Use of Conceptual Site Models to Support EMA Effluent Permit Applications

Version 1.2

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Prepared by:

Ministry of Environment and Climate Change Strategy

Disclaimer

This document does not replace the *Environmental Management Act* or its regulations. It does not list all provisions relating to waste discharges. If there are differences or omissions in this document, the Act and regulations apply.

The proponent is expected to also be aware of and use all other guidance materials and the EMA permitting process information as provided on the sites listed below.

Other Guidance Documents related to Mining Applications under the *Environmental Management Act* (EAM) are located at: http://www2.gov.bc.ca/gov/content/environment/waste-management/industrial-waste/mining-smelting. It is strongly recommended to review all of the guidance before making an application.

The EMA permitting process for Waste Discharge Authorizations is located at: http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization.

TABLE OF CONTENTS

LIST OF ACRONYMS

Adaptive Management Plans	**AMP**
American Society for Testing and Materials International	**ASTM International**
Best Available Technologies	**BAT**
BC Water Quality Guideline	**BCWQG**
BC Water Quality Objective	**BCWQO**
Canadian Council of Ministers of the Environment	**CCME**
Contaminant of Concern	**COC**
Contaminants of Potential Concern	**COPC**
Conceptual Site Models	**CSM**
Contaminated Sites Regulation	**CSR**
Environmental Management Act	**EMA**
Environmental Protection Agency	**EPA**
Environmental Protection Officer	**EPO**
Initial Dilution Zone	**IDZ**
Information Requirements Table	**IRT**
Metal Leachate/Acid Rock Drainage	**ML/ARD**
Ministry of Environment and Climate Change Strategy	**ENV**
Science-Based Environmental Benchmark	**SBEB**
Statutory Decision Maker	**SDM**
Site Performance Objectives	**SPO**
Technical Assessment Report	**TAR**
Tailings Impoundment Area	**TIA**
Trigger Response Plans	**TRP**
Water Treatment Plan	**WTP**

1. PURPOSE OF GUIDANCE DOCUMENT

This guidance is intended to provide proponents of mining projects with an introduction to using Conceptual Site Models (CSMs) as an effective tool in developing a complete Technical Assessment Report (TAR) required in support of *Environmental Management Act* (EMA) effluent permit applications (MOE 2003). This guidance makes reference to the ministry's effluent discharge application review process and the use of the Information Requirements Table (IRT) for Mining Effluent[1] in preparing the TAR. The TAR consists of the overall set of scientific investigations that are needed to depict the actual and potential effects of proposed discharges from a mining operation on the environment.

The level of detail and type of information proponents are required to collect and include in the TAR is directly related to the scale and complexity of the proposed mining activity. A CSM may be used to summarize contaminant transport, which is used as a base for the impact assessment. It is an optional approach that serves as a technical narrative to focus the discussion on matters that are of relevance to the proposed project. CSMs enable a proponent to convey existing information requirements in a format that may be more easily understood by a range of parties, including Indigenous communities, and as a tool for evaluating potential impacts from a proposed effluent discharge.

To be most effective, a CSM should be developed in the beginning stages of an assessment or design of a project, and be updated regularly as additional data are gathered. A CSM should be a stand-alone document, ideally in a format accessible to a general audience and submitted or included with the TAR for an application, ensuring that regulators and stakeholders all have a similar context for communicating concerns and approvals. The ultimate goal of a CSM is to support modelling predictions and communicate the environmental status of a site thus facilitating environmental management.

2. EFFLUENT APPLICATIONS AND THE CSM

According to the ASTM International, a CSM is defined as a written or pictorial representation of an environmental system and the biological, physical, and chemical processes that determine the transport of Contaminants of Concern (COCs) from sources through environmental media to environmental receptors within the system (ASTM 2014). A CSM is a qualitative tool that can assist mining proponents to prepare for their effluent discharge application package. A CSM

[1] Copy of the IRT can be found on the ministry's Waste Discharge Authorizations website.

evolves throughout the process of the application development. The final application submitted for the ENV review should include a final CSM, which is a summary of all site characterization information used to develop the TAR[2].

2.1. Routine Applications and the CSM

During the Preliminary Application Phase, of the ministry's effluent application process[3], the applicant will interact with ENV staff to confirm the requirements set out in legislation and guidelines. During this phase an initial CSM should be developed as part of the project description, with the final CSM being submitted with the final application package. The CSM fits into the application development process by setting a framework for the following:

- Determining whether all significant sources of COCs from the site/operations have been considered and evaluated;
- Assessing all major exposure routes or pathways via which COCs can reach the receiving environment and receptors. This includes consideration of surface water and groundwater transport mechanisms;
- Evaluating the receiving environment and using the CSM to identify all receptors that may be adversely effected by COCs released from the site and operations; and,
- Determining the data collection requirements to validate and refine the CSM in relation to the 'completion' of pathways from sources to receptors.

The following sections will describe how the development of a CSM will work in conjunction with existing ministry guidance to produce a better application TAR in support of effluent discharge applications.

