Material Topic

Water Management

What is in this Topic?

Management approach and performance related to water use, selection of water sources, and preserving water quality, in the context of balancing the needs of multiple local water users and global water concerns.

Performance Highlights

4.5

The approximate number of times water was reused and recycled at our operations in 2015.

Learn More

World Economic Forum, Global Agenda 2015: Increasing Water Stress

Why was Water Management a Material Topic in 2015?

Global Context: Water is a precious shared resource with significant social, cultural, environmental and economic value and it is fundamental for healthy, functional ecosystems. Global concerns regarding water availability and quality continue to increase. For example, in 2015 the World Economic Forum cited "increasing water stress" as one of the top issues in the coming 12 to 18 months. Ensuring that water is fairly allocated is an important issue, particularly in areas of water scarcity or where water quality can be negatively affected by human activity.

Industry Context

In the mining industry, water management has emerged as a critical issue because mining typically uses large volumes of water and can potentially affect water quality, which in turn can impact other water users. As a result, the industry can affect, and is affected by, issues of water availability and quality. Mine operations can demonstrate leadership in water stewardship by using water efficiently, maintaining water quality, and engaging with communities to collaboratively manage a shared water resource through the mining life cycle.

Many tailings facilities involve the management of large quantities of water and other mine wastes and, given the major tailings dam failures at other companies in Canada in 2014 and Brazil in 2015, tailings management is very topical. In response to these and similar events, the industry is working collaboratively to review and improve standards and critical controls for tailings storage that include practices for managing water. See more detail on the Tailings and Mine Waste Management material topic on page 91.

Teck Context

Communities near our operations or with whom we share watersheds care about access to sufficient quantities of clean water for physical and spiritual health, quality of life, economic well-being and the maintenance of the local environment. We share those values and our employees live in those same communities. Without adequate access to water, our operations could not function. Likewise, responsible water management is fundamental to maintaining the trust of our communities of interest in areas where we operate.

Pictured above: Dan Charest, Environmental Officer, tests water at Greenhills Operations

How Does Teck Manage Water?

We are working to be a leader in water stewardship by moving beyond compliance and towards collaborative water management practices that focus on sustaining and restoring water resources. Our approach to water management is based on three key elements: protecting water quality, collaborating with our communities of interest to ensure the fair allocation of water, and improving water use efficiency. Our commitment to water stewardship is embodied in our HSEC Management Standards and our sustainability strategy. At a global level, Teck has endorsed the UN Global Compact CEO Water Mandate. This means we have a commitment to adopt and implement the Mandate's strategic framework and its six core elements for water management, and to publicly report on progress annually.

Protecting Water Quality

Protecting water quality is a key part of our sustainability strategy. Our efforts are focused on keeping clean water clean through a strategy that avoids affecting water quality whenever possible. In order to ensure compliance with applicable standards, regulations and permits, we monitor the quality of water that is discharged from our operations and returned to the environment.

See more about our water compliance as part of environmental compliance on page 127.

Snapshot

Working Together on Environmental Monitoring in the Elk Valley

Teck is engaging with numerous COIs as part of our efforts to address water quality constituents released by mining activities throughout the Elk River watershed, where five of our steelmaking coal operations are located.

Under the regional wastewater discharge permit issued by the B.C. Ministry of Environment, we participate in an Environmental Monitoring Committee (EMC), a forum to share technical information and traditional knowledge related to the monitoring, adaptive management and reporting activities of the Elk Valley Water Quality Plan.

In addition to Teck, the EMC includes representatives of the B.C. government, First Nations and an independent scientist.

The inaugural EMC meeting was held in March 2015. Over the course of the year, the committee reviewed 19 water quality reports, study outlines and held a public meeting to discuss their work and issued the first of their annual reports. The 2015 EMC Public Report is available online.

Our Targets and Commitments

Our vision is to contribute to the balance between social, economic, recreational and cultural benefits of water resources, within ecologically sustainable limits. We aim to be a leader in water stewardship by improving our understanding of the quantity and quality of water used at all our mining operations, by achieving measurable improvements in water use and quality, and by engaging with other water users in our areas of influence.

Our targets include water quality targets to reduce long-term risks related to water quality through improved water management practices or new treatment facilities, as well as water quantity targets to increase the volumes of water reused.

How Does Teck Manage Water?

Sustainability Strategy Spotlight

Progress Against Our 2015 Goals

We are proud to have met our 2015 goals, including establishing operation-specific water balances and water management plans at each operation, to inform water management decision-making, and developing operation-specific water targets.

