

Water Stewardship

Water is a vital global resource for all ecosystems and for a growing human population. Readily accessible fresh water, which accounts for less than 1% of the world's water supply, is increasingly under pressure. Since 2015, the United Nation's Sustainable Development Goal 6 on clean water and sanitation has motivated countries and organizations alike to work to improve the management, protection and restoration of the world's fresh water ecosystem in an integrated way.⁴

Mining companies demonstrate leadership in water stewardship by using water efficiently, maintaining water quality, and engaging with communities to collaboratively manage a shared water resource throughout the mining life cycle. Leadership in water stewardship is a priority for Teck. Communities with whom we share watersheds care about access to sufficient quantities of clean water for health, quality of life, economic well-being and the preservation of the local environment, and we share those values. That is why we are working to protect water quality, improve water use efficiency and engage with communities of interest on watershed management.

In 2018, Teck helped advance the dialogue on water stewardship in mining by working with the International Council on Mining

and Metals (ICMM) on best practices and by implementing our Water Policy through a new Water Governance framework at our operations. We also released two new water targets, focused on reducing the use of fresh water in water-stressed regions and reducing significant water-related incidents.

We also made progress in our implementation of the Elk Valley Water Quality Plan to maintain the health of the watershed where a number of steelmaking coal operations are located. This work included upgrading the West Line Creek Active Water Treatment Facility and advancing construction of a second active water treatment facility at our Fording River Operations, and advancing a new method of water treatment using saturated rock fills.

⁴ [Why does water matter?](#) UN Environment.

Our Performance in Water Stewardship in 2018

Our Targets and Commitments: Our vision is to contribute to the balance between the social, economic, recreational and cultural benefits of water resources, within ecologically sustainable limits. The following table summarizes our performance against our 2020 sustainability goals for water.

2020 Sustainability Strategy Goal	Status	Summary of Progress in 2018
Contribute to watershed management in water-stressed regions through water use efficiency projects, use of alternative water sources, water quality improvement measures and capacity building.	On track	Quebrada Blanca and Carmen de Andacollo operations worked towards implementing a prioritized list of water projects to meet Teck's fresh water use efficiency target. Highland Valley Copper, Red Dog and Carmen de Andacollo operations made progress towards their watershed-based management plans in collaboration with communities of interest.
Increase our understanding of groundwater and proactively assess groundwater risks.	On track	Highland Valley Copper, Red Dog and Carmen de Andacollo operations assessed groundwater data and knowledge gaps, defined groundwater modelling scope and requirements, and advanced work on conceptual and numerical models.
Collaborate in developing innovative water technology and practice.	On track	Successfully developed an <i>in situ</i> method to remove selenium and nitrate from mine-impacted water through our new saturated rock fill facility.

2018 Key Performance Indicators

2018: 291%	2018: 0.48	2018: 0.51
2017: 399%	2017: 0.28	2017: 0.42
Indicator Water reused and recycled, as a percentage of new water use at mining operations	Indicator New water use intensity per tonne of raw coal processed at coal operations (m ³)	Indicator New water use intensity per tonne of ore processed at milling and flotation operations (m ³)

Our Approach to Water Stewardship

We have long recognized that water stewardship is an important sustainability challenge and a significant opportunity. In 2018, we refined our approach to water stewardship to deepen our focus on water, drive measurable improvements at our operations and embed water stewardship into all of our activities. The objectives of this work are to track and improve our water quality performance and water use efficiency, and minimize our water costs so we can respond better to watershed needs.

