

OPEN HOUSE

Wide Area Remediation Plan
and Medical Health Officer
Recommendation



Interior Health

Trail
Operations

Teck

WELCOME

Teck Trail Operations (Teck) is developing a Wide Area Remediation Plan (WARP) 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.

At Teck's request, a Medical Health Officer has provided a recommendation to protect human health from lead (Pb), which will be incorporated into the plan.

Today, we invite you to:



meet members of the team developing the plan



learn more about the ongoing work to protect human and ecological health in the Trail area



provide your feedback

Trail
Operations

Teck

FEEDBACK OPPORTUNITIES

Until January 31, you can provide feedback regarding:

FEEDBACK TOPIC 1	FEEDBACK TOPIC 2	FEEDBACK TOPIC 3
<p>Medical Health Officer recommendation to protect human health</p> <p>A draft recommendation from the Interior Health 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.</p>	<p>Proposed measures to protect human health</p> <p>Proposed remediation measures outlined in the draft WARP related to human health.</p>	<p>Approach to restoring ecological health</p> <p>Proposed remediation measures outlined in the draft WARP related to the environment.</p>

Your feedback will be incorporated into the draft MHO Recommendation and WARP. Teck will incorporate the final MHO Recommendation into the WARP before finalizing and submitting the plan to the Ministry of Environment and Parks for Approval in Principle.

How to provide feedback

Visit the engagement site to:

- Read the discussion guide and complete the online feedback form
- Read technical supporting documents

You can also send an email to:

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



Fill out the
online survey at
teck.com/TrailAreaWARP

ABOUT TECK TRAIL OPERATIONS

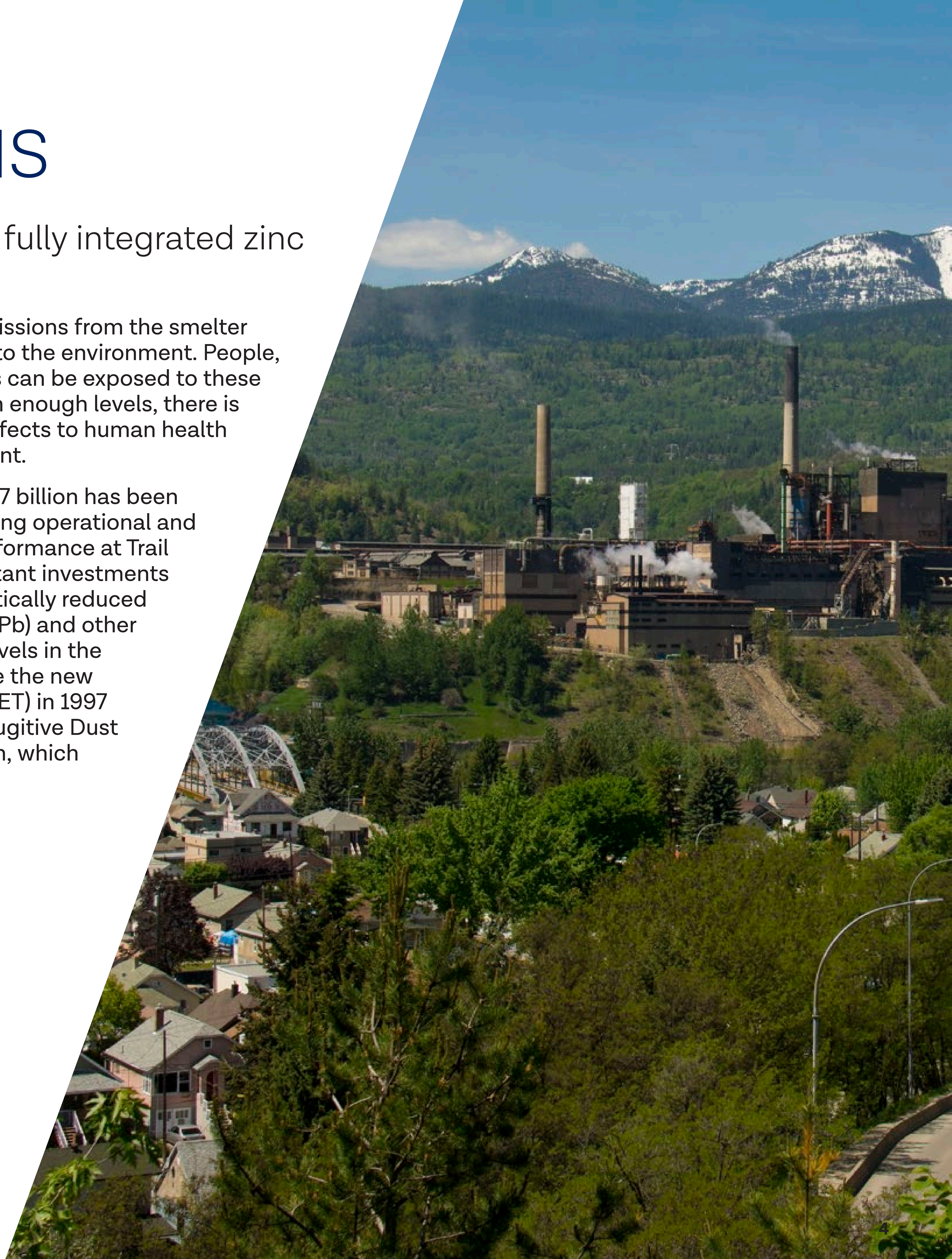
Teck Trail Operations is one of the world's largest fully integrated zinc and lead smelting and refining complexes.

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.

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.



