Wide Area Remediation Plan and Medical Health Officer Recommendation Discussion guide and feedback form

Community Engagement:
January 6–31, 2025

teck.com/TrailAreaWARP

Interior Health

Trail Operations / Teck

TECK TRAIL OPERATIONS AND THE MEDICAL HEALTH OFFICER **WANT TO HEAR FROM YOU**

Teck Trail Operations (Teck) is developing a Wide Area Remediation Plan for the Lower Columbia River valley area. This plan will set out measures to address impacts from historical air emissions from the smelter in Trail.

Teck has undertaken and implemented numerous improvements over the decades to reduce risks to human health and the environment. This includes smelter modernization and operational improvements which have significantly reduced stack emissions, community soil management, and fugitive dust reduction.

However, metals from historical air emissions are still present in soils in the Lower Columbia River valley and may be a risk to human health and the environment.

A Wide Area Remediation Plan, or WARP for short, will formalize Teck's commitment and track efforts to address these impacts by outlining a strategy and specific targets for remediation, and approaches that meet the provincial government's legal requirements for contaminated sites management in BC.

This discussion guide has been developed to provide a high-level overview of three topics, with relevant information to help you to provide feedback.

From January 6–31, 2025, you can provide feedback regarding:

FEEDBACK TOPIC 1

Medical Health Officer recommendation to protect human health

A draft recommendation from the Interior Heath Medical Health Officer (MHO) regarding lead (Pb) and human health. This recommendation informed the proposed measures to protect human health found in the draft WARP.

Feedback provided to Interior Health.

FEEDBACK TOPIC 2

Proposed measures to protect human health

Proposed remediation measures outlined in the draft WARP related to human health.

Feedback provided to Teck.

FEEDBACK TOPIC 3

Approach to restoring ecological health

Proposed remediation measures outlined in the draft WARP related to the environment.

Feedback provided to Teck.

Teck has been working directly with Indigenous communities to ensure their priorities are understood and incorporated into the WARP. Consultation with Indigenous communities is currently underway through a separate process.

How to provide your feedback

Read this discussion guide and complete the online feedback form at **teck.com/TrailAreaWARP**

Attend an in-person open house at the Trail Memorial Centre

- Wednesday, January 15 6:00p.m. – 8:00p.m.
- Saturday, January 18 11:00a.m. – 1:00p.m.

Attend the virtual open house

- Wednesday, January 22 6:00p.m. – 8:00p.m.
- Register at **teck.com/TrailAreaWARP**

Send an email with your feedback

- Teck: **TrailAreaWARP@teck.com**
- Interior Health: **THEP@interiorhealth.ca**
- Ministry of Environment and Parks: **TrailWARP@gov.bc.ca**

Additional information

Supporting technical information for the three topics is available for reference at **teck.com/TrailAreaWARP**.

- Draft Wide Area Remediation Plan
- Draft Medical Health Officer Recommendation
- 2024 Human Health Risk Assessment for Lead
- Analysis of Variables Influencing Children's Blood Lead Levels in Trail BC

Printed versions of these documents are available at the Trail & District Public Library (1505 Bay Ave, Trail) and THEP Community Program Office (1319 Bay Avenue, Trail).

For more information on the provincial government's legislative framework for management of contaminated and related protocols, please visit the **Ministry of Environment and Parks Site Remediation website.**

Who is involved and what are their roles in this process?

The planning and implementation of this engagement process is led by Teck and Interior Health, with input from a working group consisting of several organizations relevant to the development of the WARP. The following are the organizations involved, and their roles and responsibilities:

ORGANIZATION	ROLE
Teck Metals Ltd.	• Owner of Trail Operations, responsible for completing the Human Health Risk Assessment for Lead (Pb) and developing and implementing the WARP • Responsible for seeking feedback from Indigenous communities and the public regarding the draft WARP and reporting back on how feedback was considered in the plan
Interior Health Medical Health Officer	• Responsible for assessing human health risk related to lead (Pb) exposure within the area covered by the WARP and making a recommendation regarding lead (Pb) and human health for incorporation into the Plan • Responsible for seeking feedback from Indigenous communities and the public regarding the draft recommendation
B.C. Ministry of Environment and Parks	• Ministry of the provincial government responsible for protection, management and conservation of land, water, air and living resources • Statutory decision maker responsible for ensuring the WARP complies with the provincial government's legal requirements. The Ministry will issue an Approval in Principle if the WARP meets the consultation and regulatory requirements. • Responsible for ensuring the Crown's duty to consult with First Nations has been met
First Nations Health Authority	• Responsible for supporting First Nations and engagement to improve health outcomes for First Nations people in B.C.

Through this engagement process with you, and a parallel but separate process with Indigenous communities, Teck Trail Operations and Interior Health are seeking feedback to be incorporated in the WARP and Medical Health Officer Recommendation before they are finalized for approval.

BACKGROUND: **WHY IS A WIDE AREA REMEDIATION PLAN NEEDED?**

About Teck Trail Operations

Teck Trail Operations is one of the world's largest fully integrated zinc and lead smelting and refining complexes.

The metallurgical operations produce a wide variety of precious and specialty metals and chemicals and are an important part of North America's critical minerals supply chain security. Trail Operations is fully powered by the Waneta Dam which provides renewable hydroelectric power and makes Trail one of the world's lowest carbon intensive producers of critical minerals.

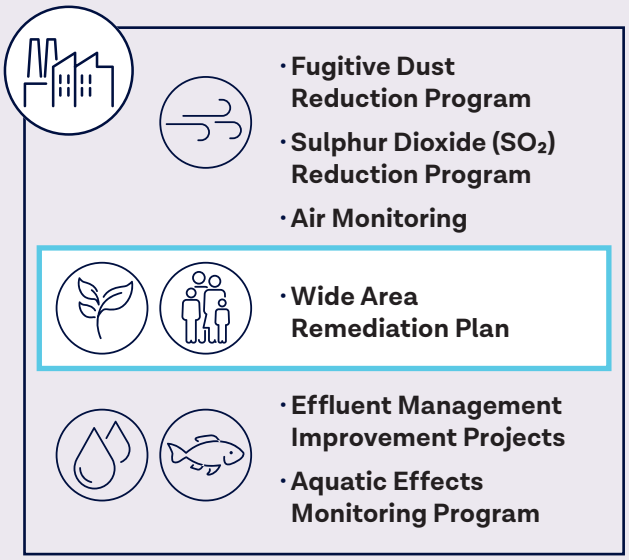
Trail Operations is proud to be a part of the local community. We have approximately 1,500 employees living in Trail, Castlegar, Warfield, Fruitvale, Montrose, Rossland and the surrounding areas. We contract and hire local companies, and we support local initiatives that strengthen our community.

