Elk Valley Water Quality Plan

Annex C.5

Phase 3 Consultation Discussion Guide and Feedback Form

Teck

Elk Valley Water Quality Plan – Phase 3 Consultation Discussion Guide

June 13, 2014

www.teck.com/ElkValley

Teck

Introduction

Teck is working with communities, First Nations and governments to create an Elk Valley Water Quality Plan that will maintain the health of the watershed and ensure continued, sustainable mining in the Elk Valley.

During Phase 3 Consultation regarding the Elk Valley Water Quality Plan, Teck is seeking comments on this document, which provides key elements of the draft Elk Valley Water Quality Plan.

Comments will be accepted until July 4, 2014. Please provide your feedback by:

- Email: elk.valley@teck.com
- Mail: Teck Elk Valley Water Quality Plan
  P.O. Box 1777
  Sparwood, B.C.
  V0B 2G0
- Online: feedback form at www.teck.com/ElkValley

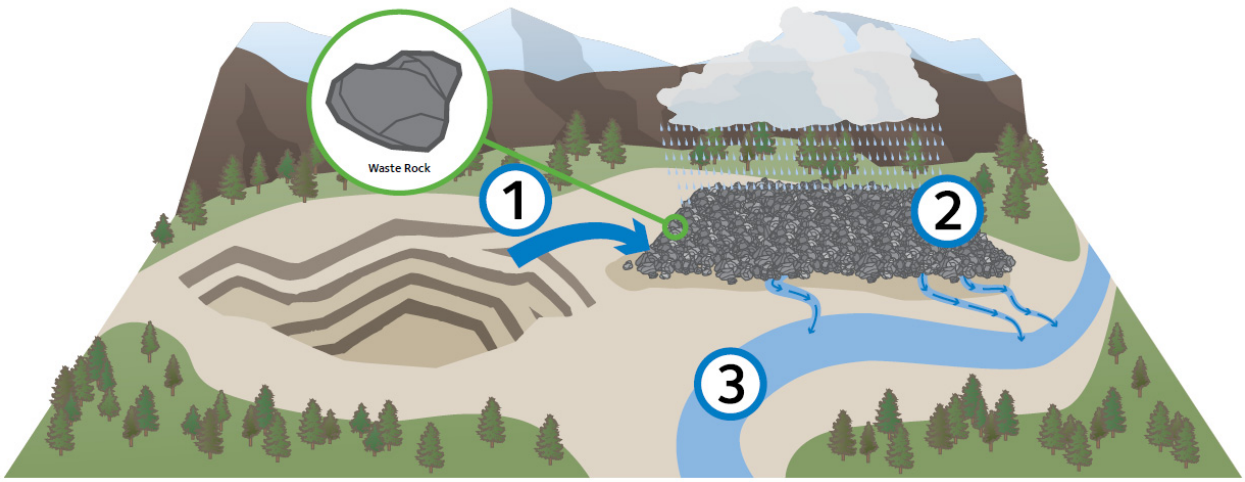
Input will be considered, along with technical and socio-economic information, as Teck finalizes the Elk Valley Water Quality Plan for submission to the B.C. Ministry of Environment.

The Elk Valley is located in the southeast corner of British Columbia, and is home to the Elk and Fording rivers, which flow into Lake Koocanusa, a reservoir that crosses the Canada-U.S. border.

The economy of the Elk Valley and surrounding region is heavily dependent on steelmaking coal mining and related activity. Teck plays an important role in supporting the economic and social pillars of communities in the Elk Valley through the operation of its five mines, which directly employ over 4,000 people locally. Teck is proud of its workers and their commitment to mining excellence and sustainable resource development.

Teck's coal reserves and resources are expected to support continued mining in the Elk Valley for many years. The Elk Valley Water Quality Plan will guide the future of mining and will help to protect water quality. While other companies have tenure to mine in the Elk Valley, Teck is the only company with active mines in the area.

The Challenge



1. Steelmaking coal occurs as layers or seams within rock. To access the coal, large quantities of this rock, referred to as waste rock, are mined and placed in piles within and adjacent to the mine pits.

2. Water from both precipitation and runoff flows through these rock piles and carries selenium and other substances, including cadmium and sulphate as well as nitrate from blasting residue, into the local watershed.

3. If present in high enough concentrations in the watershed, those substances can adversely affect aquatic health.

The Elk Valley Water Quality Plan Process

In April 2013, the Government of B.C. issued a Ministerial Order which established a process to create an Elk Valley Water Quality Plan (the Plan), the objectives of which are to manage selenium, cadmium, nitrate and sulphate, as well as address evidence of calcite formation, to achieve:

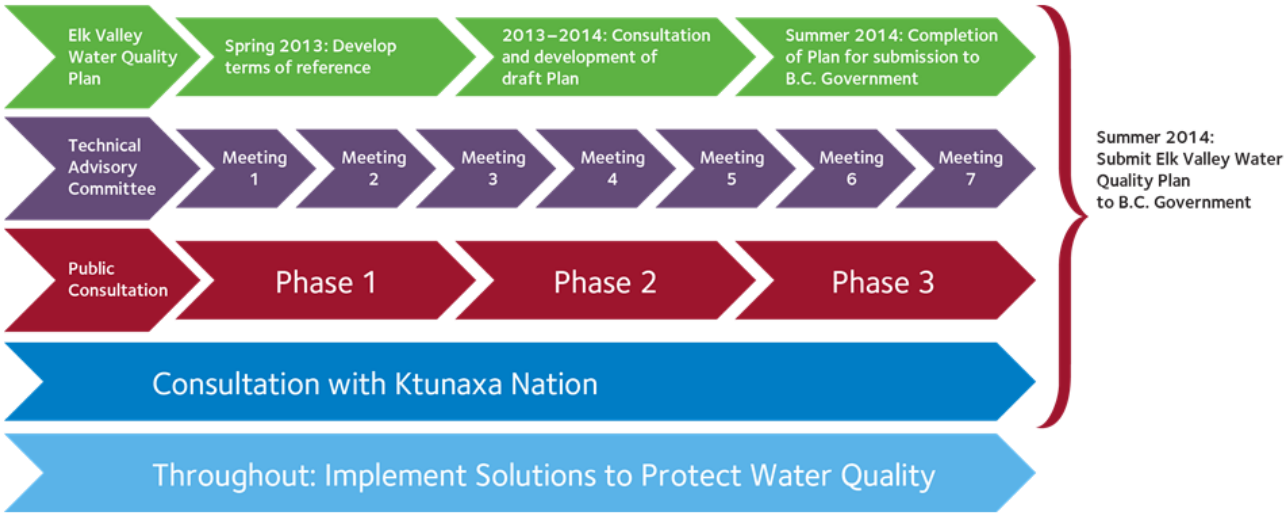
- protection of aquatic ecosystem health;
- management of bioaccumulation of water quality constituents, such as in fish tissue;
- protection of human health, and
- protection of groundwater

The Plan will establish short-, medium- and long-term targets to protect water quality, as well as targets to manage rates of calcite formation, to achieve these objectives.

Teck is developing the Elk Valley Water Quality Plan with input from governments in Canada and the U.S., local governments, First Nations, other mining companies, environmental and non-government organizations and the public. A Technical Advisory Committee composed of independent government, First Nation and scientific representatives is providing science-based advice to Teck on the development of the Plan.