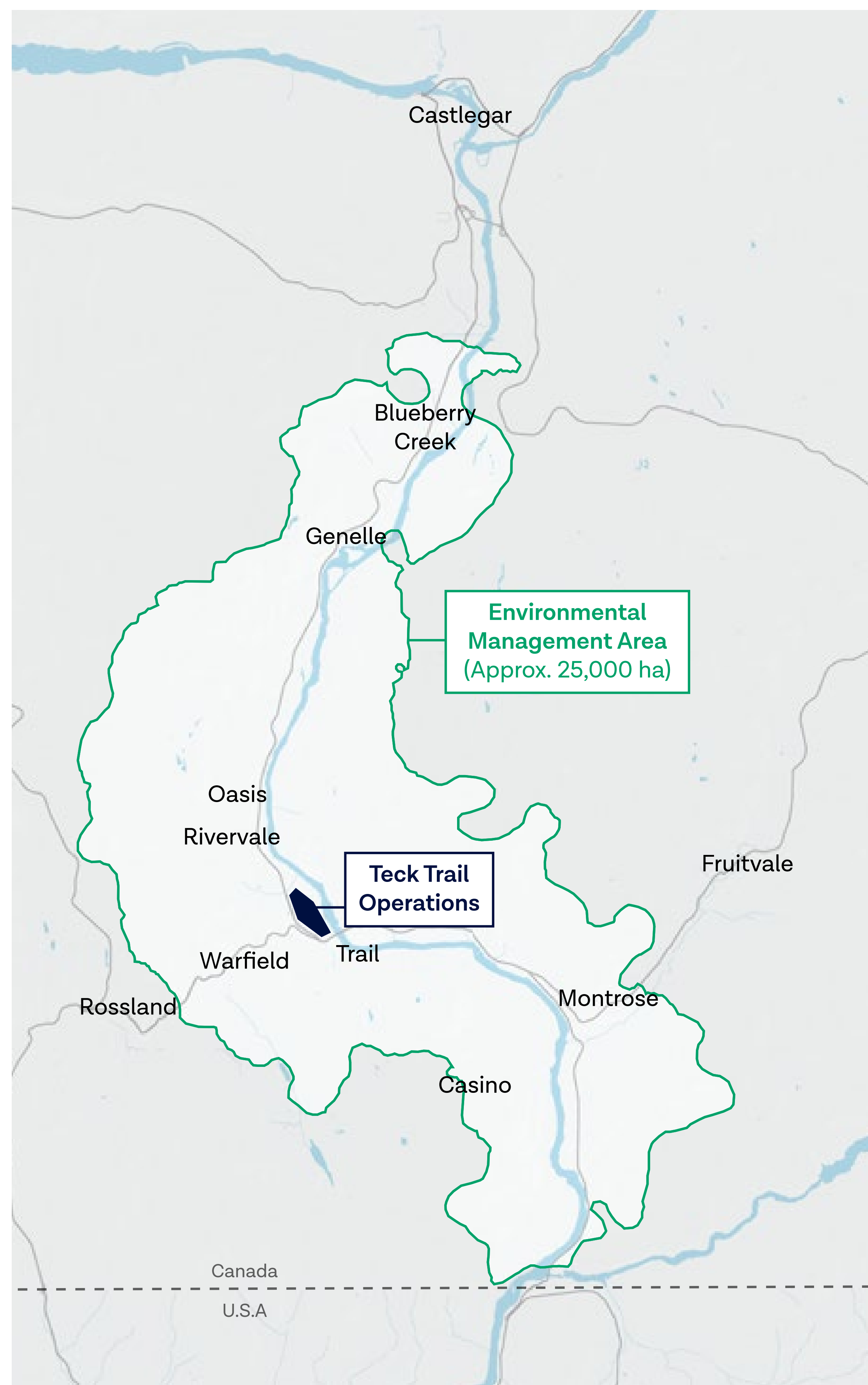
METAL CONTAMINANTS

IMPACTS & ONGOING MITIGATIONS

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

	Human Health	Ecological Health
Potential impacts	Children's exposure to lead (Pb) can increase blood lead (Pb) levels. This can result in impacts to brain development.	Impacts to plant communities, leading to a loss of biodiversity and wildlife habitat
Ongoing mitigation actions	<p>TRAIL AREA HEALTH AND ENVIRONMENT PROGRAM (THEP)</p> <p>Established in 2001 as a partnership between the City of Trail, Teck Trail Operations, Interior Health, and the Ministry of Environment and Parks</p> <p>A holistic program focused on reducing lead (Pb) exposure by addressing four key pillars: air, soil, health, and built environments</p> <p>Learn more at thep.ca</p>	<p>LOWER COLUMBIA ECOSYSTEM MANAGEMENT PROGRAM (LCEMP)</p> <p>Overseen by a working group including local and provincial governments, community-based groups, and Teck Trail Operations</p> <p>A collaborative approach to assess, rehabilitate, monitor, conserve and enhance wildland ecosystems</p> <p>Learn more at teck.com/lcemp</p>

WHAT IS A 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.

Since the 1990s, Teck has worked to identify risks to people and the environment and implement programs to address those risks. This includes impacts associated with historical air emissions.

In response to a request from the Ministry of Environment and Parks, Teck has developed the Wide Area Remediation Plan to formalize aspects of this ongoing work.

Environmental Management Area

The WARP encompasses areas where smelter-related metals (arsenic, cadmium, lead [Pb] and zinc) are present at higher concentrations than the provincial Contaminated Sites Regulation standards or regional background levels. This is called the Environmental Management Area. It is centered around Teck Trail Operations and extends to locations where metals from historical smelter emissions have settled.