2.2. The IRT and Data Collection

The IRT should be used to ensure all required data have been collected for the development of a CSM. While the IRT lists the technical information requirements for the application, the CSM provides guidance on what information needs to be included, and which COPCs may be transported into the receiving environment and ultimately to and into receptors. In the final

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[2] In this case, site characterization refers to the information required in the final IRT for a specific project.

[3] See the Waste Discharge Authorization website for the ministry's application instructions, guidance forms and process map.

effluent permitting application, the CSM should depict the transport routes and pathways to receptors of COPCs.

When the final application is completed and ready for submission to the ENV the effluent discharge quantity and quality should be adequately characterized and understood. Baseline water quality, hydrology, and hydrogeology must also have been characterized so that the data may be used to complete the conceptual model, or for any required predictive modelling. All sources of potential COC release have been evaluated, operative pathways have been identified, and the potential effect of the effluent on environmental receptors has been assessed.

The level of detailed characterization required will vary for each type of operation depending on the scale and complexity of the operation as well as site specific factors. These details will be discussed in the preliminary application phase of the project and the formalization of the IRT.

3. DESCRIPTION OF CONCEPTUAL SITE MODELS

The preparation of a CSM is not necessarily a complicated process; a model can be started with minimal information, revised as more data are acquired, and scaled to the complexity of a site. Data as required under the IRT can be integrated into a CSM by use of summary diagrams, tables, and text, that clearly demonstrates sources of COPCs, potential pathways and potential effects on receptors.

3.1. Components of a Conceptual Site Model

The final CSM that supports the TAR should at a minimum contain the following information unless deemed not applicable to the site (ASTM 2014; MOE 2010):

- The locations and characteristics of onsite and relevant offsite potential sources of contamination (either naturally occurring or introduced) and their composition, nature, and extent. For mine sites, sources are primarily those mining activities or storage facilities from which COCs may emanate and may be mobilized in any mining phase (including construction, operation, closure, and post closure);
- The possible mechanisms of mobilization of the COCs. Including whether the proposed activities is expected to lead in the future to mobilization of COCs from sources to known or potential receptors, including via pathways such as liquid phase, non-aqueous phase, dissolved-phase, or vapour-phase plumes;
- In cases where groundwater pathways are important:

    - the hydrogeologic setting, including the known or inferred extent and continuity of all aquifers and aquitards that are beneath and in the vicinity of the site and that are or may be of relevance;
    - groundwater levels (pressure heads, water-table elevations, potentiometric surfaces) and hydraulic gradients (vertical and horizontal) within and between relevant permeable geologic units that can act as conduits for COC transport;
    - the physical and hydrogeologic boundaries that define the groundwater flow systems of interest including recharge and discharge areas, pumping wells, hydraulic and physical no-flow boundaries or divides, and other relevant conditions; and,
- All known and potential environmental or human health receptors or receptor groups that may be affected by onsite activities.

The description of the CSM will include the following detailed information:

Physical Setting. The site of interest is described using figures or diagrams, such as a stratigraphic cross section. Features shown in figures or diagrams may include locations of sampling sites, project infrastructure above and below ground, topographic features, surface water locations, groundwater hydrology, soil type, and other physical descriptors.

Biological Setting. Ecological communities and the presence of all species of interest are described, with particular emphasis on sensitive, culturally or economically important species and Species at Risk. A map may be a useful accompaniment that illustrates habitat, wildlife, and/or land use descriptions. The identified species or ecosystems should reflect the potential "receptors" of COCs, including primary and secondary producers (e.g. algae, plants, invertebrates).

Human Users. Human uses of the study area will be described, including drinking water intakes, agriculture, and recreational use such as swimming, berry picking, and fishing. Specific First Nations uses, such as sustenance, collection of medicinal items, spiritual functions, etc., must be described if known.

Contaminants. Identify all COCs and their sources (type, locations of on-site and relevant off-site sources) as well as the description of the media facilitating their transport, the lateral and vertical extent of their occurrence and their concentrations.

Potential Contaminant Sources. A CSM will describe all potential sources of contaminants at a mine site. These may include, but are not limited to mine runoff, acid rock drainage, seepage, sediment pond effluent discharges, and historic features.

Potential COC Pathways. Describing potential pathways for the transport of COCs from source zones to known or potential receptors is a critical component of a CSM. Flow diagrams or tables are often used to describe the transport mechanisms and exposure routes. The transport mechanism is the movement of the COC in the environment after release from a source. Examples include diffusion, advection, partitioning, or degradation in air, surface water, ground water, soil, sediment, or biological receptors (bio-magnification). Exposure routes describe how a receptor comes in contact with a COC (e.g., inhalation, ingestion, dermal contact, vegetation root uptake, and/or gill uptake).

A CSM should clearly state which COC pathways of COC-pathway-receptor combinations warrant further assessment. When COC pathways are excluded from further assessment, documented rationale should be provided. The consideration of COC pathways should take into account current and possible future sources of a COC.