The Plan will be submitted to the B.C. Government on July 22, 2014. Once approved by the provincial government, Teck will implement the Plan.

The Ministerial Order and the Approved Terms of Reference can be found at www.teck.com/ElkValley



Timeline for development of the Elk Valley Water Quality Plan

How Teck is Protecting Water Quality Now
While the Elk Valley Water Quality Plan is in development, Teck has, and will continue to, take action to protect water quality. The construction of a water treatment plant is already underway, and Teck is conducting ongoing aquatic monitoring and extensive research and development.

Steps Teck has taken include:

- **Water treatment facilities:** Teck's first water treatment facility is currently under construction at Line Creek Operations and scheduled to begin treating water in 2014.
- **Water diversions:** Teck has constructed water diversions at several operations and has proposed construction of additional diversions to keep water clean.
- **Research and Development:** Teck launched an extensive research and development program in 2011 to improve water quality management technologies and techniques. See page 11 for more information on Teck's Research and Development (R&D) program.

What We've Heard To Date – Public Consultation and Technical Advisory Committee

Teck has been providing Elk Valley communities and other identified stakeholders with information regarding the Elk Valley Water Quality Plan since the establishment of the process in April 2013, including two phases of public consultation. Consultation Summary Reports from Phase 1 and Phase 2 consultation can be found at www.teck.com/ElkValley.

Phase 1 Consultation (October 28 – November 29, 2013)

During Phase 1 consultation, Teck provided information regarding the process to develop the Elk Valley Water Quality Plan and sought input regarding current and potential water treatment and water quality management approaches, Teck's plan for ongoing mitigation strategies and the supporting socio-economic impact analysis.

Phase 1 consultation participants were supportive of Teck developing the Elk Valley Water Quality Plan and were in agreement with the proposed key steps in developing the Plan. Some participants suggested that a broader water use plan be developed for the Elk Valley, which should consider more than Teck's operations.

Some Phase 1 consultation participants were interested to know what considerations have been given to testing well water. Some wanted to know how existing B.C. drinking water guidelines would be factored into the development of targets for the Plan. Phase 1 consultation participants also wanted more information about the water treatment and water quality management options that Teck has proposed, and requested that Teck ensure monitoring and reporting of water quality continue to be updated once the Plan is completed.

Participants recognized the importance of Teck's continued investment in research and development of the Plan and were supportive of the proposed mitigation measures.

There was broad recognition of the role Teck plays in providing well-paying jobs and supporting community services in the Elk Valley. Participants were in agreement with the proposed scope of the socio-economic impact analysis, suggesting that the Elk Valley watershed be protected to preserve the outdoor recreation economy it supports.

Consultation participants requested additional information about the effects of selenium, what treatment is available to reduce selenium and how selenium removed by treatment facilities would be managed.

Phase 2 Consultation (April 9 – May 5, 2014)

During Phase 2 Consultation, Teck provided an update regarding the progress made in developing the Plan, including information about research of ecologically-protective levels. Teck sought input regarding the short-, medium- and long-term approaches to be included in the Elk Valley Water Quality Plan, and how communities and the public would like to be consulted about the Adaptive Management of the Plan after it has been implemented.

Generally, Phase 2 consultation participants were in agreement with and supportive of the short-, medium- and long-term approaches proposed by Teck. Some participants were concerned about the economic feasibility of water treatment as a mitigation measure over time. Some participants suggested that Teck advance some of the other potential medium- and long-term measures, such as water diversions, other passive water treatment and waste rock covers.

Most participants were interested in being notified about ongoing monitoring and adaptive management of the Plan. Their preferred methods of future participation were viewing information on a website, receiving notices of opportunities to provide feedback on the implementation of the Plan, and attending community information sessions. Some participants noted that Teck should provide frequent, easy to understand updates regarding water quality monitoring results.

Some Phase 2 consultation participants requested more information about the effects of selenium on fish, birds and mammals, asking whether selenium bio-accumulates or bio-magnifies as it travels up the food

chain. Some participants wanted additional information regarding mitigation of cadmium, nitrate, sulphate and the formation of calcite.

Some Phase 2 consultation participants asked whether Teck would consider changing mining practices, such as using underground mining or slowing down production, if the targets in the Plan could not be met. Others were interested in how the Plan would accommodate or consider future industrial development in the Elk Valley.

Technical Advisory Committee

Along with input from public consultation, Teck is receiving science-based technical advice from a Technical Advisory Committee (TAC) in developing the Plan.

The TAC is chaired by a B.C. Ministry of Environment representative and is composed of representatives from:

- Government of British Columbia, including:
  - Ministry of Environment (Committee Chair)
  - Ministry of Energy and Mines
  - Environmental Assessment Office
- Ktunaxa Nation Council
- An independent third-party qualified professional scientist
- Government of Canada represented by Environment Canada
- US Federal Government
- Montana State Government
- Teck

As of June 13th, there have been six meetings of the TAC. Agendas and meeting notes from TAC meetings are available at www.elkvalleytac.com.

The TAC has provided more than 200 science-based technical recommendations which Teck is considering in developing the draft Plan. Teck's response to all TAC recommendations will be included in the Plan.

Consultation Topic: Elements of the Elk Valley Water Quality Plan

Work is ongoing to finalize the Elk Valley Water Quality Plan for submission to the provincial government by July 22, 2014, including consultation and receiving scientific recommendations from the Technical Advisory Committee. The elements included below for feedback are drawn from draft sections of the Plan. While the information in this Discussion Guide is based on extensive work and technical and stakeholder input received to date, it is subject to further revisions based on additional research and study, advice from the Technical Advisory Committee and input received through consultation, prior to being finalized and submitted to government.

The following six sections cover key elements of the Elk Valley Water Quality Plan, including the proposed target levels for the identified water quality constituents (selenium, nitrate, sulphate, cadmium and calcite), the implementation plan for mitigation measures to achieve those targets, the options assessed and chosen to manage water quality, and how Teck proposes to monitor and adapt the Plan.

Elements:

1. Human health assessment
2. Management options
3. Water quality targets
4. Implementation plan
5. Monitoring
6. Adaptive management

1. Human health assessment

In developing the Plan, Teck conducted a two-phase evaluation process to identify and assess all constituents present in the watershed and then determine if any of those present a concern for human health. The analysis included examining all applicable exposure pathways that would be encountered in the Elk Valley: drinking water sources, such as private groundwater wells or river water, swimming in the rivers, and consumption of fish.

The first phase consisted of comparing the maximum concentrations for each identified water quality constituent with health guideline values for water quality, sediment and fish concentrations, selected with B.C. Ministry of Environment guidance.

During the second phase, a multi-step assessment of any potential effects for all constituents that were identified as exceeding guidelines was conducted to determine if any human health concerns exist.