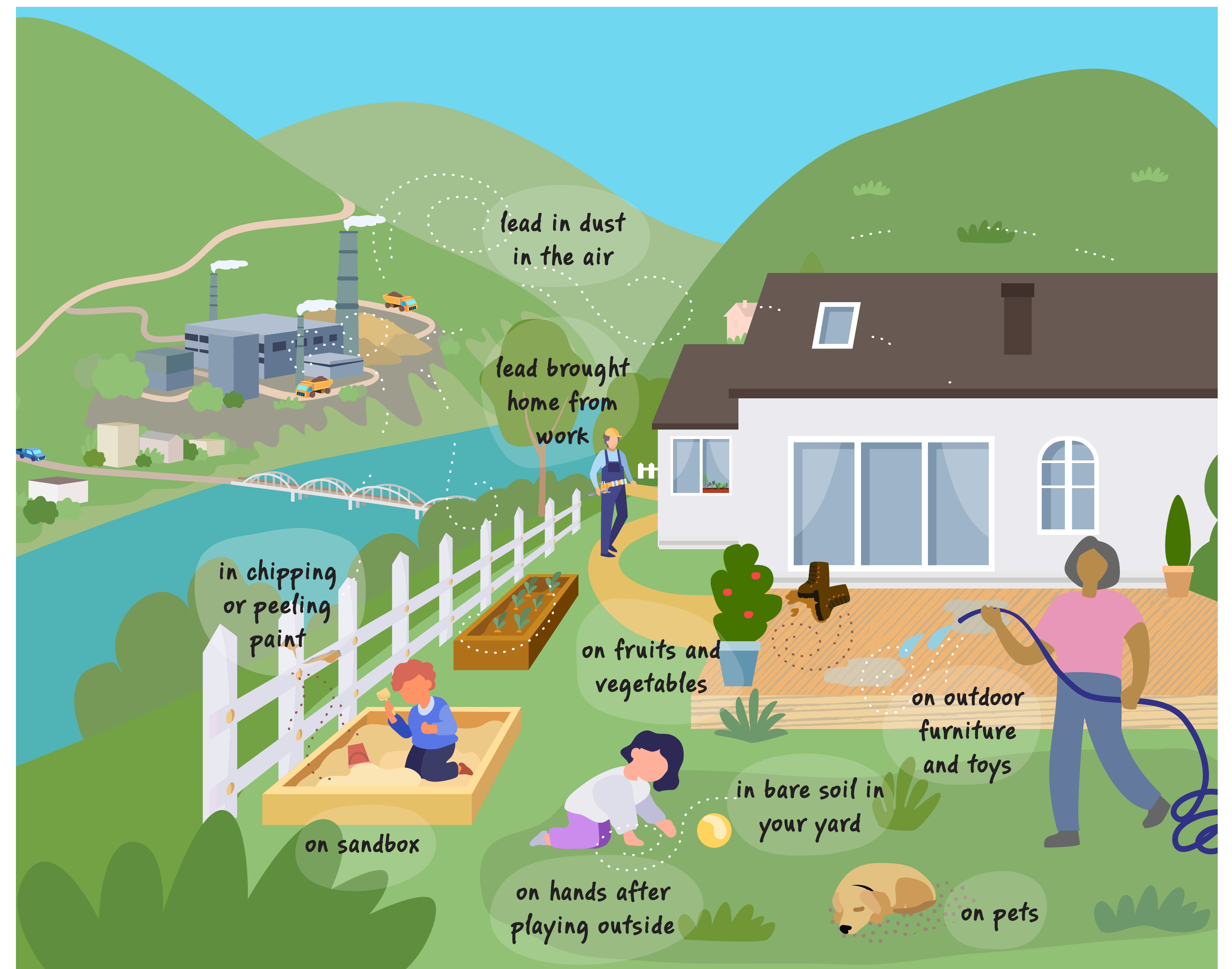
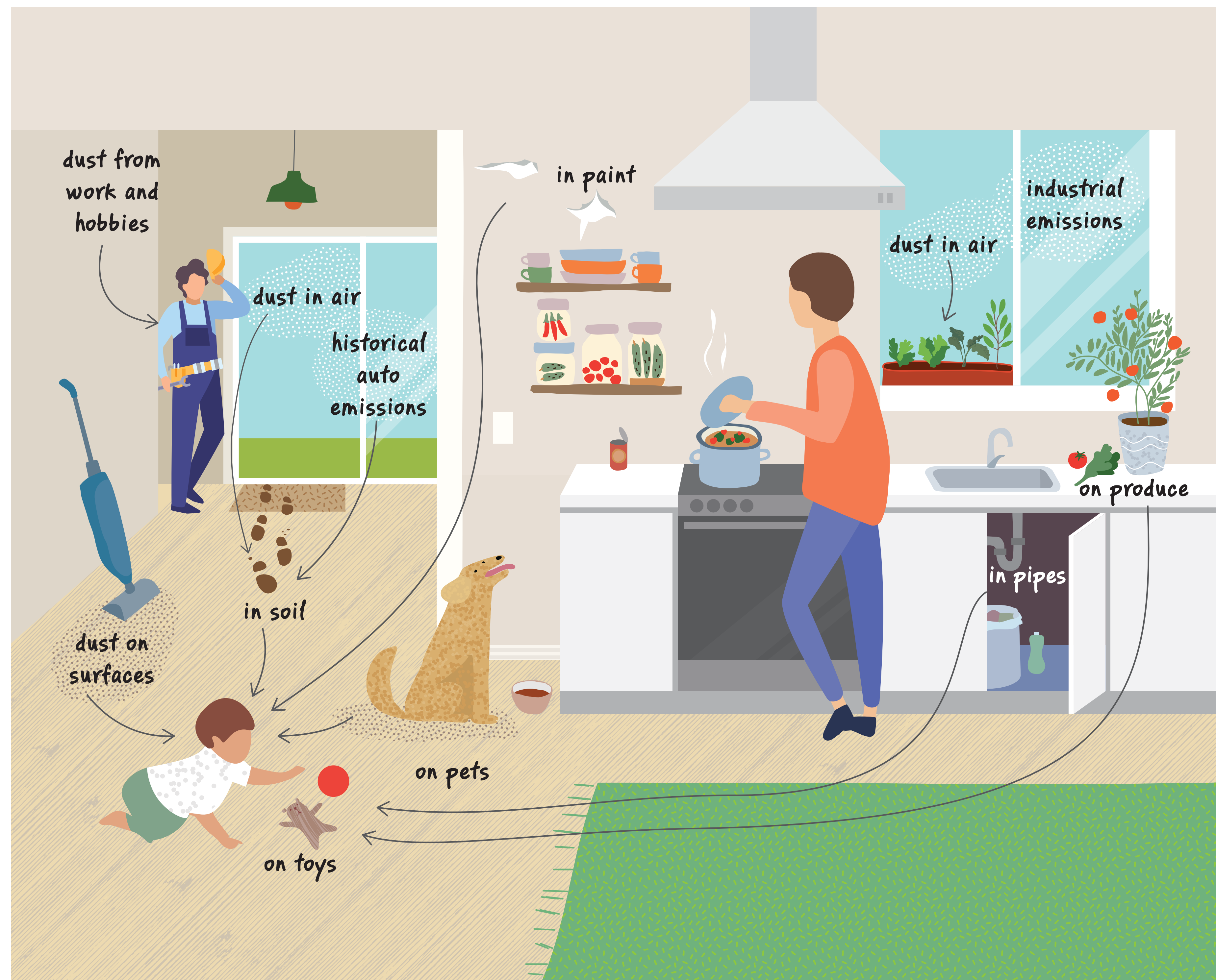
The Plan will:

- Identify Teck as the responsible party
- Enable regulatory oversight for remediation activities
- Include approved standards and priorities for remediation
 - Blood lead (Pb) target to support holistic approach to children's reducing lead (Pb) exposure
 - Soil lead (Pb) standard as one way to reduce children's lead (Pb) exposure
- Formalize Teck's approach to rehabilitating plant communities in wildlands
- Include a five-year review process to inform continuous improvement

HUMAN HEALTH LEAD EXPOSURE PATHWAYS

Lead (Pb) can come from many sources.

These are called 'exposure pathways' in the WARP.



REGULATORY BACKGROUND

The WARP is needed to ensure contaminated soil management in the Trail area follows an approved regulatory process. The Plan provides certainty to the local community that Teck will continue this work.

The WARP focuses on impacts from historical air emissions. Other regulated programs are in place to protect air quality and aquatic environments.

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)

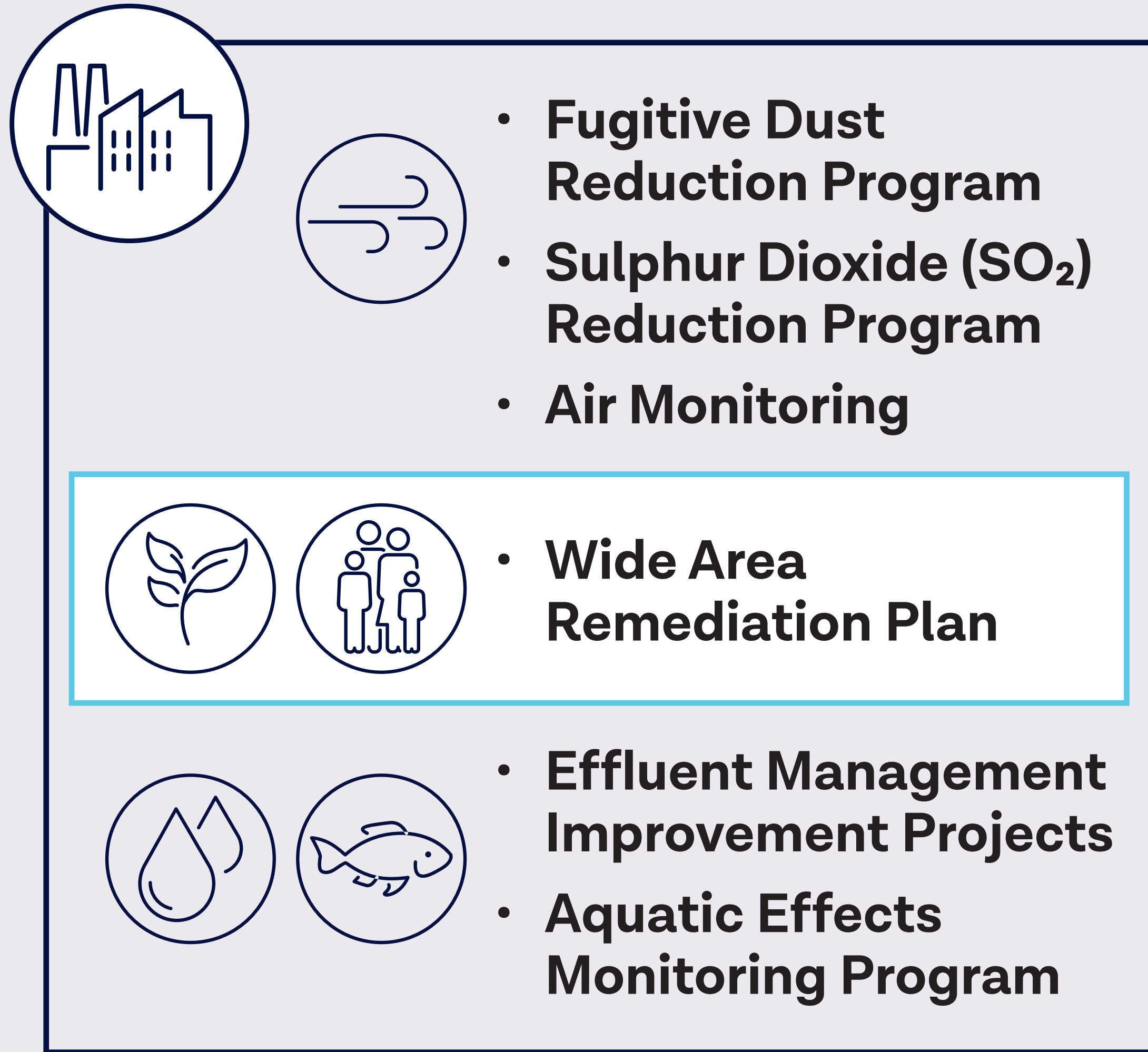
The EMA is British Columbia’s primary environmental legislation, which governs pollution control, waste management, and the management of contaminated sites. Its goal is to protect both the environment and human health.

