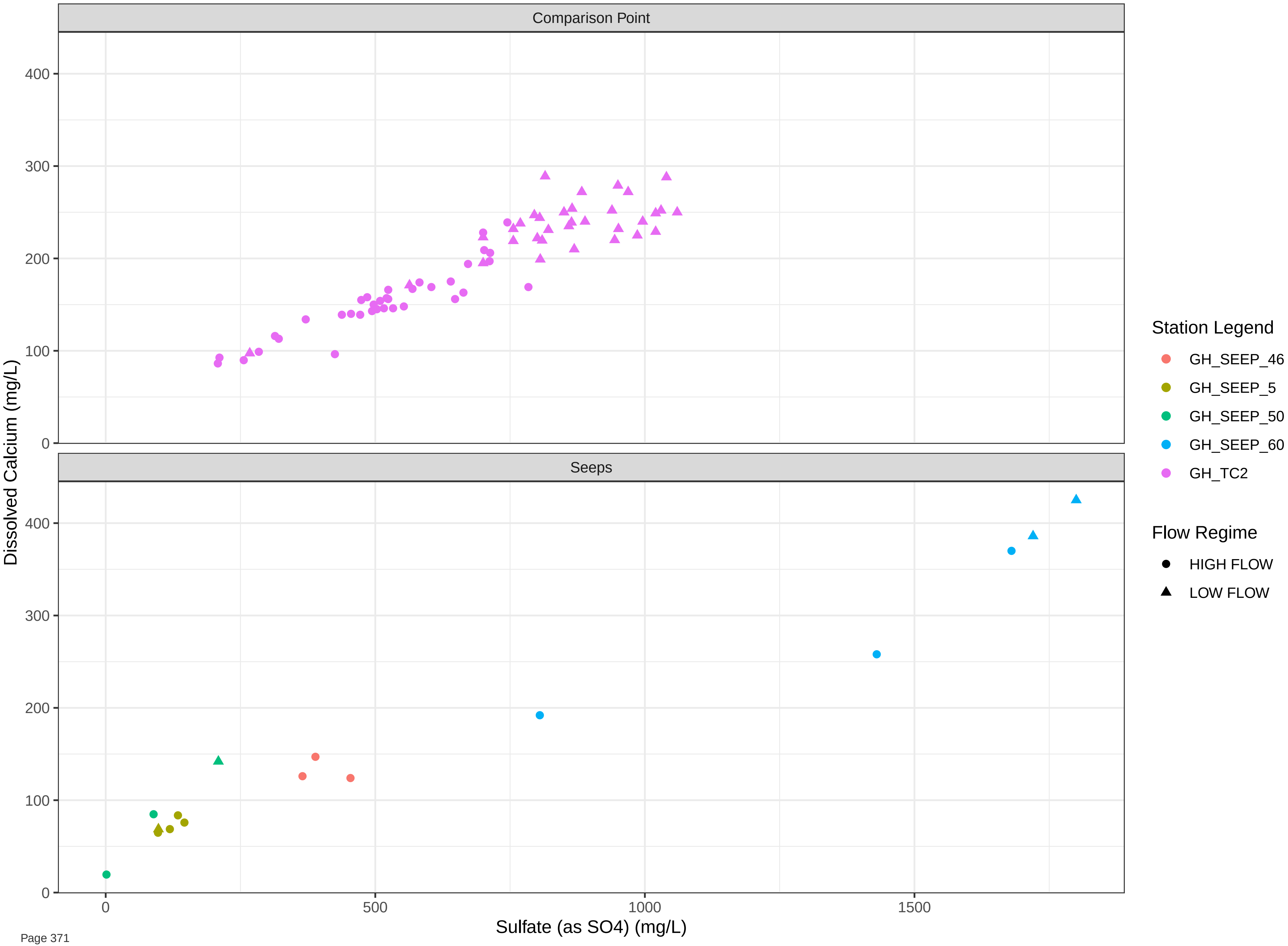

Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
50
100
150
200
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



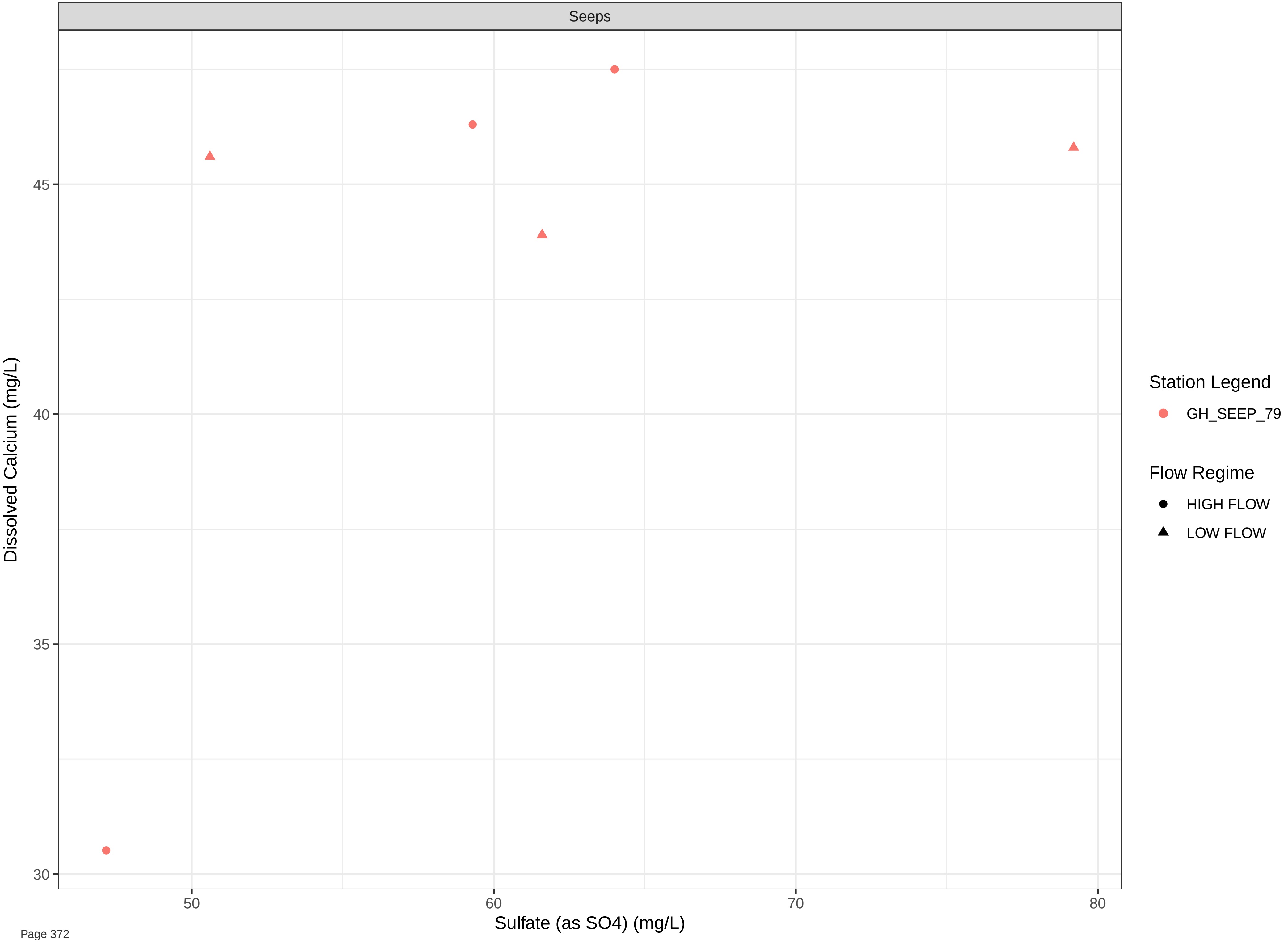
Comparison Point
Seeps
Dissolved Calcium (mg/L)
100
75
50
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

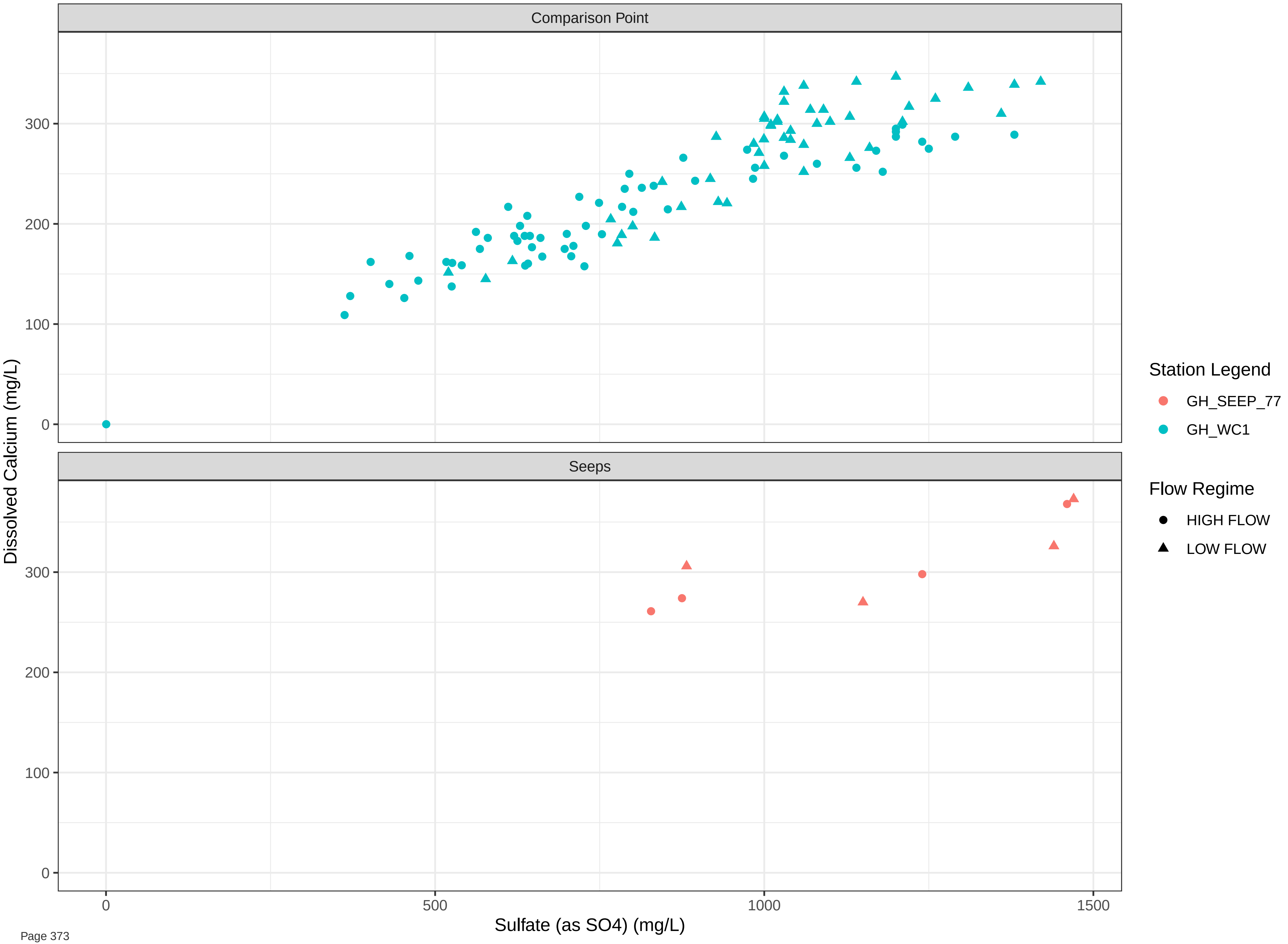


Comparison Point
Seeps
Dissolved Calcium (mg/L)
300
200
100
300
200
100
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

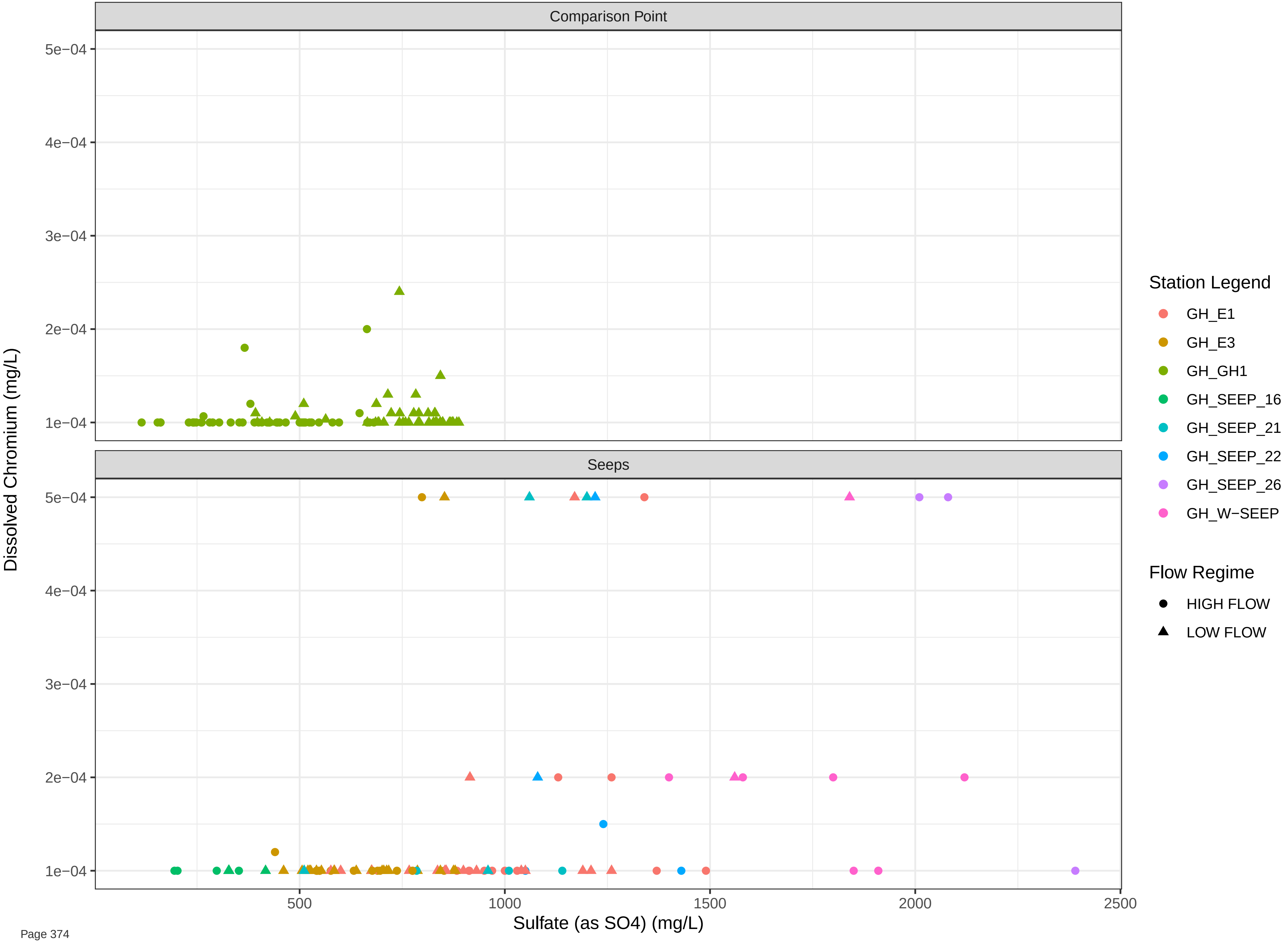


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

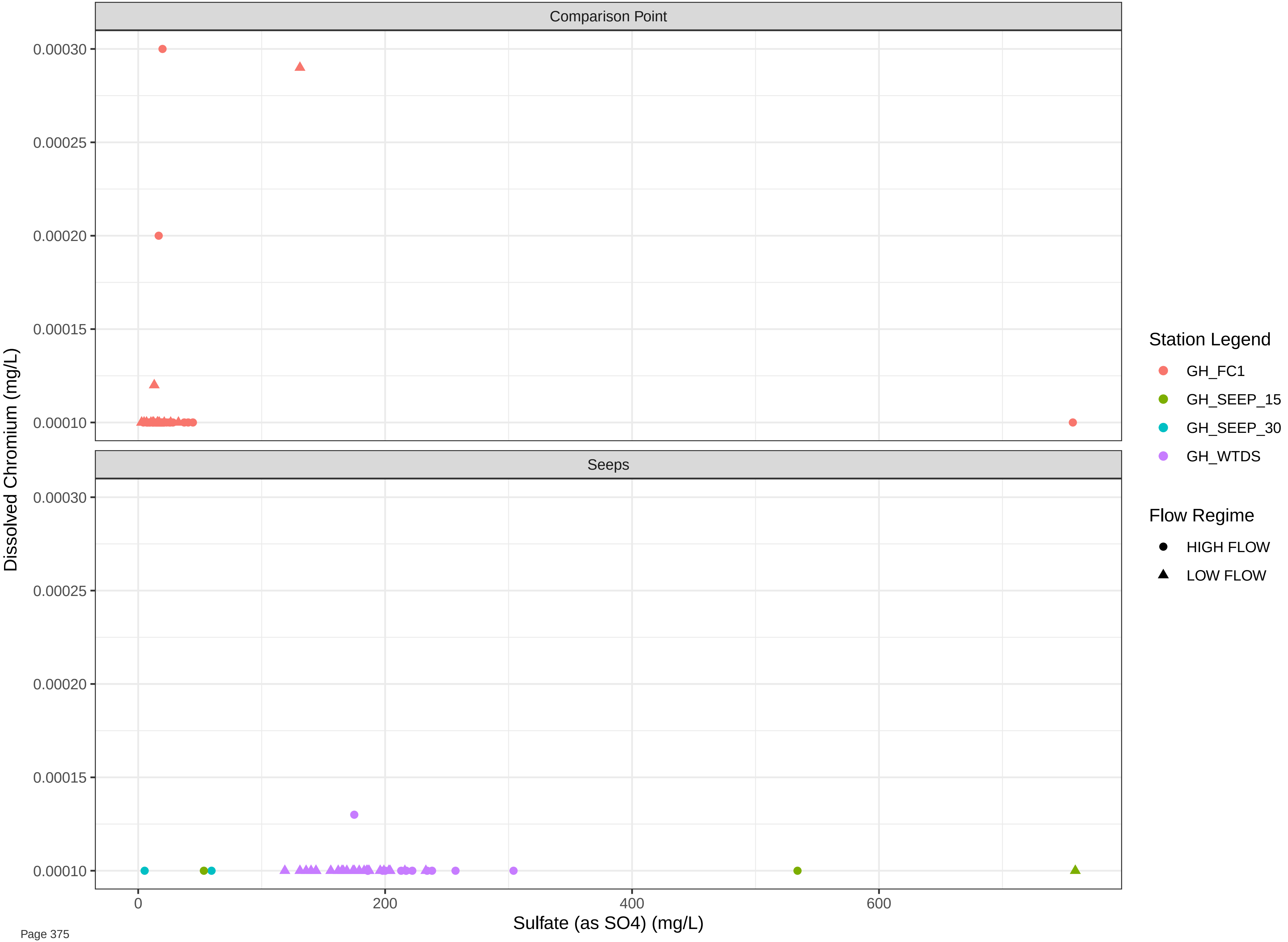

Seeps
Dissolved Calcium (mg/L)
45
40
35
30
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

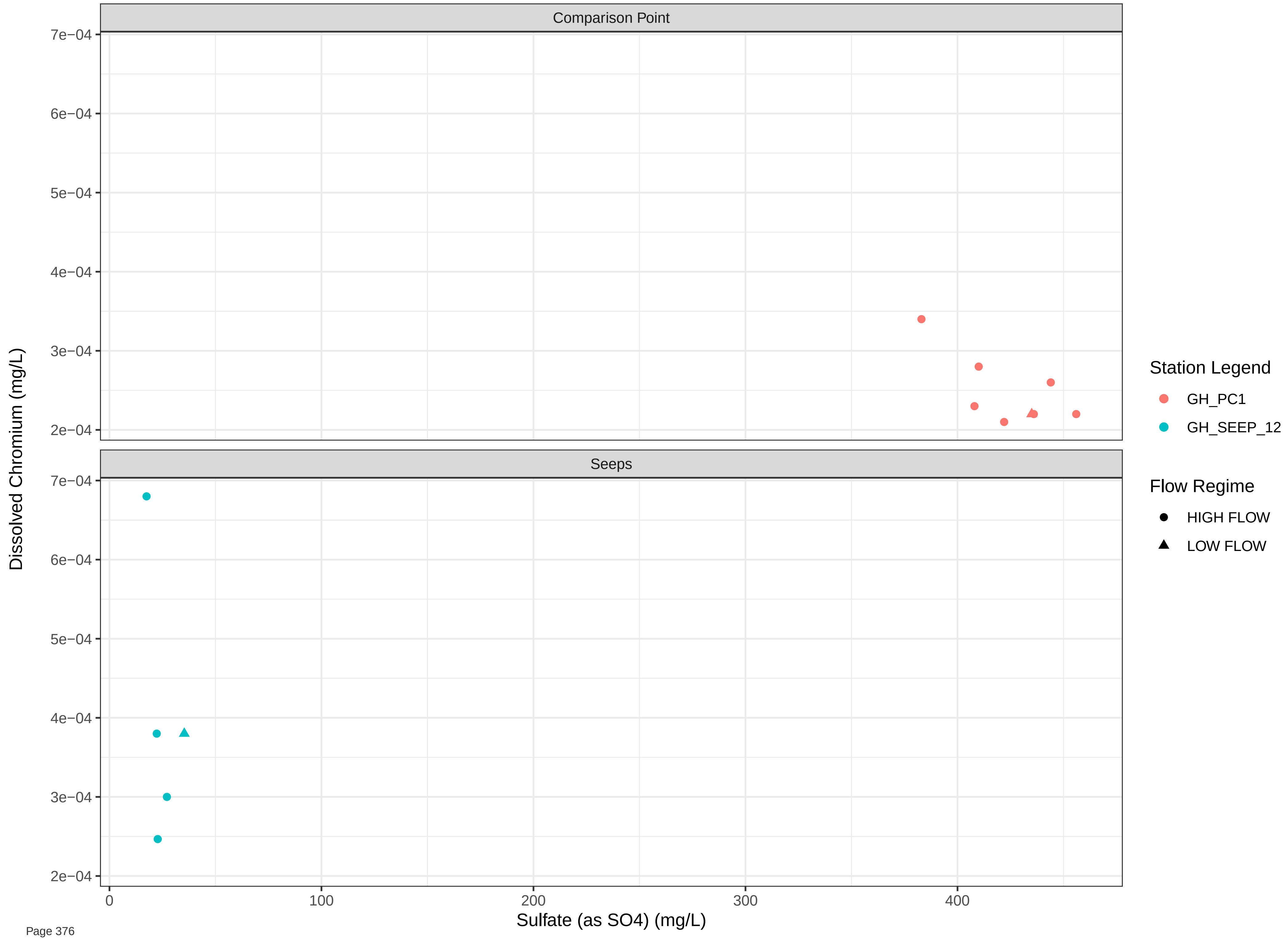


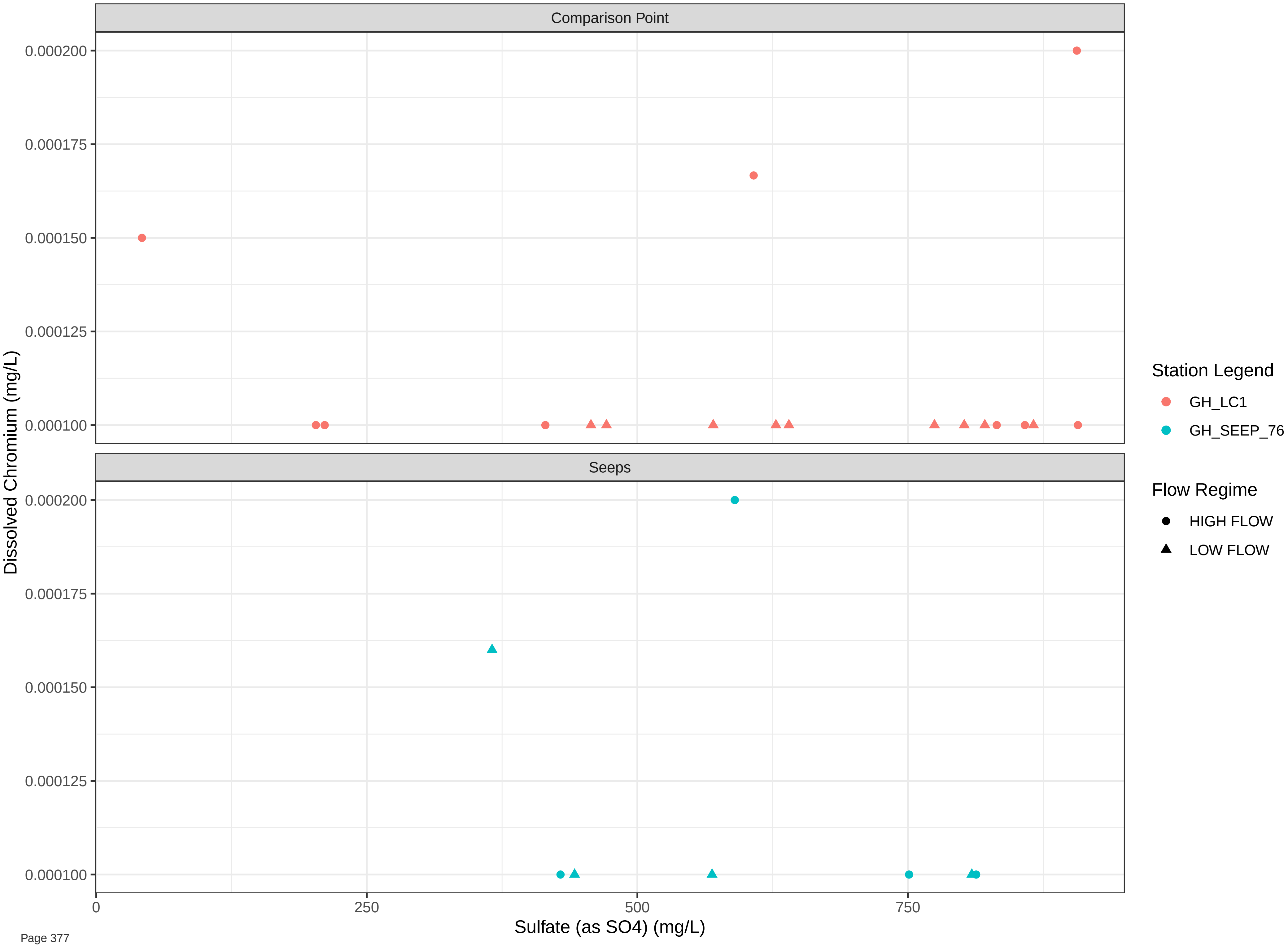
Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



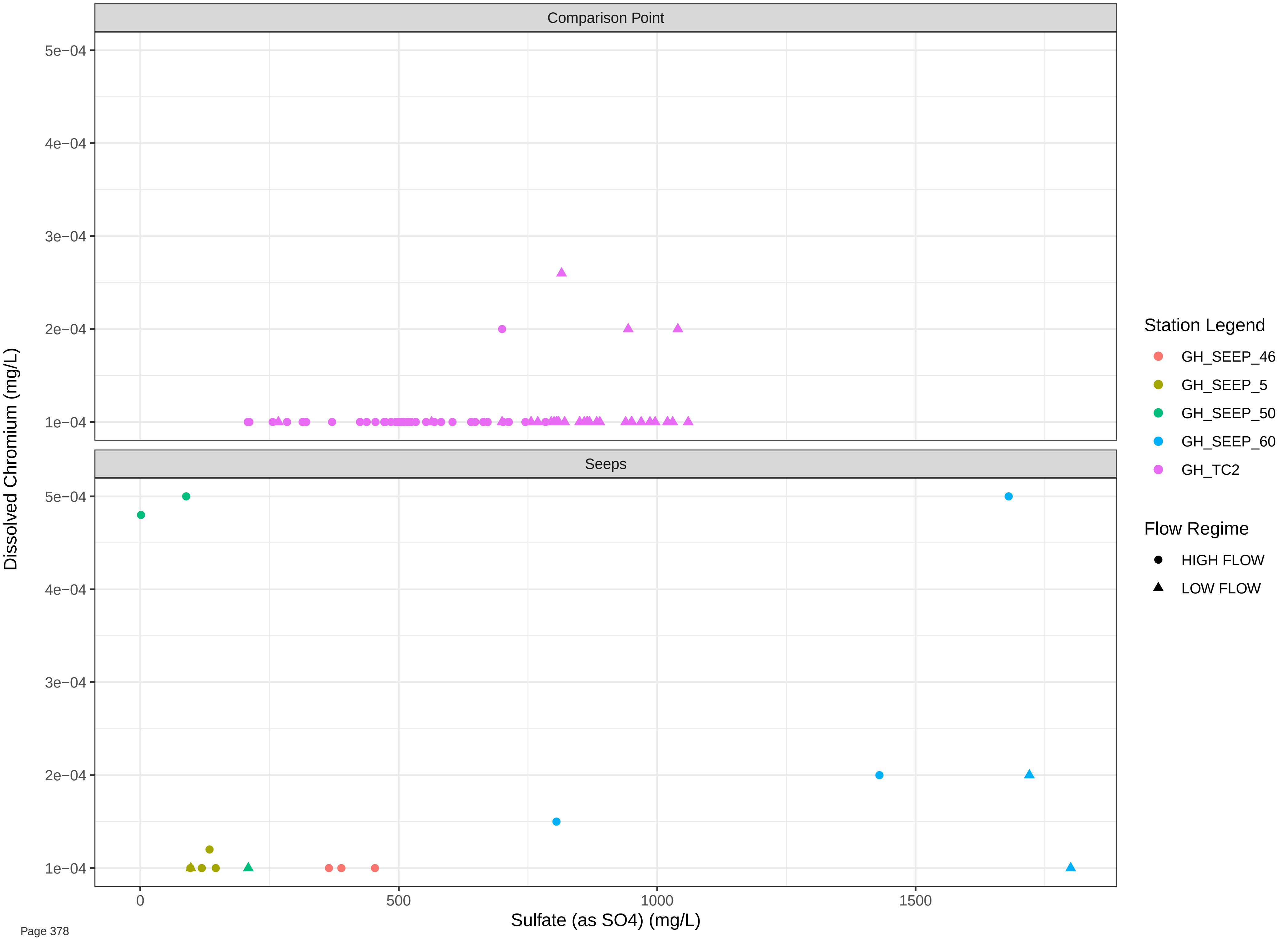
Comparison Point
Seeps
Dissolved Chromium (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.00030
0.00025
0.00020
0.00015
0.00010
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

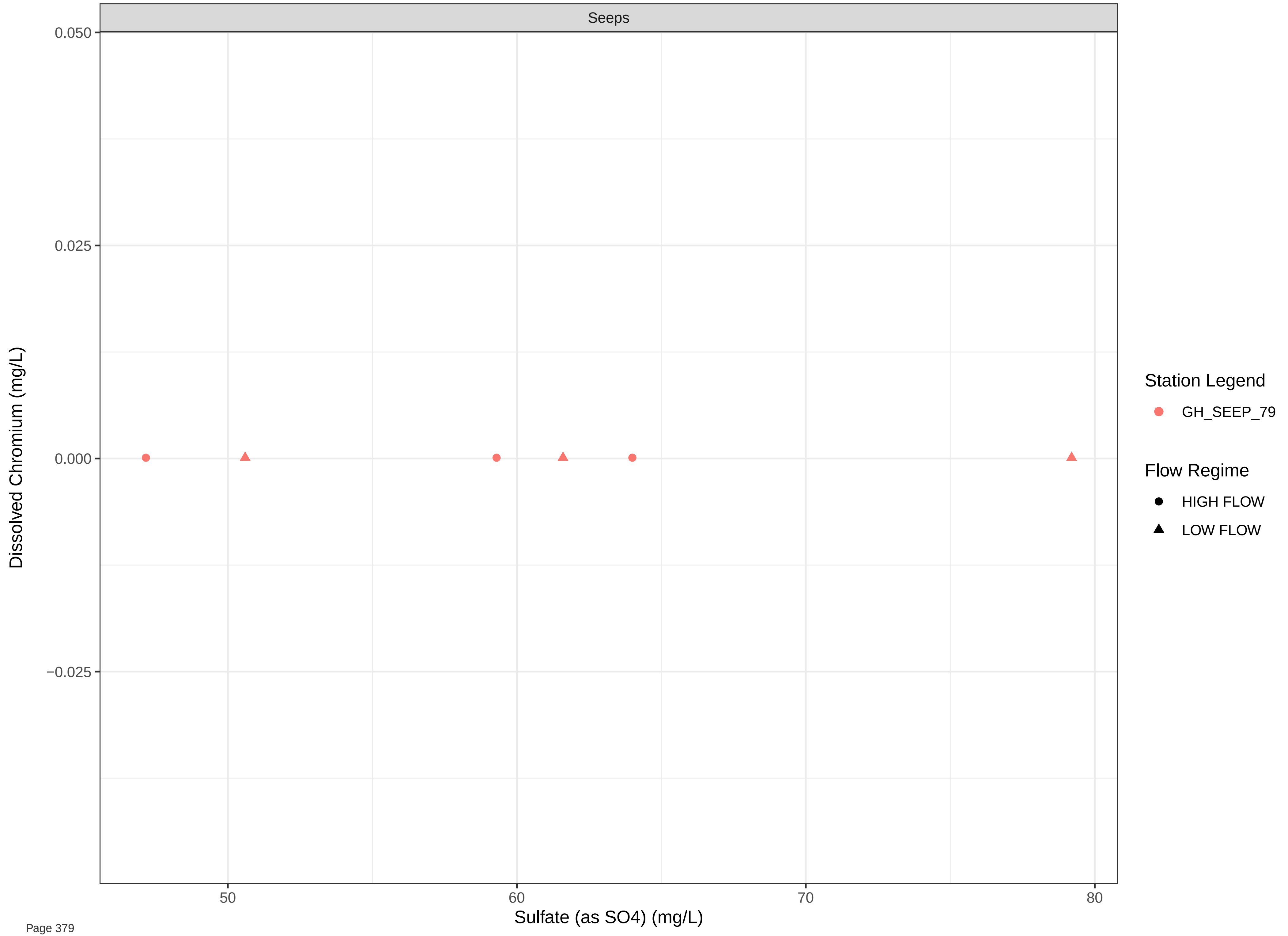

Comparison Point
Seeps
7e−04
6e−04
5e−04
4e−04
3e−04
2e−04
0
100
200
300
400
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

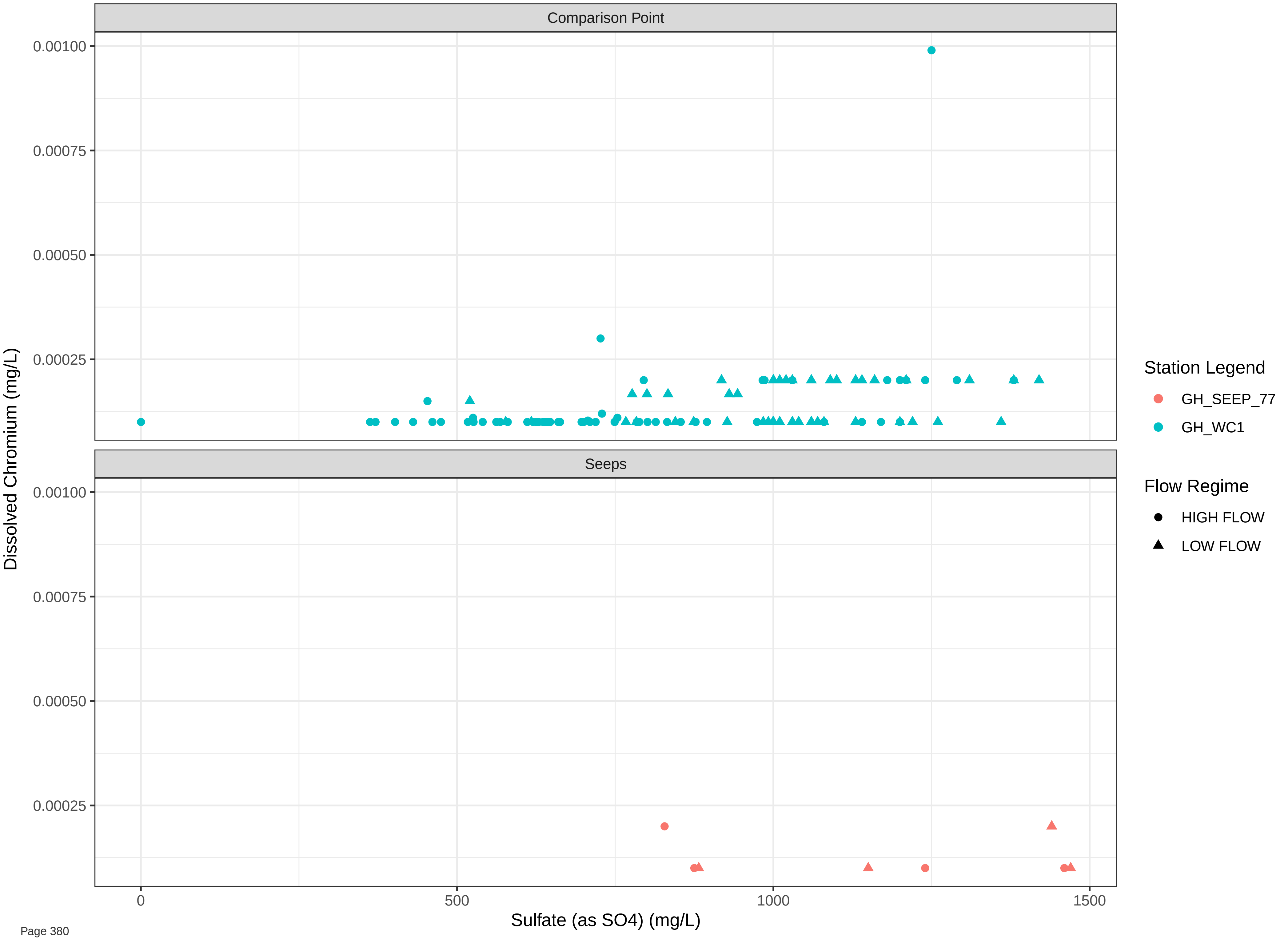


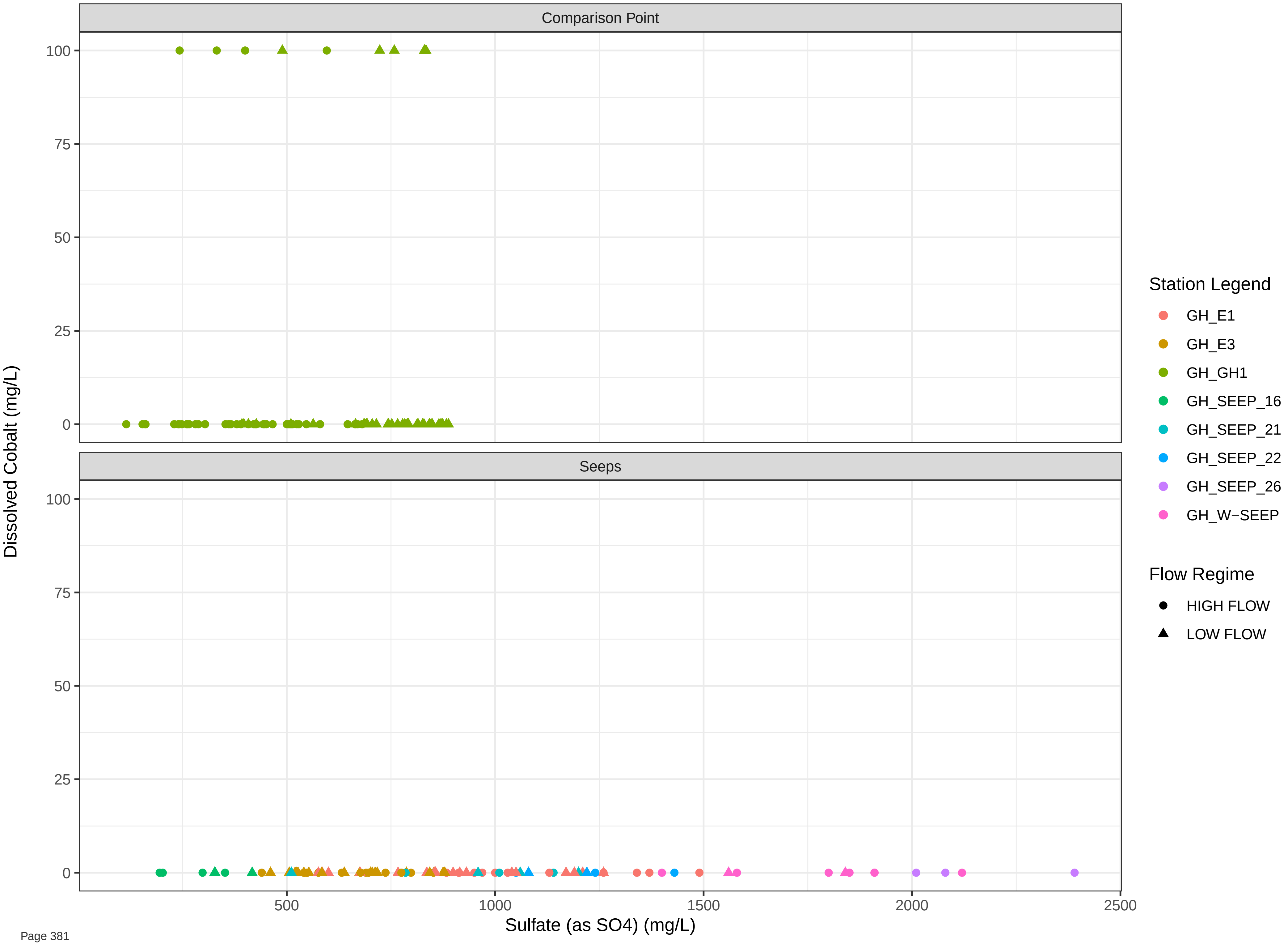
Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

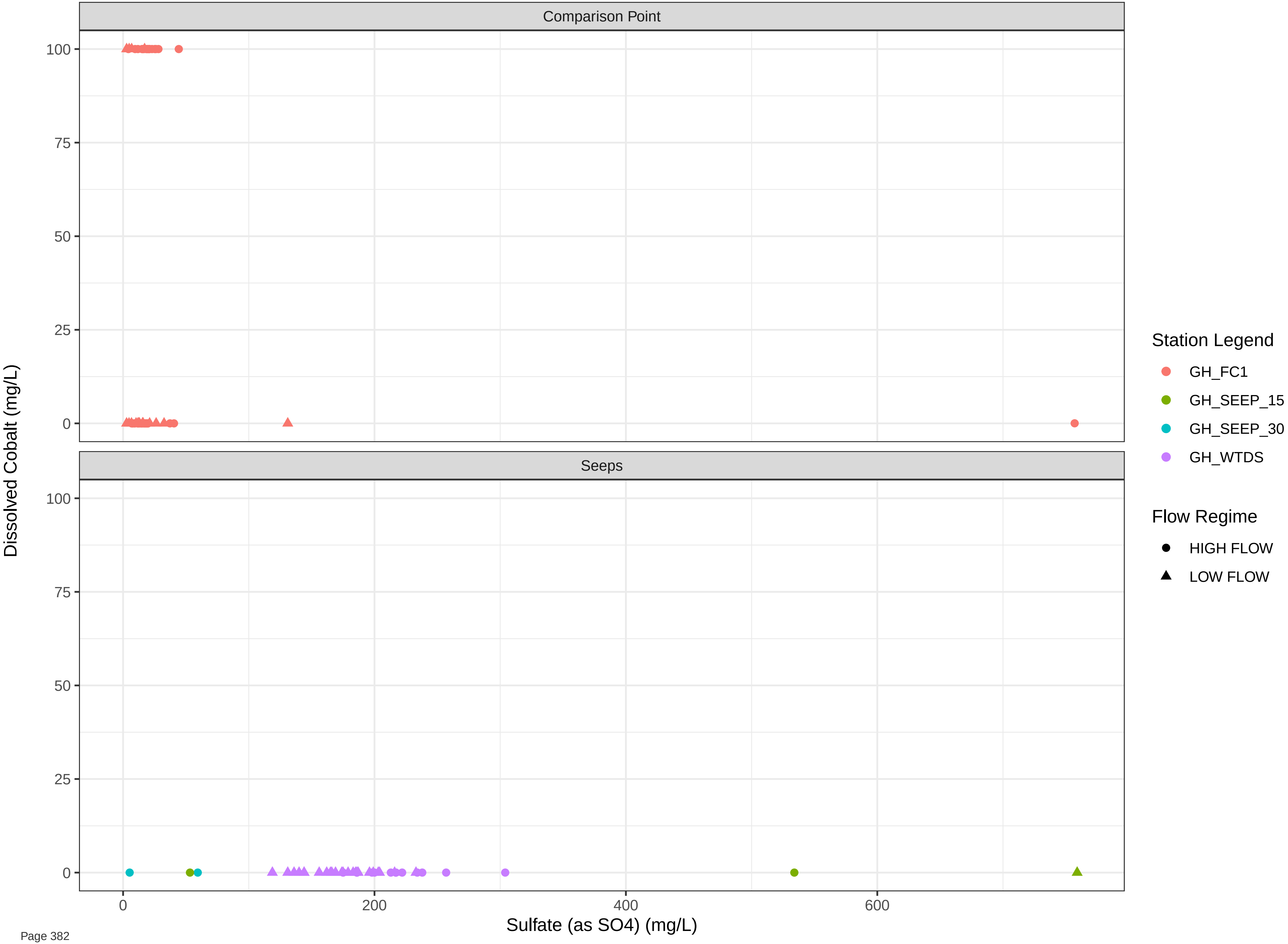


Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Chromium (mg/L)
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

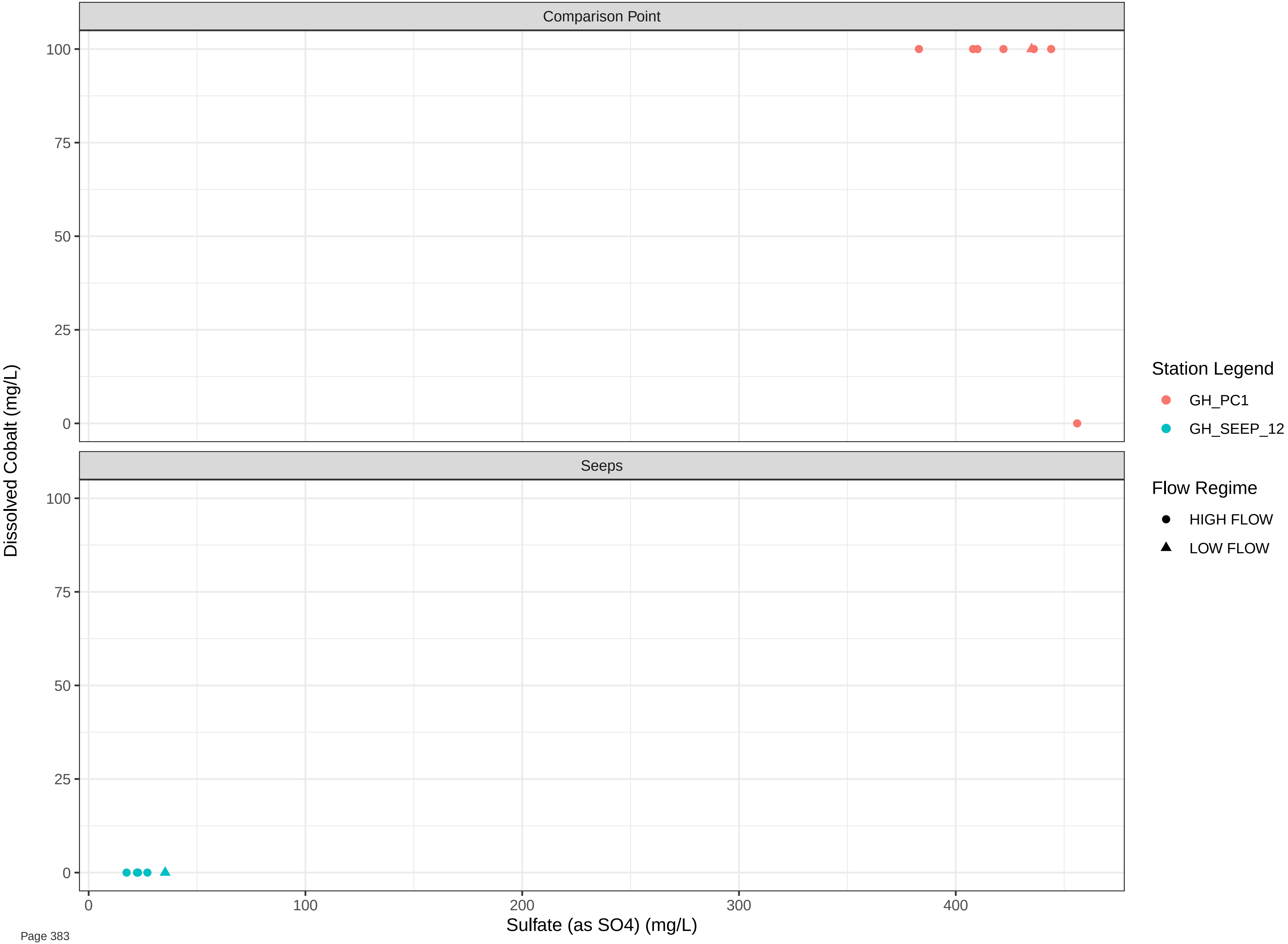

Seeps
0.050
0.025
0.000
−0.025
Dissolved Chromium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.00100
0.00075
0.00050
0.00025
Sulfate (as SO4) (mg/L)
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

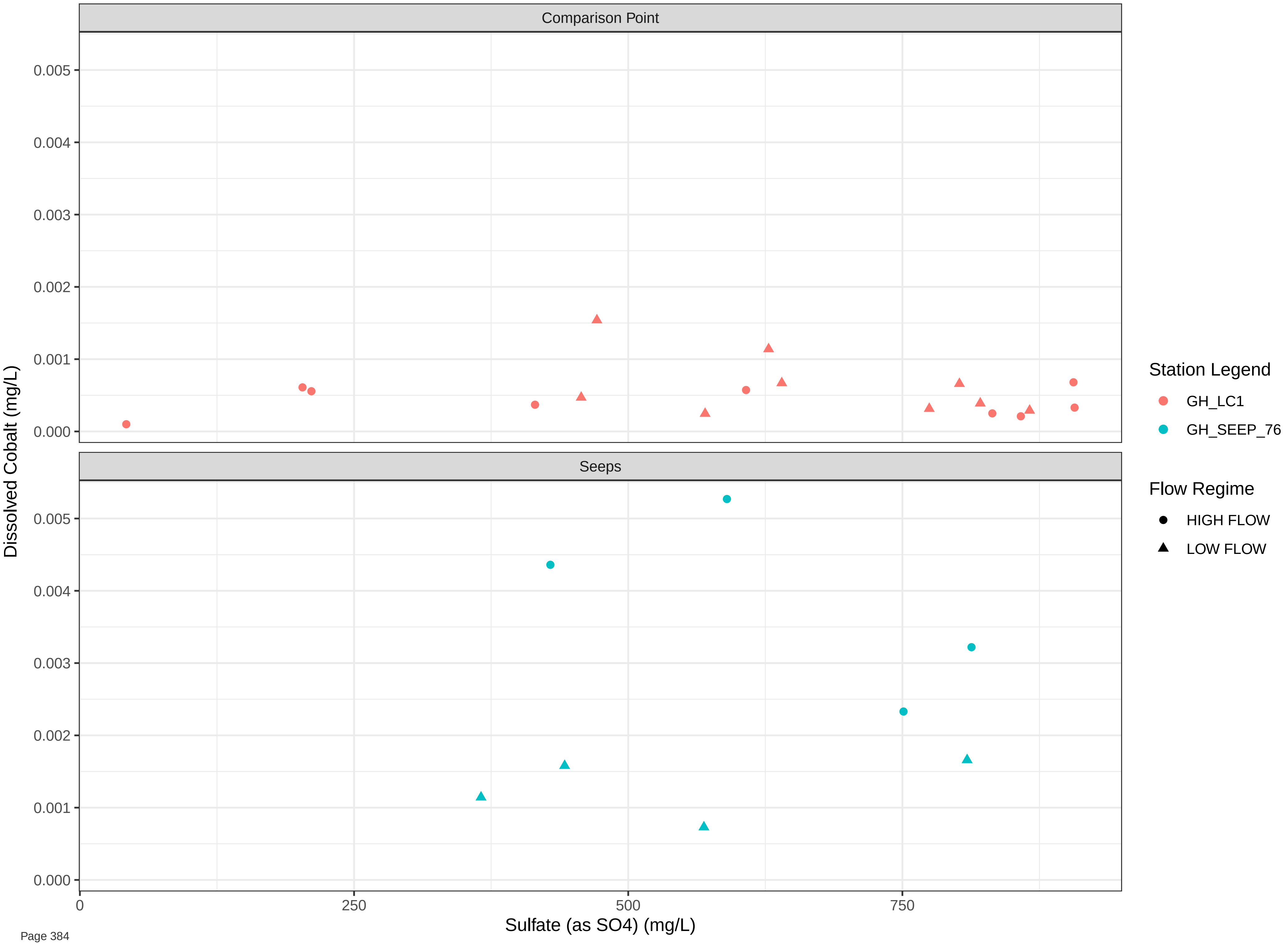

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



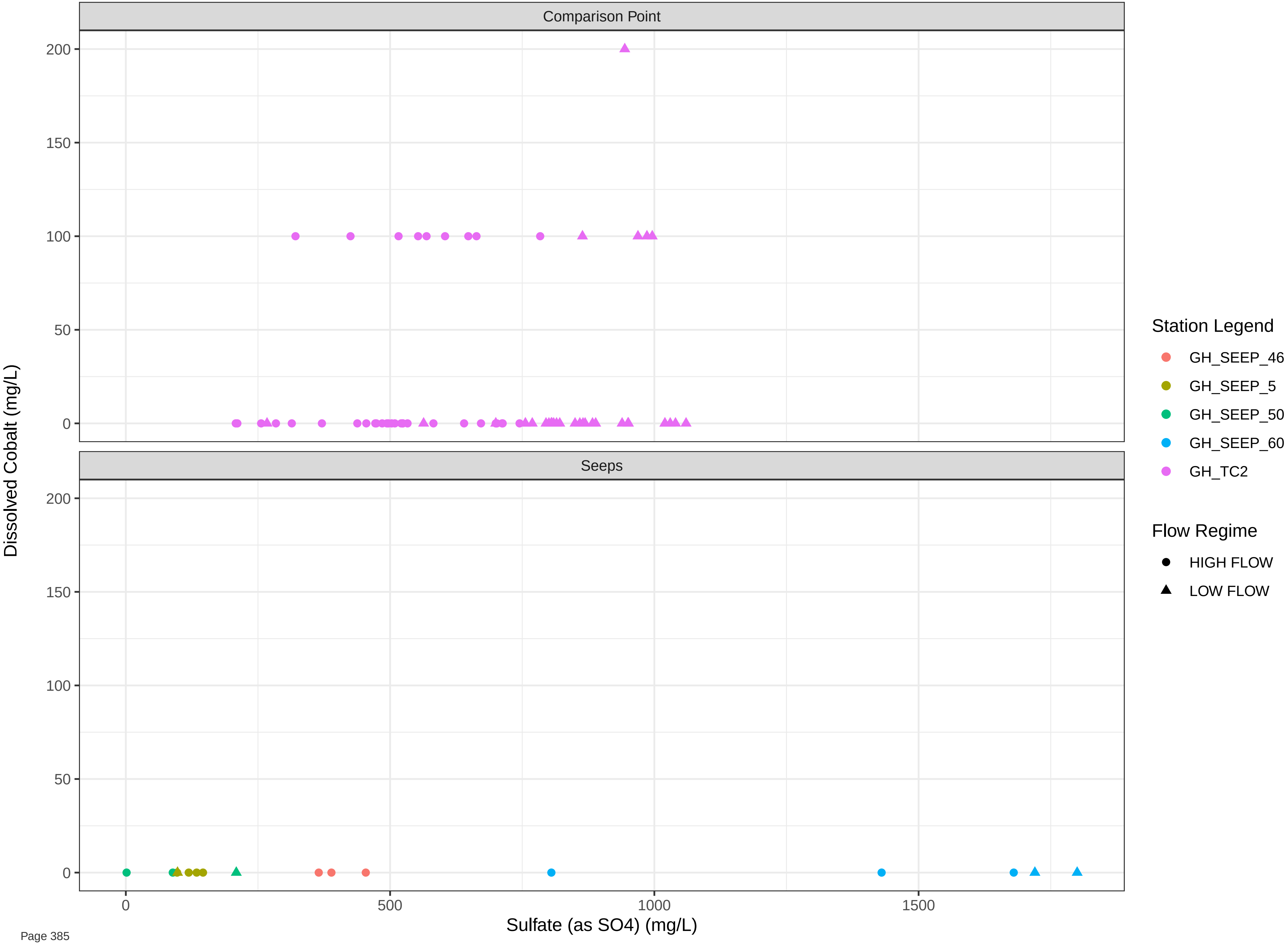
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
100
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



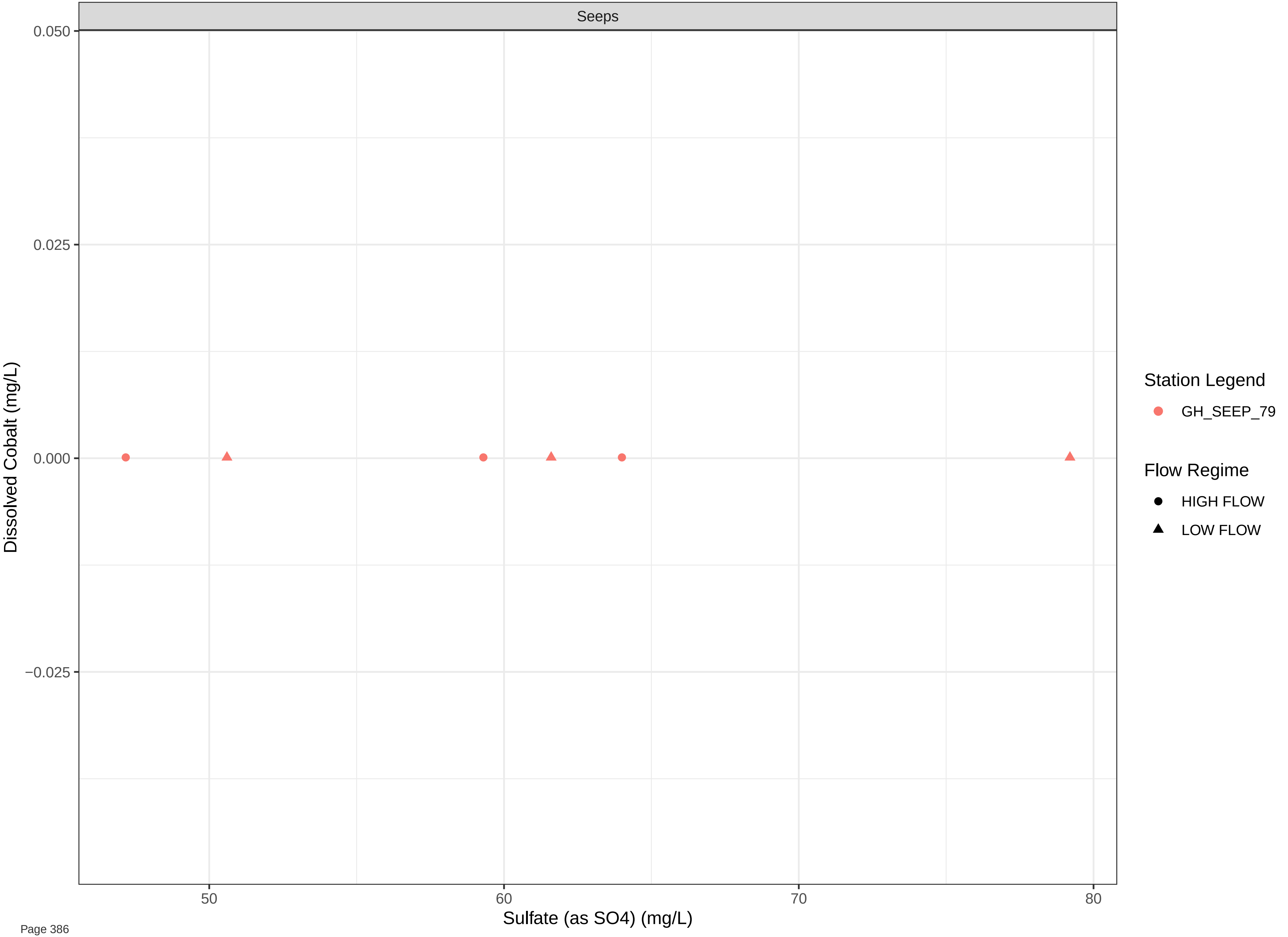
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
100
75
50
25
0
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

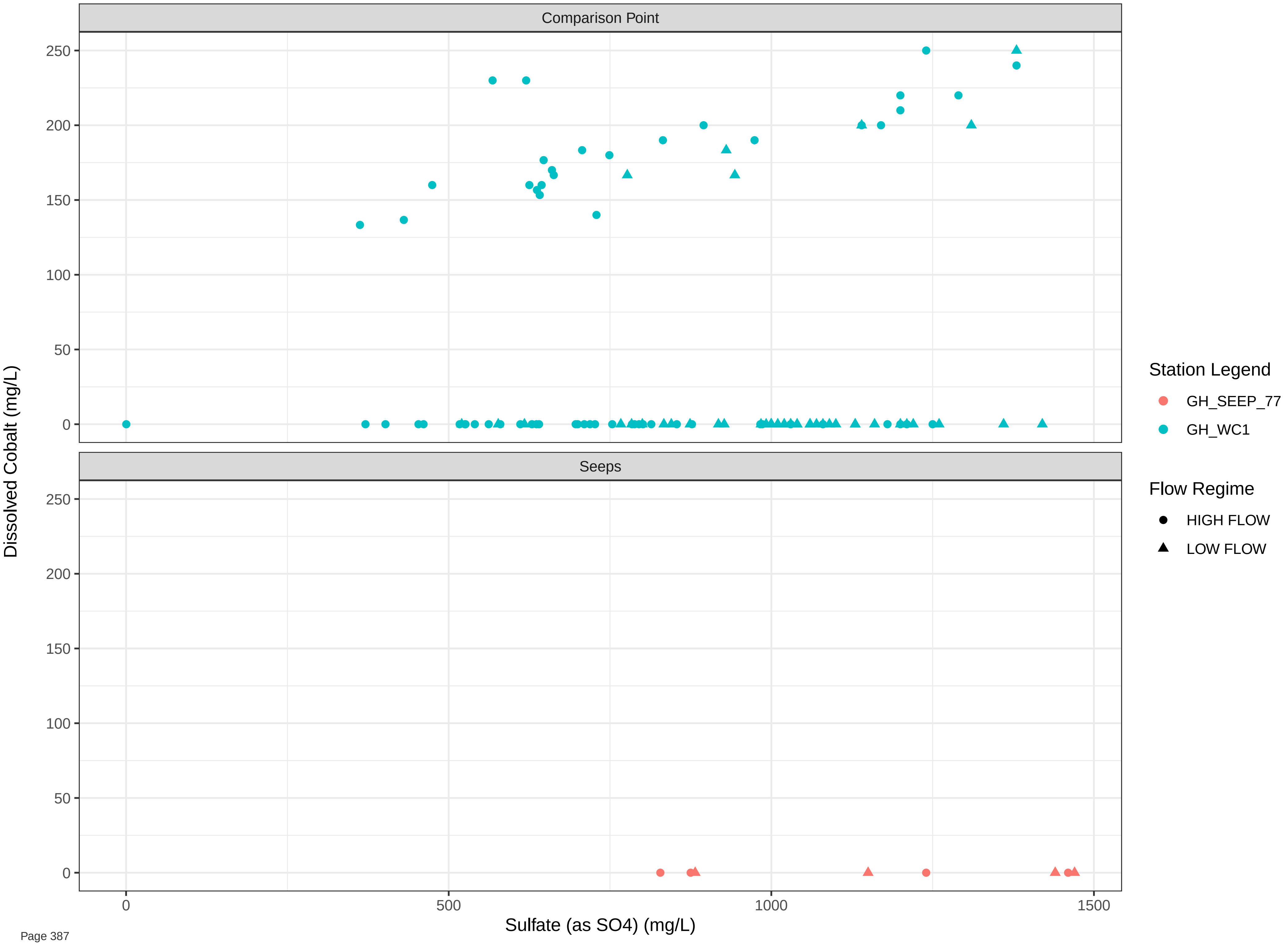


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
0.000
0.001
0.002
0.003
0.004
0.005
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



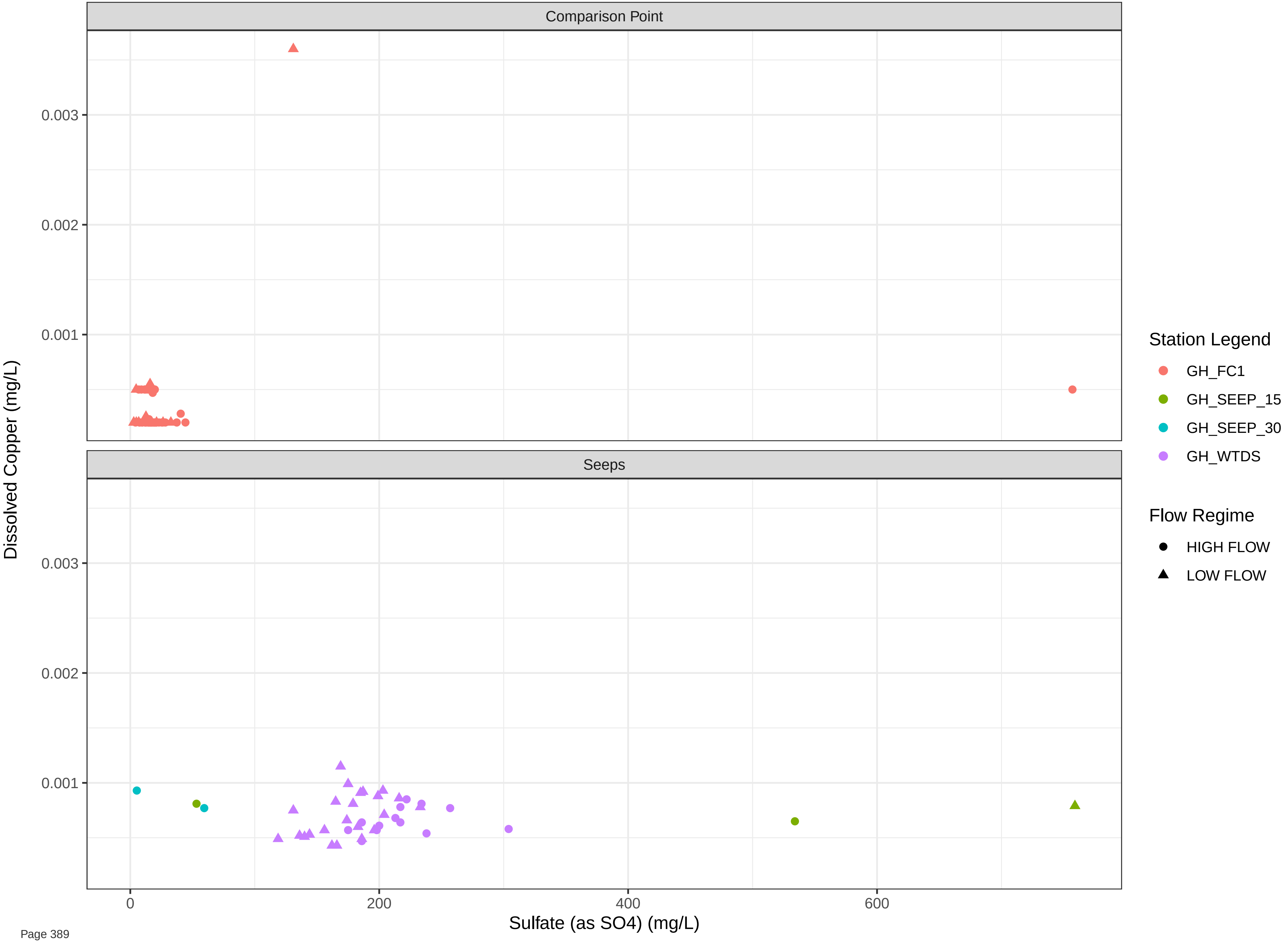
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.050
0.025
0.000
−0.025
Dissolved Cobalt (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

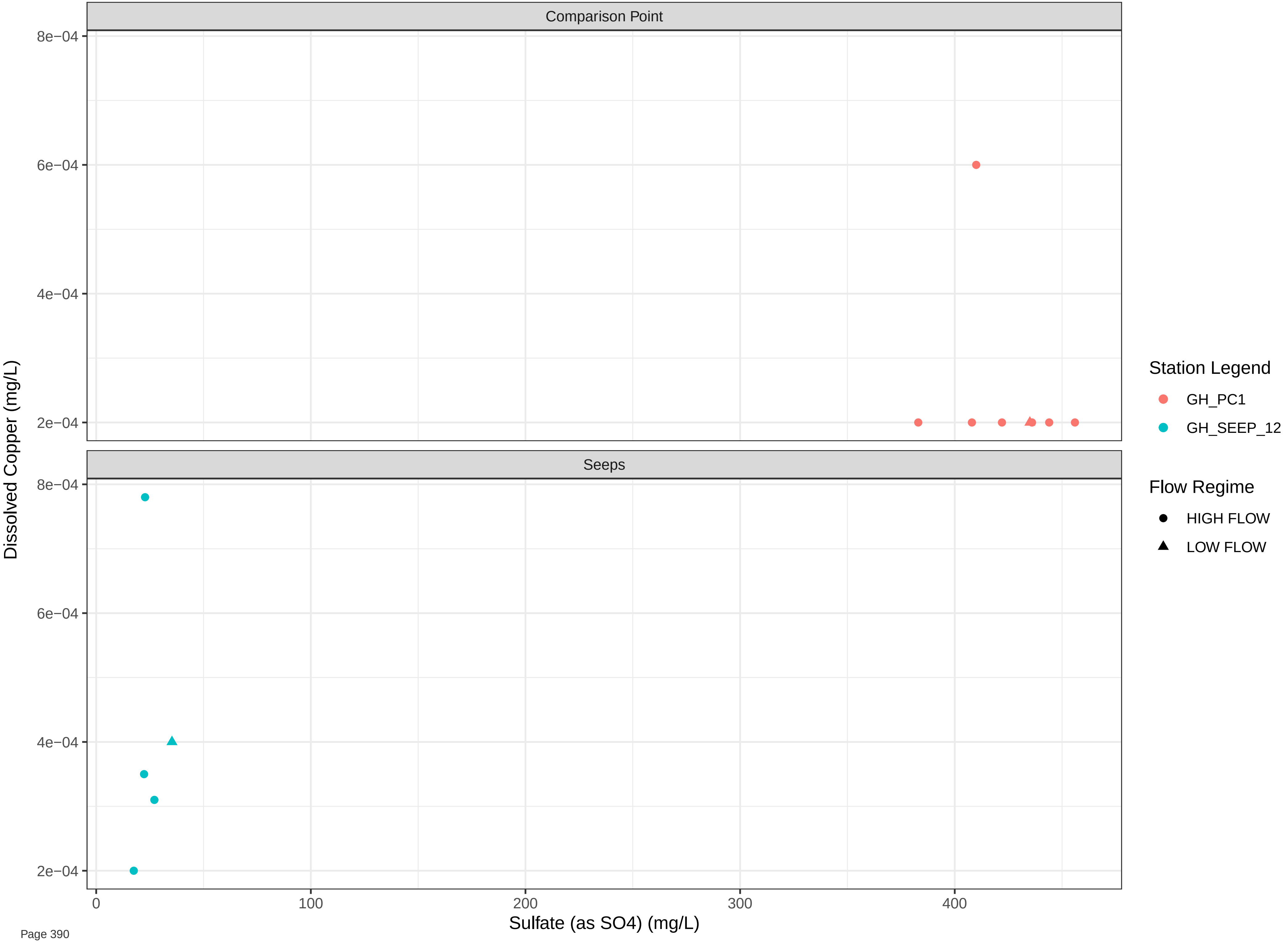


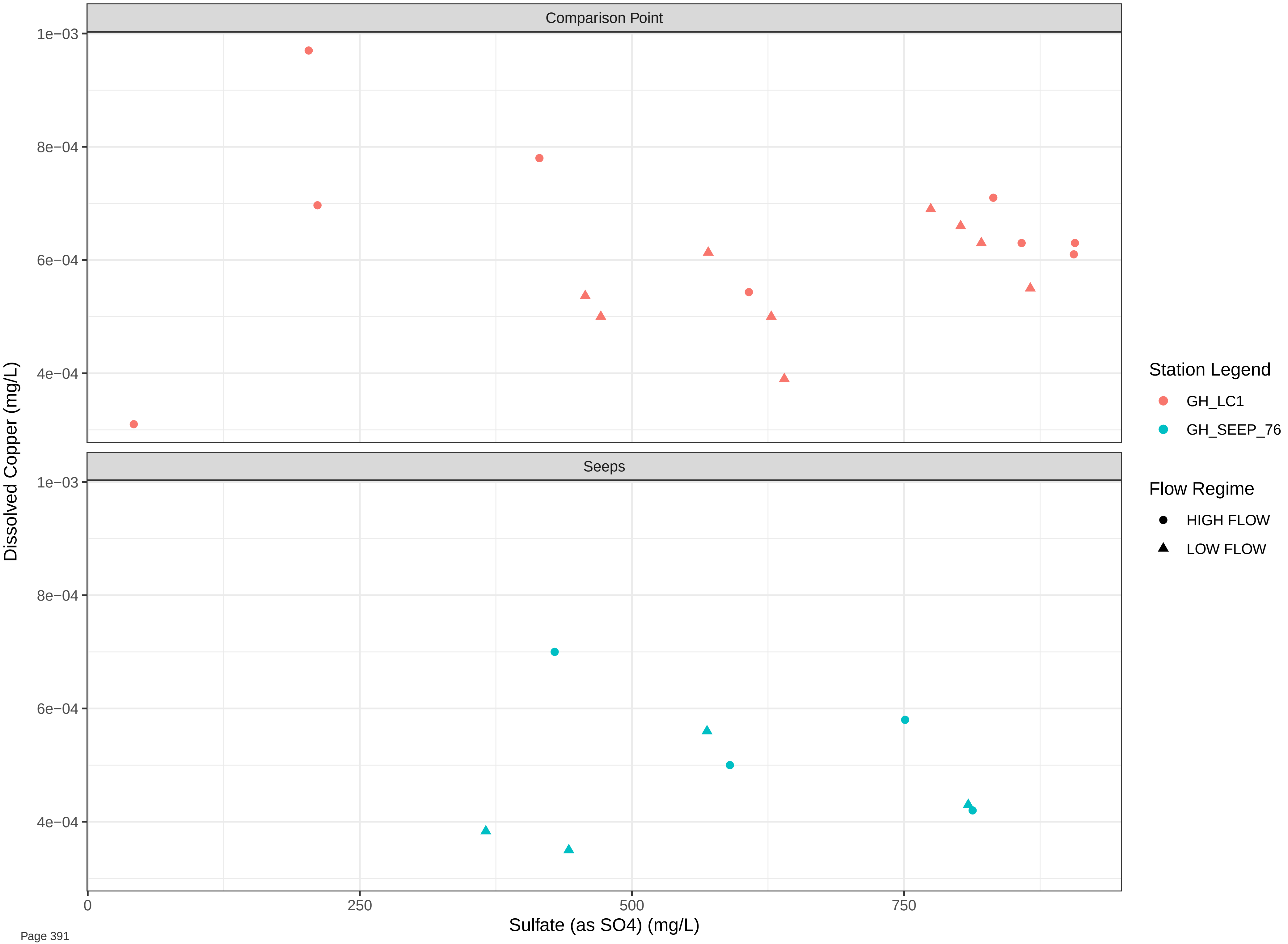
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
250
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.00125
0.00100
0.00075
0.00050
0.00025
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

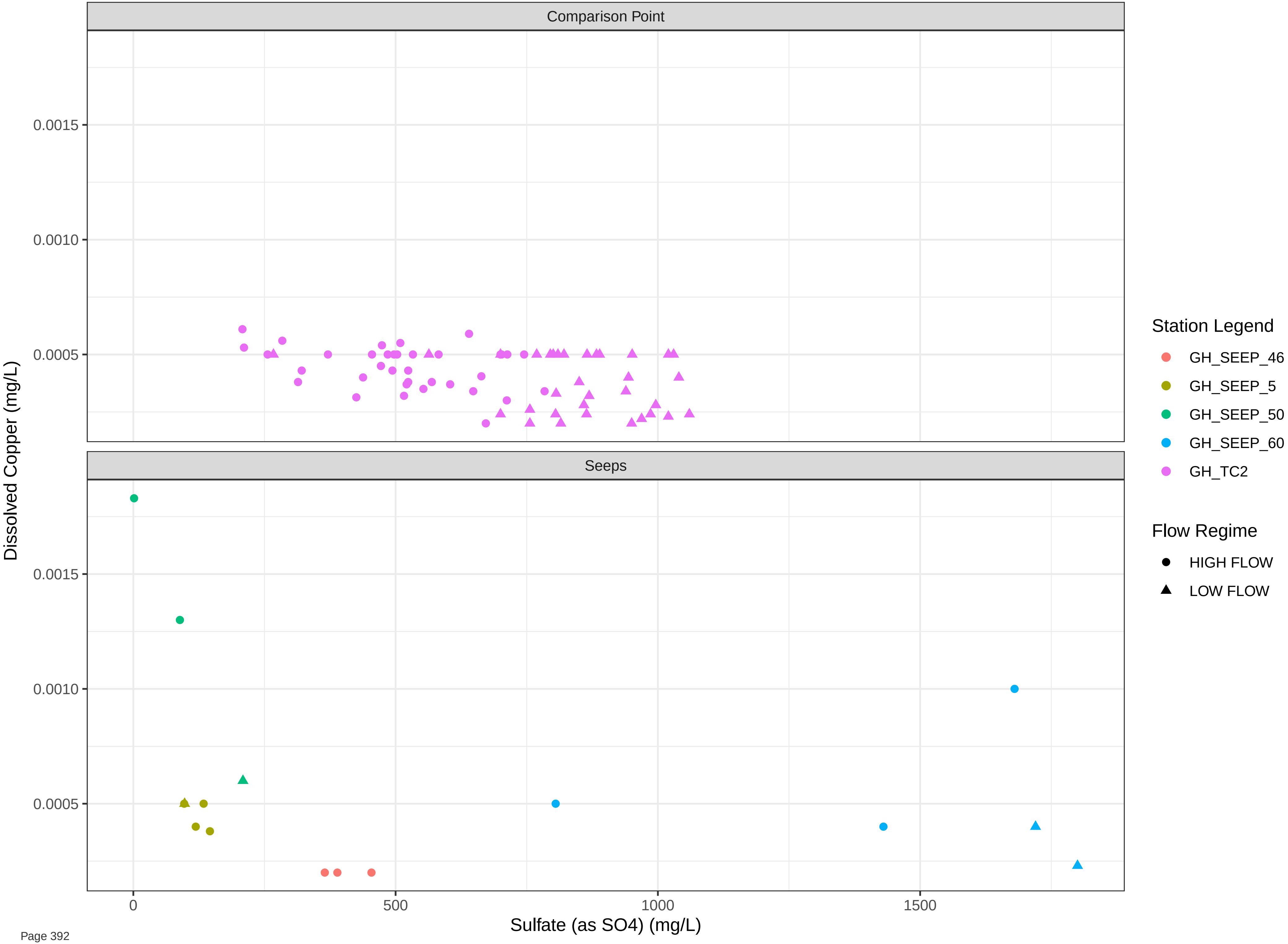


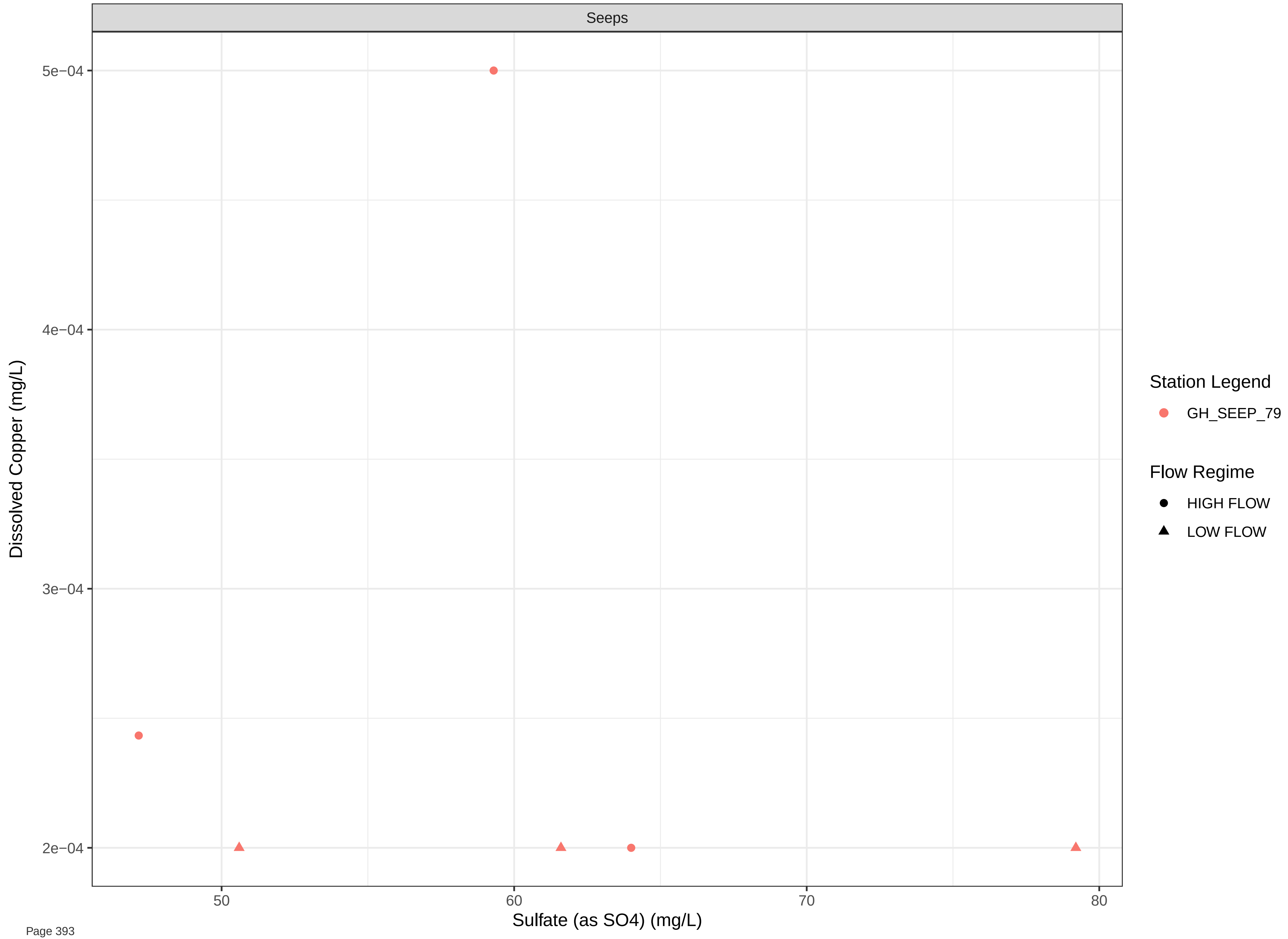
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.001
0.002
0.003
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Copper (mg/L)
8e−04
6e−04
4e−04
2e−04
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

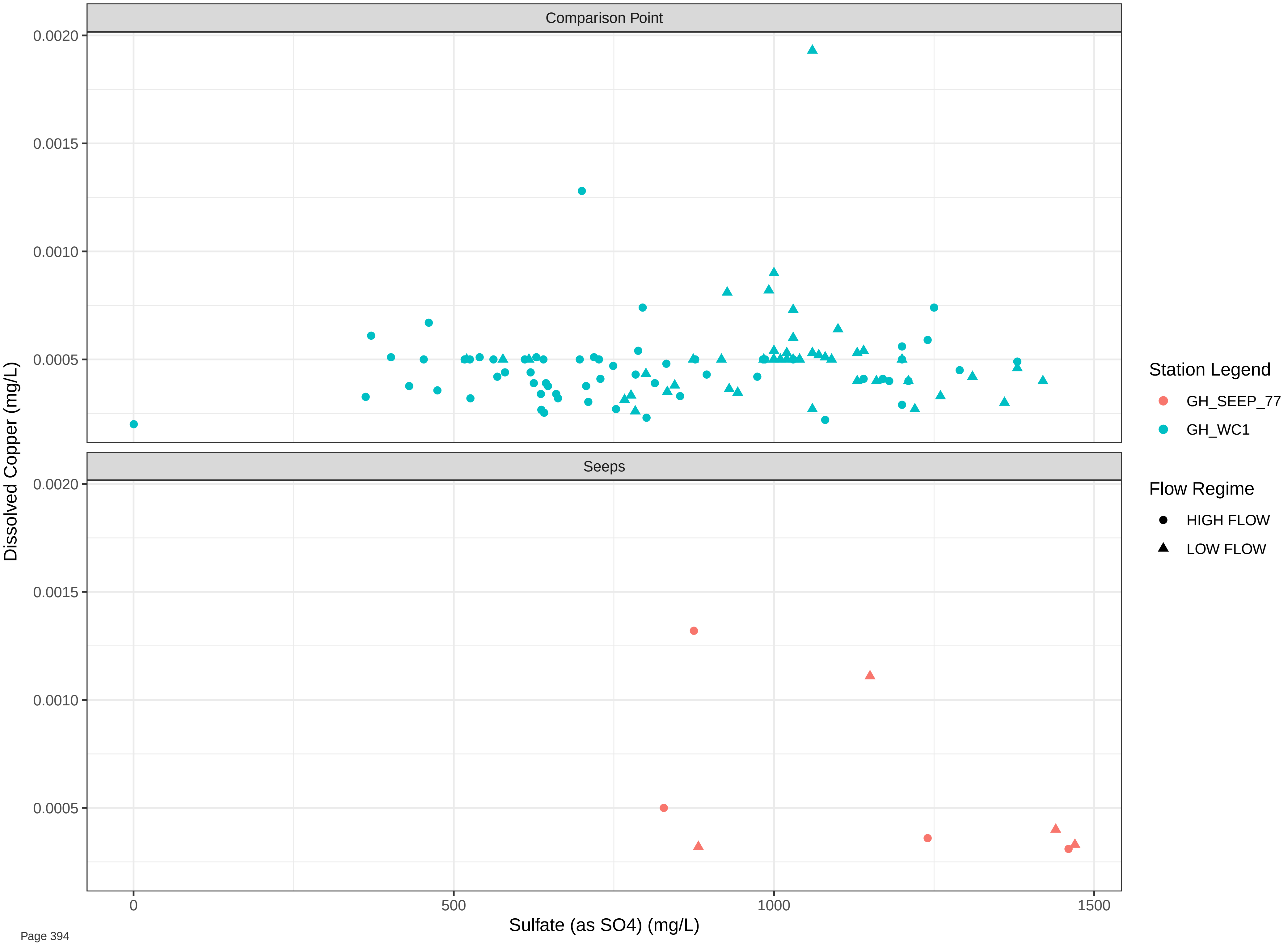


Comparison Point
Seeps
Dissolved Copper (mg/L)
1e−03
8e−04
6e−04
4e−04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

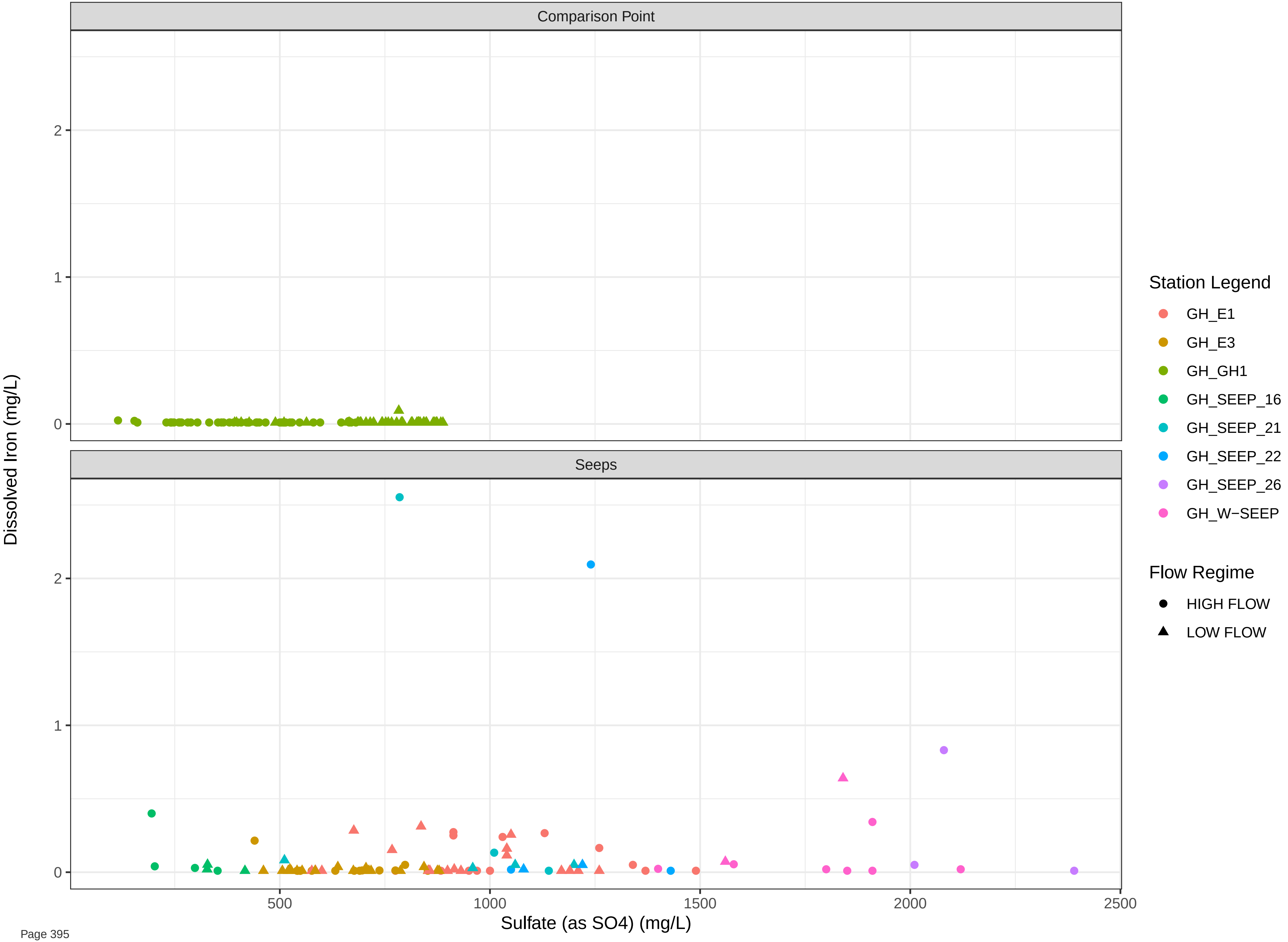

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.0015
0.0010
0.0005
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW



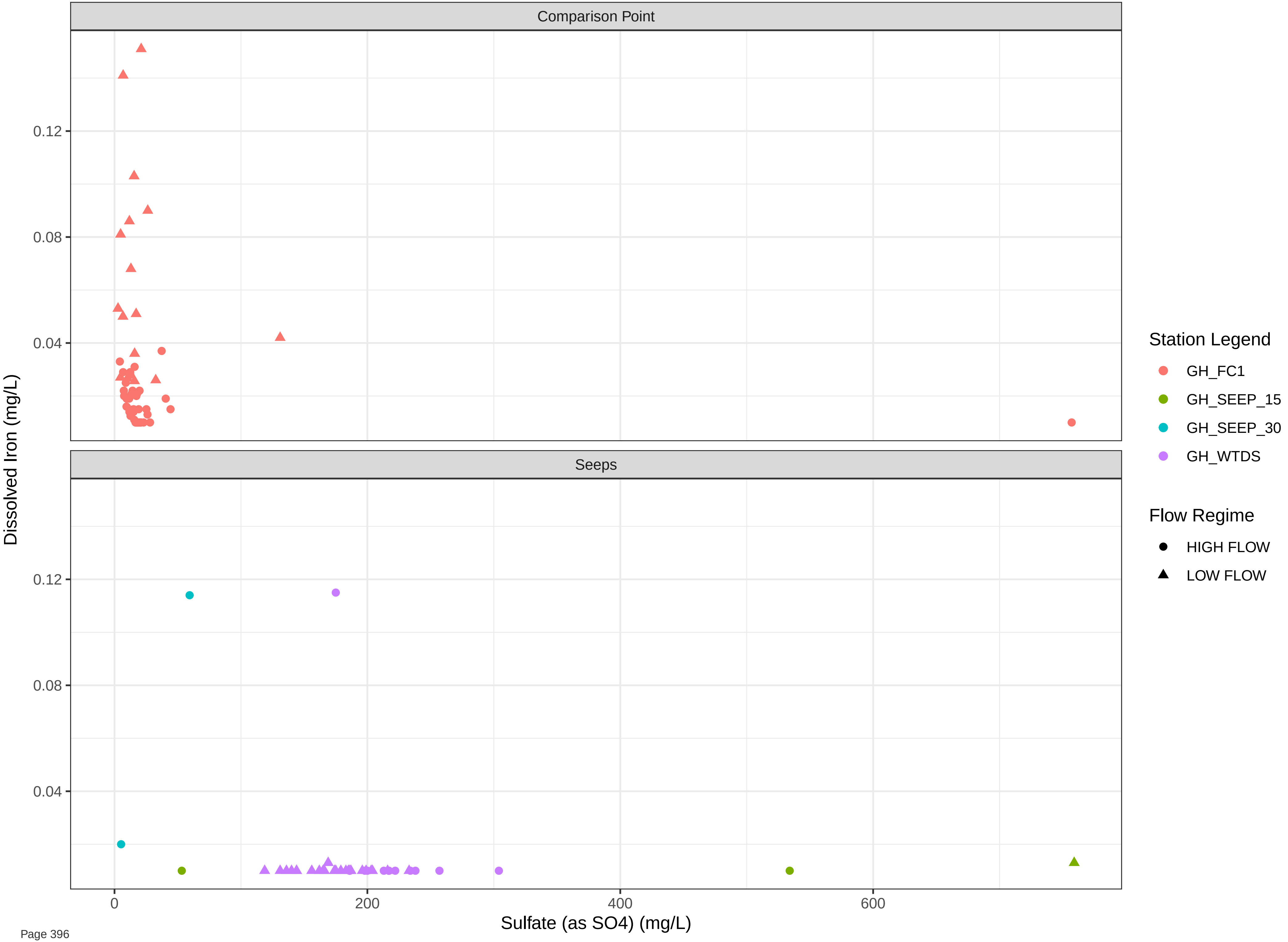
Seeps
5e−04
4e−04
3e−04
2e−04
Dissolved Copper (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



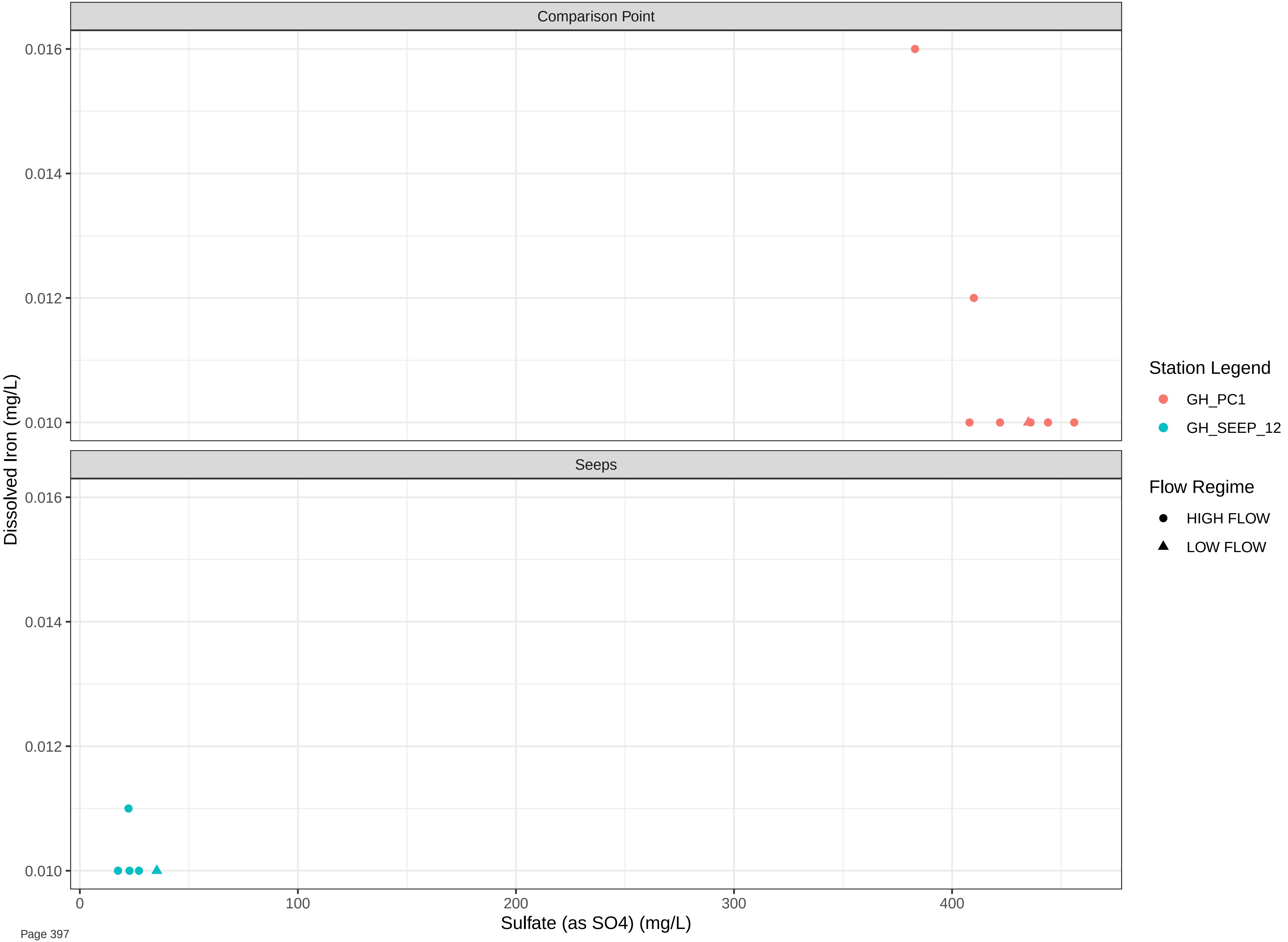
Comparison Point
Seeps
0.0020
0.0015
0.0010
0.0005
0
500
1000
1500
Dissolved Copper (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



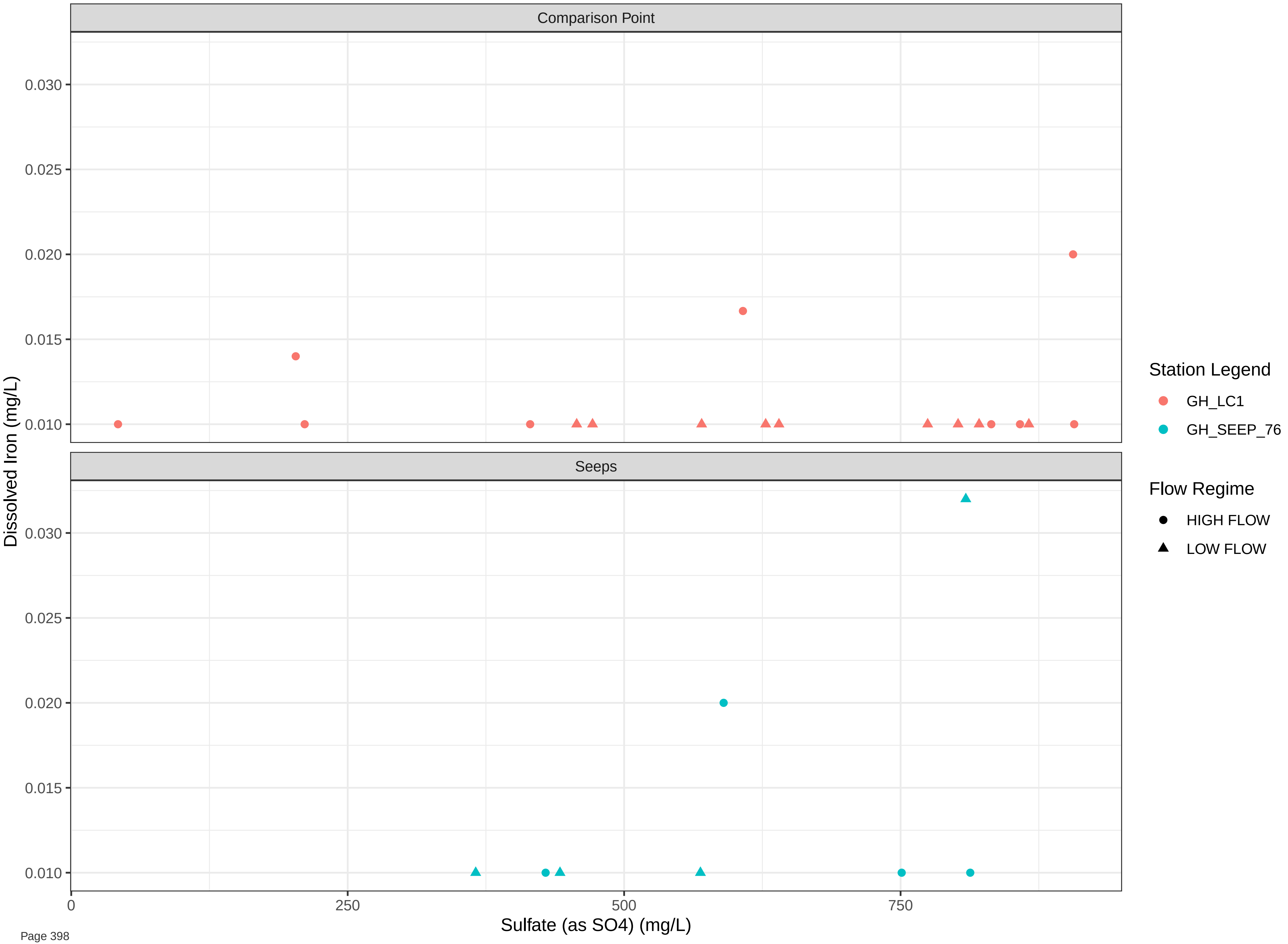
Comparison Point
Seeps
Dissolved Iron (mg/L)
0
1
2
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

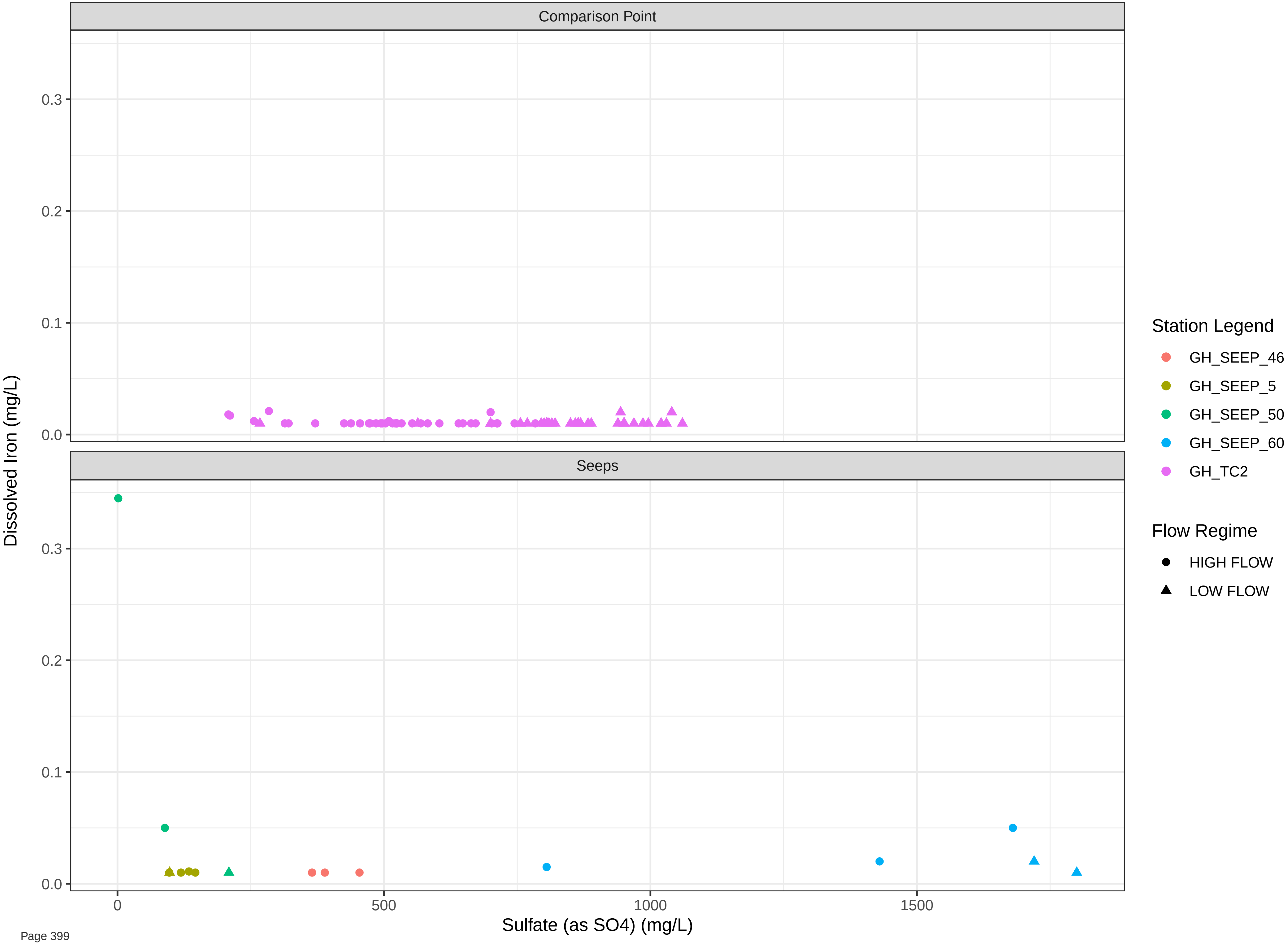


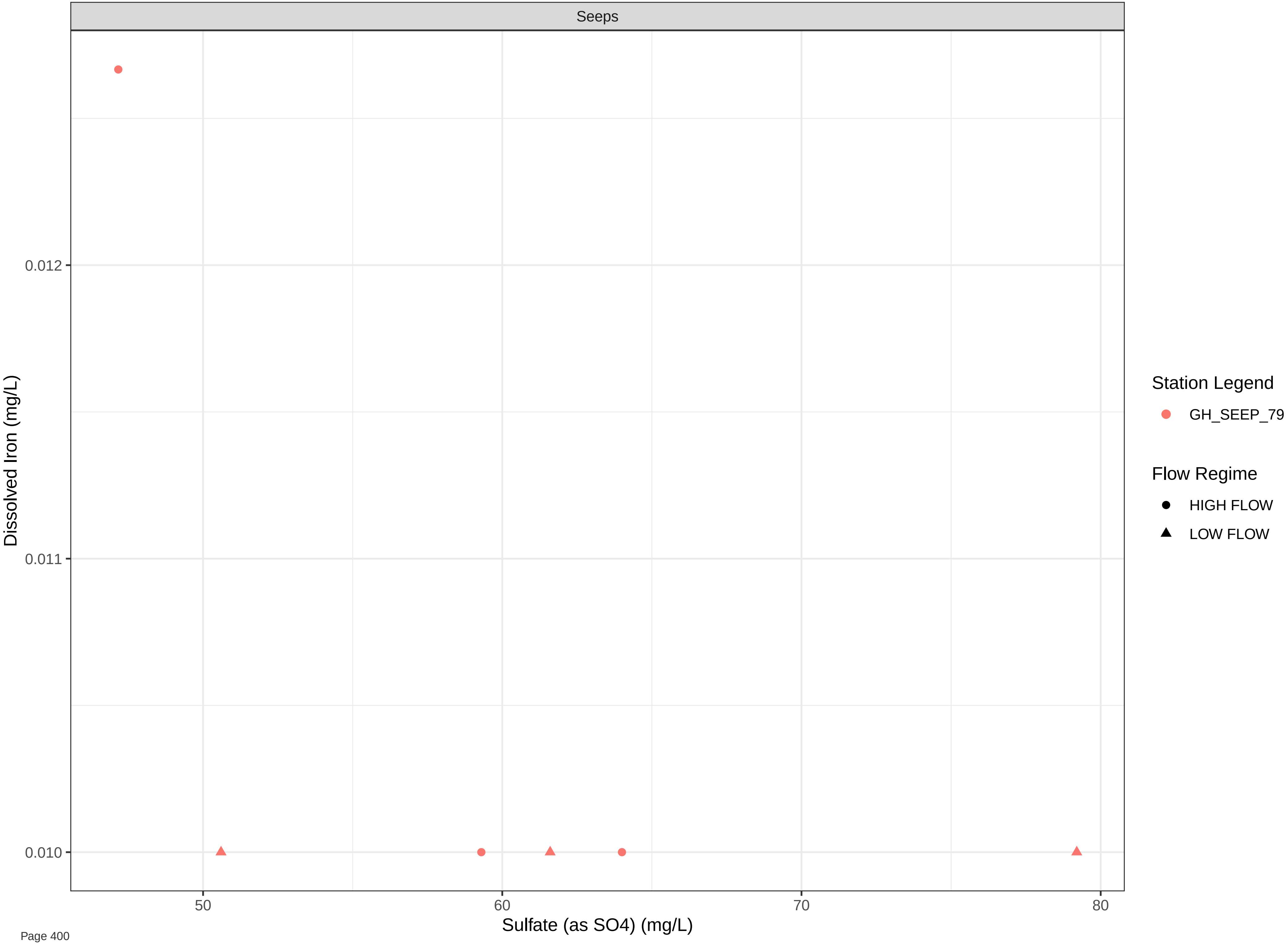
Comparison Point
Seeps
Dissolved Iron (mg/L)
0.12
0.08
0.04
0.12
0.08
0.04
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



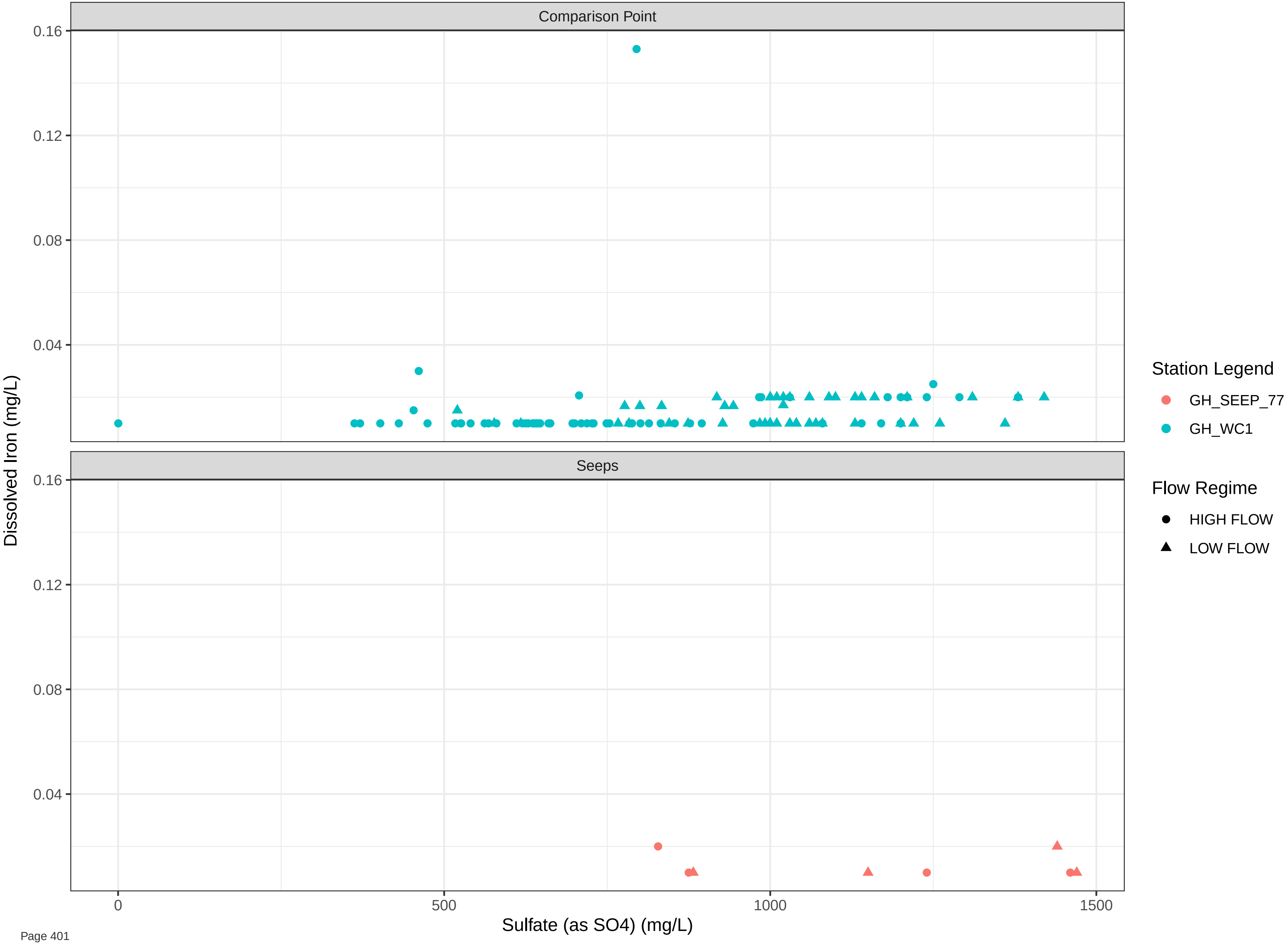
Comparison Point
Seeps
Dissolved Iron (mg/L)
0.010
0.012
0.014
0.016
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Iron (mg/L)
0.010
0.015
0.020
0.025
0.030
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

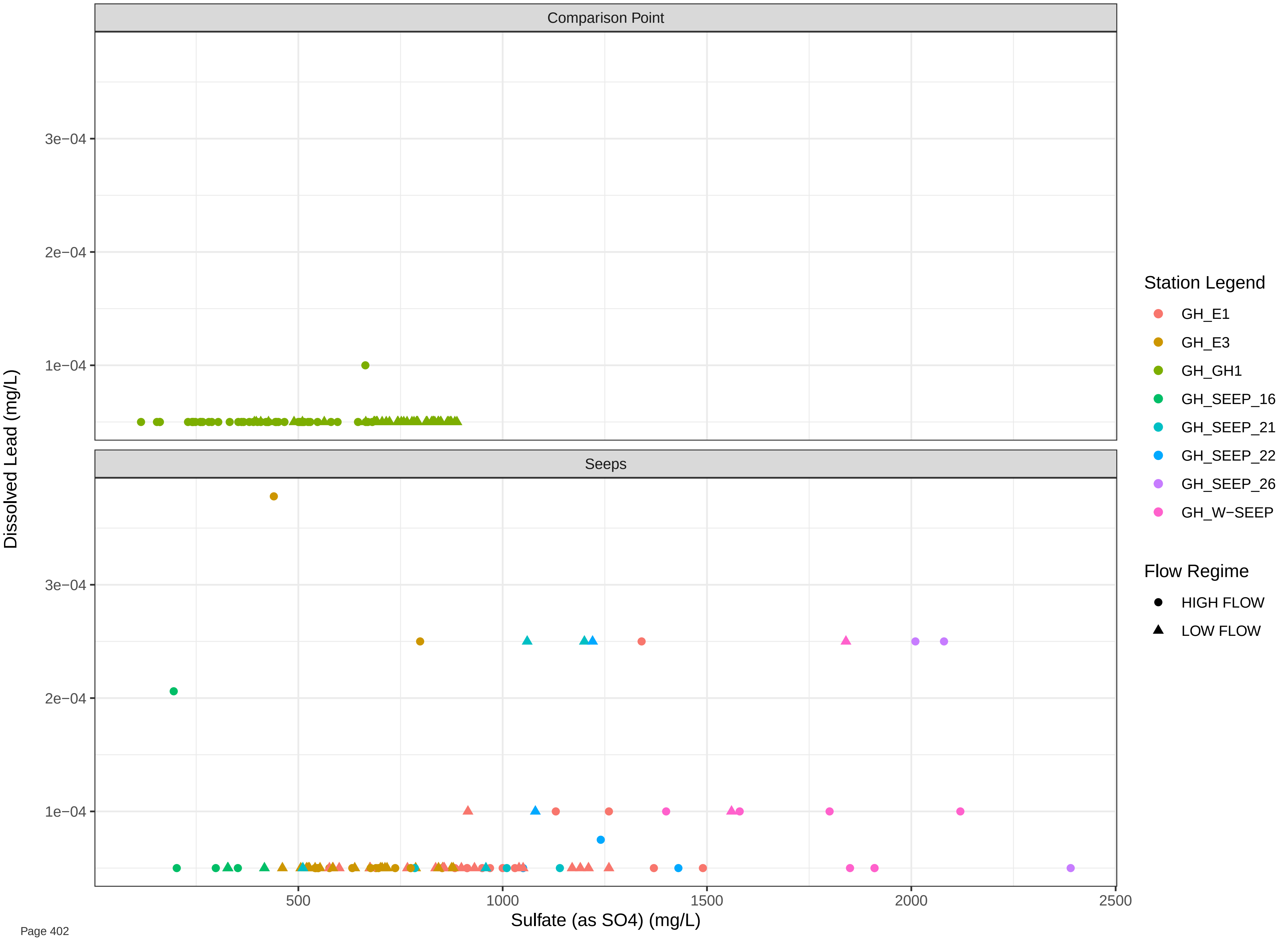

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0
0.1
0.2
0.3
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

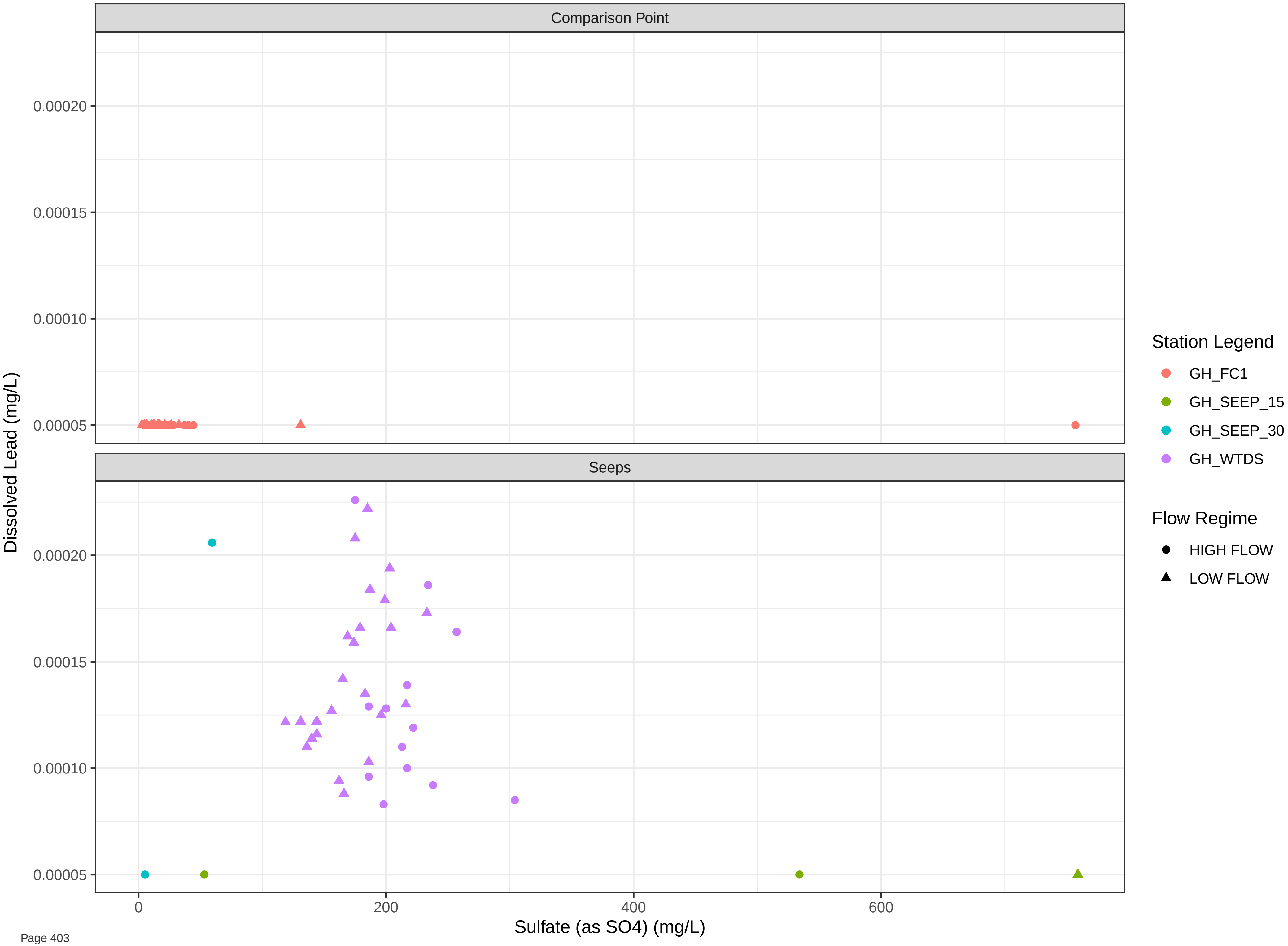


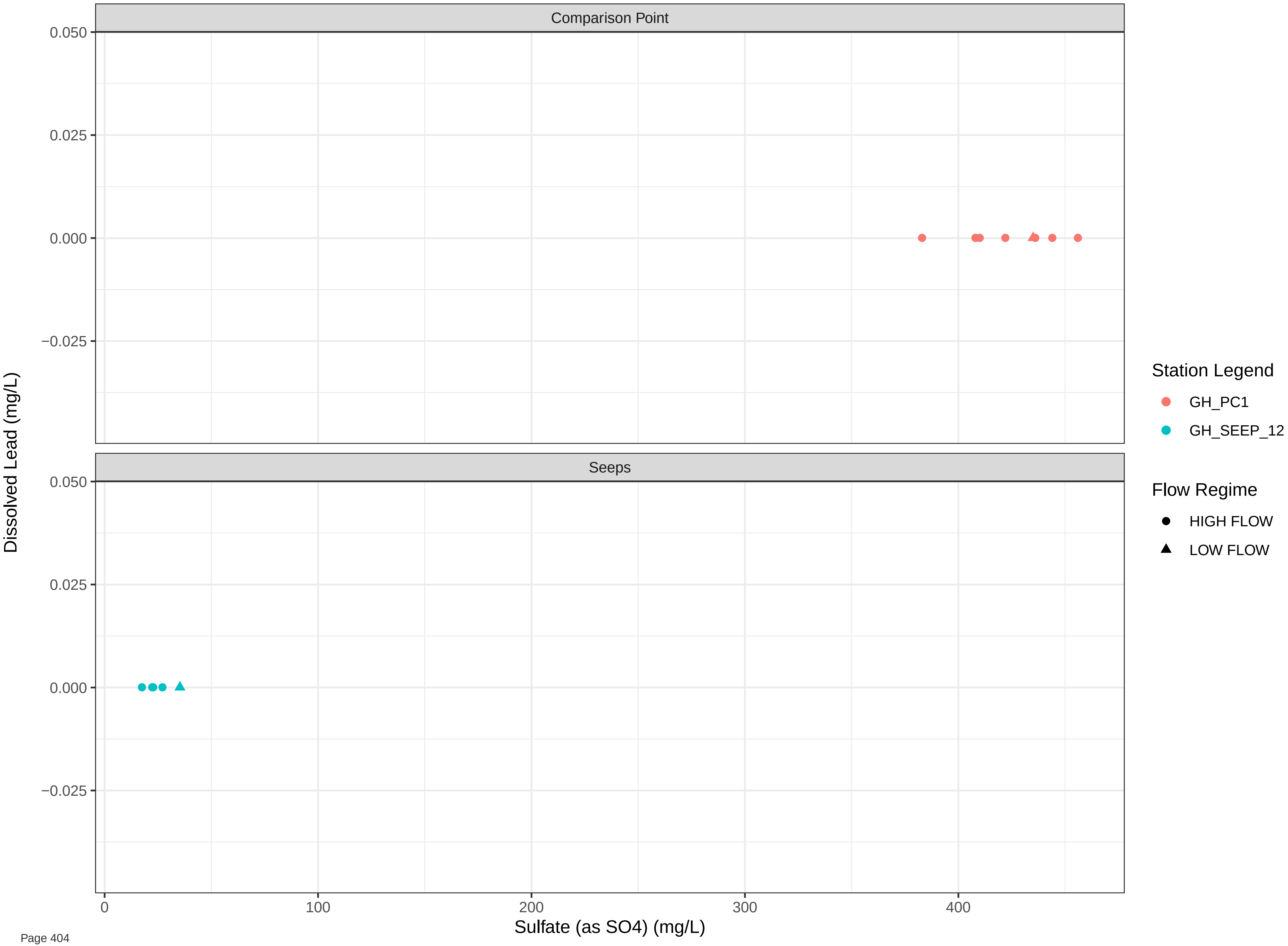
Seeps
0.012
0.011
0.010
50
60
70
80
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



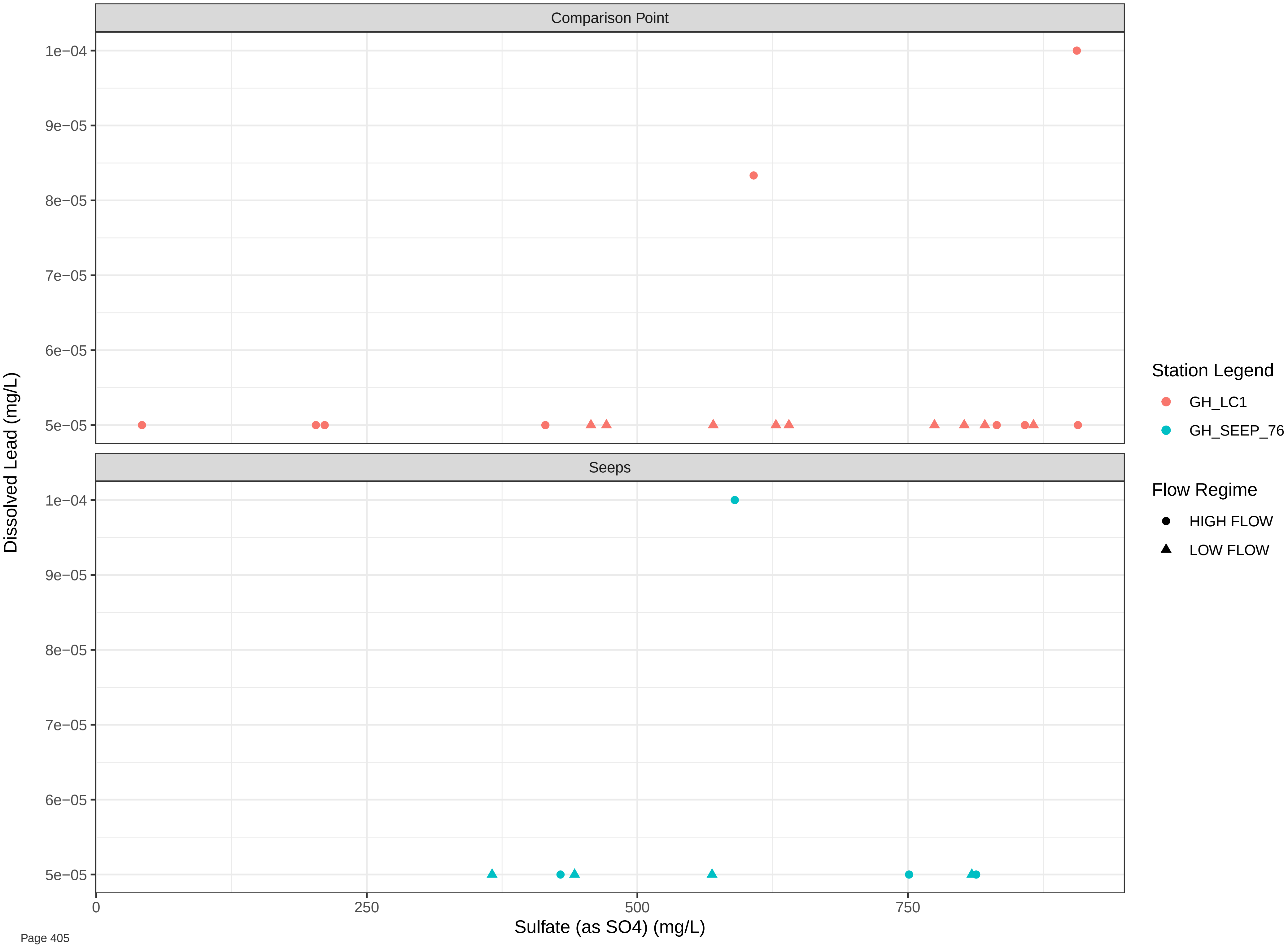
Comparison Point
Seeps
Dissolved Iron (mg/L)
0.16
0.12
0.08
0.04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

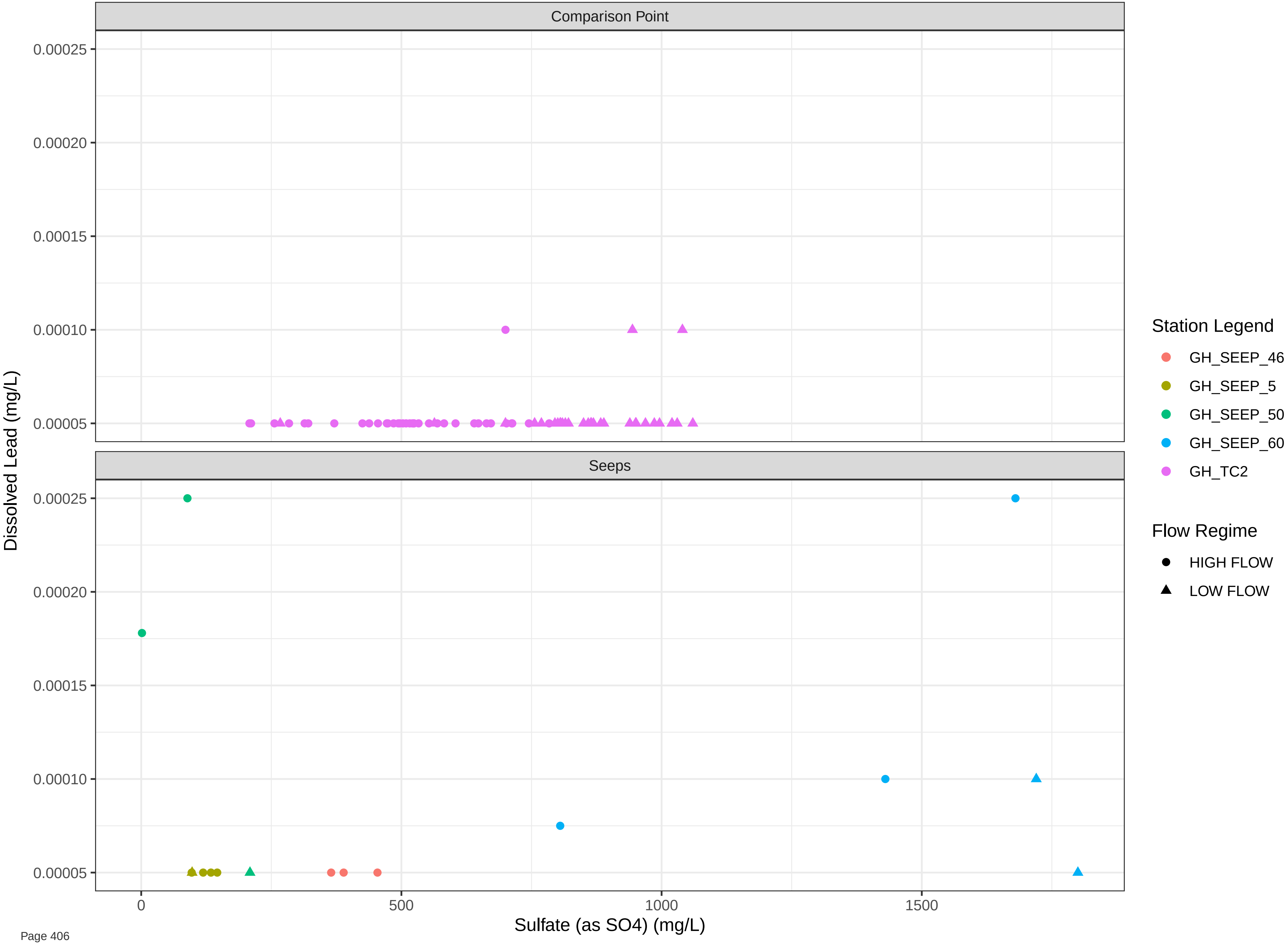

Comparison Point
Seeps
3e−04
2e−04
1e−04
500
1000
1500
2000
2500
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
0.00005
0.00010
0.00015
0.00020
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

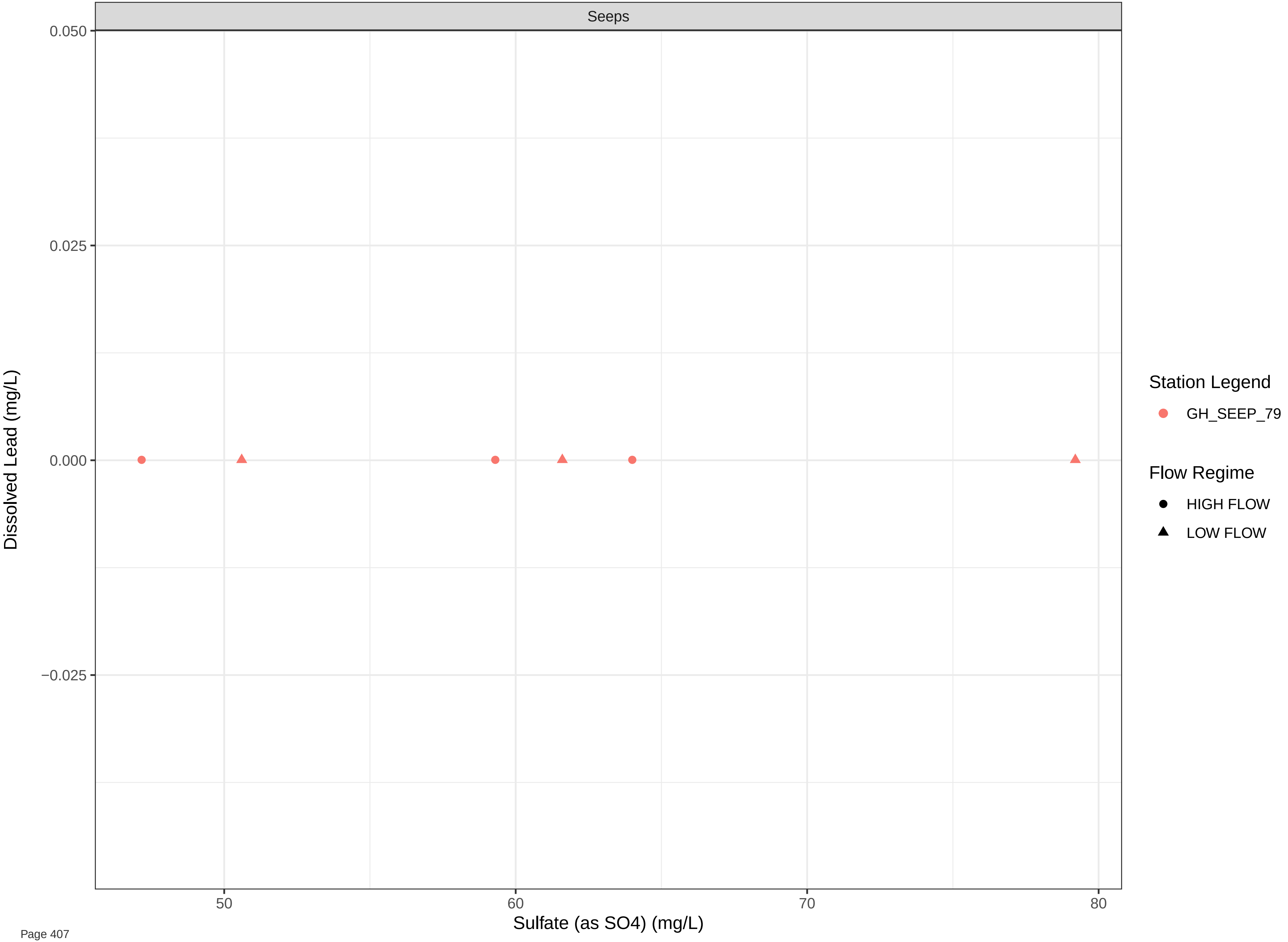


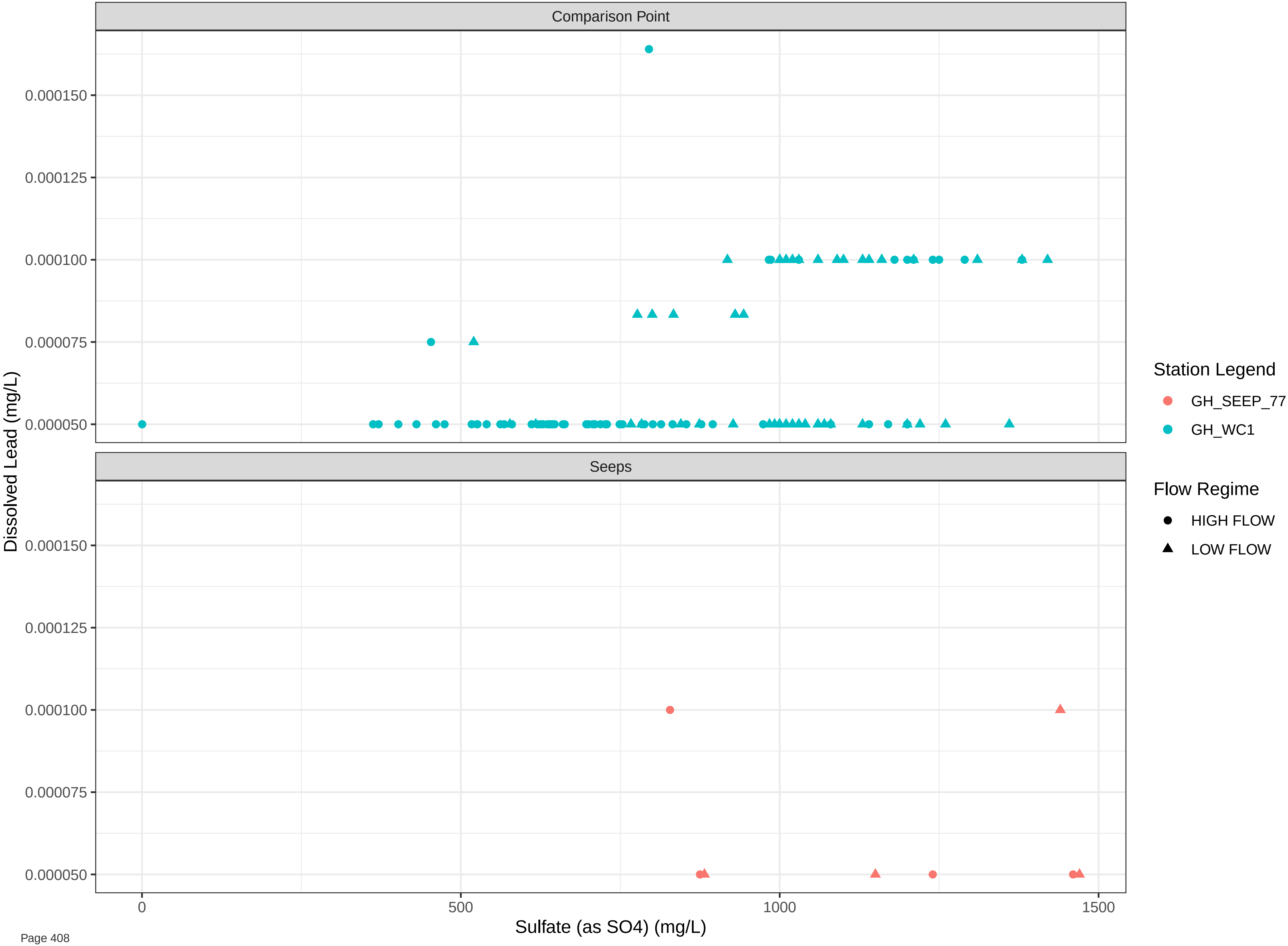
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

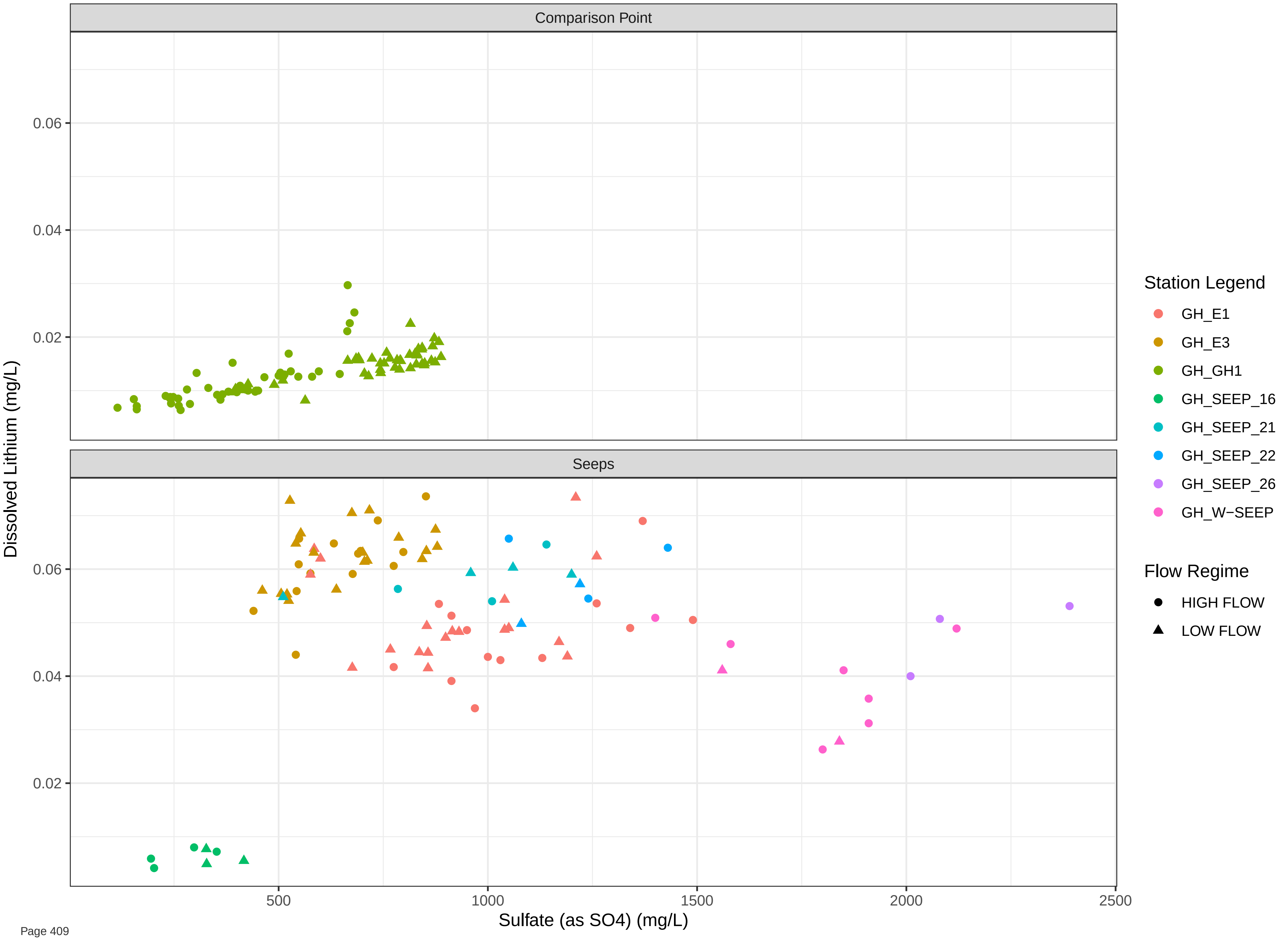

Comparison Point
Seeps
Dissolved Lead (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

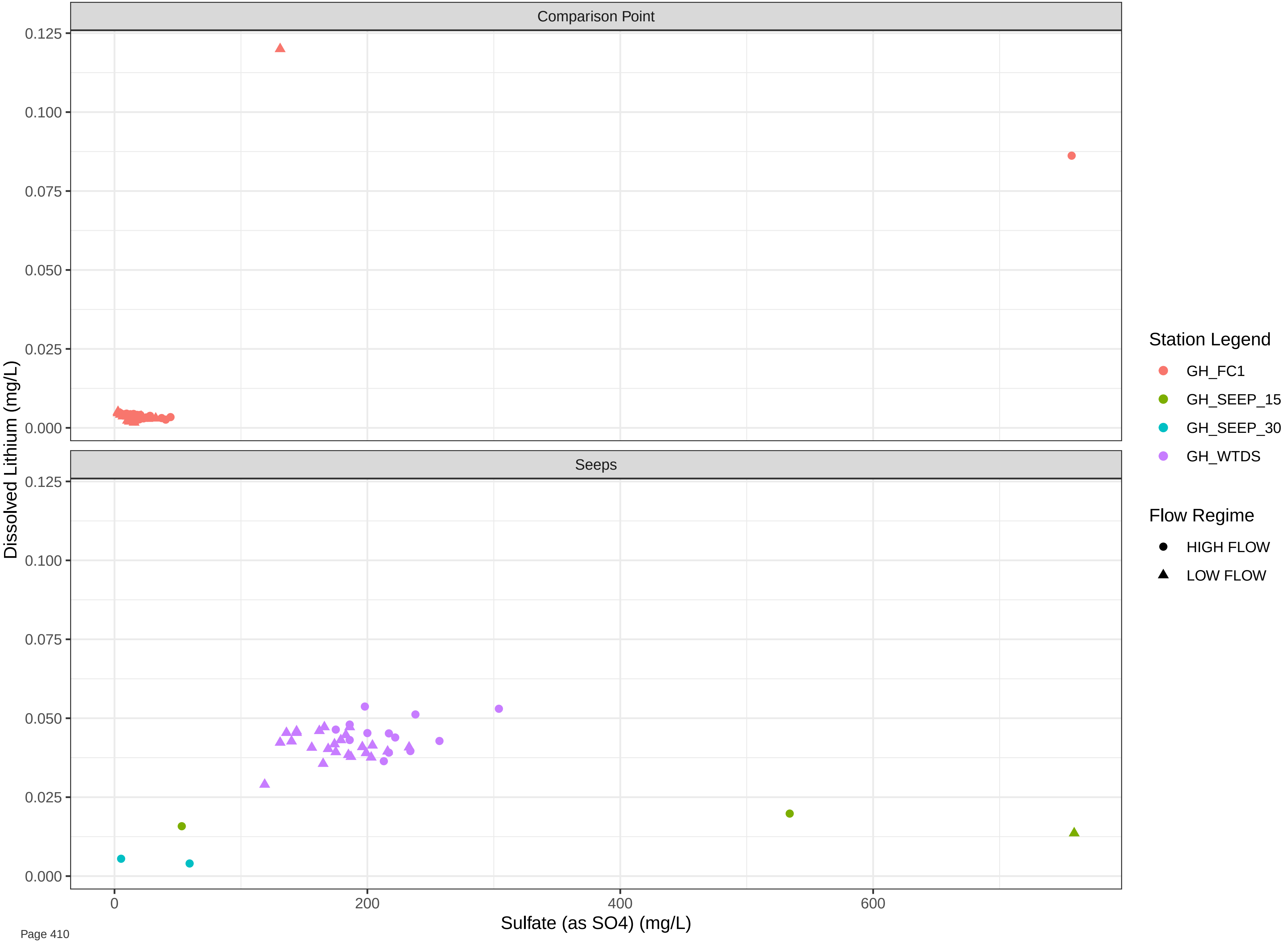


Comparison Point
Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
Dissolved Lead (mg/L)
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

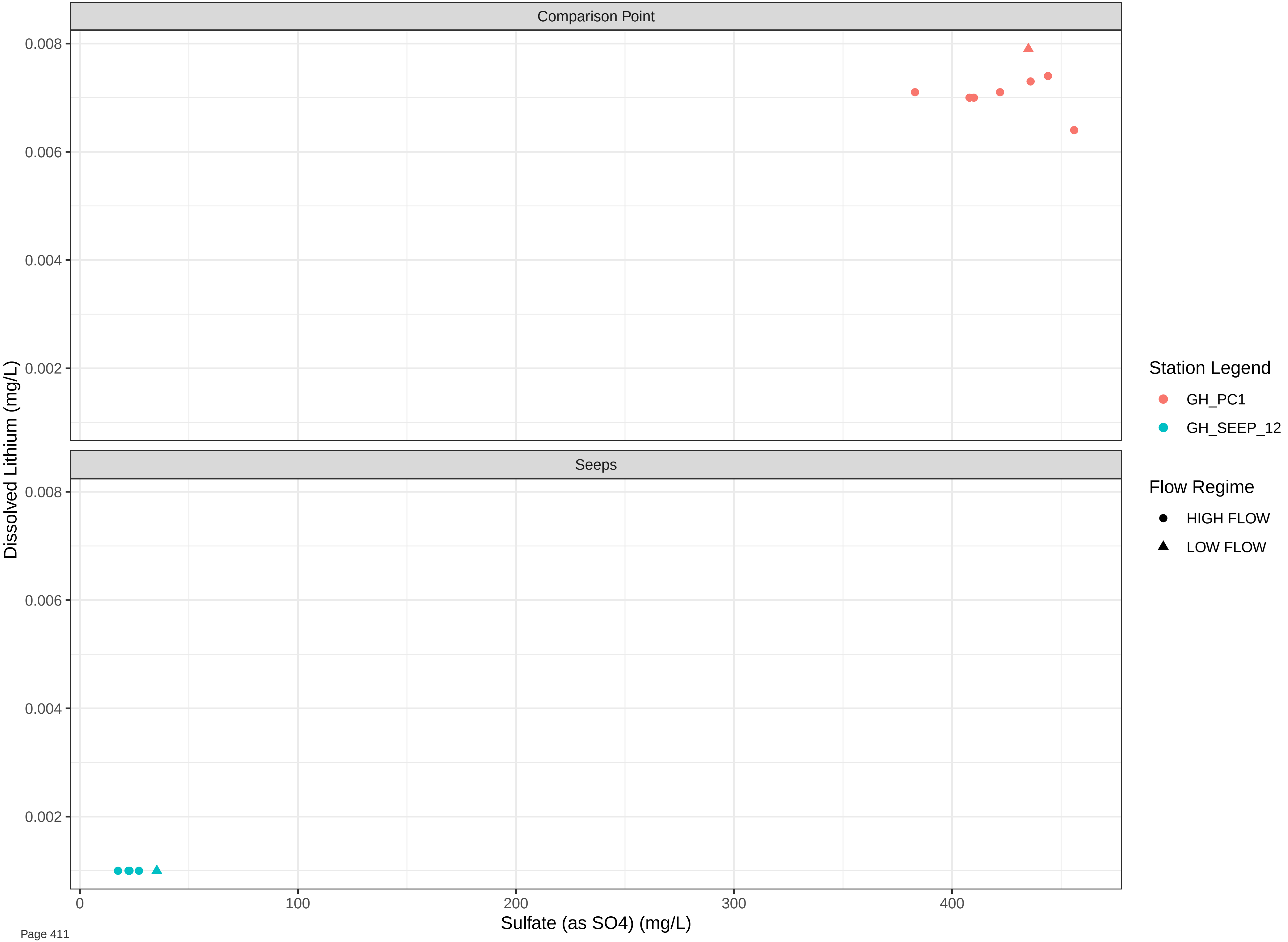

Seeps
0.050
0.025
0.000
−0.025
Dissolved Lead (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

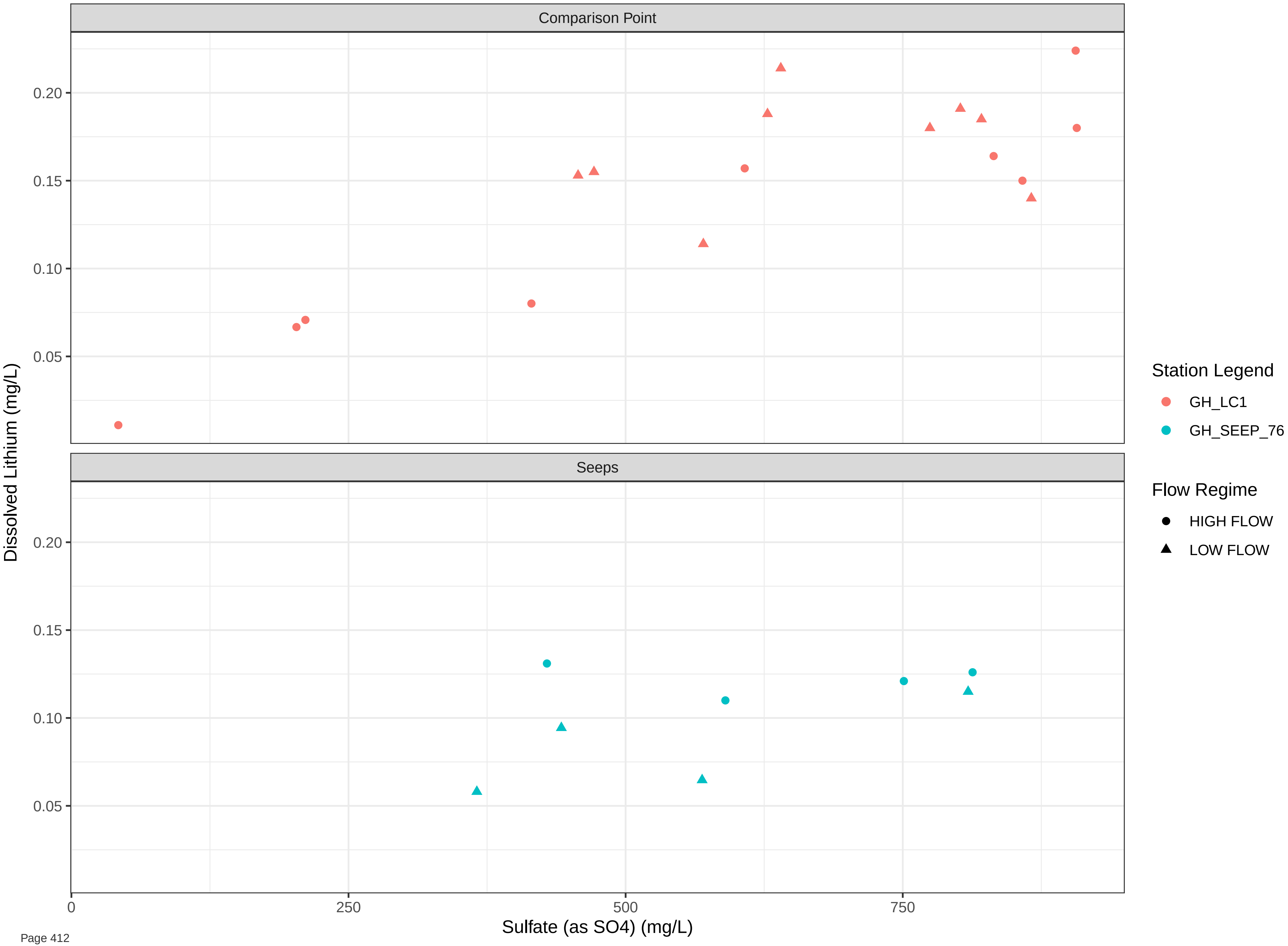

Comparison Point
Seeps
Dissolved Lead (mg/L)
0.000150
0.000125
0.000100
0.000075
0.000050
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

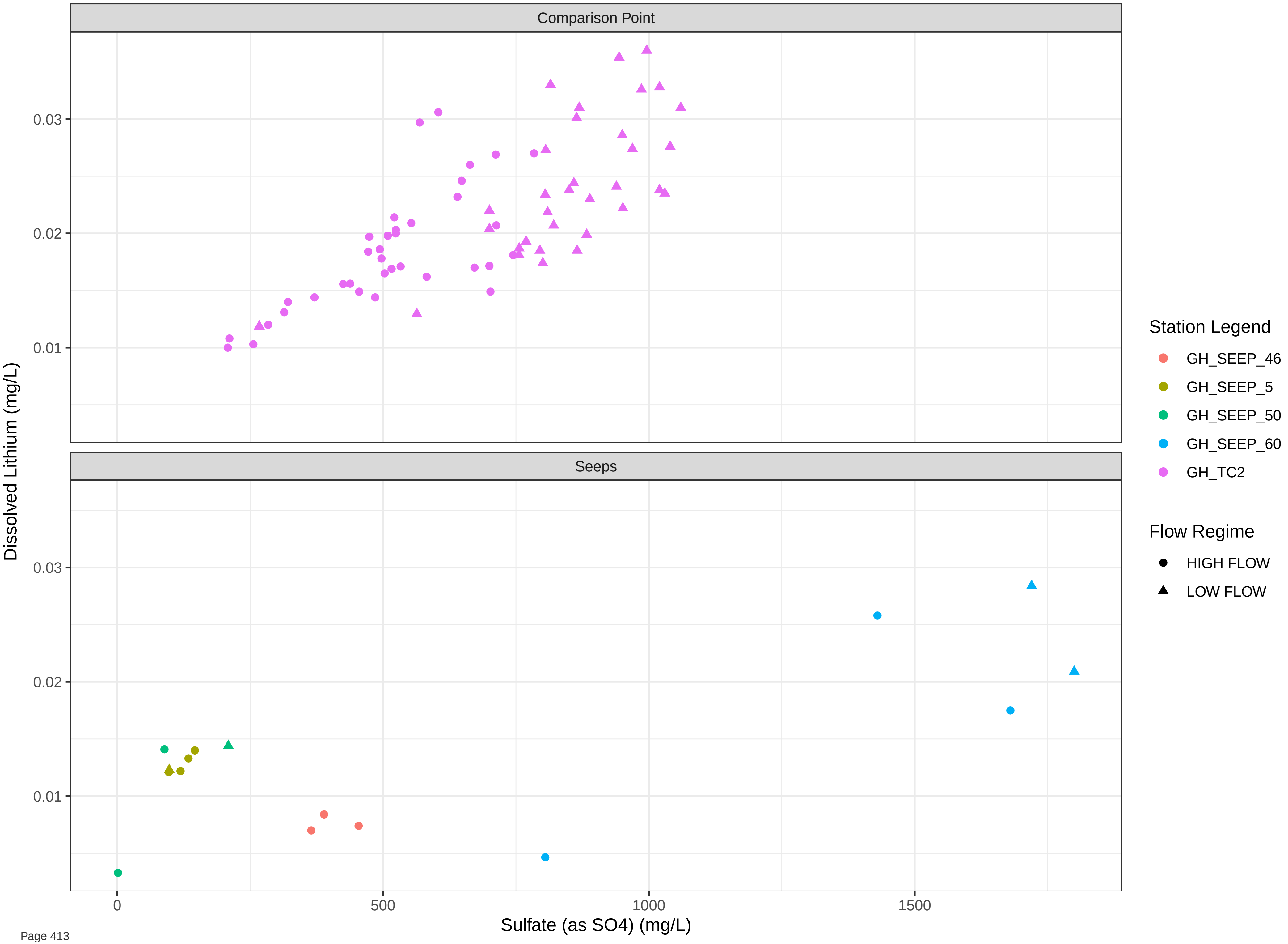

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.06
0.04
0.02
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

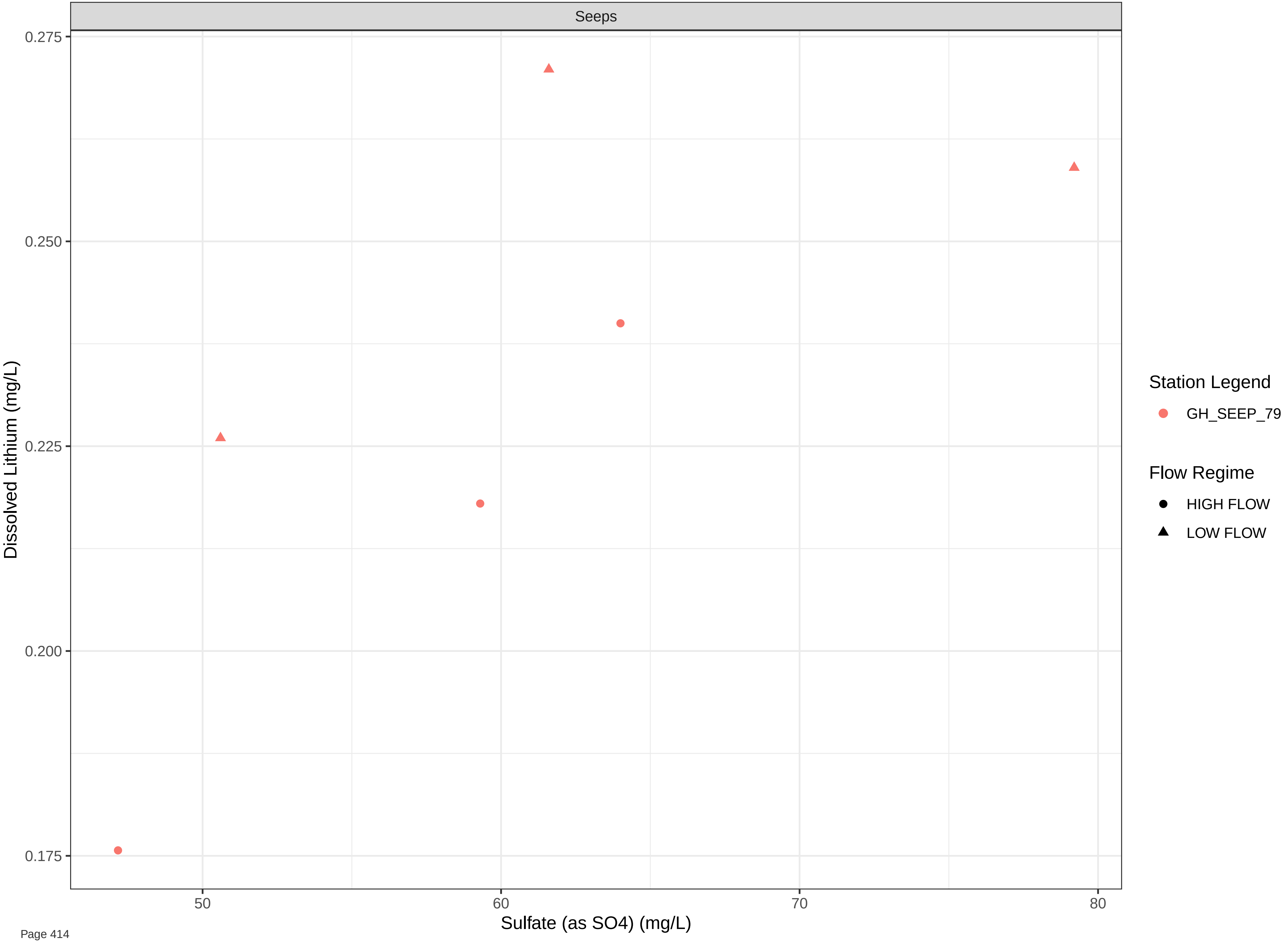


Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.125
0.100
0.075
0.050
0.025
0.000
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

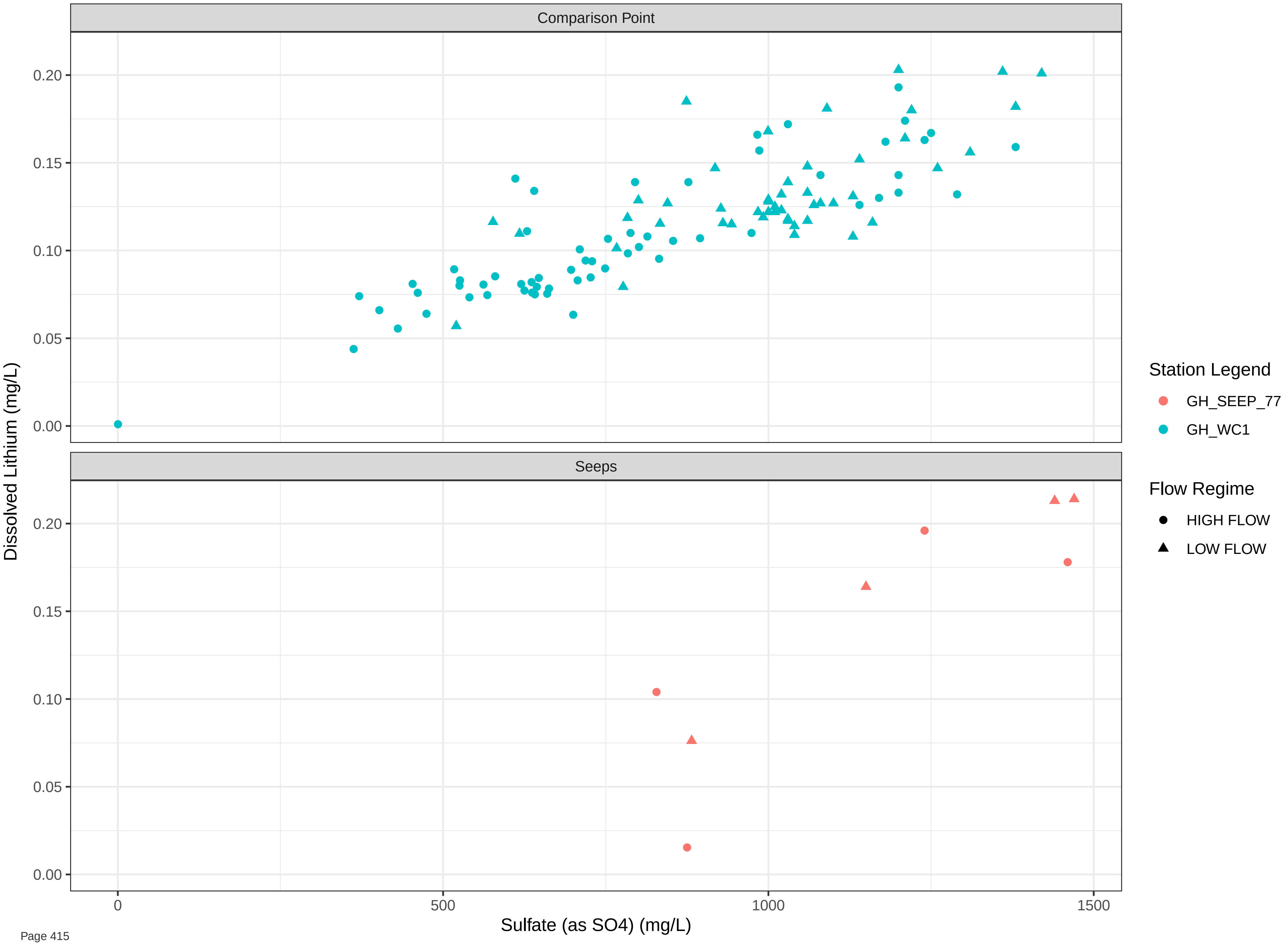

Comparison Point
Seeps
0.008
0.006
0.004
0.002
0
100
200
300
400
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.20
0.15
0.10
0.05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

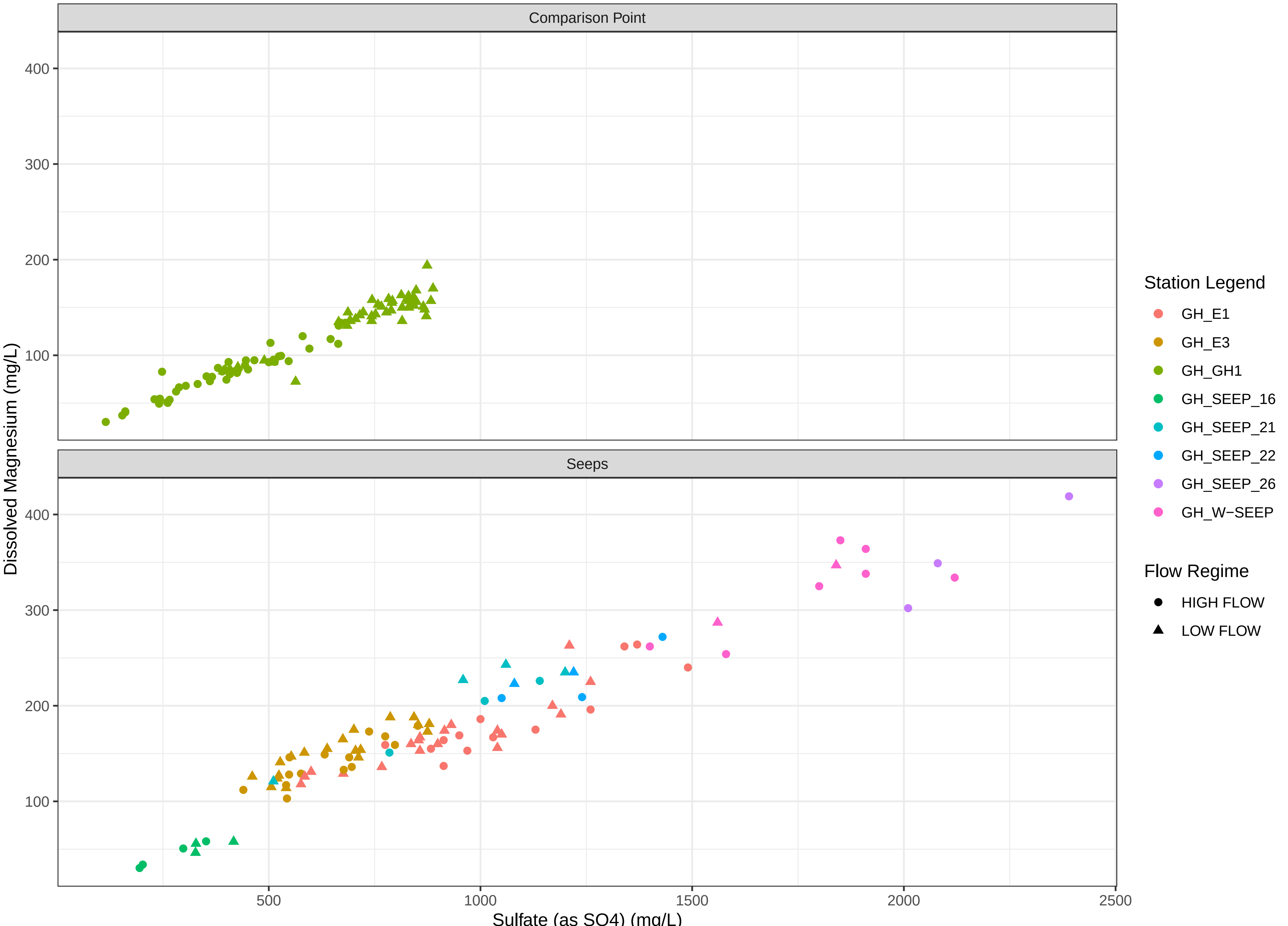

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.01
0.02
0.03
0.01
0.02
0.03
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

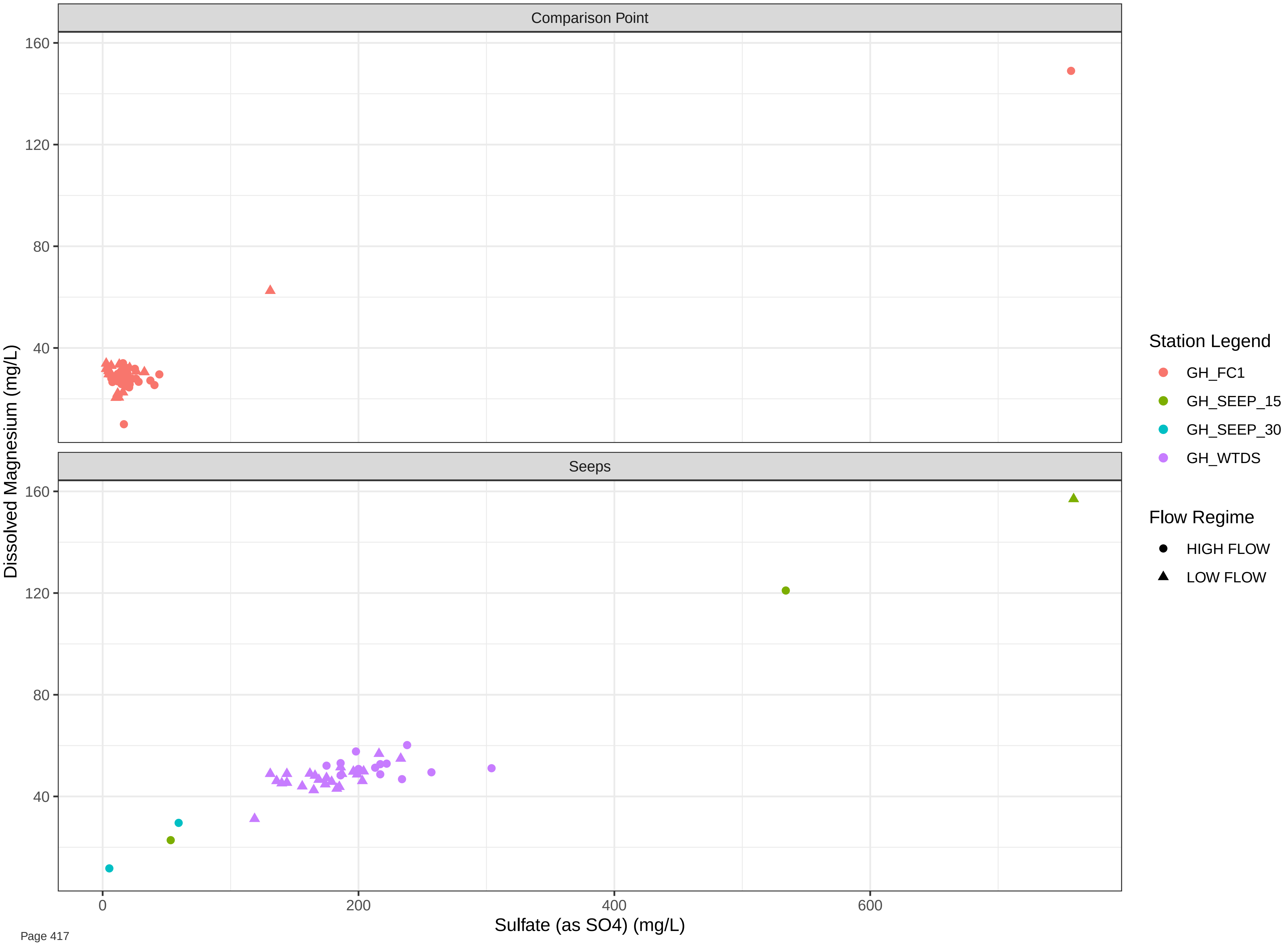


Seeps
0.275
0.250
0.225
0.200
0.175
Dissolved Lithium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

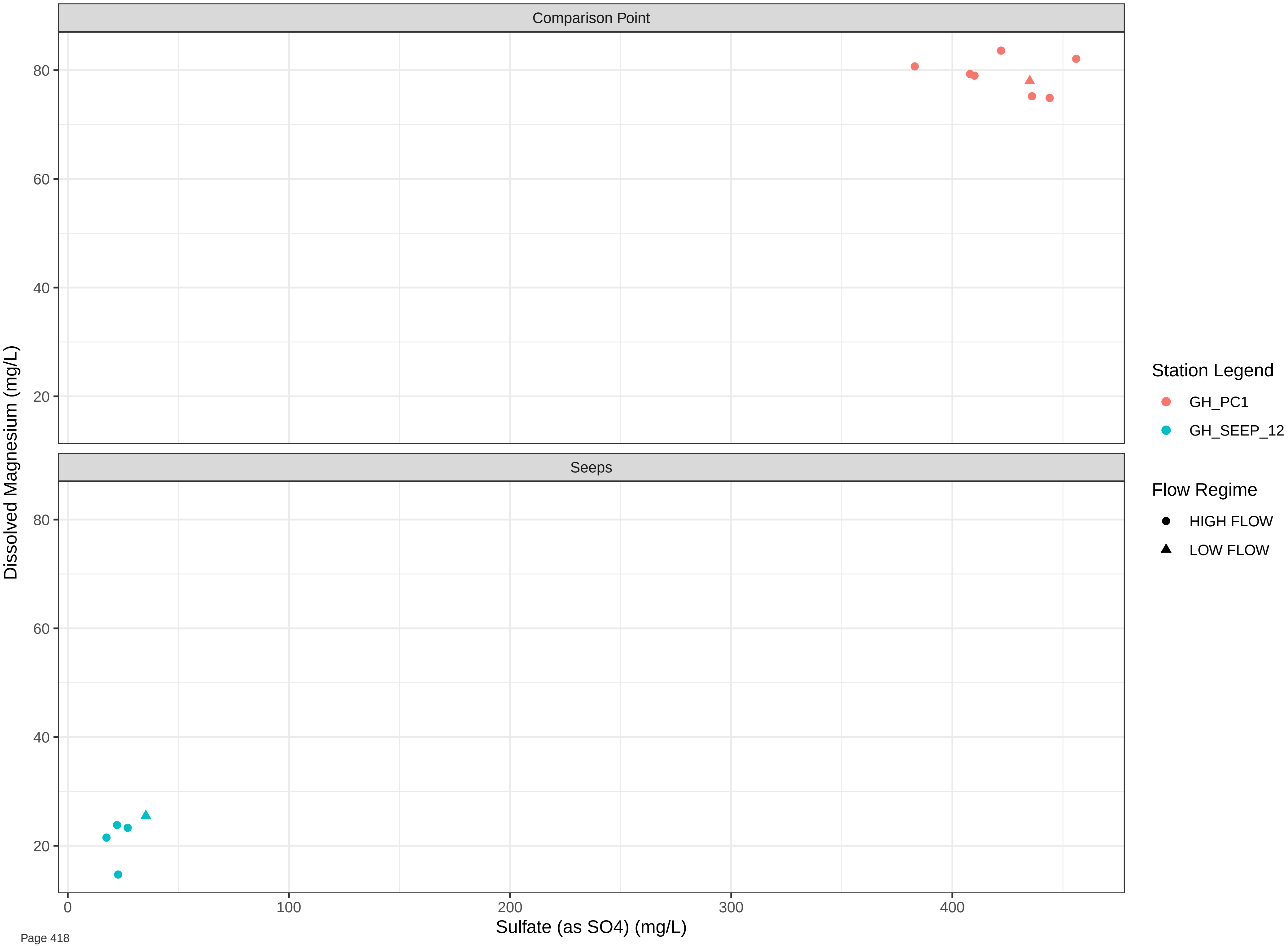


Comparison Point
Seeps
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
0.00
0.05
0.10
0.15
0.20
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

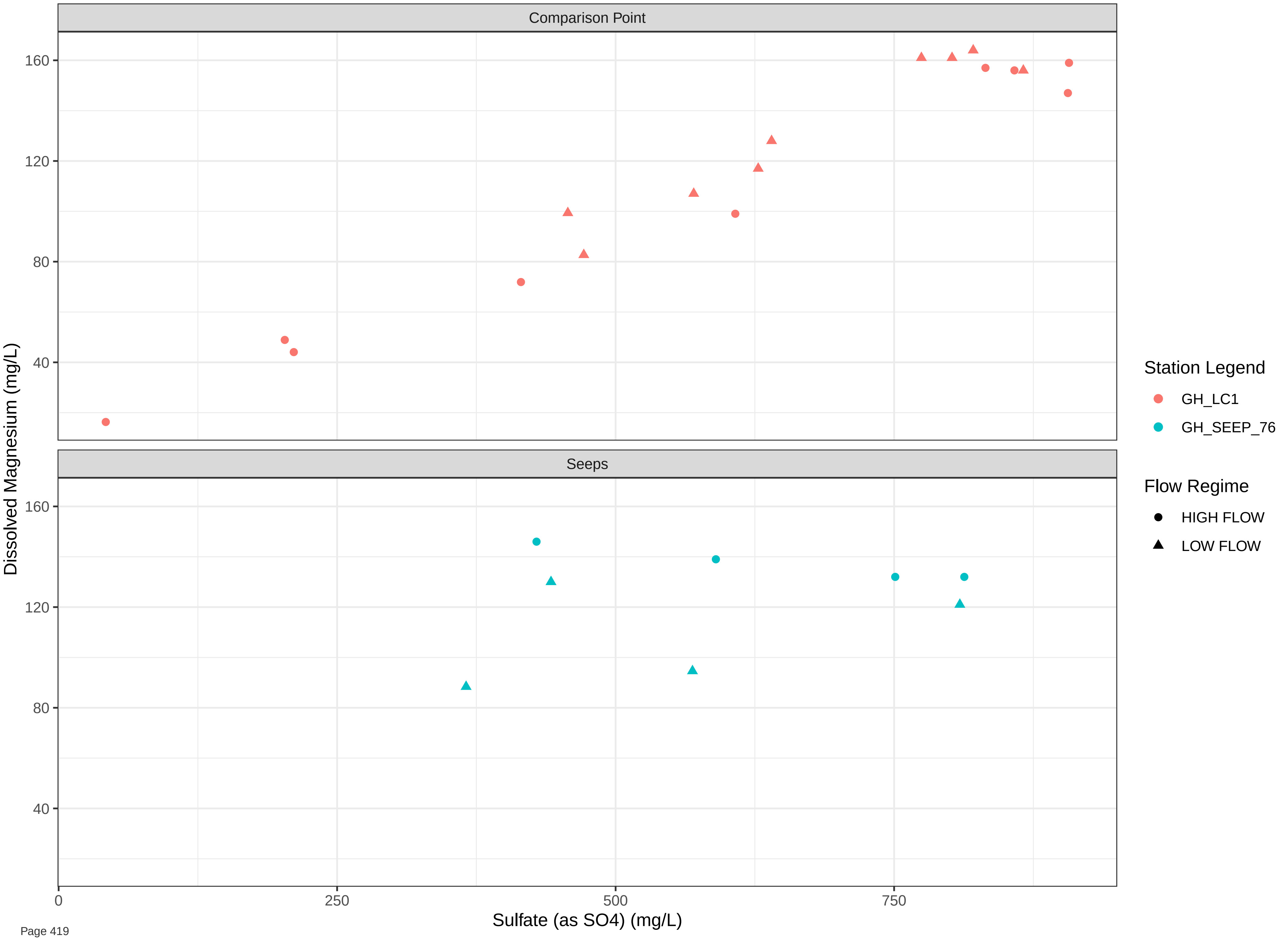

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
100
200
300
400
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

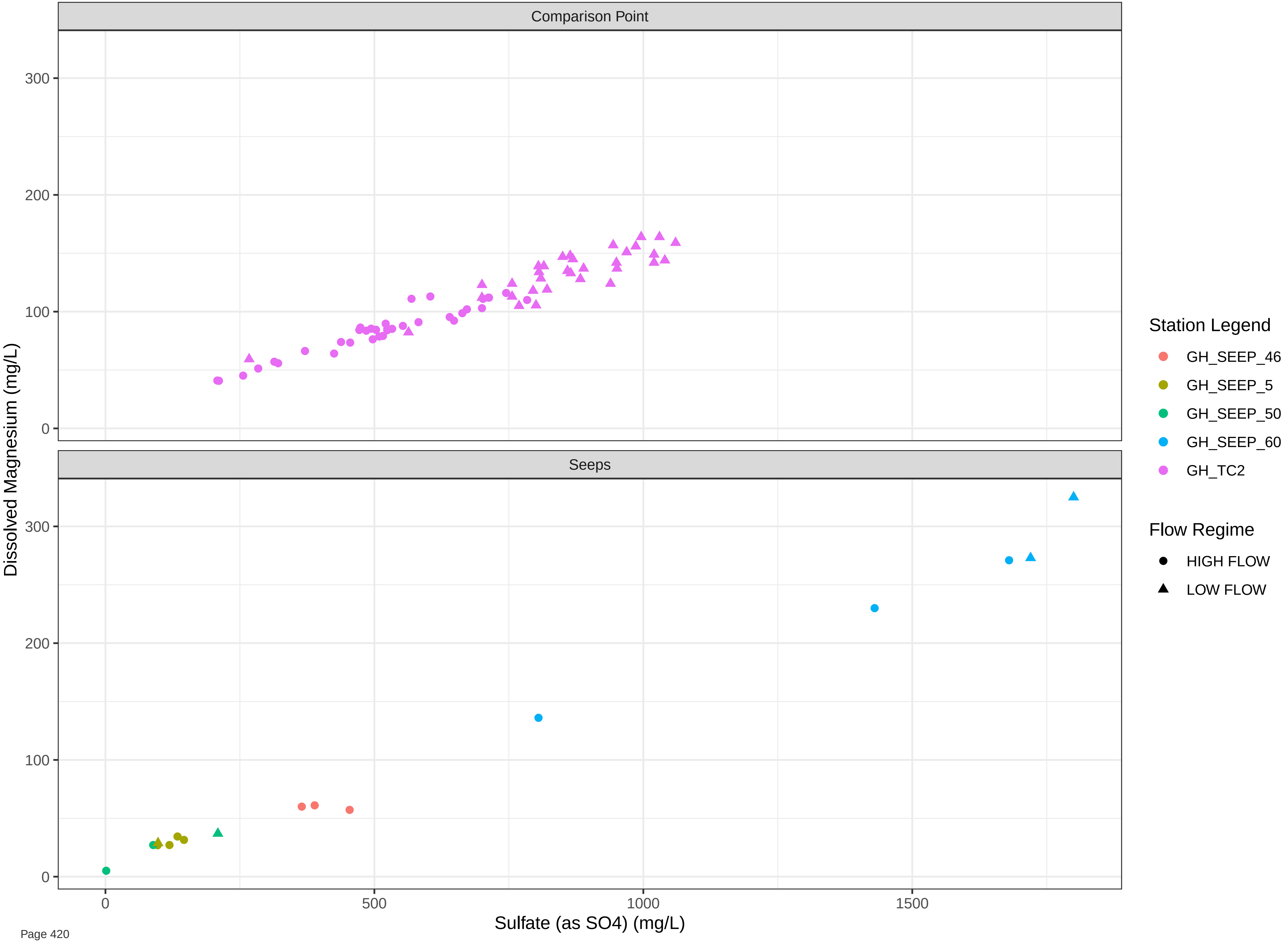


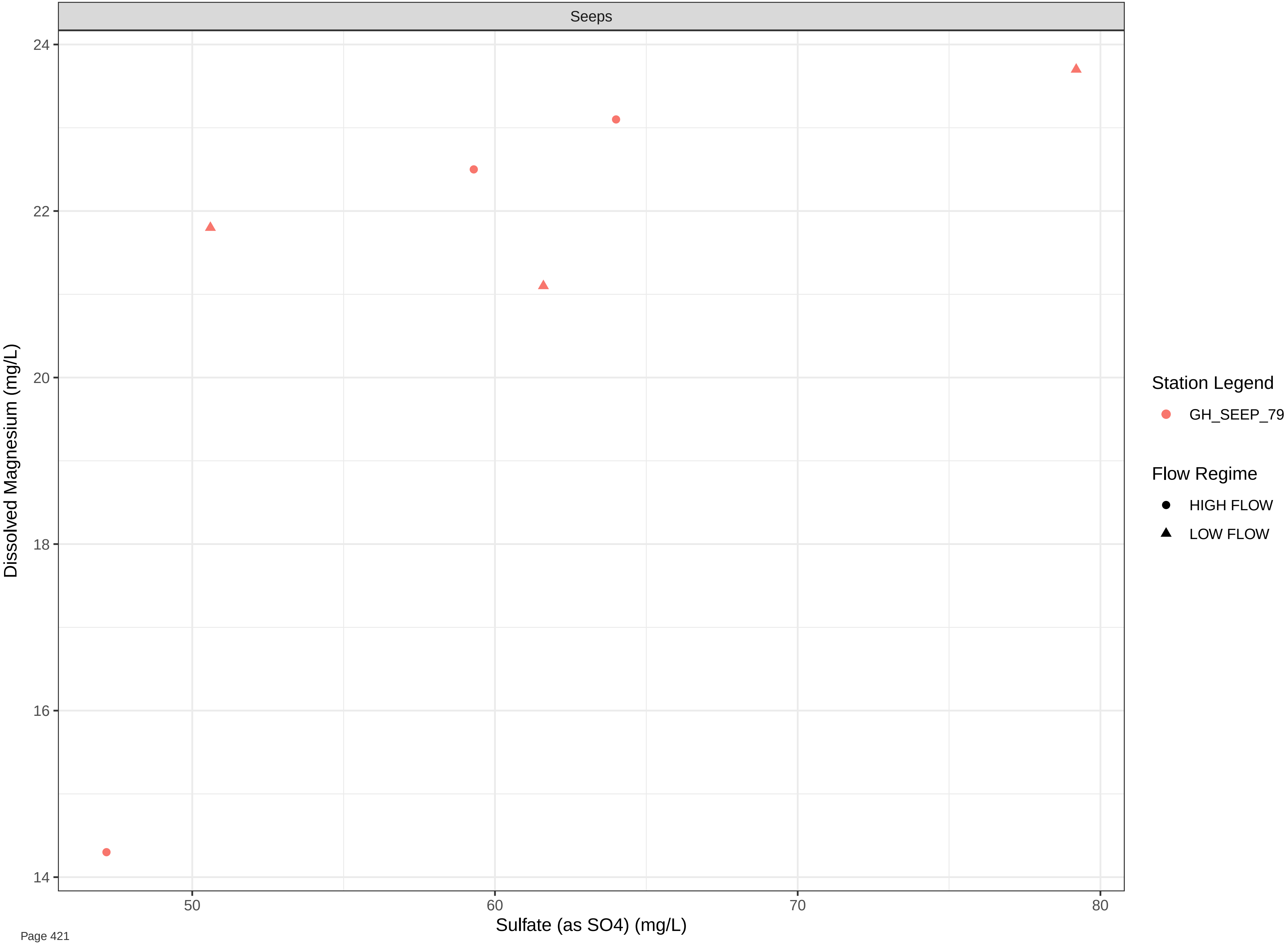
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
160
120
80
40
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



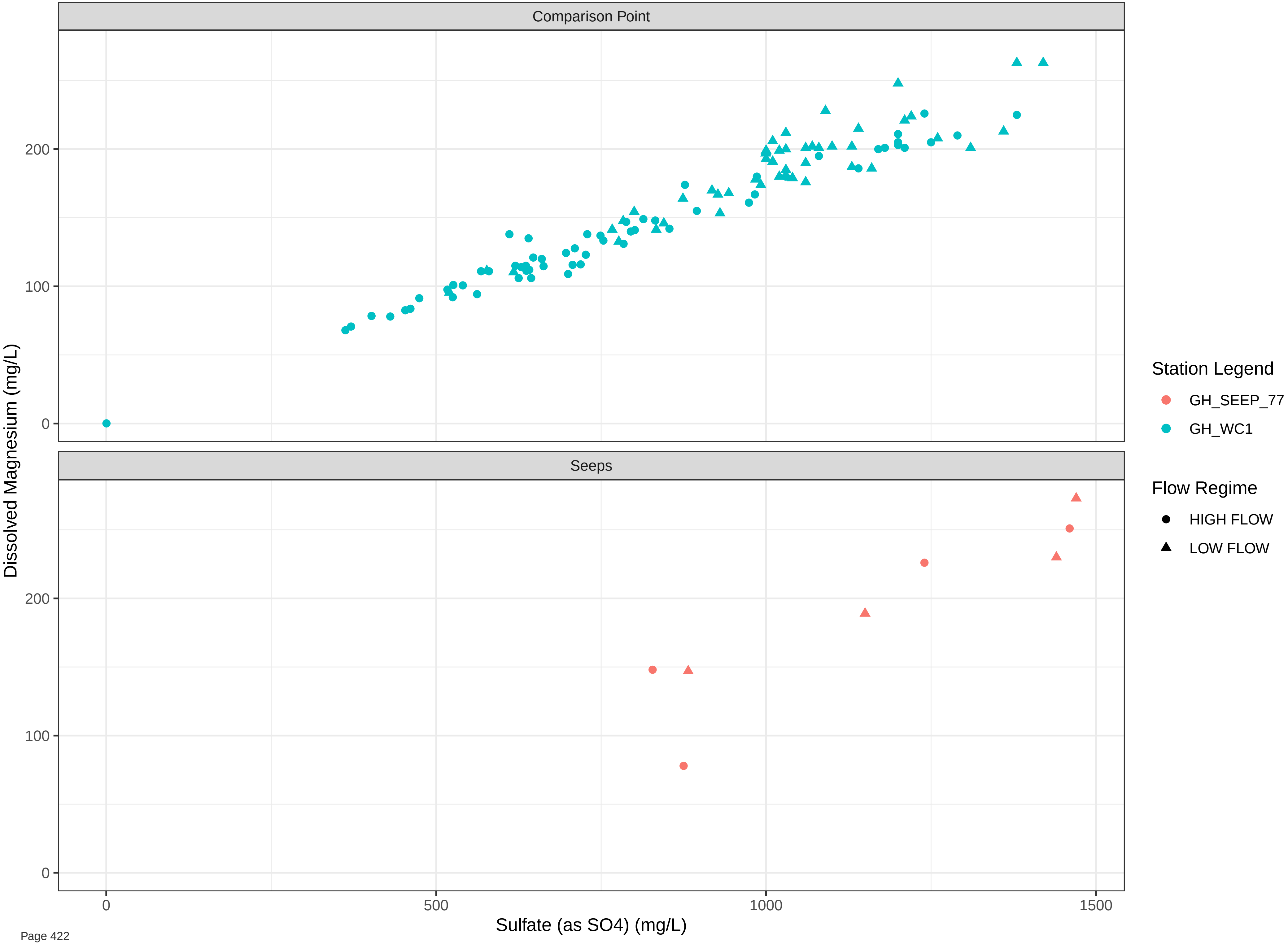
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
20
40
60
80
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

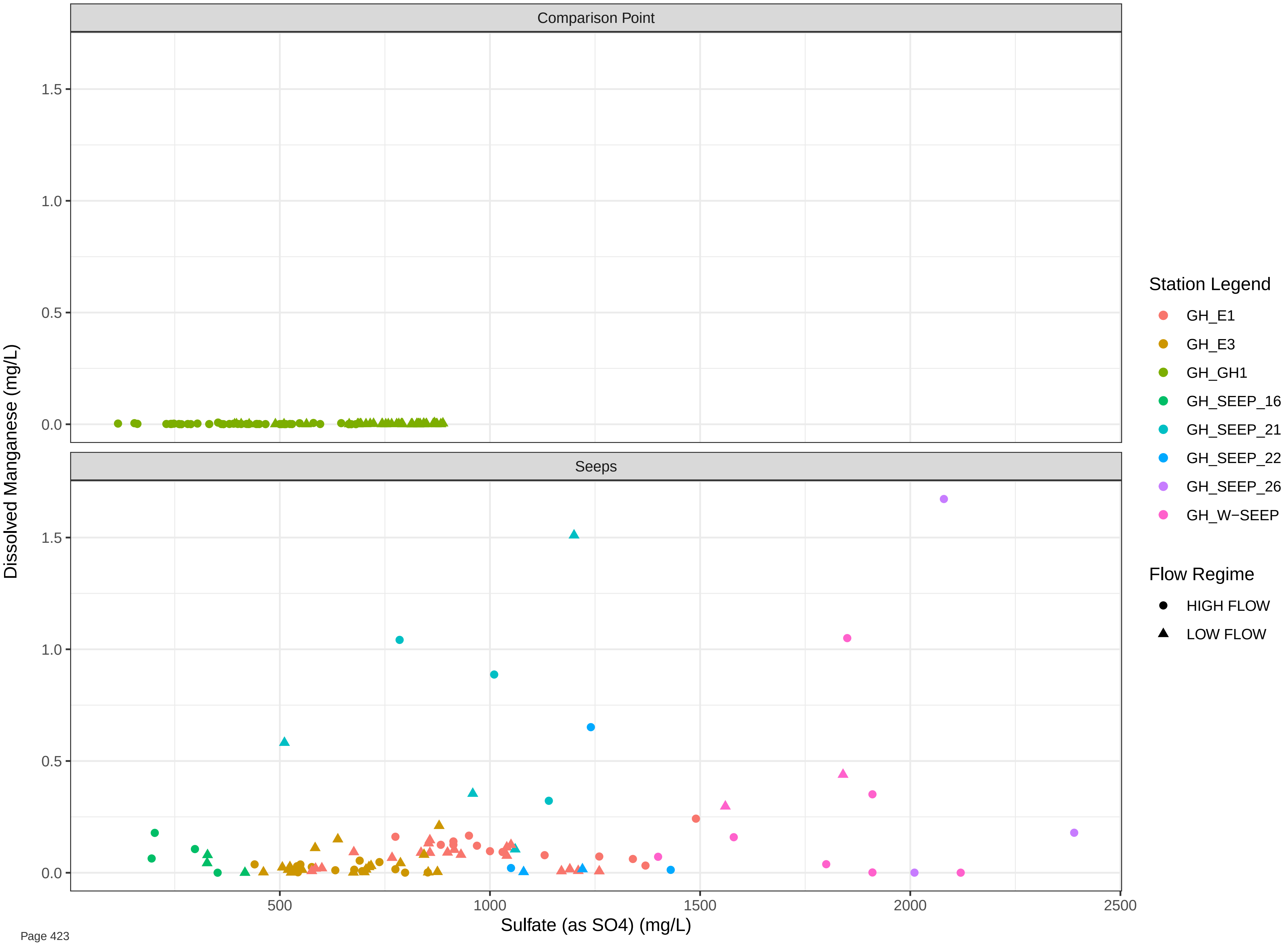

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
160
120
80
40
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

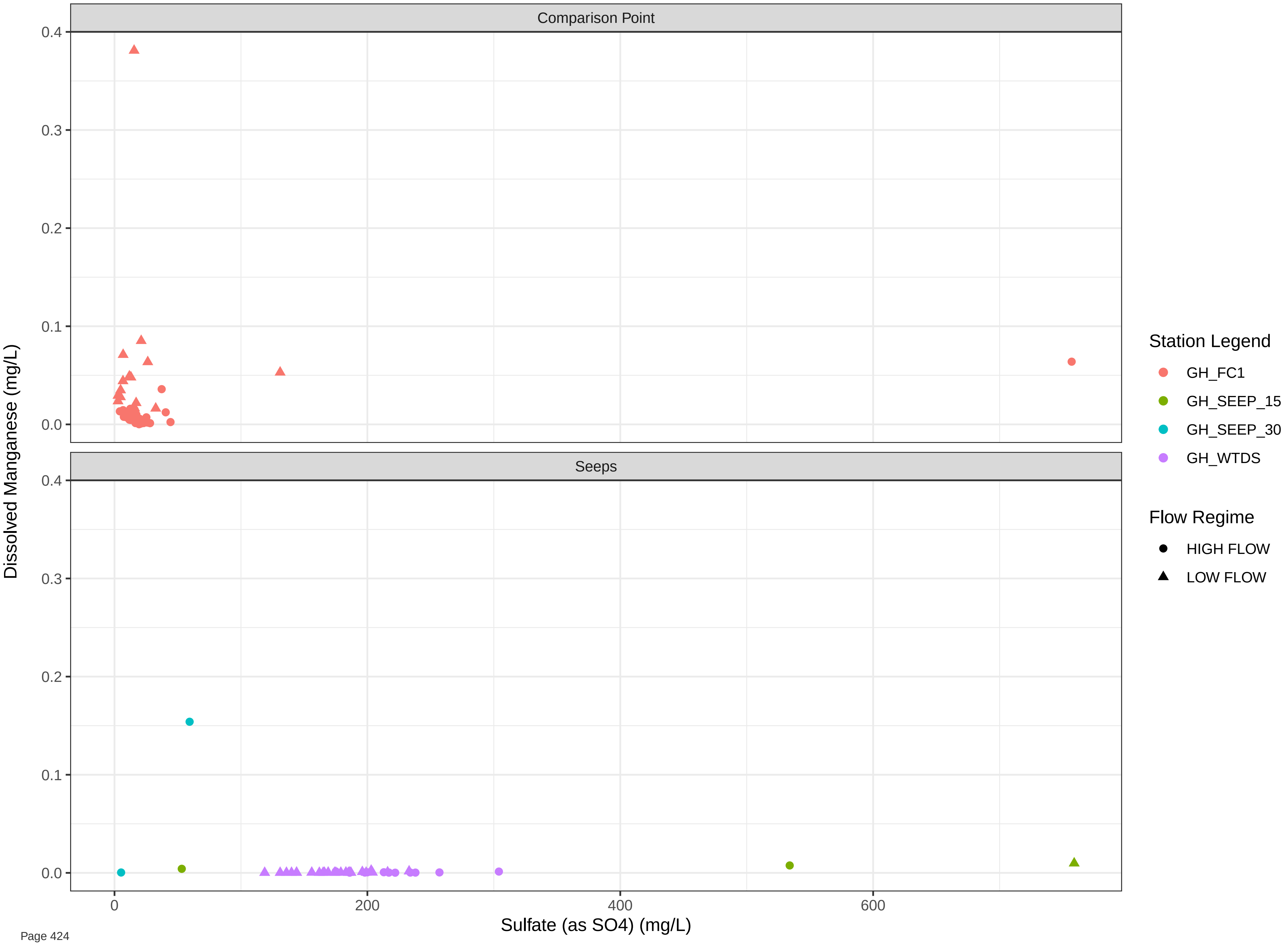


Seeps
24
22
20
18
16
14
50
60
70
80
Sulfate (as SO4) (mg/L)
Dissolved Magnesium (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

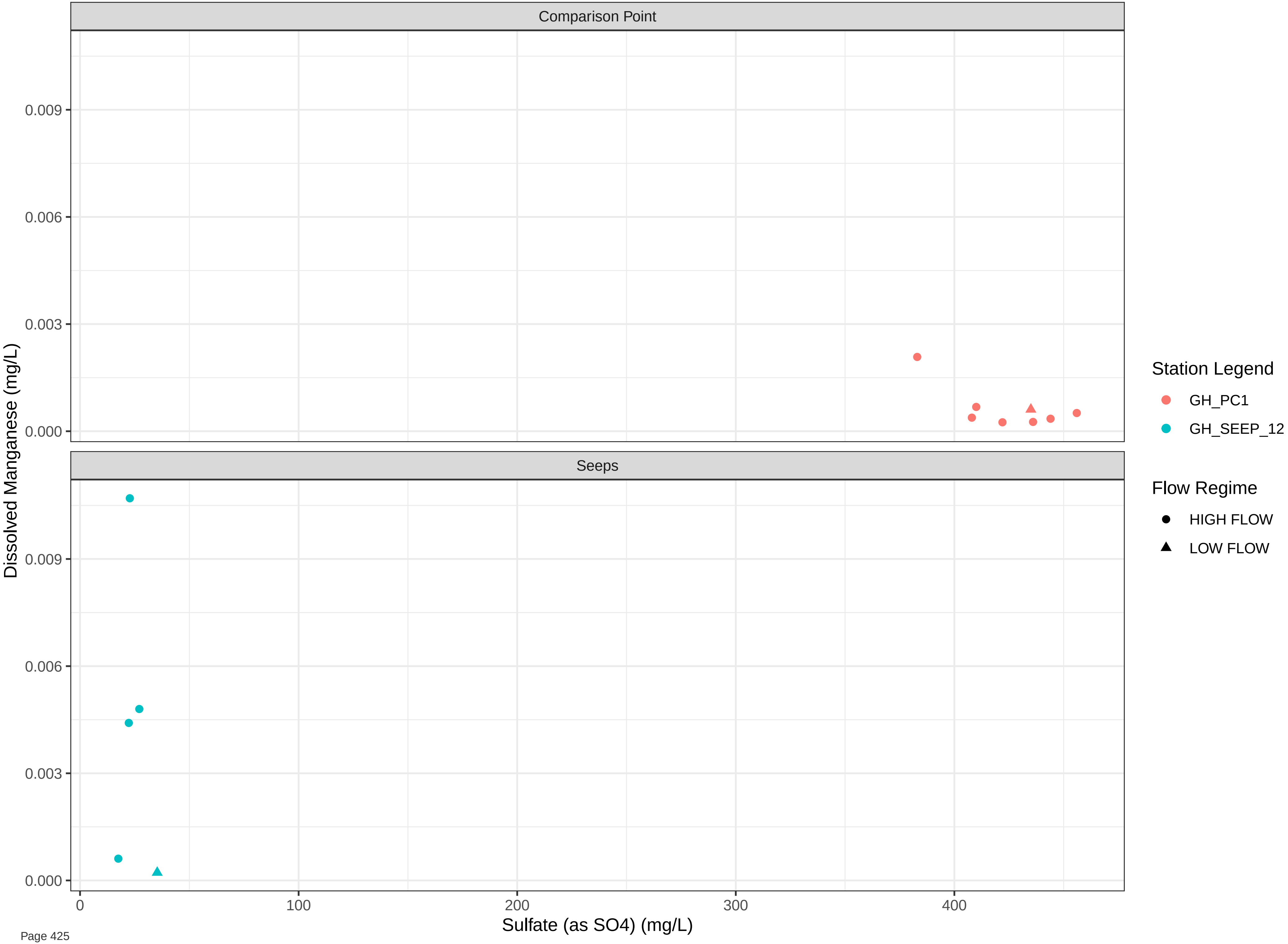

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
0
100
200
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



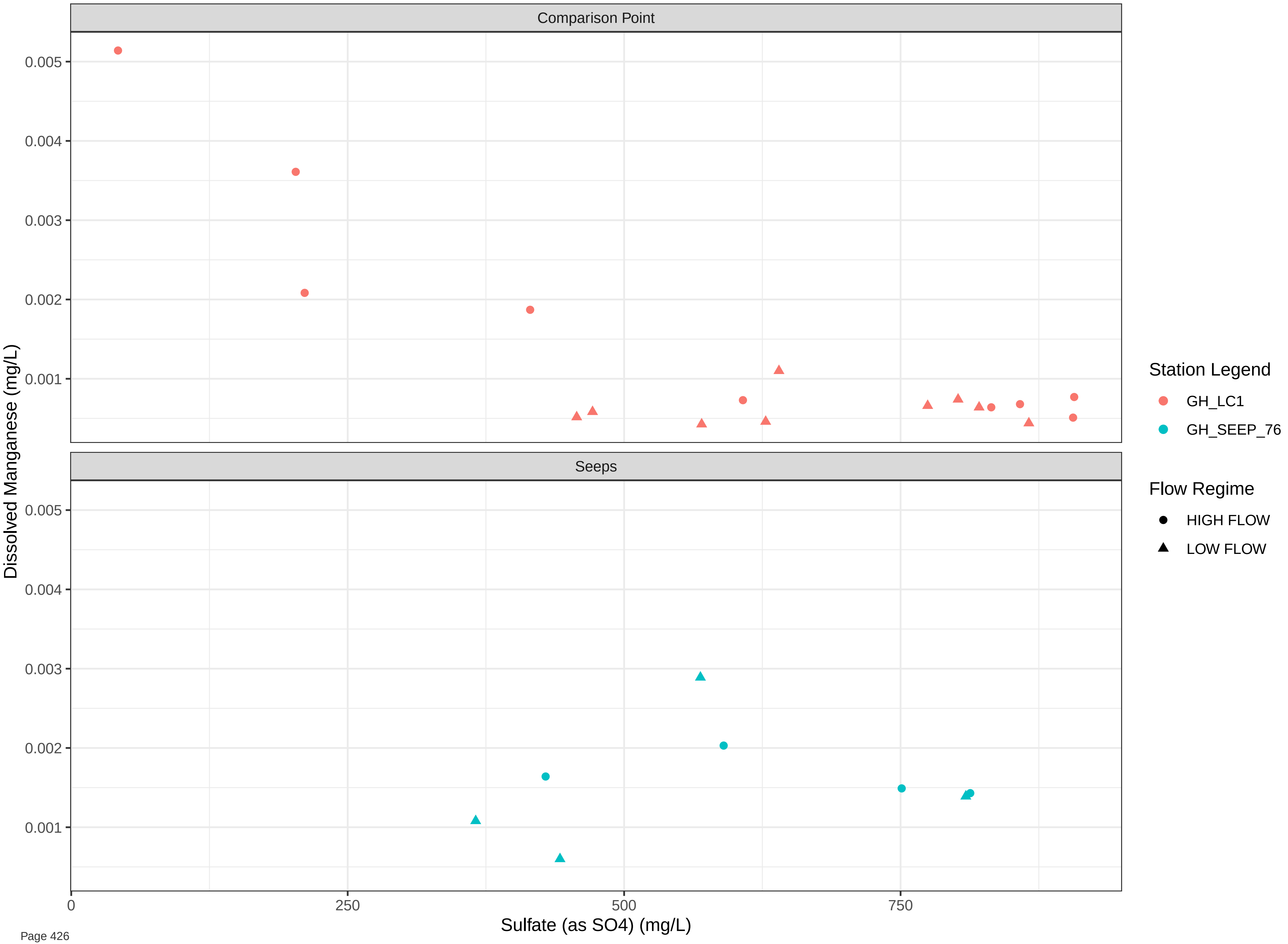
Comparison Point
Seeps
Dissolved Manganese (mg/L)
1.5
1.0
0.5
0.0
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

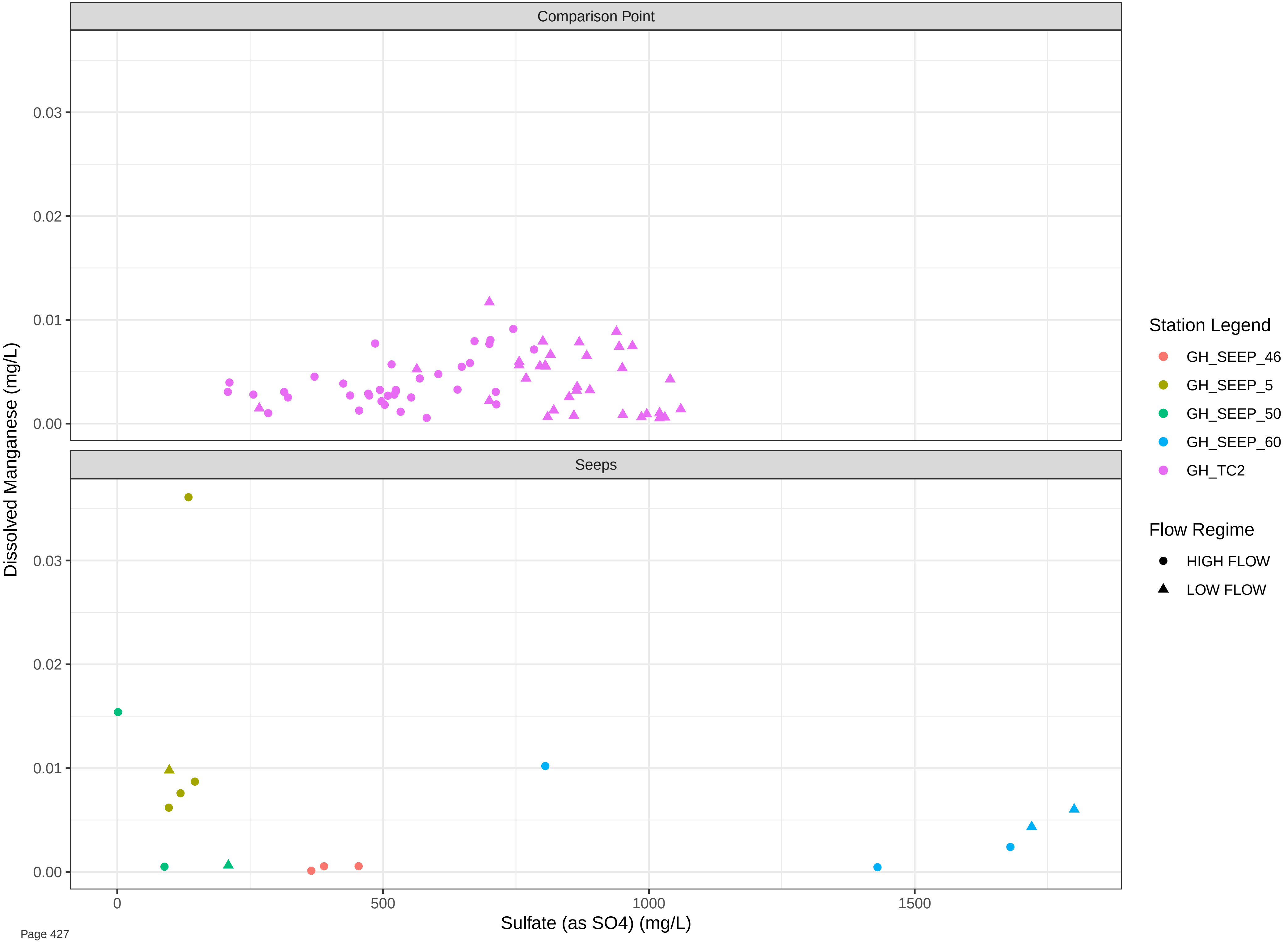


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.0
0.1
0.2
0.3
0.4
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

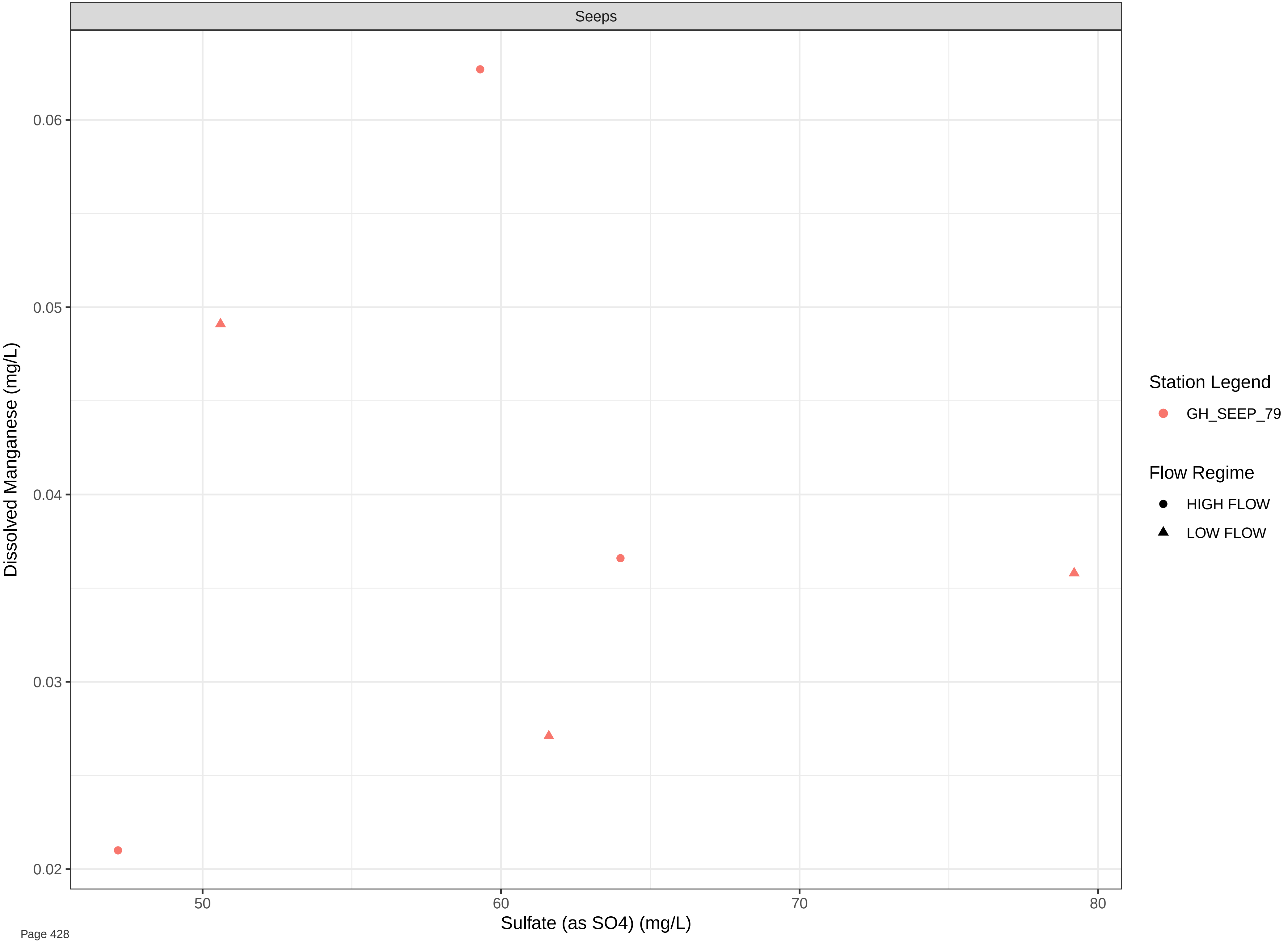


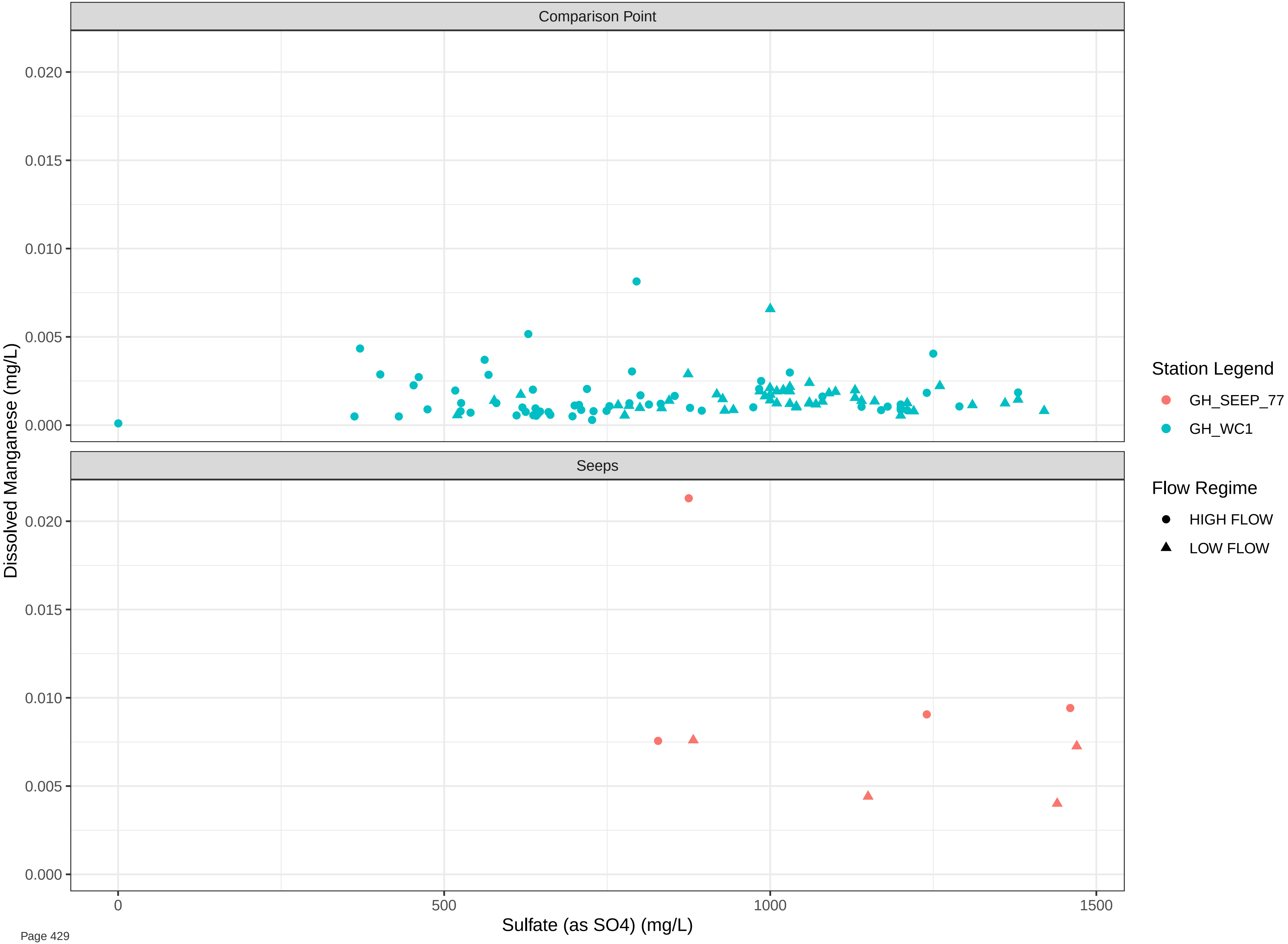
Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.000
0.003
0.006
0.009
Sulfate (as SO4) (mg/L)
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.005
0.004
0.003
0.002
0.001
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

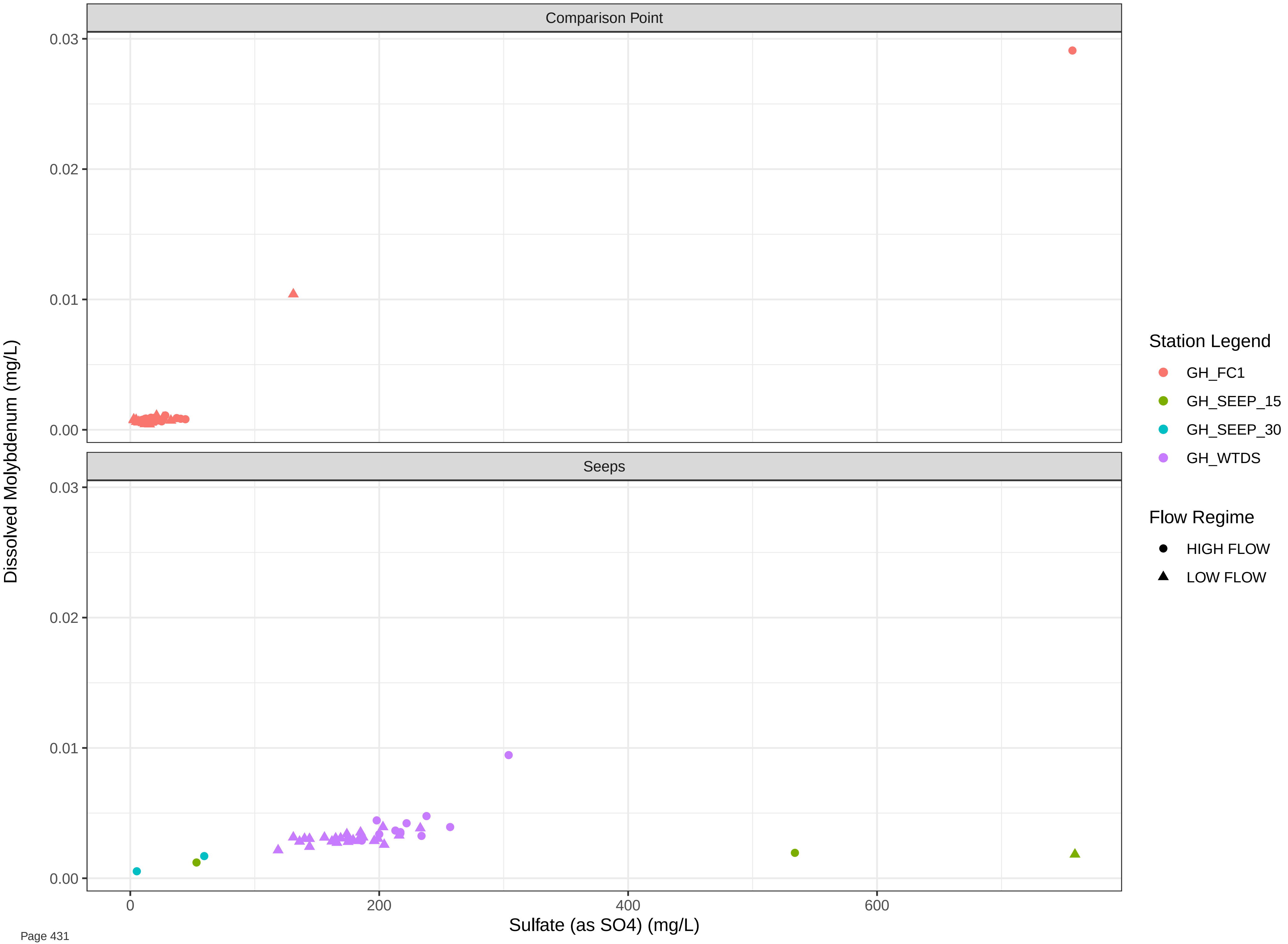


Comparison Point
Seeps
0.00
0.01
0.02
0.03
0
500
1000
1500
Dissolved Manganese (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

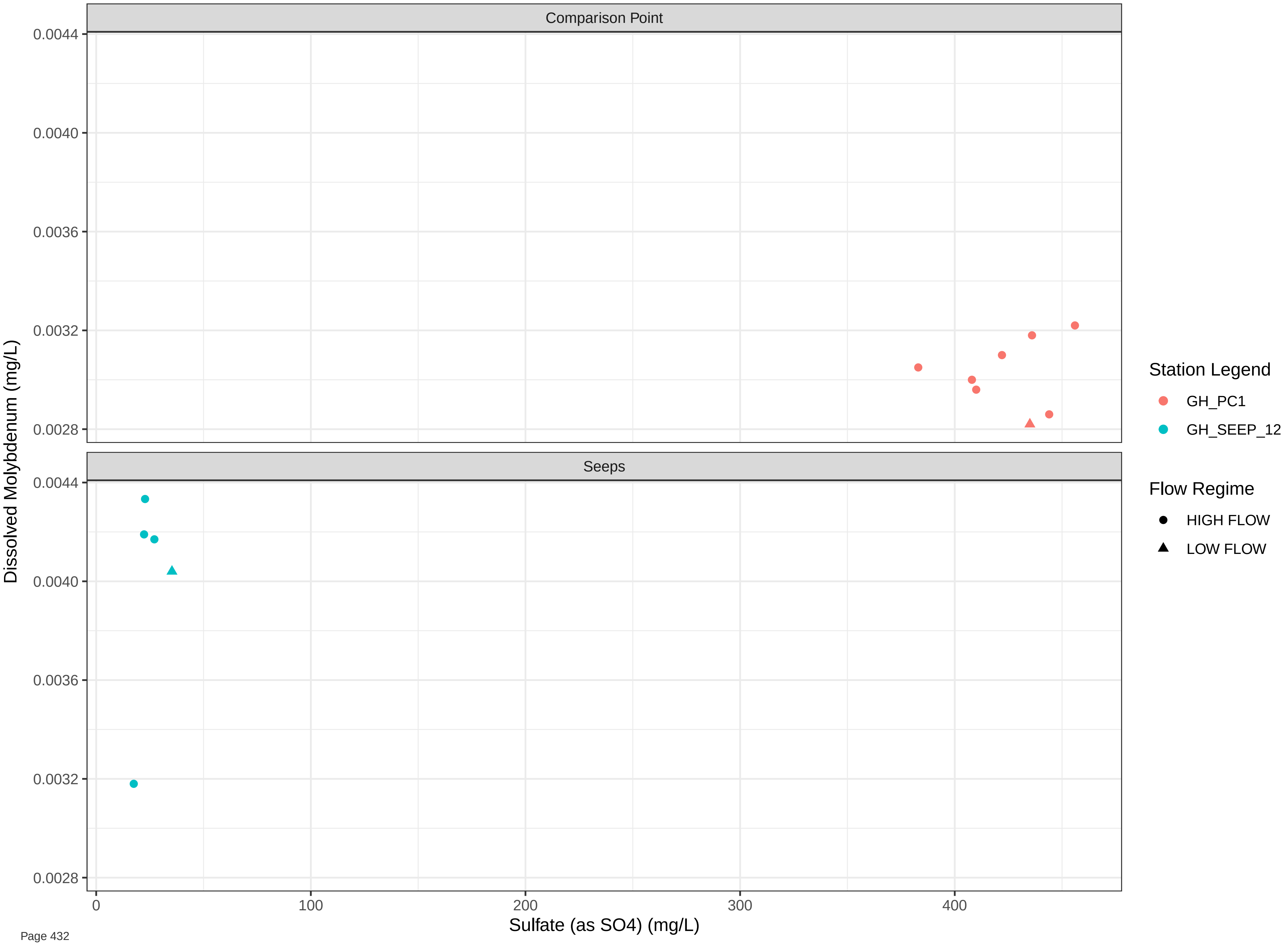

Seeps
Dissolved Manganese (mg/L)
0.06
0.05
0.04
0.03
0.02
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.020
0.015
0.010
0.005
0.000
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

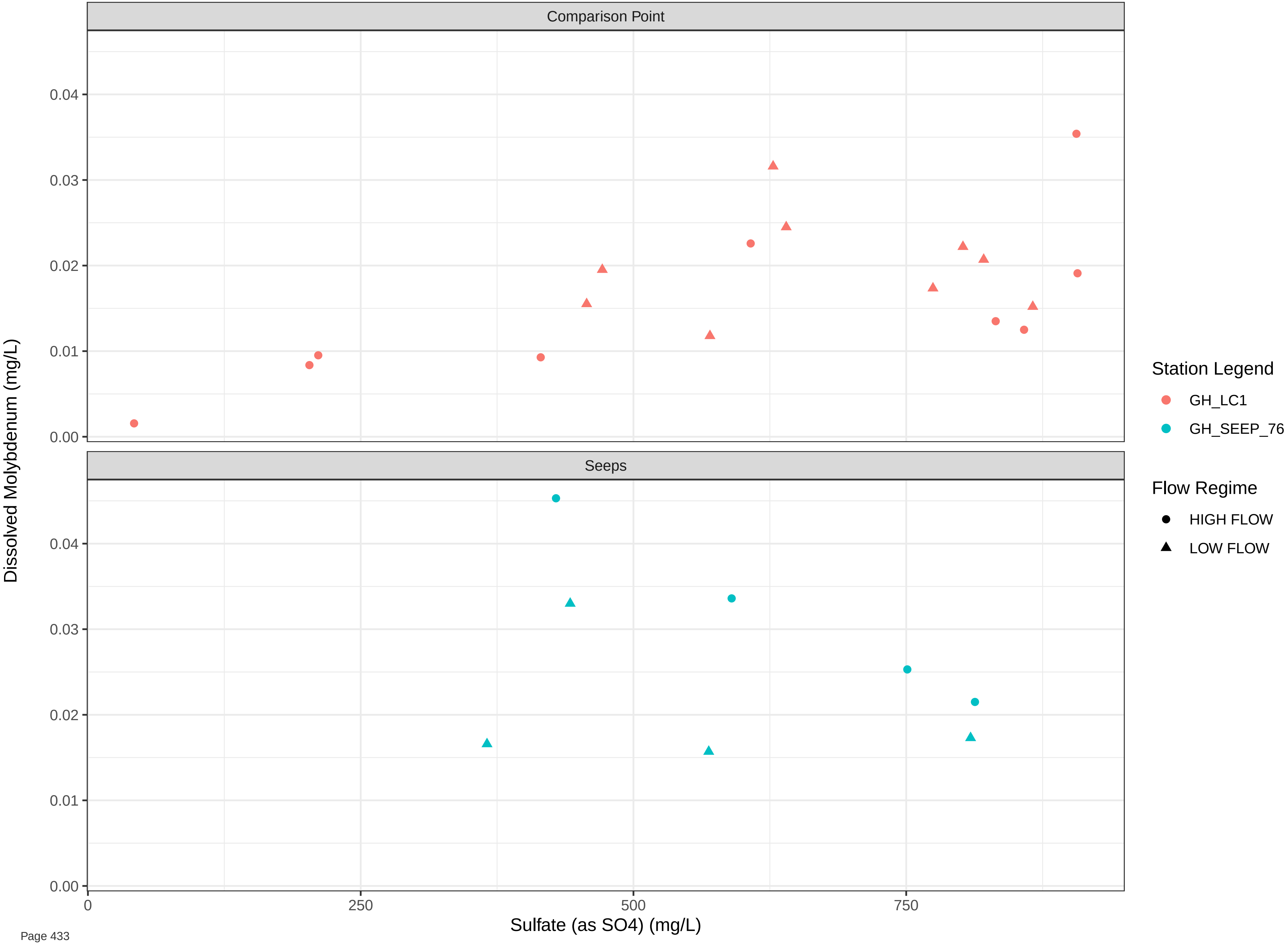
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.000
0.005
0.010
0.015
0.020
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



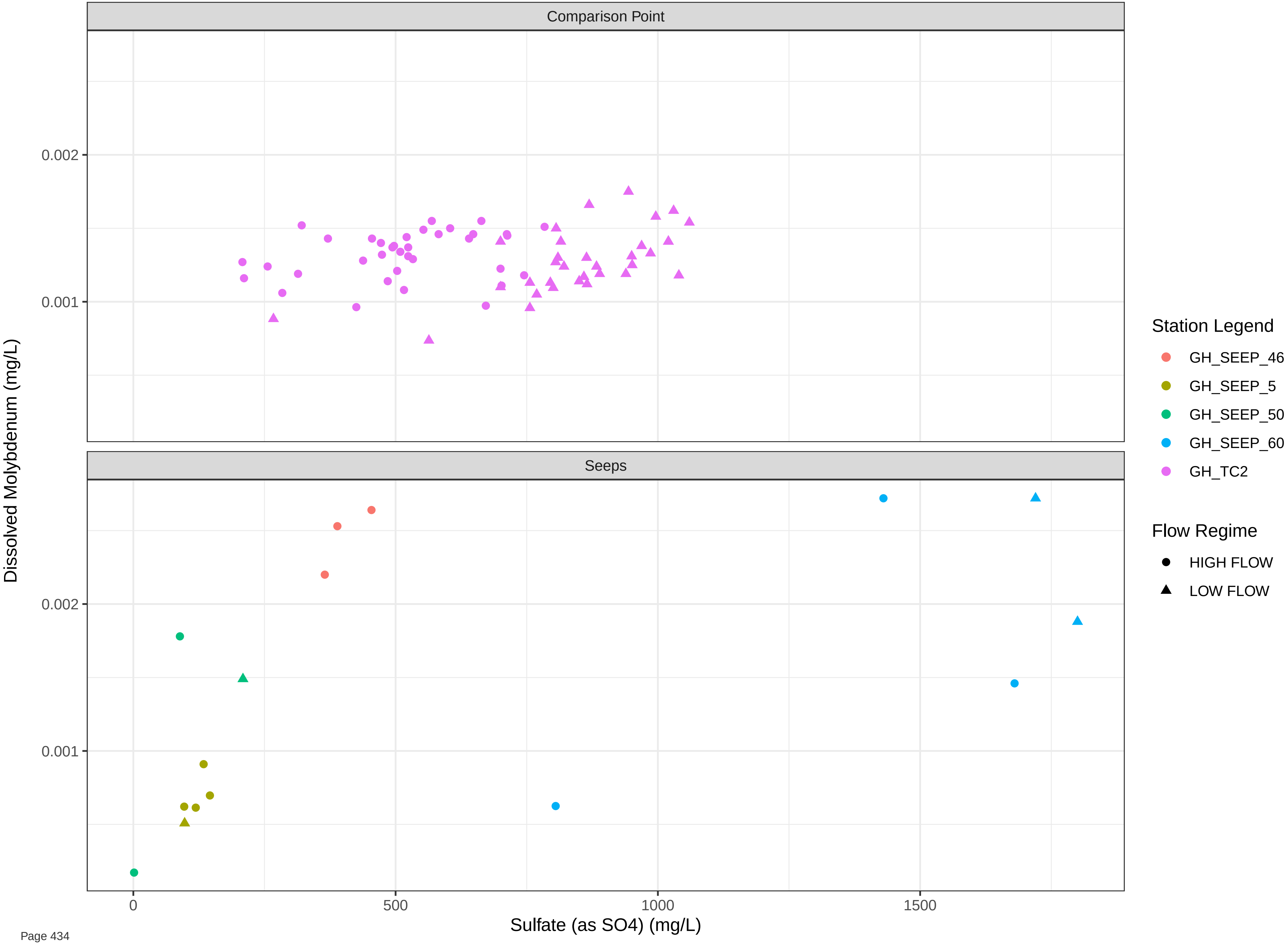
Comparison Point
Seeps
0.03
0.02
0.01
0.00
0
200
400
600
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



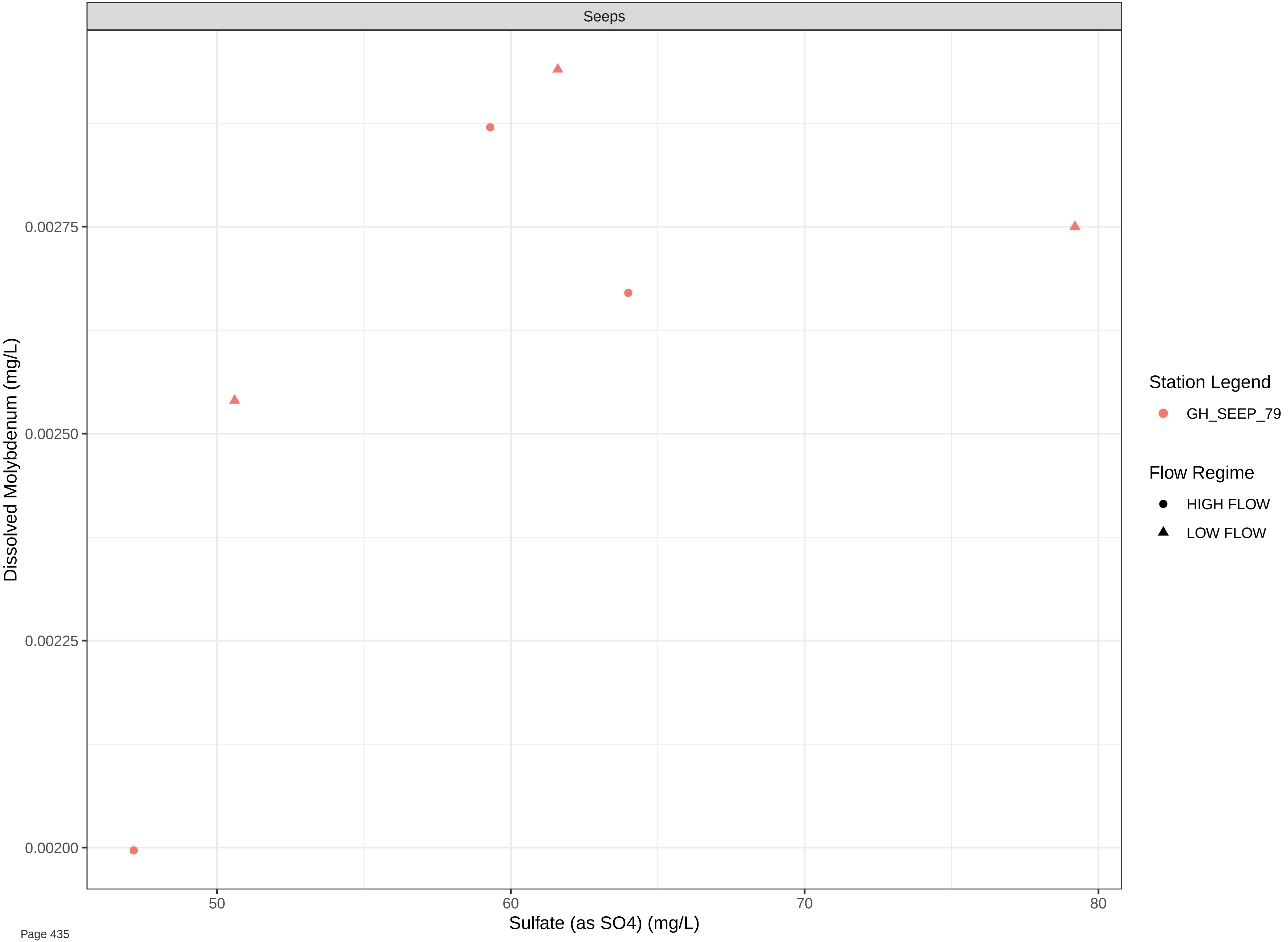
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.0044
0.0040
0.0036
0.0032
0.0028
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



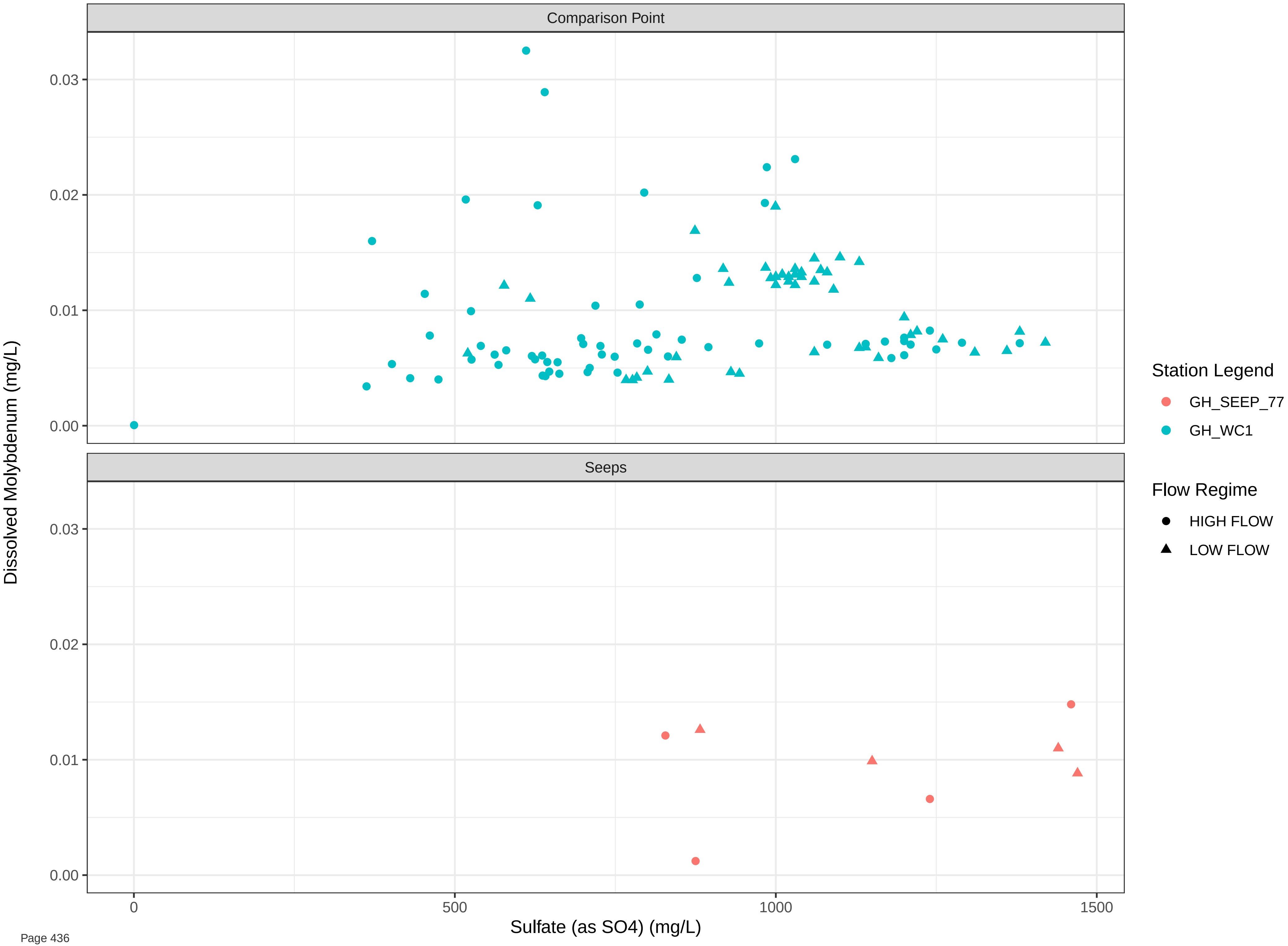
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
0.00
0.01
0.02
0.03
0.04
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



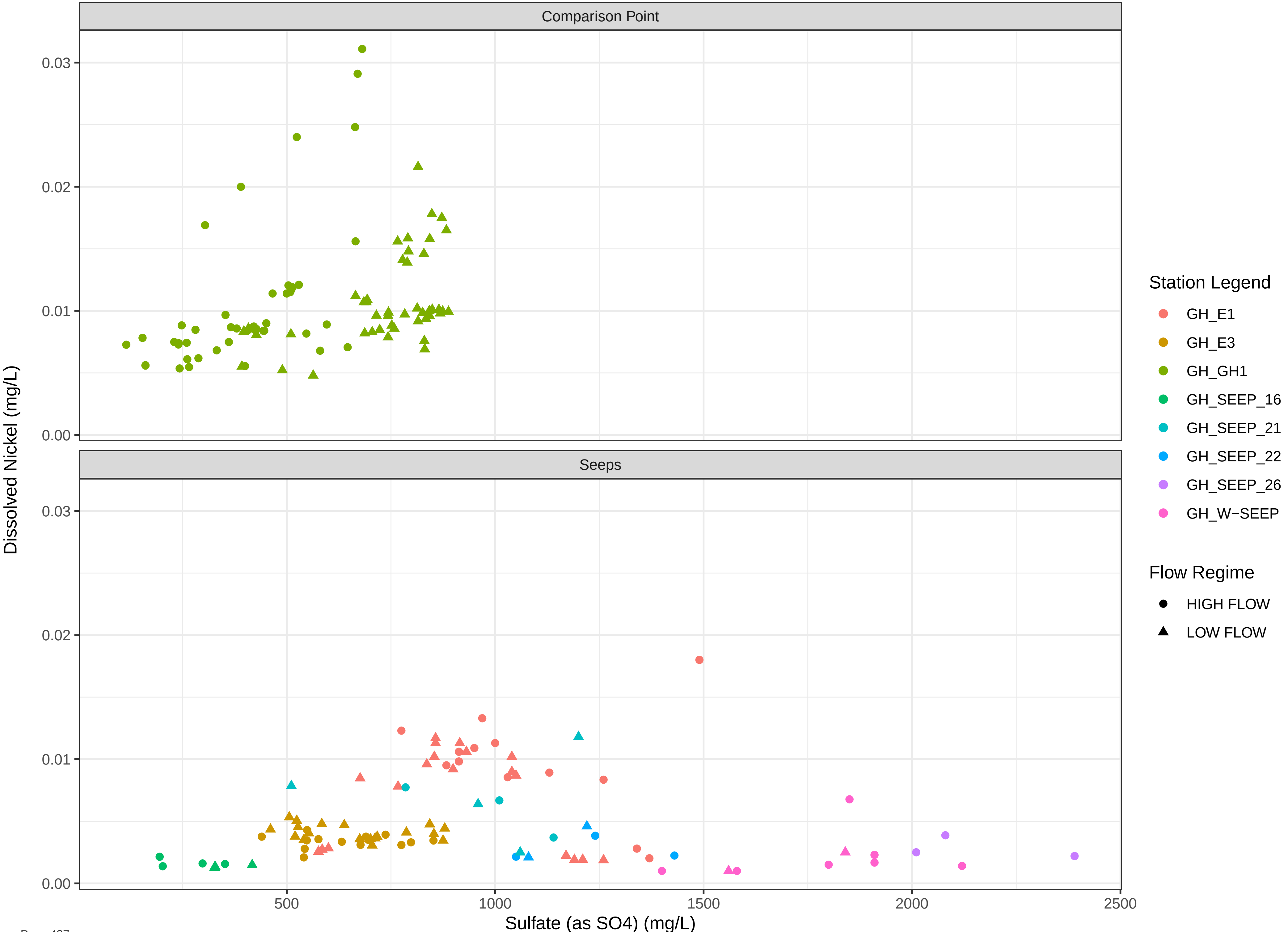
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.002
0.001
0.002
0.001
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

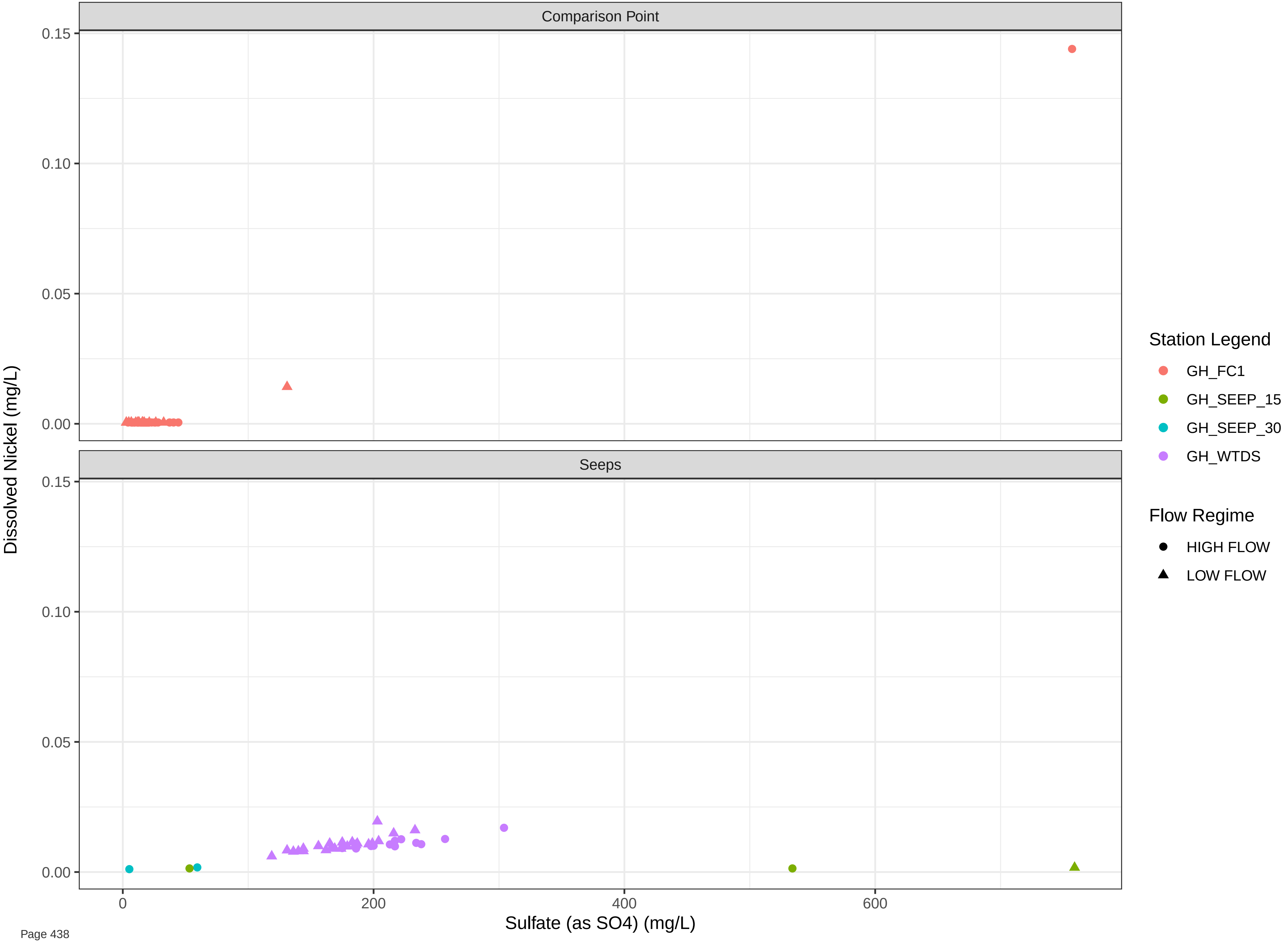


Seeps
0.00275
0.00250
0.00225
0.00200
Dissolved Molybdenum (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

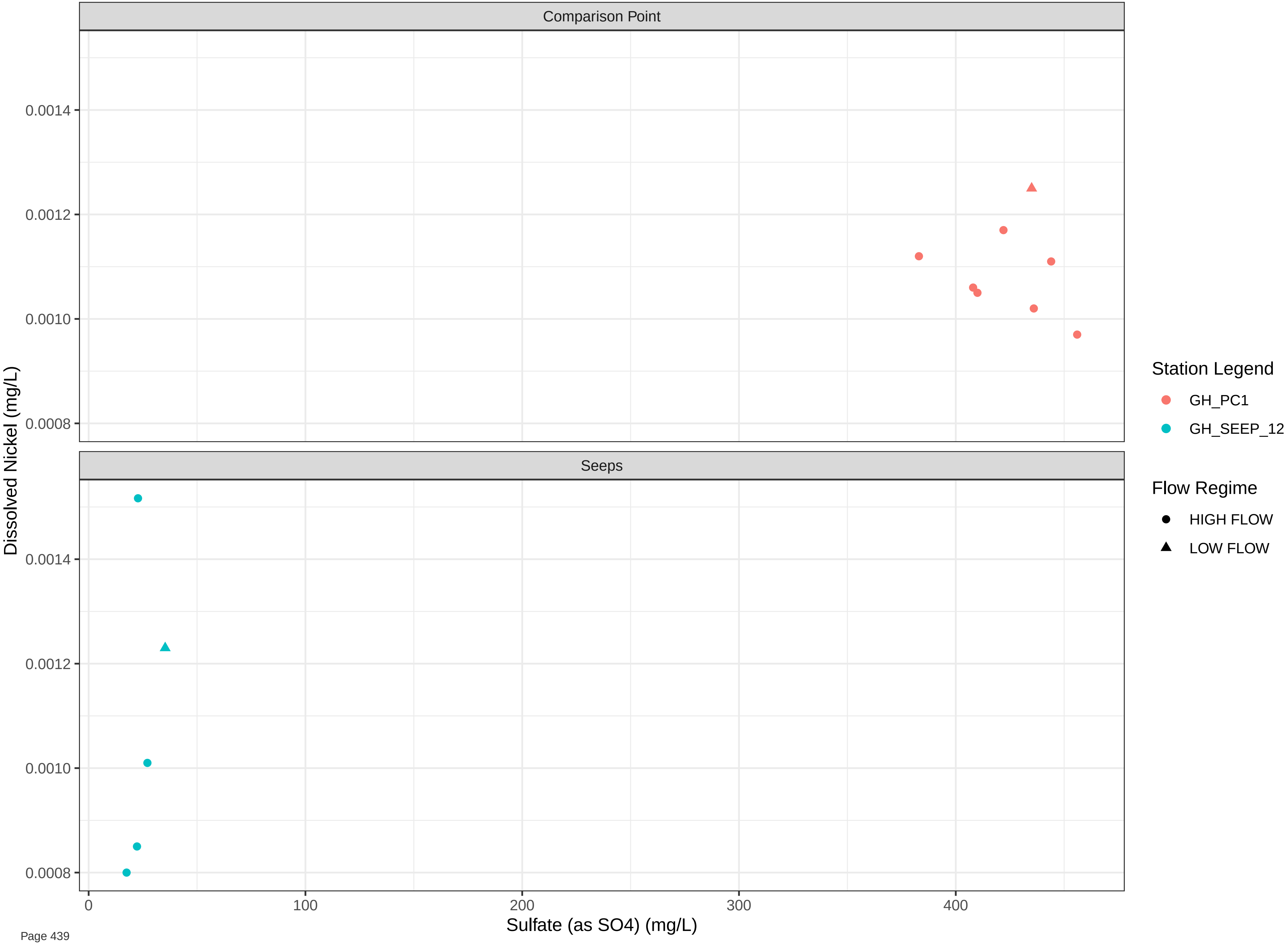


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.00
0.01
0.02
0.03
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

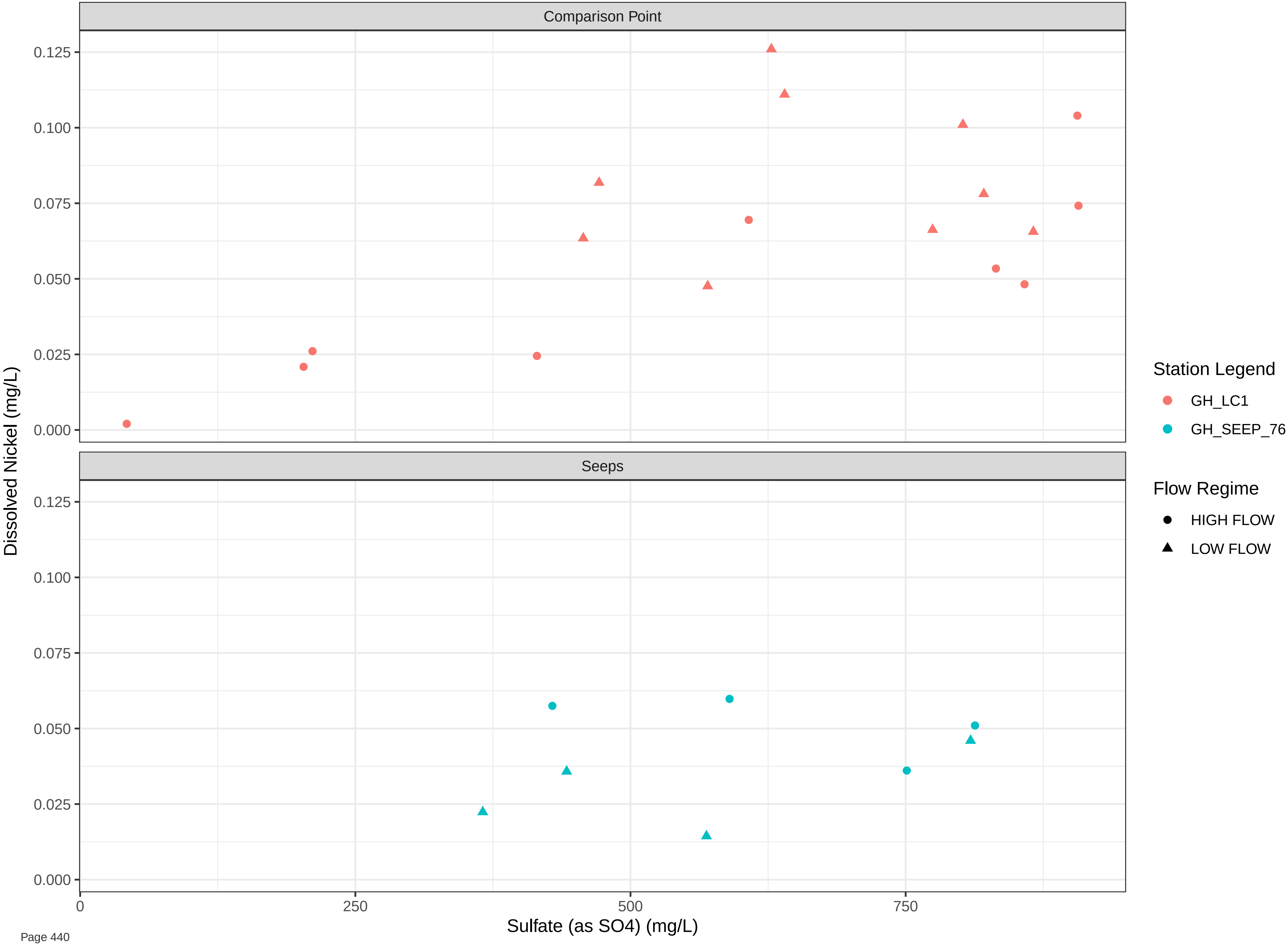

Comparison Point
Seeps
Dissolved Nickel (mg/L)
Sulfate (as SO4) (mg/L)
0.00
0.01
0.02
0.03
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



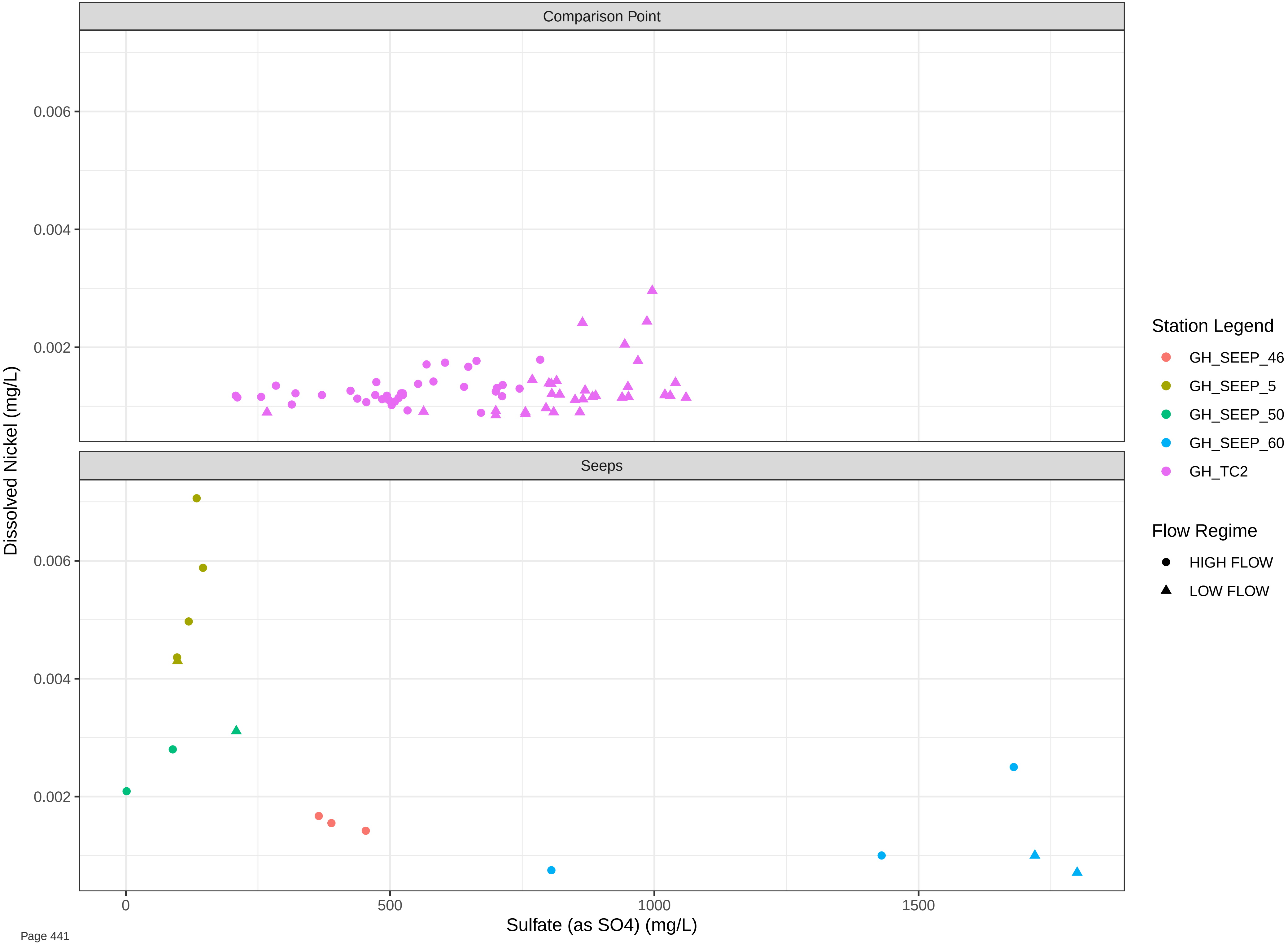
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.15
0.10
0.05
0.00
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

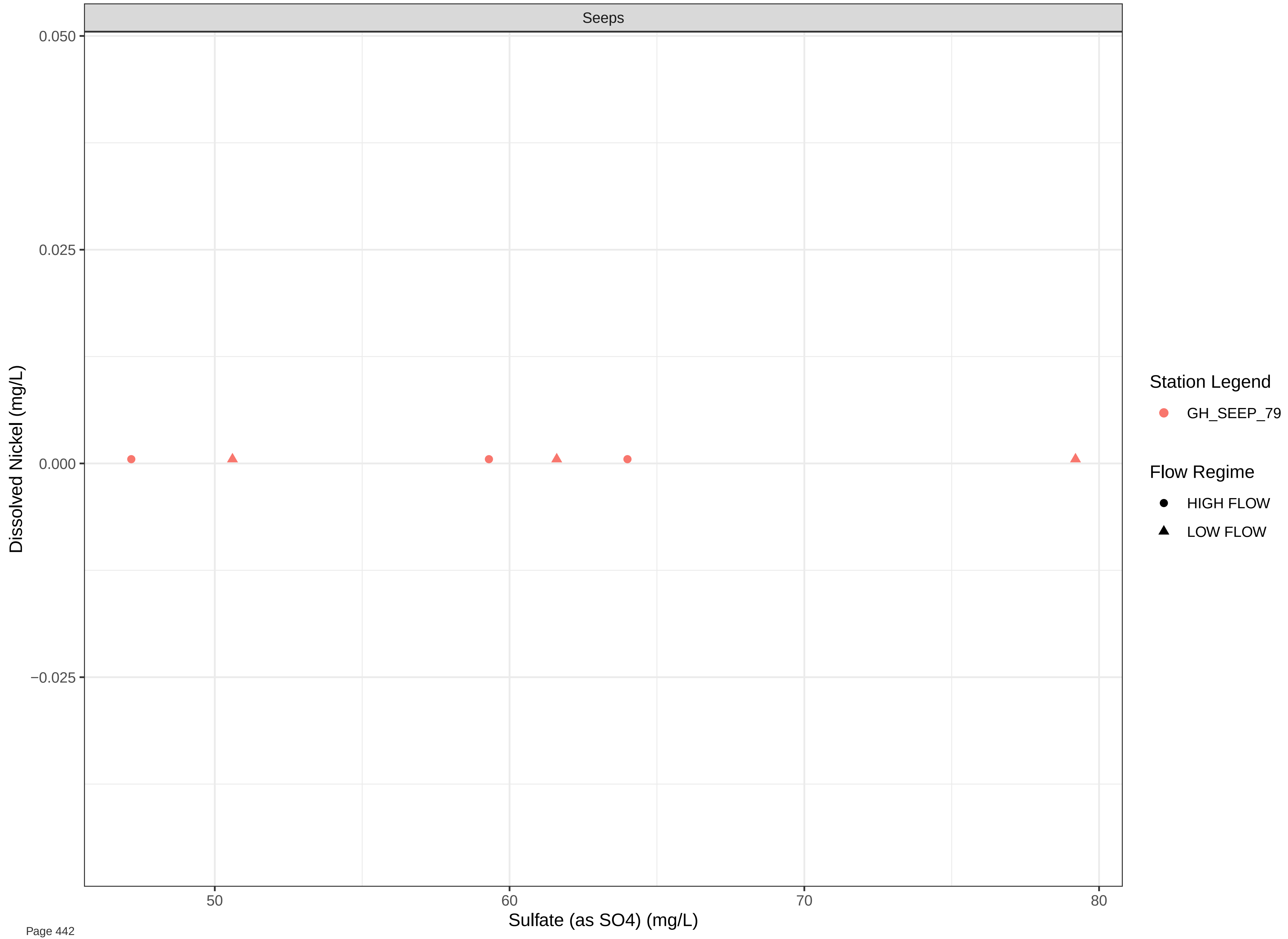


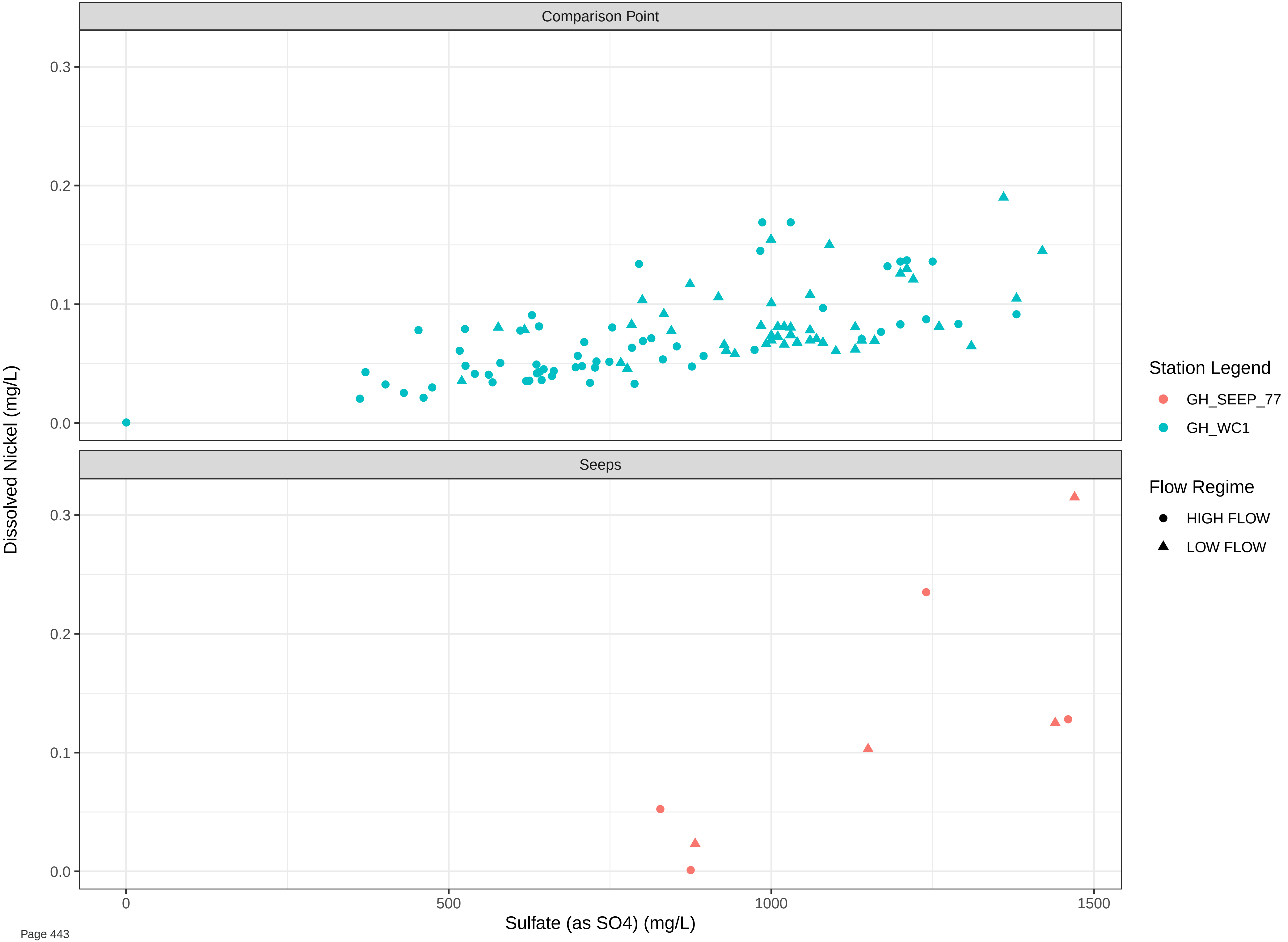
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.0014
0.0012
0.0010
0.0008
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



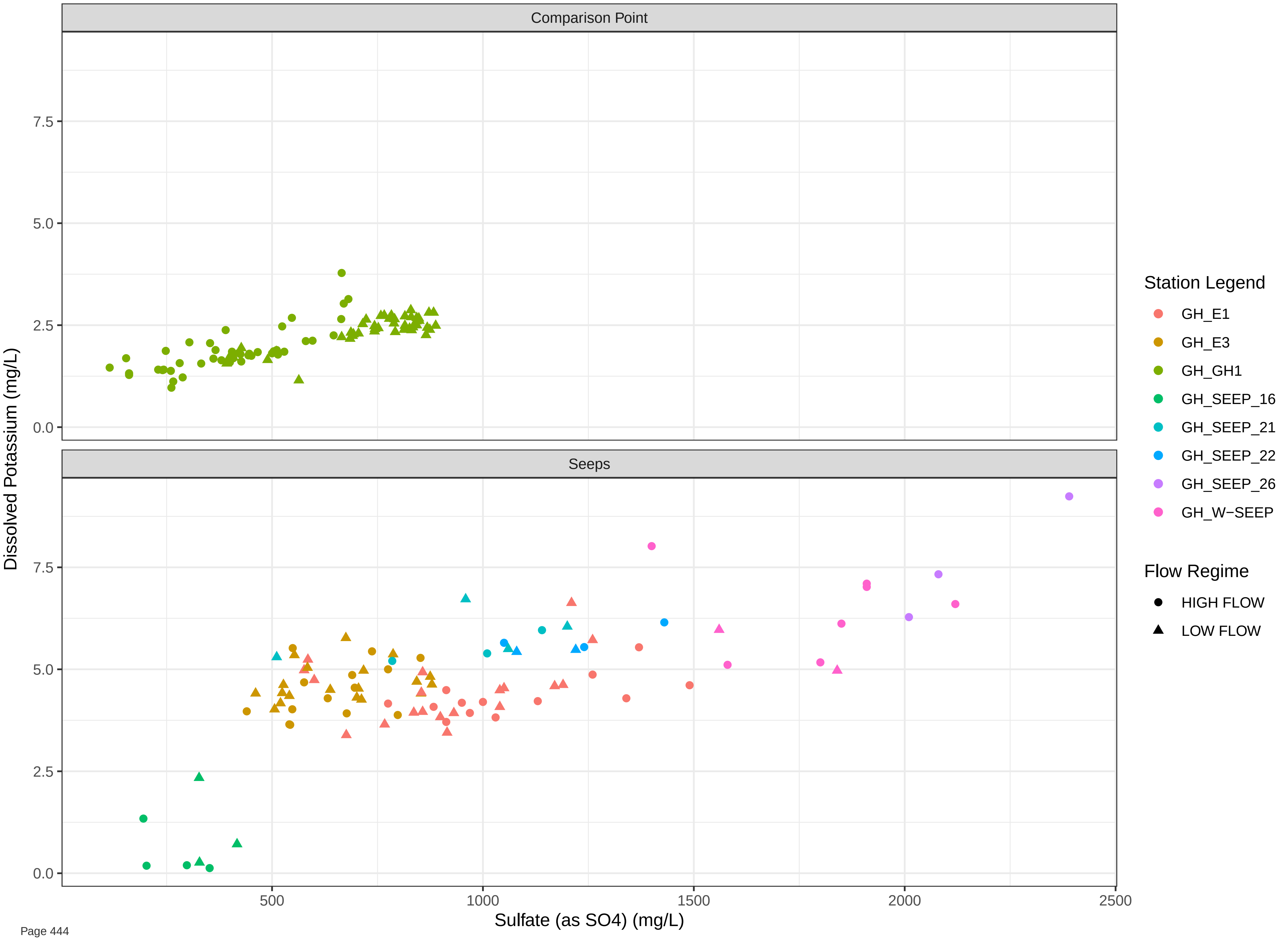
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.000
0.025
0.050
0.075
0.100
0.125
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.002
0.004
0.006
Sulfate (as SO4) (mg/L)
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

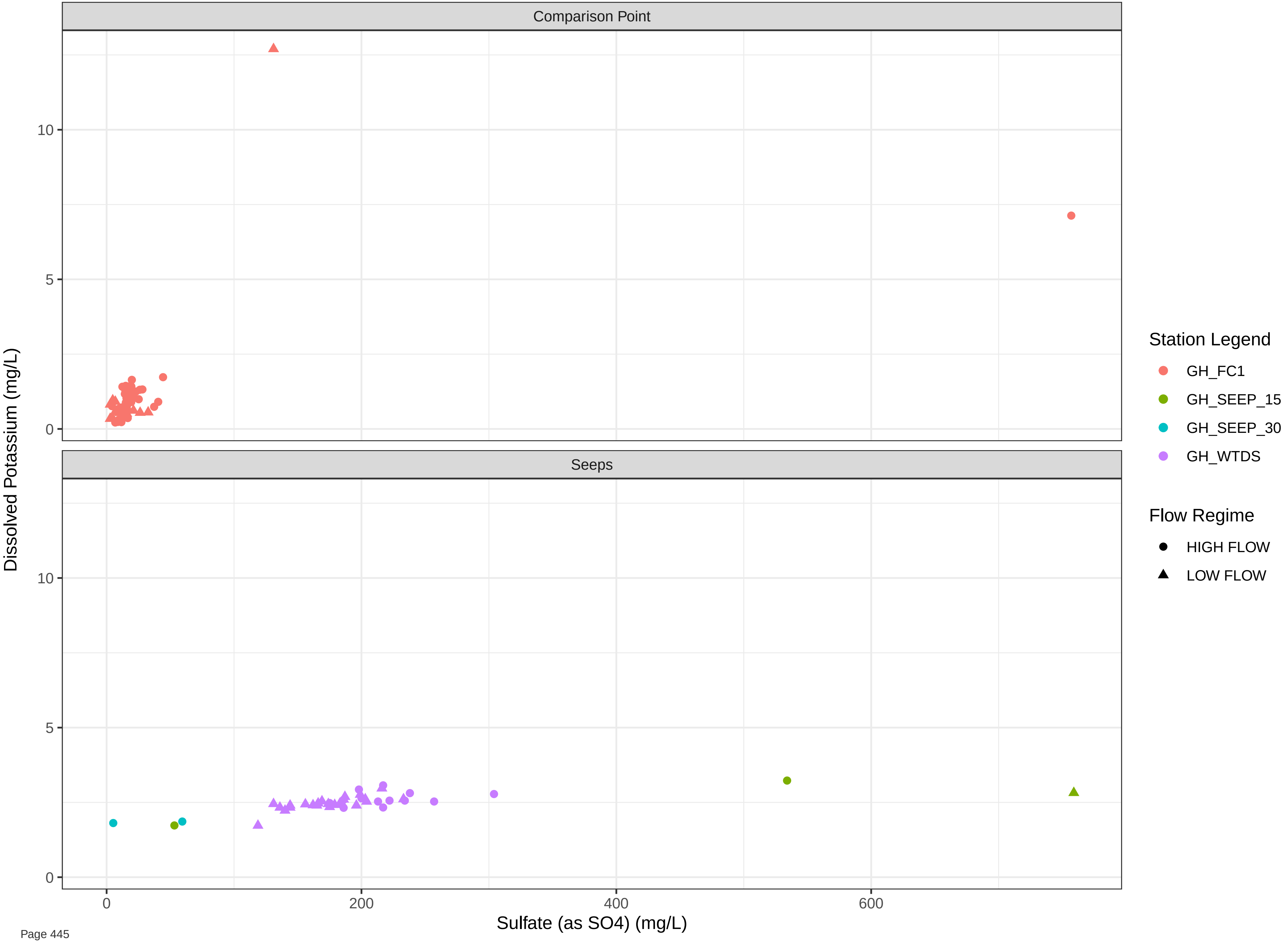

Seeps
0.050
0.025
0.000
−0.025
Dissolved Nickel (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



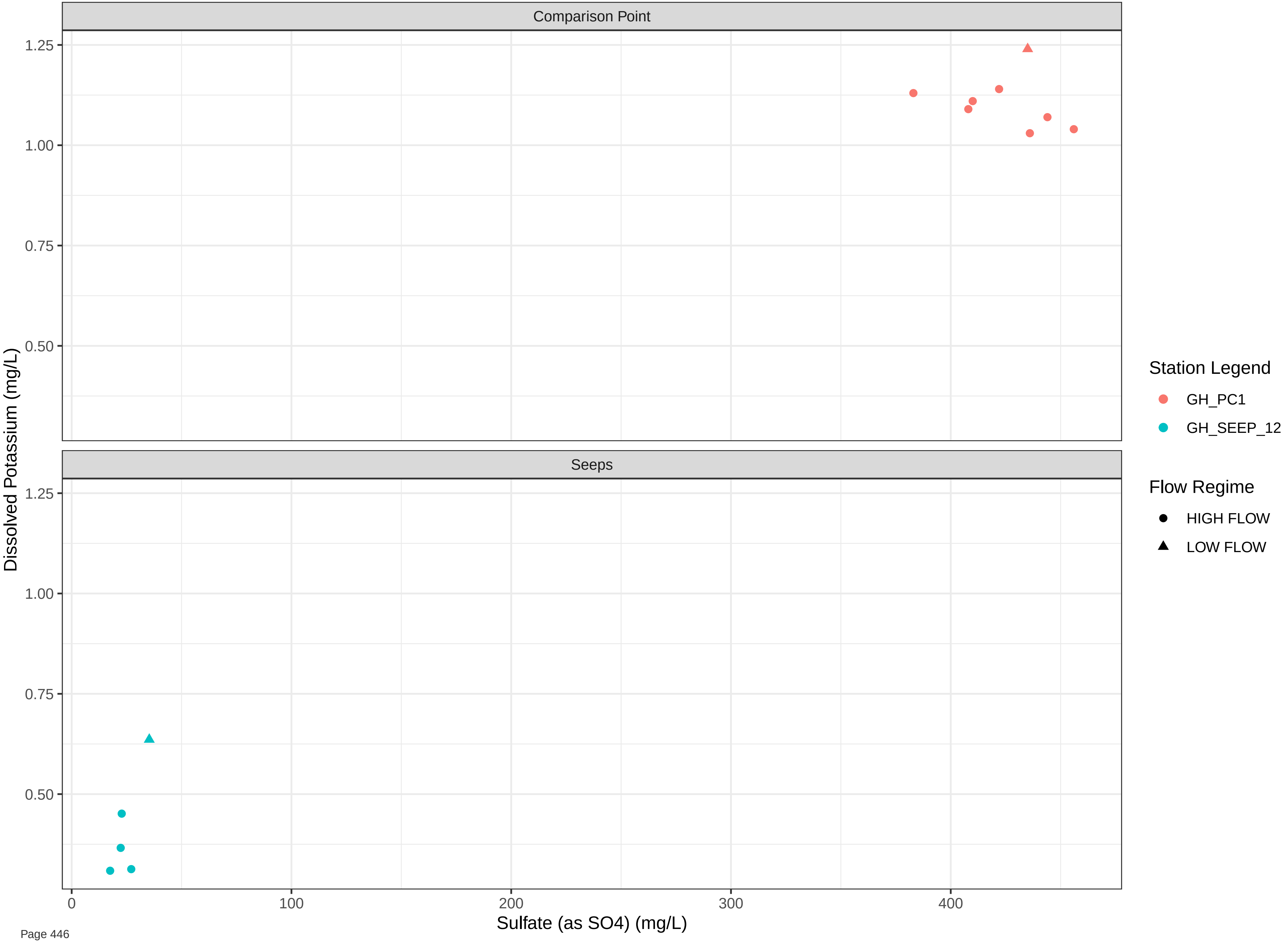
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.0
0.1
0.2
0.3
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

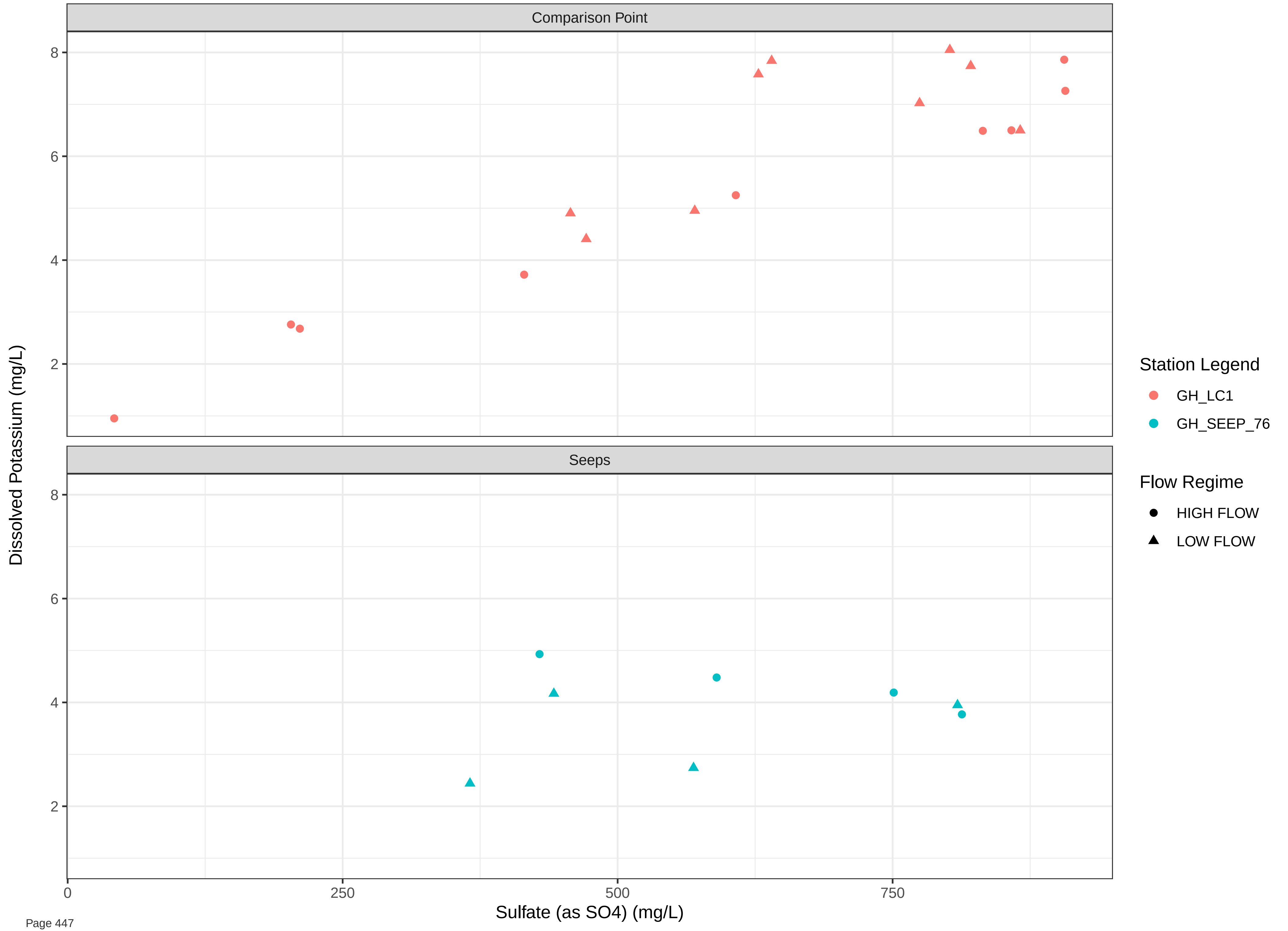


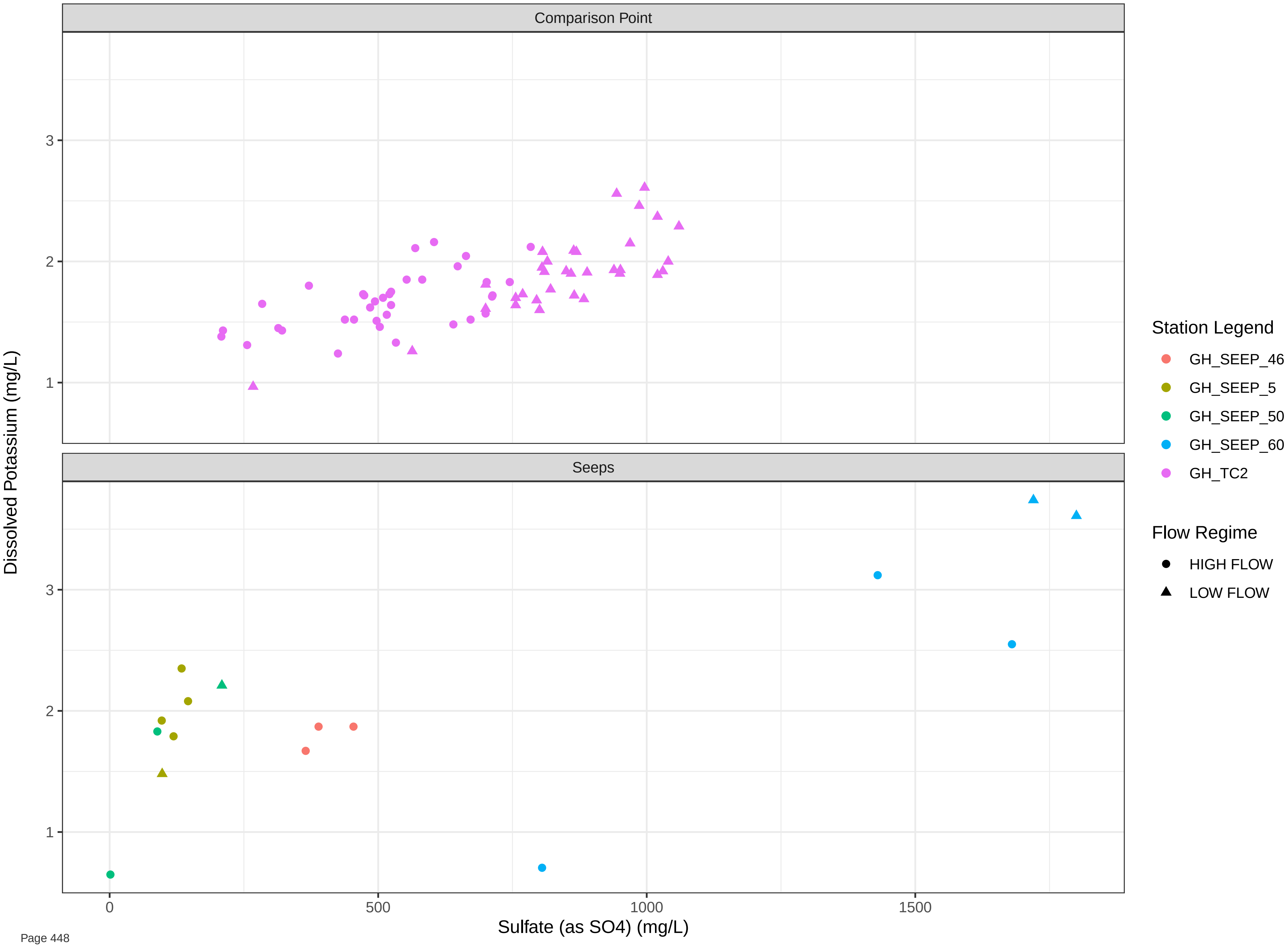
Comparison Point
Seeps
Dissolved Potassium (mg/L)
0.0
2.5
5.0
7.5
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



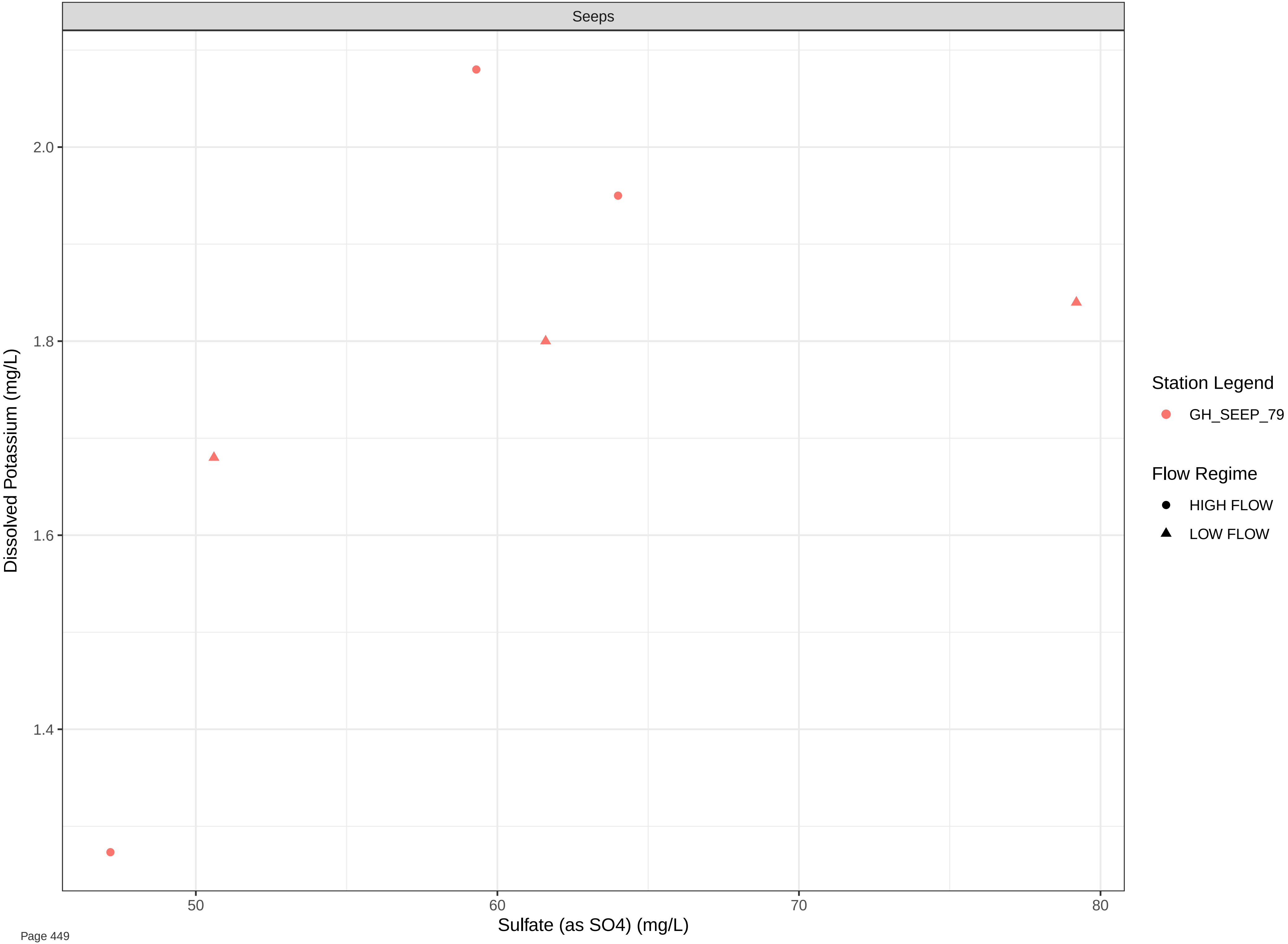
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
1.25
1.00
0.75
0.50
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

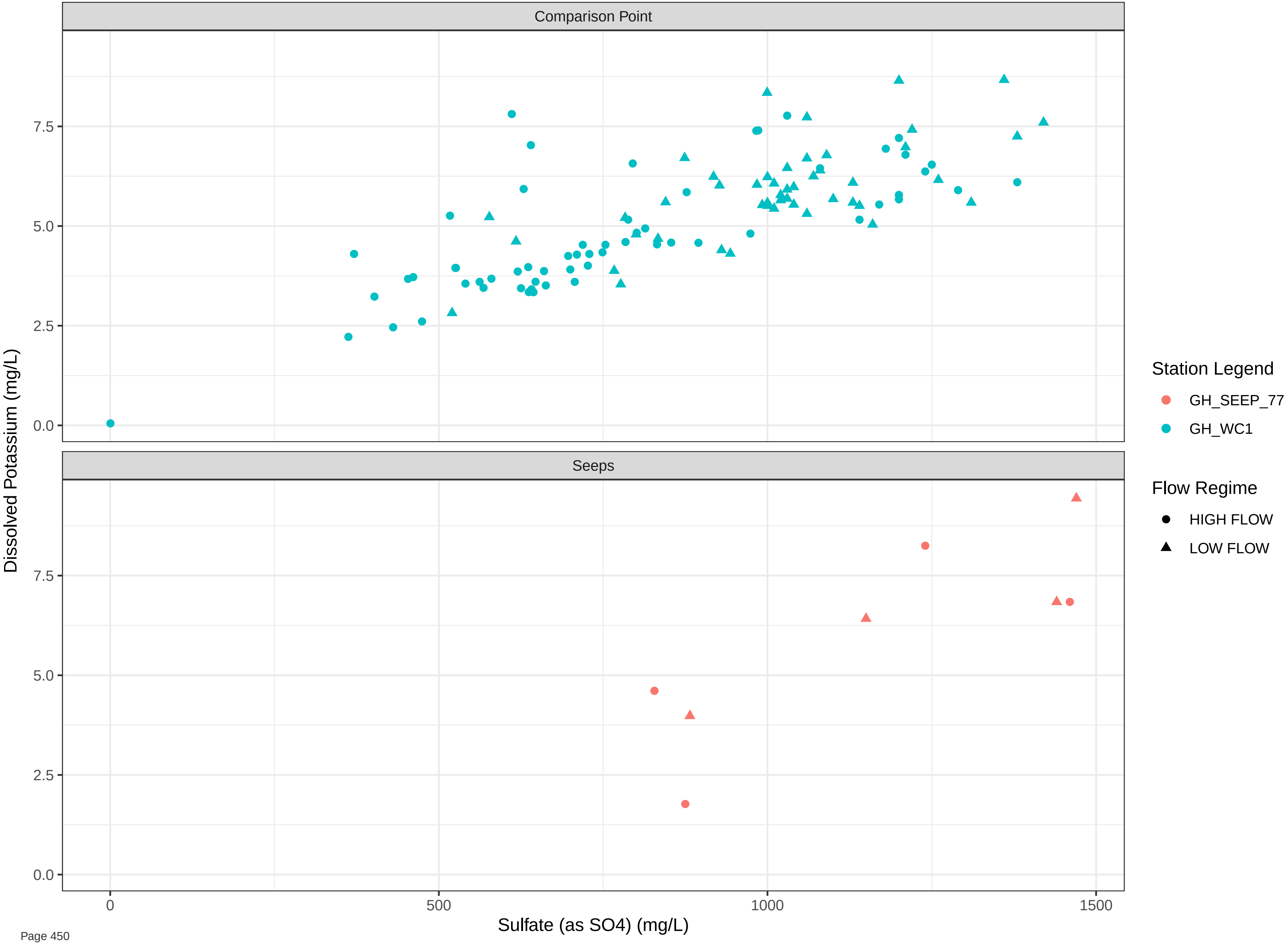

Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
8
6
4
2
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



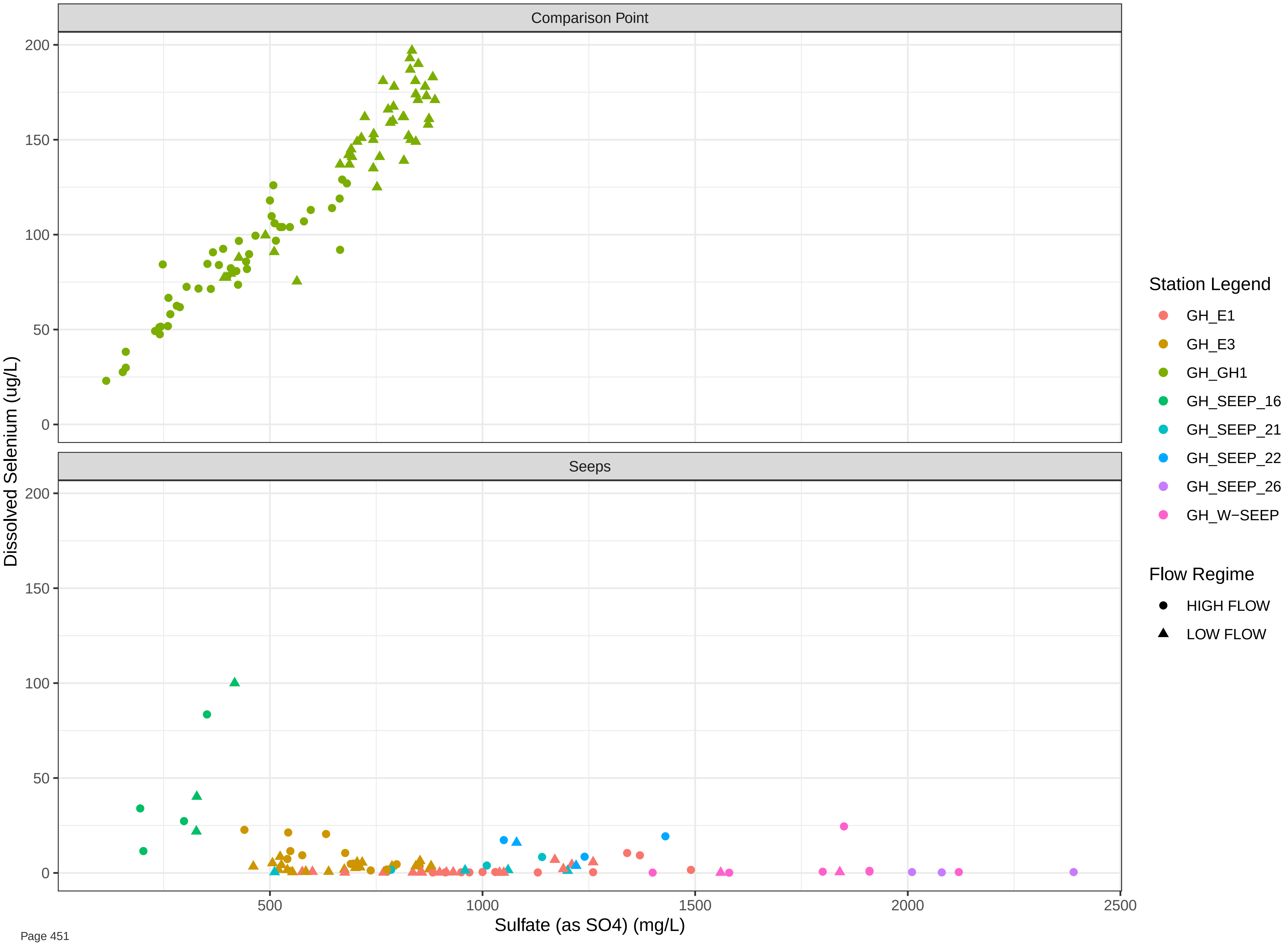
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
1
2
3
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW



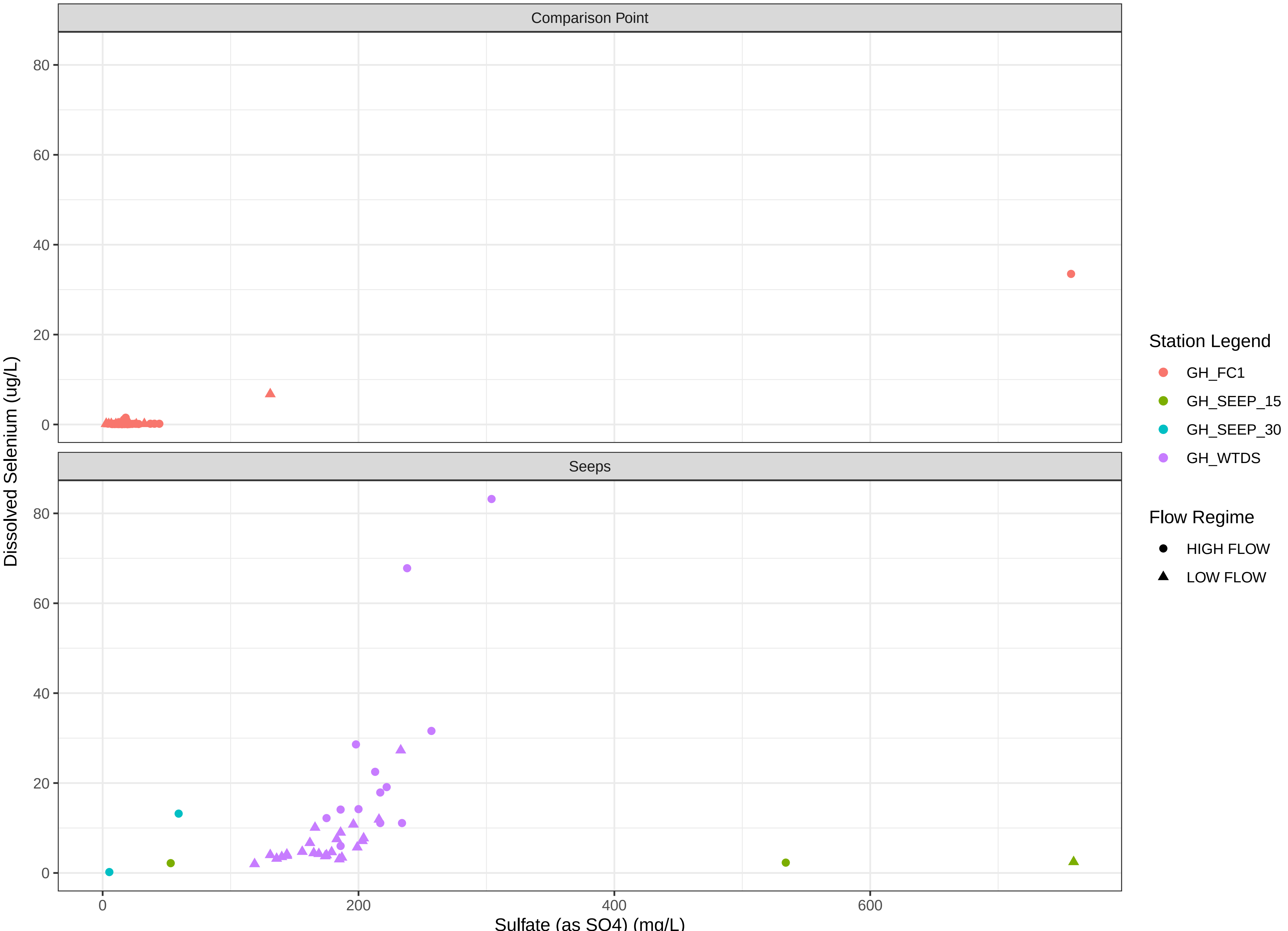
Seeps
Dissolved Potassium (mg/L)
2.0
1.8
1.6
1.4
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



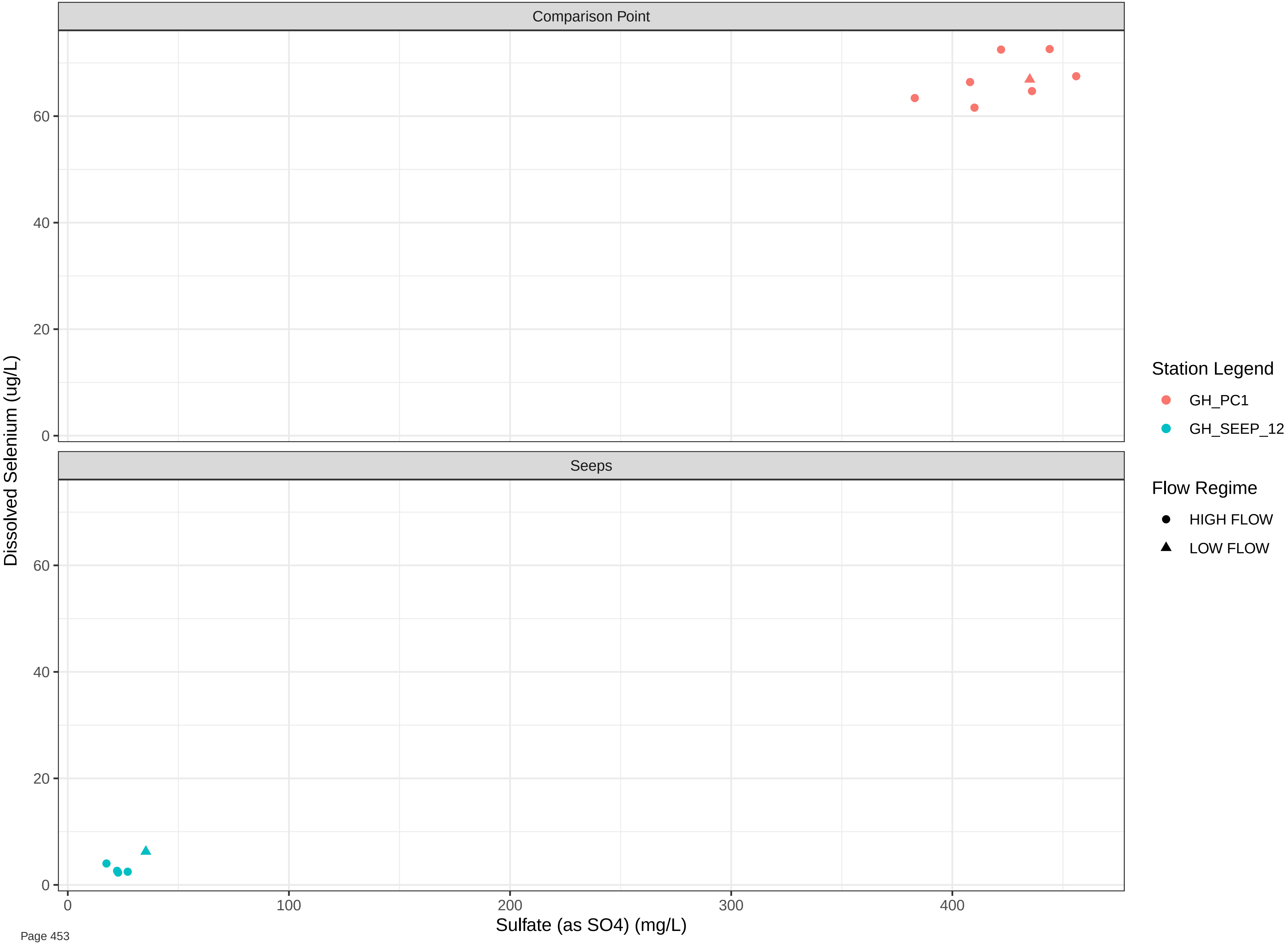
Comparison Point
Seeps
Dissolved Potassium (mg/L)
0.0
2.5
5.0
7.5
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

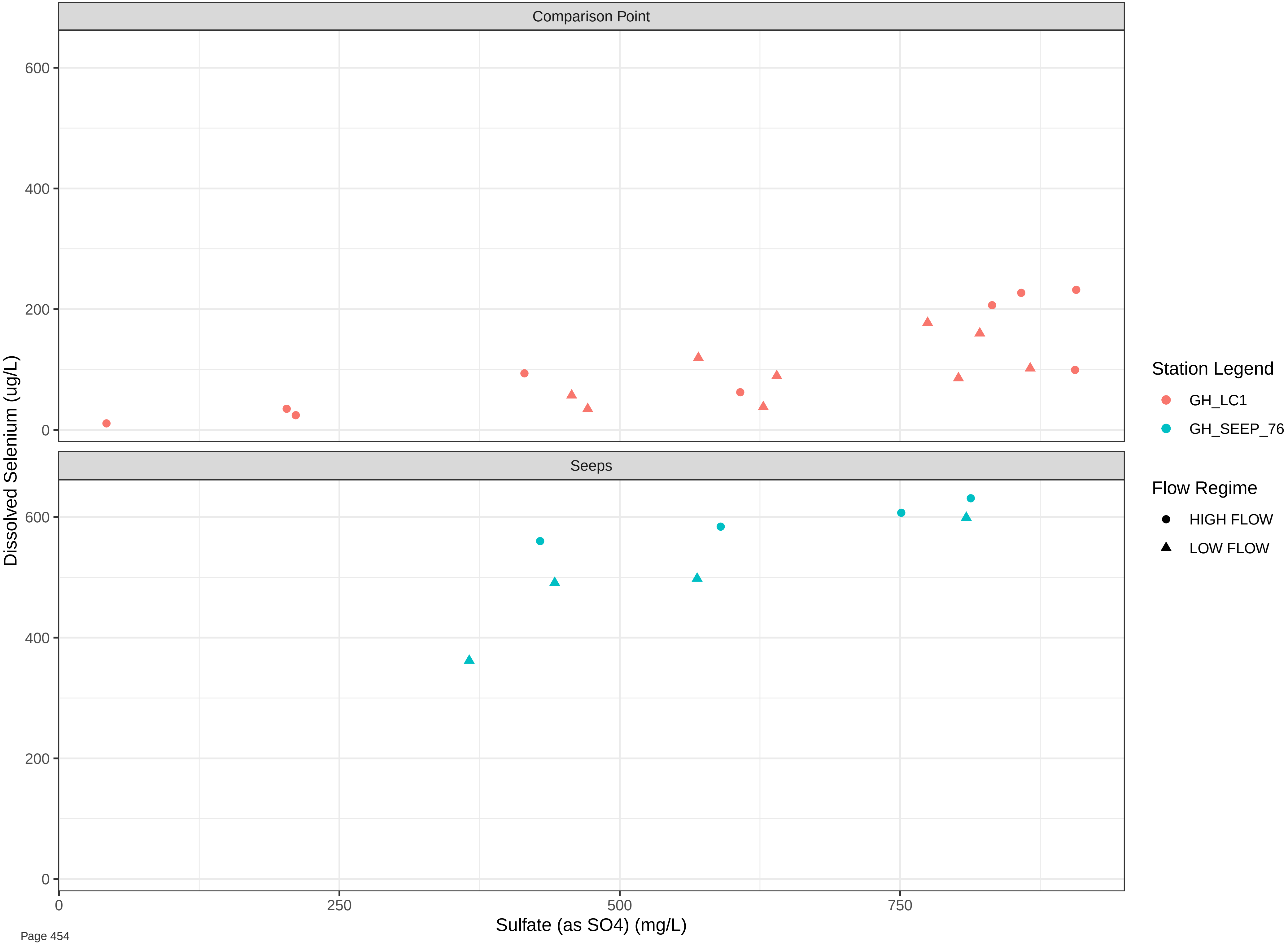


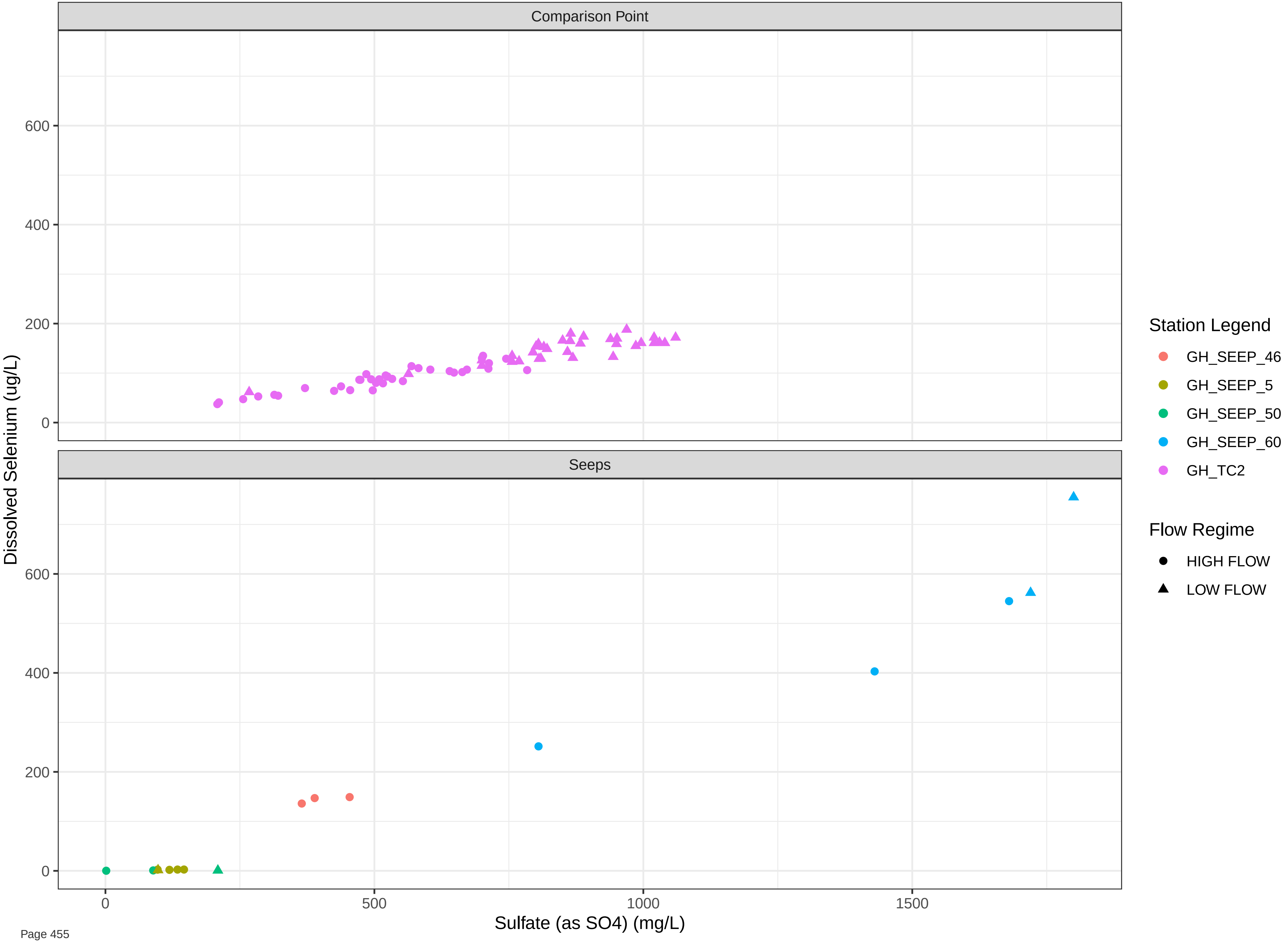
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



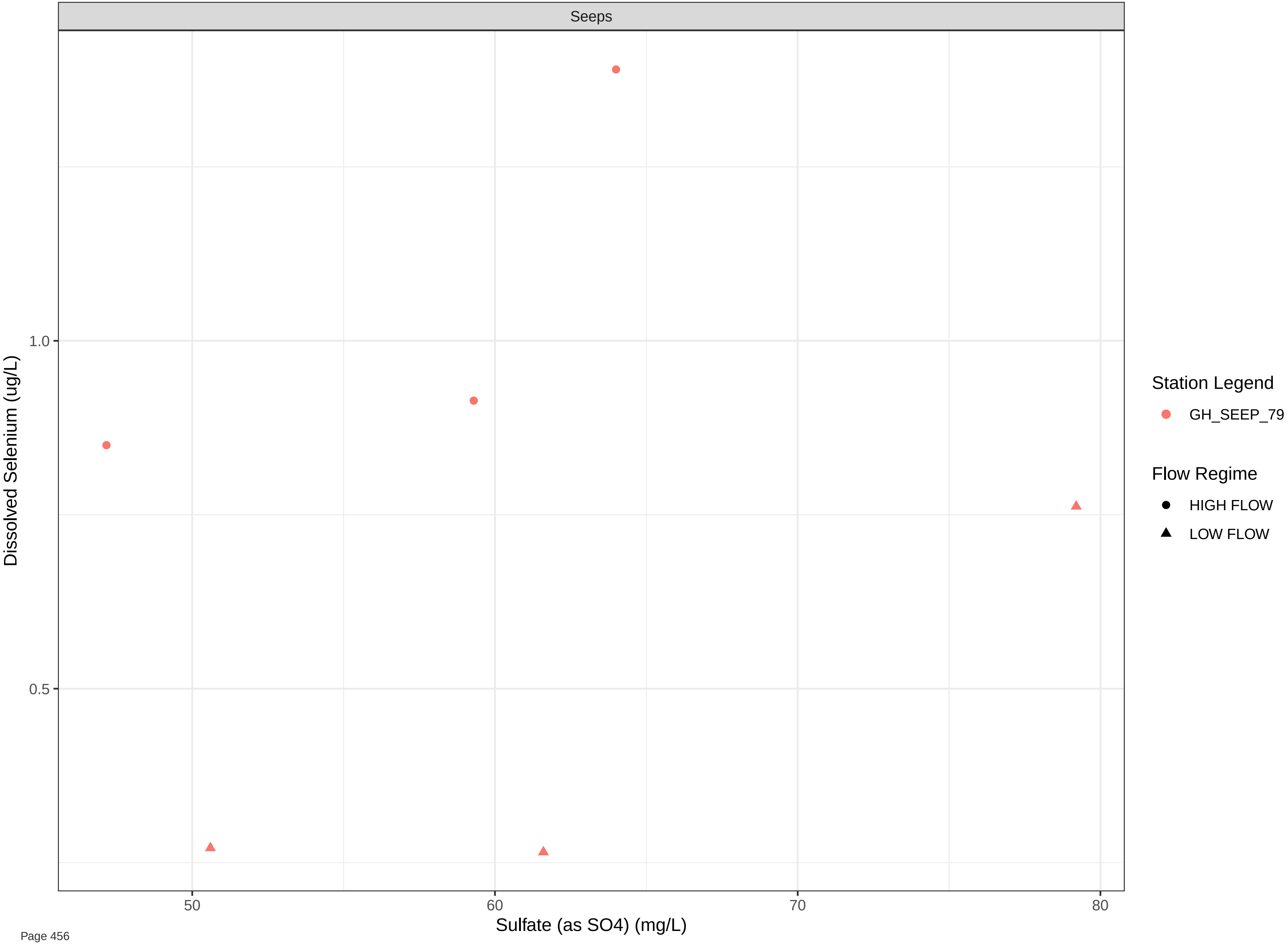
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
20
40
60
80
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
20
40
60
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

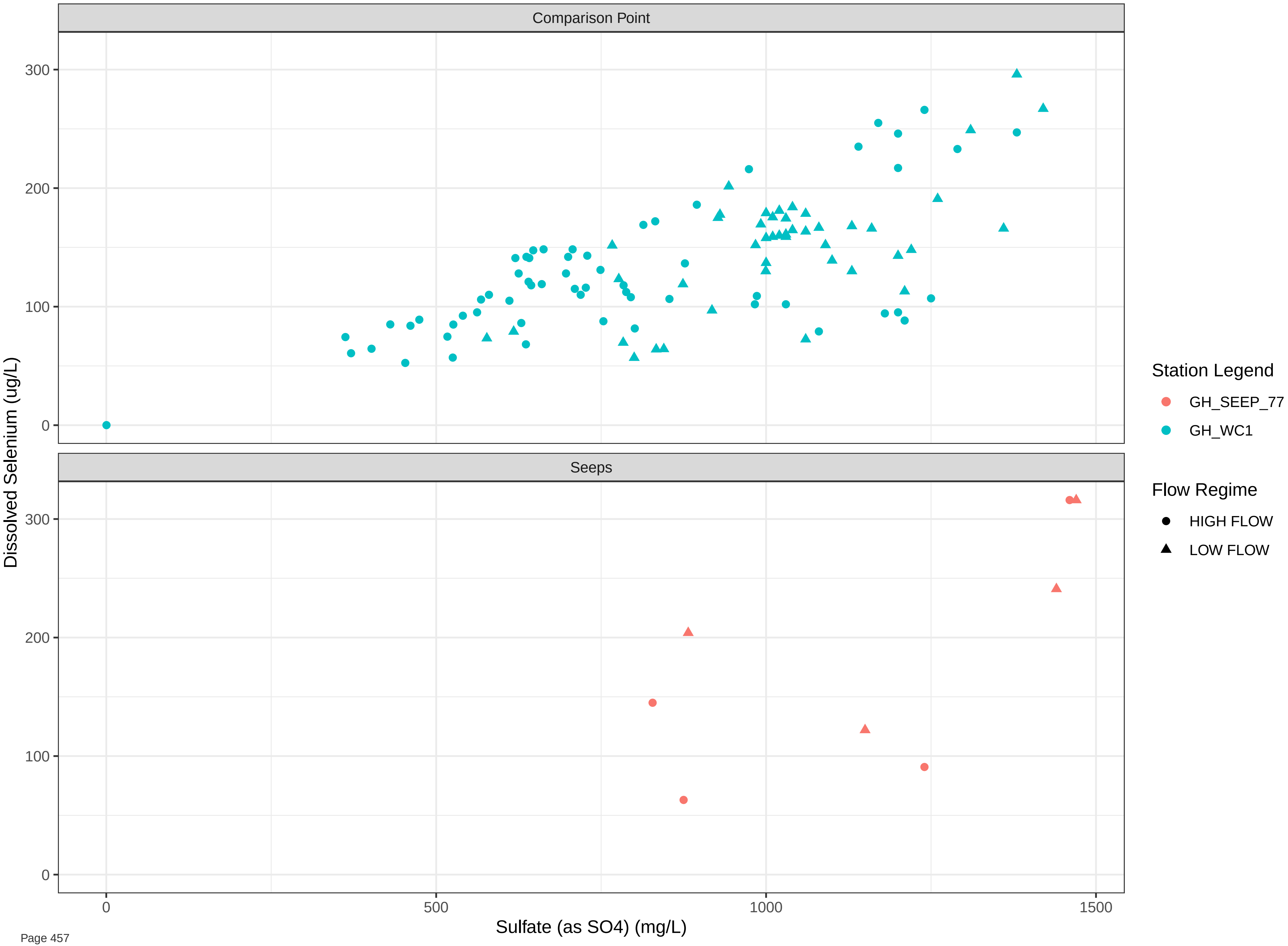

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
200
400
600
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

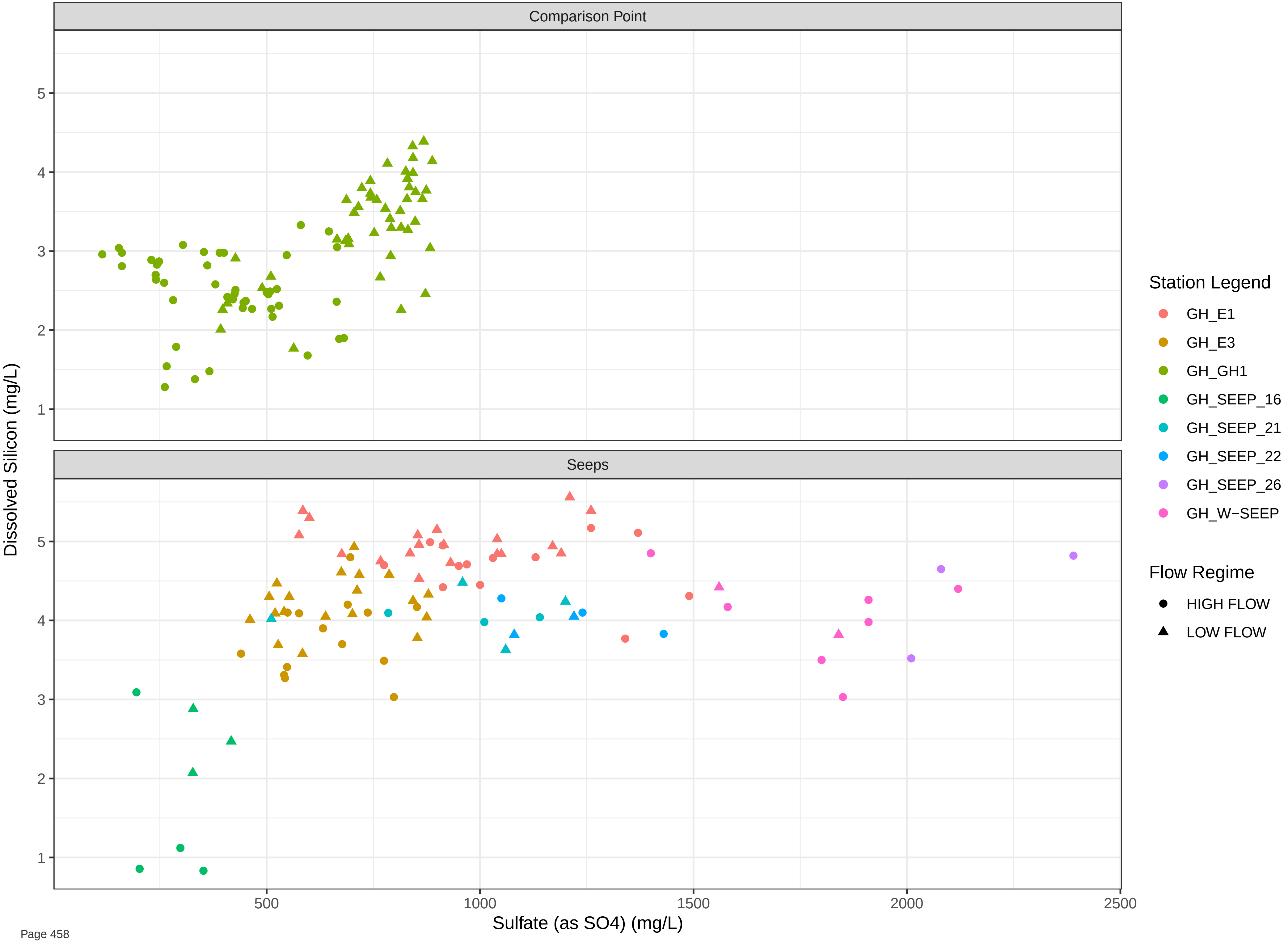


Comparison Point
Seeps
Dissolved Selenium (ug/L)
0
200
400
600
0
200
400
600
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

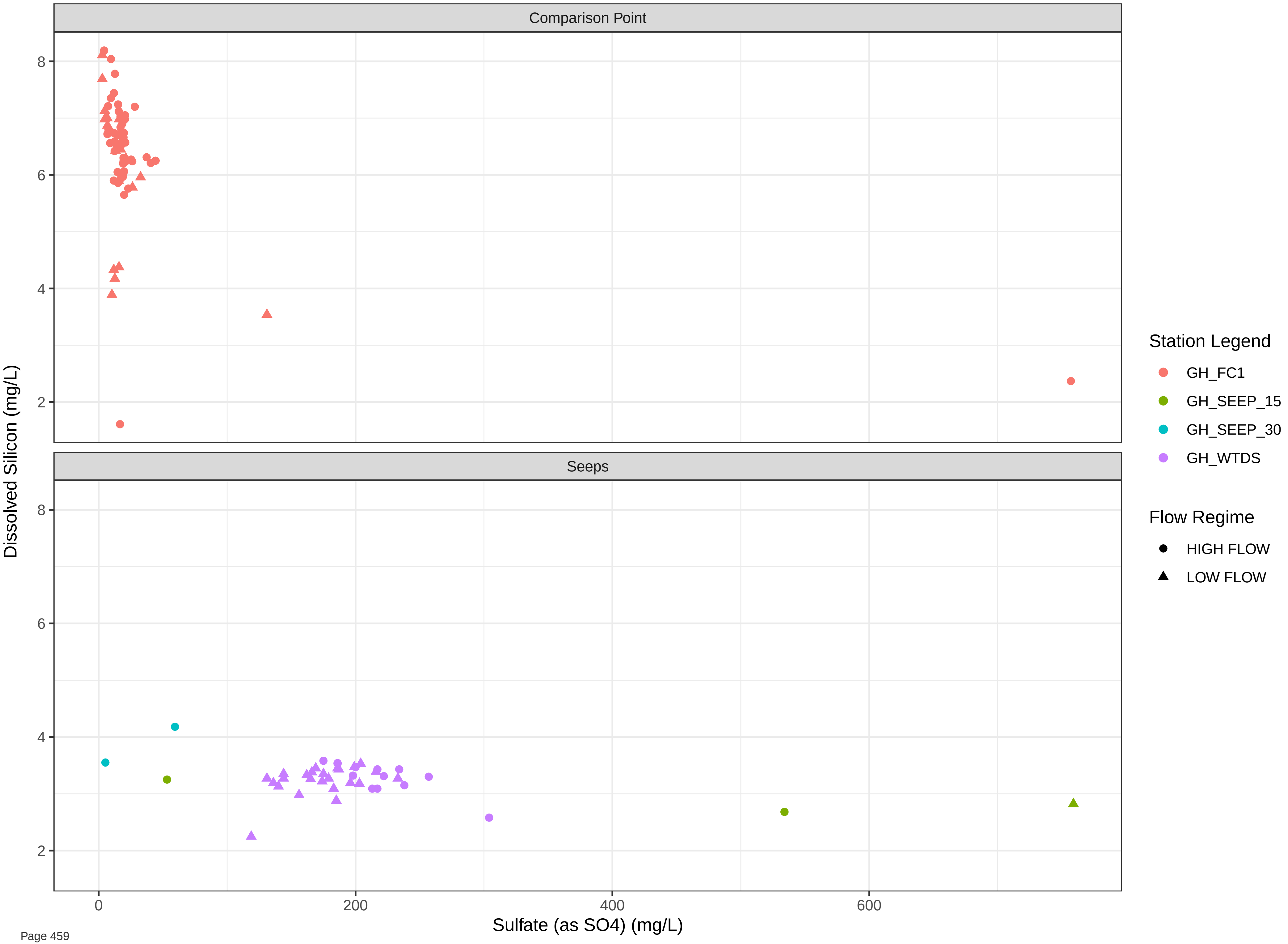


Seeps
Dissolved Selenium (ug/L)
1.0
0.5
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

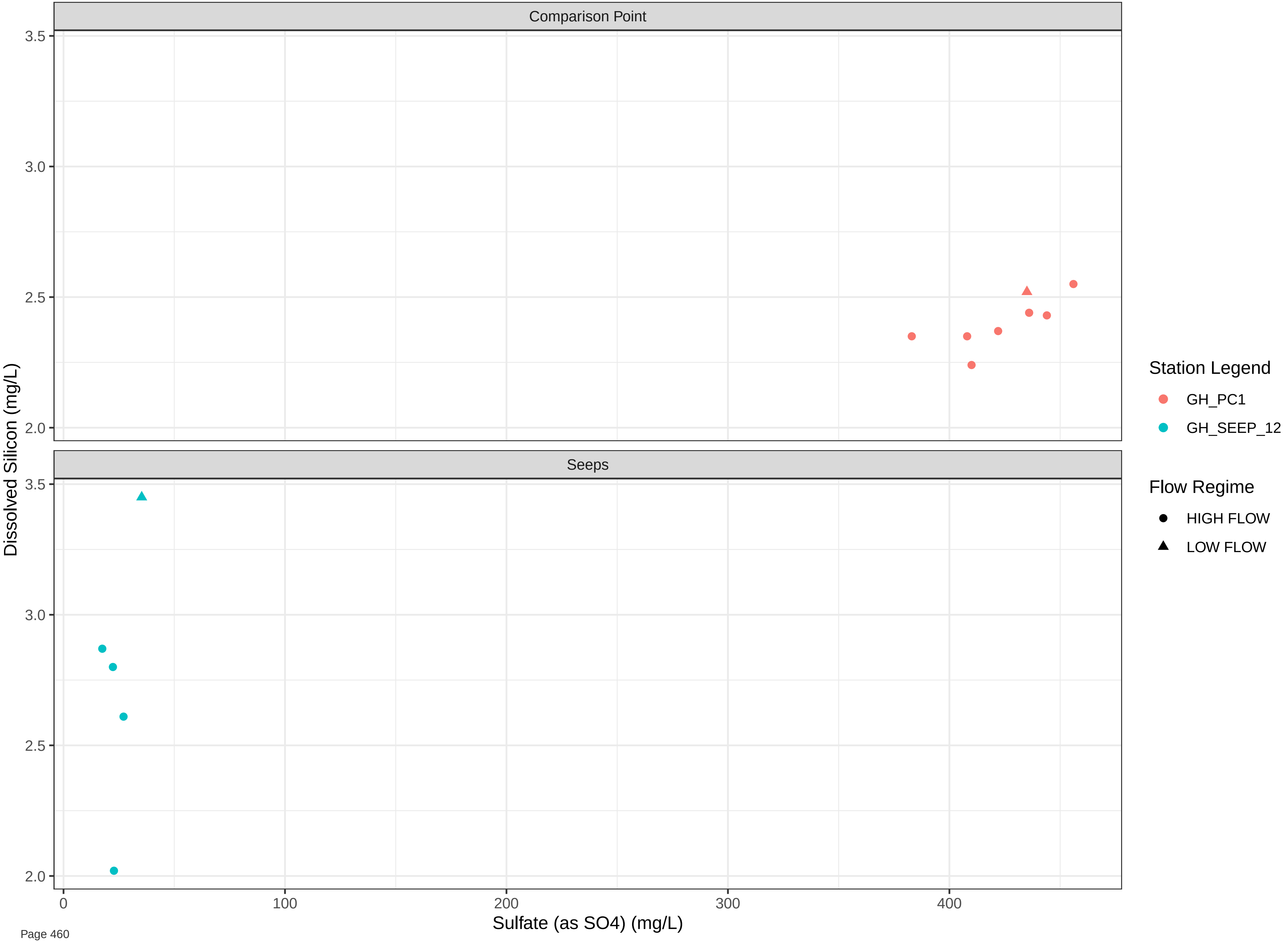

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



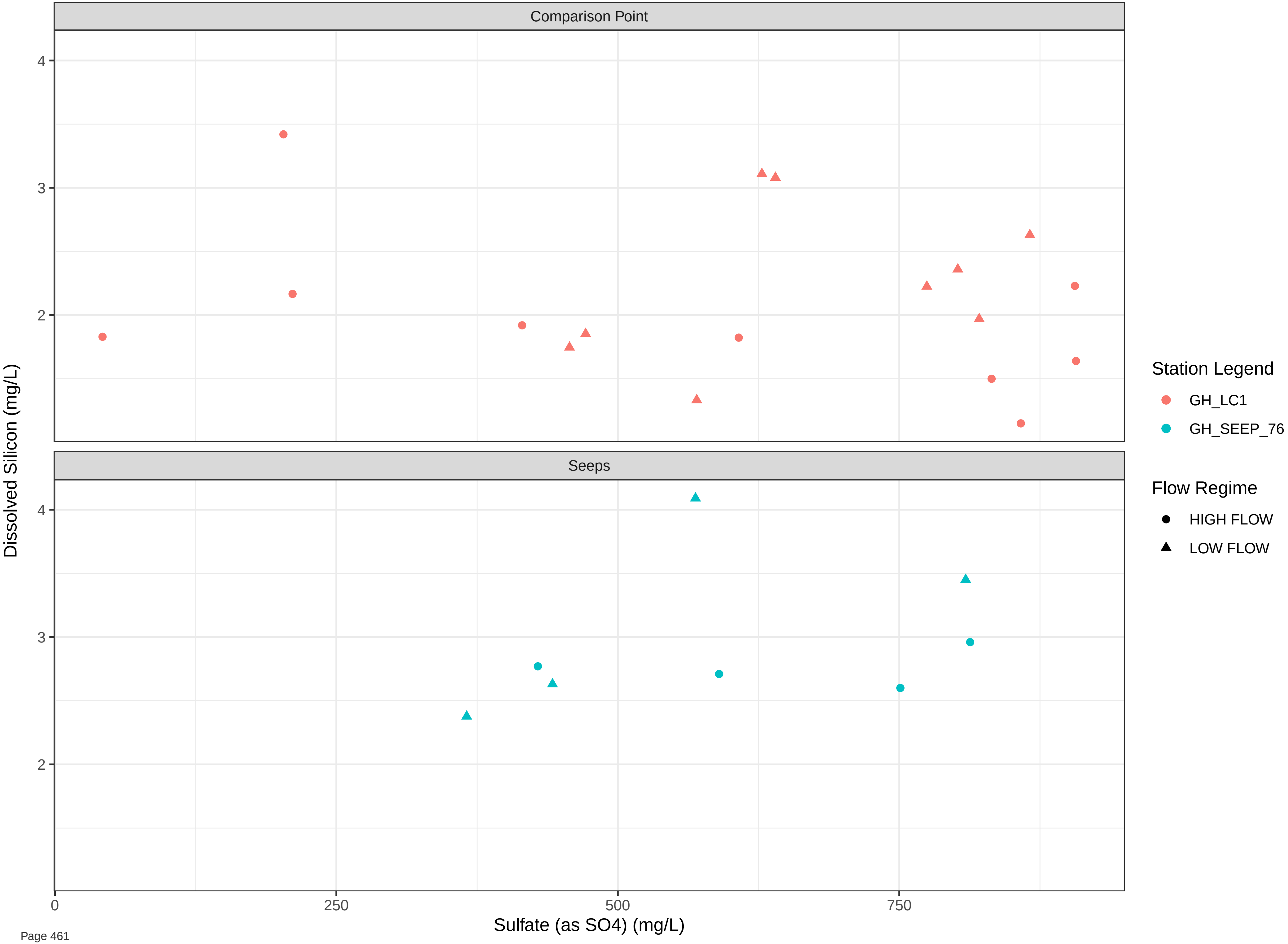
Comparison Point
Seeps
Dissolved Silicon (mg/L)
1
2
3
4
5
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

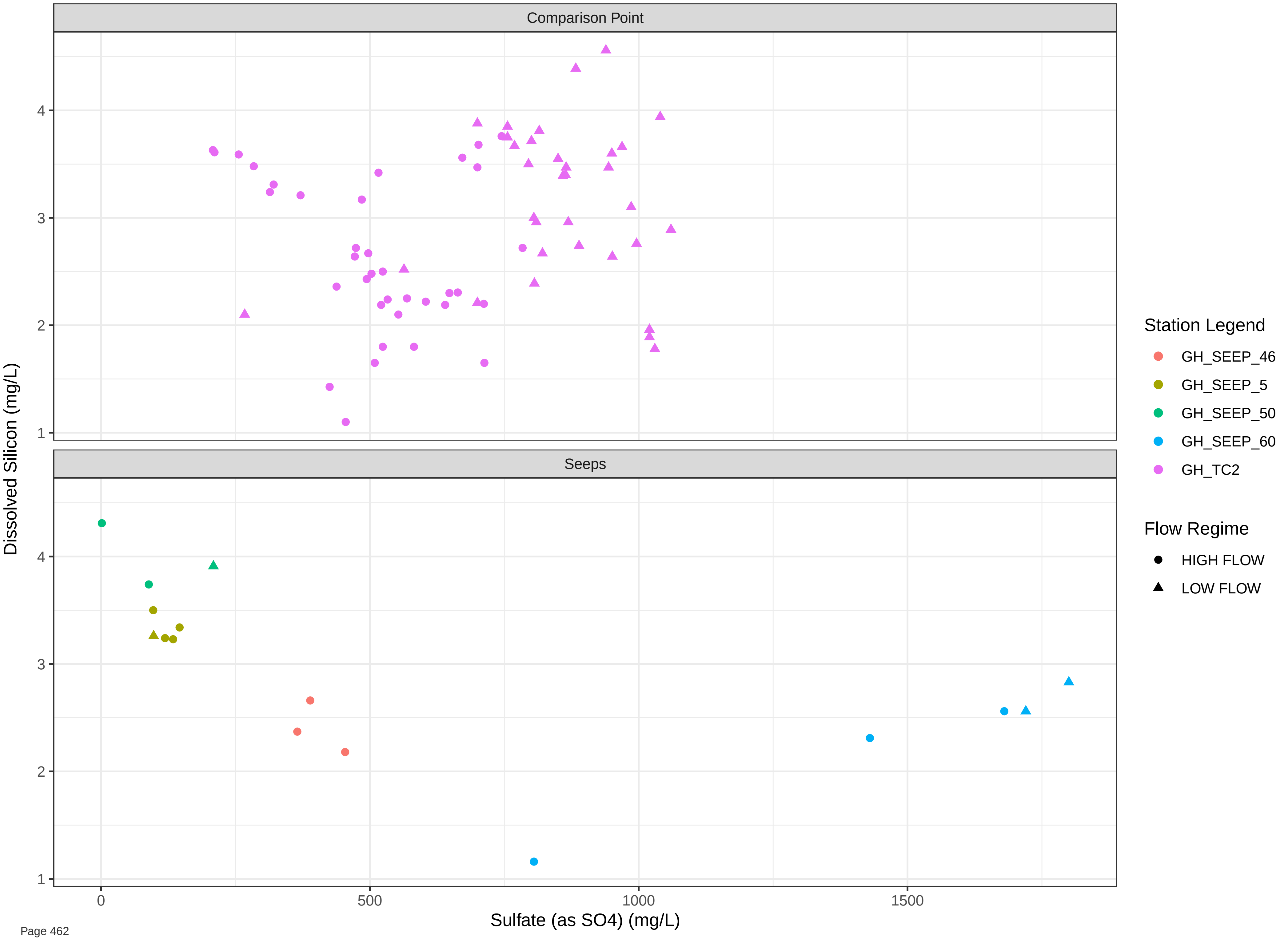


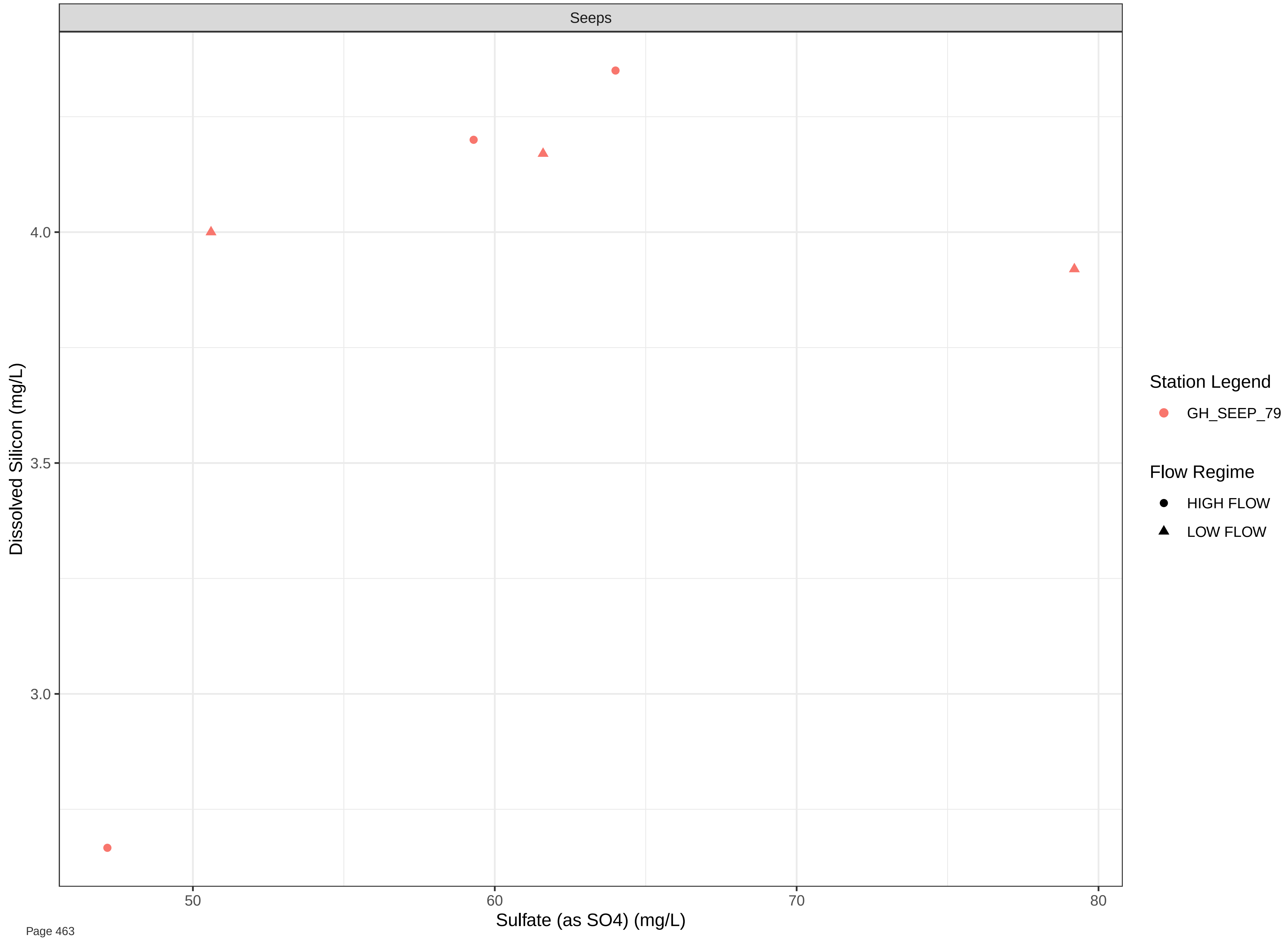
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
8
6
4
2
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

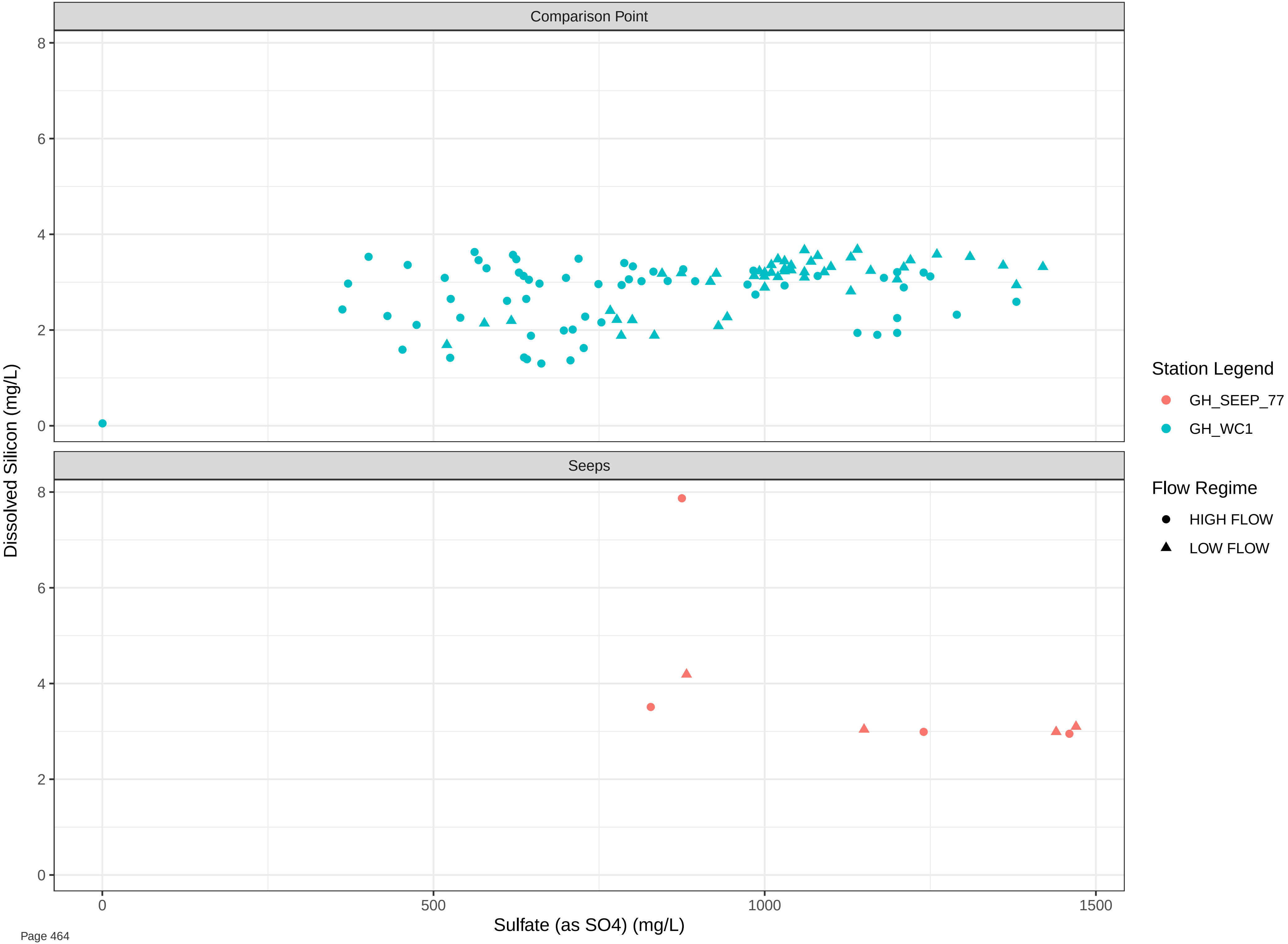


Comparison Point
Seeps
3.5
3.0
2.5
2.0
0
100
200
300
400
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

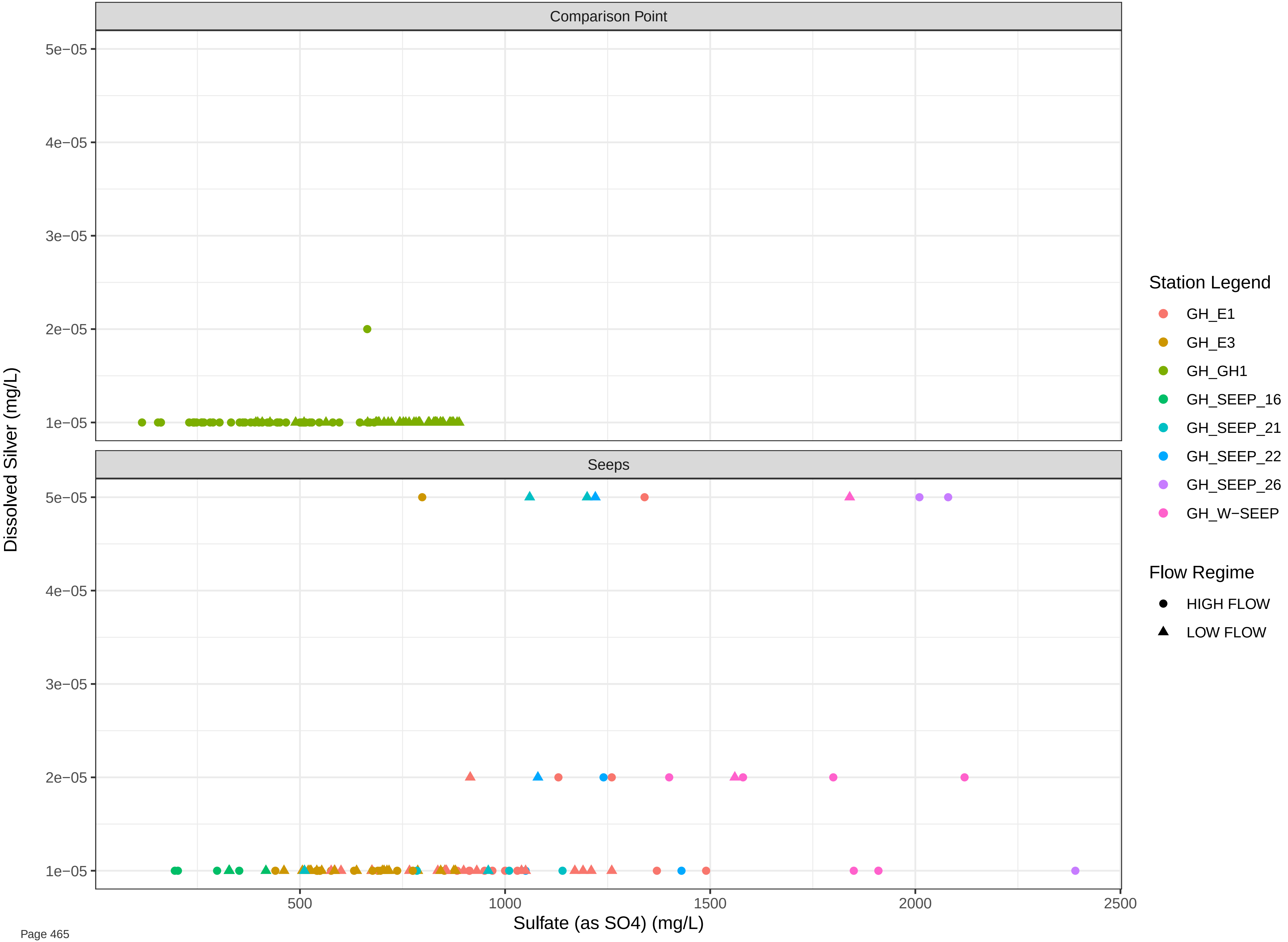

Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
4
3
2
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
1
2
3
4
0
500
1000
1500
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

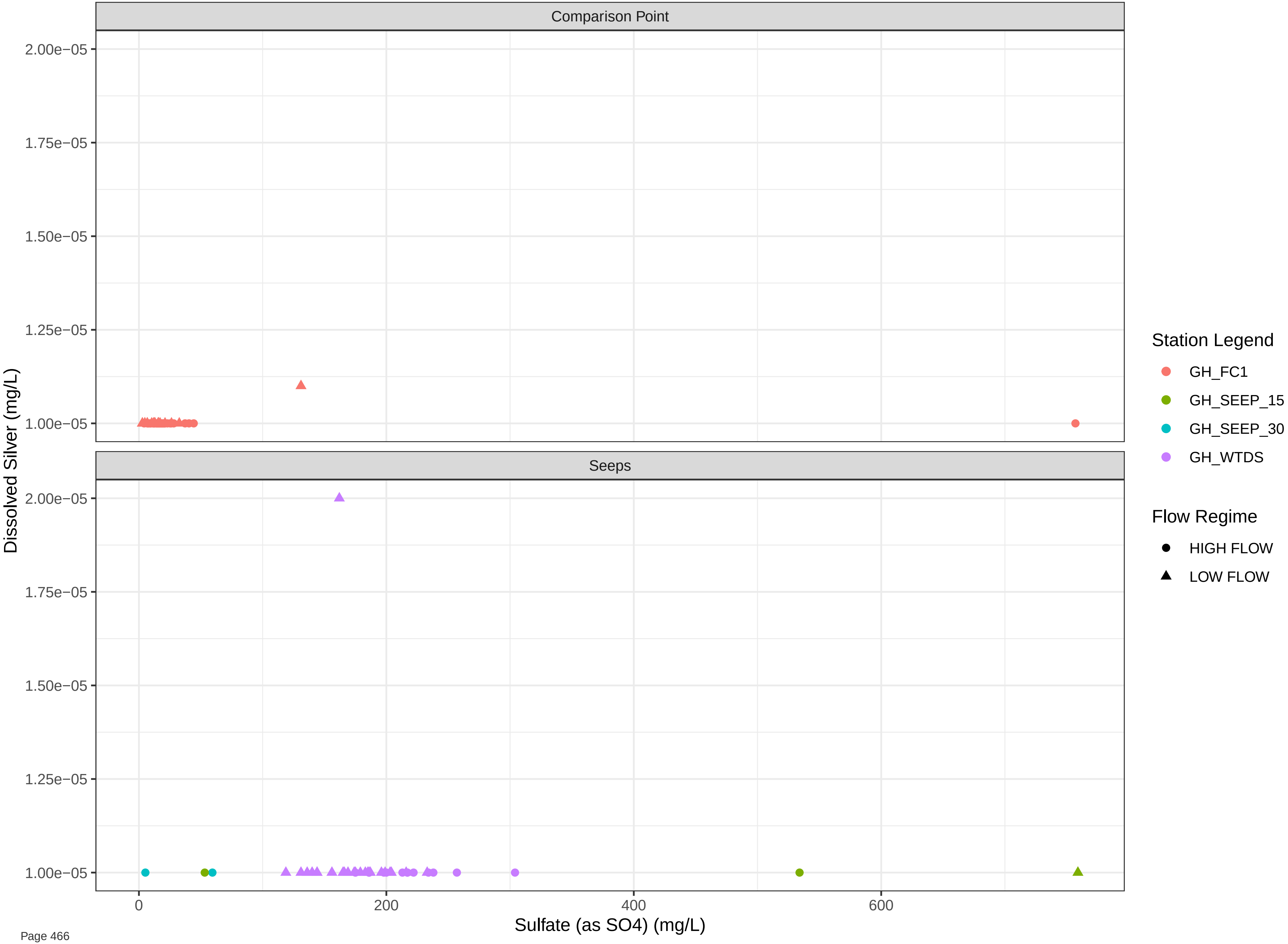

Seeps
Dissolved Silicon (mg/L)
4.0
3.5
3.0
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



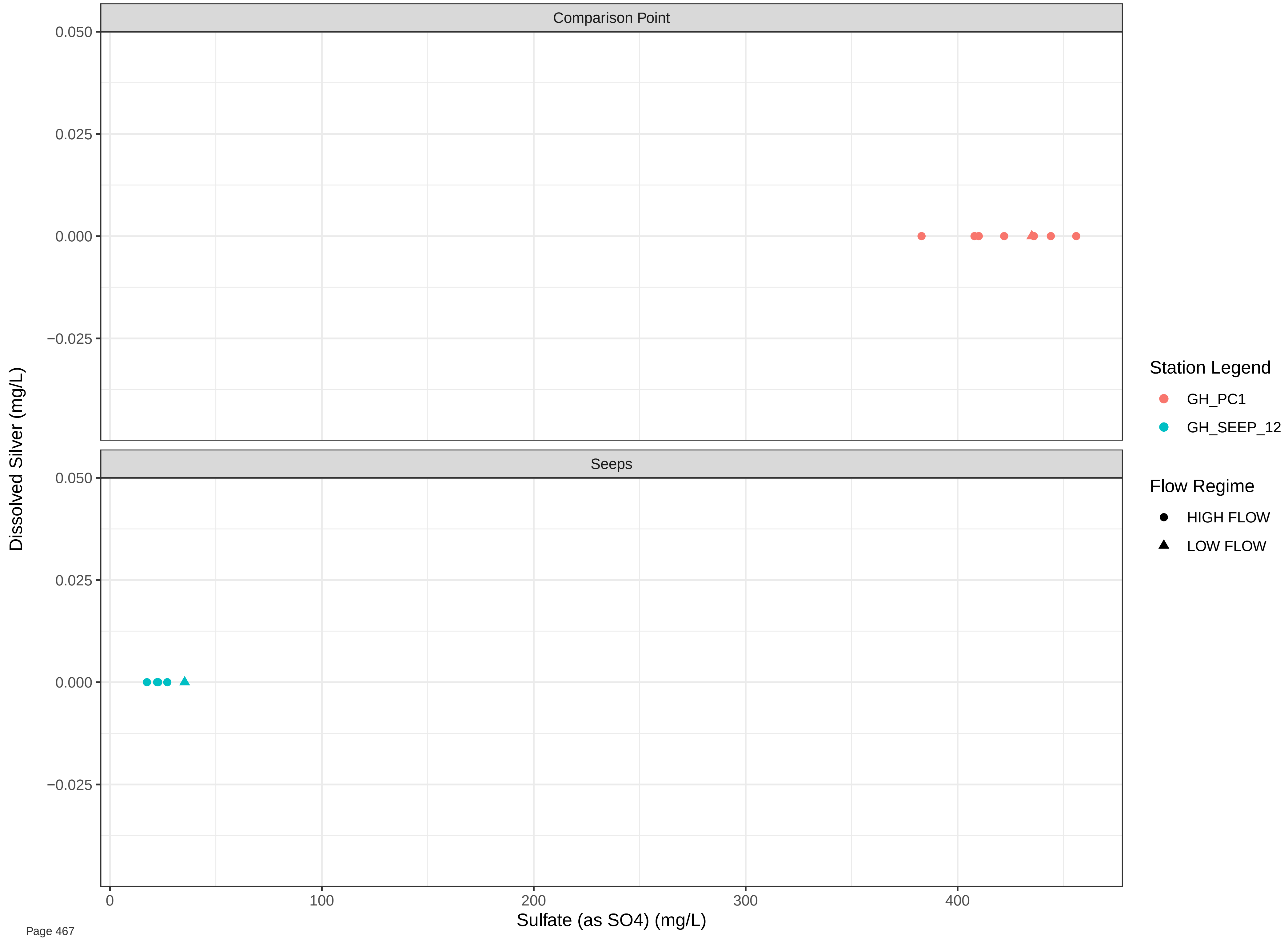
Comparison Point
Seeps
Dissolved Silicon (mg/L)
0
2
4
6
8
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



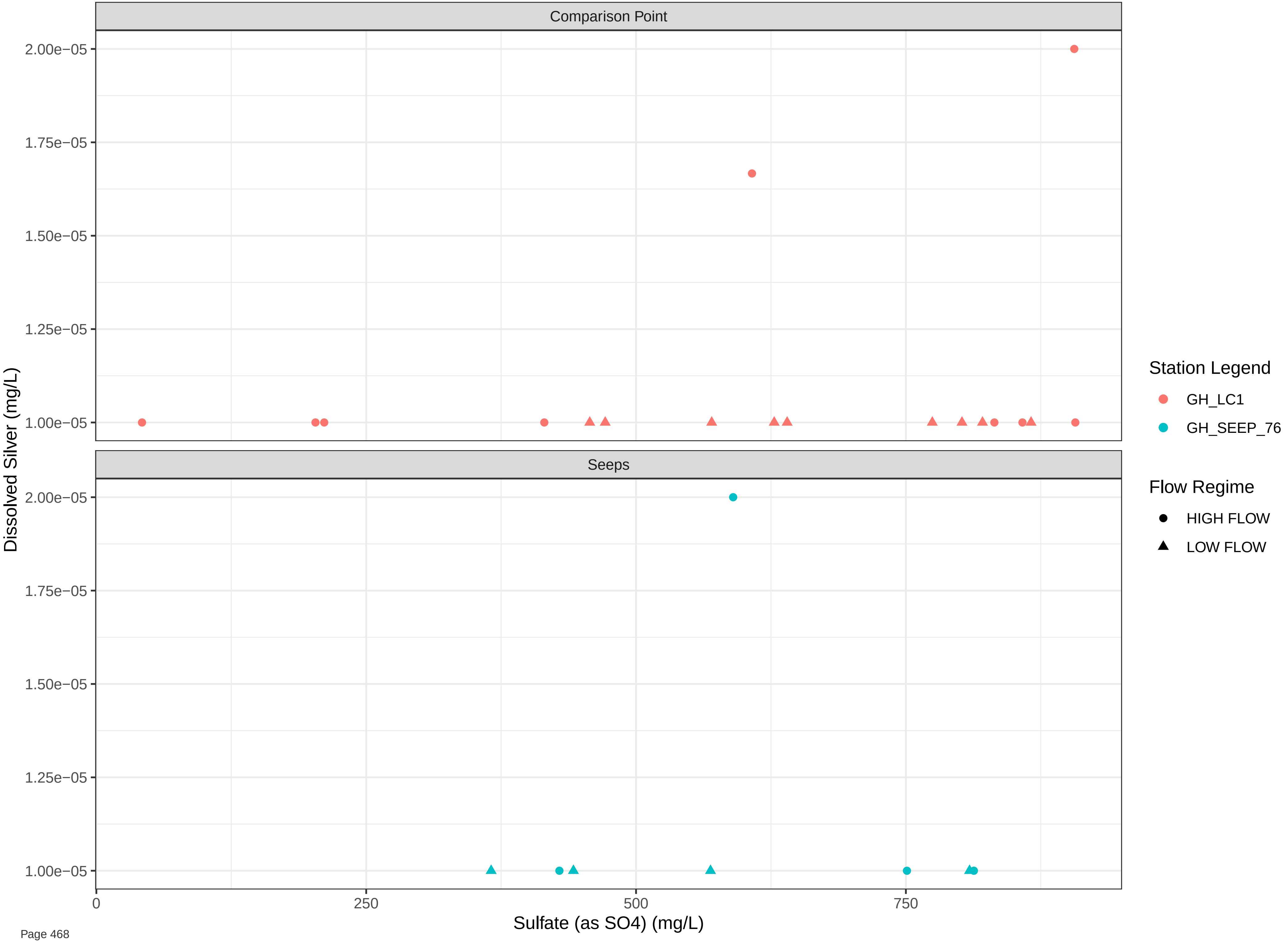
Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



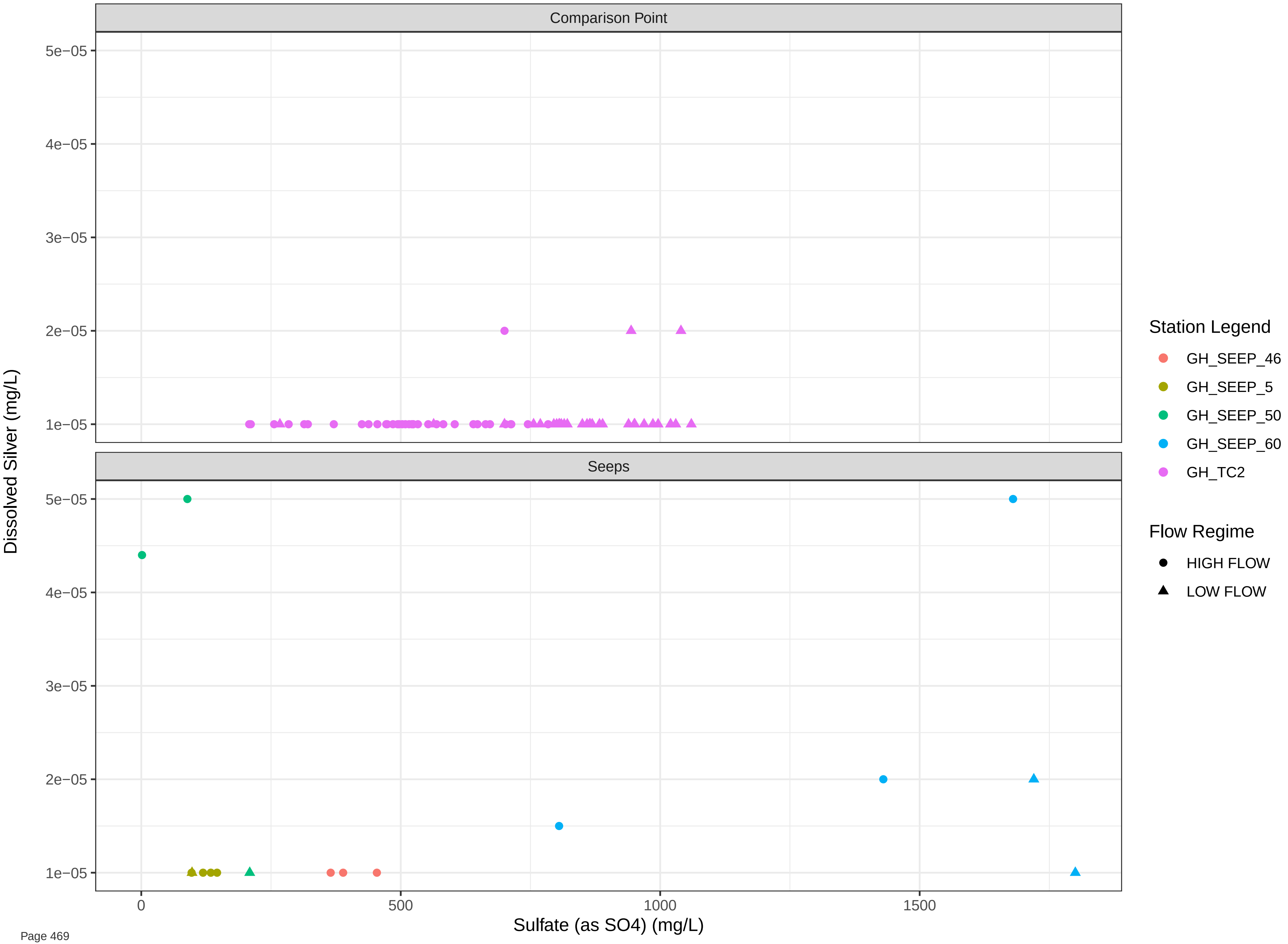
Comparison Point
Seeps
Dissolved Silver (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

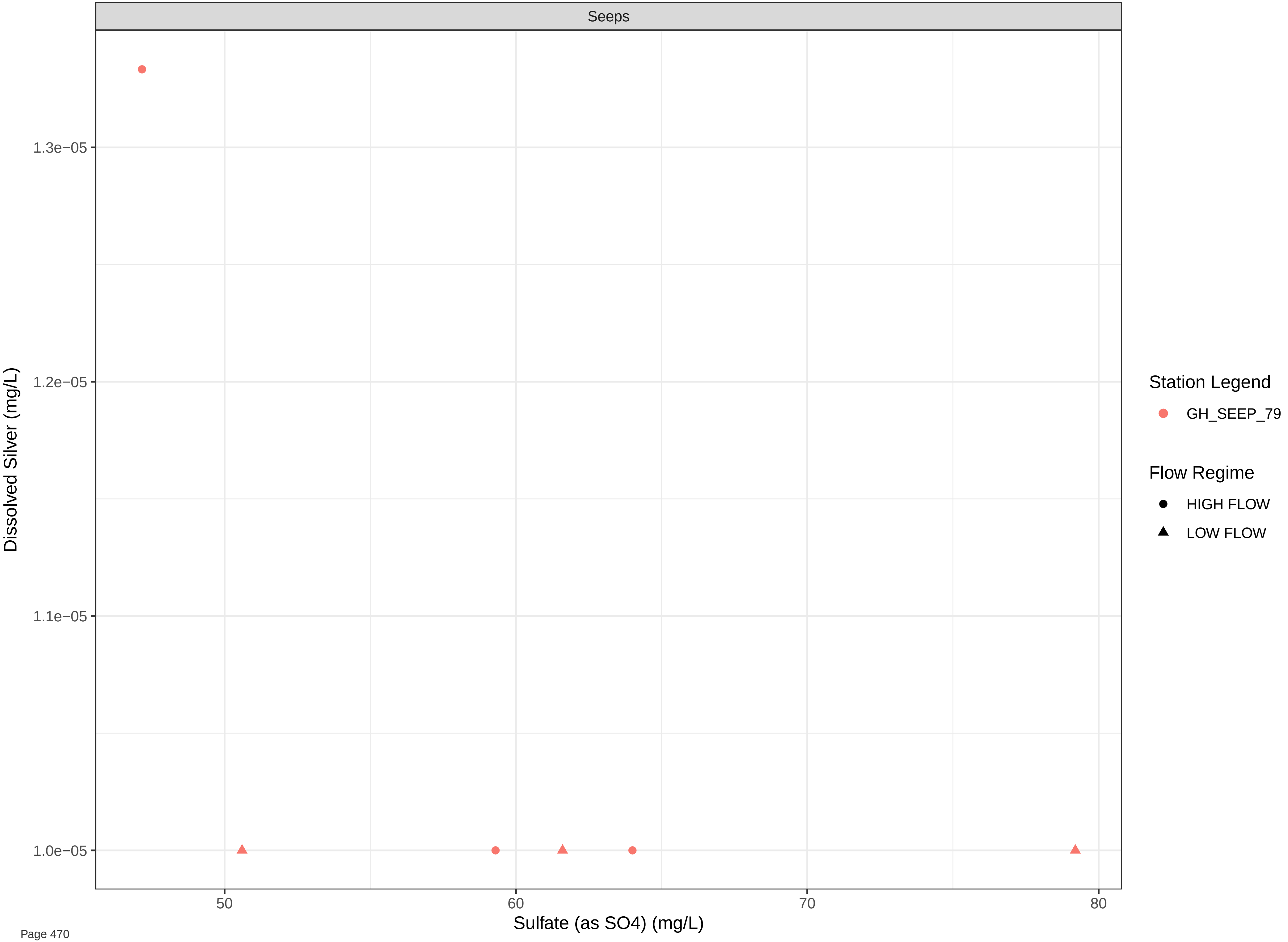


Comparison Point
Seeps
0.050
0.025
0.000
−0.025
Dissolved Silver (mg/L)
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

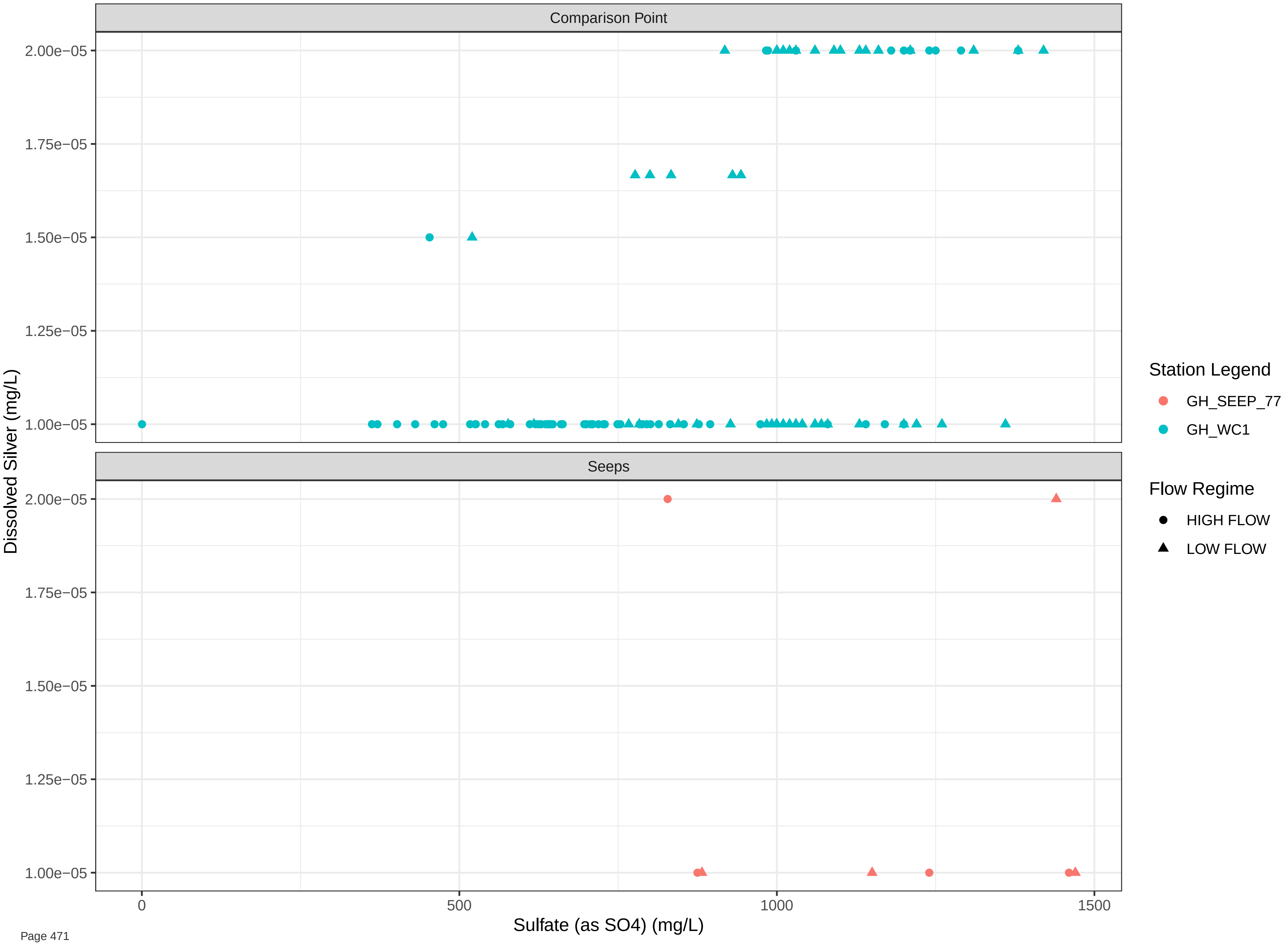


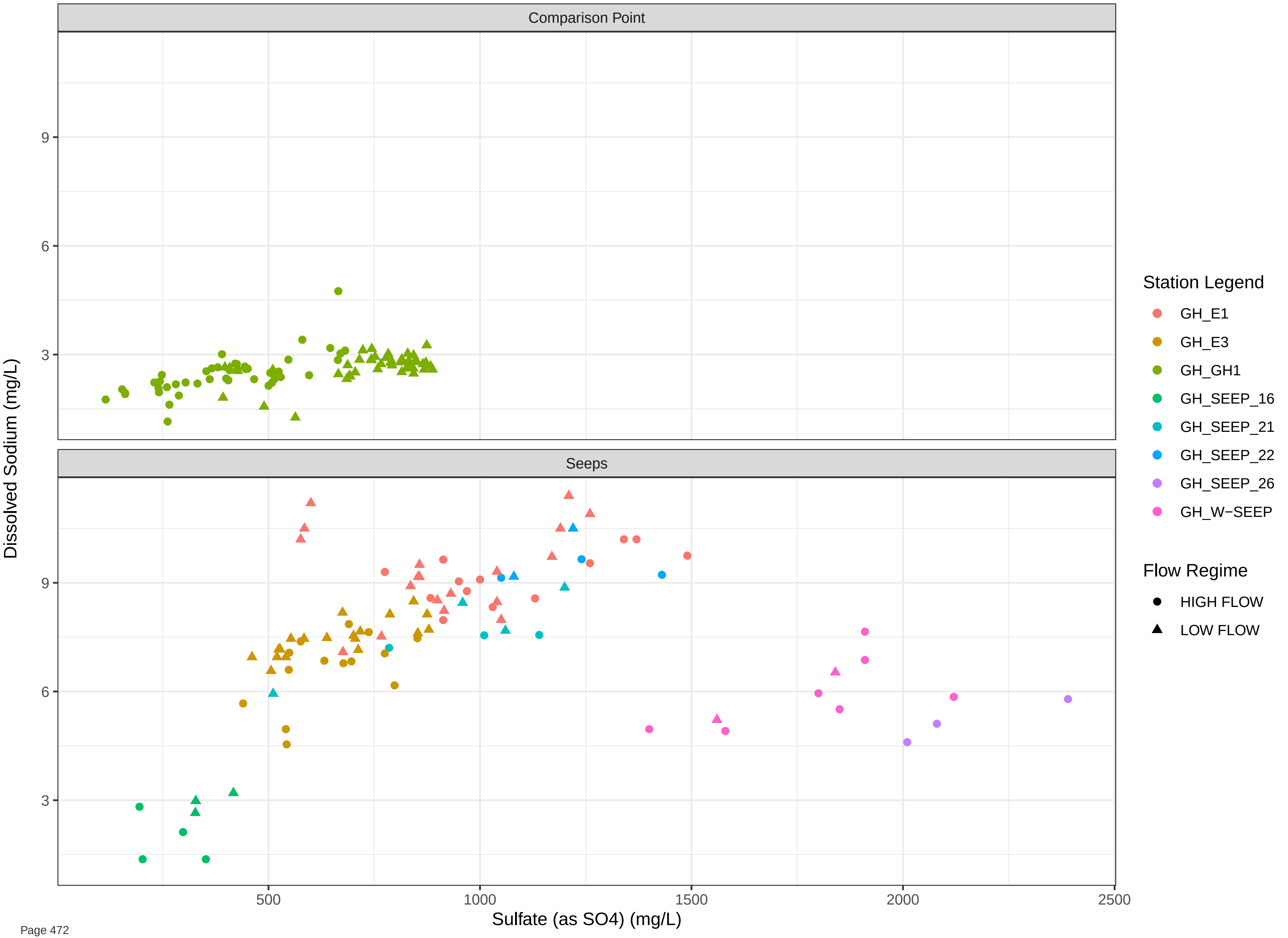
Comparison Point
Seeps
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
Dissolved Silver (mg/L)
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

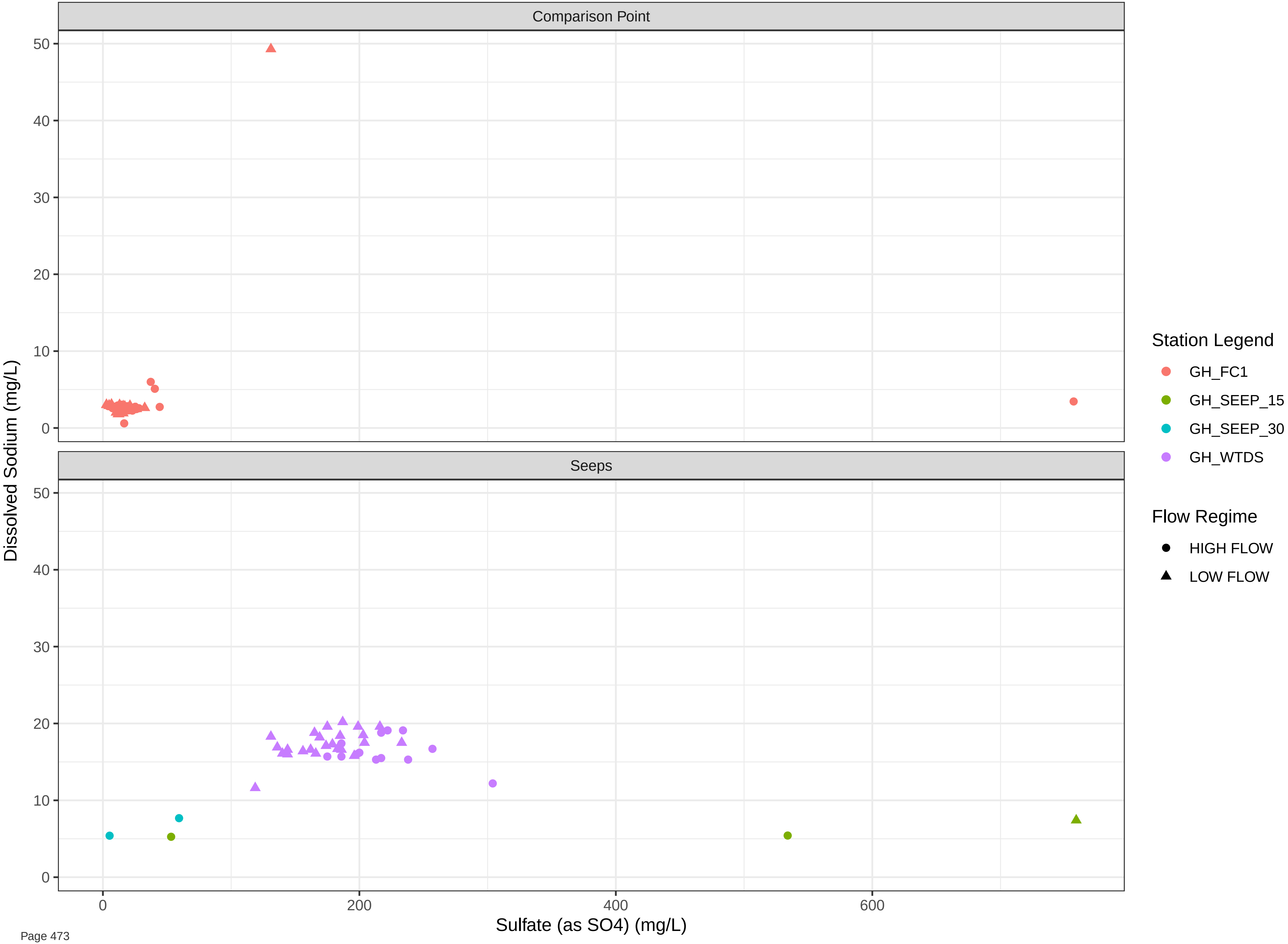


Seeps
Dissolved Silver (mg/L)
1.3e−05
1.2e−05
1.1e−05
1.0e−05
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

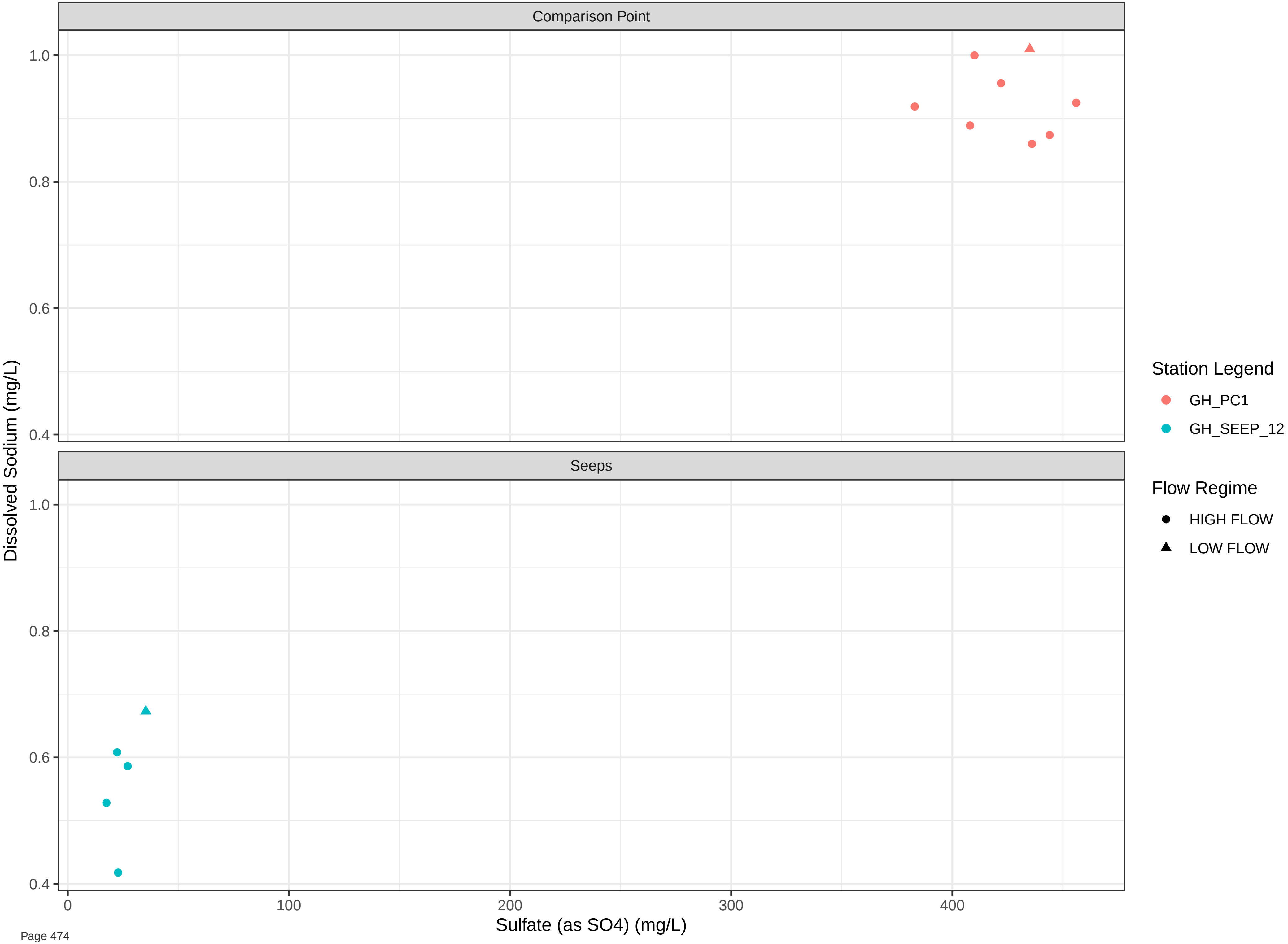

Comparison Point
Seeps
Dissolved Silver (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



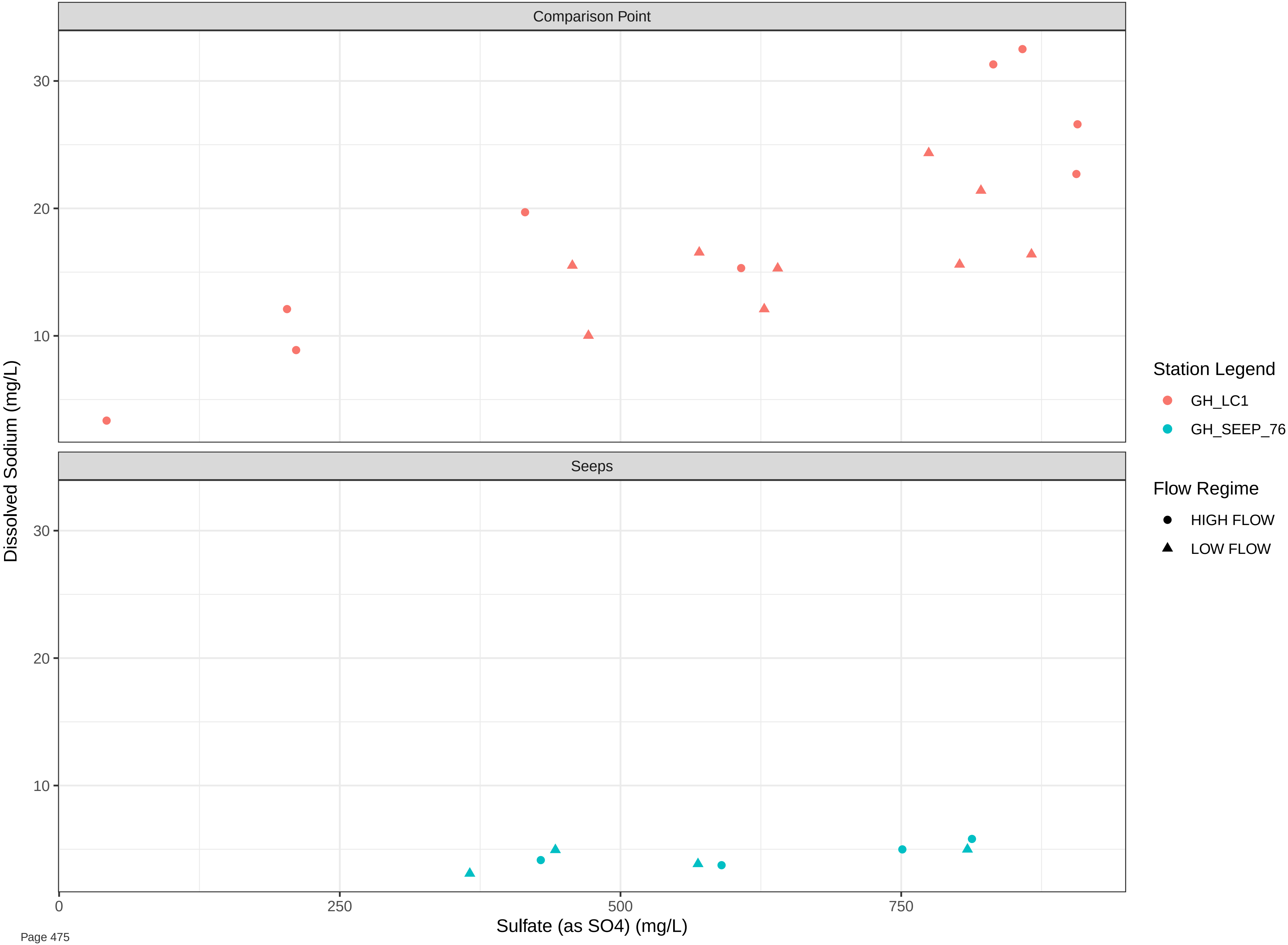
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
9
6
3
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

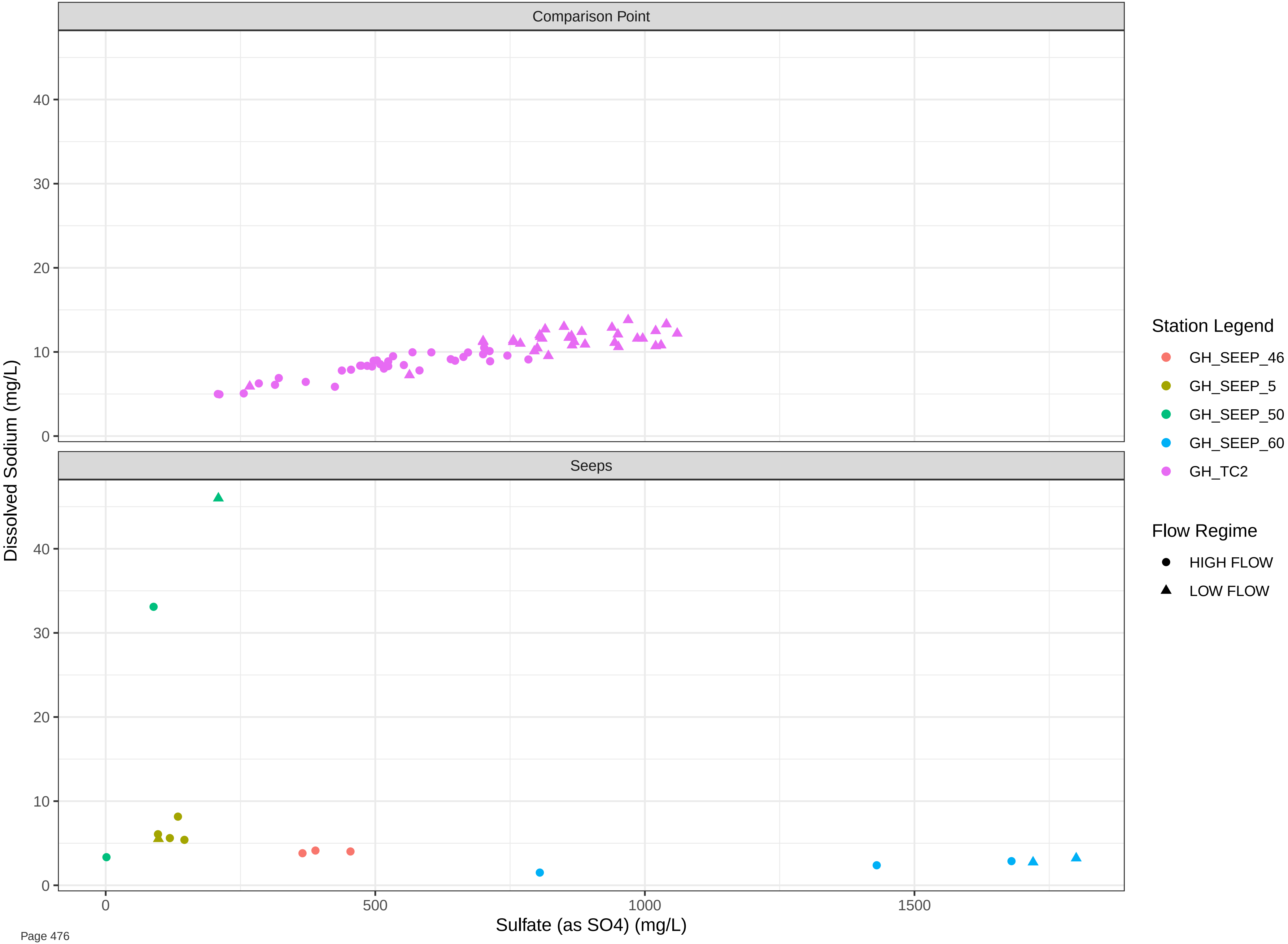


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
40
50
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