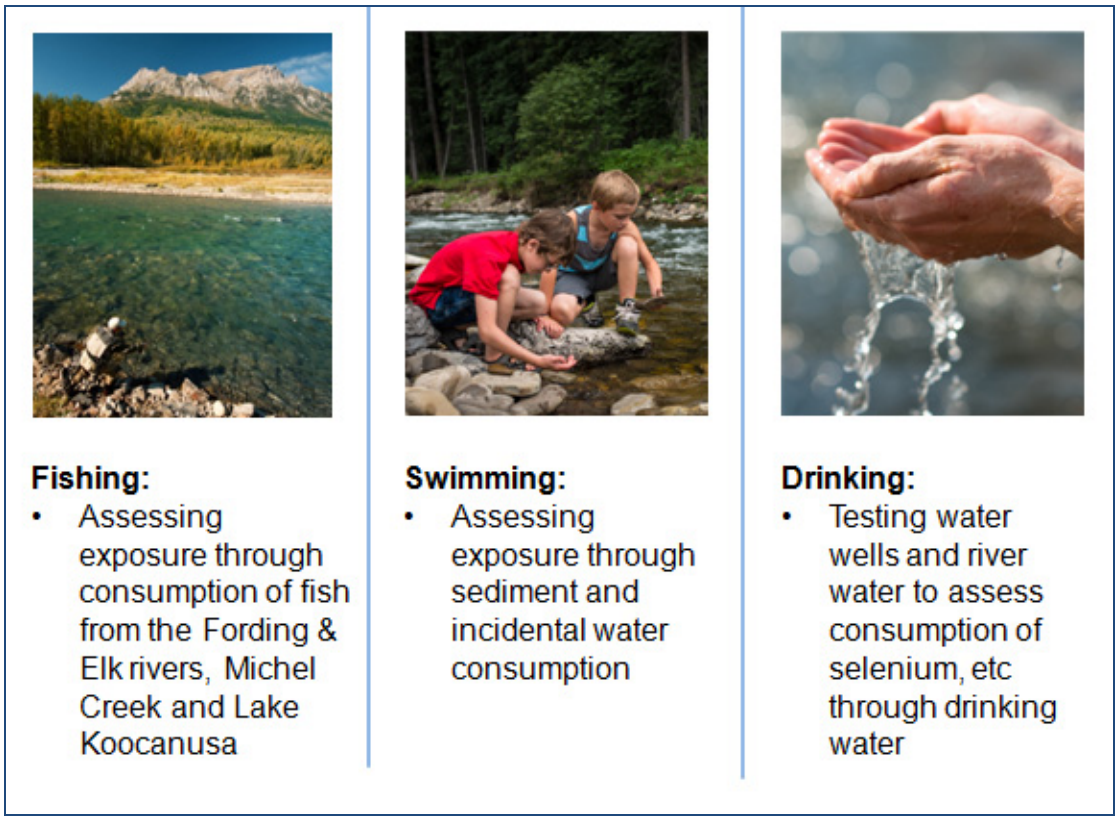


Figure 1: Exposure pathways assessed as part of human health assessment

Results

Initial screening of current water quality conditions against guidelines for the protection of human health of all constituents identified that the majority did not exceed guideline values in surface water, sediment, fish, or groundwater, and required no further evaluation.

The second phase of the assessment focused on those constituents that did exceed a guideline, or for which a guideline did not exist. These constituents were further evaluated. The assessment did not identify any health concerns associated with current water quality in the Elk Valley. For example, an analysis was conducted for selenium to determine if frequent consumption of locally-caught fish would be acceptable compared to the Health Canada guidelines for intake of selenium. This analysis determined that a diet including regular fish consumption in the Valley with other sources of dietary selenium would, on average, be expected to be lower than the daily upper intake limit for selenium.

Future Approach to Human Health

The human health assessment confirmed that current baseline conditions are protective of human health. Teck will continue to monitor concentrations of water quality constituents in surface water, groundwater and fish tissue through its monitoring programs. More information on the ongoing monitoring programs can be found on page 20. The steps that will be undertaken as part of the Plan to manage water quality in surface water are expected to also be protective of groundwater users.

2. Management Options

To determine what water quality mitigation measures should be proposed in the initial implementation plan (see page 18) for the Elk Valley Water Quality Plan, Teck undertook an assessment of options. This assessment falls into two categories: 1) Options that are proven effective and available now to use; and 2) Options or areas of research that have potential for use in the future, but require additional study or testing prior to consideration for implementation.

Available Management Options

Teck analyzed various combinations of available water management options to determine the best combination in achieving objectives of the Plan. Two options for managing water quality have been identified as practical, effective and economically viable for achieving the overall objectives of the Plan. Both have been chosen for use in the initial implementation of the Elk Valley Water Quality Plan, with the ability to incorporate new technologies or approaches as they become available:

- **Active water treatment:** involves the treatment of water to reduce water quality constituents such as selenium, and then returning the treated water back to receiving streams. Based on extensive study and piloting of available water treatment technologies, the biological treatment process used in active water treatment has been selected as the preferred water treatment technology.

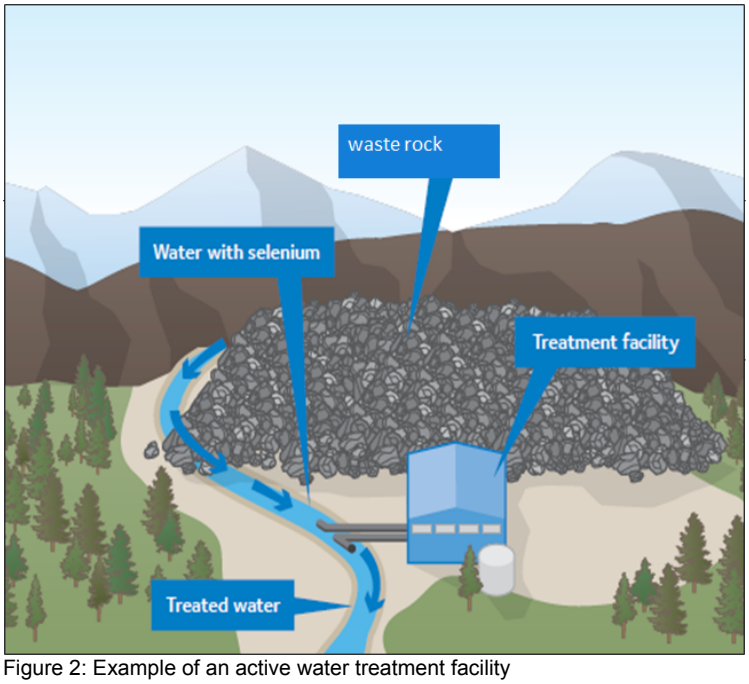


Figure 2: Example of an active water treatment facility

- **Clean water diversions:** involves the creation of earthen dykes or other physical barriers and/or pipes or other conduits to route clean water around mining activity to keep it clean. Diversions also act to reduce the volume of water passing through mining waste rock thereby reducing the volume of water that potentially requires treatment.

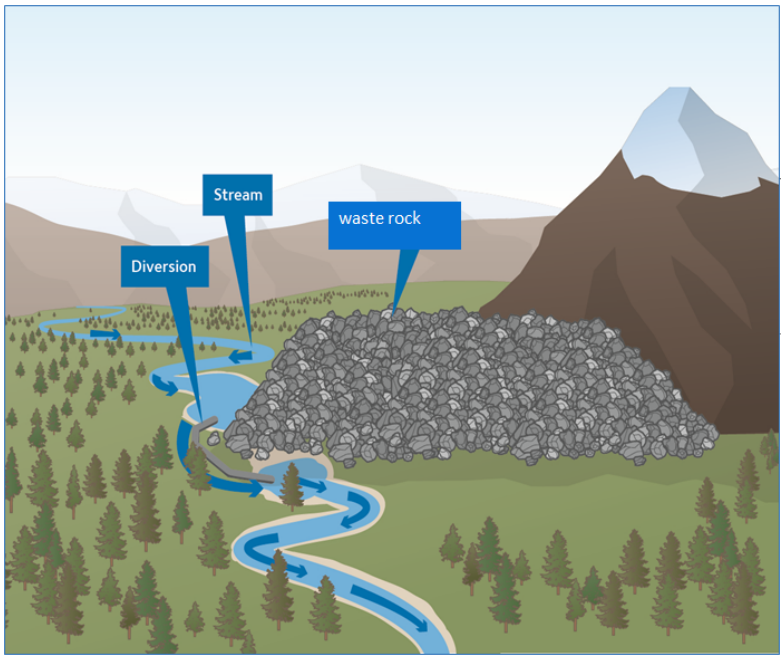


Figure 3: Example of a clean water diversion

Covers on waste rock piles were also assessed as a potential option. Because of the period of time before waste rock piles are available for safe and effective covering, it was determined that covers could not be considered as part of the initial implementation plan. However, covers may offer a longer term option for certain locations for managing water quality, and additional research into covers will be considered through the adaptive management process (see page 22).