The history of the smelter in Trail dates to 1896, when a small copper-gold smelter was built to locally treat concentrates from the mines in Rossland. By 1902, the operation began smelting and refining lead, and in 1916 was also producing zinc. Over the years, emissions from the smelter released metals into the environment. People, plants and animals can be exposed to these metals, and at high enough levels, there is a risk of adverse effects to human health and the environment.

In the early years, there were few environmental controls and regulations, but Trail Operations has innovated and evolved into a much different operation than it was in the early 1900s. Since 1977, over $1.7 billion has been invested in improving operational and environmental performance at Trail Operations. Important investments which have dramatically reduced emissions of lead (Pb) and other metals and their levels in the community include the new lead smelter (KIVCET) in 1997 and the ongoing Fugitive Dust Reduction Program, which began in 2012.

ENVIRONMENTAL REGULATORY FRAMEWORK

A Wide Area Remediation Plan is one aspect of Teck's work to protect human health and the environment and focuses on impacts from historical air emissions. Other initiatives are in place to protect air and water quality.



A Wide Area Remediation Plan is needed to ensure Teck's approach to managing contaminated soil in the Trail area follows an approved regulatory process, and is continually improving. The Plan provides certainty to the local community that Teck will continue this work.

What are the potential effects of metals in the environment?

Human health and ecological risk assessments have been conducted to understand whether metals in the Trail area pose a risk to human health or the environment.

HUMAN HEALTH

With respect to human health, lead (Pb) is the focus of the WARP; other metals measured were below regulatory standards, and do not pose a risk to people.

When people are exposed to lead (Pb) in their homes or communities, it can be unintentionally ingested or inhaled, leading to elevated blood lead (Pb) levels. Exposure to lead (Pb) may occur from outdoor sources, such as dust and soil, and from indoor sources, such as dust in our homes, paint containing lead (Pb), plumbing and/or solder, certain hobbies, smoking, and some imported products.

Young children are most likely to have health effects related to lead (Pb) because they have more contact with the environment through hand-to-mouth activities (putting fingers and objects into their mouths), they have higher absorption of lead (Pb) into their bodies, and their bodies and brains are still developing. Even low levels of lead (Pb) may have subtle effects on a child's intelligence and attention.

The effects of lead (Pb), and the measures Teck is taking to reduce them, are explained later in this document.

ENVIRONMENT

Historical air emissions impacted plant communities in the Trail area, leading to a loss of biodiversity and wildlife habitat. These effects, and the measures Teck is taking to reduce them, are explained later in this document.

About the Wide Area Remediation Plan

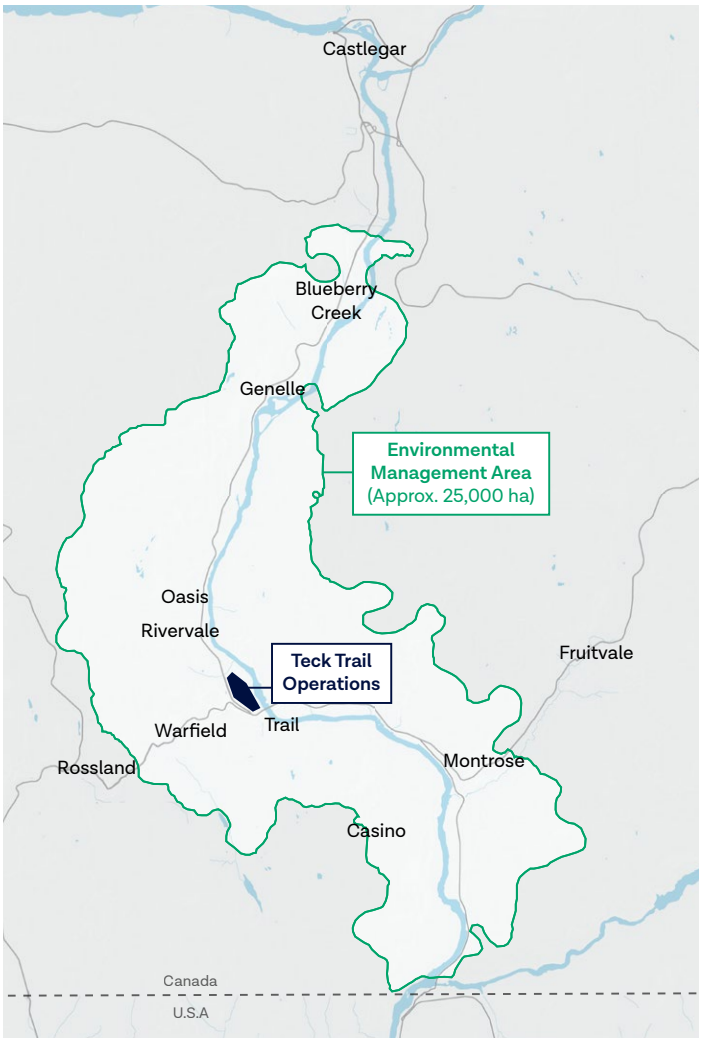
The WARP is a formal and comprehensive plan to address impacts from historical smelter air emissions on both human health and the environment in parts of the Lower Columbia River valley.

The WARP applies to the Environmental Management Area, a specific zone identified through extensive soil sampling throughout the Lower Columbia River valley. The boundary was drawn to include areas where metals are present at higher concentrations than the provincial Contaminated Sites Regulation standards or regional background levels.

This area is centered around the smelter at Teck Trail Operations, where levels of metals and potential for effects are greater, but extends to locations where metals from historical smelter emissions have settled.

> The WARP addresses the four metals contaminants associated with historical aerial emissions—arsenic (As), cadmium (Cd), lead (Pb) and zinc (Zn). Human health actions in the WARP are focused on lead (Pb). More information about how metals were evaluated can be found in the draft WARP at **teck.com/TrailAreaWARP**.

Teck has undertaken and implemented numerous improvements over the decades to reduce emissions and reduce risks to human health and the environment. It's important to note that the WARP will help regulate work already underway to reduce people's exposure to lead (Pb) and manage impacts to plant communities.



Map of the Environmental Management Area, centered around Teck Trail Operations in the Lower Columbia River valley.

What is currently being done to protect human health and the environment?

Teck has long been committed to reducing community exposure to lead (Pb), starting with the formation of the Trail Lead Task Force in the early 1990s.

In 2001, the Trail Area Health and Environment Program (THEP) was established as a partnership between the City of Trail, Teck Trail Operations, Interior Health, and the Ministry of Environment and Parks. This holistic program looks at the interconnected effects of air quality, soil contamination, and built environments (e.g. homes, daycares, civic buildings, etc.). The WARP builds on this work, helping to ensure continued progress across these multiple exposure pathways.