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.

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.



ENVIRONMENTAL STANDARDS

Environmental standards are the rules we follow to determine whether an area needs to be remediated.

Numerical standards

- Concentration limits for contaminants, such as metals
- Area with concentrations above limits is “contaminated”
- Contamination does not necessarily mean there is unacceptable risk, nor that remediation is required

Risk-based standards

- Define acceptable risk levels to protect people and the environment
- Incorporate local data to determine whether contamination may pose a risk to people or the environment
- Incorporate a Medical Health Officer recommendation

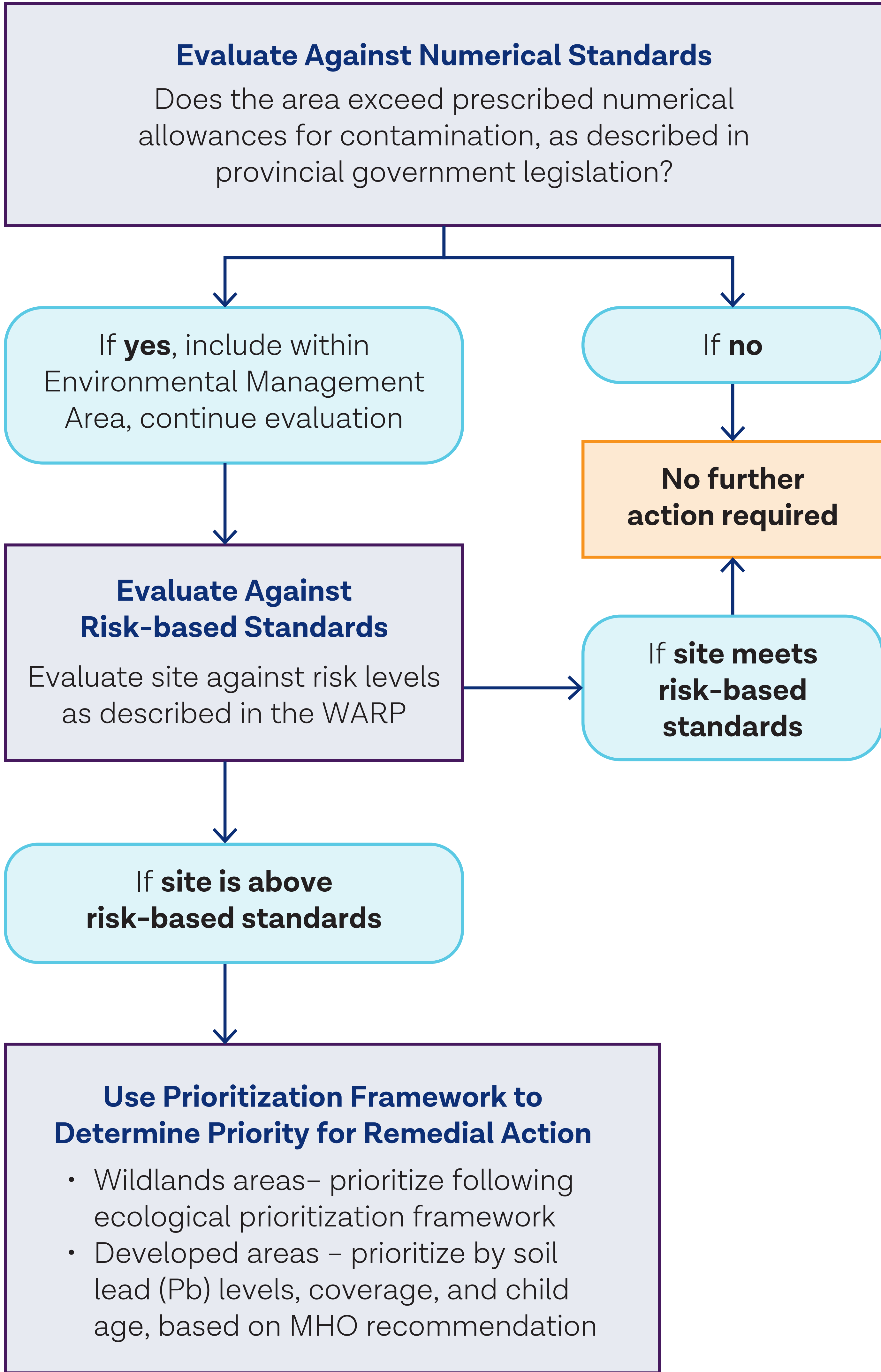
REFINING STANDARDS WITH LOCAL DATA

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

The recommendation uses local blood testing data to ensure the measures and standards in the WARP are best suited to protecting the health of our community.

The MHO’s recommendations include:

- A focus on blood lead (Pb) levels in young children as a key indicator of exposure, rather than just soil concentrations
- Use of Trail area specific analysis to guide the development of an acceptable soil lead (Pb) concentration



BACKGROUND RESEARCH

Human Health Research

HUMAN HEALTH RISK ASSESSMENTS (HHRAs)

Teck conducted studies from 2000–2011 to investigate the effects of metal contaminants on human health

Conclusion:

- Levels of arsenic, cadmium and zinc do not pose a risk to people
- Trail Area Health & Environment Program, previously initiated to reduce risks associated with lead (Pb), should continue

2024 HHRA FOR LEAD (Pb)

Conducted 2023–2024 to assess human health risks associated with exposure to lead (Pb) from the smelter operations in Trail area

Conclusion:

- Risks from lead (Pb) were not predicted for adults and adolescents
- Recommended further evaluation for children (more about this in Feedback Topic 1)

Ecological Research

ECOLOGICAL RISK ASSESSMENT (ERA)

Terrestrial report forms the basis of the ecological section of the WARP

Used models to predict risks posed by specific chemicals to plant species and animals

Assessed the:

- magnitude of potential impacts
- likelihood of the smelter being the cause of the impact
- uncertainty caused by natural variables and lack of knowledge about natural processes

Conclusion:

- Very little risk of harmful effects to animals from smelter-related metals in the environment
- Residual impacts on wildlife habitat due to past damage to plant communities



Learn more

These research documents are available in full on the WARP engagement site at teck.com/TrailAreaWARP



Medical Health Officer recommendation to protect human health

A Medical Health Officer (MHO) was requested to provide a recommended standard to guide remediation of lead (Pb) within the Environmental Management Area.