Potential Future Management Options

Teck is conducting an extensive, ongoing research and development (R&D) program with the goal of assessing technologies or techniques for managing water quality that could be integrated into the Plan during implementation.

Technologies and techniques evaluated by the R&D program fall into two categories:

- **Source control:** investigating the sources of water quality constituents and examining how mine design changes could potentially reduce the release of these substances into the watershed. This includes potential management options such as covers on waste rock piles, changes to blasting practices to reduce nitrates, and changing the design of waste rock piles to reduce release of water quality constituents.

  The source control R&D program depends on rigorous independent research and, as a result, Teck has partnered with several leading researchers from Canada and the U.S. The current team includes the University of Saskatchewan, McMaster University, and Montana State University, as well as various consultants with expertise in the field. That program has nine focus areas of research, as outlined in Figure 4 below.

Figure 4: Research Focal Areas Associated with the R&D Program.

Research Area	Statement
1. Waste rock pile design and management	Understanding the potential to design new waste rock piles to lower the amount of selenium (and other substances) released.
2. Water balances to aid water quality management decisions	Understanding the effect of water management processes on the release of selenium and other water quality substances.
3. Rock drain design and operation	Understanding the role of rock drains in waste rock piles in the release of substances.
4. Saturated/suboxic zone design and operation	Investigating the potential to reduce the release of selenium and other substances through the use of saturated fills.
5. Reclamation and management of constituents of interest	Understanding the effect of different reclamation options on the release of selenium and other substances.
6. Flooded pits	Investigating the potential of using flooded pits to manage release of substances.
7. Nitrate management	Investigating the effectiveness of explosives (nitrates) management on minimizing release of nitrates.
8. Calcite management	Understanding calcite formation and control measures.
9. Process plant: tailings facilities	Investigating the potential of using tailings to reduce the release of water quality substances.

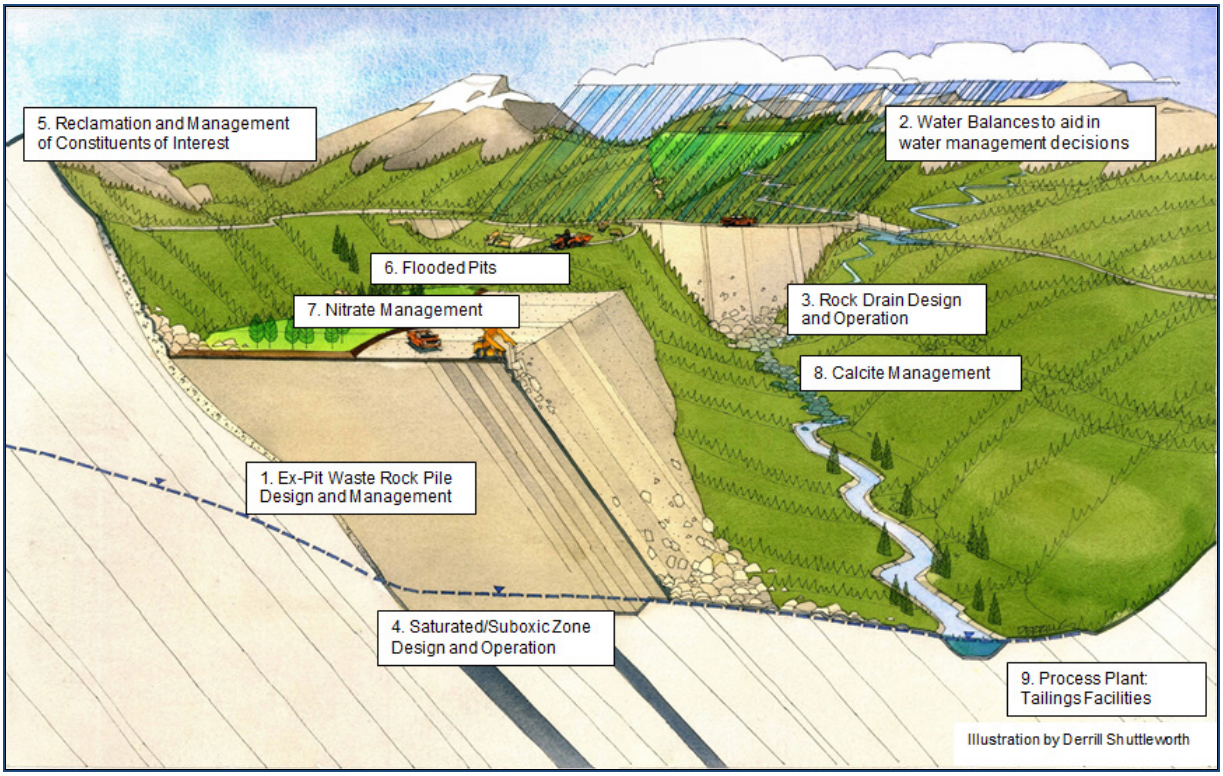


Figure 5: The source control research areas

- **Water treatment technology program:** identifying and evaluating the effectiveness of different water treatment technologies in addition to the water treatment technology currently being implemented at our Line Creek Operation in the Elk Valley.

  Factors considered in comparing technologies include the efficient removal of constituents, cost, construction, operability, technology status, supportability and sustainability (in the sense of energy consumption, facility footprint, emissions, etc.). Testing of technologies can range from small-scale laboratory tests to large-scale pilot projects in the field.

3. Water Quality Targets

A primary outcome of the Elk Valley Water Quality Plan is to establish short-, medium- and long-term water quality targets at locations in the watershed identified in the provincial government Order (called Order stations – see Figure 6 below) to achieve the objectives of the Plan:

- Long-term targets must be set at levels that are demonstrated to be protective of human and aquatic health.
- Short-term targets are set with the goal of stabilizing levels of substances at locations where concentrations were expected to increase above long-term targets without mitigation.
- Medium-term targets are intended to ensure the implementation plan is on track to meet the long-term targets.

The targets are a key measure for successful implementation of the Plan, and contribute to determining what water quality mitigation measures may be necessary. This section outlines the process undertaken to determine the water quality targets for the Plan.