For a full list of 2020 and 2030 water goals, see page 18.

Collaborating with Communities to Ensure Fair Allocation of Water

Access to clean and sufficient water by users in our areas of influence is important to us and to our communities of interest. When implementing our water management practices, we consider and engage with other water users in the watersheds where we operate. We promote the fair use of water at all of our operations. To evaluate whether water in a region is stressed, we consider the following criteria:

- Limited availability of fresh water from surface or groundwater sources in the local area
- Broad community concerns over the use of water for purposes other than human consumption and agriculture
- Limited availability of other water sources such as brackish or saline water in the immediate local area
- Very low annual rainfall/precipitation
- Known impacts or stresses on existing surface water supplies and groundwater aquifers

Improving Water Efficiency

We continuously work on optimizing our water use and minimizing our impact. Each of our operations has completed integrated water management plans and site-wide water balances, which are central components of our water management strategy. Water balances consist of data on the volume of water input, use, reuse, recycling and outputs at each operation.

Integrated Water Management Plans (IWMPs)

IWMPs are updated annually in conjunction with the update of each operation's water balance. Each plan also describes how the operation fits into the local watershed and its associated regulatory context. IWMPs, which were developed as the framework to guide water management activities at each of our operations, describe how water is managed now and in the future. They help us work towards operation-specific objectives and performance, as well as our company-wide 2020 water goals. Specifically, they describe how water will be managed, in order to:

- Contribute to meeting our sustainability goals
- Provide direction and strategy to address water management risks and challenges
- Establish how water management infrastructure performance will be monitored and reviewed

Water Balances

Site-wide water balances provide an understanding of water inputs, of consumption, and of reuse/recycle and discharge volumes at each operation. Water balances are used as a decision-making tool to assess water management alternatives, to evaluate an operation's water management performance and to provide water data for our company-wide reporting. The company-wide water balance is complex, due to the variability of natural factors such as rainfall, snowmelt and the diversity of the climates where we have our operations. These factors can affect the flows within aquifers and surface water. Understanding our water balance is key to improving water management practices and enabling better decision-making. Our 2015 company-wide water balance is available on page 104.

What was Our Performance in Water Management in 2015?

In this section, we report on our performance in protecting water quality, collaborating with our communities of interest to ensure the fair allocation of water, and improving water use efficiency.

Protecting Water Quality

We are committed to managing and monitoring water quality related to our mining activity. For example, we monitor several groundwater and surface water parameters at all of our sites such as pH, temperature, total suspended solids, metals and hydrocarbons. The detection limit for each parameter depends on local regulations or guidelines.

At each of our operations, we have specific legal requirements embedded in our operating permits regarding discharge quality and quantity. In 2015, we have no water-related regulatory non-compliances, compared to three in 2014 and none in 2013. Despite our best efforts, from time to time, unexpected events or process upsets can lead to non-compliance events.

Snapshot

Teck's First Water Treatment Facility in B.C.'s Elk Valley

Water from precipitation and runoff flows through the waste rock piles at our steelmaking coal operations, carrying naturally occurring substances such as selenium into the watershed. In large quantities, these substances can impact aquatic health in the watershed.

Beginning in the spring of 2013, Teck led a groundbreaking process to develop an area-based management plan — the Elk Valley Water Quality Plan — to address water quality challenges in the Elk Valley. The Plan was developed with input from the public, First Nations, governments, technical experts and numerous other stakeholders. Feedback was collected through an extensive three-phase consultation process with the public, Ktunaxa Nation and other interested parties.

Teck is implementing the Elk Valley Water Quality Plan in order to stabilize and reverse the increasing trend of selenium and other substances in the Elk River watershed in British Columbia, where five of our steelmaking coal operations are located.

To achieve the objectives of the Plan, we are constructing water treatment facilities, the first of which went into full operation in February 2016 at our Line Creek Operations.

The West Line Creek Active Water Treatment Facility treats up to 7,500 cubic metres of water per day — enough to fill three Olympic-sized swimming pools. The $120 million facility is reducing selenium concentrations by about 96% and nitrate concentrations by over 99% in treated water.