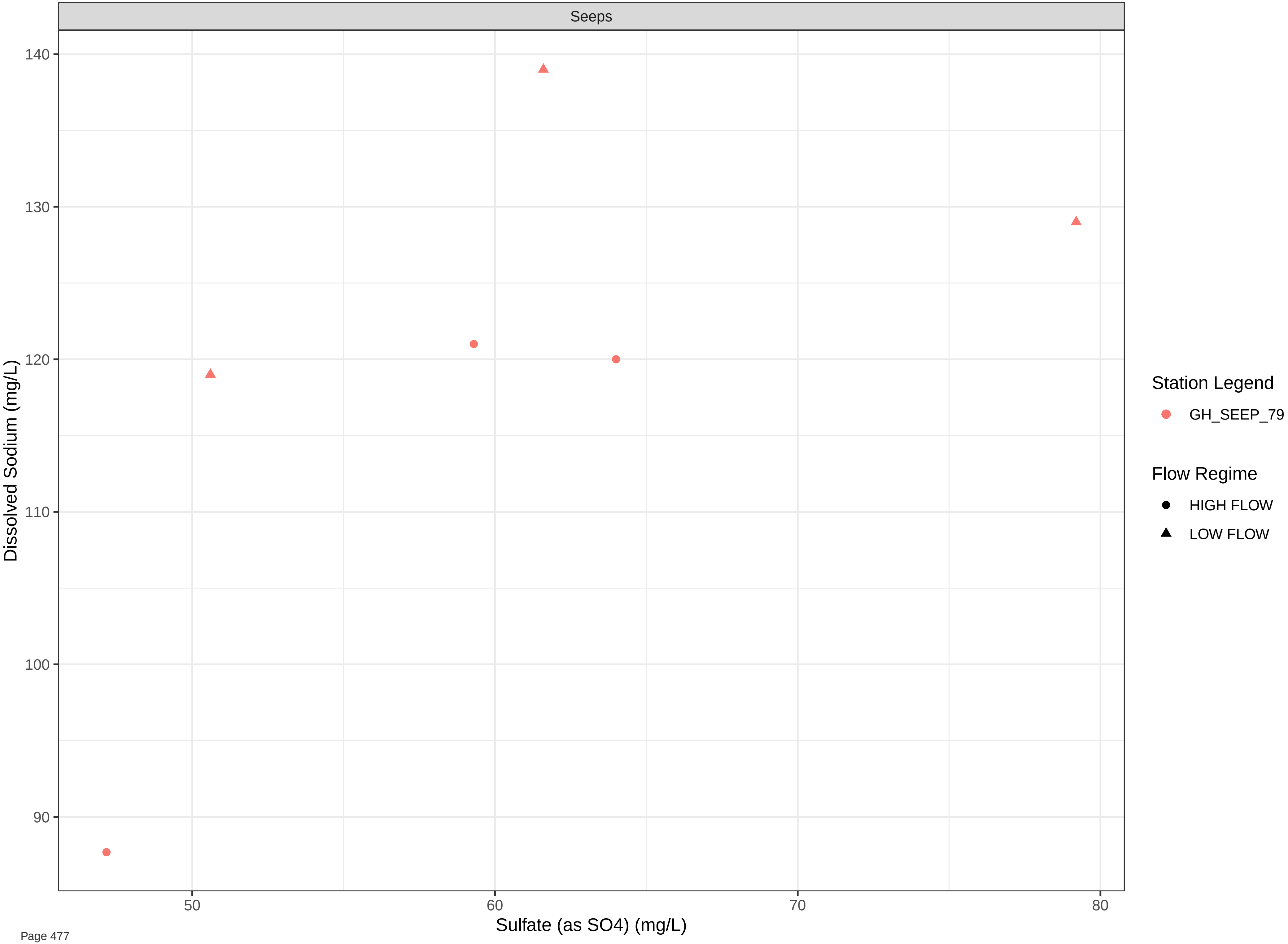


Comparison Point
Seeps
Dissolved Sodium (mg/L)
1.0
0.8
0.6
0.4
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

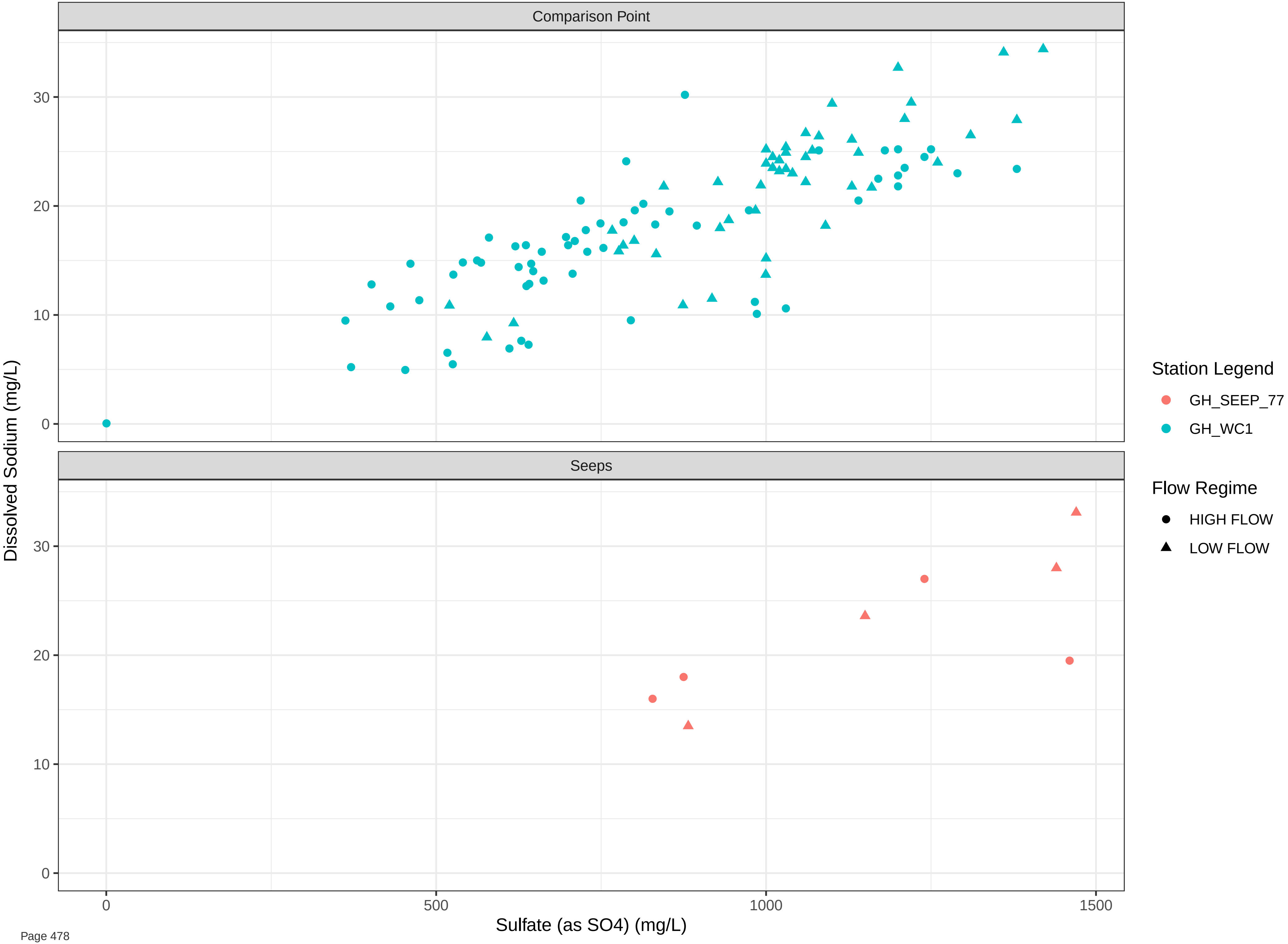

Comparison Point
Seeps
Dissolved Sodium (mg/L)
30
20
10
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



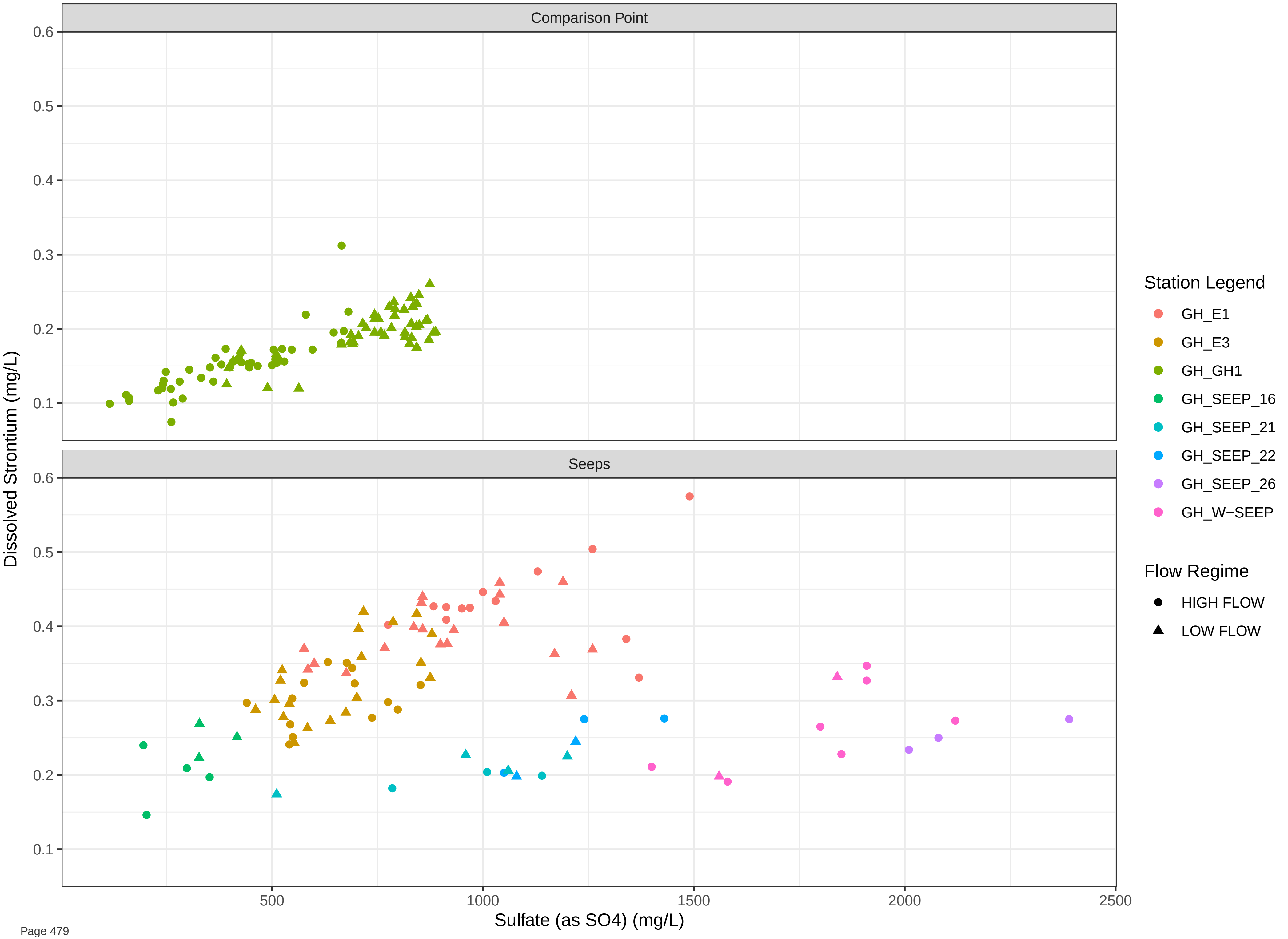
Comparison Point
Seeps
Dissolved Sodium (mg/L)
0
10
20
30
40
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

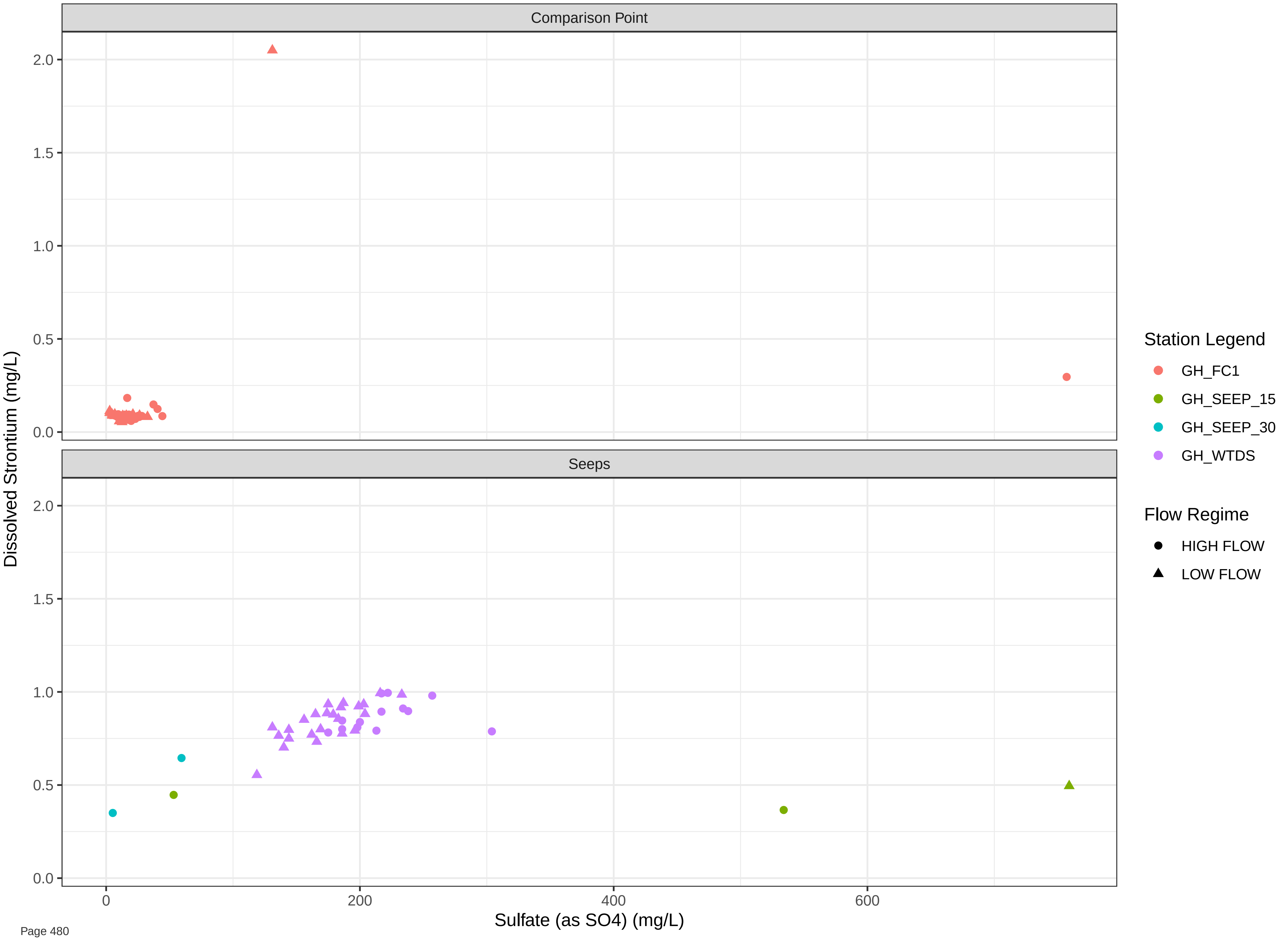


Seeps
140
130
120
110
100
90
50
60
70
80
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

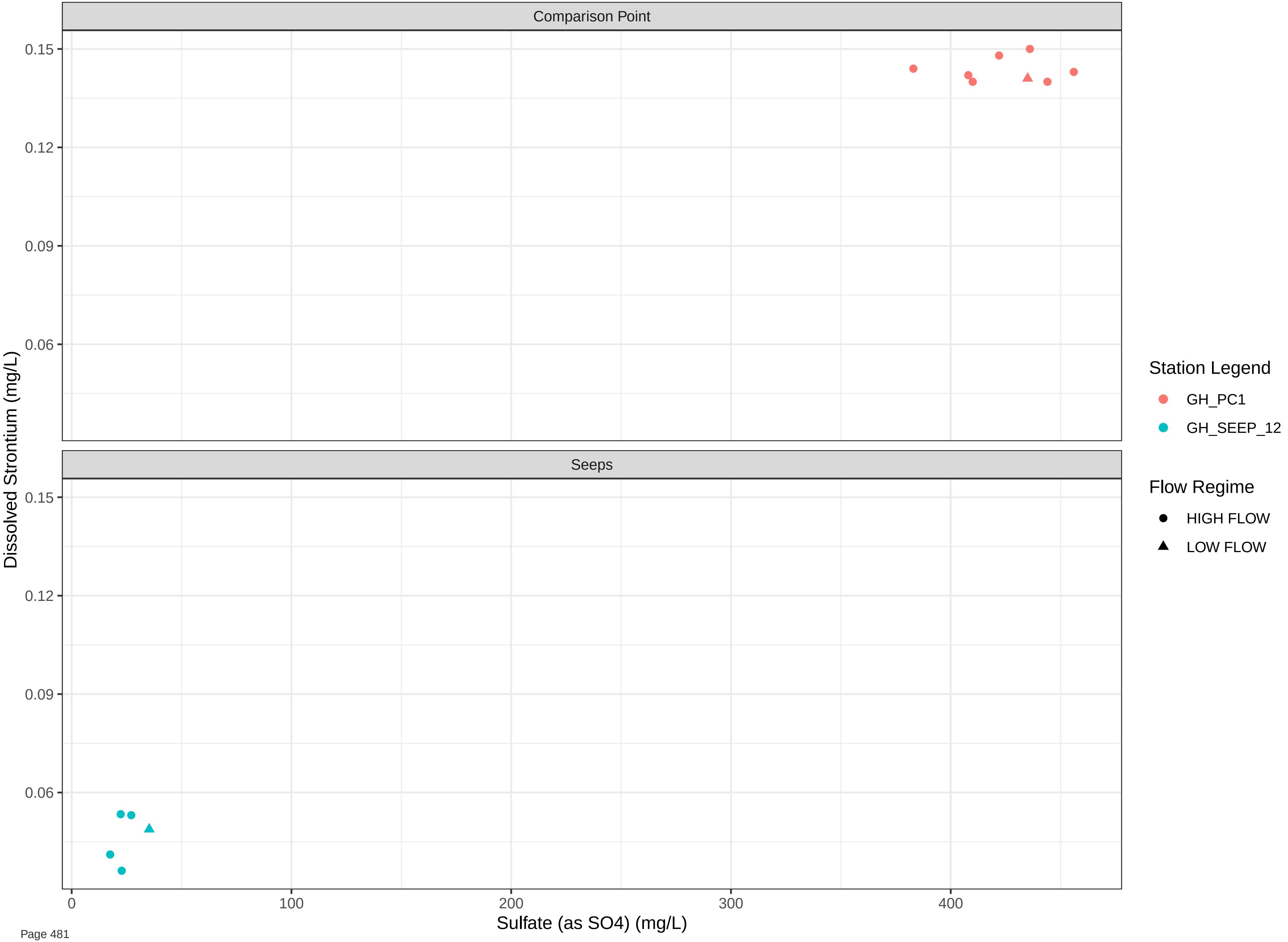


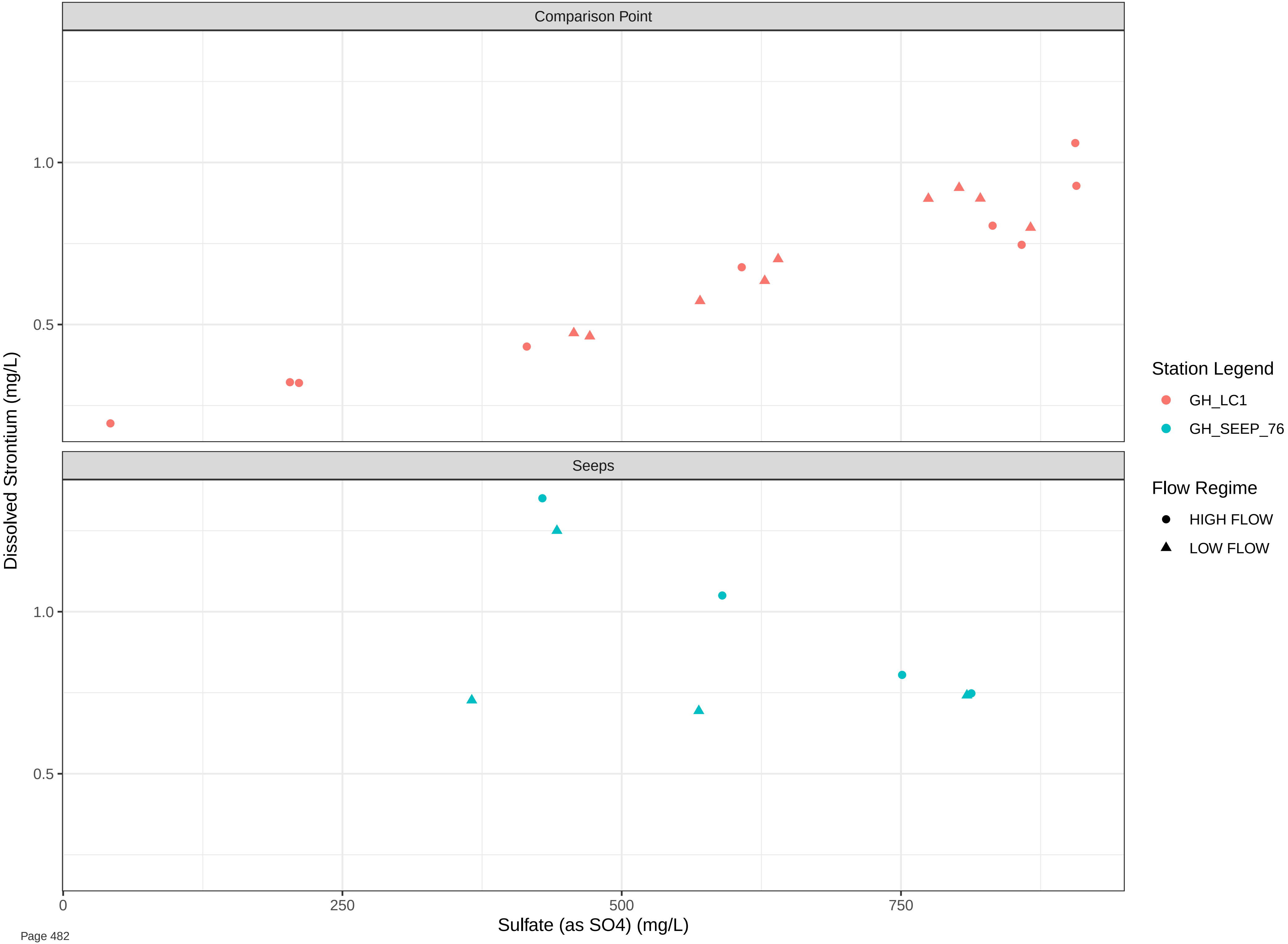
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0.1
0.2
0.3
0.4
0.5
0.6
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

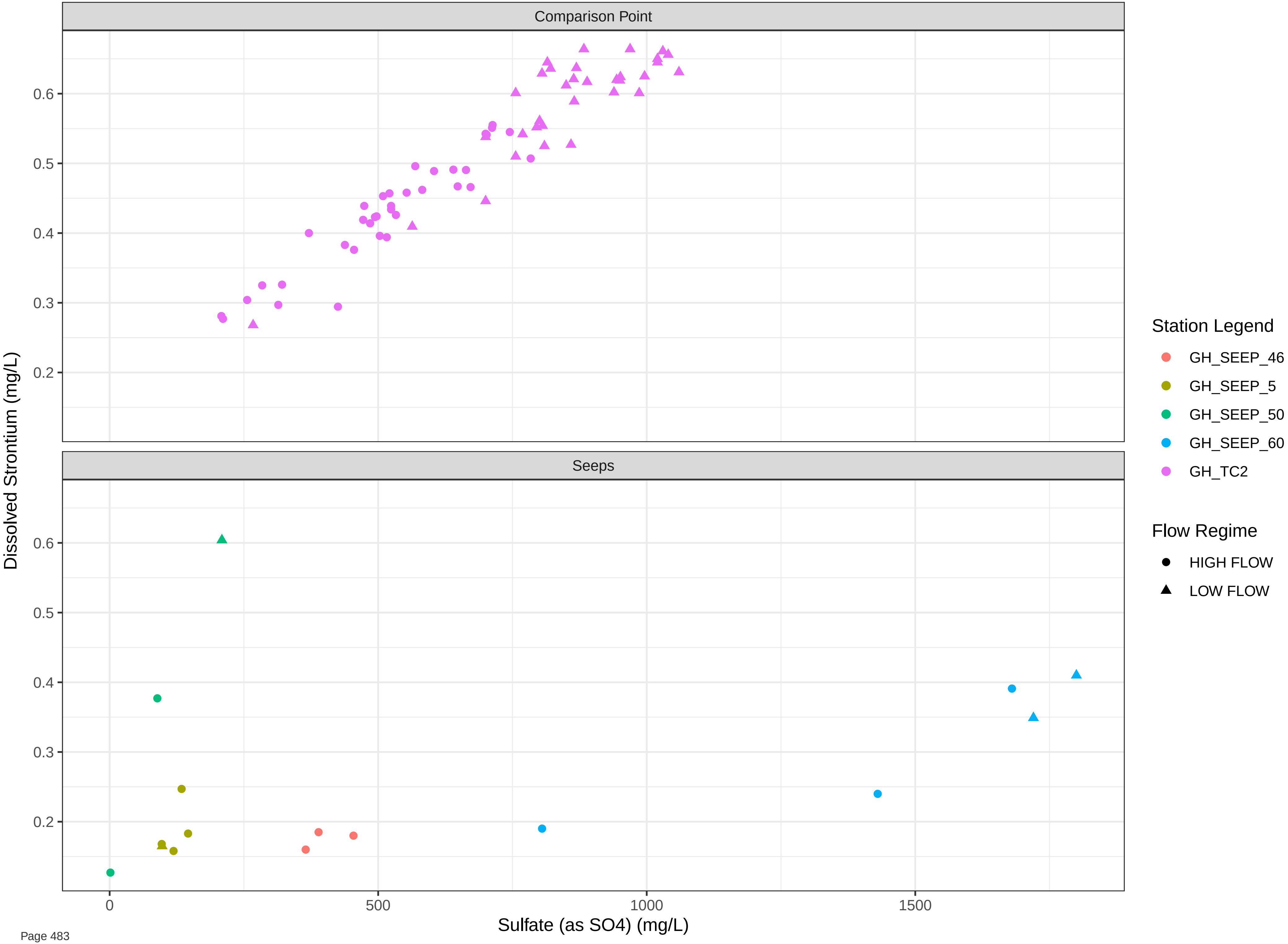


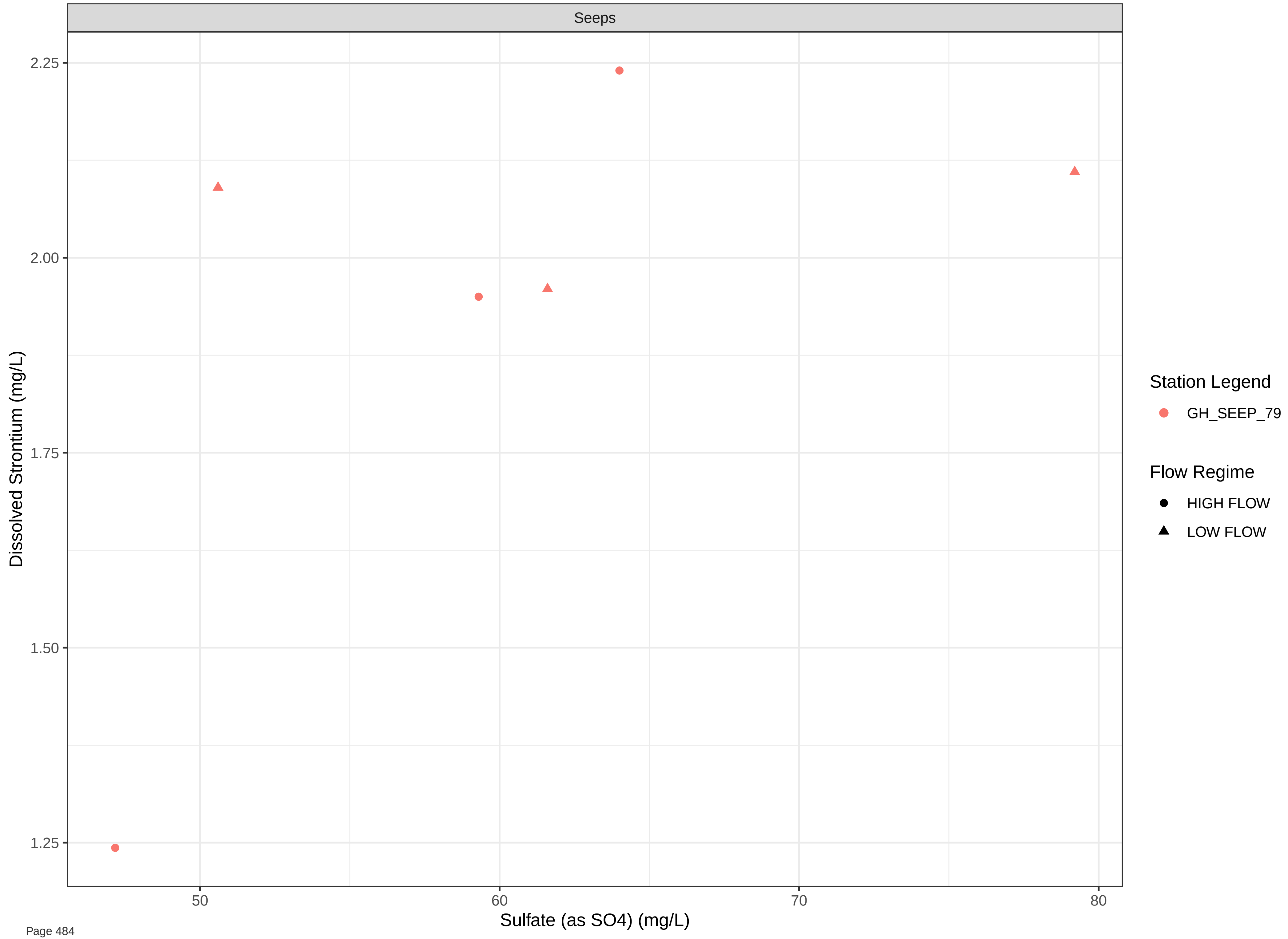
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.0
0.5
1.0
1.5
2.0
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

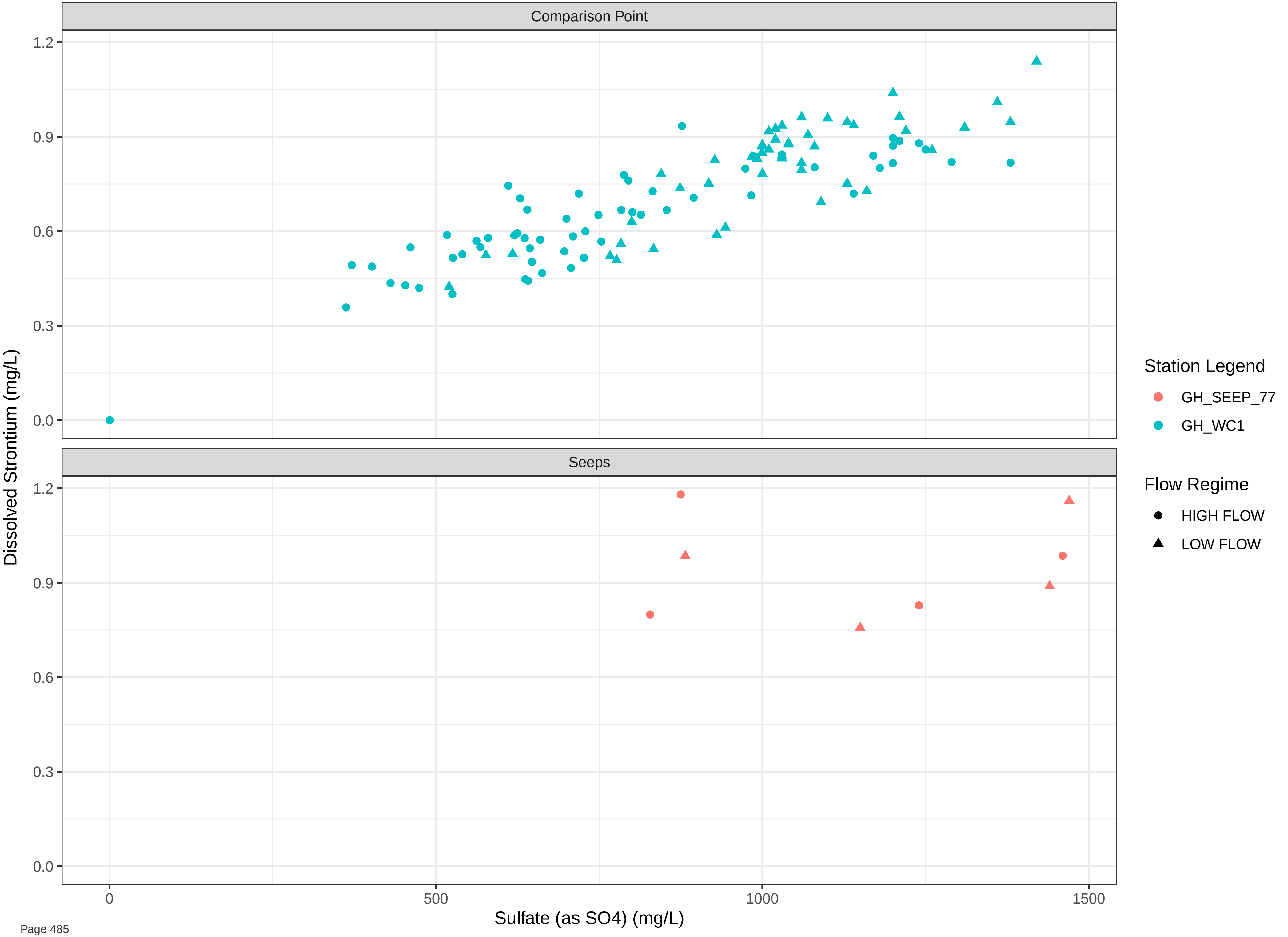

Comparison Point
Seeps
0.15
0.12
0.09
0.06
Dissolved Strontium (mg/L)
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



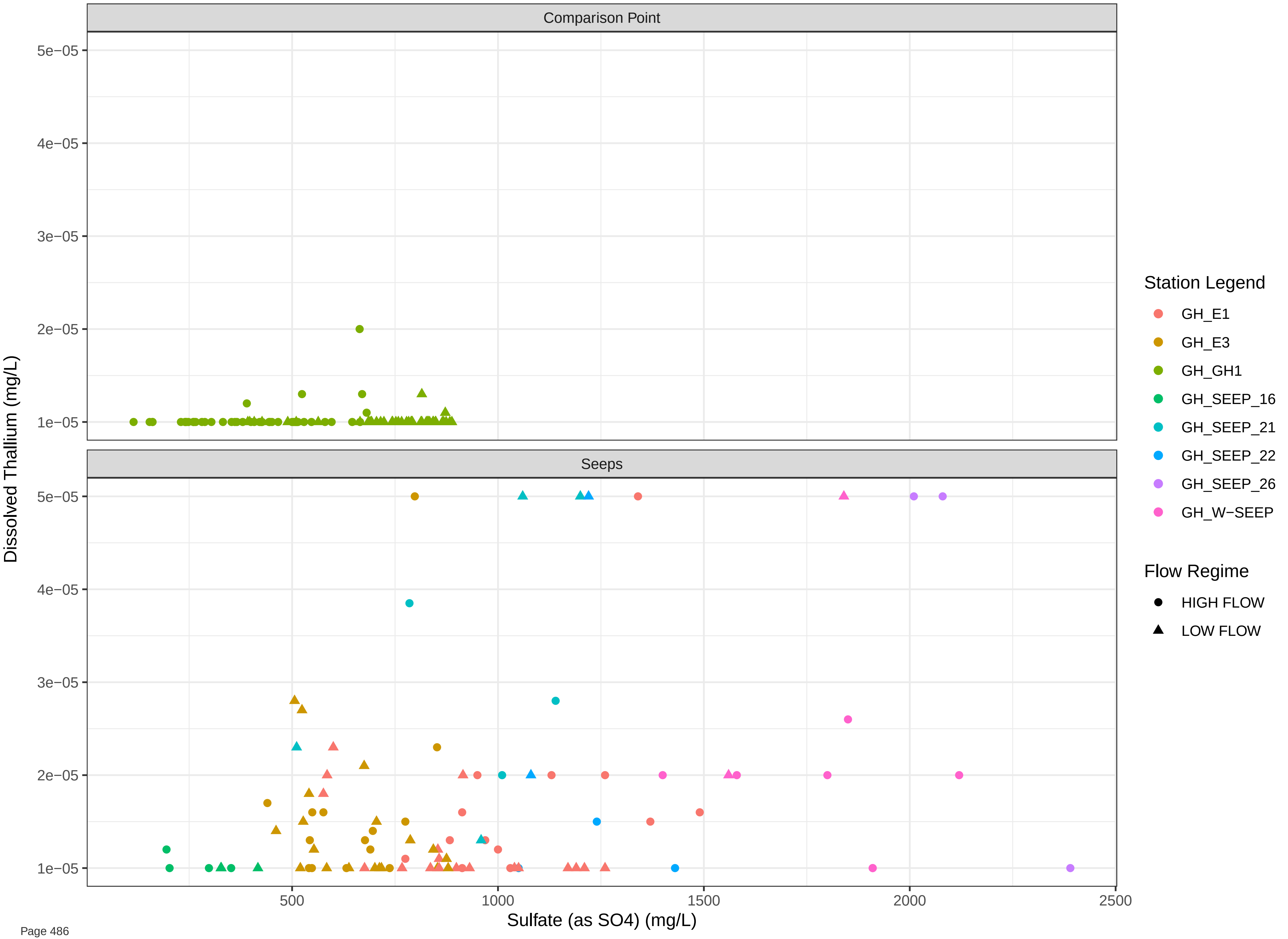
Comparison Point
Seeps
Dissolved Strontium (mg/L)
1.0
0.5
1.0
0.5
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.2
0.3
0.4
0.5
0.6
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

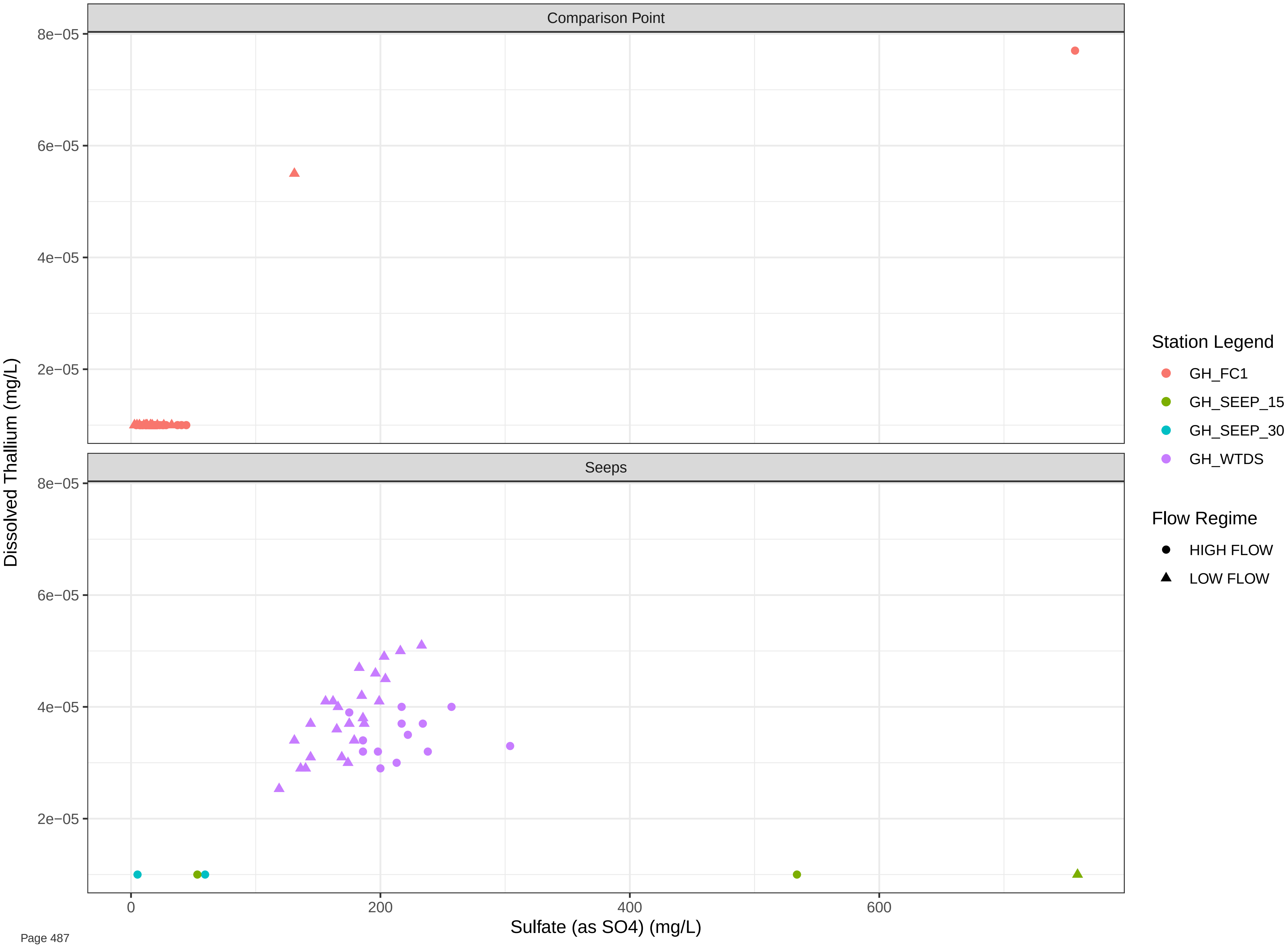

Seeps
2.25
2.00
1.75
1.50
1.25
50
60
70
80
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

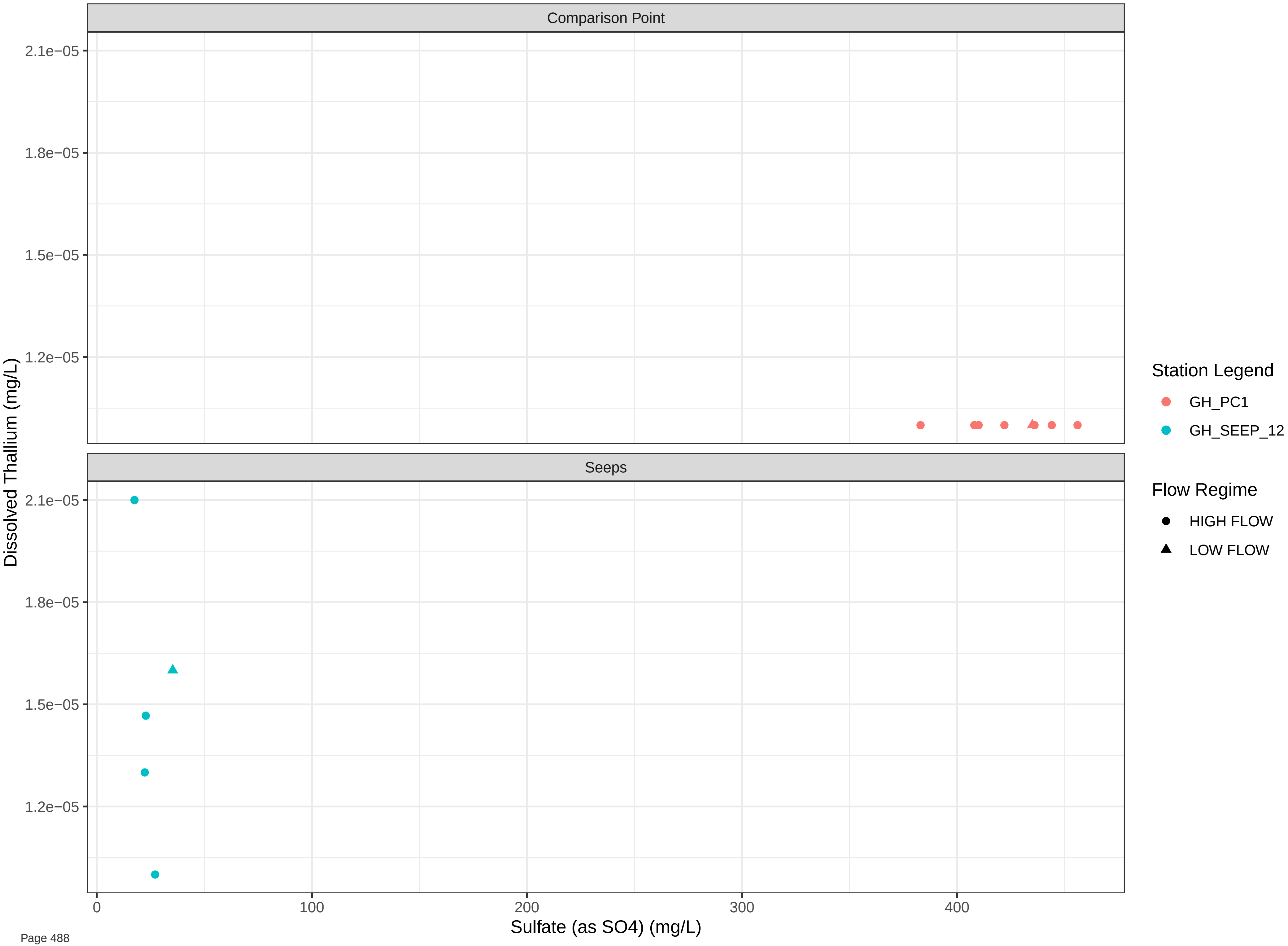


Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.3
0.6
0.9
1.2
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

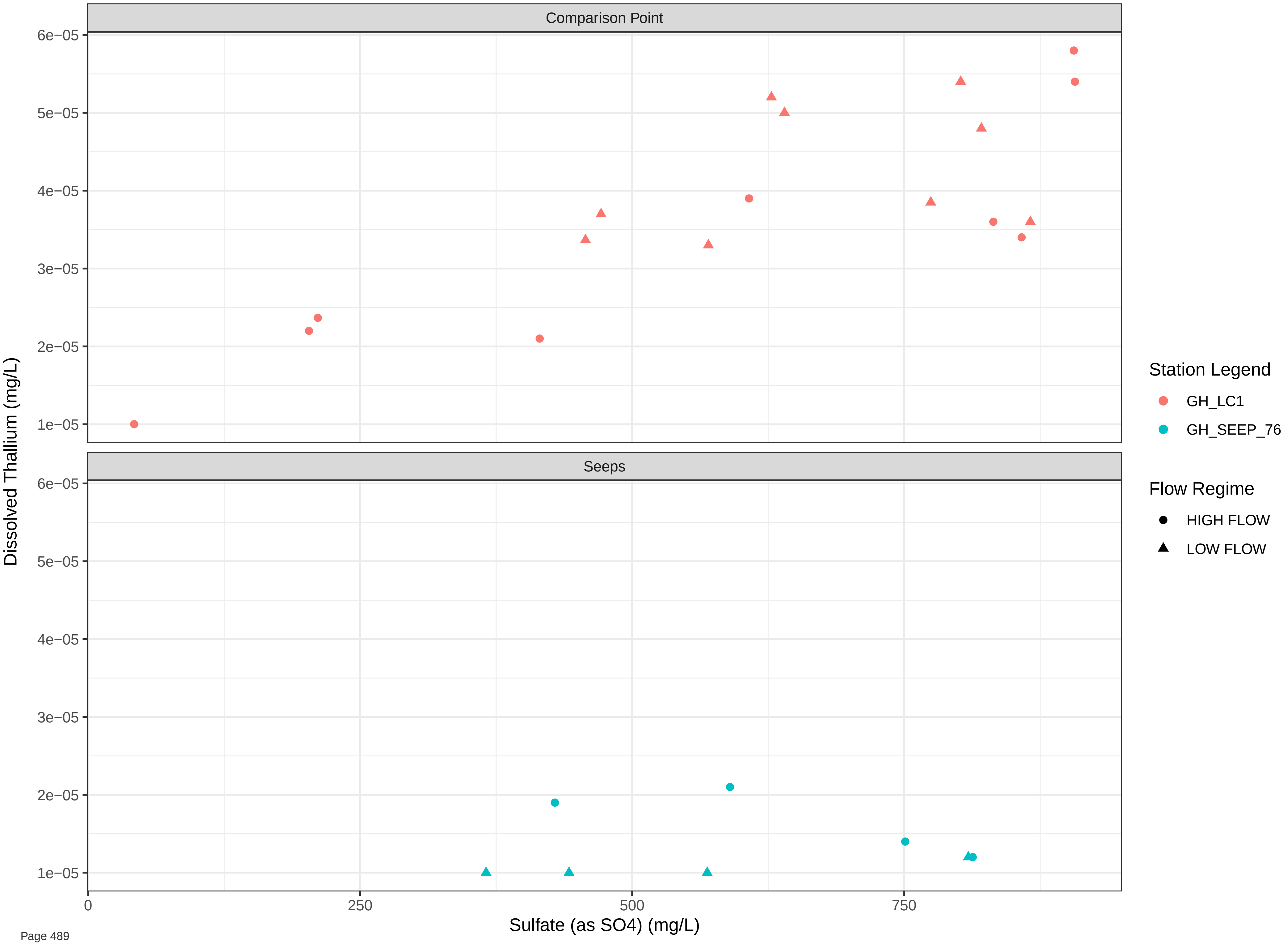


Comparison Point
Seeps
Dissolved Thallium (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

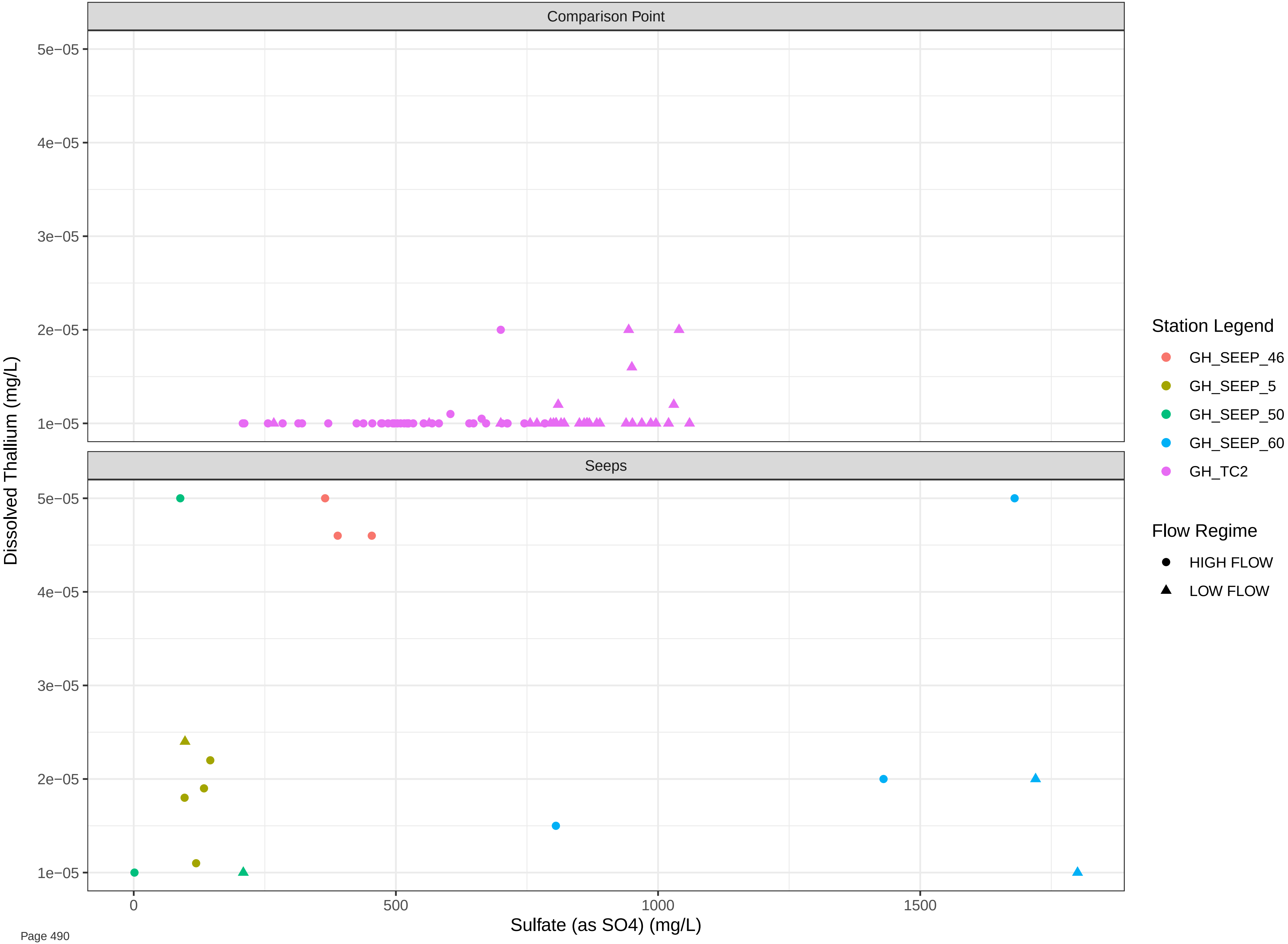

Comparison Point
Seeps
Dissolved Thallium (mg/L)
8e−05
6e−05
4e−05
2e−05
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW



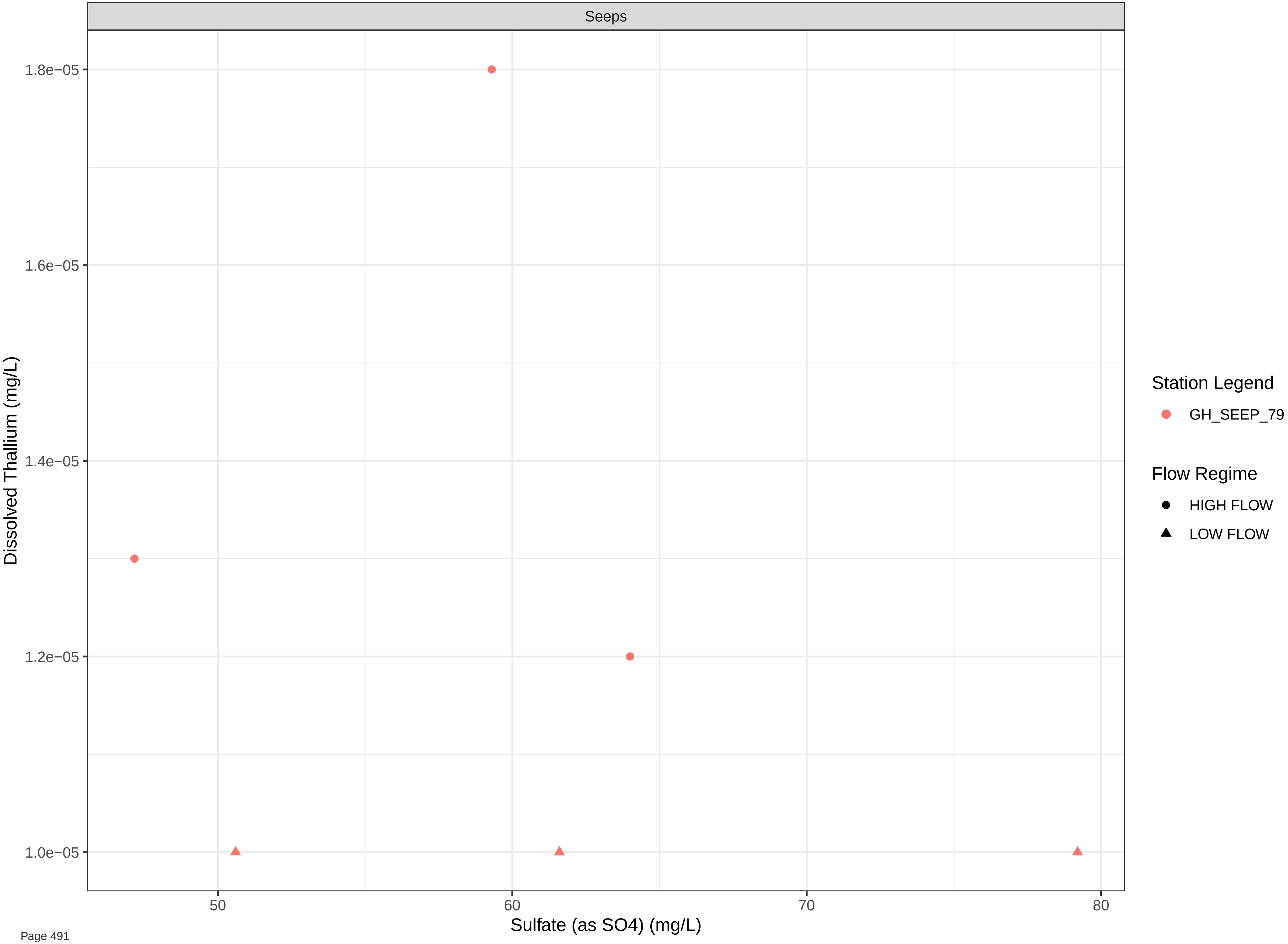
Comparison Point
Seeps
Dissolved Thallium (mg/L)
2.1e−05
1.8e−05
1.5e−05
1.2e−05
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



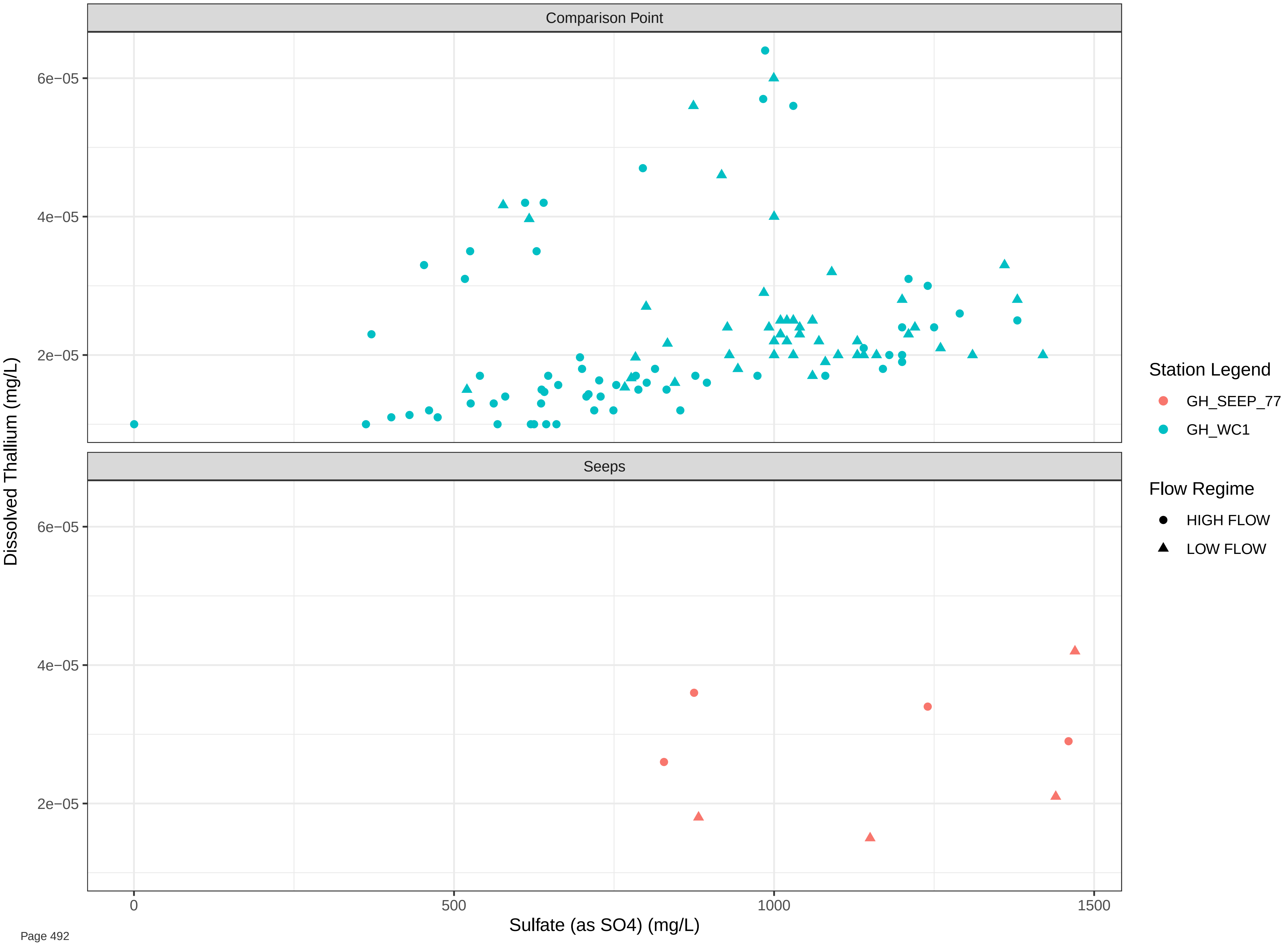
Comparison Point
Seeps
Dissolved Thallium (mg/L)
6e−05
5e−05
4e−05
3e−05
2e−05
1e−05
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



Comparison Point
Seeps
Dissolved Thallium (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

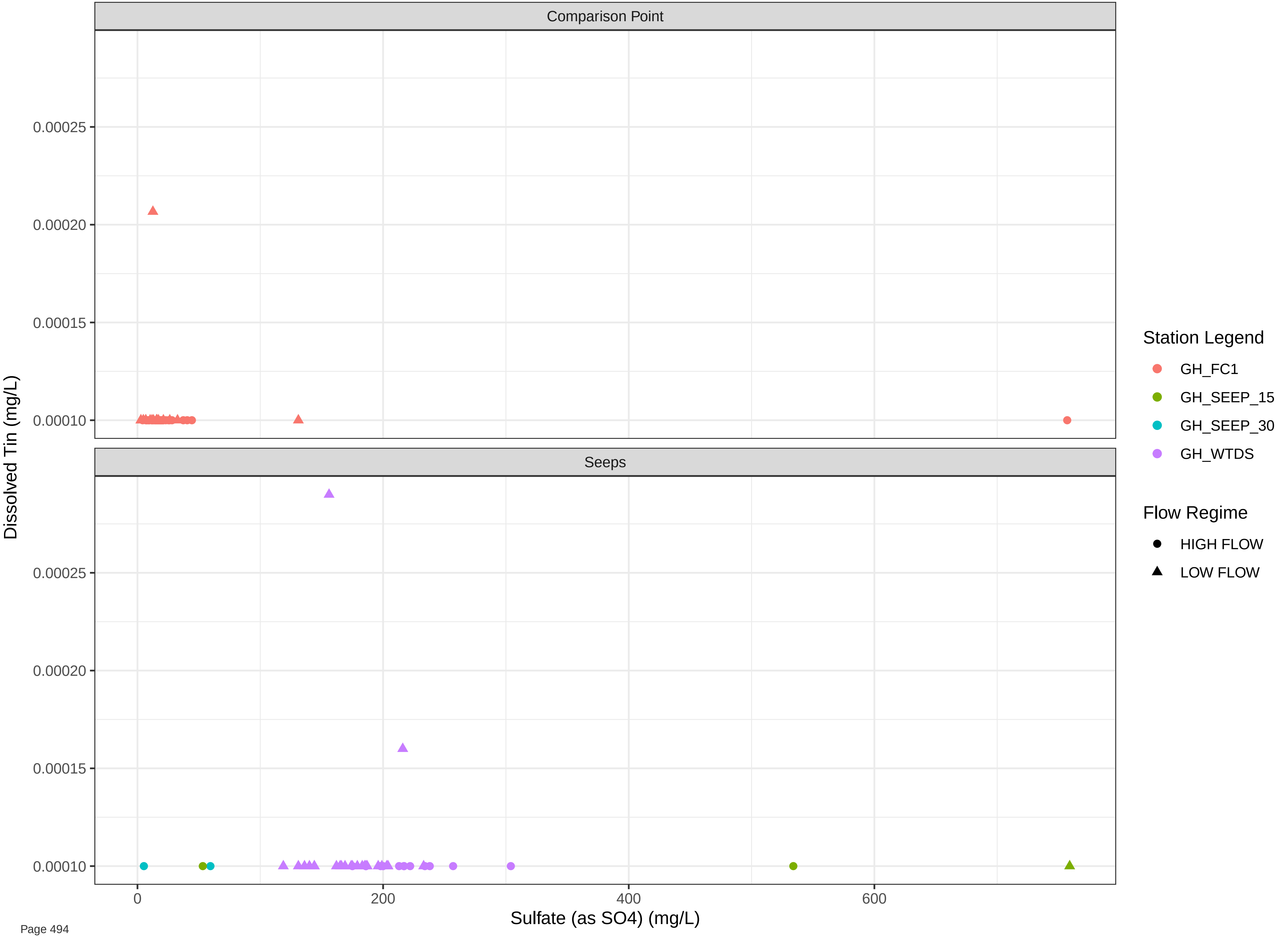


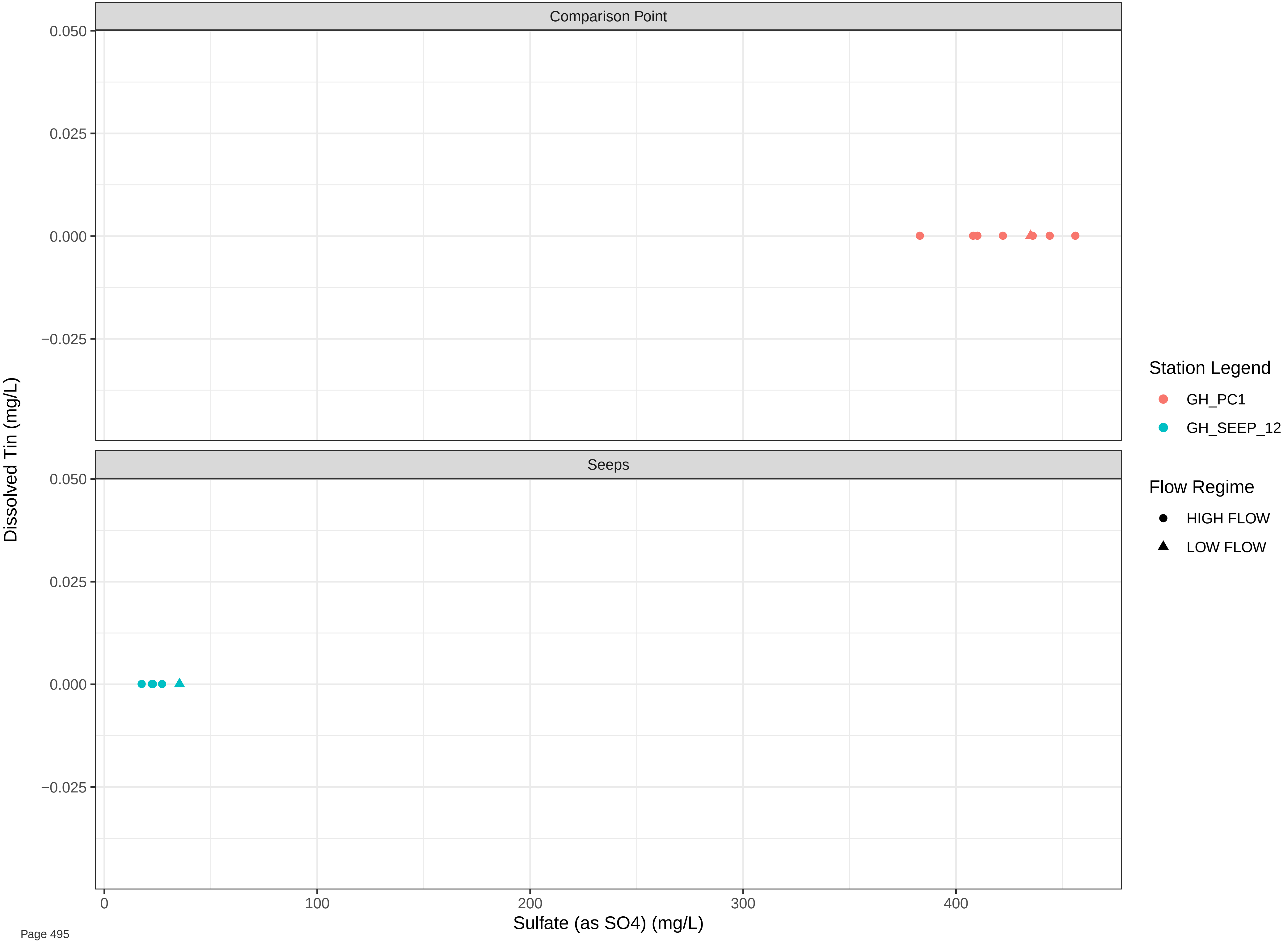
Seeps
1.8e−05
1.6e−05
1.4e−05
1.2e−05
1.0e−05
Dissolved Thallium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

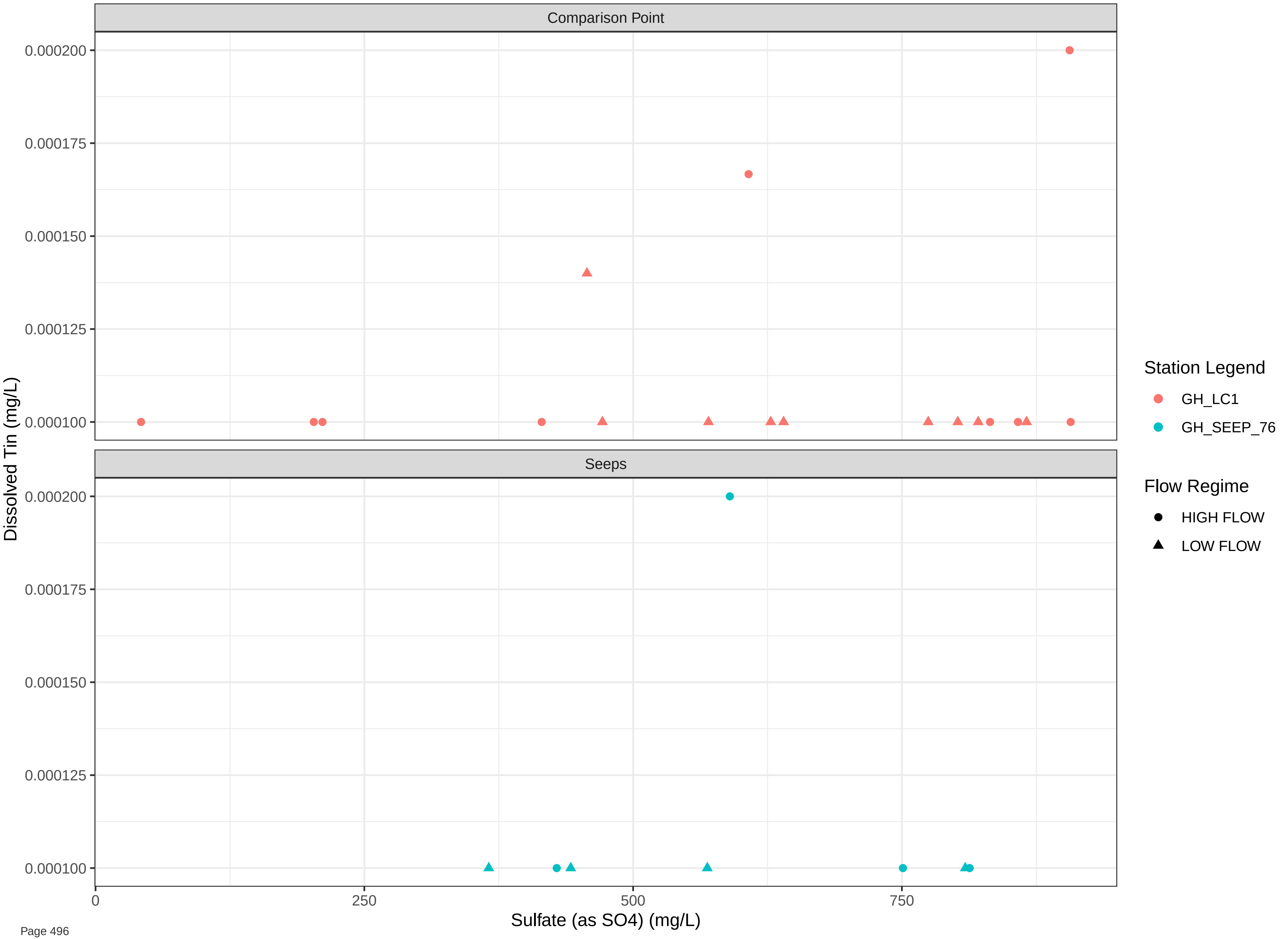


Comparison Point
Seeps
6e−05
4e−05
2e−05
0
500
1000
1500
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

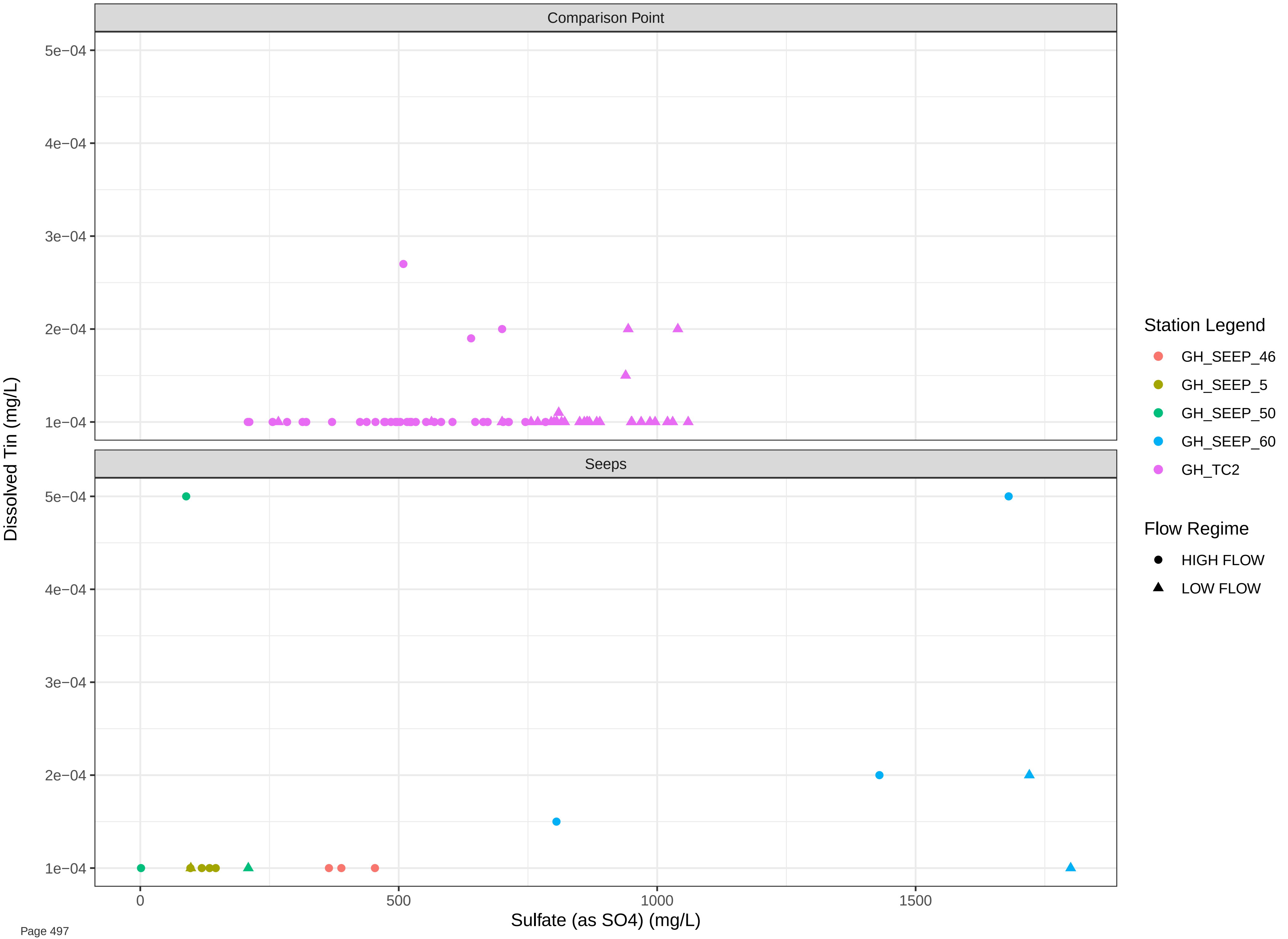
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000
0.001
0.002
0.003
0.004
0.005
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Tin (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00025
0.00020
0.00015
0.00010
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

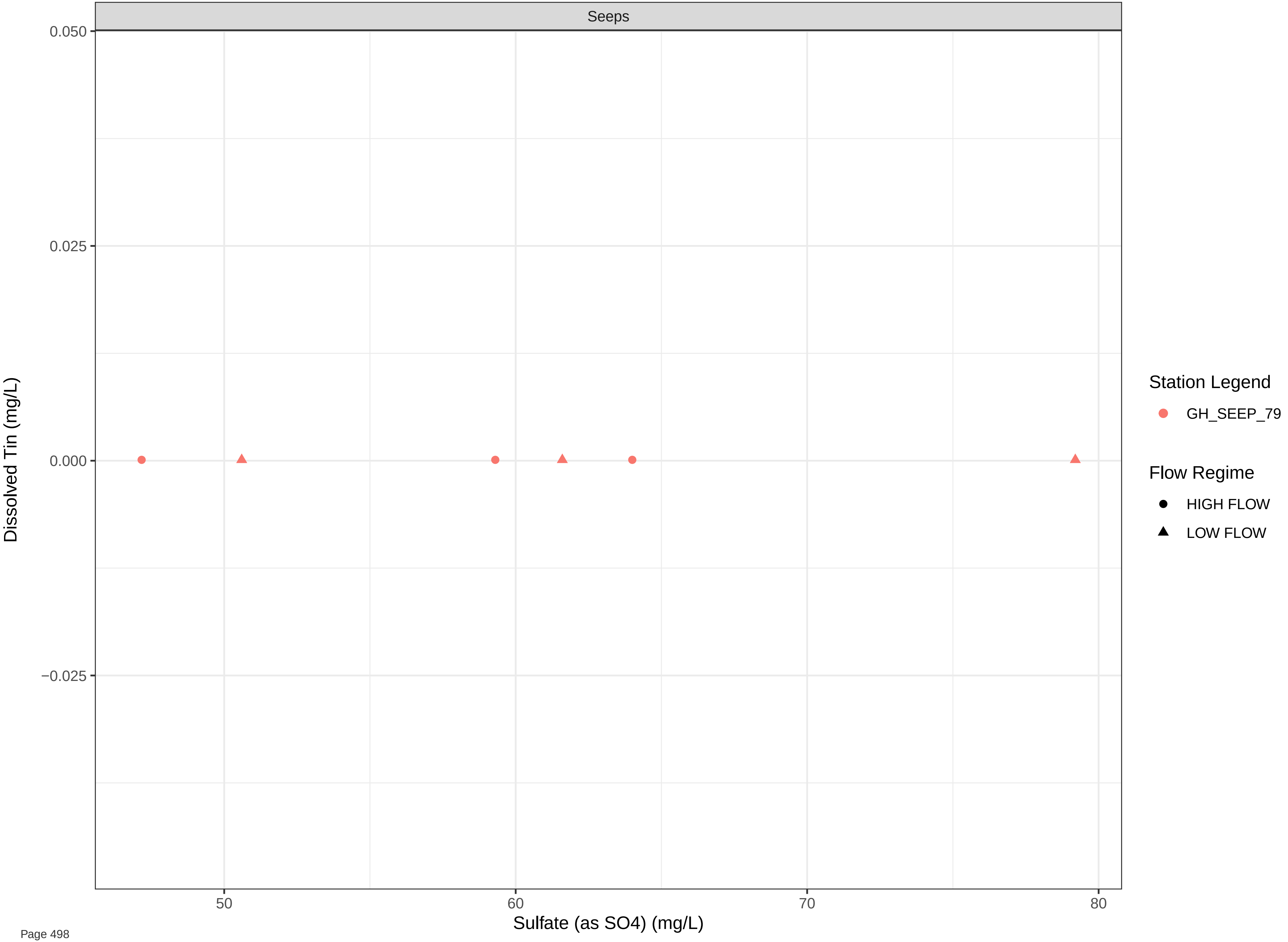

Comparison Point
Seeps
Dissolved Tin (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW



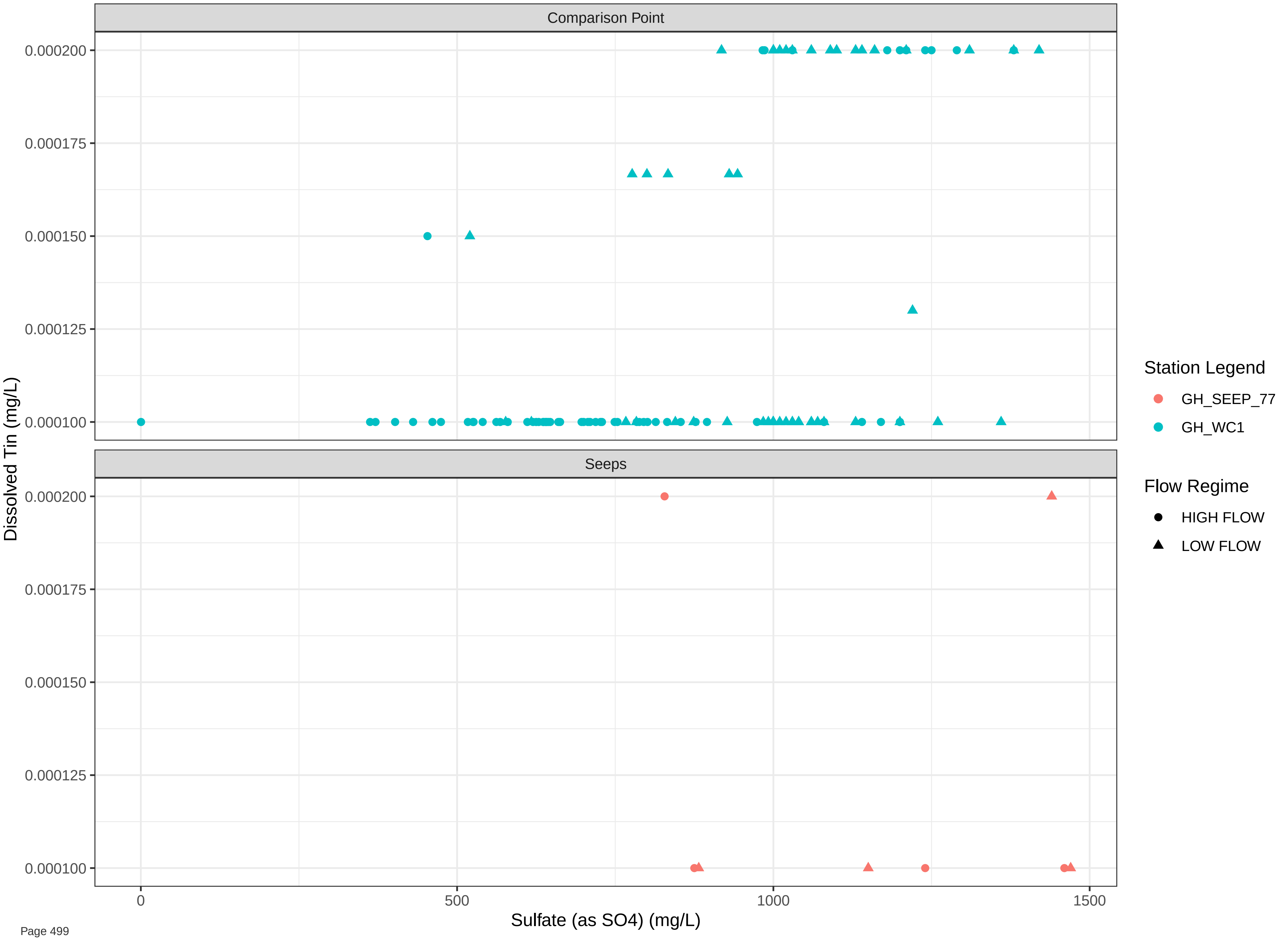
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW



Comparison Point
Seeps
Dissolved Tin (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

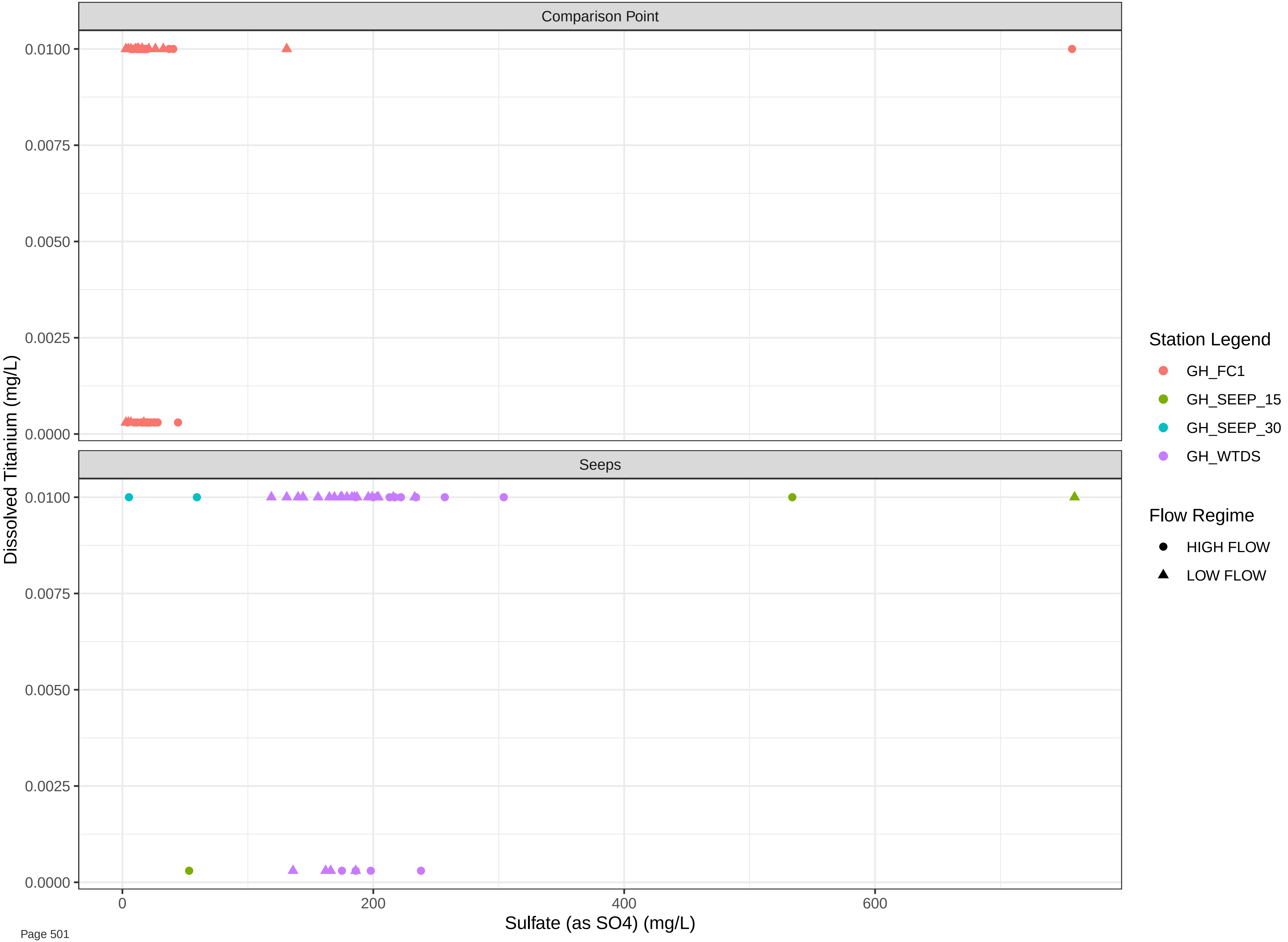


Seeps
0.050
0.025
0.000
−0.025
Dissolved Tin (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

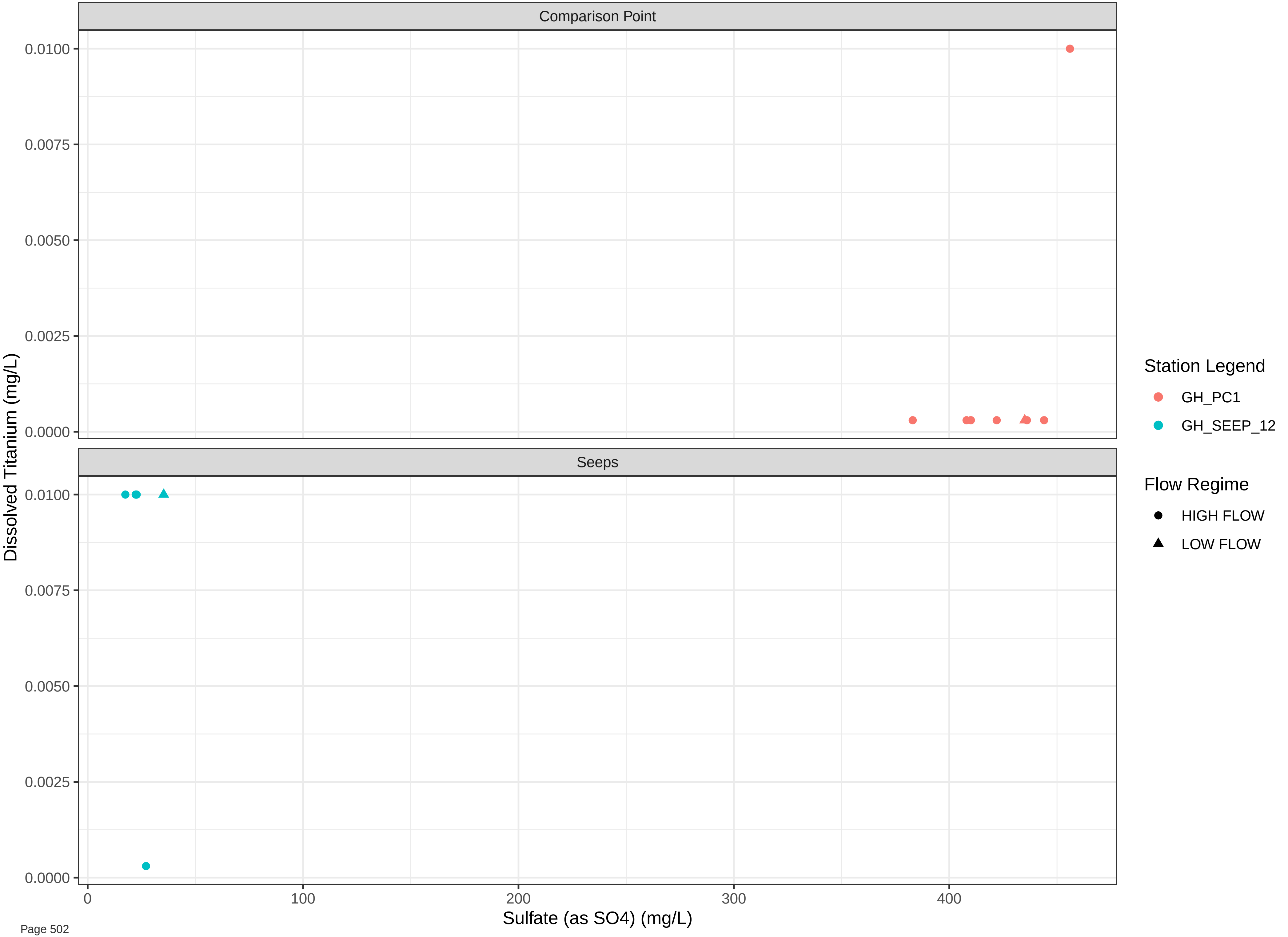


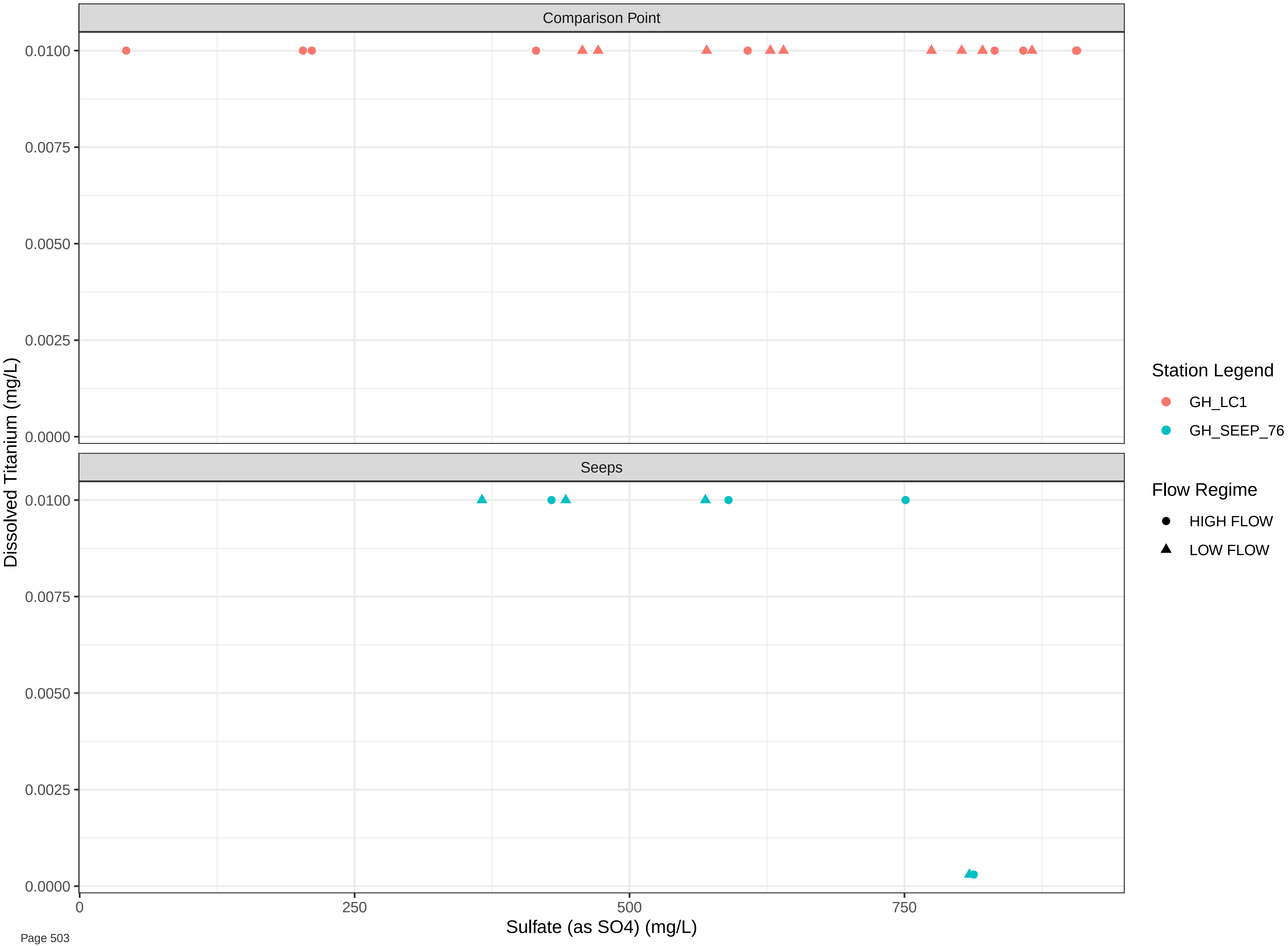
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

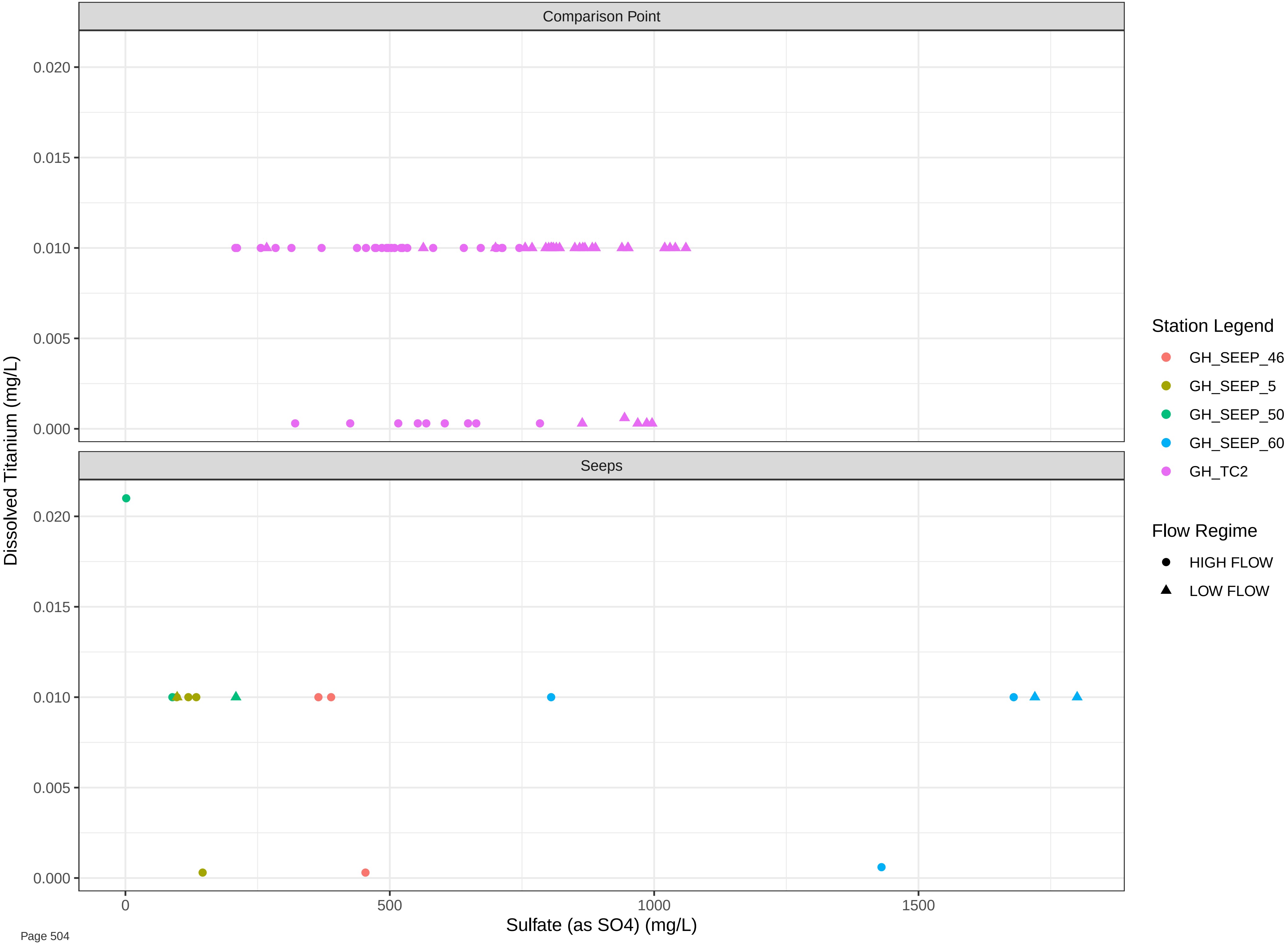


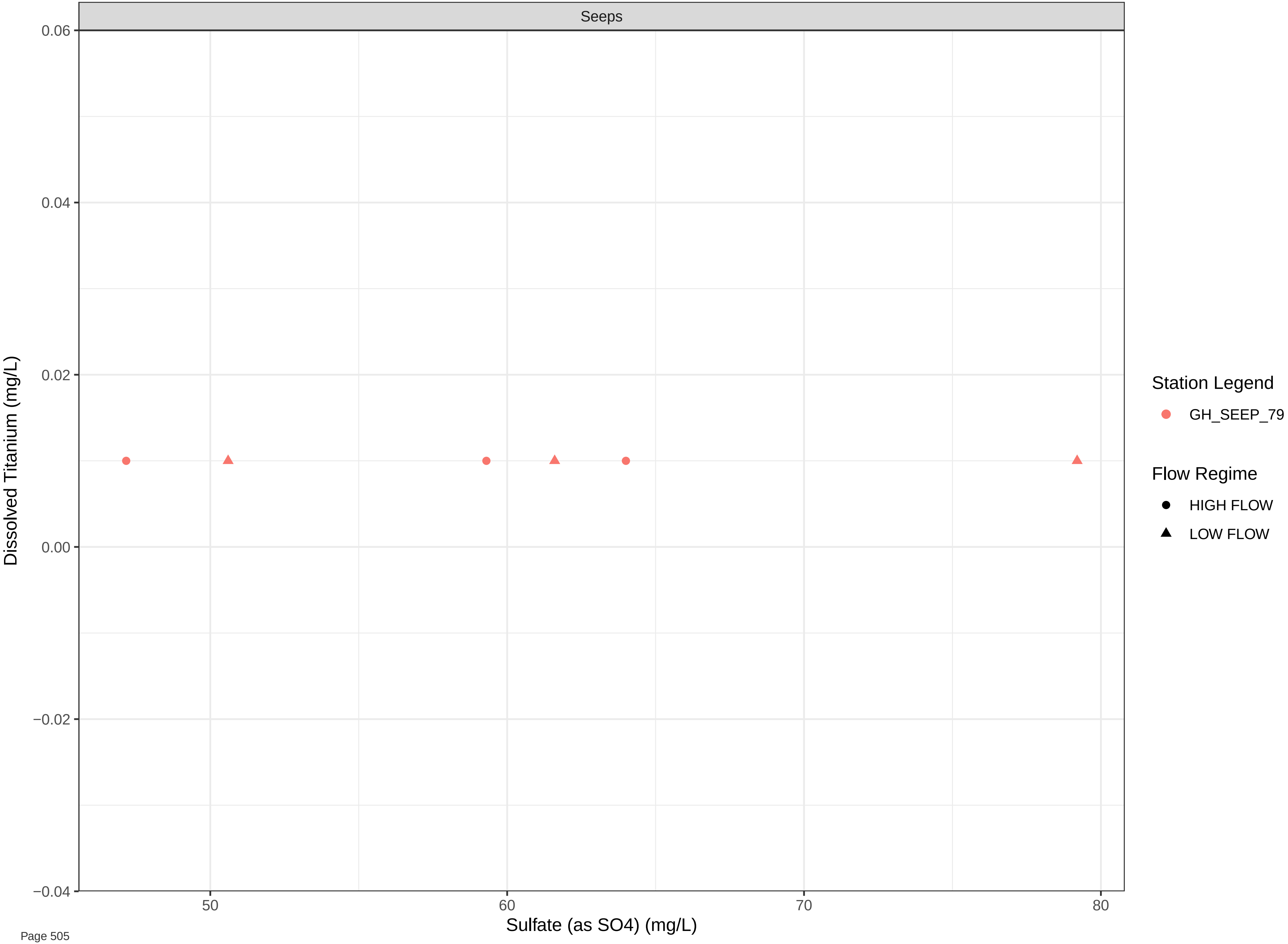
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
100
200
300
400
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

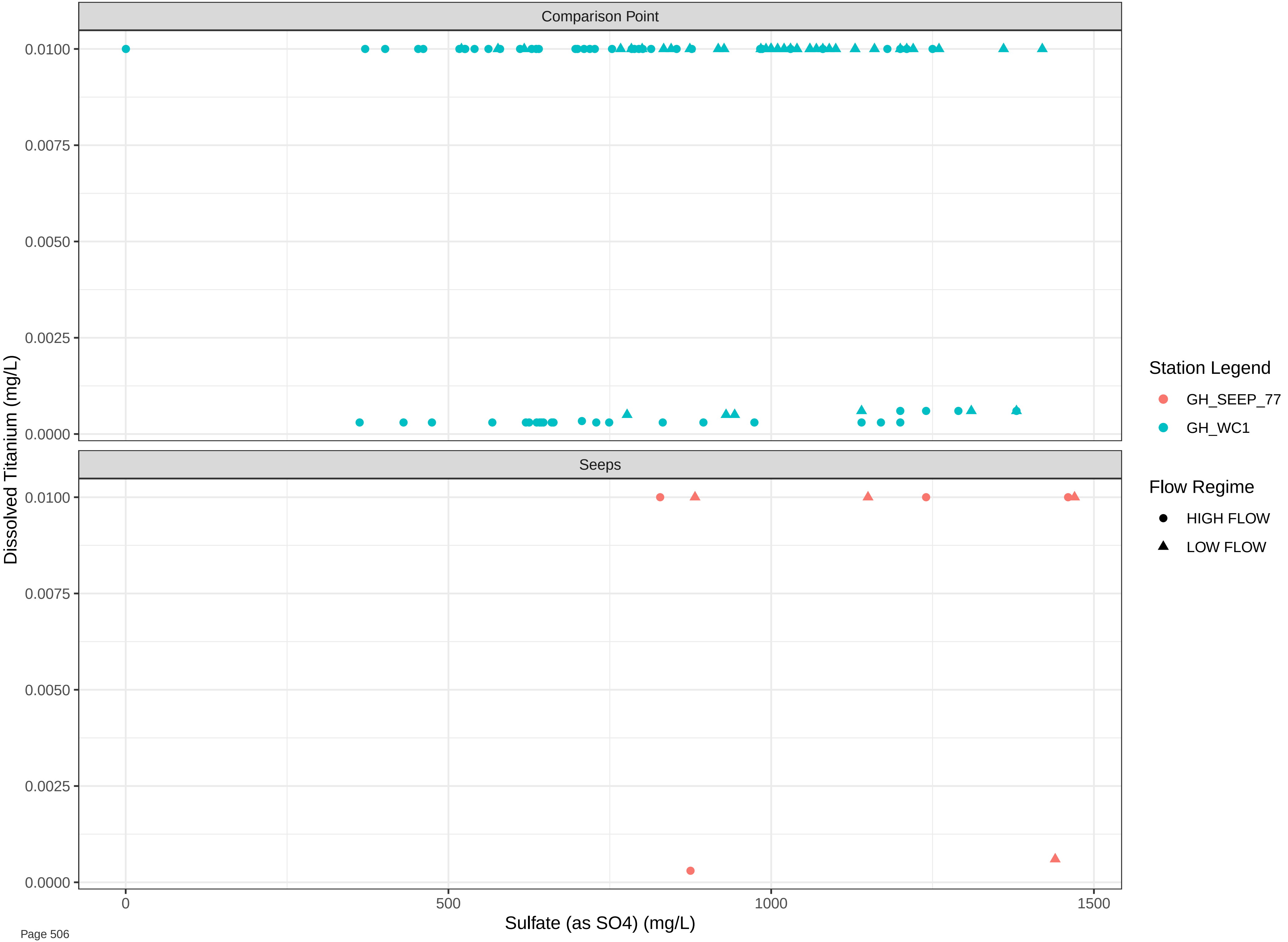


Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

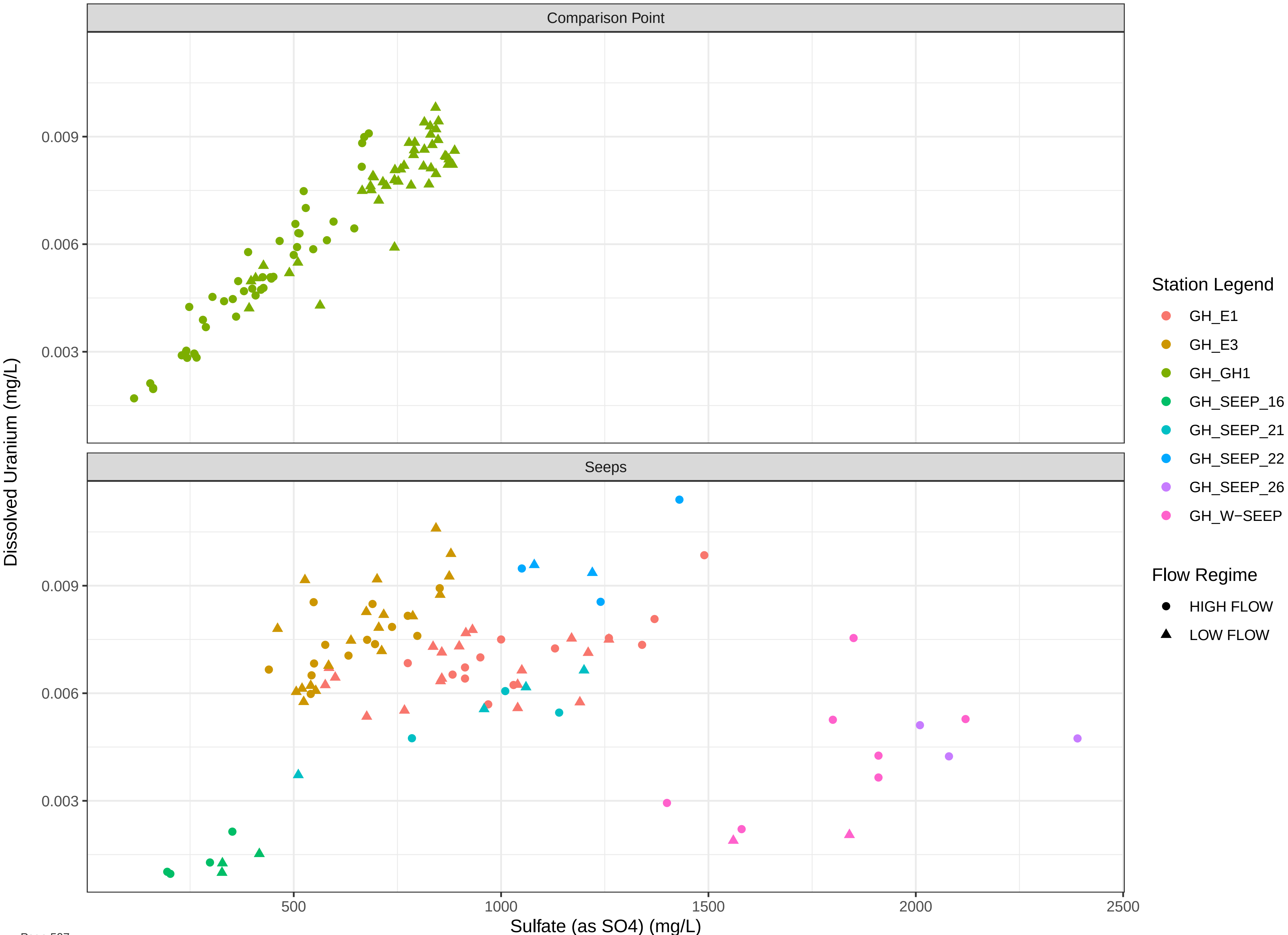

Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.000
0.005
0.010
0.015
0.020
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW

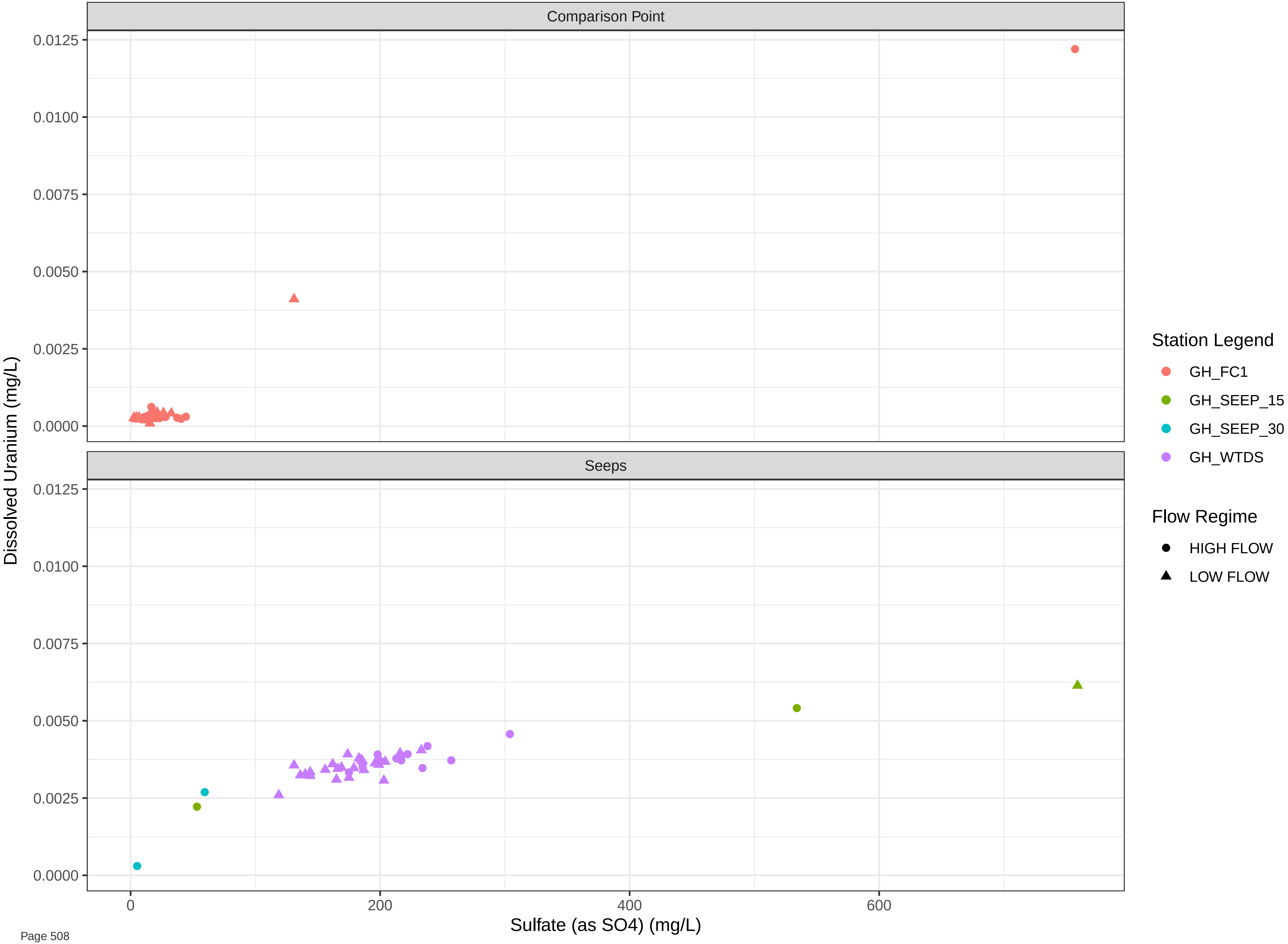


Seeps
Dissolved Titanium (mg/L)
0.06
0.04
0.02
0.00
−0.02
−0.04
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

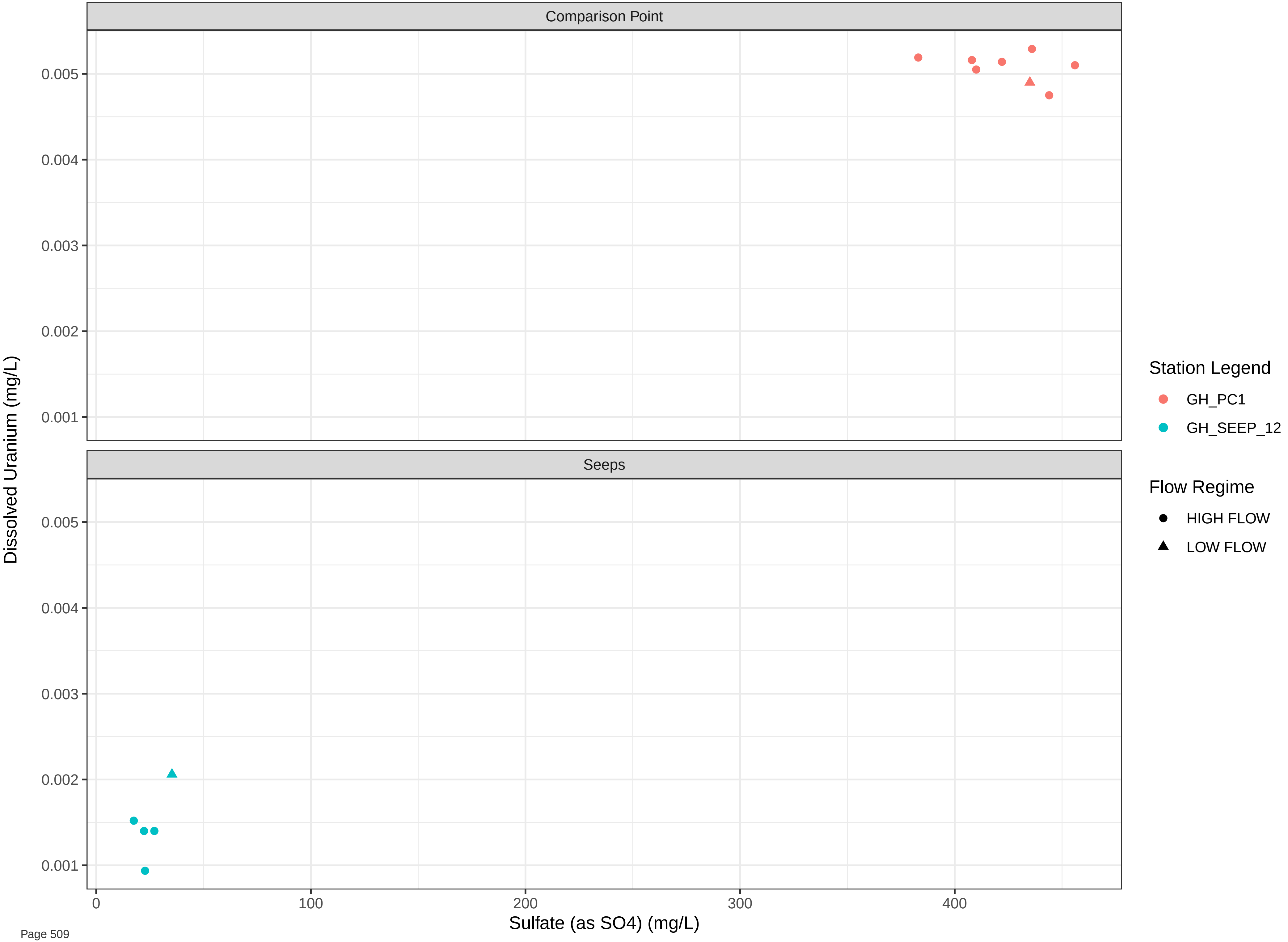


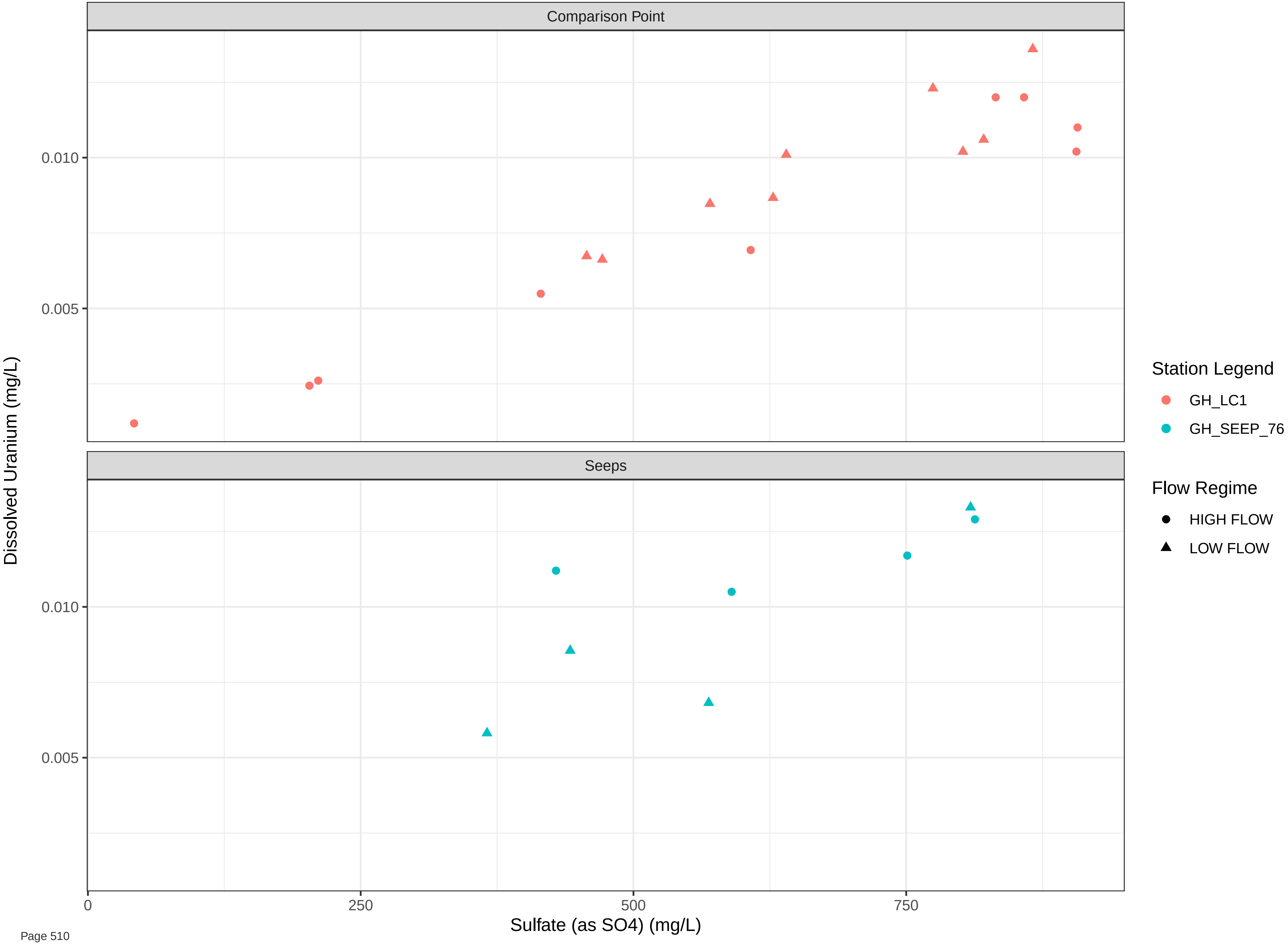
Comparison Point
Seeps
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

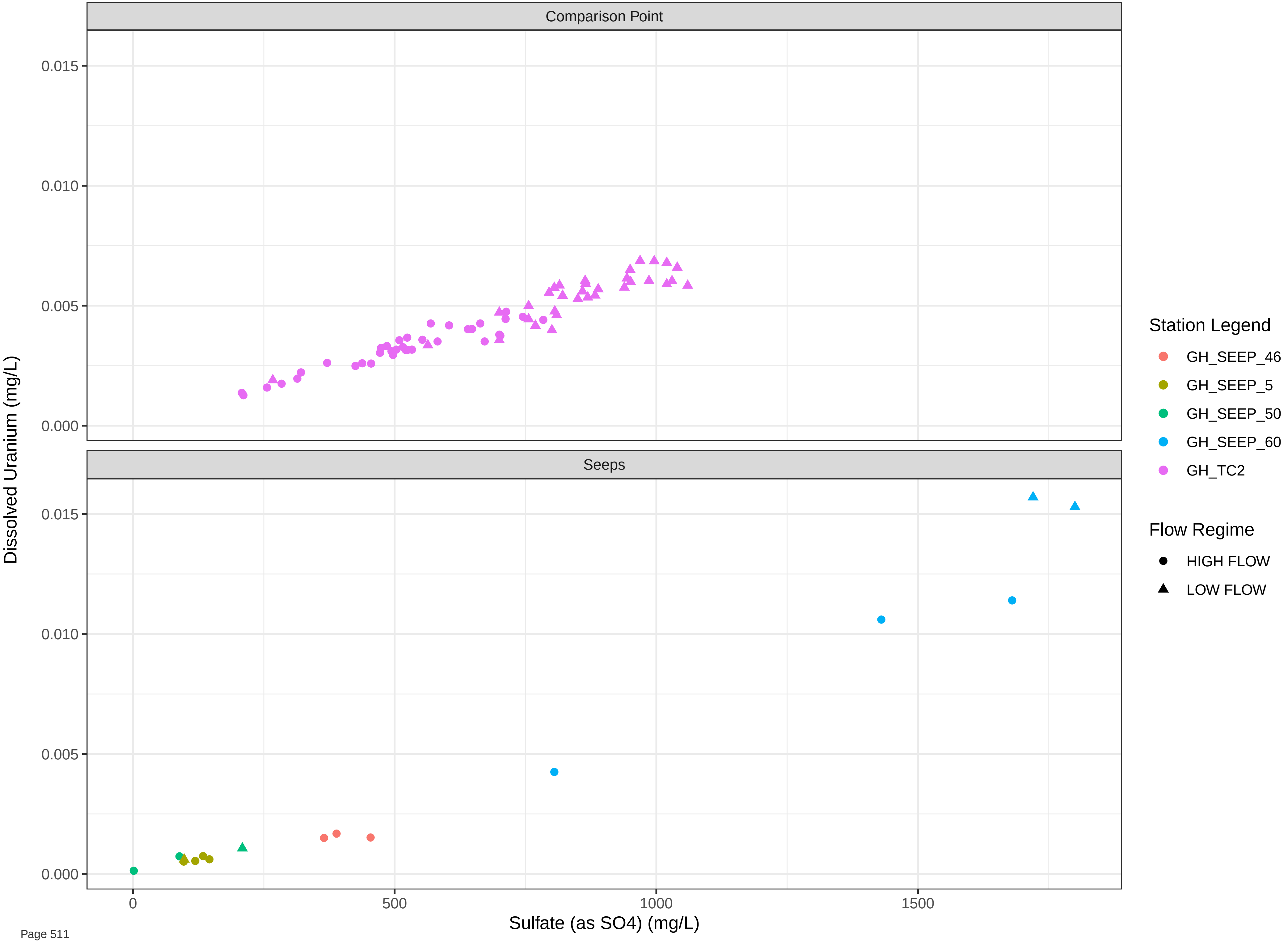

Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.009
0.006
0.003
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
2500
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW

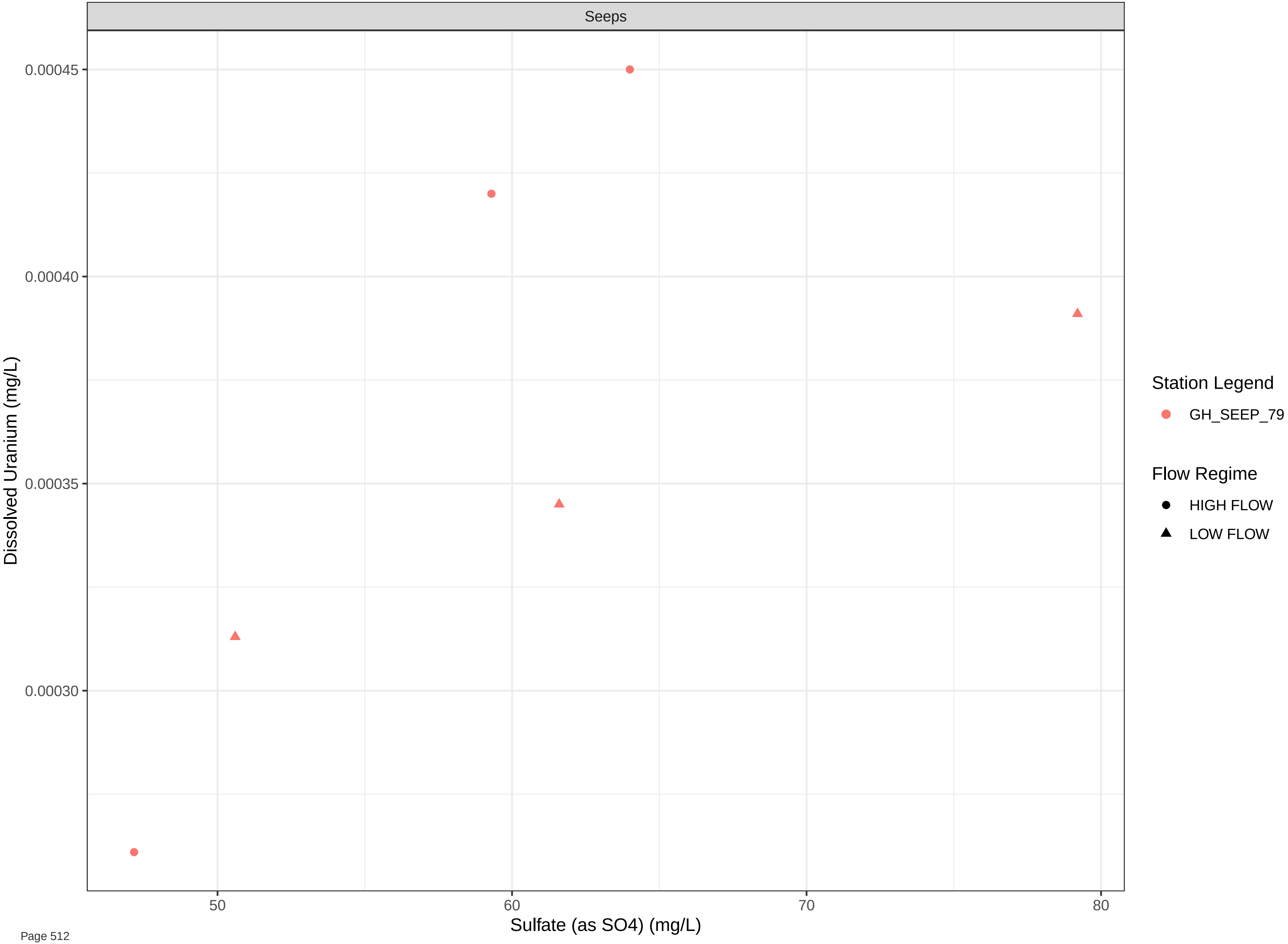


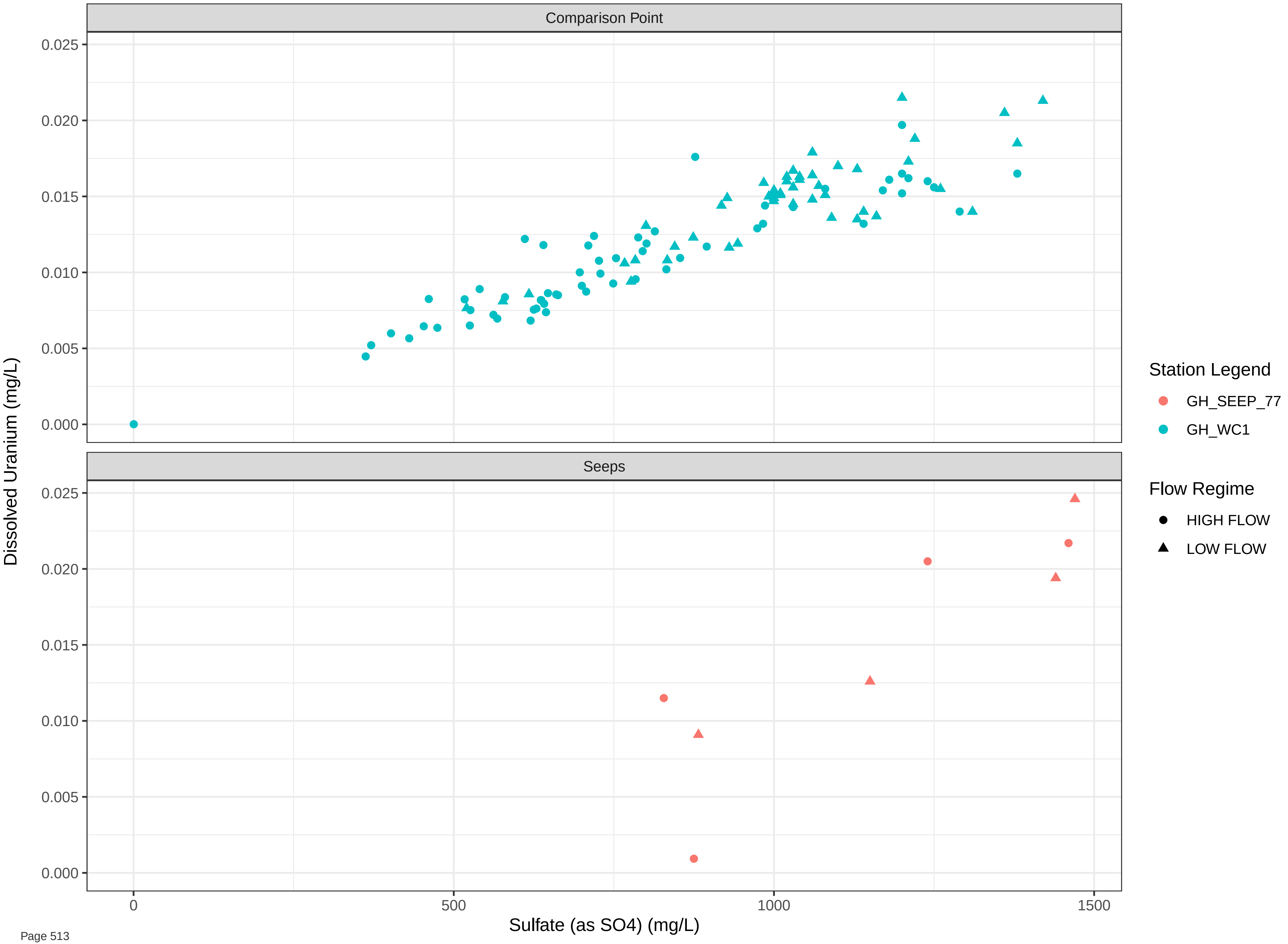
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

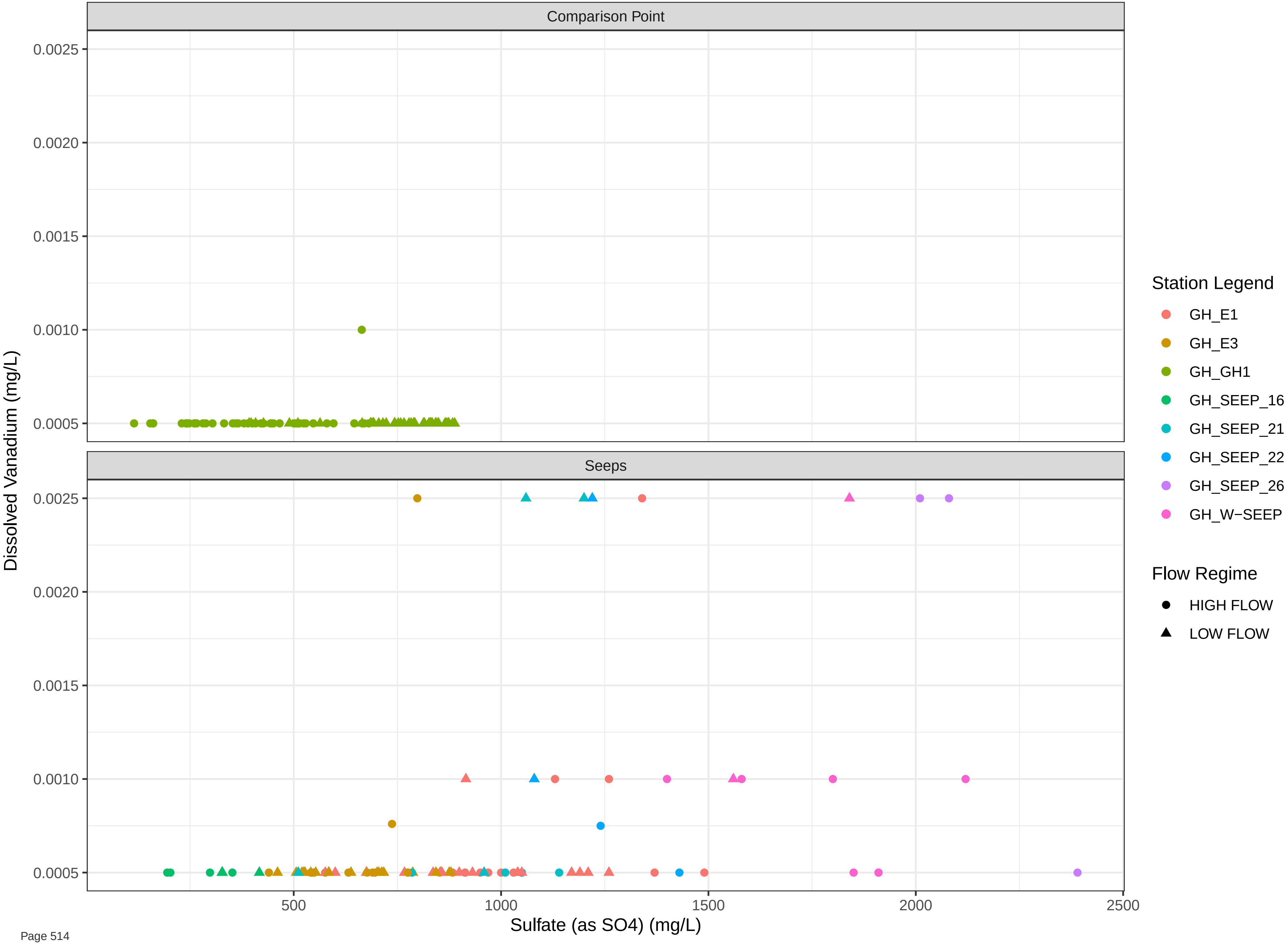

Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.005
0.004
0.003
0.002
0.001
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.010
0.005
0
250
500
750
Dissolved Uranium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

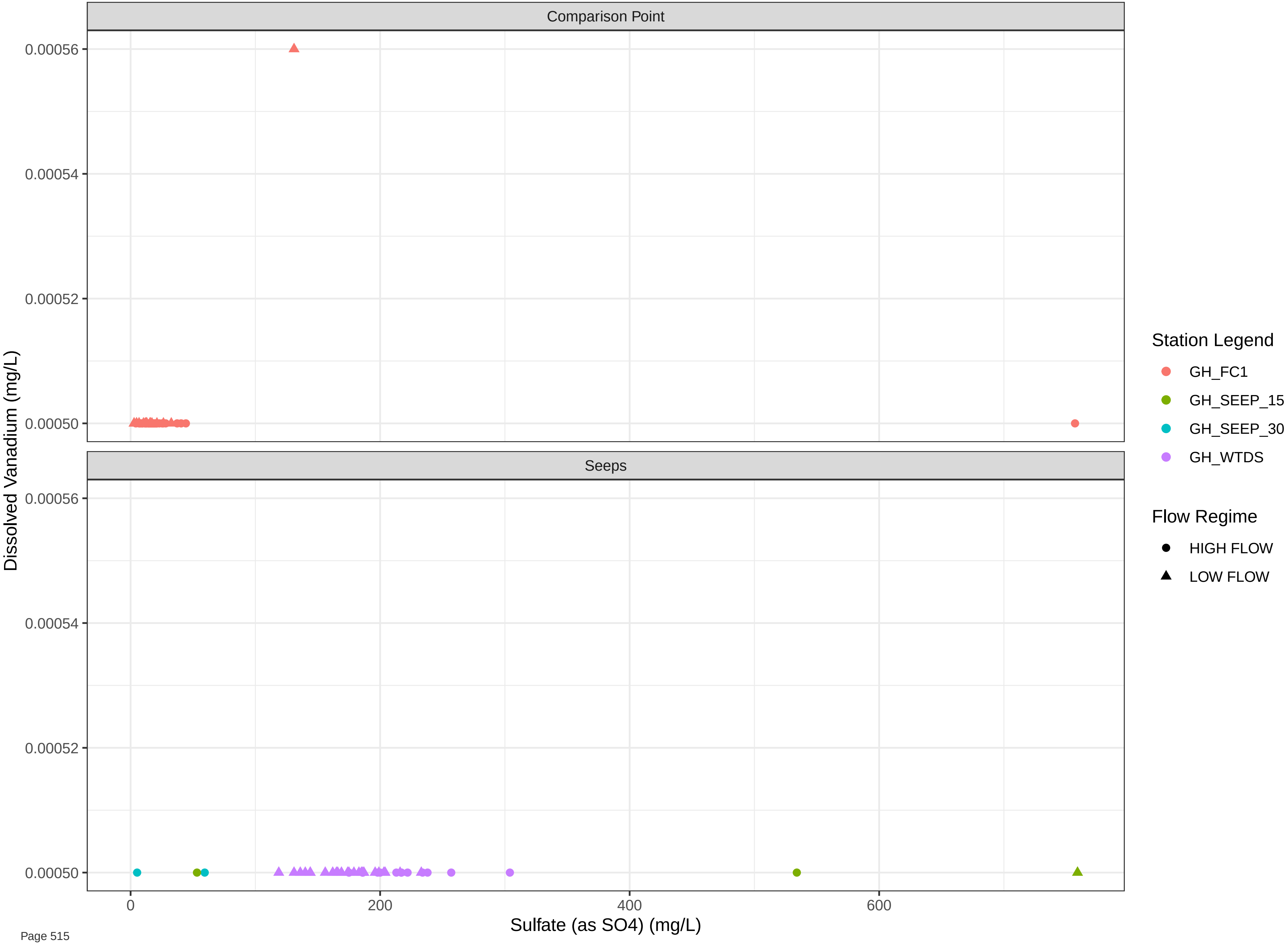

Comparison Point
Seeps
0.015
0.010
0.005
0.000
Dissolved Uranium (mg/L)
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.00045
0.00040
0.00035
0.00030
Dissolved Uranium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

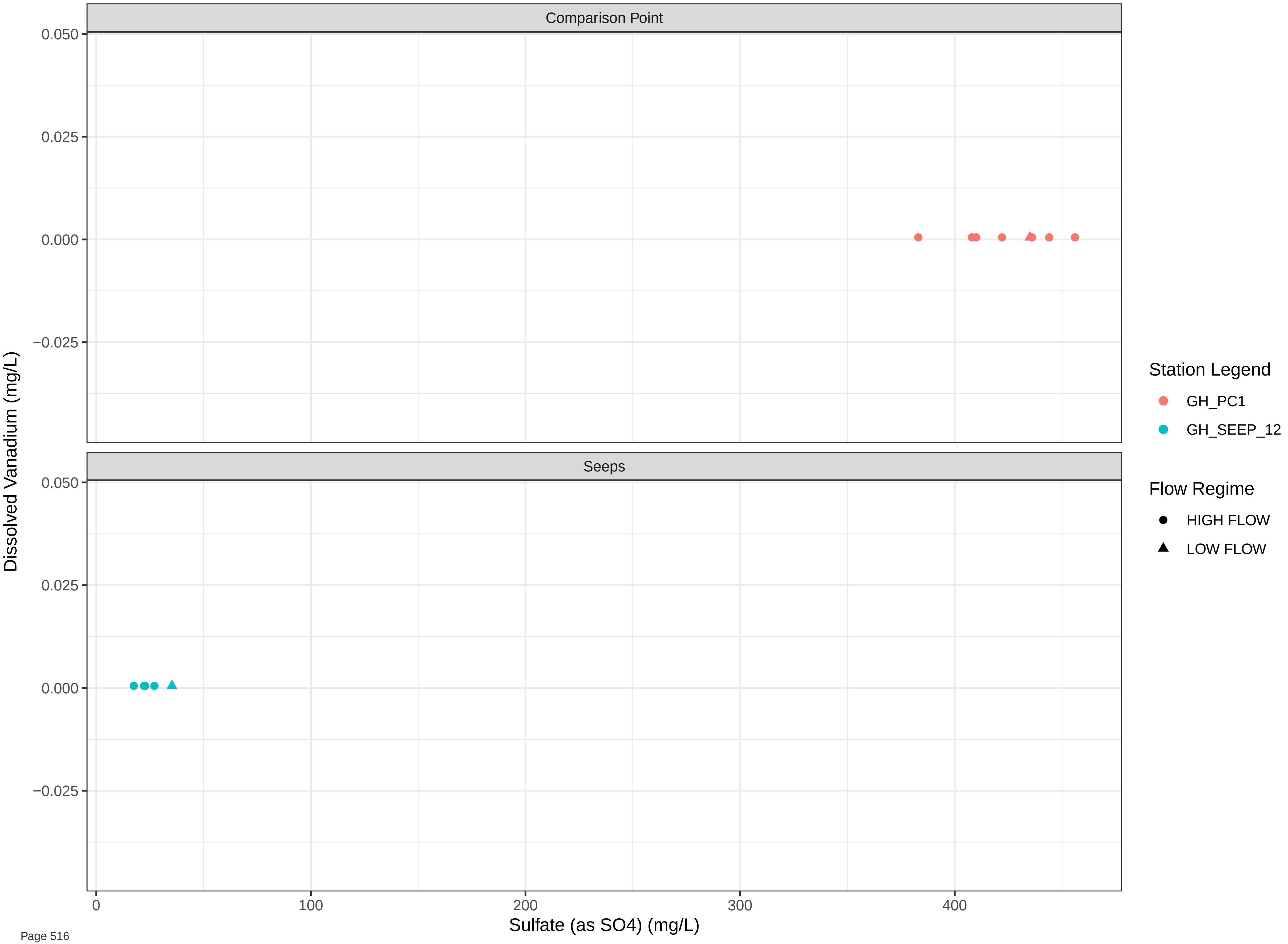

Comparison Point
Seeps
0.025
0.020
0.015
0.010
0.005
0.000
0
500
1000
1500
Dissolved Uranium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW



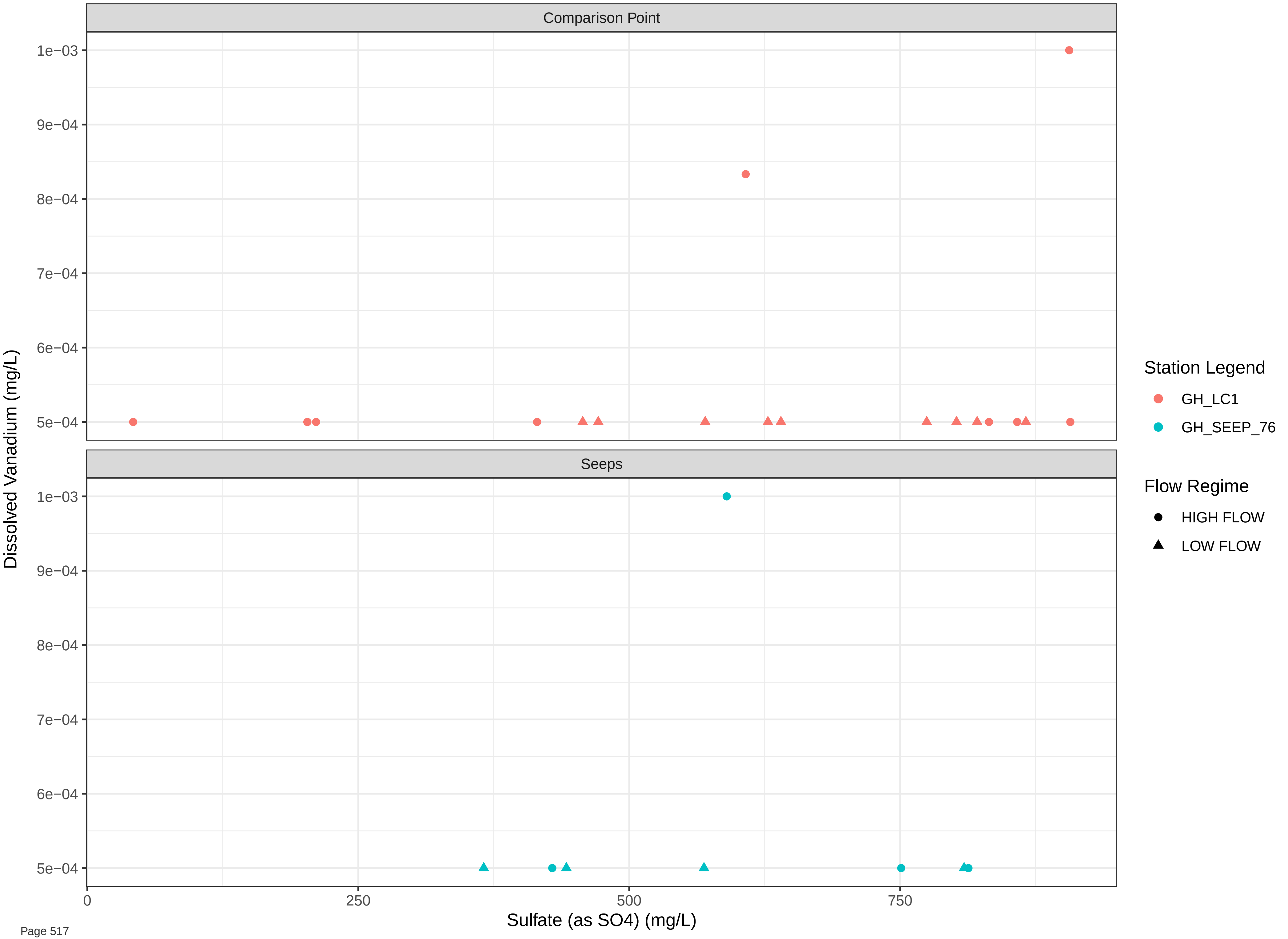
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.0025
0.0020
0.0015
0.0010
0.0005
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



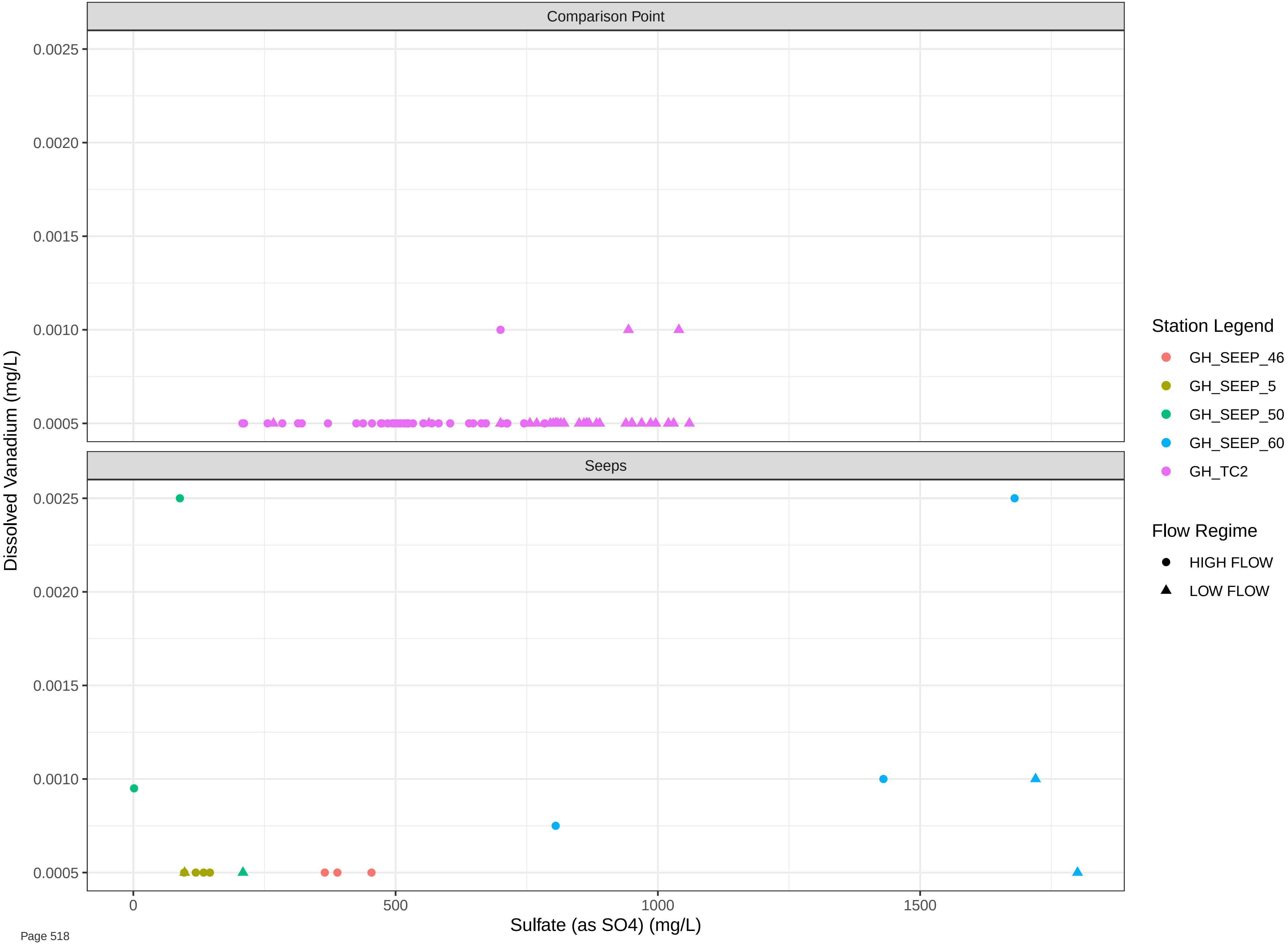
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.00056
0.00054
0.00052
0.00050
Sulfate (as SO4) (mg/L)
0
200
400
600
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

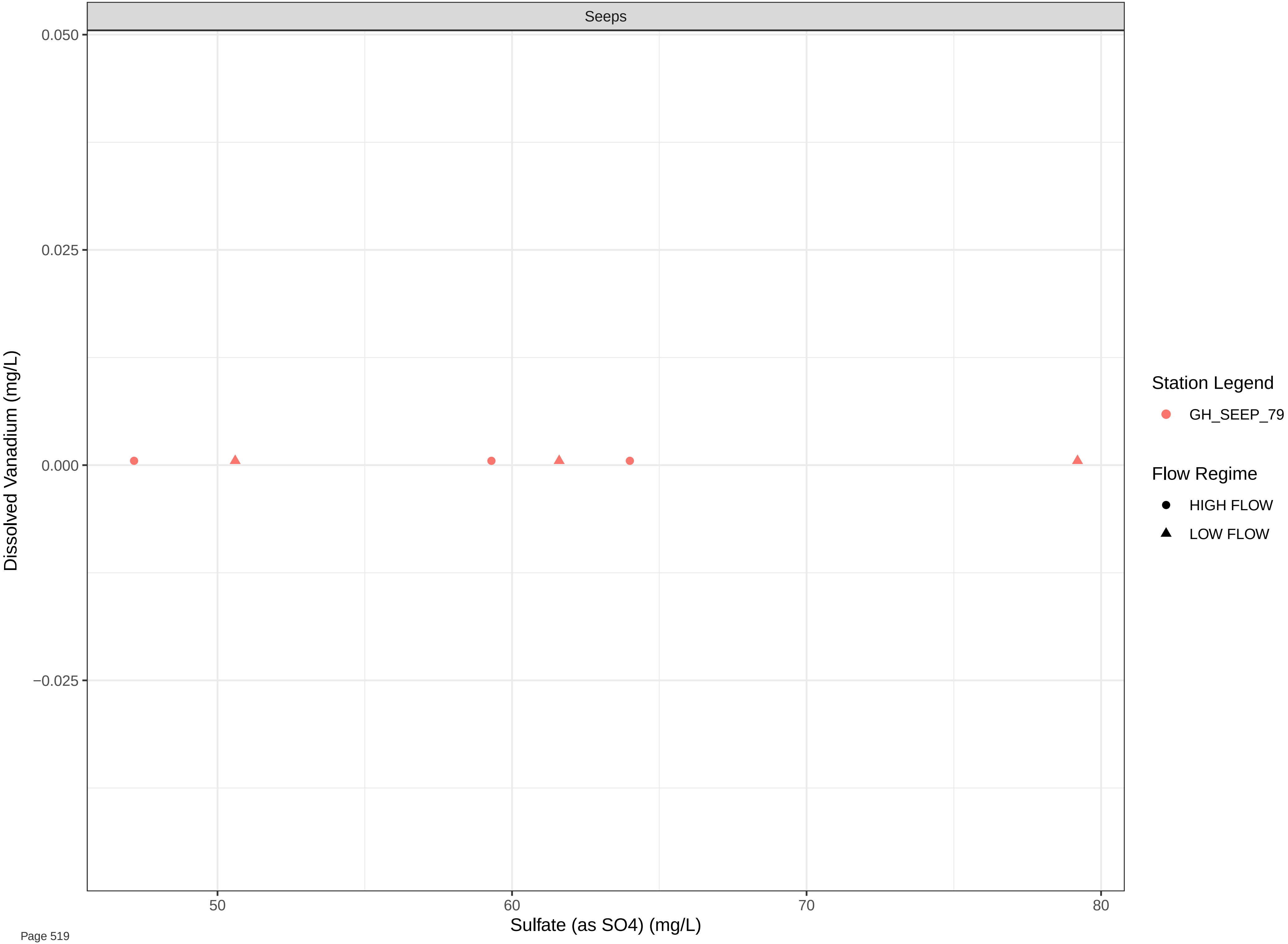


Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW

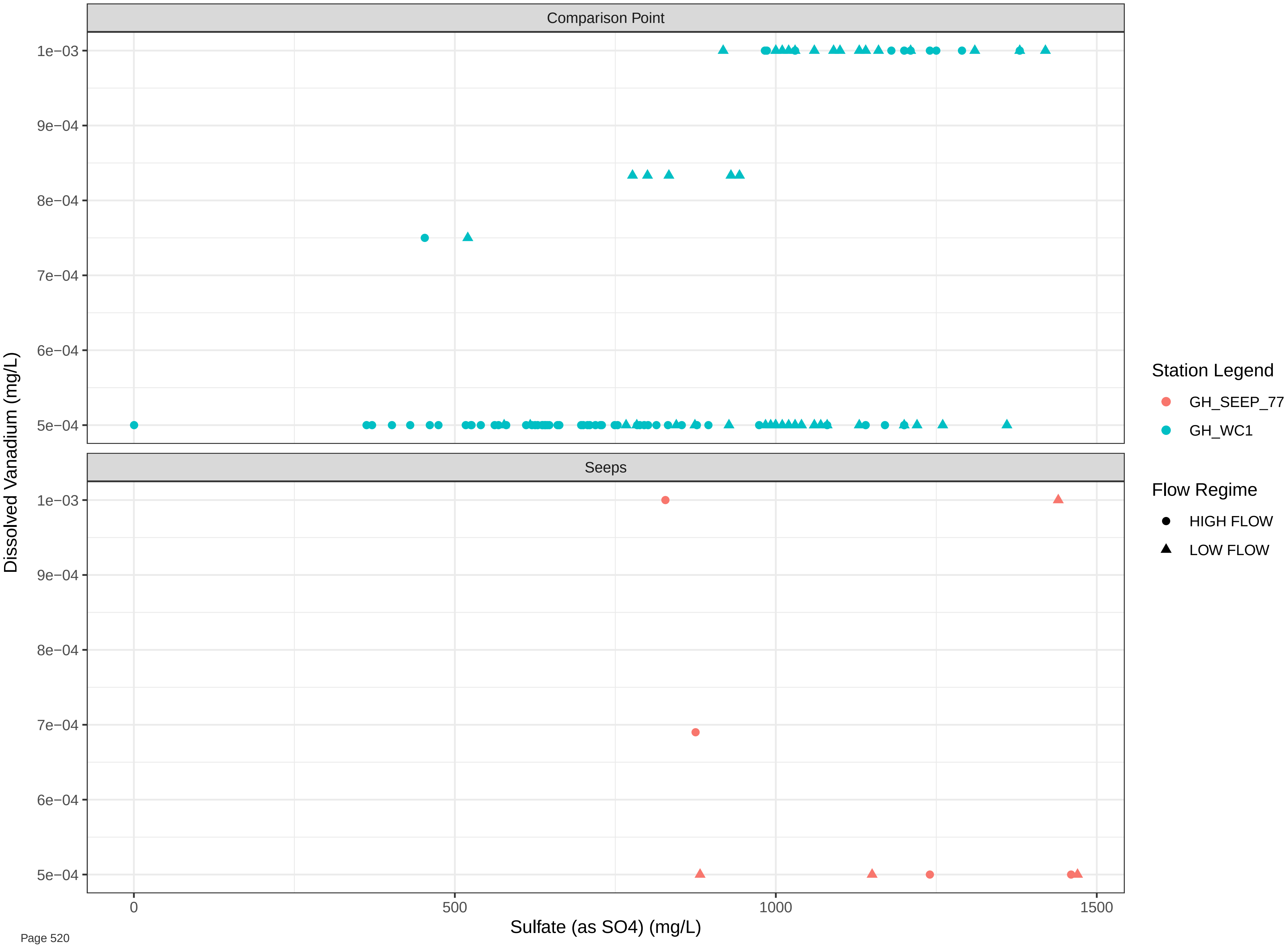


Comparison Point
Seeps
Dissolved Vanadium (mg/L)
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
0
250
500
750
Sulfate (as SO4) (mg/L)
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

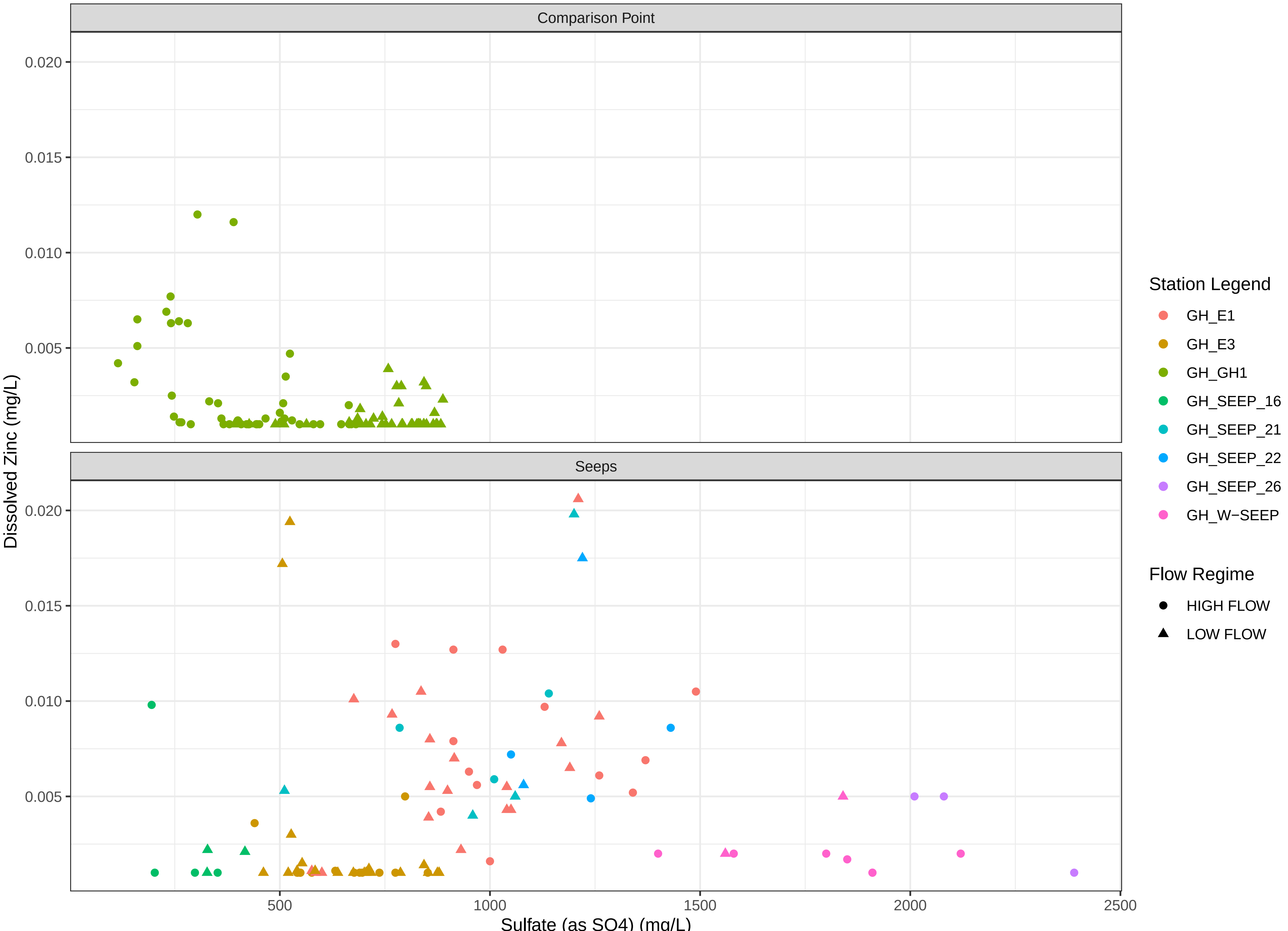

Comparison Point
Seeps
0.0025
0.0020
0.0015
0.0010
0.0005
0
500
1000
1500
Dissolved Vanadium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW



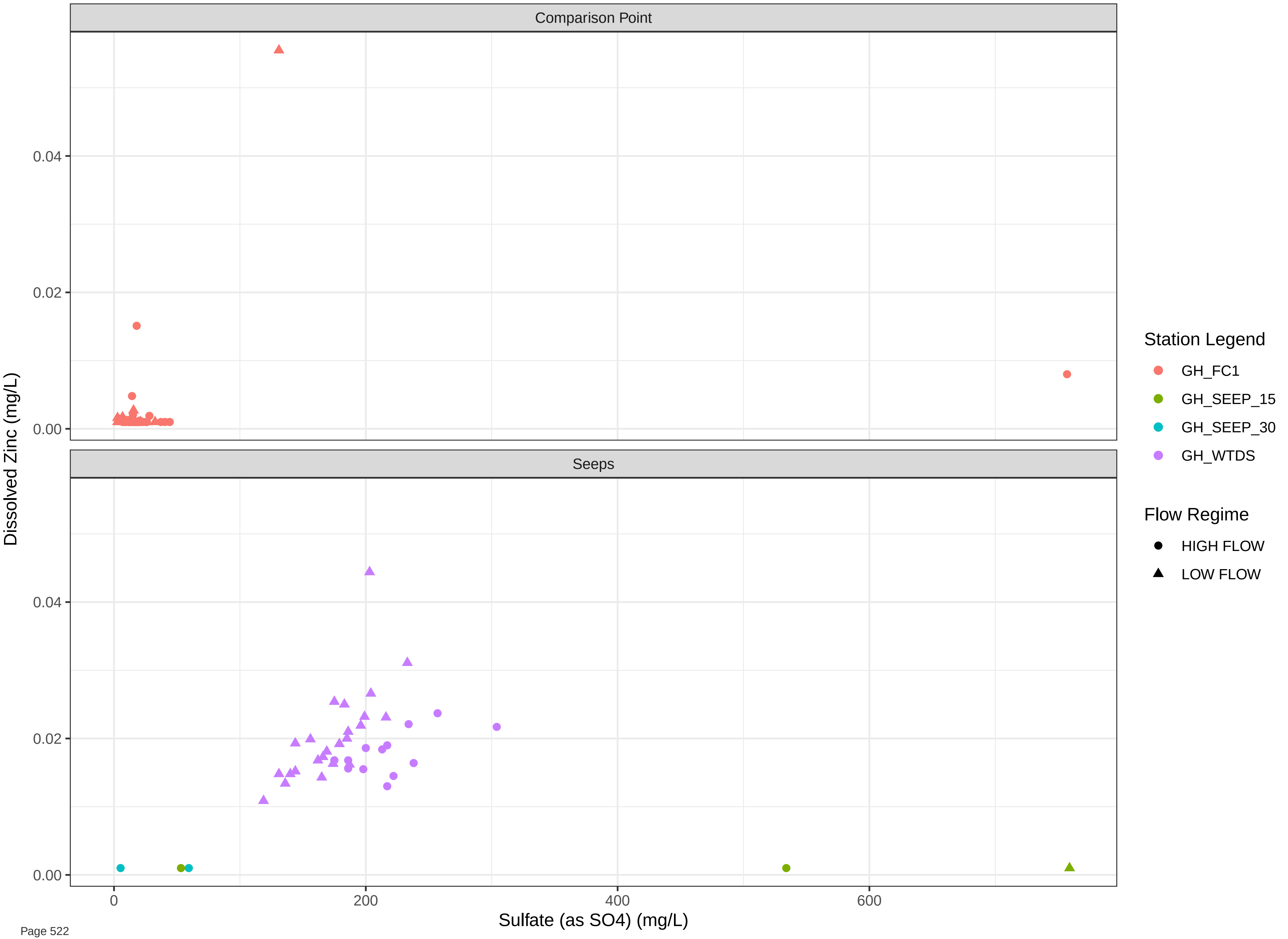
Seeps
0.050
0.025
0.000
−0.025
Dissolved Vanadium (mg/L)
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW



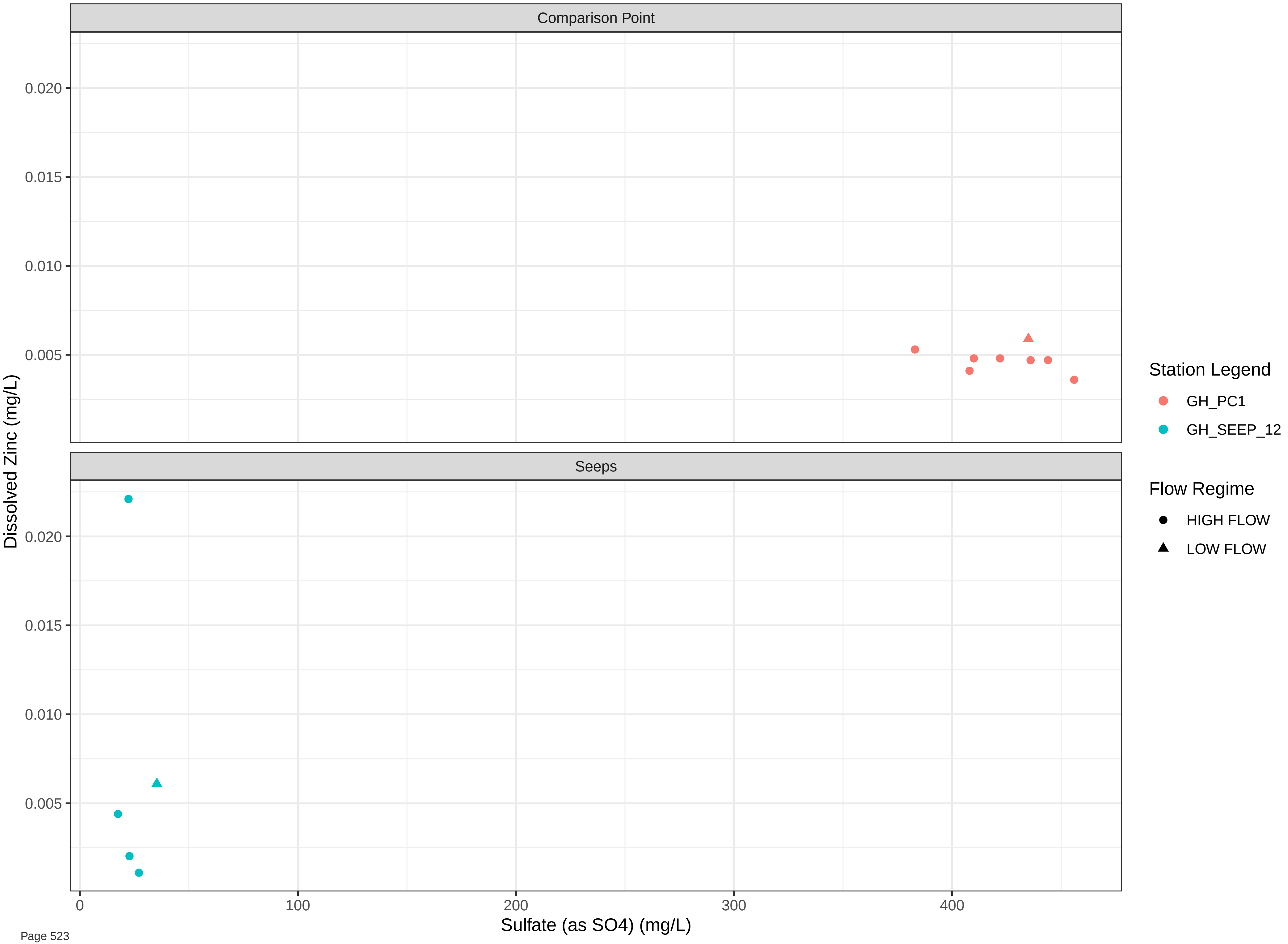
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

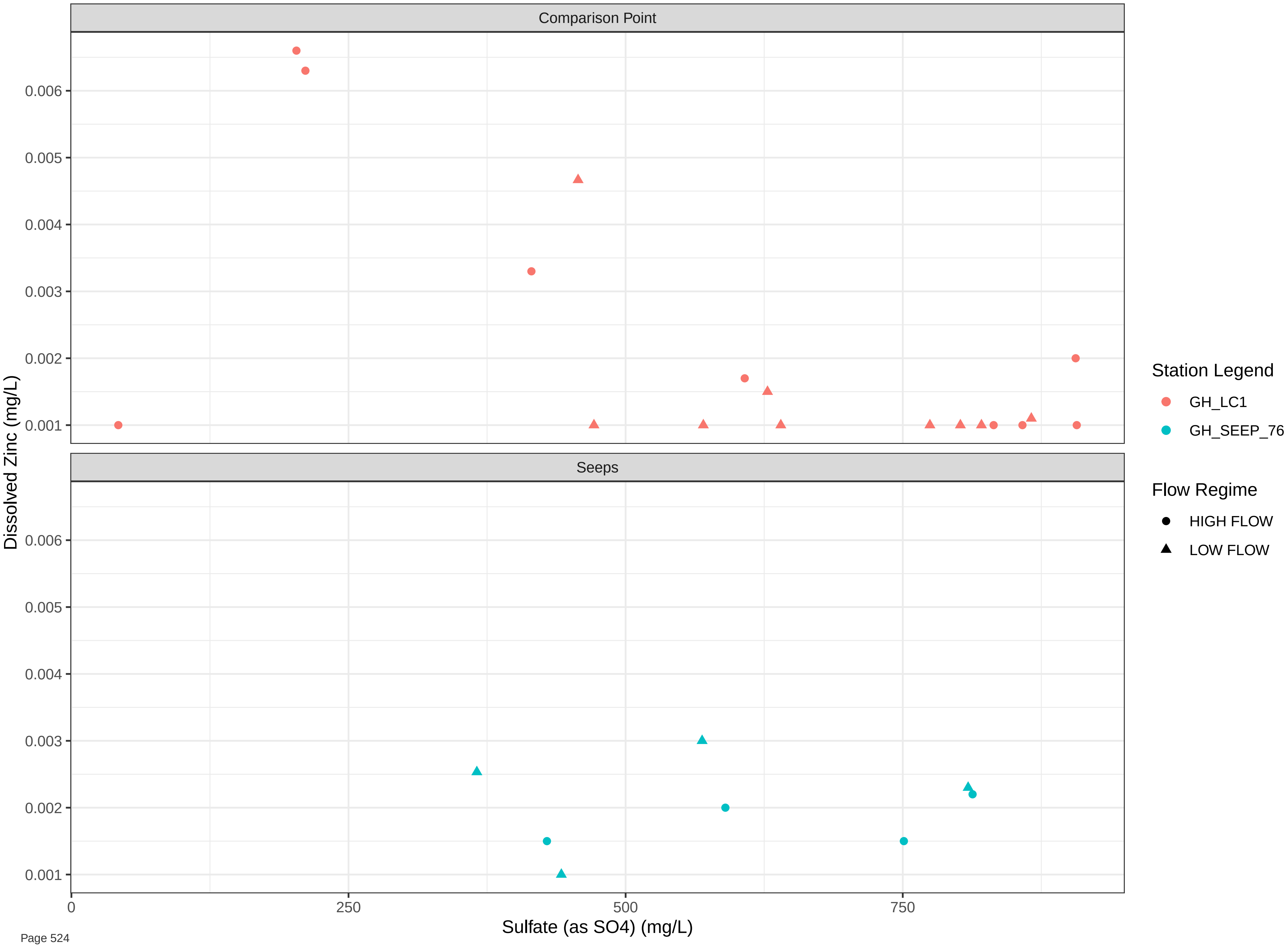


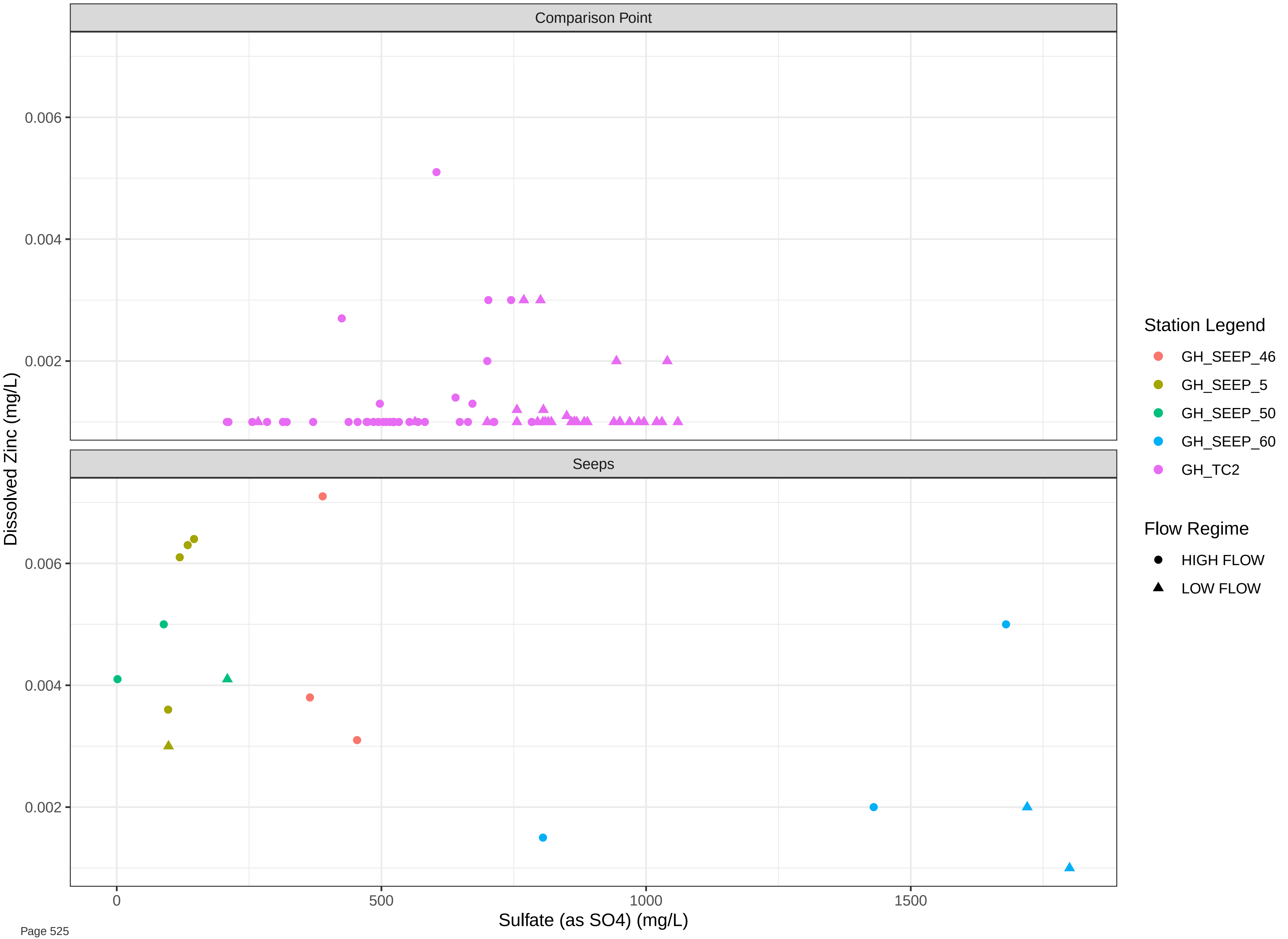
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.020
0.015
0.010
0.005
500
1000
1500
2000
2500
Sulfate (as SO4) (mg/L)
Station Legend
GH_E1
GH_E3
GH_GH1
GH_SEEP_16
GH_SEEP_21
GH_SEEP_22
GH_SEEP_26
GH_W−SEEP
Flow Regime
HIGH FLOW
LOW FLOW



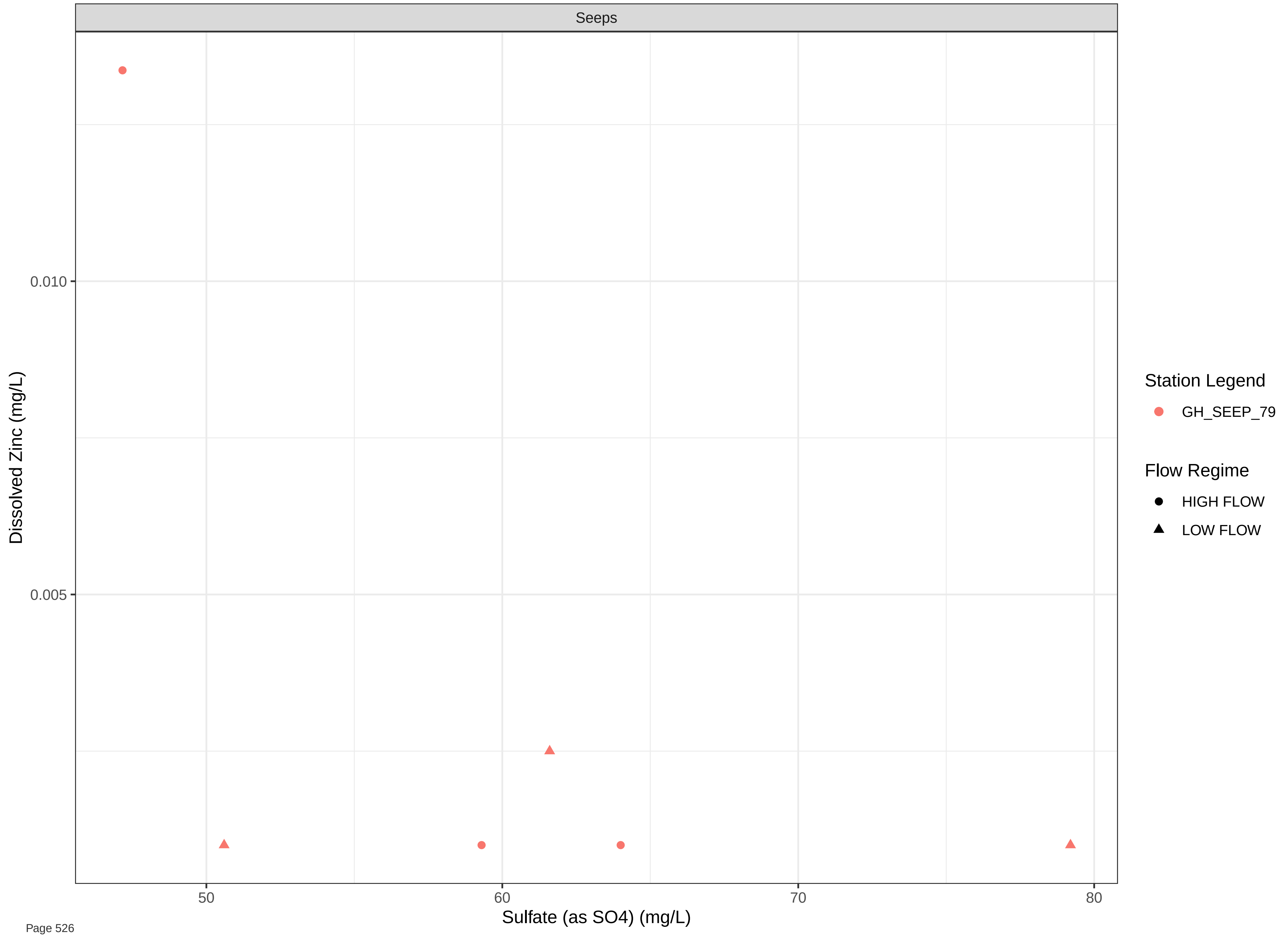
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.02
0.04
0
200
400
600
Sulfate (as SO4) (mg/L)
Station Legend
GH_FC1
GH_SEEP_15
GH_SEEP_30
GH_WTDS
Flow Regime
HIGH FLOW
LOW FLOW

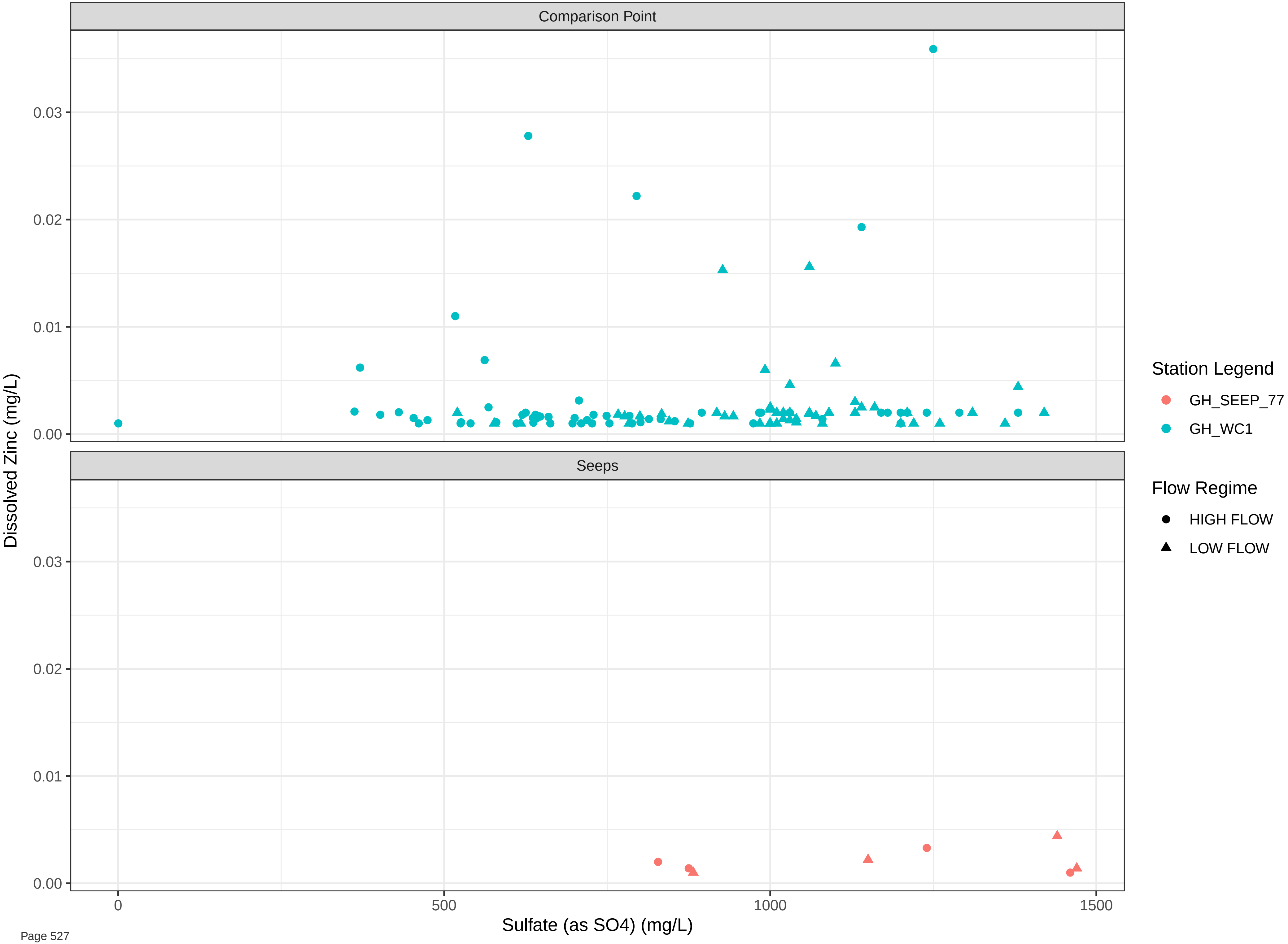

Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.020
0.015
0.010
0.005
0
100
200
300
400
Sulfate (as SO4) (mg/L)
Station Legend
GH_PC1
GH_SEEP_12
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.001
0.002
0.003
0.004
0.005
0.006
Sulfate (as SO4) (mg/L)
0
250
500
750
Station Legend
GH_LC1
GH_SEEP_76
Flow Regime
HIGH FLOW
LOW FLOW

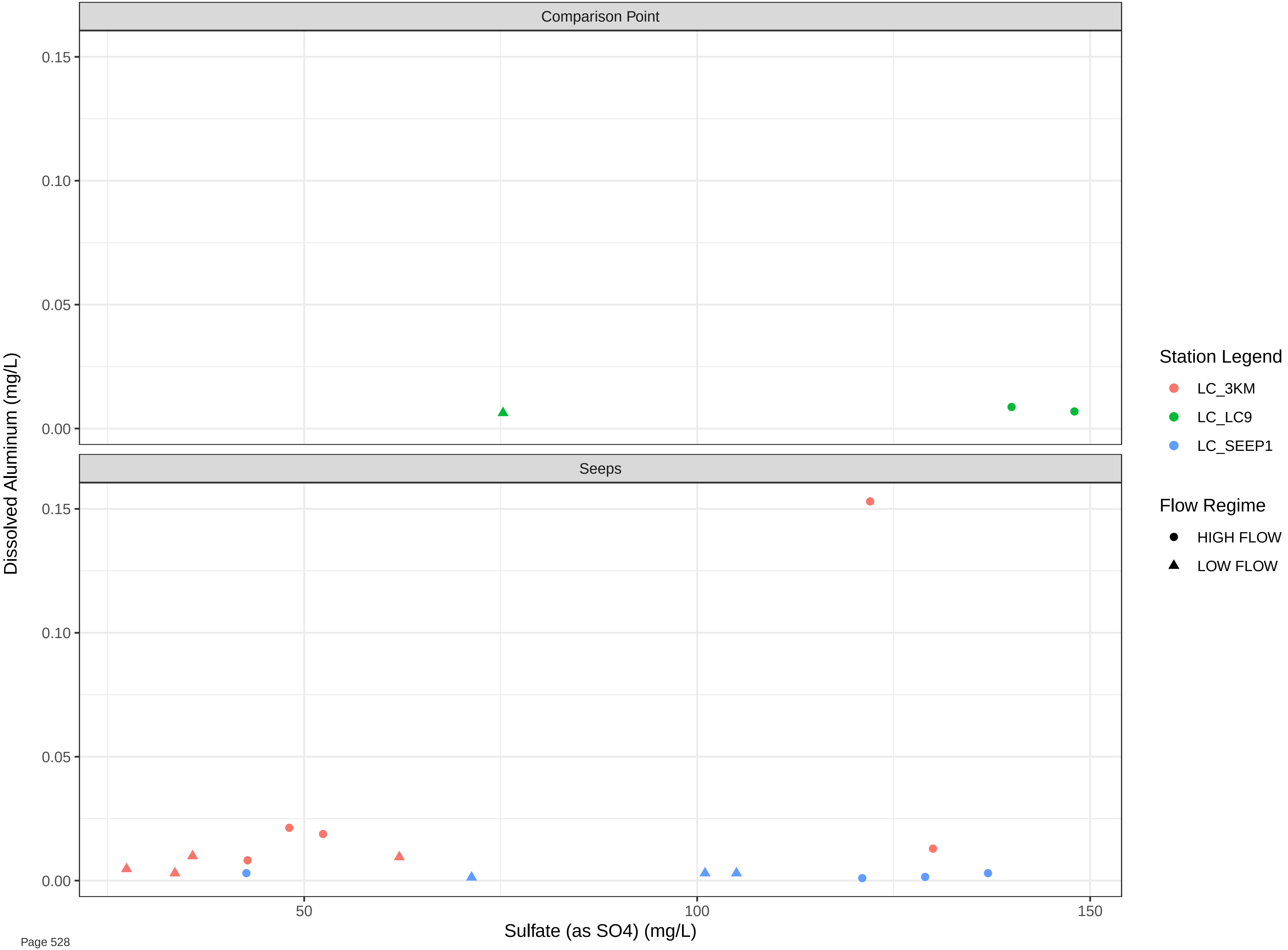


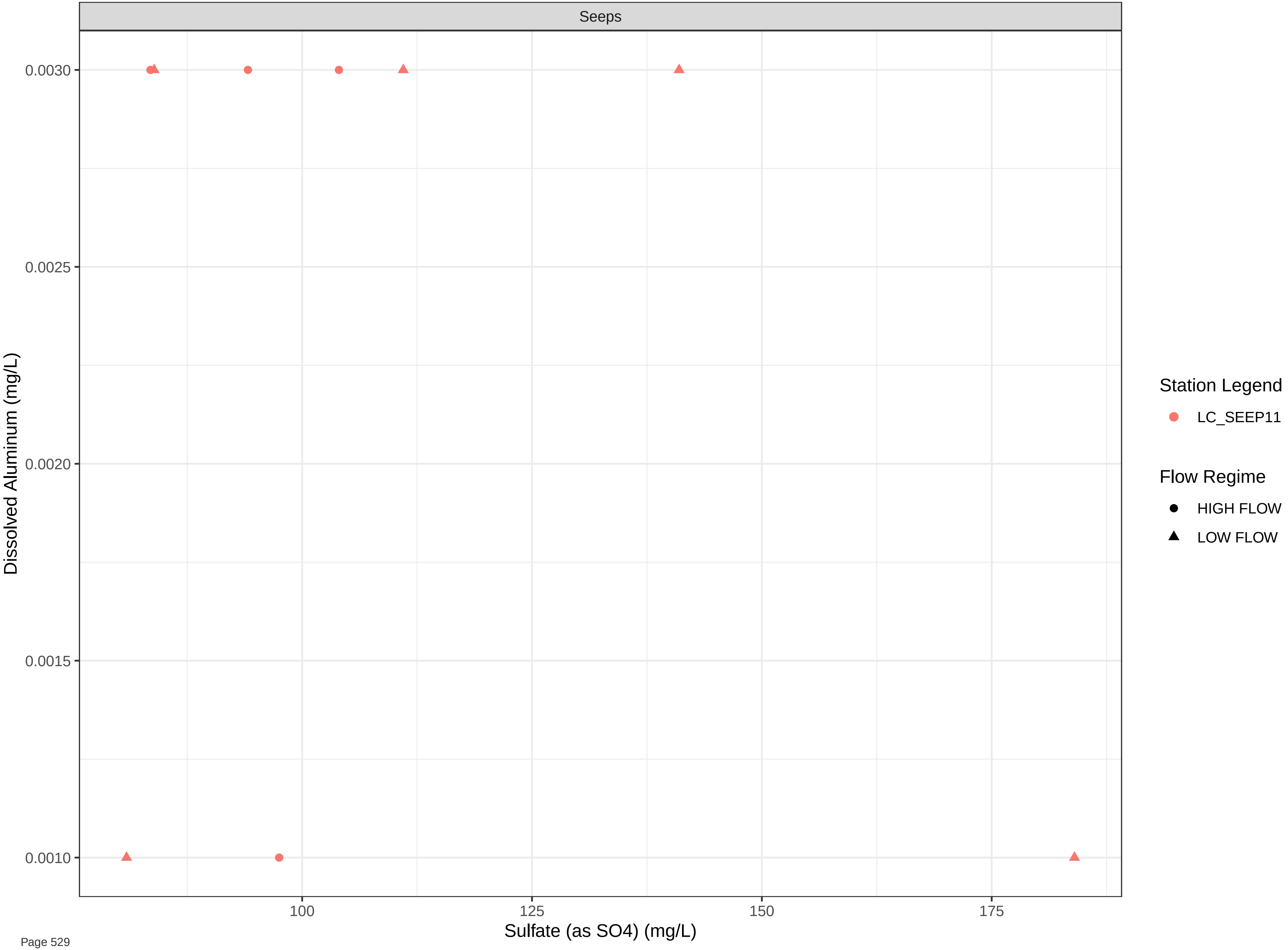
Comparison Point
Seeps
0.006
0.004
0.002
0
500
1000
1500
Dissolved Zinc (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_46
GH_SEEP_5
GH_SEEP_50
GH_SEEP_60
GH_TC2
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
Dissolved Zinc (mg/L)
0.010
0.005
50
60
70
80
Sulfate (as SO4) (mg/L)
Station Legend
GH_SEEP_79
Flow Regime
HIGH FLOW
LOW FLOW

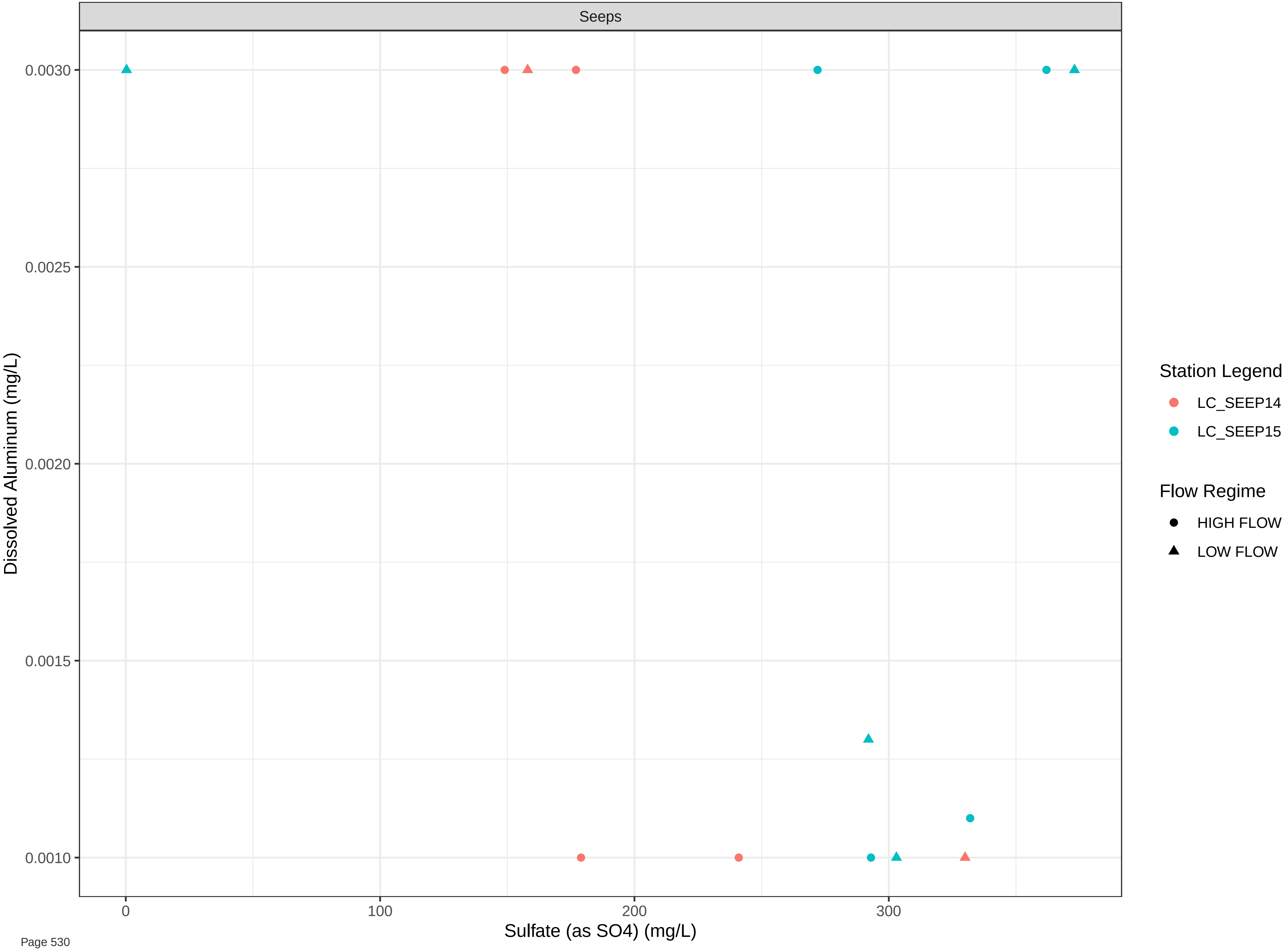


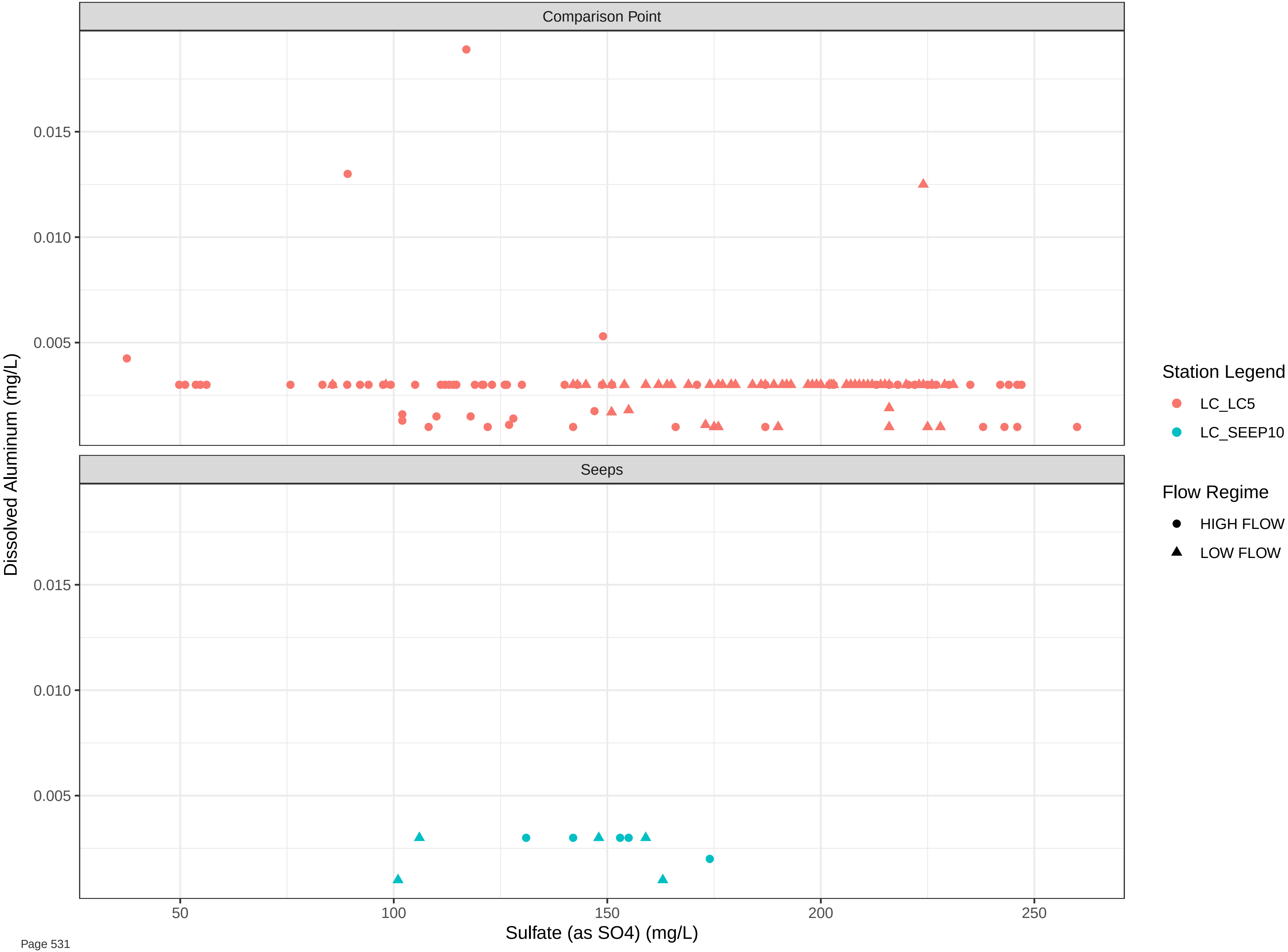
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
0.03
Sulfate (as SO4) (mg/L)
0
500
1000
1500
Station Legend
GH_SEEP_77
GH_WC1
Flow Regime
HIGH FLOW
LOW FLOW

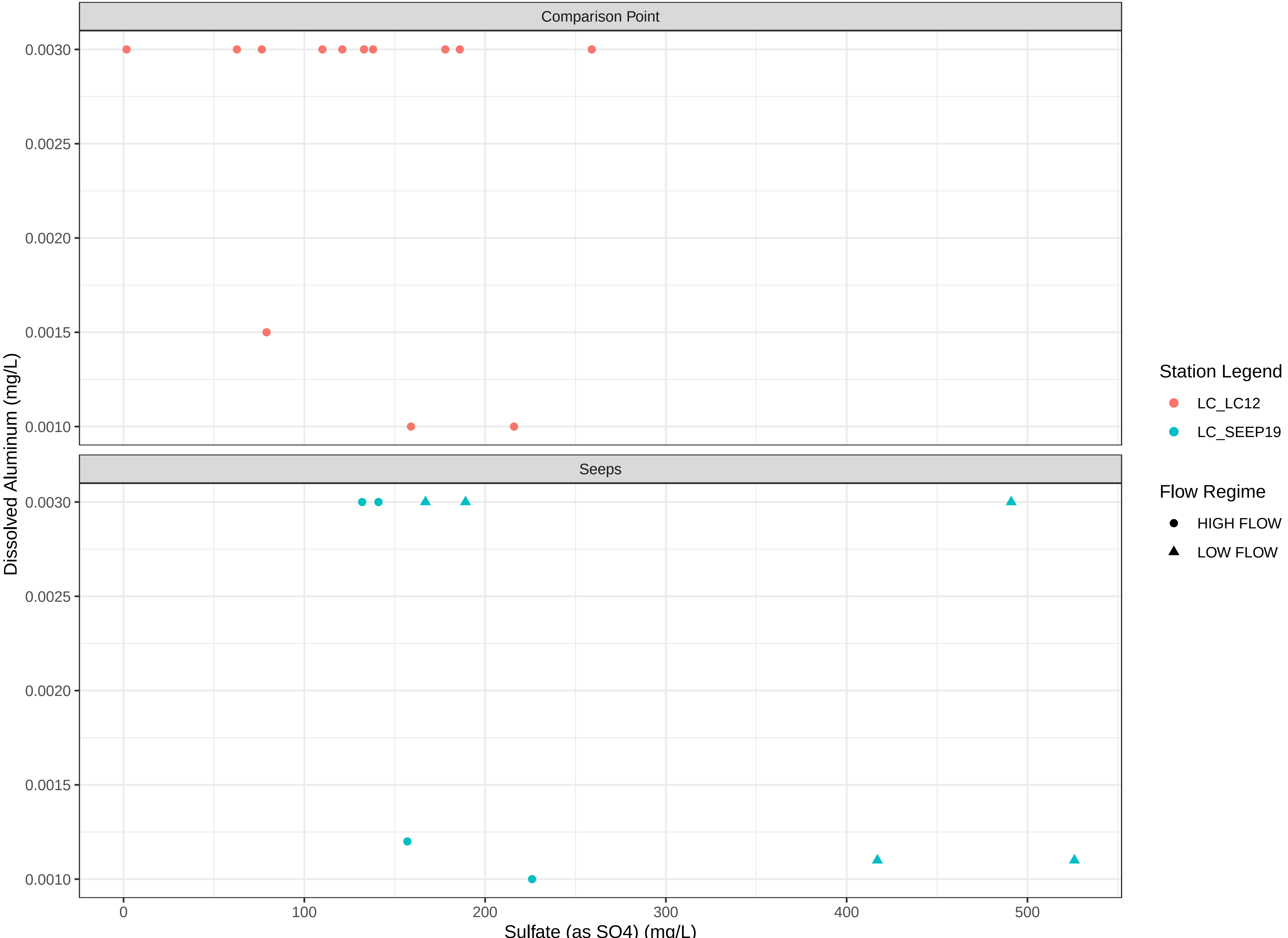

Comparison Point
Seeps
0.15
0.10
0.05
0.00
50
100
150
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



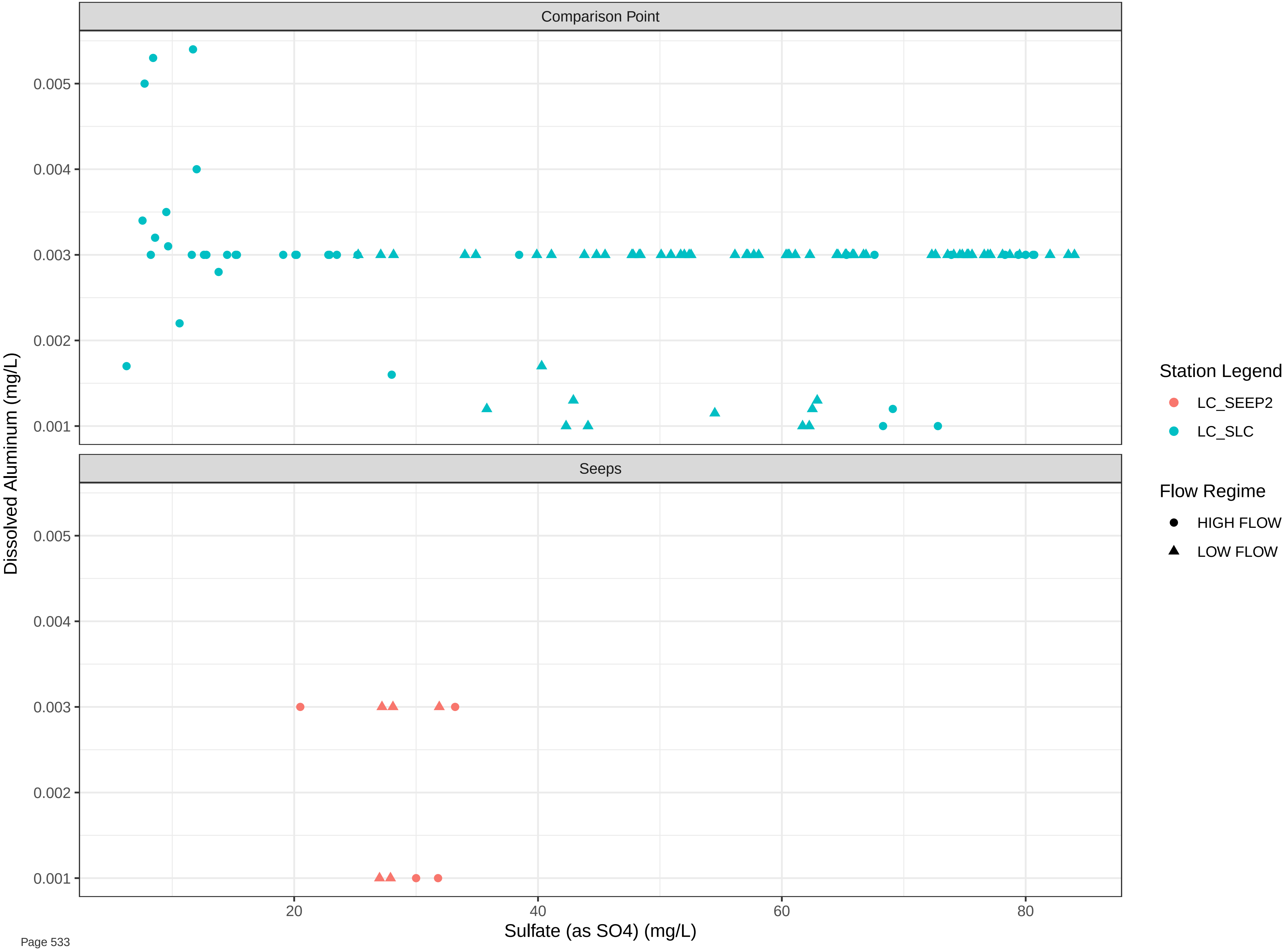
Seeps
Dissolved Aluminum (mg/L)
0.0030
0.0025
0.0020
0.0015
0.0010
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

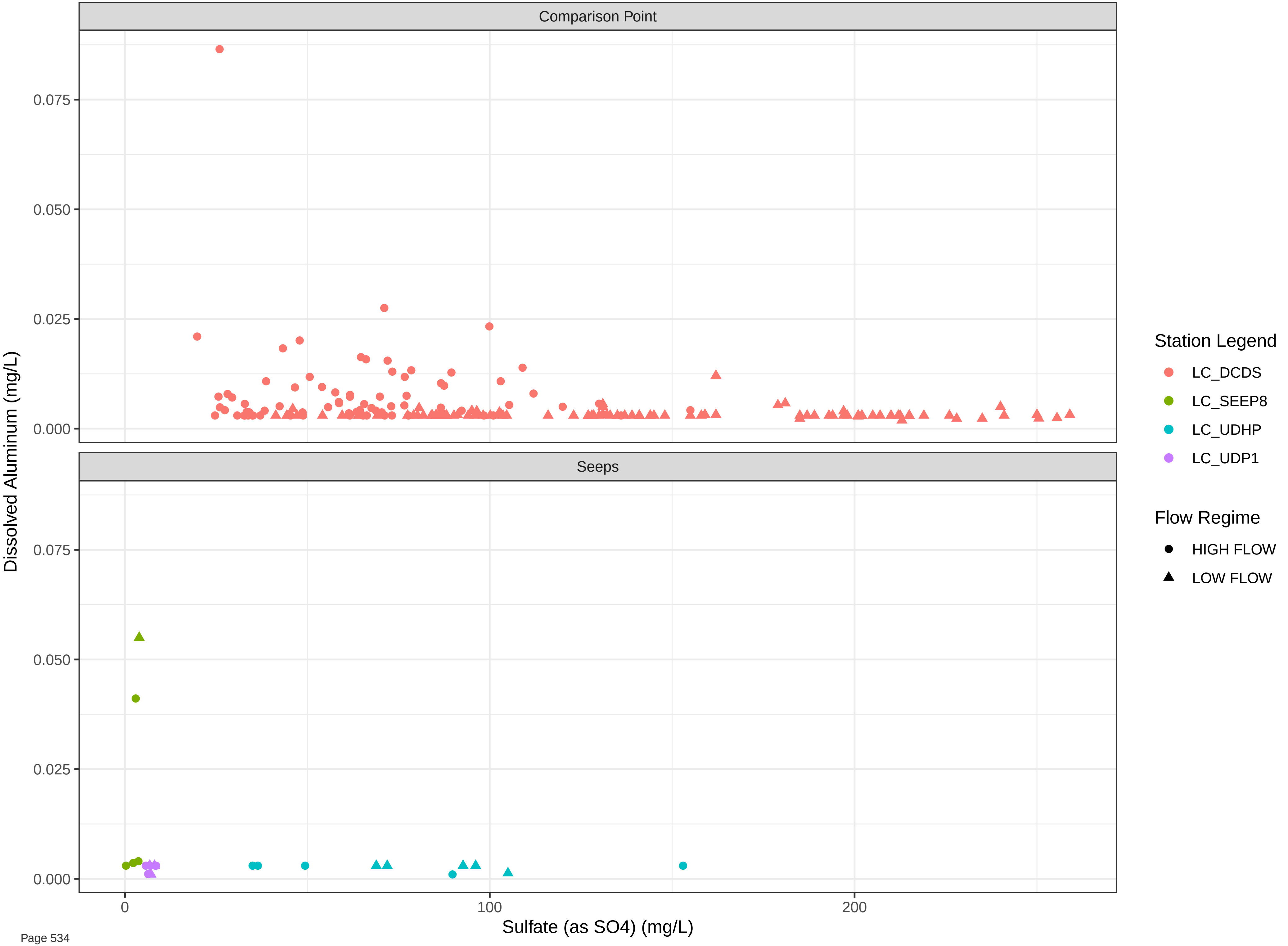

Seeps
0.0030
0.0025
0.0020
0.0015
0.0010
Dissolved Aluminum (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

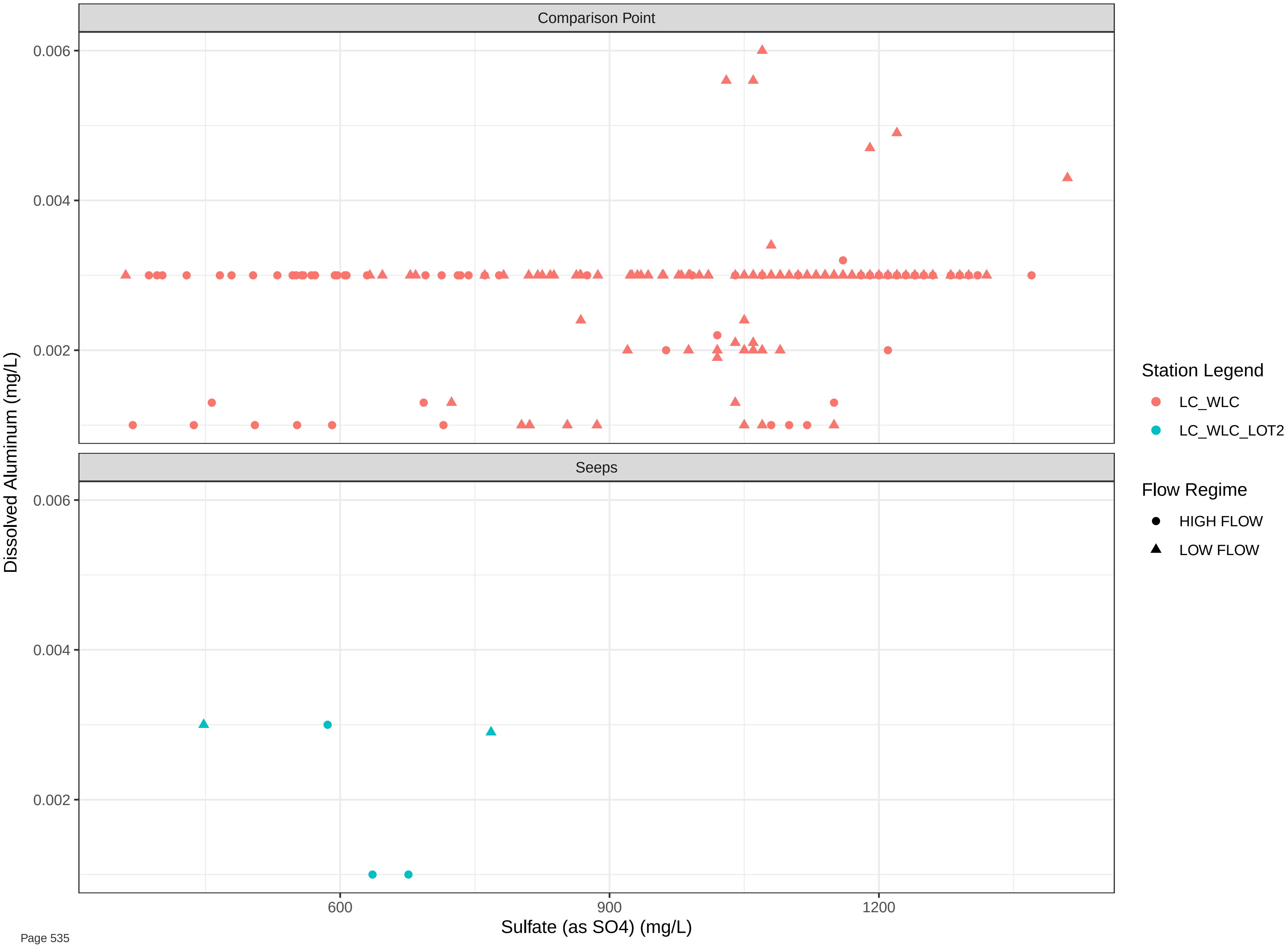

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.015
0.010
0.005
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

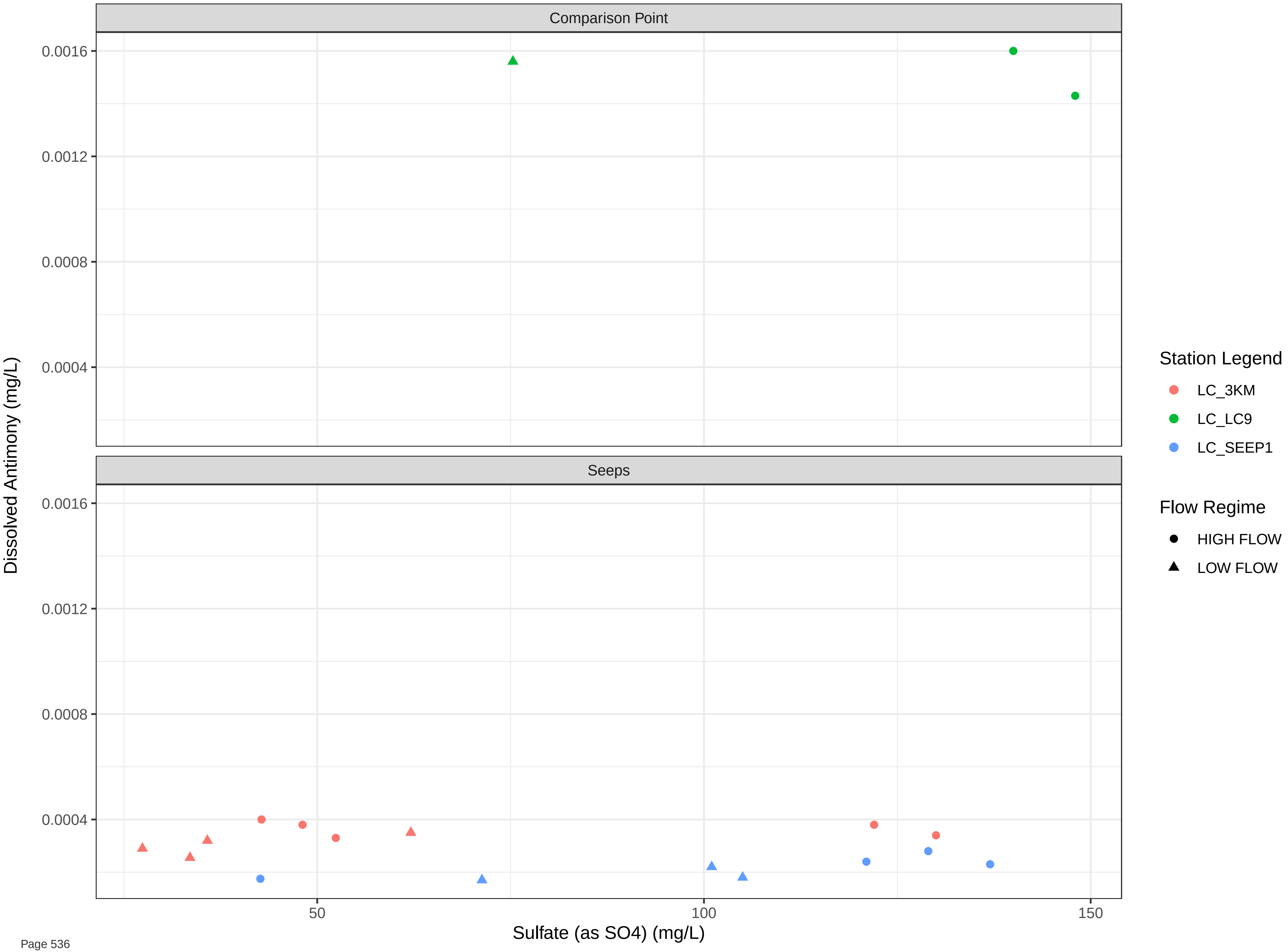


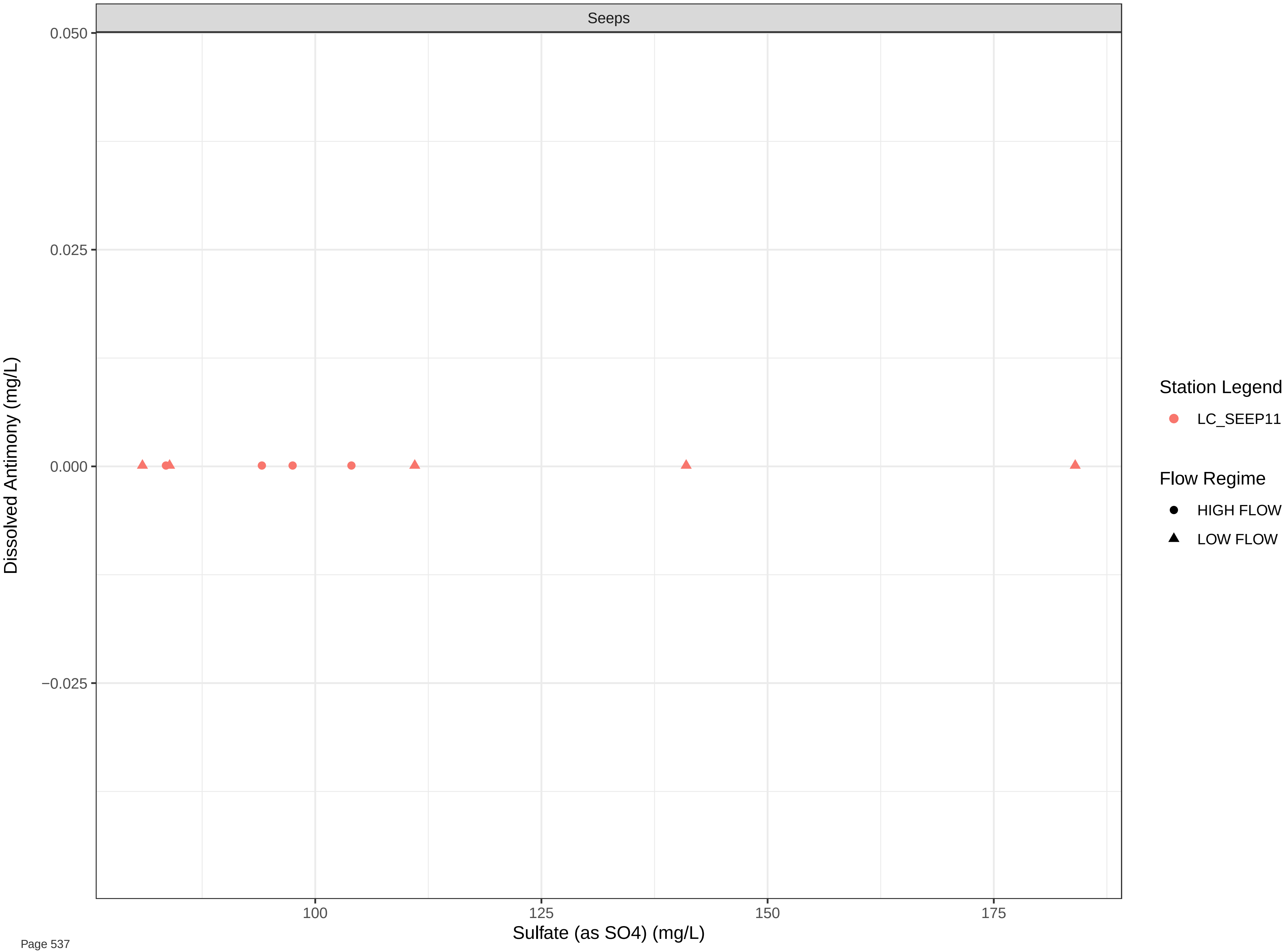
Comparison Point
Seeps
0.0030
0.0025
0.0020
0.0015
0.0010
Dissolved Aluminum (mg/L)
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.005
0.004
0.003
0.002
0.001
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

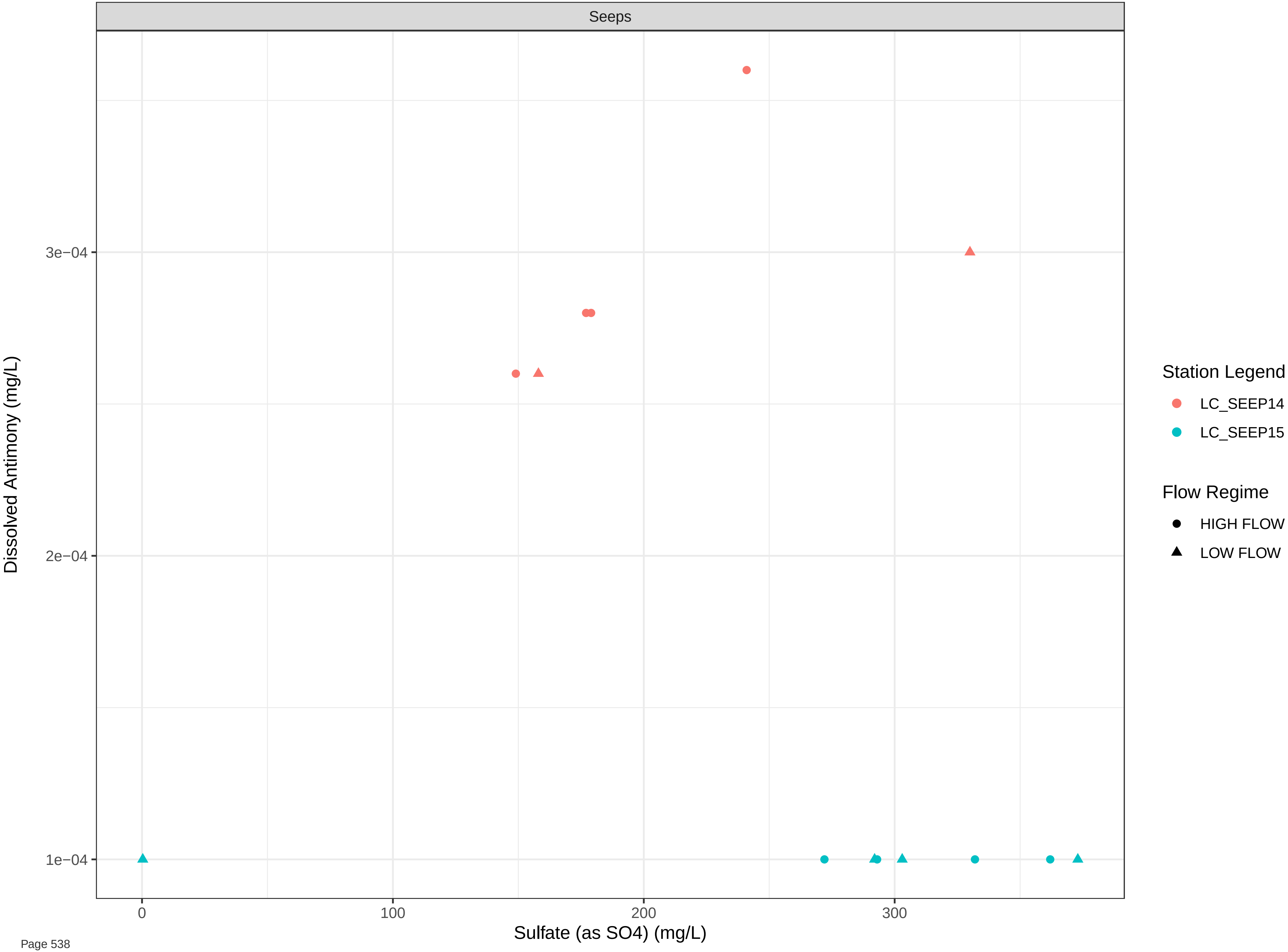

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.000
0.025
0.050
0.075
Sulfate (as SO4) (mg/L)
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.006
0.004
0.002
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

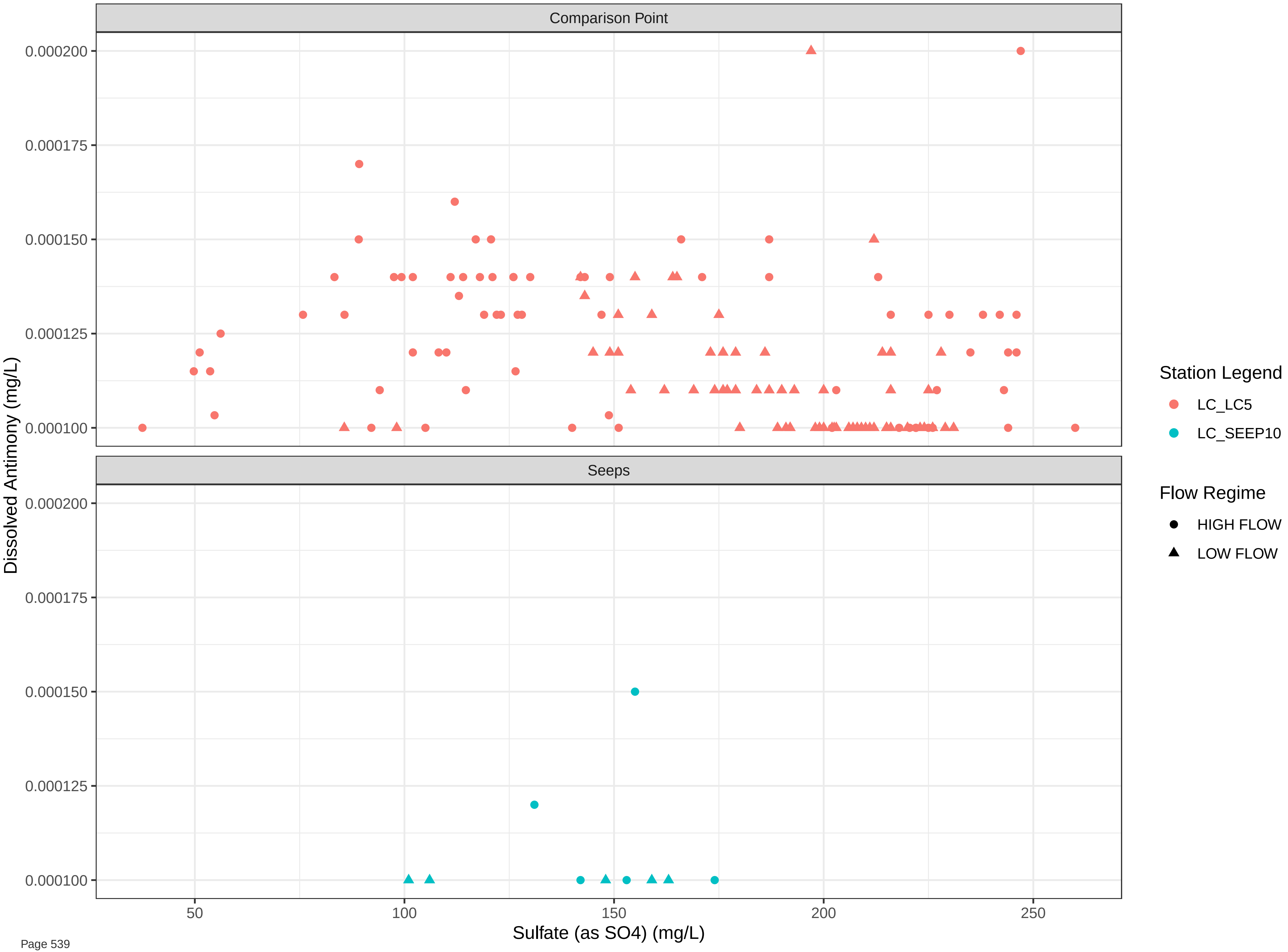

Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.0016
0.0012
0.0008
0.0004
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



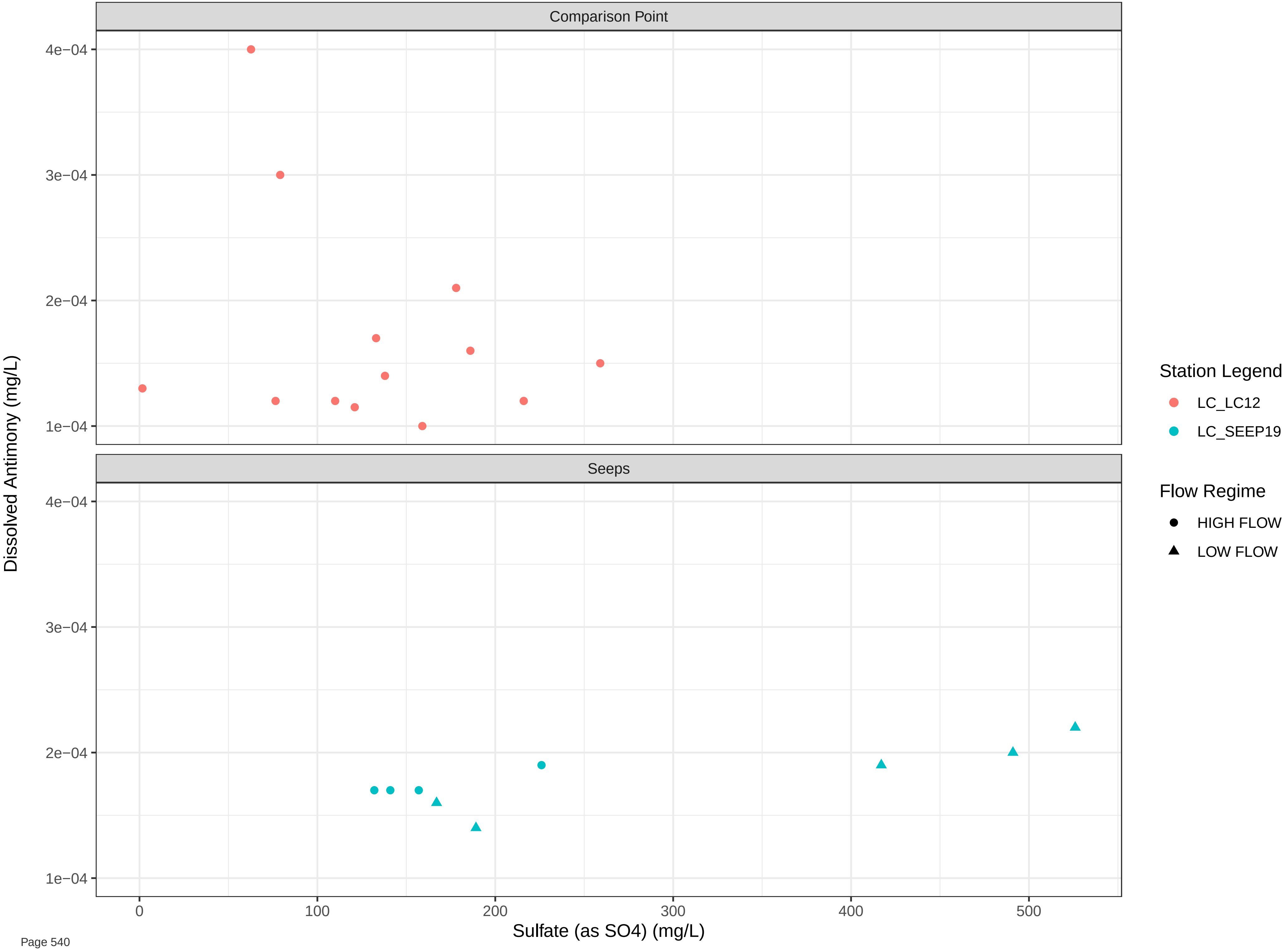
Seeps
0.050
0.025
0.000
−0.025
Dissolved Antimony (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



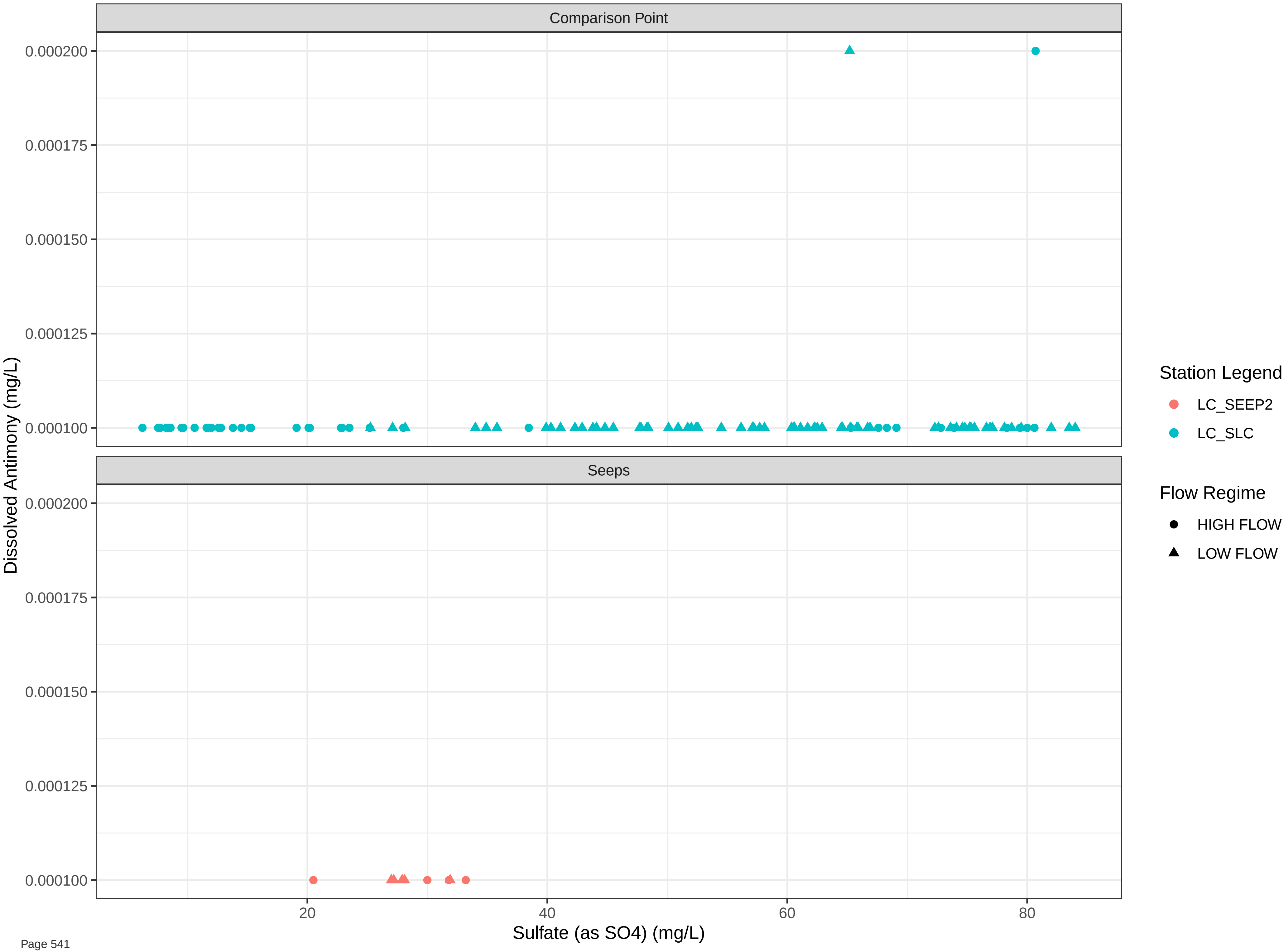
Seeps
Dissolved Antimony (mg/L)
3e−04
2e−04
1e−04
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



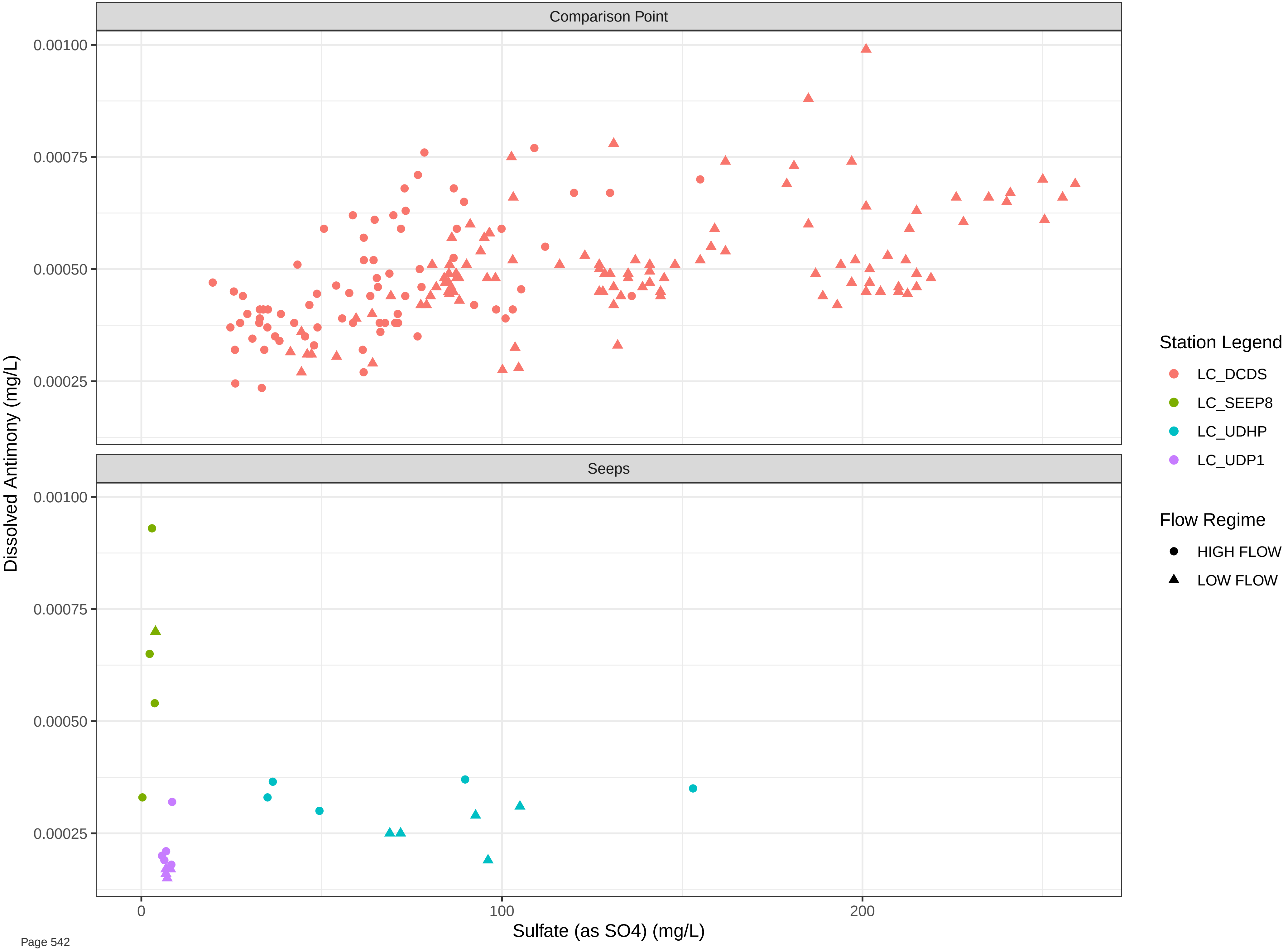
Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



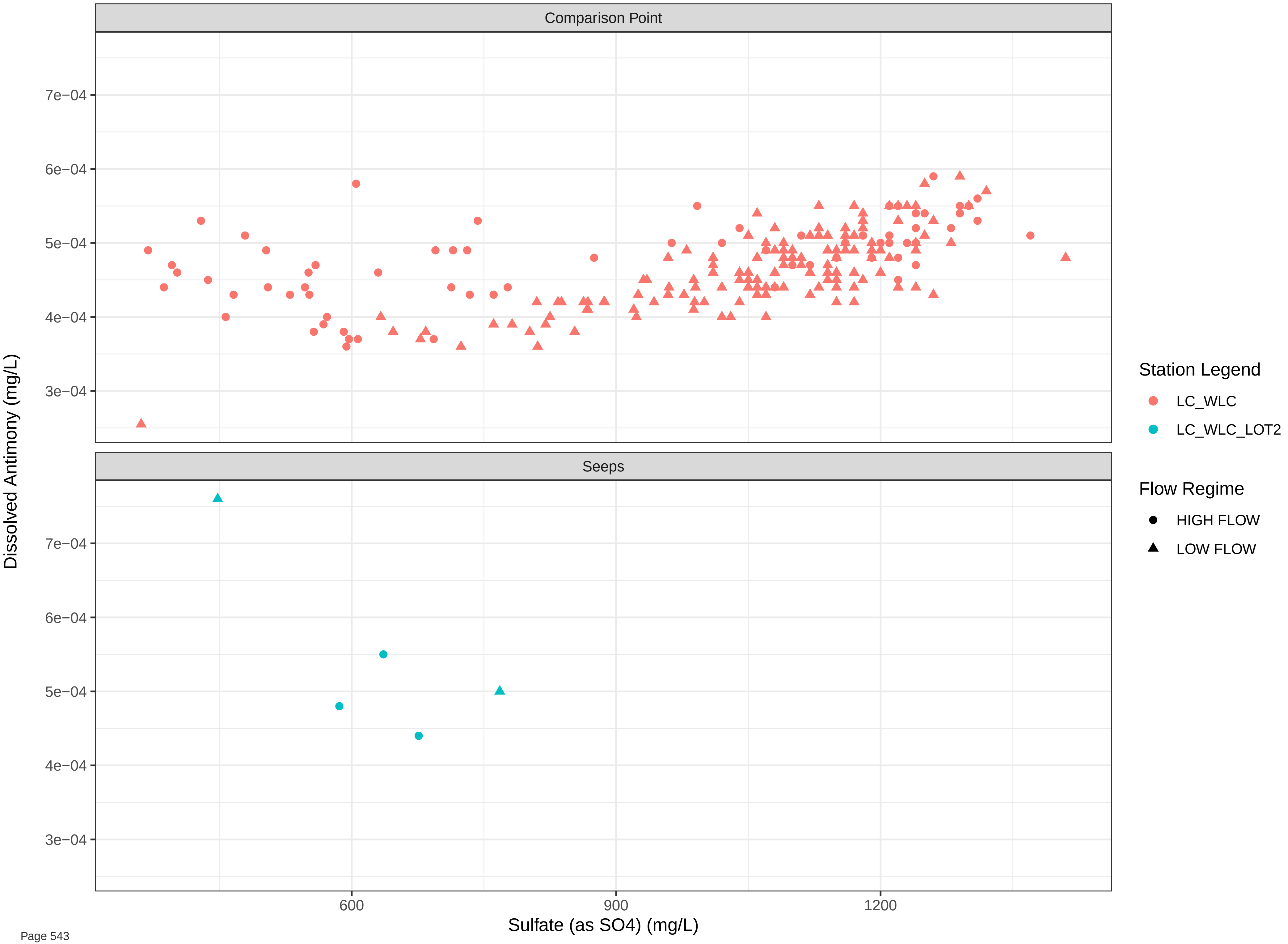
Comparison Point
Seeps
Dissolved Antimony (mg/L)
4e−04
3e−04
2e−04
1e−04
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

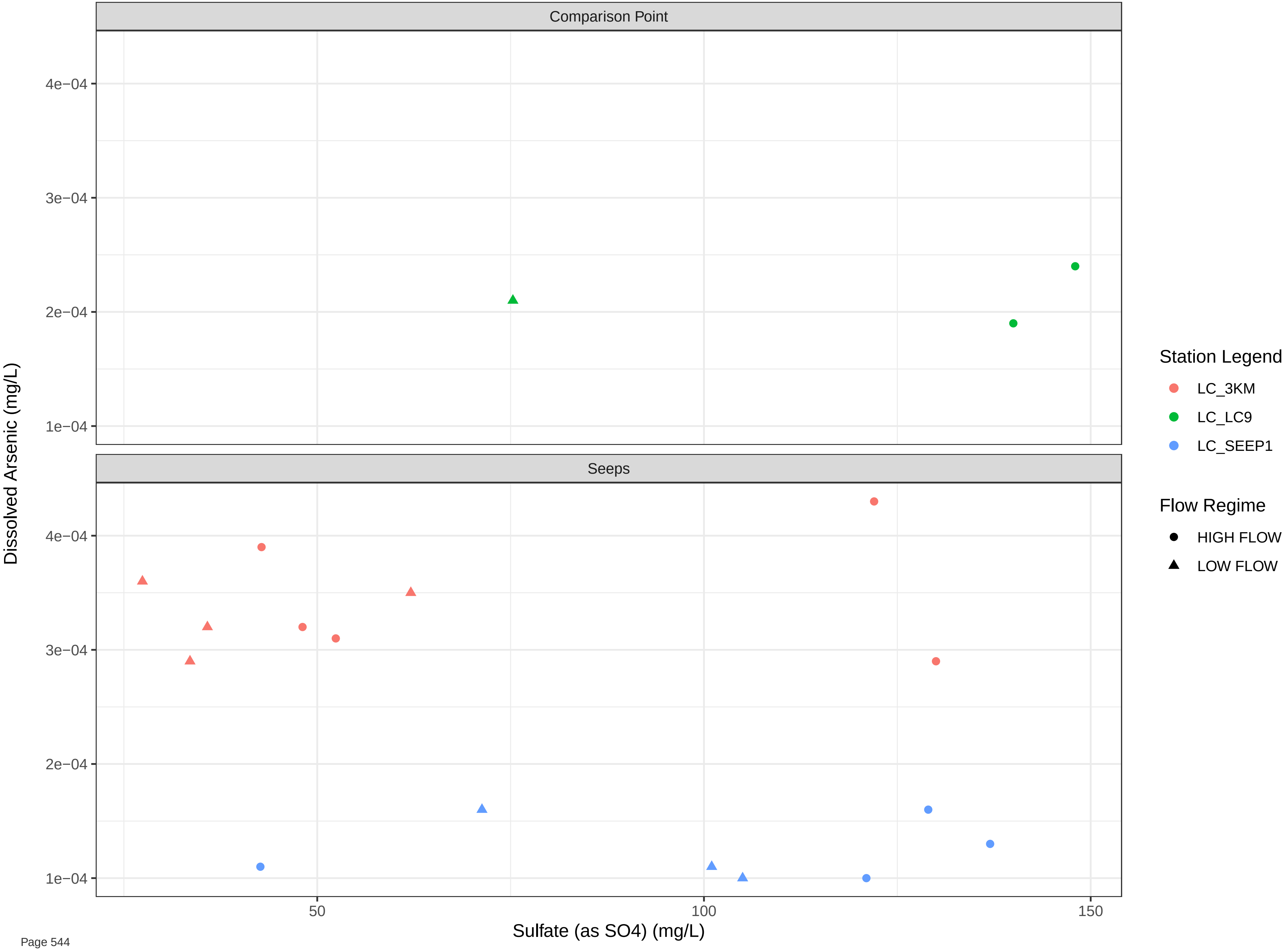


Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

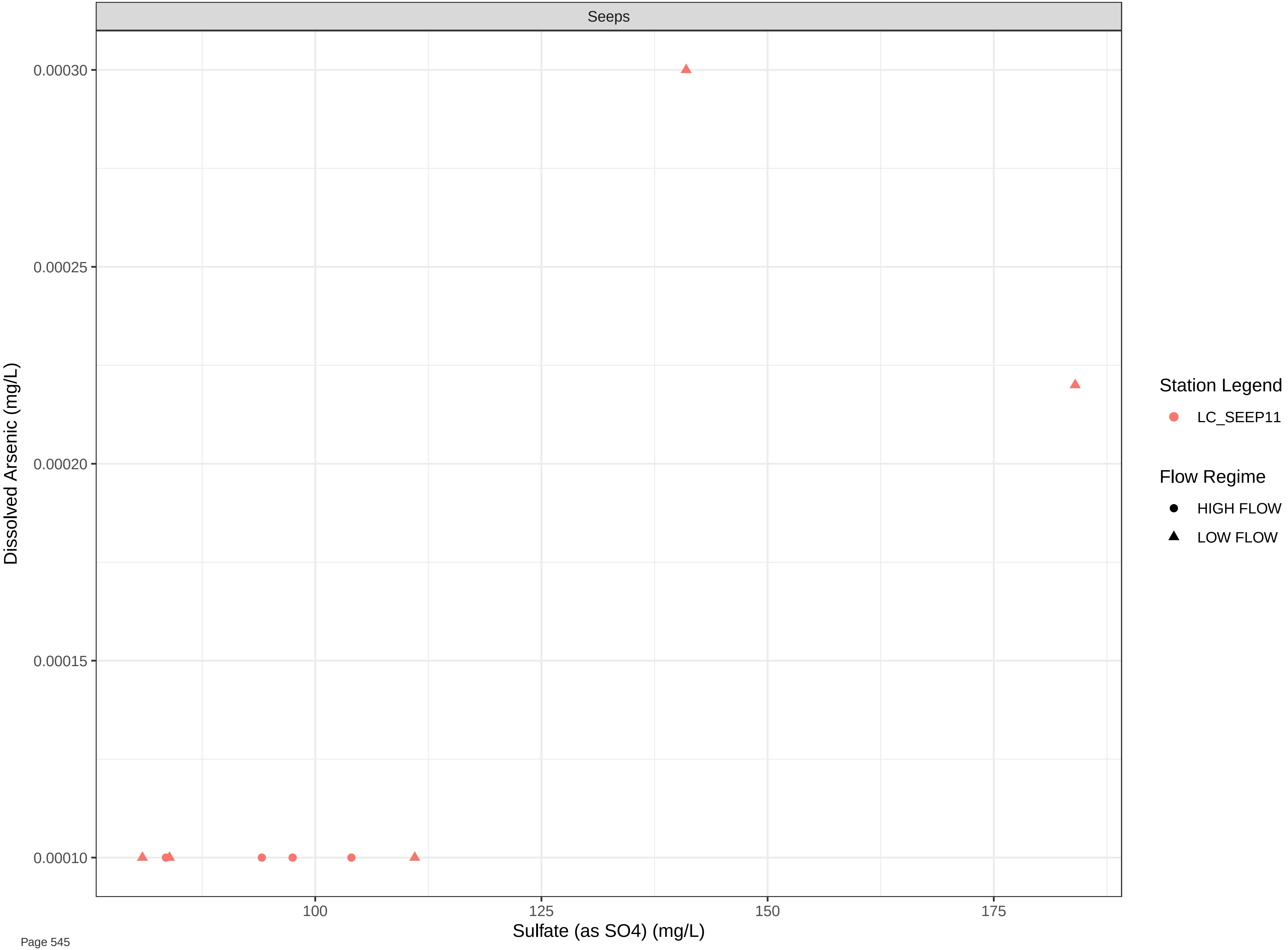


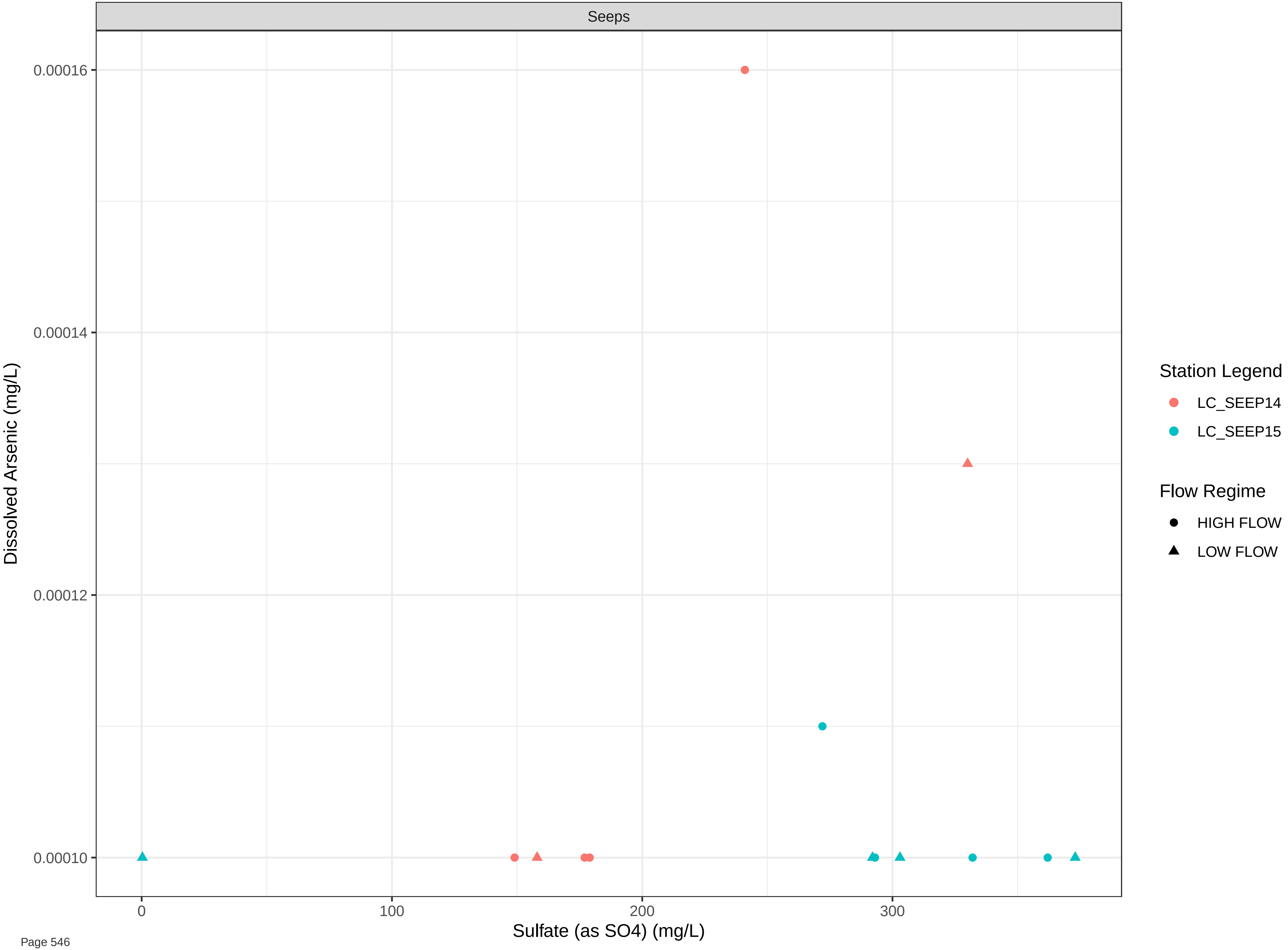
Comparison Point
Seeps
0.00100
0.00075
0.00050
0.00025
0
100
200
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
7e−04
6e−04
5e−04
4e−04
3e−04
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

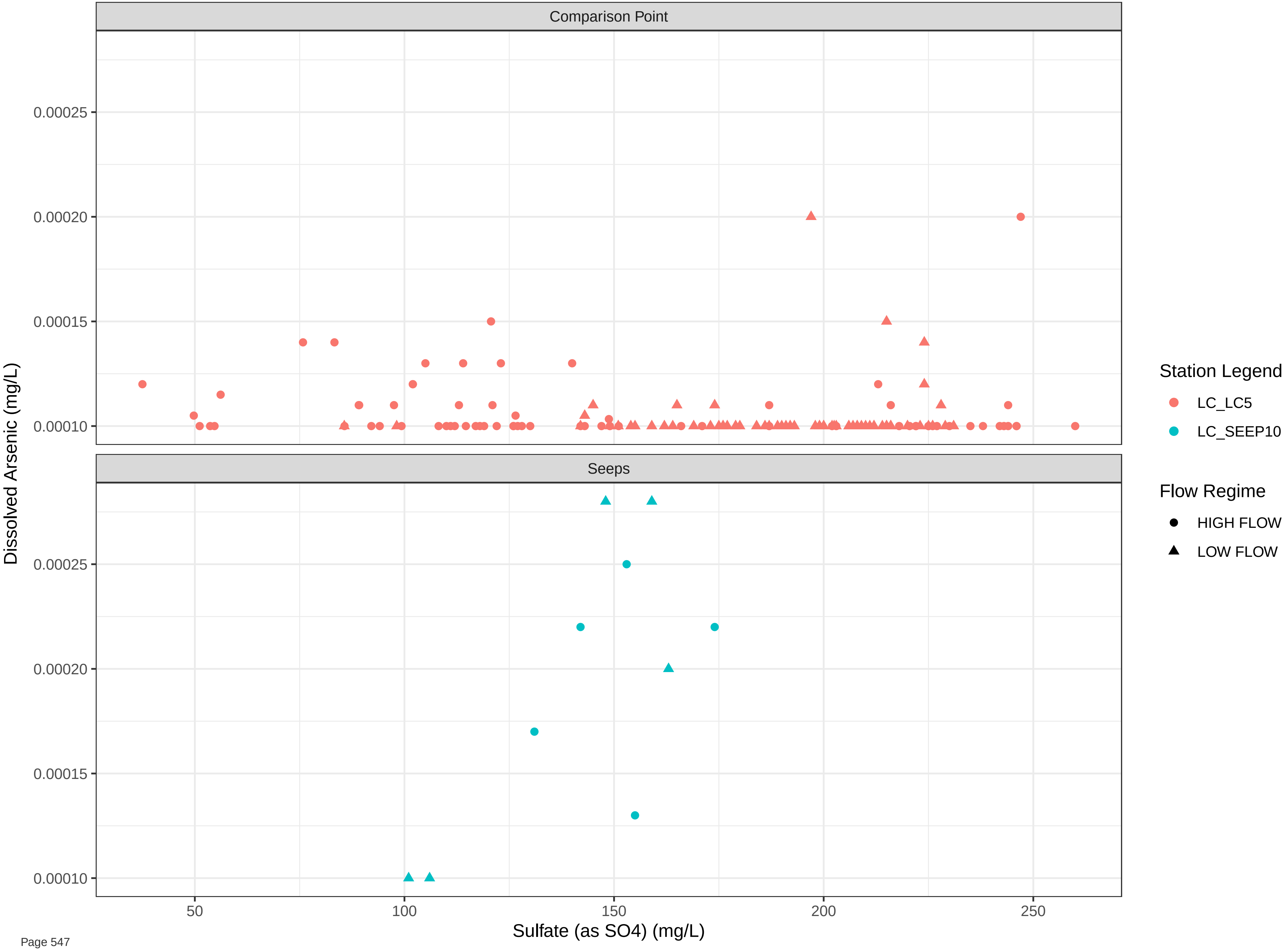


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
4e−04
3e−04
2e−04
1e−04
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

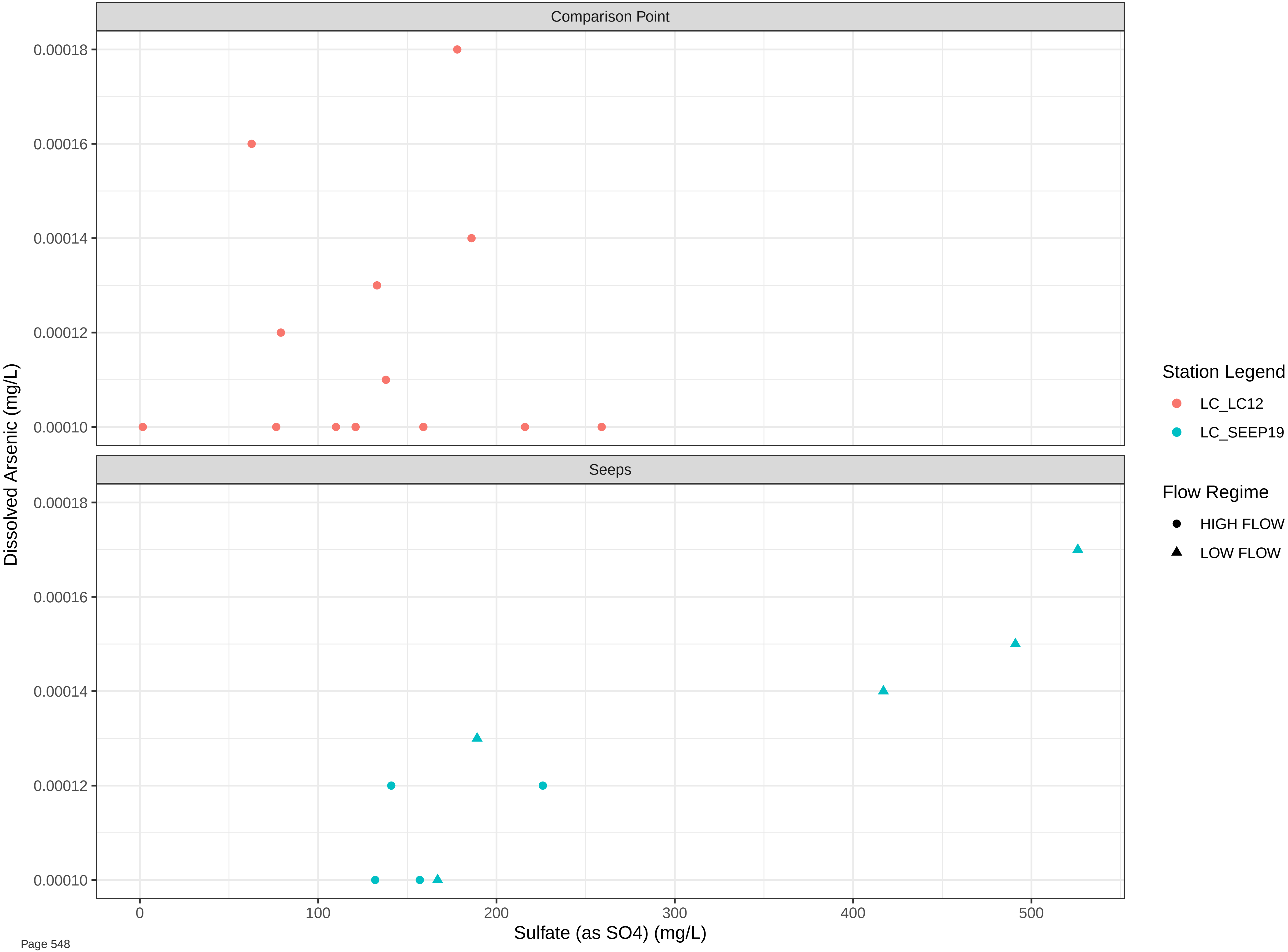

Seeps
0.00030
0.00025
0.00020
0.00015
0.00010
Dissolved Arsenic (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

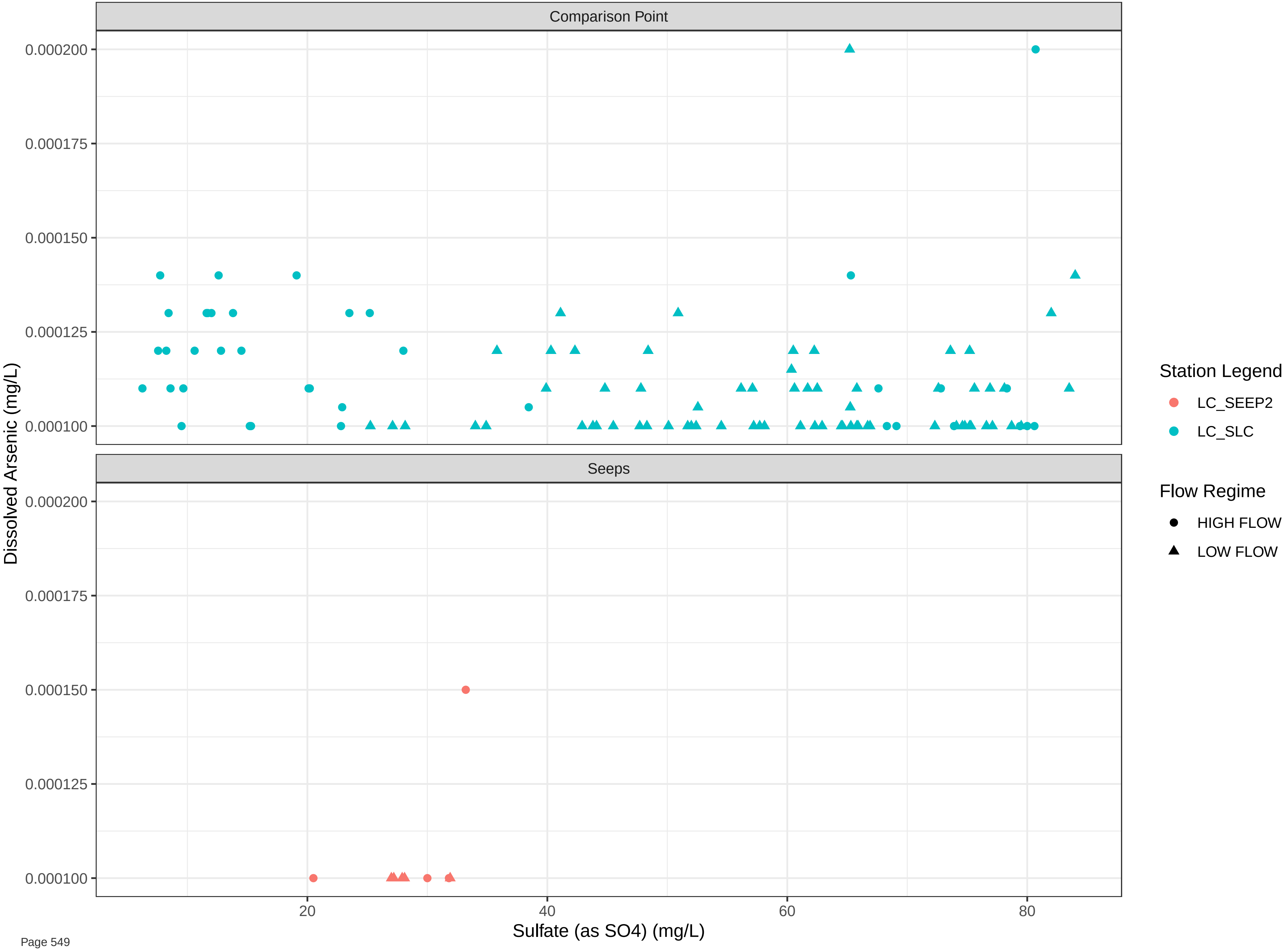


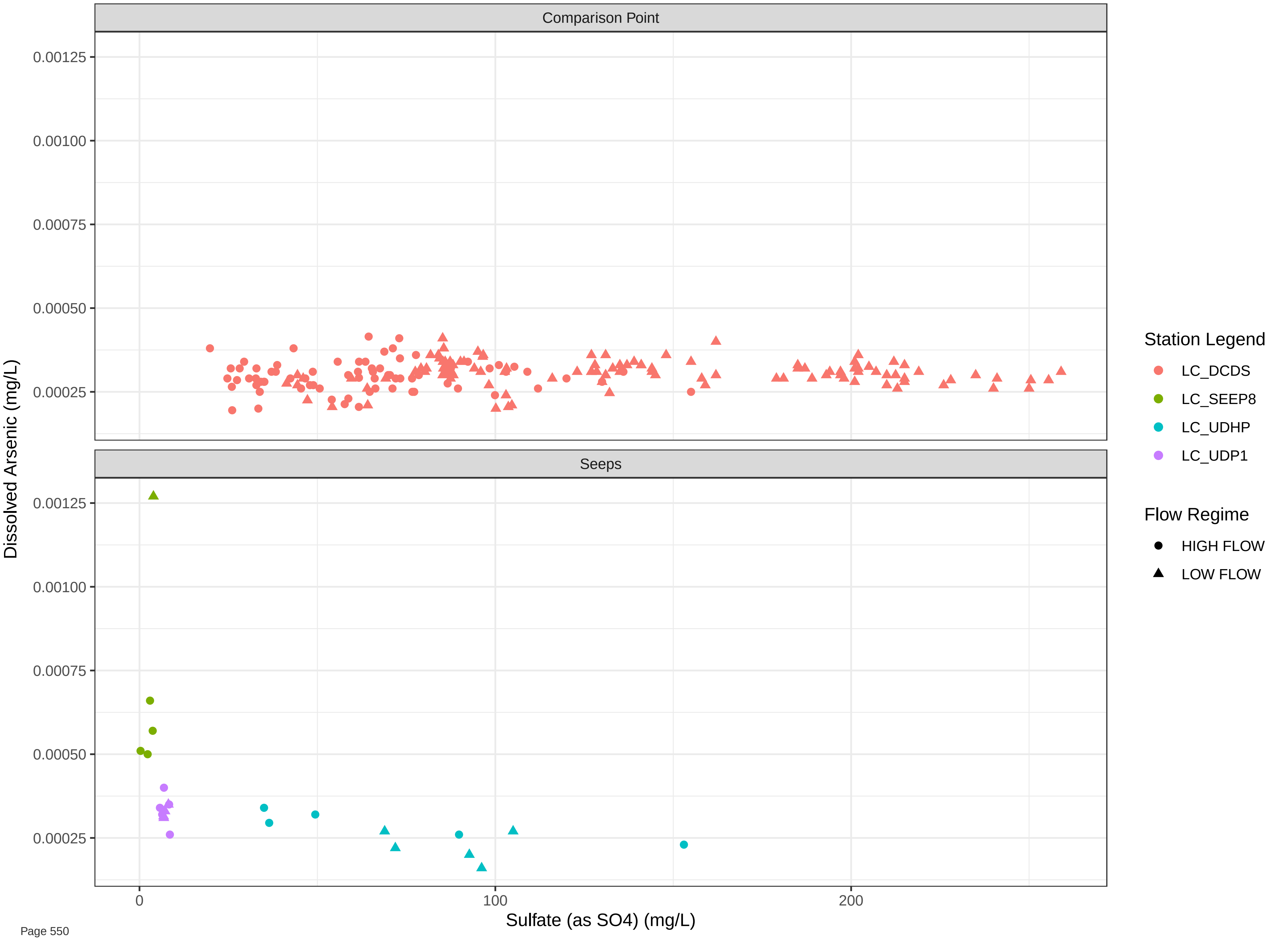
Seeps
0.00016
0.00014
0.00012
0.00010
Dissolved Arsenic (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



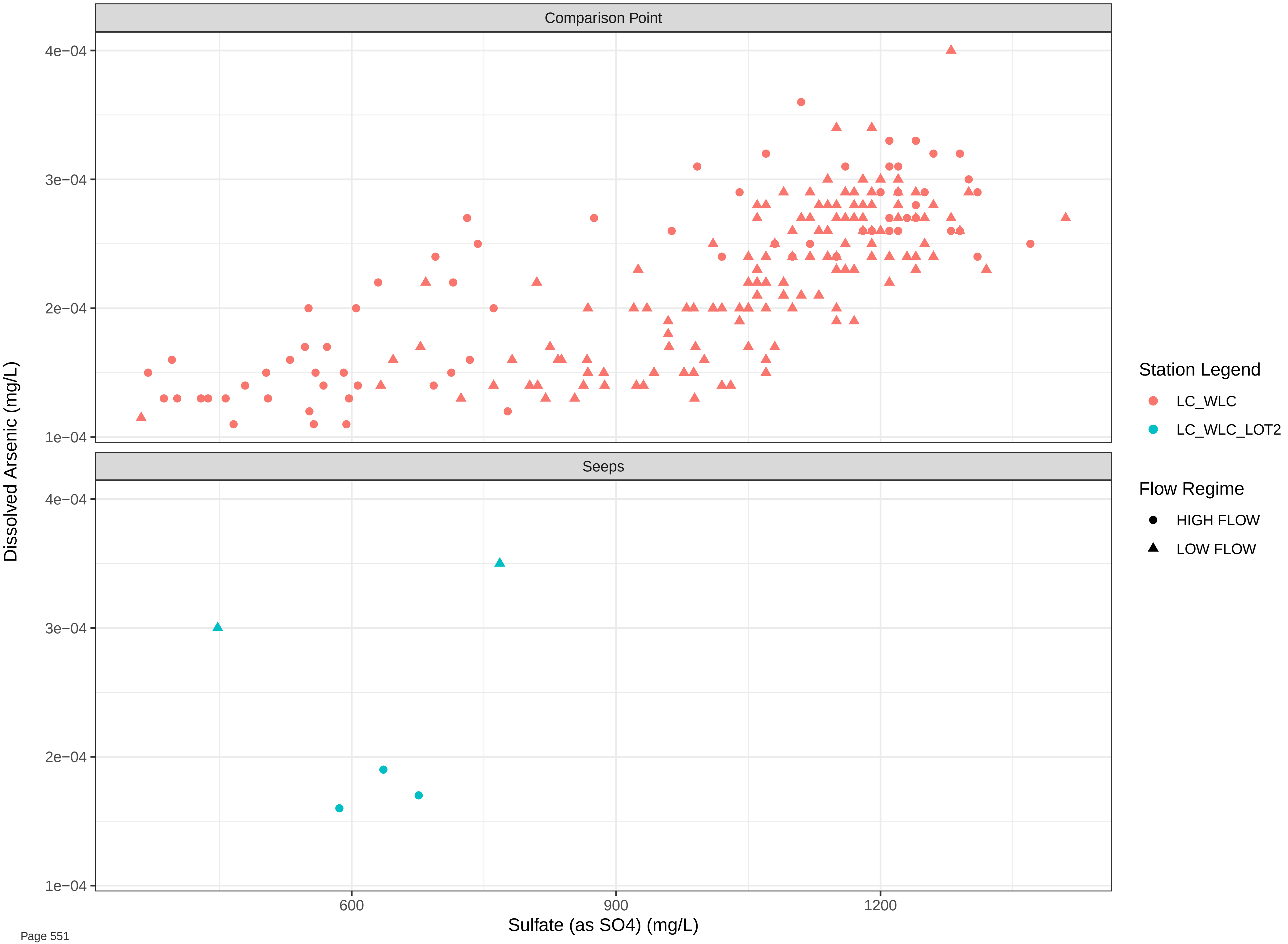
Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00010
0.00015
0.00020
0.00025
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00010
0.00012
0.00014
0.00016
0.00018
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

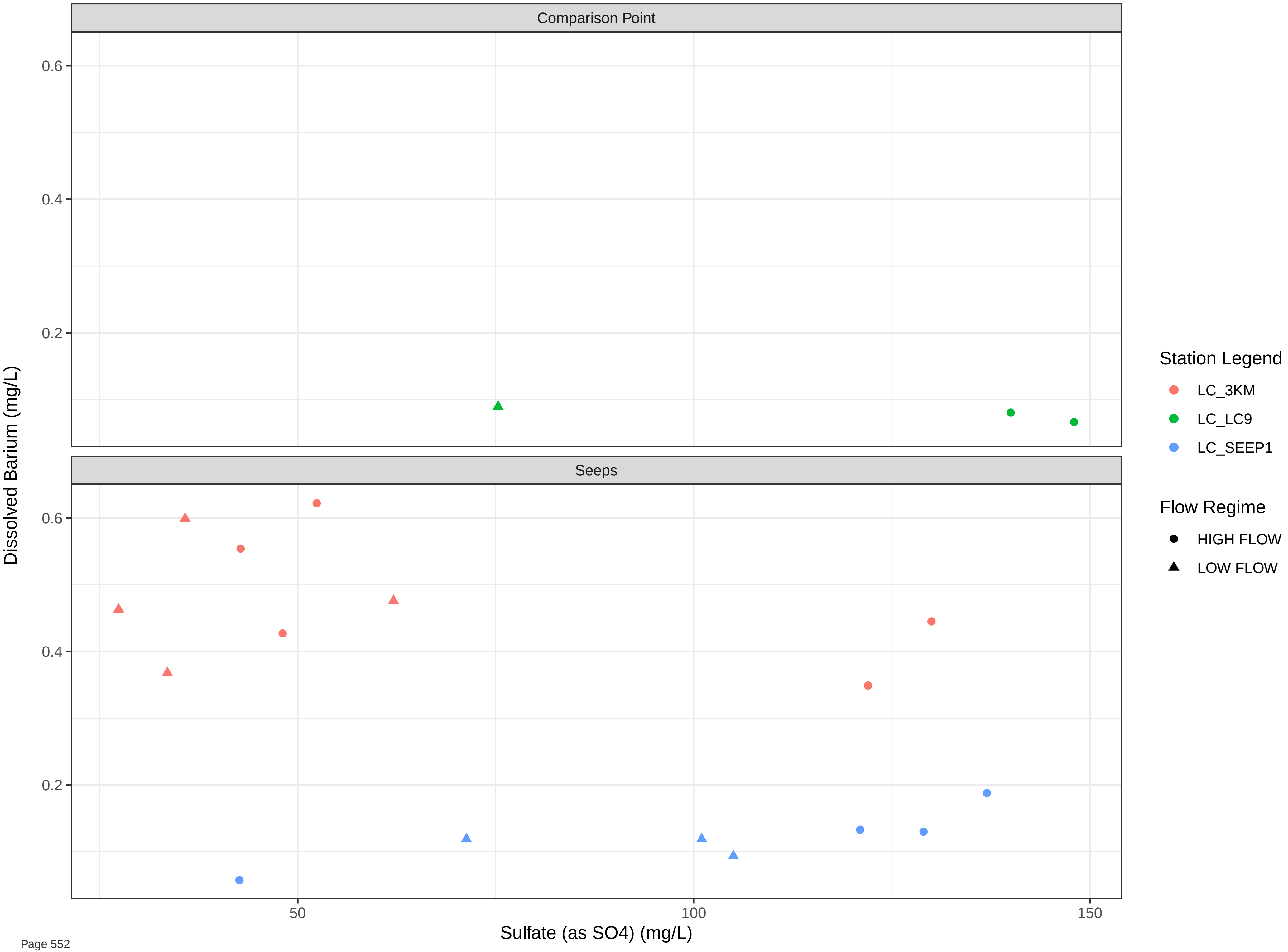

Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
Sulfate (as SO4) (mg/L)
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

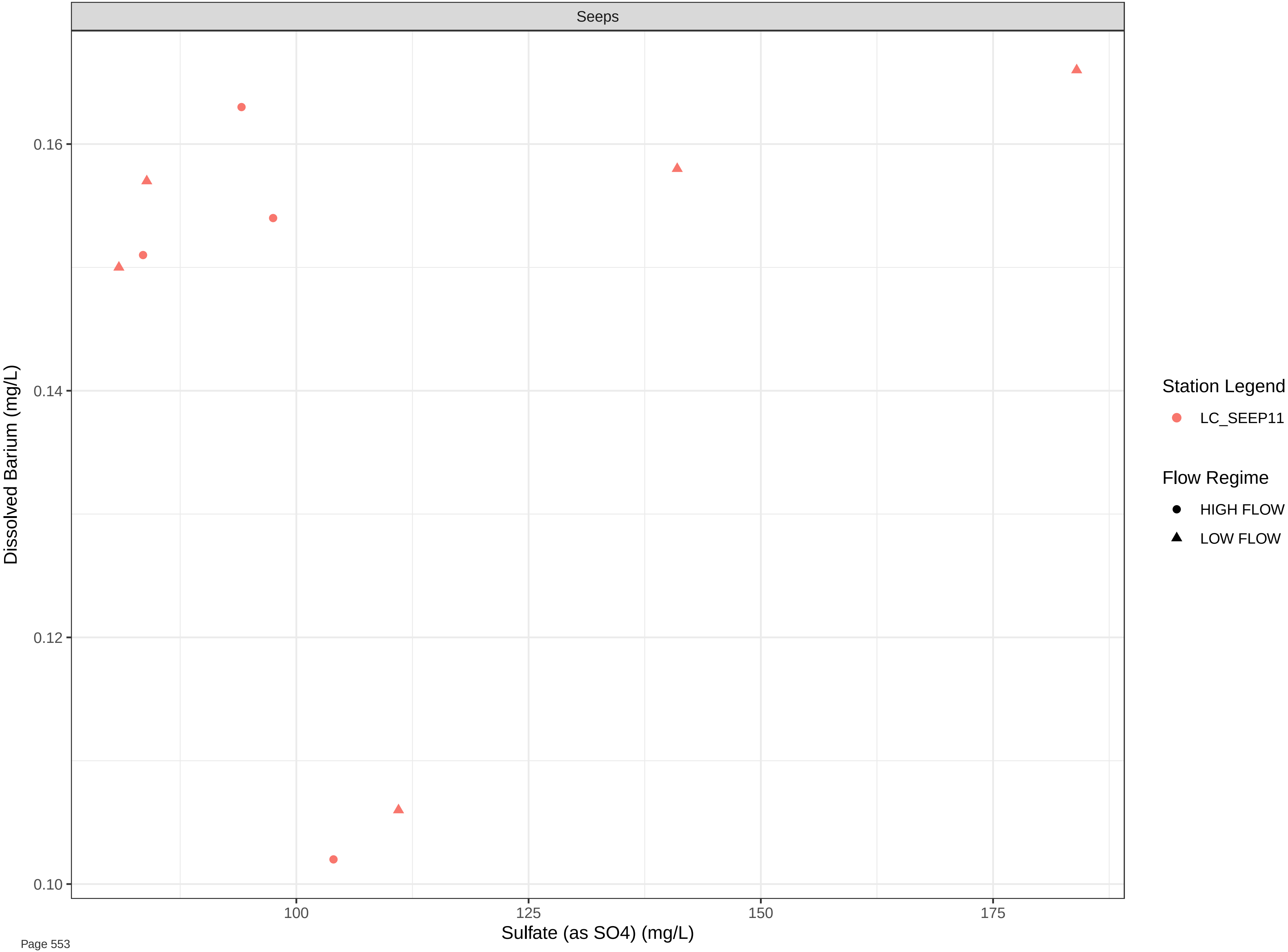


Comparison Point
Seeps
0.00125
0.00100
0.00075
0.00050
0.00025
Dissolved Arsenic (mg/L)
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

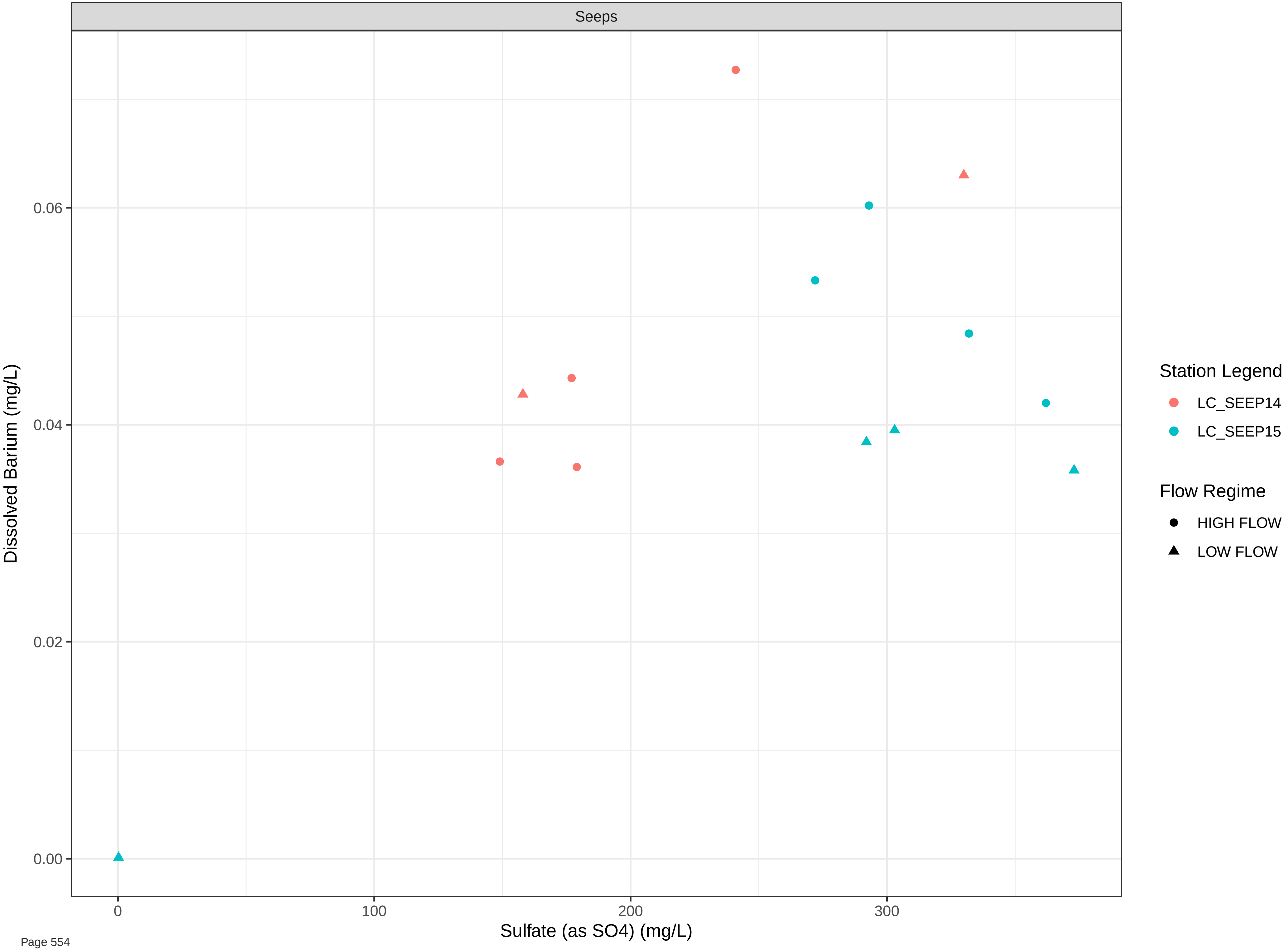


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
4e−04
3e−04
2e−04
1e−04
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

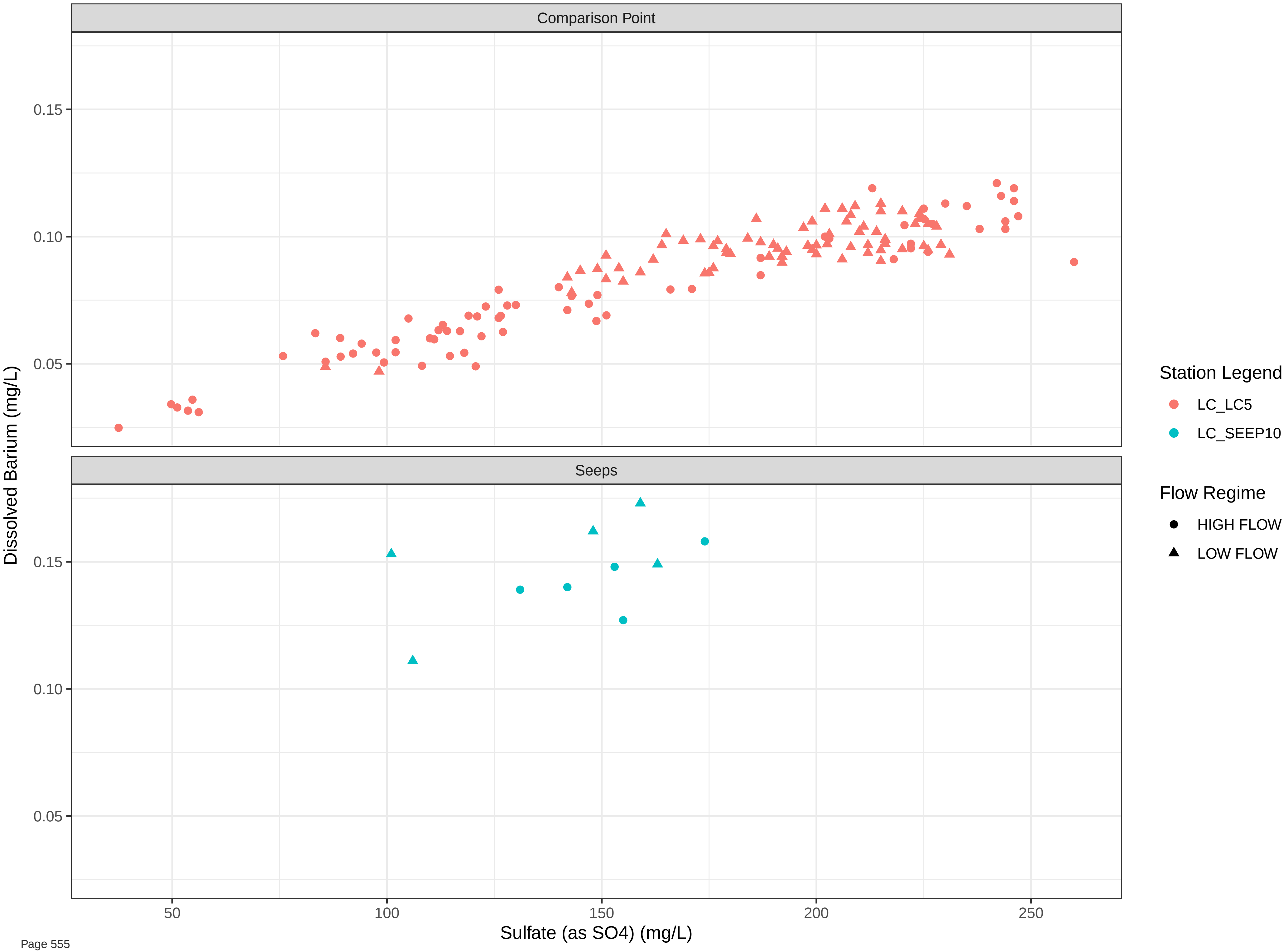

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.6
0.4
0.2
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

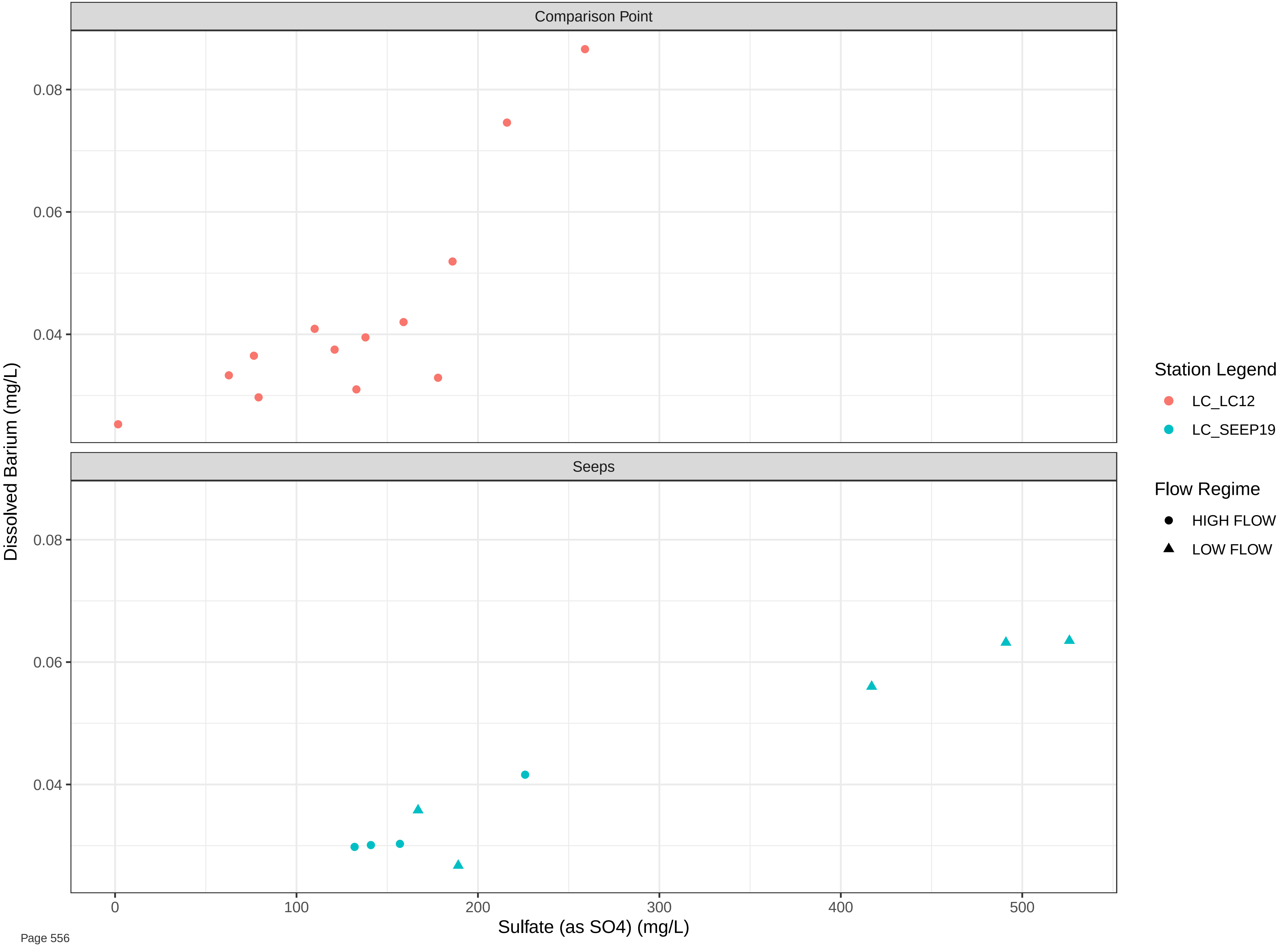


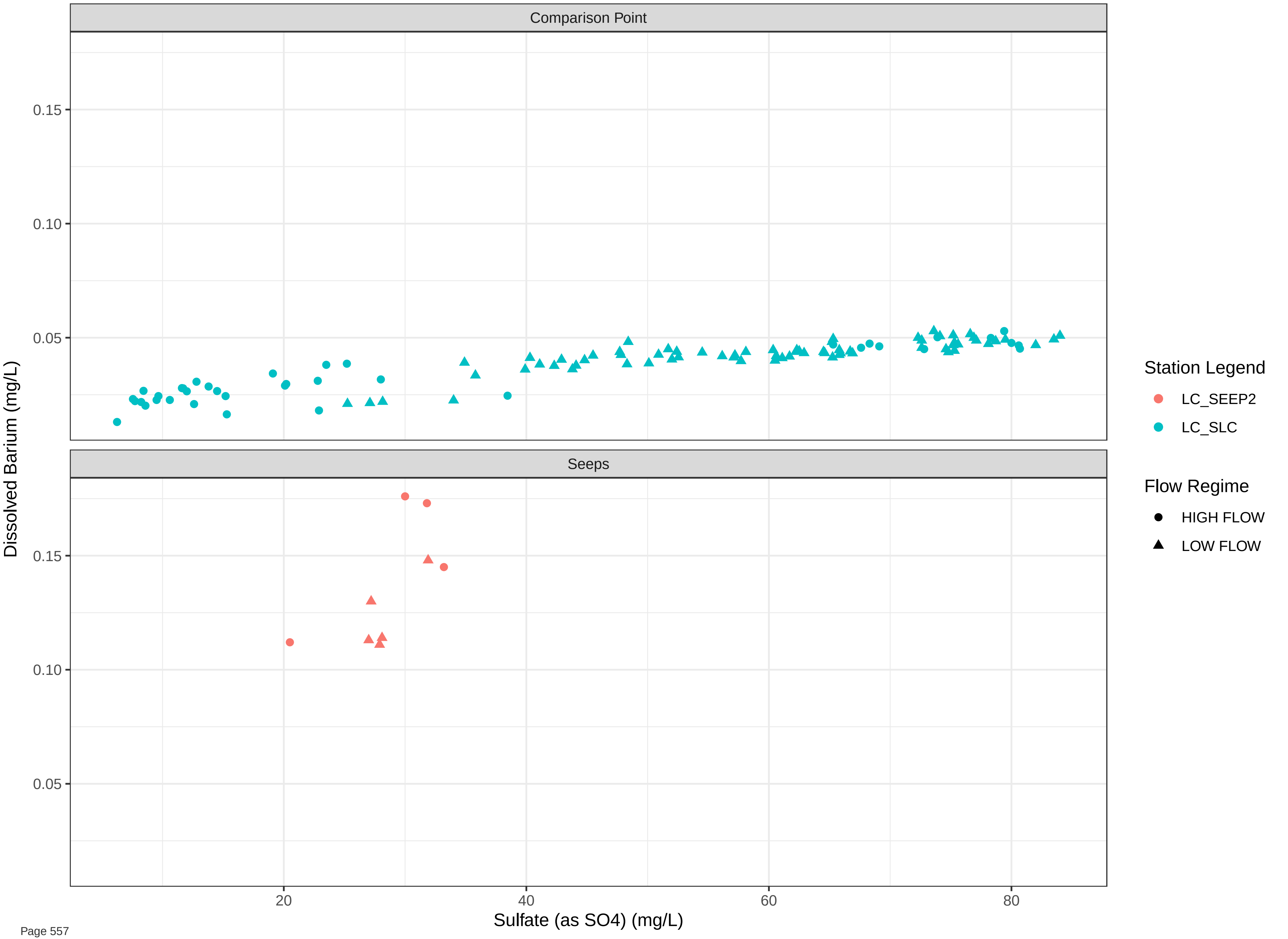
Seeps
Dissolved Barium (mg/L)
0.16
0.14
0.12
0.10
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

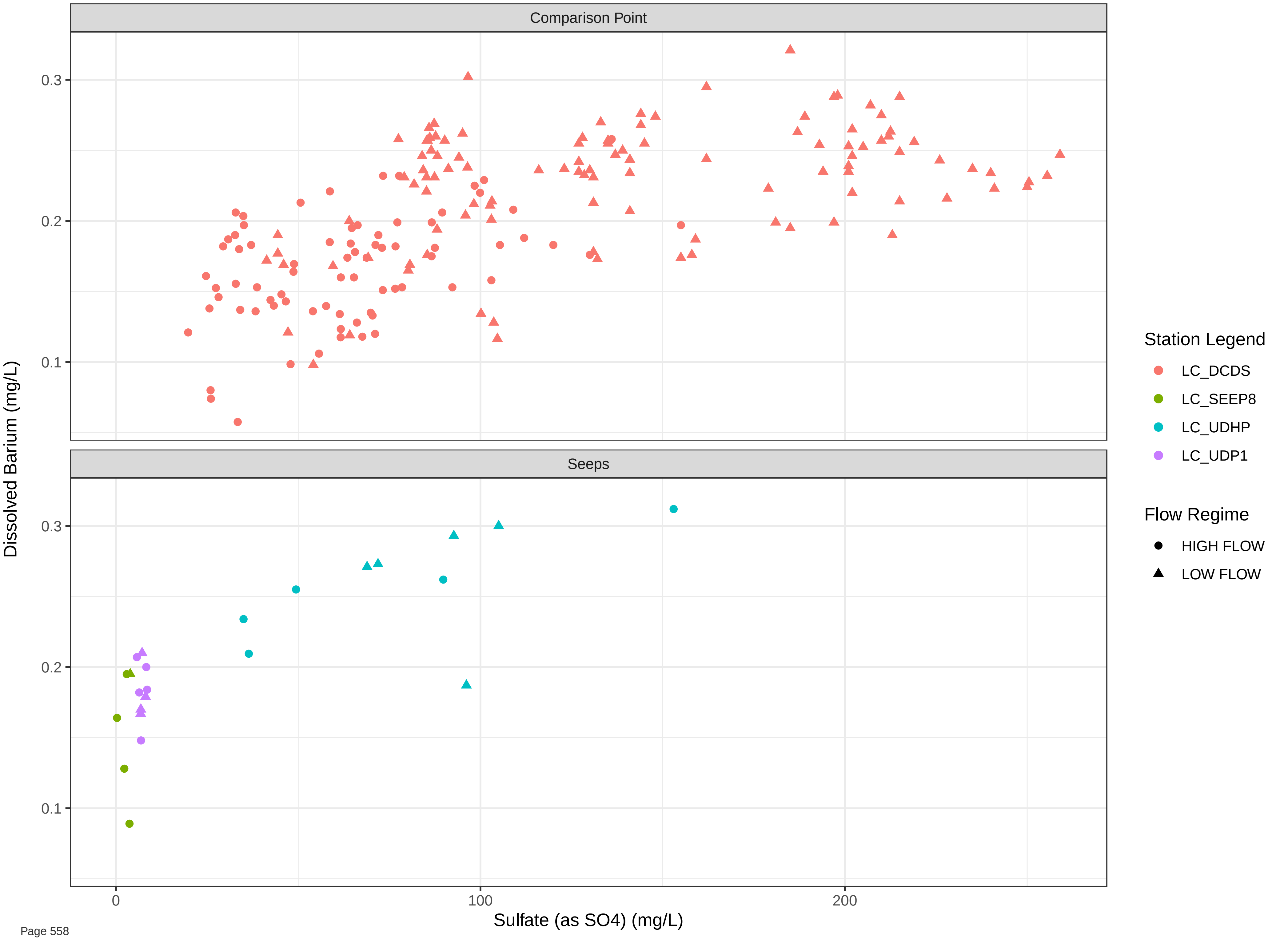


Seeps
Dissolved Barium (mg/L)
0.06
0.04
0.02
0.00
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

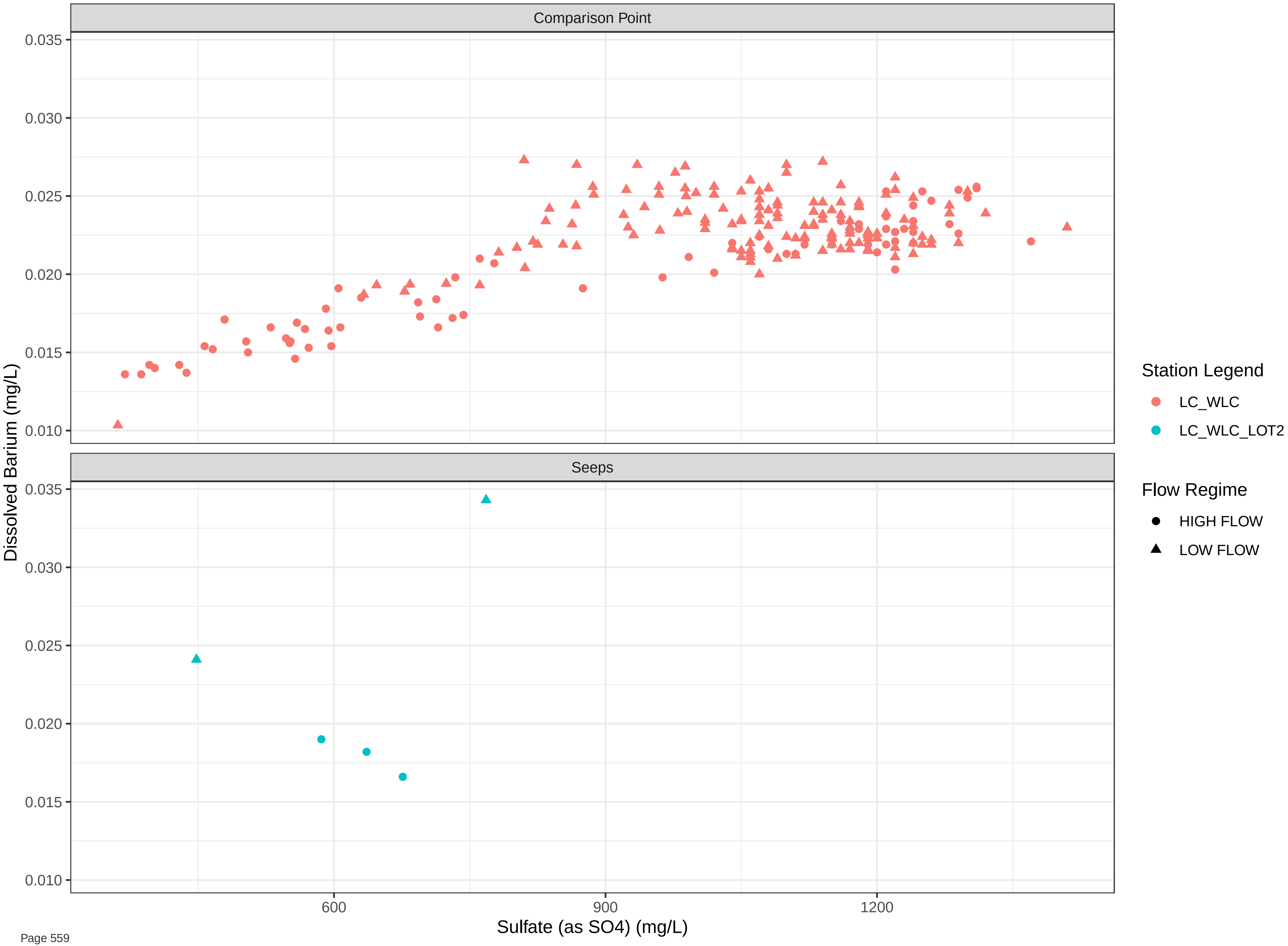

Comparison Point
Seeps
0.15
0.10
0.05
0.15
0.10
0.05
Dissolved Barium (mg/L)
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.08
0.06
0.04
Dissolved Barium (mg/L)
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

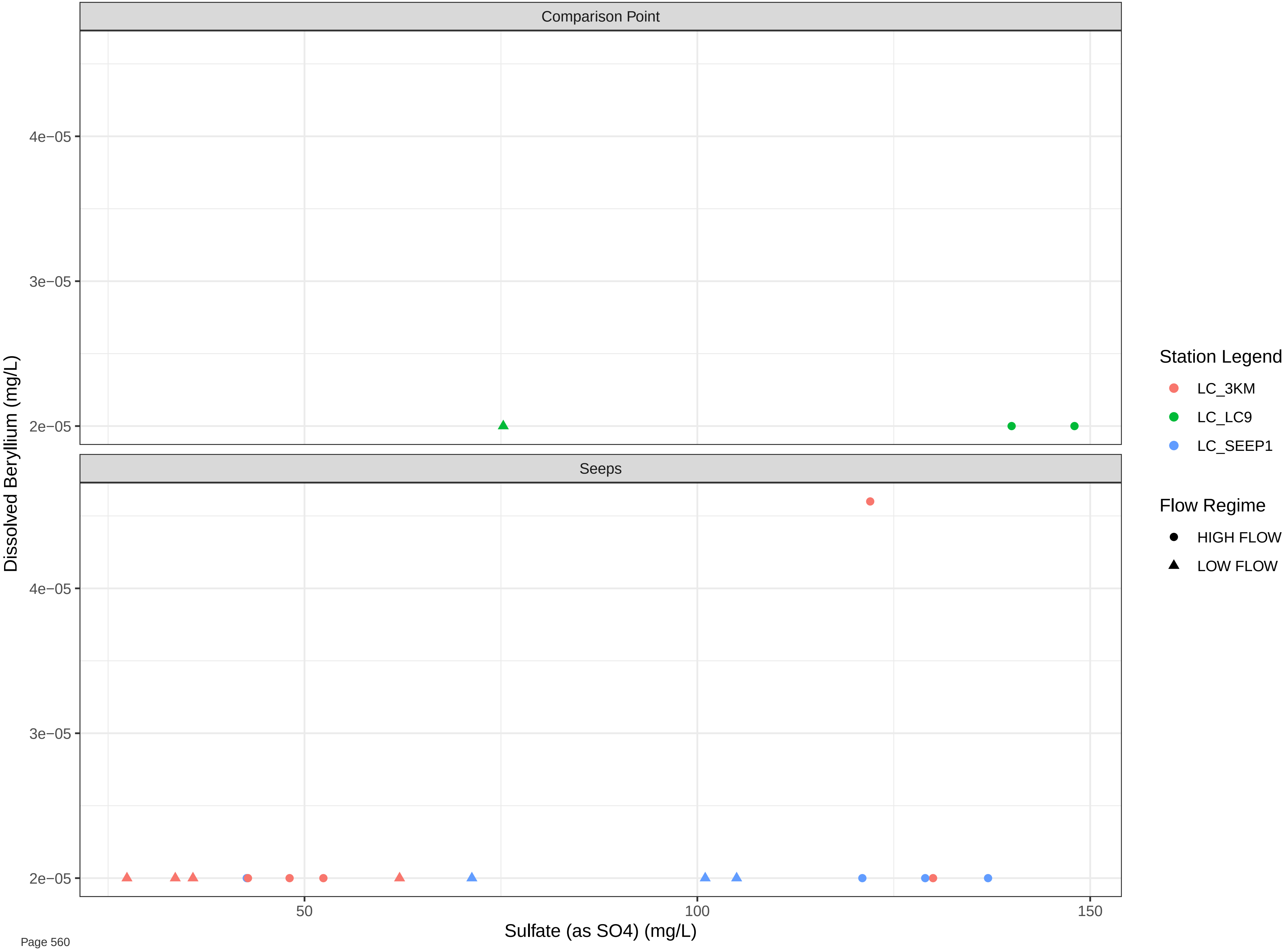

Comparison Point
Seeps
0.15
0.10
0.05
20
40
60
80
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

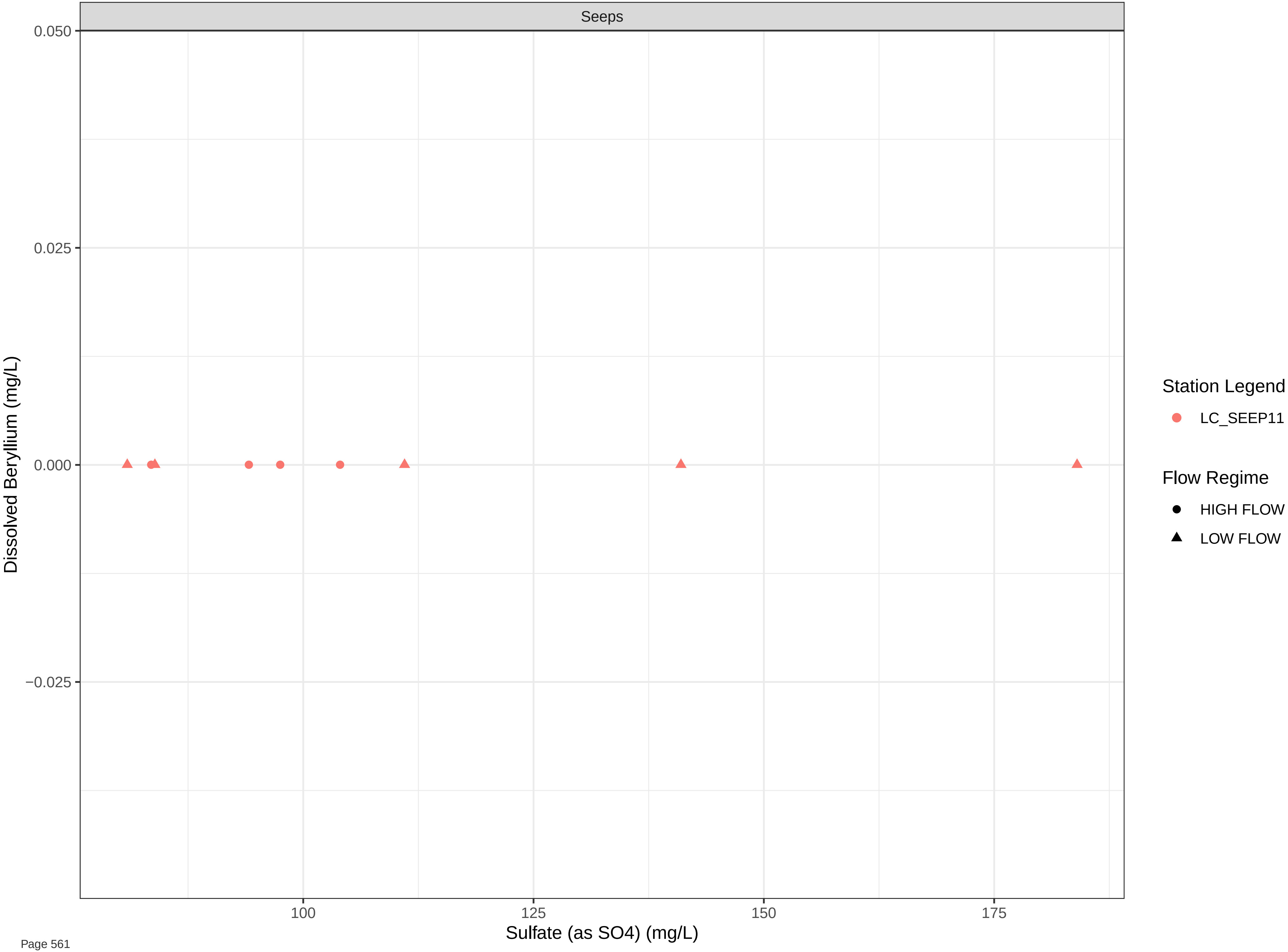


Comparison Point
Seeps
0.3
0.2
0.1
0
100
200
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

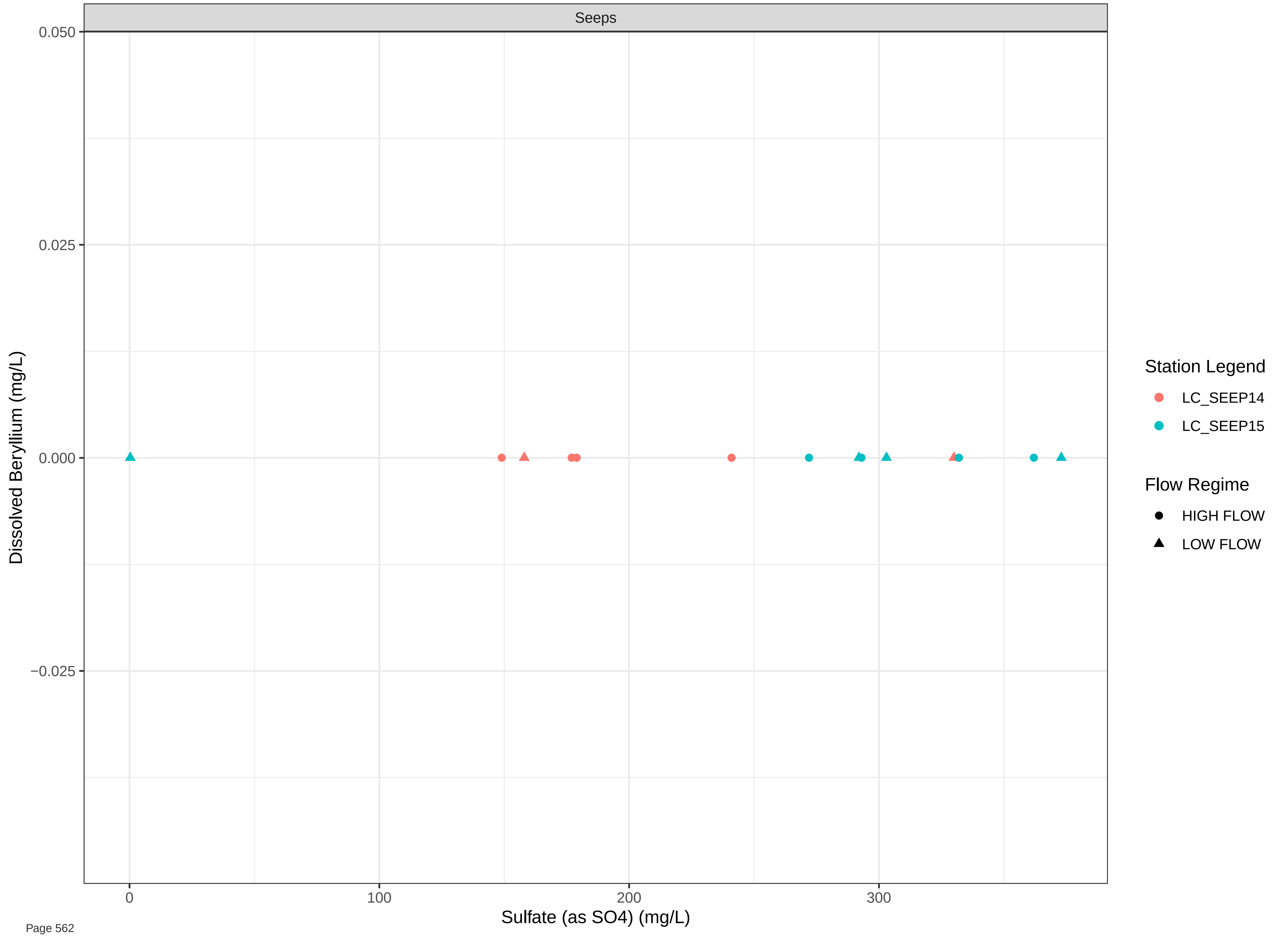


Comparison Point
Seeps
Dissolved Barium (mg/L)
0.035
0.030
0.025
0.020
0.015
0.010
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

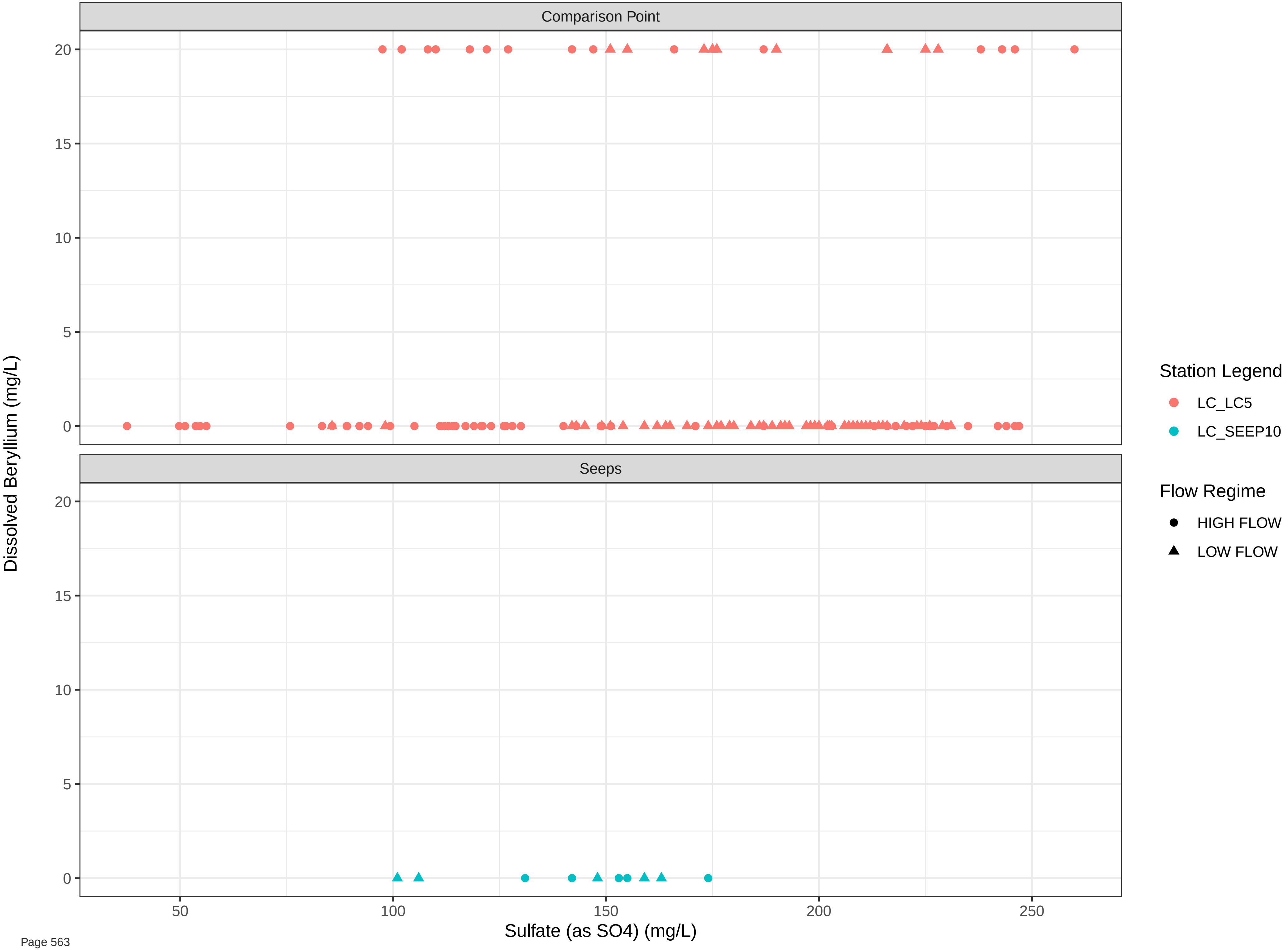

Comparison Point
Seeps
Dissolved Beryllium (mg/L)
4e−05
3e−05
2e−05
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



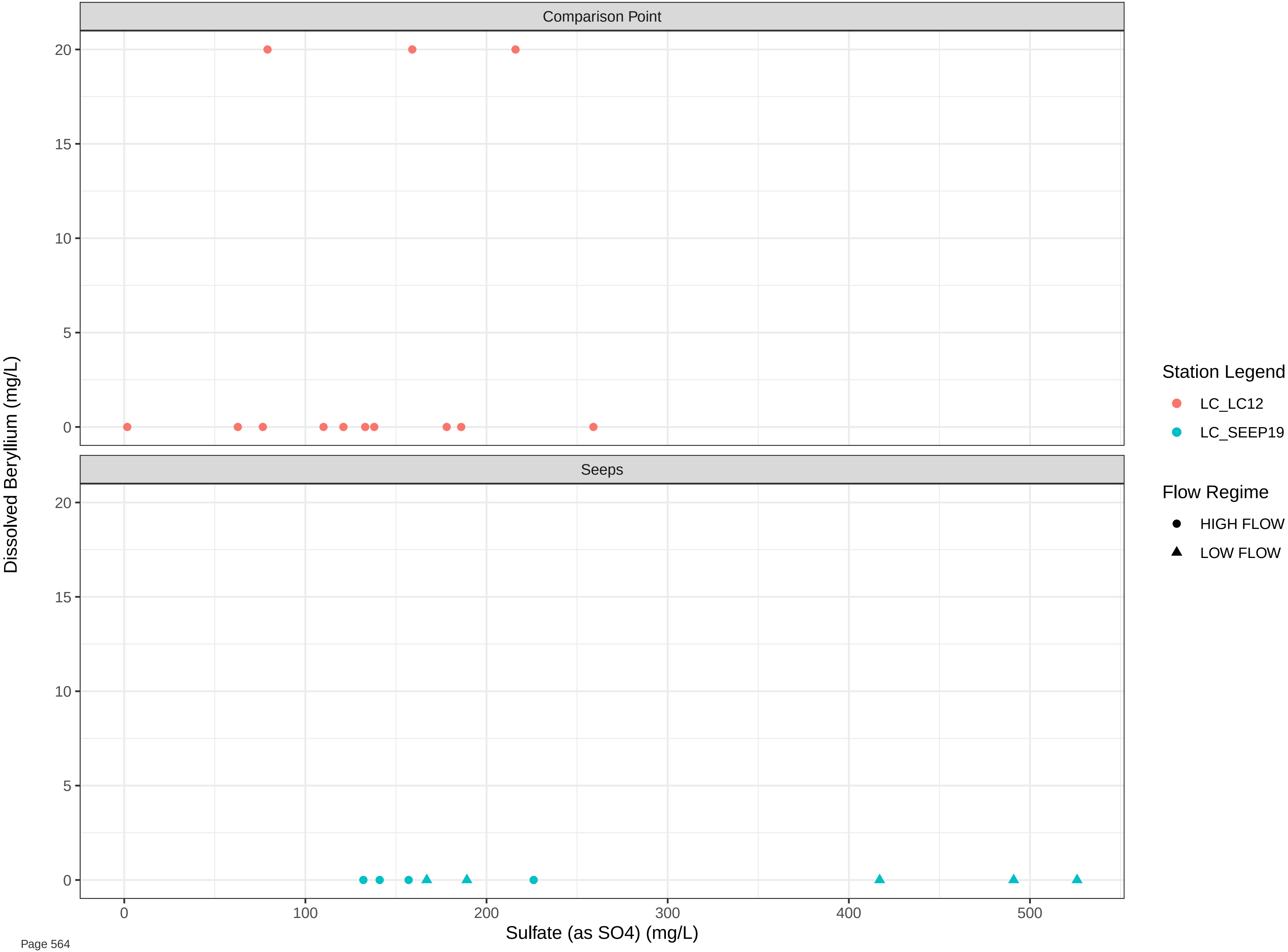
Seeps
0.050
0.025
0.000
−0.025
Dissolved Beryllium (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

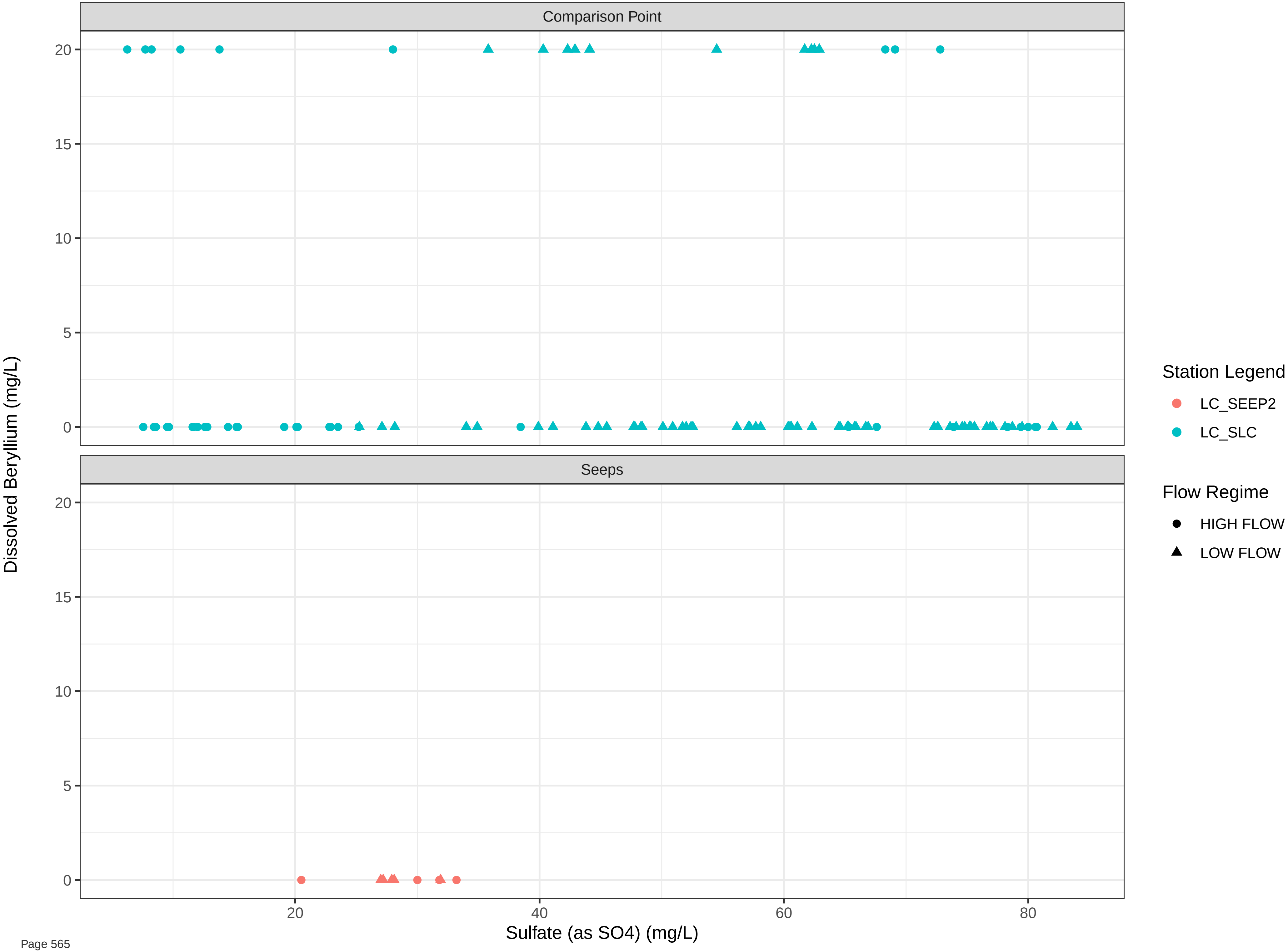


Seeps
0.050
0.025
0.000
−0.025
0
100
200
300
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

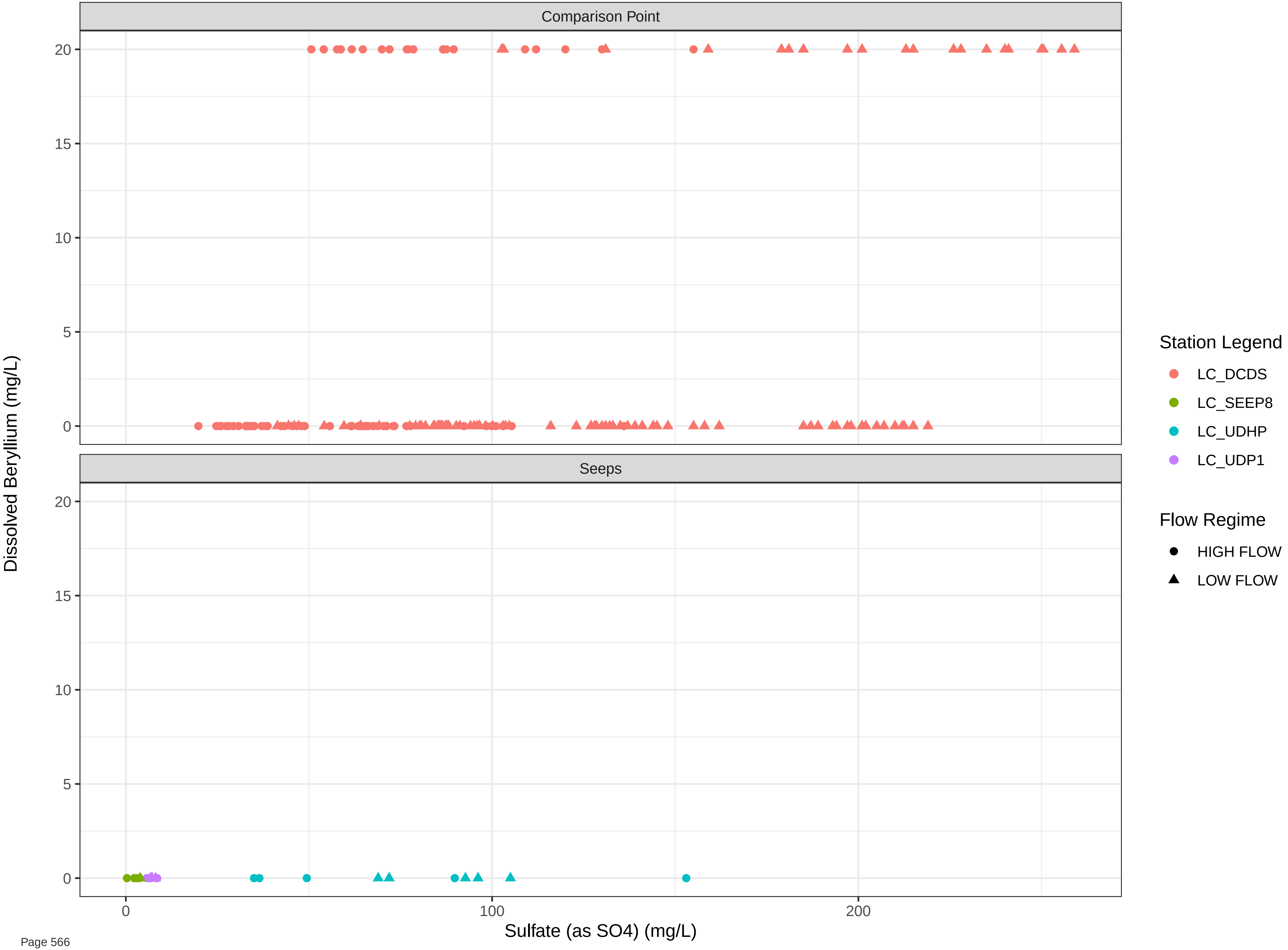


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

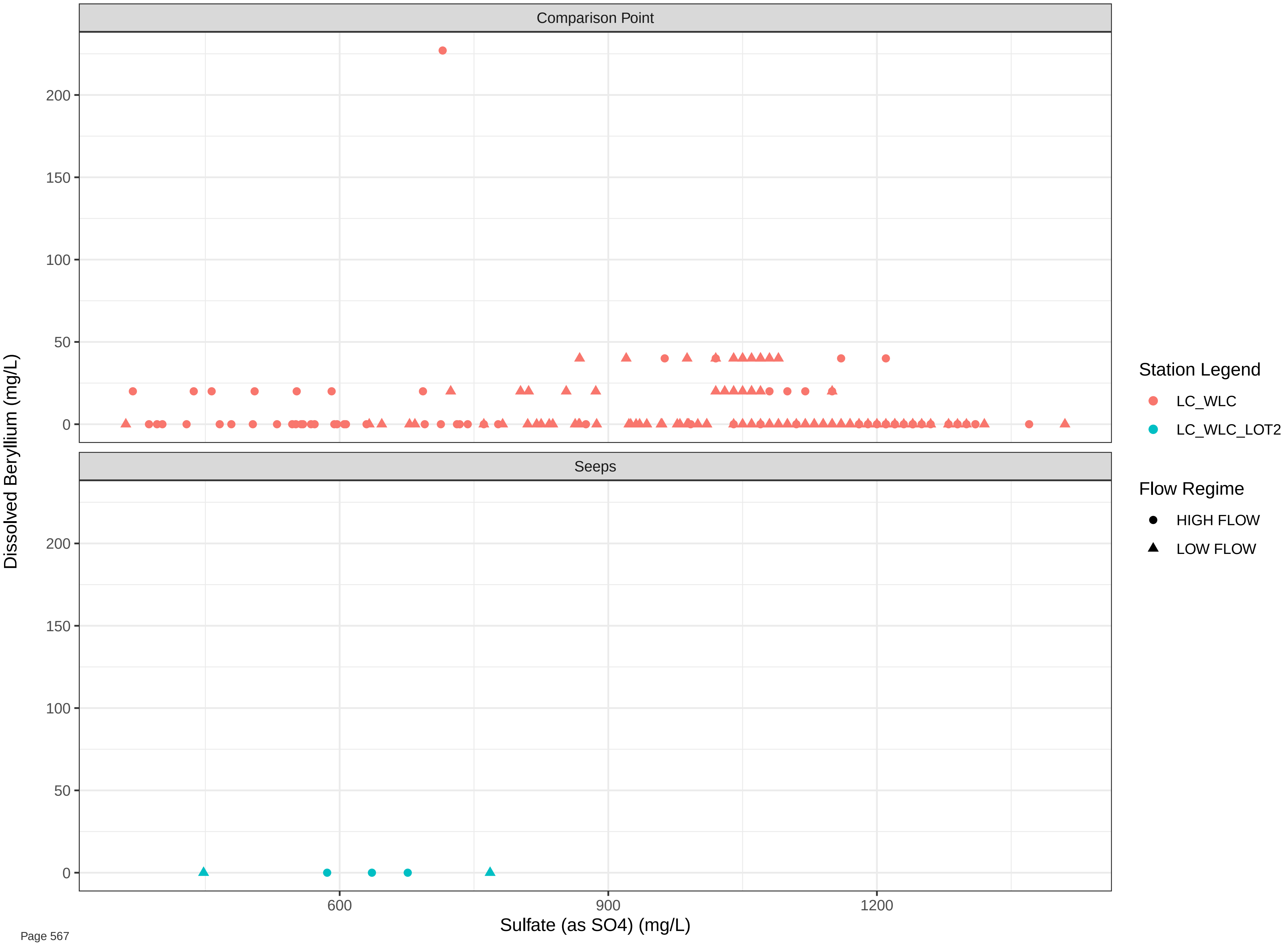

Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



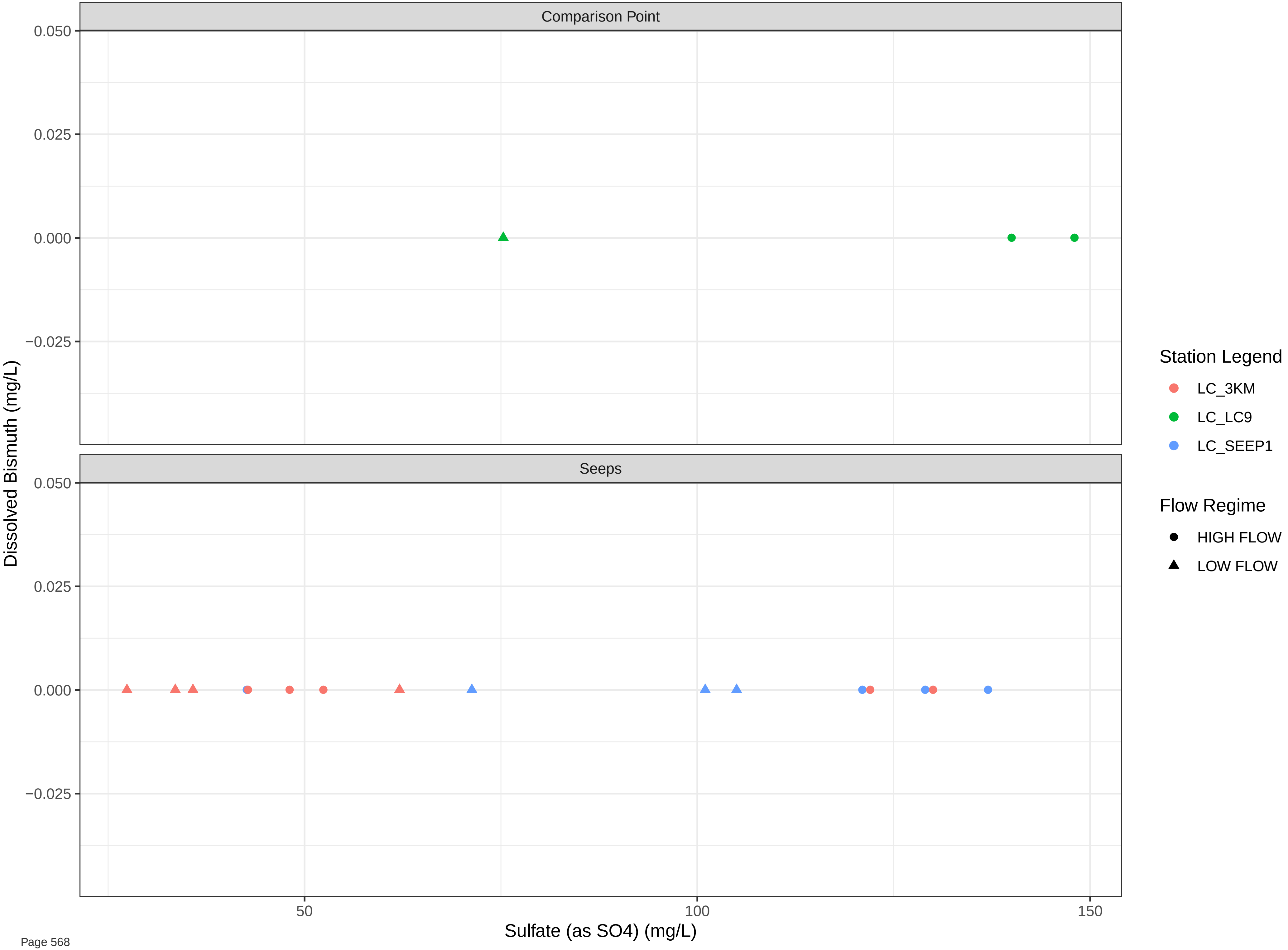
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW



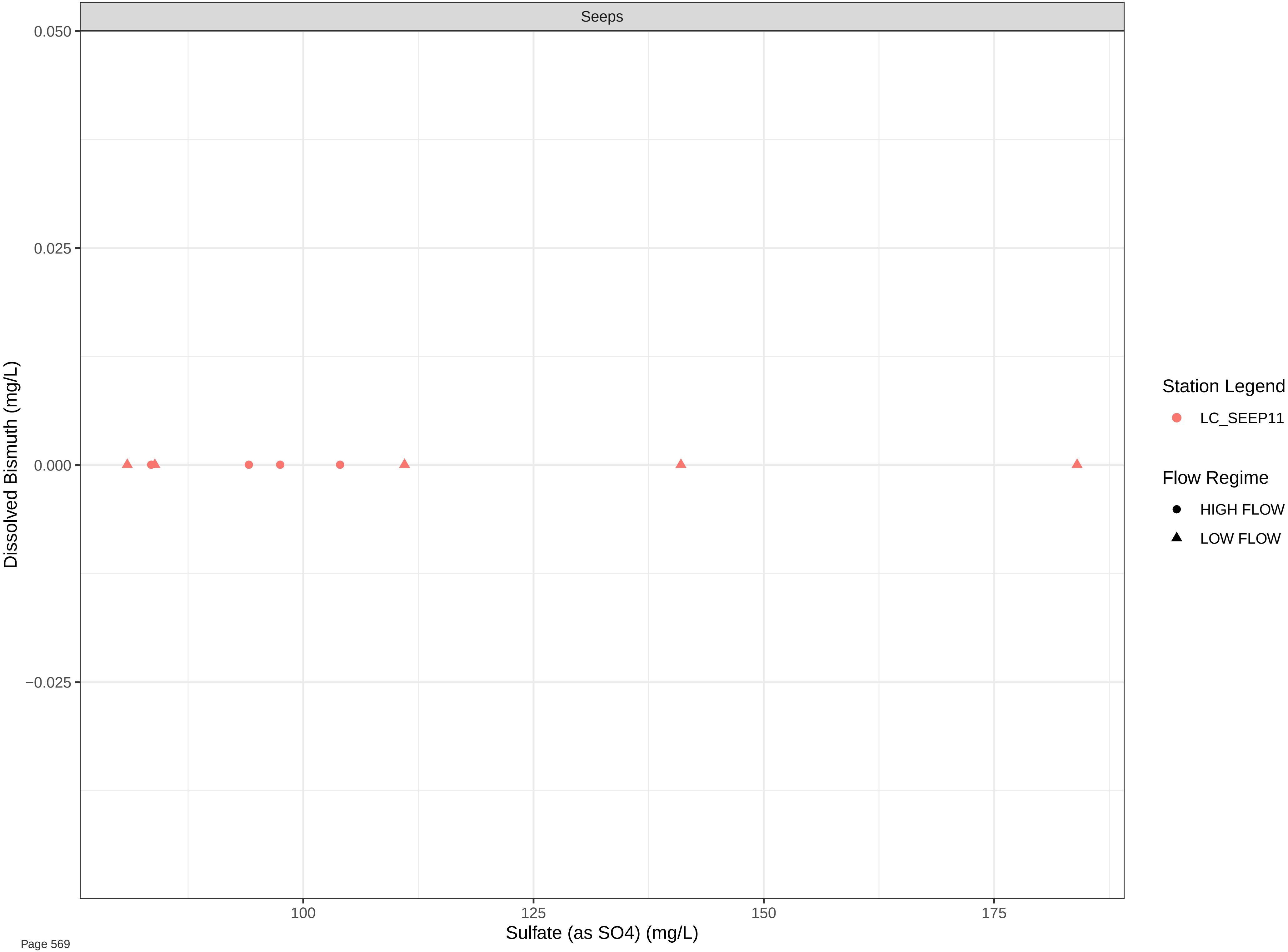
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



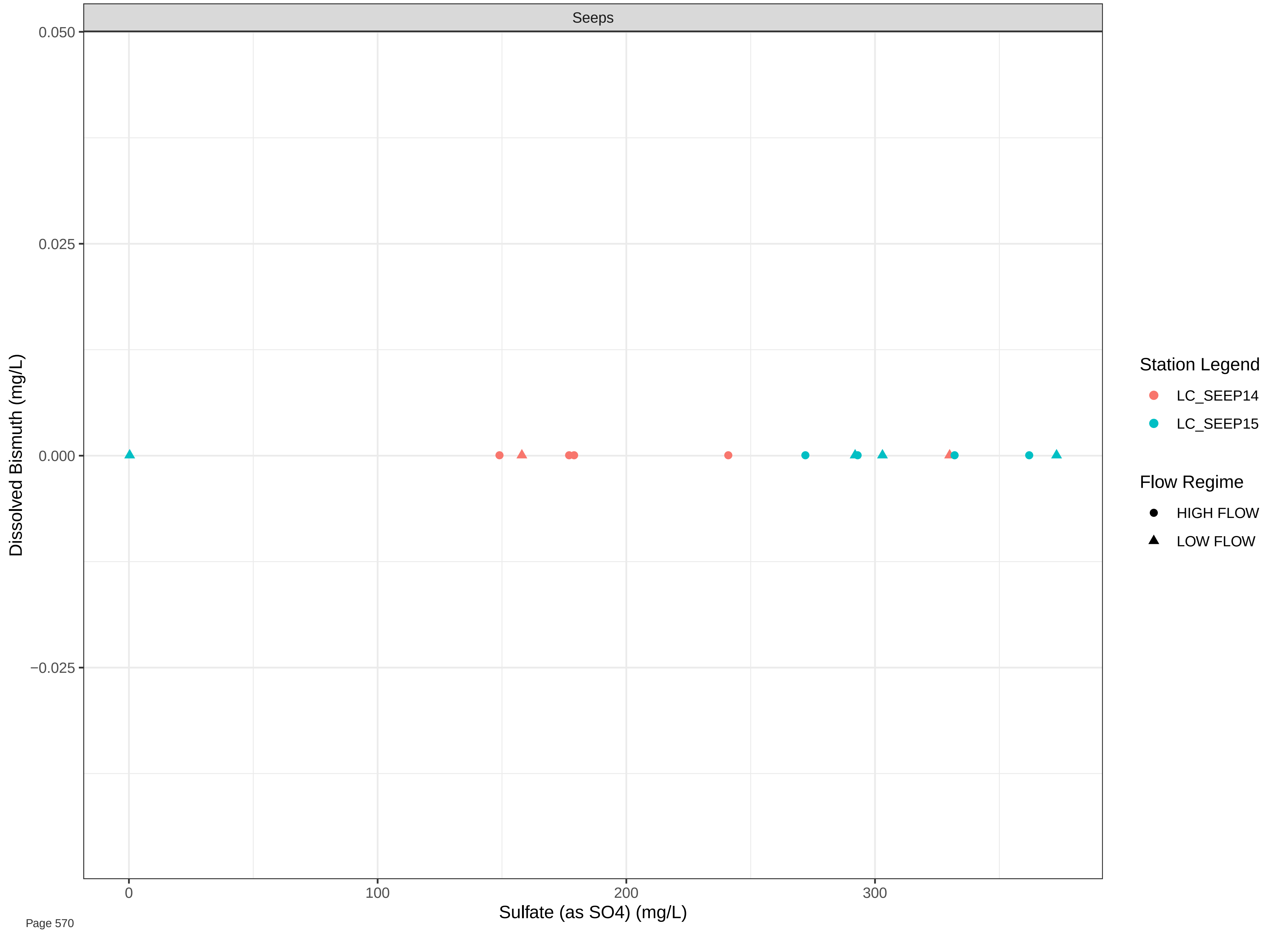
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
0
50
100
150
200
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

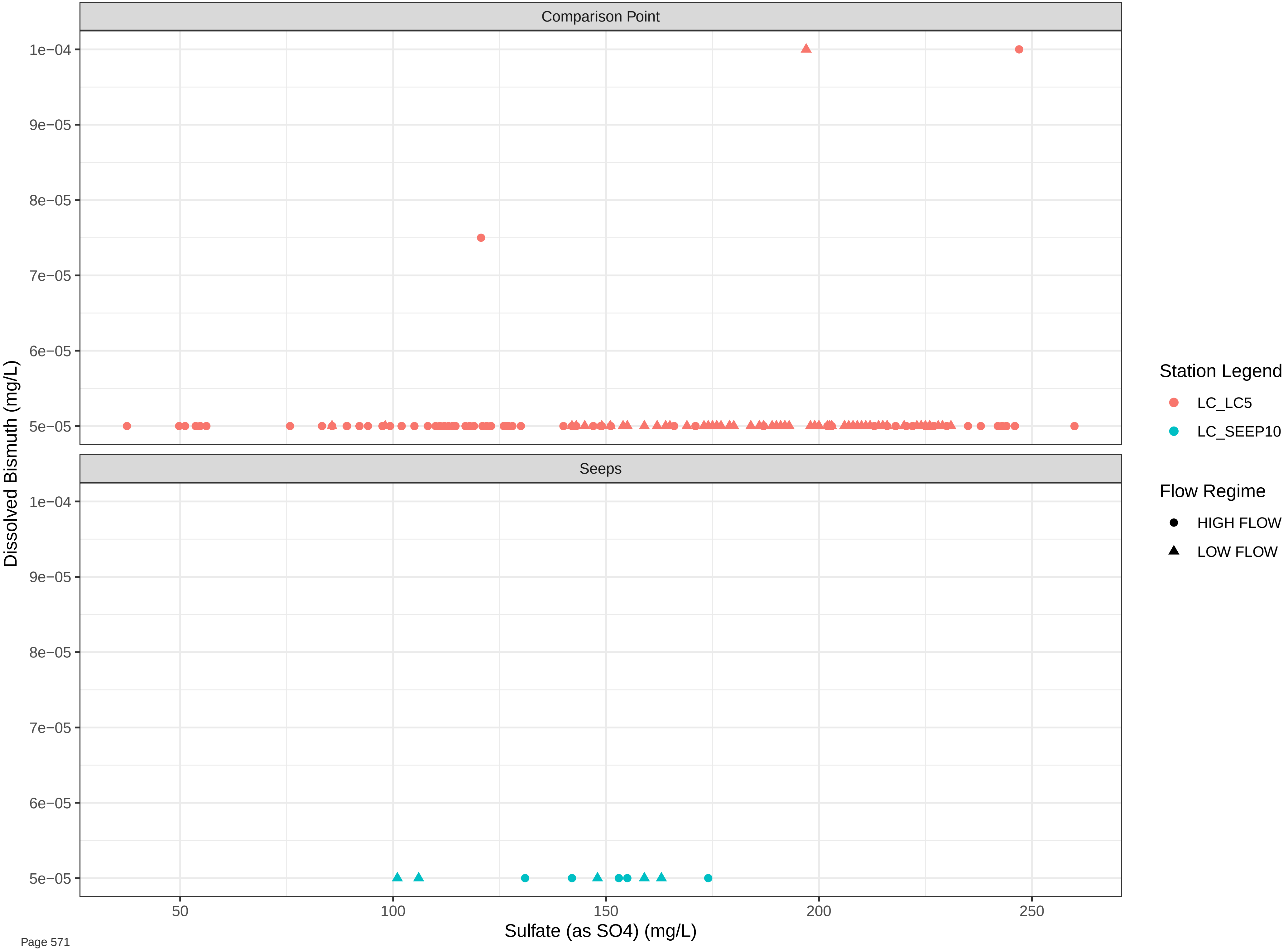


Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.050
0.025
0.000
−0.025
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

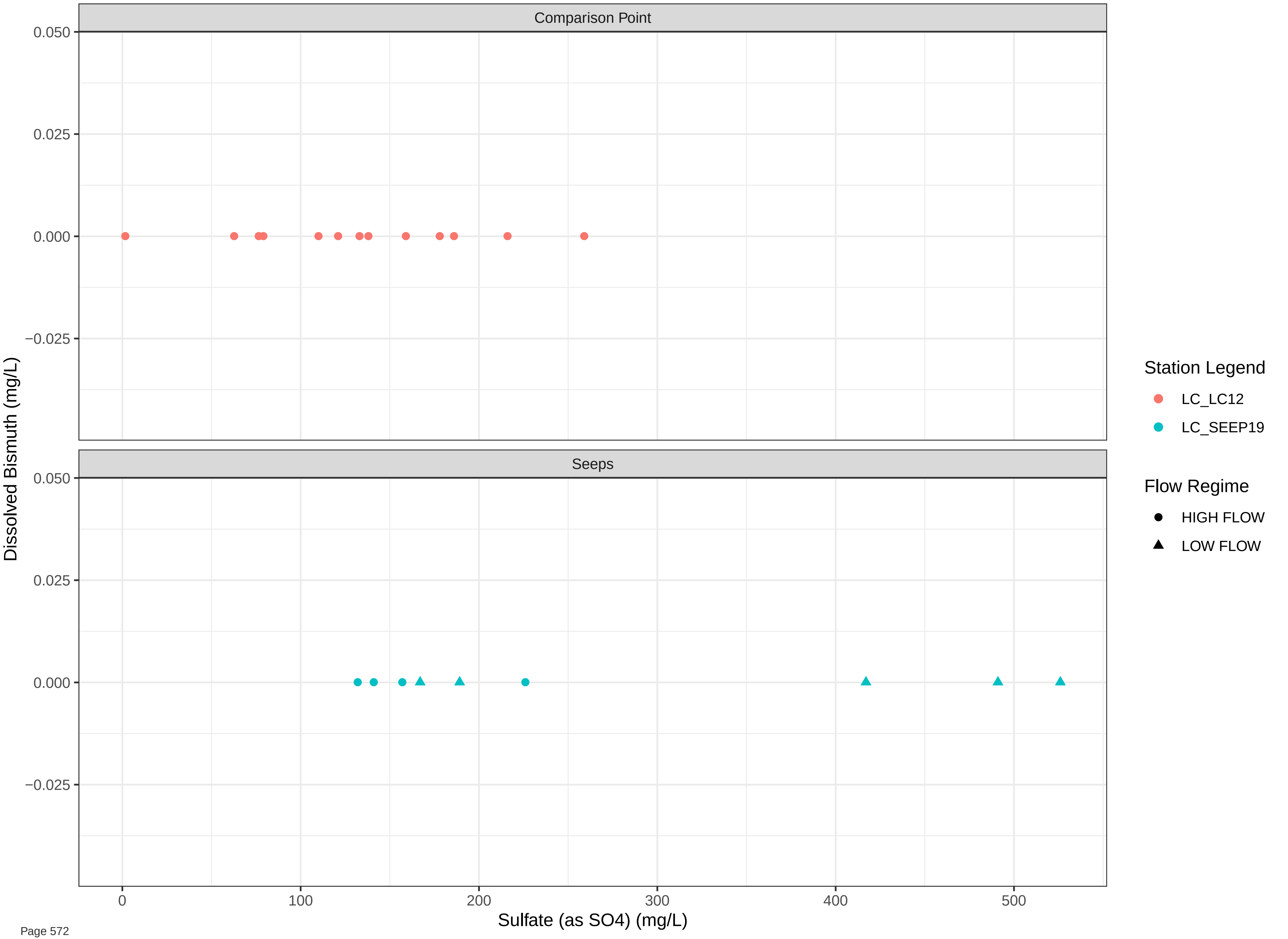


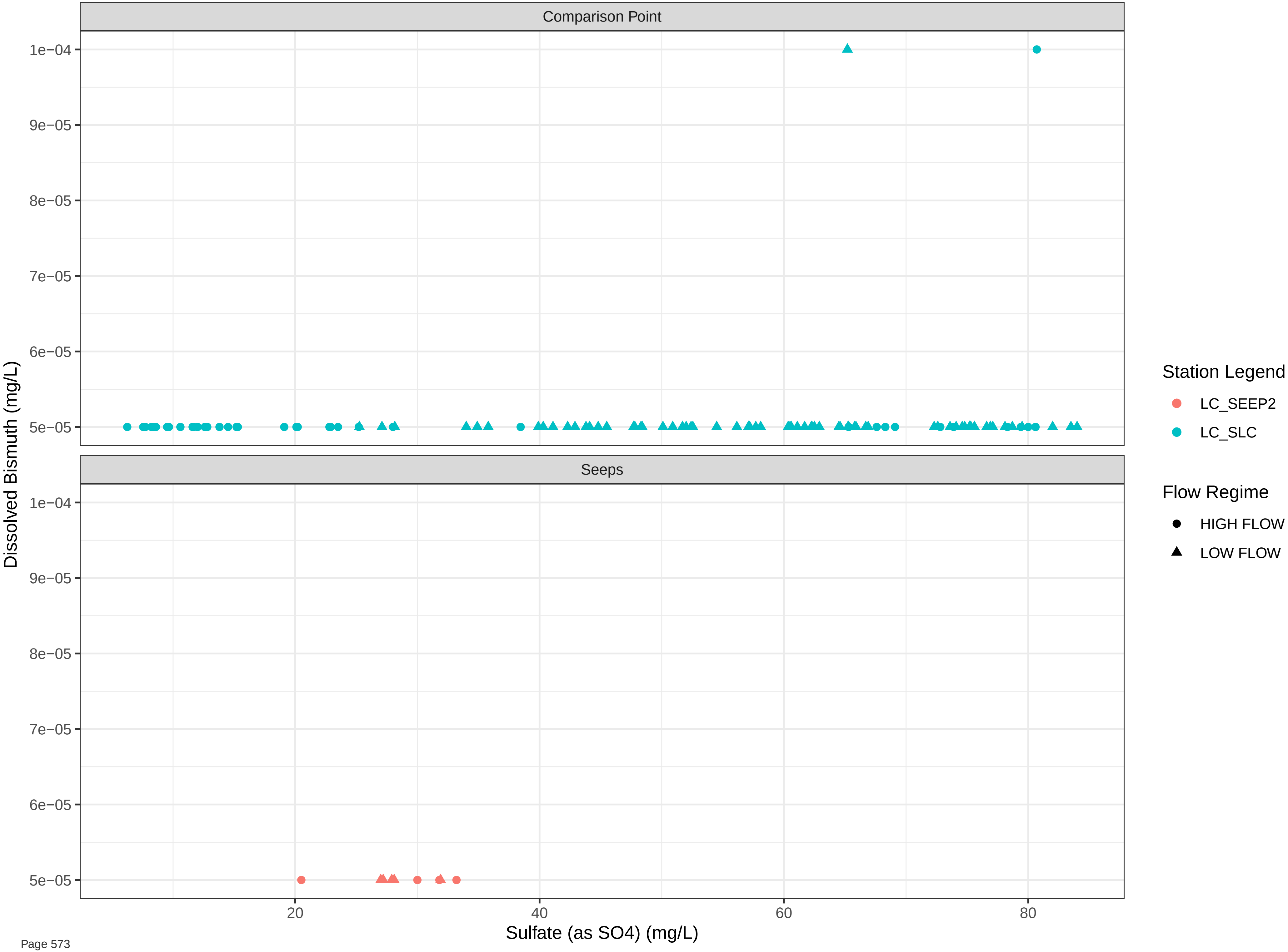
Seeps
0.050
0.025
0.000
−0.025
100
125
150
175
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

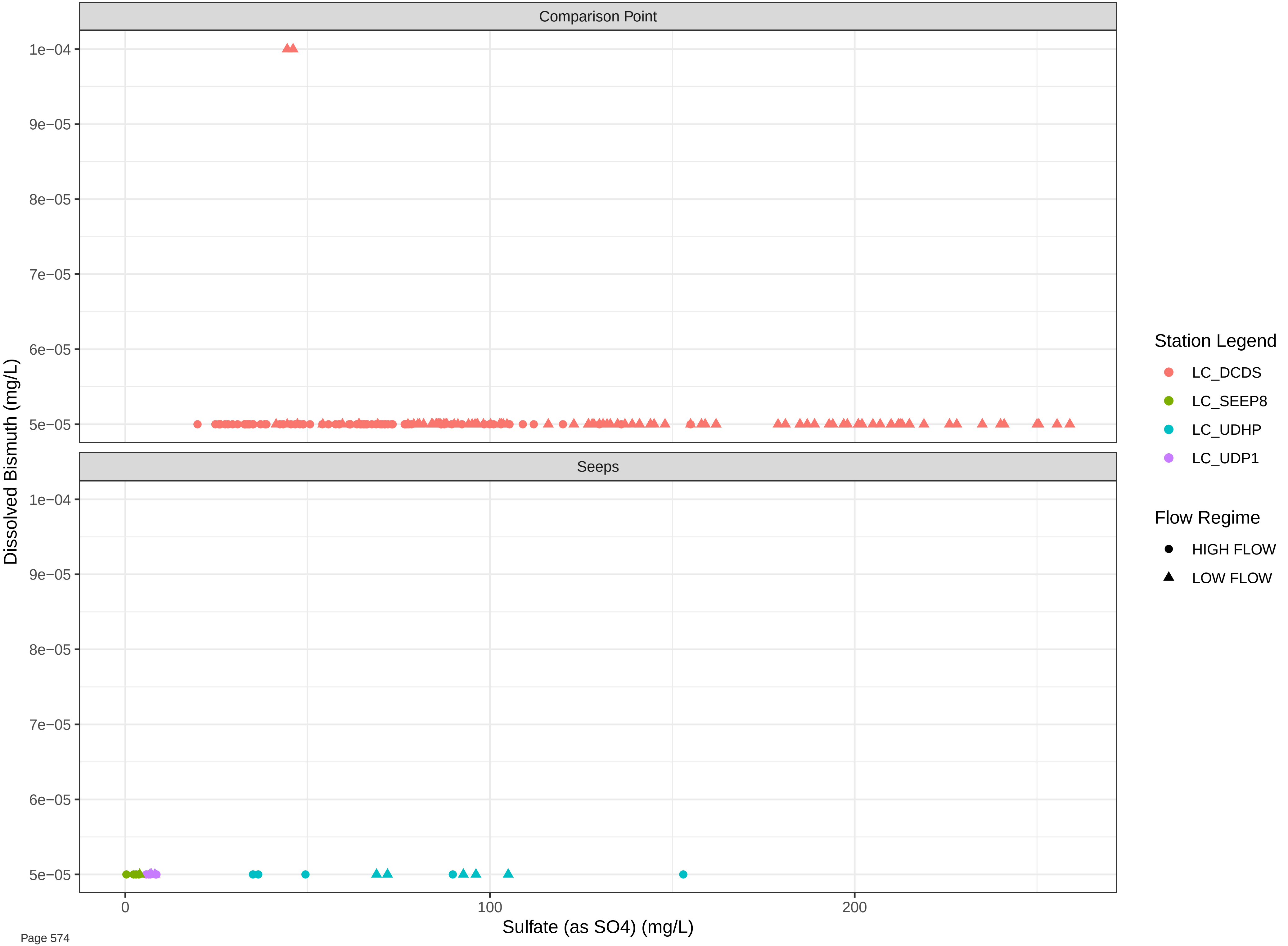

Seeps
0.050
0.025
0.000
−0.025
Dissolved Bismuth (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



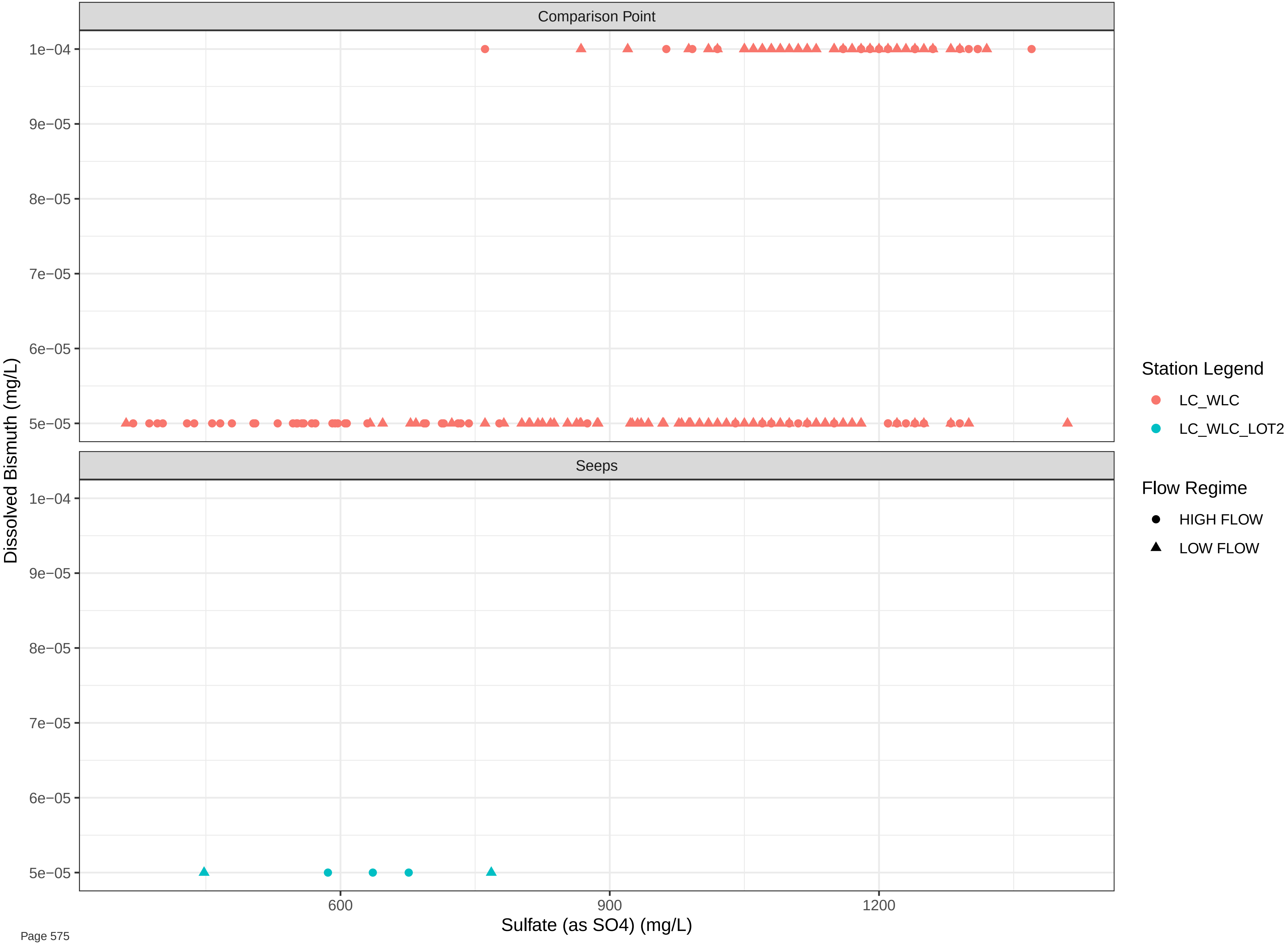
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

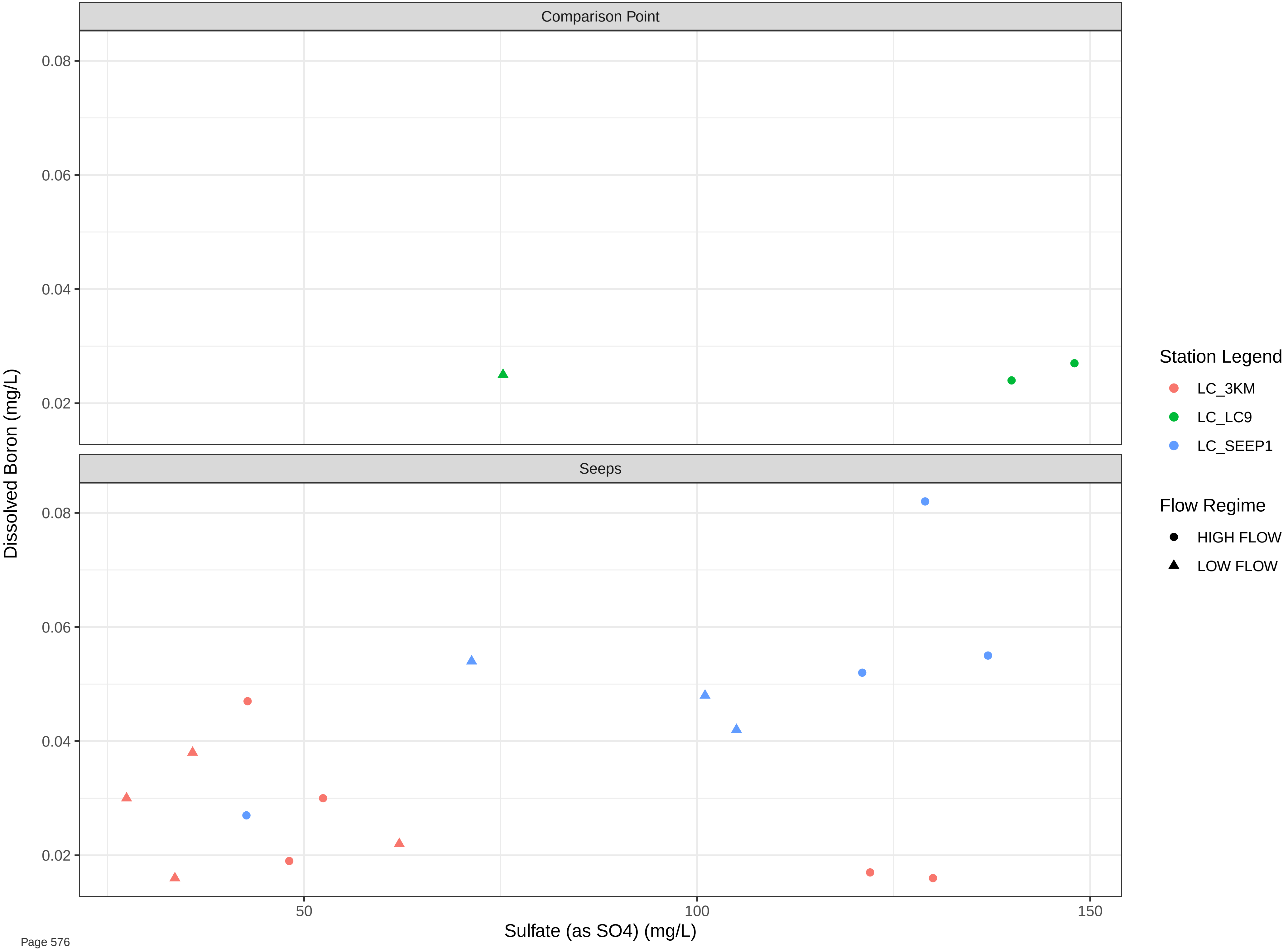

Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

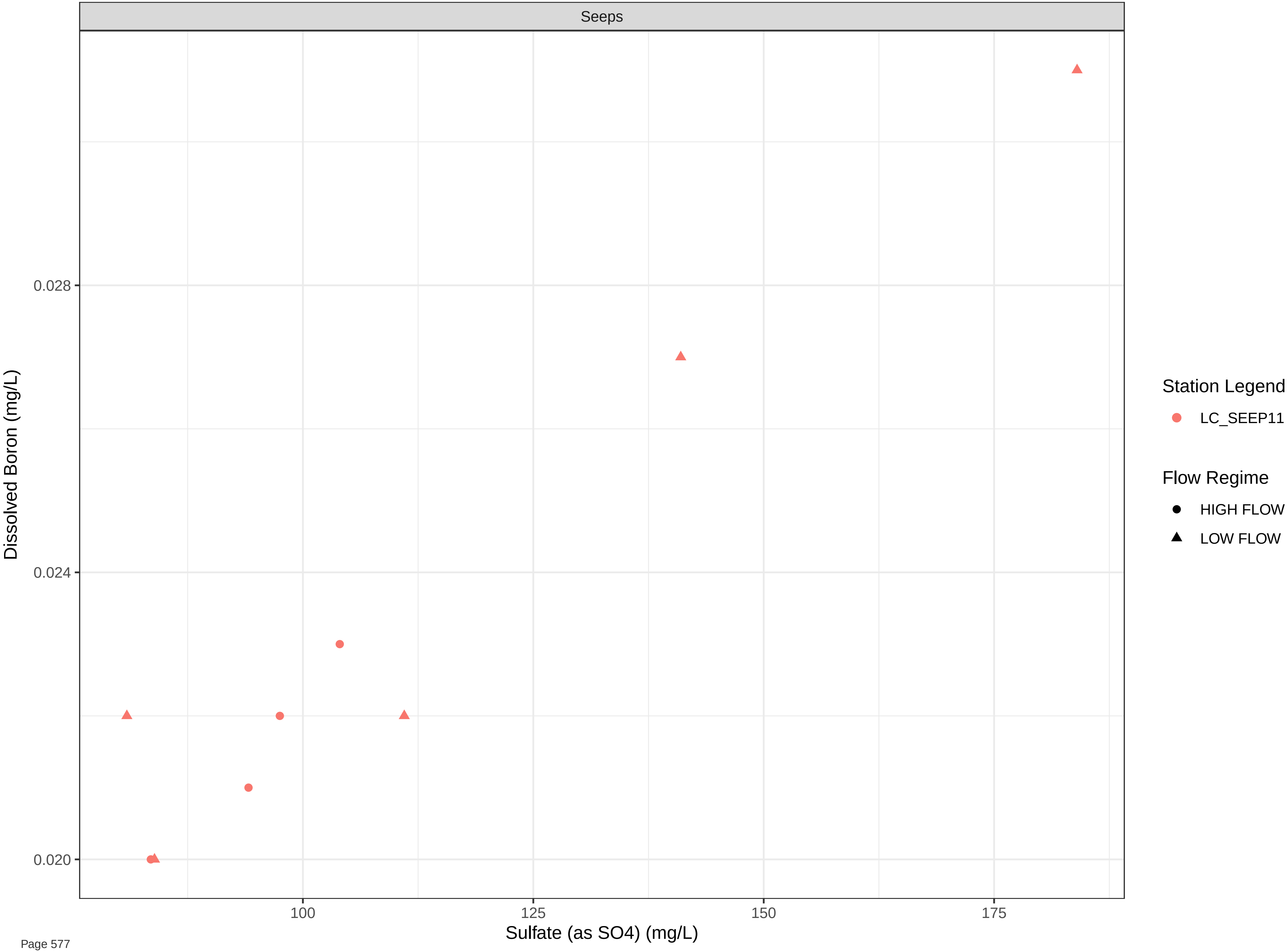

Comparison Point
Seeps
Dissolved Bismuth (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

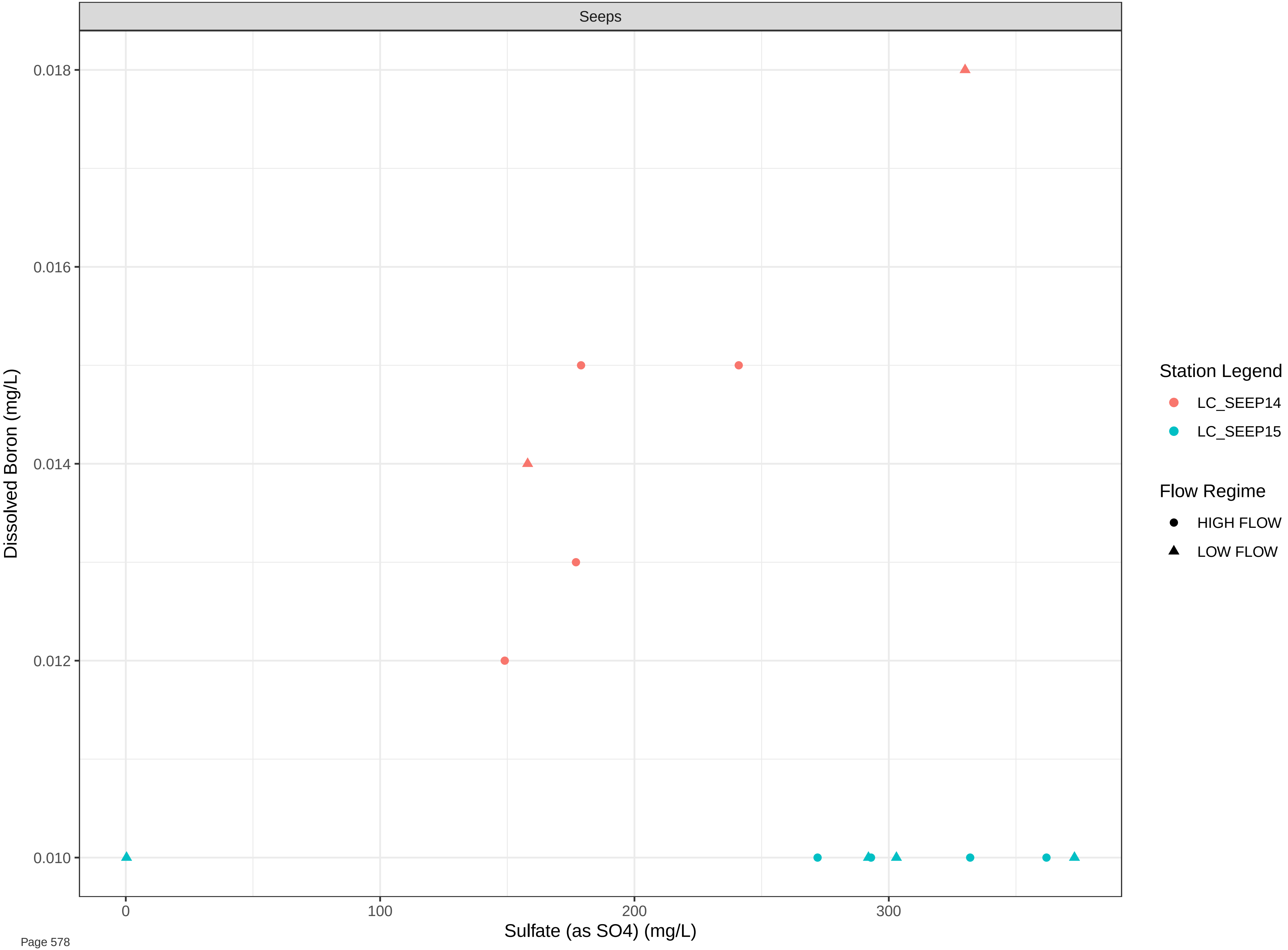


Comparison Point
Seeps
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
0
100
200
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

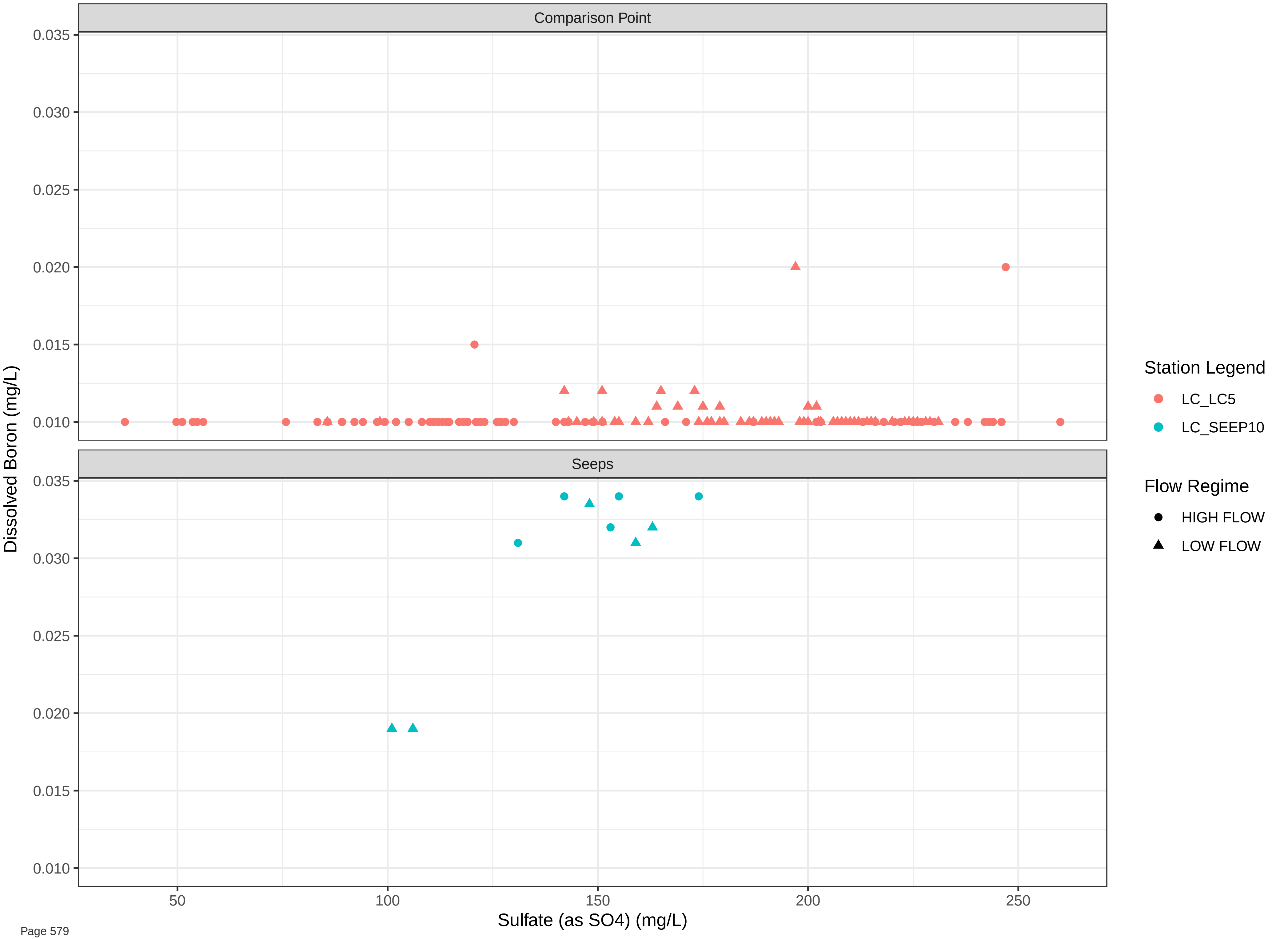

Comparison Point
Seeps
Dissolved Bismuth (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.08
0.06
0.04
0.02
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

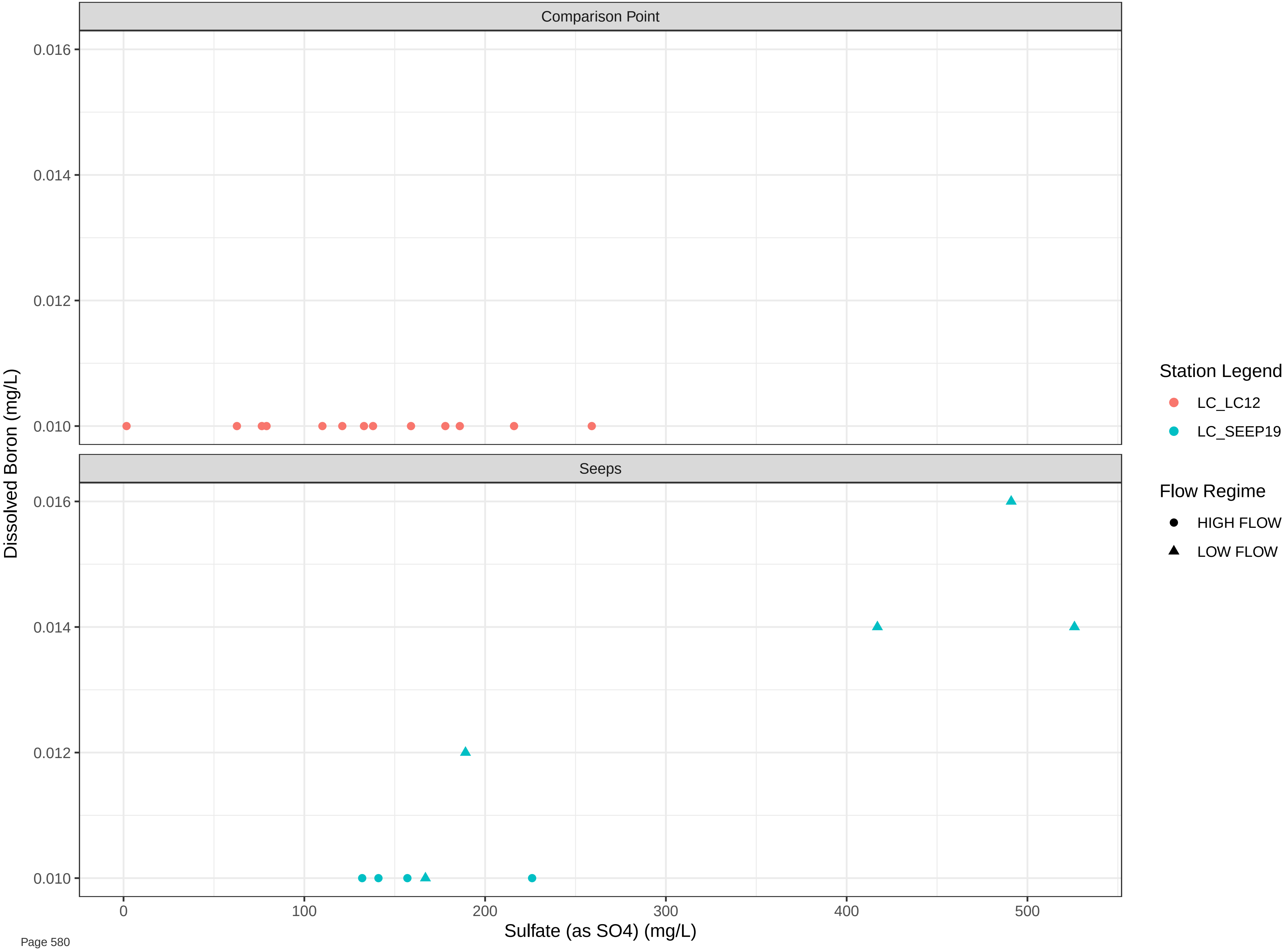

Seeps
Dissolved Boron (mg/L)
0.028
0.024
0.020
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



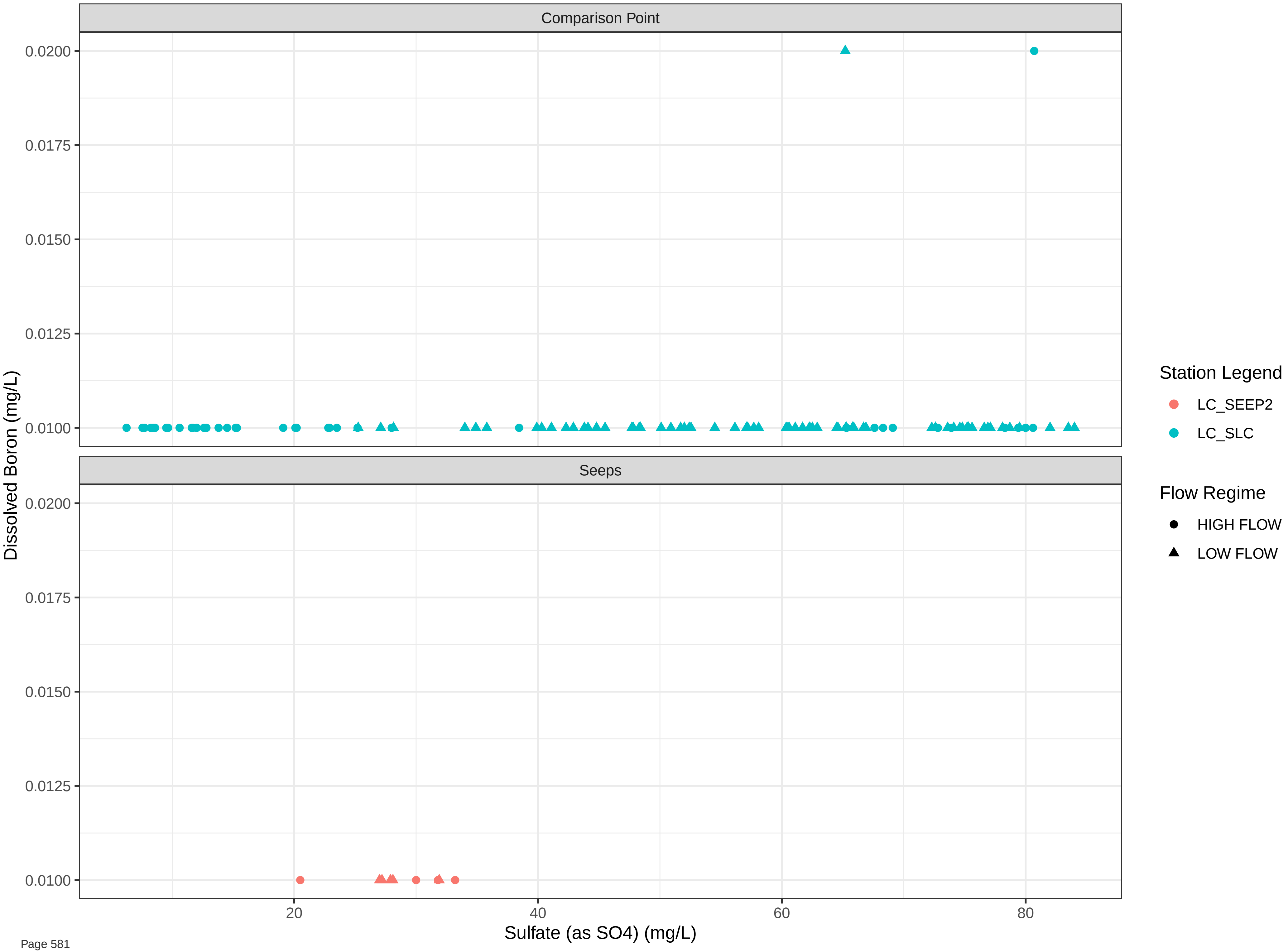
Seeps
Dissolved Boron (mg/L)
0.018
0.016
0.014
0.012
0.010
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