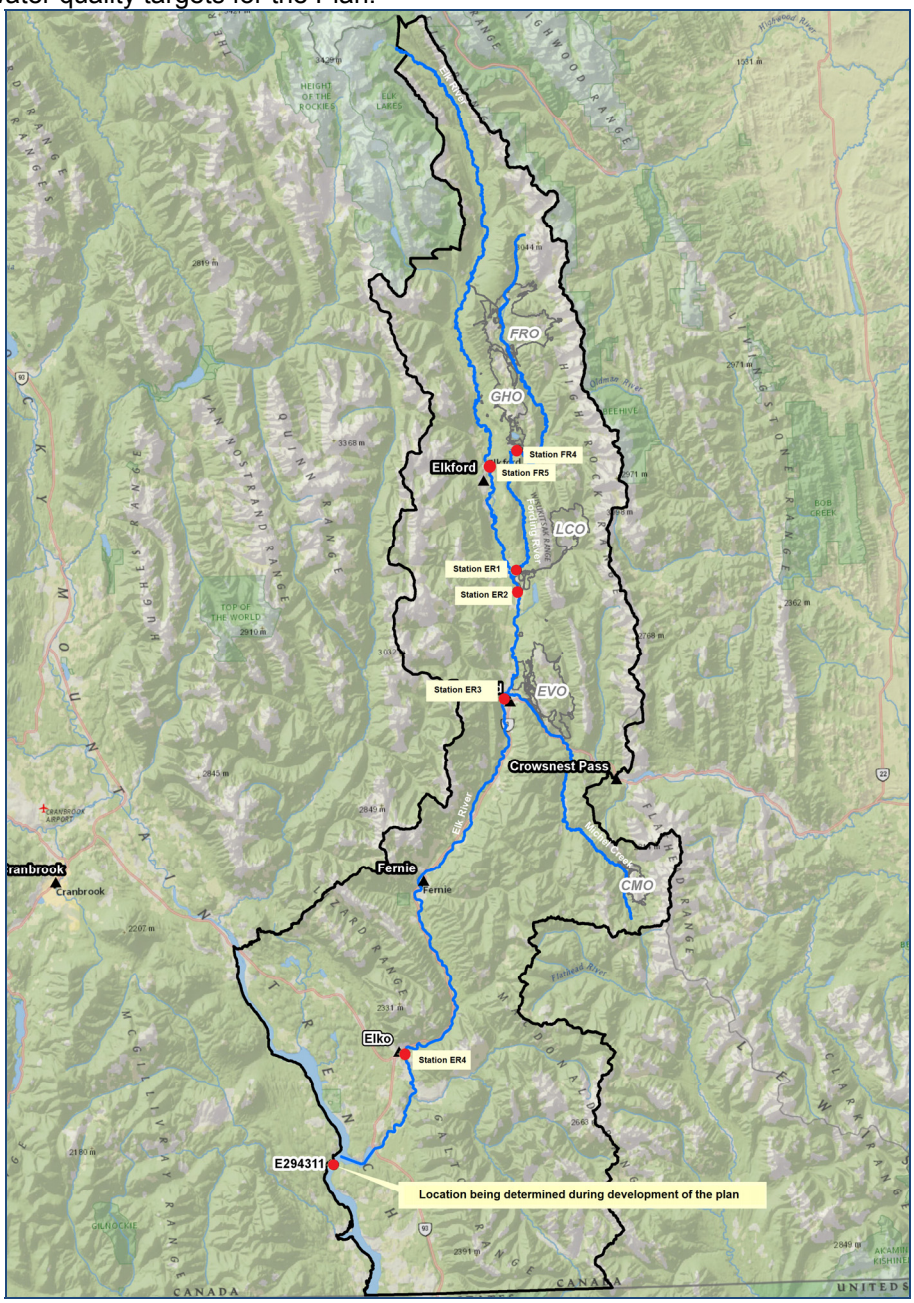


Figure 6: Map of Order station locations in the Elk Valley

Process for determining targets

Water quality targets were developed following a six-step process, which is also illustrated in Figure 7 below:

1. **Develop water quality benchmarks** for selenium, nitrate, cadmium and sulphate that are protective of aquatic life present in the Elk Valley. These water quality benchmarks will help inform the final targets. The benchmarks are based on the best currently available science. Recognizing there is a level of uncertainty, the adaptive management process (see page 22) will take into account any new, science-based information that becomes available throughout the implementation of the Plan. The process for establishing these benchmarks is described in more detail in the Phase 2 Consultation Discussion Guide available at www.teck.com/ElkValley.

2. **Evaluate current water quality conditions** and future trends in relation to existing water quality guidelines (or the equivalent, for substances which do not have a guideline). In a number of locations in the watershed, it is already possible to meet existing B.C. water quality guidelines (see Figure 8). In these cases, the proposed long-term target will be equivalent to the water quality guideline and no further steps are necessary. They include:
    - Selenium, nitrate, sulphate and cadmium in Lake Koocanusa
    - Nitrate, sulphate and cadmium in the Elk River
    - Sulphate and cadmium in the Fording River

    For those locations and substances where it is not possible to meet existing water quality guidelines, a site-specific target that is protective of human and aquatic health must be determined using steps 3-6 below. This includes:
    - Selenium in the Fording and Elk rivers
    - Nitrate in the Fording River

3. **Undertake an integrated assessment to derive long-term water quality targets** for selenium in the Fording and Elk rivers and nitrate in the Fording River. The integrated assessment combines results of the water quality benchmark setting (Step 1) with water quality modelling results for the Elk and Fording rivers and their tributaries to evaluate the overall protection of aquatic life.

    Drinking water quality guidelines and results of the human health assessment (see page 8) will also be considered for development of long-term selenium targets in the Elk River.

4. **Develop an initial implementation plan** that can achieve long-term target concentrations at each Order location (see page 18).

5. **Establish short-term water quality targets** for locations and constituents where the long-term targets are not set to water quality guidelines, which is the case for selenium in the Fording and Elk rivers and nitrate in the Fording River.

6. **Establish medium-term targets and time frames** as an intermediate step between short-term and long-term targets to demonstrate progressive improvement in water quality over time.