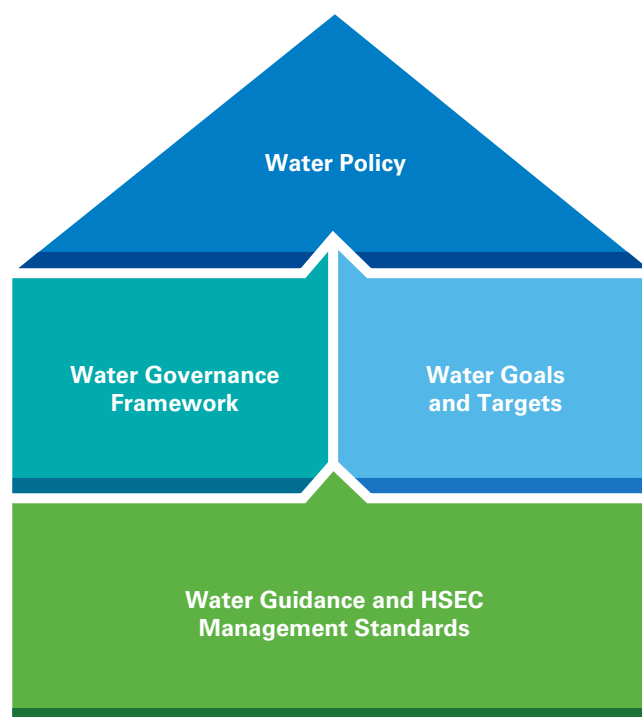
As illustrated in Figure 9, our approach to water stewardship is embodied in our Water Policy and is implemented through our Water Governance framework, which defines how we govern and improve our current water performance. In support of our Water Governance framework, we have developed additional water guidance and continue to rely on our Health, Safety, Environment and Community (HSEC) Management Standards.

Our new targets for water, established in 2018, are to reduce the consumption of fresh water at our Chilean operations by 15% by 2020 and to achieve zero significant water-related incidents each year.

This year, we met our target of zero significant water-related incidents. We also started implementing water projects at our Chilean operations intended to reduce fresh water use to help us achieve our 2020 target.

The Water Governance framework and water goals and targets provide the mechanisms to realize the commitments in our [Water Policy](#), which includes our commitment to apply consistently strong and transparent water governance, to manage water at operations efficiently and effectively, and to collaborate to achieve responsible and sustainable water use.