"This water treatment facility is part of our work to implement the Elk Valley Water Quality Plan, which was developed with input from communities, governments and First Nations to maintain water quality while supporting continued responsible mining in the region."
Robin Sheremeta,
Vice President, Coal

Collaborating with Communities to Ensure Fair Allocation of Water

Two of our operations are located in regions where water is scarce, and it has been particularly important for us to consider our neighbours' water needs at these locations. We are implementing various strategies to manage our impacts on local water availability at our Carmen de Andacollo (CdA) and Quebrada Blanca Operations in Chile, where in total, only 15% of the water used at these operations is new water (water used for the first time). The remaining 85% is recycled or reused water. This means that every cubic metre of new water is reused approximately six times before being discharged.

We have developed an alternative water supply for CdA. Dialogue with the community about their concerns regarding water use at the mine led to an agreement to supply water to our process plant from a different source. In 2011, we completed construction of a 27-kilometre water pipeline to bring water to the process plant at CdA, eliminating the need to extract water from a groundwater aquifer we had previously shared with the community. This decision was made in consideration of the other water users in the community. This is consistent with our commitment to implementing effective water management techniques in recognition of other users in the watersheds where we operate. In addition, we are evaluating the construction of a community wastewater treatment plant to provide water for our CdA operations, to potentially further reduce our demand on the local fresh water supply. Through our experience at CdA, we have developed a greater appreciation of the importance of ongoing dialogue and engagement with our local partners and community members regarding water supply issues. This experience continues to influence our efforts in community engagement at our other operations, as well as the water supply considerations for our development projects.

We're also making sure to evaluate alternative approaches for meeting water needs in new development projects. At Quebrada Blanca Phase 2 (QB2) and Project Corridor, which are both located in water-stressed regions of Chile, we have proposed the use of desalinated seawater in order to protect and conserve local fresh water sources for community and agricultural use. At the same time, using seawater is a significant investment, as it requires the construction of desalination plants and associated pipelines as well as additional energy to desalinate the water and pump it from the coast to our sites (approximately 170 kilometres to QB2 and 125 kilometres to Project Corridor). For these two projects, we are focusing on the protection of local fresh water supplies while simultaneously exploring opportunities to offset some of the emissions from electricity generation by using renewable sources.

Improving Water Efficiency

We track our water data at both the company-wide and operational levels. In order to ensure compliance with applicable standards, regulations and permits, we monitor the quality of water that is discharged from our operations and returned to the environment and how it is used to improve our water efficiency.

Water Used, Reused and Recycled

In 2015, we used a total of 294.2 million cubic metres (m^3) of water, of which 113.1 million m^3 was new water, and 181.1 million m^3 was reused or recycled water. In 2014, we used 334.6 million m^3 of water, of which 128.4 million m^3 was new water, and 206.4 million m^3 was reused or recycled water. In 2013, we used 329.9 million m^3 of water, of which 132.6 million m^3 was new water, and 197.3 million m^3 was reused or recycled water.

Table 23: **Water Used, Reused and Recycled in 2015**[1,2]

	2015	2014	2013
Total water inputs (m^3)	**323,993,000**	391,398,000	442,839,000
Total water outputs (m^3)	**334,149,000**	388,667,000	430,870,000
New water use (m^3)	**113,116,000**	128,355,000	132,261,000
Water reused/recycled (m^3)	**181,127,000**	206,246,000	197,294,000
Water used ÷ water recycled (%)	**160**	161	149

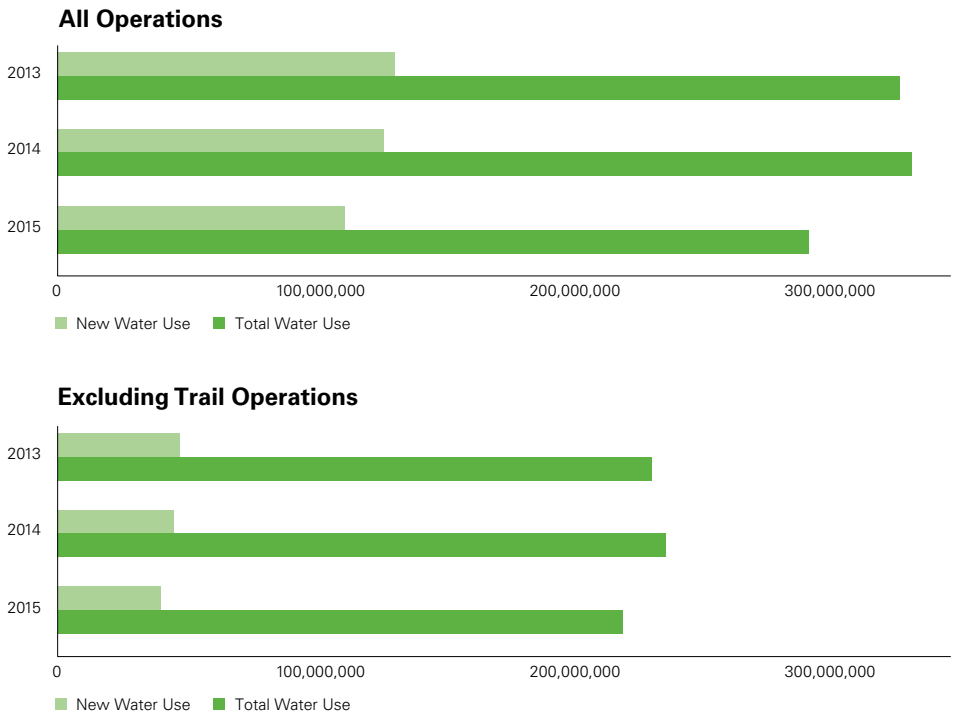
(1) This data is limited to our 11 mining operations and excludes Trail Operations.
(2) The percentage calculation is based on the total volume of water reused/recycled divided by the total volume of fresh water used.