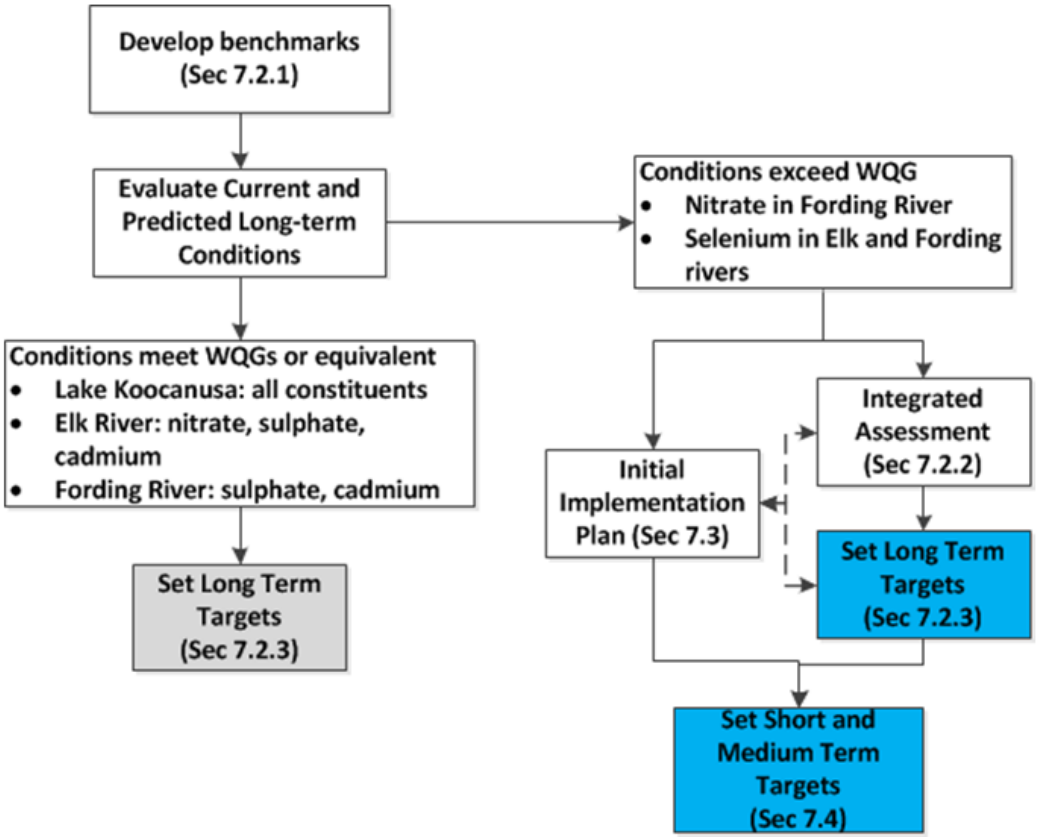


Figure 7: Decision flowchart for determining target levels

	Fording River	Elk River	Lake Koocanusa
Selenium	SST	SST	WQG
Nitrate	SST	WQG	WQG
Sulphate	Equiv to WQG	Equiv to WQG	WQG
Cadmium	Equiv to WQG	Equiv to WQG	Equiv to WQG

SST=Site Specific Target
WQG=BC Water Quality Guideline
Equiv to WQG=Equivalent to Water Quality Guideline

Figure 8: Determination of site-specific targets or guideline targets

Long-term targets

Based on the steps above, the following proposed long-term targets for each of the water quality constituents have been proposed for each Order station.

Figure 9: Summary of Proposed Long-term Water Quality Targets

Order Station	Selenium (µg/L)	Nitrate (mg/L as N)	Sulphate (mg/L)	Cadmium (µg/L)
Upper Fording River (FR4)	57	TBD	WQG Equivalent	WQG Equivalent
Lower Fording River (FR5)	40	TBD	WQG Equivalent	WQG Equivalent
Elk River downstream of Greenhills Operations (ER1)	19	WQG	WQG	WQG Equivalent
Elk River downstream of Fording River (ER2)	19	WQG	WQG	WQG Equivalent
Elk River downstream of Michel Creek and Elk River at Elko Reservoir (ER3, ER4)	19	WQG	WQG	WQG Equivalent
Lake Koocanusa (LK2)	WQG	WQG	WQG	WQG Equivalent

Notes: TBD = to be determined; WQG = water quality guideline; WQO = water quality objective; and WQG Equivalent = a target that is equivalent to the Canadian water quality guideline for the protection of aquatic life.

Based on comparison with the water quality benchmarks for protection of aquatic life, drinking water quality guidelines and the results of the human health assessment (see page 8), the proposed long-term targets have been developed to be protective of both aquatic and human health.

Short-term targets

Short-term concentration targets were determined based on technical and economic feasibility, with the goal of stabilizing levels of constituents at locations where concentrations were expected to increase above long-term targets without mitigation. In cases where current baseline concentrations of selenium, nitrate, cadmium, and sulphate meet water quality guidelines or are not expected to exceed long-term targets, short-term stabilization targets are not required. Analysis determined that short-term water quality targets were necessary for selenium and nitrate at two Order stations in the Fording River and one in the Elk River downstream of the Fording River.

Figure 10: Summary of Proposed Short-term Water Quality Targets

Order Stations	Selenium	Projected target attainment	Nitrate	Projected target attainment
Upper Fording River (FR4)	≤63 µg/L	≤2019	≤14mg/L	≤2019
Lower Fording River (FR5)	≤51 µg/L	≤2019	≤13 mg/L	≤2019
Elk River downstream of Fording River (ER2)	≤19 µg/L	≤2023	≤4 mg/L	≤2019

4. Implementation plan

An initial implementation plan was developed to meet the short-, medium- and long-term water quality targets. Water treatment and water diversions have been identified as technologies that can reliably and efficiently reduce concentrations of selenium and nitrate (see page 10). Other options based on emerging technologies and management approaches will continue to be evaluated, with the intention of incorporating them where and when appropriate through an adaptive management process (see page 22).

Implementation Plan Development

The Elk Valley Water Quality Planning Model is a regional, forward-looking planning model that estimates concentrations of selenium, nitrate and sulphate. It was created to predict how effective various mitigation measures and mitigation scenarios would be in achieving Plan objectives.

To develop the implementation plan, Teck evaluated a wide range of management options and ran more than 700 possible treatment and diversion scenarios through the Elk Valley Water Quality Planning Model. Initial results were used to identify the preferred water management options as described on page 10, and to establish the initial implementation plan described below.

Summary of Initial Implementation Plan

The initial implementation plan to meet the long-term targets proposed for the Elk Valley Water Quality Plan consists of a combination of water treatment and water diversions. The first stages of the proposed implementation plan are summarized in Figure 11 below, including proposed water sources targeted for active treatment, when the treatment could be expected to be on-line, the average estimated treatment capacity, and proposed additional water management measures, such as water diversions, for the same sources.

Additional mitigation may be required in later years. Whether this mitigation is determined to be necessary, the exact locations and timing, and what types of mitigation technology or techniques would be applied will be assessed as results of ongoing monitoring and R&D are incorporated through adaptive management.

Water sources targeted for active water treatment	**Year**	**Estimated treatment capacity (m^3/day)**	**Associated water management/diversions to be evaluated during detailed design**
Line Creek Operations treatment facility: • West Line Creek	Q2 2014	7,500	
Fording River Operations treatment facility: • Swift, Cataract, Kilmarnock creeks	2018	20,000	Diversion of watershed, Conveying Swift, and Cataract creeks and the remainder of Kilmarnock to the water treatment facility.
Elkview Operations treatment facility: • Bodie, Gate, and Erickson creeks	2020	30,000	Diversion of Upper watershed. Conveying mine affected water from Erickson to the water treatment facility.

Figure 11: Outline of the Initial Implementation Plan showing sources targeted for active water treatment

Reductions over the Plan timeframe

The charts below (Figures 12 and 13) were developed using the Elk Valley Water Quality Planning Model described above and show the measured levels of selenium from recent years at two representative Order stations in the Fording and Elk rivers. They also show the anticipated range of selenium levels going forward as mitigation measures are implemented. The general pattern is for concentrations to gradually increase until mitigation is in place upstream, which stabilizes and reverses the trend until it is below the long-term water quality target.

The green dots represent measured concentrations of selenium from recent years at the Order station. The shaded band represents the range of monthly concentrations of selenium, from high flow and low flow conditions, and how those concentrations will be reduced over time as mitigation measures are put in place.The timeframes for stabilizing water quality trends and meeting long-term targets varies depending on the location in the system relative to mitigation measures and when those measures are implemented.

The performance of the Plan will be measured by comparing the highest measured monthly concentration to the target concentrations.