Learn more at **thep.ca**

With respect to environmental impacts of historical emissions, the Lower Columbia Ecosystem Management Program has been developing approaches to address impacts to plant communities.

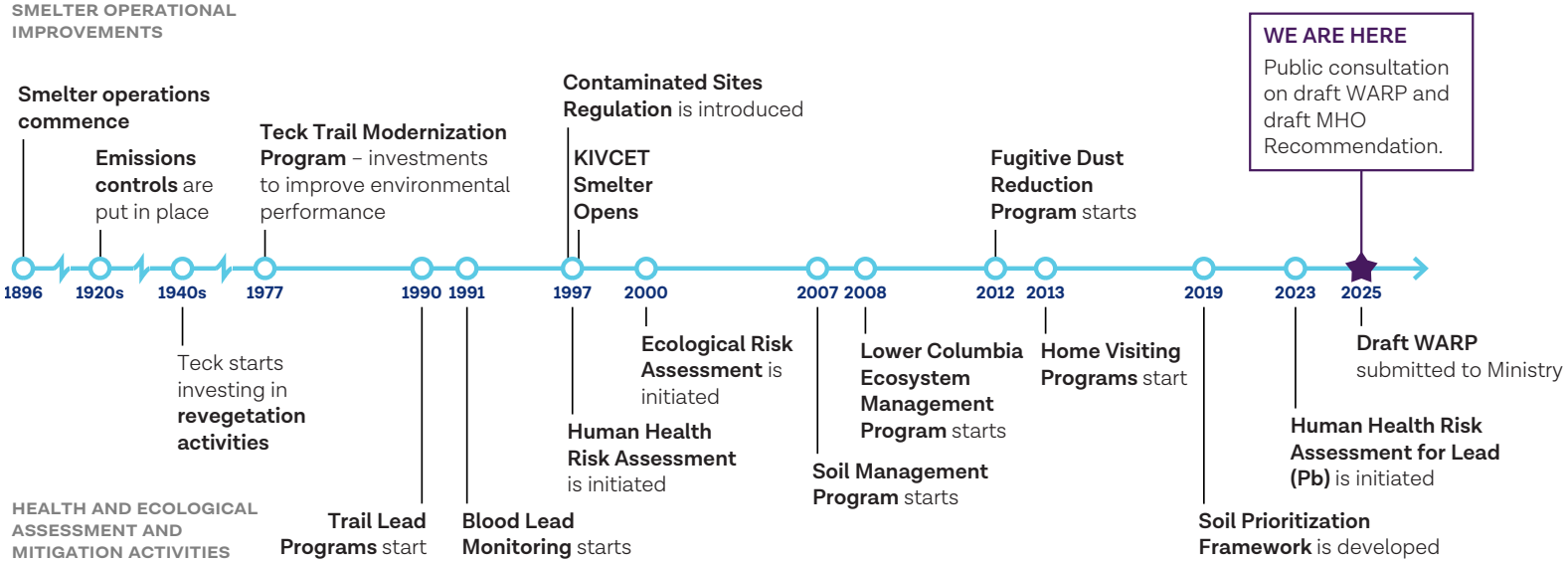
Learn more at **teck.com/lcemp**

MEETING PROVINCIAL GOVERNMENT REQUIREMENTS

The WARP was developed to comply with British Columbia's legal framework for managing contaminated sites. It adheres to both the overarching guidelines of the Ministry of Environment and Parks and the specific standards set forth in key legislation:

- ***Environmental Management Act* (EMA):** The EMA is British Columbia's primary environmental legislation, which governs pollution control, waste management, and the management of contaminated sites. Its goal is to protect both the environment and human health.
- **Contaminated Sites Regulation (CSR):** As a regulation under the EMA, the CSR sets out detailed technical and legal standards for identifying, assessing, and remediating contaminated sites. These standards are designed to ensure that contamination is addressed consistently and effectively.

The Ministry of Environment and Parks has conducted a preliminary review to ensure the document is ready for this public engagement process.



What environmental standards are applied in the WARP?

The WARP will be guided by the standards outlined in the provincial government's Contaminated Sites Regulation (CSR).

Numerical standards: The CSR sets specific numerical limits for the concentration of contaminants, such as metals (e.g., lead, arsenic, cadmium, zinc), in soil or other media. An area with concentrations above these limits is considered contaminated, and further review is required. The WARP uses these numerical standards to define the Environmental Management Area.

Risk-based standards: In addition to numerical standards, risk-based standards are used to assess whether contamination may pose a risk to people or the environment. In the WARP, risk-based standards are applied to ensure that remediation efforts are focused on areas where contamination poses a potential risk.

REFINING STANDARDS WITH LOCAL DATA

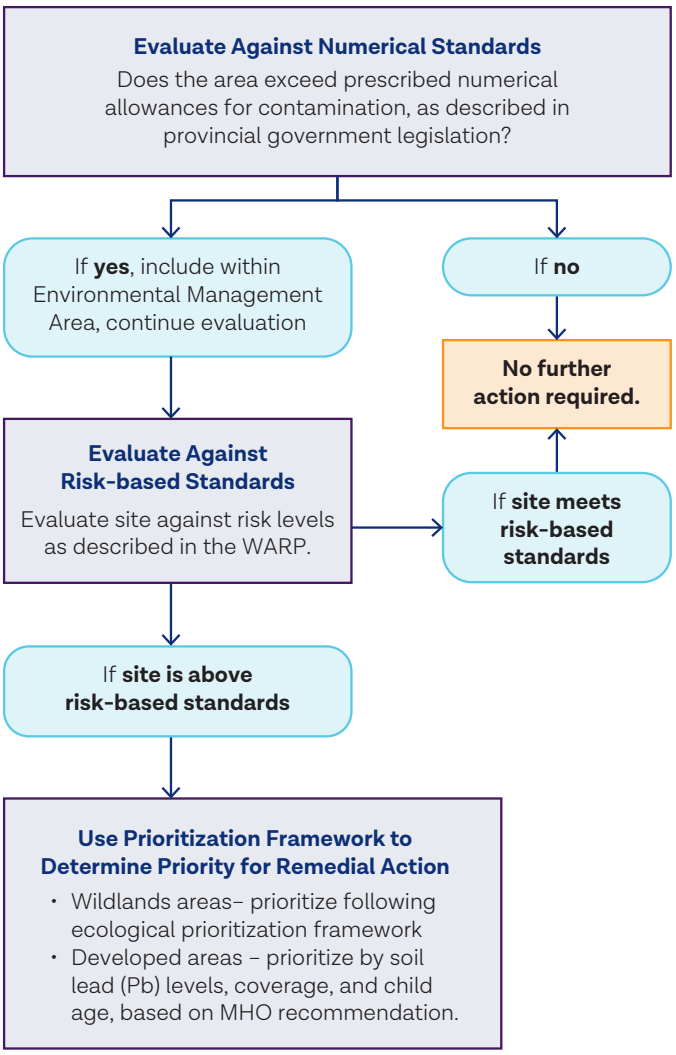
Typically, risk-based standards make assumptions about how much of a contaminant a person will be exposed to. In Trail, there is real-world data from the ongoing measurement of children's blood lead (Pb) levels. Under the CSR, this local data can be incorporated to refine the environmental standards.