Figure 9: Our Approach to Water Stewardship

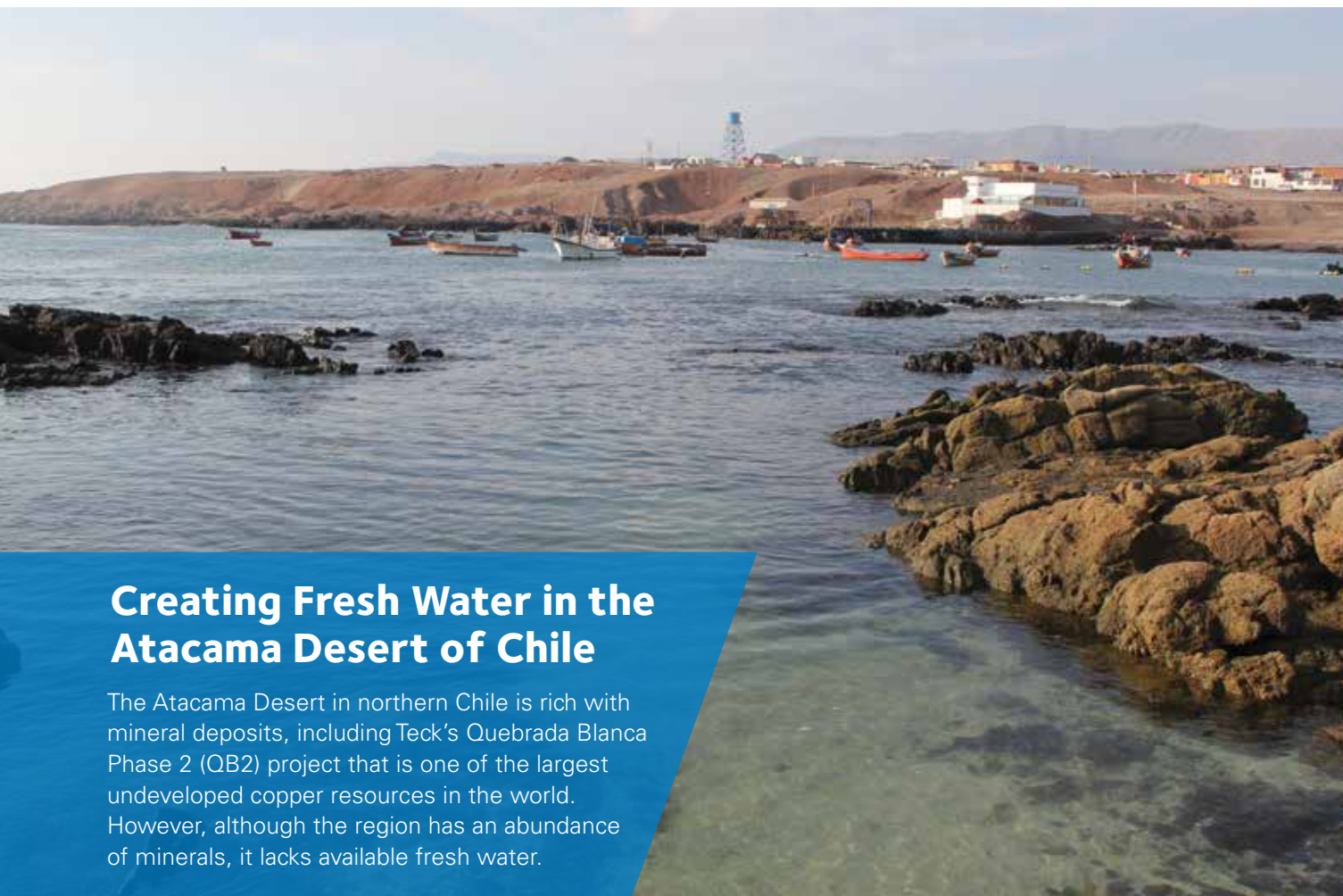


Protecting Water Quality

Throughout the year, we continued to monitor water quality and implemented controls to mitigate risks, including the implementation of the Elk Valley Water Quality Plan. In addition, as part of our sustainability strategy water goals, our Highland Valley Copper, Red Dog and Carmen de Andacollo operations continued development of site-wide groundwater models. At our Quebrada Blanca Operations, we continued construction of a multi-layer groundwater interception system, which will remain in place for Quebrada Blanca Phase 2 (QB2).

Managing Water Quality in the Elk Valley

We continue to implement water quality management measures to meet the objectives of the Elk Valley Water Quality Plan (EVWQP), which was approved in 2014 by the B.C. Minister of Environment. The goal of the EVWQP is to stabilize and reverse the increasing trend of mine-related constituents, and to ensure the health of the watershed is maintained while allowing for continued sustainable mining in the region where five of our steelmaking coal operations are located. The plan establishes short-, medium- and long-term



Creating Fresh Water in the Atacama Desert of Chile

The Atacama Desert in northern Chile is rich with mineral deposits, including Teck's Quebrada Blanca Phase 2 (QB2) project that is one of the largest undeveloped copper resources in the world. However, although the region has an abundance of minerals, it lacks available fresh water.

The Atacama Desert is one of the driest places on earth and fresh water, which is critical to the mining process, is a vital resource to be used sparingly. To preserve the availability of fresh water for others, as part of the QB2 project we will be building a desalination plant to enable the use of desalinated seawater in place of fresh water for the mining process.

"Given our proximity to the Pacific Ocean, we wanted a way to use seawater for the mining process at QB2 so we could protect the region's supply of fresh water and support our sustainability commitments," said Francisco Raynaud, Port Manager of Teck's QB2 project. "To achieve this, we have partnered with [IDE Technologies](#) from Israel, one of the most prominent desalination companies in the world, which builds plants to the scale that QB2 requires."

