Baffinland Iron Mines Corporation

BIM-5200-PLA-0023 AQUATIC EFFECTS MONITORING PLAN

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Document Revision Record

Issue Date	Rev.	Prepared By	Approved By	Issue Purpose
May 27, 2014	0	JM	OC	Part I, Item 2 of Type A Water Licence No. 2AM-MRY1325
October 30, 2015	1	WB	JM	Part I, Item 2 of Type A Water Licence No. 2AM-MRY1325 Amendment No.1
March 31, 2016	2*	AV	JM	CREMP Design Revision recommended by Minnow
May 1, 2019	2*	AM	CM	Further CREMP Design Revision following 2017 Freshwater Workshop and Phase 2 Update
July 31, 2020	2*	AM	CM	Incorporated a trigger action response plan (TARP); removed component studies designs from appendices
May 14, 2021	2*	AM	CM	Incorporated QIA comments on the TARP
March 28,2022	2*	M/KP	CD	Incorporated regulatory agency comments received on Phase 2 Proposal draft in the September 2021 Water Licence Amendment Application
March 31, 2022	2*	CD	FG	Updated AEMP benchmarks for water and TARP wording for water quality assessment based on ECCC recommendations from the Phase 2 Proposal draft (September 2021 Water Licence Amendment Application); incorporated potential oil and grease sampling (contingent upon visual assessment of sheen) in water quality monitoring component; updated AEMP benchmarks for sediment quality at lake stations

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Issue Date	Rev.	Prepared By	Approved By	Issue Purpose
March 31, 2024	2	CD	MB	Updated to reflect the responses that Baffinland provided to intervener comments on the AEMP (and related programs); added TARP tables; removed reference to Phase 2, Milne Port Railway; updated to new management plan number – BAF-PH1-830-P16-0039 to BIM-5200-PLA-0023
January 13, 2026	3	KB	WB	Included clarification for WQG for total aluminum; included new developed benchmark for selenium and uranium; Inclusion of decision tree in respect to clarification on professional judgement; reduction of fish population monitoring to align with EEM standards and reduce pressure in project lakes, review of events based monitoring; clarification and update within TARP in regards to quantifiable triggers; included more details on ongoing hydrometric monitoring,

*version was not approved

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ABBREVIATIONS

°C .... Degree(s) Celsius
µg/L .... Microgram(s) Per Litre
µm .... Micrometre(s)
AEMP .... Aquatic Effects Monitoring Plan
AMP .... Adaptive Management Plan
ANFO .... Ammonium Nitrate Fuel Oil
AQNAMP .... Air Quality and Noise Abatement Management Plan
ARD .... Acid Rock Drainage
Baffinland .... Baffinland Iron Mines Corporation
BIC .... Benthic Invertebrate Community
BOD .... Biochemical Oxygen Demand
CCME .... Canadian Council of Ministers of the Environment
CES .... Critical Effect Size(s)
COO .... Chief Operations Officer
CREMP .... Core Receiving Environment Monitoring Program
DFO .... Fisheries and Oceans Canada
DO .... Dissolved Oxygen
DOC .... Dissolved Organic Carbon
DQO .... Data Quality Objective
ECCC .... Environment and Climate Change Canada
EDA .... Exploratory Data Analysis
EEM .... Environmental Effects Monitoring
EPP .... Environmental Protection Plan
ERP .... Emergency Response Plan
FDP .... Final Discharge Point
FEIS .... Final Environment Impact Statement
FEQG .... Federal Environmental Quality Guideline
FWSSWMP .... Fresh Water Supply, Sewage and Wastewater Management Plan
g .... Gram(s)
IIBA .... Inuit Impact Benefit Agreement
IOC .... Investigation of Change

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IOL .... Inuit-Owned Lands
IQ .... Inuit Qaujimajatuqangit
KP .... Knight Piésold Ltd.
m .... Metre(s)
m^3 .... Cubic Metre(s)
m^3/day .... Cubic Metre(s) Per Day
MDL .... Method Detection Limit
MDMER .... Metal and Diamond Mining Effluent Regulations
mm .... Millimetre(s)
NIRB .... Nunavut Impact Review Board
NLCA .... Nunavut Land Claims Agreement
NSC .... North/South Consultants Inc.
NWB .... Nunavut Water Board
QA/QC .... Quality Assurance/Quality Control
QIA .... Qikiqtani Inuit Association
ROM .... Run-of-Mine
RSA .... Regional Study Area
SDA .... Statistical Data Analysis
SSWQO .... Site-Specific Water Quality Objective
SWAEMP .... Surface Water and Aquatic Ecosystem Management Plan
TARP .... Trigger Action Response Plan
TEMMP .... Terrestrial Effects Mitigation and Monitoring Plan
TDS .... Total Dissolved Solids
TKN .... Total Kjeldahl Nitrogen
TMF .... Toxicity Modifying Factors
TOC .... Total Organic Carbon
TP .... Total Phosphorus
TSS .... Total Suspended Solids
USEPA .... United States Environmental Protection Agency
VEC .... Valued Ecosystem Component
WOE .... Weight-of-Evidence
WWTF .... Wastewater Treatment Facility

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1. Introduction

1.1 Purpose and Scope

This Aquatic Effects Monitoring Plan (AEMP) describes the approach used by Baffinland Iron Mines Corporation (Baffinland) to monitor potential effects from the Mary River Project (the 'Project') to the freshwater environment. The AEMP is designed to:

- Detect potential short- and long-term effects to the aquatic environment from the Project[1]
- Provide data to evaluate the accuracy of effects predictions
- Identify mitigation measures to avert or reduce unforeseen environmental effects
- Provide data to assess the effectiveness of mitigation measures

The AEMP focuses on potential Project-related effects to freshwater environment Valued Ecosystem Components (VECs) as identified in the Final Environmental Impact Statement (FEIS) and its addenda (Baffinland, 2012, 2013, 2018).
The freshwater VECs are:

- Water quantity
- Water and sediment quality
- Freshwater biota and fish habitat

The AEMP is structured to serve as an overarching 'umbrella' that provides an opportunity to integrate results of individual but related aquatic monitoring programs. The AEMP focuses on assessment of water quantity and quality, sediment quality, primary productivity (phytoplankton), benthic invertebrate community (BIC) structure, and fish (specifically Arctic char) within streams and lakes potentially affected by Project activities. Development of individual monitoring programs/studies under the umbrella of the AEMP has allowed for the

[1] Short-term is on the scale of annual, versus long-term which is multi-year.

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application of a common framework in terms of study design and sampling protocols.

This AEMP is a living document that will be updated periodically throughout the life of the Project to account for the close-out of shorter-term monitoring programs/studies, changes in study designs that are driven by the findings of monitoring or changes to the Project, and new information in the field of aquatic effects monitoring, including updated toxicological data.

Component Studies:

The following component studies comprise the AEMP:

Environmental Effects Monitoring (EEM) Program, as required under the Metal and Diamond Mining Effluent Regulations (MDMER) (Canada, 2025).

The EEM Program is a legal requirement for metal and diamond mines discharging effluent at an aggregate rate exceeding 50 cubic metres per day (m^3/day) in Canada, including the Project, under the MDMER. The EEM Program focuses on evaluating potential effects on aquatic environments that receive mine effluent discharges. It is included under the umbrella of the AEMP and follows a federal regulatory framework that is related to, but separate from, the Core Receiving Environment Monitoring Program (CREMP) and targeted programs/studies. Under Schedule 5 of the MDMER, EEM Program study designs and data/interpretive reports must be submitted to Environment and Climate Change Canada (ECCC) every three years. The results compliment annual monitoring completed through the CREMP and targeted programs/studies and contribute to broader regulatory decision-making and adaptive management.

Core Receiving Environment Monitoring Program (CREMP), which includes monitoring of the Mine Site area (water, sediment, phytoplankton, benthic invertebrates, and fish).

The CREMP forms the backbone of the AEMP and is complimented by the EEM Program. The CREMP is a detailed aquatic monitoring program designed to

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monitor the effects of multiple stressors on the aquatic environment, including the discharge of mine effluent and treated sewage effluent, as well as ore dust deposition. The CREMP includes the monitoring of water, sediment, phytoplankton, benthic invertebrates, and fish in streams and lakes near the mine site. These data provide foundational understanding of baseline conditions, natural variability, and potential mine-related influences, and support broader interpretation of results from the EEM Program and other targeted programs/studies.

Targeted Programs/Studies:

Specific effects monitoring (or targeted monitoring) is defined as monitoring conducted to address a specific question or observed effect and/or studies that are relatively confined in terms of spatial and/or temporal scope. Targeted environmental programs/studies relate to specific environmental concerns that require further investigation or follow-up but are not anticipated to be long-term components of the EEM Program or the CREMP. The Lake Sedimentation Monitoring Program, Dustfall Monitoring Program, The Hydrometric Monitoring Program and Stream Diversion Monitoring Study represent current targeted programs/studies. These are summarized as follows:

- **Lake Sedimentation Monitoring Program (LSMP):** evaluates lake sedimentation endpoints (sedimentation rate and sediment accumulation thickness estimates) observed during baseline[2] and operational periods of the Project to determine potential Project related influences.
- **Dustfall Monitoring Program:** evaluates dustfall rates in proximity to the Project, including the Tote Road, Milne Port, and Mine Site. This program is reported on separately as part of the Air Quality and Noise Abatement Management Plan but results are used to interpret components of the LSMP
- **Stream Diversion Barrier Study:** an initial study that evaluates potential for fish barriers under natural conditions and due to Project-related stream diversions.

[2] Sediment accumulation thickness estimates were integrated into the Lake Sedimentation Monitoring Program in the 2014/2015 ice cover period and do not represent baseline conditions.

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- **Hydrometric Monitoring Program**: an ongoing monitoring program designed to monitor the spatial and temporal variability of the volume of water within the RSA that may be subject to alteration by Project activities.

1.2 Relationship to Other Management Plans

Project activities have the potential to affect site water quantity and quality, fish habitat, vegetation, and other environmental components. Therefore, the AEMP must be viewed in consideration of the Environmental Management and Monitoring Plans for the Project, as listed and described in Table 1-1. The AEMP components and the relationship of the AEMP to the Water Licence and other aquatic monitoring activities are shown on Figure 1-1.

Table 1-1 Relationship to Other Management Plans

Referenced Management Plan	Document Reference Number	Information Provided by Referenced Plan
Environmental Protection Plan (EPP)	BIM-5200-PLA-0003	Provides relevant environmental protection measures.
Surface Water and Aquatic Ecosystem Management Plan (SWAEMP)	BIM-5200-PLA-0009	Describes monitoring and mitigation measures to limit adverse Project-related effects to receiving waters, aquatic ecosystems, fish, and fish habitat from runoff and surface water interacting with Project infrastructure.
Fresh Water Supply, Sewage and Waste Water Management Plan (FWSSWMP)	BIM-5200-PLA-0022	Describes plans for managing fresh water supplies and the disposal of effluents (sewage, oily water, and mine contact water). Describes monitoring of effluent discharges, including those regulated under MDMER.

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Referenced Management Plan	Document Reference Number	Information Provided by Referenced Plan
Air Quality and Noise Abatement Management Plan (AQNAMP)	BIM-5200-PLA-0005	Describes mitigation measures to limit adverse Project-related effects to air quality and noise, and monitoring programs to determine the effectiveness of mitigation. Includes the dustfall monitoring program and dust mitigation protocol.
Sampling Program – Quality Assurance And Quality Control Plan	BIM-5200-PLA-0004	Provides specific terms and conditions for the management of QA/QC for the Project's water quality monitoring programs

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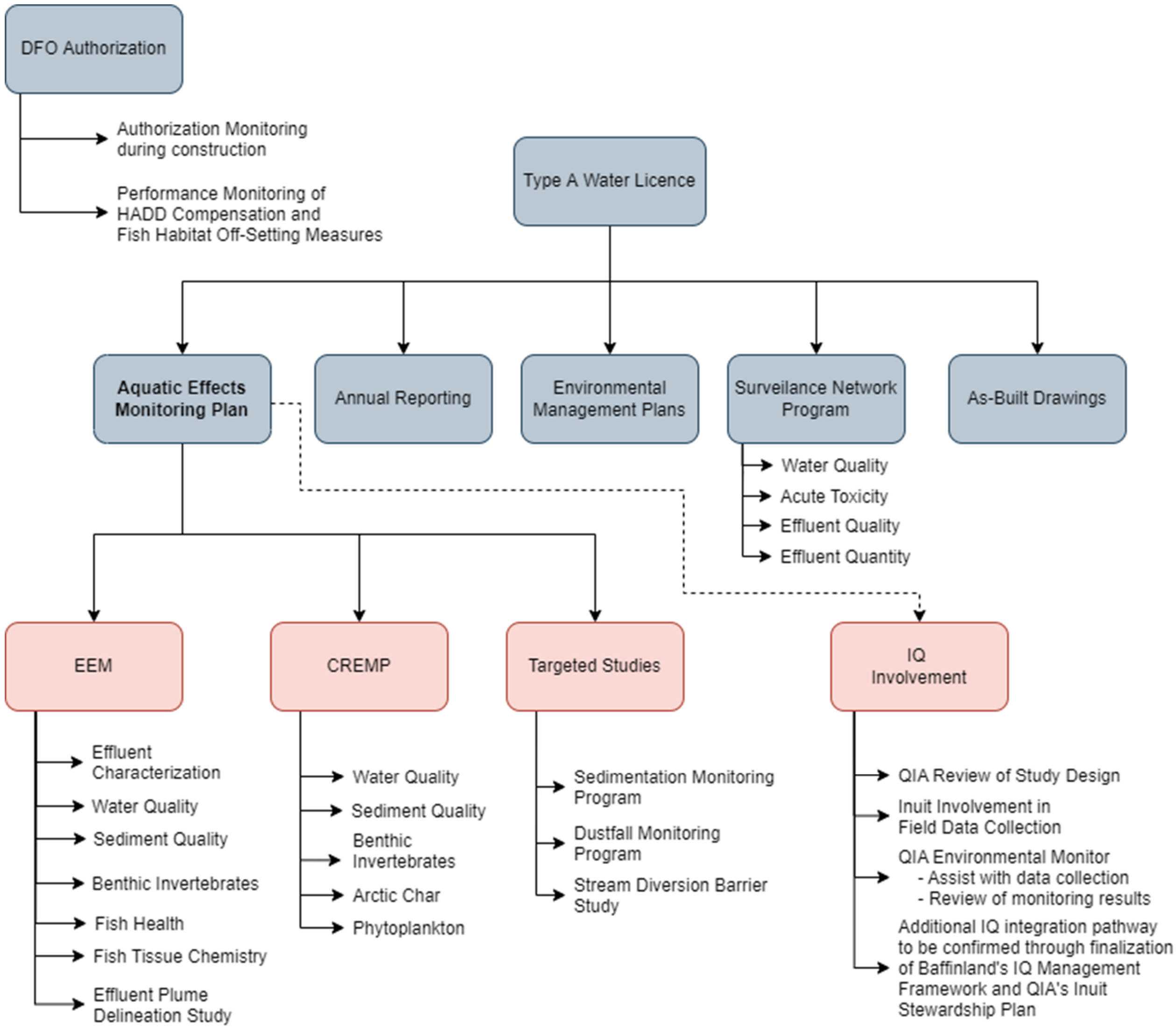

Figure 1-1 Relationship of the AEMP to the Water Licence and other Aquatic Monitoring Activities

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1.3 Regulatory Requirements

The AEMP is required by the following Project authorizations:

- Project Certificate No. 005, Amendment 05 issued by the Nunavut Impact Review Board (NIRB) (NIRB, 2023)
- Type A Water Licence No. 2AM-MRY2540 issued by the Nunavut Water Board (NWB or 'the Board') (NWB, 2025)
- Commercial Lease No. Q13C301 with the Qikiqtani Inuit Association (QIA) (QIA, 2013)

Project Certificate No. 005, Amendment 05, Condition #21 outlines requirements for this AEMP (from NIRB, 2023):

> *The Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum:*
>
> *a. monitoring of non-point sources of discharge, selection of appropriate reference sites, measures to ensure the collection of adequate baseline data and the mechanisms proposed to monitor and treat runoff, and sample sediments; and*
>
> *b. measures for dustfall monitoring designed as follows:*
>
> *i. To establish a pre-trucking baseline and collect data during Project operation for comparison;*
>
> *ii. To facilitate comparison with existing guidelines and potentially with thresholds to be established using studies of Arctic char egg survival and/or other studies recommended by the Terrestrial Environment Working Group (TEWG); and,*
>
> *iii. To assess the seasonal deposition (rates, quantities) and chemical composition of dust entering aquatic systems along representative distance transects at right angles to the Tote Road and radiating outward from Milne Port and the Mine Site.*

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The AEMP addresses Part (a) of Project Certificate No. 005, Amendment 05, Condition #21. Part (b) overlaps with the current dustfall monitoring program described in the AQNAMP (BIM-5200-PLA-0005). Interpretation of a minimum of three years of the dustfall monitoring data in relation to the aquatic environment forms part of the annual lake sedimentation targeted study described in Section 3.8.1.

Part I of Type A Water Licence No. 2AM-MRY2540 outlines conditions related to general and aquatic effects monitoring. Schedule G of Commercial Lease No. Q13C301 with the QIA identifies the AEMP as a key monitoring program.

Tables of concordance with the applicable regulatory approvals are provided in Appendix A

1.4 Version History

The previous Type A Water Licence (Amendment No. 1) (NWB, 2015) approved a 2013 AEMP framework. The initial version (Revision 0) of the AEMP was submitted to the NWB on June 27, 2014. This version contained information related to the baseline study which includes the original determination of benchmarks.

On October 30, 2015, Revision 1 of the AEMP was submitted to the NWB for approval. The purpose of this submission was to satisfy the condition stated in Part I, Item 2 of the Amended Type A Water Licence requiring Baffinland to submit to the NWB for approval in writing a revised version of the AEMP 60 days following the issuance of the Amended Type A Water Licence.

In 2015, Minnow Environmental Inc. (Minnow) was contracted to assist Baffinland in completing the field work and reporting requirements of the AEMP. After completing the CREMP field work in 2015, Minnow proposed several modifications to the CREMP to provide greater efficiencies to the program and improve the program's ability to achieve its objectives (i.e., to evaluate short- and long-term effects of the Project on aquatic ecosystems). Minnow's recommendations proposed modifications to the CREMP water quality, sediment

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quality and benthic community monitoring programs in study lakes and streams as well as modifications to the fish population monitoring program in study lakes (Minnow, 2016).

In April 2016, Baffinland submitted Revision 2 of the AEMP to the NWB for review and approval. Revision 2 of the AEMP incorporated nearly all of Minnow's recommendations for modifying the CREMP Study Design. Following the submission of the revised AEMP, Baffinland received feedback and comments from both Environment and Climate Change Canada (ECCC) and Indigenous and Northern Affairs Canada (INAC; now Crown-Indigenous Relations and Northern Affairs Canada [CIRNAC]), including concerns regarding the rationale for select recommendations proposed by Minnow.

On November 8 and 9, 2017, Baffinland chaired the 2017 Freshwater Workshop in Iqaluit, NU with regulators and stakeholders (ECCC, CIRNAC, Government of Nunavut, NWB, QIA) to discuss the Project's freshwater monitoring programs and Minnow's proposed modifications to the CREMP. Considering discussions and feedback received prior to and during the 2017 Freshwater Workshop, Baffinland has incorporated several of Minnow's recommendations into the current revision of this document for final regulatory review and approval.

The 2025 update to the AEMP (Revision 2) incorporated adaptive management mechanisms consistent with Baffinland's draft Adaptive Management Plan (AMP). Additionally, Section 6 of the Revision 2 contained the Trigger Action Response Plan (TARP) tables relevant to the AEMP. Rev 2 was also reorganized relative to Revision 1, to align the AEMP with similar changes made to Baffinland's other environmental monitoring and management plans, and two rounds of comments from the QIA (QIA, 2020a; 2020b), comments received from ECCC (2021), and outcomes from a Freshwater Workshop held on February 15, 2022, that included QIA, ECCC, and CIRNAC representation.

Revision 3 of the AEMP includes commitments made during the water license hearing which include:

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- Incorporating updated industry standard guidelines and utilising them to align with current versions of CCME and FEQG as applicable. (ECCC#9)
- Developing benchmarks for Selenium (ECC#9)
- Clarifying Aluminum benchmark for water quality is for dissolved aluminum (ECC#9)
- Inclusion of a TARP decision tree in respect to professional judgement (QIA-TR-2)
- A review of events-based monitoring conditions (QIA-TR-2)
- Clarification in the TARP table in regards to quantifiable triggers or exceedances of water quality guidelines or bench marks) for soil and water quality (QIA-TR-11/17)
- More details were included on the ongoing hydrometric monitoring program
- A reduction in the frequency of fish monitoring under the CREMP which is consistent with EEM and industry best practices, to alleviate the pressure of project influence on local lakes.

2. Objectives

The goal of the AEMP is to provide framework to monitor potential effects from the Mary River Project (the ‘Project’) to the freshwater environment. Assessment of effectiveness of monitoring will determine if the objectives and performance indicators are being met, as identified in Table 2-1.

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Table 2-1 Objectives and Performance Indicators

Objective	Performance Indicators
Detect potential short- and long-term effects to the aquatic environment from the Project	• Effluent characterization and deleterious substances • Water quality, including comparisons to AEMP benchmarks • Acute lethality and sub-lethality testing • Critical effect sizes (CES) for Arctic char and benthic invertebrates • Fish tissue study (if required under MDMER) • Chlorophyll a • Changes in streamflow
Provide data to evaluate the accuracy of effects predictions	
Identify mitigation measures to avert or reduce unforeseen environmental effects	
Provide data to assess the effectiveness of mitigation measures	

2.1 Consideration of Inuit Qaujimajatuqangit

Baffinland views Inuit Qaujimajatuqangit (IQ) as central to the successful planning and operation of the Project. IQ is reflective of the Inuit knowledge transferred from generation to generation and captures knowledge of relationships and morality, core values and worldviews, as well as environmental knowledge. As identified in the Mary River Project Inuit Impact and Benefit Agreement (IIBA), IQ is beneficial for the Project and provides critical insights into the environmental, ecological, cultural and socioeconomic dimensions of the Project.

Given the importance of IQ, Baffinland is working with QIA to developed an IQ Framework to guide its integration and use. The IQ Framework supports collaboration and decision-making throughout the life of the Project and accepts a broad definition of IQ that is not limited to that which is collected under a formal research license.

In addition to the general pathways that IQ has and will inform the AEMP, there are several initiatives with specific relevance to the AEMP worth noting here:

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- Project Certificate No. 005, Amendment 05, Appendix B - Commitment Lists: Baffinland and QIA agreed to several commitments aimed at increasing the role of IQ in aquatic effects monitoring. These include commitments by Baffinland to:
  - Resource annual snowpack sampling and monitoring through the Inuit led dust monitoring program
  - Resource the development of a snow quality metric, integrating IQ, as part of the development of Inuit Objectives, Thresholds, and Responses related to dust and therefore sedimentation
  - Continue working to develop the Milne Freshwater Fish Health monitoring program with the MHTO and the community of Pond Inlet

2.1.1 Inuit Use of Freshwater in the Project Area

Inuit use of the freshwater environment in the region includes harvesting of Arctic char (*Salvelinus alpinus*) and consumption of water, ice, and/or snow from these waterbodies for drinking. Information from various sources on fishing areas used by Inuit suggest that nearly all fishing in the region occurs in river-lake systems that support sea run Arctic char. This includes information collected in the mid-1970s for the Inuit Land Use and Occupancy Project (Brody, 1976), community information collected in the mid-1980s for the Nunavut Atlas (Riewe, 1992), fish harvest locations assessed during the Nunavut Wildlife Harvest Study (Priest and Usher, 2004), and information collected in the late 2000s as part of the Mary River Project IQ Study (KP, 2014a; 2014b). The systems examined in these studies are outside of the Project area.

Freshwater environments located near the Project Mine Site, Tote Road, and Southern Railway support landlocked populations of Arctic char. The lakes in the Project area that support landlocked Arctic char have typically been fished by Inuit only on an opportunistic, occasional frequency (KP, 2010; 2014b; Riewe, 1992). Inuit have historically used and continue to use Milne Inlet as an entrance to the interior of northern Baffin Island. Phillips Creek (from Katiktok to Milne Inlet) and the upper reaches of the Ravn River (south of Katiktok Lake) are important travel corridors both for interior access for caribou (*Rangifer tarandus*) hunting and for inter-community travel between Pond Inlet and Igloolik. Fishing

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and freshwater resources identified in the region by the Tusaqtavut studies (QIA, 2019a; 2019b) indicated 12 subsistence values within 250 m of the Project footprint. The Tusaqtavut studies also recorded community perspectives that the current Project is impacting land and resource use from the community perspective, including dust impacts to water quality along the Tote Road, limitation of access to fishing areas, and avoidance of Project areas by wildlife due to impacts to fish habitat and diminished water quality (QIA, 2019a; 2019b).

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2.2 Adaptive Management

2.2.1 Defining Adaptive Management

Baffinland incorporates adaptive management into the Project Environmental Management System with an Adaptive Management Framework (AMF) that provides the framework by which adaptive management is to be incorporated into Project operations.

Monitoring and responding to effects is addressed in a Trigger Action Response Plan (TARP) described in Section 5. The TARP identifies the pre-defined actions to be taken should threshold levels be exceeded. Monitoring results, when applicable, are compared to predictions made in the Final Environmental Impact Statement (FEIS; Baffinland, 2012) and the addendums (Baffinland 2013, 2018, 2020, 2022) to evaluate effectiveness of monitoring and mitigation strategies.