The CSR also allows the Medical Health Officer (MHO) to recommend different benchmarks for contaminants, depending on health data or local environmental conditions.

In the case of the WARP, the MHO's recommendations include:

- A focus on blood lead (Pb) levels in children as a key indicator of exposure, rather than just soil concentrations.
- A soil lead (Pb) level based on local exposure patterns and health measures, ensuring that remedial actions are directly aimed at reducing lead (Pb) exposure in the most effective and health-protective manner.

Applying the CSR framework through this sequential approach, and incorporating local context, ensures that remediation efforts through the WARP are targeted, appropriate, and effective at reducing risks to people and the environment.



Medical Health Officer Recommendation

Teck requested that a MHO provide a recommendation for a risk-based standard for remediation of lead (Pb) in the Environmental Management Area, for application in the WARP.

This recommendation ensures that remediation efforts under the WARP are aligned with the health outcomes of the local population, focusing on minimizing the risks from lead (Pb) exposure.

The recommendation is discussed in Feedback Topic 1.

What happens after this engagement process?

The Medical Health Officer will consider feedback from this engagement prior to finalizing the recommendation for final review and endorsement by the Provincial Health Officer.

Teck will consider feedback from this engagement as it finalizes the WARP for submission to the Ministry of Environment and Parks.

Teck must incorporate the MHO's recommendation into the WARP to apply for Approval in Principle from the Ministry. The Approval in Principle signifies that the plan meets the regulatory standards and is structured to effectively address the contamination. It is anticipated that the WARP will be submitted to the Ministry in spring 2025.

Once approved, the WARP will formalize Teck's commitments to remediation. These commitments will be regulated by the Government of B.C., with regulators overseeing the work done to ensure it meets the agreed-upon standards.

How will the WARP be updated in future?

Importantly, the WARP includes a five-year review cycle.

During these reviews, remediation targets will be evaluated and adjusted based on new scientific findings regarding the metals contaminants and their impacts, updated public health data that reflects changes in lead (Pb) exposure levels in the population, updated data regarding metals levels in the environment, and any other relevant information that could improve the effectiveness of the remediation efforts.

This cyclical review ensures that the WARP remains dynamic and its remediation targets are adjusted to continuously improve conditions based on the best available science.

MEDICAL HEALTH OFFICER RECOMMENDATION TO PROTECT HUMAN HEALTH

Interior Health

A Medical Health Officer (MHO) has provided a recommendation to guide remediation of lead (Pb) within the Environmental Management Area.

Human health risks associated with levels of other metals in the WARP are not significant, so they are not included in the recommendation. Teck must incorporate this recommendation in the WARP, along with supporting risk assessments, to apply for an Approval in Principle from the Ministry of Environment and Parks.

The MHO has developed a draft recommendation including:

1. **a risk-based remediation standard** that takes the form of a target blood lead (Pb) level which will be used to measure the effectiveness of Teck's actions in reducing exposure of young children to lead (Pb)
2. **a recommended soil lead (Pb) concentration** to support achieving the target blood lead level

The draft recommendation looks to decrease the gap between the blood lead (Pb) level of children in Trail, and children across Canada. In doing so, the recommendation applies a continuous improvement approach.

The goal of the MHO is to recommend measures that most effectively promote the reduction of blood lead (Pb) levels in children in Trail aged 6–36 months to a level with no measurable effects on their health. The best indicator of health risk from lead (Pb) is the level of lead (Pb) in a person's blood.

The MHO recommendation is guided by the *Public Health Act*, in accordance with the Contaminated Sites Regulation. **Learn more about remediation planning and the Contaminated Sites Regulation**.

Medical Health Officer (MHO):
Statutory decision-maker with legal authority under the *Public Health Act* to make recommendations to protect and enhance public health. As directed within the Contaminated Sites Regulation, they are authorized to make a recommendation to protect human health with respect to lead (Pb), for inclusion in the WARP.

Provincial Health Officer (PHO):
The senior public health physician in B.C., charged with monitoring the health of the population of BC and providing independent advice to the ministers and public officials on public health issues. The PHO has completed a preliminary review of the recommendation and is responsible for reviewing and endorsing the recommended standard following public engagement.

Why a risk-based standard?

A risk-based standard considers conditions present in the Environmental Management Area, as well as the blood lead (Pb) data that has been collected from the area. It enables an MHO to define suitable standards that are protective of health in the Trail area rather than using a generic standard that is not specific to the site.

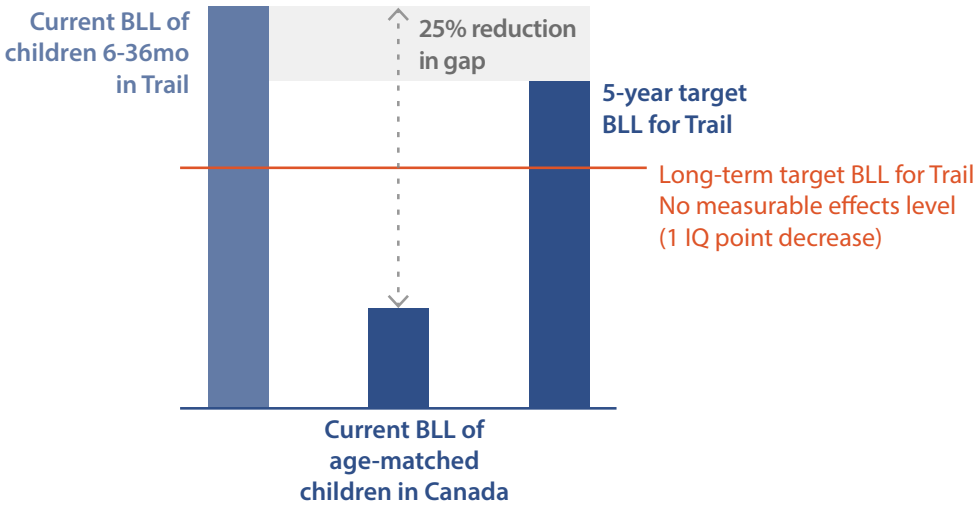
Under the CSR, the MHO can make additional recommendations, such as a blood lead (Pb) target, to better protect human health. Measurement of lead (Pb) in blood provides a more reliable insight into exposure levels in the community, and this measure is already used by the regional health authority (Interior Health) to monitor exposures.