3.2. Developing a Conceptual Site Model

A number of distinct steps can be applied for the development of a CSM:

1) Assemble Information

The information that should be included is determined in the preliminary application phase and codified in the IRT. Only data and relationships determined relevant to a site-specific model are used to develop a CSM. A CSM should not present all of the existing data at a site as it may distract from the identification of relevant (and important) pathways of exposure. However, supplementary details are to be contained in relevant reports, available for investigation in case they are needed for updating a model. These reports should be referenced and location of the relevant information in the report clearly identified.

Current and historical data sets should be screened to ensure data collection and interpretation followed approved standard procedures, such as those described in *Guidelines for Interpreting Water Quality Data* (MOE 1998), *BC Field Sampling Manual* (MOE 2013c), *RISC Standards for Aquatic Ecosystems, Atmosphere and Air Quality, Earth Sciences, Land Use, and Terrestrial Ecosystems* (MOE 2016a), and *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators* (MOE 2016b).

2) Identify and Characterize Sources of COCs

A CSM will include a list of all potential sources of COCs in groundwater, surface water, soil, sediment, biota, and air as applicable. Source locations will be identified on site maps. If releases of COCs are anticipated (planned or otherwise model predicted), timing and rate of releases as well as concentrations of COCs and discharge volumes are to be noted in associated text/tables.

3) Identify Background Concentrations of COCs

As part of CSM development, background concentrations of all identified source contaminants should be determined. Background concentration datasets must be sufficient to allow background concentrations to be distinguished from potential project related sources. A review of historical resource uses in the project area, including other upstream or nearby mines, can provide insight on locations from where the collection of samples would help to establish background levels. It is important to note what background information is based on natural conditions and what is influenced by other anthropogenic sources. Information for both is essential, where possible.

4) Identify Migration Pathways

A migration pathway is the method by which a COC is first released from its source and transported to a receptor. A CSM should identify potential release mechanisms, including accidental spills, seepage, direct discharges of treated or untreated wastewater, and evaporation. Once released, all potential migration pathways via ground water, surface water, air, soils, sediments, and biota for each source COC are to be included in a CSM using diagrams or tables. Groundwater pathways are to be examined when COCs may come into contact with subsurface soil, rock above groundwater sources or seepage from mine sources. Surface water and sediment pathways should be examined when a body of water (stream, lake, wetland, etc.) may be contacted by the COC, directly or indirectly. Air pathways should be considered for any COC that may be released via dust, smoke, steam, or gases from mining operations or areas of disturbance. In addition, COCs transported in air may deposit particulates onto surface water or soils. For COCs that bio-accumulate or bio-magnify, biota may provide a migration pathway, with a COC increasing in concentration as it travels into a specific level of the food chain and up the food chain, respectively. Migration pathways can also be used to determine the extent that source COCs may travel in environmental media. For example, if a COC is expected to reach surface water in a river, a number of factors may determine how far downstream it will be detectable.

5) Identify Exposure Pathways

An exposure pathway is the way in which a COC migrating through an environmental media comes into contact with a potential receptor. The potential exposure pathways will depend on the migration pathways and environmental receptors identified. COCs in soil, water, and sediment can contact receptors directly through ingestion, e.g. browsing on vegetation covered in dust, through ingestion via the foodweb, e.g. root uptake by forage plants, and incidental dermal contact. COCs in air can be contacted through direct inhalation of vapour or dust, or dermal contact. For all COCs, the duration and frequency of exposure should be considered, as well as the bioavailability of the particular chemical of interest. These factors will be used when determining risk of each pathway.