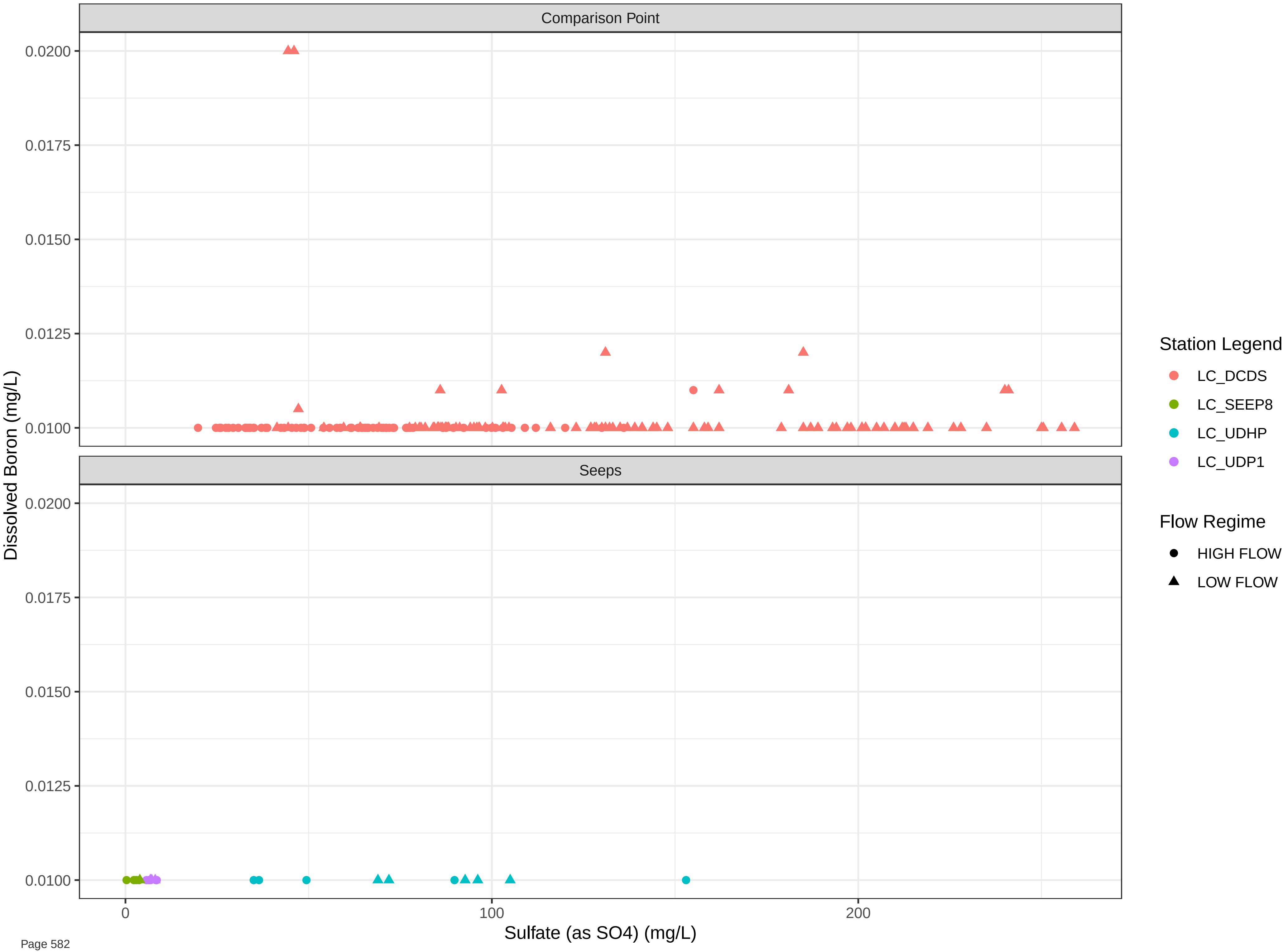


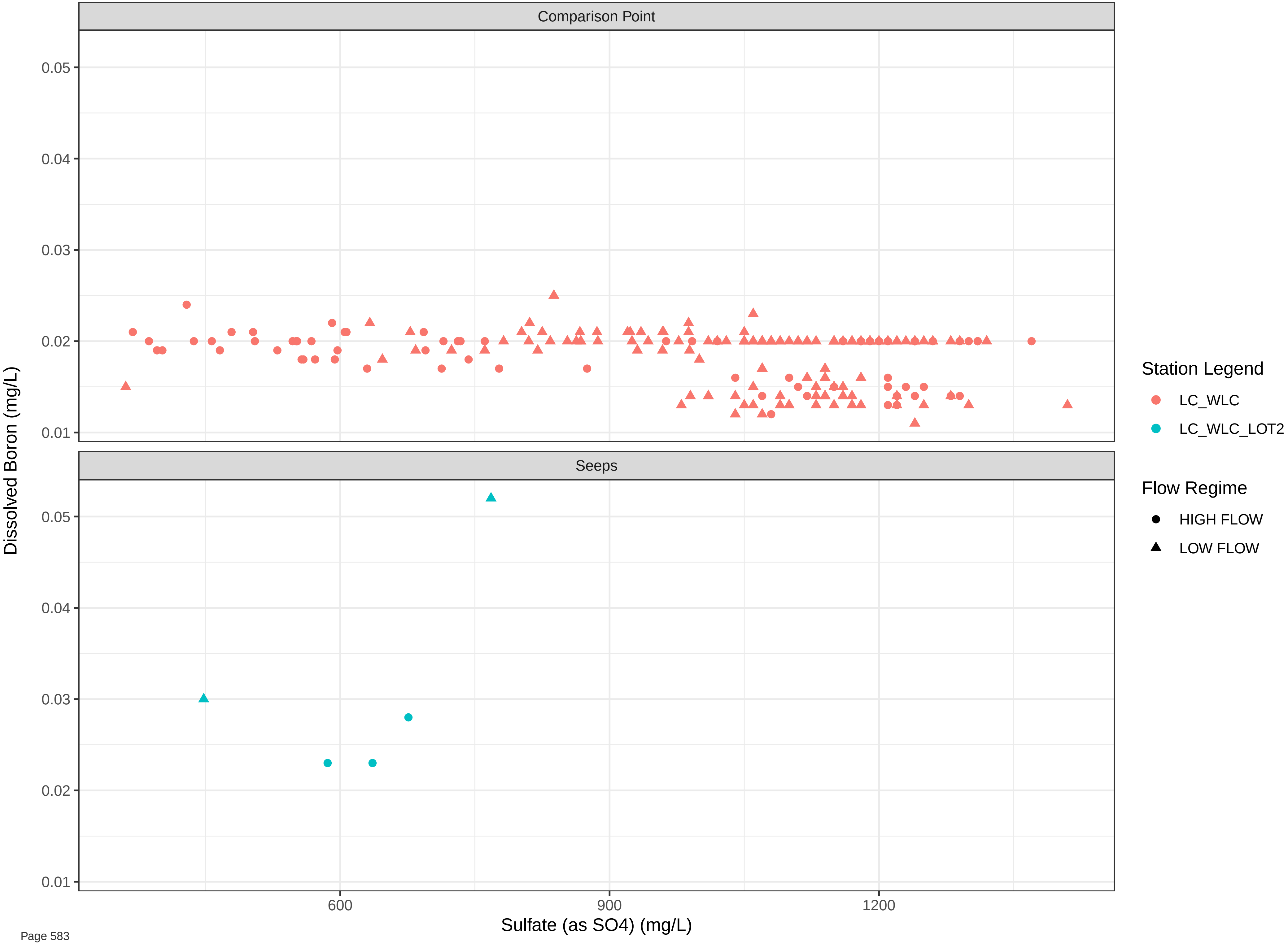
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.035
0.030
0.025
0.020
0.015
0.010
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



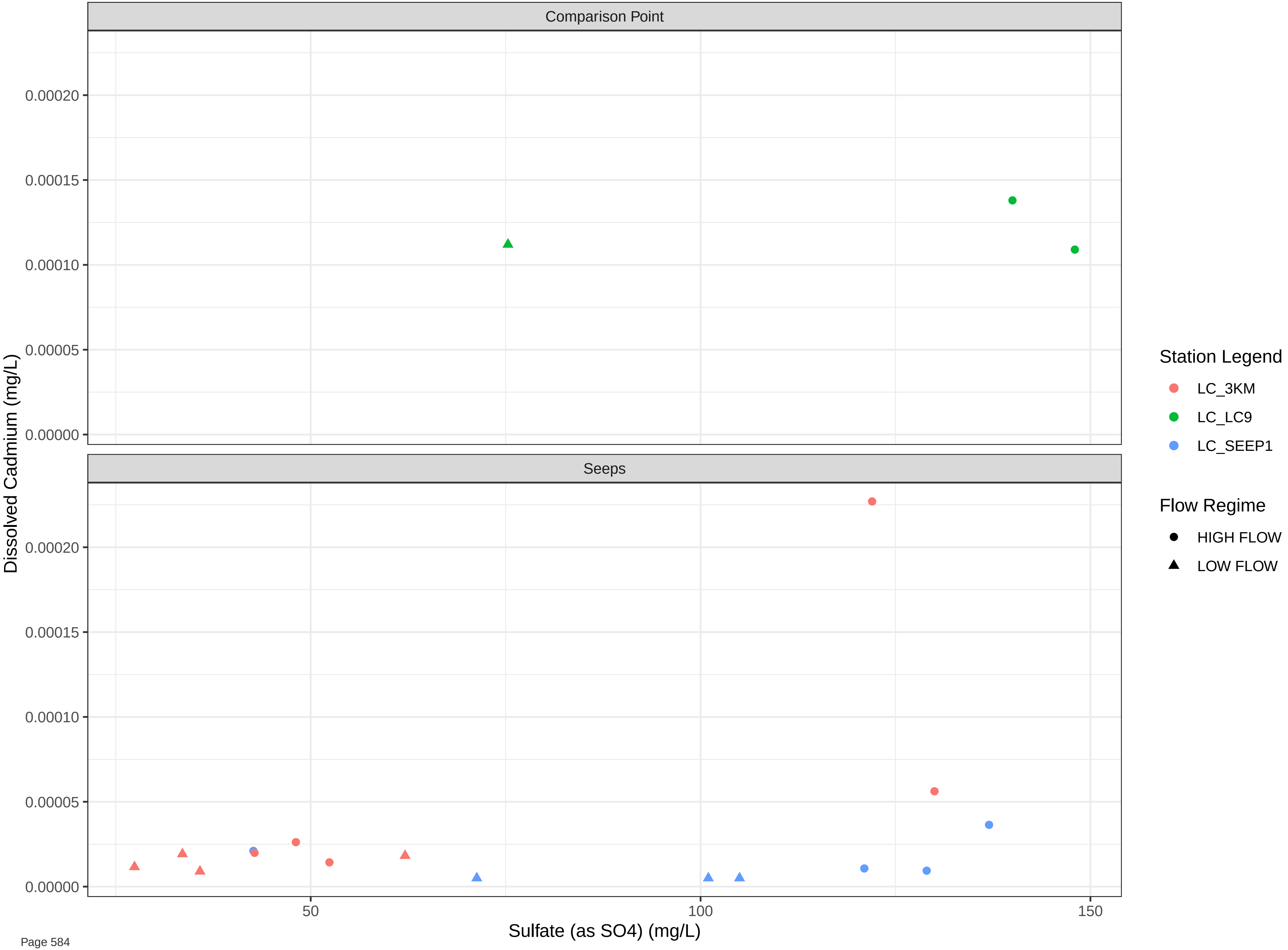
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.016
0.014
0.012
0.010
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.0200
0.0175
0.0150
0.0125
0.0100
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

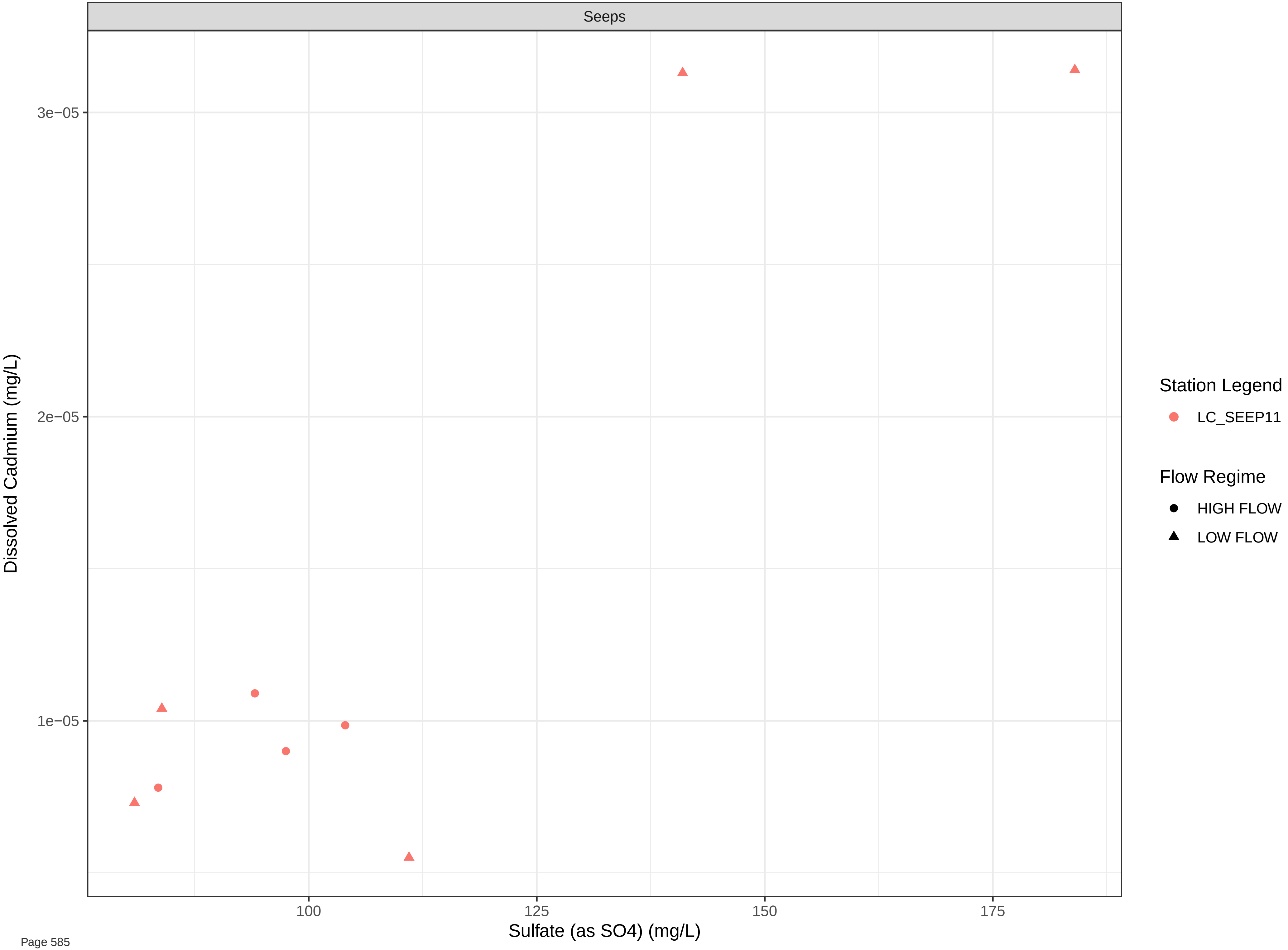

Comparison Point
Seeps
Dissolved Boron (mg/L)
0.0200
0.0175
0.0150
0.0125
0.0100
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



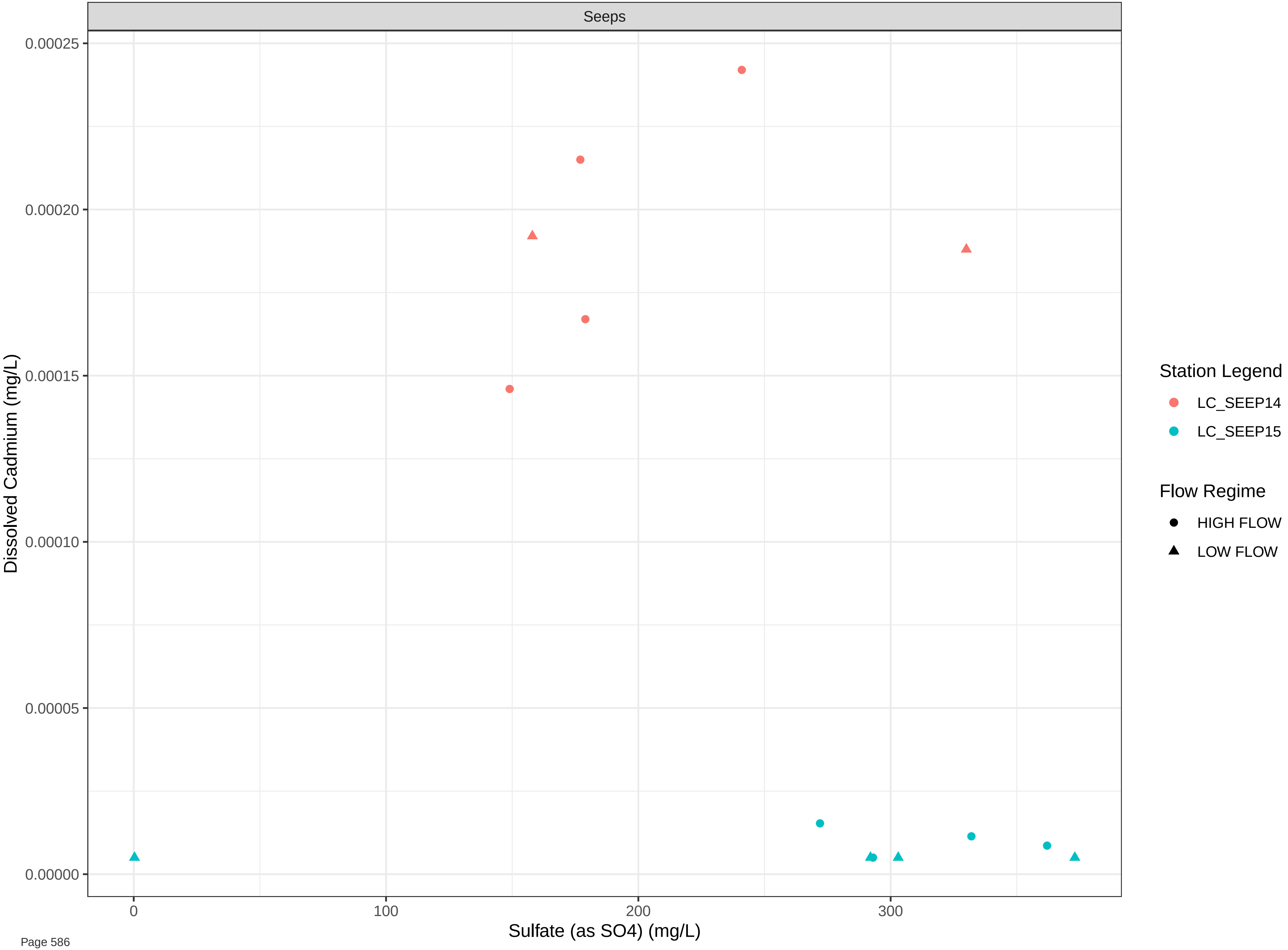
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.05
0.04
0.03
0.02
0.01
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



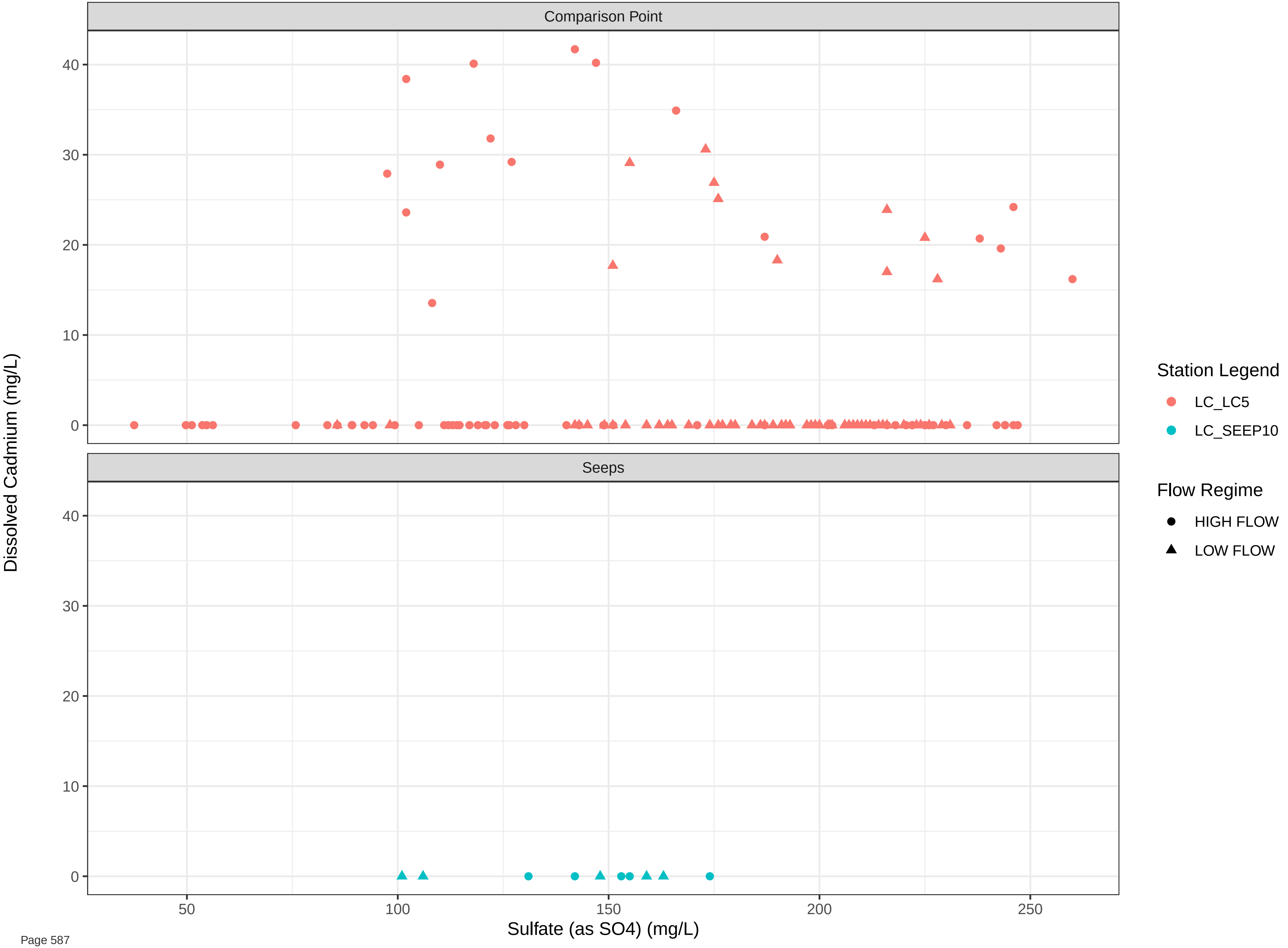
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
0.00000
0.00005
0.00010
0.00015
0.00020
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



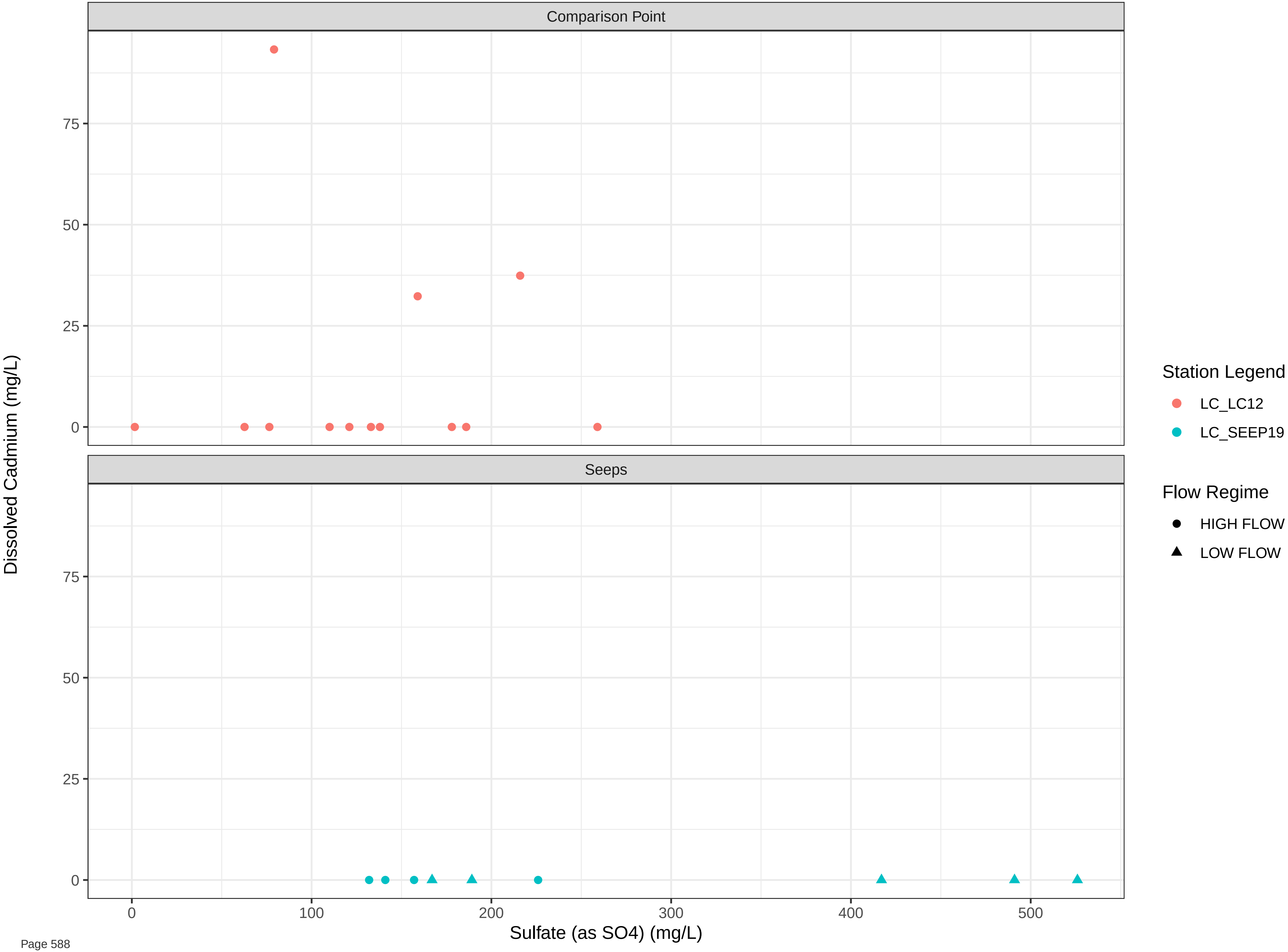
Seeps
3e−05
2e−05
1e−05
100
125
150
175
Sulfate (as SO4) (mg/L)
Dissolved Cadmium (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

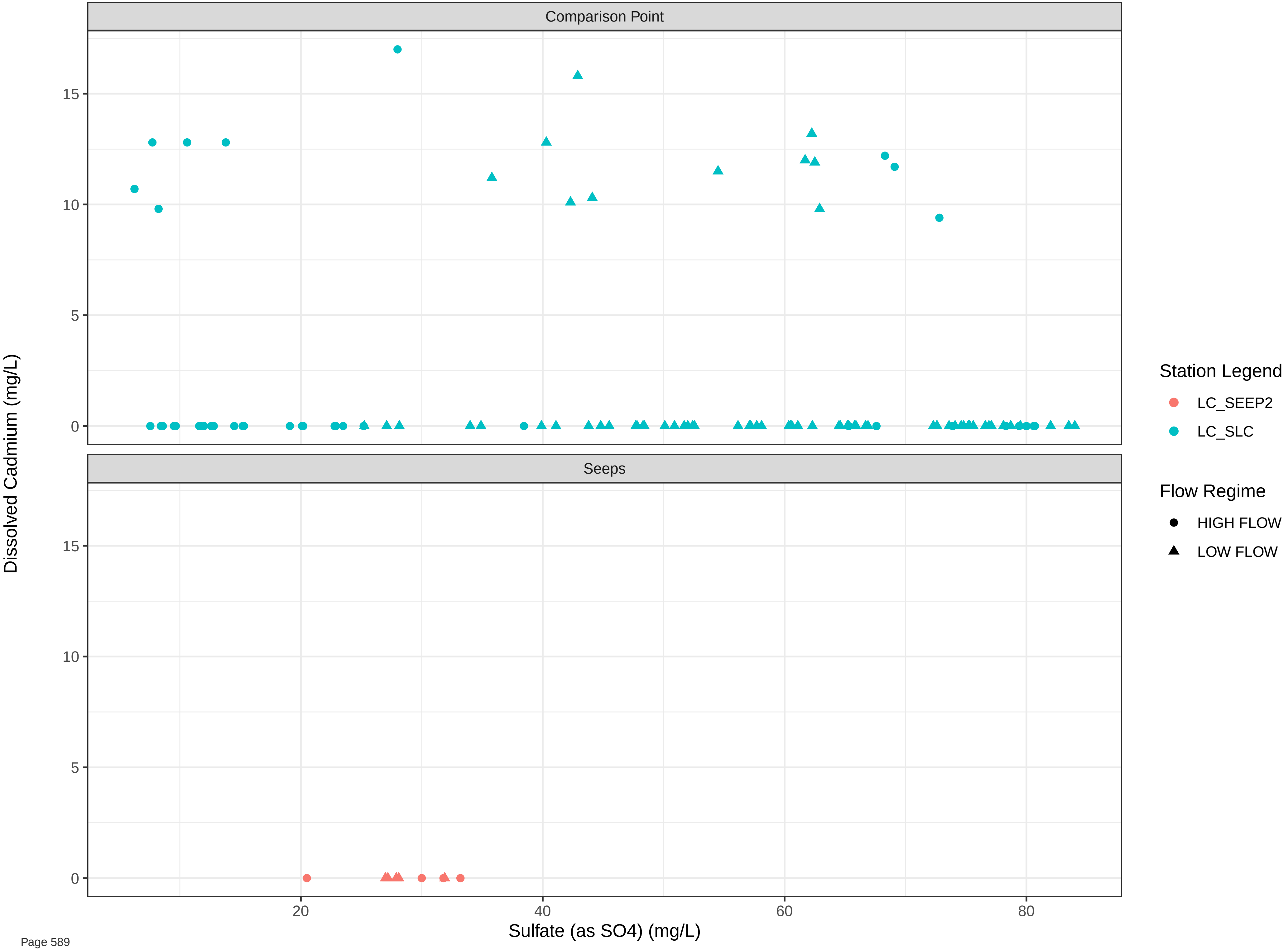


Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
Dissolved Cadmium (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

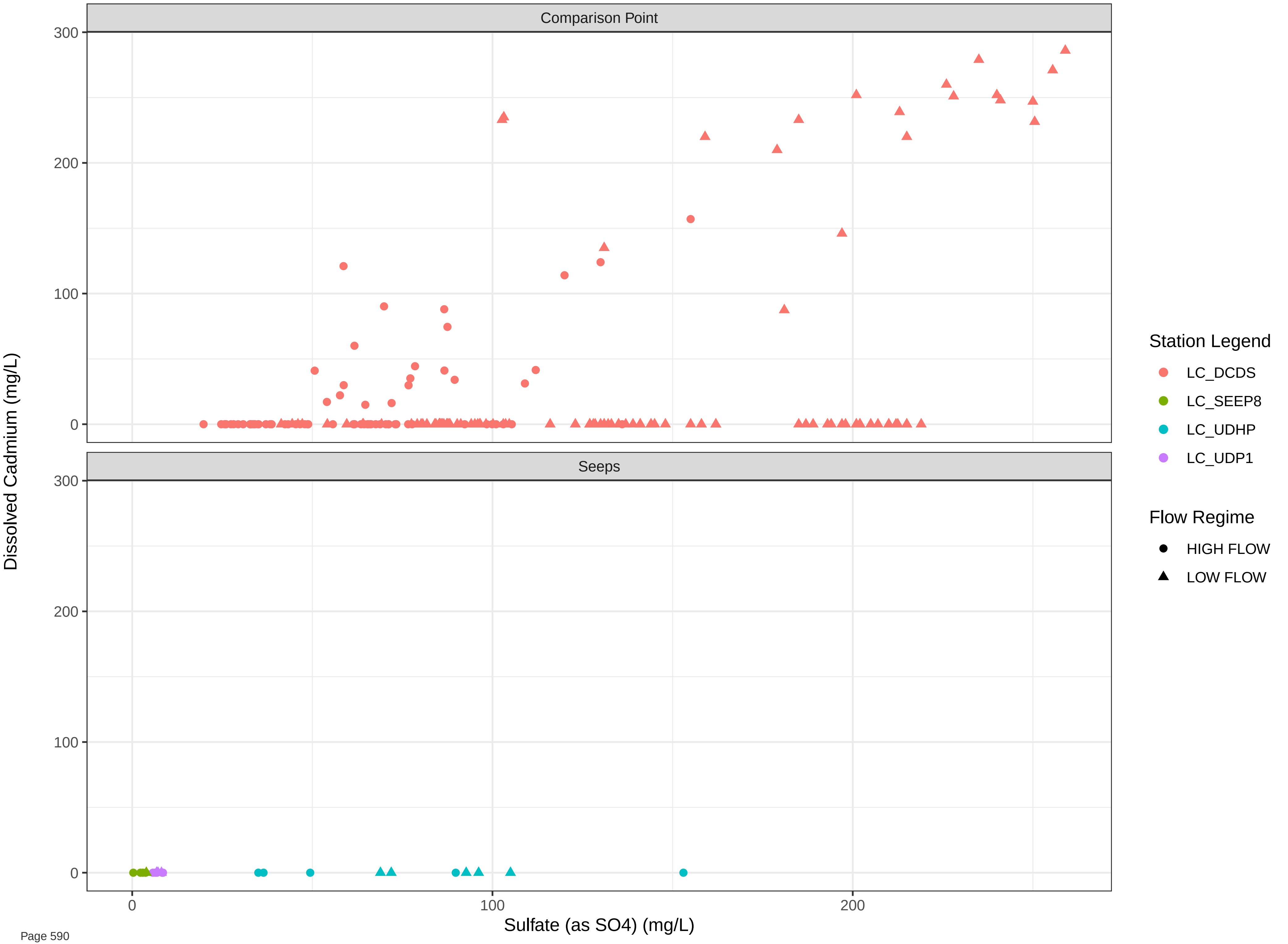


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
40
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

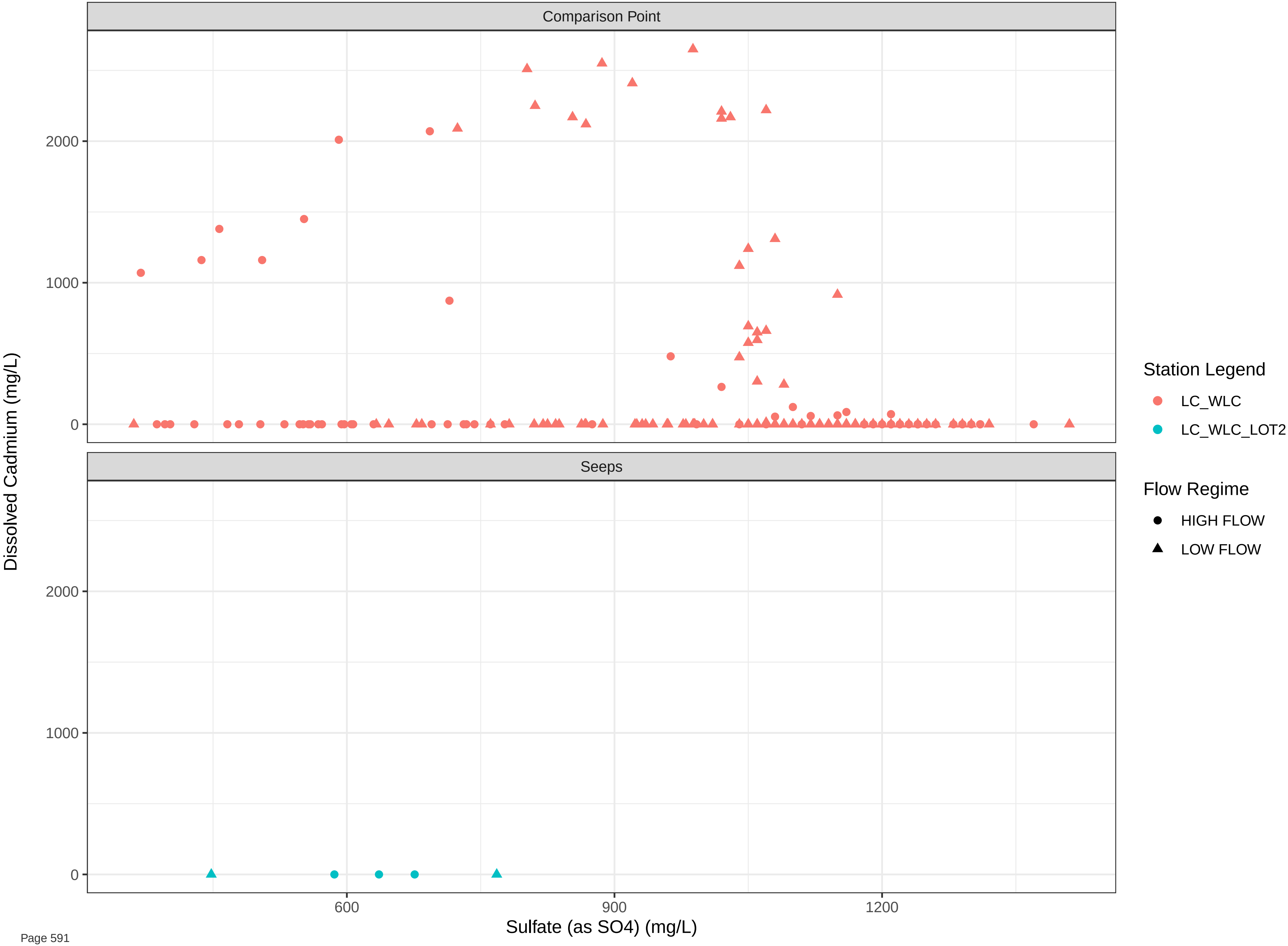

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



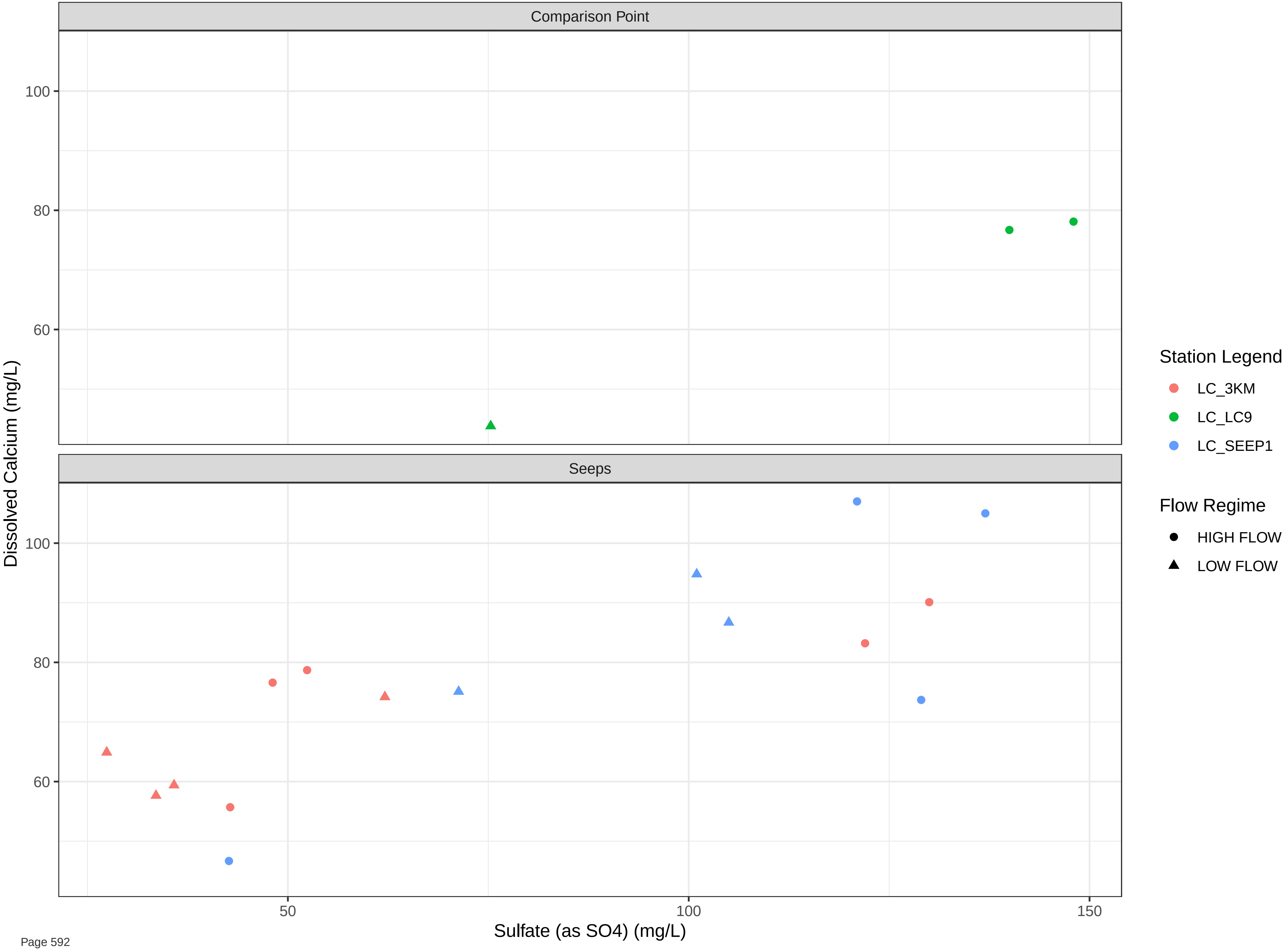
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW



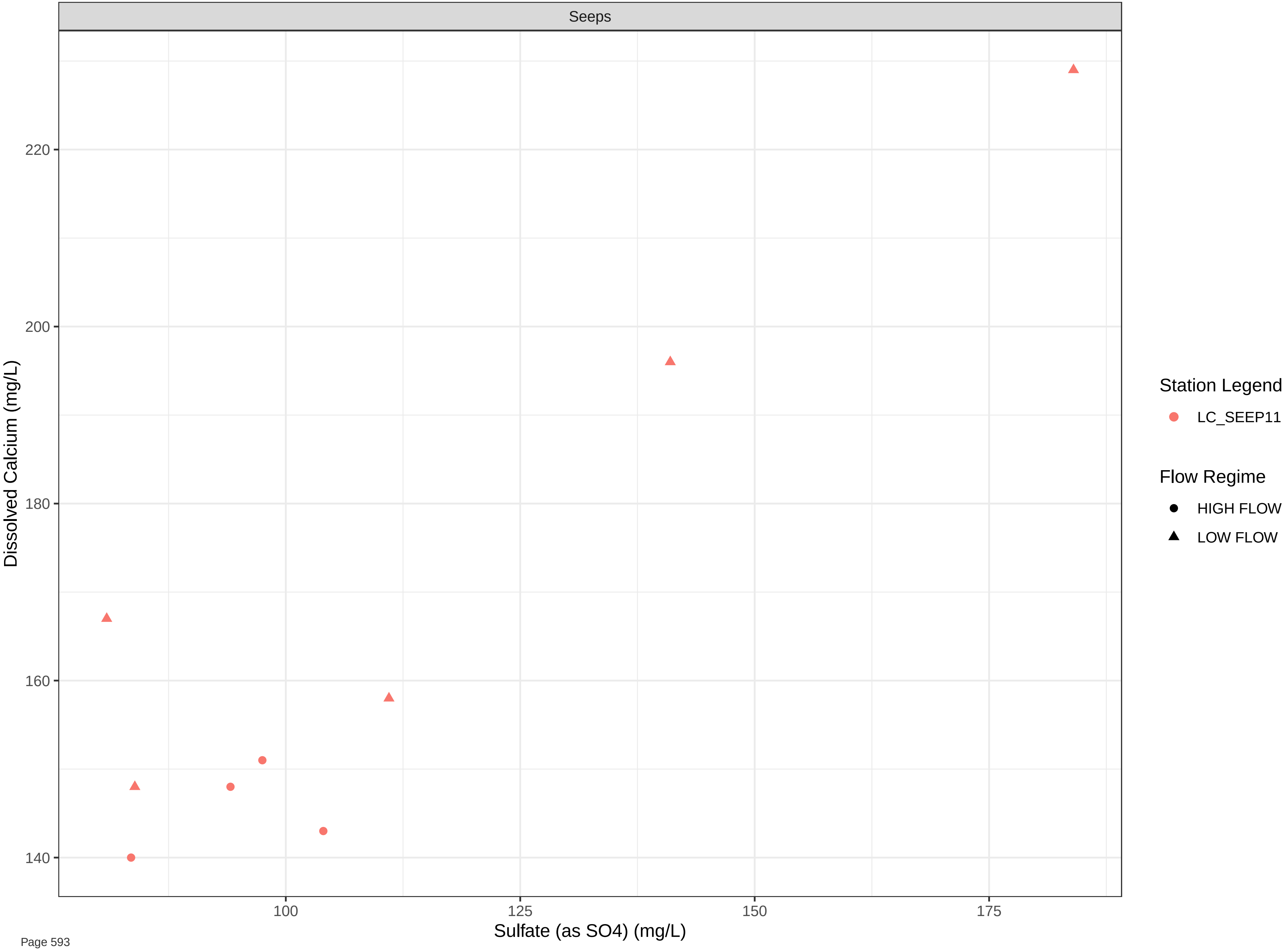
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
300
200
100
0
300
200
100
0
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

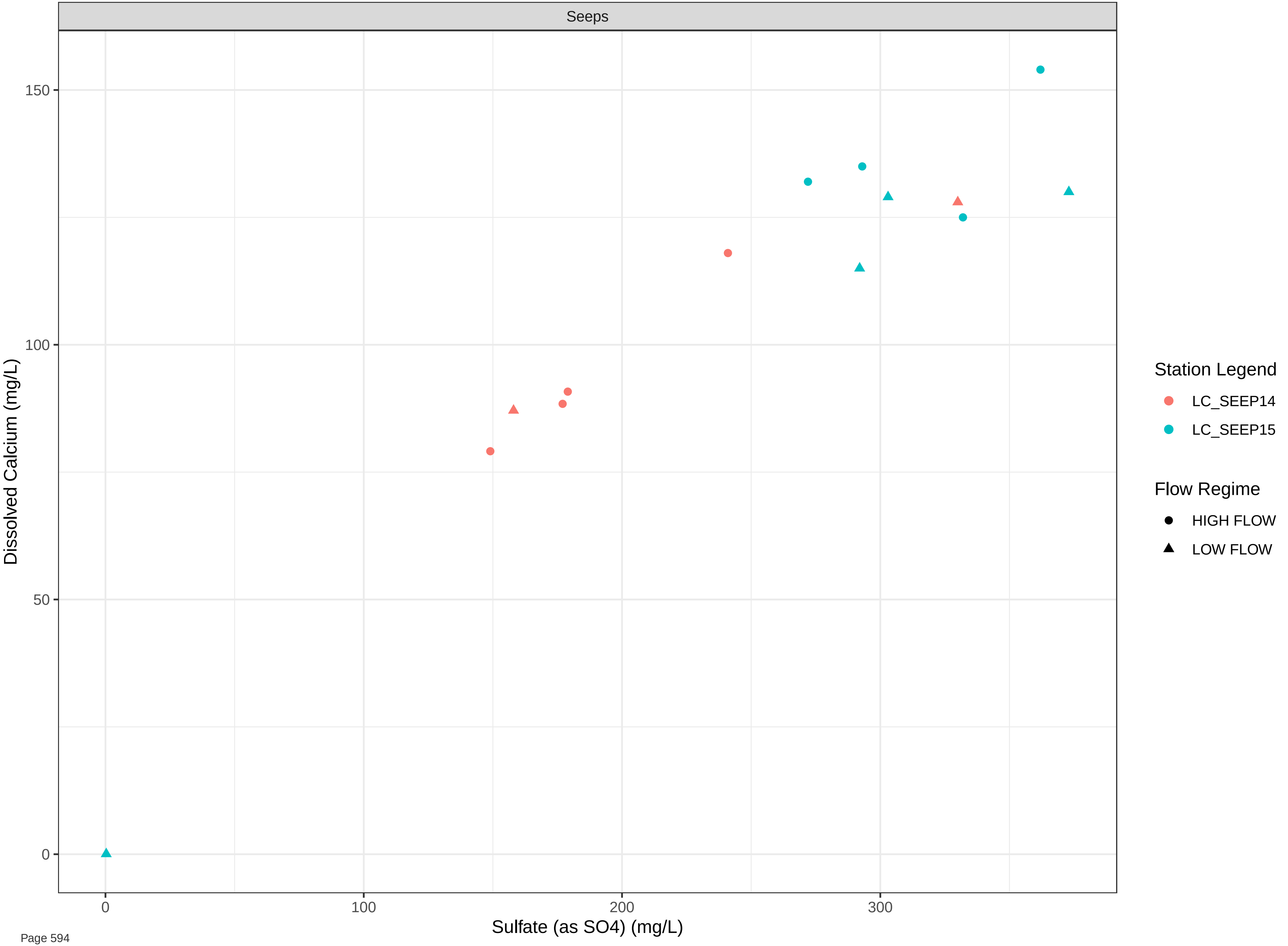


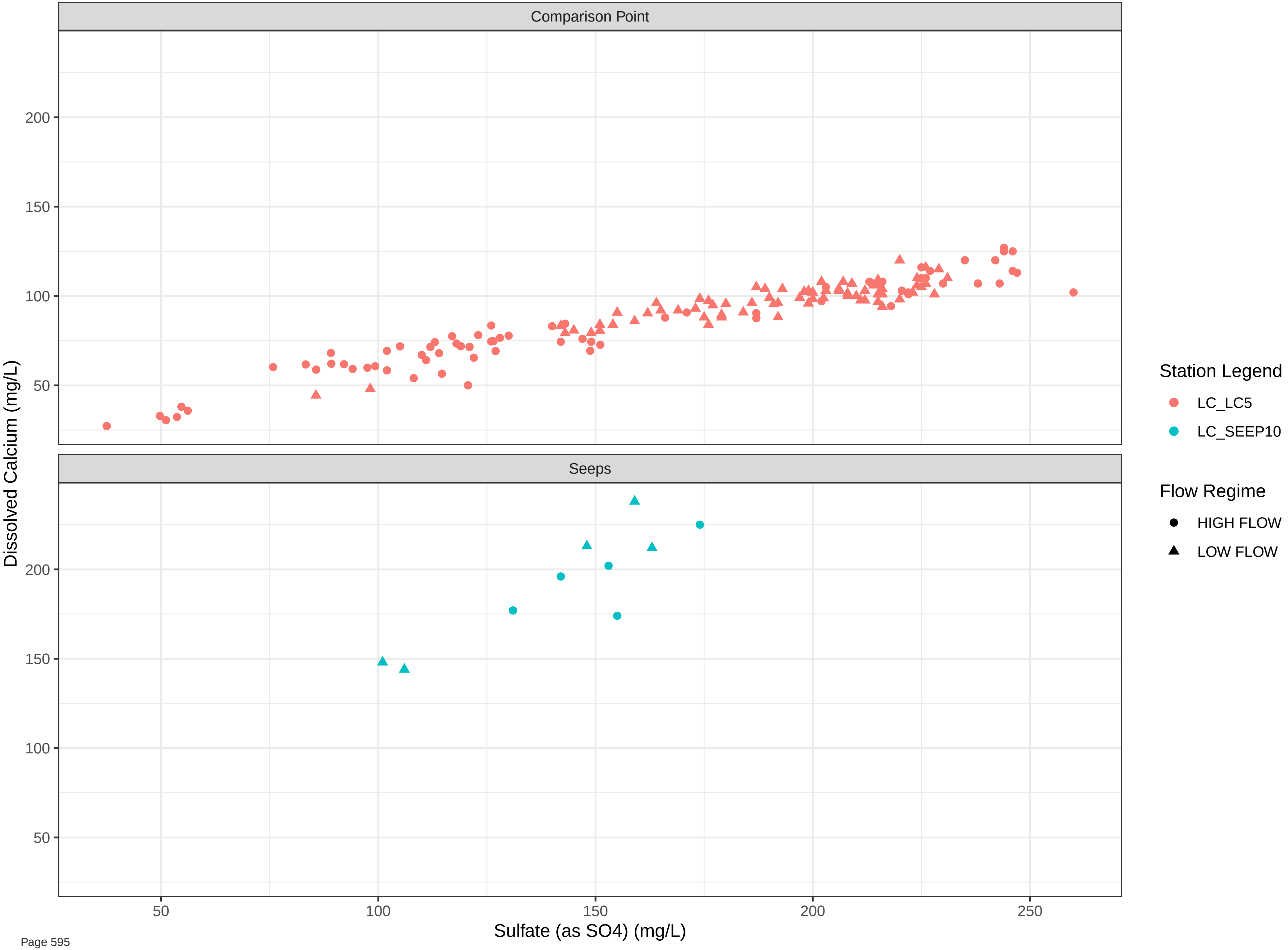
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
2000
1000
0
2000
1000
0
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



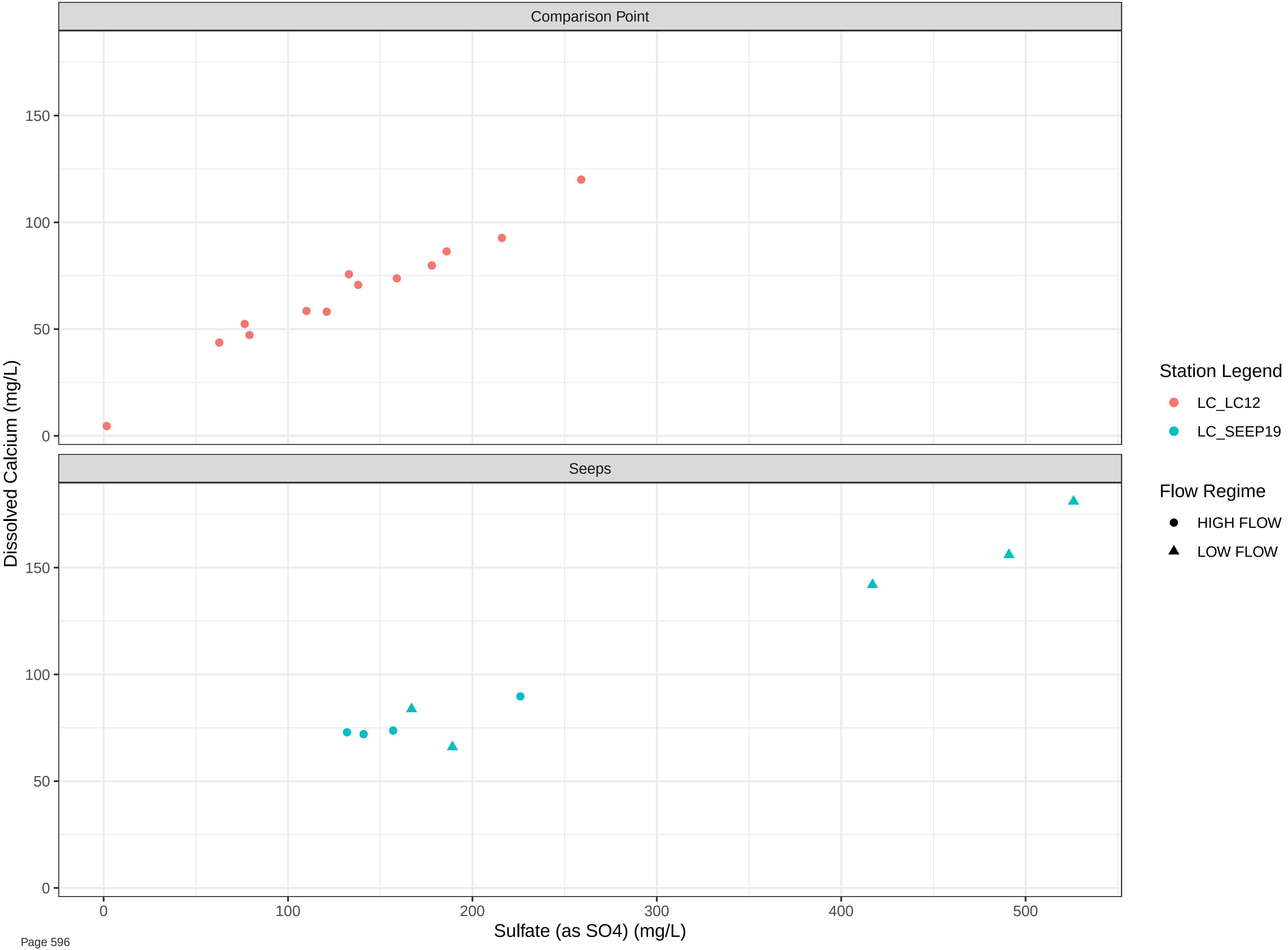
Comparison Point
Seeps
Dissolved Calcium (mg/L)
100
80
60
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
Dissolved Calcium (mg/L)
140
160
180
200
220
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

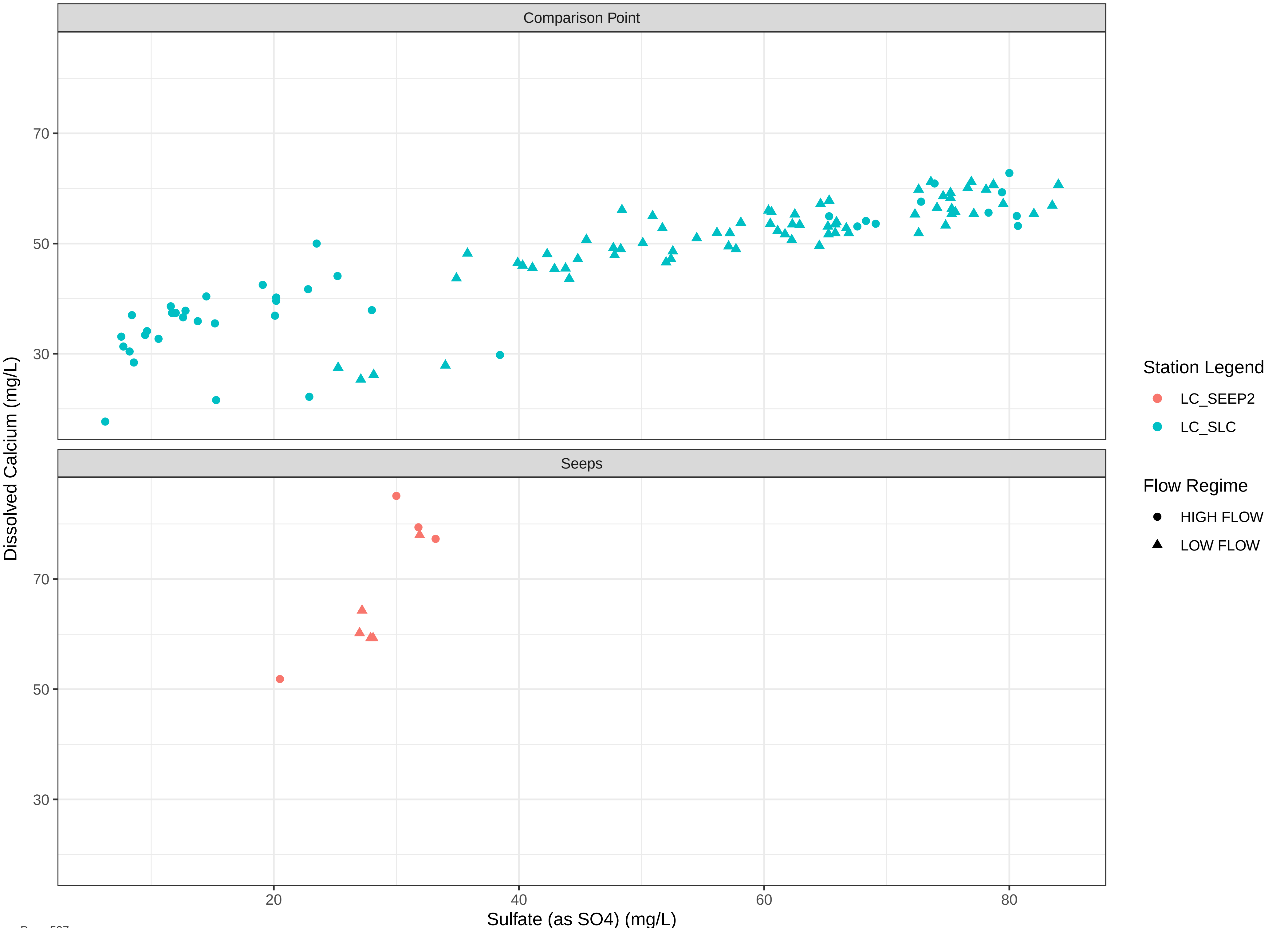

Seeps
150
100
50
0
0
100
200
300
Sulfate (as SO4) (mg/L)
Dissolved Calcium (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

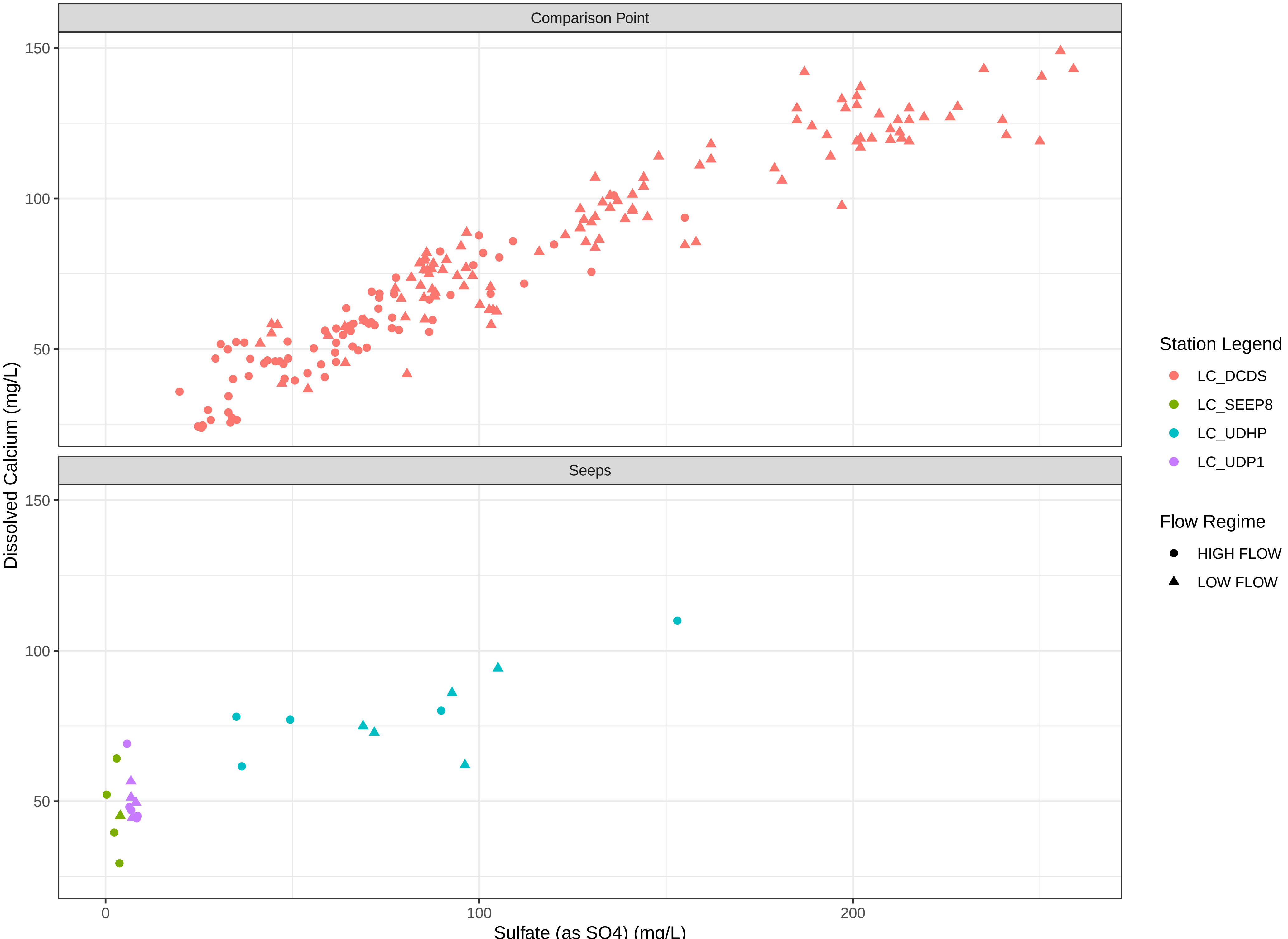


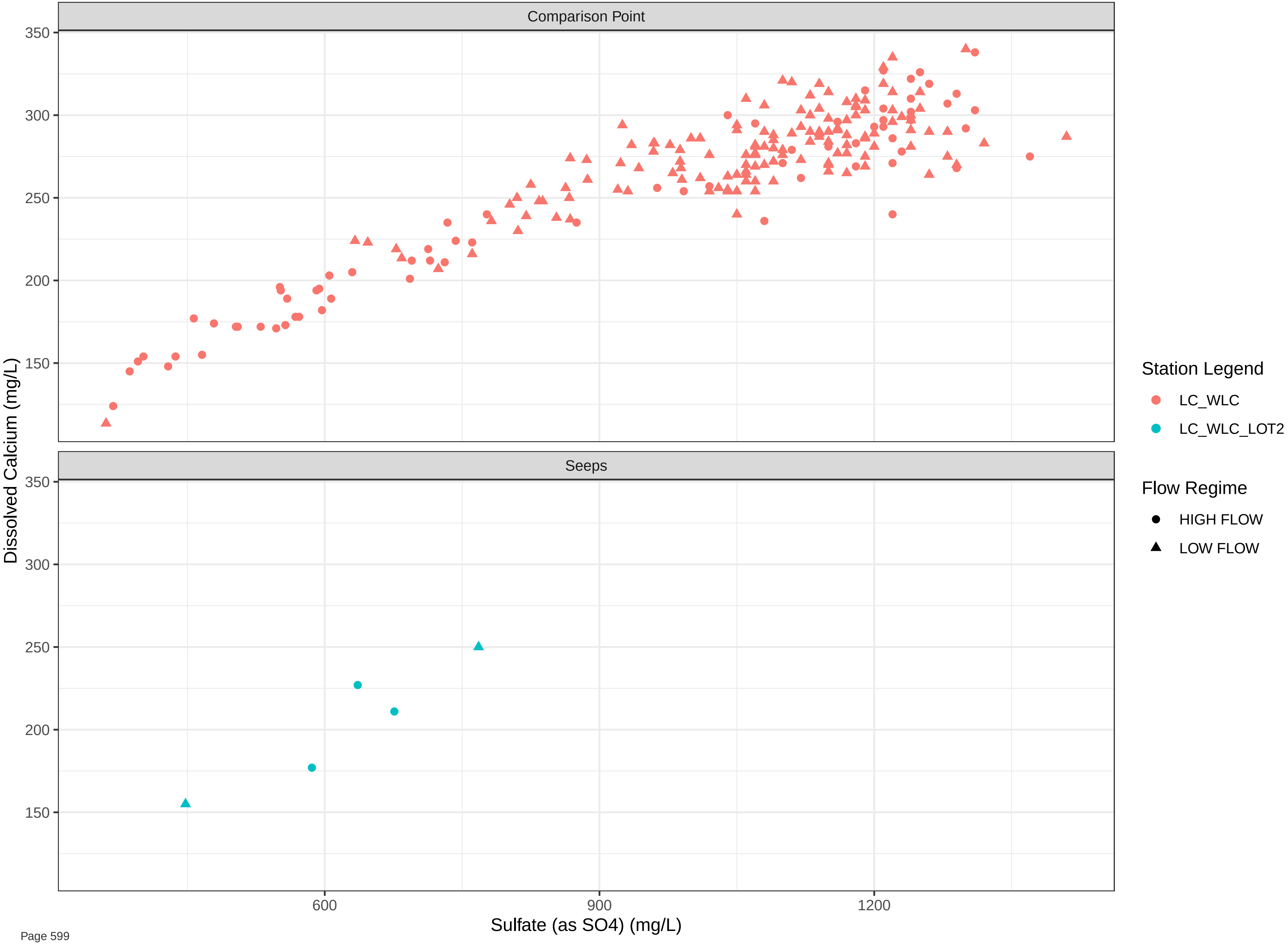
Comparison Point
Seeps
Dissolved Calcium (mg/L)
200
150
100
50
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

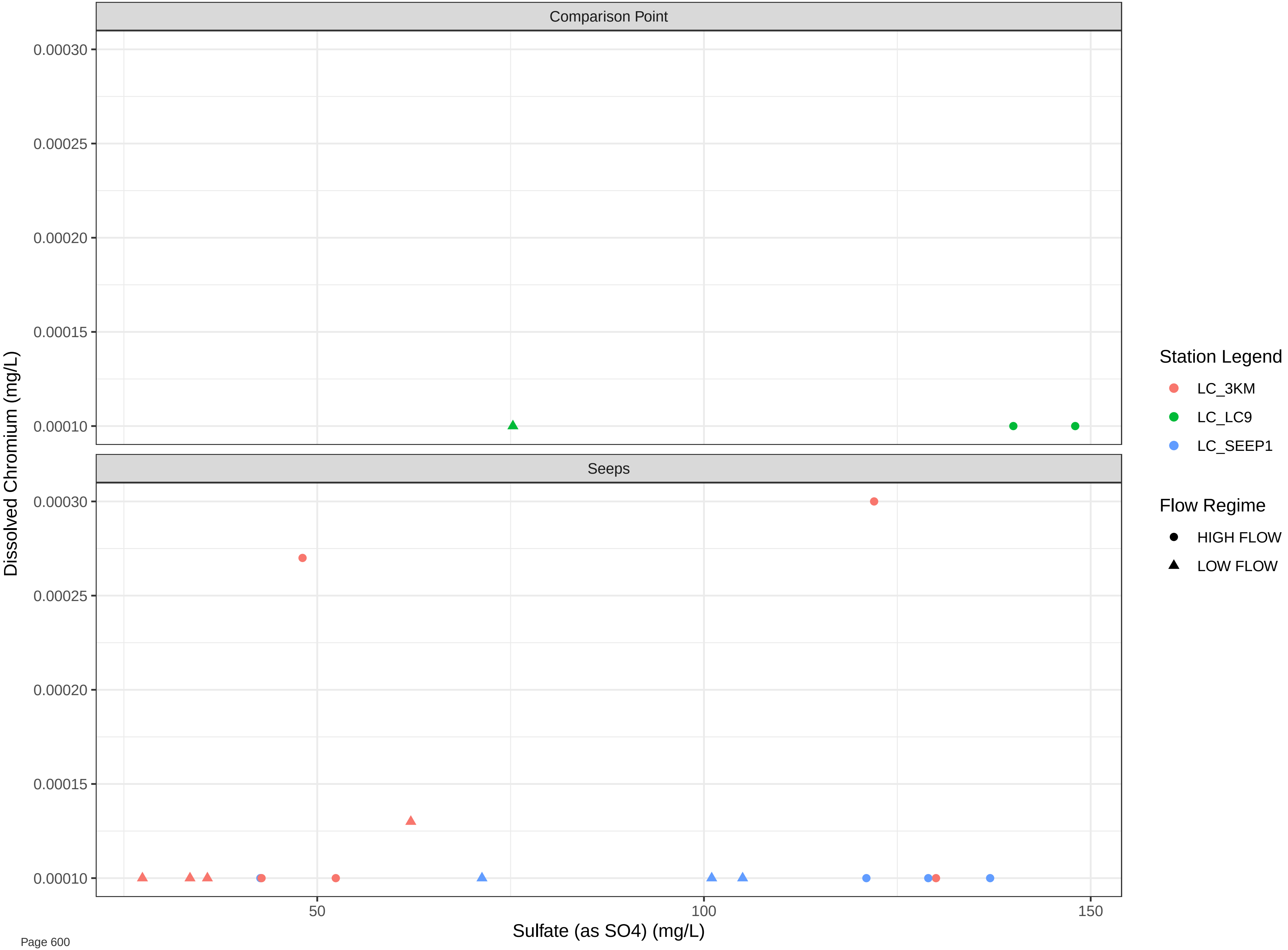


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

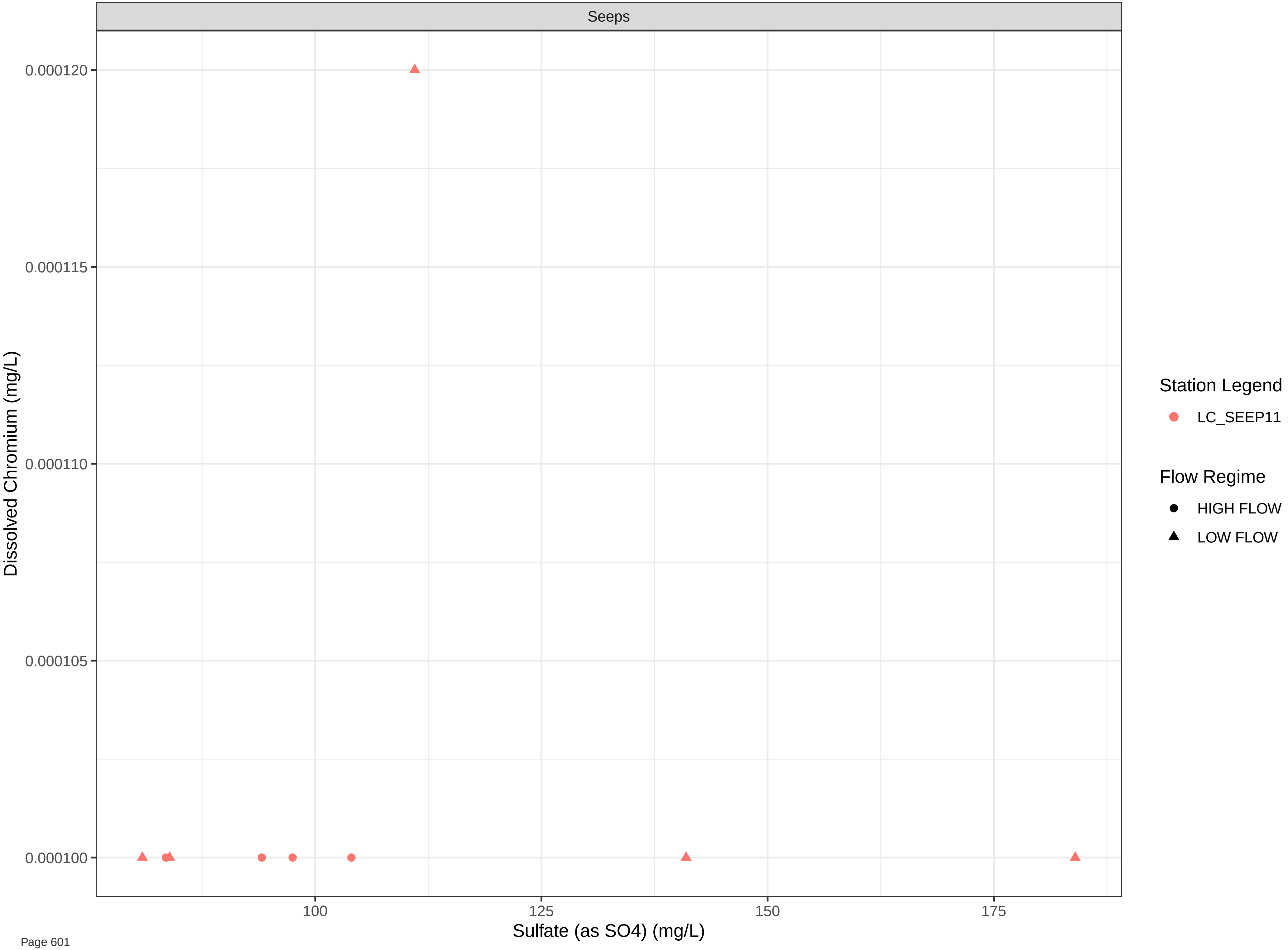

Comparison Point
Seeps
Dissolved Calcium (mg/L)
70
50
30
70
50
30
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Calcium (mg/L)
150
100
50
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

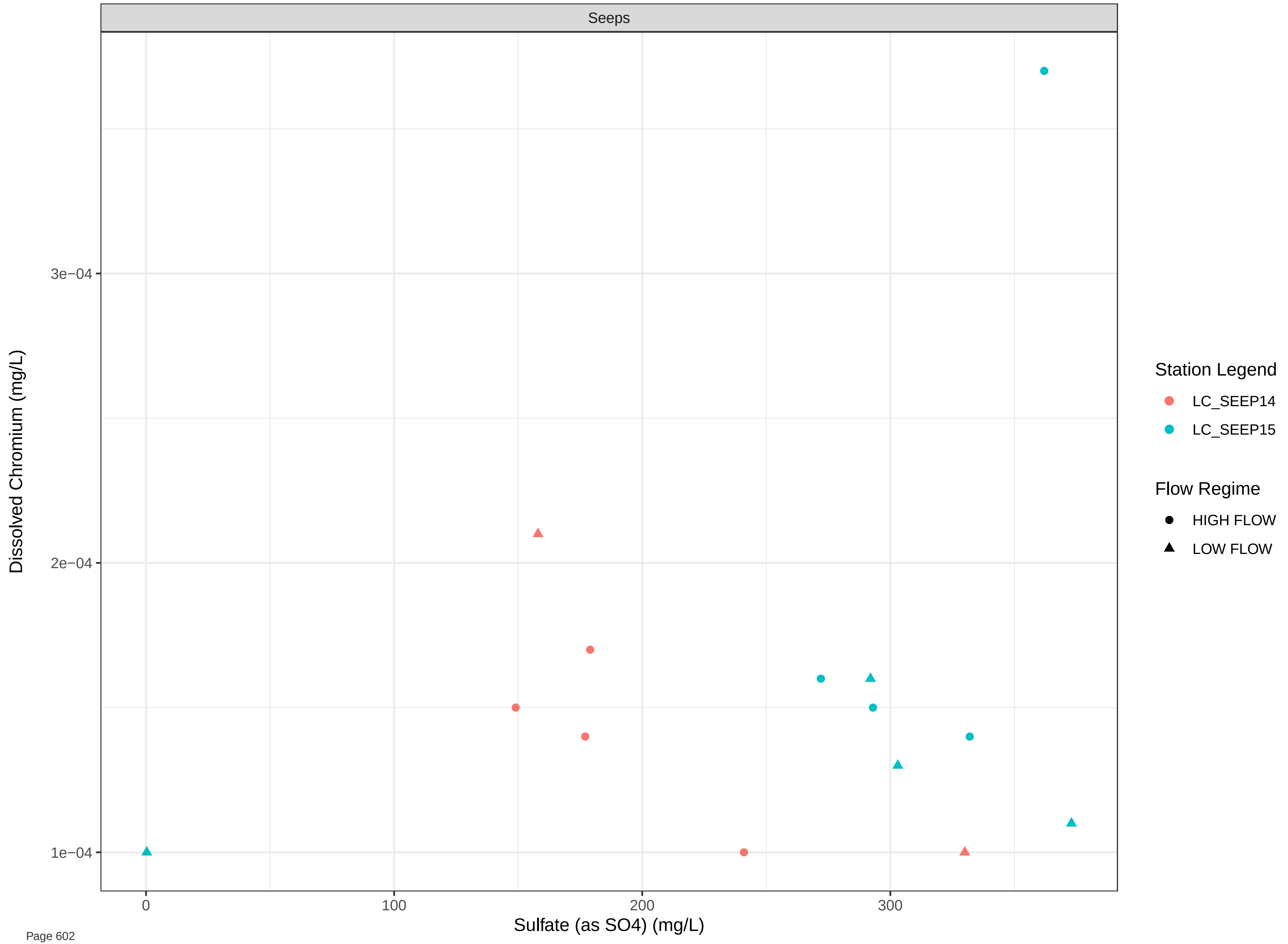

Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
350
300
250
200
150
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



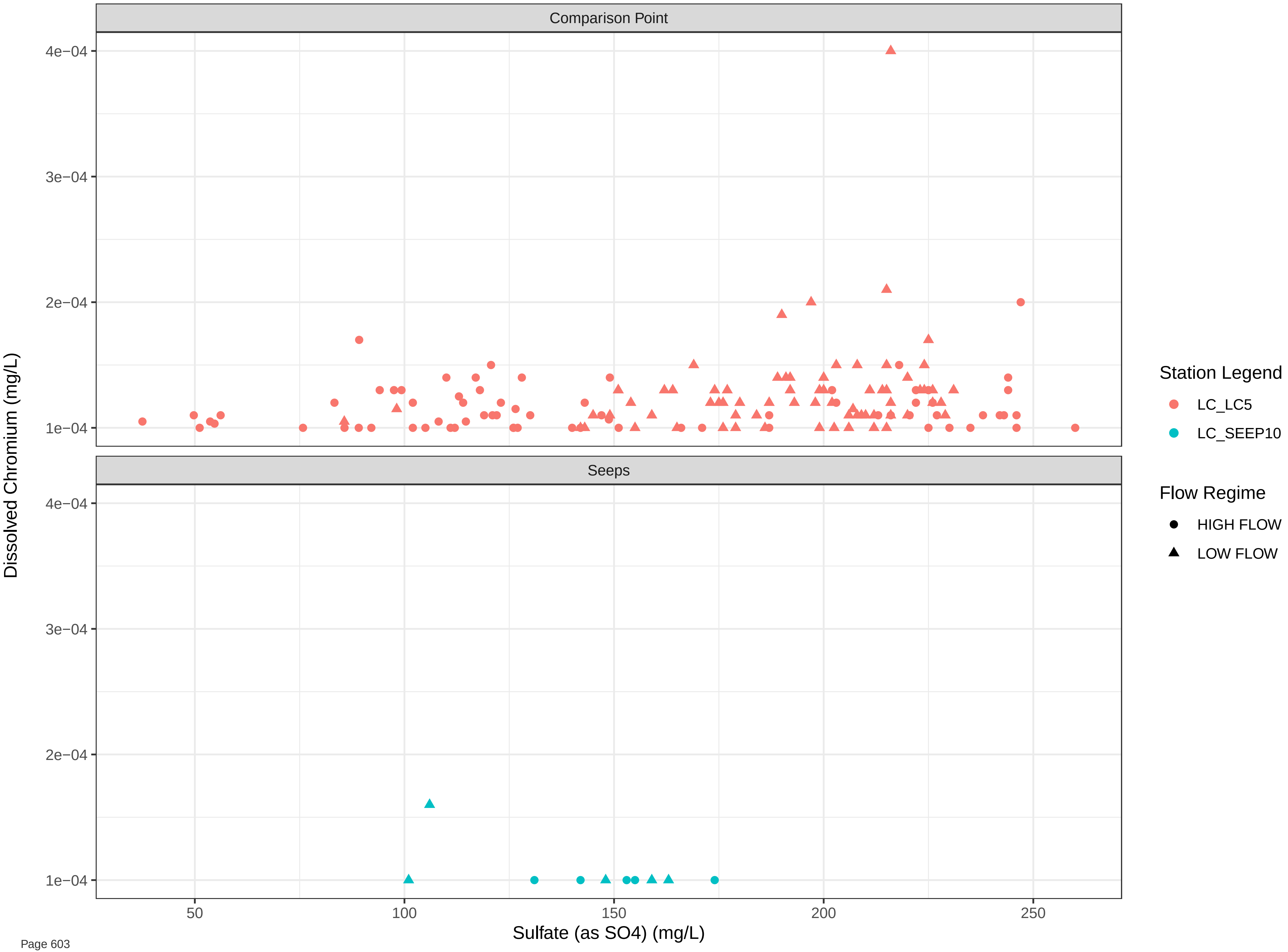
Comparison Point
Seeps
0.00030
0.00025
0.00020
0.00015
0.00010
50
100
150
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



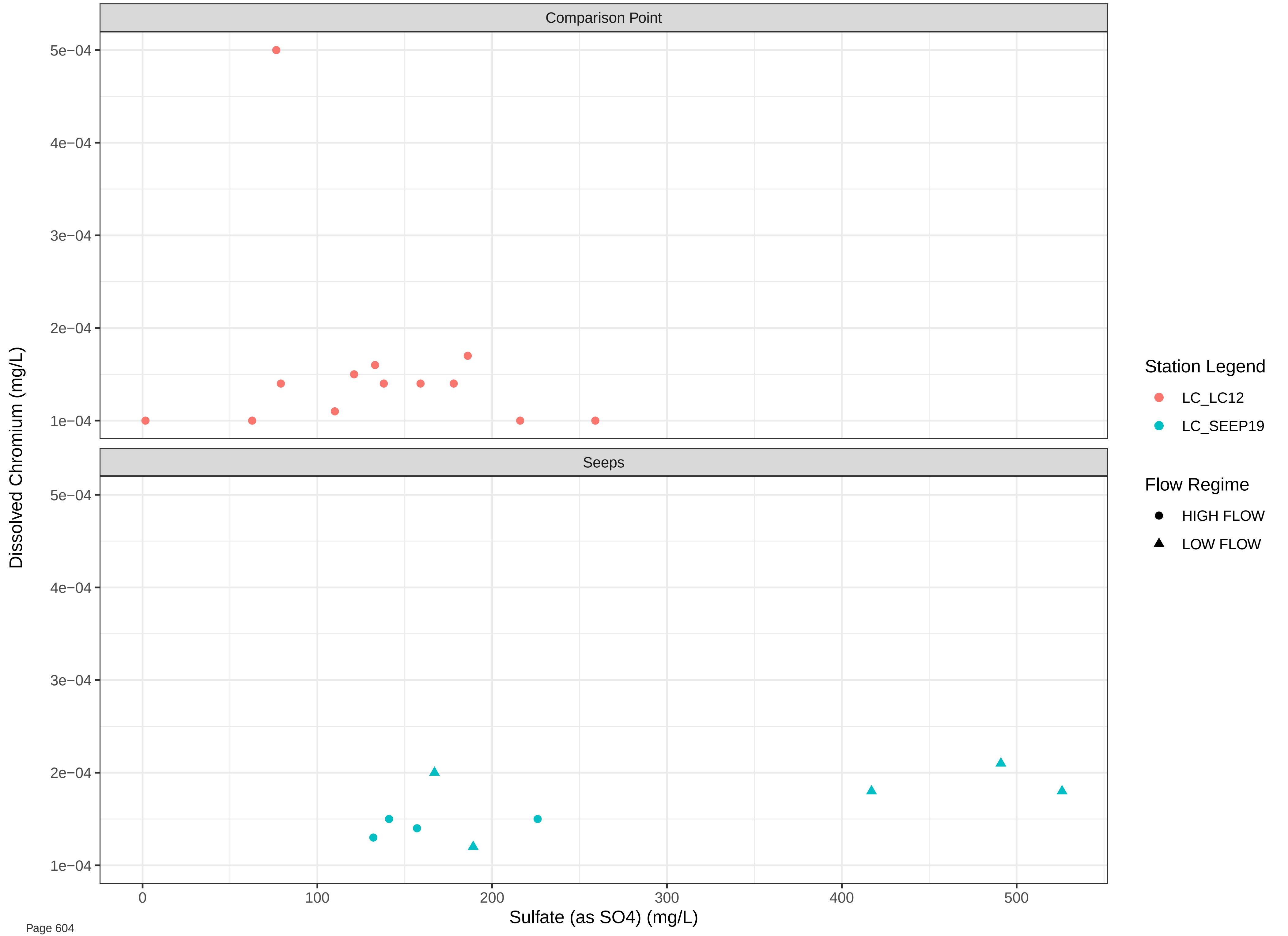
Seeps
0.000120
0.000115
0.000110
0.000105
0.000100
Dissolved Chromium (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



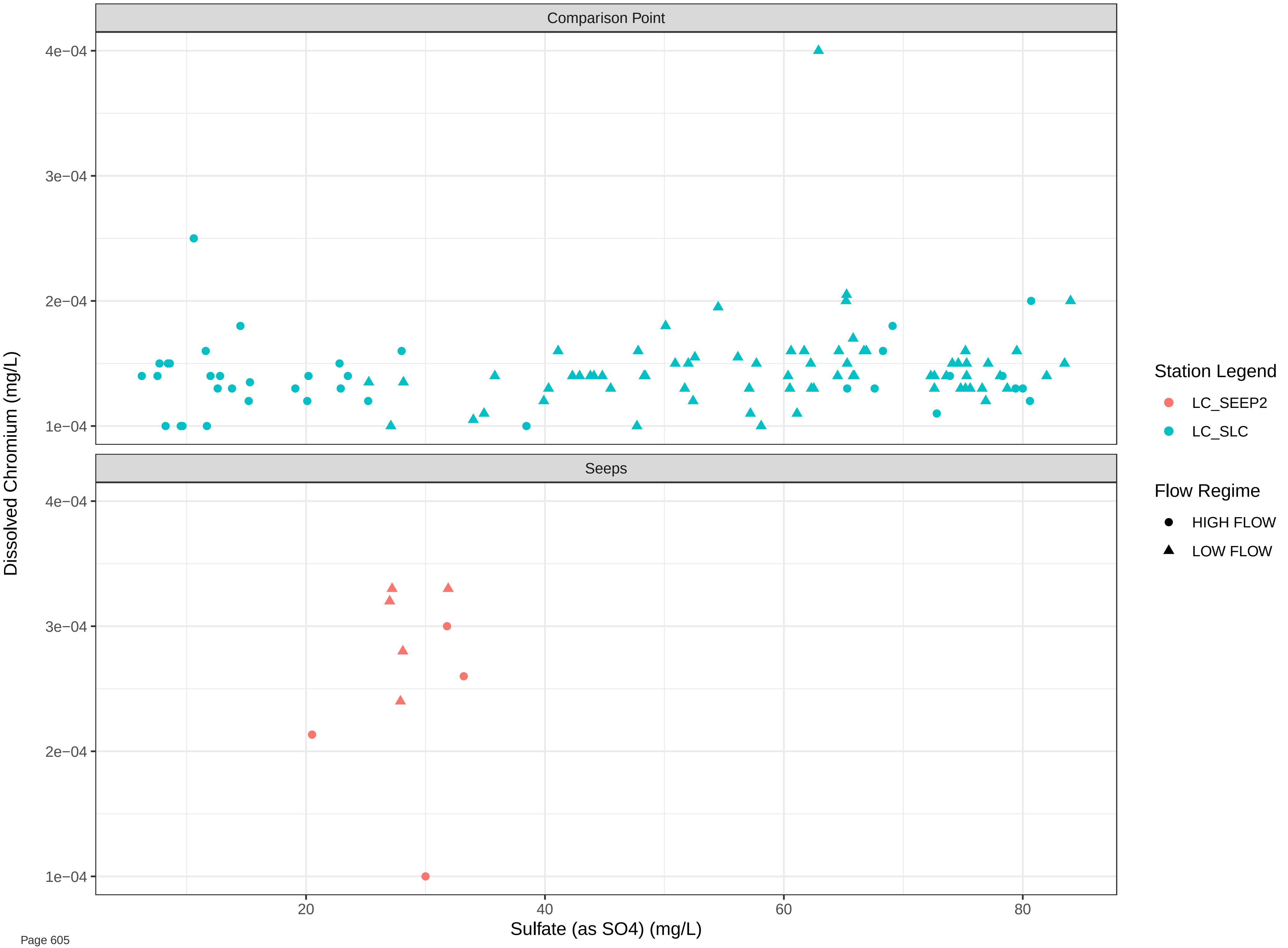
Seeps
Dissolved Chromium (mg/L)
3e−04
2e−04
1e−04
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

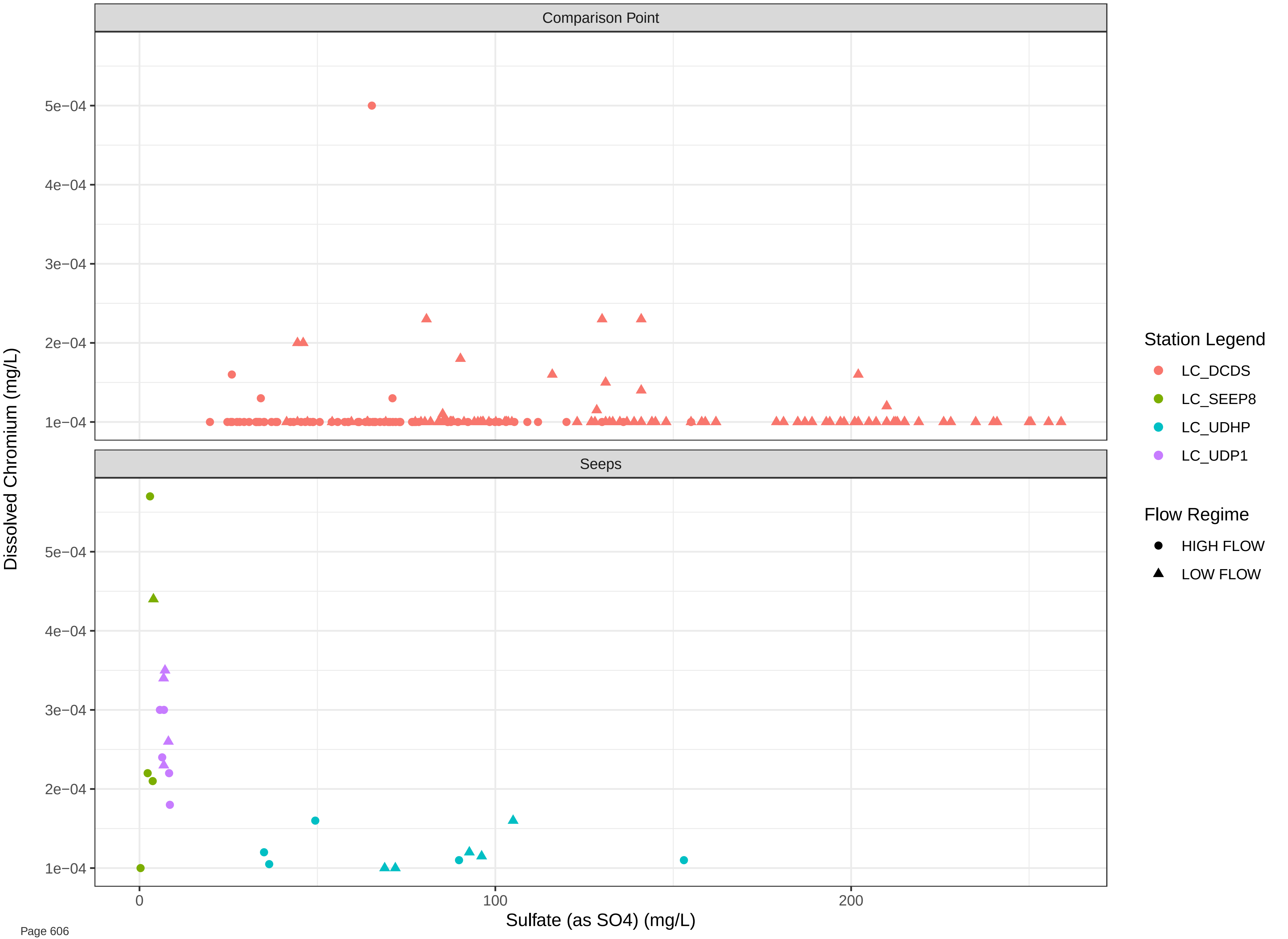


Comparison Point
Seeps
4e−04
3e−04
2e−04
1e−04
Dissolved Chromium (mg/L)
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

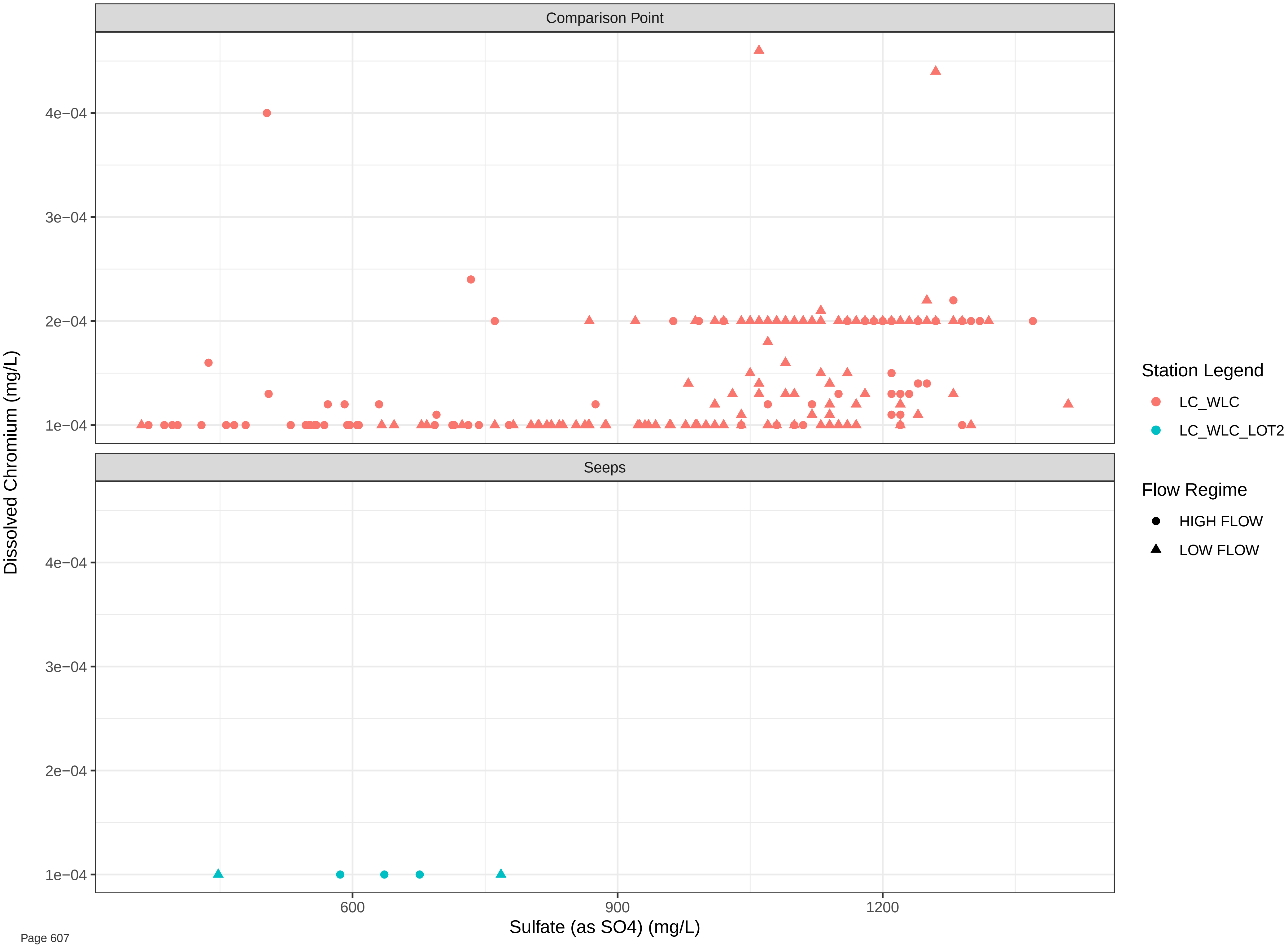


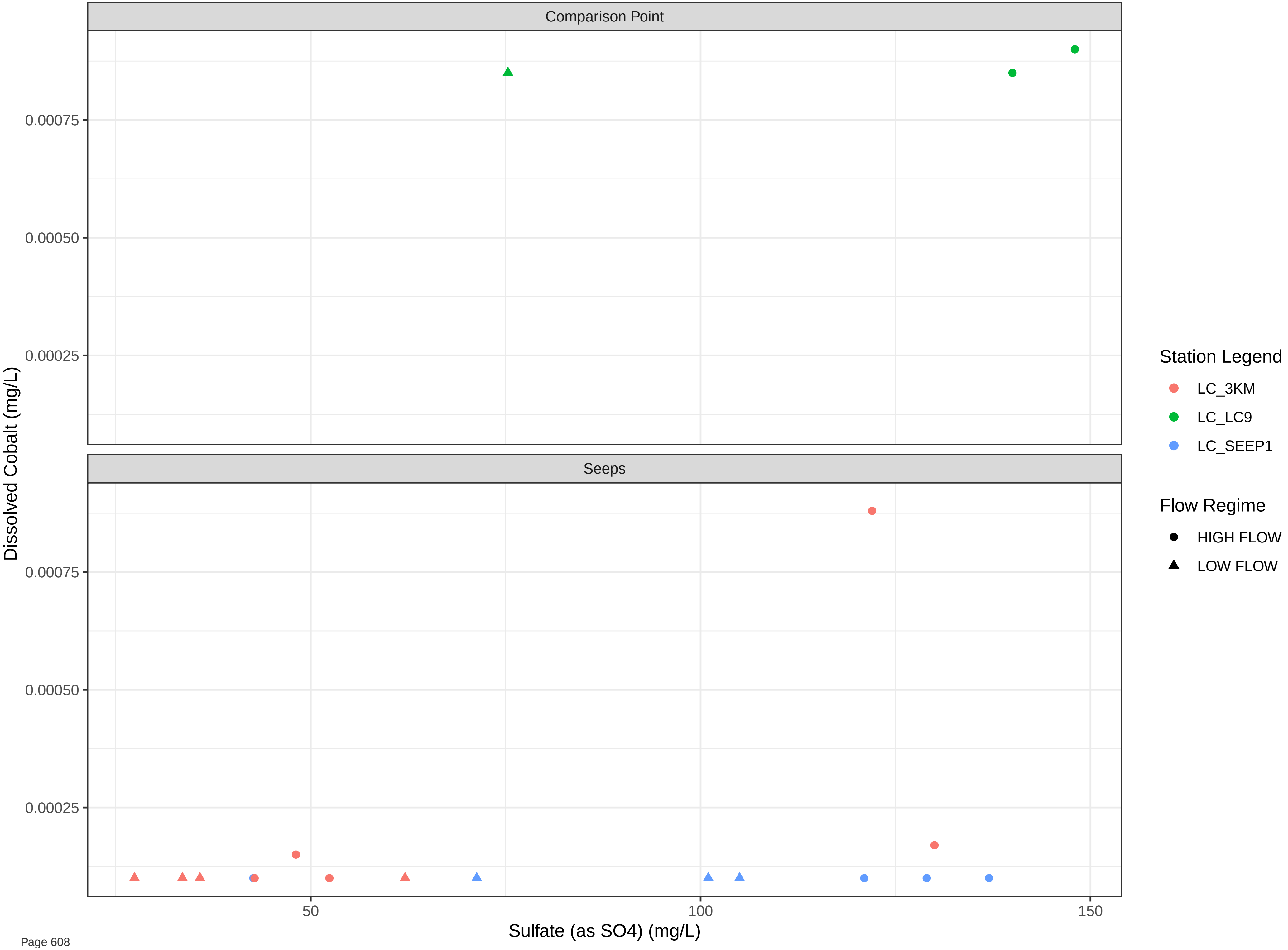
Comparison Point
Seeps
Dissolved Chromium (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
4e−04
3e−04
2e−04
1e−04
20
40
60
80
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

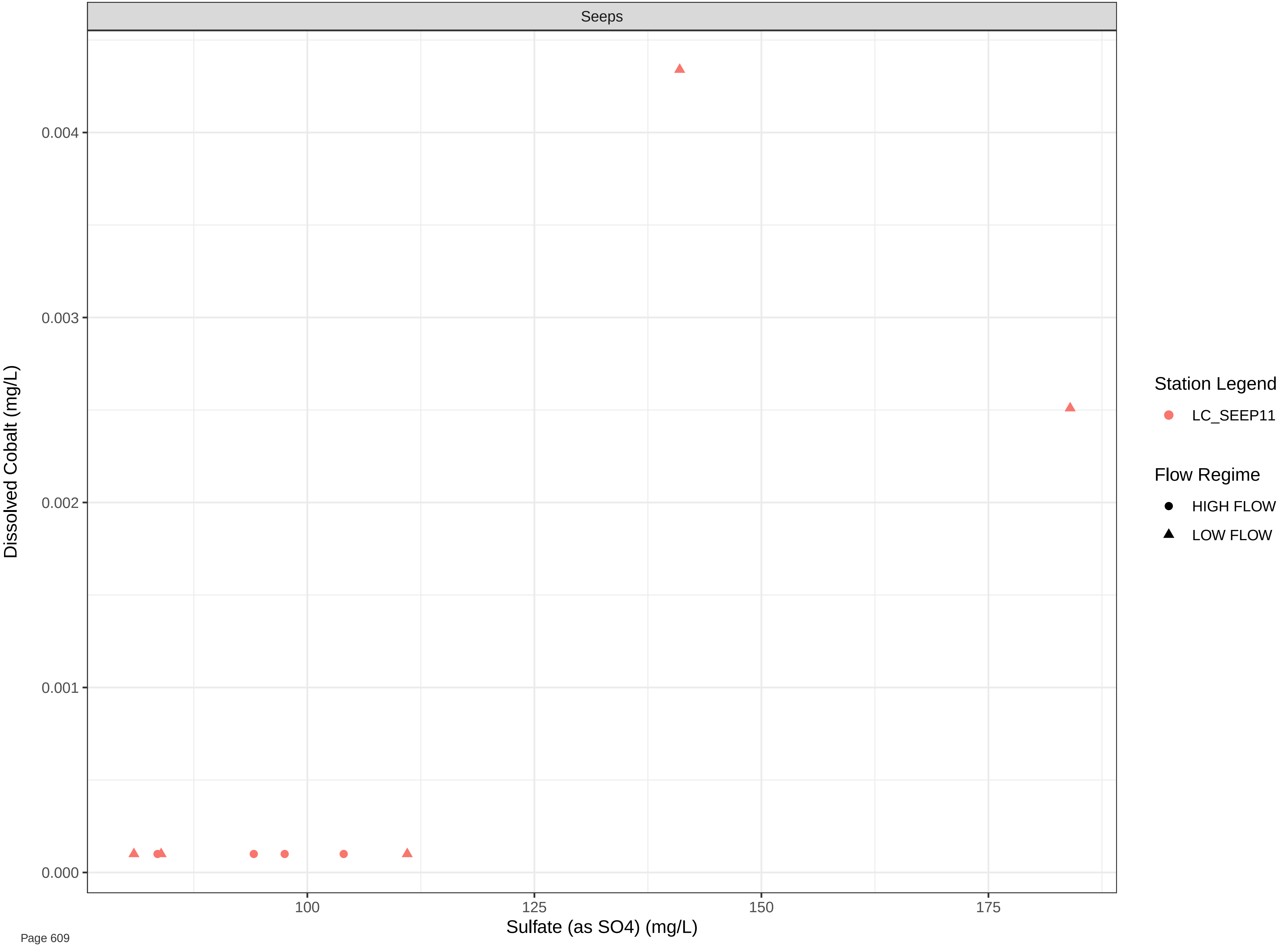


Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
0
100
200
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

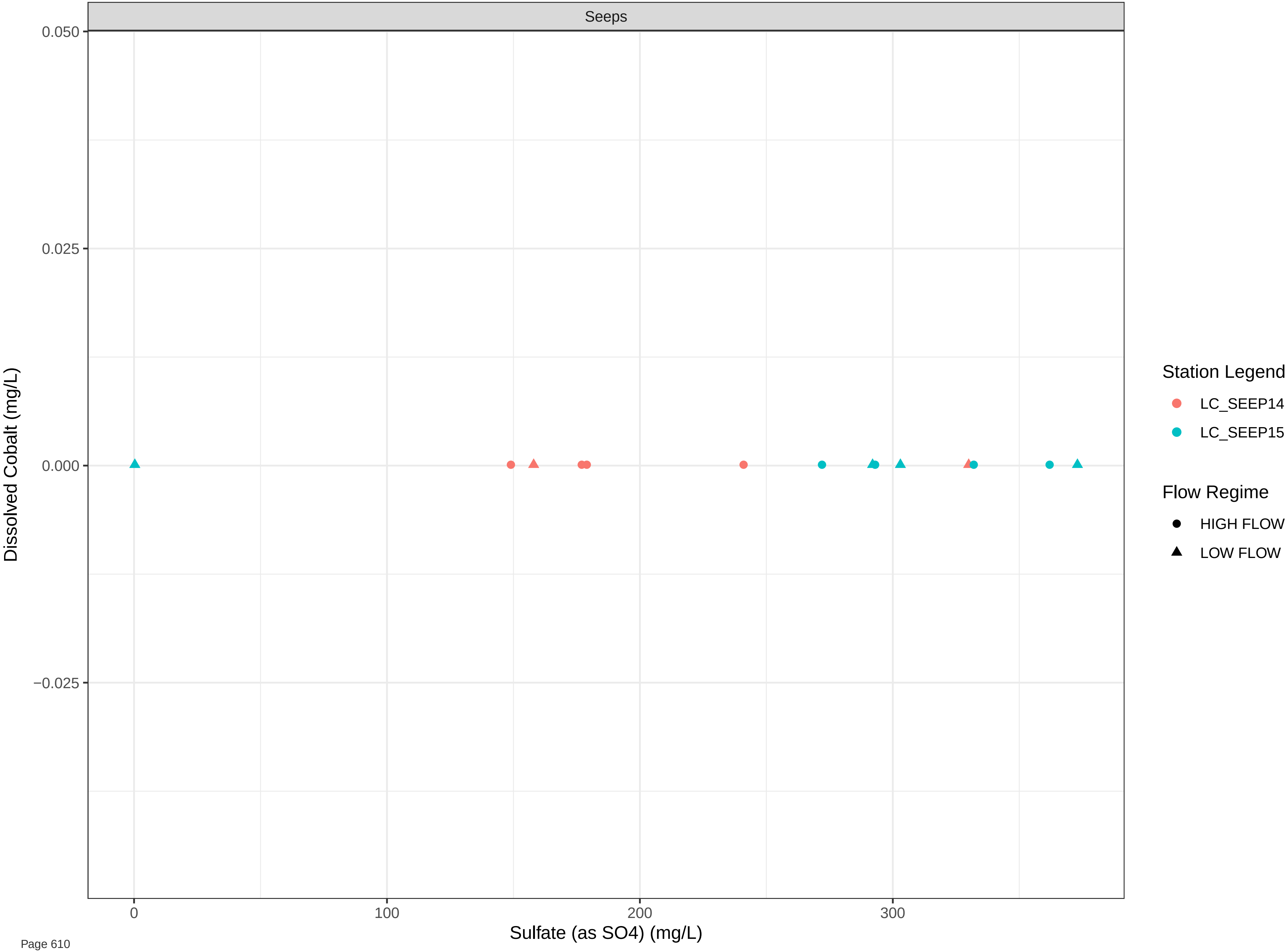

Comparison Point
Seeps
Dissolved Chromium (mg/L)
4e−04
3e−04
2e−04
1e−04
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

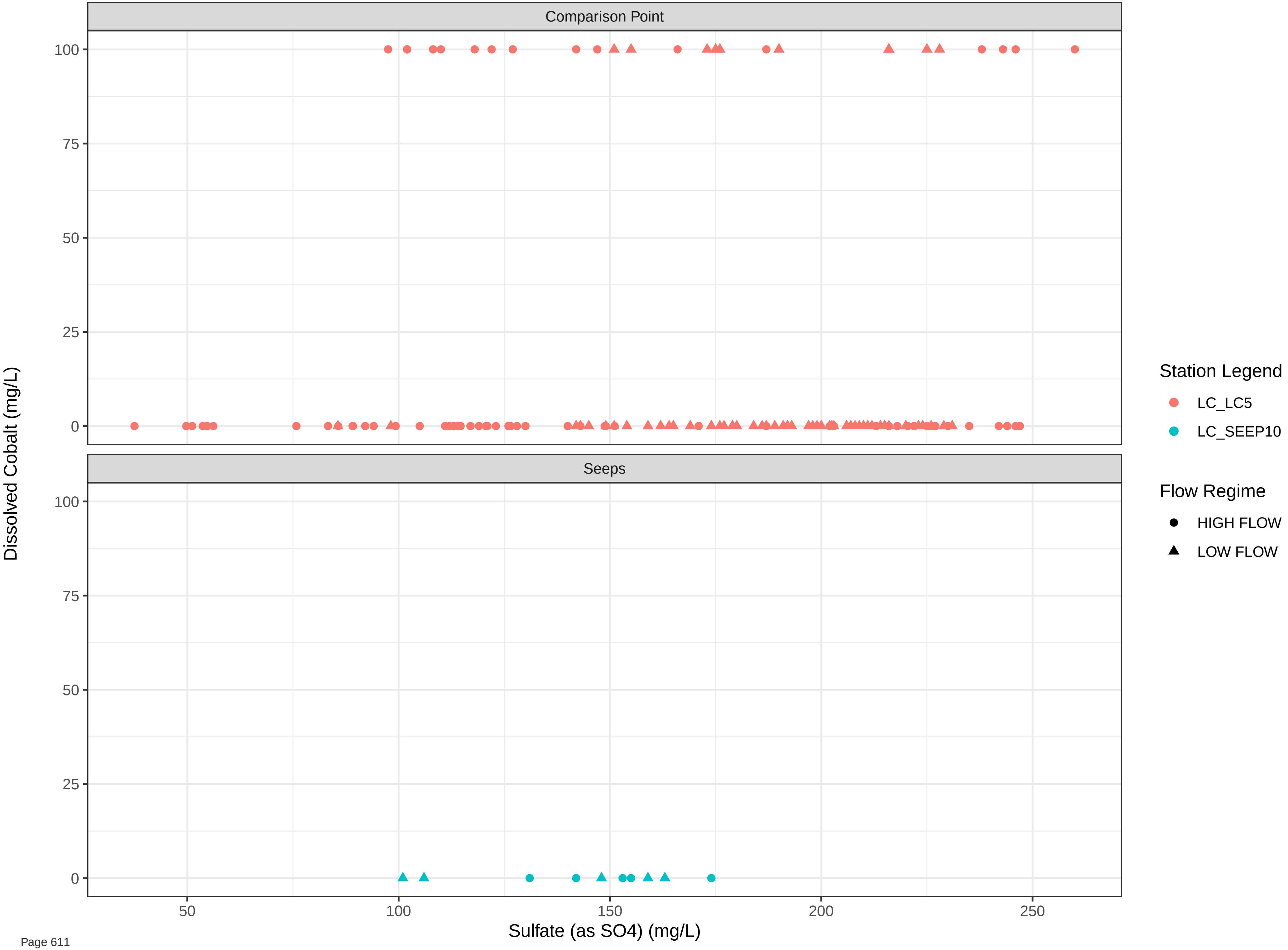


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
0.00075
0.00050
0.00025
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

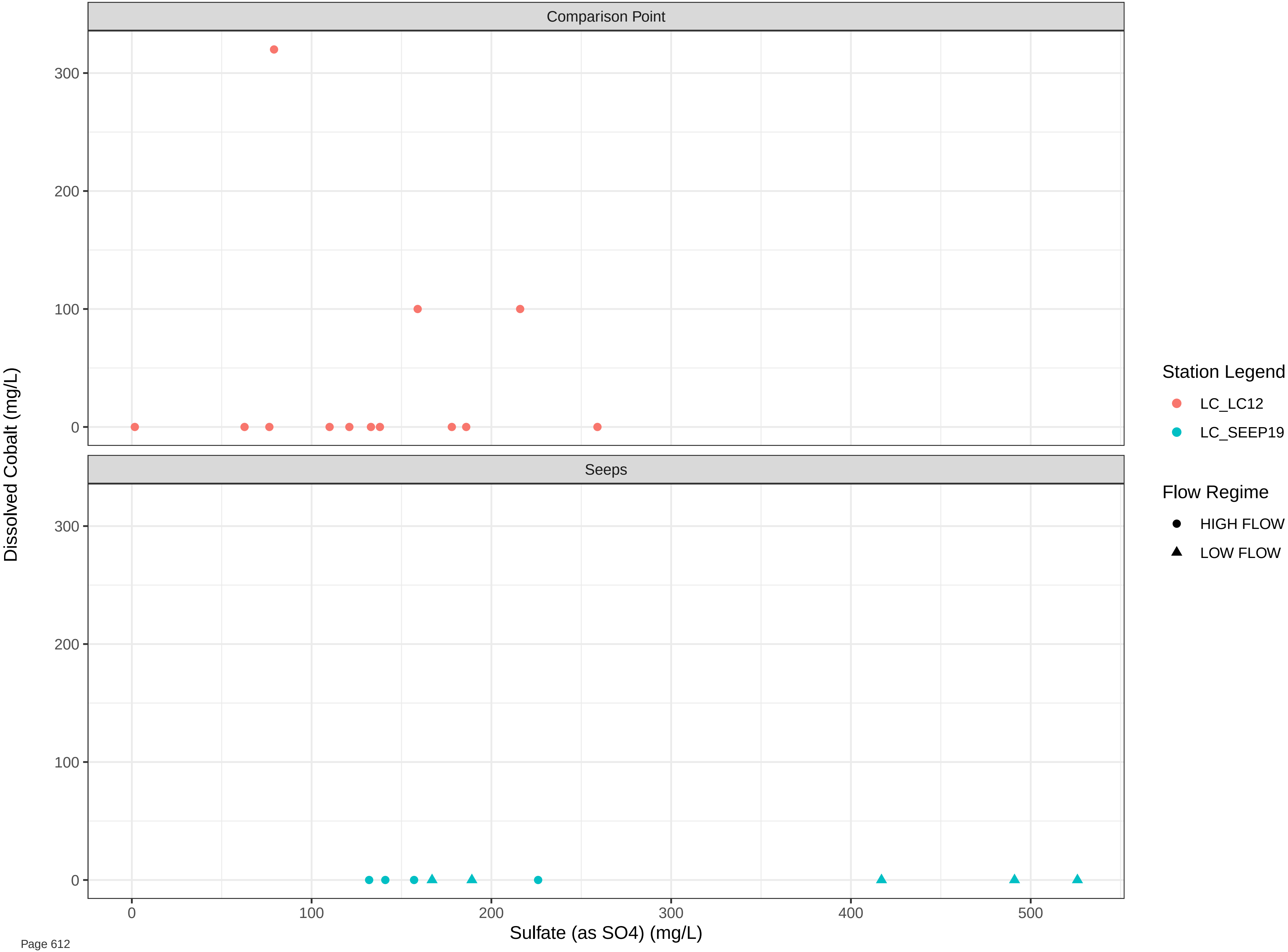


Seeps
Dissolved Cobalt (mg/L)
0.004
0.003
0.002
0.001
0.000
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

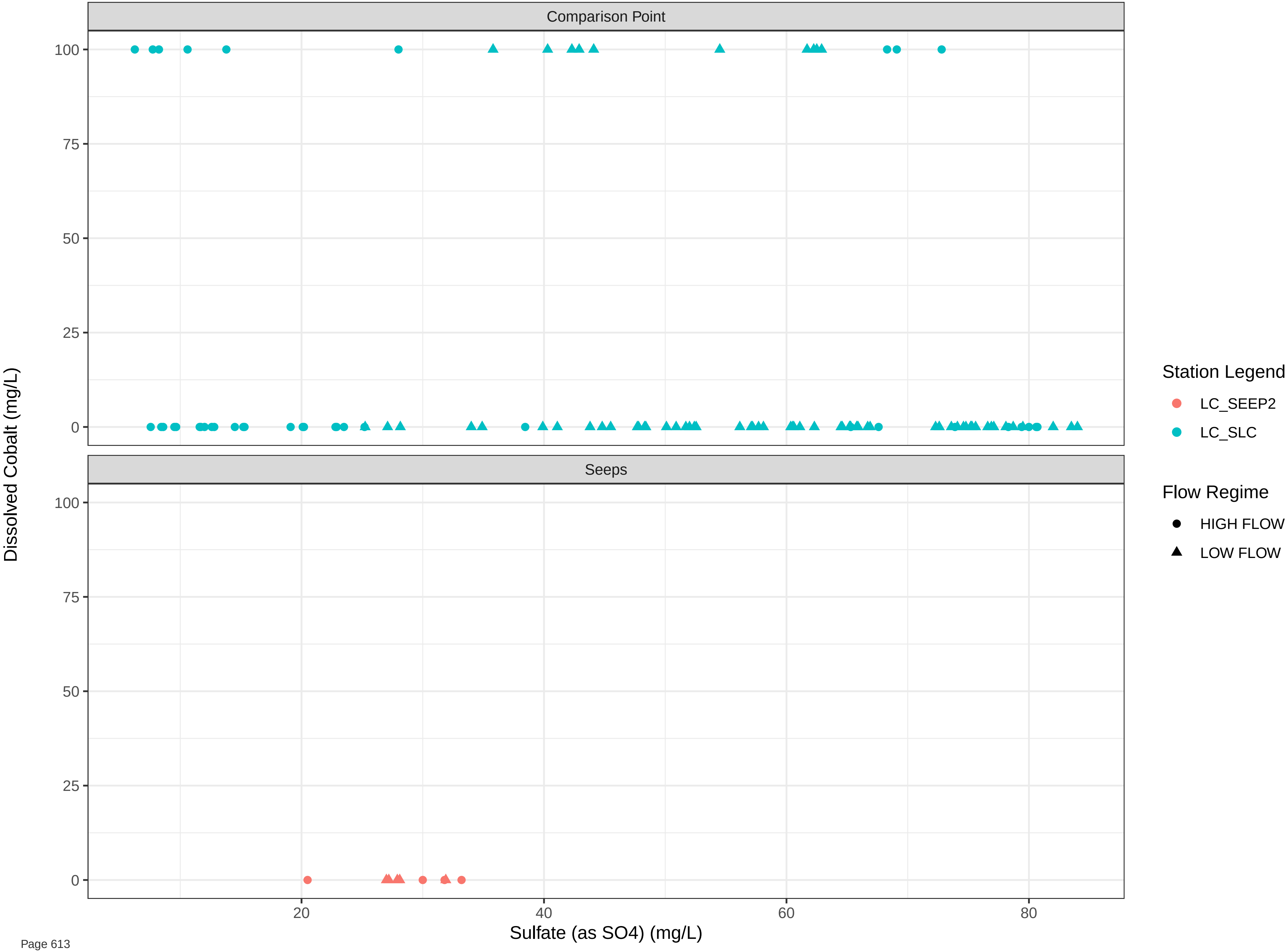

Seeps
Dissolved Cobalt (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

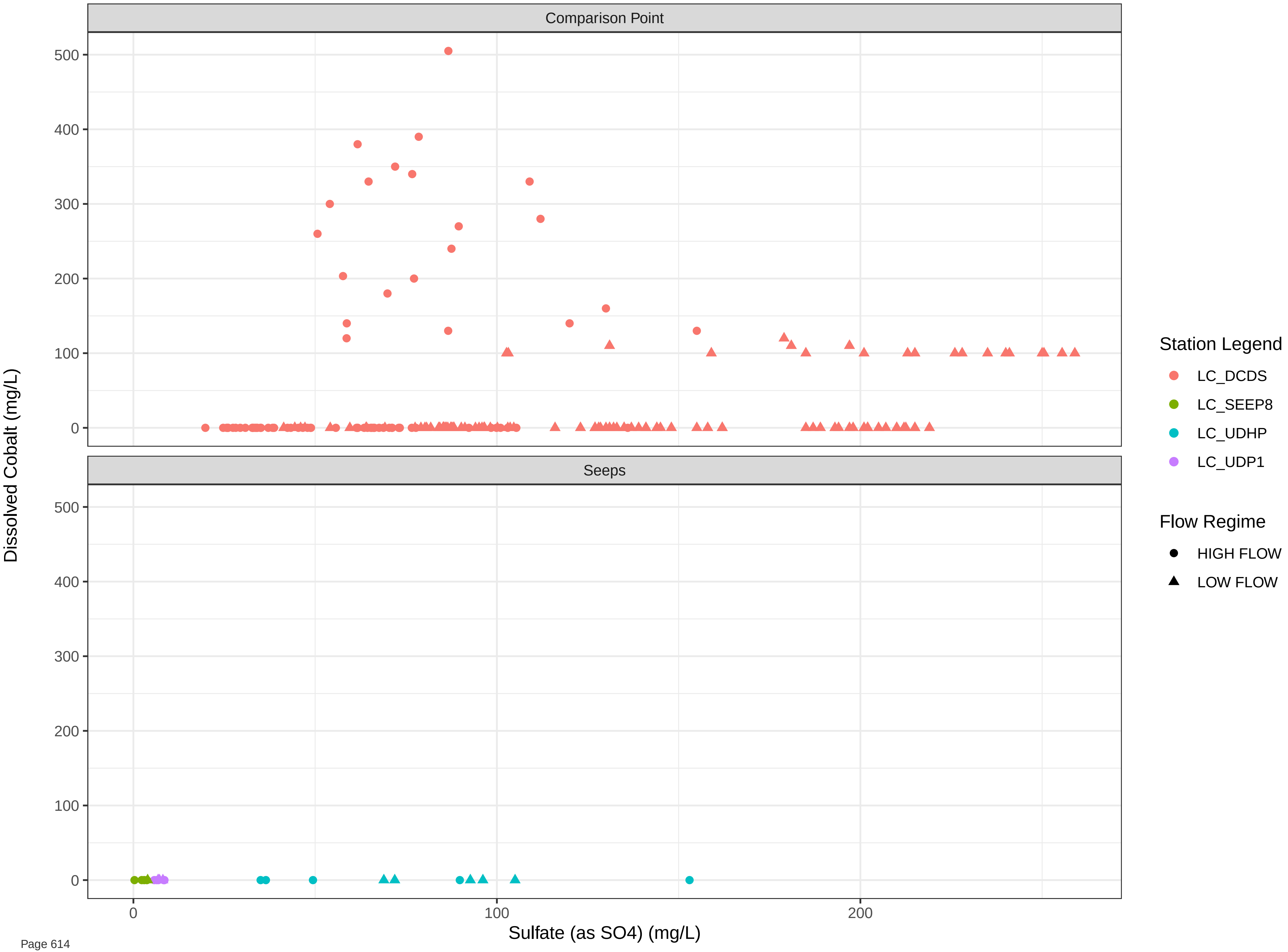


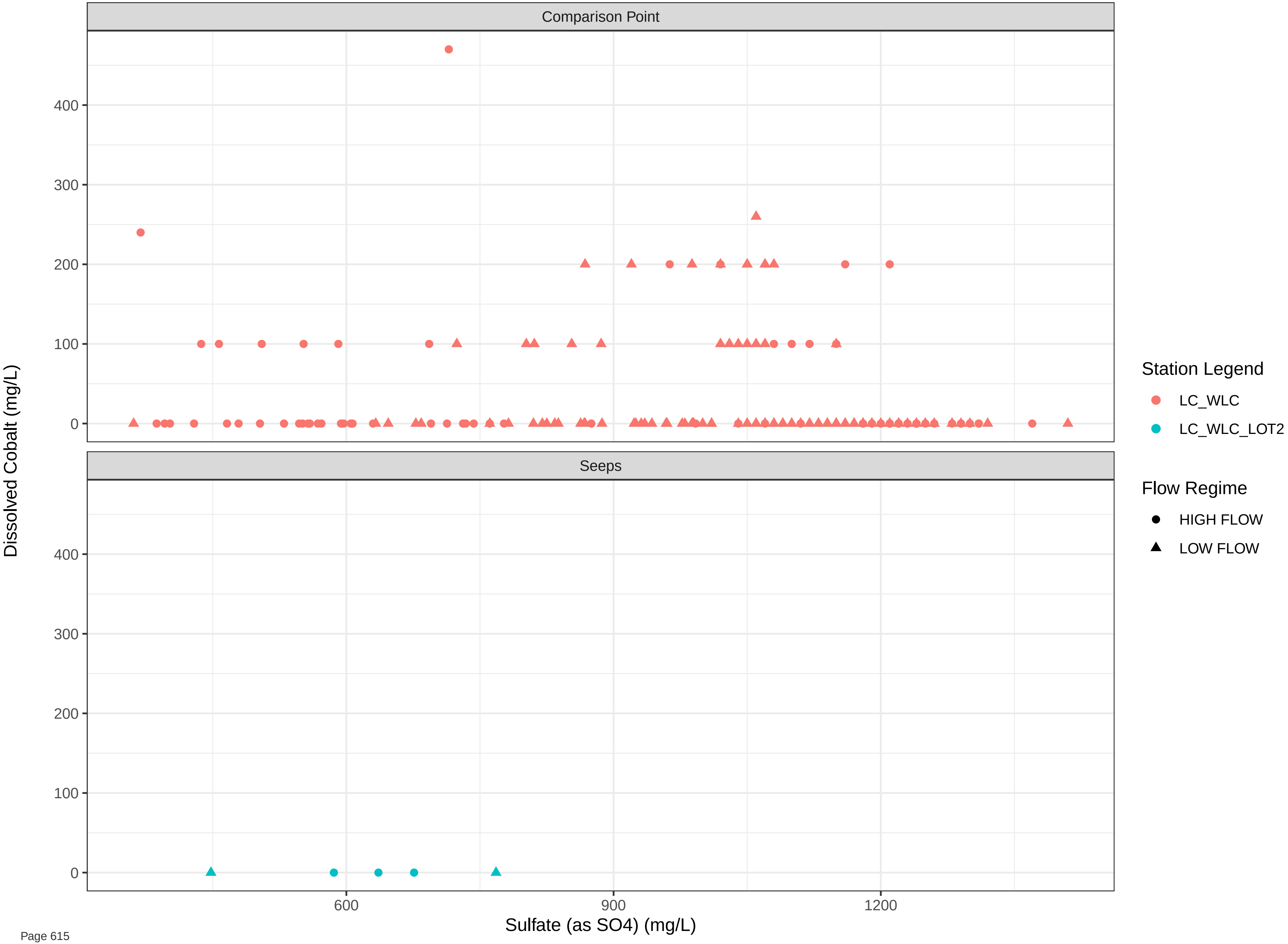
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



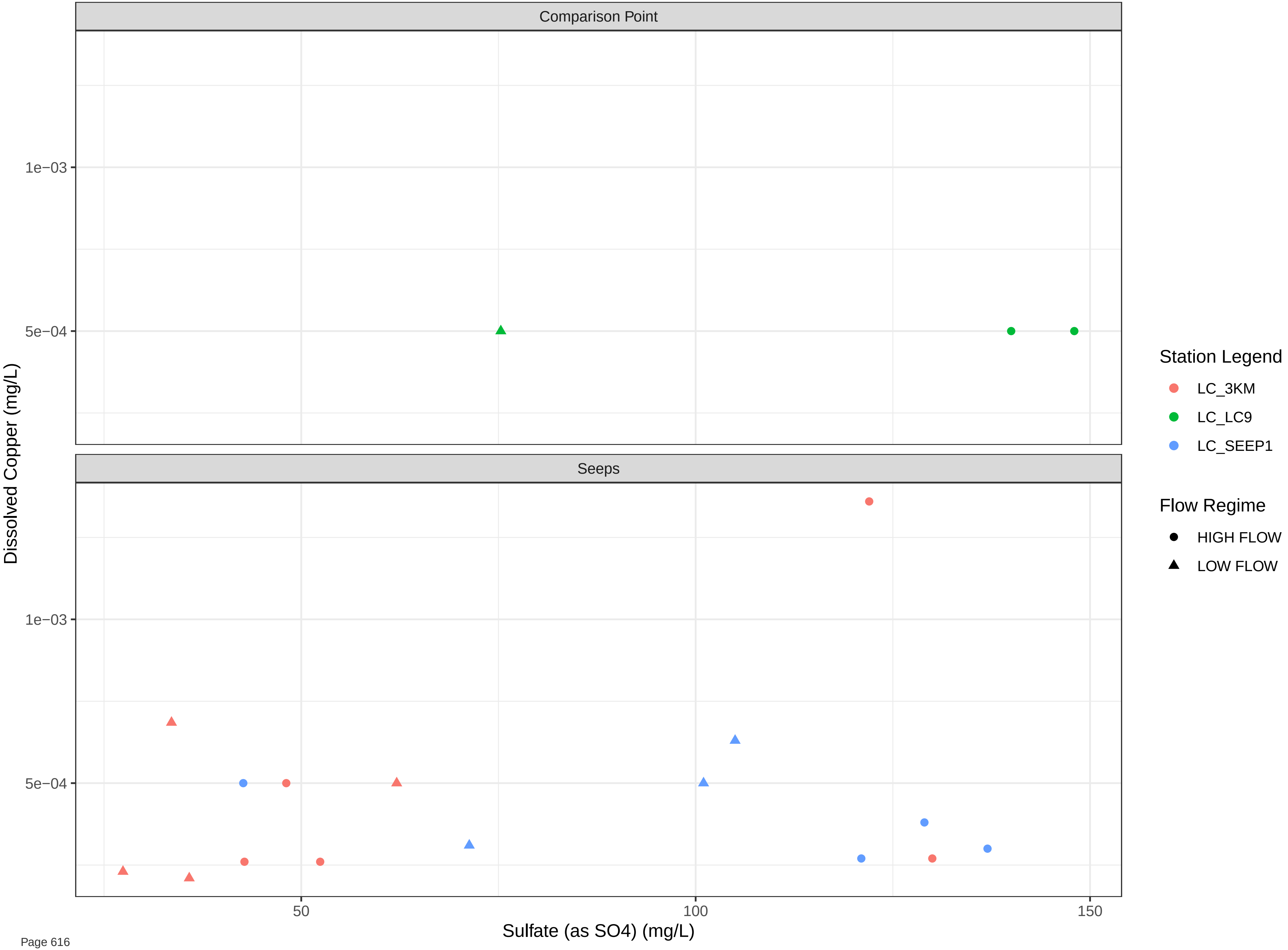
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

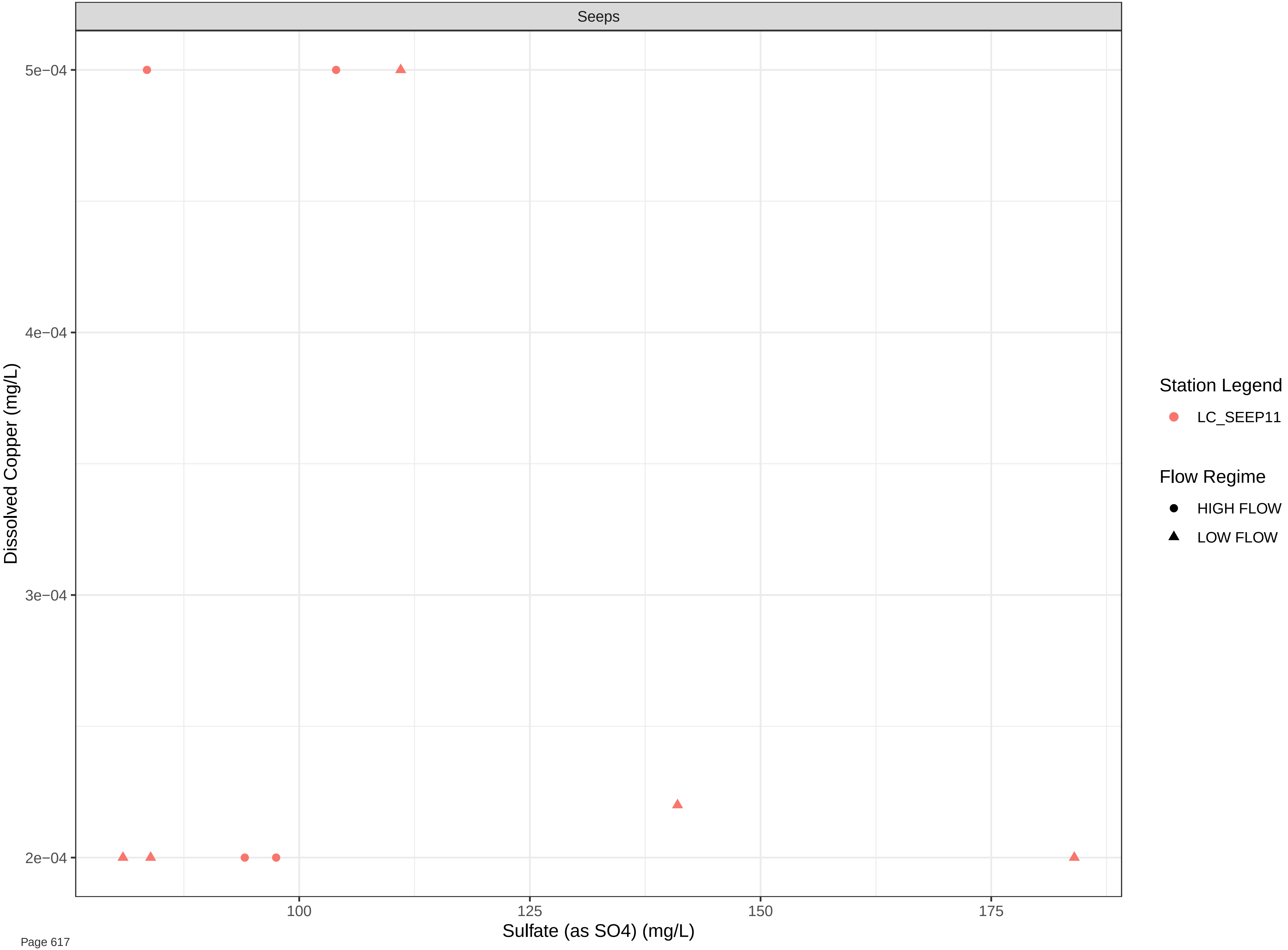

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



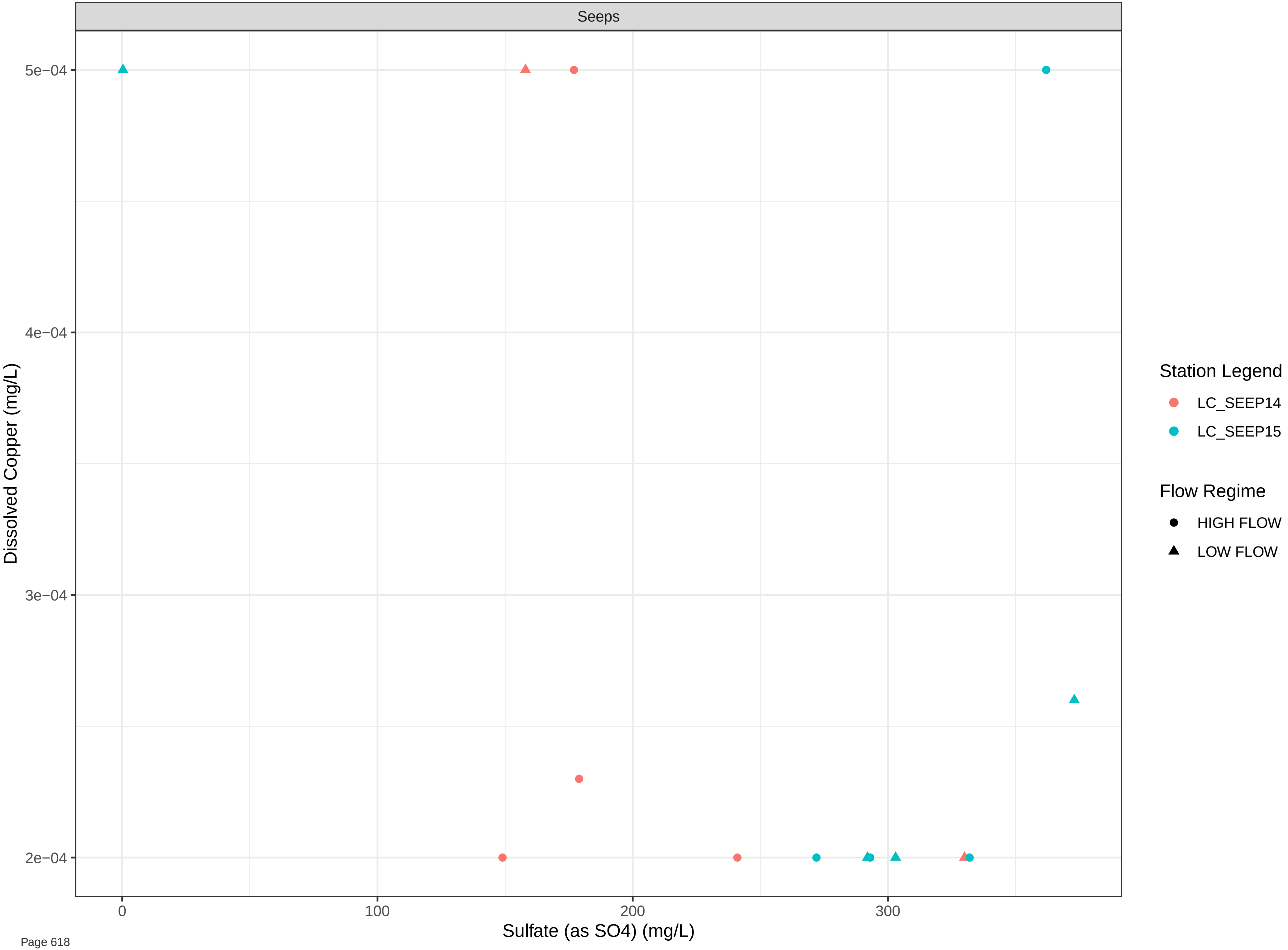
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



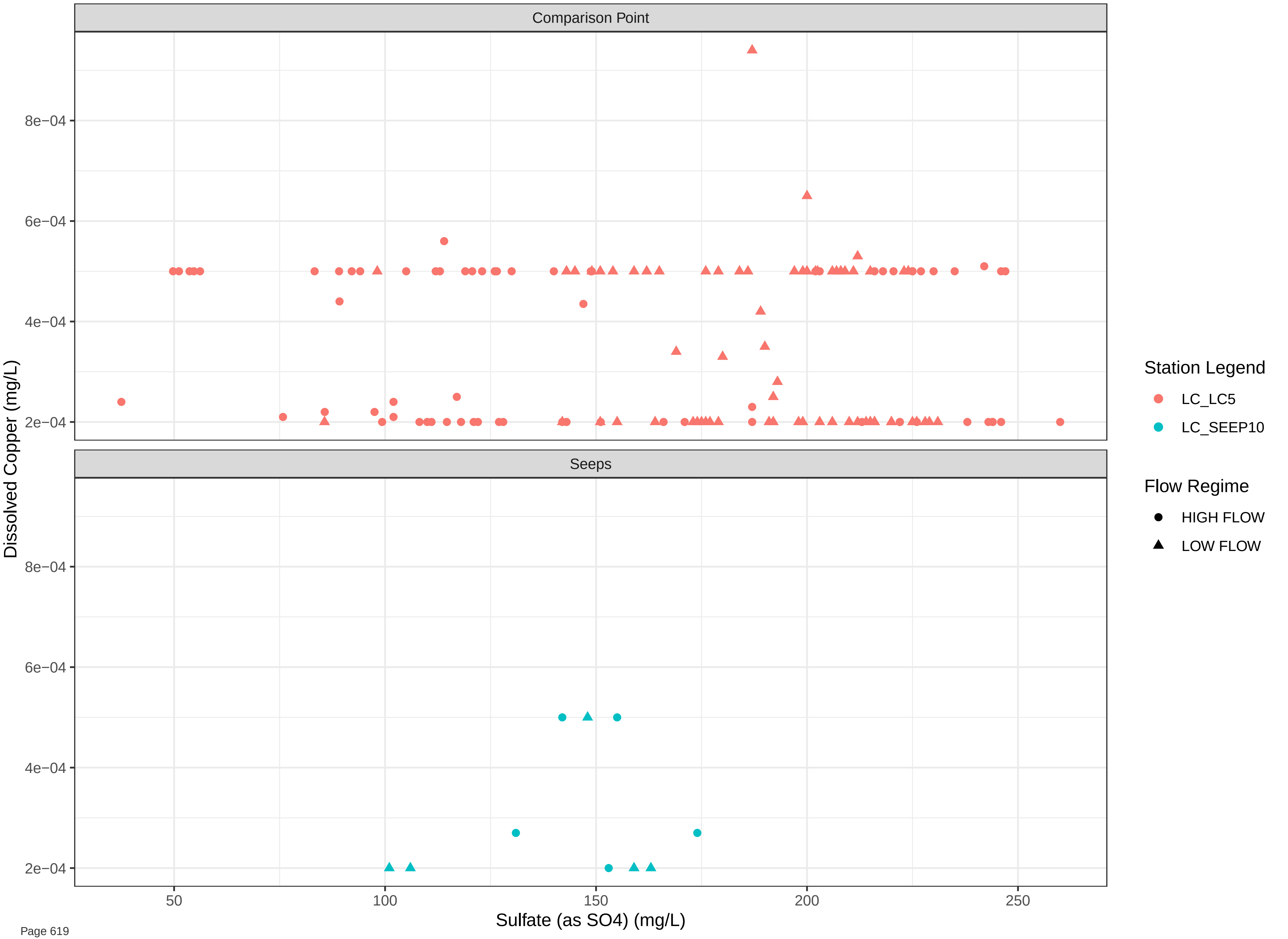
Comparison Point
Seeps
Dissolved Copper (mg/L)
1e−03
5e−04
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



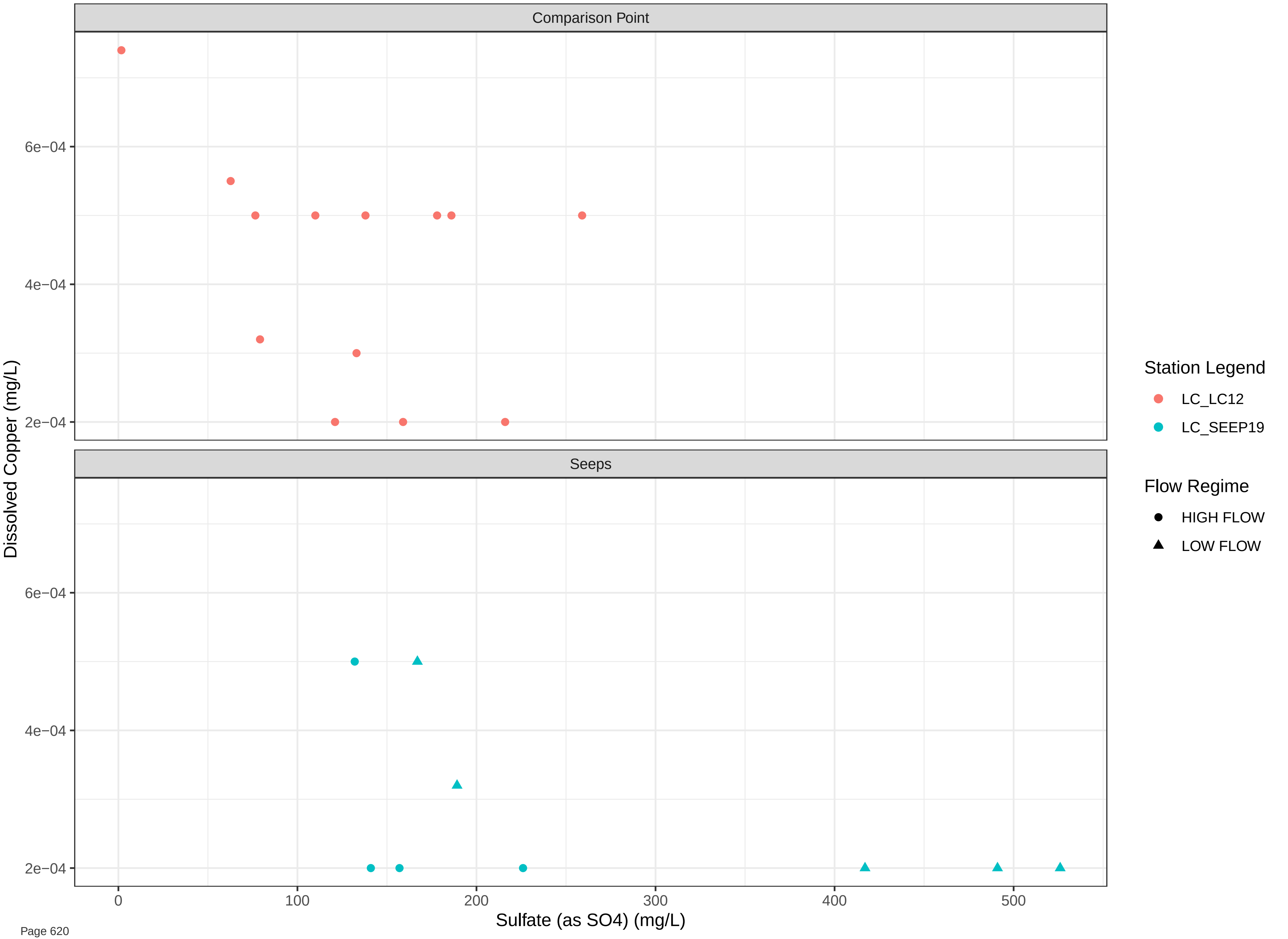
Seeps
5e−04
4e−04
3e−04
2e−04
Dissolved Copper (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



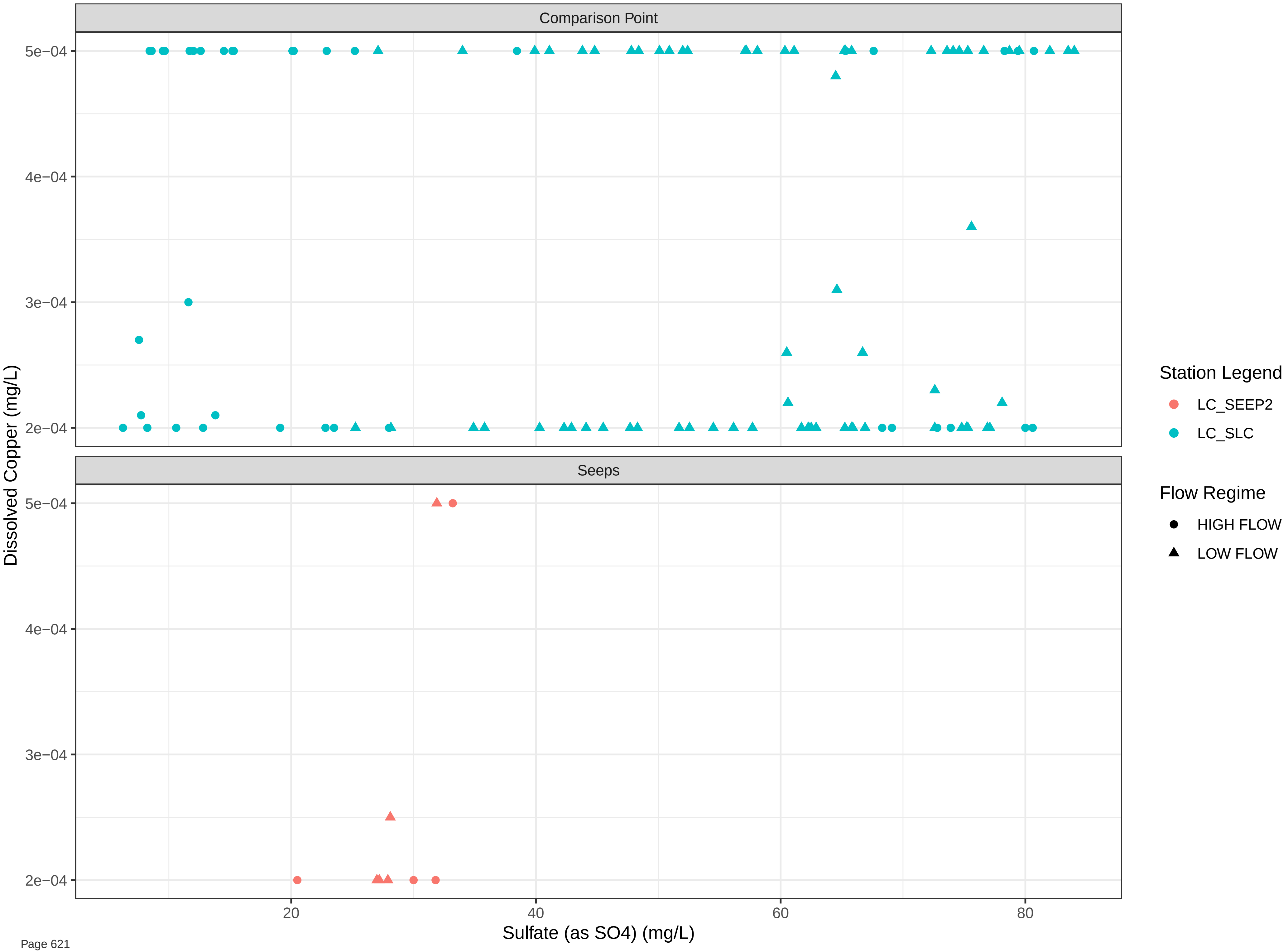
Seeps
5e−04
4e−04
3e−04
2e−04
Dissolved Copper (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

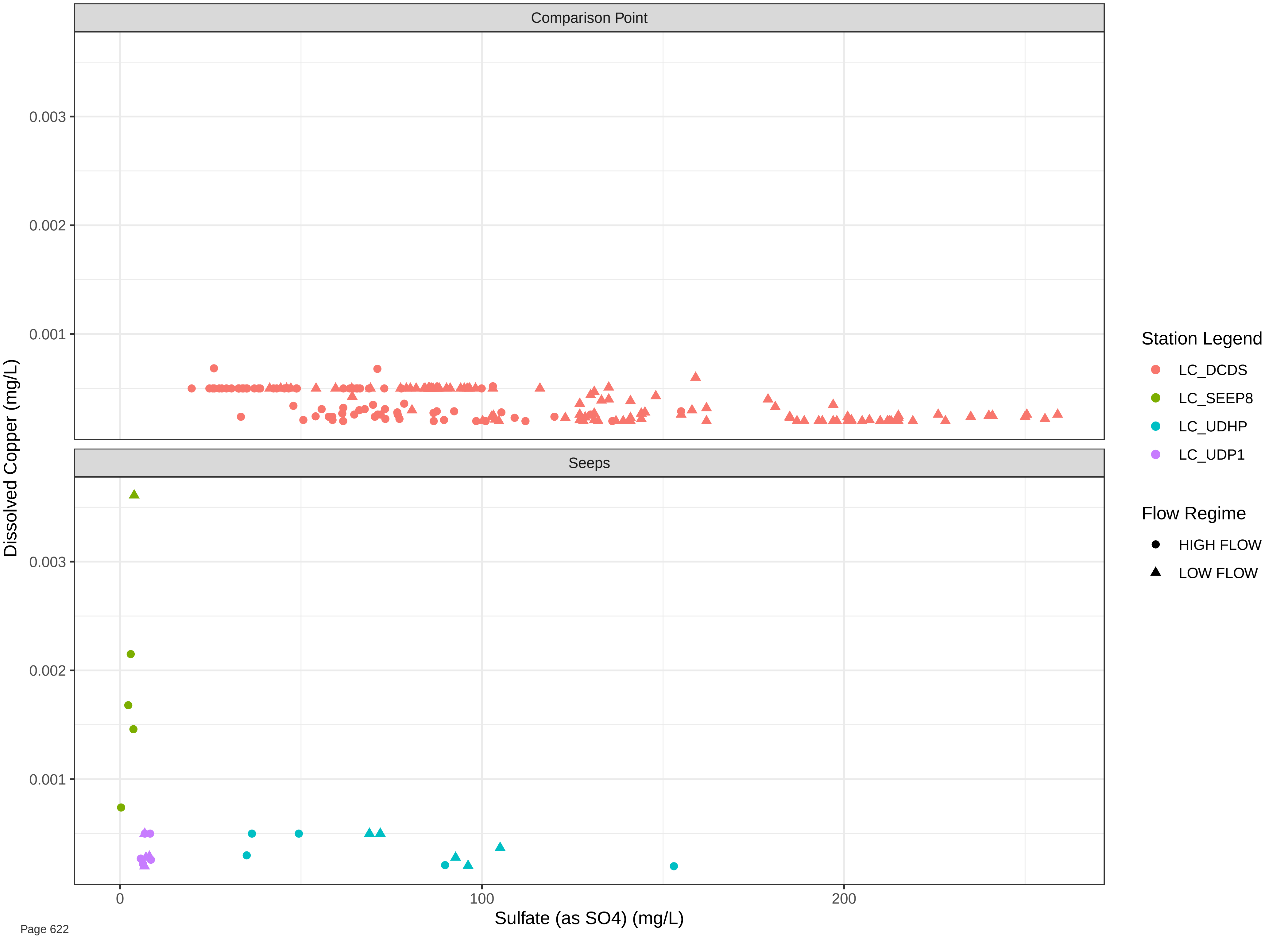


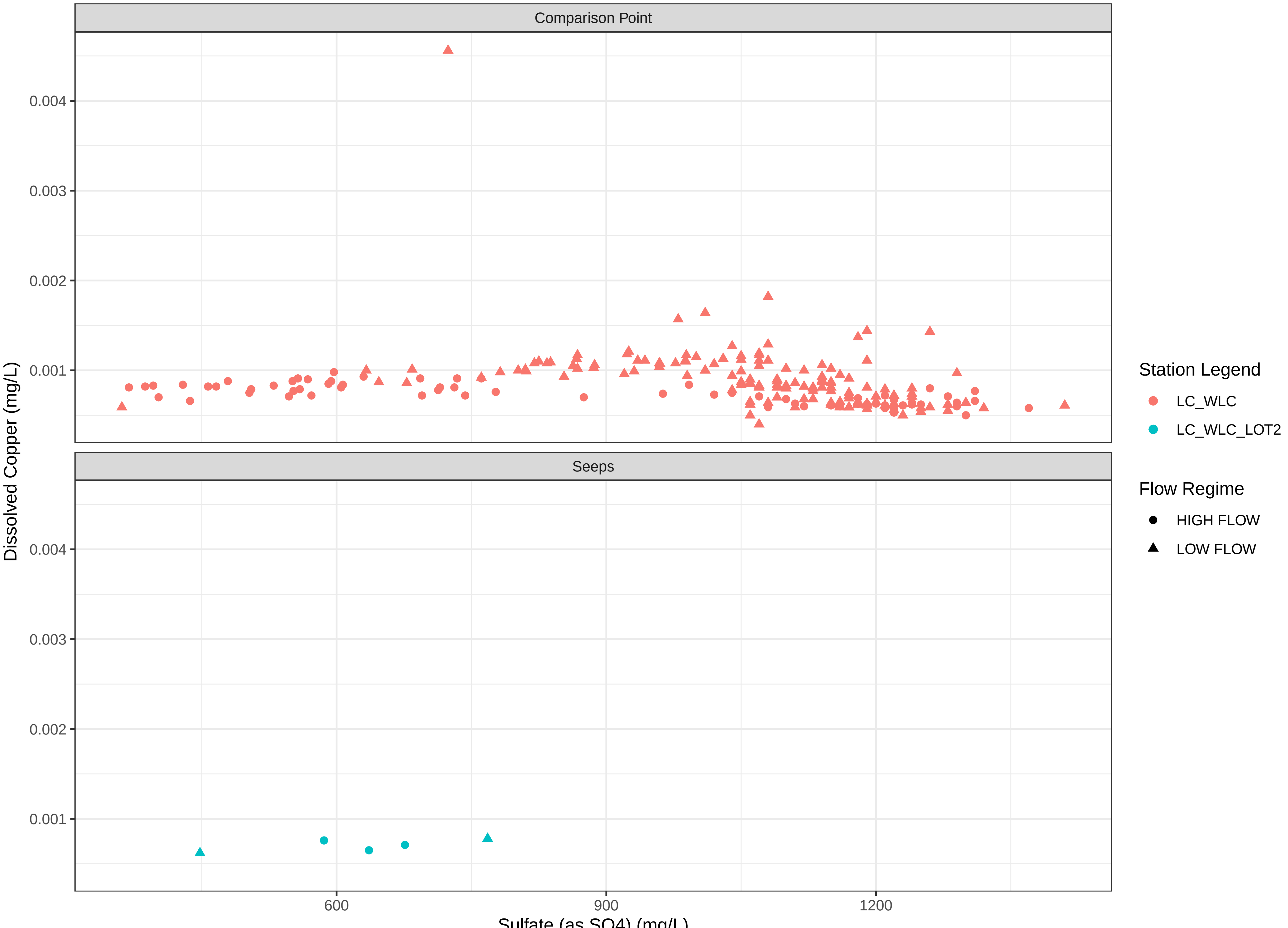
Comparison Point
Seeps
Dissolved Copper (mg/L)
8e−04
6e−04
4e−04
2e−04
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



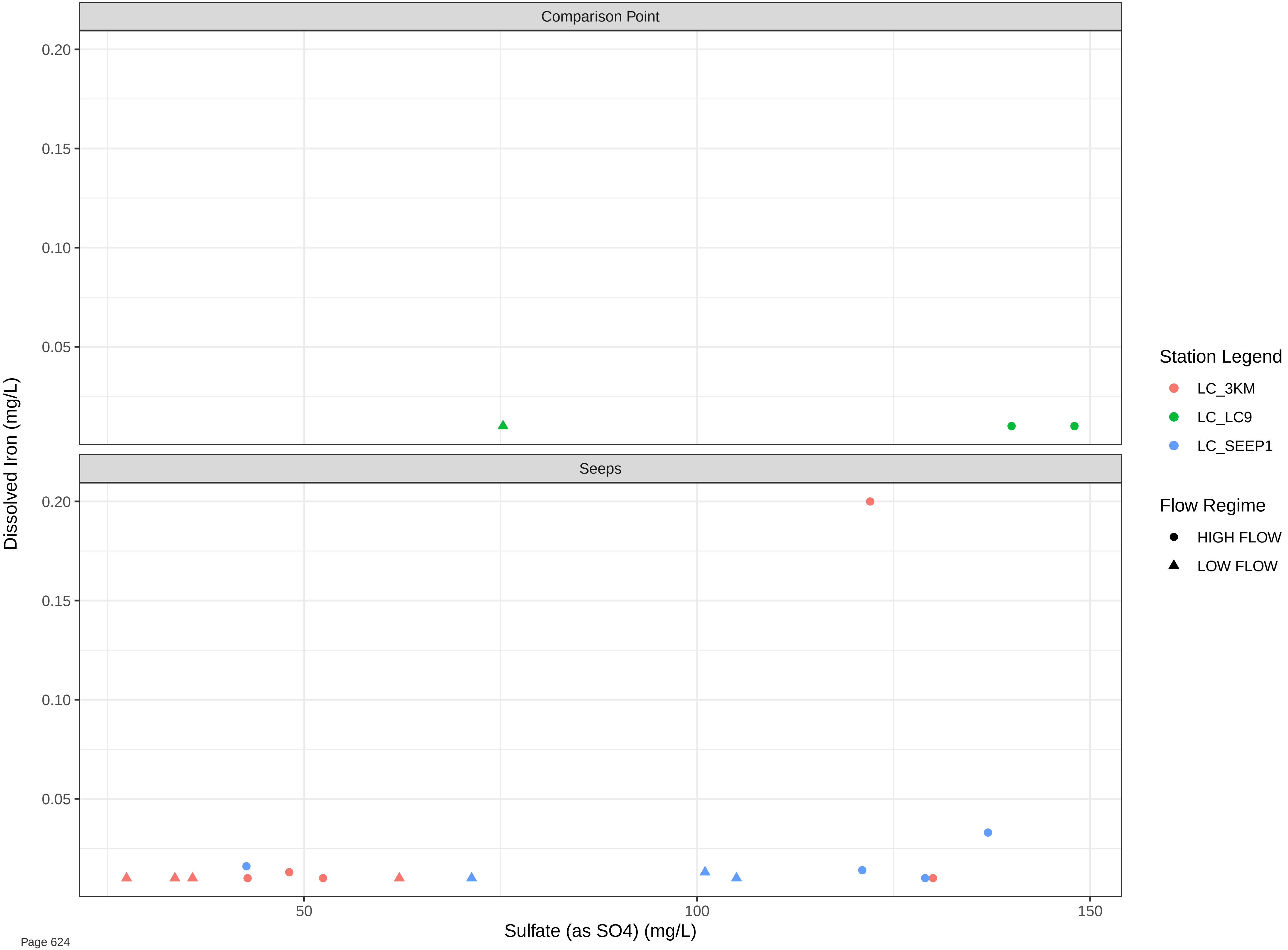
Comparison Point
Seeps
Dissolved Copper (mg/L)
6e−04
4e−04
2e−04
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

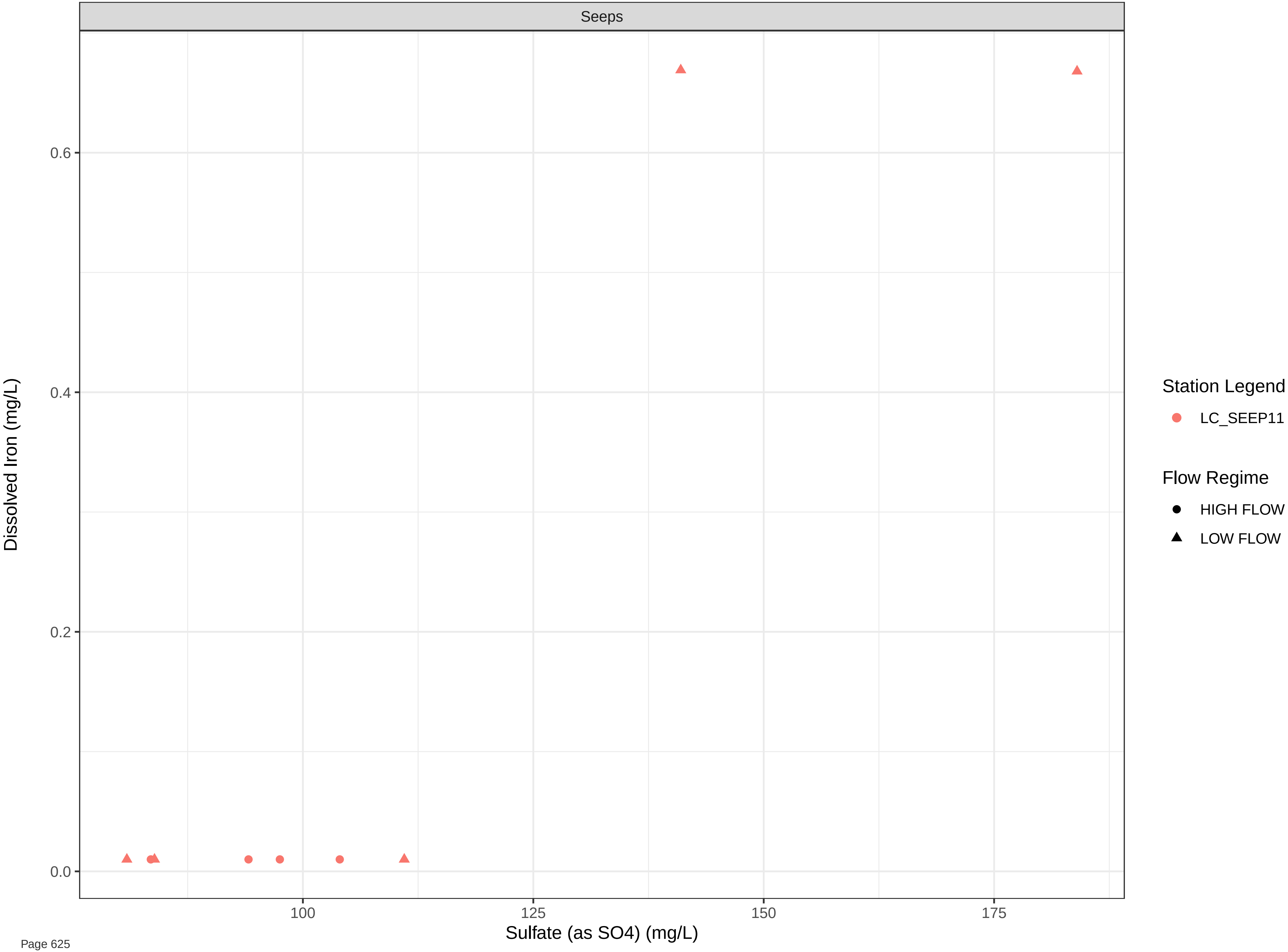

Comparison Point
Seeps
Dissolved Copper (mg/L)
5e−04
4e−04
3e−04
2e−04
Sulfate (as SO4) (mg/L)
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

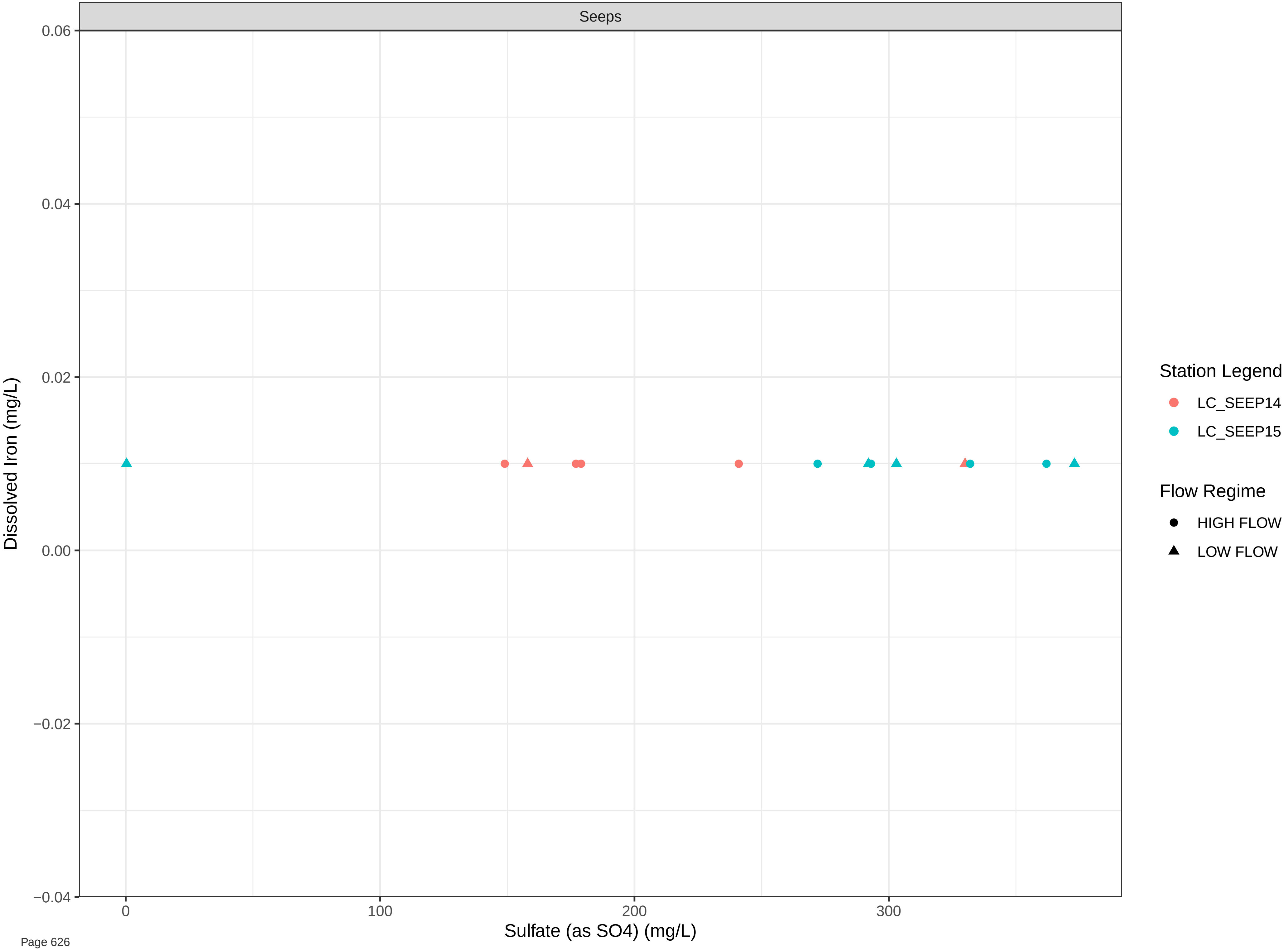

Comparison Point
Seeps
Dissolved Copper (mg/L)
0.003
0.002
0.001
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

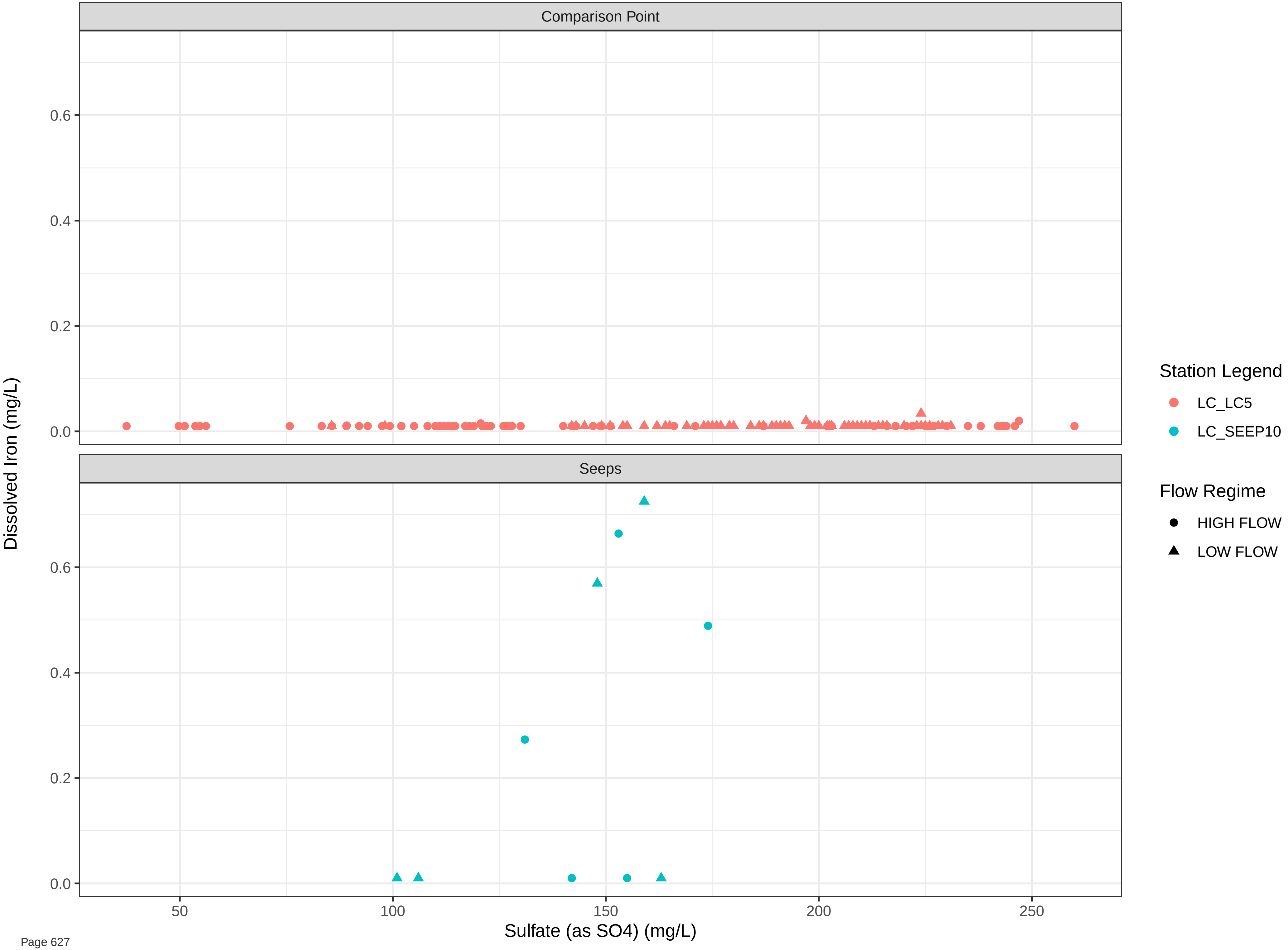


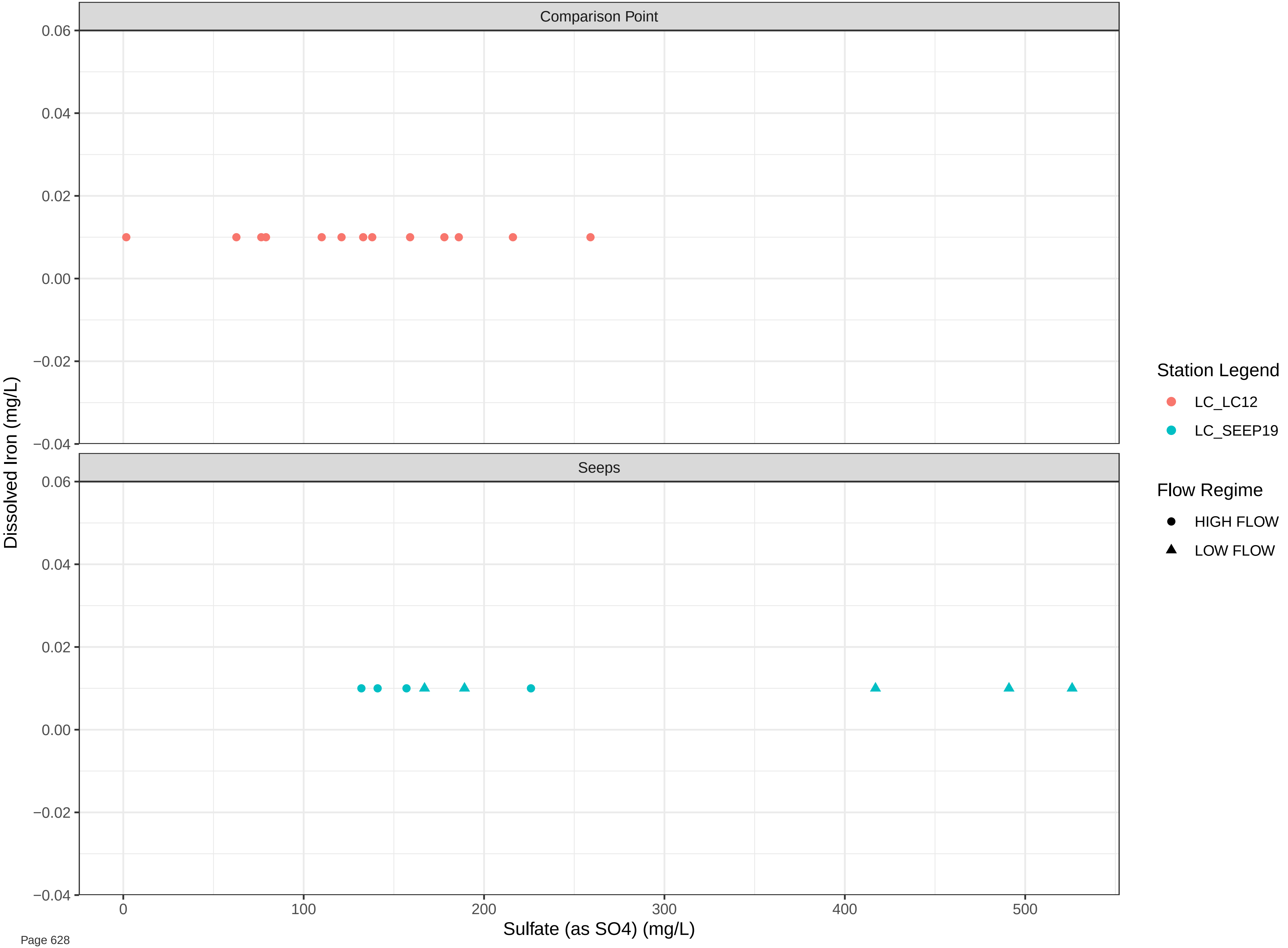
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.004
0.003
0.002
0.001
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Iron (mg/L)
0.20
0.15
0.10
0.05
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

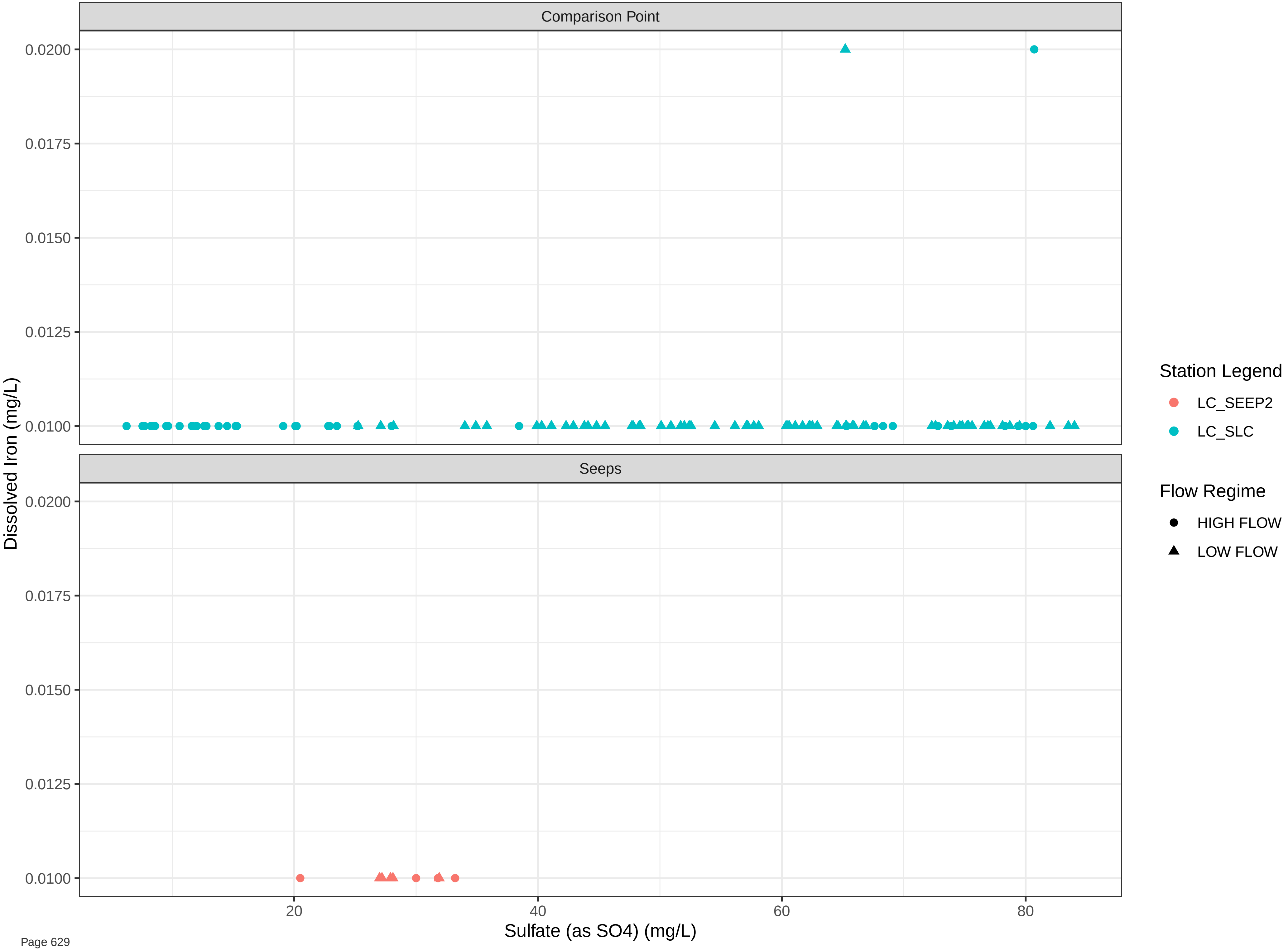

Seeps
Dissolved Iron (mg/L)
0.6
0.4
0.2
0.0
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

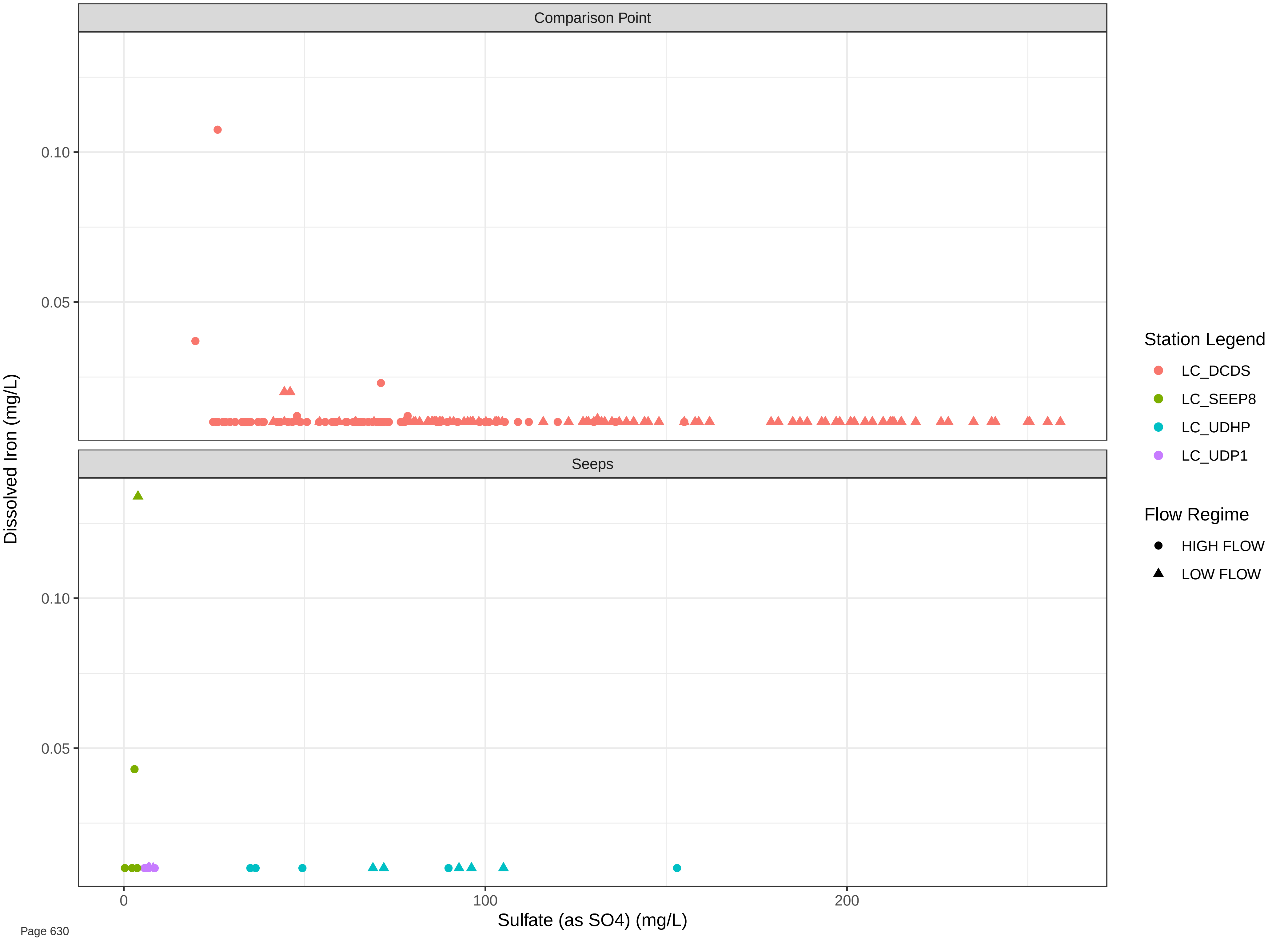

Seeps
0.06
0.04
0.02
0.00
−0.02
−0.04
0
100
200
300
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

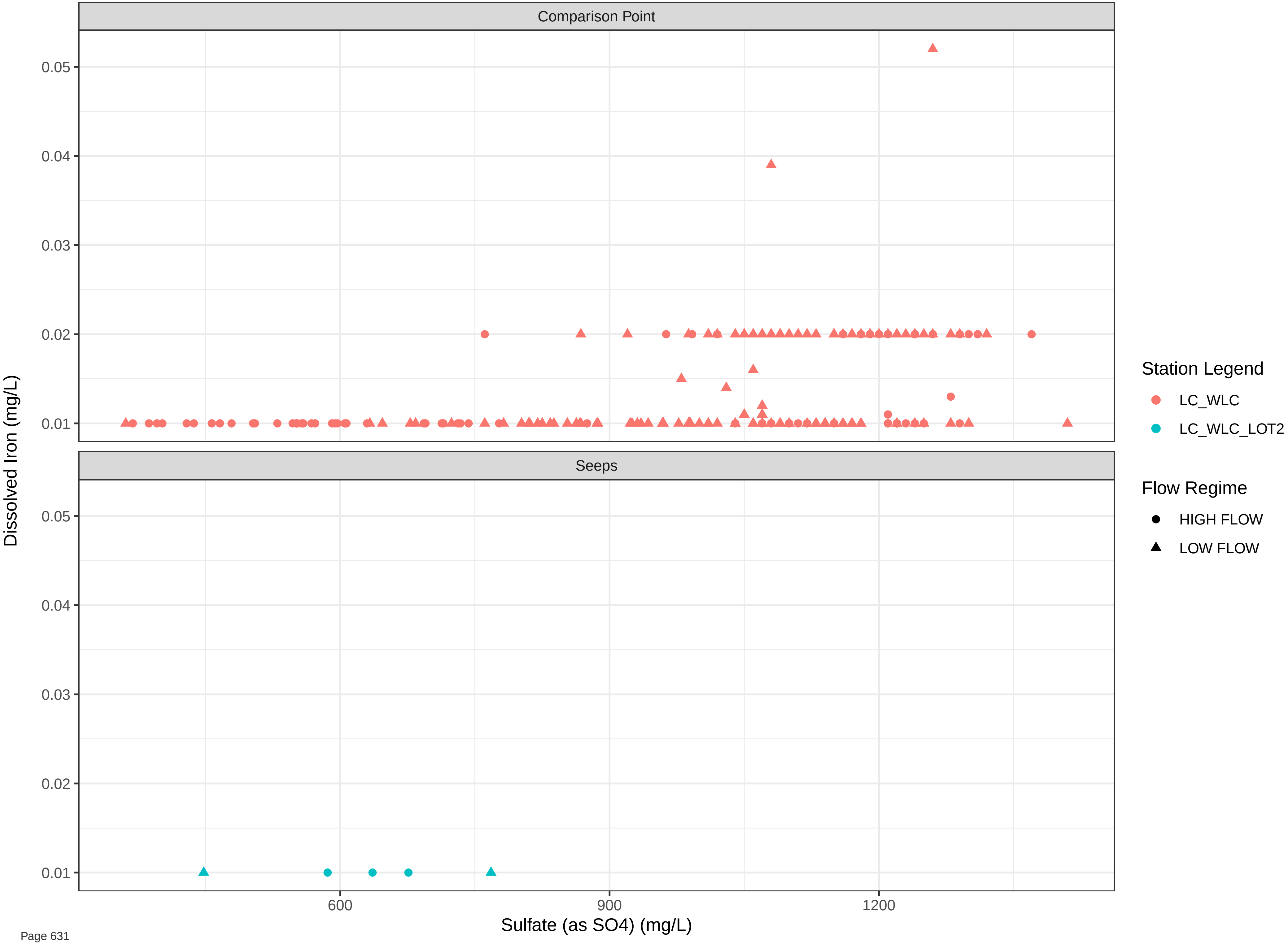

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0
0.2
0.4
0.6
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



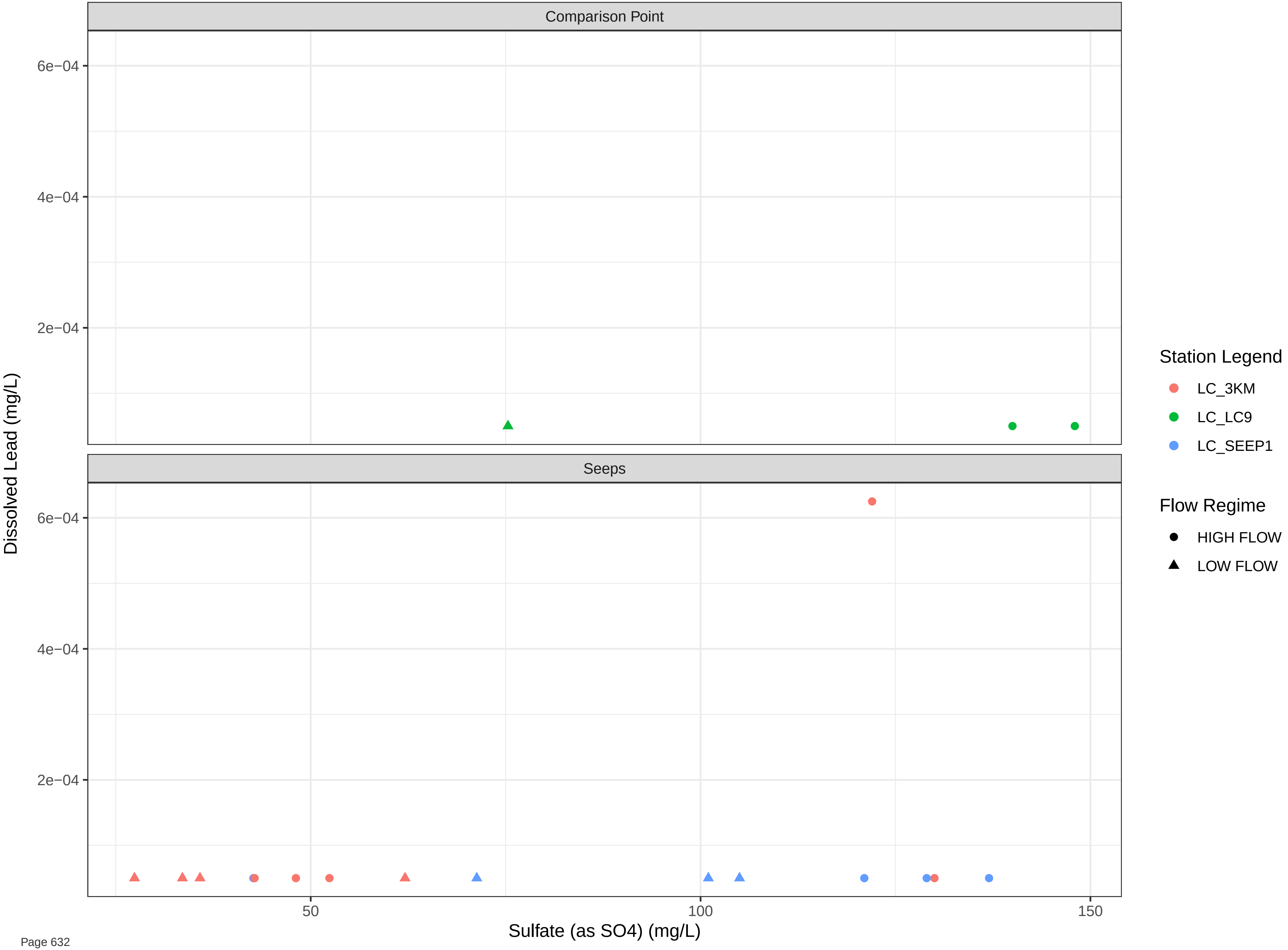
Comparison Point
Seeps
Dissolved Iron (mg/L)
0.06
0.04
0.02
0.00
−0.02
−0.04
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

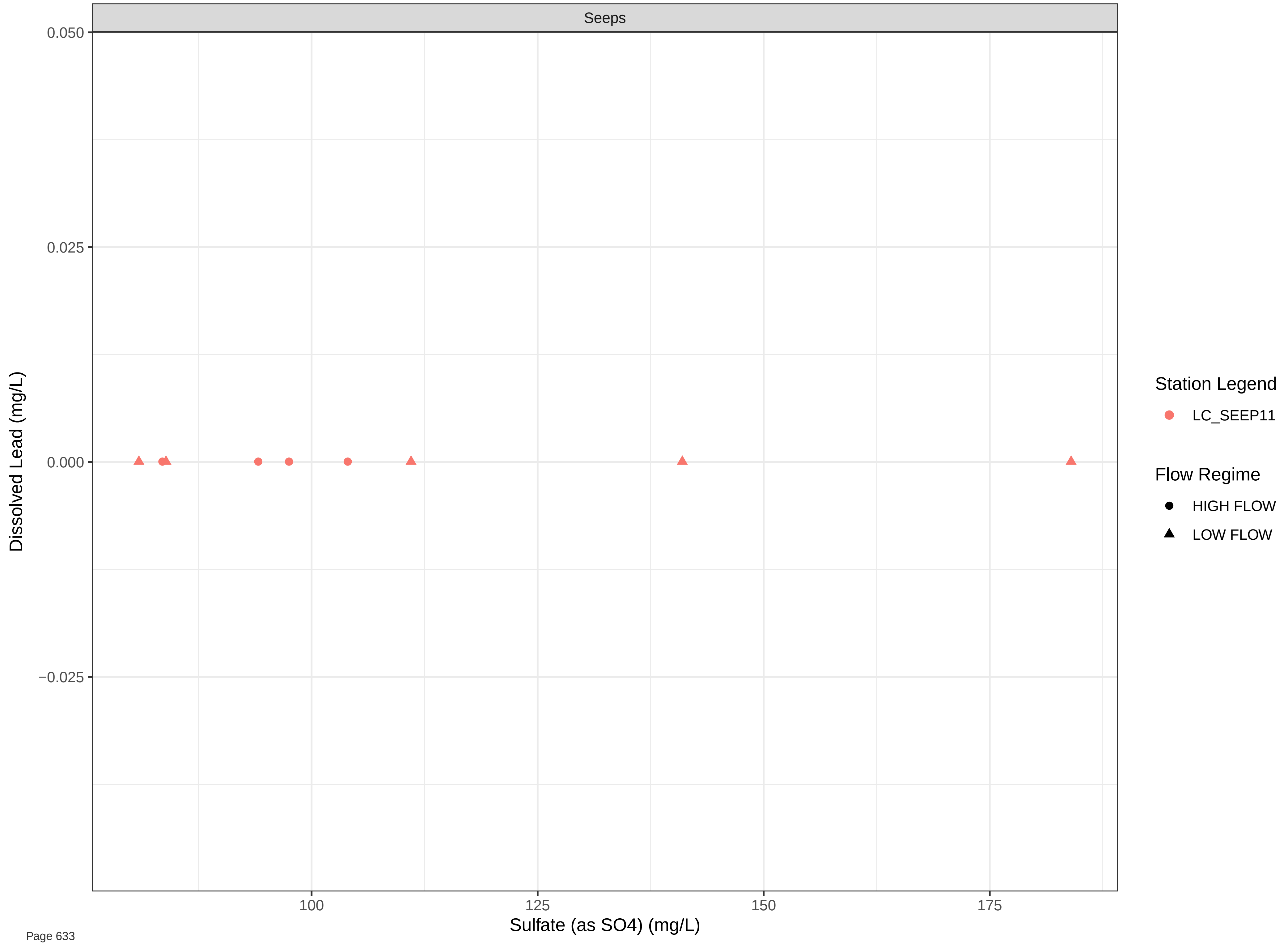

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0100
0.0125
0.0150
0.0175
0.0200
Sulfate (as SO4) (mg/L)
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

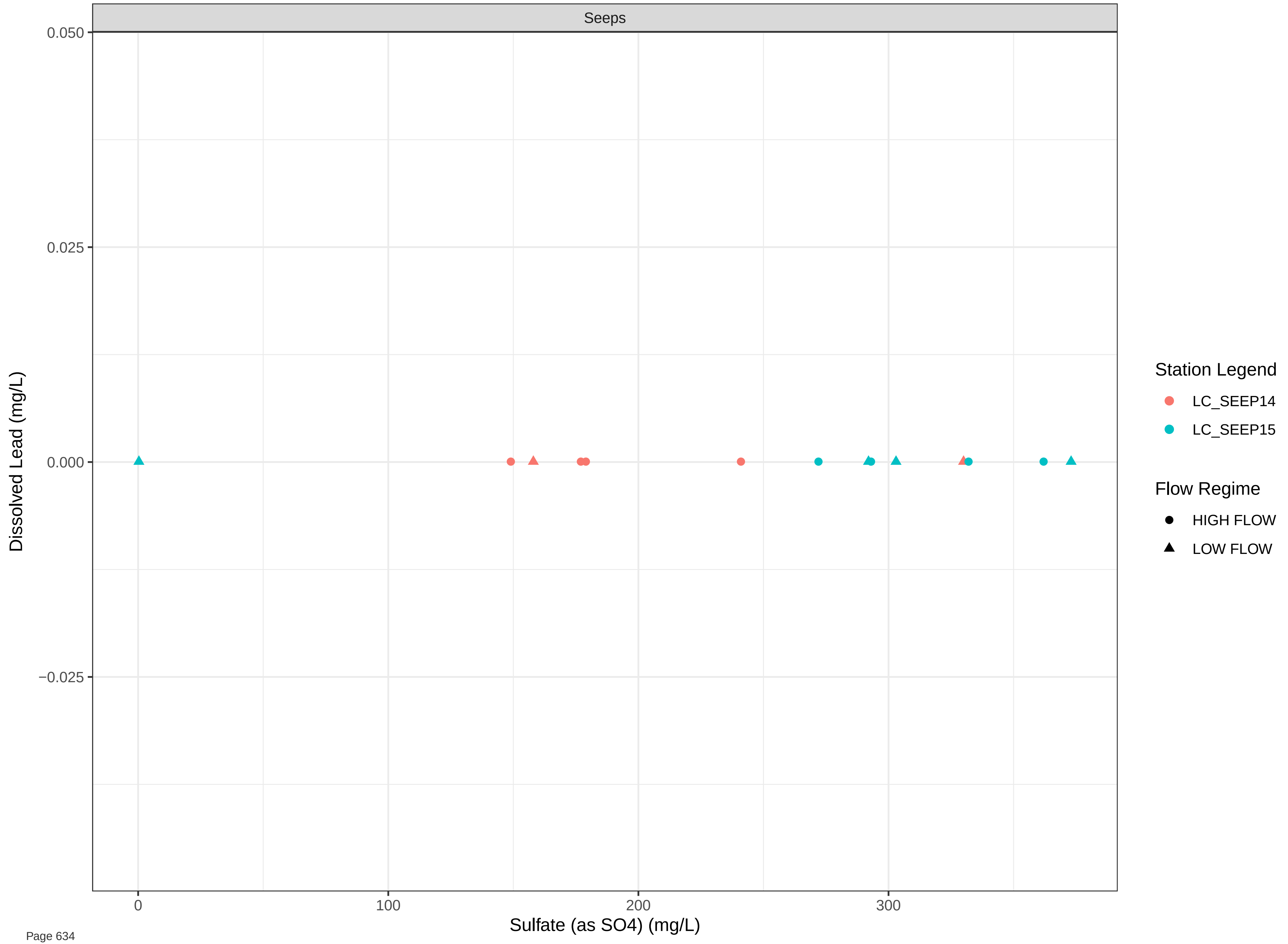

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.10
0.05
0.10
0.05
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



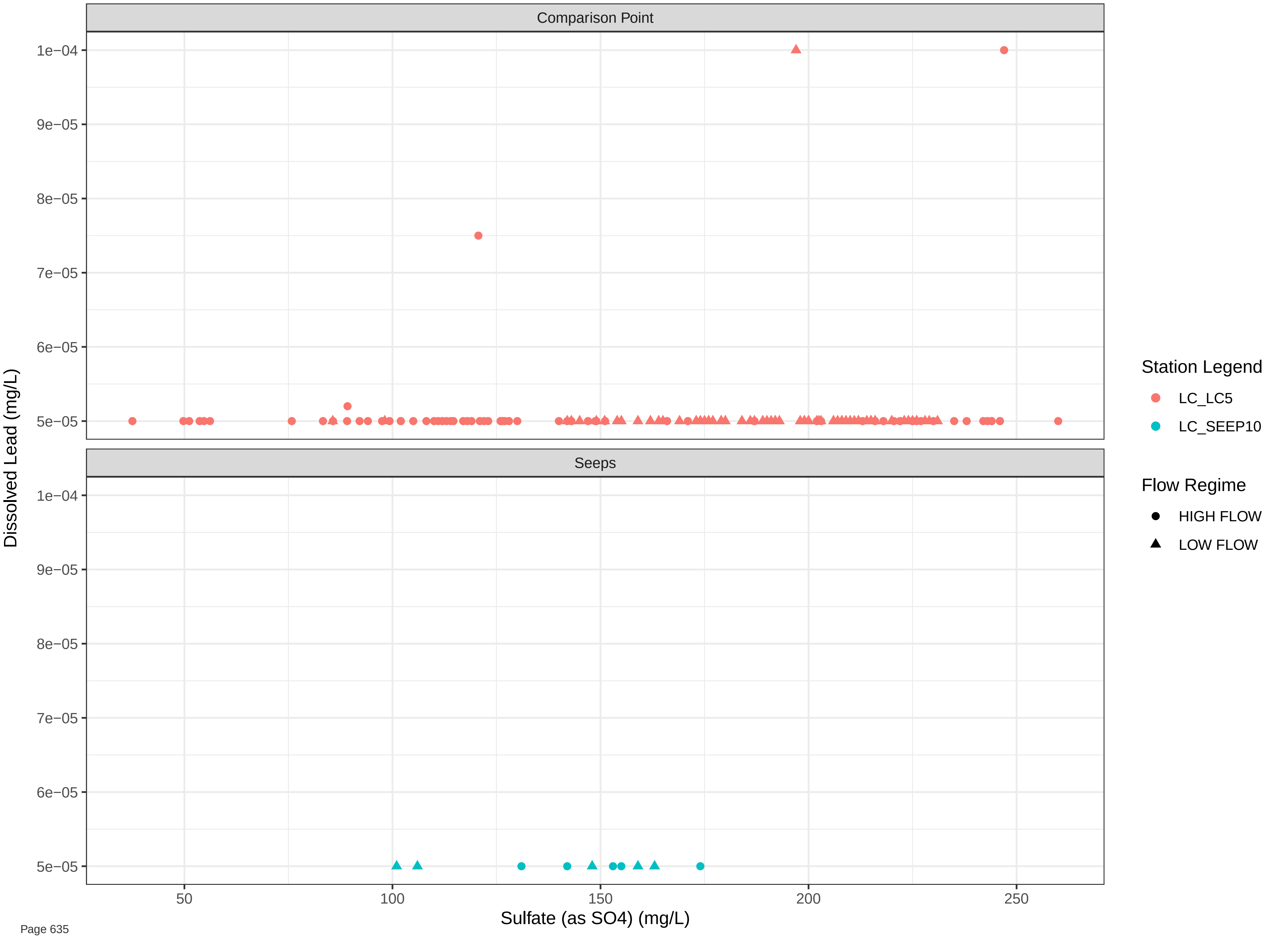
Comparison Point
Seeps
Dissolved Iron (mg/L)
0.05
0.04
0.03
0.02
0.01
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
6e−04
4e−04
2e−04
Dissolved Lead (mg/L)
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

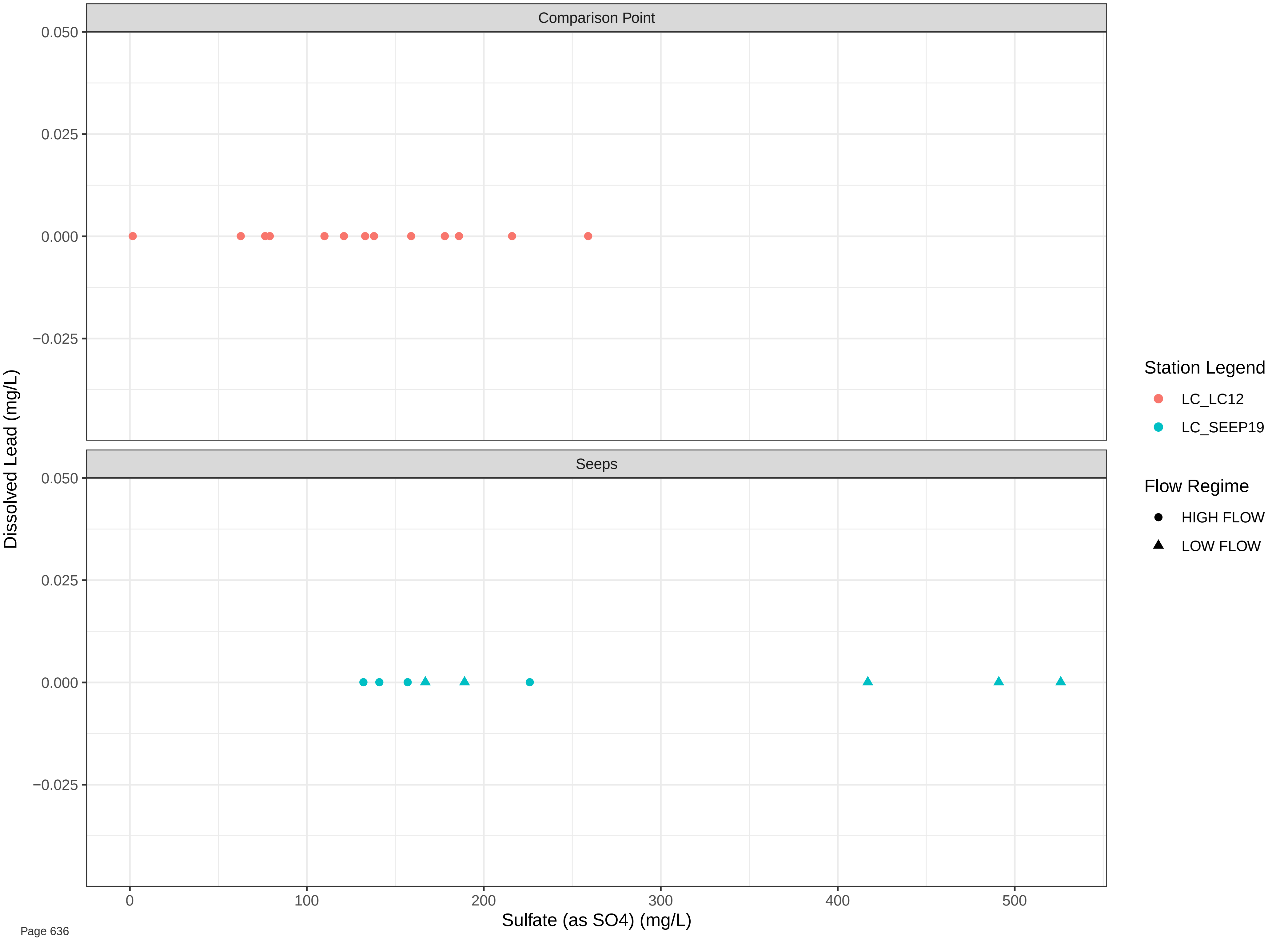

Seeps
0.050
0.025
0.000
−0.025
Dissolved Lead (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

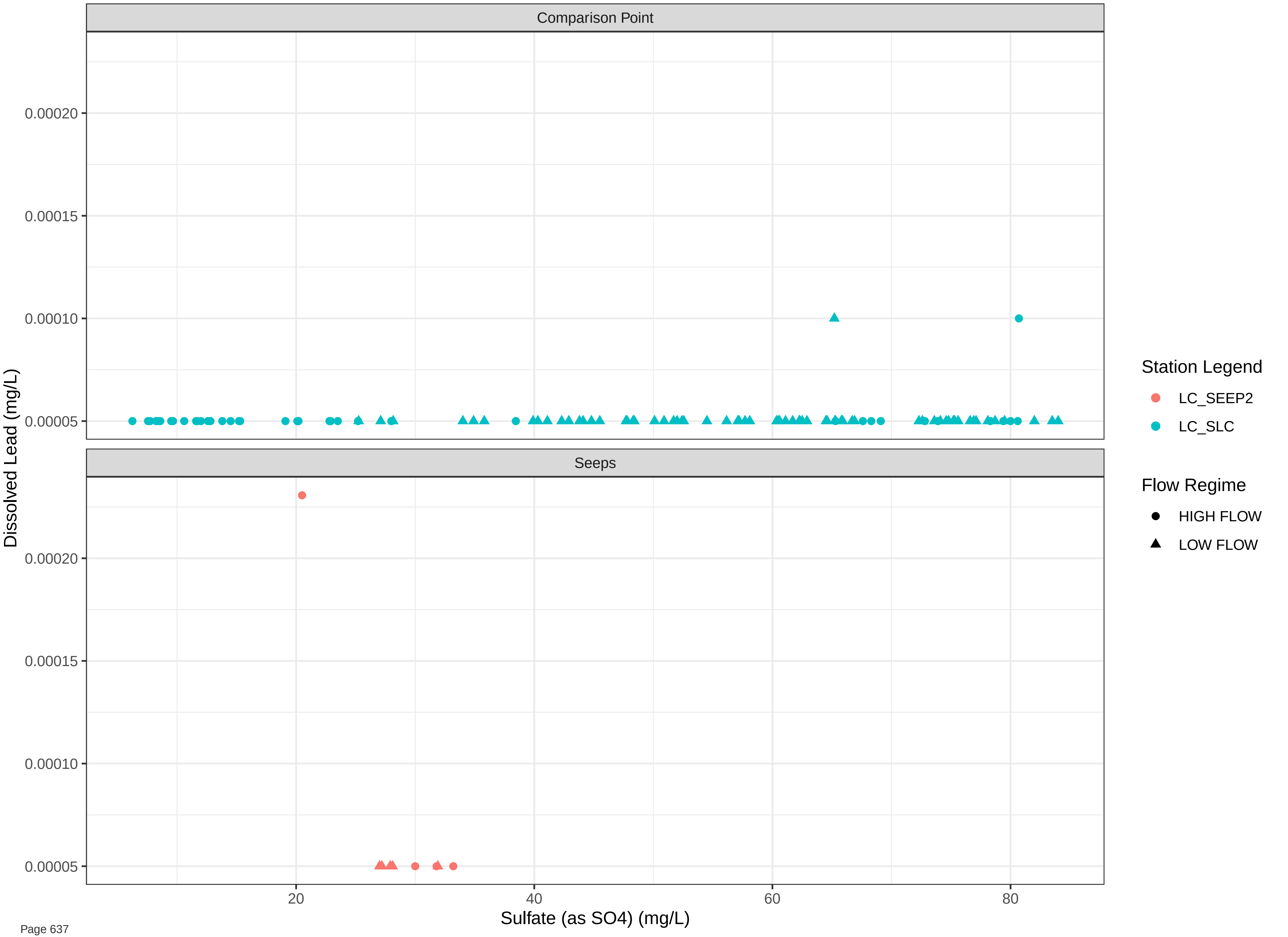


Seeps
0.050
0.025
0.000
−0.025
Dissolved Lead (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

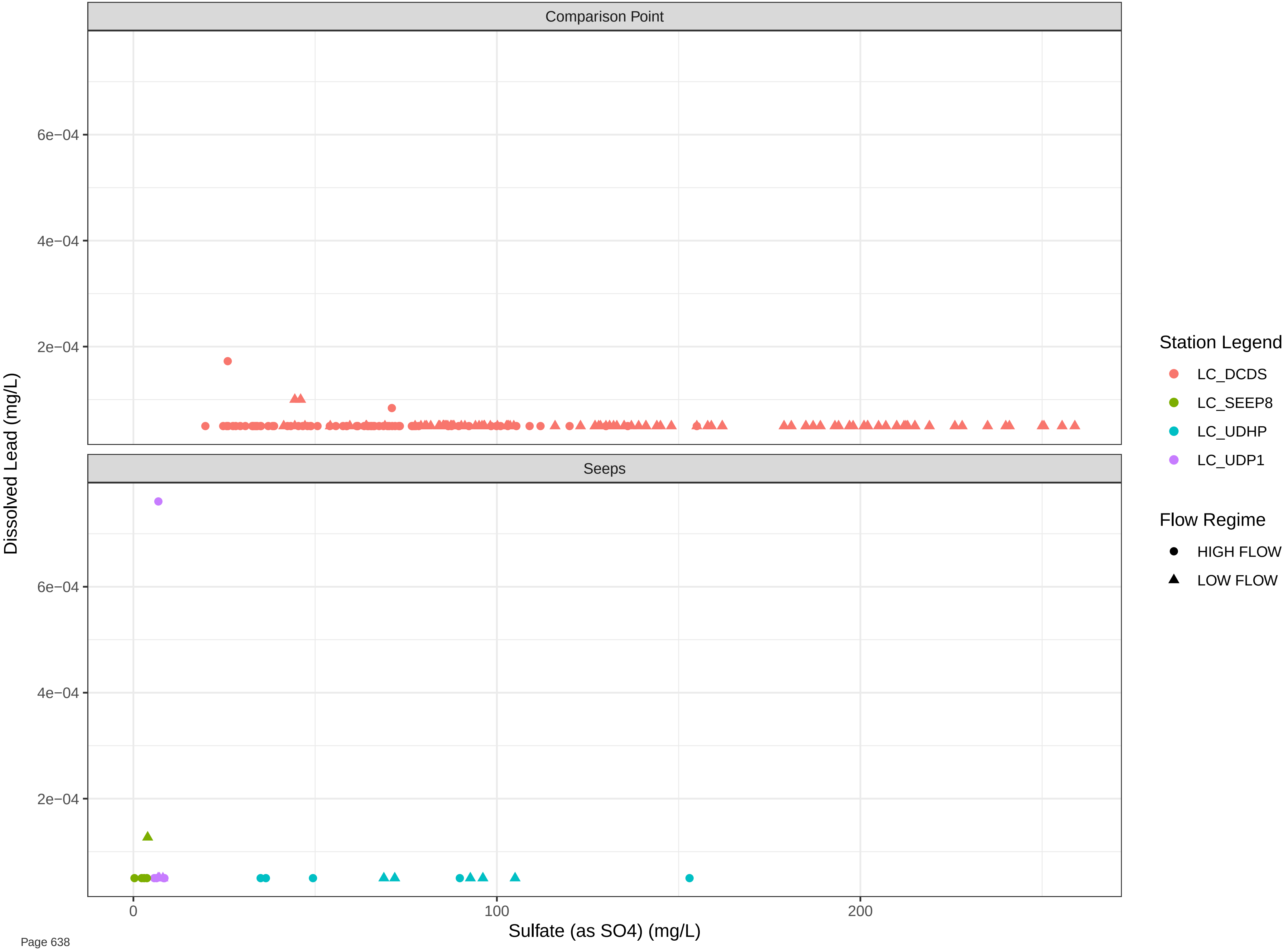


Comparison Point
Seeps
Dissolved Lead (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

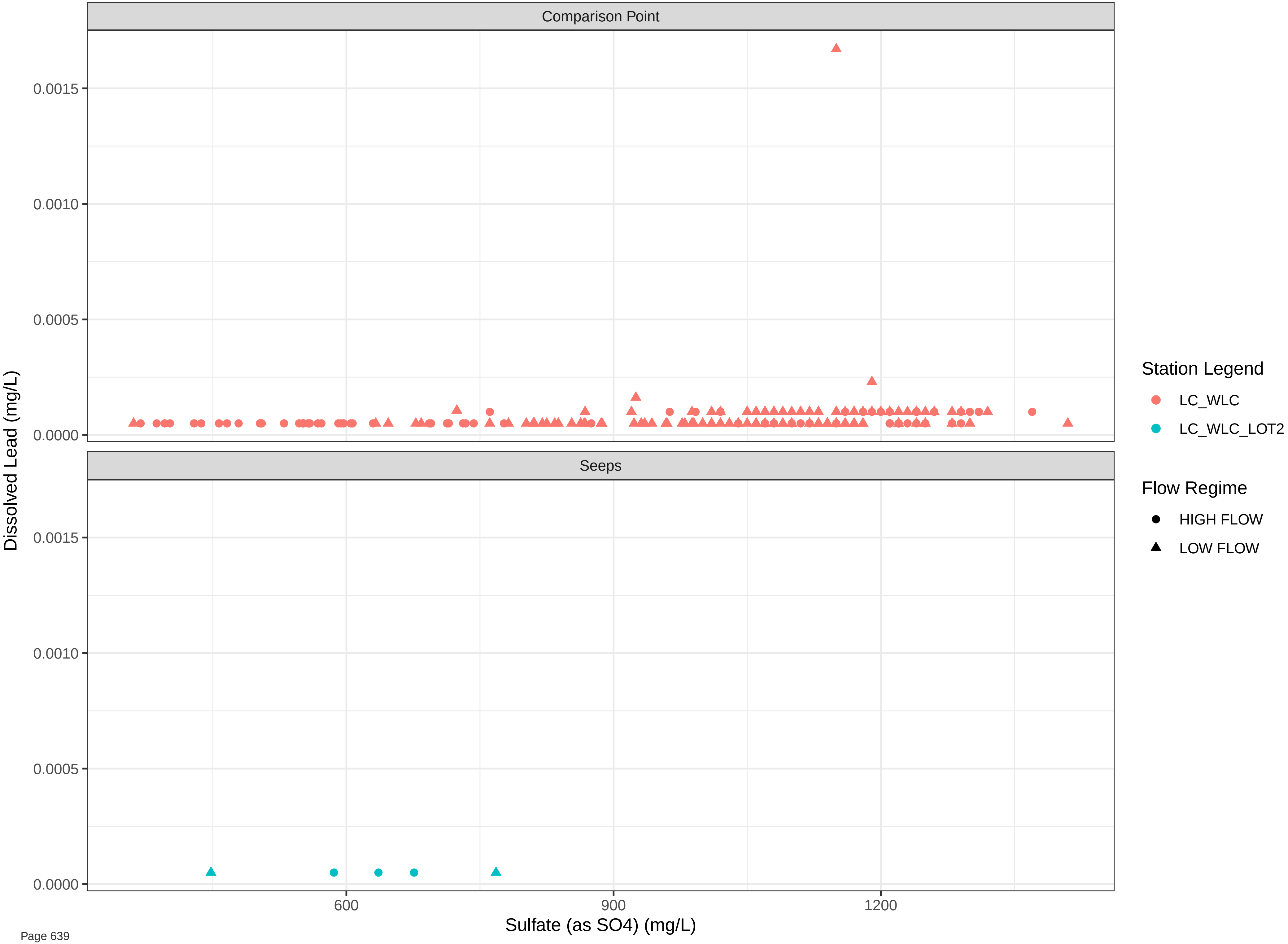

Comparison Point
Seeps
0.050
0.025
0.000
−0.025
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Dissolved Lead (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



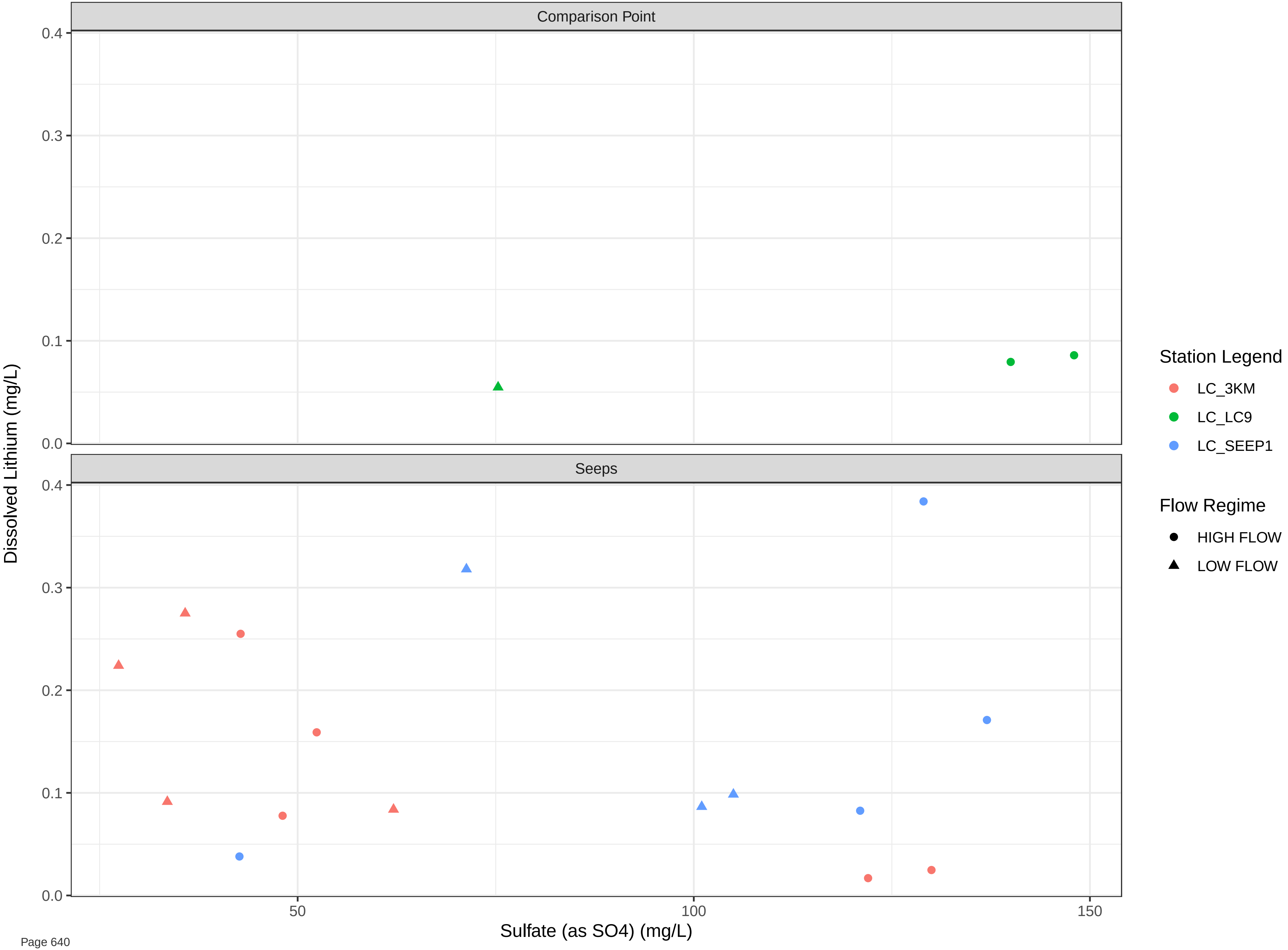
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00005
0.00010
0.00015
0.00020
Sulfate (as SO4) (mg/L)
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW



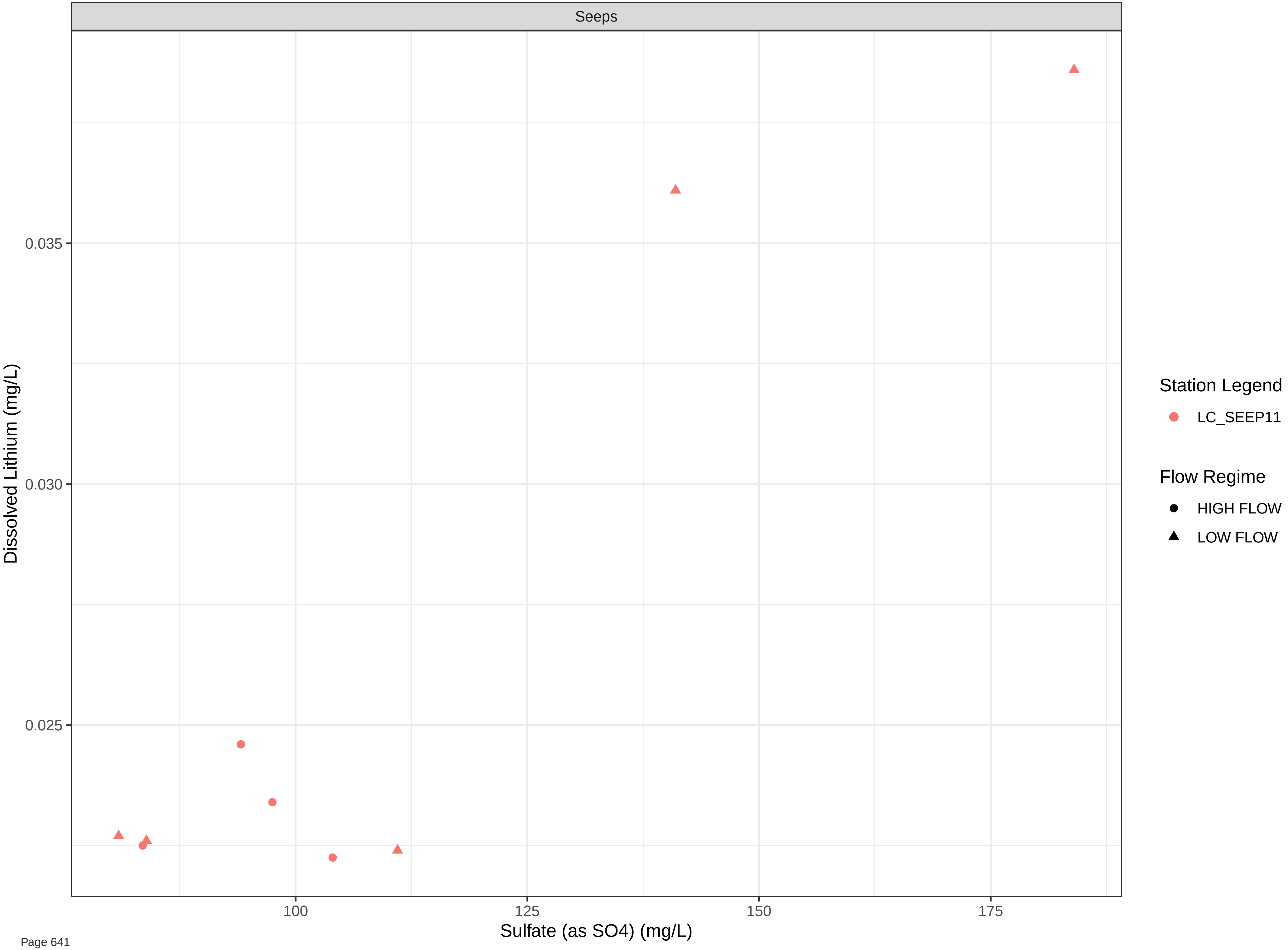
Comparison Point
Seeps
Dissolved Lead (mg/L)
6e−04
4e−04
2e−04
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



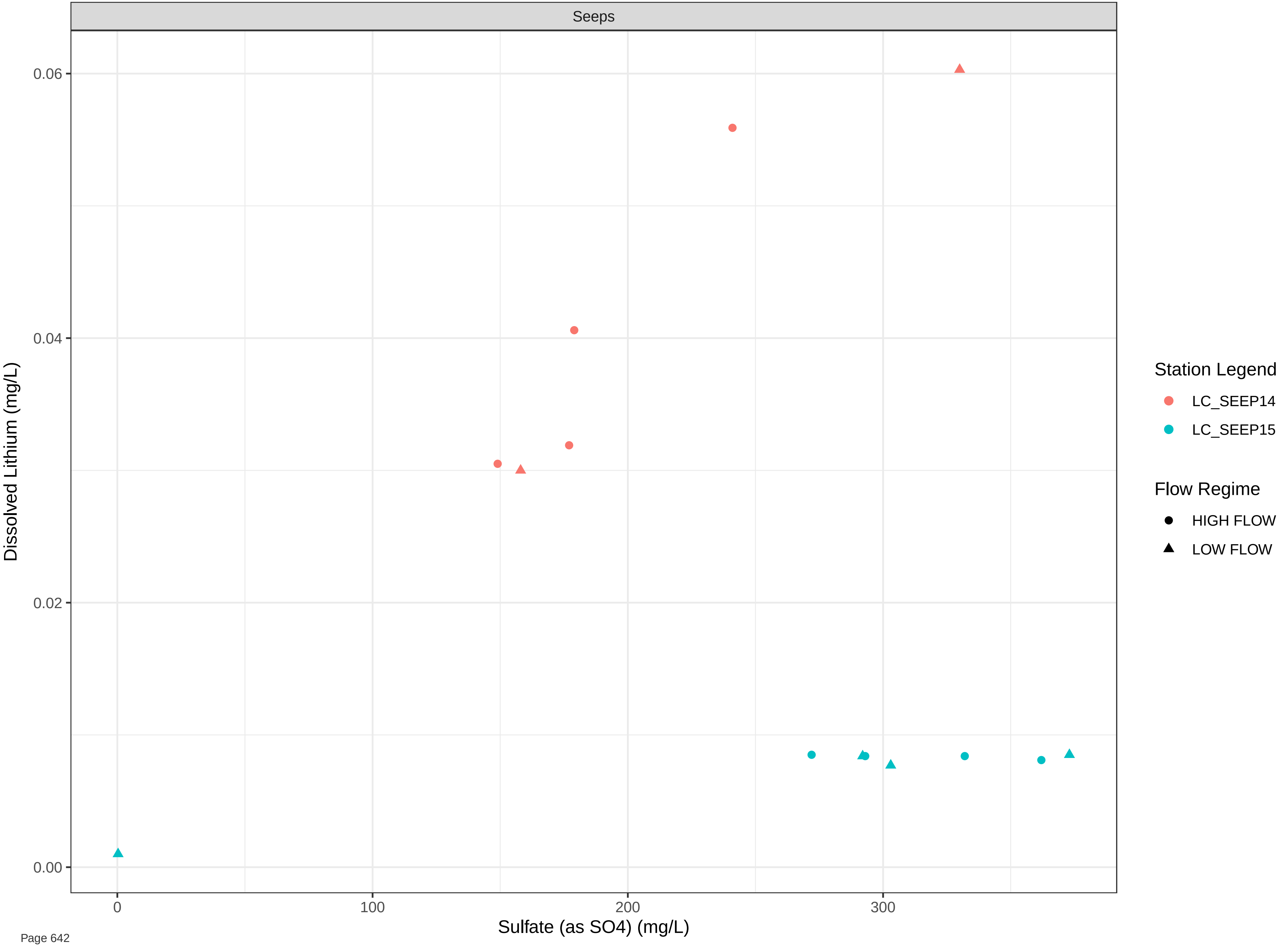
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.0015
0.0010
0.0005
0.0000
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



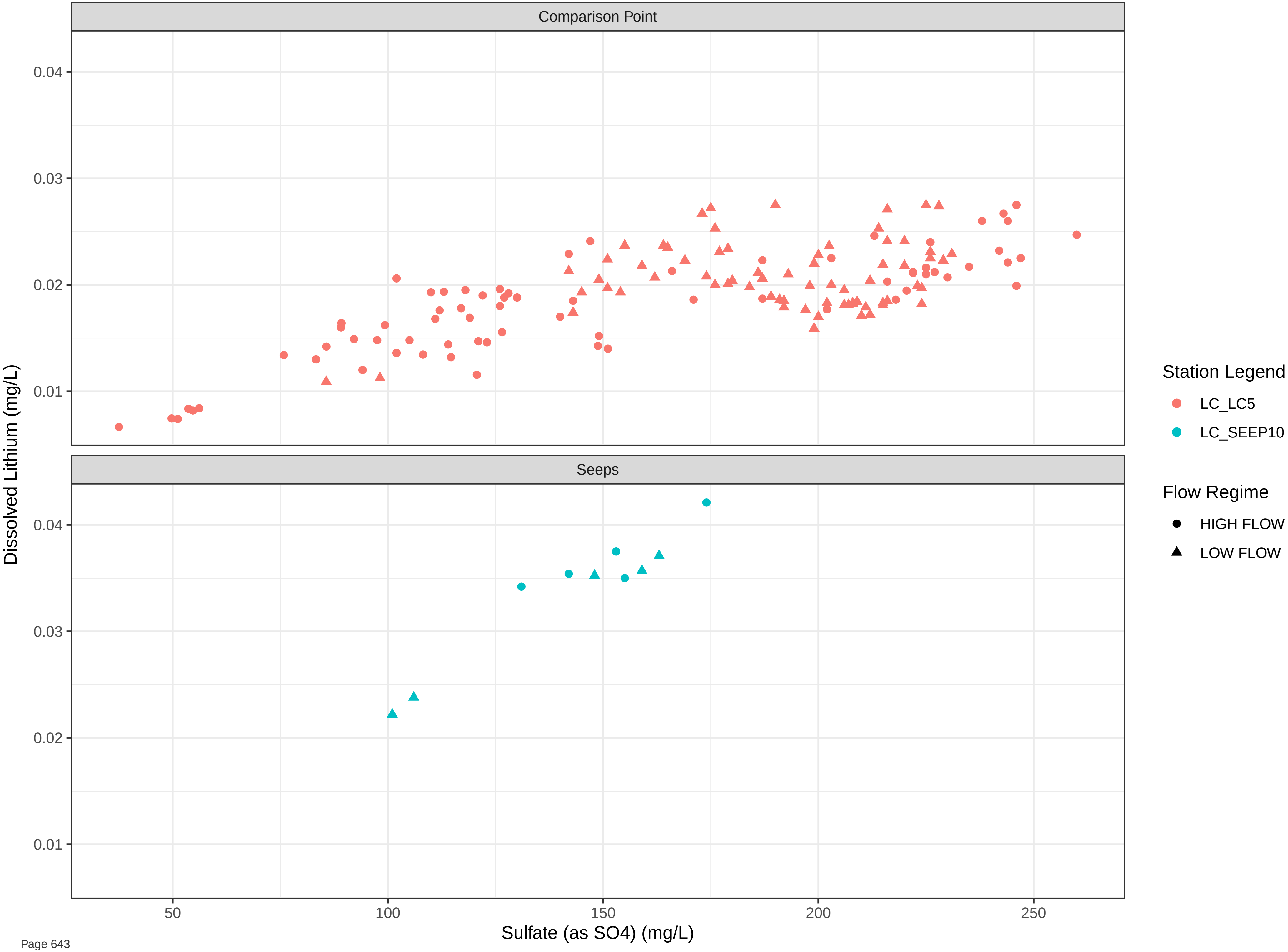
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.0
0.1
0.2
0.3
0.4
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



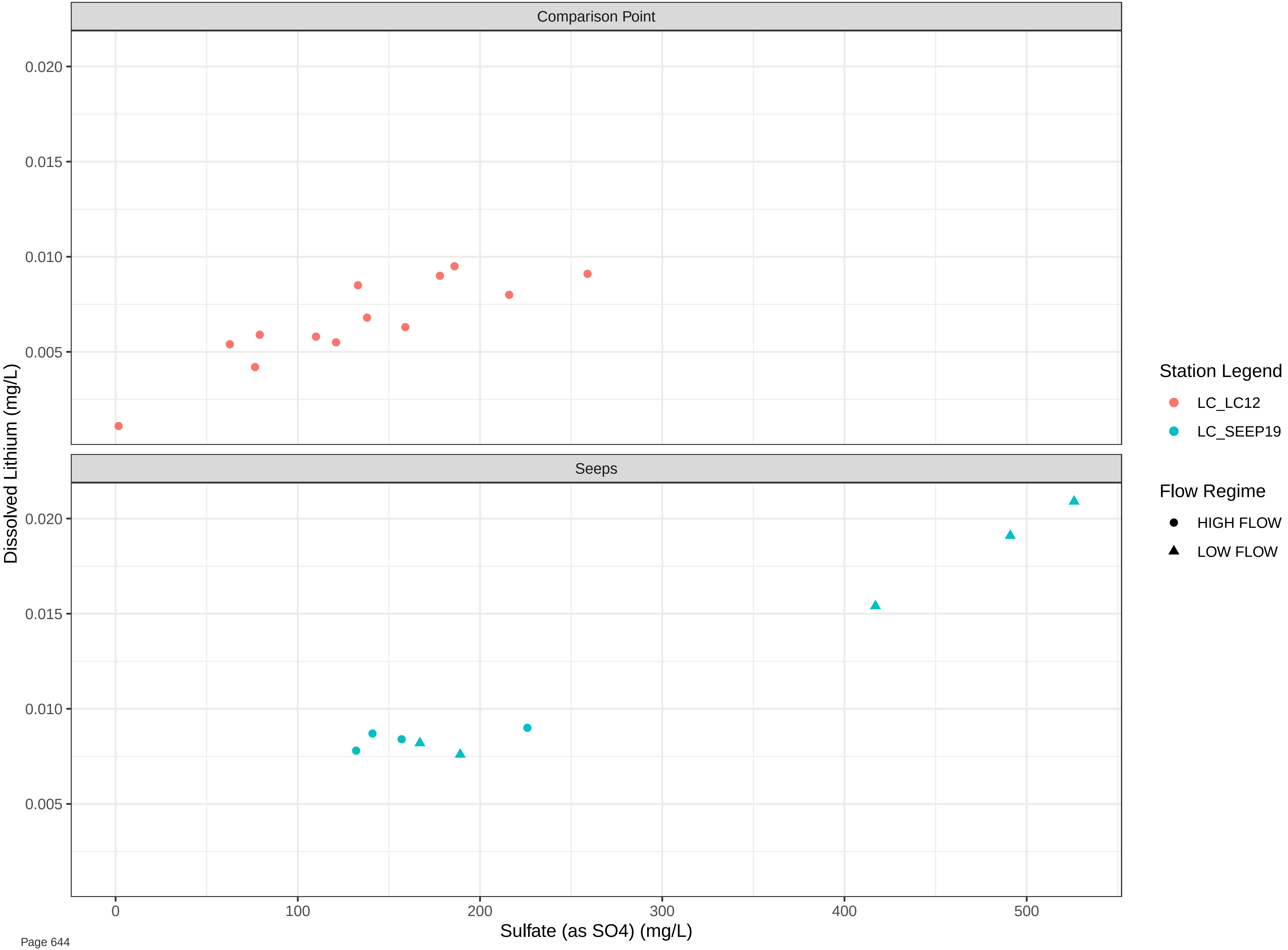
Seeps
0.035
0.030
0.025
100
125
150
175
Sulfate (as SO4) (mg/L)
Dissolved Lithium (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



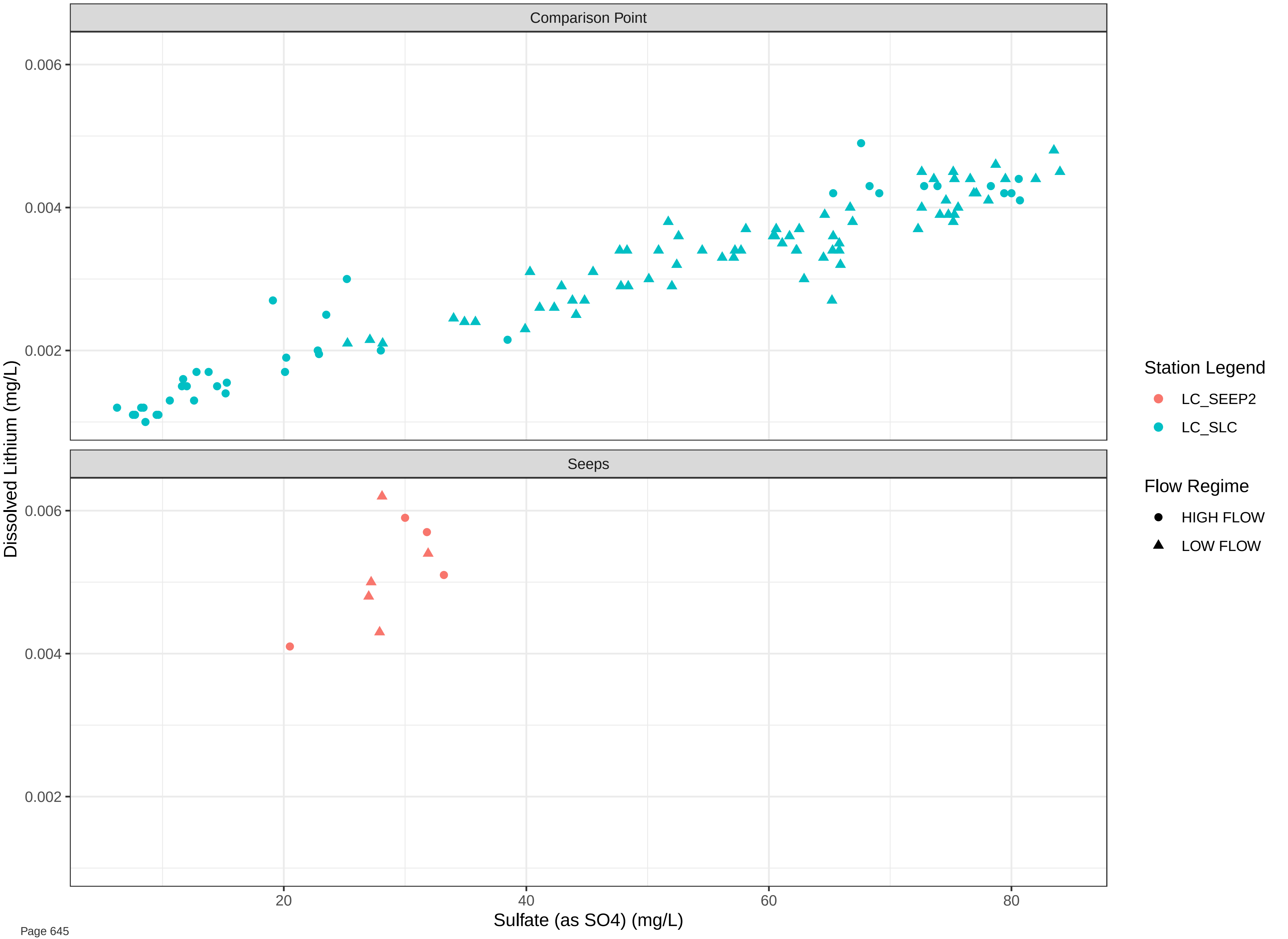
Seeps
0.06
0.04
0.02
0.00
0
100
200
300
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



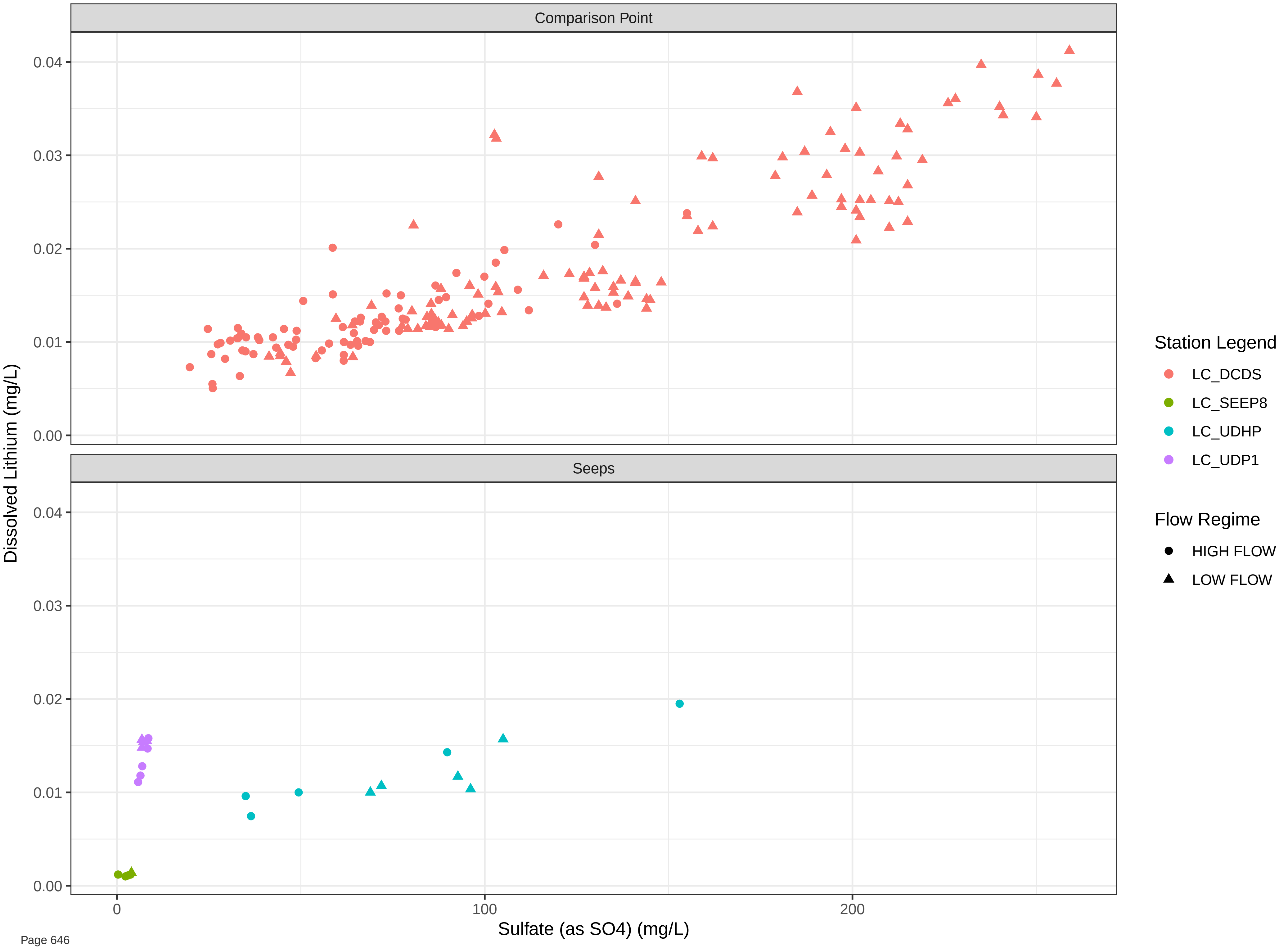
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.04
0.03
0.02
0.01
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

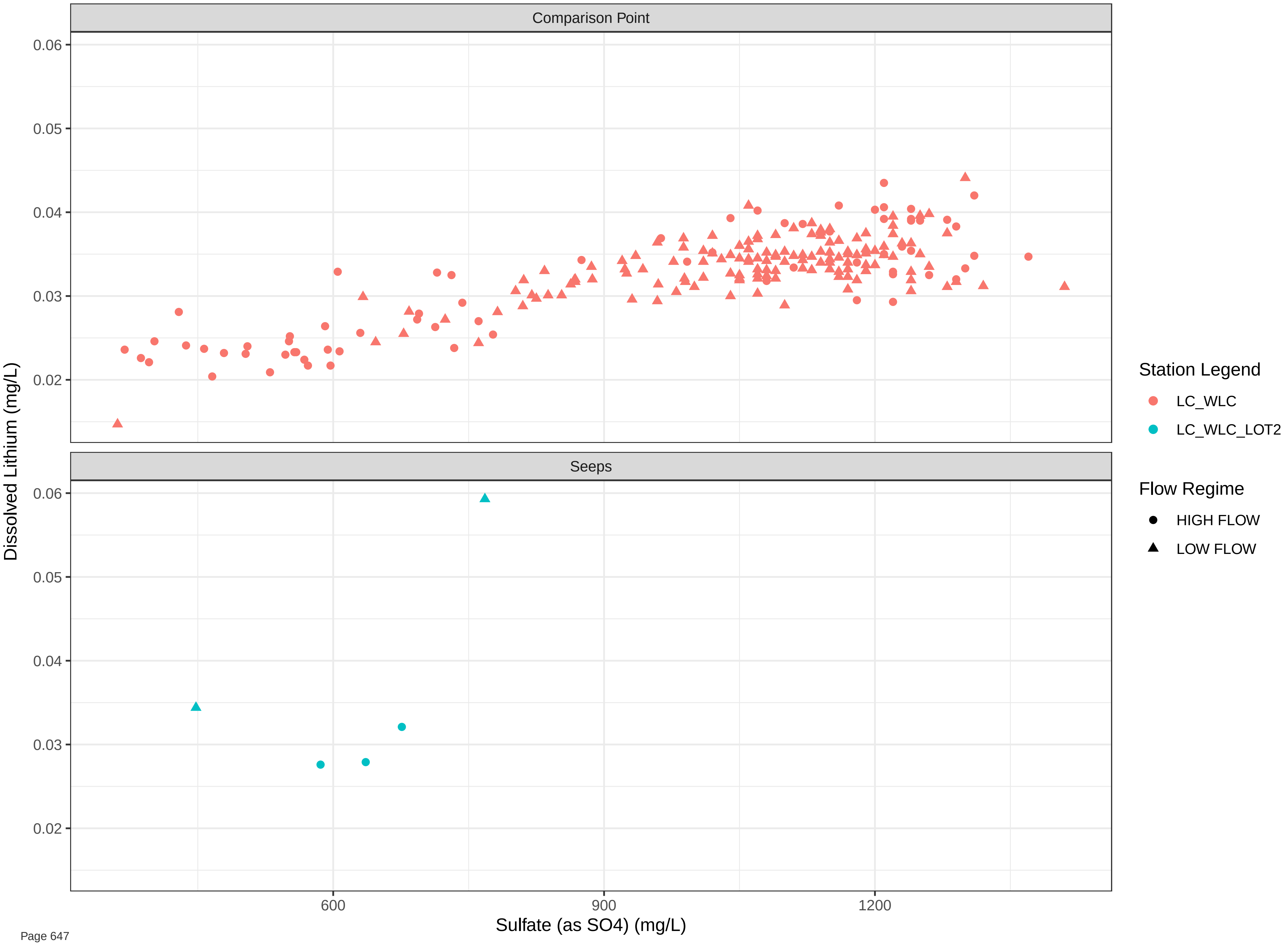


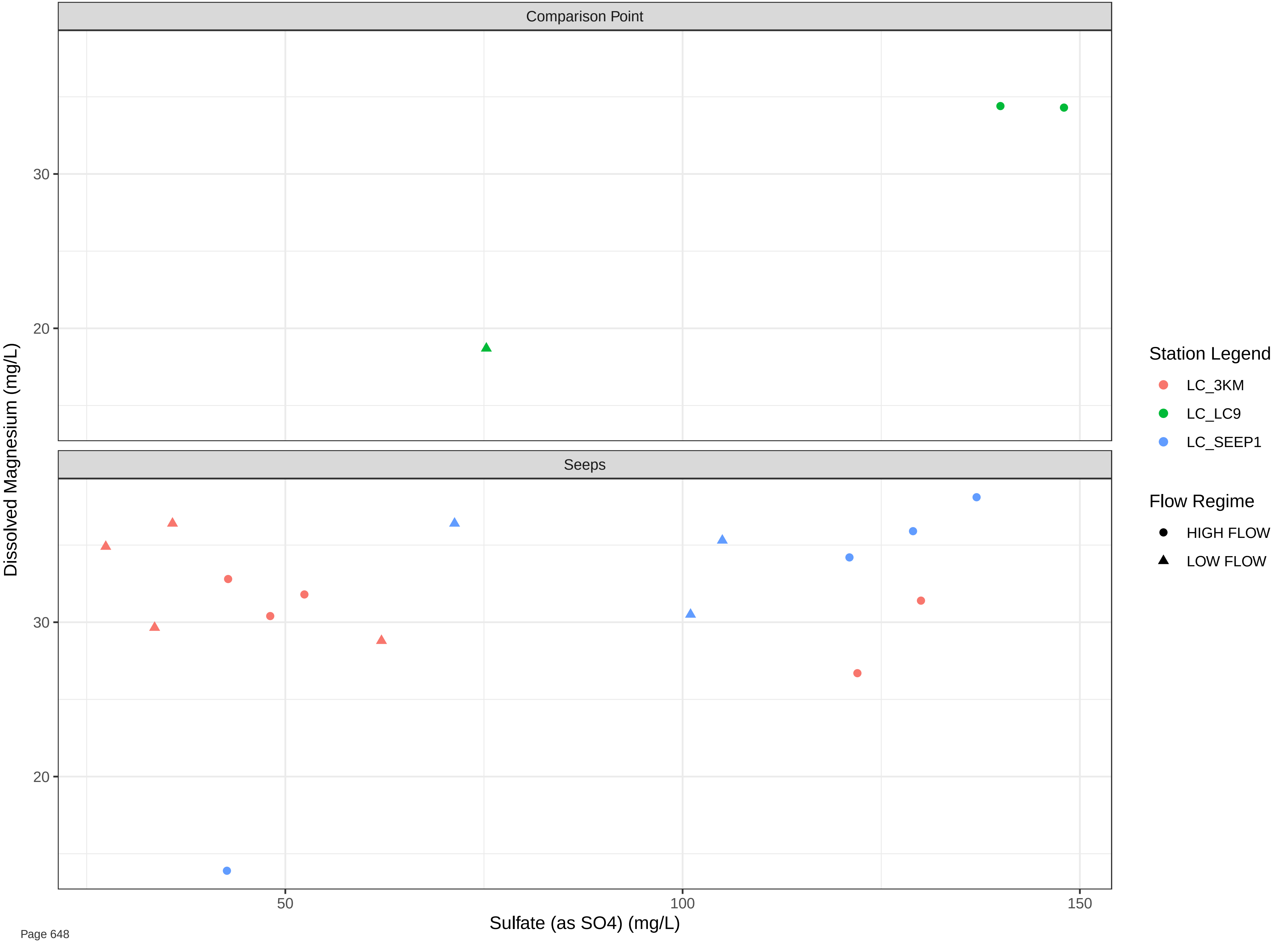
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.020
0.015
0.010
0.005
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



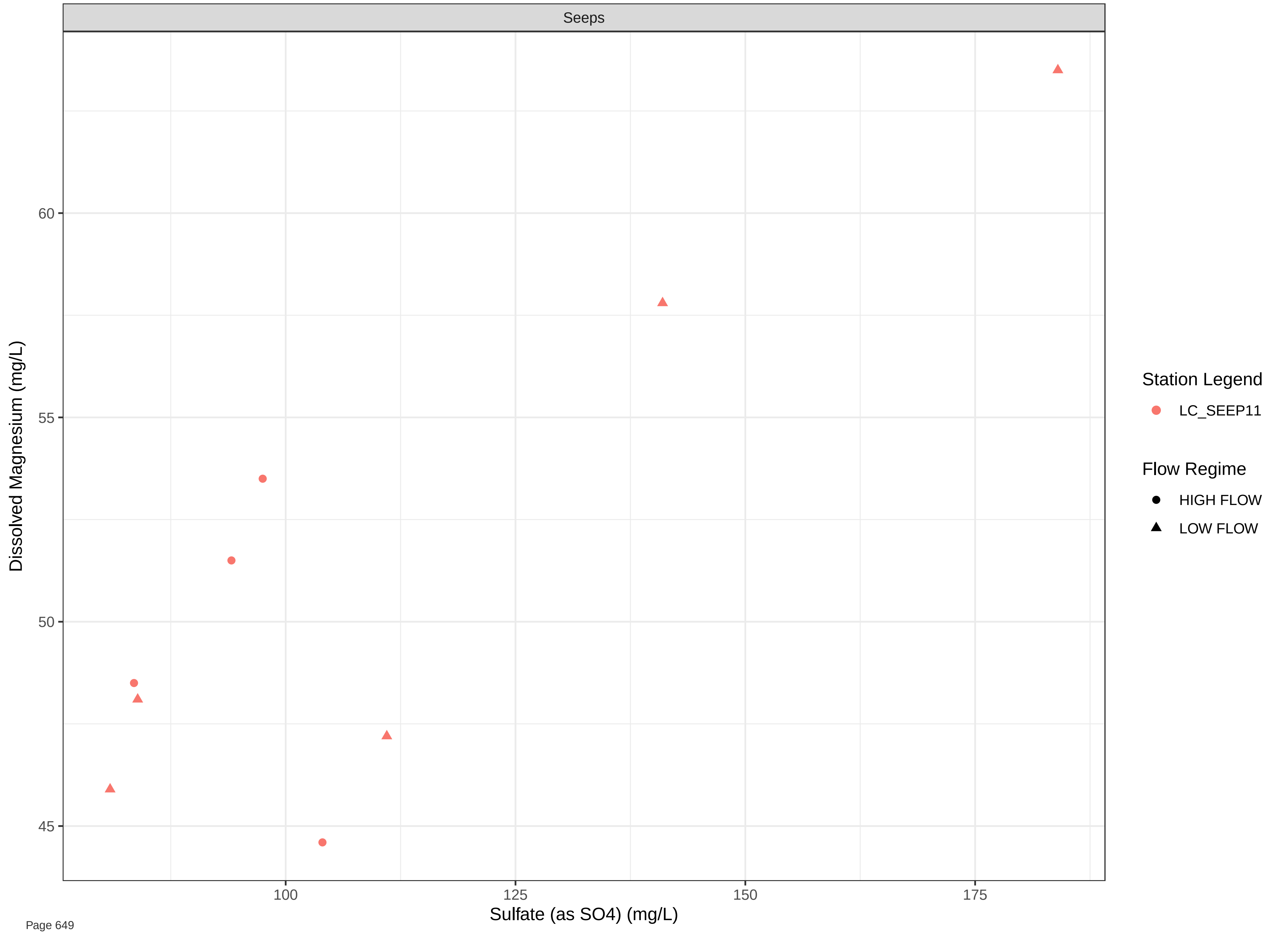
Comparison Point
Seeps
0.006
0.004
0.002
Dissolved Lithium (mg/L)
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

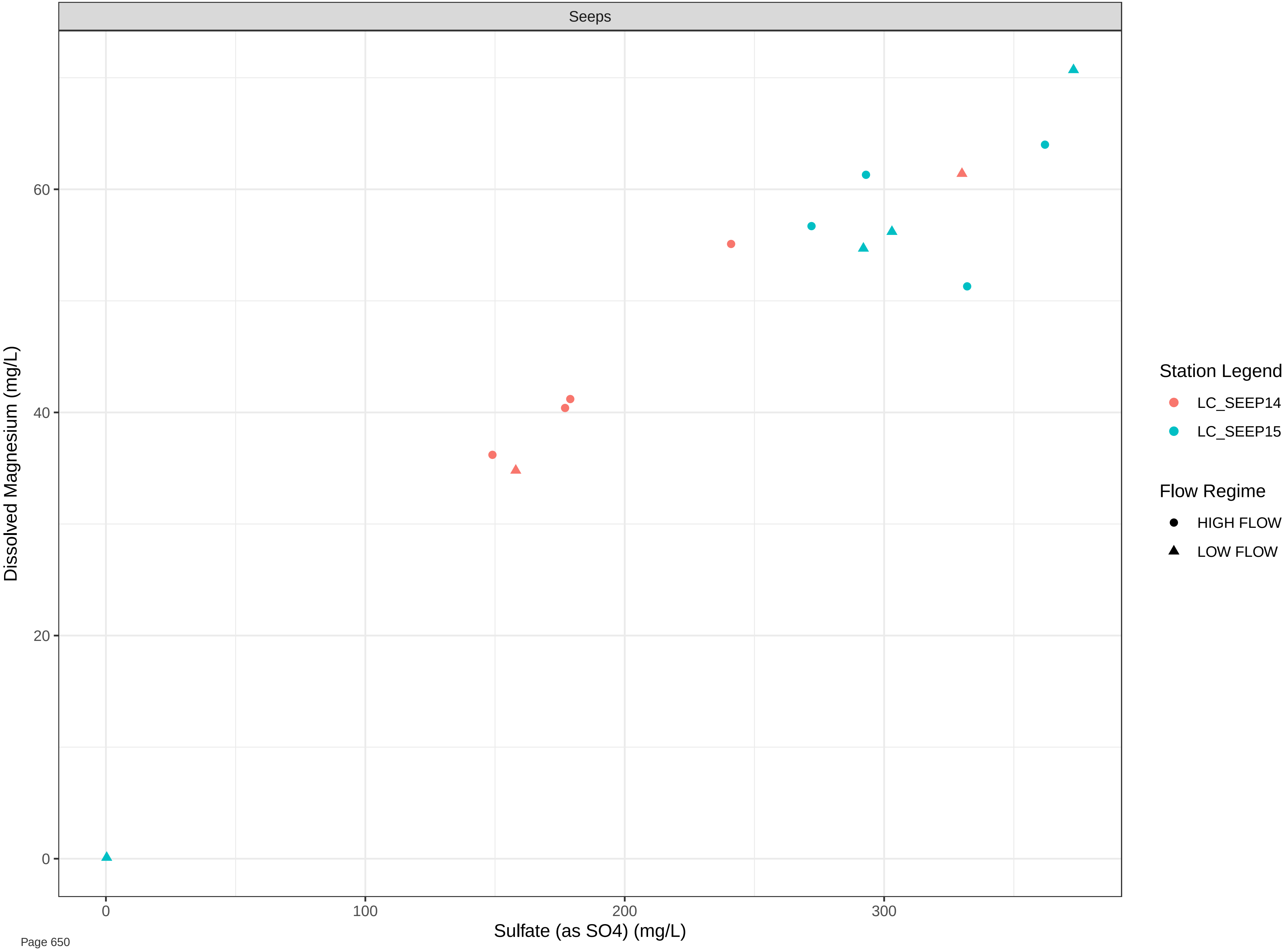

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.00
0.01
0.02
0.03
0.04
Sulfate (as SO4) (mg/L)
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

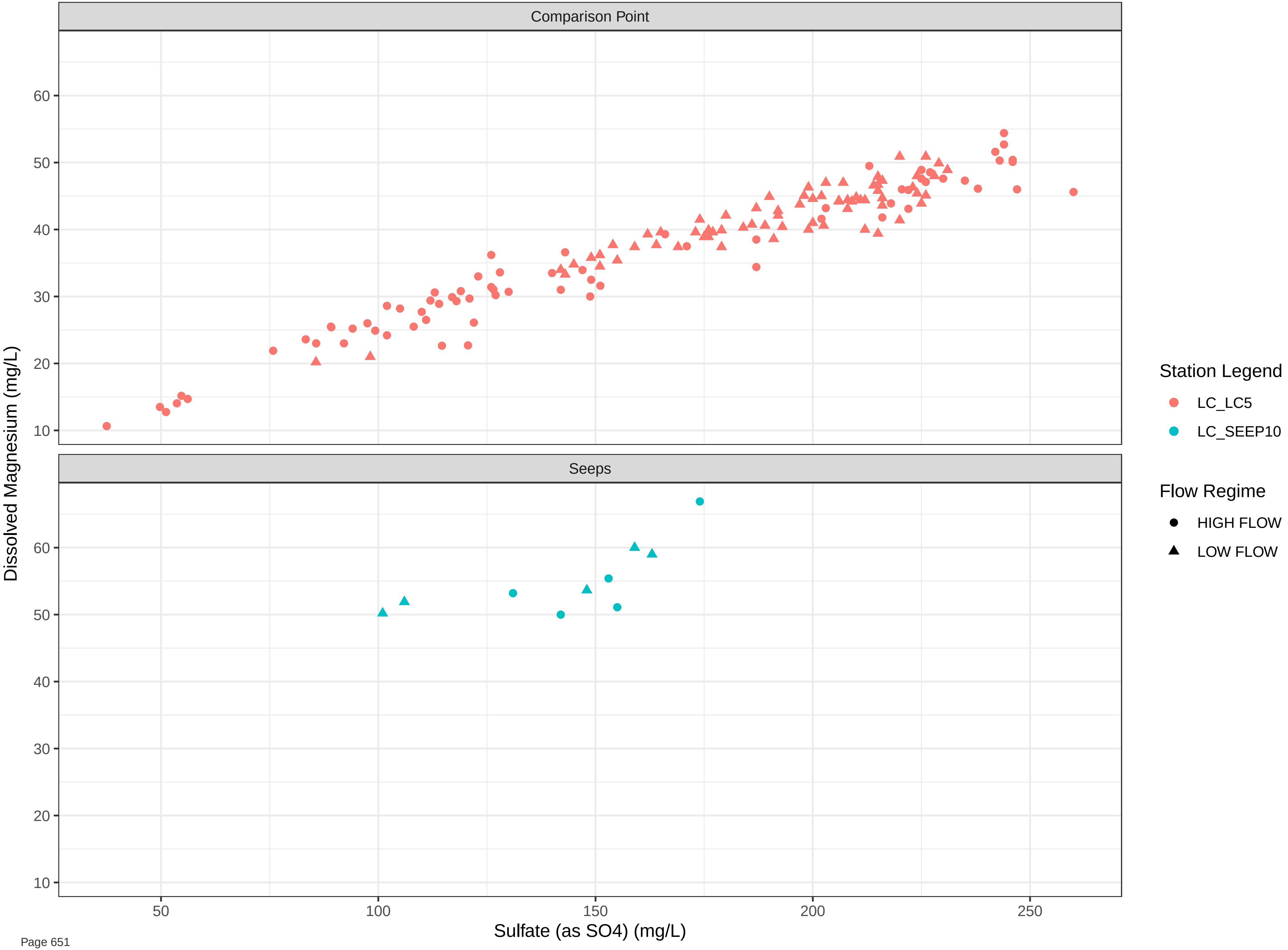

Comparison Point
Seeps
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
0.06
0.05
0.04
0.03
0.02
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



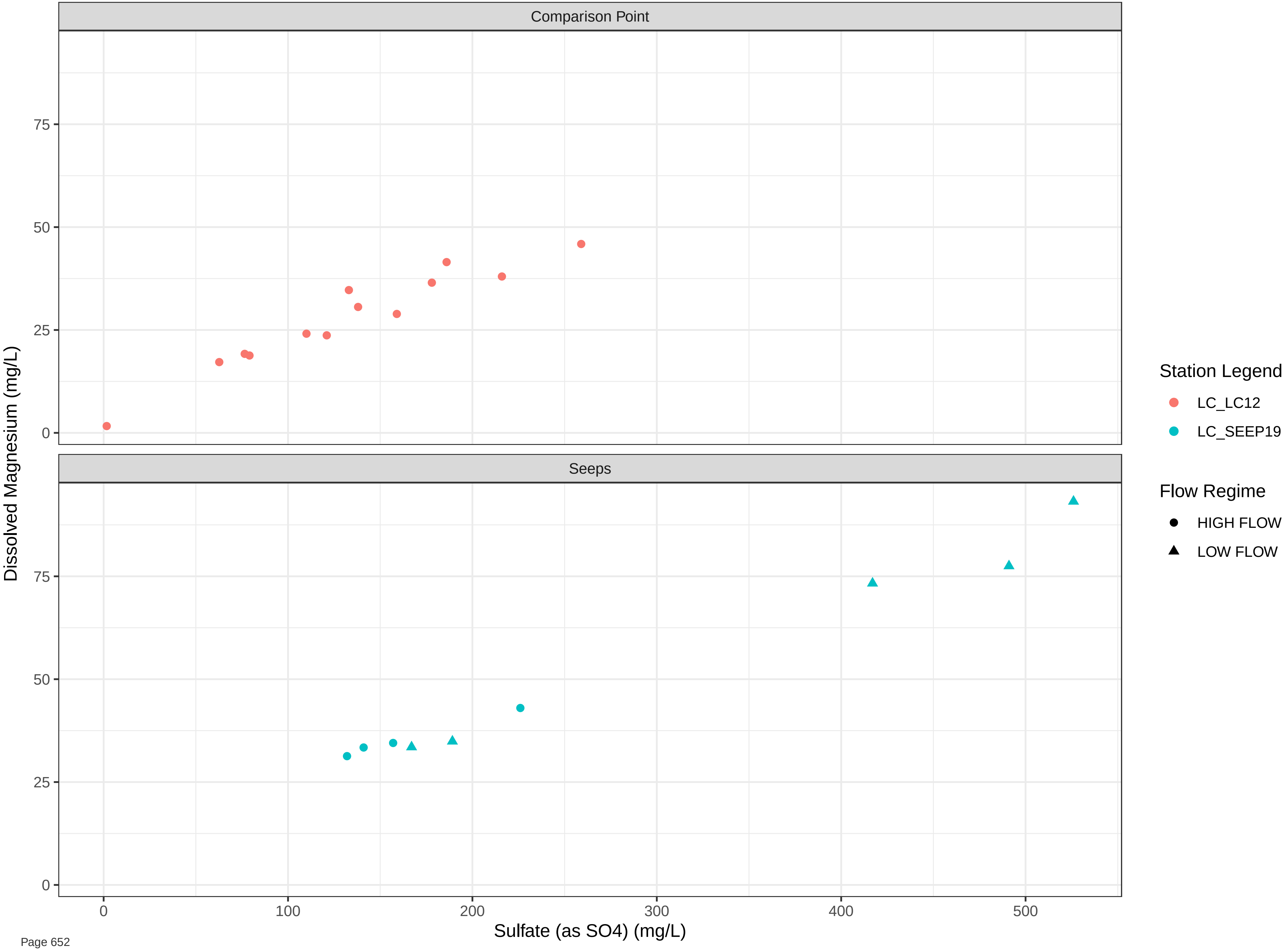
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
30
20
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

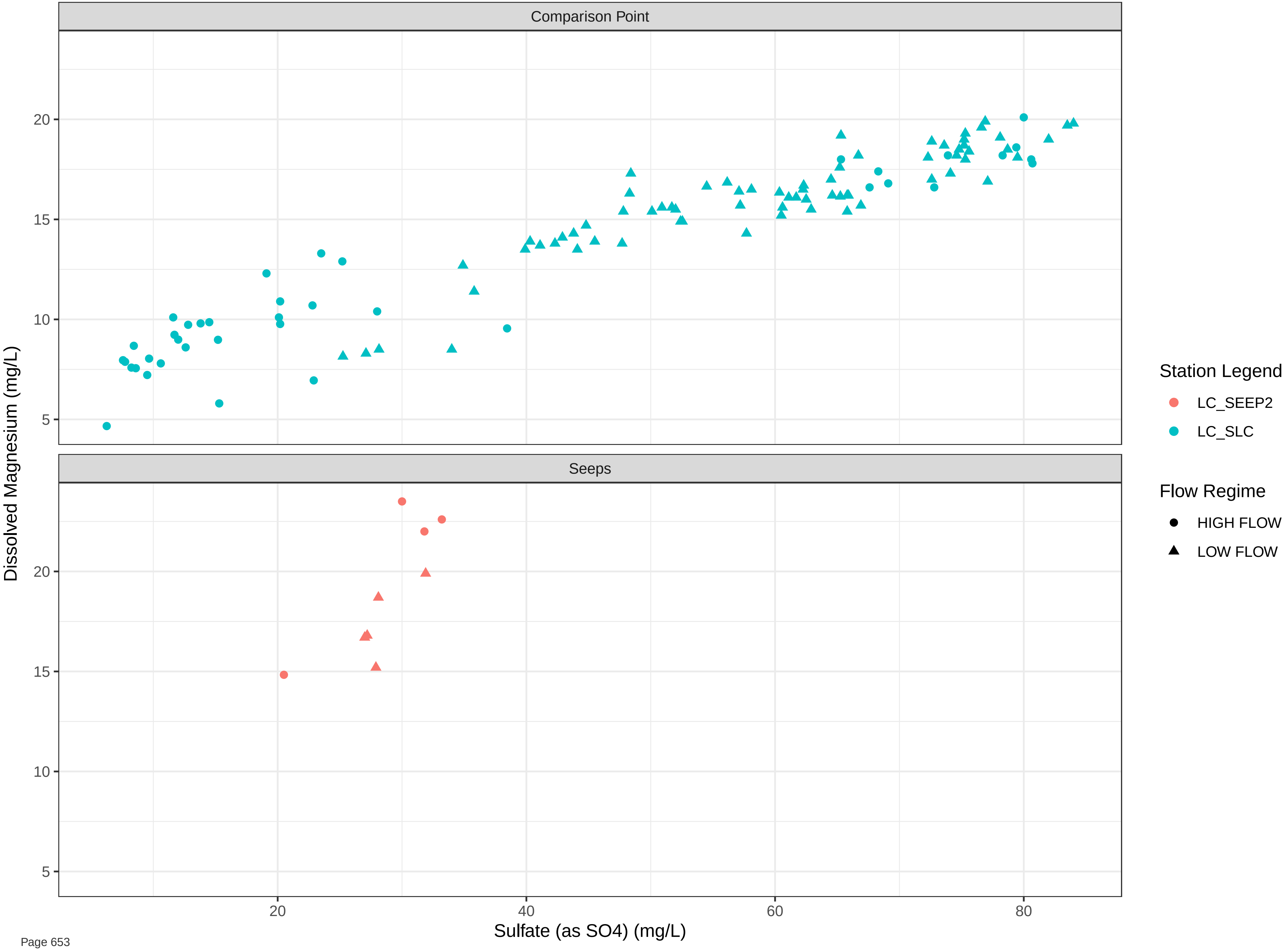

Seeps
Dissolved Magnesium (mg/L)
45
50
55
60
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

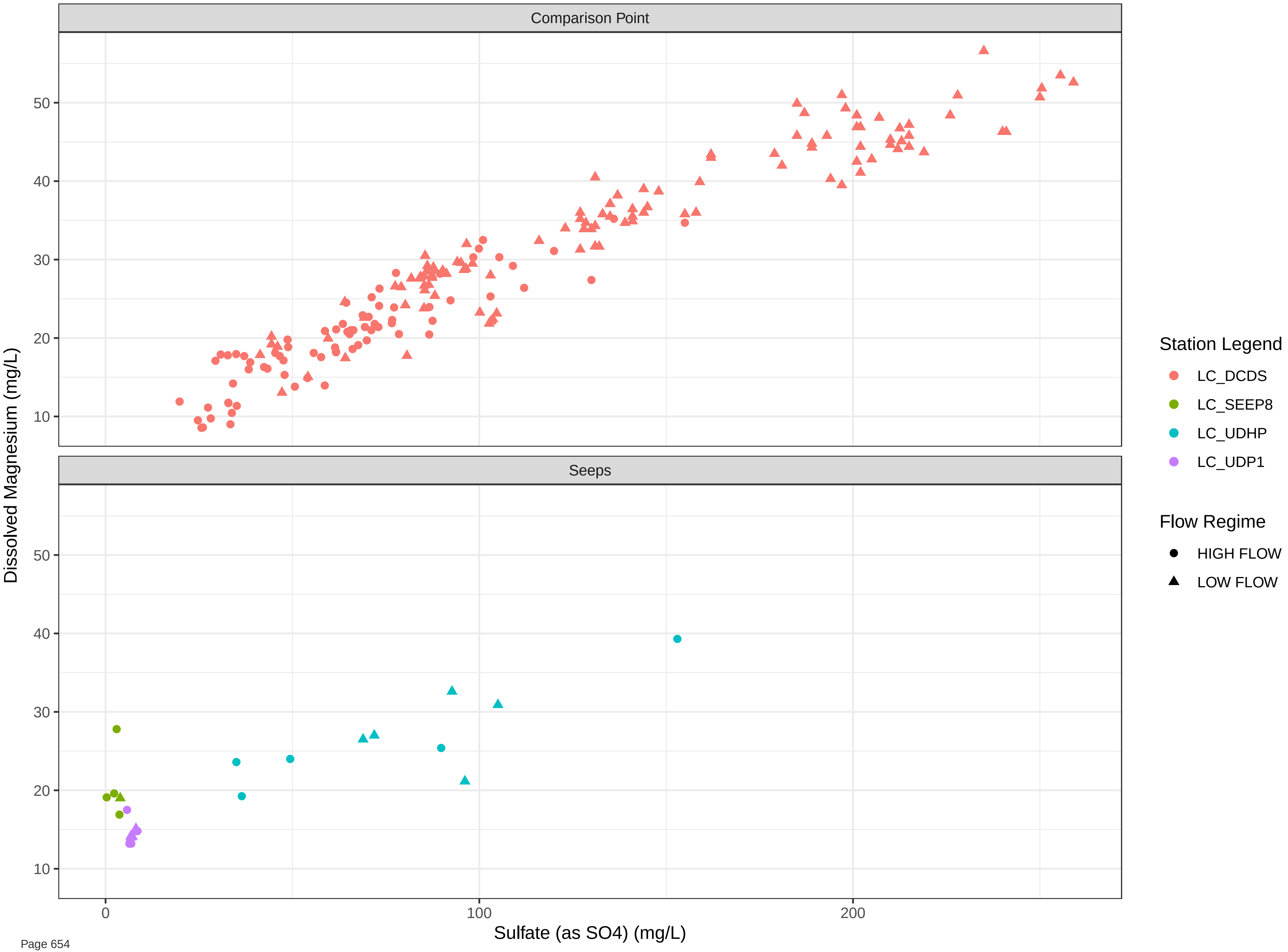

Seeps
Dissolved Magnesium (mg/L)
60
40
20
0
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



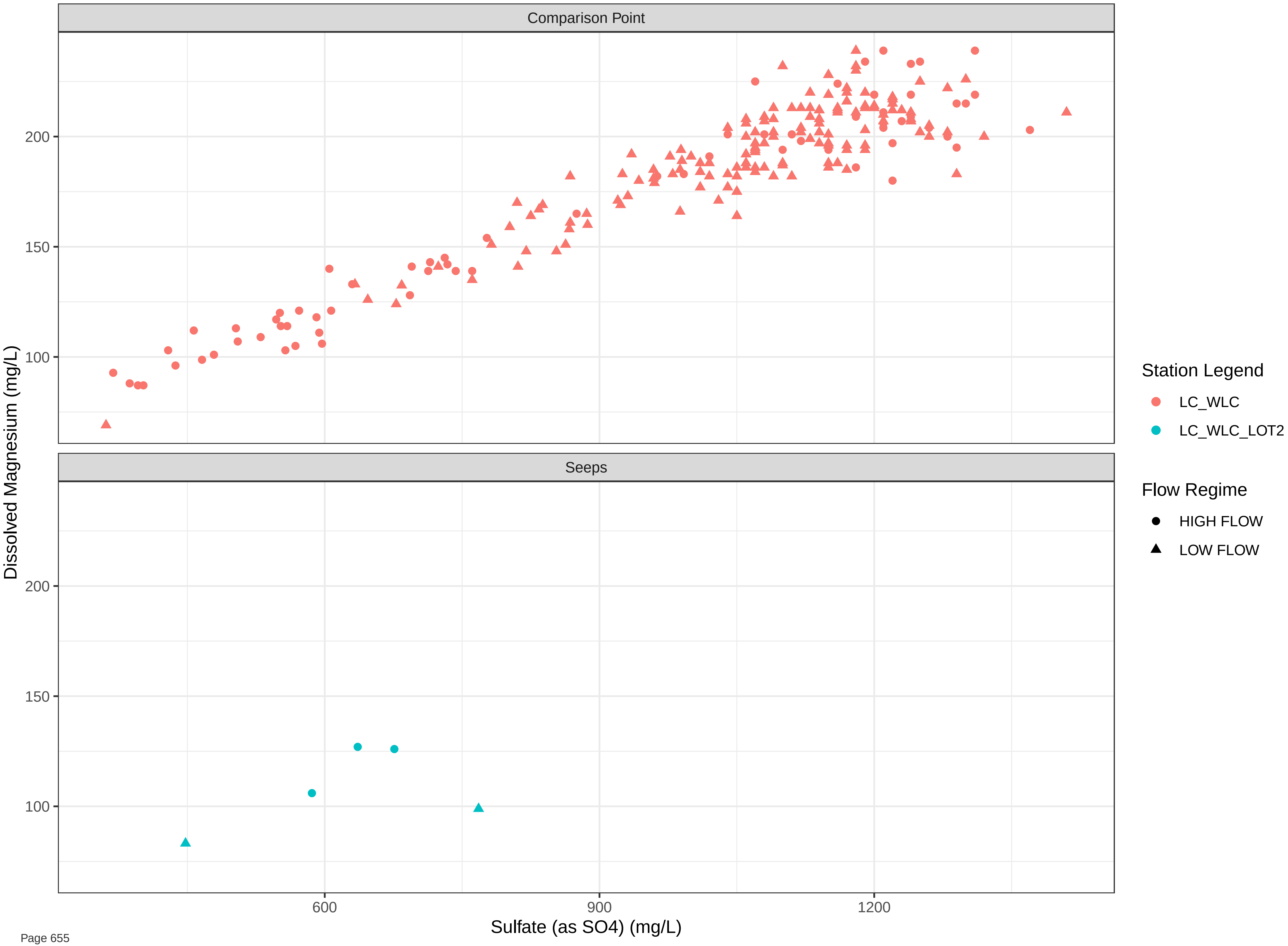
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
10
20
30
40
50
60
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

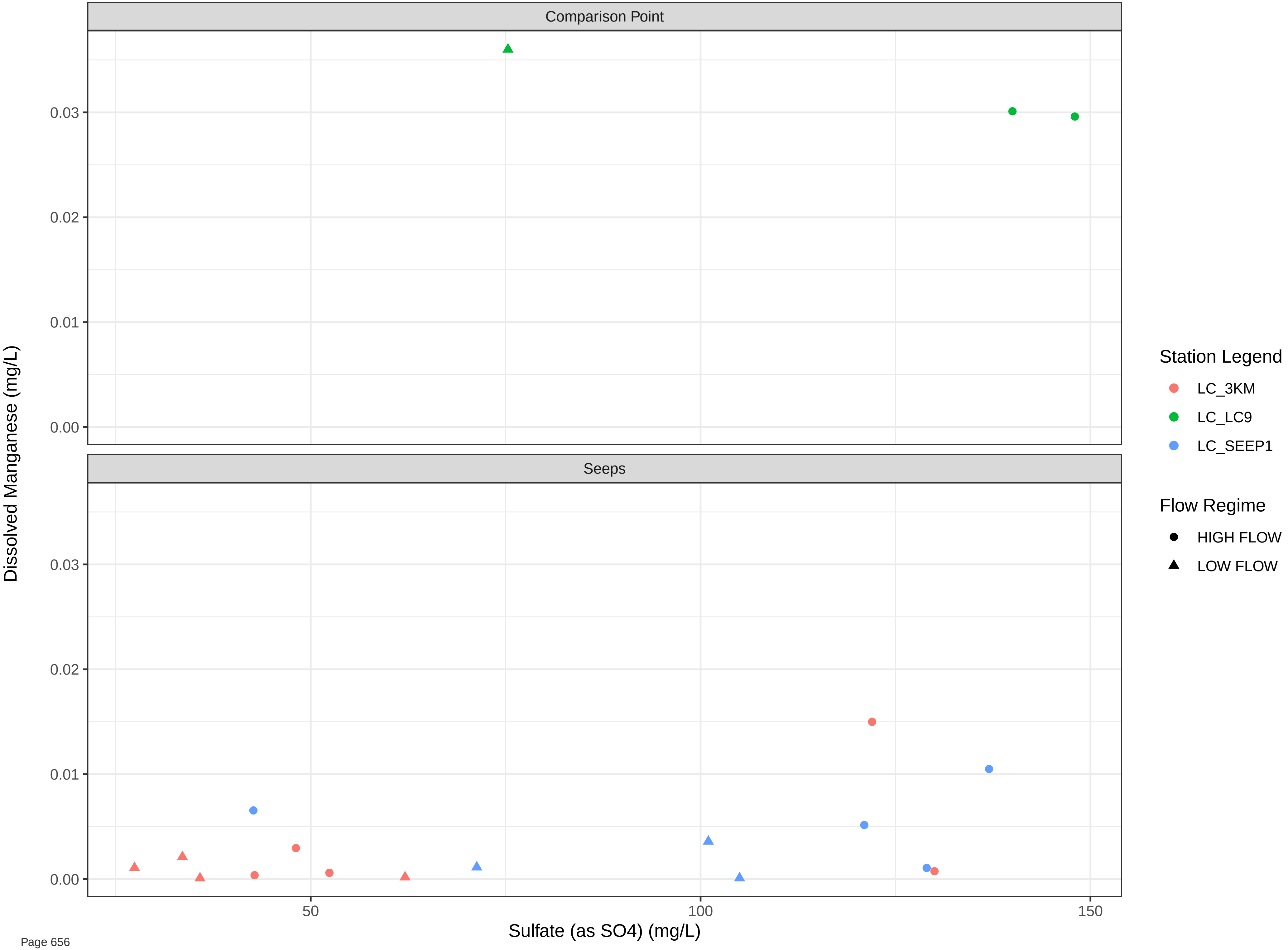

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
5
10
15
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

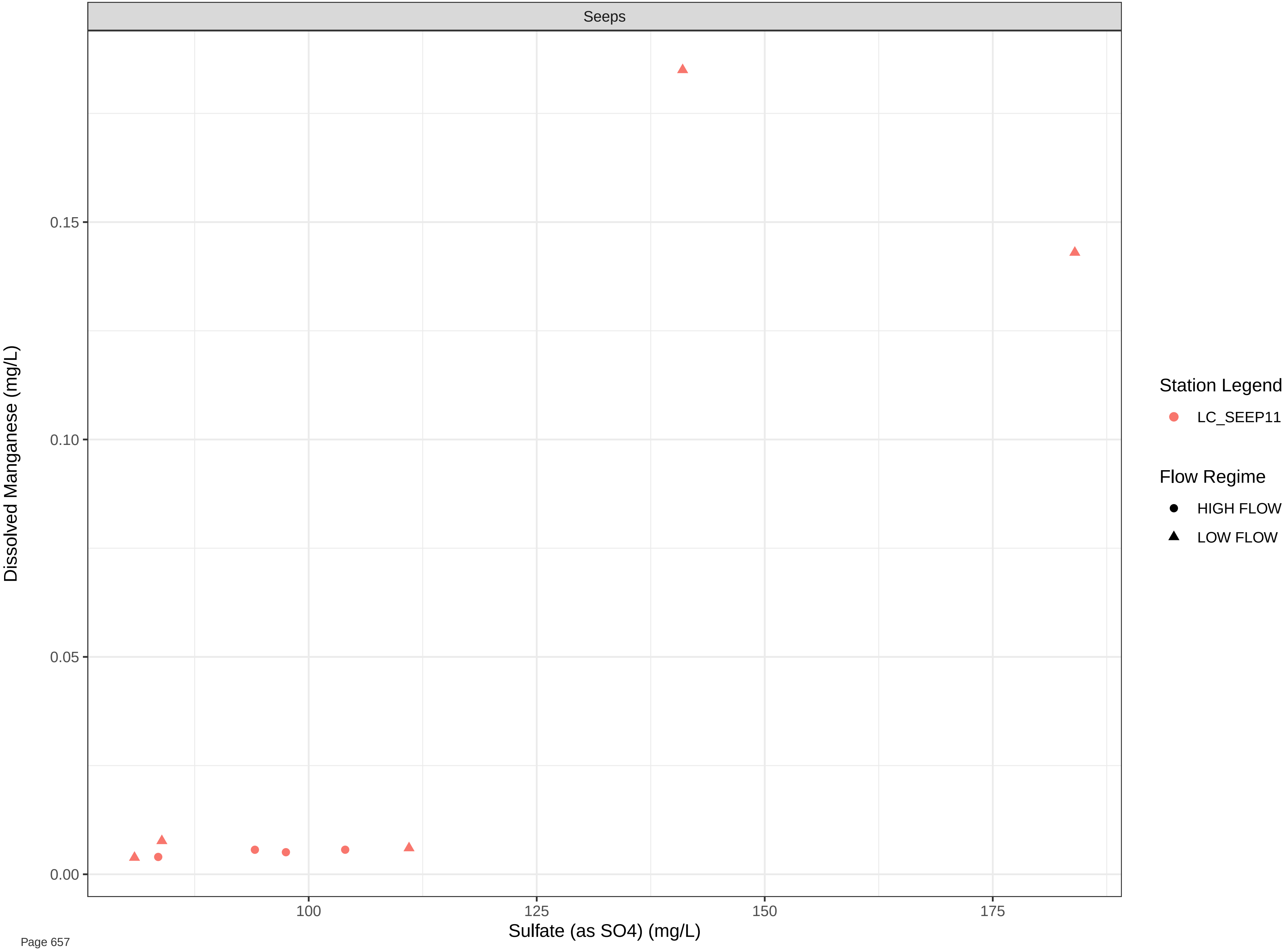


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
10
20
30
40
50
Sulfate (as SO4) (mg/L)
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

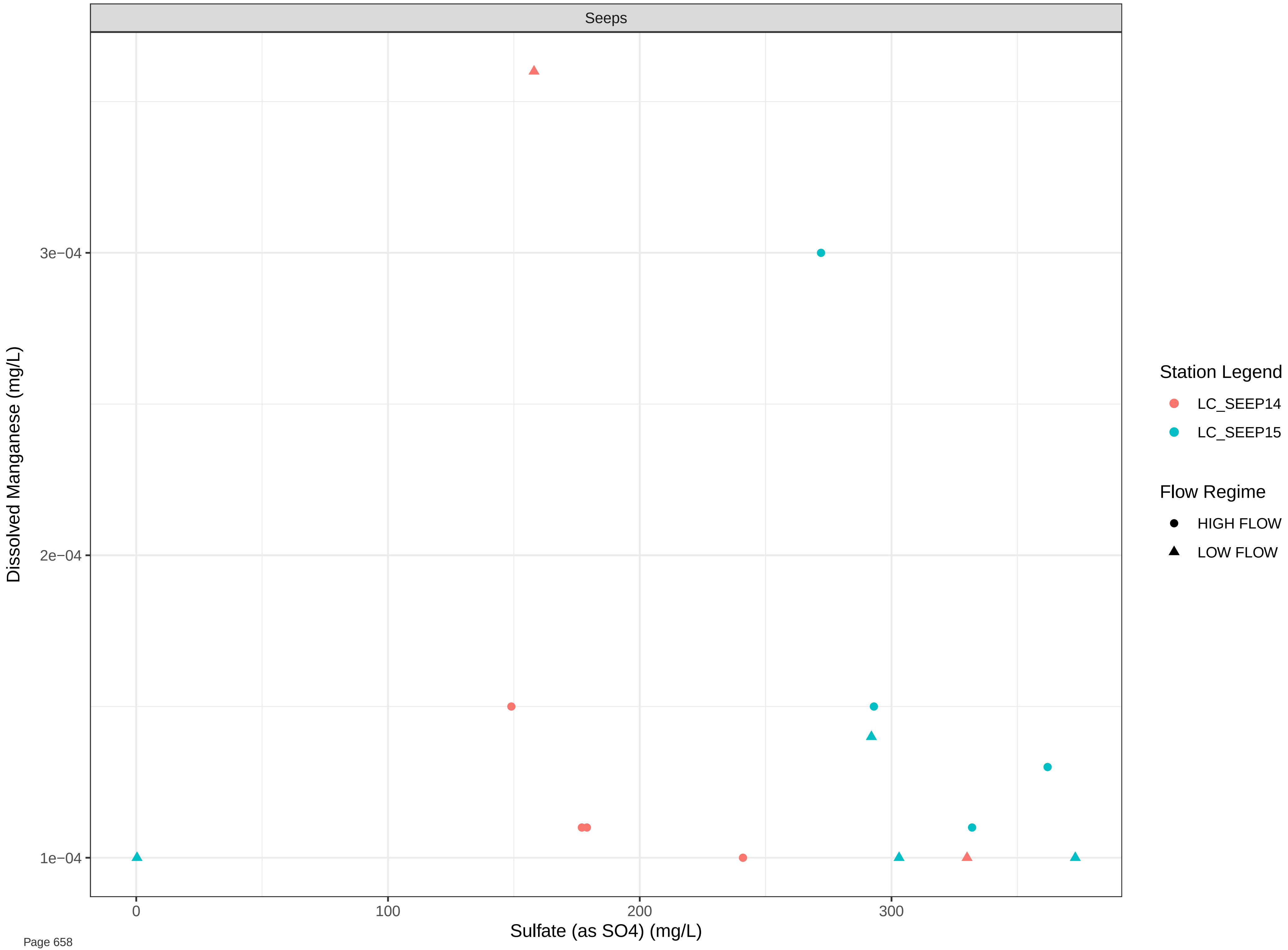

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
100
150
200
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

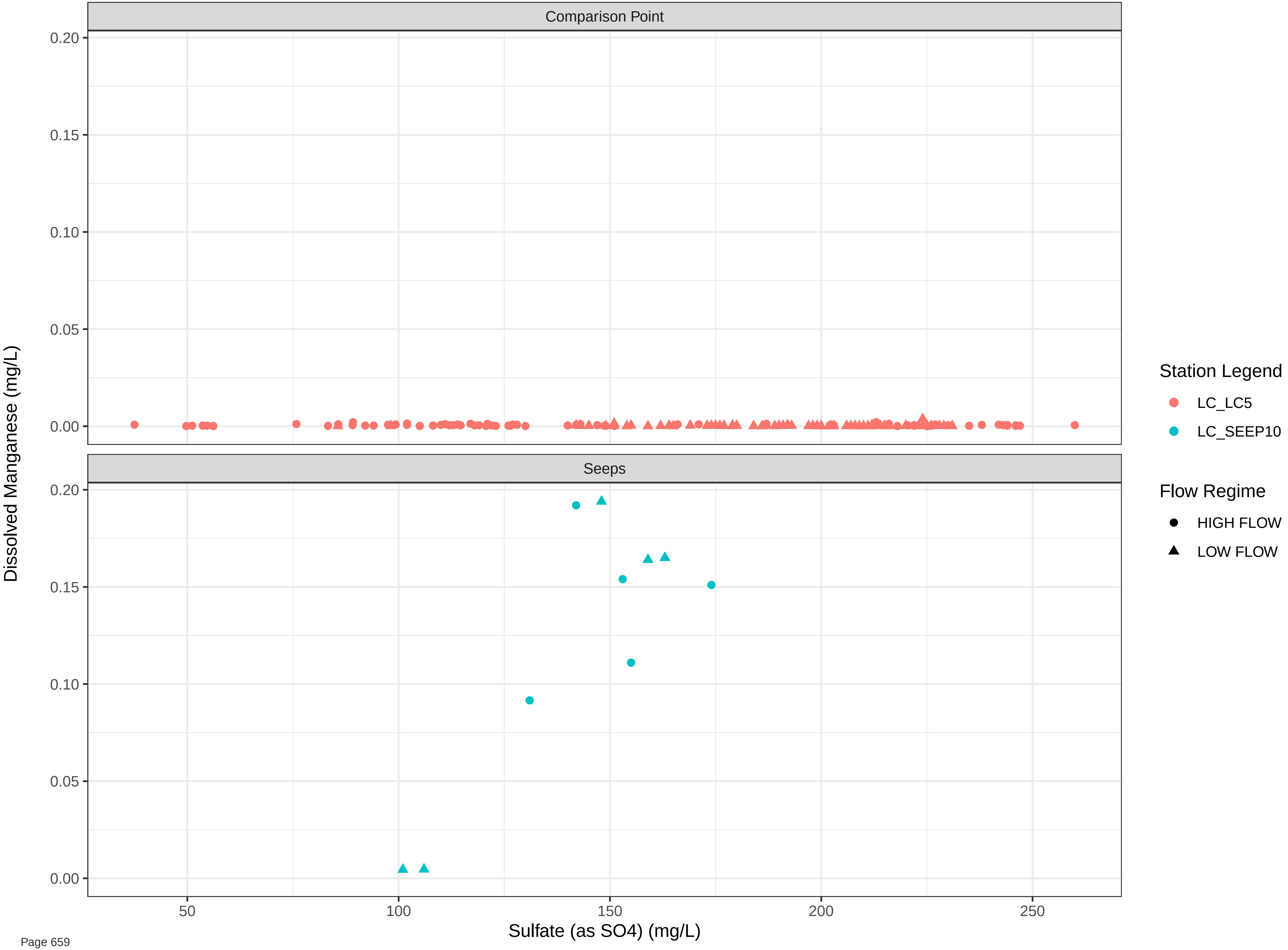


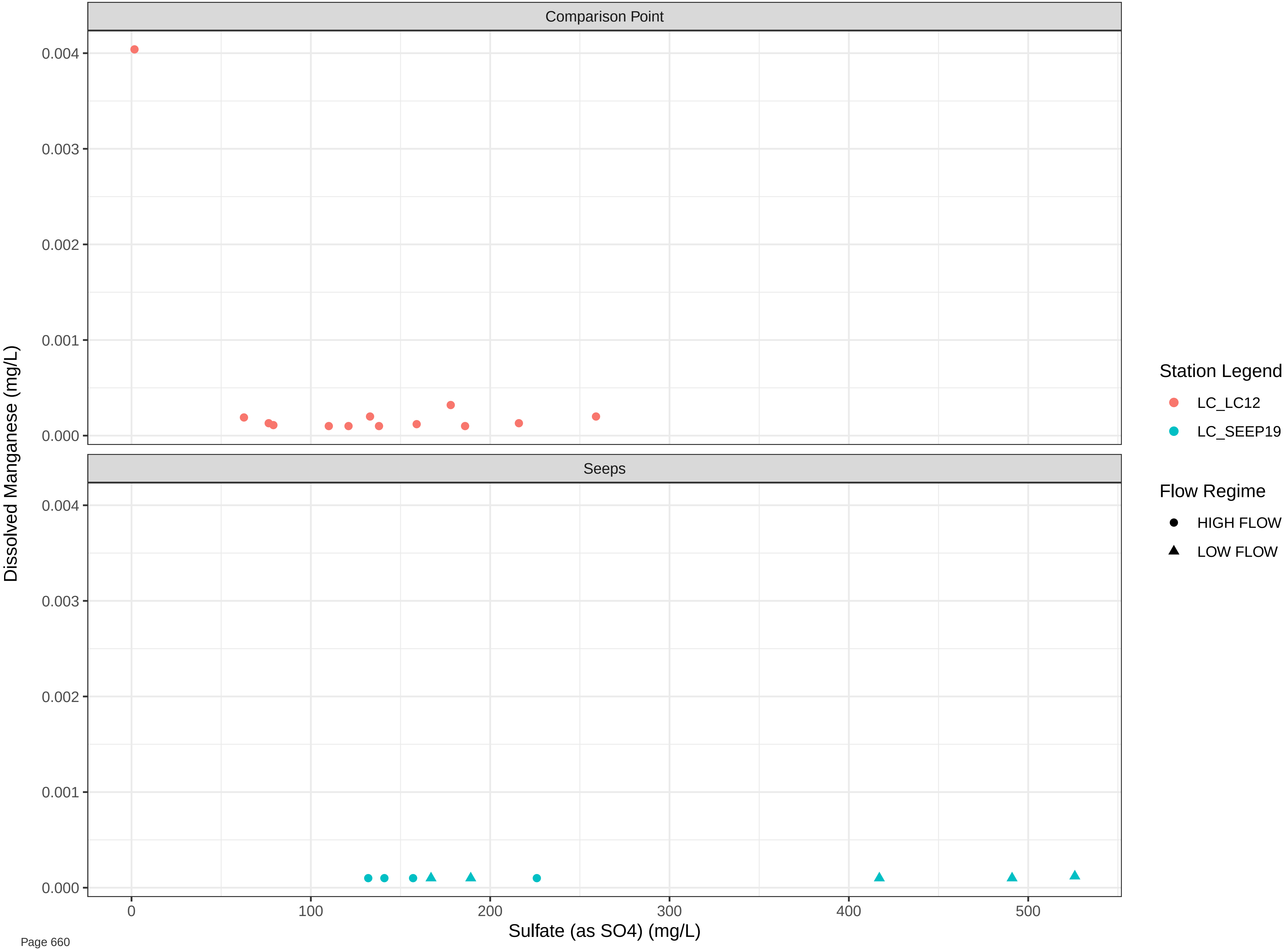
Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00
0.01
0.02
0.03
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

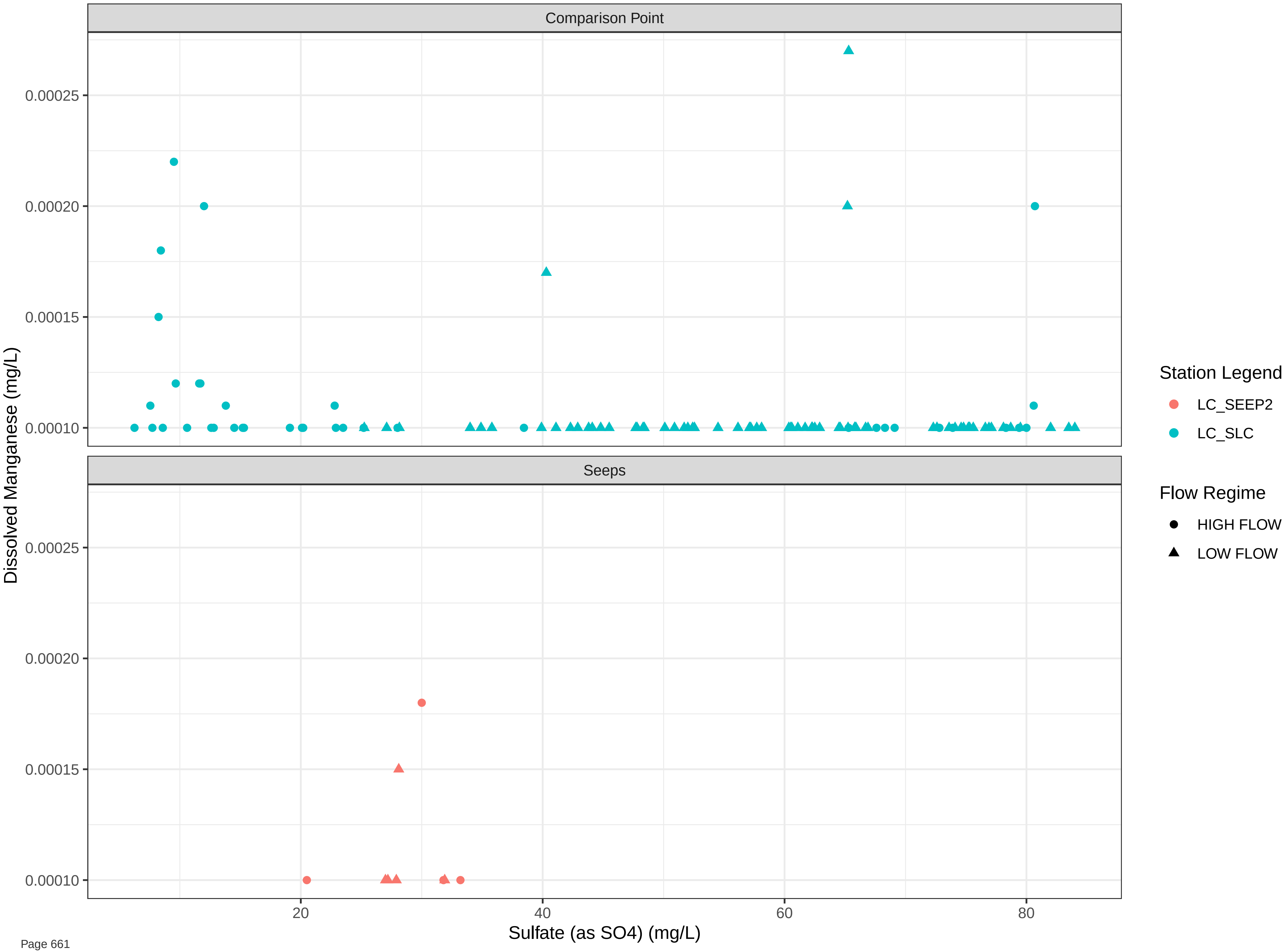


Seeps
0.15
0.10
0.05
0.00
Dissolved Manganese (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

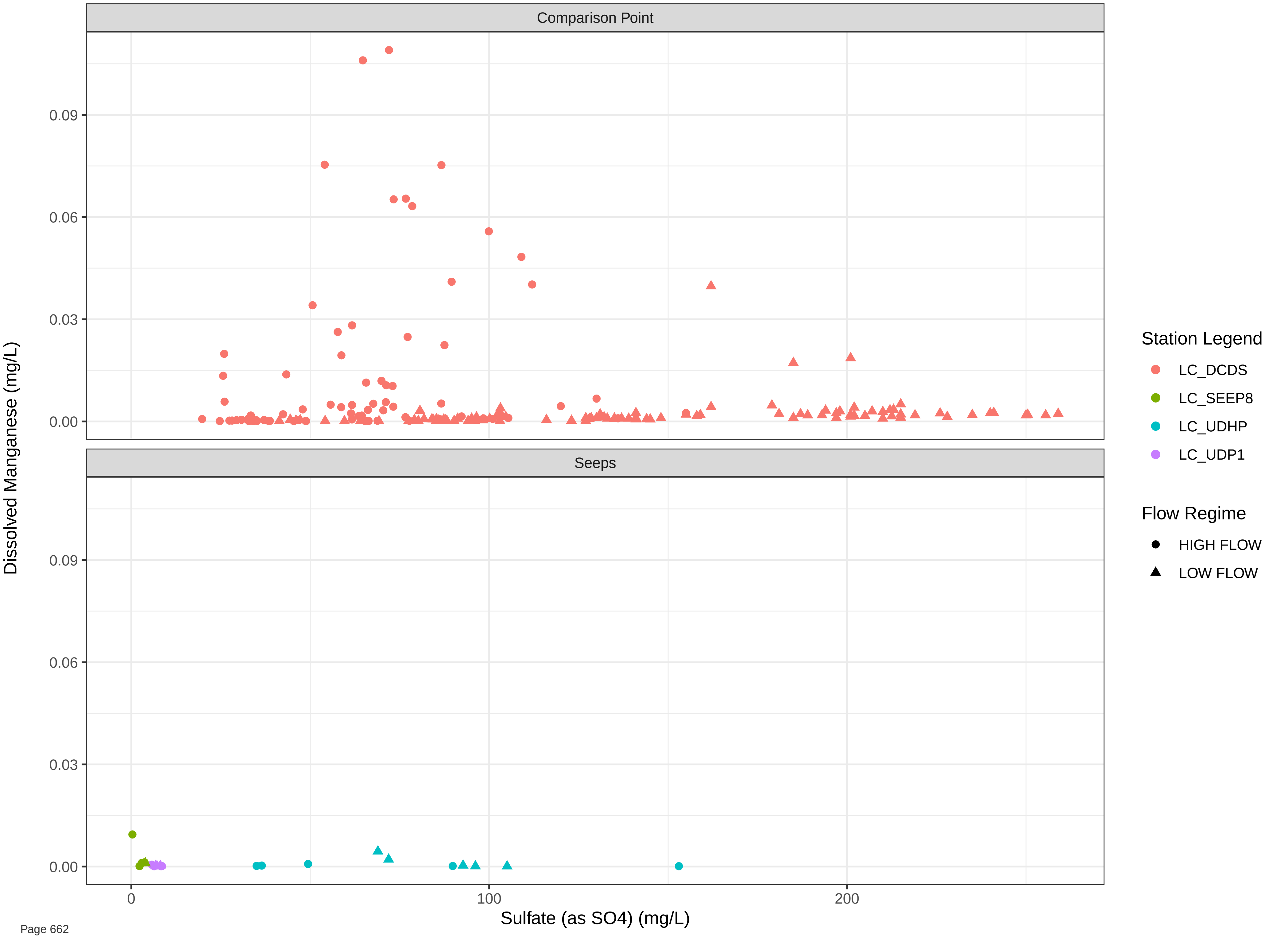

Seeps
Dissolved Manganese (mg/L)
3e−04
2e−04
1e−04
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

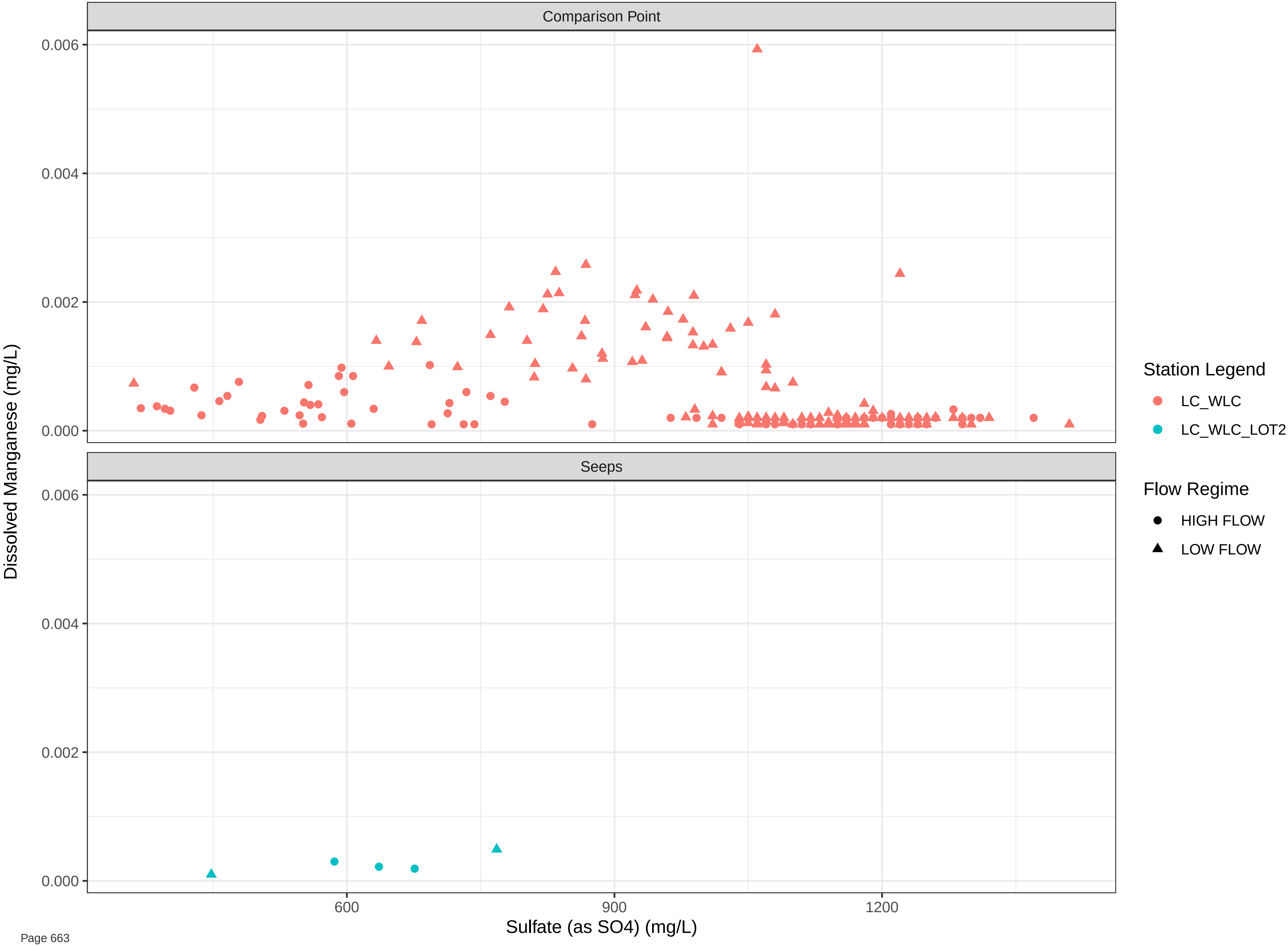

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.20
0.15
0.10
0.05
0.00
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.004
0.003
0.002
0.001
0.000
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

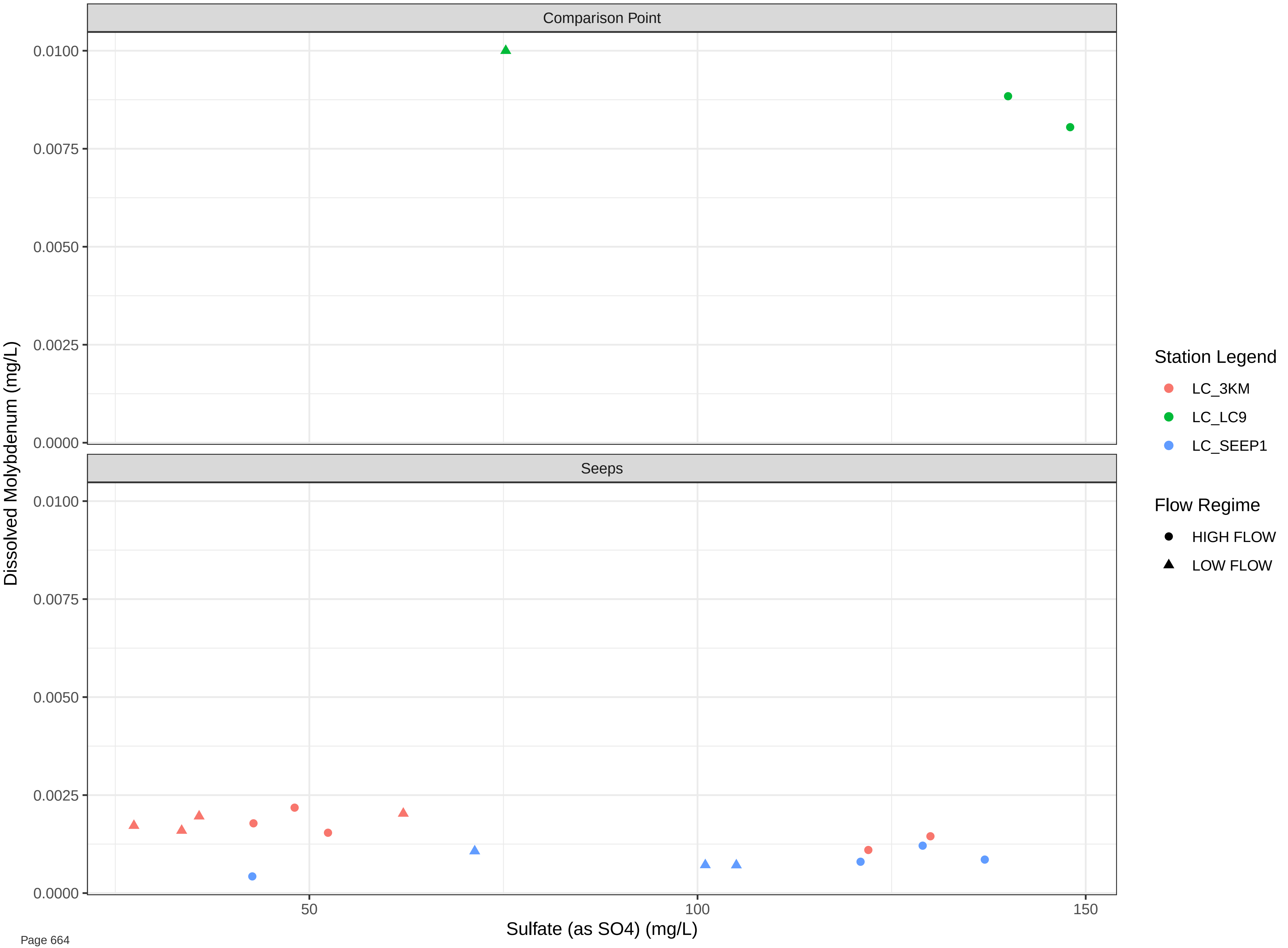


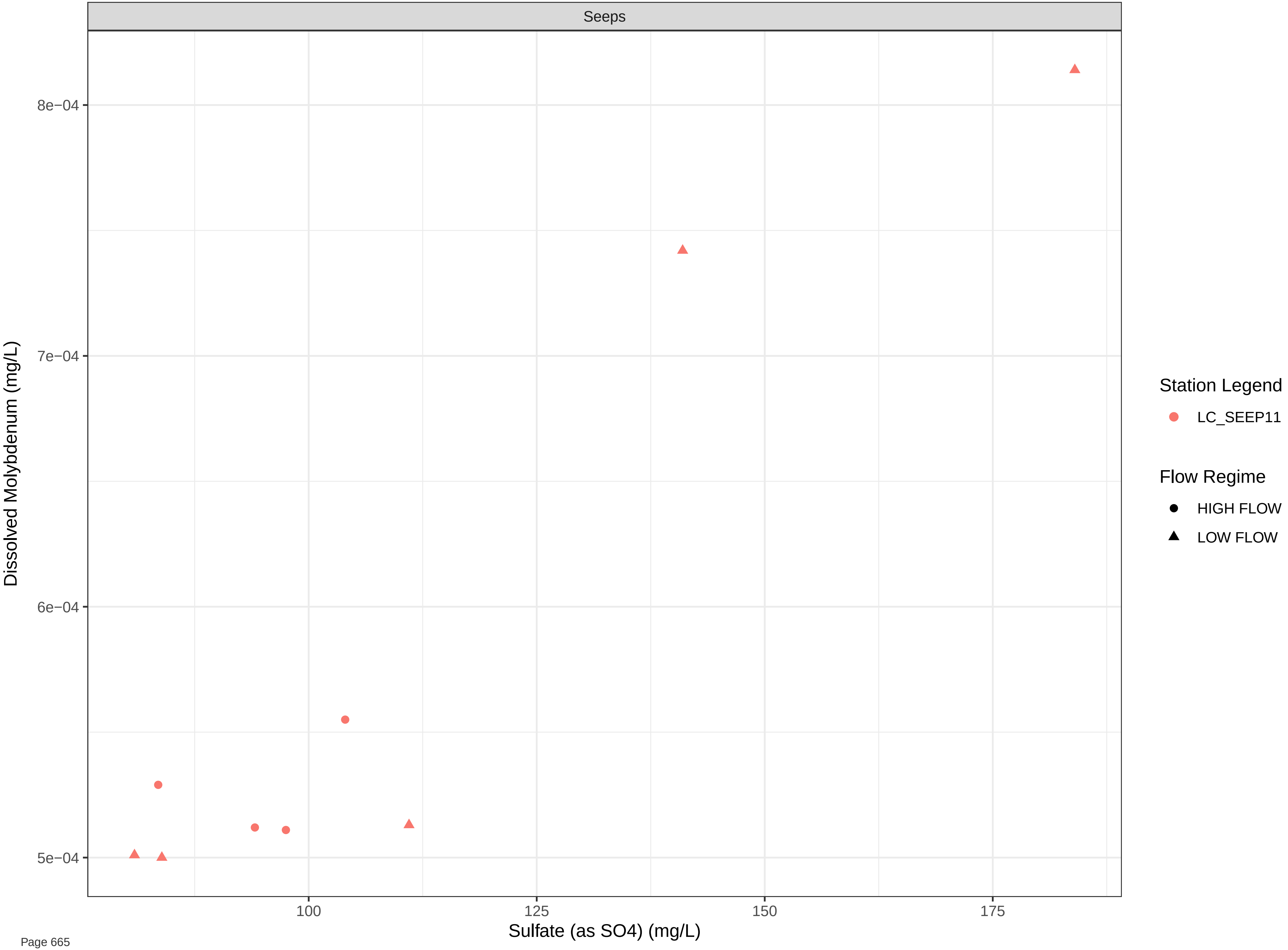
Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00025
0.00020
0.00015
0.00010
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00
0.03
0.06
0.09
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

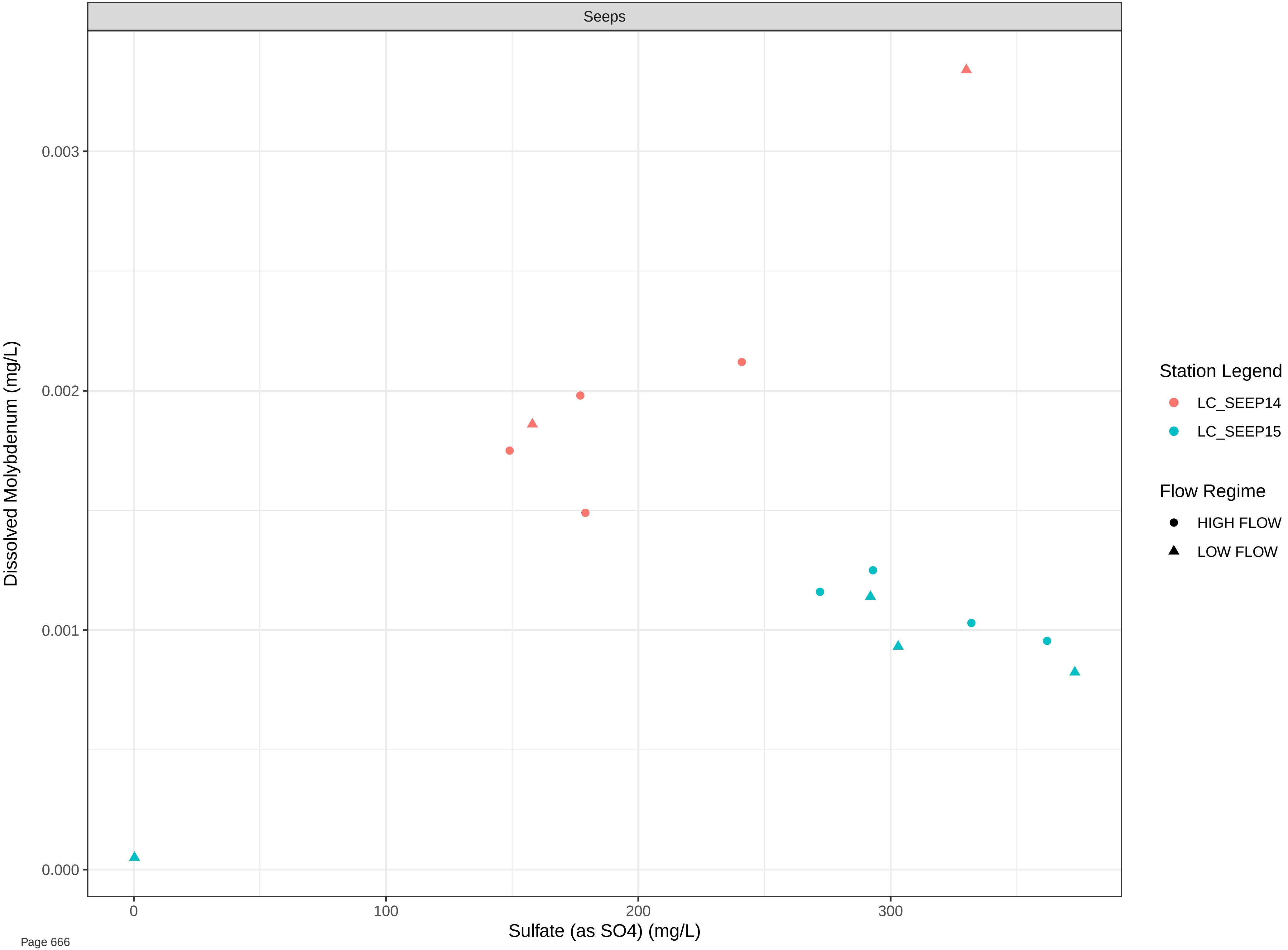


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.006
0.004
0.002
0.000
Sulfate (as SO4) (mg/L)
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

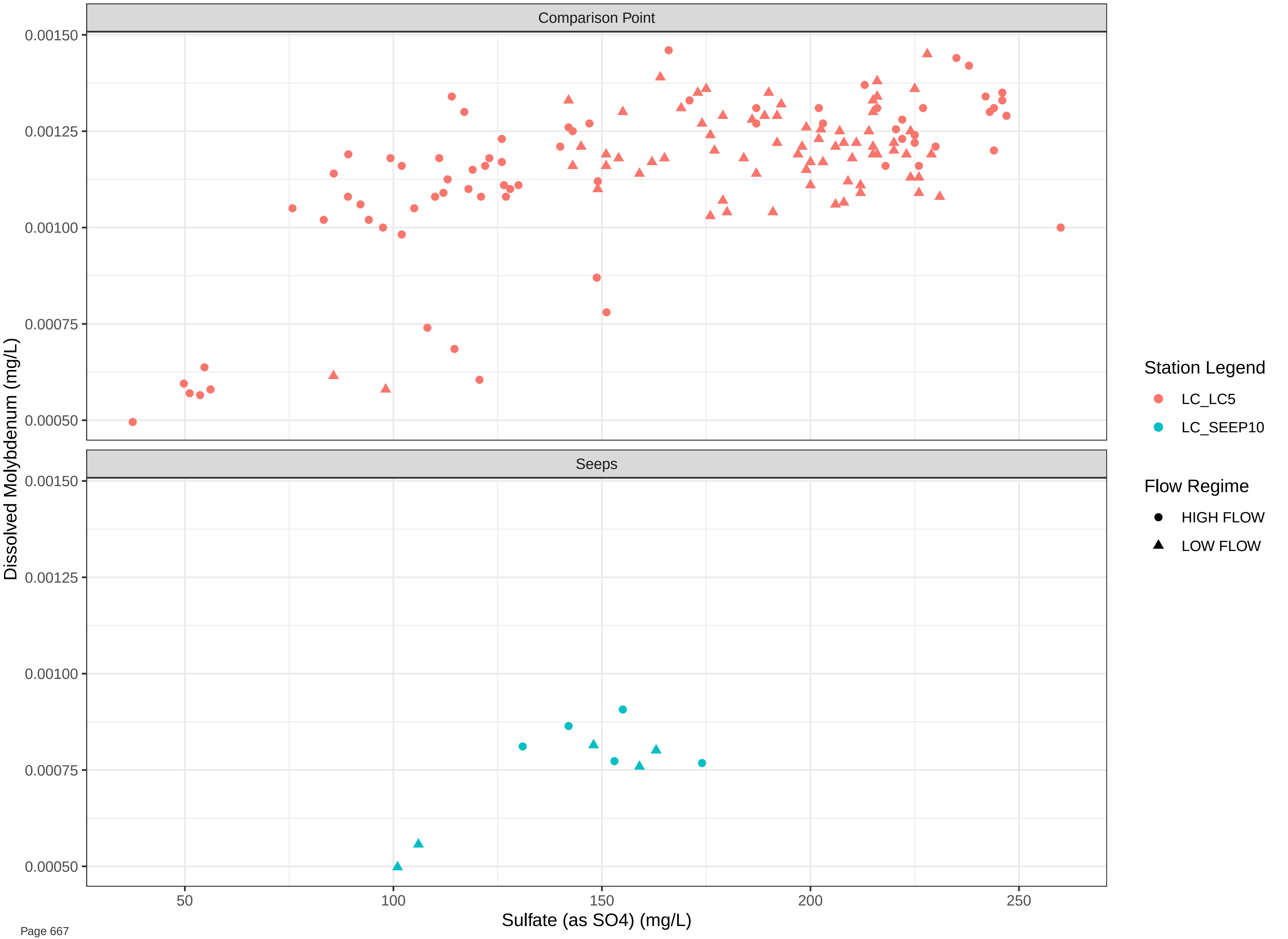

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.0000
0.0025
0.0050
0.0075
0.0100
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



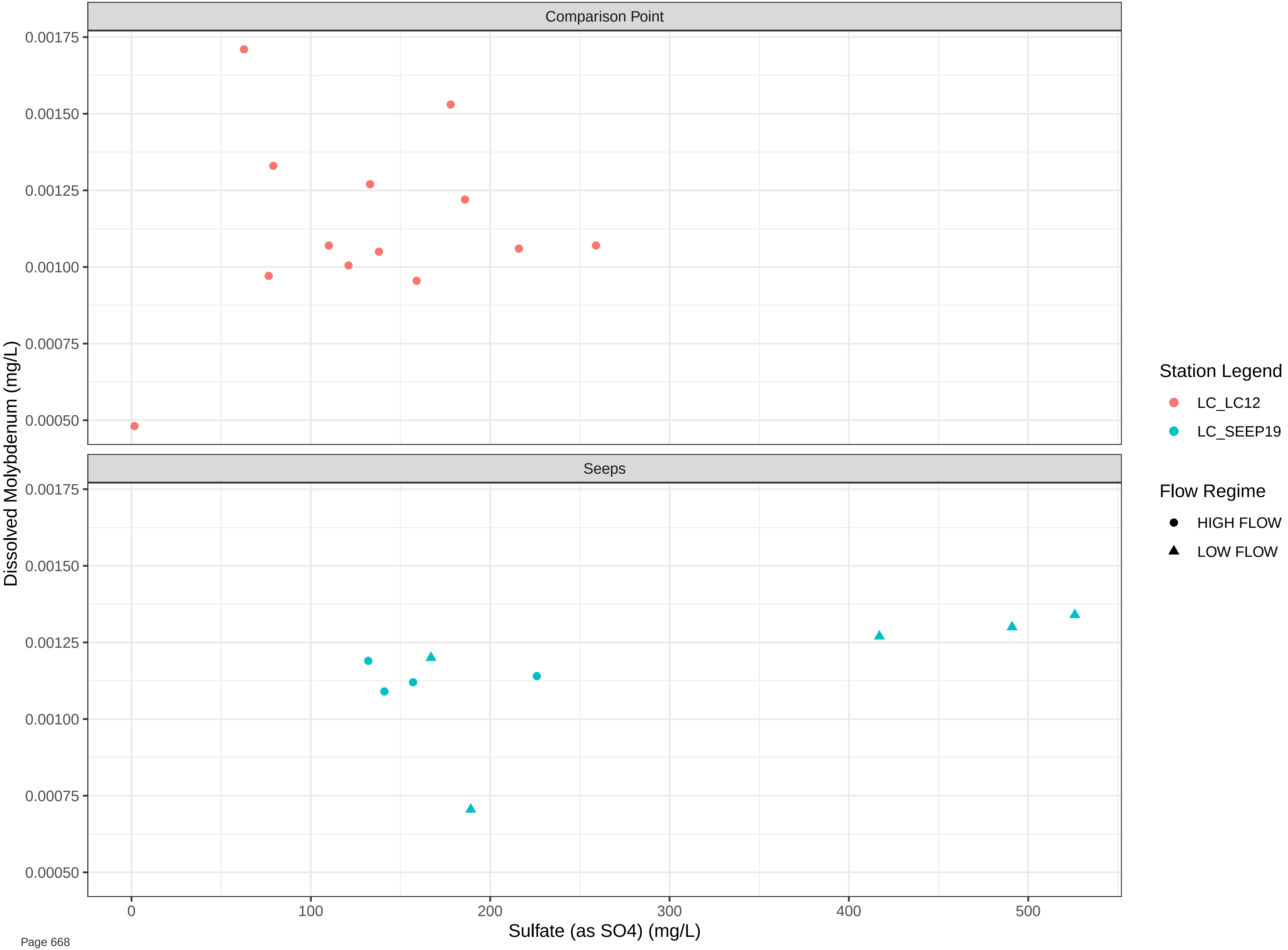
Seeps
Dissolved Molybdenum (mg/L)
8e−04
7e−04
6e−04
5e−04
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



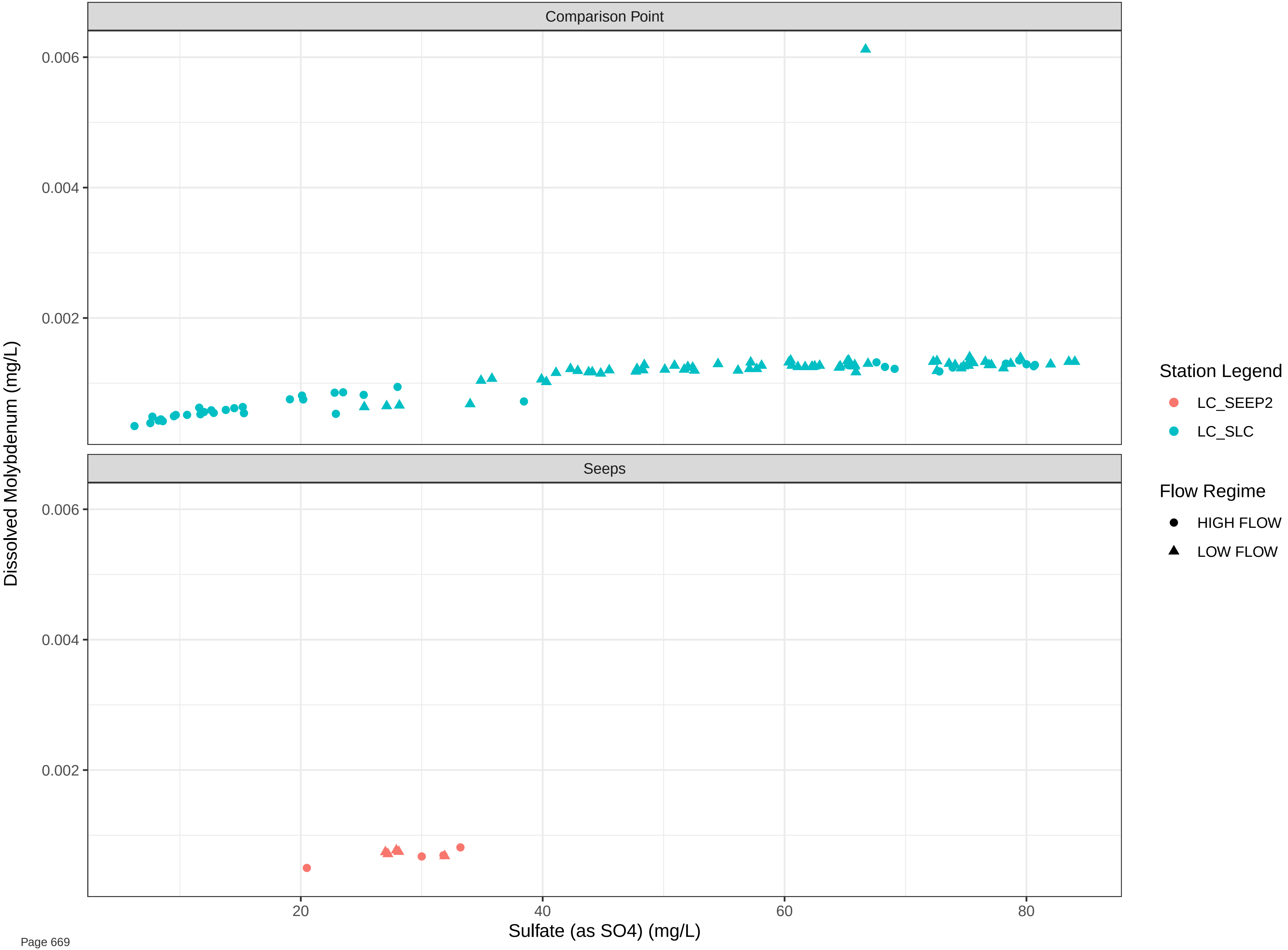
Seeps
Dissolved Molybdenum (mg/L)
0.003
0.002
0.001
0.000
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



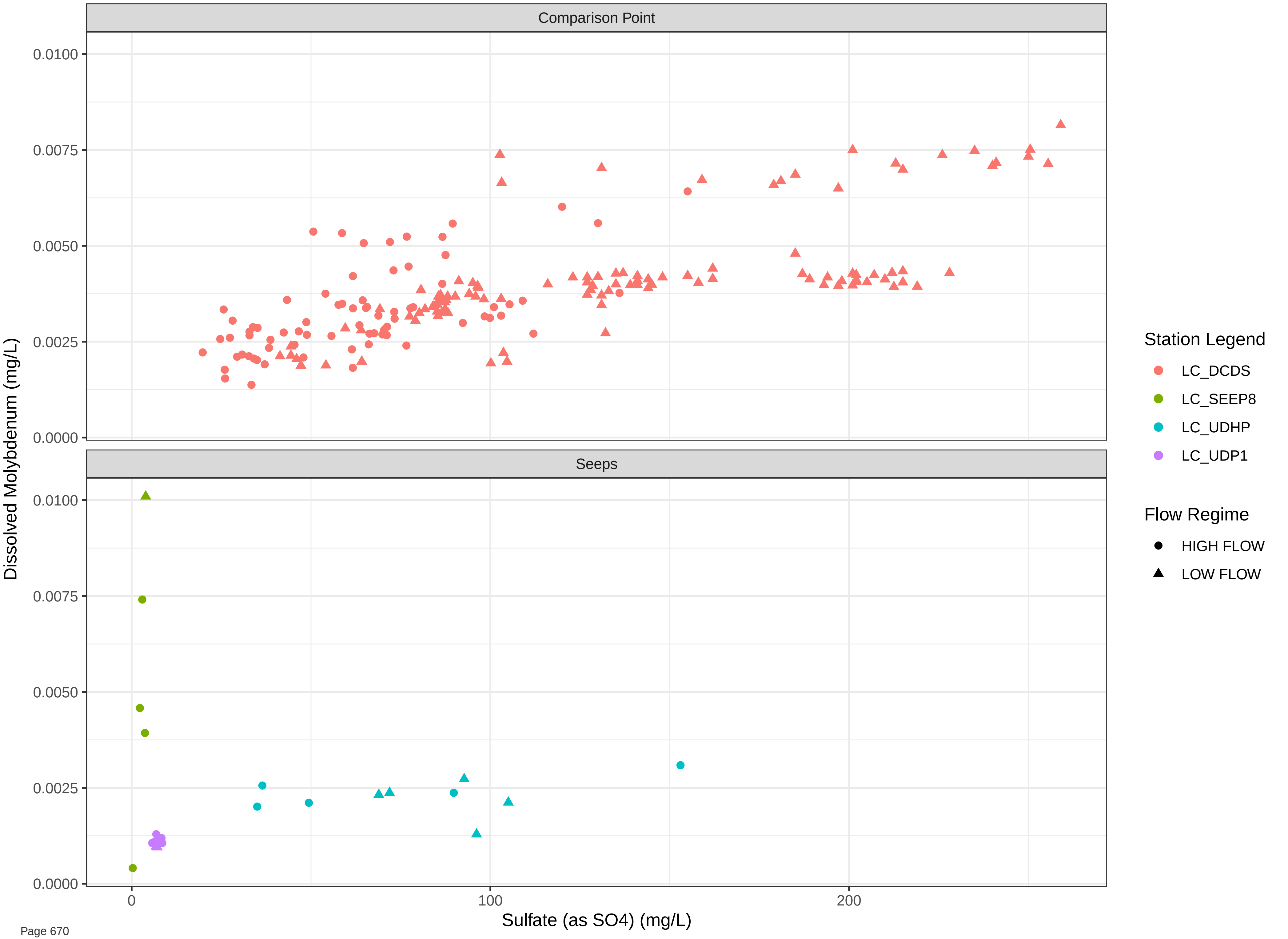
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.00150
0.00125
0.00100
0.00075
0.00050
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



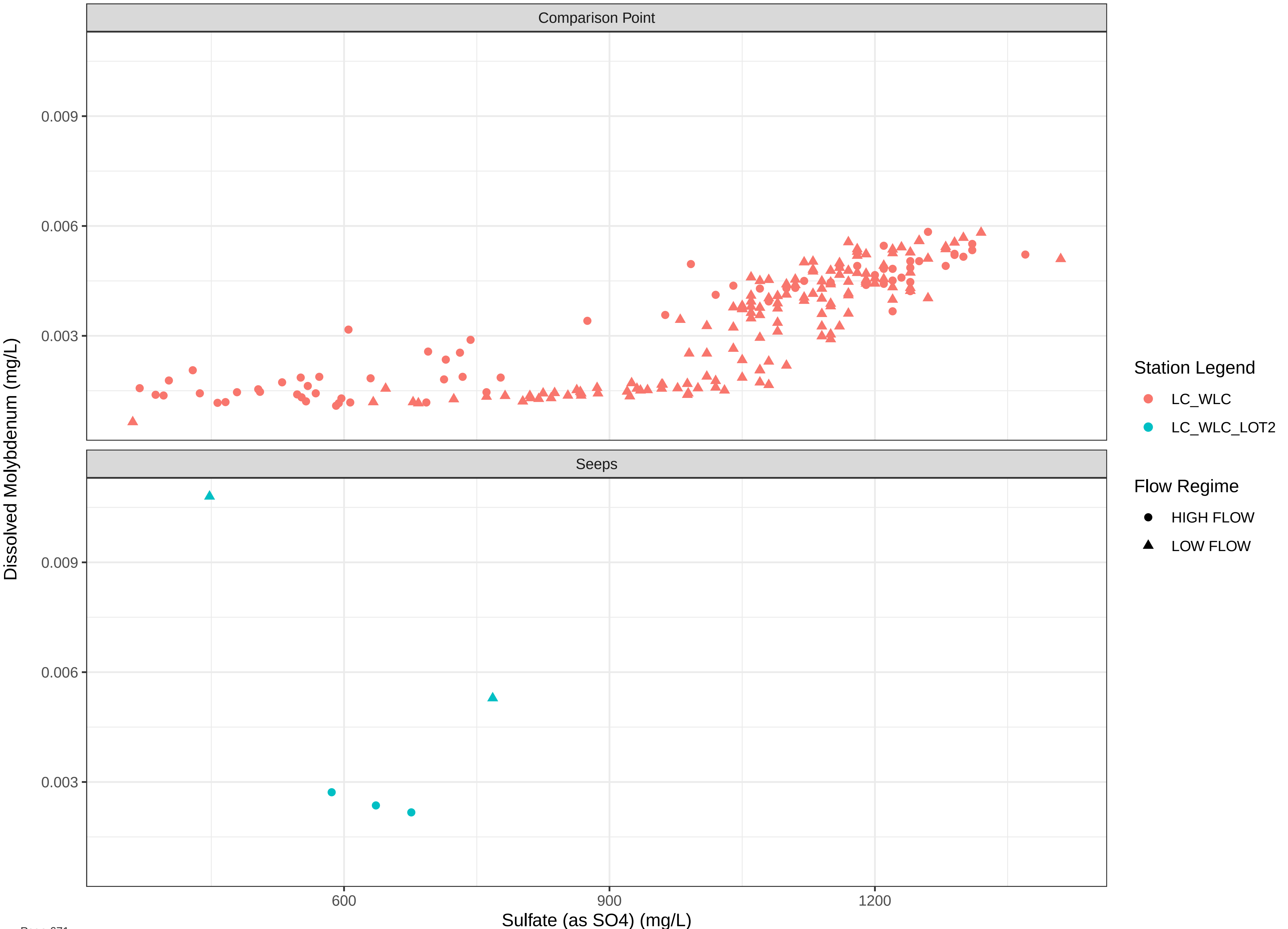
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
0.00050
0.00075
0.00100
0.00125
0.00150
0.00175
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

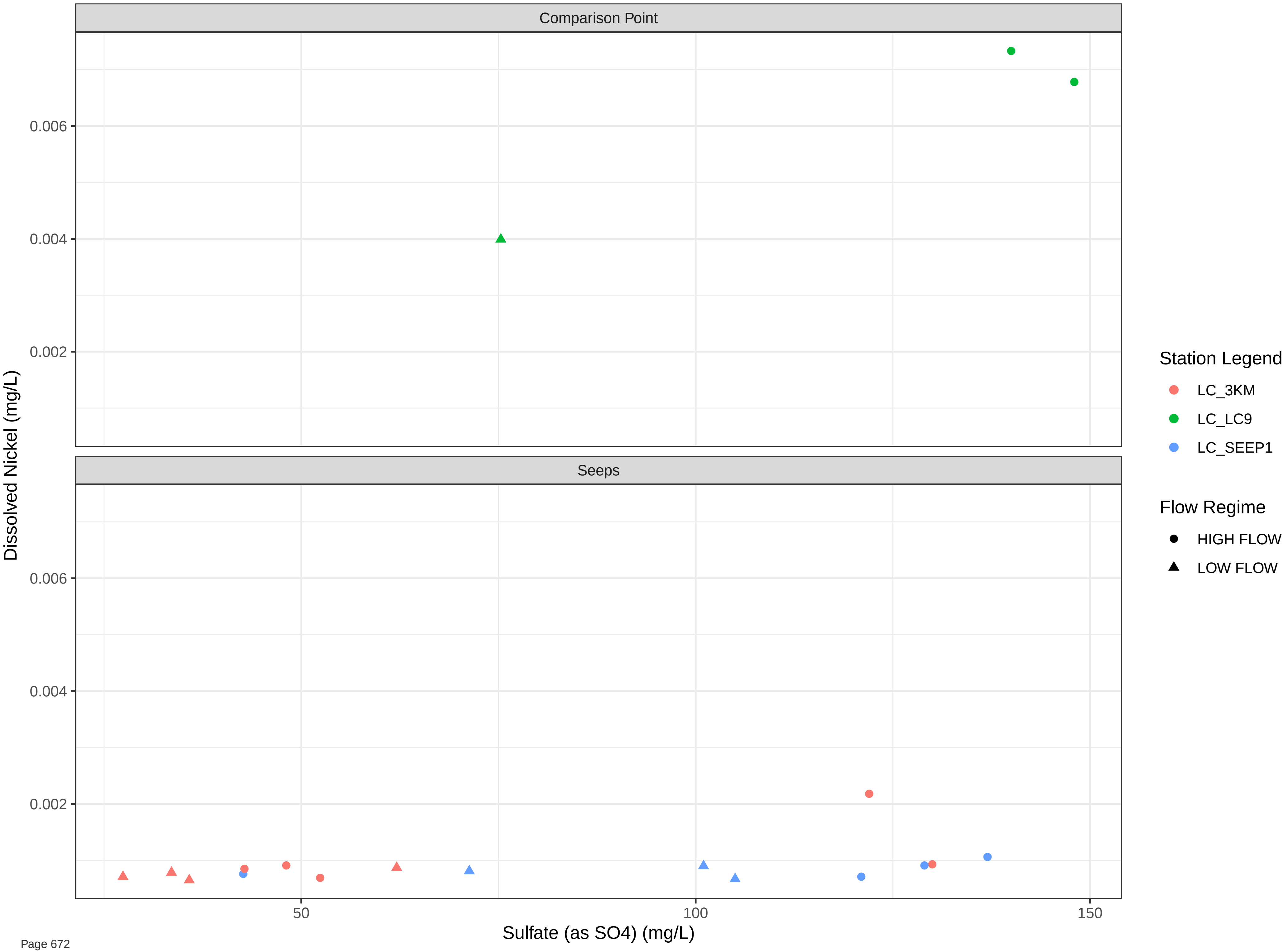


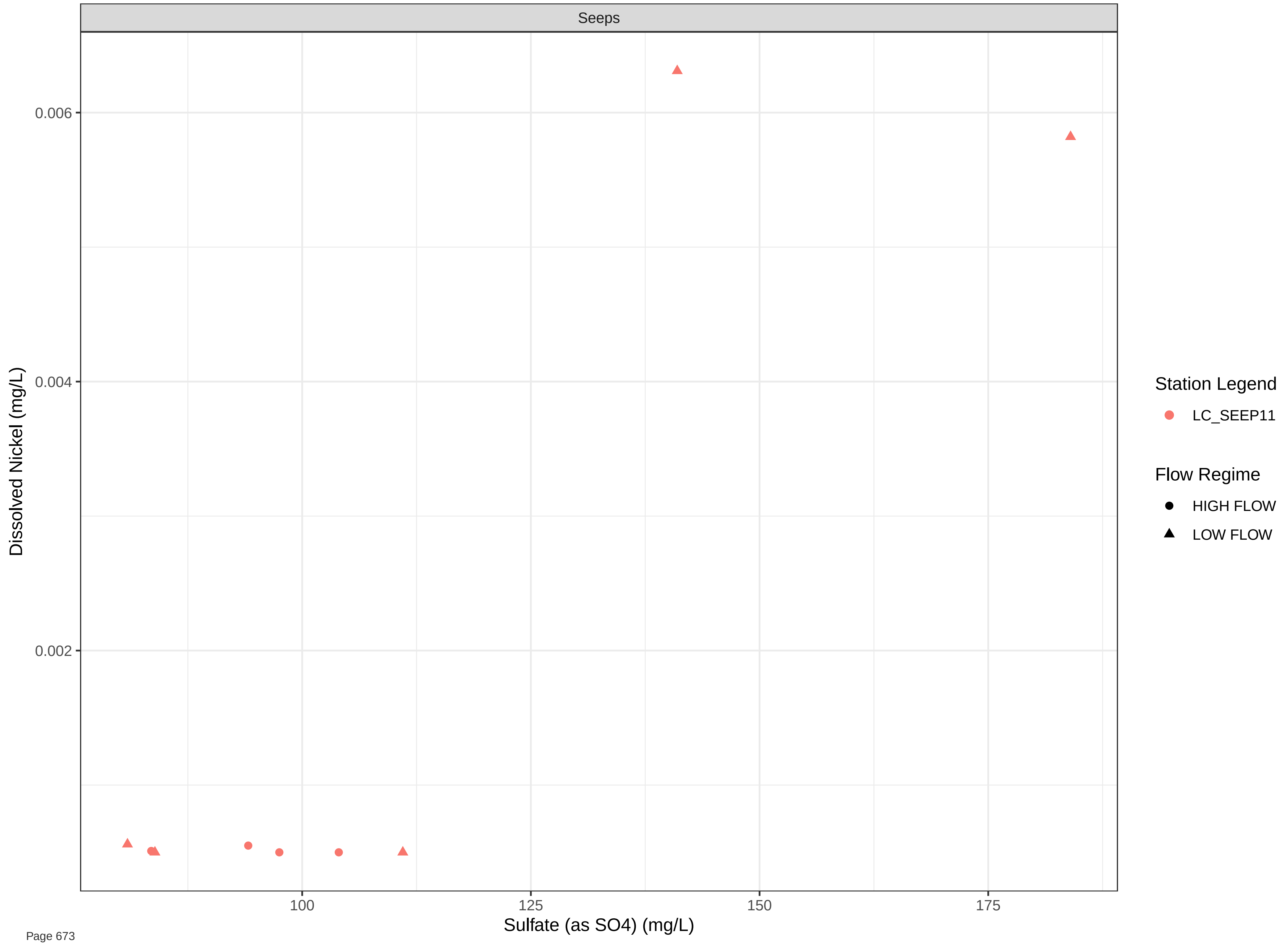
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.006
0.004
0.002
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

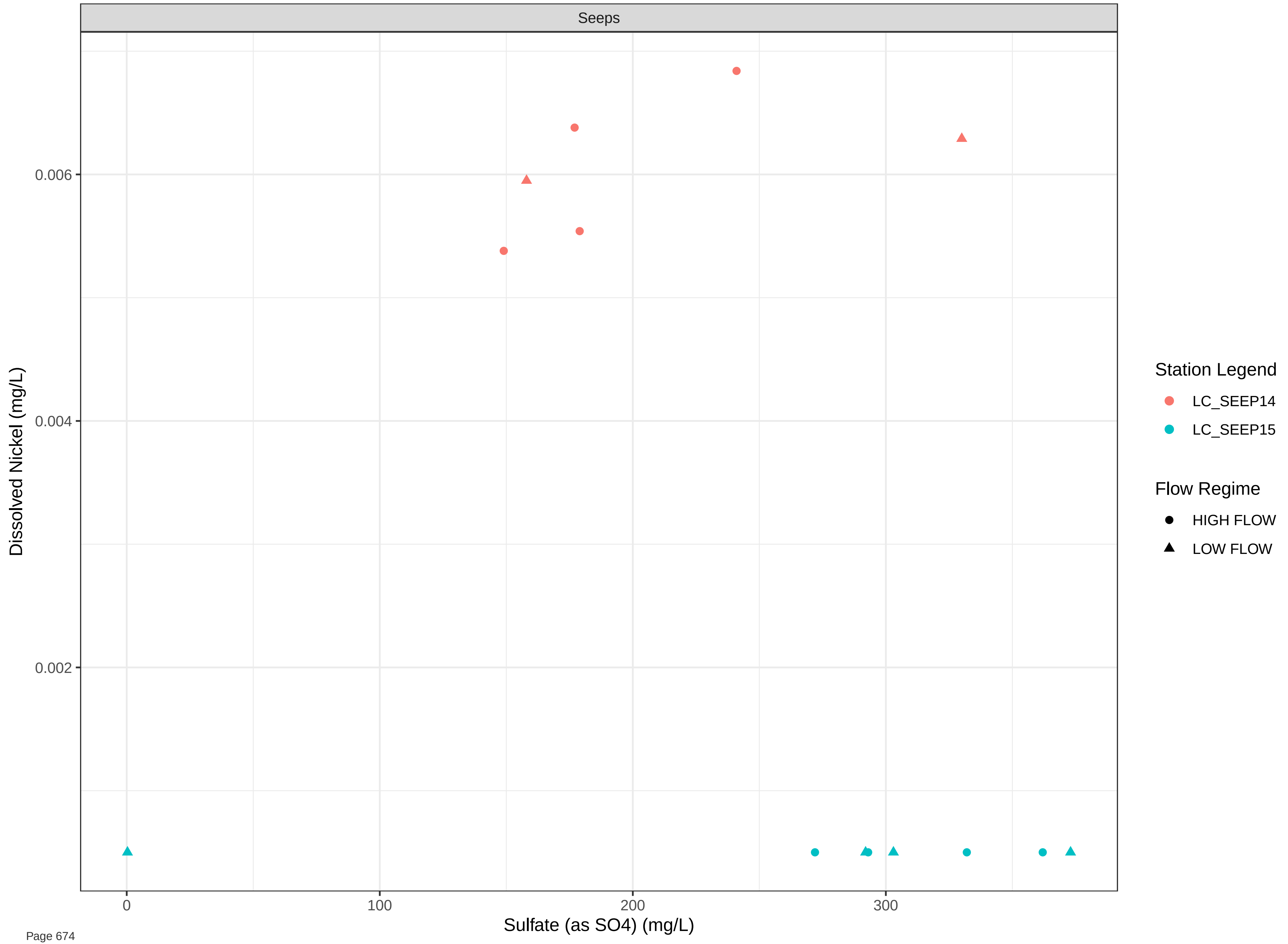


Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
0
100
200
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

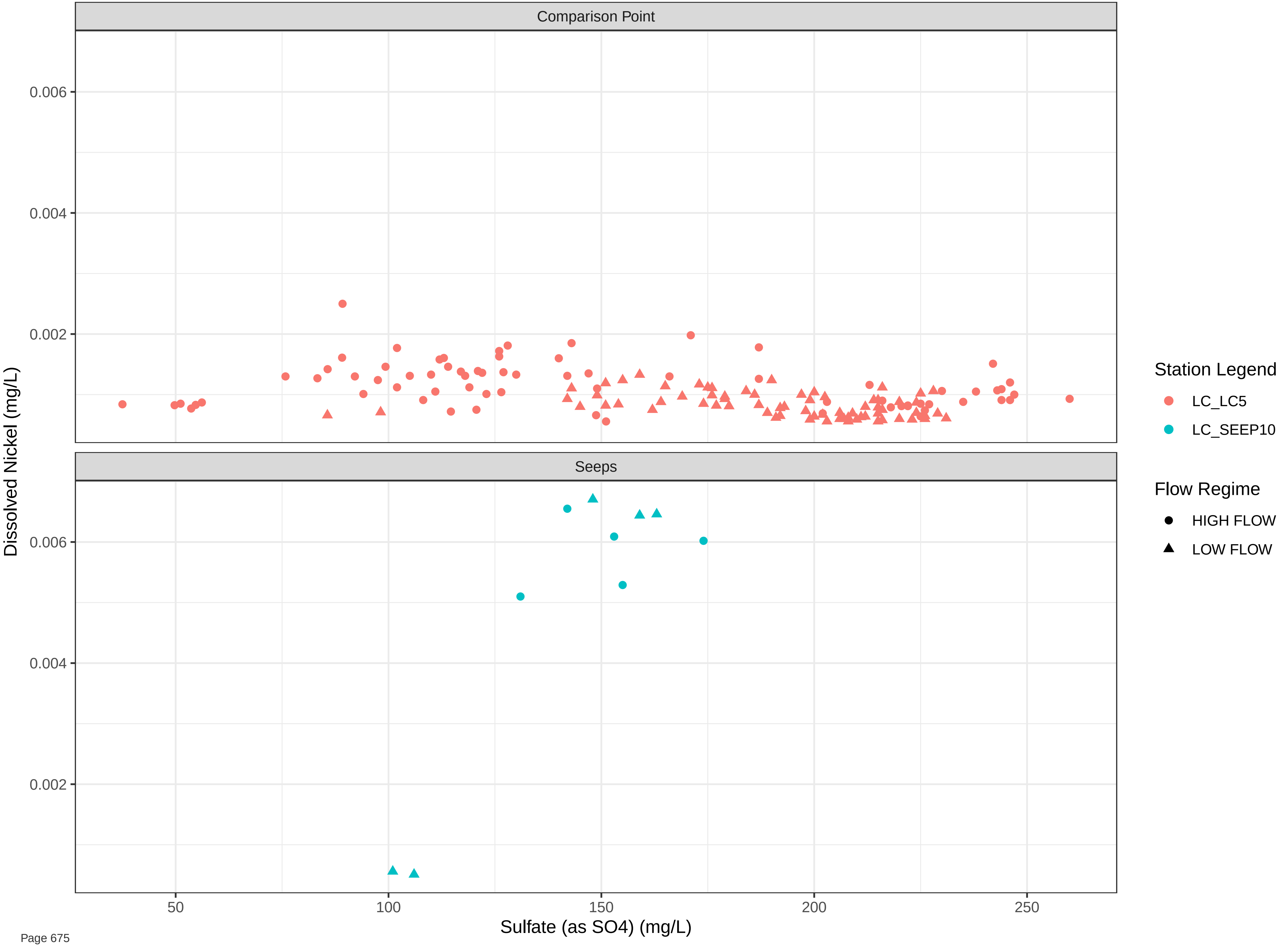

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.009
0.006
0.003
Sulfate (as SO4) (mg/L)
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.006
0.004
0.002
0.006
0.004
0.002
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

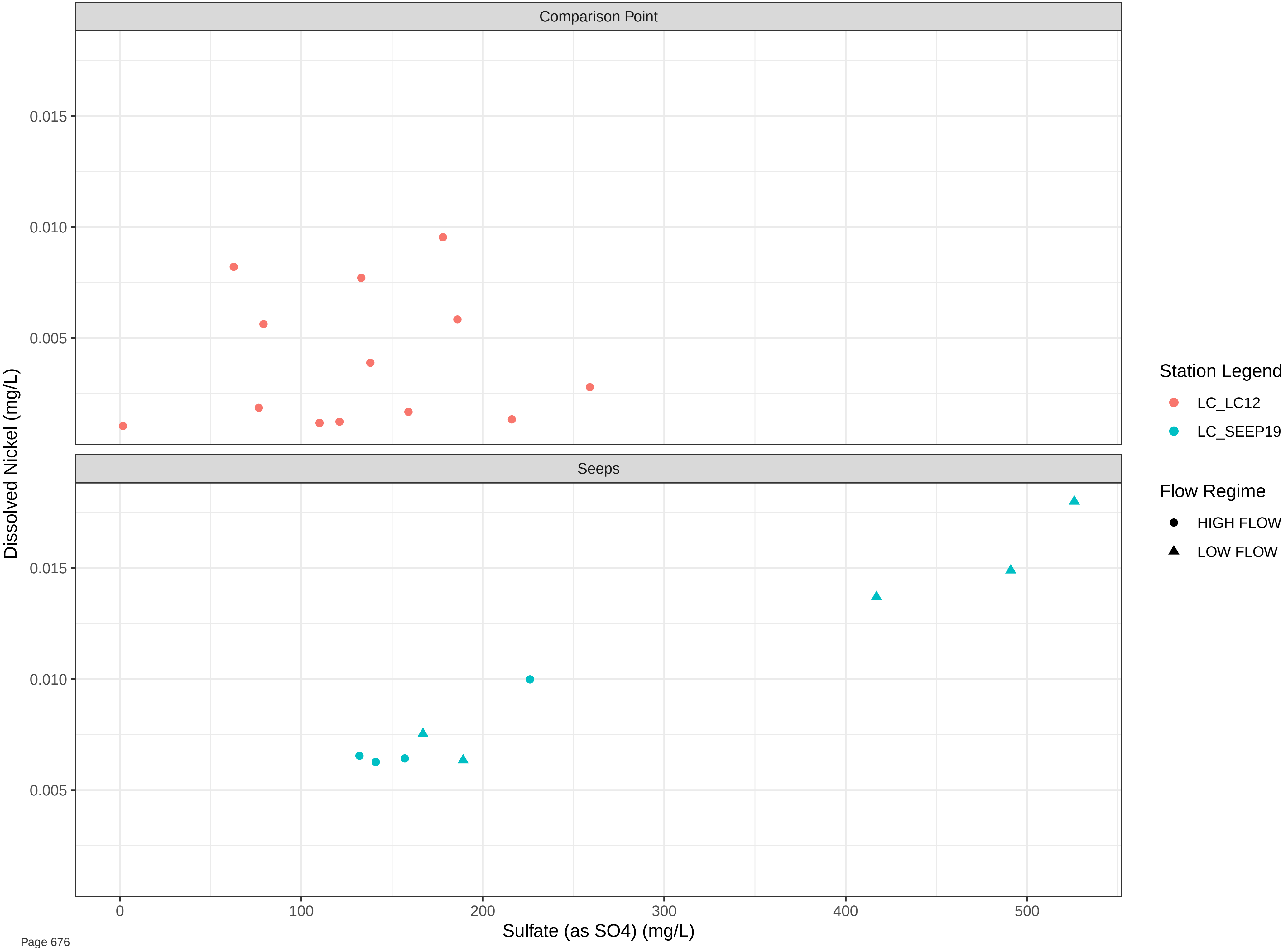

Seeps
0.006
0.004
0.002
100
125
150
175
Dissolved Nickel (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

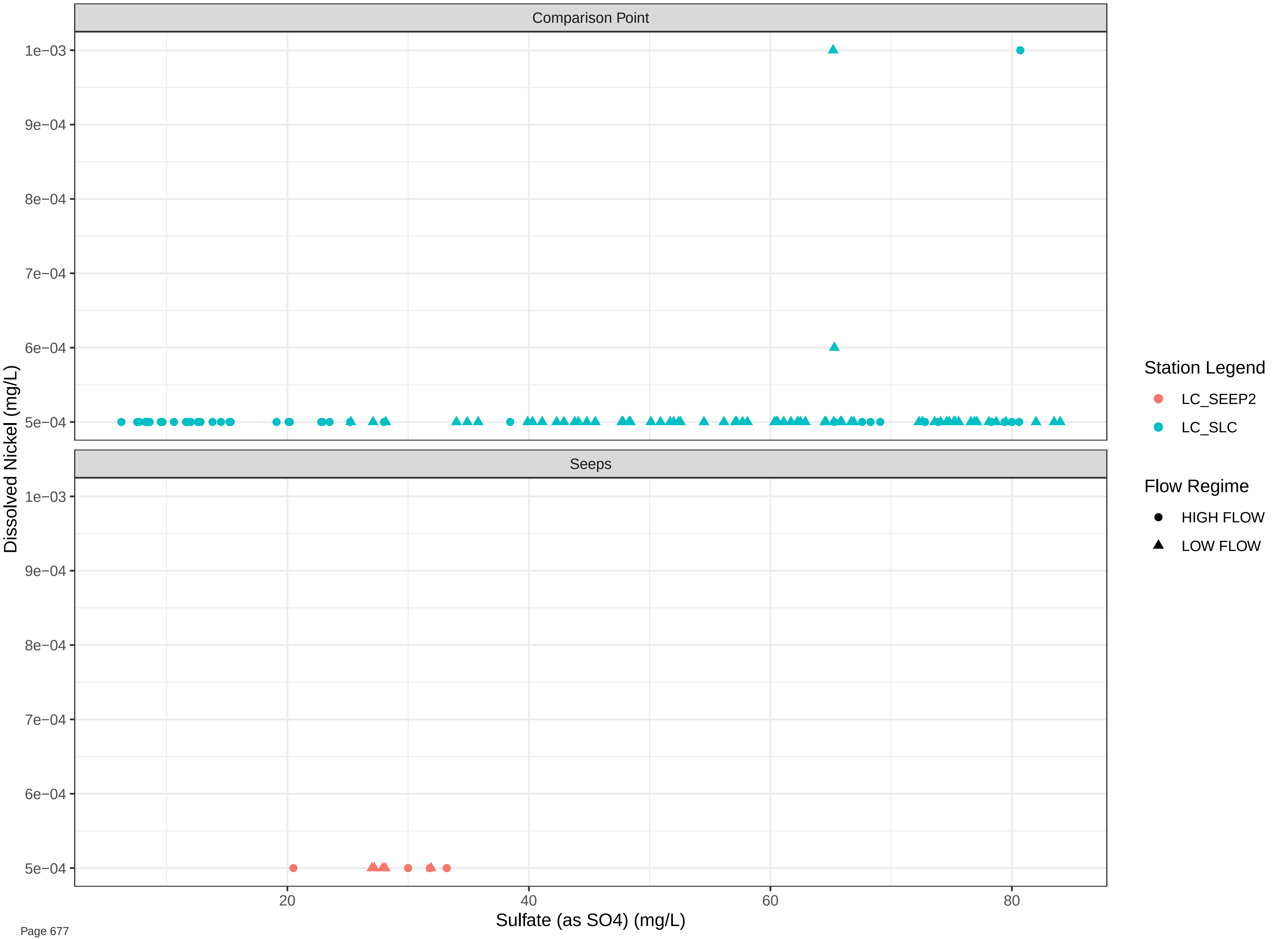


Seeps
0.006
0.004
0.002
0
100
200
300
Sulfate (as SO4) (mg/L)
Dissolved Nickel (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

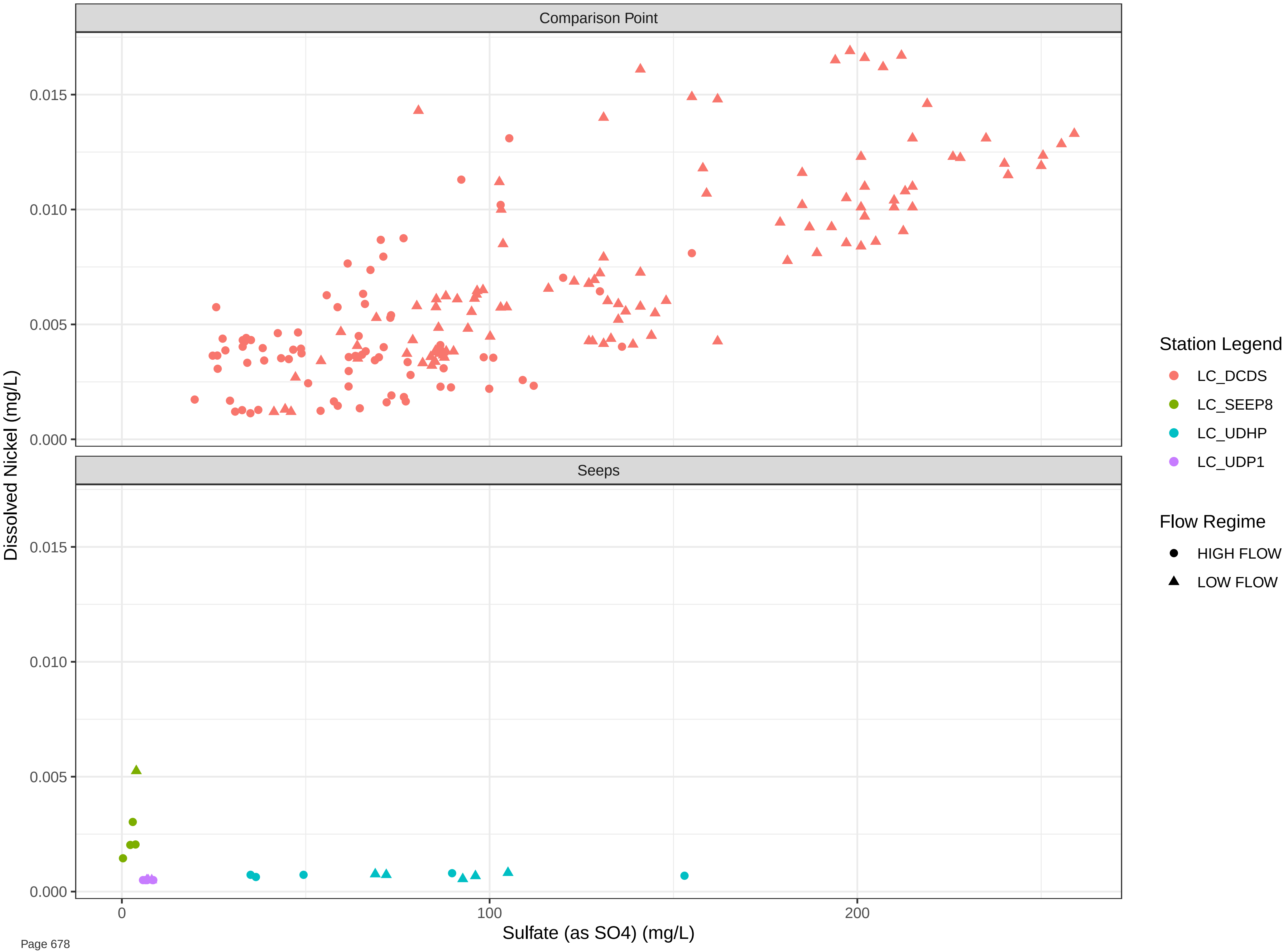


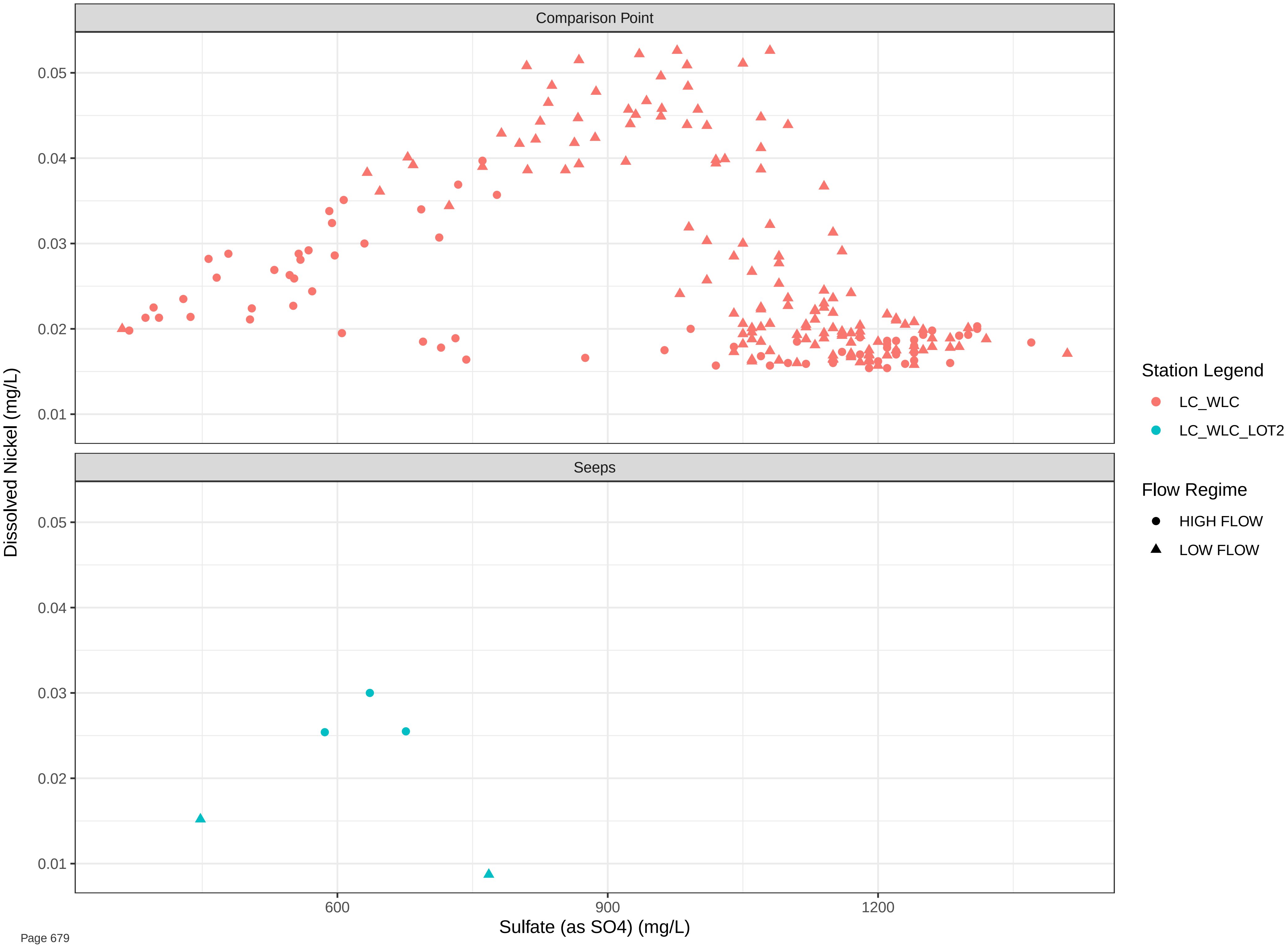
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.006
0.004
0.002
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.015
0.010
0.005
0
100
200
300
400
500
Dissolved Nickel (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

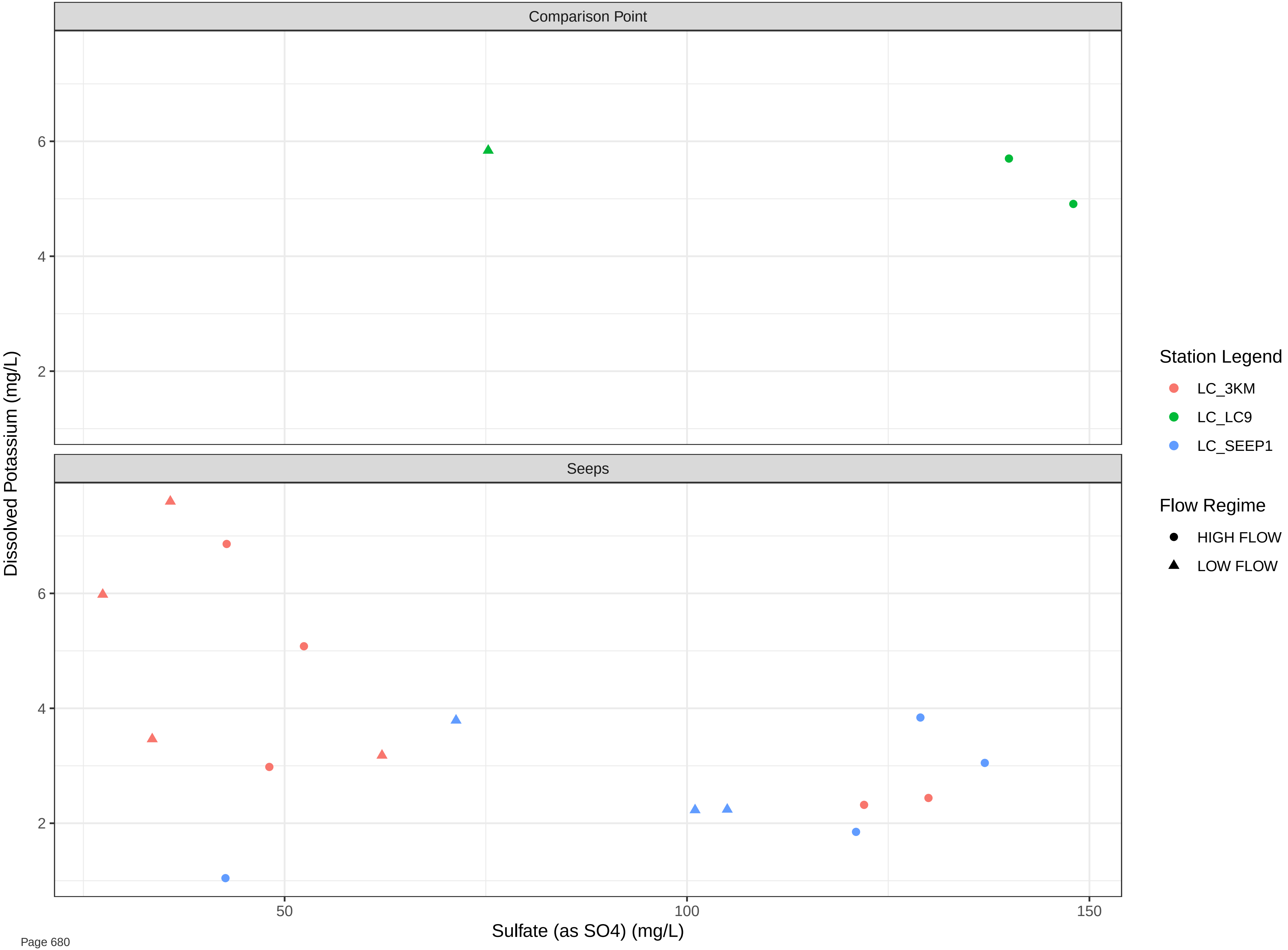


Comparison Point
Seeps
Dissolved Nickel (mg/L)
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

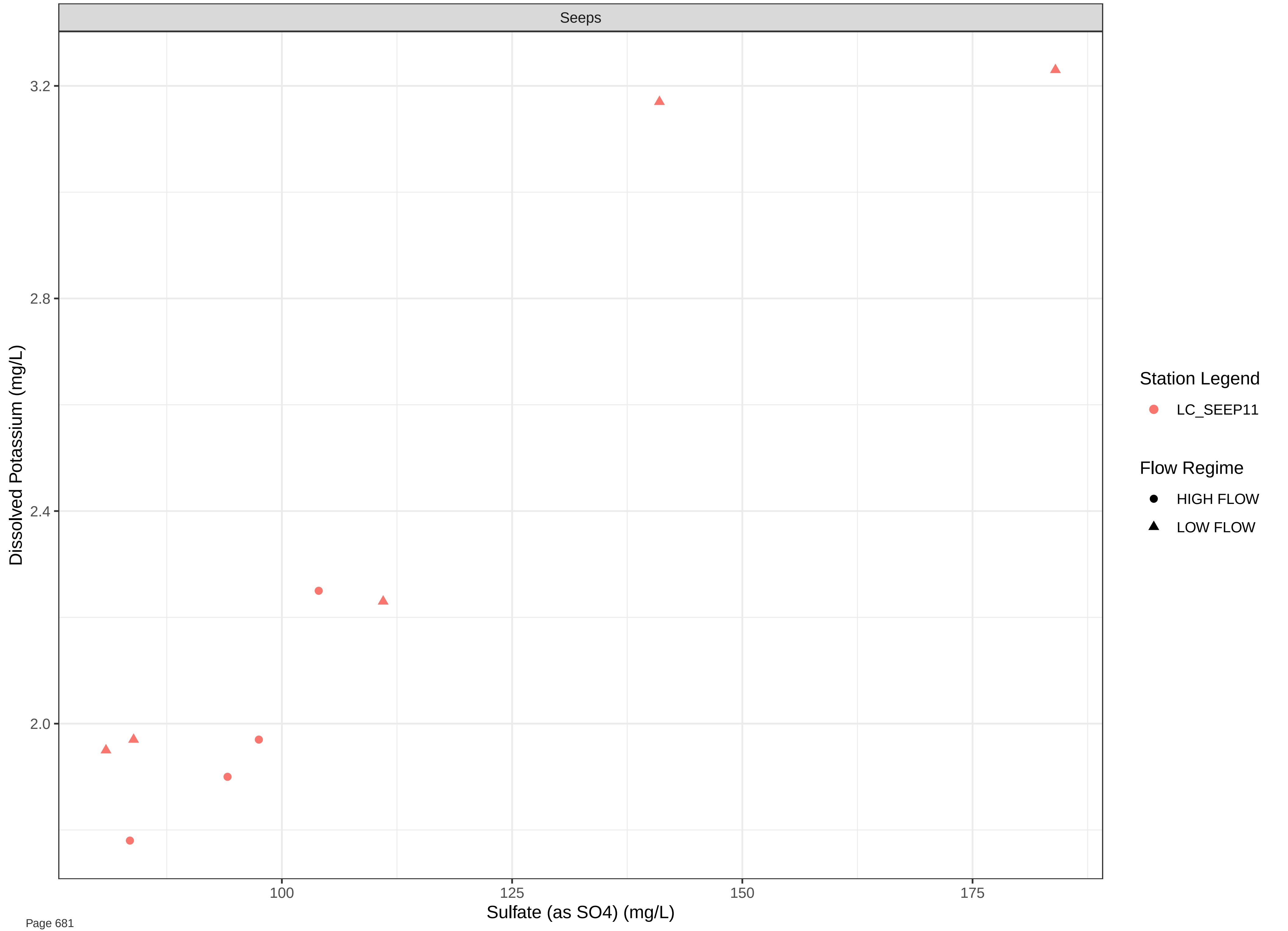

Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.000
0.005
0.010
0.015
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

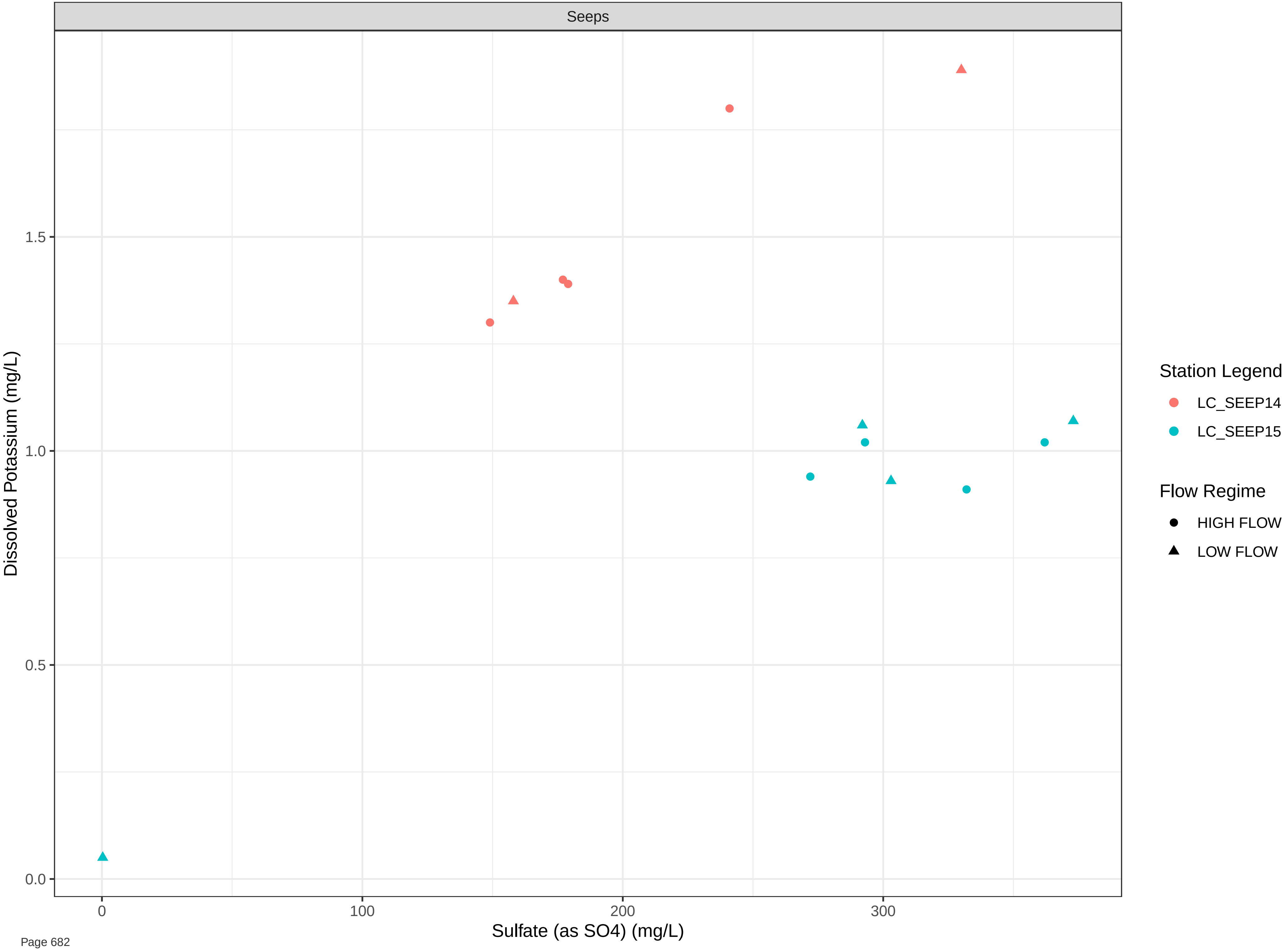


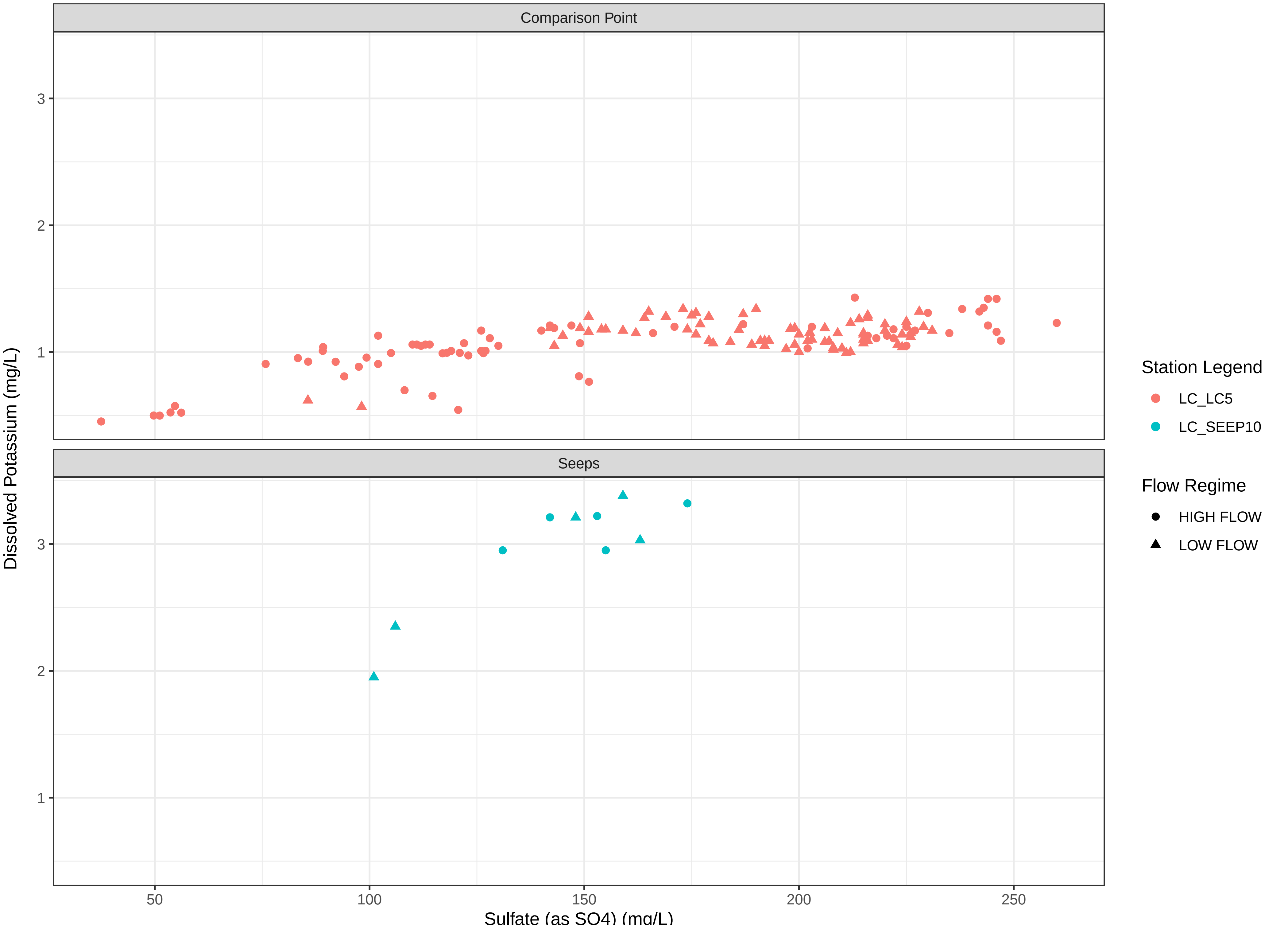
Comparison Point
Seeps
Dissolved Nickel (mg/L)
Sulfate (as SO4) (mg/L)
0.05
0.04
0.03
0.02
0.01
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

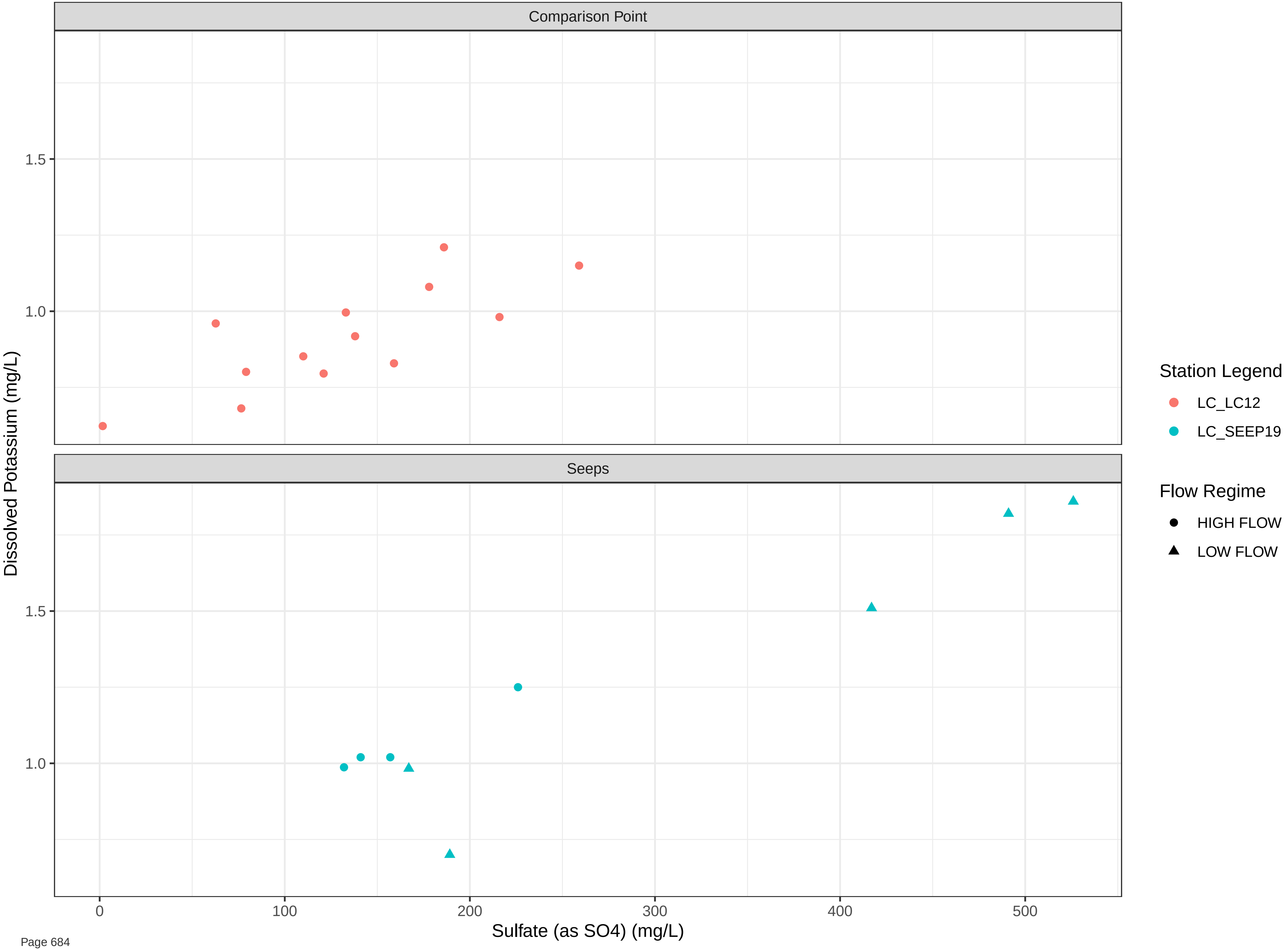


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
6
4
2
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

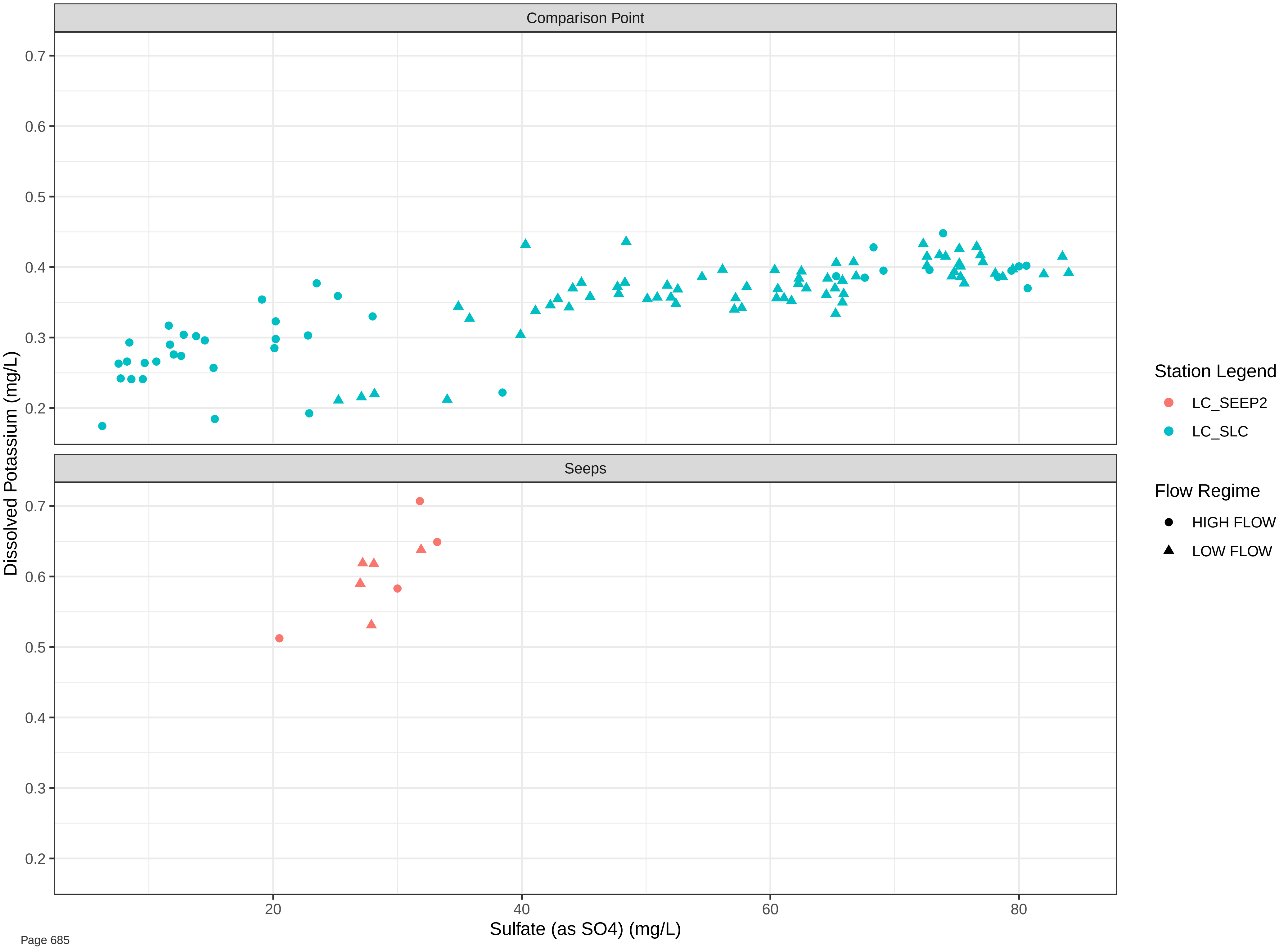

Seeps
Dissolved Potassium (mg/L)
3.2
2.8
2.4
2.0
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

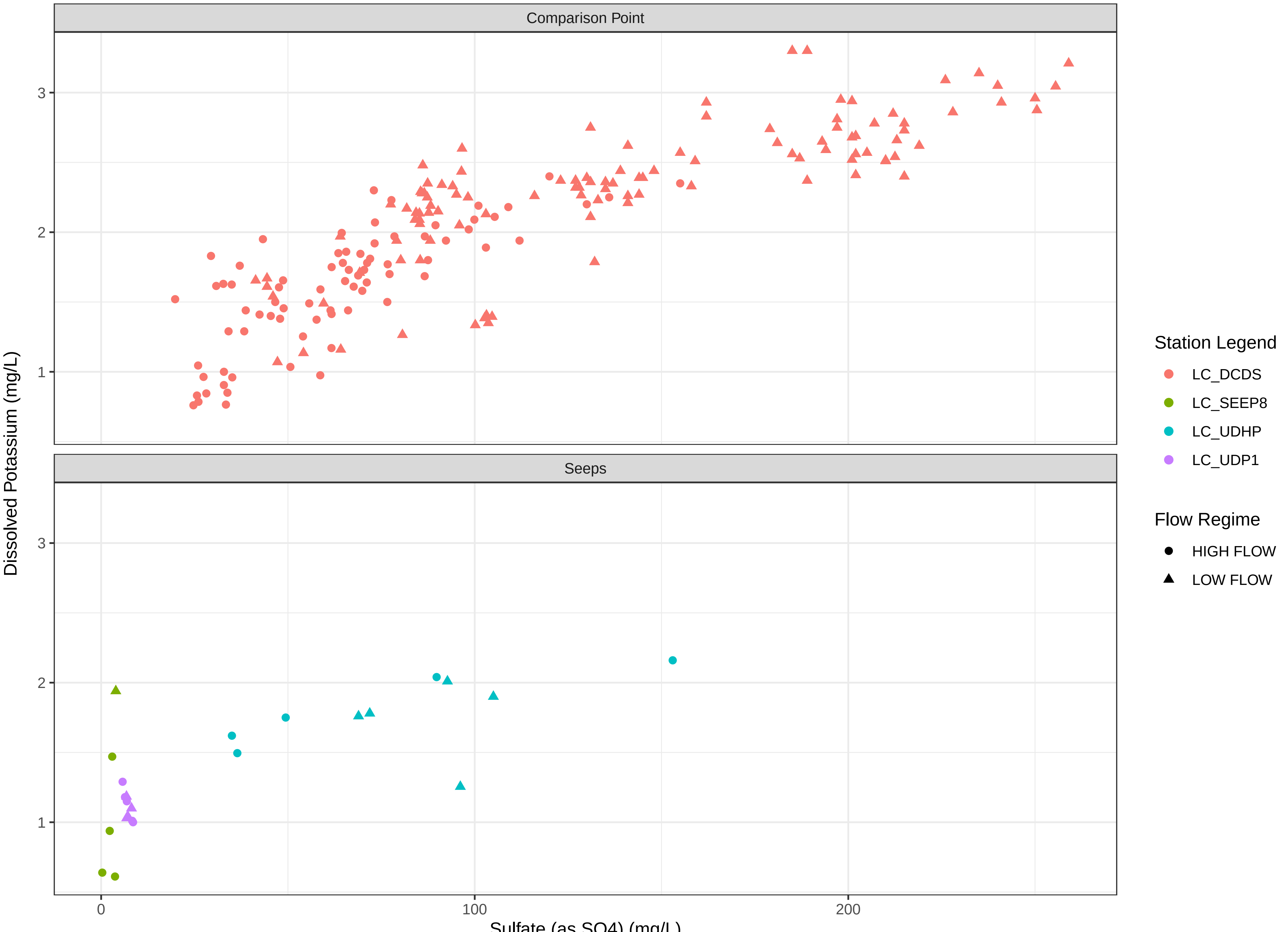

Seeps
Dissolved Potassium (mg/L)
1.5
1.0
0.5
0.0
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Potassium (mg/L)
3
2
1
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