Recommendation

“Decrease the gap in children’s blood lead between Trail children and an age matched Canadian cohort by 25% over the next five years.”

The use of a comparison between Trail and Canadian blood lead (Pb) levels is important to demonstrate progress beyond changes in the general population. While challenging, this goal has been set to ensure the continuation of actions to protect human health. The goal will be reviewed and refreshed on a five-year cycle to ensure blood lead (Pb) levels are continually reduced, and to compare against the most current and relevant data from Health Canada.

In addition to the blood lead (Pb) concentration, the MHO recommends a soil concentration of 400 micrograms of lead (Pb) per gram of soil (also written as 400µg/g or 400mg/kg). Local data suggests this number will be most protective of health in the Environmental Management Area.



WHY CHILDREN?

Young children are exposed to more lead (Pb) in the environment than older children, teens, and adults, due to their behaviors such as hand to mouth activities, crawling on floors, and mouthing objects.

These behaviors result in young children “eating more dirt and dust”. They also absorb greater amounts of ingested lead (Pb) into their blood and it takes longer for them to rid their bodies of this lead (Pb). The brain is sensitive to the effects of lead (Pb) and, since young children’s brains are still developing, they are more susceptible to these effects.

By protecting young children from the adverse effects of lead (Pb), we protect the entire population.

FAMILY HEALTH

Learn more about the supports available for families in Trail. Visit the **Trail Area Health & Environment Program website at thep.ca**.

DEFINING NO MEASURABLE EFFECTS

There is no specific blood lead (Pb) level below which we are certain there are no health effects, but this term means the concentration of lead (Pb) in a child’s blood is low enough that it will not have a measurable effect on their health. This is measured as being a loss of 1 IQ point in a population of people.

Other factors, such as having nutritious foods and enhanced learning opportunities, can have much greater impacts on a child’s IQ.

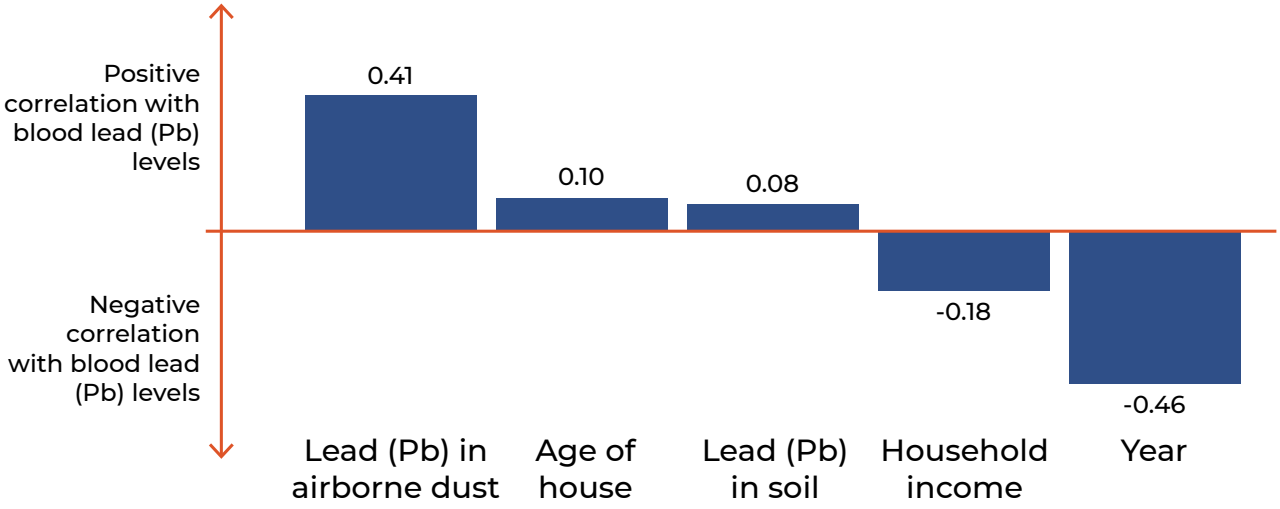
Analysis of Variables Influencing Children's Blood Lead Levels in Trail BC

Interior Health completed an analysis of the association of sources of environmental lead (Pb) and blood lead (Pb) data from 2007–2023.

The analysis evaluated the impact of various exposure pathways and socioeconomic variables on children's blood lead (Pb) levels in the community of Trail.

The findings indicate that lead (Pb) in airborne dust has a notably stronger impact on children's blood lead (Pb) than soil lead (Pb) levels in children's yards.

The Medical Health Officer's recommendation encourages Teck to lower blood lead (Pb) levels of children in Trail by addressing multiple sources. While the WARP focuses on lead (Pb) in soil, programs to reduce lead (Pb) in dust – the biggest contributor to blood lead (Pb) levels – are ongoing through the Trail Area Health and Environment Program.



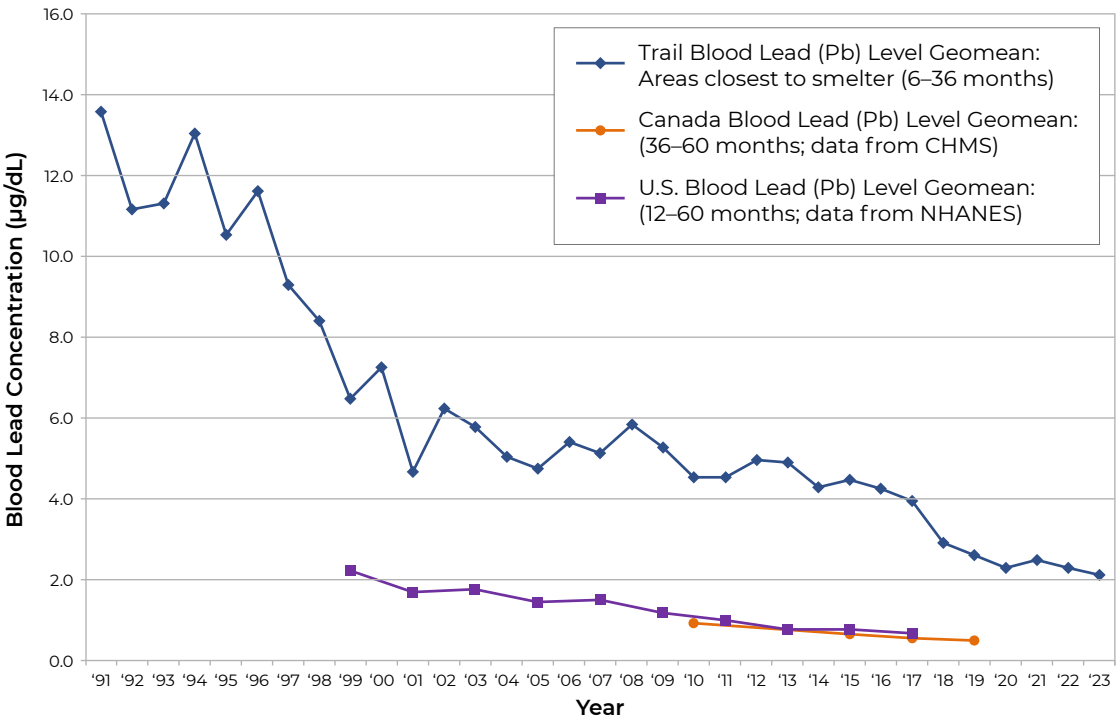
- **Lead (Pb) in airborne dust** – A moderate positive correlation was found, showing that higher concentrations of lead (Pb) in dust particles near children's homes increased the likelihood of higher blood lead (Pb) levels in those children.
- **Age of home** – A positive correlation was found, showing that children living in older homes were more likely to have higher blood lead (Pb) values.
- **Lead (Pb) in soil** – A weak correlation was found between concentrations of lead (Pb) in yard soil and blood lead (Pb) levels.
- **Household income** – Children living in homes with higher incomes were found to have lower blood lead (Pb) levels.
- **Year** – Blood lead (Pb) levels have been decreasing through the years. In Trail, this decrease is due to broad national environmental lead (Pb) reductions, such as removal of Pb from gasoline, paint, and pipes, as well as reductions due to local remediation efforts to reduce Pb in the Trail area environment.