6) Identify Potential Environmental Receptors

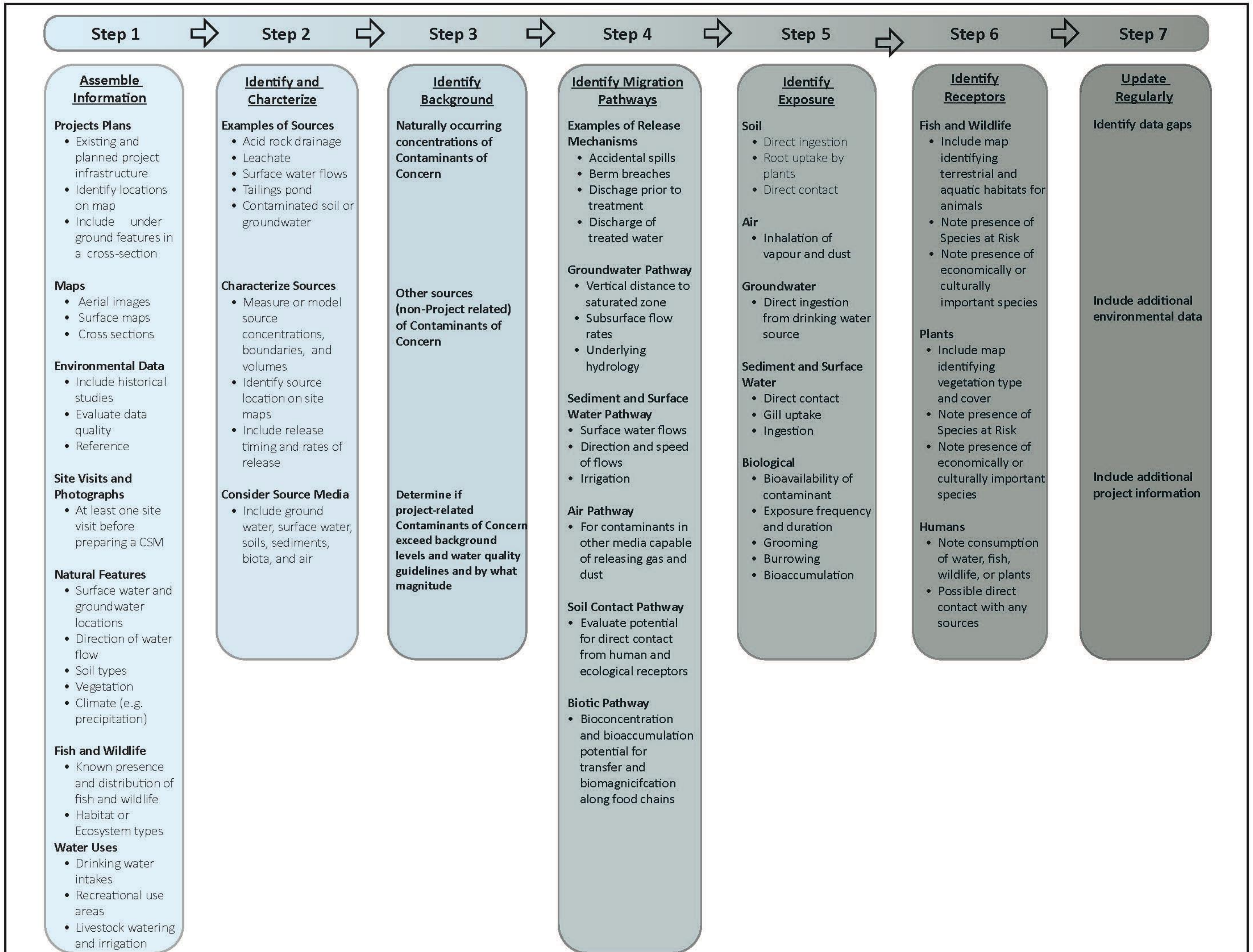
An environmental receptor is any organism such as a plant, animal, or human that may be affected by a COC. As such, a CSM should clearly identify aerial, terrestrial and aquatic linkages to the contaminants for any organism, with careful consideration of representative species of each trophic level, as well as vegetation types and distribution. In addition, economically or culturally important species, and the presence of Species at Risk, should be identified on site maps (EAO 2003). Government inventories such as the BC Conservation Data Centre, the BC Sensitive Ecosystems Inventories, and Forestry databases can be used to generate comprehensive lists of potential receptor species at the site. The presence or absence of these species is a refining step, and should be performed by a Qualified Environmental Professional (QP). Human consumption of fish, wildlife, or plants should be investigated, as well as the potential for direct contact with any COC, including from surface water and sediment. Any location for drinking water or recreational use of ground and/or surface water at and downstream of the site should be documented. As describe above, early on in the process a pathway should be considered complete until sufficient information is gathered to rule it as inoperable.

7) Identify Complete Pathways and Review Through the Assessment Process

A CSM should specify which pathways are considered complete and which are considered incomplete. For a pathway to be considered complete, three elements must be present: a mechanism for release and transport of a substance from the source to the receptor through the applicable environmental media (soil, air, groundwater or surface water); an exposure point where an environmental receptor comes into contact with the COC; and a route of entry into the receptor. An in-complete pathway lacks one of the pathway elements above, i.e., it is without a mechanism for release, an exposure point and/or a route of entry into the receptor. All plausible but incomplete pathways should be depicted on the CSM with clear justification provided in the TAR as to why the pathway was determined to be incomplete.

A CSM is intended to be a living document that will be updated as new environmental data and project information become available and as ecological and infrastructure systems at the site become better understood. Regular updates to the CSM will fill data gaps and increase confidence in the predictive nature of the document and assurance of appropriate data collection and mitigation.

Figure 1. Flow chart of the key steps for CSM development.



4. CSM REVIEW AND EVALUATION

Prior to the submission of the final application, the proponent should undertake an evaluation of the CSM and its supporting information to support the hypothesis that the management of effluent discharges as applied for, and as included into the CSM are in fact protective of the environment. The first step in this evaluation process is to determine whether or not the untreated effluent meets applicable criteria such as the BC Ambient Water Quality Guidelines (WQGs) or any other criteria determined to be applicable at the preliminary application stage. If the mine influenced untreated effluent being discharged from the site is predicted to meet applicable guidelines, the authorization process will be relatively simple. If the untreated effluent does not meet the applicable regulatory guidelines, further assessment and possible treatment options will need to be investigated.

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APPENDIX 1: GLOSSARY OF TERMS

Qualified Professional: An applied scientist or technologist specializing in a particular applied science or technology, (a) who is registered in British Columbia with the professional organization responsible for his or her area of expertise, acting under that professional association's code of ethics and subject to disciplinary action by that association, and (b) who, through suitable education, experience, accreditation and knowledge, may be reasonably relied on to provide advice within his or her area of expertise as it relates to this regulation.