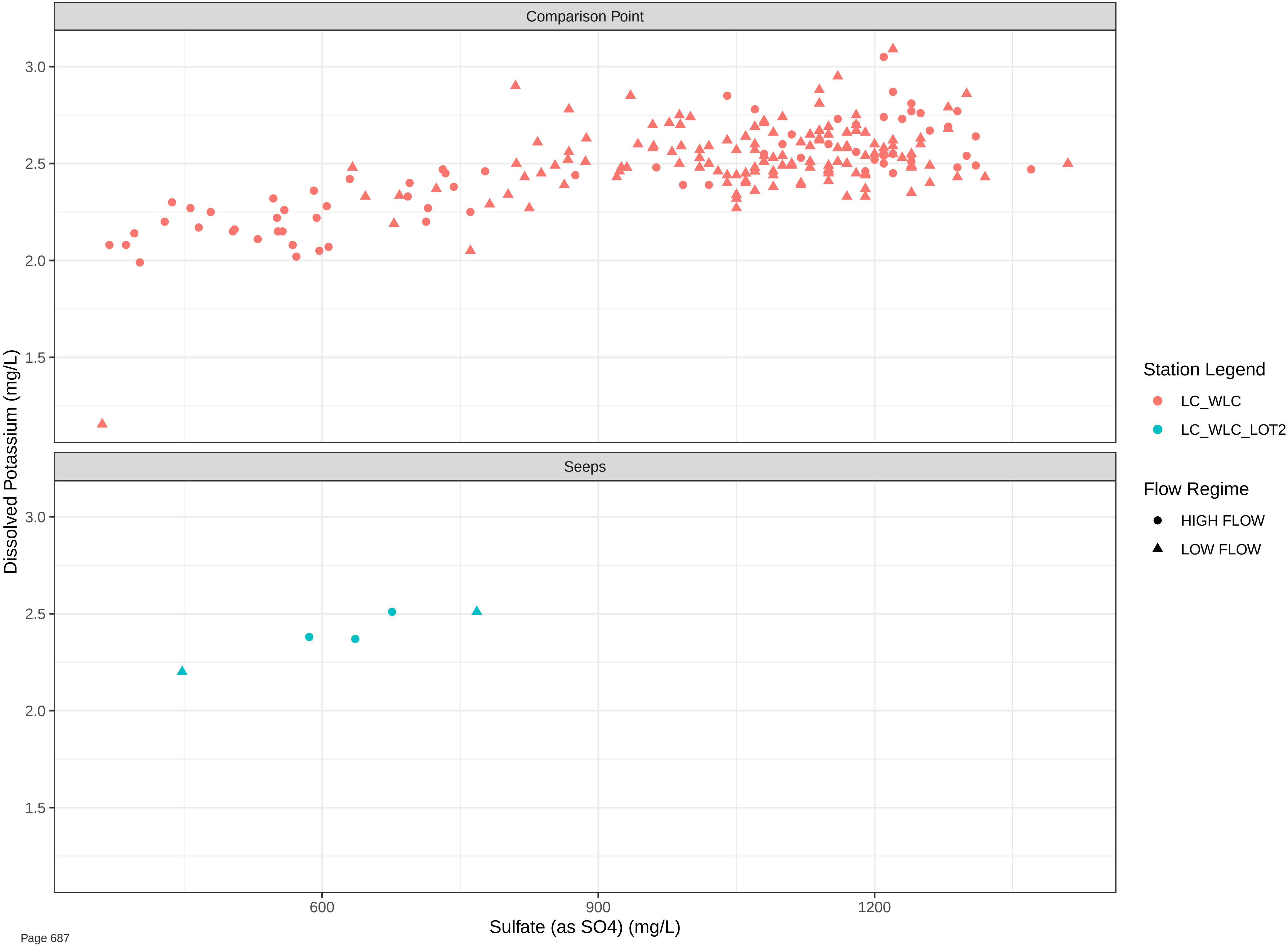


Comparison Point
Seeps
Dissolved Potassium (mg/L)
1.5
1.0
1.5
1.0
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

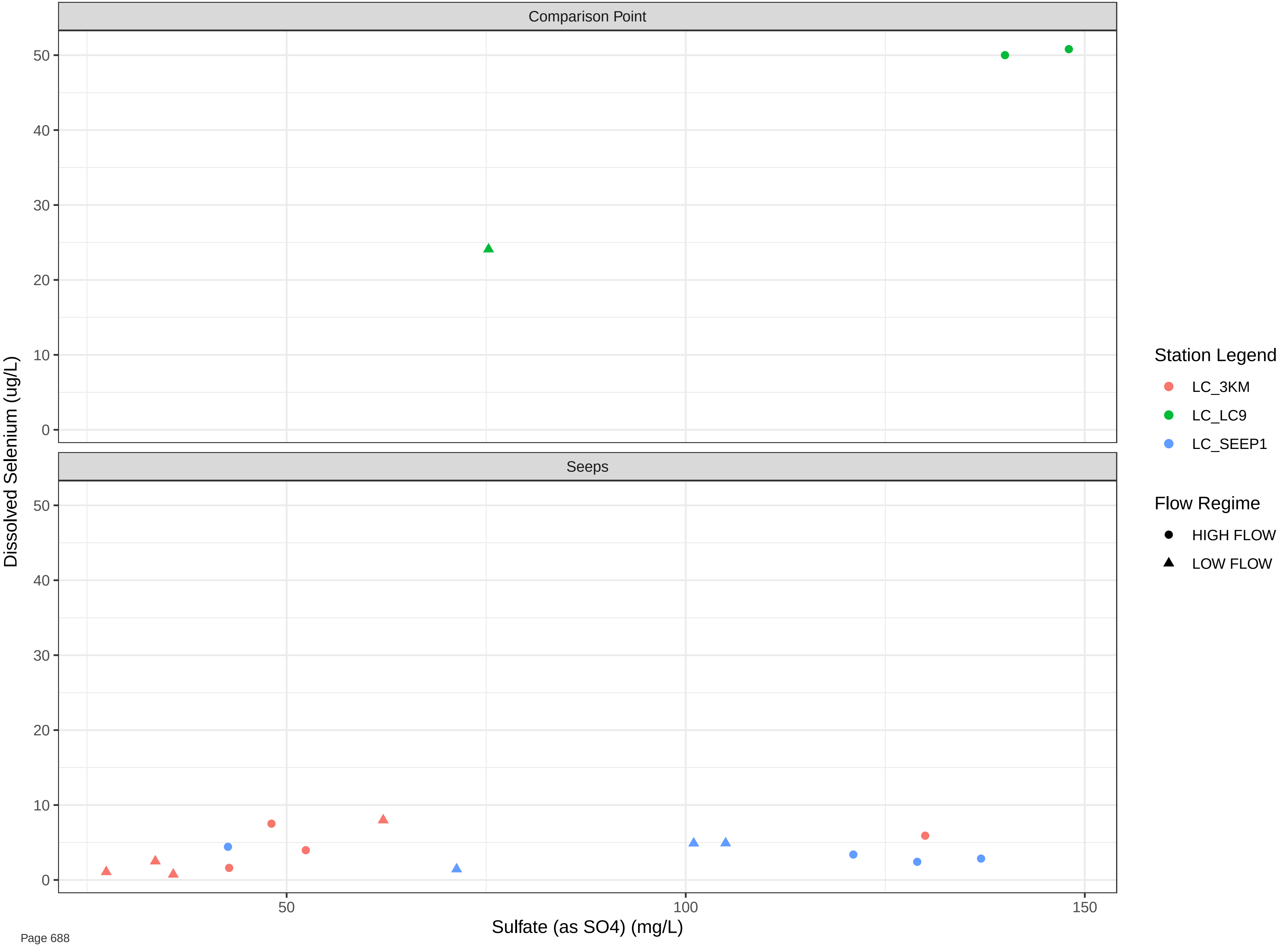

Comparison Point
Seeps
Dissolved Potassium (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

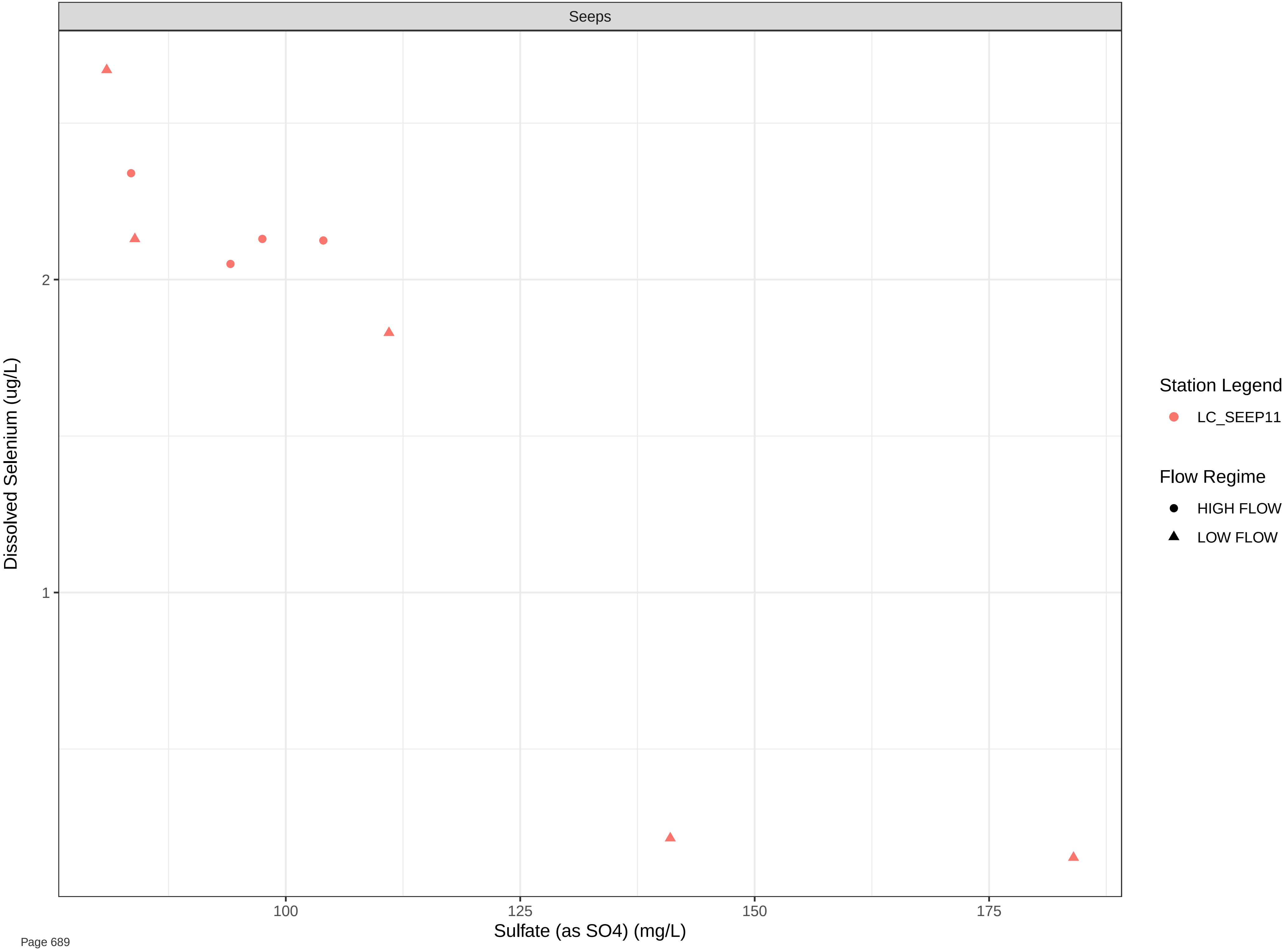


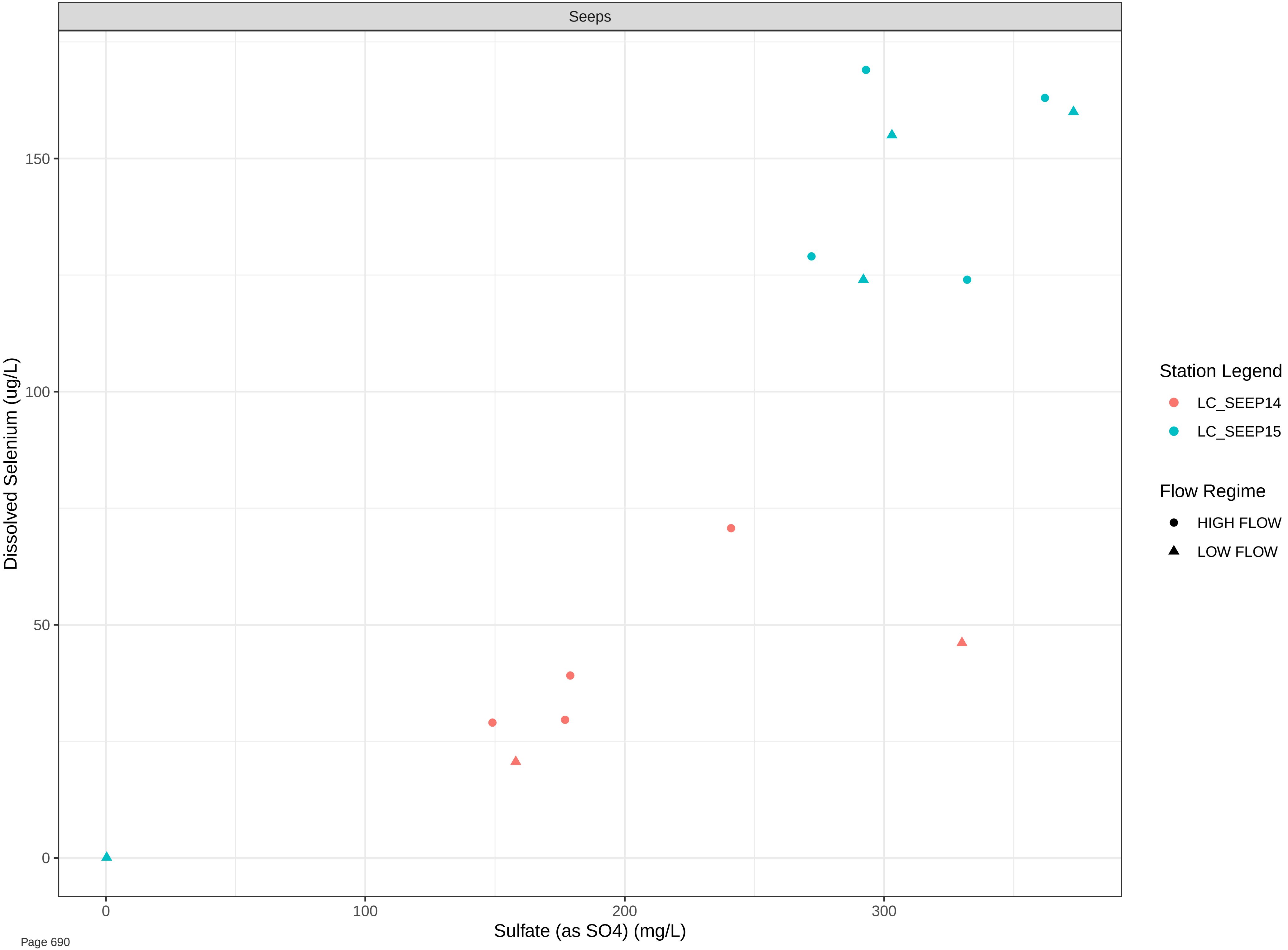
Comparison Point
Seeps
Dissolved Potassium (mg/L)
1
2
3
1
2
3
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

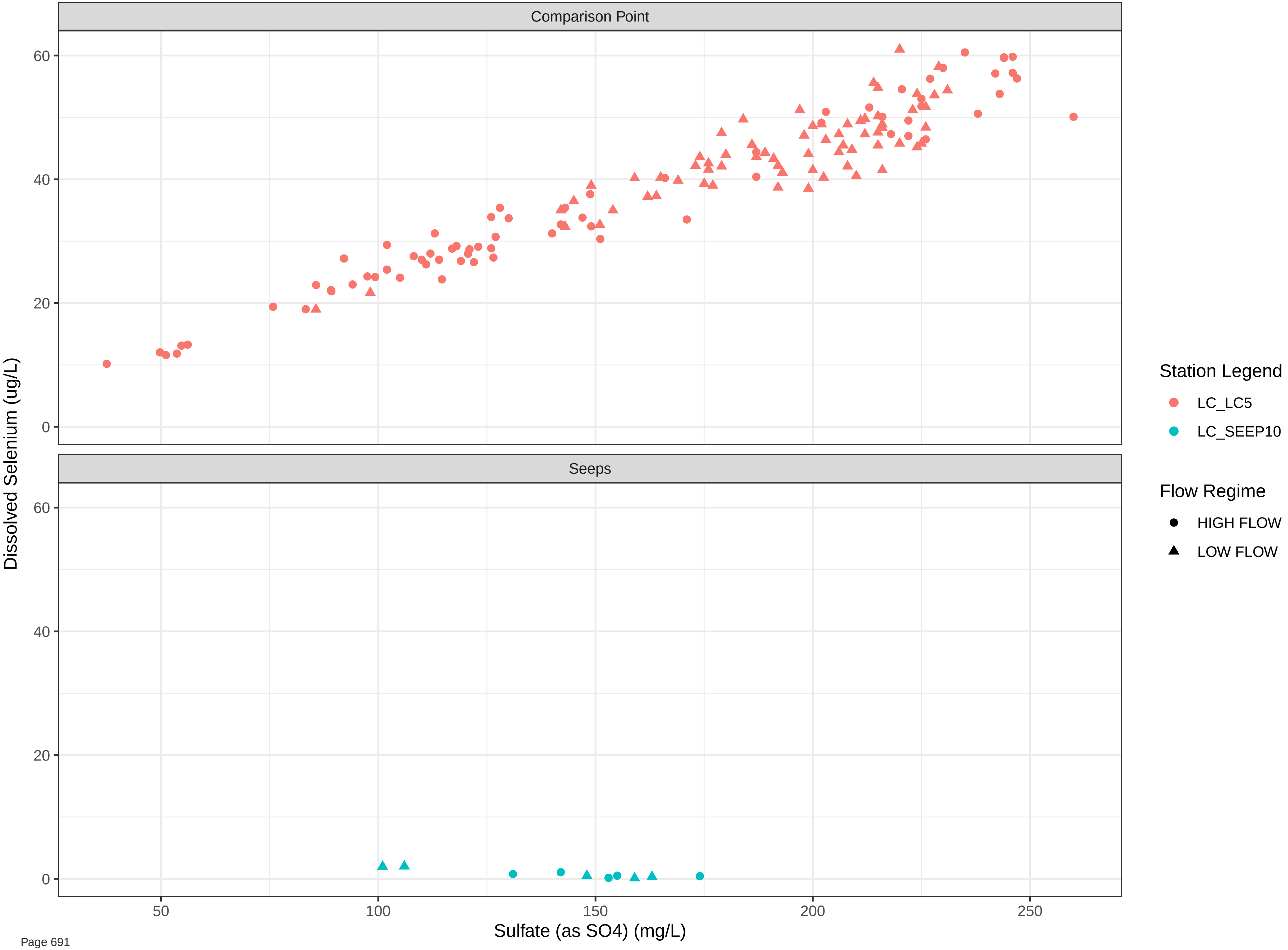


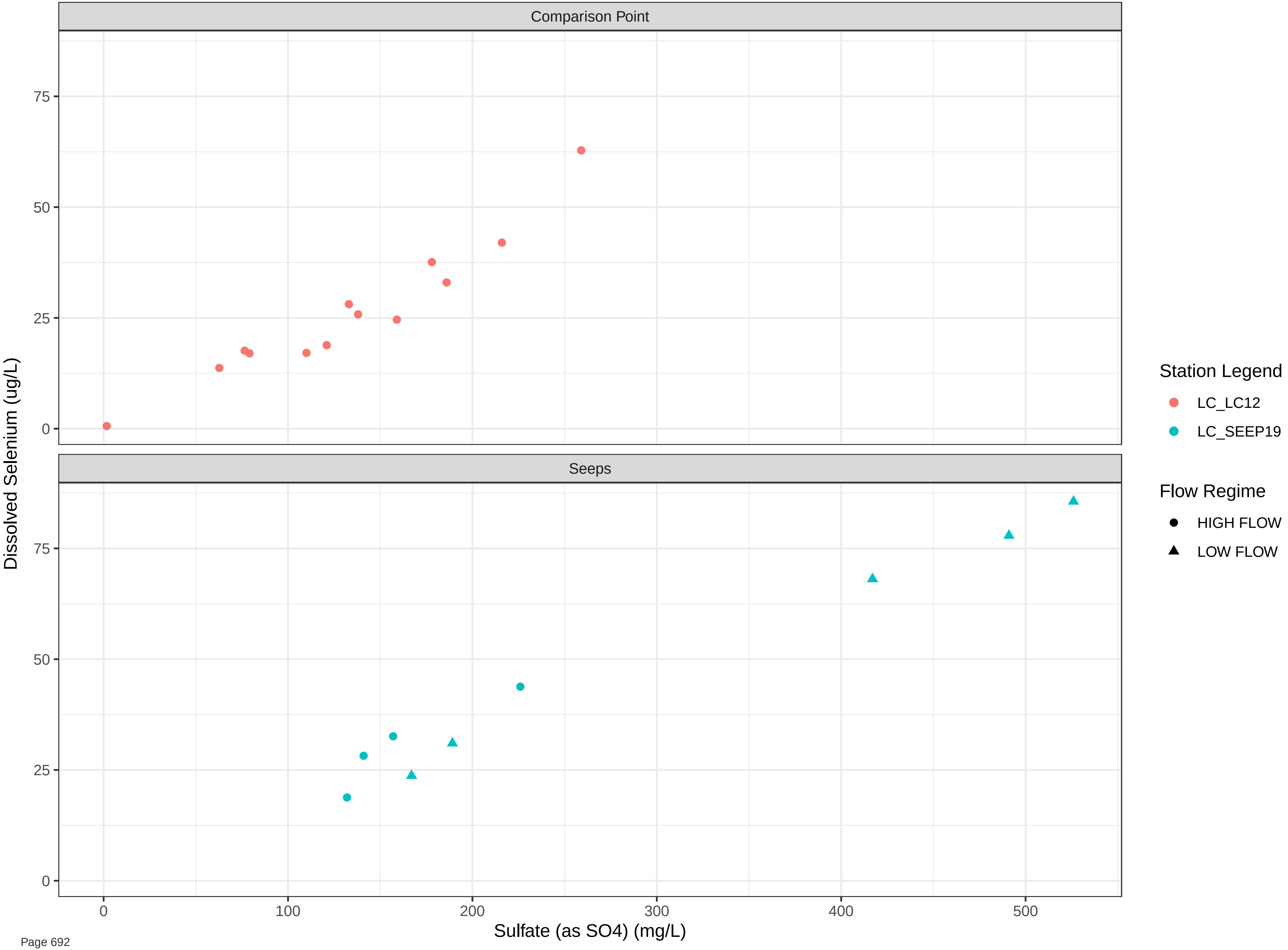
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
3.0
2.5
2.0
1.5
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
40
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

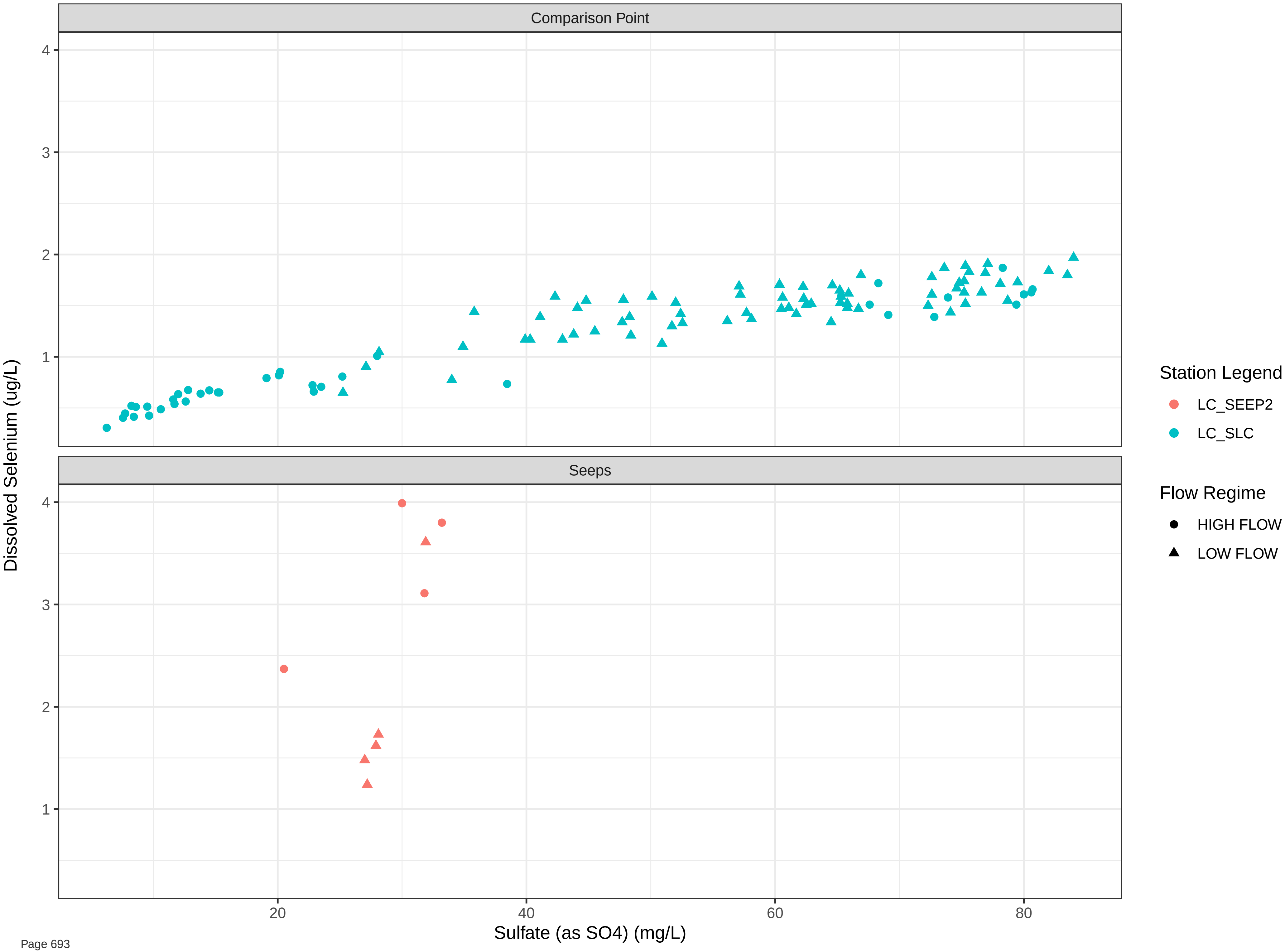

Seeps
Dissolved Selenium (ug/L)
2
1
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

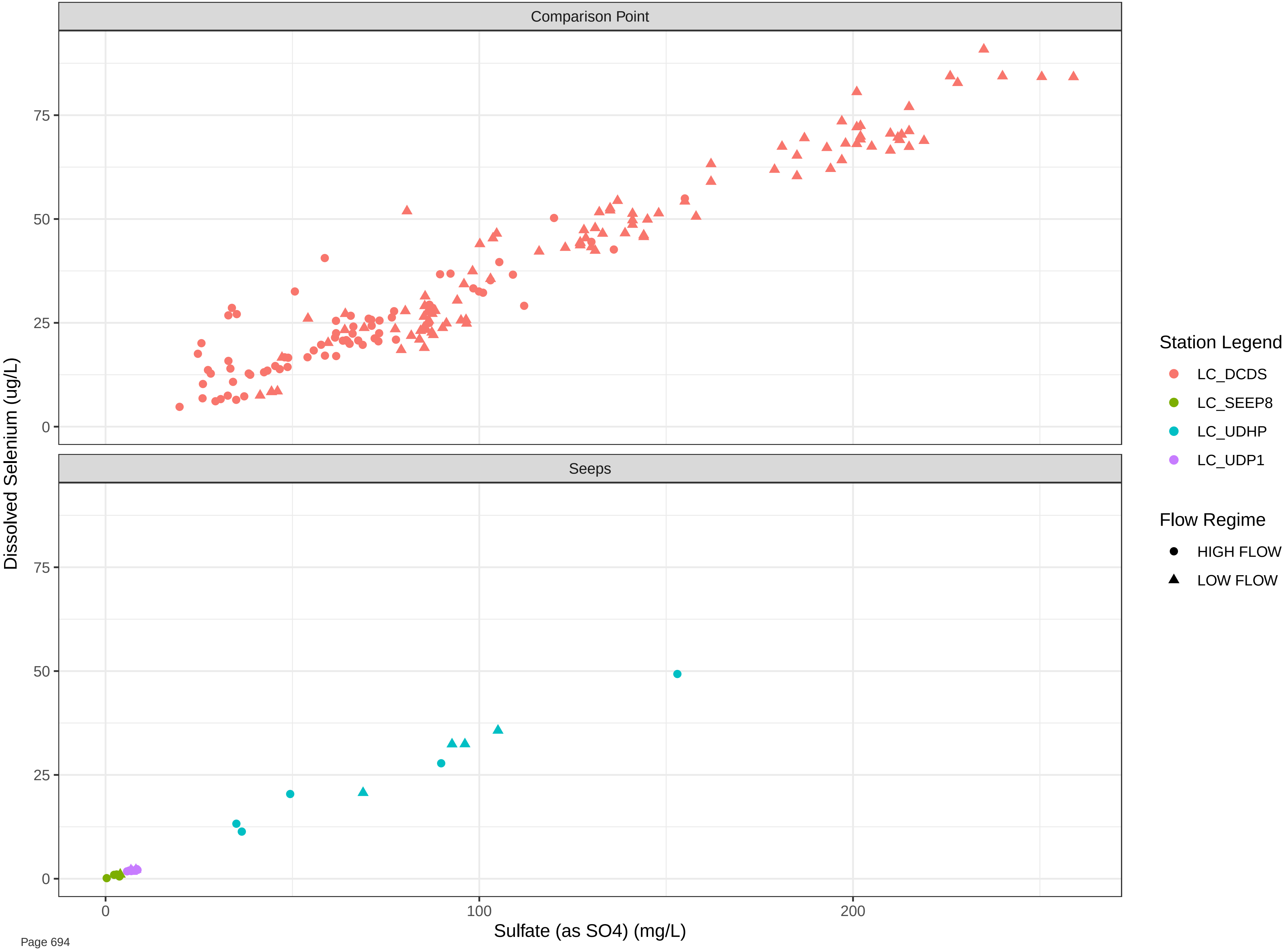

Seeps
Dissolved Selenium (ug/L)
150
100
50
0
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
20
40
60
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

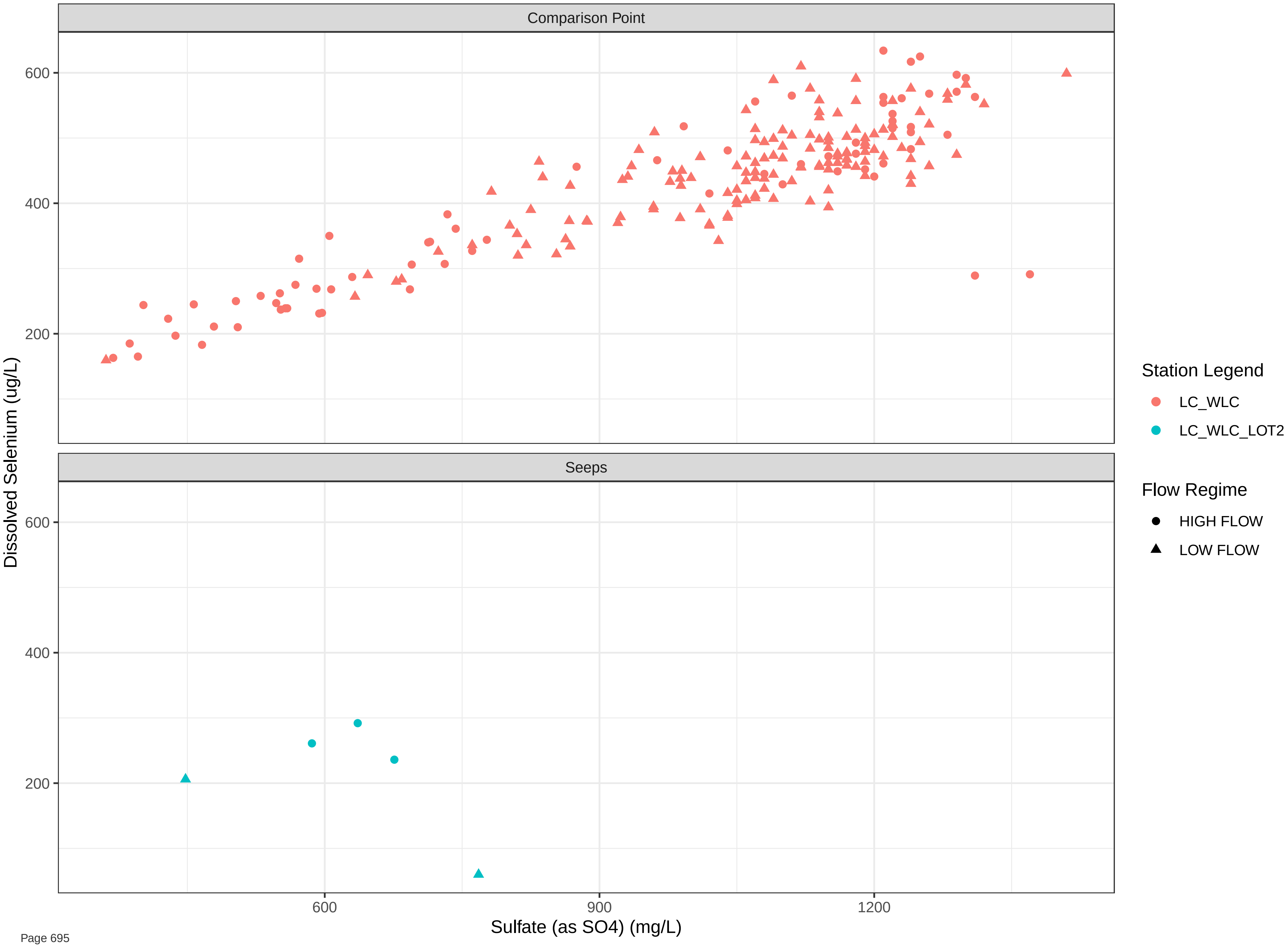


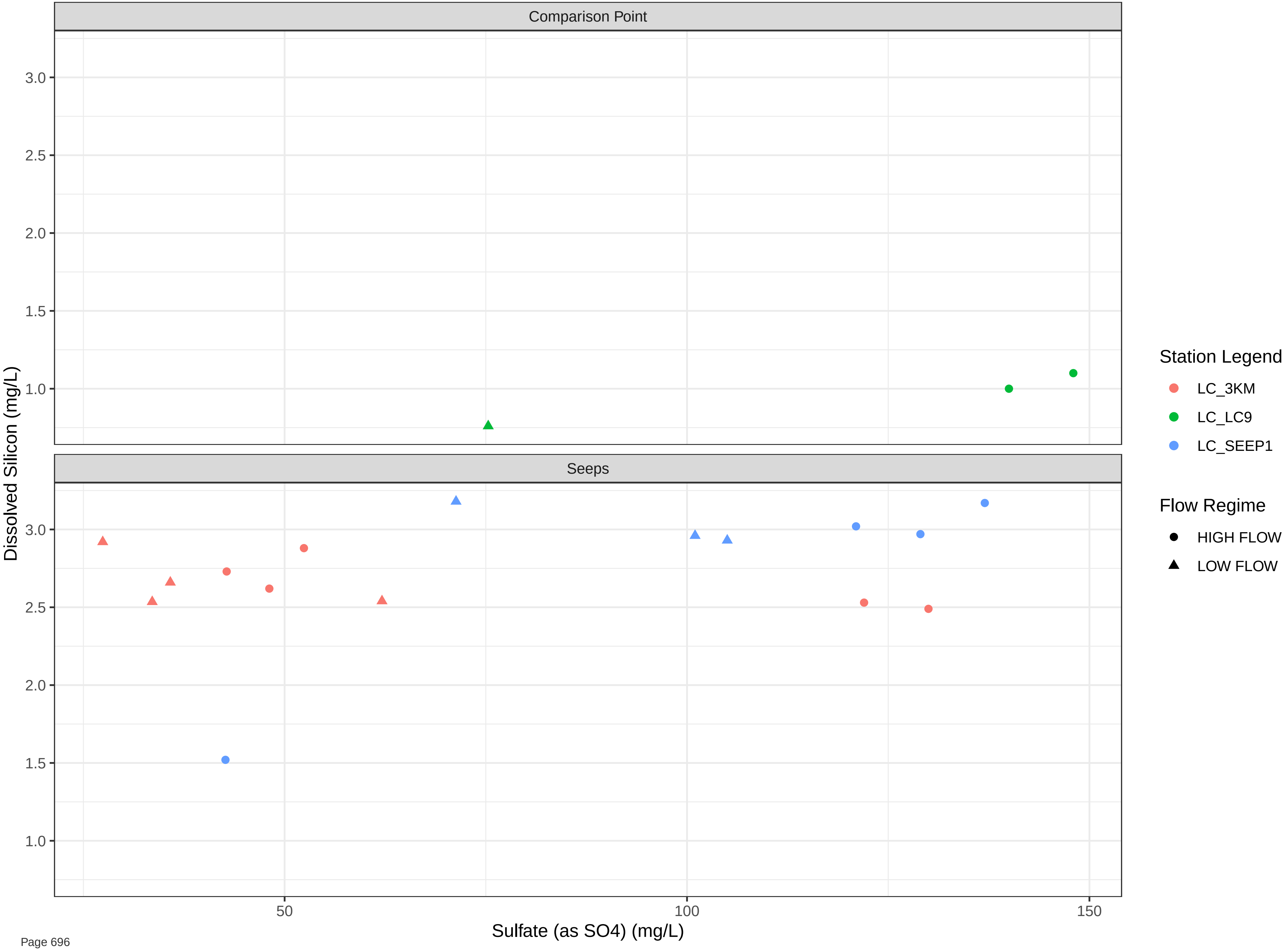
Comparison Point
Seeps
Dissolved Selenium (ug/L)
0
25
50
75
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

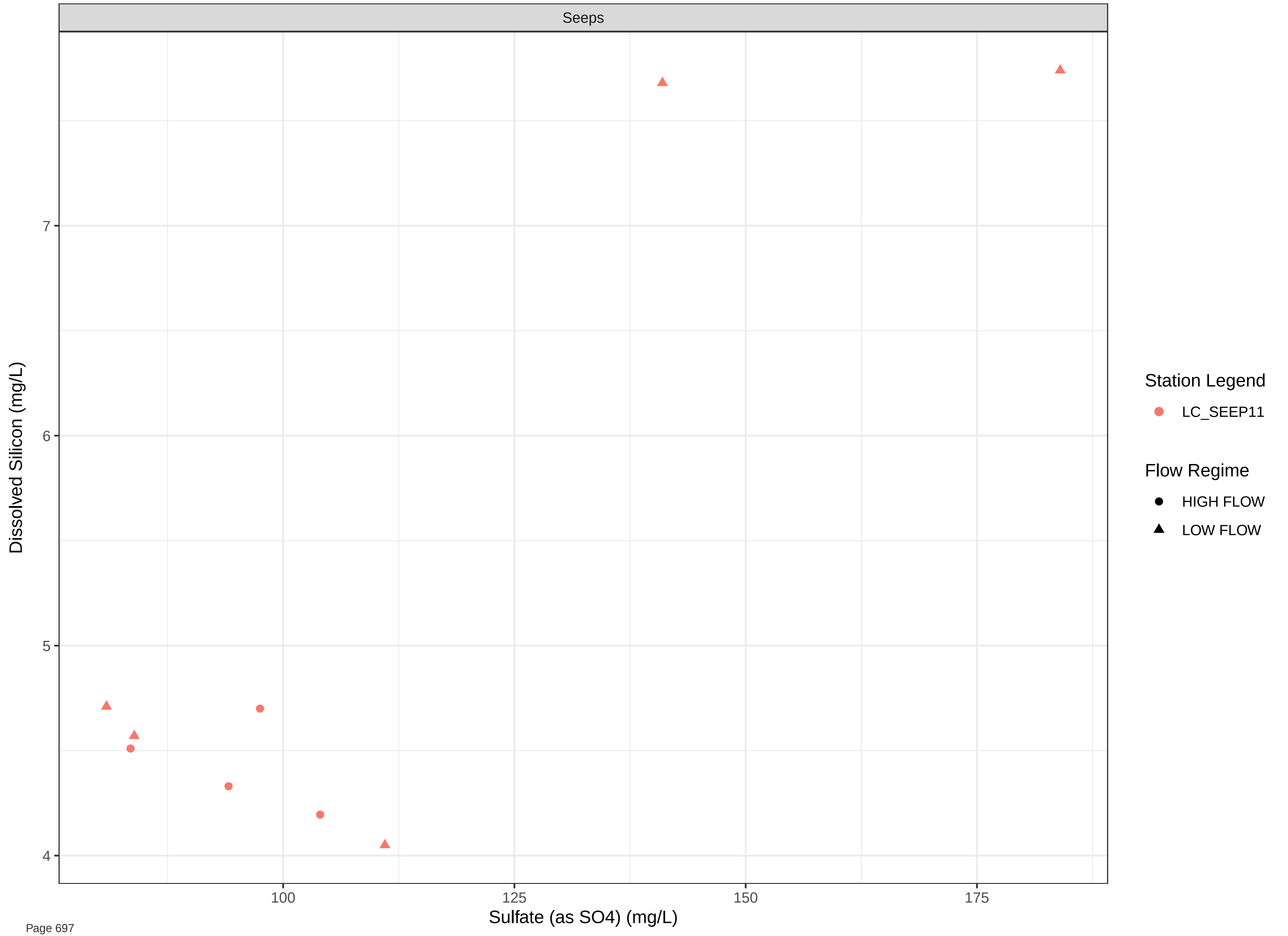

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
1
2
3
4
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

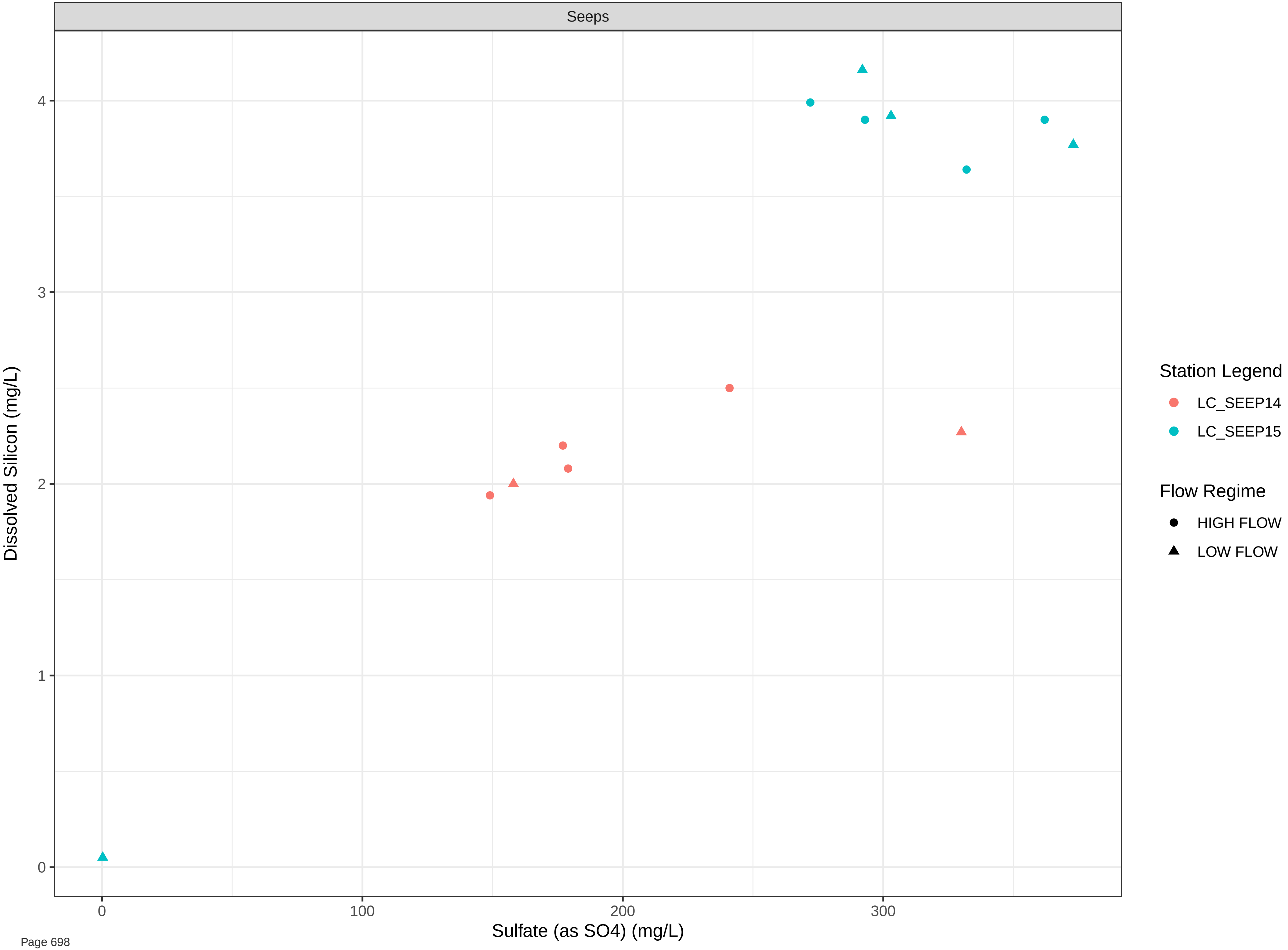


Comparison Point
Seeps
Dissolved Selenium (ug/L)
0
25
50
75
0
25
50
75
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

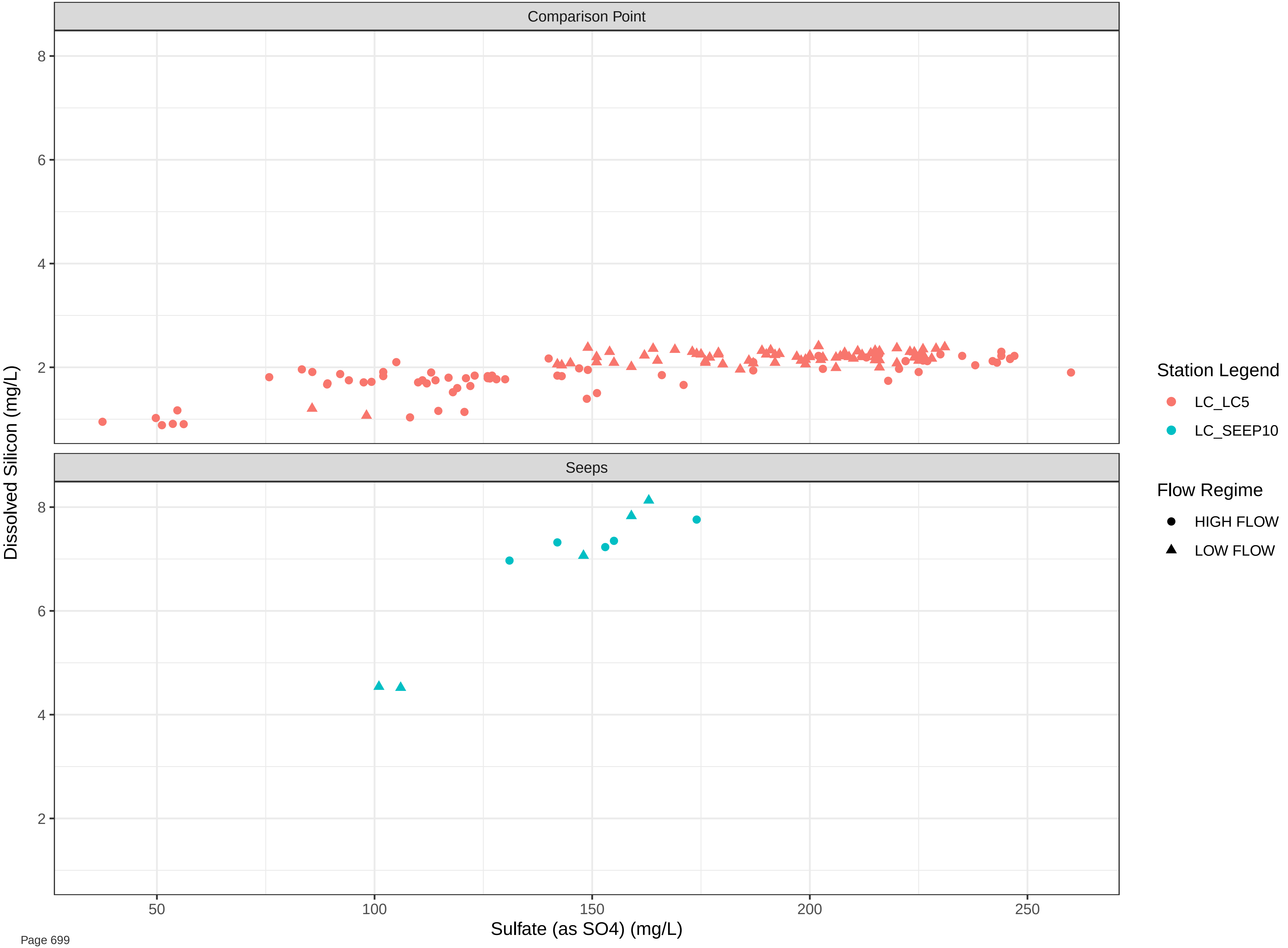

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
600
400
200
600
400
200
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

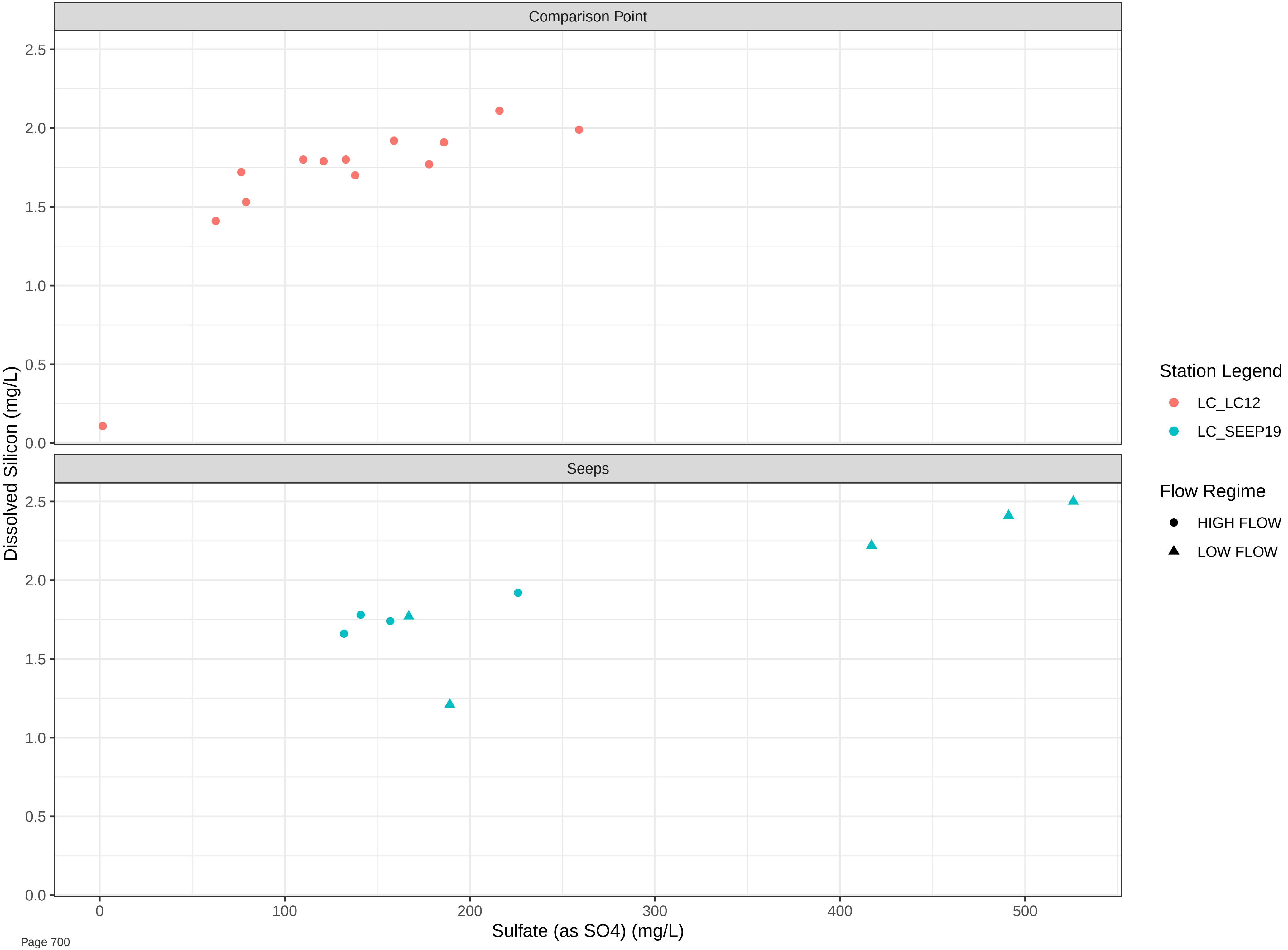

Comparison Point
Seeps
Dissolved Silicon (mg/L)
3.0
2.5
2.0
1.5
1.0
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
Dissolved Silicon (mg/L)
7
6
5
4
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

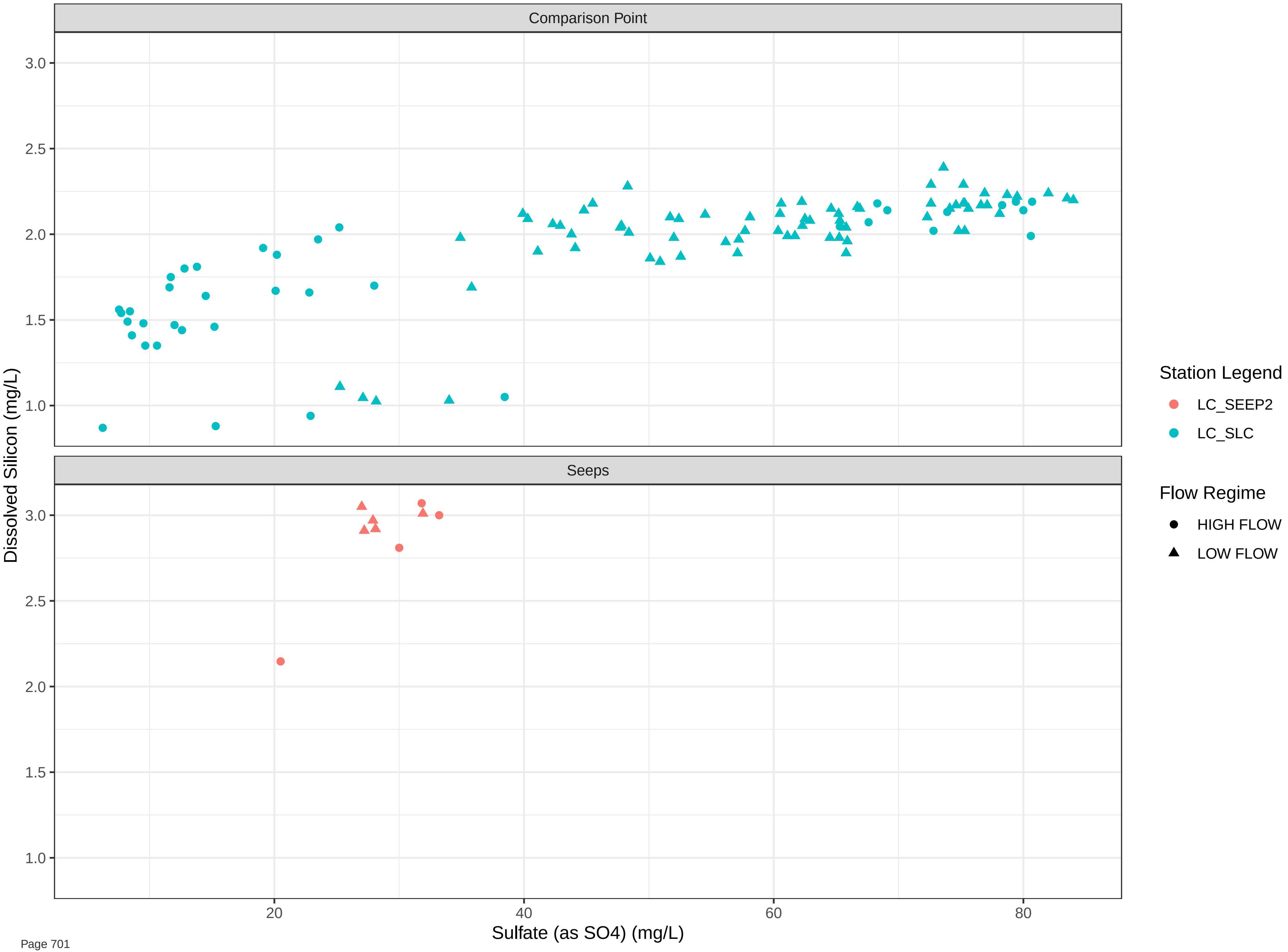


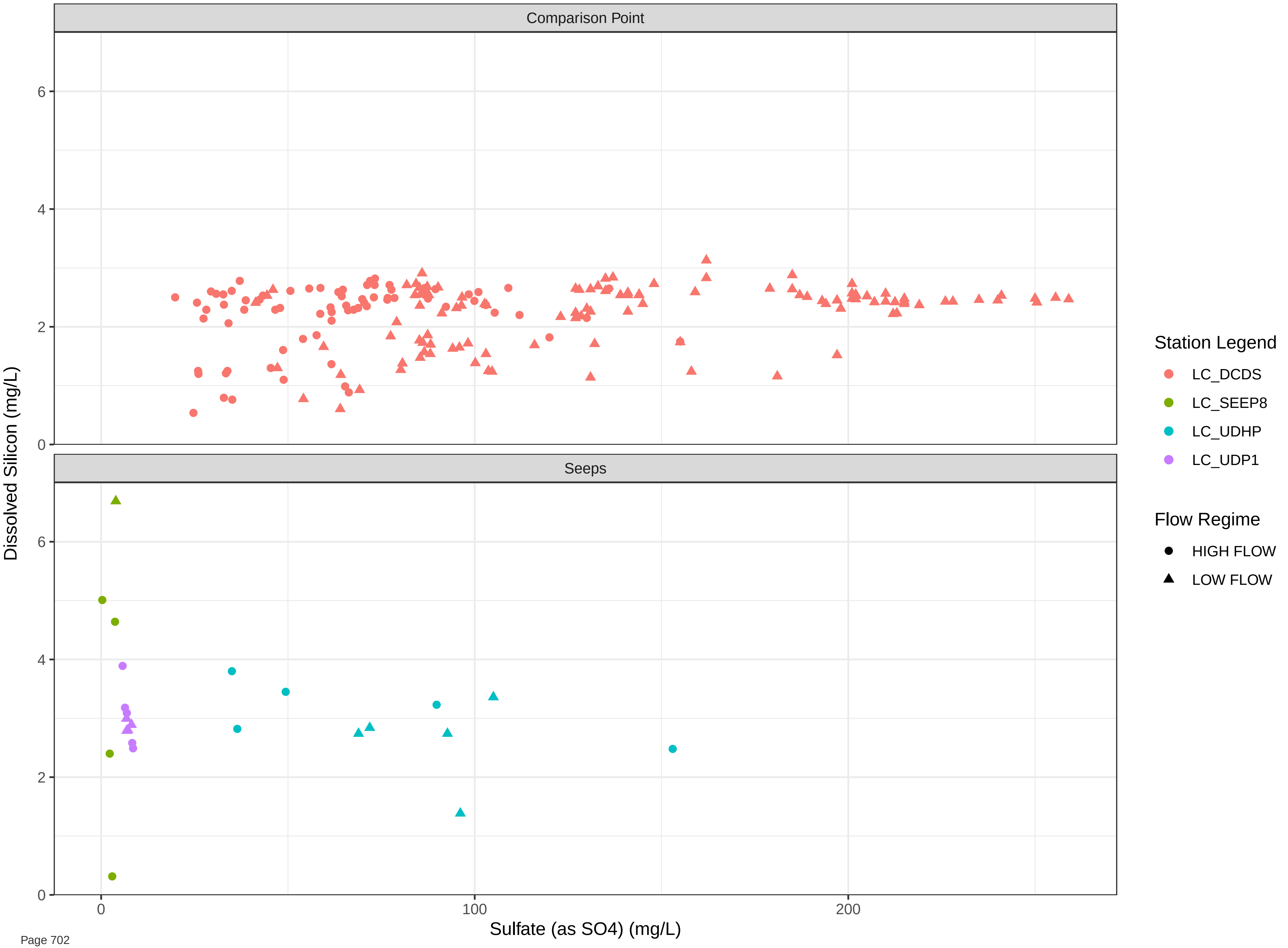
Seeps
Dissolved Silicon (mg/L)
0
1
2
3
4
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

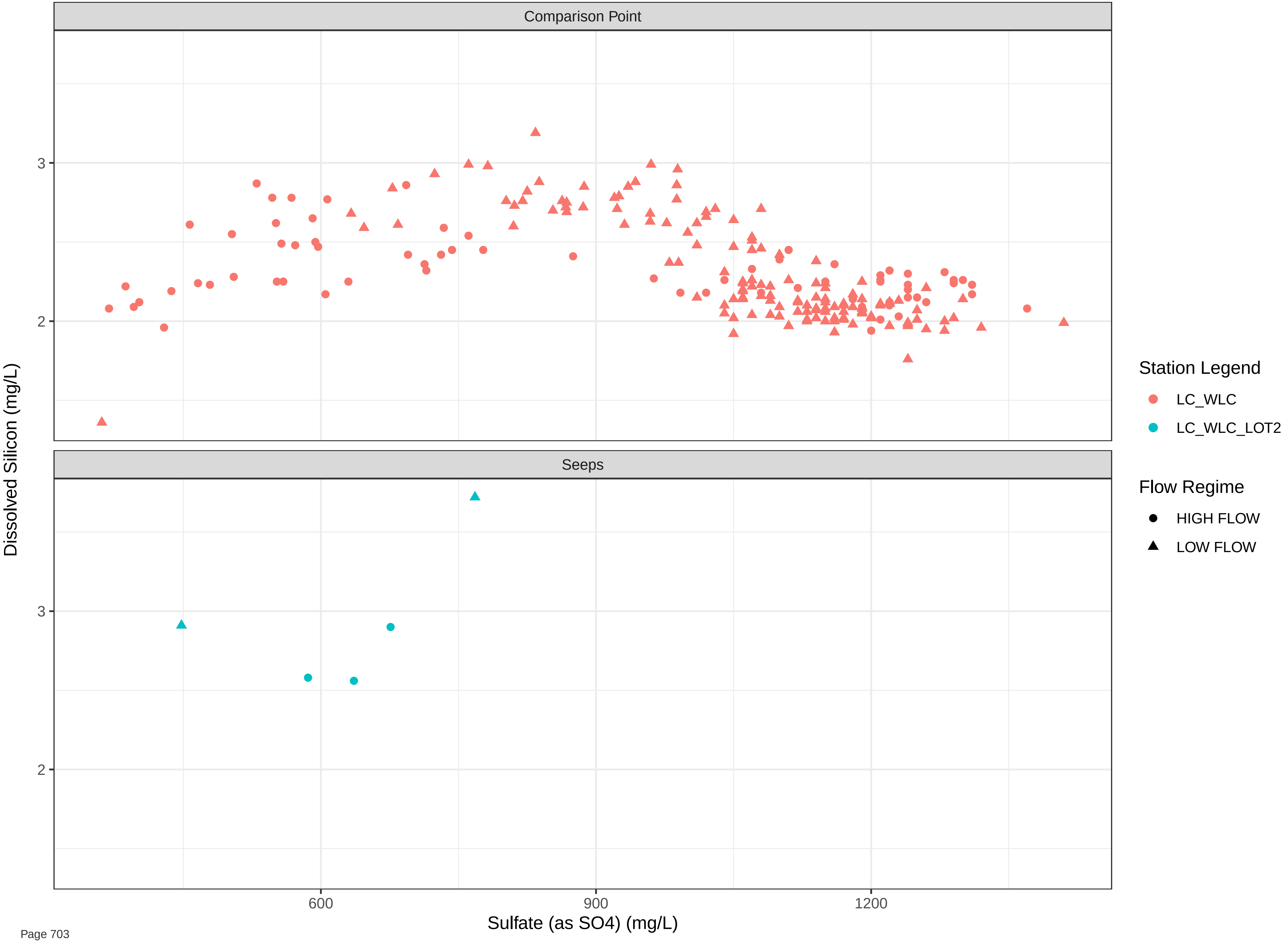

Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
8
6
4
2
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

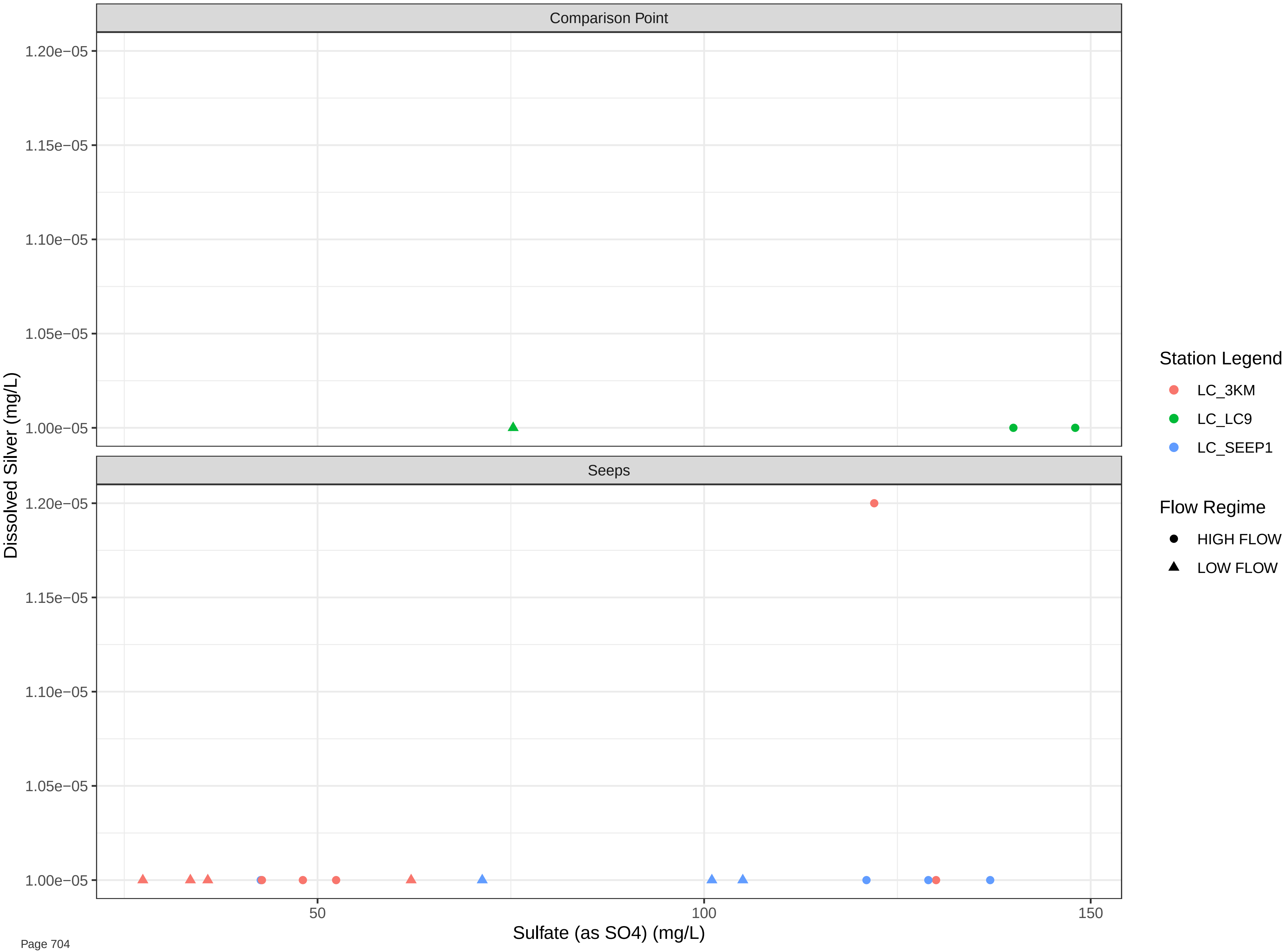


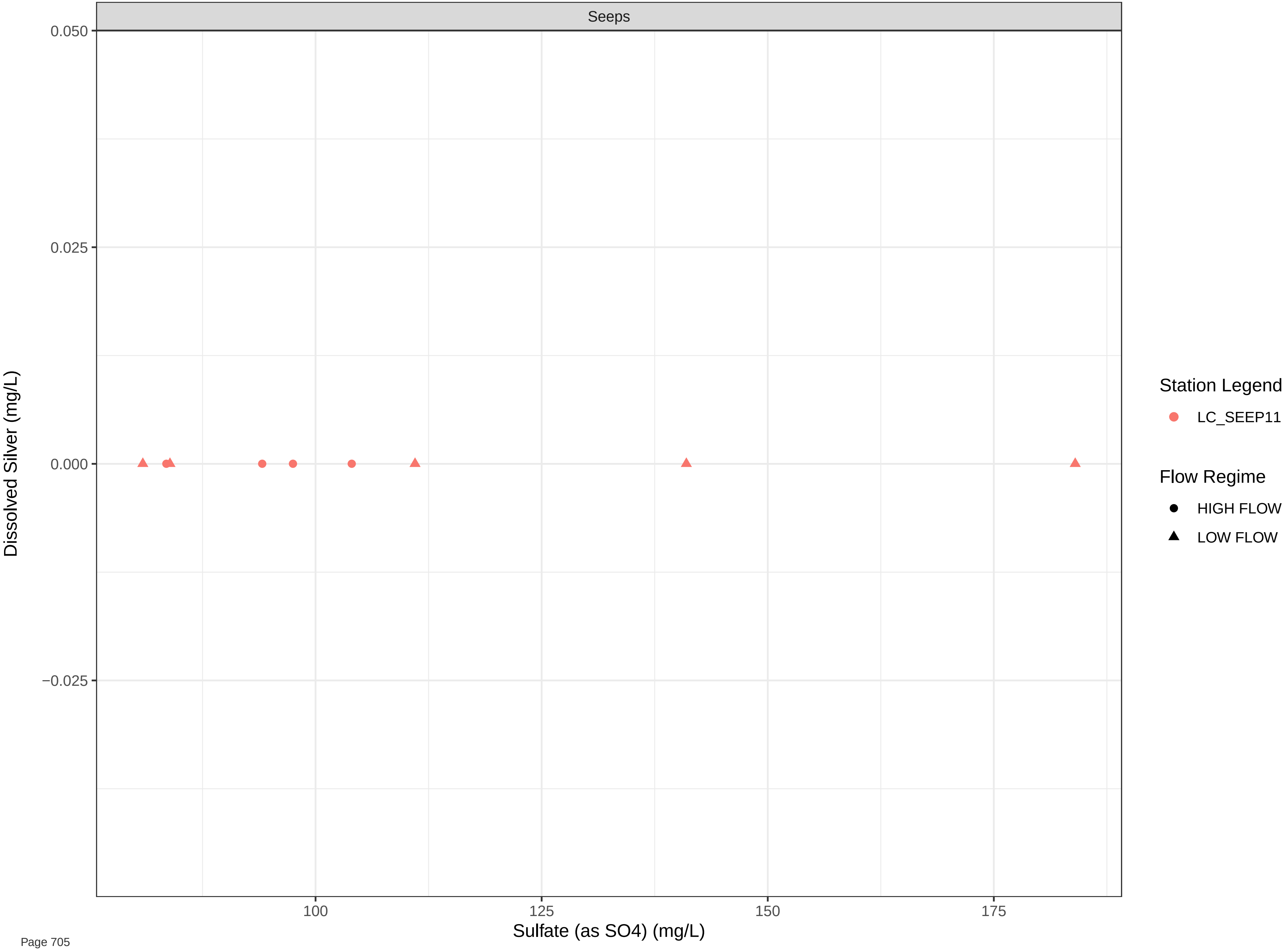
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

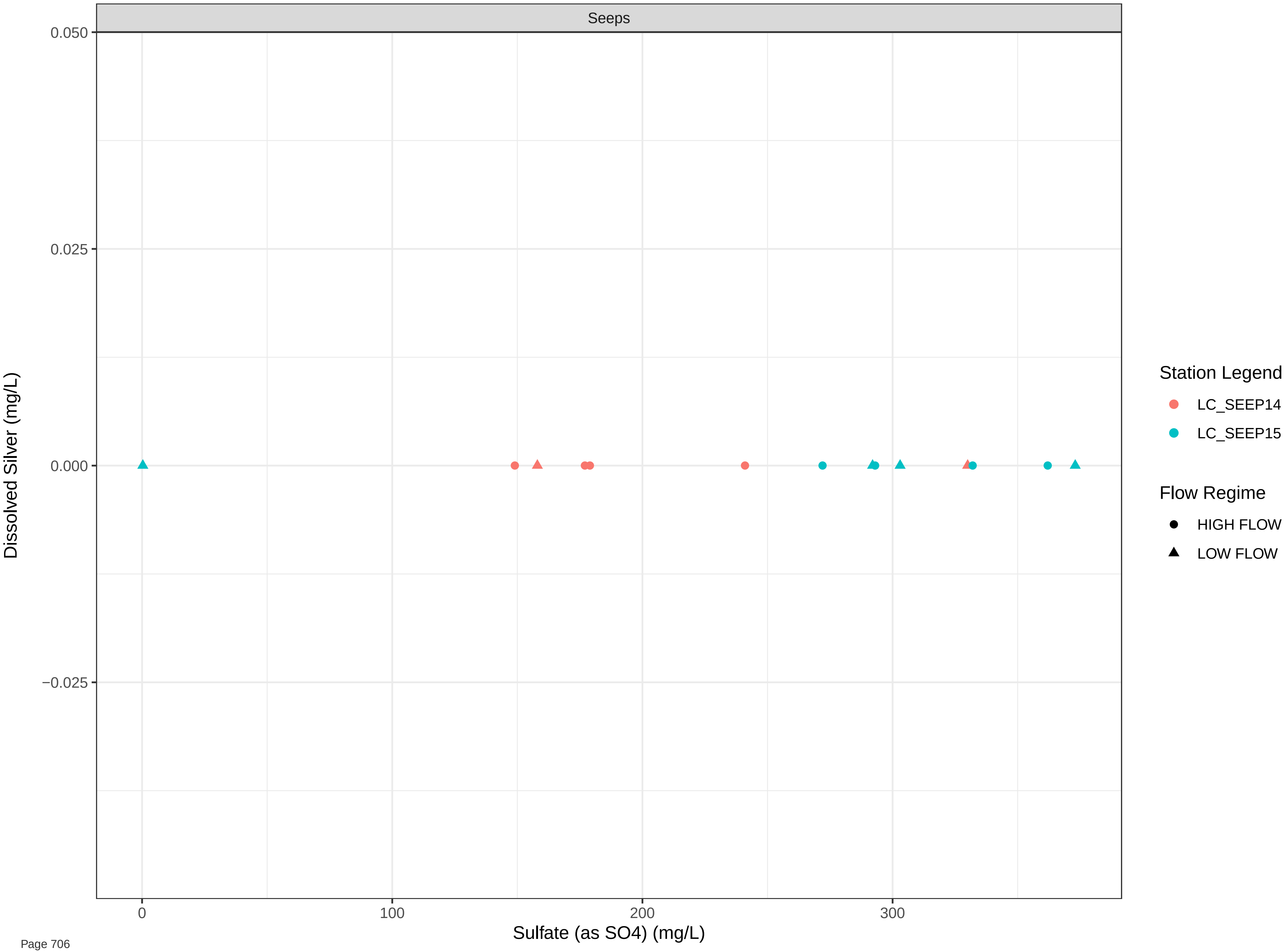

Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
3.0
2.5
2.0
1.5
1.0
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
6
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

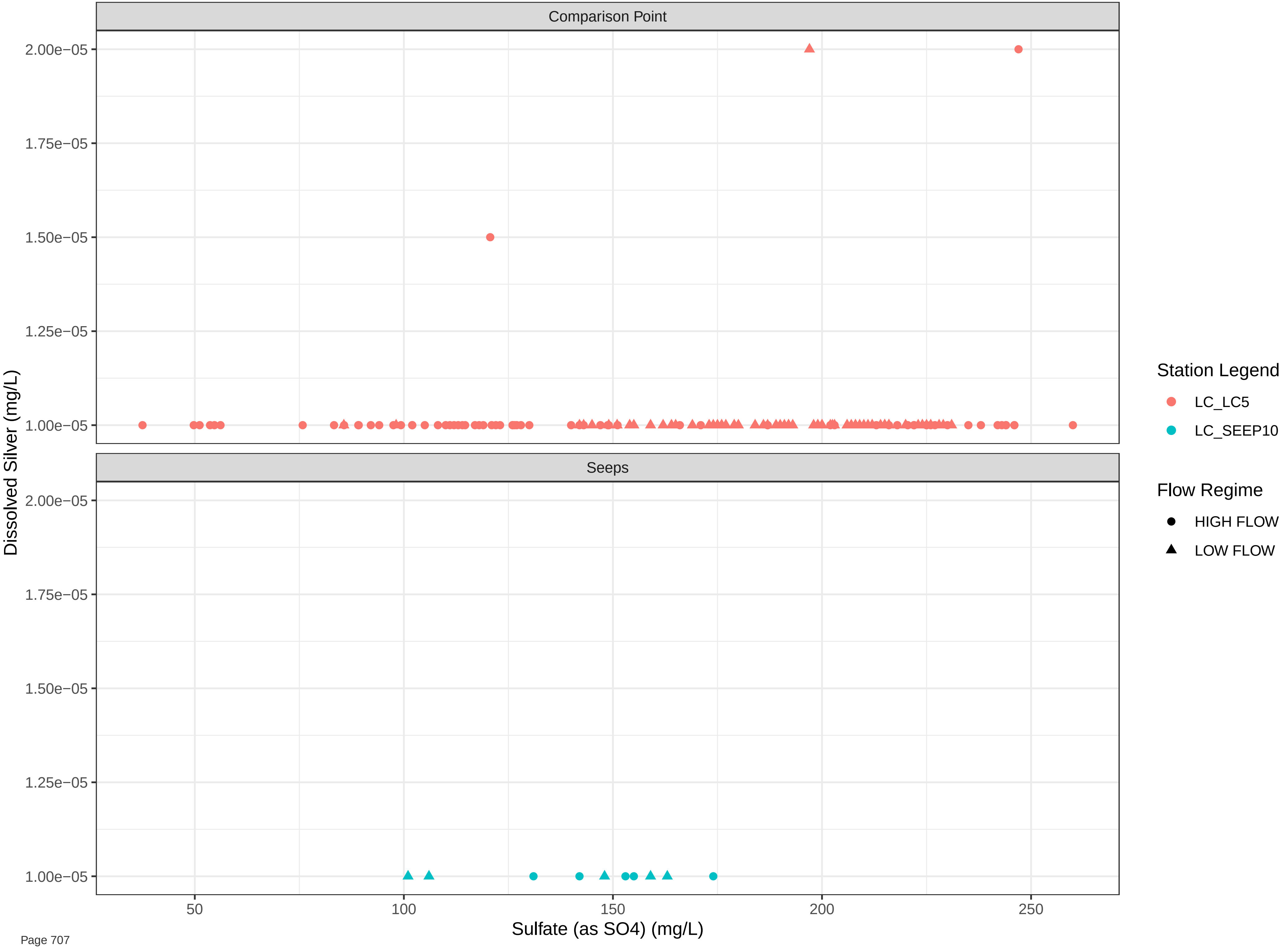

Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
3
2
3
2
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silver (mg/L)
1.20e−05
1.15e−05
1.10e−05
1.05e−05
1.00e−05
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

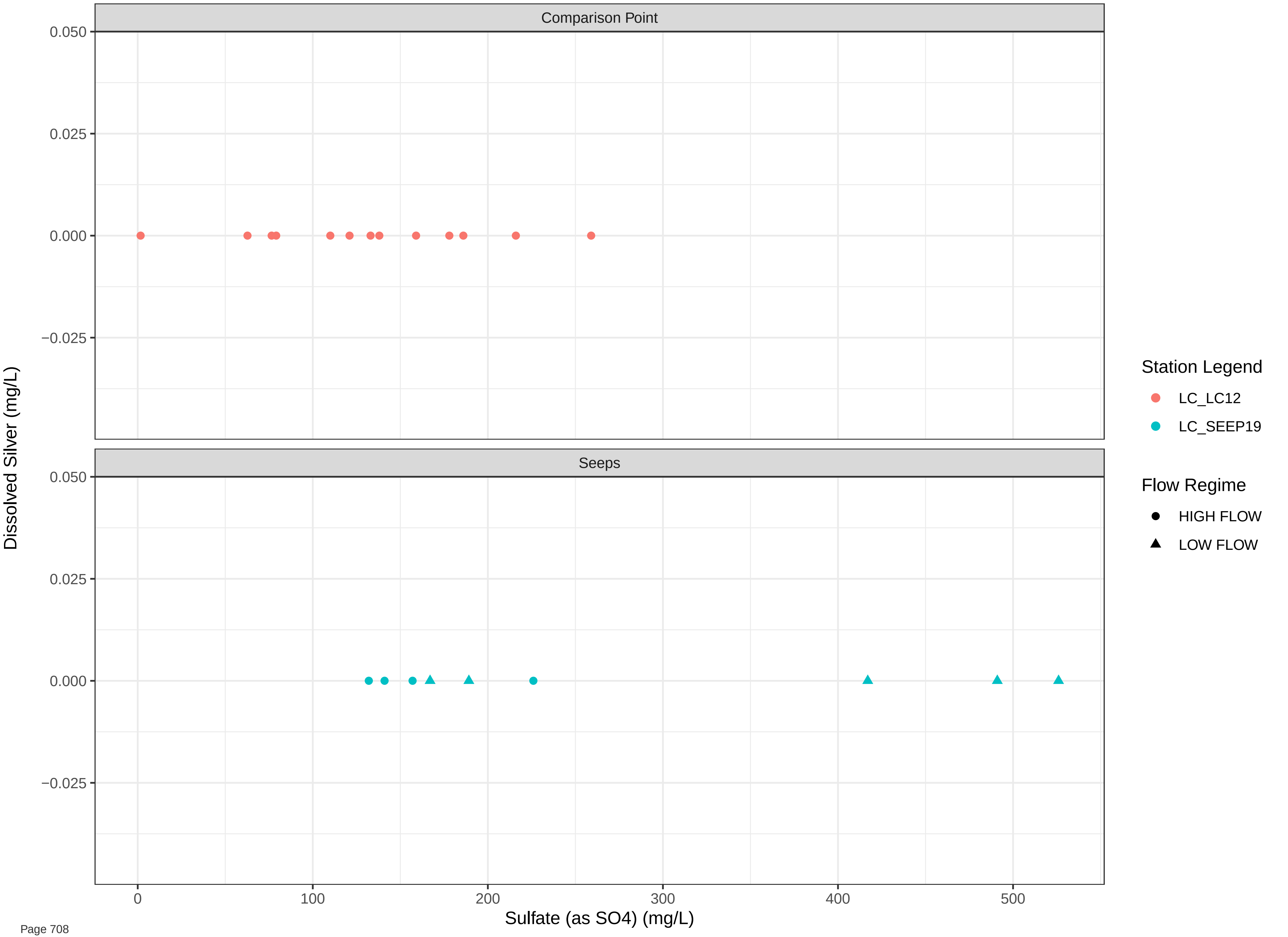

Seeps
0.050
0.025
0.000
−0.025
Dissolved Silver (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



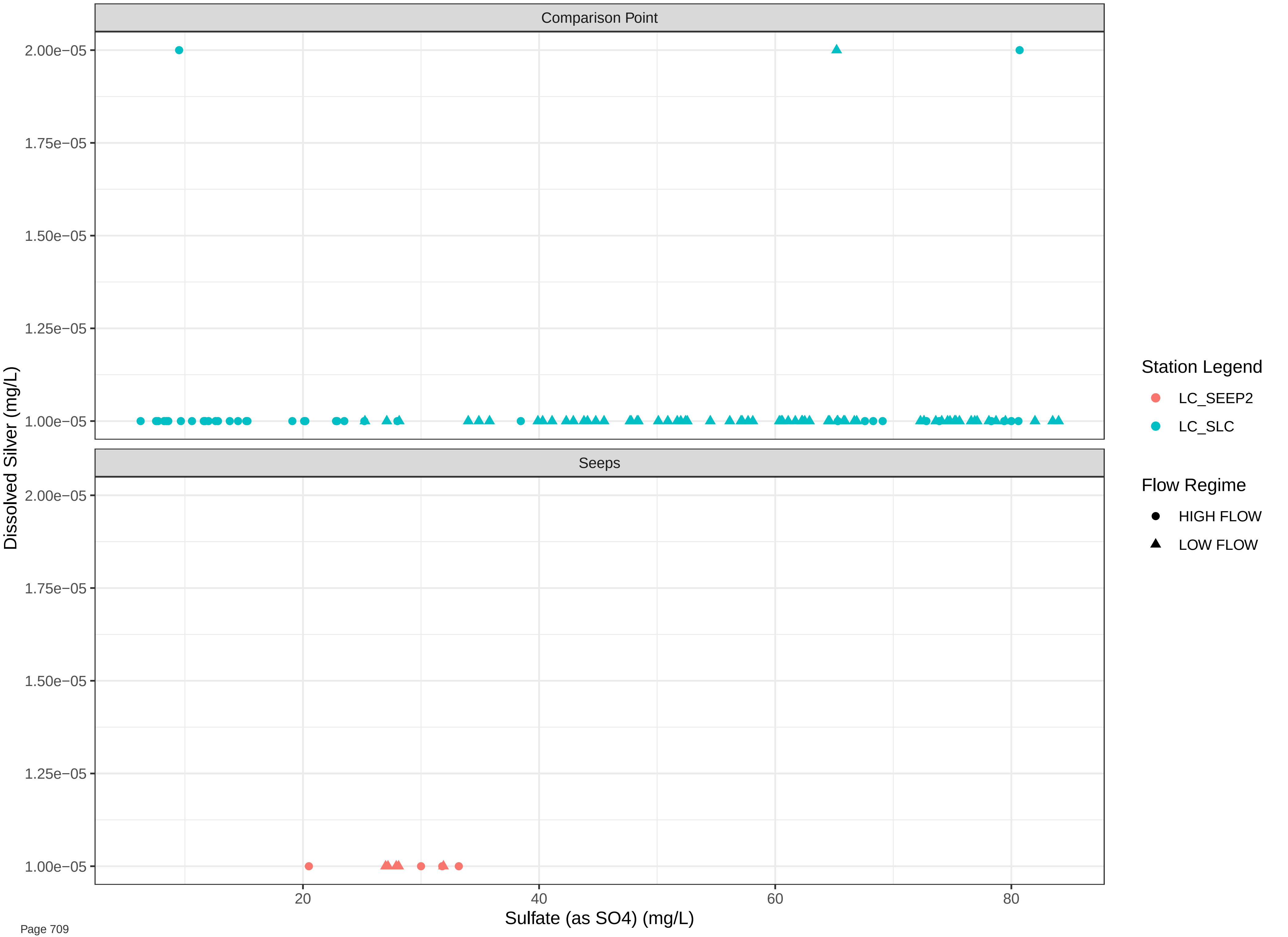
Seeps
0.050
0.025
0.000
−0.025
0
100
200
300
Sulfate (as SO4) (mg/L)
Dissolved Silver (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

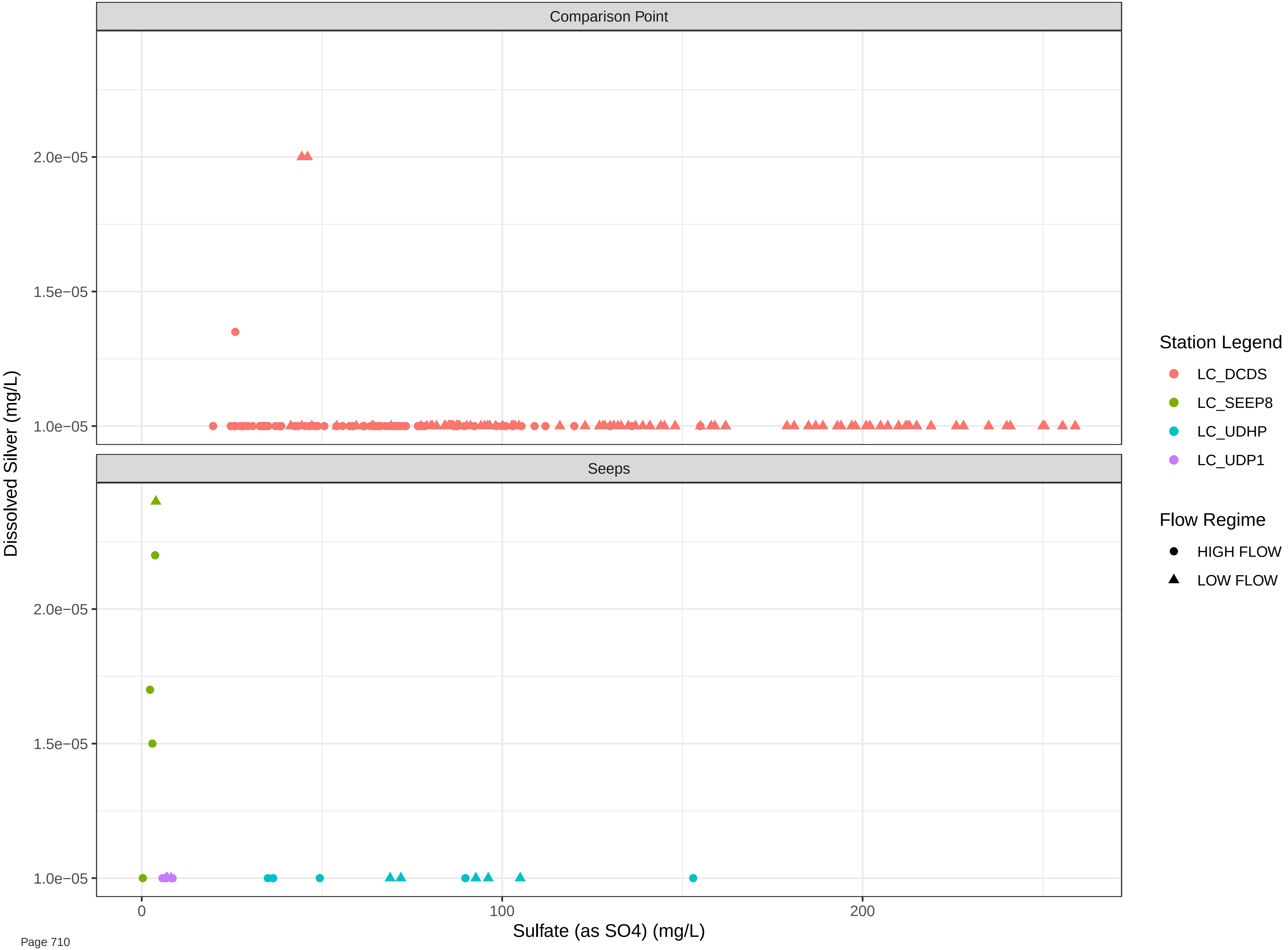


Comparison Point
Seeps
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
Dissolved Silver (mg/L)
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

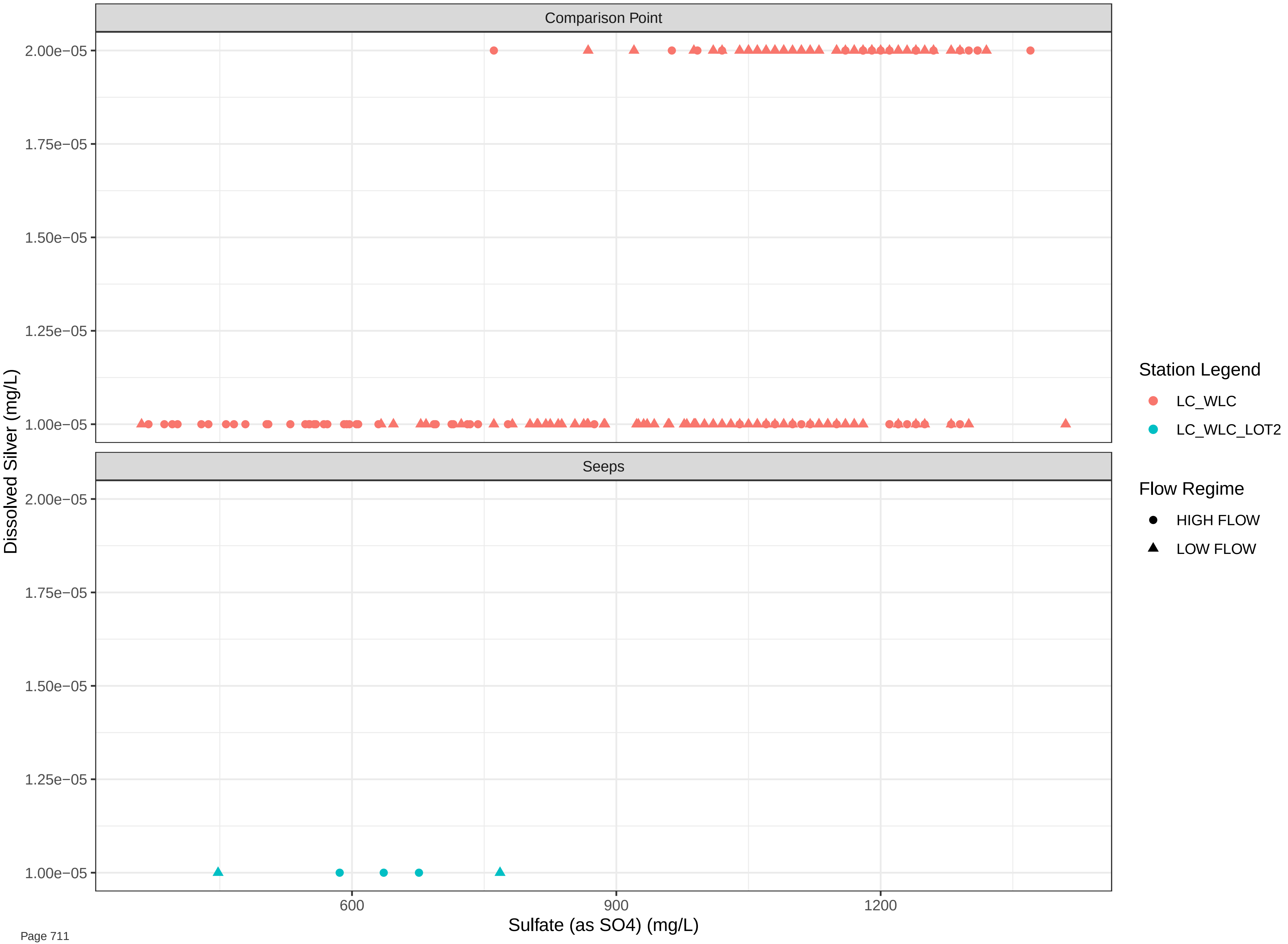


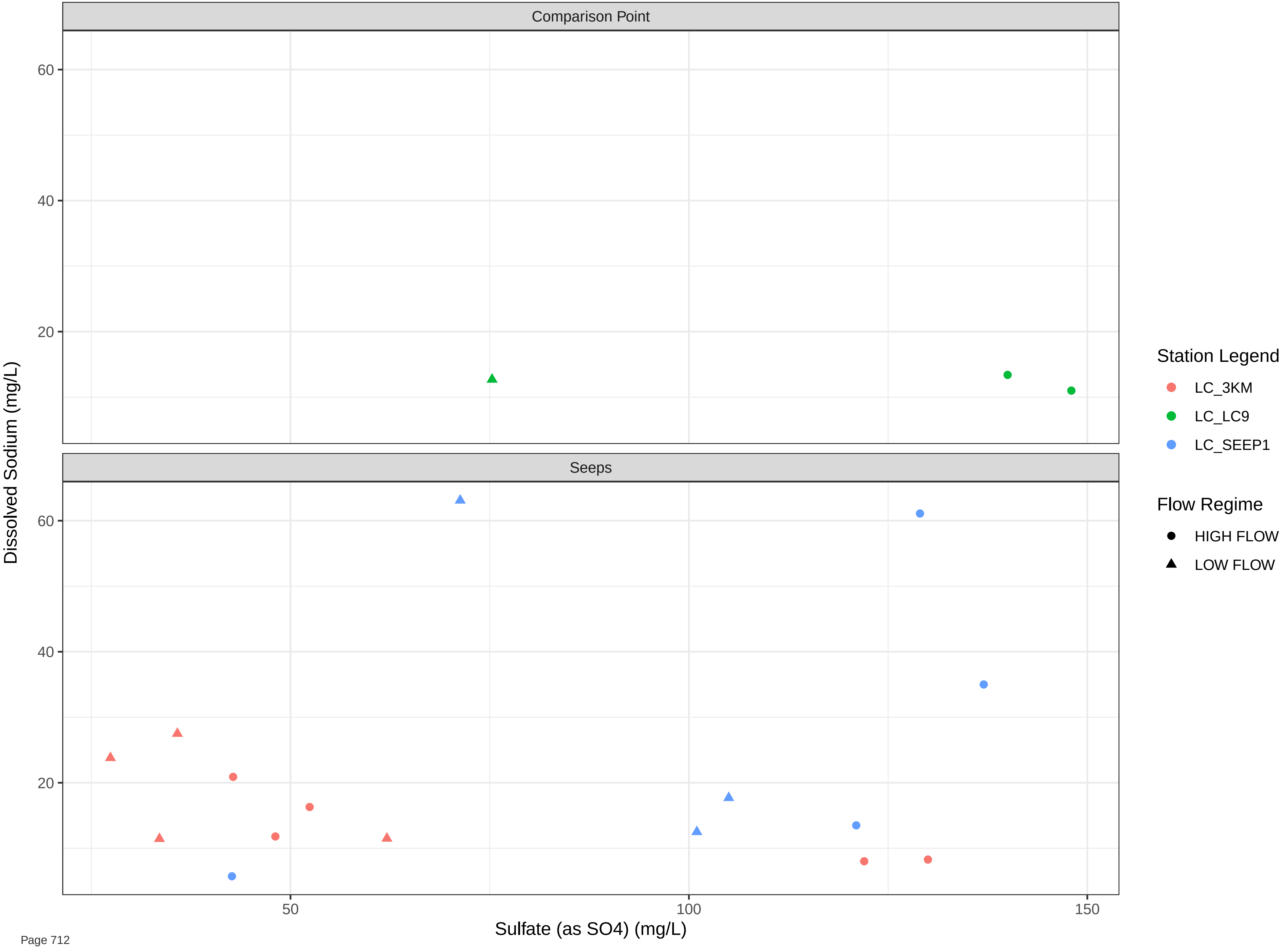
Comparison Point
Seeps
0.050
0.025
0.000
−0.025
Dissolved Silver (mg/L)
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

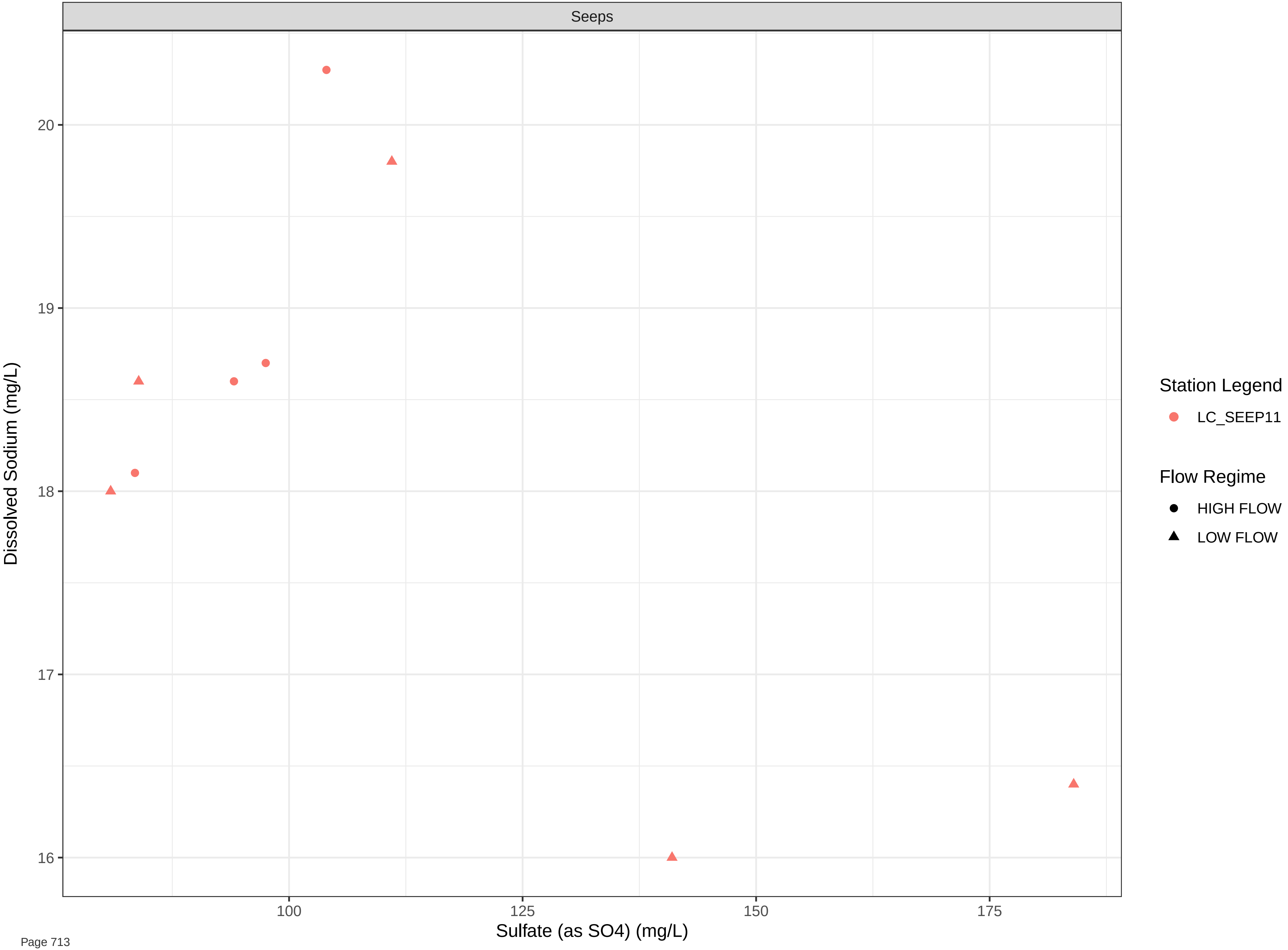

Comparison Point
Seeps
Dissolved Silver (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

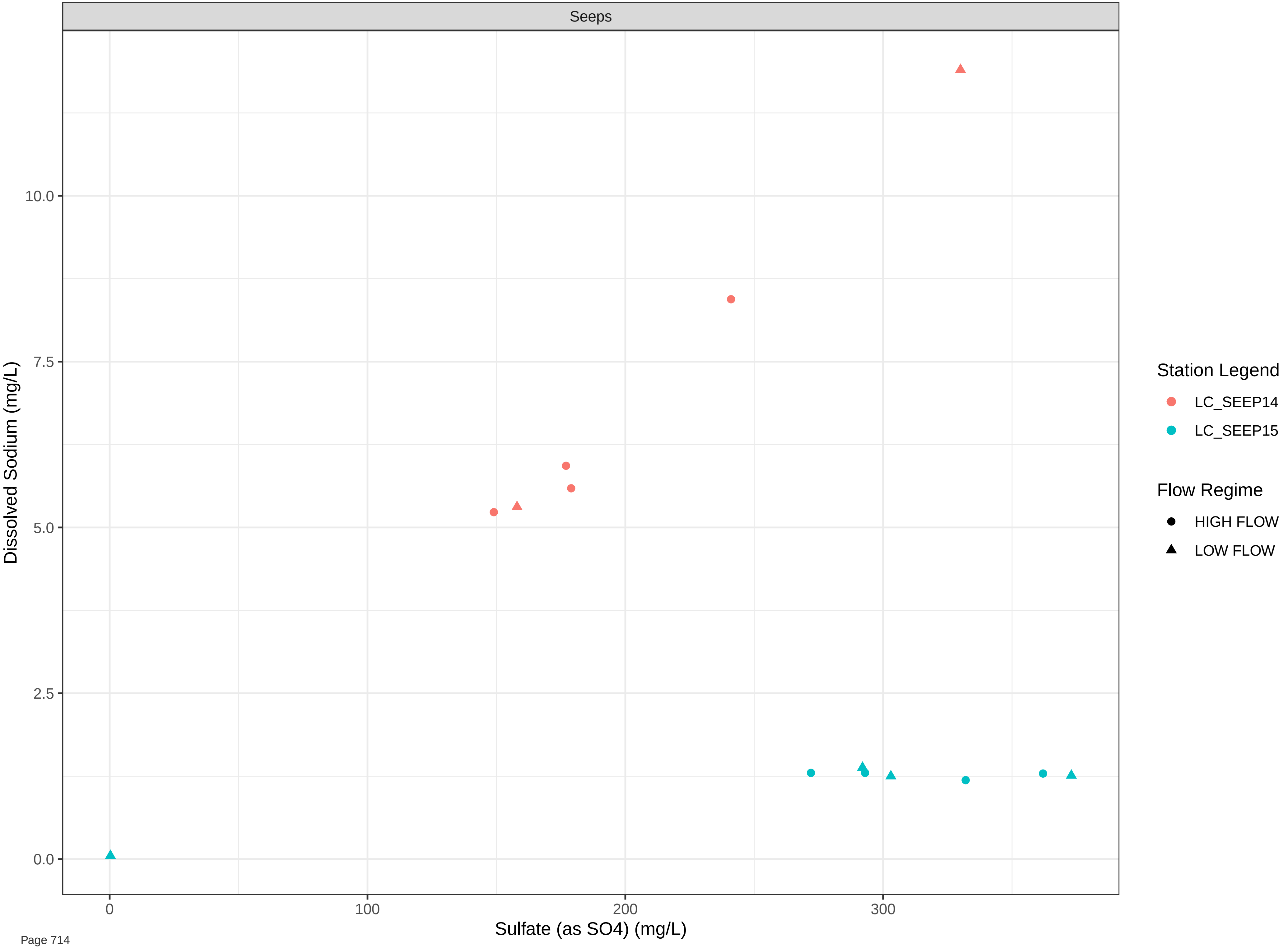


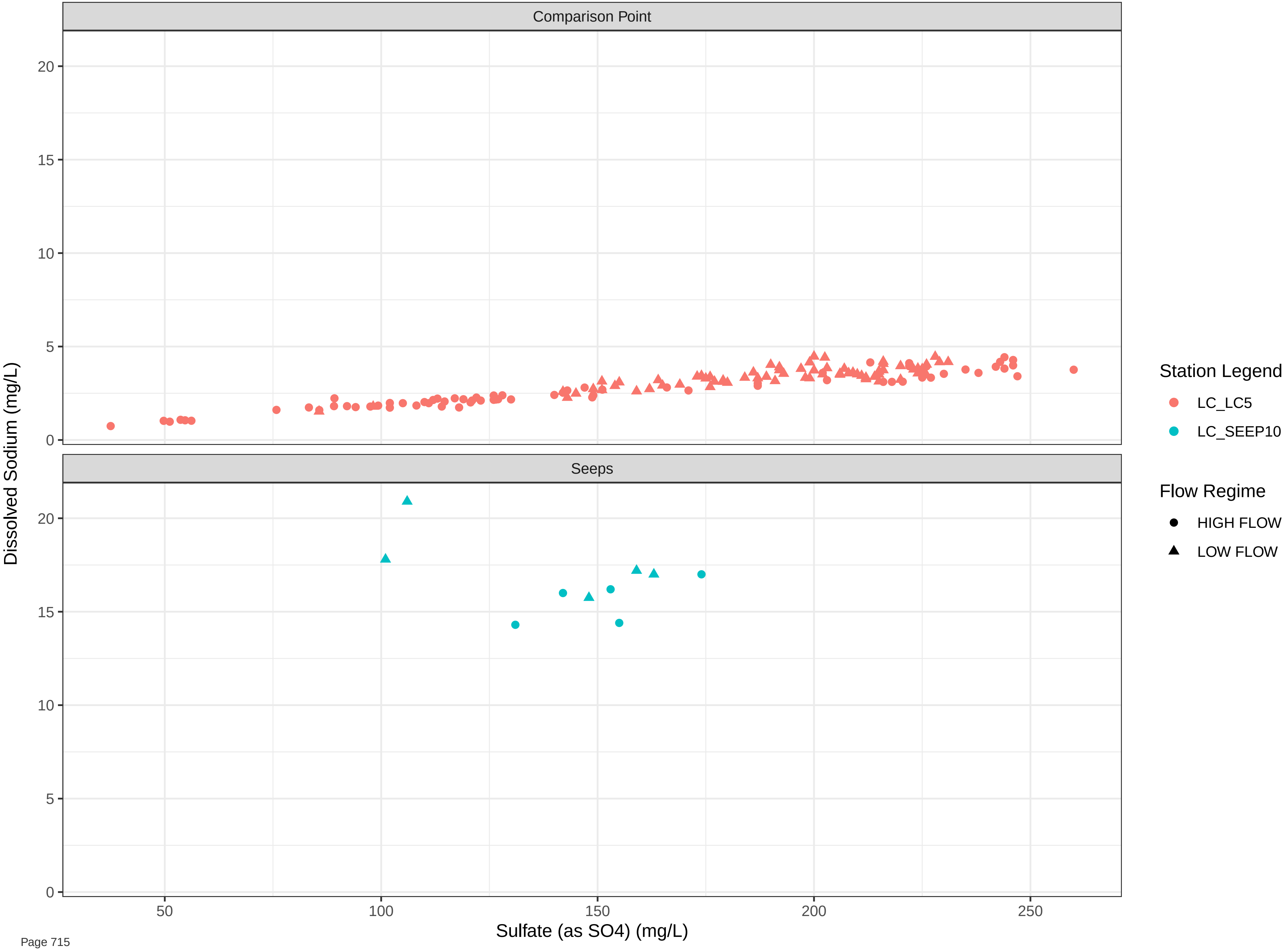
Comparison Point
Seeps
Dissolved Silver (mg/L)
2.0e−05
1.5e−05
1.0e−05
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

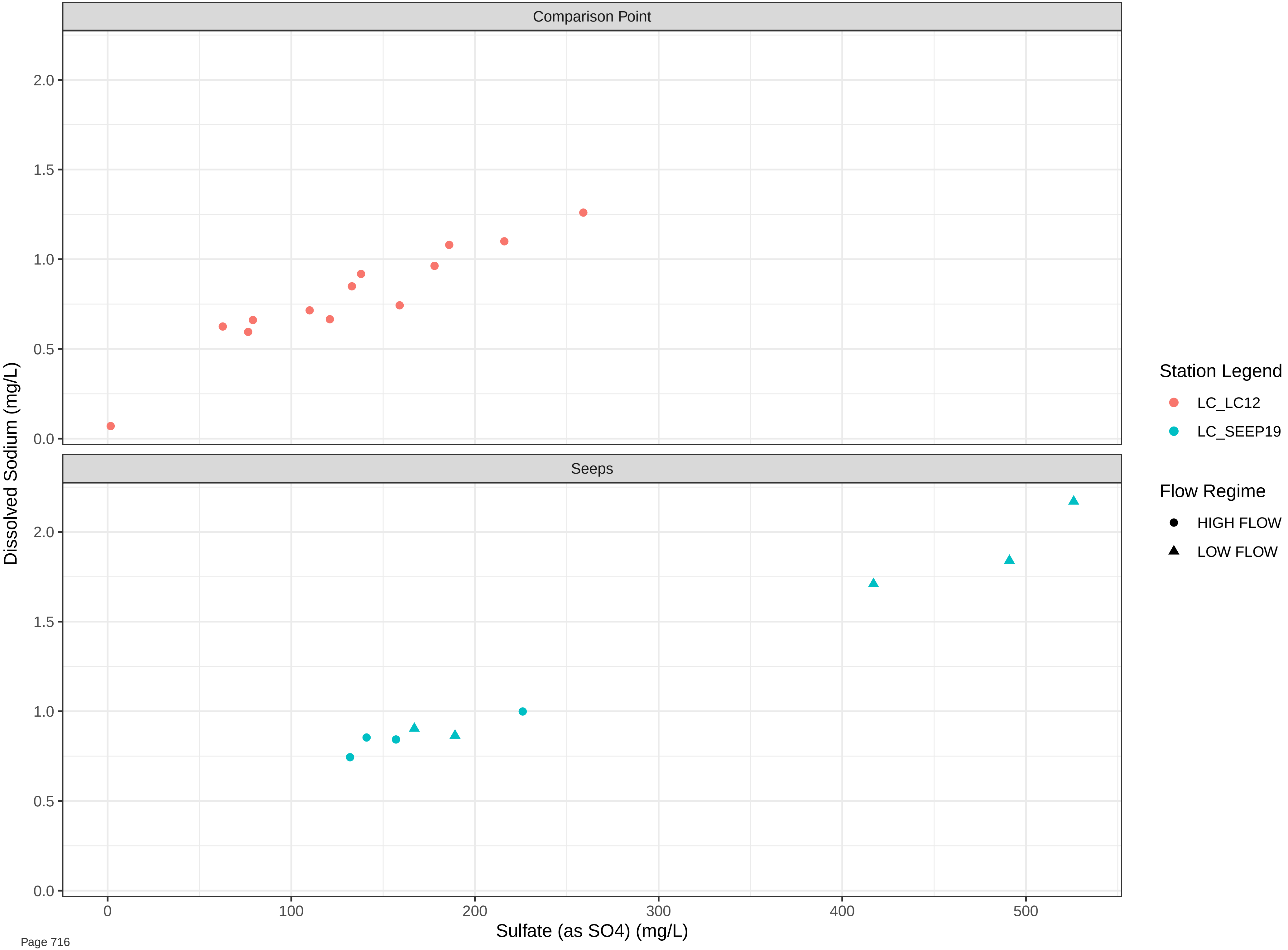

Comparison Point
Seeps
Dissolved Silver (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
60
40
20
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

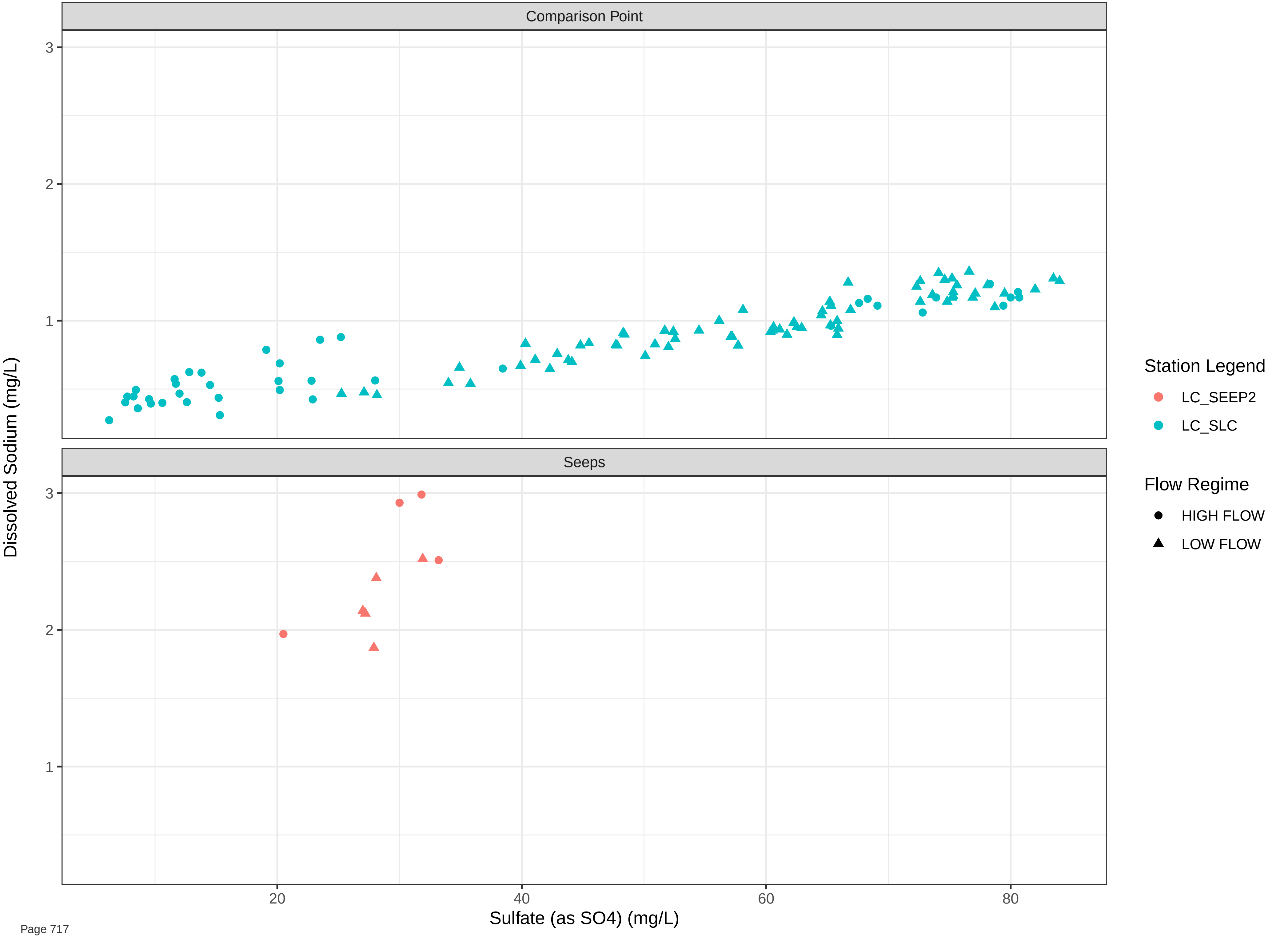

Seeps
20
19
18
17
16
Dissolved Sodium (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
Dissolved Sodium (mg/L)
0.0
2.5
5.0
7.5
10.0
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

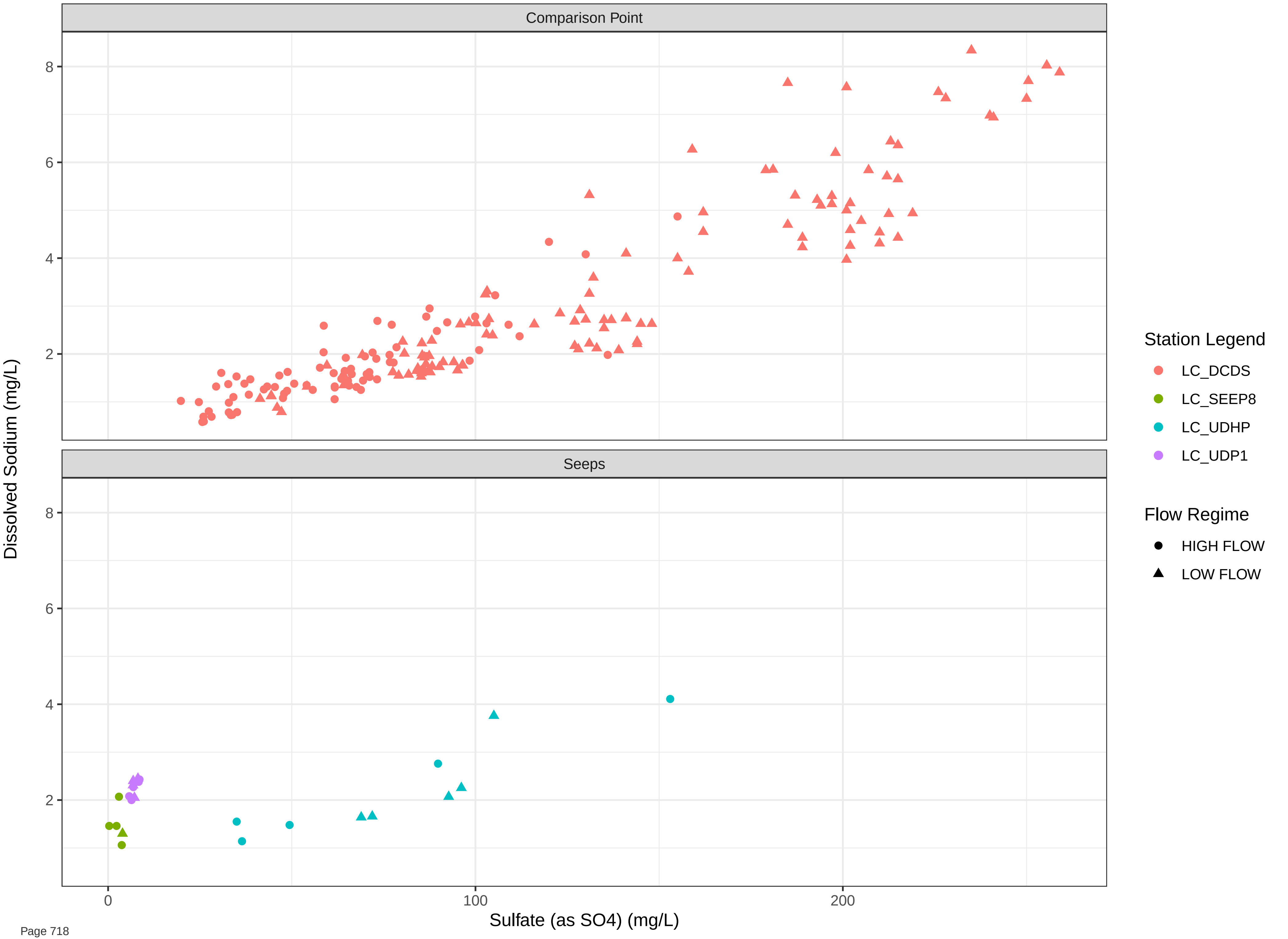

Comparison Point
Seeps
Dissolved Sodium (mg/L)
0
5
10
15
20
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



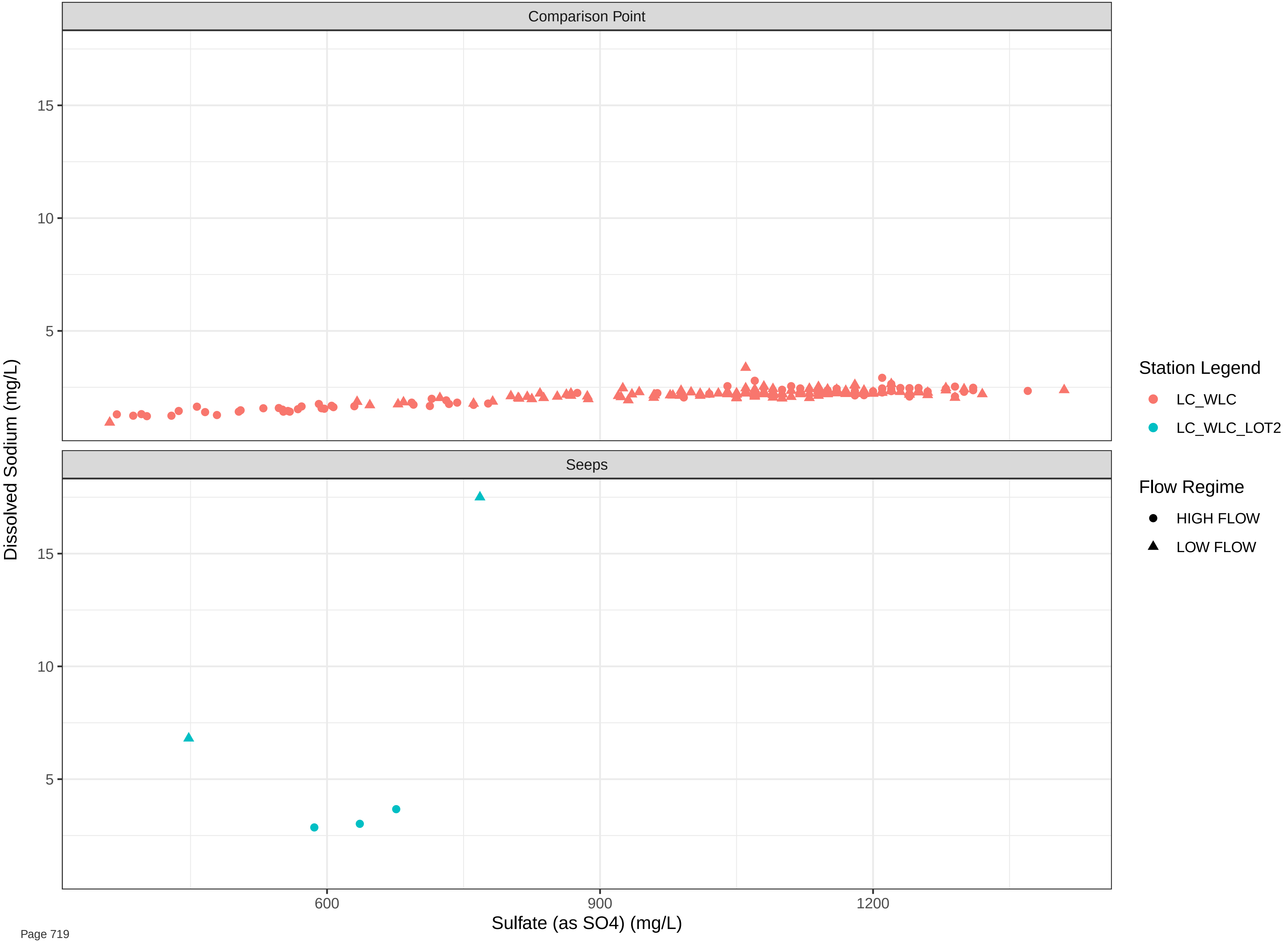
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.5
1.0
1.5
2.0
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



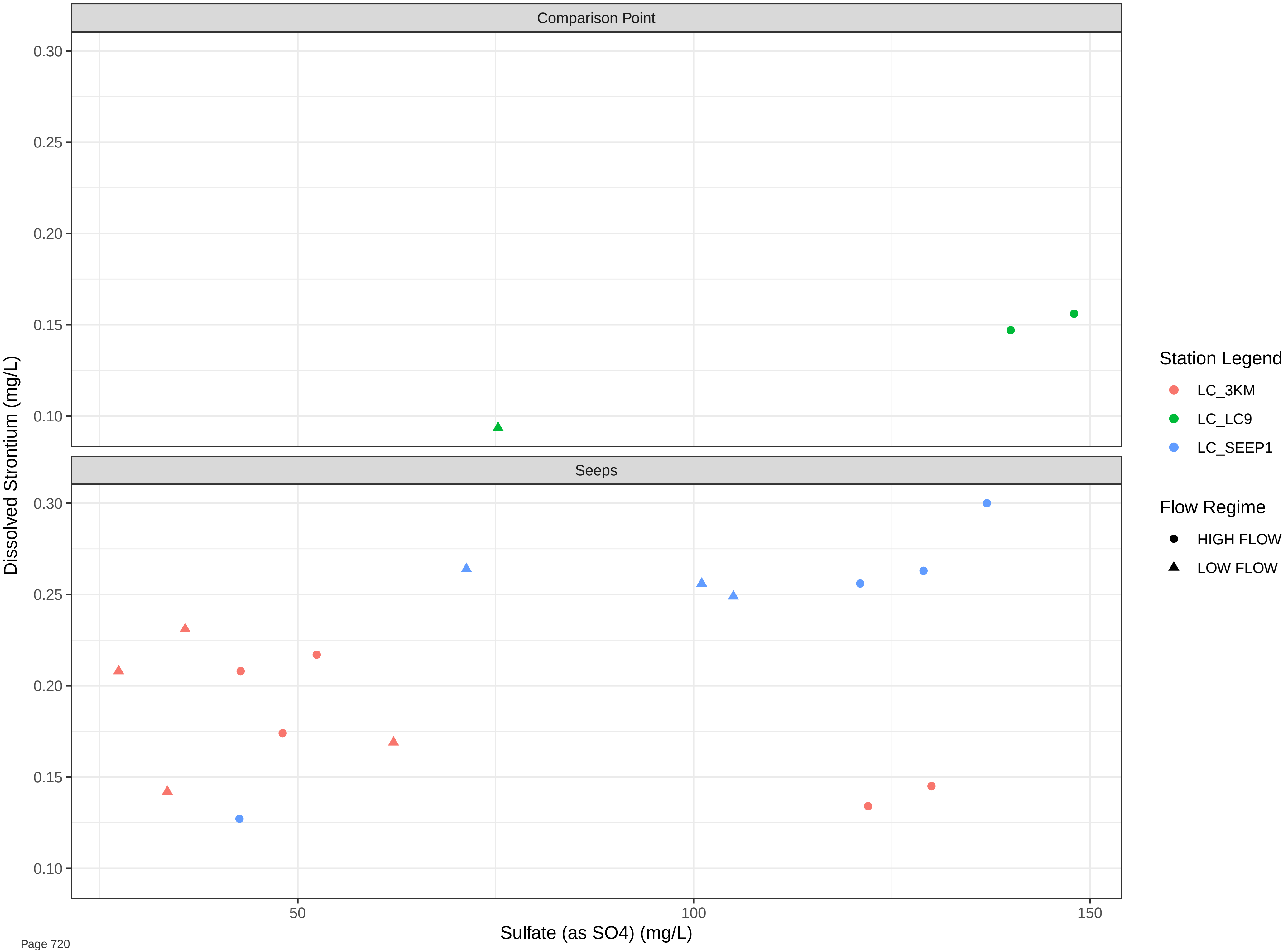
Comparison Point
Seeps
3
2
1
20
40
60
80
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

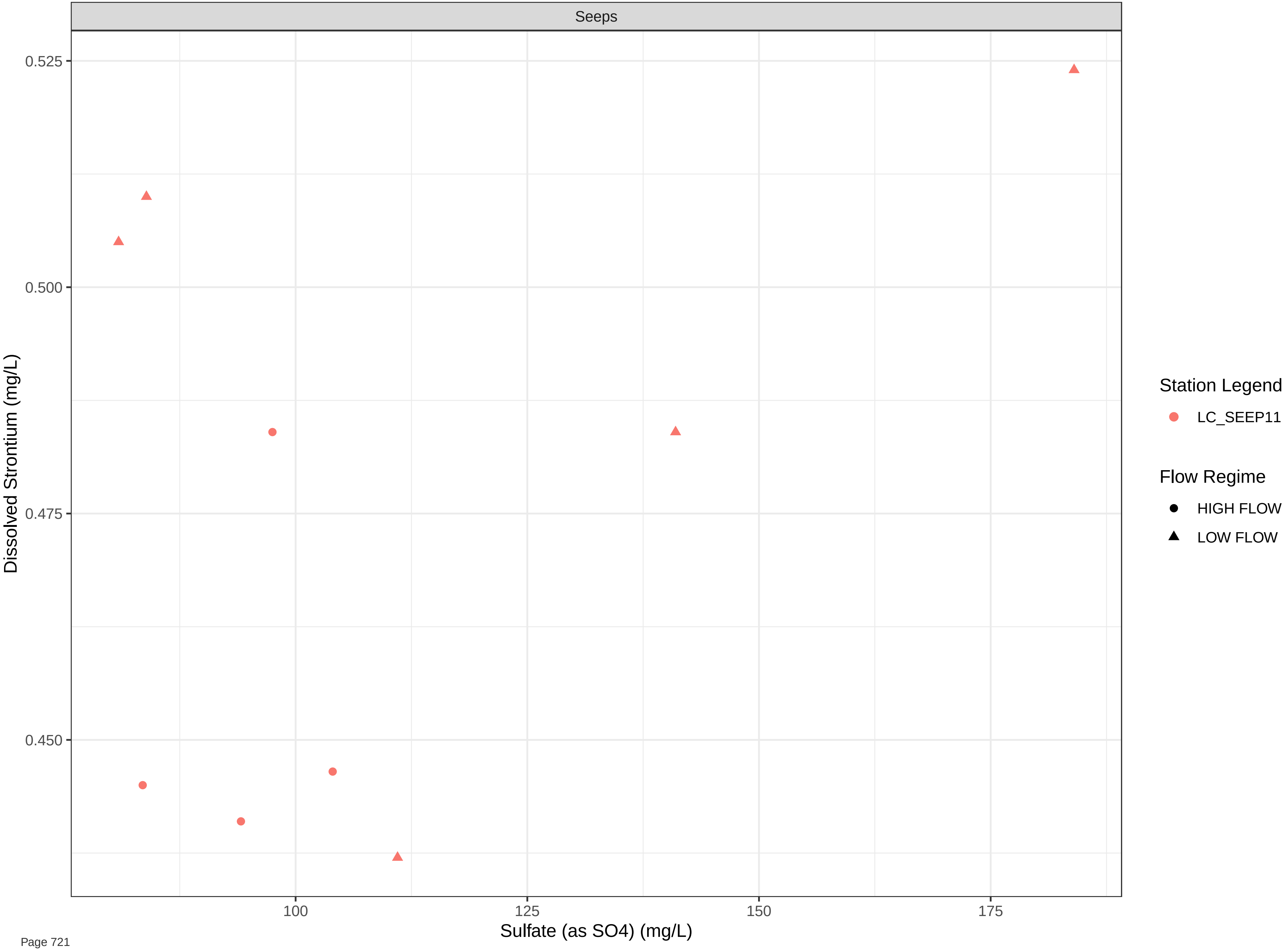


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
8
6
4
2
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

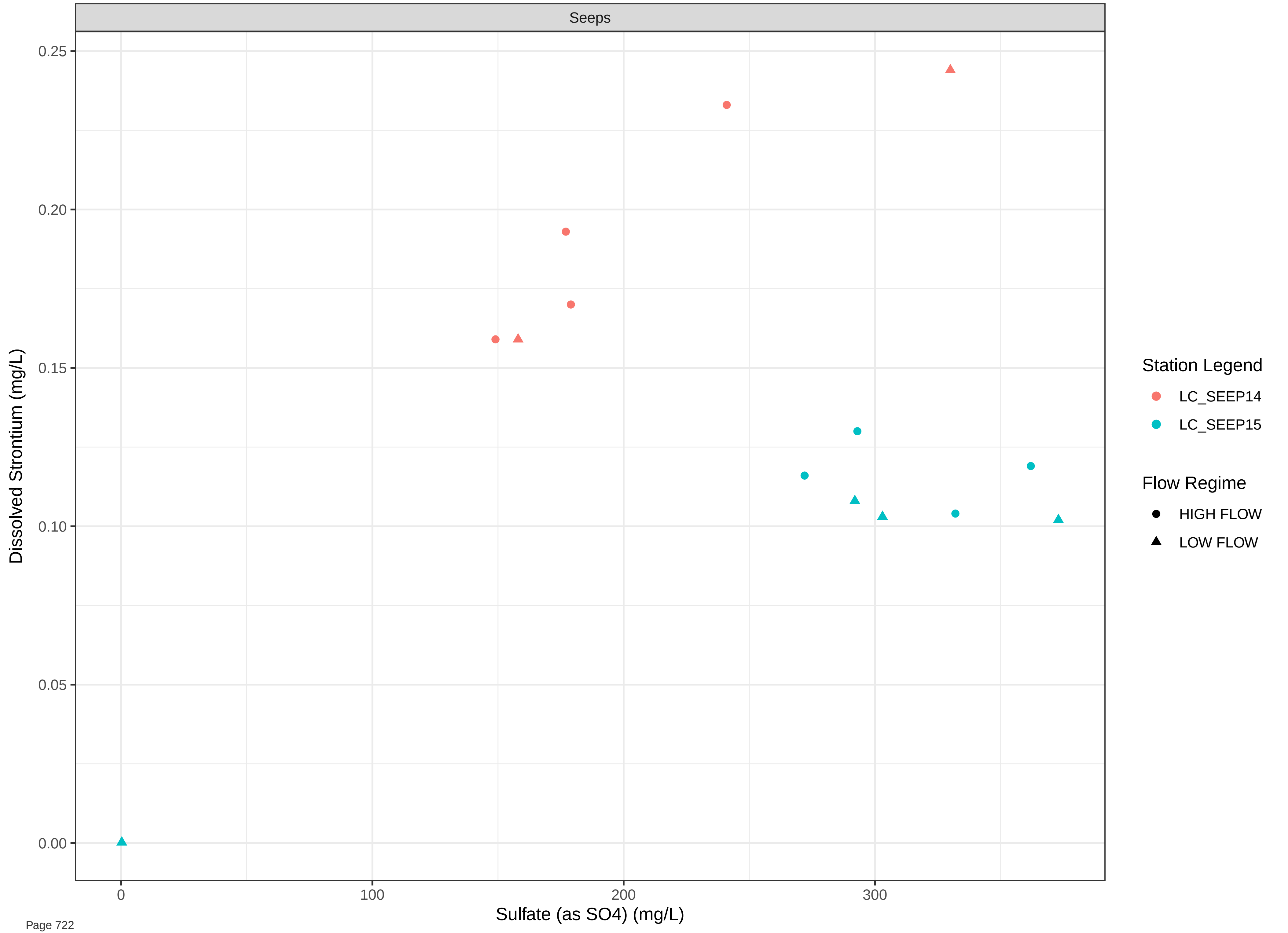


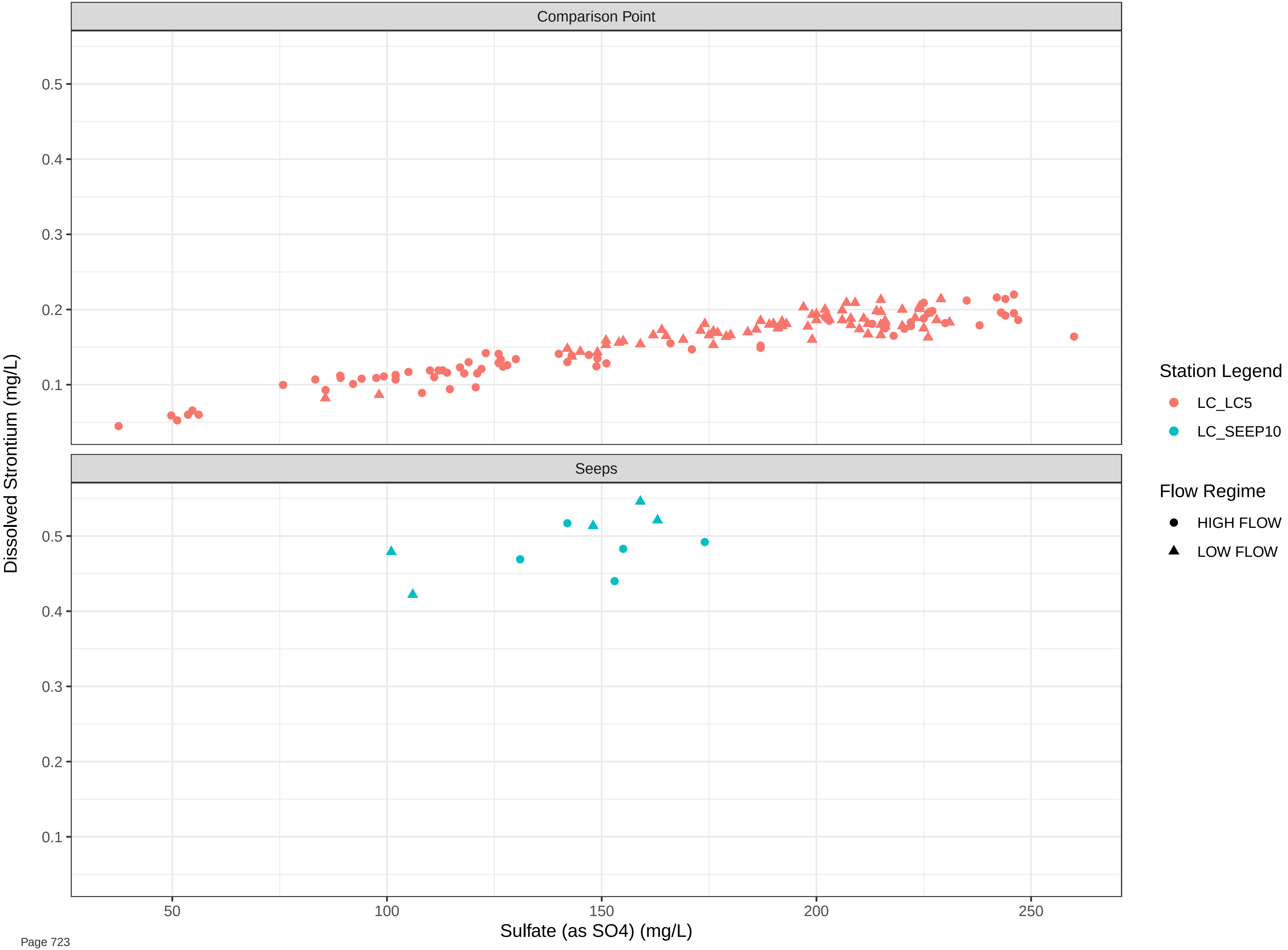
Comparison Point
Seeps
Dissolved Sodium (mg/L)
15
10
5
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

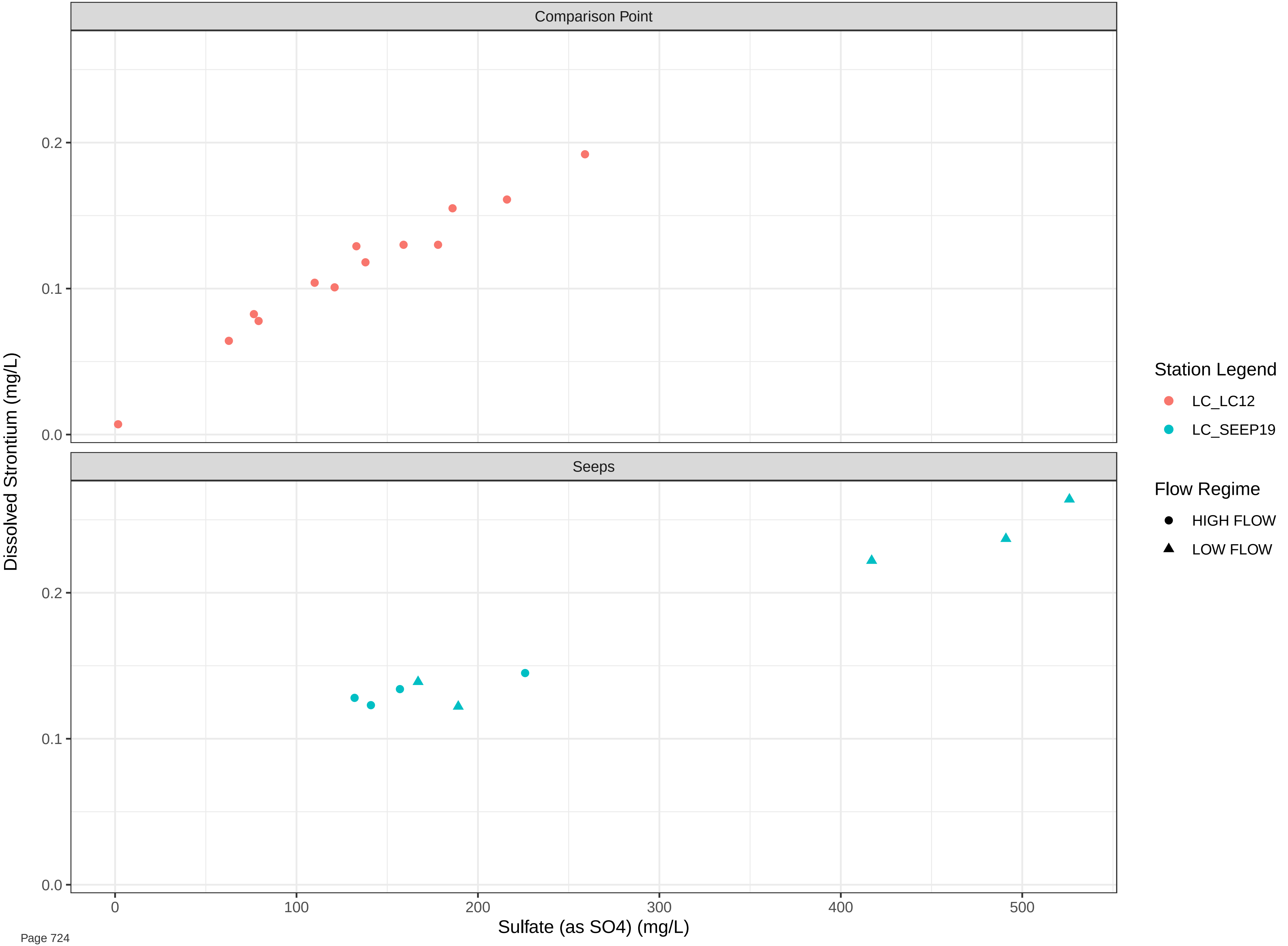

Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.30
0.25
0.20
0.15
0.10
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

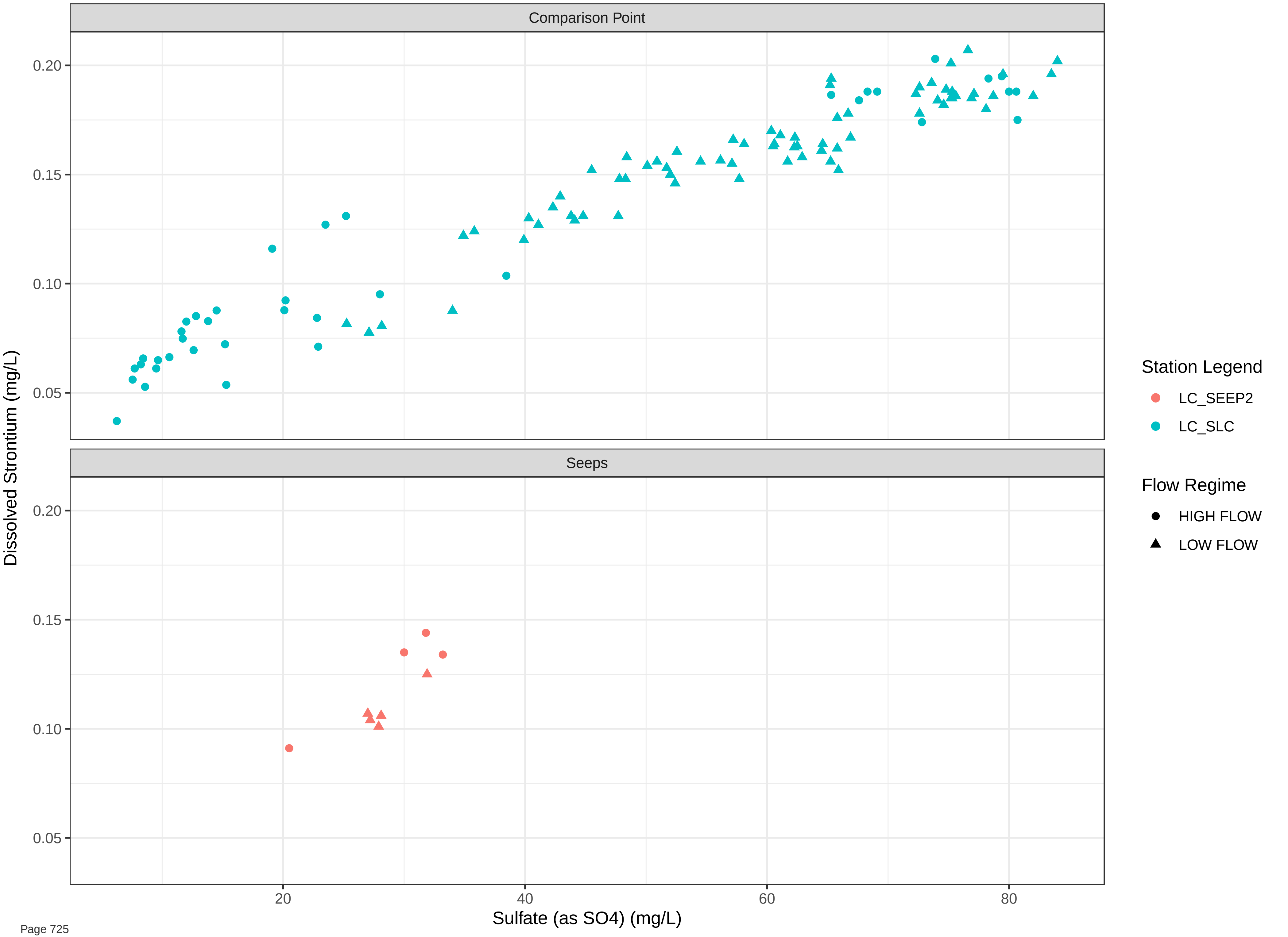


Seeps
0.525
0.500
0.475
0.450
100
125
150
175
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

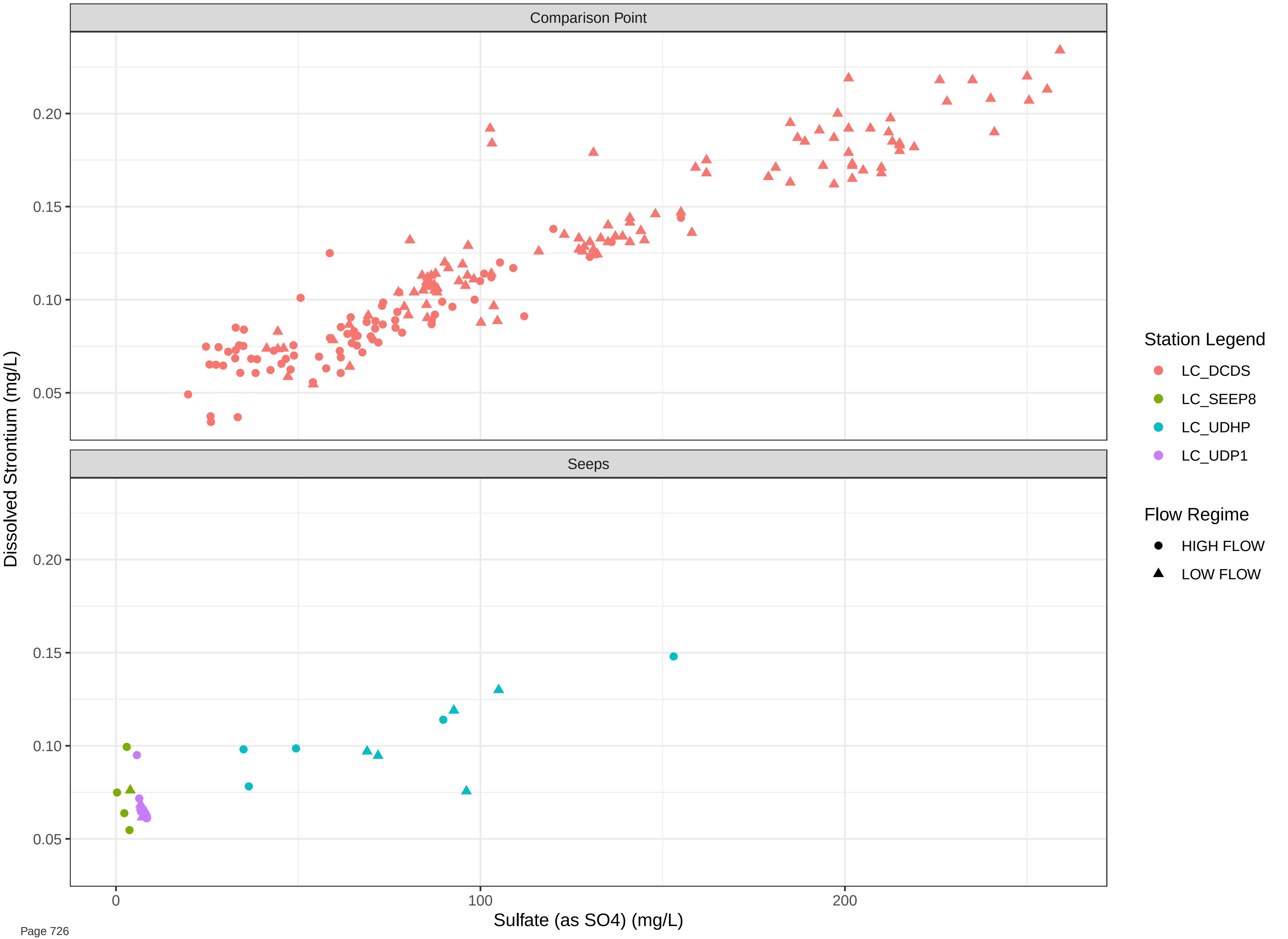

Seeps
Dissolved Strontium (mg/L)
0.25
0.20
0.15
0.10
0.05
0.00
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

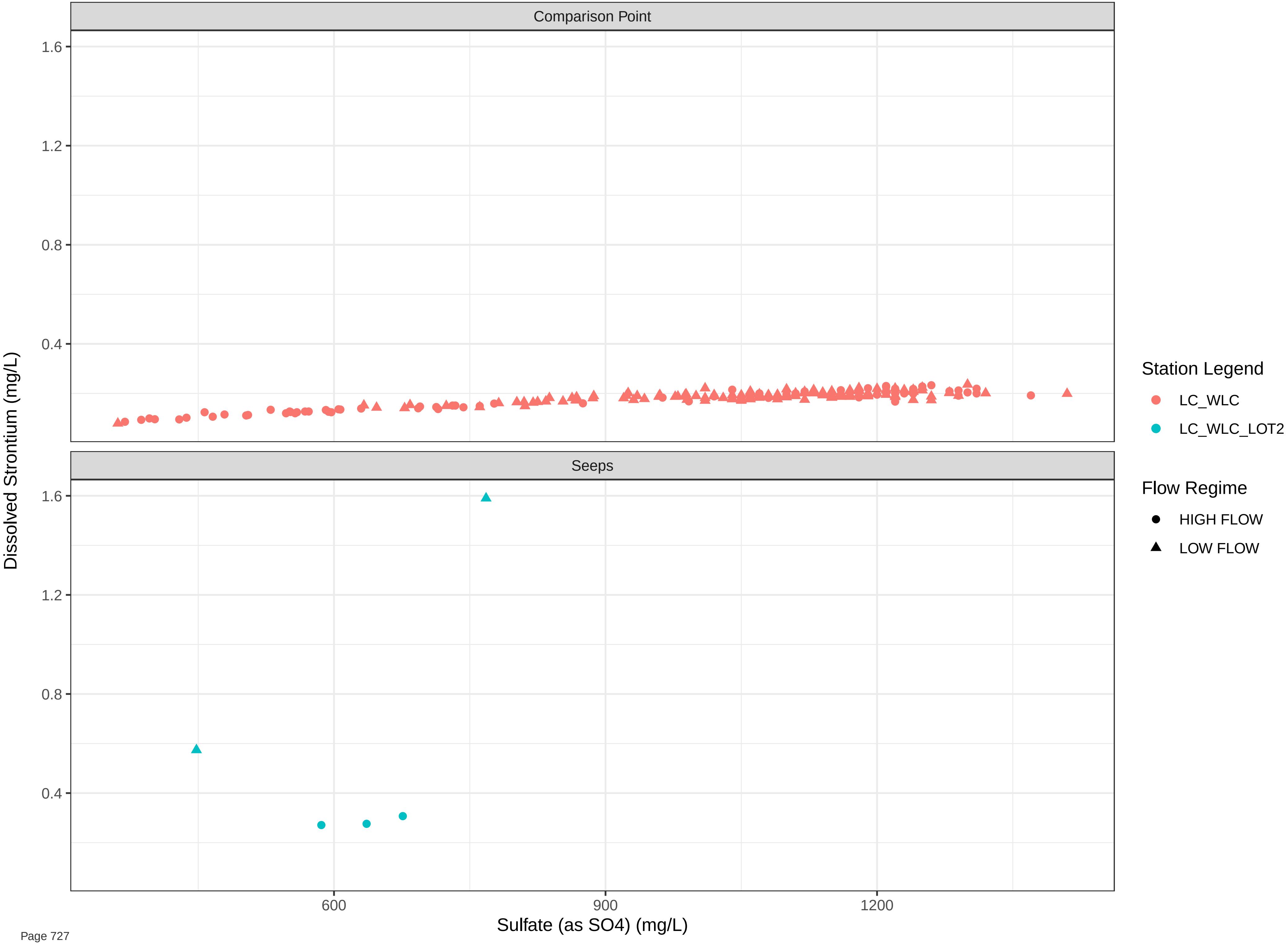

Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.5
0.4
0.3
0.2
0.1
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

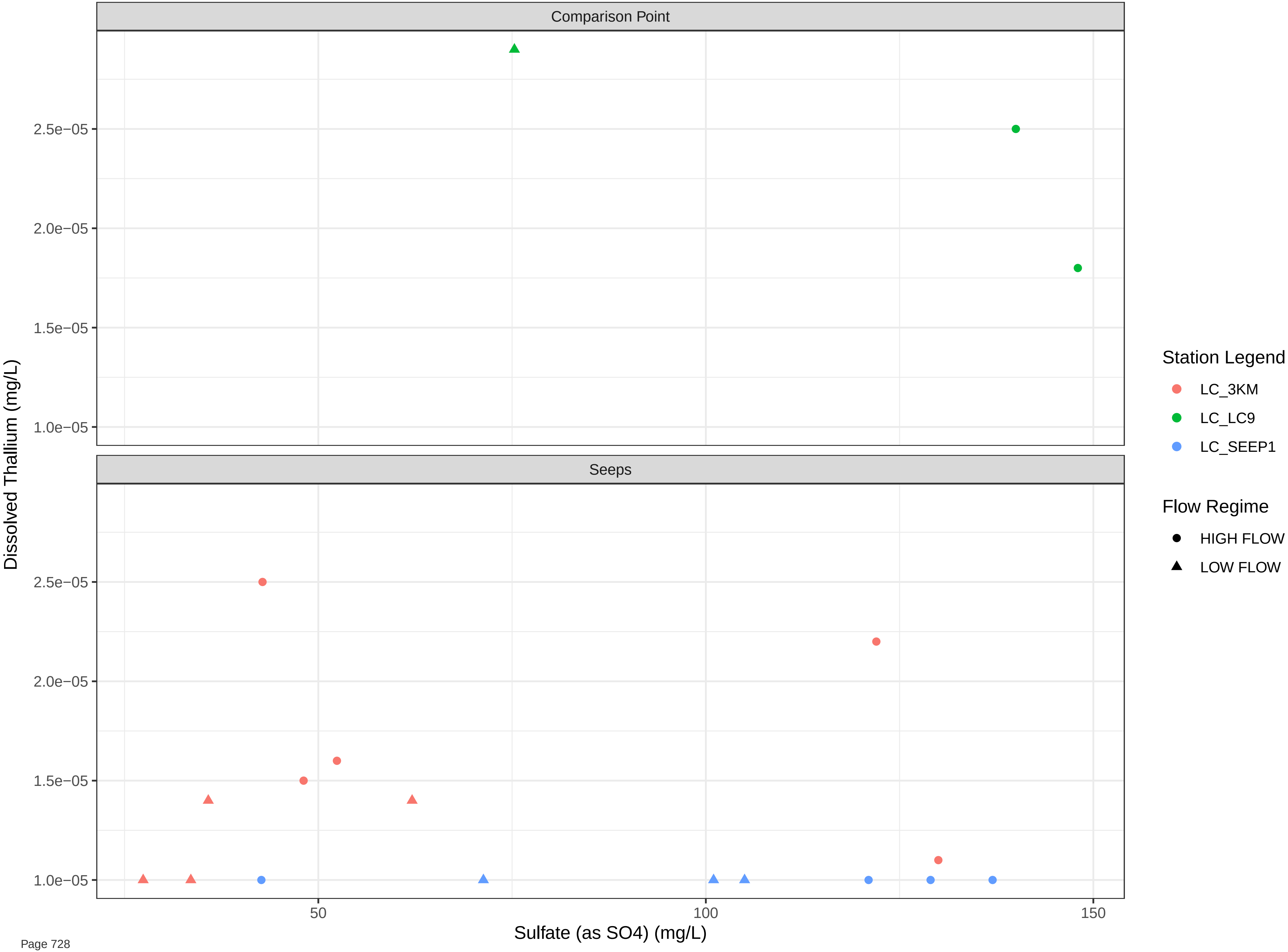

Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

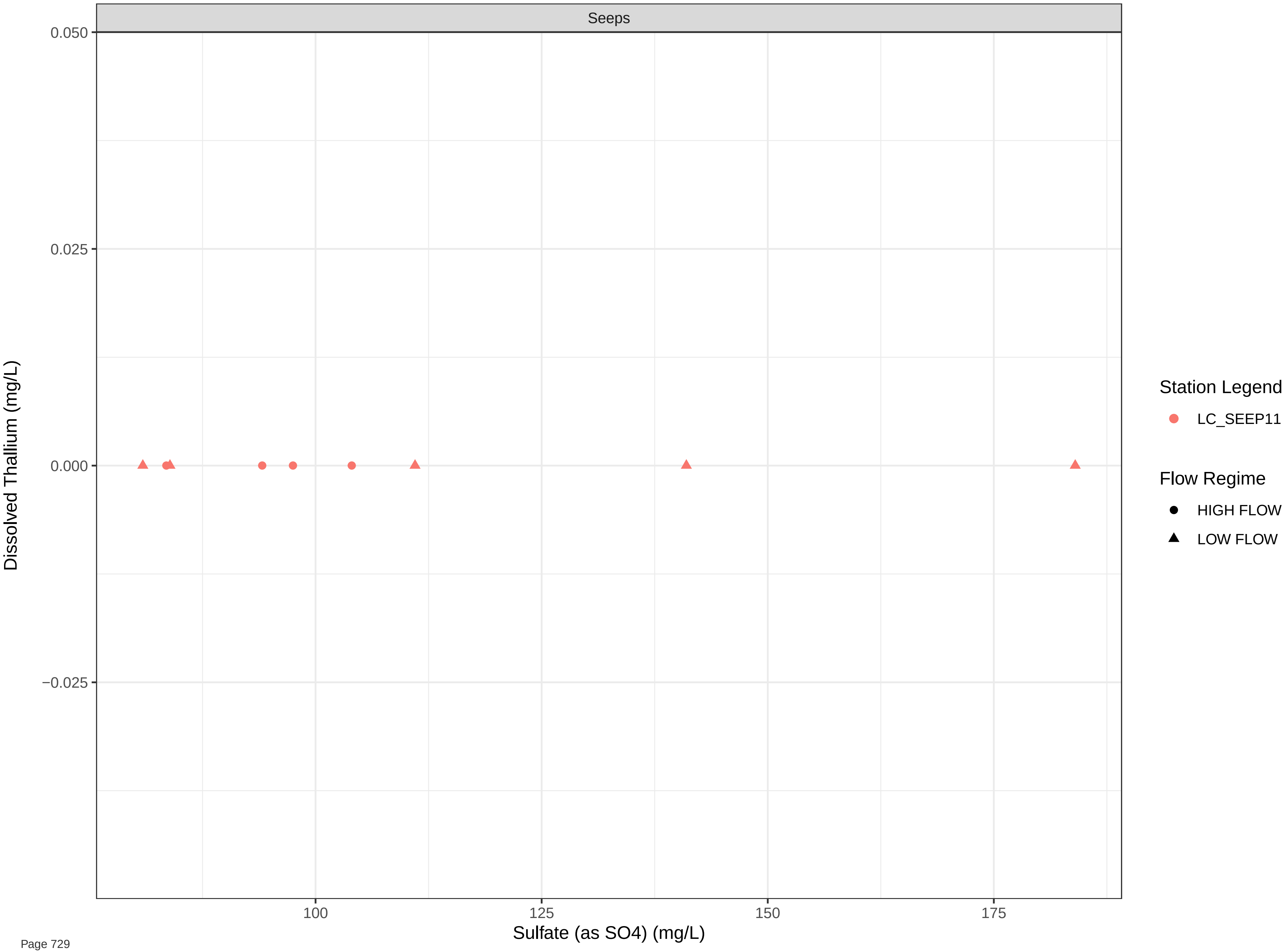


Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.20
0.15
0.10
0.05
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

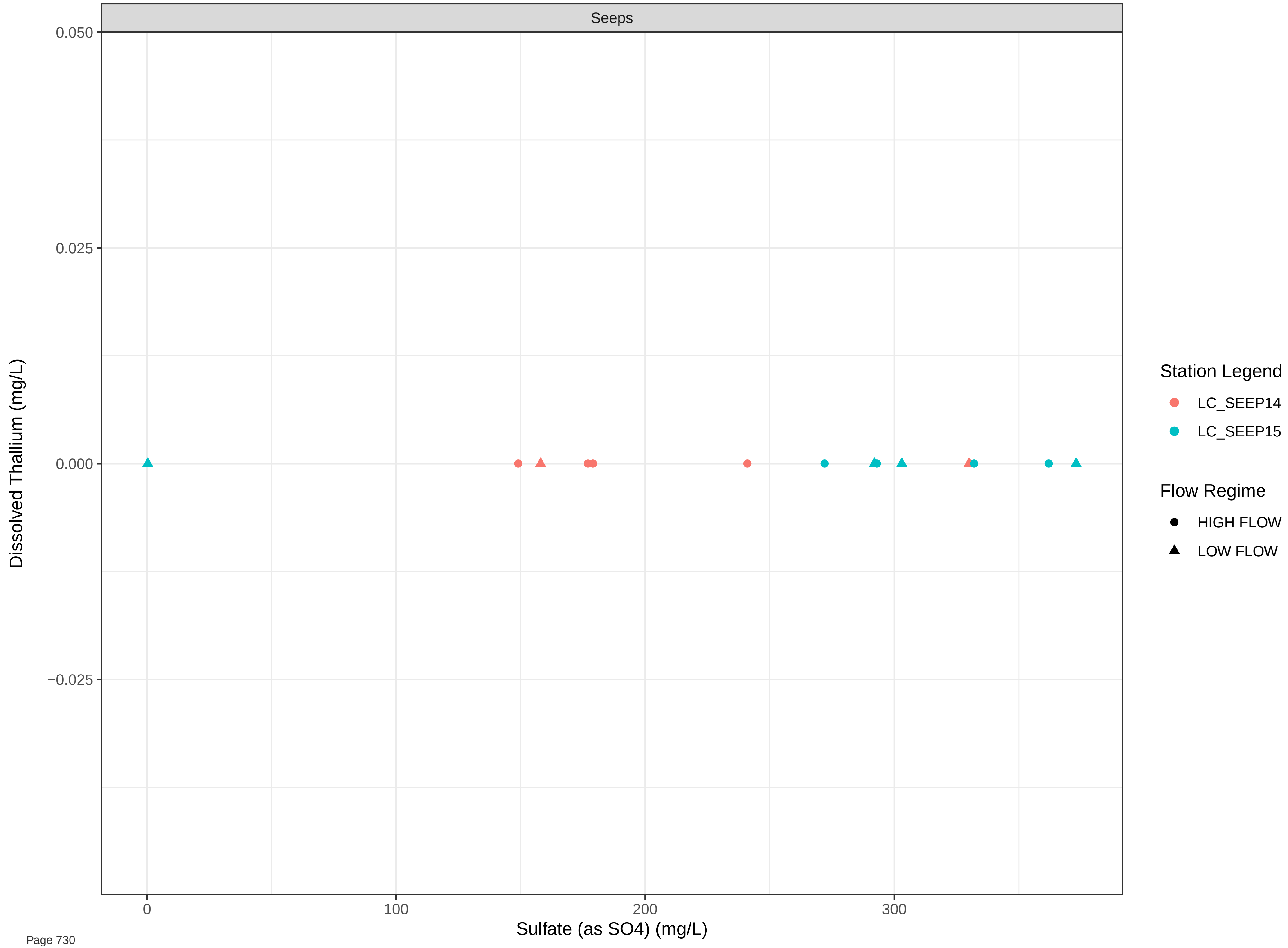

Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.05
0.10
0.15
0.20
Sulfate (as SO4) (mg/L)
0
100
200
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
1.6
1.2
0.8
0.4
600
900
1200
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

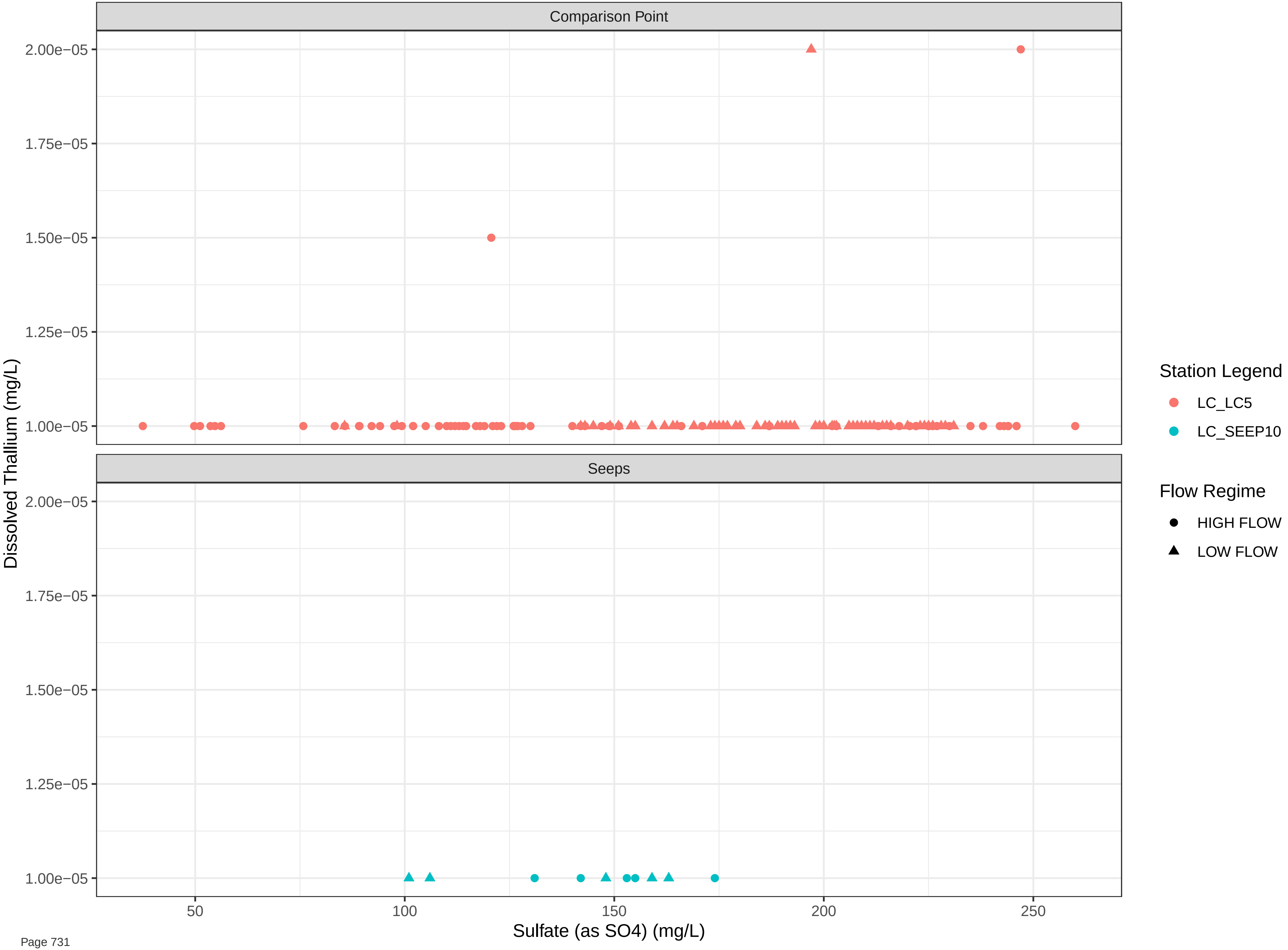

Comparison Point
Seeps
Dissolved Thallium (mg/L)
2.5e−05
2.0e−05
1.5e−05
1.0e−05
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



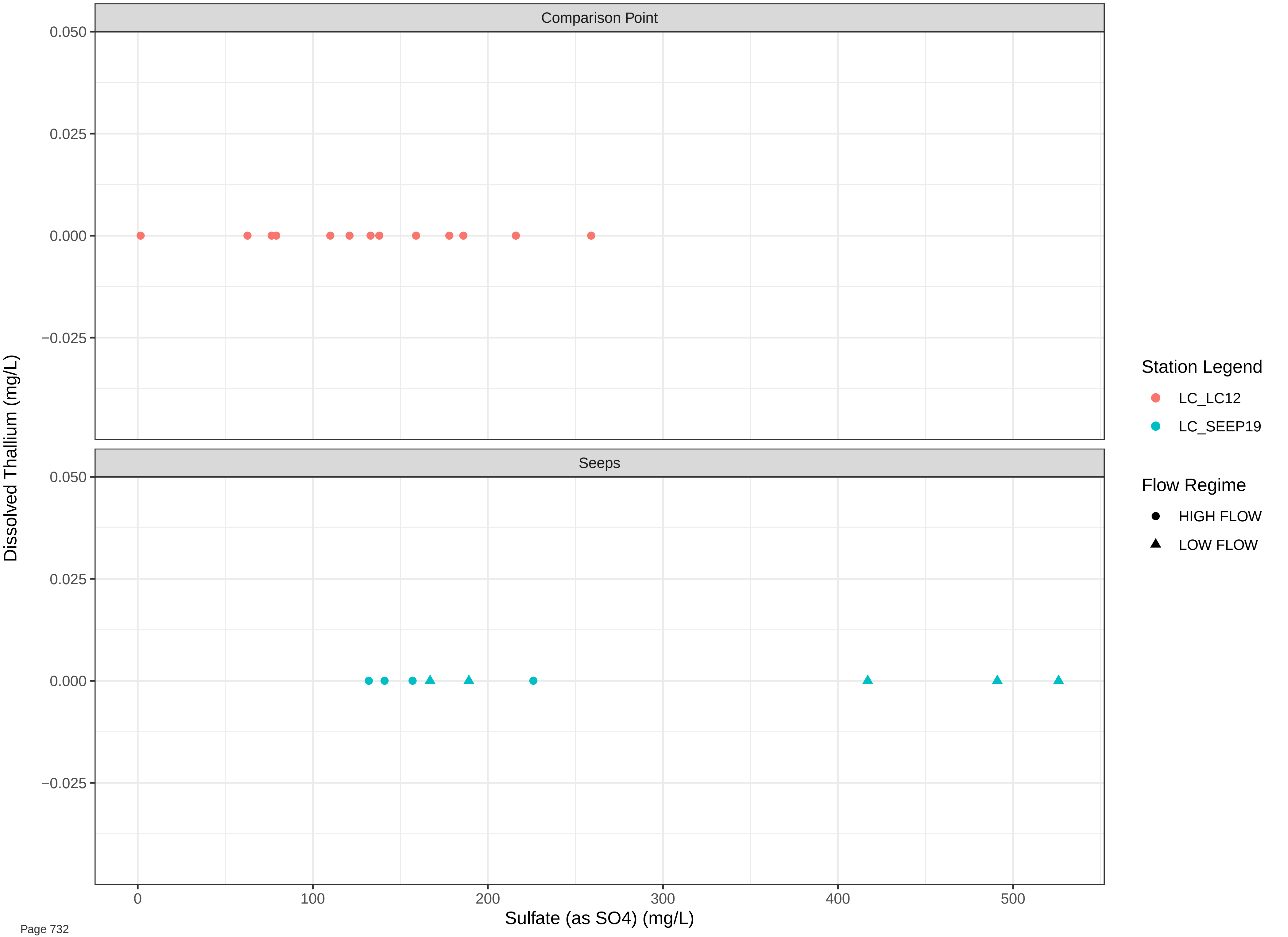
Seeps
0.050
0.025
0.000
−0.025
Dissolved Thallium (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



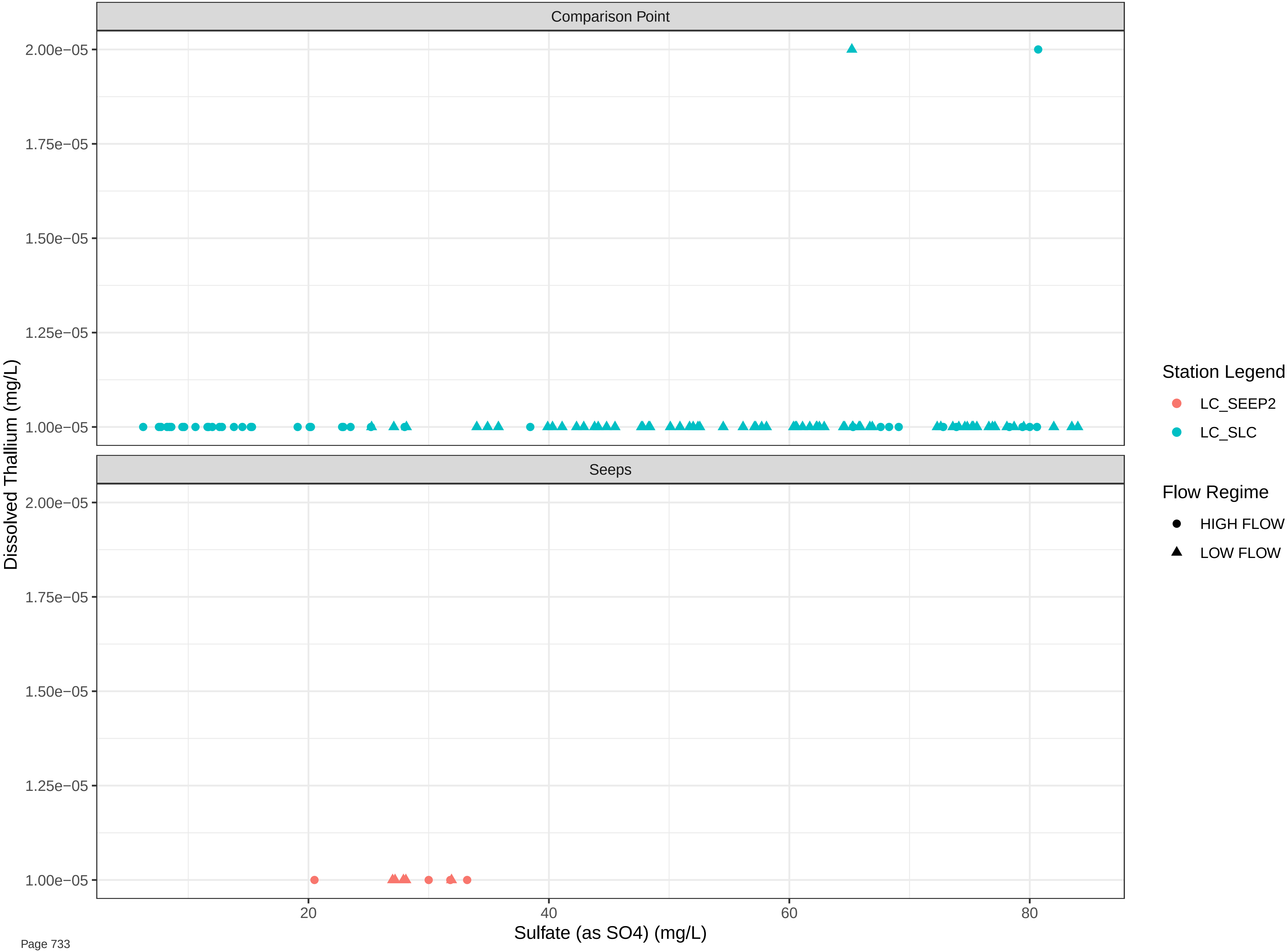
Seeps
0.050
0.025
0.000
−0.025
0
100
200
300
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



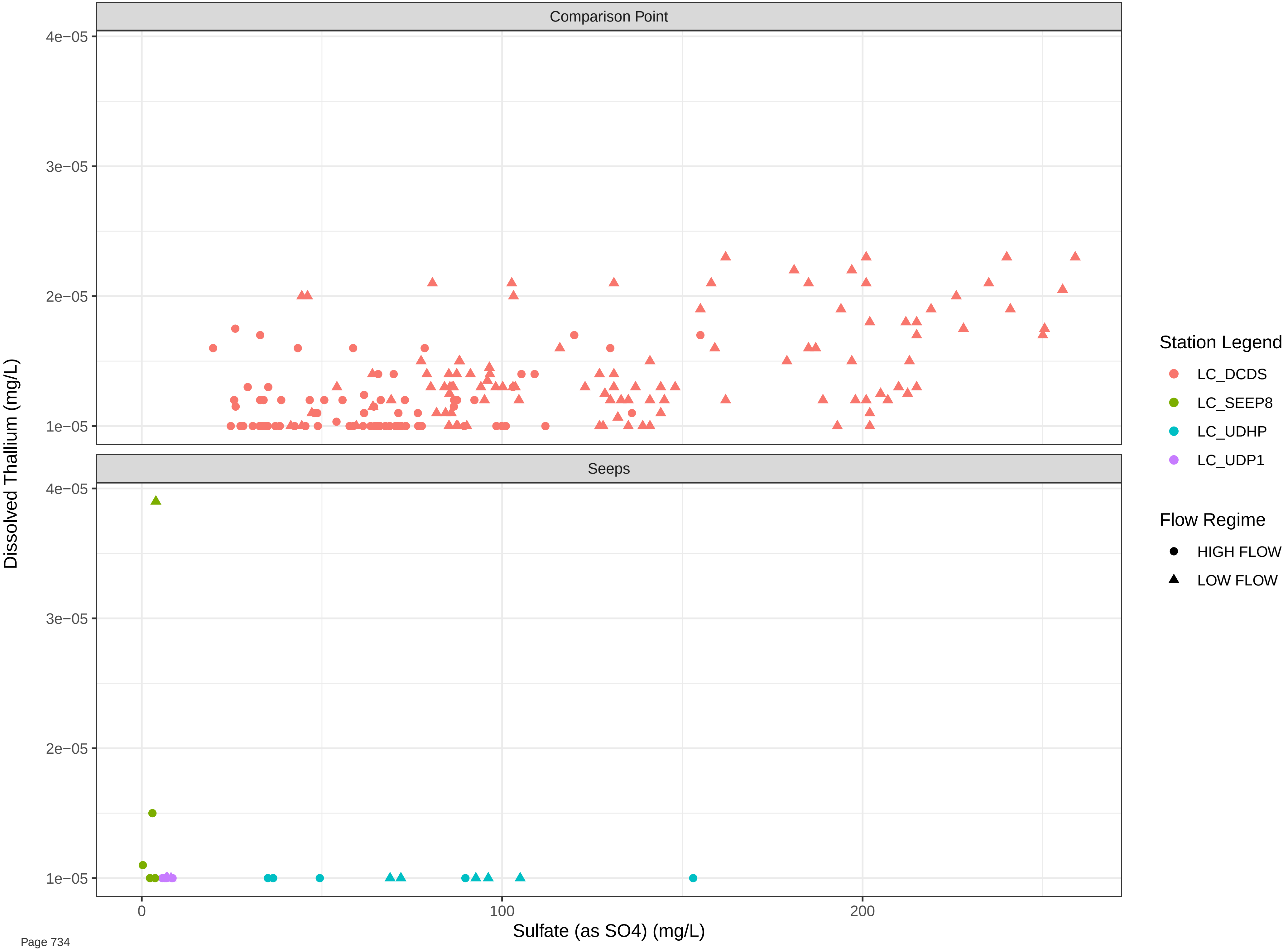
Comparison Point
Seeps
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
Dissolved Thallium (mg/L)
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



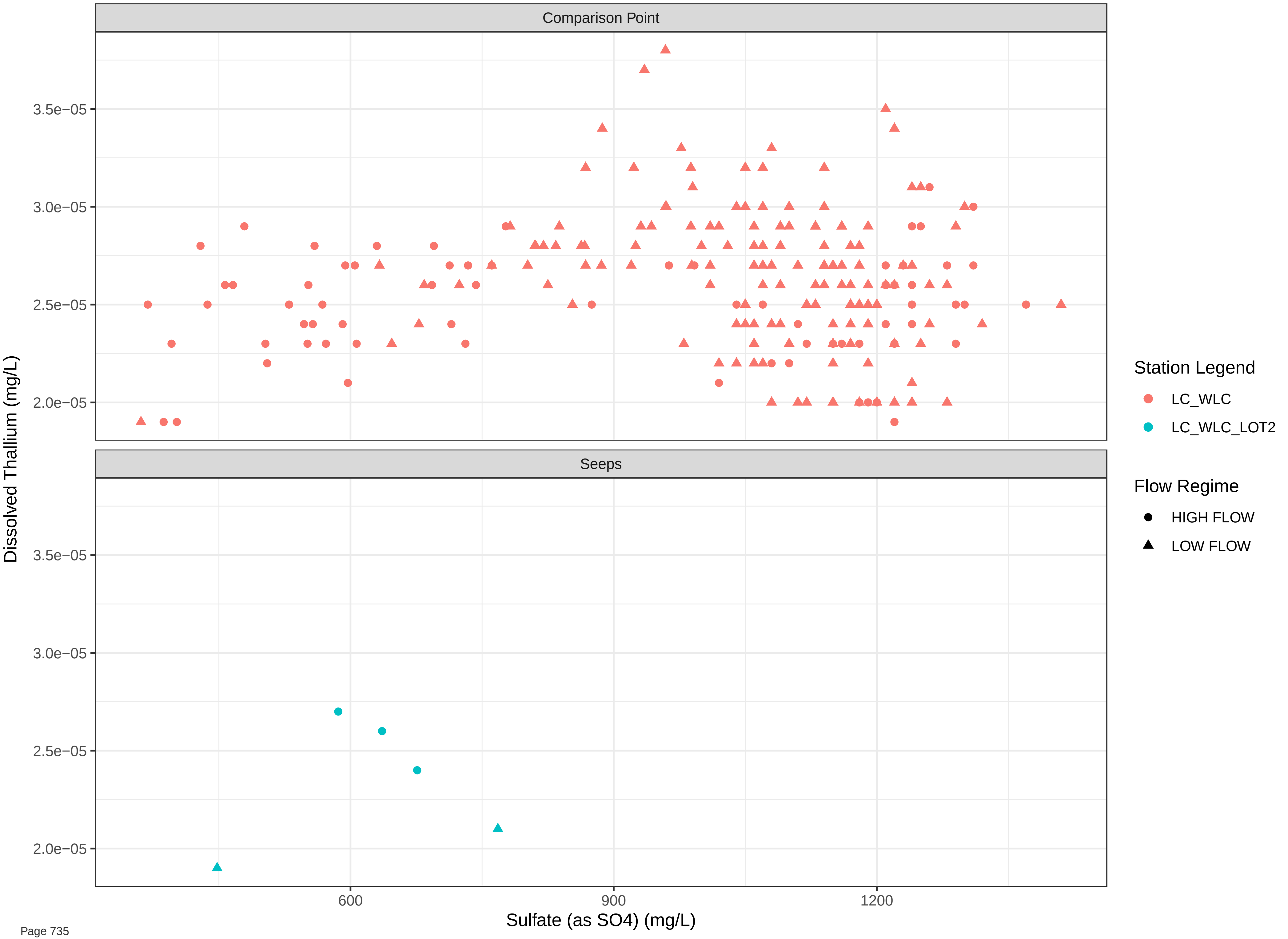
Comparison Point
Seeps
0.050
0.025
0.000
−0.025
0
100
200
300
400
500
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW



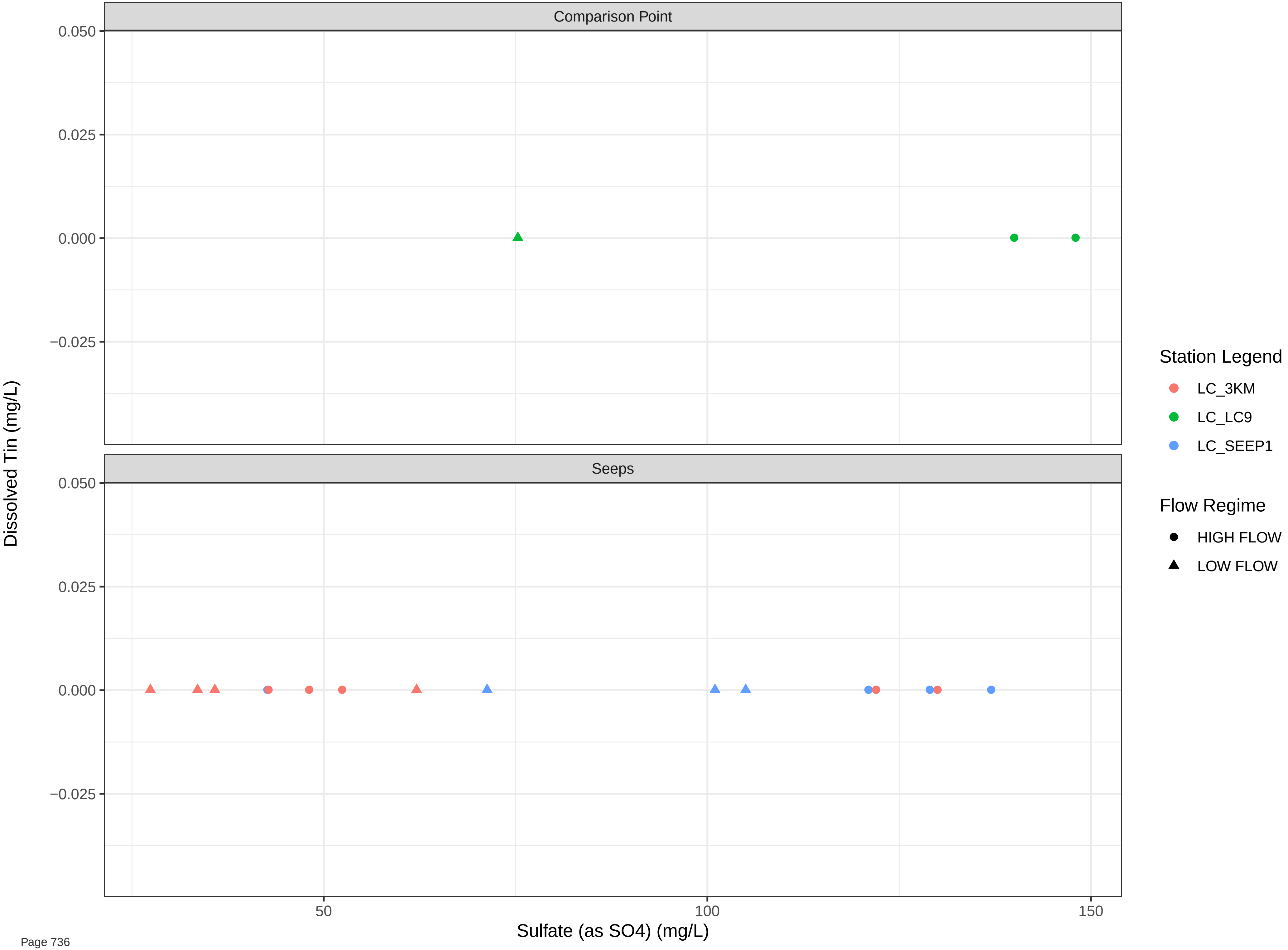
Comparison Point
Seeps
Dissolved Thallium (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW



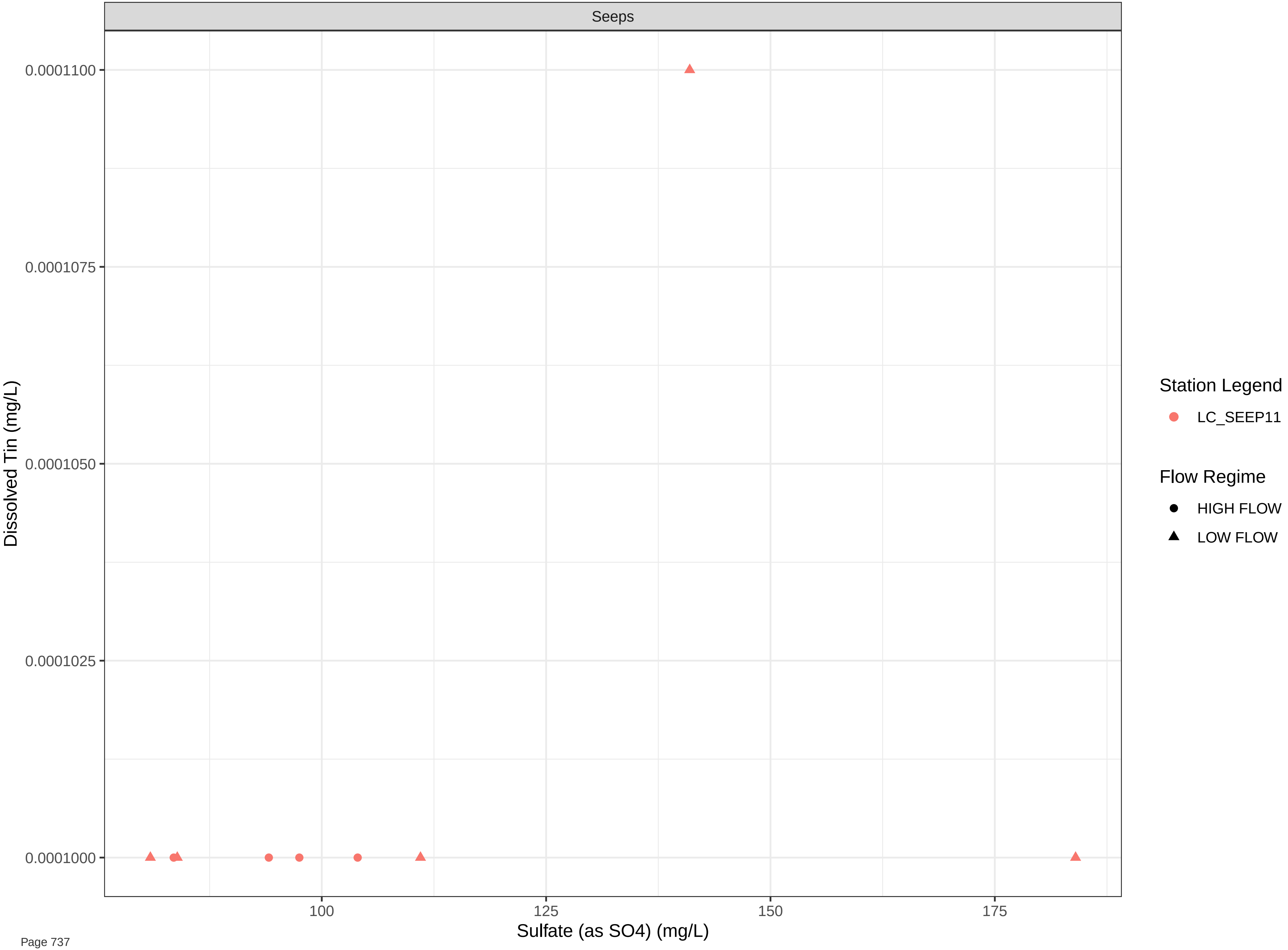
Comparison Point
Seeps
Dissolved Thallium (mg/L)
4e−05
3e−05
2e−05
1e−05
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



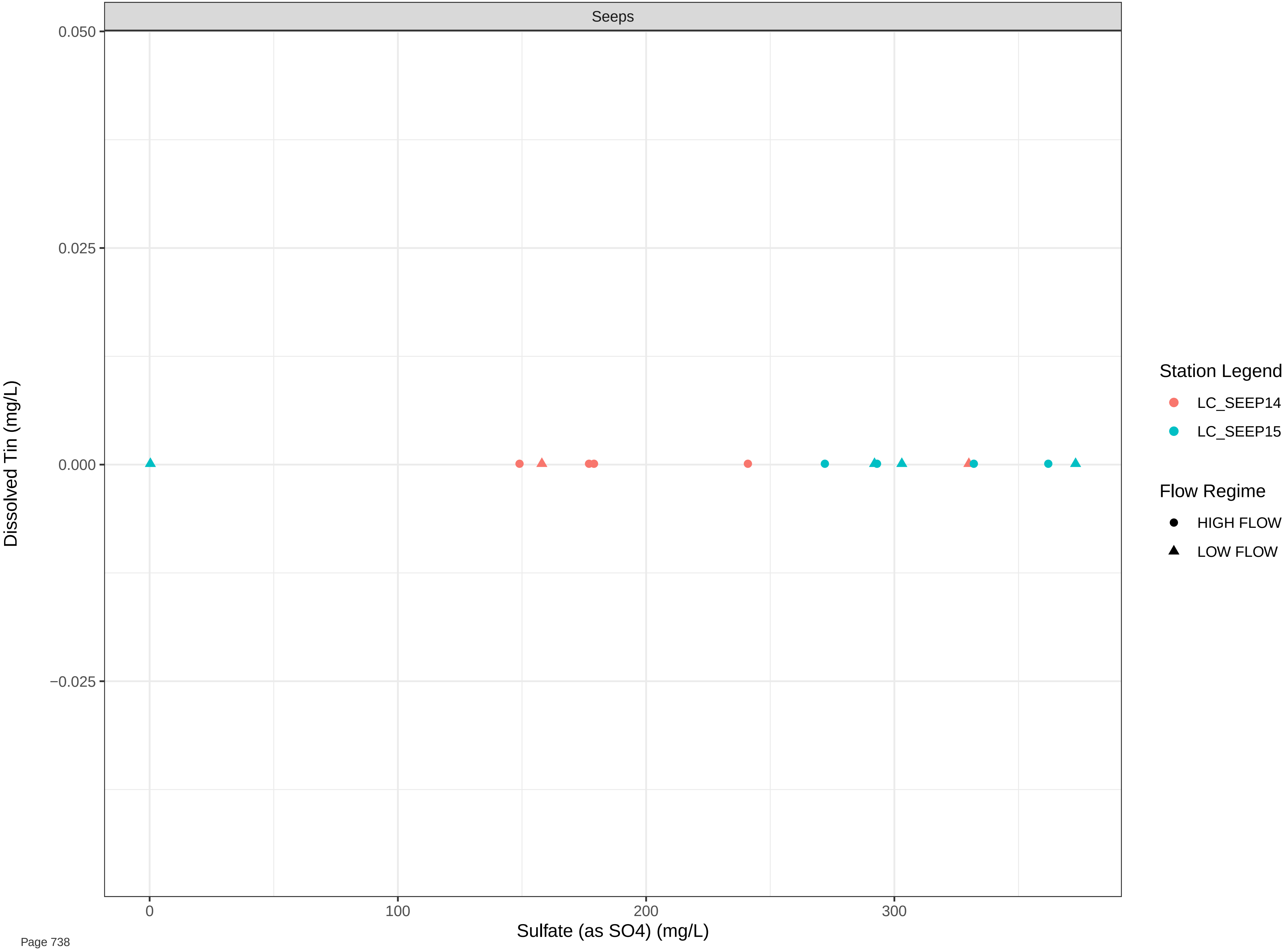
Comparison Point
Seeps
Dissolved Thallium (mg/L)
3.5e−05
3.0e−05
2.5e−05
2.0e−05
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

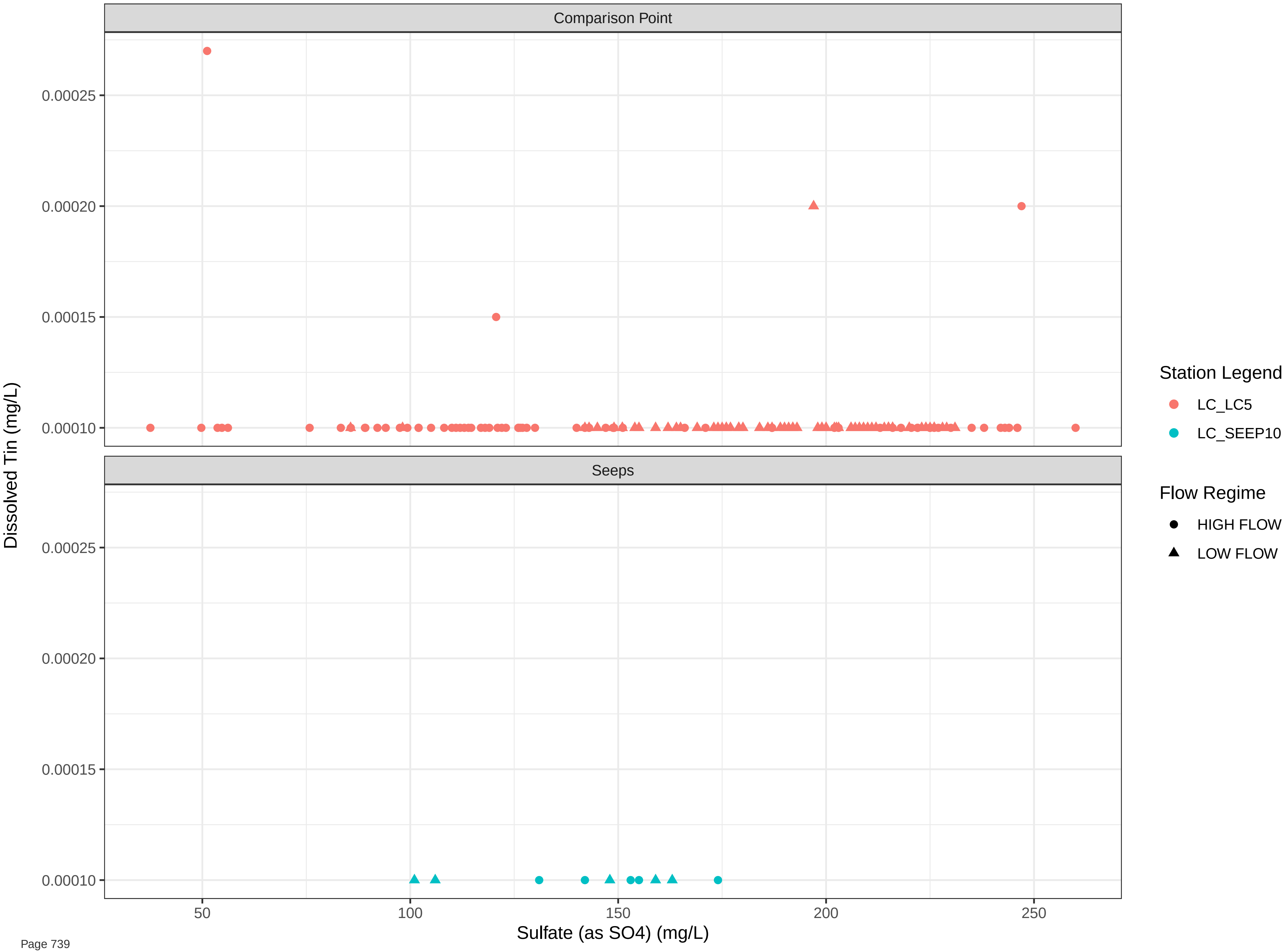


Comparison Point
Seeps
Dissolved Tin (mg/L)
0.050
0.025
0.000
−0.025
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

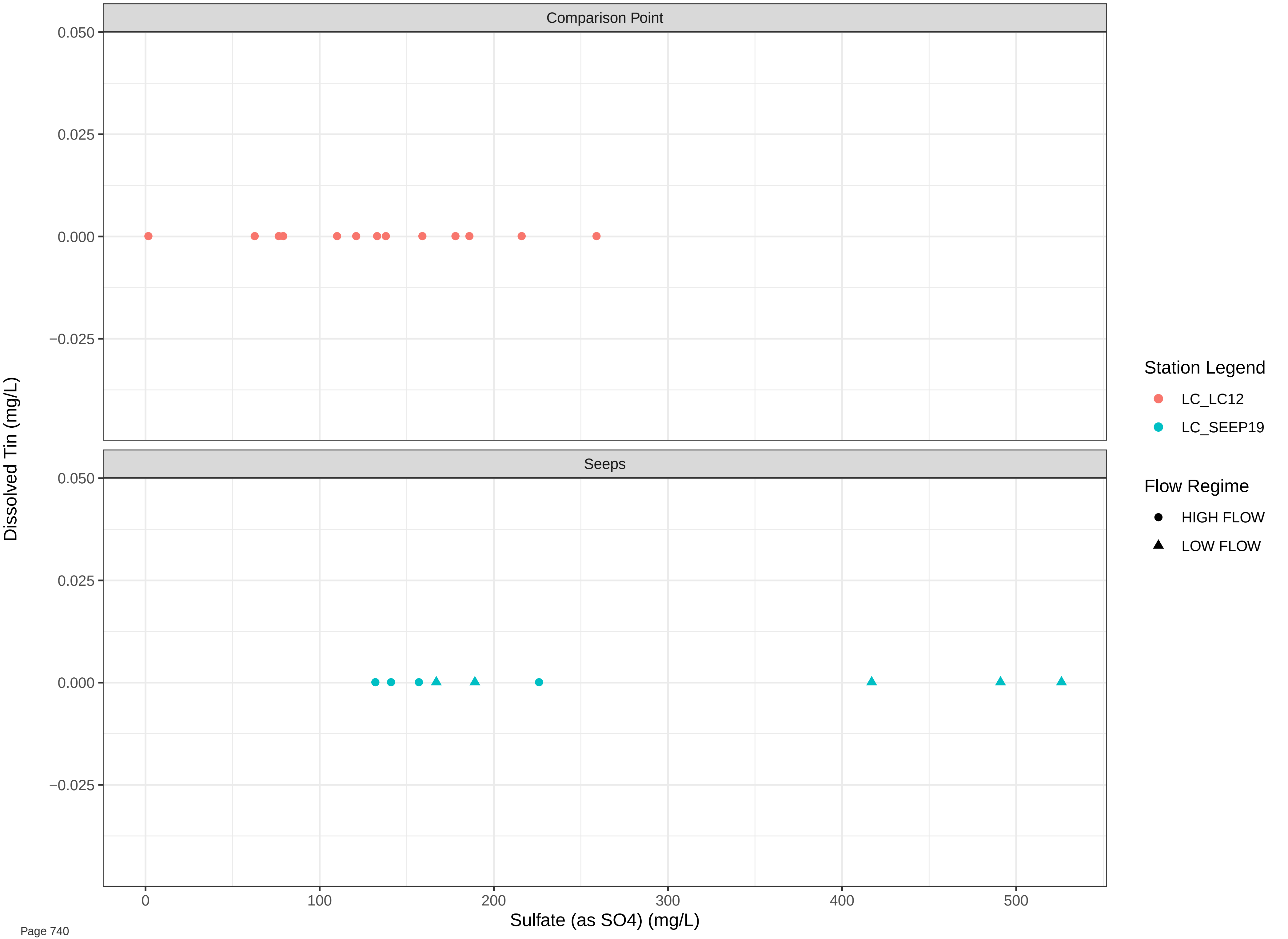


Seeps
Dissolved Tin (mg/L)
0.0001100
0.0001075
0.0001050
0.0001025
0.0001000
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

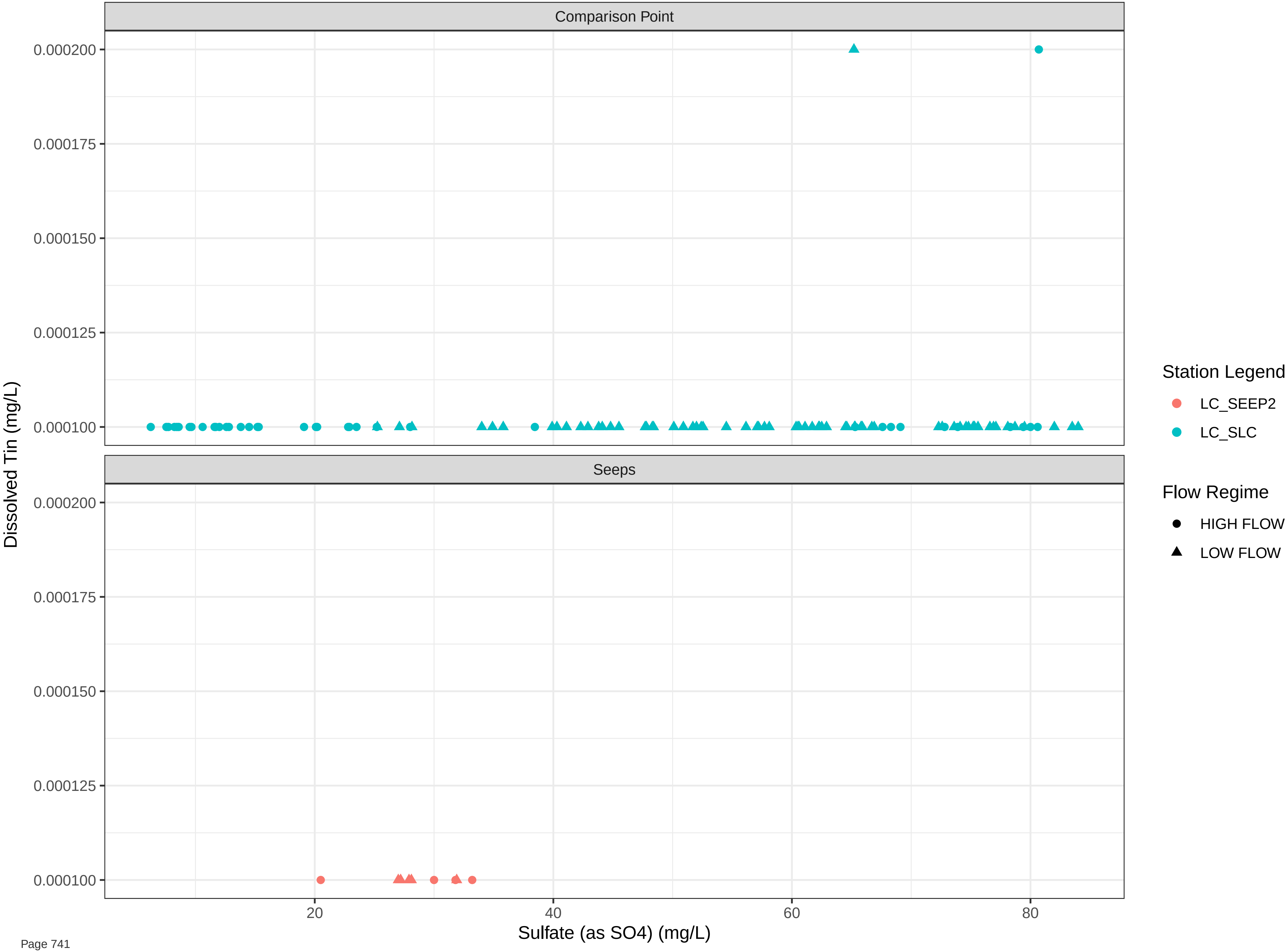

Seeps
0.050
0.025
0.000
−0.025
Dissolved Tin (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



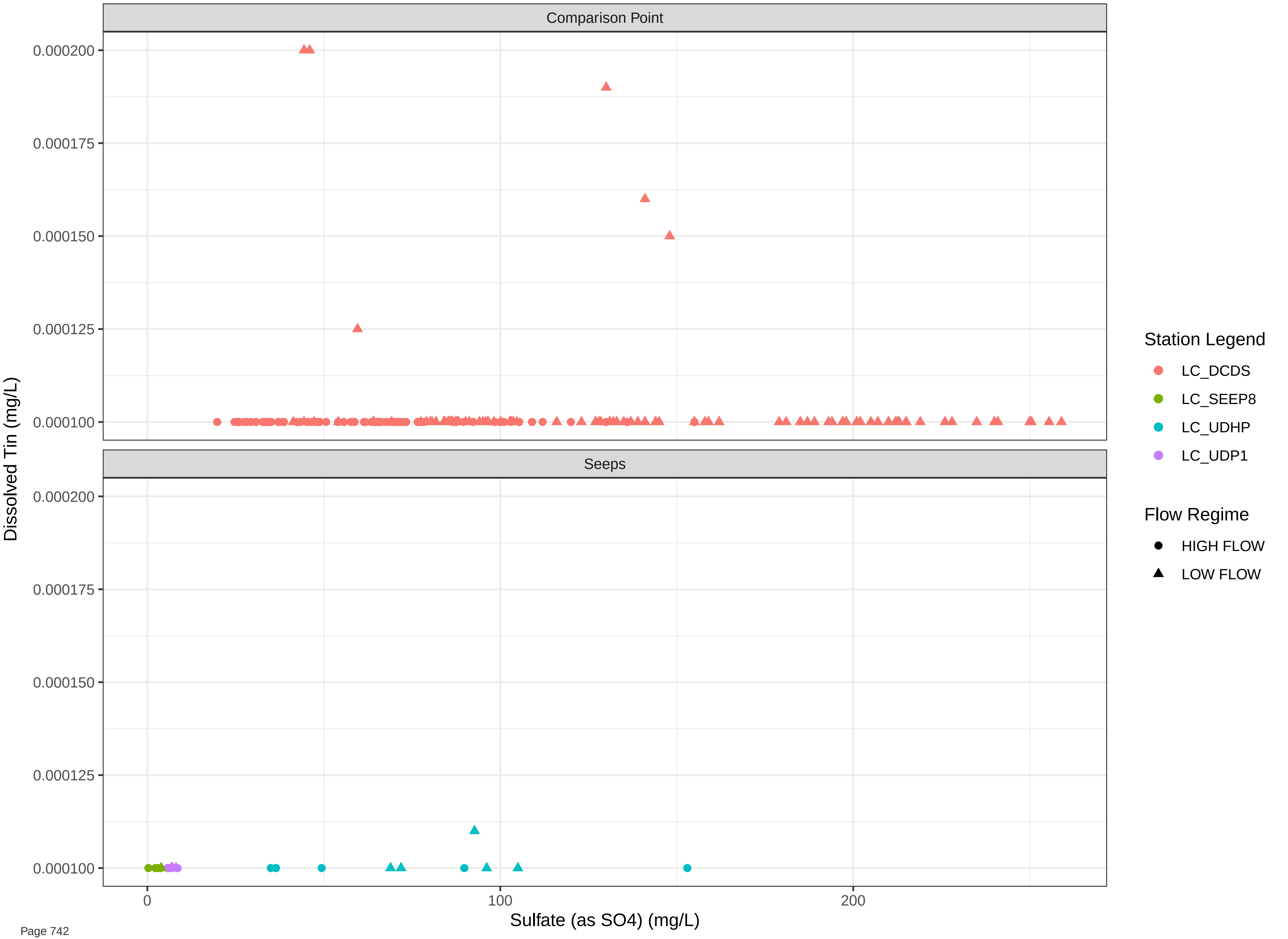
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.00025
0.00020
0.00015
0.00010
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

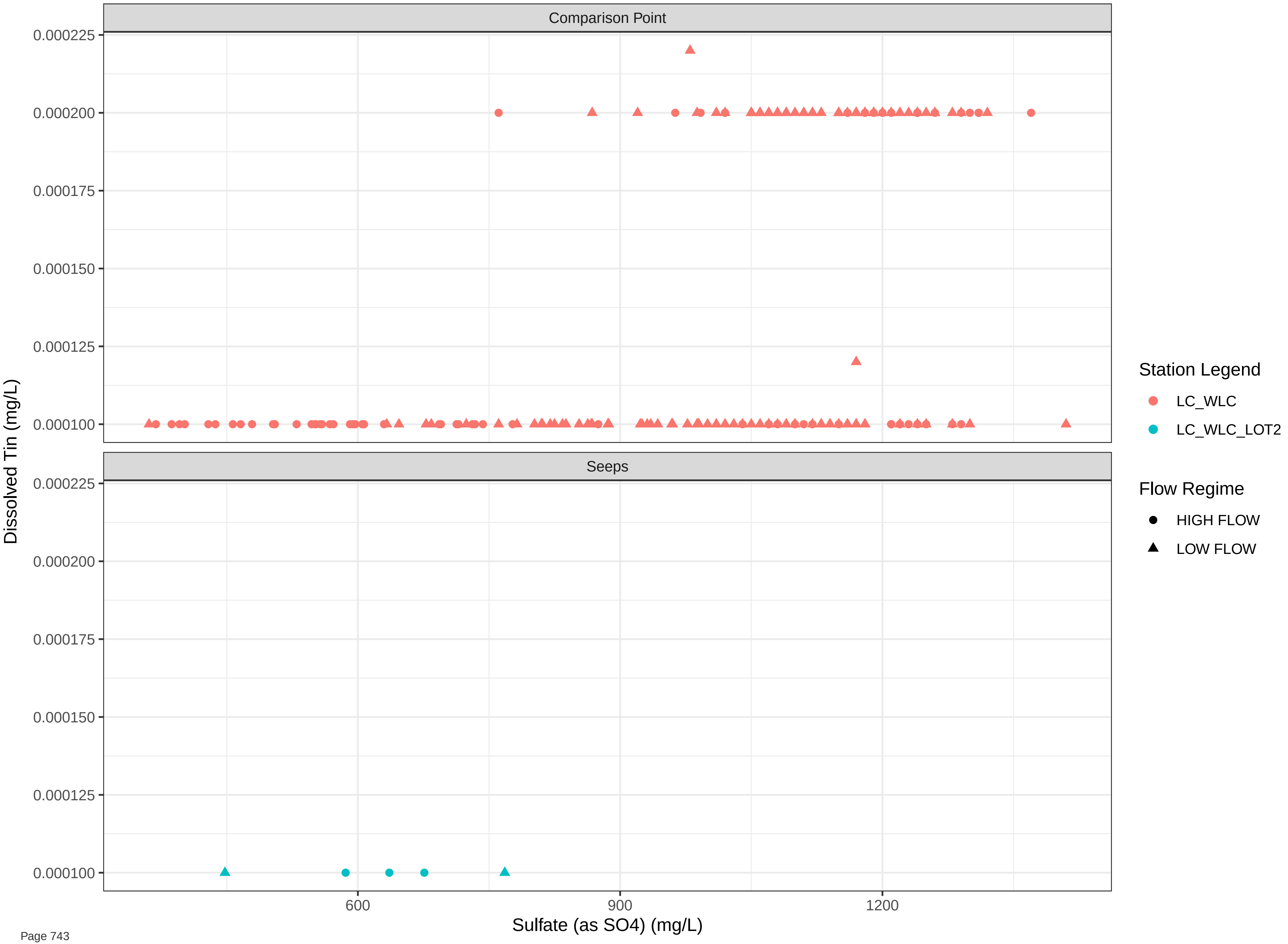


Comparison Point
Seeps
Dissolved Tin (mg/L)
0.050
0.025
0.000
−0.025
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

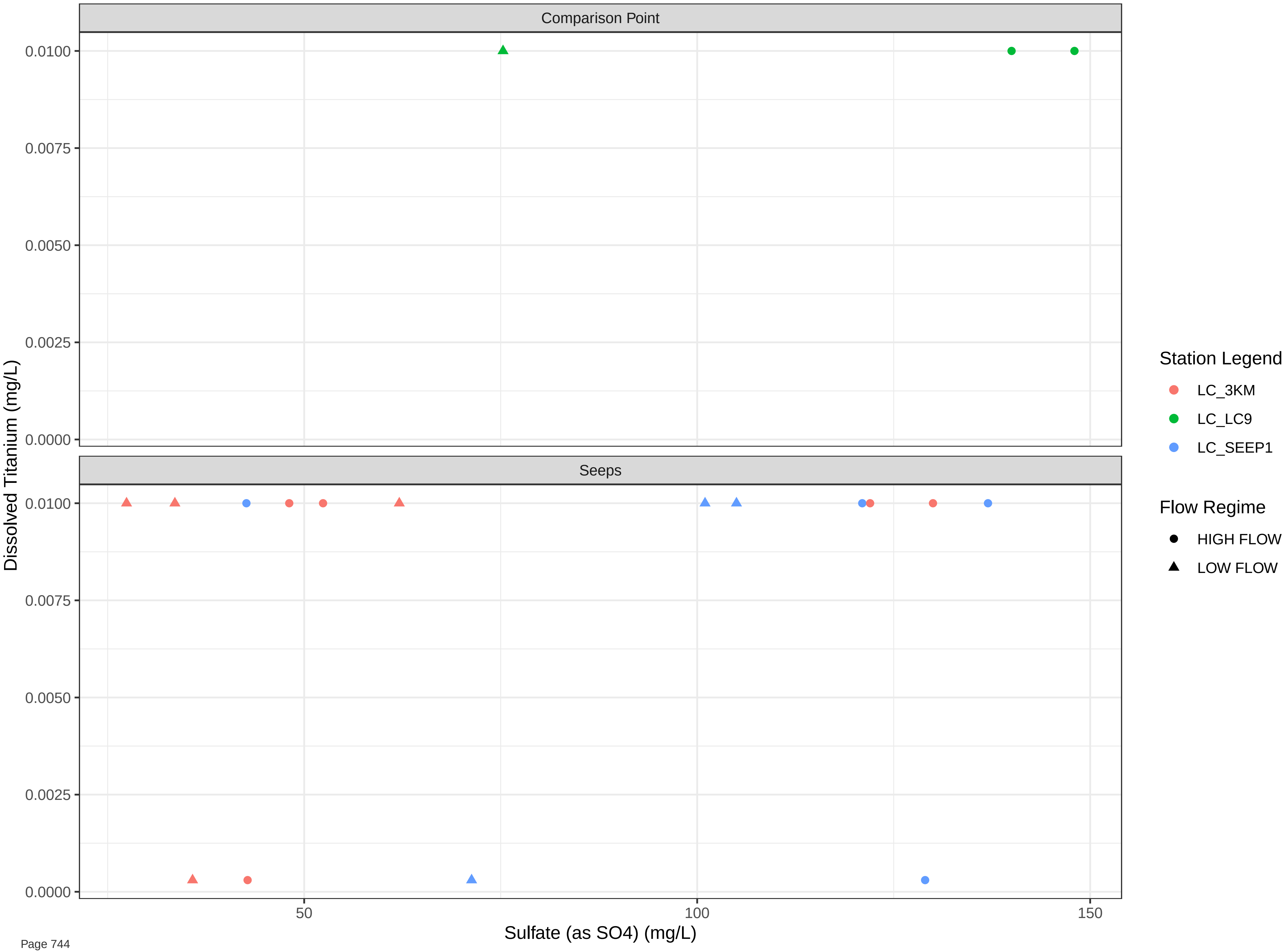


Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
Sulfate (as SO4) (mg/L)
20
40
60
80
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

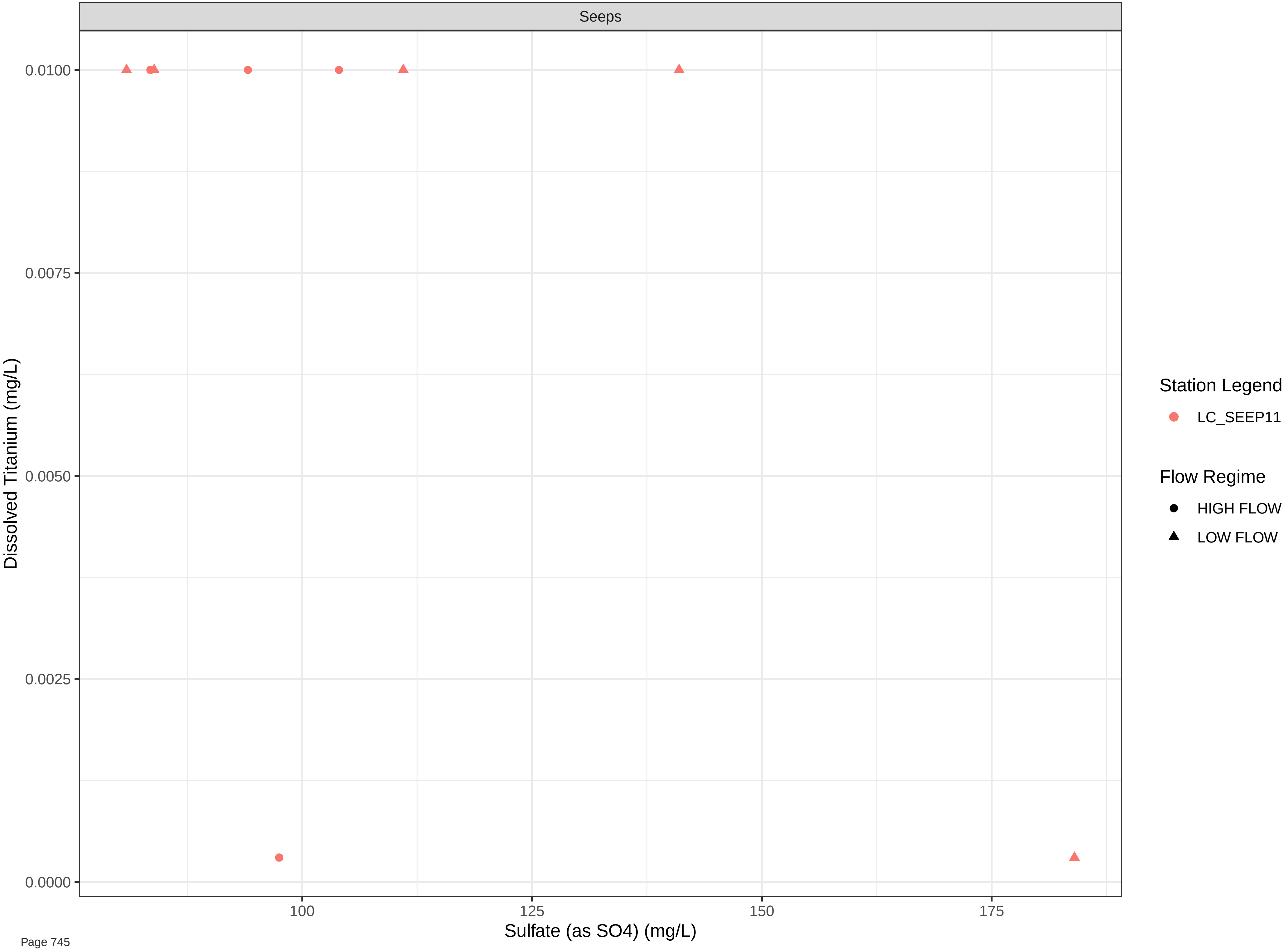

Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

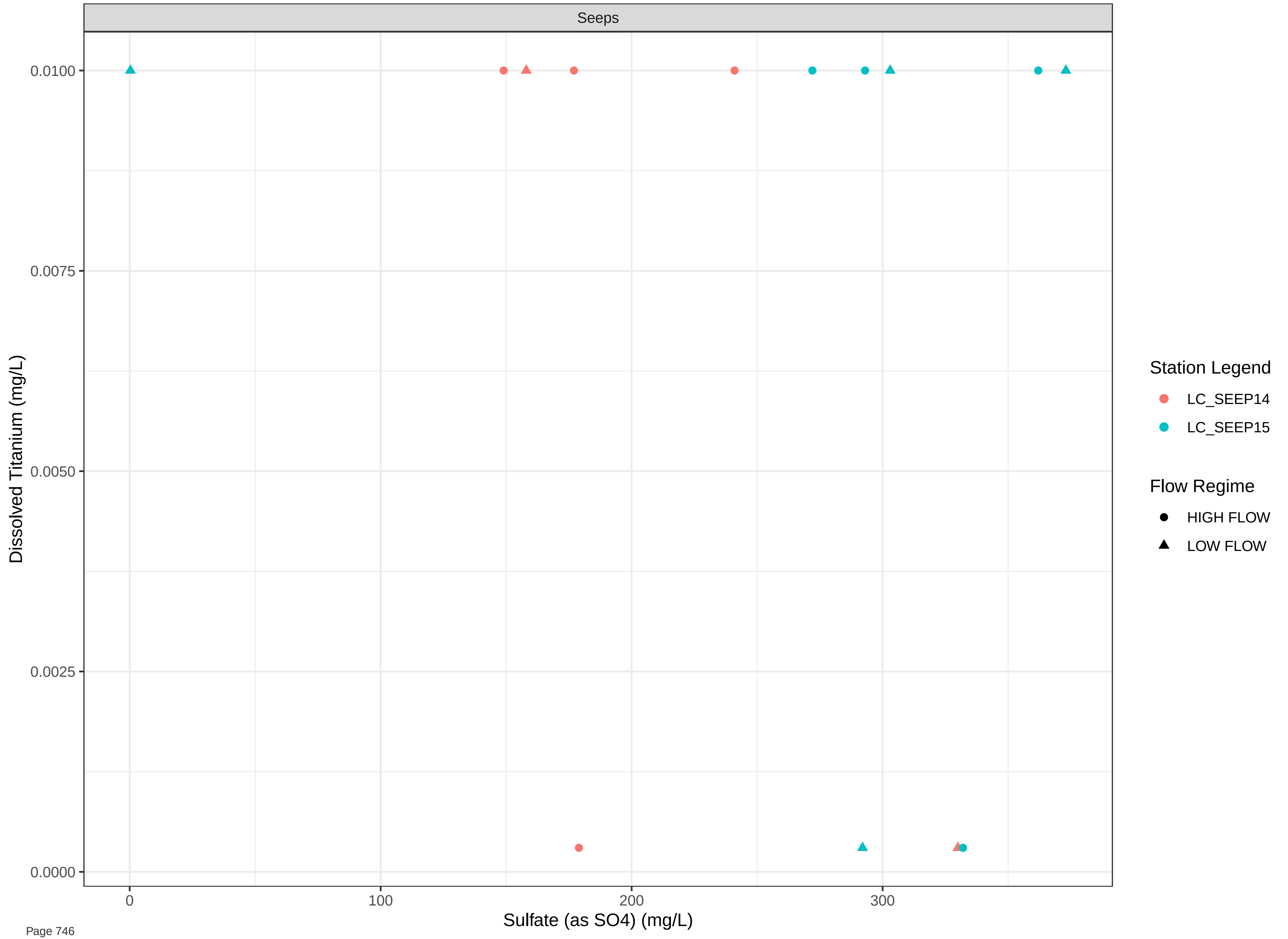


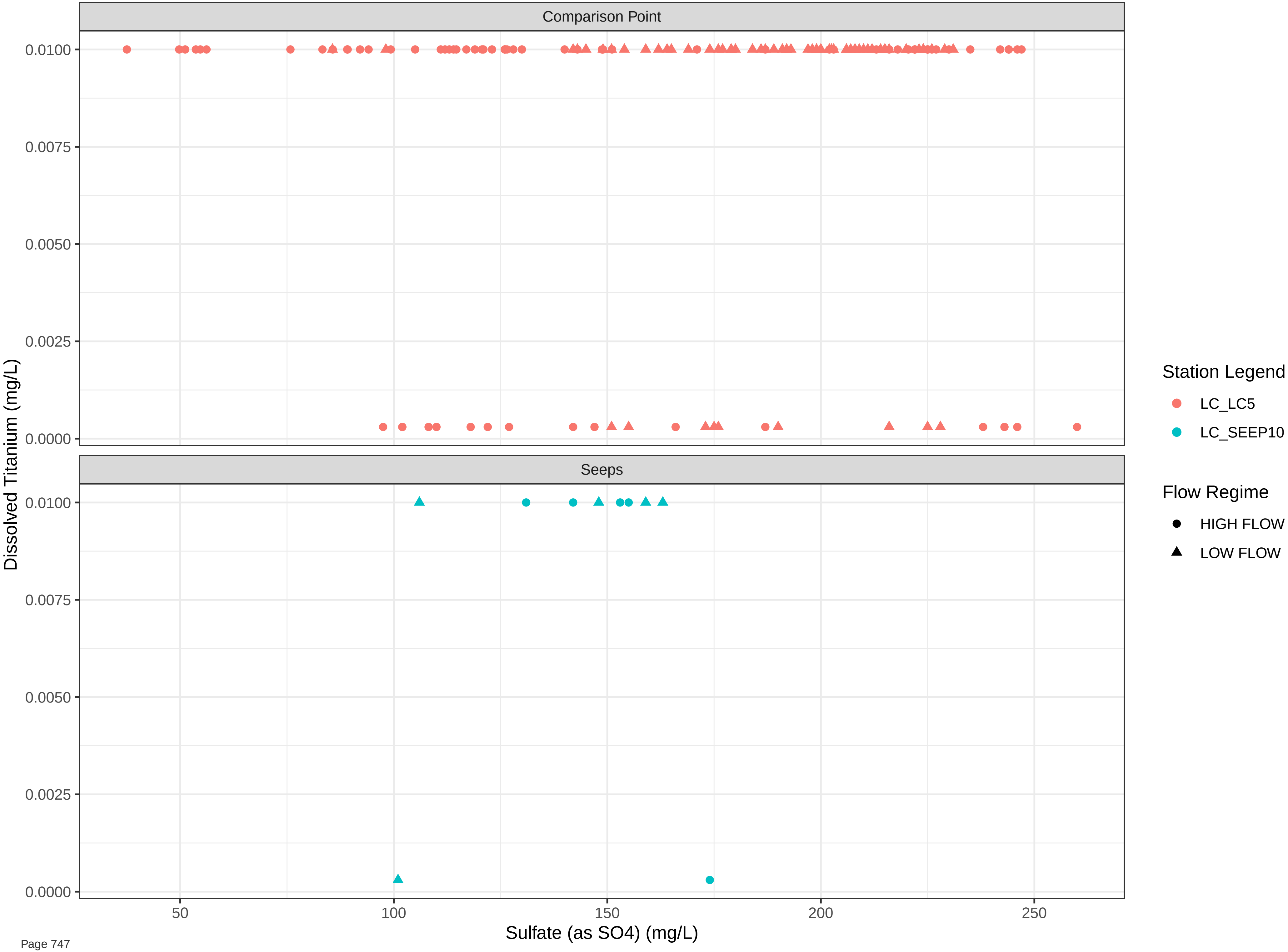
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000225
0.000200
0.000175
0.000150
0.000125
0.000100
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



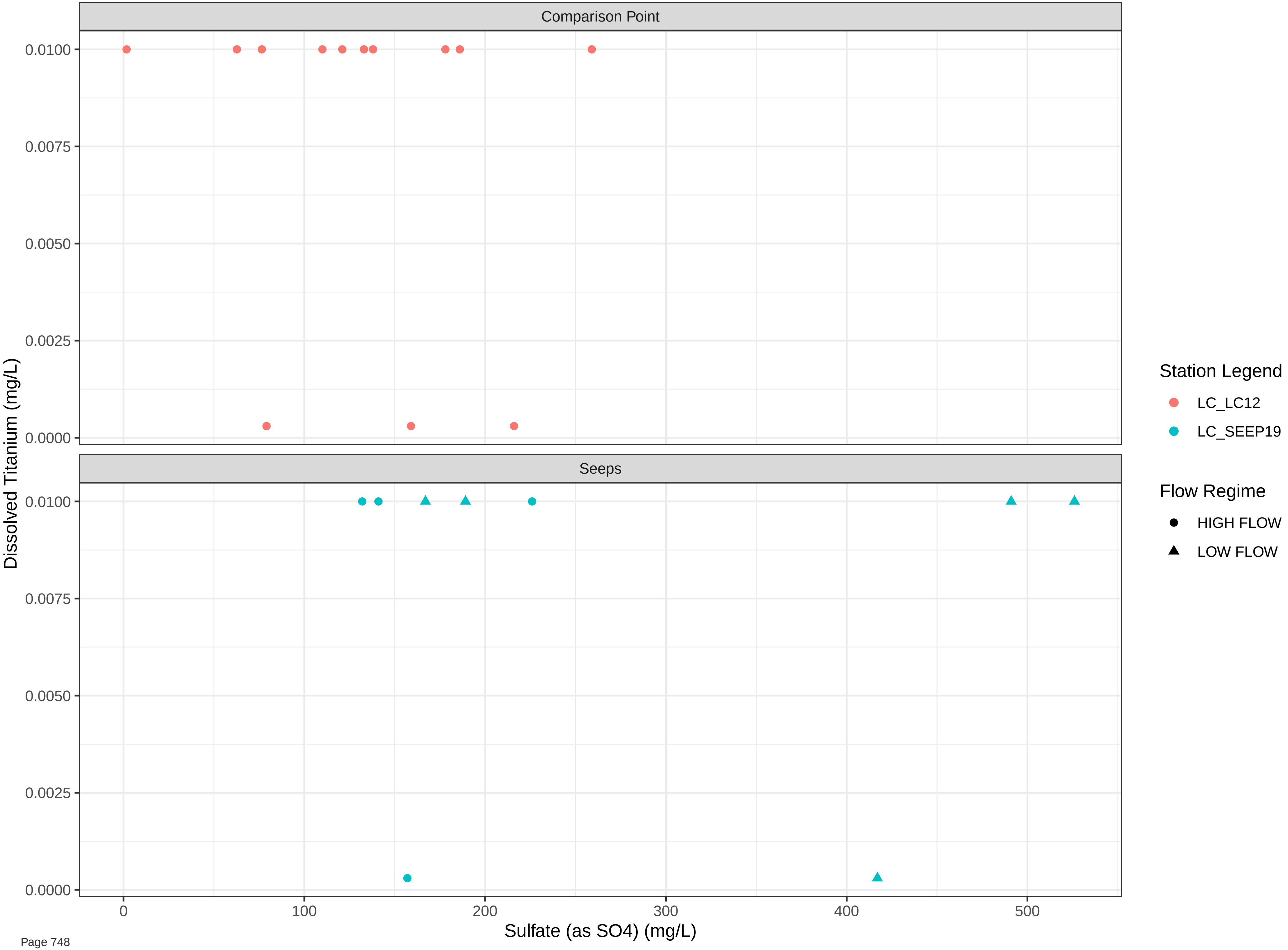
Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
50
100
150
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
Dissolved Titanium (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

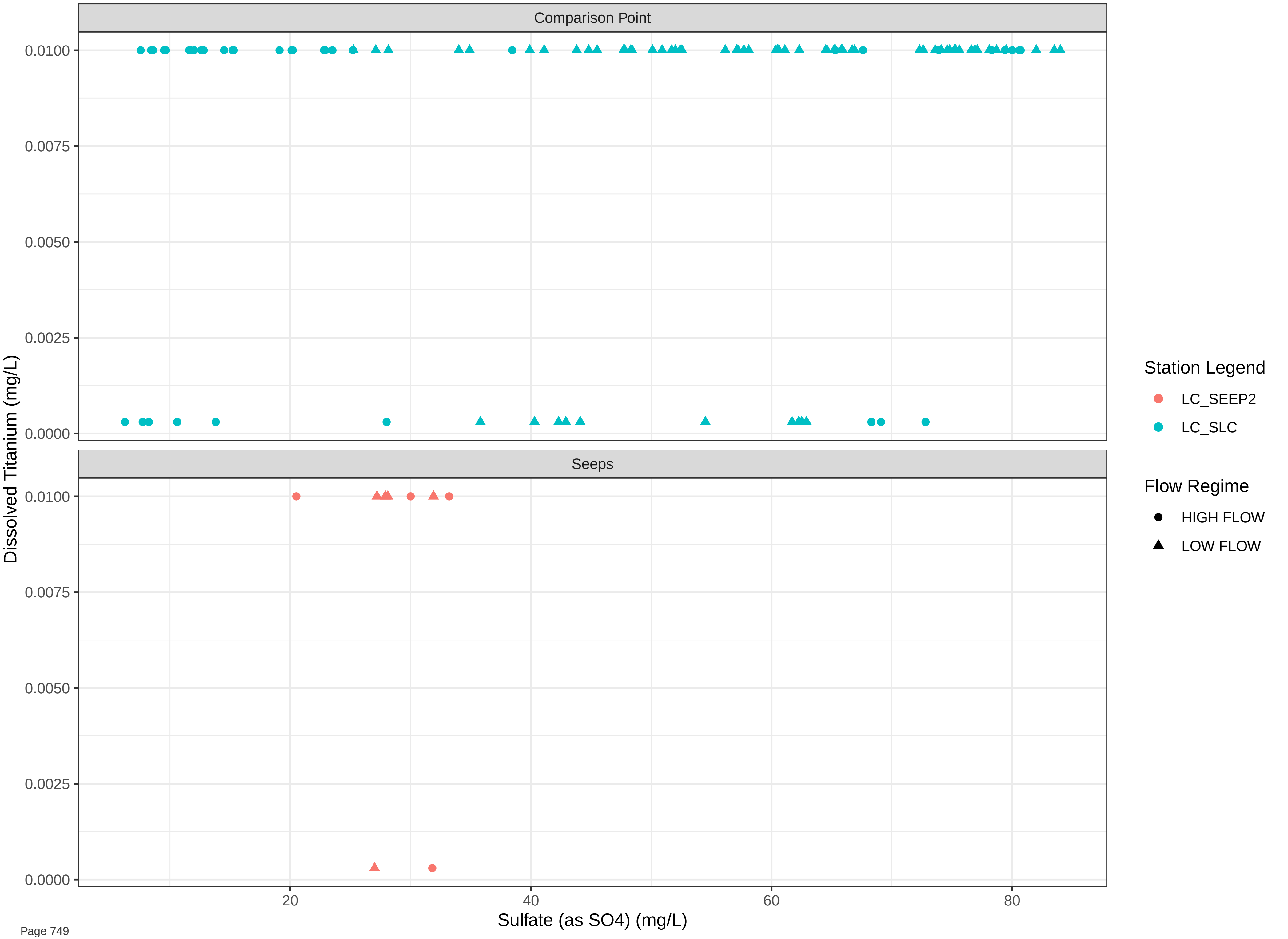

Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
Dissolved Titanium (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



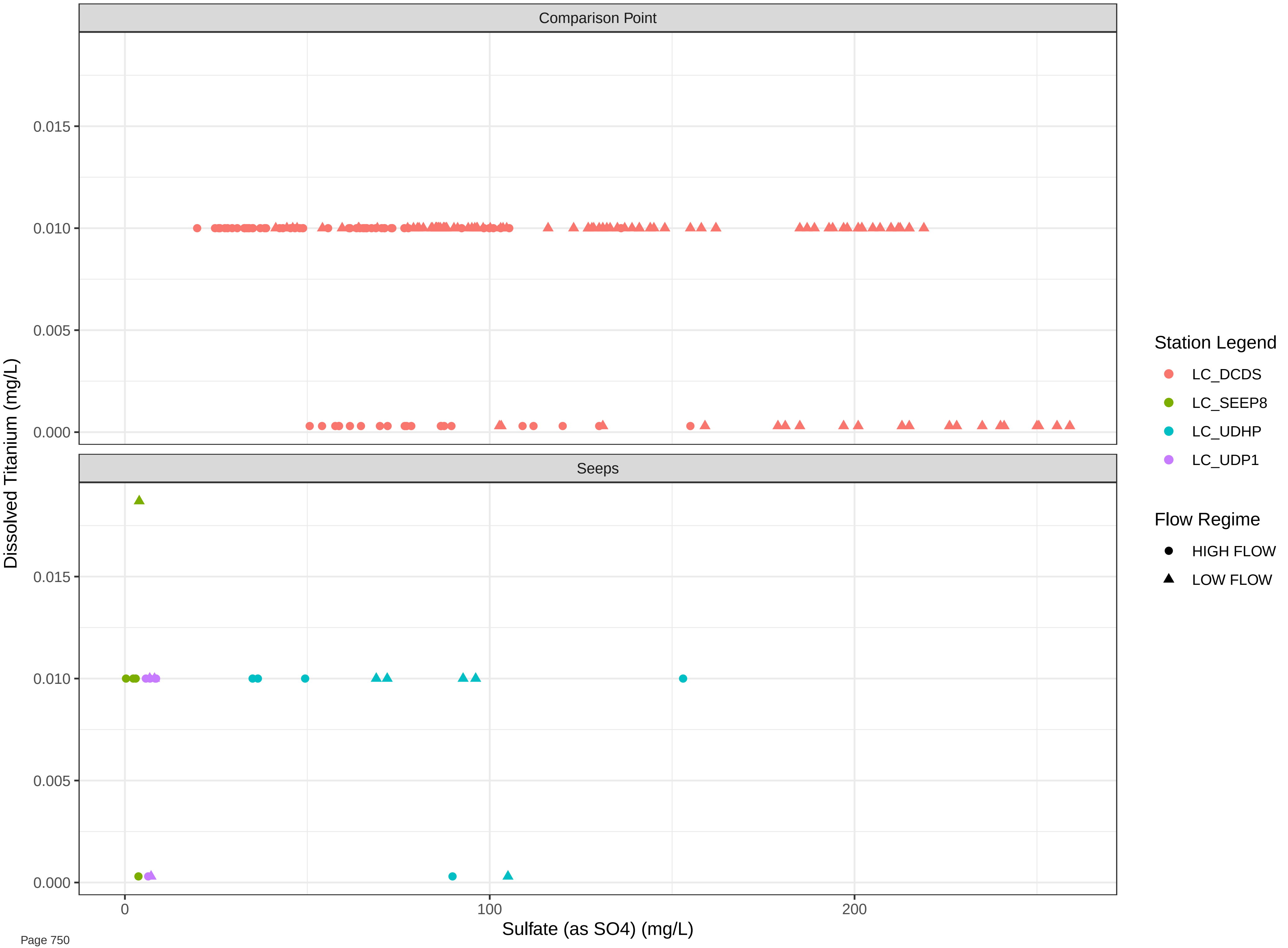
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
Sulfate (as SO4) (mg/L)
50
100
150
200
250
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

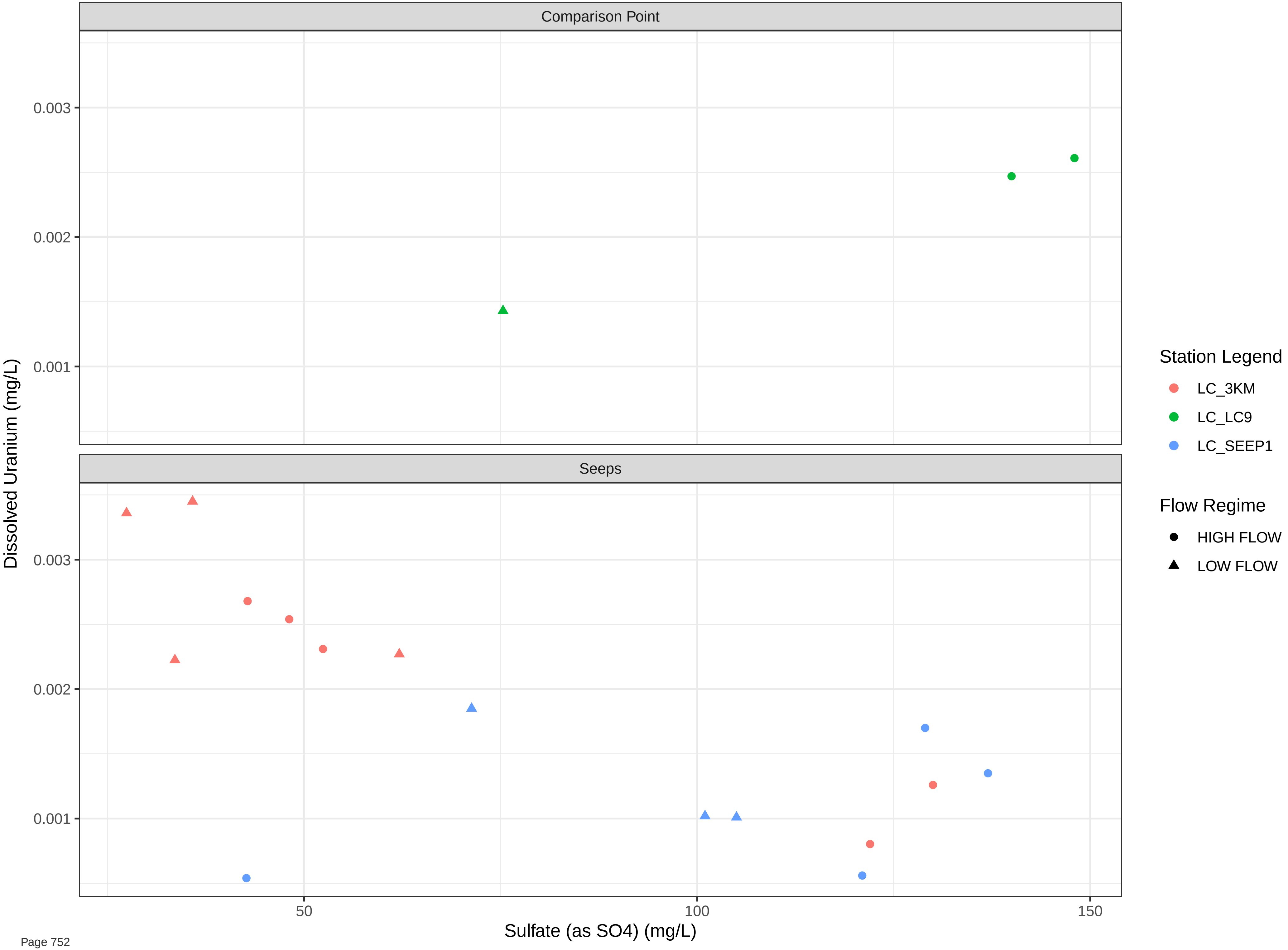


Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

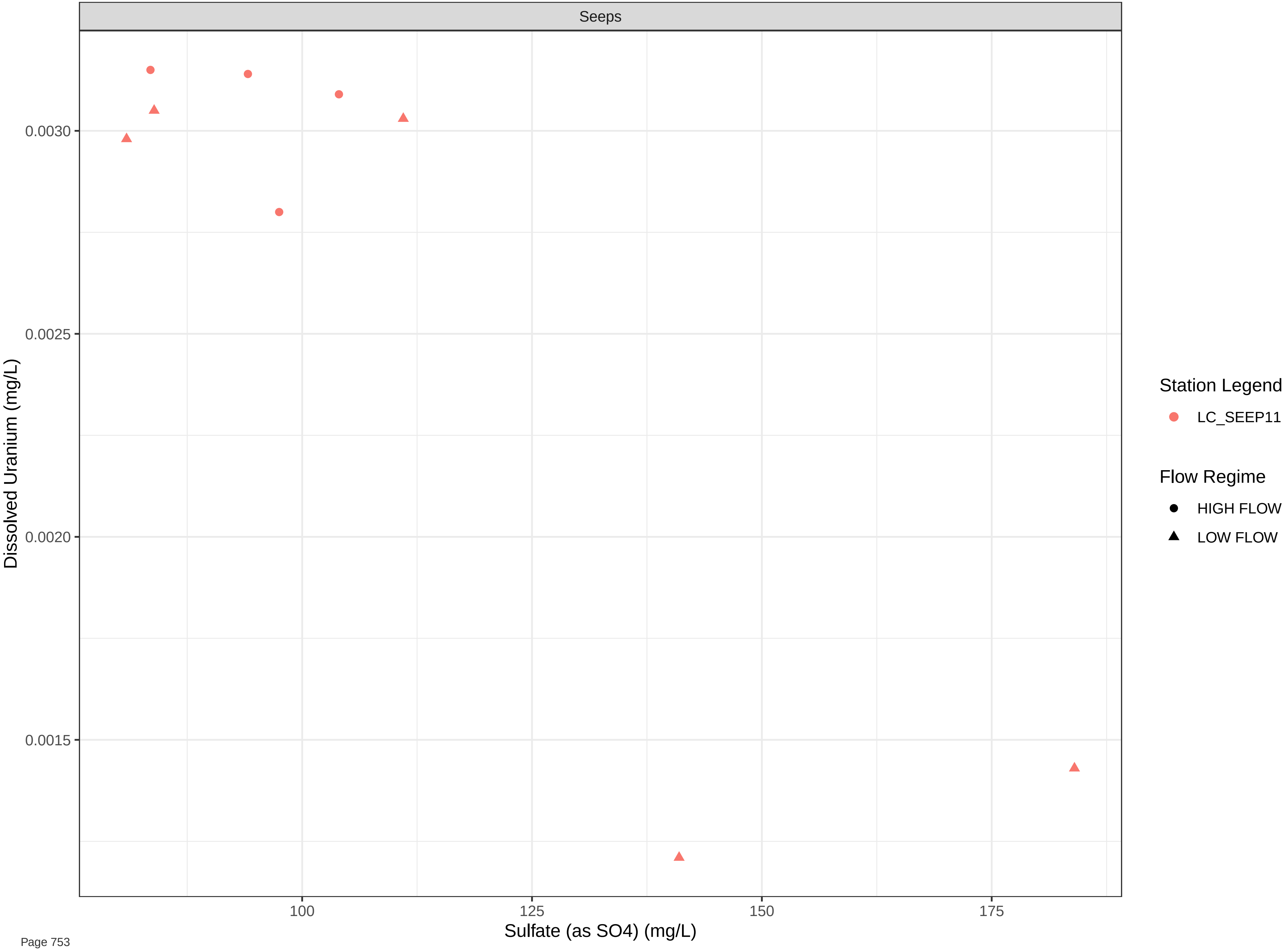


Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.000
0.005
0.010
0.015
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

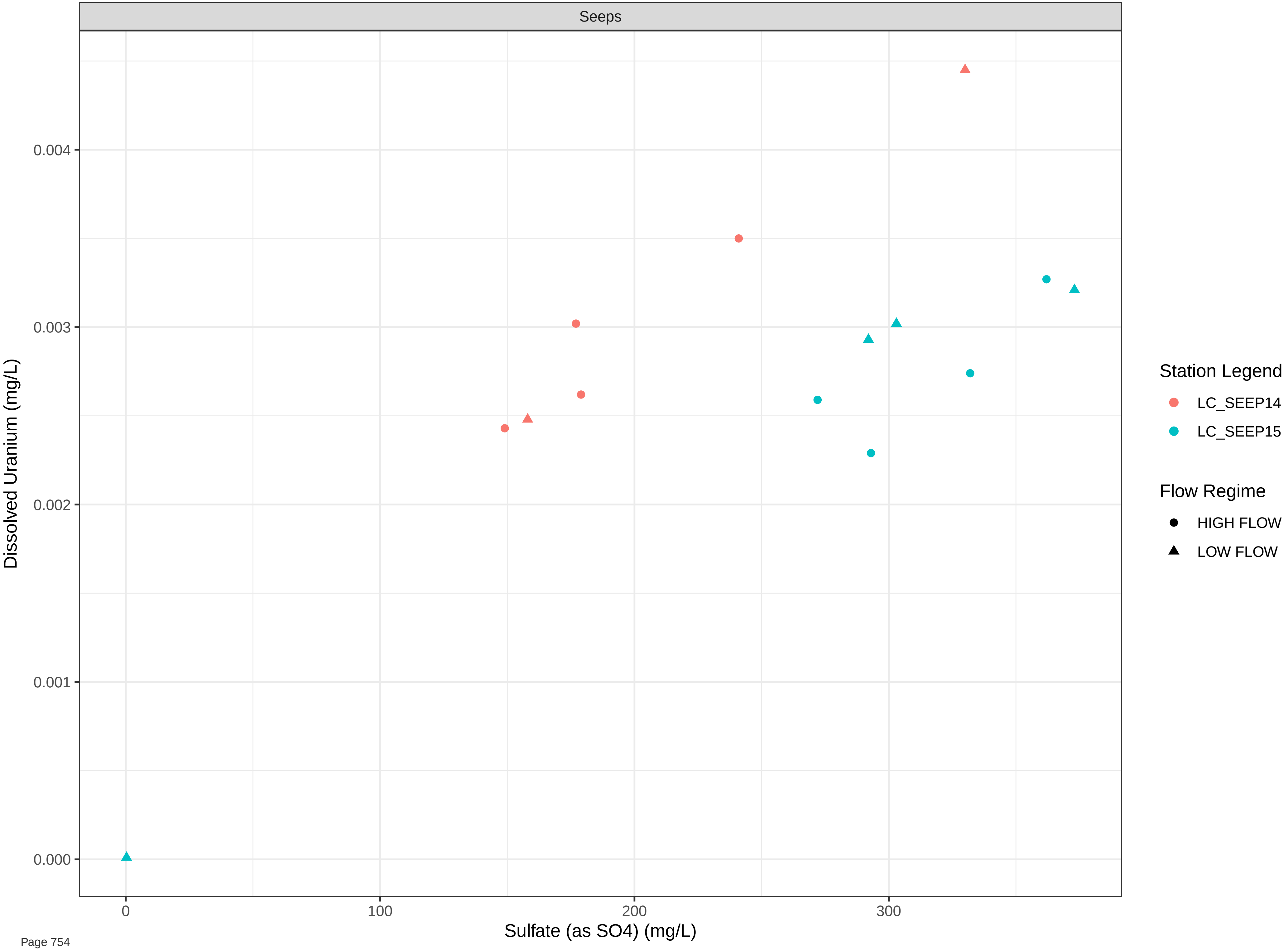

Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW



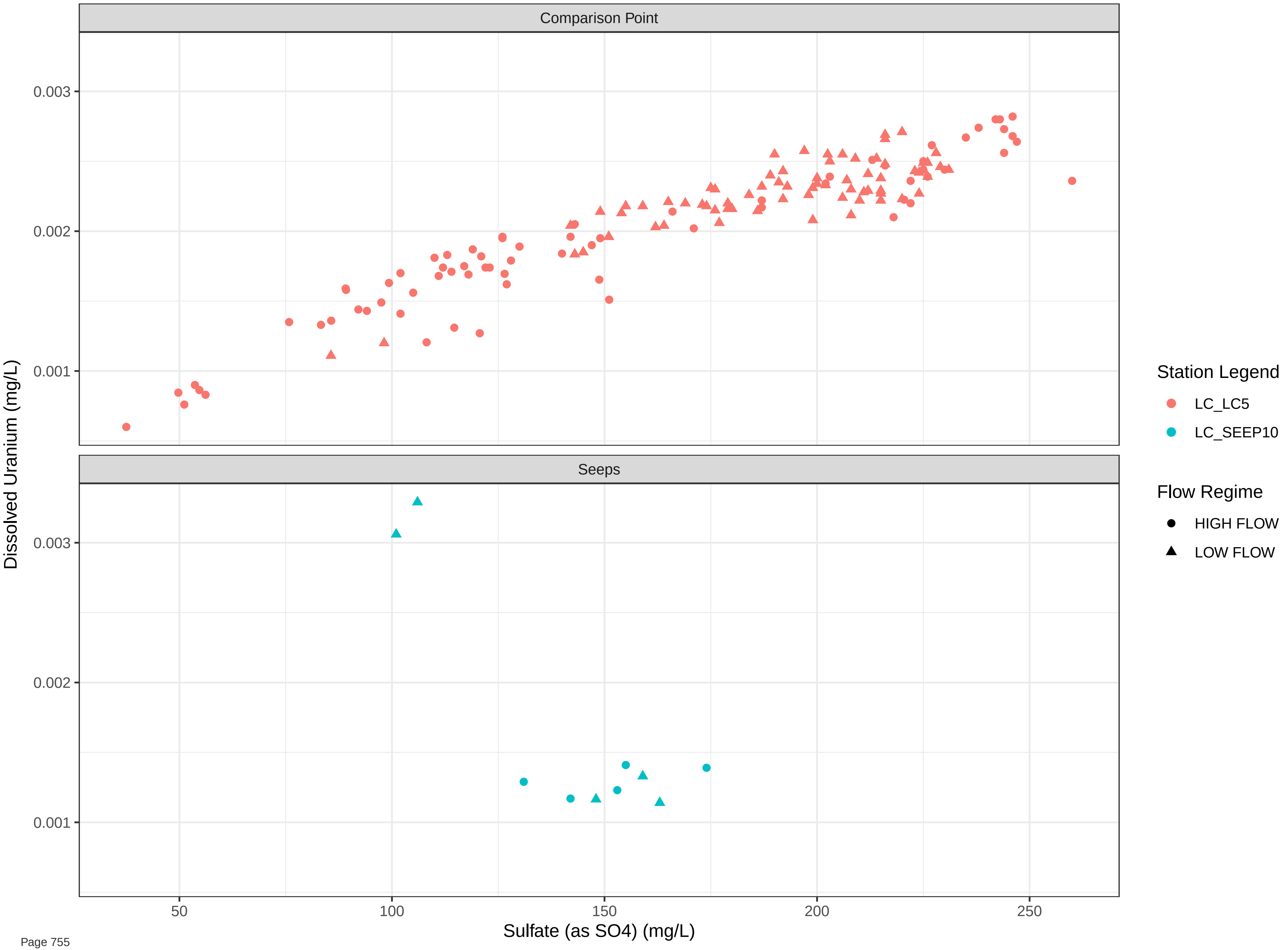
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.001
0.002
0.003
Sulfate (as SO4) (mg/L)
50
100
150
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW



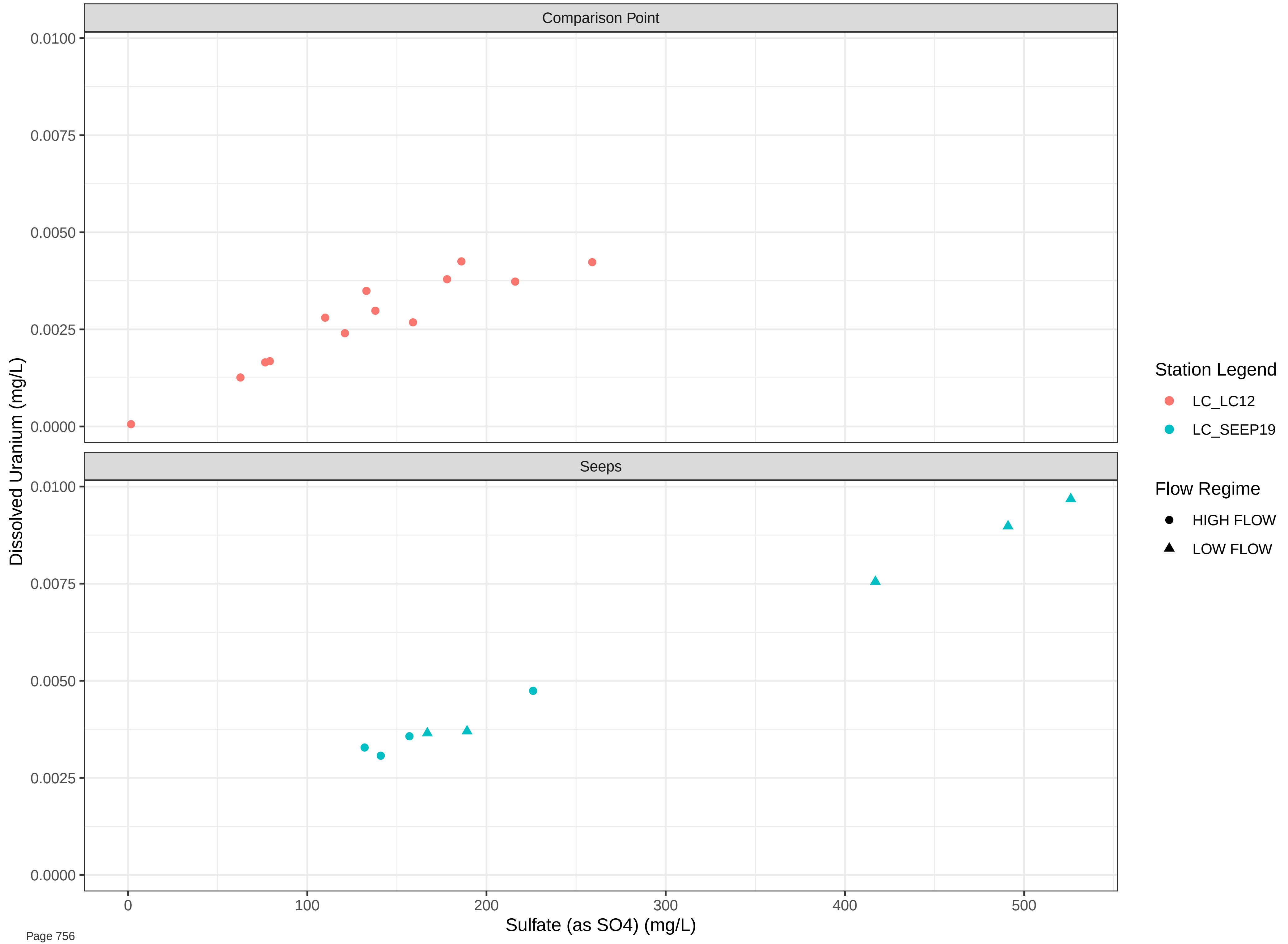
Seeps
0.0030
0.0025
0.0020
0.0015
Dissolved Uranium (mg/L)
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



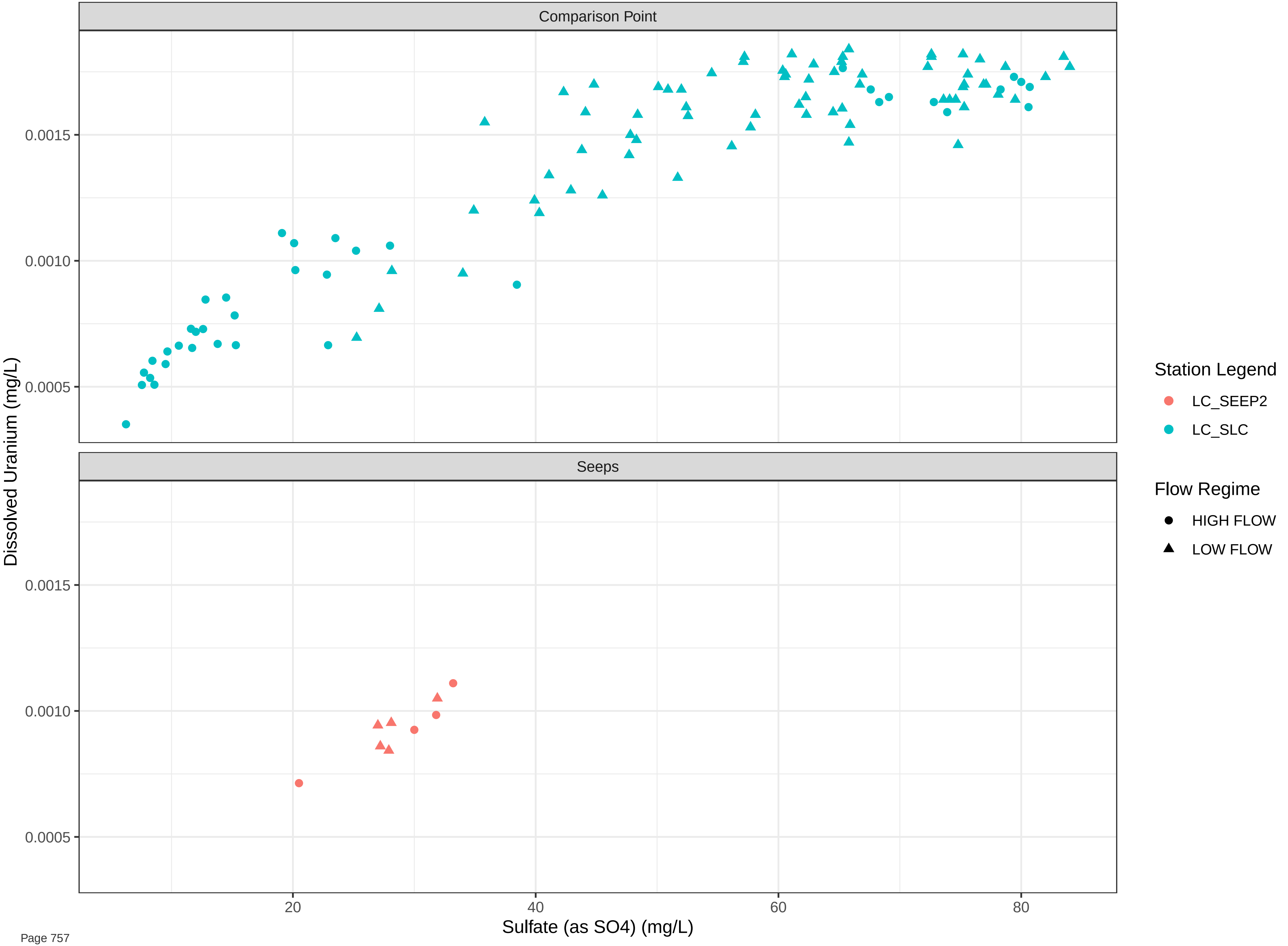
Seeps
Dissolved Uranium (mg/L)
0.000
0.001
0.002
0.003
0.004
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

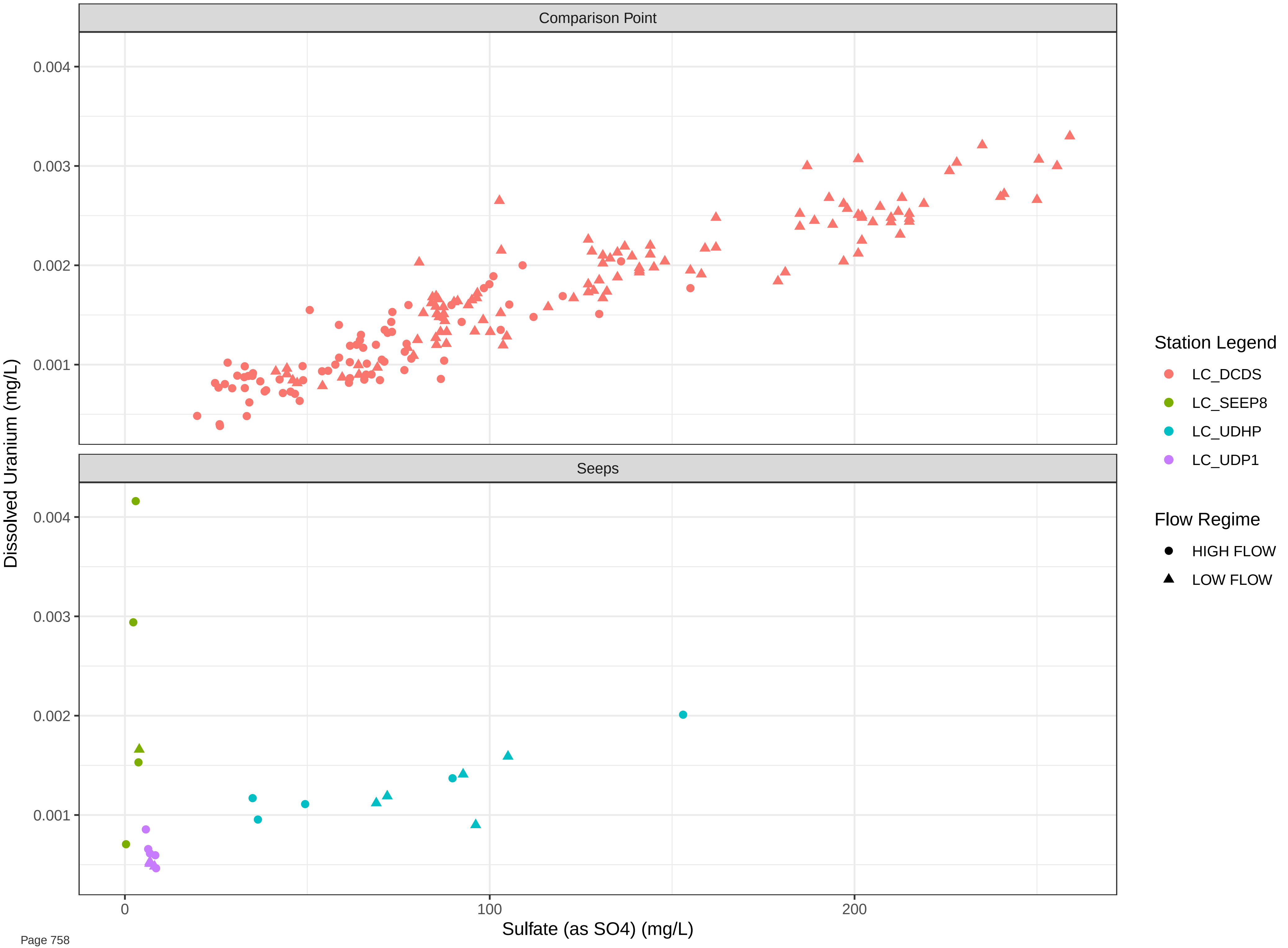


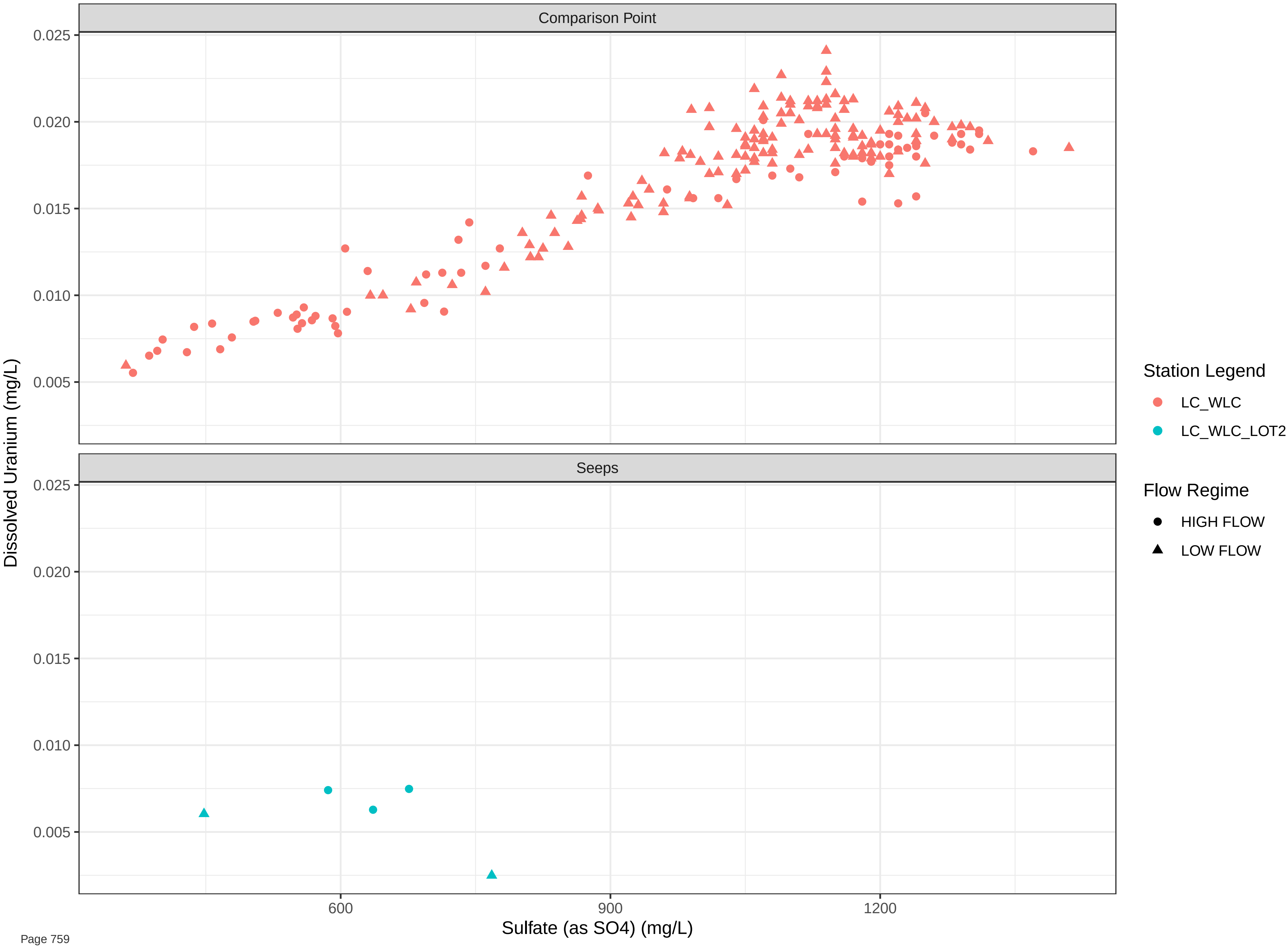
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.003
0.002
0.001
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

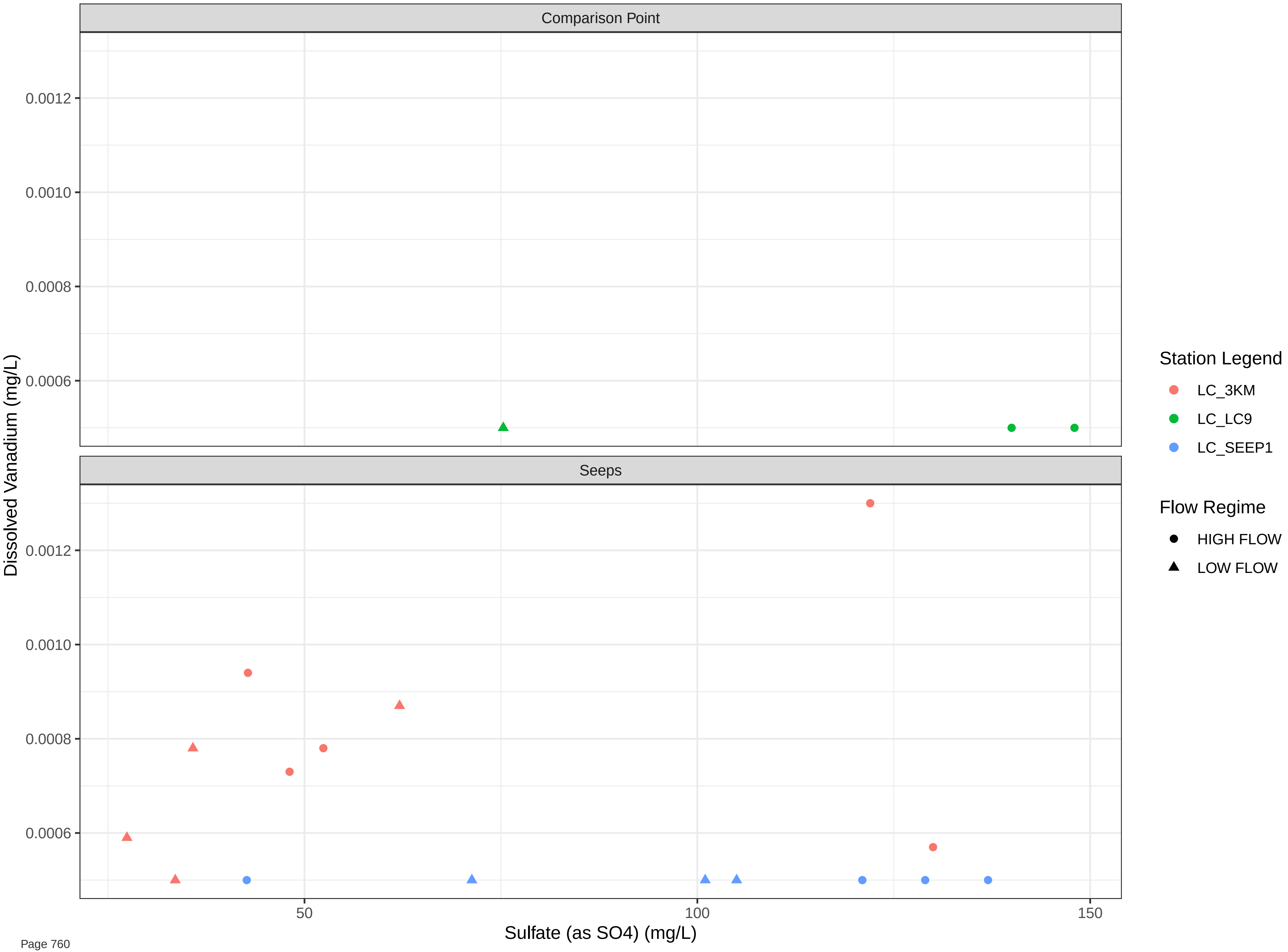


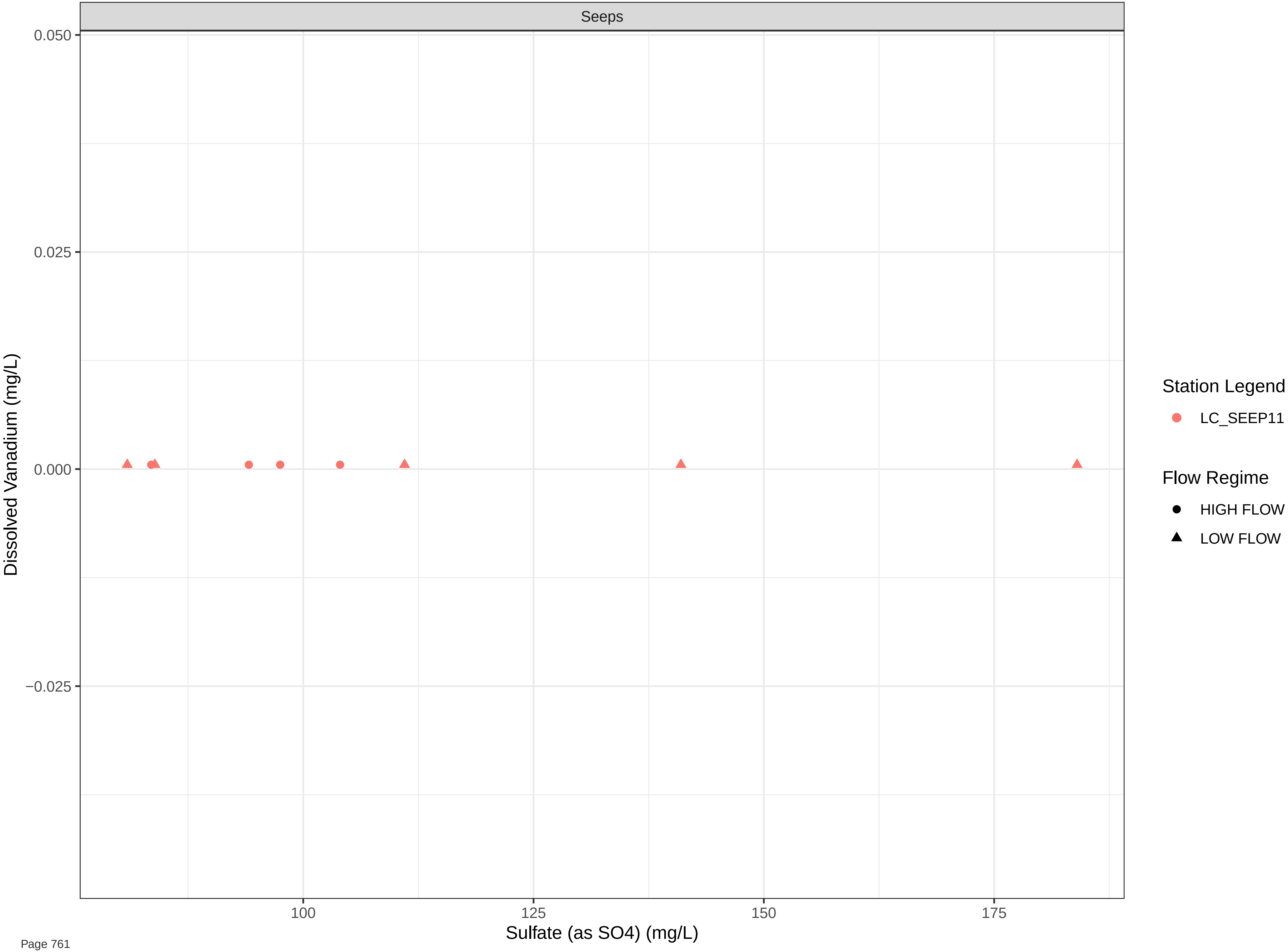
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0015
0.0010
0.0005
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

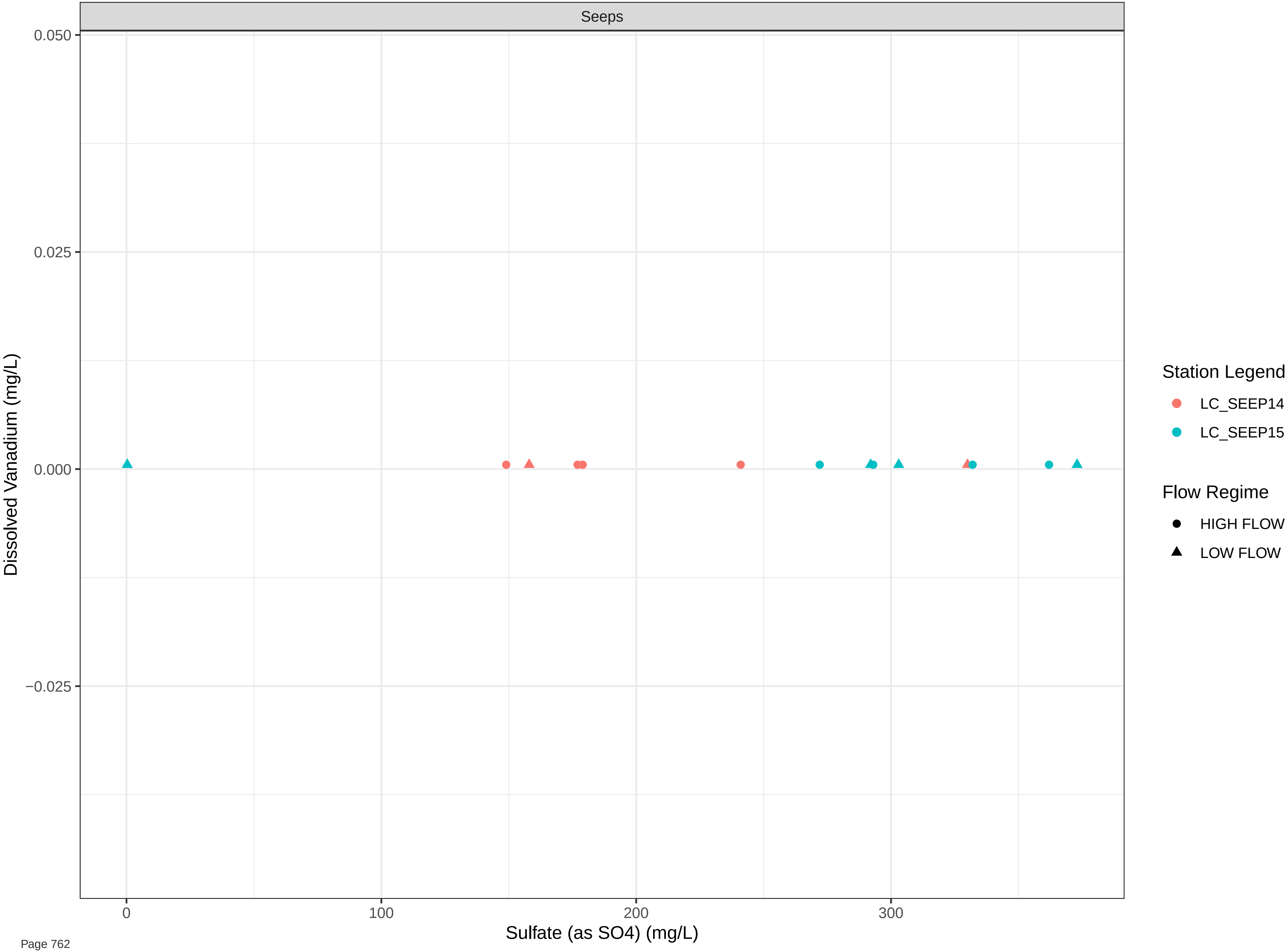

Comparison Point
Seeps
0.004
0.003
0.002
0.001
0
100
200
Dissolved Uranium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW

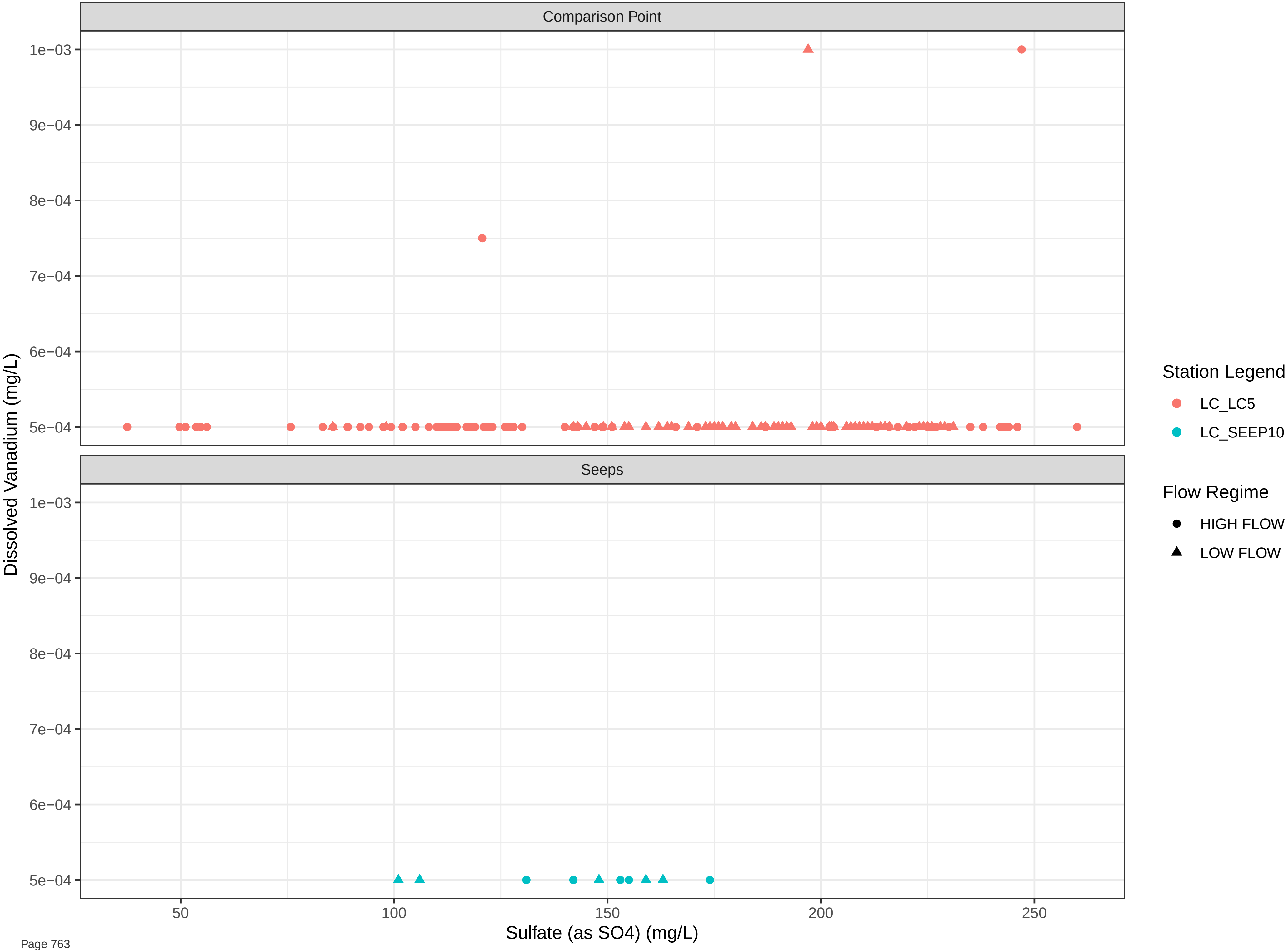

Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.025
0.020
0.015
0.010
0.005
Sulfate (as SO4) (mg/L)
600
900
1200
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.0012
0.0010
0.0008
0.0006
Dissolved Vanadium (mg/L)
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

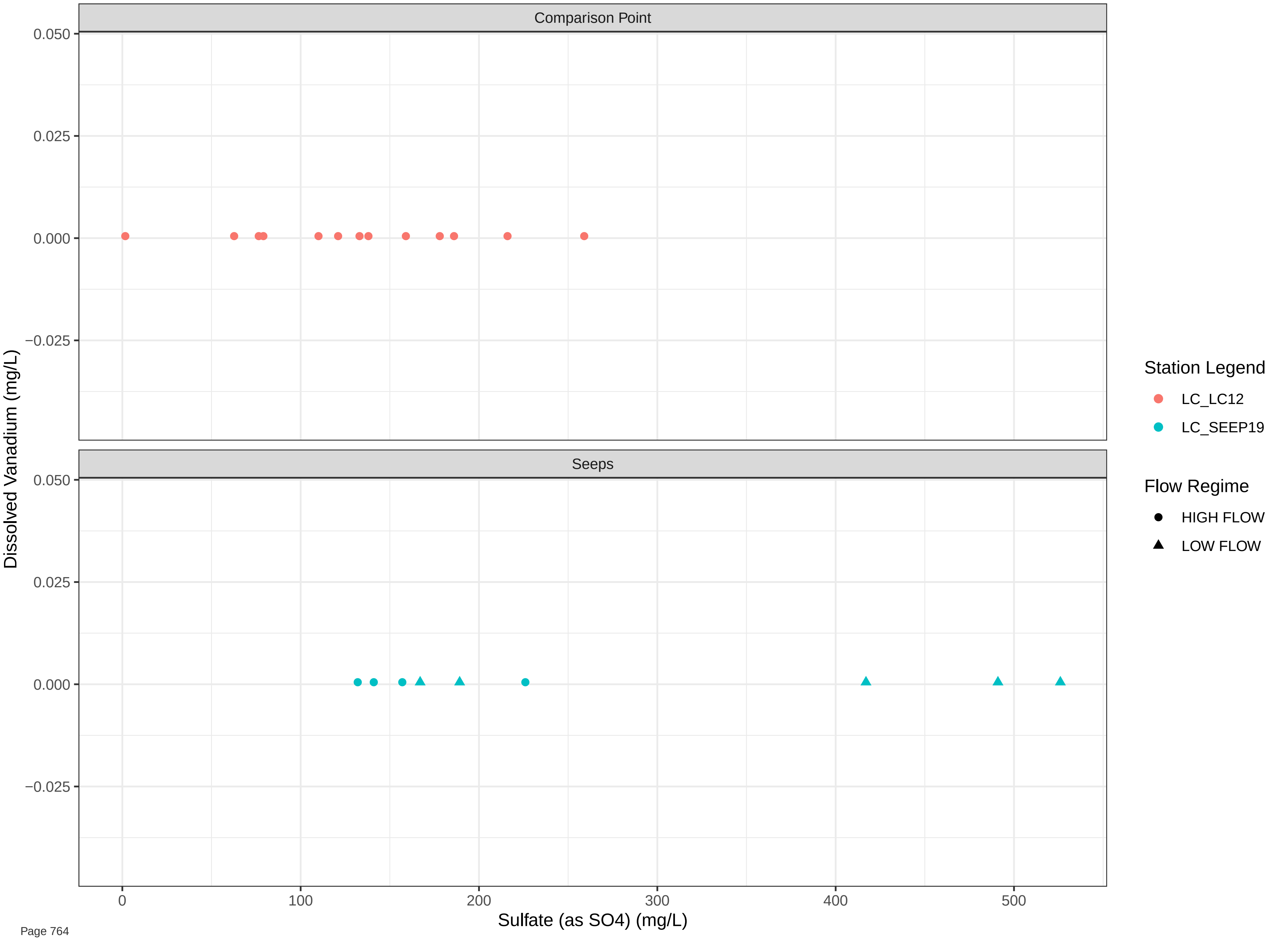


Seeps
Dissolved Vanadium (mg/L)
0.050
0.025
0.000
−0.025
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW

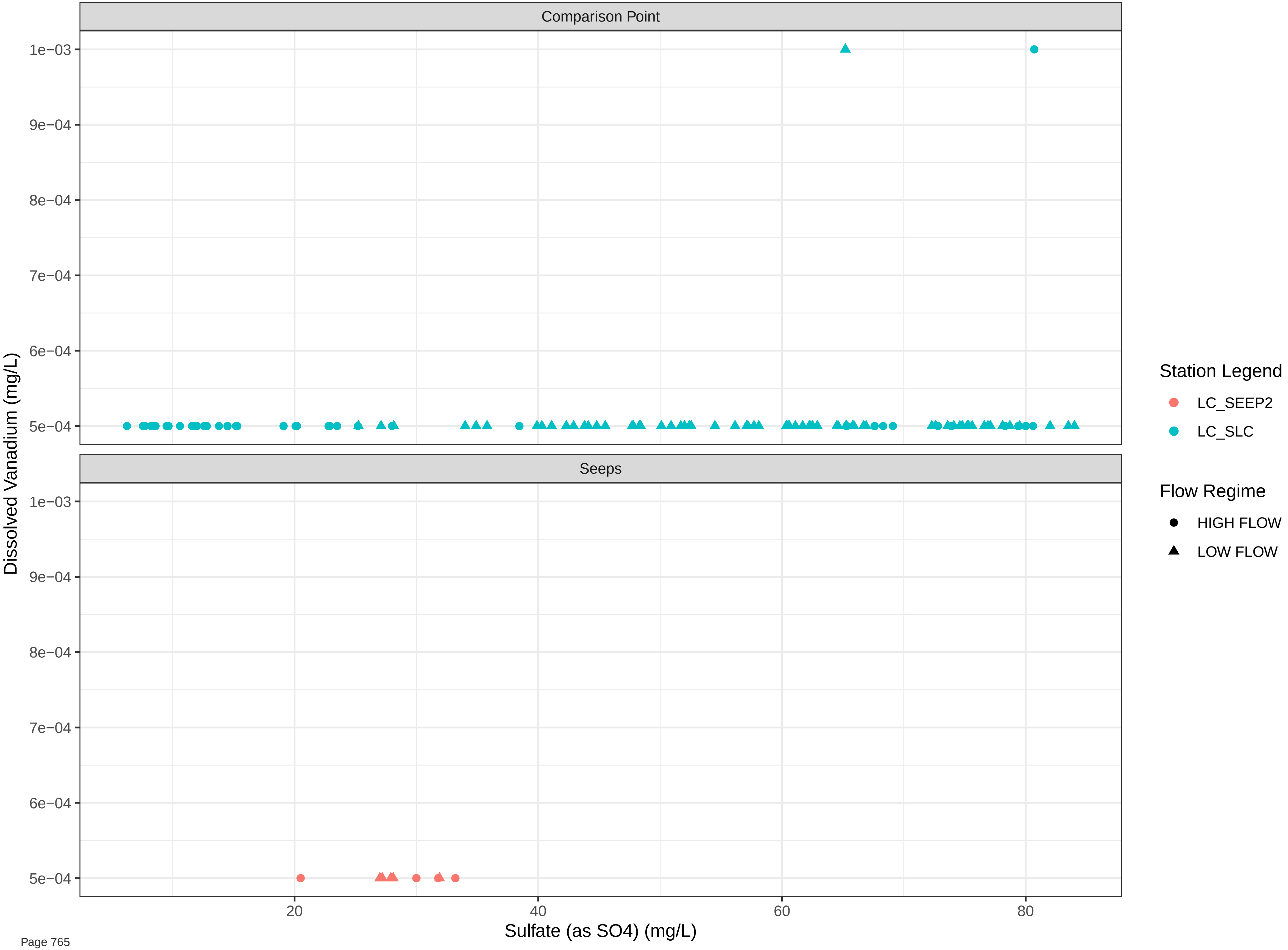

Seeps
0.050
0.025
0.000
−0.025
Dissolved Vanadium (mg/L)
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW



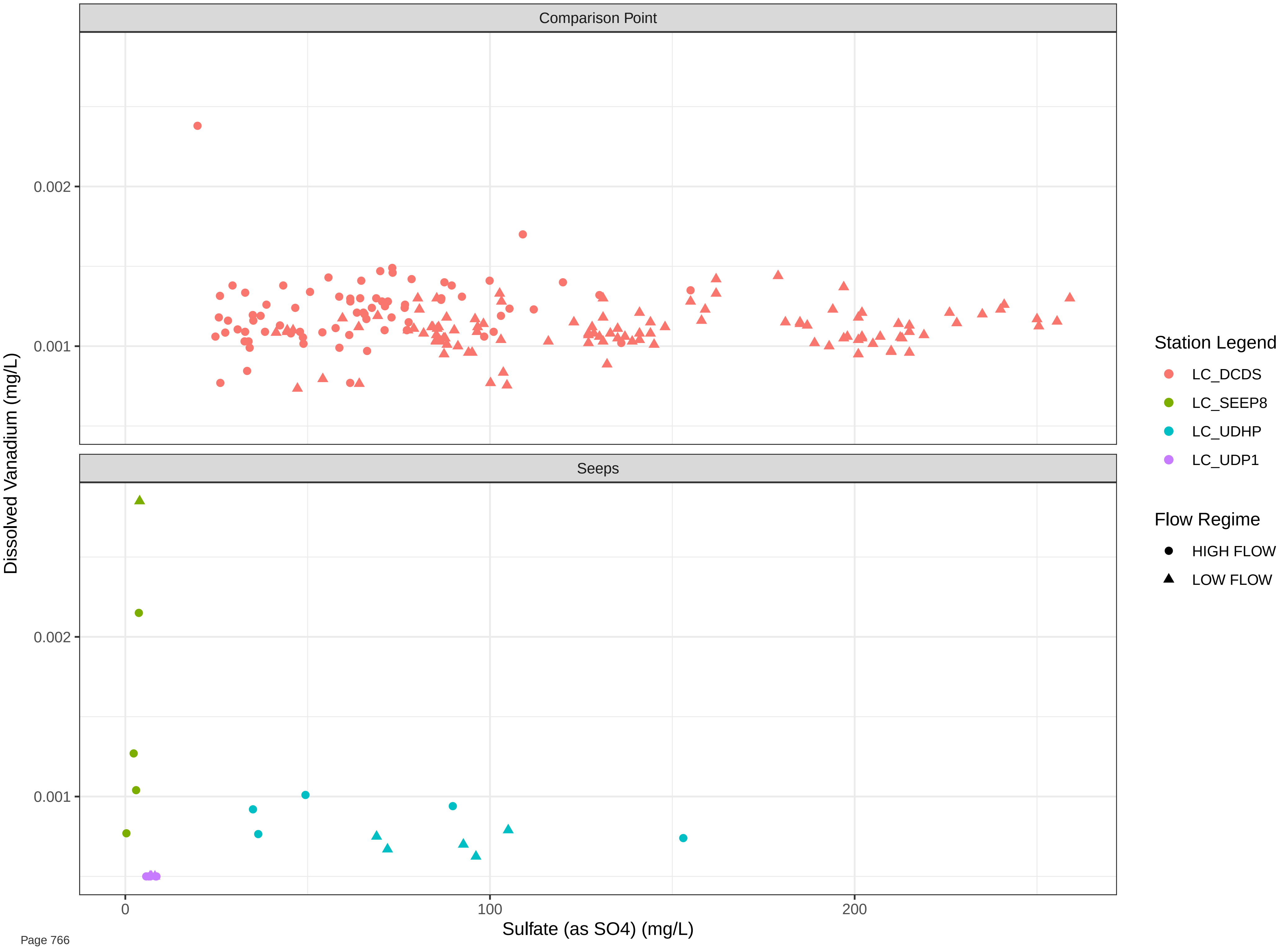
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW

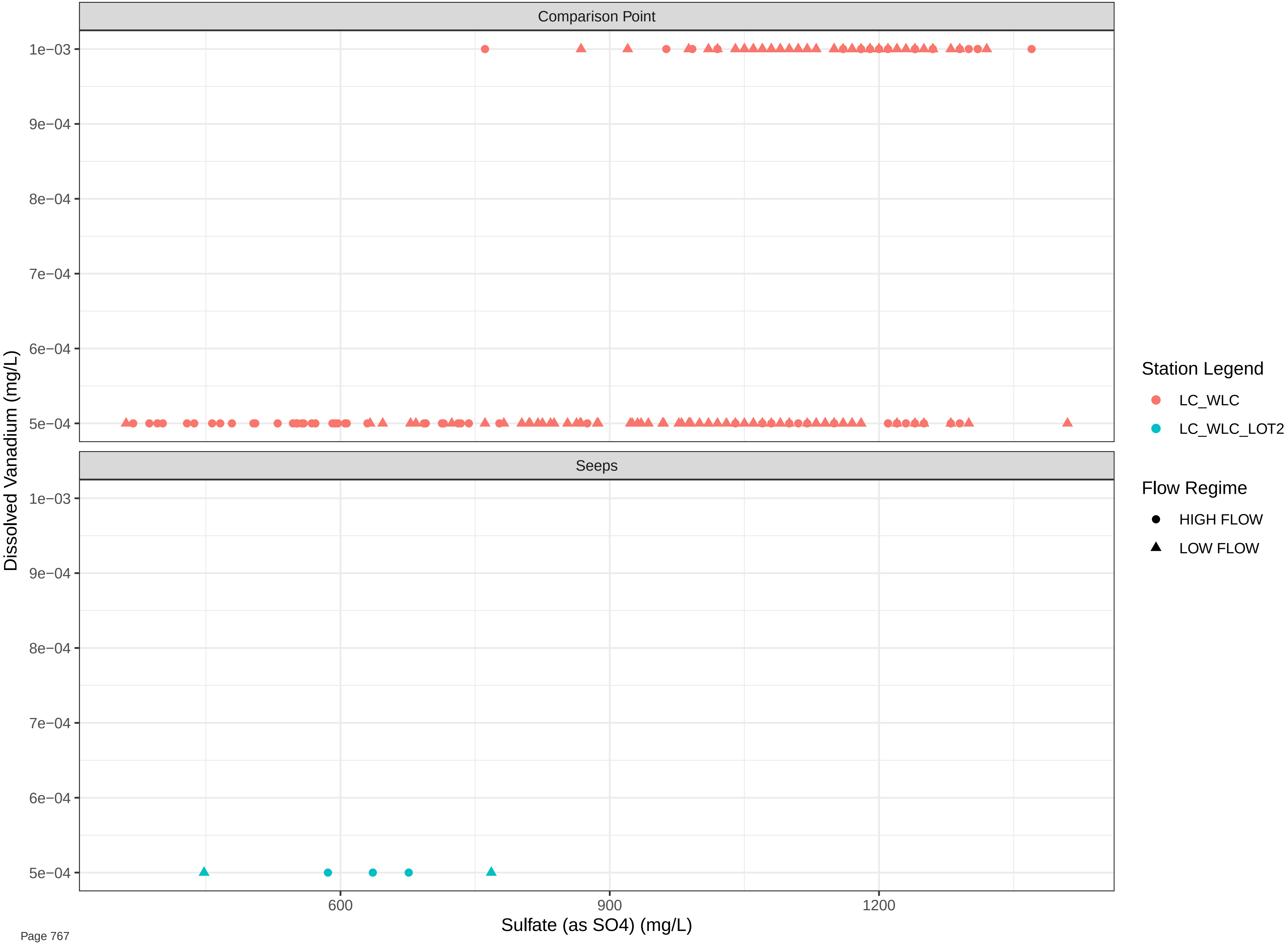


Comparison Point
Seeps
0.050
0.025
0.000
−0.025
Dissolved Vanadium (mg/L)
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW

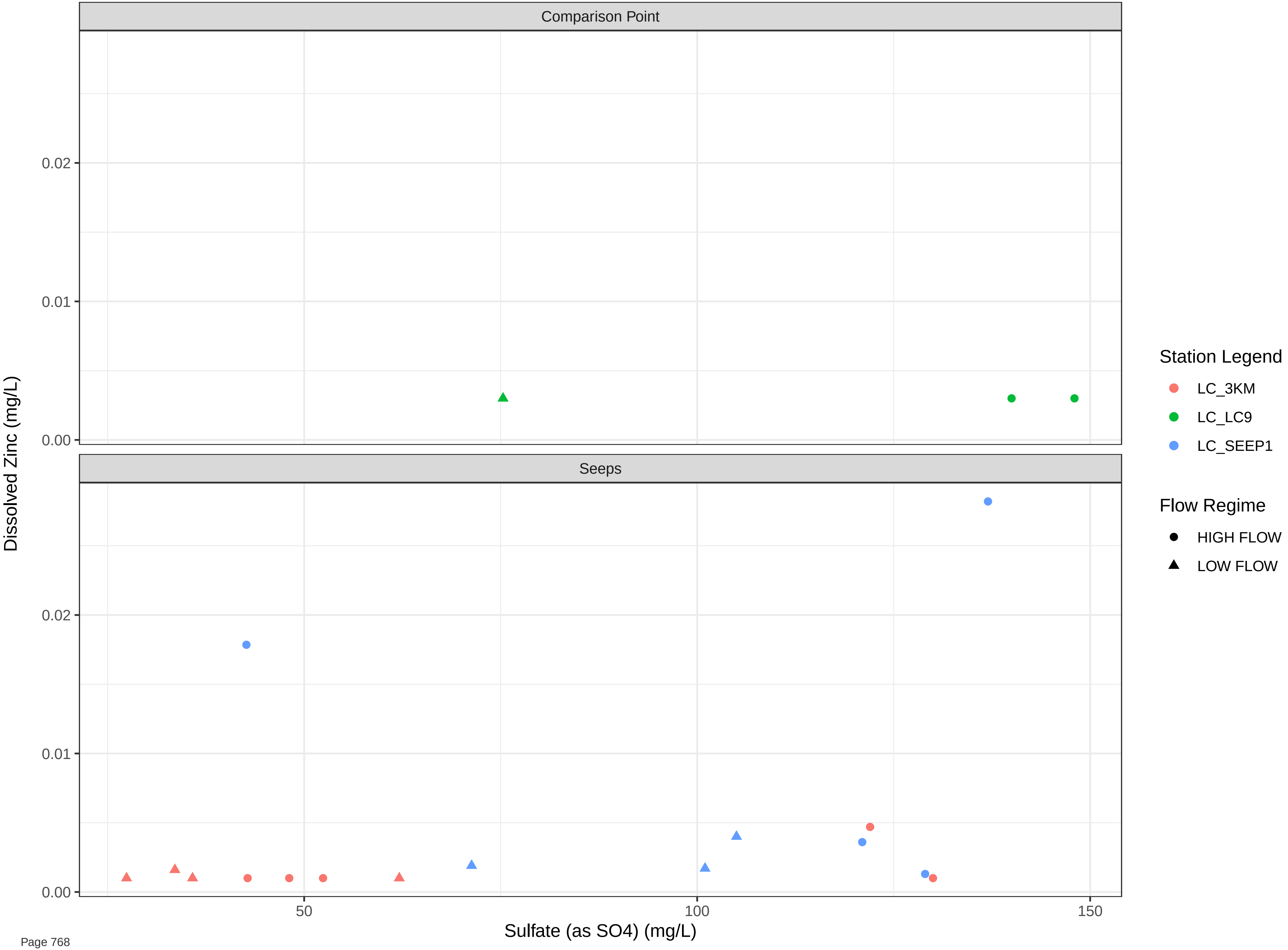


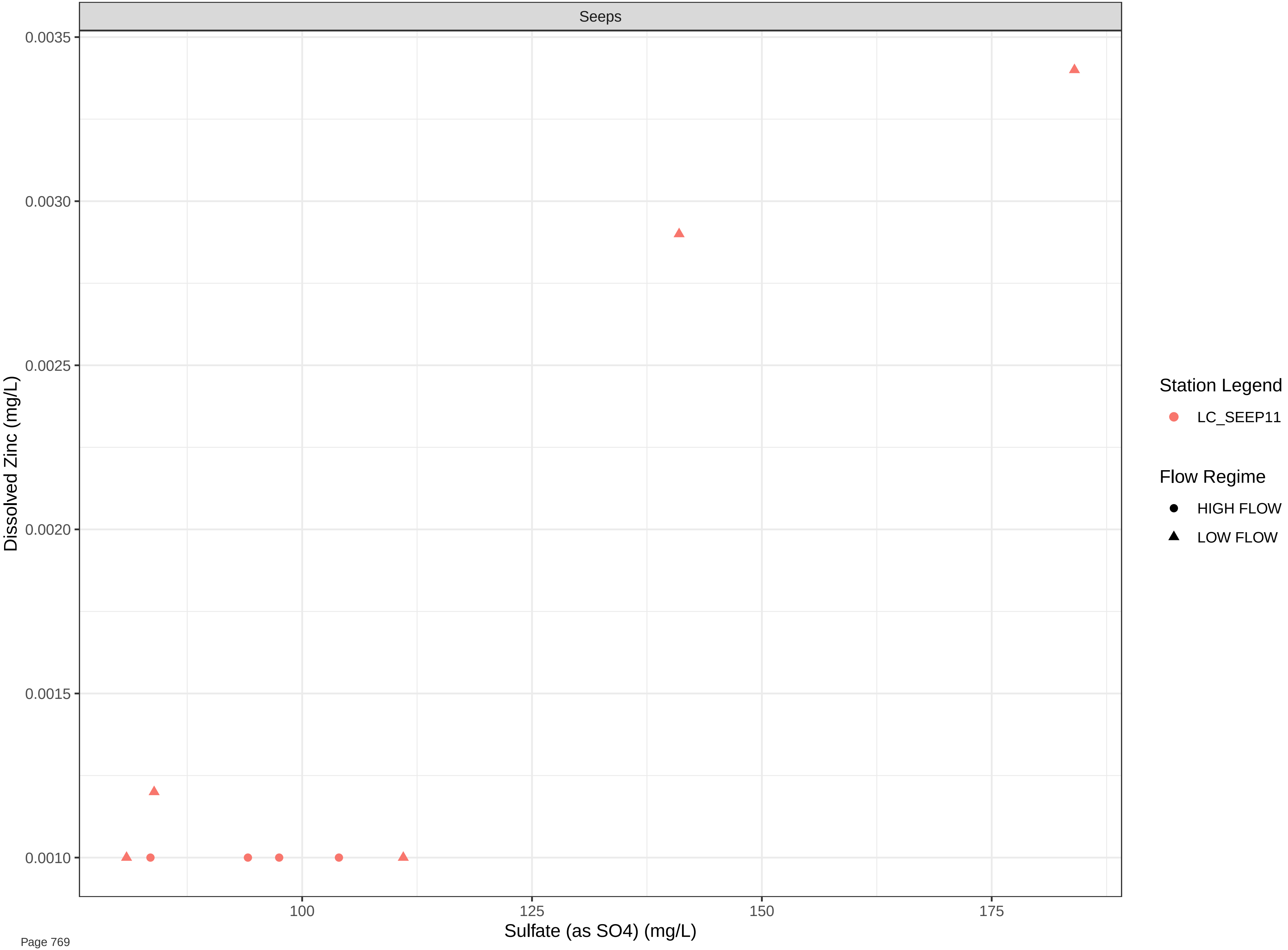
Comparison Point
Seeps
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
20
40
60
80
Dissolved Vanadium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

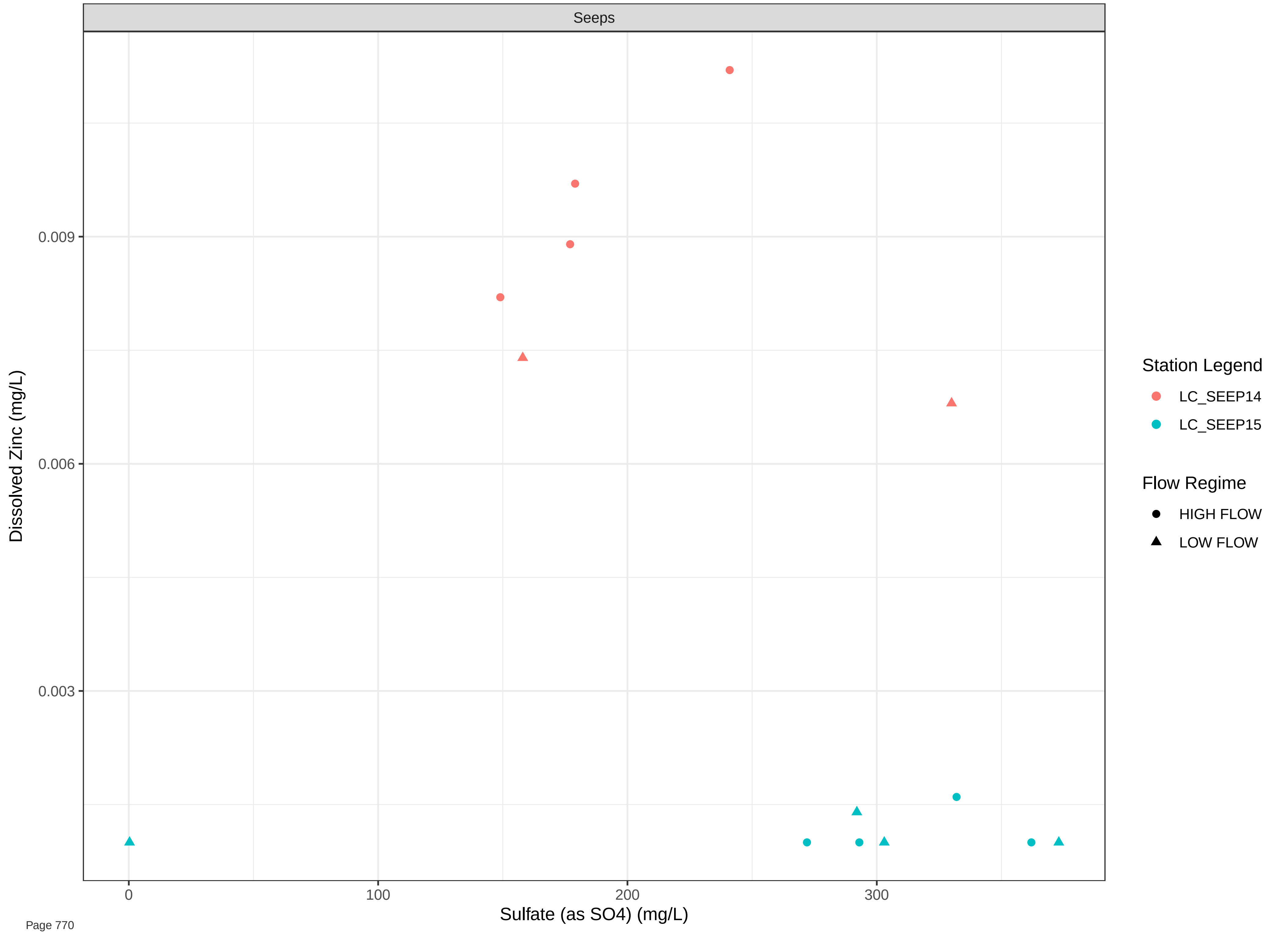

Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.002
0.001
0
100
200
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



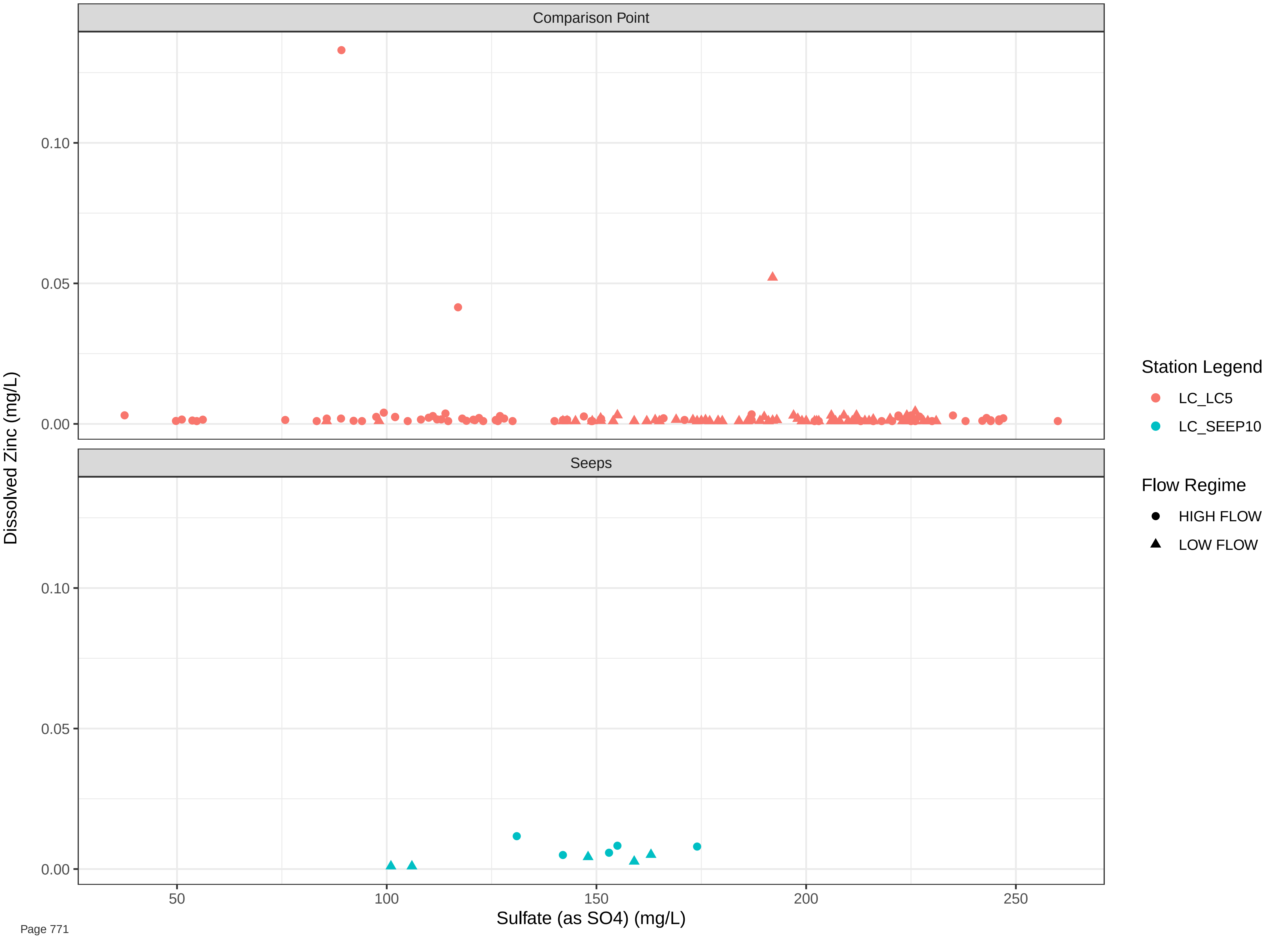
Comparison Point
Seeps
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
600
900
1200
Dissolved Vanadium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
50
100
150
Sulfate (as SO4) (mg/L)
Station Legend
LC_3KM
LC_LC9
LC_SEEP1
Flow Regime
HIGH FLOW
LOW FLOW

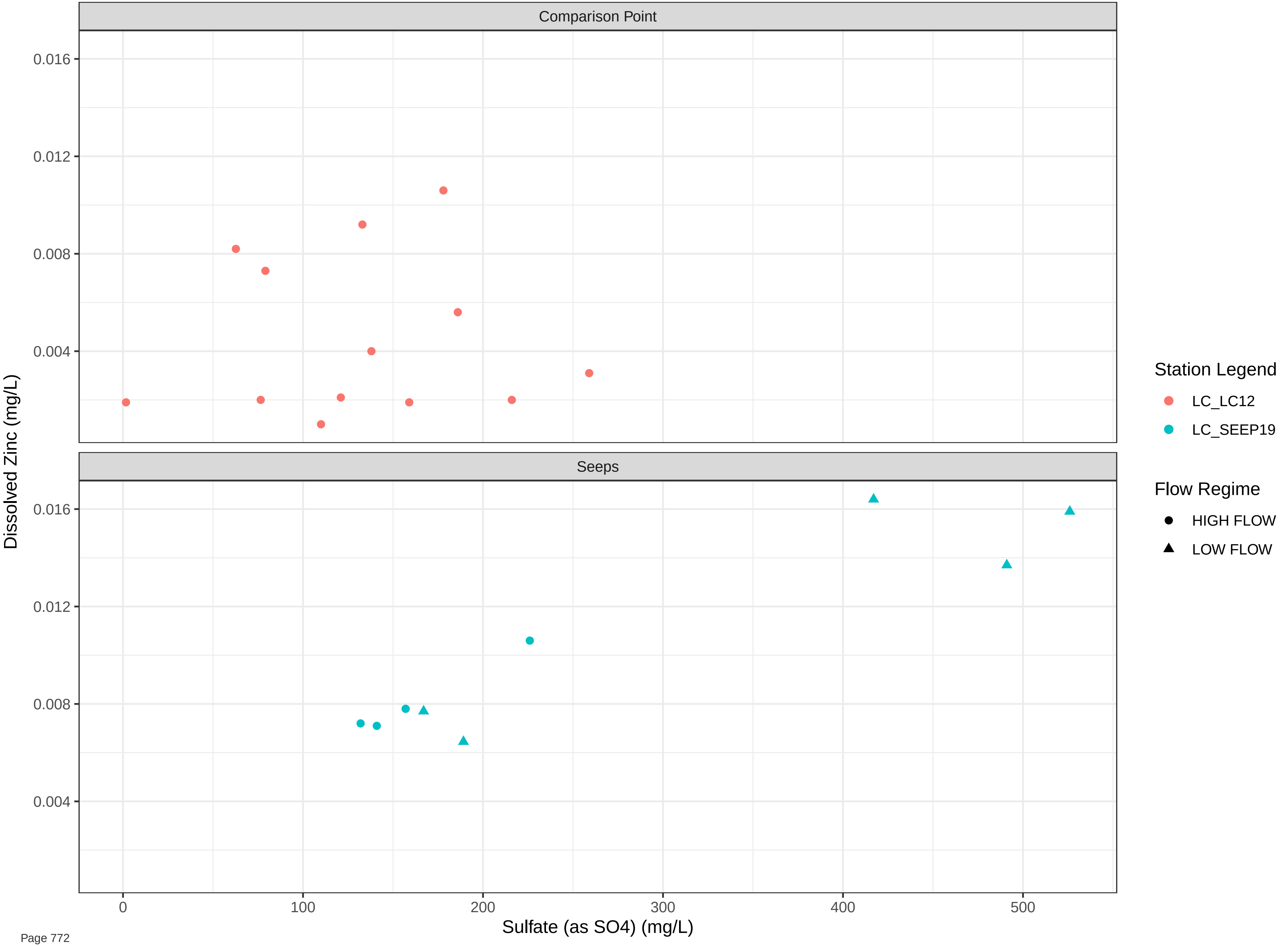

Seeps
Dissolved Zinc (mg/L)
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
100
125
150
175
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP11
Flow Regime
HIGH FLOW
LOW FLOW



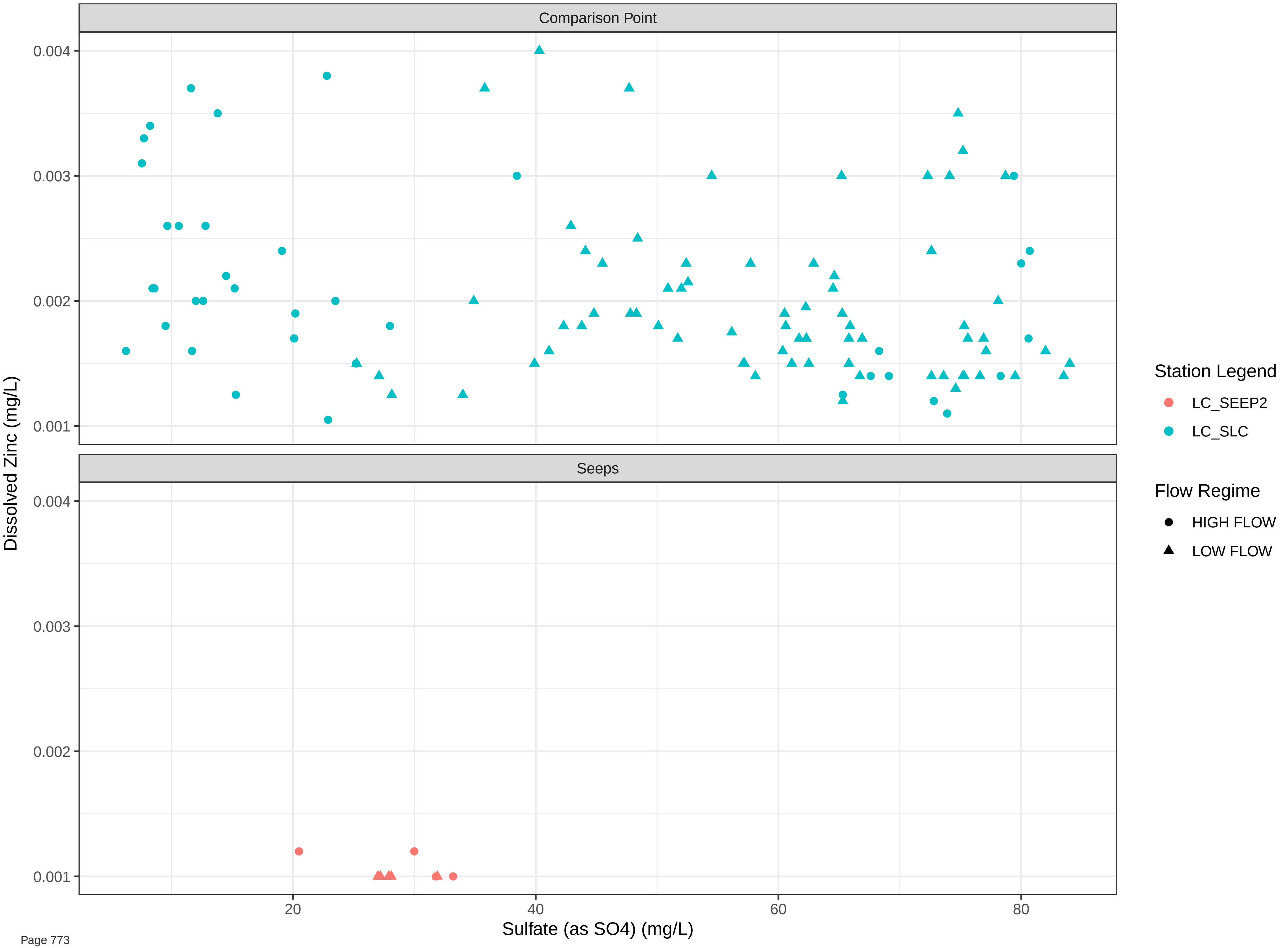
Seeps
Dissolved Zinc (mg/L)
0.009
0.006
0.003
0
100
200
300
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP14
LC_SEEP15
Flow Regime
HIGH FLOW
LOW FLOW

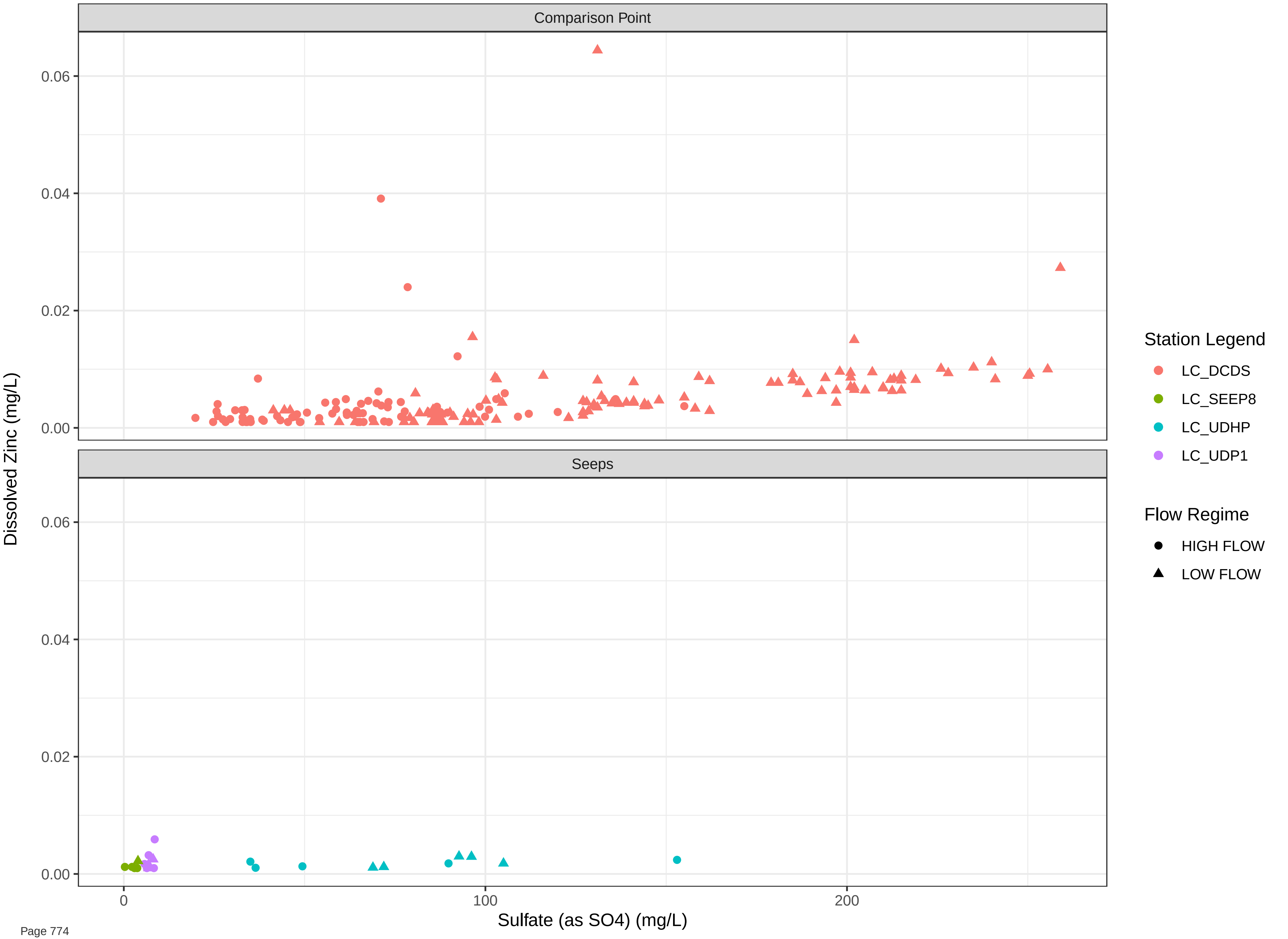


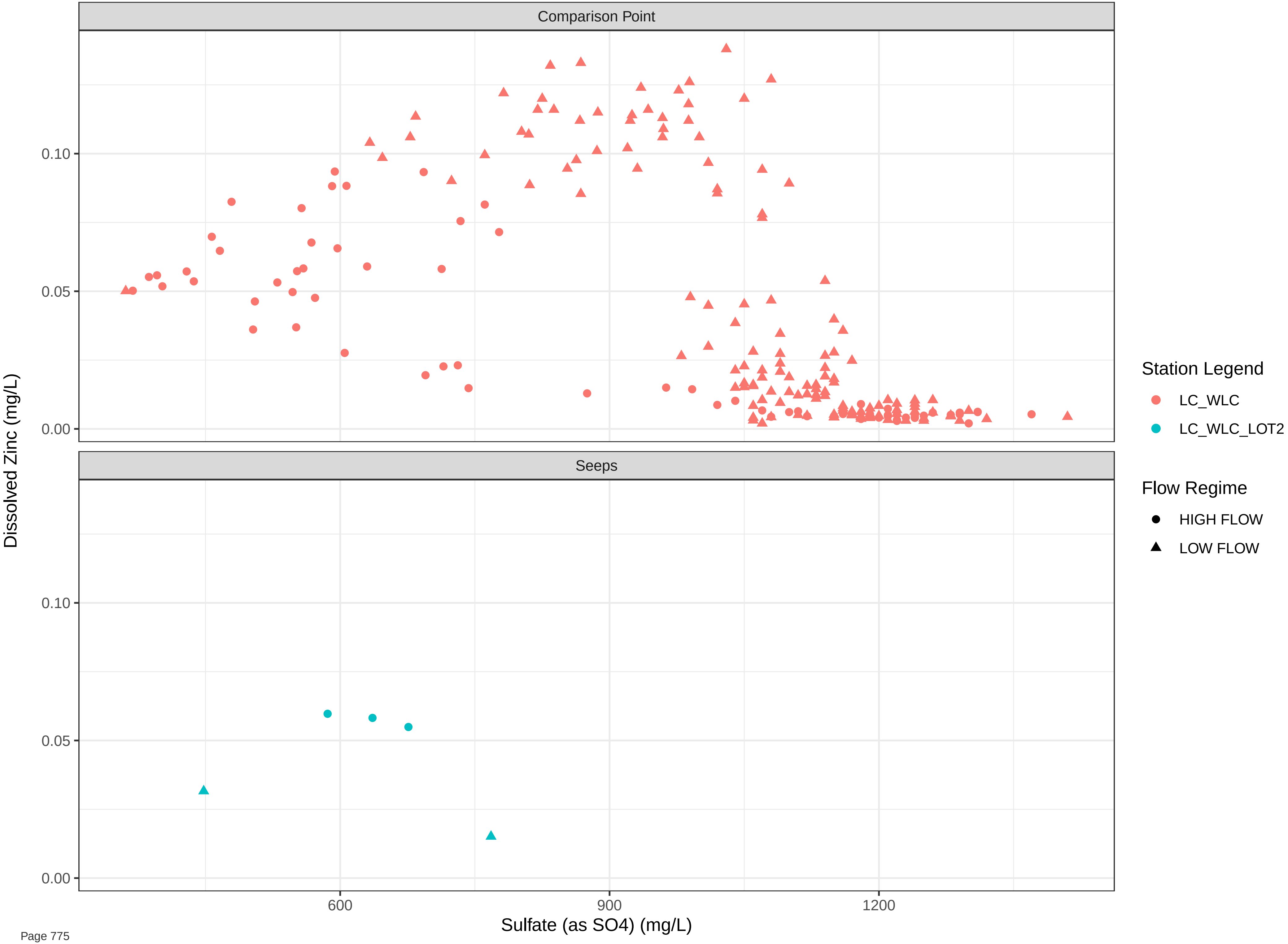
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.05
0.10
50
100
150
200
250
Sulfate (as SO4) (mg/L)
Station Legend
LC_LC5
LC_SEEP10
Flow Regime
HIGH FLOW
LOW FLOW



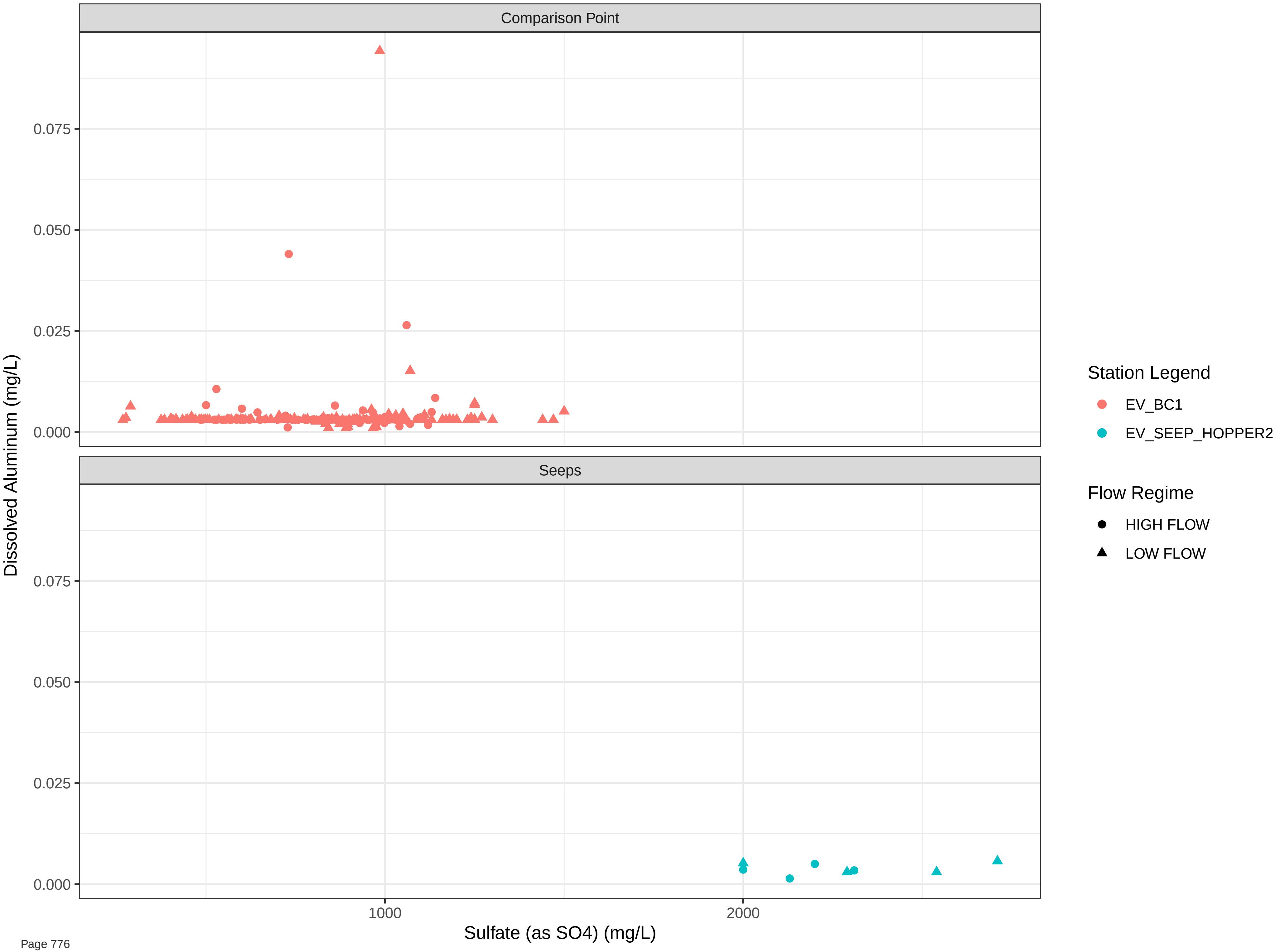
Comparison Point
Seeps
Dissolved Zinc (mg/L)
Sulfate (as SO4) (mg/L)
0.016
0.012
0.008
0.004
0
100
200
300
400
500
Station Legend
LC_LC12
LC_SEEP19
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.004
0.003
0.002
0.001
20
40
60
80
Sulfate (as SO4) (mg/L)
Station Legend
LC_SEEP2
LC_SLC
Flow Regime
HIGH FLOW
LOW FLOW

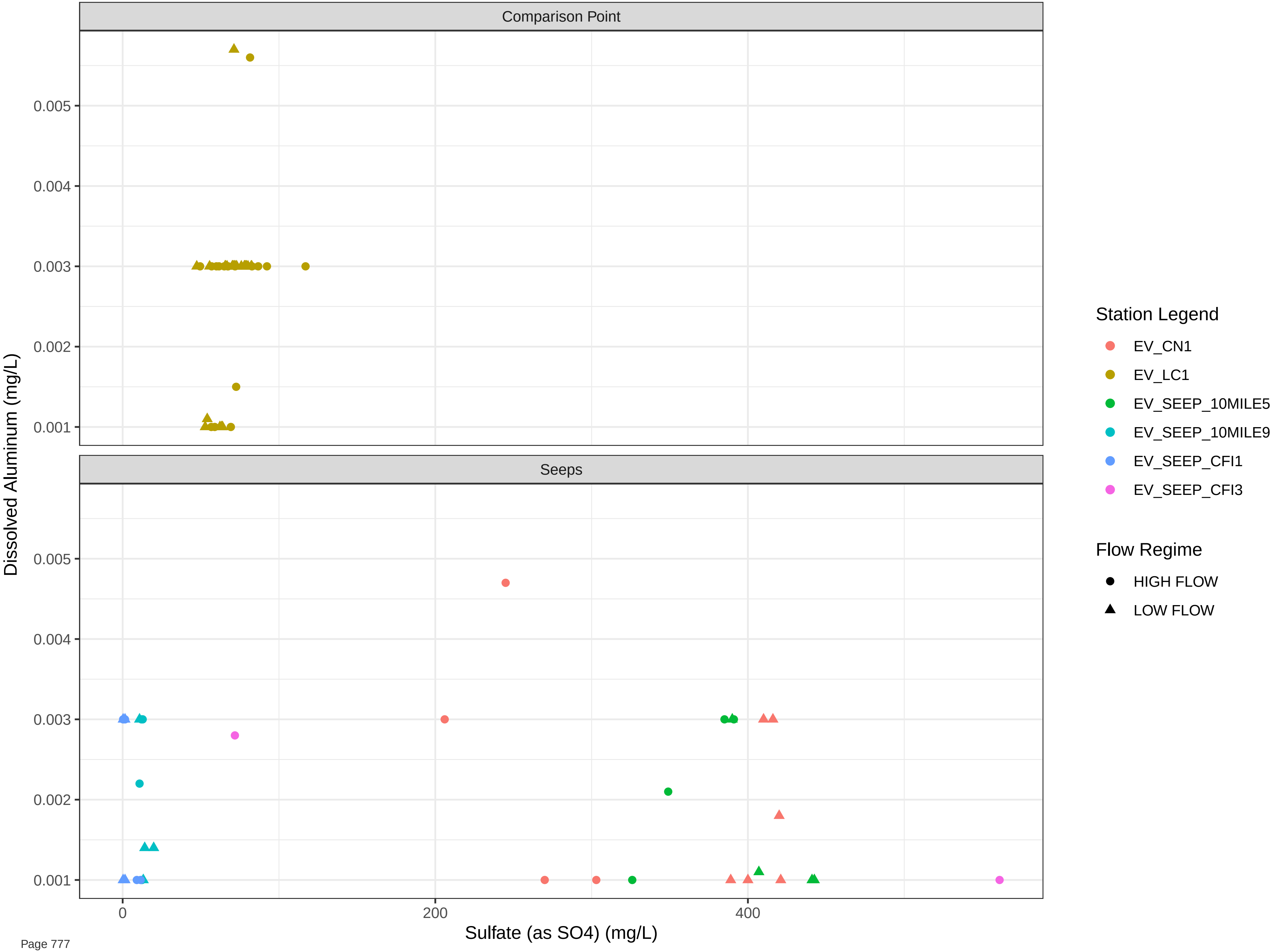

Comparison Point
Seeps
0.06
0.04
0.02
0.00
0
100
200
Dissolved Zinc (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
LC_DCDS
LC_SEEP8
LC_UDHP
LC_UDP1
Flow Regime
HIGH FLOW
LOW FLOW



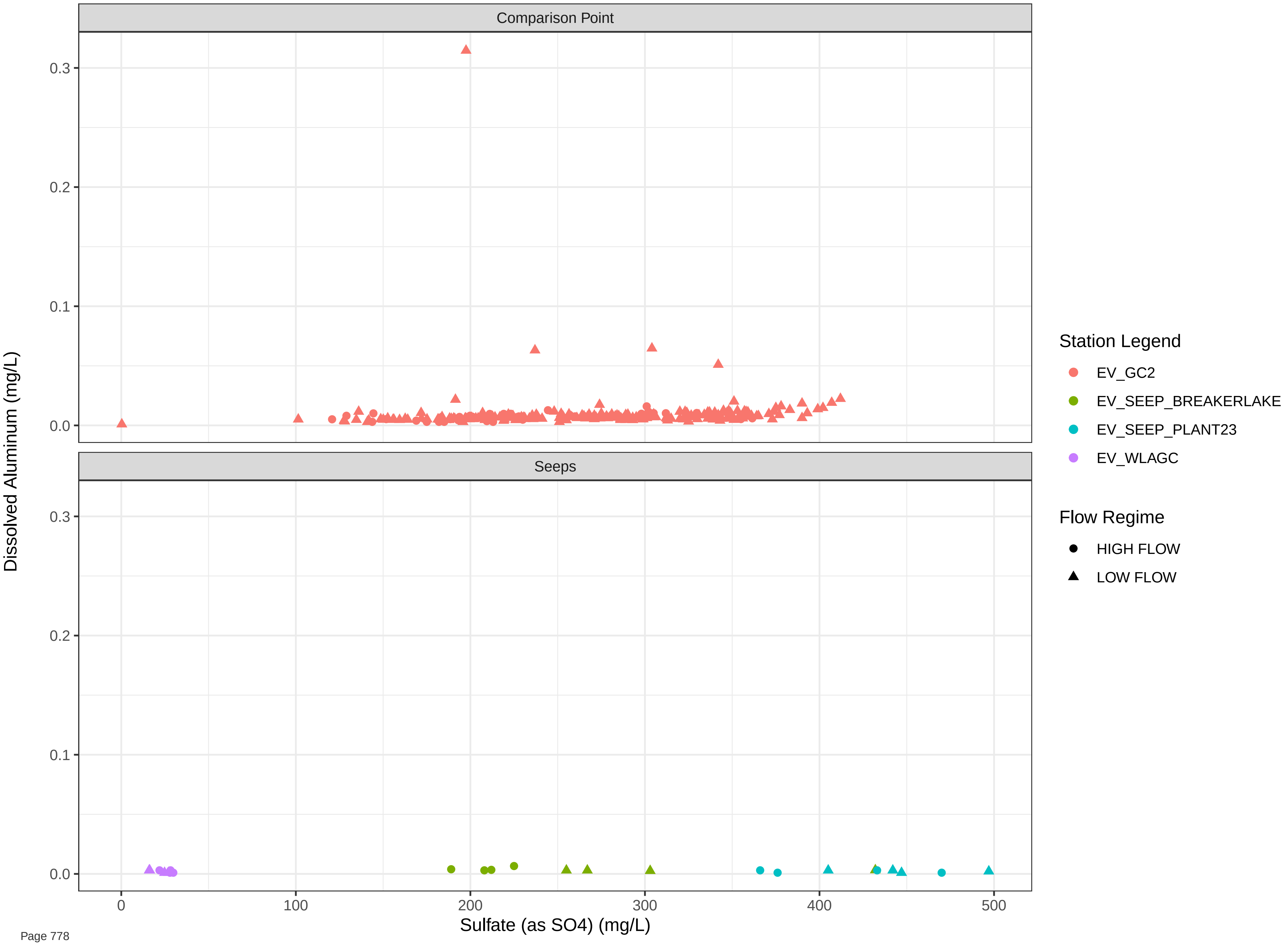
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.05
0.10
0.00
0.05
0.10
600
900
1200
Sulfate (as SO4) (mg/L)
Station Legend
LC_WLC
LC_WLC_LOT2
Flow Regime
HIGH FLOW
LOW FLOW

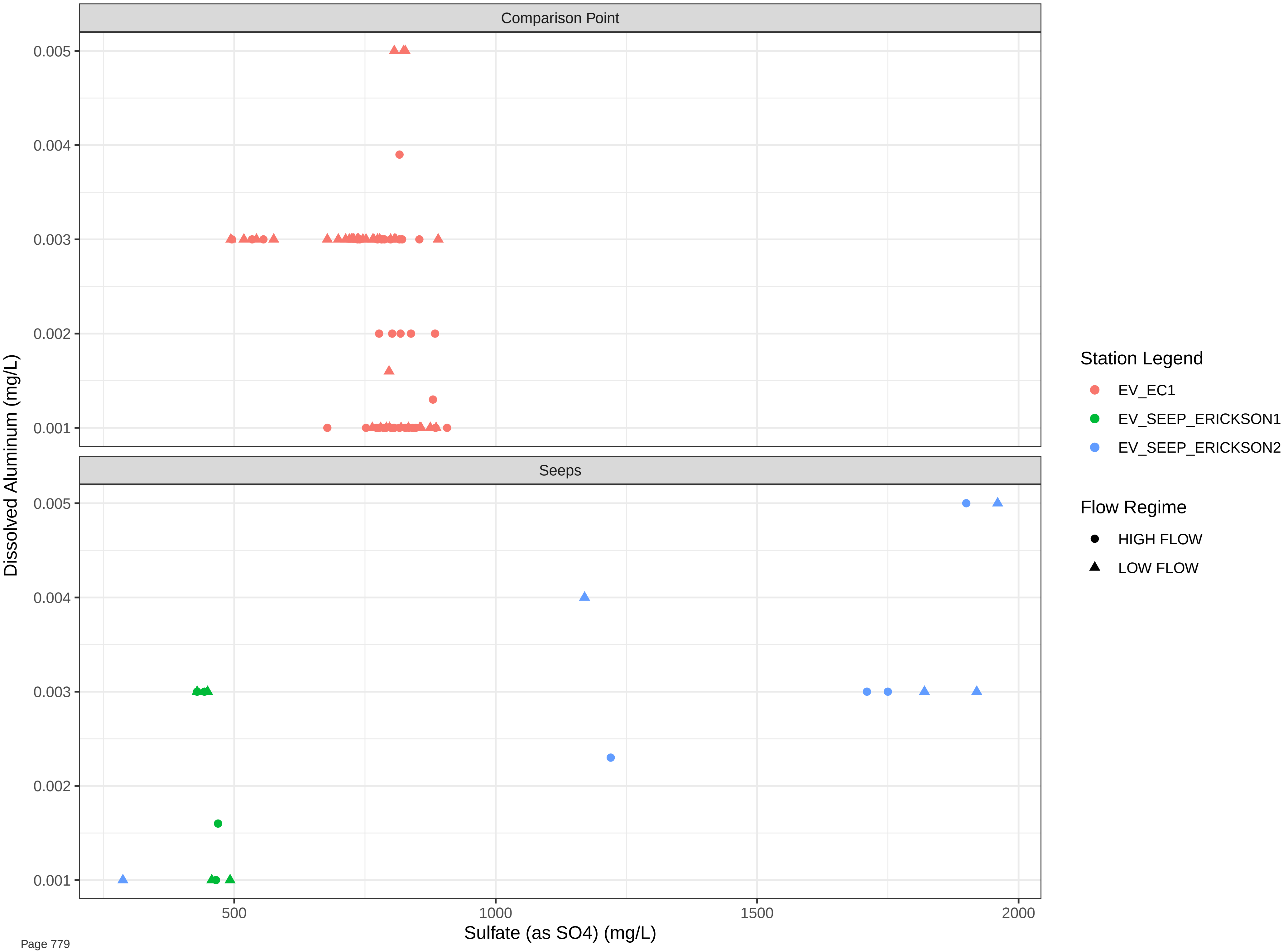


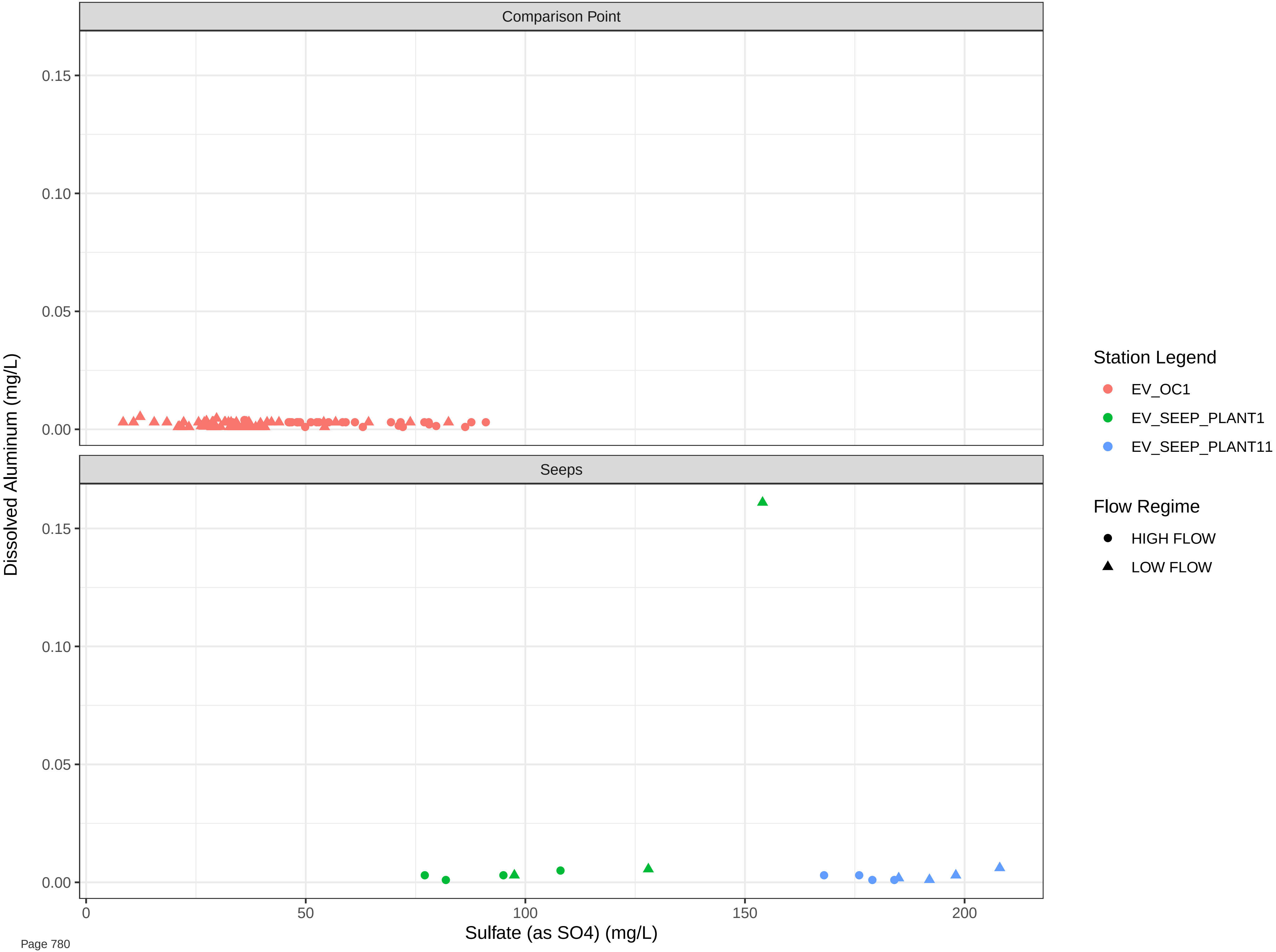
Comparison Point
Seeps
0.075
0.050
0.025
0.000
1000
2000
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

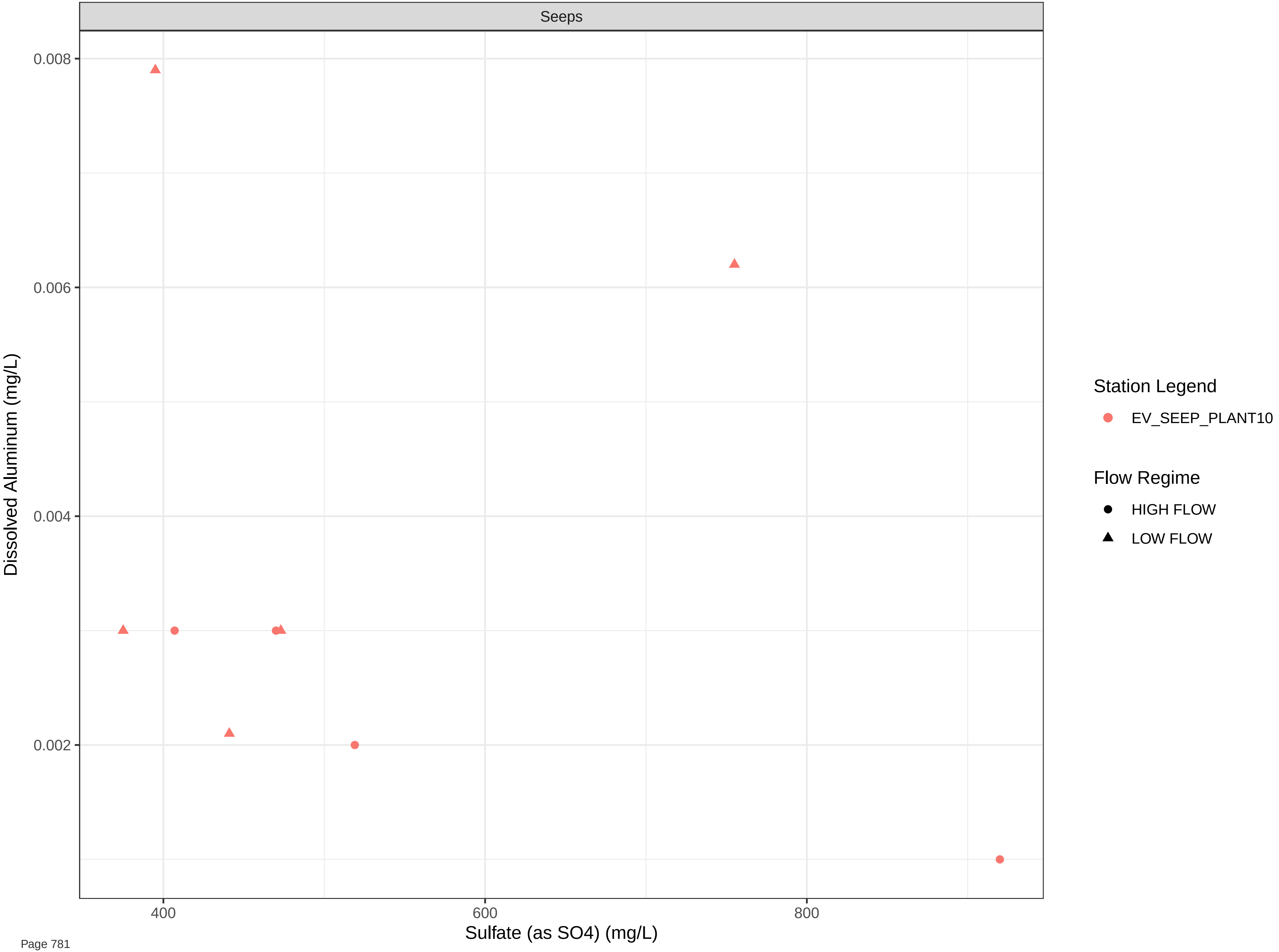


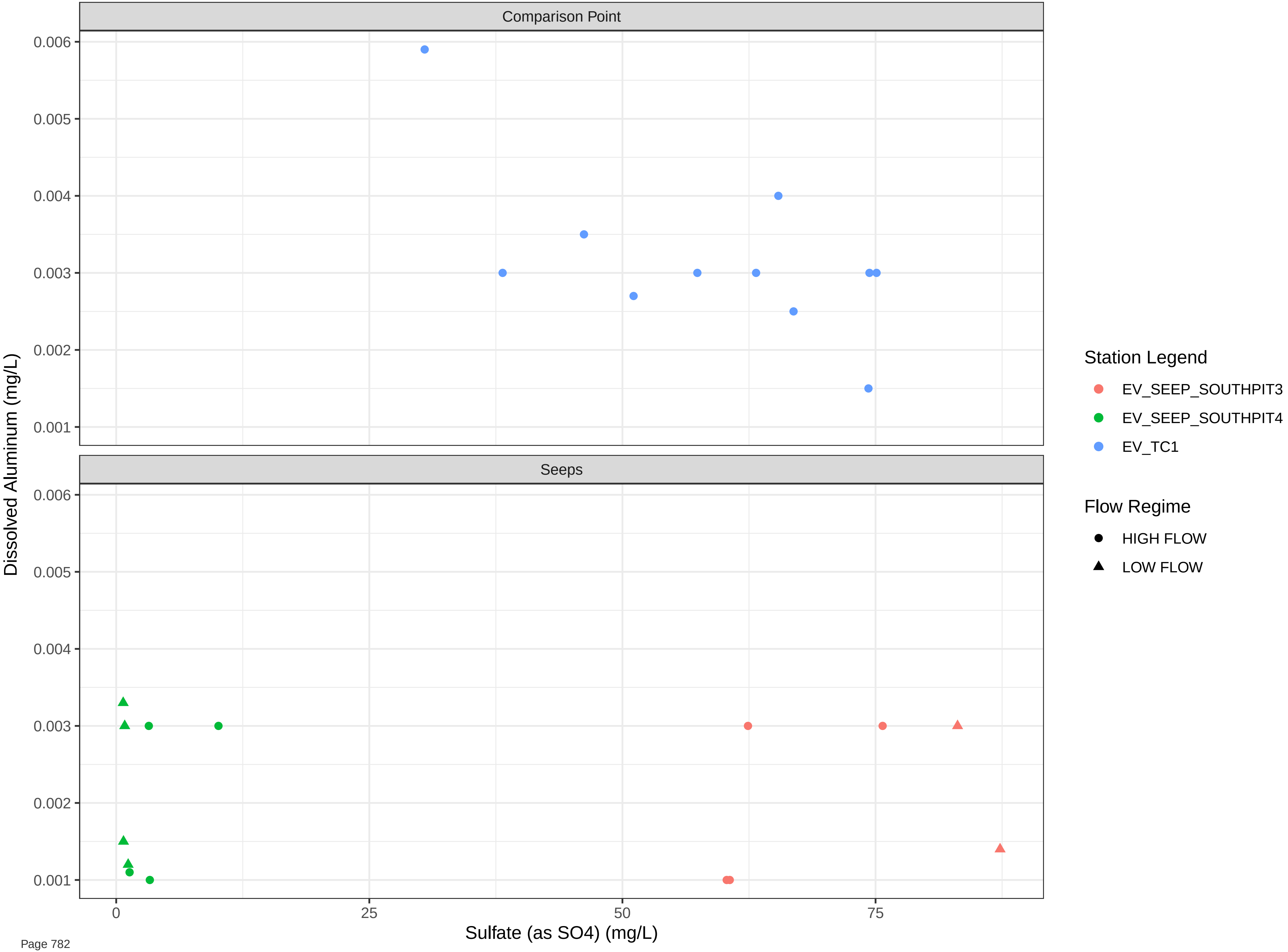
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.005
0.004
0.003
0.002
0.001
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0.3
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

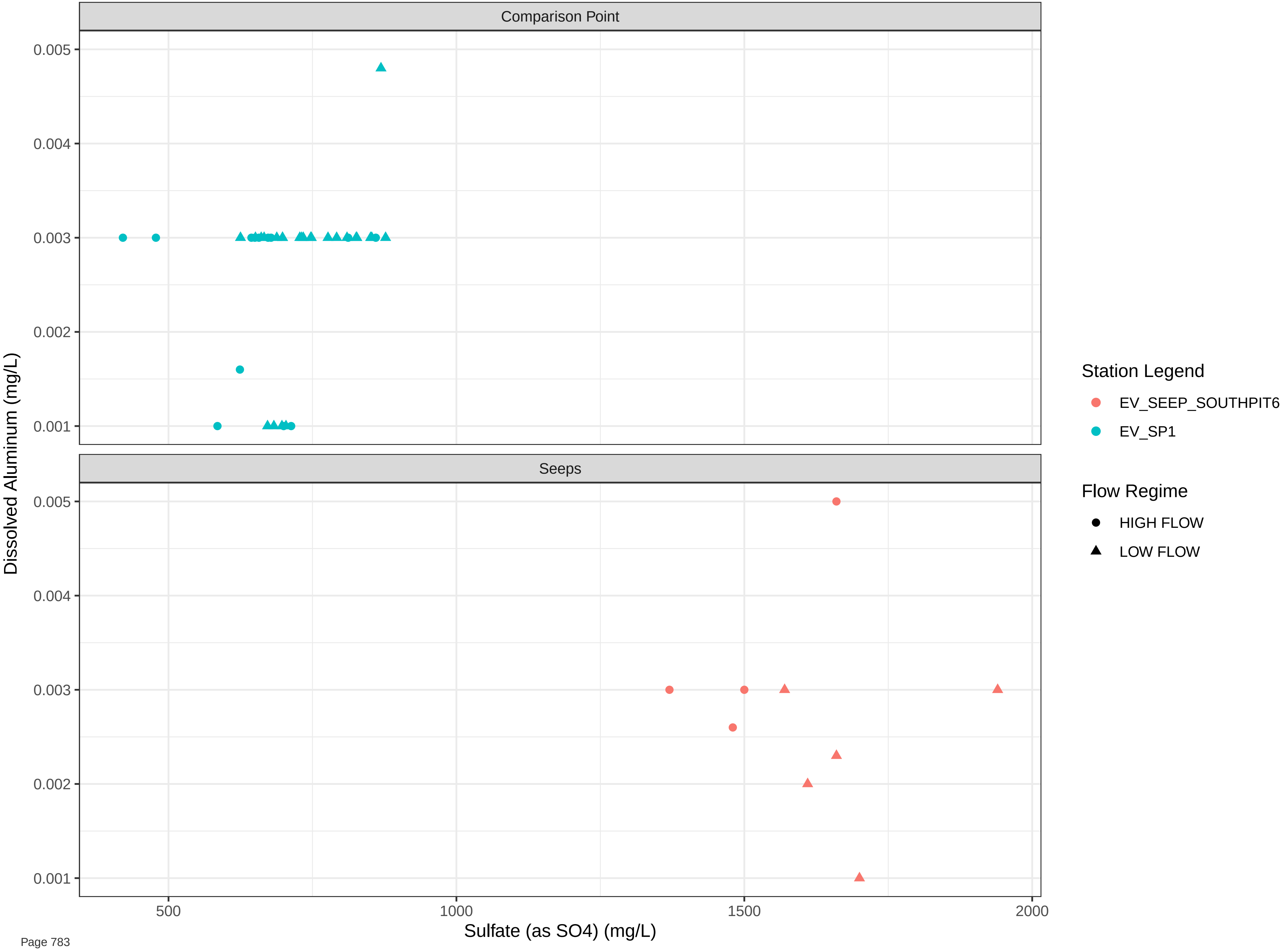

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.005
0.004
0.003
0.002
0.001
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.15
0.10
0.05
0.00
0
50
100
150
200
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

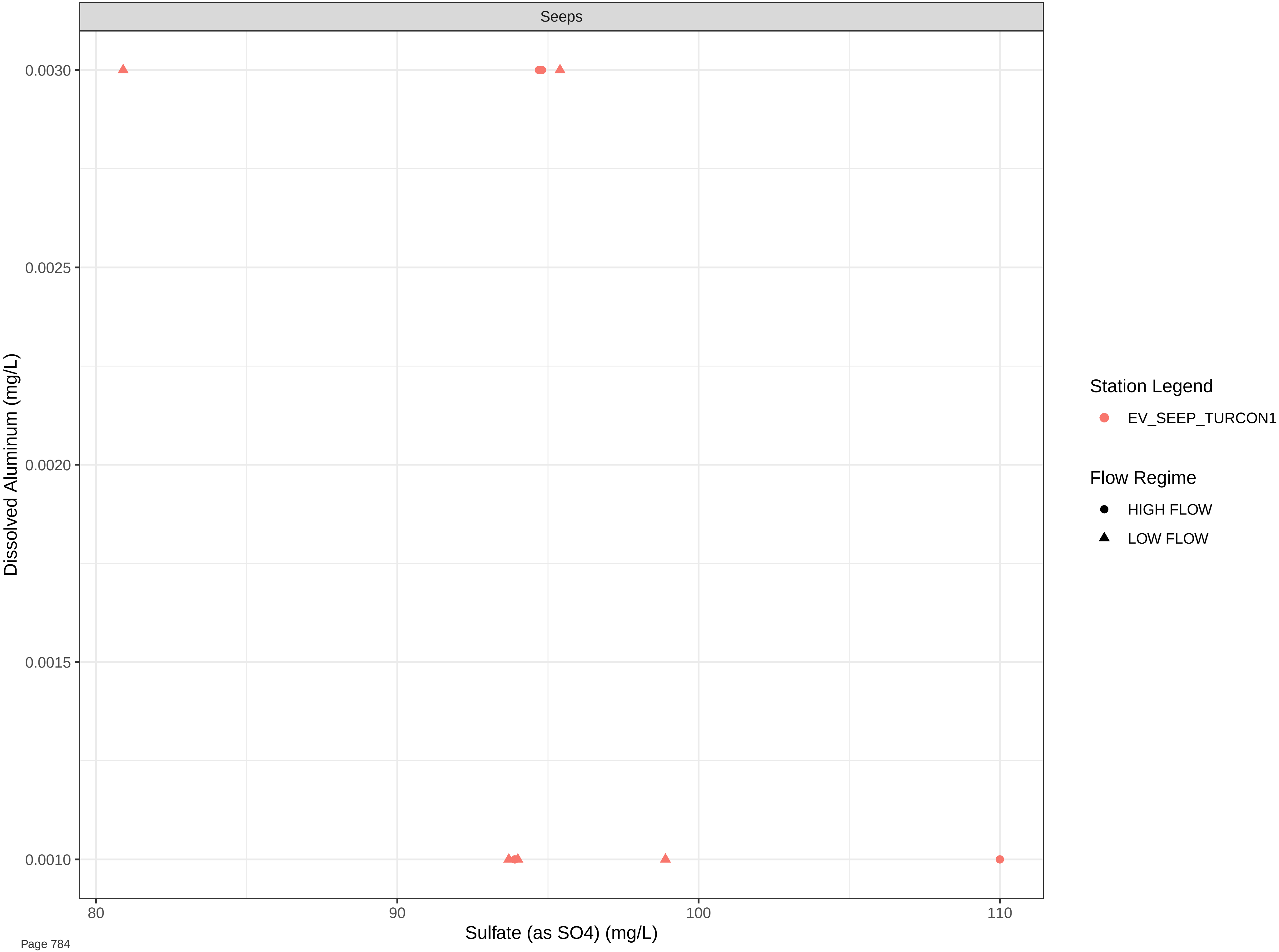

Seeps
0.008
0.006
0.004
0.002
Dissolved Aluminum (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



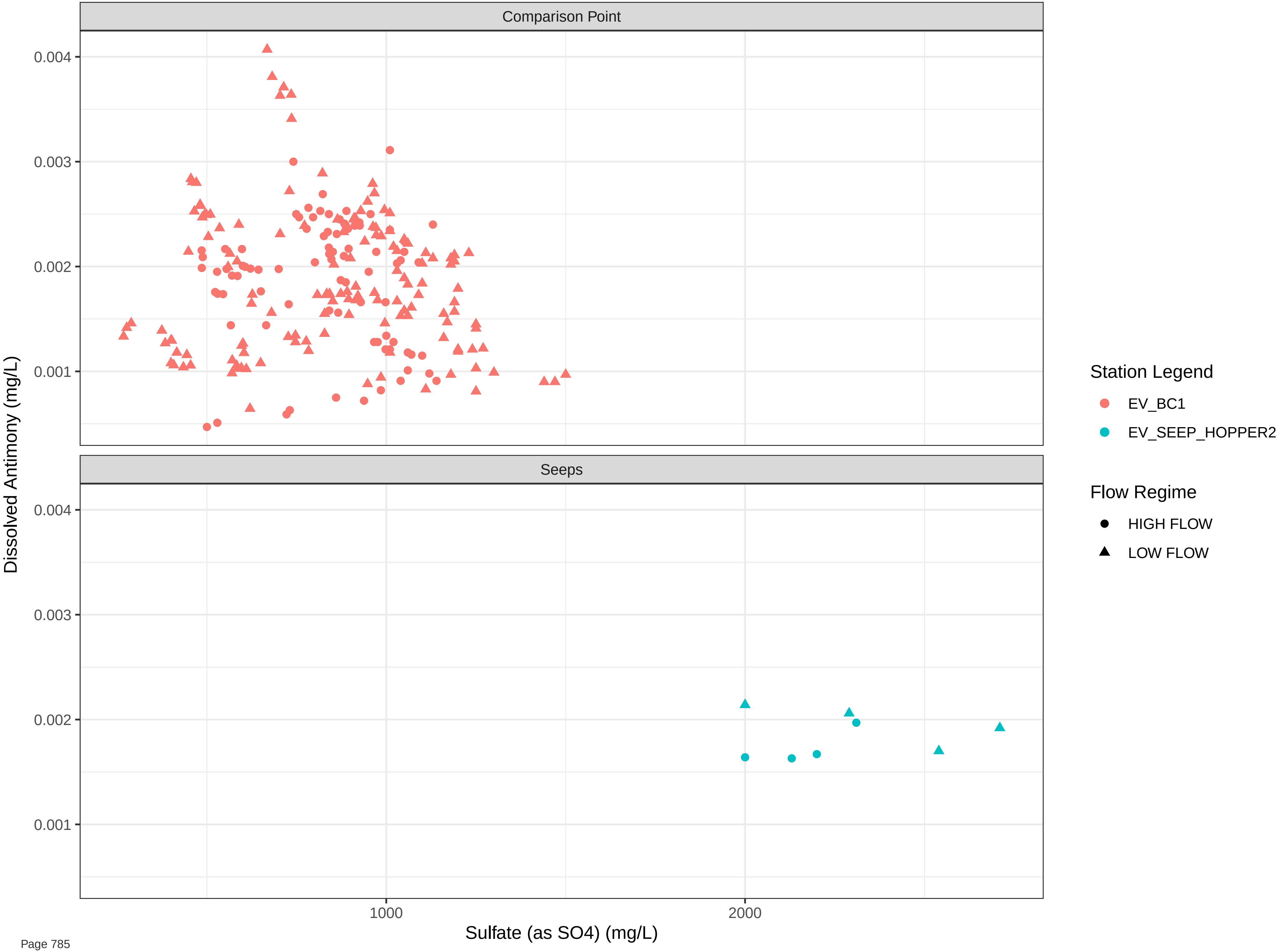
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



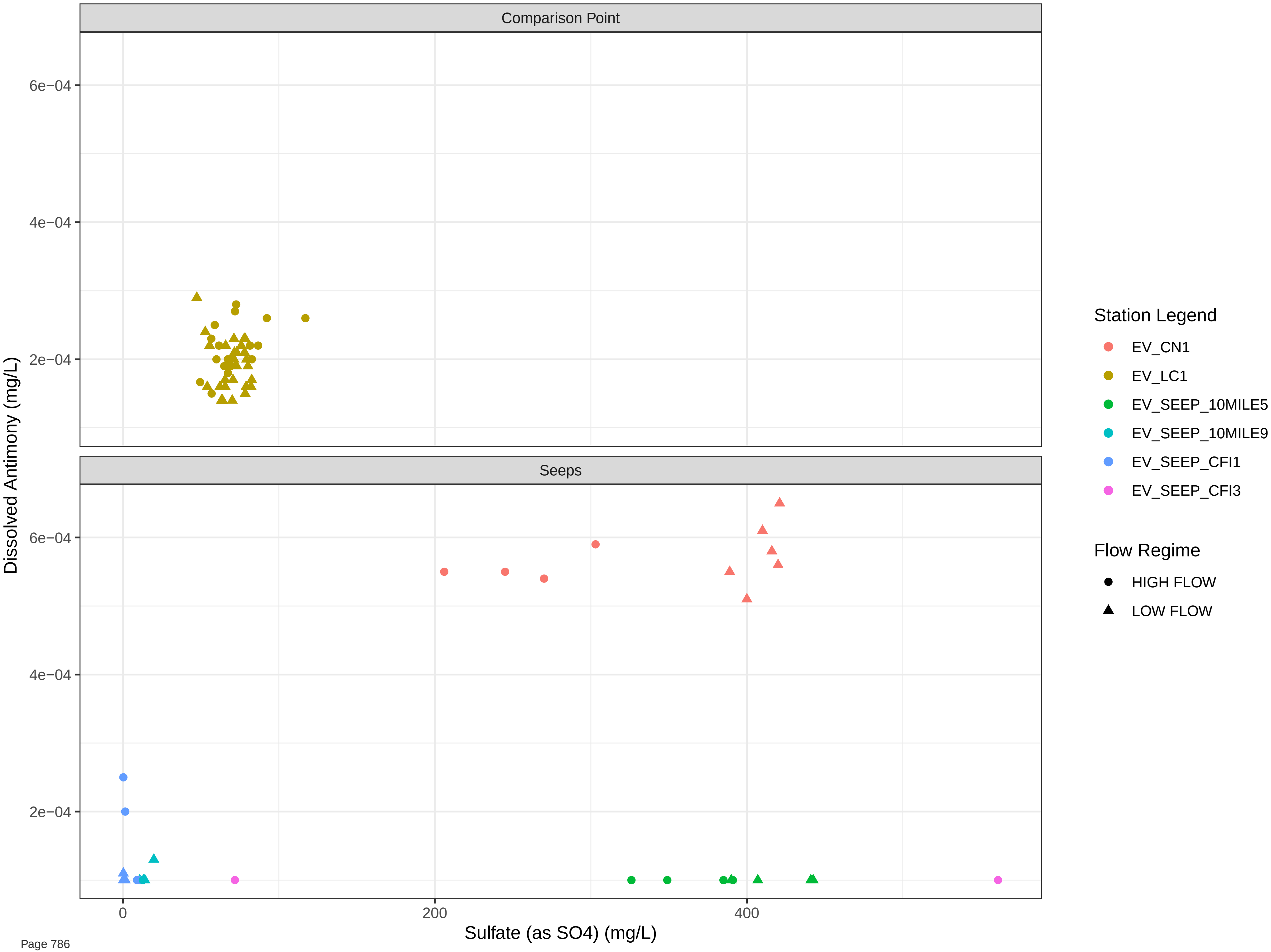
Comparison Point
Seeps
Dissolved Aluminum (mg/L)
0.005
0.004
0.003
0.002
0.001
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

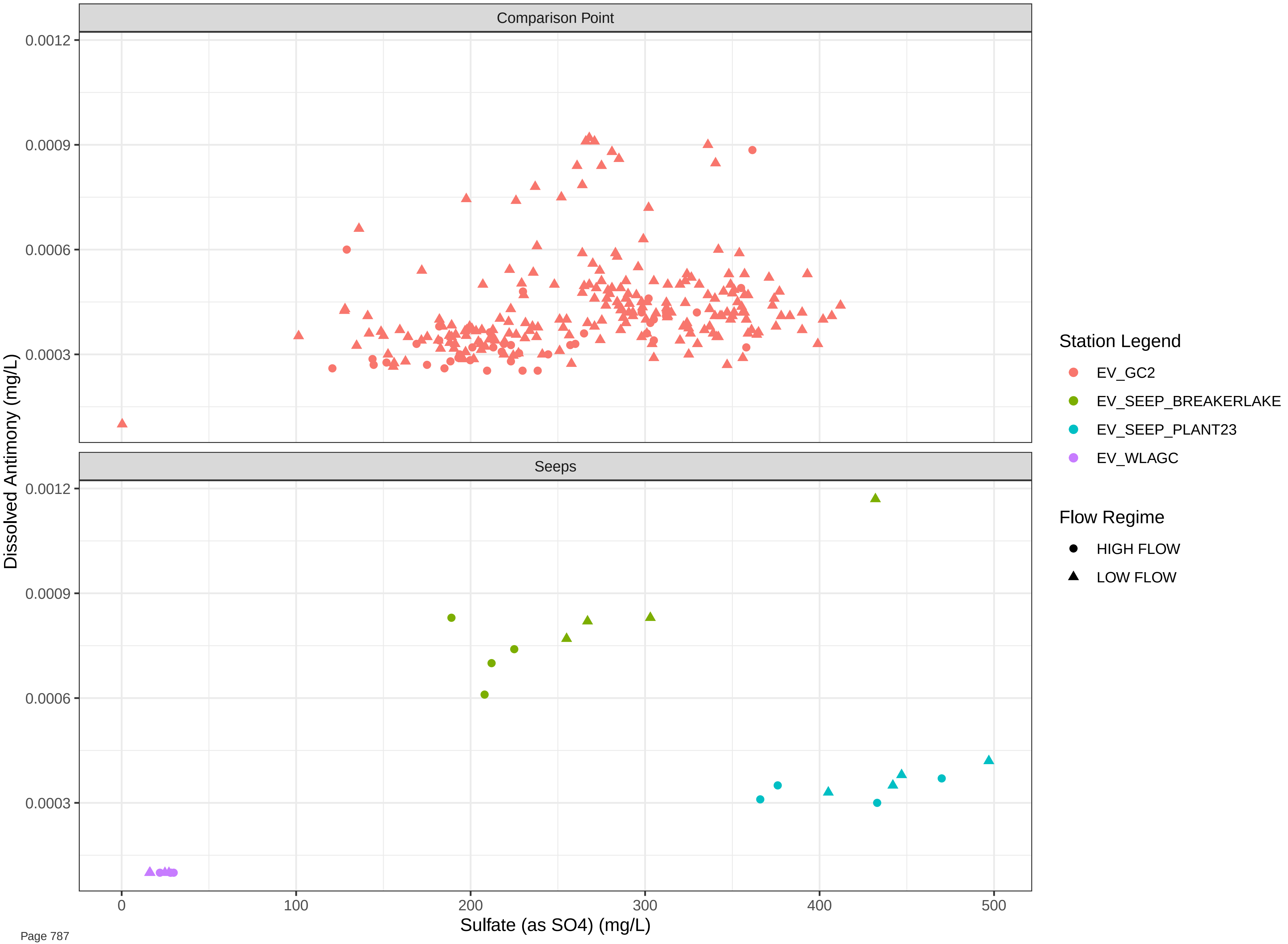


Seeps
0.0030
0.0025
0.0020
0.0015
0.0010
Dissolved Aluminum (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

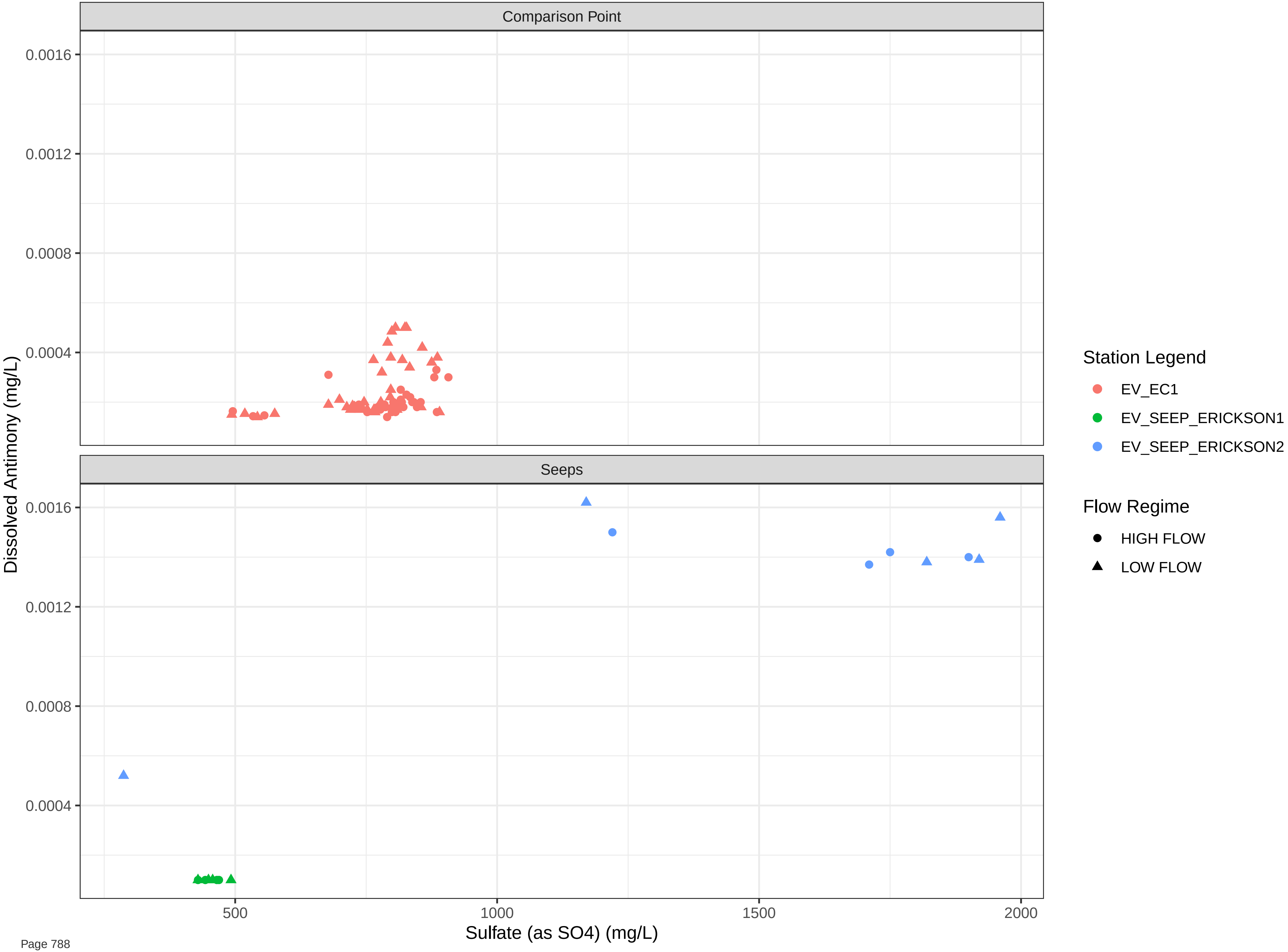


Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.004
0.003
0.002
0.001
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

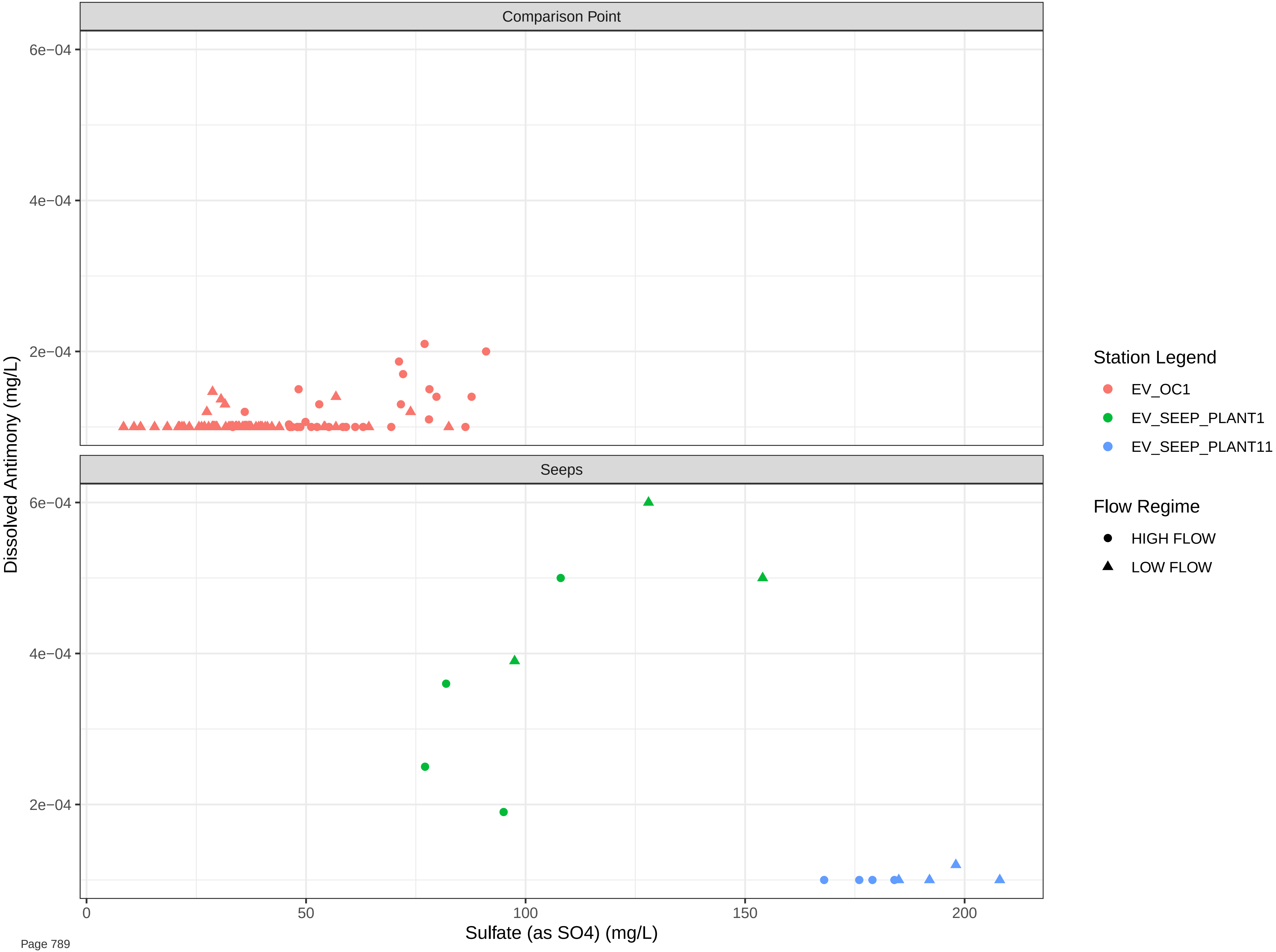

Comparison Point
Seeps
6e−04
4e−04
2e−04
0
200
400
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

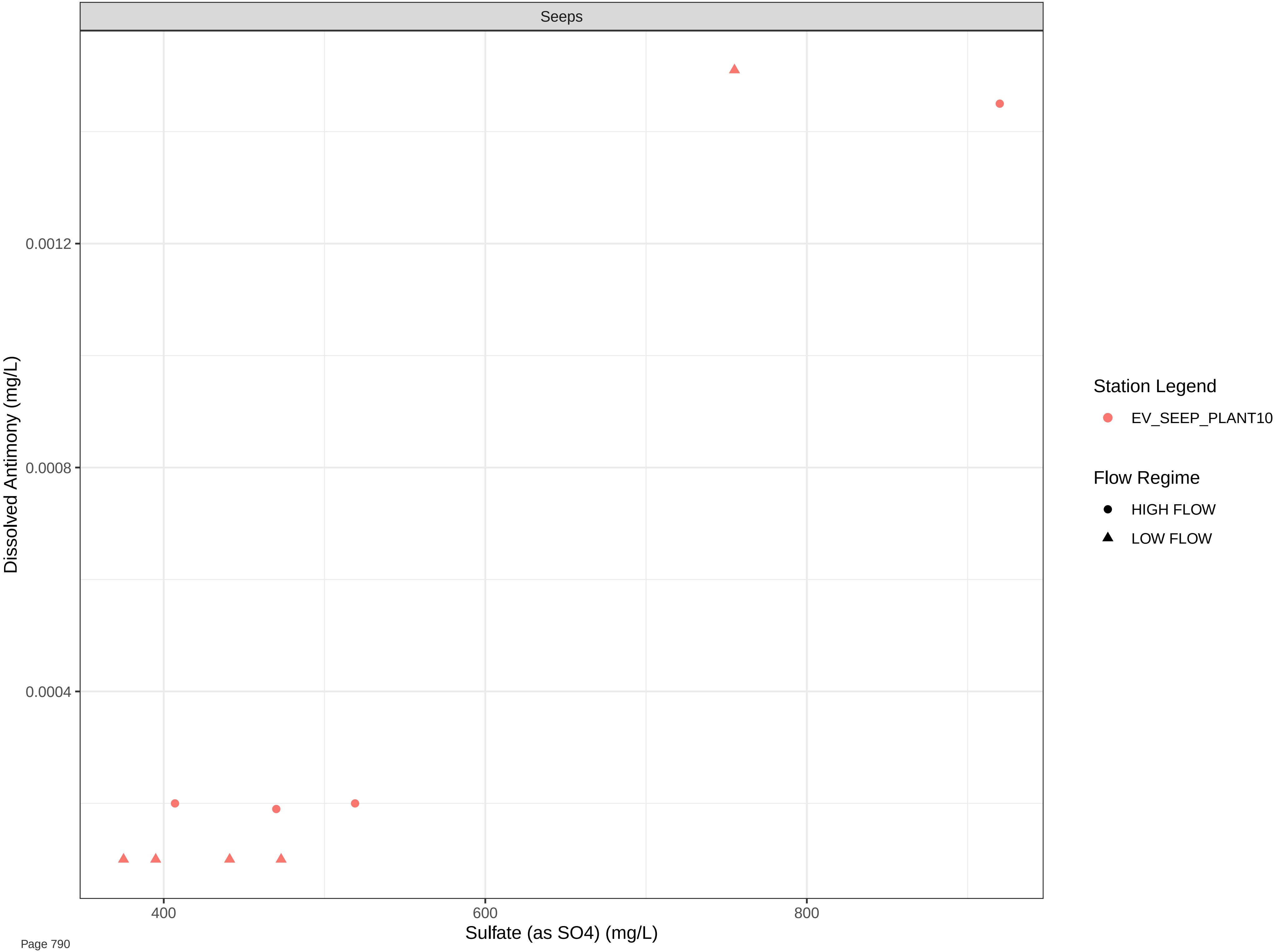


Comparison Point
Seeps
0.0012
0.0009
0.0006
0.0003
0
100
200
300
400
500
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

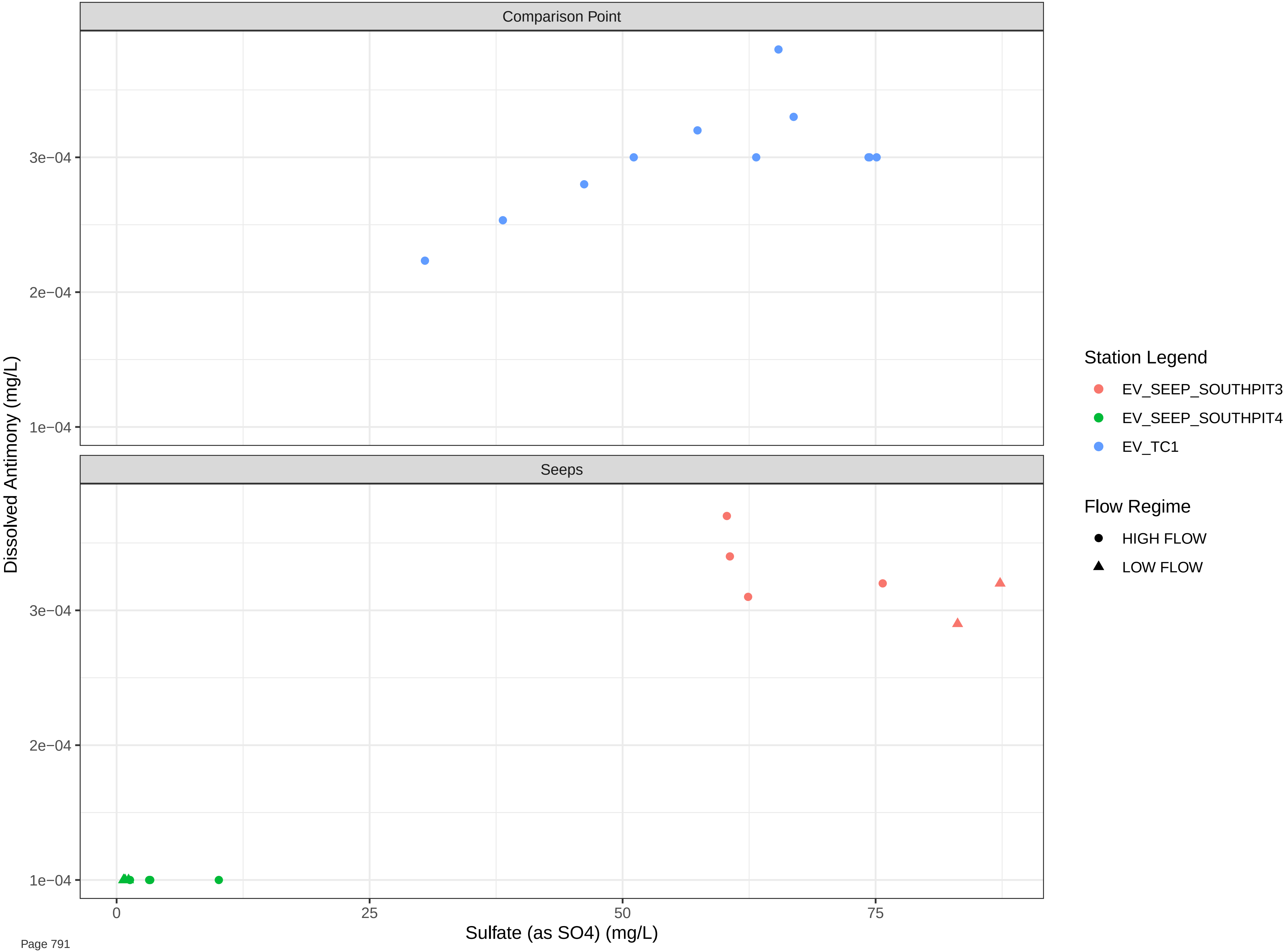


Comparison Point
Seeps
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
0.0016
0.0012
0.0008
0.0004
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