Implementation of adaptive management will be stewarded through the annual reporting cycle and collaborative discussion and review process during updates to this Plan. Ongoing inputs from the sources described within the AEMP as well as Baffinland's ongoing project monitoring will also form the basis of amendments and refinements to the objectives, indicators, thresholds, and response requirements over time.

2.3 Background

To meet AEMP objectives, Baffinland established the CREMP to assess potential mine-related effects on water quality, sediment quality, and aquatic biota (phytoplankton, benthic invertebrates, and fish). The CREMP focuses on primary receiving systems in the immediate vicinity of the Mine Site, including the Camp Lake system (Camp Lake and Camp Lake Tributaries 1 and 2), the Sheardown Lake system (Sheardown Lake Northwest, Sheardown Lake Southeast, and Sheardown Lake Tributaries 1, 9, and 12), and the Mary Lake system (including Mary River and Mary River Tributary-F). A map indicating tributaries within catchment areas is shown in Figure 2-2. Mine waste management facilities at the Mine Site include a mine waste rock stockpile and surface runoff

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collection/containment ponds situated near the mine waste rock stockpile and ore stockpile areas. In addition to periodic discharge of treated effluent from these facilities to the Mary River system, other potential mine inputs to aquatic systems located adjacent to the Mine Site include runoff and dust from ore (crusher) stockpiles located within the Sheardown Lake catchment, treated sewage discharge to the Mary River, deposition of fugitive dust generated by mine activities, and general runoff (Minnow, 2024).

The containment facilities designed to collect and manage surface water runoff at the Mine Site and the corresponding monitoring stations under the Type A Water Licence, Final Discharge Points (FDPs) under the MDMER, and receiving water bodies are summarized in Table 2.2 and are shown on Figure 2-2.

A site water balance process flow diagram showing stormwater management at the Mine Site is presented in an appendix of the Fresh Water Supply, Sewage and Waste Water Management Plan (FWSSWMP).

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Table 2-2 Effluent Discharge Locations at Mine Site Water Management Facilities

Station/FDP	Containment Facility Name	Description	Receiving Water Bodies
MS-06	Ore Stockpile Pond	Collects runoff from the ore crusher pad	Mary River
MS-07	KM106 Stockpile Pond	Collects runoff from the footprint of the Run-of-Mine (ROM) Stockpile located near KM106 of the Mine Haul Road.	Mary River
MS-08	Existing Waste Rock Facility (WRF) Pond	Collects runoff from the WRF	Mary River
MS-09 (Not Constructed)	n/a	Future pond to collect runoff from the west side of the WRF	Not Constructed
MS-10 (Not Constructed)	n/a	Future pond to collect runoff from the current Ore Stockpile Facility and future rail loadout area	Not Constructed
MS-11	KM105 Pond	Collects runoff from the Mine Haul Road	Sheardown Lake Tributary 1
MS-01	Mine Site Sewage Treatment Facility	Collects, treats and discharges camp sewage	Mary River
MS-01b	Mine Site Sailiviik Sewage Treatment Facility	Collects, treats and discharges camp sewage	Mary River

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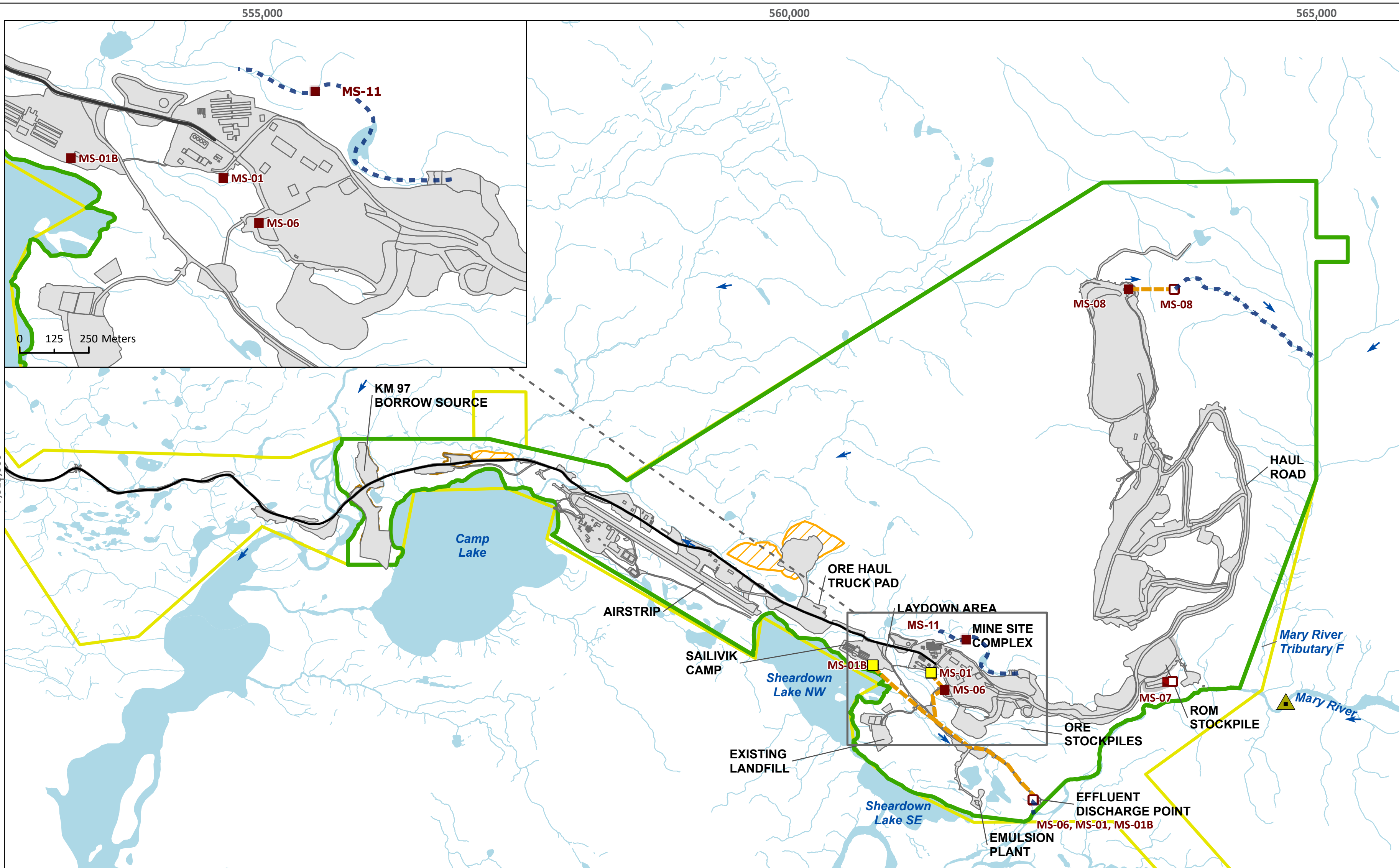

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Mine Site Layout

Projection: NAD 1983 UTM ZONE 17N.
Base Map: © Queen's Printer for Ontario, 2021.

0 250 500 1,000 Meters
Scale 1:55,000
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LEGEND

- Water Flow Direction
- Discharge Line
- Overland Effluent Channel
- Final Discharge Point under MDMER
- Outflow Point
- Water License SNP Monitoring Location
- Milne Inlet Tote Road
- Proposed North Railway - Route 3
- Current Infrastructure
- Quarry Area
- Borrow Area
- Project Development Area
- Commercial Lease Boundary

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ᑎᑎᕋᐅᔾᓯᒪᔪᖅ FIGURE 2-1

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2.3.1 Stream Diversions

The development of the open pit, a waste rock stockpile, and associated water management facilities (ditches, berms and settling ponds) has resulted in catchment modifications of five streams in the Mine Site area, as described in the FEIS (Baffinland, 2012). The streams that have been affected by these catchment modifications are shown on Figure 2-3. Of these five affected streams, Sheardown Lake Tributary 1 was predicted to be sufficiently affected as to warrant a targeted study as part of this AEMP, and thus an Initial Stream Diversion Monitoring Program was conceived to monitor these streams, focusing mainly on Sheardown Lake Tributary 1.

2.3.2 Water Quantity

Article 20 (Inuit Water Rights) of the Nunavut Land Claims Agreement (NLCA) formally recognizes the importance of water quantity and flow to the Inuit. Under the NLCA, Inuit require compensation if a project or activity will substantially affect the quantity of water flowing through Inuit-owned lands (IOL). Therefore, water quantity has been identified as a VEC. The water quantity VEC can be defined as the spatial and temporal variability of the volume of water within the Regional Study Area (RSA) that may be subject to alteration by Project activities. Diversions, runoff, and effluent discharges that pertain mainly to the Mine Site could potentially result in effects to fish habitat due to reductions or increases in flows. The potential effects, and monitoring of these effects, are addressed in the Stream Diversion Barrier Study (Section 3.8.3) and Water Quantity section (Section 3.7.2)

Conditions applying to water use and management have been outlined in Part E of the Type A Water Licence. These conditions are to be adhered to throughout the applicable timeframe of this licence. Compliance with these thresholds is addressed in the FWSSWMP. A discussion of the Project’s effects on the freshwater VECs follows.

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Key Issues and Pathways for Water Quantities

Key issues identified for freshwater quantity include:

- Water withdrawal
- Water diversion (stream diversion or changes to flow patterns in a specific watershed)
- Runoff or effluent discharge

Key Indicators and Thresholds

The key indicators for water quantity include:

- Water withdrawn for consumption, measured in cubic metres (m^3)
- Streamflow increase or decrease, measured as a percent change of the mean

Water withdrawal was anticipated to be from Camp Lake, water diversions were expected to occur around the Waste Rock Stockpile, the Open Pit, and the Ore Stockpile Platform, and effluent was expected to be discharged from the Waste Rock Stockpile, the Ore Stockpile, and the Sewage Treatment Plant. Several of the AEMP monitoring stations are located at or near the outlets of the catchments used in the effects assessment and as such can be used for analysis of the predicted changes in water quantity. The predicted effects to the MR-8, MR-10, MR-12, and MR-19 catchments are presented in the FEIS (Baffinland, 2012). The predicted effects to the SDLT-1 catchment in the FEIS were updated in KP, 2021a and the effects of the water management measures currently proposed are summarized in KP, 2021b. A summary of the predicted effects and corresponding AEMP monitoring station within the two catchments is provided in Table 2-3

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Table 2-3 Catchment area and Predicted Effect

Catchment	Predicted Effect	AEMP Monitoring Station
MR-08	Reduction in mean monthly discharge from 17% to 32% from flow diversions (Baffinland, 2012)	H04
MR-10	Reduction in mean monthly flow of up to 30% from diversions and increase in mean monthly flow of up to 63% from discharge of effluent (Baffinland, 2012)	H05
MR-12	Reduction in mean monthly flow of up to 8% from diversions and increase in mean monthly flow of up to 16% from discharge of effluent (Baffinland, 2012)	H07
MR-19	Less than or equal to a 1% change in mean monthly discharge (Baffinland, 2012)	H06
SDLT-1	Reduction in flow of up to 26% due to diversions and corresponding increase in flow up to 31% from discharge of effluent (net mean annual discharge reduction of 5%) (KP, 2021b)	H11

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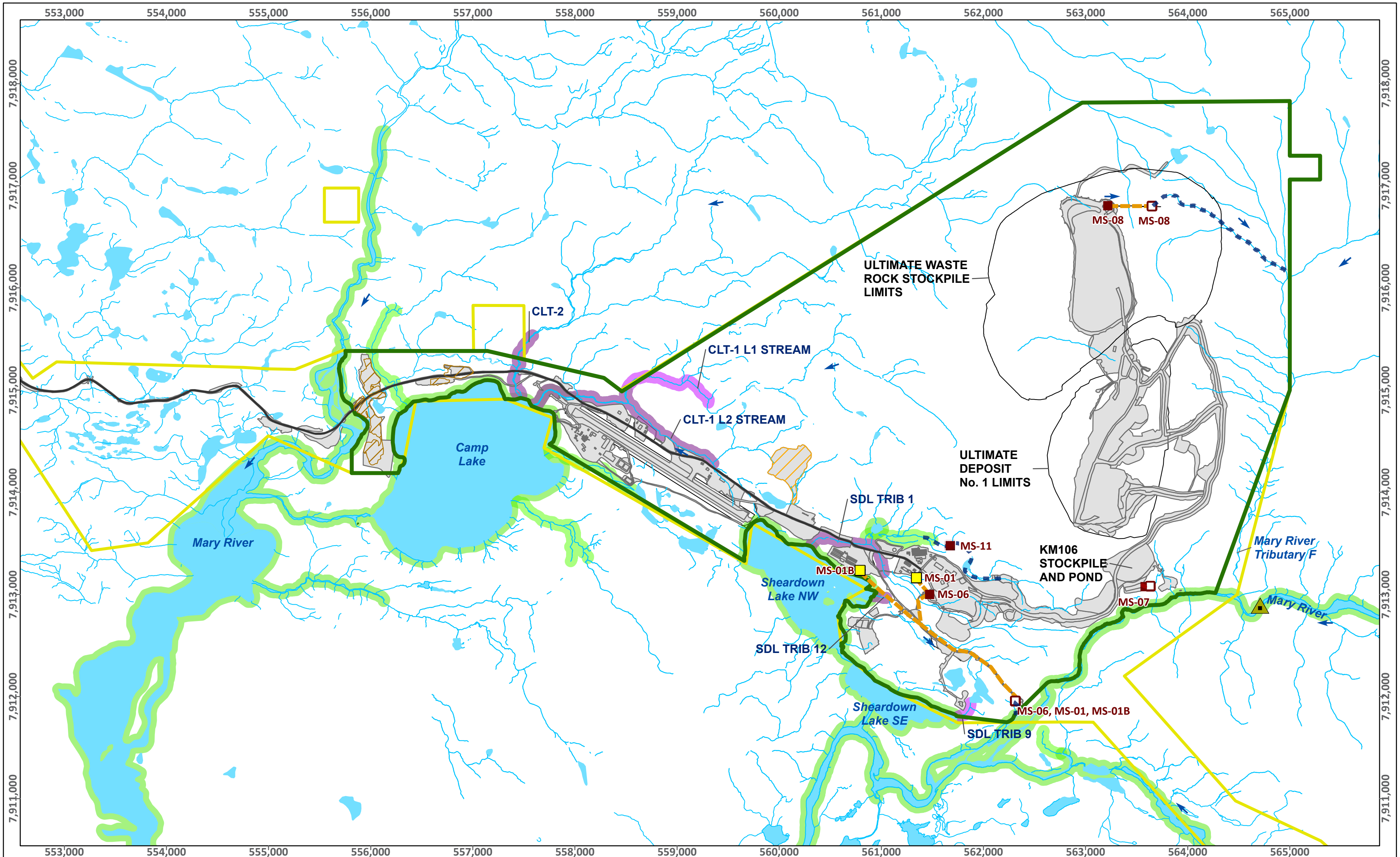

LEGEND

- Mary River Cascade Barrier
- Water Flow Direction
- Milne Inlet Tote Road
- Borrow Area
- Quarry Area
- Current Infrastructure
- Project Development Area
- Commercial Lease Boundary - Impact Area
- Streams Affected by Catchment Modifications
- Confirmed Arctic Char Habitat
- Water License SNP Monitoring Location
- Final Discharge Point
- Outflow Point

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Mine Site Tributaries and Effluent Discharge Locations

Projection: NAD 1983 UTM ZONE 17N.
Base Map: © Queen's Printer for Ontario, 2023.

0 250 500 1,000 Meters
Scale 1:55,000
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ᑎᑎᕋᐅᔭᕐᓯᒪᕙᖅ **FIGURE** 2-2

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2.3.3 Water and Sediment Quality VEC

Key Issues and Pathways for Water and Sediment Quality

Key issues considered for the surface water and sediment quality VEC are summarized in Table 2.4.

2.3.4 Freshwater Biota and Habitat

Key Issues and Pathways for Freshwater Biota

Arctic char is the primary freshwater fish species of interest regarding potential effects of the Project on the aquatic environment. Potential linkages between the Project components/activities and Arctic char are presented on Figure 2-3. These linkage pathways can be categorized into three key issues as follows:

- Potential effects on the health and condition of Arctic char
- Potential effects on Arctic char habitat
- Potential effects on direct mortality of Arctic char

2.3.4.1 Potential Effects on the Health and Condition of Arctic Char

Project-related changes in water and/or sediment quality have the potential to affect the health and condition of Arctic char. The major pathways of effects are based on the residual effects identified in the water and sediment quality assessment. Linkages considered for potential effects include three general categories:

- Point source discharges, including treated sewage effluent, WRF runoff, ore stockpile runoff, mine pit water, ROM stockpile runoff, and exploration drilling runoff
- Aqueous non-point sources, including effects related to sediment and erosion, release of blasting residues, general site runoff, and development of quarries and borrow pits
- Dust emissions and introduction to surface waters

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Effects considered relate to sublethal effects of Project-related changes in water and/or sediment quality on fish health and condition.

2.3.4.2 Potential Effects on Fish Habitat

Project activities with the potential to affect Arctic char habitat include the following:

- Placement of Project infrastructure in waterbodies (e.g., water intakes, sewage outfalls, stream crossings, lake encroachments, laydown areas)
- Various Project-related effects pathways that may alter other aquatic biota that are food sources for Arctic char or form a component of the food web and thus may affect the productive capacity of Arctic char habitat (i.e., lower trophic level biota)
- Project-related effects on sedimentation rates that may result in alteration of habitat quality (e.g., due to dust deposition)
- Project-related changes to hydrology and subsequent effects on aquatic habitat (e.g., water withdrawal, stream diversion)
- Project-related effects on fish passage, with subsequent effects on the availability of habitat, including:
  - Stream crossing construction and operation
  - Changes in hydrology that may alter hydraulic conditions necessary for fish passage (e.g., stream velocities, water depth)

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Table 2-4 Key Issues for Water and Sediment Quality

Pathway	Key Issues	Location	Project Phases
Surface runoff	Uncontrolled runoff Erosion and sediment entrainment Site drainage control Spills and contamination Drainage from quarry sites	Milne Port, Mine Site, Railway construction, Steensby Port, Quarry sites	Construction Operation Closure
Discharges from secondary containment	Fuel depots/storage - contact water may be contaminated with hydrocarbon/petroleum products	Milne Port, Mine Site, Railway construction, Steensby Port, Quarry sites	Construction Operation Closure
Discharge of brine used for drilling in permafrost	Salinity of the discharge	Construction activities	Construction
Pooling water in landfarm	Pooling water maybe contaminated with hydrocarbon/petroleum product and may require treatment prior to discharge	Milne Port Mine Site Steensby Port	Construction Operation Closure

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Pathway	Key Issues	Location	Project Phases
Pooling water in landfill	Pooling water maybe contaminated with metals, hydrocarbon/petroleum product and may require treatment prior to discharge	Milne Port Mine Site Steensby Port	Construction Operation Closure
Treated sewage effluent discharges	Effectiveness of treatment - pH, flows, biochemical oxygen demand (BOD), Faecal Coliforms, total suspended solids (TSS), nutrients, metals, oil and grease	Sheardown Lake Mary River outfall	Construction Operation Closure
Treated oily water treatment plant discharge	Effectiveness of treatment - pH, flows, TSS, metals, oil and grease	Milne Port Mine Site Steensby Port	Construction Operation Closure
Dustfall	TSS in runoff, sediment deposition on stream and lake bottoms, metals	Mine Site Milne Port Steensby	Construction Operation Closure
ROM stockpile contact water	Metals, TSS, blasting residue (ammonia, nitrate)	Mine Site	Operation
Ore stockpile contact water	Metals, TSS, blasting residue (ammonia, nitrate)	Milne Port Mine Site Steensby Port	Operation
Mine pit dewatering	Metals, TSS, blasting residue (ammonia)	Sheardown Lake Tributary, Mary River	Operation

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Pathway	Key Issues	Location	Project Phases
WRF runoff - west pond and east pond	Acid Rock Discharge (ARD), metals, TSS, blasting residue (ammonia)	Mary River	Operation Closure Post-Closure
Mine pit water	ARD, metals	Open pit	Post-Closure

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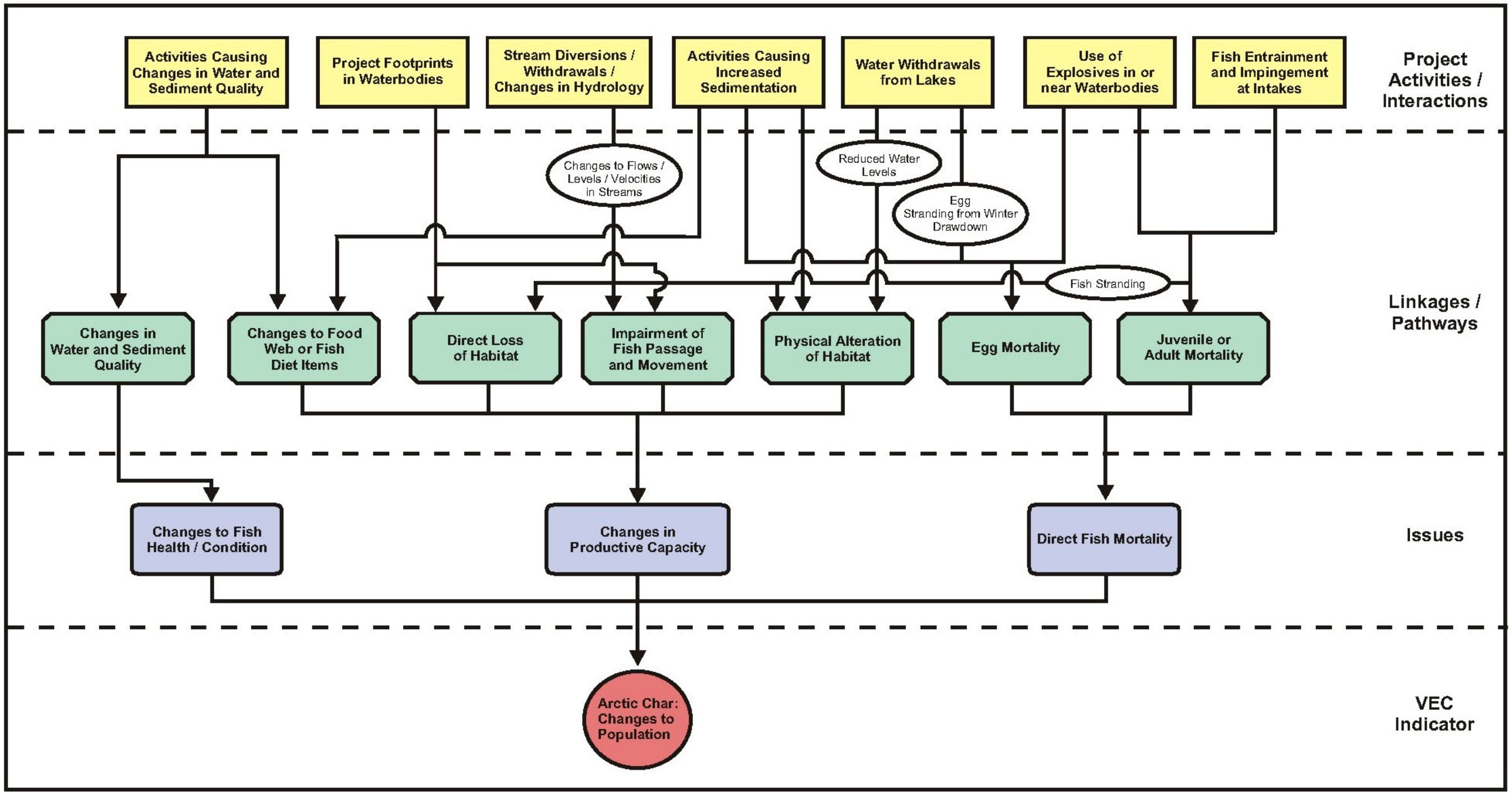

Figure 2-3 Project Activities/Pathways of Potential Effects to Arctic Char

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2.3.4.3 Potential Effects on Direct Fish Mortality

Project-related activities with the potential to cause direct mortality of Arctic char include the following:

- Activities that generate dust, potentially leading to increased sedimentation and mortality of eggs
- Winter drawdown at water source lakes, which may result in egg stranding and mortality
- Blasting in or near Arctic char habitat
- Placement of Project infrastructure in Arctic char habitat (i.e., potential spawning areas)
- Water withdrawals (i.e., potential for entrainment and/or impingement of Arctic char eggs and juveniles at water intakes)
- Water diversions and/or alterations in discharge or water levels, which could result in fish stranding

Potential effects of sedimentation on survival (hatching success) of Arctic char eggs are addressed through monitoring sediment deposition rates and estimating sediment accumulation thicknesses in Sheardown Lake as a target study (Section 3.8.1). Potential for winter drawdown to cause egg stranding is addressed through monitoring of water levels as the primary indicator, supported by information from Arctic char population monitoring (e.g., year class strengths, recruitment) completed under the CREMP. The potential for placement of Project infrastructure to cause direct mortality of Arctic char (i.e., placement of infrastructure on fish eggs) is addressed through mitigation and management, specifically through avoidance of potential spawning areas and/or by adherence to timing windows to avoid the egg incubation period. Potential for entrainment and impingement of fish at water intakes is mitigated through adherence to Fisheries and Oceans Canada's (DFO's) *Interim Code of Practice: End-of-pipe fish protection screens for small water intakes in freshwater* (DFO, 2020). The final potential pathway of effect listed above is addressed through the target study to confirm fish passage at Mine Site area streams affected by water diversions (Section 3.8.3).