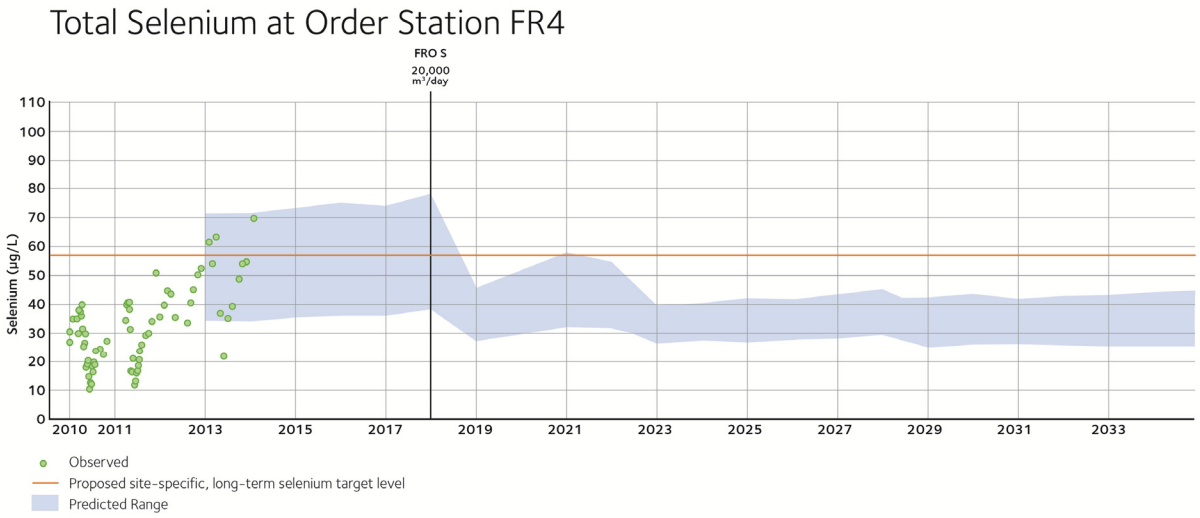


Figure 12: Predicted trend for selenium concentrations at FR4 during plan implementation

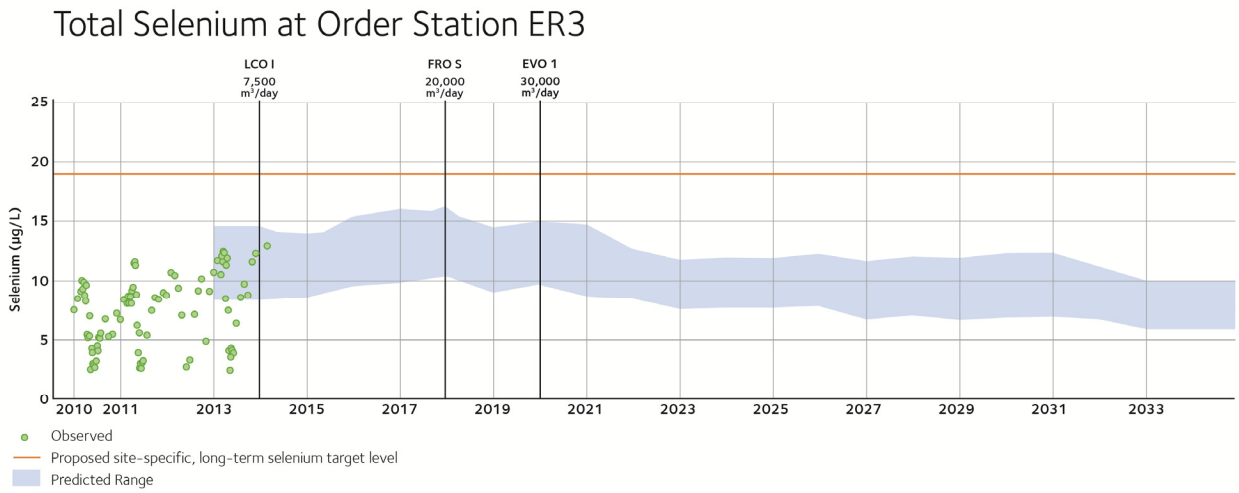


Figure 13: Predicted trend for selenium concentrations at ER3 during plan implementation

5. Monitoring

Teck conducts a comprehensive monitoring program for aquatic and environmental health as part of its operating permits and will conduct additional monitoring upon approval of the Elk Valley Water Quality Plan. This monitoring will inform management efforts undertaken through the Plan and confirm that desired outcomes are being achieved. The adaptive management process (see page 22) will incorporate the information gathered, as well as results of the R&D program, and will provide a decision-making framework for determining if changes are required to the implementation of the Plan.

The monitoring program collects data on aspects of the aquatic environment, water quality and aquatic species as outlined below. Below is a conceptual outline of potential monitoring components.

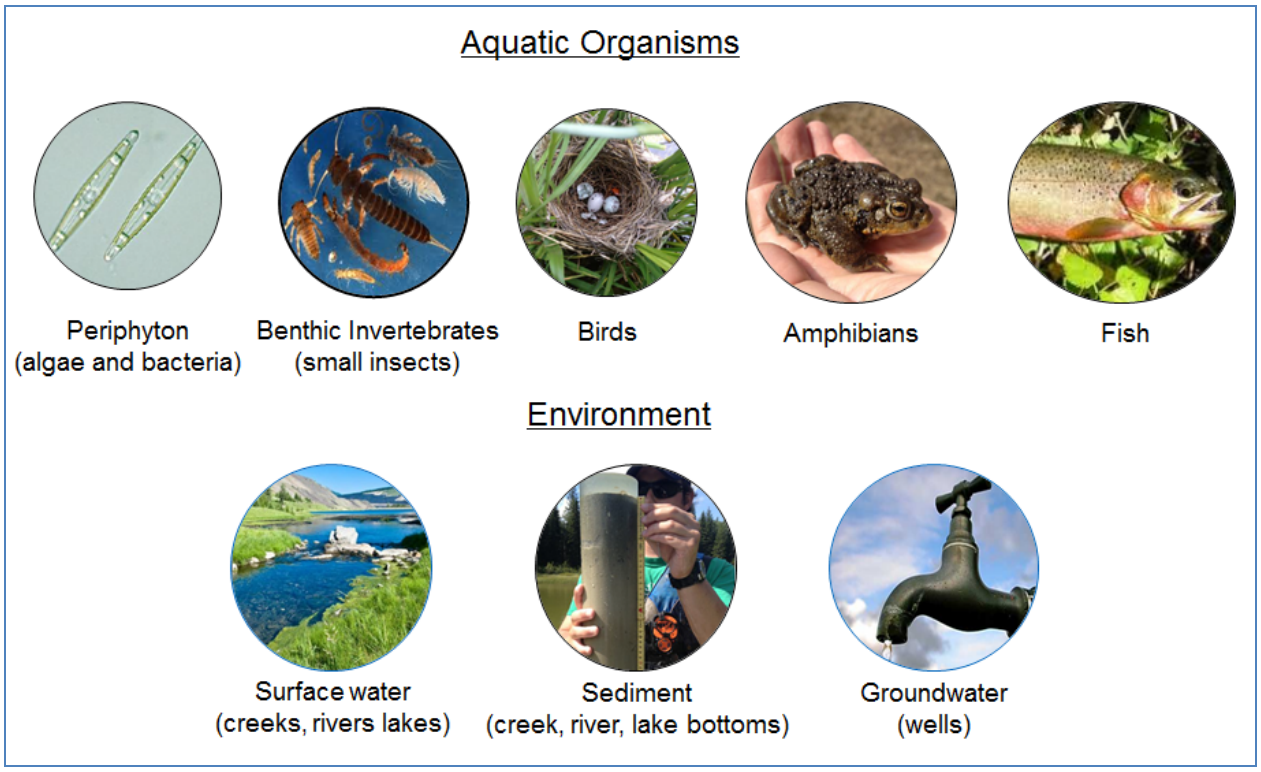


Figure 14: Potential monitoring components

1. **Sediment and calcite:** Monitoring is focused in areas of fine sediment deposition. A Calcite Index is being established to quantify and monitor calcite depositions within the watershed.