The Desalination Process

QB2's desalination plant will be the first large-scale use of desalinated seawater for mining in Chile's Tarapacá Region. The desalination process works through reverse osmosis, where a semi-permeable membrane is used to remove ions, molecules and larger particles to create fresh water.

Seawater will be pumped to the plant and purified, then pumped by five booster stations up 4,300 metres of altitude to the concentrator plant where it will be needed. The leftover concentrated saltwater (brine) is pumped back into the Pacific Ocean at a depth of 40 metres (750 metres from the coast) to ensure there is enough dilution to be compatible with the ocean's ecosystem.

When operating at full capacity, the plant will purify about 1,300 litres per second, which is enough to fill an Olympic-size pool in 40 seconds. Suction pipes used to collect seawater are almost a metre in diameter and located nearly 250 metres from land at a depth of 30 metres and are designed to ensure full compliance with coastal protection requirements.

About Quebrada Blanca Phase 2

Located 240 kilometres southeast of Iquique, QB2 will be a premier asset, with low operating costs, an initial mine life of 28 years and significant potential for further growth. First copper production is currently planned for the second half of 2021. [Learn more about QB2.](#)

water quality targets, which are protective of the environment and human health, for selenium, nitrate, sulphate and cadmium, as well as a plan to manage calcite formation.

Water Treatment Facilities

The EVWQP includes design and construction of several active water treatment facilities. The first of these facilities, the West Line Creek Active Water Treatment Facility, has completed recommissioning following treatment process improvements that were required to address the forms of selenium remaining in the treated water discharge and is now ramping up to a full treatment capacity of 7.5 million litres of water per day. In 2018 we started construction of our second water treatment facility, the Fording River South Active Water Treatment Facility, which is expected to be operational in 2020 with a full treatment capacity of 20 million litres of water per day.

We are also developing a new method of water treatment within saturated rock fills (SRFs); read more in the Innovation Highlight below. We currently have more than 20 R&D projects underway related to water quality in the Elk Valley, including projects to better control release of water quality constituents at source and to develop new water treatment methods.

Monitoring Aquatic Health

Teck conducts ongoing aquatic health studies and monitoring in the Elk Valley. Making this information broadly available helps advance community knowledge and understanding, and can accelerate the pace of scientific progress and innovation. Our monitoring activities include:

- **Regular water quality monitoring** at more than 100 surface water stations
- **Quarterly regional groundwater monitoring** at 37 wells

- **Monitoring of aquatic health** through our Regional Aquatic Effects Monitoring Program and Local Aquatic Effects Monitoring Programs, which includes monitoring water quality, sediment quality and calcite; periphyton (algae); benthic invertebrates (bugs); and fish. In some cases, monitoring also includes birds and amphibians.

Annual reports about this monitoring are prepared by professional scientists and represent the knowledge developed since the Elk Valley Water Quality Plan was approved in 2014. The reports have been reviewed by the Environmental Monitoring Committee (EMC), a group that provides science-based and Ktunaxa traditional knowledge advice and input to Teck and the B.C. Ministry of Environment and Climate Change Strategy regarding monitoring designs and reports in the Elk Valley. The committee includes representatives from the Ministry of Environment and Climate Change Strategy; Ministry of Energy, Mines and Petroleum Resources; Ktunaxa Nation Council; Interior Health Authority; and Teck, as well as an independent scientist.

Teck is focused on continued monitoring and research, and on taking the necessary steps to implement the Elk Valley Water Quality Plan. Read the [2018 Environmental Monitoring Committee Report](#) for more information.

Community Engagement on Water

Access to clean and sufficient water by users in our areas of influence is important to us and to our stakeholders. When implementing our water management practices, we consider and engage with other water users in the watersheds where we operate. In 2018, we held two open houses in the Elk Valley for members of the community to learn more about our work on water quality in the watershed, as well as new technologies being implemented to improve water performance.