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2.3.4.4 Potential Effects of Blasting on Fish

Blasting is conducted to support the construction and operation phases of the Project. The concern for potential effects on fish due to blasting overpressure mainly arises for the railway construction of the Steensby Railway. Effects of blasting on free-swimming Arctic char and their eggs is to be mitigated through the implementation of a detailed blasting management plan developed in accordance with DFO's blasting guidelines (Wright and Hopky, 1998).

2.3.4.5 Stream and River Crossing Construction and Lake Encroachment

Construction activities at watercourse crossings along the Steensby Railway, railway access roads, Project service roads, and the Tote Road have the potential to cause the following effects:

- Stranding of Arctic char due to the need to isolate watercourses to facilitate construction. This potential effect is to be mitigated by using appropriate timing windows for construction when possible and through fish salvage operations when required.
- Potential impediments to fish passage at stream crossings due to changes in water levels, flows, and/or velocities. This potential pathway of effect is to be addressed through follow-up monitoring at selected stream crossings (i.e., a subset) to evaluate fish passage as per the Stream Diversion Barrier Study monitoring described in KP (2014c); also Section 3.8.3.

2.3.5 Potential Issues and Concerns by Project Component

Potential effects on aquatic ecosystems are presented below for each of the Project components for the construction and operation phases of the Project. Since closure activities are similar in nature to construction activities, the concerns identified for the construction phase are also relevant to the closure phase.

2.3.5.1 Mine Site (Water Management Area 48)

The Mine Site includes the infrastructure required to support mining activities (camp, maintenance shops, fuel depots, wastewater treatment facilities

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(WWTFs), laydown areas, waste handling and storage facilities, landfill and landfarm, and explosives storage, manufacture, and use). The freshwater supply for the Mine Site is drawn from Camp Lake. Several quarries and borrows have been identified/developed within the Mine Site area to provide aggregate material for site development and ongoing operations and maintenance.

Potential aquatic effects at the Mine Site are listed in Table 2.5.

Table 2-5 Potential Effects to the Mine Site Aquatic Environment

VEC	Concern	Pathway	Indicator
Water Quantity	Withdrawal of water from Camp Lake	All	Changes in water level or flow
	Flow diversion from Sheardown Lake	All	Changes in water level or flow
Water and Sediment Quality	Earthworks	Surface runoff discharging to Camp Lake, Sheardown Lake NW and SE, lake tributaries and Mary River	TSS, dust, spills
	Construction activities		TSS, dust, spills
	Site drainage		TSS, dust, spills
	Quarry site drainage		TSS, dust, spills, residual ammonia
	Fuel tank farms	Discharges from secondary containment areas to receiving environment - surface drainage	Hydrocarbons
	Waste storage area		Metals
	Hazardous waste storage area		Metals, hydrocarbon
	Landfarm		Metals, hydrocarbon, nutrients
	Landfill		Metals, hydrocarbon

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VEC	Concern	Pathway	Indicator
	Treated Sewage Effluent	Outfall to Mary River	BOD, TSS, nutrient
	Treated Effluent from Oily Water Treatment Plant	Outfall to Mary River or Tundra near Sheardown Lake	TSS, hydrocarbon
	WRF stockpile drainage	Discharge to Mary River	TSS, metals, nutrients
	Waste rock stockpile drainage	Discharge to Mary River	TSS, metals, nutrients
	ROM stockpile drainage	Discharge to Mary River	TSS, metals, nutrients
	Ore stockpile drainage	Discharge to Mary River	TSS, metals, nutrients
	Mine pit dewatering	Discharge to Mary River and potentially Sheardown Lake	TSS, metals, nutrients
	Mine pit water post closure	Discharge to Mary River and potentially Sheardown Lake	TSS, metals, nutrients
	Dust	TSS in runoff	TSS, metals
Freshwater Biota and Fish Habitat	Footprint of facilities in water bodies - water crossings	Loss of habitat - crossing of Mary River ,Camp Lake tributaries	Percentage of habitat lost, amount of habitat compensation
	Integrity of water crossing	Alteration of habitat	Erosion, blockage
	Fish passage	Alteration of habitat	Blockage, barrier

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VEC	Concern	Pathway	Indicator
	Water diversions - changes in streams	Alteration or loss of habitat	Low flow and barrier to fish passage
	Changes in water and sediment quality (point and non-point sources)	Effects on Arctic char health and condition; effects on lower trophic level biota (Arctic char habitat)	Arctic char health and condition; population metrics; BIC metrics
	Dust Deposition	Alteration of habitat	Increased sediment deposition in streams and lakes BIC metrics
		Deposition on Arctic char eggs - reduced egg survival	Sedimentation rates in Arctic char spawning habitat
Groundwater Quality	Landfill	Seepage in groundwater	Metals

2.3.5.2 Milne Port (Water Management Area 48)

Milne Port currently serves as the main staging area for material and equipment required for the construction activities at the Mine Site, as well as the shipping point for ore produced by the Project. The site includes fuel depots, camps and WWTF, laydown areas, maintenance facilities, and temporary waste transit areas. Two sites have been approved for use as a freshwater supply for Milne Port: Phillip’s Creek during summer and KM32 Lake during the winter and summer. Quarries and borrow pits have been identified/developed near Milne Port to provide aggregate for site development and ongoing operations and maintenance. At Milne Port, runoff from the ore stockpiles is directed to two surface water management ponds and discharge into Milne Inlet.

- Milne Port Ore Stockpile Facility Pond - East (monitoring station MP-05)
- Milne Port Ore Stockpile Facility Pond - West (monitoring station MP-06)

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General site drainage at Milne Port, excluding ore management and containment areas, is directed to a series of swales located along the shoreline of Milne Inlet (ocean). Effluent from water treatment plants (sewage, oily water) and surface water management ponds are discharged to Milne Inlet without contacting any bodies of freshwater. As a result, site drainage and effluent discharge at Milne Port have negligible effects on the freshwater receiving environment. The concerns for freshwater aquatic effects during the construction, operation, and closure of Milne Port site are listed below:

Water Quantity

- Withdrawal of water from KM32 Lake year-round
- Diversions

Water and Sediment Quality

- Quarry management (runoff quality, residual ammonia from blasting activities)
- Construction activities
- Spills caused by accidents and malfunctions

Freshwater Biota and Fish Habitat

- Low magnitude effects to fish and fish habitat related to water quality changes

2.3.5.3 Tote Road (Water Management Area 48)

The Tote Road connects Milne Port to the Mine Site. Routine maintenance of the Tote Road will be conducted over the life of the Project to support the transport of ore and materials between the Mine Site and Milne Port. This maintenance may include repairing of water crossings, regrading of the road, and ongoing maintenance of surface water management structures (i.e., roadside swales, ditches). Several borrow sources and quarries have been identified/developed along the length of the Tote Road to support routine maintenance activities. The concerns for potential aquatic effects during construction, operation, maintenance, and closure of the Tote Road are related to:

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Water and Sediment Quality

- Dustfall from road traffic and related effects on water quality
- Drainage management from borrow sources
- Spills caused by accidents or malfunctions

Freshwater Biota and Fish Habitat

- Construction and ongoing maintenance of stream crossings
- Changes in water quality that may affect biota
- Bank erosion, stability, blockage, and integrity of the water crossing can all affect fish passage

2.3.5.4 Steensby Railway (Water Management Areas 48 and 21)

The longer-term plans for the Project involve the transportation of iron ore from the Mine Site to Steensby Port by railway. The concerns for potential aquatic effects occur mainly during the construction period of the railway embankment. Construction camps will be established at the onset of the construction period. Water and wastewater from the construction camps will be managed as per the FWSSWMP. Domestic water supply and water required for construction activities will be drawn from approved local lakes. Quarries will be developed along the Railway alignment to provide the necessary rock and aggregate required for the rail embankments, stream crossings, and bridge construction.

The concerns for potential aquatic effects during construction, operation, and closure of the railway are related to the loss or alteration of fish habitat:

Water Quantity (Potable Water and Construction Activities)

- Water withdrawals affecting downstream flows

Water and Sediment Quality

- Surface runoff water quality (TSS, spills, dust)
- Quarry management (runoff water quality, TSS, and ammonia)

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Freshwater Biota and Fish Habitat

- Stream/river crossings - flow velocity, TSS, erosion, fish stranding, fish passage and integrity of the water crossing
- Lake and river encroachment - loss of habitat, TSS (construction)
- Changes in water quality (e.g., dust, sewage effluent) - effects on Arctic char health and condition/habitat
- Blasting near water (blasting overpressure)

2.3.5.5 Steensby Port (Management Area 21)

The longer-term plans for the Project involve the shipping and stockpiling of iron ore at Steensby Port. Steensby Port will contain infrastructure required for ongoing support of the port, the Railway, and the Mine Site.

At Steensby Port, surface drainage will be directed toward Steensby Inlet (ocean). Treated sewage effluent and treated oily water will be discharged to Steensby Inlet. As a result, site drainage and effluent discharge will have minimal effects on the freshwater receiving environment.

The concerns for potential freshwater aquatic effects during the construction, operation, and closure of the Steensby Port are related to:

Water Quantity

- Withdrawal of water from 3 KM Lake (dust suppression and other minor uses) and ST347 Lake (permanent camp)

Water and Sediment Quality

- Quarry management (runoff quality, ARD potential, residual ammonia from blasting activities)
- Construction of water intakes - TSS/turbidity
- Spills caused by accidents and malfunctions

Freshwater Biota and Fish Habitat

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- Stream/river crossings - flow velocity, TSS, erosion, fish stranding, fish passage, and integrity of the water crossing
- Lake and river encroachment - loss of habitat, TSS (construction)
- Construction of water intakes - avoidance of spawning areas

The discharge criteria for the effluent and runoff water quality are presented in the Type A Water Licence.

3. Component Studies

Monitoring programs associated with the AEMP focus on short- and long-term detection of potential Project-related effects and immediate to short-term responses. These short-term impacts and responses are intended to provide feedback pertaining to the effectiveness of mitigation measures via adaptive management. They also generate most of the monitoring data that feeds into annual reporting, which includes analysis and reporting of monitoring data collected annually, along with trend analyses completed using historical monitoring data.

The review of trends or temporal patterns over time through the annual review process will inform adaptive management in the long term. This may include triggering plan updates as described in Section 5.

3.1 Process for Developing Water and Sediment Quality Benchmarks

The Mine Site occurs within an area of metal enrichment and therefore generic water quality and sediment guidelines established for all areas within Canada may naturally be exceeded at waterbodies located near the Mine Site. Thus, the selection of appropriate benchmarks must consider established water and sediment quality guidelines, such as those developed by the Canadian Council of Ministers of the Environment (CCME), as well as site-specific natural enrichment and other factors such as Toxicity Modifying Factors (TMF), including pH, water hardness, dissolved organic carbon, etc. (CCME, 2007).

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The assessment of surface water and sediment quality data over the life of the Project is on-going and the identified benchmarks may change throughout this process as more data becomes available and updates to guidelines occurs. For example, an AEMP benchmark established early on in the life of the mine may require updating to a Site-Specific Water Quality Objective (SSWQO) based on newly published literature which has become available or implementation of site-specific toxicity tests conducted to further understand TMFs or resident species toxicity. The iterative, cyclical, nature of modification of benchmarks under an AEMP is well established (MacDonald et al., 2009).

3.2 Nutrient/Eutrophication Indicators and Benchmarks

The AEMP indicator selected to reflect potential Project-related effects on phytoplankton abundance, which is used as an indicator of productivity and potential eutrophication in freshwater receiving environments, is the aqueous concentration of chlorophyll-a (NSC, 2014a). Chlorophyll-*a* is the most widely used indicator of phytoplankton abundance and is relatively easy to sample. In addition, chlorophyll-a concentrations generally show lower analytical variability and analysis is more cost-effective than for phytoplankton biomass and community composition endpoints. The data analysis/reporting process for chlorophyll-a monitoring completed under the AEMP also considers related/supporting information regarding nutrients (phosphorus and nitrogen), measures of water clarity (i.e., TSS, turbidity, Secchi disk depth), and temperature for the analysis of potential effects on phytoplankton.

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Table 3-1 Sediment Quality Benchmarks

Jurisdiction, Type of Guideline and Statistical Metric		Hg	As	Cd	Cr	Cu	Fe	Mn	Ni	P*	Pb	Zn
CCME (1999)	ISQG	0.17	5.9	0.6	37.3	35.7	NGA	NGA	NGA	NGA	35	123
	PEL	0.486	17	3.5	90	197	NGA	NGA	NGA	NGA	91.3	315
Ontario (OMOE, 2011)	LEL	0.2	6	0.6	26	16	20,000	460	16	600	31	120
	SEL	2	33	10	110	110	40,000	1100	75	2,000	250	820
97.5th Percentiles of Baseline for Lake Areas and Lake-Specific Benchmarks												
Camp Lake (2007 - 2014) (N=20)		<0.1	5.1	<0.5	85	50	47,637	3,362	72	1480	23	96
AEMP Benchmark – Camp Lake		0.33A	11.5A	2.1A	89C	84C	67,866C	3,441C	72B	1,962C	63A	219A
Sheardown Lake NW (2007-2014, excluding 2008) (N=39)		<0.1	7.4	<0.5	94	60	55,378	4,754	82	2,160	24	97
AEMP Benchmark - Sheardown Lake NW		0.33A	11.5A	2.1A	94B	89C	71,736C	4,754B	82B	2,302C	63A	219A
Sheardown Lake SE (2007 - 2014) (N=11)		<0.1	2.0	1.0	79	56	34,400	657	66	1,278	18	63
AEMP Benchmark - Sheardown Lake SE		0.33A	11.5A	2.1A	86C	87C	61,247C	2,089C	66B	1,861C	63A	219A
Mary Lake (2007 - 2014) (N= 17)		<0.1	4.6	<0.5	99	39	49,840	4,486	69	1,575	26	138
AEMP Benchmark – Mary Lake		0.33A	11.5A	2.1A	99B	79C	68,967C	4,486B	69B	2,010C	63A	219A
97.5th Percentile of Reference Lake 3 Values												

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Jurisdiction, Type of Guideline and Statistical Metric	Hg	As	Cd	Cr	Cu	Fe	Mn	Ni	P*	Pb	Zn
Reference Lake 3 (2015 – 2021) (N=70)	0.08	7.9	0.3	94	118	88,095	3,521	65	2,444	57	122

NOTES:

1. Abbreviations are as follows: ISQG = Interim Sediment Quality Guideline; PEL = Probable Effect Level; LEL = Lowest Effect Level; SEL = Severe Effect Level; NGA = no guideline available
2. Metal concentration units are in mg/kg (dry weight) unless otherwise noted.
3. As recommended by Minnow, arsenic, copper, and iron sediment quality benchmarks may be modified in the future to account for the elevated levels of these metals observed in sediments of Reference Lake 3 during the 2015 CREMP field program.
4. *=N for phosphorus is lower than other elements / parameters.
5. For benchmarks, A = guideline is based on average between the sediment quality guideline upper and lower effect level (CCME or Ontario).
6. For benchmarks, B = guideline is based on 97.5% percentile of baseline data.
7. For benchmarks, C = guideline is based on average between the 97.5^{th} percentile of baseline and reference lake concentration
8. Where mercury and cadmium were not detected in any samples in a given area, the detection limit was used in place of the 97.5% percentiles.

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An AEMP benchmark for chlorophyll-a of 3.7 micrograms per litre (µg/L) has been selected for the Mine Site area lakes based on maintaining the trophic status at the time of baseline (i.e., oligotrophic). Specifically, the benchmark represents the average of the upper and lower ranges of trophic boundaries for lakes based on chlorophyll-a as designated and/or adopted in the scientific literature (Table 3.4).

Table 3-2 Derivation of the Benchmark for Chlorophyll-*a*

Reference	Chlorophyll *a* (µg/L)	
	Maximum Oligotrophic	Minimum Mesotrophic
OECD (1982) and AENV (2013)	2.5	2.5
Wetzel (2001)	4.5	3.0
Nürnberg (1996)	3.5	3.5
Carlson (1977)	2.6	2.6
Swedish Environmental Protection Agency (2000)	5.0	5.0
USEPA (2009)	2.0	2.0
University of Florida (2002)	3.0	3.0
Galvez-Cloutier R. and M. Sanchez. (2007)	3.0	3.0
Ryding and Rast (1989)	8.0	8.0
Average	3.8	3.6
Average of Upper / Lower Range	3.7	

3.2.1 Water Quality Benchmarks

The parameters originally selected for surface water quality benchmark development (i.e., Revision 0 of the AEMP) were as follows:

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- Metals/Metalloids aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, nickel, silver, thallium, vanadium, and zinc (Al, As, Cd, Cr, Co, Cu, Fe, Pb, Ni, Ag, Tl, V, Zn)
- General Parameters and Nutrients: chloride, sulphate, ammonia, nitrite, and nitrate

In addition, numerous parameters were identified for monitoring under the Exploratory Data Analysis (Step 1 of Assessment Framework), including pH, dissolved oxygen (DO), hardness, TSS, alkalinity, magnesium, phosphorus, potassium, total organic carbon (TOC), and dissolved organic carbon (DOC), to assist with the evaluation of potential effects from the Project and track potential changes in water quality over time. If monitoring shows changes in concentrations of these substances over time, benchmarks may be developed for the additional parameter(s) in the future. In 2025, benchmarks for Selenium and Uranium were added based on results within the monitoring program and discussion with regulators during the water license renewal process.

The AEMP water quality benchmarks were originally developed taking baseline data from Mine Site area lakes and creeks/rivers into consideration. In most cases, the AEMP benchmarks for individual parameters were the same between lakes and creeks/rivers, with the vast majority of selected benchmarks reflecting generic water quality guidelines (i.e., a Canadian Water Quality Guideline or surrogate). Where parameter concentrations at the time of baseline naturally exceeded available guidelines, or parameters for which less than 5% of values were above laboratory method detection limit (MDL), other methods were applied for the development of AEMP benchmarks (Intrinsik, 2013). Federal Environmental Quality Guidelines (FEQGs) and certain Canadian Water Quality Guidelines (i.e., CCME) have been updated since the original development of benchmarks for the AEMP (i.e., Revision 0). Therefore, modifications to the original AEMP benchmarks have been completed, and the AEMP benchmarks are listed in Table 3-3 and Table 3-4.

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Table 3-3 Water Quality Benchmarks for Mine Site Lakes

Parameter[3]	Units	Water Quality Guideline	Camp Lake	Mary Lake	Sheardown Lake (NW & SE)	Selected Benchmark	Benchmark Method[2]
Aluminium	mg/L	Variable (FEQG)	Variable (FEQG)	Variable (FEQG)	Variable (FEQG)	Variable (FEQG)	D
Arsenic	mg/L	0.005	NC	0.00018	0.0001	0.005	A
Cadmium	mg/L	0.0001 (CL) 0.00006 (ML) 0.00009 (SDL)	NC	0.000023	0.000017	0.0001 (CL) 0.00006 (ML) 0.00009 (SDL)	A
Chromium $^{+3}$	mg/L	0.0089	NC	0.005	NC	0.0089	A
Cobalt	mg/L	Variable (FEQG)	NC	NC	0.0002	CL / SDL = 0.0009 ML = 0.0011	D
Copper (dissolved)	mg/L	Variable (FEQG)	0.0023	0.0025	0.0012	CL = 0.0028 ML = 0.0027 SDL NW = 0.0029 SDL SE = 0.0021	D
Iron	mg/L	0.3	0.0421	0.173	0.211	0.3	A

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Parameter[3]	Units	Water Quality Guideline	Camp Lake	Mary Lake	Sheardown Lake (NW & SE)	Selected Benchmark	Benchmark Method[2]
Lead (dissolved)	mg/L	Variable (FEQG)	0.000334	0.00013	0.00026	CL = 0.00500 ML = 0.00430 SDL NW = 0.00485 SDL SE = 0.00455	D
Nickel	mg/L	0.025	0.000941	0.00080	0.000973	0.025	A
Manganese (dissolved)	mg/L	Variable (FEQG)	0.00195	0.00647	NW – 0.00136 SE – 0.01425	CL / SDL = 0.410 ML = 0.360	D
Selenium	mg/L	0.001	0.001	0.001	0.001	0.001	A
Silver	mg/L	0.0001	NC	NC	0.0000104	0.0001	A
Strontium	mg/L	2.5	NC	NC	NC	2.5	D
Thallium	mg/L	0.0008	NC	NC	0.0001	0.0008	A
Uranium	mg/L	Variable (CCME)	Variable (CCME)	Variable (CCME)	Variable (CCME)	Variable (CCME)	A
Vanadium	mg/L	0.006	NC	0.00146	0.001	0.006	A
Zinc (dissolved)	mg/L	Variable (CCME)	0.0037	0.0030	0.00391	CL = 0.0125 ML = 0.0170 SDL NW = 0.0125	D

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Parameter[3]	Units	Water Quality Guideline	Camp Lake	Mary Lake	Sheardown Lake (NW & SE)	Selected Benchmark	Benchmark Method[2]
						SDL SE = 0.0110	
Chloride	mg/L	120	4	13	5	120	A
Ammonia	mg N/L	0.855[4]	0.84	0.32	0.44	0.855	A
Nitrite	mg N/L	0.060	0.1[5]	0.1[5]	0.1[5]	0.060	A
Nitrate	mg N/L	3	NC	0.11	NC	3	A
Sulphate	mg/L	218	3	7	5	218	A

NOTES:

1. NC = Not Calculable; CL = Camp Lake; ML = Mary Lake; SDL = Sheardown Lake; NW = northwest; SE = southeast
2. Method A = Water Quality Guideline from CCME, Method B = 97.5%ile of Baseline; Method C = 3* MDL; Method D = updated FEQG or CCME (benchmark presented considers modifying factors of pH, hardness, and/or DOC,
3. Total metals unless otherwise noted
4. Assumes temperature at 10 degrees Celsius (°C), and pH of 8
5. These values are elevated detection limits, and hence, the guideline has been selected as the AEMP benchmark.

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Table 3-4 Water Quality Benchmarks for Mine Site Streams

Parameter[4]	Units	Water Quality Guideline	Camp/Sheardown Lake Tributaries	Mary River[3]	Selected Benchmark	Benchmark Method [2]
Aluminum	mg/L	Variable (FEQG)	Variable (FEQG)	Variable (FEQG)	Variable (FEQG)	D
Arsenic	mg/L	0.005	0.00012	0.00013	0.005	A
Cadmium	mg/L	0.00008 (CLT) 0.00006 (MR)	NC	0.00002	CLT = 0.00008 MR = 0.00006	A
Chromium $^{+3}$	mg/L	0.0089	0.0015/0.0020	0.005	0.0089	A
Cobalt	mg/L	Variable (FEQG)	0.007	0.0004	CLT/SDLT = 0.0012 MR = 0.0011	D
Copper (dissolved)	mg/L	Variable (FEQG)	0.0034	0.0025	CL = 0.0048 SDLT = 0.0044 MR = 0.0036	D
Iron	mg/L	0.3	0.326/0.543	0.874	CLT = 0.326 SDLT = 0.543 MR = 0.874	B
Lead (dissolved)	mg/L	Variable (FEQG)	0.000333	0.00076	CL = 0.00605 SDLT = 0.00625 MR = 0.00420	D

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Parameter[4]	Units	Water Quality Guideline	Camp/Sheardown Lake Tributaries	Mary River[3]	Selected Benchmark	Benchmark Method [2]
Manganese (dissolved)	mg/L	Variable (FEQG)	0.021/0.007	0.013	CLT/SDLT = 0.440 MR = 0.370	D
Nickel	mg/L	0.025	0.00168/0.0025	0.0018	0.025	A
Silver	mg/L	0.0001	NC	0.0001	0.0001	A
Selenium	mg/L	0.001	0.001	0.001	0.001	A
Strontium	mg/L	2.5	NC	NC	2.5	D
Thallium	mg/L	0.0008	0.0002	0.0002	0.0008	A
Uranium	mg/L	Variable (CCME)	Variable (CCME)	Variable (CCME)	Variable (CCME)	A
Vanadium	mg/L	0.006	NC	0.002	0.006	A
Zinc (dissolved)	mg/L	0.007	0.0047/0.0057	0.0129	CL = 0.0155 SDLT = 0.0165 MR = 0.0170	D
Chloride	mg/L	120	23	21.55	120	A
Ammonia	mg N/L	0.855[5]	0.60	0.60	0.855	A
Nitrite	mg N/L	0.060	0.095[6]	0.06	0.060	A

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Parameter[4]	Units	Water Quality Guideline	Camp/Sheardown Lake Tributaries	Mary River[3]	Selected Benchmark	Benchmark Method [2]
Nitrate	mg N/L	3	0.118	0.14	3	A
Sulphate	mg/L	218	6	8	218	A

NOTES:

1. NC = Not Calculable; CLT = Camp Lake Tributary; MR = Mary River; SDLT = Sheardown Lake Tributary
2. Method A = Water Quality Guideline from CCME, Method B = 97.5% percentile of Baseline; Method C = 3* MDL; Method D = updated FEQG or CCME benchmark presented considers modifying factors of pH, hardness, and/or DOC
3. One sample (outlier) containing chemical concentrations orders of magnitude above other values was not included in the calculations for Mary River.
4. Total metals unless otherwise noted.
5. Assumes temperature at 10°C, and pH of 8.0.
6. 97.5th percentile was being driven by elevated detection limit; therefore, the guideline was selected.

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3.2.1.1 Sediment Quality Benchmarks

The parameters selected for development of sediment quality benchmarks applicable to Mine Site area lakes were as follows:

- Arsenic
- Cadmium
- Chromium
- Copper
- Iron
- Lead
- Manganese
- Mercury
- Nickel
- Phosphorus
- Zinc

The higher of the average between the CCME/surrogate upper and lower effect guideline, 97.5th percentile of baseline concentrations, or average between the 97.5th percentile of baseline and reference lake concentrations was selected as the AEMP benchmark applicable to each individual study area lake (Table 3.3).