The MHO has responsibilities under the *Public Health Act* and applies these in other legislation where they are named, such as the Contaminated Sites Regulation.

The draft recommendation is to use blood lead (Pb) as the standard and to continue to reduce children's blood lead (Pb) in Trail. A blood lead (Pb) standard encourages Teck to address multiple exposure pathways – not just soil, which is the focus of the WARP.

The recommendation of the MHO is to decrease the gap between the blood lead (Pb) levels of children in Trail and that of other Canadian children of a similar age group.



LEAD (Pb) AND HEALTH

The most sensitive (and most studied) health measure related to lead (Pb) exposure is IQ. The other effects of lead exposure on brain development are less clear but include impacts to attention.



What is IQ?

IQ (Intelligence Quotient) is a scientific measure of a person's intelligence. It is just one of many indicators of brain health.

The average IQ in Canada is about 100. If children have blood lead (Pb) levels from 1-2 ug/dL, this may lead to a decrease in IQ of one point **at a population level.**

We don't have enough information to tell us an exact level of blood lead (Pb) below which there would be **no measurable health effects.**

While we can't determine a threshold below which we see no health effects from lead (Pb), the effects of low levels of blood lead (Pb) are so small they can't be measured by today's tests.

BRAIN HEALTH

Other factors can have a much larger impact on a child's IQ as their brain develops.

For example:

- Economic stability
- Education access and quality
- Nutrition
- Access to quality healthcare
- Neighbourhood and build environment
- Social community

To demonstrate this loss, one must do a large study on thousands of children. A one IQ point loss is impossible to measure on an individual level, or even among the population of children in the Trail area.

MEDICAL HEALTH OFFICER RECOMMENDATION

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

Remediation of lead (Pb) in soil alone is not sufficient. A blood lead (Pb) concentration target is the most health-protective measure of success.

It accounts for all exposures to lead (Pb), which encourages Teck to continue its holistic approach to remediating multiple exposure sources.

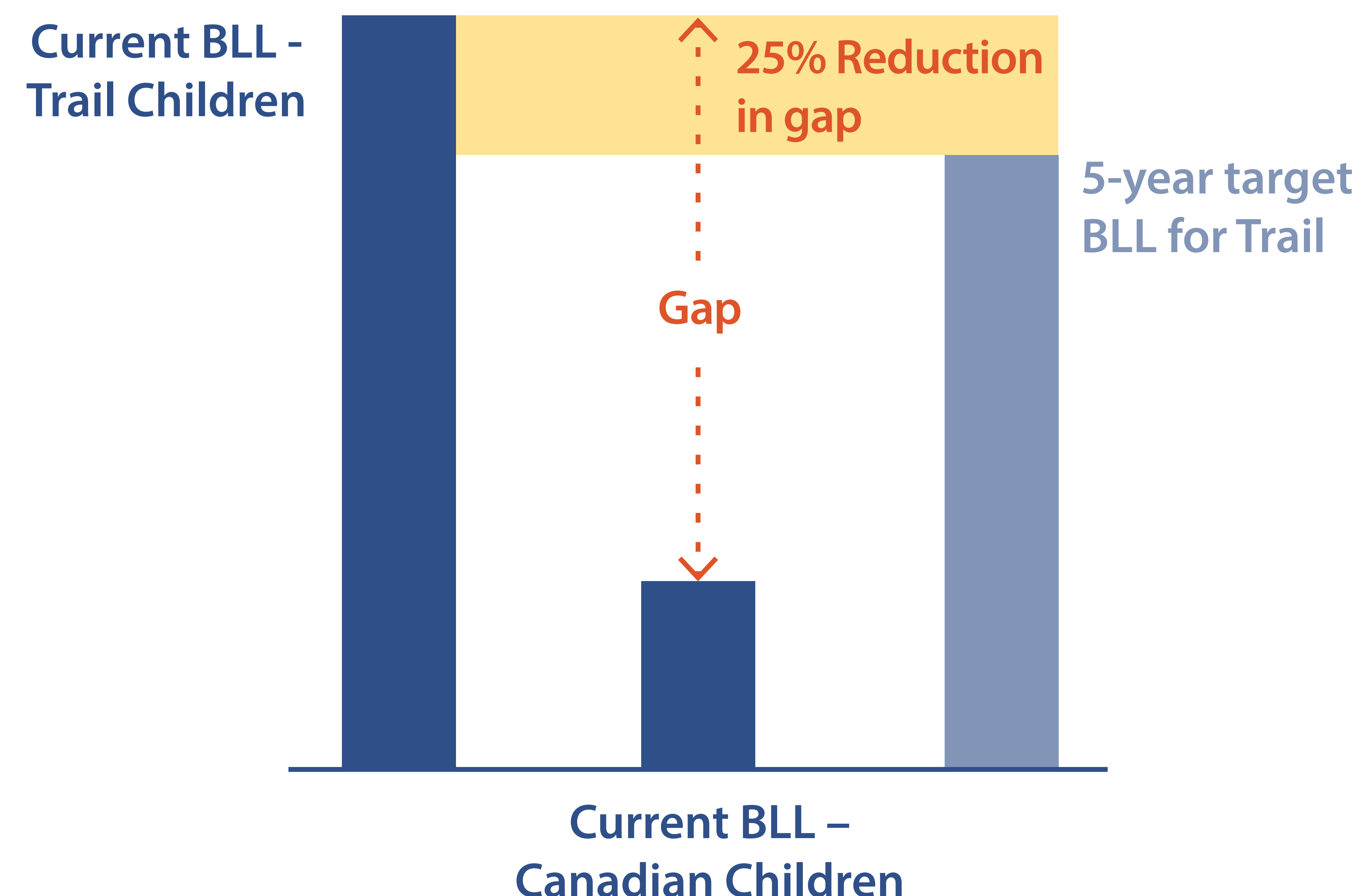
WHY CHILDREN?

Young children are exposed to more lead (Pb) in the environment than older age groups.

This is due to their behaviors, such as hand to mouth activities, crawling on floors, and mouthing objects, which result in young children “eating more dirt and dust”. Young children also absorb greater amounts of ingested lead (Pb) into their blood and their bodies take longer to get rid of 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.



TRAIL BLOOD LEAD ANALYSIS

FACTORS IMPACTING BLOOD LEAD

Interior Health analyzed the association of sources of environmental lead (Pb) and blood lead (Pb) data from 2007-2023. This analysis helps us understand which sources of lead (Pb) and other relevant variables impact children’s blood lead (Pb) levels in Trail.