The study also looked at how blood lead (Pb) levels of specific children changed before and after soil remediation. Due to the small number of children with both pre- and post-remediation blood samples, it was not possible to draw conclusions about the effect of soil remediation on blood lead (Pb) levels.

Lead (Pb) in indoor and outdoor settled dust was studied in a 2016 assessment. Lead (Pb) in settled indoor dust was found to have a moderate relationship with blood lead (Pb) levels. Lead (Pb) in settled outdoor dust was found to have a moderate to strong relationship with blood lead (Pb) levels.

Finally, the Analysis of Variables Influencing Children's Blood Lead Levels in Trail BC compared the rate of change of blood lead (Pb) levels in Trail to the rate of change in age-matched Canadian and US populations. The data shows that blood lead (Pb) levels in the Trail area have decreased at a faster rate than average US and Canadian levels. This indicates that programs aimed at reducing exposure levels are effectively reducing blood lead (Pb) levels in children living in the Trail area.

Teck has considered the MHO Recommendation and the Analysis of Variables Influencing Children's Blood Lead Levels in Trail BC in developing the measures in the draft WARP.



WE WANT TO HEAR FROM YOU

1. Do you have any comments regarding the draft Medical Health Officer Recommendation? Are there other considerations on this topic you would like the MHO to be aware prior to finalizing this recommendation?

Click here to fill out the online survey at **teck.com/TrailAreaWARP**

PROPOSED MEASURES TO PROTECT HUMAN HEALTH

Trail Operations / Teck

Teck voluntarily initiated soil testing and remediation in 2007, through the Trail Area Health & Environment Program. It is just one of the ways Teck is working to reduce blood lead (Pb) levels in the Trail area.

As shown above in Feedback Topic 1, work in previous decades to reduce children's exposure to lead (Pb) in the Trail area has been very successful. Soil management, the primary focus of the WARP, is only one source Teck is working to address. Other sources, such as lead (Pb) in dust, can have a greater impact on blood lead (Pb) levels than soil. The MHO recommendation outlined in Feedback Topic 1 will ensure that THEP continues to implement evidence-based actions to reduce children's exposure to lead (Pb) from all sources.

The soil management program outlined in the WARP is a continuation of work that is already underway. Initially, remediation was focused on child-occupied properties where soil concentrations were greater than defined limits. In December 2018, the Ministry of Environment and Parks issued a letter to Teck requiring a formalized prioritization framework and annual work plans for remediation of the highest risk sites in Trail. This requirement will be replaced by the WARP, once approved. The WARP formalizes this approach and provides certainty for residents in the Trail area of Teck's commitment and requirement to continue to undertake this work.

Soil remediation goal: to work toward the MHO recommended blood lead (Pb) target, a risk-based standard for the Environmental Management Area of 400 mg/kg Pb in soil is recommended for properties where young children are present.

Trail Area Health & Environment Program

In 1990, the Trail Lead Task Force was formed in response to concerns about lead (Pb) health risks to children. The task force undertook studies to determine sources, exposure and health risks associated with lead (Pb) in the Trail area. As part of its work, the task force began monitoring blood lead (Pb) levels in children in 1991.

One of the recommendations from the task force was to create the Trail Area Health & Environment Committee to oversee the Trail Area Health & Environment Program (THEP). The Committee is formed of representatives from the smelter, provincial and municipal governments and community groups.

The Trail Area Health & Environment Program (THEP) includes programs and provides education on four key pillars: soil, air, health, and built environments.

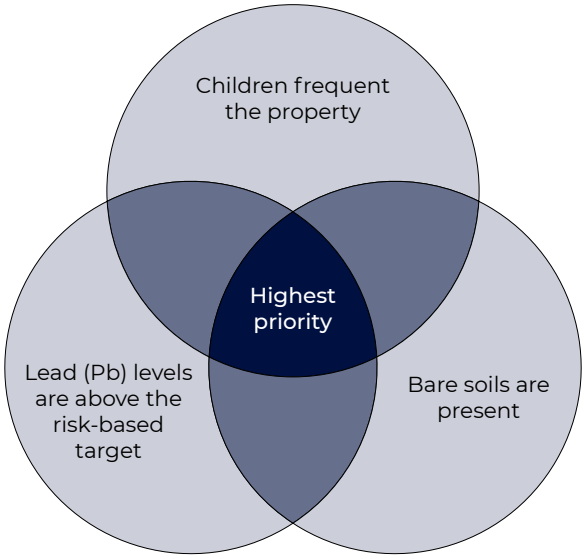
Prioritization approach

Properties which exceed the risk-based standard of 400 mg/kg will be prioritized for remediation using the following framework, focused on properties where:

- there are children younger than age 6 present for more than 2 days per week, and
- bare soils are present, as they have higher risk than soils with grass or other cover (e.g., mulch or gravel)

Some residential properties that are not frequented by children may be prioritized if they contribute to overall neighbourhood exposure.

Parks and playgrounds are also prioritized for soil management. Other property uses may also be remediated through the THEP Property Development Program.