3.3 Benthic Invertebrate Indicators and Benchmarks

Unlike water or sediment quality where guidelines for the protection of aquatic life are often used as the basis for development of triggers or thresholds for effects assessment, no generic benchmarks for BIC endpoints exist. Instead, assessing the magnitude of difference between results for a mine-exposed area and baseline/reference conditions against a specified CES can be adopted as a basis for evaluating potential Project-related effects to benthic invertebrates. A CES of two standard deviations above or below an applicable baseline mean or reference area mean has been adopted as the benchmark for the AEMP based on adoption of values/rationale used for EEM studies under the MDMER. Under

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the MDMER approach, confirmation of Project-related effects to benthic invertebrates is determined based on the results of two consecutive phases.

3.4 Arctic Char Indicators and Benchmarks

Assessment of potential Project-related effects to fish under the AEMP focuses on health endpoints for Arctic char in Mine Site area lakes. Arctic char are targeted because they are by far the most abundant species in the regional lakes, sufficient baseline catch and measurement data exist to allow for temporal comparisons, and Arctic char are an important food source for Inuit. The approach to fish monitoring under the AEMP was developed in consideration of industry standards (e.g., EEM technical guidance) and the desire to avoid potential effects to Arctic char populations from repetitive (i.e., annual), long-term monitoring. Consistent with previous years of monitoring completed under the AEMP and EEM, Arctic char health will be monitored using a primarily non-lethal design (i.e., only a sub-set of approximately 10% of captured fish will be lethally sampled for collection of ageing structures).

Similar to the BIC analysis, CES were incorporated as AEMP benchmarks for the basis of determining potential effects on Arctic char health. Where adequate sample sizes allow, the CES are used to compare newly collected data to baseline and reference conditions. A CES of +/-10% (condition) or +/- 25% (other endpoints) above and below the baseline or reference area central tendency have been adopted as the benchmarks for the AEMP, based on adoption of values/rationale used for federal EEM studies under the MDMER (Table 3.5). The applicability/appropriateness of these benchmarks will be reviewed routinely and, if appropriate, modified over time as per EEM technical guidance.

Additionally, to further align the program with EEM guidance and minimize potential pressures on the fish populations in Mine site area lakes, monitoring frequency will be reduced to once every three years, with the next cycle beginning in 2026, as fish monitoring was completed in 2025. Completing the program on a triennial, rather than annual, basis, is consistent with the MDMER/EEM and is expected to reduce the total numbers of fish that may be killed or injured incidentally as a result of temporary entanglement in gillnets or

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stress related to entanglement and subsequent handling (e.g., Baker et al. 2010; Portz et al. 2005). Reducing the total numbers of Arctic charr removed from Mine site area lakes (i.e., through unintentional mortalities and mortalities associated with collection of ageing structures) over a three-year period is expected to support continued recruitment and sustainability of the populations (i.e., fish that may have died/been sacrificed as part of the monitoring program would instead go on to spawn/produce offspring). Additionally, because fish integrate water and sediment quality, food availability, and other environmental conditions over relatively long time periods, it is not unreasonable to expect that changes in mine effluent quality, for example, may take longer than a year to result in potential changes to fish health endpoints (barring unforeseen accidents/malfunctions). Overall, the planned approach to fish health monitoring is expected to best support maintenance of the Arctic char populations in these low productivity/low fish density lakes, but still remain aligned with technical guidance/industry best practices.

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Table 3-5 Fish Endpoints and AEMP Benchmarks

Effect Indicators	Non-Lethal Study	(Threshold) Fish Effect Endpoint	CES[2]	Statistical Test
Growth	*Length of year-of-young (YOY) (age 0) at end of growth period	Length and weight of YOY (age 0) and age 1+ at end of growth period	+/- 25%	Analysis of Variance
	*Weight of YOY (age 0) at end of growth period			Analysis of Variance
	*Length and weight of 1+ fish			Analysis of Variance
Reproduction	*Relative abundance of YOY (% composition of YOY)	Relative abundance of YOY (% composition of YOY)	+/- 25%	Kolmorgorov-Smirnov test performed on length-frequency distributions with and without YOY included; OR proportions of YOY can be tested using a Chi-squared test.
Condition	*Weight-at-length	Condition	+/- 10%	Analysis of Covariance
Survival	*Length-frequency distribution	Length or age frequency distribution	+/- 25%	2-sample Kolmorgorov-Smirnov test

NOTES:

Endpoints indicated with an asterisk are used for determining potential effects as designated by statistically significant differences between newly-collected data and baseline data and/or existing reference data.

[2]CES Benchmarks are expressed as a percentage of the reference and/or baseline means.

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3.5 Effects Predictions

Adaptive management includes short- and longer-term review and response cycles (Section 2.3). The thresholds described above are applied under the TARPs to guide short-term adaptive management. Effects predictions from the FEIS and its addenda are thresholds that are appropriate for longer-term review and response cycles, such as the annual review of regulatory compliance and unexpected effects. The effects predictions from the FEIS and associated addenda are intended as the basis of comparison for the Project's performance, as described in Section 6.1. Baffinland may also identify the need for further adaptive management when unanticipated effects or effects that exceed FEIS predictions occur.

3.6 MDMER and EEM

As a metal mine, the discharge of mine effluents at the Project is regulated by the MDMER. These regulations, administered under the federal *Fisheries Act*, apply to mining and milling operations that discharge effluent(s) at a rate greater than 50 m^3/day. The Project triggered the MDMER (the Metal Mining Effluent Regulations at the time) and EEM studies on July 10, 2015. The MDMER provide a standardized framework for evaluating environmental effects and responding to unexpected effects of mine effluent discharges on the aquatic environment. More specifically, the MDMER outlines requirements for monitoring effluent quantity and quality, acute lethality testing, and EEM. The EEM Program includes effluent characterization and sublethal toxicity testing, receiving environment water quality studies (including monitoring at corresponding reference areas), and biological studies.

Prescribed monitoring frequencies for all applicable effluent discharges at the Project are summarized in Table 3.6. Each location is described further in Table 3.6.

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Table 3-6 Components of Effluent Monitoring under the MDMER and EEM

Component	Frequency
Deleterious substances monitoring (MDMER)	Weekly during discharge.
Effluent characterization (EEM)	Once per calendar quarter, at least one month after the previous quarterly sample; on effluent samples tested for acute lethality.
Acute lethality testing (Rainbow Trout *and Daphnia magna*) (MDMER)	Monthly; additional testing if effluent found to be acutely lethal.
Sublethal toxicity testing (fish, invertebrate species, plant species, algal species in freshwater and marine water) (EEM)	Quarterly during discharges (generally once annually at the Project) concurrent with effluent characterization samples. Testing is completed only at the FDP that contributes the highest loadings of deleterious substances taking receiving environment dilution factors into account, which as of the start of the fourth EEM cycle (2025/2026) is FDP MS-08 at the WRF. Sublethal toxicity testing data are used to inform biological effects and are not used for evaluating regulatory compliance. After the third year of monitoring, Baffinland was able to reduce the frequency of sampling to once per calendar quarter on the test species that was most sensitive to effluent over the previous three years (*Lemna minor*).
Effluent volume monitoring (MDMER)	Total monthly volume of effluent deposited from each FDP for each month during which there was a deposit (discharge).

Adaptive management is built into the effluent monitoring component of the MDMER sampling program. If a monthly effluent sample is determined to be acutely lethal by an acute lethality test, the following additional actions are required:

- Effluent characterization testing on each failing sample
- Acute lethality testing of grab samples from the same FDP twice monthly (but not less than seven days apart)

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The regular frequency of acute lethality testing can be resumed if the effluent is not acutely lethal in three consecutive tests. Additionally, the frequency of acute lethality testing at a given FDP may be reduced to once each calendar quarter if the effluent from that FDP is determined not to be acutely lethal for 12 consecutive months.

If any of the following occurs, Baffinland shall notify an ECCC inspector without delay and report the results in writing to the inspector within 30 days:

- MDMER Discharge Limits in Schedule 4 are or have been exceeded
- Effluent pH is less than 6.0 or greater than 9.5
- An effluent is acutely lethal

If any of the above have occurred over the year, the causes of non-compliance must be described in the annual report to ECCC along with remedial measures that are planned or that have been implemented.

The objective of the MDMER EEM biological studies is to determine whether mine effluent is causing effects on fish, fish habitat (e.g., benthic invertebrate food resources), and/or the human use of fisheries resources (e.g., mercury and selenium in fish tissues (Environment Canada, 2012). Each EEM study collectively includes the preparation of a study design document, field study implementation, preparation of an interpretive report document, and electronic data submission. All these tasks are required to be conducted within a 36-month period, the timeframe of which is referred to as a “phase”. Within each EEM phase, mines must submit an EEM Study Design to the federal Minister of Environment and Climate Change (i.e., ECCC) for regulatory approval at least six months prior to field study implementation. The study designs are developed considering relevant site characterization information; previous biological monitoring results and recommendations; regulator comments and recommendations from the previous EEM study designs and interpretive reports; amendments to the MDMER (Government of Canada, 2025), and the most recent technical guidance (Environment Canada 2012).

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For mines that have more than one FDP, the receiving environment that has the greatest potential to show adverse environmental impacts as determined through evaluation of greatest total monthly loadings of deleterious substances and the manner in which effluent mixes within the receiving environment serves as the focus for EEM biological studies (Government of Canada, 2025). This is determined through the EEM study design for each cycle. Currently, effluent is discharged into Mary River directly or via Mary River Tributary-F, as well as into Sheardown Lake Tributary 1. Table 3.7 contains information about established FDPs and receiving environment for the Project. Additional future development of the Mine Site may necessitate discharge of treated effluent to Camp Lake Tributary 1 (Figure 3-1) or other, yet-to-be-determined waterbodies.

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Table 3-7 Mary River Project MDMER FDP and Receiving Environment Monitoring Location

Discharge Source	Effluent Final Discharge Point Identifier	Coordinates (NAD 83)		Receiving Waterbody	Existing AEMP Receiving Environment Downstream Monitoring Locations				
		Latitude	Longitude		Water Quality Stations	Sediment Quality	Phytoplankton	Benthic Invertebrates	Fish
WRF (East Pond[1])	MS-08	71˚20'24.7"	79˚13'18.4"	Unnamed Tributary to Mary River (Mary River Tributary-F)	Mary River Tributary-F (F0-01) Mary River (MS-08-DS, E0-10)	Mary Lake	Mary River Tributary-F (F0-01) Mary River (E0-10)	Mary River (E0-01) Mary River Tributary-F (EEM only)	Mary River (EEM only) and Mary Lake
Ore Stockpile (Crusher) Pond	MS-06	71˚18'06.4"	79˚15'29.7"	Mary River	Mary River (E0-20 and0 E0-21)	Mary Lake	Mary River (E0-20 and EO-21)	Mary River (E0-20)	Mary River (EEM only) and Mary Lake
KM105 Pond	MS-11[2]	-	-	Sheardown Lake Tributary 1	SDLT-1 (D1-00 and D1-05)	Sheardown Lake NW	SDLT-1 (D1-00 and D1-05)	SDLT1-R1	Sheardown Lake NW
ROM Stockpile Facility	MS-07	71° 18' 41.4"	79° 13' 18.7"	Mary River	Mary River (E0-03 and E0-21)	Mary Lake	Mary River (E0-03 and E0-21)	Mary River (E0-01)	Mary River (EEM only) and Mary Lake

NOTES:

1. An interim sedimentation pond has been constructed to contain runoff from the WRF stockpile generated during Early Revenue Phase operations
2. MS-11 FDP location currently under design review

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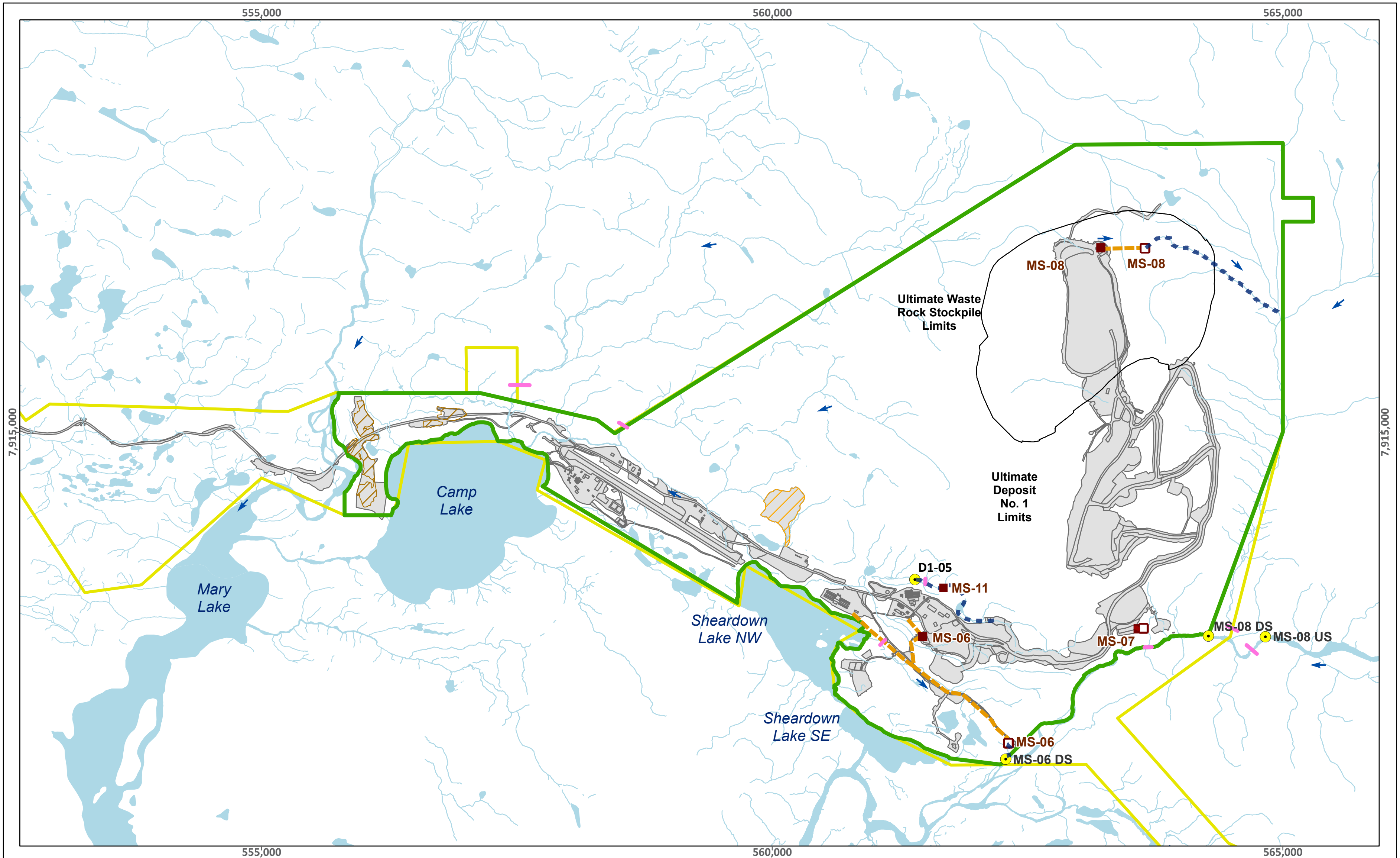

SAVED: C:\Users\Kristina.Poitras\Documents\ArcGIS\Projects\AEMP Rev 3\AEMP Rev 3.aprx; 10-Dec-25

LEGEND

- Outflow Point
- Current Final Discharge Point (FDP)
- Future Potential Final Discharge Point (FDP)
- EEM Receiver Water Stations
- Water Flow Direction
- Fish Barrier
- Overland Effluent Channel
- Milne Inlet Tote Road
- Borrow Area
- Quarry Area
- Project Development Area
- Commercial Lease Boundary

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Current and Future FDP and Receiver Water Quality Sampling Locations

Projection: NAD 1983 UTM ZONE 17N.
Base Map: © Queen's Printer for Ontario, 2023.
Source Data: Minnow Environmental Inc.

0 250 500 1,000 Meters
Scale 1:55,000
N

Baffinland

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3.7 CREMP Study Design

The CREMP was established to monitor and track potential effects of the Project on aquatic environments within and adjacent to the Mine Site. The CREMP is designed to implement follow-up monitoring to validate effects predictions for aquatic VECs and key indicators that include:

- Water quantity
- Water and sediment quality
- Freshwater biota (benthic invertebrates, phytoplankton, and Arctic char)

While the EEM program is designed to characterize effluent quality and determine potential effects on biota occurring within freshwater environments that receive mine effluent discharges, the CREMP is designed to evaluate potential effects to water quality, sediment quality, and freshwater biota on a larger geographic scale and for a greater range of potential pathways of effect (e.g., non-point source dust deposition, changes in water flow due to diversions, cumulative effluent discharges from mining operations and sewage treatment facilities). Based on the FEIS, potential aquatic effects at the Mine Site were predicted to be confined to Mary River, Camp Lake, Sheardown Lakes (NW and SE), and their associated tributaries (Figure 2-1), and therefore sampling under the CREMP targets these waterbodies. Mary Lake is the ultimate receiving waterbody for these drainage areas, but this lake was of sufficient size that no detectable effects were predicted under the FEIS. Nevertheless, the CREMP includes monitoring in Mary Lake to confirm this prediction. Overall, the CREMP includes monitoring at the following watercourses/waterbodies for the rationales provided below:

Camp Lake Tributaries and Sheardown Lake Tributaries: These tributaries may be affected by dust deposition, runoff, and water diversions over the course of mine operations,

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Sheardown Lakes (NW and SE): Changes in water quality due to airborne dust dispersion and surface runoff, and changes in hydrology may affect conditions at Sheardown Lake, as well as potential changes in productivity in tributaries to Sheardown Lake.

- **Camp Lake**: Surface runoff from tributaries affected by dust deposition water diversions and withdrawals, as well as changes in water quality due to airborne dust dispersion may affect this lake over the course of operations.
- **Mary River**: Airborne dust dispersion and reception of treated mine and WWTP effluents discharged to multiple locations along the river over the course of operations.
- **Mary Lake:** As the ultimate receiving waters for flow from Camp Lake, Sheardown Lake, and Mary River, Mary Lake reflects the cumulative receiver for all surface waters draining from the Mine Site over the course of operations.

In 2015, Reference Lake 3 (REF-03) was established as the reference lake for the CREMP to assist in identifying mine influenced changes to water, sediment and, freshwater biota of Mine Site area lakes relative to a representative reference (i.e., free from potential mine-influence) system (Tables 3.8, 3.9 and 3.10). Streams used as reference areas for the CREMP include an unnamed tributary to the Mary River and two unnamed tributaries to Angajurjualuk Lake, all of which are located southeast of the Mine Site (Tables 3.8, 3.9 and 3.10). An area of Mary River located well upstream of current mine activity (i.e., Station G0-09) serves as a reference area for the mine-exposed portion of Mary River (Table 3.8).

3.7.1 Water Quality

The key pathways of potential effects of the Project on water quality include:

- Water quality changes related to discharge of treated effluent from ore and related rock storage areas, collected site runoff, etc. to freshwater systems (e.g., immediate receiving environments including Mary River, Sheardown Lake Tributary 1 and Camp Lake Tributary 1)

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- Water quality changes related to discharge of treated sewage effluent (primarily nutrients and TSS) to freshwater systems (e.g., immediate receiving environments including Mary River and, historically, Sheardown Lake NW)
- Water quality changes due to non-point source deposition of dust in lakes and streams (e.g., Mine Site area in zone of dust deposition)
- Water quality changes due to non-point sources including site runoff and aerial deposition of ammonium nitrate fuel oil (ANFO) explosives (e.g., near Mine Site)

The key question related to the pathways of effect is:

- Do concentrations of potential mine-related parameters (i.e., TSS, metals, nutrients, etc.) in exposed areas differ from reference and/or have they changed over time?

The primary issue of concern with respect to water quality in lakes, streams, and rivers adjacent to the Mine Site is related to the combined effects from mine effluent discharges and aerial deposition of ore dust on metal and TSS concentrations. In addition, the discharge of treated sewage effluent also has the potential to cause eutrophication of Mary River based largely on greater potential inputs of total phosphorus (TP) to the system. Water quality data will be compared to AEMP benchmarks and/or applicable water quality guidelines (WQGs) for the protection of aquatic life, to data collected at applicable reference areas, and to baseline water quality data. The interpretation of data relative to AEMP benchmarks may prompt additional weight-of-evidence (WOE) analysis to determine links to mine-related operations as outlined in the TARP (Section 5).

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3.7.1.1 Lakes

Water quality monitoring includes collection of *in situ* field measures, visual evaluation of surface water (oil) sheen, and water chemistry sampling at lake, stream, and river stations representing both mine-exposed and reference waterbodies. Power analysis of the baseline water quality data from the mine-exposed lakes indicated that data from a minimum of three stations was sufficient to detect a difference equidistant between the AEMP benchmark and 97.5th percentile of baseline data at high probability (i.e., $\alpha = \beta = 0.1$) when assessing for annual changes in water chemistry relative to pre-mine conditions. Accordingly, water chemistry will be monitored from three stations at each of Camp Lake, Sheardown Lake NW, Sheardown Lake SE, and Reference Lake 3, and from six stations at Mary Lake for the CREMP (Tables 3.8, 3.9, and 3.10; Figure 3-2). Three sampling events, including winter ice-cover (April to May), summer (July to early August), and fall (late August to September) open-water periods, will be conducted annually at each lake except Reference Lake 3. Due to accessibility and associated personnel safety concerns, no winter sampling event will be conducted at Reference Lake 3, which is located approximately 60 km south of the Mine Site. During each winter, summer, and fall sampling event, field measures of water temperature, DO, pH, specific conductance, and turbidity will initially be taken as a vertical profile at one metre intervals at a designated profile station for each lake as follows:

- Camp Lake – Station JL0-07
- Sheardown Lake NW - Station DL0-01-2
- Sheardown Lake SE - Station DL0-02-3
- Mary Lake (North Basin) - Station BL0-1A
- Mary Lake (South Basin) - Station BL0-9
- Reference Lake 3 (NW Basin) - Station REF-03-W3

In addition, the field measures will include determination of Secchi depth at each lake profile station. Temperature and DO data from the profile station will be reviewed while in the field and used to guide the subsequent water chemistry

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sampling approach independently for the sampling event and study lake. In cases in which no thermal stratification or oxycline development is apparent at the lake during the sampling event, a single water chemistry sample will be retrieved from near the surface of the water column (i.e., approximately two metres below the surface) at each sampling station on the respective lake. In cases in which thermal stratification or oxycline development is apparent at the lake during the sampling event, two water chemistry samples will be retrieved at each sampling station on the respective lake, including one near the surface and the other near the bottom. The water chemistry samples will be submitted to a CALA-accredited laboratory for analysis using standard methods. Parameters to be included in the chemistry analysis include: hardness, alkalinity, TSS, total dissolved solids (TDS), nutrients (total ammonia, nitrate, nitrite, total phosphorus, total kjeldahl nitrogen [TKN], TOC, DOC), phenols, bromide, chloride, sulphate, and total and dissolved metals (including aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc). In the event that oil sheen is observed on the water surface at any lake station, oil and grease sampling will also be conducted for analytical determination of total hydrocarbon concentrations and the source of the sheen will be immediately investigated.

3.7.1.2 Streams

Water quality monitoring will be conducted at a total of 30 stream/ river stations (including 7 reference stations); Figure 3-2. Similar to sampling conducted at lakes, water quality sampling at streams and rivers will be conducted three times per calendar year, corresponding to spring freshet (early July), summer (late July to early August) and fall (late August to September) sampling events. The same *in situ* field measures, excluding Secchi depth and including visual evaluation of surface water (oil) sheen, will be collected mid water column at each stream and river sampling station during each sampling event. Water chemistry samples will be retrieved near the middle of the water column at each stream and river water quality station. The water chemistry samples will be submitted to the same accredited laboratory and analyzed for the same parameters indicated above for samples retrieved from lakes. Similar to sampling conducted at lakes, in the

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event that oil sheen is observed on the water surface at any stream/river station, oil and grease sampling will also be conducted for analytical determination of total hydrocarbon concentrations and the source of the sheen will be immediately investigated.