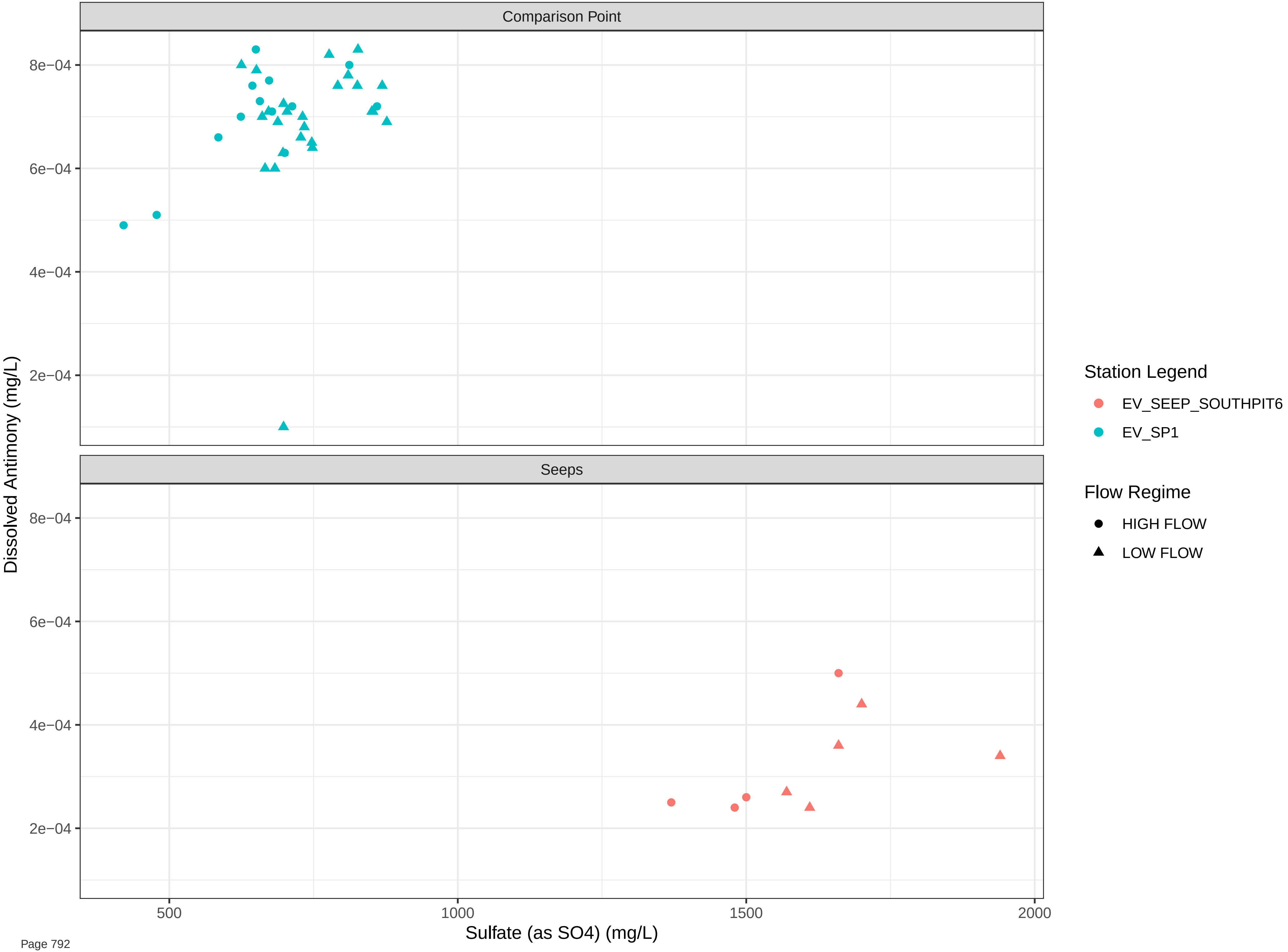

Comparison Point
Seeps
6e−04
4e−04
2e−04
0
50
100
150
200
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



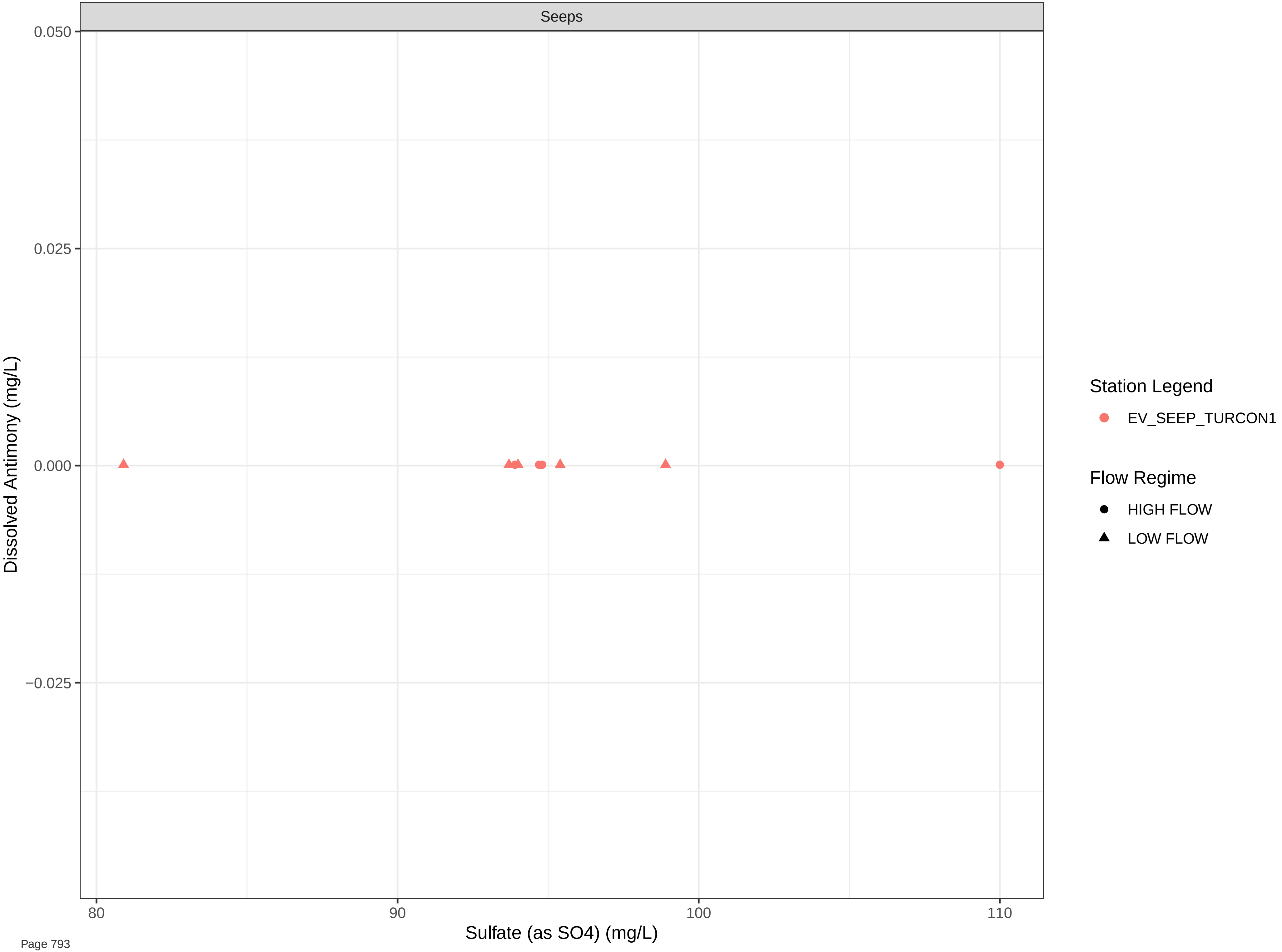
Seeps
Dissolved Antimony (mg/L)
0.0012
0.0008
0.0004
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



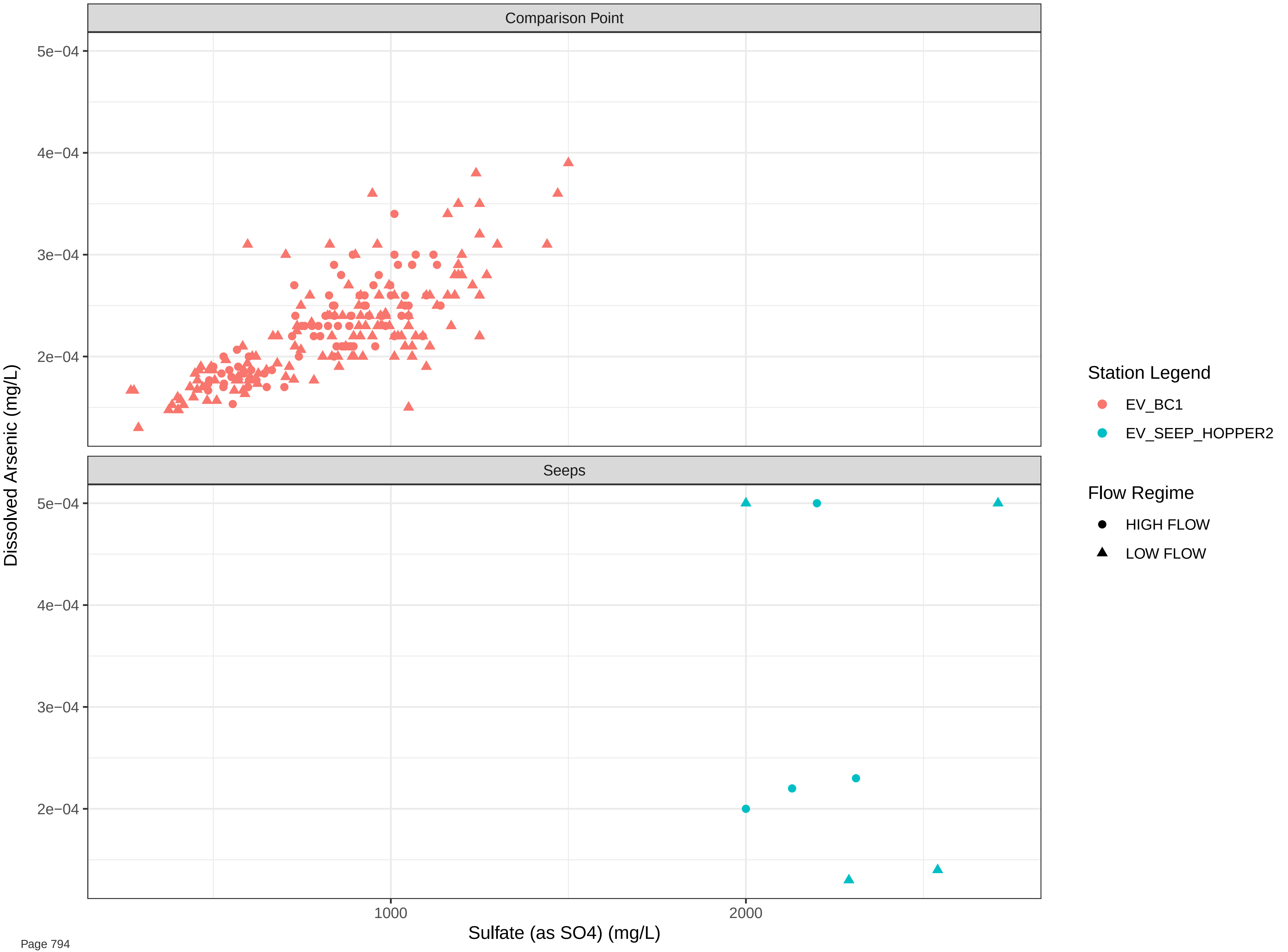
Comparison Point
Seeps
3e−04
2e−04
1e−04
0
25
50
75
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



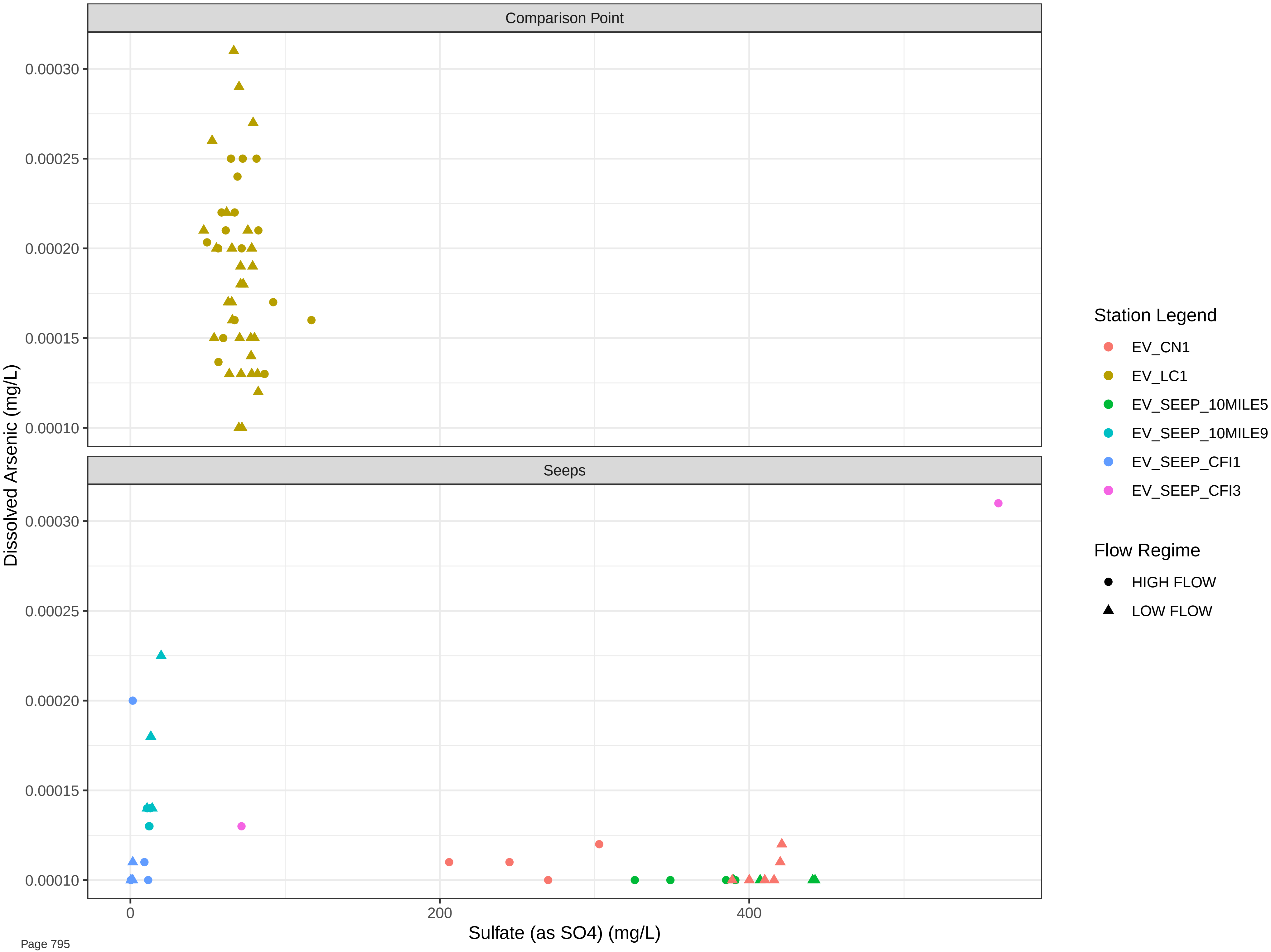
Comparison Point
Seeps
8e−04
6e−04
4e−04
2e−04
Dissolved Antimony (mg/L)
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



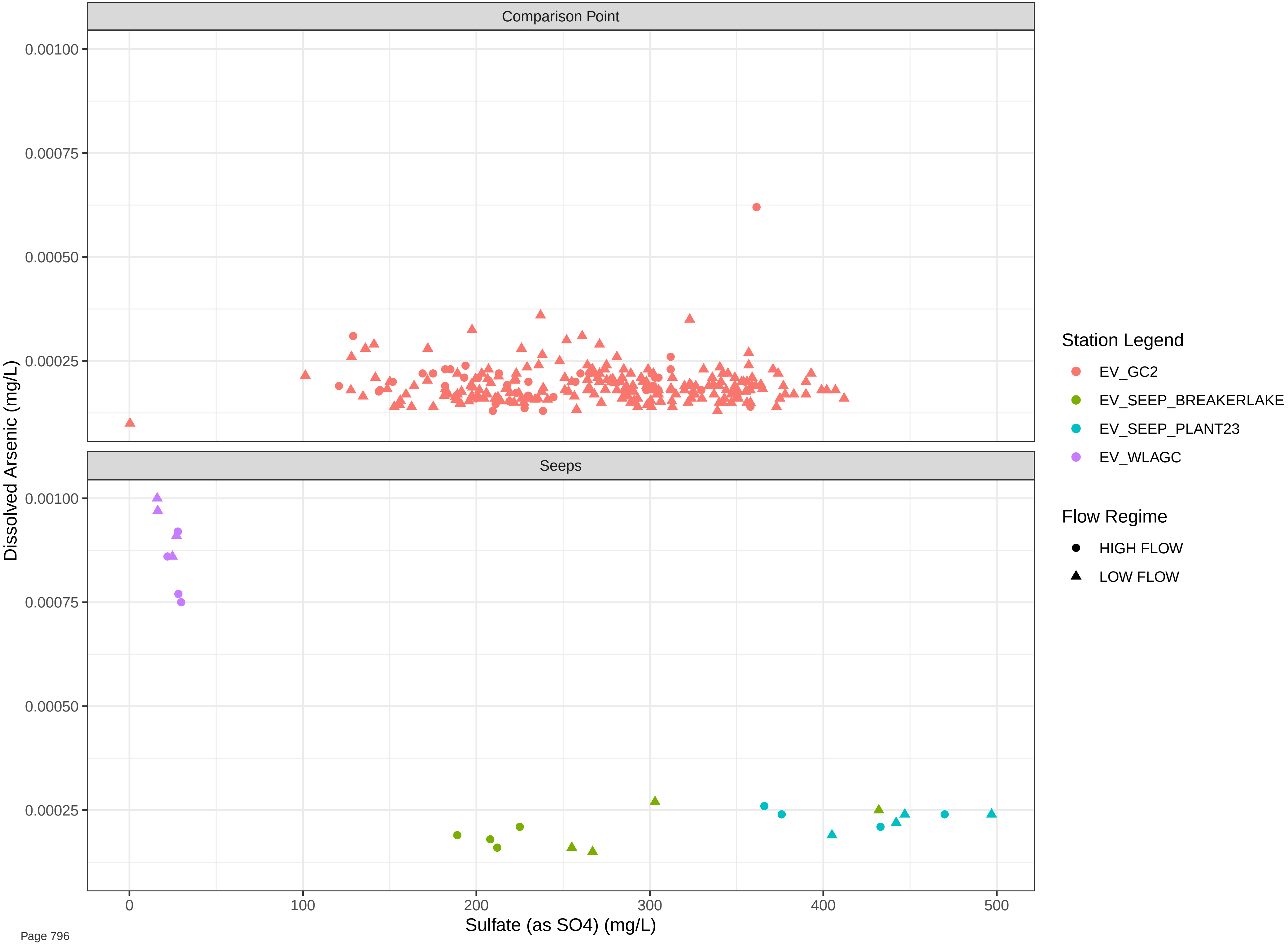
Seeps
0.050
0.025
0.000
−0.025
80
90
100
110
Dissolved Antimony (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

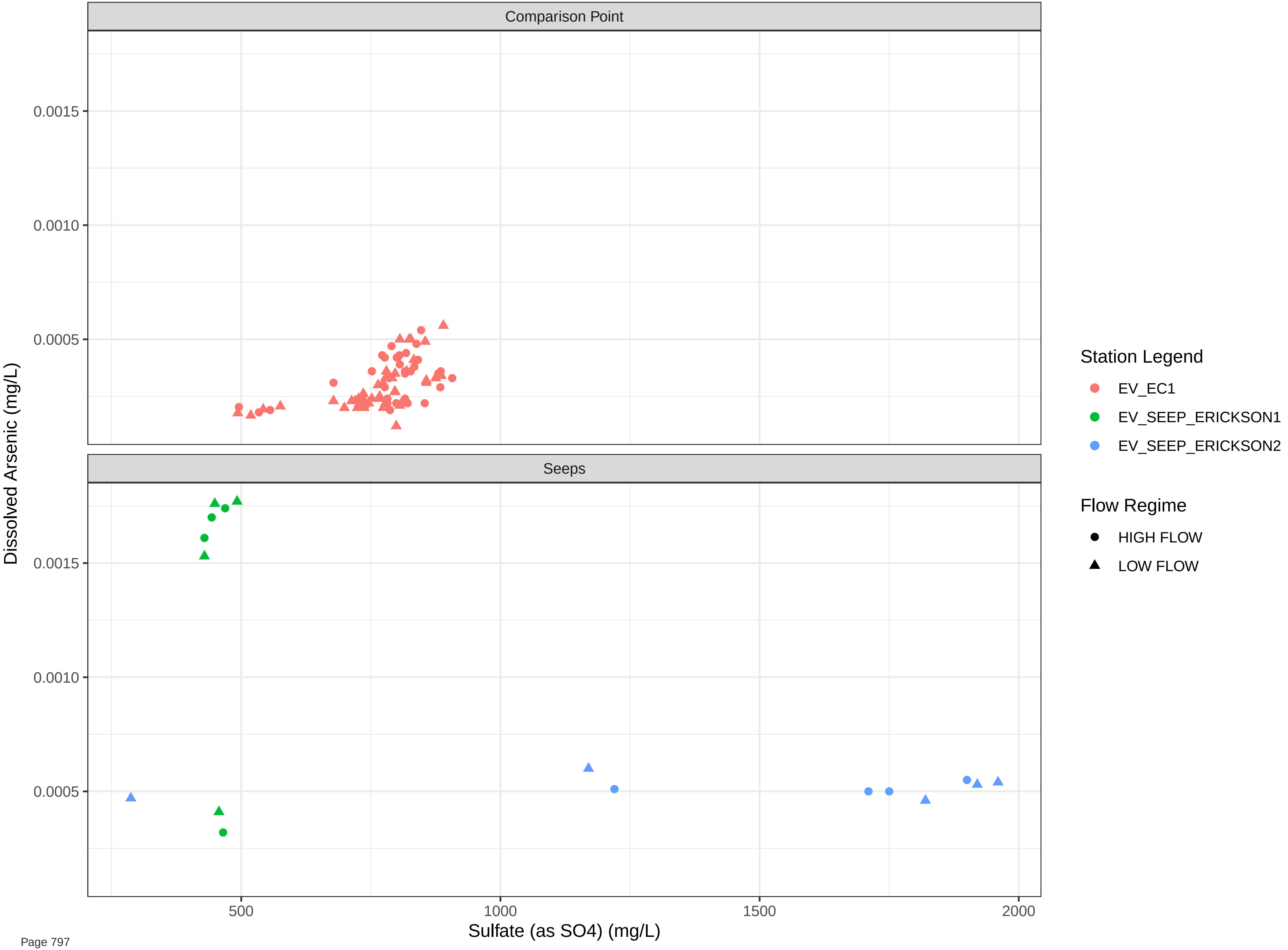


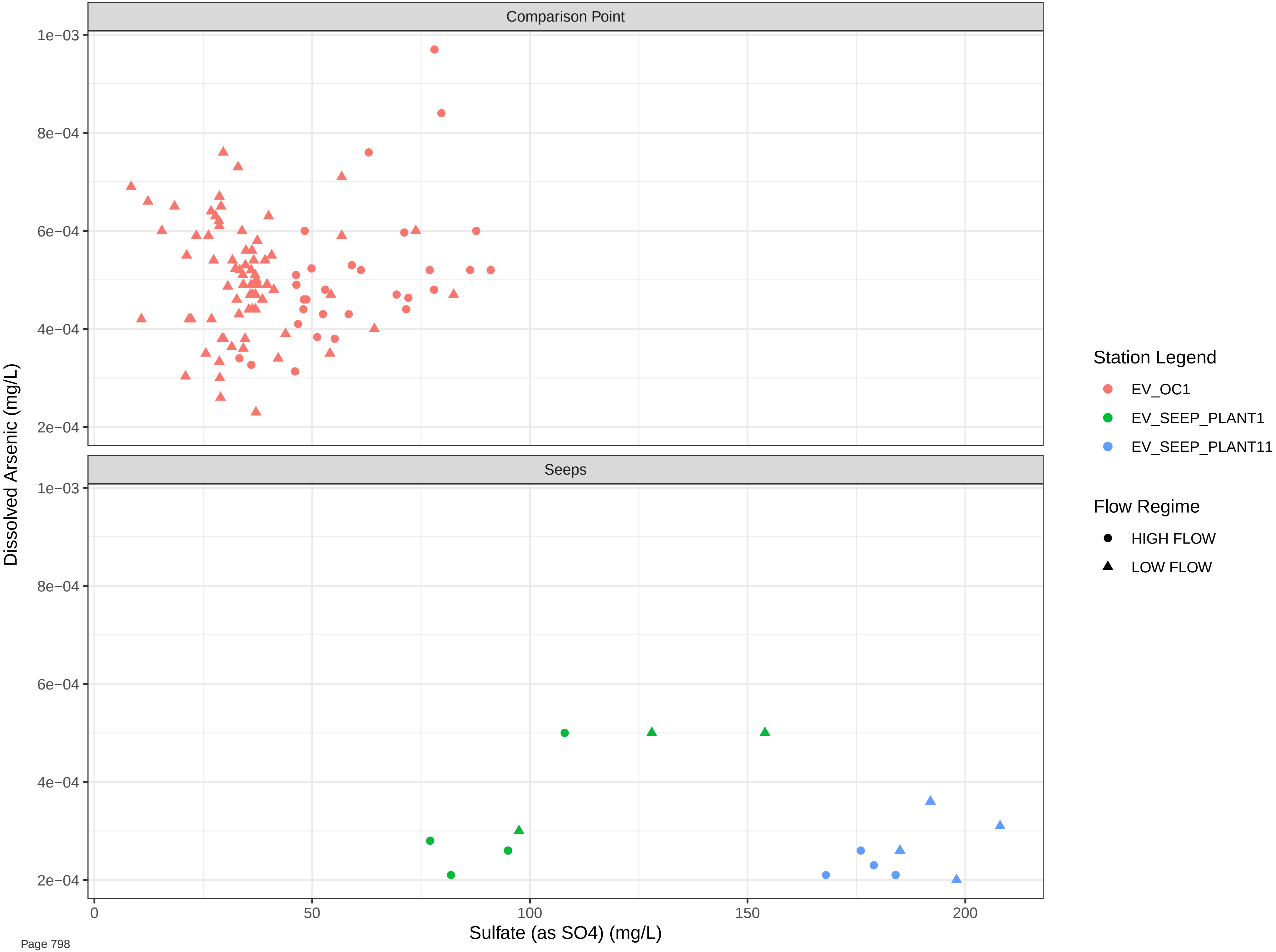
Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1000
2000
Dissolved Arsenic (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



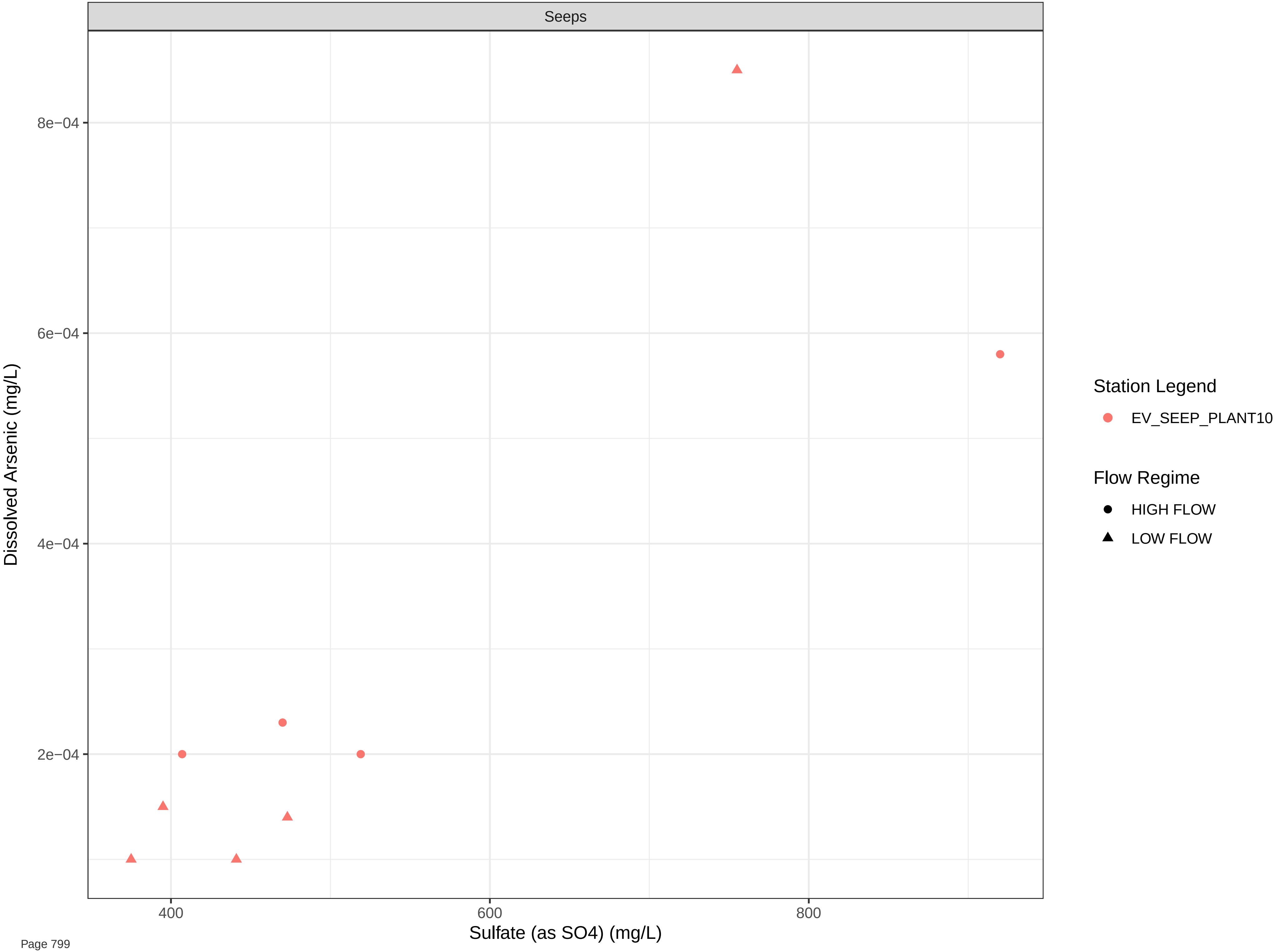
Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00030
0.00025
0.00020
0.00015
0.00010
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00100
0.00075
0.00050
0.00025
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

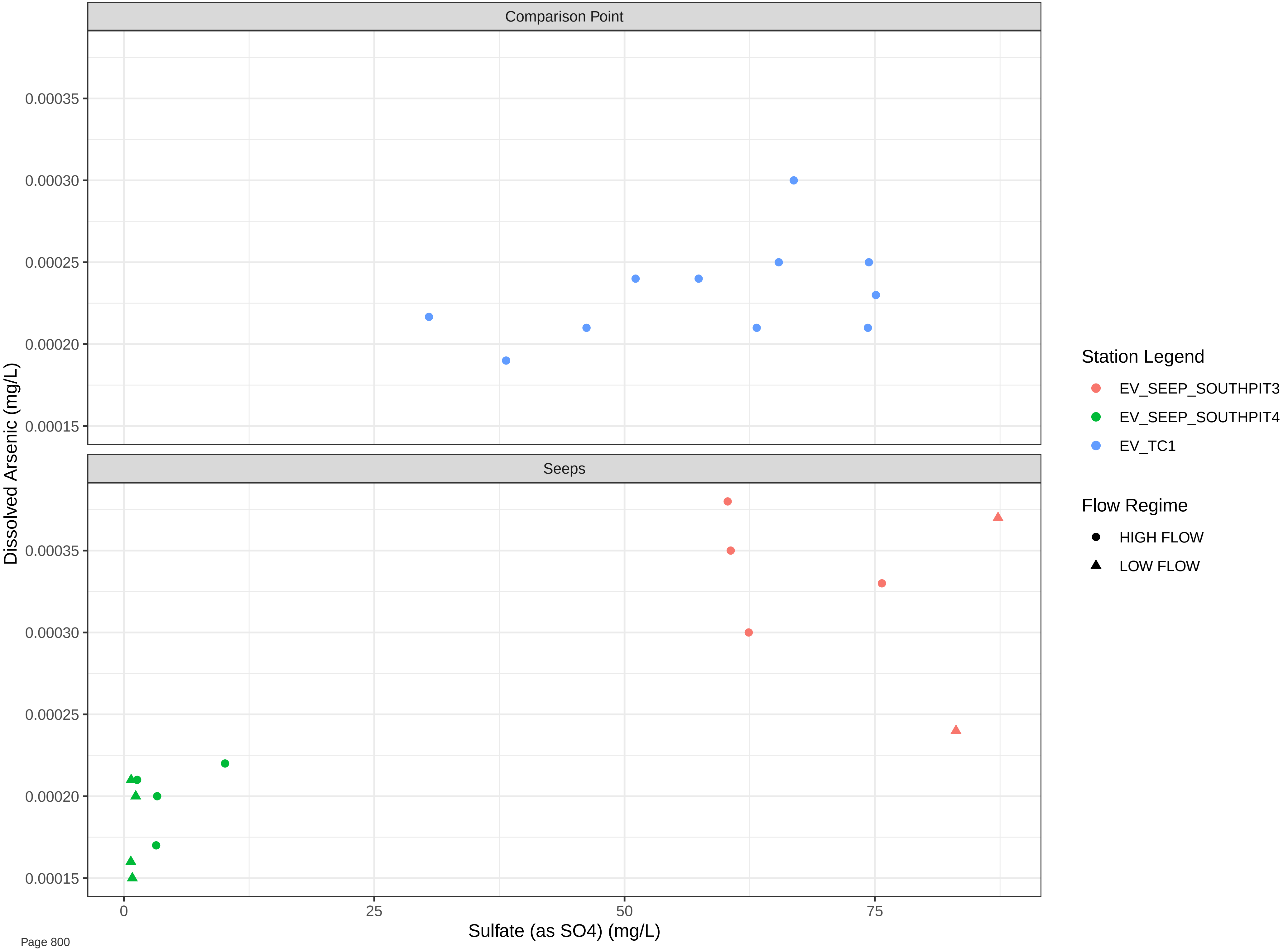

Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.0015
0.0010
0.0005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



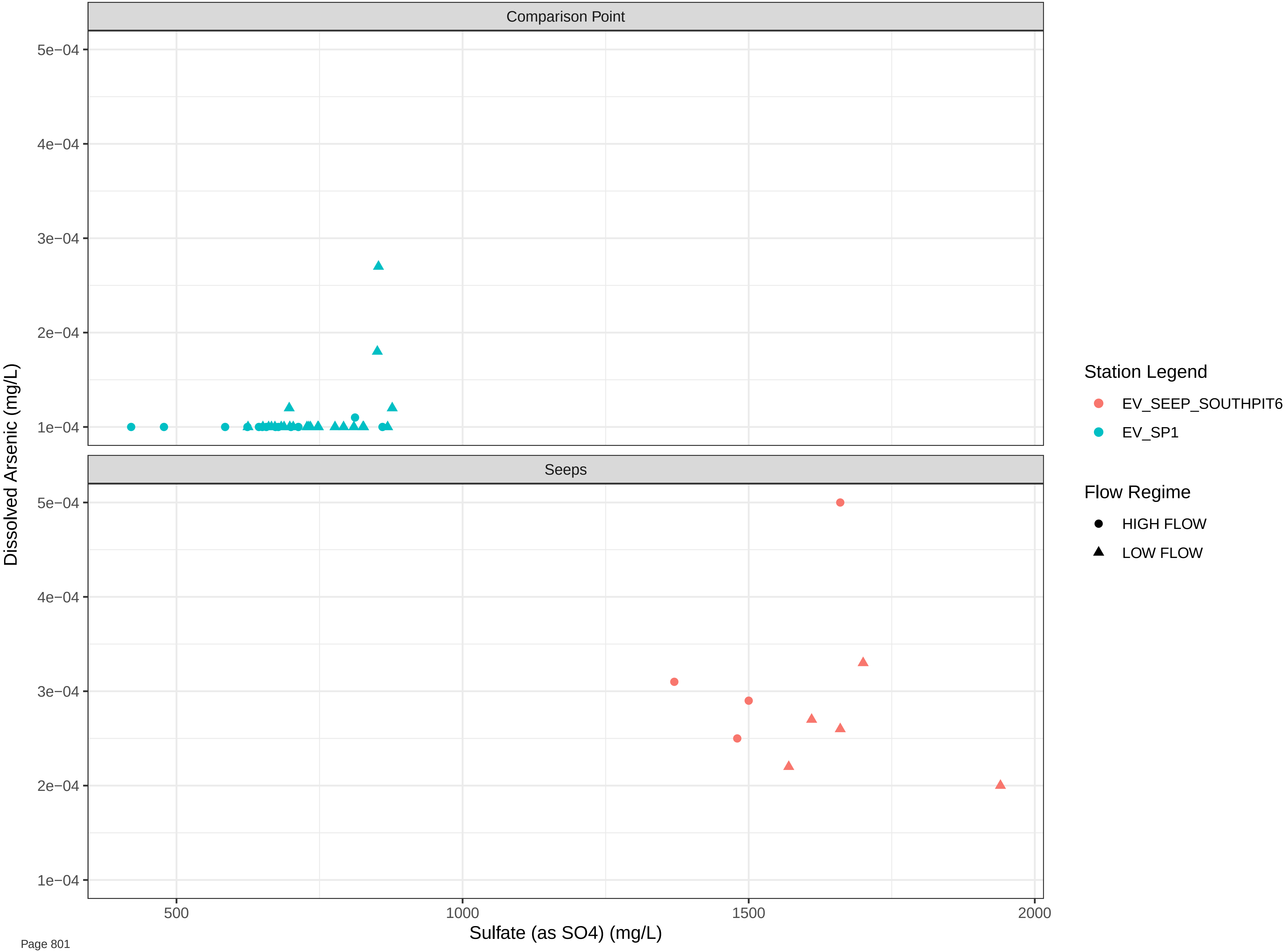
Comparison Point
Seeps
1e−03
8e−04
6e−04
4e−04
2e−04
Dissolved Arsenic (mg/L)
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



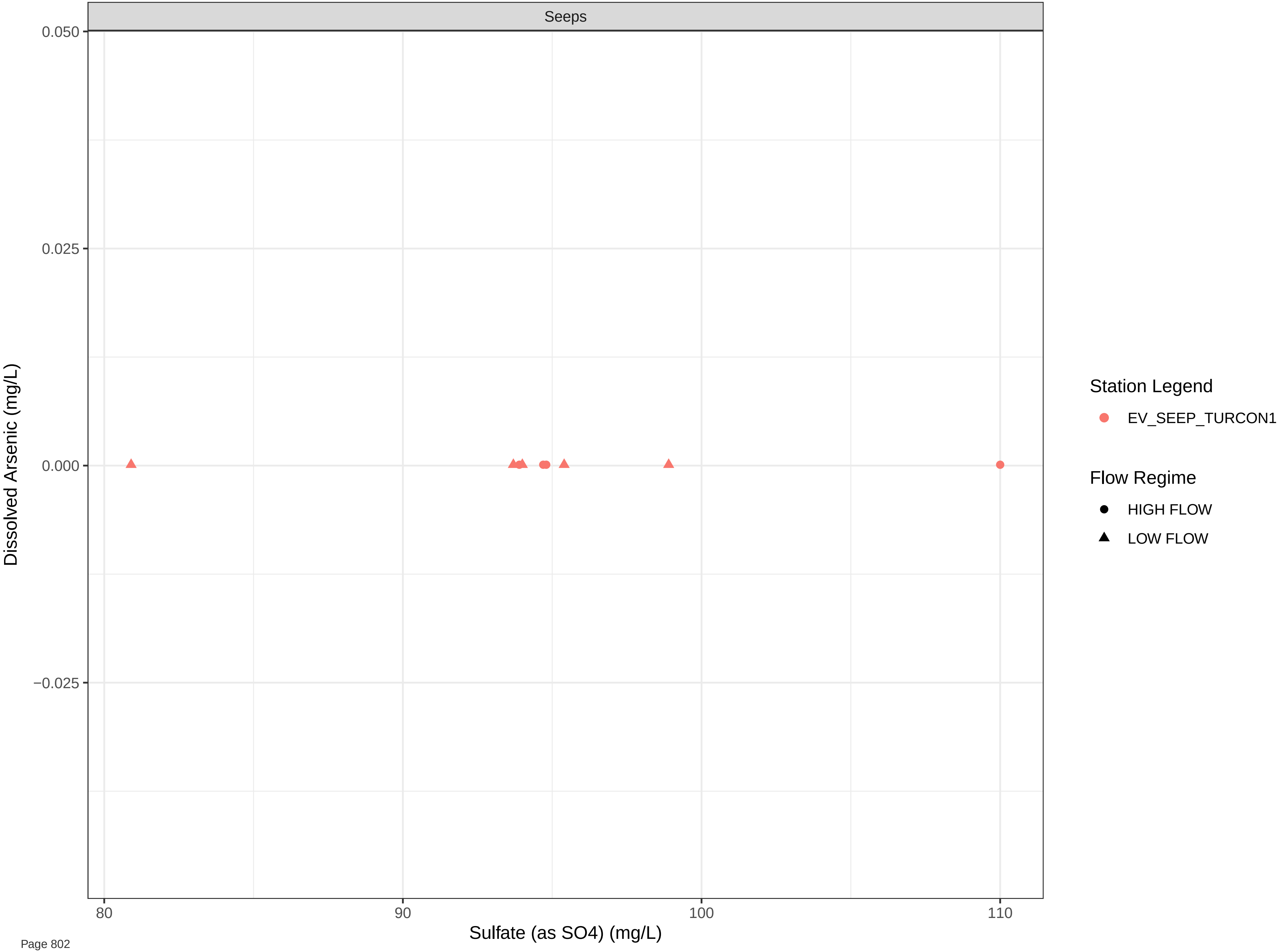
Seeps
Dissolved Arsenic (mg/L)
8e−04
6e−04
4e−04
2e−04
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



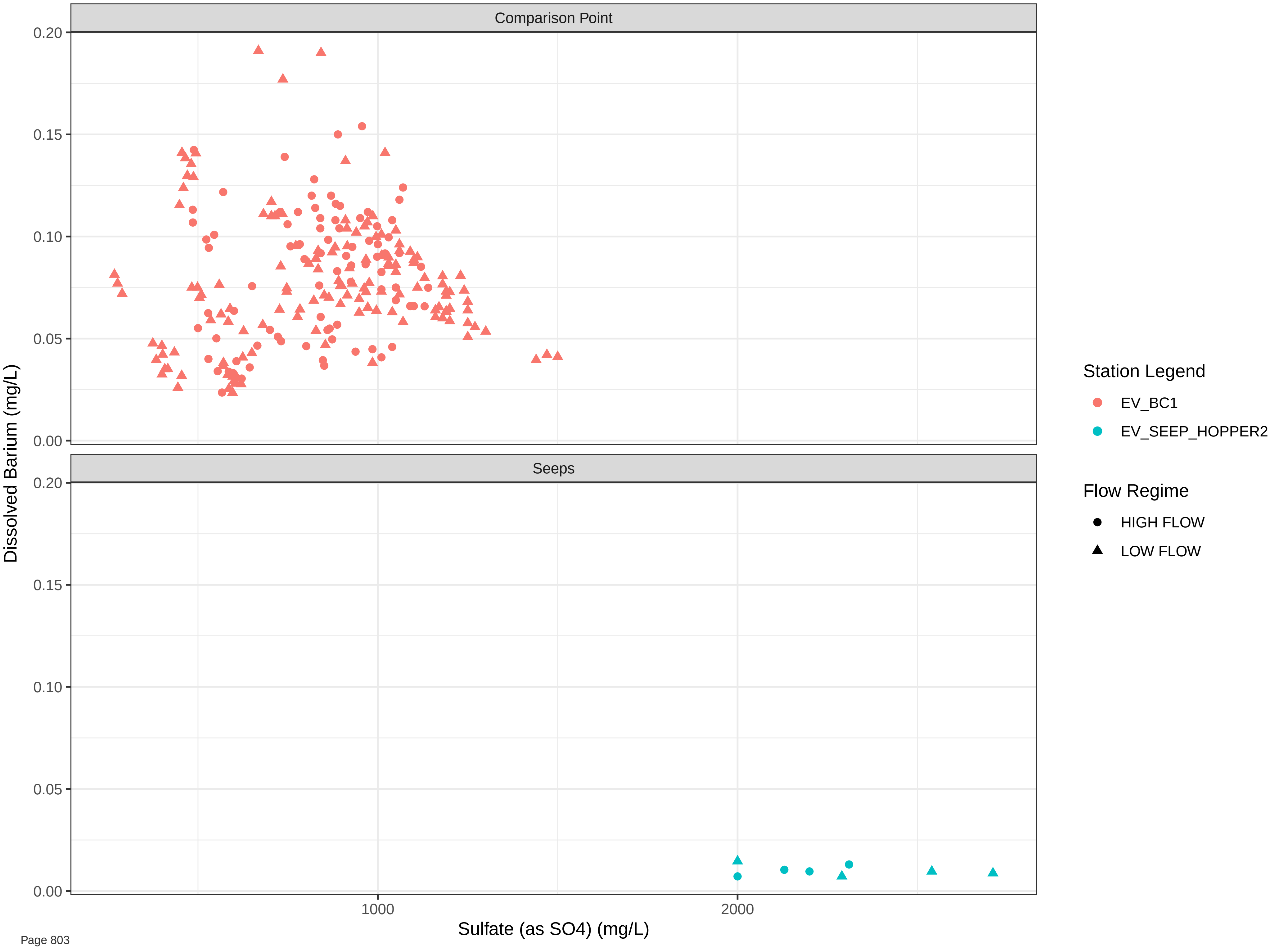
Comparison Point
Seeps
Dissolved Arsenic (mg/L)
0.00035
0.00030
0.00025
0.00020
0.00015
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



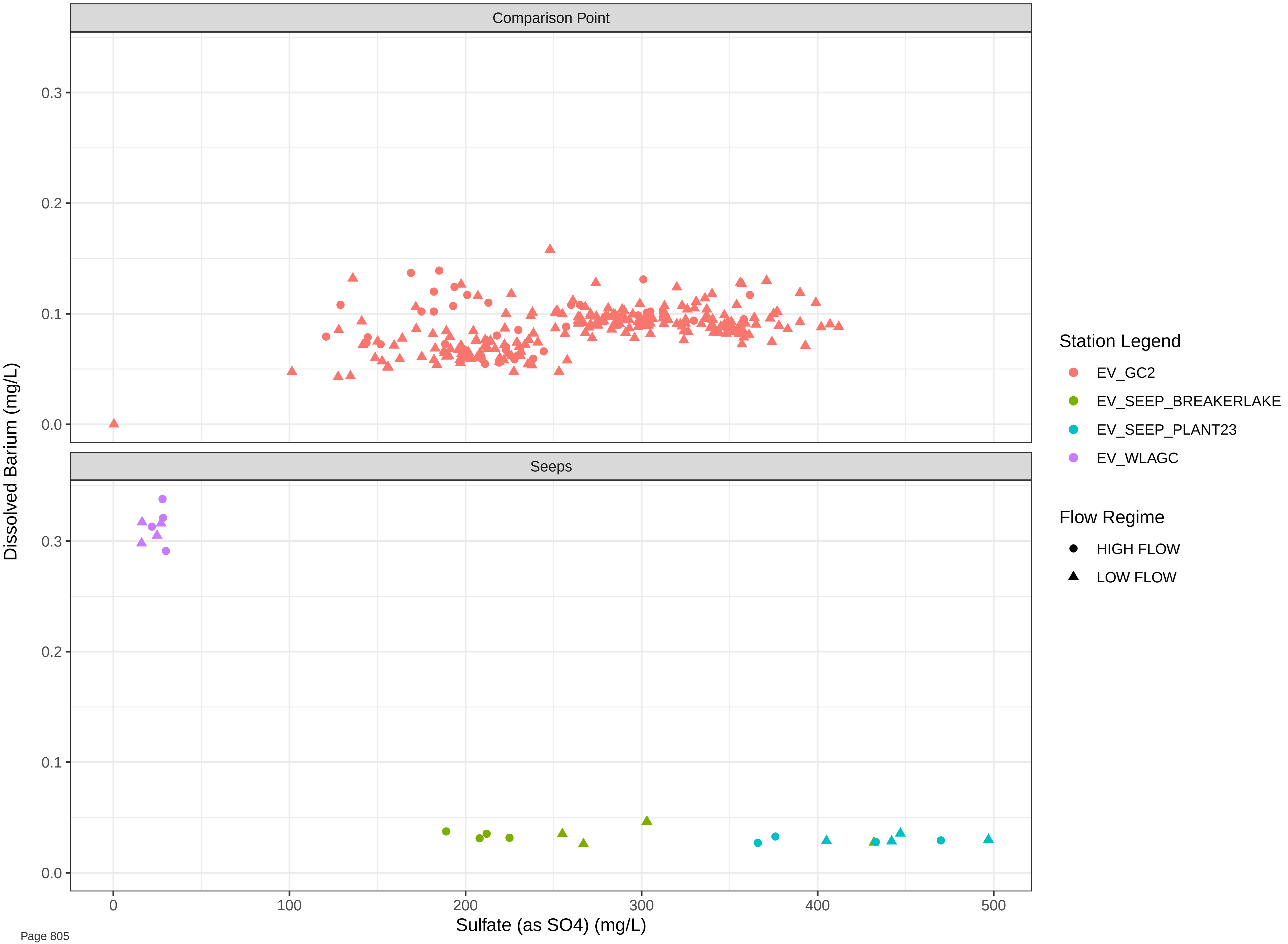
Comparison Point
Seeps
Dissolved Arsenic (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



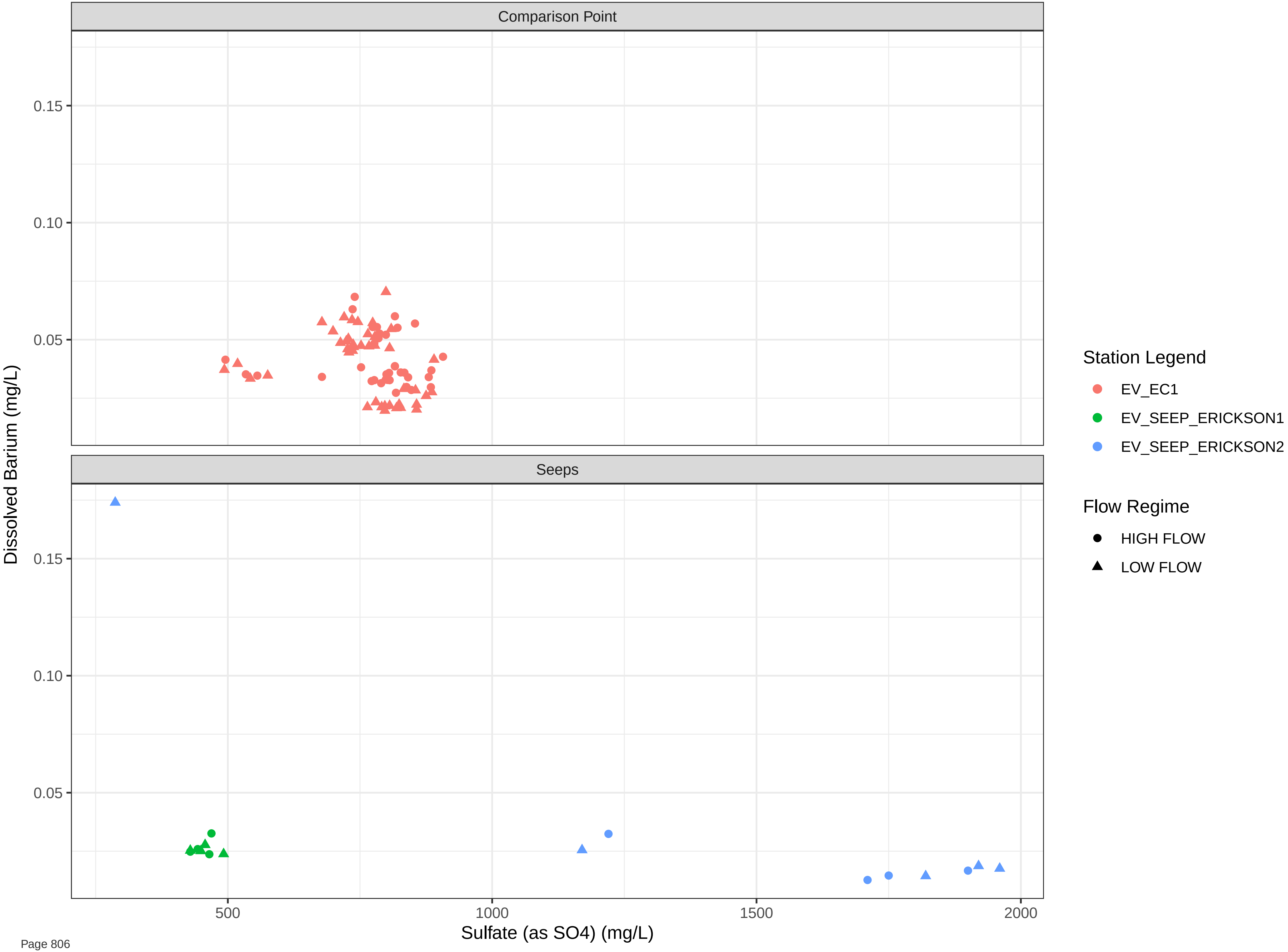
Seeps
0.050
0.025
0.000
−0.025
Dissolved Arsenic (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

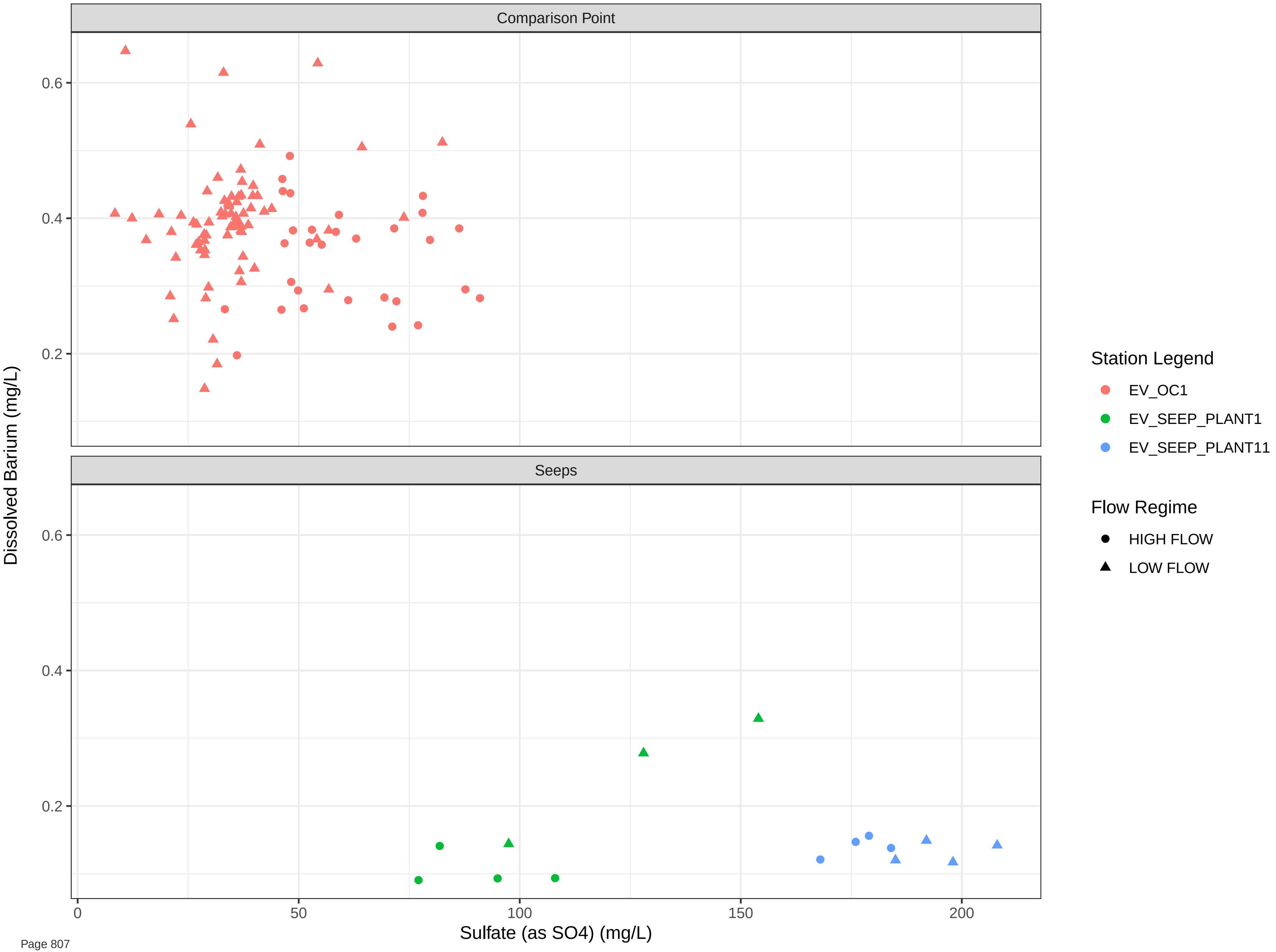

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.20
0.15
0.10
0.05
0.00
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

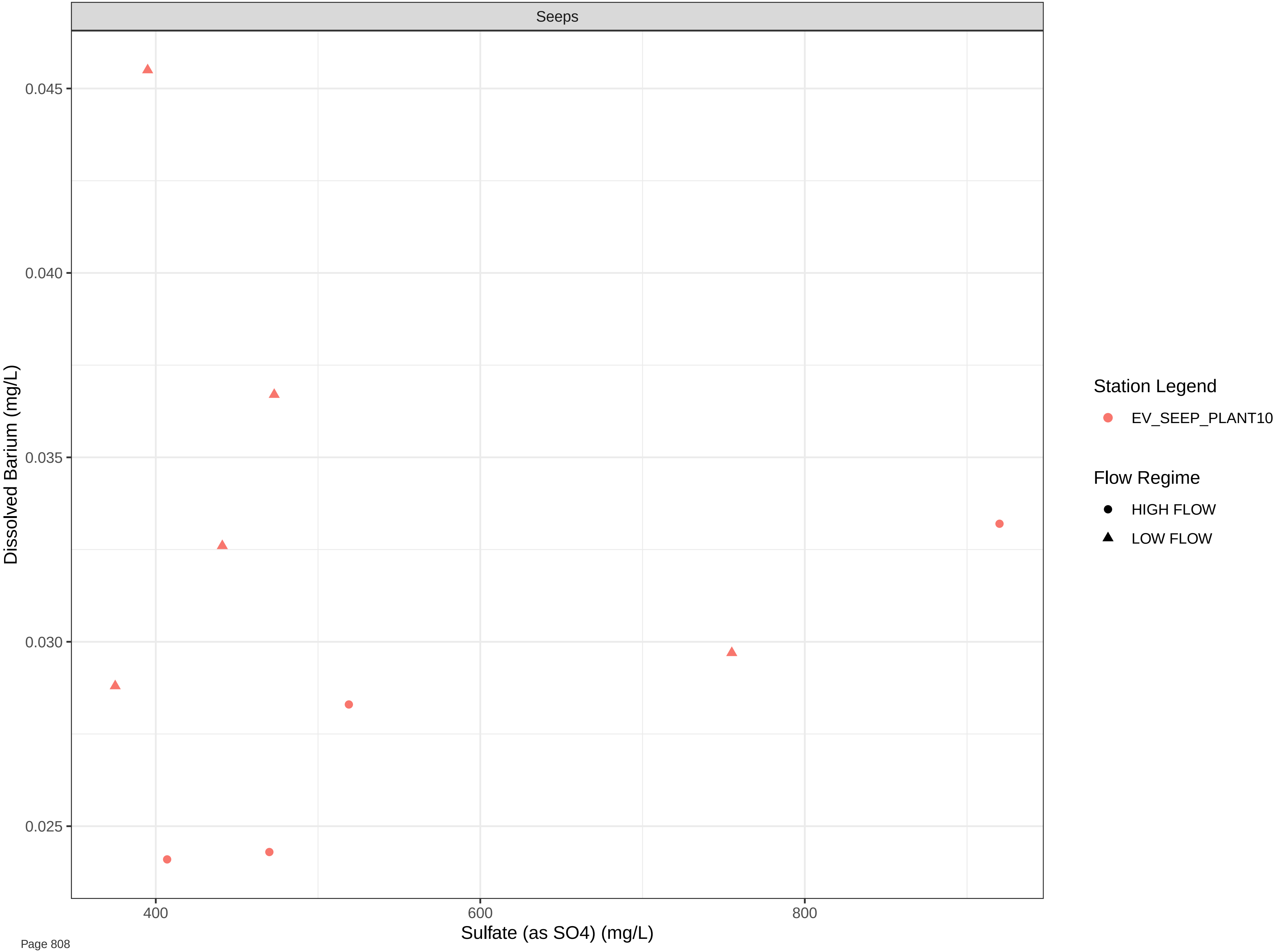
Comparison Point
Seeps
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

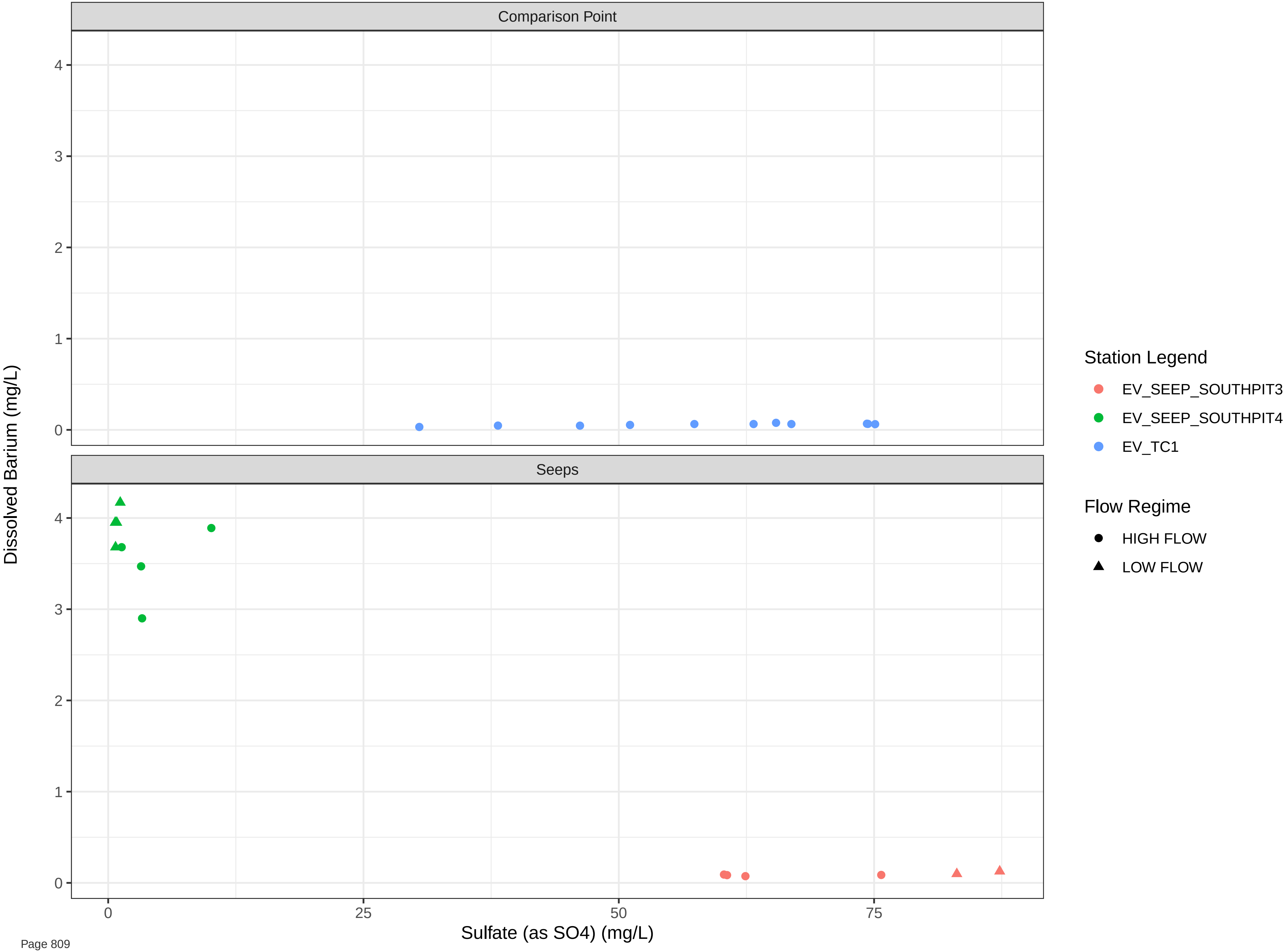


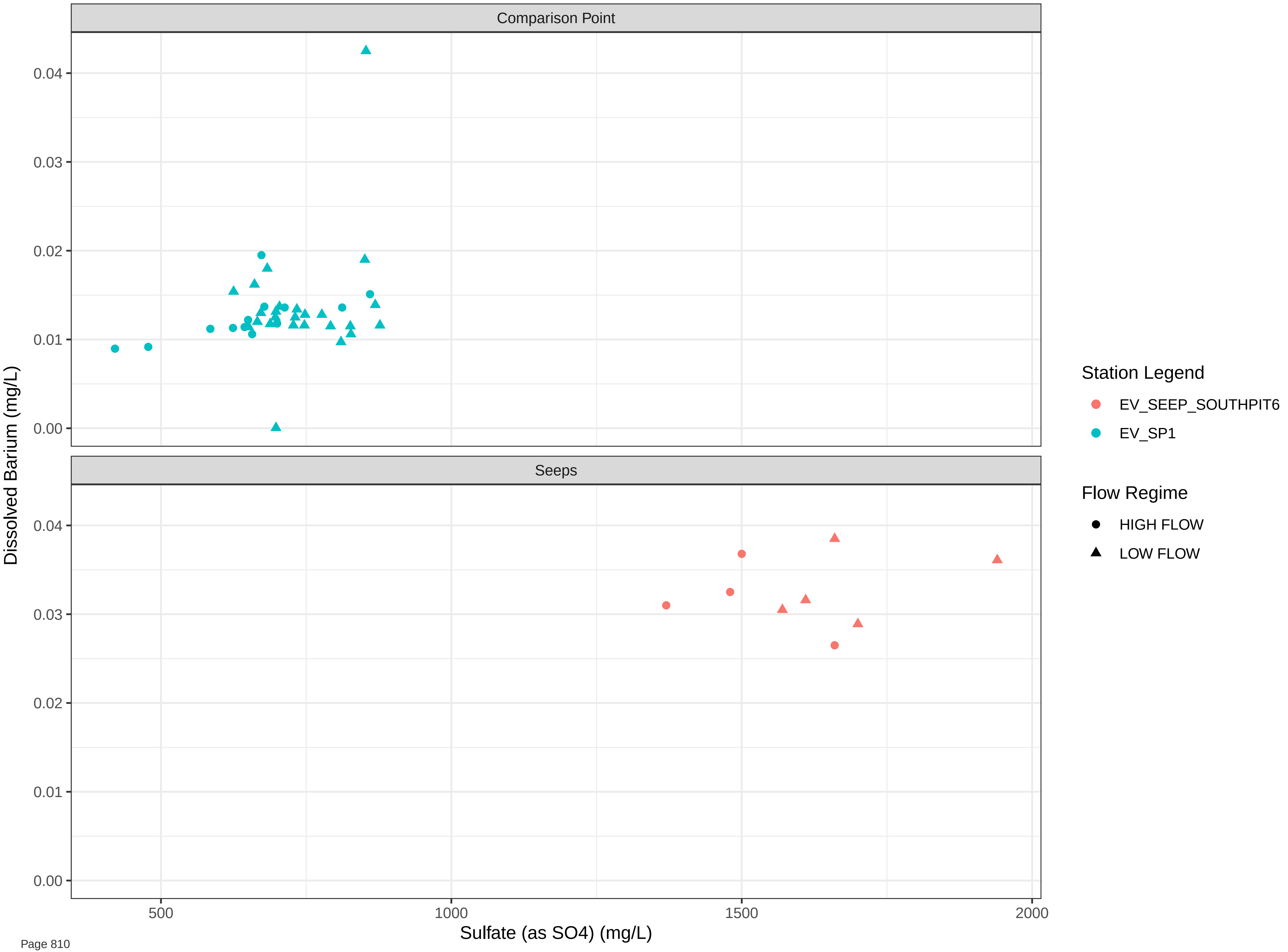
Comparison Point
Seeps
0.3
0.2
0.1
0.0
0
100
200
300
400
500
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

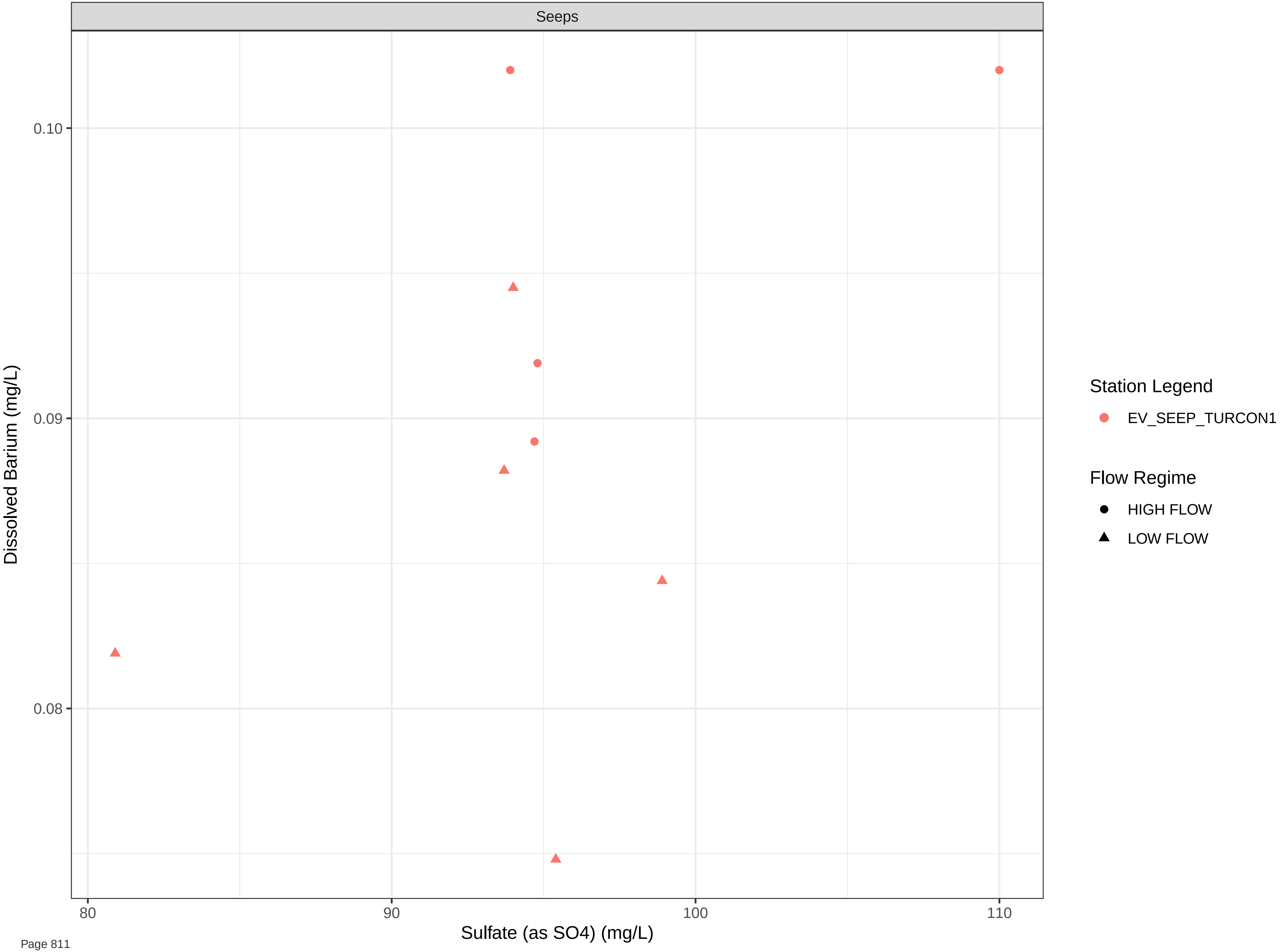

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.15
0.10
0.05
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Barium (mg/L)
0.6
0.4
0.2
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

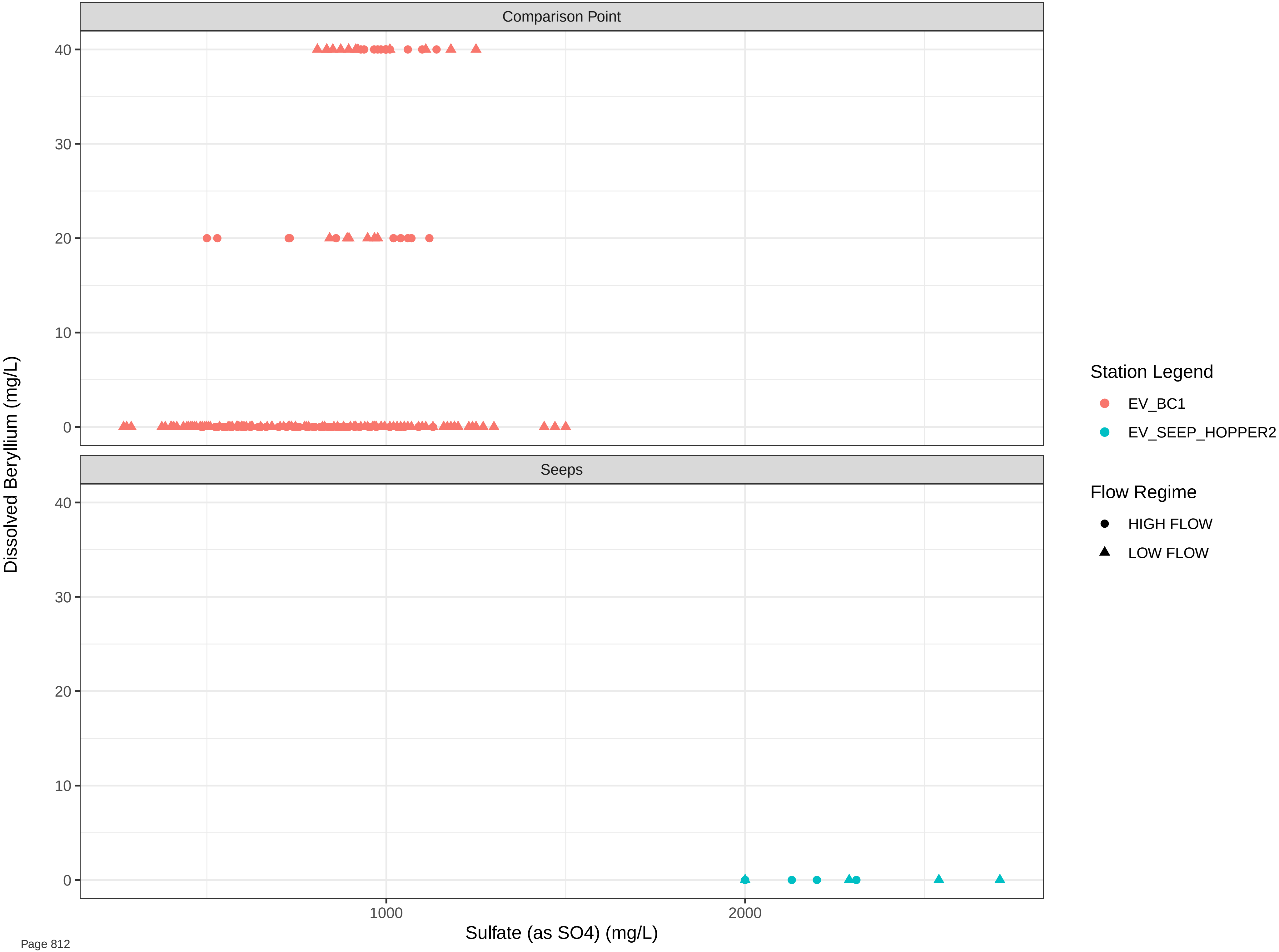

Seeps
Dissolved Barium (mg/L)
0.045
0.040
0.035
0.030
0.025
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.04
0.03
0.02
0.01
0.00
Dissolved Barium (mg/L)
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

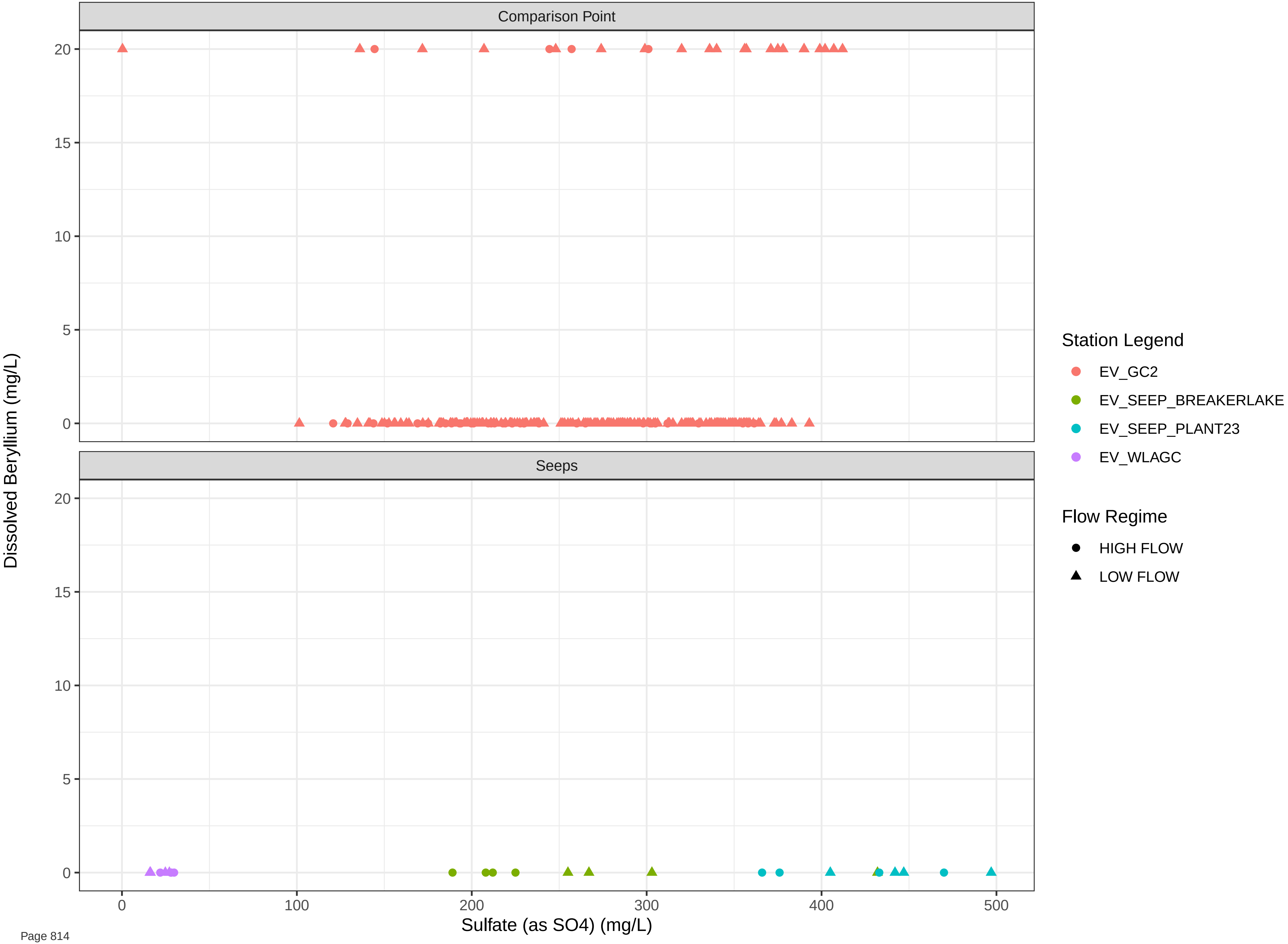


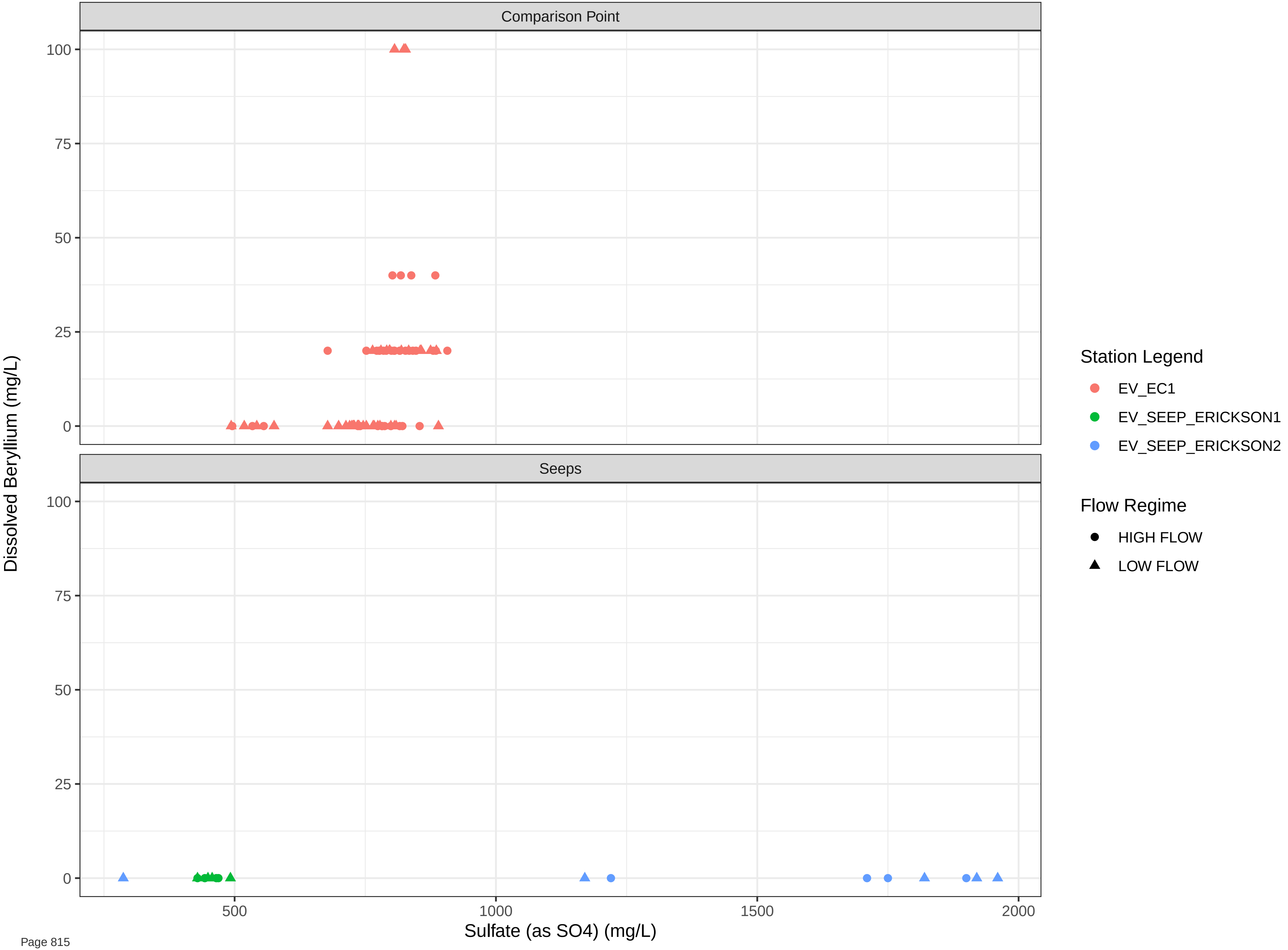
Seeps
0.10
0.09
0.08
80
90
100
110
Dissolved Barium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



Comparison Point
Seeps
Dissolved Beryllium (mg/L)
0
10
20
30
40
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

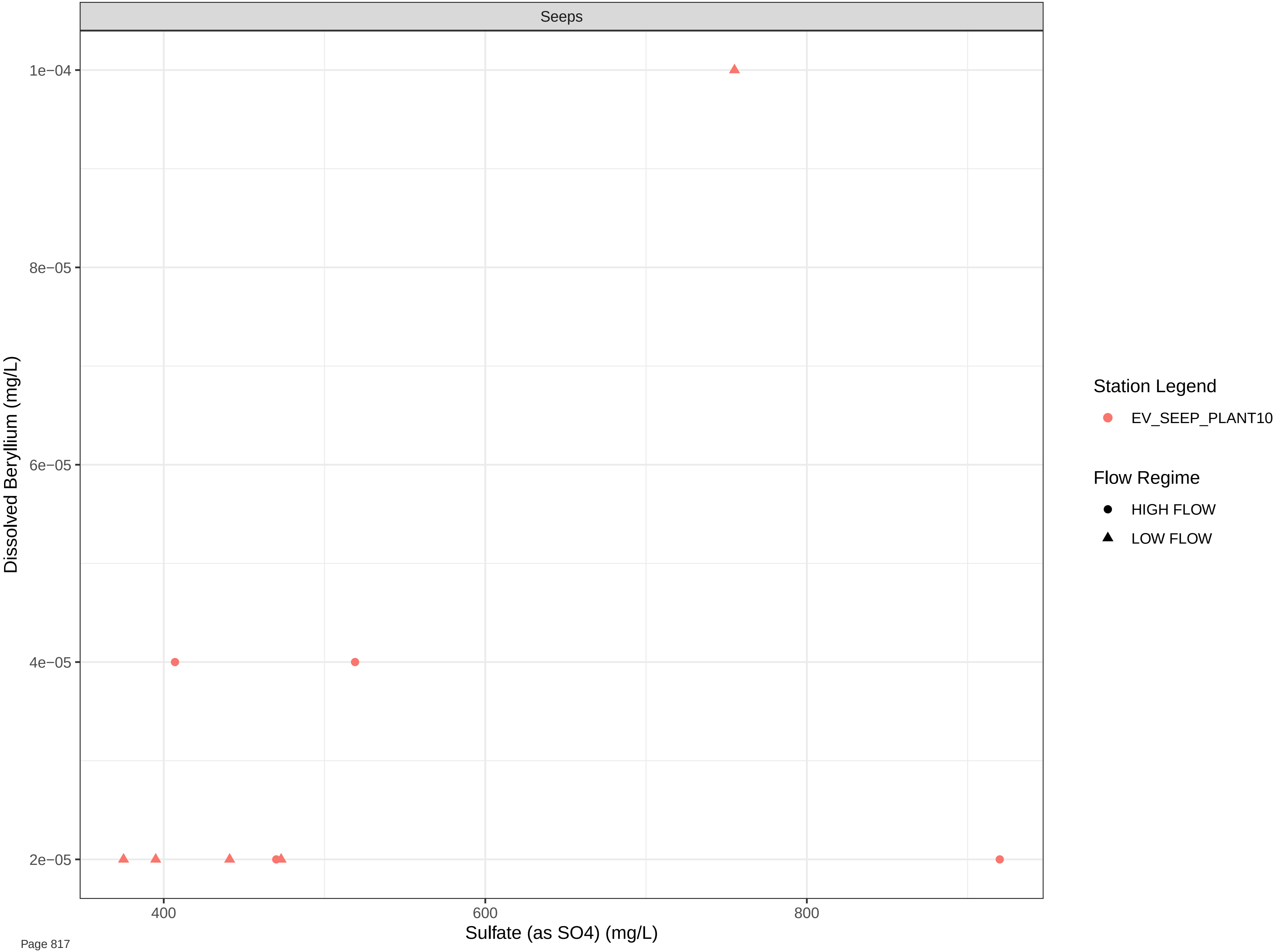

Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
0
5
10
15
20
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

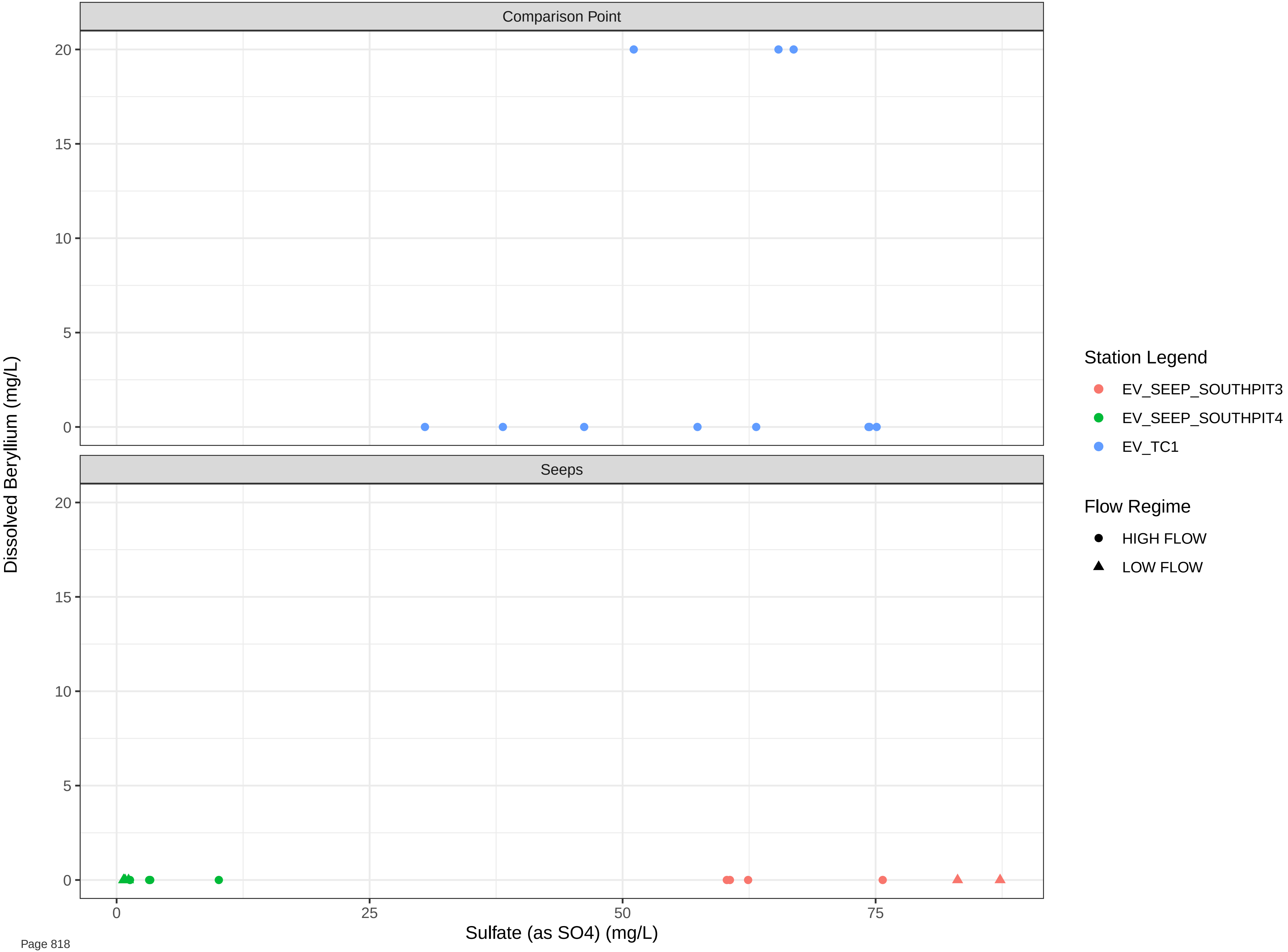


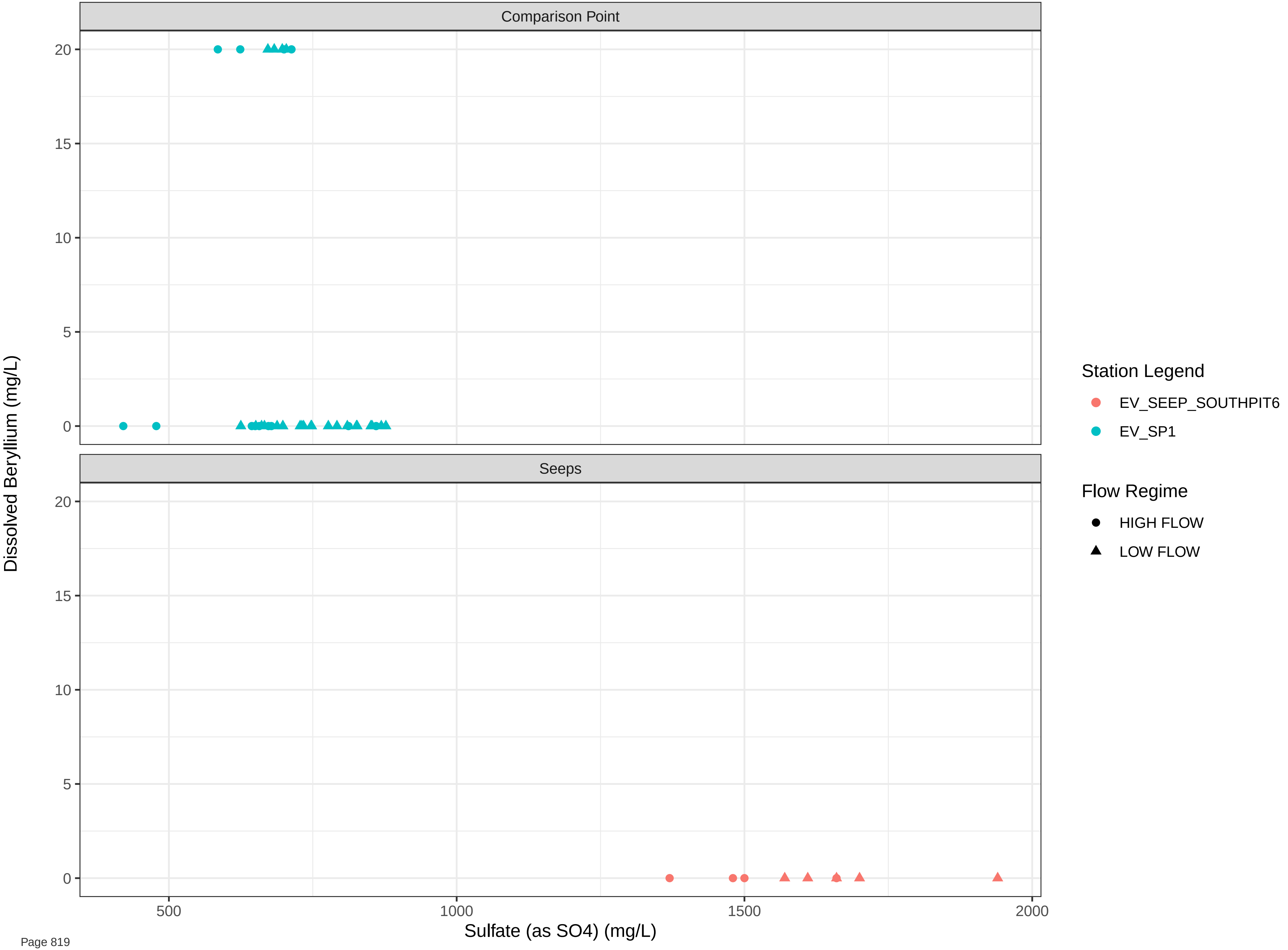
Comparison Point
Seeps
100
75
50
25
0
500
1000
1500
2000
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

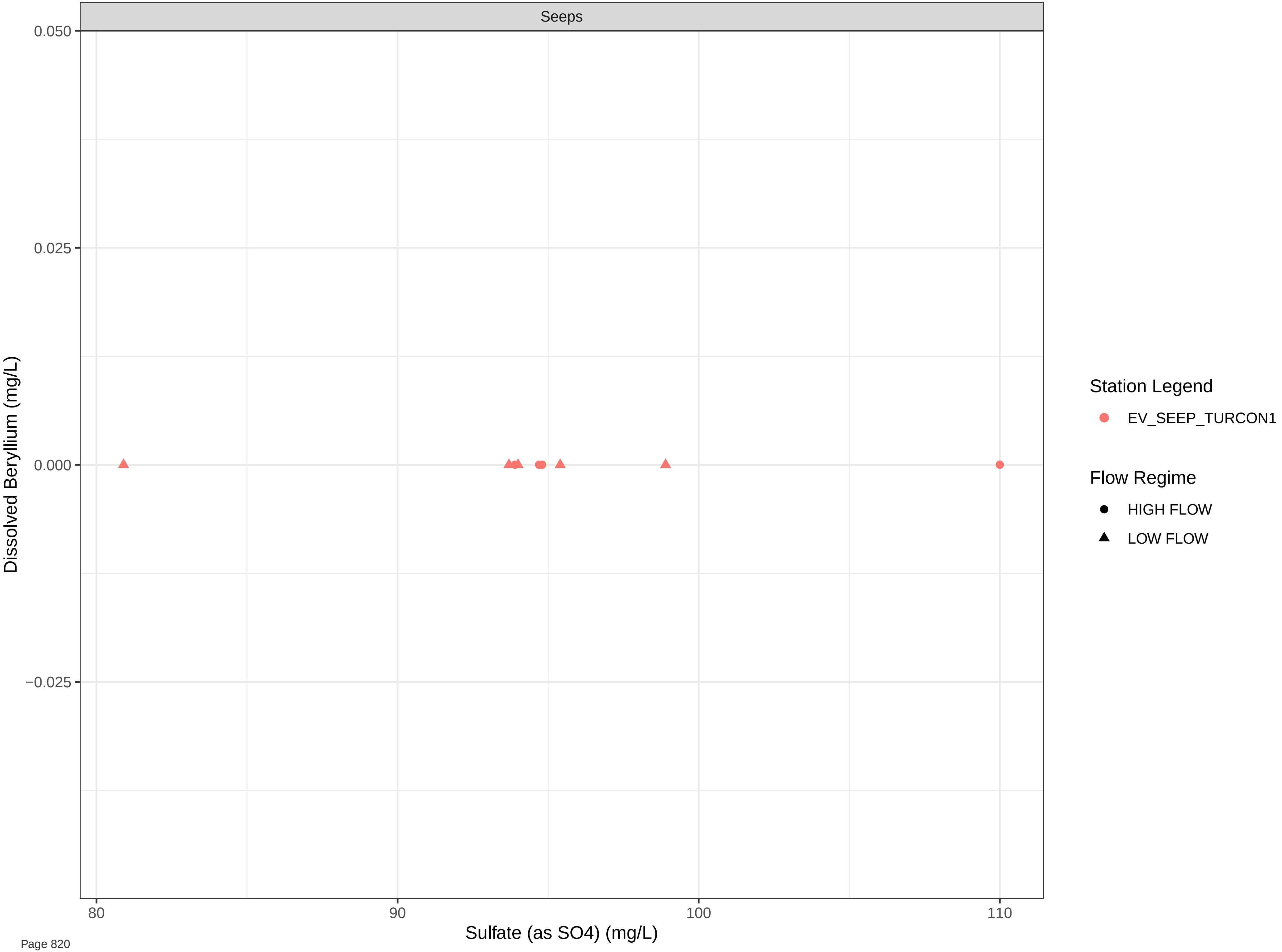


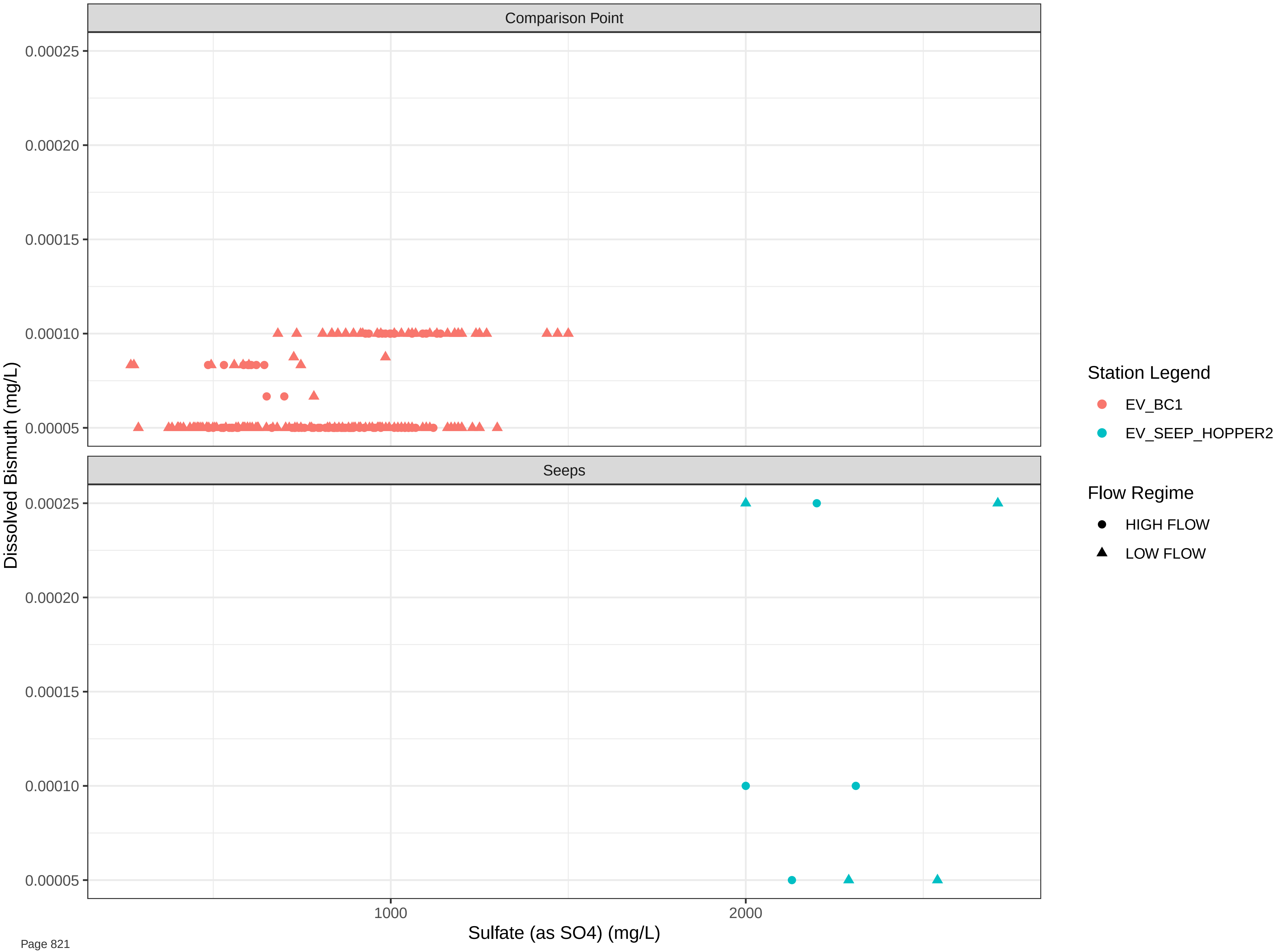
Seeps
1e−04
8e−05
6e−05
4e−05
2e−05
400
600
800
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



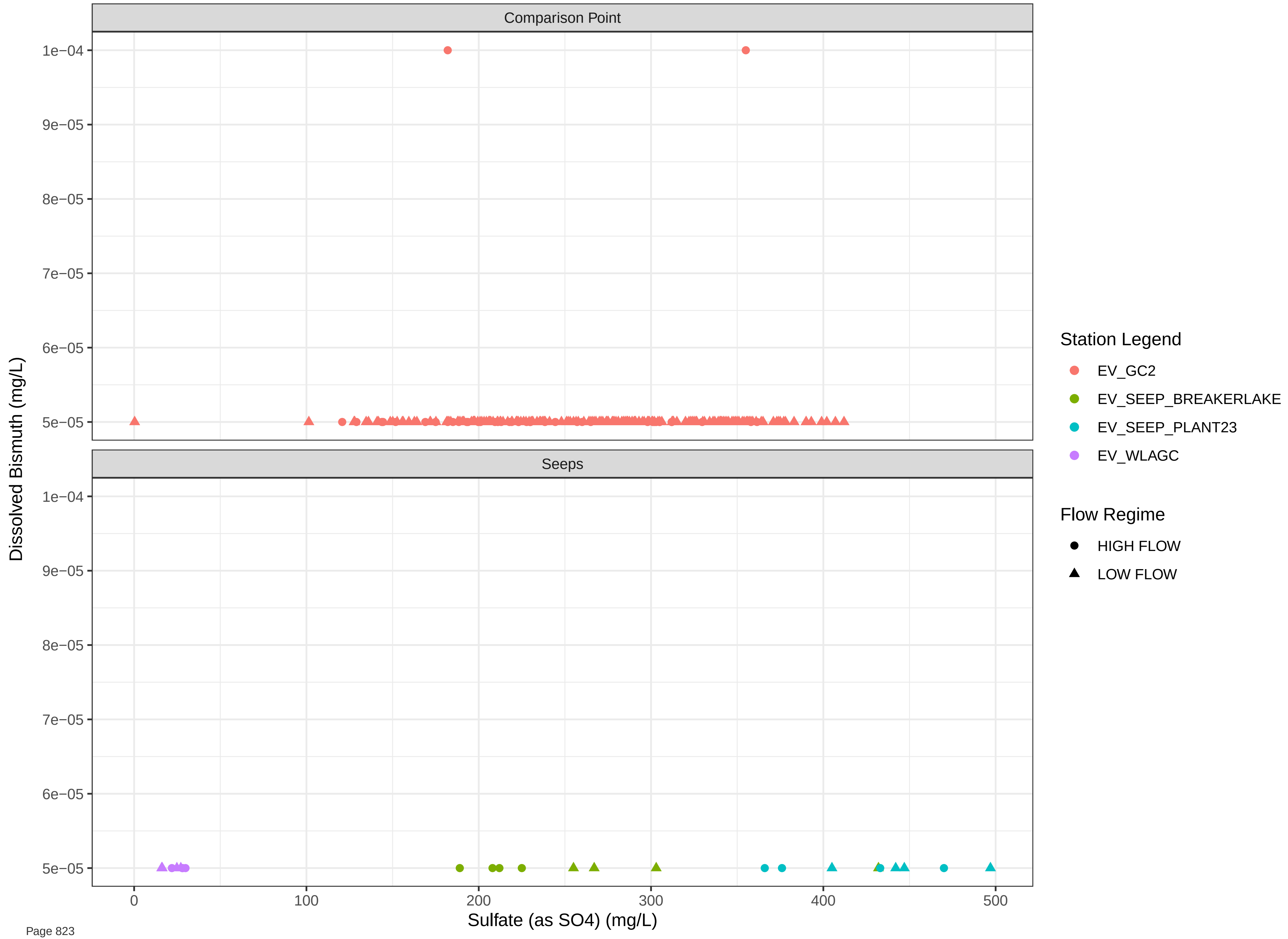
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.050
0.025
0.000
−0.025
80
90
100
110
Sulfate (as SO4) (mg/L)
Dissolved Beryllium (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

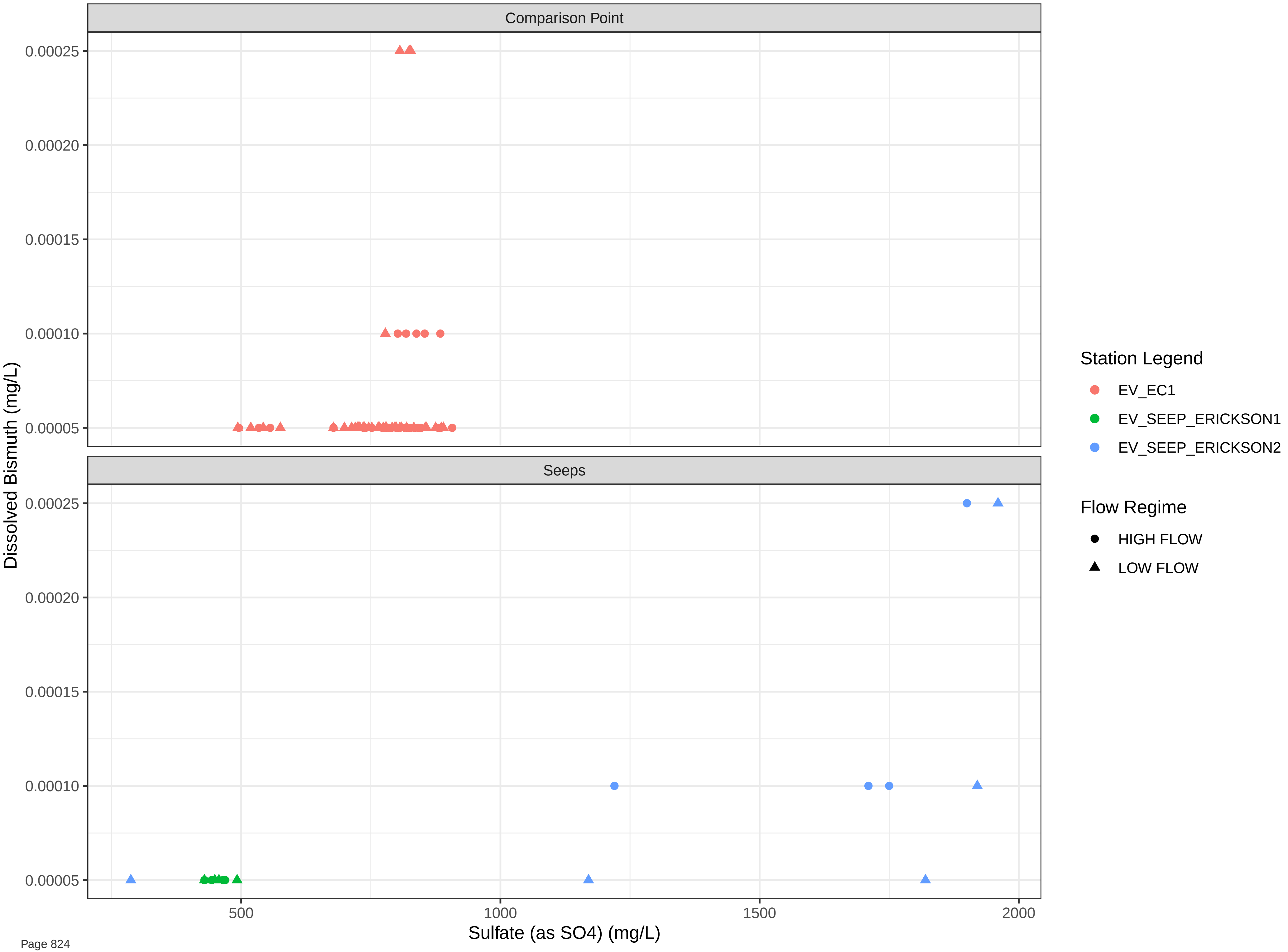


Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

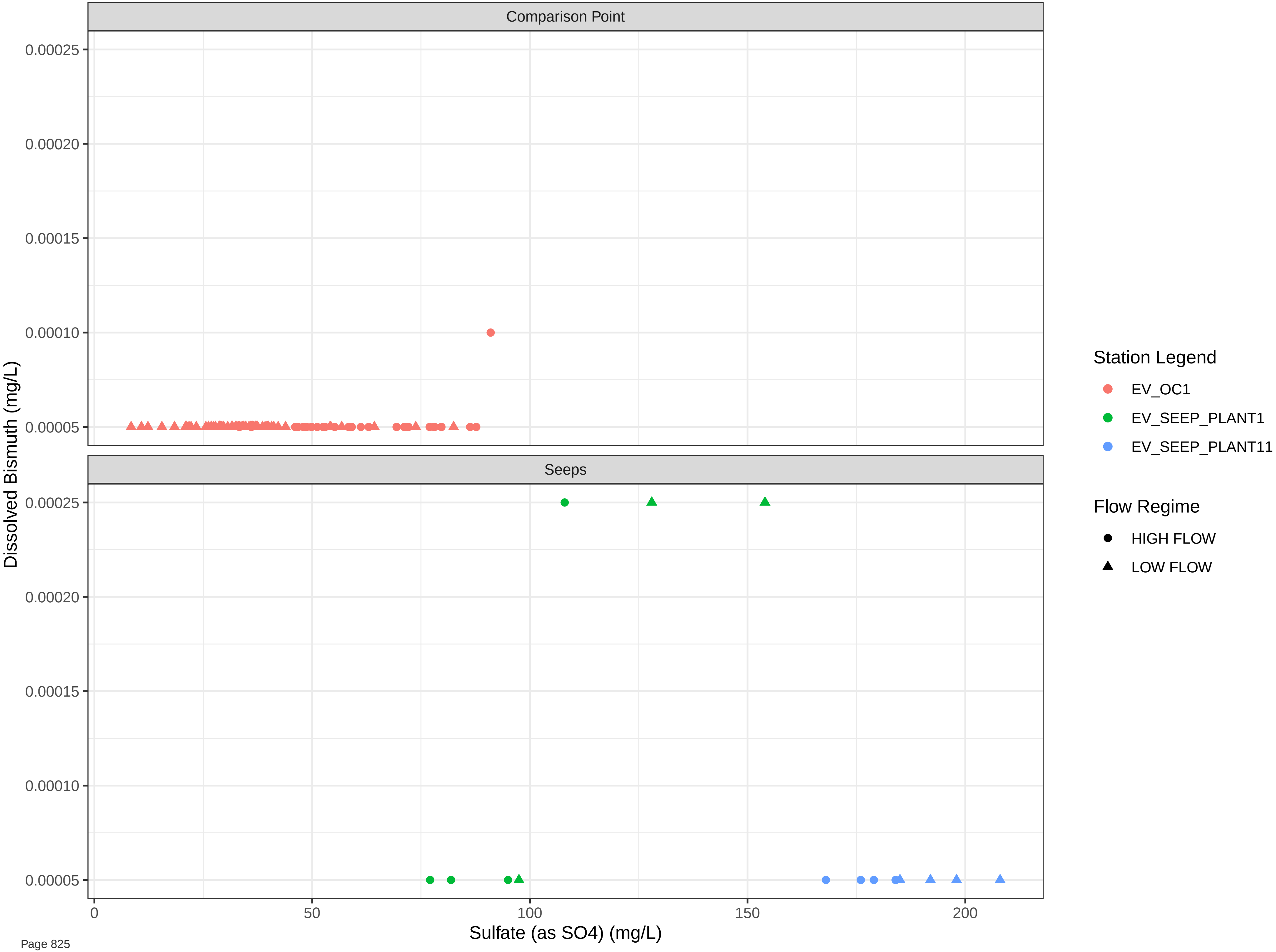
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



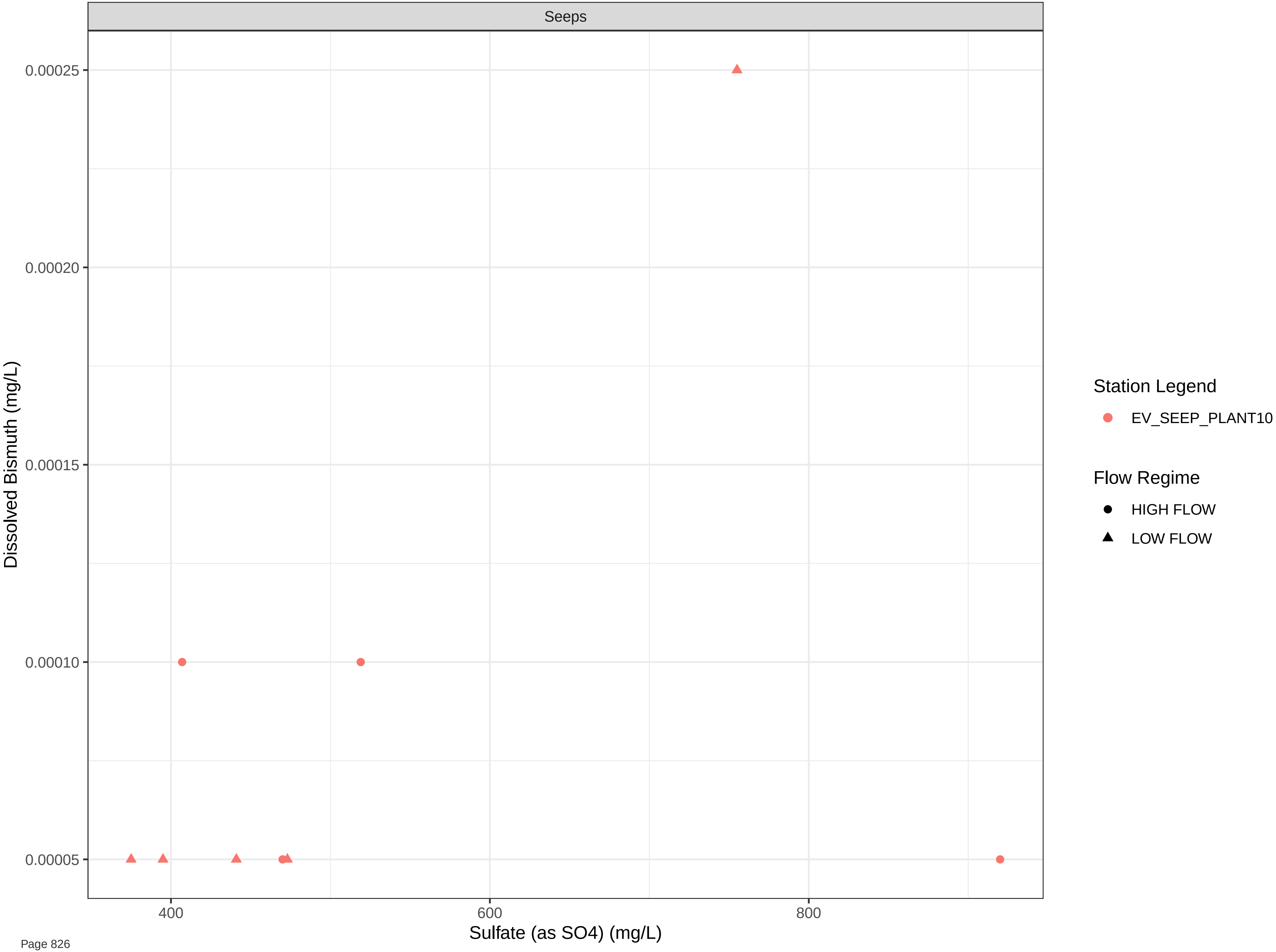
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



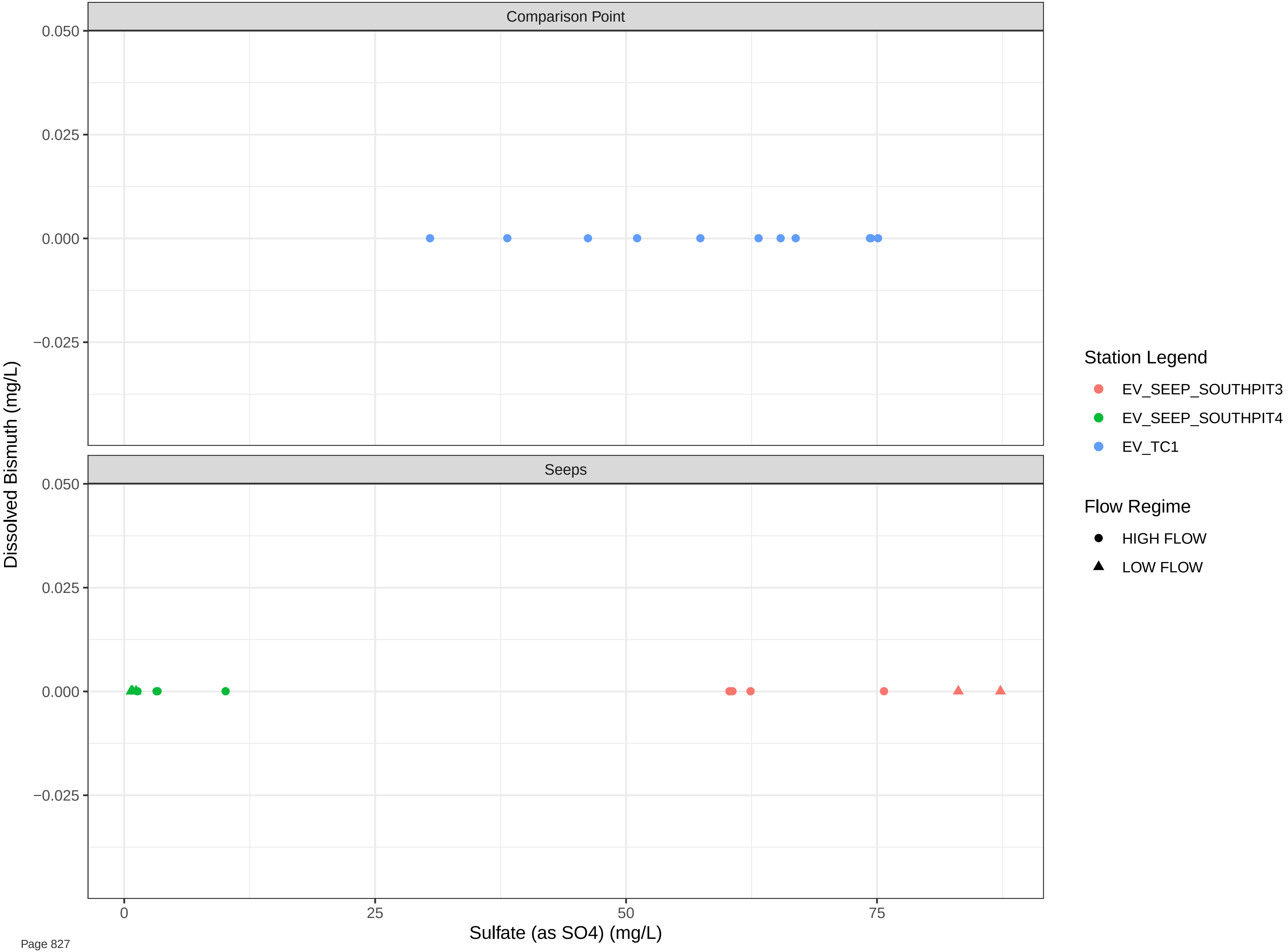
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

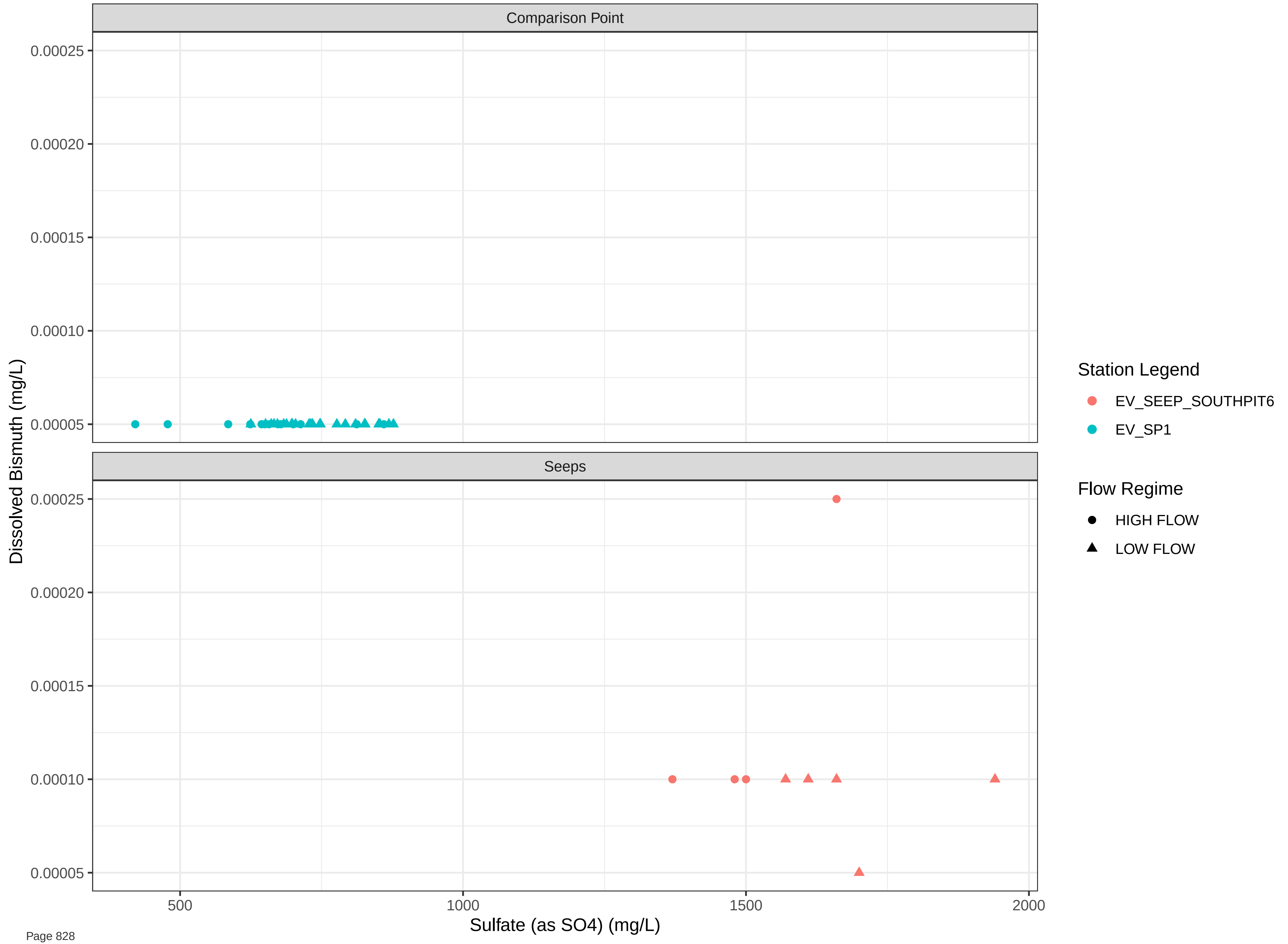


Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

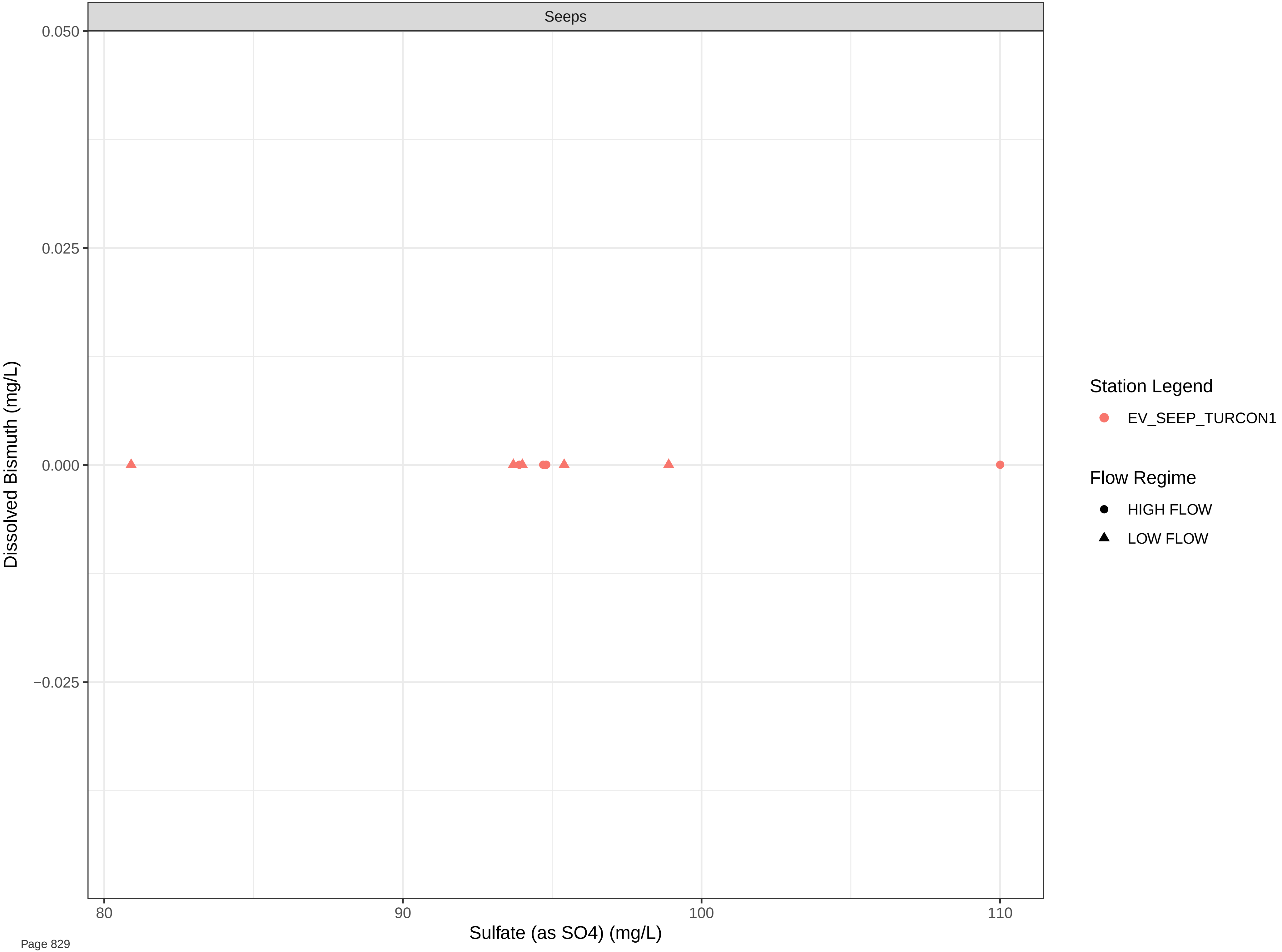


Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
400
600
800
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

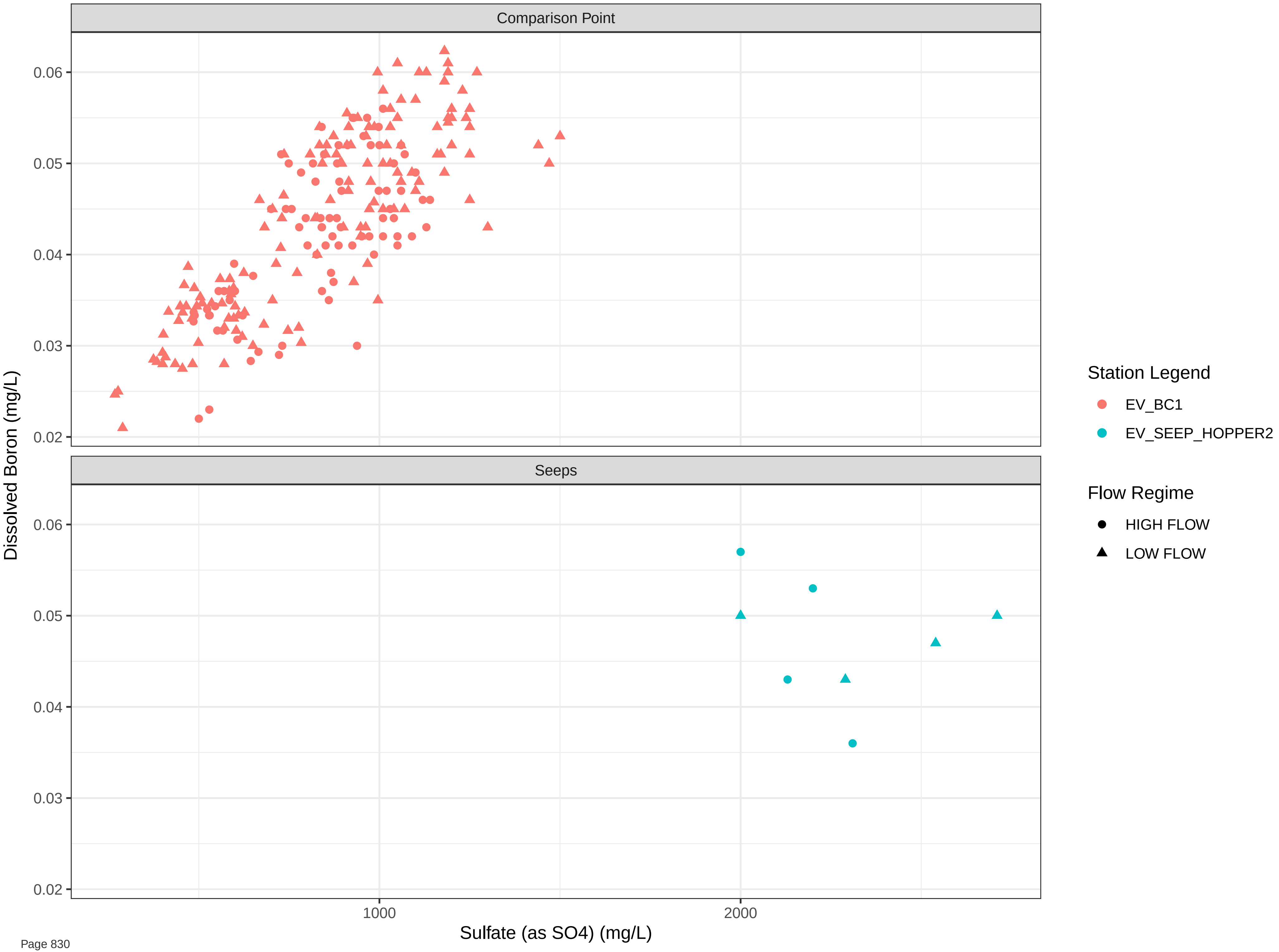

Comparison Point
Seeps
0.050
0.025
0.000
−0.025
0
25
50
75
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



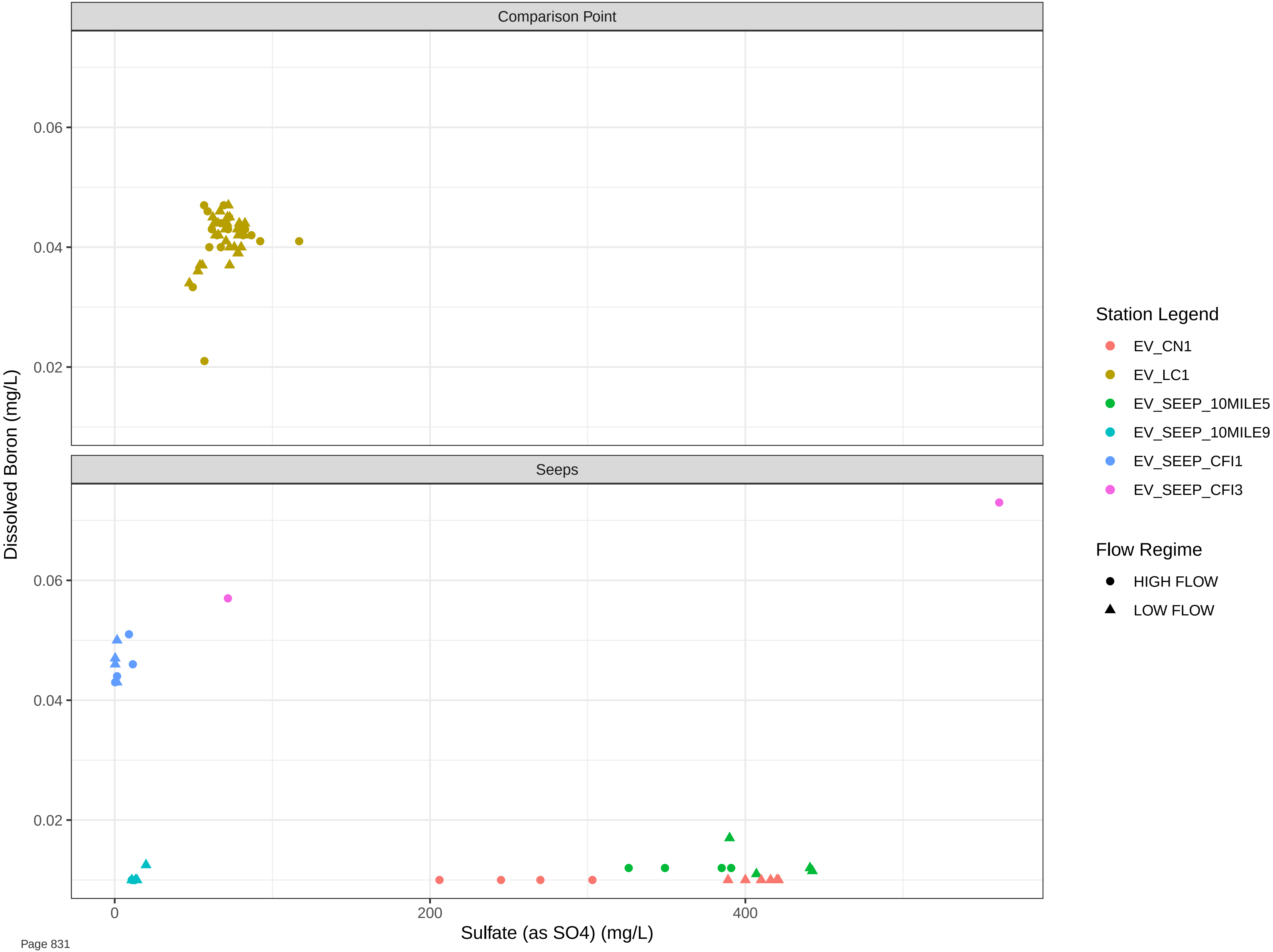
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



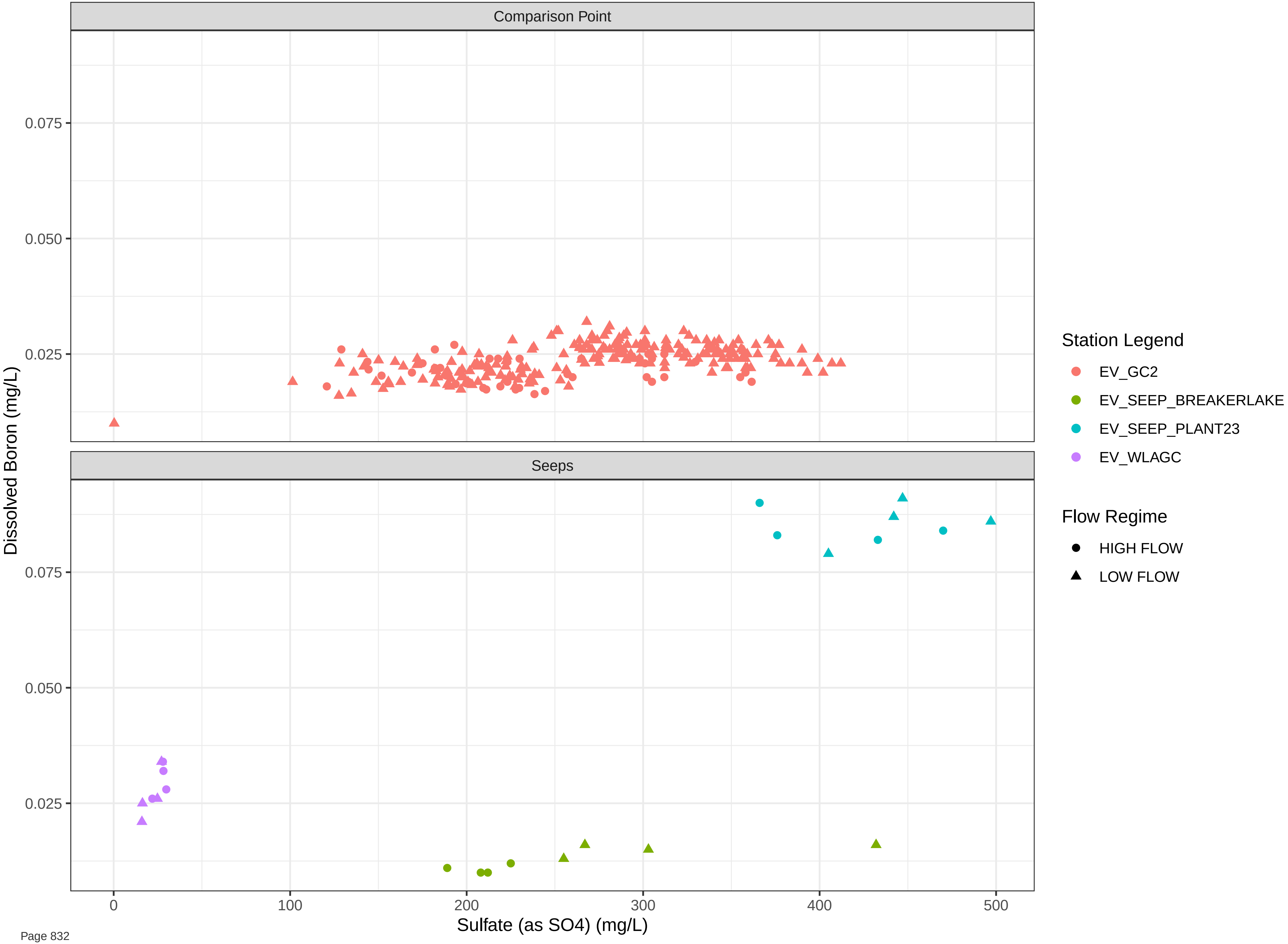
Seeps
0.050
0.025
0.000
−0.025
Dissolved Bismuth (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

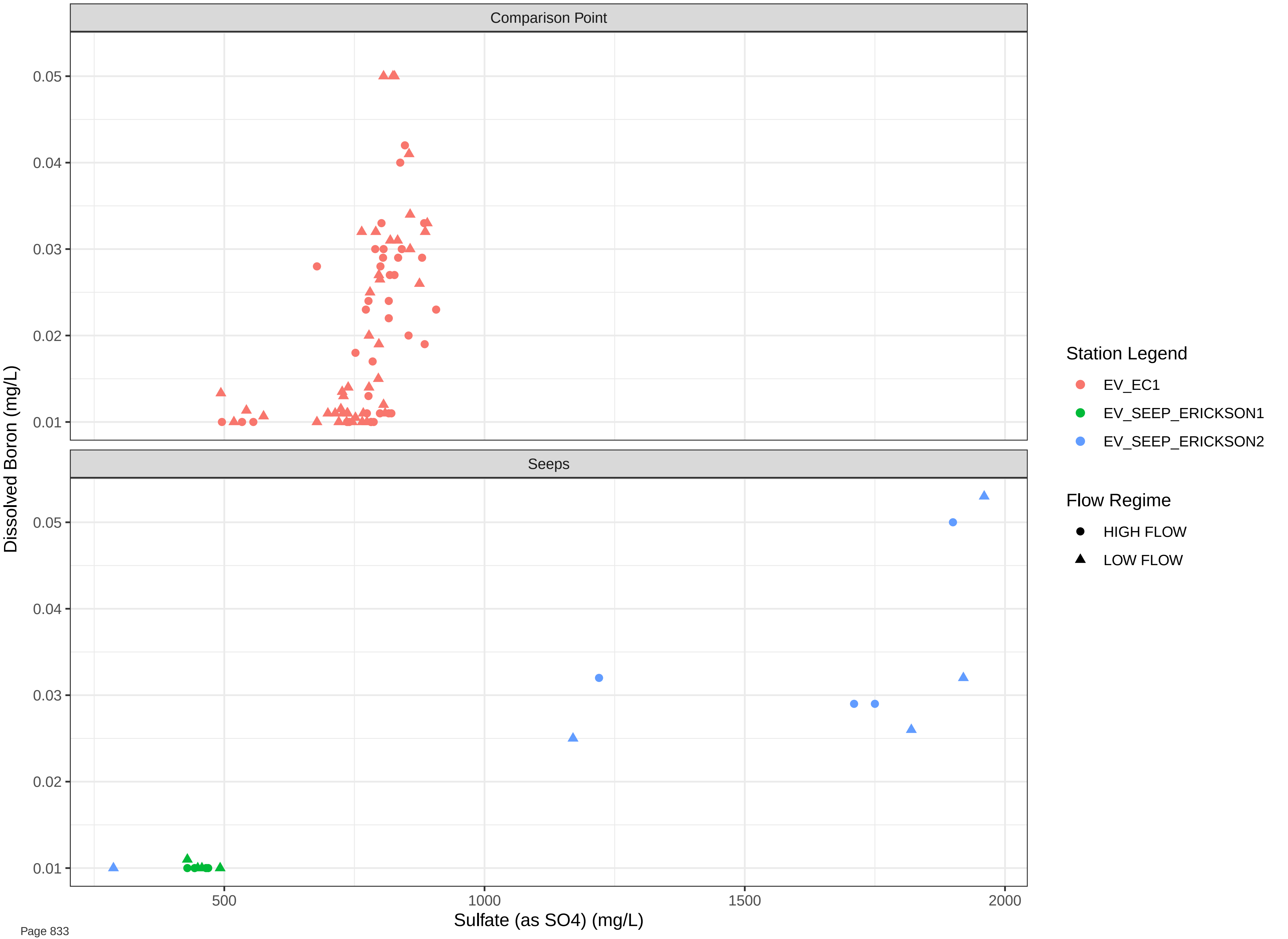


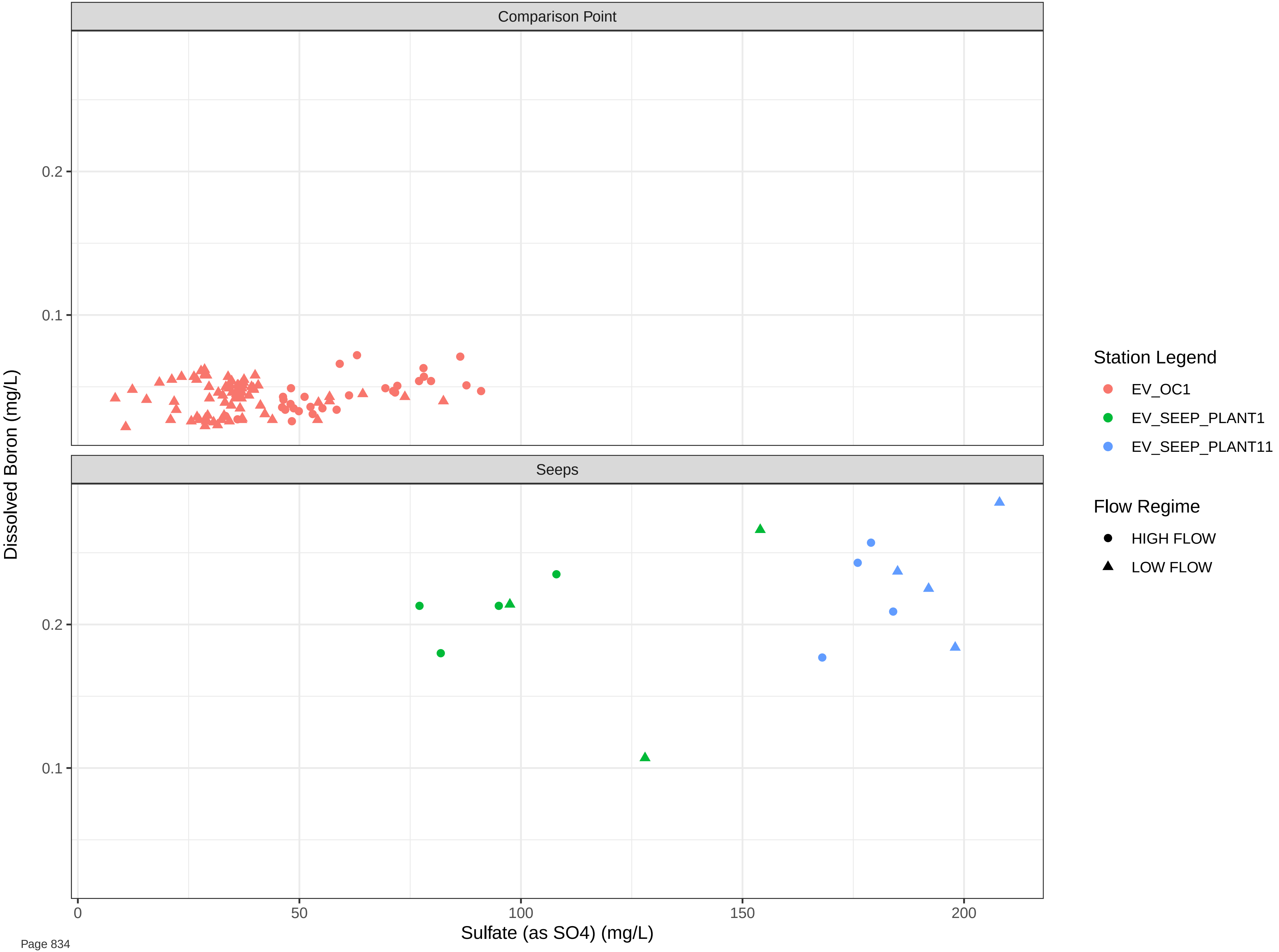
Comparison Point
Seeps
0.06
0.05
0.04
0.03
0.02
1000
2000
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



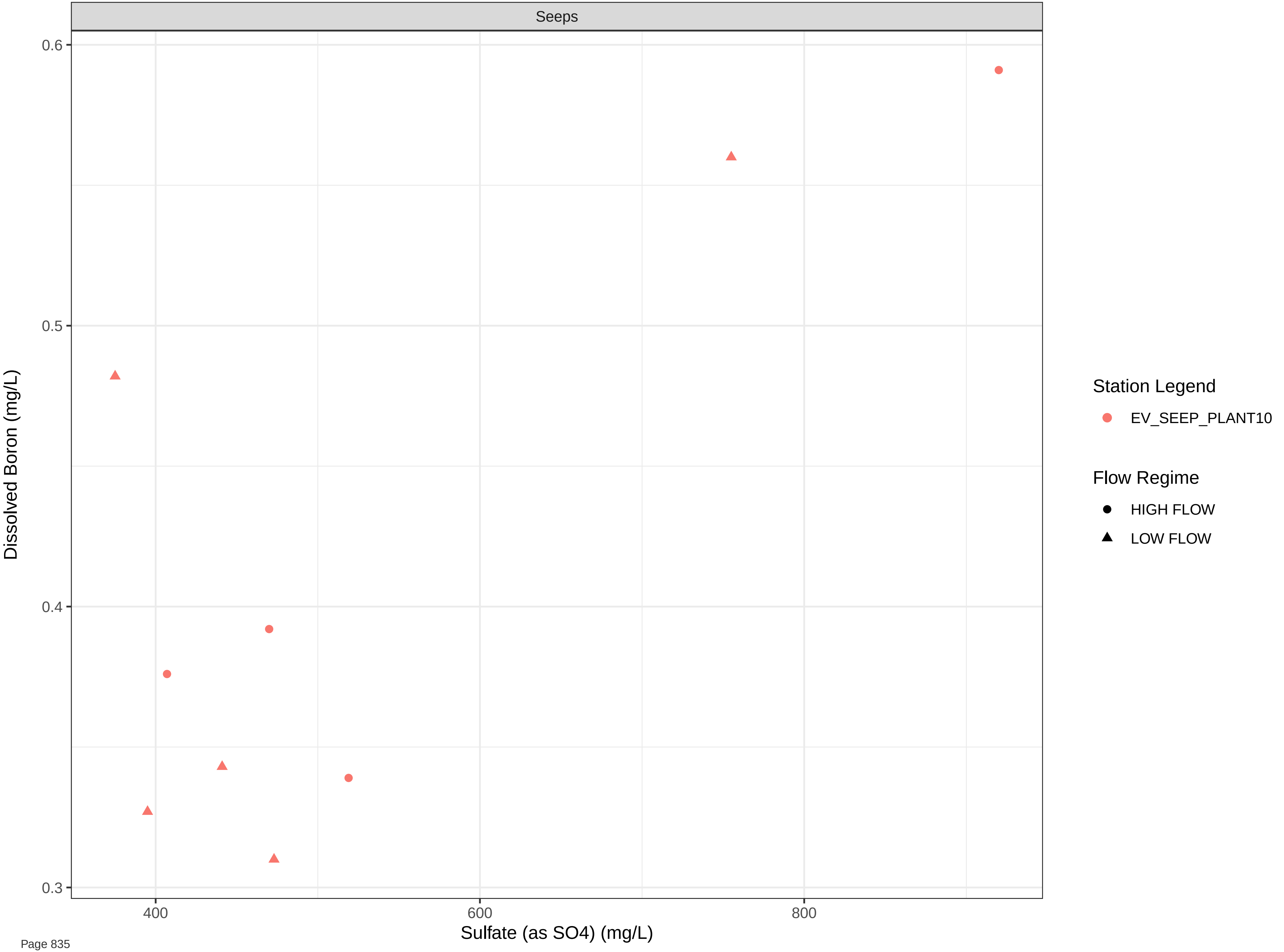
Comparison Point
Seeps
0.06
0.04
0.02
0
200
400
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.075
0.050
0.025
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

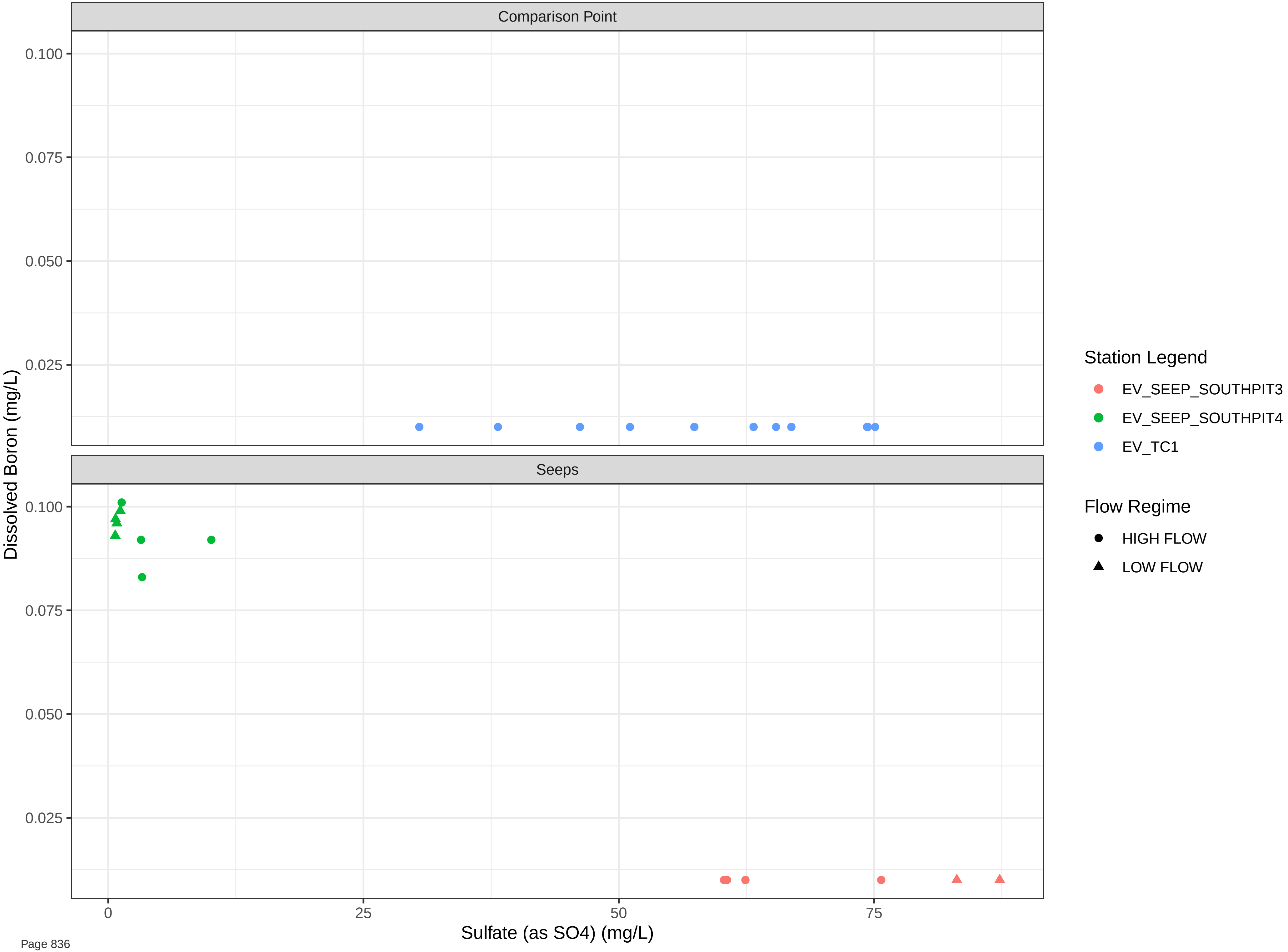

Comparison Point
Seeps
0.05
0.04
0.03
0.02
0.01
500
1000
1500
2000
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

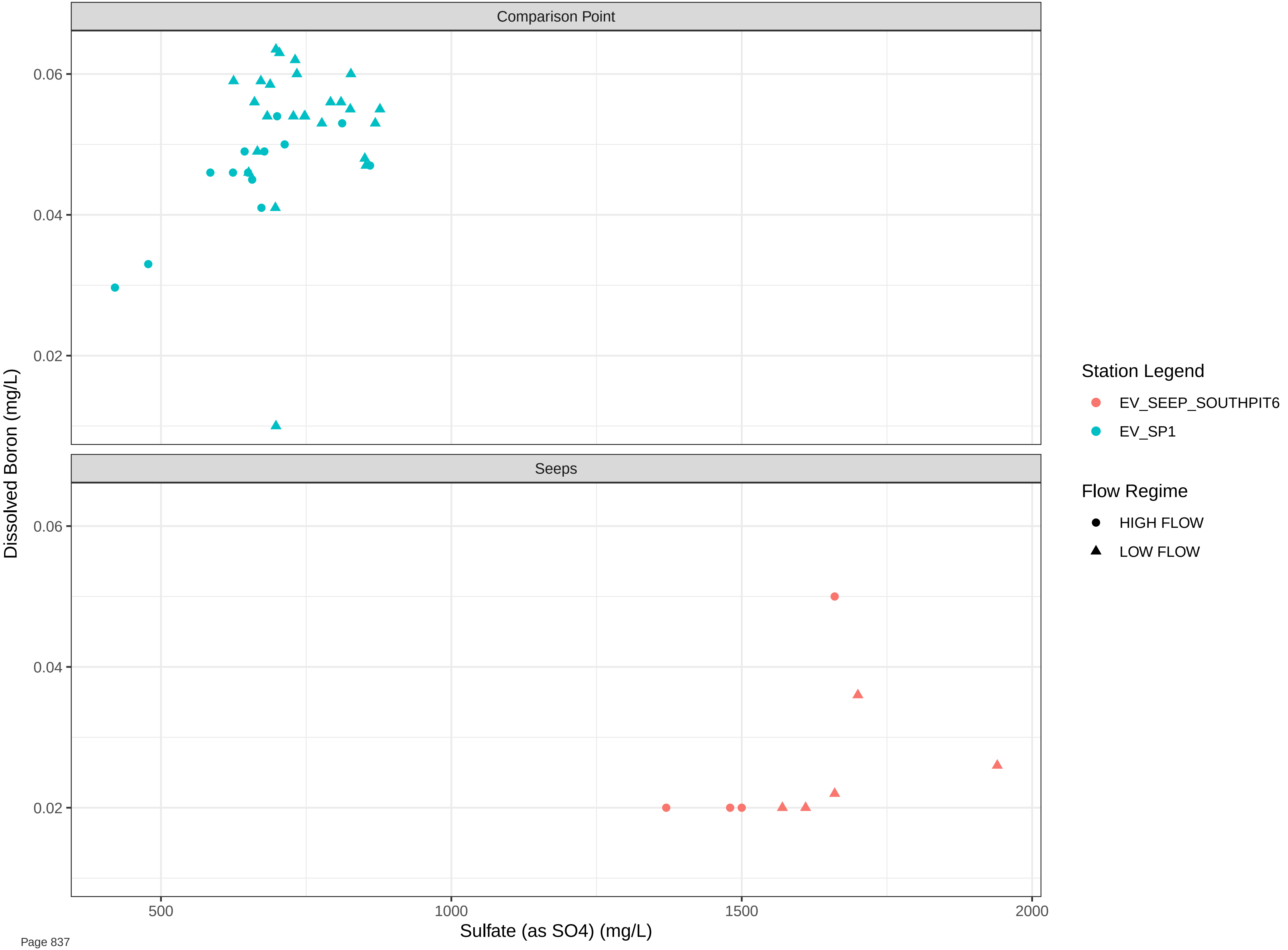


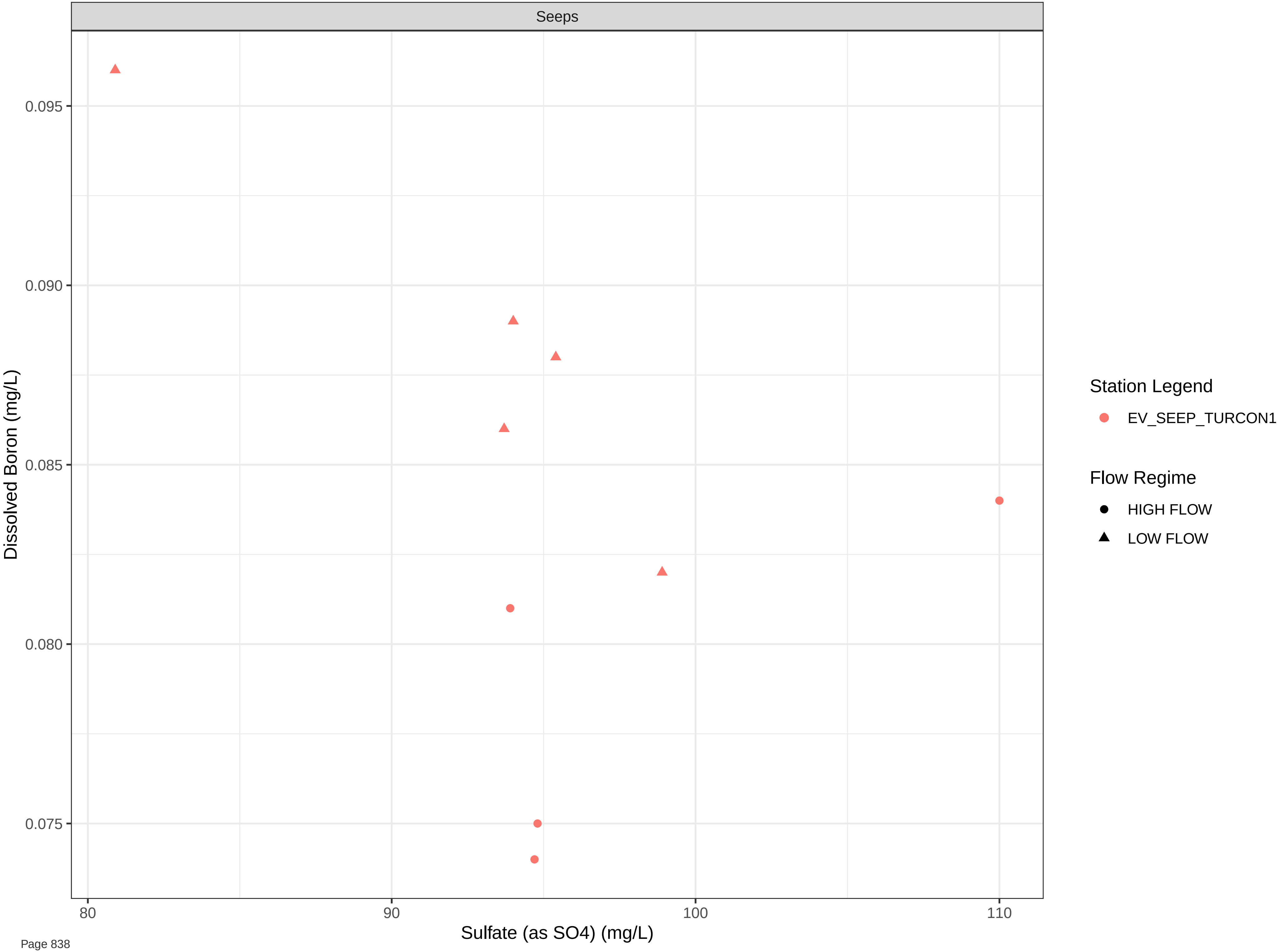
Comparison Point
Seeps
Dissolved Boron (mg/L)
0.2
0.1
0.2
0.1
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

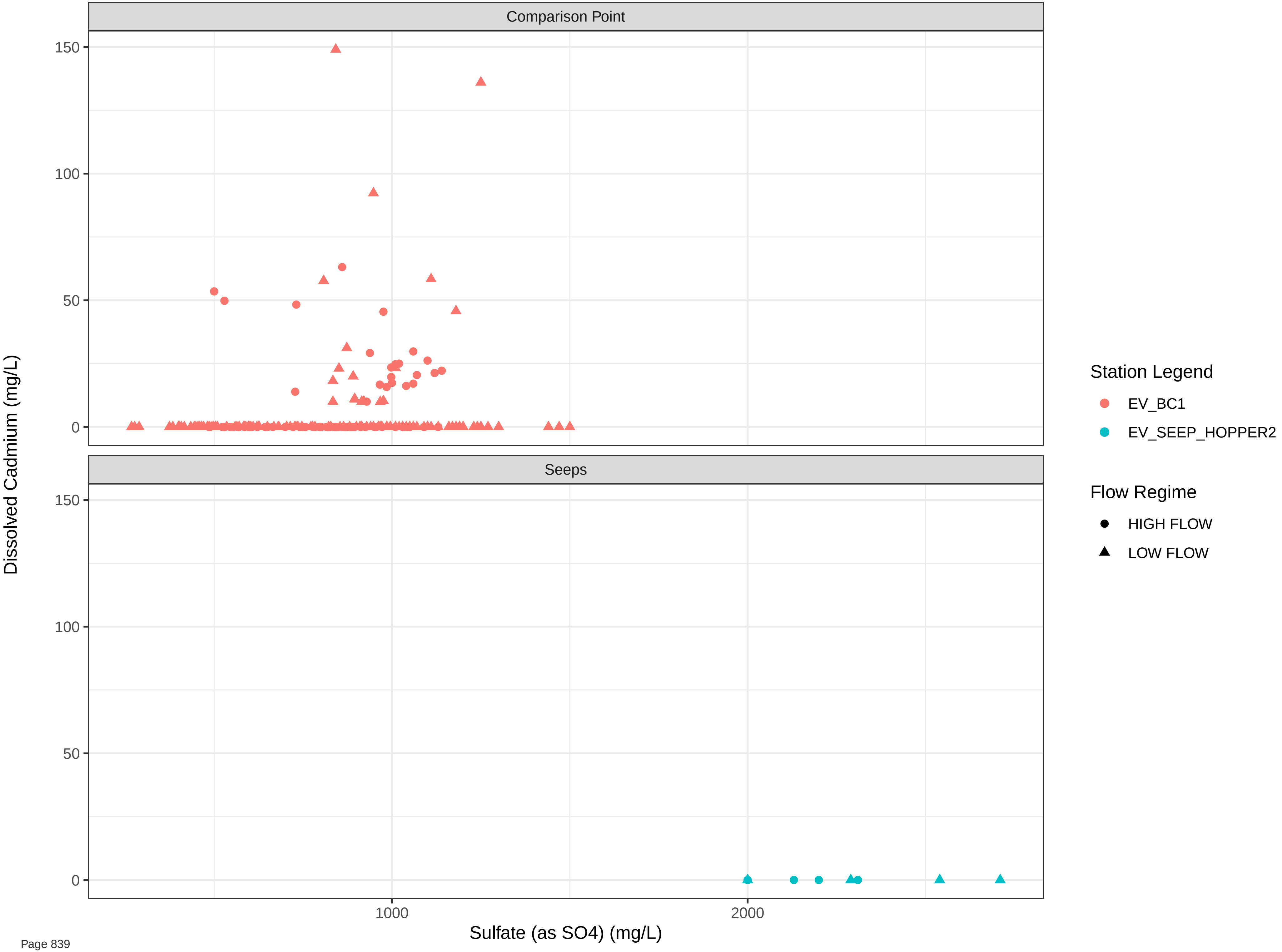


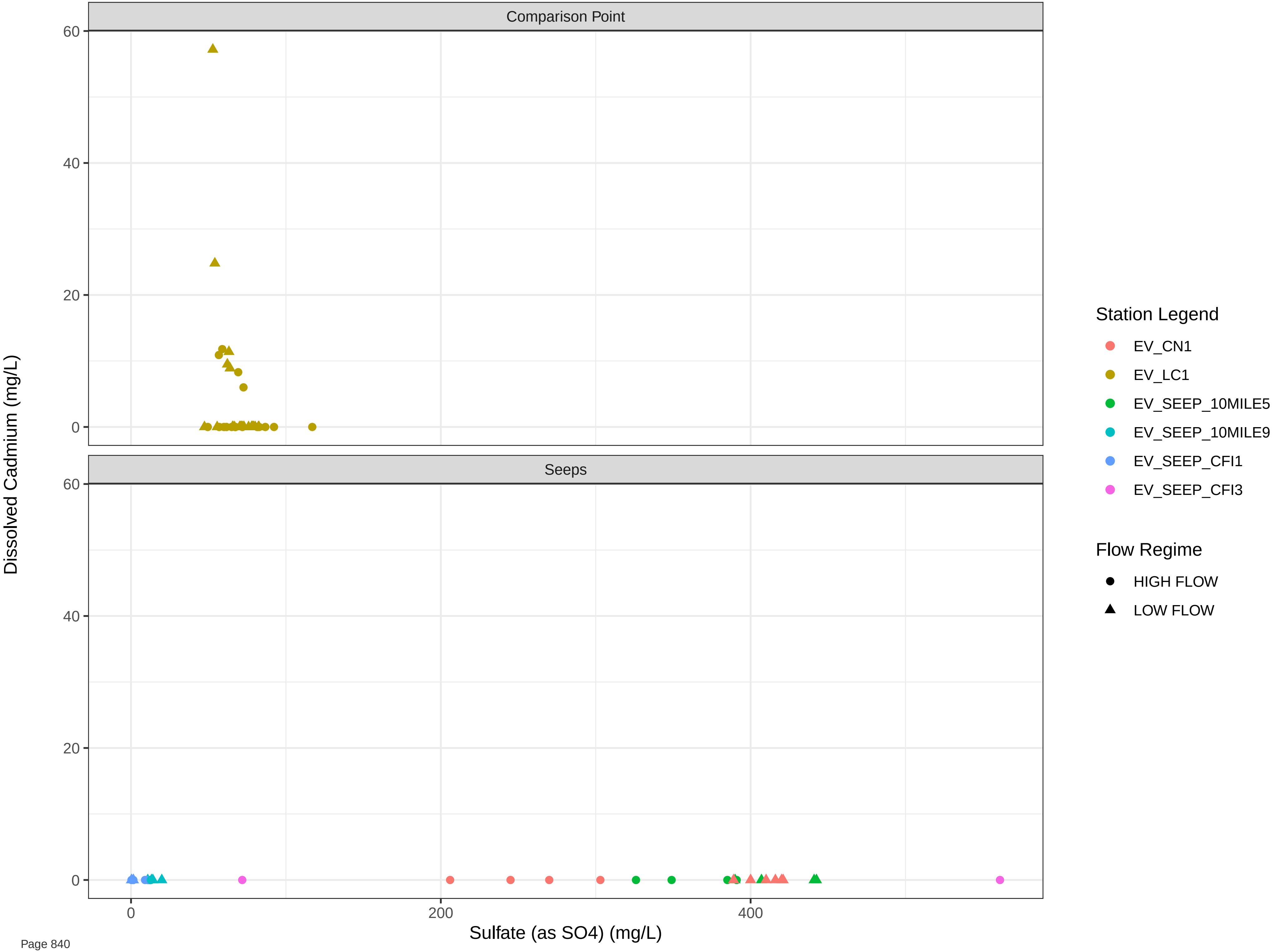
Seeps
0.6
0.5
0.4
0.3
400
600
800
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Boron (mg/L)
0.100
0.075
0.050
0.025
Sulfate (as SO4) (mg/L)
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

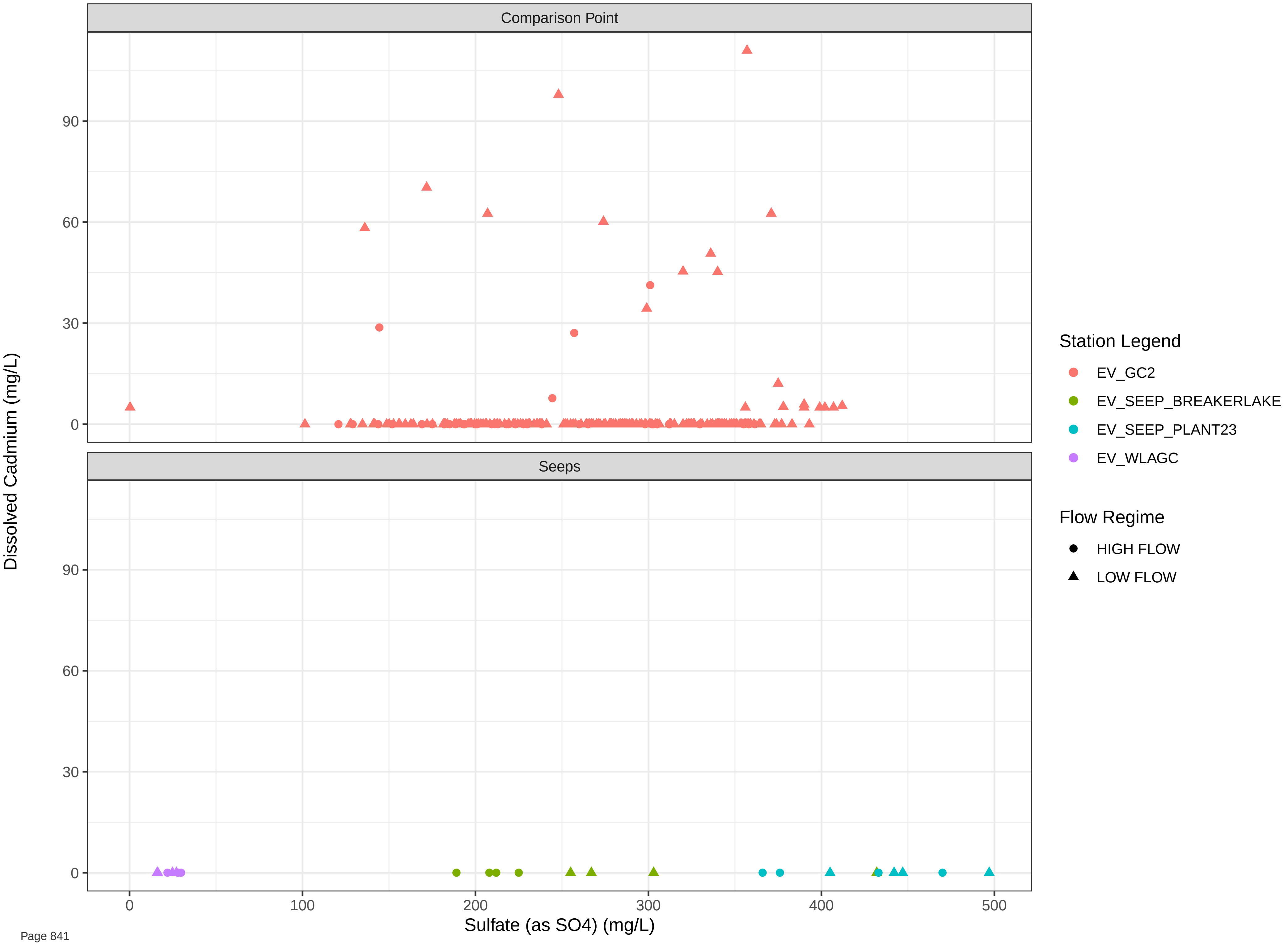

Comparison Point
Seeps
Dissolved Boron (mg/L)
0.06
0.04
0.02
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.095
0.090
0.085
0.080
0.075
80
90
100
110
Sulfate (as SO4) (mg/L)
Dissolved Boron (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

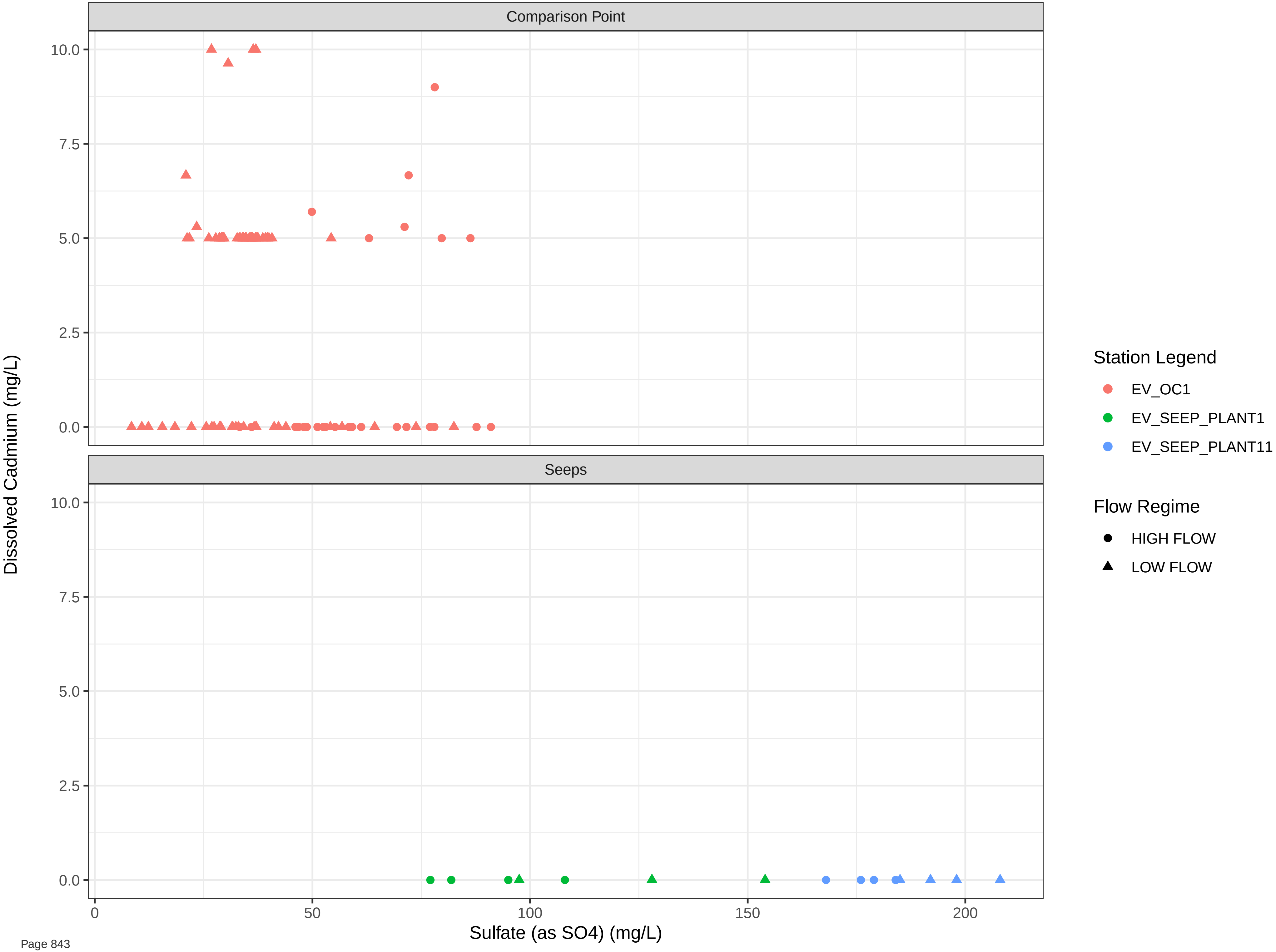

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
150
100
50
0
150
100
50
0
1000
2000
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

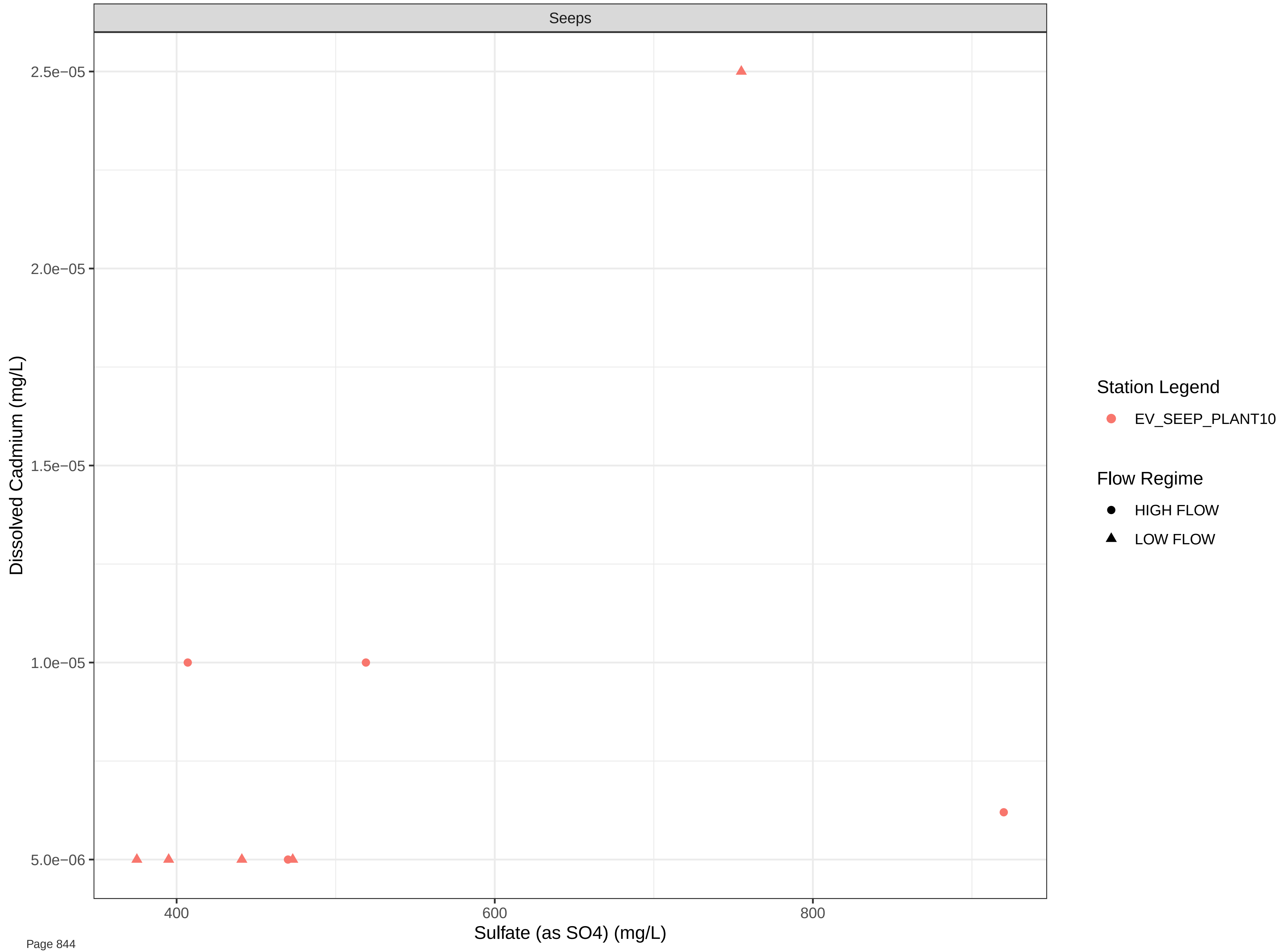


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
20
40
60
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

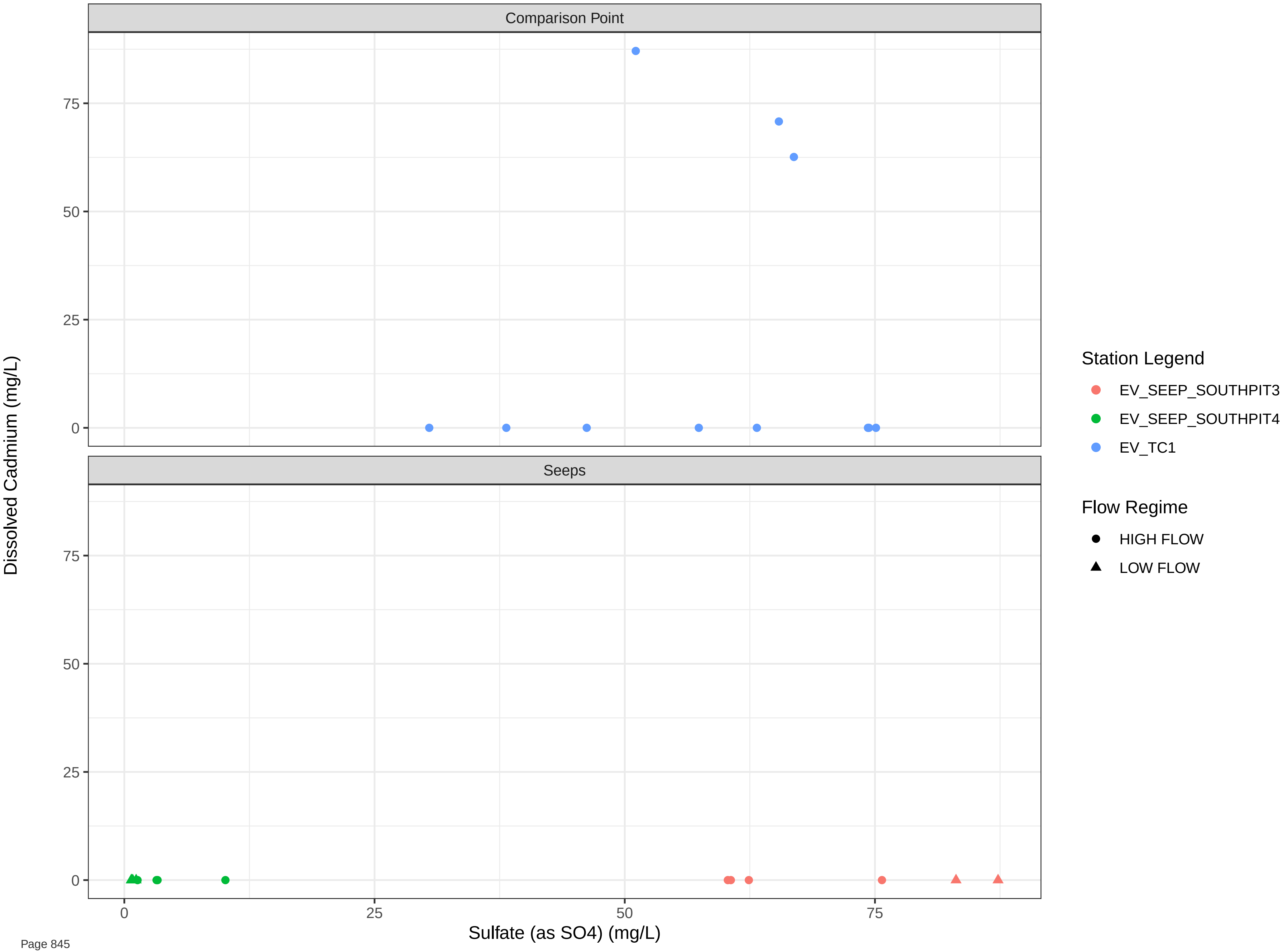

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
30
60
90
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
25
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

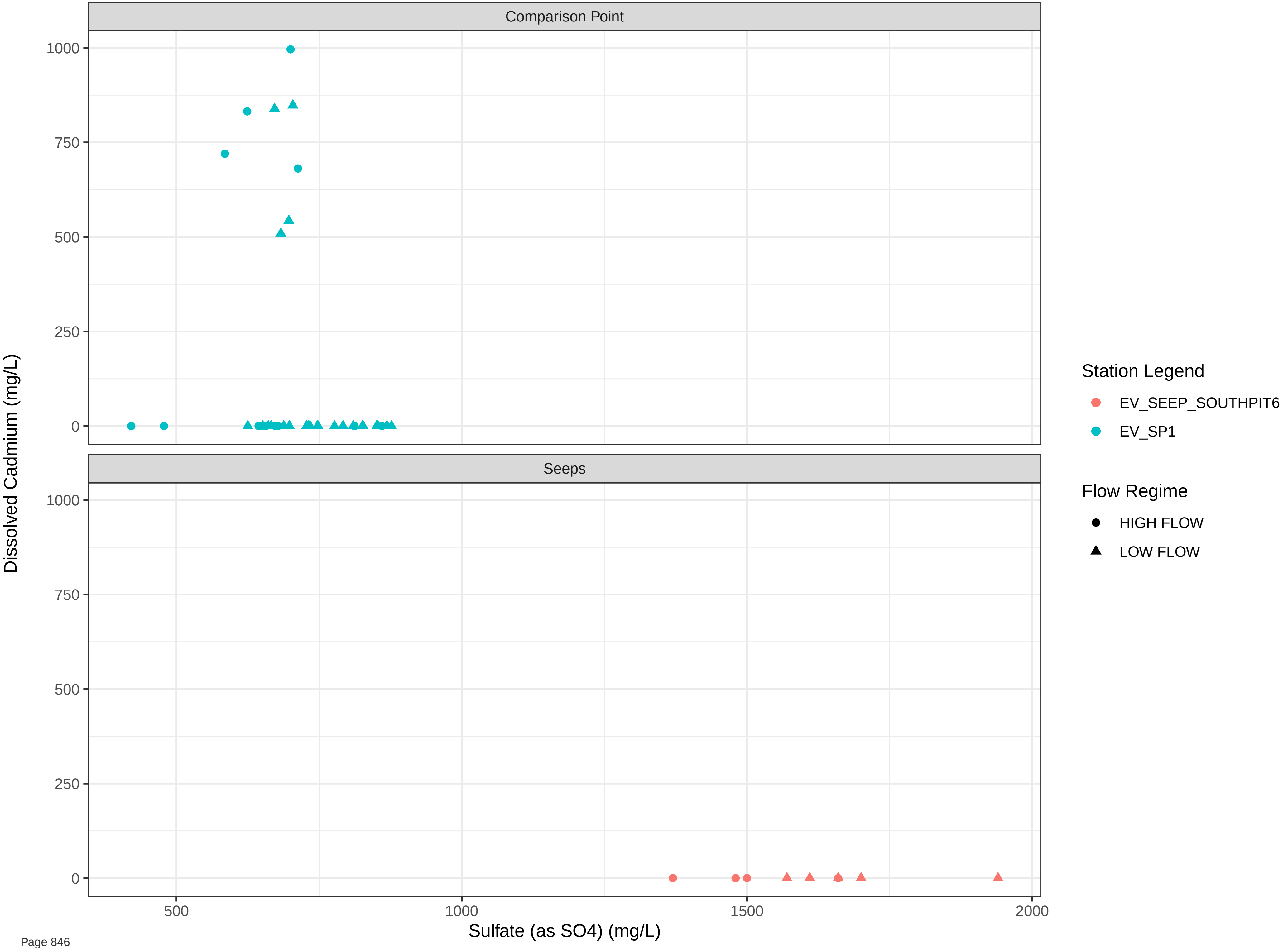

Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
2.5
5.0
7.5
10.0
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



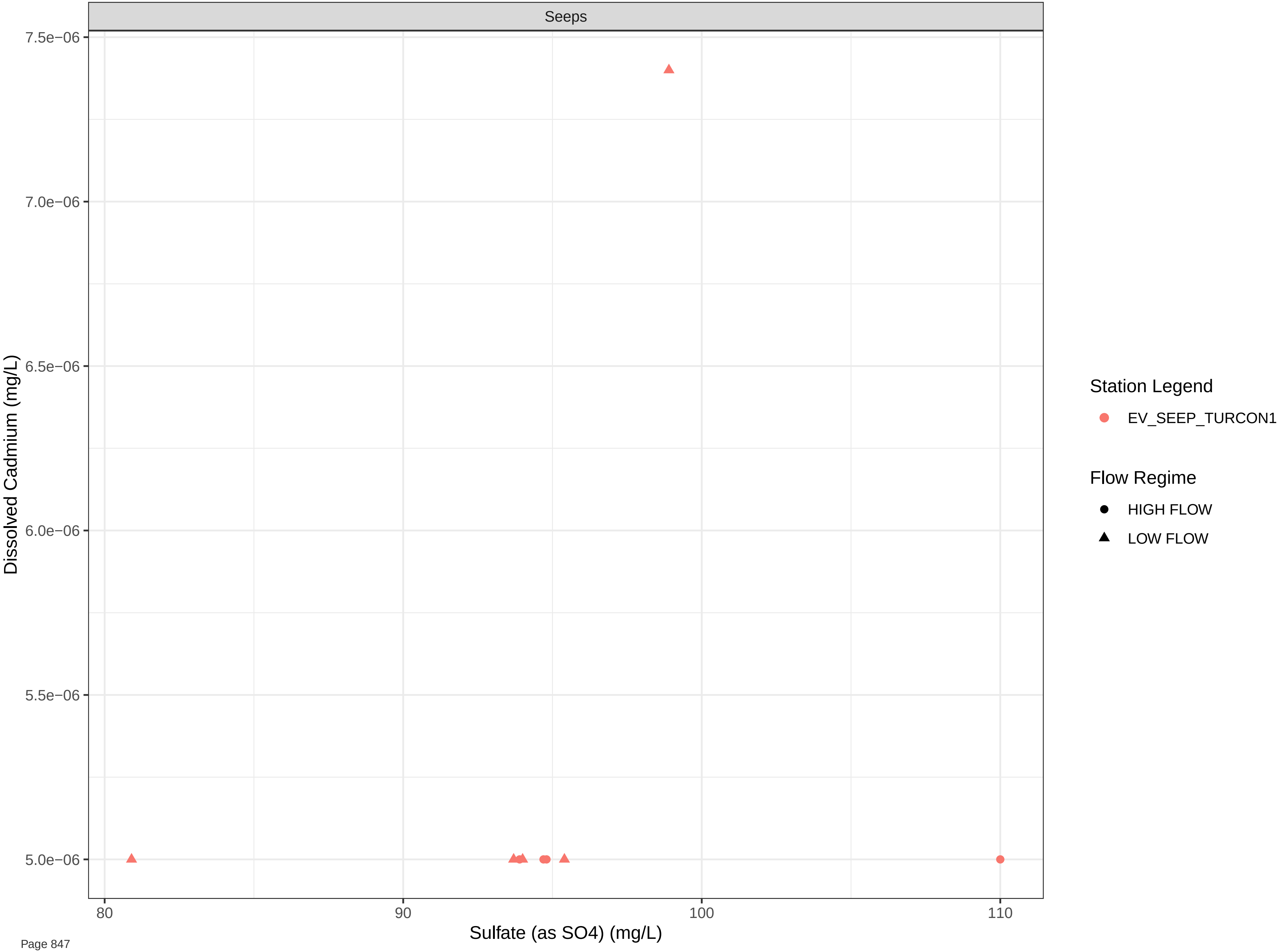
Seeps
2.5e−05
2.0e−05
1.5e−05
1.0e−05
5.0e−06
Dissolved Cadmium (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

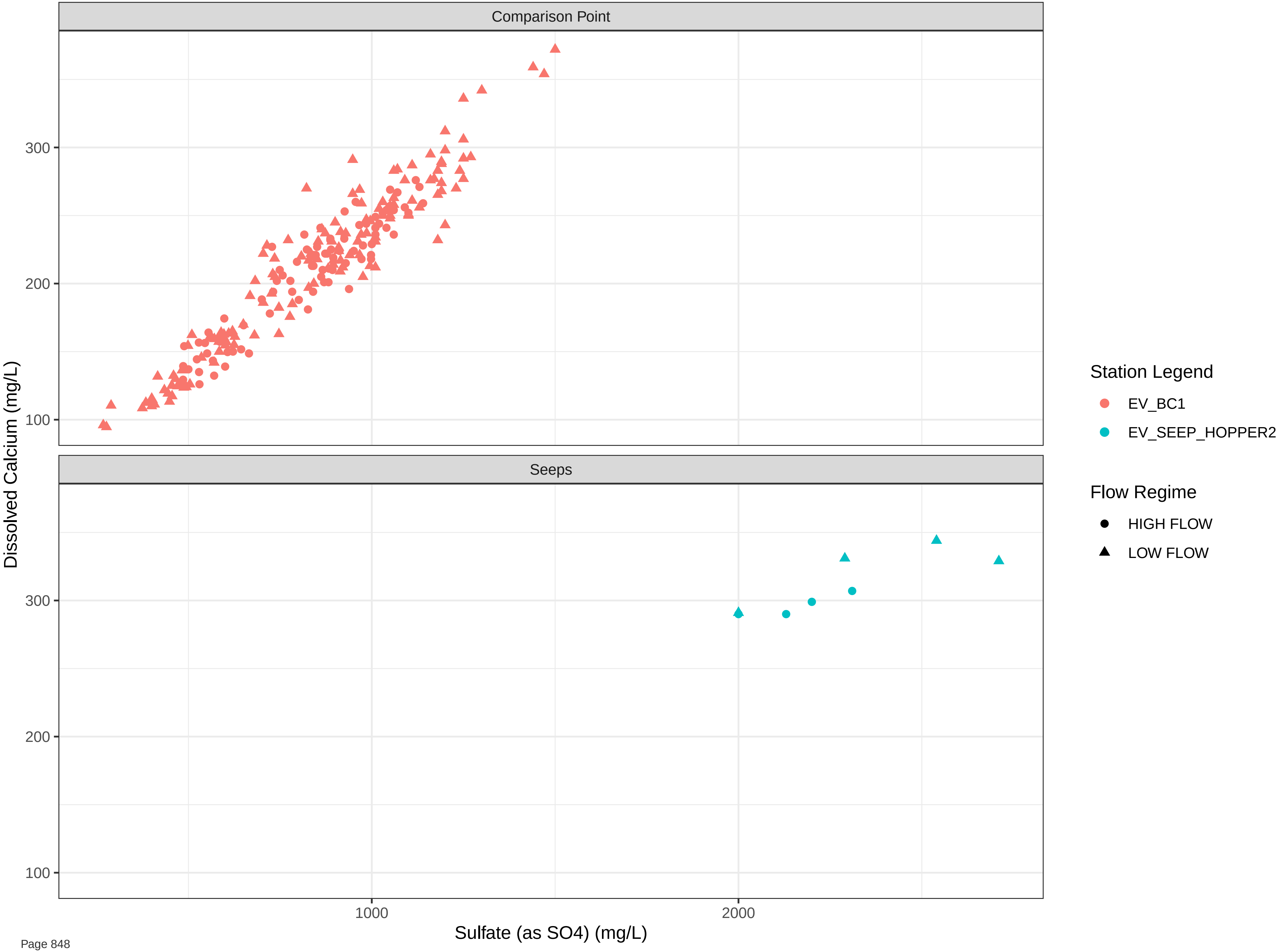


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

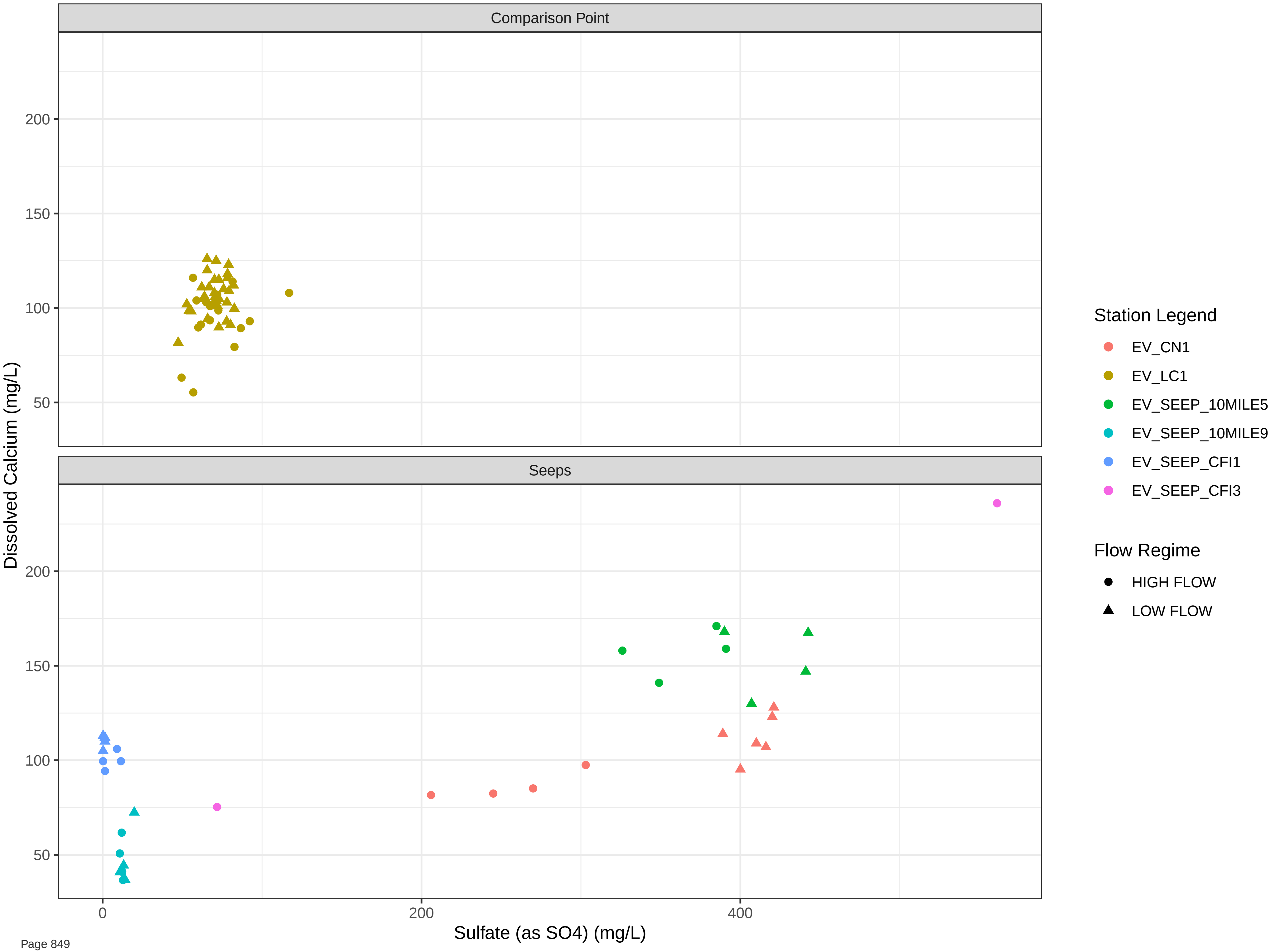


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
1000
750
500
250
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

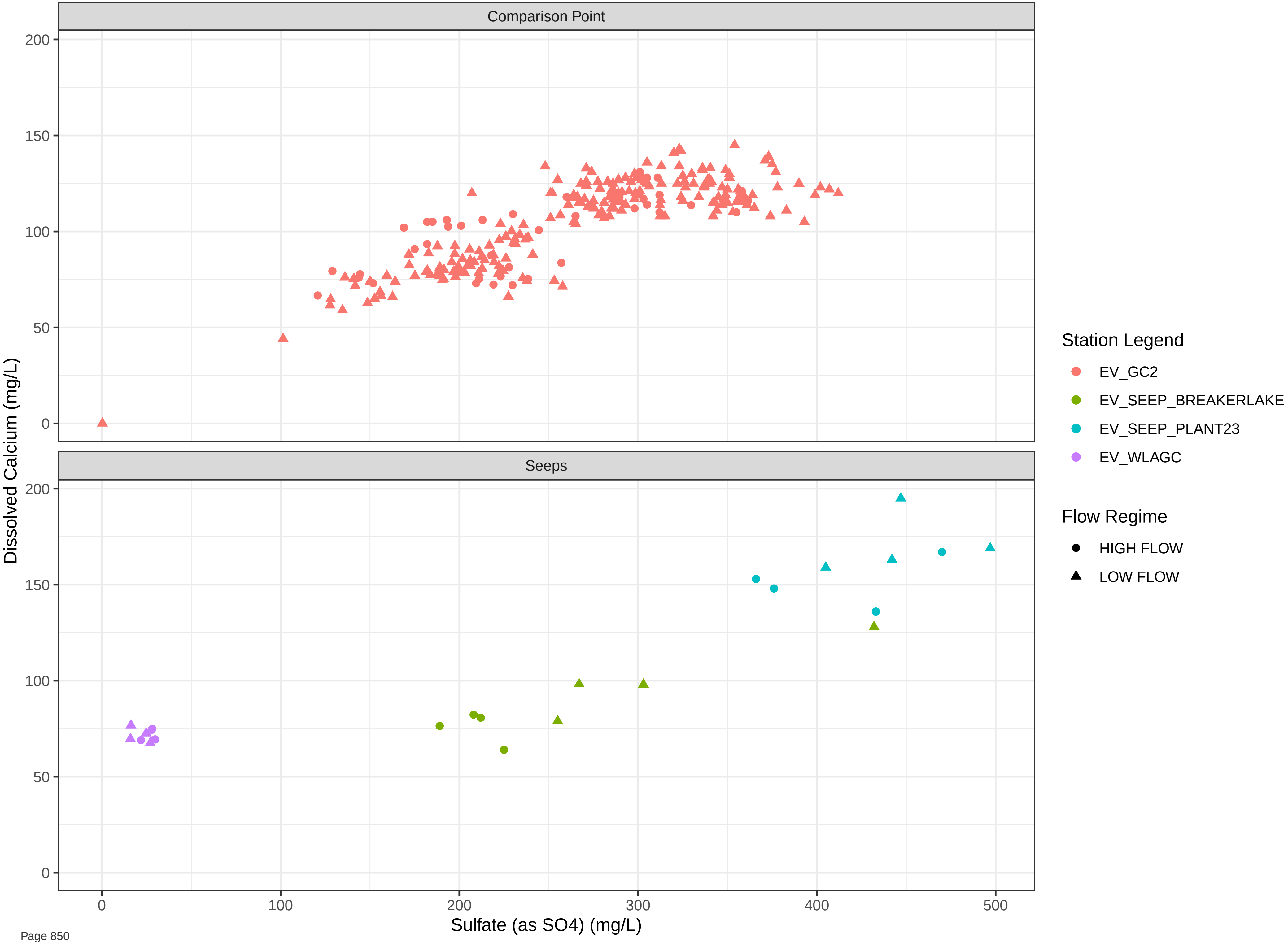

Seeps
Dissolved Cadmium (mg/L)
7.5e−06
7.0e−06
6.5e−06
6.0e−06
5.5e−06
5.0e−06
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



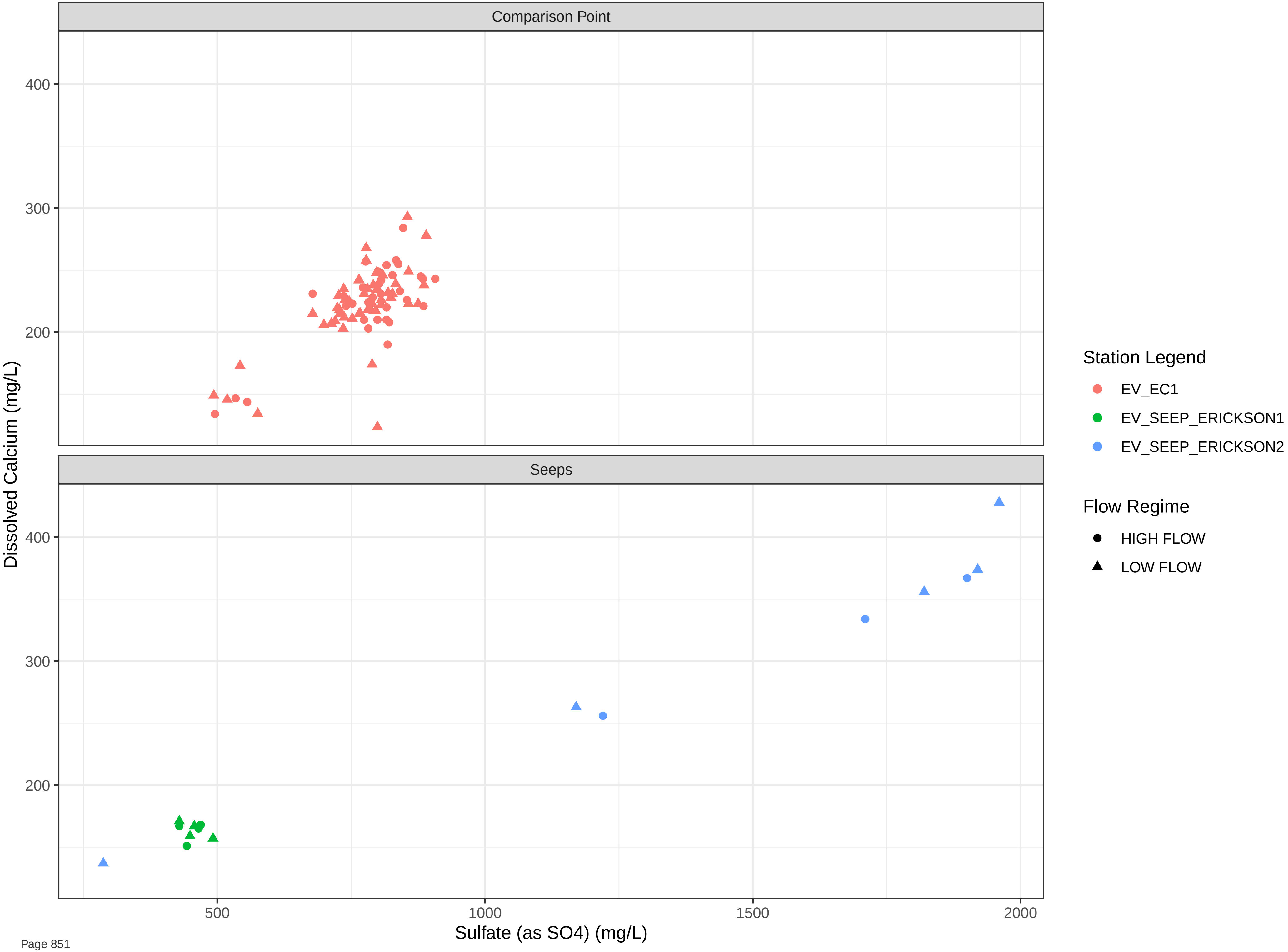
Comparison Point
Seeps
Dissolved Calcium (mg/L)
300
200
100
300
200
100
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

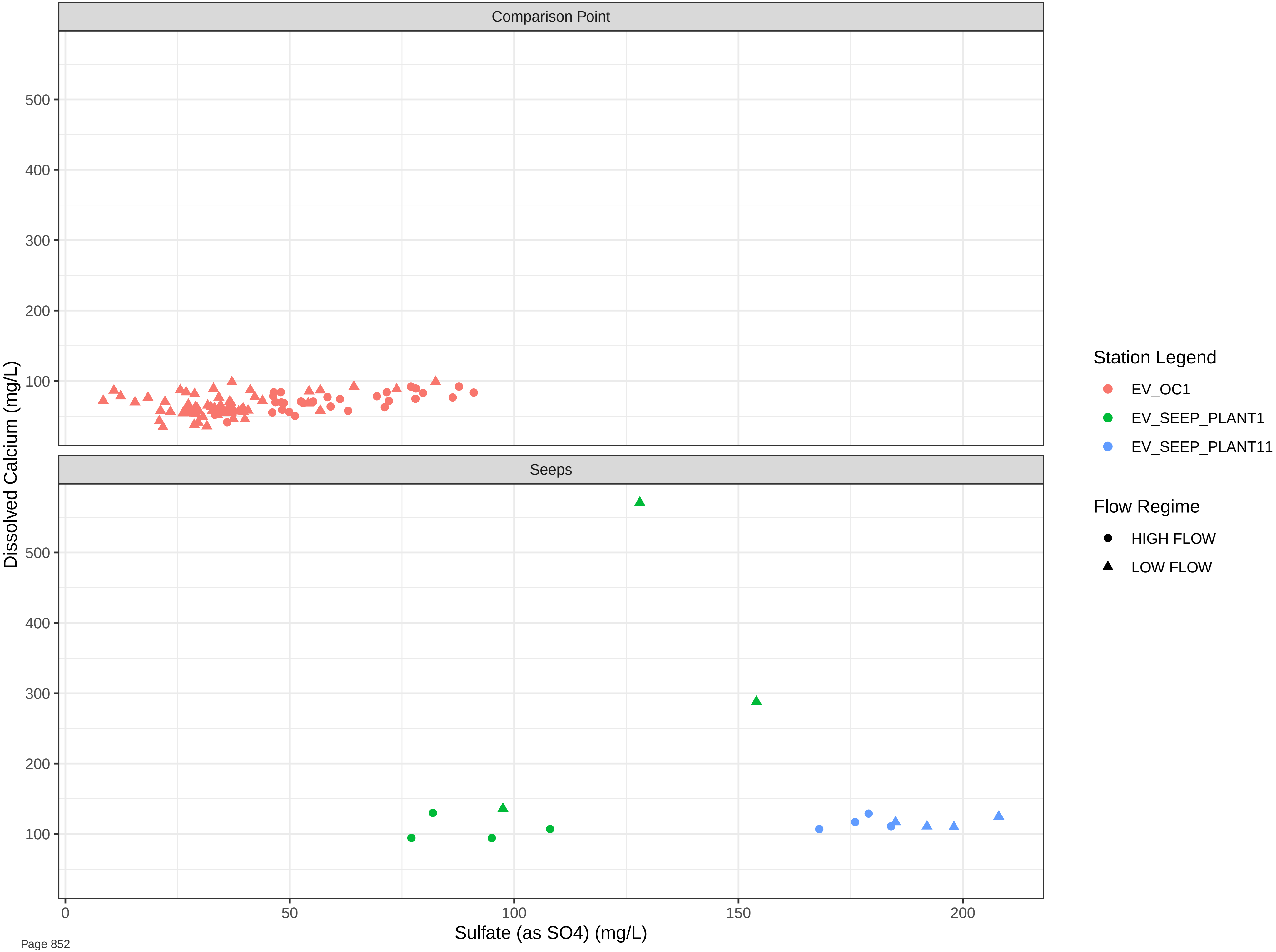


Comparison Point
Seeps
Dissolved Calcium (mg/L)
50
100
150
200
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

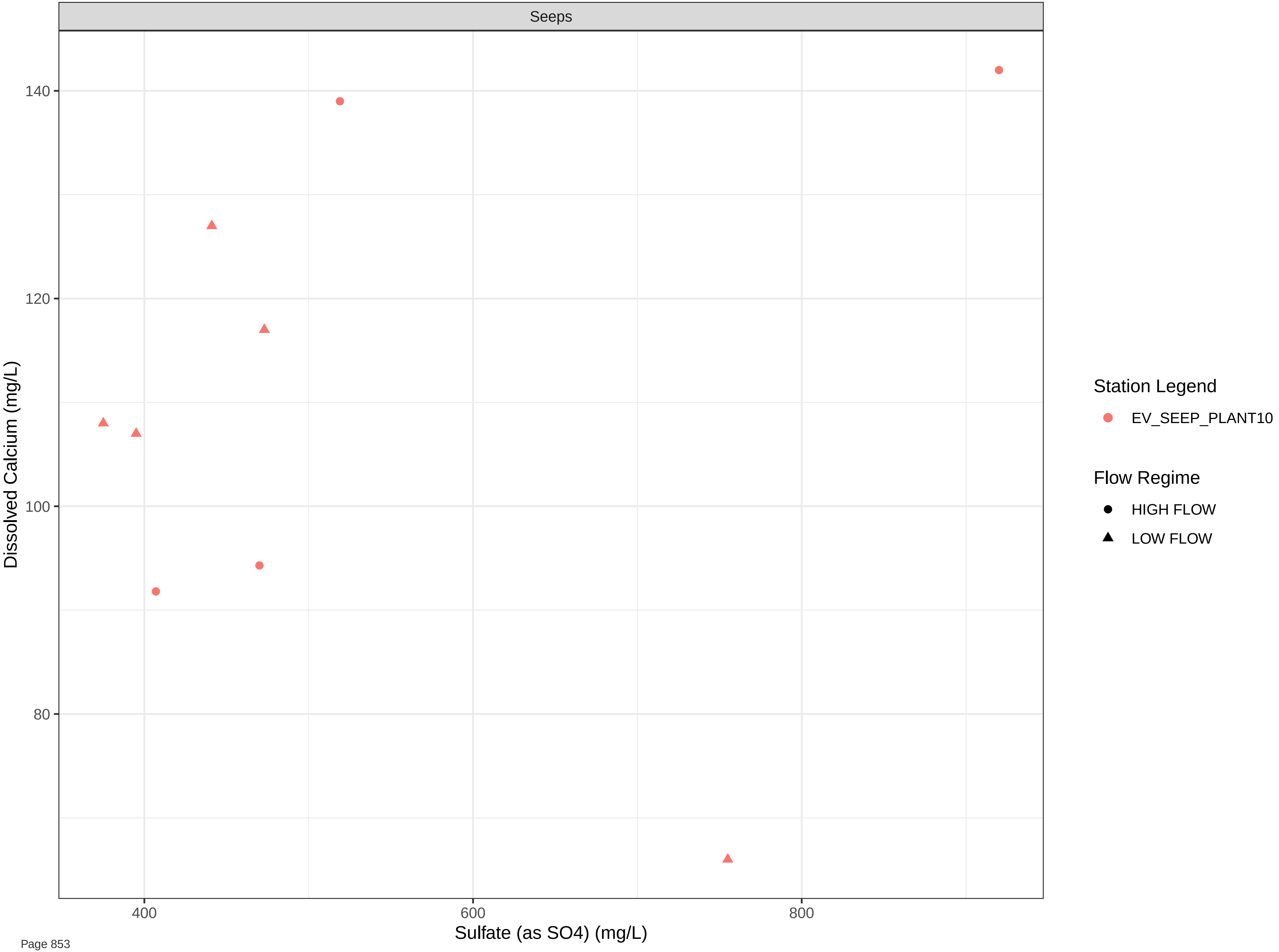


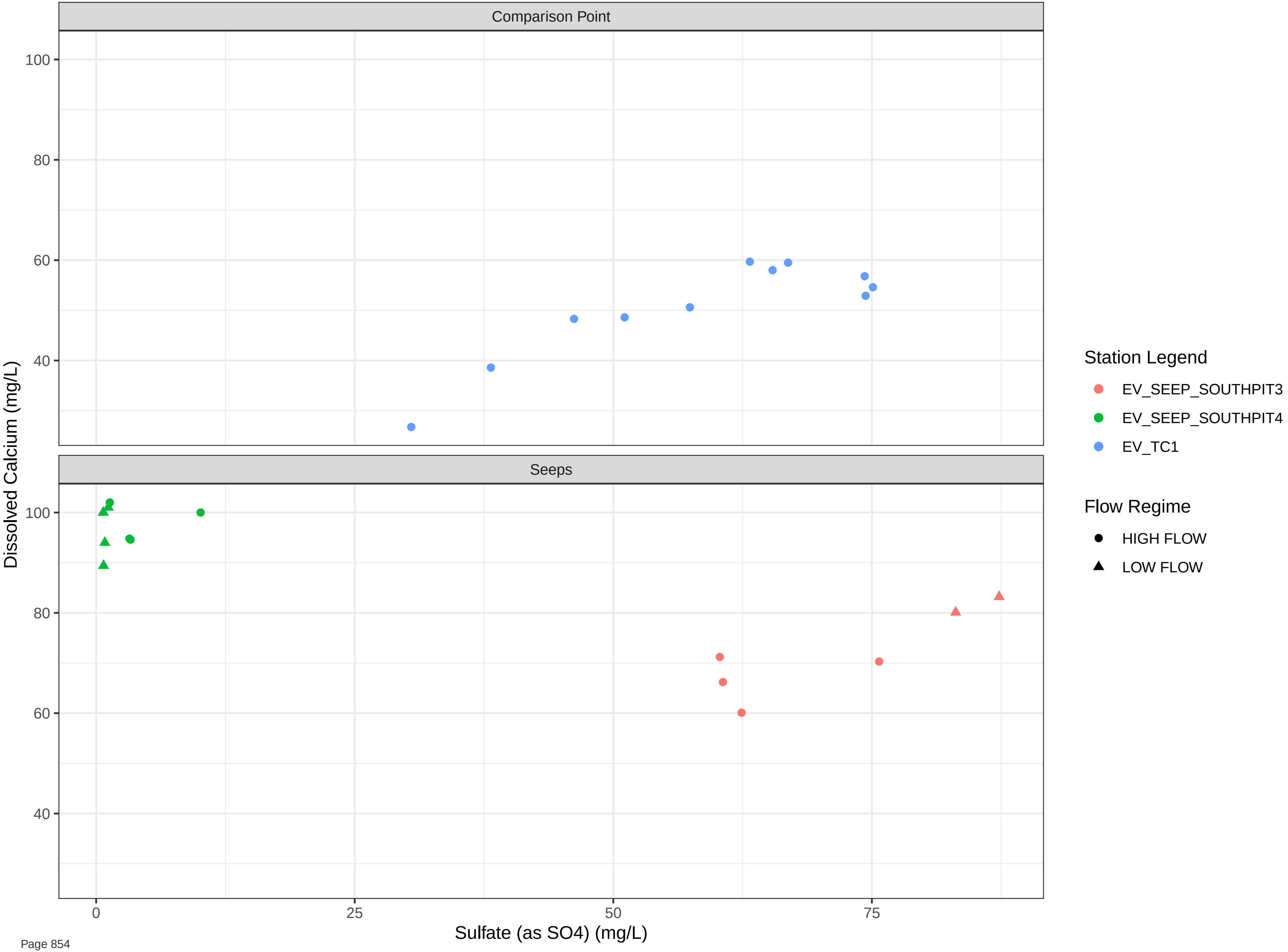
Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
400
300
200
500
1000
1500
2000
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

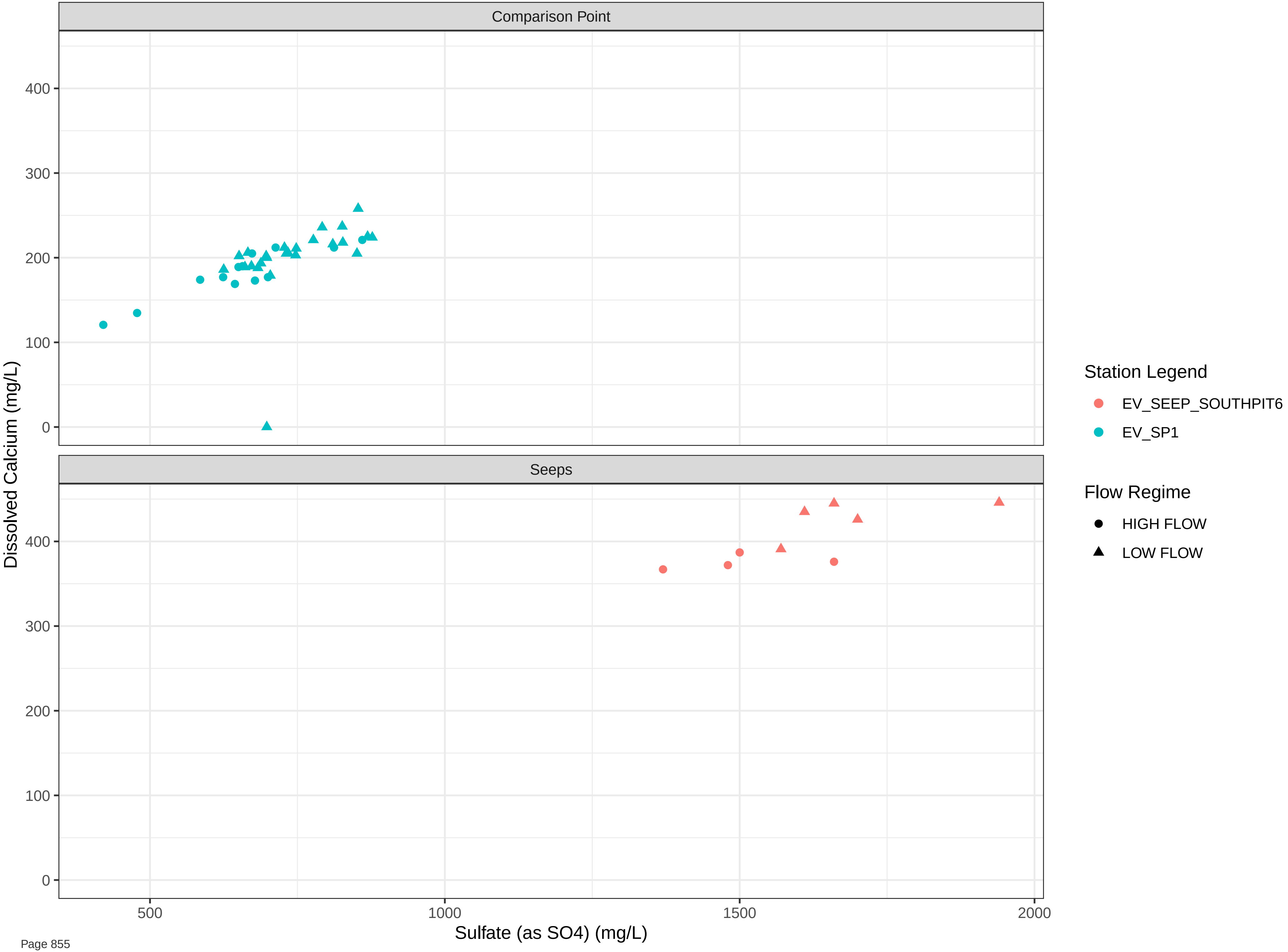


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
500
400
300
200
100
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

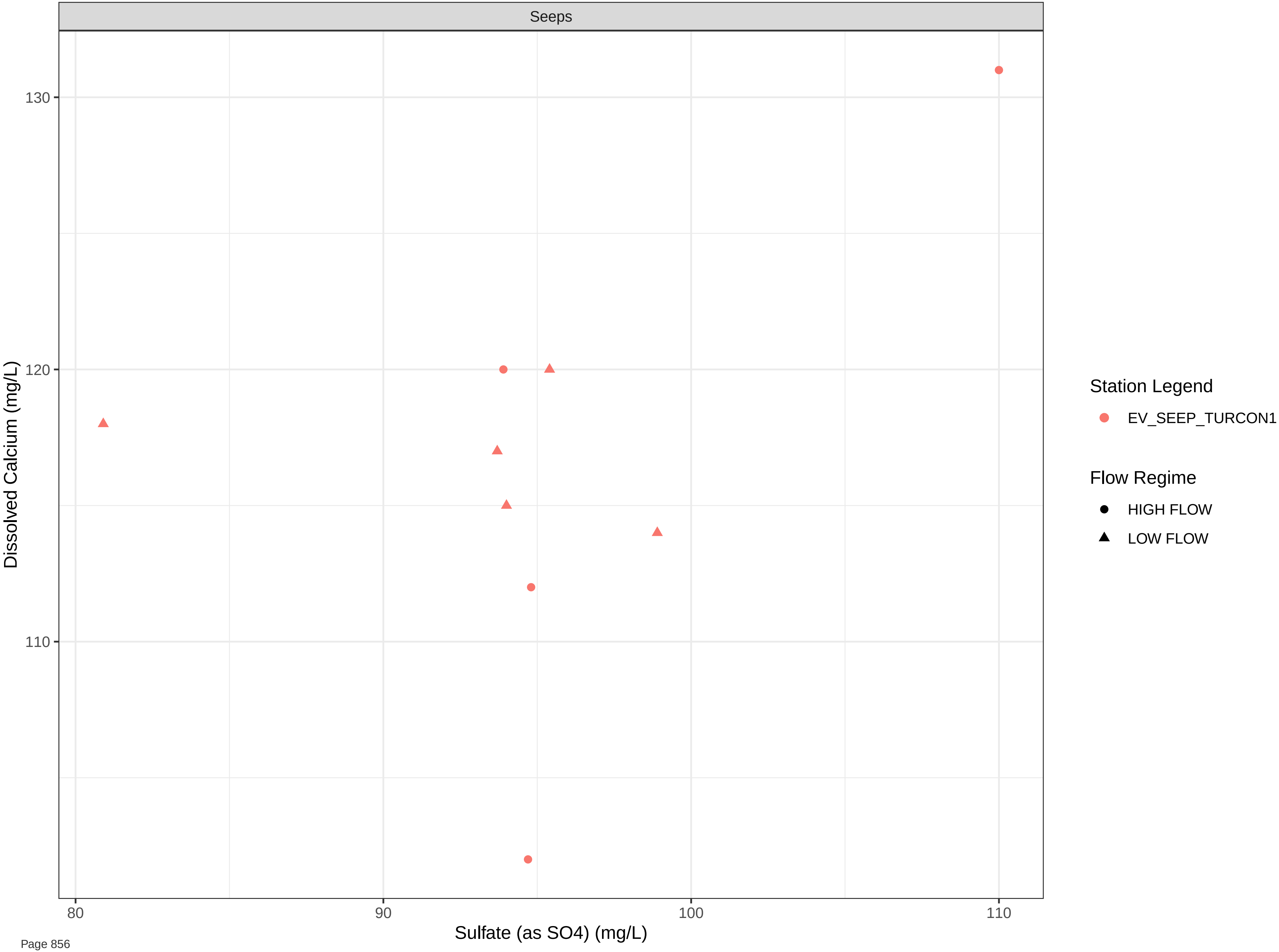

Seeps
140
120
100
80
400
600
800
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

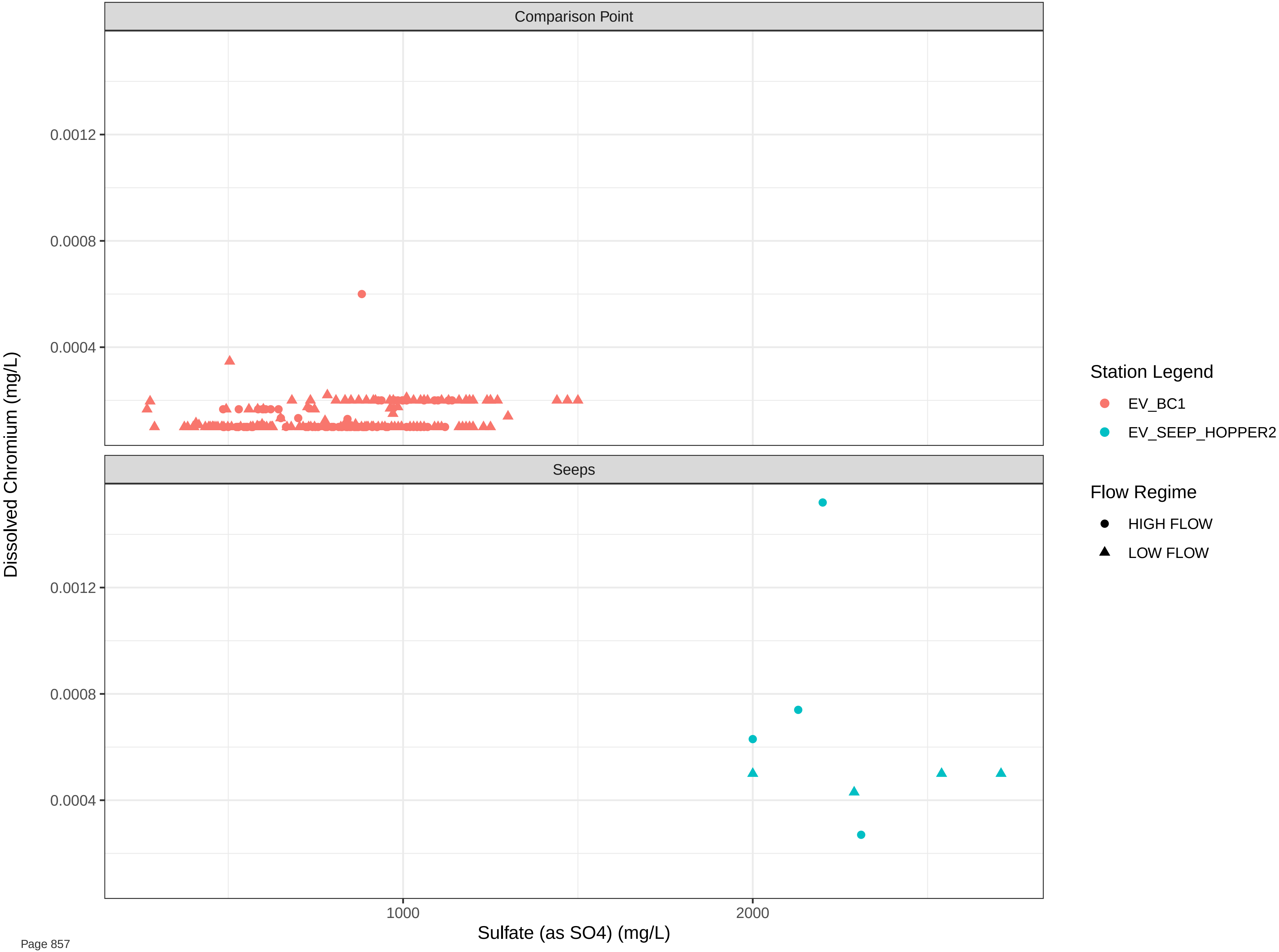


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
100
80
60
40
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

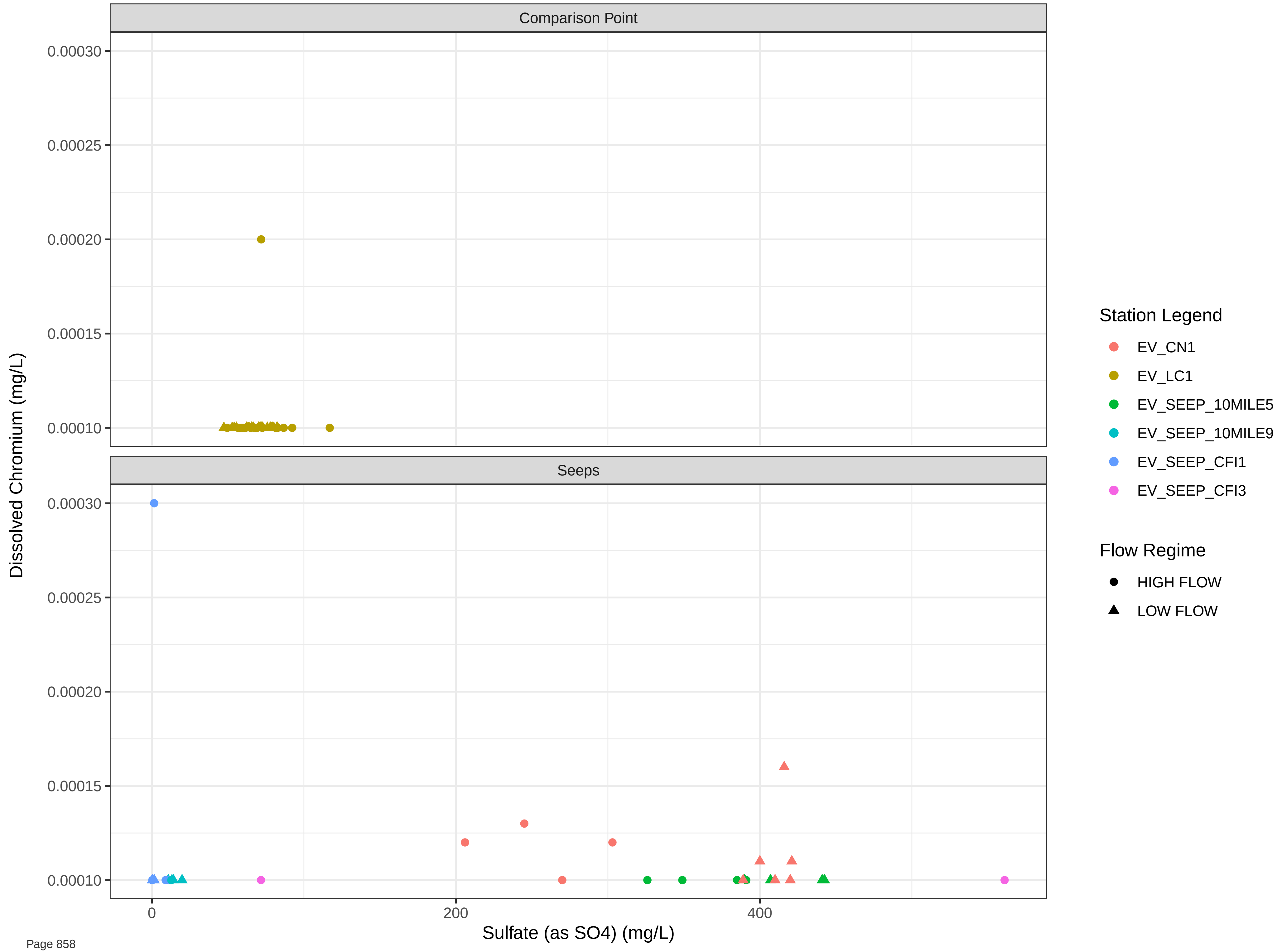


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

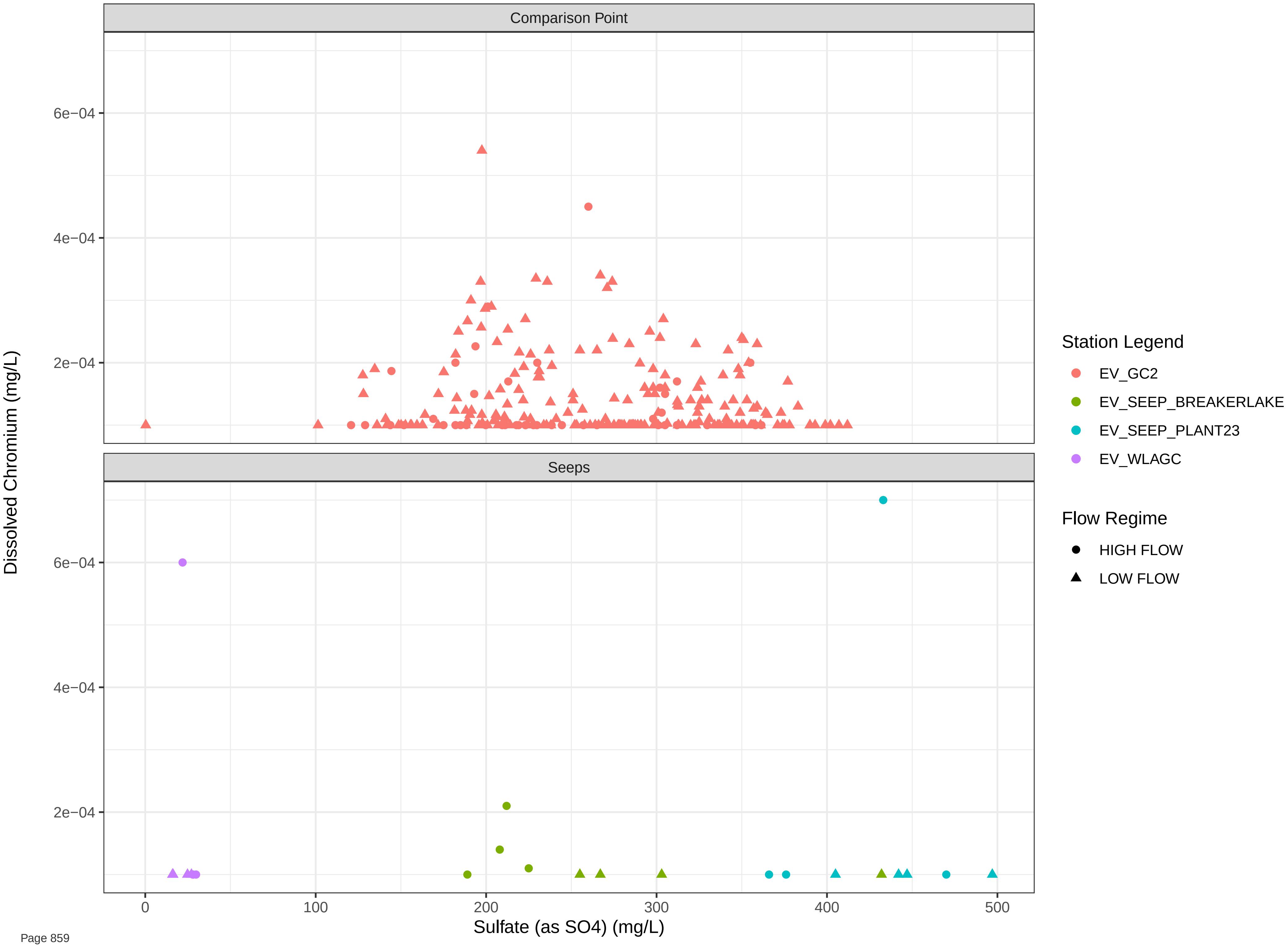

Seeps
Dissolved Calcium (mg/L)
130
120
110
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



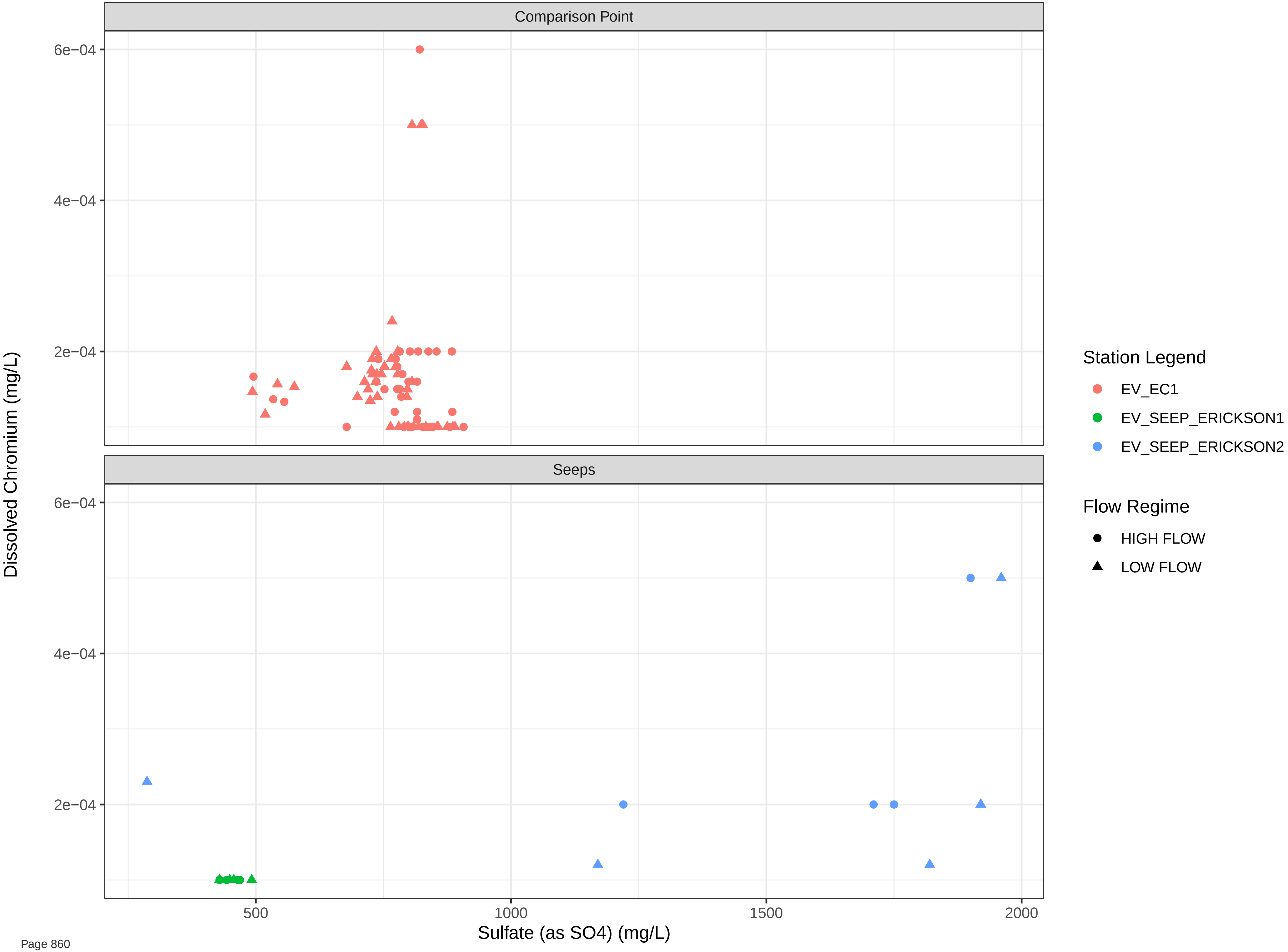
Comparison Point
Seeps
0.0012
0.0008
0.0004
Dissolved Chromium (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

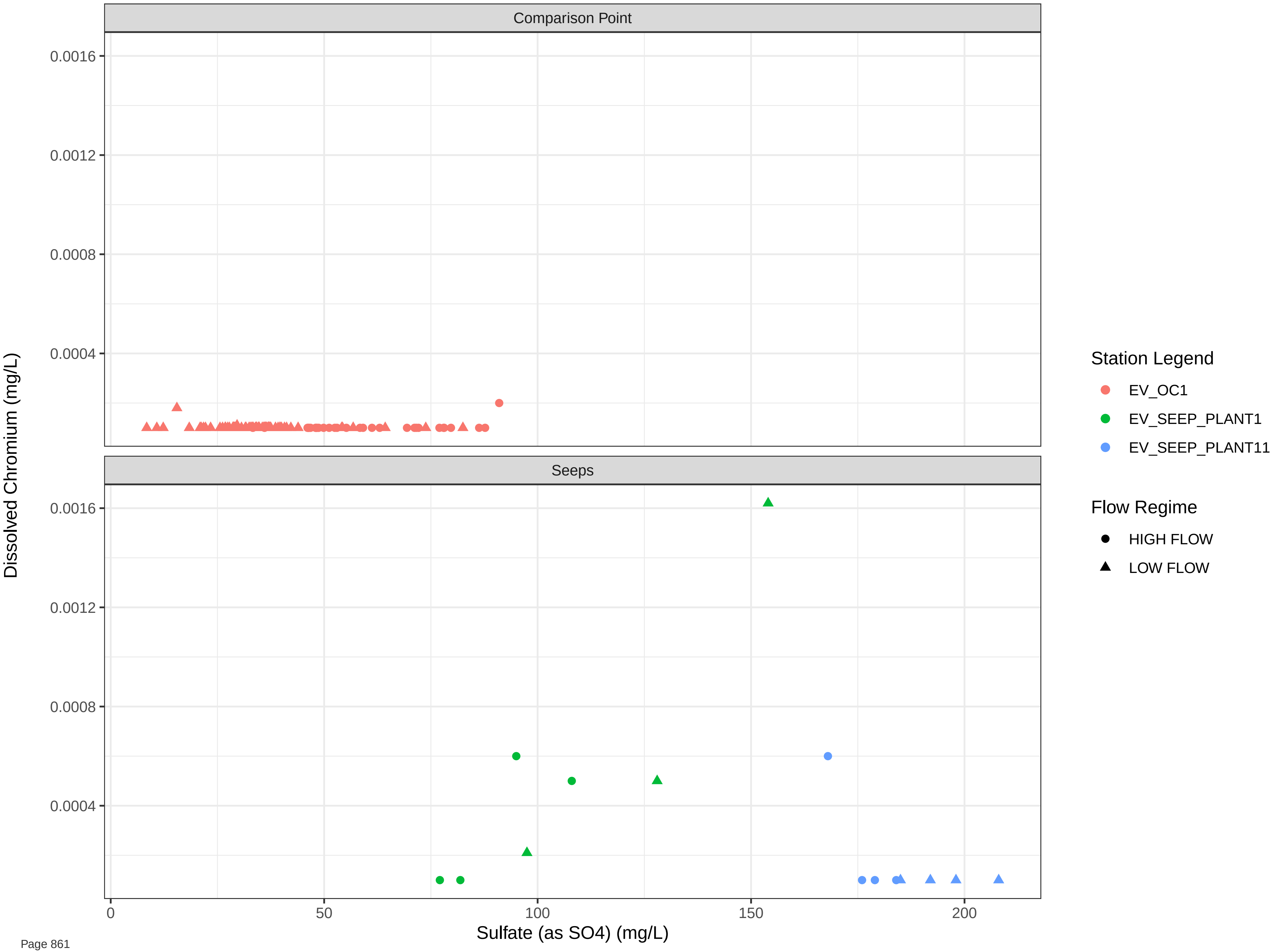


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.00030
0.00025
0.00020
0.00015
0.00010
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

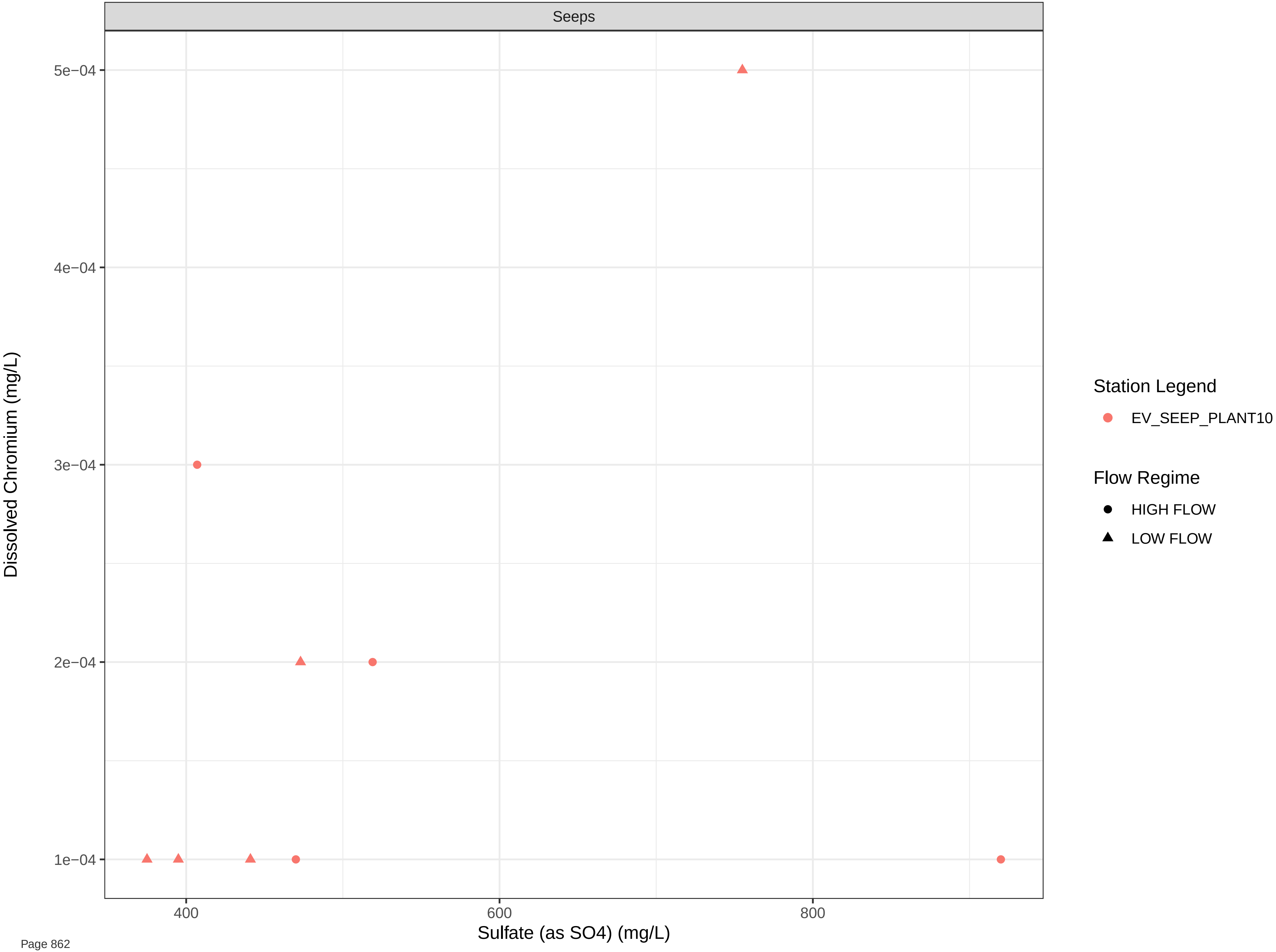


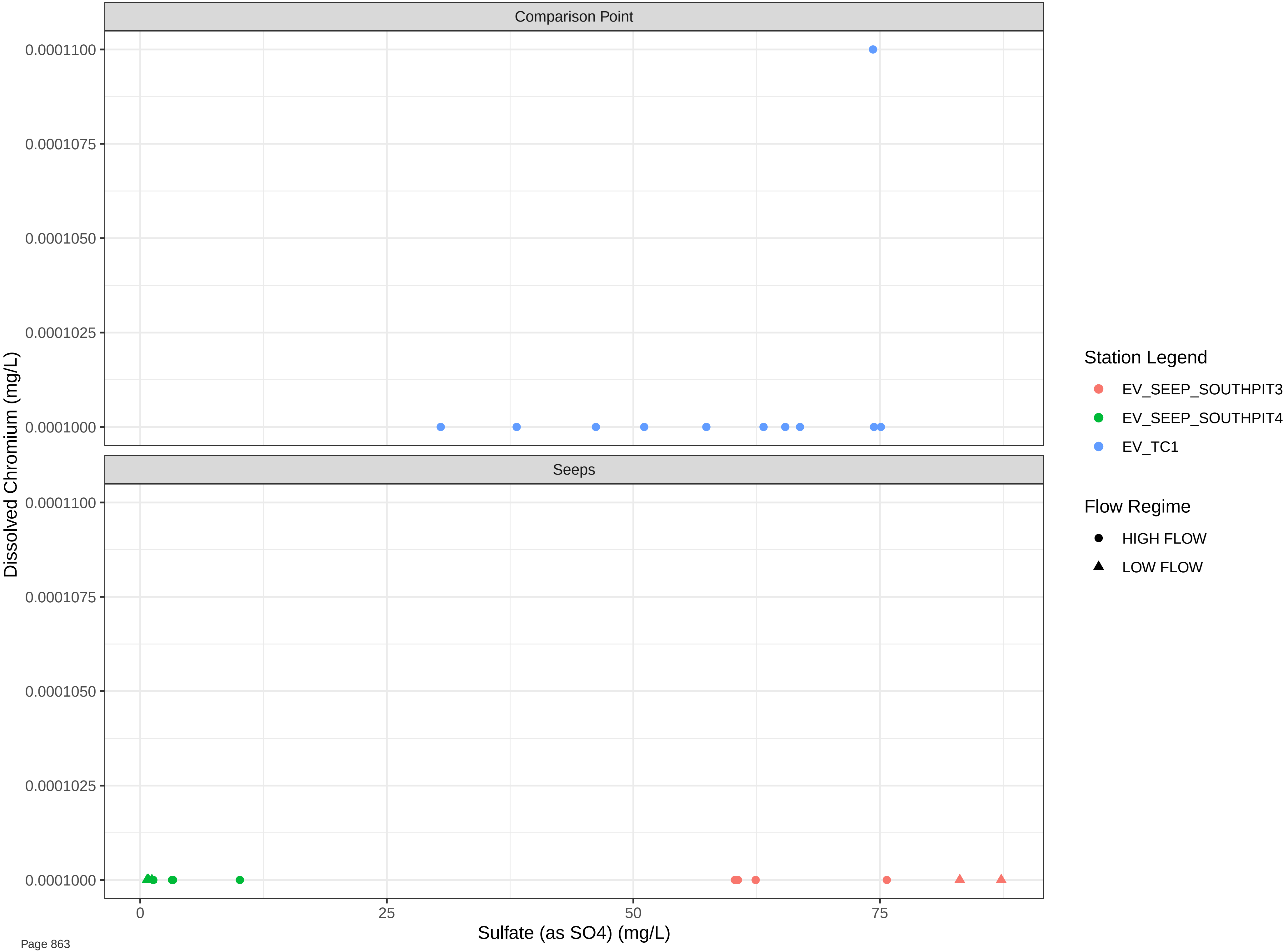
Comparison Point
Seeps
Dissolved Chromium (mg/L)
6e−04
4e−04
2e−04
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Chromium (mg/L)
6e−04
4e−04
2e−04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

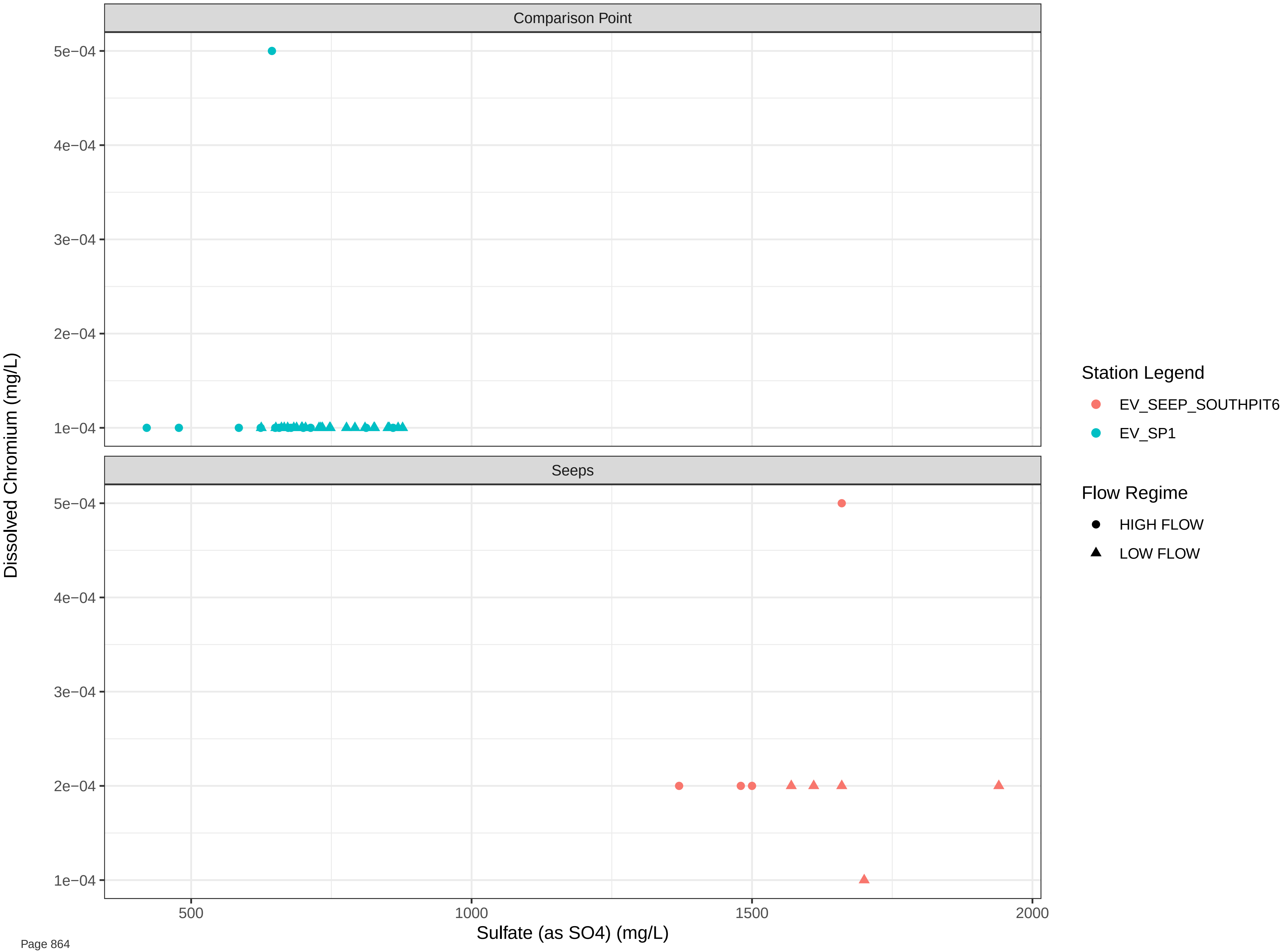


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.0016
0.0012
0.0008
0.0004
Sulfate (as SO4) (mg/L)
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

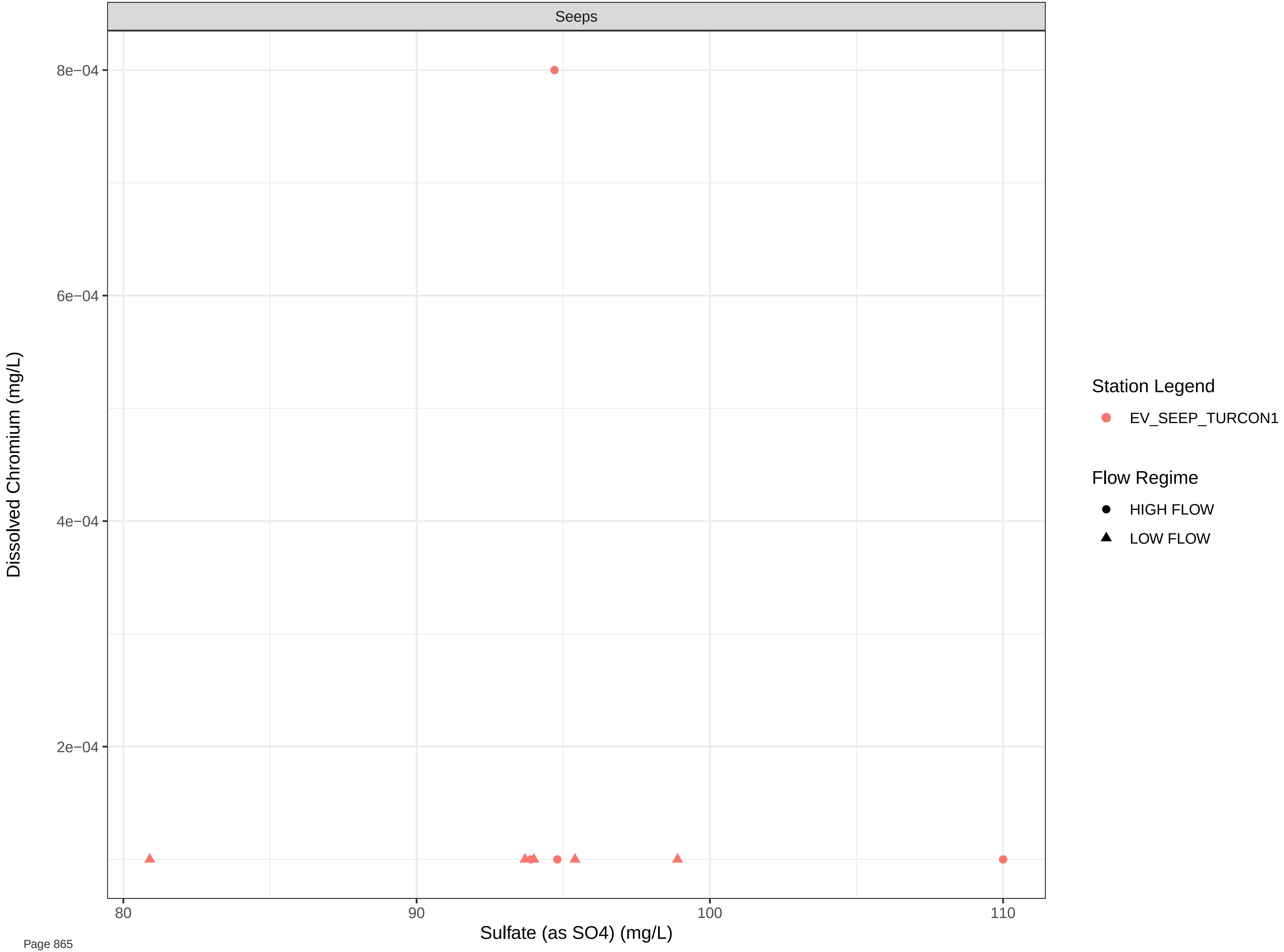

Seeps
Dissolved Chromium (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

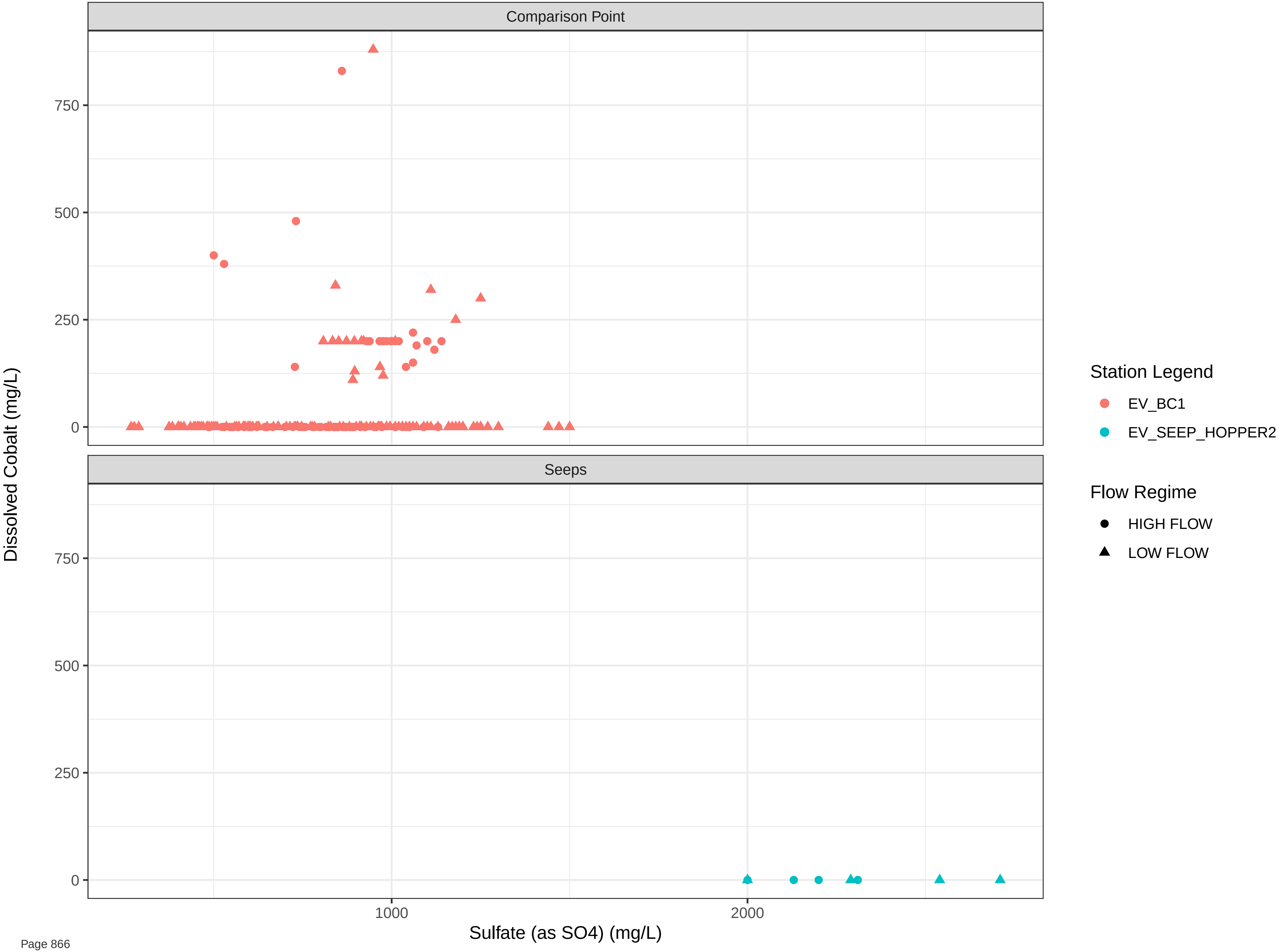


Comparison Point
Seeps
Dissolved Chromium (mg/L)
0.0001100
0.0001075
0.0001050
0.0001025
0.0001000
Sulfate (as SO4) (mg/L)
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

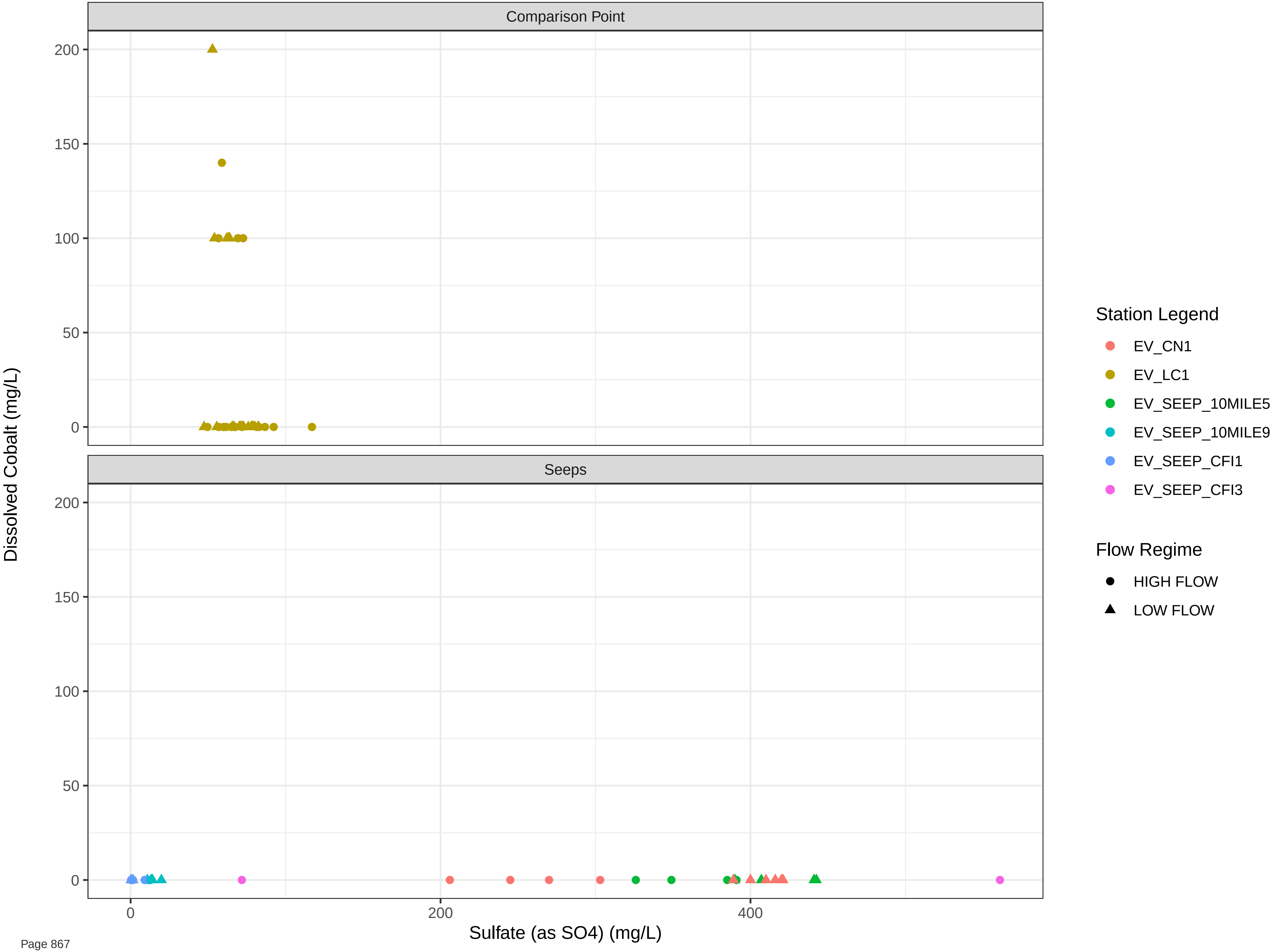


Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Chromium (mg/L)
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

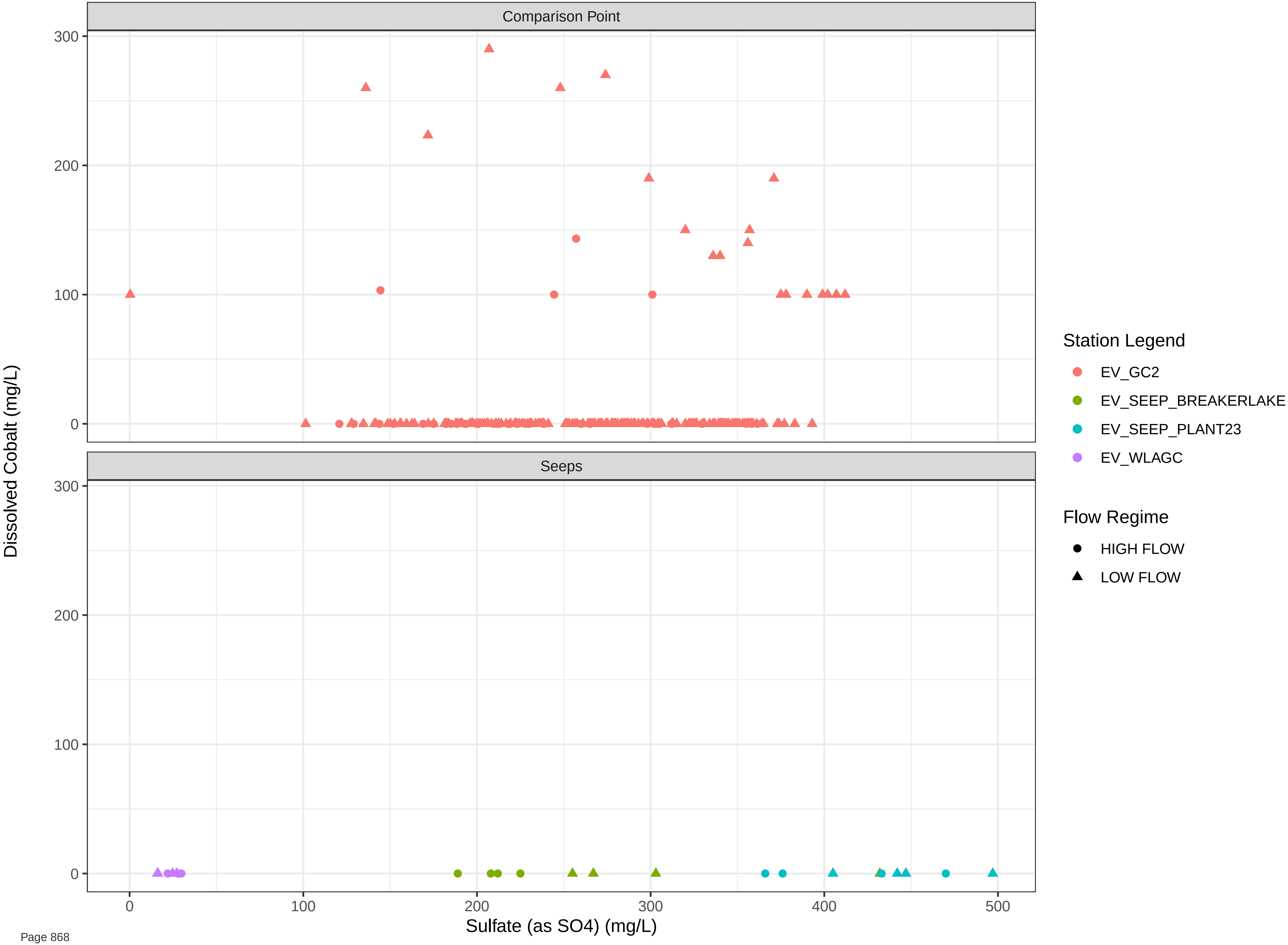

Seeps
8e−04
6e−04
4e−04
2e−04
Dissolved Chromium (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



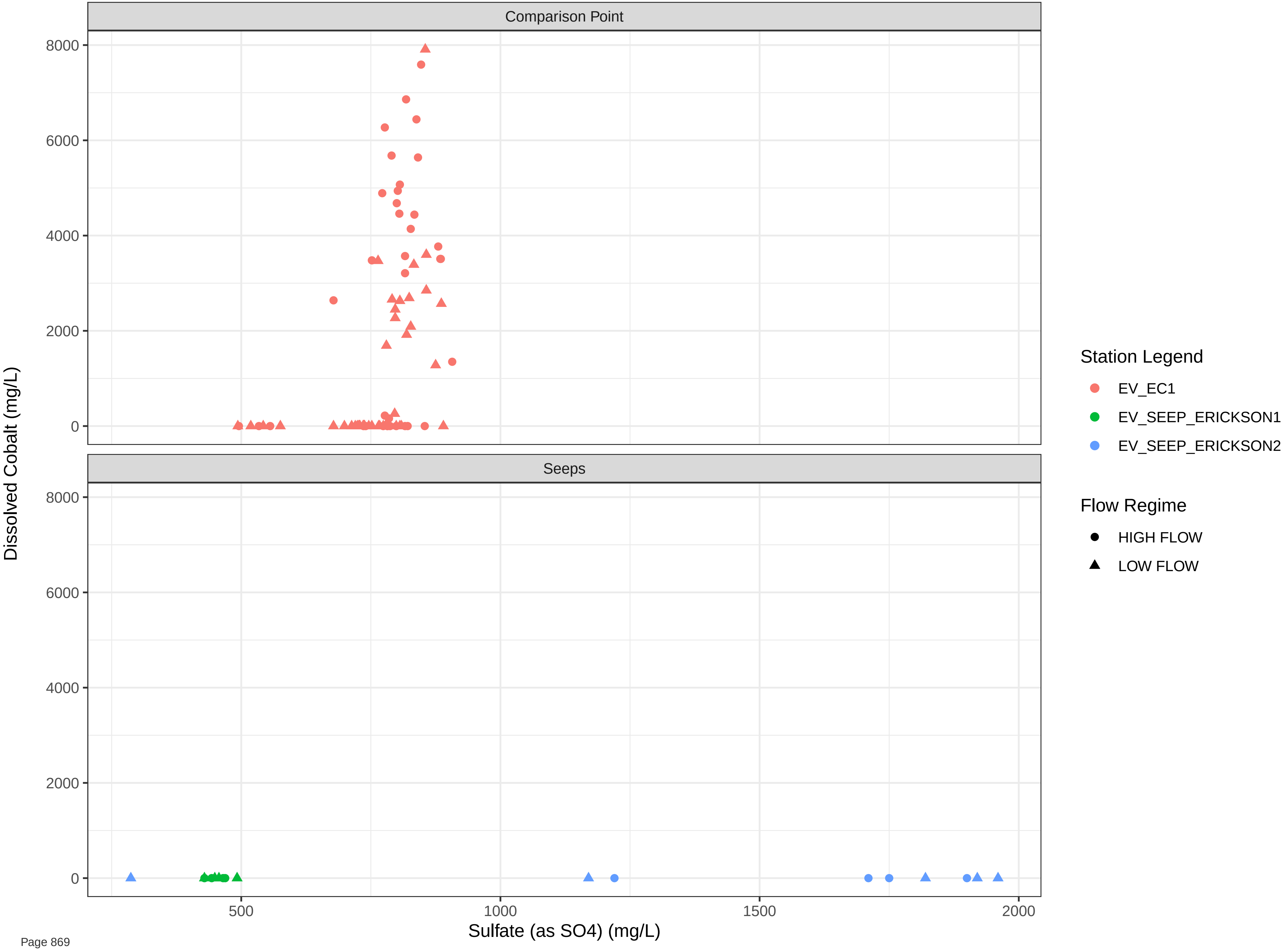
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
0
250
500
750
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



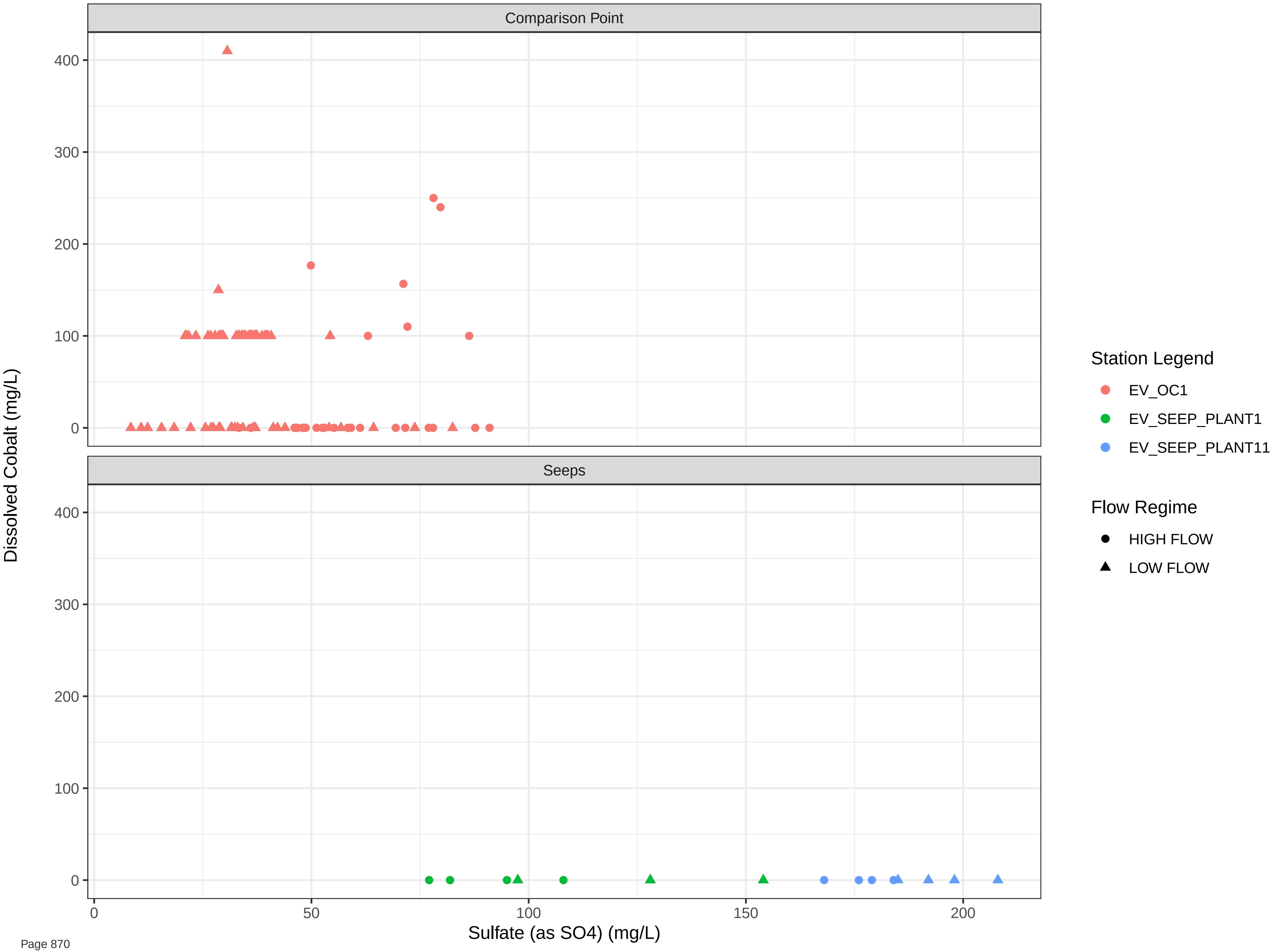
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

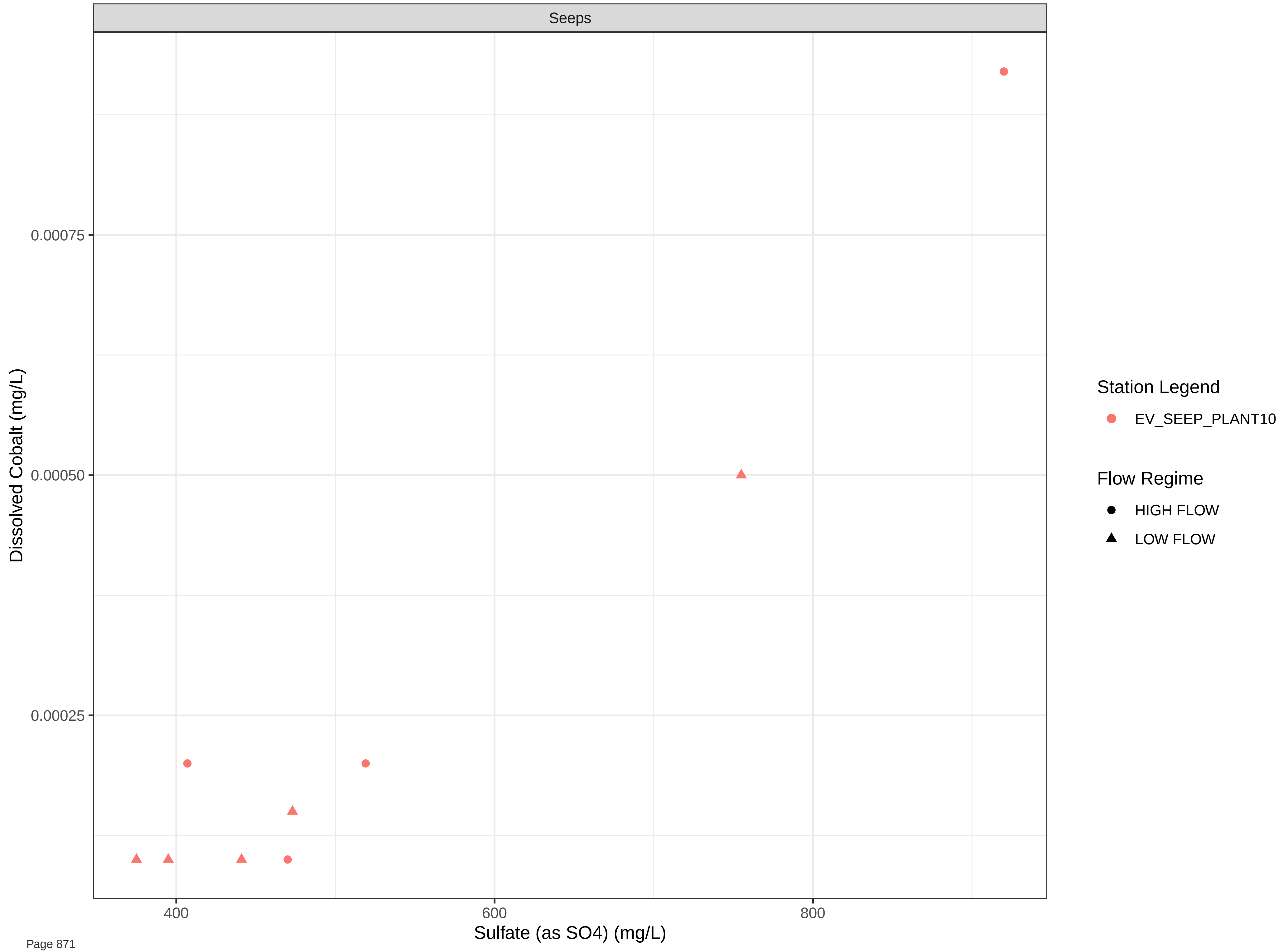


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
300
200
100
0
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

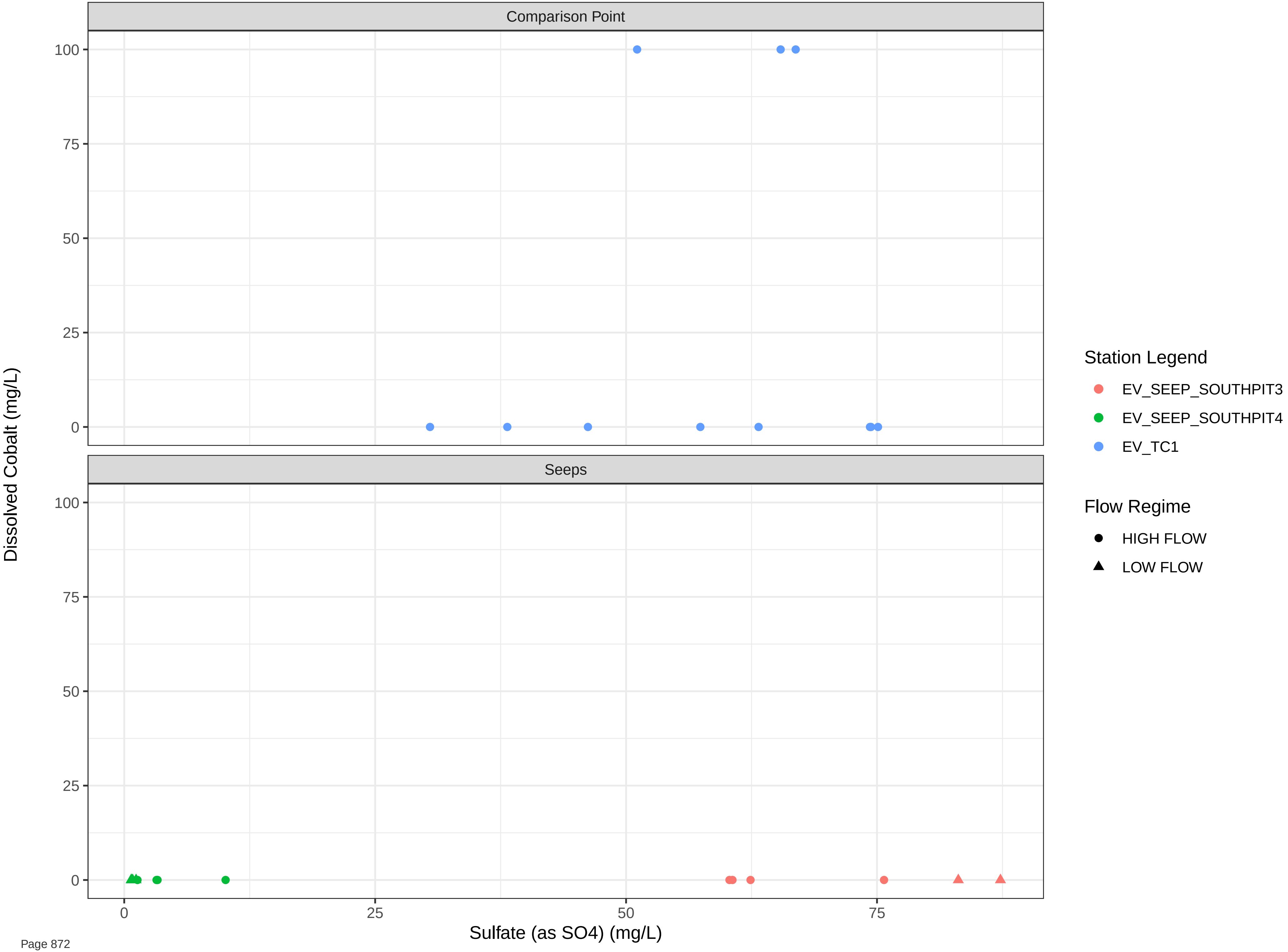


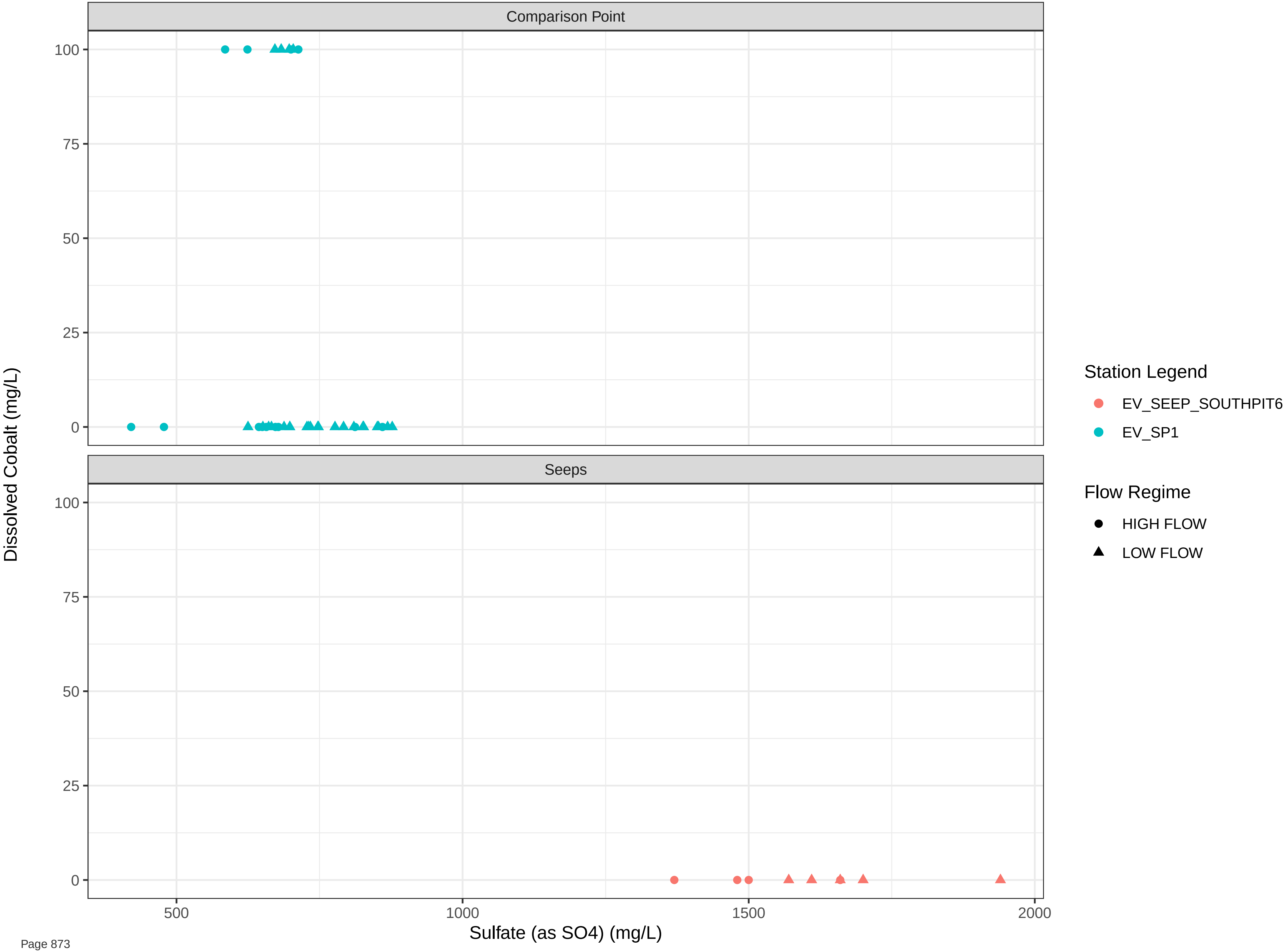
Comparison Point
Seeps
Dissolved Cobalt (mg/L)
0
2000
4000
6000
8000
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

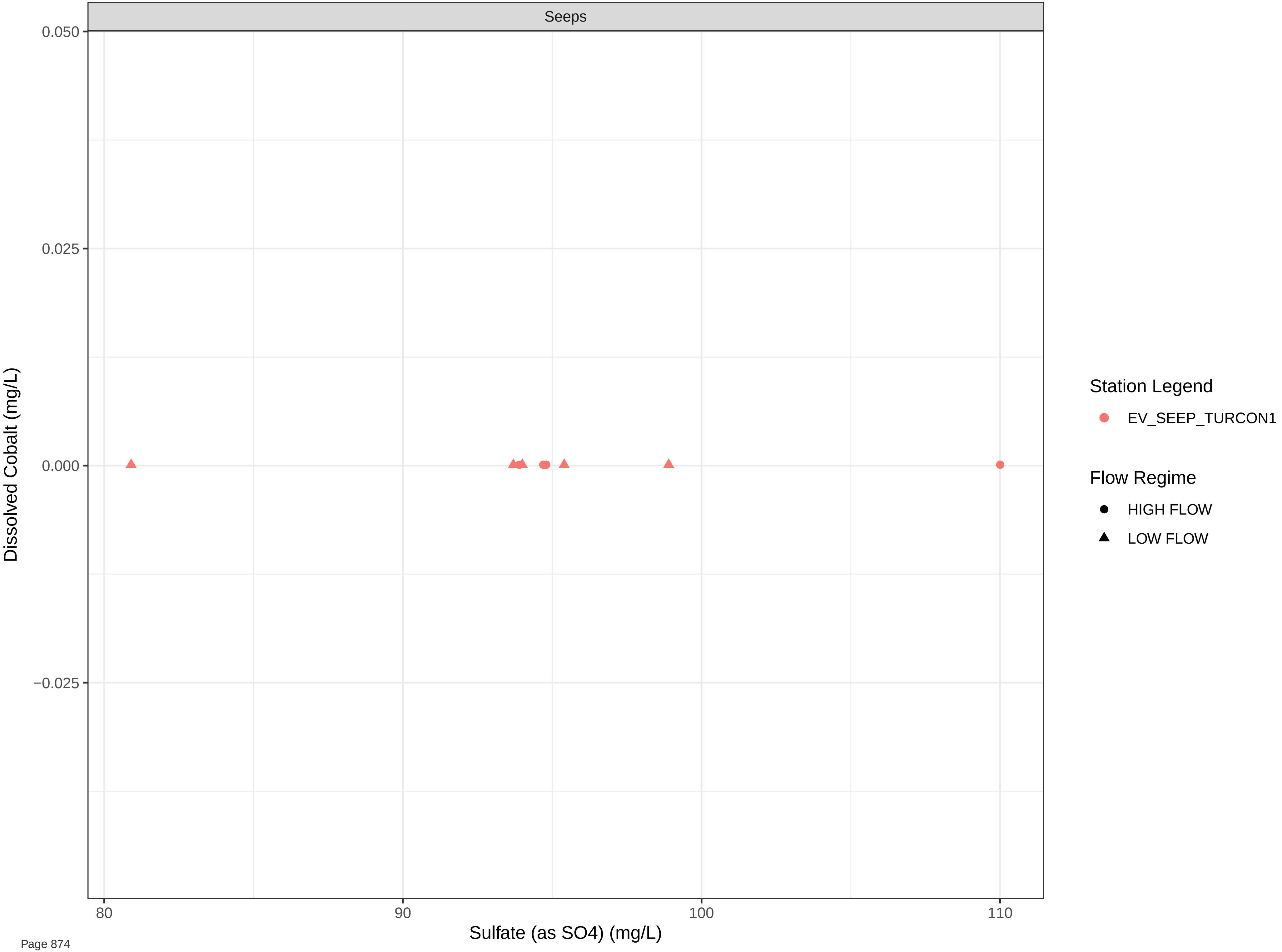


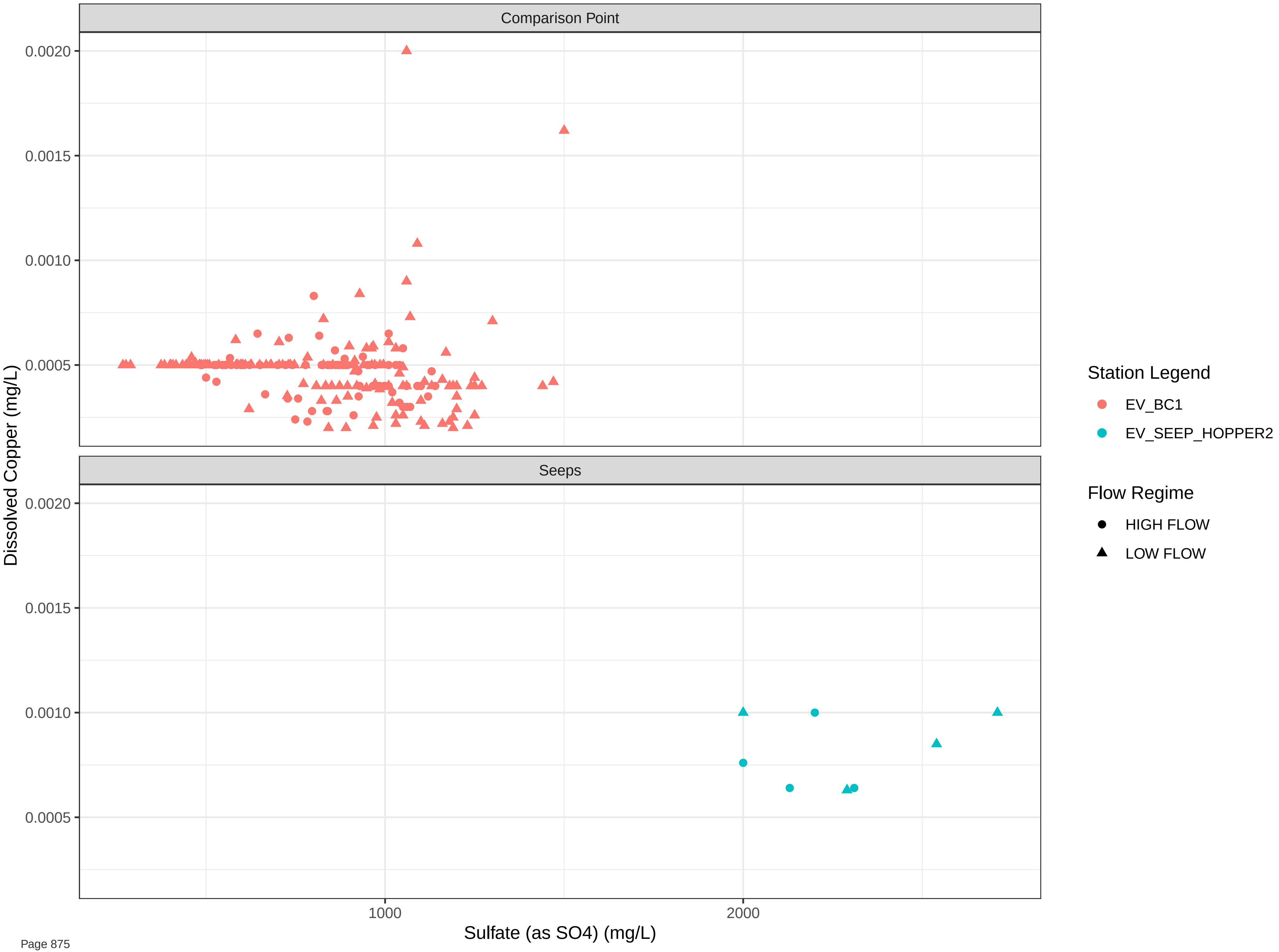
Seeps
Dissolved Cobalt (mg/L)
0.00075
0.00050
0.00025
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

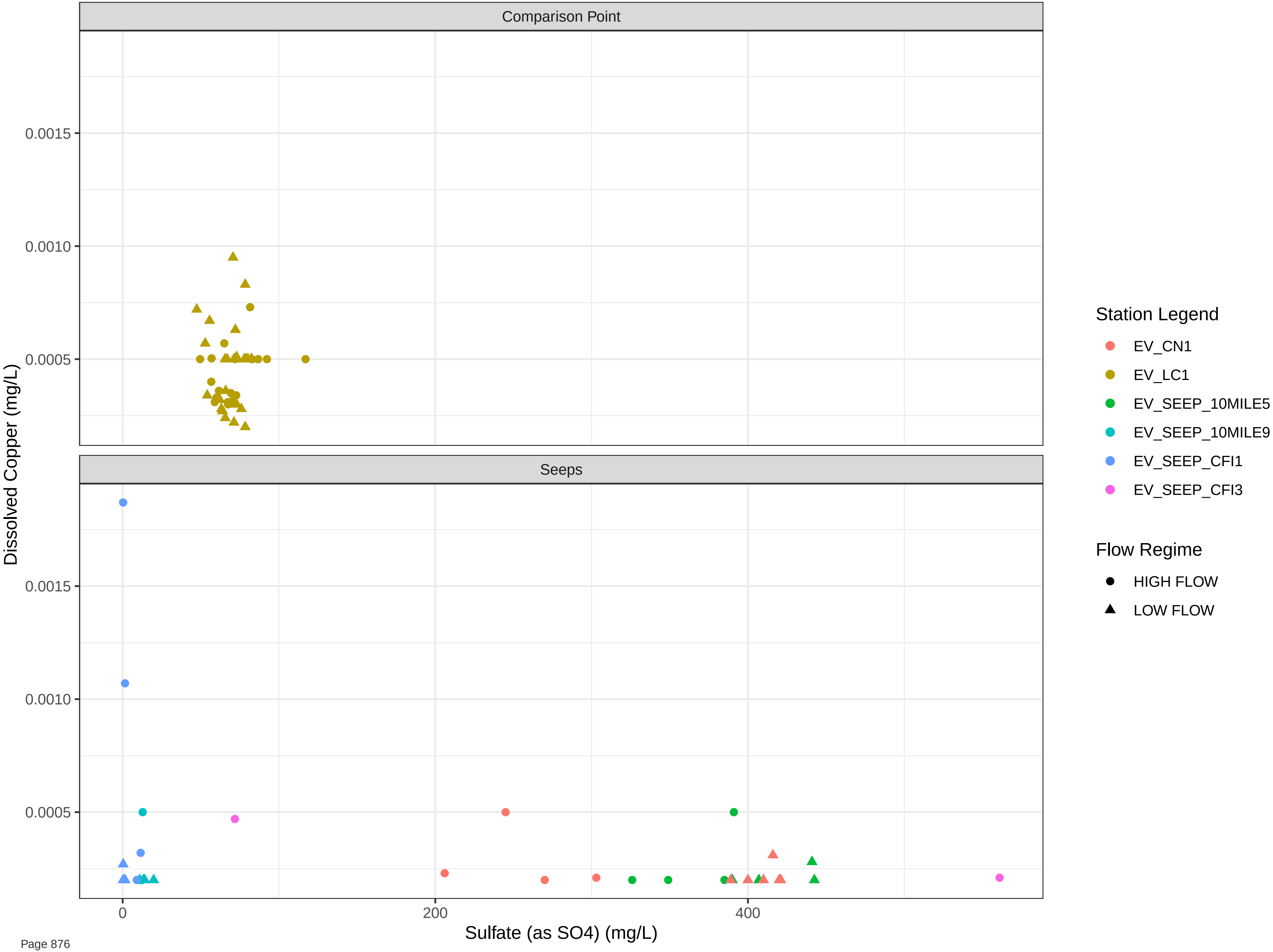


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
100
75
50
25
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

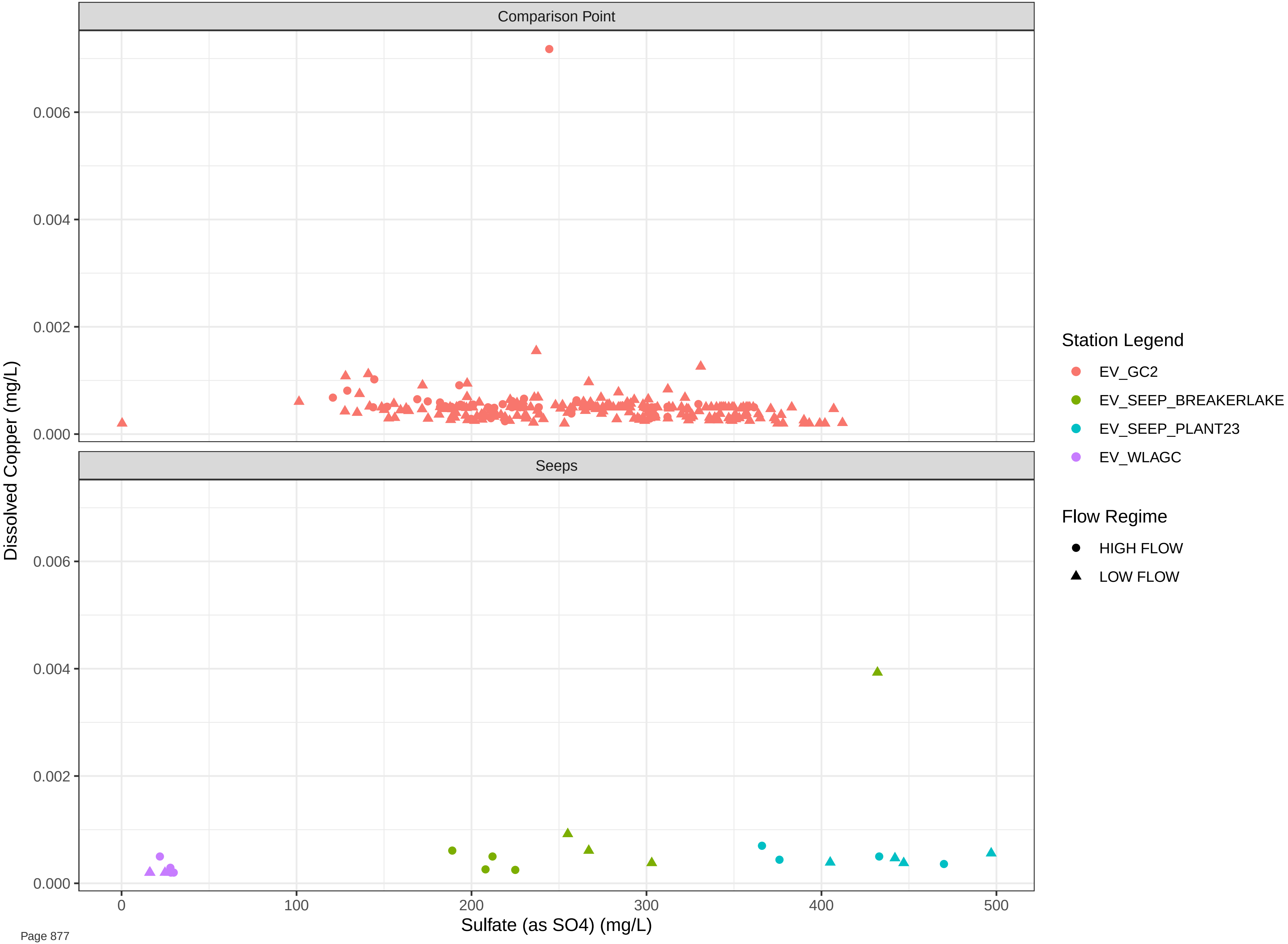

Seeps
0.050
0.025
0.000
−0.025
Dissolved Cobalt (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



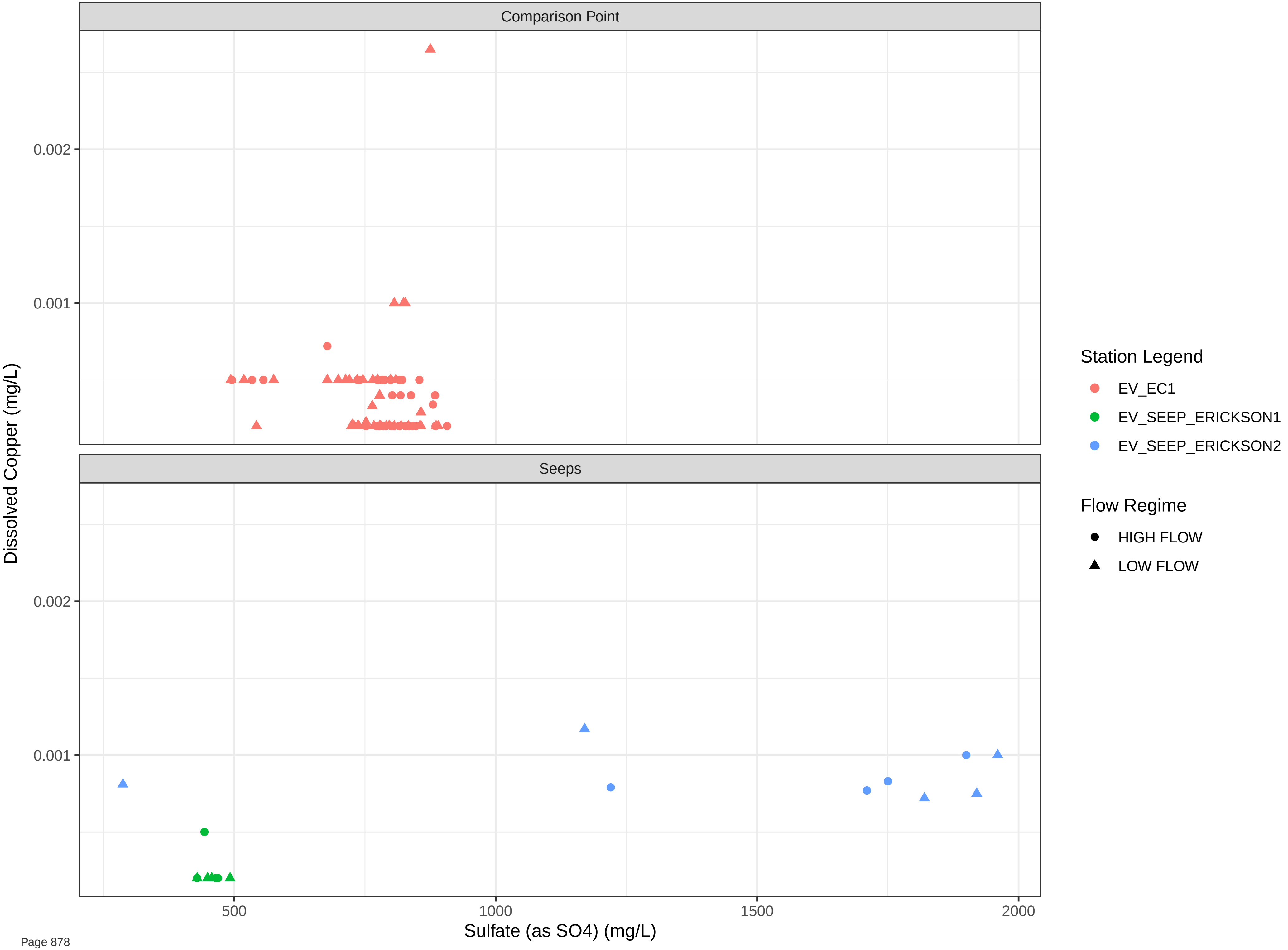
Comparison Point
Seeps
0.0020
0.0015
0.0010
0.0005
Dissolved Copper (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



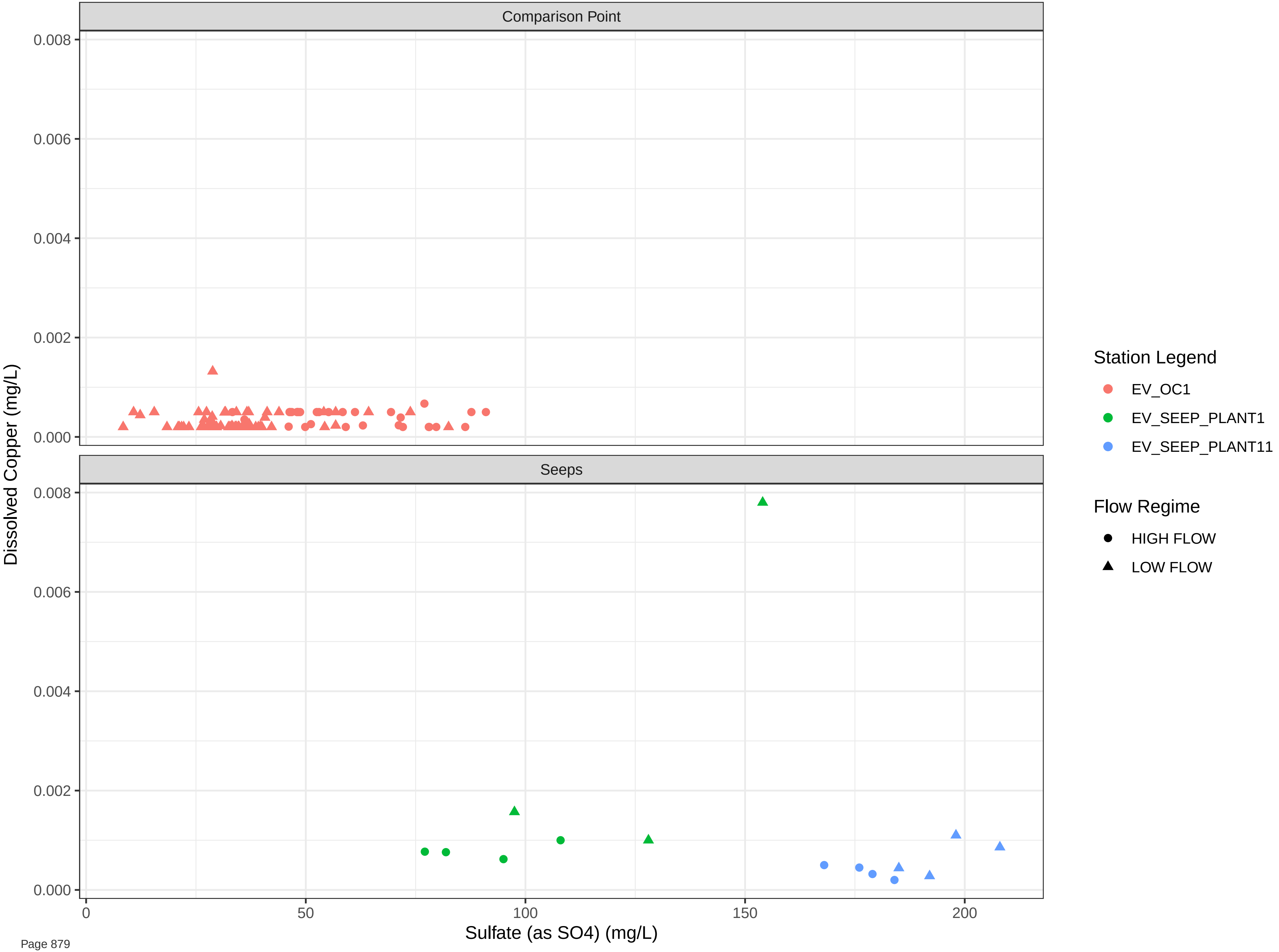
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.0015
0.0010
0.0005
0.0015
0.0010
0.0005
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



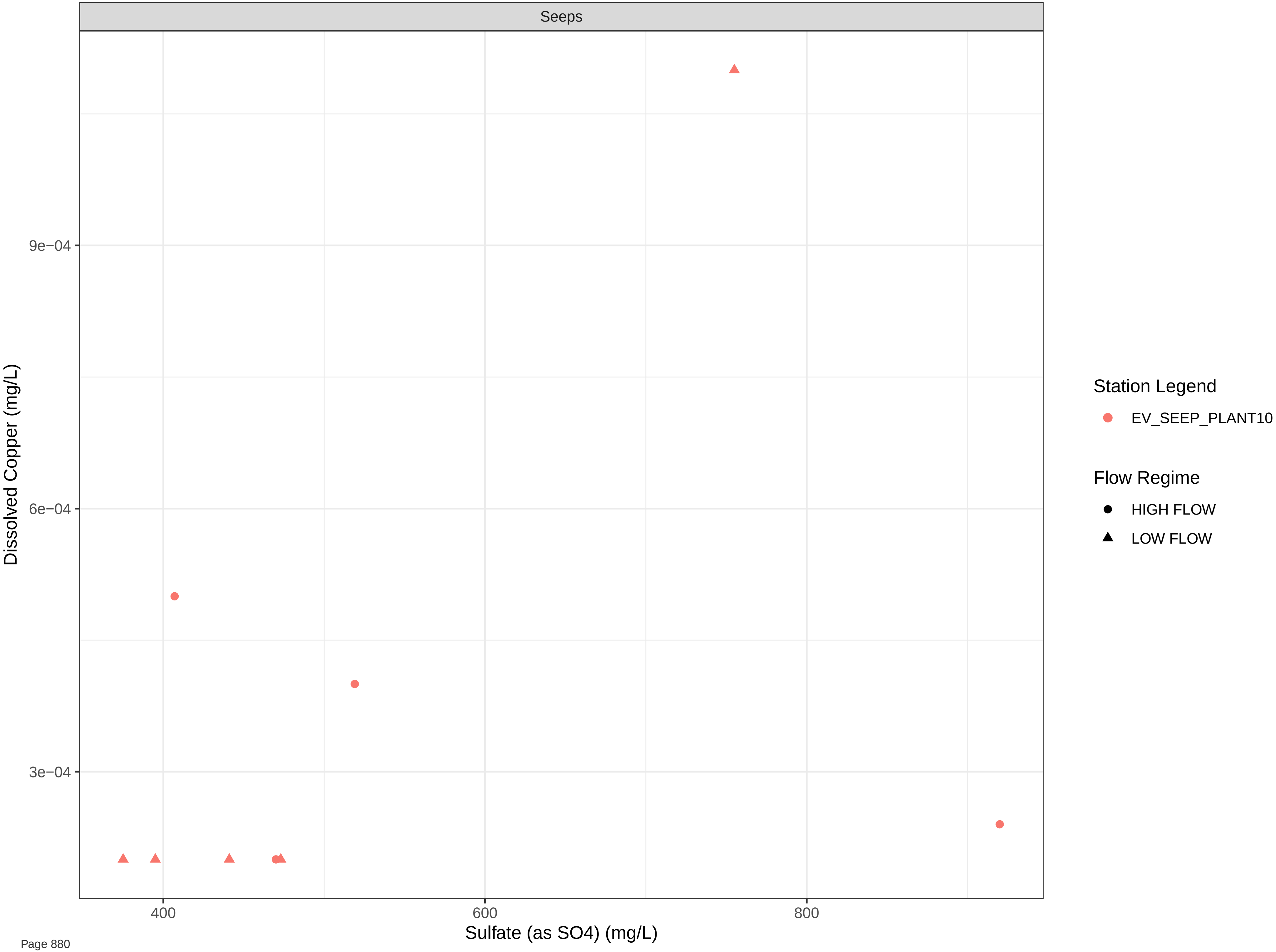
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.000
0.002
0.004
0.006
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



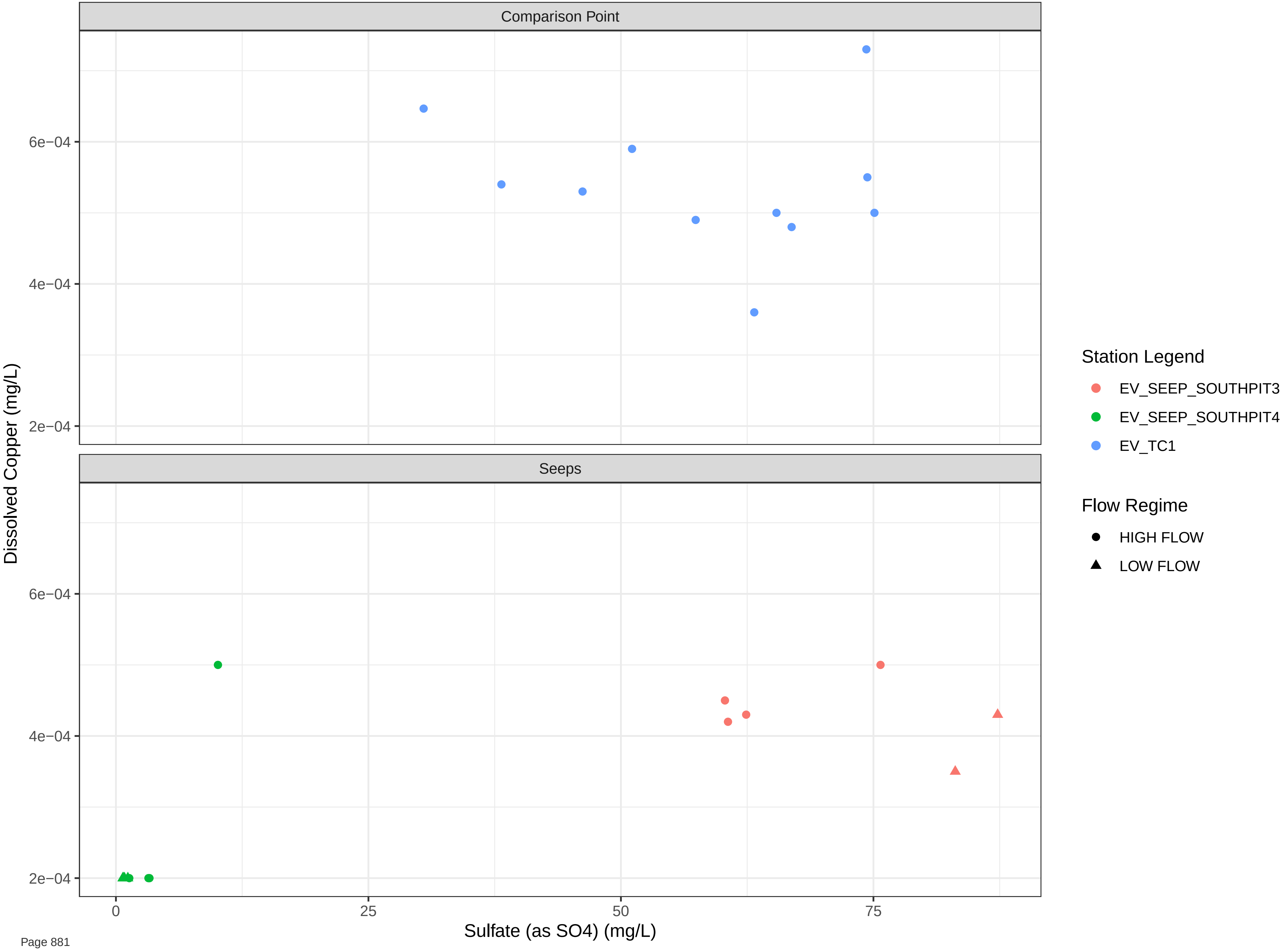
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.002
0.001
0.002
0.001
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

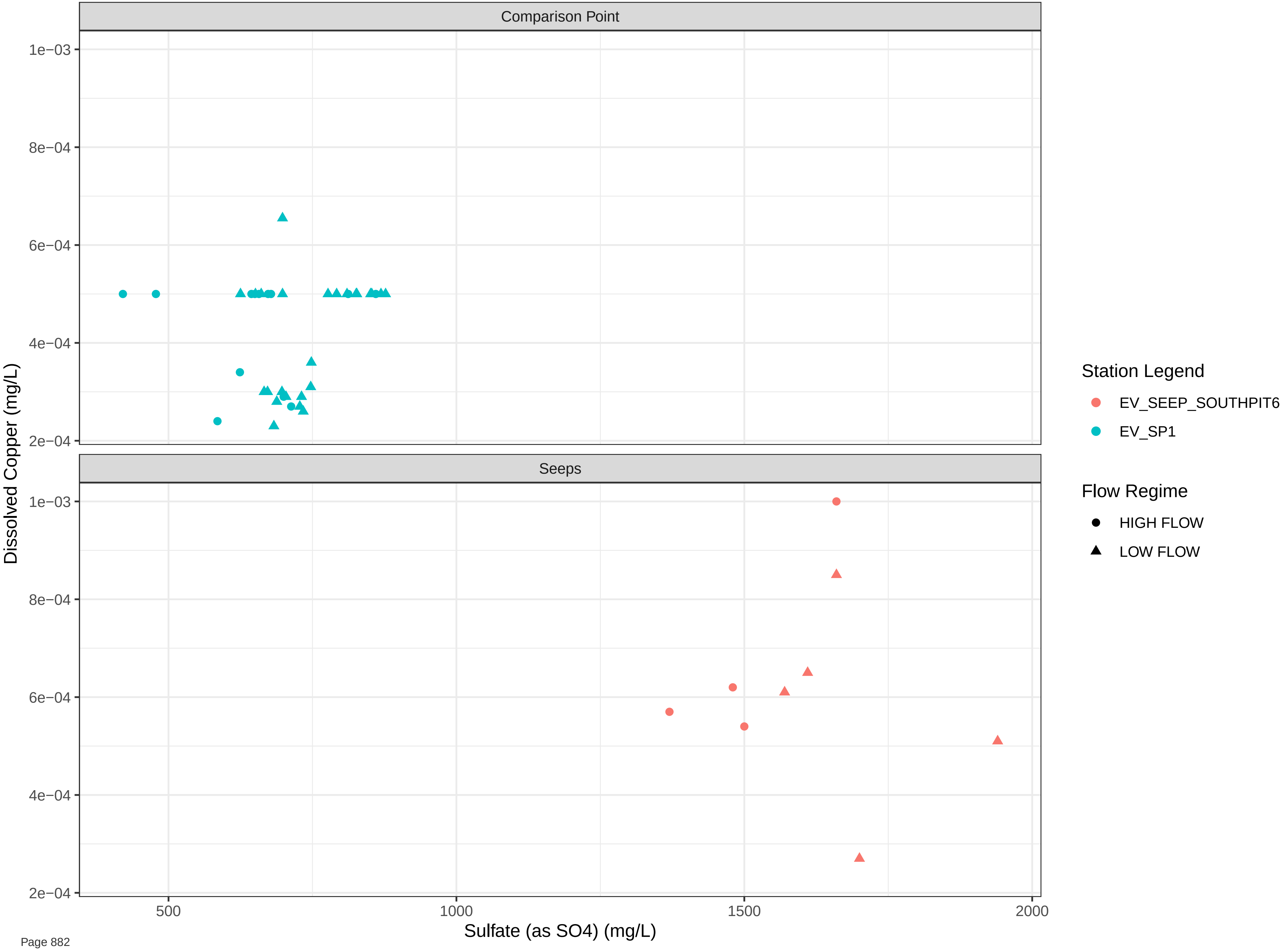


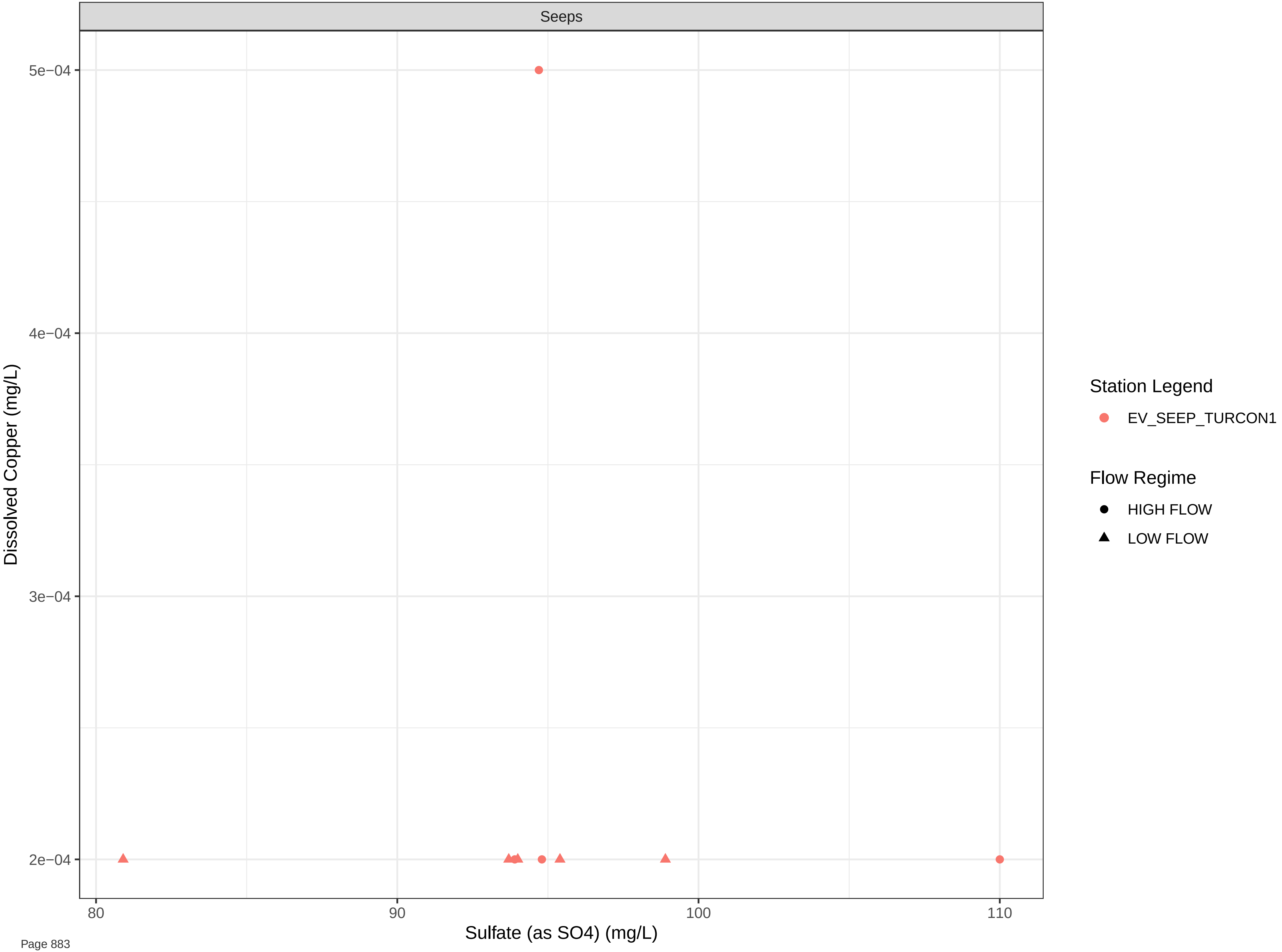
Comparison Point
Seeps
Dissolved Copper (mg/L)
0.008
0.006
0.004
0.002
0.000
Sulfate (as SO4) (mg/L)
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

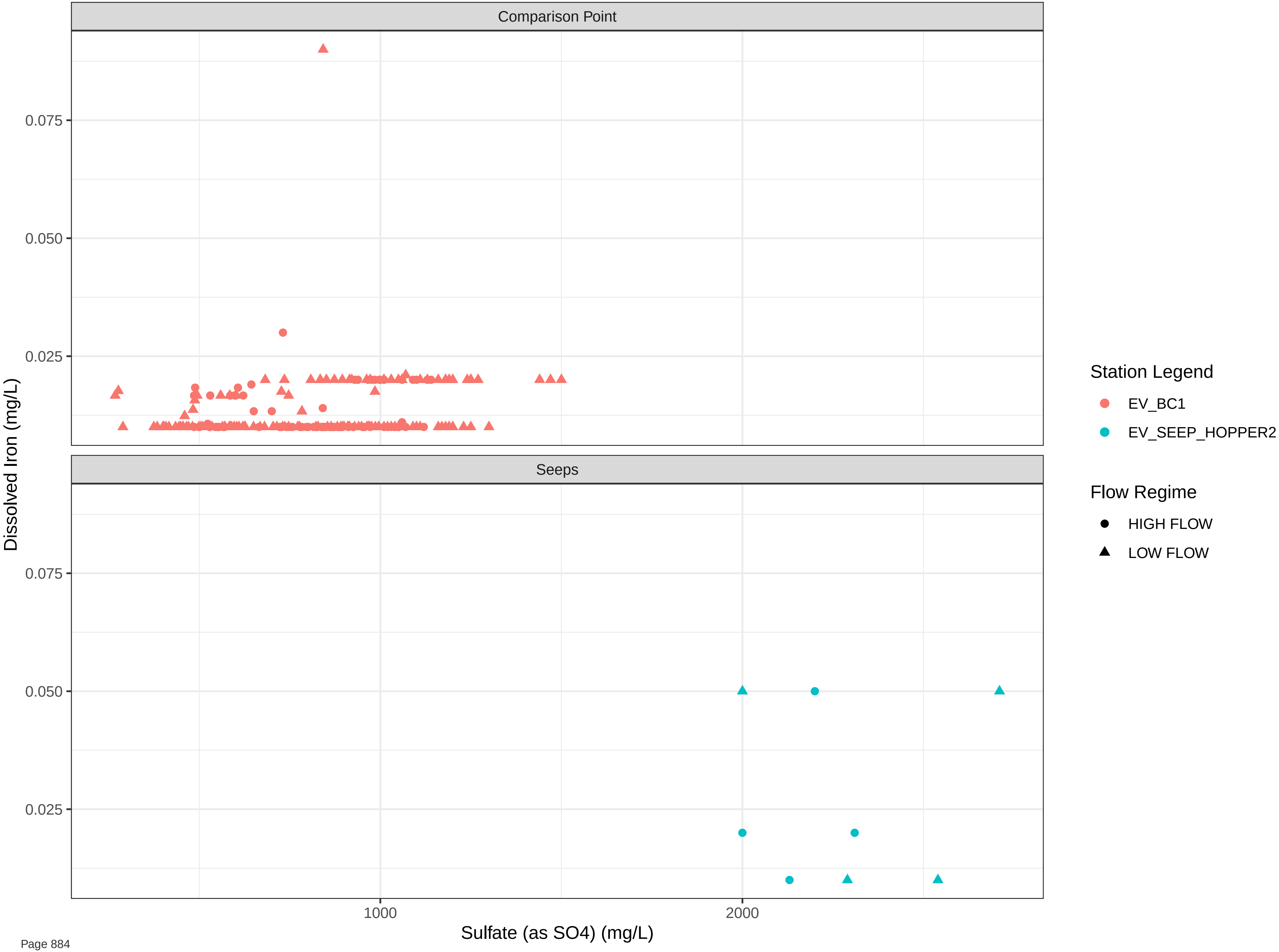


Seeps
Dissolved Copper (mg/L)
9e−04
6e−04
3e−04
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

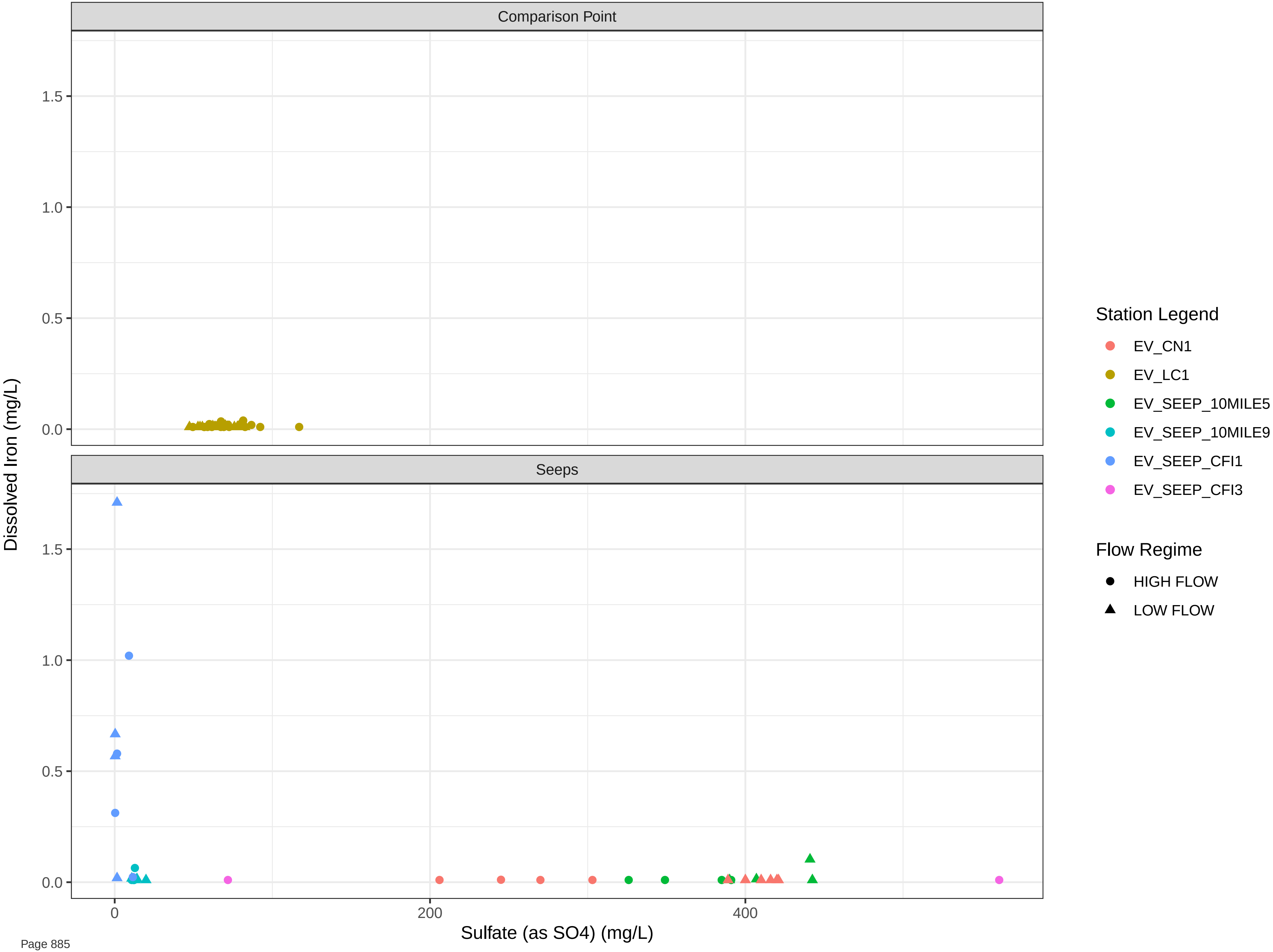

Comparison Point
Seeps
6e−04
4e−04
2e−04
0
25
50
75
Dissolved Copper (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

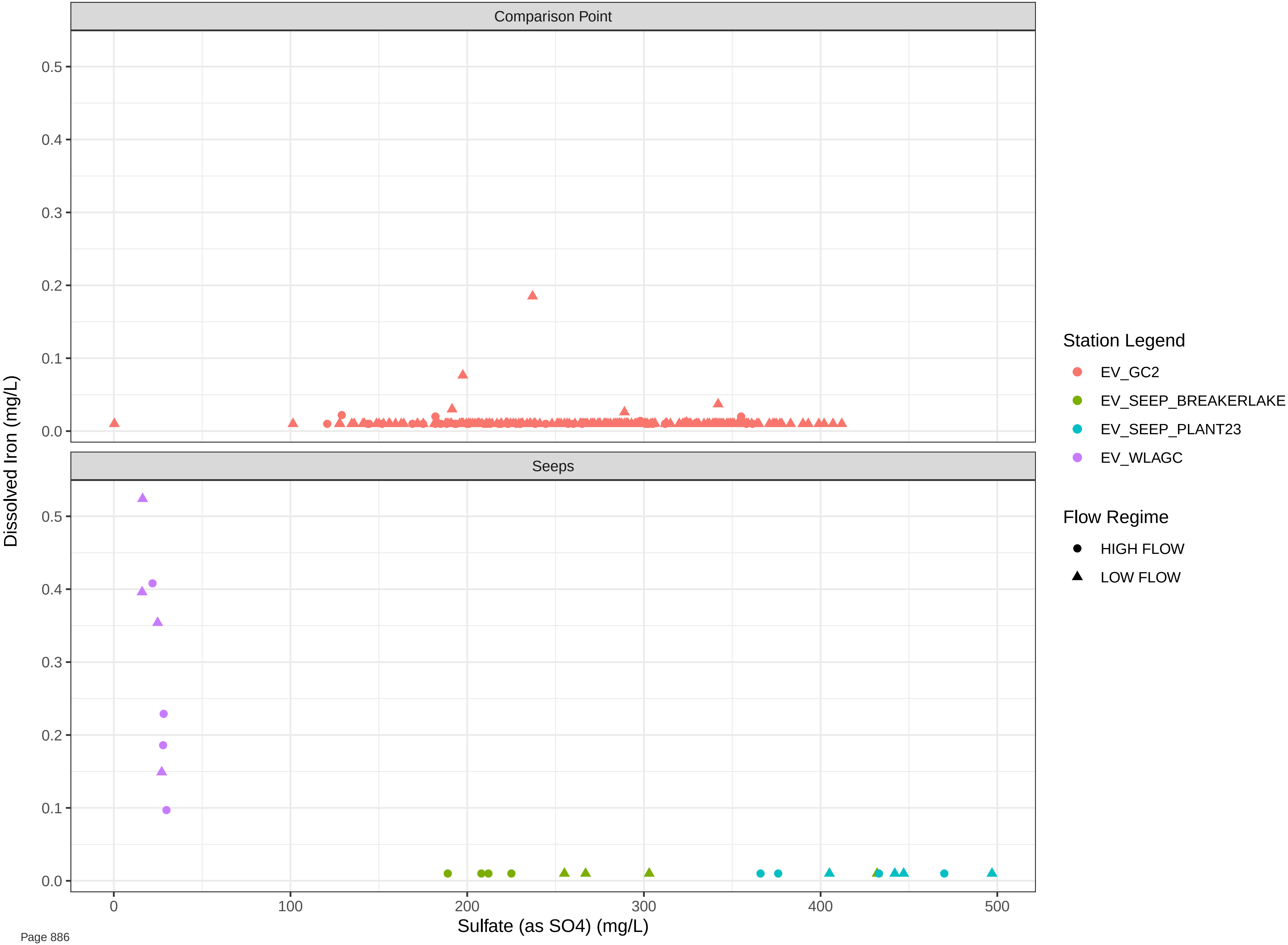

Comparison Point
Seeps
Dissolved Copper (mg/L)
1e−03
8e−04
6e−04
4e−04
2e−04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
5e−04
4e−04
3e−04
2e−04
Dissolved Copper (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

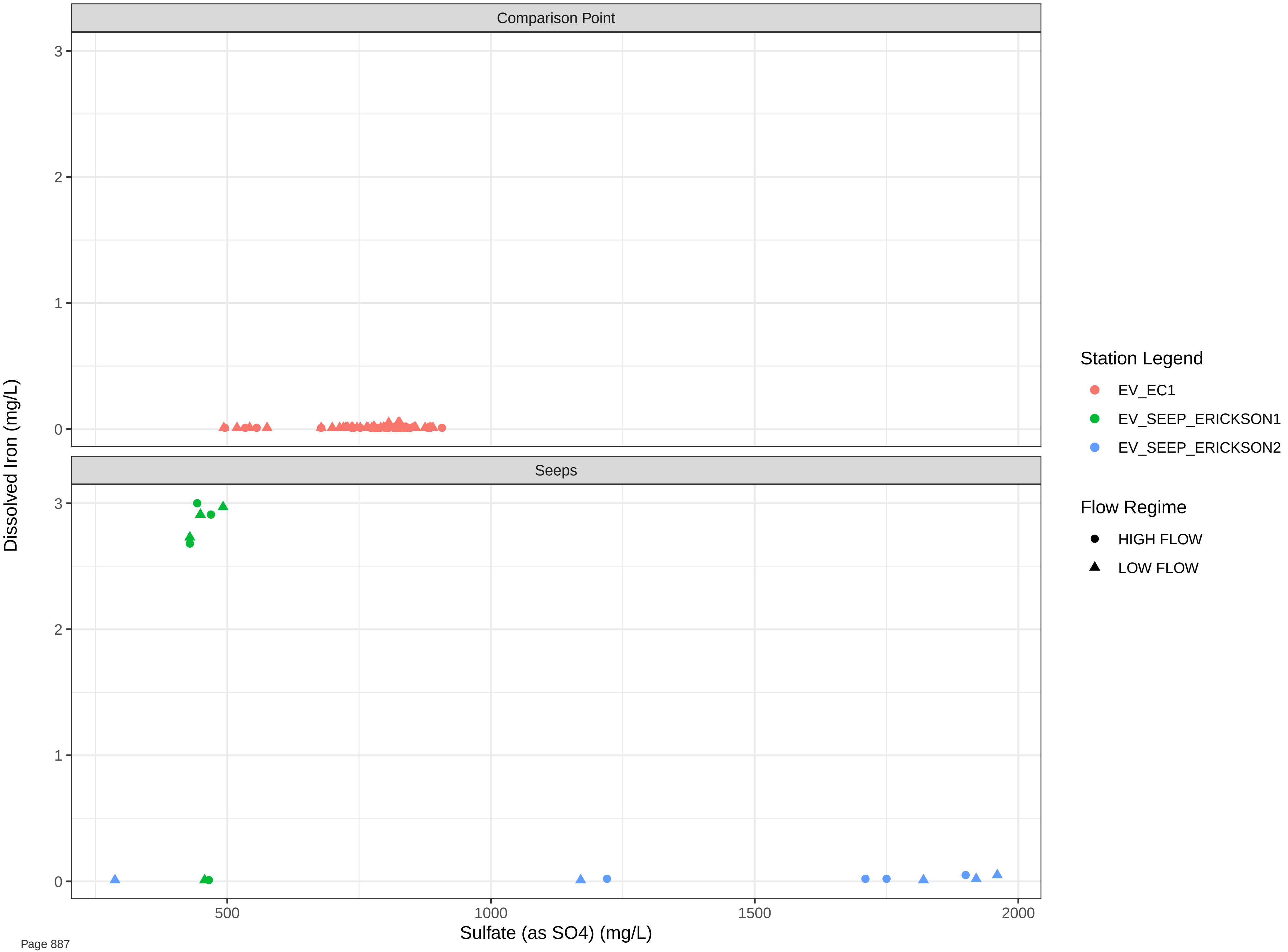


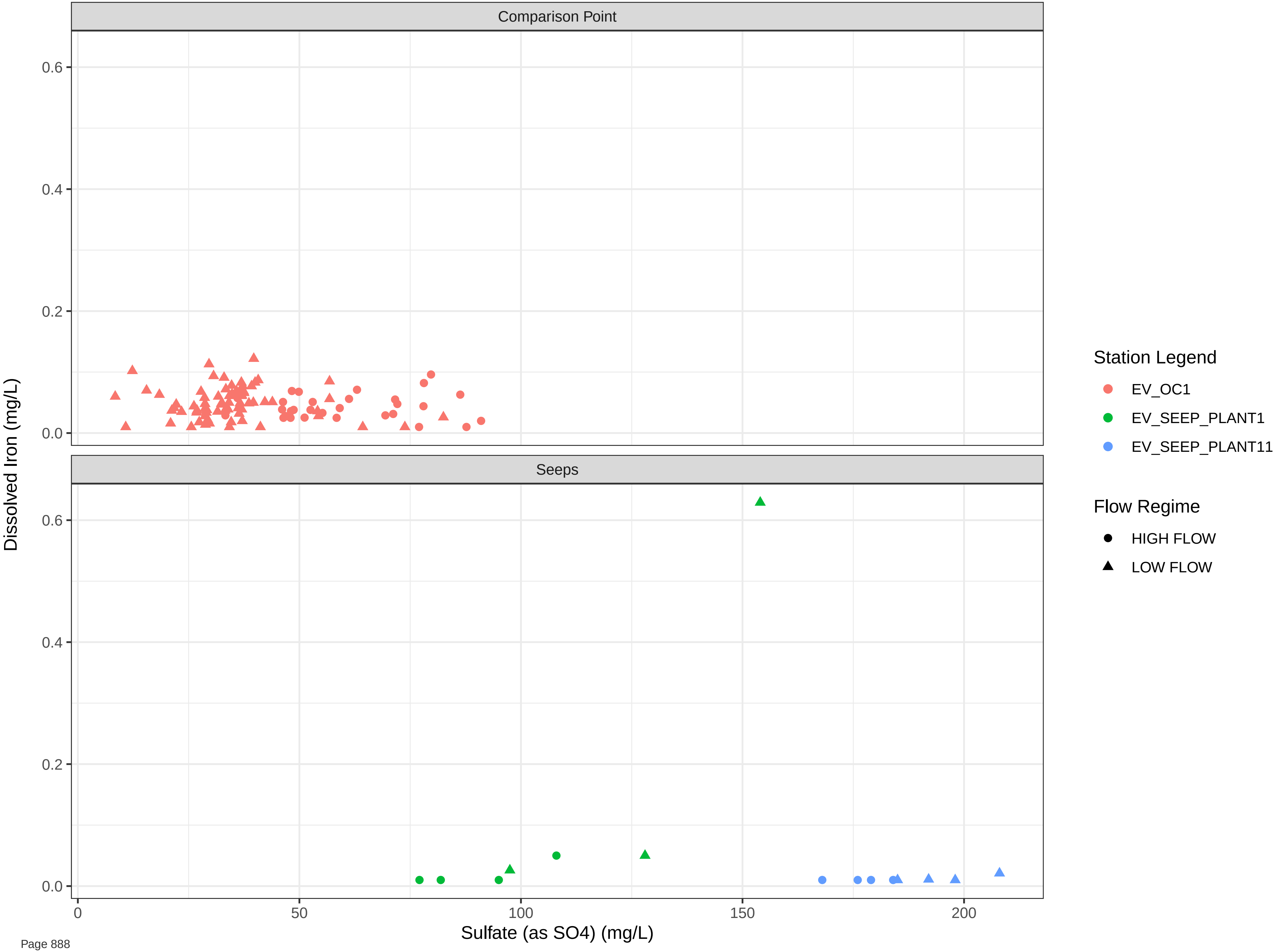
Comparison Point
Seeps
Dissolved Iron (mg/L)
0.075
0.050
0.025
0.075
0.050
0.025
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

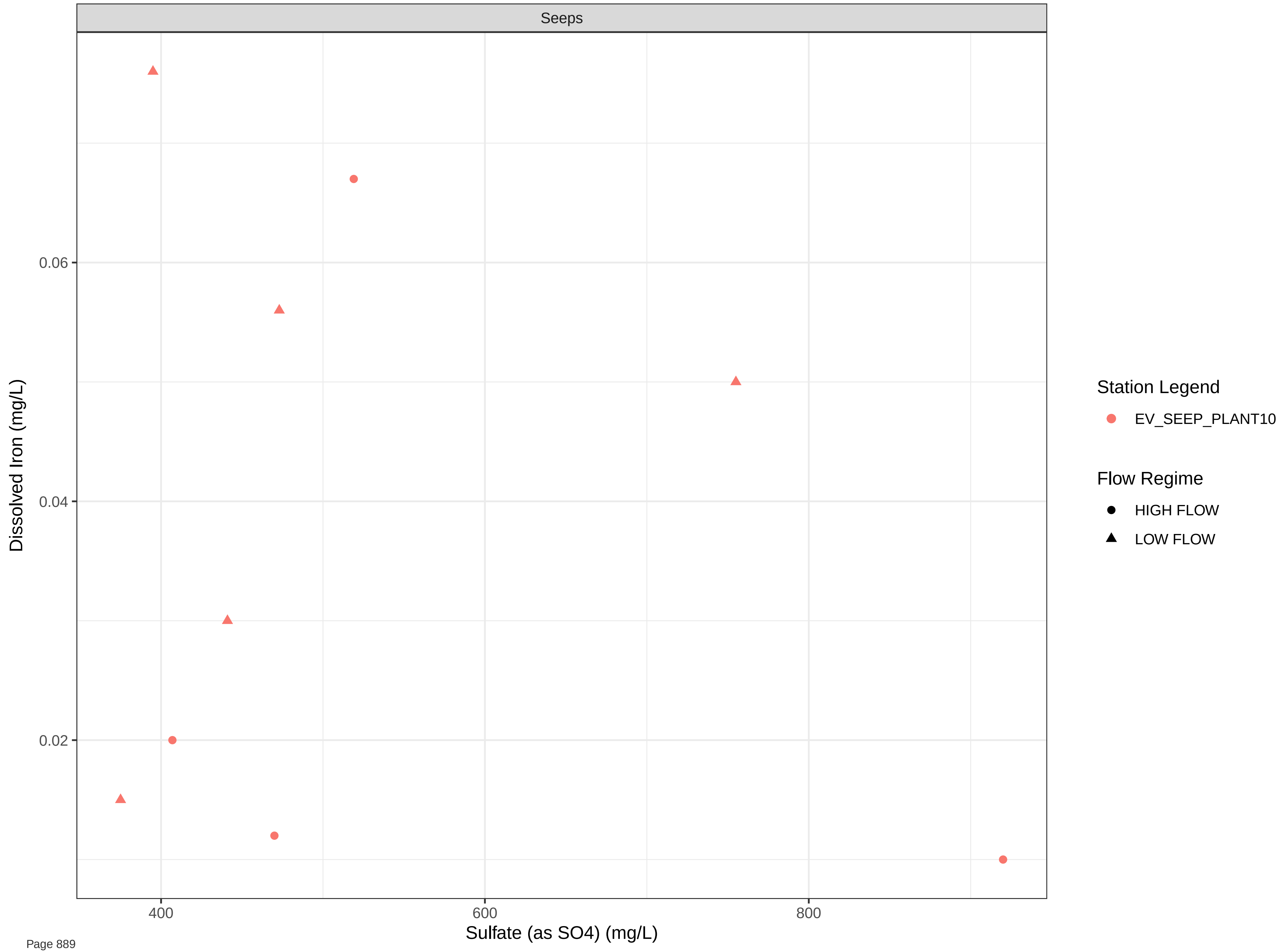

Comparison Point
Seeps
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.5
1.0
1.5
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



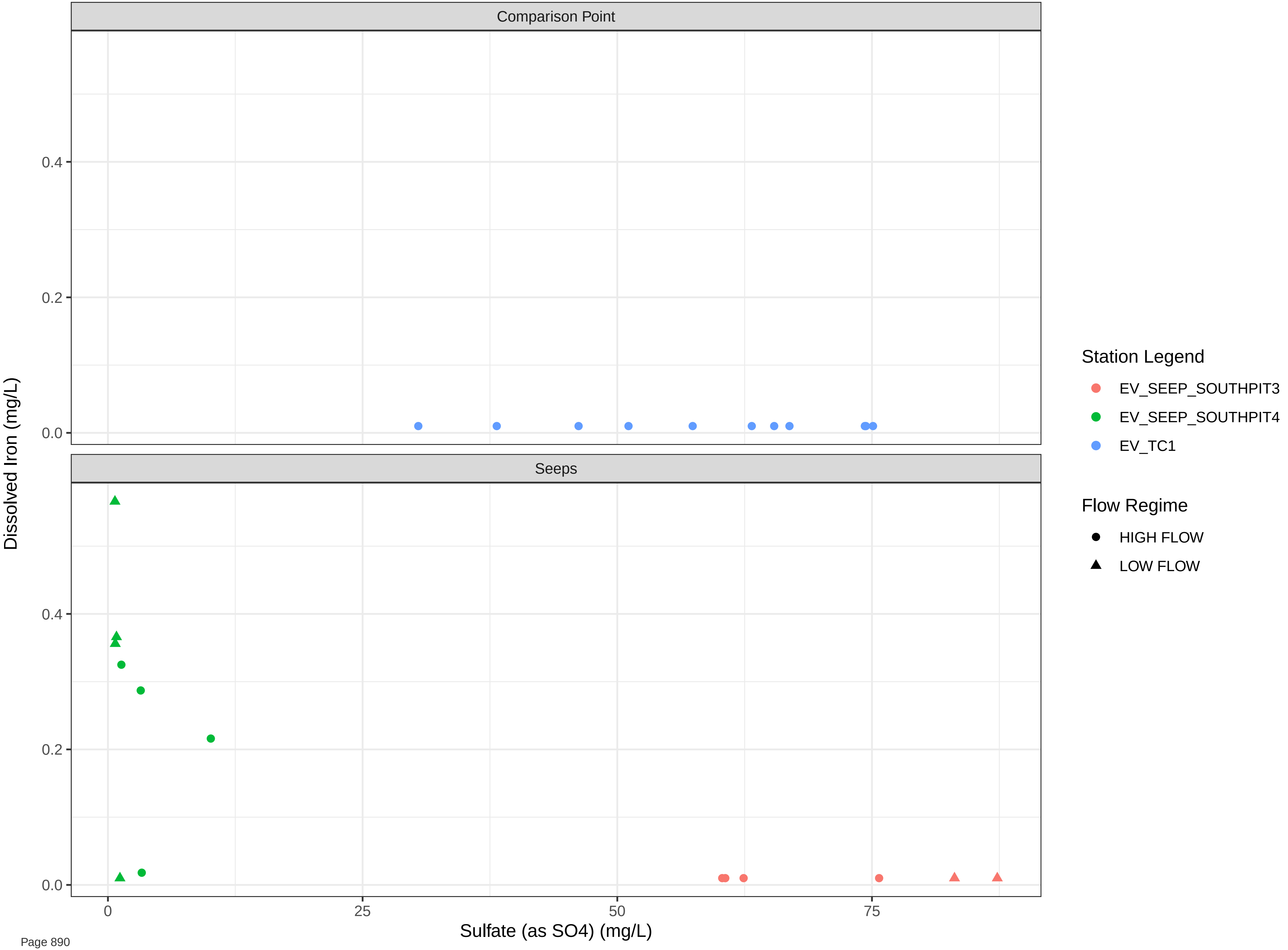
Comparison Point
Seeps
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0.3
0.4
0.5
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

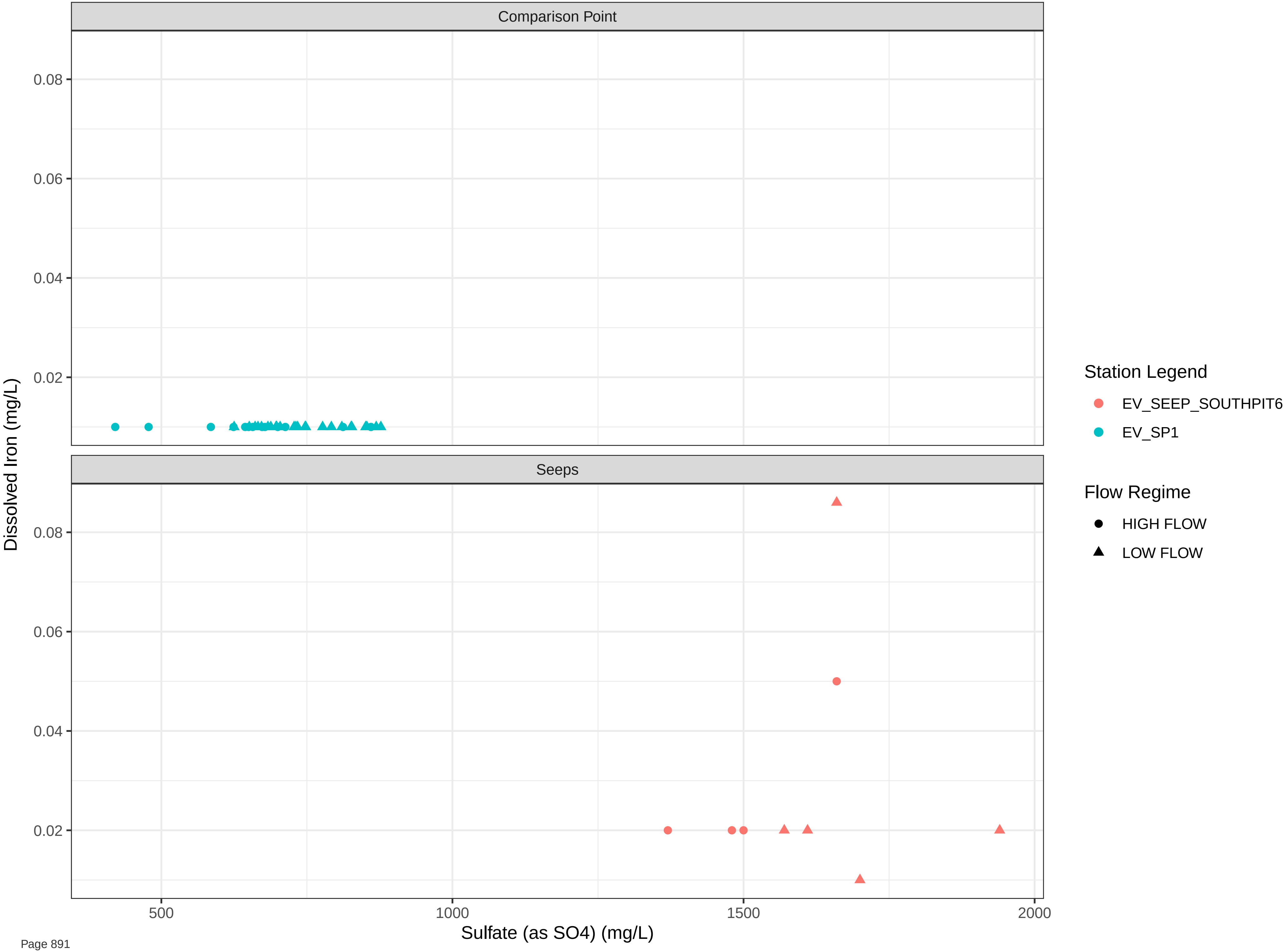

Comparison Point
Seeps
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0
0.2
0.4
0.6
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

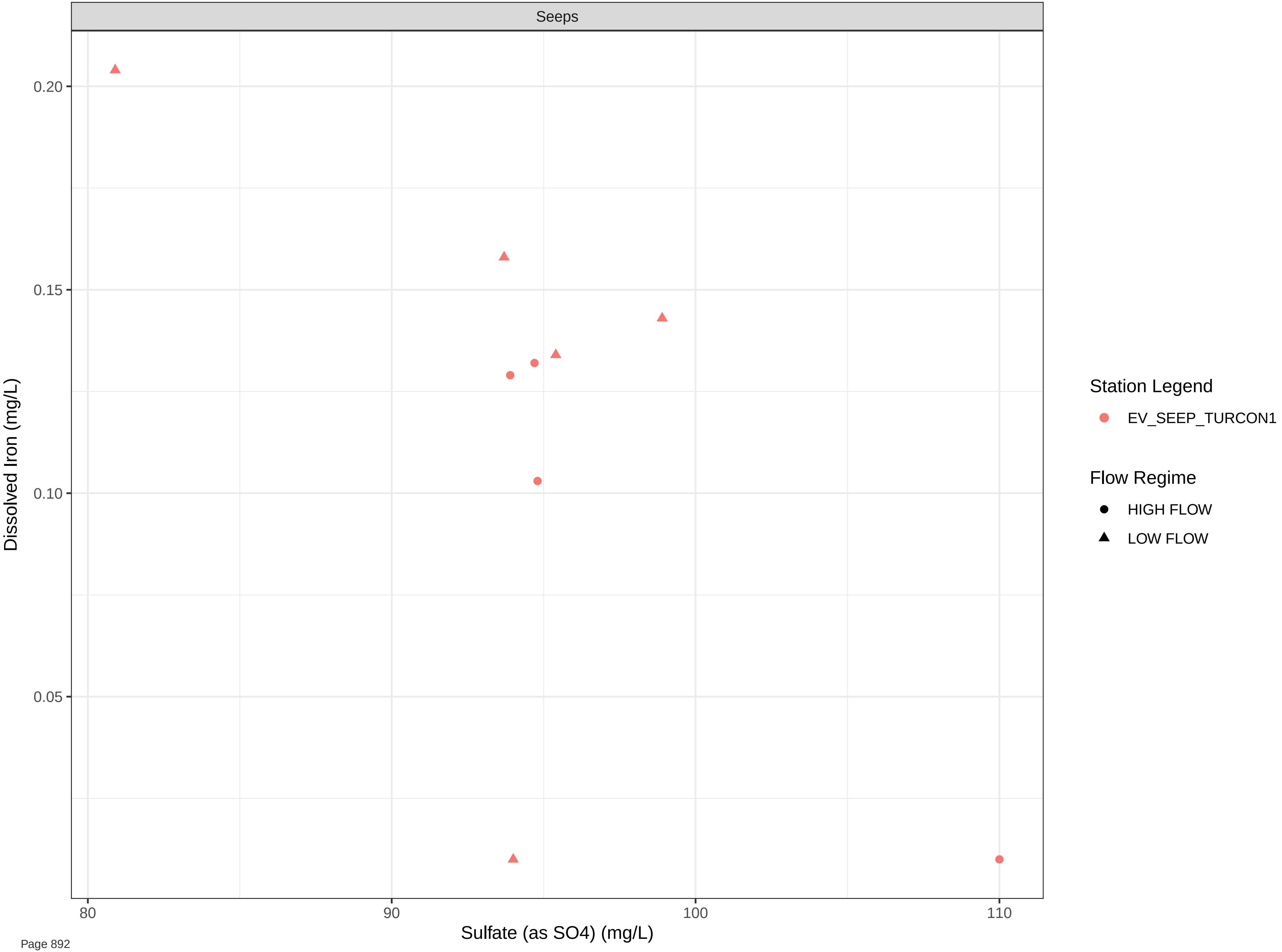


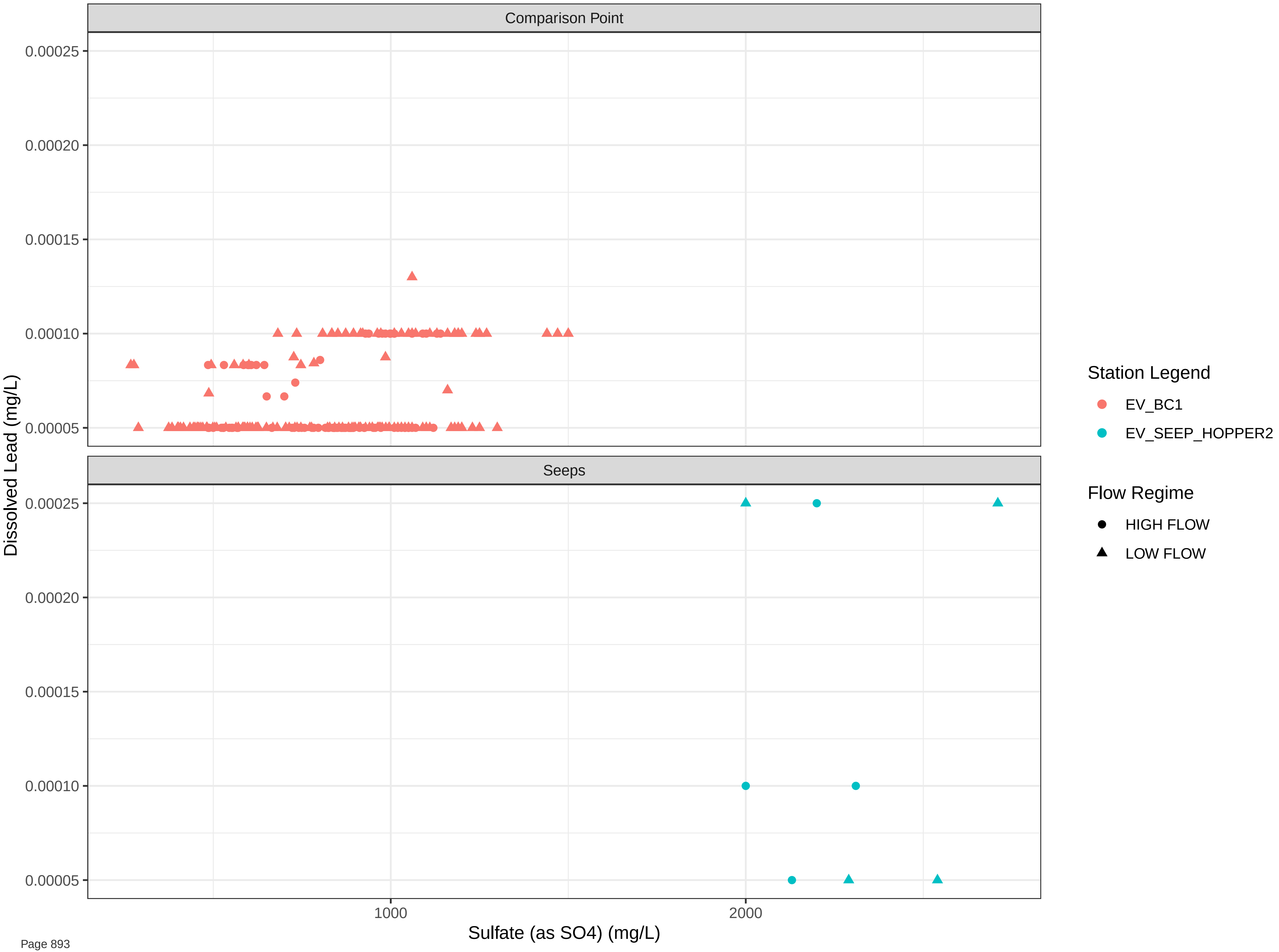
Seeps
Dissolved Iron (mg/L)
0.06
0.04
0.02
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

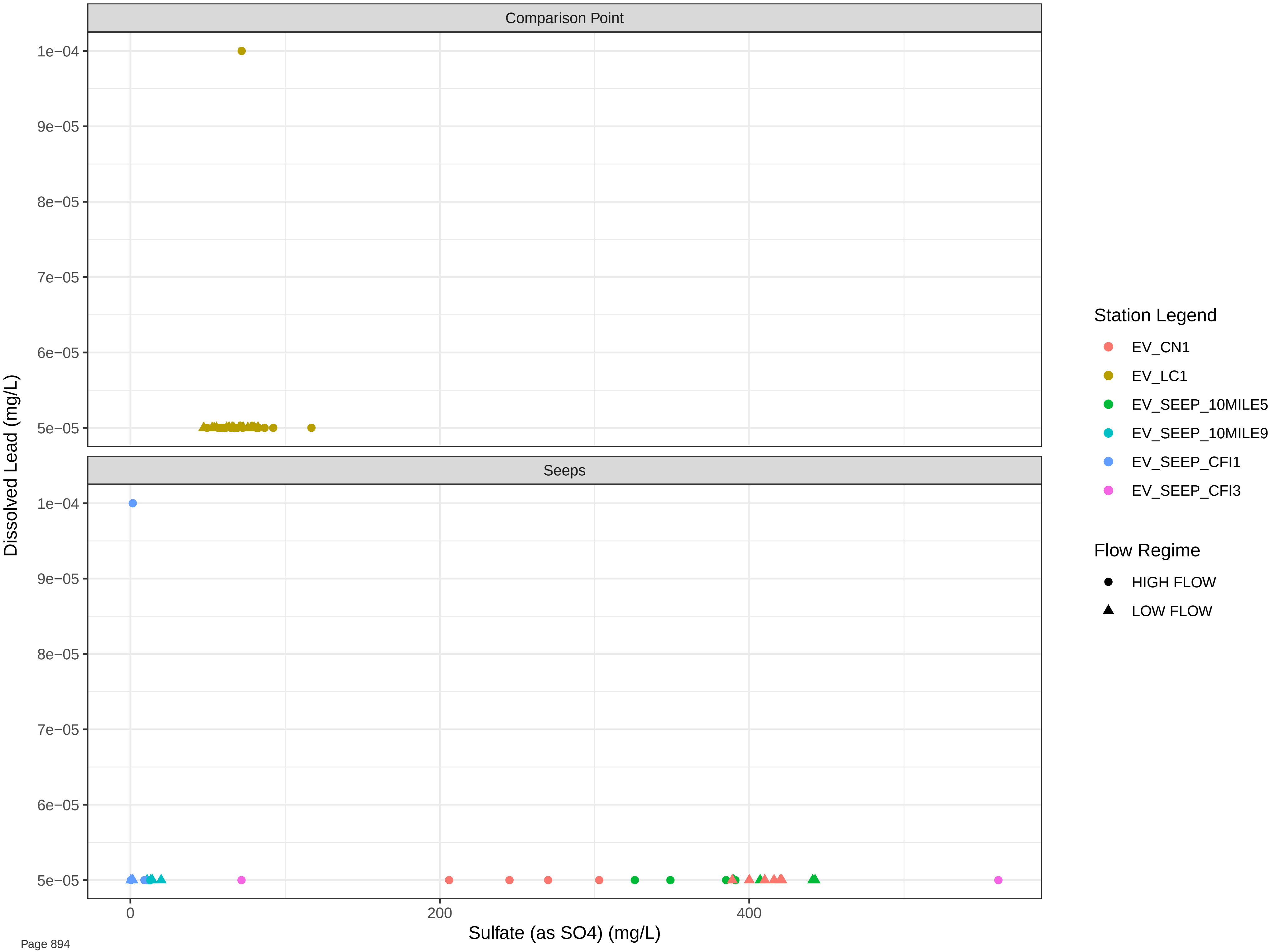

Comparison Point
Seeps
Dissolved Iron (mg/L)
0.0
0.2
0.4
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

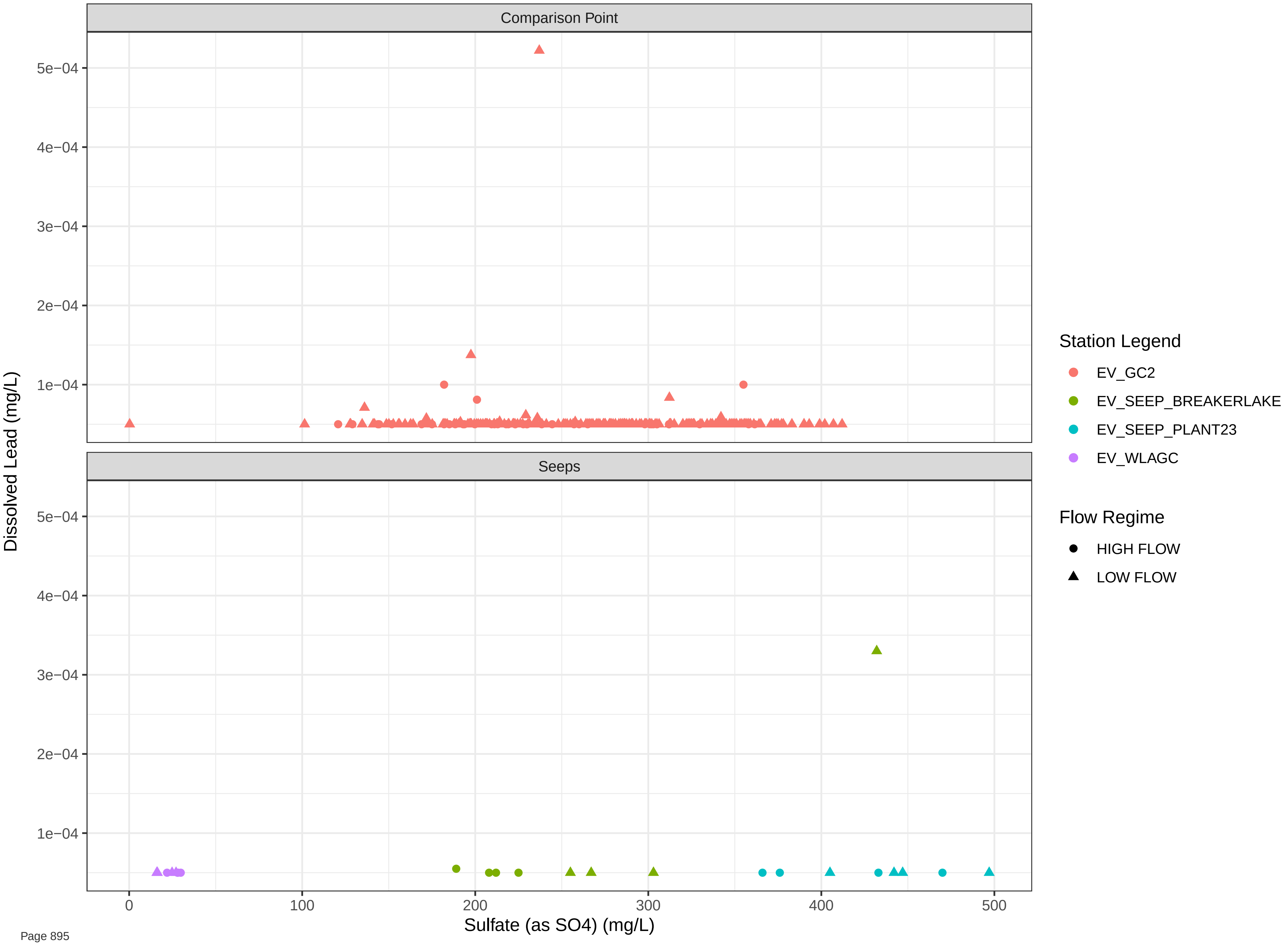


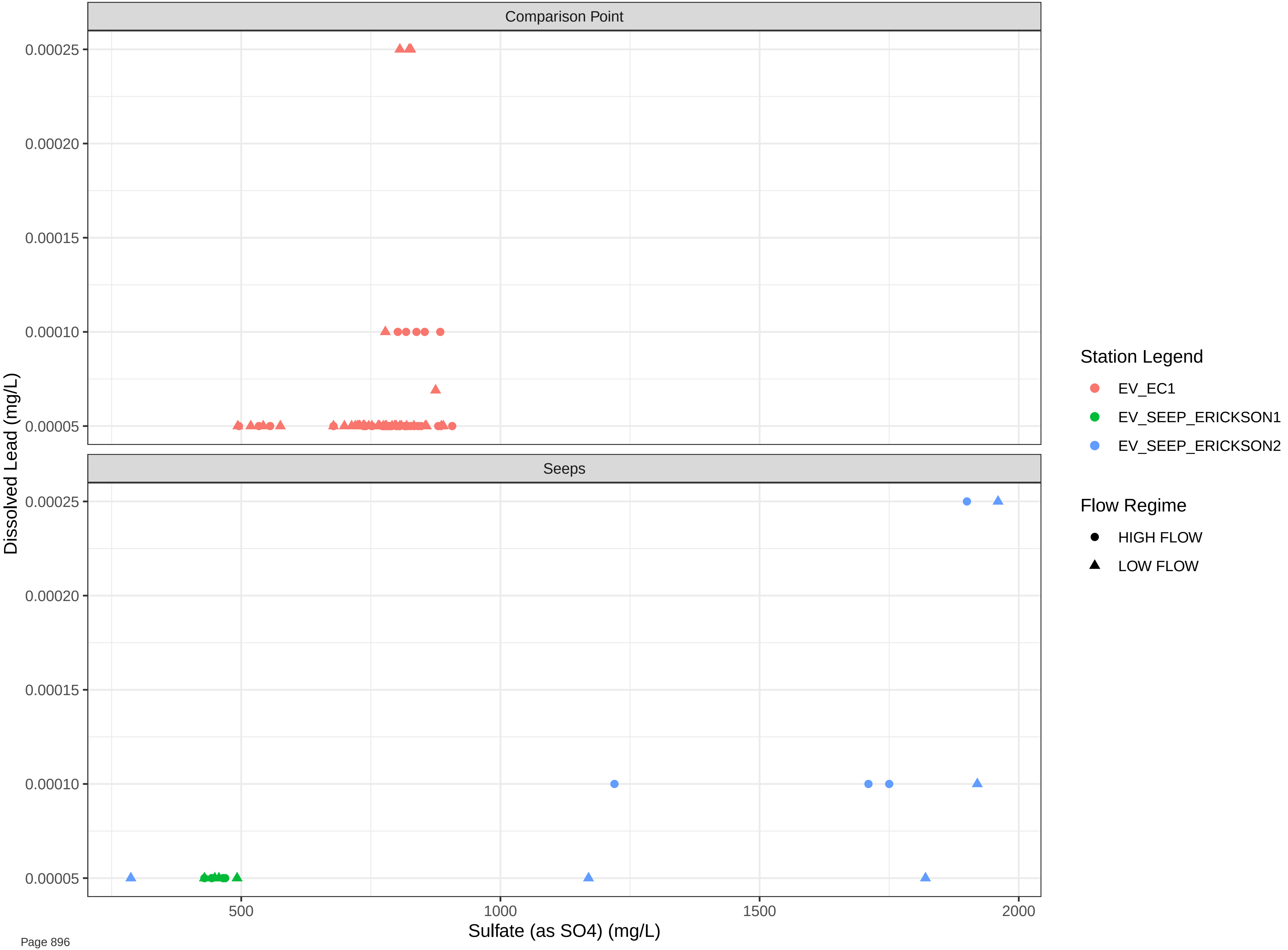
Comparison Point
Seeps
0.08
0.06
0.04
0.02
500
1000
1500
2000
Dissolved Iron (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

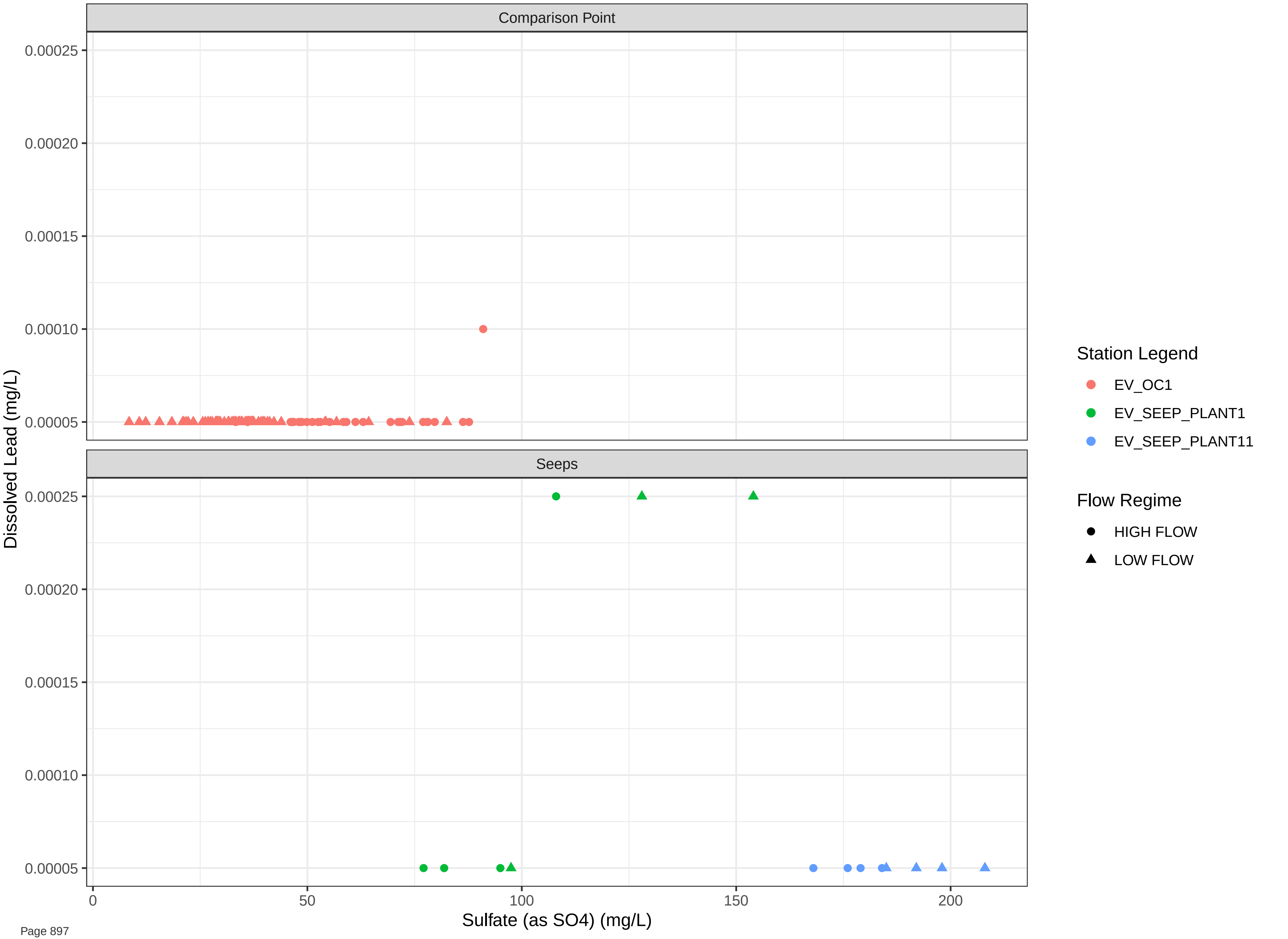

Seeps
0.20
0.15
0.10
0.05
Dissolved Iron (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

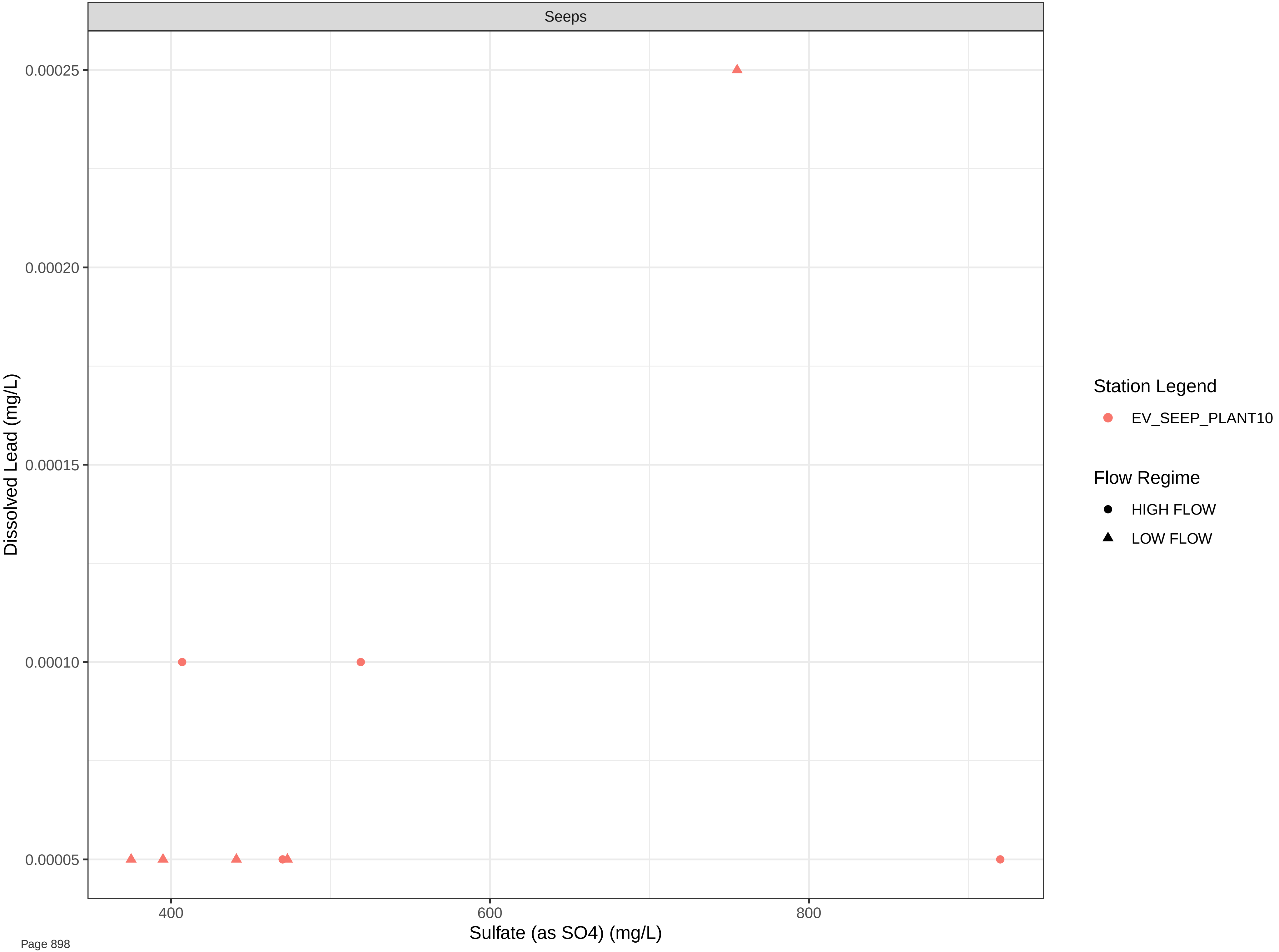

Comparison Point
Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
Dissolved Lead (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

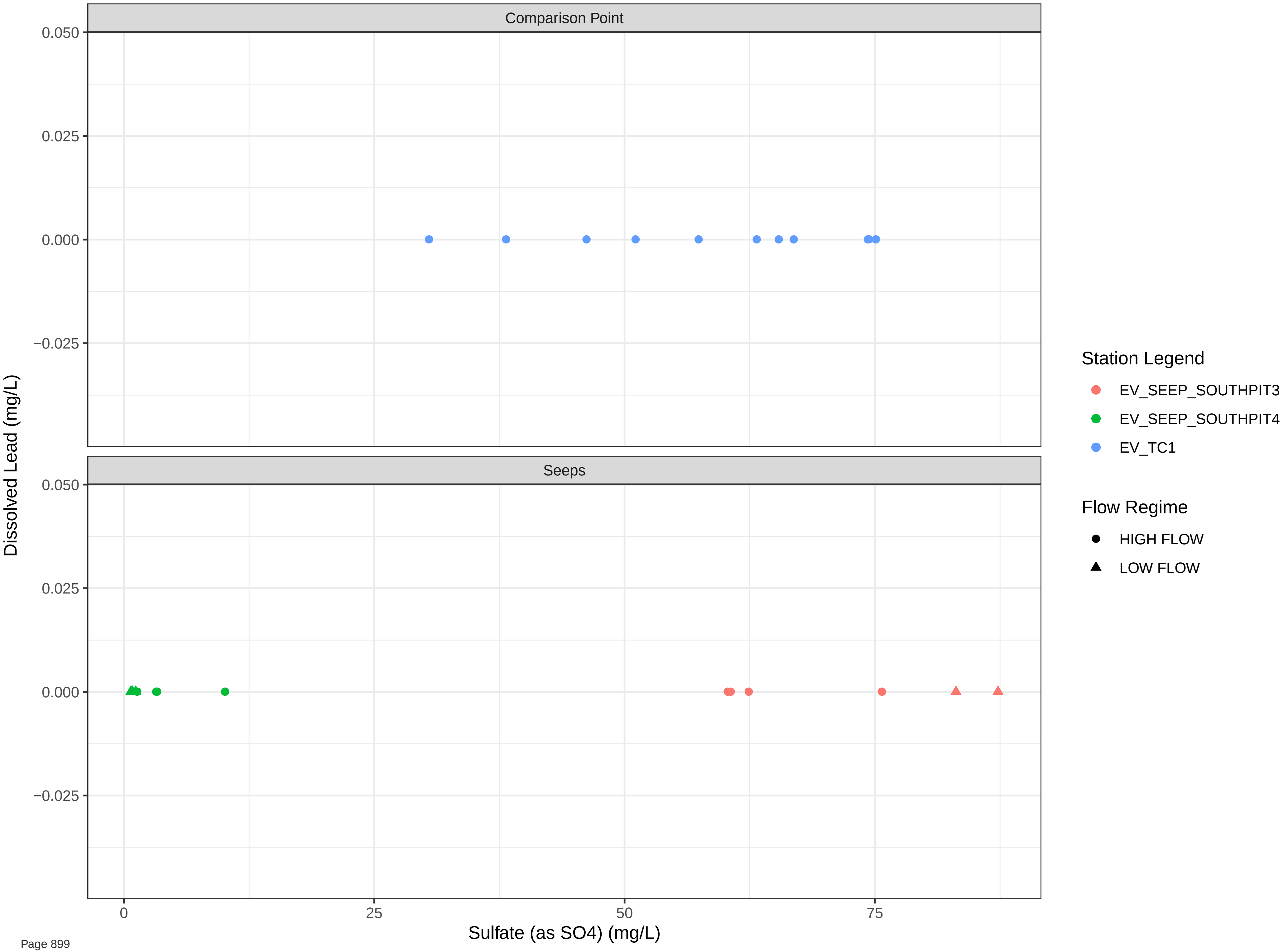

Comparison Point
Seeps
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
Dissolved Lead (mg/L)
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lead (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