Background Concentration: The concentration of a chemical substance occurring in media due to naturally occurring processes, or anthropogenic activity un-related to the Project being examined.

Bioaccumulative Substances: Substances with: 1) bioaccumulation factors (BAF) greater than 5,000, 2) bio-concentration factors (BCF) greater than 5,000, or 3) log octanol-water partition coefficients (log K_{ow}) greater than 5 (MoE, 2008).

Complete Exposure Pathway: All steps of an exposure pathway are present (source, transport, receptor).

Conceptual Site Model: A written and/or diagrammatic description of the geologic, hydrogeologic, environmental conditions of a site and the depiction of the type and extent of COC concentrations in the surface and subsurface, defines the pathways for COC migration, and identifies potential receptors.

Contaminant of Concern (COPC): Any physical, chemical, or biological substance in air, soil or water at a concentration that exceeds regulatory thresholds, or may have an adverse effect on environmental or human health receptors.

Contamination Source: Origin of environmental contamination (e.g. tailings pond, waste rock dump).

Exposure Pathway: The mechanism by which a COC migrating through a media contacts a potential receptor (e.g. ingestion of a COC in water).

Groundwater: All subsurface water that occurs beneath the water table in rocks and geologic formations.

In-complete Exposure Pathway: One or more steps of an exposure pathway are not present (e.g. a COC migrates through media, but does not contact a receptor).

Migration Pathway: The route by which a COC is released from a source and migrates through an environmental media towards a receptor.

Receptor: Any organism, such as a plant, animal, or human that may be affected by a COC.

Source: Same as Contamination Source.

Species at Risk: Species federally listed under Schedule 1 of the *Species at Risk Act* as of special concern, threatened, or endangered. These species receive federal legal protection under the act to protect individuals, populations, and their habitat.

Surface Water: Natural and artificial water bodies in direct contact with the atmosphere (e.g. streams, lakes, wetlands, industrial and navigational canals).

APPENDIX 2: CSM CASE STUDY

A1. CSM Development

A fictional mine named "South BC Mine" is described herein to illustrate the use of a CSM in the EMA application process. The mine's characteristics represent a generic mine in BC, and do not signify any individual mine or individual regulatory process. For the purposes of this case study, we consider a case where a Company has submitted an application seeking permits under the *Mines Act* and the EMA to construct an open pit copper and gold mine in south central BC, Canada.

Below we describe the CSM included in this fictional company's application, and the way in which the CSM will be utilized in two scenarios. Scenario 1 describes a relatively simple regulatory process where no guideline exceedances are anticipated and permit approval occurs along a straightforward path. Scenario 2 describes a more complicated situation when project operations are predicted to lead to groundwater and surface water contamination, requiring additional consultations with ENV, and the implementation of mitigation infrastructure and/or management strategies before a permit can be approved.

A1.1 Project Description

The South BC Mine Project is a proposed copper and gold mining and milling operation located in south central British Columbia. The Project site is located within the watershed of a large regional river. The area drains to small unnamed creeks to the north, to two larger creeks, Creek A and Creek B, to the south, and into a wetland to the west. Creek A also drains into Lake A, a popular regional lake that supports Rainbow Trout.

Features of the mine will include:

- One open mining pit;
- Processing plant (Mill);
- Waste Rock Storage Facility;
- Sediment Management Pond to collect effluent, leachate, acid rock drainage (ML/ARD) and contact water run-off;
- Wastewater Treatment Plant to treat sediment pond effluent that reports to a wetland;
- Tailings Impoundment Area (TIA) in a valley;
- North Dam and South Dam containment dams at either end of the TIA;
- Access Road; and
- Power Line.