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Table 3-8 CREMP Reference and Mine-Exposed Stations for the Mary Lake System

Study System	Water Body	Representative Water Quality Station			Reference Area used for each Study Component				
		Station Identifier	Easting	Northing	Water Quality	Sediment Quality	Phytoplankton	Benthic Invertebrates	Fish
Reference Areas	Lotic Reference	CLT-REF3	567004	7909174	Y	-	Y	-	-
		CLT-REF4	568533	7907874	Y	Y	Y	Y	-
		MRY-REF3	585407	7900061	Y	-	Y	-	-
		MRY-REF2	570650	7905045	Y	-	Y	-	-
	Reference Lake 3	REF-03-W1	575642	7852666	Y	Y	Y	Y	Y
		REF-03-W2	574836	7852744	Y		Y		
		REF-03-W3	574158	7853237	Y		Y		
	Mary River Reference	G0-09-A	571264	7917344	Y	-	Y	-	-
		G0-09	571546	7916317	Y	Y	Y	Y	-
		G0-09-B	571248	7914682	Y	-	Y	-	-

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<table>
<tr><th rowspan="2">Study System</th><th rowspan="2">Water Body</th><th colspan="3">Representative Water Quality Station</th><th colspan="5">Reference Area used for each Study Component</th></tr>
<tr><th>Station Identifier</th><th>Easting</th><th>Northing</th><th>Water Quality</th><th>Sediment Quality</th><th>Phytoplankton</th><th>Benthic Invertebrates</th><th>Fish</th></tr>
<tr><td rowspan="15">Mary River and Mary Lake System</td><td rowspan="9">Mary River</td><td>G0-03</td><td>567204</td><td>7912587</td><td rowspan="9">Mary River G0-09 Average</td><td rowspan="9">Mary River G0-09 Average</td><td rowspan="9">Mary River G0-09 Average</td><td rowspan="9">Mary River G0-09 Average</td><td rowspan="9">Not Applicable</td></tr>
<tr><td>G0-01</td><td>564459</td><td>7912984</td></tr>
<tr><td>F0-01</td><td>564483</td><td>7913015</td></tr>
<tr><td>E0-21</td><td>562444</td><td>7911724</td></tr>
<tr><td>E0-20</td><td>561688</td><td>7911272</td></tr>
<tr><td>E0-10</td><td>564405</td><td>7913004</td></tr>
<tr><td>E0-03</td><td>562974</td><td>7912472</td></tr>
<tr><td>C0-10</td><td>560669</td><td>7911633</td></tr>
<tr><td>C0-05</td><td>558352</td><td>7909170</td></tr>
<tr><td rowspan="3">Mary Lake (North Basin)</td><td>BL0-01</td><td>554691</td><td>7913194</td><td rowspan="6">Reference Lake 3</td><td rowspan="6">Reference Lake 3</td><td rowspan="6">Reference Lake 3</td><td rowspan="6">Reference Lake 3</td><td rowspan="6">Not Applicable</td></tr>
<tr><td>BL0-01-A</td><td>554300</td><td>7913378</td></tr>
<tr><td>BL0-01-B</td><td>554369</td><td>7913058</td></tr>
<tr><td rowspan="3">Mary Lake (South Basin)</td><td>BL0-05</td><td>554632</td><td>7906031</td></tr>
<tr><td>BL0-06</td><td>555924</td><td>7903760</td></tr>
<tr><td>BL0-09</td><td>554715</td><td>7904479</td></tr>
</table>

NOTE:

1. Bold indicates lake water quality stations selected for *in situ* profiling.

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Table 3-9 CREMP Reference and Mine-Exposed Stations for the Camp Lake System

Study System	Water Body	Representative Water Quality Station			Reference Area used for each Study Component				
		Station Identifier	Easting	Northing	Water Quality	Sediment Quality	Phytoplankton	Benthic Invertebrates	Fish
Reference Areas	Lotic Reference	CLT-REF3	567004	7909174	Y	-	Y	-	-
		CLT-REF4	568533	7907874	Y	Y	Y	Y	-
		MRY-REF3	585407	7900061	Y	-	Y	-	-
		MRY-REF2	570650	7905045	Y	-	Y	-	-
	Reference Lake 3	REF-03-W1	575642	7852666	Y	Y	Y	Y	Y
		REF-03-W2	574836	7852744	Y		Y		
		REF-03-W3	574158	7853237	Y		Y		

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Study System	Water Body	Representative Water Quality Station			Reference Area used for each Study Component				
		Station Identifier	Easting	Northing	Water Quality	Sediment Quality	Phytoplankton	Benthic Invertebrates	Fish
Camp Lake System	Camp Lake Tributaries	I0-01	555470	7914139	Lotic Reference Average	CLT-REF4	Lotic Reference Average	CLT-REF4	Not Applicable
		I0-02	554640	7913850					
		J0-01	555701	7913773					
		K0-01	557390	7915030					
		L0-01	557681	7914959					
		L1-02	558765	7915121					
		L1-05	558040	7914935					
		L1-08	561076	7915068					
		L1-09	558407	7914885					
		L2-03	559081	7914425					
	Camp Lake	JL0-02	557615	7914750	Reference Lake 3	Reference Lake 3	Reference Lake 3	Reference Lake 3	Reference Lake 3
		JL0-07	556800	7914094					
		JL0-09	556335	7913955					

NOTE:

1. Bold indicates lake water quality stations selected for *in situ* profiling.

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Table 3-10 CREMP Reference and Mine-Exposed Stations for the Sheardown Lake System

Study System	Water Body	Representative Water Quality Station			Reference Area used for each Study Component				
		Station Identifier	Easting	Northing	Water Quality	Sediment Quality	Phytoplankton	Benthic Invertebrates	Fish
Reference Areas	Lotic Reference	CLT-REF3	567004	7909174	Y	-	Y	-	-
		CLT-REF4	568533	7907874	Y	Y	Y	Y	-
		MRY-REF3	585407	7900061	Y	-	Y	-	-
		MRY-REF2	570650	7905045	Y	-	Y	-	-
	Reference Lake 3	REF-03-W1	575642	7852666	Y	Y	Y	Y	Y
		REF-03-W2	574836	7852744	Y		Y		
		REF-03-W3	574158	7853237	Y		Y		

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Study System	Water Body	Representative Water Quality Station			Reference Area used for each Study Component				
		Station Identifier	Easting	Northing	Water Quality	Sediment Quality	Phytoplankton	Benthic Invertebrates	Fish
Sheardown Lake System	Tributary 1	D1-00	560329	7913512	Lotic Reference Average	CLT-REF4	Lotic Reference Average	CLT-REF4	Not Applicable
		D1-05	561397	7913558					
	Tributary 9	D9-1	561848	7911860					
	Tributary 12	D12-1	560953	7912988					
	Sheardown Lake NW	DD-Hab9-Stn1	560259	7913455	Reference Lake 3	Reference Lake 3	Reference Lake 3	Reference Lake 3	Reference Lake 3
		DL0-01-2	560353	7912924					
		DL0-01-7	560525	7912609					
	Sheardown Lake SE	**DL0-02-3**	561046	7911915	Reference Lake 3	Reference Lake 3	Reference Lake 3	Reference Lake 3	Reference Lake 3
		DL0-02-4	561511	7911832					
		DL0-02-6	560756	7912167					

NOTE:

1. Bold indicates lake water quality stations selected for *in situ* profiling.

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3.7.2 Water Quantity

Hydrometric data are collected at seven stations (Table 3.11). Ongoing monitoring of stage discharge allows for comparison of baseline levels to ensure changes are within predicted values.

The Hydrometric Monitoring Program consists of water level or stage being measured at each station using a pressure transducer and data logger which record water level and temperature at 15-minute intervals. The pressure transducers are installed in a stilling well at each station. The water level is measured manually during each site visit relative to at least two benchmarks installed in bedrock. The benchmarks have been maintained throughout the life of each station and differential levelling surveys are conducted during each site visit to relate water level to a local datum. The dataloggers are downloaded and checked for proper operation during each site visit. The data logger water level data are related to the local datum at the end of the season using the survey data.

Where flows permit safe access to a watercourse’s channel, a wading current meter is used to measure stream velocity. Discharge is estimated from the current meter velocity using the area-velocity technique (mid-section method) per the Water Survey of Canada (WSC) guidelines (WSC, 1999). Whenever possible, the stream is divided into a minimum of 20 sections to measure depth and velocity with the objective of having less than 5% of the flow in each section. At least two cross sections of depth and velocity are measured during each site visit. Velocity is recorded at 0.6 of the stream depths where the stream depth is less than or equal to 0.75 m at the time of measurement.

Where higher flows prevent the use of a wading current meter, dilution gauging using Rhodamine WT is utilized to estimate discharge. The fluorescence of the Rhodamine WT is measured in-situ and recorded using a handheld fluorometer (YSI with EXO Rhodamine Sensor). Three-point calibration of the fluorometer is conducted in the field using a known concentration of Rhodamine WT solution and stream water. For estimating discharge, Rhodamine WT is added upstream

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of the station as an instantaneous release of a known volume. The fluorescence is recorded at a sufficient distance downstream to allow for complete mixing of the tracer. At least two measurements are typically performed during each site visit and the stream discharge is estimated using the integration method.

Table 3-11 AEMP Hydrometric Monitoring Stations

Station ID	Station Name	Drainage Area (km^2)	Coordinates (UTM) Easting	Coordinates (UTM) Northing
H01	Phillips Creek Tributary	250	532831	7946247
H02	Tom River near outlet to Mary Lake	210	555712	7915514
H04	Camp Lake Tributary (CLT-2)	8.3	557639	7915579
H05	Camp Lake Tributary (CLT-1)	5.3	558906	7915079
H06	Mary River	240	563922	7912984
H07	Mary River Tributary F	14.7	564451	7913194
H11	Sheardown Lake Tributary (SDLT-1)	3.6[1]	560503	7913545

3.7.3 Sediment Quality

The key pathways of potential effects of the Project on sediment quality include:

- Sediment quality changes related to discharge of treated effluent from ore stockpile and other surface runoff to freshwater systems (e.g., immediate receiving environments including Mary River, Sheardown Lake Tributary 1 and Camp Lake Tributary 1);
- Sediment quality changes related to discharge of treated sewage effluent (primarily nutrients and TSS) to freshwater systems (e.g., immediate receiving environments including Mary River and, historically, Sheardown Lake NW);

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- Sediment quality changes due to direct deposition of dust in lakes and streams (Mine Site area in zone of dust deposition); and
- Sediment quality changes due to dust deposition on land and subsequent runoff into lakes and streams (Mine Site area in zone of dust deposition).

The key question related to the pathways of effect is:

- Do concentrations of potential mine-related parameters in exposed areas differ from reference and/or have they changed over time?

The primary issue of concern with respect to sediment quality is the potential effect of ore dust containing elevated concentrations metals entering lakes, streams, and rivers near the Mine Site through direct aerial deposition and/or transfer from deposition on land via surface runoff. As such, the CREMP sediment quality monitoring programs focuses on waterbodies (lakes, streams, and rivers) located closest to the sources of ore dust. Sediment quality monitoring under the CREMP includes sampling of sediment for physical characterization and metal concentrations at lake, stream, and river study areas reflecting both mine-exposed and reference conditions.

Within lake environments, sediment quality monitoring stations have been established within shallow littoral and/or deep profundal habitat based on a 12 metre (m) deep cut-off, the value of which was used to define lake zonation during baseline characterization studies (KP, 2014a; 2015). Five littoral and three profundal sediment quality monitoring stations will be sampled at each of Camp, Sheardown Lake NW, and Mary mine-exposed lakes and at Reference Lake 3, which serves as a comparable reference area. Because the majority of Sheardown Lake SE is less than 12 m deep, sediment quality monitoring will be conducted at five littoral stations within this lake. Thus, the resulting sample size of 37 lake sediment quality monitoring stations reflects 25 littoral stations and 12 profundal stations (Figure 3-2; Table 3.12). Concurrent with benthic invertebrate community sampling conducted at the same locations, sediment quality sampling at littoral stations potentially allows linkages to be drawn between metal concentrations in sediment and effects on benthic invertebrates. Because the greatest accumulation of depositing material occurs with the deep basin(s) of

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lakes, monitoring of sediment quality at profundal stations provides the optimal basis for temporal tracking of metals in sediment of the mine-exposed lakes. Sediment quality monitoring at lakes will occur at an annual frequency.

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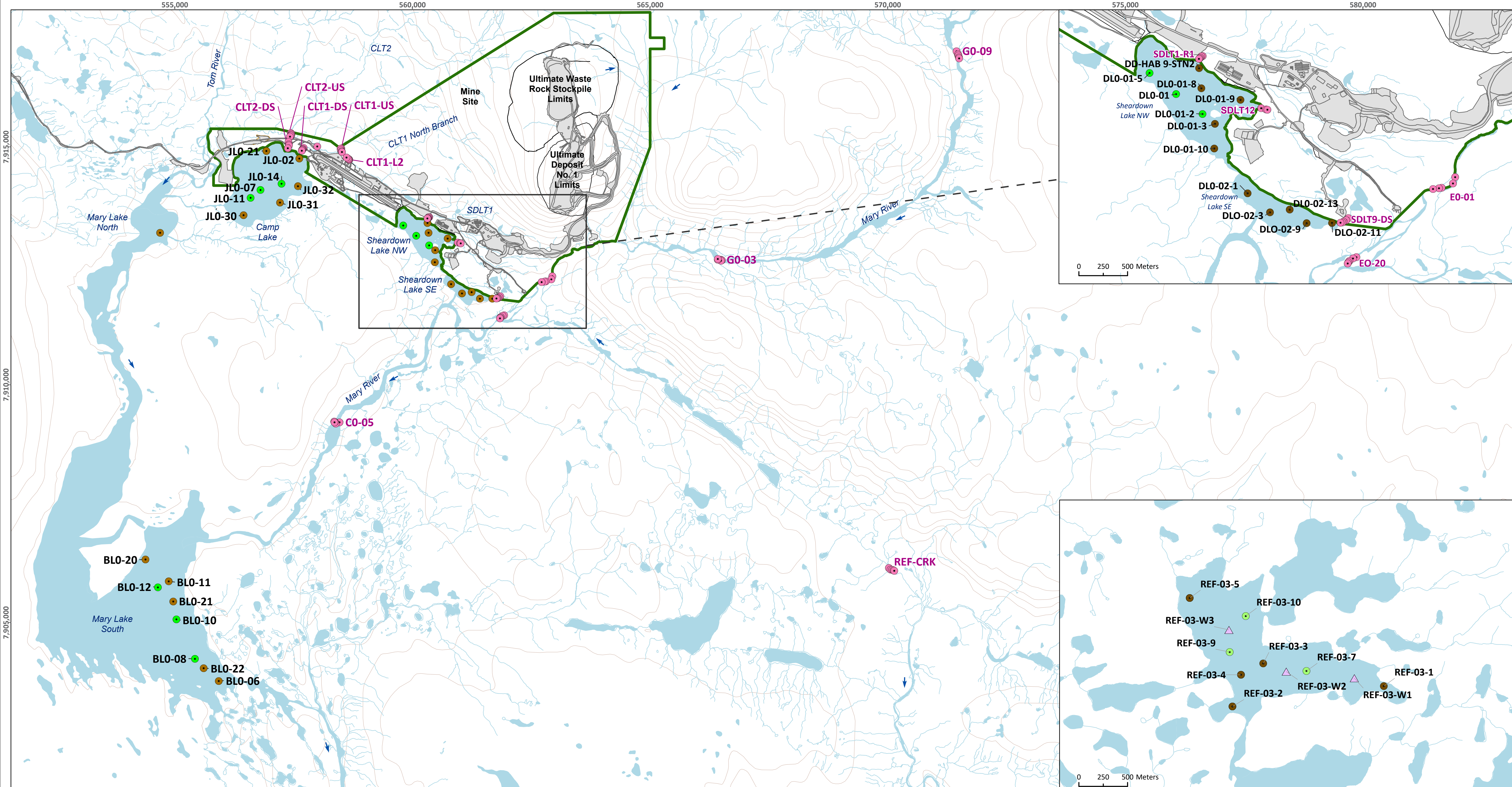


LEGEND

- Lake Littoral Sediment / Benthic Station
- Lake Profundal Sediment Station
- Stream Benthic / Sediment Stations
- Water Flow Direction
- Water Quality and Phytoplankton Monitoring Station
- Milne Inlet Tote Road
- Contour (20 m Interval)
- Project Development Area
- Borrow Area
- Quarry Area

MARY RIVER PROJECT

CREMP Water Quality and Phytoplankton Monitoring Stations

Projection: NAD 1983 UTM ZONE 17N.
Base Map: © Queen's Printer for Ontario, 2023.
Source Data: Minnow Environmental Inc.

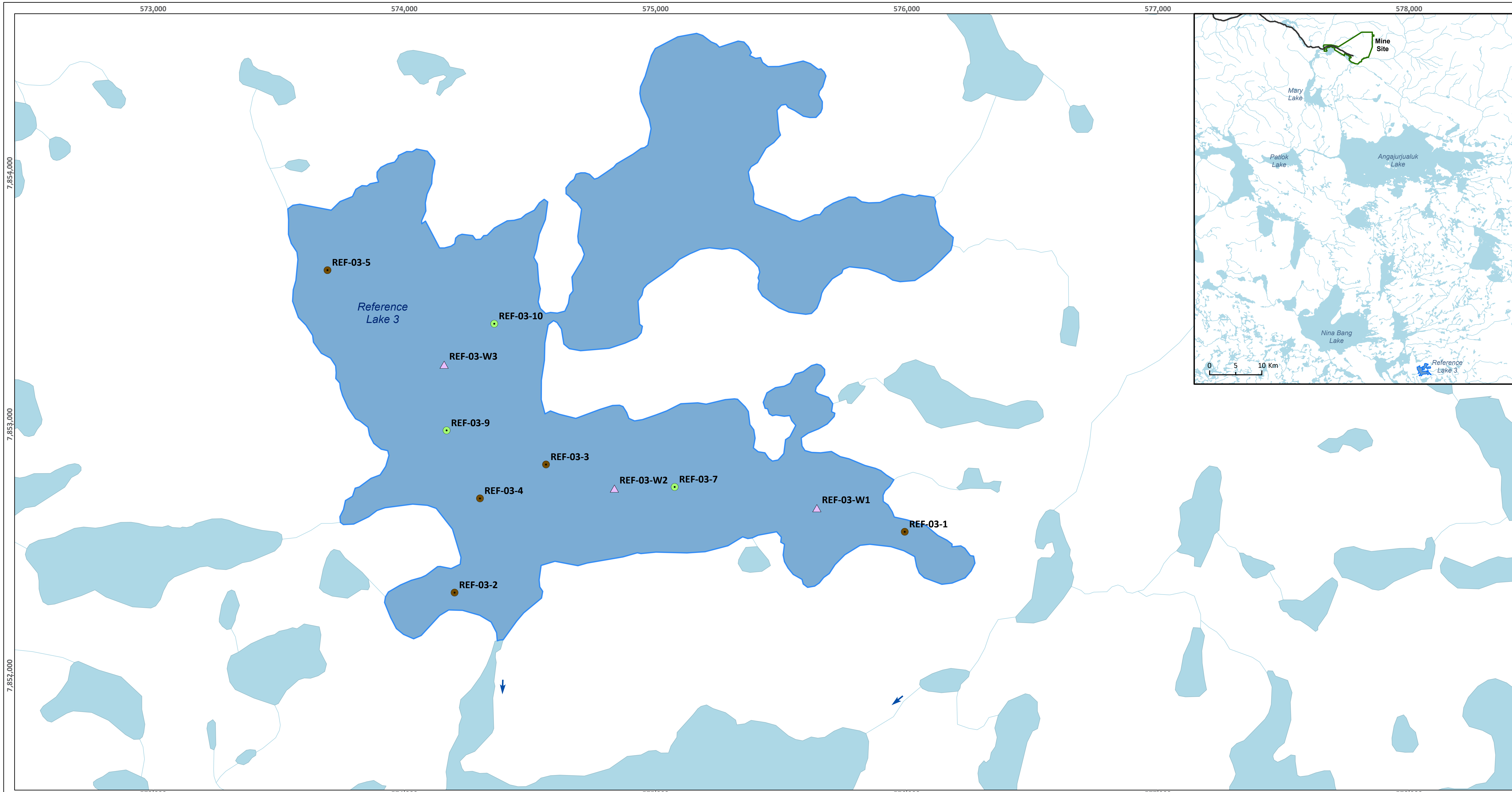
0 0.5 1 2 km
Scale 1:80,000

N

Baffinland

FIGURE 3-2

SAVED: C:\Users\Kristina Poltras\Documents\ArcGIS\Projects\AEMP Rev 3\AEMP Rev 3.aprx; 10-Dec-25



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LEGEND

- Water Flow Direction
- Littoral Sediment / Benthic Station
- Profundal Sediment Station
- Water Quality and Phytoplankton Monitoring Station
- Milne Inlet Tote Road
- Contour (20 m Interval)
- Reference Lake
- Project Development Area

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CREMP Sediment and Benthic Monitoring Station Locations

Projection: NAD 1983 UTM ZONE 17N.
Base Map: © Queen's Printer for Ontario, 2023.
Source Data: Minnow Environmental Inc.

0 50 100 200 300 400 Meters
Scale 1:15,000
N

Baffinland

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Table 3-12 Sediment and BIC Monitoring Stations

Waterbody	Station Code	Easting	Northing	Sampling Habitat
Reference Lake 3	REF-03-1	575820	7852759	littoral
	REF-03-2	574200	7852330	littoral
	REF-03-3	574564	7852840	littoral
	REF-03-4	574301	7852705	littoral
	REF-03-5	573694	7853613	littoral
	REF-03-7	575076	7852750	profundal
	REF-03-9	574168	7852975	profundal
	REF-03-10	574358	7853400	profundal
Camp Lake	JL0-02	557629	7914751	littoral
	JL0-14	557244	7914215	profundal
	JL0-21	556926	7914912	littoral
	JL0-07	556803	7914096	profundal
	JL0-11	556594	7913947	profundal
	JL0-30	556446	7913562	littoral
	JL0-31	557213	7913826	littoral
	JL0-32	557590	7914174	littoral
Sheardown Lake Northwest (NW)	DL0-01-5	559805	7913349	profundal
	DD-HAB 9-STN2	560324	7913401	littoral
	DL0-01-8	560338	7913193	littoral
	DL0-01	560078	7913132	profundal
	DL0-01-2	560350	7912928	profundal
	DL0-01-9	560745	7913077	littoral
	DL0-01-3	560471	7912838	littoral

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Waterbody	Station Code	Easting	Northing	Sampling Habitat
	DL0-01-10	560570	7912567	littoral
Sheardown Lake Southeast (SE)	DL0-02-1	560808	7912101	littoral
	DL0-02-11	561585	7911800	littoral
	DL0-02-9	561413	7911807	littoral
	DL0-02-13	561222	7911958	littoral
	DL0-02-3	561038	7911899	littoral
Mary Lake	BL0-11	554942	7906033	littoral
	BL0-12	554643	7905743	profundal
	BL0-10	555033	7905066	profundal
	BL0-08	555424	7904240	profundal
	BL0-06	555925	7903772	littoral
	BL0-20	554382	7906326	littoral
	BL0-21	554966	7905443	littoral
	BL0-22	555607	7904040	littoral

Within streams and rivers, sediment quality sampling will be conducted at three stations from each of eight stream and five river study areas that are used to assess mine-related effects to BIC. The stream sediment sampling locations include Camp Lake Tributary 1 upstream and downstream areas, Camp Lake Tributary 2 upstream and downstream areas, Sheardown Lake tributaries 1, 9, and 12, and an unnamed tributary to Mary River (referred to as CLT-REF2) serving as the stream reference area. The river sediment sampling locations include Mary River G0-03, G0-01, E0-20, and C0-05 mine-exposed study areas and the G0-09 upstream reference area. All stream and river study areas were previously observed to contain limited depositional habitat and a general absence of substantial accumulation of fine sediments (KP, 2015) (Minnow, 2016a; 2017; 2018). As a result, sediment sampling for laboratory analysis of physical characteristics and metal concentrations is limited to the shoreline and

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interstices of large, coarse substrate material (e.g., cobbles, boulders) within the applicable study areas. Sediment quality monitoring at streams and rivers is required on a three-year frequency following initiation of the stream and river sediment quality monitoring in 2017.

Sampling of sediment at study lakes will be conducted using gravity coring equipment. At each sediment monitoring station, the surficial two centimeters of sediment will be sampled from a minimum of three core samples to form a composite sample. Sampling of sediment at stream/river stations will be conducted by visually identifying locations containing fine-grained material at the sediment surface and using a silicon/plastic spoon to collect this material. One sample will be collected at each stream/river station. Following collection, sediment samples from lake and stream/river stations will be shipped to CALA-accredited analytical laboratory for analysis of percent moisture, particle size, TOC, and total metals (including mercury). The sediment quality data will be compared to applicable AEMP benchmarks, reference area data, and baseline sediment quality data. The interpretation of data relative to AEMP benchmarks may prompt additional WOE analysis to determine links to mine-related operations as outlined in the TARP (Section 5).

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3.7.4 Phytoplankton

The key pathways of potential effects of the Project on phytoplankton include:

- Water quantity changes related to water withdrawal, diversions, runoff, and discharge of treated effluent to freshwater systems
- Water quality changes related to discharge of treated effluent originating from ore or other waste stockpile runoff to freshwater systems (e.g., immediate receiving environments including Mary River, Sheardown Lake Tributary 1 and, under future operations, Camp Lake Tributary 1)
- Water quality changes related to discharge of treated sewage effluent (primarily nutrients and TSS) to freshwater systems (e.g., immediate receiving environments including Mary River and, historically, Sheardown Lake NW)
- Water quality changes due to direct deposition of Project-related dust to lakes, streams and rivers (Mine Site area in zone of dust deposition)
- Water quality changes due to non-point sources, such as site runoff and use of ANFO explosives (Mine Site)

The key question related to the pathways of effect is:

- Do concentrations of phytoplankton abundance (Chlorophyll-a concentration) in exposed areas differ from reference and/or have they changed over time?

The primary issue of concern with respect to the phytoplankton community is related to nutrient enrichment and eutrophication, though effects on water clarity (e.g., changes in TSS) could also affect primary productivity. Lakes may be more vulnerable to eutrophication than streams and rivers, and therefore cumulative influences of nutrient enrichment on lakes is a primary concern under the CREMP. Chlorophyll-a is the primary pigment of phytoplankton (i.e., algae and other photosynthetic microbiota suspended in the water column), and therefore aqueous chlorophyll-a concentrations serve as a surrogate for evaluating the amount of photosynthetic microbiota in aquatic environments under the CREMP. Chlorophyll-a samples will be collected at the same stations, same time, same frequency (i.e., three-times annually) and using the same methods and

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equipment as used for the collection of water chemistry samples. As soon as reasonably possible but within 48 hours, water samples will be filtered through a 0.45-micron cellulose acetate membrane. The membrane with filtered material will be frozen prior to shipment to a CALA-accredited analytical laboratory for chlorophyll-a analysis using standard methods.