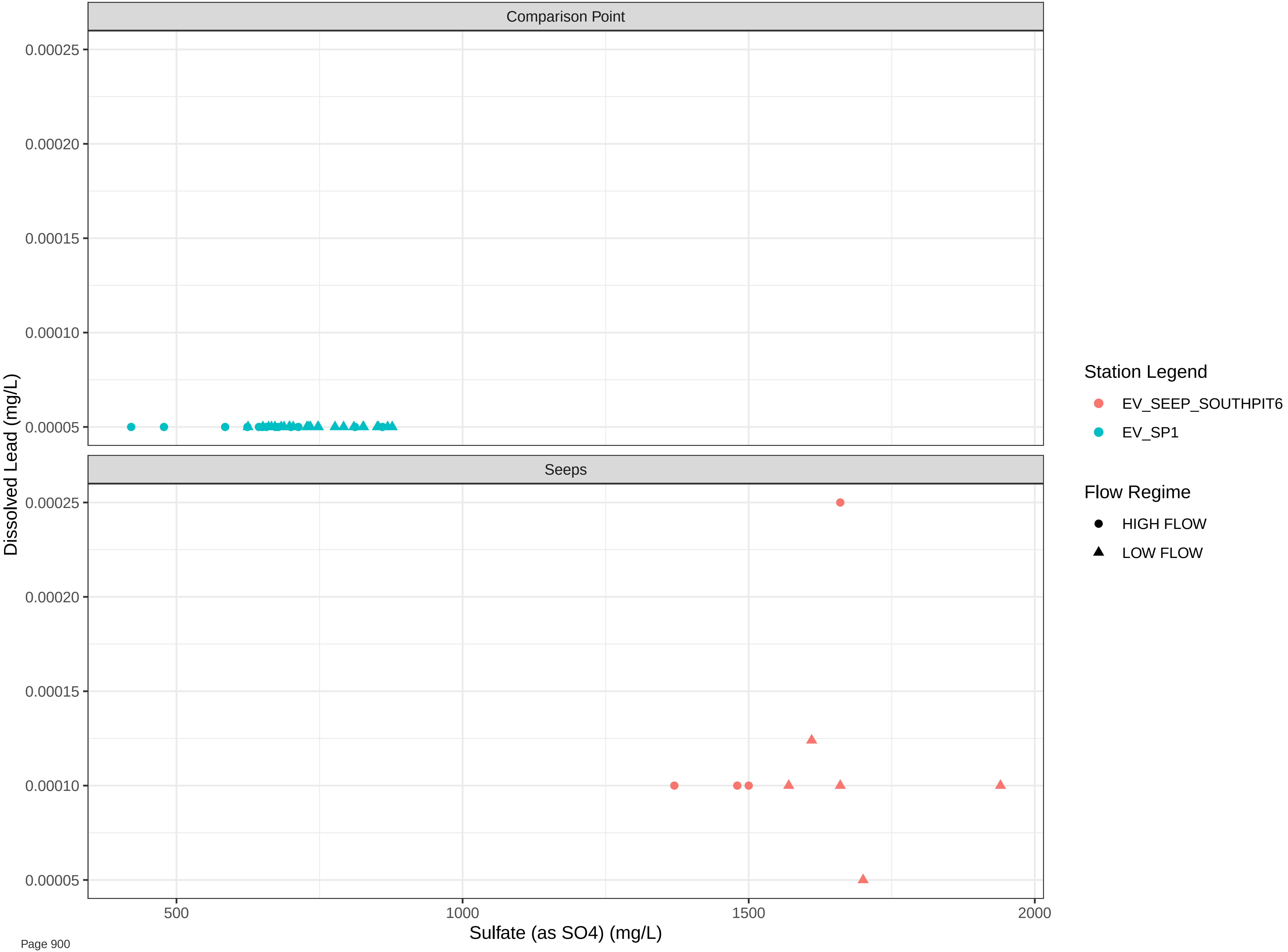

Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

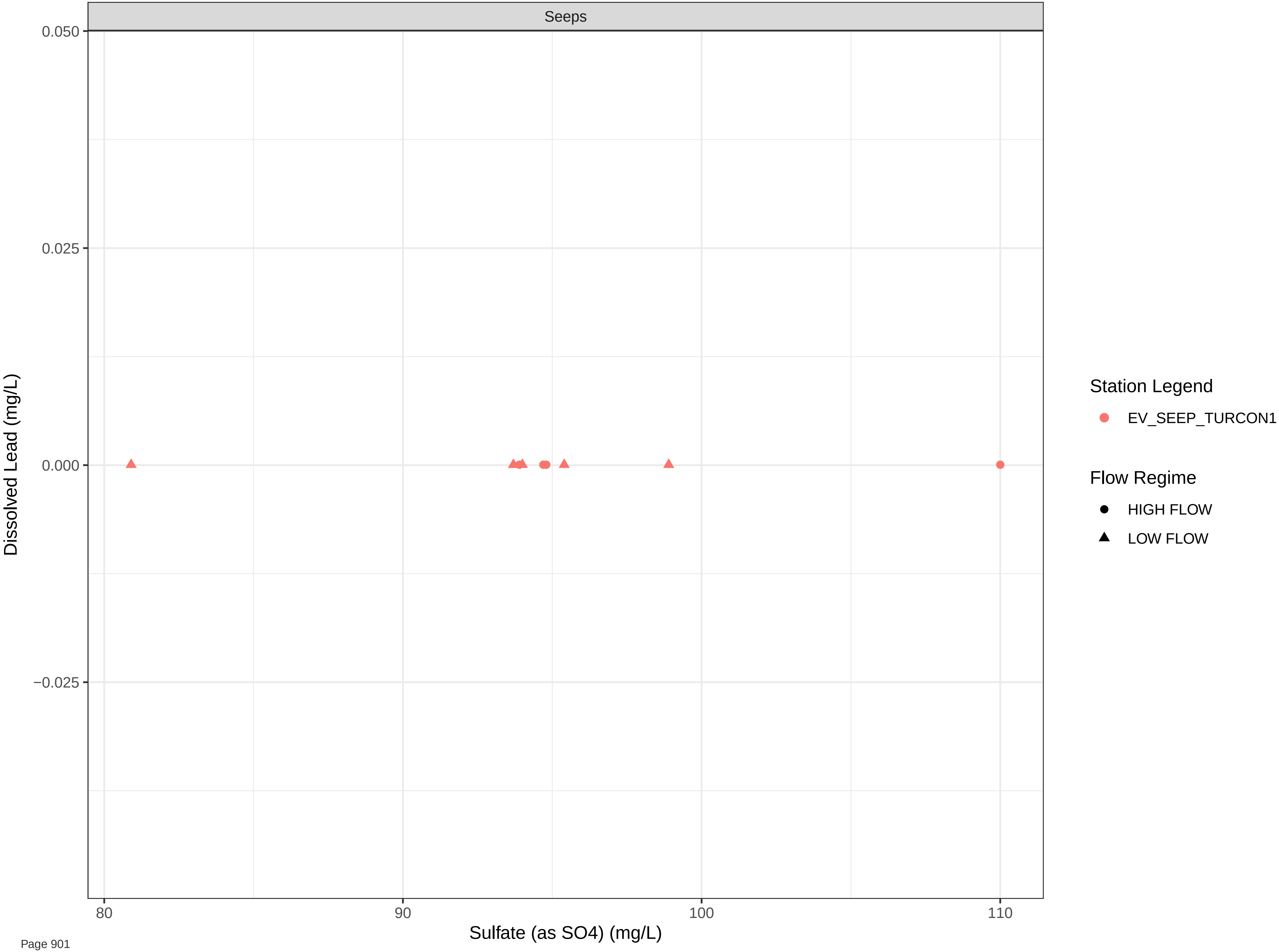

Seeps
0.00025
0.00020
0.00015
0.00010
0.00005
400
600
800
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



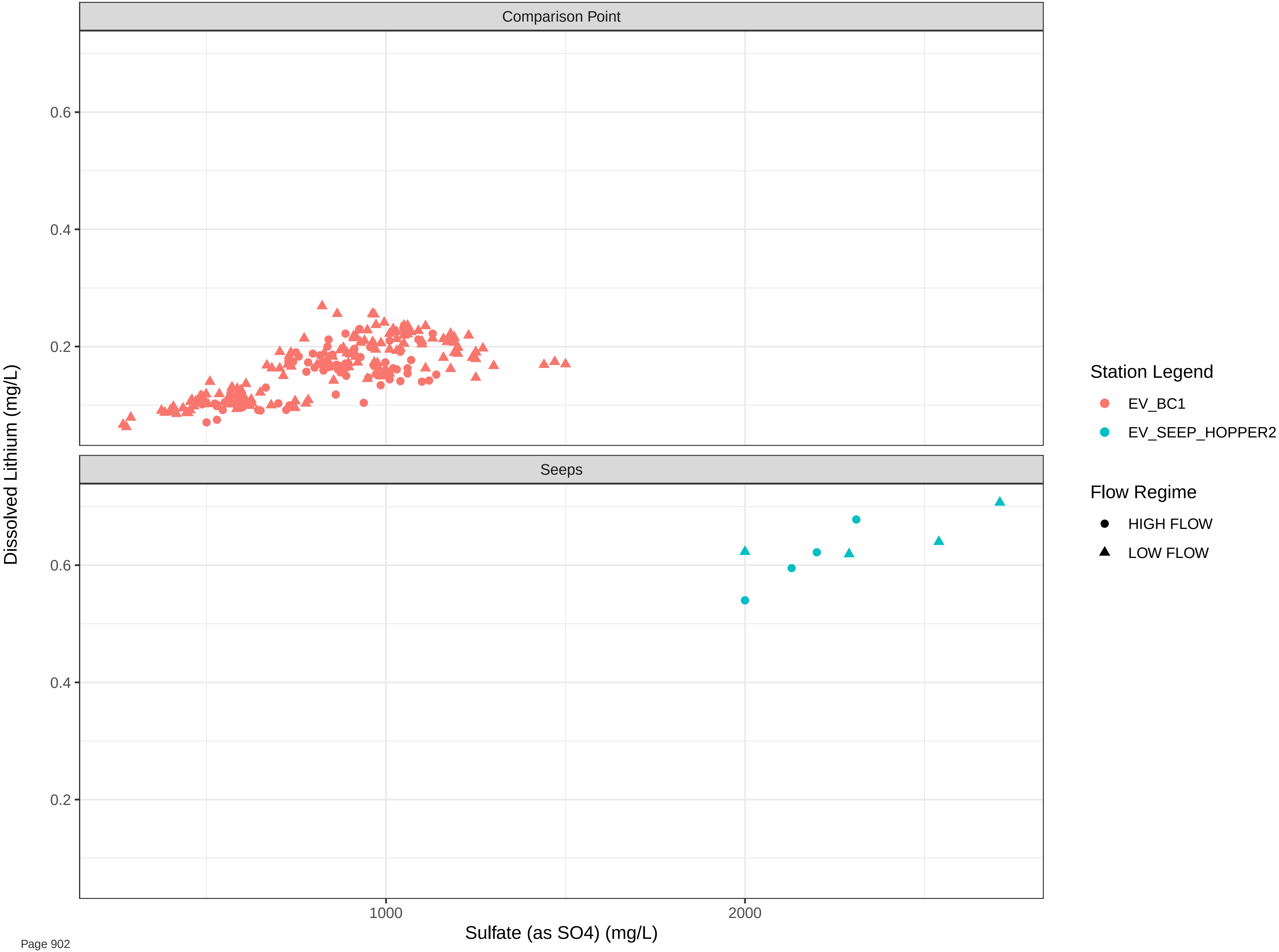
Comparison Point
Seeps
0.050
0.025
0.000
−0.025
0
25
50
75
Dissolved Lead (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

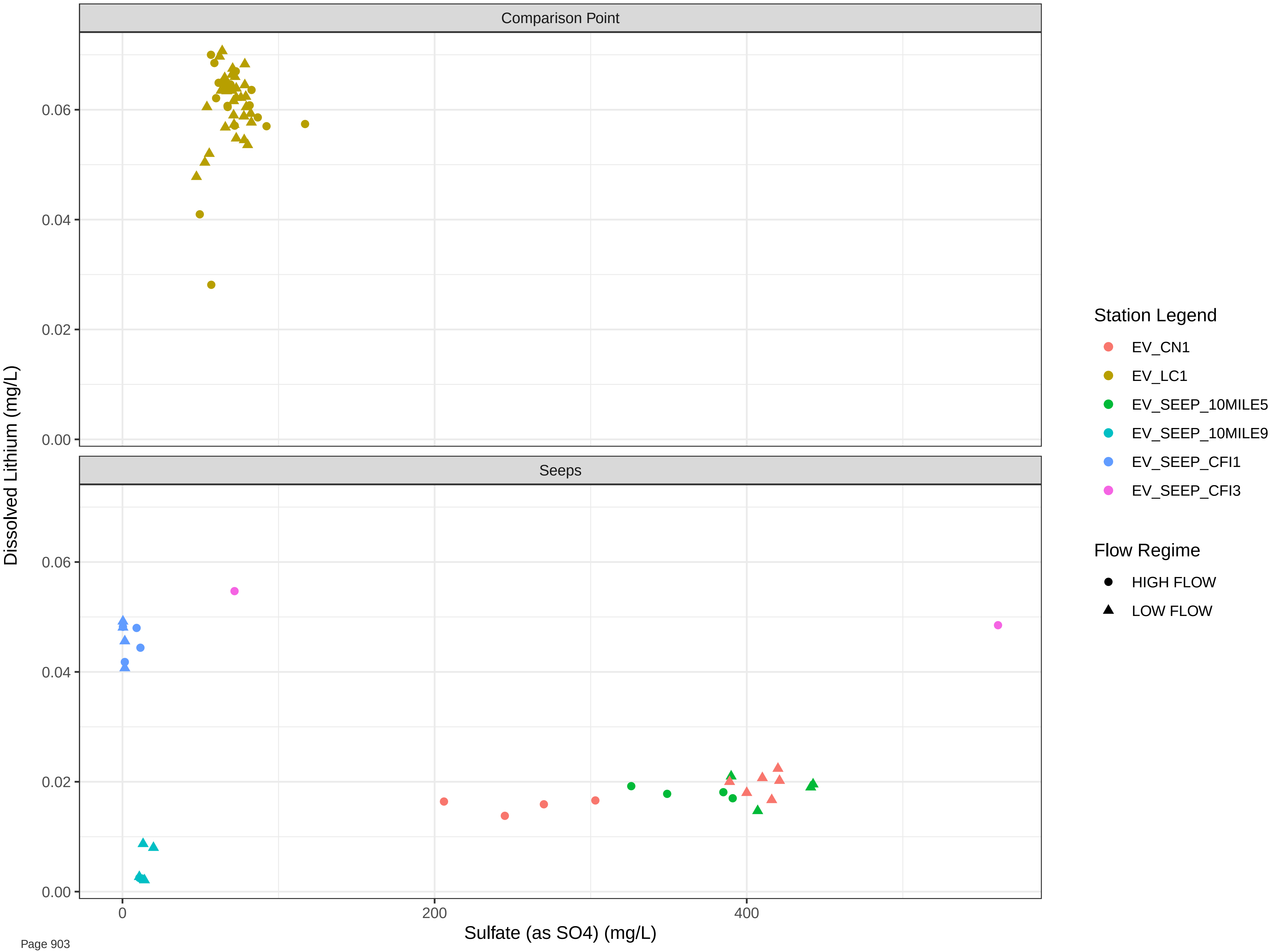


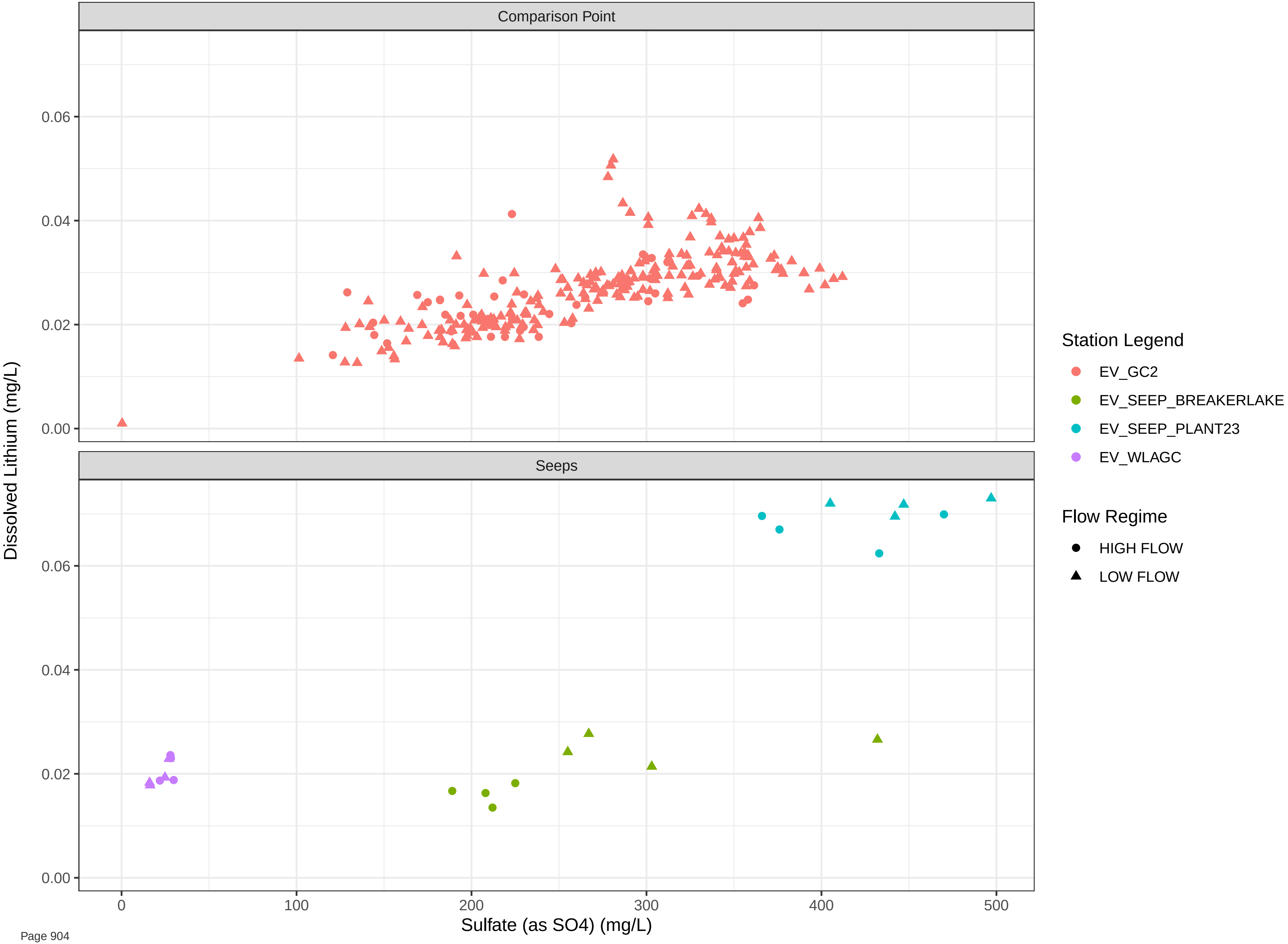
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

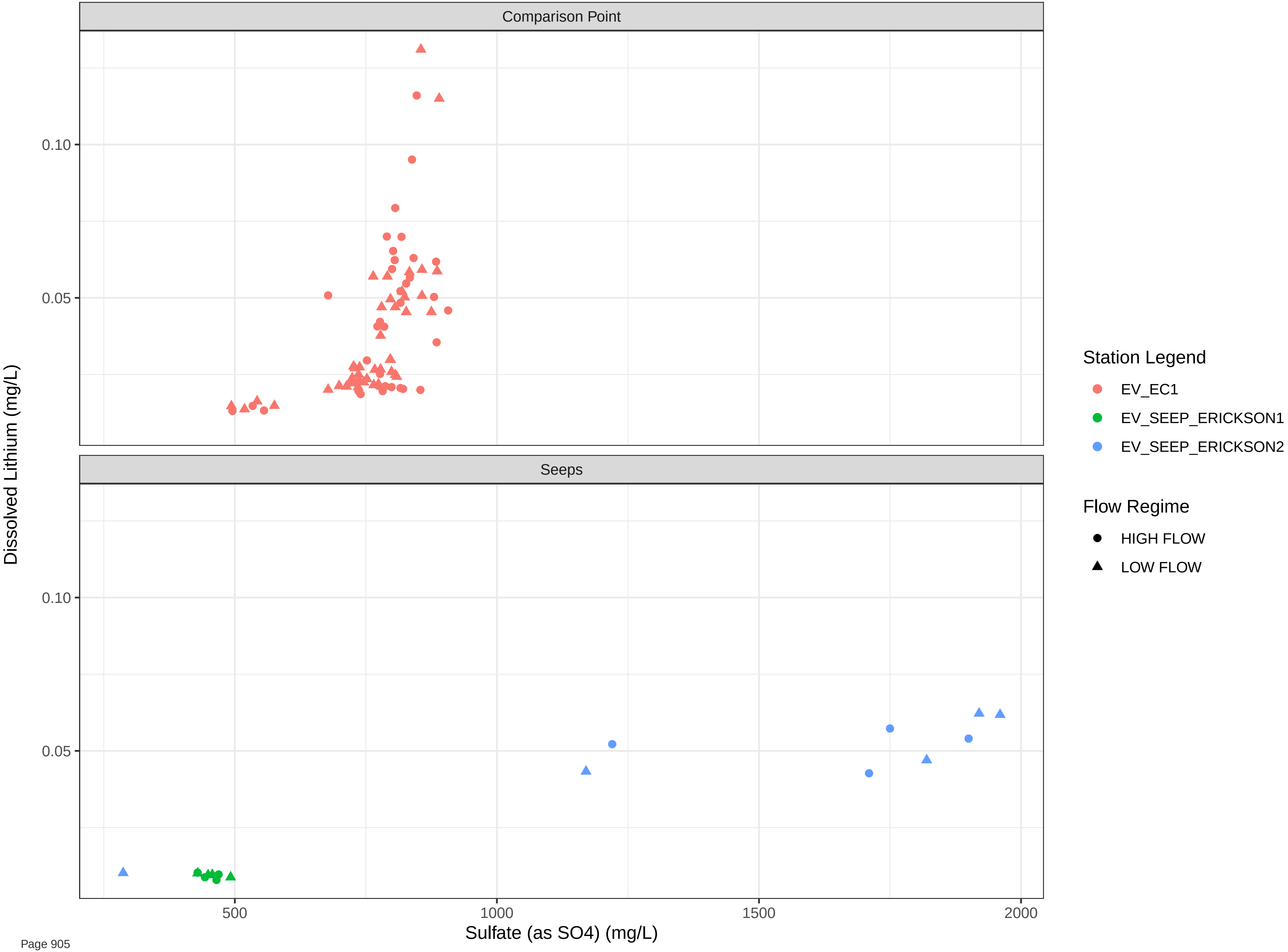


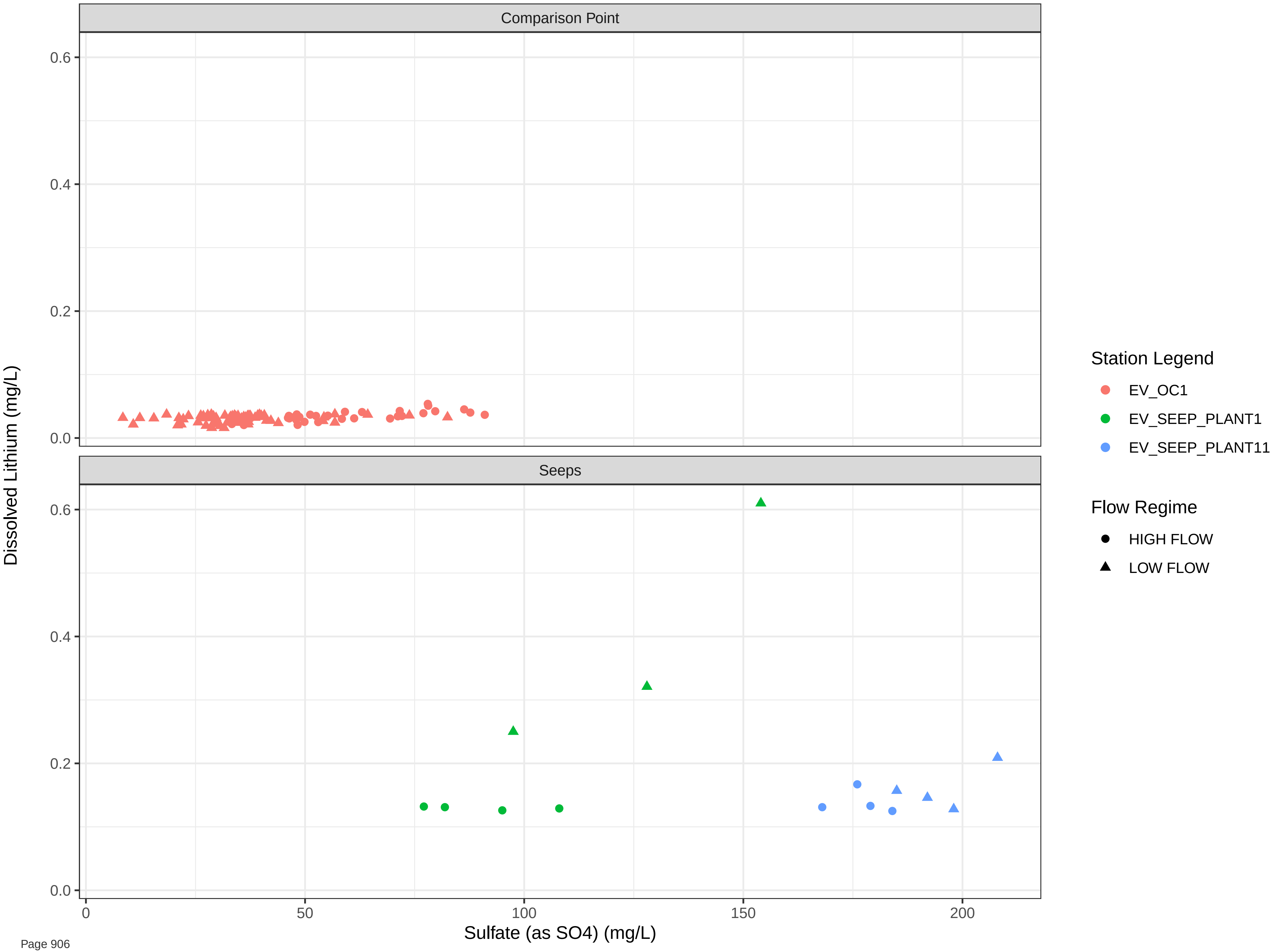
Seeps
0.050
0.025
0.000
−0.025
Dissolved Lead (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

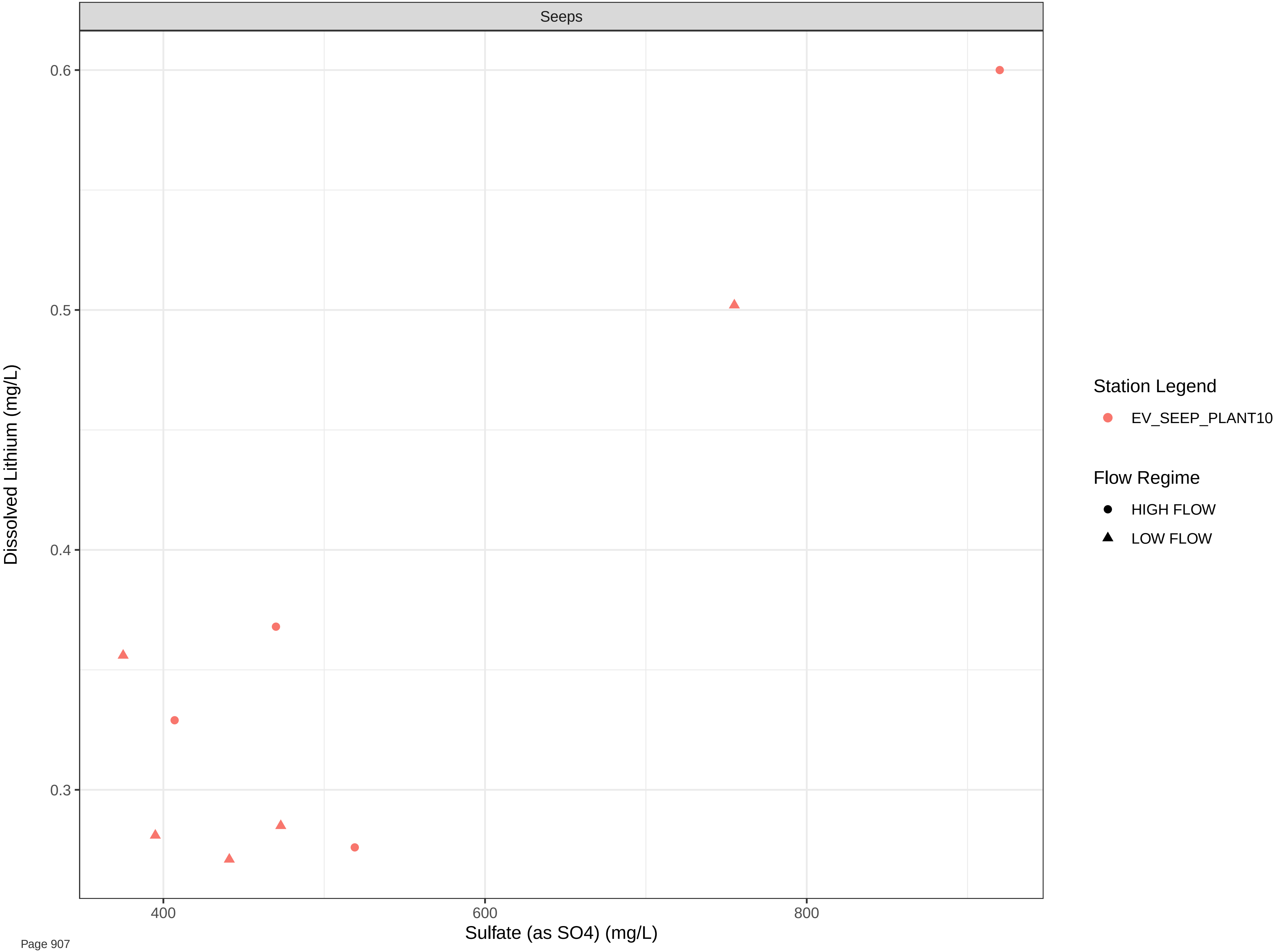

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.6
0.4
0.2
0.6
0.4
0.2
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

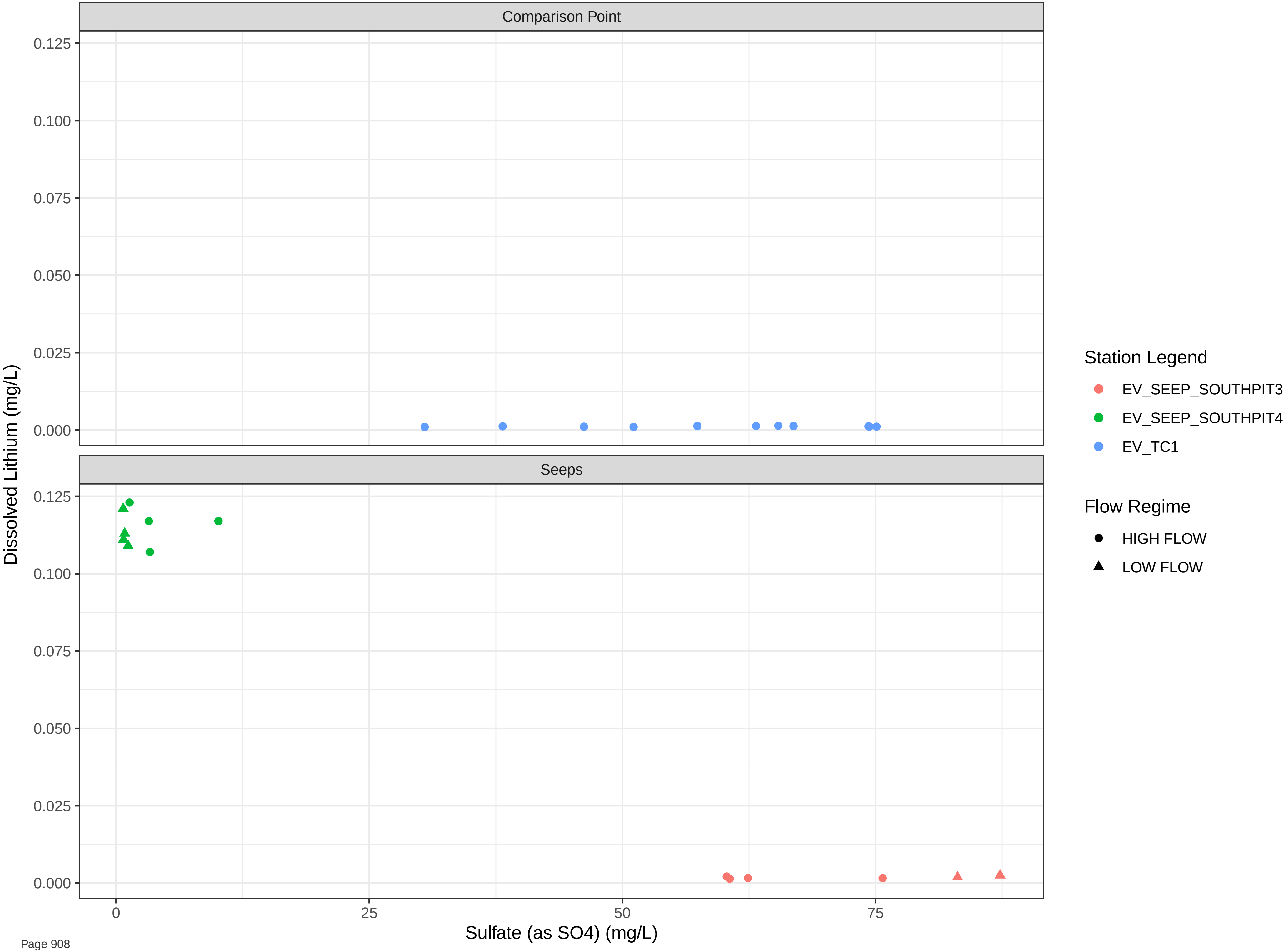

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.06
0.04
0.02
0.00
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

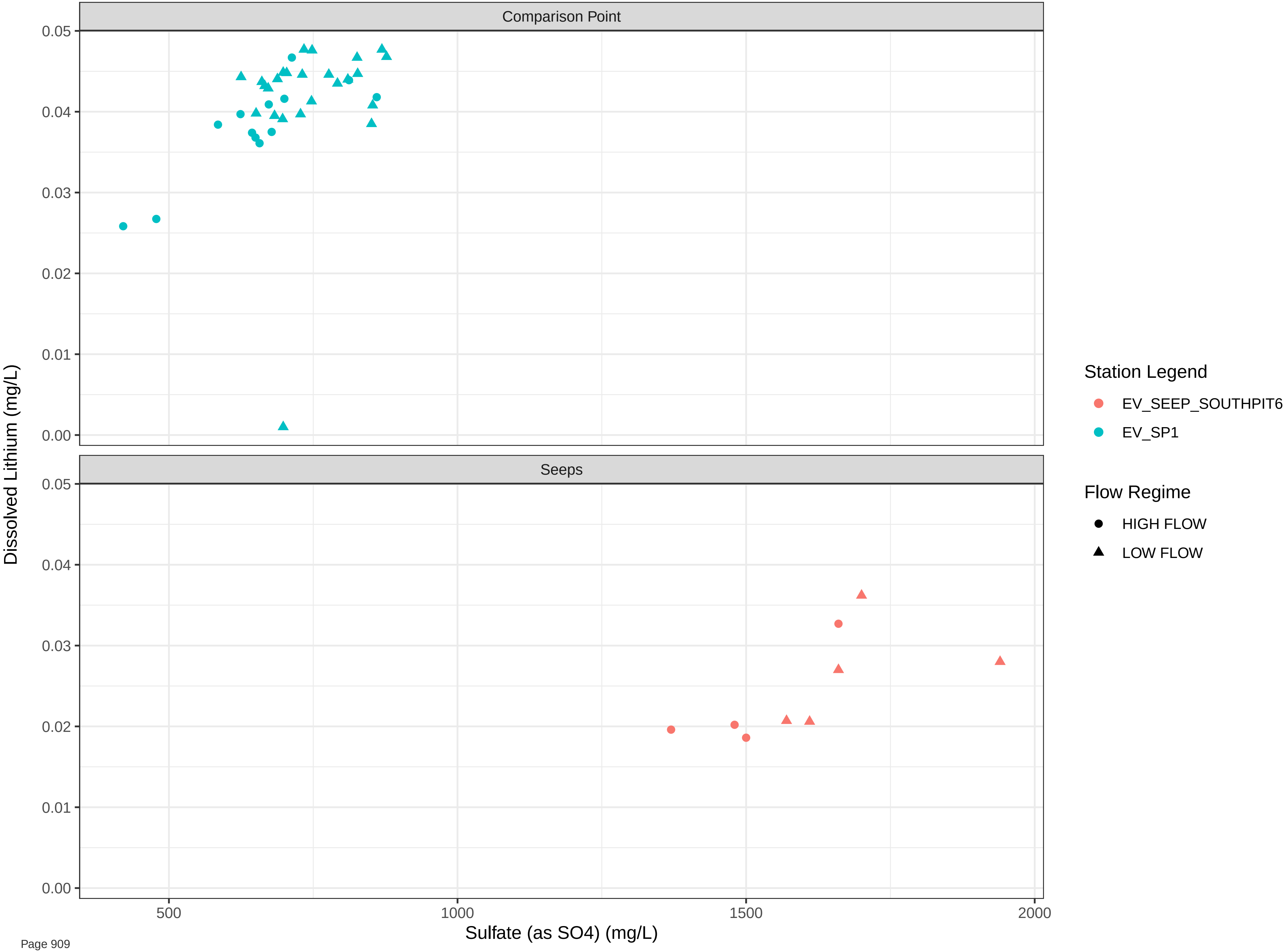

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.00
0.02
0.04
0.06
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

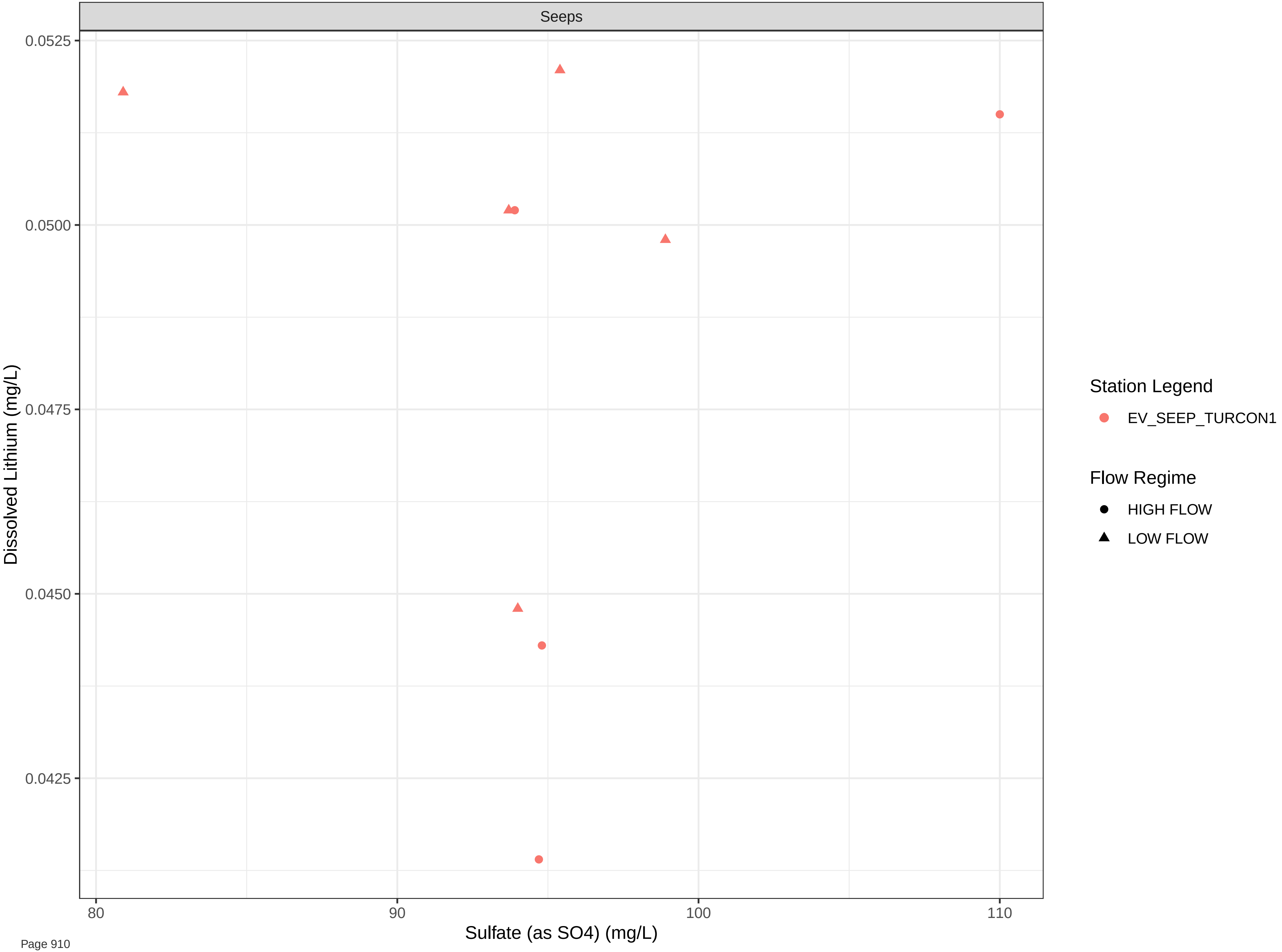

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.10
0.05
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

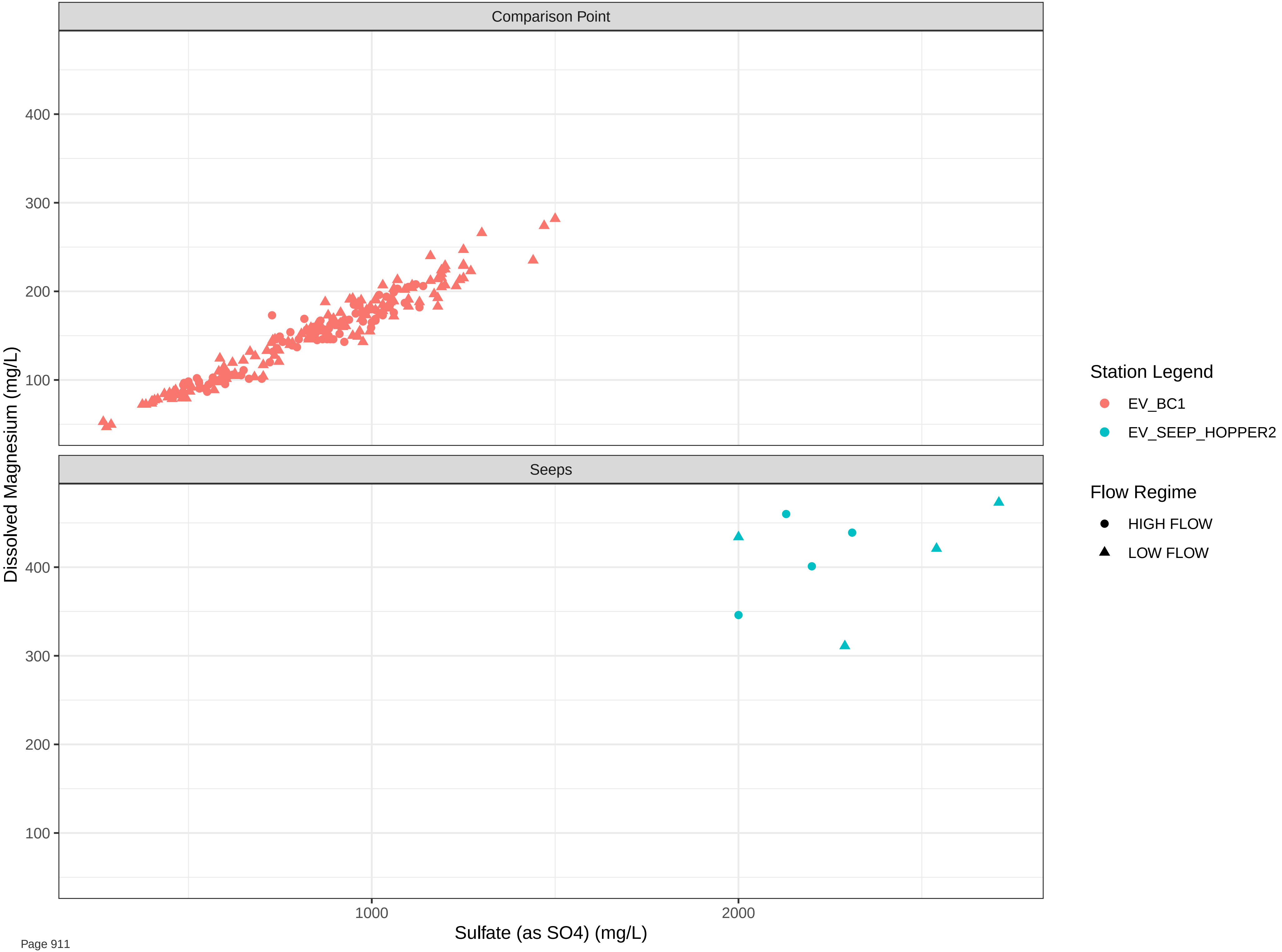

Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.0
0.2
0.4
0.6
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

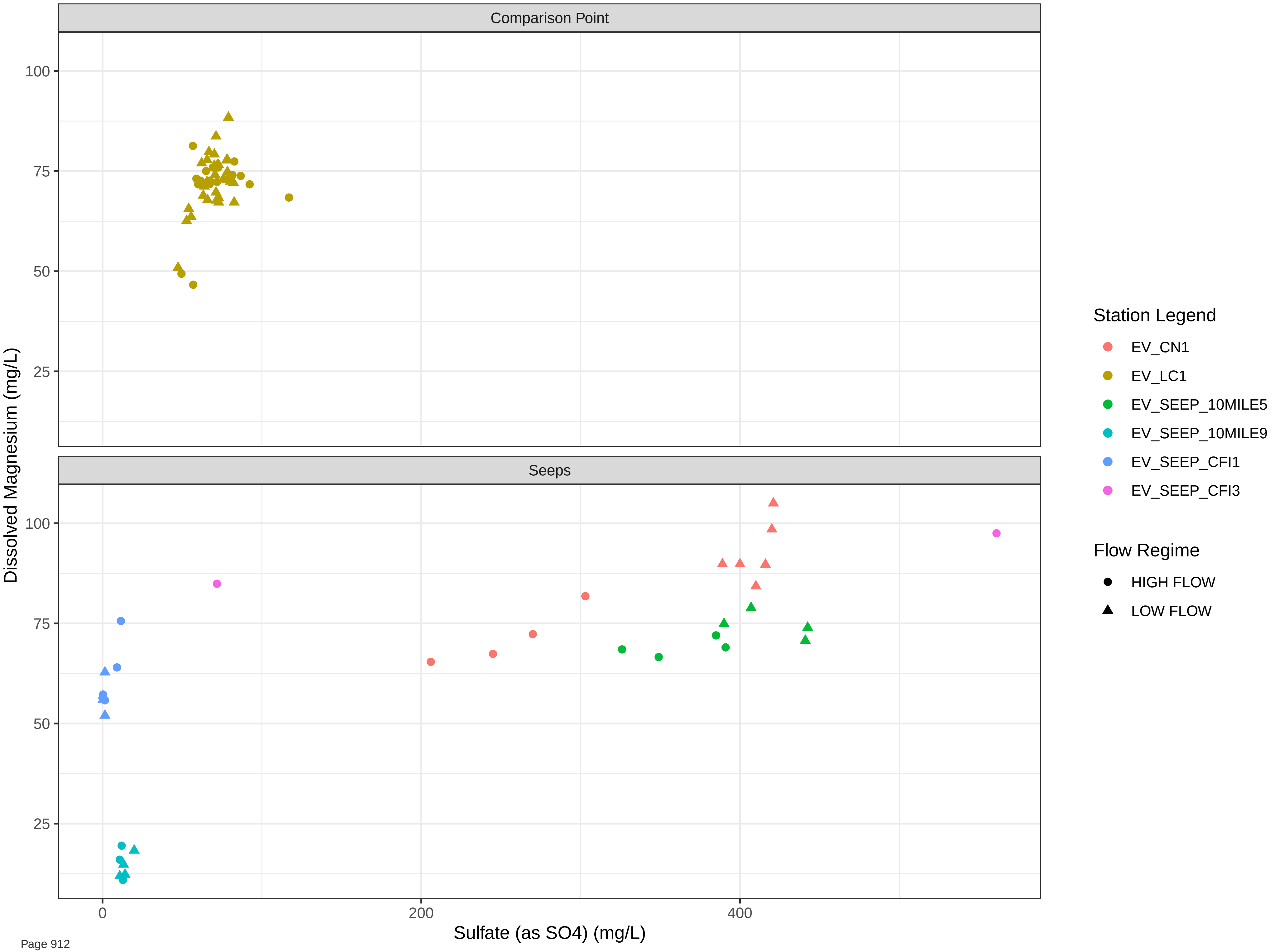

Seeps
0.6
0.5
0.4
0.3
Dissolved Lithium (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

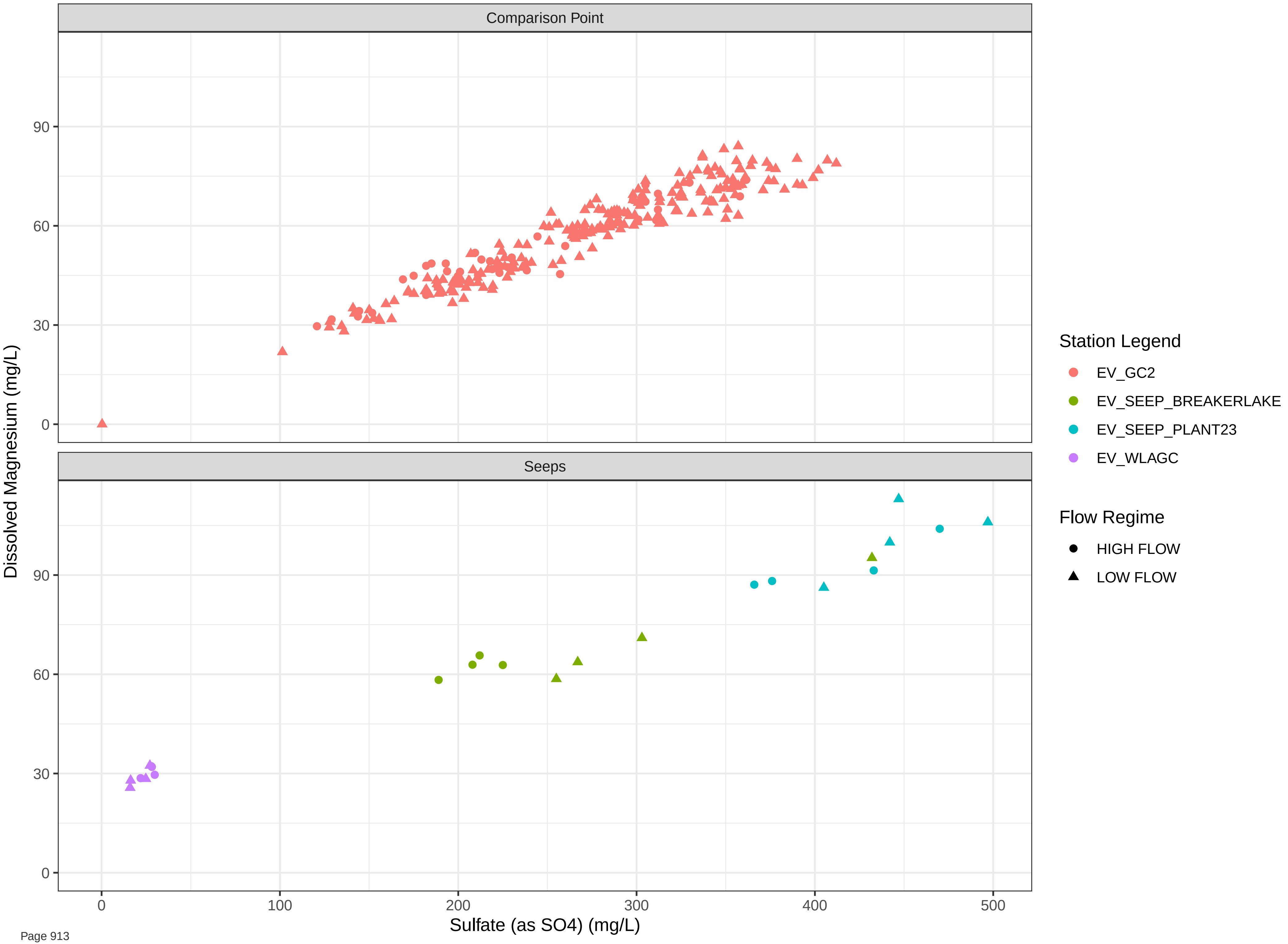

Comparison Point
Seeps
0.125
0.100
0.075
0.050
0.025
0.000
0
25
50
75
Dissolved Lithium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.05
0.04
0.03
0.02
0.01
0.00
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

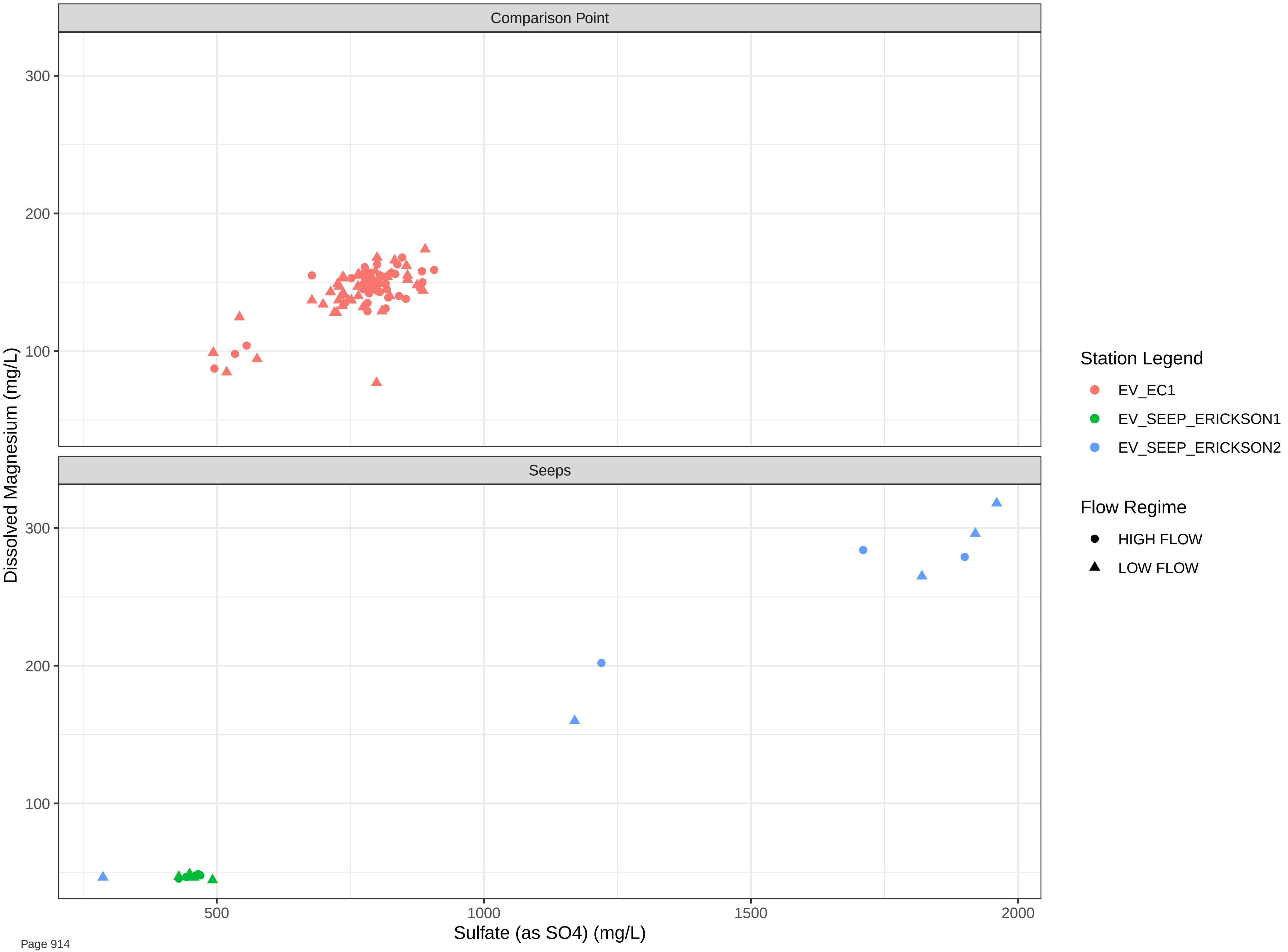

Seeps
Dissolved Lithium (mg/L)
0.0525
0.0500
0.0475
0.0450
0.0425
Sulfate (as SO4) (mg/L)
80
90
100
110
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
100
200
300
400
1000
2000
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

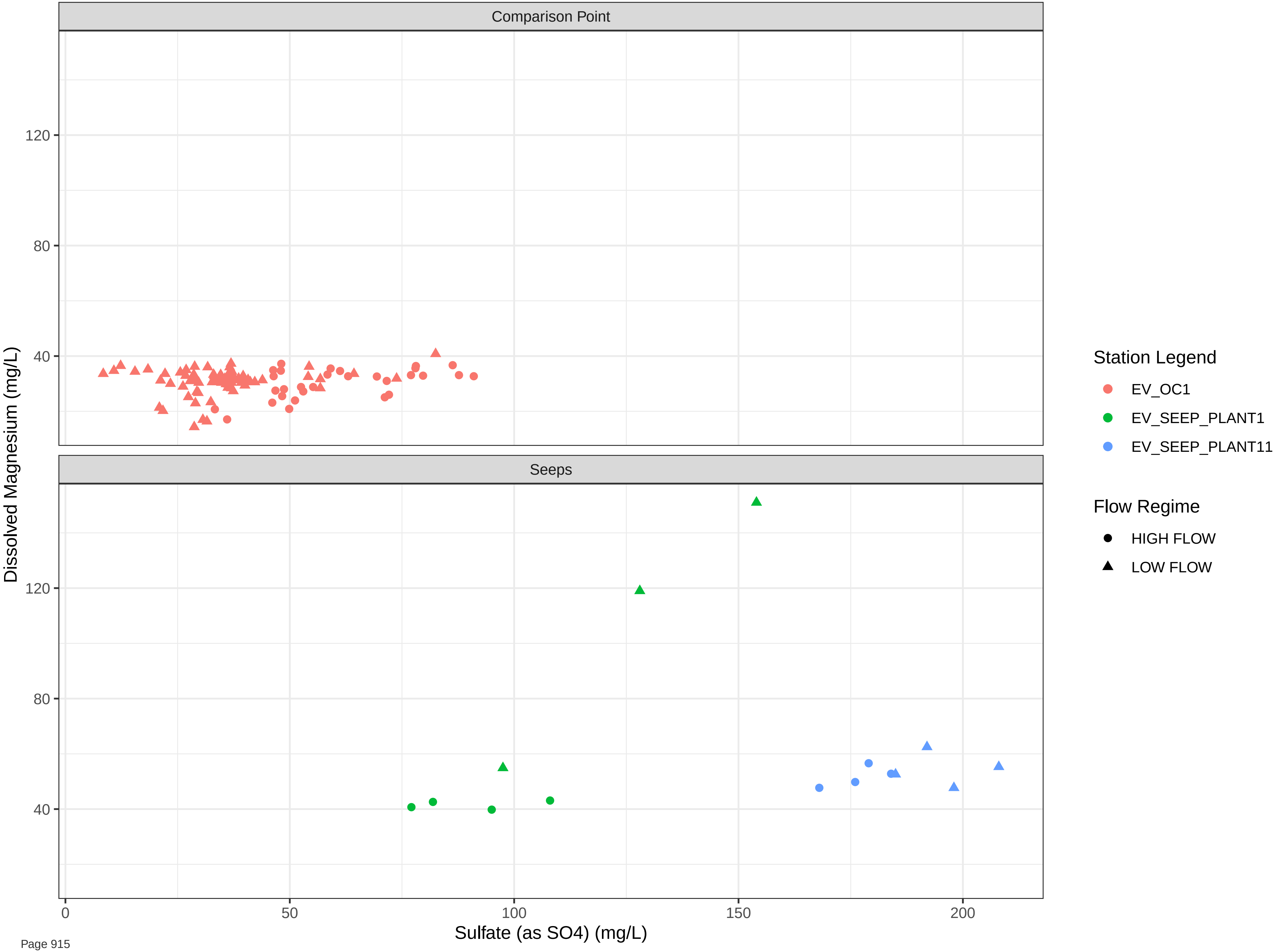

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
100
75
50
25
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

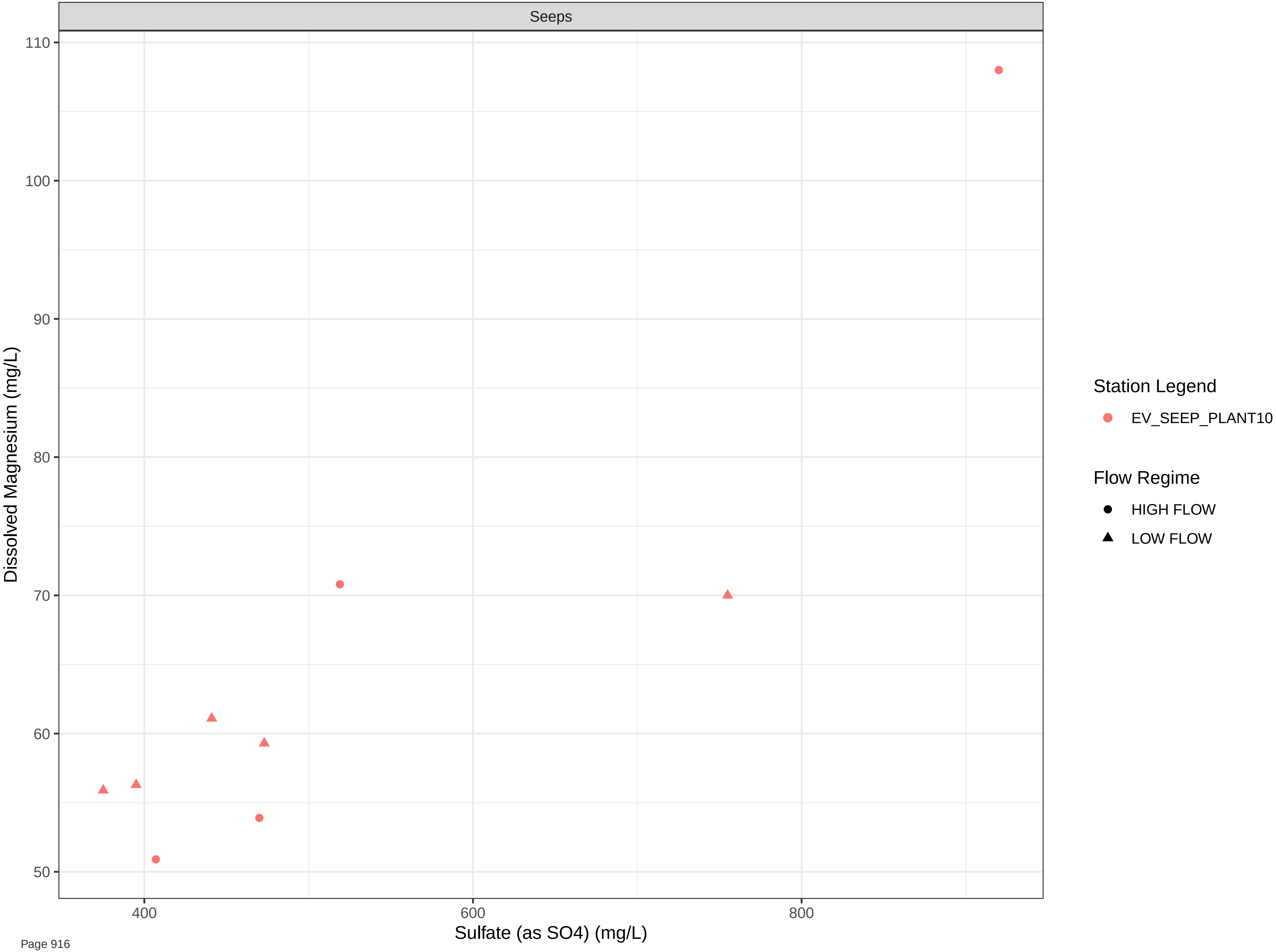


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
90
60
30
0
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

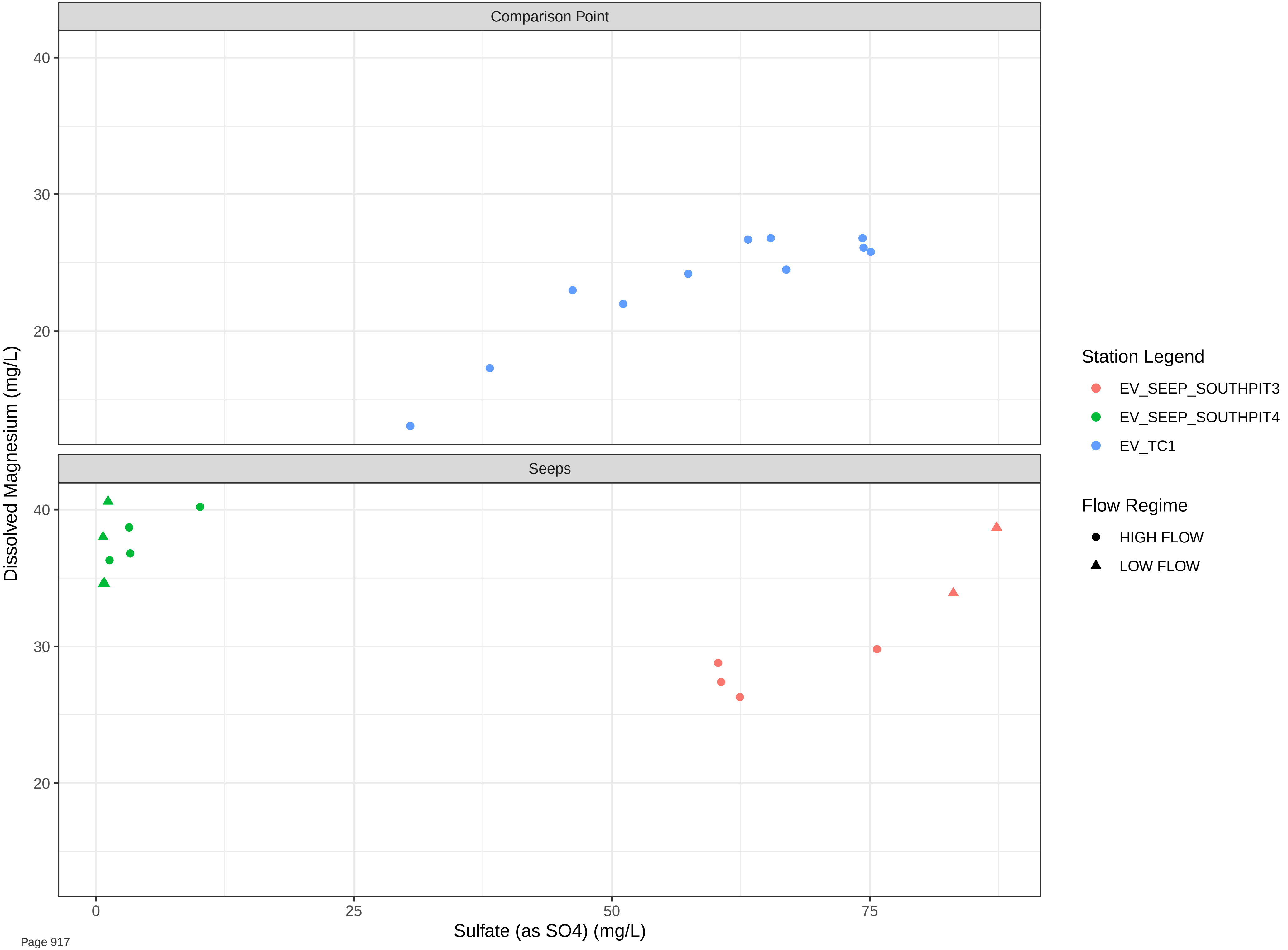


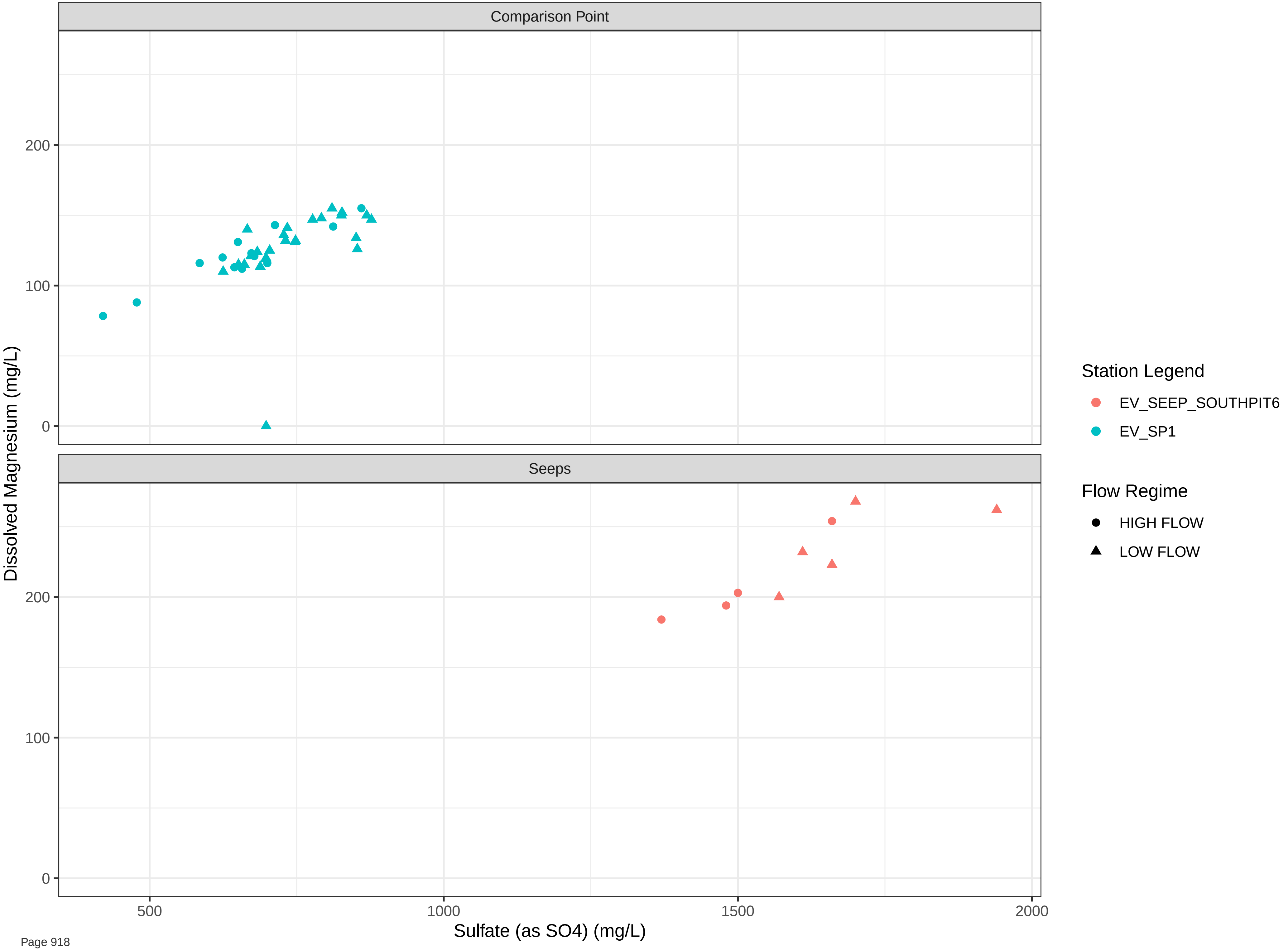
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
100
200
300
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

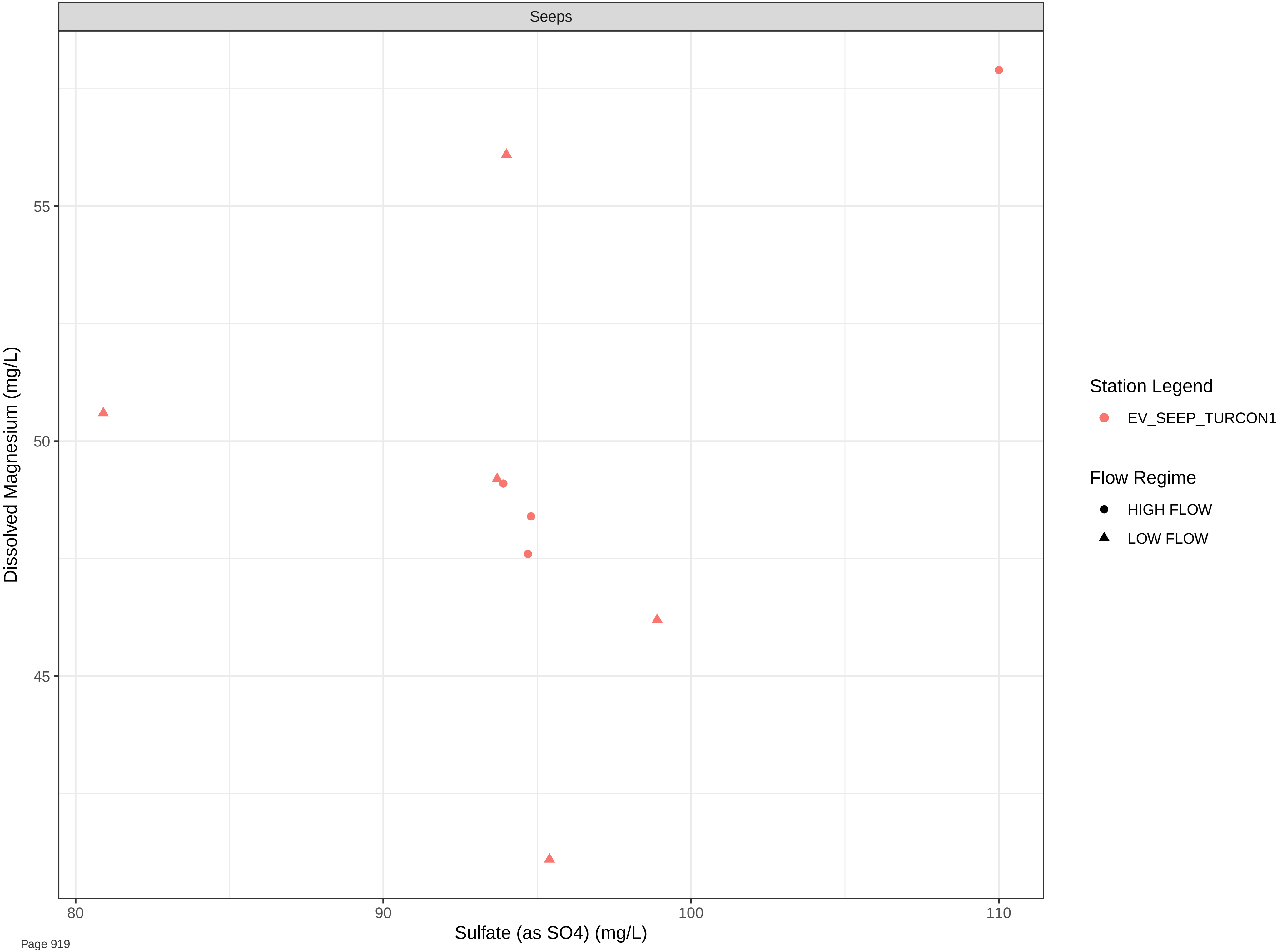

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
120
80
40
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



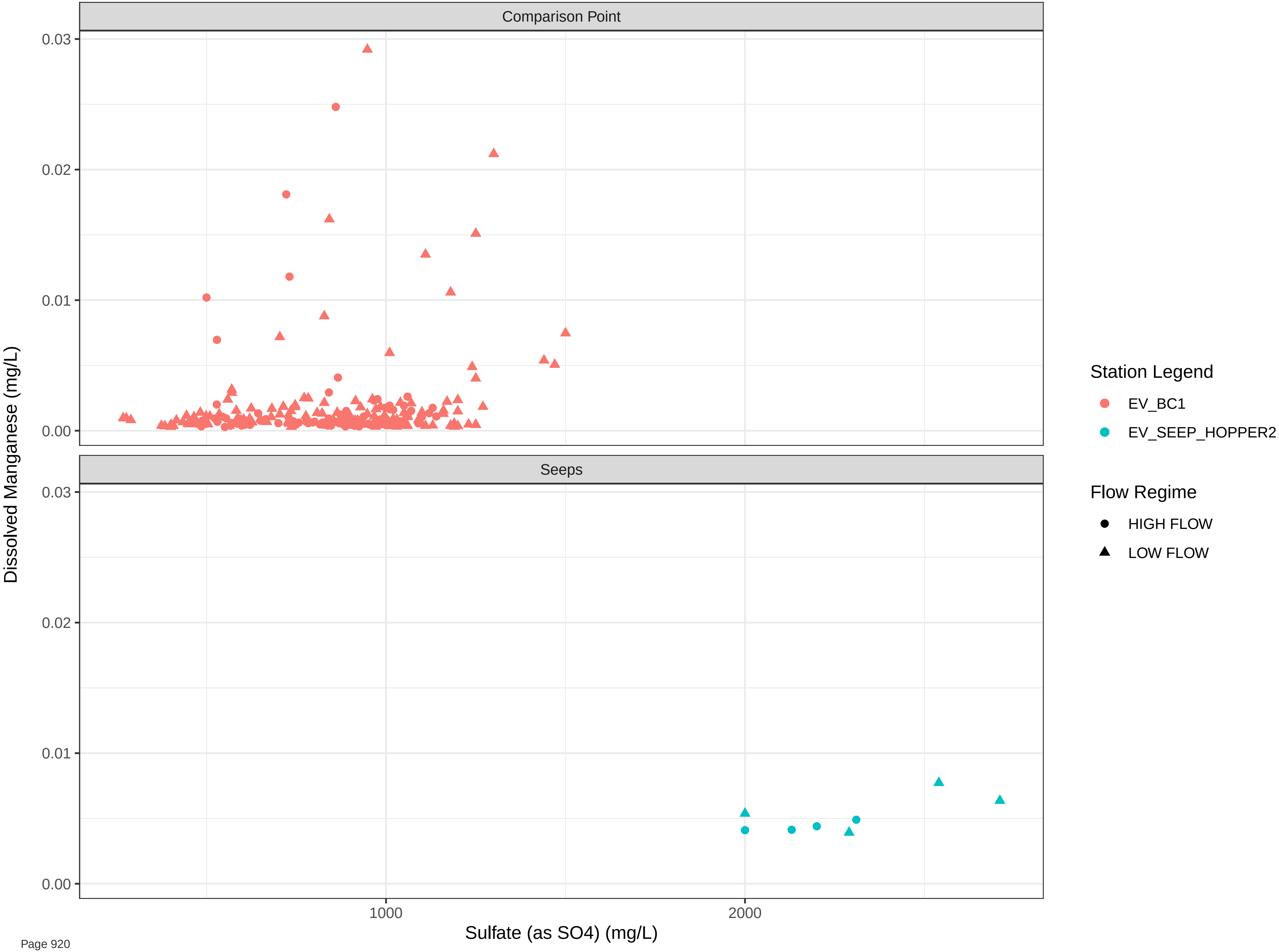
Seeps
Dissolved Magnesium (mg/L)
110
100
90
80
70
60
50
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Magnesium (mg/L)
40
30
20
40
30
20
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

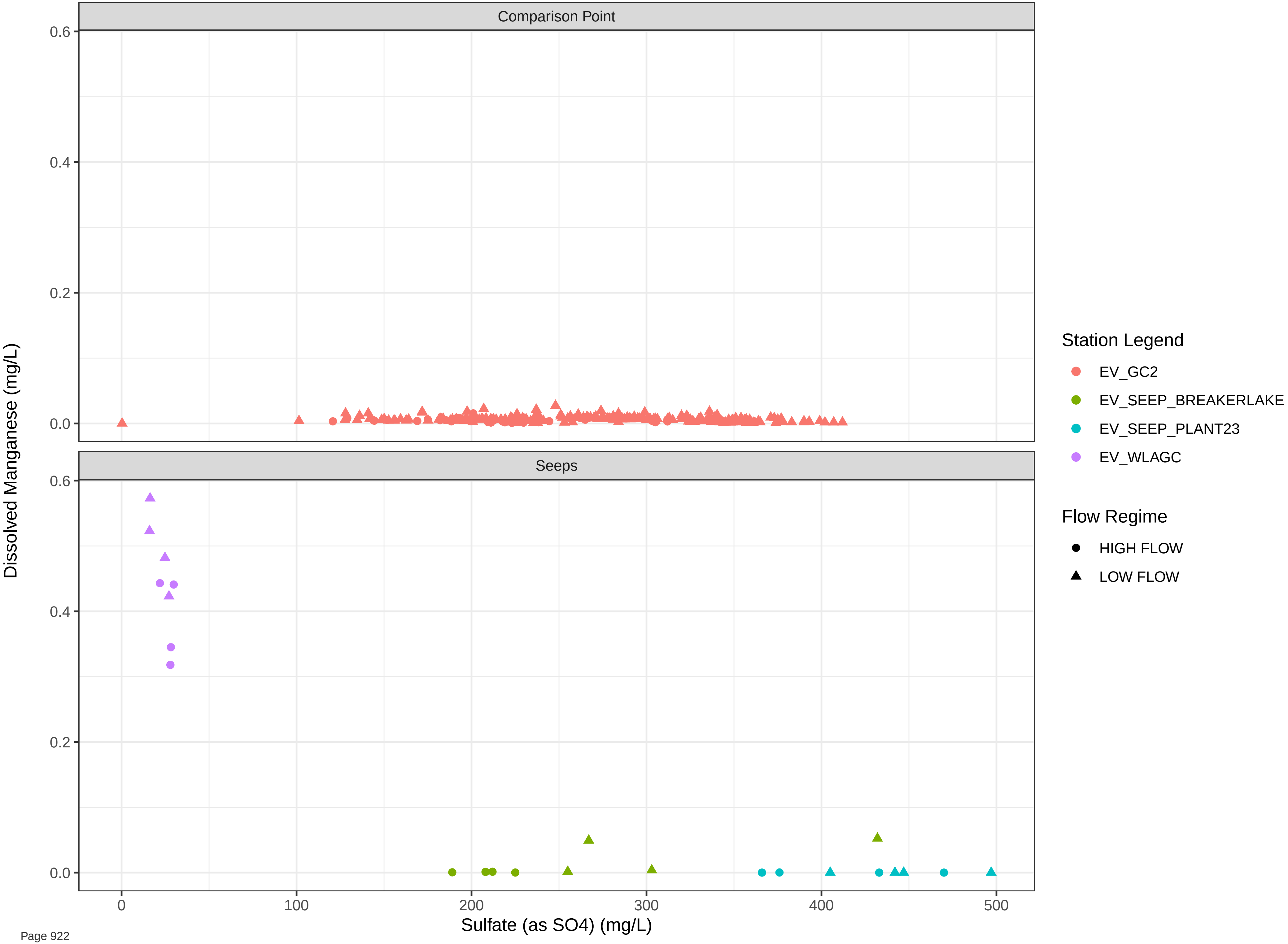

Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



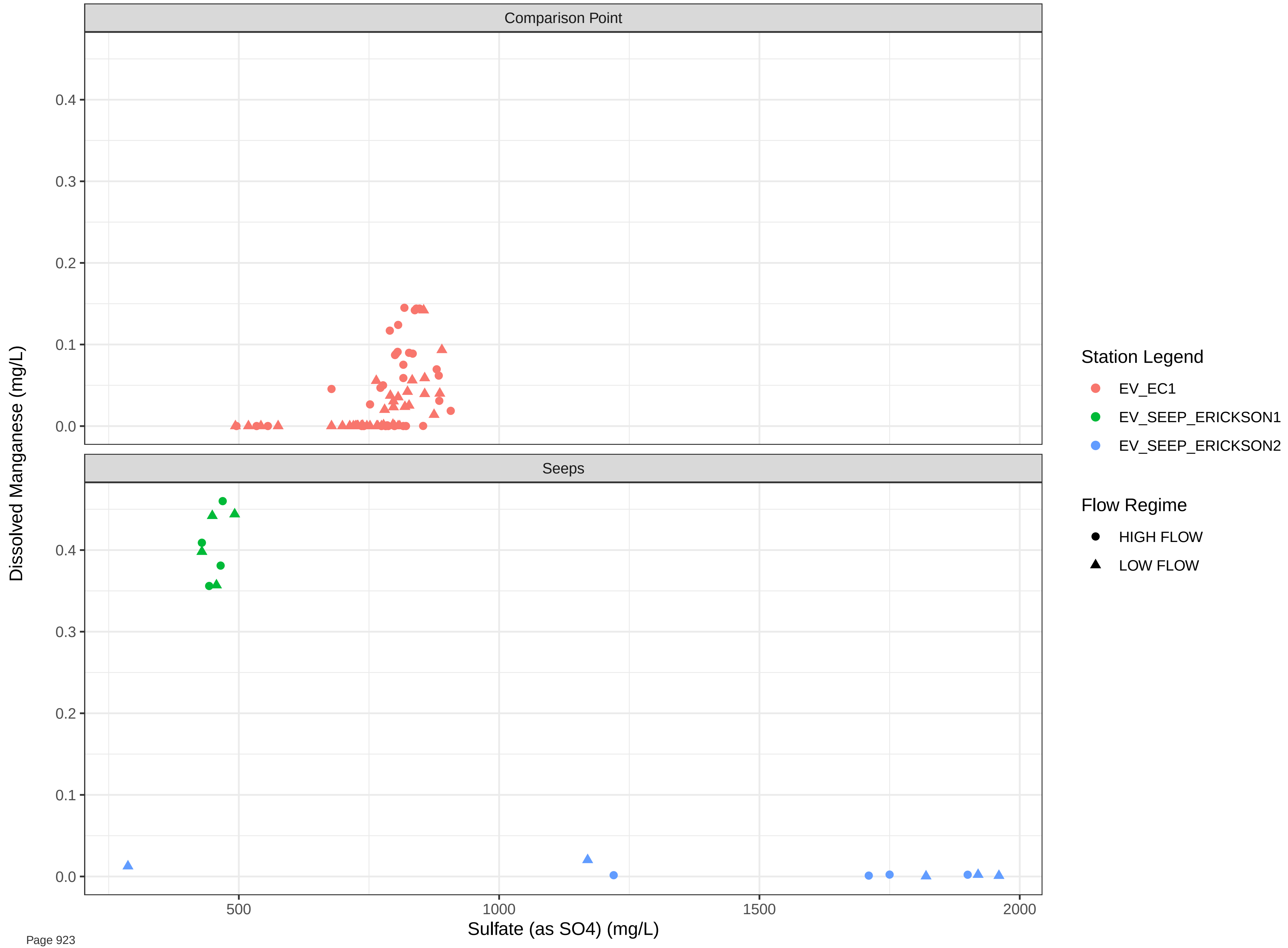
Seeps
Dissolved Magnesium (mg/L)
55
50
45
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

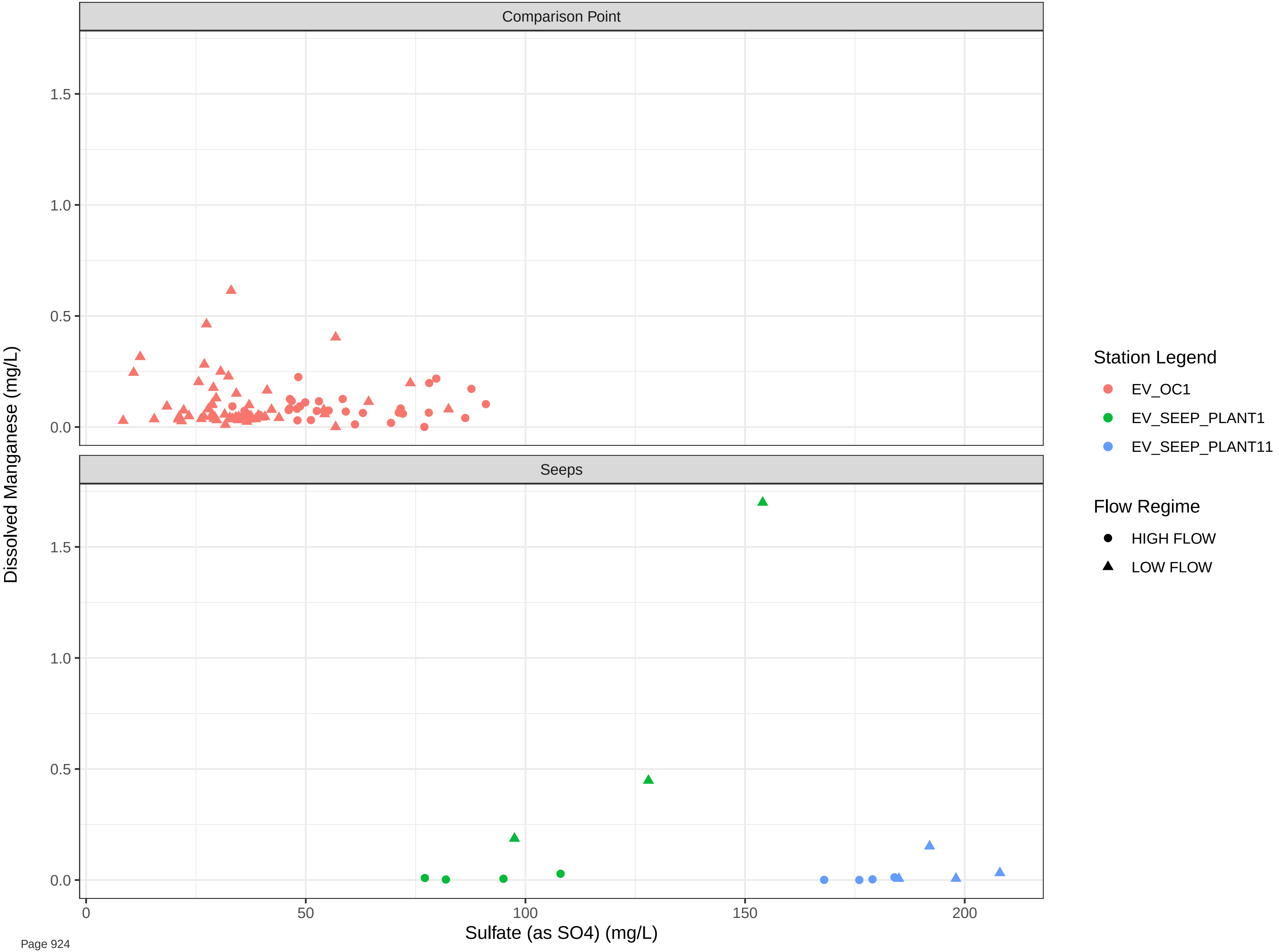

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.00
0.01
0.02
0.03
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

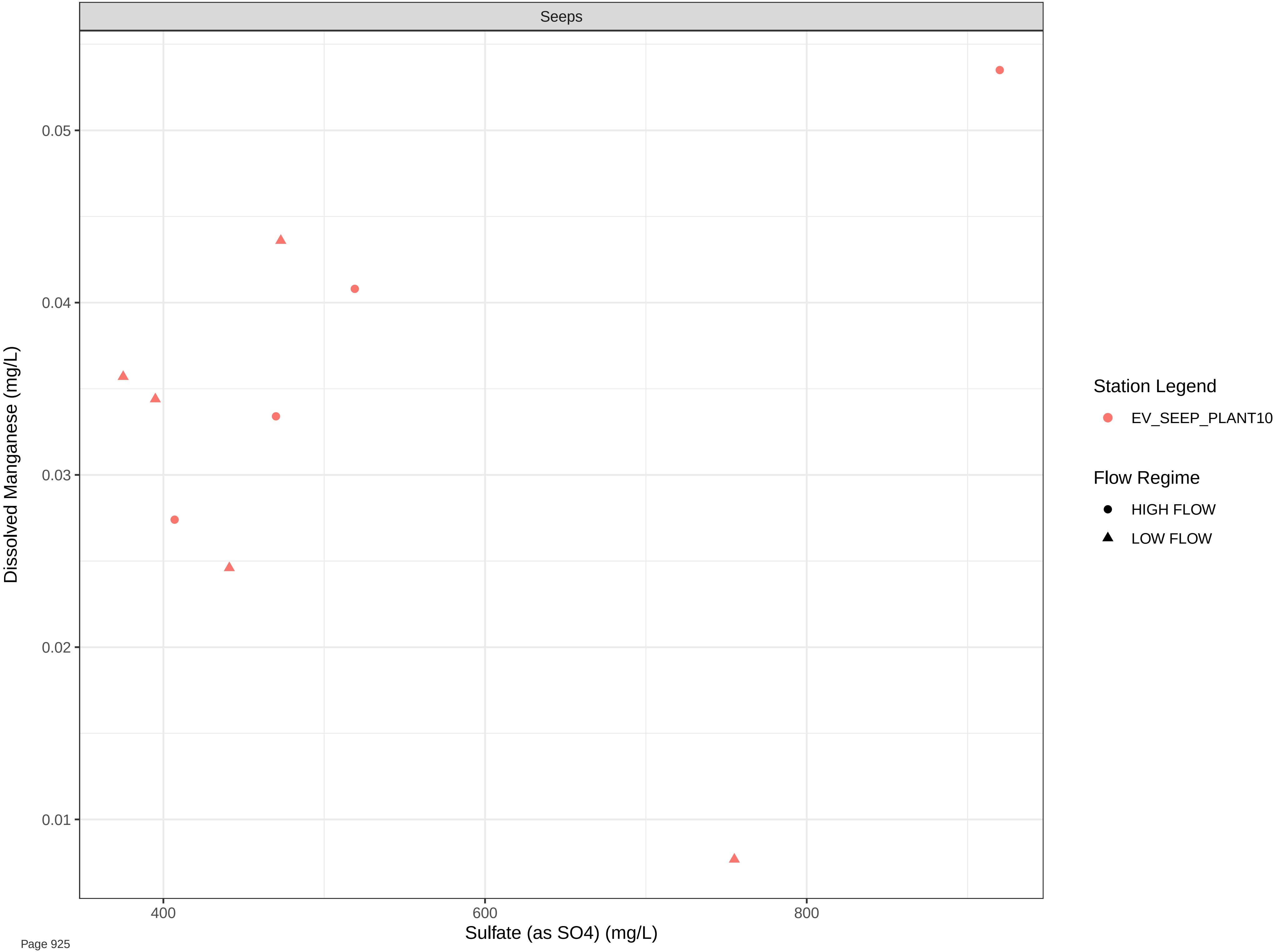

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.0
0.2
0.4
0.6
0.8
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

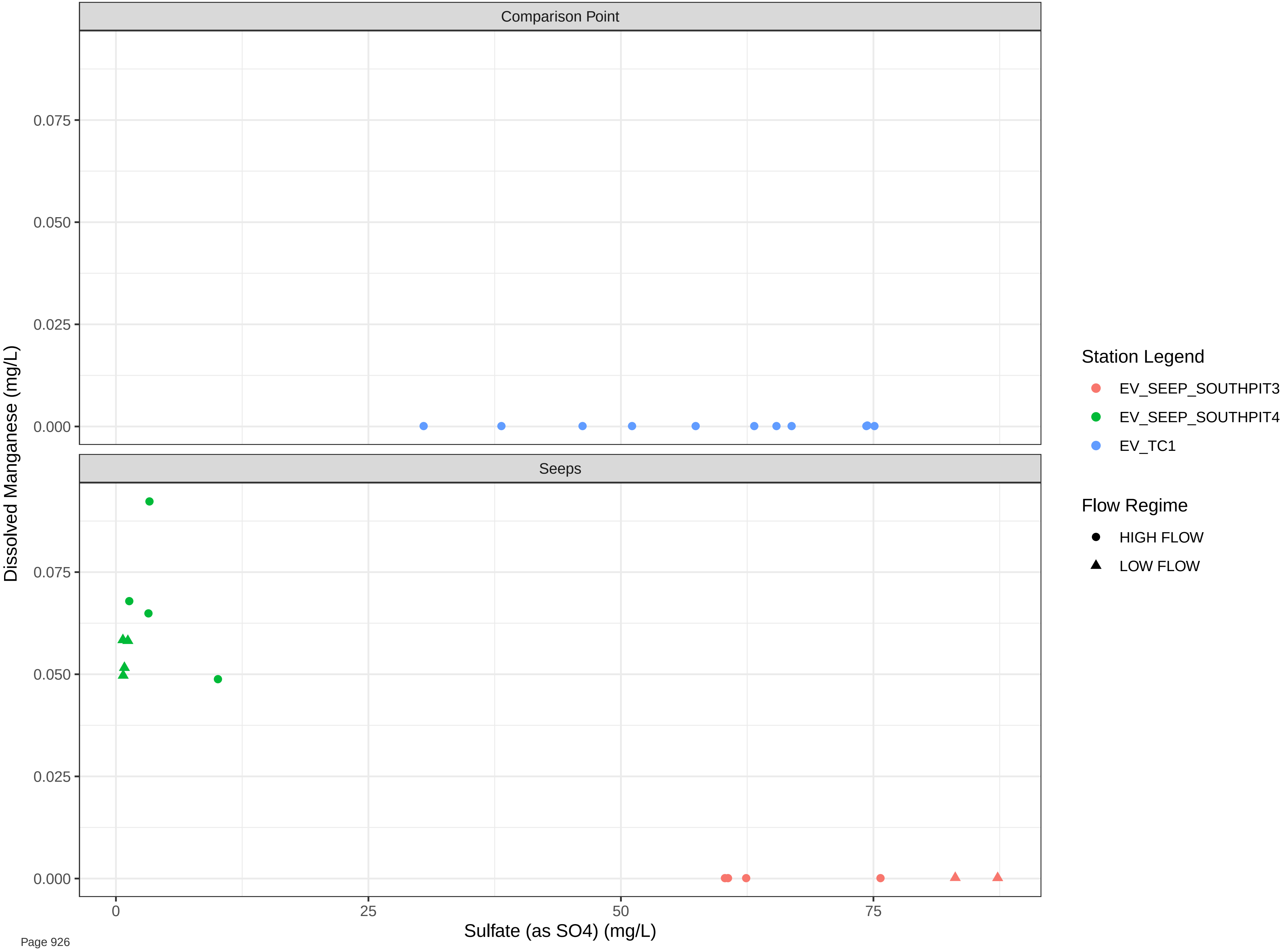


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.6
0.4
0.2
0.0
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

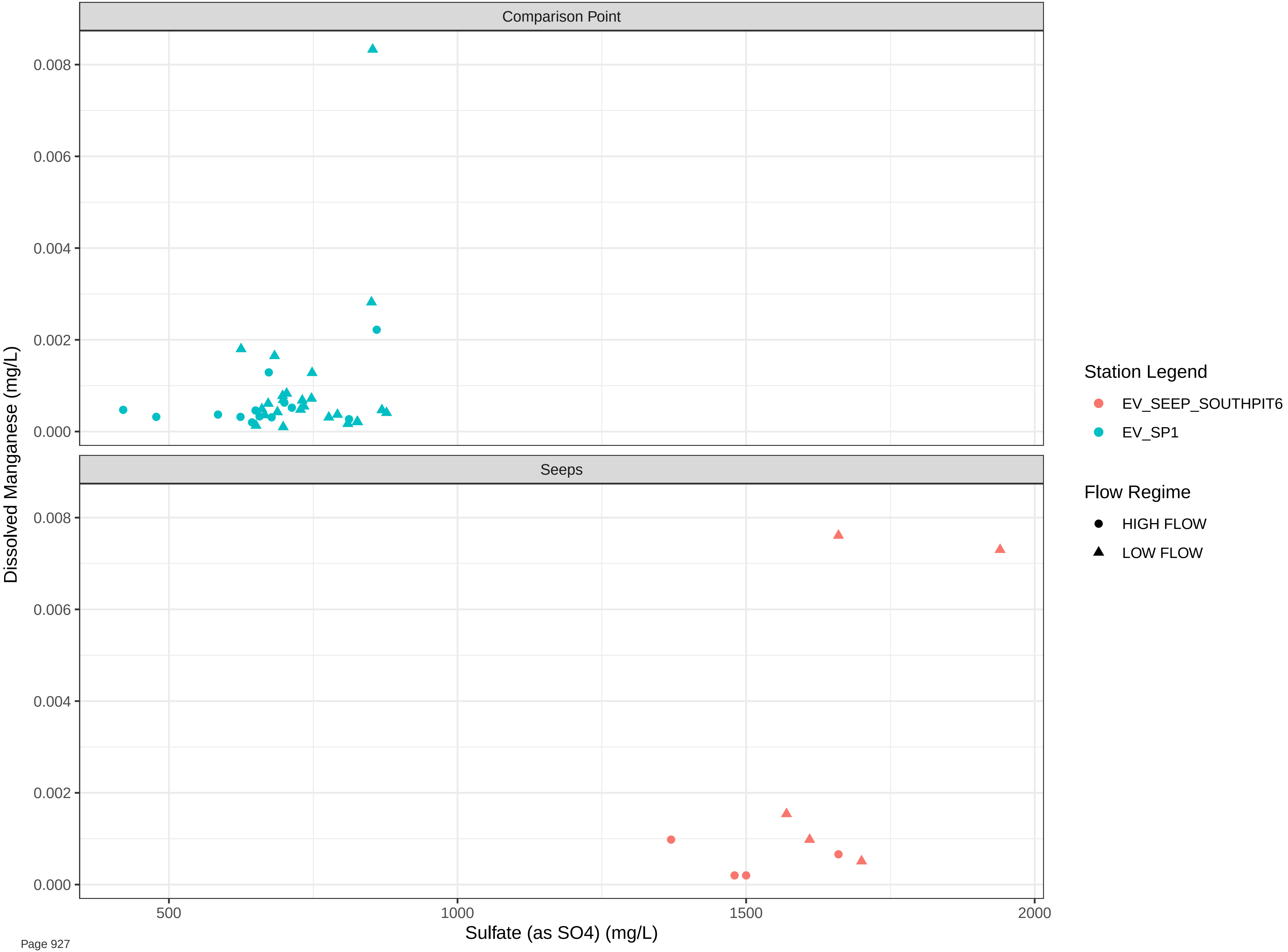

Comparison Point
Seeps
Dissolved Manganese (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0.3
0.4
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

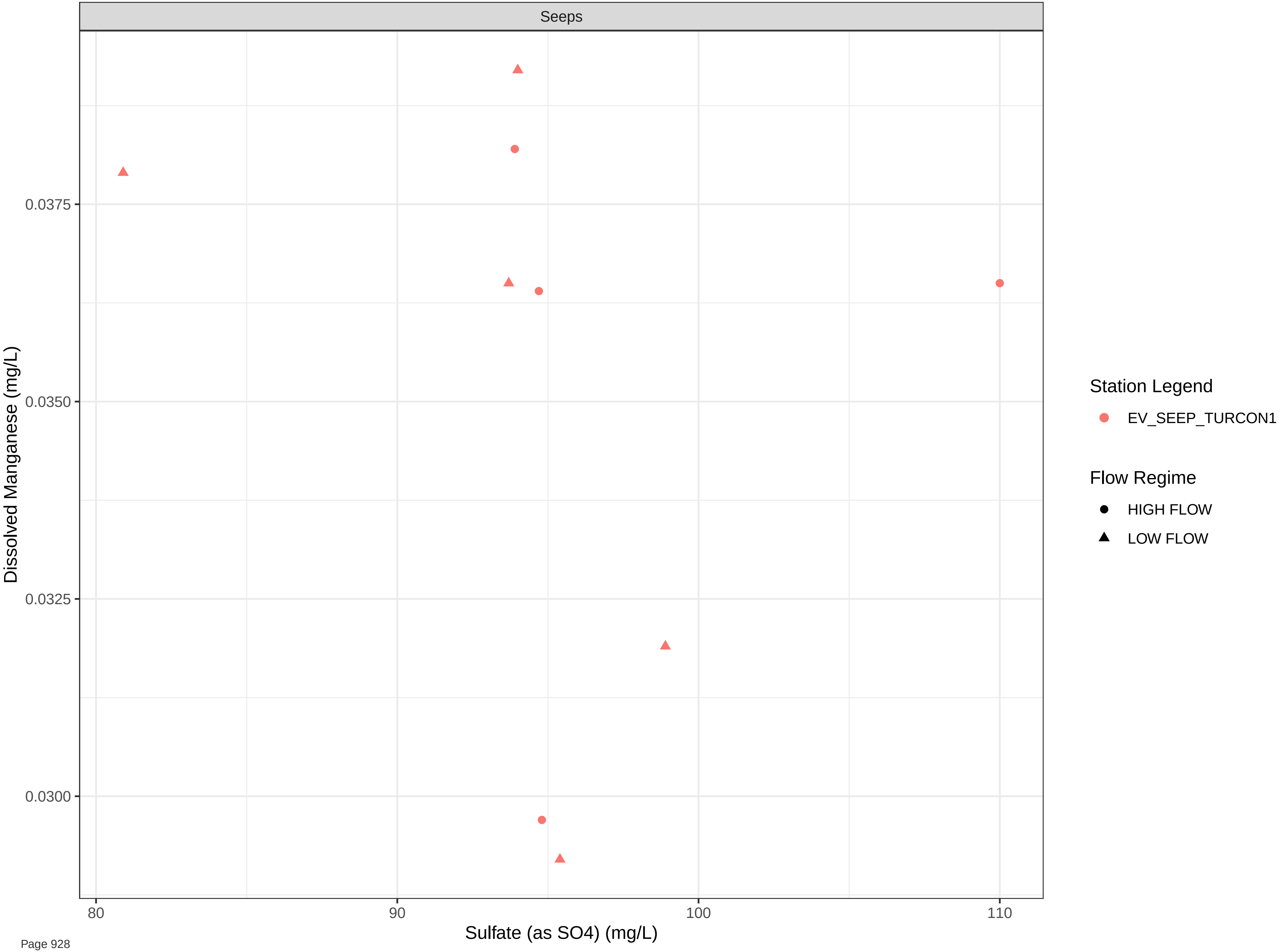

Comparison Point
Seeps
Dissolved Manganese (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.5
1.0
1.5
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

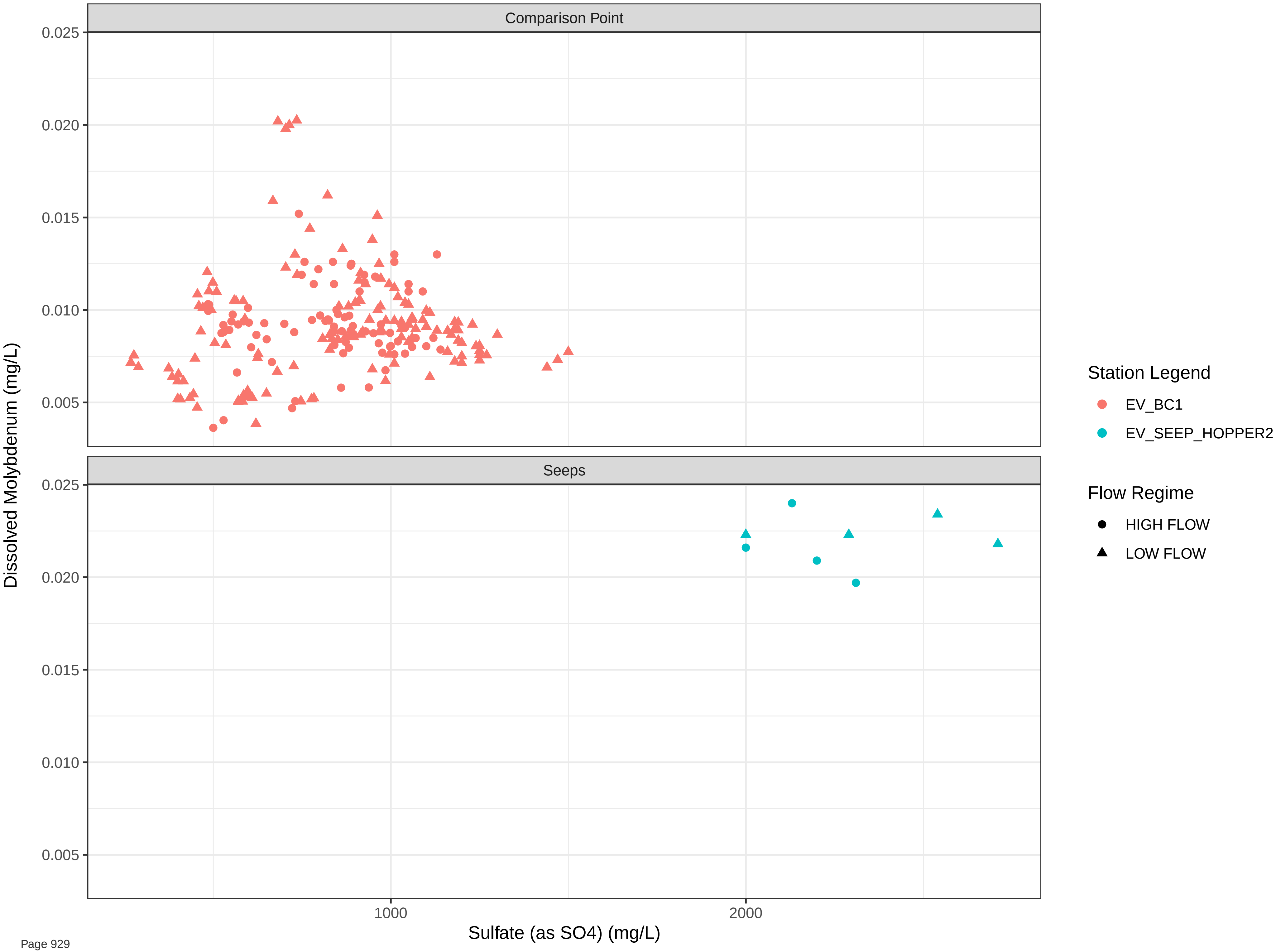

Seeps
Dissolved Manganese (mg/L)
0.05
0.04
0.03
0.02
0.01
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



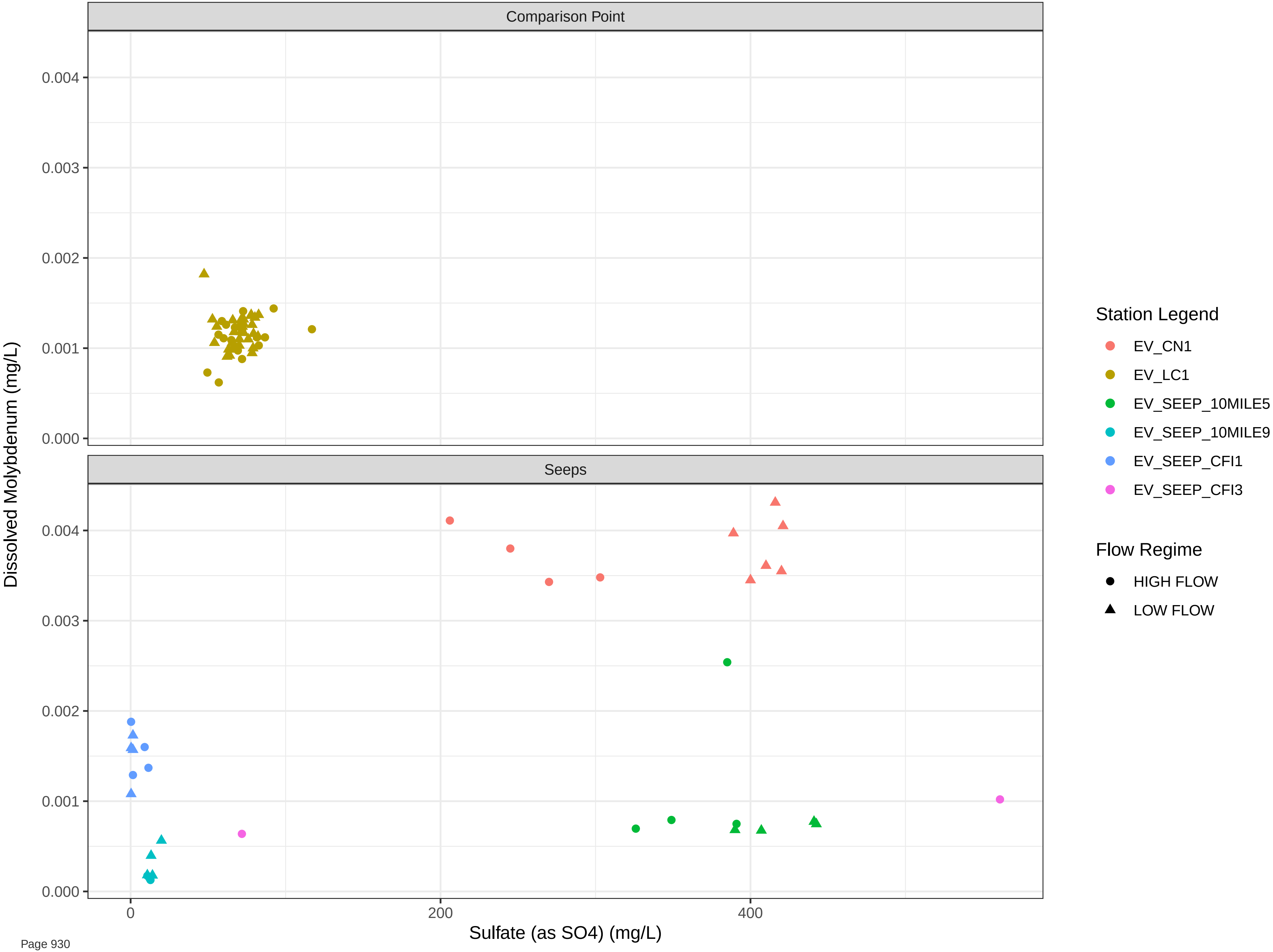
Comparison Point
Seeps
0.075
0.050
0.025
0.000
0
25
50
75
Dissolved Manganese (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

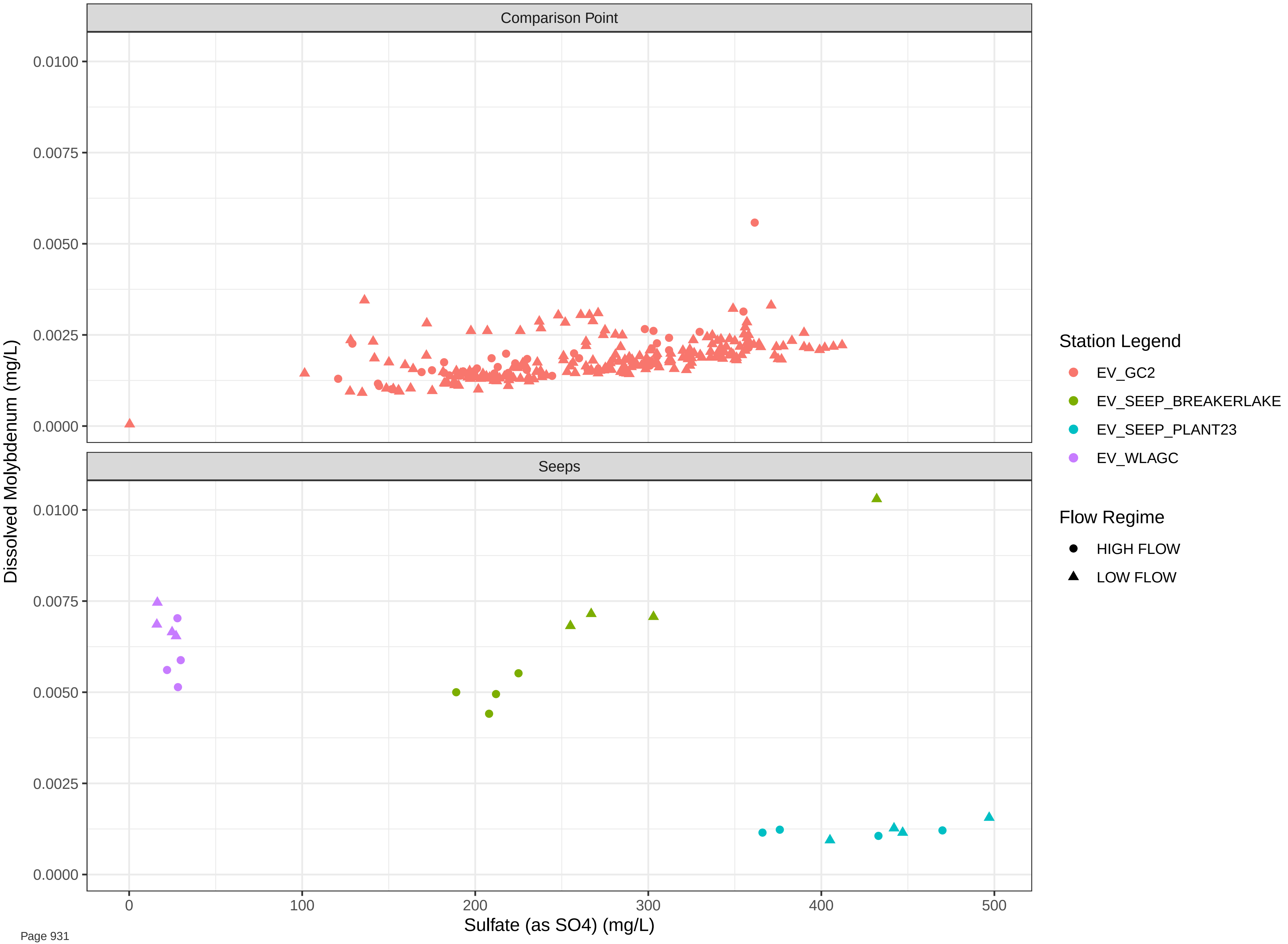

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.008
0.006
0.004
0.002
0.000
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
Dissolved Manganese (mg/L)
0.0375
0.0350
0.0325
0.0300
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

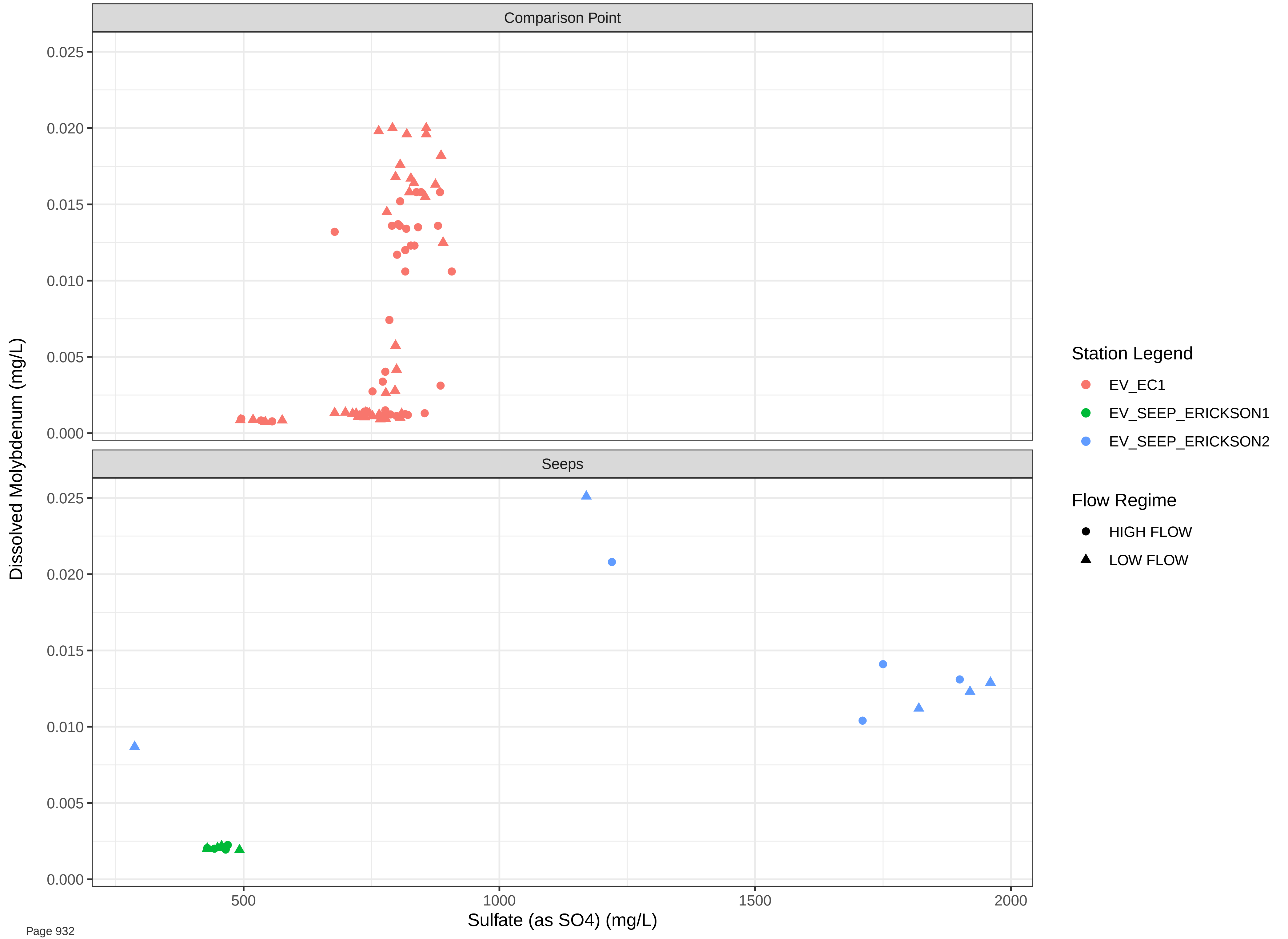


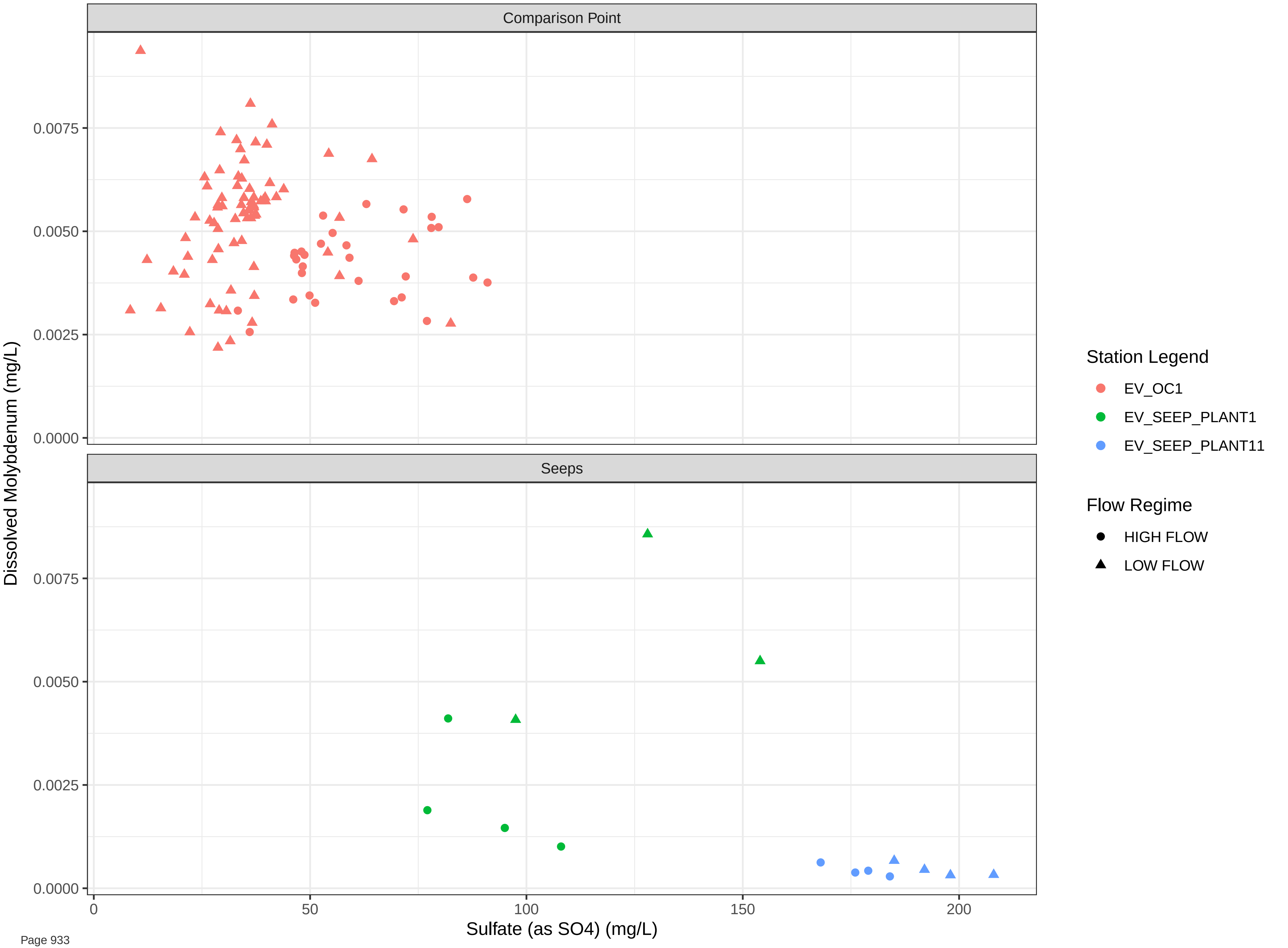
Comparison Point
Seeps
0.025
0.020
0.015
0.010
0.005
1000
2000
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

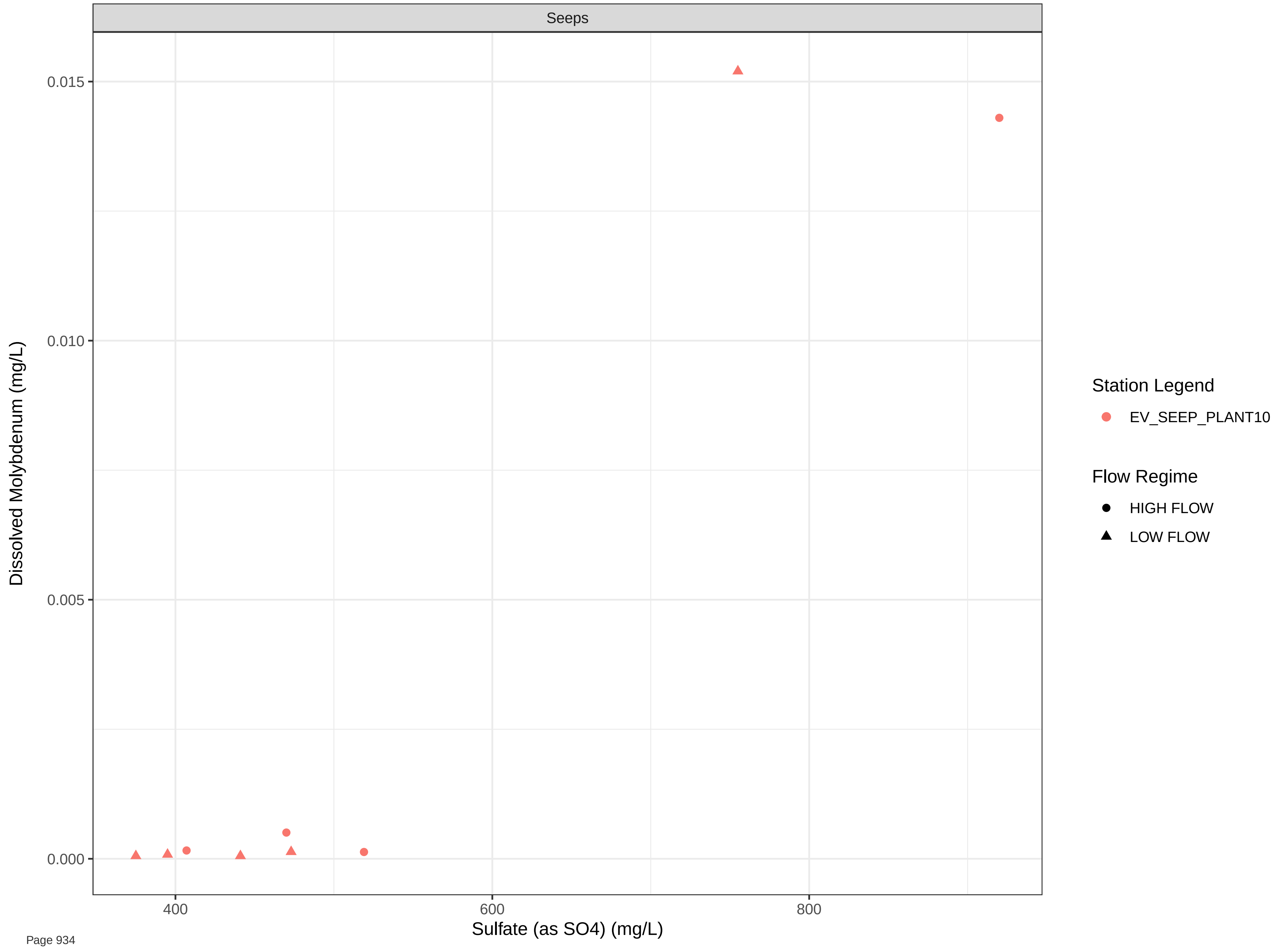

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.000
0.001
0.002
0.003
0.004
Sulfate (as SO4) (mg/L)
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



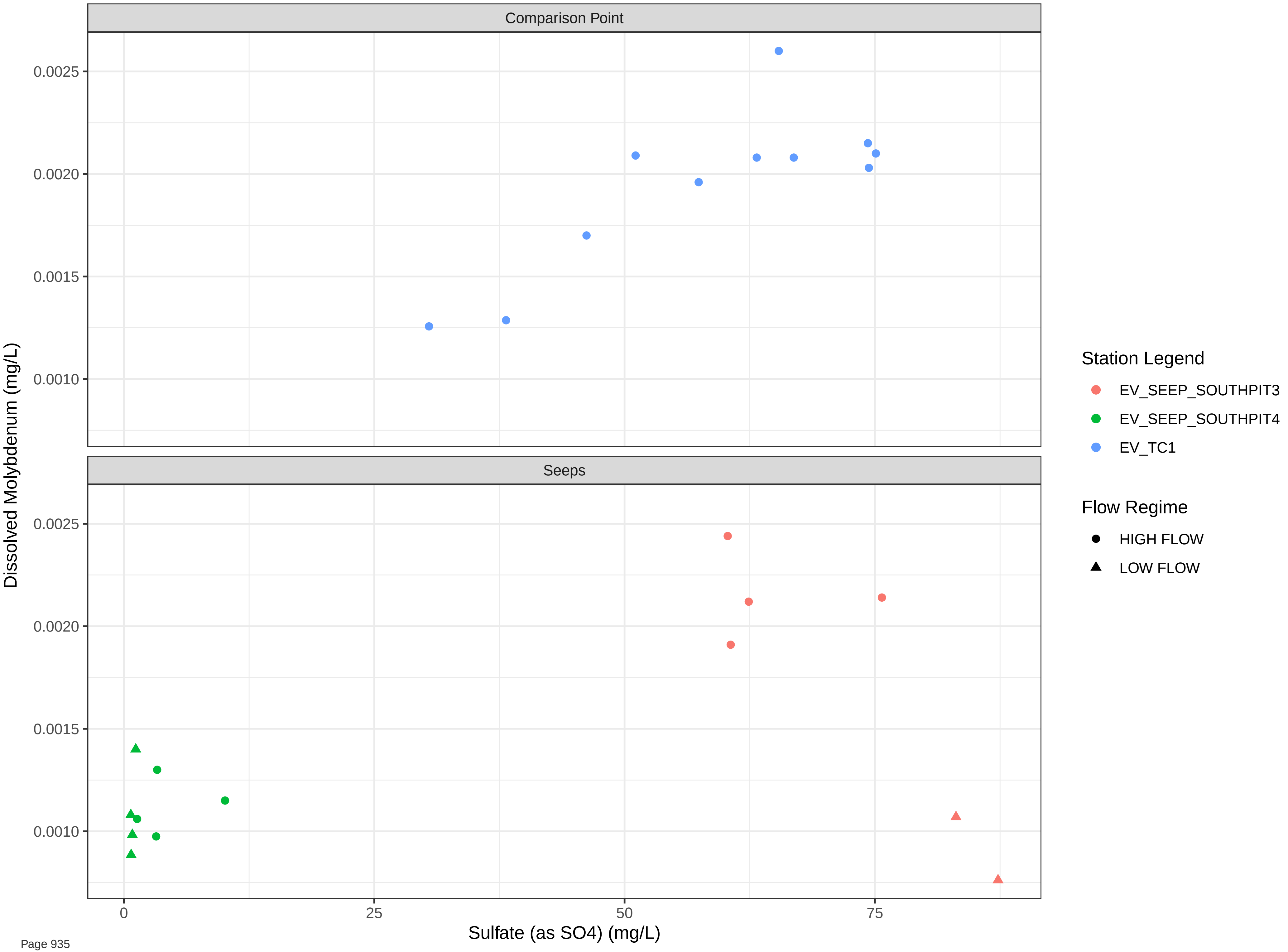
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.0000
0.0025
0.0050
0.0075
0.0100
Sulfate (as SO4) (mg/L)
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

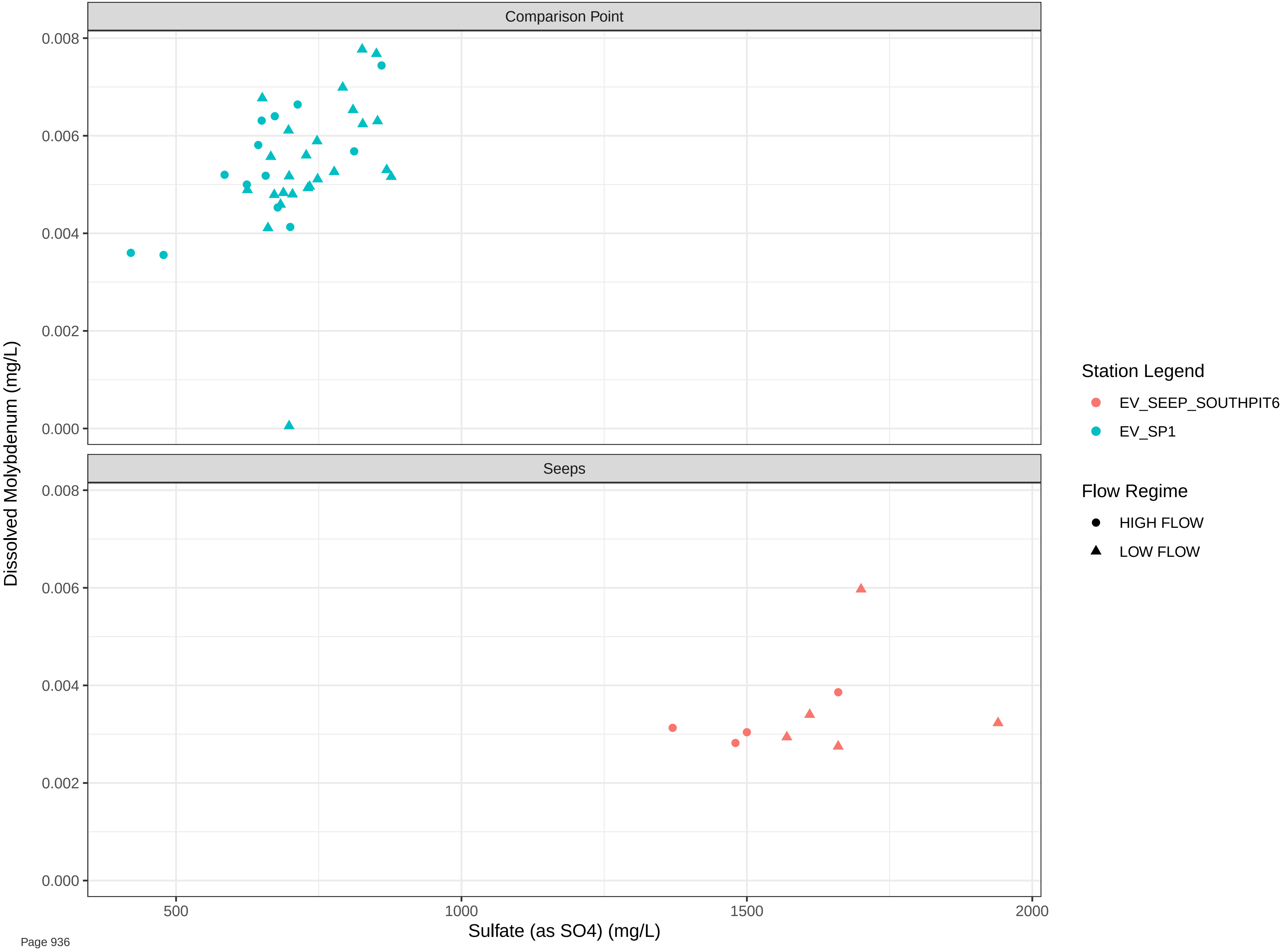

Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
0.000
0.005
0.010
0.015
0.020
0.025
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.0000
0.0025
0.0050
0.0075
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

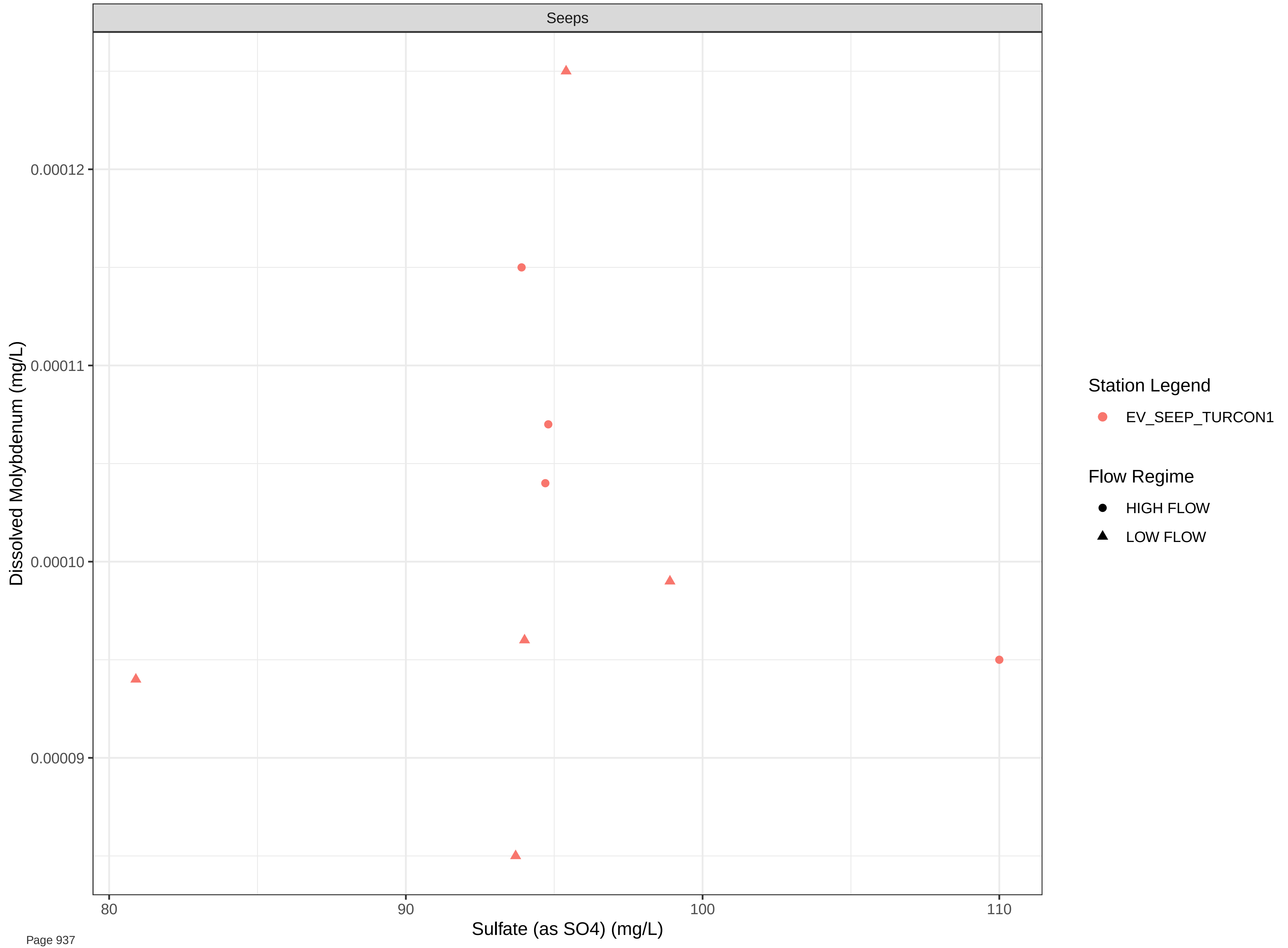


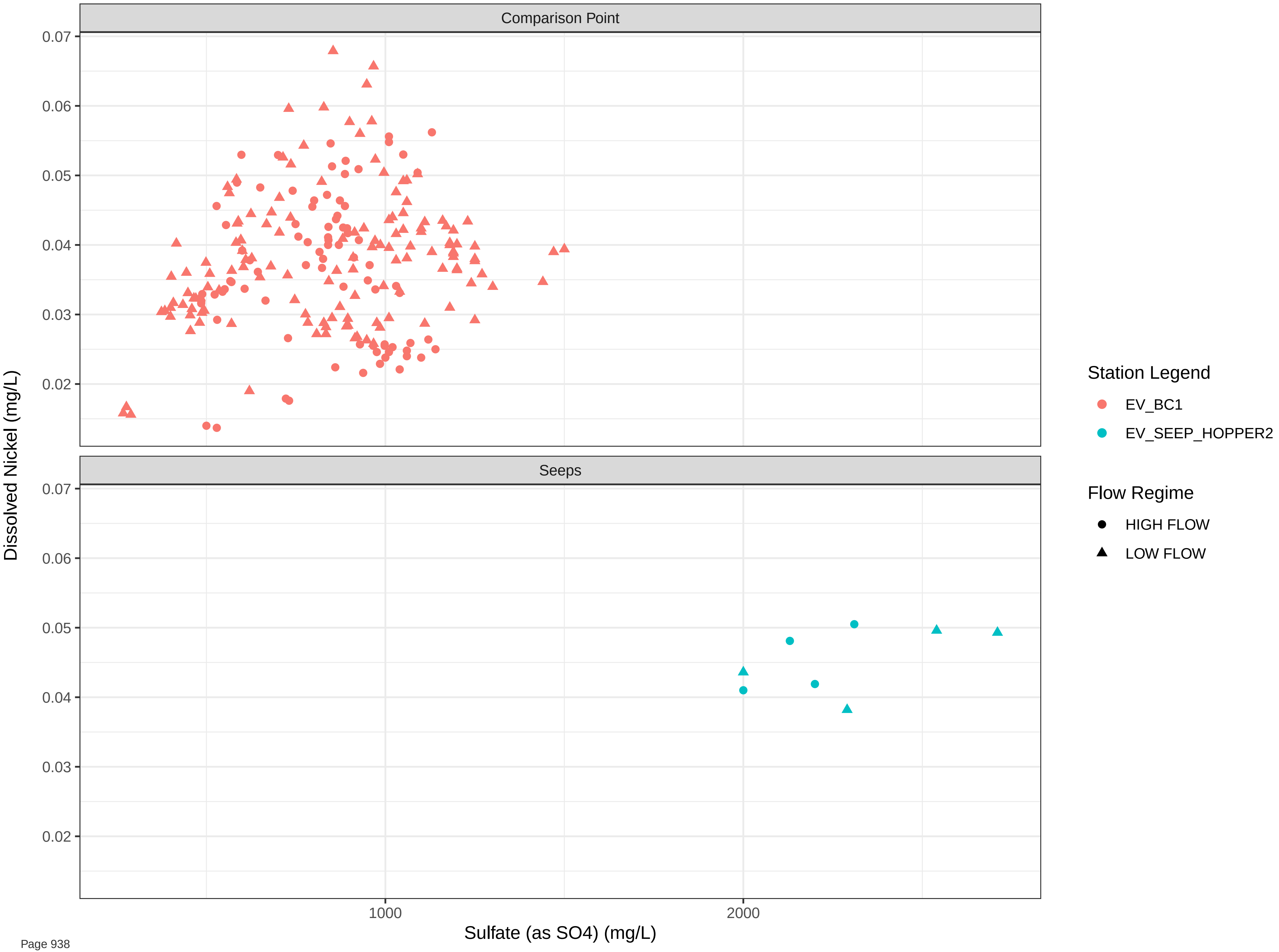
Seeps
0.015
0.010
0.005
0.000
400
600
800
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.0025
0.0020
0.0015
0.0010
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

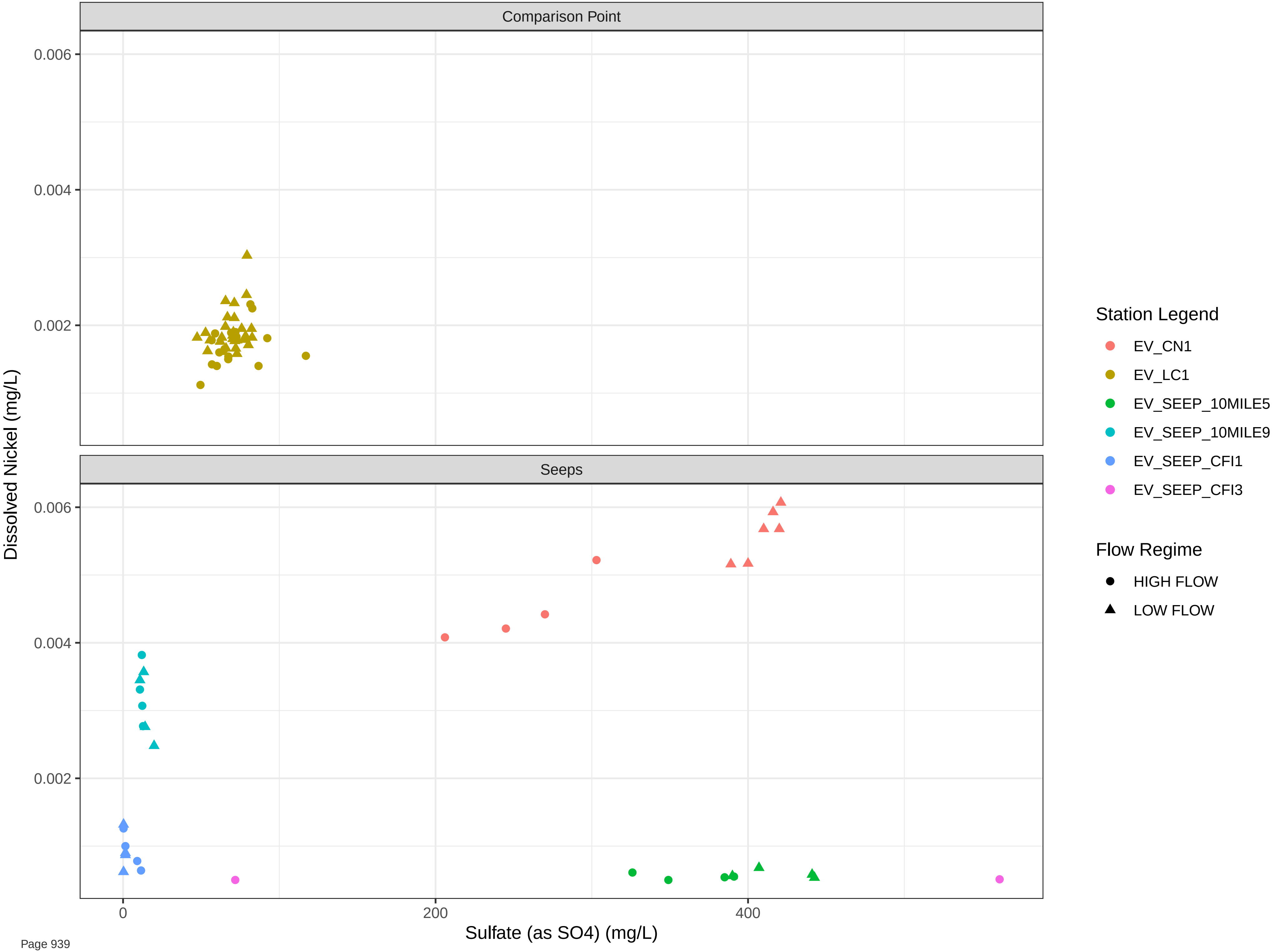


Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.000
0.002
0.004
0.006
0.008
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

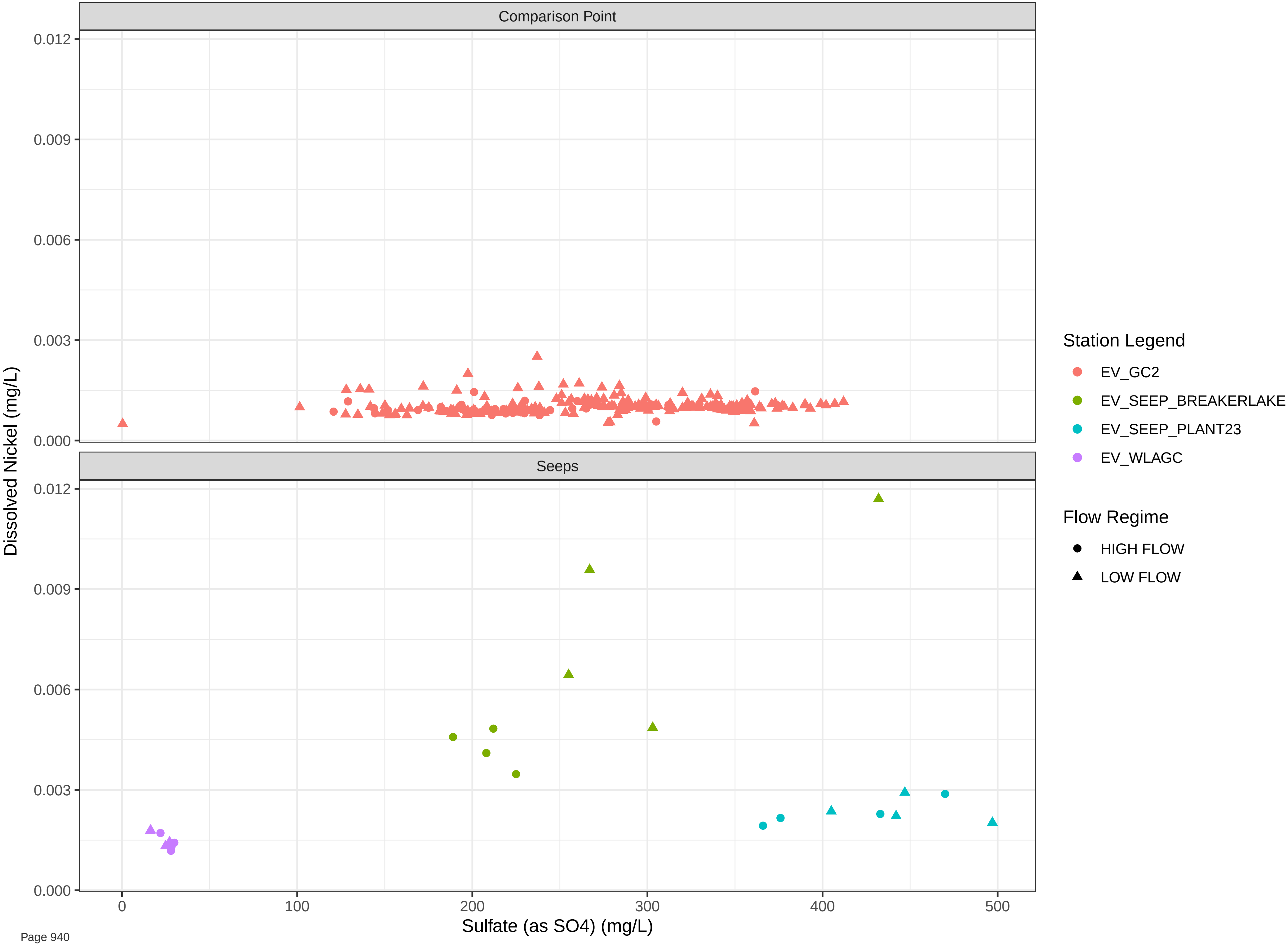

Seeps
Dissolved Molybdenum (mg/L)
0.00012
0.00011
0.00010
0.00009
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



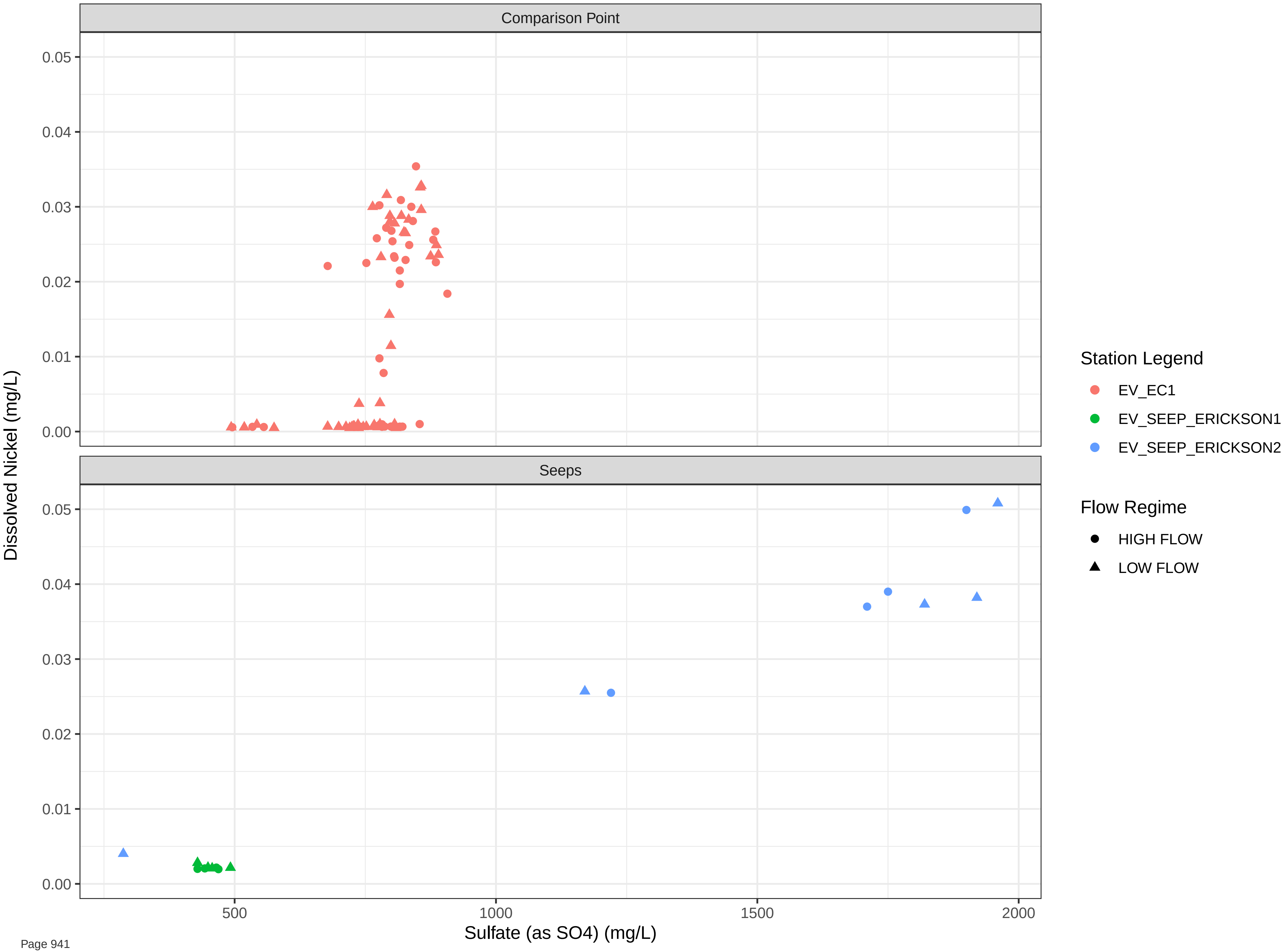
Comparison Point
Seeps
0.07
0.06
0.05
0.04
0.03
0.02
Dissolved Nickel (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



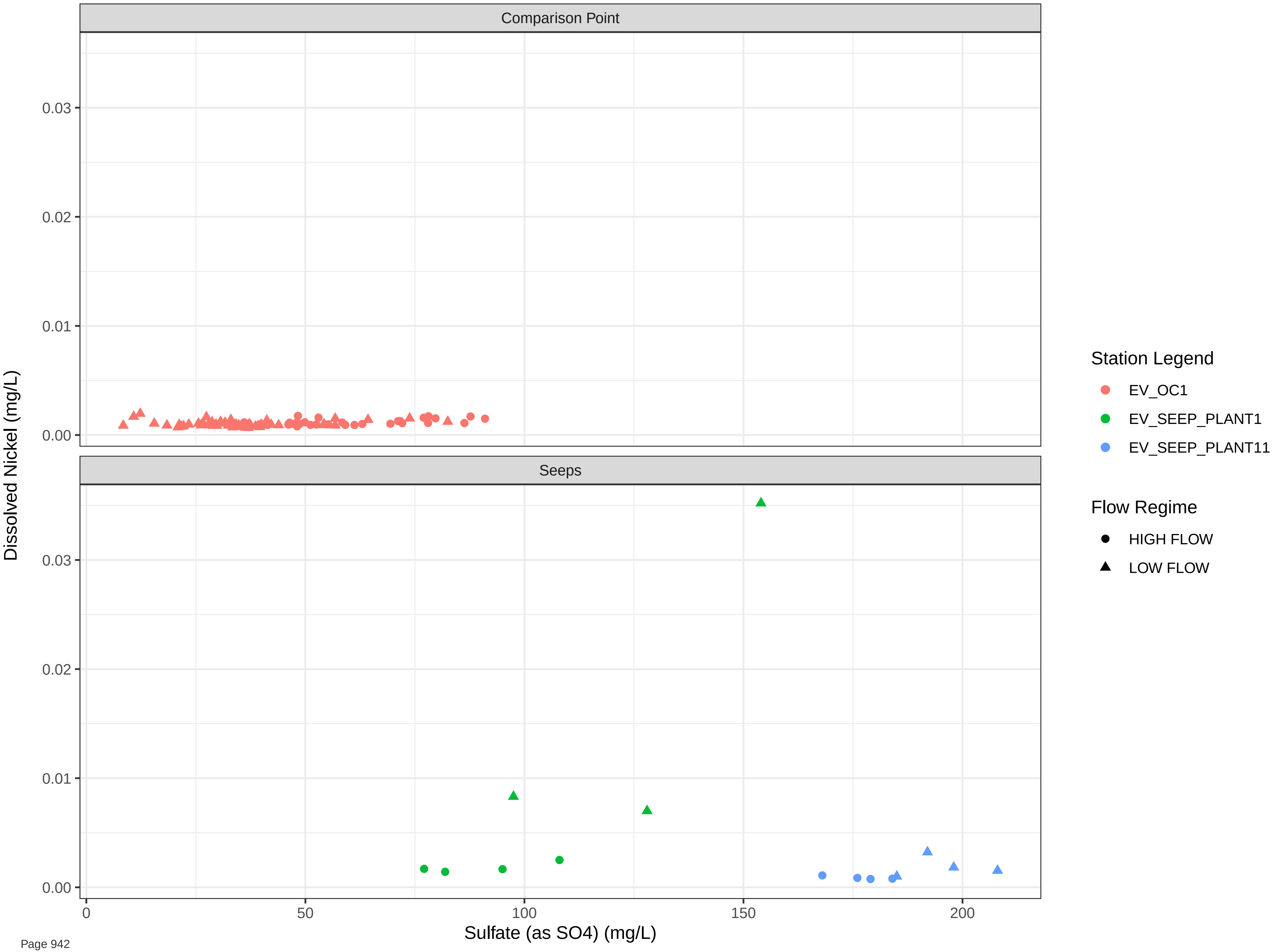
Comparison Point
Seeps
0.006
0.004
0.002
0
200
400
Dissolved Nickel (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



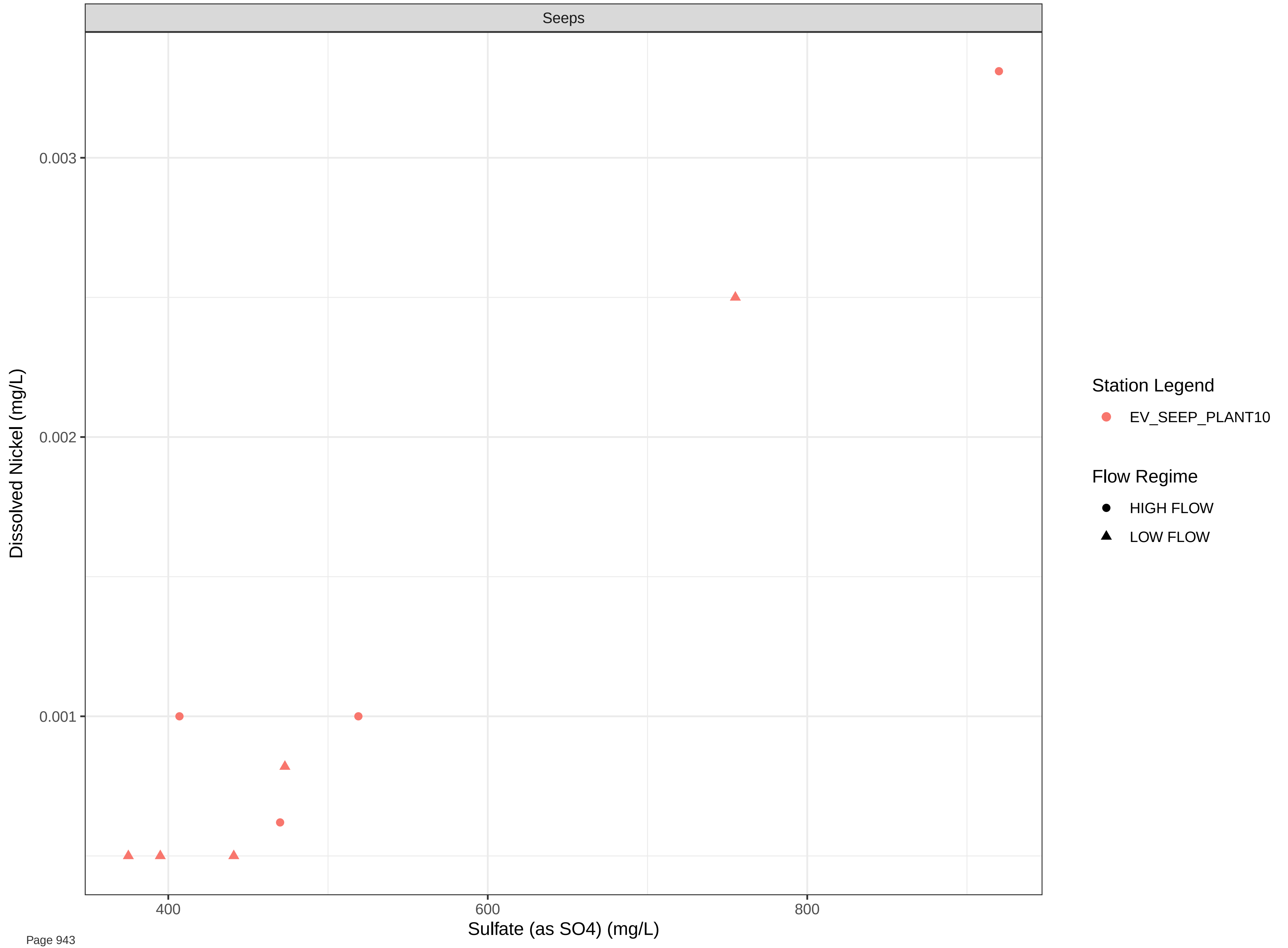
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.012
0.009
0.006
0.003
0.000
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



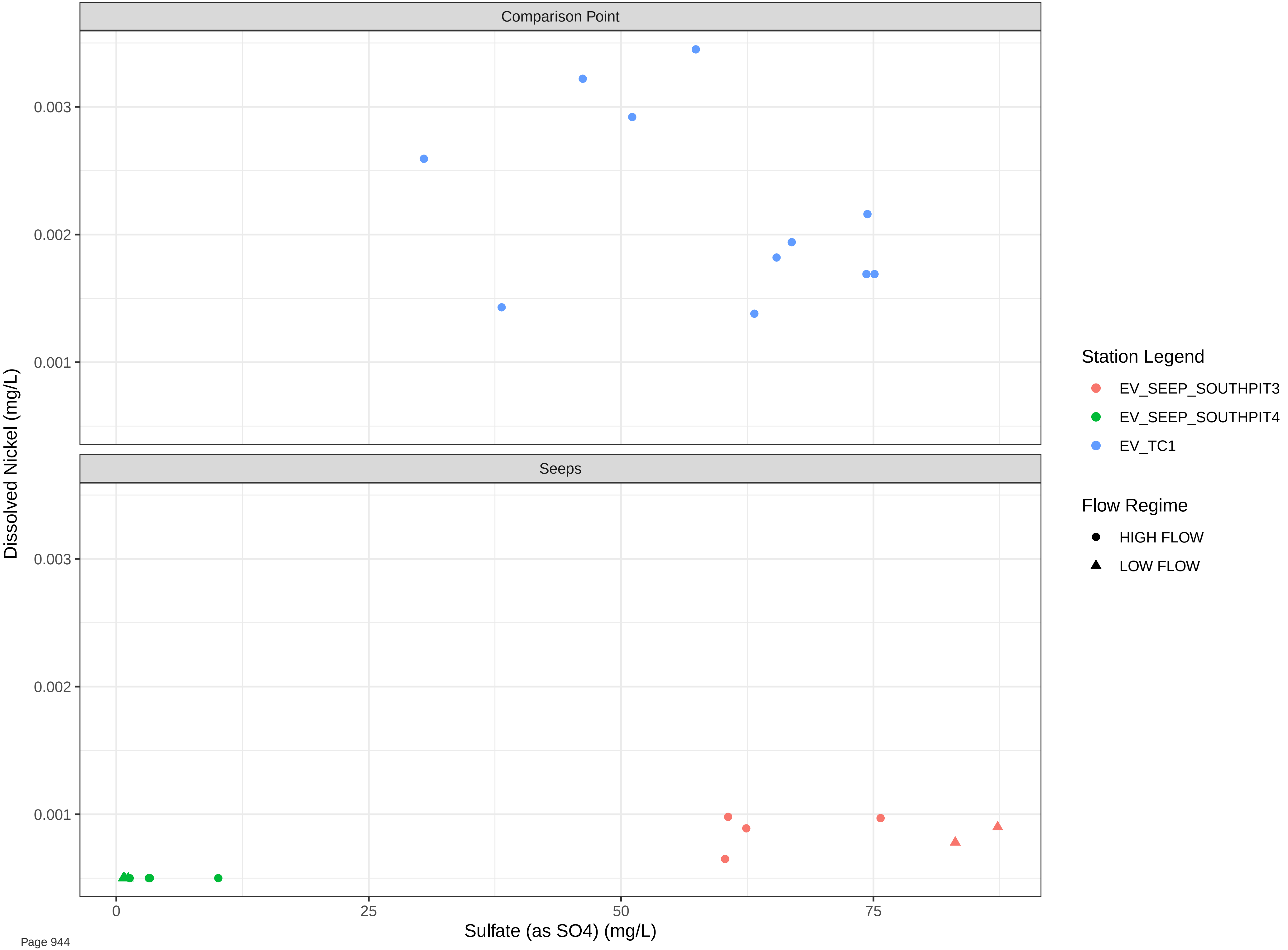
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



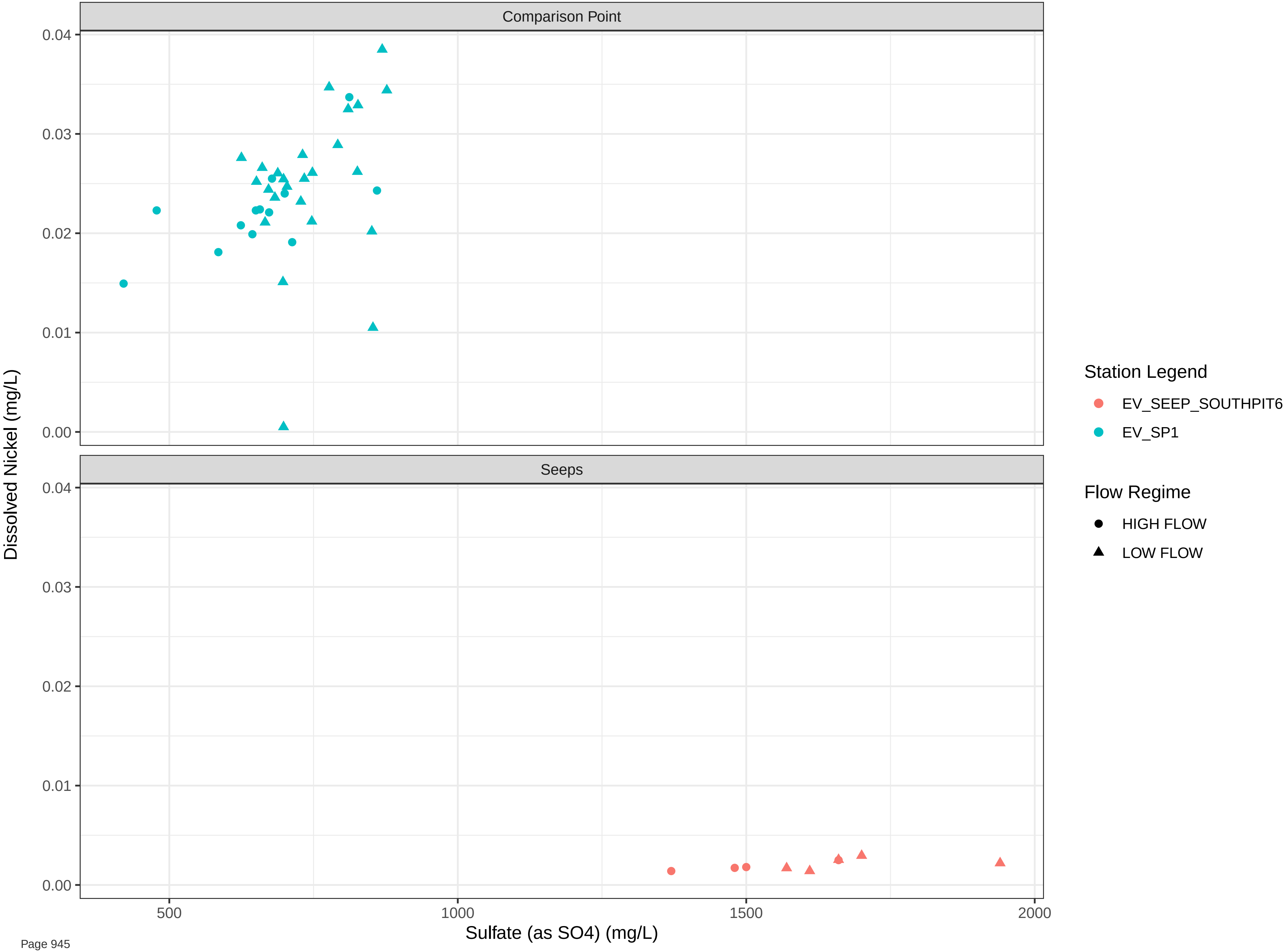
Comparison Point
Seeps
0.00
0.01
0.02
0.03
0
50
100
150
200
Dissolved Nickel (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



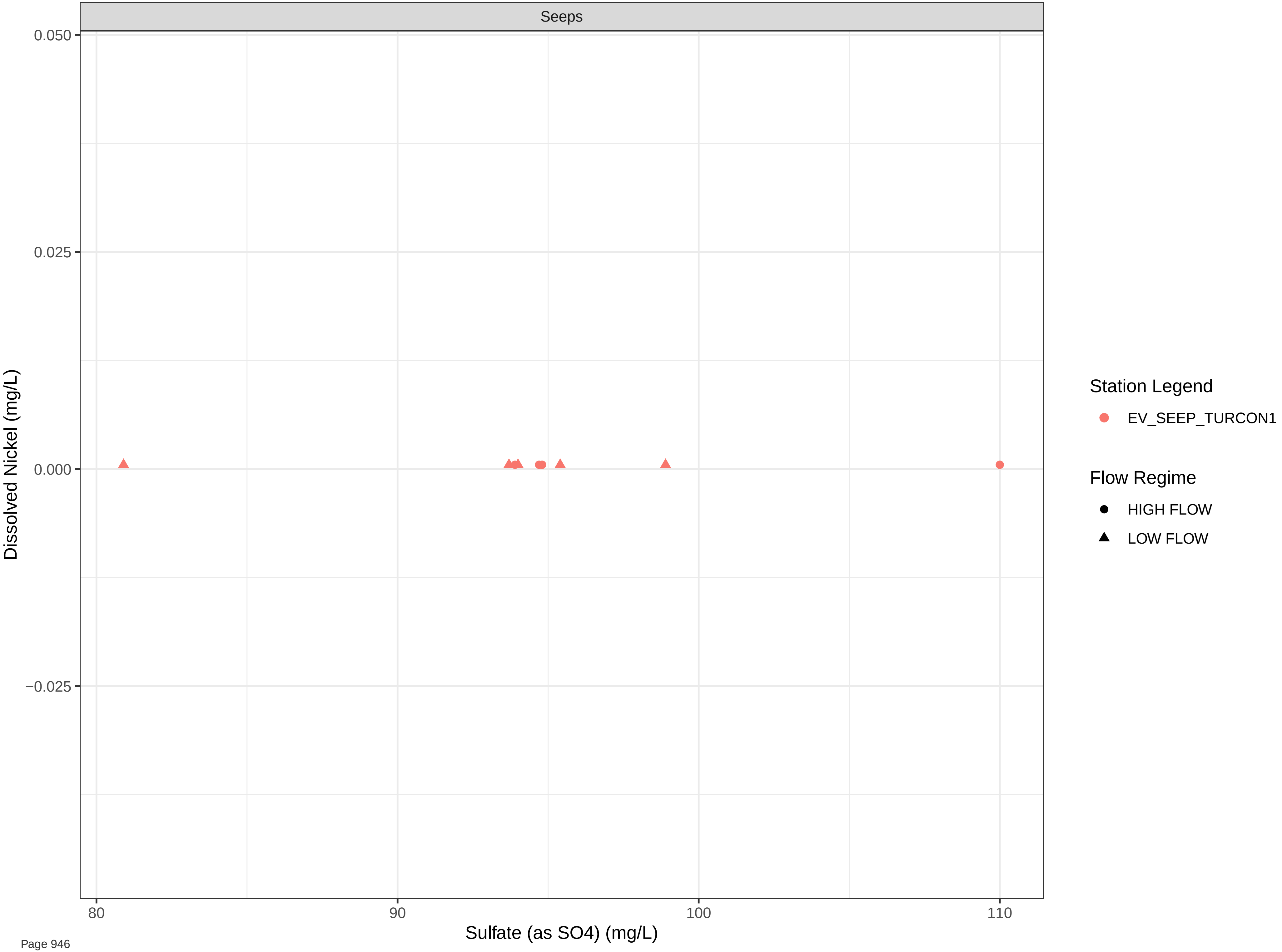
Seeps
0.003
0.002
0.001
400
600
800
Sulfate (as SO4) (mg/L)
Dissolved Nickel (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



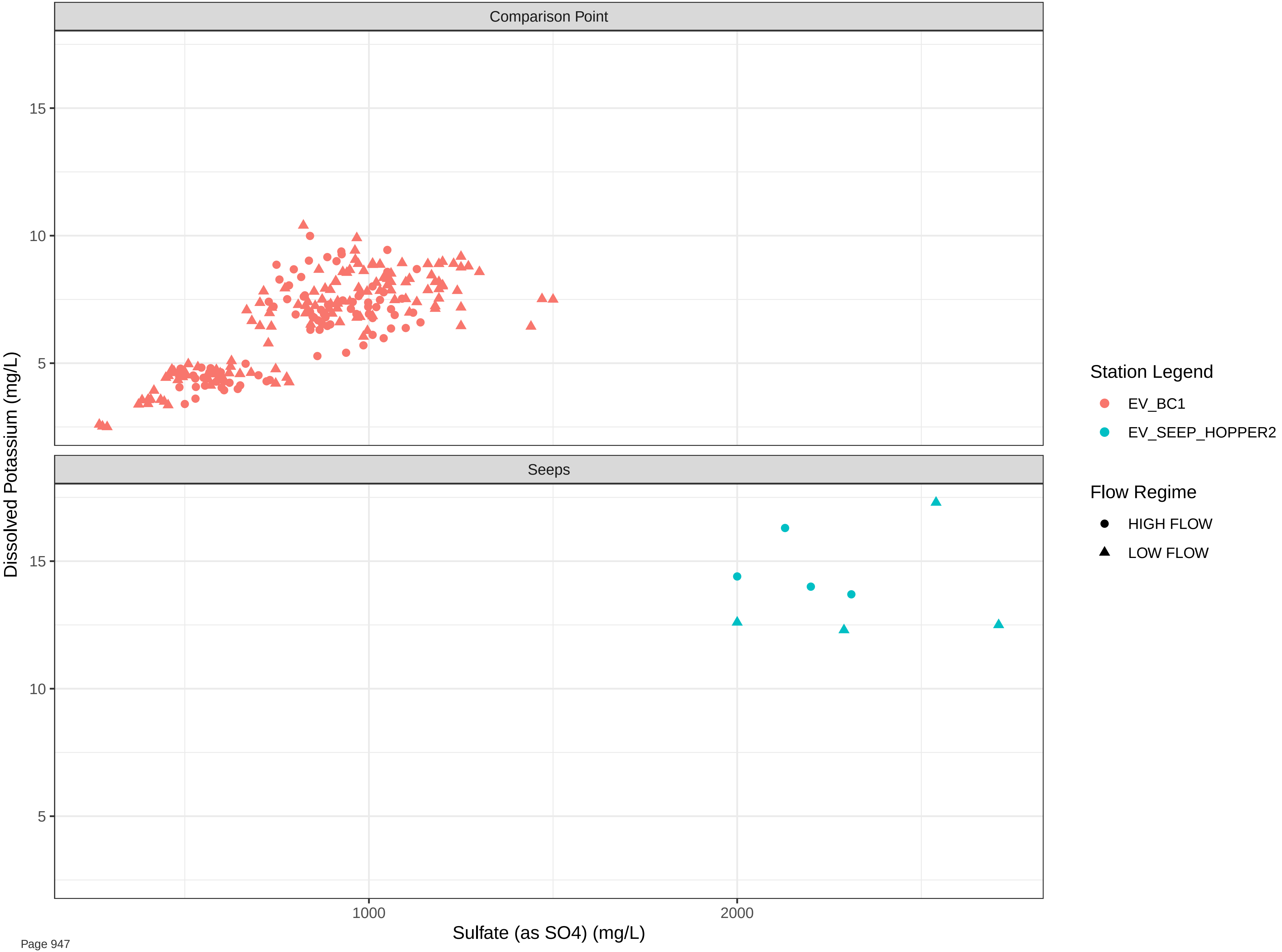
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.003
0.002
0.001
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



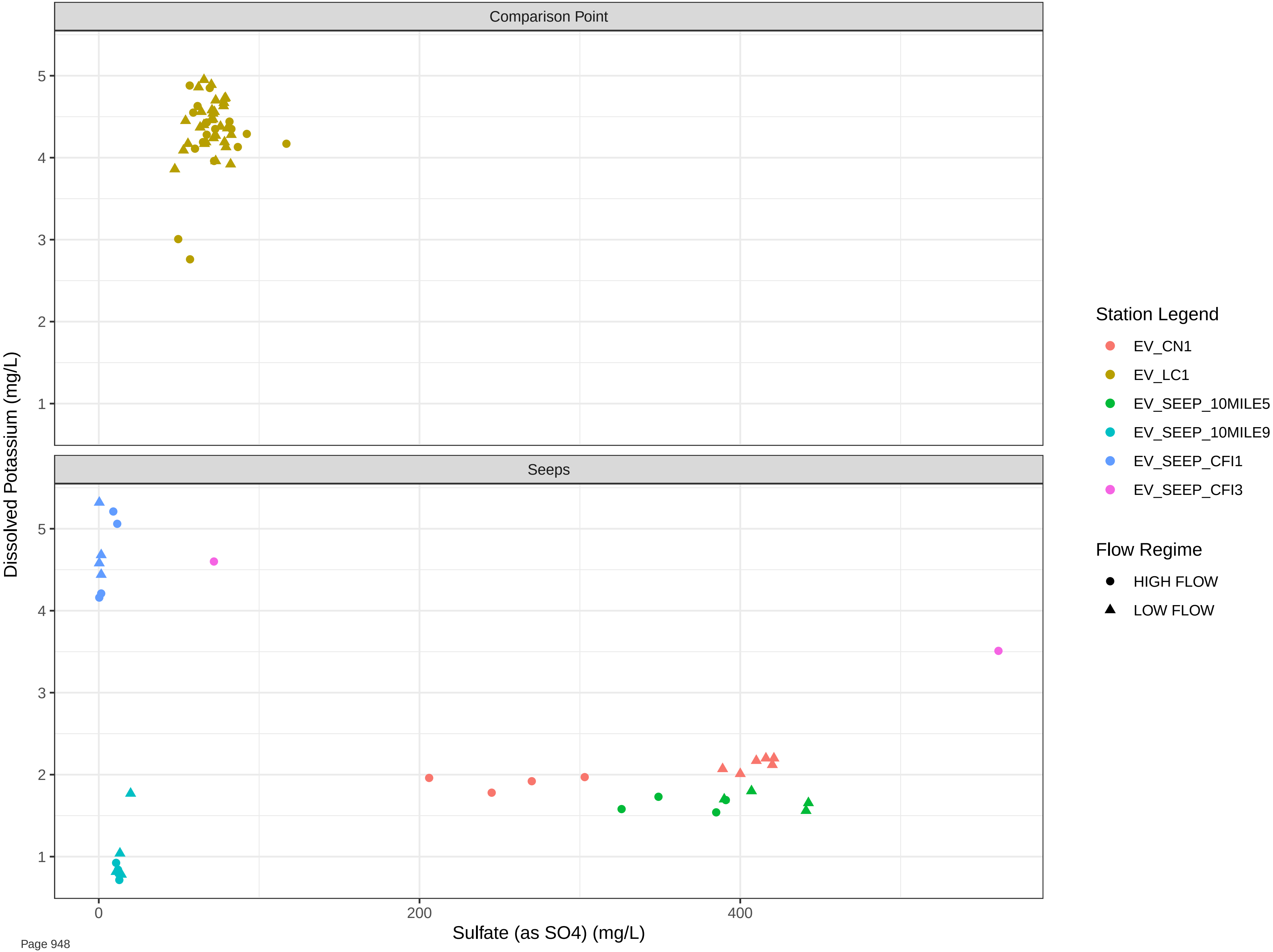
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.00
0.01
0.02
0.03
0.04
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



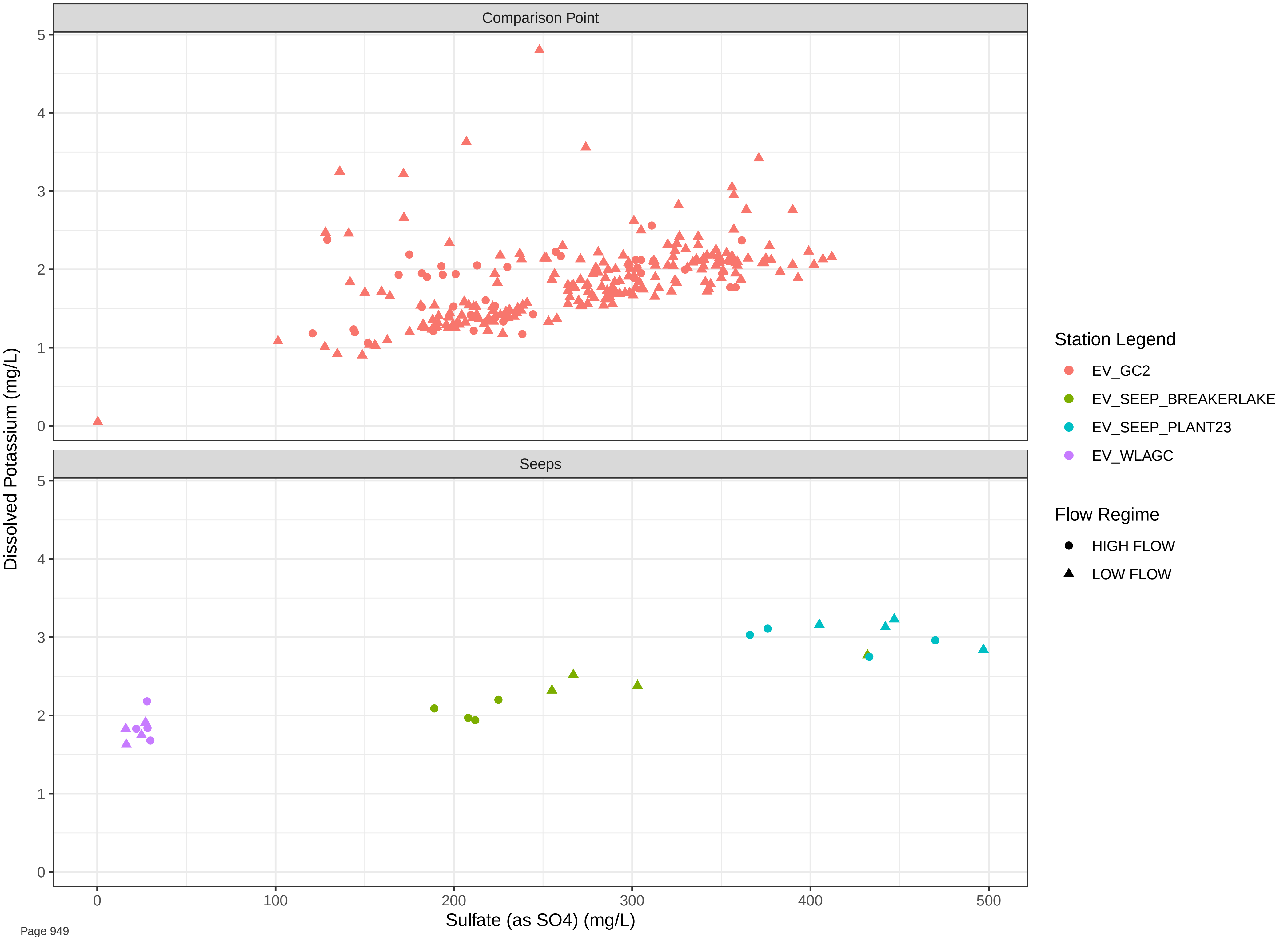
Seeps
0.050
0.025
0.000
−0.025
Dissolved Nickel (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

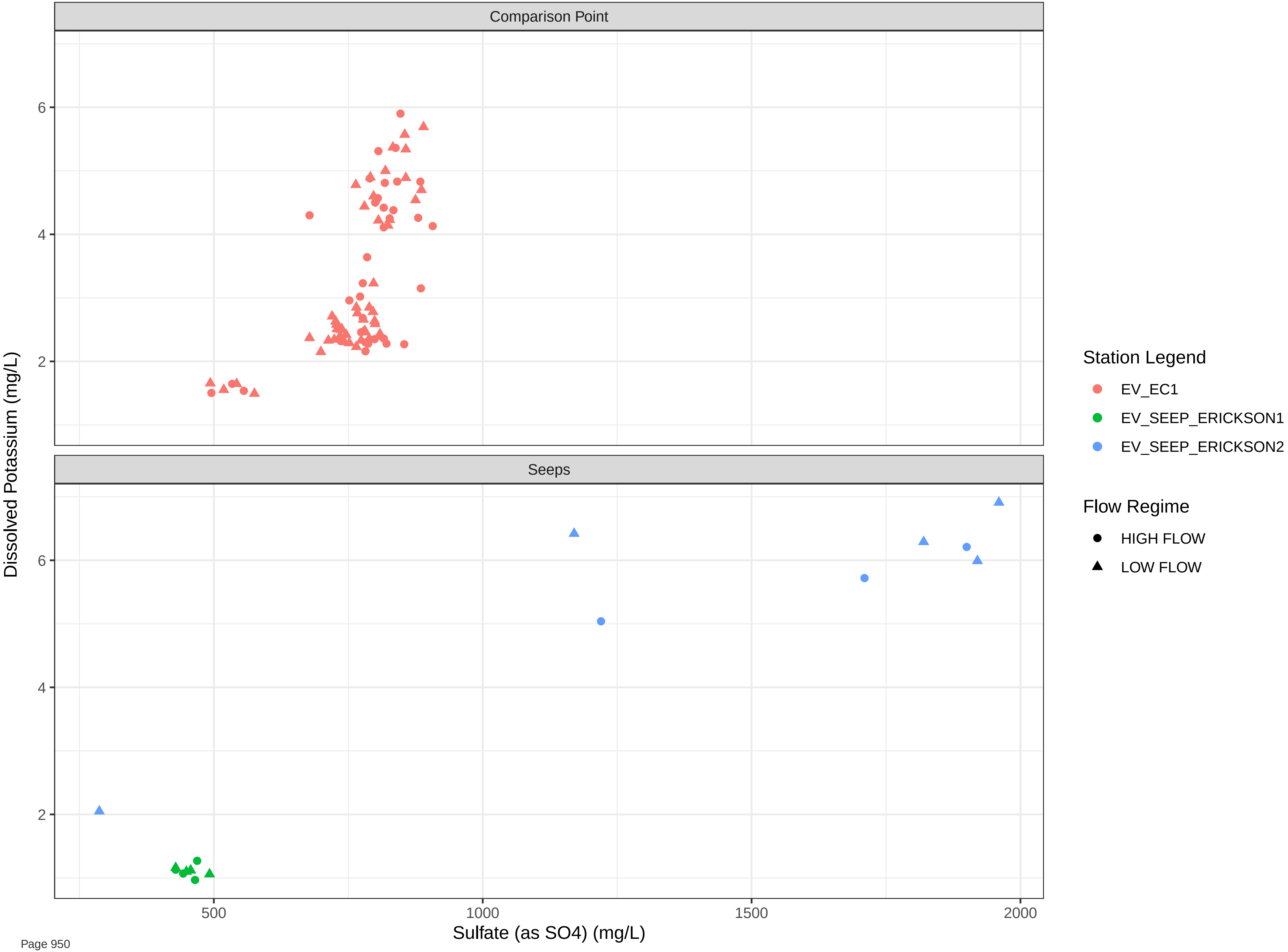


Comparison Point
Seeps
Dissolved Potassium (mg/L)
15
10
5
15
10
5
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

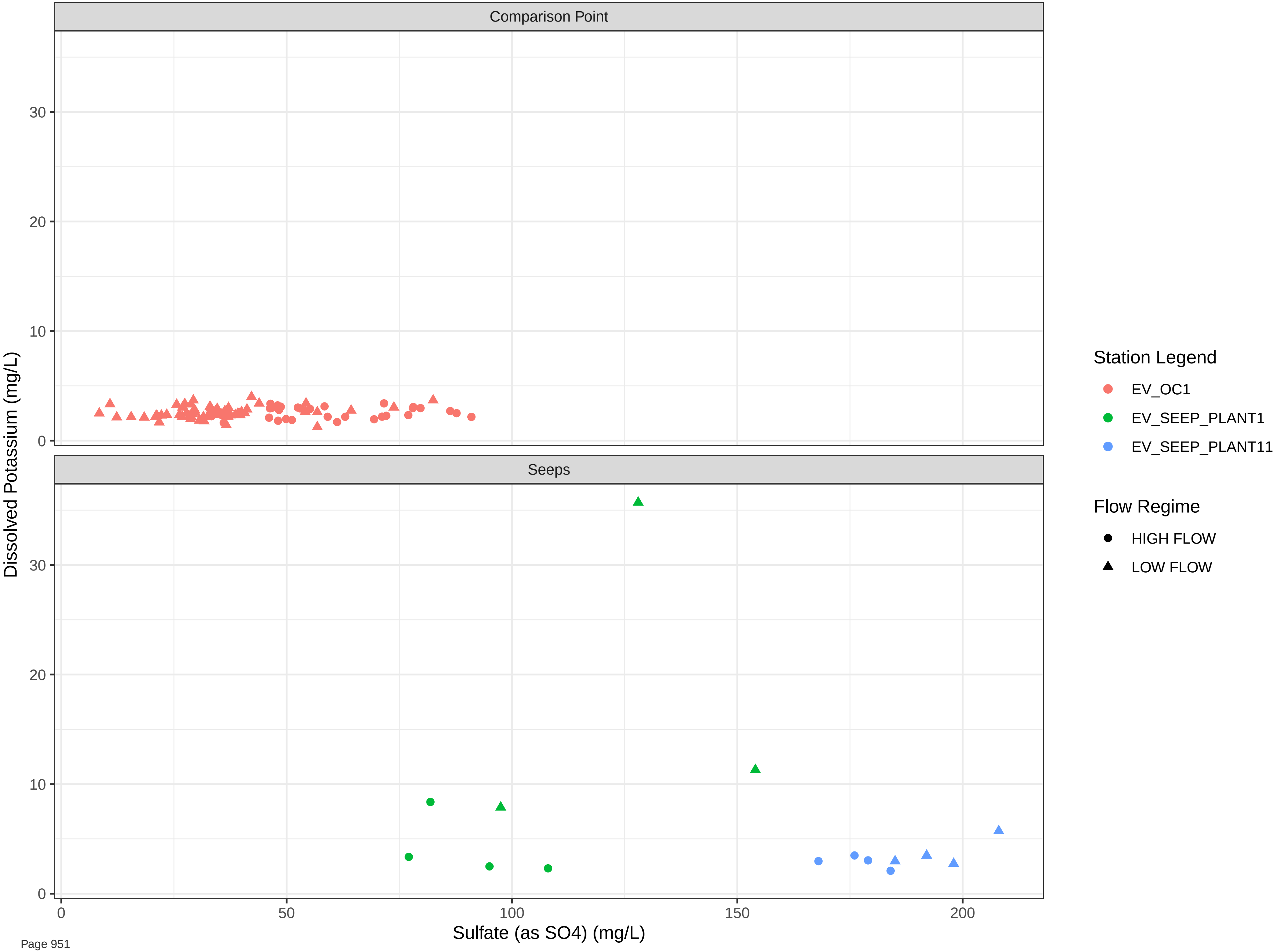


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
1
2
3
4
5
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

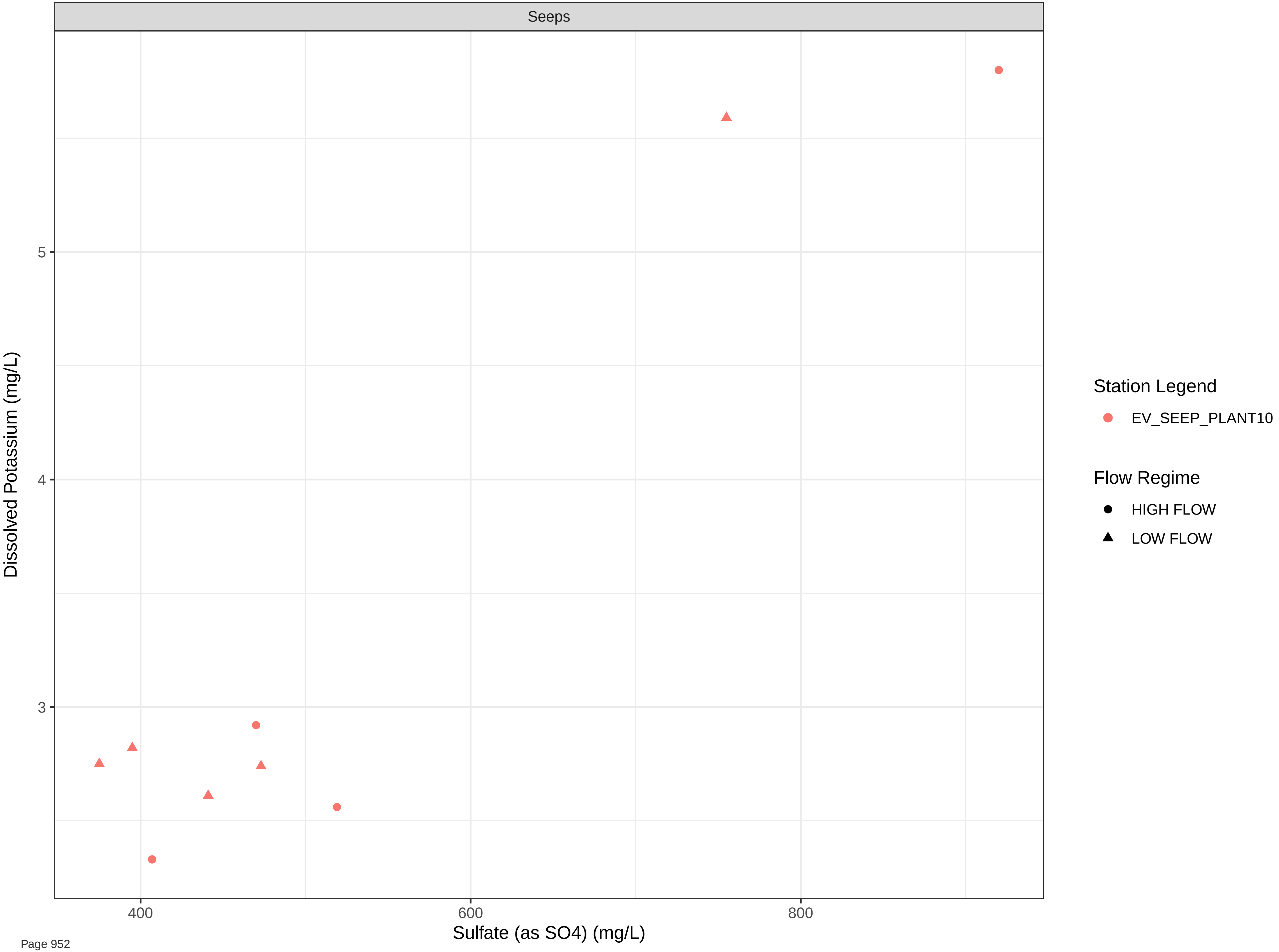

Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
5
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

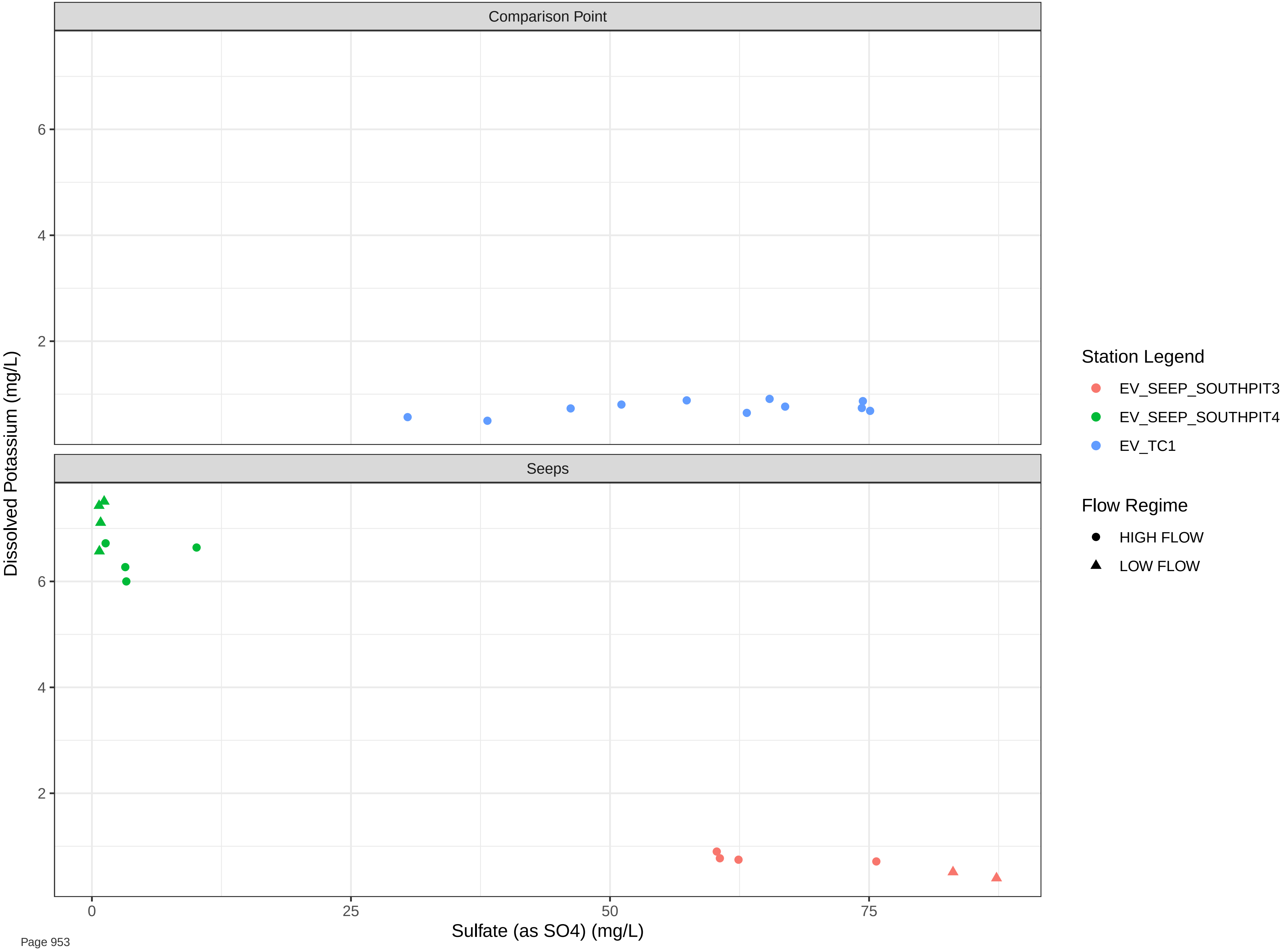


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
2
4
6
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

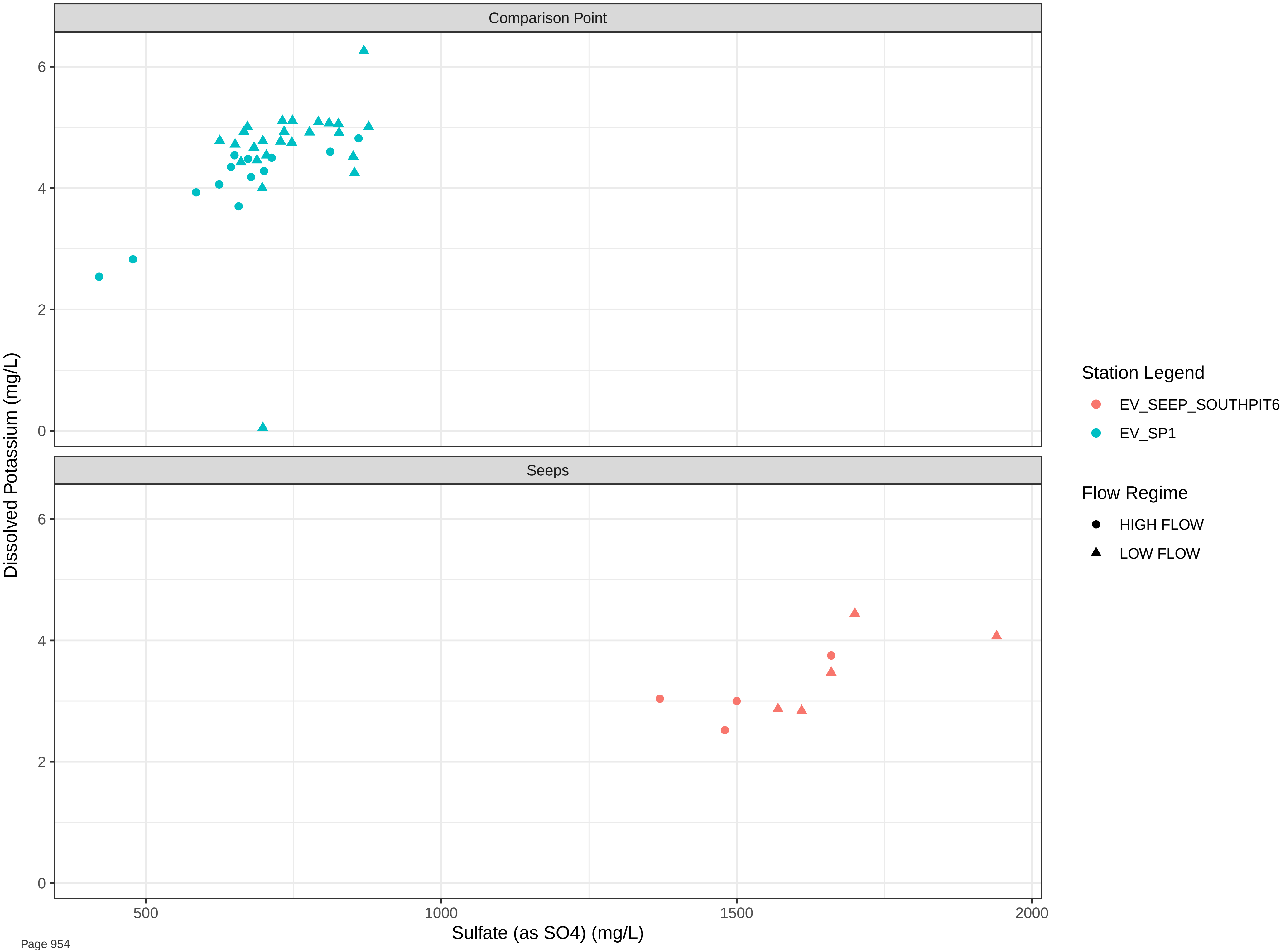


Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

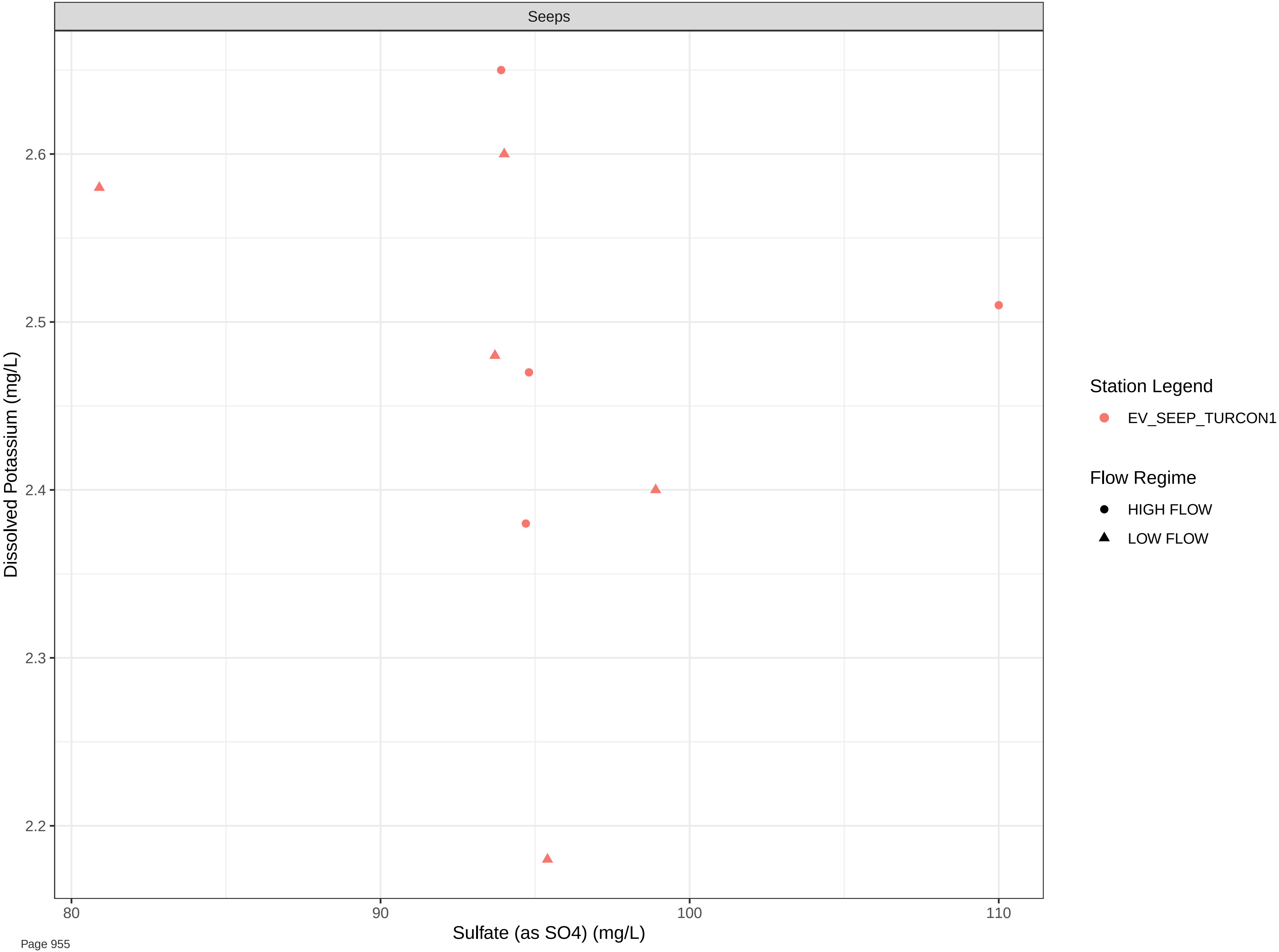

Seeps
Dissolved Potassium (mg/L)
5
4
3
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



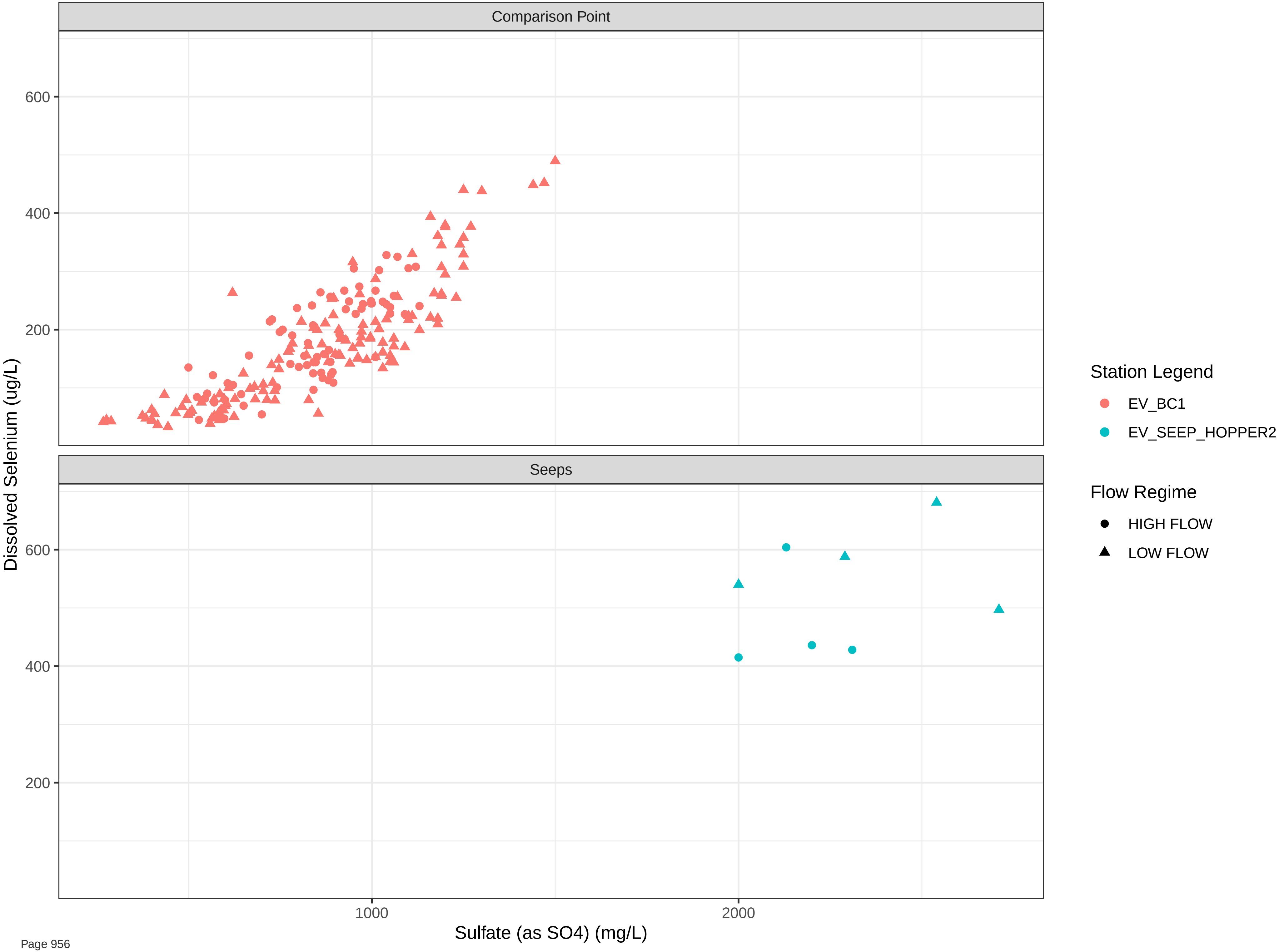
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
6
4
2
6
4
2
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



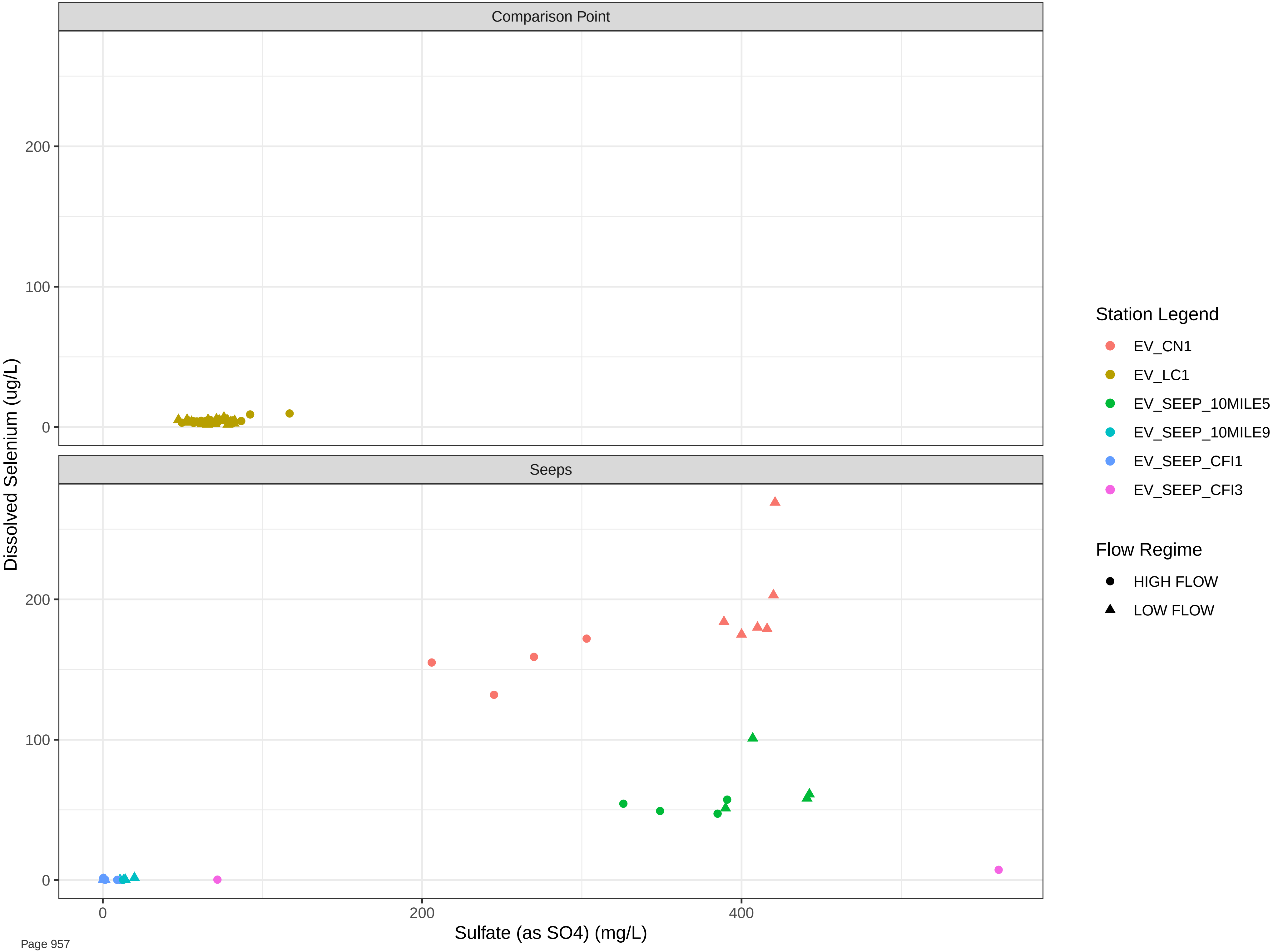
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
6
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



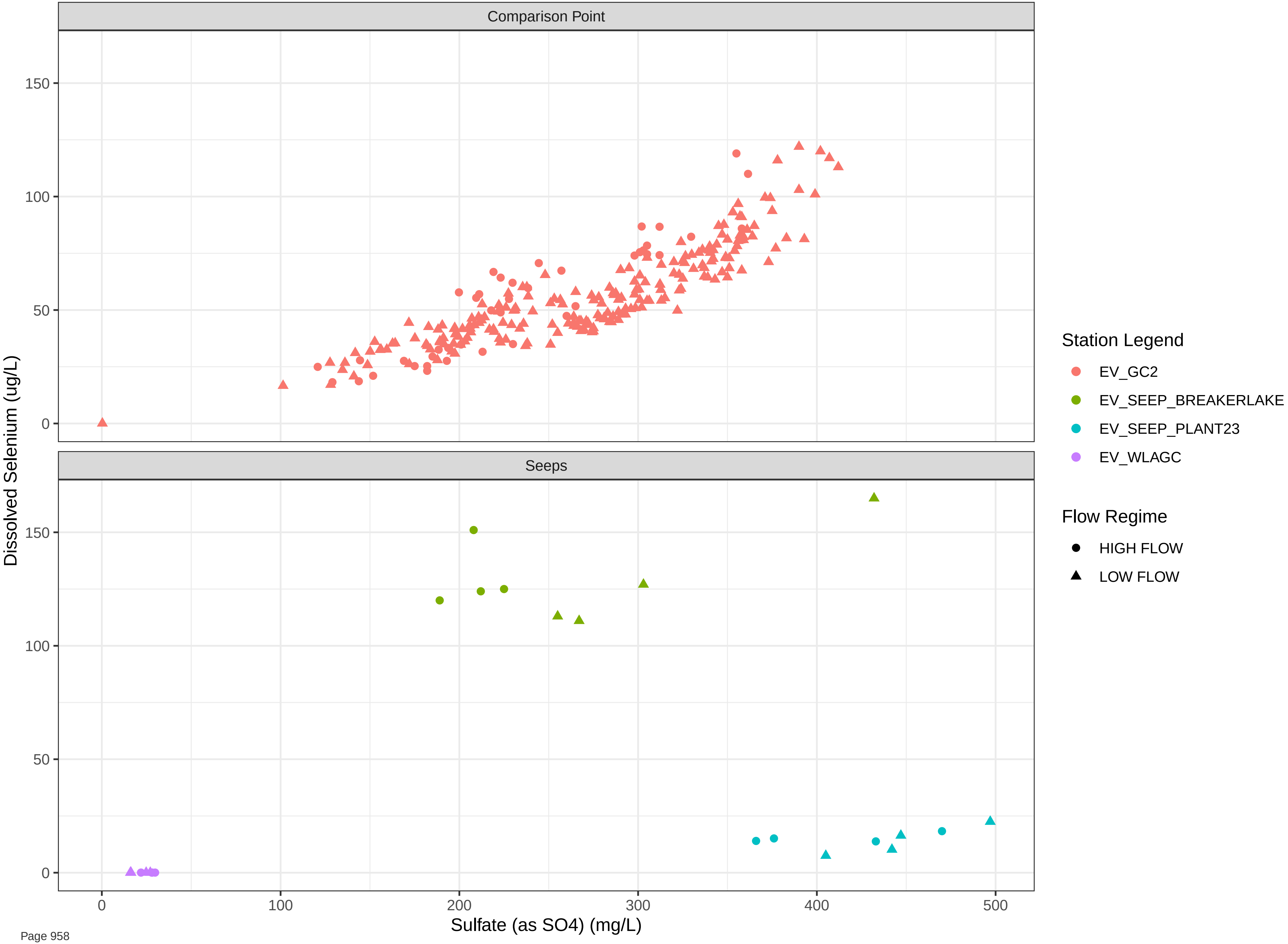
Seeps
Dissolved Potassium (mg/L)
2.6
2.5
2.4
2.3
2.2
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

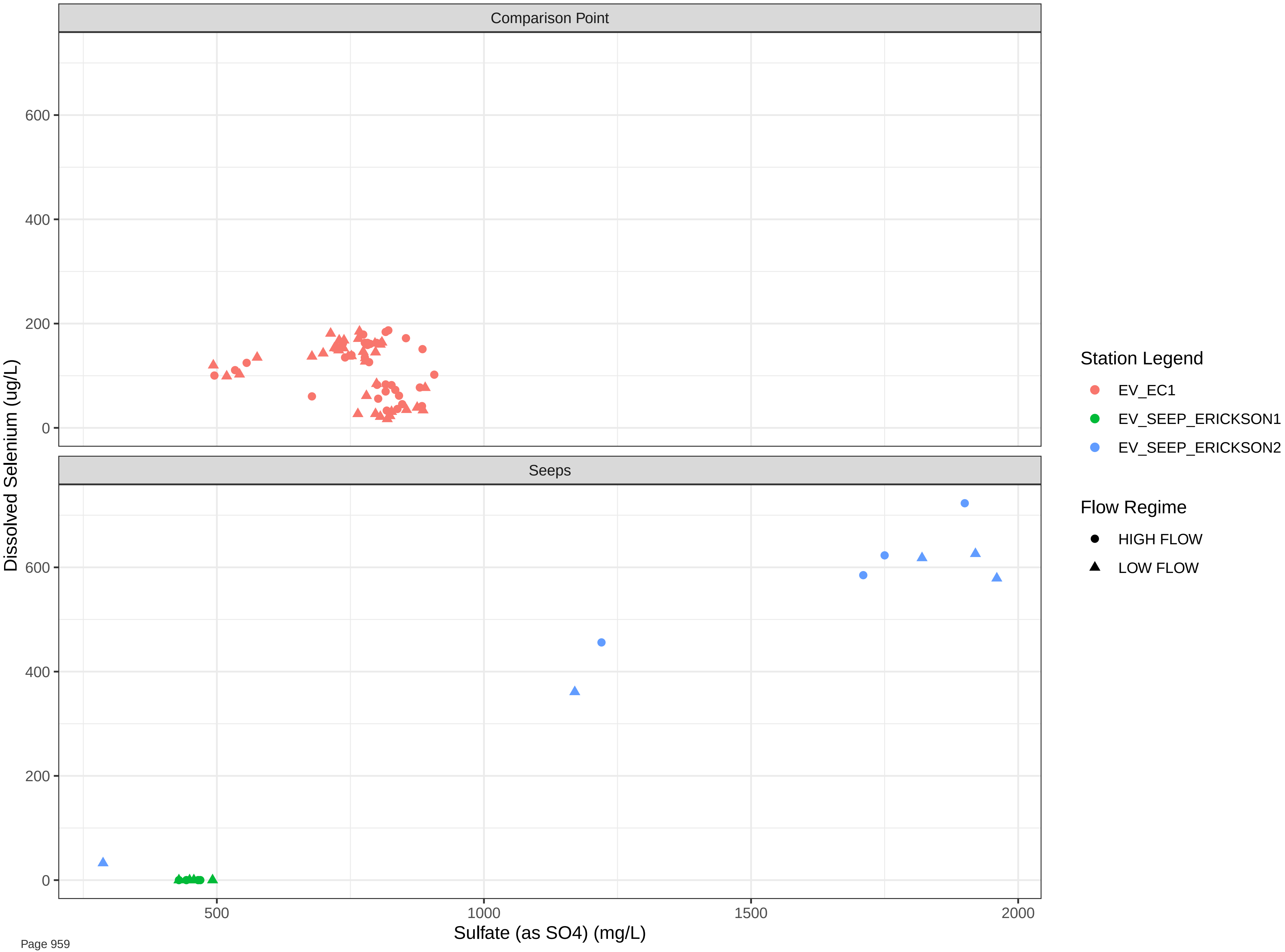


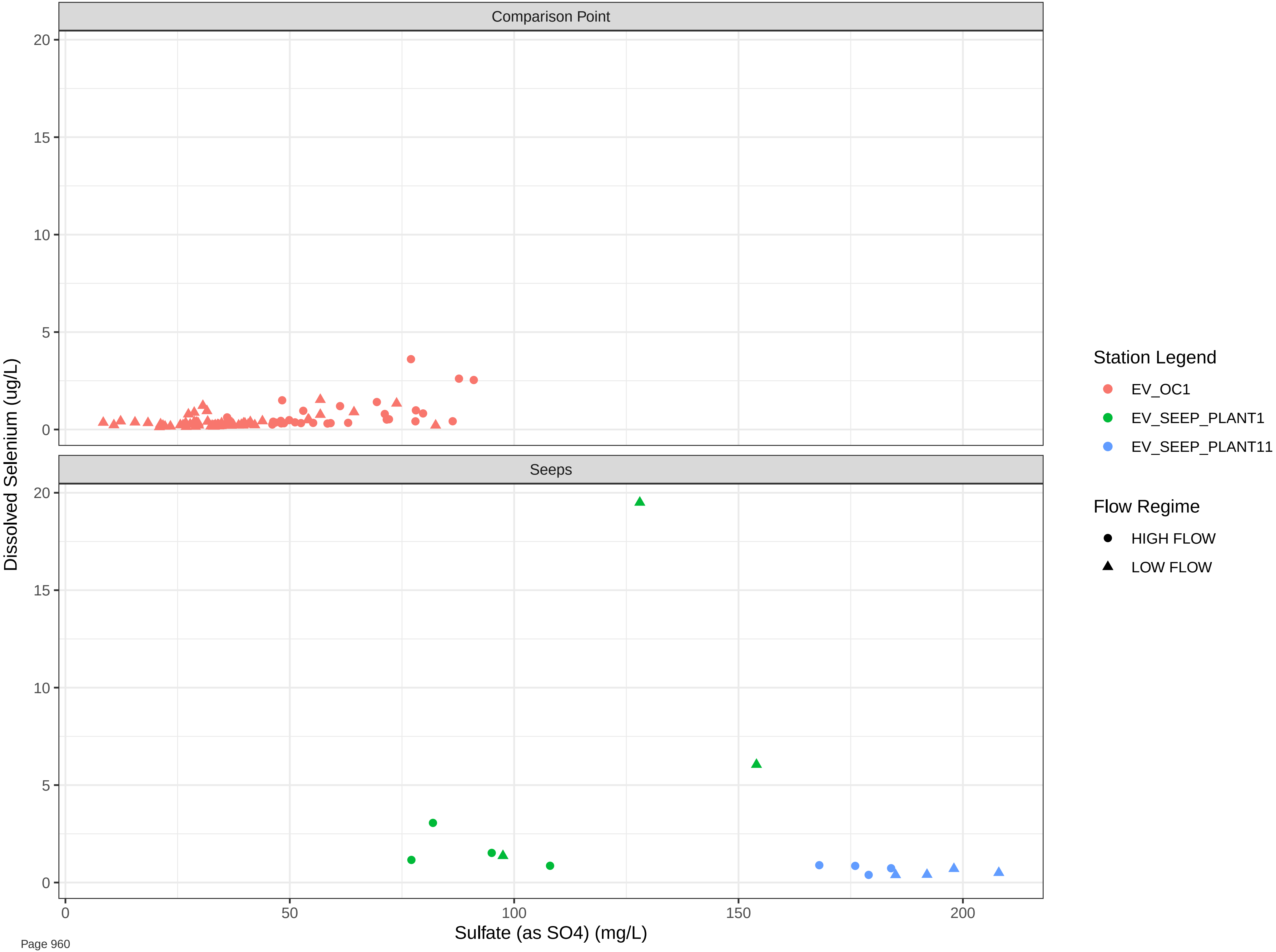
Comparison Point
Seeps
Dissolved Selenium (ug/L)
600
400
200
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

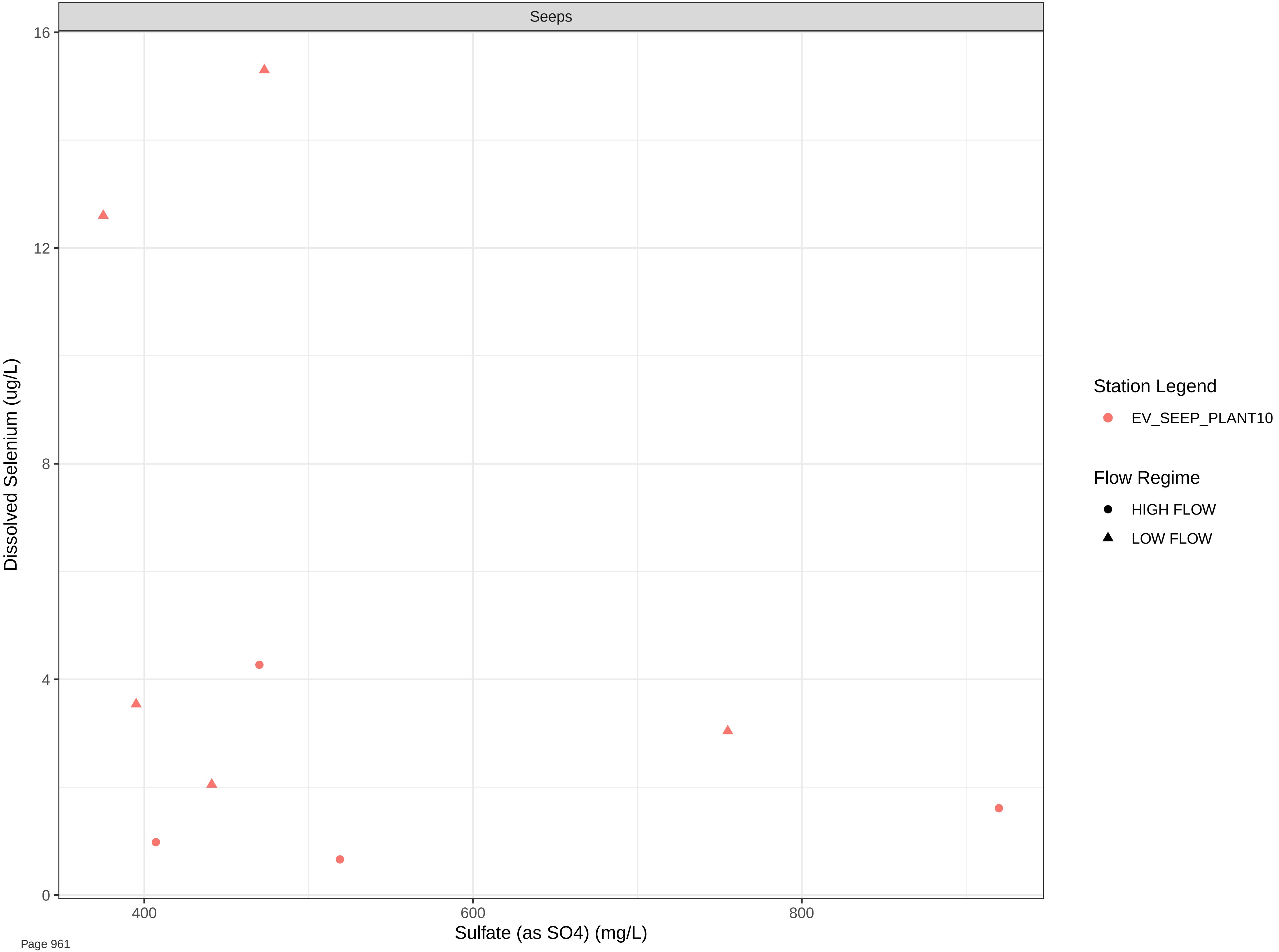


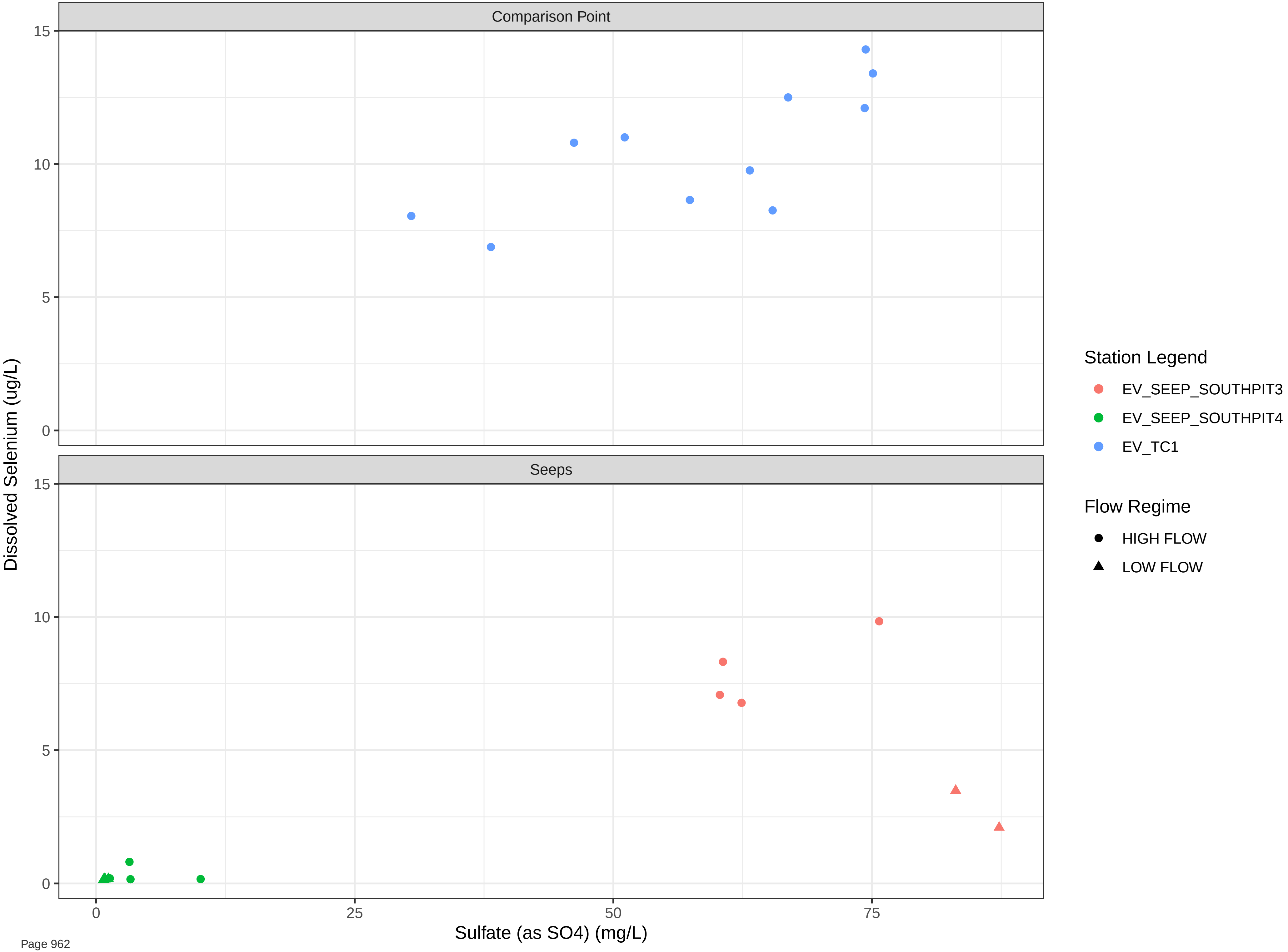
Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
100
200
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

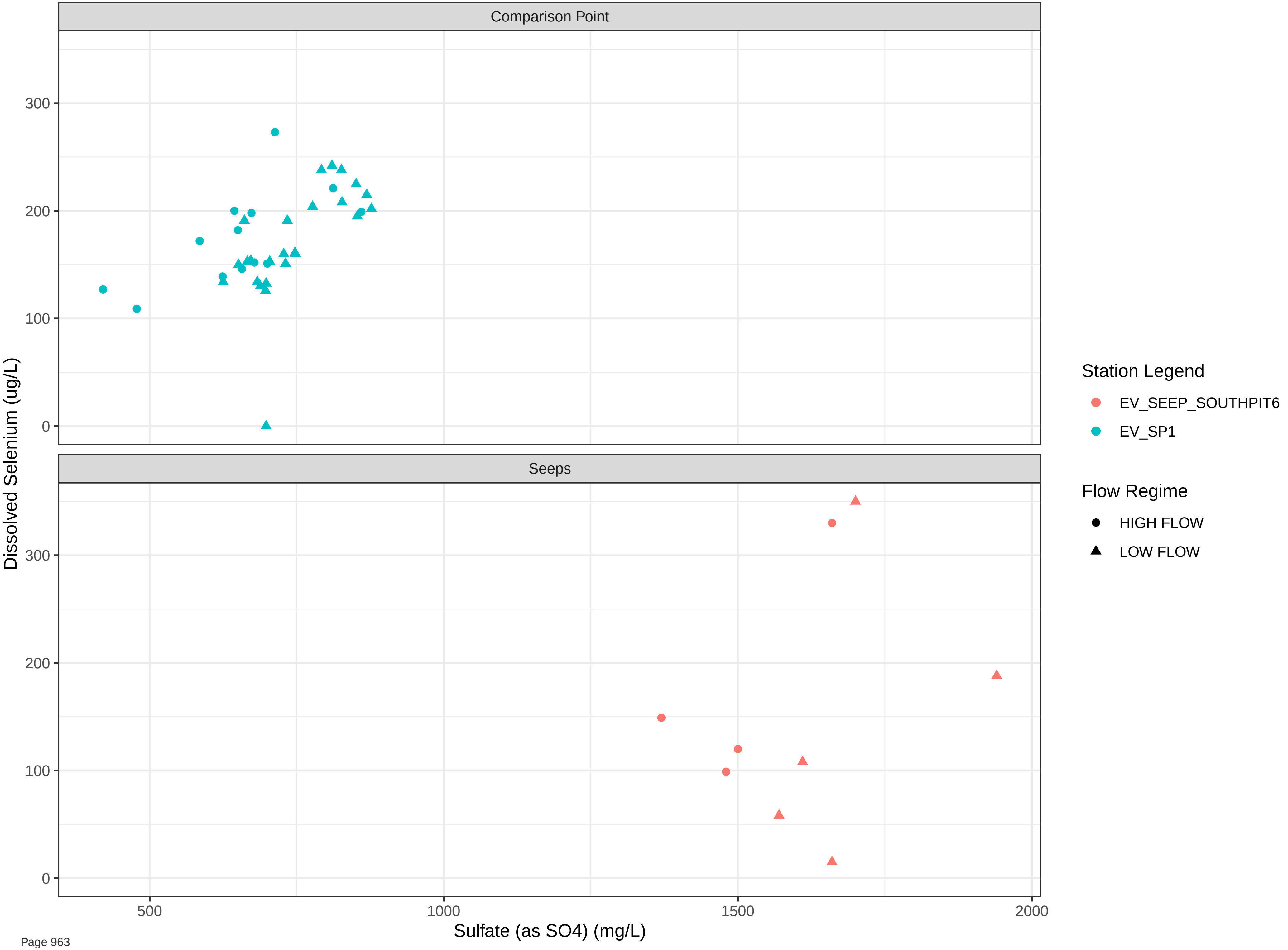

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

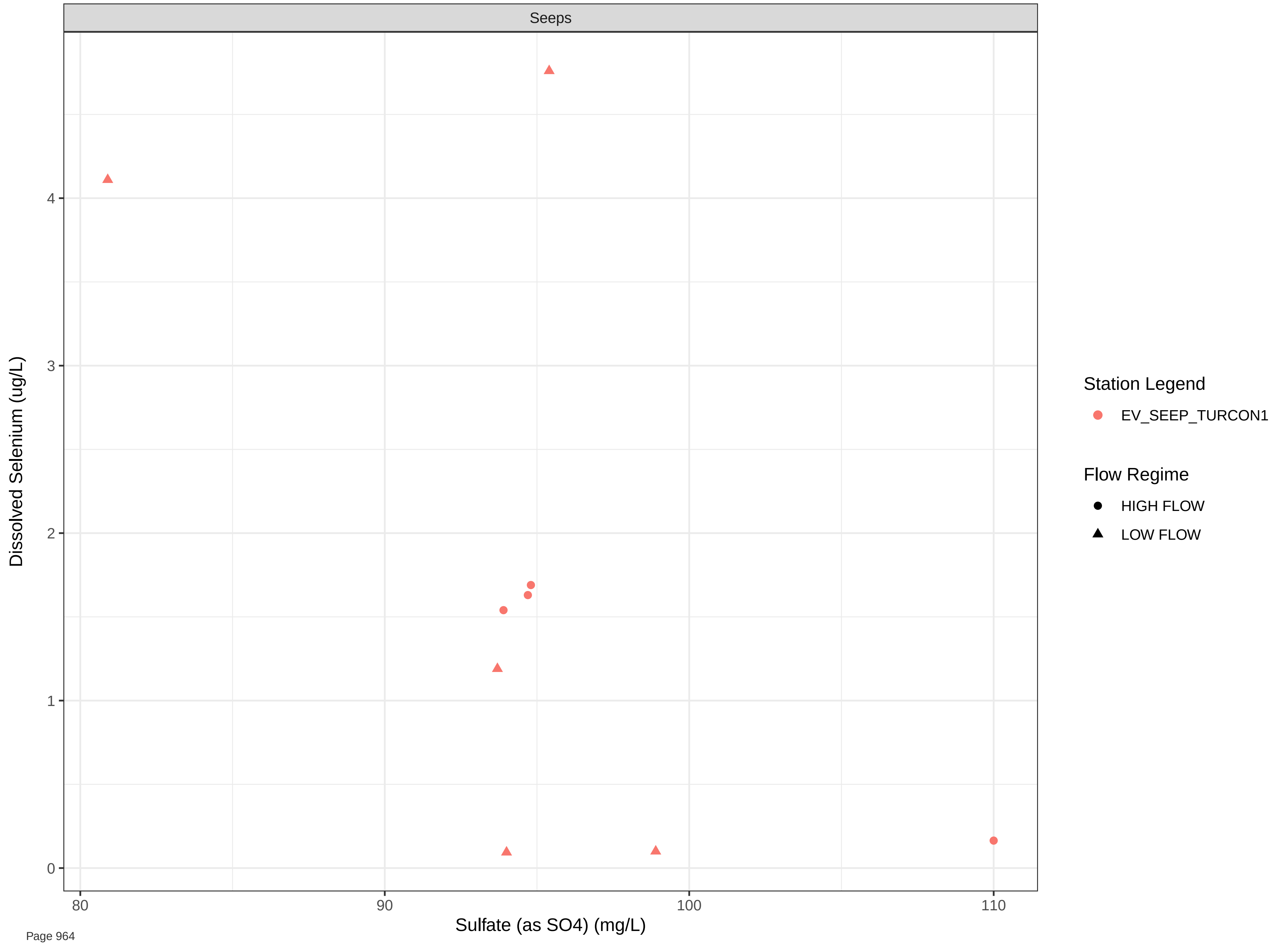

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
200
400
600
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
20
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

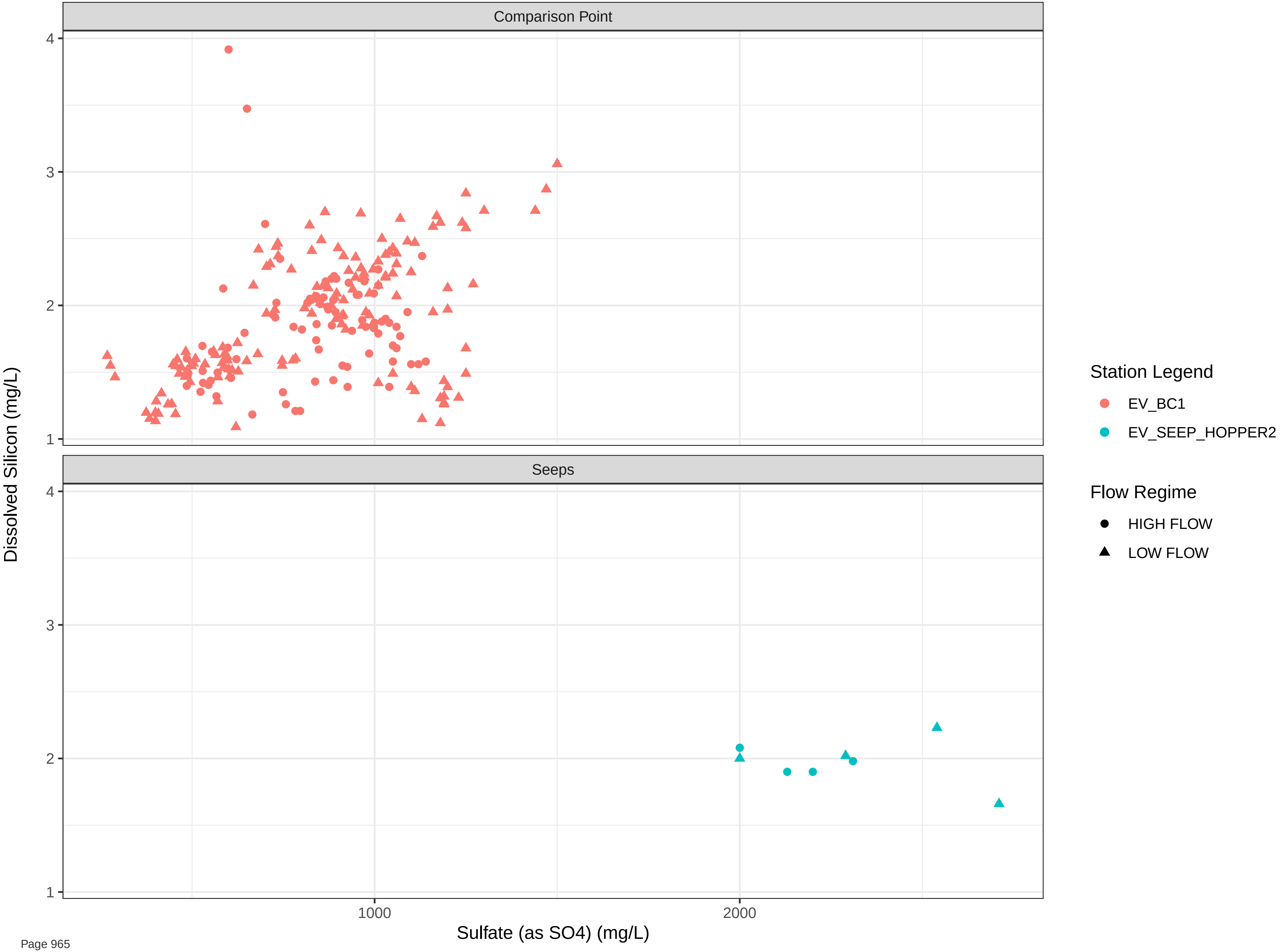

Seeps
Dissolved Selenium (ug/L)
16
12
8
4
0
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

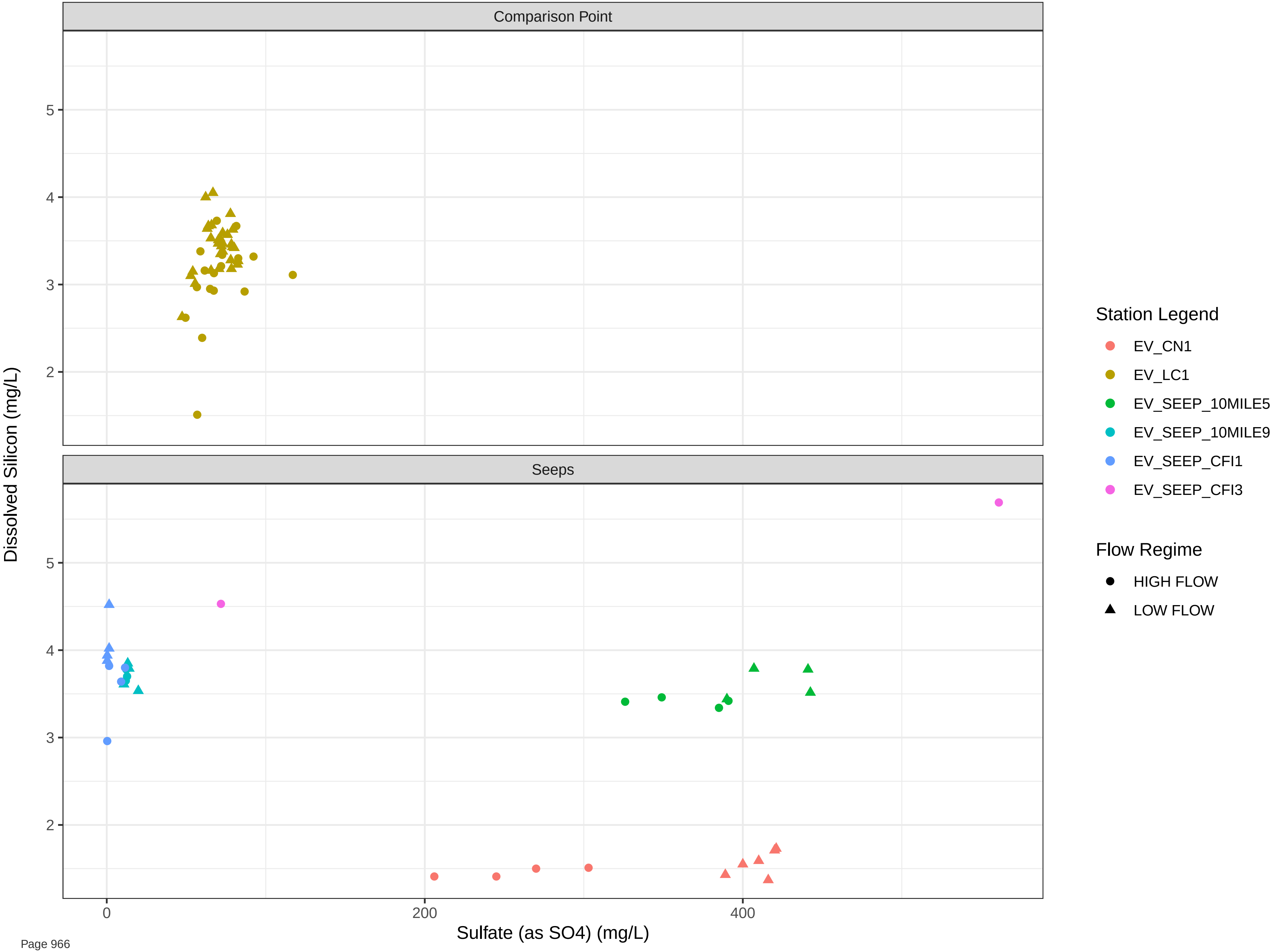

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

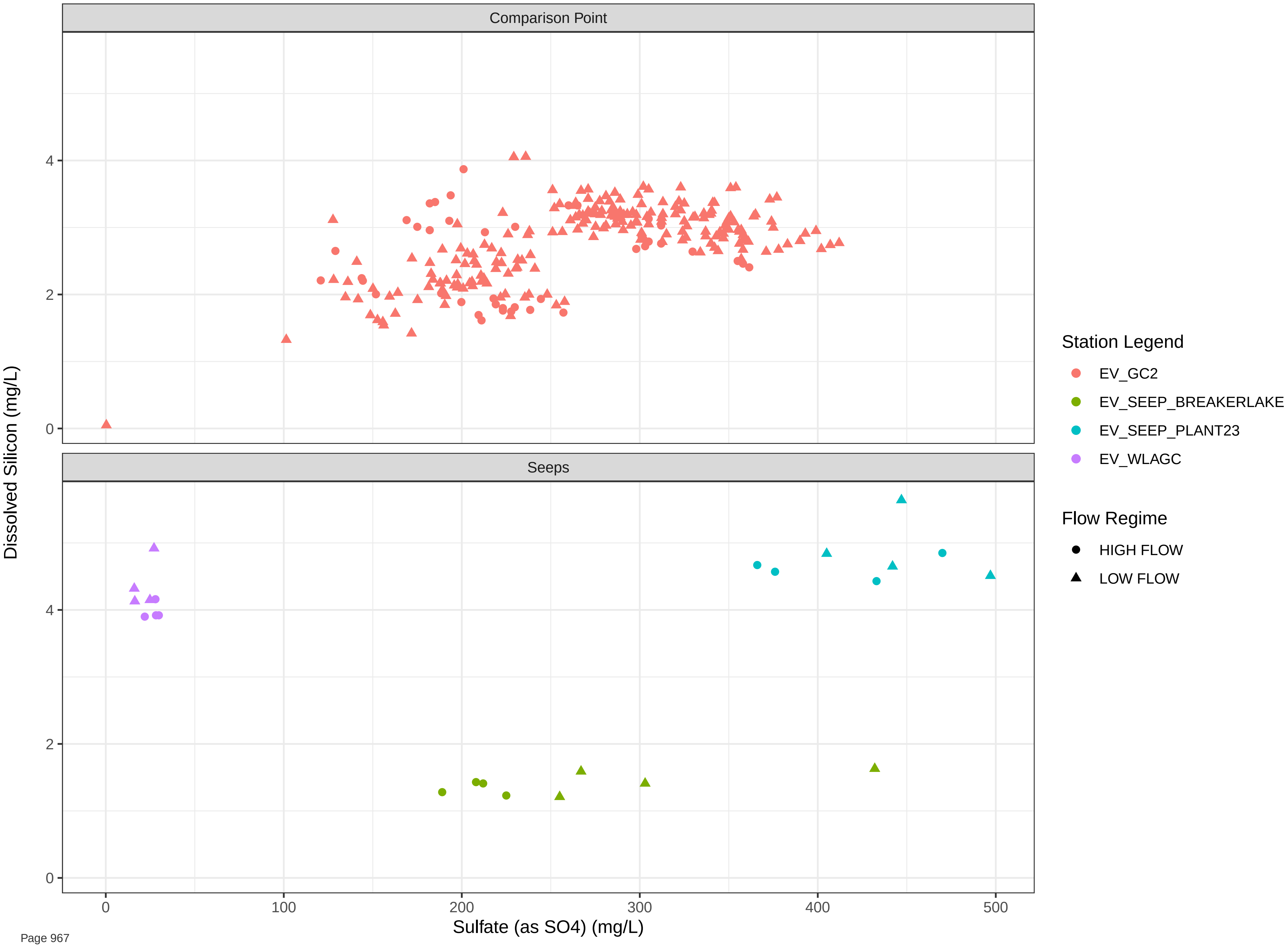

Comparison Point
Seeps
Dissolved Selenium (ug/L)
300
200
100
0
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



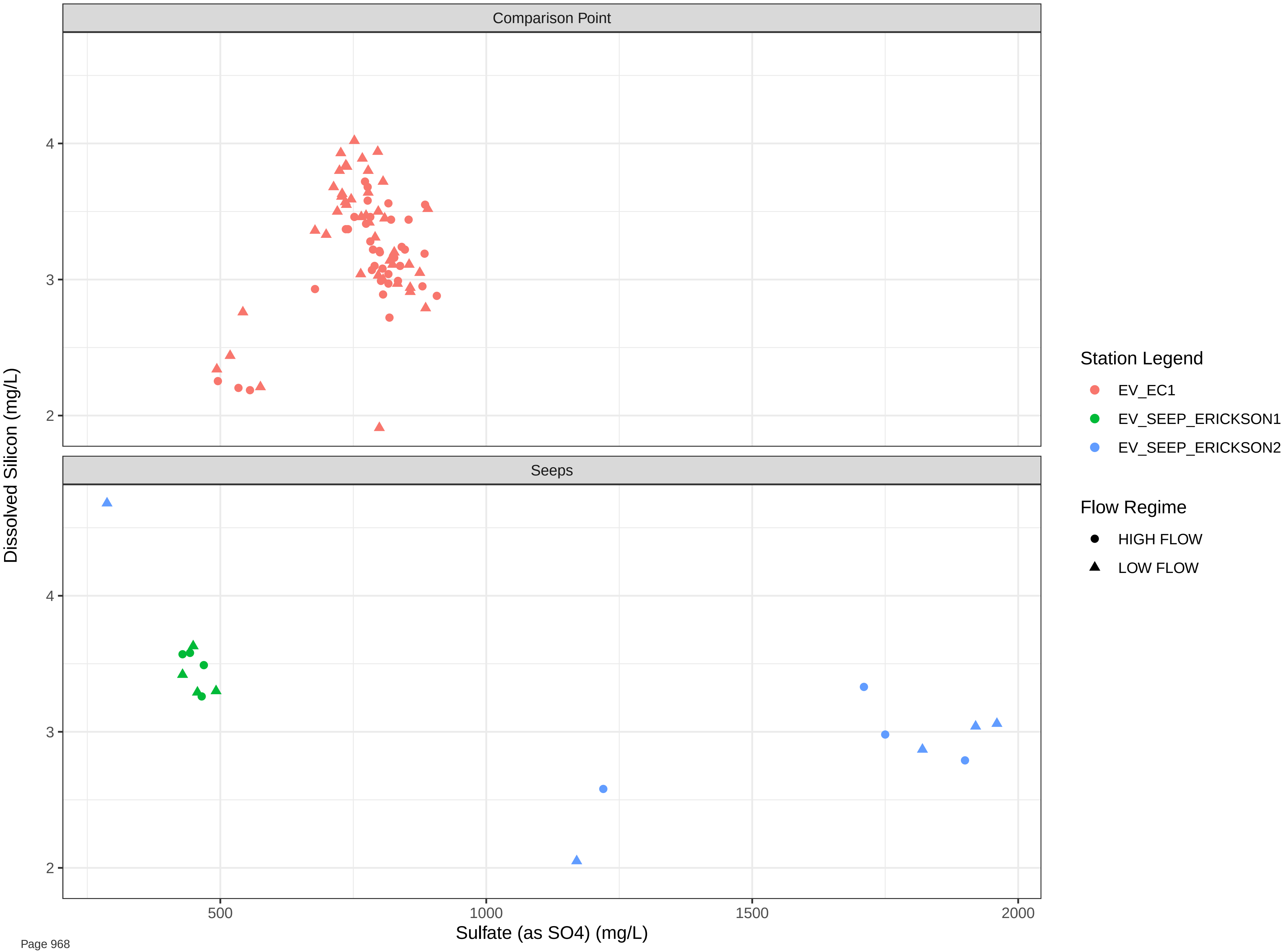
Seeps
Dissolved Selenium (ug/L)
0
1
2
3
4
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
4
3
2
1
Dissolved Silicon (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

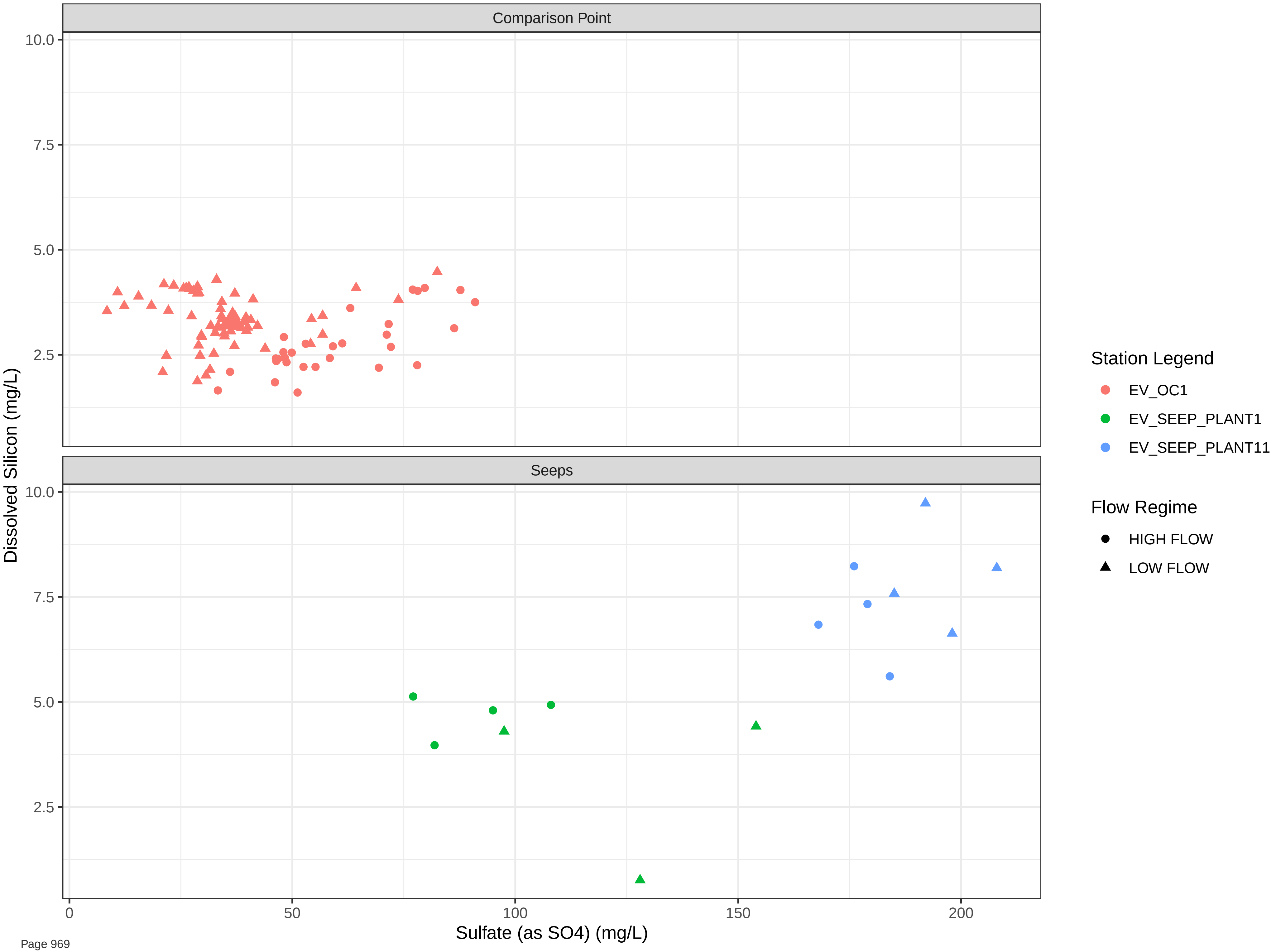

Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
5
4
3
2
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



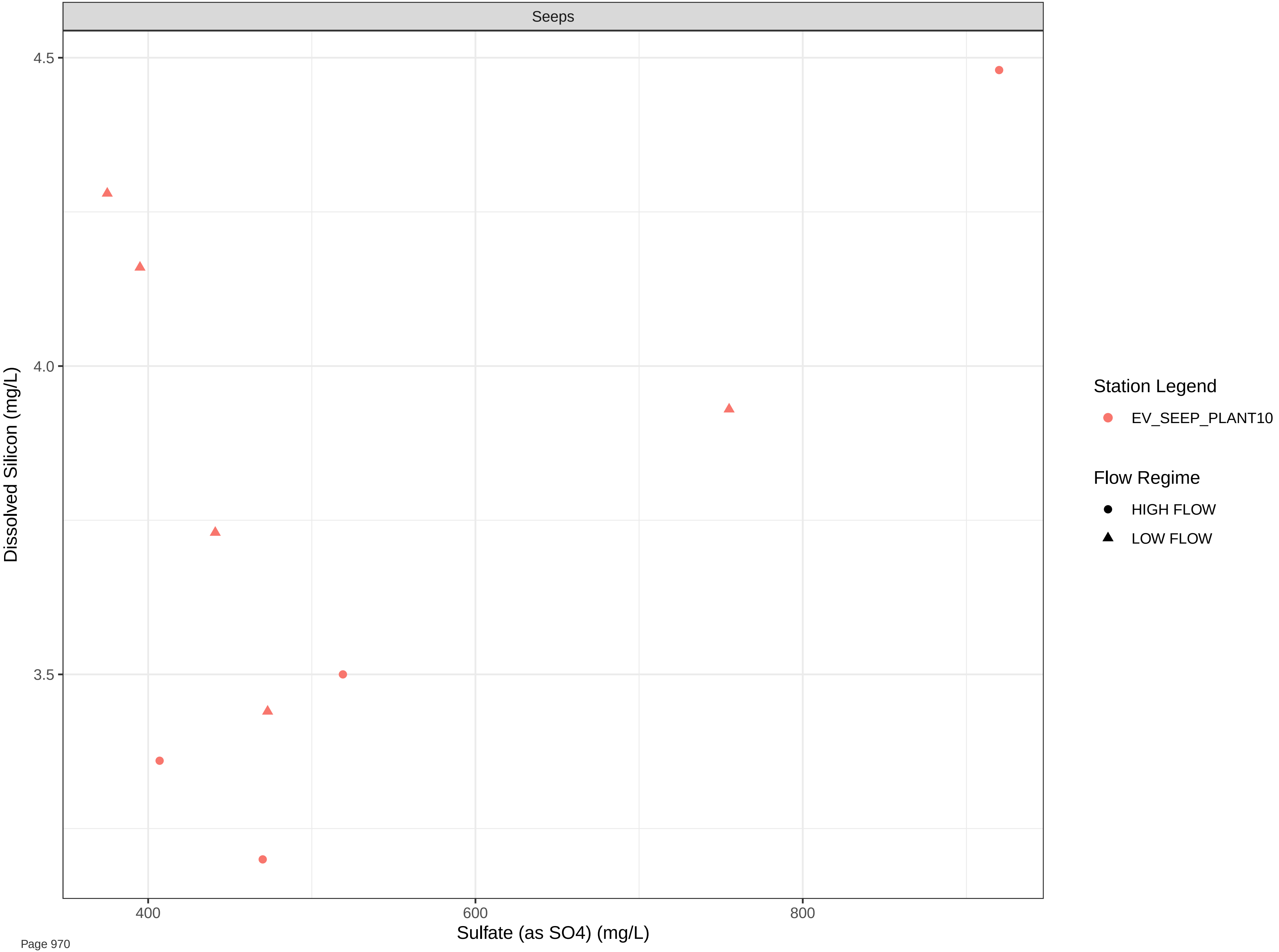
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



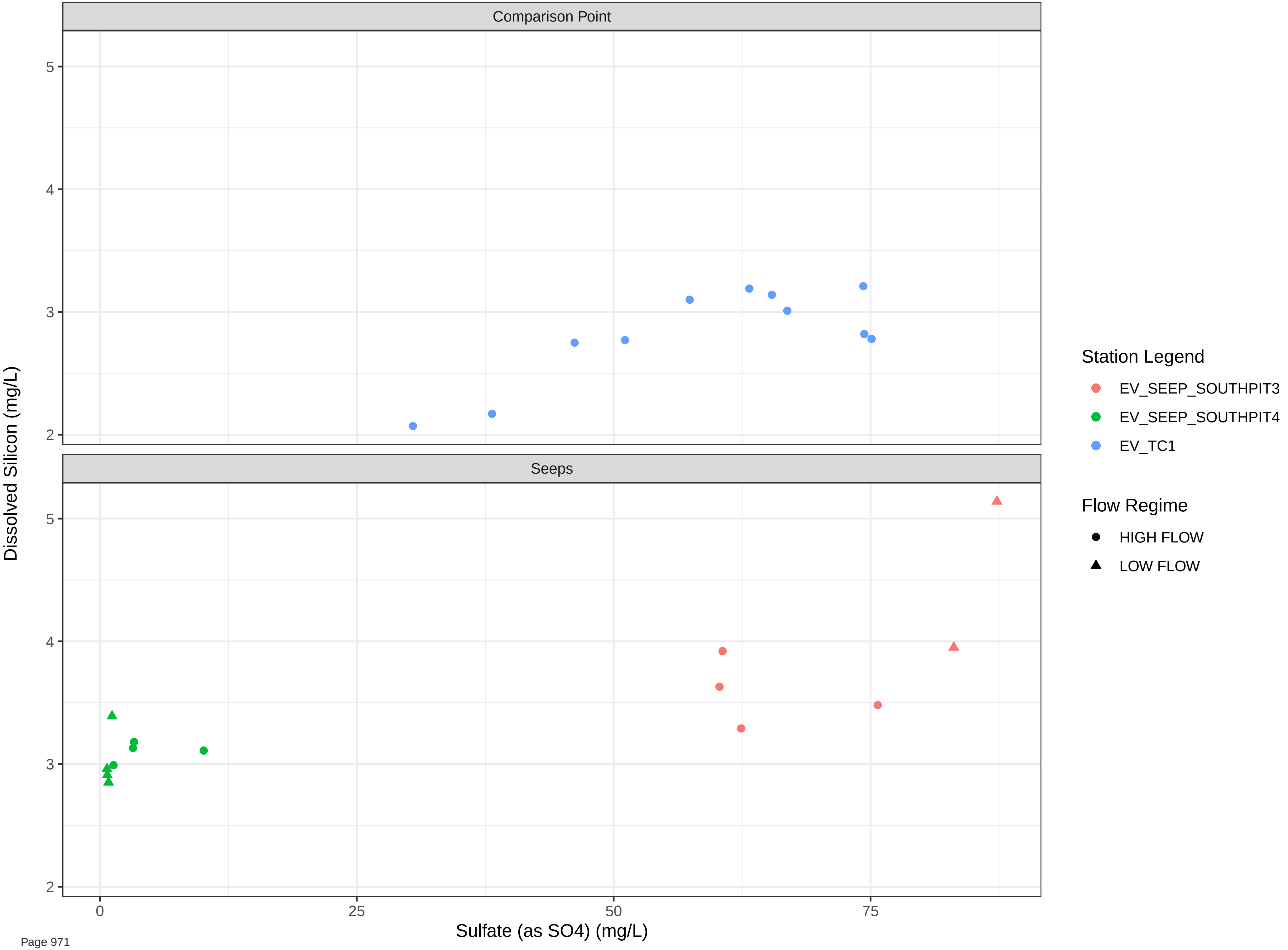
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
2
3
4
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



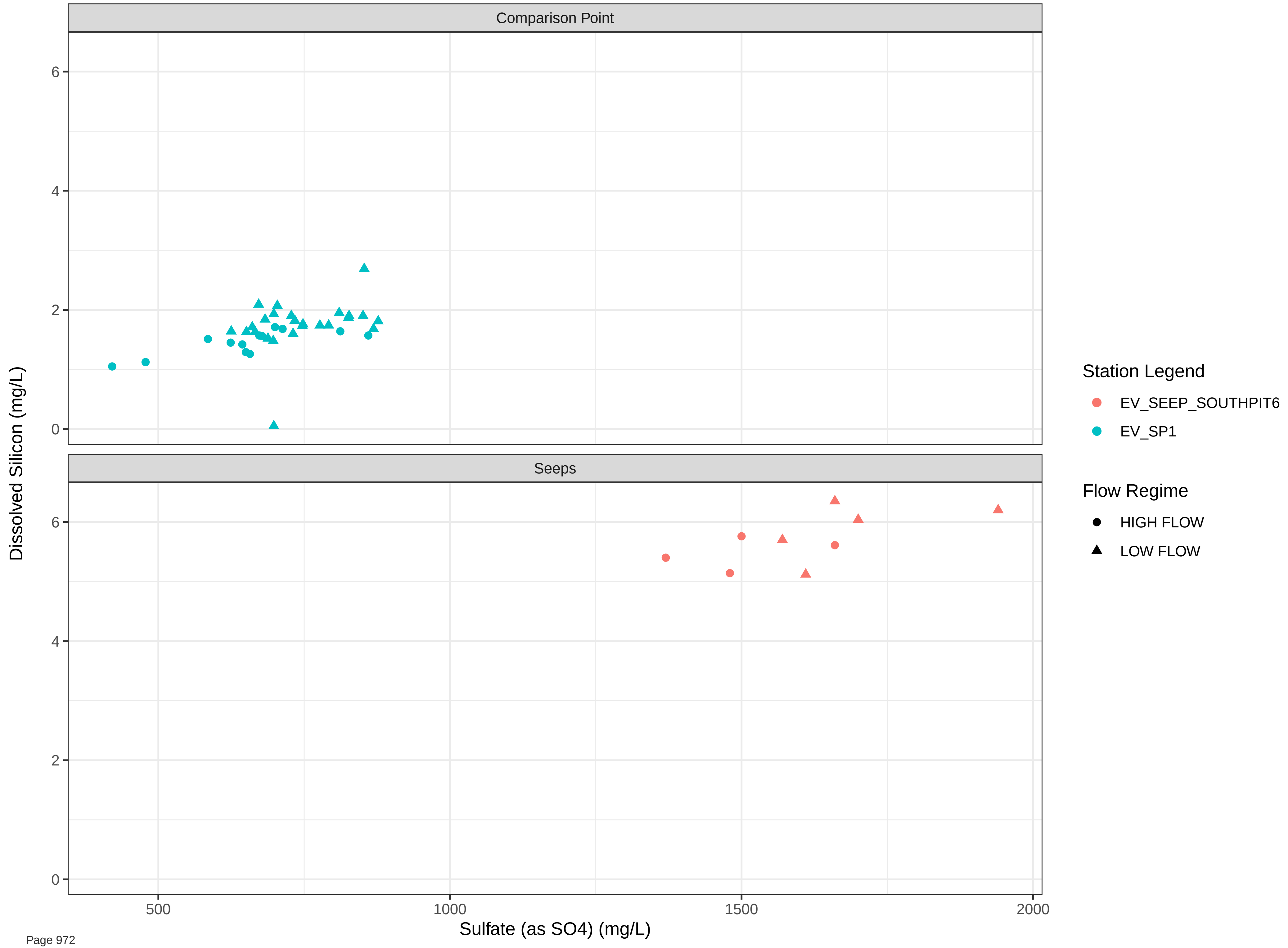
Comparison Point
Seeps
Dissolved Silicon (mg/L)
10.0
7.5
5.0
2.5
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

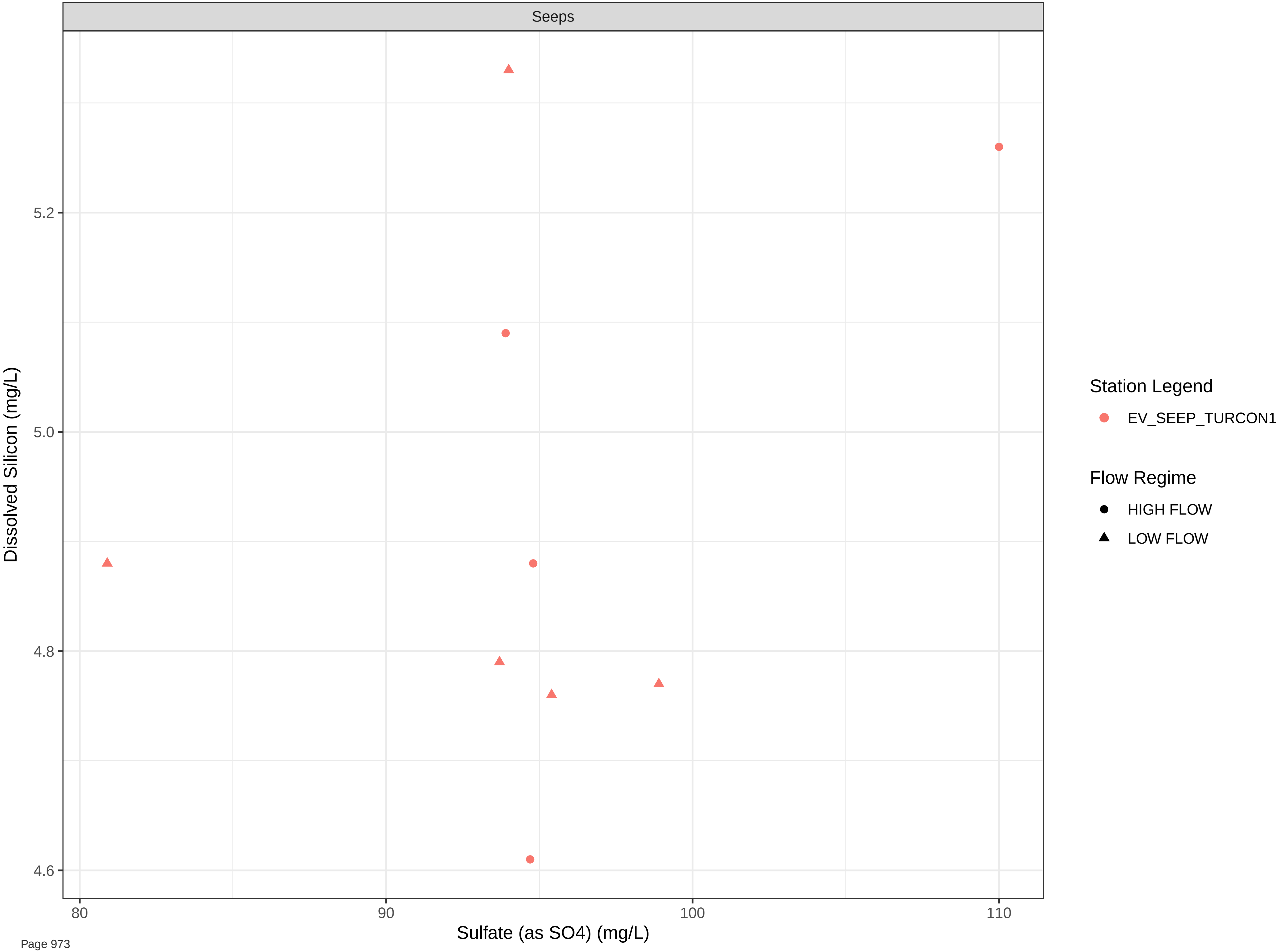


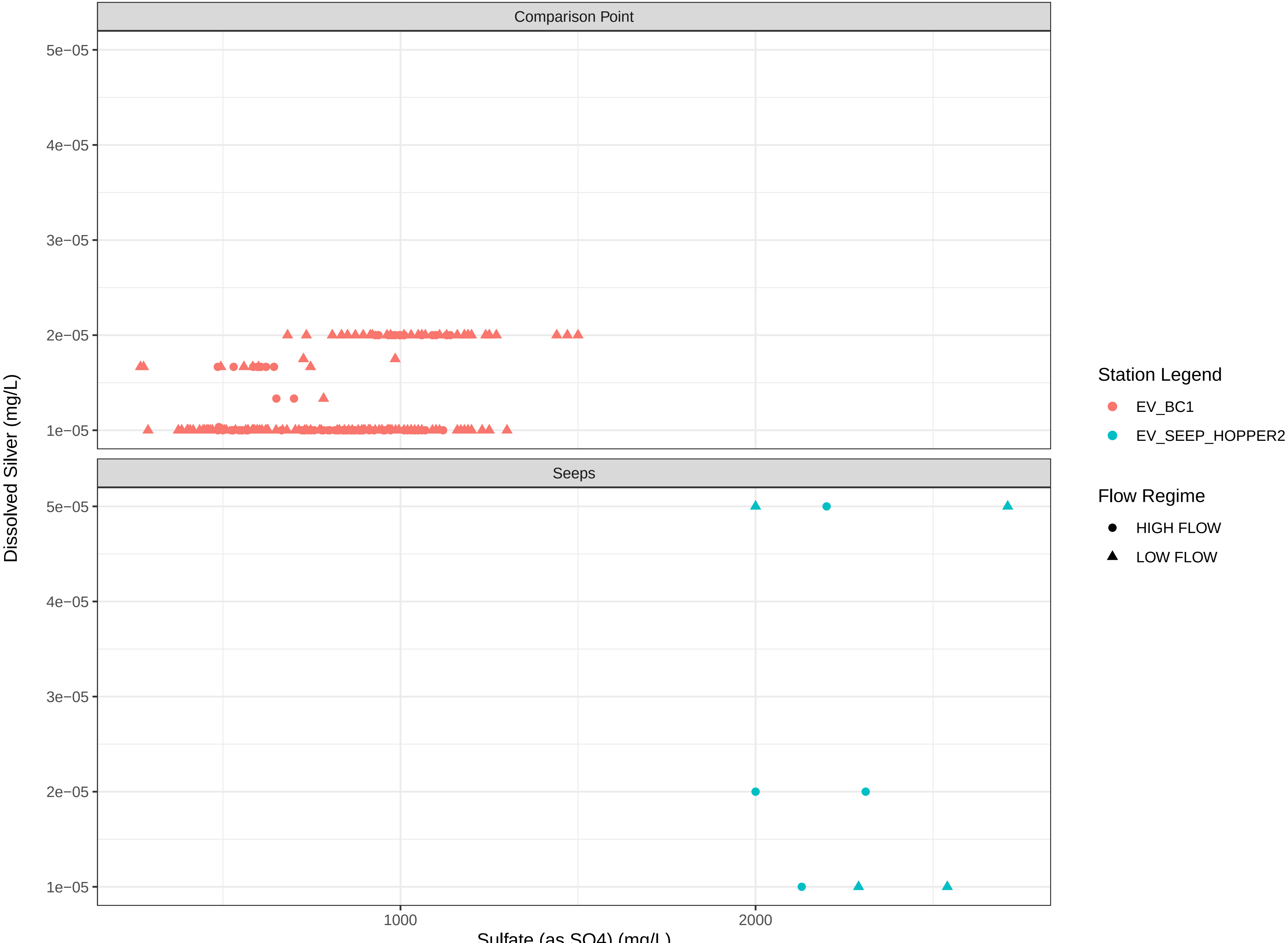
Seeps
4.5
4.0
3.5
Dissolved Silicon (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

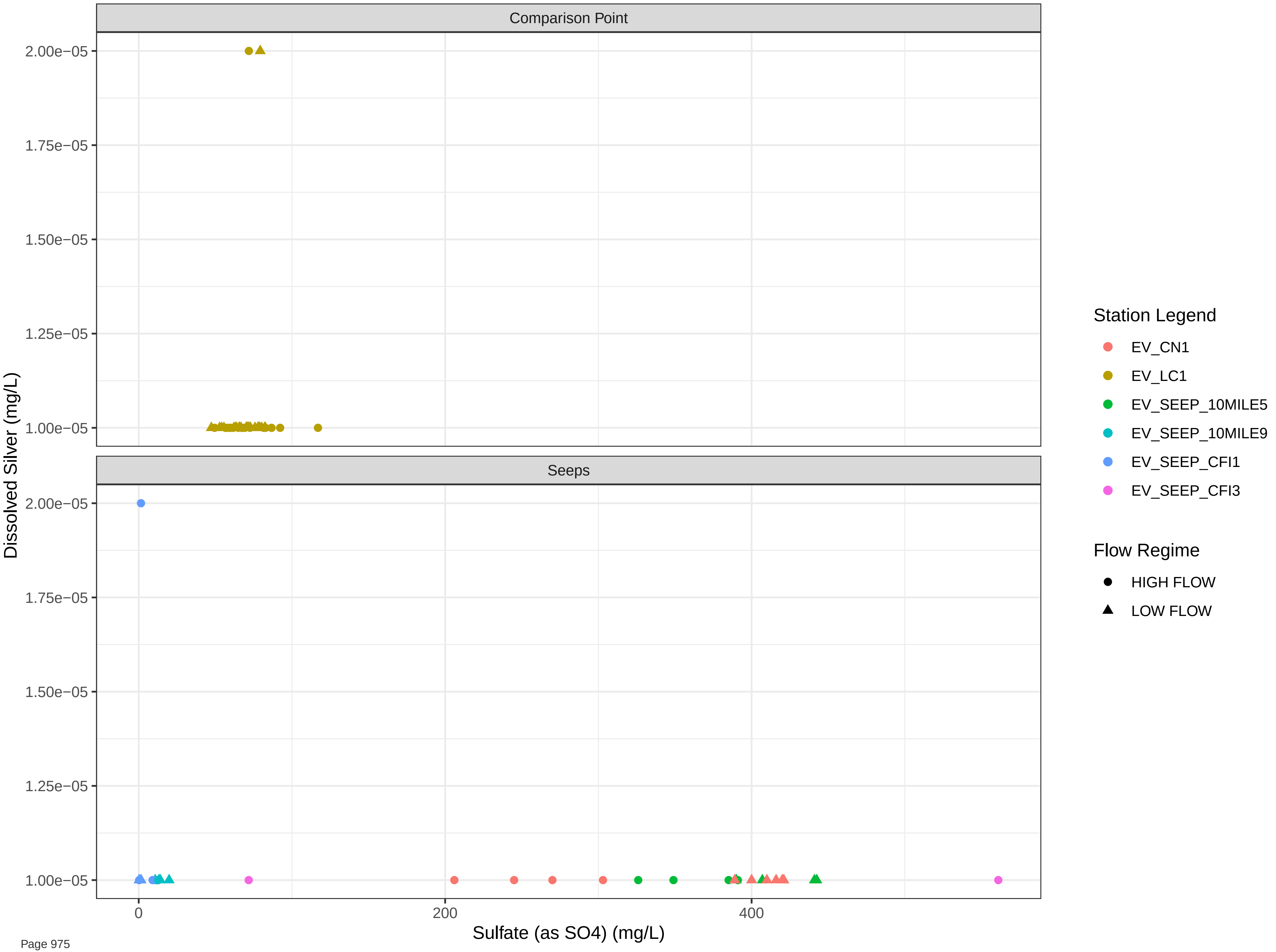


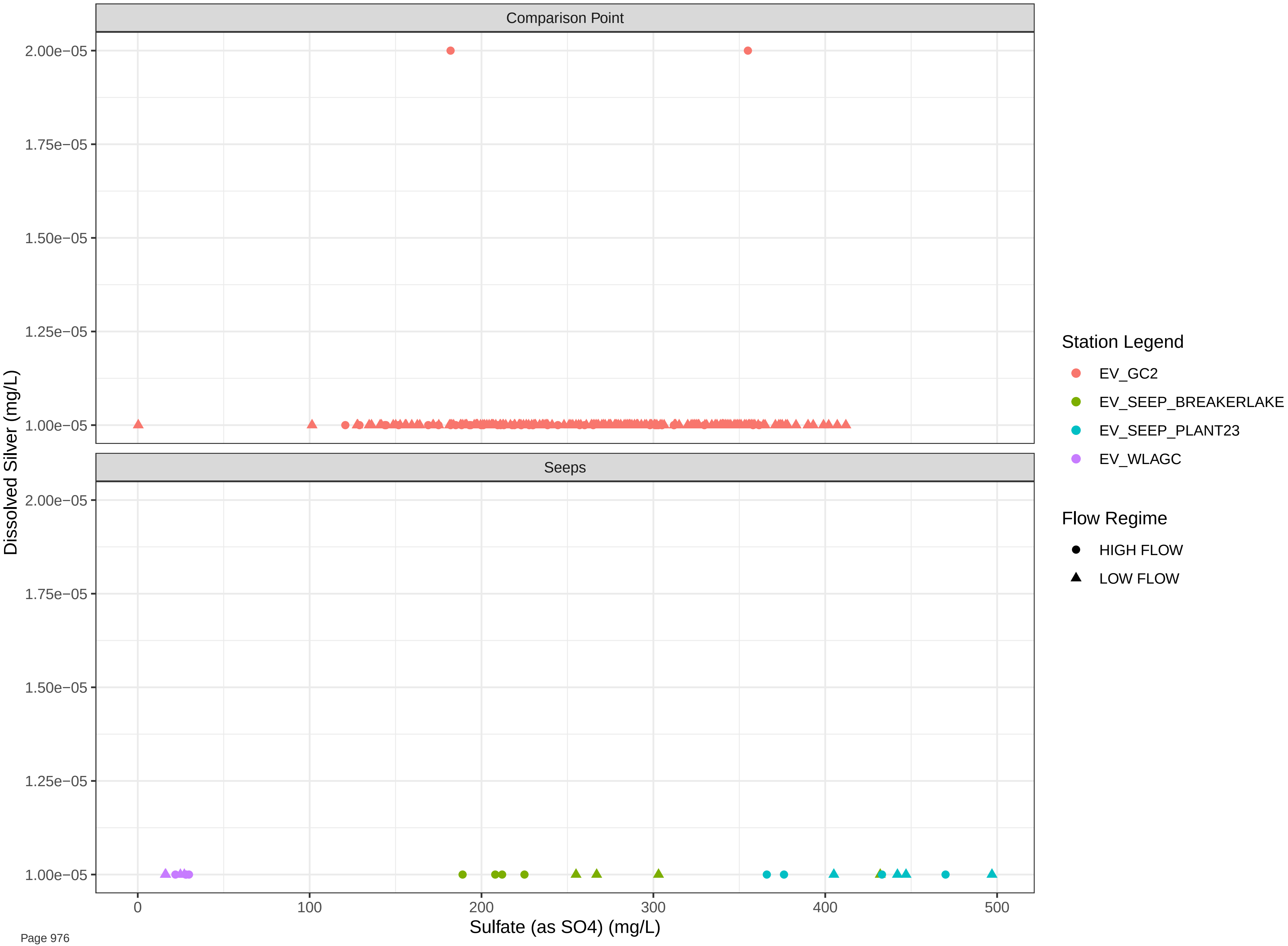
Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
5
4
3
2
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
6
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

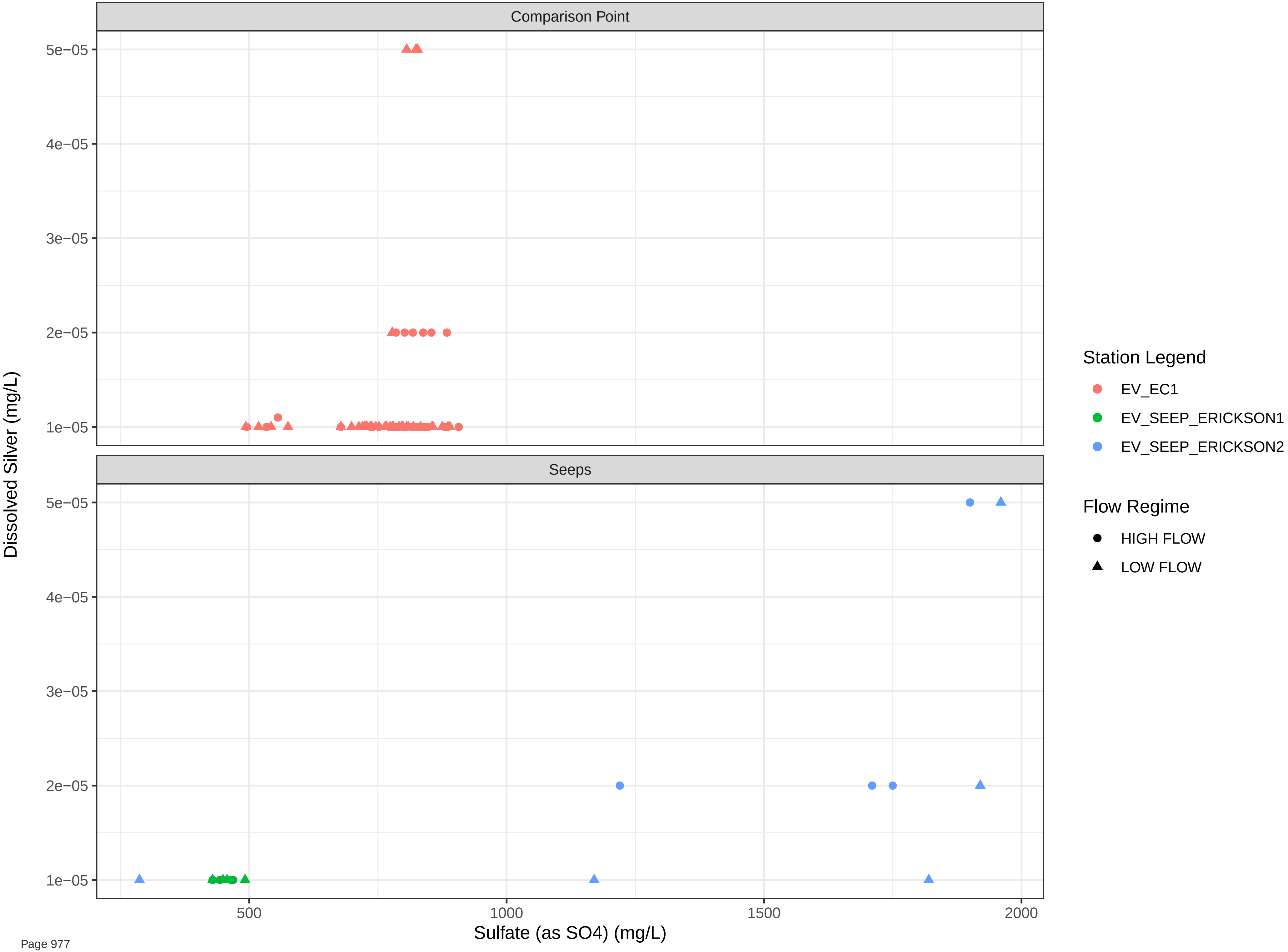

Seeps
Dissolved Silicon (mg/L)
5.2
5.0
4.8
4.6
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

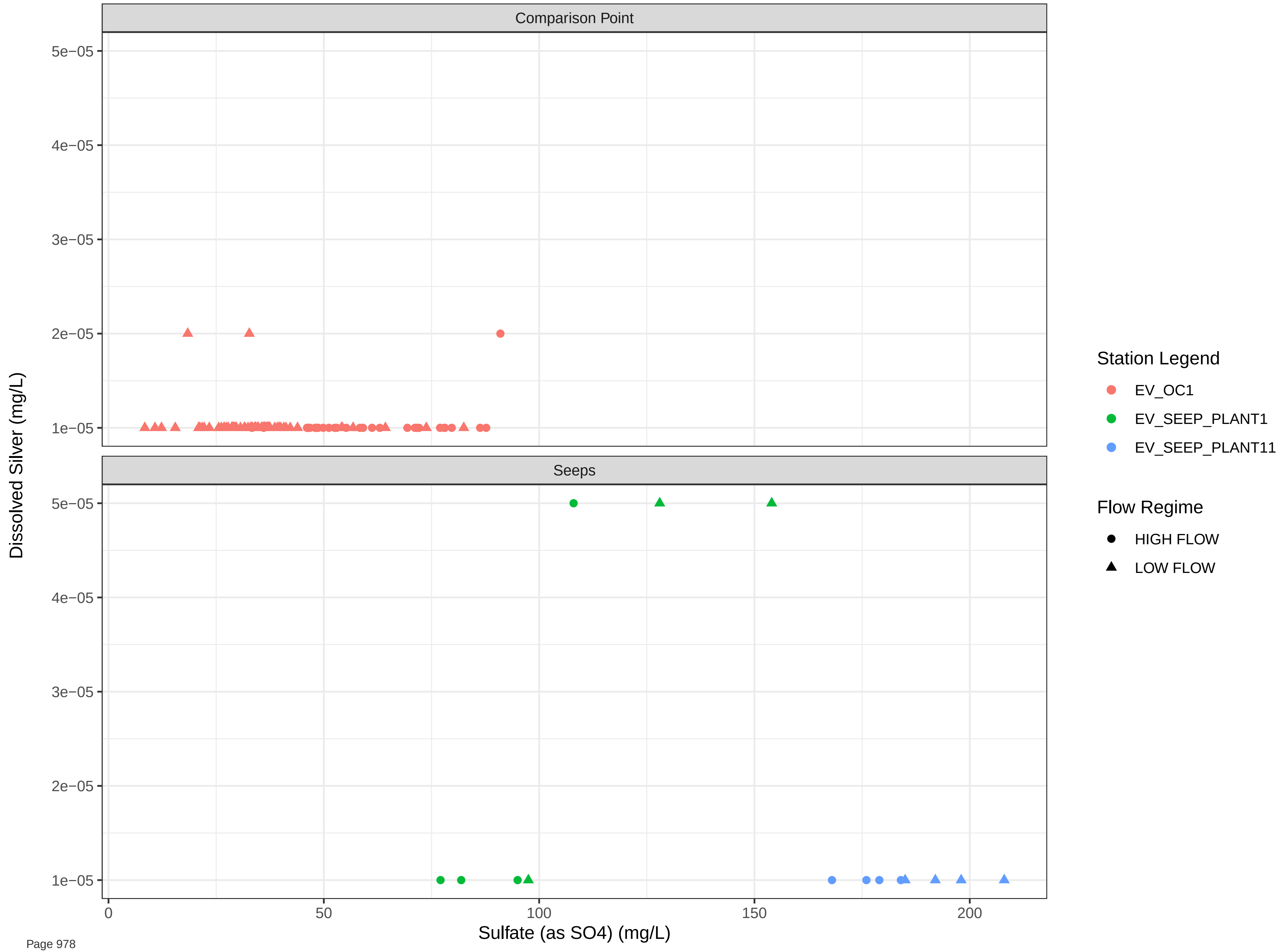

Comparison Point
Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
Dissolved Silver (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silver (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

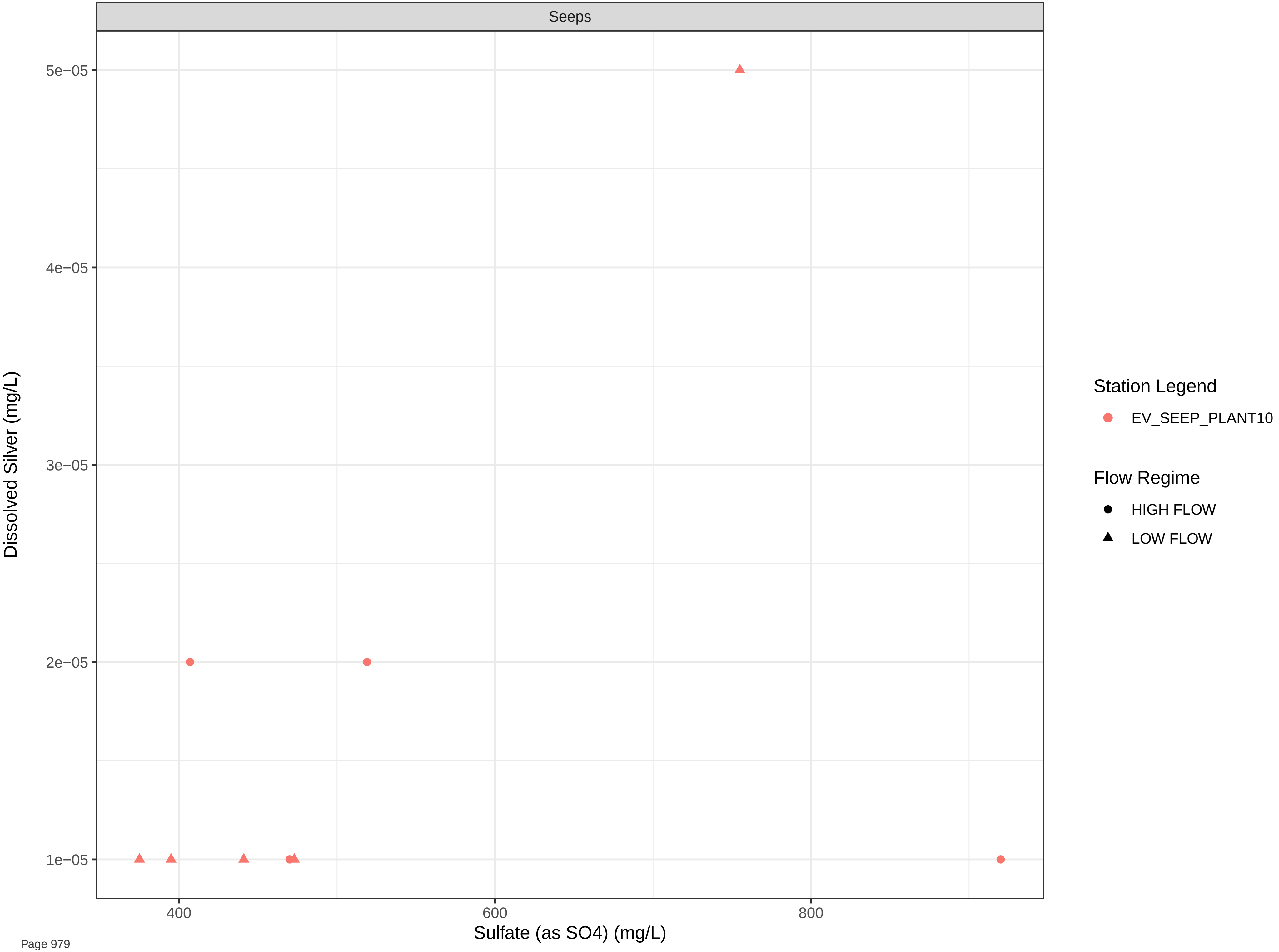


Comparison Point
Seeps
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
Dissolved Silver (mg/L)
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

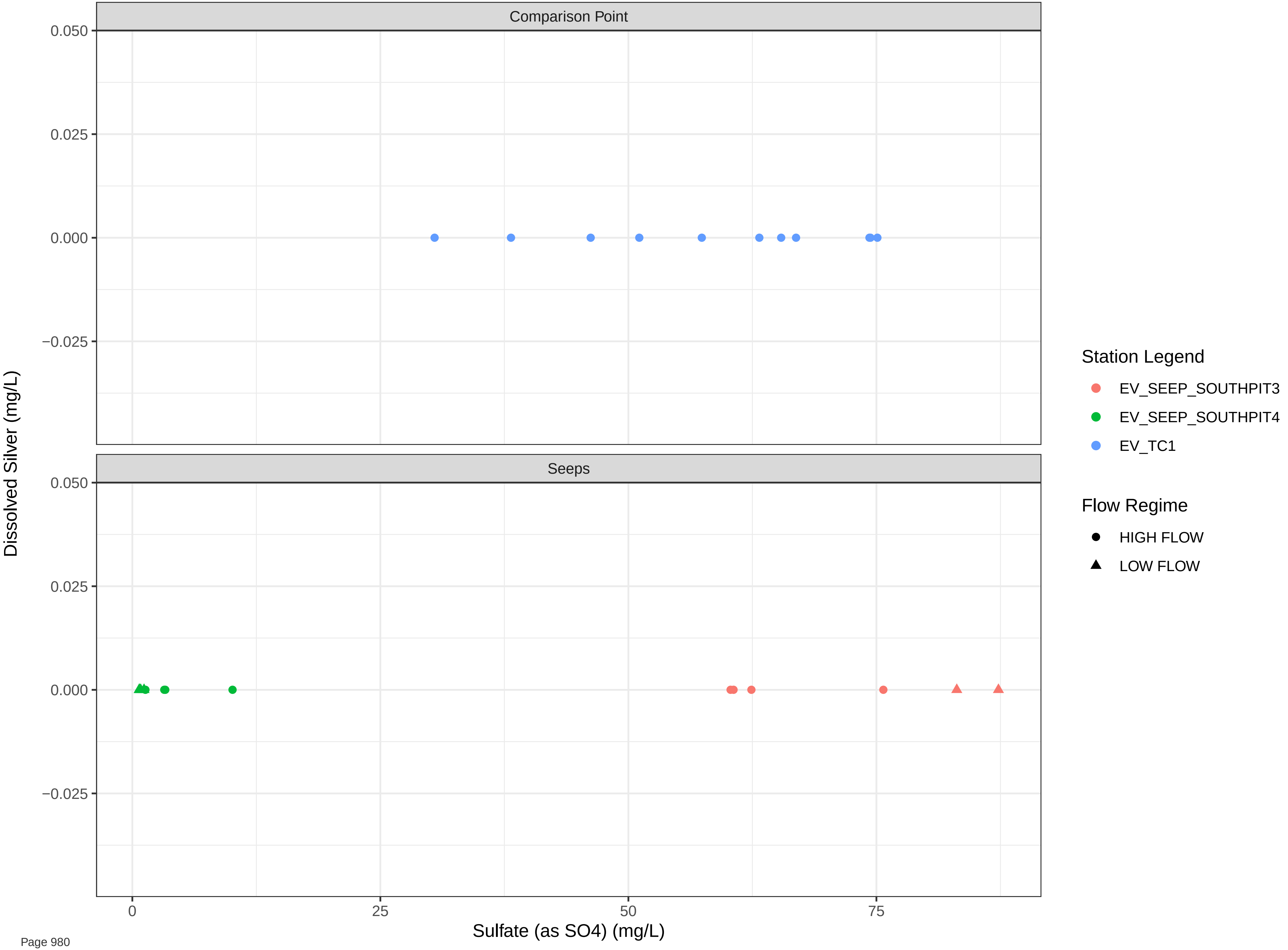

Comparison Point
Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
Dissolved Silver (mg/L)
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



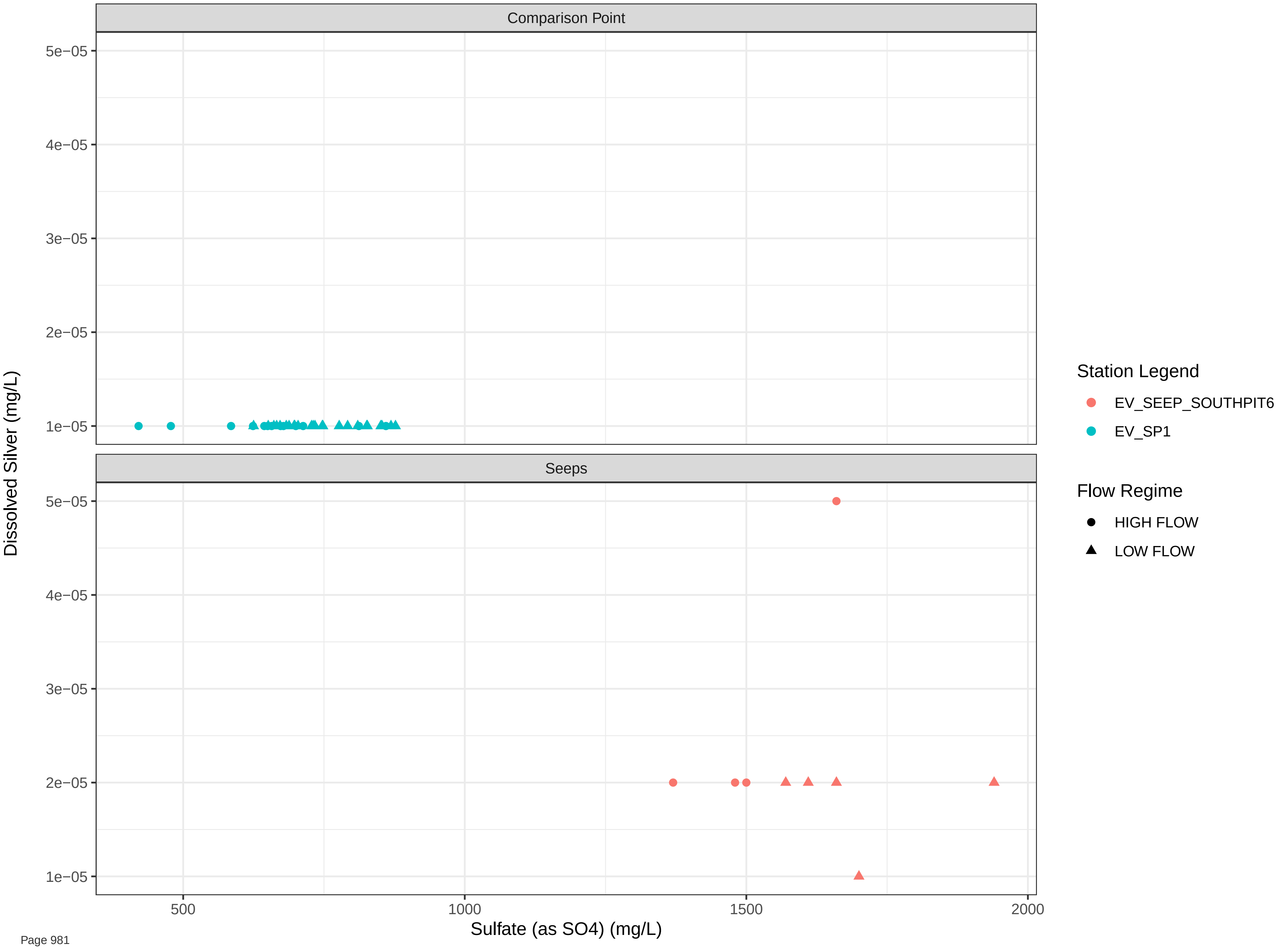
Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

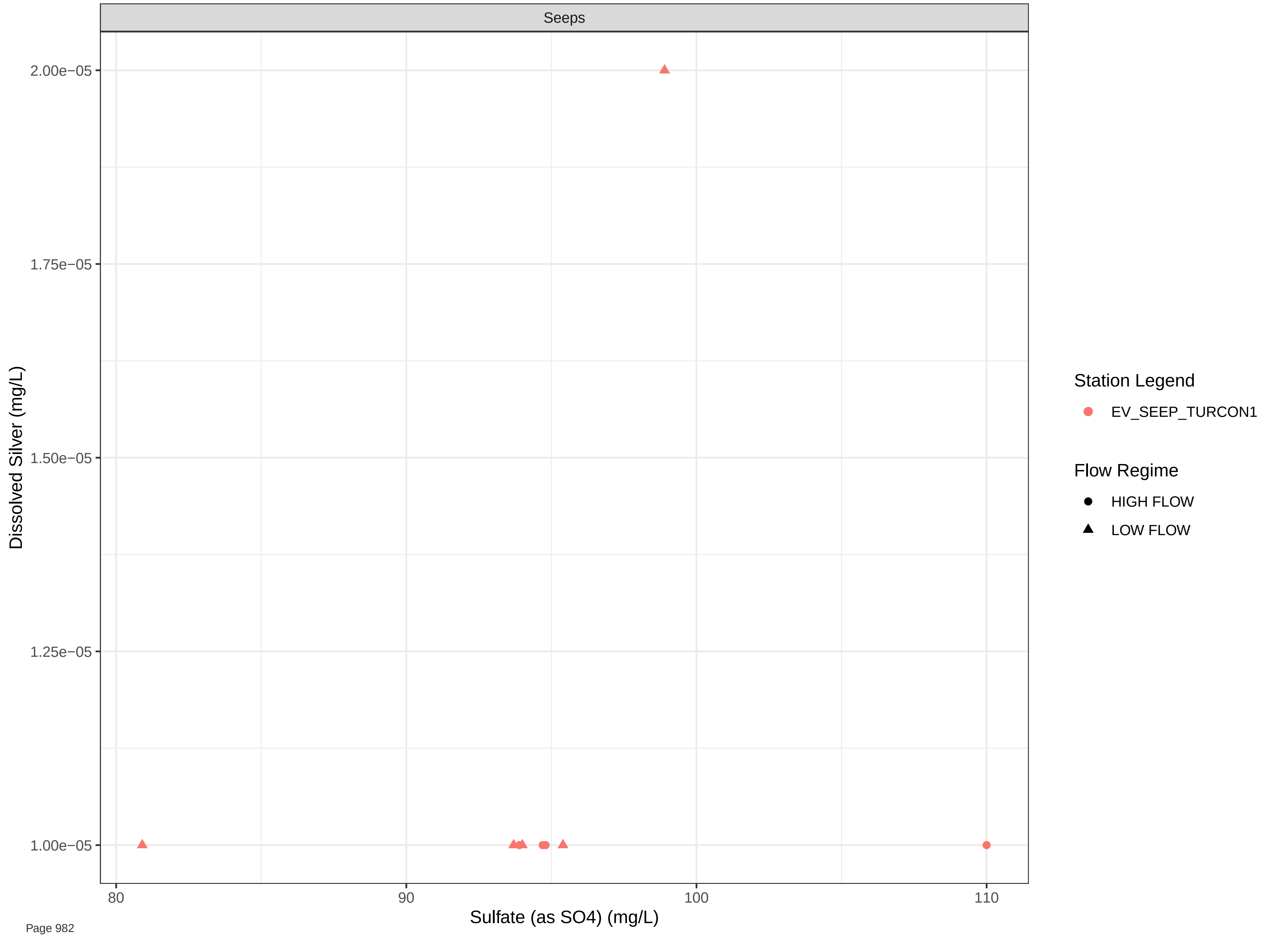


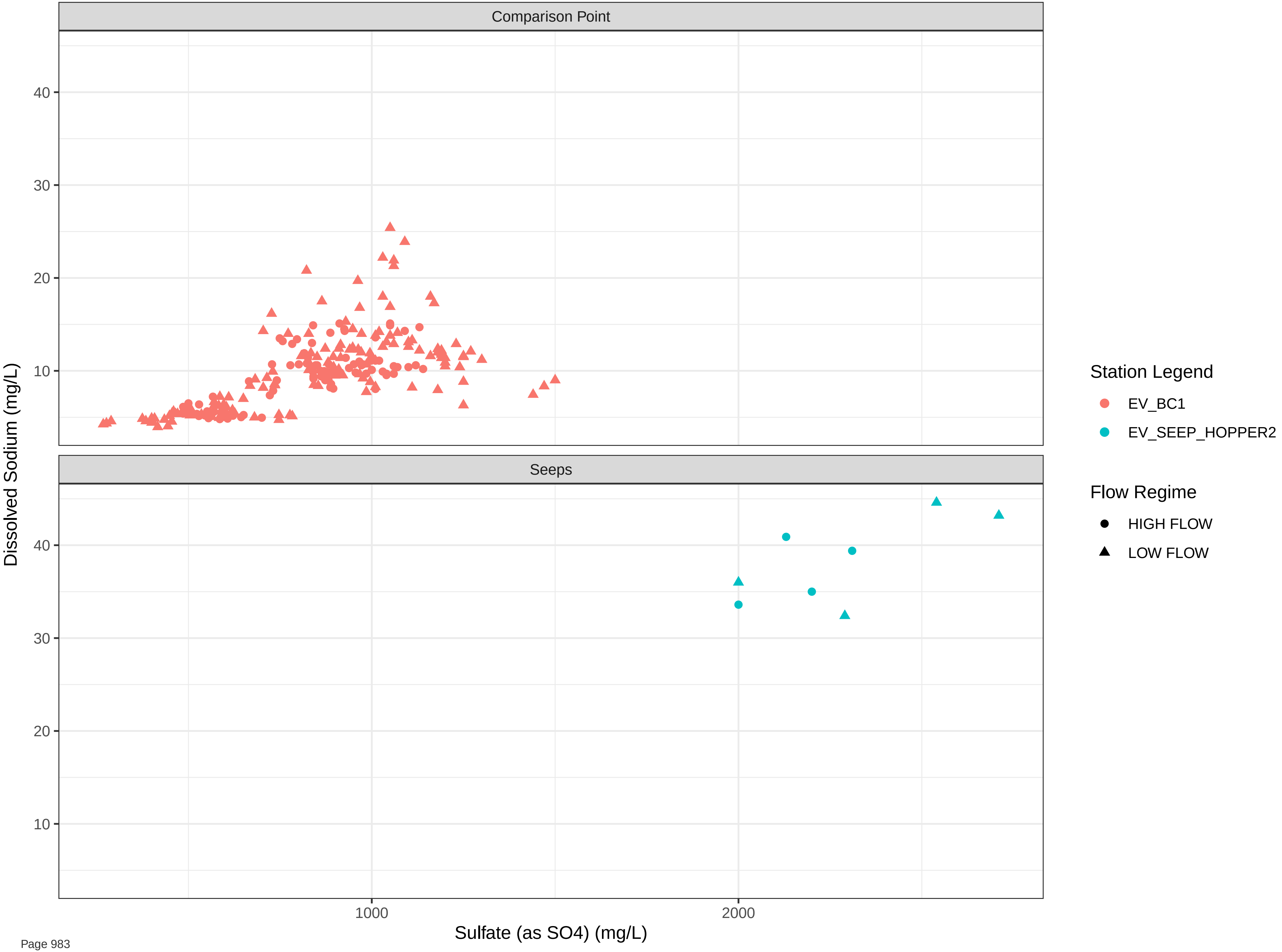
Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
Dissolved Silver (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



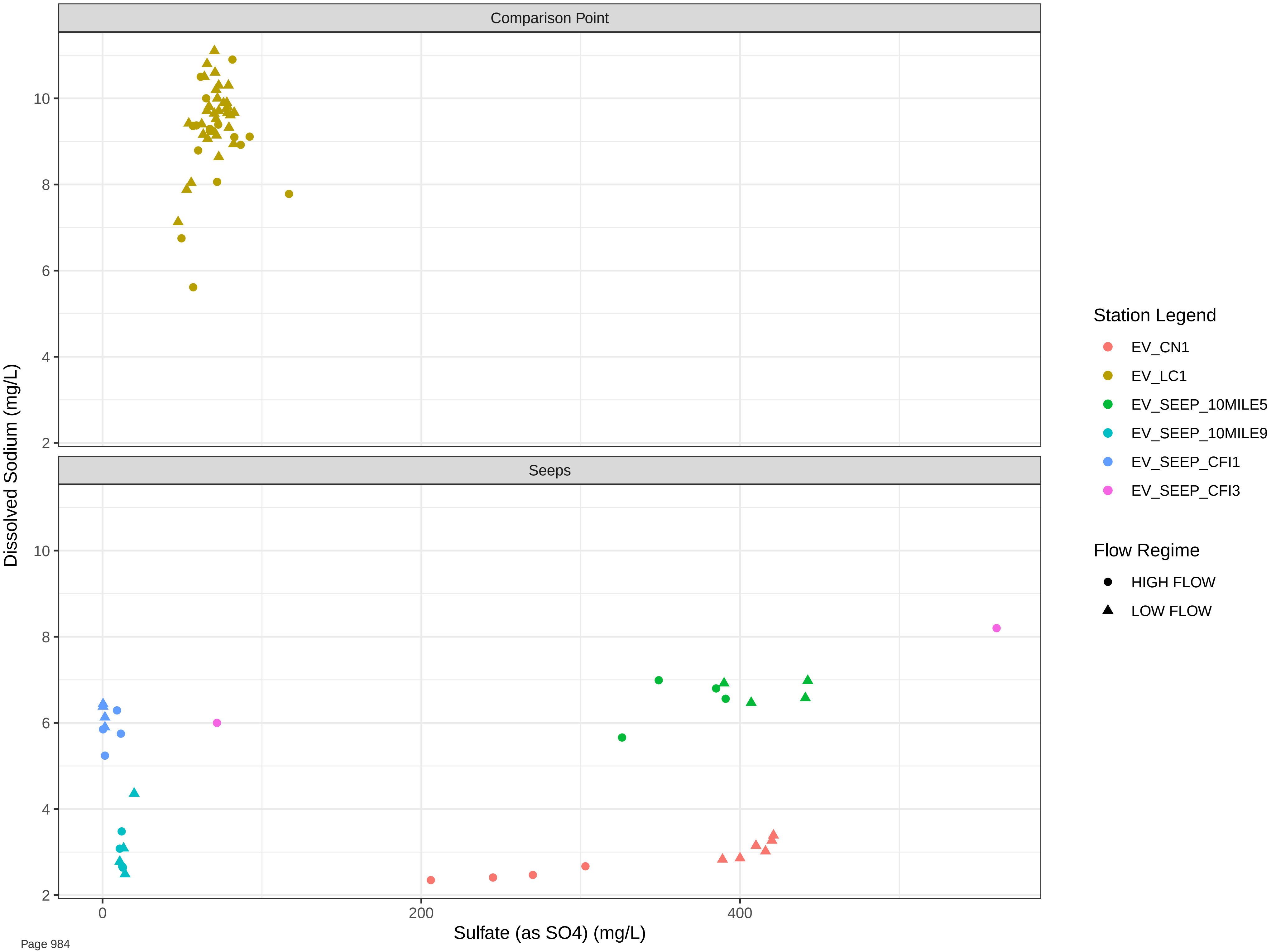
Comparison Point
Seeps
Dissolved Silver (mg/L)
0.050
0.025
0.000
−0.025
Sulfate (as SO4) (mg/L)
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silver (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

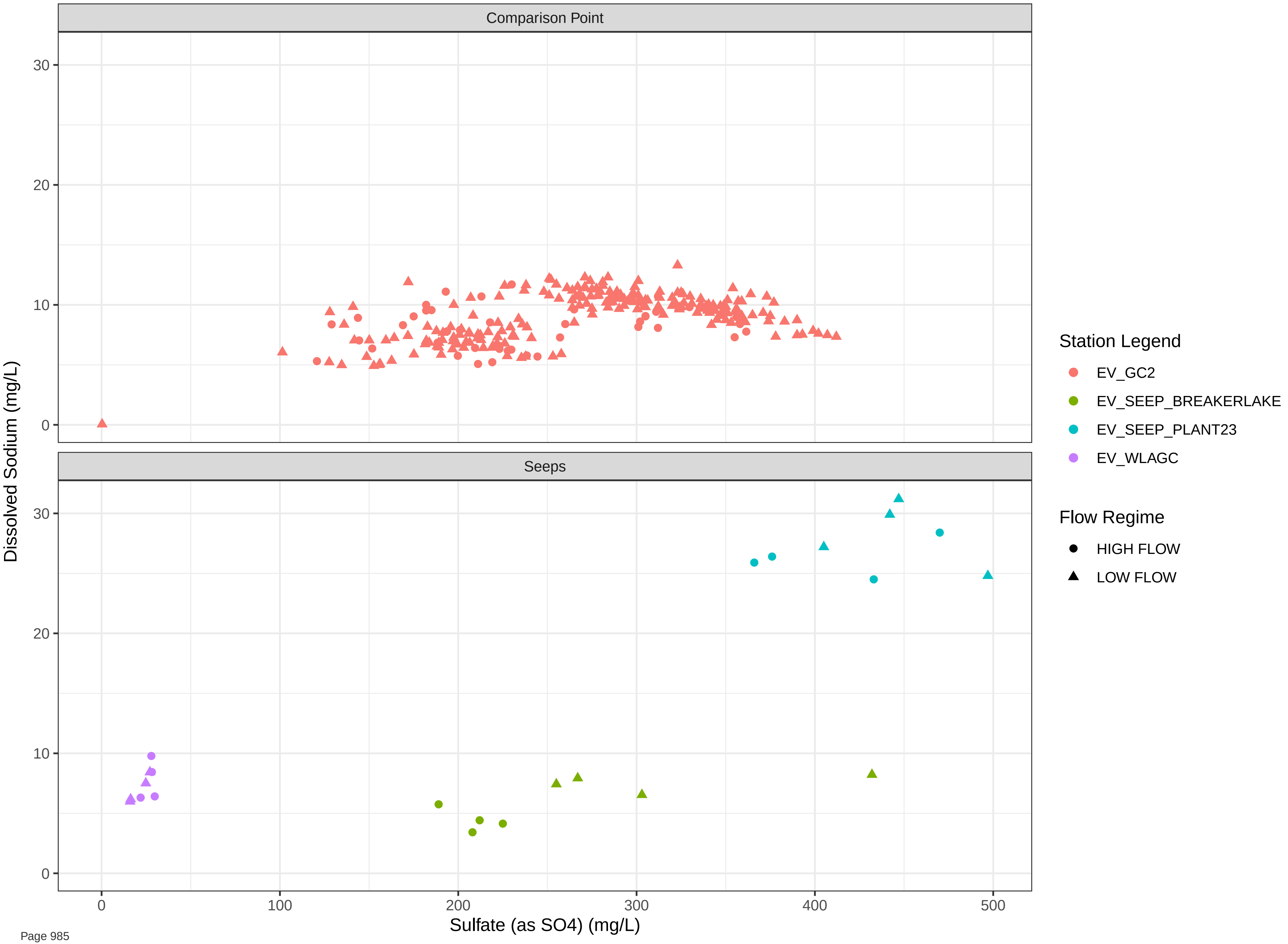

Seeps
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
80
90
100
110
Dissolved Silver (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



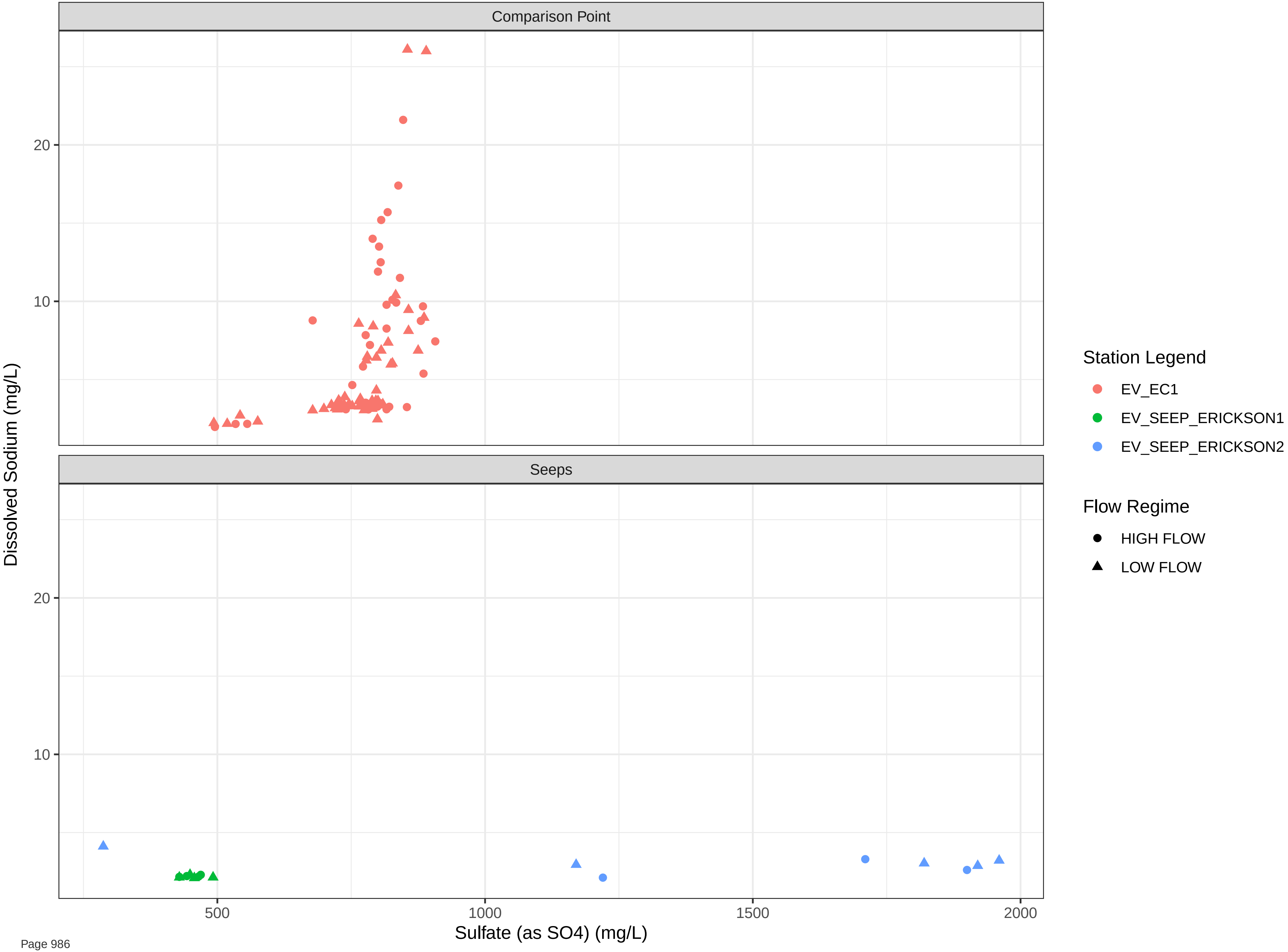
Comparison Point
Seeps
Dissolved Sodium (mg/L)
40
30
20
10
40
30
20
10
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

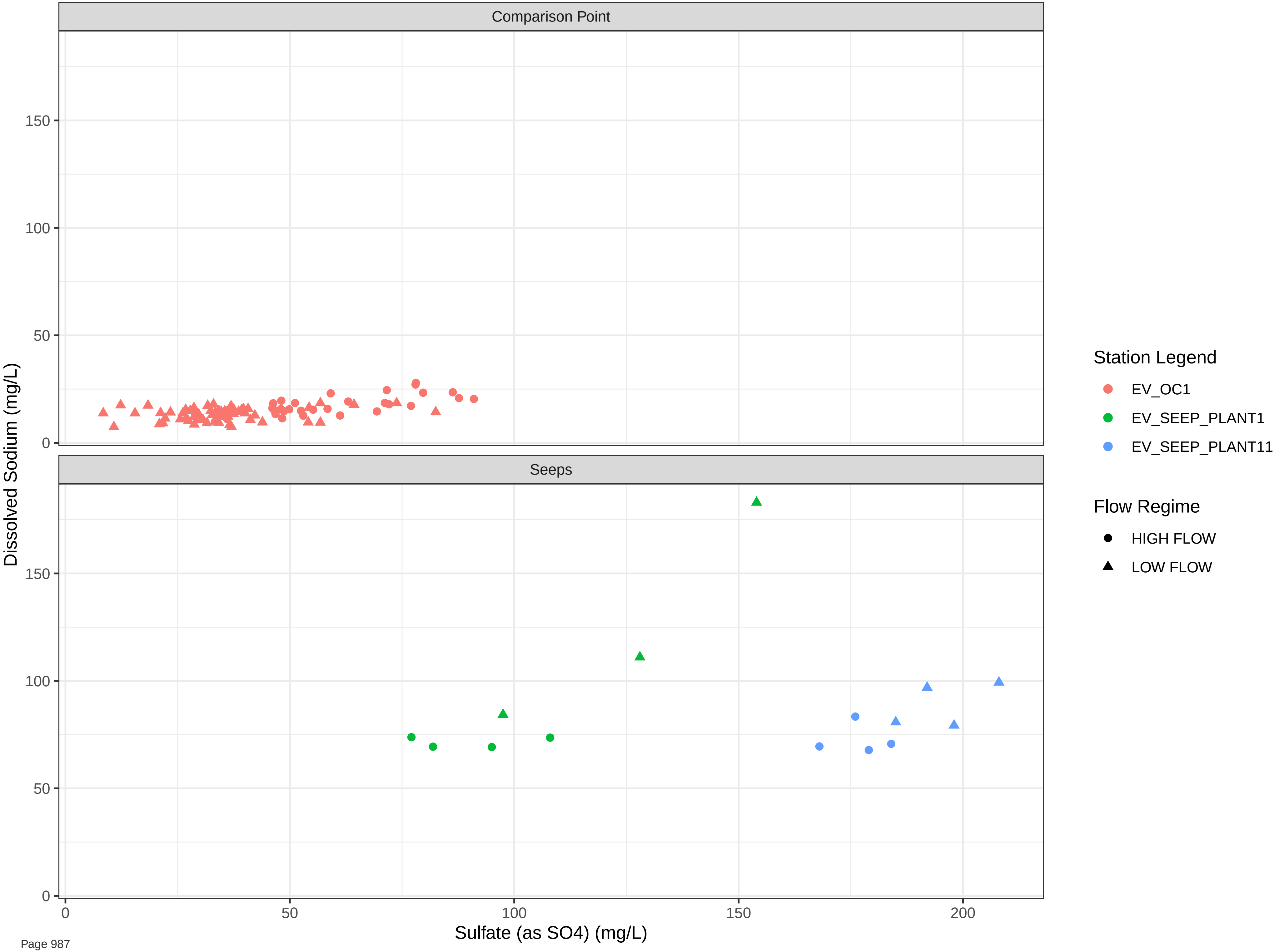


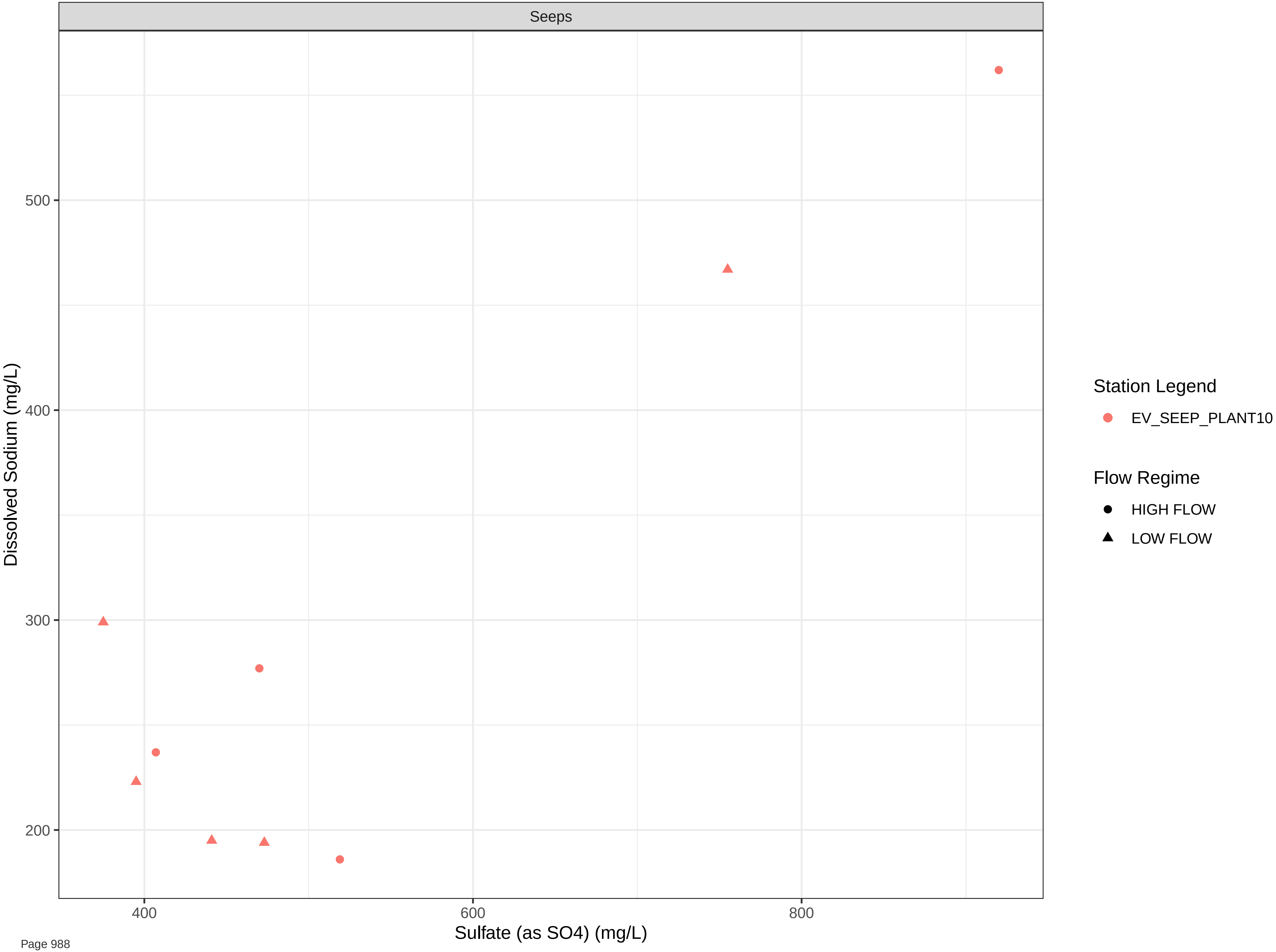
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
10
8
6
4
2
0
200
400
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

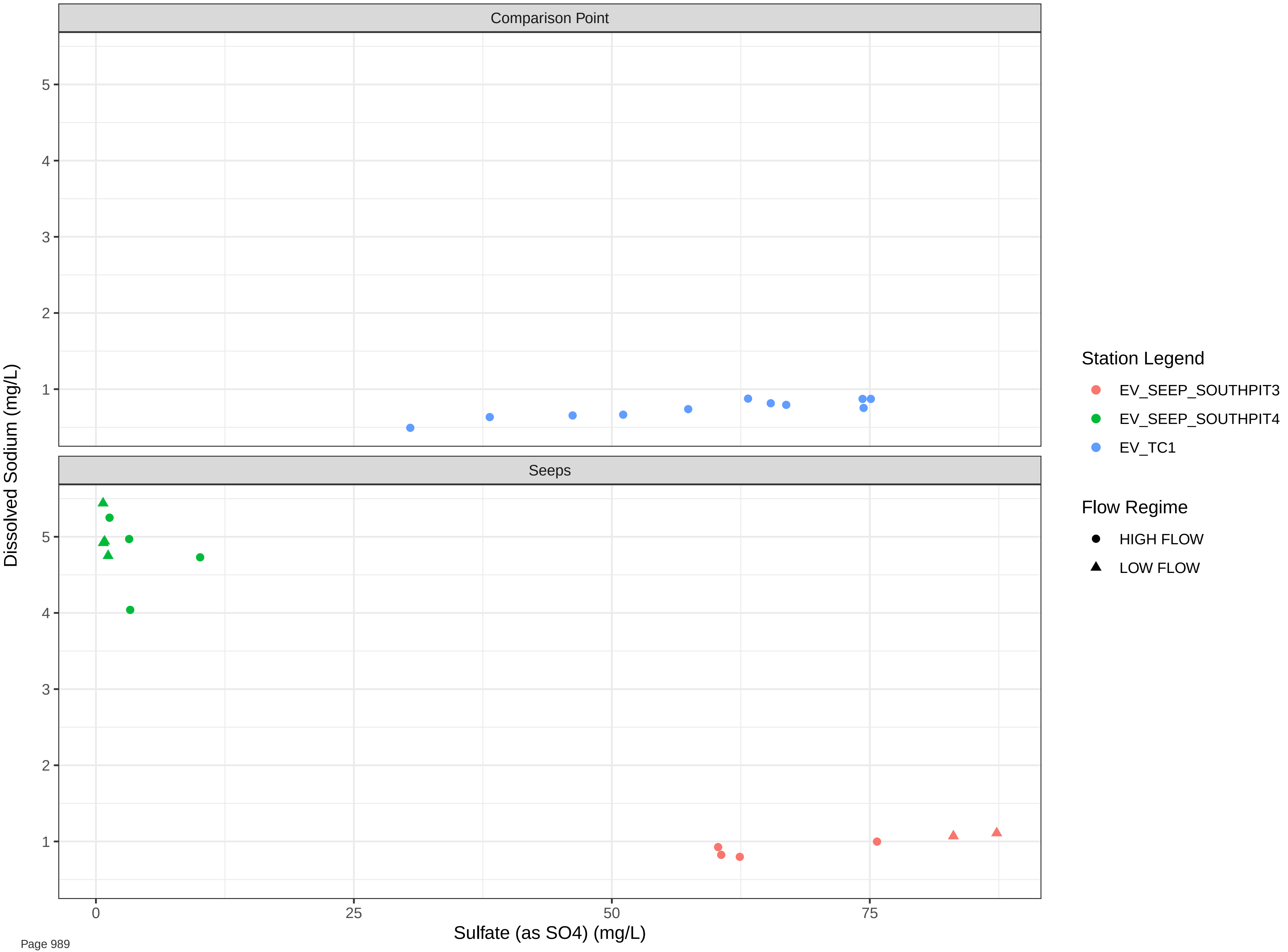


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
0
100
200
300
400
500
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

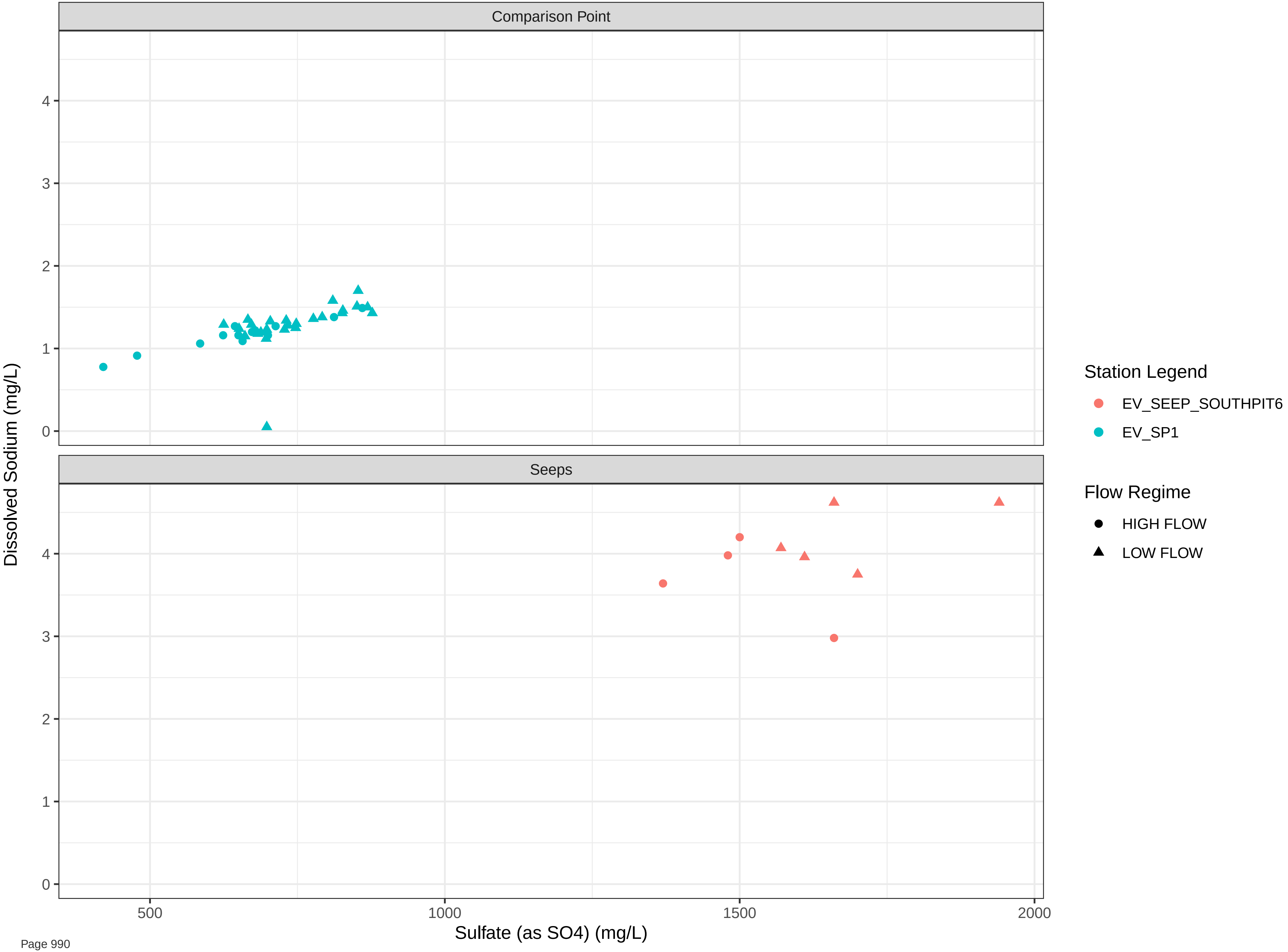

Comparison Point
Seeps
Dissolved Sodium (mg/L)
10
20
10
20
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

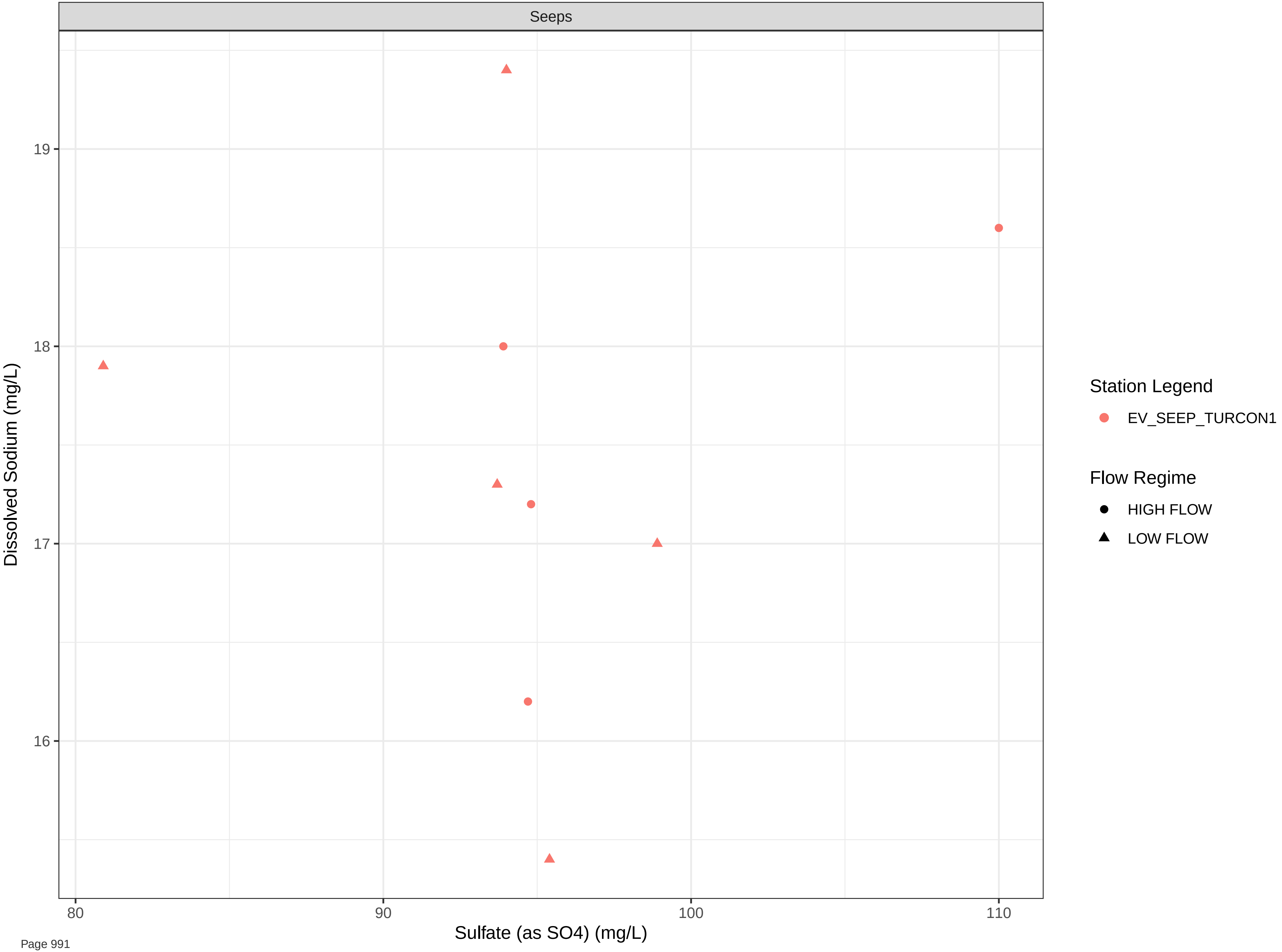

Seeps
Dissolved Sodium (mg/L)
500
400
300
200
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

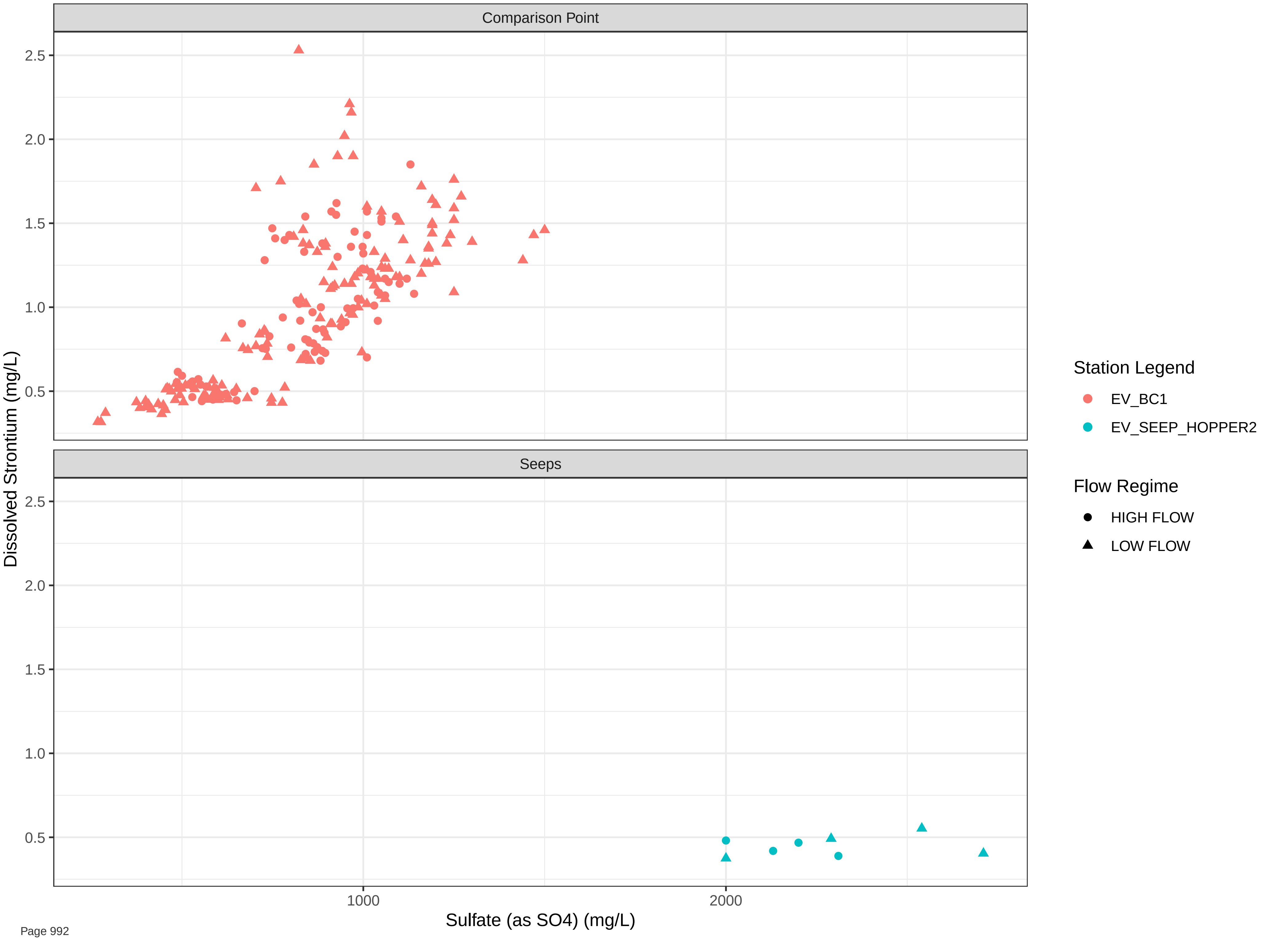


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
1
2
3
4
5
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

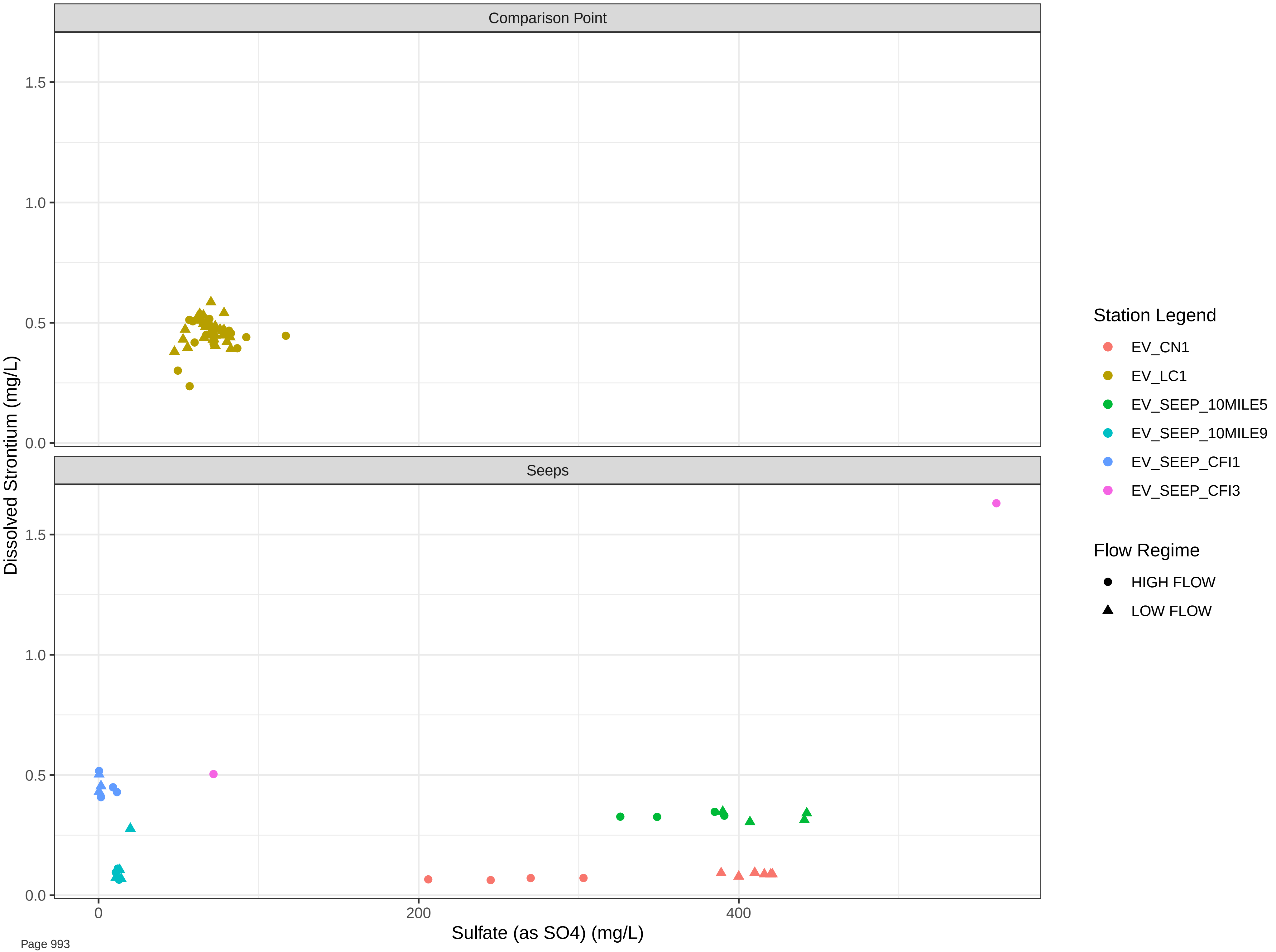


Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
3
4
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

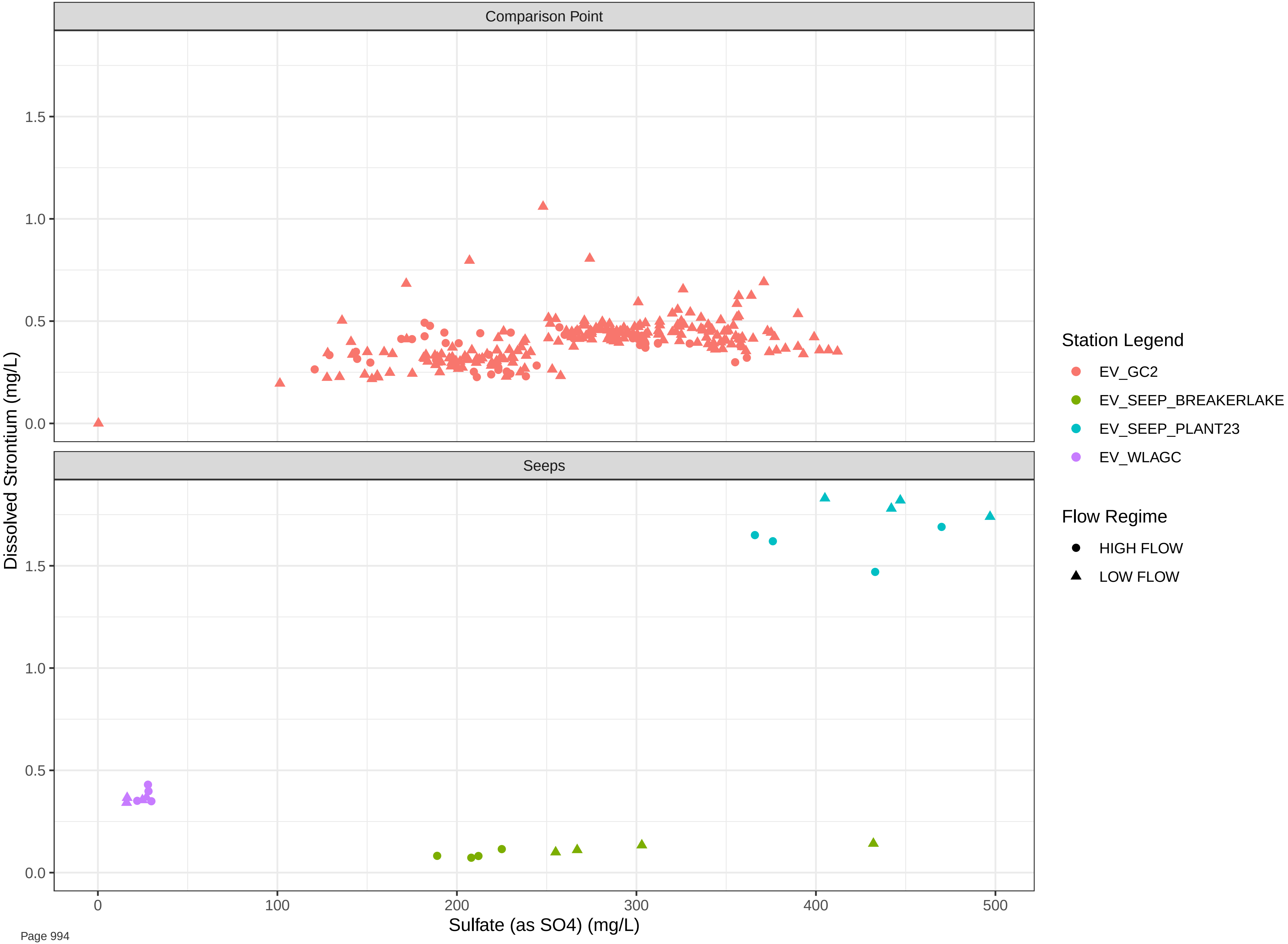

Seeps
Dissolved Sodium (mg/L)
19
18
17
16
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

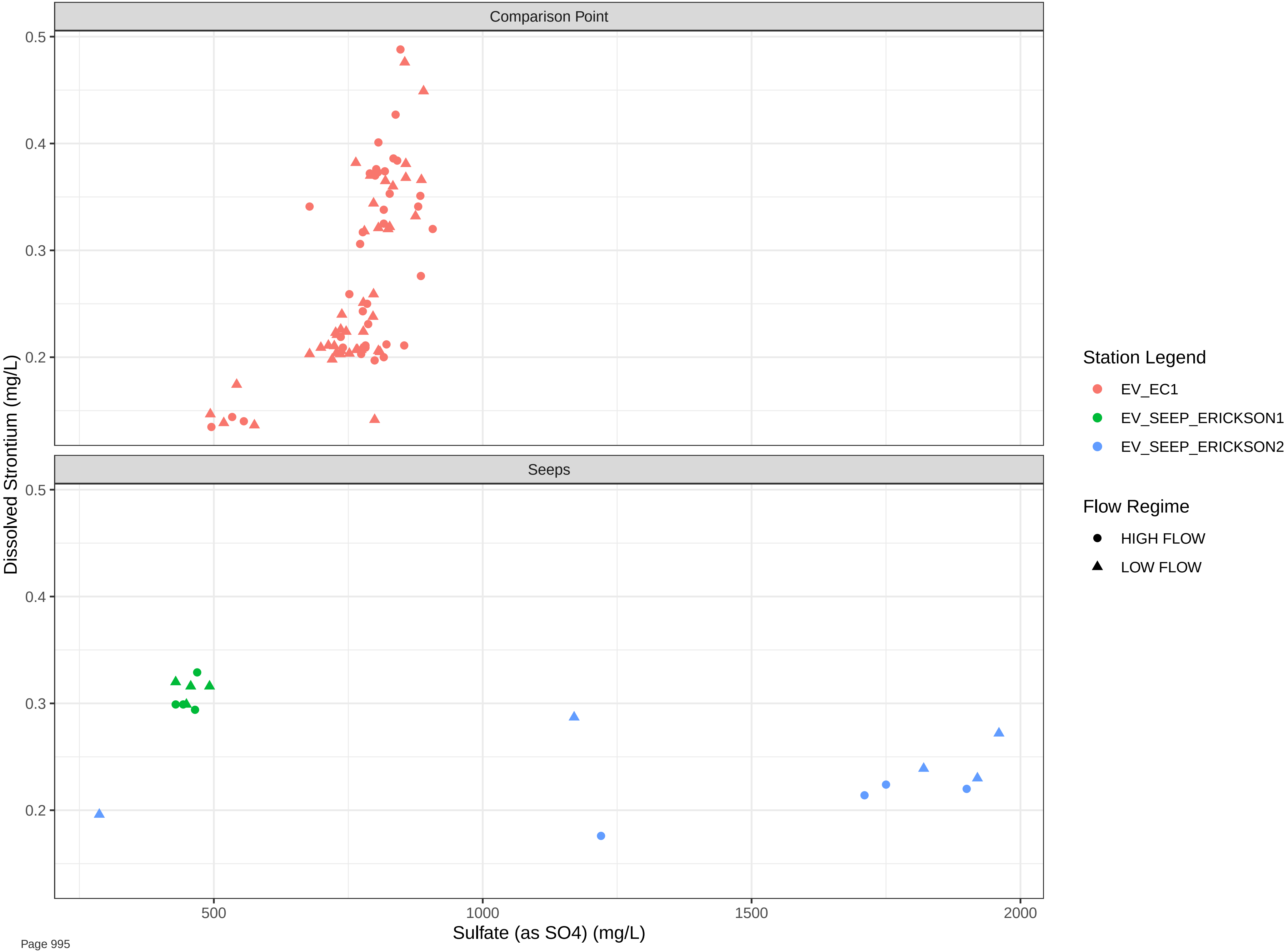


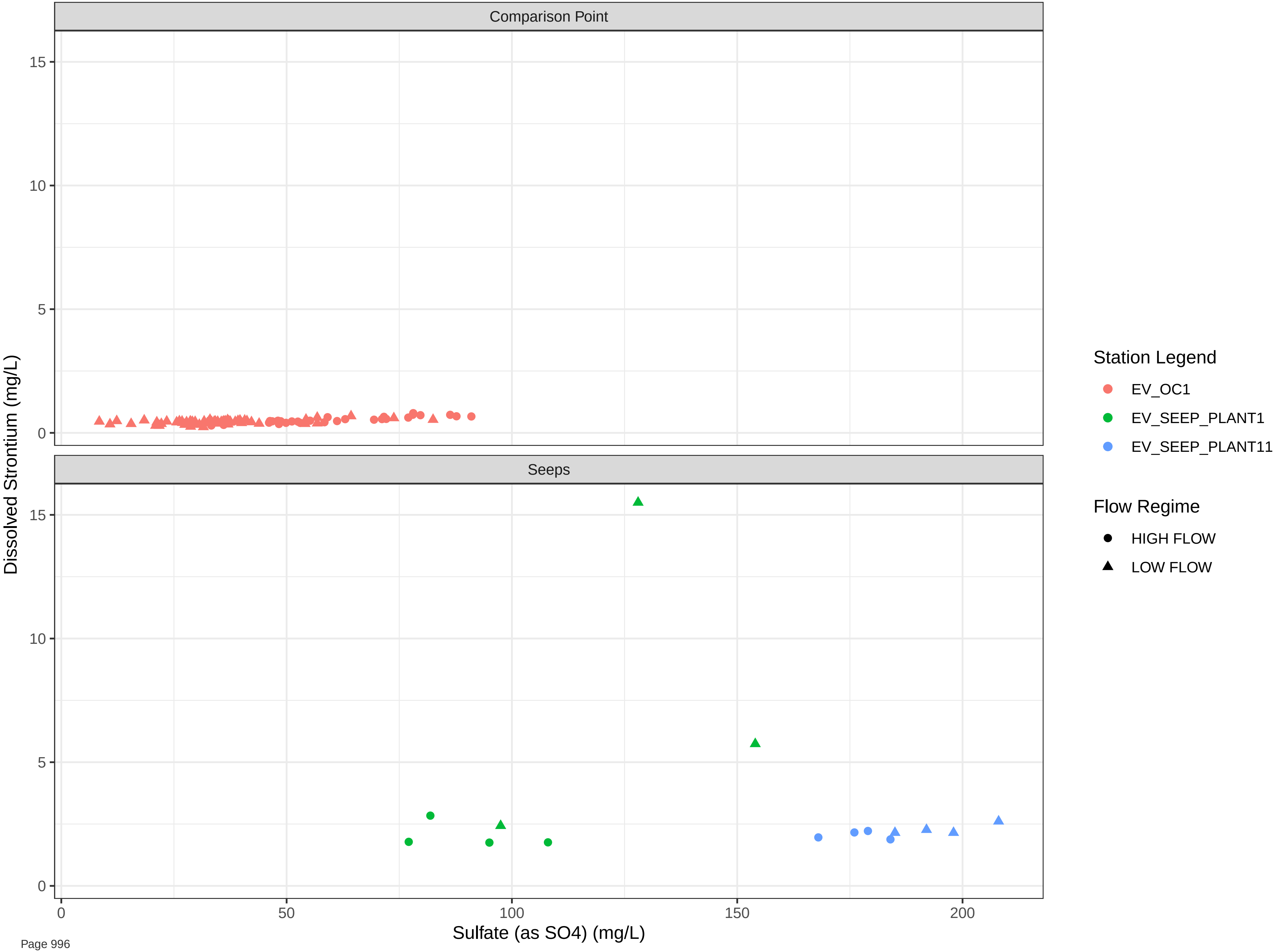
Comparison Point
Seeps
2.5
2.0
1.5
1.0
0.5
1000
2000
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



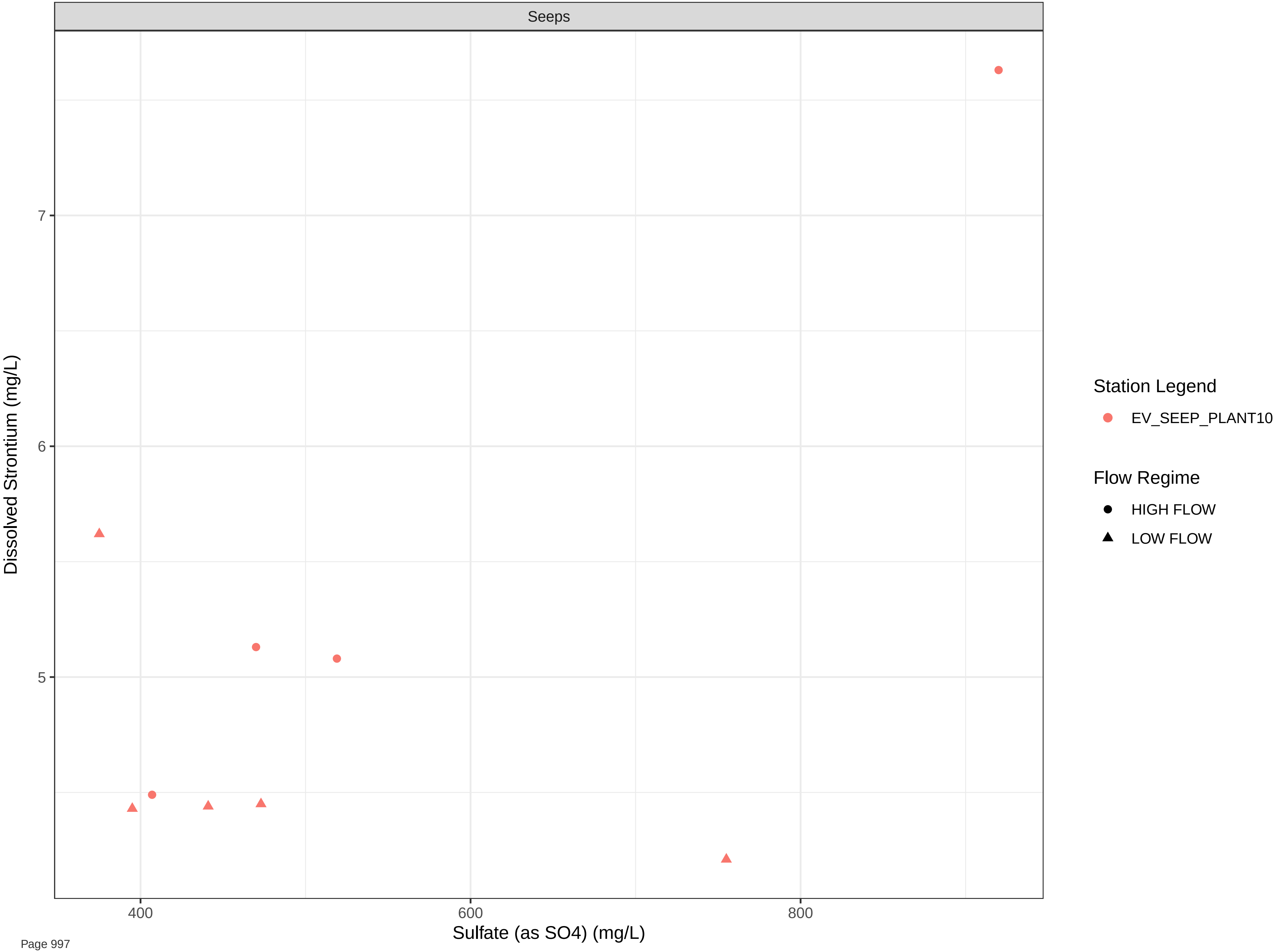
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.0
0.5
1.0
1.5
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.0
0.5
1.0
1.5
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

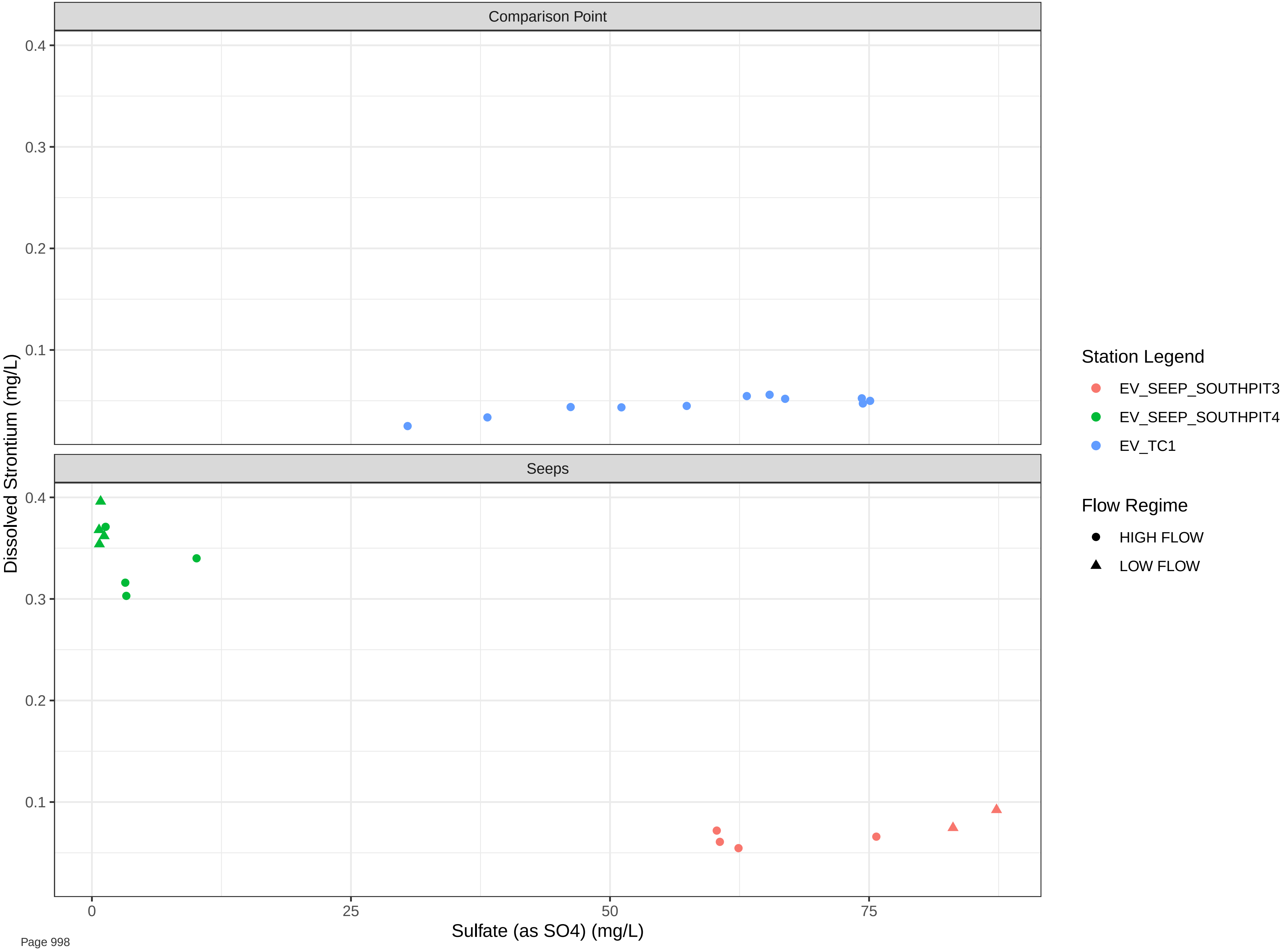

Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.5
0.4
0.3
0.2
Sulfate (as SO4) (mg/L)
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



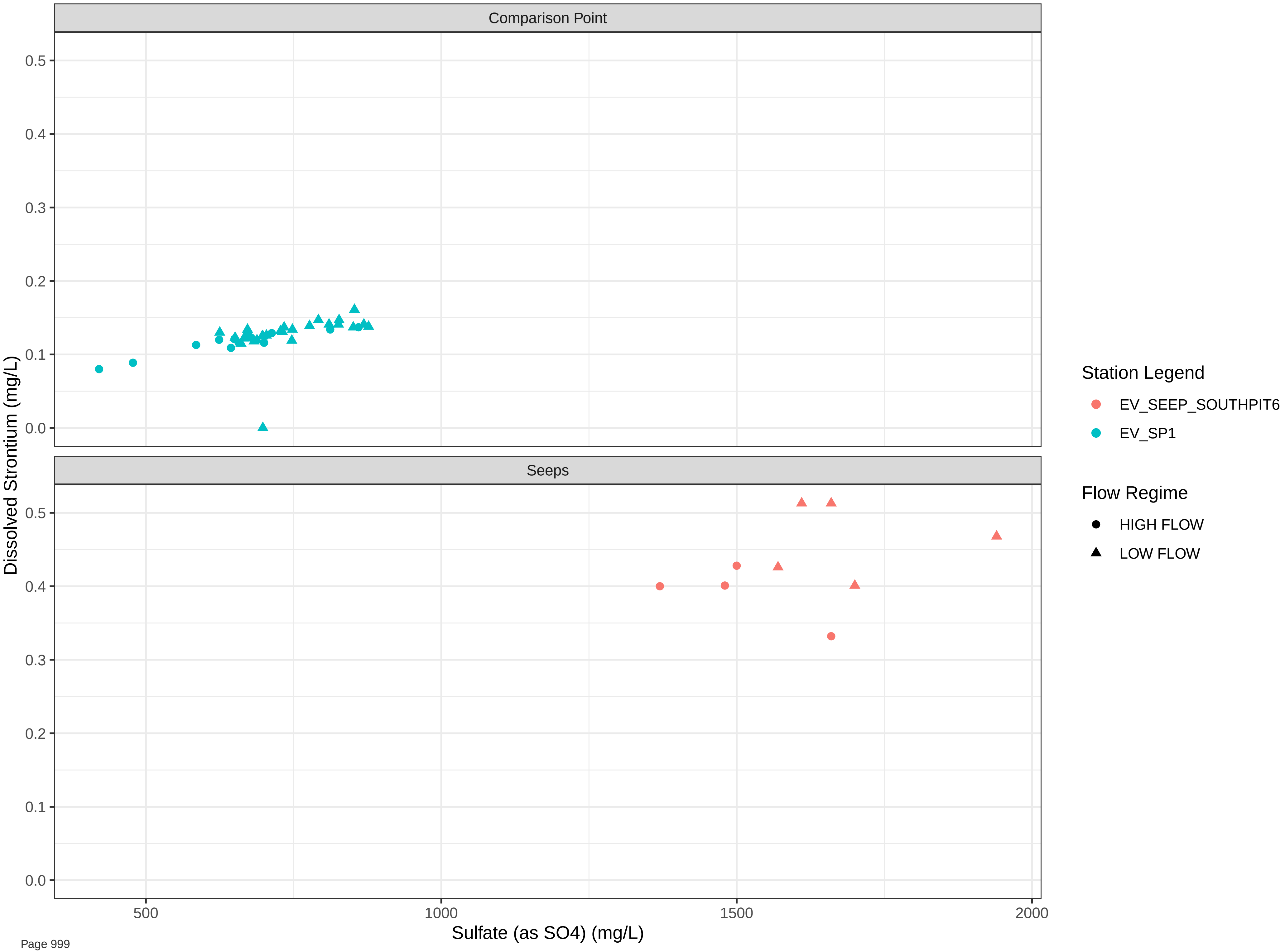
Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0
5
10
15
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



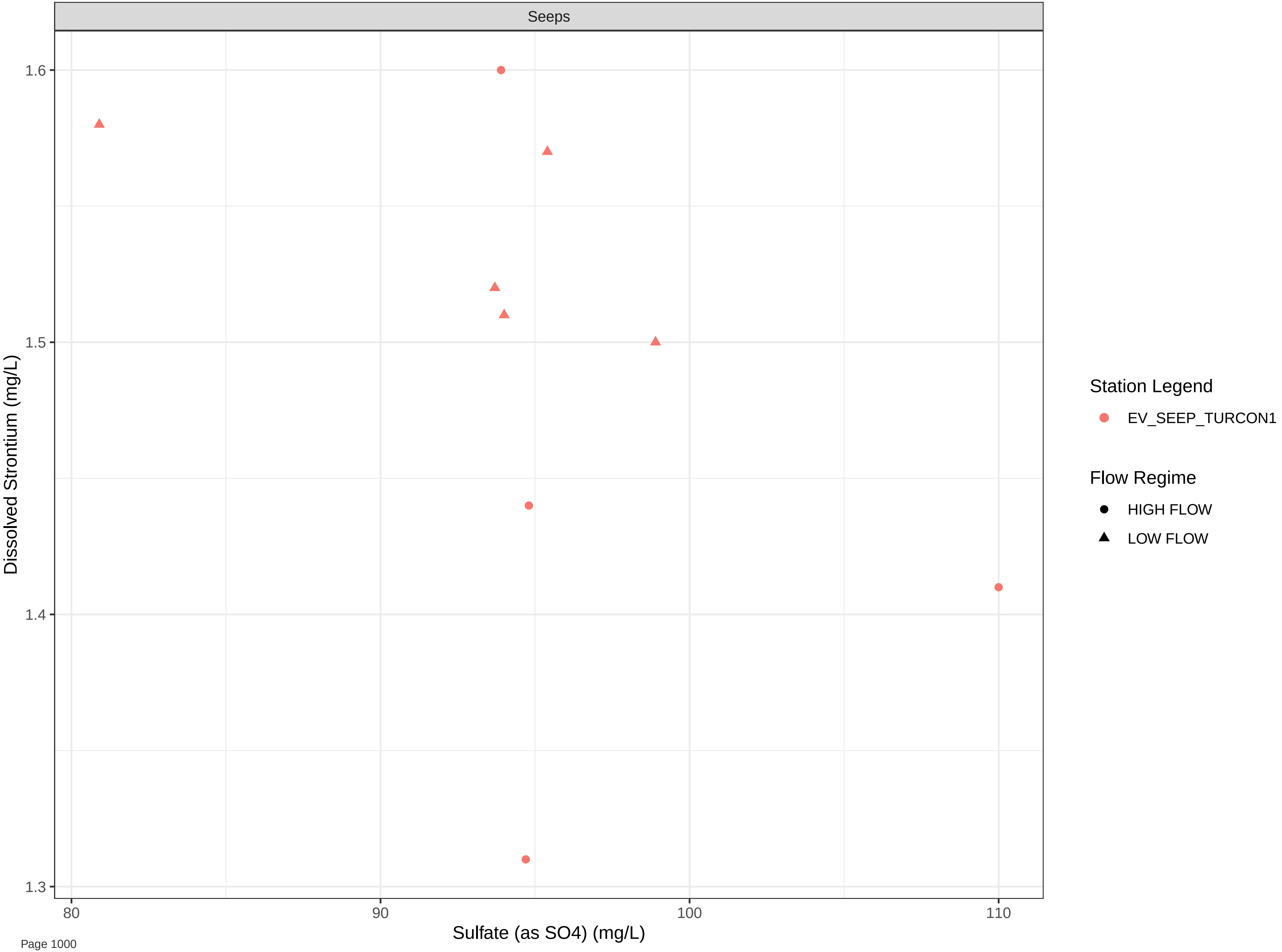
Seeps
Dissolved Strontium (mg/L)
7
6
5
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

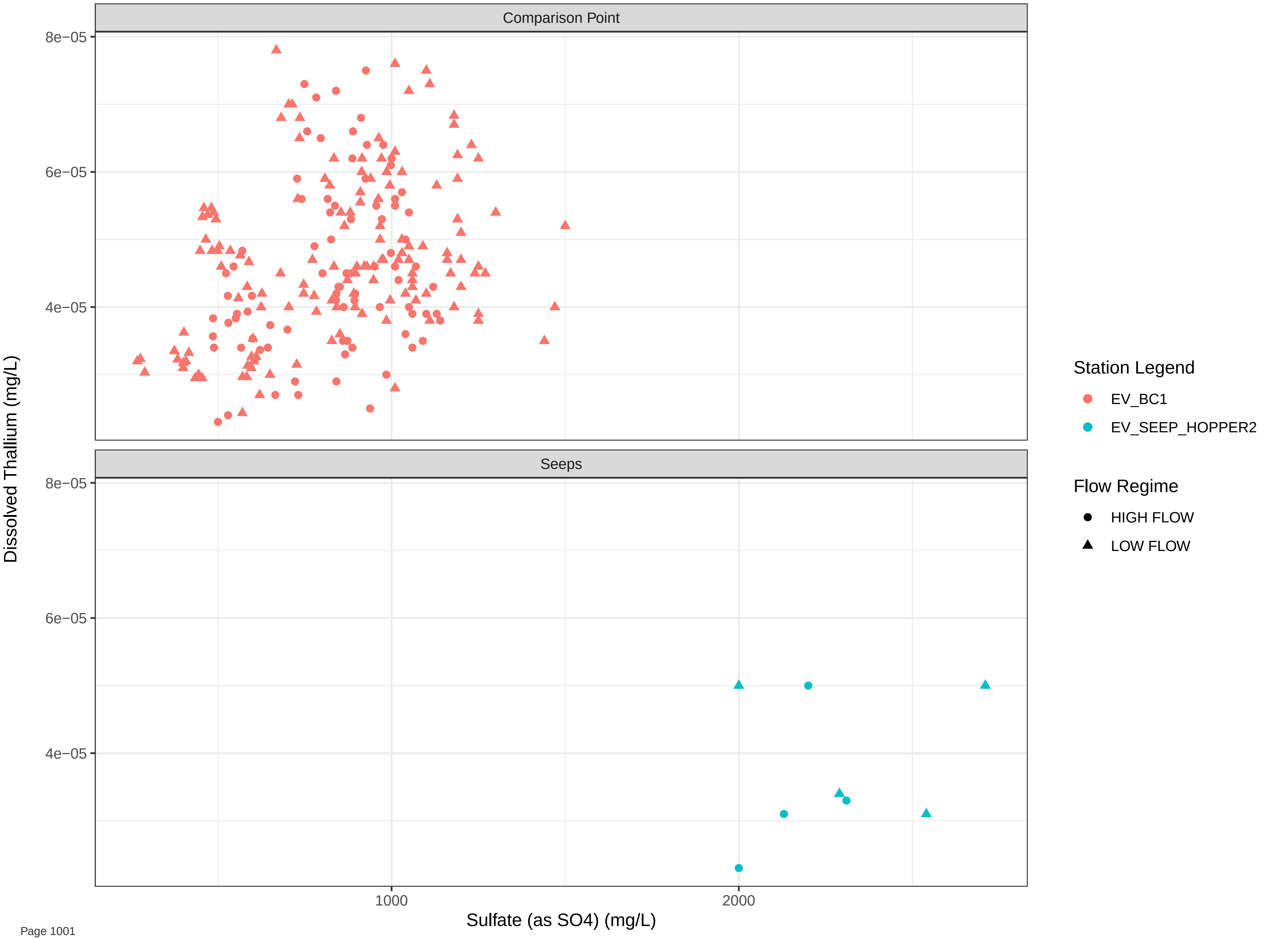


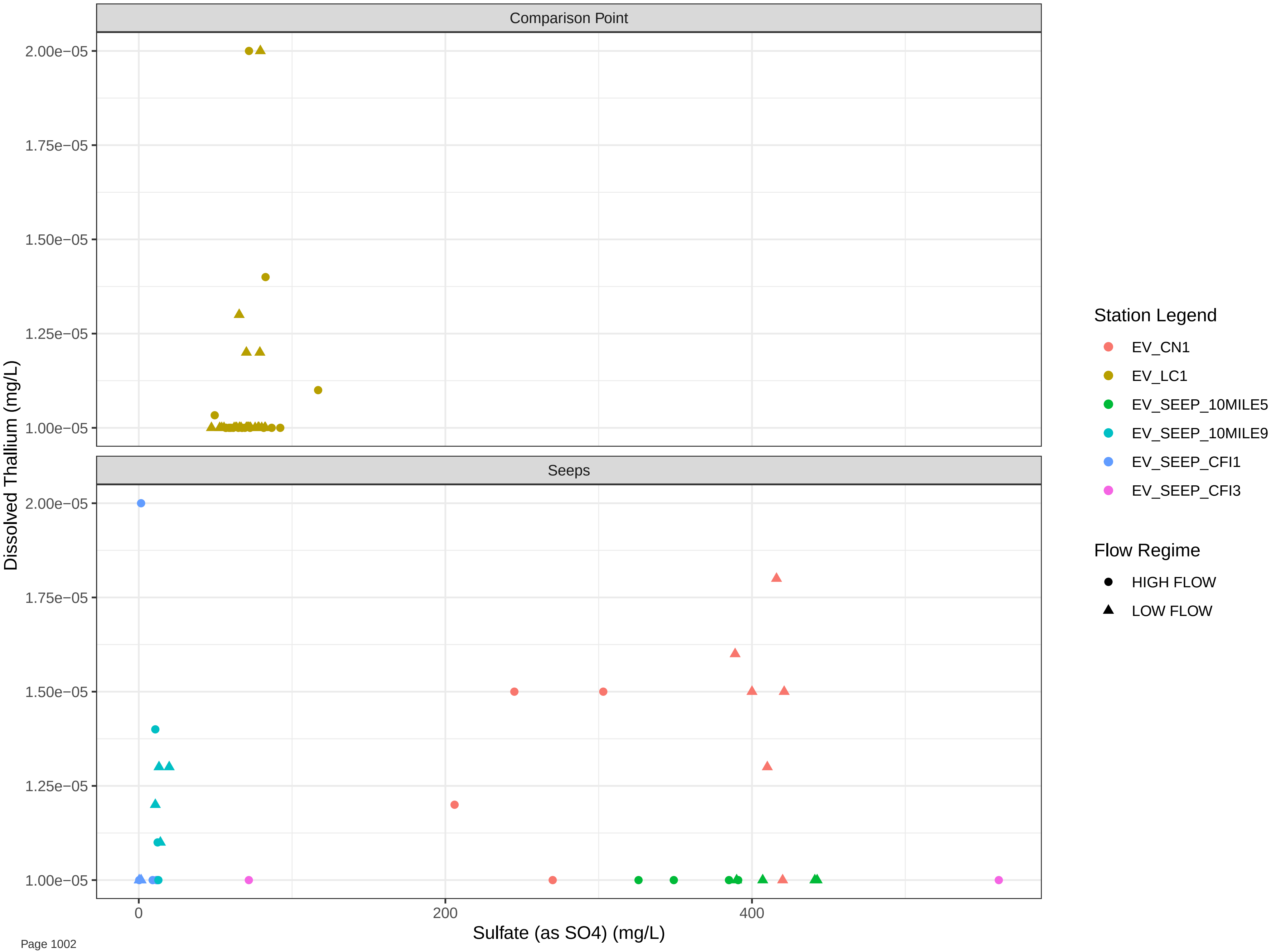
Comparison Point
Seeps
Dissolved Strontium (mg/L)
0.4
0.3
0.2
0.1
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

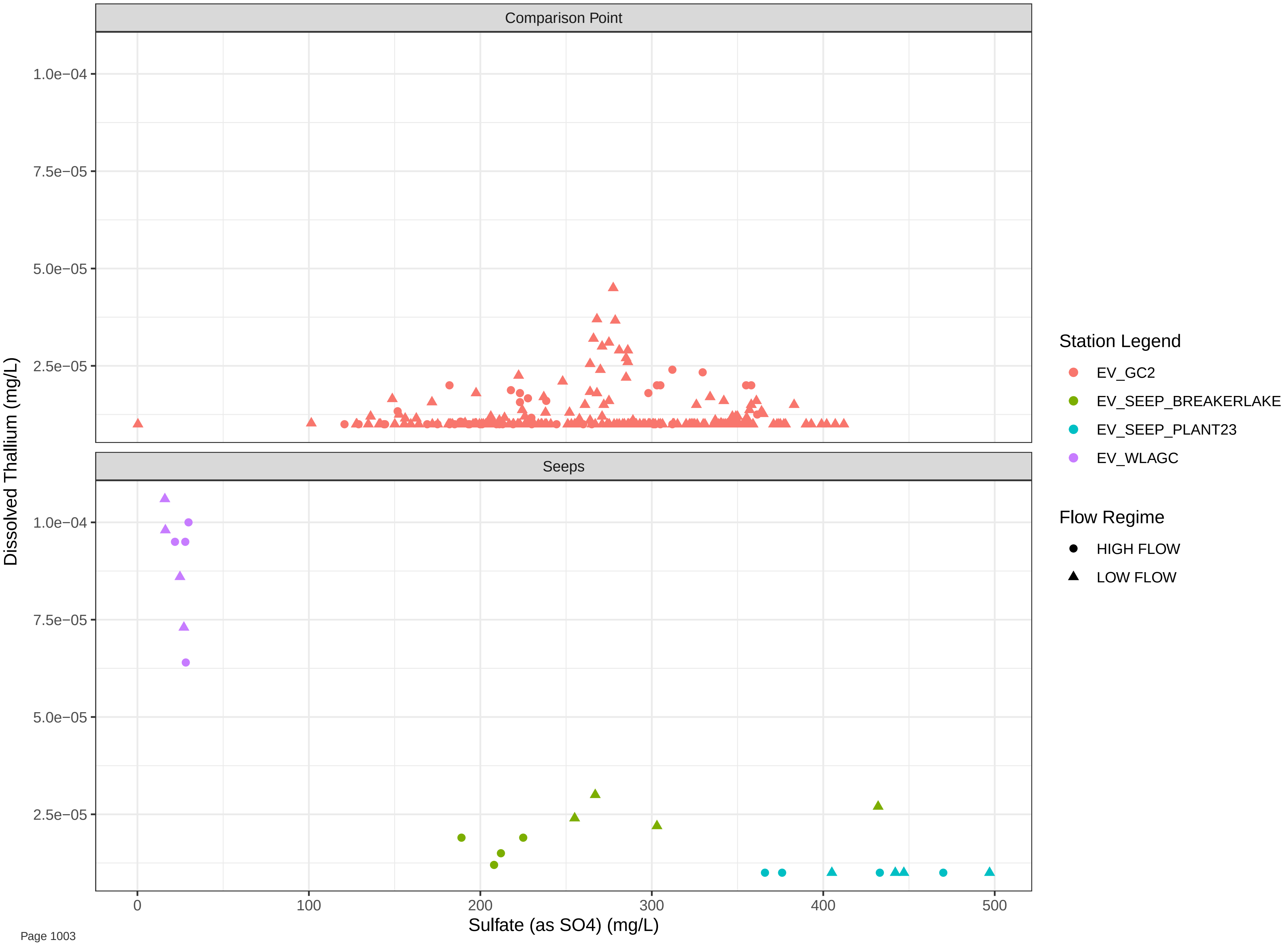


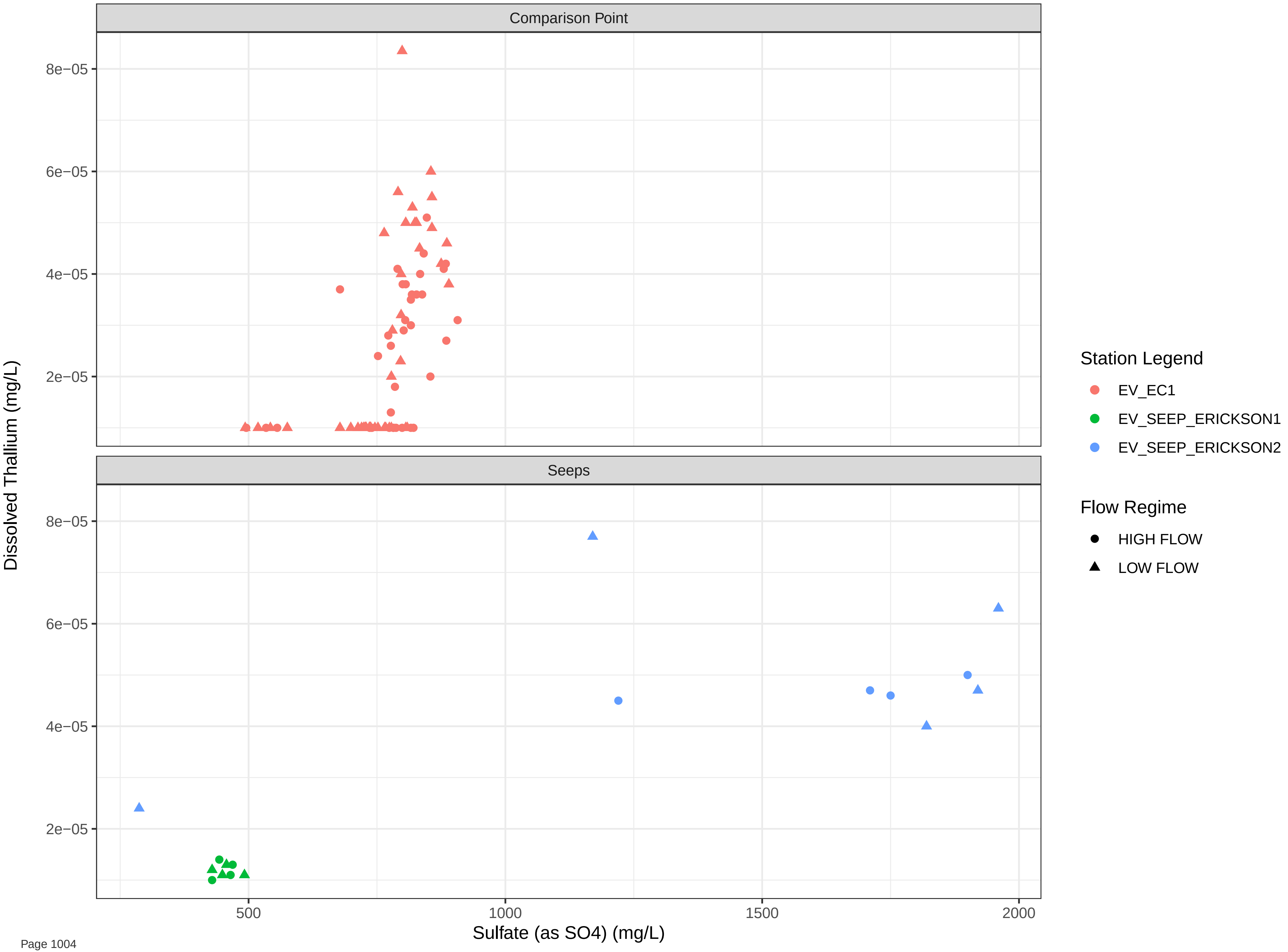
Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0.3
0.4
0.5
500
1000
1500
2000
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
1.6
1.5
1.4
1.3
80
90
100
110
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

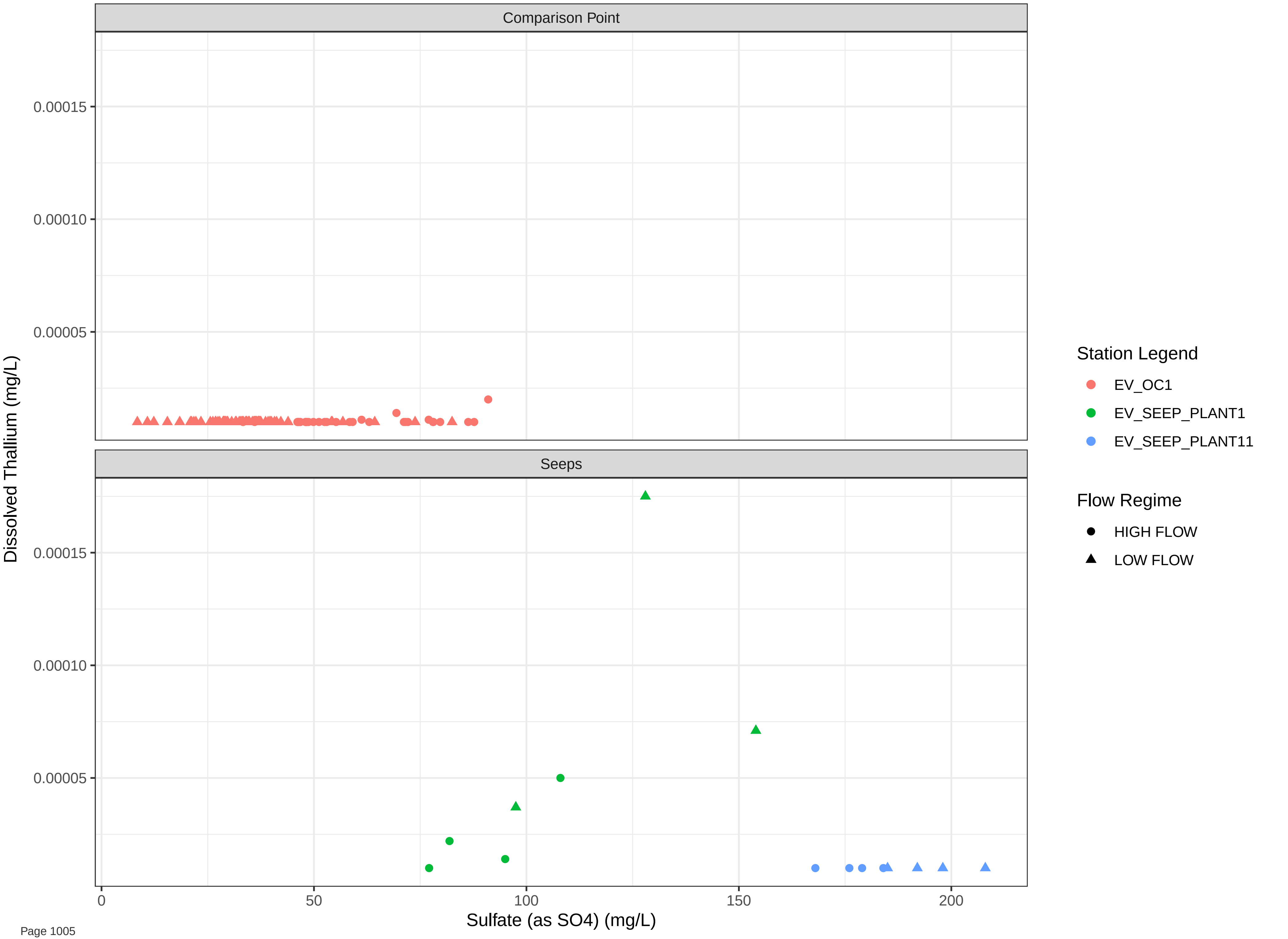

Comparison Point
Seeps
8e−05
6e−05
4e−05
1000
2000
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