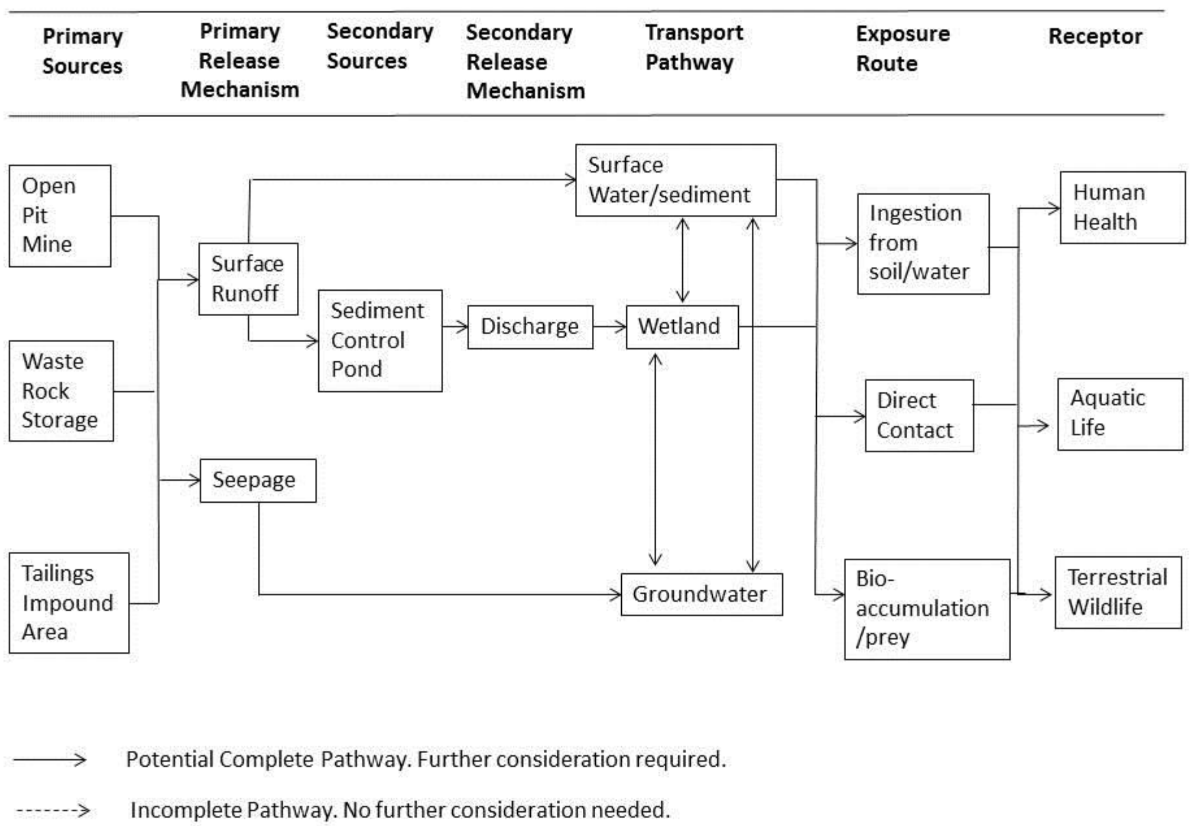
A1.2 Conceptual Site Model – Scenario 1 (Simple)

1. *Develop initial CSM*

The South BC Mine Project's initial CSM will be based on a thorough site characterization. At this stage all potential pathways of effect must be considered, until data and/or modelling predictions determine which pathways are "complete" and which are "incomplete". The primary sources considered in this example are an open pit, a waste rock storage facility, and a Tailings Impoundment Area (TIA, including the North Dam and South Dam containments). The primary release mechanisms from all of these sources are considered to be surface runoff collected in and released to surface water from a sedimentation pond and seepage to groundwater.

For the overview of this case study example, we solely present a box chart portion of a CSM. In practice, an initial CSM diagram would be associated with a map(s) and associated text that summarizes the elements in the graphics (see Section 2). Other formats for conceptual diagrams are often useful accompaniment for complicated sites especially in relation to building a water quality model. Similarly, pictorial graphics can also be considered, case by case, to better clarify and communicate potential source to receptor pathways if deemed important for public outreach. In summary, we have provided one part of a CSM to highlight the integration of a CSM in the permitting process; additional materials (figures, maps, text and tables) will be required in an application.

Figure A1: Initial CSM with all pathways requiring consideration.



2. *Determine data collection needs*

The initial CSM and the IRT can be used to determine data collection needs. In this case study, these will include requirements such as (but not limited to) hydrogeological studies to determine surface water to groundwater connectivity, habitat studies to confirm presence/absence of potential receptors (e.g., fish), baseline water quality data collection, and ARD/ML potential.