The chlorophyll-a data will be compared to the AEMP benchmark (i.e., 3.7 μg/L), to data collected at applicable reference areas, and to available baseline data. The interpretation of data relative to an assessment framework and AEMP benchmarks may prompt additional WOE analysis to determine potential links to mine-related operations as outlined in the TARP (Section 5).

3.7.5 Benthic Invertebrates

The key pathways of potential effects of the Project on BIC include:

- Water quality changes related to discharge of treated effluent from ore stockpile and other waste runoff to freshwater systems (e.g., immediate receiving environments including Mary River, Sheardown Lake Tributary 1 and, in the future, Camp Lake Tributary 1)
- Water quality changes related to discharge of treated sewage effluent (primarily nutrients and TSS) to freshwater systems (e.g., immediate receiving environments including Mary River currently and, historically, Sheardown Lake NW)
- Water quality changes due to deposition of dust in lakes and streams (Mine Site in zone of dust deposition)
- Water quality changes due to non-point sources, such as site runoff and aerial deposition of ANFO explosives residue (Mine Site)
- Changes in water levels and/or flows due to water withdrawals, diversions, and effluent discharges (i.e., alteration or loss of aquatic habitat)
- Changes in sediment quality due to effluent discharge and/or dust deposition
- Sedimentation in aquatic systems related to dust deposition
- Effects of the Project on primary producers

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The key question related to the pathways of effect is:

- Do densities of BIC in exposed areas differ from reference and/or have they changed over time?

BIC is often used as an indicator of aquatic ecosystem health because individual groups and/or taxa of benthic invertebrates exhibit differing sensitivities to anthropogenic stressors and respond in relatively predictable ways to these stressors. Additionally, benthic invertebrates show relatively limited mobility that results in effective integration of local conditions of water and sediment quality, productivity, and habitat. In addition, benthic invertebrates are an important food resource for fish. Therefore, the monitoring of BIC represents a primary tool for evaluating potential Project-related effects on aquatic biota and fisheries resources.

The CREMP BIC) study incorporates both control-impact and before-after approaches to evaluate potential Project-related effects to benthic invertebrates of lakes, streams, and rivers. Within lake environments, benthic sampling will be conducted at five littoral stations at each of Camp, Sheardown NW, Sheardown SE, and Mary mine-exposed lakes, as well as at Reference Lake 3, which serves as a comparable reference area (Figure 3-3). The same littoral stations will be used to collect sediment quality samples to allow potential linkages to be drawn between sediment quality and influences on BIC. In total, 25 benthic samples will be collected among the five study lakes as part of the CREMP study. Benthic sampling will be conducted using a petite-Ponar grab sampler at study lakes. A single sample, consisting of a composite of five grabs that have each been field sieved using a 500-micrometre (μm) mesh, will be collected at each lake benthic station. Streams and rivers sampled for benthic invertebrates will include Camp Lake Tributary 1 at one area within the north branch of the system and two areas within the main stem (upper L2 area and lower DS area), Camp Lake Tributary 2 at areas located upstream and downstream of the Milne Inlet Tote Road, Sheardown Lake Tributaries 1, 9, and 12 near their respective outlets, an unnamed tributary to Angajurjualuk Lake to serve as a comparable stream reference area, and Mary River upstream (two areas) and downstream (three

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areas) of the Mine Site (Figure 3-2). At each stream and river study area, benthic sampling will be conducted at five stations except for Sheardown Lake Tributary 12, where only three stations will be sampled due to limited habitat available for sampling. Overall, the number of stations sampled from stream environments totals 43 (including five reference stations) and from river environments totals 25 (including five reference stations; Figure 3-2). Benthic samples will be collected at stream and river study areas using a Surber sampler outfitted with 500-µm mesh. One sample, representing a composite of three Surber sampler grabs, will be collected at each stream and river benthic station. To the extent possible, water velocity and substrate characteristics at each stream and river station should be standardized among respective mine-exposed and reference area stations to minimize the influence of natural habitat variability on the samples and associated community endpoints.

Benthic samples will be submitted to a qualified laboratory for sorting, enumeration and taxonomic identification to the lowest practical level (typically genus or species) utilizing up-to-date taxonomic keys for invertebrates retained by the 500-µm mesh. Benthic data will be evaluated separately for lake, stream, and river habitats. The benthic invertebrate communities will be evaluated based on primary endpoints used for EEM (Section 3.6), including density (average number of organisms per square metre), taxonomic richness (number of taxa, as identified to lowest practical level), Simpson's Evenness Index, and the Bray-Curtis Index of Dissimilarity. Additional comparisons based on percent composition of dominant/indicator taxa, functional feeding groups, and habit preference groups may also be conducted for the analyses, but are not requirements. Statistical comparisons will be conducted between mine-exposed and reference study areas (for like habitat), and between existing conditions and baseline conditions for individual study areas, using methods consistent with those used for EEM. Accordingly, a difference in BIC will be defined as a significant difference between any paired mine-exposed and reference areas, or any paired current and baseline datasets for a given area, at a p-value of 0.10. For each endpoint that differs significantly between areas or current and baseline datasets (within an area), a magnitude of difference will be calculated between study area or annual means. Because the benthic survey was designed to have

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sufficient power to detect a difference (effect size) of ± two standard deviations, the magnitude of the difference will be calculated to reflect the number of reference/baseline mean standard deviations using equations provided by Environment Canada (2012). A CES for the BIC study of ± 2 standard deviations of reference/baseline will be used to define ecologically relevant effects, which is analogous to differences beyond those expected to occur naturally between two areas that are uninfluenced by anthropogenic inputs (i.e., between pristine reference areas; see Environment Canada (2012)). The interpretation of data relative to CES may prompt additional WOE analysis to determine potential links to mine-related operations as outlined in the TARP (Section 5).

BIC sampling will be conducted as described above in the month of August on an annual basis. This annual timing reflects the month in which benthic invertebrate sampling has consistently been conducted since commercial operations commenced, as well as the most frequent timing used during baseline benthic studies. This seasonal timing is also ecologically appropriate based on optimal maturity of invertebrate life stages (i.e., organisms are large enough to allow taxonomic resolution to lowest practical level), and best reflects the Mine Site effluent discharge regime (i.e., discharge during the open-water season only), hydrology (i.e., ice-free conditions), and dust deposition (i.e., greatest deposition rates during the open-water season).

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3.7.6 Fish (Arctic Char) Health

Key questions developed to guide the design of the fish monitoring program are reflected in the key pathways of potential effects of the Project on Arctic char, which include:

- Water quality changes related to discharge of treated effluent from ore stockpiles and other waste runoff to freshwater systems (e.g., immediate receiving environments including Mary River, Sheardown Lake Tributary 1 and, in the future, Camp Lake Tributary 1)
- Water quality changes related to discharge of treated sewage effluent (e.g., immediate receiving environments including Mary River currently and Sheardown Lake NW historically)
- Water quality changes due to deposition of dust in lakes and streams)
- Water quality changes due to non-point sources, such as from site runoff and aerial deposition of ANFO explosives residue (Mine Site)
- Changes in water levels and/or flows due to water withdrawals, diversions, and effluent discharges (i.e., alteration or loss of aquatic habitat)
- Dust deposition (i.e., sedimentation) at Arctic char spawning areas (habitat) and on Arctic char eggs
- Effects of the Project on primary and secondary producers.
- Blasting overpressure from blasting in or near water

The key question related to the pathways of effect is:

- Do concentrations of potential mine-related parameters (i.e., TSS, metals, nutrients, etc.) in exposed areas differ from reference and/or have they changed over time?

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Fish are key components of aquatic ecosystems, important ecological indicators that integrate natural and anthropogenic changes in systems over time, and highly valued as a subsistence food resource for Inuit. Therefore, the monitoring of fish health represents a primary tool for evaluating potential Project-related effects on aquatic biota and fisheries resources. Historical baseline studies indicated that Arctic char is present at Mine Site area lakes (and most streams and rivers) in adequate abundance to meet the sample sizes recommended for fish health surveys. In addition, sufficient baseline catch and measurement data exist for this species to allow application of a before-after statistical evaluation. Therefore, fish health monitoring for the CREMP focuses on the assessment of Arctic char populations in lakes adjacent to the Mine Site.

The Arctic char health study incorporates both control-impact and a before-after approaches to evaluate potential Project-related effects to fish health at Mine Site area lakes. The Mine Site area lakes include each of Camp, Sheardown NW, Sheardown SE, and Mary mine-exposed lakes and Reference Lake 3 as a comparable reference area (Figure 3-3). The approach employed for the Arctic char health survey will closely mirror the recommended EEM approach for non-lethal sampling (Environment Canada, 2012). Accordingly, the Arctic char health survey will target the non-lethal collection of approximately 100 juvenile Arctic char from nearshore lake habitat, and between 50 and 100 based on outcome of power analyses from previous years adult arctic char from littoral/profundal lake habitat. Juvenile Arctic char will be collected from each study lake shoreline area using a battery powered backpack electrofishing unit, whereas adult Arctic char will be captured from deeper offshore areas using experimental (gang index) gill nets approximately two metres high and possessing bar mesh sizes ranging from 38 to 76 millimetres (mm) (1.5” to 3”) set on the bottom for short durations (i.e., less than two hours) during daylight hours. Arctic char used for the study will be subject to assessment of deformities, erosions, lesions, and tumors, visible incidence of external and/or internal parasites, and measurements of length and weight using a non-lethal approach.

These data will be compared between mine-exposed and reference lakes, as well as between the recently collected data and baseline data for individual lakes.

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Arctic char health will be assessed separately for juveniles and adults. Data from juvenile fish will be assessed to determine presence of YOY individuals, which will be assessed separately from other juveniles. Fish size endpoints of fork length and fresh body weight will be summarized separately for YOY, juveniles (1+ age category), and adults by study area, and these measurement endpoints will then be used as the basis for evaluating four response categories (survival, growth, reproduction, and condition; Table 3.5). The data analysis will include comparisons of Arctic char health between mine-exposed and reference lakes for any given year, as well as between yearly data and baseline data for individual lakes, using statistical approaches approved for EEM studies (i.e., Environment Canada 2012). Similar to the CES applied to the benthic invertebrate community survey, a difference at absolute magnitude greater than 10% (condition) or 25% (e.g. YOY size) +/- will be used to define ecologically relevant differences between study lakes and study periods consistent with those recommended for EEM (Table 3.5; Environment Canada 2012). Finally, an a priori power analysis will be completed to determine appropriate fish sample sizes for future surveys as recommended by Environment Canada (2012). The interpretation of data relative to CES may prompt additional WOE analysis to determine potential links to mine-related operations as outlined in the TARP (Section 5).

Arctic char health monitoring will be conducted as described above in the month of August (when possible) on a tri-annual basis, which aligns with EEM studies. This timing reflects the month in which fish health sampling has consistently been conducted since commercial operations commenced, and aligns with federal standards set out in the EEM, and industry standard best practices, and will reduce the change that the project negatively impacts the fish populations, due to overfishing.

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3.8 Targeted Studies

As described in Section 1, initiation of monitoring for specific effects (or targeted monitoring) through specialized programs and studies has been included in the AEMP to address specific questions or potential impacts from the Project. These programs or studies are more confined in terms of spatial and/or temporal scope compared to the EEM and CREMP studies. These targeted monitoring studies relate to specific environmental concerns that require further investigation or follow-up but are not anticipated to be permanent or long-standing components of the CREMP. The Lake Sedimentation Monitoring Program, Dustfall Monitoring Program, and Stream Diversion Barrier Study represent the targeted monitoring studies identified to date under the AEMP.

3.8.1 Lake Sedimentation Monitoring Program

The Lake Sedimentation Monitoring Program is conducted to evaluate and track potential effects of sedimentation endpoints (i.e., sedimentation rate and sediment accumulation thickness estimates) related to the introduction of dust and other sources of suspended solids (e.g., erosion) in surface waters located near the Project (NSC, 2014c). Sedimentation rates will be monitored in Sheardown Lake NW through the deployment of sediment traps, the locations and methods of which are described in NSC (2014c) and Minnow (2021). In brief, the program will involve year-round deployment of sediment traps in Sheardown Lake NW at three locations (five monitoring stations per location) characterized by different habitat features. At each location the total dry weight deposited and bulk density of deposited sediment will be used to calculate the deposition rate (sedimentation rate) and estimated thickness of deposited sediment (sediment accumulation thickness estimate). The sediment traps are emptied and redeployed after ice-off and in fall to provide measures of seasonal (i.e., open-water and ice-cover season) deposition rates and accumulation thickness estimates. Sedimentation monitoring was initiated in 2013 and has continued on an annual basis thenceforth. The mean sediment accumulation thickness estimates in Sheardown Lake NW during the ice cover period are compared to threshold values (low, moderate, and high action threshold values) developed

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through a robust investigation on natural sediment accumulation thickness estimates in the Arctic, FEIS predictions, and published sediment accumulation thickness estimates reported to adversely affect salmonid egg survival.

The FEIS predicted Sheardown Lake NW would receive 2.1 x 10^9 grams (g) of dust annually from direct aerial dustfall and surface runoff during mining operations (Baffinland, 2012). Dustfall may represent an important source of sediment material entering Sheardown Lake NW and may be incorporated from the Dustfall Monitoring Program (described in Section 3.8.2) into the Lake Sedimentation Monitoring Program to support data interpretation. To determine the potential effects of sedimentation endpoints on the BIC, BIC samples collected in the CREMP may be incorporated into the Lake Sedimentation Monitoring Program. The dustfall and BIC data incorporated to support the lake sedimentation report requires a minimum of three years of monitoring. The lake sedimentation monitoring program provides a strong scientific basis for the determination of sediment deposition effects on Arctic char egg survival at Sheardown Lake NW.

3.8.2 Dustfall Monitoring Program

Project Certificate No. 005, Amendment No. 05, included requirements for dustfall monitoring. In 2013, Baffinland implemented a Dustfall Monitoring Program that meets the requirements under the Project Certificate No. 005, Amendment No. 05, Condition #21 (Baffinland, 2016). A description of this program is included in the AQNAMP. The Dustfall Monitoring Program consists of operating dustfall buckets positioned along transects oriented in a radial fashion from main development areas that include Milne Port, the Tote Road, and the Mine Site, and those positioned at representative reference dustfall monitoring stations. Under this program, dustfall measurements (the amount of dustfall per unit time) are completed monthly and, if sufficient volume of dustfall material is collected, dustfall material is analyzed to determine the metal concentrations in the dust. The dustfall monitoring data are used to estimate annual deposition (rates, quantities) and chemical composition of dust potentially entering aquatic systems within and near the Project operations.

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3.8.3 Initial Stream Diversion Barrier Study

A streamflow reduction barrier study was identified as a follow-up program in the FEIS (Baffinland, 2012), following which this Initial Stream Diversion Barrier Study was developed by KP (2014c). The primary objectives of this study are to monitor the effects of both increases and reductions in streamflow at several Mine Site area streams and to further understand how Project-related changes in streamflow may result in the creation of fish barriers that have the potential to occur at low flows. The monitoring program may identify the need for mitigation measures to address Project-related fish stranding.

Initial monitoring conducted under this study in 2013 focused on obtaining a better understanding for baseline flow conditions and the frequency and duration of the occurrence of natural fish barriers and fish stranding in five Mine Site area streams including:

- CLT-1
- CLT-2
- SDLT-1
- SDLT-9
- SDLT-12

This initial study was exploratory in nature with the following objectives (which contribute to the primary objectives stated above):

- Develop an understanding of low-flow conditions that may result in barriers to fish passage within two tributaries of Camp Lake and three tributaries of Sheardown Lake.
- Document fish presence throughout the stream length of each tributary under various flow conditions, including during spring freshet when high water velocities may prevent fish passage, and during late fall to document the downstream passage of fish to overwintering habitat found in lakes.

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The monitoring involved visual assessment of potential barriers and obstructions to upstream/downstream fish passage at each tributary by an experienced fish biologist. The combination of visual observations of barriers, fish presence and associated flows at the time of the survey were used to determine the conditions in which fish migration were limited within each tributary under various flow conditions. Other monitoring programs implemented by Baffinland are intended to augment interpretation and predictions under the Stream Diversion Barrier Study, including hydrology monitoring and the freshwater biota monitoring undertaken as part of the CREMP.

A reduced production rate associated with the Early Revue Phase has resulted in a considerably smaller mining footprint (open pit and waste rock stockpile) than was originally envisioned during the FEIS development, resulting in no substantial Project-related stream diversions. As a result of the negligible requirement for stream diversions, the Stream Diversion Barrier Study was discontinued. The resumption of this study will depend upon the schedule and size set forth for any future development. The approved full production (rail) phase of the Project may result in meaningful reductions in streamflow and therefore monitoring under this study will be required, and re-initiated, to identify potential Project-related fish barriers and fish stranding. Baffinland will initiate a Stream Diversion Barrier Study similar in scope to that described herein approximately one year prior to the start of the full production (rail) phase of the Project.

3.9 Quality Assurance and Quality Control

Each of the monitoring programs composing the AEMP follows standard Quality Assurance/Quality Control (QA/QC) measures as follows:

- Staffing the Project with experienced and properly trained individuals
- Ensuring that representative, meaningful data are collected through planning and efficient research
- Using standard protocols for sample collection, preservation, and documentation

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- Calibrating and maintaining all field equipment

Various additional QA/QC measures are implemented for each of the component studies, as described below.

3.9.1 Water and Sediment Quality

A strict QA/QC program is in place so that high quality and representative data are obtained in a manner that is scientifically defensible, repeatable, and well documented. This program aims to ensure that the highest level of QA/QC standard methods and protocols are used for the collection of all environmental samples. Quality assurance is obtained at the project management level through organization and planning, and the enforcement of both external and internal quality control measures. In addition to the QA/QC measures listed above, the following QA/QC procedures and practices will be implemented for the water and sediment quality monitoring programs under the CREMP:

- Internal Quality Control:
  - Approximately 10% of overall number of samples n of water quality will include duplicate, blank, and travel blank samples to be submitted for analysis with routine samples at a CALA-accredited analytical laboratory, and duplicate samples will be included for sediment sampling. This will support the assessment of field precision (duplicates) and potential for sample contamination during collection and transport (blanks)
  - Maintaining accurate field notes of any deviations or abnormalities while sampling
- External Quality Control:
  - Employing CALA-accredited analytical laboratories for the analysis of all samples
  - Determining analytical precision and accuracy and potential for laboratory contamination of samples based on interpretation of data from the analytical reports for laboratory duplicate (precision), blank (potential contamination), and spike/reference material/laboratory control (accuracy) samples

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- Maintaining accurate records of any lab errors or omissions

The field sampling protocols for the water and sediment quality monitoring programs under the CREMP are presented within an appendix of the original Water and Sediment Quality CREMP Study Design (KP, 2014a; 2014b). The quality of the data obtained for a project is assessed relative to the pre-set Data Quality Objectives (DQOs). DQOs provide a means of assessing whether the data in question are precise, accurate, representative, and complete. The results from QA/QC samples will be reviewed to determine if sample contamination occurred. These data will also be used to determine if the contamination occurred during collection, handling, storage, shipping, or laboratory handling and analysis. Upon receipt from the laboratory, the data will be uploaded into a database along with copies of field notes, photos, Sample Receipt Confirmations, spreadsheet (e.g., Microsoft Excel) data, and Certificates of Analysis.

3.9.2 Benthic Invertebrate study

Replicate sub-samples will be collected in the field at each benthic station to integrate the spatial variability in community features that is naturally encountered in the environment. Accordingly, five replicate sub-samples will be collected at lake benthic stations, and three replicate sub-samples will be collected at stream and river benthic stations, under the CREMP. Appropriate QA/QC measures related to processing and identification of benthic samples, outlined in EEM technical guidance, will be followed at the laboratory (Environment Canada, 2012). These measures will incorporate the proper steps related to re-sorting, sub-sampling, and maintenance of a voucher collection, as needed. The voucher collection will be taxonomically analysed by a second qualified invertebrate taxonomist.

Benthic samples will be sorted with the use of a stereomicroscope. Samples will be washed through a 500-µm sieve and sorted entirely except in the following instances: those samples with large amounts of organic matter (i.e., detritus, filamentous algae) and samples with high densities of major taxa. In these cases, samples will be first washed through a large mesh size sieve (3.36-mm), to

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remove all coarse detritus, leaves, and rocks. Large organisms retained in the sieve will be removed from the associated debris. The remaining sample fraction will be sub-sampled quantitatively, if necessary. For QA/QC evaluation, the sorted sediments and debris will be re-preserved and retained for up to six months following submission of reports under the CREMP or EEM programs. For those samples that were sub-sampled, sorted and unsorted fractions will be re-preserved separately. Sorted organisms will be re-preserved.

All benthic invertebrates will be identified to the lowest practical level, usually genus or species. Chironomids and oligochaetes will be mounted on glass slides in a clearing media prior to identification. Organisms will be identified using up-to-date taxonomic keys, and laboratory QA/QC will include assessments of sorting efficiency and sub-sampling precision and accuracy

3.9.3 Fish

Standard QA/QC technical procedures will be utilized for all field sampling, laboratory analysis, data entry, and data analysis related to the fish health assessment. When required, fish ages will be determined by experienced technicians and a minimum of 10% of fish ageing structures that are processed will be independently and blindly aged by a second technician. All data that are entered electronically will undergo a 100% transcription QA/QC by a second person to identify any transcription errors and/or invalid data.

3.9.4 Data Evaluation

All data will be entered into an electronic database with controlled access. Screening steps will be employed to check for transcription errors or suspicious data points. An individual not responsible for entering the data will confirm that the data entered adequately reflect the original data sheets/reports.

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4. Roles and Responsibilities

The personnel responsible for implementing the AEMP and their respective roles are described in Table 4-1.

Table 4-1 Roles and Responsibilities for AEMP

Position	Responsibilities
Chief Operations Officer (COO)/General Manager	Responsible for providing oversight for all Project operations and allocating the necessary resources for the operation, maintenance and management of Project infrastructure
Environmental Manager / Superintendent	Manage all on-site aquatic effects monitoring programs at the Project Conduct inspections and monitoring to ensure compliance with applicable regulations and commitments Report incidents to senior management and the appropriate regulatory agencies and stakeholders Provide training sessions to operational departments on the appropriate mitigation measures and strategies for managing surface water flows and effluents at the Project The on-site Environmental Superintendent is responsible for data management and reporting related to the AEMP
Environmental Coordinator	Implementation of the field components of specific programs under the Aquatic Effects Monitoring Plan Provide training to staff conducting field work under the AEMP
QIA Manager of Project Compliance and Monitoring	Directs QIA's on-site environmental resources Liaise with Baffinland's Environmental Manager/ Superintendents Reviews regulatory submissions on behalf of the QIA

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Position	Responsibilities
QIA Environmental Monitor	Monitors implementation of commitments, environmental compliance, and QIA interests Participate in routine compliance inspections and monitoring alongside Baffinland staff Participate follow-up corrective action undertaken regarding non-compliance events including spills Presents annual monitoring reports to communities as requested The core responsibilities of this position are described further in the IIBA
All Departmental Supervisors	Responsible for reading and understanding applicable sections of the AEMP and directing departmental personnel on the requirements to understand applicable sections Report any visual observations, or reports, of suspected aquatic ecosystem effects to the Environment Department Assist in implementing appropriate mitigation measures
All Project Personnel	All Project personnel will be responsible to comply with the requirements of the Plan as appropriate Report any visual observations of suspected aquatic ecosystem effects to their respective supervisors Assist in implementing appropriate mitigation measures

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5. Data Assessment and Response Framework

5.1 Steps in Data Assessment and Response

Monitoring data collected through the AEMP requires a systematic data evaluation process, as well as management responses that will be taken in response to certain data evaluation outcomes. A common assessment (data evaluation) and management response framework will be implemented. This multi-step process includes the following.

Step 1 - Data Management and Evaluation

This step includes QA/QC of the data, comparison of data to AEMP benchmarks and to reference and/or baseline data, and review of the data using various tools such as Exploratory Data Analysis (EDA) and Statistical Data Analysis (SDA), to determine if a difference relative to reference and/or baseline exists. Upon reception of analytical data from the laboratory, water quality and sediment quality data will be evaluated relative to applicable AEMP benchmarks (Tables 3.1, 3.2, and 3.3). Based on evaluation of ambient conditions (e.g., considering turbidity, TSS, and evaluation of ratios between total and dissolved metals concentrations) and considering available historical information, an assessment of potential Project-related influence on aquatic conditions will be conducted before the end of the calendar year, and ahead of the AEMP annual report deadline. A change may be detected statistically or qualitatively, relative to benchmarks, baseline values and/or spatial or temporal patterns. A difference may be statistically significant, but professional judgement will also be applied using the various evaluation tools to qualitatively assess for differences based on a WOE analysis. The decision rationale and outcomes related to any professional judgement will be clearly documented during annual reporting, and a flow chart is included in Appendix B which describes the process.

If Step 1 does not detect differences among areas (i.e., mine-exposed and reference) or years (i.e., current monitoring year and baseline), then no additional

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action is required (e.g., continued monitoring as specified within the EEM or CREMP, as applicable). If a difference is observed, then further evaluation of the data for that/those indicator(s) will be carried out as specified under the MDMER for EEM studies, or as outlined under Step 2 below for CREMP studies.