Innovation Highlight – Using Saturated Rock Fill to Improve Water Quality



Teck's research into water quality management has reached a major breakthrough with the successful development of an *in situ* method to remove selenium and nitrate from mine-impacted water. The saturated rock fill (SRF) facility built at Teck's Elkview Operations can treat up to 10 million litres per day using naturally occurring biological processes.

[Read more in this case study.](#)



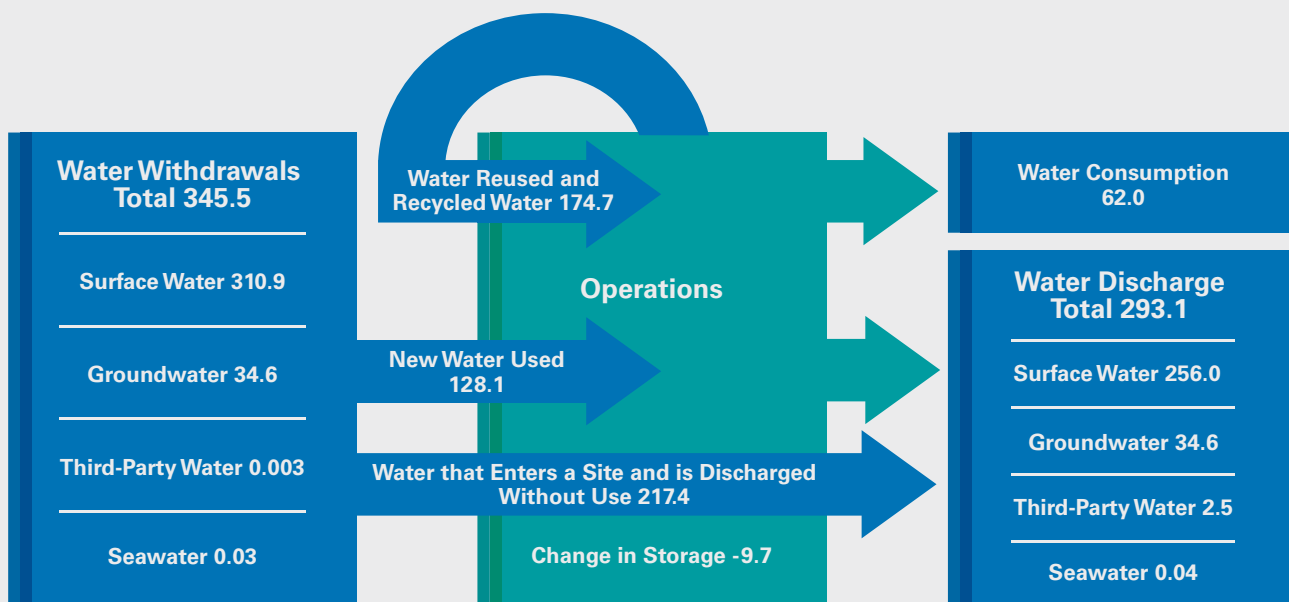
Improving Water Efficiency

We track water data for all our operations using site-wide water balances.⁵ The company-wide water balance is complex, due to the variability of natural factors such as rainfall, snowmelt, and the diversity of the climates and geological conditions where our operations are located. Understanding our water balance is key to improve water management practices and to enable better decision-making.

In 2018, we updated our water data collection and reporting to align with the ICMM's [Practical guide to consistent water reporting](#). Our detailed water data is provided in our [2018 Sustainability Performance Data spreadsheet](#).

Key water performance metrics include total water use, water reused and water recycled. In 2018, 58% of our total water use was from reused/recycled water. Water reused and recycled, expressed as a percentage of new water use, was 136% across the company. At our mining operations only (this excludes Trail Operations) this was 291%— which means reusing the same water approximately three times on average before returning that water to the environment. Our 2018 water performance was primarily affected by a wetter than average year at Highland Valley Copper operations that resulted in a significant volume of new water added into the process water circuit, a dredging campaign at our Fording River Operations that used additional new water, and improvements in accounting for new water at Red Dog Operations.