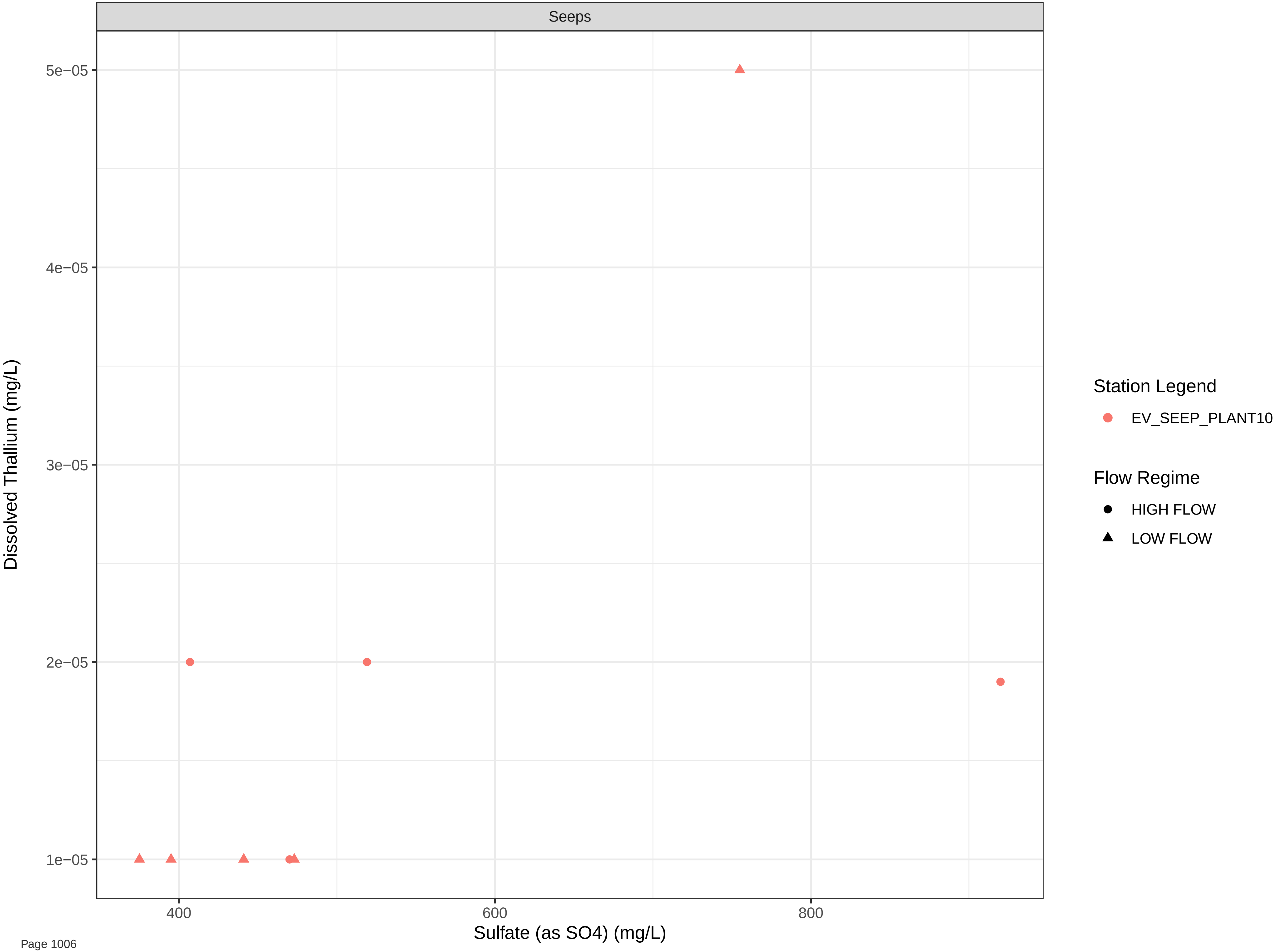

Comparison Point
Seeps
Dissolved Thallium (mg/L)
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

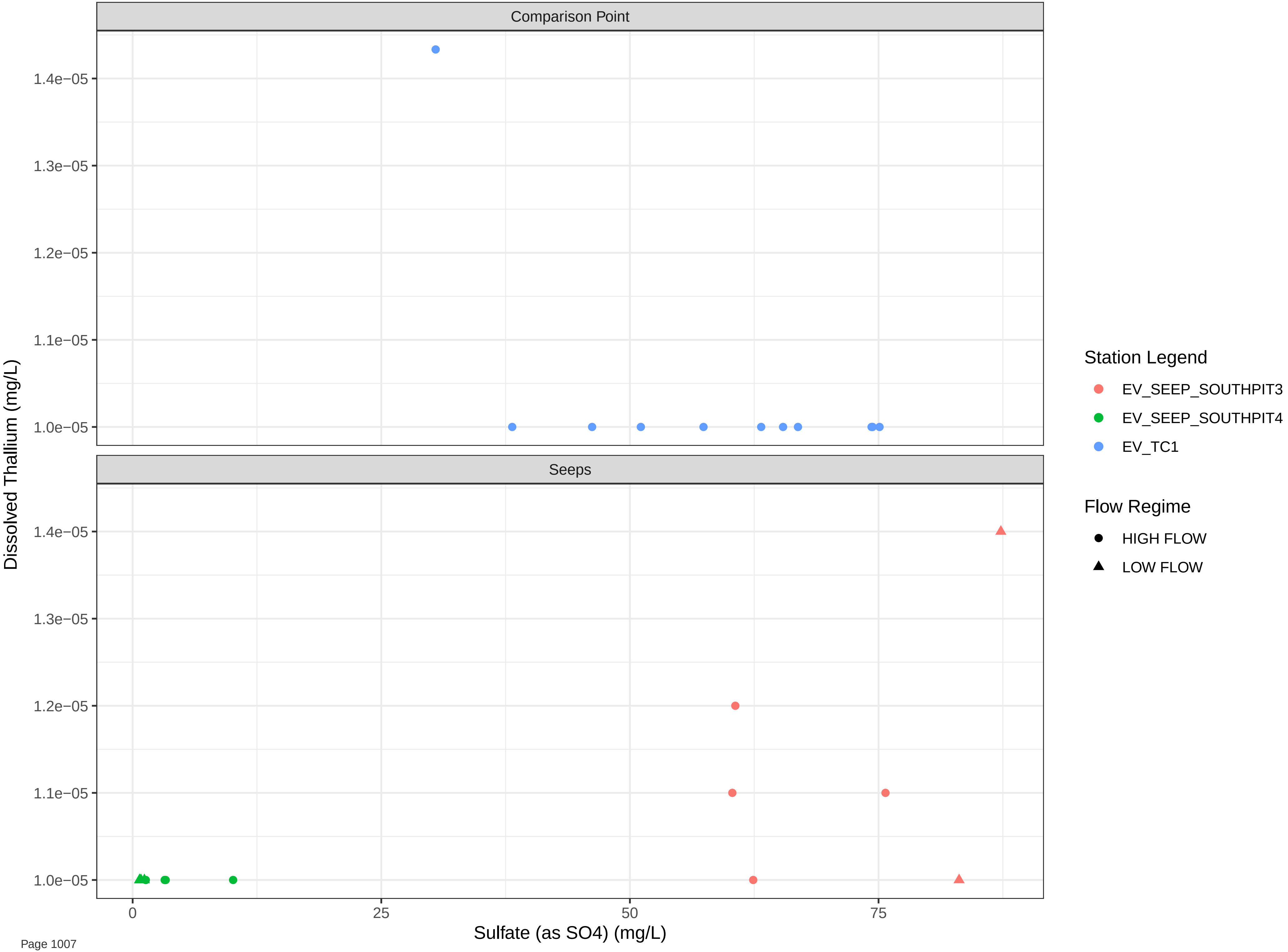

Comparison Point
Seeps
Dissolved Thallium (mg/L)
1.0e−04
7.5e−05
5.0e−05
2.5e−05
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



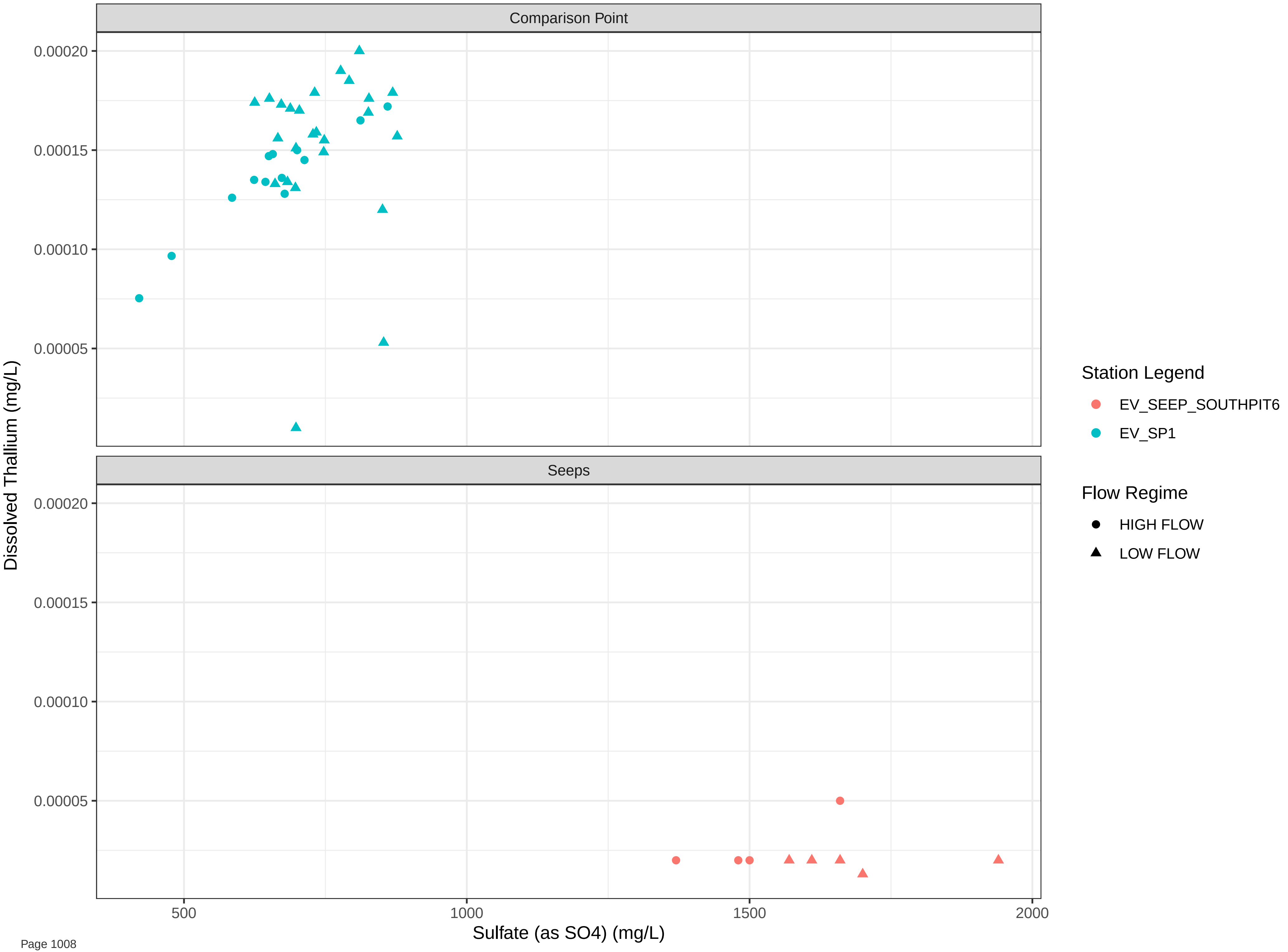
Comparison Point
Seeps
Dissolved Thallium (mg/L)
Sulfate (as SO4) (mg/L)
8e−05
6e−05
4e−05
2e−05
500
1000
1500
2000
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

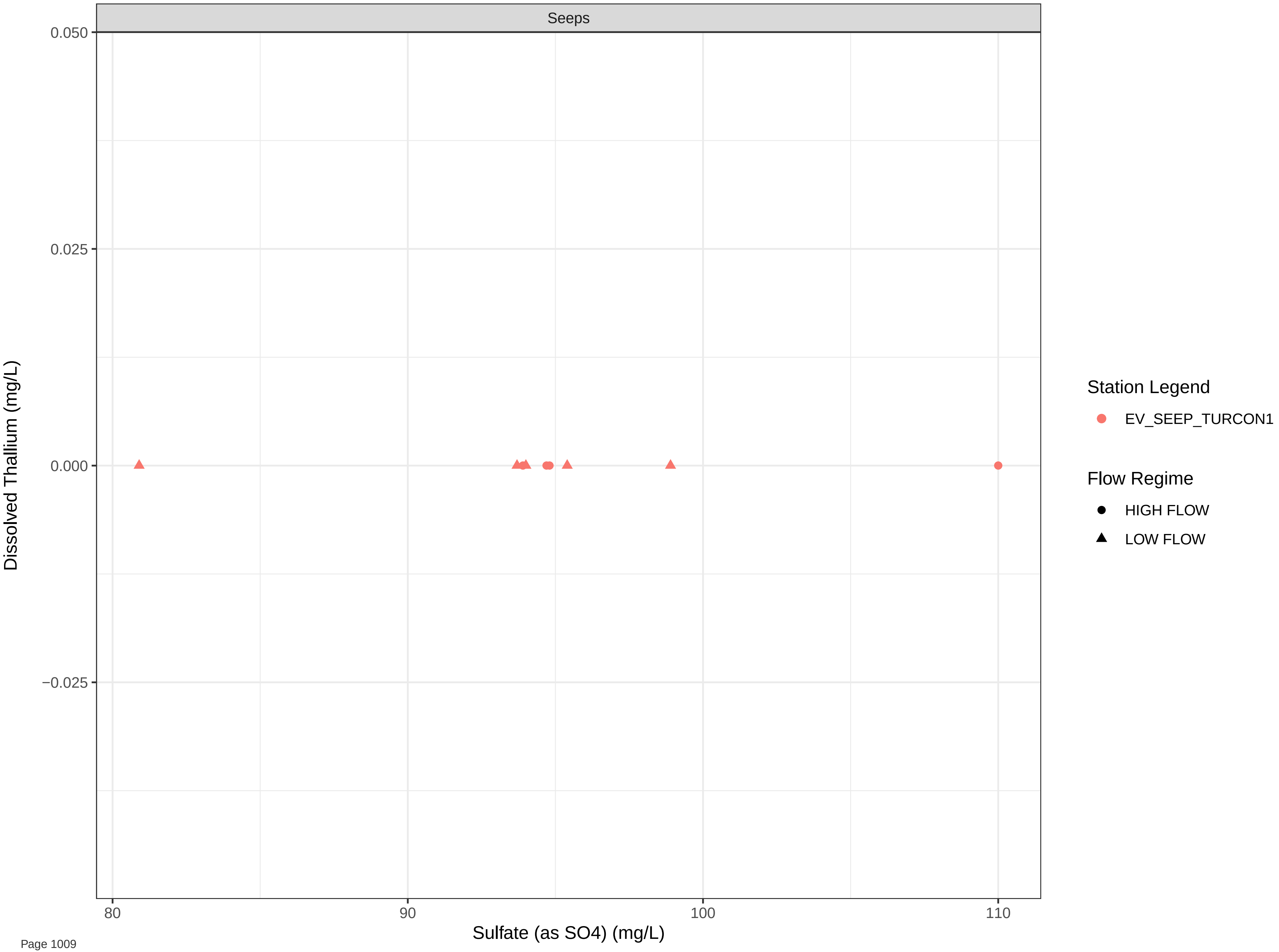

Comparison Point
Seeps
Dissolved Thallium (mg/L)
0.00015
0.00010
0.00005
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
5e−05
4e−05
3e−05
2e−05
1e−05
Dissolved Thallium (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

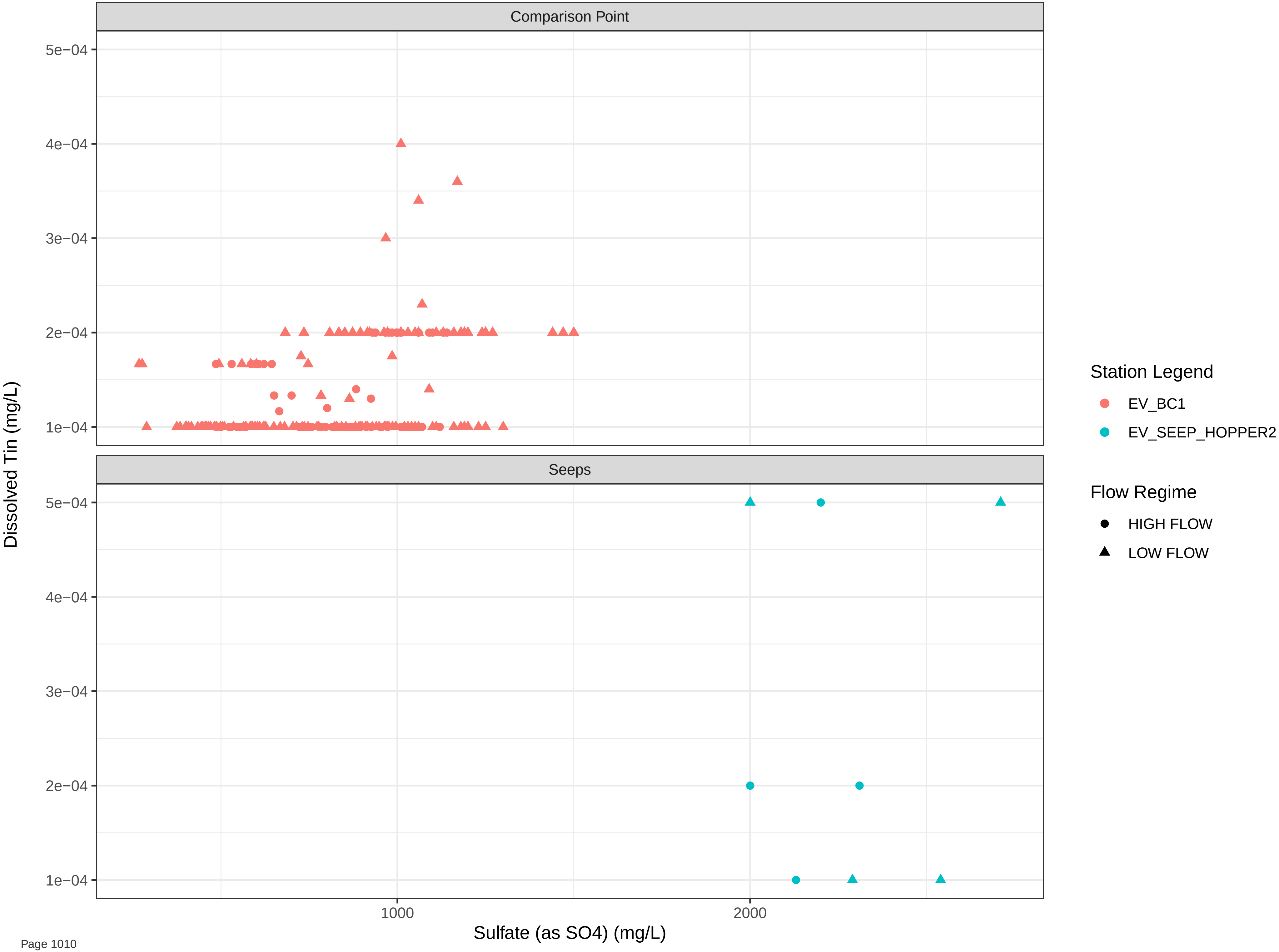


Comparison Point
Seeps
Dissolved Thallium (mg/L)
1.4e−05
1.3e−05
1.2e−05
1.1e−05
1.0e−05
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

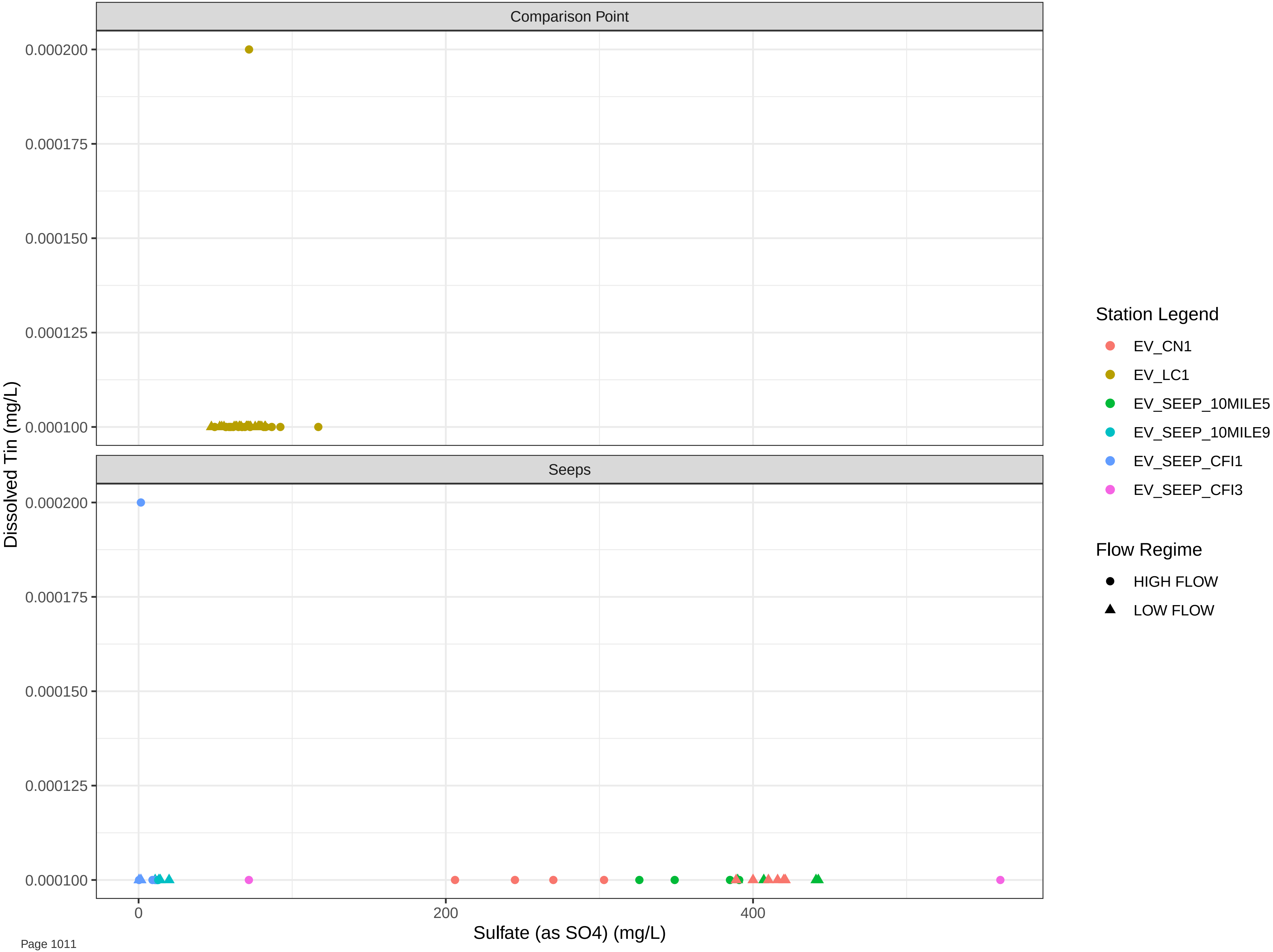

Comparison Point
Seeps
Dissolved Thallium (mg/L)
0.00020
0.00015
0.00010
0.00005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



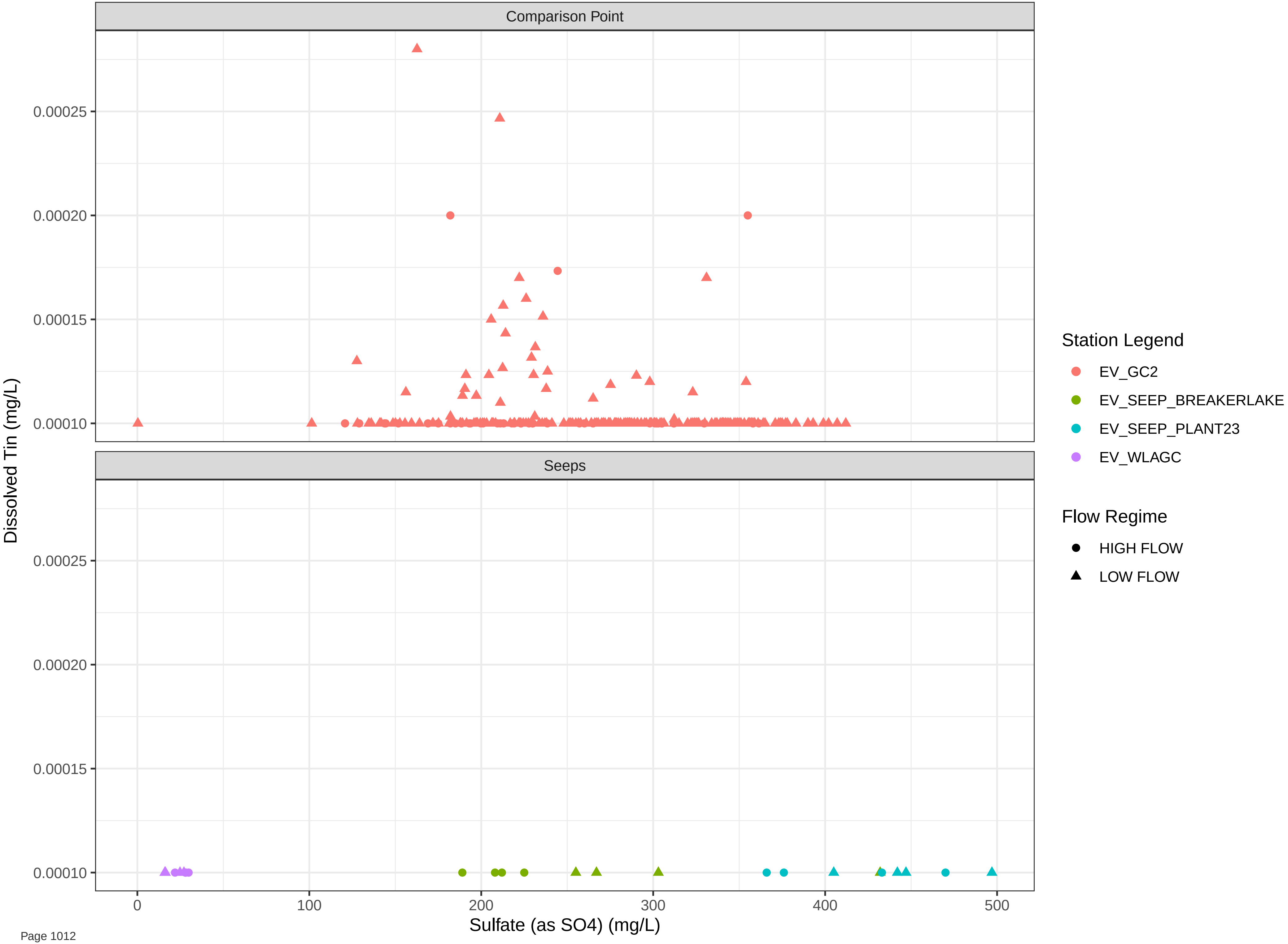
Seeps
0.050
0.025
0.000
−0.025
Dissolved Thallium (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



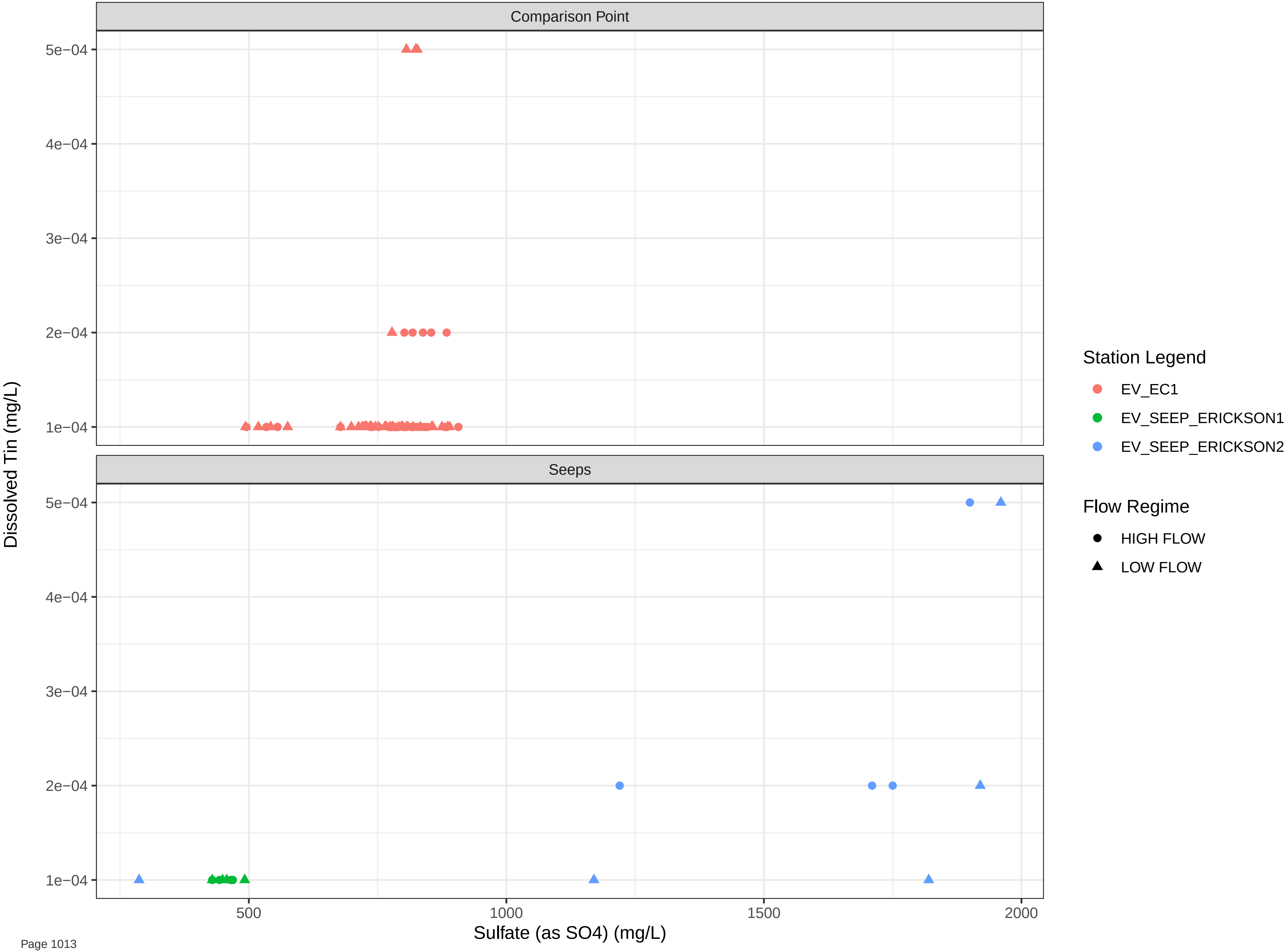
Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Tin (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

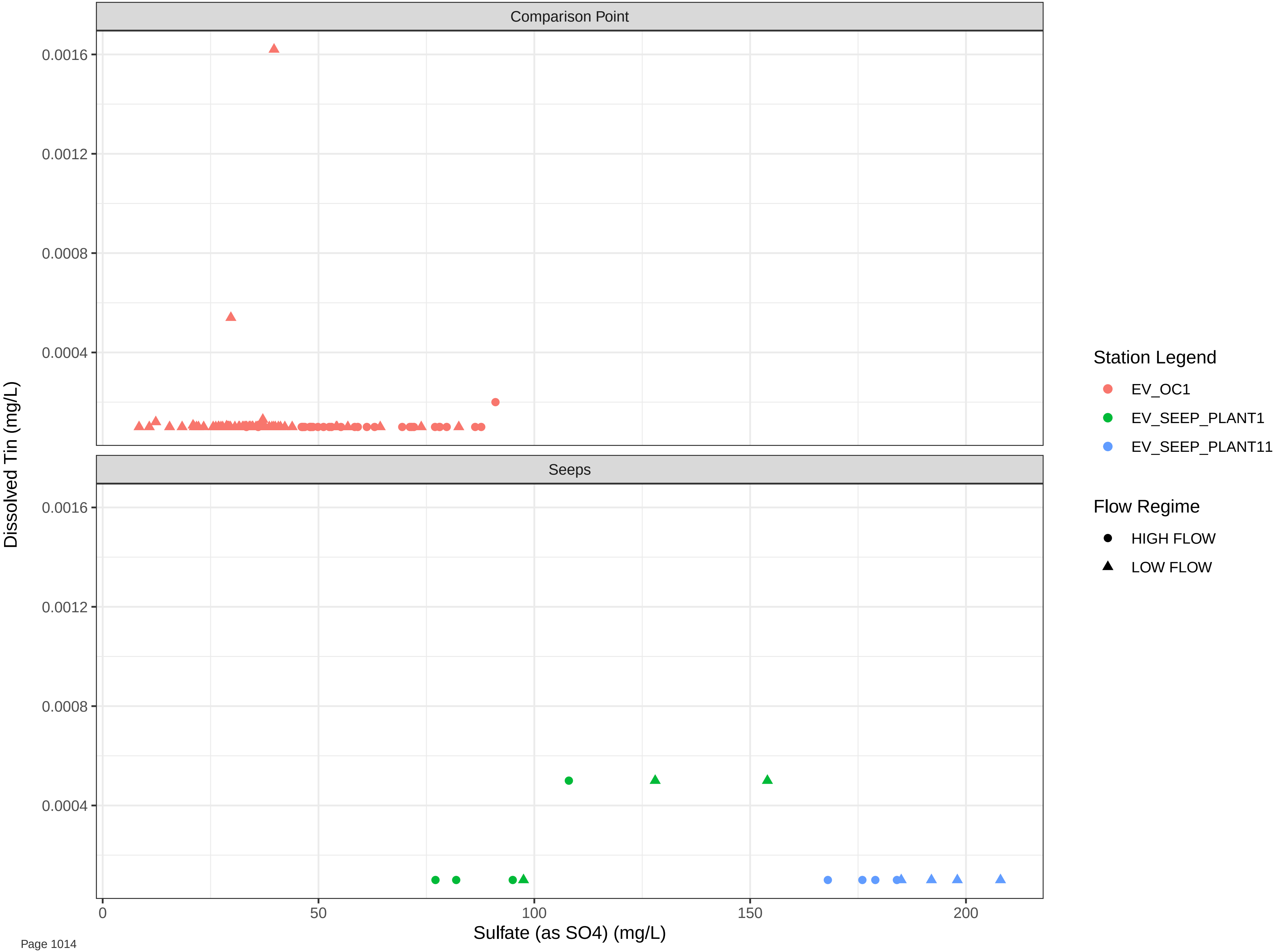


Comparison Point
Seeps
Dissolved Tin (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

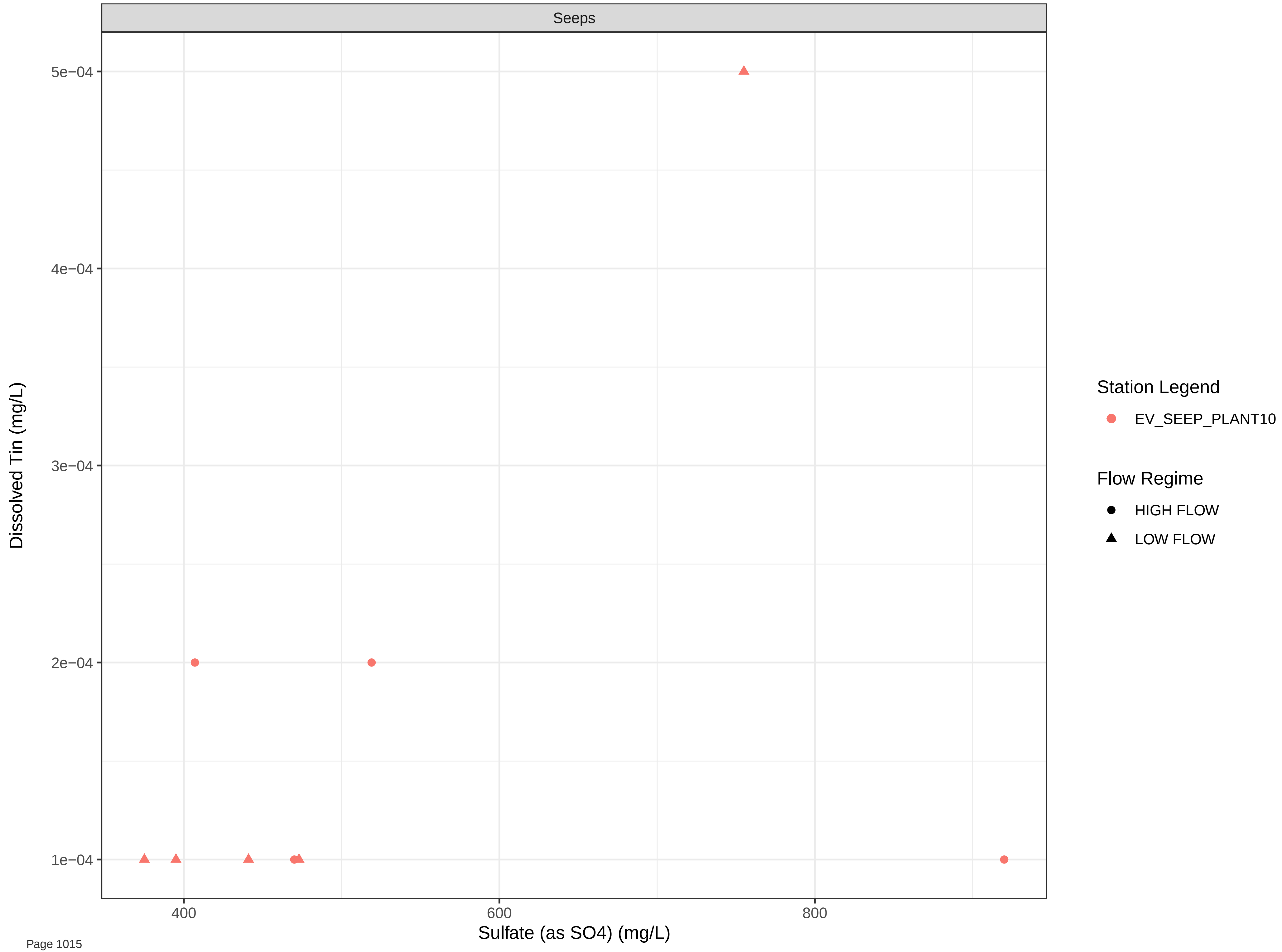


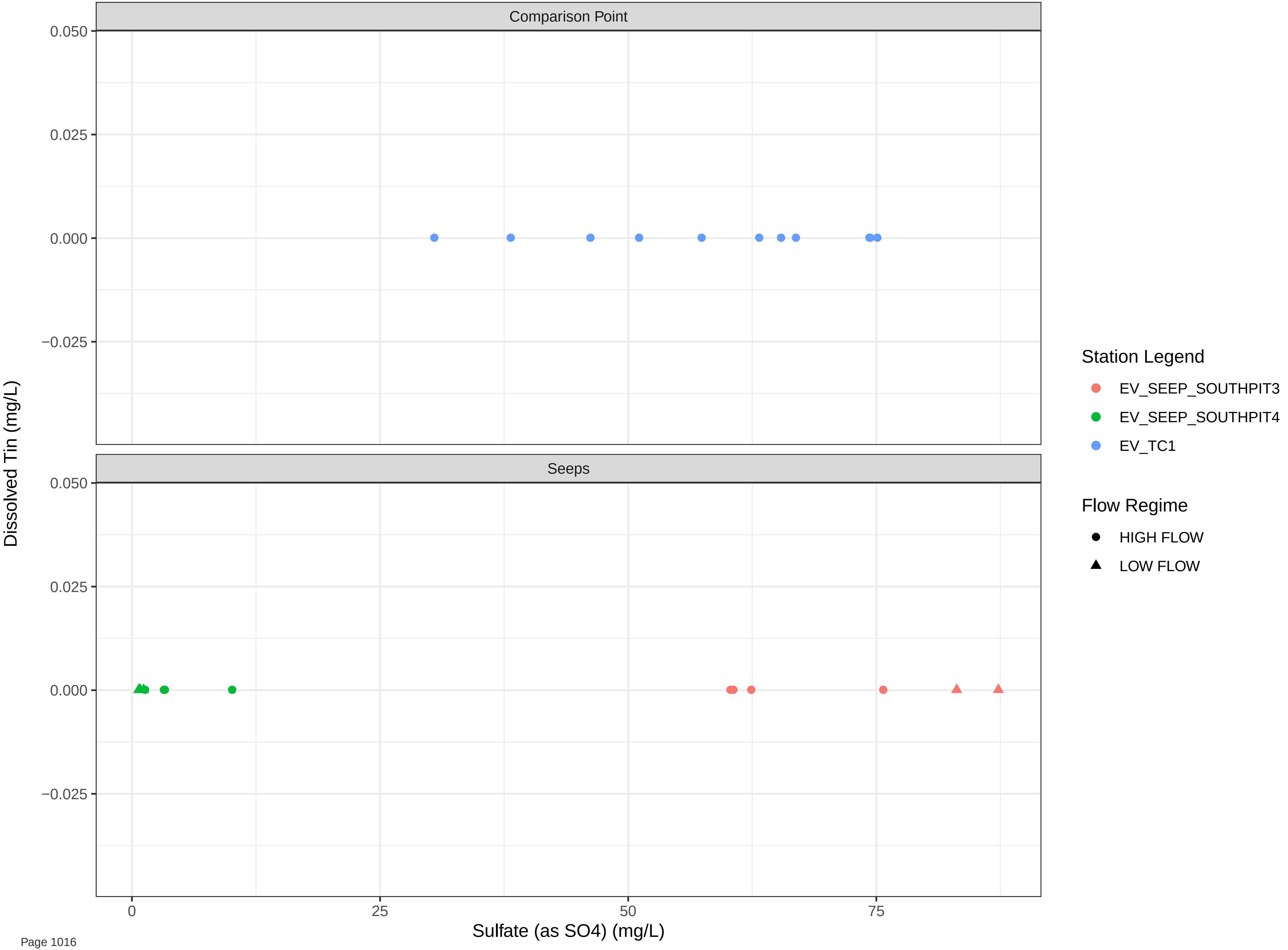
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.00025
0.00020
0.00015
0.00010
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

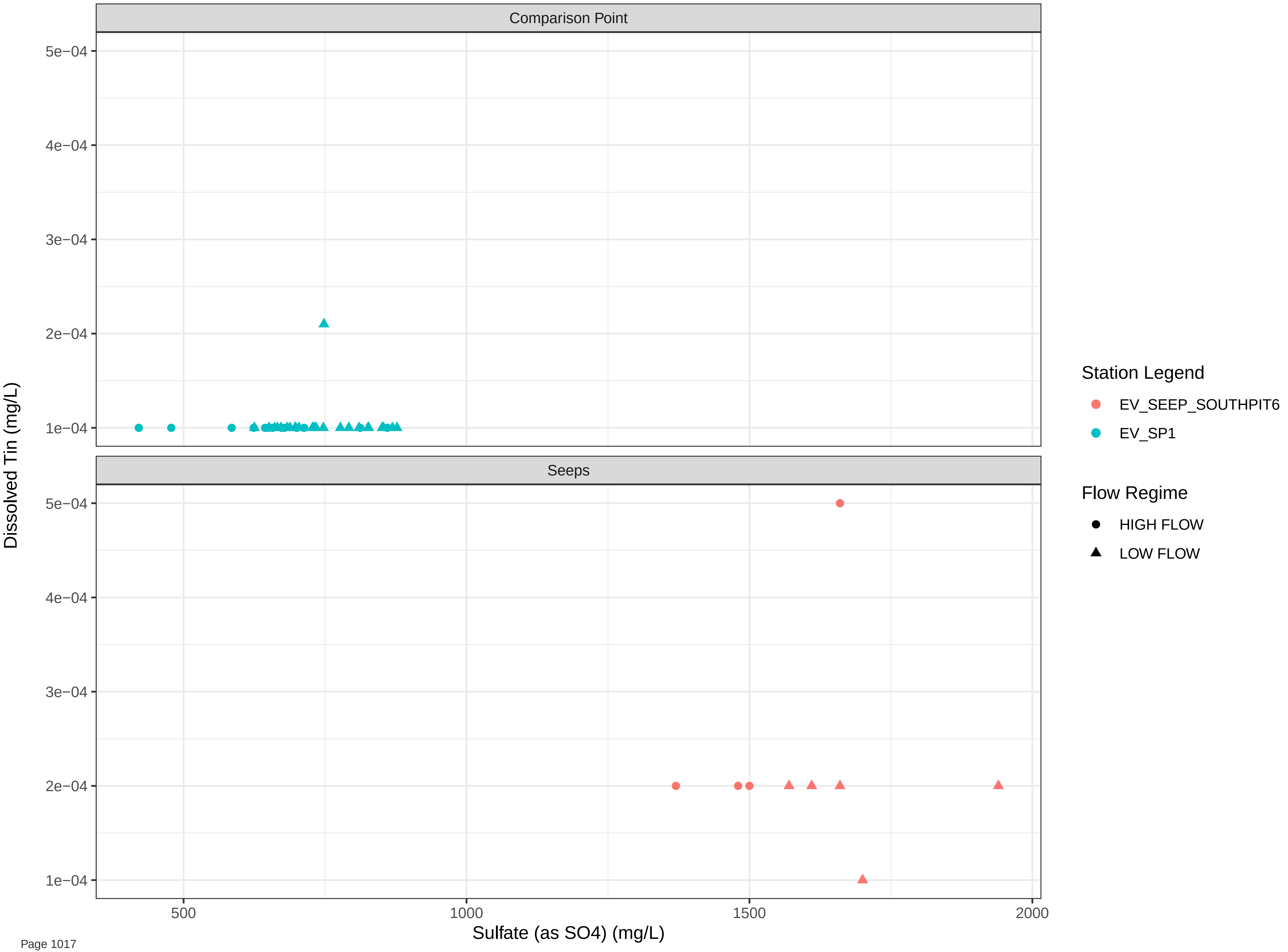

Comparison Point
Seeps
Dissolved Tin (mg/L)
5e−04
4e−04
3e−04
2e−04
1e−04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



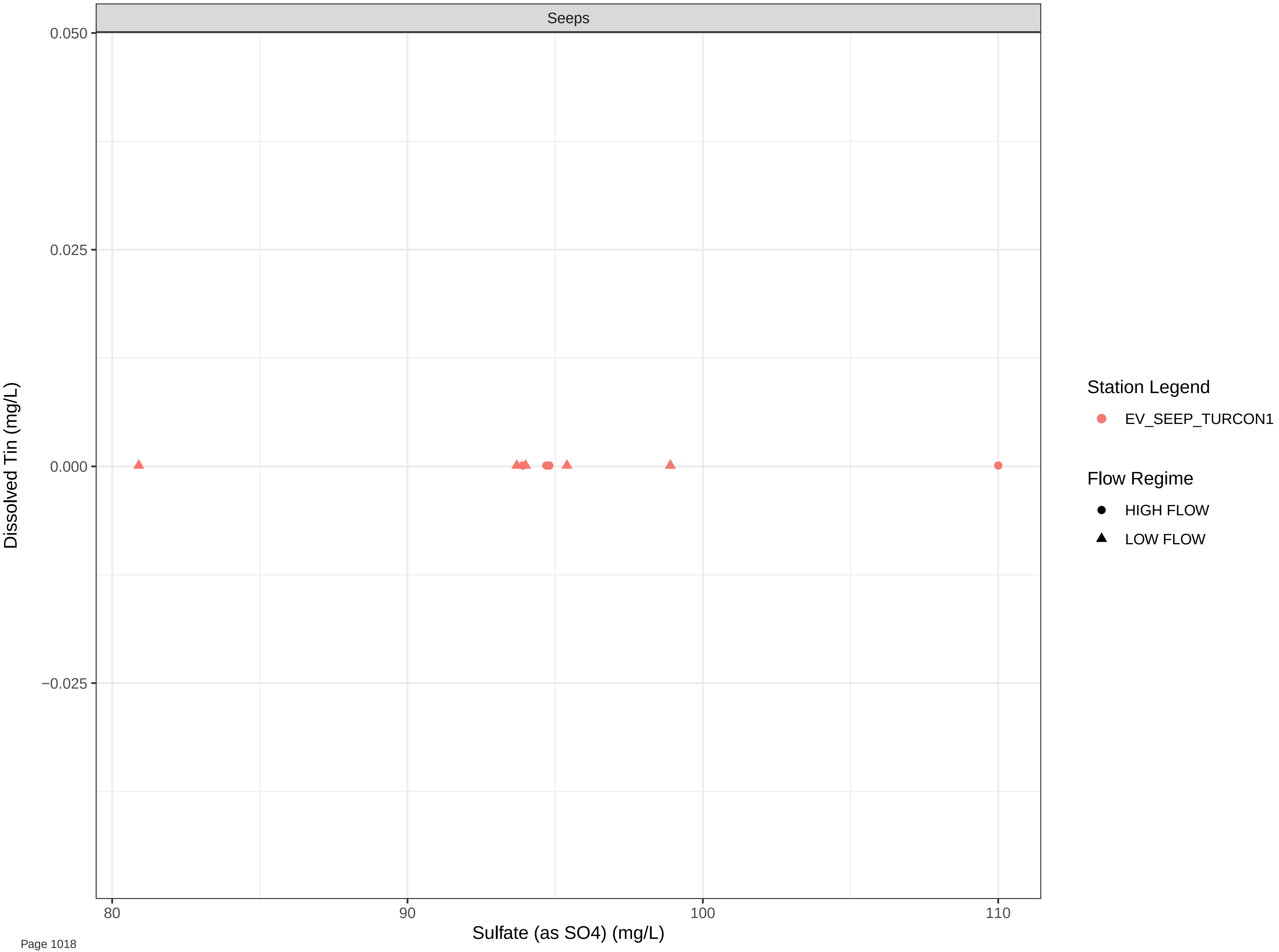
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.0016
0.0012
0.0008
0.0004
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
Dissolved Tin (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

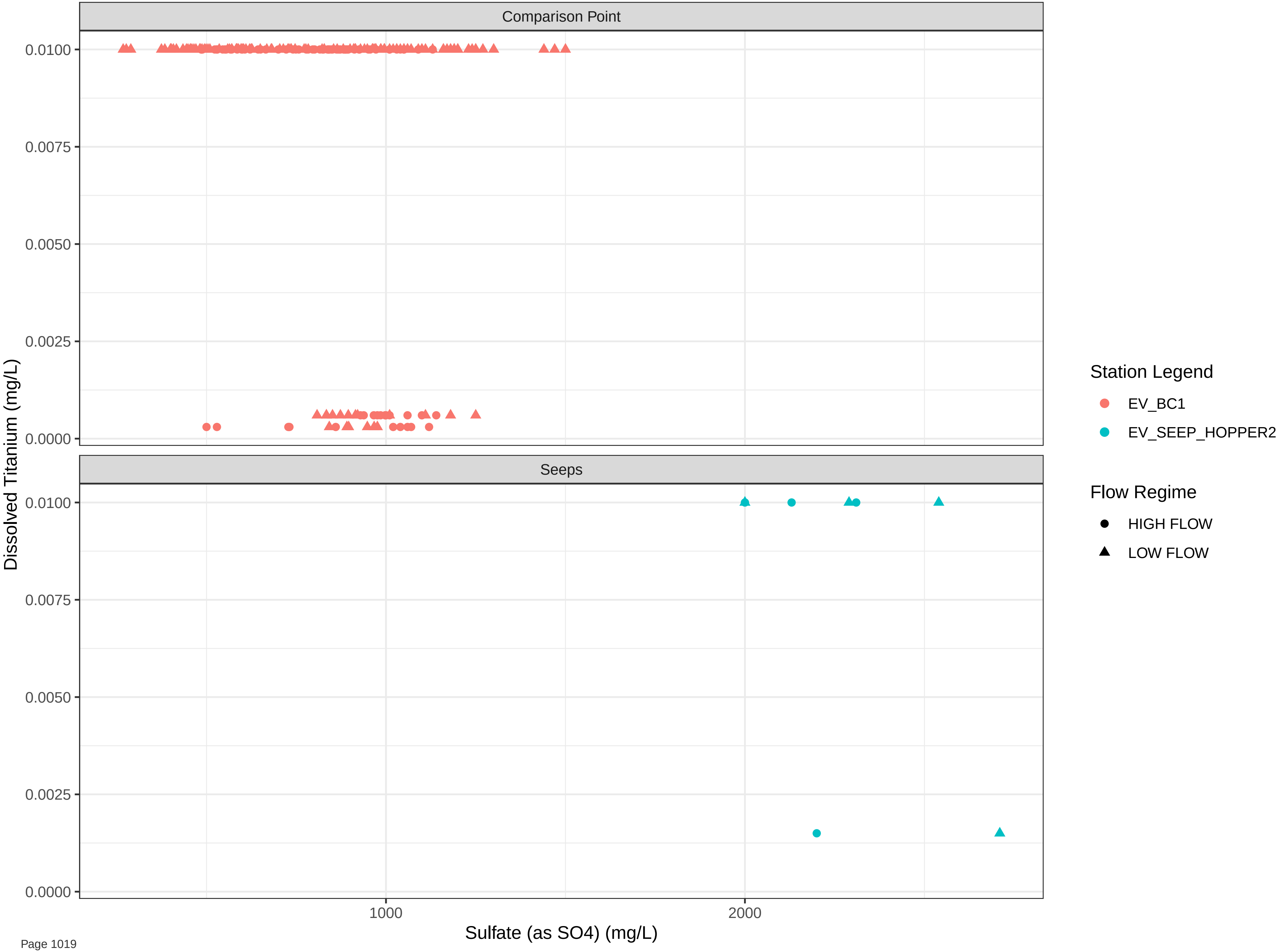

Comparison Point
Seeps
Dissolved Tin (mg/L)
Sulfate (as SO4) (mg/L)
0.050
0.025
0.000
−0.025
0
25
50
75
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



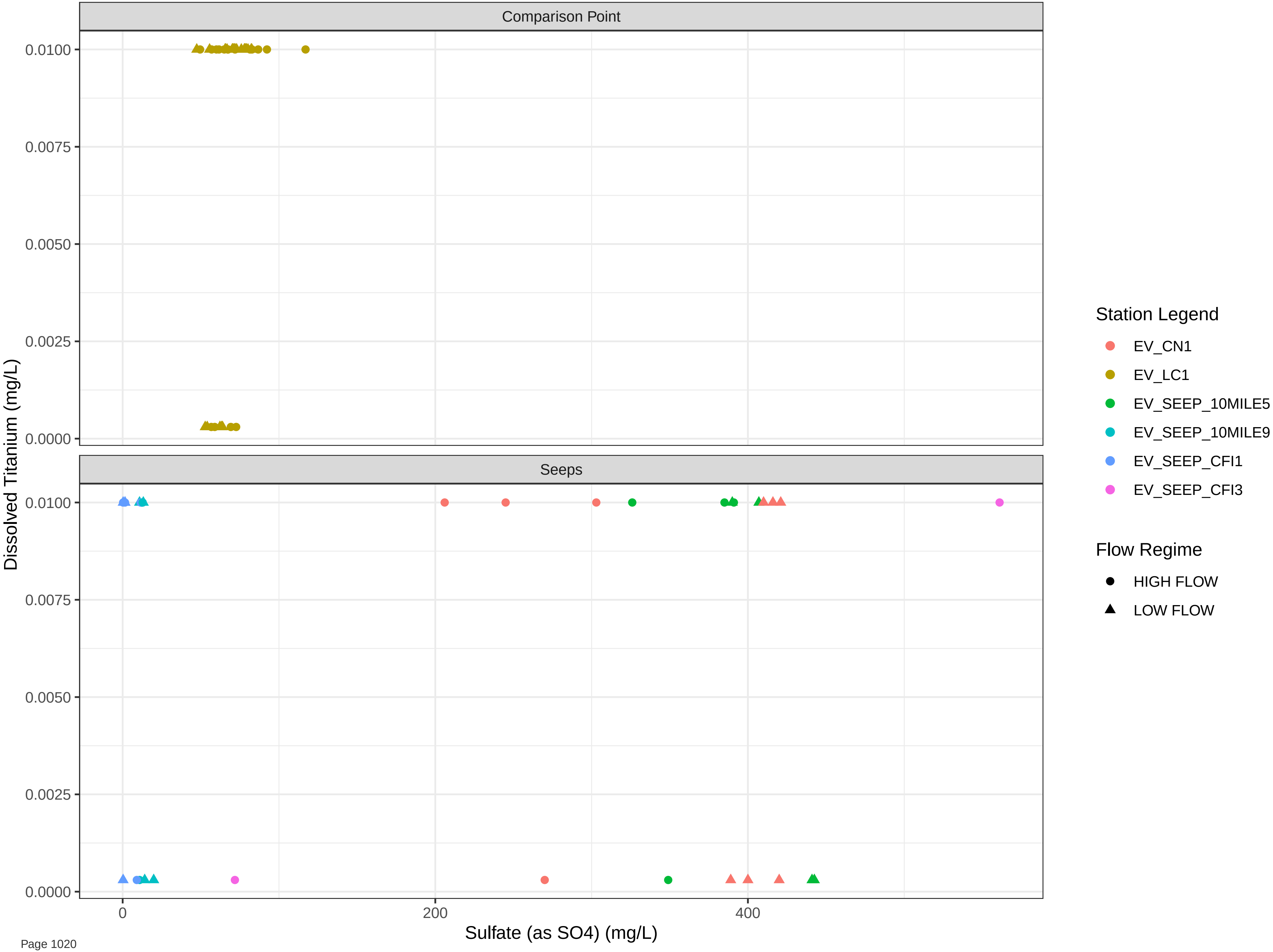
Comparison Point
Seeps
5e−04
4e−04
3e−04
2e−04
1e−04
500
1000
1500
2000
Dissolved Tin (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



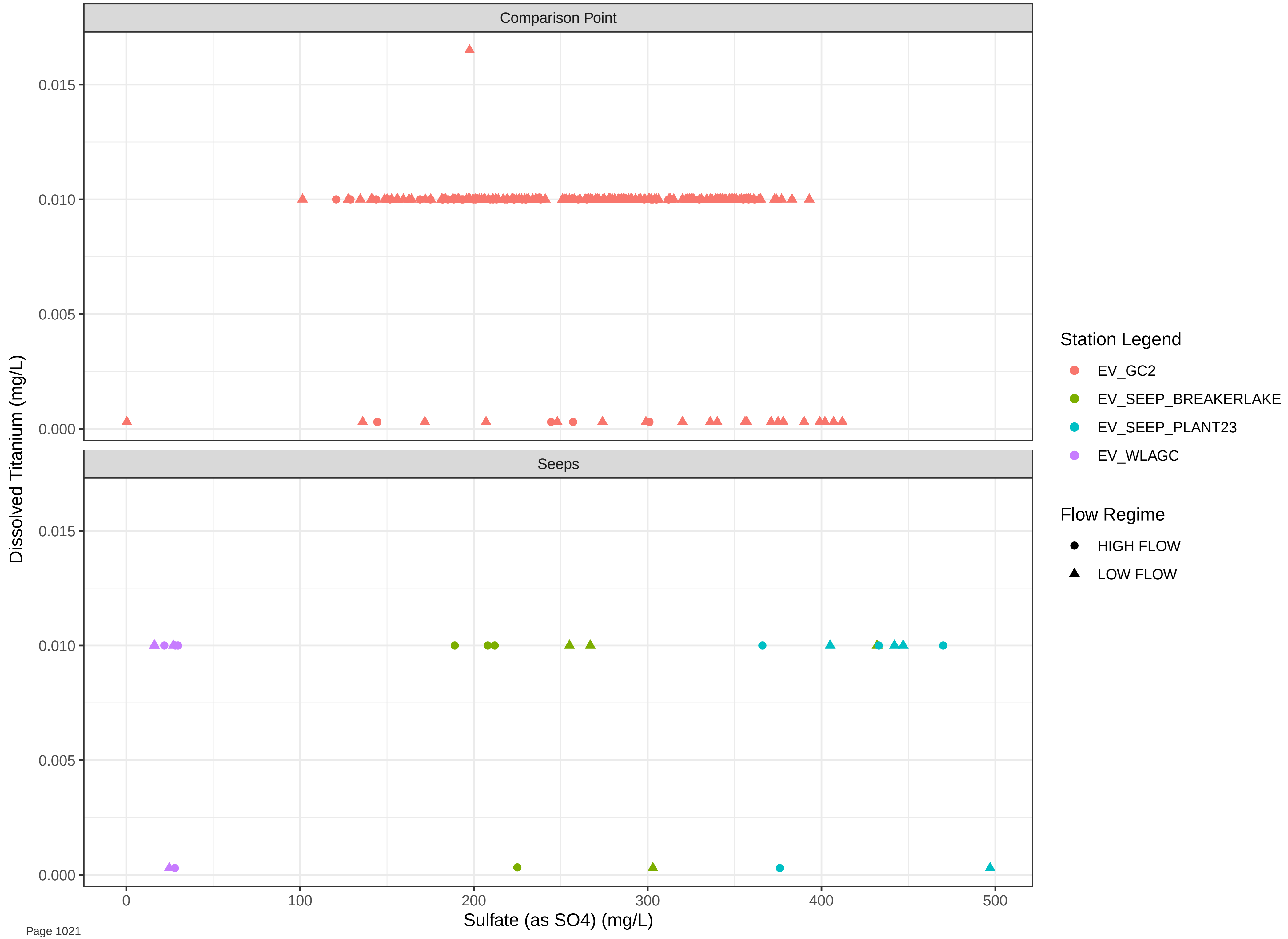
Seeps
0.050
0.025
0.000
−0.025
Dissolved Tin (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



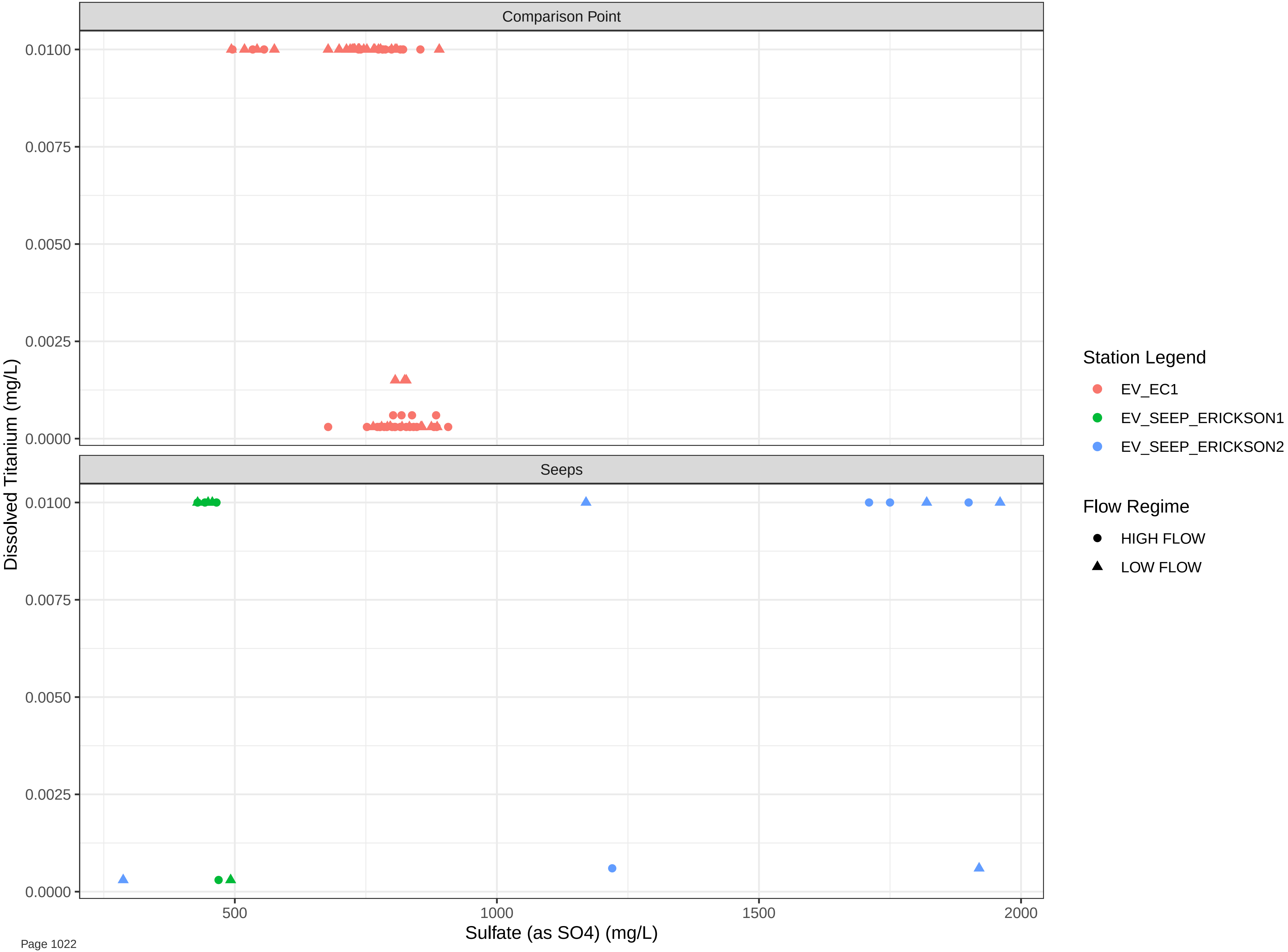
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW



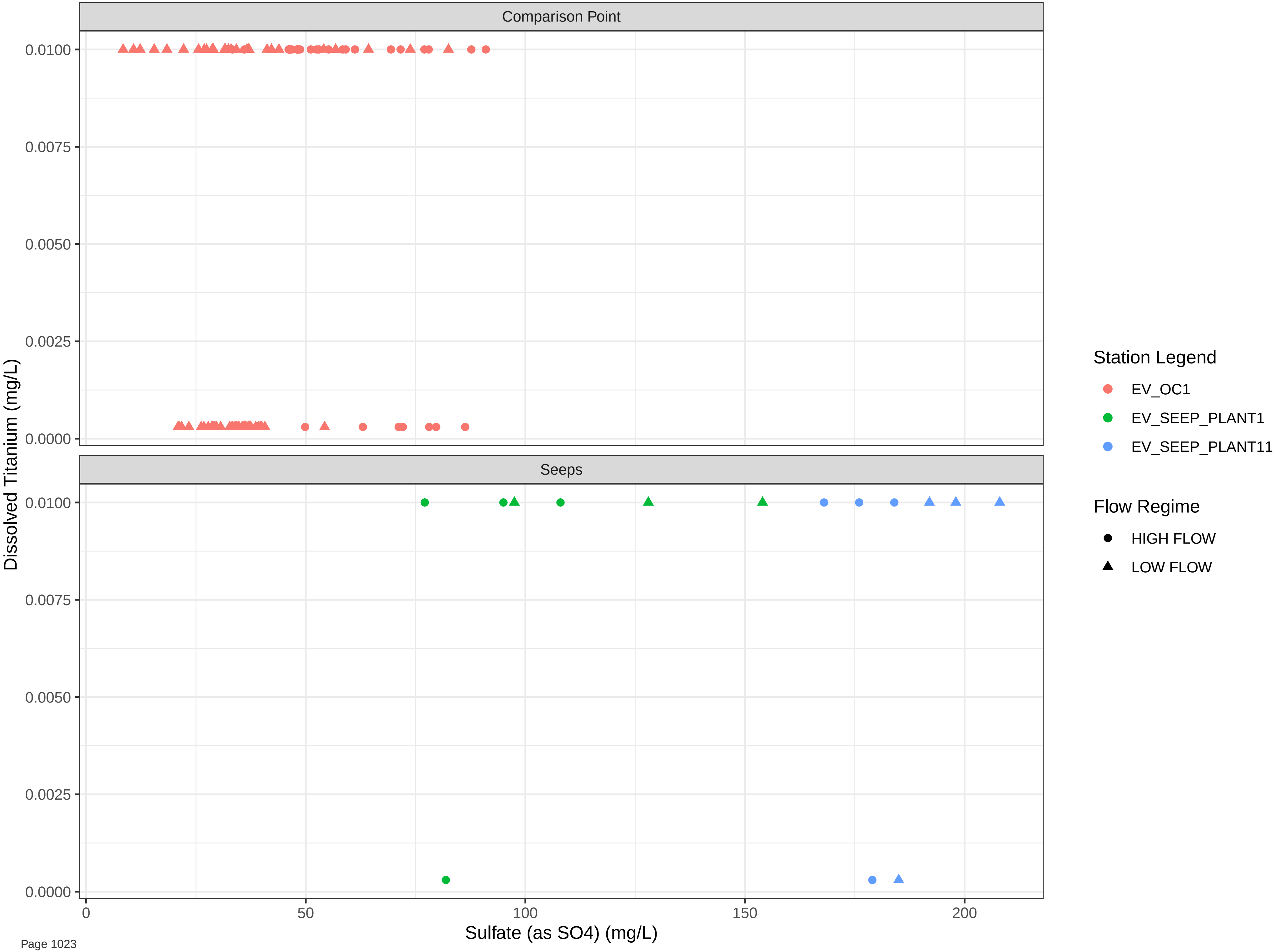
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



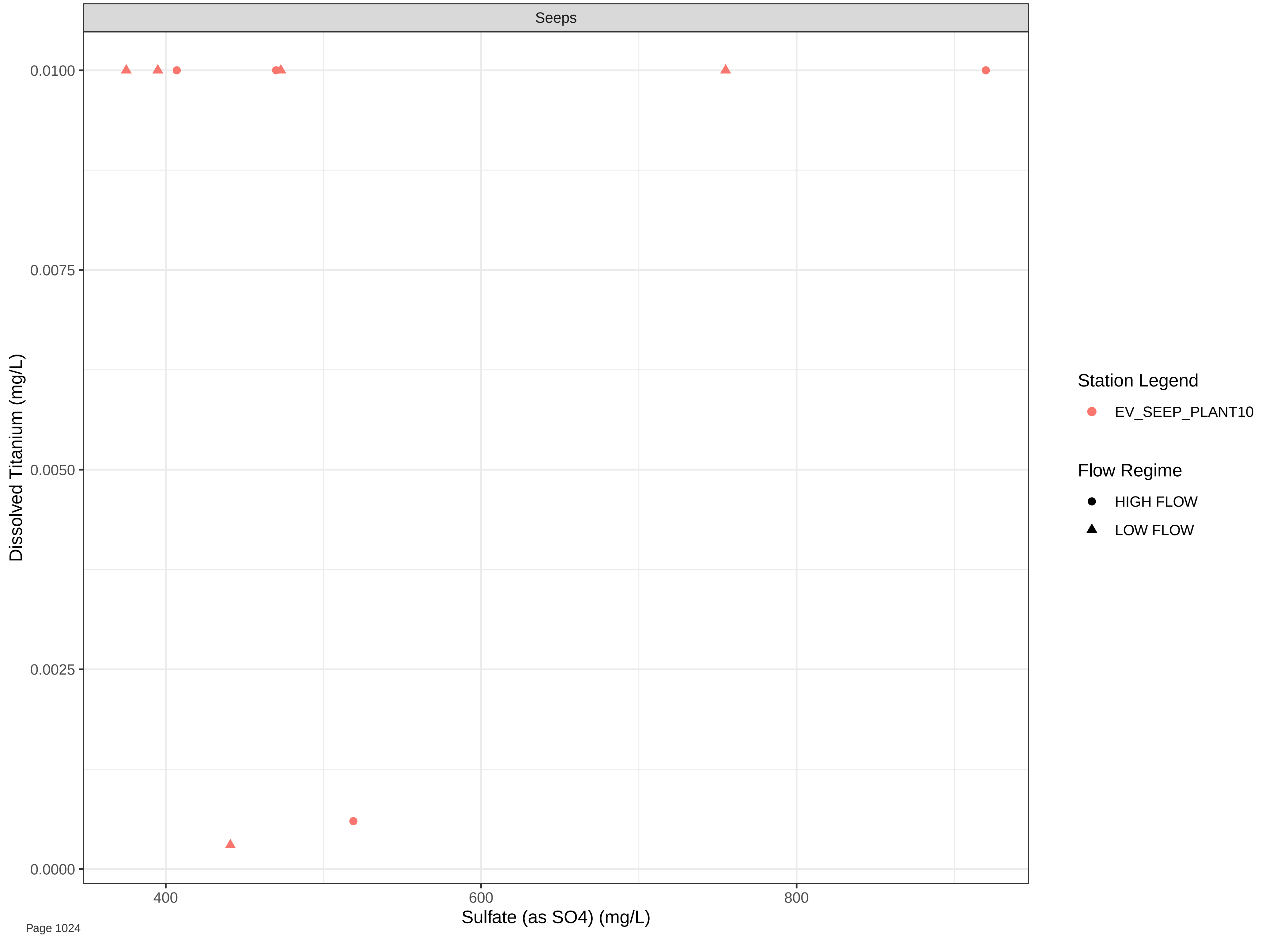
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.015
0.010
0.005
0.000
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



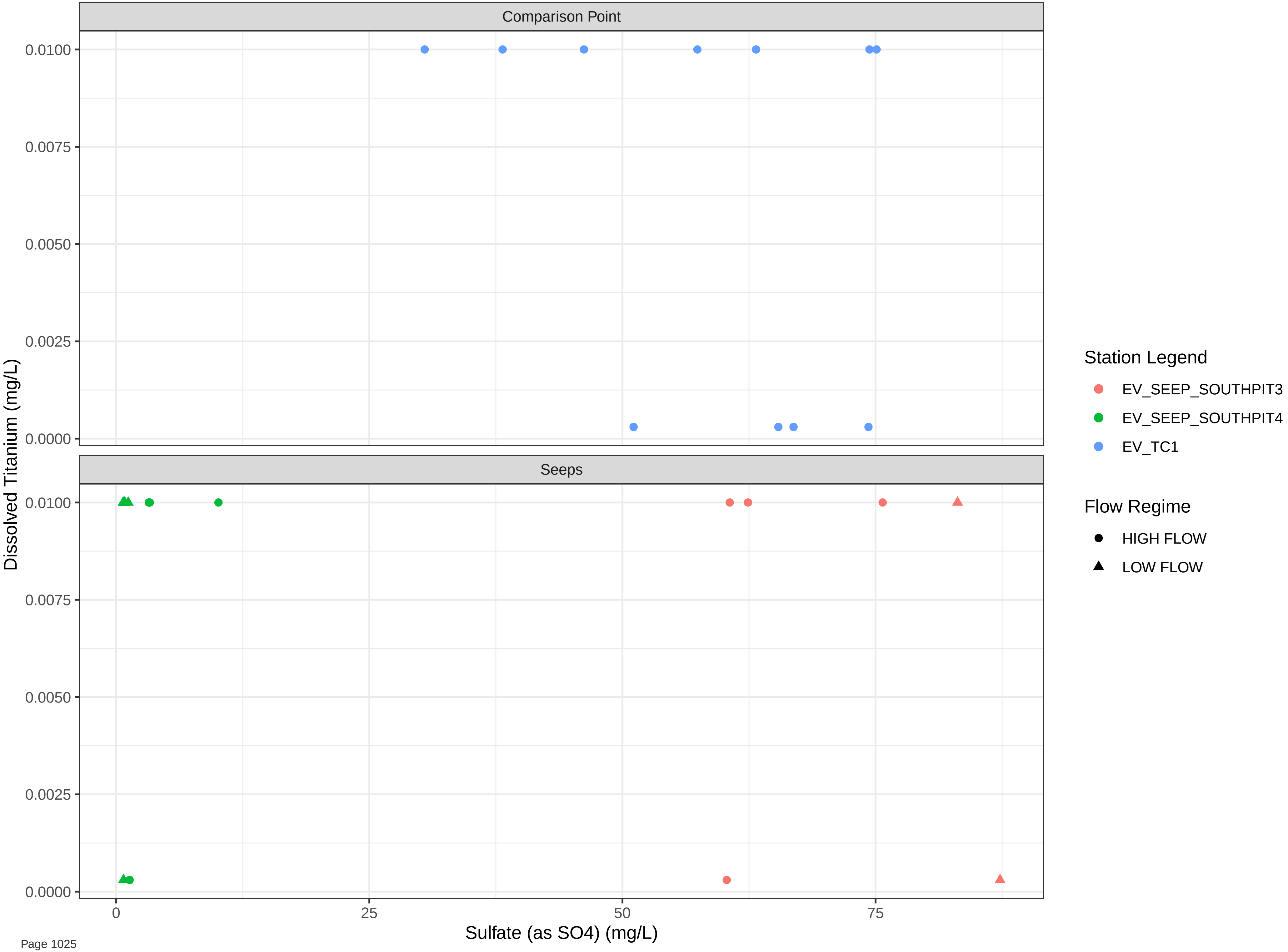
Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
500
1000
1500
2000
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

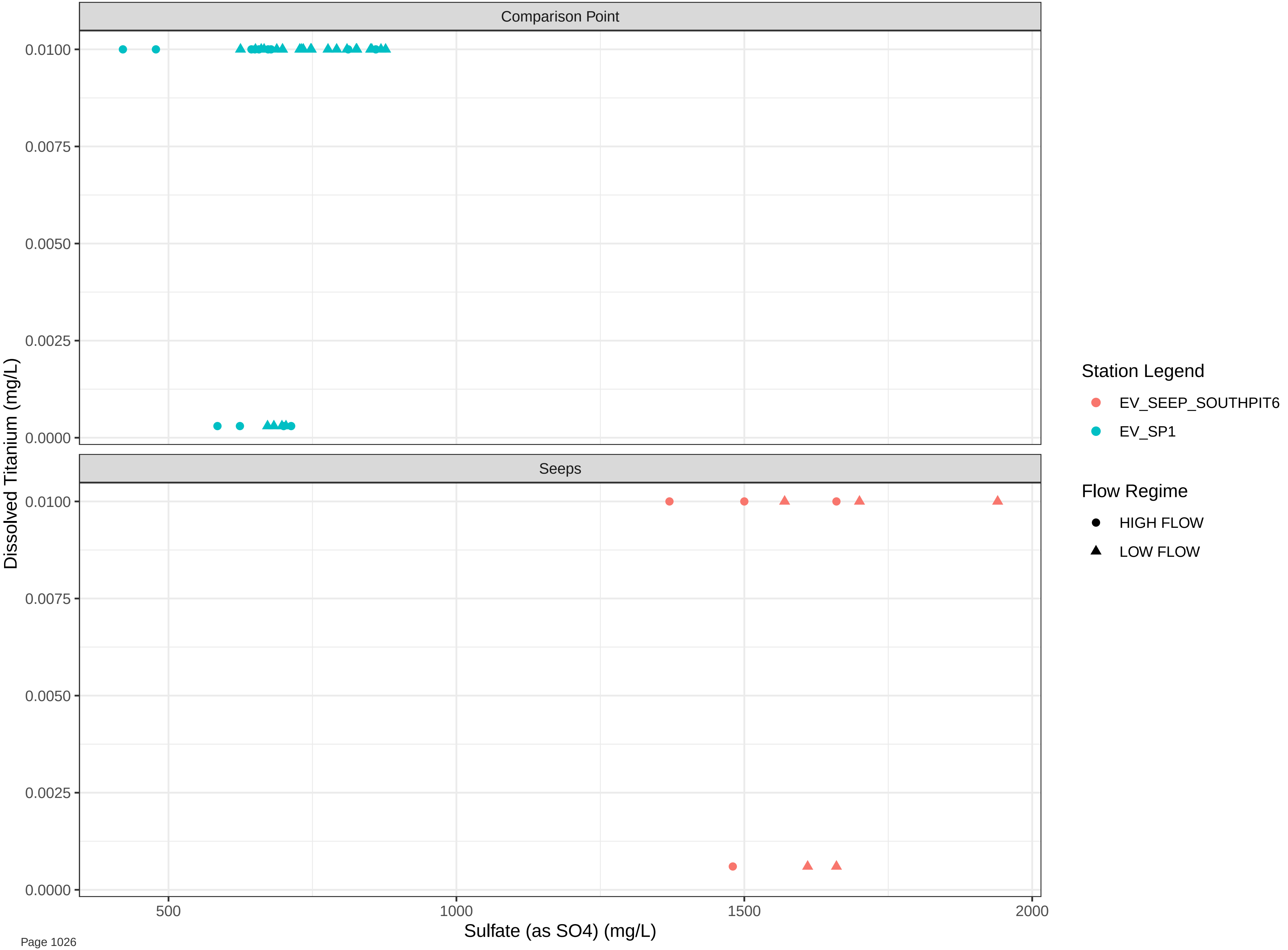


Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
0
50
100
150
200
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

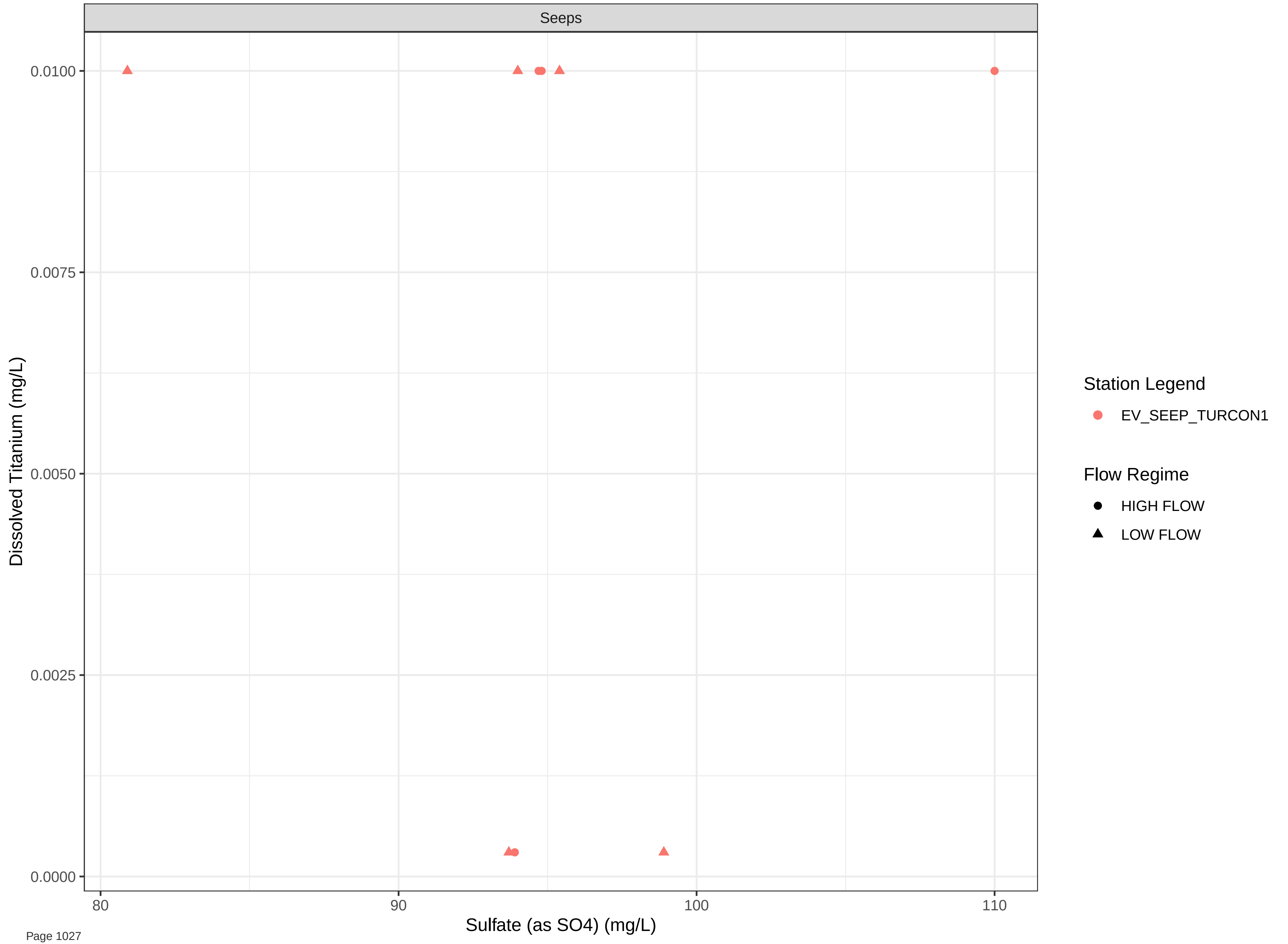


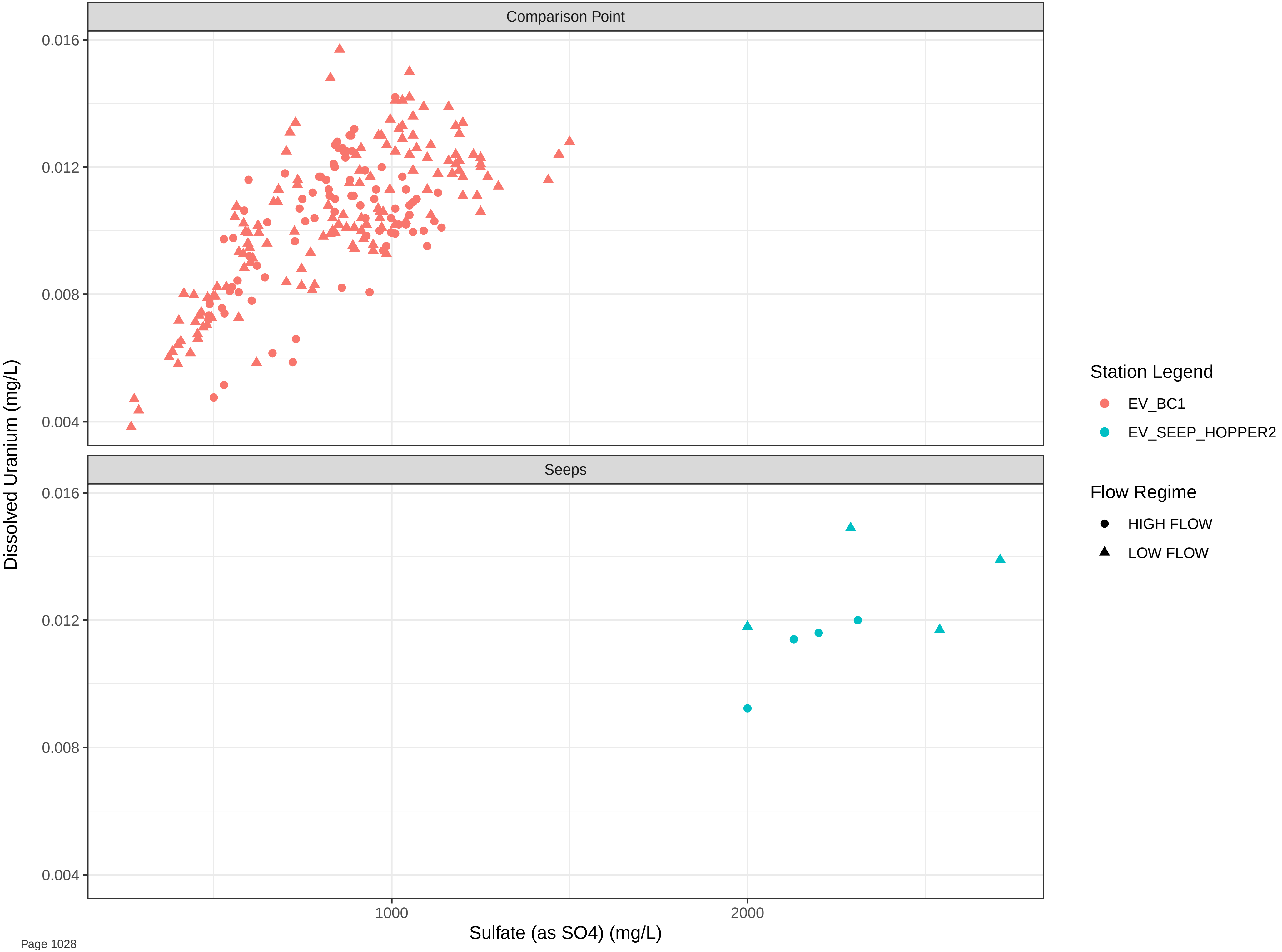
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
0
25
50
75
Dissolved Titanium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW

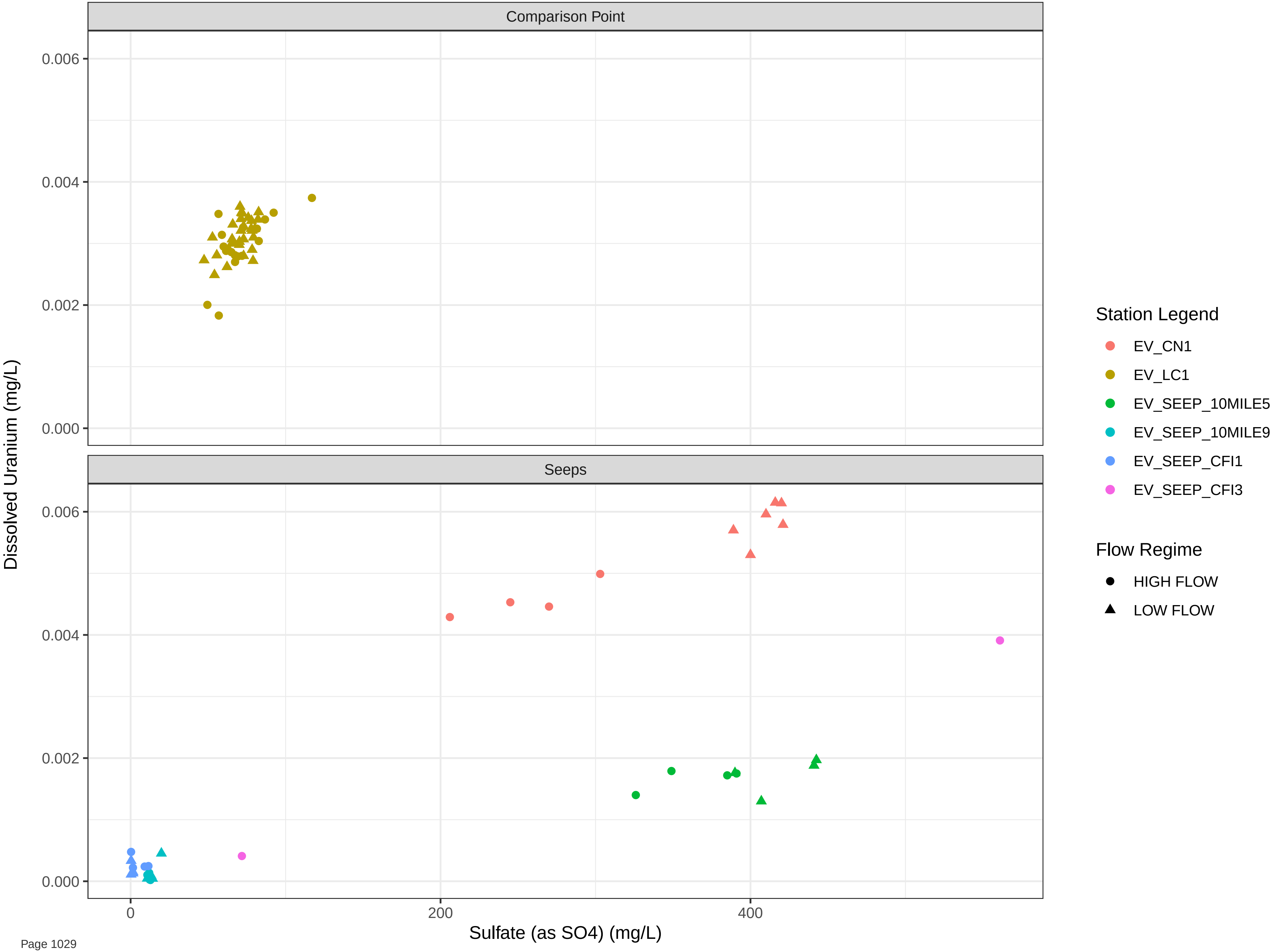


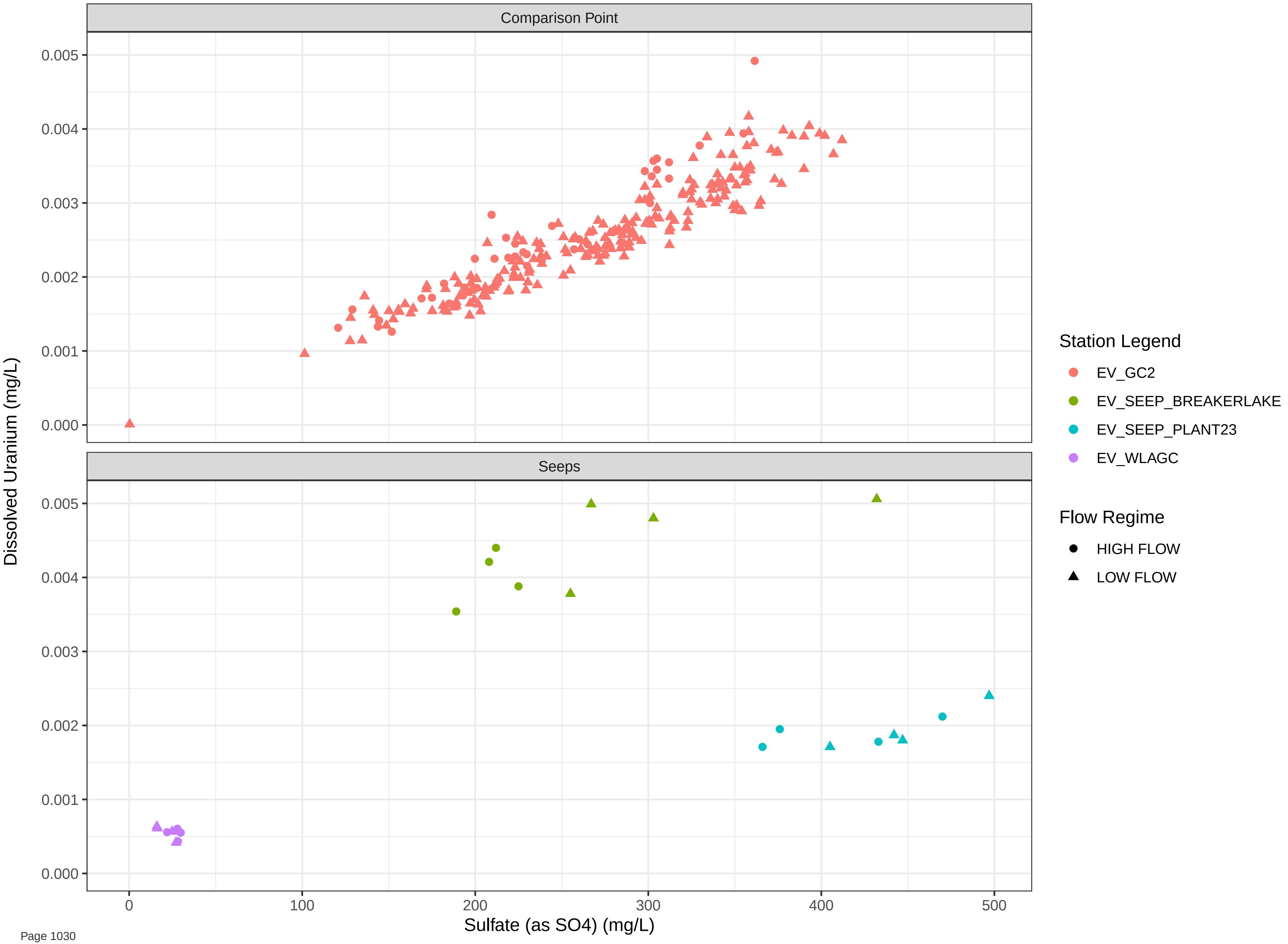
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW


Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
Dissolved Titanium (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

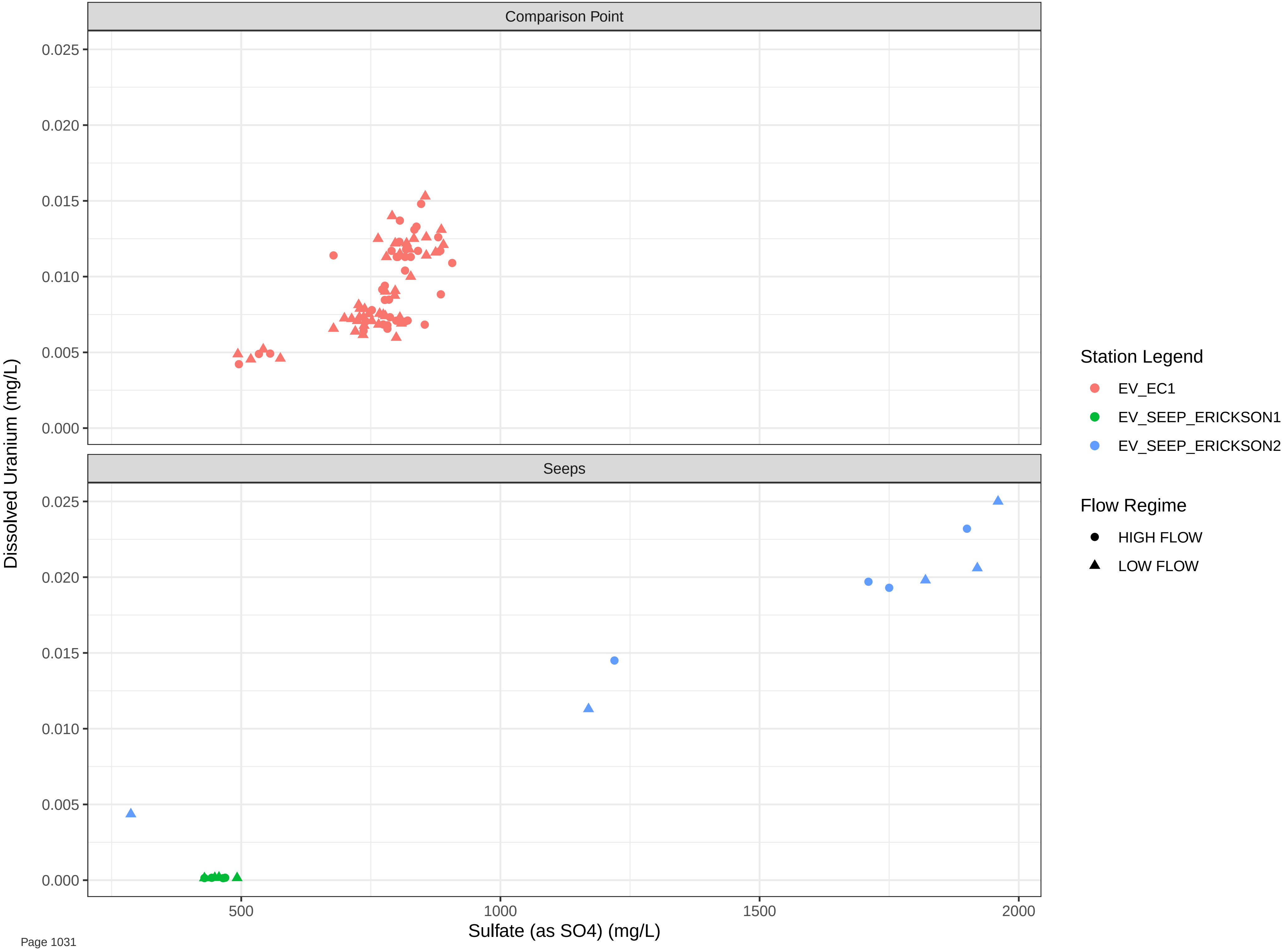


Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.016
0.012
0.008
0.004
Sulfate (as SO4) (mg/L)
1000
2000
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

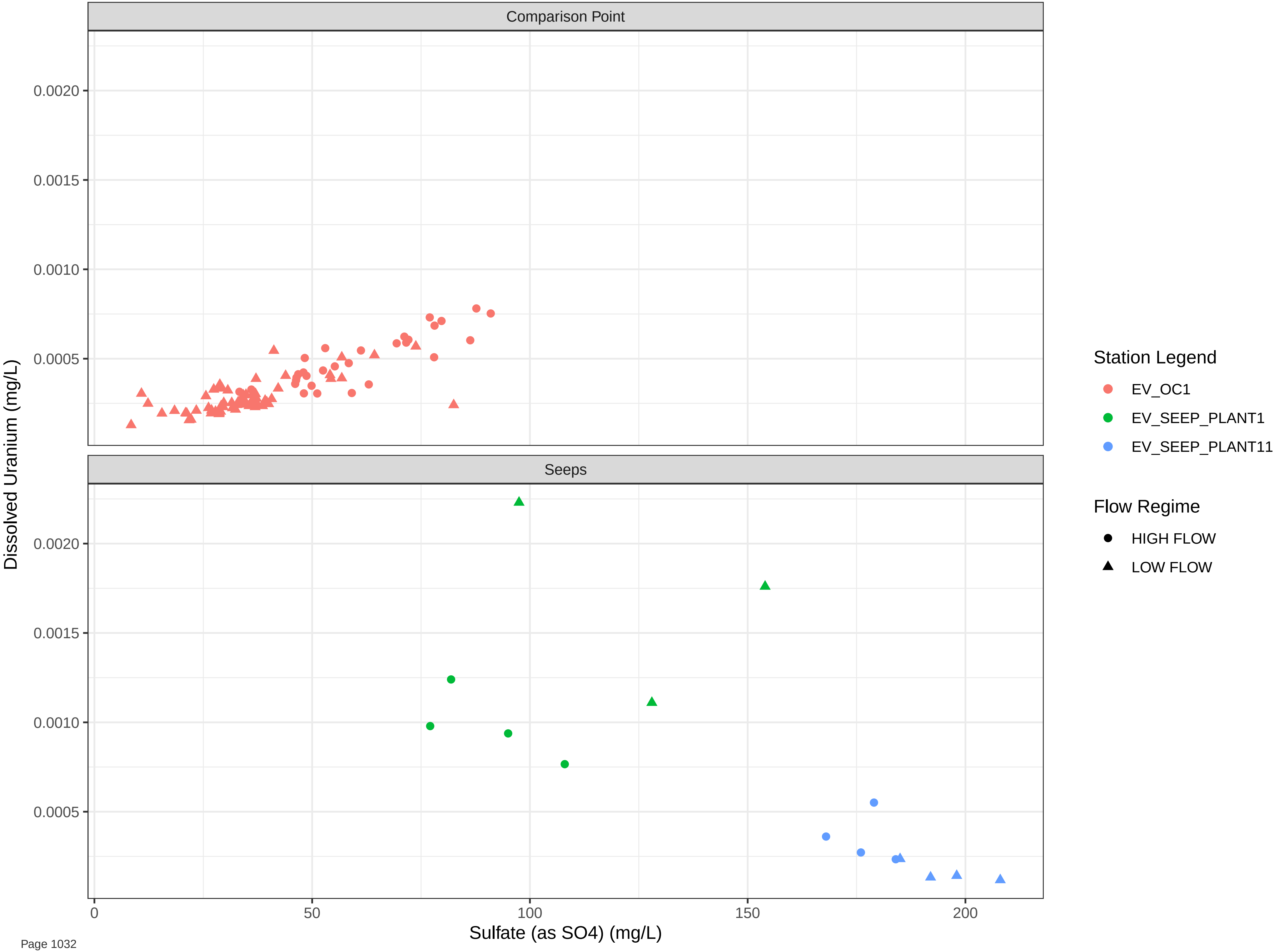

Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.006
0.004
0.002
0.000
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW



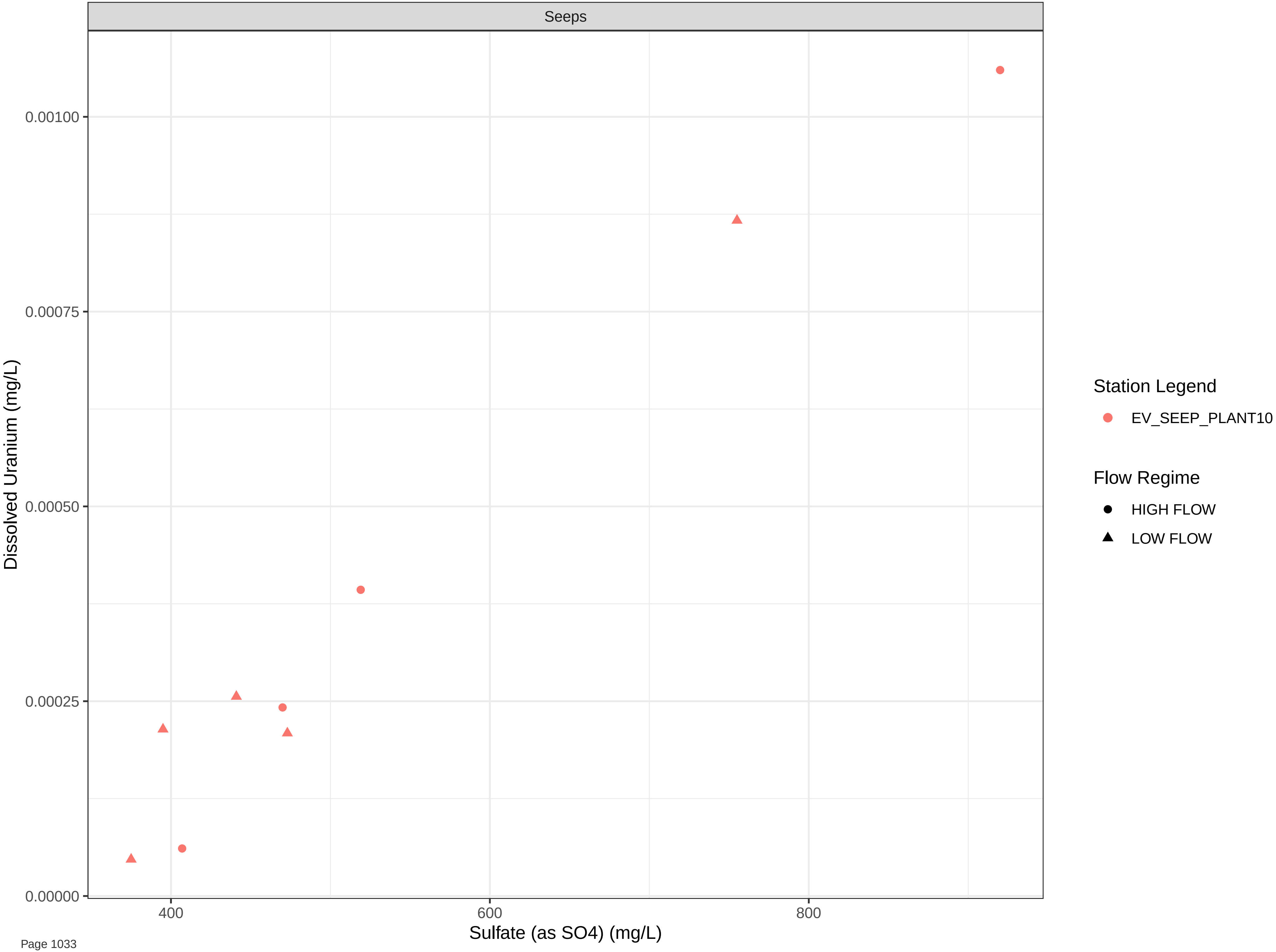
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.000
0.001
0.002
0.003
0.004
0.005
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



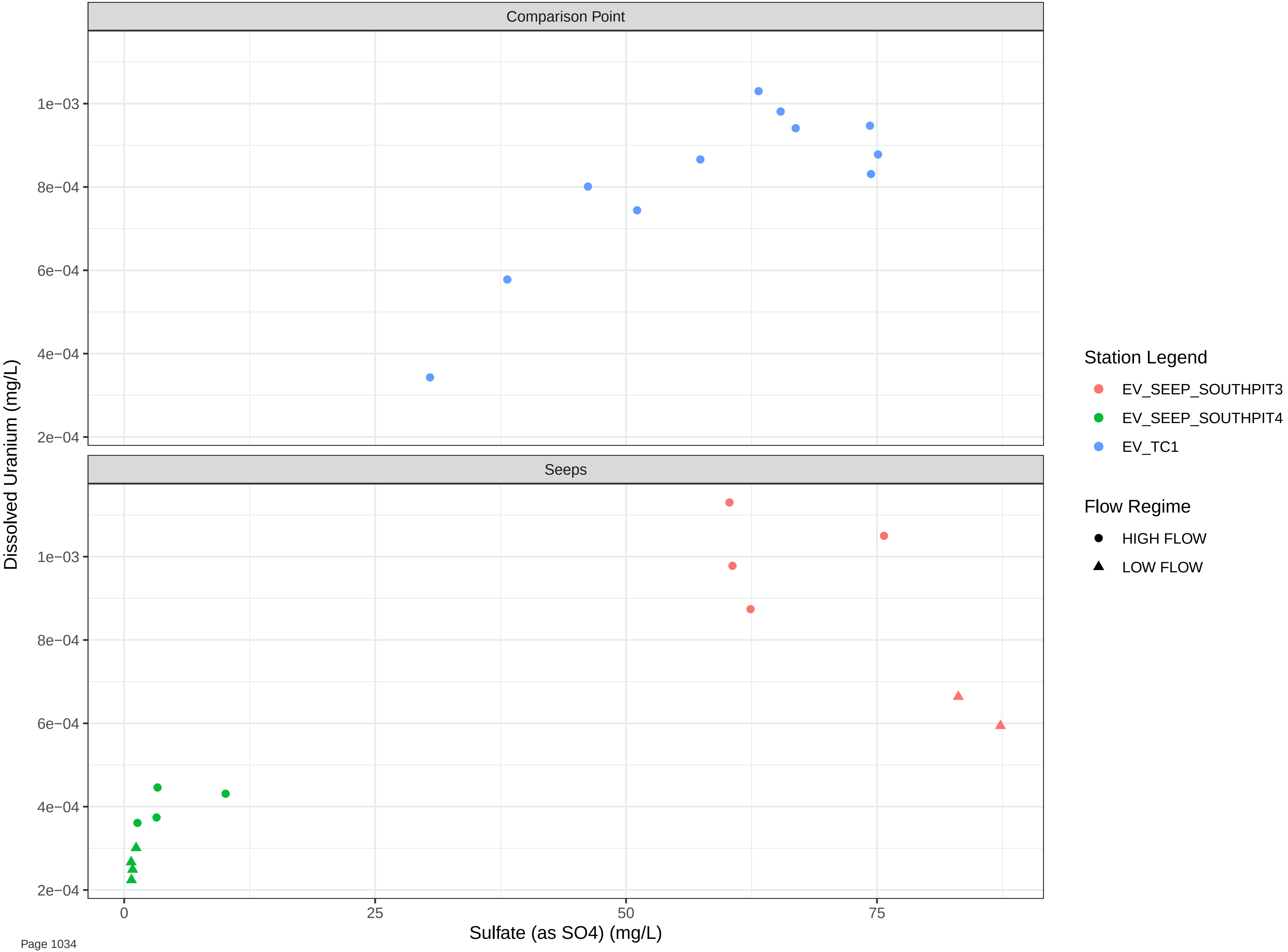
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.000
0.005
0.010
0.015
0.020
0.025
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW



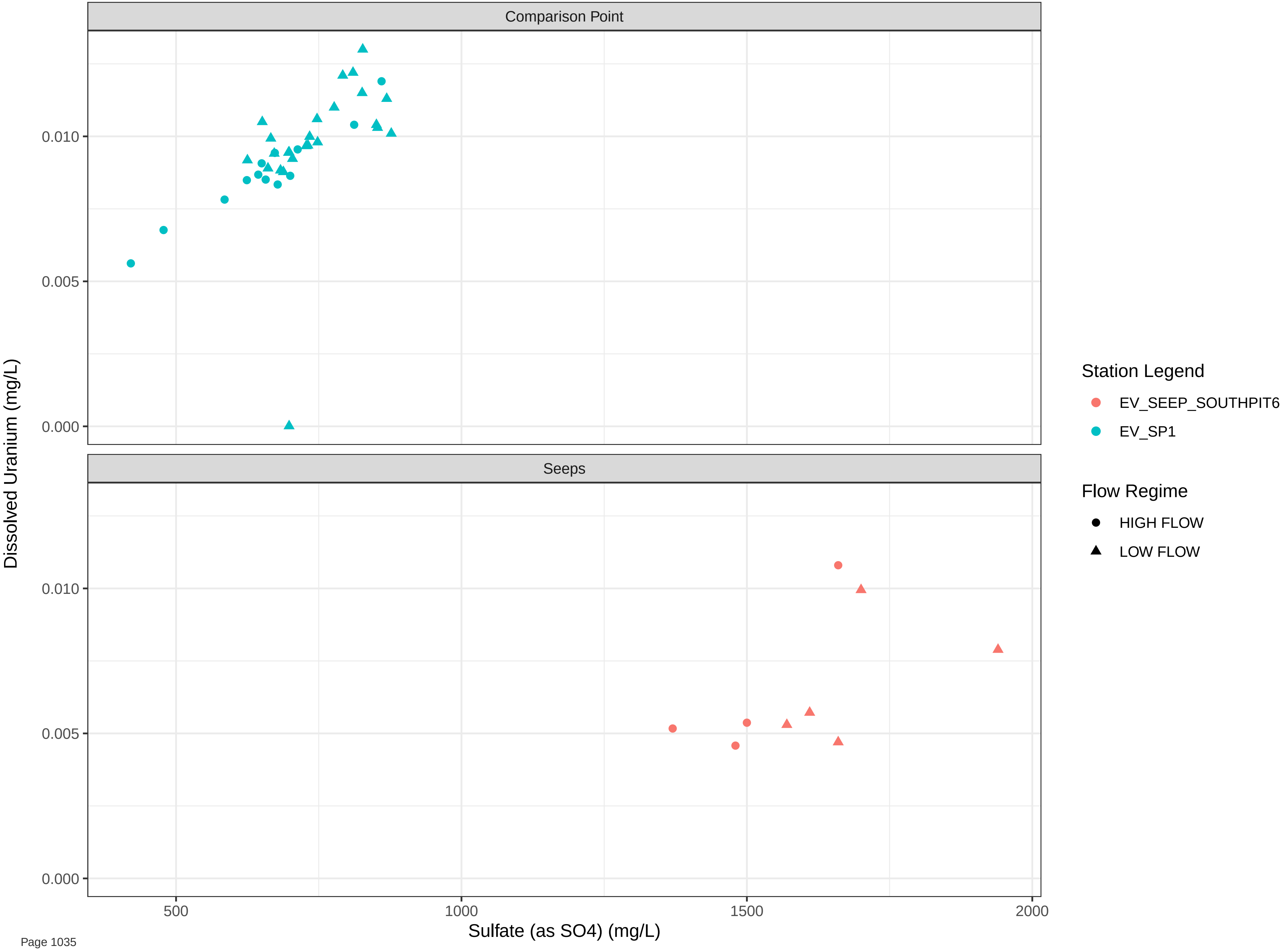
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0020
0.0015
0.0010
0.0005
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



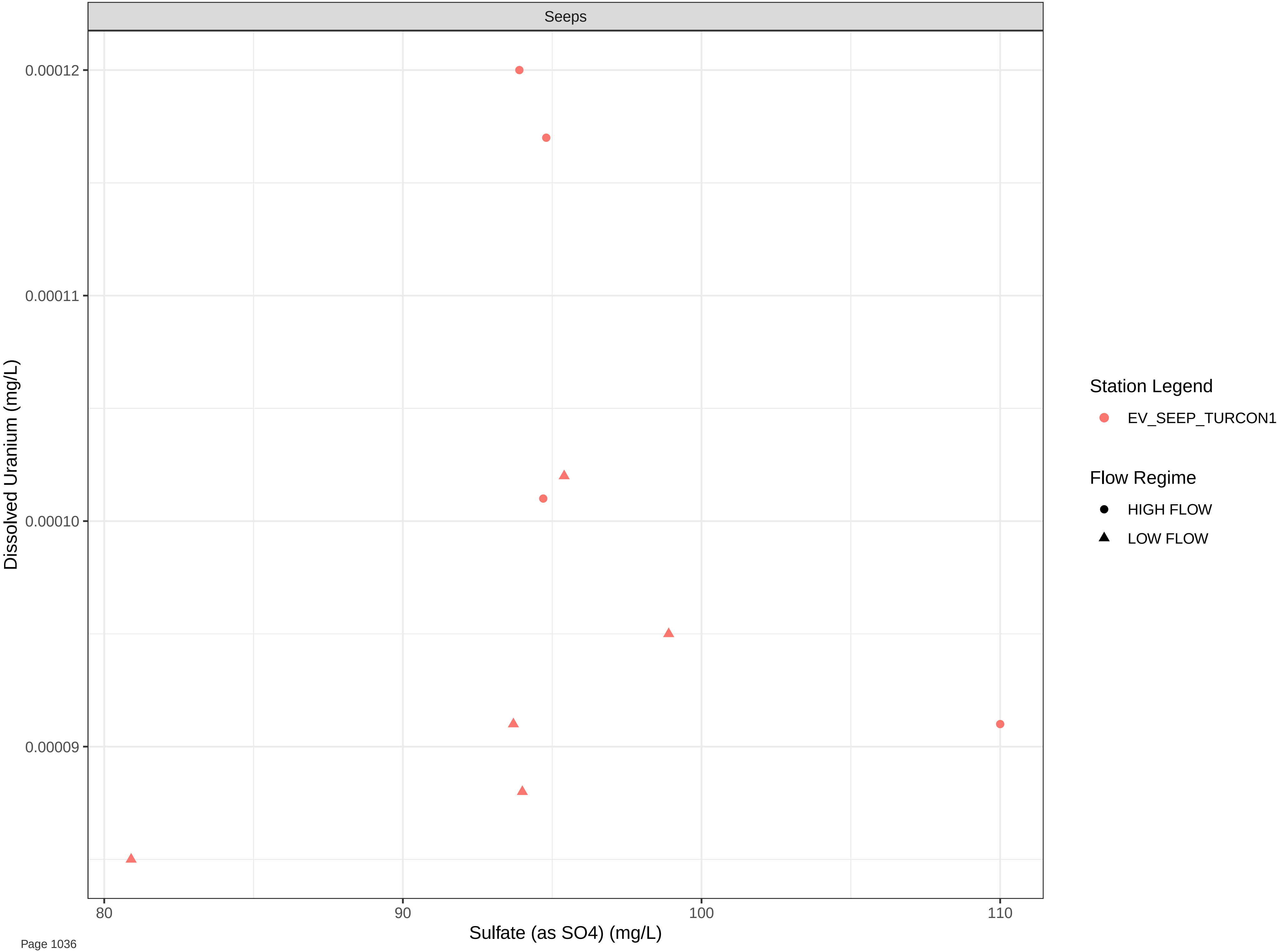
Seeps
0.00100
0.00075
0.00050
0.00025
0.00000
400
600
800
Dissolved Uranium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



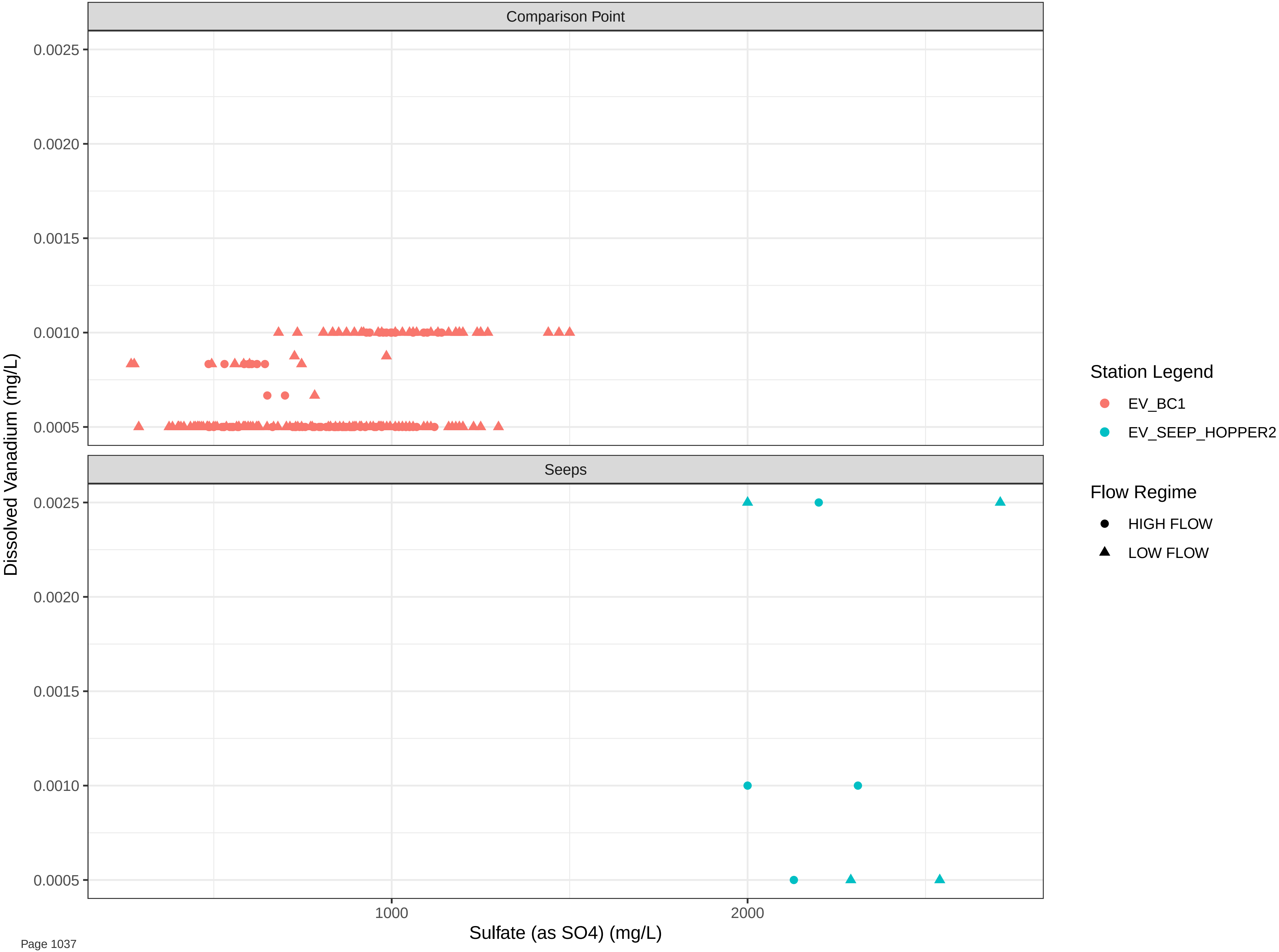
Comparison Point
Seeps
Dissolved Uranium (mg/L)
1e−03
8e−04
6e−04
4e−04
2e−04
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



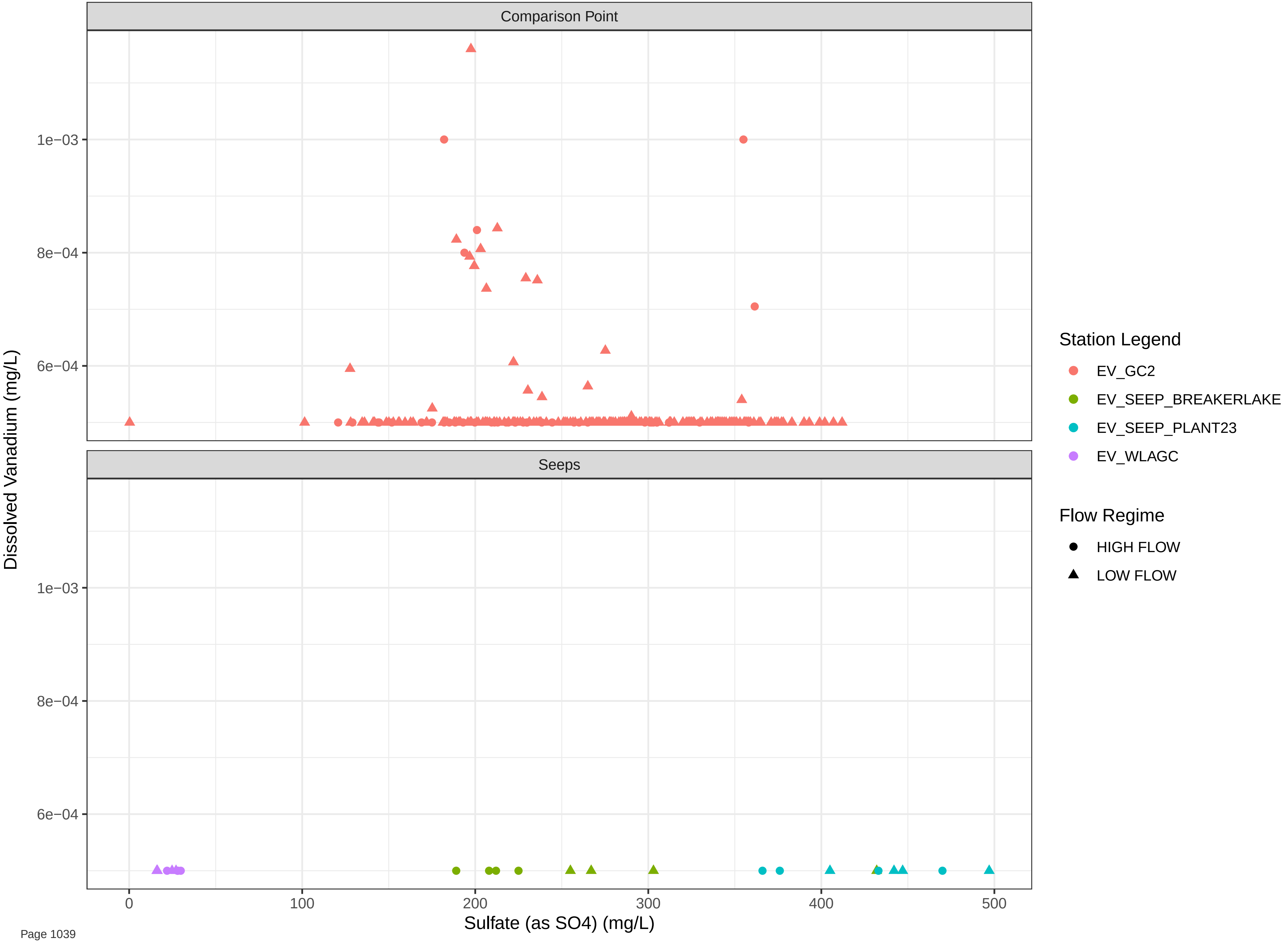
Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.000
0.005
0.010
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



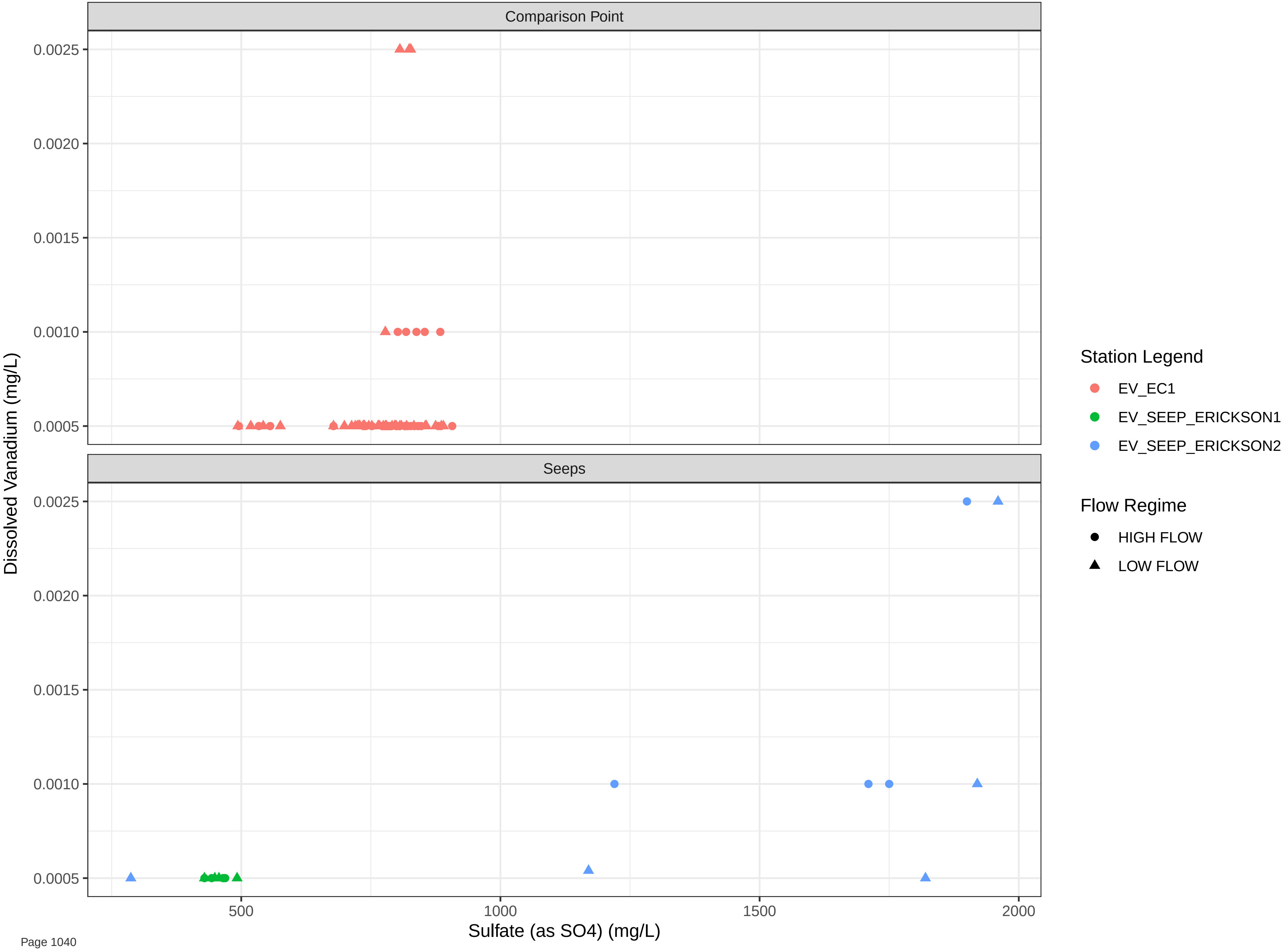
Seeps
0.00012
0.00011
0.00010
0.00009
80
90
100
110
Dissolved Uranium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.0025
0.0020
0.0015
0.0010
0.0005
Dissolved Vanadium (mg/L)
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

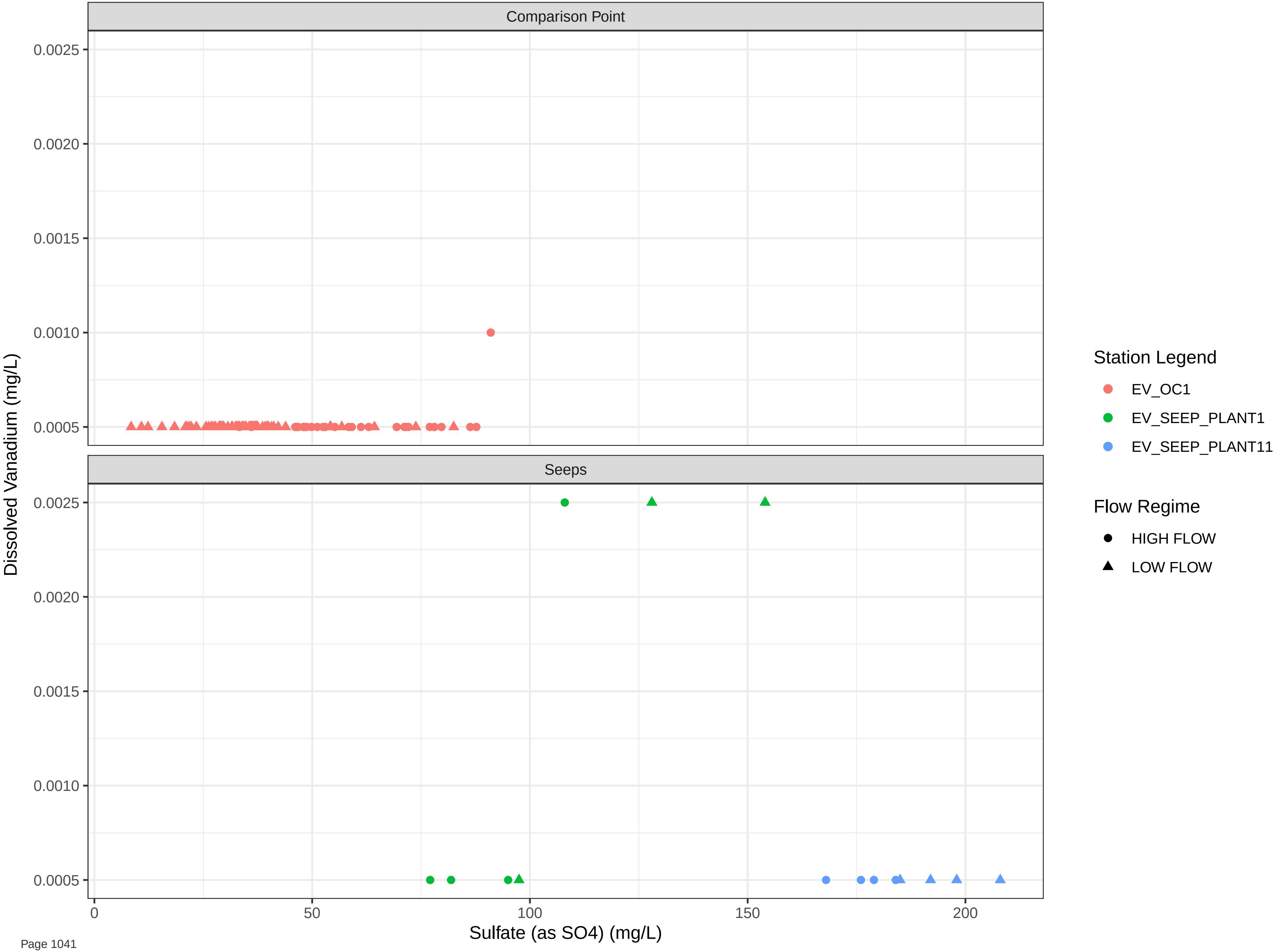

Comparison Point
Seeps
Dissolved Vanadium (mg/L)
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

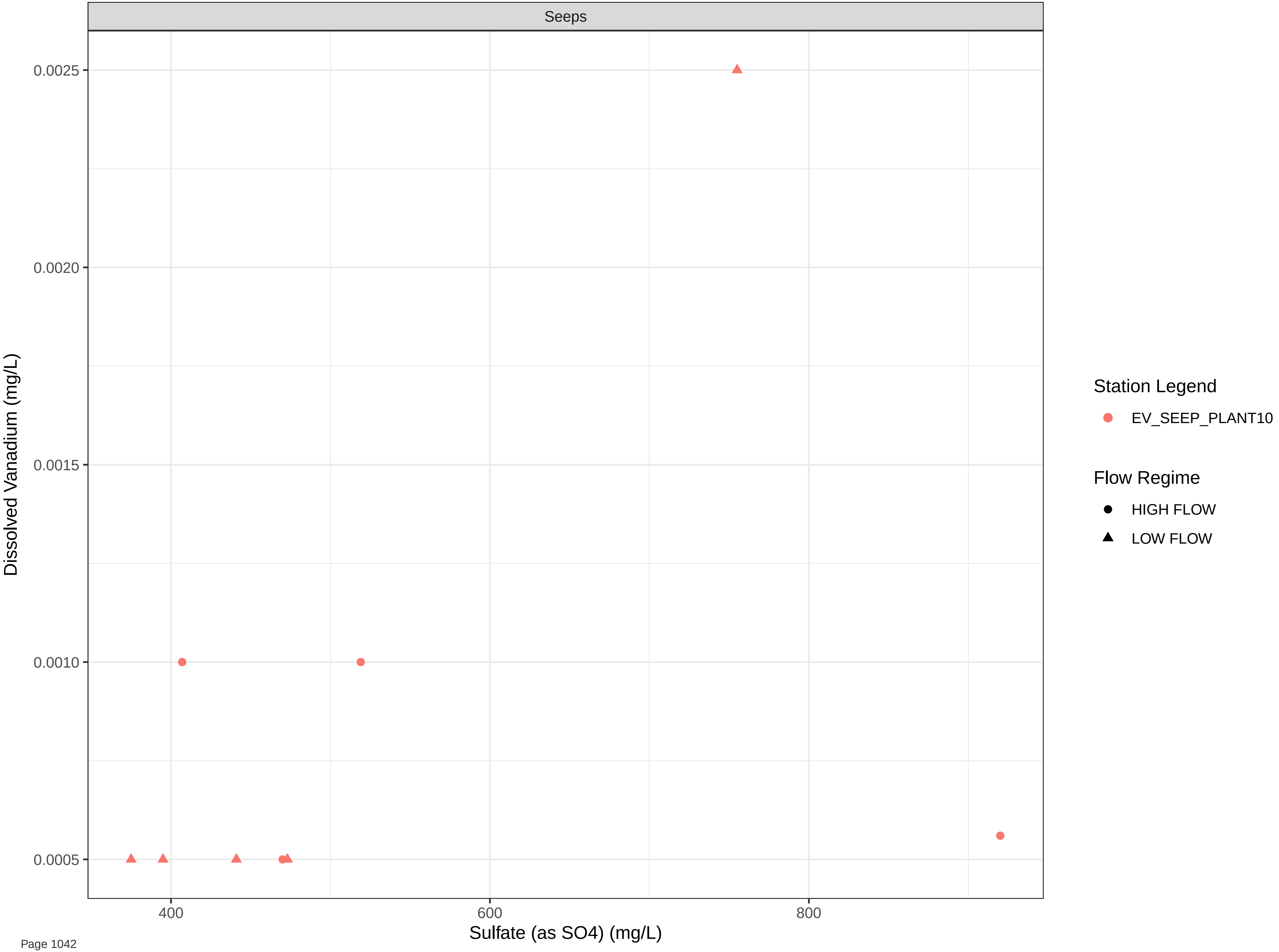


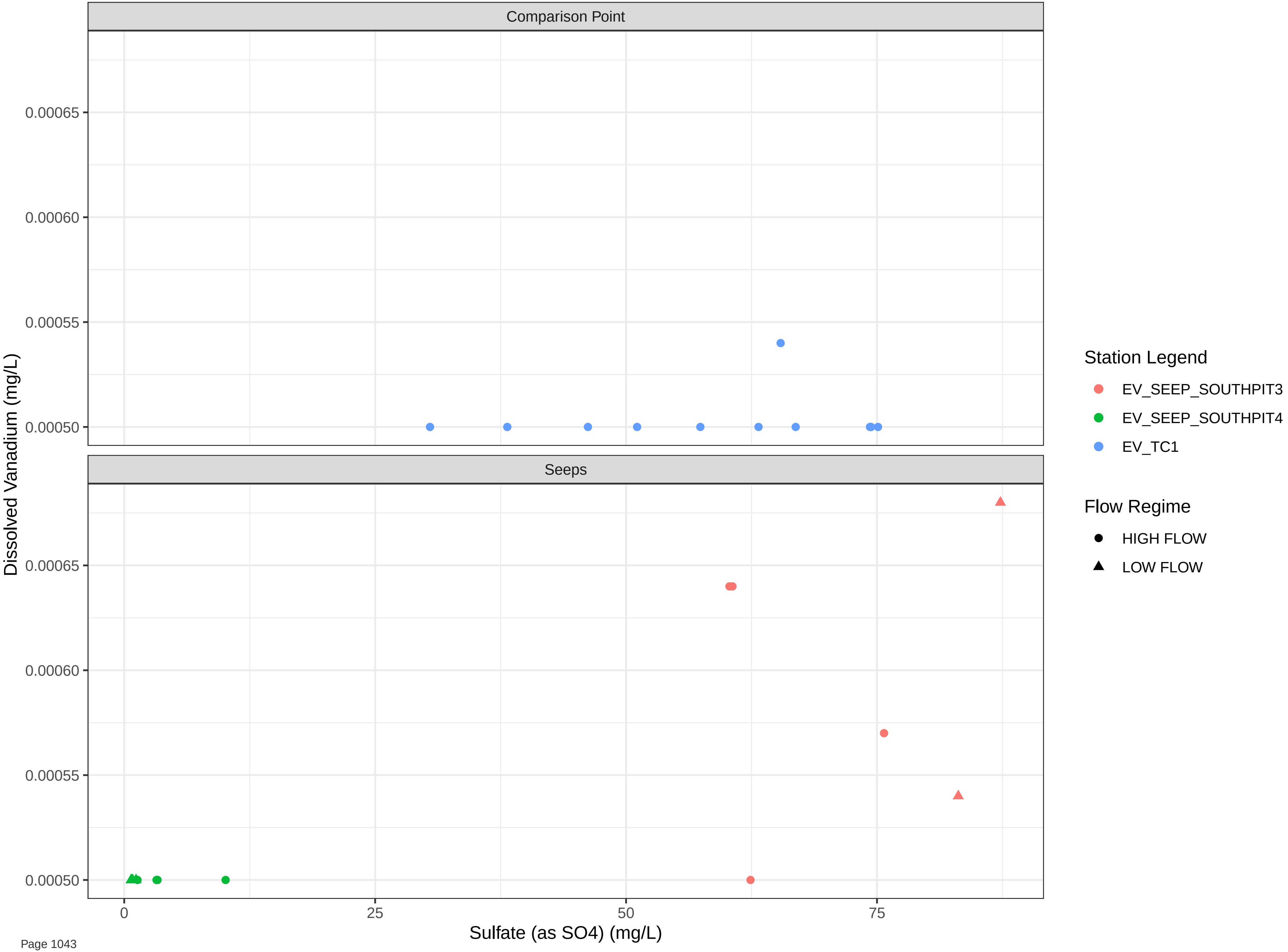
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
1e−03
8e−04
6e−04
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW



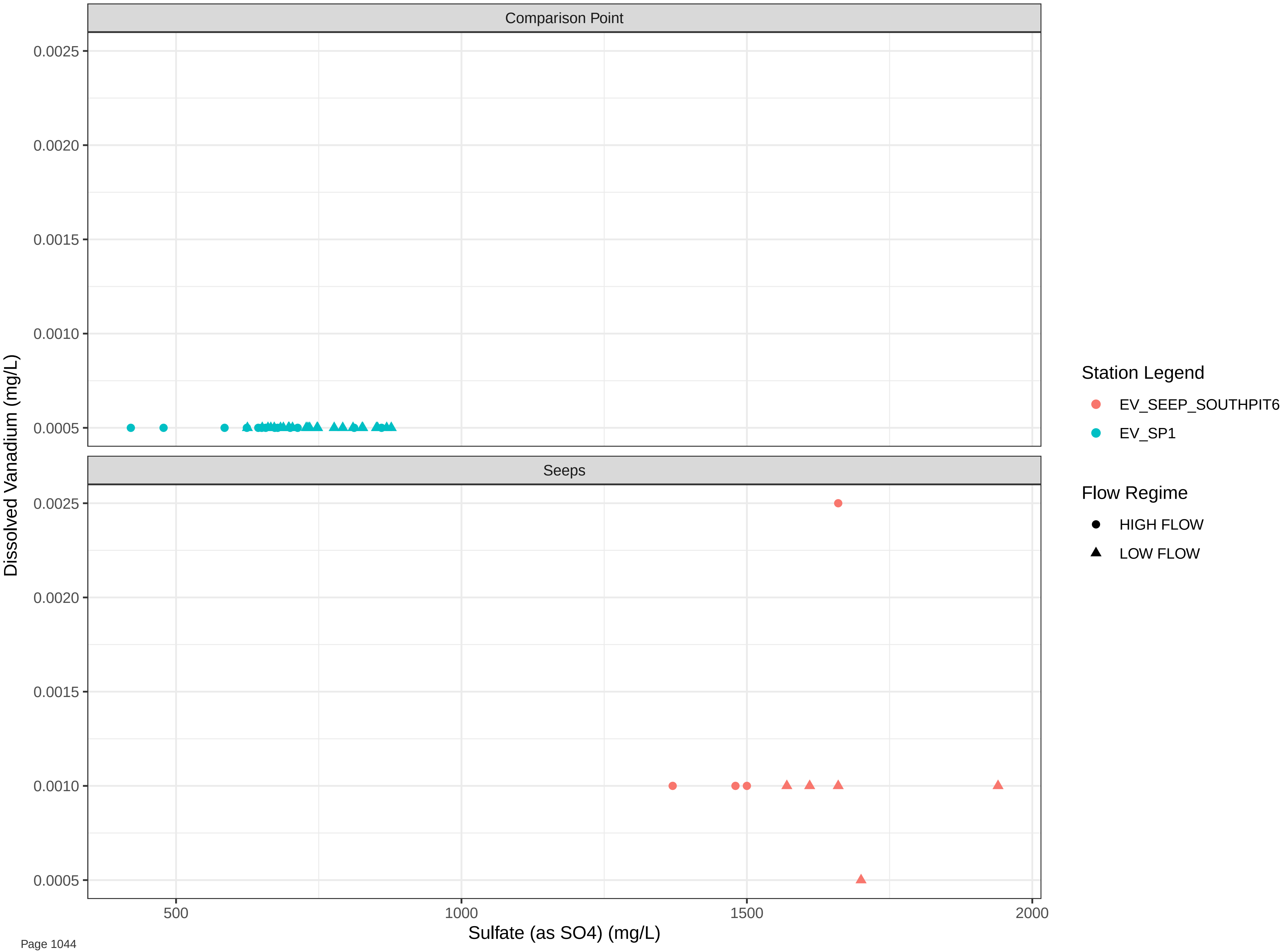
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.0005
0.0010
0.0015
0.0020
0.0025
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Vanadium (mg/L)
Sulfate (as SO4) (mg/L)
0.0025
0.0020
0.0015
0.0010
0.0005
0
50
100
150
200
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW

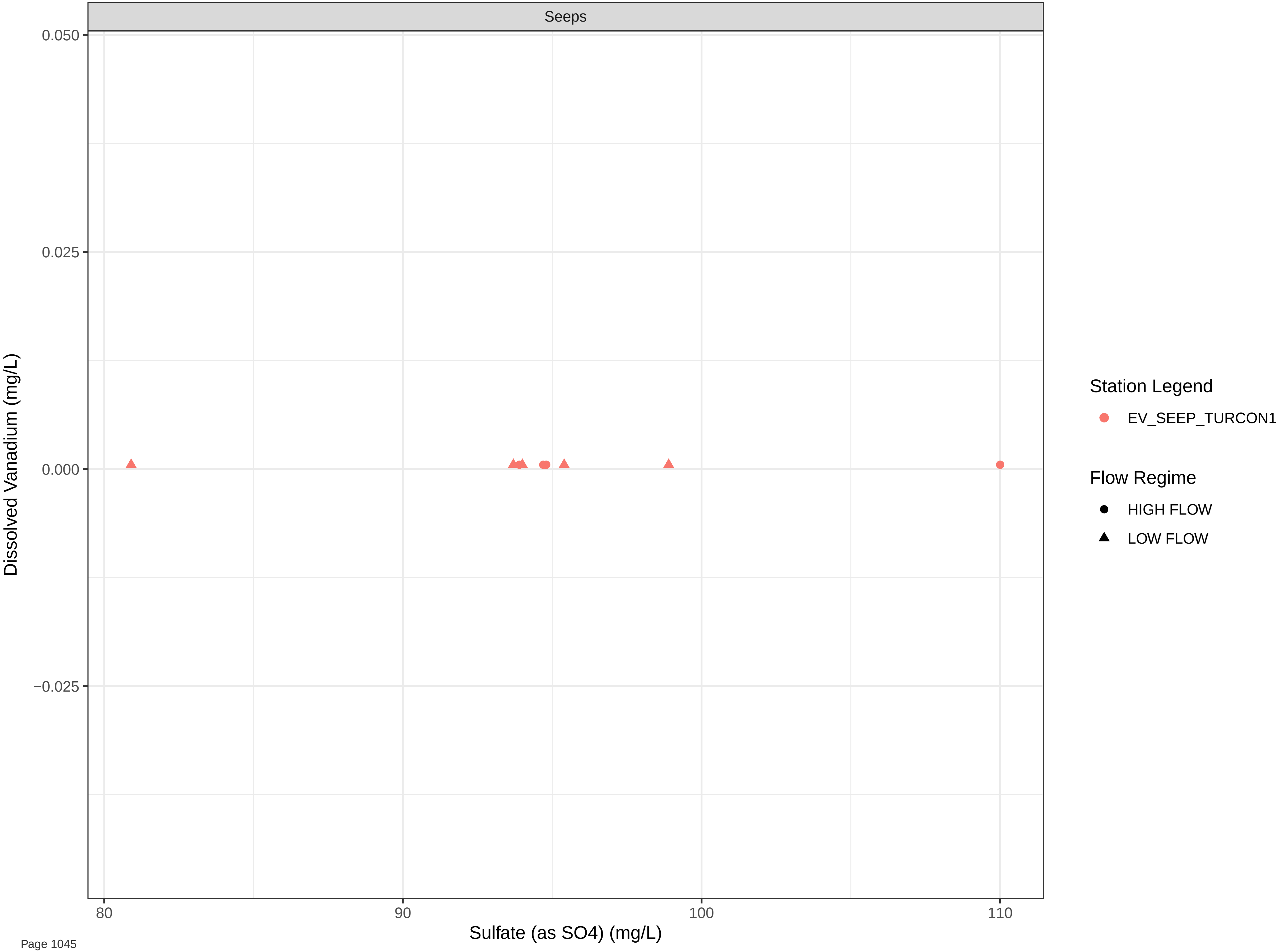

Seeps
0.0025
0.0020
0.0015
0.0010
0.0005
Dissolved Vanadium (mg/L)
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW



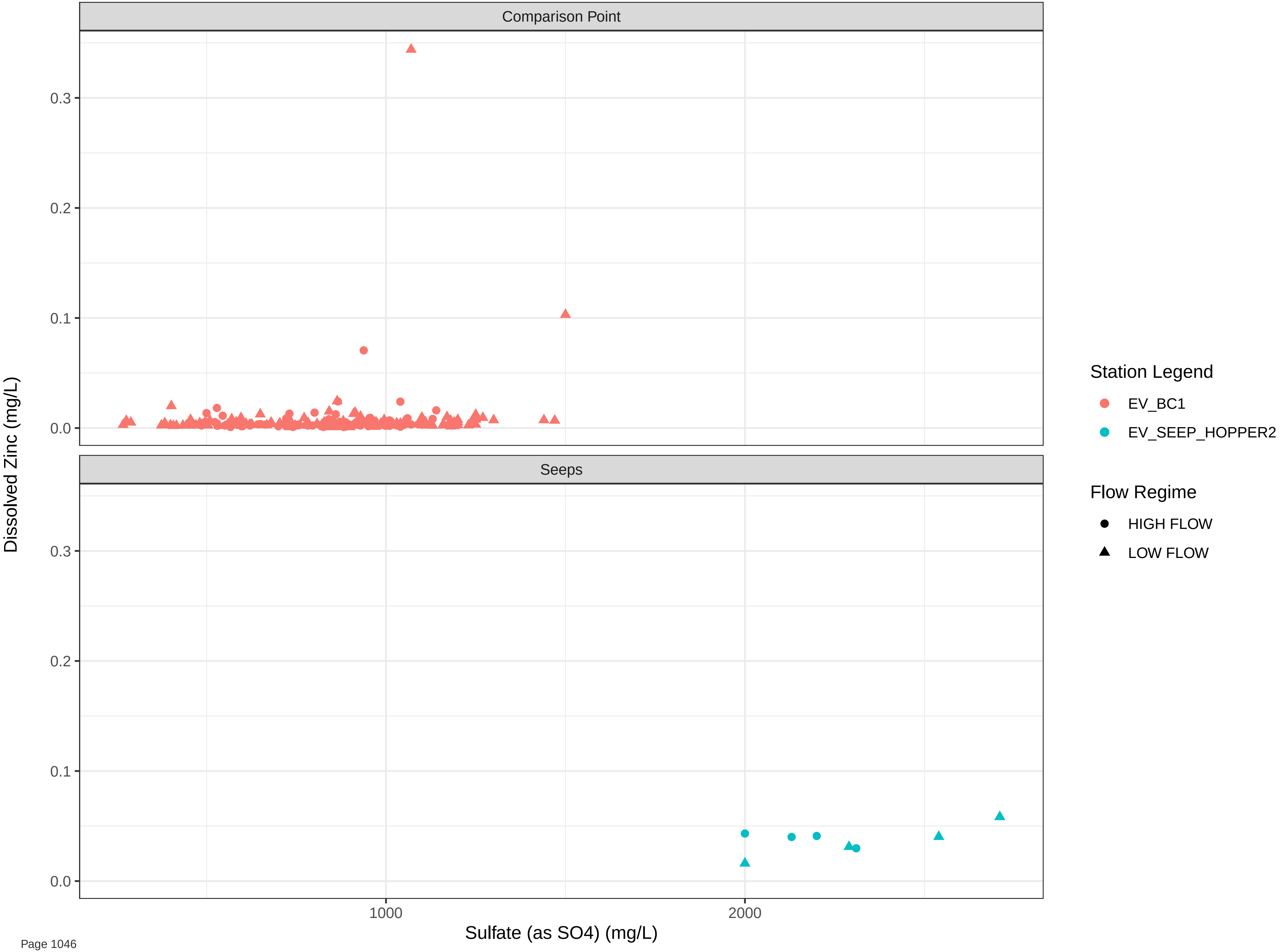
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.00065
0.00060
0.00055
0.00050
0
25
50
75
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW



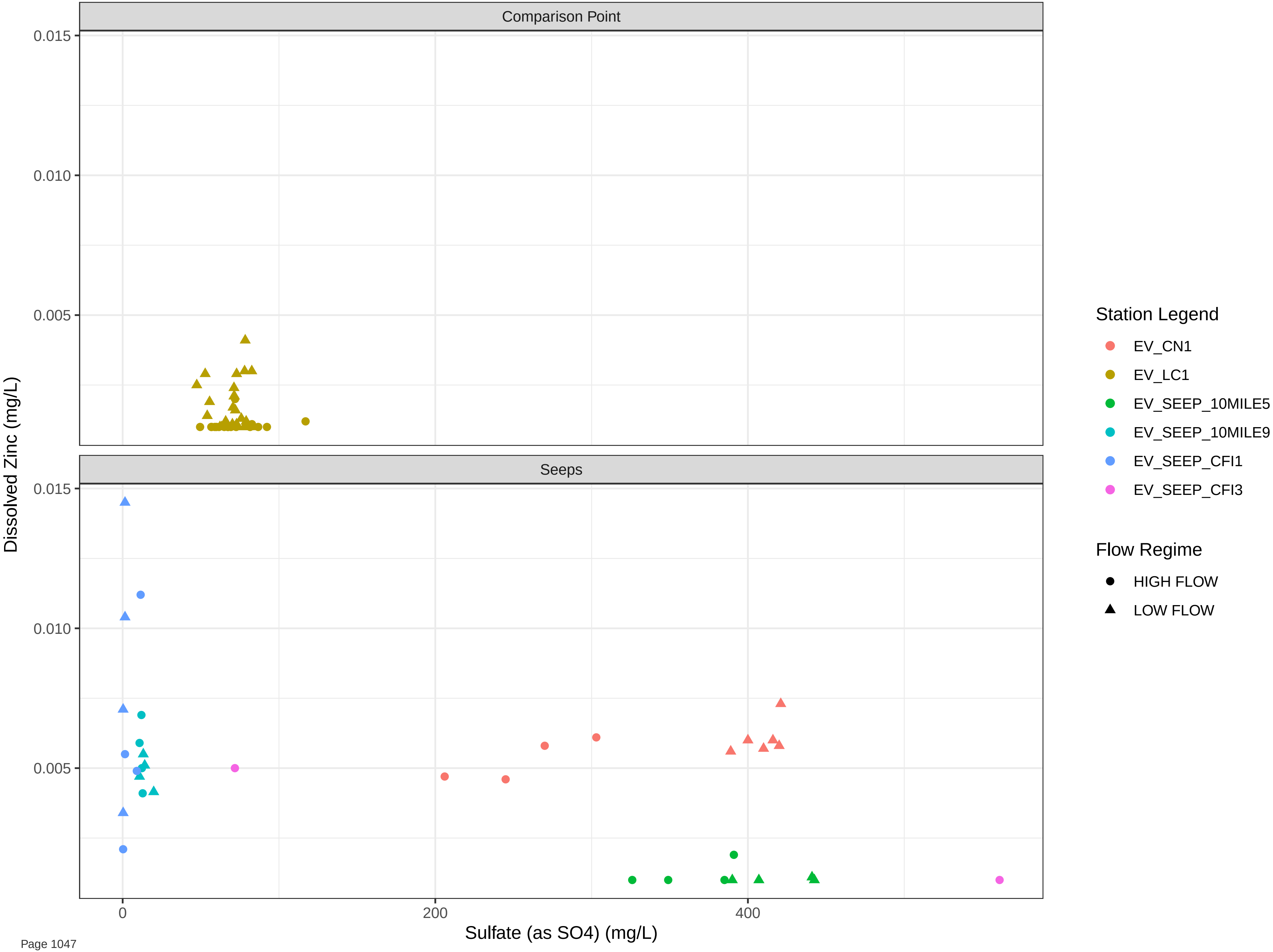
Comparison Point
Seeps
Dissolved Vanadium (mg/L)
0.0025
0.0020
0.0015
0.0010
0.0005
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW



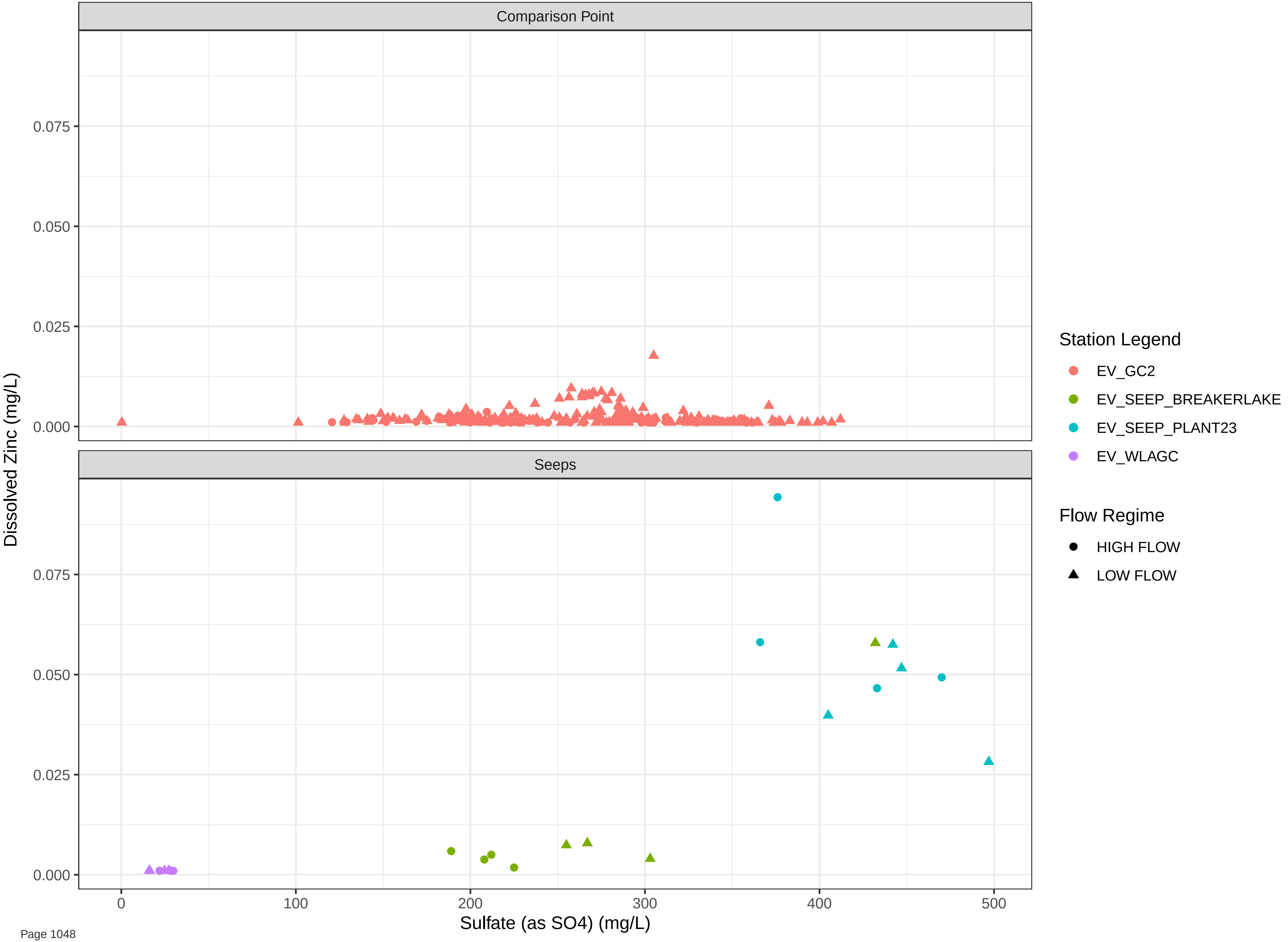
Seeps
0.050
0.025
0.000
−0.025
Dissolved Vanadium (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW



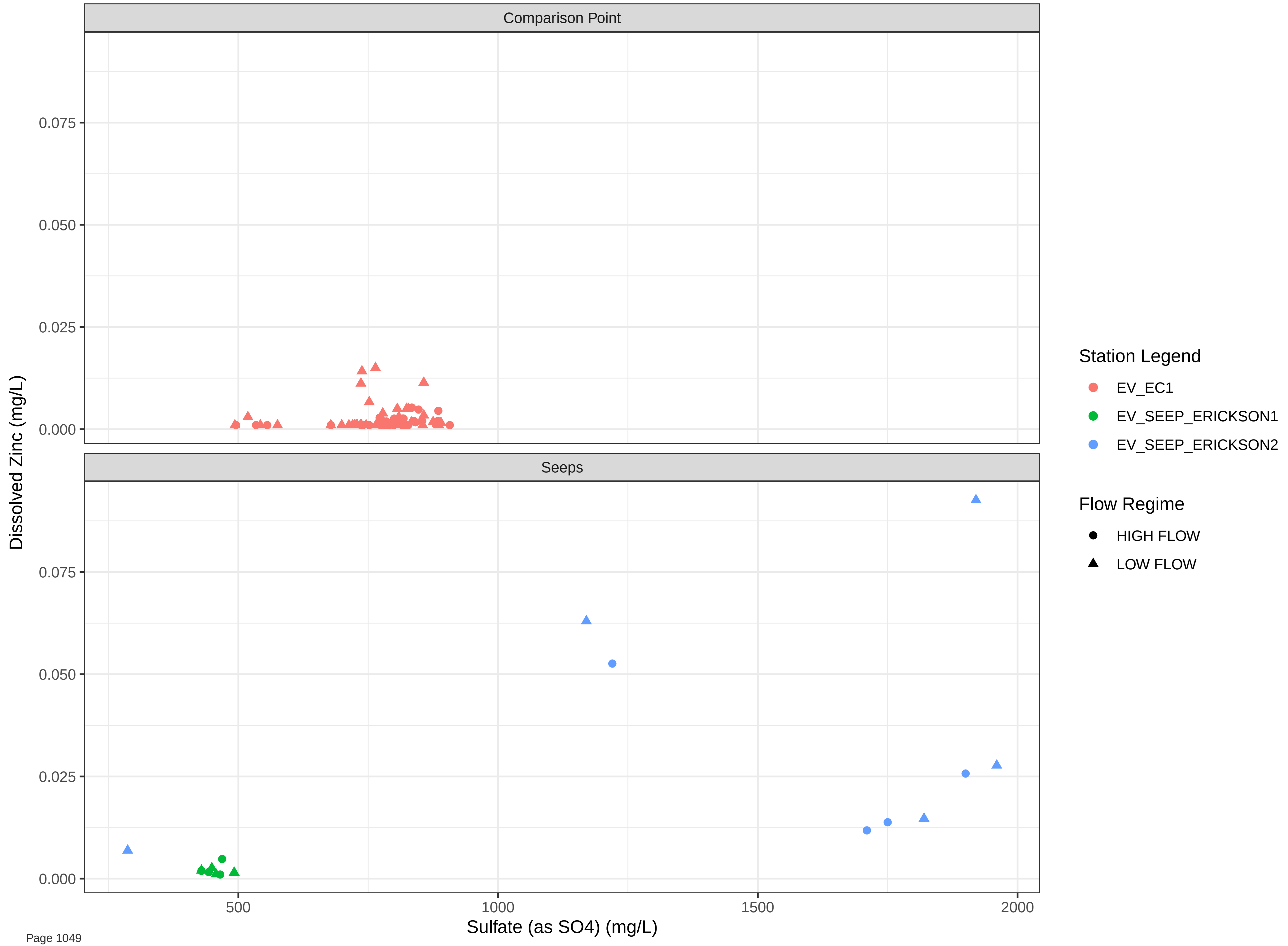
Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.0
0.1
0.2
0.3
1000
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_BC1
EV_SEEP_HOPPER2
Flow Regime
HIGH FLOW
LOW FLOW

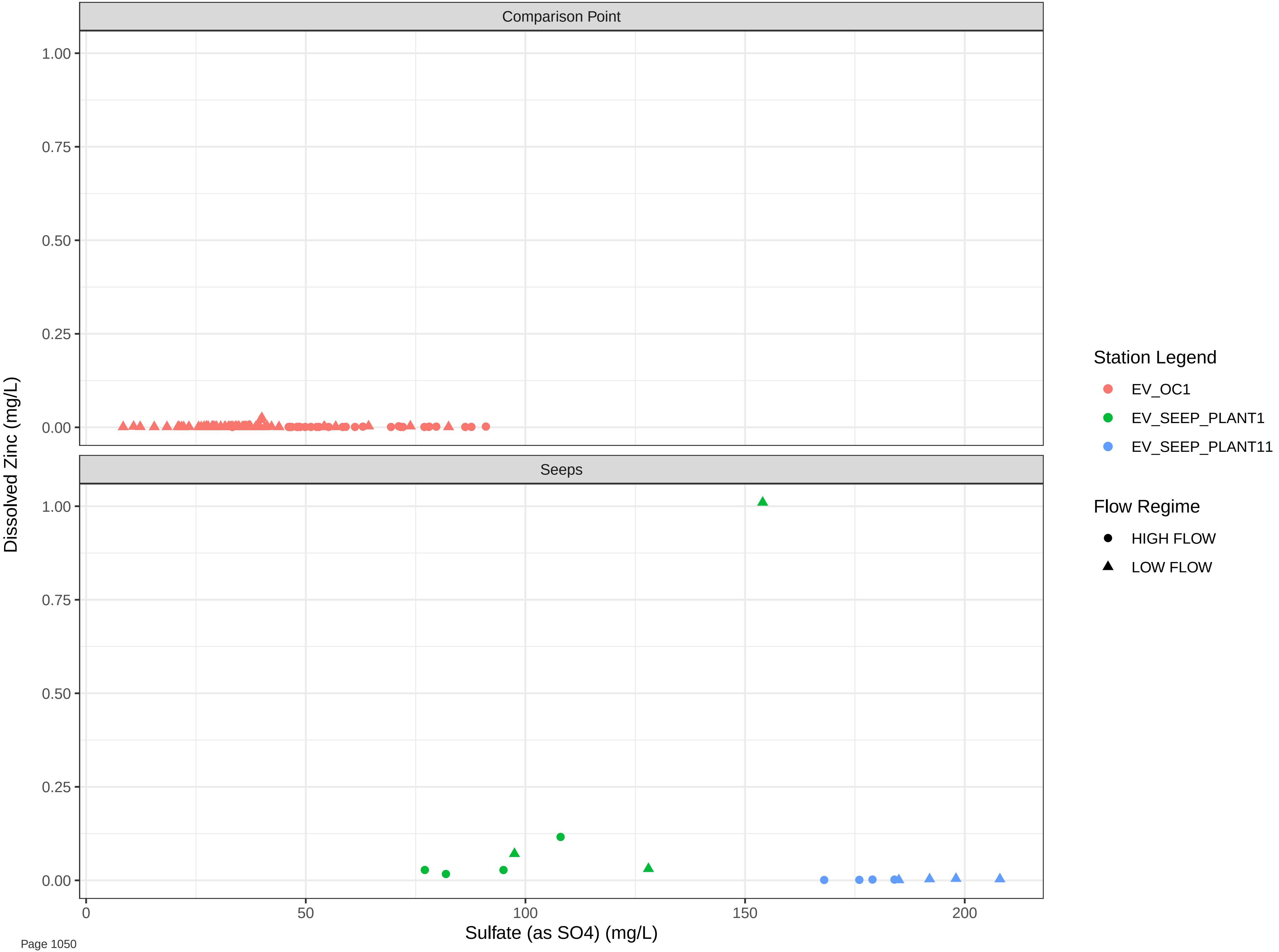


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.015
0.010
0.005
0
200
400
Sulfate (as SO4) (mg/L)
Station Legend
EV_CN1
EV_LC1
EV_SEEP_10MILE5
EV_SEEP_10MILE9
EV_SEEP_CFI1
EV_SEEP_CFI3
Flow Regime
HIGH FLOW
LOW FLOW

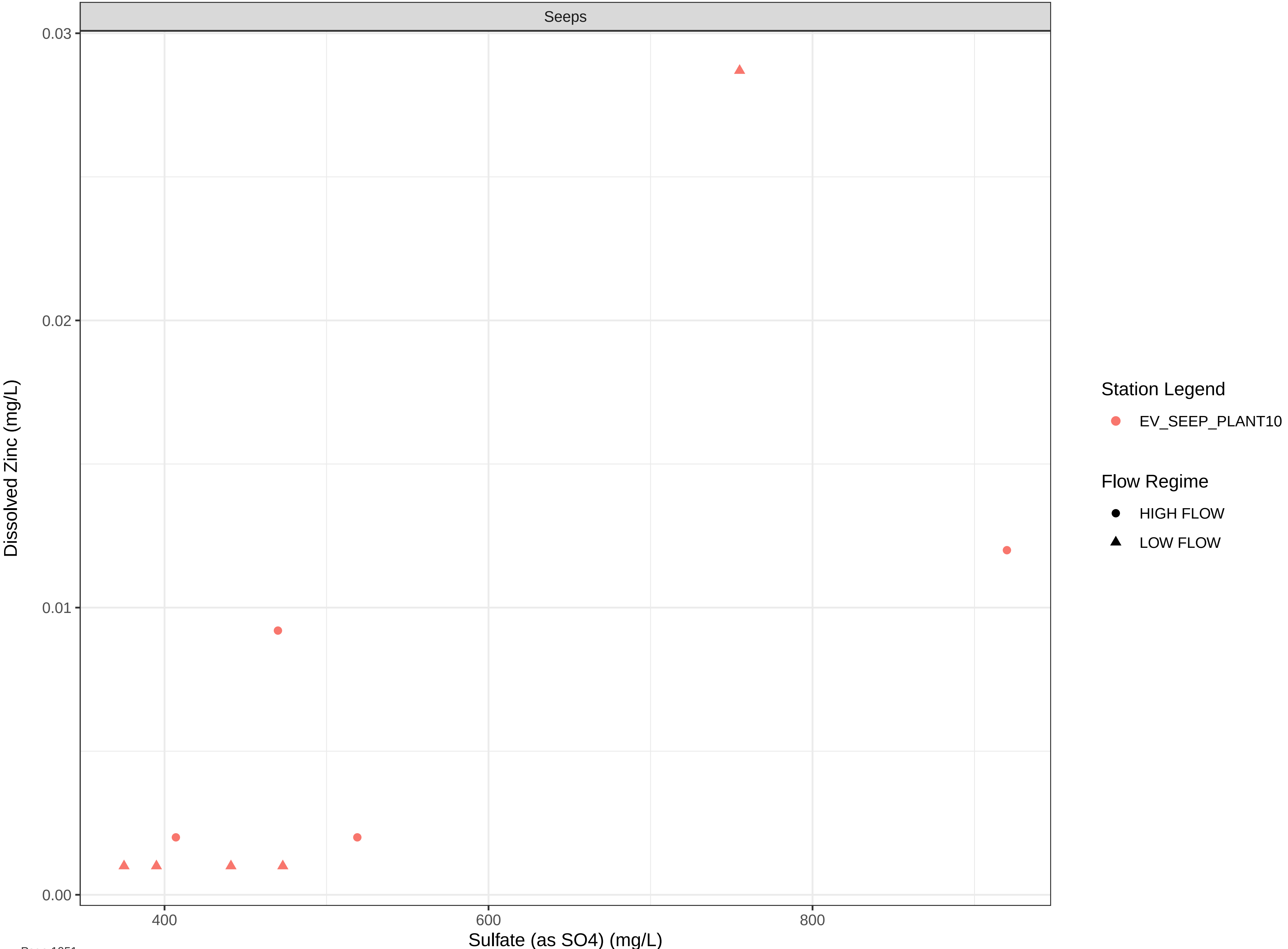


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.000
0.025
0.050
0.075
0.000
0.025
0.050
0.075
0
100
200
300
400
500
Sulfate (as SO4) (mg/L)
Station Legend
EV_GC2
EV_SEEP_BREAKERLAKE
EV_SEEP_PLANT23
EV_WLAGC
Flow Regime
HIGH FLOW
LOW FLOW

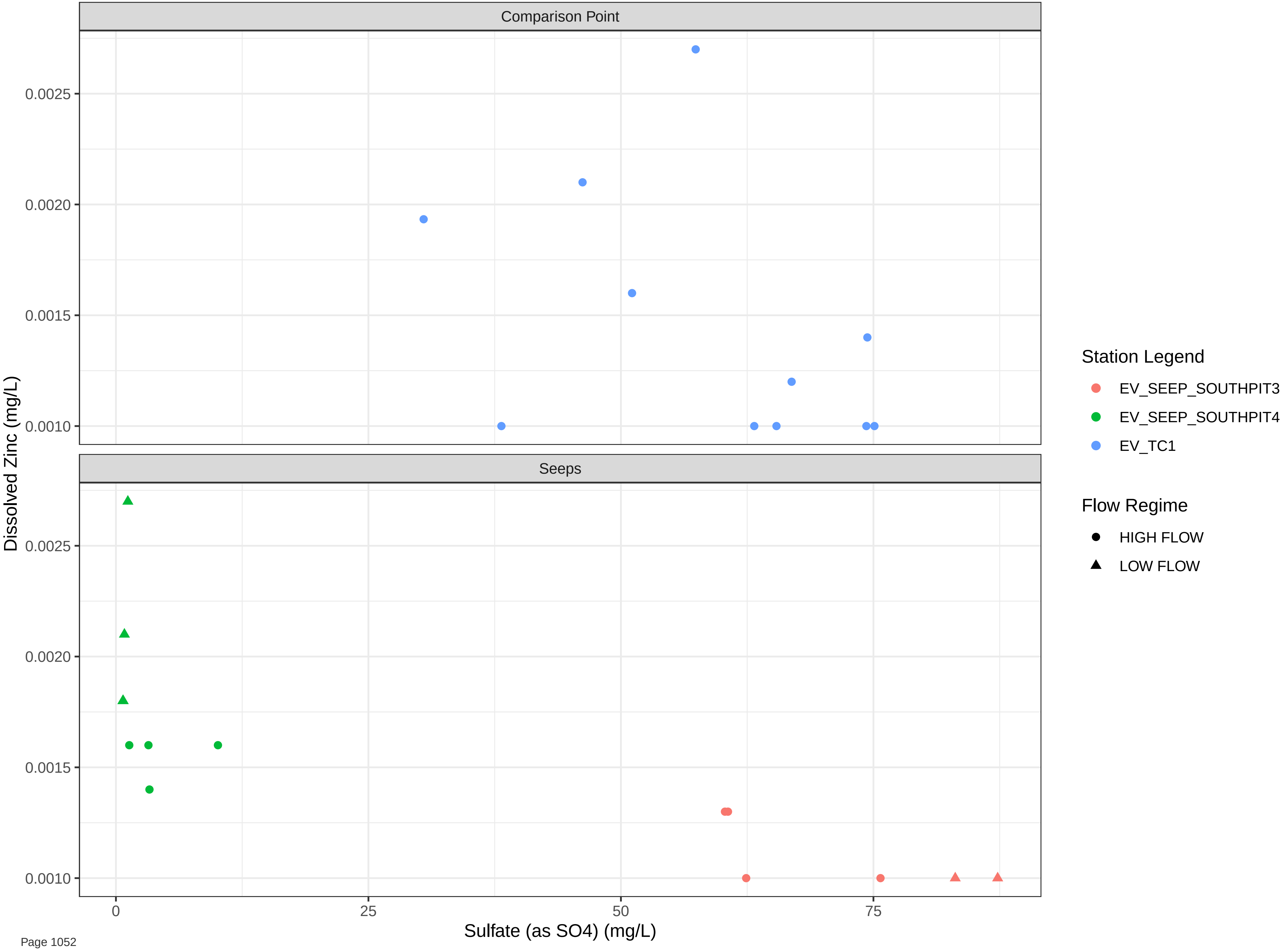

Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.000
0.025
0.050
0.075
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_EC1
EV_SEEP_ERICKSON1
EV_SEEP_ERICKSON2
Flow Regime
HIGH FLOW
LOW FLOW

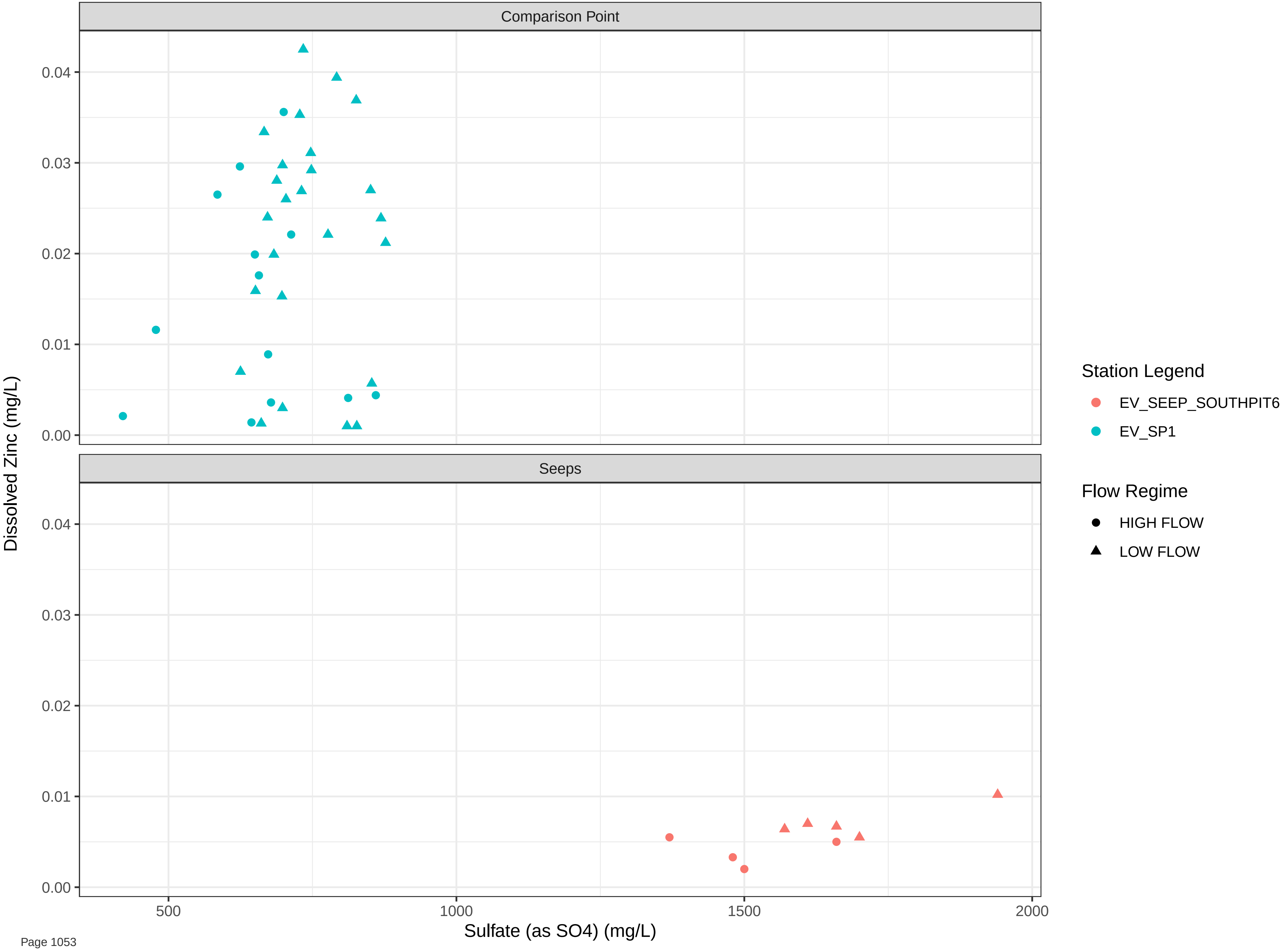


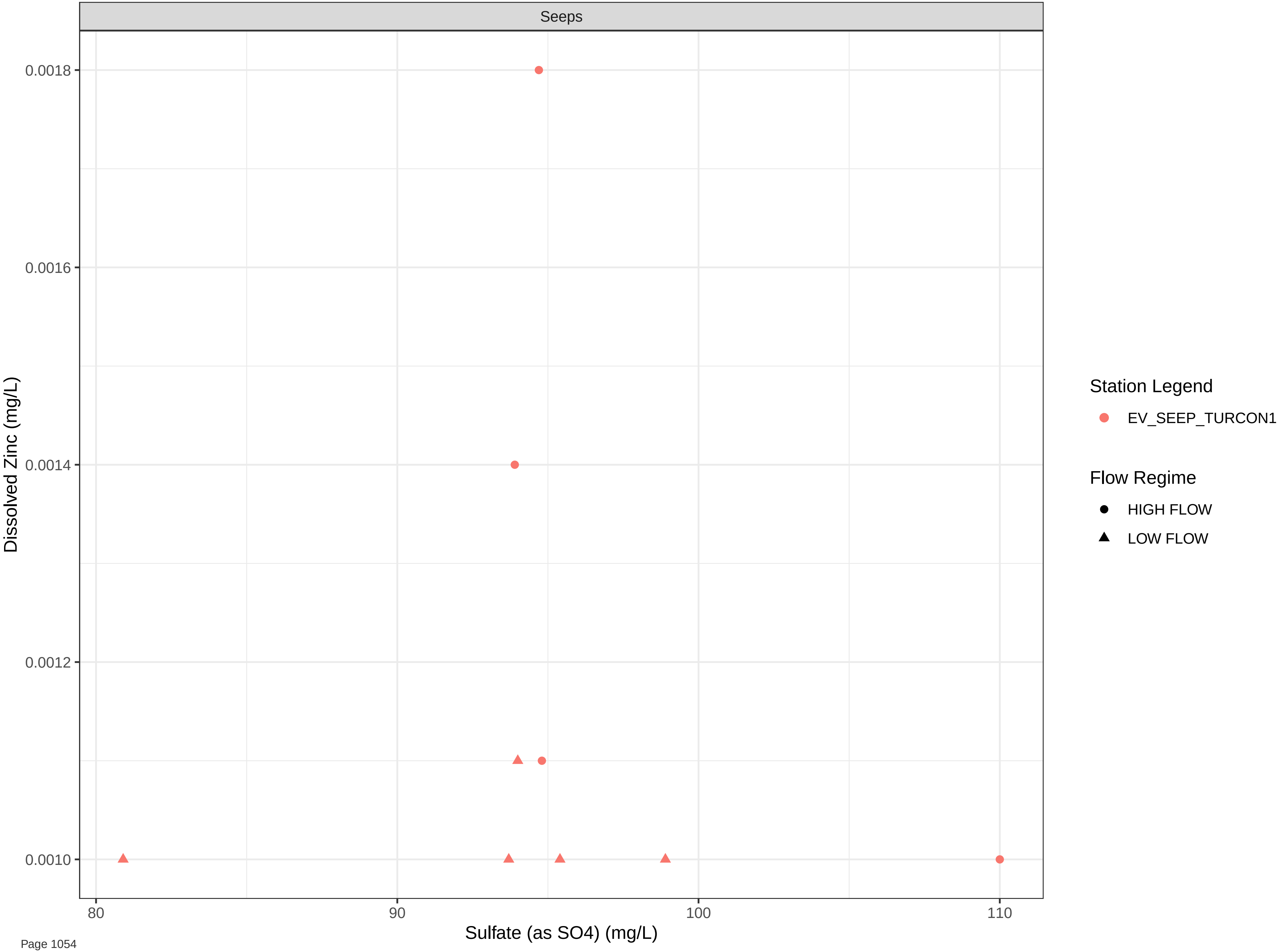
Comparison Point
Seeps
Dissolved Zinc (mg/L)
1.00
0.75
0.50
0.25
0.00
0
50
100
150
200
Sulfate (as SO4) (mg/L)
Station Legend
EV_OC1
EV_SEEP_PLANT1
EV_SEEP_PLANT11
Flow Regime
HIGH FLOW
LOW FLOW



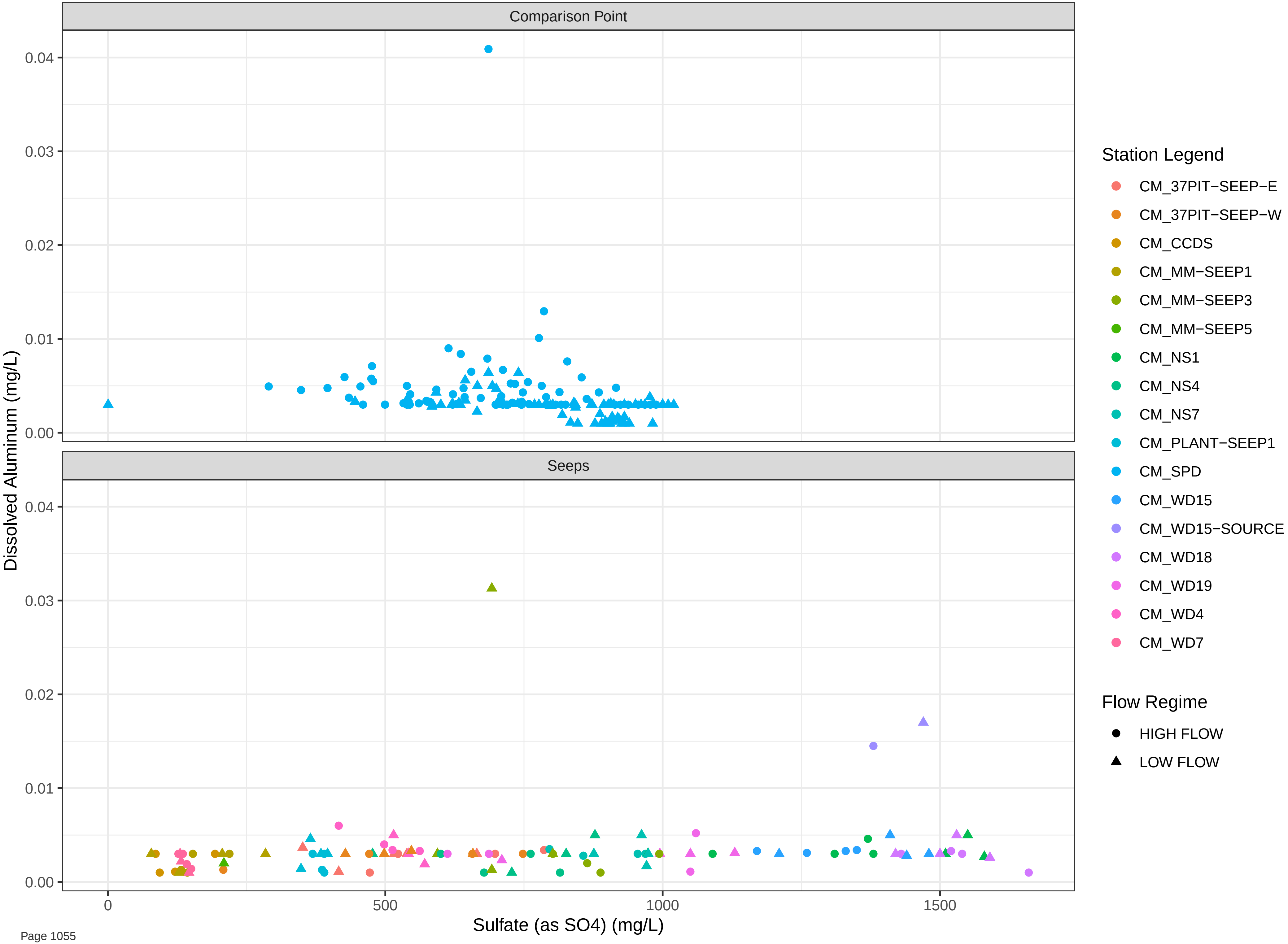
Seeps
Dissolved Zinc (mg/L)
0.03
0.02
0.01
0.00
400
600
800
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_PLANT10
Flow Regime
HIGH FLOW
LOW FLOW

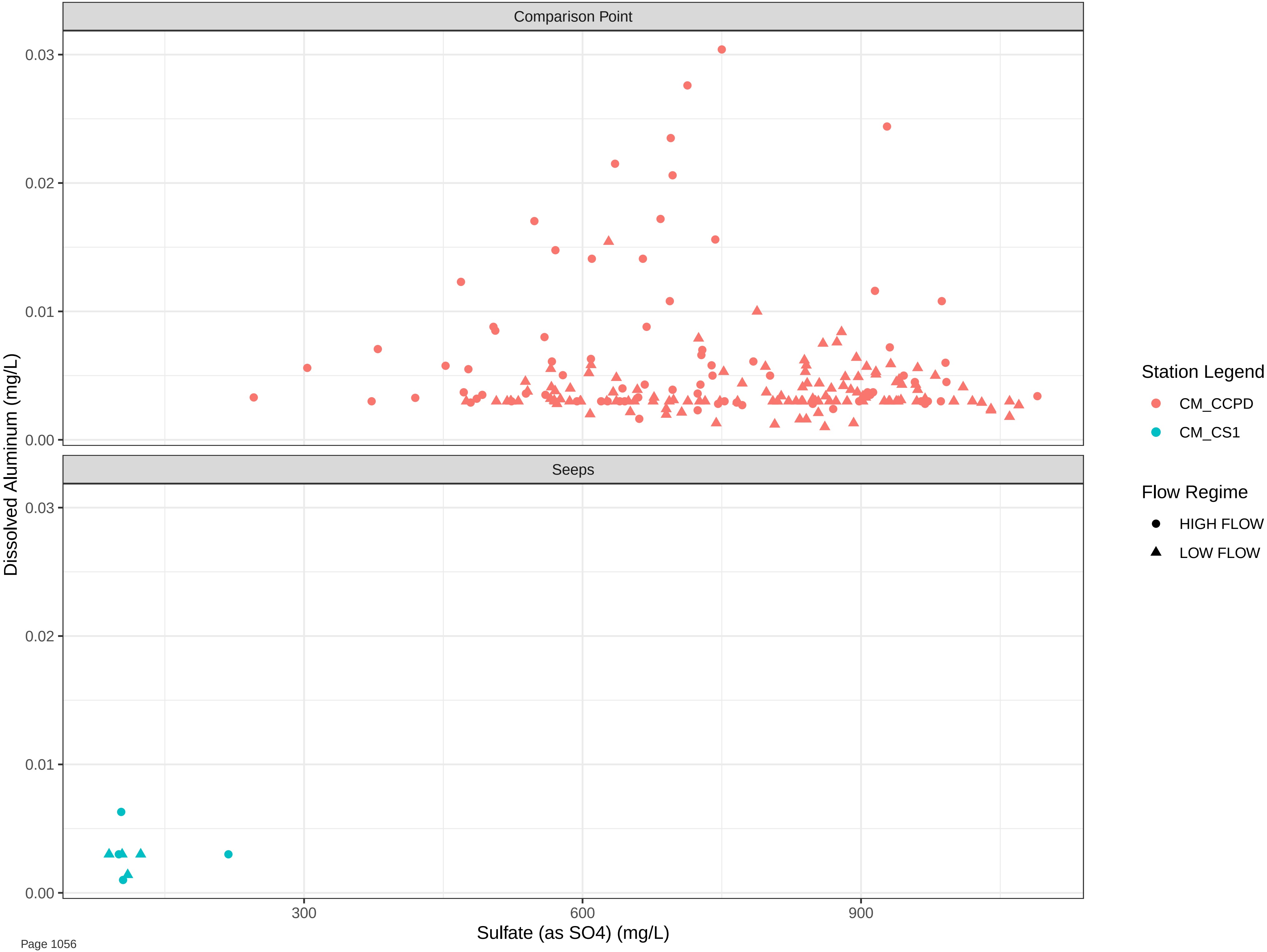

Comparison Point
Seeps
0.0025
0.0020
0.0015
0.0010
0
25
50
75
Dissolved Zinc (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT3
EV_SEEP_SOUTHPIT4
EV_TC1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.00
0.01
0.02
0.03
0.04
500
1000
1500
2000
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_SOUTHPIT6
EV_SP1
Flow Regime
HIGH FLOW
LOW FLOW

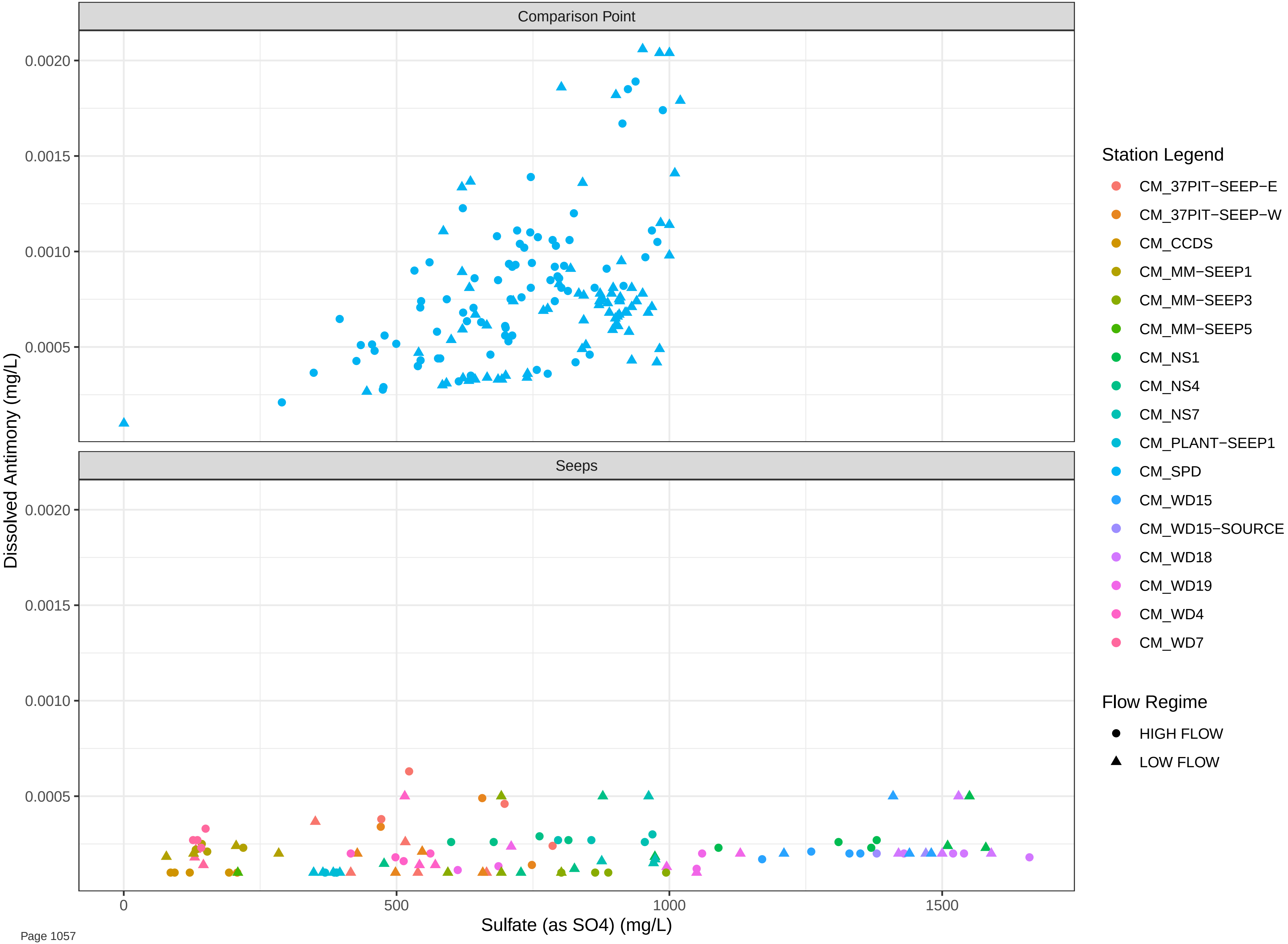


Seeps
0.0018
0.0016
0.0014
0.0012
0.0010
Dissolved Zinc (mg/L)
80
90
100
110
Sulfate (as SO4) (mg/L)
Station Legend
EV_SEEP_TURCON1
Flow Regime
HIGH FLOW
LOW FLOW

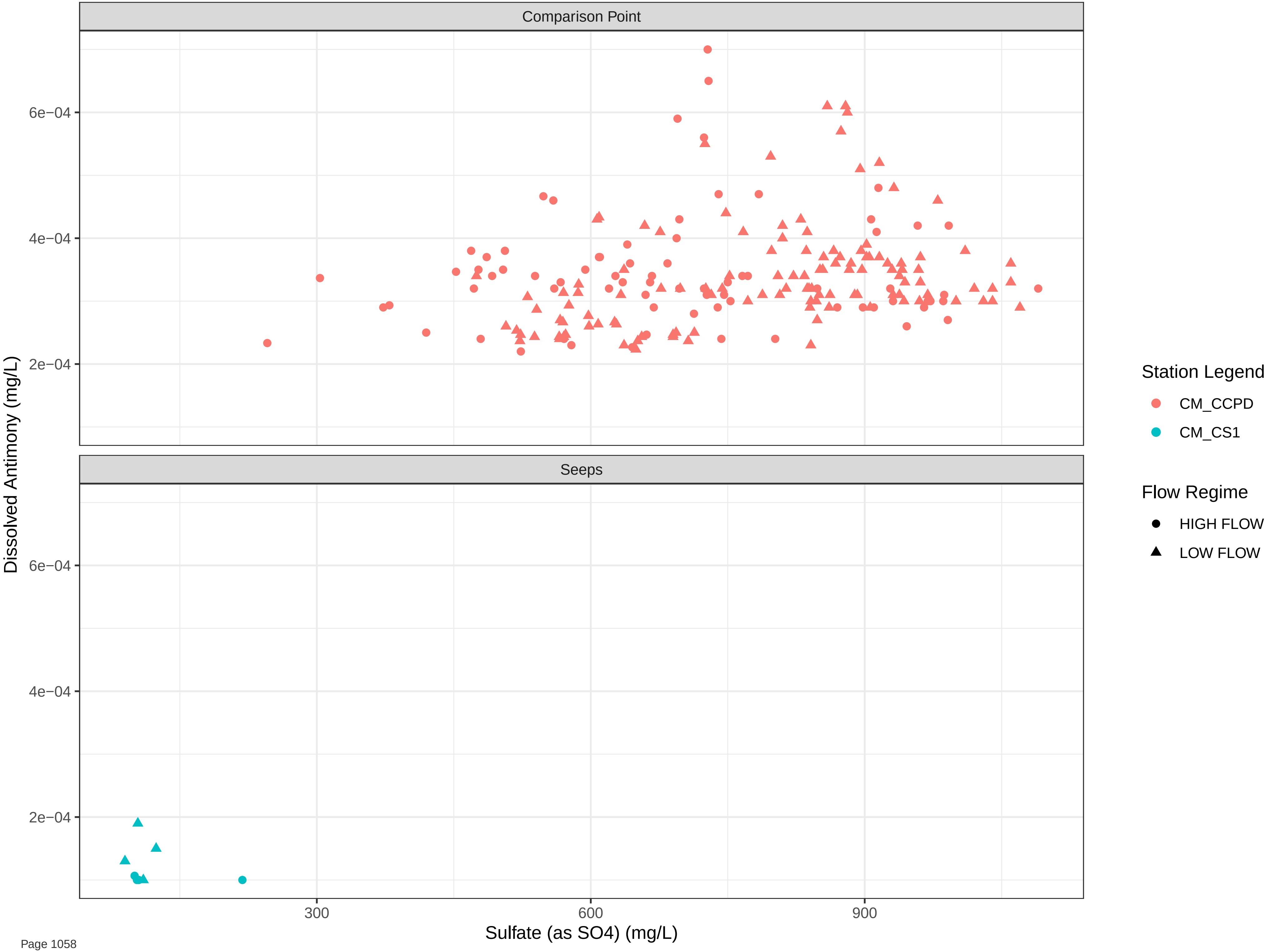

Comparison Point
Seeps
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
0.04
0.03
0.02
0.01
0.00
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



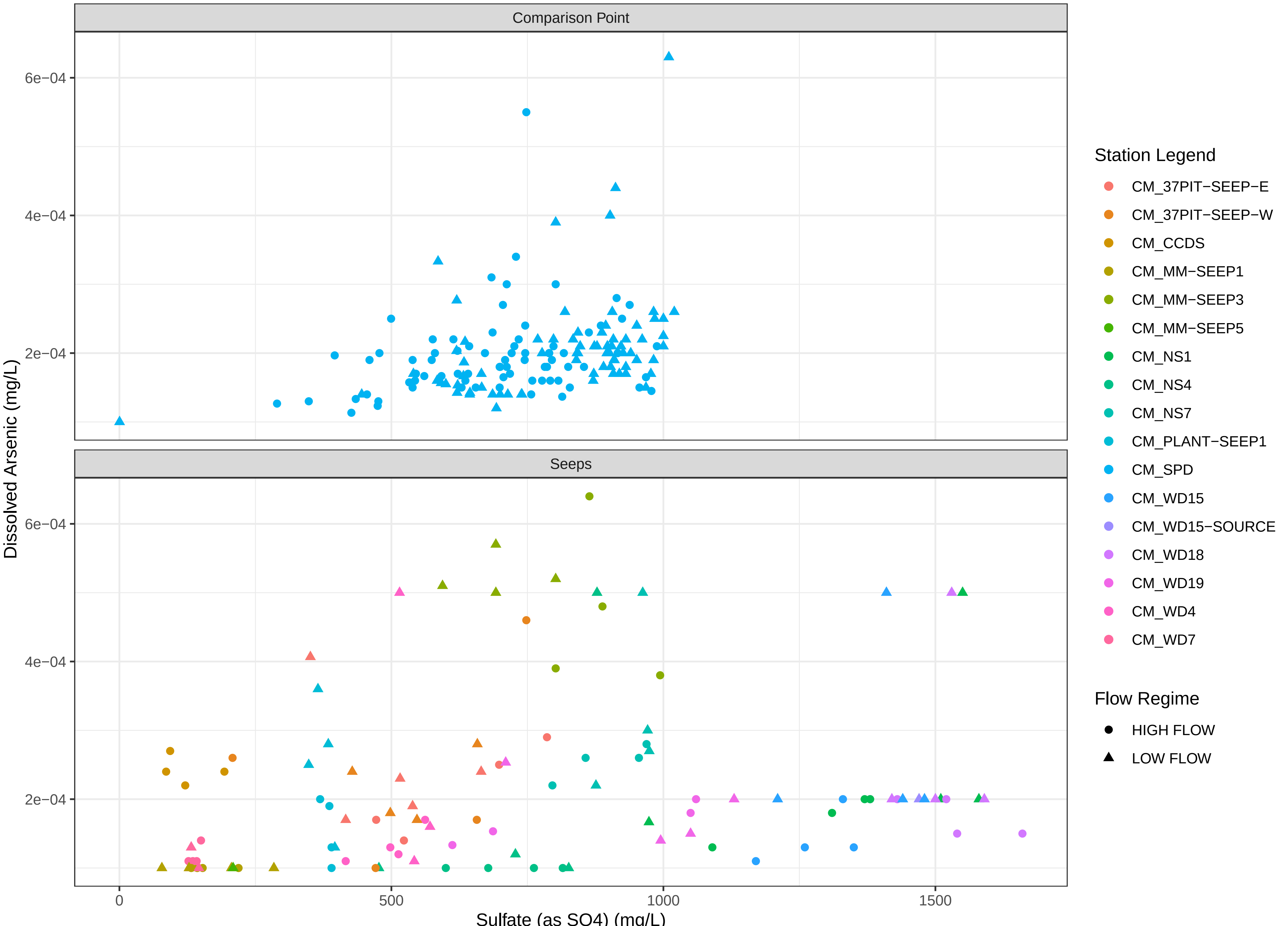
Comparison Point
Seeps
0.03
0.02
0.01
0.00
300
600
900
Dissolved Aluminum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

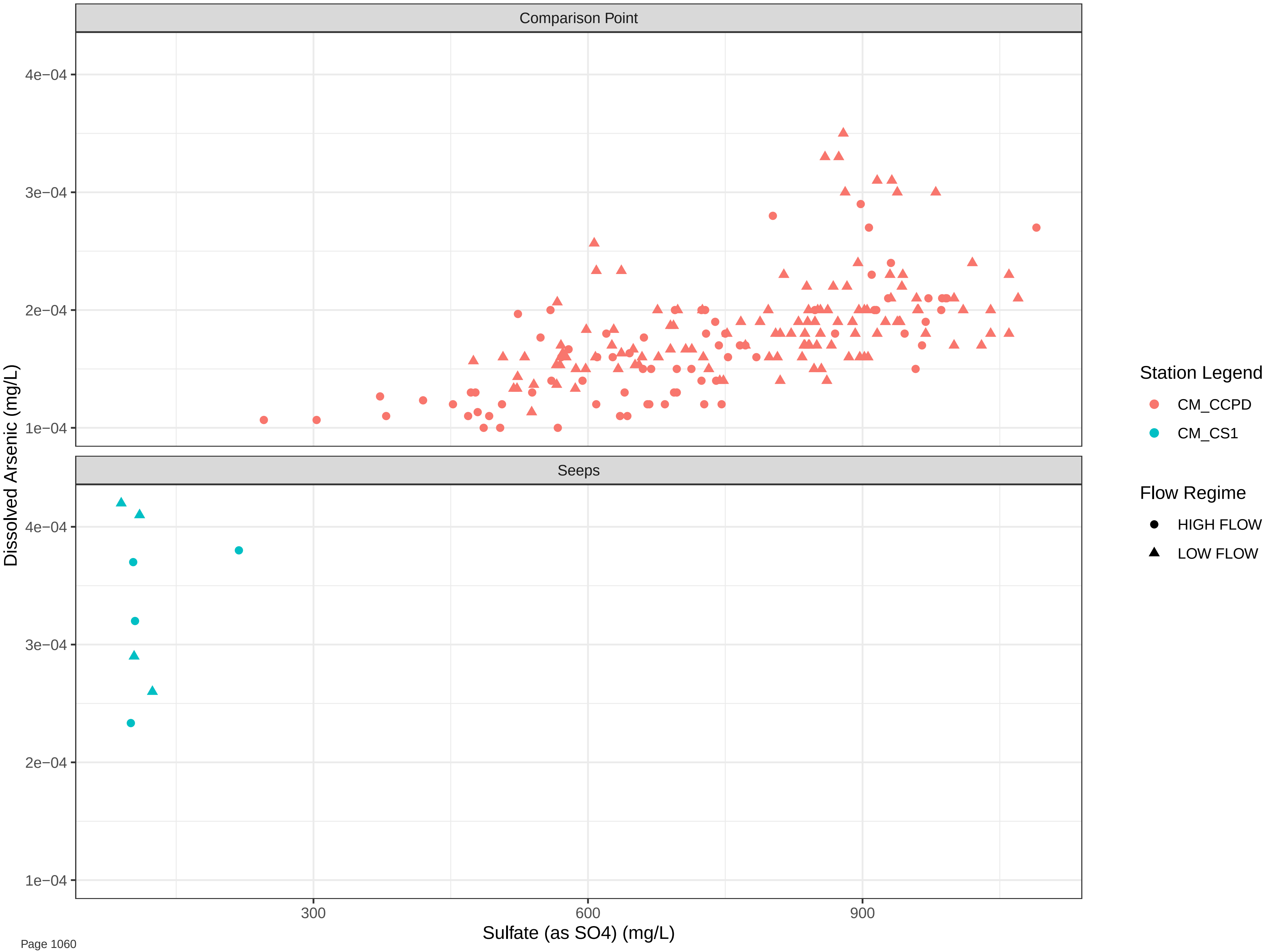


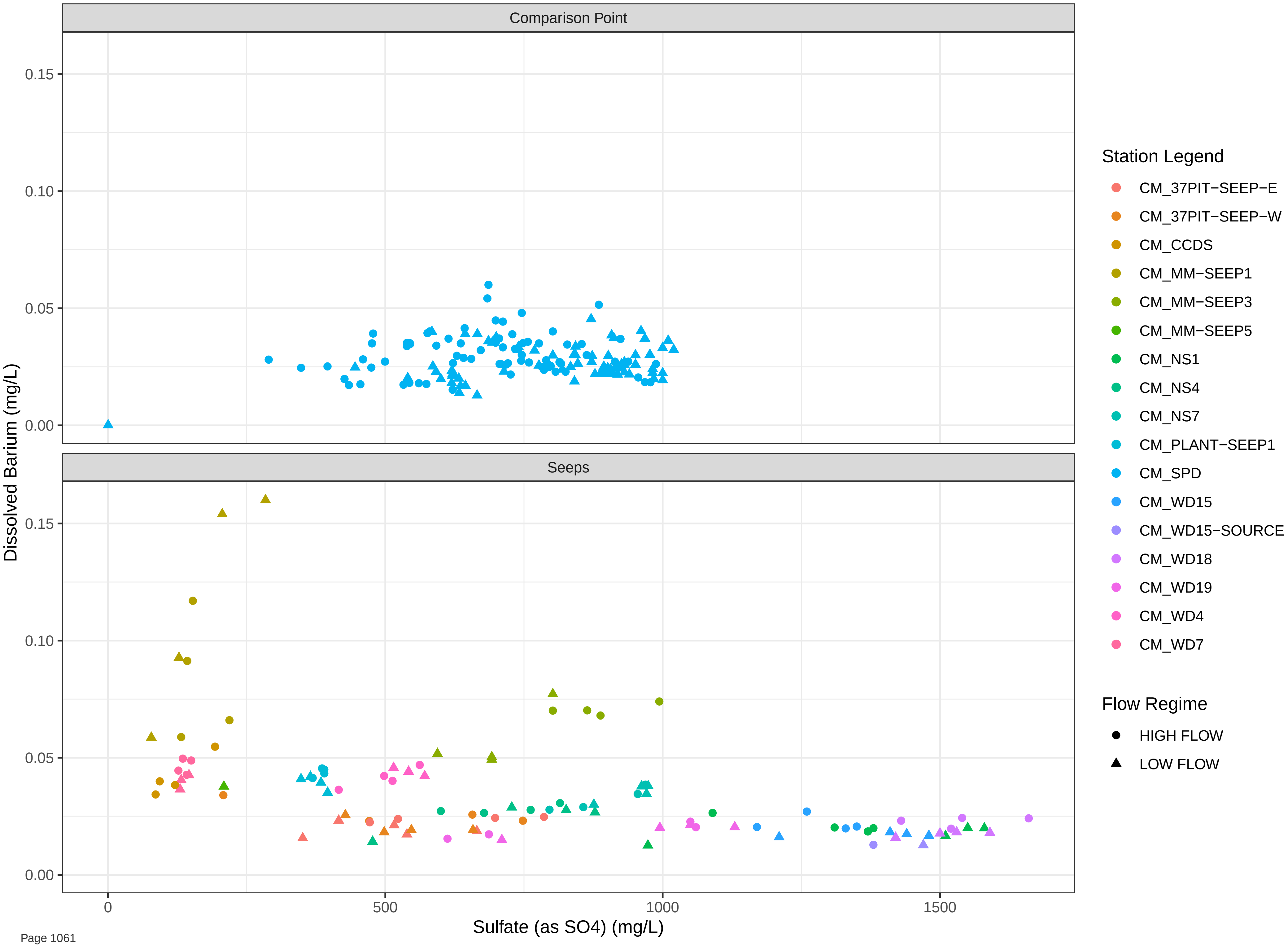
Comparison Point
Seeps
Dissolved Antimony (mg/L)
0.0020
0.0015
0.0010
0.0005
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

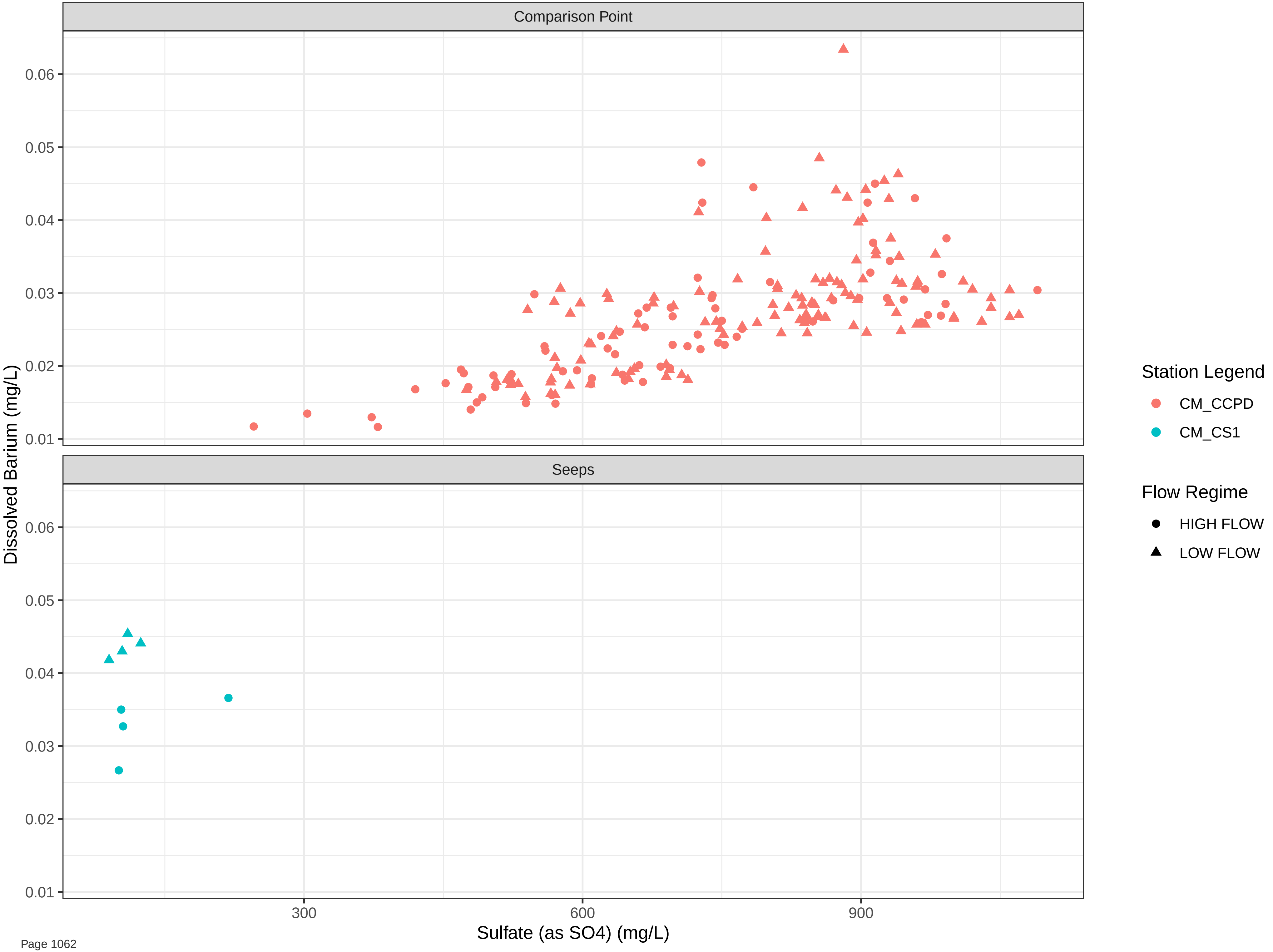


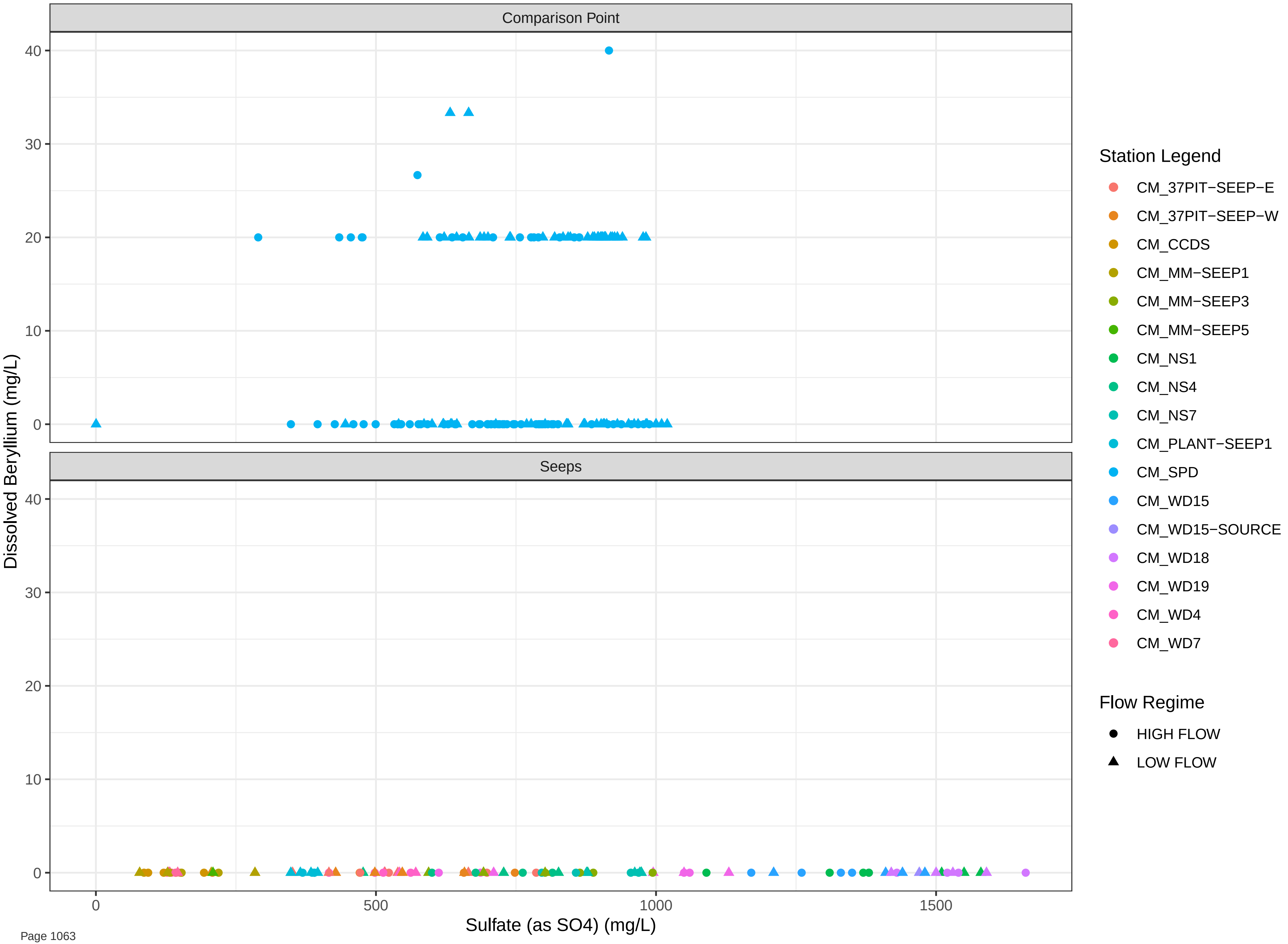
Comparison Point
Seeps
Dissolved Antimony (mg/L)
6e−04
4e−04
2e−04
6e−04
4e−04
2e−04
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Arsenic (mg/L)
6e−04
4e−04
2e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

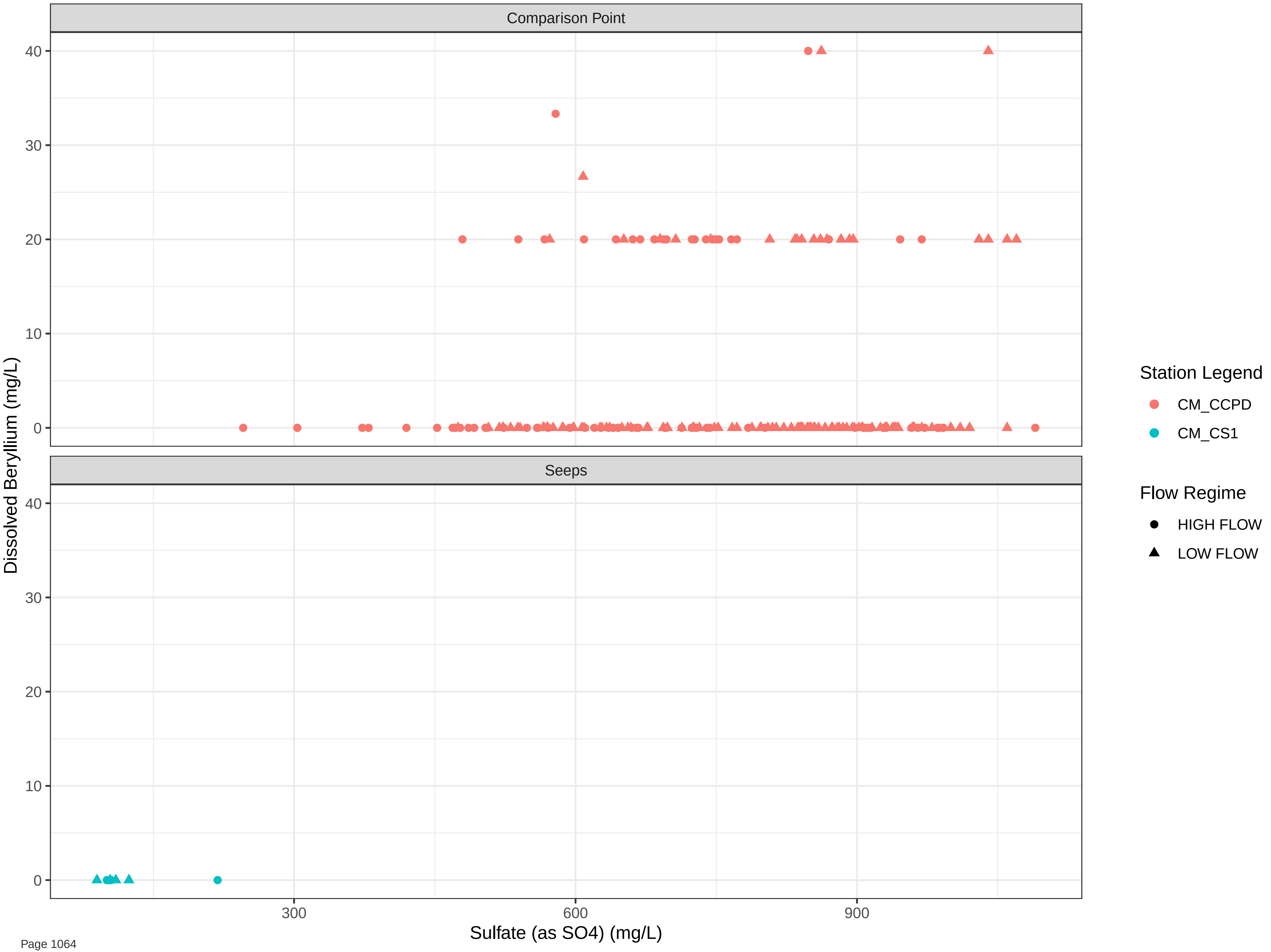

Comparison Point
Seeps
4e−04
3e−04
2e−04
1e−04
300
600
900
Dissolved Arsenic (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Barium (mg/L)
0.00
0.05
0.10
0.15
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

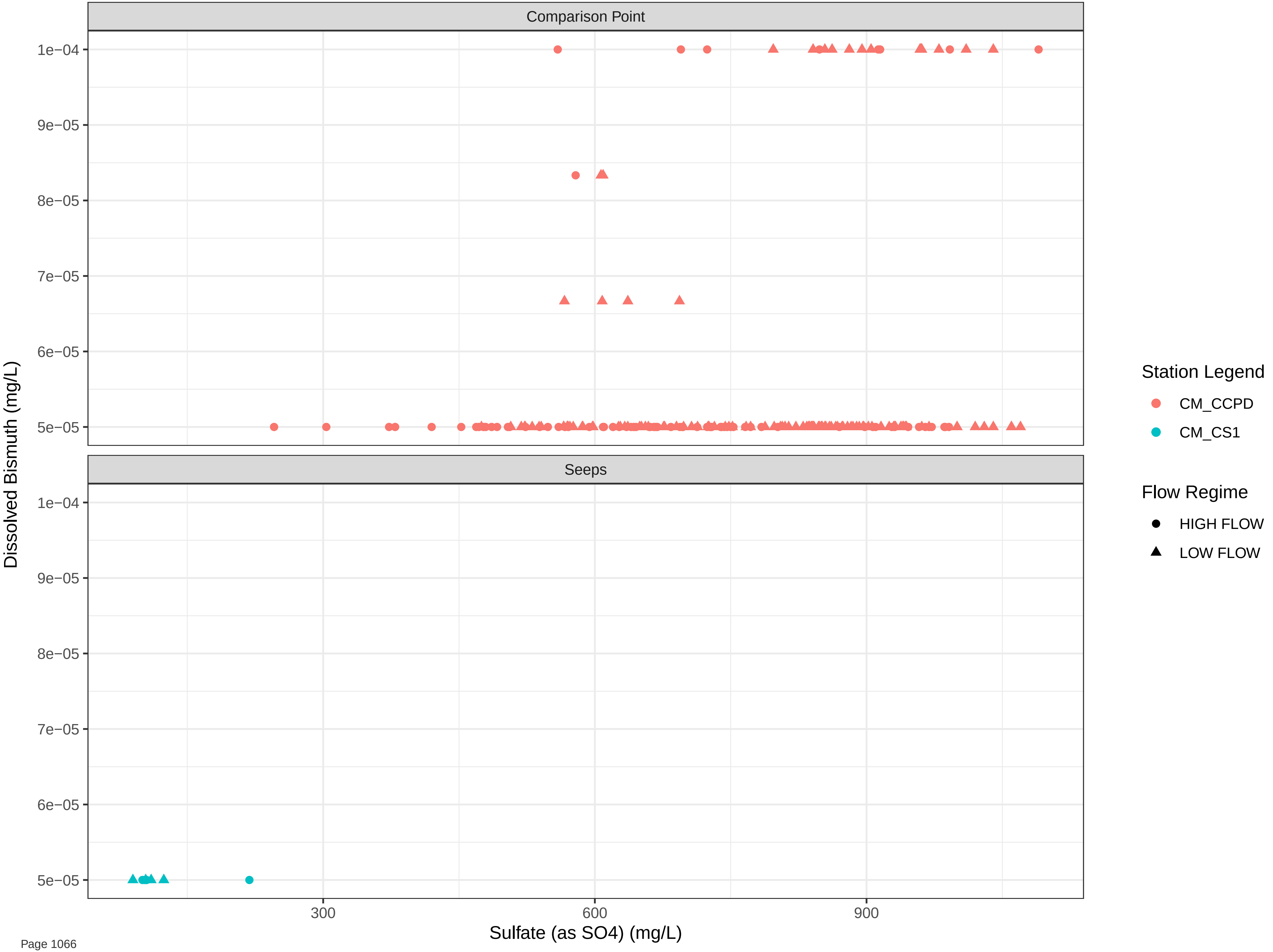

Comparison Point
Seeps
Dissolved Barium (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
Sulfate (as SO4) (mg/L)
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

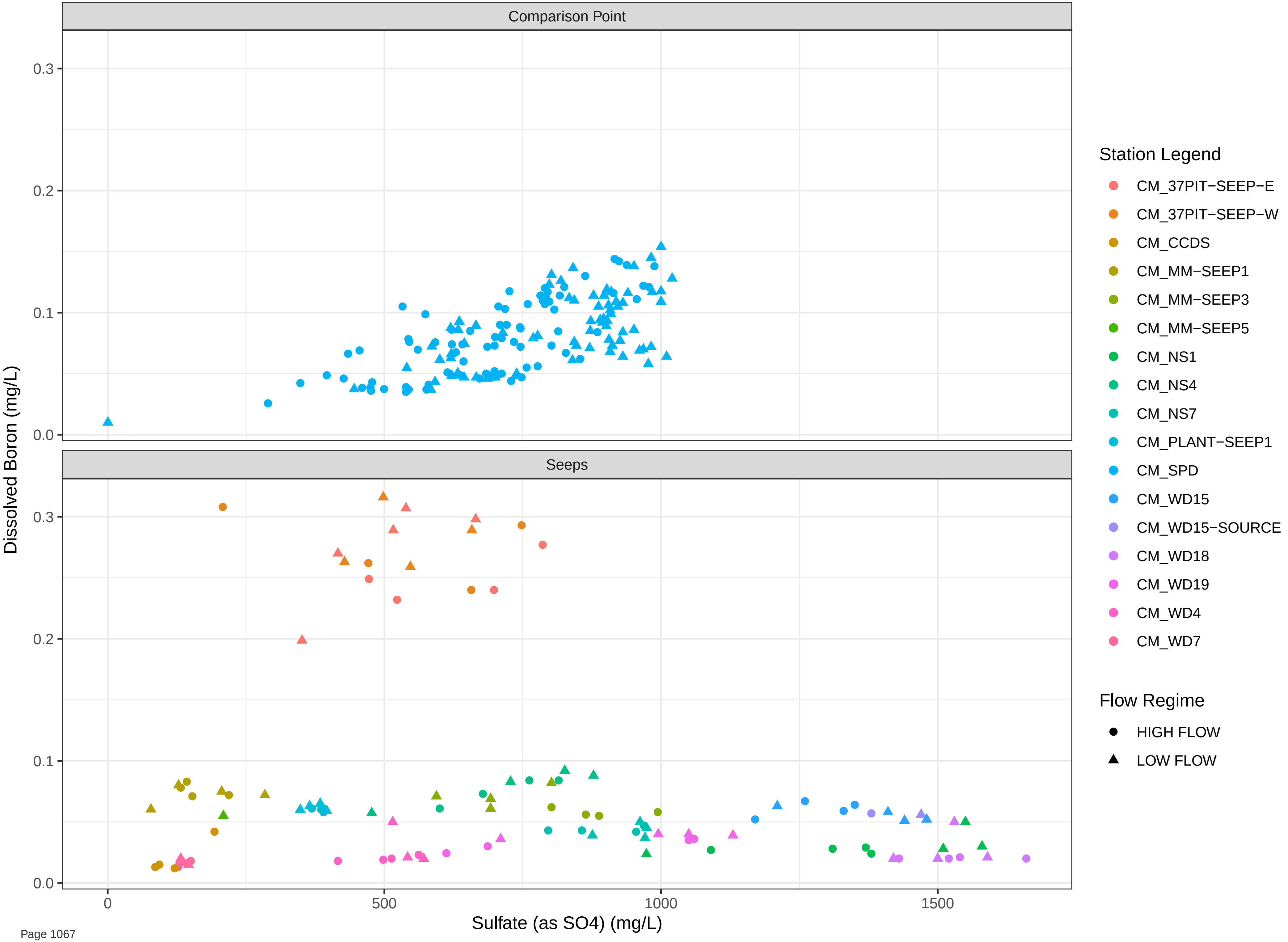


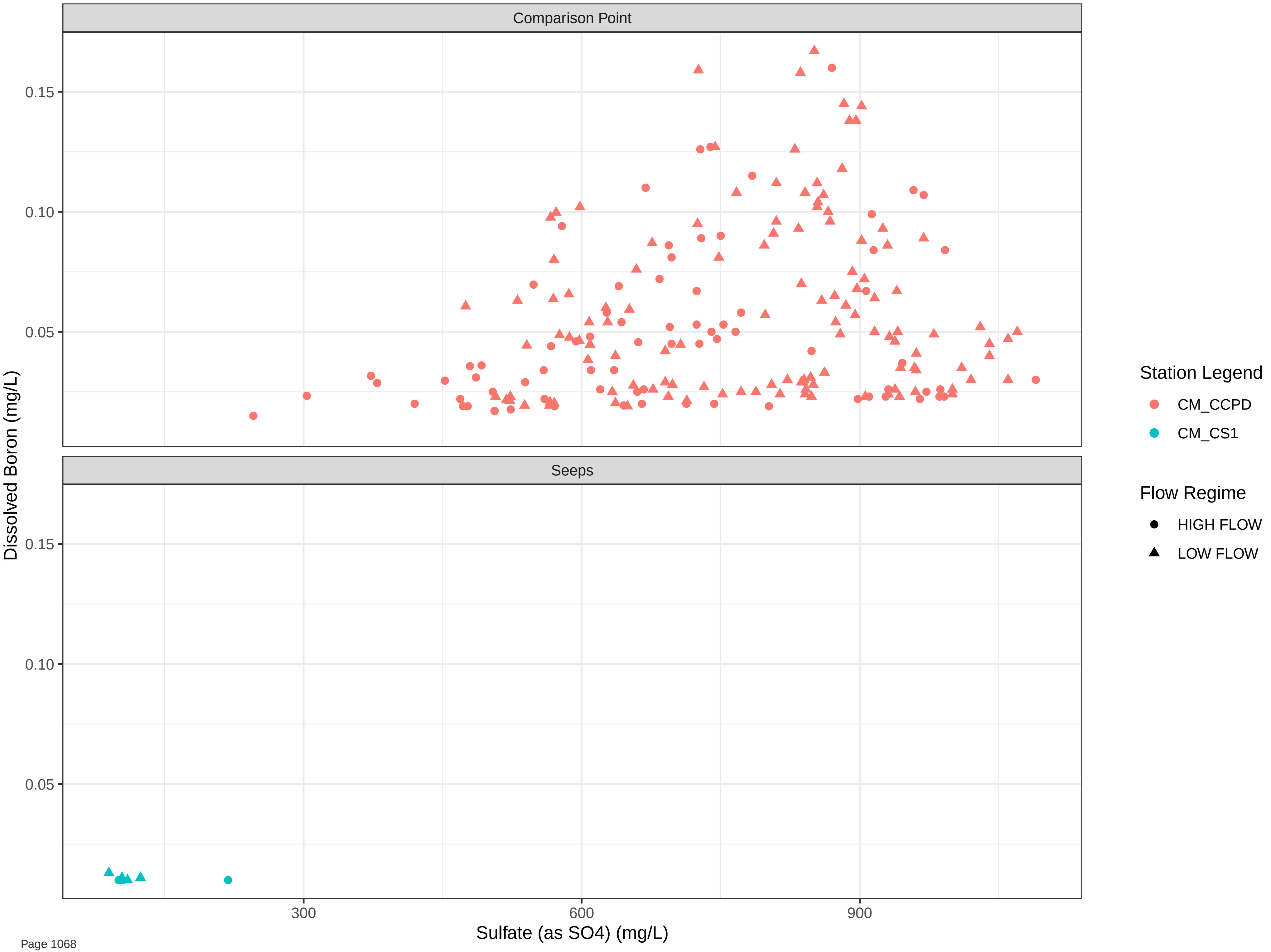
Comparison Point
Seeps
Dissolved Beryllium (mg/L)
40
30
20
10
0
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Beryllium (mg/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
40
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

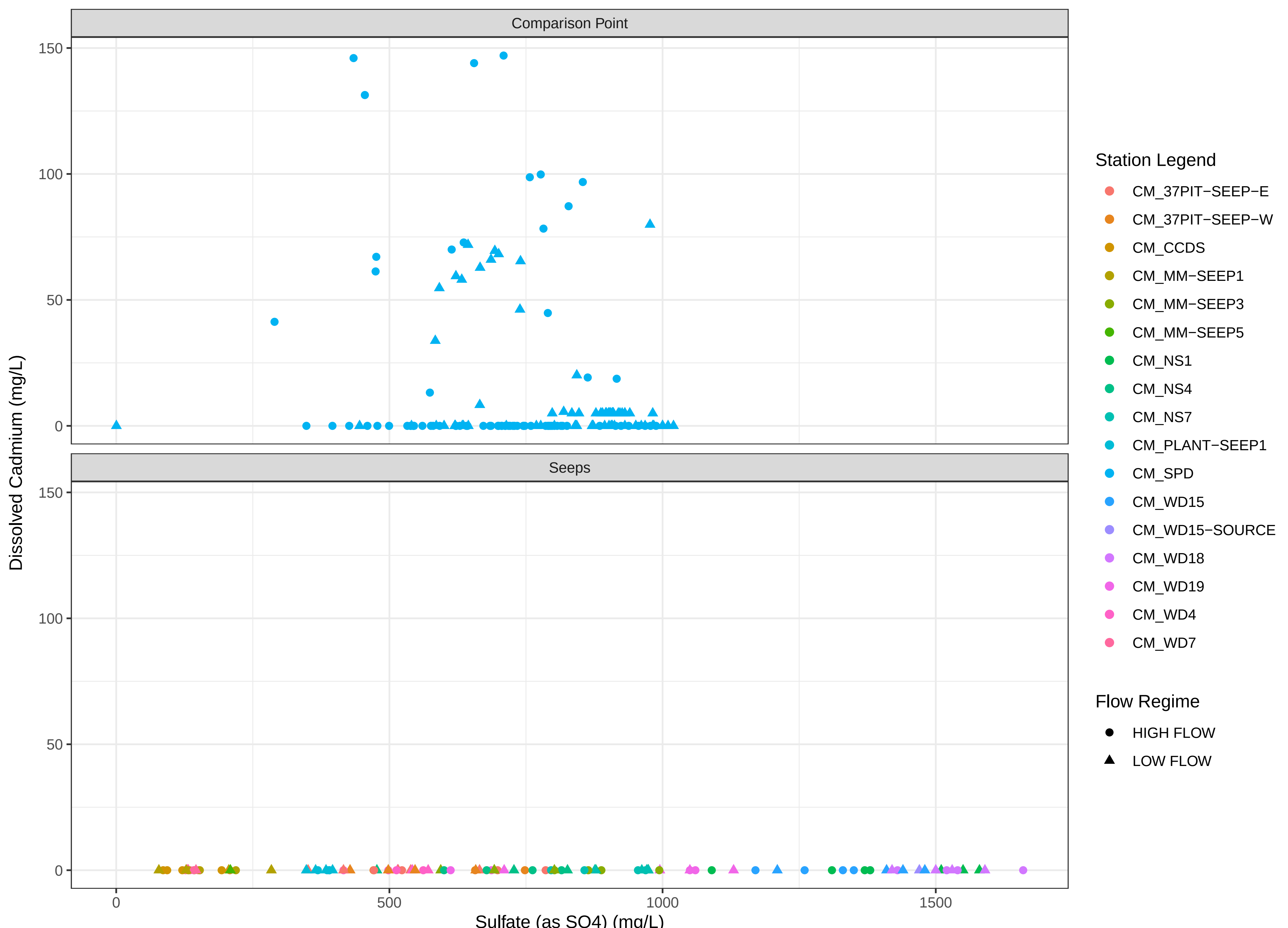
Comparison Point
Seeps
Dissolved Bismuth (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
1e−04
9e−05
8e−05
7e−05
6e−05
5e−05
300
600
900
Dissolved Bismuth (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

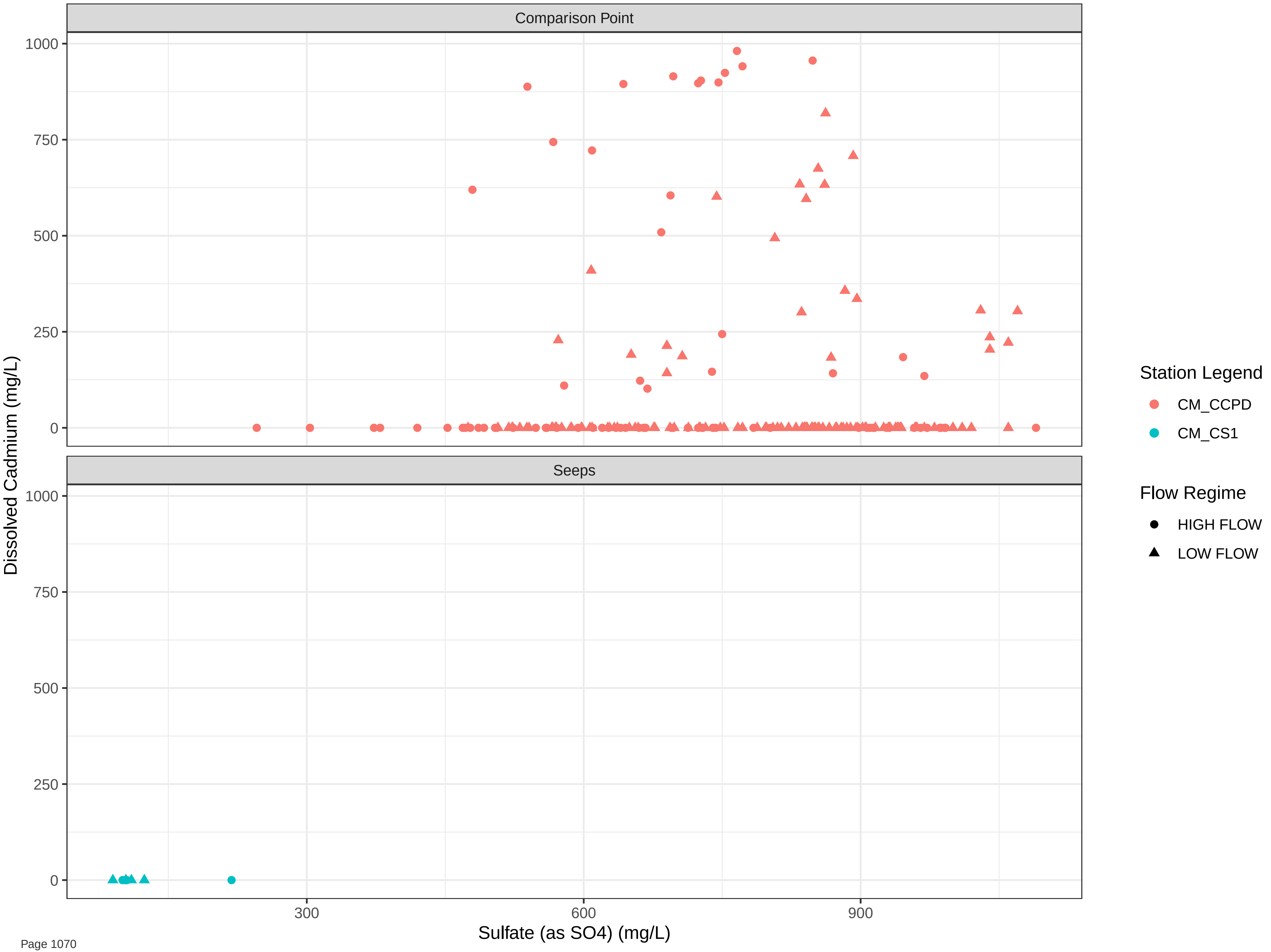

Comparison Point
Seeps
Dissolved Boron (mg/L)
Sulfate (as SO4) (mg/L)
0.0
0.1
0.2
0.3
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



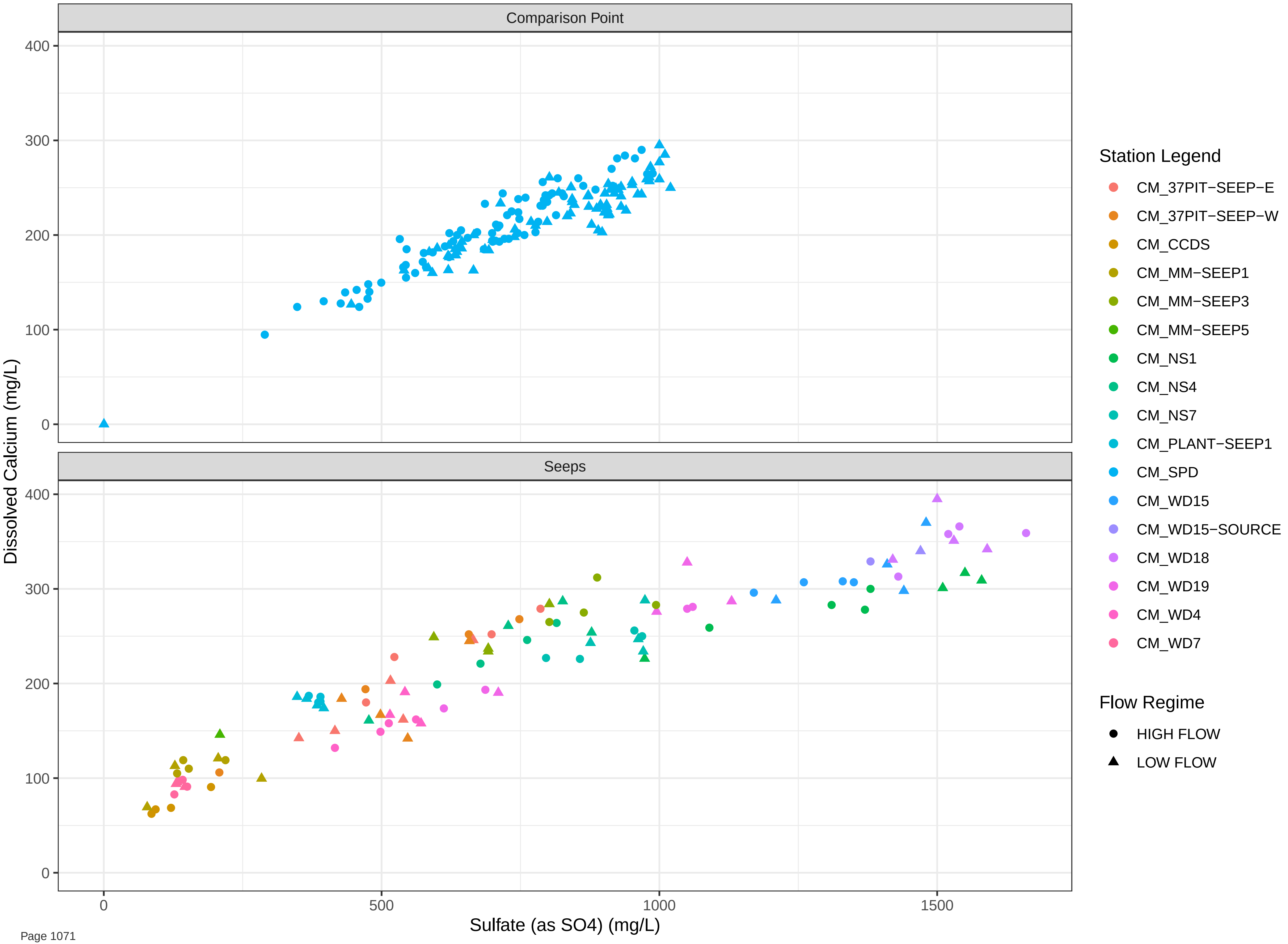
Comparison Point
Seeps
0.15
0.10
0.05
Dissolved Boron (mg/L)
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

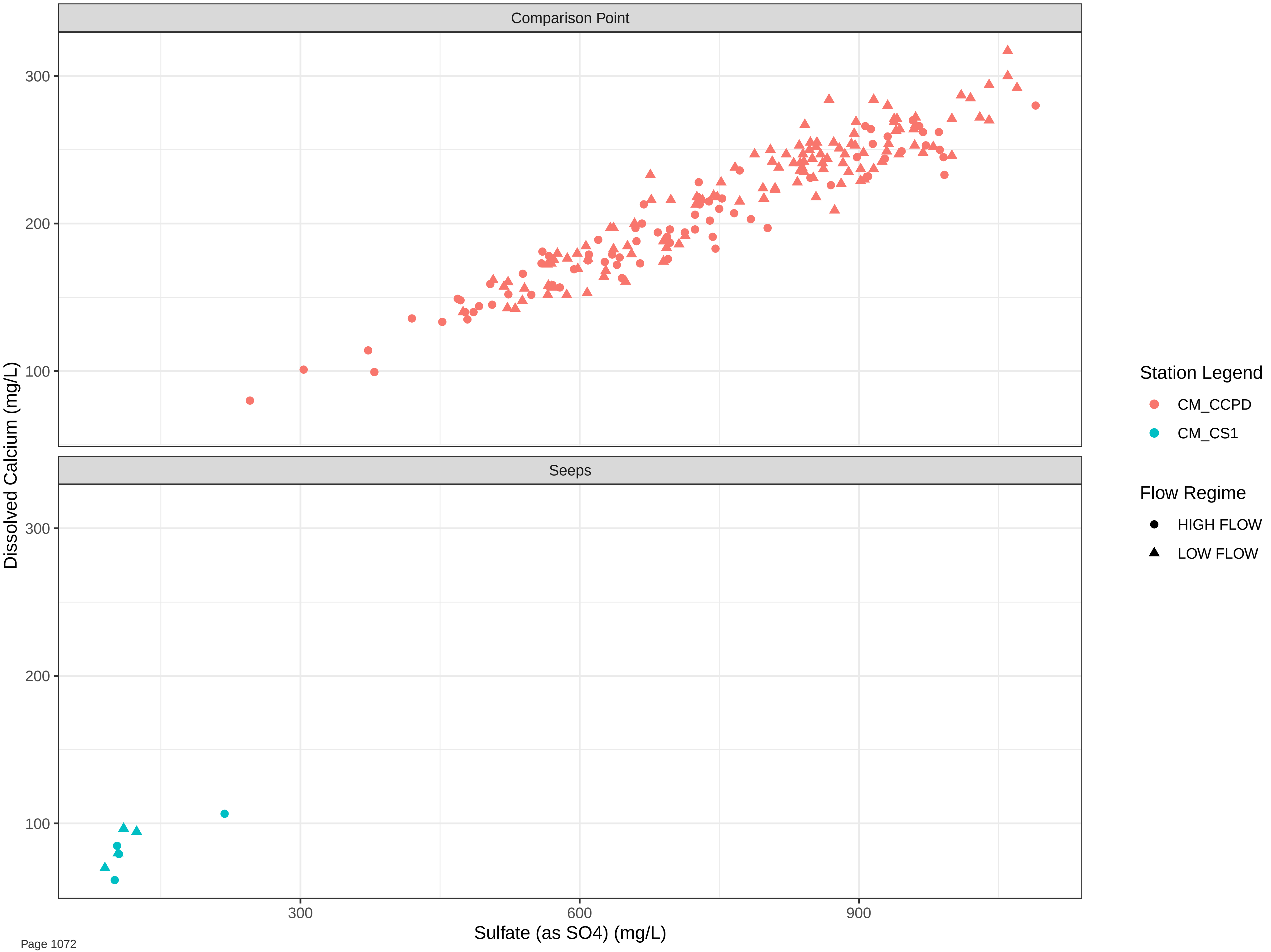


Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
150
100
50
0
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

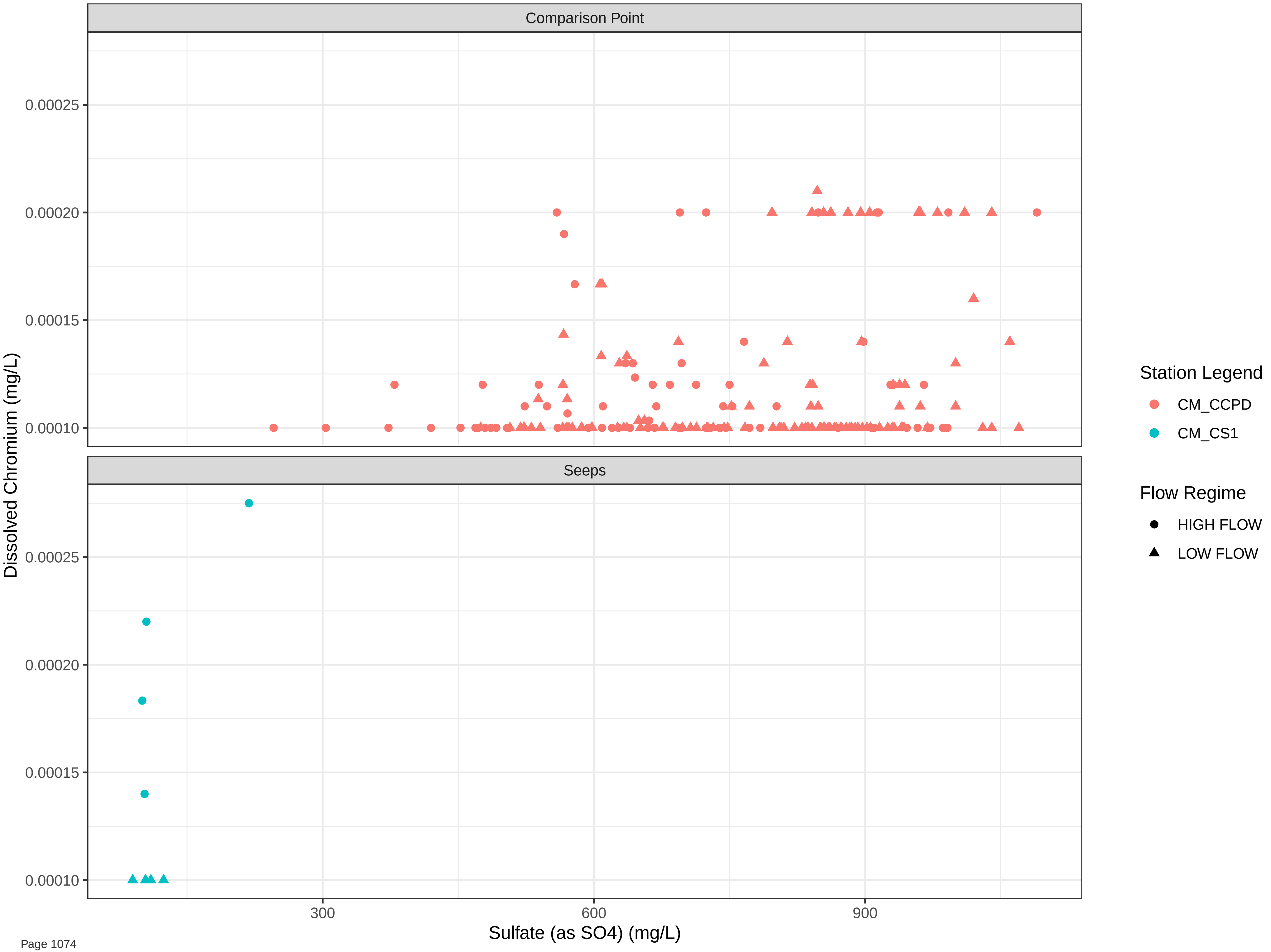


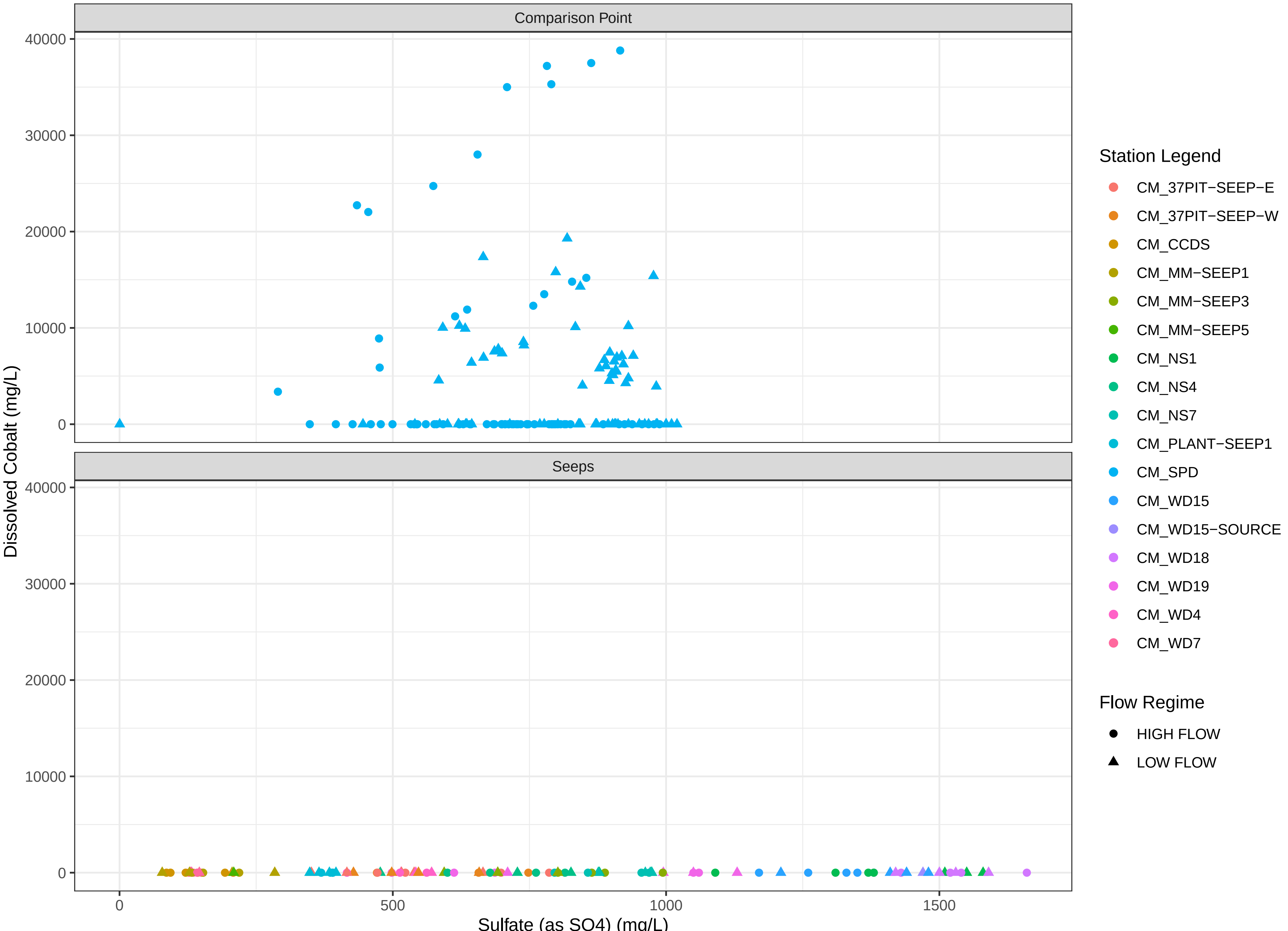
Comparison Point
Seeps
Dissolved Cadmium (mg/L)
Sulfate (as SO4) (mg/L)
1000
750
500
250
0
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Calcium (mg/L)
Sulfate (as SO4) (mg/L)
0
100
200
300
400
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

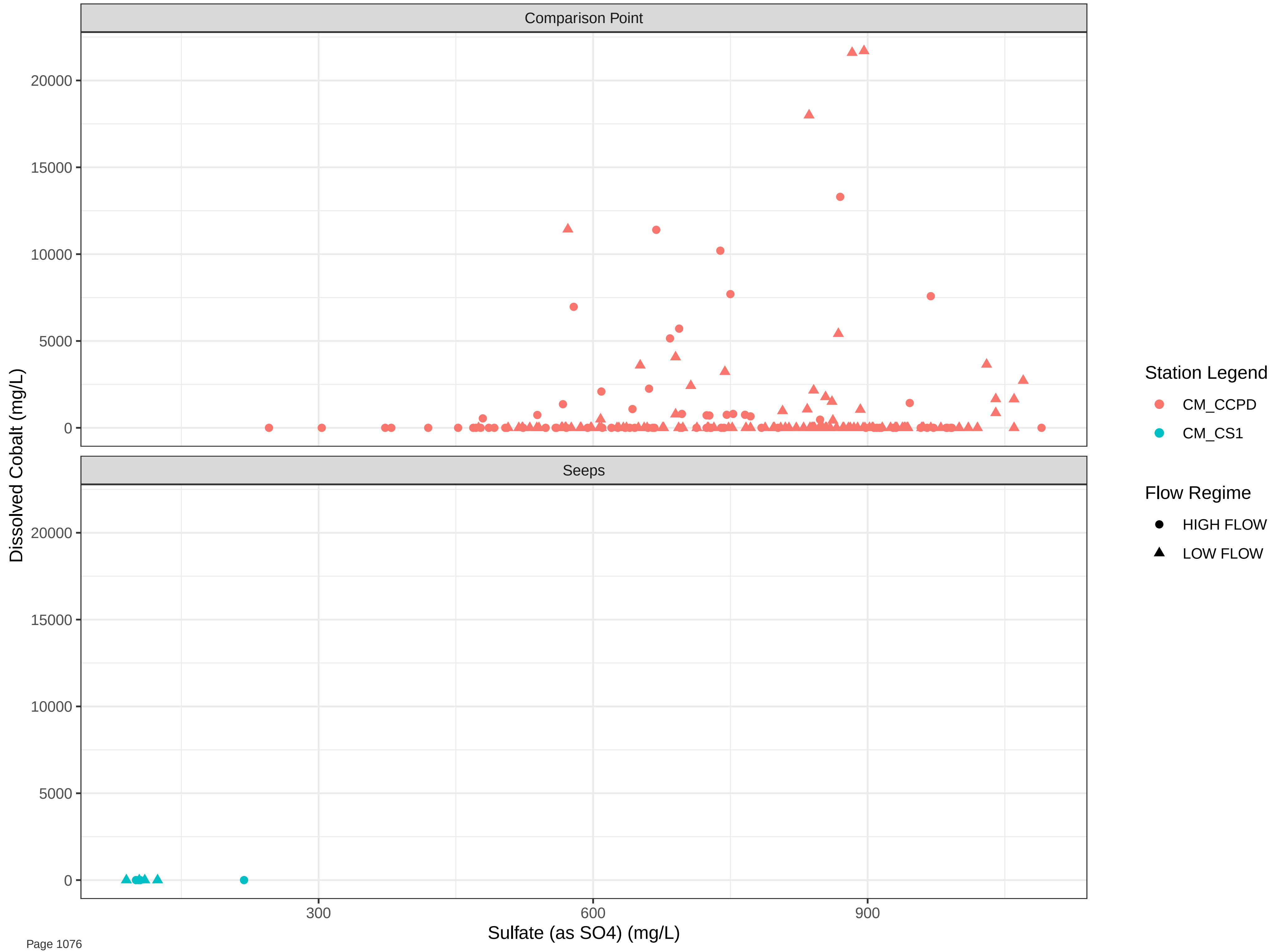

Comparison Point
Seeps
Dissolved Calcium (mg/L)
100
200
300
Sulfate (as SO4) (mg/L)
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
6e−04
4e−04
2e−04
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

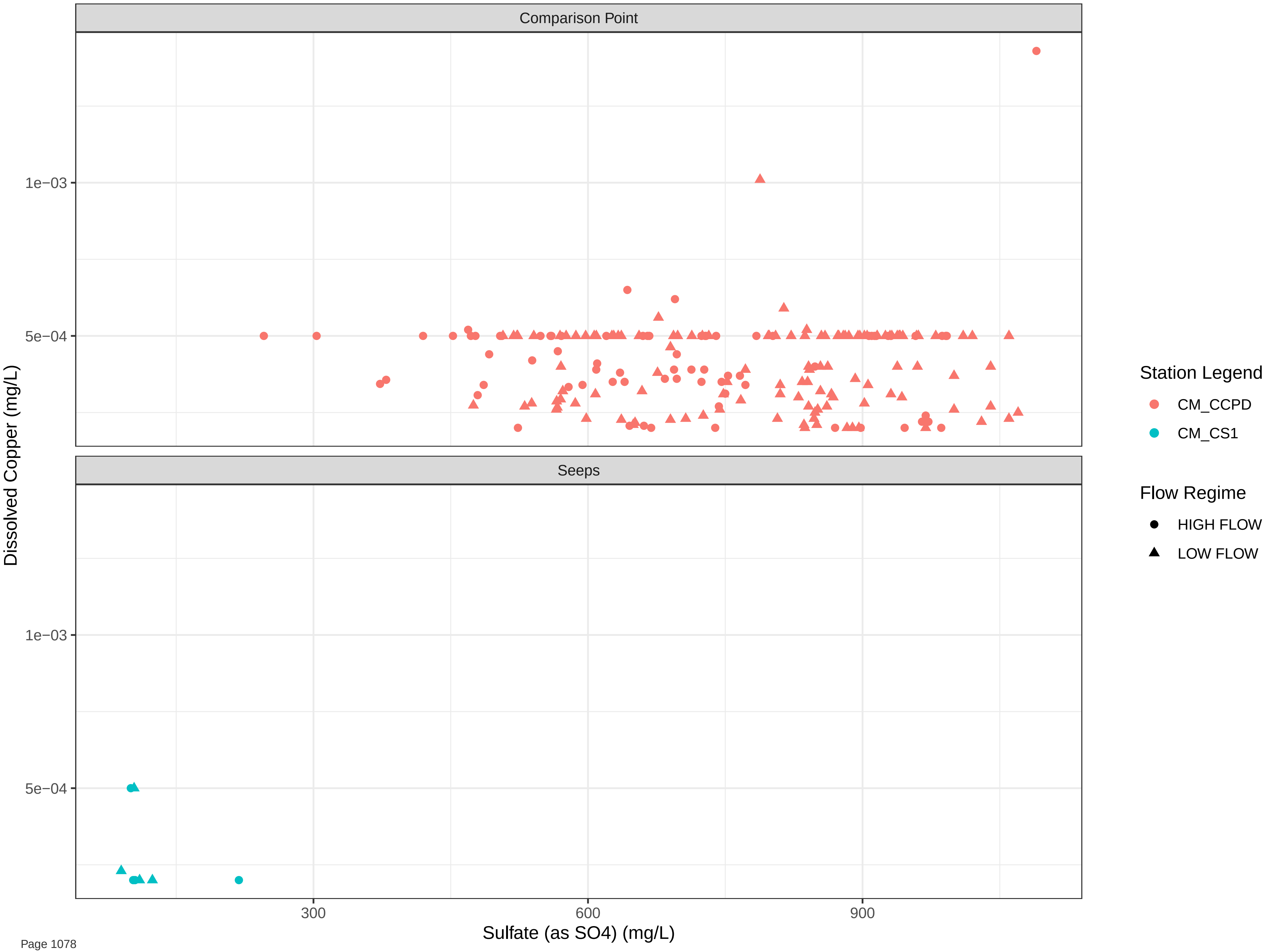

Comparison Point
Seeps
0.00025
0.00020
0.00015
0.00010
300
600
900
Dissolved Chromium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

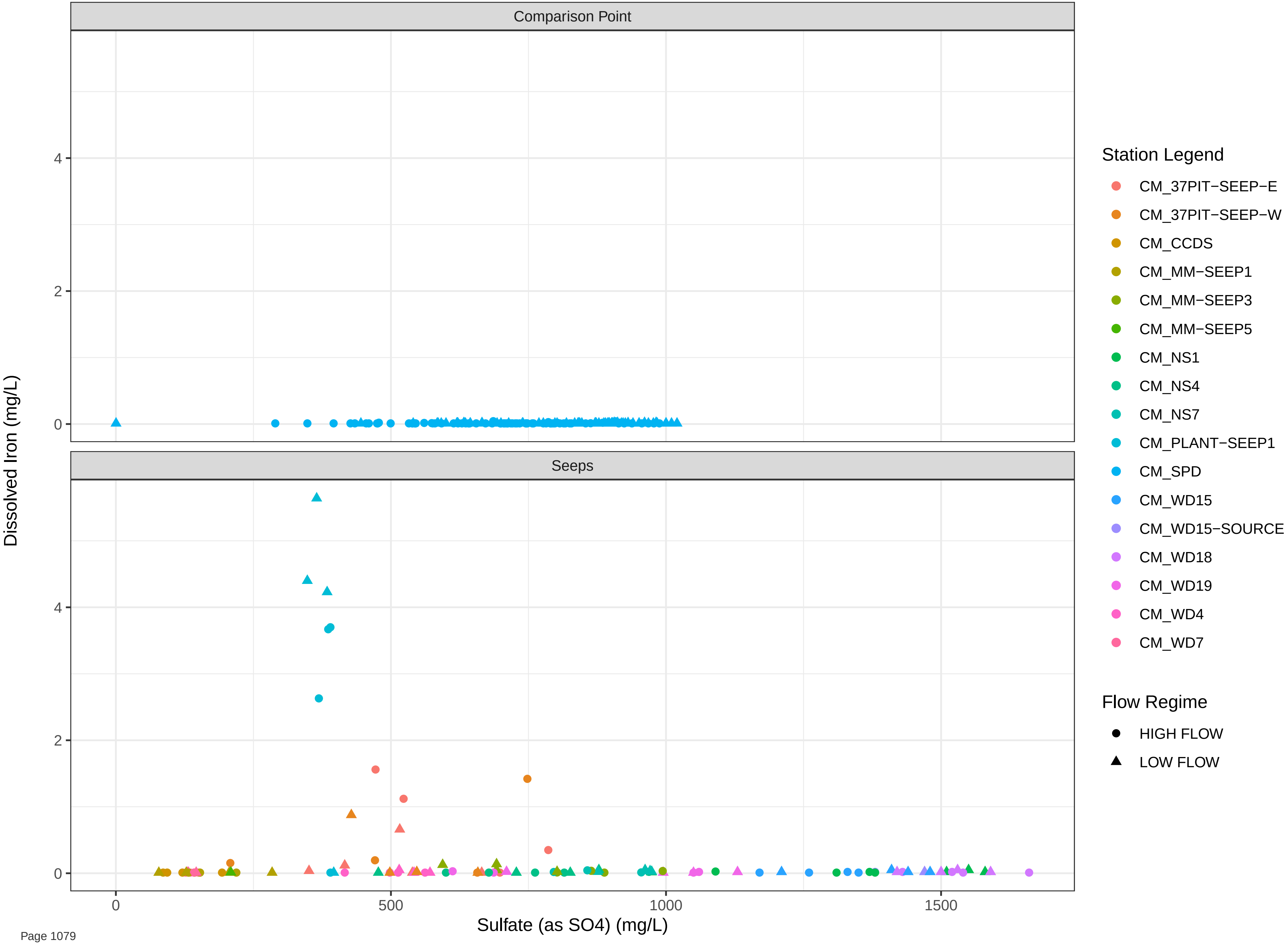


Comparison Point
Seeps
Dissolved Cobalt (mg/L)
40000
30000
20000
10000
0
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

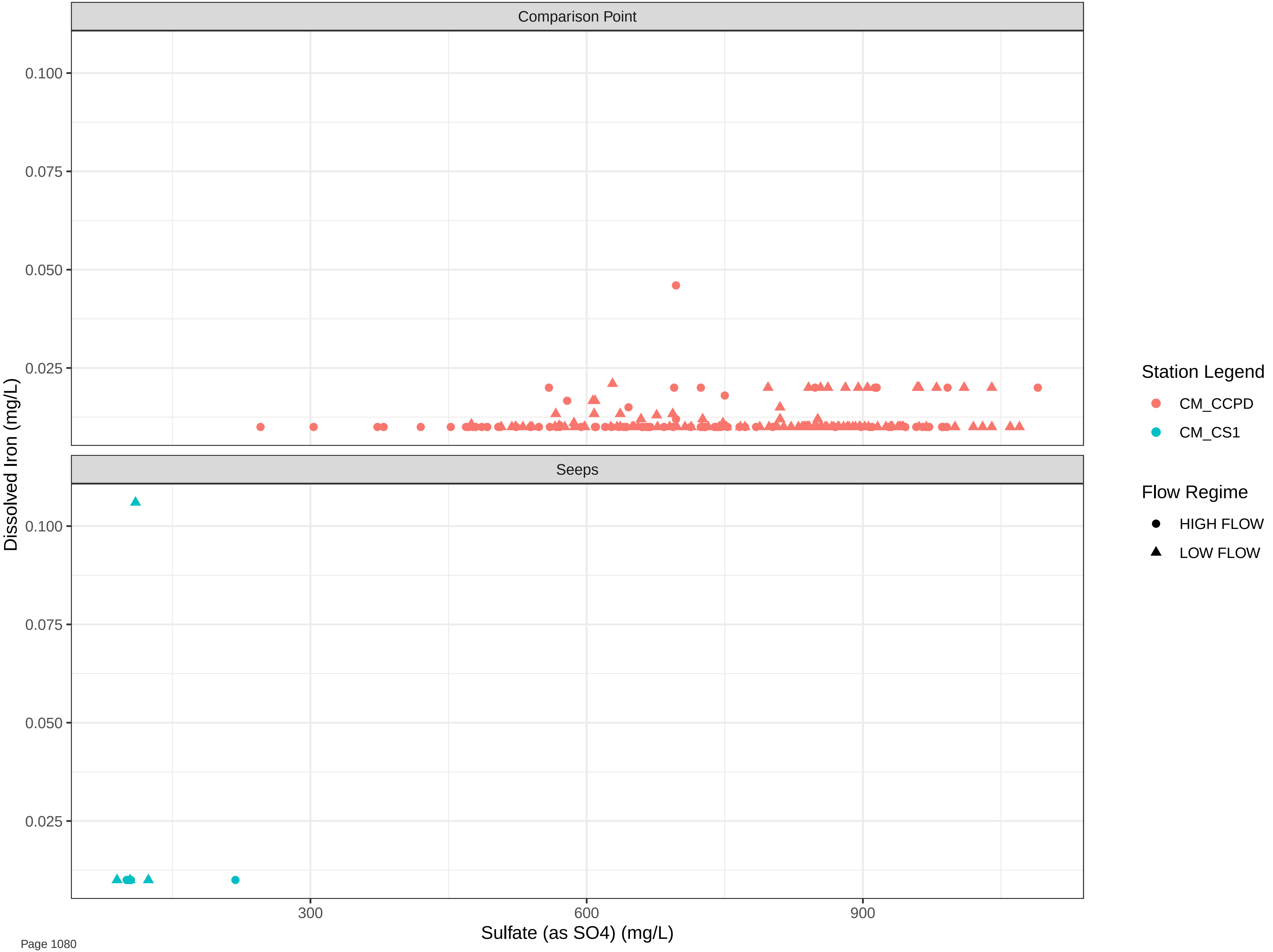

Comparison Point
Seeps
Dissolved Cobalt (mg/L)
Sulfate (as SO4) (mg/L)
20000
15000
10000
5000
0
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Copper (mg/L)
9e−04
6e−04
3e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
1e−03
5e−04
300
600
900
Sulfate (as SO4) (mg/L)
Dissolved Copper (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

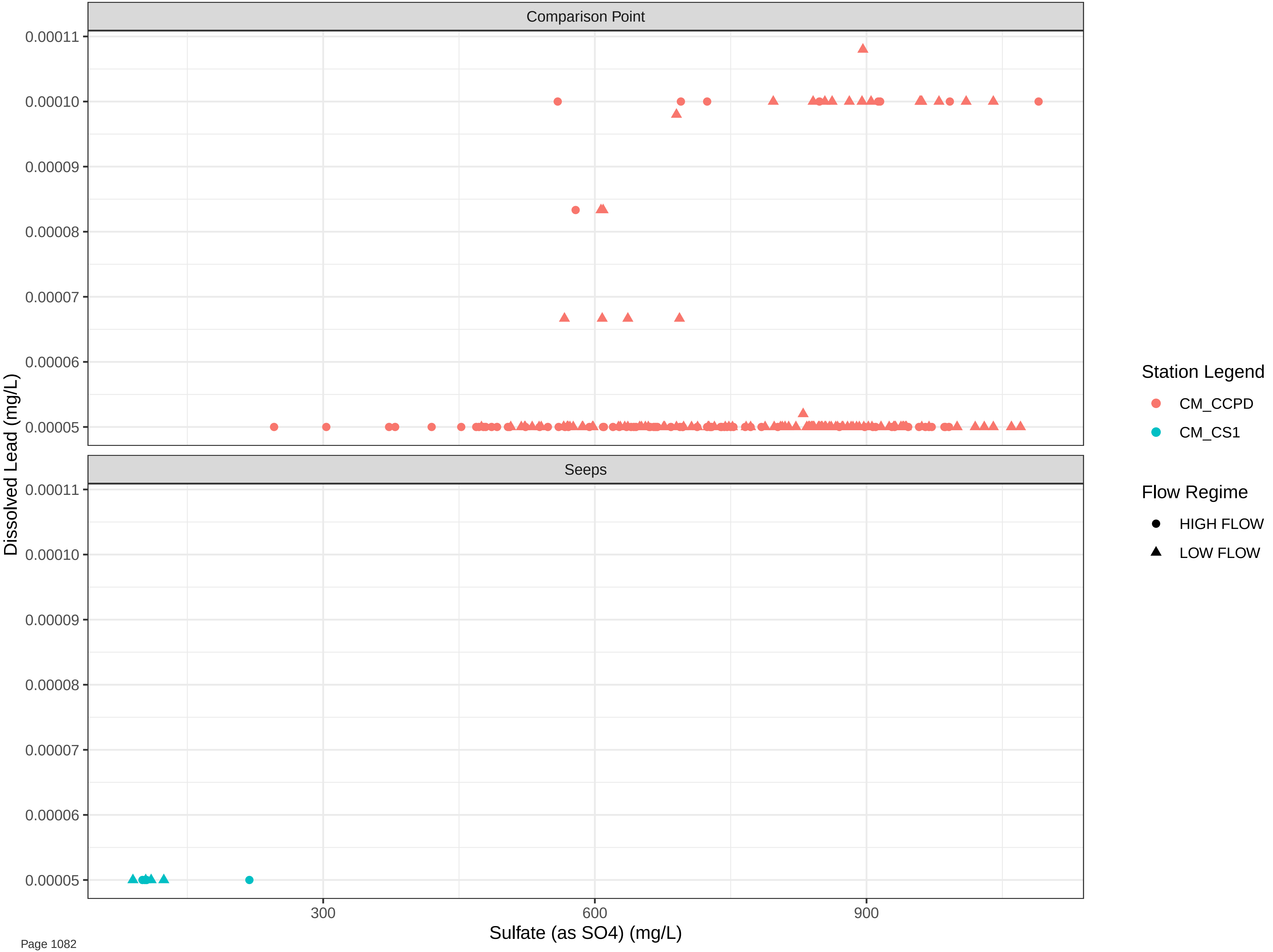


Comparison Point
Seeps
Dissolved Iron (mg/L)
0
2
4
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

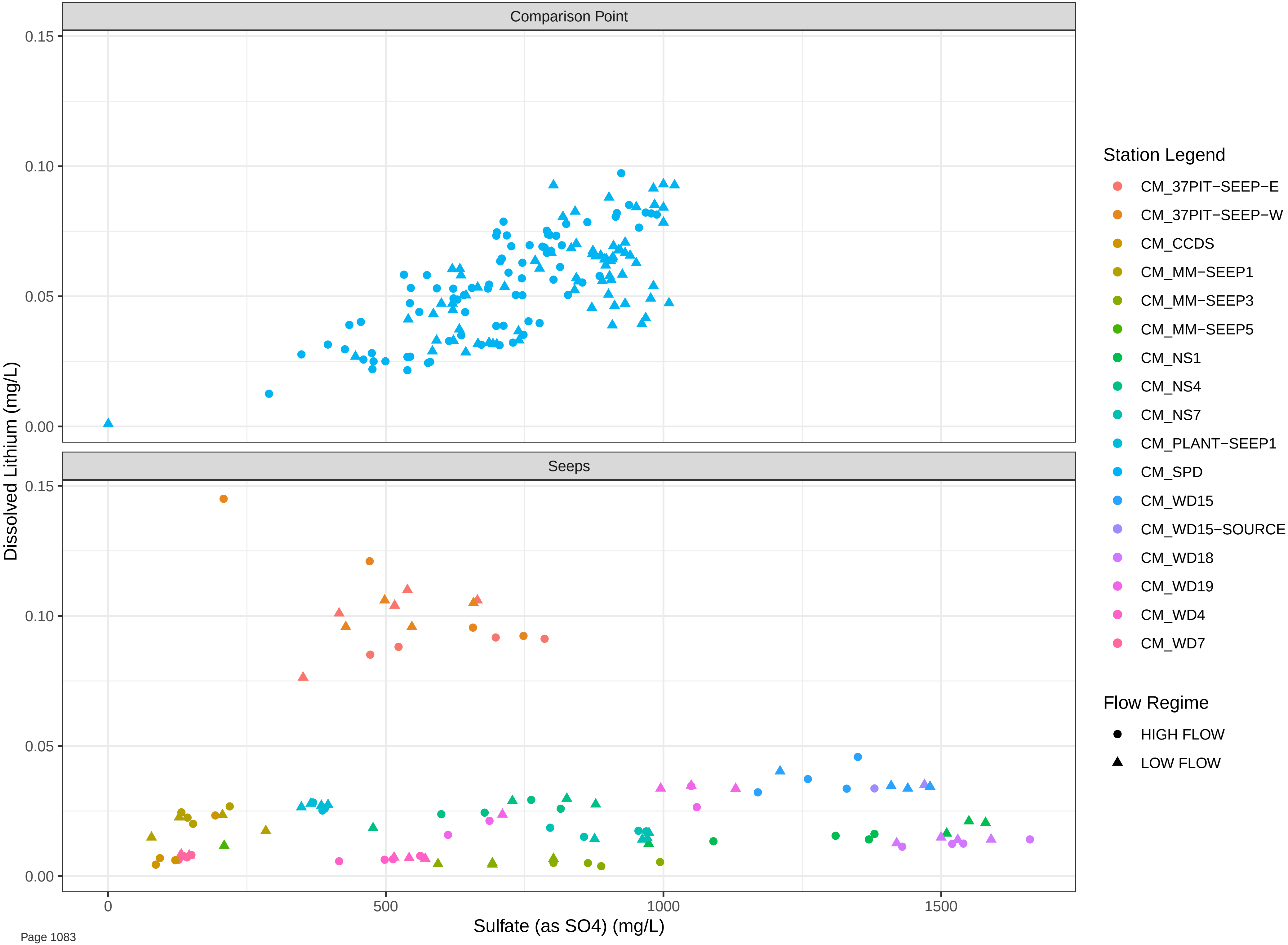


Comparison Point
Seeps
Dissolved Iron (mg/L)
0.100
0.075
0.050
0.025
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

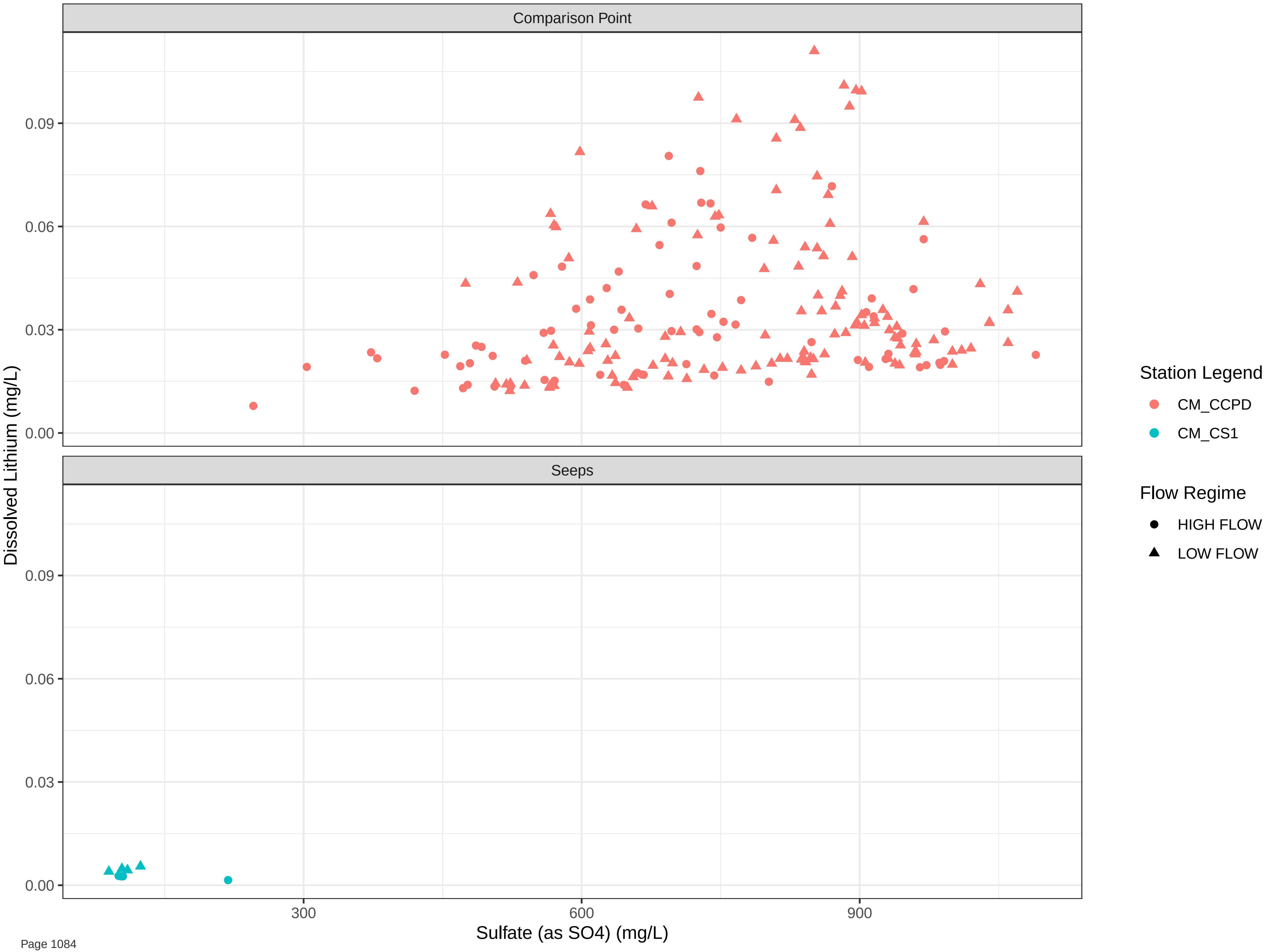

Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00025
0.00020
0.00015
0.00010
0.00005
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



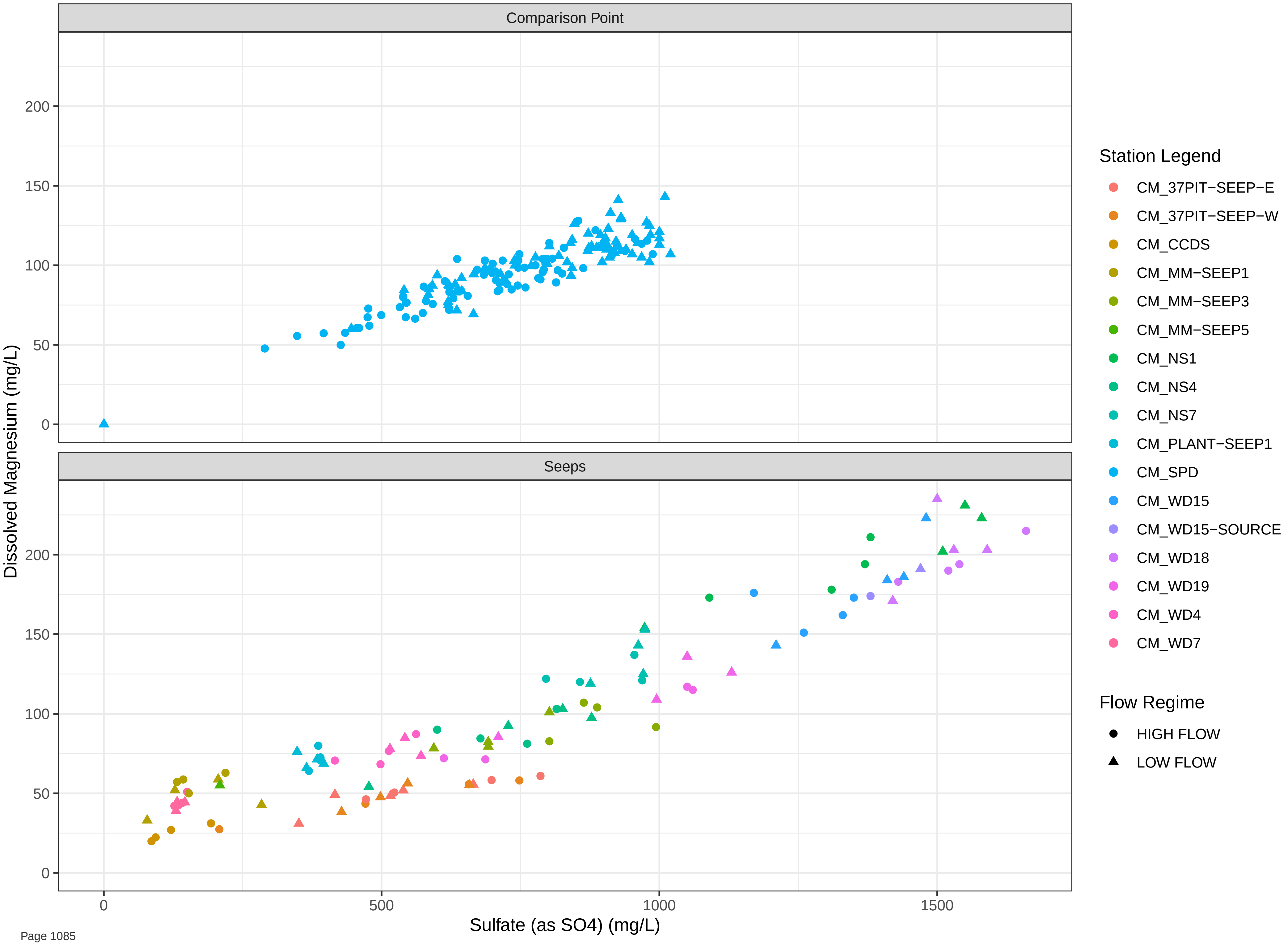
Comparison Point
Seeps
Dissolved Lead (mg/L)
0.00011
0.00010
0.00009
0.00008
0.00007
0.00006
0.00005
Sulfate (as SO4) (mg/L)
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW



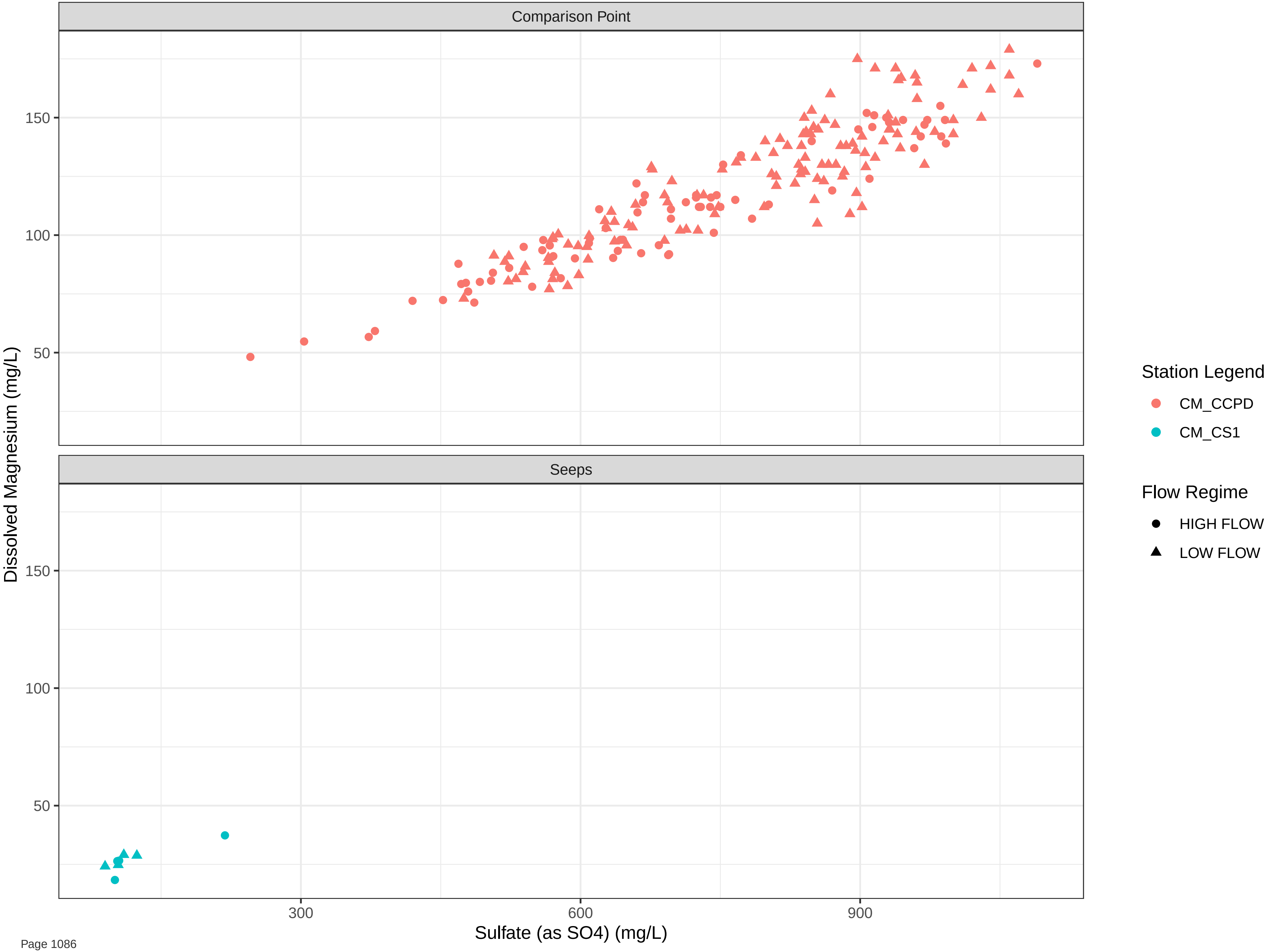
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.15
0.10
0.05
0.00
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



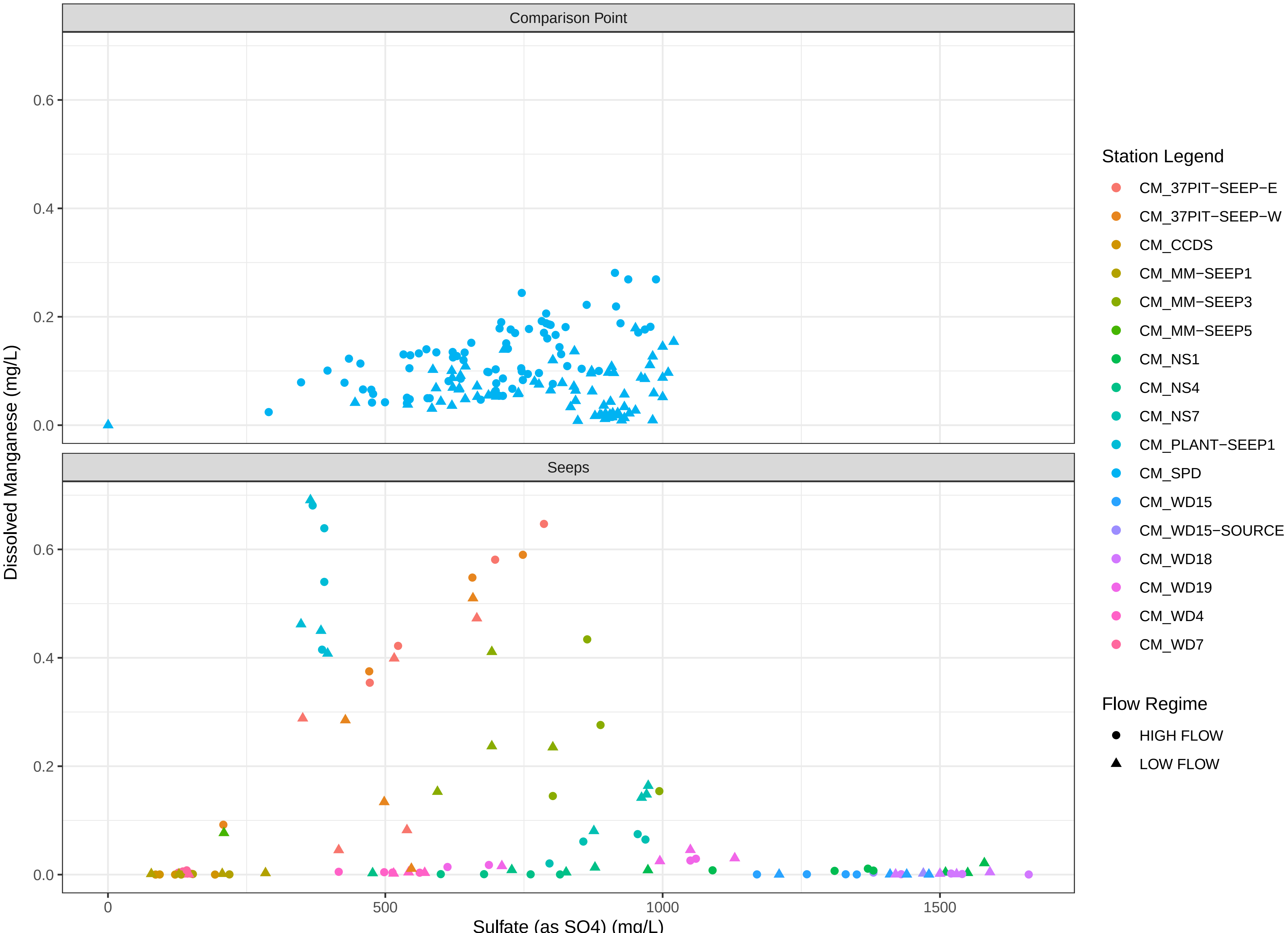
Comparison Point
Seeps
Dissolved Lithium (mg/L)
0.00
0.03
0.06
0.09
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

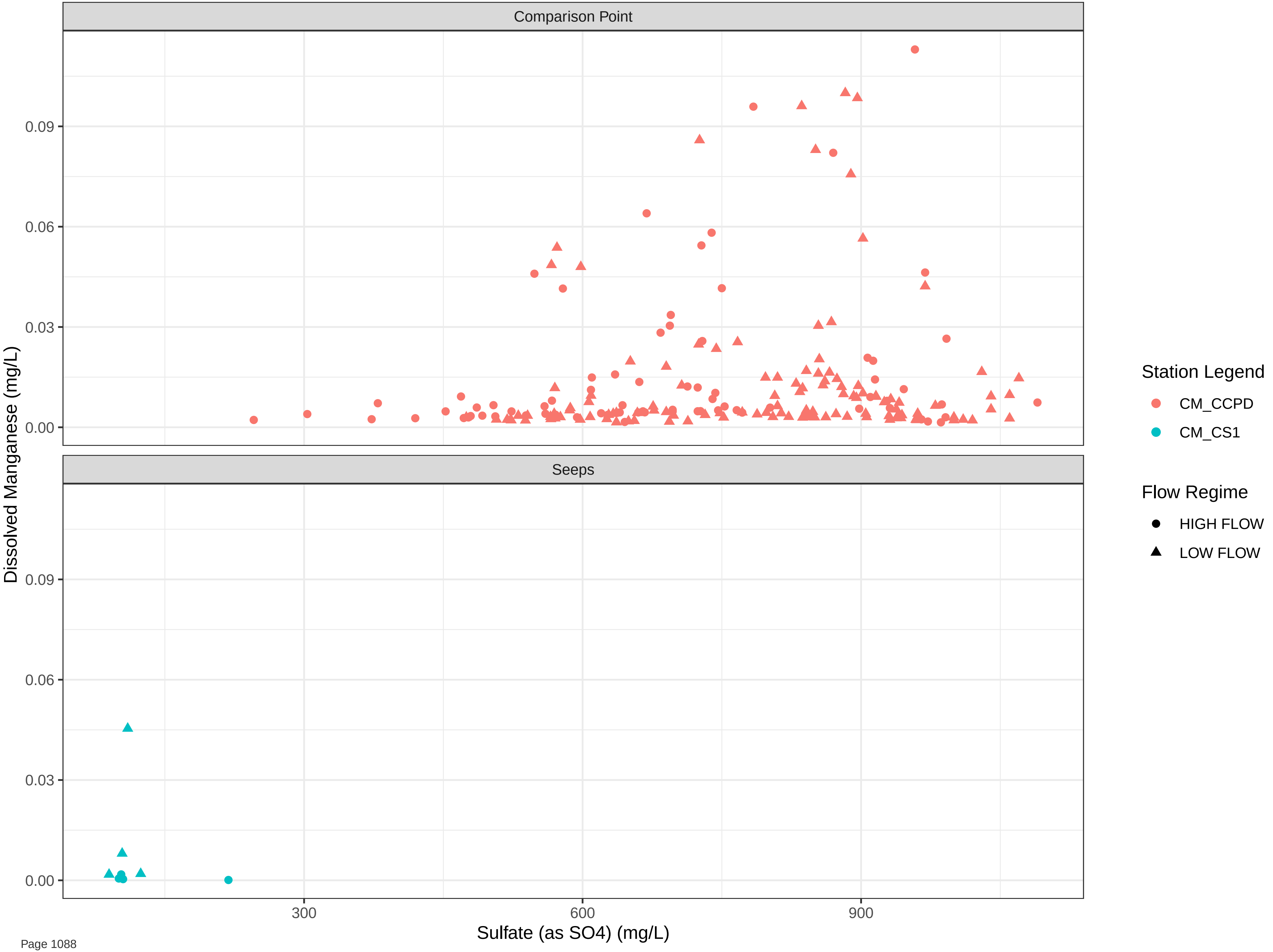


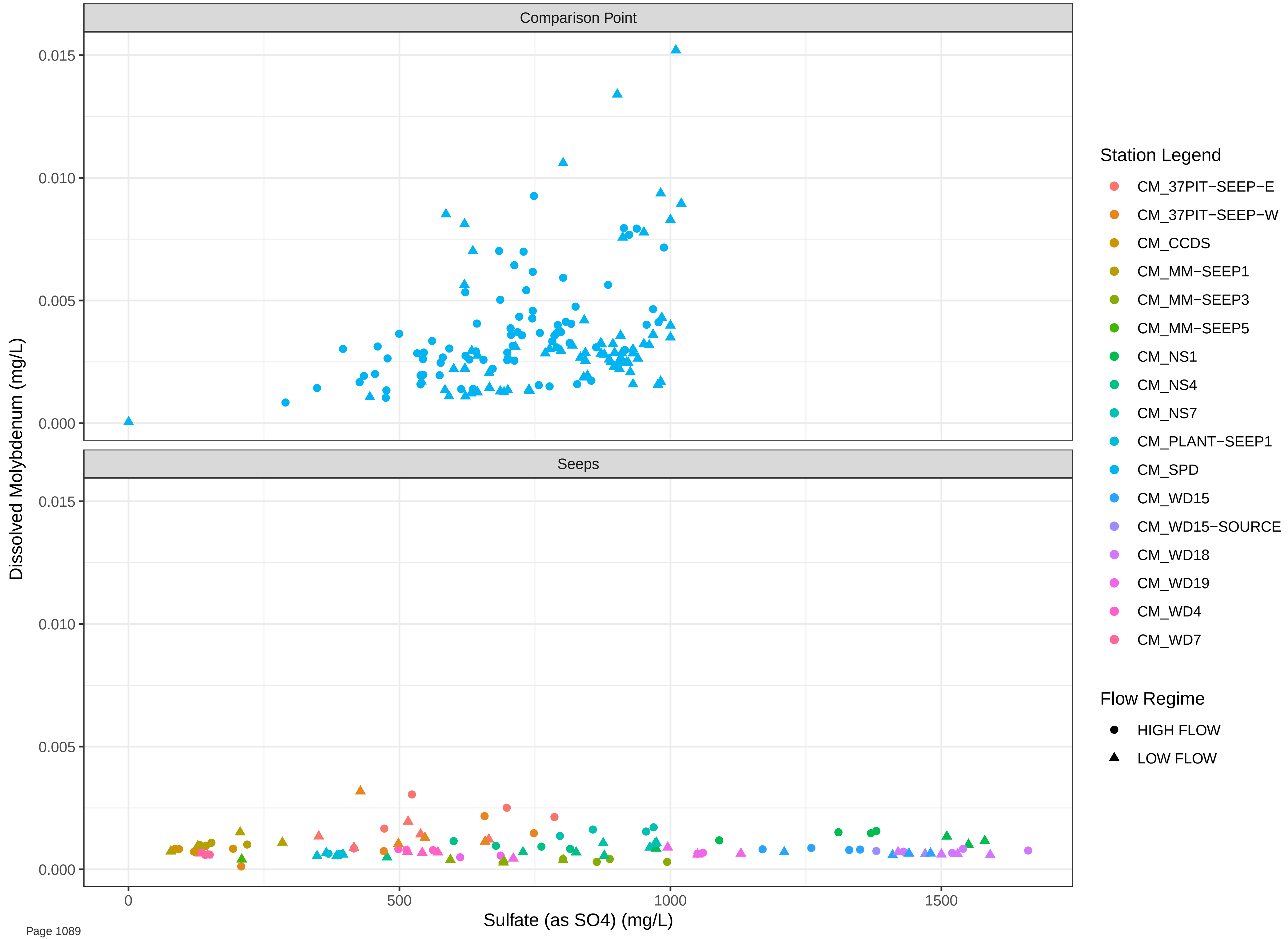
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
150
200
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



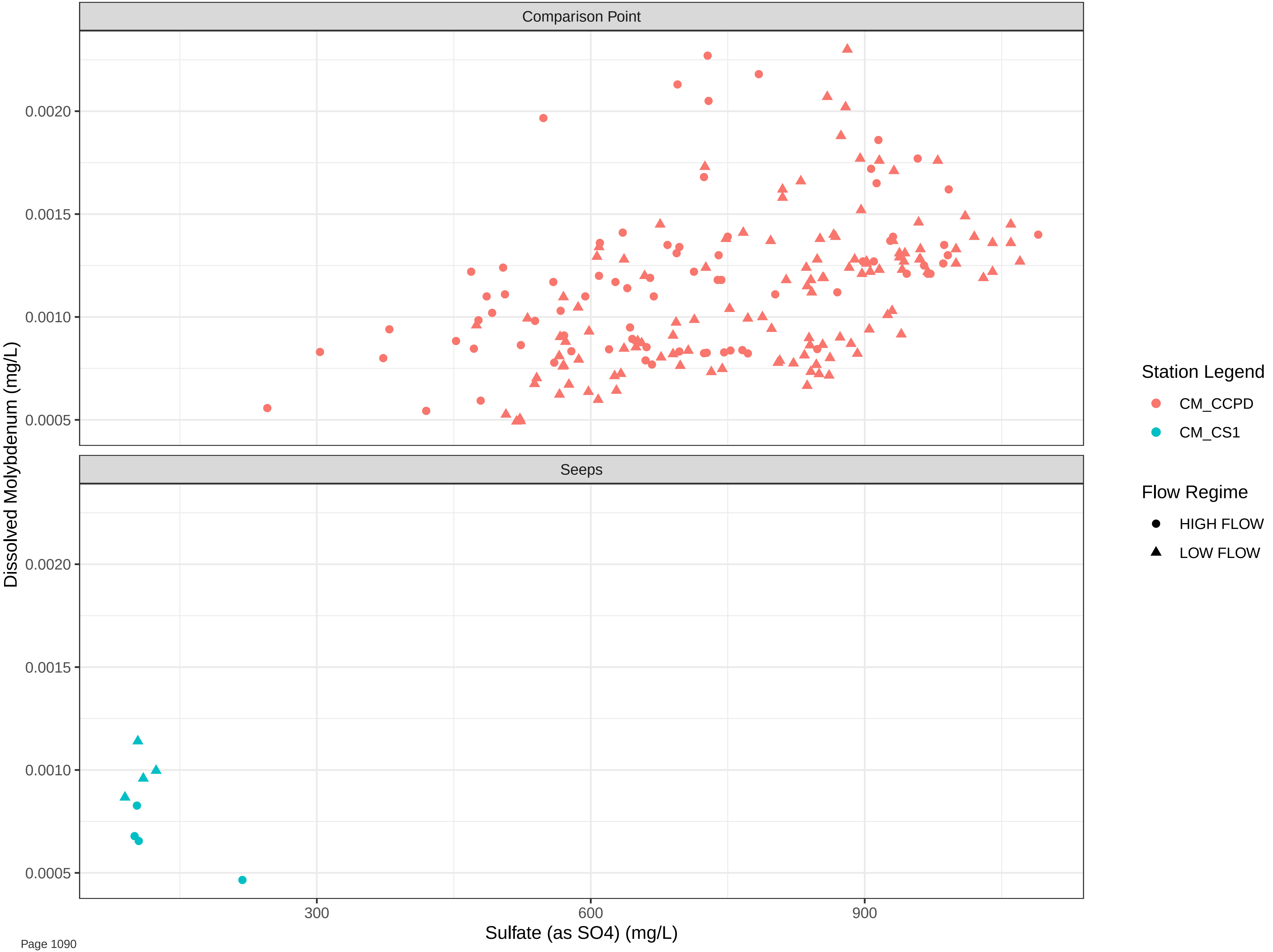
Comparison Point
Seeps
Dissolved Magnesium (mg/L)
150
100
50
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.0
0.2
0.4
0.6
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

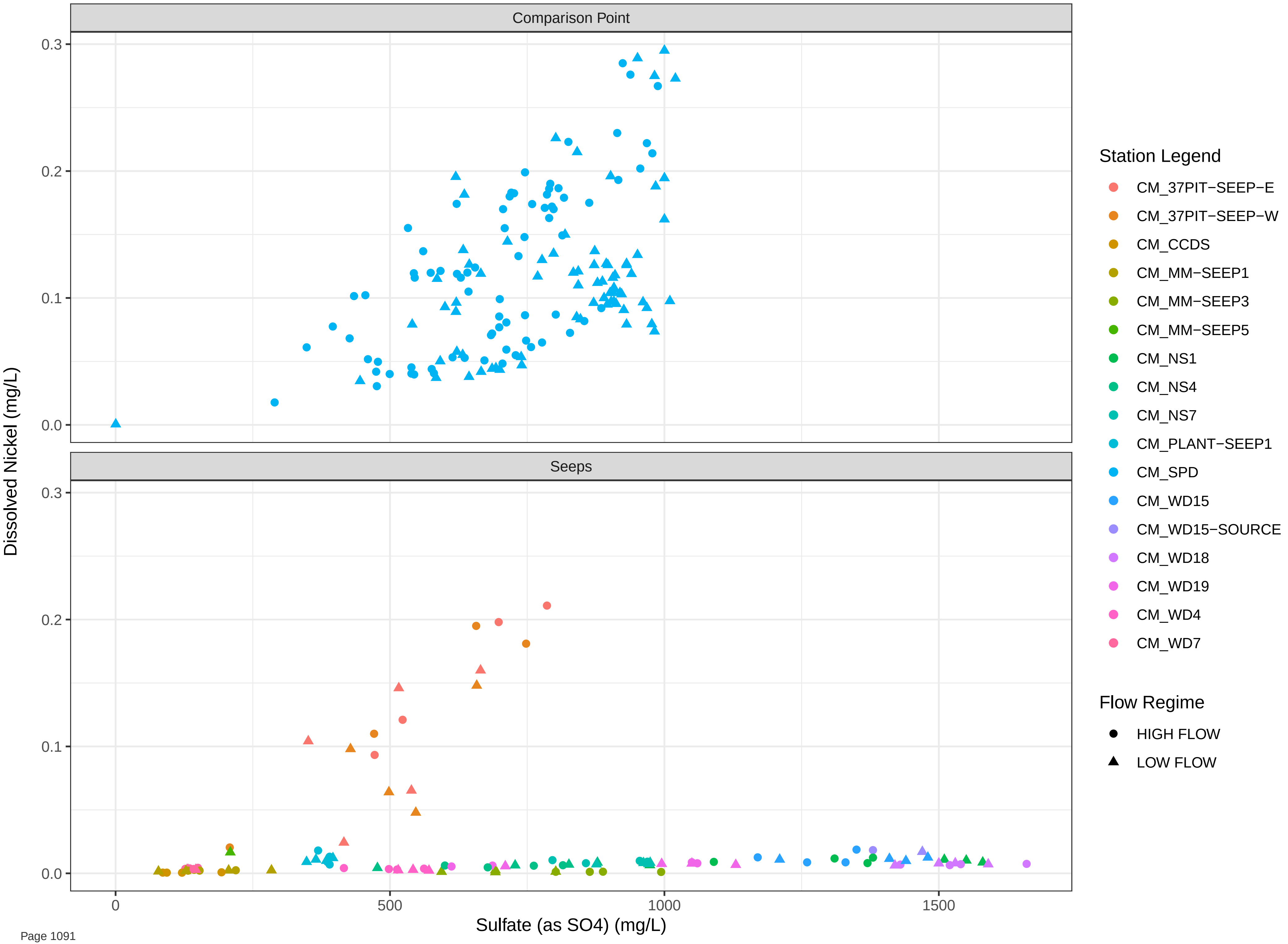

Comparison Point
Seeps
Dissolved Manganese (mg/L)
0.09
0.06
0.03
0.00
0.09
0.06
0.03
0.00
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW



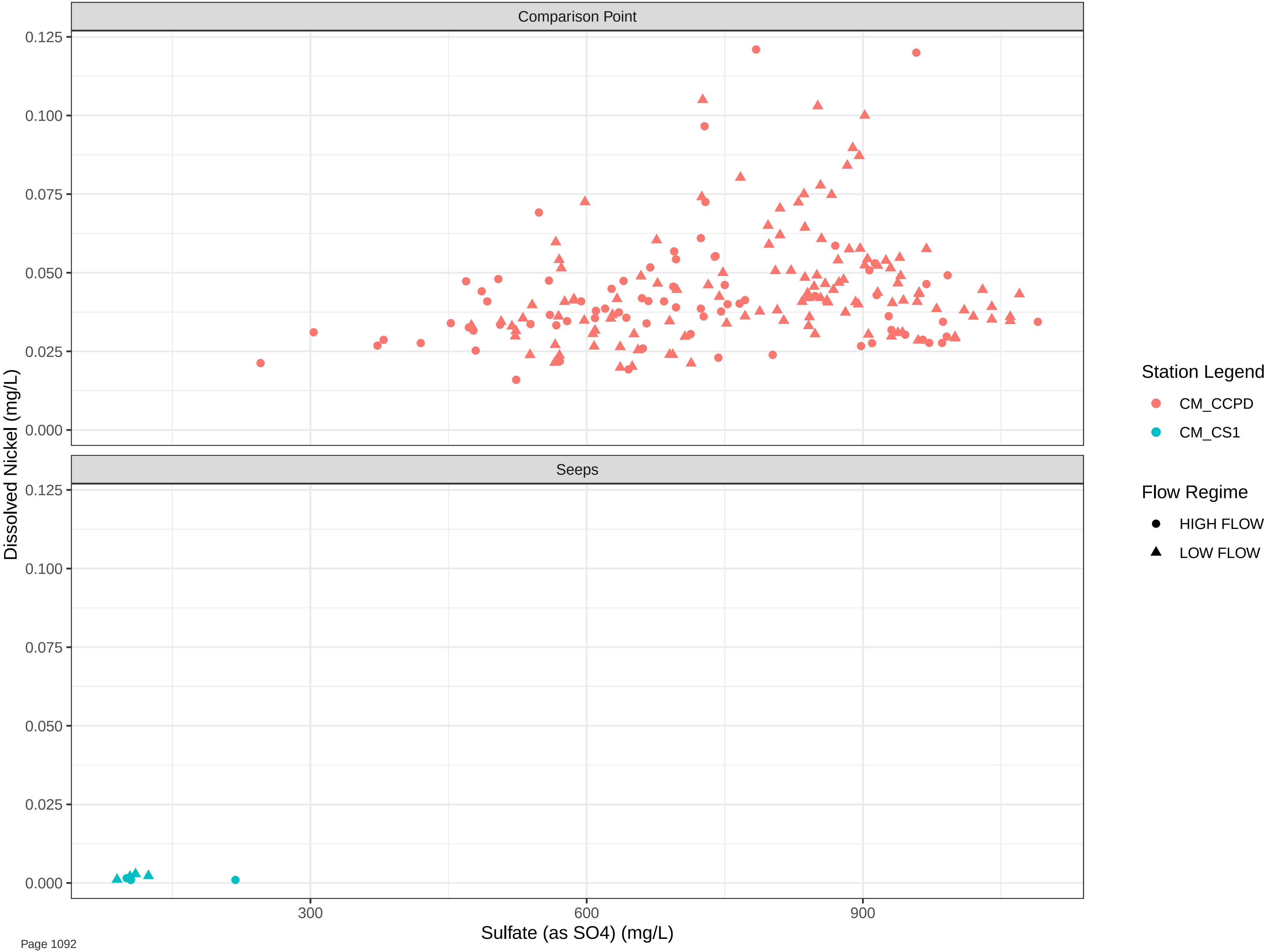
Comparison Point
Seeps
0.015
0.010
0.005
0.000
0
500
1000
1500
Dissolved Molybdenum (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



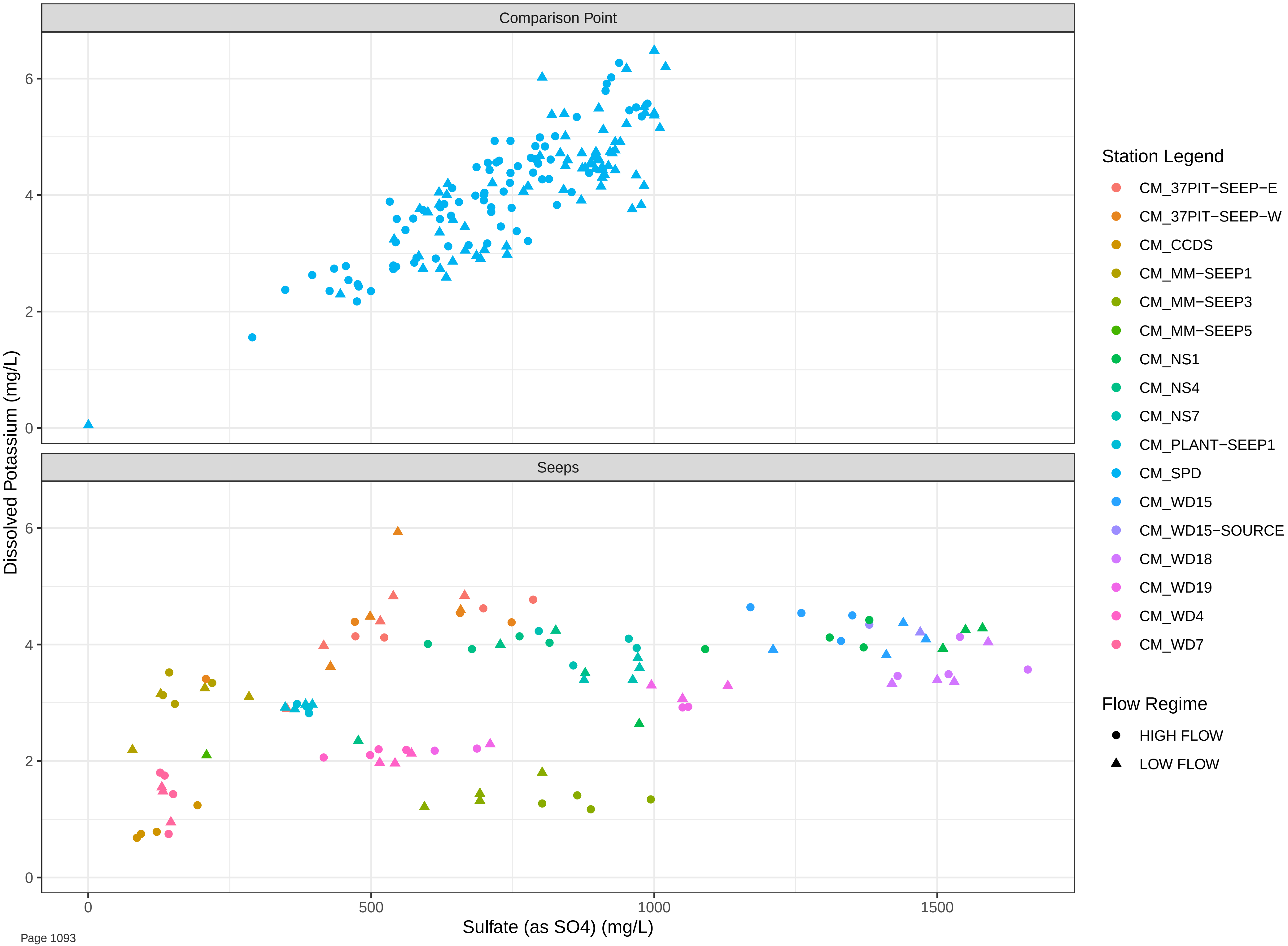
Comparison Point
Seeps
Dissolved Molybdenum (mg/L)
0.0020
0.0015
0.0010
0.0005
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW



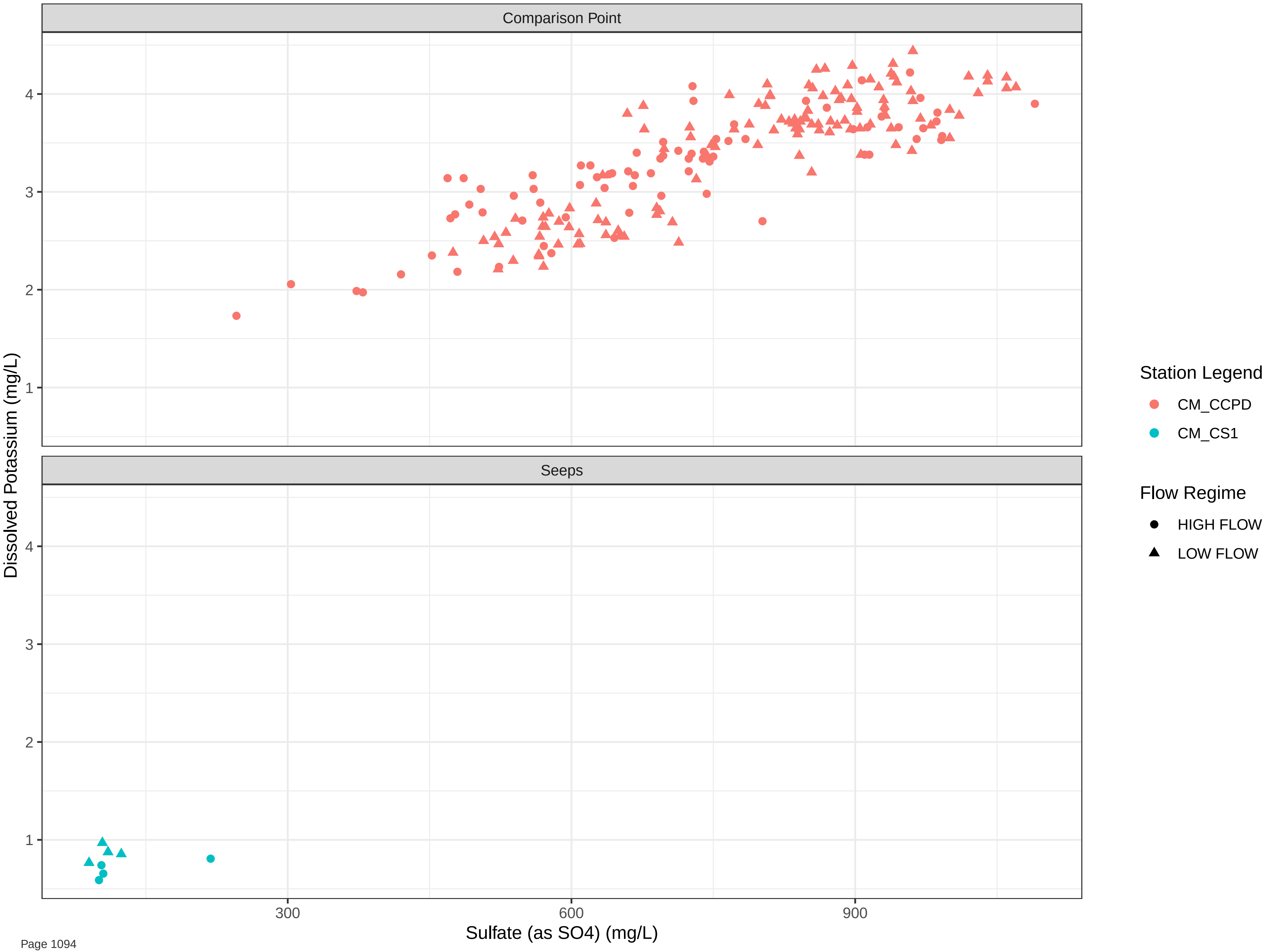
Comparison Point
Seeps
Dissolved Nickel (mg/L)
0.0
0.1
0.2
0.3
Sulfate (as SO4) (mg/L)
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



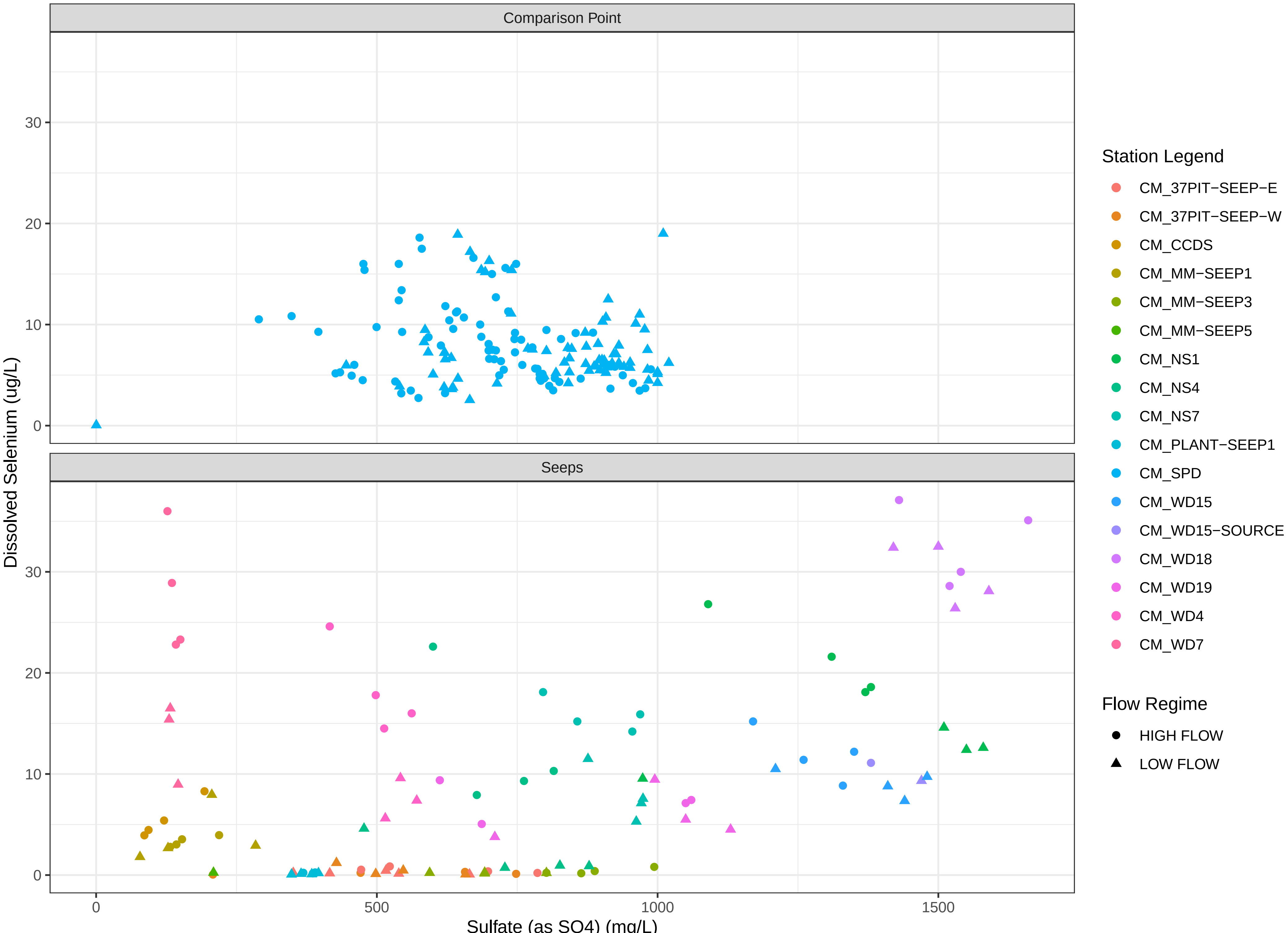
Comparison Point
Seeps
0.125
0.100
0.075
0.050
0.025
0.000
300
600
900
Sulfate (as SO4) (mg/L)
Dissolved Nickel (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

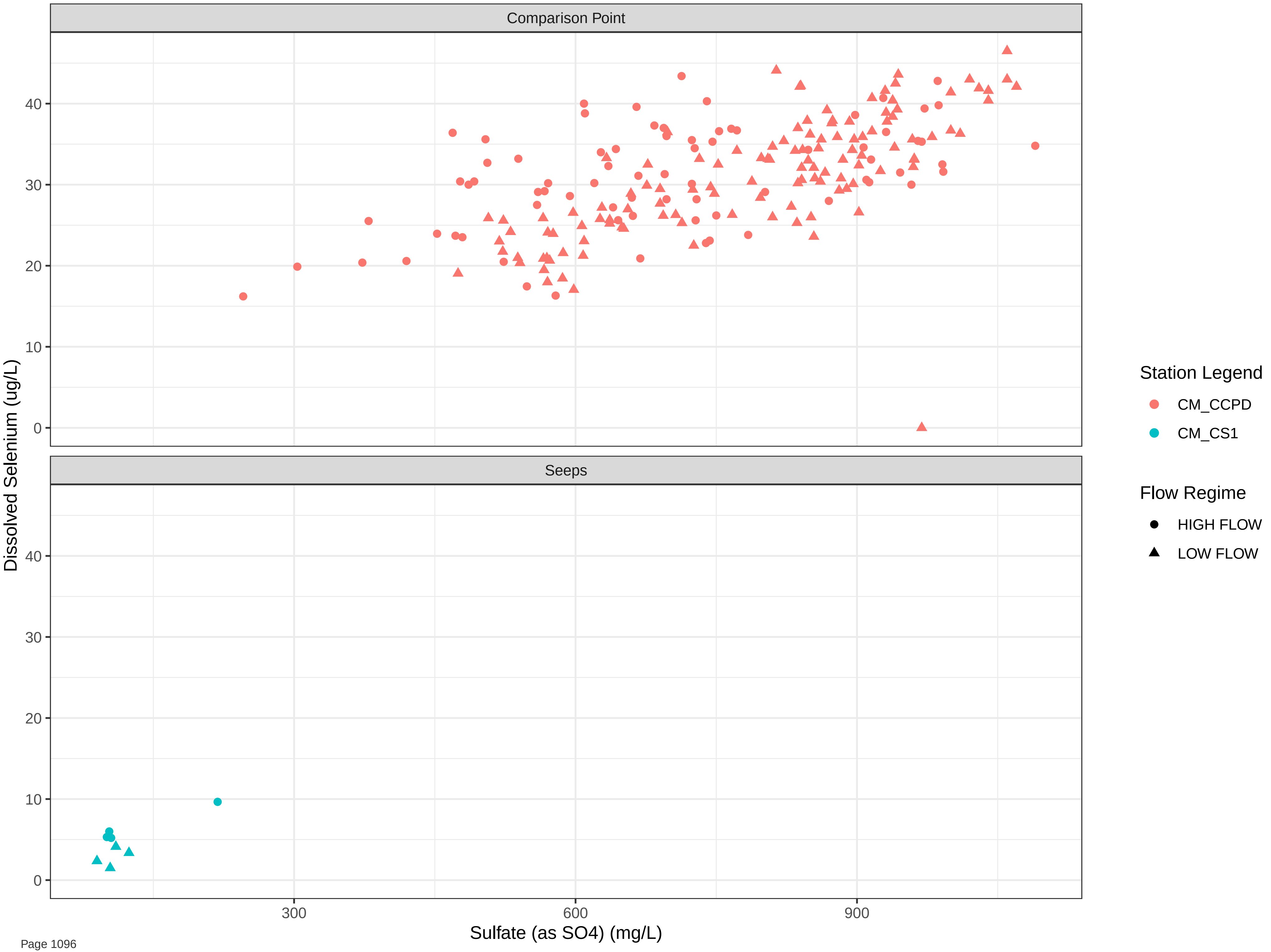


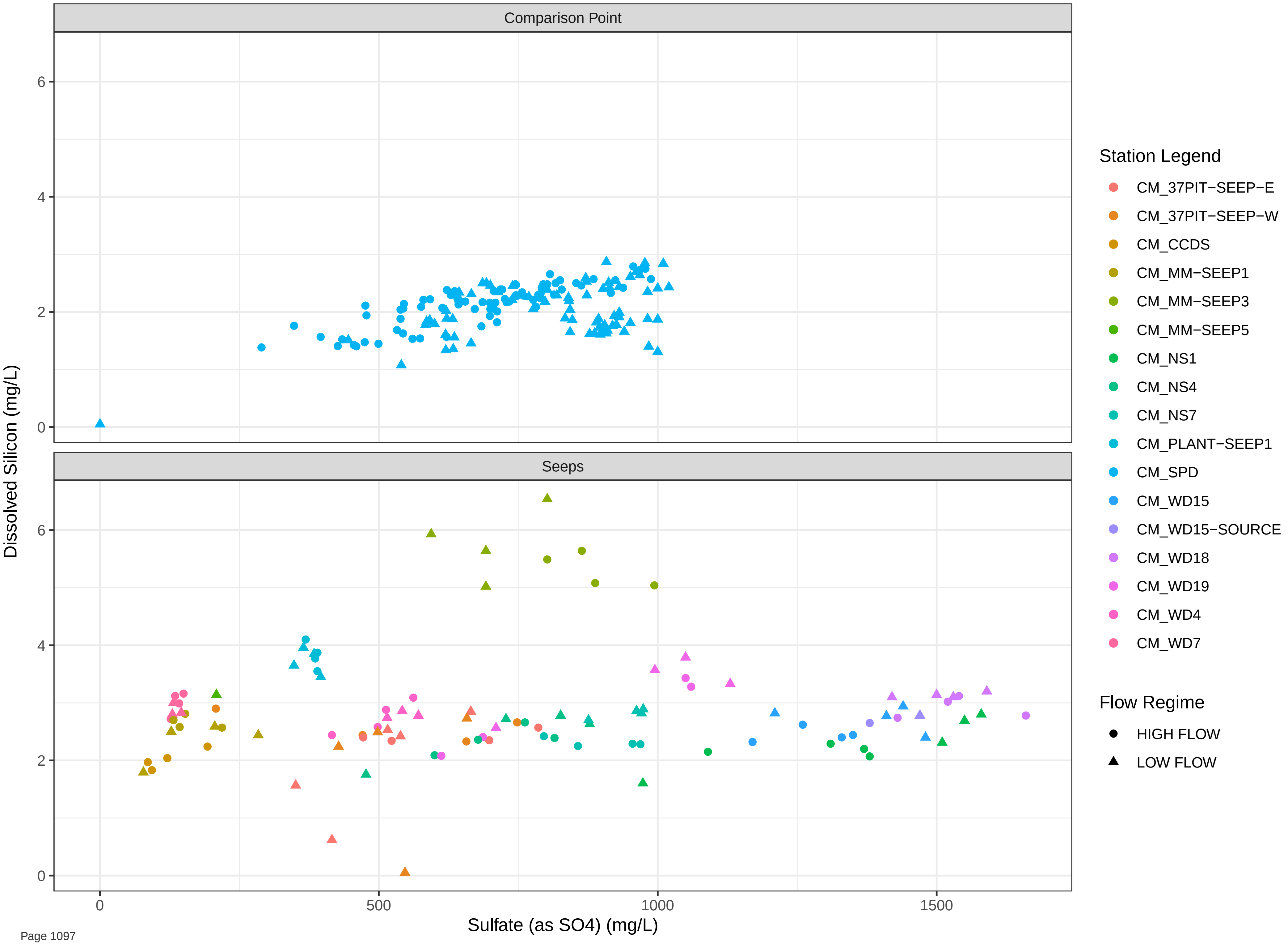
Comparison Point
Seeps
Dissolved Potassium (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
6
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

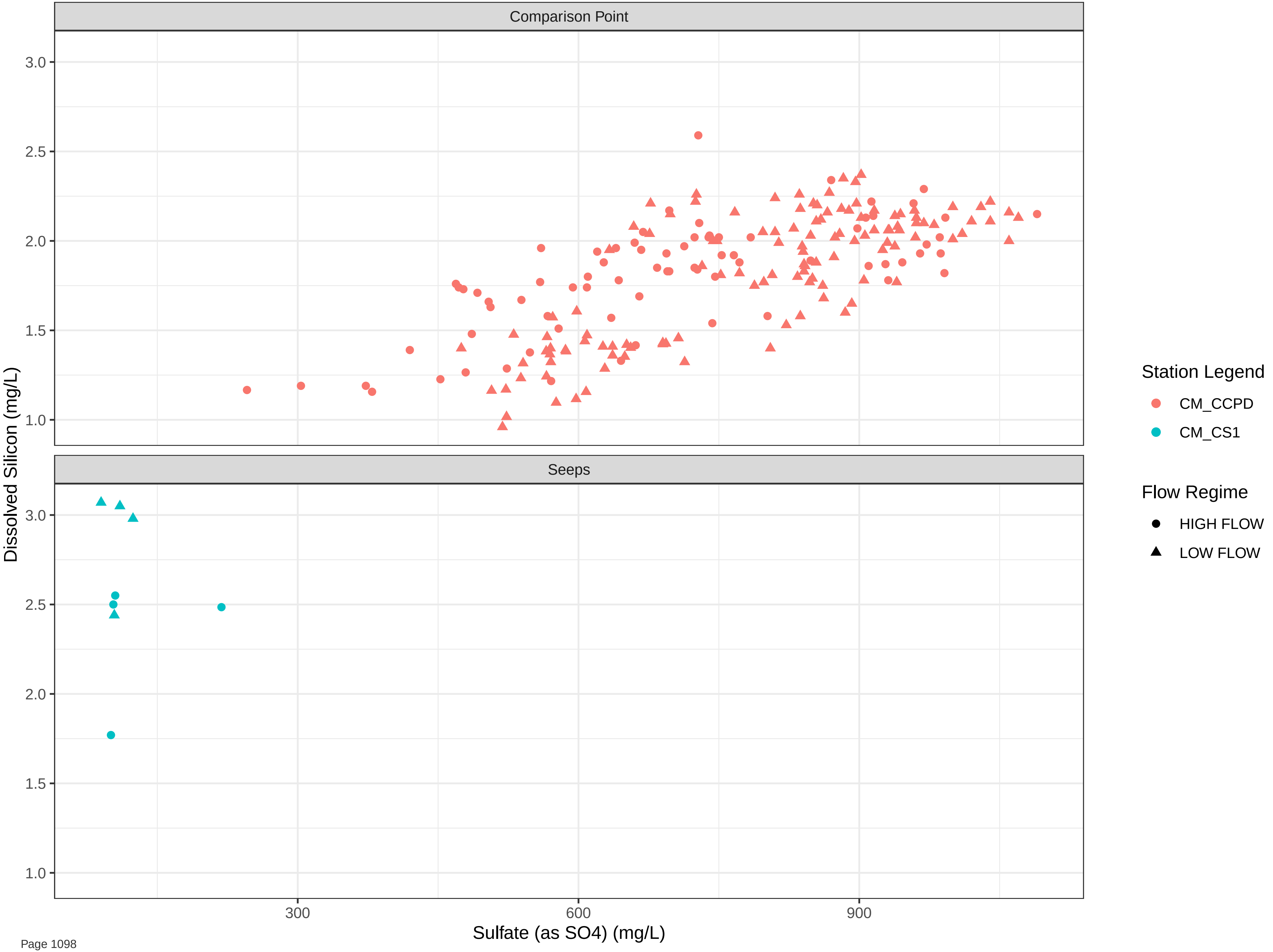


Comparison Point
Seeps
Dissolved Potassium (mg/L)
1
2
3
4
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

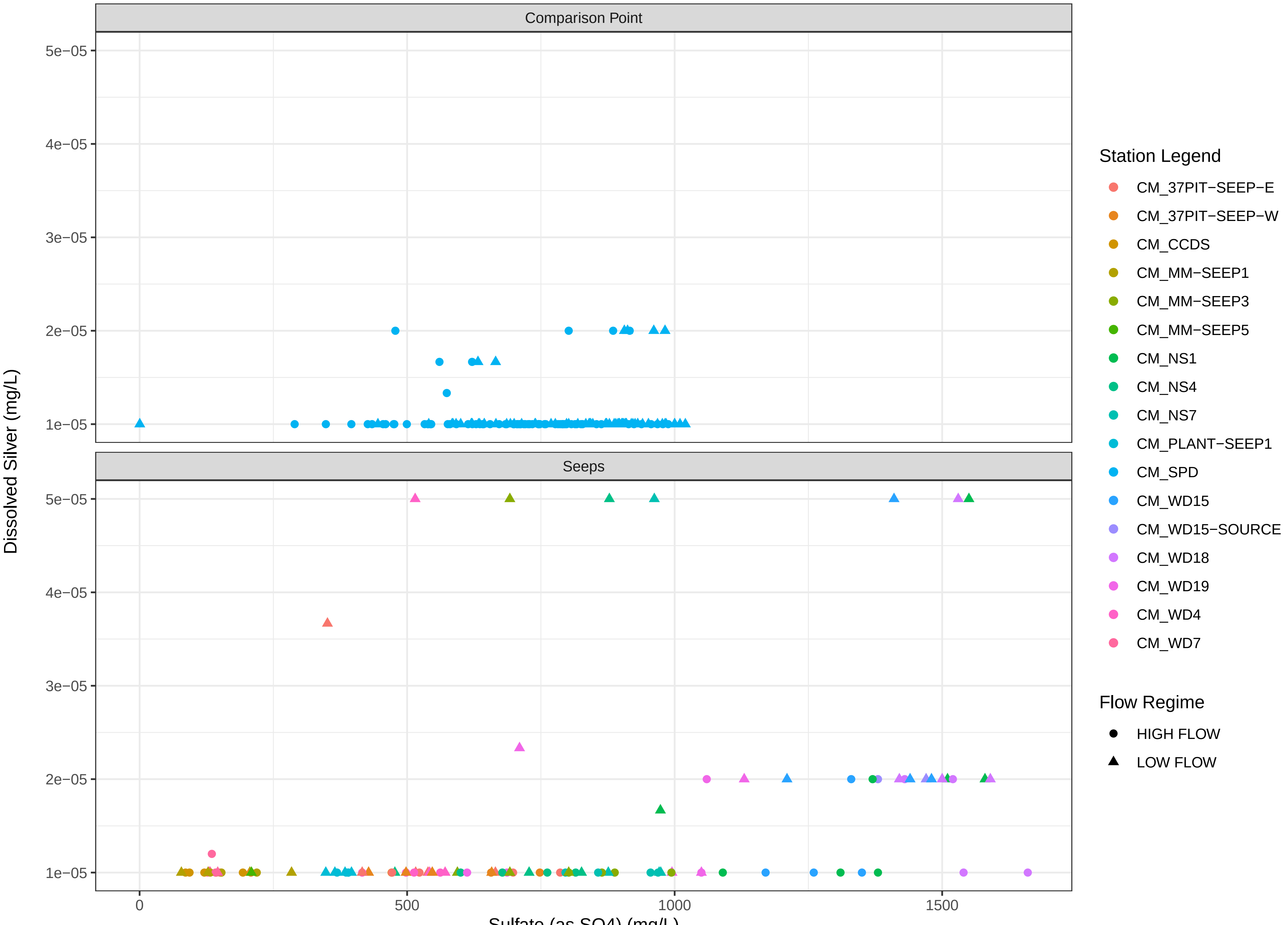

Comparison Point
Seeps
Dissolved Selenium (ug/L)
Sulfate (as SO4) (mg/L)
0
10
20
30
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

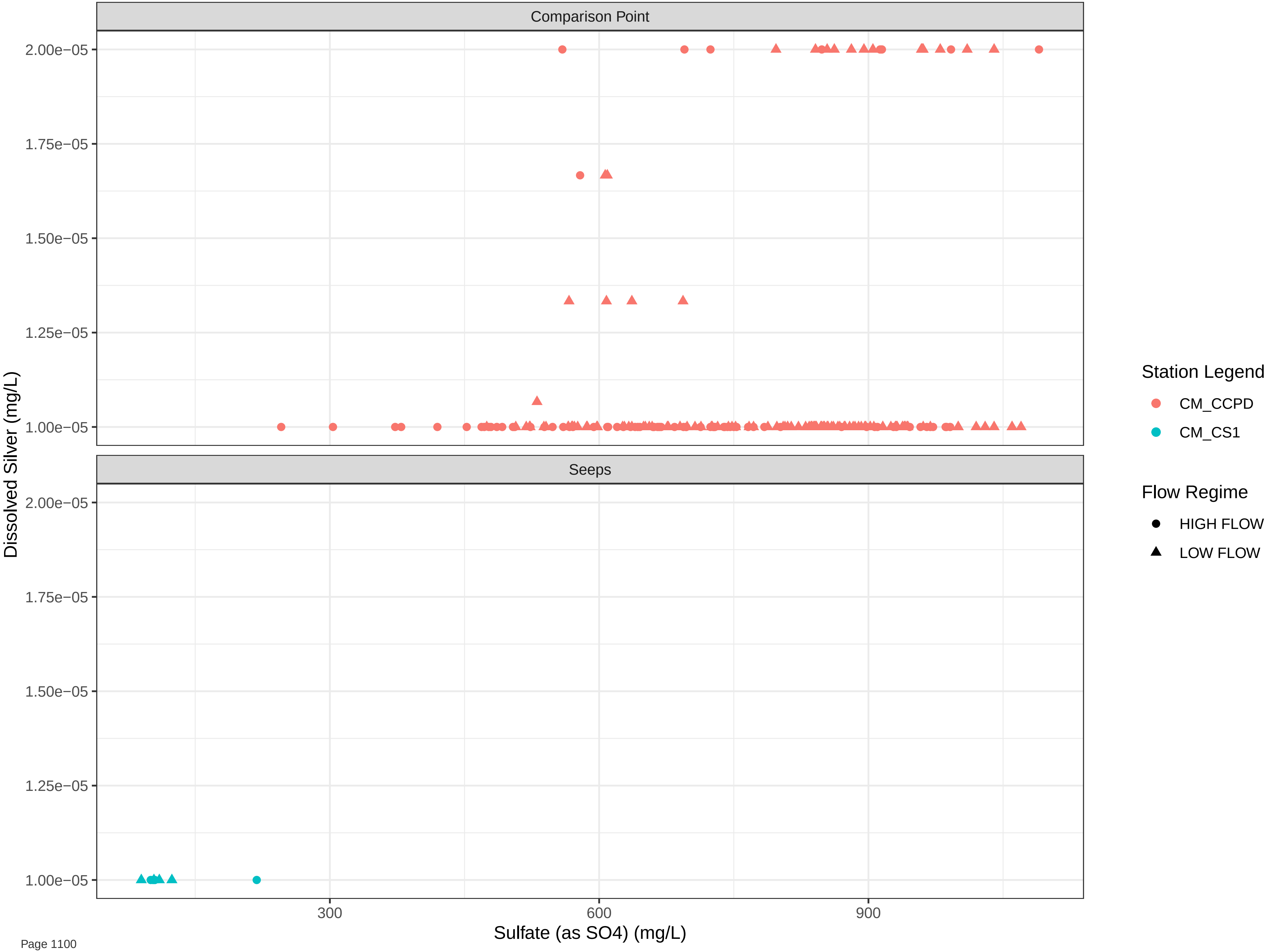

Comparison Point
Seeps
Dissolved Selenium (ug/L)
0
10
20
30
40
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Silicon (mg/L)
Sulfate (as SO4) (mg/L)
0
2
4
6
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

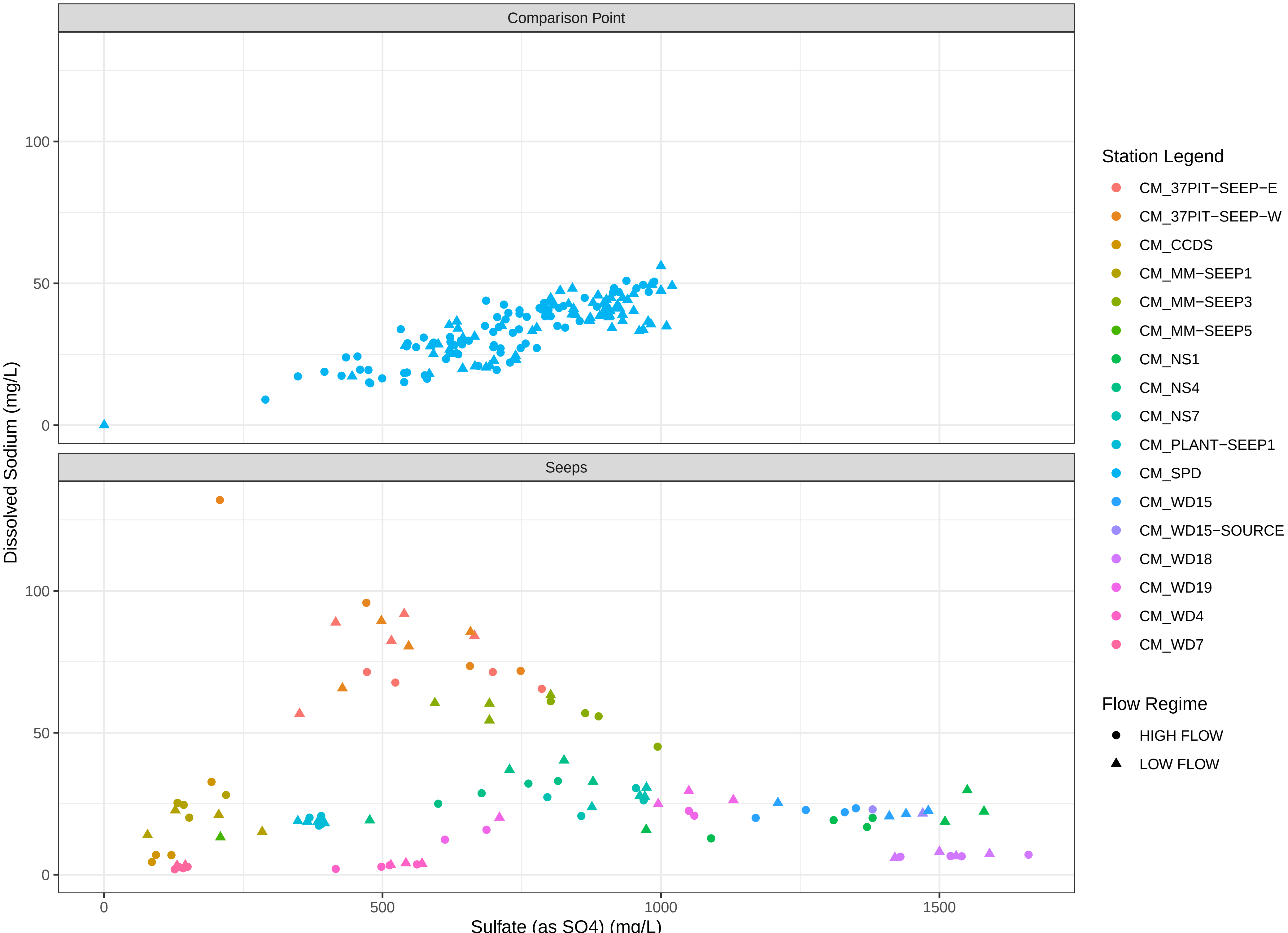


Comparison Point
Seeps
Dissolved Silicon (mg/L)
3.0
2.5
2.0
1.5
1.0
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

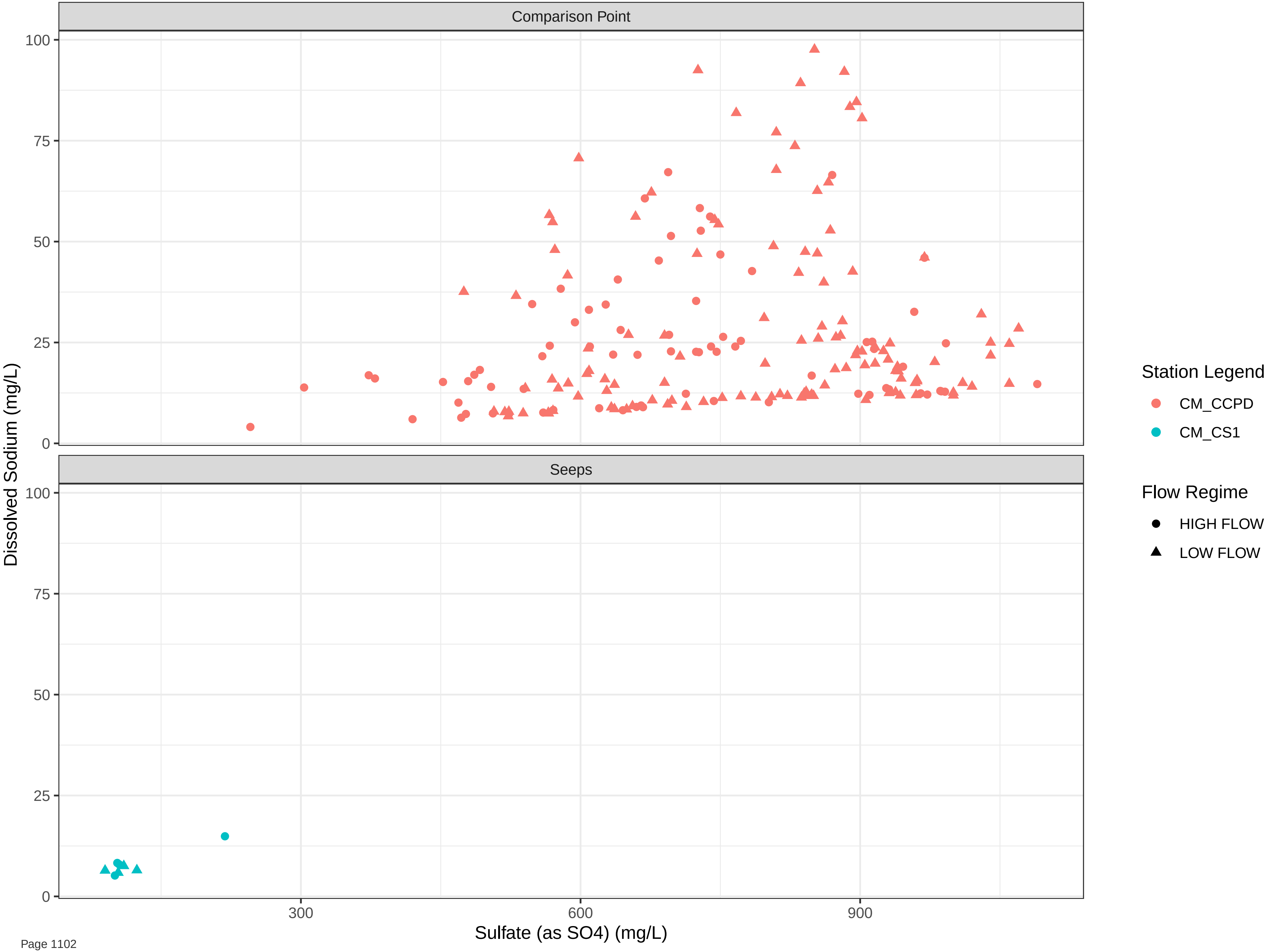

Comparison Point
Seeps
Dissolved Silver (mg/L)
Sulfate (as SO4) (mg/L)
5e−05
4e−05
3e−05
2e−05
1e−05
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

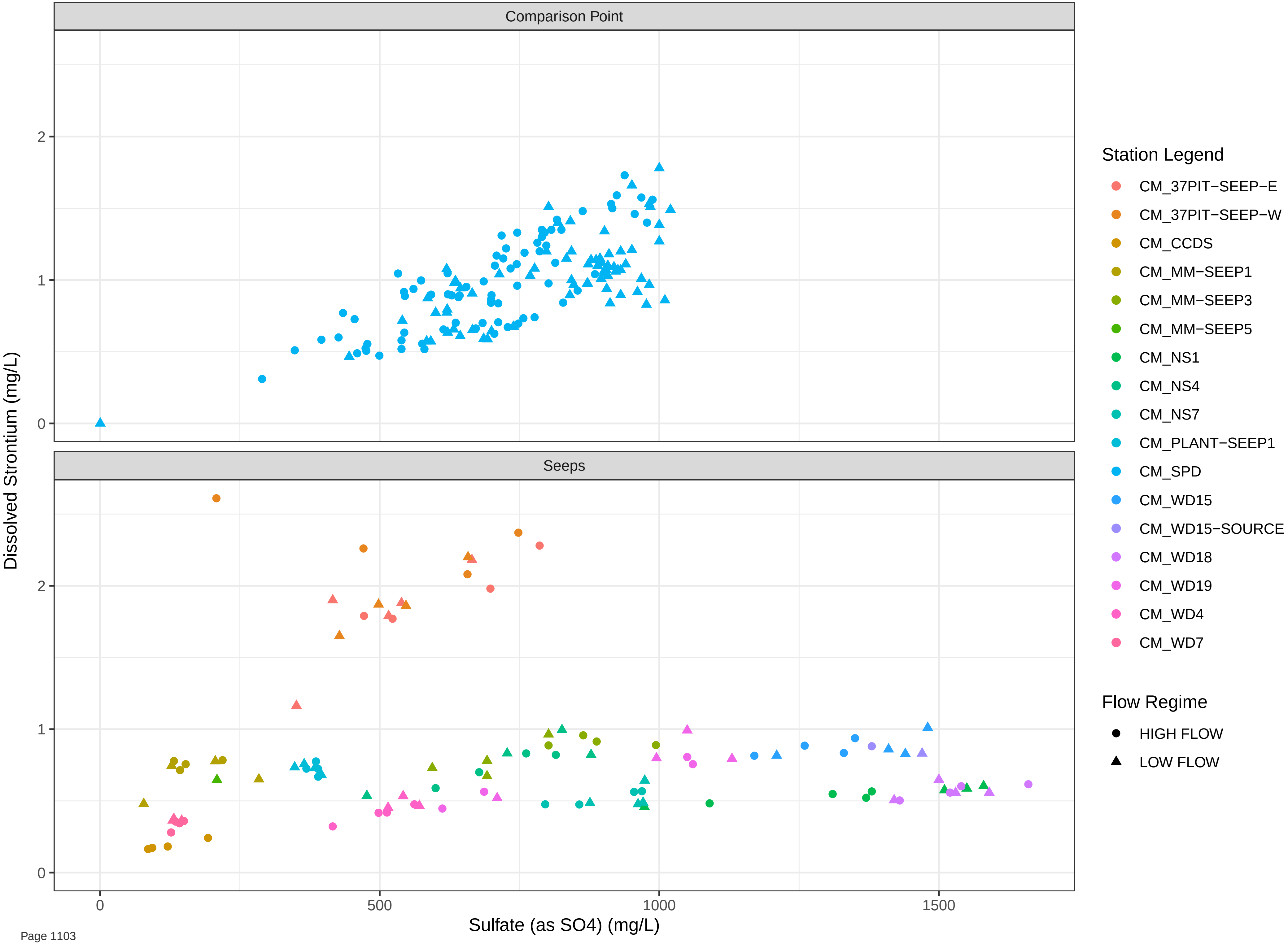


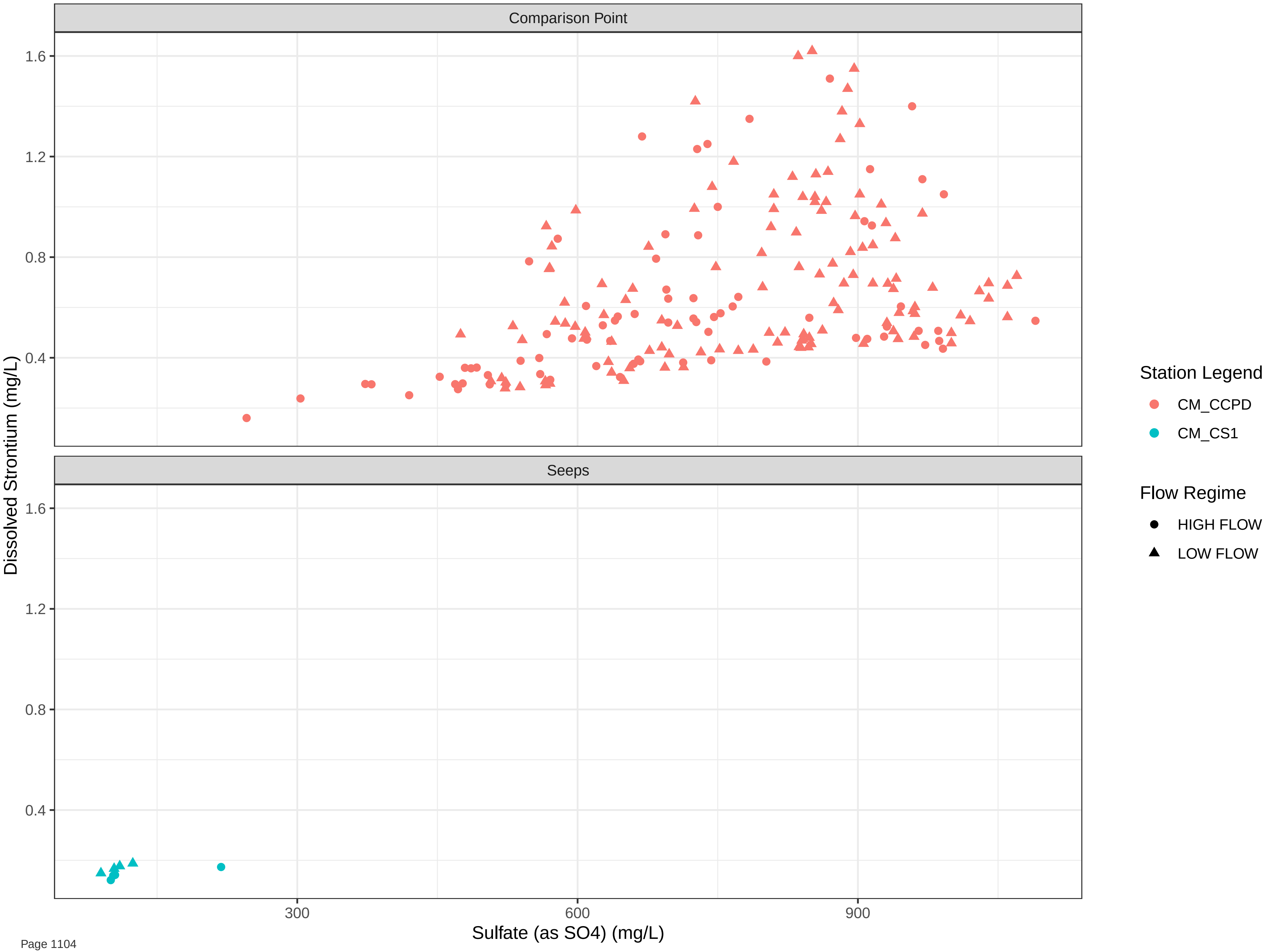
Comparison Point
Seeps
2.00e−05
1.75e−05
1.50e−05
1.25e−05
1.00e−05
300
600
900
Dissolved Silver (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW



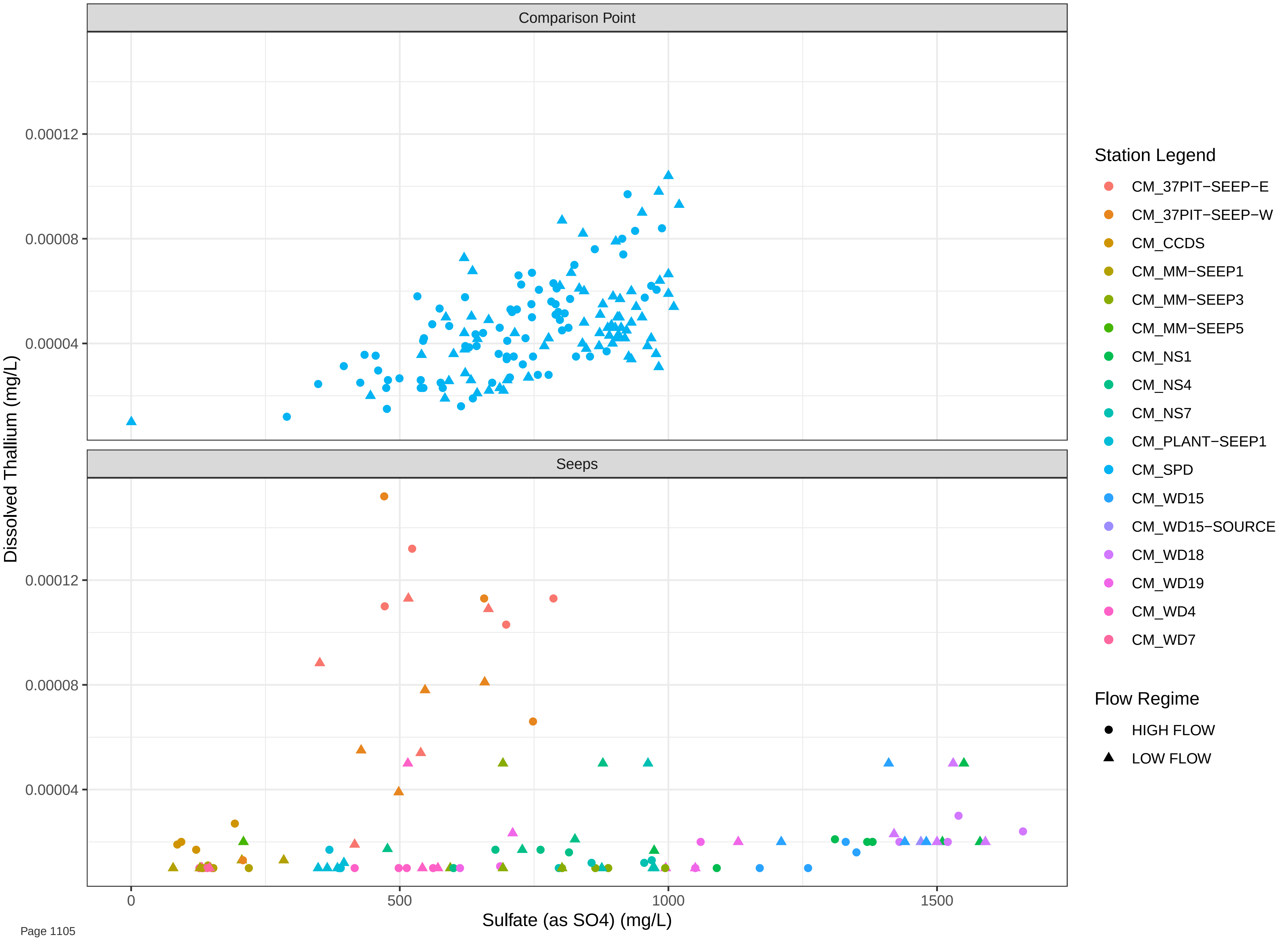
Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
50
100
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

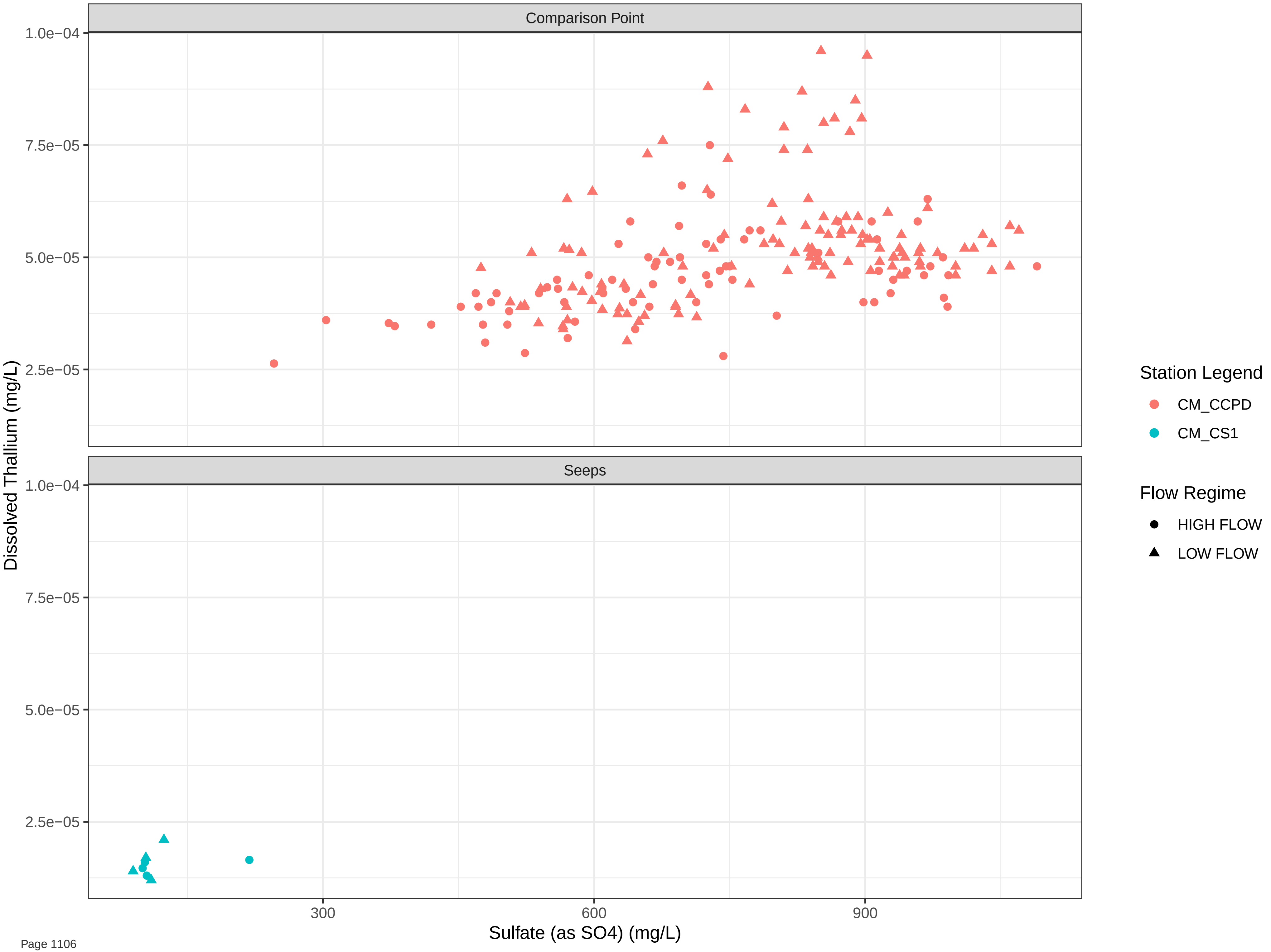

Comparison Point
Seeps
Dissolved Sodium (mg/L)
Sulfate (as SO4) (mg/L)
0
25
50
75
100
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

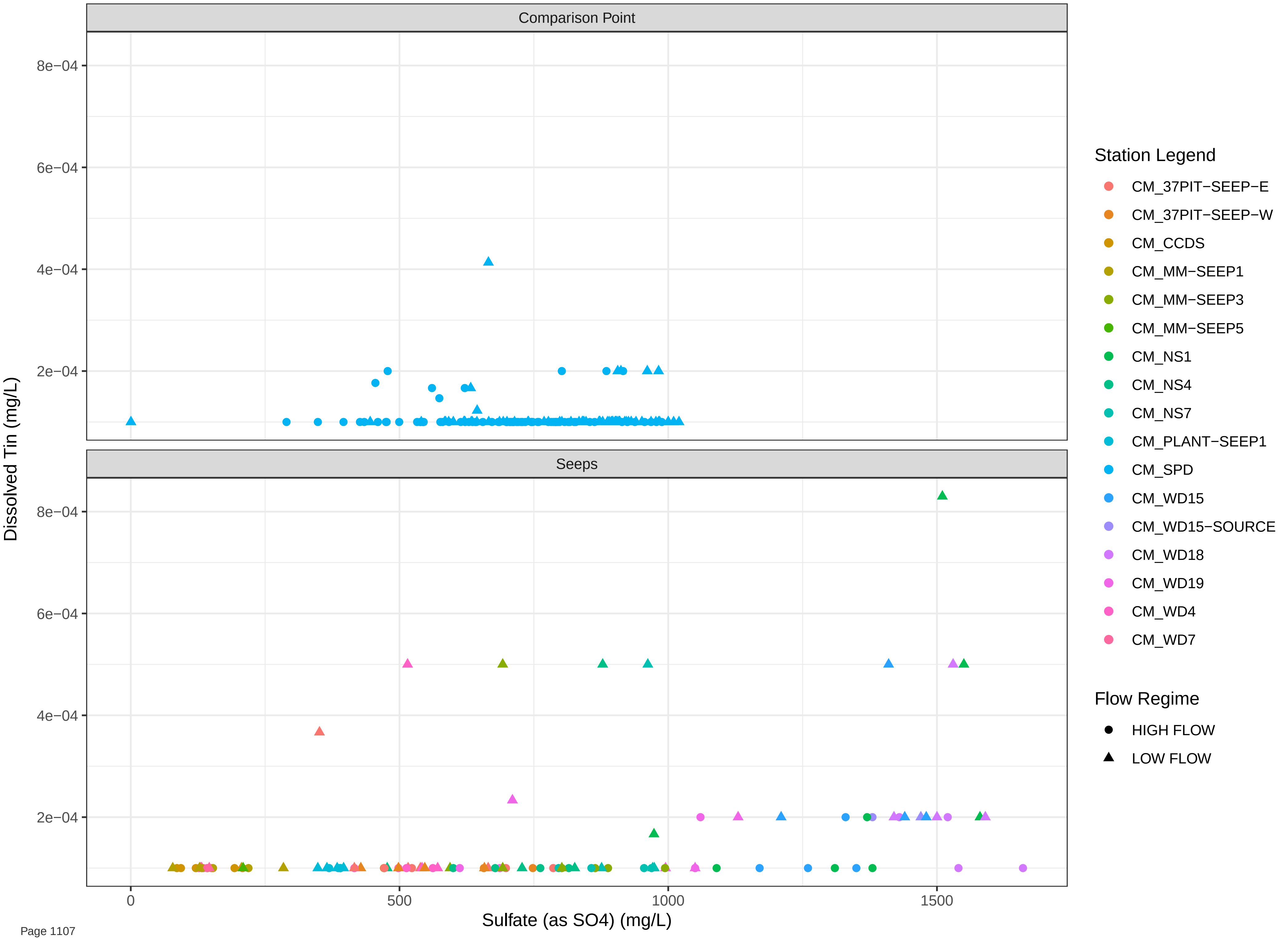

Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
0
1
2
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW



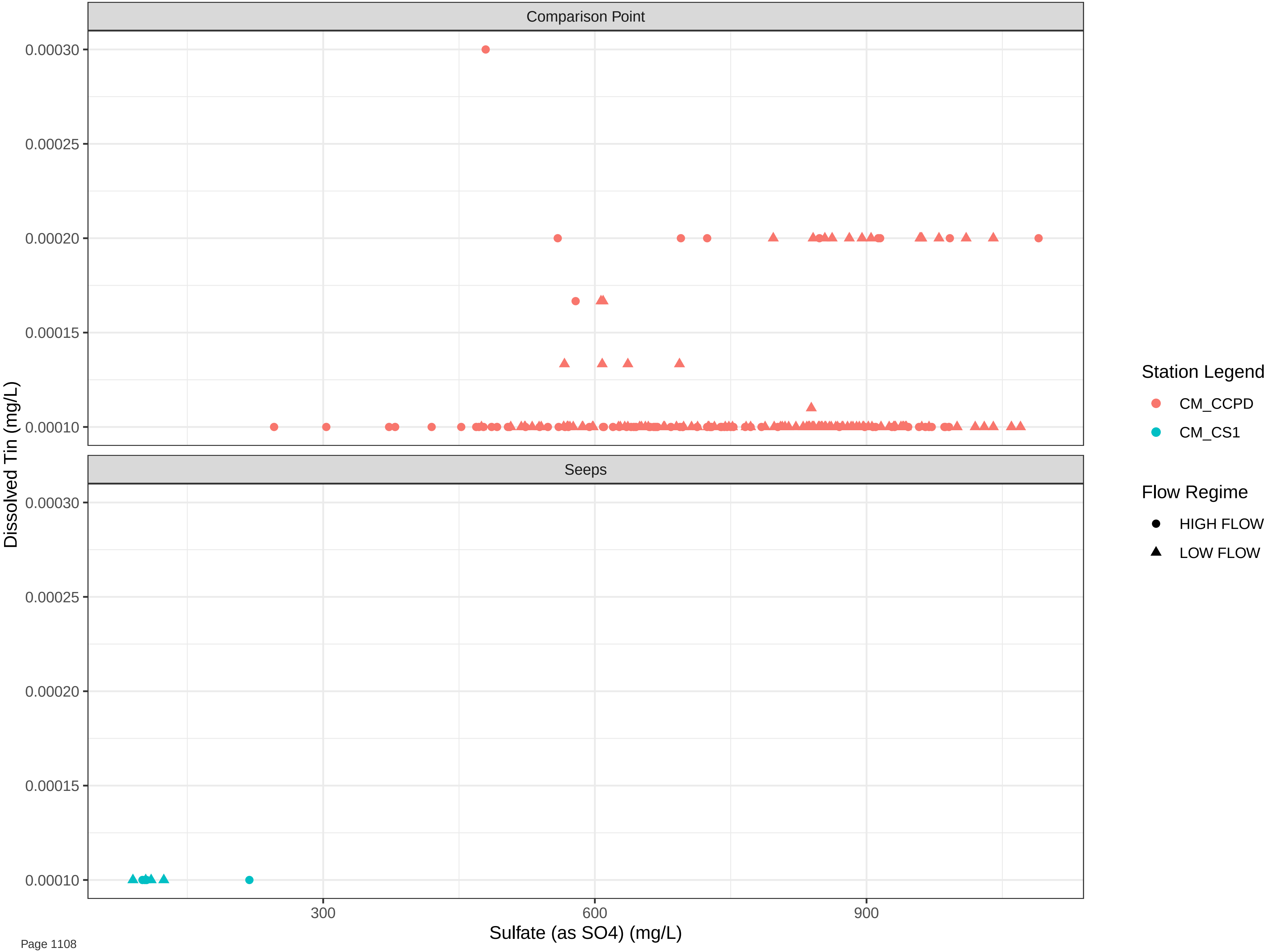
Comparison Point
Seeps
Dissolved Strontium (mg/L)
Sulfate (as SO4) (mg/L)
1.6
1.2
0.8
0.4
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Thallium (mg/L)
0.00012
0.00008
0.00004
Sulfate (as SO4) (mg/L)
0
500
1000
1500
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Thallium (mg/L)
1.0e−04
7.5e−05
5.0e−05
2.5e−05
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

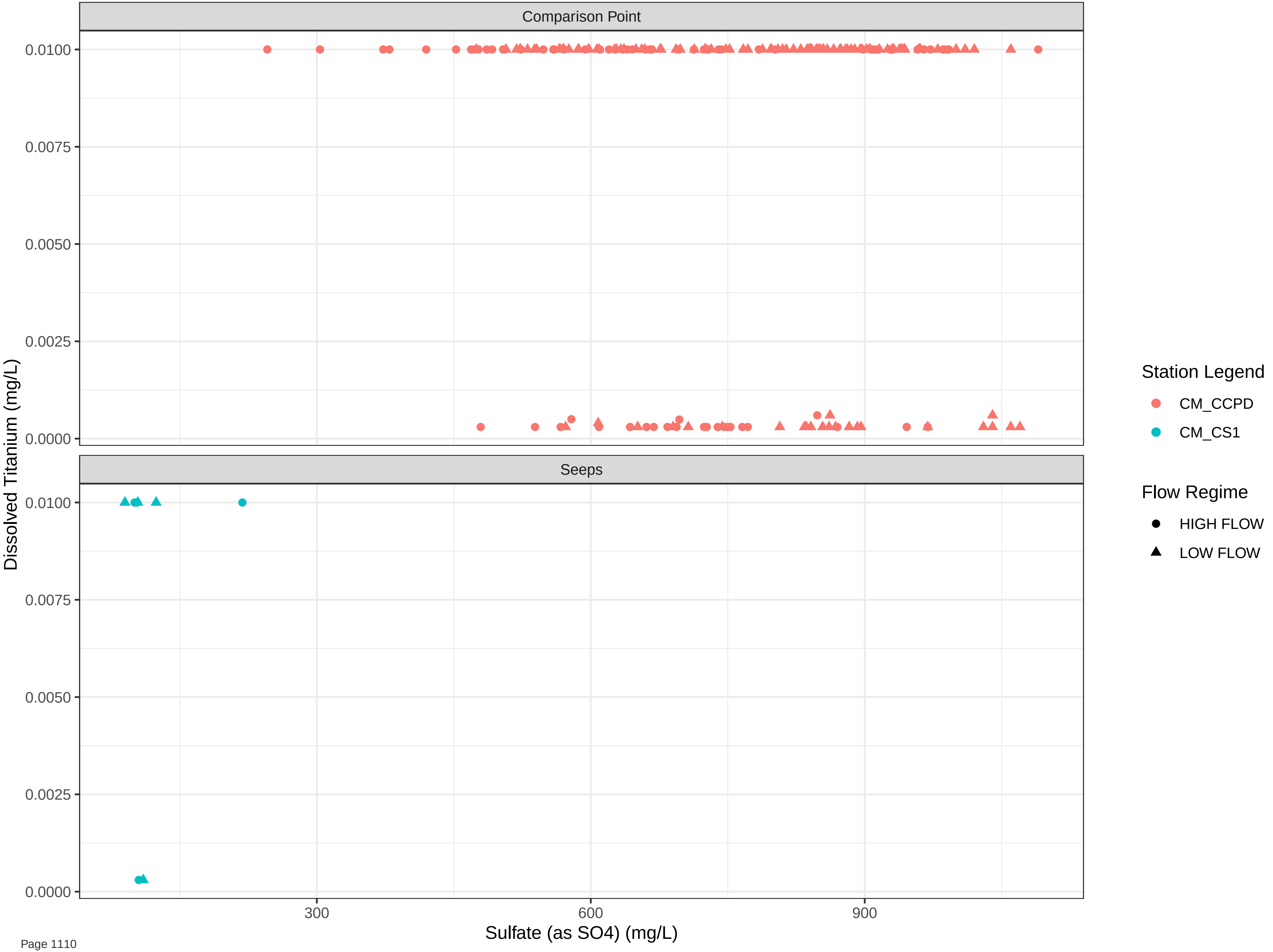


Comparison Point
Seeps
Dissolved Tin (mg/L)
8e−04
6e−04
4e−04
2e−04
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

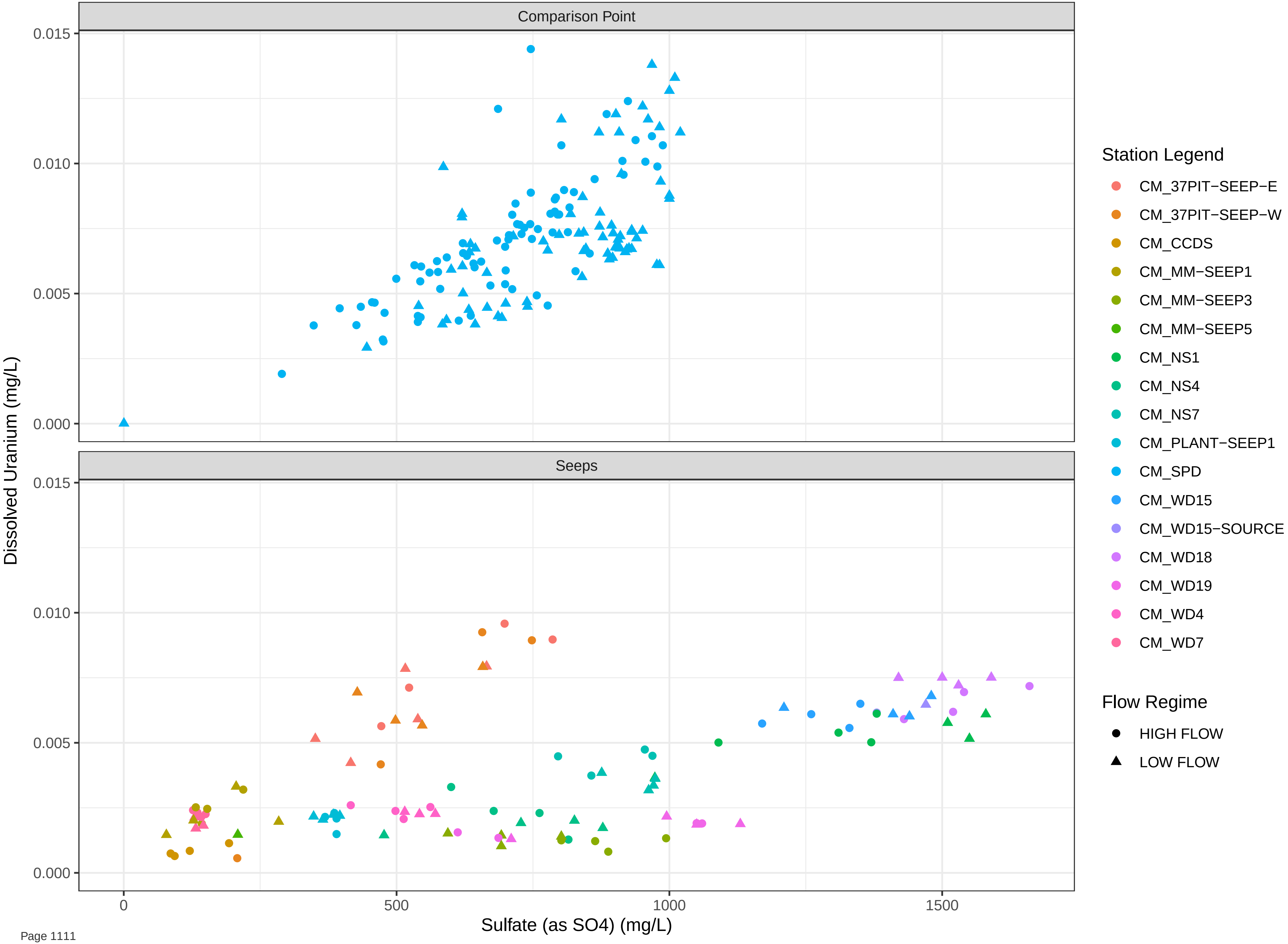


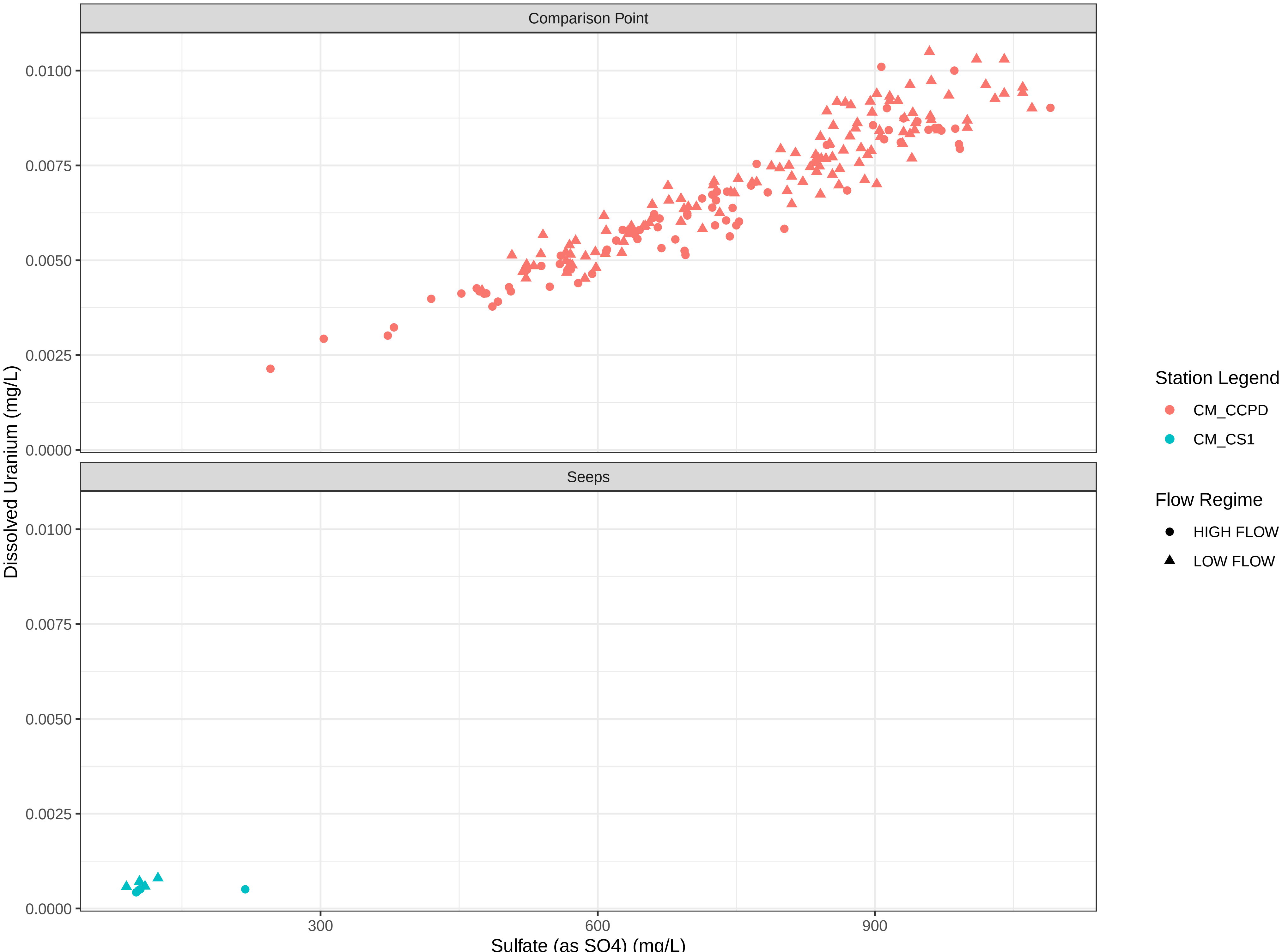
Comparison Point
Seeps
Dissolved Tin (mg/L)
0.00030
0.00025
0.00020
0.00015
0.00010
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

Comparison Point
Seeps
0.0100
0.0075
0.0050
0.0025
0.0000
Dissolved Titanium (mg/L)
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

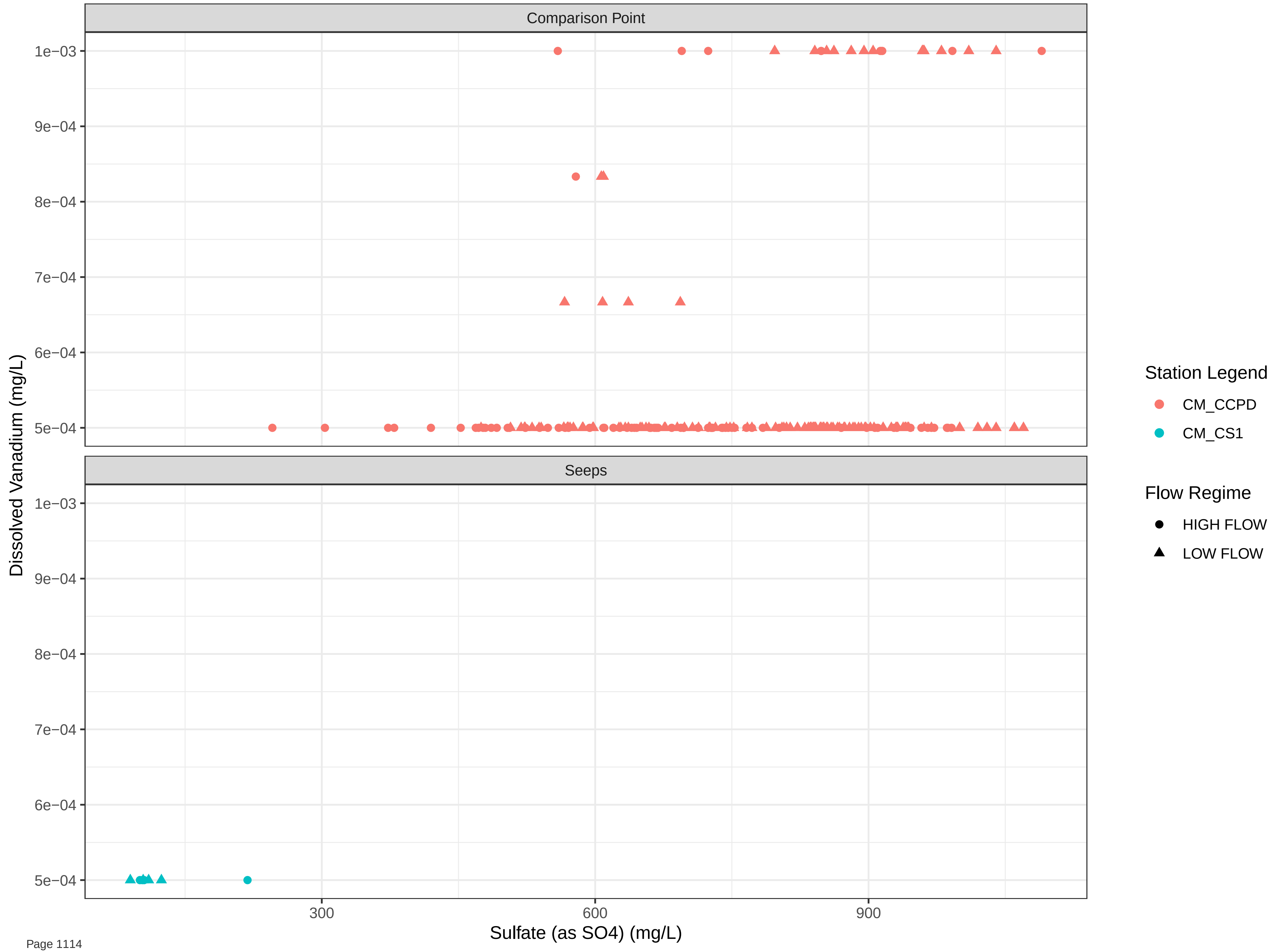


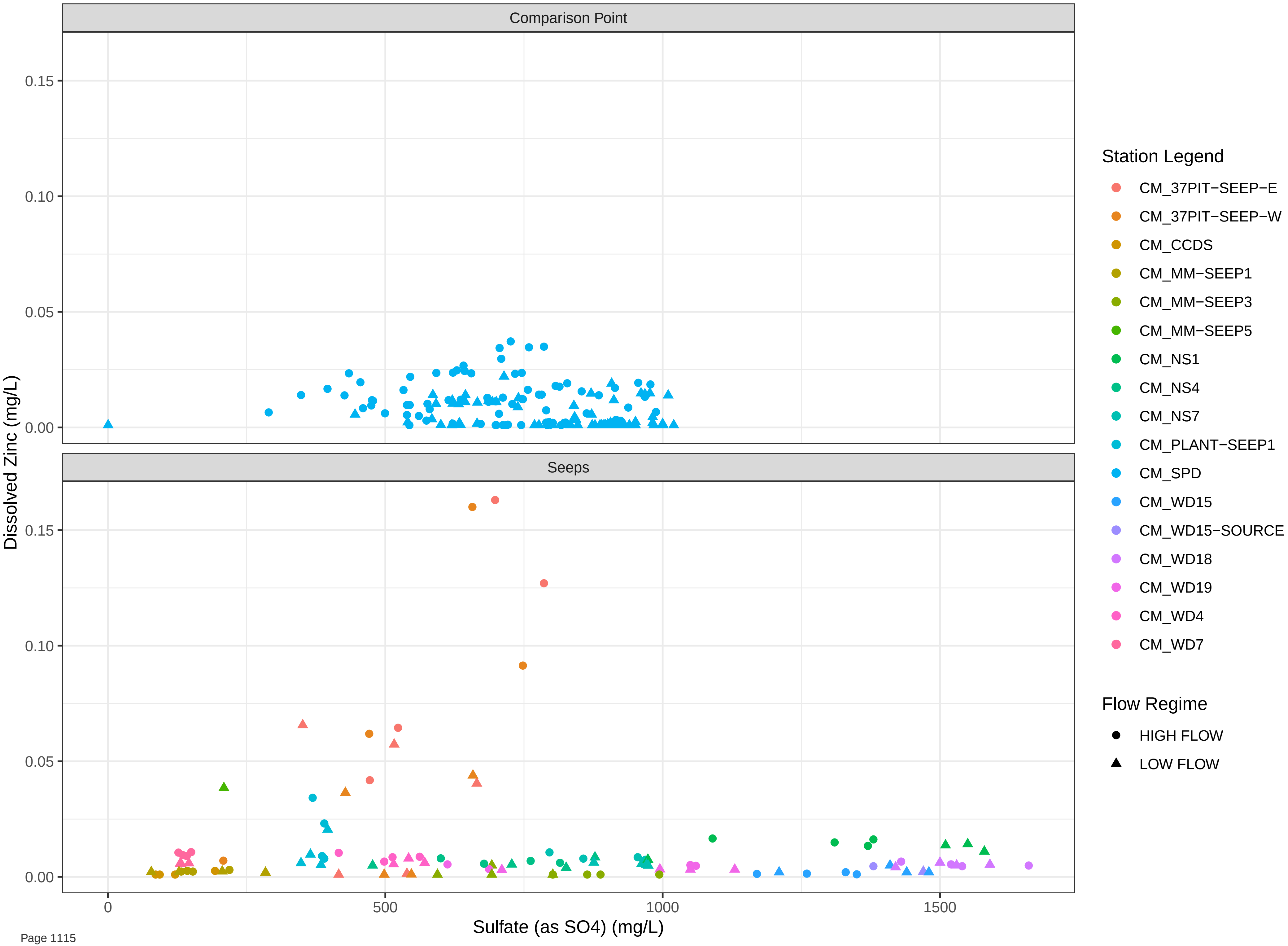
Comparison Point
Seeps
Dissolved Titanium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
Sulfate (as SO4) (mg/L)
300
600
900
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