Step 2 - Determining Whether the Observed Change is Mine-Related

Step 2 involves determining if the changes in the indicator(s) of concern are due to the Project or due to natural variability or other causes. Project activities with the potential to induce an observed change on water quality will be reviewed annually (e.g., as part of an overall trend analysis, if required), and those on sediment quality or on biota will be assessed annually corresponding with respective sampling frequency, to identify potential Project-related causes or sources. This could include evaluating effluent quality, discharge regime/rates and loading, dust deposition, and other point/non-point sources as required. Also, any evidence of potential natural causes (i.e., a major erosional event such as a slumping riverbank) will be investigated. Field data sheets, site investigations and photos will be reviewed to inform this.

Evaluation of a Project-related change will be addressed using EDA and subsequently using SDA, if required, on an annual basis as part of an annual report. For instance, EDA may include plotting of data to visually assess potential patterns over time, and to evaluate spatial differences, extent, and pattern of observed changes. The EDA will also include comparisons of data from Mine Site streams to data from reference streams and comparisons of Mine Site Lakes to reference lake(s). This will further assist with determining whether the observed changes may be due to natural variability or the Project. Graphical analyses may be used to confirm assumptions required for statistical testing (normality, sample size, independence). Differences in fish and other biotic endpoints between mine-exposed and reference areas will be preferentially tested using pair-wise Student's t-tests and/or analysis of variance and post-hoc testing, as appropriate. Prior to conducting the statistical tests, the data will be evaluated for normality and homogeneity of variance to ensure that applicable statistical test assumptions will be met. In instances in which normality cannot be

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achieved through data transformation, non-parametric Mann-Whitney U-tests (pair-wise comparisons) and/or Kruskal-Wallis H-tests (multiple group comparisons) will be used to evaluate the data. Similarly, in instances in which variances of normal data could not be homogenized by transformation, pair-wise comparisons will be conducted using Student's t-tests assuming unequal variance. SDA will be used as outlined in the individual assessment frameworks and can be applied to the parameters of interest to test the primary hypothesis for the effects of mine-related change. These tests may include formal trend analyses (e.g., Kendall tests) to determine whether a change over time is significant.

If the Step 2 analysis concludes that differences in water quality, sediment quality, or biological endpoints (relative to reference or baseline), are, or are likely, due to the Project, the assessment will proceed to Step 3. If it is concluded the observed differences relative to reference and/or baseline conditions are not due to the Project, no management response will be required (i.e., continued monitoring as specified within the CREMP). As indicated previously, these analyses, which also incorporate a qualitative WOE assessment that considers historical information and all available analytical water, sediment, and biological monitoring information, will be conducted each year as part of the CREMP and summarized in the annual report. Within the annual report, all instances in which an AEMP benchmark for water quality or sediment quality have been exceeded will be identified along with an evaluation of whether the exceedance reflected a Project-related cause, the degree to which biological effects may have occurred associated with the exceedance, and recommended follow-up actions and/or implemented mitigation that has been applied to address the exceedance (as required) will be provided based on the determination of action level (Step 3).

Step 3 - Determine Action Level

If the evaluation conducted in Step 2 has indicated with some certainly that the measured difference relative to reference and/or baseline is Project-related, Step 3 involves determination of the action level associated with the observed monitoring results. Three levels of action have been identified: low, moderate,

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and high. The general gradient of progression in response for these action levels range from increased monitoring and data analysis (e.g., trend analysis), to identification of possible sources, to risk assessment and/or mitigation. The specifics for each aquatic component (water and sediment quality, phytoplankton, benthic invertebrates, and Arctic char) are summarized in Table 5.1 and are described further in each of the component study designs. Below is a generic description of each of the levels of response.

If an AEMP benchmark is exceeded, a **low action response** may be undertaken and could include any number of potential responses, including the following:

- Evaluate temporal trends
- Identify likely source(s) and potential for continued contributions
- Confirm the site-specific relevance of benchmark and establish a more site-specific benchmark, if necessary
- Further evaluate the data (for example, for water quality, review dissolved metals data or supporting variables)
- Based on evaluations, determine next steps

If an AEMP benchmark is exceeded and it is concluded to be Project-related, a **moderate action level response** will be undertaken and could include, in addition to analyses identified for a low action response, the following:

- Consider a WOE evaluation and/or risk assessment, that incorporates assessment of other monitoring results collectively with the indicator that has changed, to evaluate effects on the ecosystem
- Evaluate the need for and specifics of increased monitoring (e.g., increasing the extent, duration, frequency, number, and/or type of samples collected)
- Evaluate the need for and specifics of additional monitoring (e.g., confirmation monitoring) and/or modifications to the CREMP
- Consider results of the trend analysis (i.e., trend analysis indicates an increasing monotonic trend) and evaluation of potential pathways of effect (i.e., causes of observed differences) to determine if management/mitigation is required; and

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- Identify next steps based on the above analyses. Next steps may include those identified for the high action level response

Quantitative triggers for the **high action level response** has not been identified as the need for additional study and/or mitigation will depend on the ultimate effects of the observed increases in the indicator parameter(s) of concern on the applicable receiver system. Also, the benchmark may need to be revised in consideration of ongoing monitoring results. The precise relationships among water quality, sediment quality, primary and secondary production, and their collective effects on fish can be difficult to predict and therefore actions undertaken under a moderate action level response will attempt to explore these relationships to advise on overall effects to the aquatic environment. Results would be discussed with regulatory agencies and the next steps would be identified. Additional actions that may be implemented in a subsequent phase (i.e., high action level response) could include:

- Implementation of increased monitoring to further assess the potential for effects and/or define magnitude and spatial extent, if warranted
- Implementation of mitigation measures or other management actions that may be identified under the moderate action level response (see the mitigation toolkit in Section 5.3)

Management actions will be implemented as identified in the low and moderate action responses for each aquatic component based on assessment of whether the difference relative to baseline/reference is mine-related and the action level determined relative to the benchmark(s). In the instance of detecting change among multiple stressors, action will be implemented according to a WOE evaluation.

Mitigation measures will be evaluated and implemented on a case-by-case basis, with consideration of an issue-specific assessment of the situation and corresponding action level. Moderate Action Responses may include mitigation measures that are easily implemented at low-cost and in a short timeframe. Such mitigation measures may already be identified as contingency or adaptive management measures within various management plans for the Project. A

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moderate action response may include development of a High Action Response, which will be implemented if, for example, a trend over time is a continued (i.e., sustained) change relative to an AEMP benchmark (increase in the magnitude of the effect). The duration of a sustained moderate action response that may escalate to a high action response if a cause has not been previously identified through triggered management action is at least three full years (i.e., year-one to identify the potential effect and determine whether the cause is mine-related, with two follow-up years to confirm cause is not mine-related and/or determine whether the magnitude of the effect is increasing). High Action Responses will be reviewed by key regulatory agencies prior to implementation unless an immediate response is required (e.g., spill event).

As indicated above, management actions and mitigation measures will be evaluated and implemented on a case-by-case basis and dependent upon the degree of difference (relative to baseline/reference)/effect identified. In the event of a specific incident known to or that is likely to result in an adverse effect to the aquatic environment, response times for management action/ mitigation will be determined with appropriate regulatory authorities using an appropriate level of action. Should a chronic Project-related influence on aquatic environment be identified as part of the annual CREMP analyses, management responses and mitigation measures for moderate and high action responses will be proposed for the following year and/or years, depending upon the response that is determined to adequately address the effect/cause and upon consultation/notification with appropriate stakeholders.

The moderate, and high-risk conditions and associated responses are outlined in the Trigger Action Response Plans (TARP) and Predefined Responses, presented in Table 5-1 and Table 5-2 respectively.

5.2 Reporting

Reporting of AEMP component studies is conducted based on an annual reporting cycle. Best efforts will be employed to integrate the results of individually monitored but related aquatic monitoring programs under the AEMP

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into each respective AEMP report (i.e., individual CREMP, Lake Sedimentation, Dustfall Monitoring, and Initial Stream Diversion programs, where applicable). The key constraint to within-year integration of results among program reports is the limited availability of time between sample collection, analysis, data evaluation, and report preparation within the annual reporting cycle. In the event that adequate time is not available to integrate results of various aquatic programs within an individual report for the reporting year, the most recent reported data for applicable programs will be considered for integration within each individual report. In addition, for each of the individual studies conducted under the AEMP, yearly-generated reports will include comparisons to impact predictions made in the Final Environmental Impact Statement to confirm the accuracy of these predictions and to aid in the ongoing assessment of environmental conditions and patterns at the Project. Under the MDMER, Baffinland submits an annual report to ECCC through the Mine Effluent Reporting System (MERS). The EEM biological studies are reported on three-year cycles as required under the MDMER.

AEMP component study monitoring results for the CREMP and Lake Sedimentation Study are appended to the QIA/NWB Annual Report for Operations on an annual basis. A monitoring results summary is also presented in the effects evaluation section of the NIRB Annual Report.

Monitoring results from the Dustfall Monitoring Program will be reported in the Terrestrial Environment Annual Monitoring Report and appended to the NIRB Annual Report, as required by Project Certificate No. 005.

The AEMP Annual Report will provide a compilation, assessment, and interpretation of findings across monitoring programs, and present an evaluation of effects and actions taken (or that will be taken) to address influences to the aquatic receiving environment that may be Project-related. Revisions to study designs or management response actions will be summarized and discussed for each key issue.

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The AEMP will be updated periodically, as required. Updates to the AEMP will be filed with the QIA/NWB Annual Reports in accordance with Schedule B, Section g, Item (ii) of the Amended Type A Water Licence. Updates to the AEMP may consist of modifications to study designs or termination of shorter-term targeted studies accompanied by adequate rationale.

5.3 Trigger Action Response Plan (TARP)

The objective of the monitoring plans and performance indicators selected for the TARP table 5.1 below are to:

- Detect potential short-term and long-term effects of the Project on the aquatic environment
- Evaluate the accuracy of effects predictions from the FEIS (Baffinland 2012)
- Assess the effectiveness of planned/recently implemented mitigation measures
- Identify additional mitigation measures to avoid or reduce unforeseen environmental effects

The pre-defined Moderate and High Action Responses that may be implemented in the event of an exceedance of a moderate risk or high-risk threshold are outlined in Table 5-2. These responses should not be considered exhaustive and may be supplemented pending the results of adaptive management investigations and ongoing adaptive management. A full review of activities and potential sources will help determine the most effective actions to implement.

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TABLE 5-1 **TRIGGER, ACTION AND RESPONSE PLAN FOR THE AEMP**

Monitoring Plan	Performance Indicator	Activity being Monitored	Risk Response Threshold / Pre-Defined Action Level Responses		
			Low	Medium	High
MDMER (EEM) Biological Monitoring Studies	CES for Arctic char population, based on the following endpoints: 1. Total body weight at age: ± 25% of reference mean. 2. Gonad weight at total body weight: ± 25% of reference mean. 3. Liver weight at total body weight: ± 25% of reference mean. 4. Total body weight at length (condition): ± 10% of reference mean. 5. Age: ± 25% of reference mean.	Mine effluent discharges	**Threshold:** Result for any one of fish population endpoints 1 through 5 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) but within CES. OR Result for any one of fish population endpoints 1 through 5 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) at a magnitude outside the CES in one and/or non-consecutive studies. **Response:** Continue with scheduled monitoring as prescribed in the MDMER to confirm the significant difference; determine if there are contributing factors in effluent (review deleterious substances monitoring of effluent and acute and sublethal toxicity testing results).	**Threshold:** Result for any one of fish population endpoints 1 through 5 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) AND the significant difference is of a magnitude outside the CES for two consecutive studies ("confirmed difference"). **Response:** Conduct IOC of the confirmed differences between effluent-exposed and reference areas, consistent with the MDMER; develop high risk response threshold and evaluate and implement most appropriate action(s) from the AEMP pre defined responses (Table 5.2). Implement plan to address potential mine-related inputs and sources.	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of IOC conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP pre-defined responses. Implement plan to address potential mine-related inputs and sources.
MDMER (EEM) Biological Monitoring Studies	CES for BIC, based on the following endpoints: 1. Density: ± 2 SD of reference mean. 2. Simpson's Evenness Index: ± 2 SD of reference mean. 3. Taxa Richness: ± 2 SD of reference mean.	Mine effluent discharges	**Threshold**: Result for any one of BIC endpoints 1 through 3 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) but within the CES. OR Result for any one of BIC endpoints 1 through 3 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) at a magnitude outside the CES in one and/or non-consecutive studies. **Response:** Continue with scheduled monitoring as prescribed in the MDMER to confirm the significant difference; determine if there are contributing factors in effluent (review deleterious substances monitoring of effluent and acute and sublethal toxicity testing results).	**Threshold:** Result for any one of BIC endpoints 1 through 3 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) AND the significant difference is of a magnitude outside the CES for two consecutive studies ("confirmed difference"). **Response:** Conduct IOC of the confirmed differences between effluent-exposed and reference areas, consistent with the MDMER; develop high risk response threshold and evaluate and implement most appropriate action(s)[8] from the pre-defined responses. Implement plan to address potential mine-related inputs and sources.	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of IOC conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level pre defined responses. Implement plan to address potential mine-related inputs and sources.
MDMER (EEM) Biological Monitoring Studies	Fish Tissue Study[1] Mean Hg concentrations in muscle tissue.	Mine effluent discharges	**Threshold:** Mean total Hg concentration in fish muscle from the effluent-exposed area exceeds the MDMER threshold for an effect on fish tissue from Hg (i.e., 0.5 µg/g wet weight) AND mean concentrations in the exposure area are statistically significantly higher (ρ <0.1) than to reference. **Response:**	**Threshold**: Mean total Hg concentrations in fish muscle from the effluent-exposed area exceeds the MDMER threshold for an effect on fish tissue from Hg (i.e., 0.5 µg/g wet weight) AND mean concentrations in the exposure area are statistically significantly higher (ρ <0.1) than reference AND	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources.

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Monitoring Plan	Performance Indicator	Activity being Monitored	Risk Response Threshold / Pre-Defined Action Level Responses		
			Low	**Medium**	**High**
			Conduct follow-up monitoring and temporal trend analysis to determine if Hg concentrations in fish tissue are increasing over time. Review the results of other component studies. Determine if there are other project-related Hg sources other than mine effluent. Implement a review of mine-related processes to determine if sources can be mitigated and implement required HG MDMER fish tissue studies under EEM if applicable threshold is met.	there is a confirmed effect (i.e., exceedance of the moderate risk response threshold) for any one of fish health endpoints 1 through 5 (above) OR there is a confirmed effect (i.e., exceedance of the moderate risk response threshold) for any one of the BIC endpoints 1 through 3 (above). **Response:** Conduct follow-up monitoring and temporal trend analysis to determine if Hg concentrations in fish tissue are increasing over time. Determine if there are other project-related Hg sources other than mine effluent. Evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement required HG MDMER fish tissue studies under EEM if applicable threshold is met. Develop and implement action(s) to reduce Hg emissions.	
MDMER (EEM) Biological Monitoring Studies	Fish Tissue Study[1] Mean Se concentrations in muscle and/or whole-body tissues.	Mine effluent discharges	**Threshold:** Mean total Se concentrations in fish tissue from the effluent-exposed area exceeds the PNEC (6.7 ug/g dw) from ECCC (2022) AND mean concentrations in the exposure area are statistically significantly higher (ρ <0.1) relative to reference. **Response:** Conduct follow-up monitoring and temporal trend analysis to determine if Se concentrations in fish tissue are increasing over time. Review the results of other component studies. Determine if there are other project-related Se sources other than mine effluent. Implement a review of mine-related processes to determine if sources can be mitigated. Implement required Se MDMER fish tissue studies under EEM if applicable threshold is met.	**Threshold:** Mean total Se concentrations in fish tissue from the effluent-exposed area exceeds the USEPA (2016) chronic effects criterion (11.3 µg/g dry weight) AND mean concentrations in the exposure area are statistically significantly higher (ρ <0.1) relative to reference. **Response:** Conduct follow-up monitoring and temporal trend analysis to determine if Se concentrations in fish tissue are increasing over time. Determine if there are other project-related Se sources other than mine effluent. Evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Develop and implement action(s) to reduce Se emissions. Implement required SE MDMER fish tissue studies under EEM if applicable threshold is met.	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources.
Lake Sedimentation Monitoring	Sedimentation (i.e., amount or depth of sediment accumulation) in Sheardown Lake	Dustfall, erosion, and sedimentation	**Threshold:** Mean sediment accumulation thickness estimate for the ice-cover / Arctic char egg incubation period (approximately October to May) exceeds 0.15 mm[4] at SHAL-2 in Sheardown Lake NW **Response:** Detailed review of CREMP data to evaluate potential sedimentation-related effects to YOY fish in Sheardown Lake NW. Review near construction projects within the catchment area that may be impacting sediment deposition rates. Detailed review of existing sediment and	**Threshold:** Mean sediment accumulation thickness estimates for the ice-cover / Arctic char egg incubation period exceed 0.54 mm[5] at any one of the monitoring areas in Sheardown Lake NW. **Response:** Review annual and historical data and assess effects based on a WOE study with the other component studies of the AEMP; establish proposed high action response. Implement plan to address mine-related inputs and sources during the next open water season to avoid potential threshold exceedance during the following incubation period[3].	**Threshold:** Mean sediment accumulation thickness estimates during the ice-cover / Arctic char egg incubation period exceeds 1 mm[6] at any one of the monitoring areas in Sheardown Lake NW. **Response:** To be determined if the moderate risk response threshold is exceeded; may include further study such as in-situ or laboratory studies on egg mortality, and adjustments to mine operations to stop or reverse the observed effects. Implement plan to address potential mine-related inputs and sources.

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Monitoring Plan	Performance Indicator	Activity being Monitored	Risk Response Threshold / Pre-Defined Action Level Responses		
			Low	Medium	High
			erosion control measures and implementation of additional control measures. Review implementation of operational ESC measures in SDLT catchment effectiveness and utilise event based monitoring in addition to defined adaptive management Water Licence sites representative of the catchment to evaluate TSS trends.[3].		
CREMP	Water quality, including comparisons to AEMP benchmarks (refer to Table 31.: Water Quality Benchmarks for Mine Site lakes and Table 3.2: Water Quality Benchmarks for Mine Site Streams, Respectively)	Mine effluent discharges, dustfall, erosion, and sedimentation	**Threshold:** Mean concentration of any one of the parameters listed in Tables 3.1 and 3.2 exceeds the applicable AEMP benchmark at any one mine-exposed area and during any season. OR Mean concentration of any one of the parameters listed in Tables 3.1 and 3.2 at any one mine-exposed area is above concentration(s) observed during baseline AND at an applicable reference area. **Response:** Conduct temporal trend analysis; confirm site specific relevance of threshold; determine next steps as part of annual reporting. Implement precautionary mitigation to avoid potential threshold exceedance as per outcome of the above investigation.	**Threshold:** Mean concentrations of any two or more of the parameters listed in Tables 3.1 and 3.2 exceed the applicable AEMP benchmarks at any one mine-exposed area and during any season. OR Mean concentrations of any two or more of the parameters listed in Tables 3.1 and 3.2, at any one mine-exposed area, are above concentration(s) observed during baseline AND at an applicable reference area. OR Mean concentration of any one of the parameters listed in Tables 3.1 and 3.2 exceeds the applicable AEMP benchmark during two or more years at any one mine-exposed area. OR Mean concentration of any one of the parameters listed in Tables 3.1 and 3.2 are above concentration(s) observed during baseline during two or more years of data at any mine exposed area AND at an applicable reference area during two or more years at any of the mine exposed areas. **Response:** WOE evaluation / risk assessment; evaluate need for and design of increased monitoring as required to further assess mine contribution; conduct temporal trend analysis to confirm concentrations are increasing (or are continuing to increase) over time; evaluate and implement most appropriate action(s) from the AEMP Action Pre-defined responses; develop high risk response threshold as part of annual reporting. Implement plan to address mine-related inputs and sources. (i.e., when it is safe and logistically practical to do so)[3].	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].
CREMP	Sediment quality, including comparisons to AEMP benchmarks (refer to Table 3.3: Sediment Quality benchmarks)	Mine effluent discharges, dustfall, erosion, and sedimentation	**Threshold:** Mean concentration of any one of the parameters listed in Table 3.3 exceeds the applicable AEMP benchmark at any one mine-exposed area. OR Mean concentration of any one of the parameters listed in Table 3.3 is statistically significantly higher at any one mine-exposed area relative to concentration(s) observed during baseline AND at an applicable reference area.	**Threshold:** Mean concentrations of any two or more of the parameters listed in Table 3.3 exceed the applicable AEMP benchmarks at any one mine-exposed area. OR Mean concentrations of any two or more of the parameters listed in Table 3.3, at any one mine-exposed area, are statistically significantly higher relative to concentration(s) observed during baseline AND at applicable an applicable reference area.	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources during the next

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Monitoring Plan	Performance Indicator	Activity being Monitored	Risk Response Threshold / Pre-Defined Action Level Responses		
			Low	Medium	High
			Response: Conduct temporal trend analysis; confirm site specific relevance of threshold; determine next steps as part of annual reporting. Implement precautionary mitigation to avoid potential threshold exceedance as per outcome of the above investigation[6].	OR Mean concentration of any one of the parameters listed in Table 3.3 exceeds the applicable AEMP benchmark during two or more years at any one mine-exposed area. OR Mean concentration of any one of the parameters listed in Table 3.3 are statistically significantly higher relative to concentration(s) observed during baseline during two or more years of data at any mine exposed area AND at an applicable reference area during two or more years at any mine exposed area. **Response:** WOE evaluation / risk assessment; evaluate need for and design of increased monitoring as required to further assess mine contribution; conduct temporal trend analysis to confirm concentrations are increasing (or are continuing to increase) over time; evaluate and implement most appropriate action(s) from the AEMP Action Pre-defined responses; develop high risk response threshold as part of annual reporting. Implement plan to address mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].	open water season (i.e., when it is safe and logistically practical to do so)[3].
CREMP	Chlorophyll a	Mine effluent discharges, dustfall, erosion, and sedimentation	**Threshold:** Mean chlorophyll-a concentration in any one mine-exposed lake during any one season exceeds the AEMP benchmark of 3.7 µg/L. OR Mean concentration in any one mine-exposed lake is statistically significantly higher relative to concentration(s) observed during baseline AND at an applicable reference area. **Response:** Conduct temporal trend analysis; confirm site specific relevance of threshold; determine next steps as part of annual reporting. Implement precautionary mitigation to avoid potential threshold as per outcome of the above investigation.	**Threshold:** Mean chlorophyll-a concentrations in two or more mine-exposed lakes during any one season exceed the AEMP benchmark of 3.7 µg/L. OR Mean concentrations in two or more mine-exposed lakes during any one season are statistically significantly higher relative to concentration(s) observed during baseline AND at an applicable reference area. OR Mean chlorophyll-a concentrations in any one mine-exposed lake exceed the AEMP benchmark of 3.7 µg/L during two consecutive seasons/sampling events. OR Mean chlorophyll-a concentrations in any one mine exposed lake are statistically significantly higher relative to concentration(s) observe during baseline AND at an applicable reference area during two consecutive seasons/sampling events. **Response:** WOE evaluation / risk assessment; evaluate need for and design of increased monitoring; conduct temporal trend analysis to confirm concentrations are increasing (or are continuing to increase) over time; evaluate and implement most appropriate action(s) from the AEMP Action Pre-defined responses; develop high risk response threshold as part of annual reporting. Implement plan to address	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].

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Monitoring Plan	Performance Indicator	Activity being Monitored	Risk Response Threshold / Pre-Defined Action Level Responses		
			Low	Medium	High
				mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].	
CREMP	CES for BIC, based on the following endpoints: 1. Density: ± 2 SD of reference or baseline mean. 2. Simpson's Evenness Index: ± 2 SD of reference or baseline mean. 3. Taxa Richness: ± 2 SD of reference or baseline mean.	Mine effluent discharges, dustfall, erosion, and sedimentation	**Threshold:** Result for any one of BIC endpoints 1 through 3 at the effluent-exposed area is statistically significantly different from reference area OR baseline (ρ <0.1) but within the CES. OR Result for any one of BIC endpoints 1 through 3 at the effluent-exposed area is statistically significantly different from reference (ρ <0.1) OR baseline at a magnitude outside the CES in one and/or non-consecutive annual studies[7]. **Response:** Conduct temporal trend analysis; confirm site specific relevance of threshold; determine next steps and implement timeline as part of annual reporting. Implement next steps and/or precautionary mitigation to avoid potential threshold exceedance during the next open water season (i.e., when it is safe and logistically practical to do so)[3].	**Threshold:** Result for any one of BIC endpoints 1 through 3 at the effluent-exposed area is statistically significantly different from reference OR baseline (ρ <0.1) AND the significant difference is of a magnitude outside the CES for two consecutive annual studies[7]. **Response:** WOE evaluation / risk assessment; evaluate need for and design of increased monitoring as required to further assess mine contribution; conduct temporal trend analysis to confirm concentrations are increasing (or are continuing to increase) over time; evaluate and implement most appropriate action(s) from the AEMP Action Pre-defined responses; develop high risk response threshold as part of annual reporting. Implement plan to address mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].
CREMP	CES for Arctic char population, based on the following endpoints: 1. Total body weight at age: ± 25% of reference or baseline mean. 2. Total body weight at length (condition): ± 10% of reference or baseline mean. 3. Age: ± 25% of reference mean. 4. Relative abundance of YOY (% composition of YOY) OR relative age-class strength: ± 25% of reference or baseline mean.	Mine effluent discharges, dustfall, erosion, and sedimentation	**Threshold:** Result for any one of fish population endpoints 1 through 4 at the effluent-exposed area is statistically significantly different from reference OR baseline (ρ <0.1) but within CES. OR Result for any one of fish population endpoints 1 through 4 at the effluent-exposed area is statistically significantly different from reference OR baseline (ρ <0.1) at a magnitude outside the CES in one and/or non-consecutive studies[7]. **Response:** Conduct temporal trend analysis; confirm site specific relevance of threshold; determine next steps and implementation timeline as part of annual reporting. Implement next steps and/or precautionary mitigation to avoid potential threshold exceedance during the next open water season (i.e., when it is safe and logistically practical to do so)[3].	**Threshold:** Result for any one of fish population endpoints 1 through 4 at the effluent-exposed area is statistically significantly different from reference OR baseline (ρ <0.1) AND the significant difference is of a magnitude outside the CES for two consecutive studies[7]. **Response:** WOE evaluation / risk assessment; evaluate need for and design of increased monitoring as required to further assess mine contribution; conduct temporal trend analysis to confirm concentrations are increasing (or are continuing to increase) over time; evaluate and implement most appropriate action(s) from the AEMP Action Pre-defined responses; develop high risk response threshold as part of annual reporting. Implement plan to address mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].	**Threshold:** To be determined based on outcome of moderate pre-defined action level response. **Response:** Conduct further investigation to confirm cause is consistent with results of investigation conducted under the moderate action level response; evaluate and implement most appropriate action(s) from the AEMP Action Level Pre-defined responses. Implement plan to address potential mine-related inputs and sources during the next open water season (i.e., when it is safe and logistically practical to do so)[3].
MDMER Effluent Monitoring	Deleterious substances monitoring	Mine effluent discharges	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, MDMER and Water Licence compliance limits.	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, MDMER and Water Licence compliance limits.	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, MDMER and Water Licence compliance limits.