Findings indicated some factors resulted in **increased blood lead levels:**

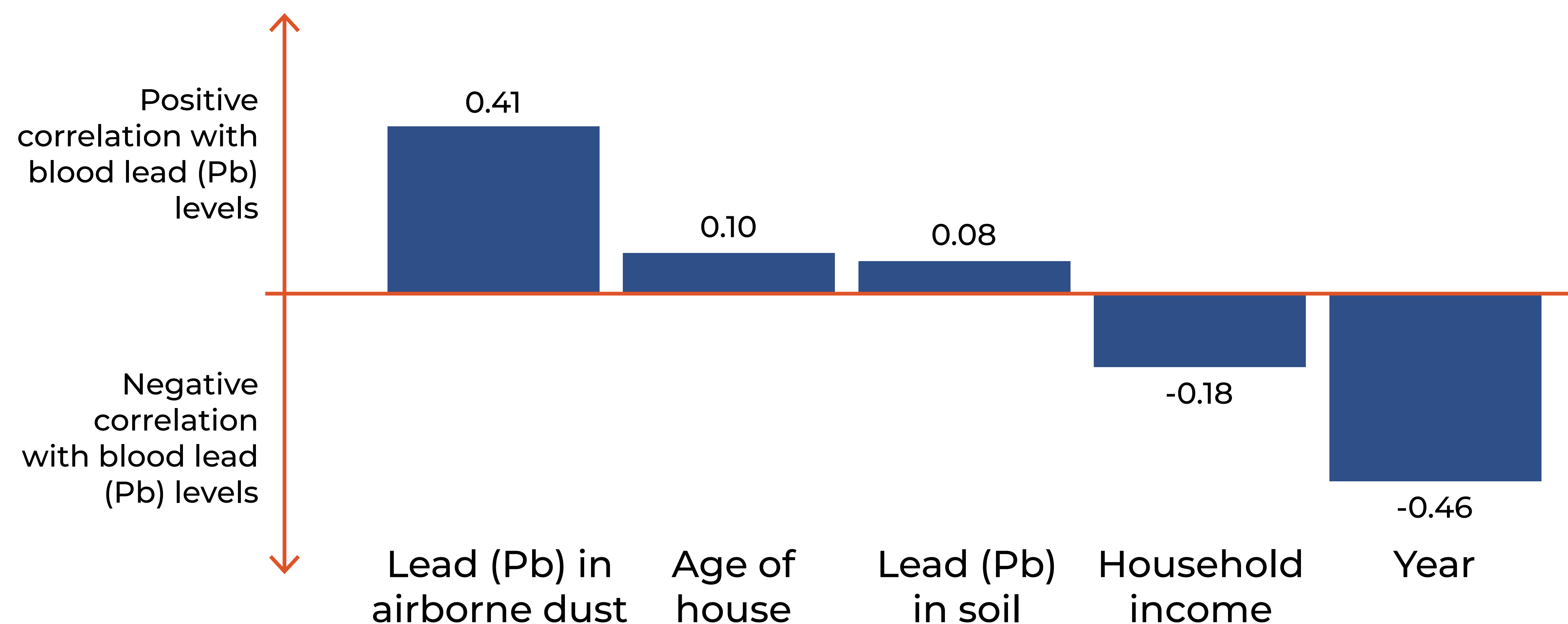
- **Lead (Pb) in airborne dust:** Higher concentrations of lead (Pb) in dust particles near children’s homes increased the likelihood of higher blood lead (Pb) levels.
 - Strongest correlation, thought to be the biggest contributor to blood lead (Pb) levels in Trail area
- **Age of home:** Children living in older homes were found to be more likely to have higher blood lead (Pb) values
- **Lead (Pb) in soil:** Higher lead concentrations in soil in a child’s yard increased likelihood of higher blood lead (Pb) levels
 - Weak to moderate correlation

Other factors resulted in **decreased blood lead levels:**

- **Household income:** Children of higher income homes were found to have lower blood lead (Pb) levels
- **Year:** As the years progress, blood lead (Pb) levels have been decreasing, largely due to broad national environmental lead (Pb) reductions, such as removal of lead (Pb) from gasoline, paint, and pipes

SOIL LEAD CONCENTRATION

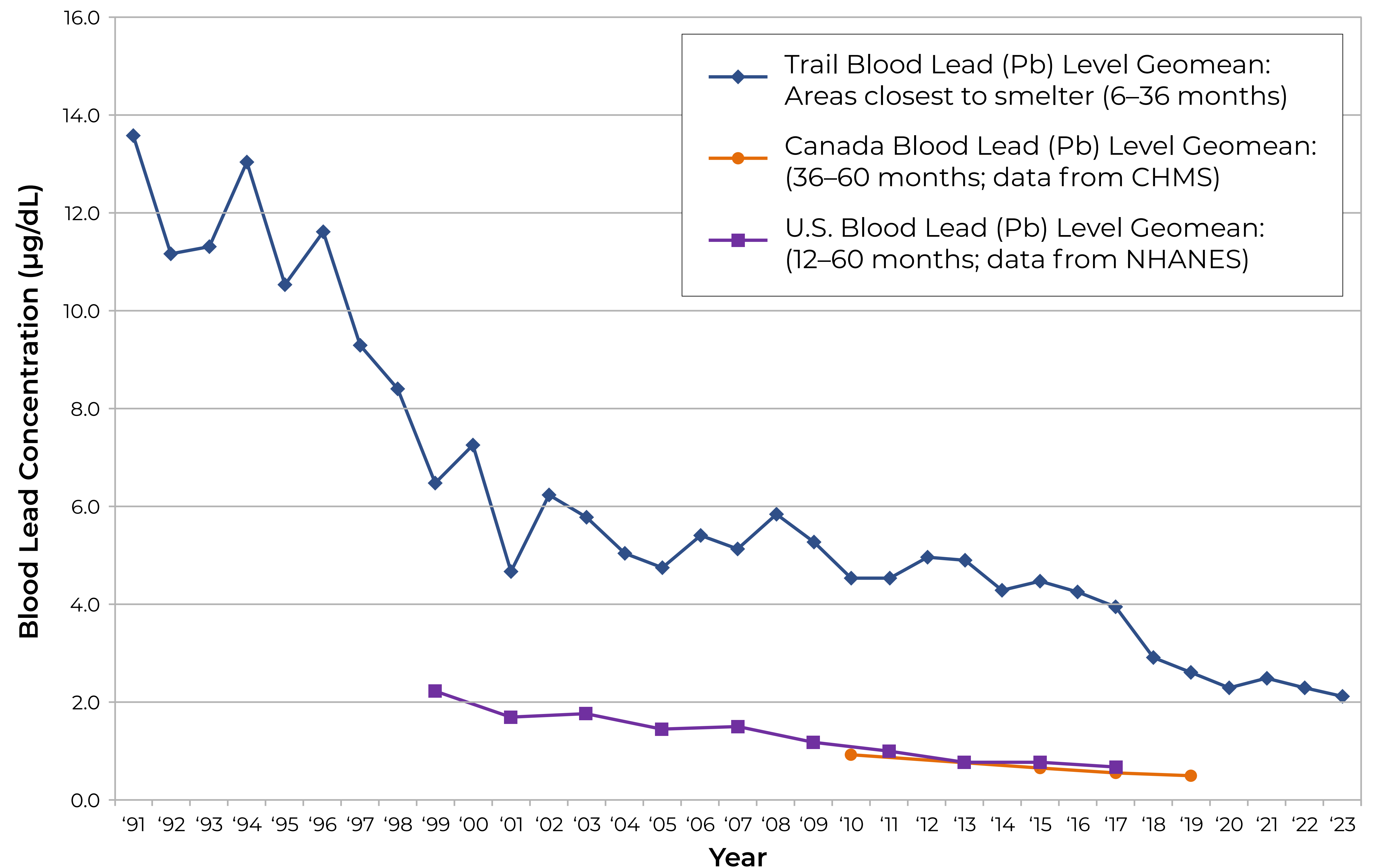
The Human Health Risk Assessment for Lead (Pb) used data from the Interior Health Analysis to determine a reasonable and health protective soil lead concentration, specific for the Trail Environmental Management area.