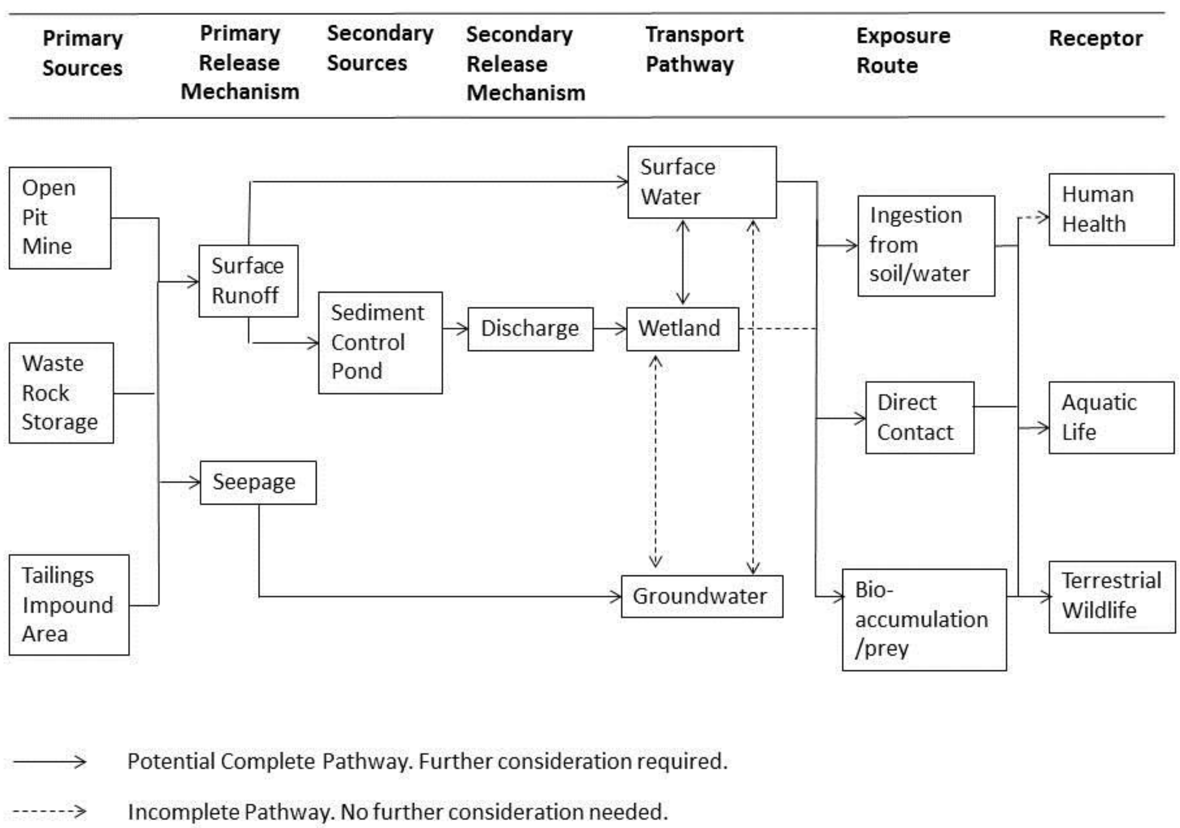
3. *Ministry approval of Project IRT*

Proposed data collection (based on the initial CSM) will be included in an IRT checklist, and submitted to the ENV for approval, and accompanied by the CSM as an explanatory tool to support the rationalization of the data collection choices.

4. *Collect data and update CSM*

Following data collection, all potential transport pathways depicted in the initial CSM will be re-assessed, and some or all of them may be deemed “incomplete”. For example, in the case of this simplified Scenario 1, we assume that studies sufficiently demonstrated there is no connectivity of groundwater to surface water. In this case, the potential transport pathway of COCs from the tailings pond, to groundwater, to surface water, is incomplete and does not need to be considered further (Figure A3).

Figure A3: Updated CSM with indication of complete and incomplete pathways related to groundwater.



5. Model predicted effects on receptors

In Scenario 1, effluent will be discharged from the sediment pond to the western wetland (Figure A3). Effluent characterization and water quality predictions must therefore be completed using an approved method. The predicted effluent flow and water quality will then be compared to water quality guidelines to support the impact assessment of effluent loading on the receiving environment.

In the simplified Scenario 1, we assume that predicted water quality in the effluent meets water quality guidelines. Therefore no impact on receptors is indicated and the transport pathway does not need to be considered further.

6. *Finalize CSM*

When finalizing the CSM, proponents are advised to conduct their own internal review to ensure that all pieces have been completed prior to beginning their TAR. This will include ensuring that all supporting data and materials are available for inclusion in the TAR, and that all potential transport pathways have been considered.

7. *Prepare Technical Assessment Report (TAR)*

The TAR will provide rationale to support the impact assessment provided in the TAR. Referring to the finalized CSM, rationale will include data that demonstrates a lack of complete transport pathways anticipated.

A1.3. Conceptual Site Model – Scenario 2 (Complex)

1. *Develop CSM*

The Initial CSM, data collection needs, and approval on IRT for Scenario 2 will be identical to the initial CSM in Scenario 1 (Figure). (*Differences will appear later depending on results of baseline data collection and predictive models*).

2. *Determine data collection needs*

Initial data collection needs will be identical to those in Scenario 1.

3. *Ministry approval of Project IRT*

Proposed data collection steps will be described in an IRT checklist and submitted to the ENV for review and decision, accompanied by the CSM as an explanatory tool to explain the data collection choices.

4. *Collect data and update CSM*

In Scenario 2, the baseline studies demonstrate groundwater connectivity to surface water occurs downstream of the South Dam. In this case, the transport pathway of COCs from the TIA, to groundwater, to surface water cannot be ruled out, and potential impacts to receptors must be examined further. The initial CSM diagram with all pathways showing as potentially complete is maintained.

5. *Model predicted effects on receptors*

In Scenario 2, COCs can reach surface water in two ways: 1) effluent discharge from the sediment pond to the western wetland; and 2) groundwater from the TIA. In this scenario, effluent characterization and water quality predictions must therefore be completed to predict water quality concentrations. In Scenario 2, the predicted concentrations of dissolved Aluminum (dAl) and dissolved Copper (dCu) in the effluent discharge and in surface water downstream of the South Dam will exceed BC WQGs.

6. *Apply mitigation and evaluate BAT*

When predicted water quality is not expected to meet guidelines, the next step is to assess the (BAT). In this example, we present three potential technologies to intercept transport pathways and prevent COPCs from reaching receptors (Figure A4):

- Installing a Water Treatment Plant (WTP) to treat sediment pond effluent prior to discharge to the wetland;
- Installing a seepage dam to contain TIA seepage flow; and
- Install groundwater pump wells to intercept COPCs in groundwater and return them to the TIA.