Proposed measures by land use

The following outlines Teck's proposed soil management measures for different land uses, in support of achieving the targets and recommendation set out by the MHO:

1. **Residential properties with young children**
   - **Replacement of soil** through excavation, installation of a permeable fabric to provide a physical barrier, and restoration (landscaping)
   - **Covering and improvements** including seeding, fertilizing and aerating lawns to reduce bare soil, covering with landscape fabrics and features, hardscaping with patio stone, asphalt or concrete
   - **Limiting access** through fencing or planting shrubs or plants
2. **Urban parks and greenspaces where young children are frequently present**
   - **Replacement of soil** at playground and other high use areas
   - **Providing support for ground cover improvements** for greenspaces
   - **Coordinating and streamlining activities** during park modification (e.g., playground replacement, tree removal)
3. **Other land uses**
   - **Replacement or covering of soils** at residential portions of agricultural properties
4. **Property Development Program**
   - **Working with landowners and developers** of commercial, industrial, institutional or large residential developments to manage soils with elevated metals levels as a result of historical air emissions

A residential property before, during, and after remediation.

Human health research

The approach to protect human health was developed after thorough scientific research to ensure Teck's actions have the greatest impact possible.

From 2000–2011, Human Health Risk Assessments (HHRAs) were conducted to investigate the effects of metal contaminants on human health. In 2023–2024, Teck commissioned a more in-depth HHRA specifically focused on lead (Pb).

2024 HUMAN HEALTH RISK ASSESSMENT (HHRA) FOR LEAD (Pb)

Teck commissioned AtkinsRéalis to complete an HHRA to guide development of the WARP. This study was conducted to assess human health risks associated with exposure to lead (Pb) from the smelter operations in Trail, using lead (Pb) data from the Trail area and standard models to estimate blood lead (Pb) levels in different scenarios. The study looked at how people of all ages might be exposed to lead (Pb), such as ingesting and inhaling soil and indoor dust, or consuming home-grown foods.

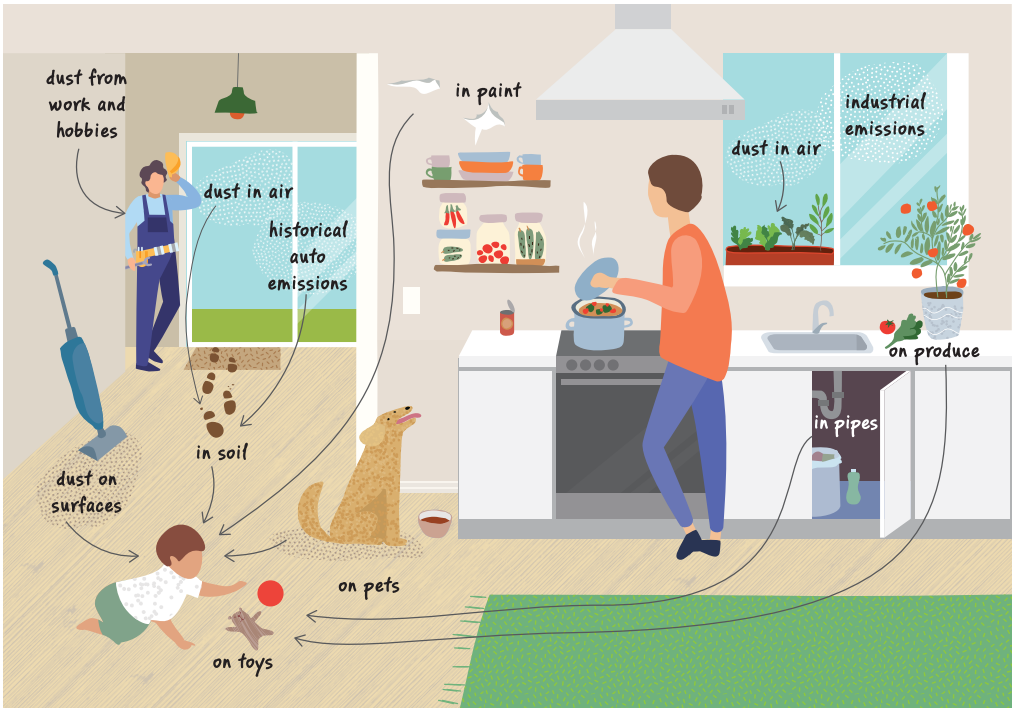
When comparing the results of the HHRA with actual blood lead (Pb) data collected in the Trail area, the HHRA predicted higher levels than those actually measured in Trail. This is because the models used in the HHRA use conservative assumptions about how and when people are exposed to lead (Pb).

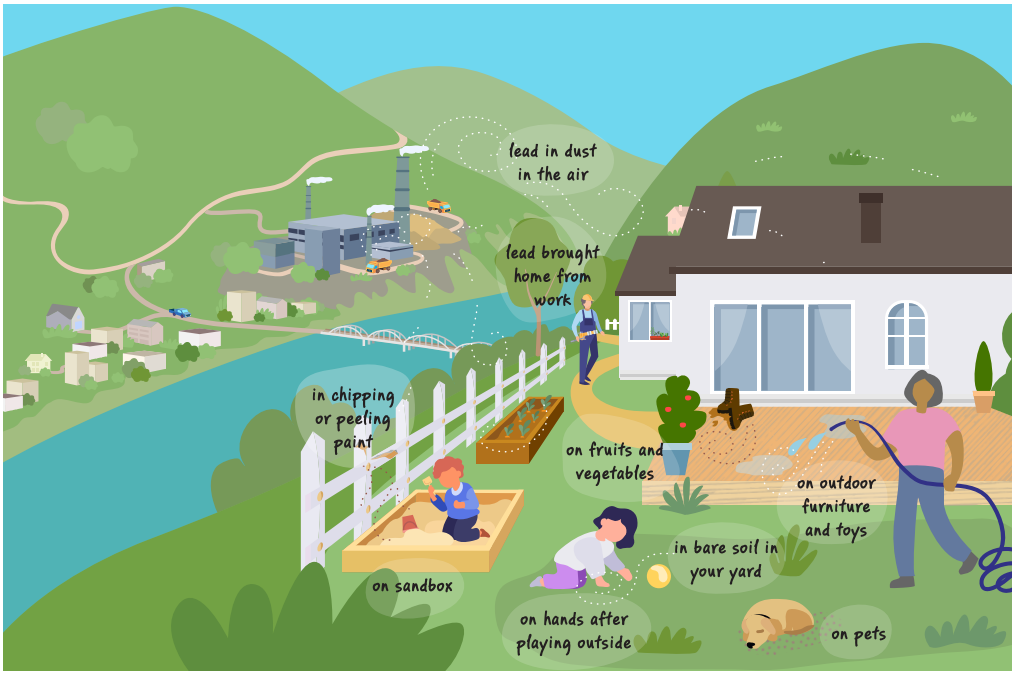
For example, the HHRA assumes that children will accidentally ingest soil with high concentrations of lead (Pb) every day, which is highly unlikely for most children.