TRAIL BLOOD LEAD ANALYSIS

BLOOD LEAD TREND COMPARISON

An analysis of the rate of change of blood lead (Pb) levels over time indicates that Trail children's blood lead values demonstrate higher absolute rate of change when compared to Canadian and US children.



FEEDBACK TOPIC 1

SUMMARY

Remediation of lead (Pb) in soil alone is not sufficient to protect health. We must also reduce impacts from other sources such as lead (Pb) in airborne dust. The MHO recommendation, alongside a Trail specific soil concentration goal, will best support interventions to protect the population from the health effects of lead (Pb).

The MHO Recommendation encourages Teck to continue its holistic approach to reducing blood lead (Pb) levels in the community.

The MHO Recommendation sets a target for continued remediation efforts to ensure the gap between blood lead (Pb) levels of children in Trail and those across Canada continues to decrease.

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

What happens next?

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

The blood lead (Pb) target will be refreshed every five years, aligned with the WARP’s review cycle, to ensure continued progress.

We want to hear from you

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?

Fill out the survey at
teck.com/TrailAreaWARP



Proposed measures to protect human health



The soil remediation actions in the WARP aren't new – they are already part of the work being completed through the Trail Area Health and Environment Program (THEP).

Although the WARP focuses on soil remediation, this is only one way to reduce exposure to lead (Pb). THEP focuses on reducing lead (Pb) exposure in the community by addressing four key pillars – air, soil, health, and built environments.

The WARP will formalize the soil component of this ongoing work and gives the provincial government power to oversee it. This provides certainty

to residents that Teck will continue to support progress toward the MHO recommended blood lead (Pb) target.

The WARP includes a prioritization approach and measures for remediating contaminated soil. Those familiar with THEP and ongoing soil remediation efforts in the Trail area will be familiar with these initiatives already.



PROPOSED PRIORITIZATION APPROACH

This approach will guide how Teck determines which properties are highest priority for remediation.

Soil management is prioritized on residential properties where:

- Children younger than age 6 are present
- Bare soils are present; and
- Soil lead (Pb) levels are above the risk-based standard of 400 mg/kg

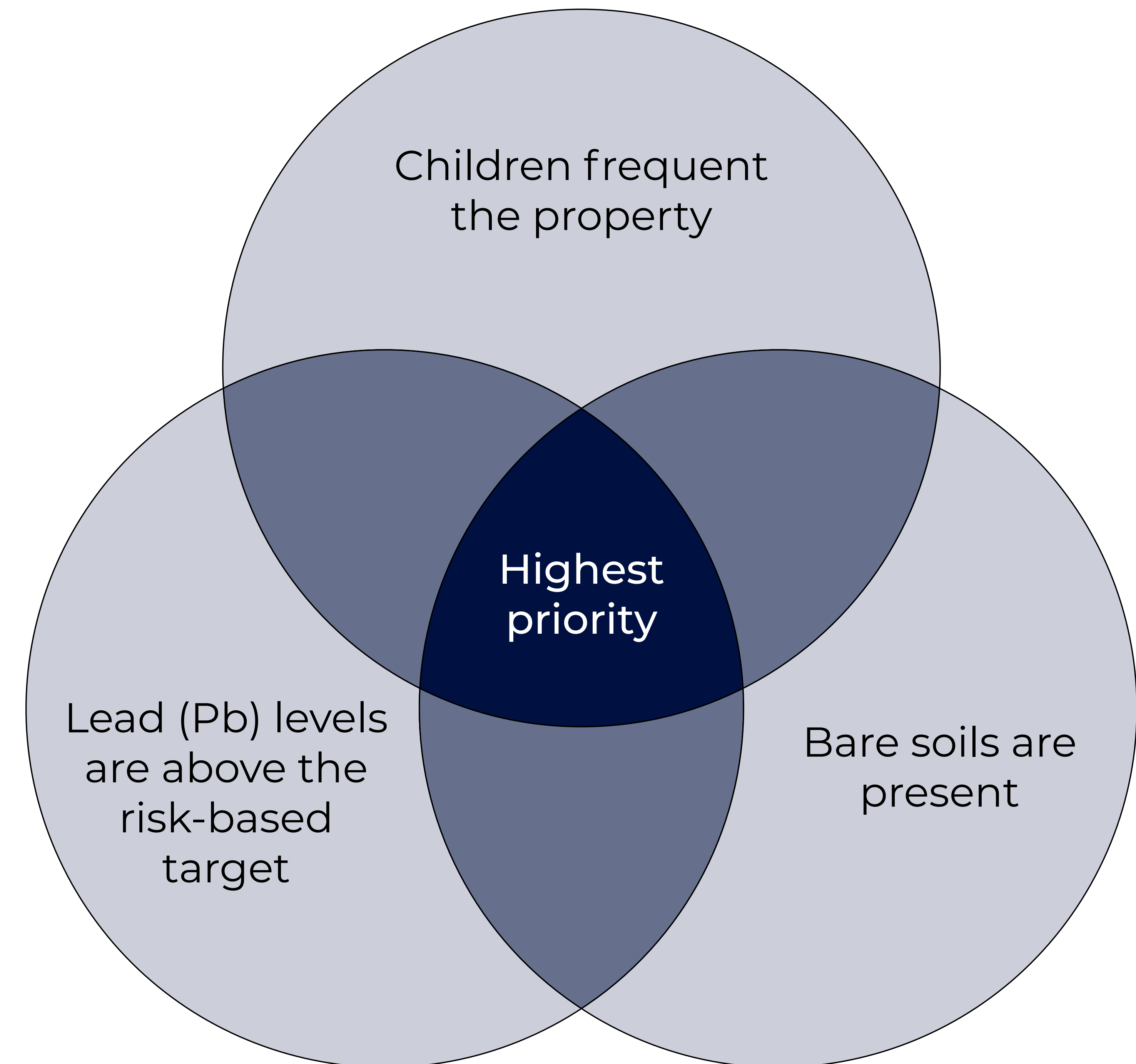
Some residential properties that are not frequented by children may be prioritized if they contribute to overall neighbourhood exposure.

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

We want to hear from you

Do you have any comments on the proposed approach to prioritizing properties?

Fill out the survey at
teck.com/TrailAreaWARP



PROPOSED REMEDIATION MEASURES

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 removal, installation of a permeable fabric to provide a physical barrier and define the extent of removal for future reference, 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

We want to hear from you

Do you have any comments on the proposed soil management measures?

Fill out the survey at
teck.com/TrailAreaWARP



A residential property before, during, and after soil remediation.