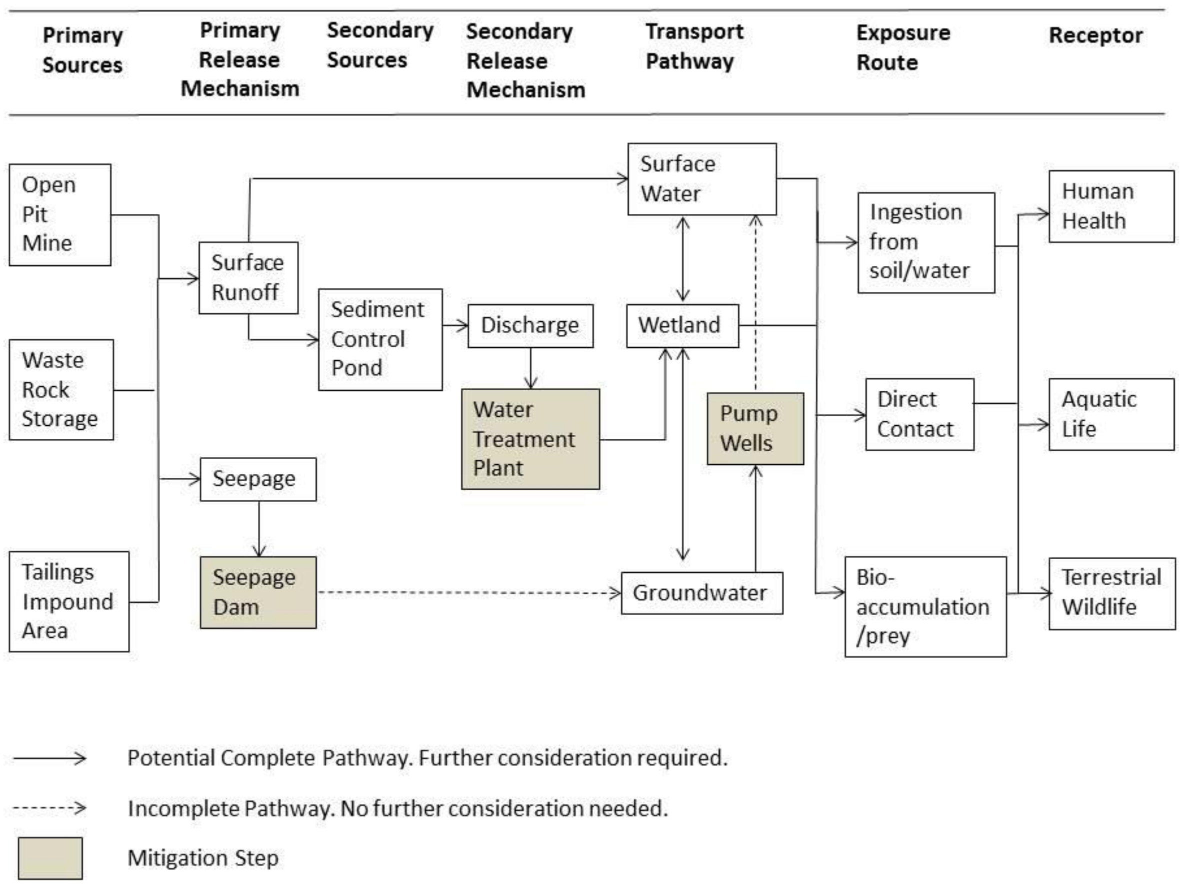
7. *Re-model predicted effects on receptors and update CSM*

Following selection of mitigative technologies, predicted effluent quality models must be re-calculated and compared to applicable water quality guidelines. In the case of Scenario 2, we assume that two parameters (dissolved Aluminum and dissolved Copper) continue to exceed BC WQGs following mitigation.

8. *Define Initial Dilution Zone (IDZ)*

An IDZ can be defined for point source discharges, such as effluent from the sediment pond (A.A. Aquatic Research Ltd. 1987). In this case, effluent predictions would apply outside of the IDZ, but not inside.

Figure A4: Updated CSM with indication of complete and incomplete pathways related to groundwater after applying BAT.



9. Site Specific Benchmarks

In some circumstances, science-based environmental benchmarks (SBEBs) (MOE 2016c) may be developed to support permitting or other regulatory decisions.

For details on the development and use of SBEBs, please refer to MOE 2016c (Technical Guidance 8 Environmental Management Act Applications - A Framework for the Development and Use of Freshwater Science-Based Environmental Benchmarks for Aquatic Life in Environmental Management Act Permitting for Mines).

10. Finalize CSM

When site specific benchmarks are deemed acceptable by the ministry, predictions of effluent quality may be compared to the accepted SBEB. The CSM will then be updated to re-define which potential transport pathways are considered “complete” or “incomplete” to describe potential impacts on receptors.

(Figure A5 presents an alternative format for presenting a CSM schematic. Additional pictorial graphics, maps, text and tables will be expected as part of a complete CSM. In the finalized CSM, rationale will include data, analysis and or modeling that demonstrates why some transport pathways are incomplete.)

Figure A5: Alternative presentation format for a box plot component of a CSM.