Using data specific to Trail, such as Interior Health's Analysis of Variables Influencing Children's Blood Lead Levels in Trail BC, helps us understand how best to protect people living in the area. While higher soil lead (Pb) concentrations may contribute to elevated blood lead (Pb) levels in children, the Analysis shows that lead (Pb) from airborne dust is the dominant source of elevated blood lead (Pb) in children.

See Feedback Topic 1 for information on the Analysis of Variables Influencing Children's Blood Lead Levels in Trail BC.

The results of the HHRA for Lead (Pb) were used to develop a risk-based soil standard to guide remediation efforts.





Lead (Pb) can come from many sources. These are called 'exposure pathways' in the WARP.

WE WANT TO HEAR FROM YOU

2. Do you have any comments about the proposed prioritization approach to soil management? Are there other considerations on this topic you would like Teck to be aware of as we prepare to submit the WARP to the Ministry of Environment and Parks for review and approval?

Click here to fill out the online survey at **teck.com/TrailAreaWARP**

3. Do you have any comments about the proposed soil management measures? Are there other considerations on this topic you would like Teck to be aware of as we prepare to submit the WARP for review and approval?

Click here to fill out the online survey at **teck.com/TrailAreaWARP**

FEEDBACK TOPIC 3

APPROACH TO RESTORING ECOLOGICAL HEALTH

Trail Operations / Teck

Historical air emissions from the smelter in Trail have impacted plant communities and the associated wildlife habitats.

Teck undertook a series of Ecological Risk Assessments to identify where impacts associated with historical emissions require management actions under the Contaminated Sites Regulation. A steering committee was formed to oversee the development and implementation of wildland restoration activities through the Lower Columbia Ecosystem Management Program (LCEMP).

The WARP proposes to continue the work to address impacts to plant communities through the LCEMP, including development of restoration goals, actions, and a prioritization framework.

To learn more about the work of the LCEMP, please visit Lower Columbia Ecosystem Management Program webpage **teck.com/lcemp**

Ecosystem restoration goal: rehabilitate impacted plant communities in wildlands within the Environmental Management Area to a similar condition to reference areas that have not been impacted by Trail Operations. Wildlands can include forests, brushlands, grasslands, wetlands, and floodplains.

Prioritization approach

Many factors are considered in determining how Teck prioritizes its ecological restoration activities, including the priorities of Indigenous communities, the Crown, landowners, communities and regulatory bodies. Other factors include a site's anticipated land use or zoning, size, presence of priority habitats or species-at-risk, and the probability of successful restoration.

INDIGENOUS AND COMMUNITY PRIORITIES

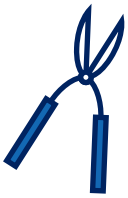
Teck is engaging with Indigenous communities to identify opportunities for Indigenous knowledge to inform restoration approaches and priorities. Teck is also working alongside local groups involved with land management and stewardship, to incorporate their knowledge into restoration planning.

Proposed remediation measures

Potential options for restoring a site are:

Improve soil conditions – amend soils to support plant health

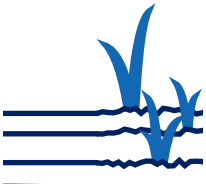
Treat invasive plants – use selective pulling, herbicide, and/or bio-control to remove invasive plants



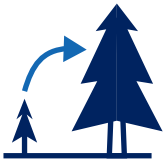
Silviculture treatments – apply treatments such as prescribed fire and selective tree thinning and pruning

Brushing – remove aggressive understory plants to allow other native understory vegetation to compete

Plant – plant native trees, shrubs and/or herbs



Scarify – make the soil rough and loose to control erosion and eliminate compaction while creating microsites for pioneering vegetation species



Natural regeneration – allow natural regeneration in areas that may not benefit significantly from treatment

Control access – use signage and/or public education and awareness to restrict access to sites to support restoration

Biodiversity offsets will be developed for areas where restoration is infeasible or where the restoration target is not achieved.

For forested sites, benchmarks for restoration were set by surveying vegetation in forested areas that were not impacted by contamination. The benchmarks include factors such as the number of plant species present, the percentage of ground cover, and percentage of native and non-native tree cover.

For non-forested sites, ecosystems will be compared to detailed descriptions of reference ecosystems provided by the BC Conservation Data Centre. These descriptions will act as benchmarks to inform what restoration activities should be, and what the final site should look like.

Ecological Research

Teck's approach and restoration actions were developed following extensive scientific research to ensure they are appropriate and effective. From 2000-2011, Teck carried out an Ecological Risk Assessment (ERA) to characterize the risks from smelter emissions to ecological health in the Trail area. The assessment resulted in two reports, one on the aquatic component and one on the terrestrial component. The terrestrial report forms the basis of the ecological section of the WARP.

The assessment used three models to predict risks posed by specific chemicals to plant species and animals within portions of impacted area. The study assessed the **magnitude** of potential impacts, the **likelihood** of the smelter being the cause of the impact, and **uncertainty** caused by natural variables and lack of knowledge about natural processes. When the combination of magnitude of the impact and evidence for a link with the smelter are strong enough, remediation actions are considered.

The terrestrial report concluded that there is very little risk of harmful effects to animals from smelter-related metals in the environment, but that there are residual impacts on wildlife habitat due to past damage to plant communities. It is these impacts that are being addressed by LCEMP.

WE WANT TO HEAR FROM YOU

4. Do you have any comments about the draft methodology and prioritization approach for ecological restoration? Are there other considerations on this topic you would like Teck to be aware of as we prepare to submit the WARP for review and approval?

Click here to fill out the online survey at **teck.com/TrailAreaWARP**

Additional Comments

5. Do you have any additional comments you wish to provide regarding any aspect of the Wide Area Remediation Plan?

Click here to fill out the online survey at **teck.com/TrailAreaWARP**

Tell us about you (optional)

Where do you live?

- ☐ Trail (Columbia Heights)
- ☐ Trail (East Trail)
- ☐ Trail (Glenmerry)
- ☐ Trail (Miral Heights)
- ☐ Trail (Shavers Bench)
- ☐ Trail (Sunningdale)
- ☐ Trail (Tadanac)
- ☐ Casino
- ☐ Castlegar
- ☐ Fruitvale
- ☐ Montrose
- ☐ Other: _____
- ☐ Oasis
- ☐ Rivervale
- ☐ Rossland
- ☐ Waneta
- ☐ Warfield

Are you a Teck employee?

☐ Yes ☐ No

If you would like to receive updates about the Wide Area Remediation Plan, please provide us with your name and email address.

Name: _____

Email: _____

Contact information will only be used to provide updates about the Wide Area Remediation Plan.