Figure 10: Company-Wide Water Balance (million m³)



Water withdrawal: water that is received, extracted or managed (collected and conveyed through an operation's infrastructure) by operation and by type (surface water, groundwater, seawater or third-party water); excludes water diverted away from operational areas

Water discharge: water removed from an operation and returned to the environment or a third party (surface water, groundwater, seawater or third party)

Water consumption: water that is no longer available for use, including evaporated water, water entrained in products or tailings, and other operational losses

Water use: water used for mining or operational processes, such as for mineral processing, cooling, dust control or truck washing. Water use includes:

- New water: water that is used for the first time
- Reused water: water that is reused without being treated between uses
- Recycled water: water that is reused and is treated prior to reuse

Water that enters a site and is discharged without use: water that enters a site, is not used in any processes and is released to the receiving environment

Change of storage: the change in the stored water volume at our operations – the difference between water inputs and water outputs. A positive number indicates water accumulation and a negative number indicates decreased storage

Types of Water

Surface water: water from precipitation and runoff that is not diverted around the operations; includes water inputs from surface water bodies that may be located within our operation's boundaries

Groundwater: water from beneath the earth's surface that collects or flows in the porous spaces in soil and rock that is not diverted around the operations

Third-party sources: water supplied by an entity external to the operation, such as from a municipality. We do not use wastewater from other organizations

Seawater: water obtained from a sea or ocean

Table 10: Water Used, Reused and Recycled

	2018	2017	2016	2015
Total water use (m ³) ⁽¹⁾	302,835,000	291,930,000	285,268,000	285,864,000
New water use (m ³)	128,146,000	115,368,000	117,930,000	115,466,000
Water reused/recycled (m ³) ⁽¹⁾	174,688,000	176,563,000	167,338,000	170,371,000
Reused/recycled as % of new water use ^{(1),(2)}	136%	153%	142%	148%

(1) The figures for 2017 have been restated due to improvements in some operations' water accounting.

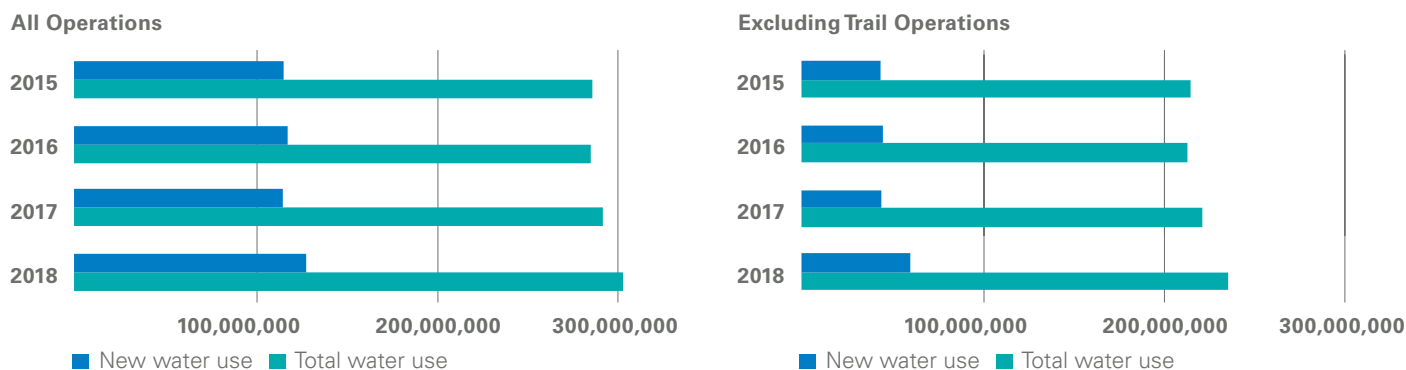
(2) The percentage calculation is based on the total volume of water reused/recycled divided by the total volume of new water used.