Approach to restoring ecological health



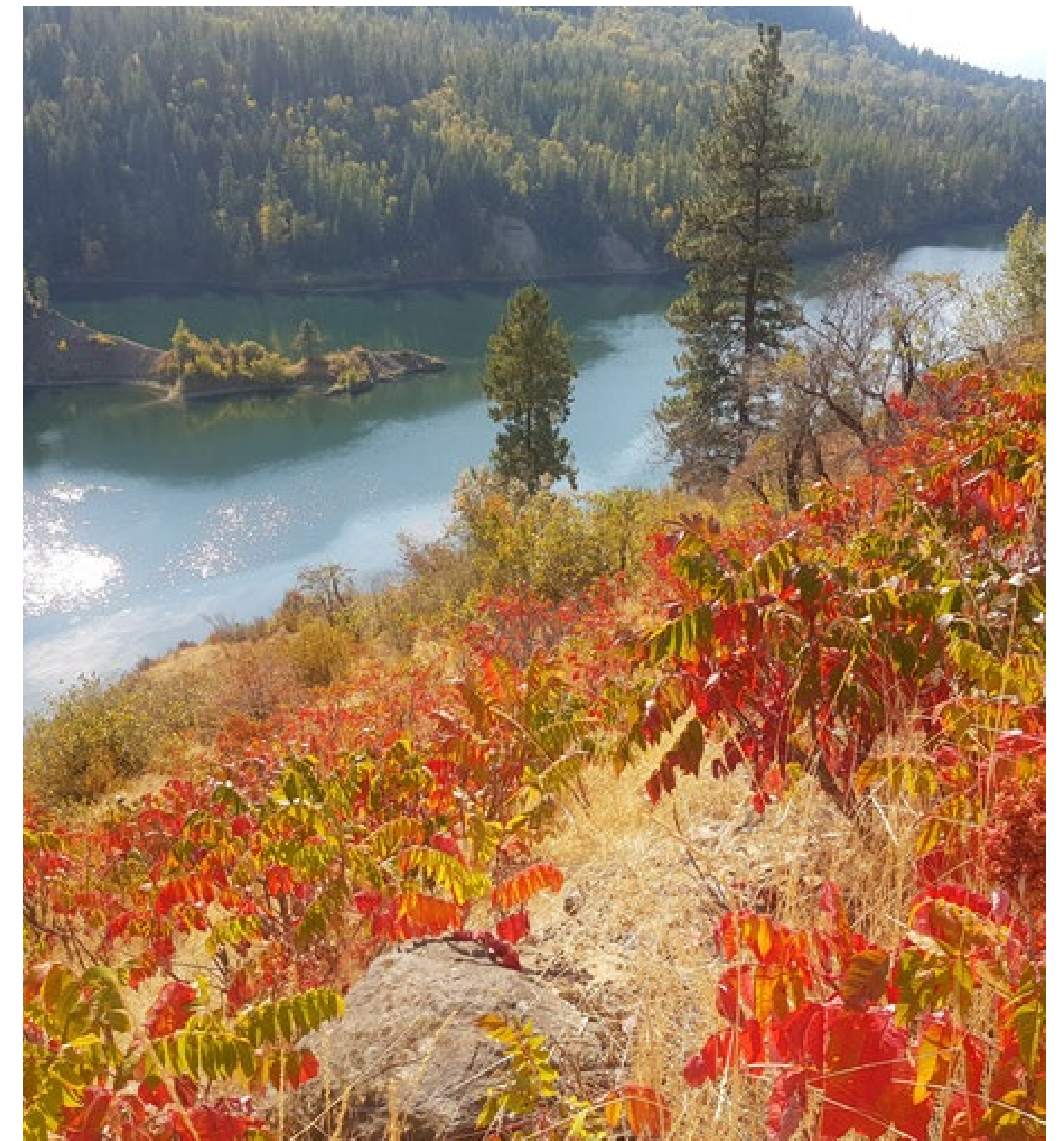
The ecological restoration portion of the WARP is a continuation of existing work to restore wildlands through the Lower Columbia Ecosystem Management Program (LCEMP).

The LCEMP is overseen by a working group including local and provincial governments, community-based groups, Indigenous groups, and Teck Trail Operations.

Like the human health portion of the WARP, the ecological portion of the Plan will formalize this ongoing work and give the provincial government power to oversee it.

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.



PROPOSED ECOLOGICAL REMEDIATION & PRIORITIZATION

Remediation of wildlands will aim to restore impacted sites to a condition similar to a reference area that has not been impacted.

For forested sites, this is based on plant community surveys from similar forested areas.

Non-forested sites will be restored based on detailed descriptions of reference ecosystems provided by the BC Conservation Data Centre.

Ecological Site Prioritization

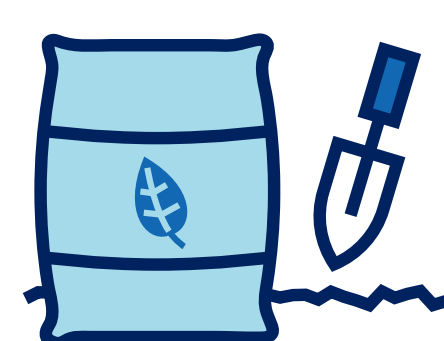
Ecological sites are prioritized for restoration according to the priorities of Indigenous communities, the Crown, landowners, communities and regulatory bodies.

Other site considerations that inform our prioritization approach include:

- anticipated land use or zoning
- size
- presence of priority habitats or species-at-risk
- probability of successful restoration

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.

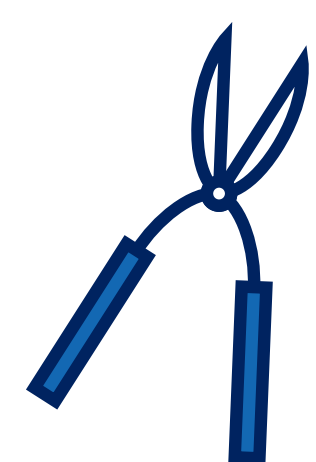
Where feasible, restoration techniques include:



Improve soil conditions: amend soils to support plant health



Treat weeds: use selective pulling, herbicide, and/or bio-control to remove weeds



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



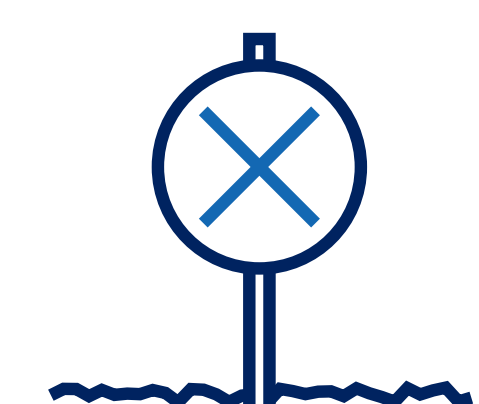
Plant: plant native trees, shrubs and/or herbs



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

We want to hear from you

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?

Fill out the survey at teck.com/TrailAreaWARP



NEXT STEPS

CONSIDER FEEDBACK

Teck and the Medical Health Officer will consider feedback from this engagement.

REVISE WARP

Teck will incorporate the MHO recommendation and feedback from this engagement into the WARP before applying for an Approval in Principle from the Ministry of Environment and Parks.

FINALIZE MHO RECOMMENDATION

The Medical Health Officer will finalize the recommendation for review by the Provincial Health Officer.

Once approved, the WARP will be regulated by the Government of B.C.

REVIEW CYCLE

The WARP will be reviewed every five years.

The remediation targets will be evaluated and adjusted, and new public health data and other relevant information will be incorporated. This ensures the continuous improvement of conditions based on the best available science.