We track our data both company-wide and for our mining operations only (excluding Trail Operations, which is our zinc and lead smelting and refining facility). Water reused and recycled, expressed as a percentage of new water use, was 160% across the company. At our mining operations only, this percentage was 440%. This means that our mining operations recycled and reused the same water approximately 4.5 times on average before returning that water to the environment.

Trail Operations accounts for nearly 25% of our total water use and 65% of our new water use. Almost all of the water used at our Trail Operation is used 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. Therefore, we track this water separately from the data for our mining operations.

Figure 17, on the next page, shows the new water and total water use trend over the past three years. In 2015, the significant reduction of total water use across all our operations is largely due to the implementation of a cooling tower retrofit project at our Trail Operations. The project's objective was to reduce the volume of water needed in the cooling circuit and resulted in an approximately 25% reduction in water use, based on the baseline average. The reduction of total and new water used across our mining operations is attributable, for the most part, to the decision to implement staggered three-week shutdowns at our steelmaking coal operations.

Figure 17: **Total and New Water Use (m³)**



Water Intensity

We benchmark our water performance on the basis of new water use intensity, as shown in Table 24. Our new water use intensity is defined as the annual volume of new water used per unit of material processed by our steelmaking coal, milling and flotation operations. These water metrics allow us to more consistently evaluate our water performance independent of variations in annual precipitation and ore grades. In addition, these metrics will allow us to establish new water use efficiency targets that will inform water management decisions and improvement projects at our operations.

Table 24: **New Water Use Intensity**

	Coal Operations[1]			Milling and Flotation Operations[2]		
	2015	**2014**	**2013**	**2015**	**2014**	**2013**
New water use, in million cubic metres (m^3)	**14.9**	15.4	16.6	**24.9**	29.4	30.7
Quantity processed or produced	**35,302,000** tonnes of raw coal processed	40,424,000 tonnes of raw coal processed	38,941,000 tonnes of raw coal processed	**69,186,000** tonnes of ore processed	72,565,000 tonnes of ore processed	67,357,000 tonnes of ore processed
New water use intensity	**0.42** m^3/tonne of raw coal processed	0.38 m^3/tonne of raw coal processed	0.43 m^3/tonne of raw coal processed	**0.36** m^3/tonne of ore processed	0.41 m^3/tonne of ore processed	0.46 m^3/tonne of ore processed

(1) Includes Cardinal River, Coal Mountain, Elkview, Fording River, Greenhills and Line Creek operations.
(2) Includes Red Dog, Pend Oreille, Highland Valley Copper and Carmen de Andacollo operations.

Our 2015 new water use intensity metrics continued to show an improvement for our coal operations and our milling and flotation operations relative to 2014 and 2013. The improvements can be attributed to continuous focus and commitments to reduce our water use intensity across the company and the development of the 2015 water targets. At our coal operations, improvements are largely attributable to Line Creek and Greenhills, where there was a significant increase in the amount of water reused/recycled. The improvements at our milling and flotation operations are largely attributable to the closure of our Duck Pond Operations and commissioning of our Pend Oreille Operations, as the water use intensity at Pend Oreille Operations is significantly lower than at Duck Pond.

For Quebrada Blanca and Trail operations, an intensity metric for new water 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 Quebrada Blanca Operations and Trail Operations based on the absolute amount of new water used.