2. **Surface water:** In addition to ongoing sampling being conducted throughout the region as part of existing permits, additional water samples will be collected and tested on a monthly basis from sampling stations in the Fording and Elk rivers and Lake Koocanusa. This monitoring will provide a direct measure to evaluate water quality relative to current baseline conditions, ecological benchmarks and the short-, medium- and long-term target concentrations in the Plan.

3. **Groundwater:** The human health assessment confirmed that, among the wells Teck tested, current baseline groundwater concentrations do not present a concern to consumers. However, as part of the monitoring program, wells with elevated values and a number of randomly-selected wells will be resampled and tested for another year to provide more information on groundwater quality. This data will be used to confirm that groundwater concentrations remain protective of human health.

4. **Periphyton:** Monitoring of periphyton (e.g., algae and bacteria) will be conducted to evaluate any potential effect from water treatment facilities. This will inform management decisions, including

potential modifications to the water treatment facilities, and will assist in evaluating bioaccumulation of constituents in the receiving environment.

5. **Benthic invertebrates:** Benthic invertebrates (small aquatic insects) play an important role in selenium bioaccumulation within the aquatic food web and serve as an indicator of overall aquatic ecosystem health. Benthic invertebrates typically have small home ranges, making invertebrates reliable indicators of localized conditions. As a result, benthic invertebrates will be monitored at numerous locations throughout the watershed.

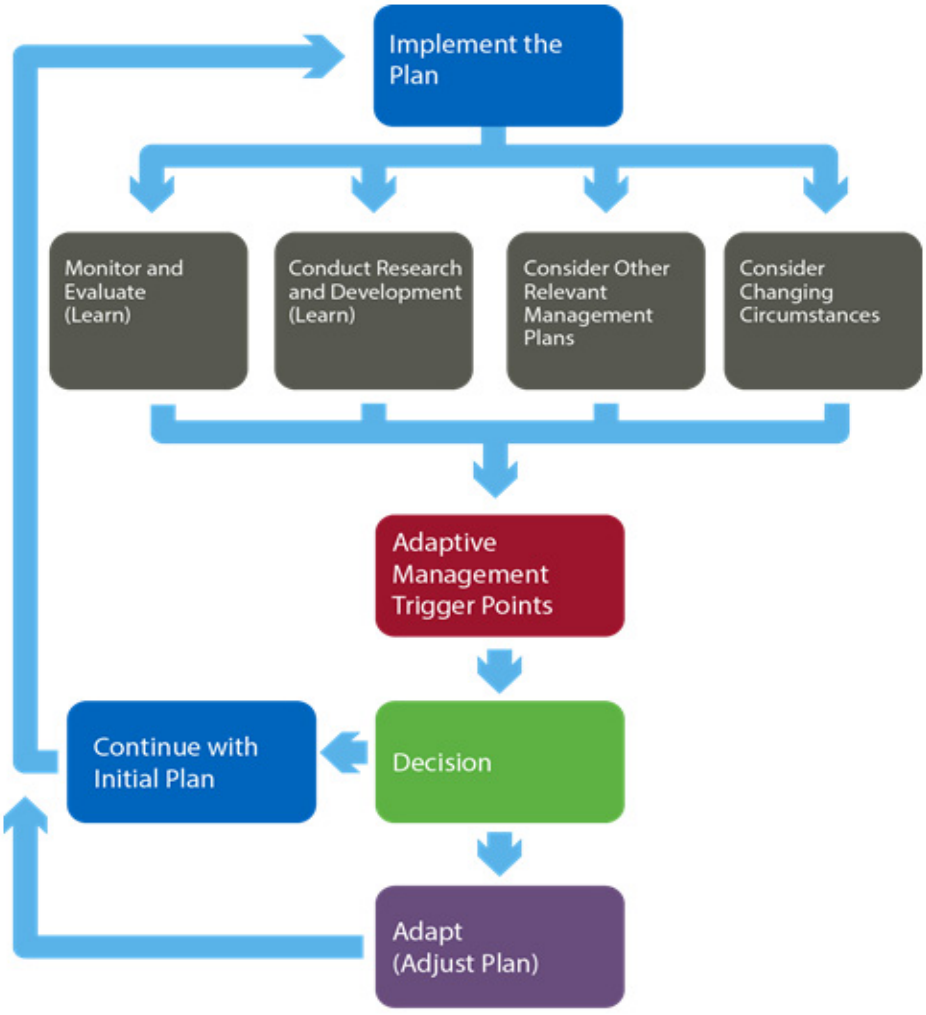
6. **Fish:** The health and sustainability of resident fish populations are important to maintaining ecosystem functions within the watershed as well as supporting an active fishery. Two species, Westslope cutthroat trout and longnose sucker, will serve as sentinel species in the assessment of fish populations and health within the Elk Valley. The fish health monitoring program will assess population size/demographics, body condition, and growth in mine-exposed areas compared to reference areas, and will also be compared within the same areas over time. Collection of fish tissue for selenium analysis will be conducted on three species – Westslope cutthroat, longnose sucker and mountain whitefish. Tissue data will be compared to established benchmarks for effects on fish, historic data to assess trends over time, selenium bioaccumulation, and will also be evaluated with respect to fish consumption guidelines.

7. **Amphibians and Birds:** Sampling and analysis of tissue has been conducted previously for both amphibians and birds. Additional monitoring and sampling will be considered as necessary as part of the ongoing regional aquatic effects monitoring program.

6. Adaptive Management

The proposed measures to achieve targets for the Elk Valley Water Quality Plan are based on the best available information and economically achievable technologies currently available. Advances in technology and science, including Teck's own R&D program, will likely change the measures available to achieve targets in the future. Changing conditions in the watershed, assessed by on-going monitoring and updated mine plans, will also inform decisions related to Plan implementation. In addition, other relevant management plans in the region need to be considered so that coordination and integration occurs. For these reasons, an adaptive management framework is necessary to the implementation of the Plan.

Adaptive management provides a systematic but flexible means for collecting, evaluating and incorporating data and information to manage uncertainties, and if necessary, to refine a plan or portions thereof so that objectives and outcomes are met. The adaptive management framework for the Plan incorporates a tiered decision-making framework to allow for iterative adjustments to the initial implementation plan, as shown in Figure 15 below.



The adaptive management process

Figure 15

Please provide your feedback

Comments on the development of the Elk Valley Water Quality Plan will be accepted until July 4, 2014. Input received during consultation will be considered, along with technical and socio-economic information, as Teck finalizes the draft Elk Valley Water Quality Plan for submission to government by July 22, 2014.

Please provide your feedback by:

- Email: elk.valley@teck.com
- Mail: Teck Elk Valley Water Quality Plan
  P.O. Box 1777
  Sparwood, B.C.
  V0B 2G0
- Online: feedback form at www.teck.com/ElkValley