Trail Operations accounts for 23% of our total water use and 53% of our new water use. Almost all of the water used at our Trail Operations is for cooling purposes, meaning that it does not come into contact with chemicals or reagents, and the only change it undergoes is a slight increase in temperature before being returned to the environment within regulatory-approved

conditions. We track this water separately from the data for our mining operations.

Figure 11 illustrates the new water use and total water use trends over the past four years. We continue to focus on improving our practices and increasing our reuse/recycle water use to meet our water needs.

Figure 11: Total and New Water Use (m³)



Water Intensity

We benchmark our water performance on the basis of a new water use intensity metric, as shown in Tables 11 and 12. Our new water use intensity is defined as the annual volume of new water used per unit of material processed by our steelmaking coal operations and by our milling and flotation operations. These water metrics allow us to more consistently evaluate our water use performance, independent of variations in annual precipitation and ore grades. In addition, these metrics allow us to make informed water management decisions and prioritize improvement projects at our operations.

Our 2018 new water use intensity metrics showed that our steelmaking coal operations increased relative to 2017, and that

our base metal milling and flotation operations also increased relative to 2017. The increase in new water use intensity at our coal operations and at our milling and flotation operations is primarily due to additional fresh water inputs that occurred at multiple operations through use of different water supply sources or above average precipitation onto mine facilities.

For Quebrada Blanca and Trail operations, an intensity metric for new water use is not meaningful because the volume of new water used at both operations is largely independent of the quantity of material processed or produced. Therefore, we assess our water performance at these operations based on the absolute amount of new water used.

Table 11: New Water Use Intensity at Coal Operations

Coal Operations ⁽¹⁾	2018	2017	2016	2015
New water use (million m ³)	18.8	11.3	15.5	14.9
Raw coal processed (tonnes)	39,398,000	40,706,000	38,871,000	35,302,000
New water use intensity (m³/tonne)	0.48	0.28	0.40	0.42

(1) Includes Cardinal River, Coal Mountain, Elkview, Fording River, Greenhills and Line Creek operations.

Table 12: New Water Use Intensity at Milling and Flotation Operations

Milling and Flotation Operations ⁽¹⁾	2018	2017	2016	2015
New water use (million m ³)	38.8	33.1	28.0	27.2
Ore processed (tonnes)	75,349,000	74,356,000	72,262,000	69,186,000
New water use intensity (m³/tonne)	0.51	0.45	0.39	0.39

(1) Includes Red Dog, Pend Oreille, Highland Valley Copper and Carmen de Andacollo operations.

Table 13: New Water Use at Quebrada Blanca and Trail Operations (million m³)

	2018	2017	2016	2015
Quebrada Blanca (water used primarily in metal leaching process)	2.4	1.7	1.6	1.7
Trail (water used primarily for cooling)	68.1	71.1	72.8	71.7

Outlook for Water Stewardship

In 2019, we will continue the work of implementing our approach to water stewardship, with a focus on achieving our water goals and two water targets: reducing fresh water consumption at our Chilean operations and achieving zero significant water-related incidents across Teck. We will also continue to implement the Elk Valley Water Quality Plan by advancing construction of an active water treatment facility at our Fording River Operations. In addition, we will continue with our research on saturated rock fill technology to better understand the capabilities and limitations of this technology and how it can complement our approach to water management company-wide. Additionally, we will advance construction of the desalination plant for our Quebrada Blanca Phase 2 project.

GRI Indicators and Topic Boundary

303-103, 303-1, 303-3, 306-103, 306-1

This topic is considered most material by our shareholders, employees, local communities, regulators and society in the context of Teck's operations.

How Does Teck Manage This Topic?

Information about how we steward water, including relevant policies, management practices and systems is [available for download on our website](#).