Table 25: **New Water Use (in million m^3) at Quebrada Blanca and Trail Operations**

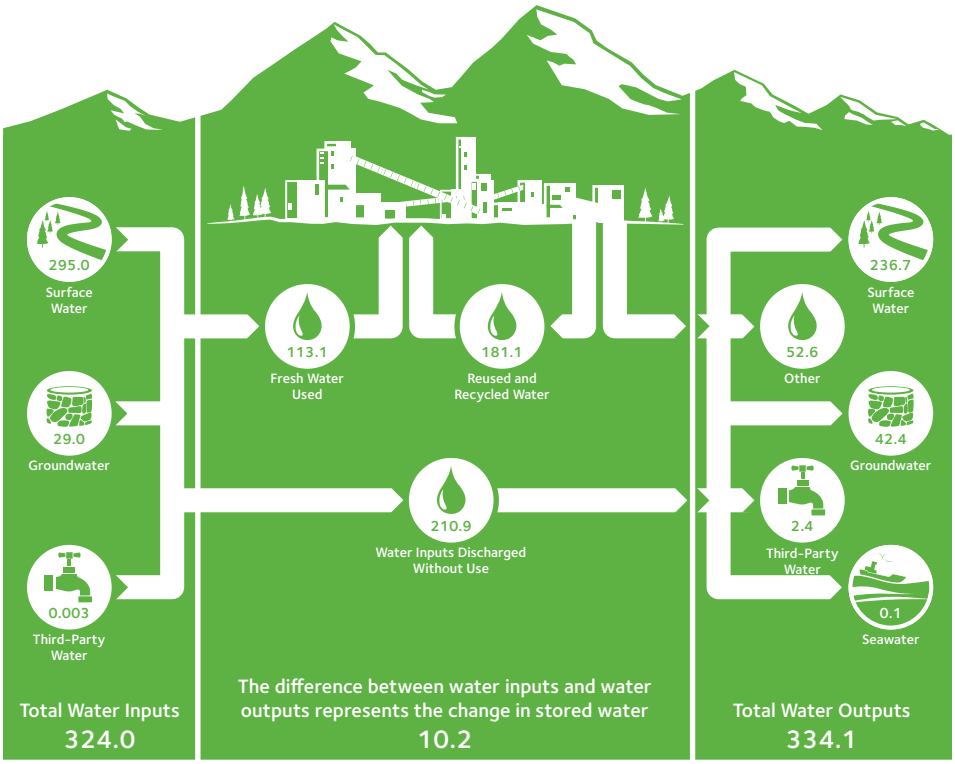
	2015	**2014**	**2013**
Quebrada Blanca (water used primarily in metal leaching process)	**1.7**	1.7	1.9
Trail (water used primarily for cooling)	**71.7**	81.6	83.4

What was Our Performance in Water Management in 2015?

Outlook for Water Management

In 2016, Teck will continue to focus on three areas of water management — water efficiency, groundwater risks and innovative water technology — and improving our performance across our operations, particularly in water-stressed regions. For example, we will increase our understanding of groundwater conditions across the company and proactively assess groundwater risks. In addition, a groundwater treatment plant at our Trail Operations is currently under construction and is expected to become operational in 2016. Furthermore, we will continue our work to improve water quality near our steelmaking coal operations through the Elk Valley Water Quality Improvement Plan.

Figure 18: **Company-Wide 2015 Water Balance in million cubic metres**[1,2,3]



How to Read a Water Balance

Water inputs:
Water that is received, extracted or managed (i.e., collected and conveyed through an operation's infrastructure). Water inputs can come from:

- Surface water[1]
- Groundwater
- Seawater
- Third-party sources[2]

Water inputs exclude water diverted away from operational areas.

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

Water outputs:
Water that is returned to the environment or is not available for further use after it has been collected, used, treated or stored. The destinations for water outputs include:

- Surface water
- Groundwater
- Seawater
- Third-party entities
- Other[3]

Water accumulated: The difference between water inputs and water outputs. This is indicative of the change in the stored water volume at our operations.

(1) Surface water includes water from precipitation and runoff that is not diverted around the operation, and water inputs from surface waterbodies that may or may not be within the boundaries of our operations. While we do not directly collect rainwater for use in our operations, the quantities of rainwater and runoff inputs to our operations constitute the majority of our surface water inputs, except at Trail Operations.

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

(3) Other includes water that has evaporated and is not recoverable (e.g., contained in ore concentrate or tailings).