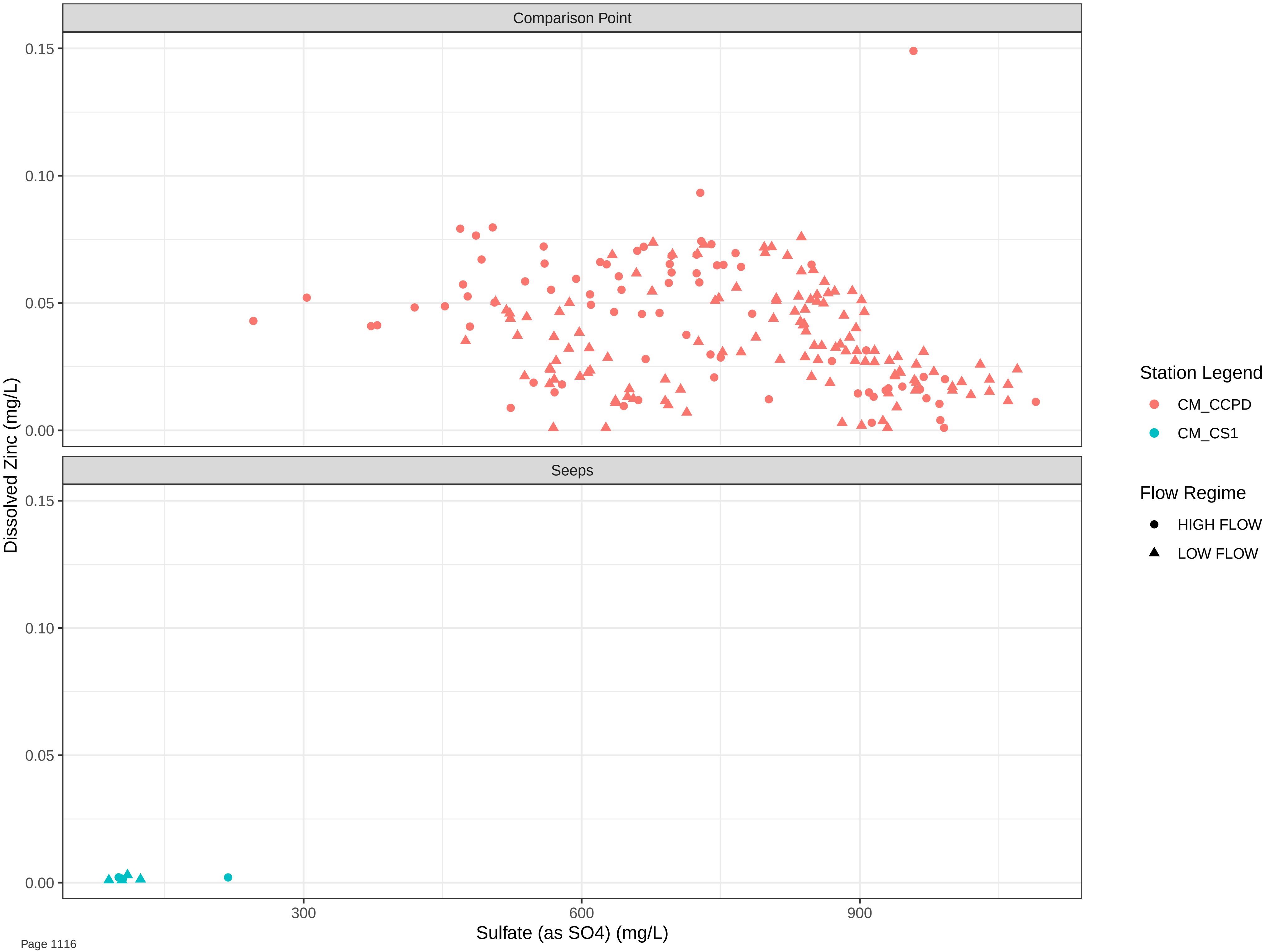

Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.015
0.010
0.005
0.000
0
500
1000
1500
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
Dissolved Uranium (mg/L)
0.0100
0.0075
0.0050
0.0025
0.0000
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

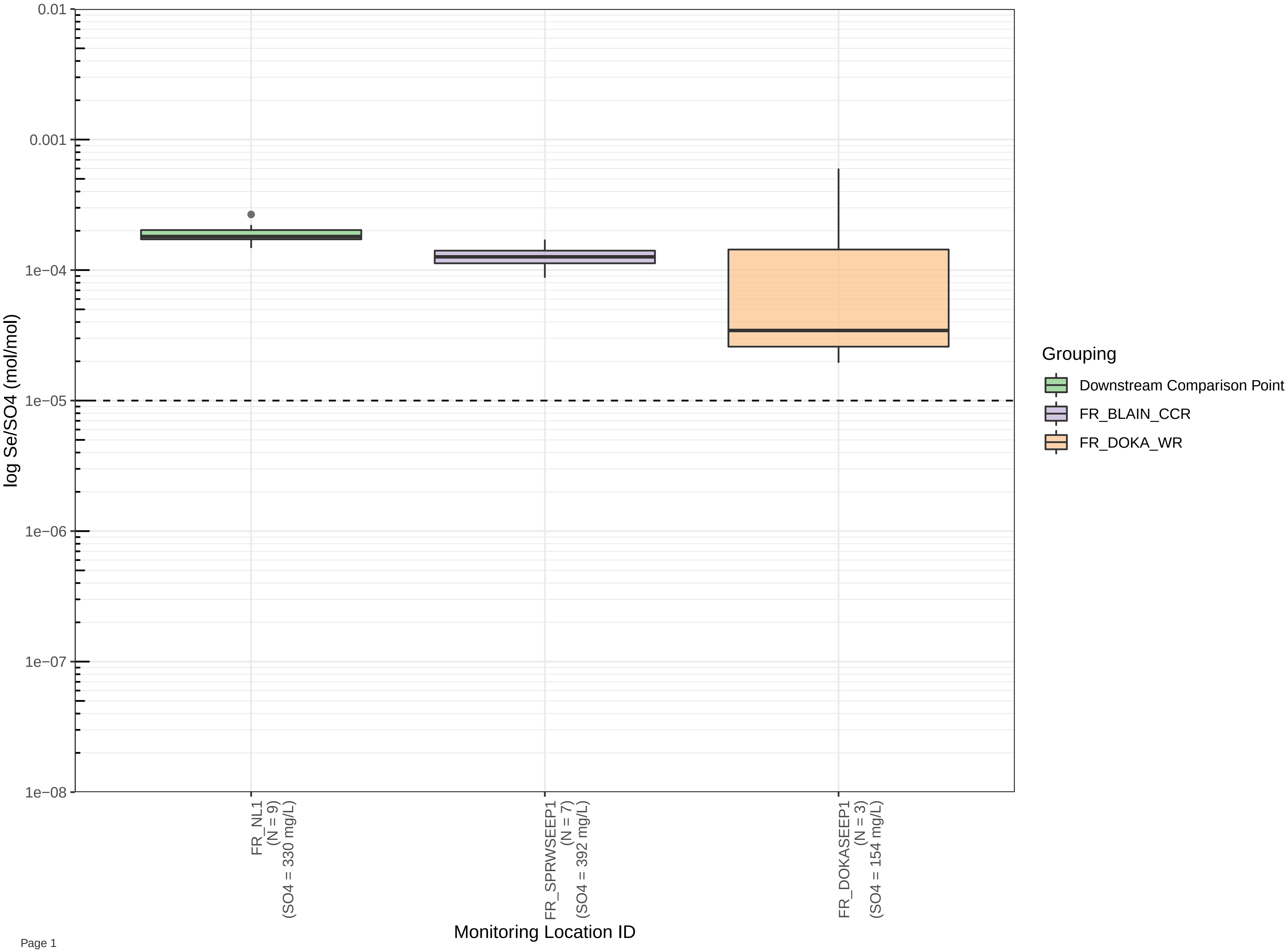
Comparison Point
Seeps
0.0025
0.0020
0.0015
0.0010
0.0005
0
500
1000
1500
Dissolved Vanadium (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

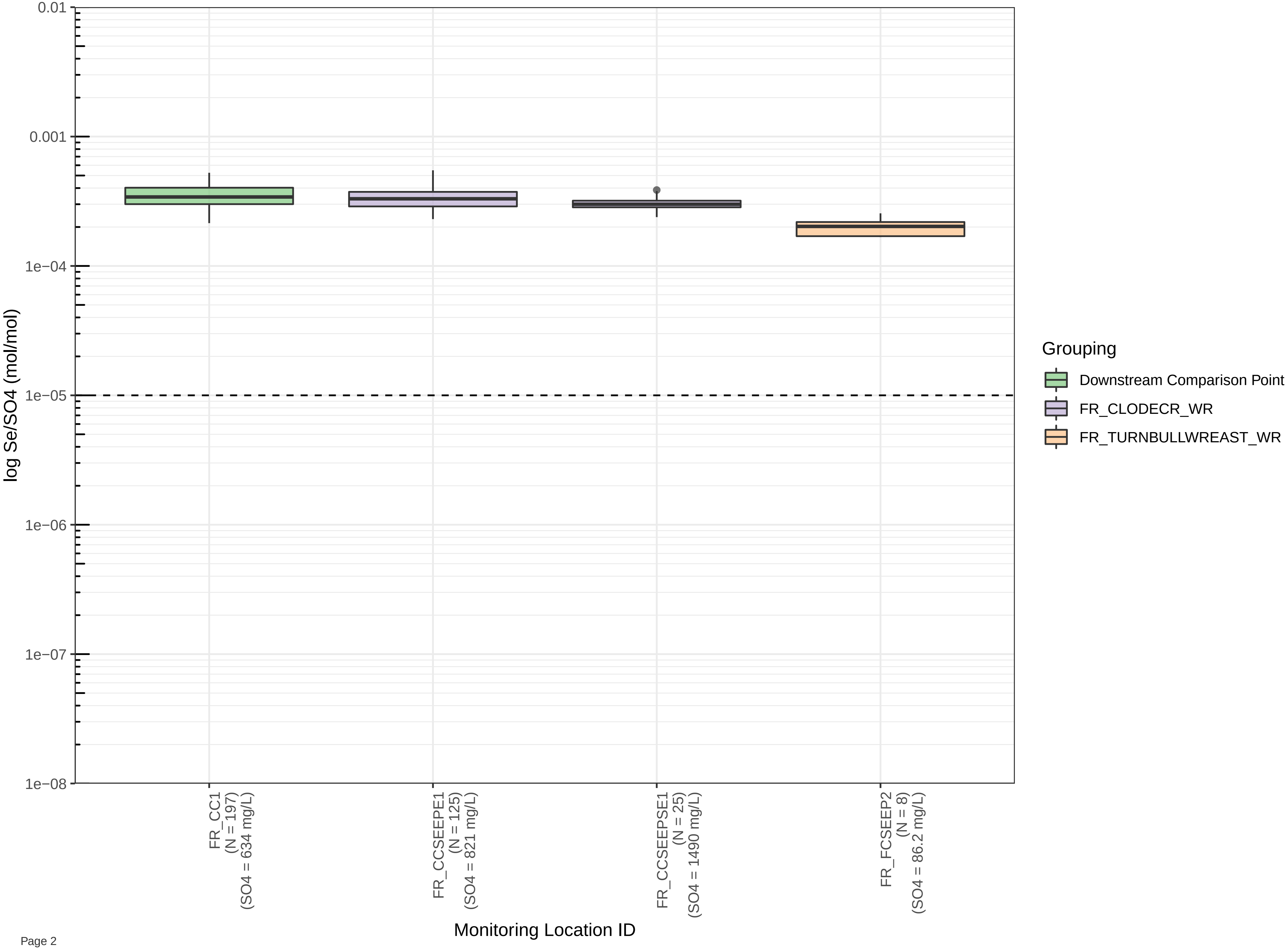

Comparison Point
Seeps
Dissolved Vanadium (mg/L)
1e−03
9e−04
8e−04
7e−04
6e−04
5e−04
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW


Comparison Point
Seeps
0.15
0.10
0.05
0.00
0
500
1000
1500
Dissolved Zinc (mg/L)
Sulfate (as SO4) (mg/L)
Station Legend
CM_37PIT−SEEP−E
CM_37PIT−SEEP−W
CM_CCDS
CM_MM−SEEP1
CM_MM−SEEP3
CM_MM−SEEP5
CM_NS1
CM_NS4
CM_NS7
CM_PLANT−SEEP1
CM_SPD
CM_WD15
CM_WD15−SOURCE
CM_WD18
CM_WD19
CM_WD4
CM_WD7
Flow Regime
HIGH FLOW
LOW FLOW

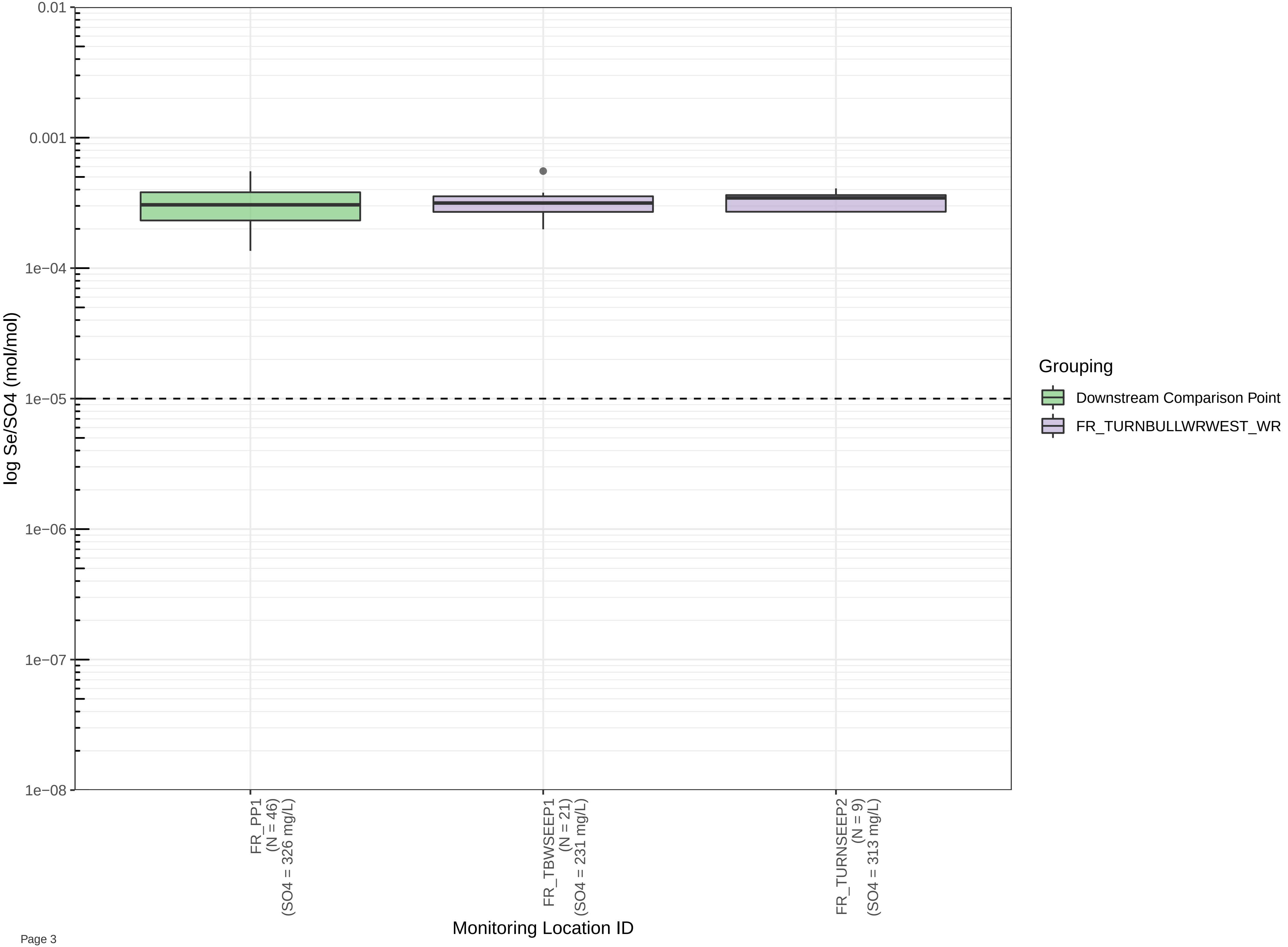

Comparison Point
Seeps
Dissolved Zinc (mg/L)
0.15
0.10
0.05
0.00
300
600
900
Sulfate (as SO4) (mg/L)
Station Legend
CM_CCPD
CM_CS1
Flow Regime
HIGH FLOW
LOW FLOW

Appendix F Comparison to Permitted Surface Water Monitoring Locations for Se/SO_4

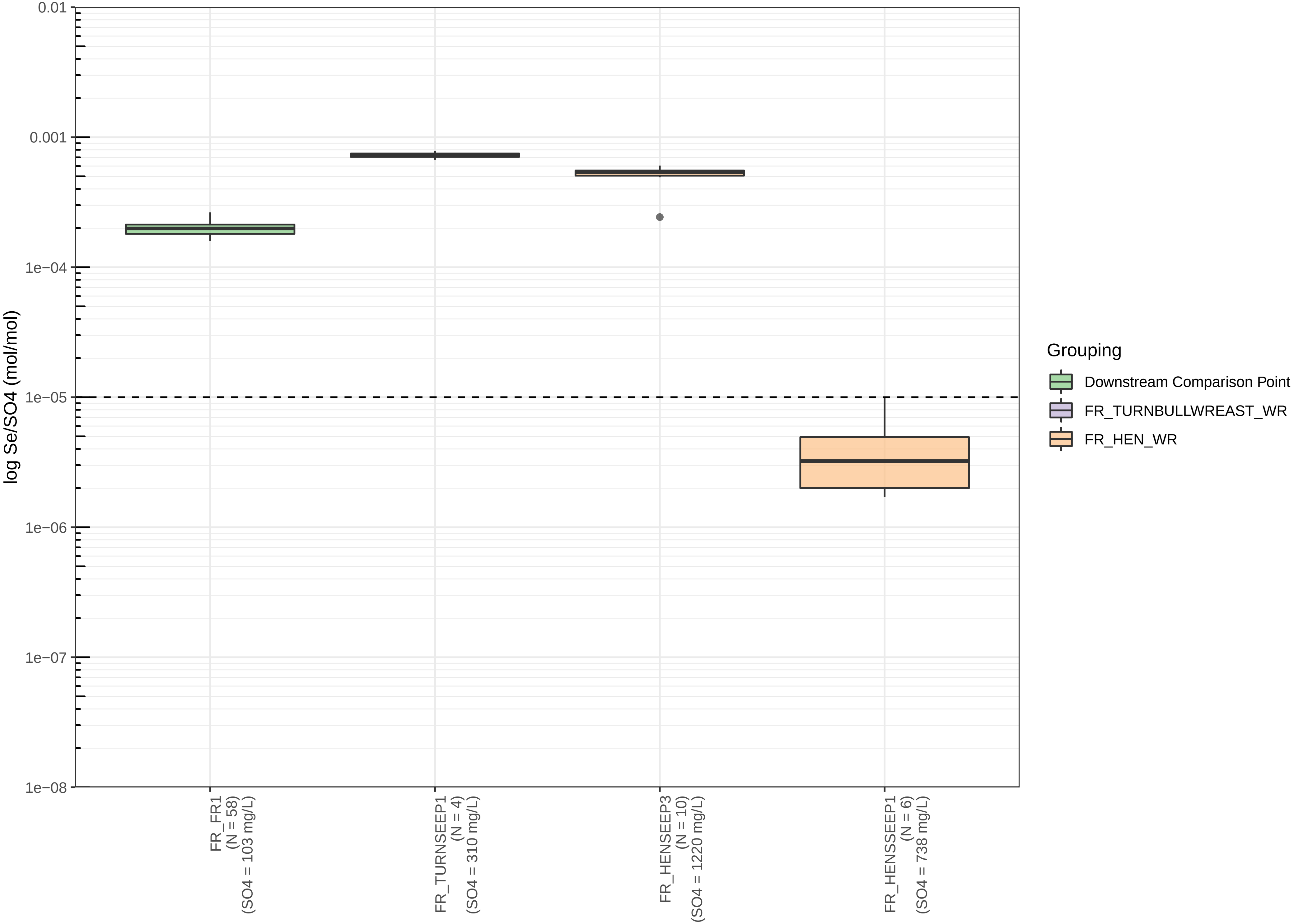

0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_NL1 (N = 9) (SO4 = 330 mg/L)
FR_SPRWSEEP1 (N = 7) (SO4 = 392 mg/L)
FR_DOKASEEP1 (N = 3) (SO4 = 154 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_BLAIN_CCR
FR_DOKA_WR



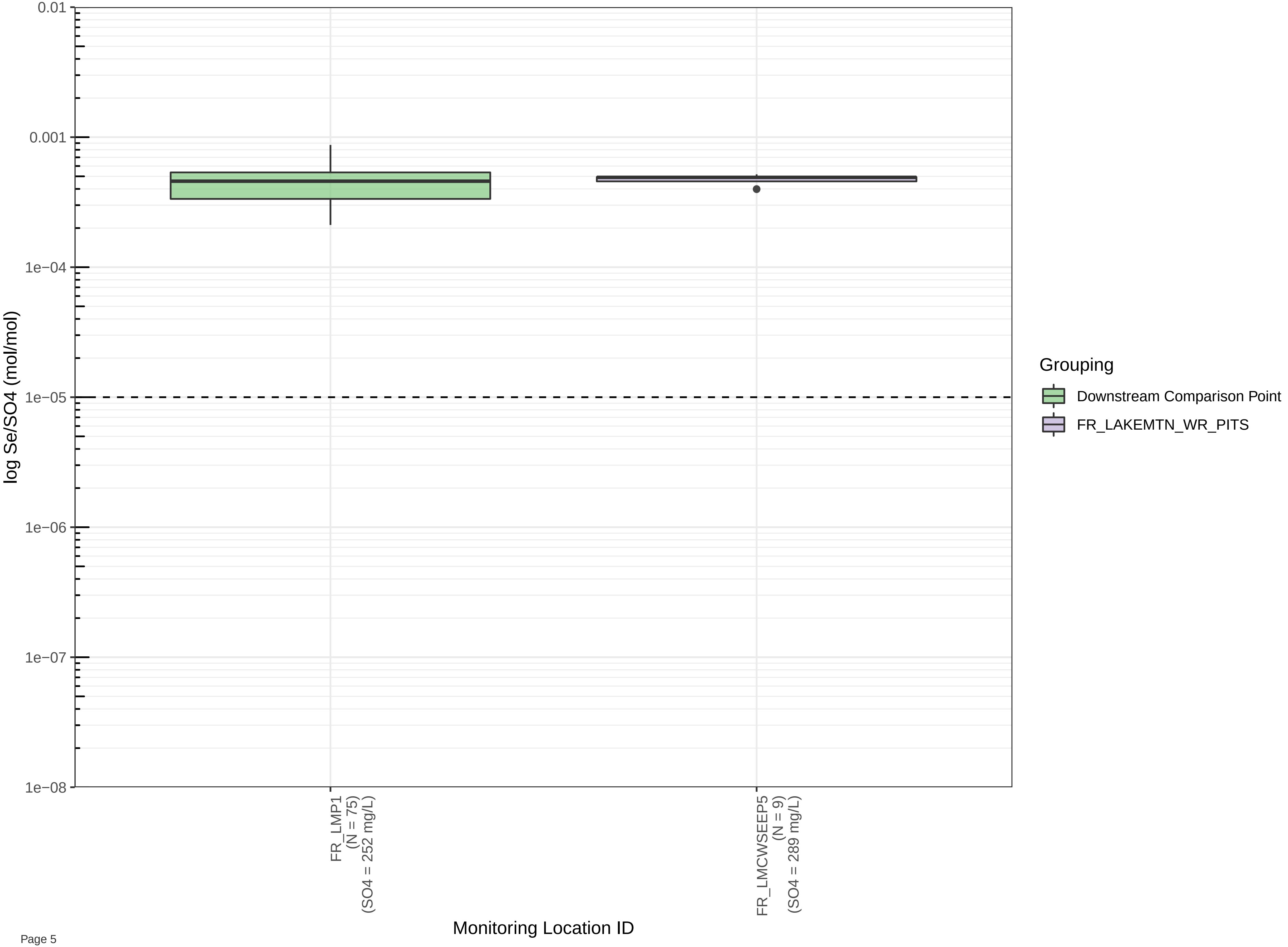
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_CC1
(N = 197)
(SO4 = 634 mg/L)
FR_CCSEEPE1
(N = 125)
(SO4 = 821 mg/L)
FR_CCSEEPSE1
(N = 25)
(SO4 = 1490 mg/L)
FR_FCSEEP2
(N = 8)
(SO4 = 86.2 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_CLODECR_WR
FR_TURNBULLWREAST_WR



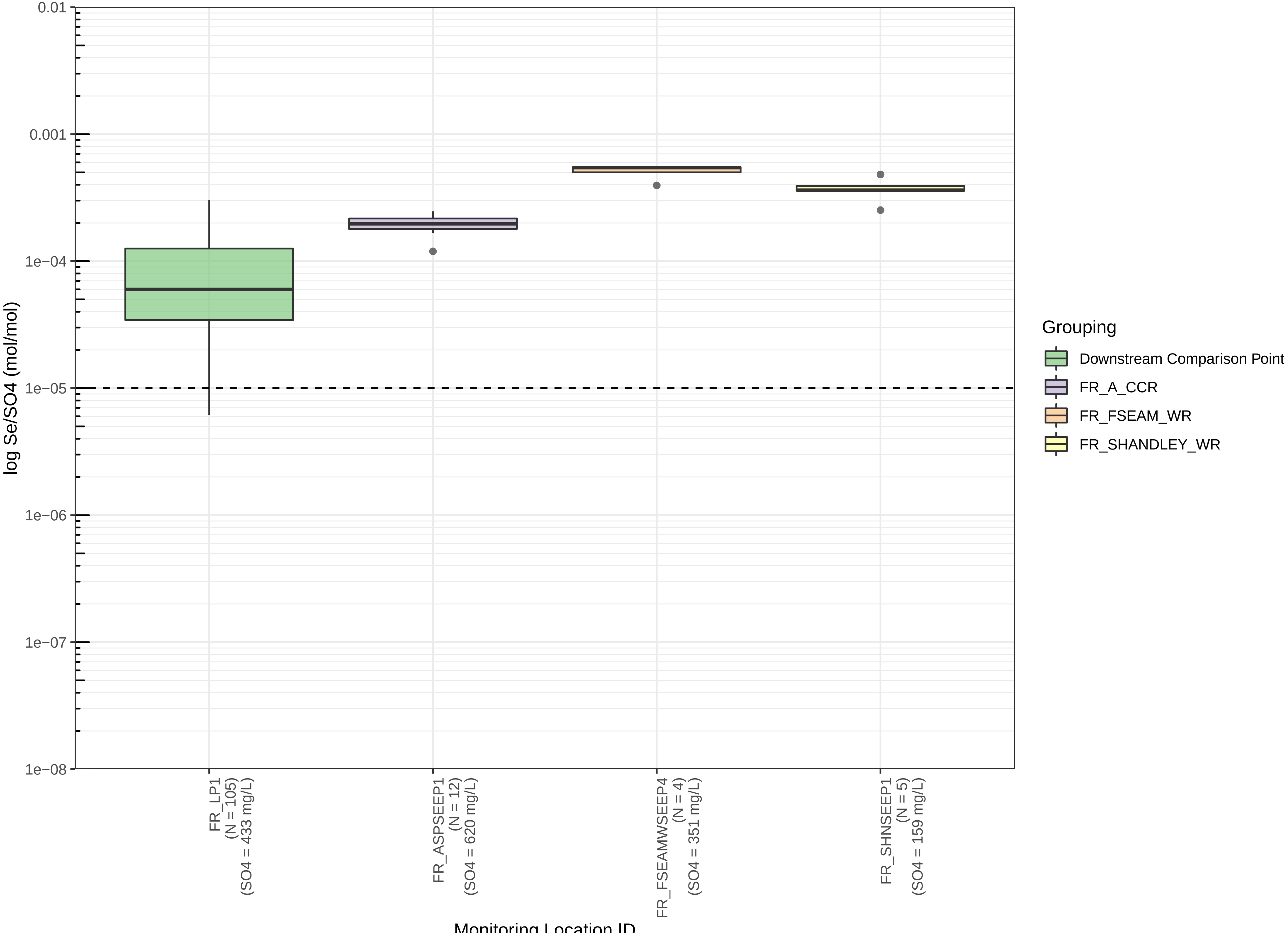
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_PP1
(N = 46)
(SO4 = 326 mg/L)
FR_TBWSEEP1
(N = 21)
(SO4 = 231 mg/L)
FR_TURNSEEP2
(N = 9)
(SO4 = 313 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_TURNBULLWRWEST_WR



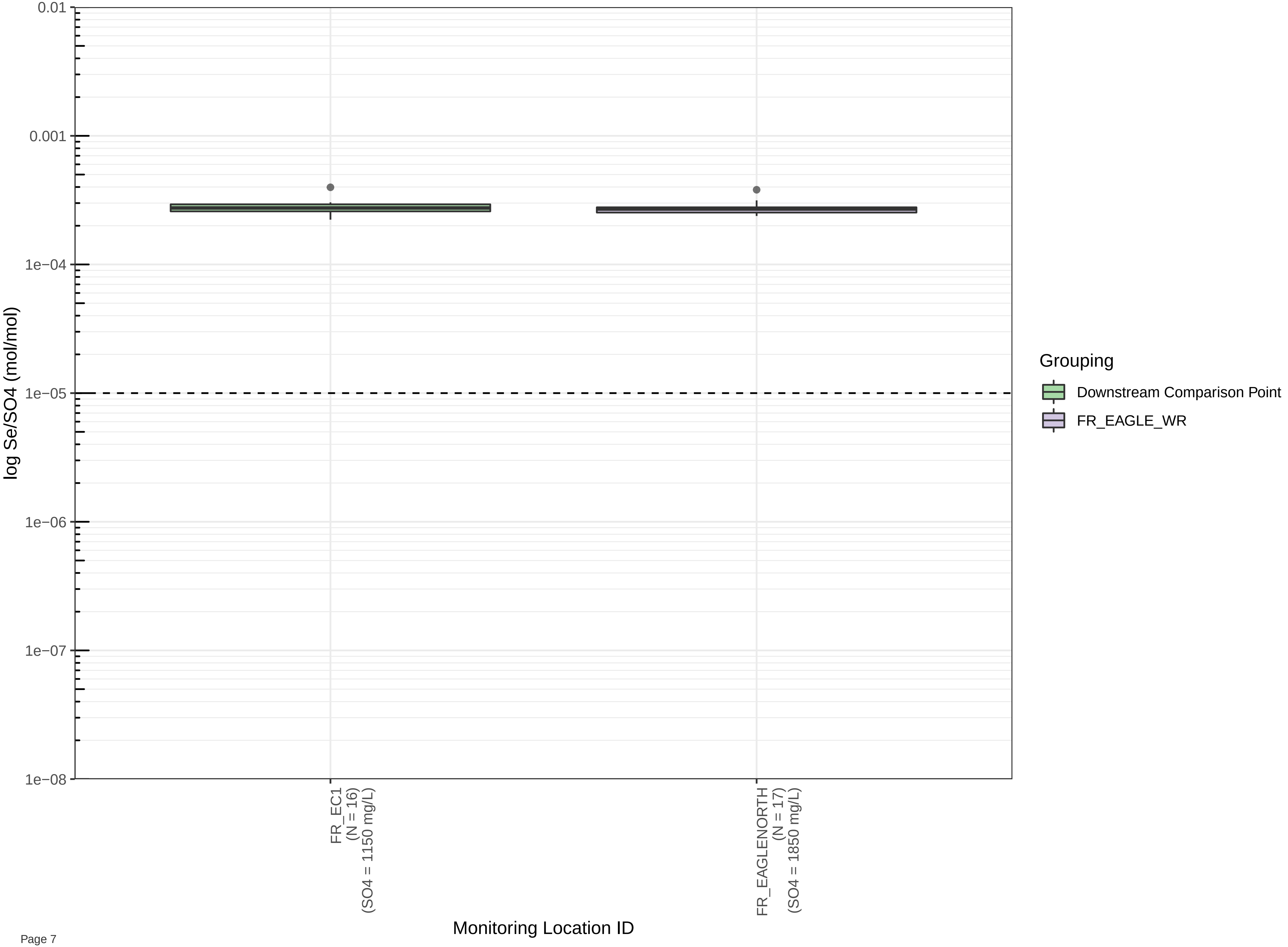
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_FR1 (N = 58) (SO4 = 103 mg/L)
FR_TURNSEEP1 (N = 4) (SO4 = 310 mg/L)
FR_HENSEEP3 (N = 10) (SO4 = 1220 mg/L)
FR_HENSSEEP1 (N = 6) (SO4 = 738 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_TURNBULLWREAST_WR
FR_HEN_WR

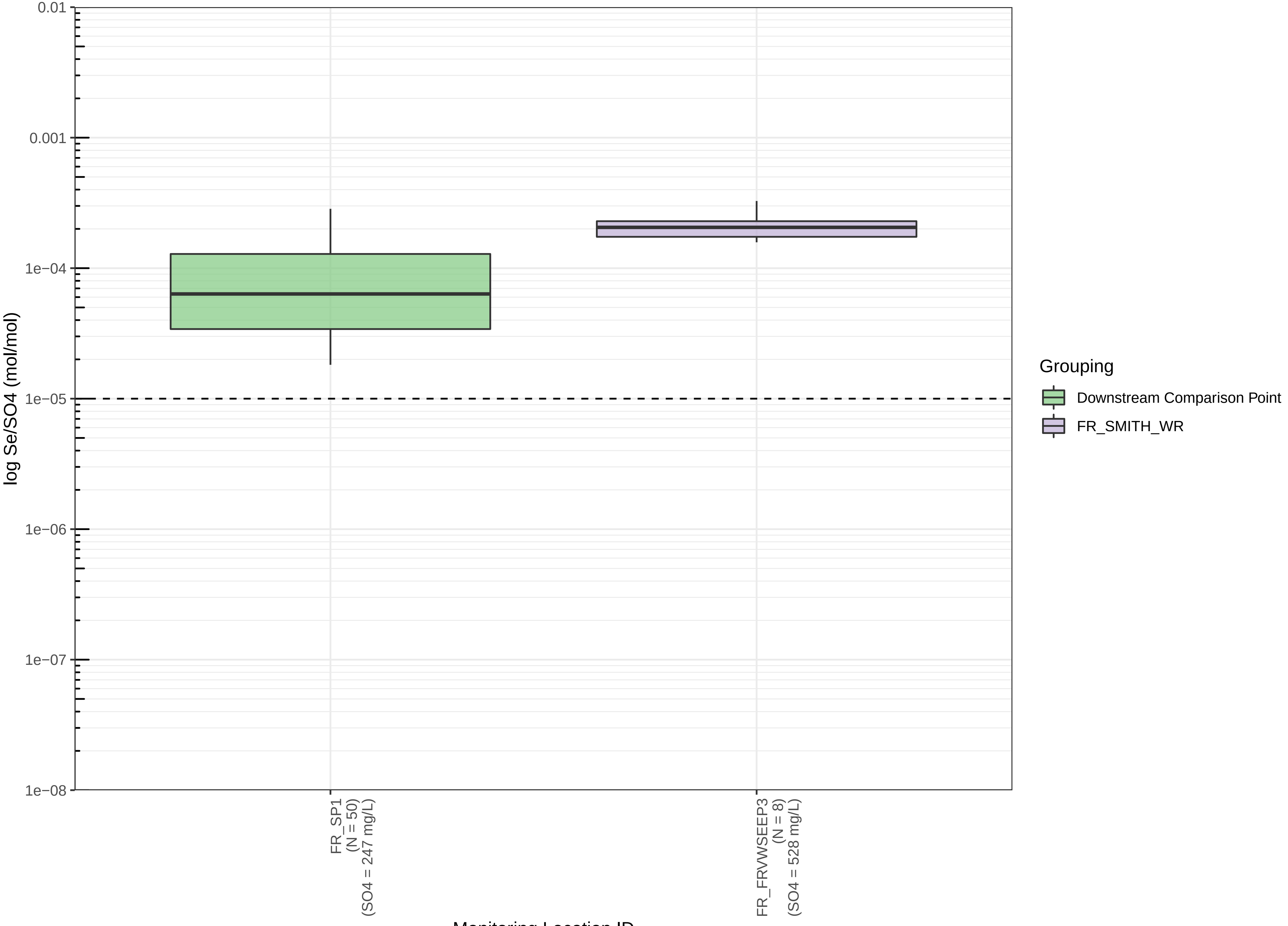


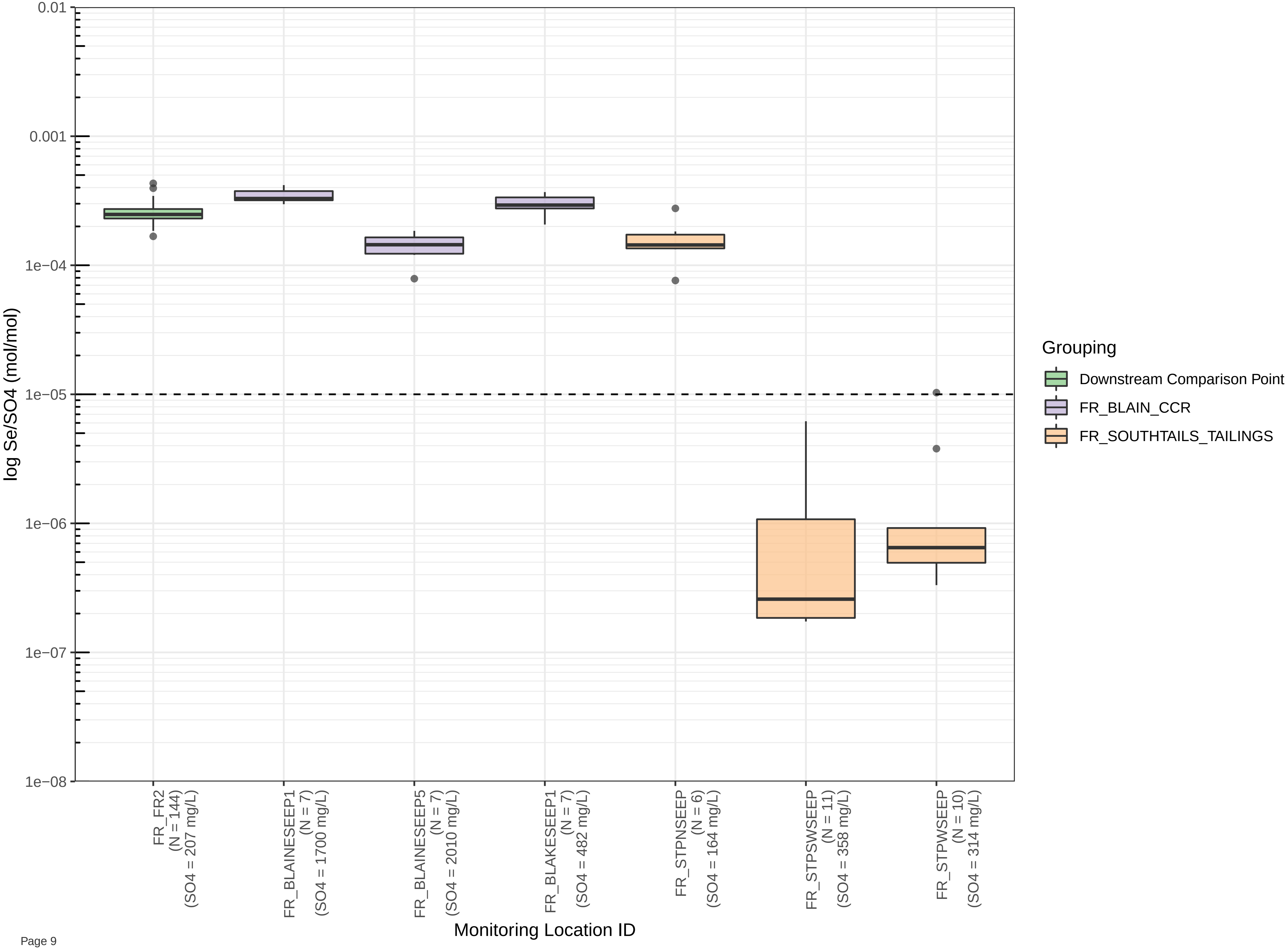
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_LMP1
(N = 75)
(SO4 = 252 mg/L)
FR_LMCWSEEP5
(N = 9)
(SO4 = 289 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_LAKEMTN_WR_PITS



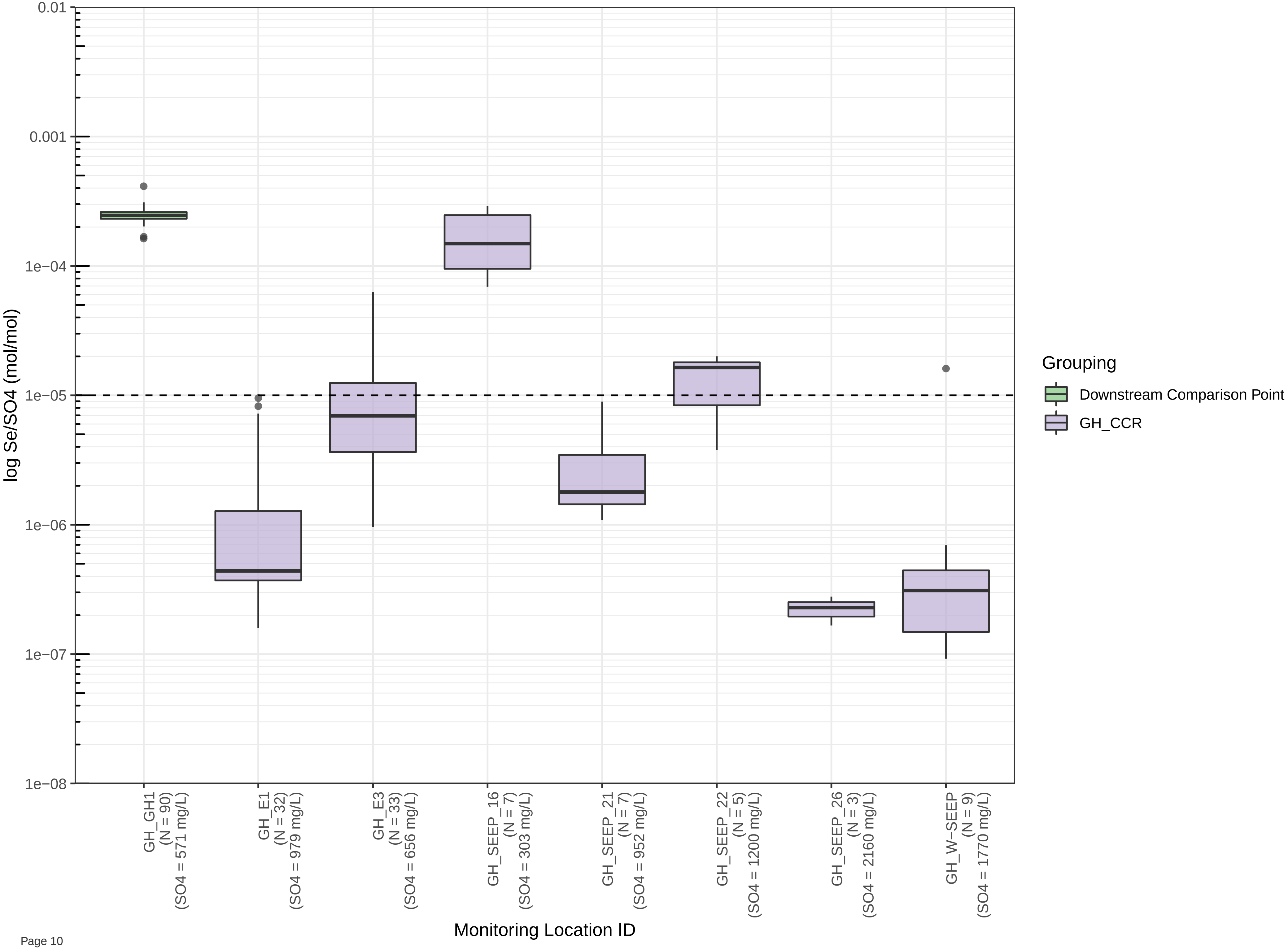
log Se/SO4 (mol/mol)
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
FR_LP1 (N = 105) (SO4 = 433 mg/L)
FR_ASPSEEP1 (N = 12) (SO4 = 620 mg/L)
FR_FSEAMWSEEP4 (N = 4) (SO4 = 351 mg/L)
FR_SHNSEEP1 (N = 5) (SO4 = 159 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_A_CCR
FR_FSEAM_WR
FR_SHANDLEY_WR


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_EC1
(N = 16)
(SO4 = 1150 mg/L)
FR_EAGLENORTH
(N = 17)
(SO4 = 1850 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_EAGLE_WR

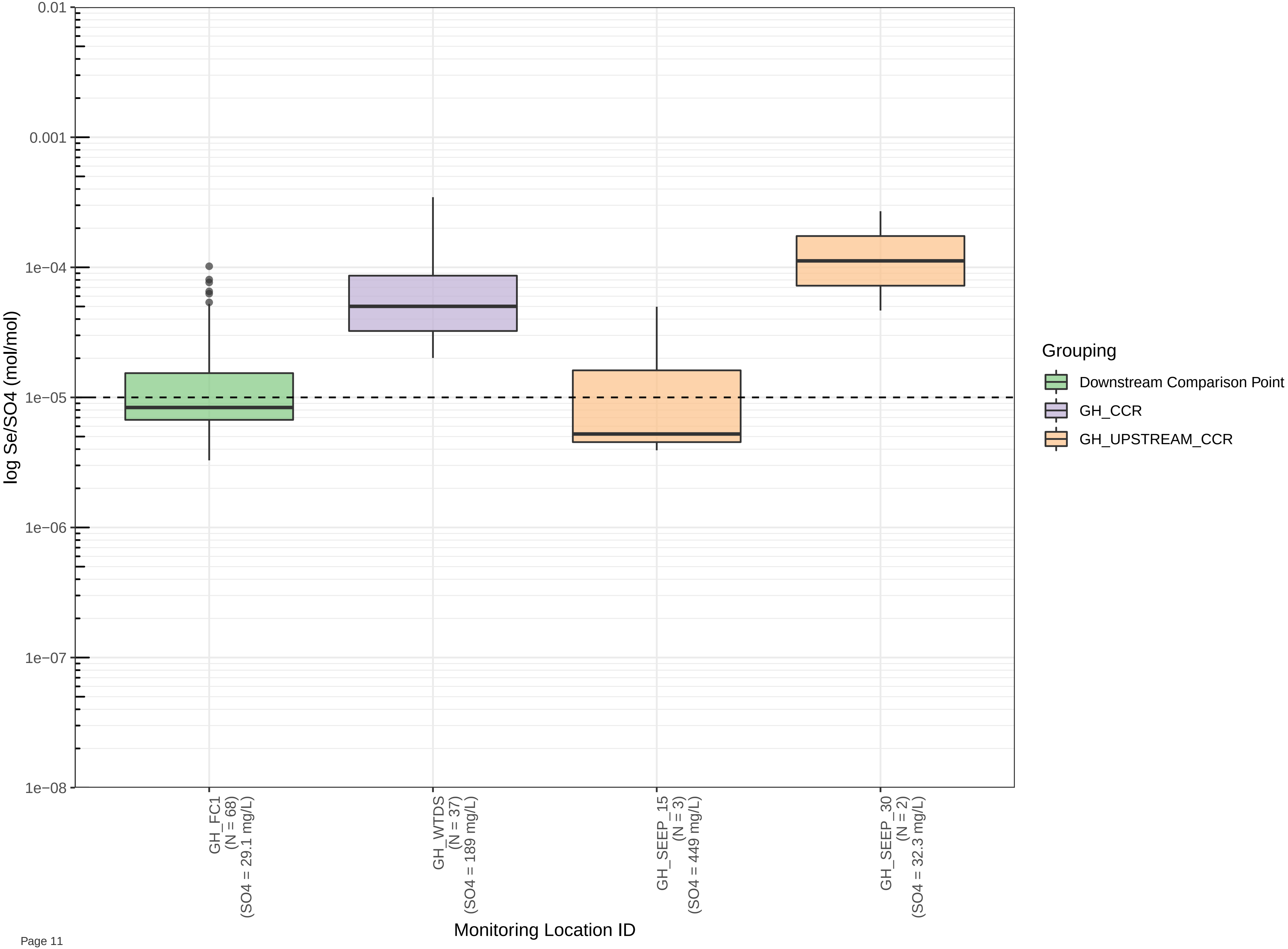

0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
FR_SP1
(N = 50)
(SO4 = 247 mg/L)
FR_FRVWSEEP3
(N = 8)
(SO4 = 528 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_SMITH_WR



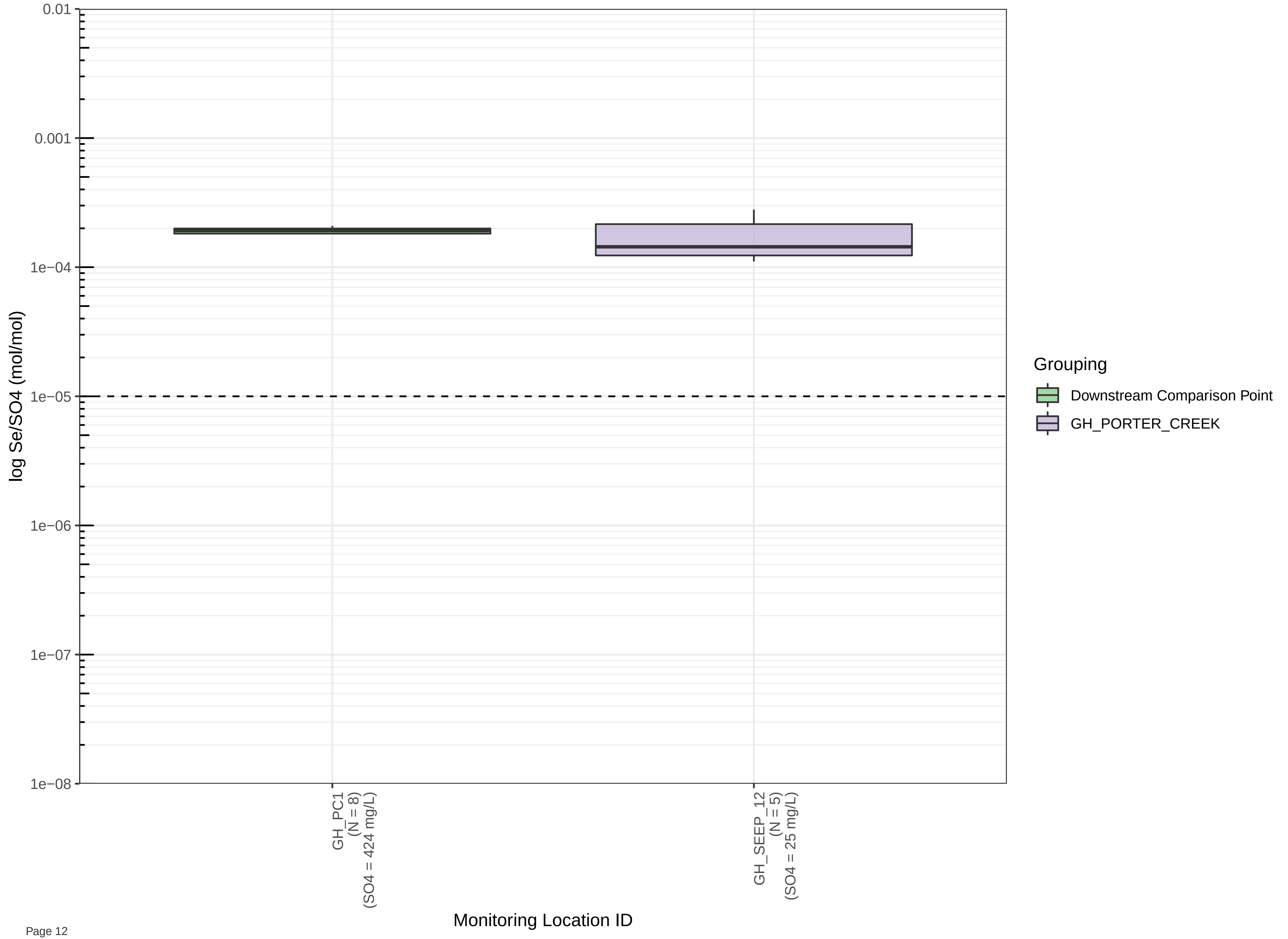
log Se/SO4 (mol/mol)
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
FR_FR2 (N = 144) (SO4 = 207 mg/L)
FR_BLAINESEEP1 (N = 7) (SO4 = 1700 mg/L)
FR_BLAINESEEP5 (N = 7) (SO4 = 2010 mg/L)
FR_BLAKESEEP1 (N = 7) (SO4 = 482 mg/L)
FR_STPNSEEP (N = 6) (SO4 = 164 mg/L)
FR_STPSWSEEP (N = 11) (SO4 = 358 mg/L)
FR_STPWSEEP (N = 10) (SO4 = 314 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
FR_BLAIN_CCR
FR_SOUTHTAILS_TAILINGS



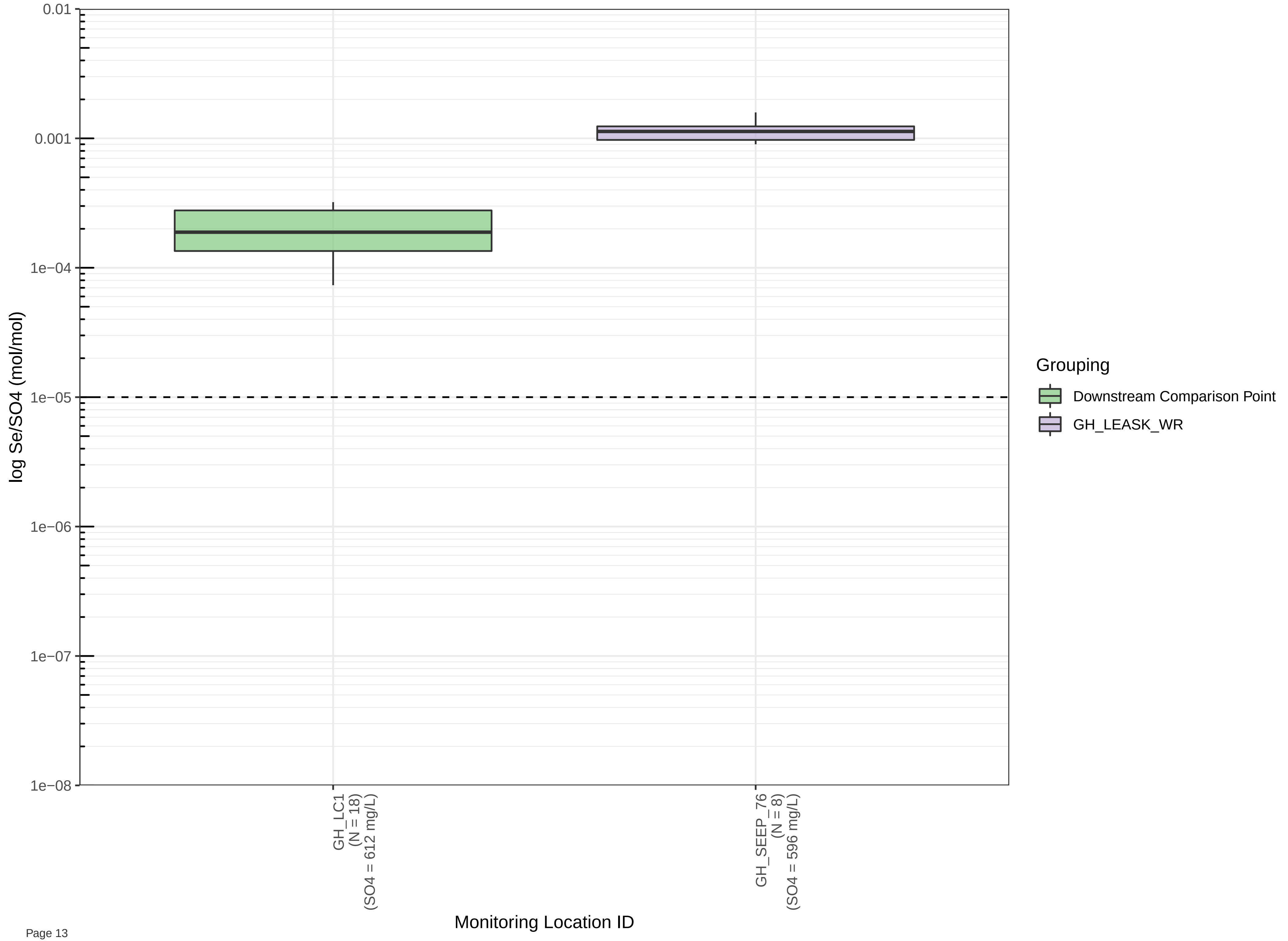
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
GH_GH1 (N = 90) (SO4 = 571 mg/L)
GH_E1 (N = 32) (SO4 = 979 mg/L)
GH_E3 (N = 33) (SO4 = 656 mg/L)
GH_SEEP_16 (N = 7) (SO4 = 303 mg/L)
GH_SEEP_21 (N = 7) (SO4 = 952 mg/L)
GH_SEEP_22 (N = 5) (SO4 = 1200 mg/L)
GH_SEEP_26 (N = 3) (SO4 = 2160 mg/L)
GH_W−SEEP (N = 9) (SO4 = 1770 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
GH_CCR



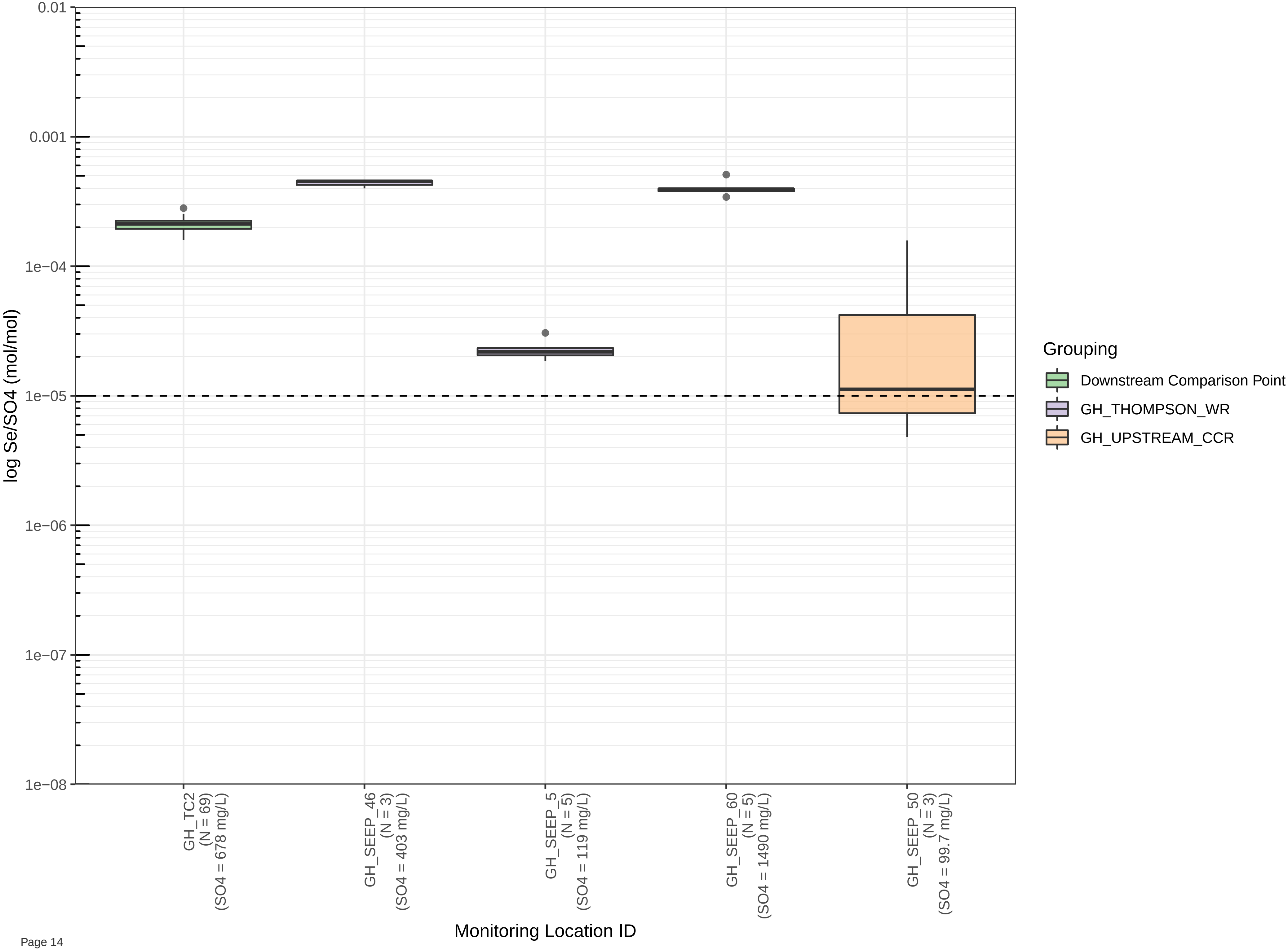
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
GH_FC1 (N = 68) (SO4 = 29.1 mg/L)
GH_WTDS (N = 37) (SO4 = 189 mg/L)
GH_SEEP_15 (N = 3) (SO4 = 449 mg/L)
GH_SEEP_30 (N = 2) (SO4 = 32.3 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
GH_CCR
GH_UPSTREAM_CCR



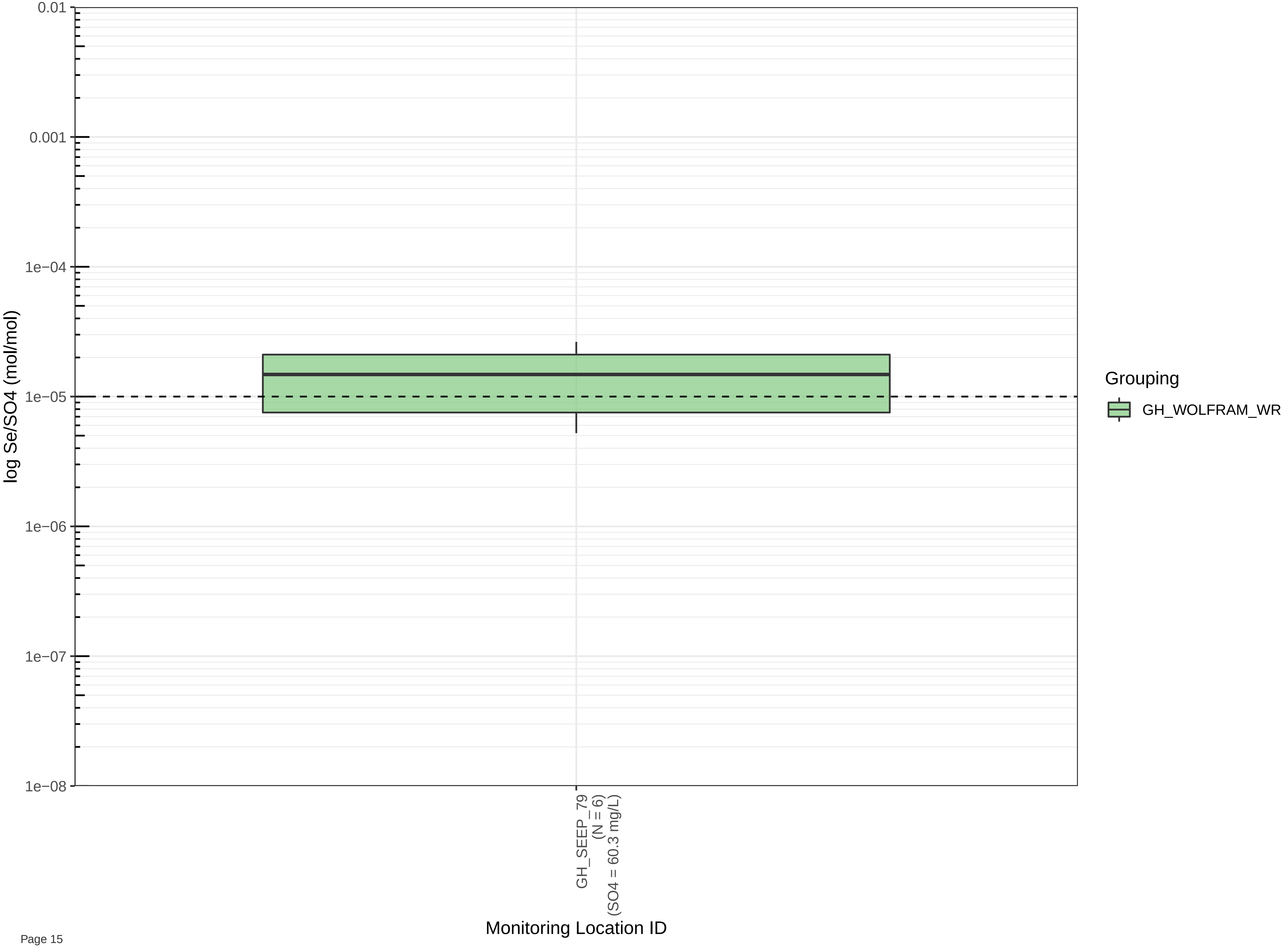
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
GH_PC1
(N = 8)
(SO4 = 424 mg/L)
GH_SEEP_12
(N = 5)
(SO4 = 25 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
GH_PORTER_CREEK

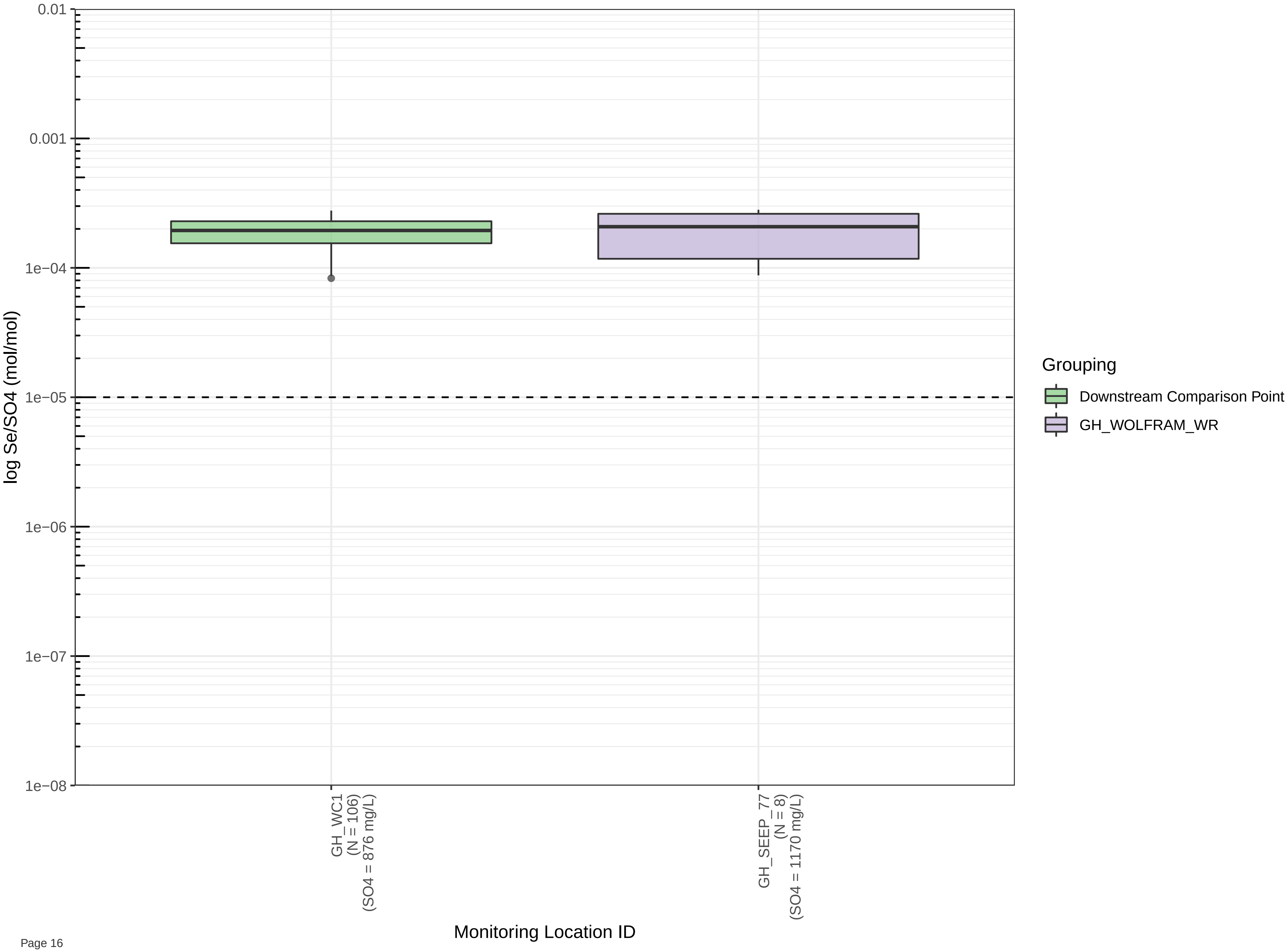


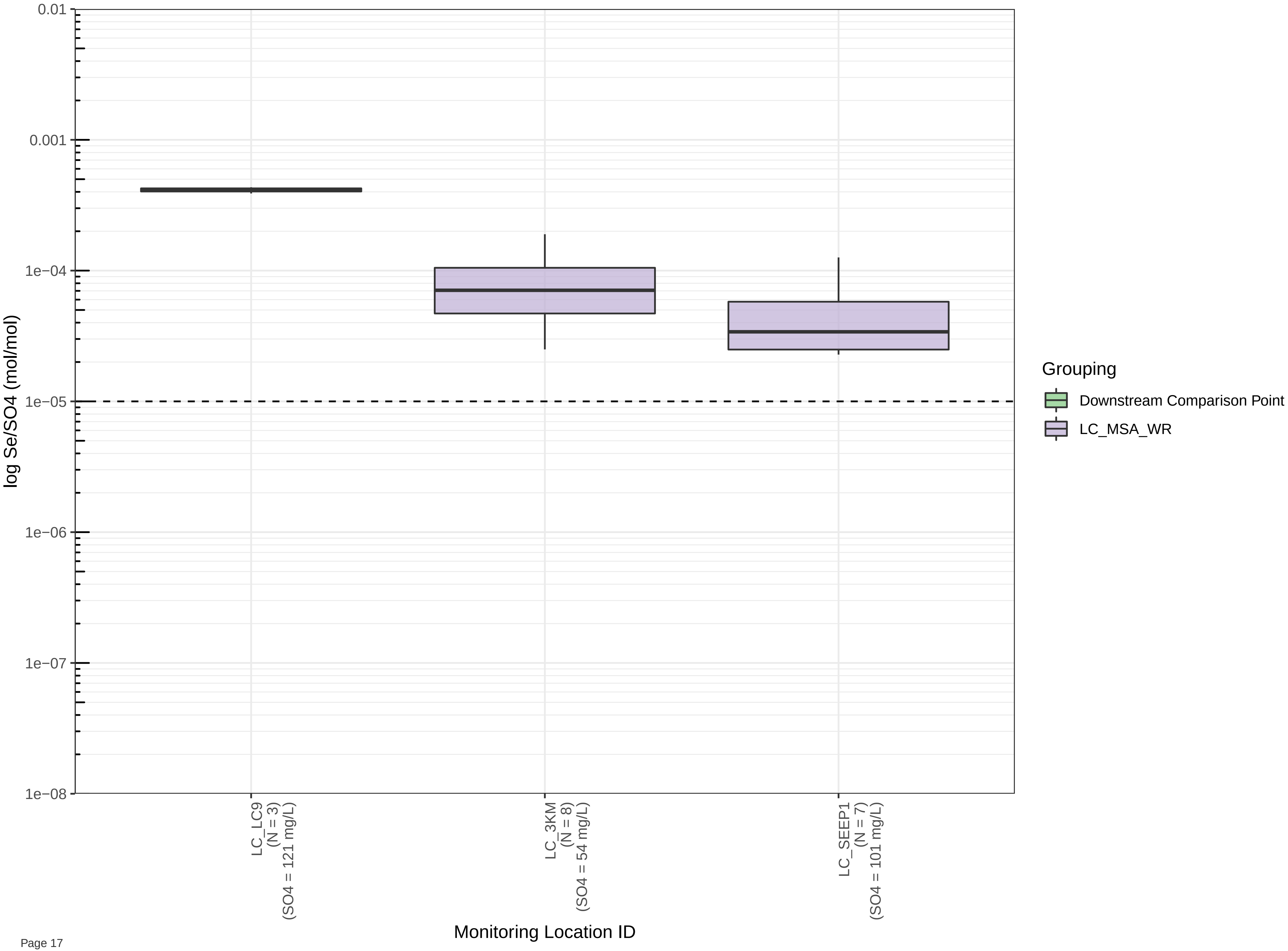
log Se/SO4 (mol/mol)
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
GH_LC1
(N = 18)
(SO4 = 612 mg/L)
GH_SEEP_76
(N = 8)
(SO4 = 596 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
GH_LEASK_WR

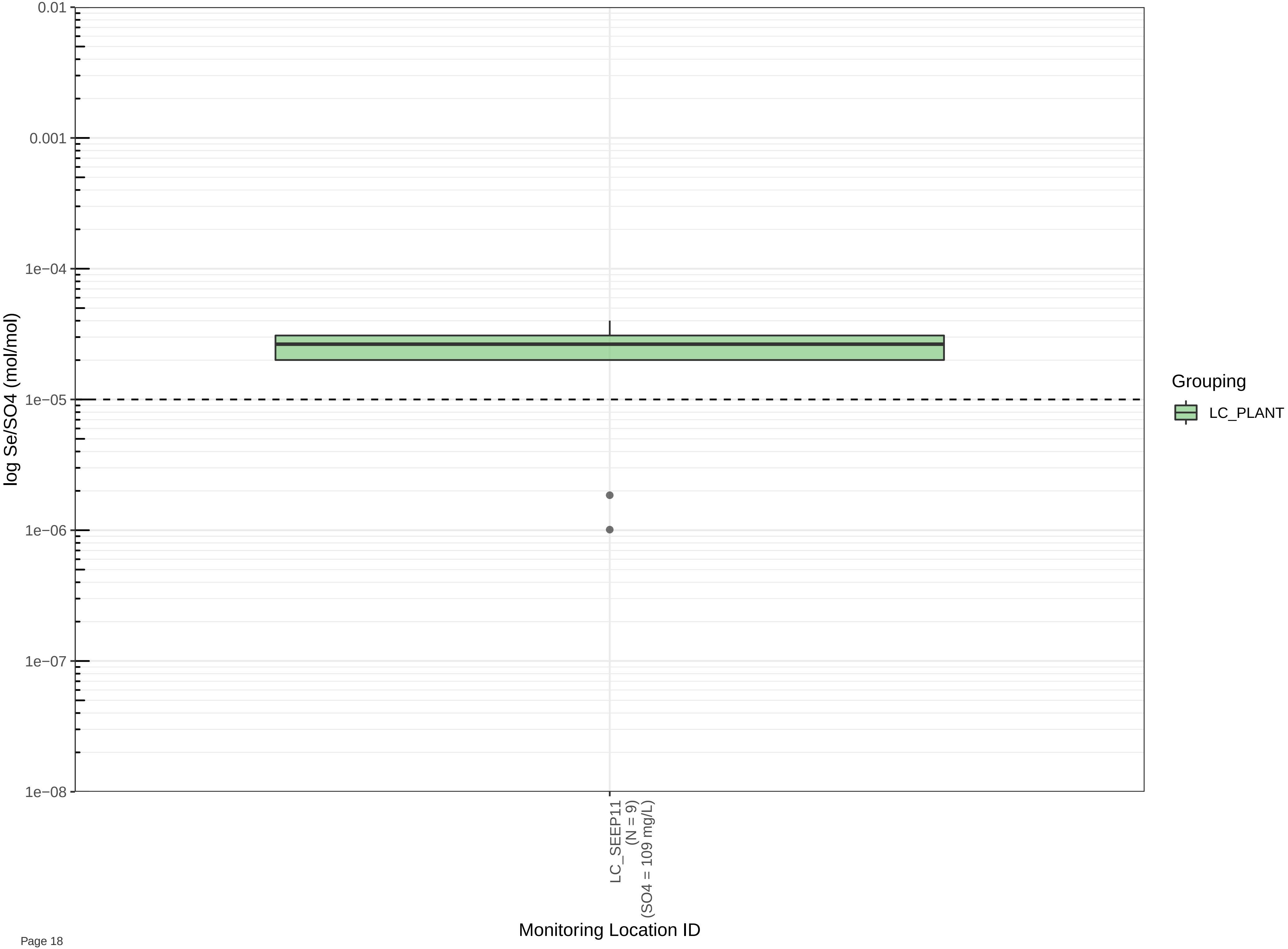


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
GH_TC2 (N = 69) (SO4 = 678 mg/L)
GH_SEEP_46 (N = 3) (SO4 = 403 mg/L)
GH_SEEP_5 (N = 5) (SO4 = 119 mg/L)
GH_SEEP_60 (N = 5) (SO4 = 1490 mg/L)
GH_SEEP_50 (N = 3) (SO4 = 99.7 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
GH_THOMPSON_WR
GH_UPSTREAM_CCR

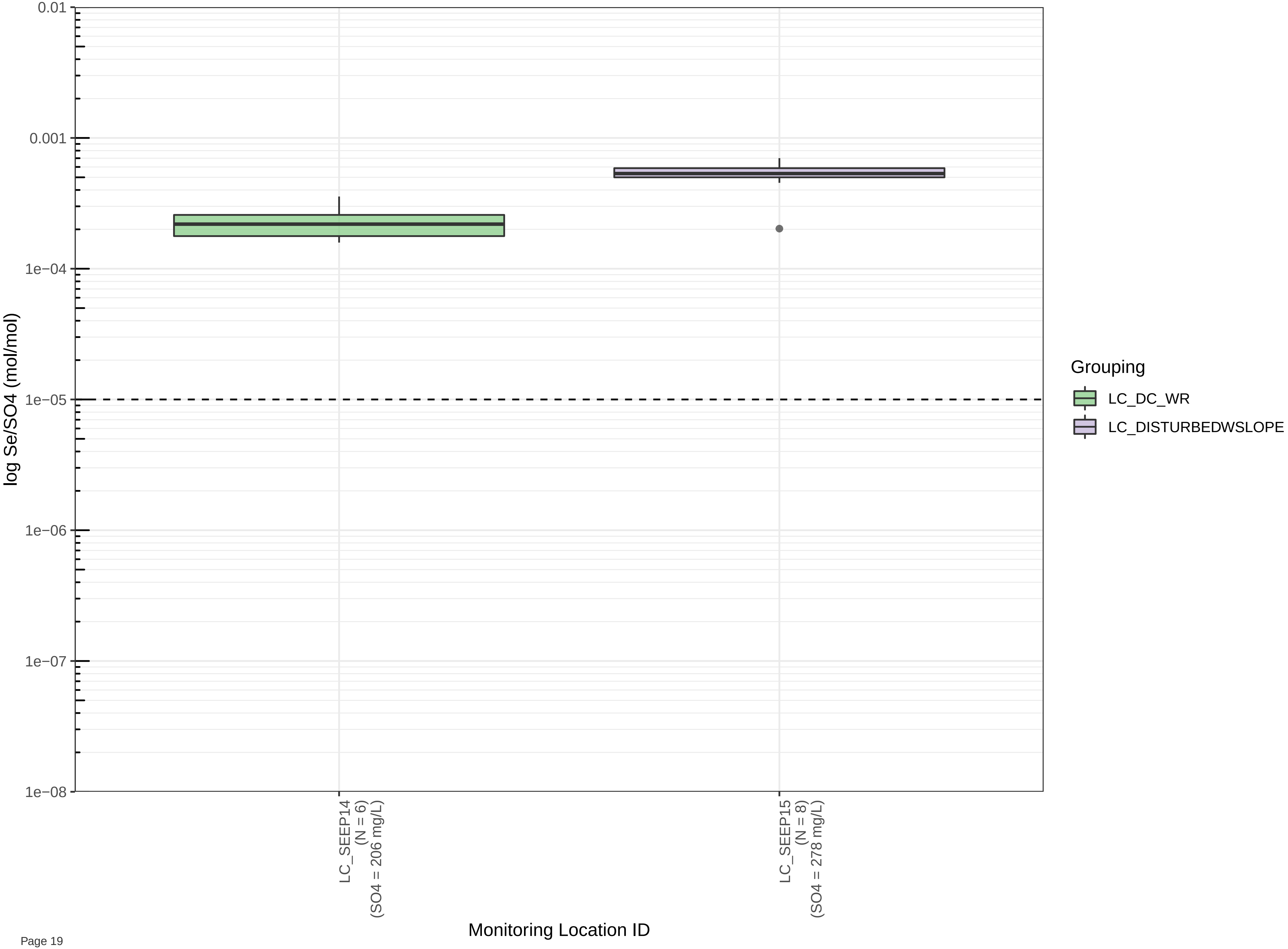

0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
GH_SEEP_79
(N = 6)
(SO4 = 60.3 mg/L)
Monitoring Location ID
Grouping
GH_WOLFRAM_WR


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
GH_WC1
(N = 106)
(SO4 = 876 mg/L)
GH_SEEP_77
(N = 8)
(SO4 = 1170 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
GH_WOLFRAM_WR

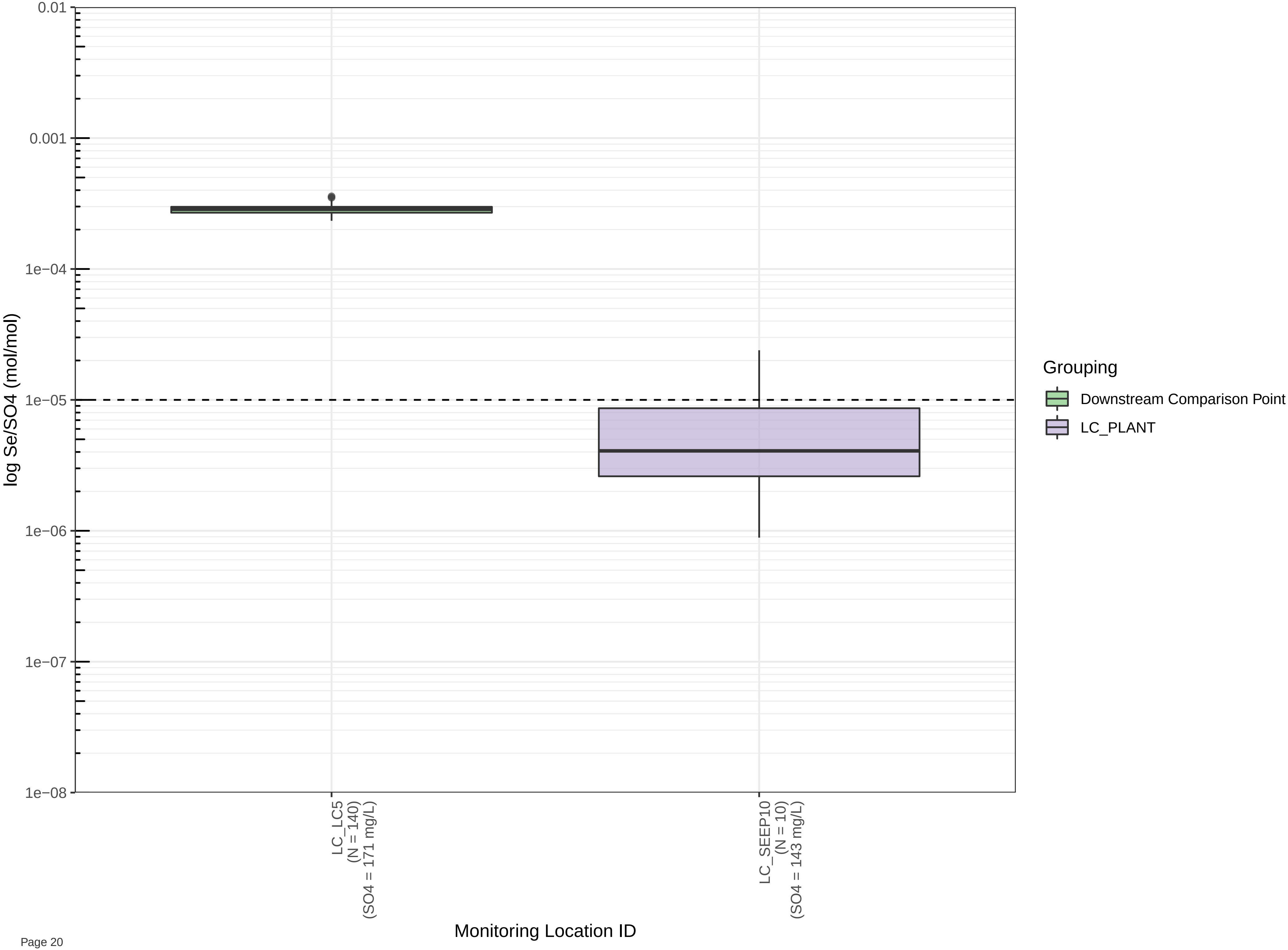

0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
LC_LC9
(N = 3)
(SO4 = 121 mg/L)
LC_3KM
(N = 8)
(SO4 = 54 mg/L)
LC_SEEP1
(N = 7)
(SO4 = 101 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
LC_MSA_WR

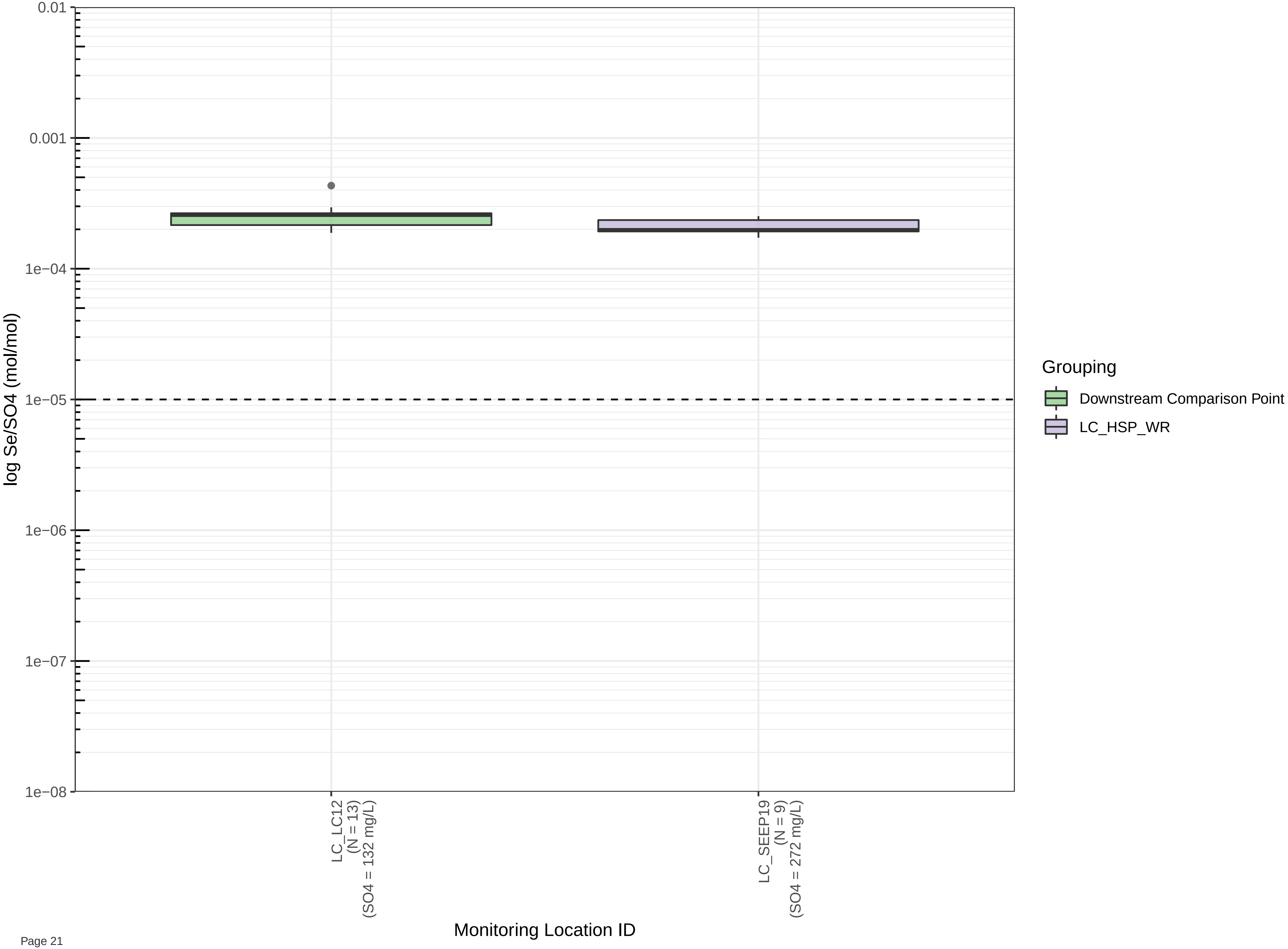


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
LC_SEEP11
(N = 9)
(SO4 = 109 mg/L)
Monitoring Location ID
Grouping
LC_PLANT

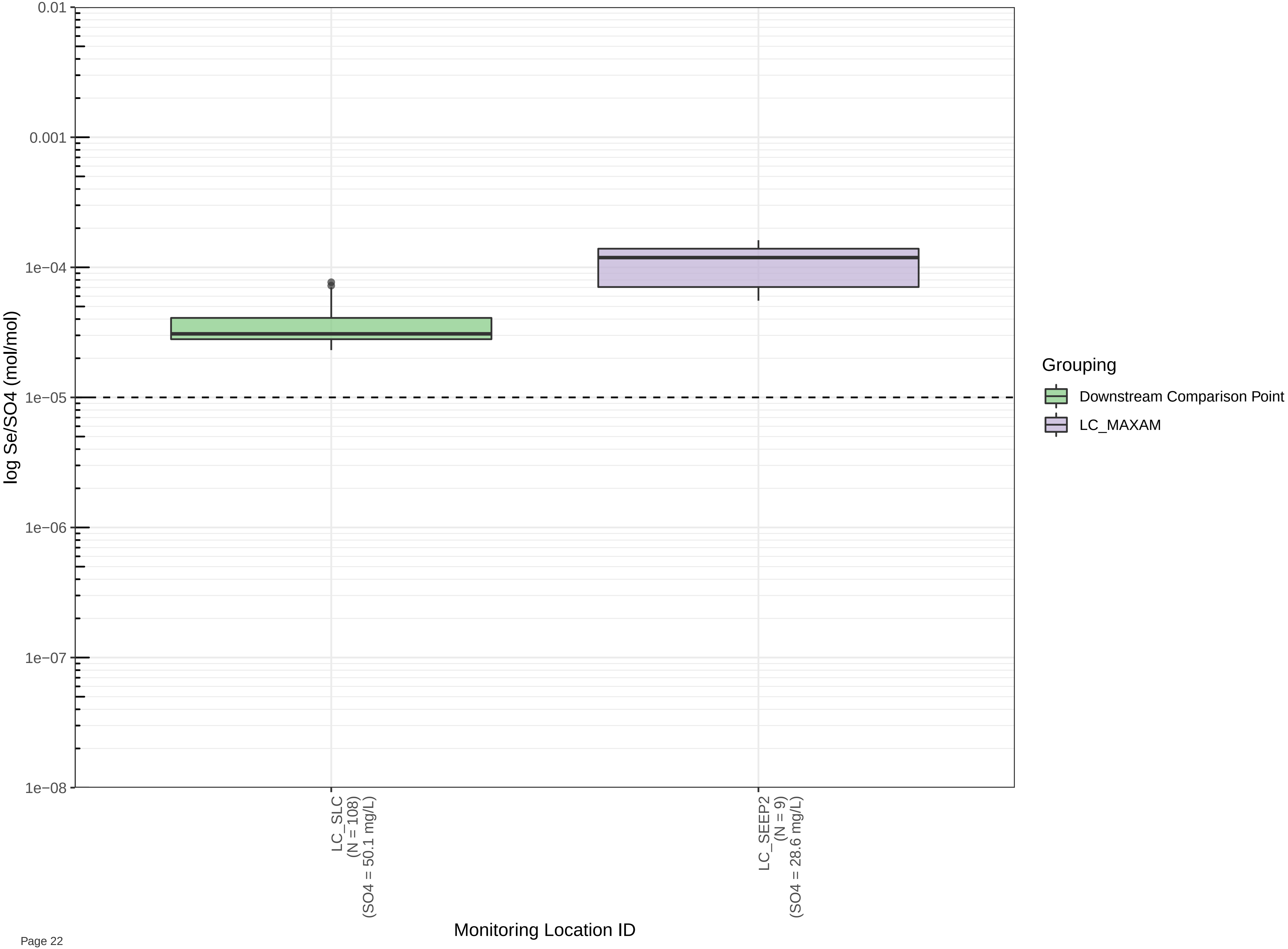


log Se/SO4 (mol/mol)
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
LC_SEEP14
(N = 6)
(SO4 = 206 mg/L)
LC_SEEP15
(N = 8)
(SO4 = 278 mg/L)
Monitoring Location ID
Grouping
LC_DC_WR
LC_DISTURBEDWSLOPE

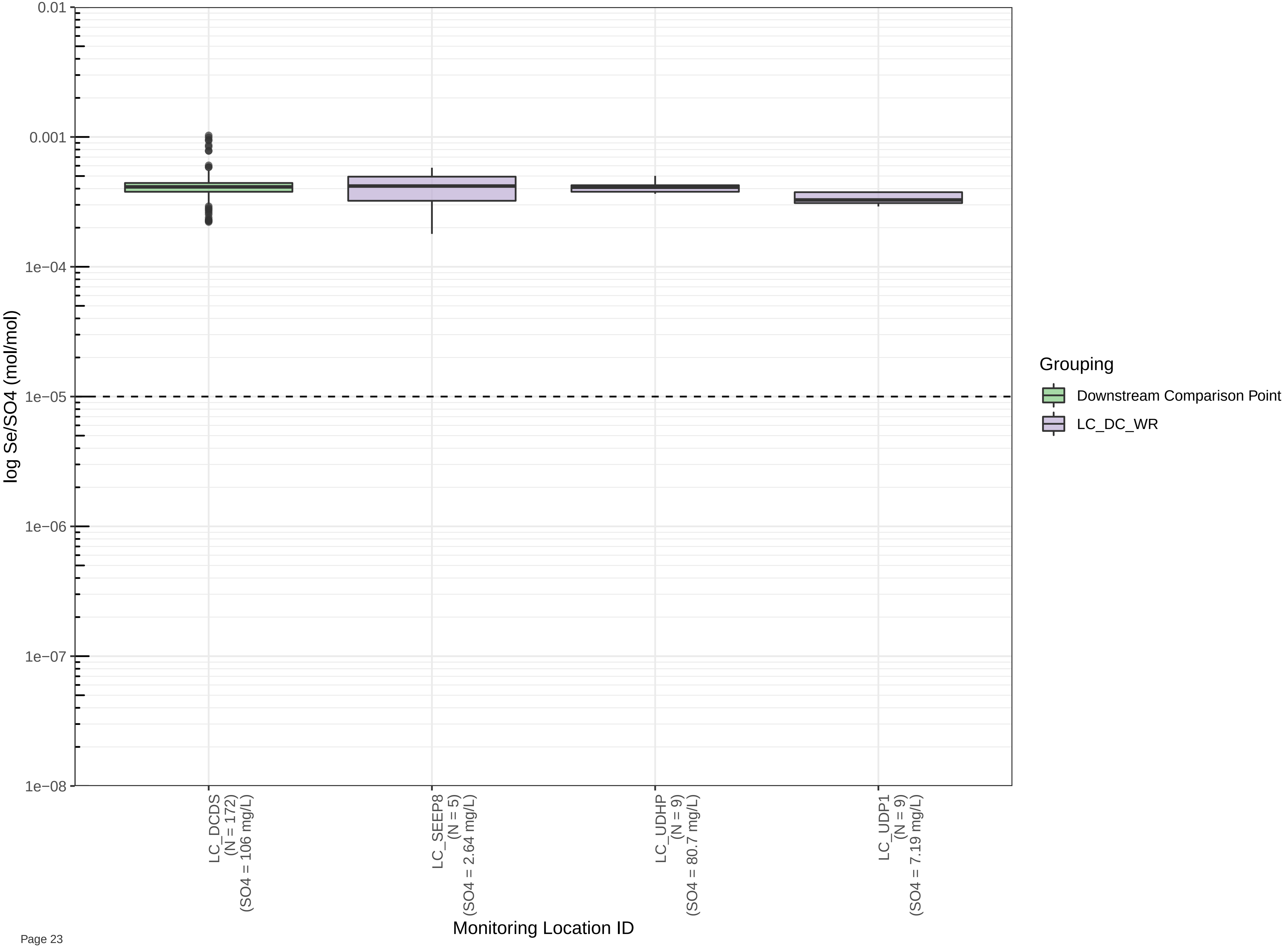

0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
Grouping
Downstream Comparison Point
LC_PLANT
LC_LC5
(N = 140)
(SO4 = 171 mg/L)
LC_SEEP10
(N = 10)
(SO4 = 143 mg/L)
Monitoring Location ID



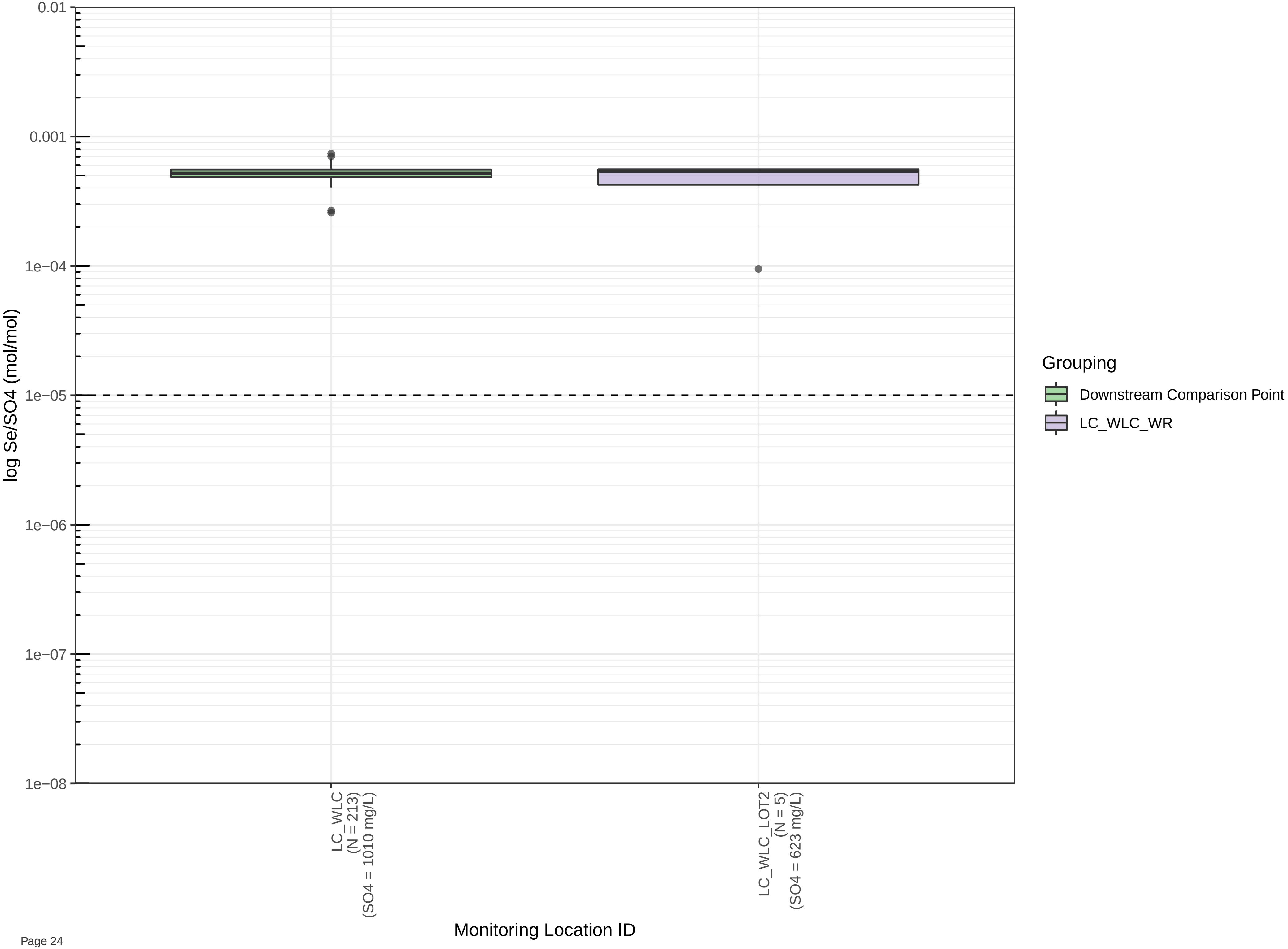
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
LC_LC12
(N = 13)
(SO4 = 132 mg/L)
LC_SEEP19
(N = 9)
(SO4 = 272 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
LC_HSP_WR



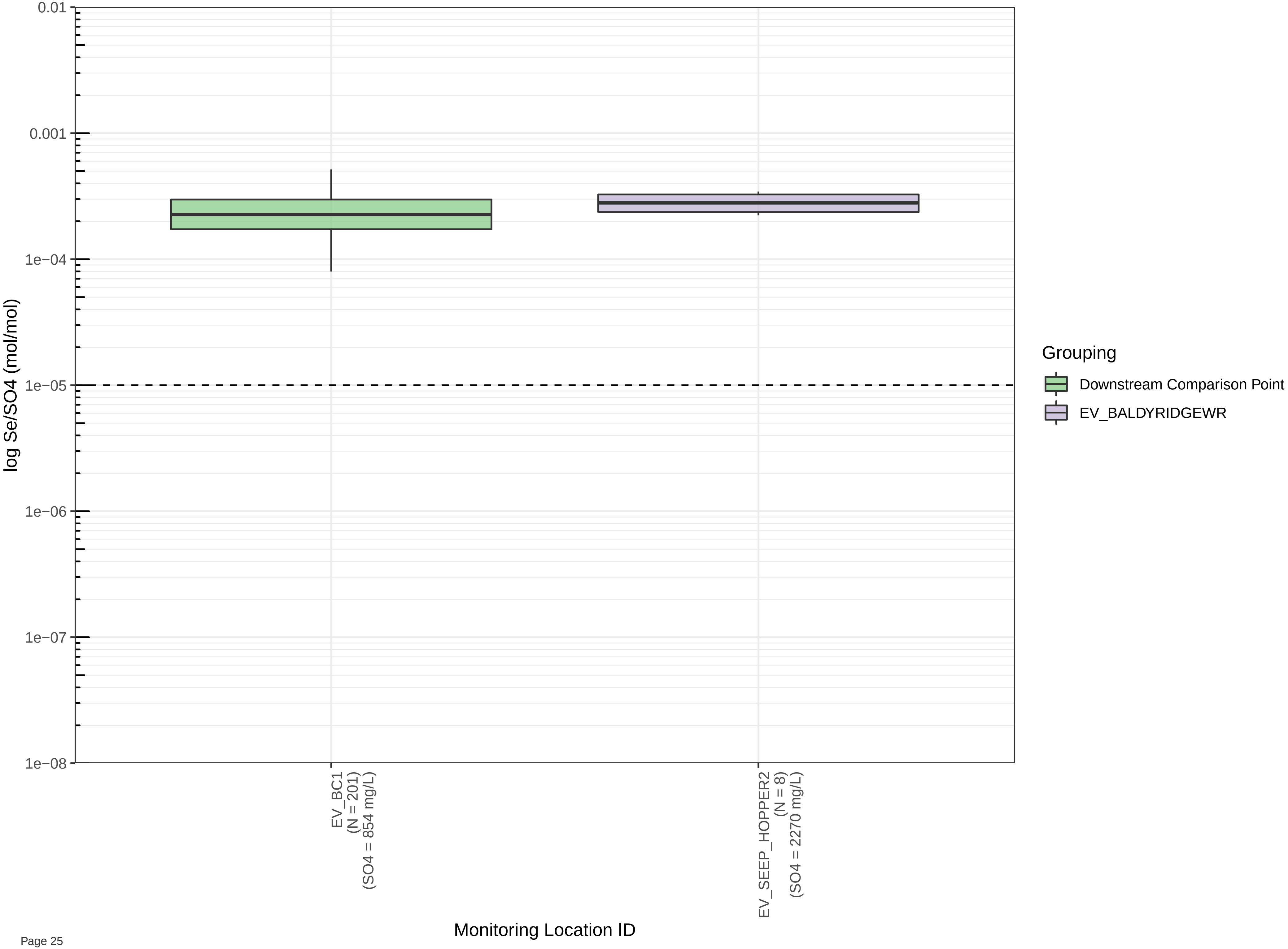
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
LC_SLC
(N = 108)
(SO4 = 50.1 mg/L)
LC_SEEP2
(N = 9)
(SO4 = 28.6 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
LC_MAXAM



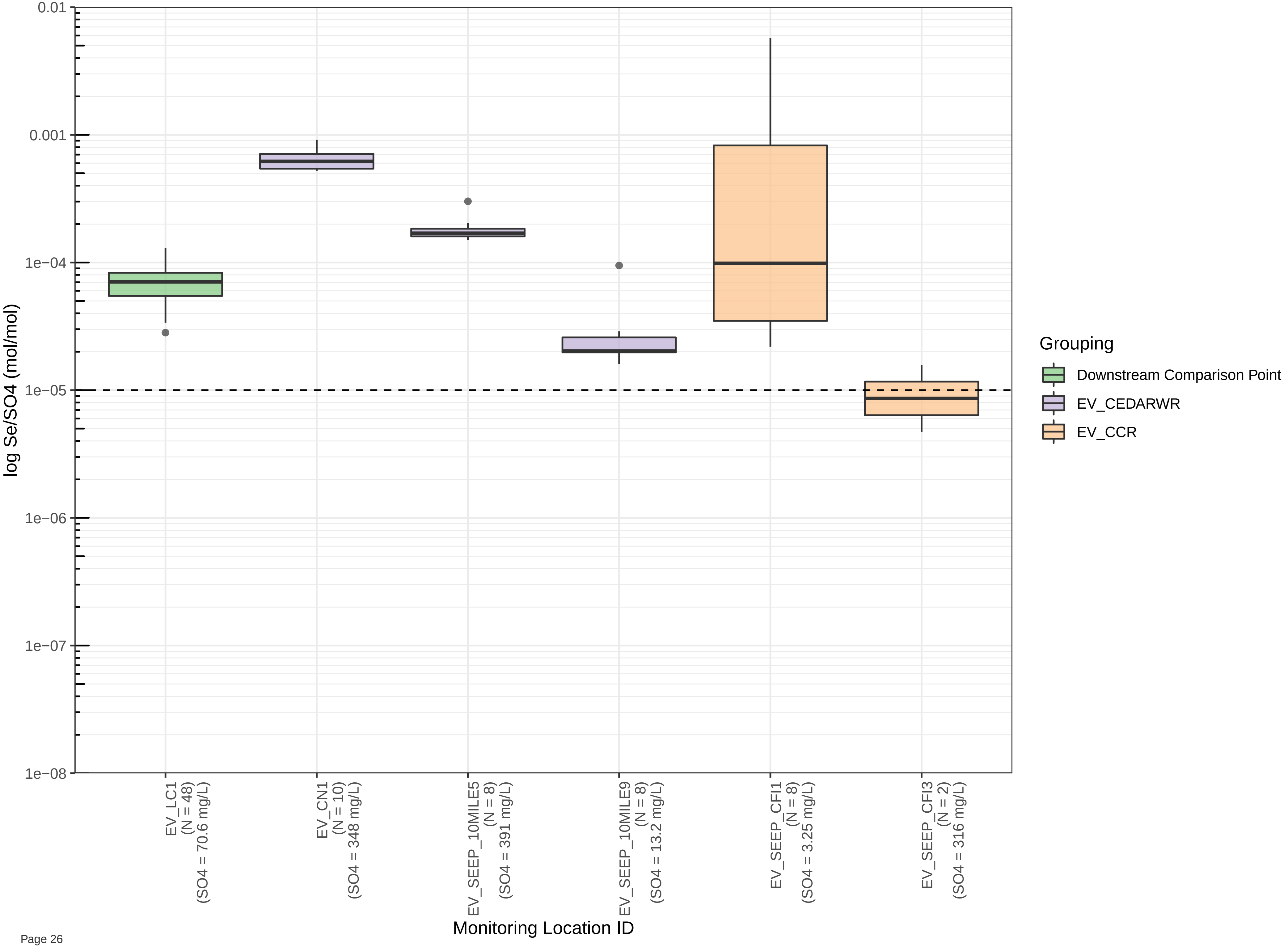
log Se/SO4 (mol/mol)
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
LC_DCDS (N = 172) (SO4 = 106 mg/L)
LC_SEEP8 (N = 5) (SO4 = 2.64 mg/L)
LC_UDHP (N = 9) (SO4 = 80.7 mg/L)
LC_UDP1 (N = 9) (SO4 = 7.19 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
LC_DC_WR



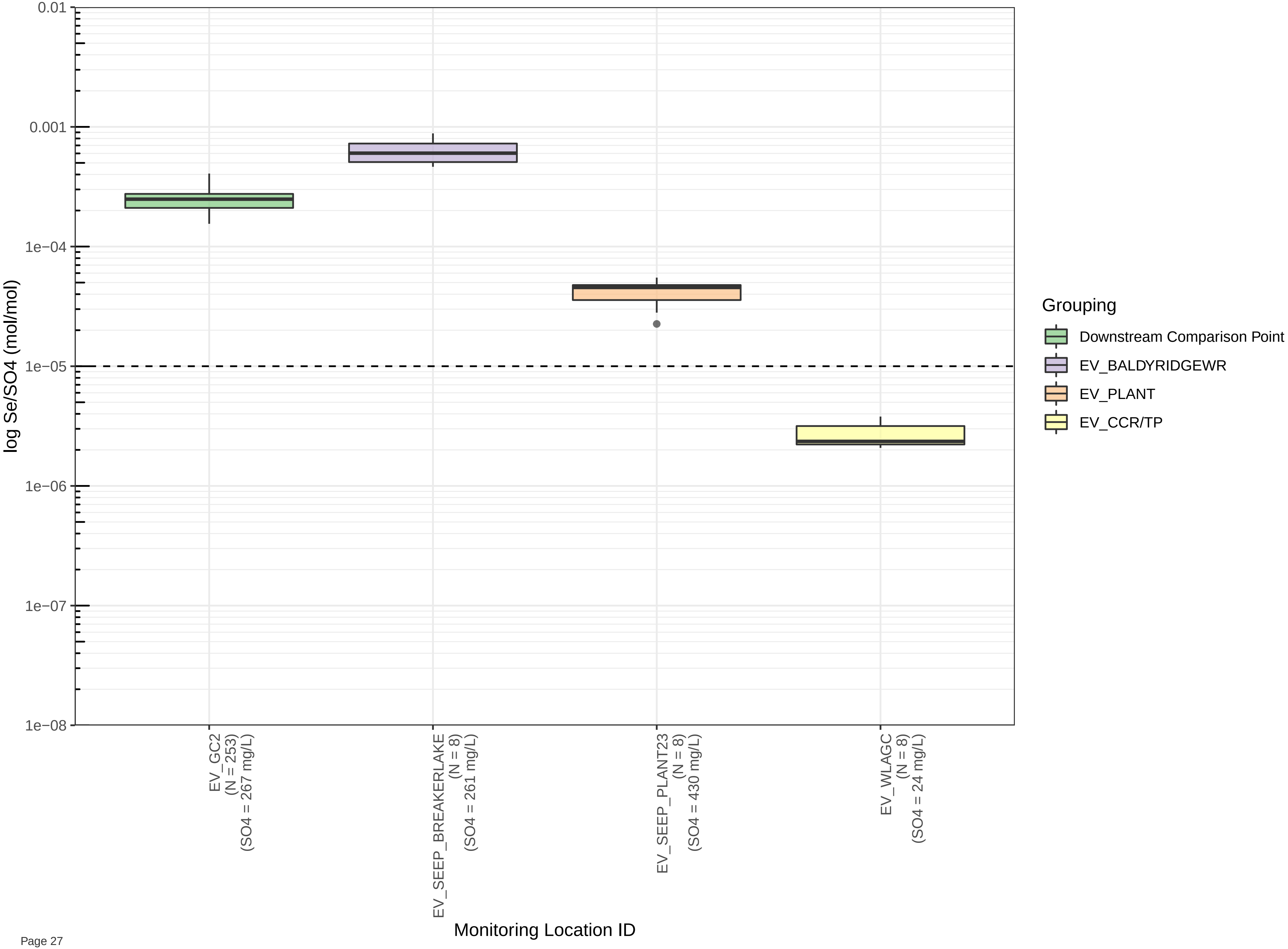
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
LC_WLC
(N = 213)
(SO4 = 1010 mg/L)
LC_WLC_LOT2
(N = 5)
(SO4 = 623 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
LC_WLC_WR

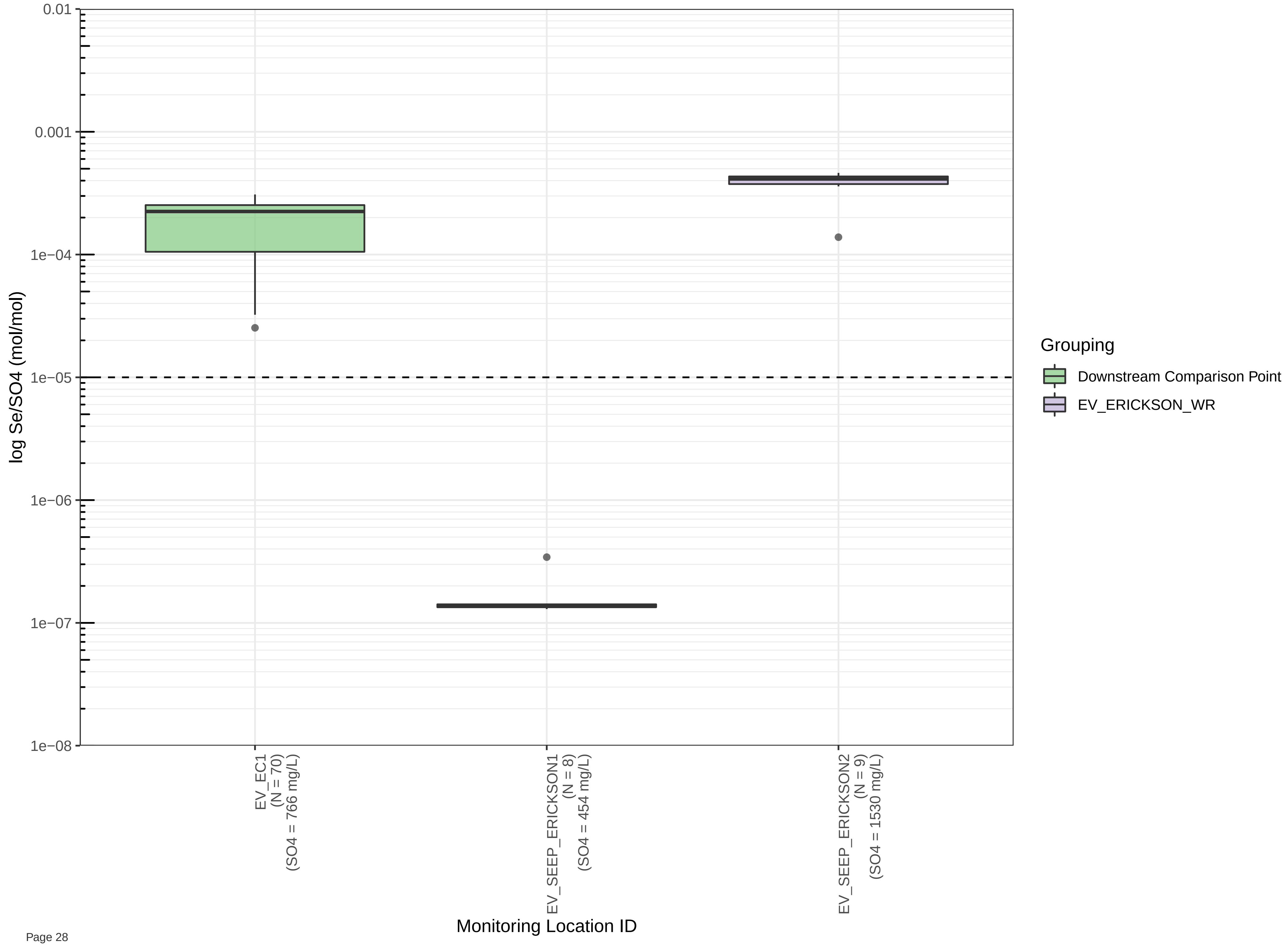


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_BC1
(N = 201)
(SO4 = 854 mg/L)
EV_SEEP_HOPPER2
(N = 8)
(SO4 = 2270 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_BALDYRIDGEWR

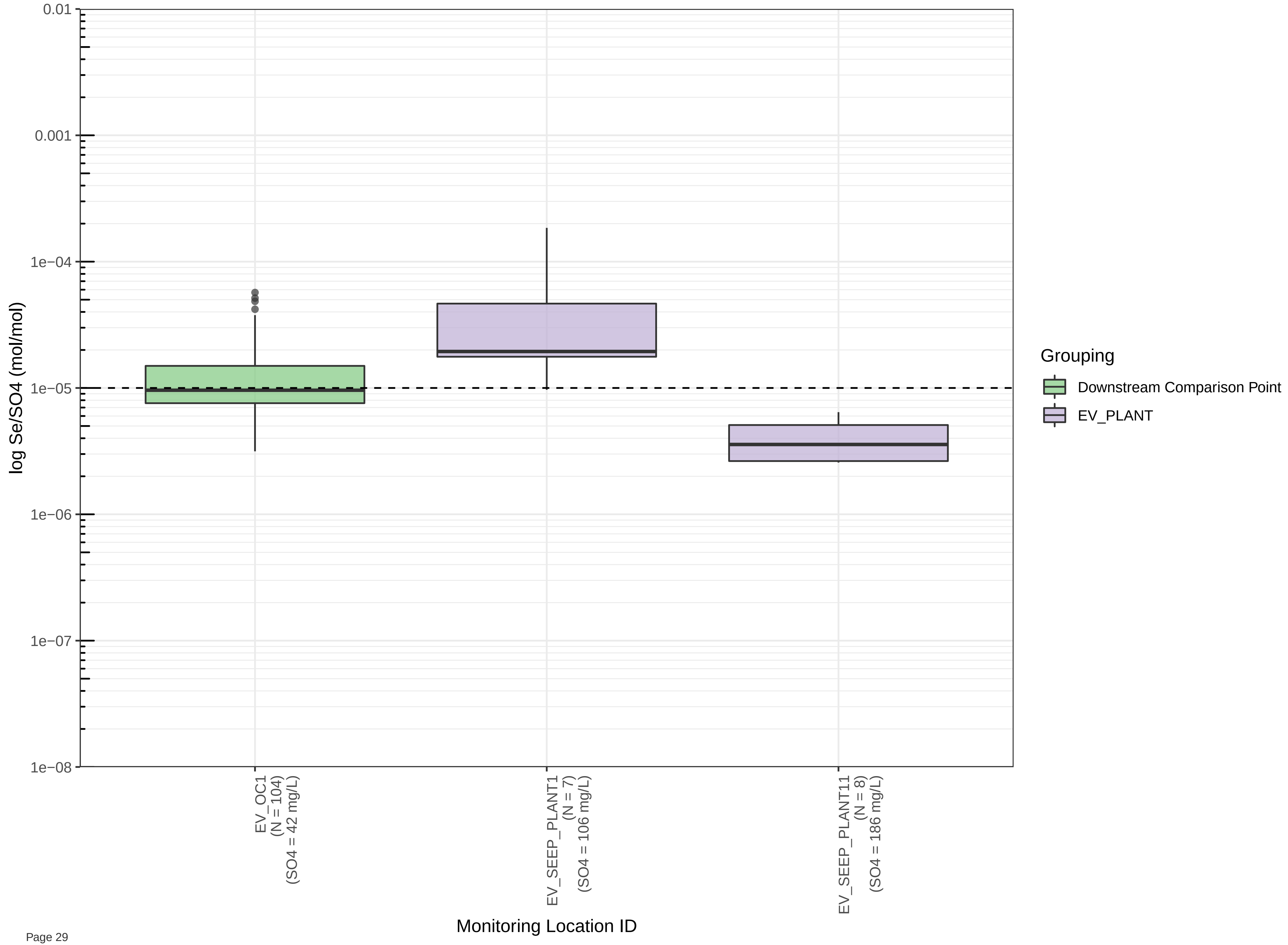


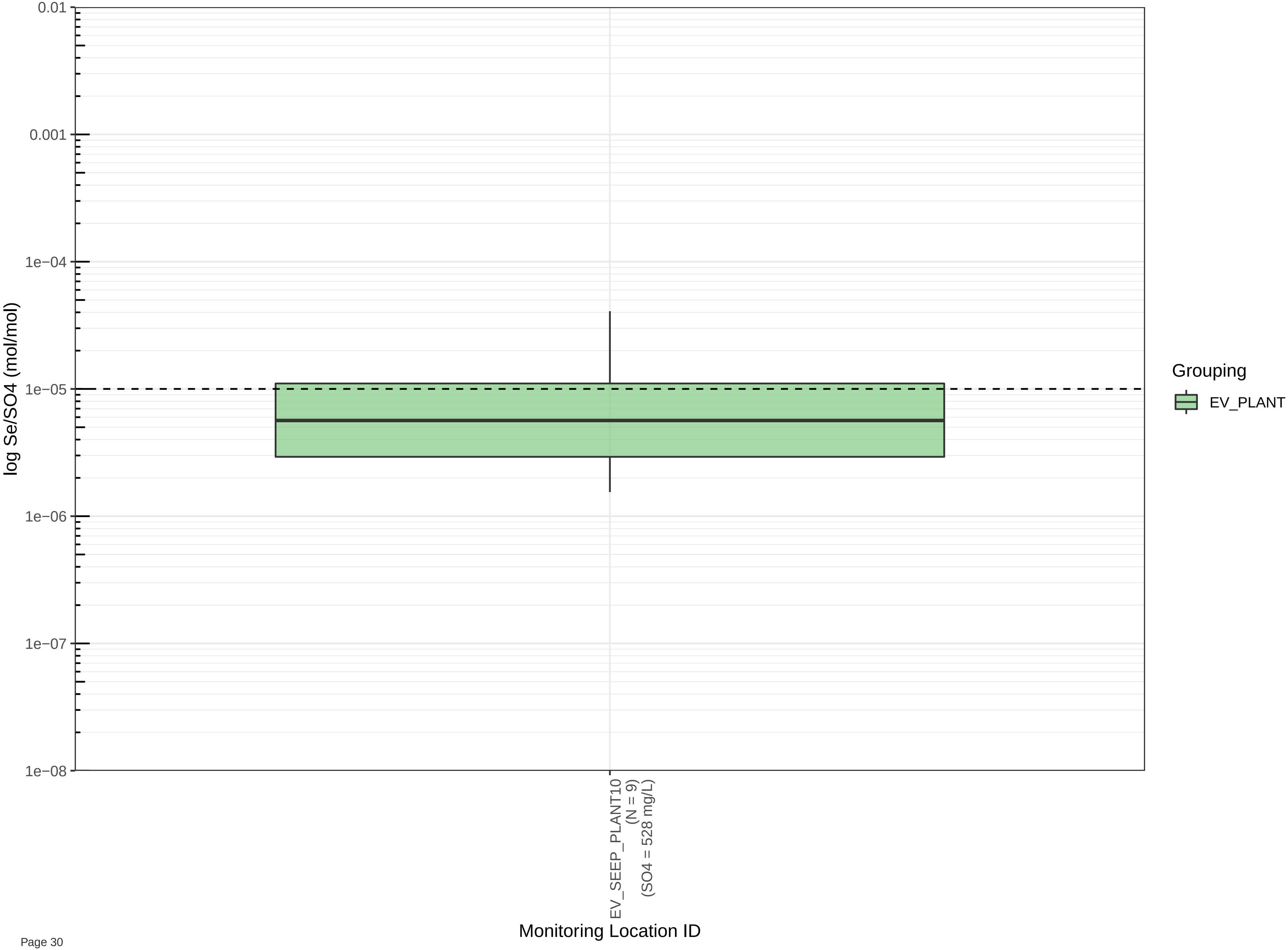
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_LC1 (N = 48) (SO4 = 70.6 mg/L)
EV_CN1 (N = 10) (SO4 = 348 mg/L)
EV_SEEP_10MILE5 (N = 8) (SO4 = 391 mg/L)
EV_SEEP_10MILE9 (N = 8) (SO4 = 13.2 mg/L)
EV_SEEP_CFI1 (N = 8) (SO4 = 3.25 mg/L)
EV_SEEP_CFI3 (N = 2) (SO4 = 316 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_CEDARWR
EV_CCR


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_GC2 (N = 253) (SO4 = 267 mg/L)
EV_SEEP_BREAKERLAKE (N = 8) (SO4 = 261 mg/L)
EV_SEEP_PLANT23 (N = 8) (SO4 = 430 mg/L)
EV_WLAGC (N = 8) (SO4 = 24 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_BALDYRIDGEWR
EV_PLANT
EV_CCR/TP

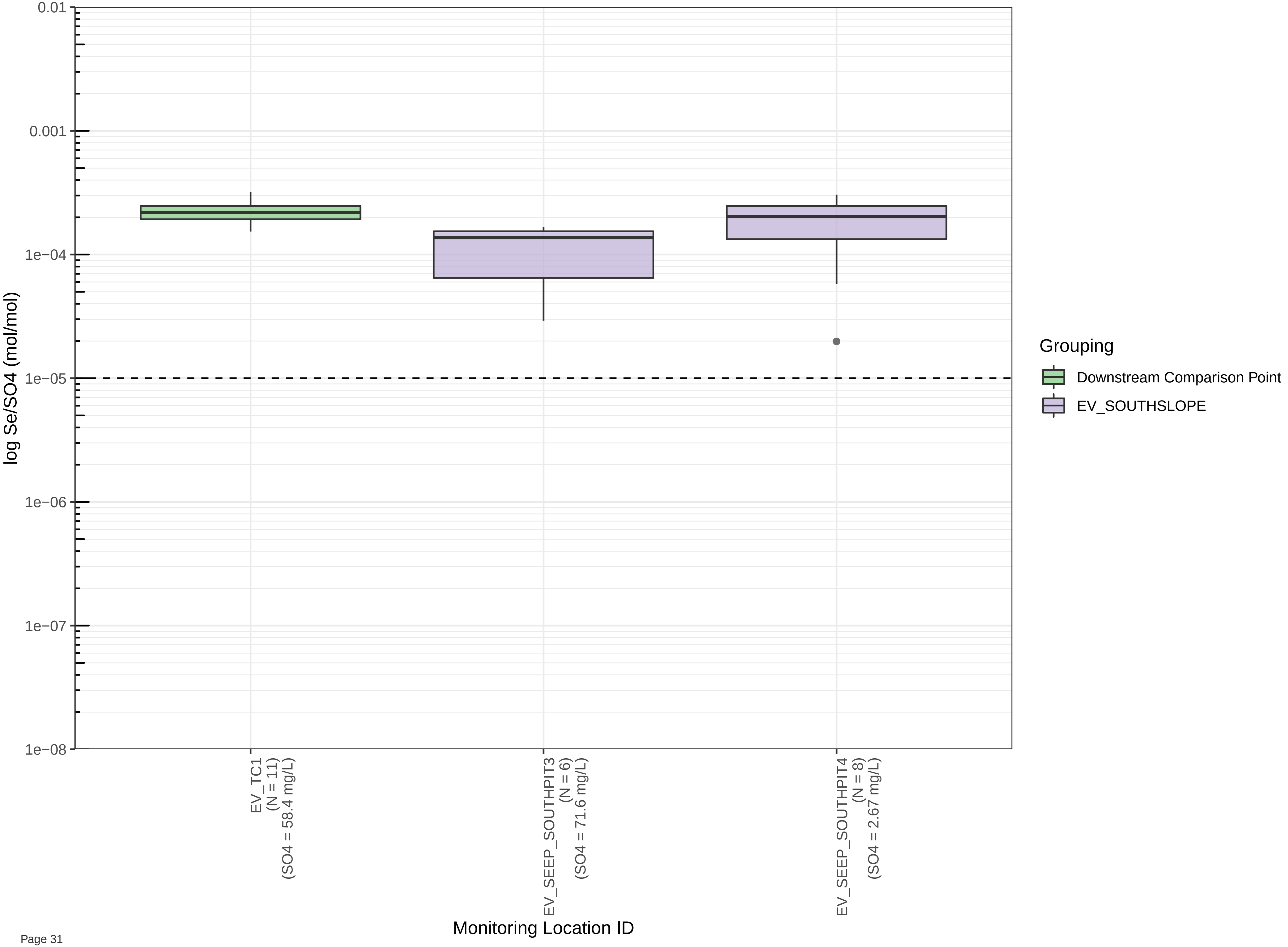


0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_EC1
(N = 70)
(SO4 = 766 mg/L)
EV_SEEP_ERICKSON1
(N = 8)
(SO4 = 454 mg/L)
EV_SEEP_ERICKSON2
(N = 9)
(SO4 = 1530 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_ERICKSON_WR

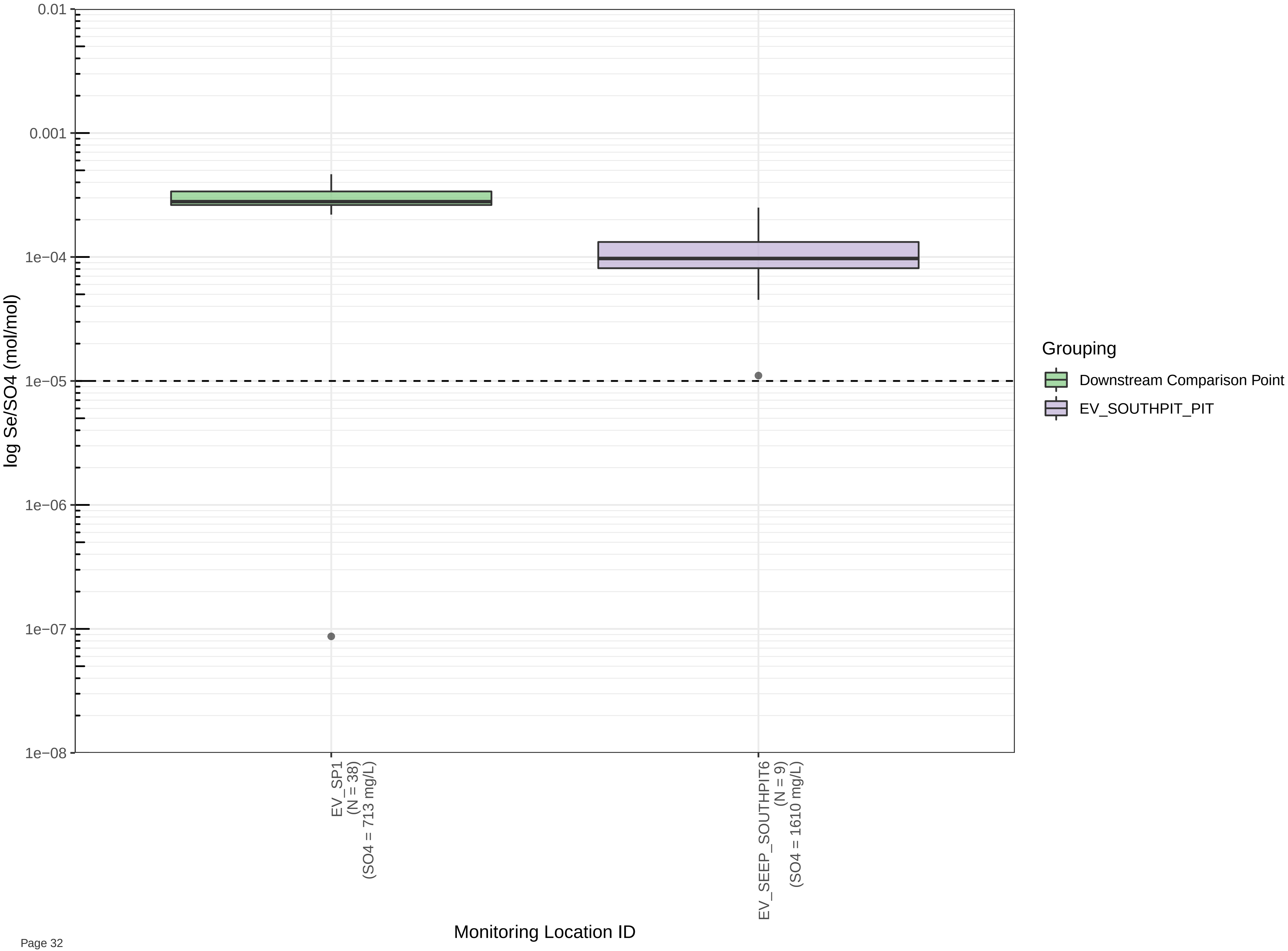

0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_OC1
(N = 104)
(SO4 = 42 mg/L)
EV_SEEP_PLANT1
(N = 7)
(SO4 = 106 mg/L)
EV_SEEP_PLANT11
(N = 8)
(SO4 = 186 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_PLANT



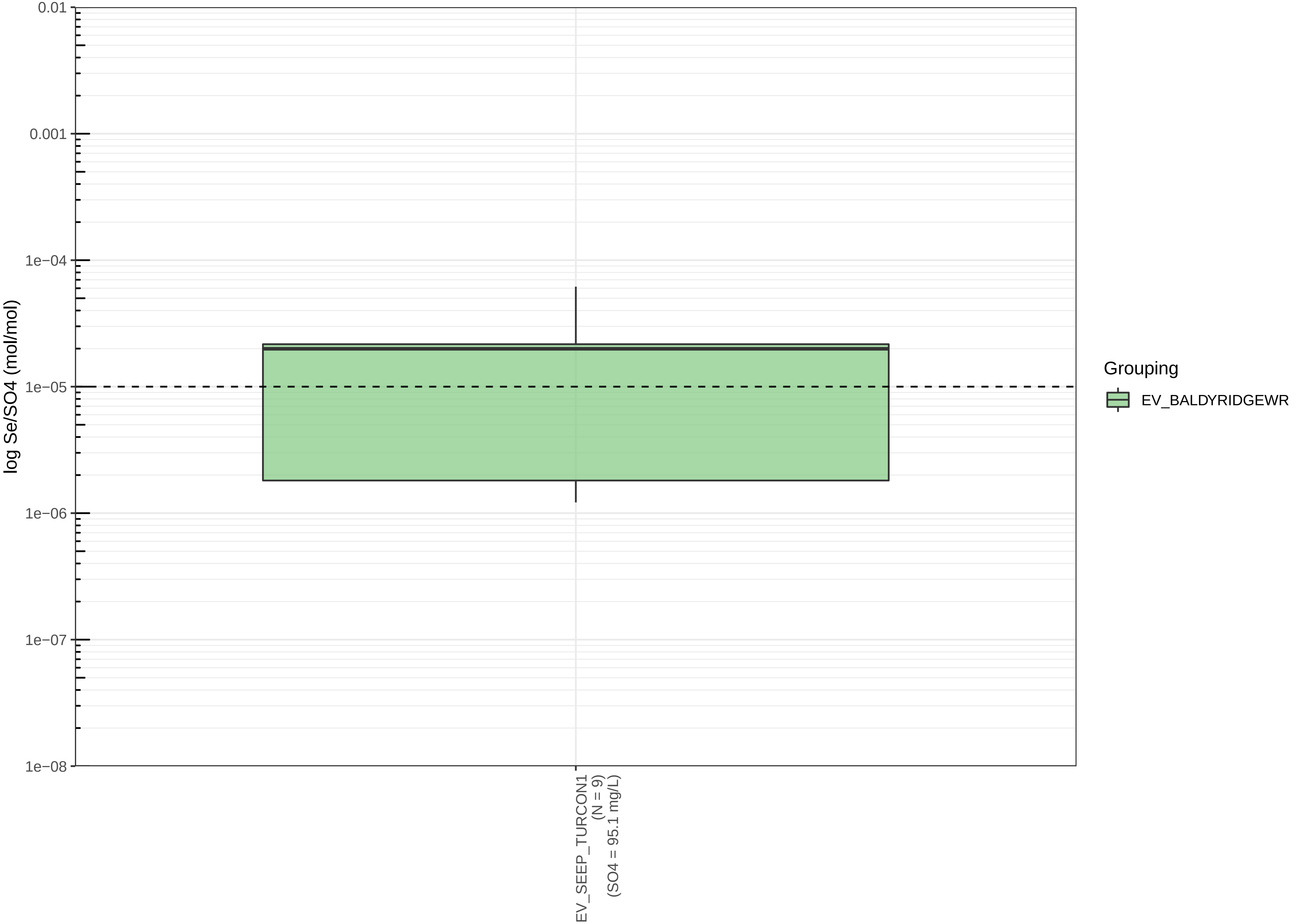
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_SEEP_PLANT10 (N = 9) (SO4 = 528 mg/L)
Monitoring Location ID
Grouping
EV_PLANT



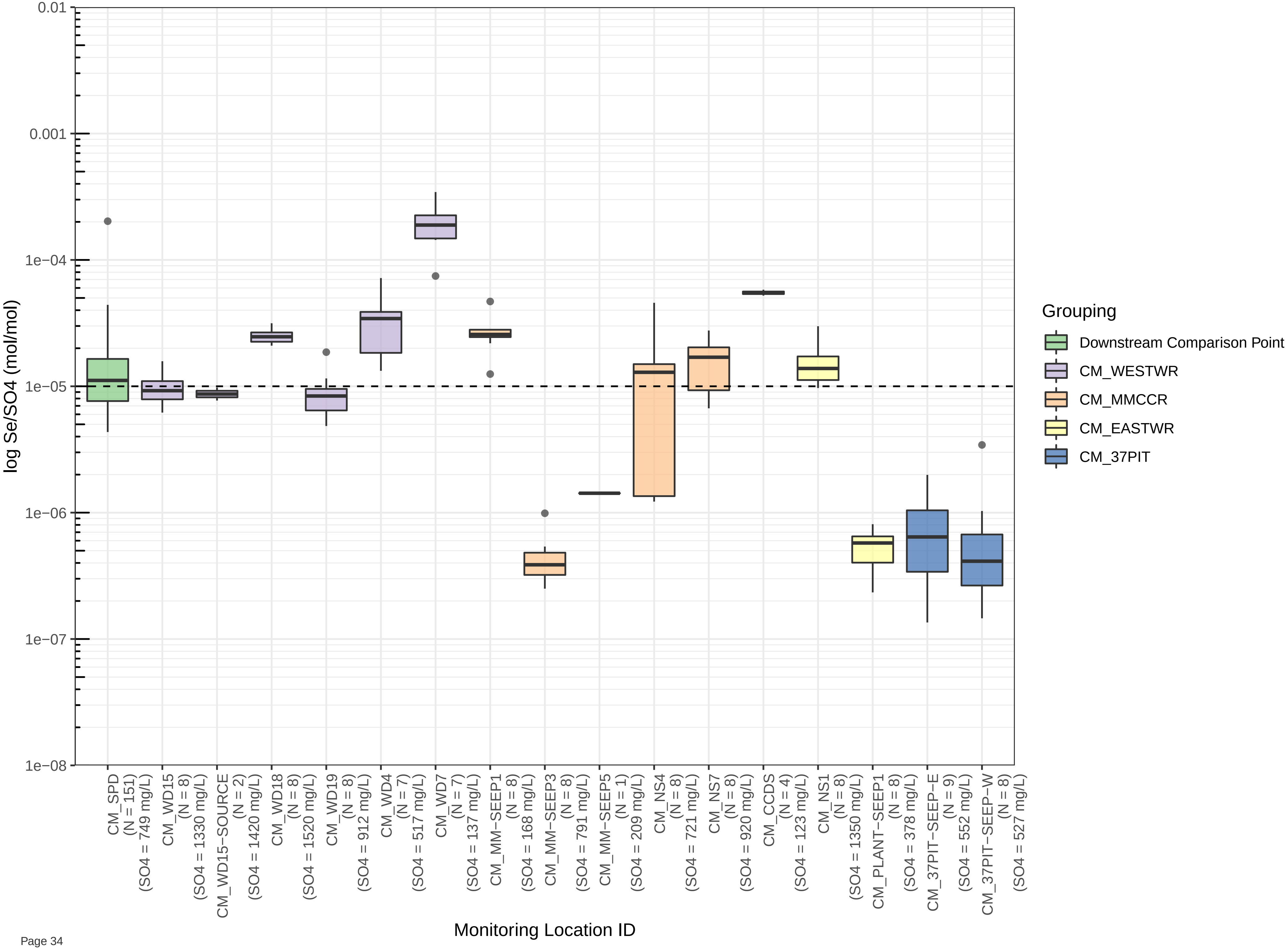
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_TC1
(N = 11)
(SO4 = 58.4 mg/L)
EV_SEEP_SOUTHPIT3
(N = 6)
(SO4 = 71.6 mg/L)
EV_SEEP_SOUTHPIT4
(N = 8)
(SO4 = 2.67 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_SOUTHSLOPE



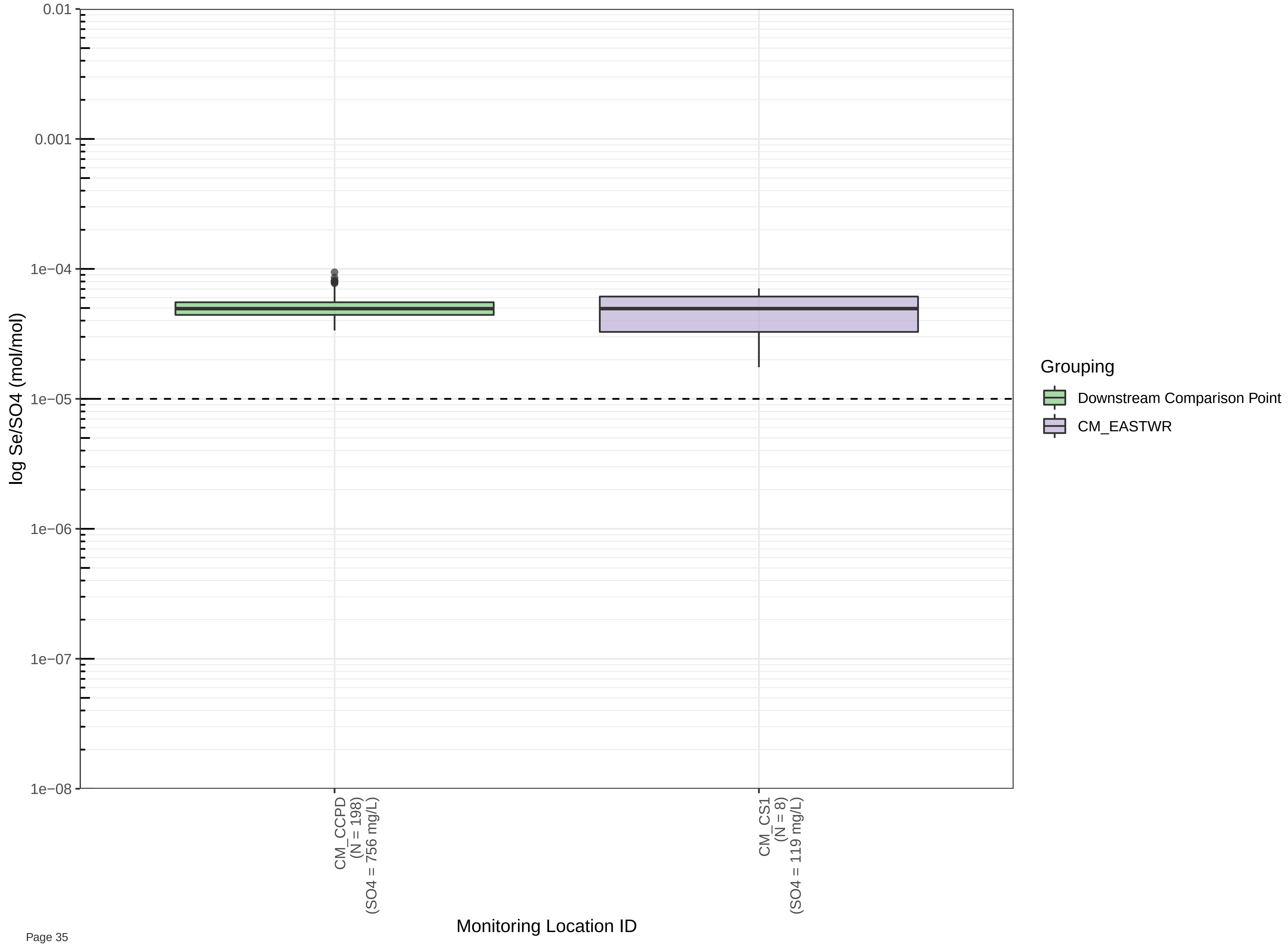
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_SP1
(N = 38)
(SO4 = 713 mg/L)
EV_SEEP_SOUTHPIT6
(N = 9)
(SO4 = 1610 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
EV_SOUTHPIT_PIT



0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
EV_SEEP_TURCON1
(N = 9)
(SO4 = 95.1 mg/L)
Monitoring Location ID
Grouping
EV_BALDYRIDGEWR



log Se/SO4 (mol/mol)
0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
CM_SPD (N = 151) (SO4 = 749 mg/L)
CM_WD15 (N = 8) (SO4 = 1330 mg/L)
CM_WD15−SOURCE (N = 2) (SO4 = 1420 mg/L)
CM_WD18 (N = 8) (SO4 = 1520 mg/L)
CM_WD19 (N = 8) (SO4 = 912 mg/L)
CM_WD4 (N = 7) (SO4 = 517 mg/L)
CM_WD7 (N = 7) (SO4 = 137 mg/L)
CM_MM−SEEP1 (N = 8) (SO4 = 168 mg/L)
CM_MM−SEEP3 (N = 8) (SO4 = 791 mg/L)
CM_MM−SEEP5 (N = 1) (SO4 = 209 mg/L)
CM_NS4 (N = 8) (SO4 = 721 mg/L)
CM_NS7 (N = 8) (SO4 = 920 mg/L)
CM_CCDS (N = 4) (SO4 = 123 mg/L)
CM_NS1 (N = 8) (SO4 = 1350 mg/L)
CM_PLANT−SEEP1 (N = 8) (SO4 = 378 mg/L)
CM_37PIT−SEEP−E (N = 9) (SO4 = 552 mg/L)
CM_37PIT−SEEP−W (N = 8) (SO4 = 527 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
CM_WESTWR
CM_MMCCR
CM_EASTWR
CM_37PIT



0.01
0.001
1e−04
1e−05
1e−06
1e−07
1e−08
log Se/SO4 (mol/mol)
CM_CCPD
(N = 198)
(SO4 = 756 mg/L)
CM_CS1
(N = 8)
(SO4 = 119 mg/L)
Monitoring Location ID
Grouping
Downstream Comparison Point
CM_EASTWR

Appendix G QAQC Review Results

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vancouver@srk.com
www.srk.com

FINAL

Appendix G

To	Cam Jaeger, Nathaniel Barnes	**Client**	Teck Coal Limited
From	Anne Day	**Project**	1CT017.358
Cc	Stephen Day	**Date**	March 24, 2022

Subject Elk Valley Regional Seep Monitoring: 2021 Annual Reporting QAQC Review Results

1 Introduction

This memo discusses the results of the 2021 seep sampling QAQC review for the Teck's Elk Valley Regional Seep Monitoring Program (RSMP).

1.1 Field Blanks

Five field blank samples failed QA/QC:

- One field blank from CMm from September 30, 2021, for pH (4.52 compared to expected 5.5)
- Two field blanks from EVO from June 28, 2021, and September 28, 2021, for pH (4.22 and 6.33, respectively)
- One field blank from GHO from October 5, 2021, for pH (4.72 compared to expected 5.5)
- One field blank from GHO from September 28, 2021, for phosphorus (1.33 mg/L), DOC (2.98 mg/L), and TOC (2.91 mg/L).

Field blanks at CMm and EVO that failed for lab pH may result from carryover from the previous sample tested. The GHO field blank that failed for phosphorus, DOC, and TOC may be due to sample contamination in the field during sampling or in the lab during testing as the failure occurred across bottles. This sample was taken at the GH_SEEP_16 seep location. Contamination does not appear to have affected any seep samples at GHO.

1.2 Field Duplicates

One duplicate pair collected at FR_ASPSEEP1 on November 3, 2021, failed reproducibility of turbidity and total manganese. This may indicate heterogeneity in suspended sediments at this sampling location. One duplicate pair collected at FR_STPWSEEP on June 16, 2021, failed reproducibility of dissolved and total cadmium and dissolved and total manganese. This could be due to the off gassing of CO_2 during travel, and these results were considered acceptable.

One duplicate pair collected at FR_TURNSEEP2 on June 10, 2021, failed reproducibility of total aluminum, cadmium, and manganese. One duplicate pair collected at GH_SEEP_16 on September 28, 2021, failed reproducibility of phosphorus, total aluminum, iron, silicon, and selenium. One duplicate pair collected at GH_SEEP_77 on June 28, 2021, failed reproducibility of total aluminum, iron, manganese, phosphorus, and turbidity. All dissolved metal concentrations passed for these three samples. This may indicate heterogeneity in suspended sediments at these seeps. Results were accepted as dissolved metal concentrations passed QA/QC, results are generally consistent with previous results and interpretation is not expected to be affected.

1.3 Field vs. Lab Measurements

1.3.1 pH

Due to short hold times, field pH is generally considered to be more reliable than lab pH and some degree of difference between the two measurements is expected. Nine out of the 148 samples reviewed had a difference between field pH and laboratory pH greater than 1 pH unit. Five samples reported laboratory pH measurements that were between 1.0 and 1.2 pH units higher than the field measurements. This could be due to the off gassing of CO_2 during travel, and these results were considered acceptable. Four samples had laboratory pH measurements 1.2 higher than field measurements:

- GH_SEEP_21 was sampled on June 23, 2021. Field pH: 6.38, Lab pH: 7.76
- GH_SEEP_22 was sampled on June 23, 2021. Field pH: 6.65, Lab pH: 7.86
- GH_SEEP_5 was sampled on June 23, 2021. Field pH: 7.04, Lab pH: 8.11.
- GH_SEEP_5 was sampled on September 27, 2021. Field pH: 7.08, Lab pH: 8.31

These four samples were not used in the analysis and should be discarded from the EQuIS database.

1.3.2 Conductivity

20 out of 155 samples reviewed had a difference between laboratory and field conductivity greater than 30% RPD.

- 11 samples at CMm, all sampled on September 29 or September 30, 2021.
- Two samples at FR_CCSEEPE1 and five samples at FR_EAGLENORTH for sampling programs other than the RSMP. All seven samples were reported between February 1 and February 11, 2021.
- Two samples at LCO, both sampled on October 7, 2021.

The field meter may require more time to reach a steady reading for the samples FRO, LCO, and CMm where all the samples listed above were taken within a short time frame and likely with the same field measurement instrumentation.

1.3.3 Ion Balance

87 out of 311 samples had an ion imbalance greater than ±10% for samples with an EC greater than 100 µS/cm.

- FRO samples with an imbalance had charge balances varying from +10 to +83%. 48 samples had a charge balance between +10 and +18% and were considered acceptable. 37 samples had a charge balance between +64 and 83%. These samples are associated with seep locations FR_CCSEEPE1, FR_CCSEEPSE1, and FR_EAGLENORTH, sampled more frequently between January 5, 2021, and April 12, 2021. These samples were not used in the analysis and should be reviewed with the laboratory.
- The GHO sample charge balance was +23% and was considered acceptable.
- The LCO sample charge balance was +13% and was considered acceptable.
- No samples at EVO or CMm had an ion balance ±10% for samples with an EC greater than 100 µS/cm.

Regards,
SRK Consulting (Canada) Inc.

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Consultant

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Appendix IV

Isotope Memo 2021 SSGMP and RGMP Report

- Tables
- Drawings
- Attachments

  1: Laboratory Reports

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March 29, 2022

Project: 635544

Teck Coal Limited
Bag 2000
Sparwood, BC V0B 2G00

ATTENTION: Cam Jaeger and Nathaniel Barnes

REFERENCE: **Interim Update for RGMP Water Isotope Sampling Program (δ^2H_{H2O}, $\delta^{18}O_{H2O}$, tritium)**

1 Introduction

At the request of Teck Coal Limited (Teck Coal), SNC-Lavalin Inc. (SNC-Lavalin) completed an isotope sampling program for the Regional Groundwater Monitoring Program (RGMP) to further improve the Elk Valley water isotope dataset. A more robust isotopic dataset will help to advance understanding of groundwater sources and flowpaths and refine the regional and site-specific hydrogeological conceptual site models (CSM). The objective of the RGMP isotope sampling program is to evaluate the use of isotopic tools for this purpose and included collection of water samples for analysis of stable isotopes (δ^2H_{H2O} [deuterium] and $\delta^{18}O_{H2O}$) and radioactive isotope (tritium, ^3H).

This deliverable provides an interim update of the RGMP isotope sampling program, written for inclusion as an appendix in the 2021 RGMP/Site Specific Groundwater Monitoring Program (SSGMP) annual report. The data presented herein were collected relatively recently and as such, due to time limitations, isotope data presented in this interim update will not be used to advance Study Area or operation specific hydrogeological CSMs in the 2021 RGMP/SSGMP annual report. However, in future deliverables, these data will be considered in refinement of hydrogeological CSMs.

1.1 Background

As summarized in the 2020 RGMP Update (SNC-Lavalin, 2020), stable isotopes may help to estimate groundwater elevation and may also be used to distinguish shallow, intermediate and deep groundwater flow paths (surficial and/or bedrock) based on the amount of mixing that has occurred between the groundwater and surface water systems. This assumes the water sampled represents a “longer term average” of infiltration as annual precipitation in an area can show considerable isotopic shift due to temperature-related seasonal influences. Tritium can be used to estimate the relative age of recent groundwater and to determine if deep groundwater systems are contributing to local or intermediate flow paths (Clark and Fritz 1997 & Motzer, 2007).

As part of the 2020 RGMP Update, existing isotopic data were compiled to assess the flow systems within bedrock and surficial aquifers in the Elk Valley. Based on review of $\delta^{18}O$, δ^2H and tritium data, the 2020 RGMP Update indicated these isotopic systems appear to be useful tools in a line of evidence approach for assessing groundwater flow paths. It was noted that the limitations of this data set are its spatial and temporal distribution, and sample types (i.e., groundwater, surface water and seeps). The 2020 RGMP Update recommended to collect isotope samples as part of the RGMP to further improve the data set but also to refine the regional and Study Area specific CSMs (SNC-Lavalin, 2020).

The following sub-sections provide background information relating to stable and radioactive water isotopes and a description of the existing isotopic dataset (prior to this sampling program).

1.1.1 Hydrogen (δ^2H_{H2O}, Deuterium) and Oxygen ($\delta^{18}O_{H2O}$) Isotopes

An isotopic "fractionation" occurs during precipitation as atmospheric water vapour precipitates across the continent (continental effect) or when vapour rises over topographically high areas resulting in orographic precipitation (altitude effect). This causes the hydrogen and oxygen molecules in rain or snow to be depleted with respect to ^2H and ^{18}O, as the heavier isotopes (^2H and ^{18}O) prefer the liquid form whereas and the lighter isotopes (^1H and ^{16}O) prefer the vapour form. In isotope nomenclature, the difference in isotopic values is measured with respect to a standard and is referred to using the δ notation (e.g., δ^2H and $\delta^{18}O$). The more negative isotopic values are referred to as depleted and more positive values are referred to as enriched. This fractionation can happen on a global or local scale. When plotted on a graph, the global scale is referred to as the "Global Meteoric Water Line" or GMWL and the local scale is called the "Local Meteoric Water Line" or LMWL. Barbour et al. (2016) analyzed 313 precipitation samples to define a LMWL for the Elk Valley. Evaporation that occurs at surface water and seep locations are expected to plot along the "Local Evaporation Line" or LEL; a LEL in the Elk Valley has been reported by Harrison et al. (2000). These lines allow comparison of isotopic results in rain, surface and groundwater and can serve to fingerprint the origin of the water molecule with respect to an altitude. When δ^2H and $\delta^{18}O$ values in groundwater are compared to the GMWL or LMWL, they can be very useful in assessing the provenance of the original recharge area. For example, if groundwater recharge is from high elevations, then the isotopic signature should be depleted, while groundwater recharge from lower elevations would be enriched (Clark and Fritz, 1997).

1.1.2 Radioactive Tritium Isotopes

Isotopes of tritium (^3H) can be qualitatively assessed to determine residence time in an aquifer (i.e., how long the water is present in an aquifer) stemming from the addition of atmospheric ^3H from thermonuclear bomb testing in the 1950s and 60s. Bomb testing in the 1950s and 60s released approximately 1.13 x 10^9 Tritium Units (TU) into the atmosphere, peaking in 1963, and subsequently attenuating since with a ^3H half-life of 12.4 years (Motzer, 2007). As geogenic ^3H in most groundwater is negligible, measurable ^3H in groundwater virtually always signifies modern recharge. Tritium values can provide approximate groundwater age estimates, as presented in the following table.

Table A: Tritium as an Indicator for Groundwater Age Estimates

Tritium Units (TU) [1]	Groundwater Age
< 0.8	Sub-modern water (prior to 1950's)
0.8 to 4	Mix of sub-modern and modern water
5 to 15	Modern water (less than 5 to 10 years)
15 to 30	Some "bomb" tritium (mix of 1960's and modern water)
> 30	Dominantly 1960's recharge

From Clark and Fritz (1997).

[1] The detection limit of the tritium analysis is 0.8 TU.

It is noted that the above stated values are taken from a 1997 reference, which is roughly one half-life ago as of the date of this study, thereby changing the ranges of TU values to their respective time frames. Because of this, only a qualitative and comparative analysis should be performed by analyzing groundwater samples to determine if they experienced relatively shorter residence times vs. longer residency.

1.1.3 Existing Isotopic Dataset

The existing isotopic dataset includes data from academic studies and field investigations in the Elk Valley. Table B includes the total number of samples reported in the publications available to SNC-Lavalin for the 2020 RGMP Update and is the data are categorized by the media that was sampled. Statistic summary values (minimum, maximum and mean) were included in the dataset when academic sources that did not publish the entire dataset. In addition, isotopic results obtained from the Mass Balance Investigation (MBI) and Michel Creek flow and load accretion study were also incorporated into the isotope dataset.

Table B: Summary of data included in the existing Elk Valley isotopic dataset

Reference	Number of Samples from different media				
	Groundwater (MW screened in bedrock)[1]	Groundwater (MW screened in unconsolidated materials)[1]	Seep[2]	Surface Water	Precipitation
Aravena et al. (2001)	32		4	0	0
Barbour et al. (2016)[3]	0	11	0	3	313[4]
Golder Associates (2015)	9	58	14	0	0
Harrison et al. (2000)[5]	27		5	8	0
Summit Environmental Consultants (2007)	2	2	8	4	0
Shatilla (2013)[3,5]	0		0	632	39
SNC-Lavalin dataset (2009 to 2020)	0	20	1	18	0
Szmigielski (2015)[5]	113		84	85	0

[1] MW = Monitoring Well. The well completion details (e.g., screened in bedrock or unconsolidated materials) was not provided in all references.
[2] Springs are inferred to be seeps based on no mention of elevated temperature associated with thermal springs.
[3] Complete dataset was not reported. Mean values were included in the dataset.
[4] Precipitation analysis values were not reported. Analysis was used to create the Elk Valley LMWL.
[5] Complete dataset was not reported. Minimum and maximum values were included in the dataset

1.2 Objective and Scope of Work

The objective of the RGMP isotope sampling program is to collect isotope samples from groundwater, seeps, surface water and precipitation to further improve the Elk Valley water isotope dataset.

The scope of work generally includes the following tasks:

- Field work: collection of water samples (groundwater, seep, surface water and precipitation) for isotopic analysis ($\delta^{18}O$, $\delta^{2}H$ and tritium) at locations across the Elk Valley.
- Data compilation and analysis (ongoing).
- Interpretation and reporting (not yet initiated).

Collection of water isotopic samples ($\delta^{18}O$, $\delta^{2}H$ and tritium) in the Elk Valley is ongoing through other programs and has been expanded to include other isotopic systems. Teck will also collect water isotopic samples at all background locations as part of the RGMP, and the Mass Balance Investigation (MBI) has collected samples for nitrate ($\delta^{15}N_{NO3}$, $\delta^{18}O_{NO3}$) and sulphate ($\delta^{34}S_{SO4}$, $\delta^{18}O_{SO4}$) stable isotopes. All isotopic data collected in the Elk Valley will be compiled in isotope dataset.

2 Methodology

Isotope samples ($\delta^{18}O$, $\delta^{2}H$ and tritium) were collected between October 2021 to January 2022 from locations associated with Teck Coal's five mines, including Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO) and Coal Mountain Mine (CMO). In addition, samples were collected from regional locations (RG_series locations) off the Mine Permitted Area. As indicated in Section 1, this deliverable provides an interim factual update of the RGMP isotope sampling program, written for inclusion as an appendix in the RGMP/SSGMP 2021 annual report. Samples from a total of 105 groundwater, surface water or seep locations were collected as part of the RGMP isotope sampling program, as well as three precipitation samples collected from one location in Sparwood.

A summary of the sampled locations is provided in Table 1 and shown on Drawings 1 to 5, including:

- Groundwater: 82 monitoring wells selected across the Elk Valley (each operation and select background wells) at a range of screened elevations (high elevations and valley bottom) as well as from monitoring wells screened in unconsolidated materials (63 locations) and bedrock (19 locations).
- Seep: four seep locations near or within the EVO MPA included in the Elk Valley Regional Seep Monitoring Program [RSMP] or Sparwood Ridge sampling program).
- Surface Water: 19 surface water locations sampled monthly or weekly as part of Permit 107517 monitoring requirements.
- Precipitation: Three precipitation samples collected opportunistically in Sparwood, BC.

At the time of writing results from 85 samples (79%) were available for inclusion in this deliverable, which included 69 monitoring wells (53 wells screened in unconsolidated materials and 16 locations screened in bedrock), four seep locations, nine surface water locations and three precipitation samples.

2.1 Sample Collection

The isotope ($\delta^{18}O$, $\delta^{2}H$ and tritium) samples were collected by Teck Coal Limited and SNC-Lavalin personnel using Teck's Standard Practices and Procedures (SP&Ps) and SNC-Lavalin's Preferred Operating Procedures (POPs), which are consistent with procedures provided in the BC Field Sampling Manual (Clark, 2013). Isotope Tracer Technologies Inc. (IT2), an accredited, third-party laboratory in Waterloo, provided guidance for isotope sample collection and submission practices. Isotope samples were filtered and collected in laboratory supplied containers. Preservatives were not added to the sample, and headspace was limited to prevent isotope fractionation. The samples were shipped to IT2 for isotopic analysis ($\delta^{18}O$, $\delta^{2}H$ and tritium).

3 Results

3.1 RGMP Isotope Sampling Program

A summary of available $\delta^{18}O$, $\delta^{2}H$ and tritium results from the RGMP isotope sampling program conducted between October 2021 and January 2022 are below. Isotope data presented in this interim update will not be used to advance Study Area or operation specific hydrogeological CSMs in the 2021 RGMP/SSGMP annual report, due to time limitations. Available $\delta^{18}O$, $\delta^{2}H$ and tritium results are provided in Table 2 and laboratory reports are provided in Attachment 1. Table C below summarizes the range, average and standard deviation of $\delta^{18}O$, $\delta^{2}H$ and ^{3}H based on the media type of the sample.

Table C: Summary of Available Isotope Results from the RGMP Isotope Sampling Program

		$\delta^{18}O_{H2O}$ (‰)	$\delta^{2}H_{H2O}$ (‰)	^{3}H (TU)
Bedrock [1]	Number of samples	16	16	16
	Minimum	-19.34	-147.6	1.9
	Maximum	-16.96	-126.8	9.3
	Average	-18.37	-139.4	4.4
	Standard deviation	0.7	6.7	2.0
Unconsolidated Materials	Number of samples	53	53	51
	Minimum	-21.00	-162.2	0.8
	Maximum	-16.91	-124.9	7.9
	Average	-18.50	-140.6	4.6
	Standard deviation	0.9	7.6	2.0
Seeps	Number of samples	4	4	3
	Minimum	-18.94	-143.1	0.8
	Maximum	-16.44	-125.9	5.9
	Average	-17.61	-134.3	3.9
	Standard deviation	1.2	7.9	2.7

Table C (Cont'd): Summary of Available Isotope Results from the RGMP Isotope Sampling Program

		$\delta^{18}O_{H2O}$ (‰)	$\delta^{2}H_{H2O}$ (‰)	^{3}H (TU)
Surface Water	Number of samples	9	9	9
	Minimum	-19.07	-144.5	5.3
	Maximum	-17.19	-128.1	12.9
	Average	-18.05	-136.2	8.2
	Standard deviation	0.6	5.8	3.0
Precipitation	Number of samples	3	3	3
	Minimum	-19.06	-145.6	1.3
	Maximum	-9.54	-66.7	5.7
	Average	-13.98	-103.8	3.8
	Standard deviation	4.8	39.7	2.2

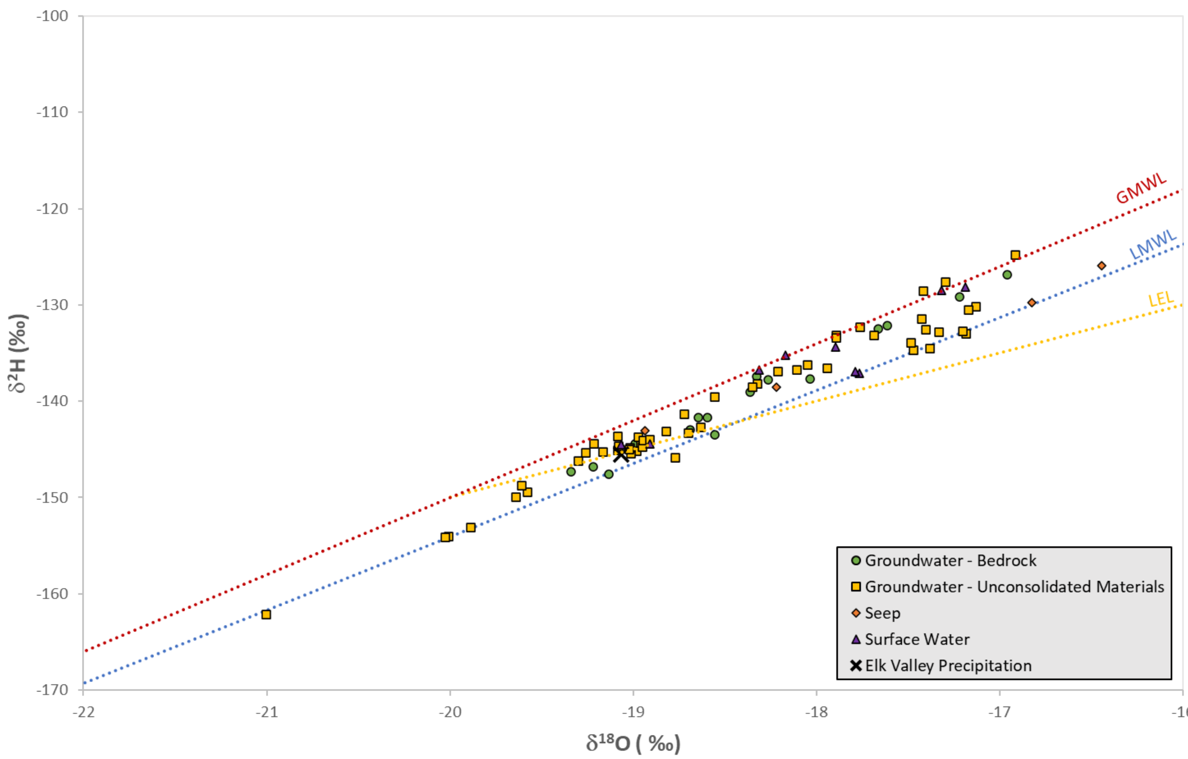
Notes:

[1] Results from groundwater are provided for wells screened in bedrock [one location (RG_MW_FR10A) screened over the bedrock till interface]

[2] Average of tritium results included 0.8 TU when samples were below the DL (< 0.8 TU).

Available δ¹⁸O and δ²H results from the RGMP isotope sampling program are presented on Figure 1 below by media type. All samples follow the sample the trend of the GMWL and LMWL. All δ¹⁸O and δ²H results are between -20‰ and -16.9‰ and -154.2‰ and 124.8‰, respectively, except for the groundwater sample collected at GH_MW-MC-2D (δ¹⁸O of -21‰, δ²H of -162.2‰).

Figure 1: Available δ¹⁸O and δ²H results from the RGMP isotope sampling program conducted between October 2021 and January 2022. The LMWL was characterized by Barbour et al. (2016) using 313 precipitation samples that were collected in the Elk Valley. The LEL was estimated by Harrison et al. (2000a) from samples collected from ponds and seeps in the Elk Valley.



Available tritium results are compared to the δ¹⁸O and δ²H in Figure 2, below. Review of data presented in Figures 1 and 2 indicated the following:

- Groundwater: wells screened in bedrock and unconsolidated materials have a wide range of δ¹⁸O and δ²H values (as summarized in Table C). Tritium values from wells screened both in bedrock and unconsolidated materials are primarily within the submodern to modern range. Seven wells (EV_ECgw, GH_MW_BG1A, GH_MW_BG1B, GH_MW_BG1C GH_MW-MC-2D, LC_PIZDC1307, and LC_PIZDC1404D) had tritium values below the detection limit of 0.8 TU and are within the submodern (prior to the 1950s) category.
- Seep: three seeps located near or within the EVO MPA had relatively enriched δ¹⁸O and δ²H values and had tritium values in the modern water range, with the exception of one sample with results below the tritium detection limit which falls in the submodern category (EV_SPR1B).

› Surface Water: results from nine surface water had relatively enriched $\delta^{18}O$ and δ^2H values and had tritium values in the modern water range.

› Precipitation: of the three precipitation samples collected opportunistically in Sparwood, BC, one sample from October 2021 plotted within the expected range for Elk Valley precipitation (based on the LWML established by Barbour et al. (2016), while the other two samples collected in November plotted outside the expected range (range in values provided in Table C).

Figure 2: Available tritium, δ18O and δ2H results from the RGMP isotope sampling program conducted between October 2021 and January 2022. Correlation between TU and groundwater age summarized in Section 1.1.2 and obtained from Clark and Fritz (1997). Tritium analysis detection limit (DL) is 0.8 TU. Samples that have a tritium value less than the DL are displayed as 0.8 TU

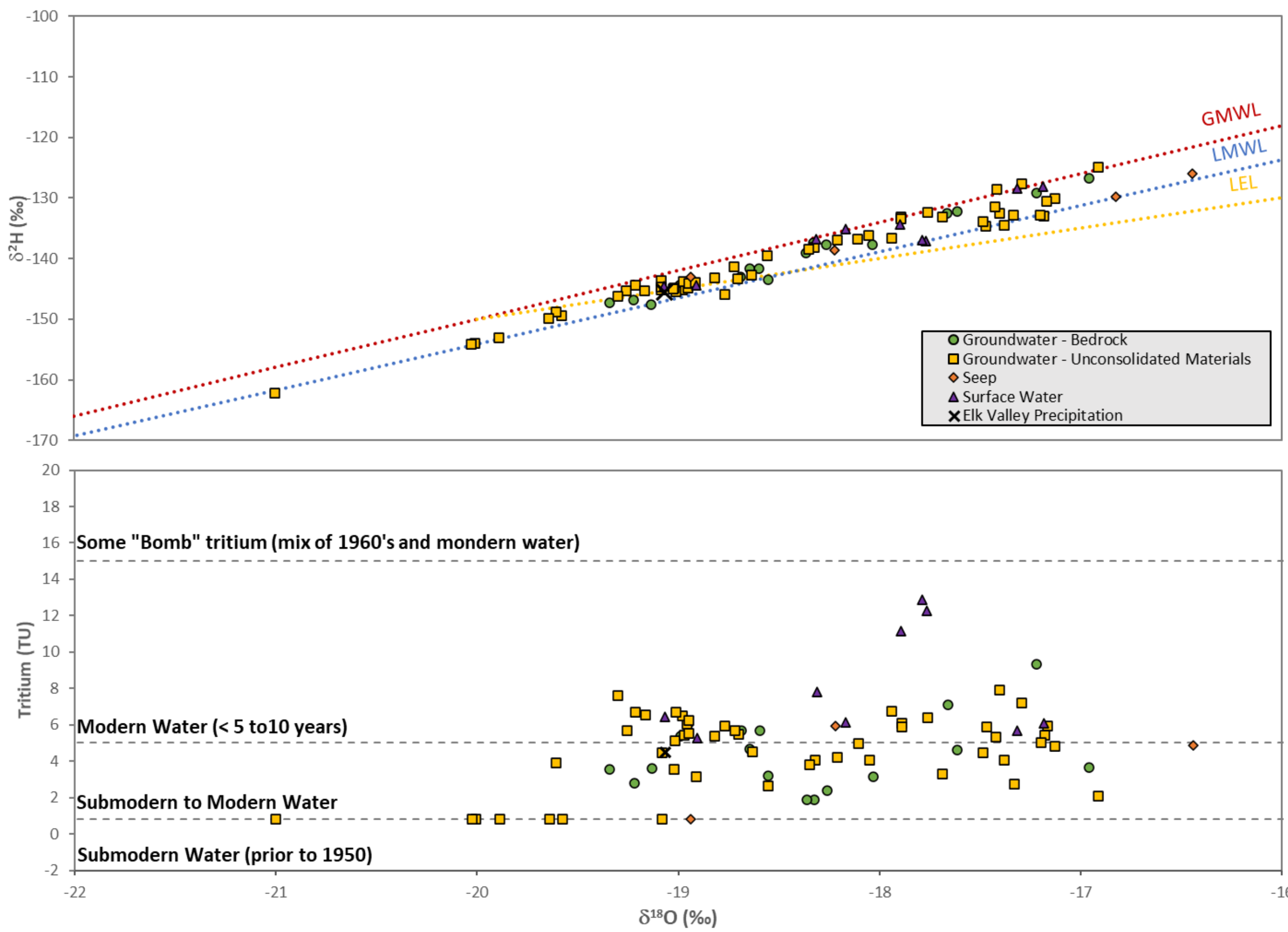
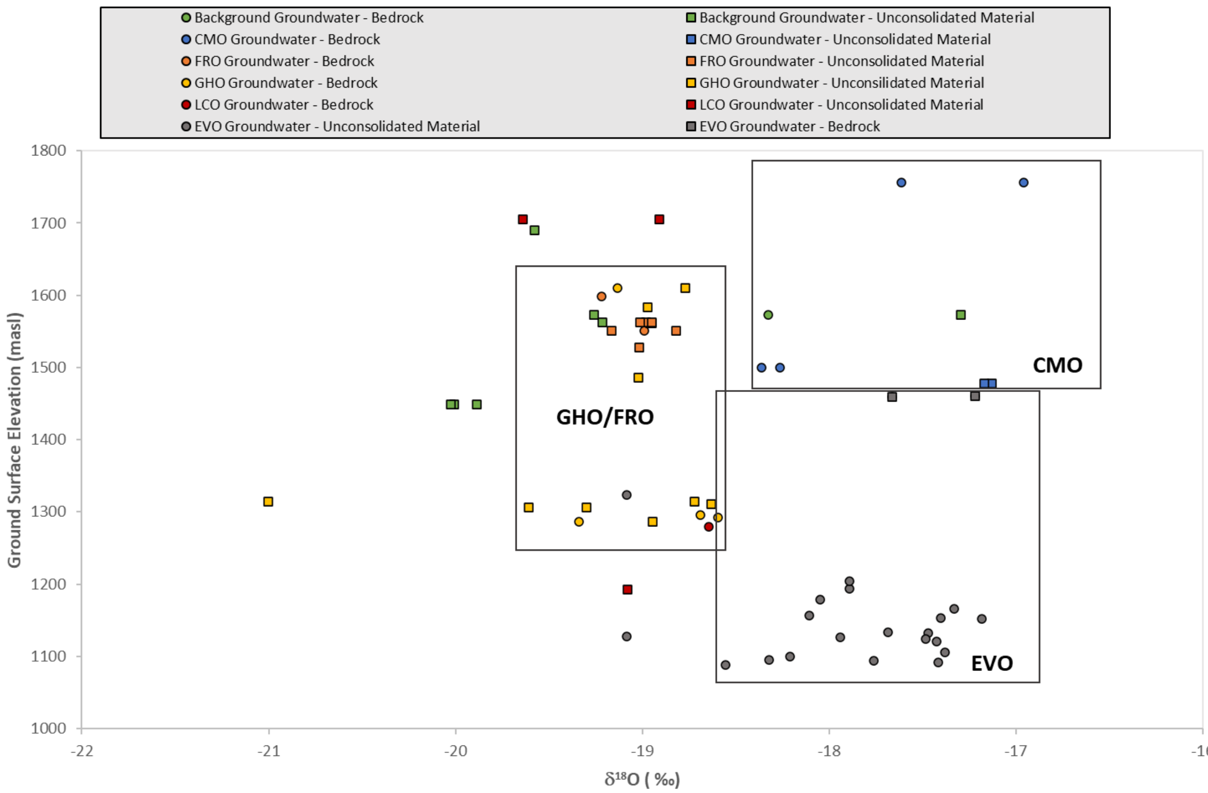


Figure 3 illustrates the relationship of $\delta^{18}O$ and ground elevation. There is not a clear relationship between $\delta^{18}O$ and ground elevation, potentially due to the large variation in elevation across the Elk Valley or complexities associated with the groundwater flowpaths.

Figure 3: Available $\delta^{18}O$ from the RGMP isotope sampling program conducted between October 2021 and January 2022 and inferred recharge elevation.



3.2 Compilation of Data from RGMP Isotope Sampling Program and Existing Dataset

Isotopic results obtained from the RGMP isotope sampling program were added to the existing isotope dataset compiled as part of the 2020 RGMP Update (SNC-Lavalin, 2020) summarized in Table B and shown on Figure 4 and Figure 5. In addition, isotopic results obtained from the Mass Balance Investigation (MBI) and Michel Creek flow and load accretion study were also incorporated into the isotope dataset.

Figure 4: Available $\delta^{18}O$ and $\delta^{2}H$ results from the RGMP isotope sampling program conducted between October 2021 and January 2022 and existing isotope dataset. The LMWL was characterized by Barbour et al. (2016) using 313 precipitation samples that were collected in the Elk Valley. The LEL was estimated by Harrison et al. (2000a) from samples collected from ponds and seeps in the Elk Valley.

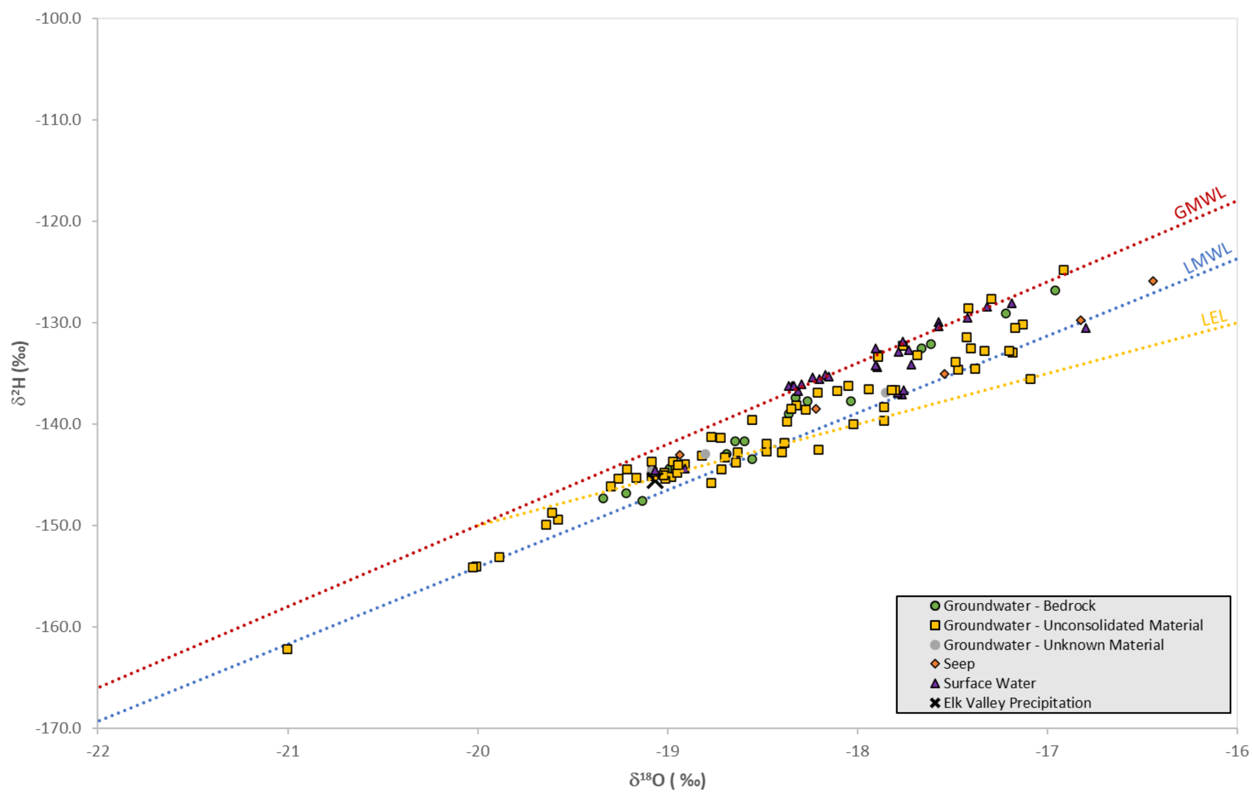
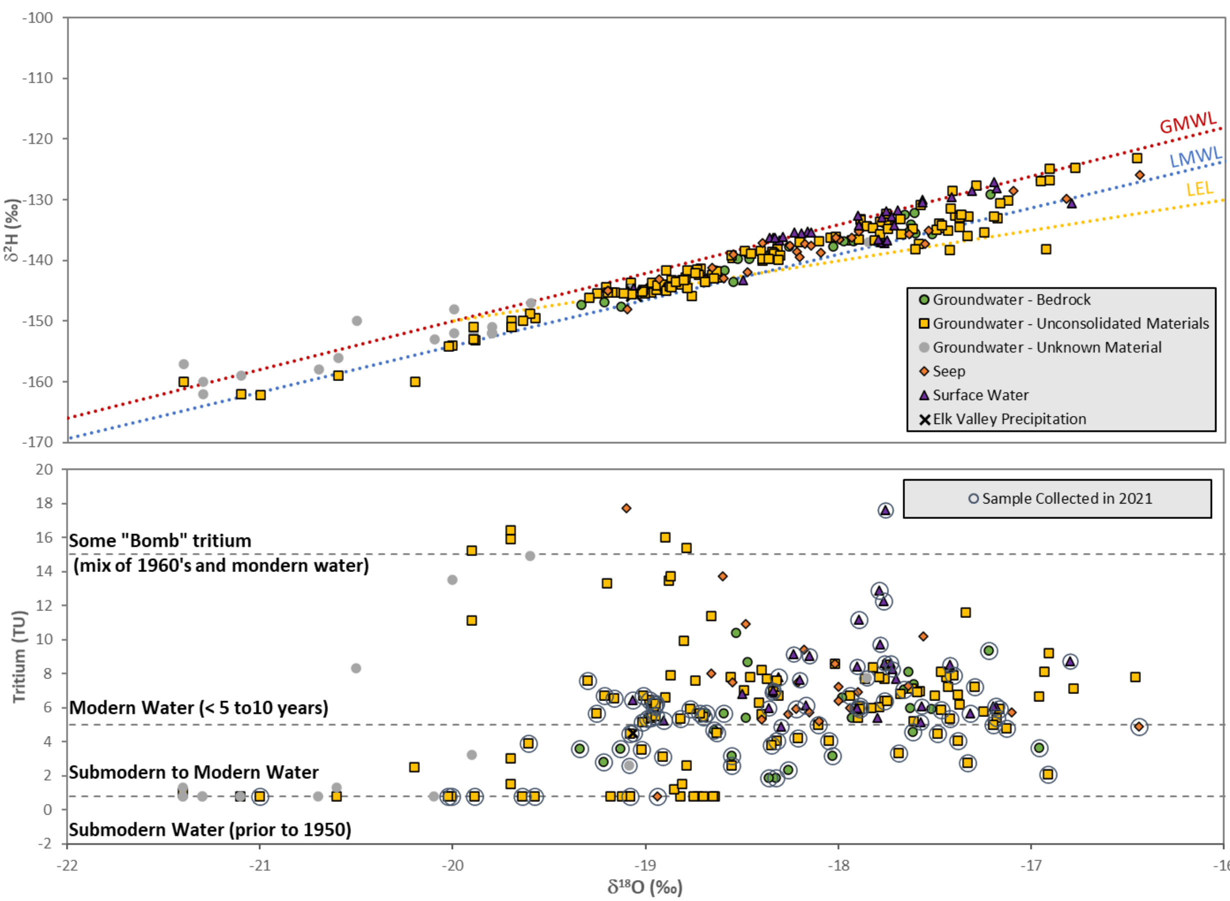


Figure 5: Available tritium, δ18O and δ2H results from the RGMP isotope sampling program conducted between October 2021 and January 2022 and existing isotope dataset. Correlation between TU and groundwater age summarized in Section 1.1.2 and obtained from Clark and Fritz (1997). Samples collected in 2021 are circled to highlight the additional tritium decay that may impact the groundwater age categories that were determined in 1997 (Clark and Fritz, 1997). Tritium analysis detection limit (DL) is 0.8 TU. Samples that have a tritium value less than the DL are displayed as 0.8 TU



4 Conclusions

Preliminary $\delta^{18}O$ and $\delta^{2}H$ results follow the GMWL and LMWL and were collected from a range of ground elevations within each operation. The tritium analysis indicates that most samples fall within the submodern to modern and modern age water categories and a few samples are considered to be older, submodern water.

5 References

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This report has been prepared and the work referred to in this report have been undertaken by SNC-Lavalin Inc. (SNC-Lavalin) for the exclusive use of Teck Coal Ltd. (Teck Coal), who has been party to the development of the scope of work and understands its limitations. The methodology, findings, conclusions and recommendations in this report are based solely upon the scope of work and subject to the time and budgetary considerations described in the proposal and/or contract pursuant to which this report was issued. Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. SNC-Lavalin accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report. Should this report be submitted to the BC Ministry of Environment & Climate Change Strategy (ENV) by Teck Coal Ltd., ENV is authorized to rely on the results in the report, subject to the limitations set out herein, for the sole purpose of determining whether Teck Coal has fulfilled its obligations with respect to meeting the regulatory requirements of ENV.

The findings, conclusions and recommendations in this report (i) have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area, and (ii) reflect SNC-Lavalin's best judgment based on information available at the time of preparation of this report. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our original contract and included in this report. The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, site conditions change or standards are amended, modifications to this report may be necessary. The results of this assessment should in no way be construed as a warranty that the subject site is free from any and all environmental impact.

Any soil and rock descriptions in this report and associated logs have been made with the intent of providing general information on the subsurface conditions of the site. This information should not be used as geotechnical data for any purpose unless specifically addressed in the text of this report. Groundwater conditions described in this report refer only to those observed at the location and time of observation noted in the report.

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7 Closure

We trust this letter report meets your current requirements and greatly appreciate the opportunity to assist Teck with this project. If you have any questions, please contact the undersigned at your convenience.

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Tables

1: Summary of Sampled Locations for Isotopic Analysis (δ2H, δ18O and tritium)

2: Summary of Isotope ($\delta^{18}O$, $\delta^{2}H$ and 3H) Results from RGMP Isotope Sampling Program (Interim Update)

Drawings

- Drawing 1: 2021-2022 RGMP Isotope Sampling Locations – FRO
- Drawing 2: 2021-2022 RGMP Isotope Sampling Locations – GHO
- Drawing 3: 2021-2022 RGMP Isotope Sampling Locations – LCO
- Drawing 4: 2021-2022 RGMP Isotope Sampling Locations – EVO
- Drawing 5: 2021-2022 RGMP Isotope Sampling Locations – CMm

Attachments

1: Laboratory Reports

Tables:

Table 1: Summary of Sampled Locations for Isotopic Analysis (δ^2H, $\delta^{18}O$ and tritium)

Operation	Location ID	Media	Included in Analysis of Results	Results are pending
			(n = 85)	(n = 23)
Background	CM_MW3-SH	Groundwater	X	
	FR_MW_CH1-A	Groundwater	X	
	FR_MW_CH2	Groundwater	X	
	GH_MW_BG1A	Groundwater	X	
	GH_MW_BG1B	Groundwater	X	
	GH_MW_BG1C	Groundwater	X	
	LC_PIZDC1307	Groundwater	X	
	CM_MW3-DP	Groundwater (bedrock)	X	
CMO	CM_MW_AG1A	Groundwater	X	
	CM_MW_AG1B	Groundwater	X	
	CM_MW1-SH	Groundwater (bedrock)	X	
	CM_MW1-DP	Groundwater (bedrock)	X	
	CM_MW7-DP	Groundwater (bedrock)	X	
	CM_MW7-SH	Groundwater (bedrock)	X	
	CM_MC2	Surface Water	X	
EVO	EV_MW_GV4B	Groundwater		X
	EV_GV3gwD	Groundwater		X
	EV_GV3gwS	Groundwater		X
	RG_MW_WW	Groundwater	X	
	RG_MW-03-04	Groundwater	X	
	EV_MW_GC1A	Groundwater		
	EV_ECgw	Groundwater	X	
	EV_ER1gwD	Groundwater	X	
	EV_ER1gwS	Groundwater	X	
	EV_MW_AQ1	Groundwater	X	
	EV_MW_BC1A	Groundwater	X	
	EV_MW_BC1B	Groundwater	X	
	EV_MW_BC2	Groundwater	X	
	EV_MW_BC3	Groundwater	X	
	EV_MW_GC1B	Groundwater	X	
	EV_MW_GT1A	Groundwater	X	
	EV_MW_GT1B	Groundwater	X	
	EV_RCSgw	Groundwater	X	
	EV_MW_MC3	Groundwater	X	
	EV_MW_MCgwA	Groundwater	X	
	EV_MW_MCgwB	Groundwater	X	
	EV_MW_SP1A	Groundwater	X	
	EV_MW_SP1B	Groundwater	X	
	EV_MW_SP1C	Groundwater	X	
	EV_MW_SPR1A	Groundwater	X	
	EV_MW_SPR1C	Groundwater	X	
	EVO_BRD-12-02A	Groundwater	X	
	EV_MW_DC2	Groundwater (bedrock)	X	
	EV_MW_DC6	Groundwater (bedrock)	X	
	EV_MW_GV4A	Groundwater (bedrock)		X
	EV_SPR1B	Seep	X	
	EV_SEEP_SOUTHPIT6	Seep	X	
	EV_SEEP_ERICKSON2	Seep	X	
	EV_SEEP_TURCON1	Seep	X	
	EV_ER4	Surface Water		X
	EV_HC1	Surface Water	X	
	EV_ER1	Surface Water	X	
	EV_MC2	Surface Water	X	
	EV_EC1	Surface Water	X	
	EV_ECOUT	Surface Water	X	
	EV_DC1	Surface Water	X	

Table 1: Summary of Sampled Locations for Isotopic Analysis (δ^2H, $\delta^{18}O$ and tritium) - Continued

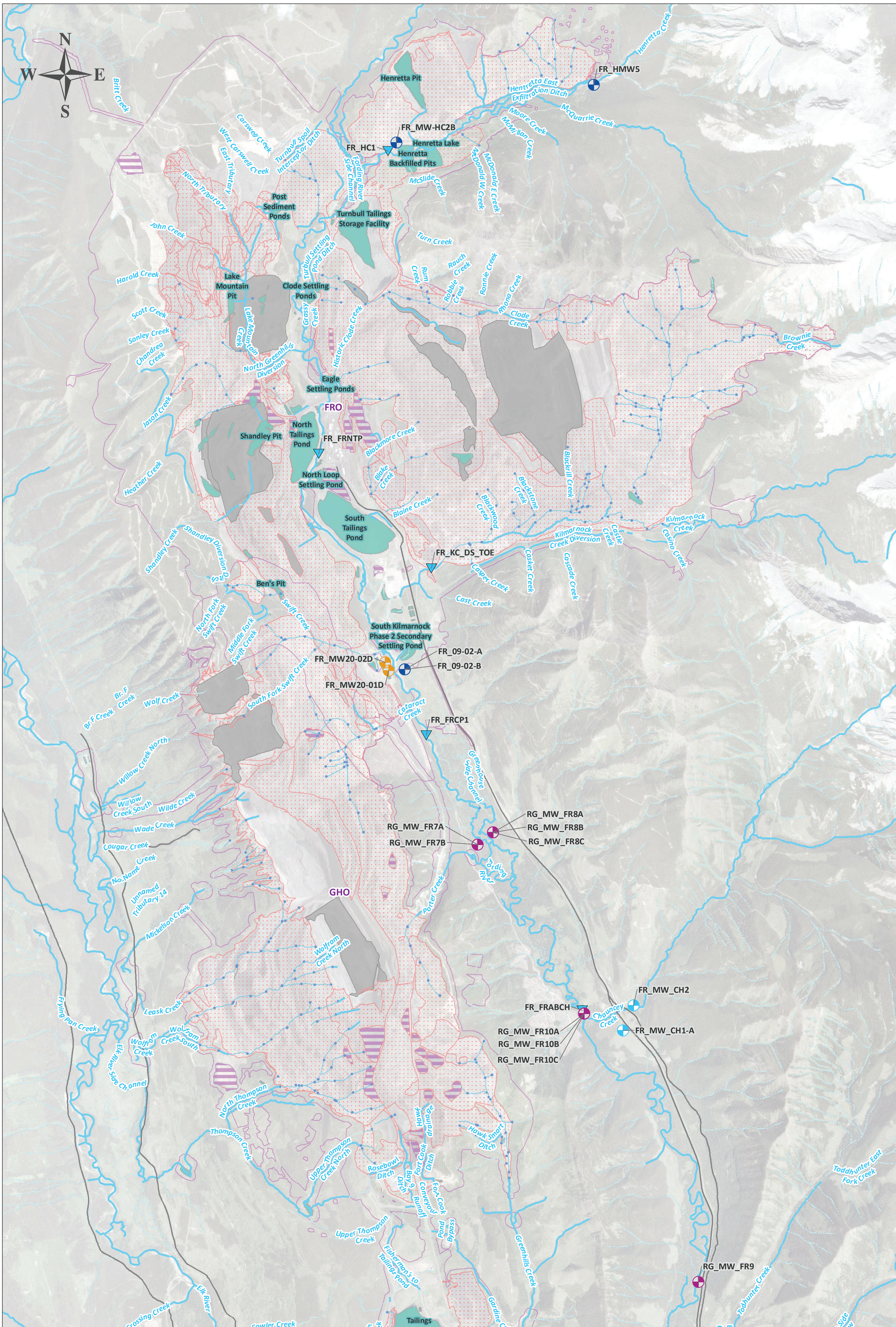
Operation	Location ID	Media	Included in Analysis of Results	Results are pending
			(n = 85)	(n = 23)
FRO	FR_09-02-A	Groundwater		X
	FR_09-02-B	Groundwater		X
	FR_HMW5	Groundwater		X
	FR_MW_HC2B	Groundwater	X	
	RG_MW_FR10B	Groundwater	X	
	RG_MW_FR10C	Groundwater	X	
	RG_MW_FR7A	Groundwater	X	
	RG_MW_FR7B	Groundwater	X	
	RG_MW_FR8A	Groundwater	X	
	RG_MW_FR8B	Groundwater	X	
	RG_MW_FR8C	Groundwater	X	
	RG_MW_FR9	Groundwater	X	
	FR_MW20-01D	Groundwater (bedrock)	X	
	FR_MW20-02D	Groundwater (bedrock)	X	
	RG_MW_FR10A	Groundwater (bedrock)	X	
	FR_HC1	Surface Water		X
	FR_FRNTP	Surface Water		X
	FR_KC_DS_TOE	Surface Water		X
	FR_FRABCH	Surface Water		X
	FR_FRCP1	Surface Water		X
	FR_SCCAT	Surface Water		X
GHO	GH_GA-MW-2	Groundwater		X
	GH_MW-ERSC-1	Groundwater		X
	GH_MW_WC1-A	Groundwater	X	
	GH_MW_WC1-B	Groundwater	X	
	GH_MW-GHC-1B	Groundwater	X	
	GH_MW-MC-2D	Groundwater	X	
	GH_MW-MC-2S	Groundwater	X	
	GH_MW-PC	Groundwater	X	
	GH_POTW10	Groundwater	X	
	RG_MW_ER5B	Groundwater	X	
	RG_MW_LCWC1	Groundwater	X	
	GH_MW_PC4A	Groundwater (bedrock)		X
	GH_MW-GHC-1A	Groundwater (bedrock)	X	
	RG_MW_ER5A	Groundwater (bedrock)	X	
	RG_MW_ER7A	Groundwater (bedrock)	X	
	RG_MW_ER8	Groundwater (bedrock)	X	
	GH_MC1	Surface Water		X
	GH_FR1	Surface Water	X	
	GH_ERC	Surface Water	X	
LCO	LC_MW_CP1B	Groundwater		X
	RG_MW_DC1B	Groundwater		X
	LC_MW_ER4A	Groundwater	X	
	LC_PIZDC1404D	Groundwater	X	
	LC_PIZDC1404S	Groundwater	X	
	RG_MW_LCB	Groundwater	X	
	LC_MW_CP1A	Groundwater (bedrock)		X
	RG_MW_LC4A	Groundwater (bedrock)	X	
	LC_LC4	Surface Water		X
	LC_LCDSSLCC	Surface Water		X
Precipitation	RG_PR_ER01	Precipitation	X	
	RG_PR_ER02	Precipitation	X	
	RG_PR_ER03	Precipitation	X	

Table 2: Summary of Isotope (δ^{18}O, δ^{2}H and 3H) Results from RGMP Isotope Sampling Program (Interim Update)

Media	Well ID	Operation	Sample Date	Results					
				δ^{18}O (‰)		δ^{2}H (‰)		^{3}H (TU)	
				Average Result	± 1σ	Average Result	± 1σ	Average Result	± 1σ
Groundwater (MW screened in bedrock)	CM_MW3-DP	Background/CMO	2021-10-11	-18.32	0.03	-137.4	0.3	1.9	0.6
	CM_MW1-SH	CMO	2021-10-27	-18.26	0.01	-137.7	0.1	2.4	0.1
	CM_MW1-DP	CMO	2021-10-27	-18.36	0.04	-139.0	0.1	1.9	0.1
	CM_MW7-DP	CMO	2021-11-10	-17.61	0.03	-132.2	0.4	4.6	0.6
	CM_MW7-SH	CMO	2021-11-10	-16.96	0.03	-126.8	0.4	3.6	0.6
	EV_MW_DC2	EVO	2021-11-29	-17.66	0.03	-132.5	0.2	7.1	0.5
	EV_MW_DC6	EVO	2021-11-29	-17.22	0.01	-129.1	0.2	9.3	0.7
	FR_MW20-01D	FRO	2021-11-10	-18.55	0.02	-143.5	0.1	3.2	0.5
	FR_MW20-02D	FRO	2021-11-09	-19.22	0.02	-146.8	0.4	2.8	0.5
	RG_MW_FR10A	FRO	2021-11-05	-18.99	0.02	-144.4	0.1	5.4	0.7
	GH_MW-GHC-1A	GHO	2021-11-18	-19.13	0.02	-147.6	0.1	3.6	0.3
	RG_MW_ER5A	GHO	2021-11-03	-19.34	0.02	-147.4	0.2	3.6	0.6
	RG_MW_ER7A	GHO	2021-11-02	-18.60	0.01	-141.7	0.1	5.7	0.7
	RG_MW_ER8	GHO	2021-11-03	-18.69	0.04	-143.0	0.2	5.7	0.7
	RG_MW_LC4A	LCO	2021-11-26	-18.64	0.02	-141.7	0.3	4.7	0.6
Groundwater (MW screened in unconsolidated materials)	CM_MW3-SH	Background/CMO	2021-10-11	-17.29	0.01	-127.6	0.1	7.2	0.5
	CM_MW_AG1A	CMO	2021-11-03	-17.13	0.05	-130.2	0.2	4.8	0.4
	CM_MW_AG1B	CMO	2021-11-03	-17.17	0.03	-130.5	0.2	5.9	0.4
	EV_ECgw	EVO	2021-11-12	-19.08	0.02	-145.1	0.1	< 0.8	0.4
	EV_ER1gwD	EVO	2021-11-17	-18.55	0.03	-139.6	0.2	2.6	0.6
	EV_ER1gwS	EVO	2021-11-17	-18.21	0.02	-136.9	0.2	4.2	0.6
	EV_MW_AQ1	EVO	2021-10-28	-18.11	0.02	-136.8	0.2	5.0	0.7
	EV_MW_BC1A	EVO	2021-11-05	-17.47	0.05	-134.7	0.2	5.9	0.4
	EV_MW_BC1B	EVO	2021-11-05	-17.18	0.02	-133.0	0.0	5.4	0.4
	EV_MW_BC2	EVO	2021-12-07	-18.03	0.03	-137.7	0.2	3.2	0.5
	EV_MW_BC3	EVO	2021-12-07	-17.33	0.04	-132.8	0.2	2.7	0.5
	EV_MW_GC1B	EVO	2021-10-24	-17.94	0.04	-136.6	0.1	6.7	0.5
	EV_MW_GT1A	EVO	2021-10-27	-17.76	0.02	-132.3	0.3	6.4	0.5
	EV_MW_GT1B	EVO	2021-10-27	-17.40	0.03	-132.6	0.1	7.9	0.6
	EV_RCSgw	EVO	2021-11-07	-17.20	0.03	-132.8	0.4	5.0	0.4
	EV_MW_MC3	EVO	2021-11-21	-17.42	0.02	-131.4	0.1	5.3	0.4
	EV_MW_MCgwA	EVO	2021-11-21	-17.38	0.02	-134.6	0.2	4.1	0.3
	EV_MW_MCgwB	EVO	2021-11-21	-17.49	0.03	-133.9	0.1	4.5	0.4
	EV_MW_SP1A	EVO	2021-10-19	-18.1	0.0	-136.2	0.1	4.0	0.5
	EV_MW_SP1B	EVO	2021-10-19	-17.9	0.0	-133.2	0.3	6.1	0.6
	EV_MW_SP1C	EVO	2021-10-19	-17.9	0.0	-133.4	0.1	5.9	0.6
	EV_MW_SPR1A	EVO	2021-11-14	-18.32	0.03	-138.2	0.4	4.0	0.6
	EV_MW_SPR1C	EVO	2021-11-14	-17.69	0.05	-133.2	0.1	3.3	0.5
	EVO_BRD-12-02A	EVO	2021-12-07	-16.91	0.02	-124.8	0.3	2.1	0.5
	RG_MW_WW	EVO	2021-11-23	-19.08	0.02	-143.7	0.3	-	-
	RG_MW-03-04	EVO	2021-11-24	-17.42	0.04	-128.6	0.2	-	-
	FR_MW_CH1-A	Background/FRO	2021-10-26	-19.21	0.02	-144.4	0.2	6.7	0.6
	FR_MW_CH2	Background/FRO	2021-10-26	-19.26	0.03	-145.4	0.2	5.7	0.6
	FR_MW_HC2B	FRO	2021-10-20	-18.7	0.0	-143.3	0.1	5.5	0.6
	RG_MW_FR10B	FRO	2021-11-05	-18.82	0.03	-143.2	0.1	5.4	0.7
	RG_MW_FR10C	FRO	2021-11-05	-19.17	0.03	-145.3	0.1	6.6	0.7
	RG_MW_FR7A	FRO	2021-11-02	-18.95	0.03	-144.3	0.3	6.2	0.7
	RG_MW_FR7B	FRO	2021-11-02	-18.96	0.03	-144.6	0.2	6.1	0.7
	RG_MW_FR8A	FRO	2021-11-04	-18.98	0.02	-145.2	0.1	6.5	0.7
	RG_MW_FR8B	FRO	2021-11-01	-19.01	0.02	-145.4	0.1	6.7	0.7
	RG_MW_FR8C	FRO	2021-11-01	-18.95	0.03	-144.8	0.1	6.2	0.7
	RG_MW_FR9	FRO	2021-11-03	-19.02	0.02	-144.8	0.1	5.1	0.6
	GH_MW_BG1A	Background/GHO	2021-11-19	-19.89	0.03	-153.1	0.3	< 0.8	0.0
	GH_MW_BG1B	Background/GHO	2021-11-19	-20.01	0.03	-154.0	0.1	< 0.8	0.0
	GH_MW_BG1C	Background/GHO	2021-11-19	-20.02	0.02	-154.2	0.1	< 0.8	0.0
	GH_MW_WC1-A	GHO	2021-11-18	-19.61	0.02	-148.8	0.2	3.9	0.3
	GH_MW_WC1-B	GHO	2021-11-18	-19.30	0.02	-146.2	0.1	7.6	0.6
	GH_MW-GHC-1B	GHO	2021-11-18	-18.77	0.03	-145.8	0.1	5.9	0.5
	GH_MW-MC-2D	GHO	2021-11-17	-21.00	0.02	-162.2	0.4	< 0.8	0.0
	GH_MW-MC-2S	GHO	2021-11-17	-18.72	0.05	-141.4	0.5	5.7	0.4
	GH_MW-PC	GHO	2021-12-03	-18.97	0.02	-143.7	0.2	5.4	0.4
	GH_POTW10	GHO	2021-11-19	-19.02	0.02	-145.1	0.2	3.5	0.3
	RG_MW_ER5B	GHO	2021-11-03	-18.95	0.02	-144.1	0.0	5.5	0.6
	RG_MW_LCWC1	GHO	2021-11-02	-18.63	0.03	-142.8	0.1	4.5	0.6
	LC_PIZDC1307	Background/LCO	2021-11-18	-19.58	0.03	-149.4	0.1	< 0.8	0.5
	LC_MW_ER4A	LCO	2021-11-19	-19.08	0.01	-144.7	0.2	4.5	0.6
	LC_PIZDC1404D	LCO	2021-11-10	-19.64	0.02	-149.9	0.3	< 0.8	0.4
	LC_PIZDC1404S	LCO	2021-11-10	-18.91	0.03	-144.0	0.1	3.1	0.5
	RG_MW_LCB	LCO	2021-11-26	-18.35	0.02	-138.5	0.3	3.8	0.6
Seep	EV_SPR1B	EVO	2021-11-14	-18.94	0.03	-143.1	0.3	< 0.8	0.5
	EV_SEEP_SOUTHPIT6	EVO	2021-12-14	-16.82	0.03	-129.8	0.1	-	-
	EV_SEEP_ERICKSON2	EVO	2021-11-10	-16.44	0.02	-125.9	0.2	4.9	0.4
	EV_SEEP_TURCON1	EVO	2021-11-10	-18.22	0.03	-138.6	0.1	5.9	0.5
Surface Water	CM_MC2	CMO	2021-10-27	-17.19	0.02	-128.1	0.2	6.1	0.5
	EV_HC1	EVO	2021-11-02	-18.17	0.04	-135.2	0.2	6.1	0.7
	EV_ER1	EVO	2021-11-03	-18.31	0.03	-136.7	0.3	7.8	0.6
	EV_MC2	EVO	2021-11-03	-17.32	0.02	-128.5	0.2	5.7	0.7
	EV_EC1	EVO	2021-11-04	-17.77	0.01	-137.1	0.1	12.3	1.0
	EV_ECOUT	EVO	2021-11-07	-17.79	0.03	-136.9	0.1	12.9	0.9
	EV_DC1	EVO	2021-11-02	-17.90	0.02	-134.4	0.2	11.2	2.2
	GH_FR1	GHO	2021-11-09	-18.91	0.02	-144.4	0.1	5.3	0.6
	GH_ERC	GHO	2021-11-09	-19.07	0.04	-144.5	0.1	6.4	0.7
Precipitation	RG_PR_ER01	-	2021-11-05	-13.33	0.03	-99.2	0.4	5.7	0.7
	RG_PR_ER01	-	2021-10-24	-19.06	0.02	-145.6	0.2	4.5	0.6
	RG_PR_ER01	-	2021-11-15	-9.54	0.03	-66.7	0.1	1.3	0.1

Drawings:

1. 2021-2022 RGMP Isotope Sampling Locations – FRO
2. 2021-2022 RGMP Isotope Sampling Locations – GHO
3. 2021-2022 RGMP Isotope Sampling Locations – LCO
4. 2021-2022 RGMP Isotope Sampling Locations – EVO
5. 2021-2022 RGMP Isotope Sampling Locations – CMm



Legend

- Surface Water
- Groundwater - FR-X
- Groundwater - MBI
- Groundwater - SSGMP
- Groundwater - Swift Creek Ponds
- Secondary Road
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Mine Permitted Boundaries
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:

1. Locations and Imagery provided by Teck Coal Ltd.

Revisons:

0 - CW - 2021-08-04 - DRAFT - KH
1 - AO - 2021-10-18 - FINAL - LH

0 300 600 1,200 1,800 2,400 3,000 Metres

Client: Teck Coal Limited

Project Location: Elk Valley, BC

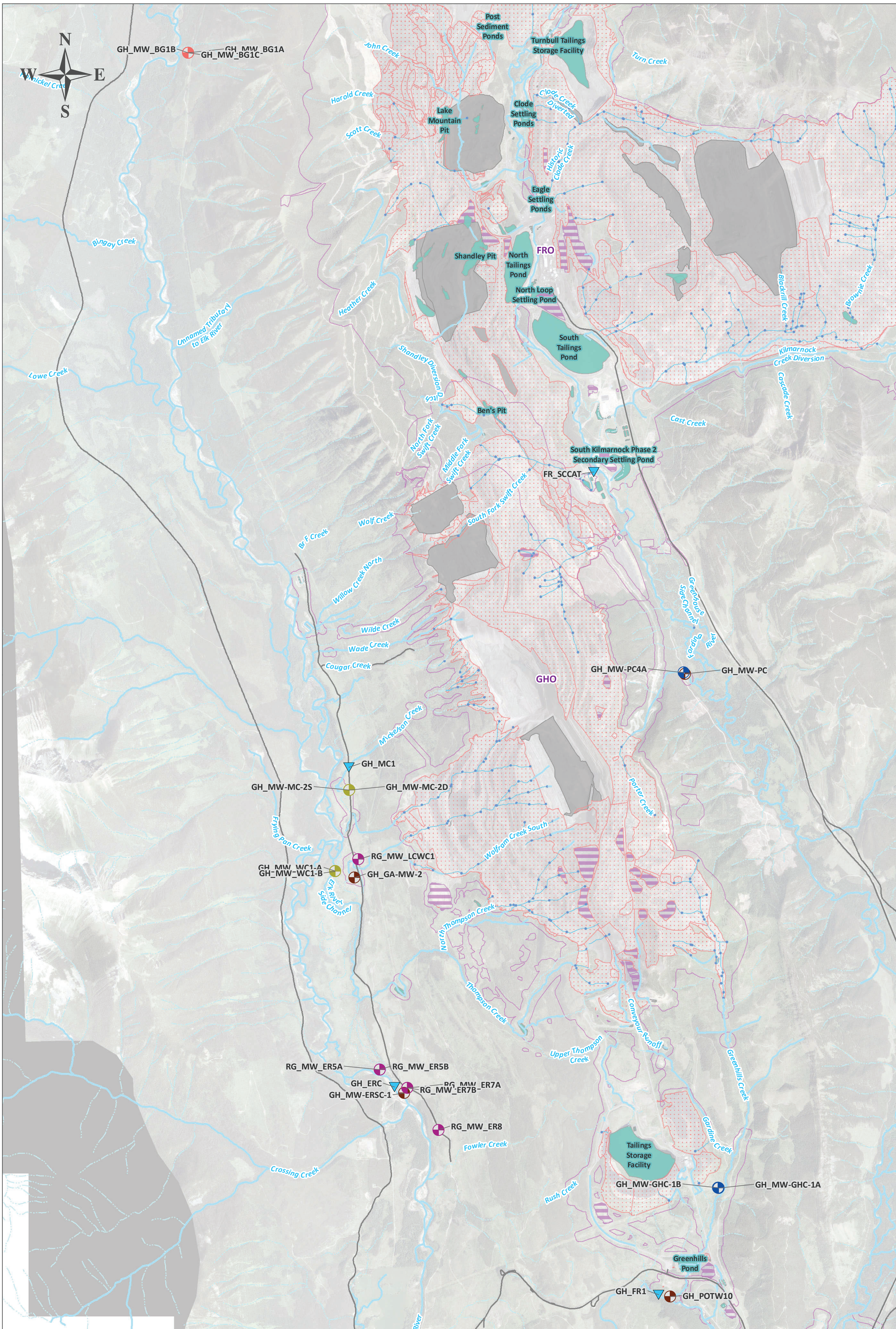
SNC·LAVALIN

2021-2022 RGMP Isotope Sampling Locations - FRO

CHK'D: LH	DATE: 2022-02-16	SCALE: 1:60,000	REF No:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 1

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\683032

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\686904\686904-Drawing 1-FRO_Teck.mxd



Legend

- Surface Water
- Groundwater - MBI
- Groundwater - Phase 5/7-2
- Groundwater - RGMP
- Groundwater - SSGMP
- Groundwater - SSGMP/RGMP
- Secondary Road
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Mine Permitted Boundaries
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Locations and Imagery provided by Teck Coal Ltd.

References:
1. 2020 Orthophoto provided by Teck Coal Limited.

Revisons:
0 - CW - 2021-08-04 - DRAFT - KH
1 - AO - 2021-10-18 - FINAL - LH

0 300 600 1,200 1,800 2,400 3,000 Metres

Client:
Teck Coal Limited

Project Location:
Elk Valley, BC

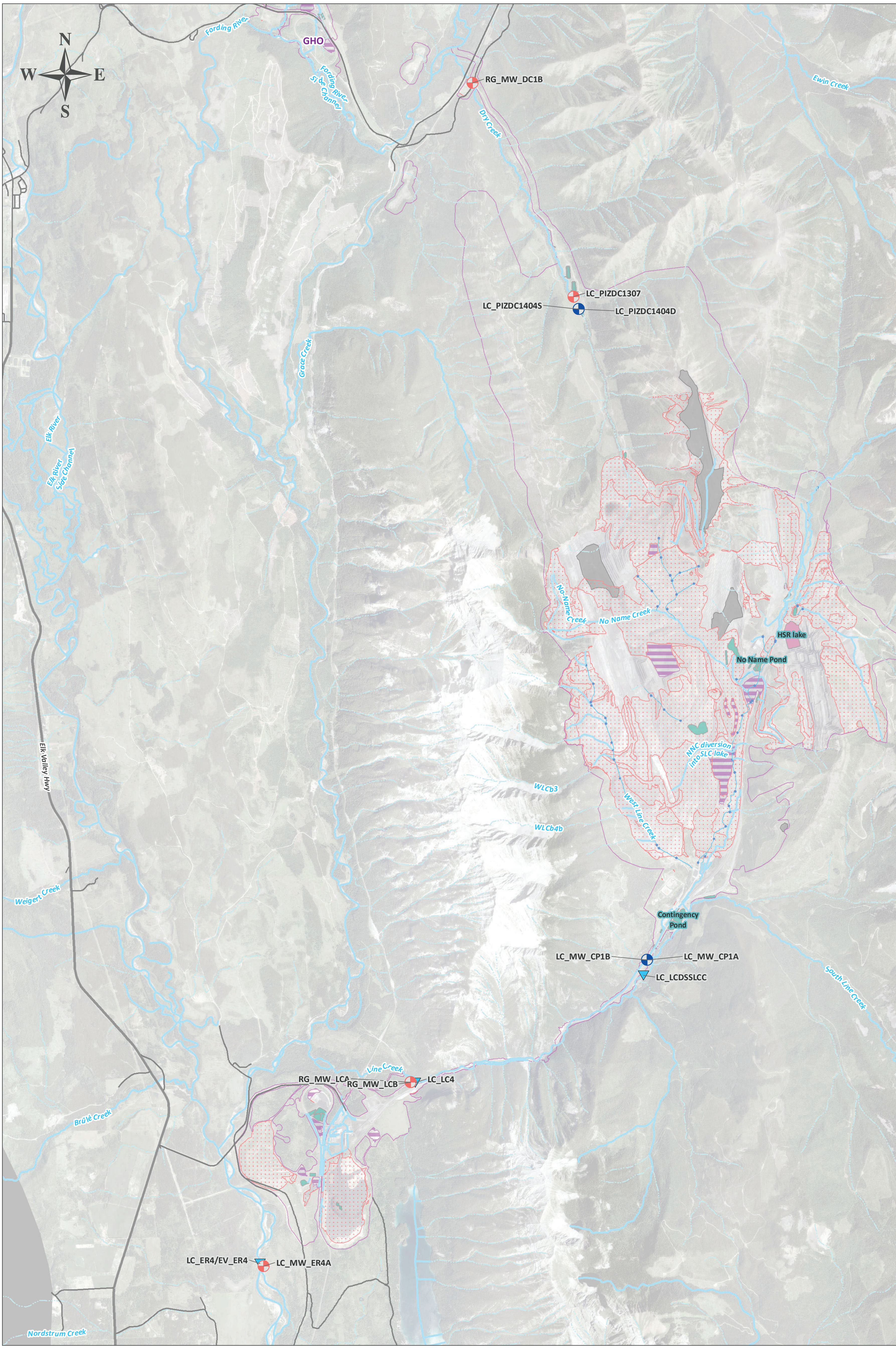
SNC·LAVALIN

2021-2022 RGMP Isotope Sampling Locations – GHO

CHK'D: LH	DATE: 2022-02-16	SCALE: 1:60,000	REF No:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 2

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\683032

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\686904\686904-Drawing 2-GHO_Teck.mxd



Legend

- Surface Water
- Groundwater - RGMP
- Groundwater - SSGMP
- Highway
- Secondary Road
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Mine Permitted Boundaries
- Tailings/Settling Pond
- Reservoir
- Pit
- Stockpiles
- Waste Dump (Spoils)

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. 2020 Orthophoto provided by Teck Coal Limited.

Revisons:
0 - AO - 2021-08-04 - DRAFT - KH
1 - AO - 2021-10-18 - FINAL - LH

0 300 600 1,200 1,800 2,400 3,000 Metres

Client: Teck Coal Limited

Project Location: Elk Valley, BC

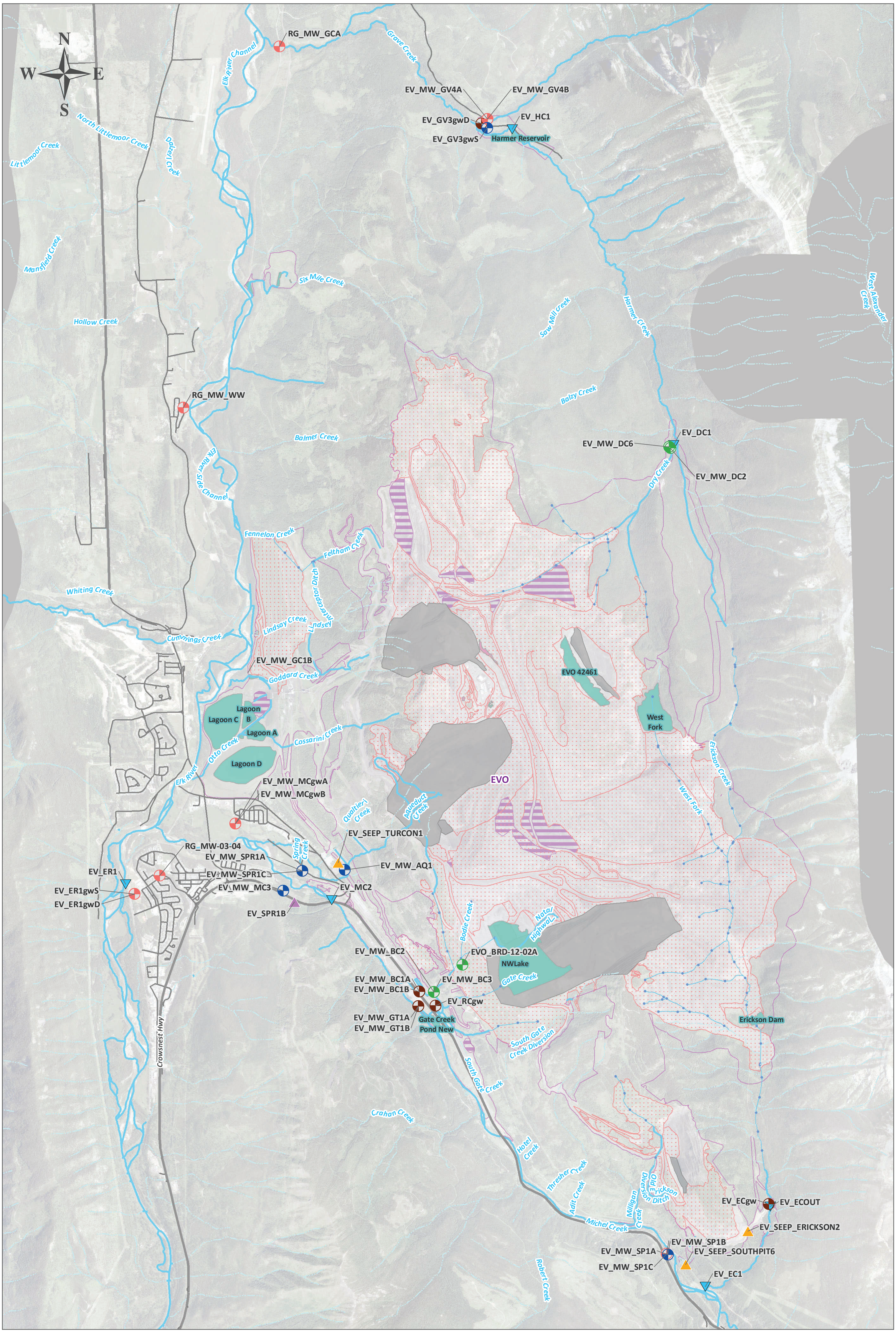
SNC·LAVALIN

2021-2022 RGMP Isotope Sampling Locations – LCO

CHK'D: LH
BY: AO
DATE: 2022-02-16
SCALE: 1:60,000
COORD SYS: NAD 1983 UTM Zone 11N
REF No: **DRAWING 3**

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\683032

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\686904\686904-Drawing 3-LCO_Teck.mxd



Legend

- Seep - Sparwood Ridge
- Seep - Seep Monitoring Program
- Surface Water
- Groundwater - RGMP
- Groundwater - SSGMP
- Groundwater - SSGMP/RGMP
- Groundwater - n/a
- Highway
- Secondary Road
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Mine Permitted Boundaries
- Tailings/Settling Pond
- Reservoir
- Pit
- Stockpiles
- Waste Dump (Spoils)

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1.

Revisons:
0 - CW - 2021-08-04 - DRAFT - KH
1 - AO - 2021-10-18 - FINAL - LH

0 300 600 1,200 1,800 2,400 3,000 Metres

Client: Teck Coal Limited

Project Location: Elk Valley, BC

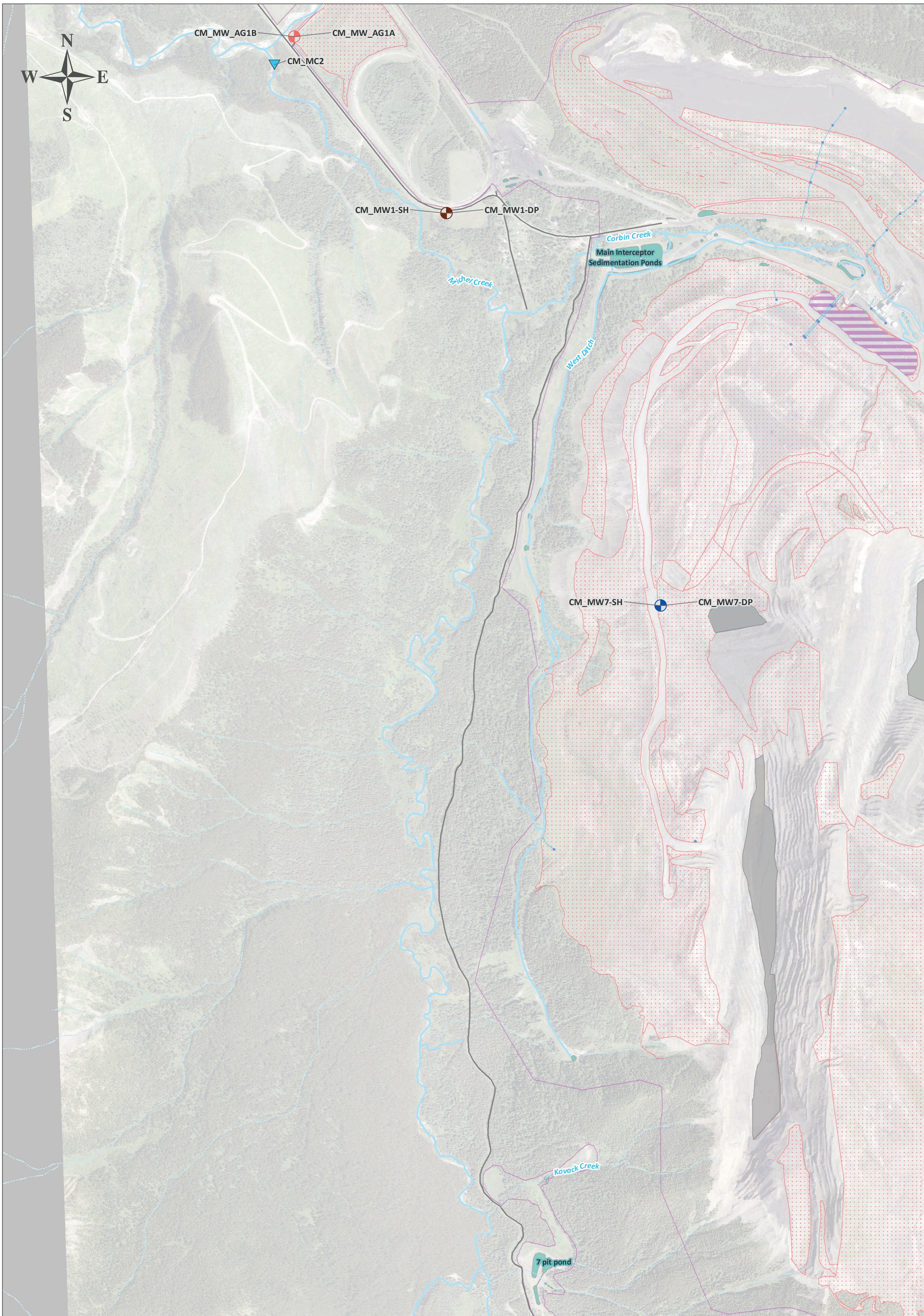
SNC·LAVALIN

2021-2022 RGMP Isotope Sampling Locations – EVO

CHK'D: LH	DATE: 2022-02-16	SCALE: 1:55,000	REF No:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 4

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\683032

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\686904\686904-Drawing 4-EVO_Teck.mxd



Legend

- Surface Water
- Groundwater - RGMP
- Groundwater - SSGMP
- Groundwater - SSGMP/RGMP
- Secondary Road
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Mine Permitted Boundaries
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. 2020 Orthophoto provided by Teck Coal Limited.

Revisons:
0 - CW - 2021-08-04 - DRAFT - KH
1 - AO - 2021-10-18 - FINAL - LH

0 87.5 175 350 525 700 875 Metres

Client: Teck Coal Limited

Project Location: Elk Valley, BC

SNC·LAVALIN

2021-2022 RGMP Isotope Sampling Locations – Cmm

CHK'D: LH	DATE: 2022-02-16	SCALE: 1:16,000	REF No:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 5

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\683032

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\686904\686904-Drawing 5-Cmm_Teck.mxd

Attachment 1: Laboratory Reports

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210393

2021-11-01

Approved by:

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER
TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker/ Melissa MacDonald
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210393**
Project Number: **666653 MBI**
PO: **680806. Additional**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	RG_FRSPRING_WS_2021_08_18_NP	2021-08-18	10:30	77799	X	-19.69	0.02	X	-150.7	0.2
2	RG_MW_ER5A_WG_2021_08_17_NP	2021-08-17	14:15	77800	X	-19.43	0.05	X	-147.5	0.3
3	RG_MW_ER5B_WG_2021_08_17_NP	2021-08-17	13:30	77801	X	-19.21	0.04	X	-145.0	0.2
4	RG_MW_MC10A_WG_2021_08_17_NP	2021-08-17	13:30	77802	X	-19.16	0.04	X	-144.8	0.3
5	RG_MW_ER7A_WG_2021_08_18_NP	2021-08-18	14:00	77803	X	-18.50	0.02	X	-141.3	0.3
6	RG_MW_ER8_WG_2021_08_18_NP	2021-08-18	14:30	77804	X	-18.71	0.02	X	-143.3	0.3
7	RG_MW_LCWC1_WG_2021_08_16_NP	2021-08-16	12:00	77805	X	-18.55	0.03	X	-142.1	0.3
8	RG_MW_FR7A_WG_2021_08_24_NP	2021-08-24	9:25	77806	X	-18.91	0.02	X	-144.5	0.2
9	RG_MW_FR7B_WG_2021_08_24_NP	2021-08-24	9:10	77807	X	-18.88	0.03	X	-144.0	0.3
10	RG_MW_FR8A_WG_2021_08_23_NP	2021-08-23	13:15	77808	X	-18.84	0.03	X	-144.1	0.2
11	RG_MW_FR8B_WG_2021_08_23_NP	2021-08-23	12:15	77809	X	-18.77	0.03	X	-142.5	0.3
12	RG_MW_FR8C_WG_2021_08_23_NP	2021-08-23	12:00	77810	X	-18.96	0.05	X	-143.7	0.3
13	RG_MW_MC10A_WG_2021_08_23_NP	2021-08-23	12:00	77811	X	-18.99	0.04	X	-143.8	0.1
14	RG_MW_FR9_WG_2021_08_27_NP	2021-08-27	11:30	77812	X	-18.88	0.03	X	-143.1	0.1
15	RG_MW_FR10A_WG_2021_08_27_NP	2021-08-27	10:30	77813	X	-18.91	0.03	X	-142.9	0.2
16	RG_MW_FR10B_WG_2021_08_27_NP	2021-08-27	8:50	77814	X	-18.83	0.03	X	-142.0	0.1
17	RG_MW_FR10C_WG_2021_08_27_NP	2021-08-27	9:00	77815	X	-19.02	0.02	X	-143.7	0.2

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).

Standard Used:
IT2-2B / IT2-11B / IT2-12C Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)

Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
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Attn.: Leslie Harker/ Melissa MacDonald
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210393
Project Number: 666653 MBI
PO: 680806. Additional

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	RG_FRSPRING_WS_2021_08_18_NP	2021-08-18	10:30	77799	X	2.8	0.6
2	RG_MW_ER5A_WG_2021_08_17_NP	2021-08-17	14:15	77800	X	3.5	0.6
3	RG_MW_ER5B_WG_2021_08_17_NP	2021-08-17	13:30	77801	X	5.7	0.7
4	RG_MW_MC10A_WG_2021_08_17_NP	2021-08-17	13:30	77802	X	6.4	0.7
5	RG_MW_ER7A_WG_2021_08_18_NP	2021-08-18	14:00	77803	X	5.2	0.6
6	RG_MW_ER8_WG_2021_08_18_NP	2021-08-18	14:30	77804	X	6.4	0.7
7	RG_MW_LCWC1_WG_2021_08_16_NP	2021-08-16	12:00	77805	X	5.8	1.1
8	RG_MW_FR7A_WG_2021_08_24_NP	2021-08-24	9:25	77806	X	5.1	0.6
9	RG_MW_FR7B_WG_2021_08_24_NP	2021-08-24	9:10	77807	X	5.9	0.7
10	RG_MW_FR8A_WG_2021_08_23_NP	2021-08-23	13:15	77808	X	5.5	0.6
11	RG_MW_FR8B_WG_2021_08_23_NP	2021-08-23	12:15	77809	X	6.3	0.7
12	RG_MW_FR8C_WG_2021_08_23_NP	2021-08-23	12:00	77810	X	6.6	0.7
13	RG_MW_MC10A_WG_2021_08_23_NP	2021-08-23	12:00	77811	X	6.1	0.6
14	RG_MW_FR9_WG_2021_08_27_NP	2021-08-27	11:30	77812	X	4.9	1.1
15	RG_MW_FR10A_WG_2021_08_27_NP	2021-08-27	10:30	77813	X	5.2	1.0
16	RG_MW_FR10B_WG_2021_08_27_NP	2021-08-27	8:50	77814	X	5.4	1.0
17	RG_MW_FR10C_WG_2021_08_27_NP	2021-08-27	9:00	77815	X	5.3	1.0

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

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ISOTOPE TRACER TECHNOLOGIES INC

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210646

2022-01-06

Approved by:

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Attn.: Leslie Harker/ Melissa MacDonald
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210646**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	FR_MW-HC2B_WG_20211020_NP	2021-10-20	11:32	83322	X	-18.70	0.04	X	-143.3	0.1

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-2B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:
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E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210646**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	E^{3}H	Result	± 1σ
		Date	Time				
1	FR_MW-HC2B_WG_20211020_NP	2021-10-20	11:32	83322	X	5.5	0.6

E^{3}H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:
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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	
	(Rush)	

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX ______ BOTH ______
SELECT: PDF ____ DIGITAL ____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <---- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

ANALYSIS REQUEST

SAMPLING INFORMATION: Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	GRAB	MATRIX: WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	# CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)									COMMENTS	LAB ID
2021-10-20	11:32			x			FR_MW-HC2B_WG_20211020_NP	2	R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

__ FROZEN
__ COLD
__ COOLING INITIATED
__ AMBIENT

SAMPLED BY: SG / IL	DATE & TIME 20211020/5:15PM	RECEIVED BY: N.H.	DATE & TIME Oct.10, 2021	Observations
RELINQUISHED BY:	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210648

2022-01-06

Approved by:

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Isotope Tracer Technologies Inc.
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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Attn.: Leslie Harker/ Melissa MacDonald
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210648
Project Number: 686094

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	EV_MW_SP1A_WG_2021-Q4_NP	10/19/2021	12:40	83334	X	-18.05	0.01	X	-136.2	0.1
2	EV_MW_SP1B_WG_2021-Q4_NP	10/19/2021	12:35	83335	X	-17.89	0.03	X	-133.2	0.3
3	EV_MW_SP1C_WG_2021-Q4_NP	10/19/2021	14:10	83336	X	-17.89	0.03	X	-133.4	0.1

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-2B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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Attn.: Leslie Harker/ Melissa MacDonald
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210648
Project Number: 686094

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	EV_MW_SP1A_WG_2021-Q4_NP	10/19/2021	12:40	83334	X	4.0	0.5
2	EV_MW_SP1B_WG_2021-Q4_NP	10/19/2021	12:35	83335	X	6.1	0.6
3	EV_MW_SP1C_WG_2021-Q4_NP	10/19/2021	14:10	83336	X	5.9	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	
	(Rush)	

COMPANY NAME: SNC-Lavalin
OFFICE ADDRESS: 520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker
PROJECT # 686094
PHONE: 250-505-6493 FAX
PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX _______ BOTH ________
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:
ENTERED BY:
DATE/TIME ENTERED:
BIN #:

SAMPLING INFORMATION / **ANALYSIS REQUEST**

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)									COMMENTS	LAB ID
10/19/2021	12:40			x			EV_MW_SP1A_WG_2021-Q4_NP	2	R	R										
10/19/2021	12:35			x			EV_MW_SP1B_WG_2021-Q4_NP	2	R	R										
10/19/2021	14:10			x			EV_MW_SP1C_WG_2021-Q4_NP	2	R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

Observations

SAMPLED BY: Josh Batstone/Braiden Clarke | 10/19/2021 | RECEIVED BY: | DATE & TIME
RELINQUISHED BY: | DATE & TIME | RECEIVED AT LAB BY: N.H. | DATE & TIME Oct.22, 2021

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT² FILE # 210649

2022-01-06

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
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Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210649
Project Number: 686094

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	δ^2H	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	FR_MW_CH1-A_WG_2021_10_26_NP	2021-10-26	10:50	83337	X	-19.21	0.02	X	-144.4	0.2
2	FR_MW_CH2_WG_2021_10_26_NP	2021-10-26	13:00	83338	X	-19.26	0.03	X	-145.4	0.2

^{18}O & ^2H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-2B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^2H ± 1‰)

Approved by:

Orfan S-Stash

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E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210649**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	FR_MW_CH1-A_WG_2021_10_26_NP	2021-10-26	10:50	83337	X	6.7	0.6
2	FR_MW_CH2_WG_2021_10_26_NP	2021-10-26	13:00	83338	X	5.7	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

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Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4, Waterloo, ON, N2V 1K4
Tel: 519-886-5555 | Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	X
	(Rush)	

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL ___X__ FAX _______ BOTH _______
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

ANALYSIS REQUEST

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)	COMMENTS	LAB ID
2021-10-26				x			FR_MWCH-1A_WG-2021-10-26-NP	2	R	R		
2021-10-26	13:00			x			FR-MWCH2-WG-2021-10-26-NP	2	R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		
				x					R	R		

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

__ FROZEN
__ COLD
__ COOLING INITIATED
__ AMBIENT

Observations

SAMPLED BY: TAHINA CHOUDHURY	DATE & TIME 26OCT'2021	RECEIVED BY:	DATE & TIME
RELINQUISHED BY: Tahina Chowdhury [signature]	DATE & TIME 26OCT2021/16:00	RECEIVED AT LAB BY: N.H.	DATE & TIME Oct.22, 2021

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210672

2022-01-24

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
Waterloo, ON, N2V 1Z5 Tel: 519-886-5555 |
Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: Harker, Leslie <Leslie.Harker@snclavalin.com>
E-mail: Victoria.Sharpe@teck.com
E-mail: Shelby.Holden@teck.com

File Number: **210672**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	CM_MW1-SH_WG_2021-10-11_N-NAL	2021-10-27	12:20	83853	X	-18.26	0.01	X	-137.7	0.1
2	CM_MW1-DP_WG_2021-10-11_N-NAL	2021-10-27	13:00	83854	X	-18.36	0.04	X	-139.0	0.1
3	CM_MC2_WS_2021-10-27_N-NAL	2021-10-27	13:30	83855	X	-17.19	0.02	X	-128.1	0.2
4	CM_MW3-SH_WG_2021-10-11_N-NAL	2021-10-28	12:00	83856	X	-17.29	0.01	X	-127.6	0.1
5	CM_MW3-DP_WG_2021-10-27_N-NAL	2021-10-28	11:50	83857	X	-18.32	0.03	X	-137.4	0.3
6	CM_MW_AG1A_WG_2021-10-11_N-NAL	2021-11-04	14:55	83858	X	-17.13	0.05	X	-130.2	0.2
7	CM_MW_AG1B_WG_2021-10-11_N-NAL	2021-11-04	13:45	83859	X	-17.17	0.03	X	-130.5	0.2
8	CM_NNP2_WS_2021-10-11_N-NAL	2021-11-04	--	83860	X	-17.18	0.03	X	-130.4	0.1

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-2B / IT2-11B / IT2-12C Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4, Waterloo, ON, N2V 1K4
Tel: 519-886-5555 | Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: Harker, Leslie <Leslie.Harker@snclavalin.com>
E-mail: Victoria.Sharpe@teck.com
E-mail: Shelby.Holden@teck.com

File Number: **210672**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	CM_MW1-SH_WG_2021-10-11_N-NAL	2021-10-27	12:20	83853	X	2.4	0.1
2	CM_MW1-DP_WG_2021-10-11_N-NAL	2021-10-27	13:00	83854	X	1.9	0.1
3	CM_MC2_WS_2021-10-27_N-NAL	2021-10-27	13:30	83855	X	6.1	0.5
4	CM_MW3-SH_WG_2021-10-11_N-NAL	2021-10-28	12:00	83856	X	7.2	0.5
5	CM_MW3-DP_WG_2021-10-27_N-NAL	2021-10-28	11:50	83857	X	1.9	0.6
6	CM_MW_AG1A_WG_2021-10-11_N-NAL	2021-11-04	14:55	83858	X	4.8	0.4
7	CM_MW_AG1B_WG_2021-10-11_N-NAL	2021-11-04	13:45	83859	X	5.9	0.4
8	CM_NNP2_WS_2021-10-11_N-NAL	2021-11-04	--	83860	X	8.6	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested		
	(regular)		
	(Rush)		

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX ______ BOTH _______
SELECT: PDF ____ DIGITAL ____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com
EMAIL 3: Victoria.Sharpe@teck.com
EMAIL 4: Shelby.Holden@teck.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <---- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

ANALYSIS REQUEST

Sample Date/Time: Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)								COMMENTS	LAB ID
2021-10-27	12:20		x	x			CM_MW1-SH_WG_2021-10-11_N-NAL	2	R	R									
2021-10-27	13:00		x	x			CM_MW1-DP_WG_2021-10-11_N-NAL	2	R	R									
2021-10-27	13:30		x	x			CM_MC2_WS_2021-10-27_N-NAL	2	R	R									
2021-10-28	12:00		x	x			CM_MW3-SH_WG_2021-10-11_N-NAL	2	R	R									
2021-10-28	11:50		x	x			CM_MW3-DP_WG_2021-10-11_N-NAL	2	R	R									
2021-11-04	14:55		x	x			CM_MW_AG1A_WG_2021-10-11_N-NAL	2	R	R									
2021-11-04	13:45		x	x			CM_MW_AG1B_WG_2021-10-11_N-NAL	2	R	R									
2021-11-04	–		x	x			CM_NNP2_WS_2021-10-11_N-NAL	2	R	R									

SPECIAL INSTRUCTIONS/COMMENTS

[signature]

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: Keily Stewart / Darren Simpson / Shelby Holden (Coal Mountain)	11/04/2021 14:00:00 PM	RECEIVED BY:	DATE & TIME	Observations
RELINQUISHED BY: Shelby Holden (250) 425-7529	11/04/2021 14:00:00 PM	RECEIVED AT LAB BY: N. H.	DATE & TIME Nov. 08 2021	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT² FILE # 210673

2022-01-28

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
Waterloo, ON, N2V 1Z5 Tel: 519-886-5555 |
Fax: 519-886-5575
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Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210673
Project Number: 686094

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	EV_MW_GC1B_WG_2021_Q4_NP	2021-10-24	13:39	83861	X	-17.94	0.04	X	-136.6	0.1
2	EV_MW_GT1A_WG_2021_Q4_NP	2021-10-27	10:42	83862	X	-17.76	0.02	X	-132.3	0.3
3	EV_MW_GT1B_WG_2021_Q4_NP	2021-10-27	11:49	83863	X	-17.40	0.03	X	-132.6	0.1
4	EV_ER1_WS_2021-11_MON_N	2021-11-03	8:27	83864	X	-18.31	0.03	X	-136.7	0.3
5	EV_MC2_WS_2021-11_MON_N	2021-11-03	9:31	83865	X	-17.32	0.02	X	-128.5	0.2
6	EV_MW_AQ1_WG_2021_Q4_NP	2021-10-28	11:16	83866	X	-18.11	0.02	X	-136.8	0.2
7	EV_HC1_WS_2021-11_MON_N	2021-11-02	11:10	83867	X	-18.17	0.04	X	-135.2	0.2
8	EV_DC1_WS_2021-11_MON_N	2021-11-02	10:20	83868	X	-17.90	0.02	X	-134.4	0.2

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-2B / IT2-11B / IT2-12C Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:
Orfan S-Stash

Orfan Shouakar-Stash, PhD
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V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210673**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	EV_MW_GC1B_WG_2021_Q4_NP	2021-10-24	13:39	83861	X	6.7	0.5
2	EV_MW_GT1A_WG_2021_Q4_NP	2021-10-27	10:42	83862	X	6.4	0.5
3	EV_MW_GT1B_WG_2021_Q4_NP	2021-10-27	11:49	83863	X	7.9	0.6
4	EV_ER1_WS_2021-11_MON_N	2021-11-03	8:27	83864	X	7.8	0.6
5	EV_MC2_WS_2021-11_MON_N	2021-11-03	9:31	83865	X	5.7	0.7
6	EV_MW_AQ1_WG_2021_Q4_NP	2021-10-28	11:16	83866	X	5.0	0.7
7	EV_HC1_WS_2021-11_MON_N	2021-11-02	11:10	83867	X	6.1	0.7
8	EV_DC1_WS_2021-11_MON_N	2021-11-02	10:20	83868	X	11.2	2.2

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:
Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
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CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.	Specify date required	Service Requested		
		(regular)		
		(Rush)		

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL ___X__ FAX ________ BOTH ________
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

ANALYSIS REQUEST

PLEASE INDICATE FILTERED, PRESERVED OR BOTH
<----- **(F, P, F/P)**

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)								COMMENTS	LAB ID
2021-10-24	13:39			x			EV_MW_GC1B_WG_2021_Q4_NP	2	R	R									
2021-10-27	10:42			x			EV_MW_GT1A_WG_2021_Q4_NP	2	R	R									
2021-10-27	11:49			x			EV_MW_GT1B_WG_2021_Q4_NP	2	R	R									
2021-11-03	8:27			x			EV_ER1_WS_2021-11_MON_N	2	R	R									
2021-11-03	9:31			x			EV_MC2_WS_2021-11_MON_N	22	R	R									
2021-10-28	11:16			x			EV_MW_AQ1_WG_2021_Q4_NP	2	R	R									
2021-11-02	11:10			x			EV_HC1_WS_2021-11_MON_N	2	R	R									
2021-11-02	10:20			x			EV_DC1_WS_2021-11_MON_N	2	R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
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Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: J. Batstone, S. Hansen, C. Bracken, B. Clarke	2021-11-03	RECEIVED BY:	DATE & TIME	Observations
RELINQUISHED BY:	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for: SNC Lavalin

IT^2 FILE # 210689

2022-01-24

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
Waterloo, ON, N2V 1Z5 Tel: 519-886-5555 |
Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210689
Project Number: 680806 MBI

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	RG_MW_FR7A_2021_11_02_NP	2021-11-02	11:15	84701	X	-18.95	0.03	X	-144.3	0.3
2	RG_MW_FR7B_2021_11_02_NP	2021-11-02	11:00	84702	X	-18.96	0.03	X	-144.6	0.2
3	RG_MW_FR8A_2021_11_04_NP	2021-11-04	15:15	84703	X	-18.98	0.02	X	-145.2	0.1
4	RG_MW_FR8B_2021_11_01_NP	2021-11-01	11:45	84704	X	-19.01	0.02	X	-145.4	0.1
5	RG_MW_FR8C_2021_11_01_NP	2021-11-01	11:50	84705	X	-18.95	0.03	X	-144.8	0.1
6	RG_MW_FR9_2021_11_03_NP	2021-11-03	15:25	84706	X	-19.02	0.02	X	-144.8	0.1
7	RG_MW_FR10A_2021_11_05_NP	2021-11-05	10:45	84707	X	-18.99	0.02	X	-144.4	0.1
8	RG_MW_FR10B_2021_11_05_NP	2021-11-05	9:45	84708	X	-18.82	0.03	X	-143.2	0.1
9	RG_MW_FR10C_2021_11_05_NP	2021-11-05	9:50	84709	X	-19.17	0.03	X	-145.3	0.1
10	RG_MW_MC11A_2021_11_05_NP	2021-11-05	9:50	84710	X	-19.12	0.02	X	-144.5	0.2
11	RG_MW_MC10A_2021_11_03_NP	2021-11-03	9:30	84711	X	-19.40	0.02	X	-147.4	0.2
12	RG_MW_ER5A_WG_2021_11_03_NP	2021-11-03	9:30	84712	X	-19.34	0.02	X	-147.4	0.2
13	RG_MW_ER5B_WG_2021_11_03_NP	2021-11-03	3:30	84713	X	-18.95	0.02	X	-144.1	0.0
14	RG_MW_ER7A_WG_2021_11_02_NP	2021-11-02	15:40	84714	X	-18.60	0.01	X	-141.7	0.1
15	RG_MW_ER8_WG_2021_11_03_NP	2021-11-03	16:00	84715	X	-18.69	0.04	X	-143.0	0.2
16	RG_MW_LCWC1_WG_2021_11_02_NP	2021-11-02	13:00	84716	X	-18.63	0.03	X	-142.8	0.1
17	RG_PR_ER01_WG_2021_11_05_NP	2021-11-05	7:00	84717	X	-13.33	0.03	X	-99.2	0.4
18	RG_PR_ER01_WG_2021_10_24_NP	2021-10-24	12:00	84718	X	-19.06	0.02	X	-145.6	0.2

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).

Standard Used:
IT2-11B / IT2-012C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)

Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210689**
Project Number: **680806 MBI**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	RG_MW_FR7A_2021_11_02_NP	2021-11-02	11:15	84701	X	6.2	0.7
2	RG_MW_FR7B_2021_11_02_NP	2021-11-02	11:00	84702	X	6.1	0.7
3	RG_MW_FR8A_2021_11_04_NP	2021-11-04	15:15	84703	X	6.5	0.7
4	RG_MW_FR8B_2021_11_01_NP	2021-11-01	11:45	84704	X	6.7	0.7
5	RG_MW_FR8C_2021_11_01_NP	2021-11-01	11:50	84705	X	6.2	0.7
6	RG_MW_FR9_2021_11_03_NP	2021-11-03	15:25	84706	X	5.1	0.6
7	RG_MW_FR10A_2021_11_05_NP	2021-11-05	10:45	84707	X	5.4	0.7
8	RG_MW_FR10B_2021_11_05_NP	2021-11-05	9:45	84708	X	5.4	0.7
9	RG_MW_FR10C_2021_11_05_NP	2021-11-05	9:50	84709	X	6.6	0.7
10	RG_MW_MC11A_2021_11_05_NP	2021-11-05	9:50	84710	X	5.7	0.6
11	RG_MW_MC10A_2021_11_03_NP	2021-11-03	9:30	84711	X	4.5	0.6
12	RG_MW_ER5A_WG_2021_11_03_NP	2021-11-03	9:30	84712	X	3.6	0.6
13	RG_MW_ER5B_WG_2021_11_03_NP	2021-11-03	3:30	84713	X	5.5	0.6
14	RG_MW_ER7A_WG_2021_11_02_NP	2021-11-02	15:40	84714	X	5.7	0.7
15	RG_MW_ER8_WG_2021_11_03_NP	2021-11-03	16:00	84715	X	5.7	0.7
16	RG_MW_LCWC1_WG_2021_11_02_NP	2021-11-02	13:00	84716	X	4.5	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocuries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	X
	(Rush)	

COMPANY NAME: SNC Lavalin

OFFICE ADDRESS: #3 520 Lake Street, Nelson, BC V1L 4C6

PROJECT MANAGER: **Leslie Harker**

PROJECT # **680806 MBI**

INVOICE TO: 'Leslie.Harker', payables@snclavalin.com

PO # **686094 -Additional Parameters**

EMAIL Yes FAX ______ BOTH ______ SELECT:
PDF ____ DIGITAL ____ BOTH Yes
EMAIL 1: Melissa.MacDonald@snclavalin.com
EMAIL 2: Leslie.Harker@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE DESCRIPTION TO APPEAR ON REPORT	NUMBER OF CONTAINERS	TRITIUM OF WATER SAMPLES (F)	HYDROGEN & OXYGEN STABLE IS (F)									COMMENTS	LAB ID
2021-11-03	9:30			X			RG_MW_ER5A_WG_2021_11_03_NP	2	R	R									1x1L + 1x100mL	
2021-11-03	3:30			X			RG_MW_ER5B_WG_2021_11_03_NP	2	R	R									"	
2021-11-02	15:40			X			RG_MW_ER7A_WG_2021_11_02_NP	2	R	R									1x500 + 1x100mL	
2021-11-03	16:00			X			RG_MW_ER8_WG_2021_11_03_NP	2	R	R									1x1L + 1x100mL	
2021-11-02	13:00			X			RG_MW_LCWC1_WG_2021_11_02_NP	2	R	R									1x1L + 1x100mL	
2021-11-05	7:00			X			RG_PR_ER01_2021_11_05_NP	1		R									1x100mL	
2021-10-24	12:00						RG_PR_ER01_2021_10_24_NP	2		R									1x100 + 1x60mL	

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

Observations

SAMPLED BY:	DATE & TIME	RECEIVED BY:	DATE & TIME
RELINQUISHED BY:	DATE & TIME:	RECEIVED AT LAB BY: N.H.	DATE & TIME Nov 15, 2022

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	X
	(Rush)	

COMPANY NAME: SNC Lavalin

OFFICE ADDRESS: #3 520 Lake Street Nelson, BC V1L 4C6

PROJECT MANAGER: **Leslie Harker**

PROJECT # **680806 MBI**

INVOICE TO: 'Leslie.Harker', payables@snclavalin.com

PO # **686094 -Additional Parameters**

EMAIL Yes FAX ______ BOTH ______ SELECT:
PDF ____ DIGITAL ____ **BOTH** Yes **EMAIL 1:** Melissa.MacDonald@snclavalin.com **EMAIL 2:** Leslie.Harker@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Sample Date/Time: Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE DESCRIPTION TO APPEAR ON REPORT	NUMBER OF CONTAINERS	TRITIUM OF WATER SAMPLES (F)	HYDROGEN & OXYGEN STABLE IS (F)									COMMENTS	LAB ID
2021-11-02	11:15	11:20		X			RG_MW_FR7A_2021_11_02_NP	2	R	R									1x1L + 1x100mL	
2021-11-02	11:00	✓		X			RG_MW_FR7B_2021_11_02_NP	2	R	R									"	
2021-11-04	15:15	15:00		X			RG_MW_FR8A_2021_11_04_NP	2	R	R									"	
2021-11-01	11:45			X			RG_MW_FR8B_2021_11_01_NP	2	R	R									"	
2021-11-01	11:50			X			RG_MW_FR8C_2021_11_01_NP	2	R	R									"	
2021-11-03	15:25			X			RG_MW_FR9_2021_11_03_NP	2	R	R									"	
2021-11-05	10:45			X			RG_MW_FR10A_2021_11_05_NP	2	R	R									1x500mL + 1x100mL	
2021-11-05	9:45			X			RG_MW_FR10B_2021_11_05_NP	2	R	R									1x1L + 1x100mL	
2021-11-05	9:50			X			RG_MW_FR10C_2021_11-05_NP	2	R	R									"	
2021-11-05	9:50			X			RG-MW-MC11A-2021-11-05-NP	2	R	R									"	
2021-11-03	9:30			X			RG-MW-MC10A-2021-11-03-NP	2	R	R									"	

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

Observations

SAMPLED BY:	DATE & TIME	RECEIVED BY:	DATE & TIME
RELINQUISHED BY:	DATE & TIME:	RECEIVED AT LAB BY: N H.	DATE & TIME Nov 15, 2021

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210691

2022-01-24

Approved by:

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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E-mail: Victoria.Sharpe@teck.com
E-mail: Shelby.Holden@teck.com

File Number: **210691**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	CM_MW7-SH_WG_2021_10_11_N-NAL	2021-11-10	14:50	84722	X	-16.96	0.03	X	-126.8	0.4
2	CM_MW7-DP_WG_2021_10_11_N-NAL	2021-11-10	15:10	84723	X	-17.61	0.03	X	-132.2	0.4

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-2B / IT2-11B / IT2-12C Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:
Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

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E-mail: Melissa.MacDonald@snclavalin.com
E-mail: Harker, Leslie <Leslie.Harker@snclavalin.com>
E-mail: Victoria.Sharpe@teck.com
E-mail: Shelby.Holden@teck.com

File Number: **210691**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	CM_MW7-SH_WG_2021_10_11_N-NAL	2021-11-10	14:50	84722	X	3.6	0.6
2	CM_MW7-DP_WG_2021_10_11_N-NAL	2021-11-10	15:10	84723	X	4.6	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:
Orfan S-Stash

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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM Page 1 of 1

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	
	(Rush)	

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX _______ BOTH _______
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com
EMAIL 3: Victoria.Sharpe@teck.com
EMAIL 4: Shelby.Holden@teck.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- **(F, P, F/P)**

SUBMISSION #:
ENTERED BY:
DATE/TIME ENTERED:
BIN #:

SAMPLING INFORMATION / **ANALYSIS REQUEST**

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)	COMMENTS	LAB ID
2021-11-10	14:50		x	x			CM_MW7-SH_WG_2021-10-11_N-NAL	2	R	R		
2021-11-10	15:10		x	x			CM_MW7-DP_WG_2021-10-11_N-NAL	2	R	R		

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: Keily Stewart / Shelby Holden (Coal Mountain)	11 / 10 / 2021 14:00:00	RECEIVED BY:	DATE & TIME
RELINQUISHED BY: Shelby Holden (250) 425-7529	11 / 10 / 2021 14:00:00	RECEIVED AT LAB BY: R.H.	DATE & TIME Nov.15, 2021

Observations

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210692

2022-02-04

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
Waterloo, ON, N2V 1Z5 Tel: 519-886-5555 |
Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
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V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210692**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	GH_ERC_WS_2021-11-09_N	11/09/2021	12:20	84724	X	-19.07	0.04	X	-144.5	0.1
2	GH_FR1_WS_2021-11-09_N	11/09/2021	13:20	84725	X	-18.91	0.02	X	-144.4	0.1

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-13B / IT2-00A / IT2-15A Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210692**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	GH_ERC_WS_2021-11-09_N	11/09/2021	12:20	84724	X	6.4	0.7
2	GH_FR1_WS_2021-11-09_N	11/09/2021	13:20	84725	X	5.3	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
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Rec'd Nov. 15, 2021

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Page 1 of 1

MANITOULIN TRANSPORT 1-800-265-1485

32261152

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	
	(Rush)	

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX ______ BOTH ______
SELECT: PDF ____ DIGITAL ____ BOTH _X_
EMAIL 1: Leslie.Harker@sncjavalin.com
EMAIL 2: Melissa.MacDonald@sncjavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION / **ANALYSIS REQUEST**

Sample Date/Time: Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	GRAB	MATRIX: WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)									COMMENTS	LAB ID
11/9/2021	12:20			x			GH_ERC_WS_2021-11-09_N	3	R	R										
11/9/2021	13:20			x			GH_FR1_WS_2021-11-09_N	3	R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: ~~Heather Stevenson~~ Eric Olsen	11/9/2021	RECEIVED BY:	DATE & TIME	Observations
RELINQUISHED BY: [signature]	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210708

2022-02-04

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
Waterloo, ON, N2V 1Z5 Tel: 519-886-5555 |
Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: **210708**
Project Number: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	FR_MW20-01D_WG_2021_11_10_NP	2021-11-10	9:45	85105	X	-18.55	0.02	X	-143.5	0.1
2	FR_MW20-02D_WG_2021_11_09_NP	2021-11-09	12:05	85106	X	-19.22	0.02	X	-146.8	0.4
3	FR_MW_MC11A_WG_2021_11_09_NP	2021-11-09	12:05	85107	X	-19.26	0.02	X	-147.8	0.2

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4, Waterloo, ON, N2V 1K4
Tel: 519-886-5555 | Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: # 3 520 Lake Street
Nelson, BC
V1L 4C6
Attn.: Leslie Harker
E-mail: Melissa.MacDonald@snclavalin.com
Harker, Leslie <Leslie.Harker@snclavalin.com>

File Number: 210708
Project Number: 686094

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	FR_MW20-01D_WG_2021_11_10_NP	2021-11-10	9:45	85105	X	3.2	0.5
2	FR_MW20-02D_WG_2021_11_09_NP	2021-11-09	12:05	85106	X	2.8	0.5
3	FR_MW_MC11A_WG_2021_11_09_NP	2021-11-09	12:05	85107	X	2.8	0.5

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:
Orfan S-Stash

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Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.	Specify date required	Service Requested	
		(regular)	
		(Rush)	

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL ___X__ FAX ________ BOTH ________
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com
Email 3: evan.warner@teck.com
Email 4: David.Burroughs@teck.com
Email 5: Cruz.Canlas@teck.com

ANALYSIS REQUEST

PLEASE INDICATE FILTERED, PRESERVED OR BOTH
<----- **(F, P, F/P)**

SUBMISSION #:
ENTERED BY:
DATE/TIME ENTERED:
BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)								COMMENTS	LAB ID
2021-11-10	9:45		x	x			FR_MW20-01D_WG_2021_11_10_NP	2	R	R									
2021-11-09	12:05		x	x			FR_MW20-02D_WG_2021_11_09_NP	2	R	R									
2021-11-09	12:05		x	x			FR_MW_MC11A_WG_2021_11_09_NP	2	R	R									

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: Evan Warner	DATE & TIME 2021-11-09, 10	RECEIVED BY:	DATE & TIME	Observations
Relinquished BY: Evan Warner	DATE & TIME 2021-11-15, 1700	RECEIVED AT LAB BY: N.H.	DATE & TIME Nov.24, 2021	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210716

2022-02-04

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
Waterloo, ON, N2V 1Z5 Tel: 519-886-5555 |
Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: #3-520 Lake Street
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V1L 4C6
Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: tom.jeffery@teck.com

File Number: 210716
Project Number: 686094
PO: 686094

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	LC_PIZDC1307_WG_Q4-2021_NP	11/18/2021	14:00	85608	X	-19.58	0.03	X	-149.4	0.1
2	LC_MW_ER4A_WG_Q4-2021_N	11/19/2021	13:45	85609	X	-19.08	0.01	X	-144.7	0.2
3	LC_PIZDC1404S_WG_Q4-2021_NP	11/10/2021	14:35	85610	X	-18.91	0.03	X	-144.0	0.1
4	LC_PIZDC1404D_WG_Q4-2021_NP	11/10/2021	13:10	85611	X	-19.64	0.02	X	-149.9	0.3
5	LCA SPO Deep	11/26/2021	12:05	85612	X	-18.64	0.02	X	-141.7	0.3
6	LCB SPO Shallow	11/26/2021	11:00	85613	X	-18.35	0.02	X	-138.5	0.3

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).

Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)

Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER
TECHNOLOGIES INC

Client: SNC Lavalin
Address: #3-520 Lake Street
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V1L 4C6
Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: tom.jeffery@teck.com

File Number: **210716**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	LC_PIZDC1307_WG_Q4-2021_NP	11/18/2021	14:00	85608	X	< 0.8	0.5
2	LC_MW_ER4A_WG_Q4-2021_N	11/19/2021	13:45	85609	X	4.5	0.6
3	LC_PIZDC1404S_WG_Q4-2021_NP	11/10/2021	14:35	85610	X	3.1	0.5
4	LC_PIZDC1404D_WG_Q4-2021_NP	11/10/2021	13:10	85611	X	< 0.8	0.4
5	LCA SPO Deep	11/26/2021	12:05	85612	X	4.7	0.6
6	LCB SPO Shallow	11/26/2021	11:00	85613	X	3.8	0.6

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:
Orfan S-Stash

Orfan Shouakar-Stash, PhD
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Rec'd Dec. 08, 2021

Page 4 of 4

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	X
	(Rush)	

COMPANY NAME	SNC-Lavalin		TECK COAL
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6	Box 2003, 15km North Hwy 43, Sparwood, BC V0B 2G0	
PROJECT MANAGER: Leslie Harker		PROJECT MANAGER: Tom Jeffery	
PROJECT # 686094			
PHONE: 250-505-6493	FAX	REPORT FORMAT/DISTRIBUTION	
	PO # 686094	EMAIL __X__ FAX _______ BOTH _______	
		SELECT: PDF _____ DIGITAL _____ BOTH __X__	
		EMAIL 1: Leslie.Harker@snclavalin.com	
		EMAIL 2: Melissa.MacDonald@snclavalin.com	
		EMAIL 3: tom.jeffery@teck.com	

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)									COMMENTS	LAB ID
11/18/2021	14:00			x			LC_PIZDC1307_WG_Q4-2021_NP		R	R										
11/19/2021	13:45			x			LC_MW_ER4A_WG_Q4-2021_N		R	R										
11/10/2021	14:35			x			LC_PIZDC1404S_WG_Q4-2021_NP		R	R										
11/10/2021	13:10			x			LC_PIZDC1404D_WG_Q4-2021_NP		R	R										
11/26/2021	12:05			x			LCA SPO Deep		R	R									RG_MW_LCA	
11/26/2021	11:00			x			LCB SPO Shallow		R	R									RG_MW_LCB	

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No _X__
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No _X__

SAMPLE CONDITION
___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT
Observations

SAMPLED BY: Tanya Dick/ Shanise Fossen	DATE & TIME 2021/12/02	RECEIVED BY:	DATE & TIME
RELINQUISHED BY:	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

MANITOULIN TRANSPORT 1-800-265-1485
32156631

ISOTOPE TRACER TECHNOLOGIES INC

Isotope Analyses for: SNC Lavalin

IT^2 FILE # 210718

2022-02-04

Approved by:

Orfan Shouakar-Stash, PhD
Director
Isotope Tracer Technologies Inc.
608 Weber St. North Unit 3&4,
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Fax: 519-886-5575
Email: orfan@it2isotopes.com
Website: www.it2isotopes.com

ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
Address: #3-520 Lake Street
Nelson, BC
V1L 4C6
Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: kim.harrer@snclavalin.com

File Number: **210718**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	EV_MW_BRD-12-02A_WG_2021_10_19_NP	2021-12-07	13:30	85621	X	-16.91	0.02	X	-124.8	0.3
2	EV_MW_BC2_WG_2021_12_07_NP	2021-12-07	15:15	85622	X	-18.03	0.03	X	-137.7	0.2
3	EV_MW_BC3_WG_2021_12_07_NP	2021-12-07	15:45	85623	X	-17.33	0.04	X	-132.8	0.2
4	EV_MW_MC10A_WG_2021_12_07_NP	2021-12-07	12:00	85624	X	-18.04	0.02	X	-137.9	0.2
5	EV_MW_MC11A_WG_2021_12_07_NP	2021-12-07	12:10	85625	X	-17.34	0.03	X	-132.9	0.3

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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V1L 4C6
Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: kim.harrer@snclavalin.com

File Number: 210718
Project Number: 686094
PO: 686094

#	Sample ID	Sample Collection		Sample #	E³H	Result	± 1σ
		Date	Time				
1	EV_MW_BRD-12-02A_WG_2021_10_19_NP	2021-12-07	13:30	85621	X	2.1	0.5
2	EV_MW_BC2_WG_2021_12_07_NP	2021-12-07	15:15	85622	X	3.2	0.5
3	EV_MW_BC3_WG_2021_12_07_NP	2021-12-07	15:45	85623	X	2.7	0.5
4	EV_MW_MC10A_WG_2021_12_07_NP	2021-12-07	12:00	85624	X	3.5	0.6
5	EV_MW_MC11A_WG_2021_12_07_NP	2021-12-07	12:10	85625	X	3.1	0.5

E³H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
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Rec'd Dec. 13, 2021

Page 4 of 4

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	X
	(Rush)	

COMPANY NAME: SNC-Lavalin
OFFICE ADDRESS: 520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker
PROJECT # 686094
PHONE: 250-505-6493
FAX
PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX _______ BOTH _______
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com
EMAIL 3: kim.harrer@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <---- (F, P, F/P)

SUBMISSION #:
ENTERED BY:
DATE/TIME ENTERED:
BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)								COMMENTS	LAB ID
2021-12-07	13:30			x			EV_MW_BRD-12-02A_WG_2021_10_19_NP	3	R	R									
2021-12-07	15:15			x			EV_MW_BC2_WG_2021_12_07_NP	3	R	R									
2021-12-07	15:45			x			EV_MW_BC3_WG_2021_12_07_NP	3	R	R									
2021-12-07	12:00			x			EV_MW_MC10A_WG_2021_12_07_NP	3	R	R									
2021-12-07	12:10			x			EV_MW_MC11A_WG_2021_12_07_NP	3	R	R									

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

__ FROZEN
__ COLD
__ COOLING INITIATED
__ AMBIENT

Observations

SAMPLED BY: S.Endicott [signature]	DATE & TIME: 8-Dec-21 1700	RECEIVED BY:	DATE & TIME
RELINQUISHED BY: S.Endicott [signature]	DATE & TIME: 8Dec21 1700	RECEIVED AT LAB BY:	DATE & TIME

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT² FILE # 210719

2022-02-16

Approved by:

Orfan Shouakar-Stash, PhD
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com

File Number: **210719**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	EV_MW_SPR1A_WG_2021_Q4_NP	11/14/2021	10:58	85626	X	-18.32	0.03	X	-138.2	0.4
2	EV_MW_SPR1B_WG_2021_Q4_NP	11/14/2021	12:15	85627	X	-18.94	0.03	X	-143.1	0.3
3	EV_MW_SPR1C_WG_2021_Q4_NP	11/14/2021	9:25	85628	X	-17.69	0.05	X	-133.2	0.1
4	EV_ECGW_WG-2021-11-12_NP	11/12/2021	9:34	85629	X	-19.08	0.02	X	-145.1	0.1
5	EV_ER1GWS_WG_2021_Q4_NP	11/17/2021	17:02	85630	X	-18.21	0.02	X	-136.9	0.2
6	EV_ER1GWD_WG_2021_Q4_NP	11/17/2021	14:44	85631	X	-18.55	0.03	X	-139.6	0.2
7	EV_EC1_WS_2021-11_MON_N	11/4/2021	9:55	85632	X	-17.77	0.01	X	-137.1	0.1
8	EV_ECOUT_WS_2021_2021-11_MON_N	11/7/2021	15:19	85633	X	-17.79	0.03	X	-136.9	0.1
9	EV_MW_BC1A_WG_2021_Q4_NP	11/5/2021	12:26	85634	X	-17.47	0.05	X	-134.7	0.2
10	EV_MW_BC1B_WG_2021_Q4_NP	11/5/2021	13:18	85635	X	-17.18	0.02	X	-133.0	0.0
11	EV_RCSGW_WG_2021_Q4_NP	11/7/2021	16:41	85636	X	-17.20	0.03	X	-132.8	0.4
12	EV_SEEP_ERICKSON2_WS_2021-11-10_NP	11/10/2021	11:54	85637	X	-16.44	0.02	X	-125.9	0.2
13	EV_SEEP_TURCON1_WS_2021-11-10_NP	11/10/2021	9:42	85638	X	-18.22	0.03	X	-138.6	0.1
14	EV_MW_MCGWA_WG_2021_Q4_NP	11/21/2021	13:08	85639	X	-17.38	0.02	X	-134.6	0.2
15	EV_MW_MCGWB_WG_2021_Q4_NP	11/21/2021	13:59	85640	X	-17.49	0.03	X	-133.9	0.1
16	EV_MW_MC3_WG_2021_Q4_NP	11/21/2021	14:10	85641	X	-17.42	0.02	X	-131.4	0.1

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com

File Number: **210719**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	E^{3}H	Result	± 1σ
		Date	Time				
1	EV_MW_SPR1A_WG_2021_Q4_NP	11/14/2021	10:58	85626	X	4.0	0.6
2	EV_MW_SPR1B_WG_2021_Q4_NP	11/14/2021	12:15	85627	X	< 0.8	0.5
3	EV_MW_SPR1C_WG_2021_Q4_NP	11/14/2021	9:25	85628	X	3.3	0.5
4	EV_ECGW_WG-2021-11-12_NP	11/12/2021	9:34	85629	X	< 0.8	0.4
5	EV_ER1GWS_WG_2021_Q4_NP	11/17/2021	17:02	85630	X	4.2	0.6
6	EV_ER1GWD_WG_2021_Q4_NP	11/17/2021	14:44	85631	X	2.6	0.6
7	EV_EC1_WS_2021-11_MON_N	11/4/2021	9:55	85632	X	12.3	1.0
8	EV_ECOUT_WS_2021_2021-11_MON_N	11/7/2021	15:19	85633	X	12.9	0.9
9	EV_MW_BC1A_WG_2021_Q4_NP	11/5/2021	12:26	85634	X	5.9	0.4
10	EV_MW_BC1B_WG_2021_Q4_NP	11/5/2021	13:18	85635	X	5.4	0.4
11	EV_RCSGW_WG_2021_Q4_NP	11/7/2021	16:41	85636	X	5.0	0.4
12	EV_SEEP_ERICKSON2_WS_2021-11-10_NP	11/10/2021	11:54	85637	X	4.9	0.4
13	EV_SEEP_TURCON1_WS_2021-11-10_NP	11/10/2021	9:42	85638	X	5.9	0.5
14	EV_MW_MCGWA_WG_2021_Q4_NP	11/21/2021	13:08	85639	X	4.1	0.3
15	EV_MW_MCGWB_WG_2021_Q4_NP	11/21/2021	13:59	85640	X	4.5	0.4
16	EV_MW_MC3_WG_2021_Q4_NP	11/21/2021	14:10	85641	X	5.3	0.4

E^{3}H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

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[illegible]

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Page 1 of 1

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested		
	(regular)		
	(Rush)		

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX _______ BOTH _______
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)									COMMENTS	LAB ID
11/14/2021	10:58			x			EV_MW_SPR1A_WG_2021_Q4_NP	2	R	R										
11/14/2021	12:15			x			EV_MW_SPR1B_WG_2021_Q4_NP	2	R	R										
11/14/2021	9:25			x			EV_MW_SPR1C_WG_2021_Q4_NP	2	R	R										
11/12/2021	9:34			x			EV_ECgw_WG_2021-11-12_NP	2	R	R										
11/17/2021	17:02			x			EV_ER1GWS_WG_2021_Q4_NP	2	R	R										
11/17/2021	14:44			x			EV_ER1GWD_WG_2021_Q4_NP	2	R	R										
11/4/2021	9:55			x			EV_EC1_WS_2021-11_MON_N	2	R	R										
11/7/2021	15:19			x			EV_ECOUT_WS_2021-11_MON_N	2	R	R										
11/5/2021	12:26			x			EV_MW_BC1A_WG_2021_Q4_NP	2	R	R										
11/5/2021	13:18			x			EV_MW_BC1B_WG_2021_Q4_NP	2	R	R										
11/7/2021	16:41			x			EV_RCSGW_WG_2021_Q4_NP	2	R	R										
11/10/2021	11:54			x			EV_SEEP_ERICKSON2_WS_2021-11-10_NP	2	R	R										
11/10/2021	9:42			x			EV_SEEP_TURCON1_WS_2021-11-10_NP	2	R	R										
11/21/2021	13:08			x			EV_MW_MCGWA_WG_2021_Q4_NP	2	R	R										
11/21/2021	13:59			x			EV_MW_MCGWB_WG_2021_Q4_NP	2	R	R										
11/22/2021	14:10			x			EV_MW_MC3_WG_2021_Q4_NP	2	R	R										

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: J.Batstone/B.Clarke/S.Hansen/C.Bracken	11/22/2021	RECEIVED BY:	DATE & TIME	Observations
RELINQUISHED BY: [signature]	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210720

2022-02-16

Approved by:

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ISOTOPE TRACER TECHNOLOGIES INC

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V1L 4C6
Tel: 250-505-6493
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E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com
E-mail: Jennifer.Manojlovic@teck.com
E-mail: Heather.Stevenson@teck.com
E-mail: Ryan.Grady@teck.com

File Number: **210720**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	GH_POTW10_WG_2021-10-04_NP	11/19/2021	14:10	85642	X	-19.02	0.02	X	-145.1	0.2
2	GH_MW-GHC-1B_WG_2021-10-04_NP	11/18/2021	12:20	85643	X	-18.77	0.03	X	-145.8	0.1
3	GH_FOX3_WG_2021-10-04_NP	11/18/2021	12:20	85644	X	-18.76	0.03	X	-145.8	0.1
4	GH_MW-GHC-1A_WG_2021-10-04_NP	11/18/2021	13:55	85645	X	-19.13	0.02	X	-147.6	0.1
5	GH_MW-PC_WG_2021-10-04_NP	12/3/2021	11:45	85646	X	-18.97	0.02	X	-143.7	0.2

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).

Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)

Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER
TECHNOLOGIES INC

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E-mail: Heather.Stevenson@teck.com
E-mail: Ryan.Grady@teck.com

File Number: 210720
Project Number: 686094
PO: 686094

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	GH_POTW10_WG_2021-10-04_NP	11/19/2021	14:10	85642	X	3.5	0.3
2	GH_MW-GHC-1B_WG_2021-10-04_NP	11/18/2021	12:20	85643	X	5.9	0.5
3	GH_FOX3_WG_2021-10-04_NP	11/18/2021	12:20	85644	X	5.9	0.4
4	GH_MW-GHC-1A_WG_2021-10-04_NP	11/18/2021	13:55	85645	X	3.6	0.3
5	GH_MW-PC_WG_2021-10-04_NP	12/3/2021	11:45	85646	X	5.4	0.4

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

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Rec'd Dec 13, 2021

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Page 1 of 1

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Specify date required	Service Requested
	(regular)
	(Rush)

COMPANY NAME: SNC-Lavalin

OFFICE ADDRESS: 520 Lake Street, Nelson, BC V1L 4C6

PROJECT MANAGER: Leslie Harker

PROJECT # 686094

PHONE: 250-505-6493

FAX

PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX ______ BOTH ______

SELECT: PDF ____ DIGITAL ____ BOTH __X__

EMAIL 1: Leslie.Harker@snclavalin.com

EMAIL 2: Melissa.MacDonald@snclavalin.com

EMAIL 3: Jennifer.Manojlovic@teck.com

EMAIL 4: Heather.Stevenson@teck.com

EMAIL 5: Ryan.Grady@teck.com

ANALYSIS REQUEST

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION

Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium 3H (F)								COMMENTS	LAB ID
11/19/2021	14:10			x			GH_POTW10_WG_2021-10-04_NP	3	R	R									
11/18/2021	12:20			x			GH_MW-GHC-1B_WG_2021-10-04_NP	3	R	R									
11/18/2021	12:20			x			GH_FOX3_WG_2021-10-04_NP	3	R	R								Duplicate for GH_MW-GHC-1B	
11/18/2021	13:55			x			GH_MW-GHC-1A_WG_2021-10-04_NP	3	R	R									
12/3/2021	11:45			x			GH_MW-PC_WG_2021-10-04_NP	3	R	R								Sample not field filtered due to	
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes __ No __

If yes, an authorized drinking water COC MUST be used for this submission.

Is the water sampled intended to be potable for human consumption? Yes __ No __

SAMPLE CONDITION

__ FROZEN
__ COLD
__ COOLING INITIATED
__ AMBIENT

SAMPLED BY: RG/JM/RA	DATE & TIME 12/7/	RECEIVED BY:	DATE & TIME	Observations
RELINQUISHED BY:	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Tracking #

MANITOULIN TRANSPORT
1-800-265-1485

32261158

Isotope Analyses for:
SNC Lavalin

IT² FILE # 210726

2022-02-16

Approved by:

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ISOTOPE TRACER TECHNOLOGIES INC

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V1L 4C6
Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com

File Number: **210726**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	EV_MW_DC6	2021-11-29	14:35	85683	X	-17.22	0.01	X	-129.1	0.2
2	EV_MW_DC2	2021-11-29	12:35	85684	X	-17.66	0.03	X	-132.5	0.2

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).

Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)

Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:
Orfan S-Stash

Orfan Shouakar-Stash, PhD
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ISOTOPE TRACER TECHNOLOGIES INC

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E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com

File Number: **210726**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	EV_MW_DC6	2021-11-29	14:35	85683	X	9.3	0.7
2	EV_MW_DC2	2021-11-29	12:35	85684	X	7.1	0.5

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

Orfan S-Stash

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Rec'd Dec. 03, 2021

MANITOULIN TRANSPOR
1-800-265-1485

32159026

↑ Tracking #

ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested	
	(regular)	
	(Rush)	

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL __X__ FAX _______ BOTH _______
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- **(F, P, F/P)**

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION / **ANALYSIS REQUEST**

Sample Date/Time: Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	GRAB	MATRIX: WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	F δ2H (H2O) and δ18O (H2O)	F Tritium, 3H									COMMENTS	LAB ID
2021-				x				3	R	R										
2021-11-29	14:25			x			EV-MW-DC6	3	R	R										
2021-11-29	12:35			x			EV-MW-DC2		R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										
				x					R	R										

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY: Cris Romeo	DATE & TIME	RECEIVED BY:	DATE & TIME	Observations	
RELINQUISHED BY: Cris Romeo	DATE & TIME	RECEIVED AT LAB BY:	DATE & TIME		

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210727

2022-02-16

Approved by:

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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V1L 4C6
Tel: 250-505-6493
Attn.: Leslie Harker
E-mail: Leslie.Harker@snclavalin.com
E-mail: Melissa.MacDonald@snclavalin.com

File Number: **210727**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	GH_MW-MC-2S_WG_2021_11_17_NP	2021-11-17	10:05	85685	X	-18.72	0.05	X	-141.4	0.5
2	GH_MW-MC-2D_WG_2021_11_17_NP	2021-11-17	11:00	85686	X	-21.00	0.02	X	-162.2	0.4
3	GH_MW-WC1-A_WG_2021_11_18_NP	2021-11-18	14:45	85687	X	-19.61	0.02	X	-148.8	0.2
4	GH_MW-WC1-B_WG_2021_11_18_NP	2021-11-18	13:55	85688	X	-19.30	0.02	X	-146.2	0.1
5	GH_MW-BG1A_WG_2021_11_19_NP	2021-11-19	9:50	85689	X	-19.89	0.03	X	-153.1	0.3
6	GH_MW-BG1B_WG_2021_11_19_NP	2021-11-19	11:00	85690	X	-20.01	0.03	X	-154.0	0.1
7	GH_MW-BG1C_WG_2021_11_19_NP	2021-11-19	12:00	85691	X	-20.02	0.02	X	-154.2	0.1
8	RG_PR_ER01_2021_11_15_NP	2021-11-15	8:00	85692	X	-9.54	0.03	X	-66.7	0.1

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).

Standard Used:
IT2-11B / IT2-12C / IT2-13B/ IT2-00A Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)

Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

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Director
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File Number: **210727**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	E^3H	Result	± 1σ
		Date	Time				
1	GH_MW-MC-2S_WG_2021_11_17_NP	2021-11-17	10:05	85685	X	5.7	0.4
2	GH_MW-MC-2D_WG_2021_11_17_NP	2021-11-17	11:00	85686	X	< 0.8	0.0
3	GH_MW-WC1-A_WG_2021_11_18_NP	2021-11-18	14:45	85687	X	3.9	0.3
4	GH_MW-WC1-B_WG_2021_11_18_NP	2021-11-18	13:55	85688	X	7.6	0.6
5	GH_MW-BG1A_WG_2021_11_19_NP	2021-11-19	9:50	85689	X	< 0.8	0.0
6	GH_MW-BG1B_WG_2021_11_19_NP	2021-11-19	11:00	85690	X	< 0.8	0.0
7	GH_MW-BG1C_WG_2021_11_19_NP	2021-11-19	12:00	85691	X	< 0.8	0.0
8	RG_PR_ER01_2021_11_15_NP	2021-11-15	8:00	85692	X	1.3	0.1

E^3H ANALYSES

Tritium is reported in Tritium Units.
1TU = 3.221 Picocurries/L per IAEA, 2000 Report.
1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

Approved by:

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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Page 1 of 1

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Specify date required	Service Requested	
	(regular)	
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COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

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SELECT: PDF ____ DIGITAL ____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

ANALYSIS REQUEST

PLEASE INDICATE FILTERED, PRESERVED OR BOTH <----- (F, P, F/P)

SUBMISSION #:
ENTERED BY:
DATE/TIME ENTERED:
BIN #:

SAMPLING INFORMATION

Sample Date/Time		TYPE		MATRIX					F	F										
Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O)	Tritium, 3H									COMMENTS	LAB ID
2021-11-17	10:05			x			GH_MW-MC-2S_WG_2021_11_17_NP	2	R	R										
2021-11-17	11:00			x			GH_MW-MC-2D_WG_2021_11_17_NP	2	R	R										
2021-11-18	14:45			x			GH_MW_WC1-A_WG_2021_11_18_NP	2	R	R										
2021-11-18	13:55			x			GH_MW_WC1-B_WG_2021_11_18_NP	2	R	R										
2021-11-19	9:50			x			GH_MW_BG1A_WG_2021_11_19_NP	2	R	R										
2021-11-19	11:00			x			GH_MW_BG1B_WG_2021_11_19_NP	2	R	R										
2021-11-19	12:00			x			GH_MW_BG1C_WG_2021_11_19_NP	2	R	R										
2021-11-15	8:00			x			RG_PR_ER01_2021_11_15_NP	3	R	R									2 2H/18O bottles inc.	

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FOR WATER SAMPLES (CHECK Yes OR No)

A[illegible] any samples taken from a regulated DW System? Yes ___ No ___
If [illegible], an authorized drinking water COC MUST be used for this submission.
[illegible] the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

__ FROZEN
__ COLD
__ COOLING INITIATED
__ AMBIENT

Observations:

SAMPLED BY: Jen von Gradulewski and Janine Morris	DATE & TIME Nov 30	RECEIVED BY:	DATE & TIME
RELINQUISHED BY: Jen von Gradulewski	DATE & TIME Nov 30	RECEIVED AT LAB BY:	DATE & TIME

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

ISOTOPE TRACER TECHNOLOGIES INC

Isotope Analyses for:
SNC Lavalin

IT^2 FILE # 210745

2022-03-01

Approved by:

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

Client: SNC Lavalin
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E-mail: Melissa.MacDonald@snclavalin.com

File Number: **210745**
Project Number: **686094**
PO: **686094**

#	Sample ID	Sample Collection		Sample #	$\delta^{18}O$	Aver	Stdv	$\delta^{2}H$	Aver	Stdv
		Date	Time		H_2O	VSMOW		H_2O	VSMOW	
1	RG_MW_WW_WG_2021_Q4_NP	2021-11-23	11:47	86420	X	-19.08	0.02	X	-143.7	0.3
2	RG_MW-03-04_WG_2021_Q4_NP	2021-11-24	13:45	86421	X	-17.42	0.04	X	-128.6	0.2
3	EV_SEEP_SOUTHPIT6_WS_2021-12-14_NP	2021-12-14	11:22	86422	X	-16.82	0.03	X	-129.8	0.1

Please note: All 1L bottles split inside cooler. 100ml bottles were still intact. Please advise.

^{18}O & ^{2}H (CRDS)

Instrument Used: Cavity Ring Down Spectroscopy (CRDS)
CRDS (Model L2130-i) (Picarro, California, USA).
Standard Used:
IT2-11B / IT2-12C / IT2-13B Calibrated with IAEA Standards (V-SMOW, SLAP, and GISP)
Typical Standard deviation:
(^{18}O ±0.1‰) (^{2}H ± 1‰)

Approved by:

Orfan S-Stash

Orfan Shouakar-Stash, PhD
Director
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ISOTOPE TRACER TECHNOLOGIES INC

CHAIN OF CUSTODY / ANALYTICAL SERVICES REQUEST FORM

Note: all TAT Quoted material is in business days which exclude statutory holidays and weekends.

Specify date required	Service Requested		
	(regular)		
	(Rush)		

COMPANY NAME	SNC-Lavalin
OFFICE ADDRESS	520 Lake Street, Nelson, BC V1L 4C6
PROJECT MANAGER: Leslie Harker	
PROJECT # 686094	
PHONE: 250-505-6493	FAX
	PO # 686094

REPORT FORMAT/DISTRIBUTION

EMAIL ___X__ FAX ________ BOTH ________
SELECT: PDF _____ DIGITAL _____ BOTH __X__
EMAIL 1: Leslie.Harker@snclavalin.com
EMAIL 2: Melissa.MacDonald@snclavalin.com

PLEASE INDICATE FILTERED, PRESERVED OR BOTH
<----- **(F, P, F/P)**

SUBMISSION #:

ENTERED BY:

DATE/TIME ENTERED:

BIN #:

SAMPLING INFORMATION / **ANALYSIS REQUEST**

Sample Date/Time: Date (YYYY-MM-DD)	Time (24hr) (hh:mm)	TYPE: COMP	TYPE: GRAB	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	δ2H (H2O) and δ18O (H2O) (F)	Tritium, 3H (F)								COMMENTS	LAB ID
2021-11-23	11:47			x			RG_MW_WW_WG_2021_Q4_NP	2	R	R									
2021-11-24	13:45			x			RG_MW-03-04_WG_2021_Q4_NP	2	R	R									
2021-12-14	11:22			x			EV_SEEP_SOUTHPIT6_WS_2021-12-14_NP	2	R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									
				x					R	R									

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ___ No ___
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ___ No ___

SAMPLE CONDITION

___ FROZEN
___ COLD
___ COOLING INITIATED
___ AMBIENT

SAMPLED BY:	DATE & TIME	RECEIVED BY:	DATE & TIME	Observations
C.Bracken/B.Clarke. S.Aucoin/S.Hansen/J.Batstone	DATE & TIME: 12/17/2021	RECEIVED AT LAB BY:	DATE & TIME	

1. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

2. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

Appendix V

Data Quality Assurance / Quality Control (QA/QC)

1 Data Quality Assurance / Quality Control (QA/QC)

Teck Coal Limited (Teck) provided field and laboratory data relevant to the Site-Specific Groundwater Monitoring Programs (SSGMPs) and Regional Groundwater Monitoring Program (RGMP) to SNC-Lavalin Inc. (SNC-Lavalin). In addition, several wells were sampled by SNC-Lavalin personnel in 2021. Analysis of the Quality Assurance / Quality Control (QA/QC) data was completed by SNC-Lavalin. For wells sampled by Teck personnel, SNC-Lavalin has relied on data and information provided by Teck and has therefore assumed that the information provided is both complete and accurate. Interpretations and conclusions within this report are made with the assumption that data collection was completed in accordance with Permit 107517, the British Columbia Field Sampling Manual (BCFSM; BC MOE, 2013a, b), and Teck's Standard Practice and Procedures (SP&P) or SNC-Lavalin's Preferred Operating Procedures.

The QA/QC assessment completed for the SSGMPs and RGMPs reviewed shipping and handling issues, summarized results of relative percent differences (RPDs) from duplicate samples, summarized detections of analytes in field blanks, and reviewed laboratory quality control reports. QA/QC results for RGMP wells within mine boundaries are presented within the discussion of their respective operations, while background wells outside of mine boundaries are presented in their own section. In addition, regional drinking water program wells are presented with the nearest operation. A summary of QA/QC methods and results for each Operation/Program are presented below.

1.1 Summary of QA/QC Methods

1.1.1 Shipping and Handling

Shipping and handling QA/QC includes assessment of sample integrity upon arrival at the laboratory and analysis hold time exceedances. Sample integrity observations are documented by the laboratory upon receipt of the sample. Deficiencies noted by the laboratory may include sample analysis after specified hold times, elevated sample temperature, bottle damage, labelling errors, which may result in deviations from the specifications of the British Columbia Laboratory Analysis Manual (BCLAM; Austin, 2016) or in requested analyses not being conducted. Hold time exceedances may result from samples received at the lab or analyzed past their specified hold time. Hold time exceedances are identified on the Certificates of Analyses (COAs) in Appendix XIII.

1.1.2 Duplicate Samples

Duplicate samples, as described in the BCFSM Part E (BC MOE, 2013a), were collected at a frequency of at least one per ten samples during each sampling event to assess the overall precision (i.e., sample repeatability) which may be affected by both field sampling methodology (i.e., whether field collection procedures may result in variances in the chemistry of collected samples) and the precision of the laboratory analysis. Duplicate samples were evaluated by calculation of the RPD of the concentration between the sample and duplicate, as follows:

$$RPD = \frac{|sample\ 1 - sample\ 2|}{\frac{1}{2}(sample\ 1 + sample\ 2)} \times 100\%$$

RPDs are calculated for parameters where at least one of the samples was greater than five times the laboratory detection limit; an RPD of less than 20% for metals and inorganics is considered an acceptable level of precision per the BCFSM Part A (BC MOE, 2013b). Teck has a QA/QC program based on this manual; where the result is less than five times the detection limit, the acceptable RPD will be modified as follows:

- RPD < 20%: Acceptable.
- RPD > 20% with value > 5 times the Detection Limit (DL): Possible problem.
- RPD > 50% with results > 5 times the DL: Definite problem, most likely sample contamination or lack of sample representativeness.

1.1.3 Blanks

Field and trip blanks were processed and submitted for analysis as part of each sampling event under each SSGMP and the RGMP. Teck's standard practice for collecting field blank samples is to open a designated field blank sample bottle pre-filled with ultra-pure de-ionized (DI) water and preservative (where applicable) at the sampling site during regular sample collection. For dissolved parameters (i.e., dissolved metals and dissolved organic carbon), blanks are collected by passing laboratory supplied DI water through a filter and collecting the sample. The sample is subsequently preserved in the same manner as the original samples, replicating the sampling protocol. Blanks from the dissolved parameters provide information on contamination results from potential residue remaining on the filter, which may result in sample bias. Overall, field blanks provide information on potential contamination resulting from field handling techniques and atmospheric contamination.

Standard practice for trip blanks includes delivery of a sample set from the laboratory pre-filled with ultra-pure DI water and preservative (where applicable), which are kept in a cooler (with the other samples) and are unopened throughout the sampling trip. Trip blanks are meant to detect widespread contamination from the container and preservative during transport and storage. Field and trip blanks were shipped to the laboratory with routine samples and screened for analyte detections.

1.1.4 Laboratory QA/QC

ALS Canada Ltd (ALS) conducted routine internal QA/QC in accordance with BCLAM and reported these results as analyte qualifiers alongside the sample analysis results. SNC-Lavalin reviewed the qualifiers and considered them in the context of the other QA/QC analyses in evaluating their potential effects on the groundwater quality data.

1.1.5 Field QA/QC

SNC-Lavalin reviewed field parameters, manual water level measurements, and field notes recorded by Teck during sampling. Field parameters in the Teck database were compared to those in the field notes and corrections made to the database when notation errors were found. Manual depths to water measurements were compared to historical manual levels and to continuous water levels from data loggers. Select manual measurements were flagged as suspected notation errors.

1.2 Background Monitoring Locations

The background program consisted of monitoring and sampling 23 wells; however, QA/QC results for nine of the wells (LC_PIZDC1307, LC_PIZDC1308, LC_PIZP1103, LC_PIZP1101, EV_MW_GV4A/B, CM_MW3-SH/DP, CM_MW6-DP) are included in their respective operation sections. As such, the following QA/QC assessment for the background program will focus primarily on the remaining 14 wells (FR_MW_FRRD1, FR_MW_CH1-A, FR_MW_CH2, GH_MW_BG1A/B/C, GH_MW-Willow-1D, GH_MW-Willow-2S/D, GH_MW Wolf-1S/D, GH_MW-Wolf-2D, RG_MW_AC1A/B).

1.2.1 Shipping and Handling

A summary of shipping and handling issues from the 2021 sampling program is provided in Table A.

Table A: Summary of Shipping and Handling Issues

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
1-4	Hold Time Exceedance	All wells blanks and duplicates	pH, Oxidation Reduction Potential (ORP)	Exceeded ALS recommended hold time of 15 minutes prior to sample receipt. Field measurement recommended.
1	Hold Time Exceedance	FR_MW_MC10B (Field Blank)	Turbidity	Re-analysis/dilution exceeded ALS recommended hold time of three days, but initial testing was conducted within hold time.
3	Hold Time Exceedance	GH_MW-Wolf-2D	Turbidity	Analyzed four days after sample collection. This exceeded ALS recommended hold time of three days prior to sample analysis. Potentially biased high.

Except for pH and ORP for each sample, and turbidity in one sample, hold times were not exceeded for parameters analyzed in 2021. Parameters pH and ORP have a hold time of 15 minutes and measurements are taken in the field. These hold time exceedances did not affect data interpretation, as field measurement for pH and ORP are used for data analysis.

1.2.2 Duplicate Samples

A total of 81 samples and 12 field duplicates were collected from the 23 wells within the background monitoring program. A summary of samples with RPD values above 20% and parameter concentrations greater than five times the DL are provided in Table B, below.

Table B: Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
1	2	FR_MW_CH1-A	Total phosphorous	25%
		LC_PIZP1101*	Total Kjeldahl Nitrogen (TKN)	24%
			Orthophosphate	52%
2	4	LC_PIZP1101*	Ammonia-N	90%
			Dissolved Aluminum	64%
3	4	FR_MW-FRRD1	Total suspended solids (TSS)	48%
4	2	LC_PIZP1101*	Total dissolved solids (TDS)	25%
			Turbidity	190%

Note:
* indicates that duplicate samples are addressed in their respective operation sections.
RPD values greater than 50% are underlined.
All other sample analytes had RPD values below 20%.

Calculated RPDs exceeded 50% at LC_PIZP1101 in Q1, Q2, and Q4. These exceedances are addressed in the Line Creek Operations (LCO) QA/QC section. Calculated RPDs for all other parameters analyzed were less than 20% for the 23 wells assessed in the QA/QC assessment for the background program. These results indicate low variability in constituent concentrations from sampling and handling.

1.2.3 Field and Trip Blanks

Detections were reported in four of the eight field blanks and three of the seven trip blanks submitted for laboratory analysis in 2021. A summary of the field and trip blank results are described in Table C, below, which includes concentrations of detectable parameters and laboratory DLs.

Table C: Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks				
1	FR_MW-FRRD1	Dissolved molybdenum	0.139 mg/L	0.050 mg/L
3	EV_MW_GV4B	Turbidity	0.20 NTU	0.10 NTU
4	RG_MW_AC1A	Total dissolved solids	11 mg/L	10 mg/L
	LC_PIZP1101	Ammonia-N	0.0313 mg/L	0.0050 mg/L
		TKN	0.057 mg/L	0.050 mg/L
Trip Blanks				
2	June 10	Ammonia-N	0.0063 mg/L	0.0050 mg/L
4	October 1	Total dissolved solids	22 mg/L	10 mg/L
	October 27	Dissolved molybdenum	0.317 mg/L	0.050 mg/L

Note:
Values greater than five times the RDL are underlined.
Concentrations of all constituents in field and trip blanks were less than the primary screening criteria.

Overall detectable concentrations in field blanks were within five times the DL at the 23 wells assessed in the QA/QC assessment for the background program, with the exception of ammonia-N, which exceeded five times the DL at LC_PIZP1101 in Q4. This is addressed in the LCO QAQC section.

Overall, detectable concentrations in the trip blanks were within five times the DL at the 23 wells assessed in the QA/QC assessment for the background program, with the exception of dissolved molybdenum in Q4. Results for dissolved molybdenum in groundwater samples ranged from 0.423 to 35.2 µg/L. The concentration in the blank was less than the lowest sample result and therefore the results did not affect data interpretation.

Previously, the laboratory investigated the source(s) of parameters above DLs in blanks; however, potential sources of sample cross-contamination were not identified (SNC-Lavalin, 2019). There is a possibility the elevated parameters concentrations were caused by contamination in the field, during transport, or from sample bottles or preservatives.

1.2.4 Laboratory QA/QC

The detailed results of laboratory QA/QC are included in COAs in Appendix XIII. The quality control reports were reviewed and are summarized below.

Adjustments to the DLs were made to some parameters in select samples, qualifiers include the following:

- DL raised due to dilution required for high concentration of test analytes; and
- DL adjusted due to sample matrix effects (e.g., chemical interference, colour, turbidity).

The raised DLs were consistently below the screening standards, and as such, these DL qualifiers did not affect data quality.

Results for laboratory QA/QC samples occasionally yielded a series of qualifiers used to flag limitations in the reportability of the QA/QC result. These qualifiers are not expected to reflect on data quality, and include the following:

- Matrix spike recovery could not be accurately calculated due to high analyte background in sample;
- Reported result verified by repeat analysis; and
- TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.

The results of the laboratory QA/QC were acceptable for the purpose of this assessment. A review of the quality assurance portion of the laboratory analytical reports did not identify any additional QA/QC issues.

1.2.5 Field QA/QC

Manual water level measurements were collected from all wells during each quarter. Field parameter measurements were collected from all wells during each quarter, with the exception of GH_MW_BG1A in Q1, and ORP at FR_MW_FRRD1, FR_MW_CH1-A, and FR_MW_CH2 in Q2. In addition, continuous water levels were recorded for all monitoring wells, however, dataloggers at GH_MW_BG1A, GH_MW_BG1B, and GH_MW_BG1C could not be downloaded in 2021.

1.2.6 QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples collected from the background monitoring well network indicated the data collected are acceptable for use in this report. Calculated RPDs were greater than 50% for four parameters from three samples. Calculated RPDs were less than 50% for all other parameters in the twelve duplicate samples. Hold time exceedances were identified for pH and ORP in all samples, and turbidity in GH_MW-Wolf-2D in Q3. The results reflect low variability for handling and sampling for the program.

Field measurements and manual and/or continuous water levels were collected from all background wells in 2021 to ensure data quality. Where detectable, concentrations of parameters in trip blanks were less than five times the DL, with the exception of ammonia-N (LC_PIZP1101) in Q4. Concentrations of parameters in field blanks were less than five times the DL, with the exception of dissolved molybdenum in Q4. The laboratory quality control reports were reviewed, and the data are considered reliable.

2 Fording River Operations (FRO)

2.1 Program Deviations

A summary of program deviations from the 2021 monitoring program is provided in Table D. Deviations that were not resolved are noted as Not Resolved (NR).

Table D: Summary of Program Deviations

Quarter	Well ID	Comment
1-4	FR_HMW1D	Datalogger data are not available due to a connection error. (NR)
4	FR_HMW1S/D	Dissolved metals were not analyzed except for mercury and major cations because they were not requested on the Chain of Custody(COC).
4	FR_HMW2	The sample was not collected due to the tubing and datalogger being stuck at the base of the well. The logger was pulled in October and not re-deployed due to concern that it would be tangled in the tubing stuck at the base of the well. (NR)
3-4	FR_TBSSMW-1	Datalogger data are not available, possibly due to a logger memory shortage or to the technician not re-starting the logger after downloading.
2-4	FR_MW_NTPSE	Samples were not collected because the well was recommended to be added to the SSGMP in Q4 of 2021, and previously, sampling was conducted within another program, which ceased in Q1 of 2021.
3-4	FR_MW_NTPSE	Datalogger data not available as the well was not part of a monitoring program.
2-4	FR_KB-1 FR_KB-2 FR_KB-3A/B	Dissolved mercury was not analyzed.
4	FR_KB-1 (Trip Blank) FR_KB-2 (Field Blank)	Dissolved mercury was not analyzed.
1	RG_MW_FR10A/B/C	Samples were not collected and continuous datalogger data are not available because the wells were installed in Q2.
2	RG_MW_FR10A/C	Continuous datalogger data are not available due to firmware issues with the Leveloggers®.
1	FR_MW18-02	The sample was not collected because the well was recommended to be added to the SSGMP in Q4 of 2021, and previously, sampling was conducted under another program that began in Q2 of 2021.

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2.1.1 Shipping and Handling

A summary of shipping and handling issues from the 2021 sampling program is provided in Table E.

Table E: Summary of Shipping and Handling Issues

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
1-4	Hold Time Exceedance	All wells blanks and duplicates	pH, ORP	Exceeded ALS recommended hold time of 15 minutes prior to sample receipt. Field measurement recommended.
1	Shipping Issue	FR_HMW2 FR_TRP (Trip Blank)	Total mercury, total metals	Low-level mercury total and total metals bottles not received.
1	Hold Time Exceedance	FR_HMW1S FR_HMW1D FR_HMW3 (and duplicate)	Dissolved orthophosphate Nitrate-N Nitrite-N Turbidity	Hold time of three days exceeded. Laboratory did not receive the samples in time to meet hold time requirements.
2	Hold Time Exceedance	FR_09-04-A (and duplicate) FR_09-04-B FR_GH_WELL4 FR_TRP (Trip Blank)	Dissolved orthophosphate Nitrate-N Nitrite-N Turbidity	Hold time of three days exceeded. Samples were submitted to the laboratory within the required hold time.

The recommended hold times for pH and ORP were exceeded for all samples, duplicates, and blanks in 2021. These parameters have a hold time of 15 minutes and the measurements are taken in the field, and therefore the hold times are obviously not met. These hold time exceedances were not considered to be an issue, as field measurements for pH and ORP are used for data analysis. The hold time of three days for dissolved orthophosphate, nitrate-N, nitrite-N, and turbidity was not met for two shipments in 2021, in Q1 and Q2. The samples collected from FR_HMW1S/D and FR_HMW3 in Q1 were not received by the laboratory within the recommended hold time, while the samples collected from FR_09-04-A/B, FR_GH_WELL4, and the trip blank in Q2 were received within the hold time. The sample concentrations were consistent with other quarterly samples collected in 2021 and therefore, the hold time exceedances did not affect interpretation of the results.

2.1.2 Duplicate Samples

A total of 108 samples and 14 field duplicates collected in 2021 were included in the FRO QA/QC assessment. A summary of samples with RPD values above 20% and concentrations of parameters greater than five times the DL are provided in Table F, below.

Table F: Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
1	3	FR_HMW3	Chloride	39%
		FR_HMW5	Ammonia-N	84%
			Nitrate-N	85%
		FR_09-01-A	Chloride	25%
2	3	FR_MW-SK1B	Dissolved Cadmium	69%
		RG_MW_FR10C	Dissolved Barium	27%
			Dissolved Molybdenum	22%
3	3	FR_GCMW-2	Nitrite-N	22%
		FR_09-02-A	Turbidity	27%
4	5	FR_HMW1S	TKN	52%
		RG_MW_FR10C	TSS	30%
			Sulphate	23%

Note:
RPD values greater than 50% are underlined.
All other sample analytes had RPD values below 20%.

Review of the duplicate sample results indicated calculated RPDs for dissolved cadmium (Q2 FR_MW-SK1B), ammonia-N (Q1 FR_HMW5), nitrate-N (Q1 FR_HMW5), and TKN (Q4 FR_HMW1S) were above acceptable levels (50%). TKN does not have applicable primary screening criteria and therefore, the RPD result did not affect data interpretation. The highest dissolved cadmium concentration among the sample/duplicate pair at FR_MW-SK1B in Q2 (0.0676 µg/L) was 7 times lower than the most stringent hardness-based primary screening criteria (0.5 µg/L). Ammonia-N concentrations (0.0522 to 0.128 mg/L) were at least an order of magnitude lower than the temperature and pH dependant primary screening criteria (1.31 to 18.5 mg/L), and therefore, the RPD results did not affect data interpretation. Similarly, the nitrate-N concentrations (0.0314 to 0.0779 mg/L) were at least two orders of magnitude lower than the most stringent primary screening criteria (10 mg/L) and did not affect data interpretation. Calculated RPDs for the numerous organic, inorganic, and physical parameters analyzed, were otherwise less than 20%. These results indicated low variability in constituent concentrations from sampling and handling.

2.1.3 Field and Trip Blanks

Detections were reported in eight of the 15 blanks submitted for laboratory analysis in 2021. Concentrations of detectable parameters and laboratory detections limits are provided in Table G, below.

Table G: Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks				
2	FR_MW-SK1B	Total Alkalinity	1.0 mg/L	1.0 mg/L
		Dissolved Barium	0.20 mg/L	0.10 mg/L
		Dissolved Magnesium	0.0069 mg/L	0.0050 mg/L

Table G (Cont'd): Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks (Cont'd)				
3	RG_MW_FR10B	Ammonia-N	0.0061 mg/L	0.0050 mg/L
		Nitrate-N	0.0438 mg/L	0.0050 mg/L
		Dissolved Barium	0.16 µg/L	0.10 µg/L
		Dissolved Copper	0.50 µg/L	0.20 µg/L
		Dissolved Magnesium	0.0052 mg/L	0.0050 mg/L
		Dissolved Manganese	0.13 µg/L	0.10 µg/L
		Dissolved Zinc	1.7 µg/L	1.0 µg/L
4	RG_MW_FR10B	Hardness	20.2 mg/L	0.50 mg/L
		Dissolved Aluminum	2.0 µg/L	1.0 µg/L
		Dissolved Barium	0.67 µg/L	0.10 µg/L
		Dissolved Calcium	7.89 mg/L	0.050 mg/L
		Dissolved Chromium	1.20 µg/L	0.10 µg/L
		Dissolved Copper	0.39 µg/L	0.20 µg/L
		Dissolved Magnesium	0.126 mg/L	0.0050 mg/L
		Dissolved Manganese	1.11 µg/L	0.10 µg/L
		Dissolved Nickel	0.63 µg/L	0.50 µg/L
		Dissolved Sodium	0.413 mg/L	0.050 mg/L
		Dissolved Strontium	4.51 µg/L	0.20 µg/L
		Dissolved Tin	0.15 µg/L	0.10 µg/L
		Dissolved Zinc	2.5 µg/L	1.0 µg/L
Trip Blanks				
1	February 4	Ammonia-N	0.0367 mg/L	0.0050 mg/L
2	April 26	Ammonia-N	0.0279 mg/L	0.0050 mg/L
	May 19	Dissolved Zinc	1.2 µg/L	1.0 µg/L
4	October 15	Nitrate-N	0.0261 mg/L	0.0050 mg/L
	November 5	Ammonia-N	0.0717 mg/L	0.0050 mg/L
		TOC	1.52 mg/L	0.50 mg/L
		DOC	1.45 mg/L	0.50 mg/L
		Dissolved Barium	0.12 µg/L	0.10 µg/L
		Dissolved Calcium	0.119 mg/L	0.050 mg/L
		Dissolved Copper	1.26 µg/L	0.20 µg/L
		Dissolved Manganese	0.13 µg/L	0.10 µg/L
		Dissolved Zinc	1.9 µg/L	1.0 µg/L

Note:
Value greater than five times the DL are underlined.
Concentrations of all constituents in field and trip blanks were less than the primary screening criteria.

Ammonia-N was detected in four blanks including one field blank and three trip blanks, and at concentrations greater than five times the DL in two of the trip blank samples. Results for ammonia-N in groundwater samples collected at FRO ranged from the DL (0.005 mg/L) to 3.80 mg/L. As a result, the ammonia-N groundwater results may not be representative of formation water quality, since the source of the ammonia-N concentrations in the blanks samples is not known, and concentrations in blanks ranged from the DL (0.005 mg/L) to 7 times the DL (0.0367 mg/L) and were over the same order of magnitude as the sample results. The sample results and blank detections were lower than the pH dependant applicable primary screening criteria (3.7 mg/L – 18 mg/L), and therefore the ammonia-N detections in the trip and field blank samples have not affected interpretation of the data.

Other parameters with blank sample concentrations greater than five times the DLs included dissolved nitrate-N in a field blank (Q3 RG_MW_FR10B) and a trip blank collected October 15, dissolved copper in a trip blank collected November 5, and hardness and numerous dissolved metals in a field blank (Q4 RG_MW_FR10B). The concentrations of these parameters in the blanks ranged from 5 (nitrate-N in the trip blank collected October 15) to 158 (dissolved calcium in the field blank collected in Q4) times the DL. However, with the exception of dissolved chromium in the field blank collected in Q4 (1.2 µg/L) and dissolved copper in the trip blank collected November 5 (1.26 µg/L), the concentrations of these parameters were orders of magnitude lower than the most stringent primary screening criteria. The dissolved chromium and copper concentrations were 4 and 15 times lower than the most stringent primary screening criteria, respectively, and the concentrations of these parameters in all samples collected for the SSGMP and RGMP were low and met the primary screening criteria. Based on the above, cross-contamination due to field equipment or travel was considered to be unlikely, and the detectable concentrations in blanks did not affect data interpretation.

Previously, the laboratory conducted an investigation into the source(s) of parameters above DLs in blanks; however, sample cross-contamination was not found (SNC-Lavalin, 2019). Elevated concentrations of parameters may have been caused by contamination in the field or from sample bottles or preservatives. The parameters above the DLs did not affect the data interpretation due to their low concentrations below primary screening criteria.

2.1.4 Laboratory QA/QC

The detailed results of the laboratory QA/QC are included in the COAs in Appendix XIII. The quality control reports were reviewed and are summarized below.

Adjustments to the DLs were made to some parameters in select samples, qualifiers include the following:

- DL raised due to dilution required for high concentration of test analytes;
- DL raised due to dilution required for high dissolved solids and/or electrical conductivity;
- DL adjusted for required dilution;
- DL adjusted due to sample matrix effects (e.g., chemical interference, colour, turbidity); and
- DL raised due to chromatographic interference caused by co-elution.

The raised DLs were consistently below the screening standards therefore these detection limit qualifiers did not affect data quality.

Results for laboratory QA/QC samples occasionally yielded a series of qualifiers used to flag limitations in the reportability of the QA/QC result. These qualifiers are not expected to reflect on data quality, and include the following:

- Reported result verified by repeat analysis;
- Ion Balance Review: Imbalance is due to interference or non-measured components;
- Dissolved concentration exceeds total. Results were confirmed by repeat analysis;
- Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration; and
- TKN may be biased low due to nitrate-N interference. Nitrate-N is greater than 10 times TKN.

These notes are not unusual for these analyses considering the chemistry of the samples that reflects a mine-influenced groundwater (i.e., select samples have high TDS or nitrate-N concentrations). The results of the laboratory QA/QC were acceptable for the purpose of this assessment. A review of the quality assurance portion of the laboratory analytical reports did not identify any additional QA/QC issues.

2.1.5 Field QA/QC

Field parameters and manual water level measurements were collected from all wells during each quarter except for wells FR_HMW2 in Q4, FR_NTPSE in Q2 to Q4, and FR_MW18-02 in Q1, which were not monitored or sampled for the reasons detailed in Table D. In addition, continuous water levels were recorded for all monitoring wells except for the supply wells FR_POTWELLS and FR_GHWELL4 (which cannot be instrumented or accessed for manual monitoring due to well completion) and monitoring wells FR_09-02-B, FR_09-04-B, which are not instrumented. Continuous water levels were also not available for FR_HMW1D in 2021 due to a connection error. However, manual water level measurements were collected from FR_HMW1D prior to sampling in each quarter. The manual water level measurement made at FR_HMW5 in Q1 was considered erroneous based on all historical measurements.

2.1.6 QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. Calculated RPDs for all parameters in the 14 duplicate samples were less than 50% except for dissolved cadmium, ammonia-N, nitrate-N and TKN in three sample/duplicate pairs. Hold time exceedances were only for orthophosphate, nitrate-N, nitrite-N, and turbidity; however, the concentrations were consistent with other historical results from those wells and did not affect data interpretation. The results reflect low variability for handling and sampling for the program.

The laboratory quality control reports were reviewed, and the data are considered reliable. Detectable concentrations of ammonia-N, nitrate-N, several dissolved metals in field and trip blanks were greater than five times the DL and considered in interpreting results. Concentrations of detectable parameters in blanks were well below the applicable primary screening criteria and did not affect data interpretation.

Manual and/or continuous water levels were collected from select wells in 2021; however, continuous water level data from FR_HMW1D could not be downloaded in 2021 due to a connection error. Overall, field measurements collected are considered reliable with the exception of the manual water level measurement made at FR_HMW5 in Q1.

3 Greenhills Operations (GHO)

3.1 Program Deviations

A summary of program deviations from the 2021 monitoring program is provided in Table H. Deviations that were not resolved are noted as NR.

Table H: Summary of Program Deviations

Quarter	Well ID	Comment
3-4	GH_MW-TD	Sampling between Q3 and Q4 occurred <60 days apart.
2-3	GH_POTW17	Sampling between Q2 and Q3 occurred >120 days apart.
1-2	GH_GA-MW-4	Sampling between Q1 and Q2 occurred >120 days apart.
3-4	GH_GA-MW-2	Sampling between Q3 and Q4 occurred <60 days apart.
3-4	GH_MW-ERSC-1	Sampling between Q3 and Q4 occurred <60 days apart.
3-4	GH_MW-GHC-1B	Datalogger data are not available due to a connection error. (NR)
1	GH_MW-TD	Water level was not recorded.
2	GH_MW_ERSC-1	Well hoses tangled downhole; water level could not be measured.
3	RG_MW_FR11A/B	Routine parameter samples were not analyzed. The samples in the cooler were damaged in transit to the laboratory and the water in the sample bottles were lost. The wells were not re-sampled in Q3.
4		Wells were not sampled in Q4.
4	GH_POTW09	Field DO was not recorded.
4	GH_POTW10	Field DO was not recorded.
4	GH_POTW15	Field DO was not recorded.

3.1.1 Shipping and Handling

A summary of shipping and handling issues from the 2021 sampling program is provided in Table I.

Table I: GHO – Summary of Shipping and Handling

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
1-4	Hold Time Exceedance	All locations, duplicate and blanks	pH and ORP	Exceeded ALS recommended hold time of 15 minutes prior to sample receipt. Field measurement recommended.
1	Hold Time Exceedance	GH_MW-LC1-A	Dissolved orthophosphate	Hold time exceeded by five days for re-analysis or dilution but initial testing was conducted within hold time.

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Table I (Cont'd): GHO – Summary of Shipping and Handling

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
3	Hold Time Exceedance	GH_MW-MC-2S	Turbidity	Hold time exceeded by one day. Sample received prior to hold time expiry.
		GH_MW-MC-2D		
3	Hold Time Exceedance	Field blank	Nitrate-N	Hold time exceeded by 10 days. Sample received prior to hold time expiry.
4	Hold Time Exceedance	GH_MW_LC1-B	TSS	Hold time exceeded by one day. Sample received prior to hold time expiry.
		GH_MW-MC-1S		
		GH_MW-MC-1D		
		GH_MW-MC-2S		
		GH_MW-MC-2D		

Except for pH and ORP and the above listed samples, hold times were not exceeded for parameters analyzed in 2021. Parameters pH and ORP have a hold time of 15 minutes and measurements are taken in the field. These hold time exceedances did not affect data interpretation, as field measurements for pH and ORP were used for data analysis.

3.1.2 Duplicate Samples

A total of 107 samples and 11 field duplicates collected in 2021 were included in the GHO QAQC assessment. A summary of samples with RPD values above 20% and concentrations of parameters greater than five times the DL are provided in Table J.

Table J: Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
1	4	GH_MW_EF1A	Bicarbonate	32%
			Total alkalinity	34%
		GH_MW_GHC-1A	TSS	<u>116%</u>
			Turbidity	<u>54%</u>
2	4	GH_MW_GHC-4B	Cadmium	36%
			Total phosphorus	<u>108%</u>
			TKN	<u>59%</u>
		GH_MW-MC-2D	Aluminum	20%
			Bromide	<u>55%</u>
			Carbonate	41%
			Lithium	37%
			Selenium	<u>82%</u>

Table J (Cont'd): Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
3	3	GH_MW-TD	Cadmium	80%
			Turbidity	20%
4	3	GH_MW-GHC-1B	Chloride	22%
			Nitrite-N	74%
			TSS	40%
			Turbidity	39%
		GH_MW-MC-1D	Turbidity	28%

Note:
RPD values greater than 50% are underlined.
All other sample analytes had RPD values below 20%.

Calculated RPDs for the numerous organic, inorganic, and physical parameters analyzed were otherwise less than 20%. These results indicated low variability in constituent concentrations from sampling and handling.

3.1.3 Field and Trip Blanks

Detections were reported in eight of the 14 blanks submitted for laboratory analysis in 2021. Concentrations of detectable parameters and laboratory detections limits are provided in Table K, below.

Table K: Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks				
1	January 25	Total Organic Carbon (TOC)	1.8 mg/L	0.50 mg/L
	March 3	Magnesium	0.0097 mg/L	0.0050 mg/L
		Manganese	0.11 ug/L	0.10 ug/L
2	June 9	Dissolved cadmium	0.0068 ug/L	0.0050 ug/L
		Dissolved barium	0.21 ug/L	0.10 ug/L
		Manganese	0.16 ug/L	0.10 ug/L
		Dissolved zinc	2.5 ug/L	1.0 ug/L
		TKN	0.092 mg/L	0.050 mg/L
4	November 26	Manganese	0.11 ug/L	0.10 ug/L
		Orthophosphate	0.001 mg/L	0.0010 mg/L
		Dissolved cooper	0.23 ug/L	0.20 ug/L
		Dissolved Organic Carbon (DOC)	0.68 mg/L	0.50 mg/L

Table K (Cont'd): Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Trip Blanks				
1	January 25	Ammonia-N	<u>0.0476 mg/L</u>	0.0050 mg/L
2	June 9	TKN	<u>0.148 mg/L</u>	0.0050 mg/L
		DOC	0.52 mg/L	0.50 mg/L
		TOC	0.56 mg/L	0.50 mg/L
4	December 3	Ammonia-N	0.0135 mg/L	0.0050 mg/L

Note:
Value greater than five times the DL are <u>underlined</u>.
Concentrations of all constituents in field and trip blanks were less than the primary screening criteria.

Concentrations of parameters in blanks greater than five times the DL include the following:

- Ammonia-N in a trip blank (Q1 GH_MW-GHC-1A), and
- TKN in a trip blank (Q2 GH_MW-MC-2D).

Results for ammonia-N in groundwater samples collected at GHO ranged from the DL (0.05 mg/L) to 0.71 mg/L. The ammonia-N results should be regarded as uncertain because the concentrations in blanks ranged from the DL (0.05 mg/L) to 10 times the DL (0.476 mg/L) and were over the same order of magnitude as the sample results. Both the results and blank detections were lower than the pH dependant applicable primary screening criteria (3.7 mg/L – 18 mg/L) but did not affect data interpretation.

3.1.4 Laboratory QA/QC

The detailed results of laboratory QA/QC are included in COAs in Appendix XIII. The quality control reports were reviewed and are summarized below.

Adjustments to the DLs were made to some parameters in select samples. The raised DLs were consistently below the screening standards and as such, these DL qualifiers did not affect data interpretation. Qualifiers include the following:

- DL raised due dilution required due to high concentration of test analytes; and
- DL adjusted due to sample matrix effects (e.g., chemical interference, colour, turbidity).

Results for laboratory QA/QC samples occasionally yielded a series of qualifiers used to flag limitations in the reportability of the QA/QC result. These qualifiers did not affect data interpretation and included the following:

- Matrix spike recovery could not be accurately calculated due to high analyte background in sample;
- DL raised: dilution required due to high concentration of test analyte(s);
- Duplicate results and limits are expressed in terms of absolute difference;
- Relative Percent Difference not available due to result(s) being less than detection limit; and
- Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.

These notes are not unusual for these analyses considering the chemistry of the samples that reflects a mine-influenced groundwater (i.e., select samples have high TDS or nitrate concentrations).

The results of the laboratory QA/QC were considered acceptable for the purpose of this assessment. A review of the quality assurance portion of the laboratory analytical reports did not identify any additional QA/QC issues.

3.1.5 Field QA/QC

Manual groundwater levels were not measured at GH_MW-GHC-1A (Q2) and GH_MW-ERSC-1 (Q2). Water levels could not be measured at GH_POTW09, GH_POTW10, GH_POTW15, GH_POTW17, and RG_DW-01-03 due to existing infrastructure blocking access to the well.

Continuous groundwater level data was unavailable at wells GH_MW-PC (Q3), GH_MW-GHC-1B (Q3, Q4), and GH_MW-ERSC-1 (Q2) due to instrumentation errors. In 2021, there was no pressure transducer in GH_MW-TD, GH_MW_RLP-2, GH_POTW09, GH_POTW10, GH_POTW15, GH_POTW17, and RG_DW-01-03. A pressure transducer was installed at the newly installed wells GH_MW_PC4A/4B in Q3 and at RG_MW_FR11A/11B in Q4.

Field parameters were collected for all sites and all quarters in 2021.

3.1.6 QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. Calculated RPDs for all parameters in the 11 duplicate samples were less than 50% except for TSS, turbidity, dissolved bromide, nitrate-N, total and TKN at select wells. Hold times were met by the laboratory with the exception of alkalinity, bicarbonate, carbonate, hydroxide and nitrate-N in two batches. Samples that exceeded hold times were considered in the interpretation of the results.

Detectable concentrations of ammonia-N and TKN in trip and field blanks were greater than five times the DL. The concentration of these parameters in samples and blanks collected in 2021 were well below the applicable primary screening criteria and therefore, did not affect data interpretation.

The laboratory quality control reports identified several field-filtered samples with concentrations of dissolved parameters greater than total. The concentrations of parameters were well below the primary screening criteria and therefore did not affect data interpretation. No other issues were identified in the laboratory quality control reports and the data are considered reliable.

Continuous groundwater level data was unavailable at wells GH_MW-PC (Q3), GH_MW-GHC-1B (Q3, Q4), GH_MW-ERSC-1 (Q2), GH_MW_EF1A (Q4), and GH_MW_EF1B (Q4) due to instrumentation errors. A pressure transducer was installed at the newly installed wells GH_MW_PC4A/B in Q3 and at RG_MW_FR11A/B in Q4.

4 Line Creek Operations

4.1 Program Deviations

A summary of program deviations from the 2021 monitoring programs is provided in Table L. Deviations that were not resolved are noted as NR.

Table L: SSGMP and Relevant RGMP Study Areas – Summary of Program Deviations

Quarter	Well ID	Comment
Logger Deviations		
3	LC_MW_ER4A LC_MW_ER4B	Datalogger data not downloaded due to software issues.
4	LC_PIZP1001	Logger downloading issues, which may require instrumentation replacement. (NR)
3, 4	LC_PIZP1103	Manual water levels declined while logger levels increased. Possible error suspected with either logger hanging cable or logger malfunction. Unknown interference with logger positioning. Slip in the logger position of 12.6 cm on September 4, 2021 between 10:38 and 11:38 am. There were no indications in field notes or staffing schedules that the cables were adjusted. No damages reported to the well on Q4 sample field sheet. (NR)
Field Deviations		
1	LC_PIZDC1404D	Turbidity not recorded correctly due to technician (field student) error. Missing measurement.
2, 3, 4	LC_PIZP1101	Well damaged; casing bent over. Missing manual water levels Q2 to Q4. 0.3 m rise in logger placement on September 21, 2021 on day of repair. Unable to correct this data for elevation until new survey is completed. (NR)
4	WL_MW-15-04-B	Field turbidity was not measured due to insufficient water volume.
Sample/Analysis Deviations		
3	RG_MW_DC1A RG_MW_DC1B	Routine analysis (including sulphate and turbidity) not performed by laboratory. Routine bottle was reported open and empty upon arrival to the laboratory.
4	LC_MW_ER4A LC_MW_ER4B	Missing some routine parameters, including sulphate and nitrate nitrogen. Bottles for routine parameters were received by the laboratory but analysis not completed and/or reported.
1	LC_MT3 (field blank for LC_PIZ1206C) LC_RD3 (trip blank January 29)	No analysis for bicarbonate, carbonate, or hydroxide performed by laboratory.

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Table L (Cont'd): SSGMP and Relevant RGMP Study Areas – Summary of Program Deviations

Quarter	Well ID	Comment
Sample/Analysis Deviations (Cont'd)		
2	WL_MW-15-02-A WL_MW-15-04-B	No analysis for bicarbonate, carbonate, or hydroxide performed by laboratory.
1, 2	LC_MW20_01 LC_MW20_02A LC_MW20_02B LC_MW20_03 LC_PIZ1206A LC_PIZ1206C LC_PIZ1211N LC_PIZ1212	
3	LC_MW_MW10C (trip blank September 1)	
3	LC_MW_CP1B	No analysis for pH, conductivity, total alkalinity, bicarbonate, carbonate, or hydroxide performed by laboratory.
1-4	Trip blanks: LC_RD3_WG_2021-01-25_NP; WG_Q1-2021_012; WG_Q2-2021_006; WG_Q3-2021_009_RD2; and WG_Q4-2021_012_RD2	Dissolved metals bottles for the trip blank samples were not submitted.
3	LC_PIZ1206A LC_PIZ1206C LC_CC3 (field duplicate) LC_MT3 (field blank)	Hold time of three days exceeded for nitrate-N and nitrite-N. Laboratory received the samples but forgot to analyze them.

Note:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

A review and analysis of the laboratory results for dissolved and total selenium for the 2021 monitoring program identified multiple occurrences of dissolved selenium concentrations exceeding total. A summary the RPDs of the samples with concentrations greater than five times the DL are provided in Table M. A summary of the laboratory identified occurrences of dissolved concentrations exceeding total are in the Laboratory QAQC section below.

Table M: LCO – Dissolved vs. Total Selenium for Select Samples

Well ID	Q[a]	Dissolved Selenium (ug/L)	Total Selenium (ug/L)	RPD (%)
LC_MW20_01	1	57.1	52.8	8%
LC_MW20_02B		46.9	43.3	8%
LC_PIZ1206A		425	386	10%
LC_PIZ1206C		68.9	60.7	13%
LC_PIZ1211N		127	118	7%
LC_PIZ1212		139	118	16%

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Table M (Cont'd): LCO – Dissolved vs. Total Selenium for Select Samples

Well ID	Q[a]	Dissolved Selenium (ug/L)	Total Selenium (ug/L)	RPD (%)
LC_PIZ1212	1	139	118	16%
LC_PIZDC0901		2.21	1.71	26%
LC_PIZDC1306		2.15	2.04	5%
LC_MW20_01	2	63.9	59.1	8%
LC_PIZ1206A		389	369	5%
LC_PIZ1206C		72.6	68.4	6%
LC_PIZ1211N		96.3	85.5	12%
LC_PIZ1212		119	109	9%
LC_PIZDC0901		0.607	0.53	14%
WL_MW-15-02-B		16	11.8	30%
LC_MW_ER4B		9.35	8.25	13%
LC_MW20_02B	3	39.5	38.4	3%
LC_PIZ1206A		291	271	7%
LC_PIZ1206C		73.8	69.1	7%
LC_PIZ1211N		170	154	10%
LC_PIZ1212		99.6	93	7%
LC_PIZDC0901		0.544	0.522	4%
LC_MW_ER4B		7.47	6.47	14%
LC_PIZDC1306		3.67	3.02	19%
LC_MW20_01	4	52.5	43.1	20%
LC_MW20_02B		39.5	35.1	12%
LC_PIZDC0901		1.27	1.02	22%
LC_PIZDC1306		2.68	2.43	10%
LC_PIZ1206A		315	295	7%
LC_PIZ1206C		89.6	75.6	17%
LC_PIZ1211N		120	101	17%
LC_PIZ1212		127	116	9%
WL_MW-15-02-B		33.4	29.4	13%
LC_MW_CP1B		41.2	39.1	5%
LC_MW_CP1A		52.2	49.6	5%
RG_MW_LC4B		32.5	28.1	15%
RG_MW_LC4A		12.6	11.6	8%
LC_MW_SRDA		43.2	39.4	9%
LC_MW_SRDB		43.2	39.8	8%
LC_MW_ER4B		15	13	14%

Note:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

RPDs for total versus dissolved selenium ranged from 2% (Q4 LC_PIZ1206A) to 30% (Q2 WL_MW-15-02-B). Although there were several instances, the RPDs were relatively low and therefore, not expected to affect data interpretation. Due to a variety of factors, it is not uncommon for the dissolved concentration to be greater than the total concentration.

4.1.1 Shipping and Handling

A summary of shipping and handling issues from the 2021 sampling program is provided in Table N.

Table N: LCO – Summary of Shipping and Handling

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
1-4	Hold Time Exceedance	All wells, duplicates, and blanks	pH, ORP	Exceeded ALS recommended hold time of 15 minutes prior to sample receipt. Field measurements analyzed.
3	Hold Time Exceedance	LC_PIZ1206A LC_PIZ1206C LC_CC3 (field duplicate) LC_MT3 (field blank)	Nitrate-N, Nitrite-N	Hold time of three days exceeded. Laboratory received the samples but did not analyse them.

Except for pH and ORP, hold times were not exceeded for parameters analyzed in 2021. Parameters pH and ORP have a hold time of 15 minutes and measurements are taken in the field. These hold time exceedances were not inferred to affect interpretation as field measurement for pH and ORP are used for data analysis.

4.1.2 Duplicate Samples

A total of 106 samples and 15 field duplicates collected in 2021 were included in the LCO QA/QC assessment. A summary of samples with RPD values greater than 20% and concentrations of parameters greater than five times the DL are provided in Table O.

Table O: LCO – Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
1	3	LC_MW20_03	Total Phosphorous	38%
		LC_PIZP1101	TKN	24%
			Orthophosphate	<u>52%</u>
		LC_PIZP1105	TSS	<u>59%</u>
			Turbidity	41%
			Nitrate-N	<u>184%</u>
			Total Phosphorous	<u>93%</u>
			TOC	<u>129%</u>

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Table O (Cont'd): LCO – Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
2	2	LC_PIZP1105	TSS	47%
			Turbidity	53%
			Nitrate-N	141%
			Dissolved Aluminum	23%
			Dissolved Zinc	29%
		LC_PIZP1101	Ammonia Nitrogen	90%
			Dissolved Aluminum	64%
3	6	RG_MW_DC1A	Total Phosphorous	57%
		LC_PIZP1105	TSS	49%
			Turbidity	42%
			Nitrate-N	28%
			Total Phosphorous	54%
			TOC	54%
			Dissolved Cadmium	30%
			Dissolved Manganese	72%
			Dissolved Molybdenum	24%
4	4	LC_PIZ1206A	Chloride	24%
			Dissolved Cadmium	21%
		LC_PIZP1101	TDS	25%
			Turbidity	190%
		LC_PIZP1105	Ammonia Nitrogen	21%
			Nitrate-N	48%
		LC_MW_SRD2B	Acidity	28%

Note:
[a] ( ) denotes laboratory turbidity (NTU)
RPD values greater than 50% are underlined.
All other sample analytes had RPD values below 20%.

Review of the duplicate sample results indicated calculated Relative Percent Differences (RPDs) for the parameters listed below were above acceptable levels (50%), most of which originated from two monitoring wells (LC_PIZP1101 and LC_PIZP1105) located in the Process Plant area. Of the parameters listed below, only ammonia-N, nitrate-N, dissolved aluminum, and dissolved manganese have exceeded primary screening criteria.

- TSS:
  - LC_PIZP1105 Q1.
- Turbidity:
  - LC_PIZP1105 Q2.
  - LC_PIZP1101 Q4.
- Ammonia-N:
  - LC_PIZP1101 Q2.
- Nitrate-N:
  - LC_PIZP1105 Q1.
  - LC_PIZP1105 Q2.

- Orthophosphate:
  - LC_PIZP1101 Q1.
- Total phosphorous:
  - LC_PIZP1105 Q1.
  - LC_PIZP1105 Q3.
  - RG_MW_DC1A Q3.
- TOC:
  - LC_PIZP1105 Q1.
  - LC_PIZP1105 Q3.
- Dissolved aluminum:
  - LC_PIZP1101 Q2.
- Dissolved manganese:
  - LC_PIZP1105 Q3.

As indicated in the preceding table and list, elevated RPD values were most numerous at LC_PIZP1105 (Q1 to Q4) and at LC_PIZP1101 (Q1, Q2, and Q4). Review of the field sampling records indicated the samples and duplicates from well LC_PIZP1105 were collected by bailer, which is a method known to raise turbidity concentrations. The laboratory turbidity concentrations ranged between 290 NTU to 3,730 NTU. The well casing at LC_PIZP1101 was damaged in Q2 and repaired in Q4.

The following was concluded for LC_PIZP1101 and LC_PIZP1105:

- As there are no primary screening criteria for orthophosphate, TSS, TDS, turbidity, total phosphorous, ammonia-N, and TOC, the RPDs greater than 50% were not of concern.
- Specifically for LC_PIZP1101:
  - Ammonia-N concentrations for the sample and its duplicate in Q2 had RPD of 90%; however, the concentrations were an order of magnitude less than the most stringent primary screening criteria, and therefore, the elevated RDP has not affected data interpretation.
  - Dissolved aluminum concentrations the sample and its duplicate in Q2 had RPD of 64%; however, the concentrations were two orders of magnitude less than the most stringent primary screening criteria, and therefore, the elevated RDP has not affected data interpretation.
  - TKN concentrations for the sample and its duplicate in Q1 had RPD of 24%; however, as there are no primary screening criteria, this elevated RPD has not affected data interpretation.
- Specifically for LC_PIZP1105:
  - Nitrate-N concentrations for the sample and its duplicates in Q1 and Q2 had RPDs greater than 50%; however, all concentrations were an order of magnitude less than the most stringent primary screening criteria, and therefore, the elevated RDP has not affected data interpretation.
  - Dissolved aluminum concentrations the sample and its duplicate in Q2 had RPD of 23%; however, the concentrations were two orders of magnitude less than the most stringent primary screening criteria, and therefore, the elevated RDP has not affected data interpretation.
  - Ammonia-N concentrations for the sample and its duplicate in Q2 had RPDs of 21%; however, the concentrations were an order of magnitude less than the most stringent primary screening criteria, and therefore the elevated RDP has not affected data interpretation.
  - Concentrations for the sample and its duplicate were less than the most stringent primary screening criteria, and therefore, the elevated RDP has not affected data interpretation for:

- Dissolved zinc concentrations in Q2;
- Dissolved cadmium concentrations in Q3;
- Dissolved manganese concentrations in Q3; and
- Dissolved molybdenum concentrations in Q3.

Given the above results, sampling procedures at LC_PIZP1101 and LC_PIZP1105 should be reviewed and improved upon to obtain representative duplicate samples. It was recommended in other sections of this annual report that LC_PIZP1101 be developed further, and the post-repair results should be analyzed for signs of further well casing damage.

Singularly elevated RPD values were calculated at four locations (LC_MW20_03, RG_MW_DC1A, LC_PIZ1206A, and LC_MWSRD2B) each for a single analyte. For the following analytes at the four locations, the elevated RPD's were outside of the acceptable range, but did not affect data interpretation:

› Total phosphorus concentrations were elevated twice (no primary screening criteria). RPDs of 38% and 67%.

› Acidity concentration was elevated once (no primary screening criteria). RPD of 28%.

› Chloride concentrations at LC_PIZ1206A and its duplicate had an RPD of 24% (both concentrations were an order of magnitude less than the most stringent primary screening criteria).

› Dissolved cadmium at LC_PIZ1206A and its duplicate had an RPD of 21% (both concentrations were an order of magnitude less than the most stringent primary screening criteria).

As RPDs have only been documented at select wells, elevated RPDs were not attributed to laboratory error.

4.1.3 Field and Trip Blanks

Detections were reported in 10 of the 15 blanks submitted for laboratory analysis in 2021. Concentrations of detectable parameters and laboratory detections limits are provided in Table P, below

Table P: Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks				
3	LC_MW_CP1A (September 1, 2021)	TOC	1.98 mg/L	0.50 mg/L
		DOC	2.24 mg/L	0.50 mg/L
4	LC_PIZP1101 (November 23, 2021)	Ammonia-N	0.0313 mg/L	0.0050 mg/L
		TKN	0.057 mg/L	0.050 mg/L
	LC_PIZP1105 (November 22, 2021)	Dissolved Aluminum	1.6 µg/L	1.0 µg/L
	LC_MW_SRD2B (November 24, 2021)	Hardness	1.11 mg/L	0.50 mg/L
		Conductivity	3.4 µS/cm	2.0 µS/cm
		Turbidity	0.51 NTU	0.10 NTU
		Chloride	0.18 mg/L	0.10 mg/L
		Sulphate	0.37 mg/L	0.30 mg/L
		Nitrate-N	0.0088 mg/L	0.0050 mg/L
		Dissolved Barium	0.35 µg/L	0.10 µg/L

Table P (Cont'd): Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks (Cont'd)				
4 (Cont'd)	LC_MW_SRD2B (November 24, 2021) (Cont'd)	Dissolved Calcium	0.308 mg/L	0.050 mg/L
		Dissolved Copper	0.74 µg/L	0.20 µg/L
		Dissolved Magnesium	0.0822 mg/L	0.0050 mg/L
		Dissolved Sodium	0.073 mg/L	0.050 mg/L
		Dissolved Strontium	1.19 µg/L	0.20 µg/L
		Dissolved Zinc	1.7 µg/L	1.0 µg/L
Trip Blanks				
1	WG_Q1 March 24	Ammonia-N	0.0061 mg/L	0.0050 mg/L
		Nitrite-N	0.0010 mg/L	0.0010 mg/L
2	WG_Q2 June 10	Ammonia-N	0.0063 mg/L	0.0050 mg/L
3	LC_MW_MC10C September 1	TOC	1.87 mg/L	0.50 mg/L
		DOC	1.91 mg/L	0.50 mg/L
	WG_Q3 September 16	Ammonia-N	0.240 mg/L	0.0050 mg/L
4	WG_Q4 November 22	Ammonia-N	0.0085 mg/L	0.0050 mg/L
	LC_MW_MC10 November 24	Dissolved Barium	0.10 µg/L	0.10 µg/L
		Dissolved Calcium	0.085 mg/L	0.050 mg/L
		Dissolved Magnesium	0.0171 mg/L	0.0050 mg/L
		Dissolved Strontium	0.33 µg/L	0.20 µg/L
		Dissolved Zinc	1.0 µg/L	1.0 µg/L

Note:
Value greater than five times the DL are underlined.
Concentrations of all constituents in field and trip blanks were less than the primary screening criteria.

Seven of the 30 total detectable concentrations in the field and trip blanks were greater than five times the DL. Ammonia-N was the most common parameter to be greater than five times the DL, with three instances. Dissolved magnesium occurred twice; and dissolved calcium, dissolved strontium, and turbidity each had a single instance; Previously, the laboratory conducted an investigation into the source(s) of parameters above DLs in blanks; however, they did not identify any laboratory cross-contamination (SNC-Lavalin, 2019). There is a possibility that the elevated concentrations of parameters were caused by contamination in the field or from sample bottles or preservatives.

As evident by the detected dissolved metals parameters in both the field blank and trip blank on November 24, 2021, and the elevated turbidity in the field blank, conceivably cross-contamination was introduced during sampling and/or shipment. A review of analytical results for the four other samples collected on that day and shipped to the laboratory in the same cooler (LC_MW_ERX1A/B and LC_MW_SRD2A/B) indicated detectable concentrations of dissolved barium, calcium, copper, magnesium, sodium, strontium, and zinc, but they were all far less than the most stringent applicable primary screening criteria. Sampling procedures should be reviewed regularly to ensure consistency in methods. Additionally, the risk of cross-contamination at these two monitoring wells should be evaluated and steps taken to minimize it.

Ammonia-N was the most common parameter measured in the blank samples with concentrations greater than five times the DL in three samples. Results for ammonia-N in groundwater samples collected at LCO ranged from the DL (0.005 mg/L) to 3.32 mg/L. The ammonia-N results may not be representative of formation water quality, since the source of the ammonia-N concentration in the blank sample is not known, and the concentrations in blanks range over the same order of magnitude as the sample results. The concentrations in blanks ranged from the DL (0.005 mg/L) to 4.8 times the DL (0.240 mg/L) and were the same order of magnitude higher as the sample results. Both the results and blank detections were lower than the pH dependant applicable primary screening criteria (1.31 – 18.5 mg/L) and therefore, did not affect data interpretation.

Dissolved metals samples were missing for most trip blanks, as detailed in Table J above.

4.1.4 Laboratory QA/QC

The detailed results of laboratory QA/QC are included in COAs in Appendix XIII. The quality control reports were reviewed and are summarized below.

Adjustments to the DLs were made to some parameters in select samples, qualifiers include the following:

- DL raised due to dilution required for high concentration of test analytes;
- DL raised due to dilution required due to high dissolved solids / electrical conductivity;
- DL adjusted for required dilution; and
- DL adjusted due to sample matrix effects (e.g., chemical interference, colour, turbidity).

The raised DLs were consistently below the screening standards and as such these DL qualifiers did not affect data interpretation.

Results for laboratory QA/QC samples occasionally yielded a series of qualifiers used to flag limitations in the reportability of the QA/QC result. These qualifiers did not affect data interpretation, and included the following:

- Reported result verified by repeat analysis;
- Turbidity exceeded upper limit of the nephelometric method. Minimum value reported;
- Ion Balance Reviewed: Imbalance is due to interference or non-measured component; and
- TKN may be biased low due to nitrate-N interference. Nitrate-N is greater than 10 times TKN.

These notes are not unusual for these analyses considering the chemistry of the samples that reflects a mine-influenced groundwater (i.e., select samples have high TDS or nitrate concentrations).

Results for laboratory QA/QC samples also yielded this qualifier:

- Dissolved concentration exceeds total. Results were confirmed by re-analysis; and
- Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.

This qualifier was applied for dissolved antimony, lead, molybdenum, and tin chiefly for samples from LC_PIZP1101 (September 21, 2021) and LC_PIZP1105 (March 24, 2021 and June 11, 2021) and their dups:

- The dissolved antimony sample collected with a bailer on:
  - March 24, 2021 from LC_PIZP1105 (30.4 µg/L) and it's duplicate (29.6 µg/L) were far greater than the total samples (0.67 µg/L and 0.63 µg/L, respectively) and greater than the most stringent primary screening criteria of 6 µg/L (CSR DW). These samples did not represent formation groundwater from the targeted aquifer.
  - June 11, 2021 from LC_PIZP1105 duplicate (4.03 µg/L) was far greater than the total samples (0.62 µg/L) but less than the most stringent primary screening criteria.
- The dissolved tin sample collected with a bladder pump on March 22, 2021 from LC_PIZP1101 (1.06 µg/L) and its duplicate (1.07 µg/L) were far greater than the total samples (0.035 µg/L and 0.031 µg/L, respectively) but less than the most stringent primary screening criteria.
- The dissolved molybdenum sample collected with a bladder pump on September 21, 2021 from LC_PIZP1101 (12.3 µg/L) and its duplicate (12.7 µg/L) were greater than the total samples (3.87 µg/L and 4.43 µg/L, respectively) and greater than the most stringent primary screening criteria of 10 µg/L (CSR IW). A further review of all the 2021 data (at this well) revealed the other three dissolved molybdenum samples also had concentrations greater than the total, although not flagged by the laboratory. Two out of the three samples reported total molybdenum at concentrations less than the most stringent primary screening criteria. In summary, the 2021 dissolved molybdenum samples collected from LC_PIZP1101 are considered unreliable.

These samples generally had higher TSS, TDS, and/or turbidity concentrations. Based on the Background Groundwater Assessment (BGA) completed for the 2020 RGMP Update (SNC-Lavalin, 2020), antimony was identified as being mining-related while molybdenum was not. Further discussion on potential sources of molybdenum in the Process Plant area is available in Section 1.6.1.2 of Appendix X (LCO 2021 SSGMP and RGMP Report). Sampling procedures should be evaluated and modified as needed to mitigate this laboratory qualifier.

The groundwater sample collected on April 17, 2021 at LC_MW20_02B reported dissolved molybdenum (1.66 µg/L) at a higher concentration that total molybdenum (1.22 µg/L) with an RPD of 31%. These concentrations were far less than the most stringent primary screening criteria (10 µg/L) and the laboratory did not flag any other parameters, therefore these data are considered reliable.

The groundwater sample collected on September 24, 2021 at LC_PIZ1212 reported dissolved lead (0.103 µg/L) at a higher concentration that total lead (< 0.05 µg/L) with an RPD of 69%. These concentrations were far less than the most stringent primary screening criteria (10 µg/L) and the laboratory did not flag any other parameters, therefore these data are considered reliable.

4.1.5 Field QA/QC

Field parameters were collected from all wells in 2021, except for turbidity for LC_PIZDC1404D in Q1 and WL_MW-15-04-B in Q4.

Manual water level measurements were collected from all wells in 2021, except for LC_PIZP1101 in Q2-Q4 due to damage to the well.

4.1.6 QA/QC Summary

A total of 106 samples, 15 field duplicates, eight field blanks, and seven trip blanks were included in the 2021 LCO QA/QC assessment. The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report, except for dissolved molybdenum samples at LC_PIZP1101 (Q1 to Q4) and the Q1 sample for dissolved antimony at LC_PIZP1105 (Q1). The exceedances of these parameters at these wells are not reliable, as the samples didn't reflect groundwater from the targeted aquifer.

Review of the sample and duplicate RPDs greater than 20% revealed data interpretation was not affected.

Hold time exceedances were mostly for pH and ORP, which have hold times of 15 minutes and are measured in the field.

Detectable concentrations of parameters in blanks were less than five times the DLs except for ammonia-N, dissolved magnesium, dissolved calcium, dissolved strontium, and turbidity. However, concentrations were less than the applicable primary screening criteria and therefore, did not affect data interpretation.

Most laboratory qualifiers did not affect the overall interpretation, except for all dissolved molybdenum samples at LC_PIZP1101 and the Q1 sample for dissolved antimony at LC_PIZP1105, both of which were not representative of formation groundwaters. Molybdenum is considered naturally occurring in the Process Plant area and not related to mining activities; however, antimony is inferred to be mine-related. Sampling procedures should be reviewed regularly to ensure consistency in methods.

In addition, some field parameters and manual water levels could not be collected in 2021; however, the missing data is not expected to impact the overall data interpretation.

5 Elkview Operations (EVO)

5.1 Program Deviations

A summary of program deviations from the 2021 monitoring program is provided in Table Q.

Table Q: Summary of Program Deviations

Quarter	Well ID	Comment
2	EV_MCgwS	Dissolved mercury was not analyzed at this well. The vial for dissolved mercury was received by the laboratory broken; therefore, analysis could not be completed.
3	EV_MW_WW	Groundwater sample was not analyzed. The cooler which contained the sample was lost in transit to the laboratory. The well was not re-sampled in Q3.
3	MC_MC10C (Trip Blank) EV_EC7GW (Trip Blank)	Field personnel received empty trip blank bottles from the laboratory; therefore, no sample was available for the laboratory to provide analysis.
1-3	RG_DW-T (Trip Blank)	Dissolved metals and total organic carbon were not analyzed since these analyses were not included in the COCs.

5.1.1 Shipping and Handling Issues

A summary of shipping and handling issues from the 2021 sampling program is provided in Table R.

Table R: Summary of Shipping and Handling Issues

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
1-4	Hold Time Exceedance	All wells, blanks, and duplicates	pH, ORP	Exceeded ALS recommended hold time of 15 minutes prior to sample receipt. Field measurement recommended.
1	Hold Time Exceedance	EV _GV3gw, EV_GV3gwS, EV_MW_GV4A/B	TDS, TSS	Hold time of three days exceeded for analysis by one day. Laboratory received samples on time and analysis within the hold time was overlooked by the lab.
	Hold Time Exceedance (Cont'd)	RG_DW-02-20 (Field Blank) RG_DW-T (Trip Blank)	Nitrate-N, nitrite-N	Hold time of three days exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
		EV_MW_MC3	Dissolved orthophosphate-P	

Table R (Cont'd): Summary of Shipping and Handling Issues

Quarter	Qualifier	Well ID	Possibly Affected Analytes	Comment
2	Shipping Issue	EV_MCgwS	Dissolved Mercury	Vial for dissolved mercury was received by the laboratory broken; therefore, analysis could not be completed.
3	Hold Time Exceedance	EV_MW_SPR1B	Total alkalinity, alkalinity bicarbonate (as CaCO3), bicarbonate (HCO3), conductivity	Hold times for parameters were exceeded for re-analysis or dilution, but initial testing was conducted within hold time.

With the exception of pH and ORP for each sample and the samples listed in the table above, initial hold times were not exceeded for parameters analyzed in 2021, with the exception of TDS and TSS in EV_GV3gw, EV_GV3gwS and EV_MW_GV4A/B. The pH and ORP parameters have a hold time of 15 minutes and measurements are taken in the field. These hold time exceedances are not considered to be an issue since field measurements for pH and ORP are used for data analysis and not lab measured pH and ORP. The laboratory was contacted regarding exceeding the hold time for TDS and TSS and reported that analysis of these samples was overlooked.

5.1.2 Duplicate Samples

A total of 178 samples and 18 field duplicates collected in 2021 were included in the EVO QA/QC assessment. A summary of samples with RPD values above 20% and concentrations of parameters greater than five times the DL are provided in Table S, below.

Table S: Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
1	4	RG_DW-02-20	TKN	62%
		EV_MCgwD	Turbidity	173%
			TSS	177%
			Chloride	77%
			Ammonia-N	48%
			Nitrate-N	62%
			Total phosphorus	157%
			Dissolved iron	26%
		EV_OCgw	Turbidity	49%
			Dissolved iron	38%
2	4	-	-	-

Table S (Cont'd): Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
3	6	EV_LSgw	Turbidity	21%
			TKN	21%
		EV_OCgw	TSS	64%
			Turbidity	47%
			Nitrite-N	37%
			Orthophosphate	23%
			Total phosphorus	87%
4	4	EV_OCgw	Turbidity	30%
			Nitrate-N	27%
			Dissolved iron	21%

Note:
RPD values greater than 50% are underlined.
All other sample analytes had RPD values below 20%.

The above elevated RPD values have been calculated at EV_OCgw in Q1, Q3 and Q4, as well as EV_MCgwD in Q1 and EV_LSgw in Q3. As RPDs have only been documented at select wells, elevated RPDs are not inferred to be related to laboratory error which would be expected at multiple well locations. Groundwater at EV_MCgwD was pumped at a slightly higher rate (0.55 L/min) than what is considered acceptable for low-flow sampling and was sampled when measured turbidity was 80.35 NTU. The elevated pump rate along with increased turbidity in the water column, which did not stabilize prior to sampling, may have contributed to higher RPD values. Monitoring well EV_OCgw contained the greatest amount of RPD flags during the Q3 sampling event. During this event, the turbidity of groundwater was 20.86 NTU, while turbidity during the other two events remained low at less than 7 NTU. Low-flow sampling procedures were adhered to at this well during all three events; therefore, the increase in RPDs may be attributed to the turbidity of the sample in Q3. Similarly, monitoring well EV_LSgw was sampled by low-flow and turbidity remained low at time of sampling (7 NTU). Sampling procedures at these wells will be reviewed and improved upon to obtain the most representative samples.

Review of the duplicate sample results indicates that calculated RPDs for TKN (Q1 RG_DW-02-20), TSS and total phosphorus (Q1 EV_MCgwD and Q3 EV_OCgw), turbidity, chloride, and nitrate-N (Q1 EV_MCgwD) were above acceptable levels (50%). Turbidity, TKN, TSS, and total phosphorus do not have applicable primary screening criteria and therefore are not considered a significant concern. All other parameters were two orders of magnitude less than the applicable primary screening criteria and as such not identified as an issue. Calculated RPDs for the numerous organic, inorganic, and physical parameters analyzed, were otherwise less than 50%. These results indicate low variability in constituent concentrations from sampling and handling.

5.1.3 Field and Trip Blanks

Detections were reported in 17 of the 34 blanks submitted for laboratory analysis in 2021. Concentrations of detectable parameters and laboratory detections limits are provided in Table T, below.

Table T: Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blank				
1	EV_MW_GC1B	Ammonia-N	0.12 mg/L	0.0050 mg/L
		TKN	0.109 mg/L	0.05 mg/L
	EV_MCgwD	Ammonia-N	0.0103 mg/L	0.0050 mg/L
3	EV_LSgw	Ammonia-N	0.0149 mg/L	0.0050 mg/L
	EV_OCgw	Ammonia-N	0.0050 mg/L	0.0050 mg/L
		TOC	0.65 mg/L	0.50 mg/L
	EV_MW_SP1B	Ammonia-N	0.0074 mg/L	0.0050 mg/L
	EV_ER1gwD	Dissolved aluminum	2.1 µg/L	1.0 µg/L
		Dissolved barium	0.16 µg/L	0.10 µg/L
	EV_MW_GV4B	Turbidity	0.20 NTU	0.1 NTU
	RG_DW-02-20	Dissolved copper	0.50 µg/L	0.20 µg/L
4	EV_OCgw	Ammonia-N	0.0104 mg/L	0.0050 mg/L
Trip Blank				
1	March 19	Dissolved Aluminum	1.2 µg/L	1.0 µg/L
		Dissolved Manganese	0.14 µg/L	0.10 µg/L
		Dissolved Zinc	1.7 µg/L	1.0 µg/L
	March 25	Ammonia-N	0.0191 mg/L	0.0050 mg/L
3	July 14	Ammonia-N	0.0303 mg/L	0.0050 mg/L
	September 12	Ammonia-N	0.112 mg/L	0.0050 mg/L
		TKN	0.113 mg/L	0.050 mg/L
4	October 1	Total Dissolved Solids	22 mg/L	10 mg/L
	October 24	Ammonia-N	0.0107 mg/L	0.0050 mg/L
	October 27	Ammonia-N	0.0068 mg/L	0.0050 mg/L
	November 21	Ammonia-N	0.0373 mg/L	0.0050 mg/L
		TKN	0.070 mg/L	0.050 mg/L
	November 22	Ammonia-N	0.0201 mg/L	0.0050 mg/L

Note:
Values greater than five times the RDL are underlined.
Concentrations of all constituents in field and trip blanks were less than the primary screening criteria.

Ammonia-N was the only parameter measured in the field and blank samples with concentrations greater than five times the DL in 2021. Results for ammonia-N in groundwater samples collected at EVO ranged from the DL (0.05 mg/L) to 1.59 mg/L. As a result, the ammonia-N groundwater results may not be representative of formation water quality, since the source of the ammonia-N concentrations in the blank samples is not known, and concentrations in blanks ranged from the DL (0.05 mg/L) to 8 times the DL (0.0373 mg/L) and were over the same order of magnitude as the sample results. Both the results and blank detections were lower than the pH dependant applicable primary screening criteria (3.7 mg/L – 18 mg/L), and therefore the ammonia-N detections in the trip blank and field blank samples have not affected the data interpretation.

Previously, the laboratory conducted an investigation into the source(s) of parameters above DLs in blanks, however, sample cross-contamination was not found (SNC-Lavalin, 2019). Elevated concentrations may have been caused by contamination in the field or from sample bottles or preservatives. The ammonia-N concentrations above the DLs did not affect data interpretation due to their low concentrations below primary screening criteria.

5.1.4 Laboratory QA/QC

The detailed results of laboratory QA/QC are included in COAs in Appendix XIII. The quality control reports were reviewed and are summarized below.

Adjustments to the DLs were made to some parameters in select samples, qualifiers include the following:

- DL raised due to dilution required due to high concentration of test analytes.
- DL adjusted due to sample matrix effects (e.g., chemical interference, colour, turbidity).
- DL adjusted for required dilution.
- DL raised due to dilution required due to high dissolved solids/electrical conductivity.

The raised DLs were consistently below the screening standards and as such these DL qualifiers did not affect data quality.

Results for laboratory QA/QC samples occasionally yielded a series of qualifiers used to flag limitations in the reportability of the QA/QC result. The laboratory has indicated the following qualifiers have not affected data interpretation:

- Matrix spike recovery could not be accurately calculated due to high analyte background in sample.
- Method blank exceeds ALS DQO. Associated samples results which are less than Limit of Reporting or greater than five times blank level are considered reliable.
- Data quality objective was marginally exceeded (by less than 10% absolute) for less than 10% of analyte in a multi-element scan / multi-parameter scan (considered acceptable).
- Reported result verified by repeat analysis.
- Relative percent difference not available due to result(s) being less than DL.
- Ion Balance Reviewed: Imbalance is due to interference or non-measured component.
- Initial method blank for the submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd Method Blank results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible.
- TKN results may be biased low due to nitrate-N interference. nitrate-N is greater than 10 times TKN.
- TKN matrix spike recovery was low due to interference from high nitrate, which causes negative bias on TKN.
- TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.
- Concentrations of DOC exceeds TOC. Results were confirmed by re-analysis.

These notes are not unusual for these analyses considering the chemistry of the samples reflect mine-influenced groundwater (i.e., select samples have high TDS or nitrate-N concentrations). Ion balance review was only noted at EV_WF_SW in Q1 (84.2%) and Q3 (121%). Ion imbalances were not observed in 2020 samples collected at this well and this appears to have been an isolated occurrence. Concentrations of most analytical results at this well were less than the primary screening criteria, except for manganese and iron; therefore, the ion imbalance is not inferred to affect data interpretation. The results of the laboratory QA/QC were considered acceptable for the purpose of this assessment. A review of the quality assurance portion of the laboratory analytical reports did not identify any additional QA/QC issues.

5.1.5 Field QA/QC

Continuous groundwater level data was unavailable at wells EV_MW_AQ1 (Q4), EV_MCgwS (Q1), EV_MCgwD (Q1), EV_MW_MCgwA (Q3 and Q4), EV_MW_MC2A (Q4), EV_MW_SP1B (Q3 and Q4) due to instrumentation errors.

5.1.6 QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. Several parameters in three field duplicate samples had calculated RPDs greater than 50%; however, the parameters either do not have an applicable primary screening criteria or concentrations in samples were well below the applicable primary screening criteria. Therefore, the RPDs above acceptable levels were not considered to affect data interpretation. Noted hold time exceedances were primarily for parameters that required re-analysis, with the exception of TSS and TDS at select wells, where analysis of these parameters were overlooked by the laboratory.

Select parameters were detected in 17 of the 34 trip and field blanks collected in 2021. Of the detectable parameters, concentrations of ammonia-N in two samples were greater than five times the DL. The concentrations of these parameters in samples and blanks were well below the applicable screening criteria or the parameter(s) did not have an applicable screening criterion. The detection of parameters in blanks did not affect data interpretation. The laboratory quality control reports were reviewed, and the data are considered reliable. Although continuous water levels could not be obtained from select monitoring wells, manual measurements were collected, and the 2021 data are considered reliable.

SNC·LAVALIN

6 Coal Mountain mine

6.1 Program Deviations

A summary of program deviations from the 2021 monitoring program is provided in Table U.

Table U: Summary of Program Deviations

Quarter	Well ID	Comment
3	CM_MW4-DP and CM_MW6-SH	TOC was not analyzed in 2021. TOC analysis was requested on the COC, but was missed by the laboratory.
2, 3	CM_MW3-DP	Pressure transducers stopped recording.

6.1.1 Shipping and Handling

A summary of shipping and handling issues from the 2021 sampling program is provided in Table V.

Table V: Summary of Shipping and Handling Issues

Qualifier	Quarter	Well ID	Possibly Affected Analytes	Comments
Hold Time Exceedance	1-4	All wells, duplicates and blanks	pH, ORP	Exceeded ALS recommended hold time of 15 minutes prior to sample receipt. Field measurement recommended.

With the exception of pH and ORP, initial hold times were not exceeded for parameters analyzed in 2021. Parameters pH and ORP have a hold time of 15 minutes and measurements are taken in the field. These hold time exceedances did not affect data interpretation as pH and ORP field measurements were analyzed.

Samples collected from CM_MW_AG1A, CM_MW_AG1B, and CM_MW5-SH were identified as being mislabelled in Q1 2021. The laboratory COA CG2100340 has been re-issued with the correct sample IDs.

6.1.2 Duplicate Samples

A total of 68 samples and eight field duplicates collected in 2021 were included in the CMm QA/QC assessment. A summary of samples with RPD values above 20% and concentrations of parameters greater than five times the DL are provided in Table W, below.

Table W: Summary of Relative Percent Difference Values for Duplicate Samples

Quarter	Number of Duplicate Samples Collected	Well ID	Possibly Affected Analytes	RPD Value
1	2	CM_MW1-OB	Turbidity	28%
			Nitrate-N	77%
			Nitrite-N	71%
		CM_MW_AG1B	Turbidity	71%
			Chloride	52%
			Sulphate	55%
			Nitrate-N	47%
2	2	CM_MW1-SH	Bromide	23%
			Sulphate	65%
			Dissolved Iron	33%
		CM_MW2-SH	Nitrate-N	64%
3	2	CM_MW_AG1A	Ammonia-N	35%
		CM_MW8	Chloride	24%
			Sulphate	31%
			Uranium	25%
4	2	CM_MW_AG1B	Turbidity	23%
		CM_MW10	Ammonia-N	22%

Notes:
RPD values greater than 50% are underlined.
All other sample analytes had RPD values below 20%.

Review of the duplicate sample results indicates that calculated RPD for nitrate-N and nitrite-N (Q1 CM_MW1-OB), turbidity, chloride and sulphate (Q1 CM_MW_AH1B), sulphate (Q2, CM_MW1-SH), and nitrate-N (Q2, CM_MW2-SH) were above the acceptable level (50%).

Nitrite-N concentrations were an order of magnitude lower than the applicable chloride dependant primary screening criteria (0.2 mg/L – 10 mg/L), and Nitrate-N concentrations were an order of magnitude lower than the applicable primary screening criteria (10 mg/L). Chloride concentrations were two orders of magnitude lower than the applicable primary screening criteria (100 mg/L) and Sulphate concentrations were an order of magnitude lower than the applicable primary screening criteria (500 mg/L). Based on the concentrations of parameters shown above, the RDP values that were greater than 50% are not inferred to affect interpretation.

Calculated RPDs for the numerous organic, inorganic, and physical parameters analyzed, were otherwise less than 50%. These results indicate low variability in constituent concentrations from sampling and handling.

6.1.3 Field and Trip Blanks

Detections were reported in four of the eight blanks submitted for laboratory analysis in 2021. Concentrations of detectable parameters and laboratory detections limits are provided in Table X, below.

Table X: Summary of Blank Samples with Parameters above Detection Limit

Quarter	Location or Date	Parameter	Value	Detection Limit
Field Blanks				
1	CM_MW_AG1B	None detected	-	-
2	CM_MW1-SH	None detected	-	-
3	CM_MW8	None detected	-	-
4	CM_MW10	None detected	-	-
Trip Blanks				
1	March 5, 2021	Dissolved zinc	2.2 µg/L	1.0 µg/L
2	May 20, 2021	Ammonia-N	0.0460 mg/L	0.0050 mg/L
		TKN	0.064 mg/L	0.050 mg/L
3	July 28, 2021	Ammonia-N	0.0209 mg/L	0.0050 mg/L
		Nitrate-N	0.0518 mg/L	0.0050 mg/L
		Dissolved sodium	0.153 mg/L	0.050 mg/L
		Dissolved zinc	169 µg/L	1.0 µg/L
4	November 3, 2021	Ammonia-N	0.0124 mg/L	0.0050 mg/L
		TKN	0.587 mg/L	0.050 mg/L

Note:
Values greater than five times the RDL are underlined.
Concentrations of dissolved zinc exceeded primary screening criteria in the Q3 trip blank. All other constituents in field and trip blanks were less than the primary screening criteria.

Overall detectable concentrations in the field and trip blanks were within five times the DL with the exception of ammonia-N, nitrate-N and dissolved zinc.

Results for ammonia-N in groundwater samples collected at CMm ranged from the DL (0.005 mg/L) to nearly 200 times the DL (0.981 mg/L). The ammonia-N results may not be representative of formation water quality, since the source of the ammonia-N concentration in the blank sample is not known, and the concentrations in blanks range over the same order of magnitude as the sample results. The blank detections are an order of magnitude lower than the pH dependant applicable primary screening criteria (3.7 – 18 mg/L) and therefore, did not affect data interpretation.

Results for nitrate-N in groundwater samples collected at CMm ranged from the DL (0.005 mg/L) to 720 times the DL (3.60 mg/L). The nitrate-N results may not be representative of formation water quality, since the source of the nitrate-N concentration in the blank sample is not known, and the concentrations in blanks range over the same order of magnitude as the sample results. The blank detections are two orders of magnitude lower than the applicable primary screening criteria (10 mg/L) and therefore, did not affect data interpretation.

Results for TKN in groundwater samples collected at CMm ranged from the DL (0.050 mg/L) to 26 times the DL (1.32 mg/L). The TKN results may not be representative of formation water quality, since the source of the TKN concentration in the blank sample is not known, and the concentrations in blanks range over the same order of magnitude as the sample results. Because there are no applicable primary screening criteria for TKN, the blank detections, did not affect data interpretation.

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Results for dissolved zinc in groundwater samples collected at CMm ranged from the DL (1.0 µg/L) to 64 times the DL (63.9 µg/L). As a result, the dissolved zinc groundwater results may not be representative of formation water quality, since the source of the dissolved zinc concentration in the blank sample is not known, and concentrations in the blanks ranged from the DL (1.0 µg/L) to 169 µg/L and were over the same order of magnitude as the sample results. While the concentration in blanks exceeded the hardness dependant primary screening criteria (75 µg/L – 2,400 µg/L), no sample results exceeded the applicable primary screening criteria, and the blank detection did not affect data interpretation.

Previously, the laboratory investigated the source(s) of parameters above DLs in blanks; however, they did not identify any cross-contamination (SNC-Lavalin, 2019). Elevated concentrations may have been caused by contamination in the field or from sample bottles or preservatives. The parameters above the DLs did not affect data interpretation due to their low concentrations (below primary screening criteria).

6.1.4 Laboratory QA/QC

The detailed results of laboratory QA/QC are included in COAs in Appendix XIII. The quality control reports included in the laboratory COAs were reviewed and are summarized below.

Adjustments to the DLs were made to some parameters in select samples, qualifiers include the following:

- DL raised due to dilution required for high concentration of test analytes;
- DL adjusted due to sample matrix effects (e.g., chemical interference, colour, turbidity);
- DL adjusted for required dilution;
- DL raised due to dilution for high dissolved solids and/or electrical conductivity; and
- DL adjusted due to insufficient sample.

The raised DLs were consistently below the screening standards and as such these detection limit qualifiers did not affect data interpretation.

Results for laboratory QA/QC samples occasionally yielded a series of qualifiers used to flag limitations in the reportability of the QA/QC result. These qualifiers did not to affect data interpretation, and include the following:

- Reported result verified by repeat analysis;
- Ion balance reviewed: imbalance is due to interference or non-measured components;
- Dissolved concentration exceeds total. Results were confirmed by re-analysis; and
- TKN may be biased low due to Nitrate-N interference. Nitrate-N is greater than 10 times TKN.

These notes are not unusual for these analyses considering the chemistry of the samples reflecting mine-influenced groundwater (i.e., select samples have high TDS or nitrate-N concentrations). The results of the laboratory QA/QC were considered acceptable for the purpose of this assessment. A review of the quality assurance portion of the laboratory analytical reports did not identify any additional QA/QC issues.

6.1.5 Field QA/QC

Field parameters and quarterly (semi-annually at CM_MW1-SH/DP) water level measurements were collected from all wells in 2021. Monitoring wells CM_MW4-SH/DP were observed to be under flowing artesian conditions during each quarterly visit. Monitoring wells CM_MW1-OB/SH/DP, CM_MW5-SH/DP and CM_MW_AG1A/B had Leveloggers® installed prior to 2021 and have continuous water levels measured throughout 2021. Monitoring wells CM_MW2-SH, CM_MW3-SH/DP and CM_MW4-SH/DP had Leveloggers® installed in 2021 and have continuous water level measurement for part of 2021.

6.1.6 QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for the analyses conducted in this report. Calculated RPDs for the eight duplicate samples collected were less than 50% with the exception nitrate-N in two samples, nitrite-N in one sample and sulphate in one sample. Hold time exceedances were only identified for pH and ORP. The results reflect low variability for handling and sampling for the program.

The laboratory quality control reports were reviewed and the data are considered reliable. There were no detectable concentrations of parameters in field blanks. Detectable concentrations of parameters in trip blanks were below five times the detection limits, except for ammonia-N, nitrate-N, TKN, and dissolved zinc in separate trip blanks. The concentrations of ammonia-N, nitrate-N, TKN, and dissolved zinc in samples collected in 2021 were well below the applicable screening criteria and therefore, did not affect data interpretation. Field measurements and manual and/or continuous water levels were collected from select CMm wells in 2021 and data are considered reliable.

7 References

Austin, J. (editor). 2016. British Columbia Environmental Laboratory Manual. Environmental Monitoring, Reporting and Economics Section, Knowledge Management Branch, B.C., Ministry of Environment, Victoria, BC.

British Columbia Ministry of Environment (BC MOE). 2013a. Part E Ambient Freshwater and Effluent Sampling. British Columbia Field Sampling Manual. 2013.

British Columbia Ministry of Environment (BC MOE). 2013b. Part A Quality Control and Quality Assurance. British Columbia Field Sampling Manual. 2013.

SNC-Lavalin Inc. (SNC-Lavalin). 2019. 2018 Annual Groundwater Monitoring Report – Fording River Operations. Prepared for Teck Coal Limited. March 28, 2019.

SNC-Lavalin Inc. (SNC-Lavalin). 2020. Regional Groundwater Monitoring Program, Program Update. Prepared for Teck Coal Ltd. December 4, 2020.

Appendix VI

Field Methodology

- Attachments
  1: Teck Coal Standard Practices & Procedures
  2: Analyte List

1 Field Methodology

Water level measurement, sample collection and handling was completed by Teck or others in accordance with the British Columbia Field Sampling Manual (BCFSM) Parts A and E. (BC MOE, 2013a, b) as required in Permit 107517. A consistent general methodology was followed for each location by adhering to Teck's updated Standard Practices and Procedures (SP&Ps) for water level measurements, well purging and groundwater sampling (TC_GW-01, TC_GW-02; Attachment 1). Appropriate well-specific methods were required to account for specific safety concerns, well construction, well type, and variable recharge. During monitoring and sampling events, field observations were recorded, such as weather conditions and any unusual occurrences (i.e., changes in site use or site physical conditions, the condition of the monitoring well and whether repairs are needed, and ponded water in the vicinity of the monitoring well).

1.1 Sampling Frequency

Permit 107517 prescribes a minimum quarterly sampling frequency after well installation, to assess seasonal variability of groundwater conditions, which is consistent with the BC Ministry of Environment & Climate Change Strategy (ENV) Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (ENV, 2016). Monitoring frequency is further reviewed on an annual basis to assess adequacy to address the seasonal variability and to address whether the frequency should be reduced if little to no variability is observed. Overall, unless otherwise recommended, the quarterly monitoring schedule and rationale was as follows:

- Winter (First Quarter): Winter sampling to capture when groundwater levels are nearing their lowest and recharge to groundwater is minimized due to frozen ground.
- Spring (Second Quarter): Sampling during the freshet months to capture when groundwater levels and the extent of groundwater recharge and discharge are maximized.
- Summer (Third Quarter): Sampling during the post freshet months to capture when the groundwater levels are decreasing.
- Fall (Fourth Quarter): Sampling to capture groundwater conditions between the summer and winter sampling events.

1.2 Analyte List

Groundwater was analyzed for select constituents from the core list of general water quality analytes provided in Table 2 of the BC ENV's Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (ENV, 2016). Minimum detection limits for each parameter are suitable for comparison to the screening criteria. The list of recommended constituents, detection limits, and rationale is presented in the 2018 Site-specific Groundwater Monitoring Program (SSGMP) Update reports (SNC-Lavalin, 2019a, b, c; Golder, 2019; SRK, 2018) and provided in Attachment 2. An updated analyte list was provided as part of the 2020 RGMP Update; however, is currently pending approval (SNC-Lavalin, 2020).

Analyses for dissolved metals is specified to prevent misrepresentation of the mobile concentrations of constituents due to increased turbidity, which may occur as the result of sampling techniques, well construction, and/or geological formation (i.e., clay or silt bearing formations). For metals, the dissolved (i.e., filtered samples) component provides the best representation of groundwater transport. Approval for removal of total metals from all of Teck's groundwater sampling programs was received via email to Teck from ENV on November 3, 2016.

The 2018 SSGMP Update recommends analyzing for bicarbonate, carbonate, and hydroxide in place of bicarbonate-, carbonate-, and hydroxide-alkalinity to assist with water-type data interpretation. These parameters are used to characterize water type and direct analysis of these parameters would eliminate the need to convert alkalinity results.

1.3 Sample Handling and Shipment

Samples were handled and shipped in a manner that is consistent with the practices and procedures prescribed in the BCFSM Parts A and E and Teck's SP&Ps TC_GW-01 and TC_GW-02. Samples were submitted to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory for analysis in accordance with the British Columbia Environmental Laboratory Manual (Austin, 2016).

The following was completed as per Teck SP&P's:

- Preservatives and certified clean sample bottles were provided by an accredited laboratory.
- Samples collected for dissolved metals were field-filtered using a syringe and in-line filter.
- Samples that required preservation were preserved in the field.
- Samples were shipped in ice-chilled coolers under chain-of-custody documentation and procedures.

1.4 Groundwater Monitoring and Sampling

As per Teck's SP&P and the BCFSM, groundwater monitoring was generally completed as follows:

- Prior to sample collection, manual water level measurements (i.e., with an electronic water level tape) were measured from each location. In addition to manual water level measurements, the water levels in some wells were continuously monitored with pressure transducers (hereinafter referred to as dataloggers).
- Dataloggers were downloaded each quarter when possible. Prior to sampling or deployment of dataloggers, depth-to-water measurements were collected. Datalogger measurements were collected hourly in order to capture daily fluctuation of water levels. Dataloggers were removed and uploaded following the depth to water measurement. After samples were collected the data logger was re-deployed at the same depth. Any changes in length of cable used were noted.
- Water level data was corrected for atmospheric influences using a barometric logger, which measures atmospheric pressure. Dataloggers were deployed below groundwater level and barometric loggers were deployed above the groundwater level. Both dataloggers and barometric loggers were deployed below the anticipated frost penetration depth to prevent the instrument from freezing.

As per Teck's SP&P and the BCFSM, groundwater purging and sampling was generally completed as follows:

- Water quality monitoring equipment was prepared and calibrated. Sensors were calibrated on a routine basis and the calibration process was documented. If a field measurement was identified out of the expected historical ranges from previous sampling events at the monitoring well, calibration of field probes was re-confirmed.
- Dedicated tubing was installed in each well and a pump was used to draw water to the surface for sample collection. The specific pump type selected for each monitoring well location was determined based on well construction, type, and recharge characteristics. Wells with depth to water less than 7 mbgs were generally purged and sampled following low-flow (0.5 L/min) sampling techniques to minimize sediment entrainment. In cases where depth to water was approximately 7 mbgs or greater, wells were sampled using tubing fitted with a Waterra foot valve or a bladder pump. Wells were purged three well volumes or until field parameters [electrical conductivity (EC), dissolved oxygen (DO), pH, oxidation-reduction potential (ORP), turbidity and temperature] stabilized after three consecutive readings using a YSI flow through cell. Field parameters were recorded once stable, prior to sampling.
- Following purging, a sample was collected at a flow rate of approximately 0.1 L/min using the lowest possible setting for the particular pump. The low-flow rate is intended to minimize the disturbance of entrained sediments mixing within the well and is intended to draw water directly from the formation around the well.
- Groundwater monitoring, purging, and sampling details specific to each Operation are presented in the sections below.

1.5 Fording River Operations

In addition to manual monitoring, 24 monitoring wells were continuously monitored with data loggers. Continuously monitored wells are listed in Table FR-02 (Appendix.VIII).

The specific pump type selected for each monitoring well location is provided in Table FR-02 (Appendix.VIII).

Select wells at FRO require different methods for sampling. Supply wells, (i.e., FR_GH_WELL4 and FR_POTWELLS), have limited access to the wellhead; therefore, samples were collected from a distribution point (i.e., faucet) within the water system or at the sample port at the well head. Samples from FR_POTWELLS are representative of one or more of a number of wells in the water supply system, while FR_GH_WELL4 is representative of a single well. FR_GH_WELL4 (not continuously running) was purged and parameters were monitored to ensure stabilization prior to sampling, while parameters were only measured a single time from FR_POTWELLS (continuously running) prior to sampling.

1.6 Greenhills Operations

Prior to sample collection, manual water level measurements (i.e., with a water level tape) were measured from each location, with the exception of GH_MW-UTC-A, because the well was damaged, and supply wells GH_POTW09, GH_POTW10, GH_POTW15, GH_POTW17, RG_DW-01-03 and RG_DW-01-07 due to having limited access to the wellhead.

In addition to manual monitoring, all wells except for GH_MW-TD, GH_MW-UTC-A, and the supply wells were continuously monitored with data loggers. Supply wells were not continuously monitored due to having limited access to the wellhead.

The specific pump type selected for each monitoring well location is provided in Table GH-02 (Appendix IX. GH_MW-MC-1D/S, GH_MW-MC-2D/S and GH_MW_EF1A/B were purged and sampled using a peristaltic pump and following low-flow (0.5 L/min) sampling techniques to minimize sediment entrainment. The remaining monitoring wells were sampled using a bladder pump.

Select wells at GHO require different methods for sampling (GH_MW-TD and supply wells). Flowing artesian conditions were encountered at GH_MW-TD during installation. Groundwater at this well is collected directly from the discharge spigot using filters and a syringe. Supply wells GH_POTW09, GH_POTW10, GH_POTW15, and GH_POTW17 were sampled from the sample port at the wellhead. Prior to collection of samples, the supply wells were purged and parameters were recorded.

1.7 Line Creek Operations

In addition to manual monitoring, nine wells were continuously monitored with data loggers. These wells are listed in Table LC-02 (Appendix X).

The specific pump type selected for each monitoring well location is provided in Table LC-02 (Appendix X).

Prior to sampling, wells were purged, with the exception of LC_PIZP1105, which was sampled using a bailer. Prior to collection of samples from domestic and supply wells, the tap or valve at the wells was opened for a minimum of five minutes to purge water through the distribution system. The objective of purging was to obtain samples representative of the water source and not a sample influenced by the distribution system.

Purging of monitoring wells was completed using either a bailer, peristaltic pump or bladder pump following low-flow sampling techniques.

1.8 Elkview Operations

In addition to manual monitoring, 37 wells were continuously monitored with data loggers (Table GH-02, Appendix IX).

The specific pump type selected for each monitoring well location is provided in Table GH-02 (Appendix IX). Purging of monitoring wells was completed using either a peristaltic pump, bladder pump or a submersible pump following low-flow sampling techniques.

Prior to sampling, wells were purged with the exception of EV_WF_SW, which was sampled using a HydraSleeve™ (no purge method) due to the deep water level at this well (>130 mbgs). Supply wells were sampled from a distribution point. Prior to collection of samples, the tap or valve at the supply wells was opened for a minimum of five minutes to purge water through the distribution system. The objective of purging was to obtain samples representative of the water source and not a sample influenced by the distribution system.

1.9 Coal Mountain mine

In addition to manual monitoring, 12 wells were continuously monitored with data loggers (Table CM-02, Appendix XII).

Monitoring wells were sampled using three methods: low-flow purging/sampling, artesian flow grab sampling, and no-purge sampling. The specific pump type selected for each monitoring well location is provided in Table CM-02 (Appendix XII).

Low-flow sampling was conducted using dedicated bladder pumps for the majority of wells (Table CM-02, Appendix XII). Low-flow sampling was conducted using a peristaltic pump at CM_MW_AG1A and CM_MW_AG1B. Flow rates were sustained below 0.5 L/min while purging, and samples were collected following stabilization of field parameters.

Grab samples were collected from artesian flow at monitoring wells CM_MW4-SH and CM_MW4-DP. Water discharging from the top of the standpipe was directed into sample bottles.

No-purge sampling was conducted at four monitoring wells (CM_MW1-DP, CM_MW7-SH, CM_MW7-DP, and CM_MW8) using the HydraSleeve™ system. Recovering the sleeve captured a core of water from the standpipe along the well screen interval. The HydraSleeve™ was then returned to the bottom of the standpipe following sampling.

1.10 Regional Drinking Water Program

There is limited access to the wellhead at municipal and private domestic wells sampled as part of the RGMP (RG_DW-01-03, RG_DW-02-20, RG_DW-03-04, RG_DW-03-10); therefore, samples were collected from a distribution point (i.e., faucet) within the water system or at the sample port at the well head. Domestic wells were sampled, where possible, via the sample port used in the initial drinking water evaluation or previous sampling event.

Prior to collection of samples, the tap or valve at the sample location was opened for a minimum of five minutes to purge water through the distribution system. The objective of purging was to obtain samples representative of the water source and not a sample influenced by the distribution system.

Water quality parameters (pH, EC, temperature, ORP, DO, and turbidity) were monitored until stable readings were obtained. Once the stabilized water quality parameters were recorded, the flow was reduced to minimize splashing and samples were collected in laboratory supplied bottles.

2 References

Austin, J. (editor). 2016. British Columbia Environmental Laboratory Manual. Environmental Monitoring, Reporting and Economics Section, Knowledge Management Branch, B.C., Ministry of Environment, Victoria, BC.

British Columbia Ministry of Environment (BC MOE). 2016. Technical Guidance 6: Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators. Technical Guidance for Environmental Management Act Applications, Version 2.0, June 2016.

British Columbia Ministry of Environment (BC MOE). 2013a. Part A Quality Control and Quality Assurance. British Columbia Field Sampling Manual. 2013.

British Columbia Ministry of Environment (BC MOE). 2013b. Part E Ambient Freshwater and Effluent Sampling. British Columbia Field Sampling Manual. 2013.

SNC-Lavalin Inc. 2020. Regional Groundwater Monitoring Program, Program Update. Prepared for Teck Coal Ltd. December 4, 2020

Attachment 1: Teck Coal Standard Practices & Procedures

MEASUREMENT OF WATER TABLE ELEVATION IN WELLS

Teck Coal Ltd. utilizes a system in which Standard Practices and Procedures are developed, implemented and maintained. This helps ensure that safety and environmental risks associated with various work tasks are identified, mitigated and managed.

1.0 PURPOSE AND SCOPE

This document outlines the procedure which will be used by personnel for measuring water depth in wells, observation wells, and piezometers.

2.0 RESPONSIBILITIES

Depending on the operation, field monitoring activities and documentation may be carried out by an Environmental Officer, Environmental Technician (not all operations have this position), or a designate, such as an Environmental Co-op Student.

The Environmental Officer, Technician, or designate is responsible for:

- Measuring the depth to groundwater in a structure (well, observation well, piezometer)

3.0 BACKGROUND

Depth to groundwater surface is measured using an electric water level meter (such as Solinst Model No. 101 or equivalent). A light on the water level meter illuminates and/or an audible alarm sounds when the weighted probe tip contacts the water surface in the well and completes an electronic circuit. The measured depth to water is determined to within 0.01 meter by noting the point on the probe cable that corresponds to the measuring point (MP) at the top of the well/piezometer casing at the initial point of contact.

4.0 PROCEDURES

The following steps are necessary to collect water level measurements:

1. Check the operation of the meter by turning on the indicator switch and pressing the test button.

2. Holding the water level indicator above the well casing, lower the cable gradually into the well or piezometer until the indicator contacts the water surface. The contact with water surface is indicated by the buzzer sounding and/or illumination of the indicator light. At this point, stop lowering the cable.

3. Note the point on the graduated cable that corresponds to the MP at the top of the casing when the electronic circuit is first completed. The MP should be the inner casing and not the outer casing that is protecting the well. If the inner casing cannot be reached and the outer casing is used as the MP, then this must be recorded in the datasheet. If necessary, grasp tape with thumb and index finger exactly at the measuring point marked at the top of the well casing. Pull tape out of well slowly and read measurement.

4. Record the depth to the water surface to the nearest 0.01 m.

5. Draw the cable about 0.25 above the surface of the water, then lower it and repeat Steps 2 through 4. If these two readings differ by more than 0.02 m, repeat until the measured readings stabilize. Measurements should always be taken as the indicator is lowered into the well, not as it is raised.

5.0 DEVIATION FROM PROCEDURE

Adherence to this procedure will help to ensure that depth to water is measured properly, can be consistently repeated, and provides accurate data for measurement of water table elevation. Deviation from this procedure may result in improper measurement of water depth and inaccurate data being recorded.

6.0 KEY DOCUMENTS/TOOLS/REFERENCES

- Teck. 2012. Environment, Health, Safety and Community Management Standards. July.
    - Standard 4 – Water, Ecosystems and Biodiversity
    - Standard 13 – Monitoring – Measurement, Inspection and Audit
    - Standard 20 – Documents and Records

MONITORING WELL PURGING AND GROUNDWATER SAMPLING

Teck Coal Ltd. utilizes a system in which Standard Practices and Procedures are developed, implemented and maintained. This helps ensure that safety and environmental risks associated with various work tasks are identified, mitigated and managed.

1.0 PURPOSE AND SCOPE

This document outlines the procedure which will be used by Teck Coal for purging, monitoring and sampling groundwater from monitoring wells. This is applicable to more routine monitoring programs such as compliance monitoring, and not necessarily to research and development programs, which may require far more detailed water chemistry.

2.0 RESPONSIBILITIES

Depending on the operation, field monitoring activities and documentation may be carried out by an Environmental Officer, Environmental Technician (not all operations have this position), or a designate, such as an Environmental Co-op Student.

The Environmental Officer, Technician, or designate is responsible for:

- Purging the well as possible prior to performing any monitoring or sampling activities.
- Collecting the water sample(s)

3.0 BACKGROUND

It is recommended that a low-flow pump is used to sample groundwater where possible. This is not always a feasible or practical methodology. Having to use a pump, power source, and associated equipment can be a major hindrance, especially for sampling locations which may be remote and/or off of roadways or good pathways.

Manual methods to purge and collect groundwater include use of bailers or plastic tubing with foot valves to allow water to be pumped one-way by hand. Dedicated plastic tubing with foot valves is inexpensive, effective, easy to use and can be set up so that each monitoring well has its own dedicated tubing. This would eliminate potential for cross-contamination between wells. Bailers can also be used for purging and sampling, and are inexpensive and very portable. If bailers are used, care must be taken to prevent contamination from one well to the next. Either bailers need to be disposable (single use), or carefully cleaned and decontaminated between sampling locations.

4.0 PROCEDURES

Actively producing well

If a dewatering well has been installed and is actively being used to lower or control the water table, then samples can likely be collected at the surface. Either sample at the discharge point of the pump (hard or soft line) or from a tap installed at the well head.

Monitoring Well or Piezometer

A monitoring well or piezometer is a passive structure (no permanent pump installed) and so water must be brought to the surface manually or by use of a low flow pump.

Water can be brought to the surface for measurement and sample collection using a low flow pump, plastic tubing and one-way foot valve, or bailer.

Preparation

Preparation includes inspecting the condition of the well, monitoring health and safety conditions, and calibrating and decontaminating equipment. General procedures are presented below:

1. Make sure area around well head is clean and free of debris. If necessary, place a plastic drop cloth around the well head to prevent sampling equipment from coming into contact with the ground surface.
2. Inspect condition of well (e.g., well locked, loose-fitting cap, measuring point well marked, surface casing disturbed, well casing straight, condition of concrete pad). Indicate condition of well on the datasheet.
3. All equipment should be decontaminated before and after introduction to each well. Protective latex or nitrile gloves should be worn during possible water-contact or

equipment-contact activities. At a minimum, gloves should be changed between each well or when introduction of potential contaminants to the well is possible.

4. Measure water level using an electronic water level meter as described in SP&P TC-GW-01. Sounding the bottom of the well using a weighted tape (i.e., for well casing volume calculations) before sampling is not recommended to avoid resuspension of settled solids. If possible, determine the elevation of the well bottom from drilling records.

5. Calculate the well casing volume as follows:

$$\text{well casing volume (L)} = \pi\,(r^2)(h)(1000\ \text{L/m}^3)$$

where h = height of water in the well casing (i.e., depth to bottom of the well minus depth to water (in m), and r = radius of well casing (in m).

6. Calibrate water quality meters for measuring field parameters as appropriate. At a minimum, temperature, pH, specific conductance, and turbidity measurements should be collected during purging and before sampling. Record equipment calibration and maintenance in the equipment log sheets. Decontaminate meters between wells by rinsing with distilled water.

Well Purging

Where reasonably practicable, it is recommended that 3-4 purge volumes of water is removed from the well. Monitoring wells are purged before groundwater samples are collected for analyses. The purpose of well purging is to remove stagnant groundwater from the well (which has interacted with air in the well casing).

The well must then be allowed to recharge prior to sampling. In some cases, such as encountering a very low production and/or essentially dry well, it is not feasible to purge 3-4 volumes of water. If this situation is encountered, be sure to keep good records of the field conditions experienced, the volume of water purged, and notes detailing why 3-4 purge volumes are not possible. Also record any visual observations of the water purged, such as color, turbidity, odor, presence of invertebrates (eg. mayfly larva) etc., which may provide useful information about the state of the well.

Field parameters (i.e., at a minimum pH, temperature and specific conductance) are measured during the purging process (See SOP TC-GW-03).
Purging is assumed to be complete when the readings of these parameters have stabilized.

It is recommended that purging takes place the day before sampling. The well needs to have the stagnant water removed and then recharge. However, recharge water should not sit for too long prior to sampling, as it can react again with air in the casing and become unrepresentative of the groundwater in the area.

1. Lower the pump intake or intake tubing (as applicable) into the water column. The pump intake should be placed at the middle or slightly above the middle of the screened interval in confined aquifers. Placement of the pump intake near the top of the water column is recommended for unconfined aquifers screened across the water table.
2. Conduct purging at a rate that is lower than used to develop the well and that will minimize drawdown in the well. Recommended purge rates for low-flow sampling are generally less than 0.5 L/min, or a rate that results in minimal (i.e., less than 0.3 m) drawdown in the well. Actual purge rates will vary on the basis of aquifer material, well construction, and purging equipment.
3. Continue purging the well until field parameters have stabilized. Field parameters are stable when three successive readings are within ± 0.1 for pH, ±3 percent for conductivity, ± 0.2 ºC for temperature, ± 10 mV for redox potential and ± 10 percent for turbidity and dissolved oxygen.
4. After the field parameters have stabilized, reduce the pump rate to approximately 0.1 L/min or the lowest possible flow setting for the particular pump. Pump should be operated at a rate less than 0.1 L/min when collecting samples for VOC analysis.
5. In the event that even very low purge rates result in emptying of the well, groundwater samples for laboratory analyses should be collected as soon as sufficient groundwater accumulates in the well, regardless of field parameters or total volume purged.

Groundwater Sampling

- Groundwater sampling is conducted after proper purging of the well.
- Where possible, groundwater samples for analyses should be collected directly from the pump discharge at the lowest rate possible to minimize cross contamination, suspension of solids, and aeration of the sample.
- Both bladder pumps and submersible pumps are suitable for purging and sampling of all groundwater parameters. A bailer may be used to collect groundwater samples for laboratory

analyses of volatile organic compounds; however, the peristaltic pump is suitable for collection of semivolatile organic compounds (SVOCs), metals, and general chemistry parameters.

- Bailers are not recommended for purging or sampling of groundwater monitoring wells because they may agitate solids in and next to the well.

1. Groundwater samples should be introduced directly from the pump discharge into the proper sample container and filled to capacity.
2. In general, groundwater samples collected for multiple compounds should be collected in the following order:
   - Volatile organic compounds (VOCs)
   - Dissolved gasses and total organic carbon (TOC)
   - SVOCs (such as polycyclic aromatic hydrocarbons)
   - Metals and cyanide
   - Major water quality cations and anions
   - Radionuclides.
3. In some cases, field filtration may be required (e.g., metals). Filtered water should be introduced directly into the appropriate sample container. If samples cannot be filtered in the field, do not preserve them. The receiving lab can filter then preserve.
4. If applicable, remove the pump or tubing from the well. Close and lock the well. Decontaminate the sampling equipment.

5.0 DEVIATION FROM PROCEDURE

Adherence to this procedure will ensure that wells are purged and sampled correctly. Deviation from this procedure may result in improper collection of samples which yield poor or incorrect data, or to unnecessary health and safety risk to the person(s) collecting the sample(s).

6.0 KEY DOCUMENTS/TOOLS/REFERENCES

- British Columbia. 2003. British Columbia field sampling manual for continuous monitoring and the collection of air, air-emission, water, wastewater, soil, sediment and biological samples. Province of British Columbia, Ministry of Water, Land and Air Protection. January.
- Teck. 2012. Environment, Health, Safety and Community Management Standards. July.
    - Standard 4 – Water, Ecosystems and Biodiversity
    - Standard 13 – Monitoring – Measurement, Inspection and Audit
    - Standard 20 – Documents and Records
- U.S. EPA. 1993. Ground water sampling—a workshop summary. EPA/600/R-94/205. U.S. Environmental Protection Agency, Robert S. Kerr Environmental Research Laboratory, Ada, OK.

Attachment 2: Table – Analyte List

Attachment 2: Analyte List

	Units
Field Parameters	
Temperature	ºC
pH	pH unit
Dissolved Oxygen	mg/L
Specific Conductance	µS/cm
Oxidation-Reduction Potential (ORP)	mV
Physical Parameters (laboratory)	
pH	pH unit
Hardness (as CaCO3)	mg/L
Specific Conductance	µS/cm
Total Suspended Solids	mg/L
Total Dissolved Solids	mg/L
Turbidity	NTU
Alkalinity, total (as $CaCO_3$)	mg/L
Bicarbonate	mg/L
Carbonate	mg/L
Hydroxide	mg/L
Ammonia (as N)	mg/L
Bromide	mg/L
Chloride	mg/L
Fluoride	mg/L
Nitrate (as N)*	mg/L
Nitrite (as N)	mg/L
Total Kjeldhal Nitrogen	mg/L
Ortho-Phosphate	mg/L
Total Phosphorus	mg/L
Sulphate (SO_4)*	mg/L
Dissolved Metals	
Aluminum	µg/L
Antimony	µg/L
Arsenic	µg/L
Barium	µg/L
Beryllium	µg/L
Bismuth	µg/L
Boron	µg/L
Cadmium*	µg/L
Calcium	µg/L
Chromium	µg/L
Cobalt	µg/L
Copper	µg/L
Iron	µg/L
Lead	µg/L
Lithium	µg/L
Magnesium	µg/L
Manganese	µg/L
Mercury	µg/L
Molybdenum	µg/L
Nickel	µg/L
Potassium	µg/L
Selenium*	µg/L
Silver	µg/L
Sodium	µg/L
Strontium	µg/L
Thallium	µg/L
Tin	µg/L
Titanium	µg/L
Uranium	µg/L
Vanadium	µg/L
Zinc	µg/L
Organics	
Total Organic Carbon	-
Dissolved Organic Carbon	-

BOLD = Included in the Elk Valley Drinking Water Sampling Plan

Underlined = Standards are available in the CSR for AW, IW, or LW; BC WQG AW; or, Guidelines for Canadian Drinking Water Quality DW

Italics = Constituents included in the TG6 "Core List of General Water Quality Analytes and Field Measurements"

* = Constituents of interest (CI)

TG6 = *Technical Guidance 6 Water and Air Baseline Monitoring Document for Mine Proponents and Operators* (BC MoE, 2012).

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