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Monitoring Plan	Performance Indicator	Activity being Monitored	Risk Response Threshold / Pre-Defined Action Level Responses		
			Low	Medium	High
MDMER Effluent Monitoring	Acute lethality testing: Rainbow trout, *Daphnia magna*	Mine effluent discharges	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, MDMER and Water Licence compliance limits.	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, MDMER and Water Licence compliance limits.	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, MDMER and Water Licence compliance limits.
MDMER Effluent and Water Quality Monitoring Studies	Effluent characterization monitoring	Mine effluent discharges	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, and development and implementation of EEM study designs with ECCC. There are Hg and Se discharge limits in effluent characterization that trigger studies respecting fish tissue, if exceeded[1].	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, and development and implementation of EEM study design with ECCC.	Addressed in the Fresh Water Supply, Sewage and Wastewater Management Plan, and development and implementation of EEM study design with ECCC.
MDMER Effluent and Water Quality Monitoring Studies	Sublethal toxicity testing (fish and/or invertebrate and/or macrophyte and/or algal species)	Mine effluent discharges	Addressed through development and implementation of EEM study designs with ECCC.	Addressed through development and implementation of EEM study designs with ECCC	Addressed through development and implementation of EEM study designs with ECCC
MDMER Effluent and Water Quality Monitoring Studies	Water quality monitoring at exposure and reference areas	Mine effluent discharges	Receiving water quality subject to the AEMP benchmarks established for the CREMP and EEM study designs with ECCC	Receiving water quality subject to the AEMP benchmarks established for the CREMP and EEM study designs with ECCC	Receiving water quality subject to the AEMP benchmarks established for the CREMP and EEM study designs with ECCC
Fish Passage Monitoring	Safeguard fish habitat and fish passage; fish presence/absence	Water crossings	Addressed in the Surface Water and Aquatic Ecosystem Management Plan and Stream Diversion Barrier Study results which will be conducted 1 year prior to full rail construction	Addressed in the Surface Water and Aquatic Ecosystem Management Plan and Stream Diversion Barrier Study results which will be conducted 1 year prior to full rail construction	Addressed in the Surface Water and Aquatic Ecosystem Management Plan and Stream Diversion Barrier Study results which will be conducted 1 year prior to full rail construction

NOTES:

1. A study respecting Hg in fish tissue is required if the annual mean (calendar year) concentration of total Hg in effluent characterization samples is ≥0.10 µg/L, unless the results of the previous two biological monitoring studies indicate no effect on fish tissue from Hg. A Hg fish tissue study is also required if the method detection limit used in respect of total Hg for the analysis of at least two of four effluent characterization samples in a calendar year is ≥0.10 µg/L. A study respecting Se in fish tissue is required if the annual mean (calendar year) concentration of total Se in effluent characterization samples is ≥5 µg/L and/or effluent characterization reveals a total Se concentration ≥10 µg/L. A study respecting Se in fish tissue is also required if the method detection limit used for any effluent sample is ≥10 µg/L, or the method detection limit used in respect of total Se for the analysis of at least two of four effluent characterization samples in a calendar year is ≥5 µg/L.
2. Two consecutive assessments refer to two sampling events based on frequency of sampling for each program (annually for CREMP and within 36 months of the previous MDMER biological study).
3. Subject to feasibility of implementation of standard sedimentation and erosion mitigation measures as defined within the SWAEMP and regulatory approval as identified during the evaluation of next steps. Actions will progressively prioritise mitigation measures that do not require regulatory approvals as defined within the SWAEMP and progress to engineering controls as necessary subject to regulatory approvals.
4. Upper range of natural sedimentation rate of 50 mg/cm^2/year, converted to a sediment accumulation thickness estimate using the measured dry bulk density of sediment in Sheardown Lake NW.
5. Predicted sediment accumulation in FEIS Volume 7, Section 3.4.2.3.
6. FEIS threshold carried forward into the lake sedimentation program; threshold corresponds to where significant adverse effects from sediment deposition to salmonoid eggs were observed, based on a review of the relevant literature completed at the time of FEIS development.
7. For performance indicators related to fish health and benthic invertebrate communities, MDMER critical effect sizes (CES) have been adopted as the basis for defining risks and guiding responses. These CES have bounds in both the positive (higher) and negative (lower) direction of a reference area mean, and therefore differences between two study areas can have a magnitude within these bounds or fall outside of these bounds. Because use of the terminology “exceeds the CES threshold” normally has a connotation in the positive direction, such terminology does not adequately account for large differences in the negative direction. Similarly, describing a difference as “lower than the CES threshold” can be construed as meeting a criterion when in fact it could be a large negative difference that does not meet the criterion. For these cases, use of the terminology “within” and “outside” of a CES more adequately reflects whether a difference meets or does not meet a criterion.
8. Most appropriate action(s) means based on targeted investigation of source and review of table 5.2, applying professional judgement and a review of historic data.

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Table 5-2 Moderate and High Action Pre-Defined Response

Mitigation	Potential sources	Potential Responses
Avoid/reduce	Dust emissions	• Complete activity audit and risk review. • Redesign engineering controls. • Spray (or respray) piles with approved dust suppressant. • Research for alternate dust suppression products. • Evaluate additional surface watering Or sprinkler systems • Where applicable, install or redesign conveyor shrouding for fugitive dust. • Conduct review of new technology and solutions available on the market for dust control. • Develop site-specific risk-based guidelines.
	Erosion and sedimentation	• Complete activity audit and risk review. • Stabilize eroding surfaces with rip rap or other measures. • Install sediment control infrastructure (i.e., check dams). • Explore redesign of water conveyance structures and culverts. • Construct diversion ditches or berms. • Direct non-contact water away from site infrastructure. • Conduct review of new technology and solution available on the market for erosion and sedimentation control. •

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Mitigation	Potential sources	Potential Responses
	Effluent discharges	• Complete activity audit and risk review. • Review current water treatment process and effluent discharge parameters • Assess potential use and effectiveness of batch water treatment with reagents, and/or flocculants. • Review timing and volume of discharge • Construct water management structures (i.e., additional settlement ponds, dams etc.). • Implement alternate water treatment technologies

6. Review of Plan Effectiveness

An important element of Baffinland's management system is reviewing the continued suitability, adequacy and effectiveness of each management plan. This will occur through an annual review process as well as scheduled updates.

6.1 Annual Review of Compliance and Unanticipated Effects

Baffinland conducts internal inspections and audits throughout the year. Throughout the year, immediate corrective actions are taken as appropriate to address instances of non-compliance, as well as unanticipated effects that may be observed. Follow-up corrective actions may also be required. As described above (Section 5.2), before the end of each calendar year, water quality and sediment quality data will be evaluated relative to applicable AEMP benchmarks as a basis for determining occurrence of a potential Project-related effect and determining appropriate follow-up actions. The annual review of unanticipated effects will incorporate a comparison of results to predictions from the FEIS and its addenda to inform on the Project's performance relative to these original predictions and to aid in the ongoing assessment of environmental conditions

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and trends at the Project. These immediate and follow-up corrective actions will be documented in the annual report.

One follow-up corrective action may be to revise mitigation measures or monitoring programs described in the applicable management plans. During the annual reporting cycle, Baffinland will review instances of non-compliance as well as unanticipated effects and determine if a review of plan effectiveness is appropriate. This process is articulated on Figure 6-1. The results of this annual review will be reported in the annual report. Management plan updates that result from this process will also be filed with the annual report.

This process may occur annually whether repeat non-compliance and/or unanticipated effects are identified or not (Figure 6-1).

In response to Water Licence Condition Part I, Item 14 (b) and (c), Baffinland has adopted a framework in which the operational implementation of event-based surface water monitoring is housed within the Surface Water and Aquatic Ecosystem Management Plan (SWAEMP), while the interpretation and assessment of event-based results is complemented with evaluation performed alongside the AEMP/CREMP framework. The SWAEMP, as an operational management plan under the Type A Water Licence, is the appropriate instrument to define real-time triggers, sampling logistics, and response actions under variable hydrological conditions (e.g., extreme rainfall, freshet).

The AEMP remains focused on evaluating mine-related influences on the aquatic receiving environment using long-term, statistically robust datasets.

Quantitative rainfall-based triggers and associated sampling actions are therefore specified in the SWAEMP, and the resulting data are performed alongside AEMP/CREMP analyses, compared to applicable water quality guidelines and AEMP benchmark values, and used within the adaptive management framework. This structure ensures that event-based monitoring and quantifiable triggers are implemented within the AEMP framework as required by the Water Licence, while maintaining clear and efficient alignment between the operational SWAEMP and the effects-focused AEMP.

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6.2 Scheduled updates

In addition to the annual review cycle described above, scheduled reviews will occur according to the schedule presented in Table 6.1.

Table 6-1 Plan Review Schedule

Review Event	Description	Responsibility
Every three-years during operation	Mandatory management review	General Manager or designate Superintendent Operations or designate Superintendent Technical Services or designate Superintendent Environment or designate

Plan updates will be recorded in the Document Revision Record located at the front of the plan.

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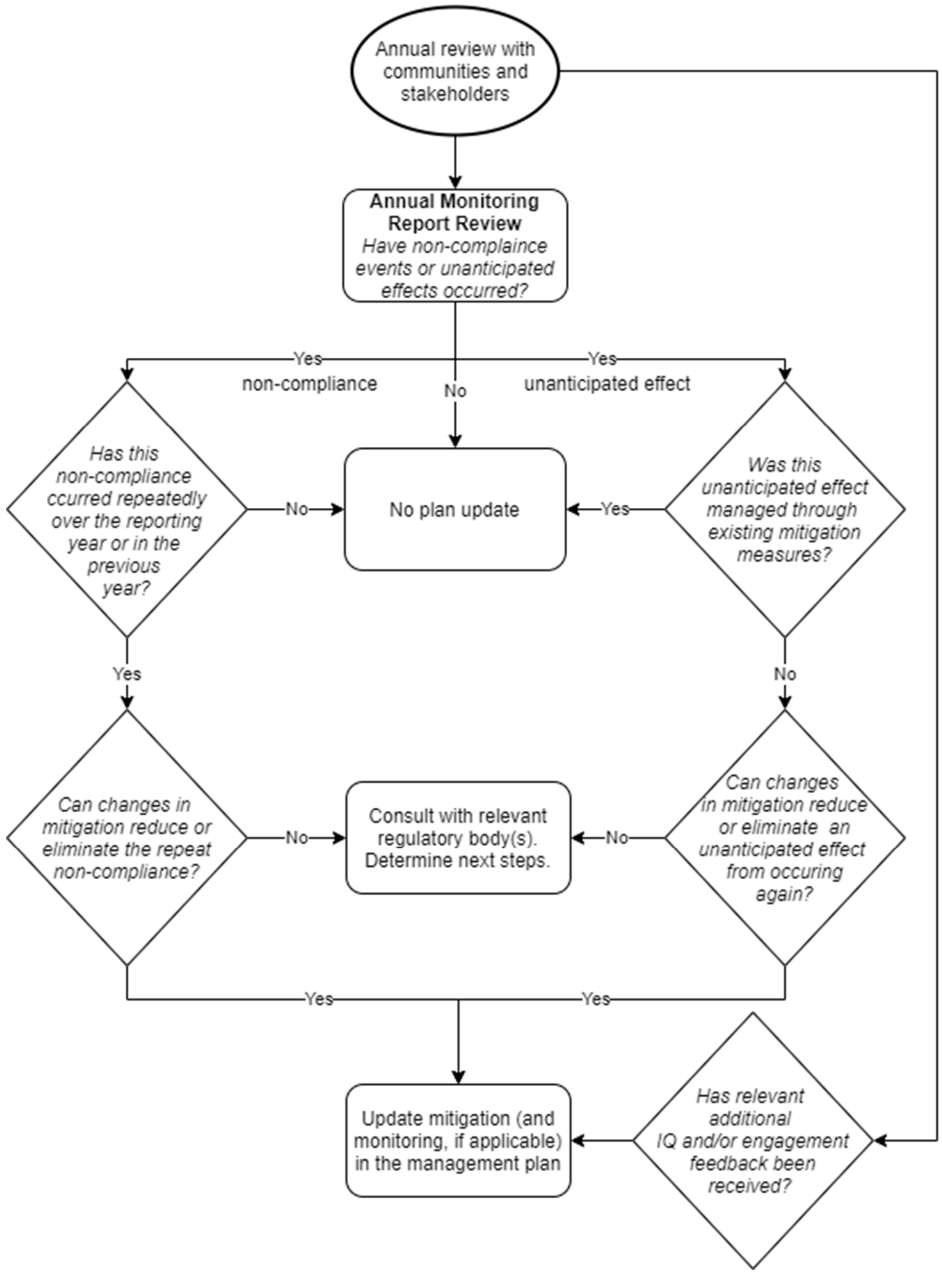

Figure 6-1 Annual Review of Plan Effectiveness

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7. References

Alberta Environment (AENV). 2013. Lake water trophic status. http://environment.alberta.ca/01715.html. Accessed February 22, 2014.

Baker, M.R., N.W. Kendall, T.A. Branch, D.E. Schindler, and T.P. Quinn. 2010. Selection due to nonretention mortality in gillnet fisheries for salmon. Evolutionary Applications 4(3): 429-443.

Baffinland Iron Mines Corporation (Baffinland). 2012. *Final Environmental Impact Statement*. February 2012.

Baffinland Iron Mines Corporation (Baffinland). 2013 *Addendum to the Final Environmental Impact Statement*. June 2013.

Baffinland Iron Mines Corporation (Baffinland). 2016. *Terrestrial Environment Management and Monitoring Plan*, Rev 1. March 14, 2016.

Carlson R.E. 1977. *A trophic state index for lakes*. Limnol. Oceanogr. 22: 361-369.

Canadian Council of Ministers of the Environment (CCME). 1999. *Canadian environmental quality guidelines*. Canadian Council of Ministers of the Environment, Winnipeg, MB. As Updated. Available at: http://st-ts.ccme.ca/.

Canadian Council of Ministers of the Environment (CCME). 2007. *Canadian sediment quality guidelines for the protection of aquatic life: Summary tables and fact sheets. Update 2002*. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

Environment Canada. 2012. *Metal Mining Technical Guidance for Environmental Effects Monitoring*. National Environmental Effects Monitoring Office.

Fisheries and Oceans Canada (DFO). 2020. Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater. February 6, 2020.

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Freeman, Milton M. R., ed. Inuit Land Use and Occupancy Project: Report (3 volumes). Department of Indian and Northern Affairs, Ottawa, 1976

Galvez-Cloutier R. and M. Sanchez. 2007. Trophic status evaluation for 154 lakes in Quebec, Canada: monitoring and recommendations. Wat. Qual. Res. J. Can. 42: 252-268.

Government of Canada. Regulations Amending the Metal and Diamond Mining Effluent Regulations, SOR/2025-138 and SOR/2025-139 (June 13, 2025). Consolidated version current as of June 9, 2025.

Government of Canada — Environment and Climate Change Canada (ECCC). (2012). Metal mining technical guidance for environmental effects monitoring (En14-61/2012E-PDF). Ottawa: ECCC.

Intrinsik. (2014, June 26). Development of Water and Sediment Quality Benchmarks for Application in Aquatic Effects Monitoring at the Mary River Project. Halifax, NS: Nova Scotia

Knight Piésold Ltd. (KP). 2007. Mary River Project – Bulk Sampling Program – Fish Habitat No Net Loss and Monitoring Plan. Ref. No. NB102-181/10-4, Rev. 0. August 30, 2007.

Knight Piésold. (2010) Summary of Community Based Research Undertaken For The Mary River Project In 2006 to 2010 – North Bay, ON; Ontario

Knight Piésold Ltd. (KP). 2014a. Baffinland Iron Mines Corporation – Mary River Project – Water and Sediment Quality Review and CREMP Study Design. Ref. No. NB102-181/33-1, Rev. 2. June 25, 2014.

Knight Piésold Ltd. (KP). 2014b. Baffinland Iron Mines Corporation – Mary River Project – Water and Sediment Quality Sampling Protocol. Ref. No. NB102-181/33-2, Rev.0. March 28, 2014.

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Knight Piésold Ltd. (KP). 2014c. Initial Stream Diversion Barrier Study - Rev. 0 - Mary River Project - Aquatic Effects Monitoring Program. Memo Ref. No. NB14-00160. June 25, 2014.

Knight Piésold Ltd. (KP). 2015. Baffinland Iron Mines Corporation – Mary River Project – 2014 Water and Sediment CREMP Monitoring Report. KP Ref. No. NB102-181/34-6. March 19, 2015.

Minnow. 2016a. Mary River Project 2015 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 2569.

Minnow. 2017. Mary River Project 2016 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 2569.

Minnow. 2018. Mary River Project 2017 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March. Project 177202.0033.

Minnow. 2021. Mary River Project 2019 to 2020 Lake Sedimentation Monitoring Report. Prepared for Baffinland Iron Mines Corp. March. Project 207202.0045.

MacDonald, D.D., Clark, M.J.R., Whitfield, P.H., and Wong, M.P. 2009. *Designing monitoring programs for water quality based on experience in Canada I. Theory and framework*. Trends in Analytical Chemistry 28(2):204-213.

Nunavut Impact Review Board (NIRB). 2014. Nunavut Impact Review Board - Public Hearing Report - Mary River Project: Early Revenue Phase Proposal - Baffinland Iron Mines Corporation. NIRB File No. 08MN053. March 2014.

Nunavut Impact Review Board (NIRB). 2023. In the matter of Nunavut Land Claims Agreement, Nunavut Land Claims Agreement Act, S.C., 1993, c.29 Article 12, Part 5 And In the matter of an application by Baffinland Iron Mines Corporation for development of the Mary River Project Proposal in Qikiqtani Region of Nunavut, NIRB Project Certificate [No. 005]. Amendment No. 05. November 17, 2023.

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North/South Consultants Inc. (NSC). 2014a. Mary River Project - Core Receiving Environment Monitoring Program: Freshwater Biota. June 2014.

North/South Consultants Inc. (NSC). 2014b. *Mary River Project* - Candidate Reference Lakes: Preliminary Survey 2013. June 2014.

North/South Consultants Inc. (NSC). 2014c. Mary River Project - Aquatic Effects Monitoring Program: Lake Sedimentation Monitoring Program. June 2014.

Nürnberg, G.K. 1996. Trophic state of clear and colored, soft- and hardwater lakes with special consideration of nutrients, anoxia, phytoplankton and fish. Lake and Reservoir Management. 8: 17-30.

Nunavut Water Board (NWB). 2015. *Water Licence No: 2AM-MRY1325 – Amendment No. 1*. July 31, 2015.

Nunavut Water Board (NWB). 2025. *Water Licence No: 2AM-MRY2530*. April 28, 2025.

Ontario Ministry of the Environment (OMOE). 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. PIBS # 7382e01. April 15, 2011.

Organization for Economic Cooperation and Development (OECD). 1982. *Eutrophication of waters - Monitoring, Assessment and Control - Final Report*. OECD cooperative programme on monitoring of inland waters (eutrophication control), Environment Directorate. OECD, Paris. 154 p.

Portz, D.E., C.M. Woodley, J.J. Cech, and C.R. Liston. 2005. Effects of Short-term Holding in Fishes: A Synthesis and Review. Volume 29. December, 2005.

Qikiqtani Inuit Association (QIA). 2013. Commercial Lease No. Q13C301, Commercial Lease for Inuit Owned Lands Between: Qikiqtani Inuit Association (as Landlord) and Baffinland Iron Mines Corporation (as Tenant). September 6, 2013.

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Qikiqtani Inuit Association. (2019, June 17). Tusaqtavut for the Phase 2 application of the Mary River Project — IMTE [PowerPoint slides].https://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY2540%20BIMC/2%20ADMIN/2%20NPC%20NIRB/1%20NIRB/2019/190617%202AM-MRY1325-08MN035-QIA%20PowerPoint%20Tusaqtavut-IMTE.pdf

Qikiqtani Inuit Association (QIA). 2020a. Comment on Adaptive Management in Baffinland's Aquatic Environment Monitoring Plan (AEMP) 7 September 2020 draft Rev. 2 with focus on Table 5.1. Prepared by Bruce Stewart. September 7, 2020.

Qikiqtani Inuit Association (QIA). 2020b. Comment on Trigger Action Response Plan in Baffinland's Aquatic Environment Monitoring Plan (AEMP) draft Rev. 2 with focus on Table 5.1. Prepared by Bruce Stewart. November 20, 2020.

Priest, H. & Usher, P. J. (2004). The Nunavut Wildlife Harvest Study — Final Report. Iqaluit, NU: Nunavut Wildlife Management Board. 822 pp.

Riewe, R. R. (ed.). *Nunavut Atlas*. Edmonton: Canadian Circumpolar Institute and the Tungavik Federation of Nunavut, 1992. ISBN 9781772122183.

Ryding., S.O. and W. Rast. 1989. *The Control of Eutrophication of Lakes and Reservoirs.* Vol. 1. UNESCO, Paris and the Parthenon Publishing, United Kingdom. 314 p.

Swedish Environmental Protection Agency. 2000. *Environmental quality criteria. Lakes and watercourses*. Swedish EPA Report 5050. 102 p.

University of Florida, Florida Lakewatch. 2002. Trophic state: a waterbody's ability to support plants, fish and wildlife. Gainesville, FL, USA.

United States Environmental Protection Agency (USEPA). 2009. *National lake assessment: A collaborative survey of the nation's lakes*. EPA 841-R-09-001. USEPA, Office of Water and Office of Research and Development, Washington, D.C.104 p.

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Wetzel, R.G. (2001): Limnology Lakes and Rivers ecosystems. San Diego Academic press, 1006 pp.

Wright, D. G. and Hopky, G. E. 1998. *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*. Canadian Technical Report of Fisheries Aquatic Sciences 2107.

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Appendix A Concordance Tables

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Tables A.1, A.2 and A.3 show the terms and conditions of the Project's Type A Water Licence (2AM-MRY1325 - Amendment No. 1), the Project Certificate No. 005 and the location within the Aquatic Effects Monitoring Plan that the information can be found.

Table A.1 Concordance Table with Type A Water Licence Terms and Conditions

Part	Item	Condition	Section
I	1	The Board has approved with the issuance of the Licence, for the Construction Phase of the Project, the plan entitled *Aquatic Effects Monitoring Program (AEMP) Framework*, dated February 2013, applicable during the Construction Phase of the Project.	Superseded by final plan under Item 2
	2	The Licensee shall submit to the Board, for approval in writing, at least sixty (60) days following approval of this Amendment, a revised version of the Plan entitled Aquatic Effects Management Plan (BAF-PH1-830-P16-0039, Rev 0), June 27, 2014, that addresses the relevant comments received from intervening parties during the review period for the Plan. The Plan under this condition, once approved, will supersede the Plan referenced in Part I, Item 1.	The AEMP

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Table A.2 Concordance Table With Project Certificate Terms And Conditions

No.	Condition	Section
21	The Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum:	
	a. monitoring of non-point sources of discharge, selection of appropriate reference sites, measures to ensure the collection of adequate baseline data and the mechanisms proposed to monitor and treat runoff, and sample sediments; and	2.3, 3.7, 5.1
	b. measures for dustfall monitoring designed as follows: i. To establish a pre-trucking baseline and collect data during Project operation for comparison; ii. To facilitate comparison with existing guidelines and potentially with thresholds to be established using studies of Arctic char egg survival and/or other studies recommended by the Terrestrial Environment Working Group (TEWG); and, iii. To assess the seasonal deposition (rates, quantities) and chemical composition of dust entering aquatic systems along representative distance transects at right angles to the Tote Road and radiating outward from Milne Port and the Mine Site.	3.5 (reference to dustfall monitoring); 4.3.1 and Appendix F (related lake sedimentation monitoring program); Air Quality and Noise Abatement Management Plan (dustfall monitoring program)

Table A.3 Concordance Table with Commercial Lease with the QIA

Sch.	Condition	Section
G	Identifies the AEMP as a key monitoring program	The AEMP

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Appendix B Professional Judgement Process

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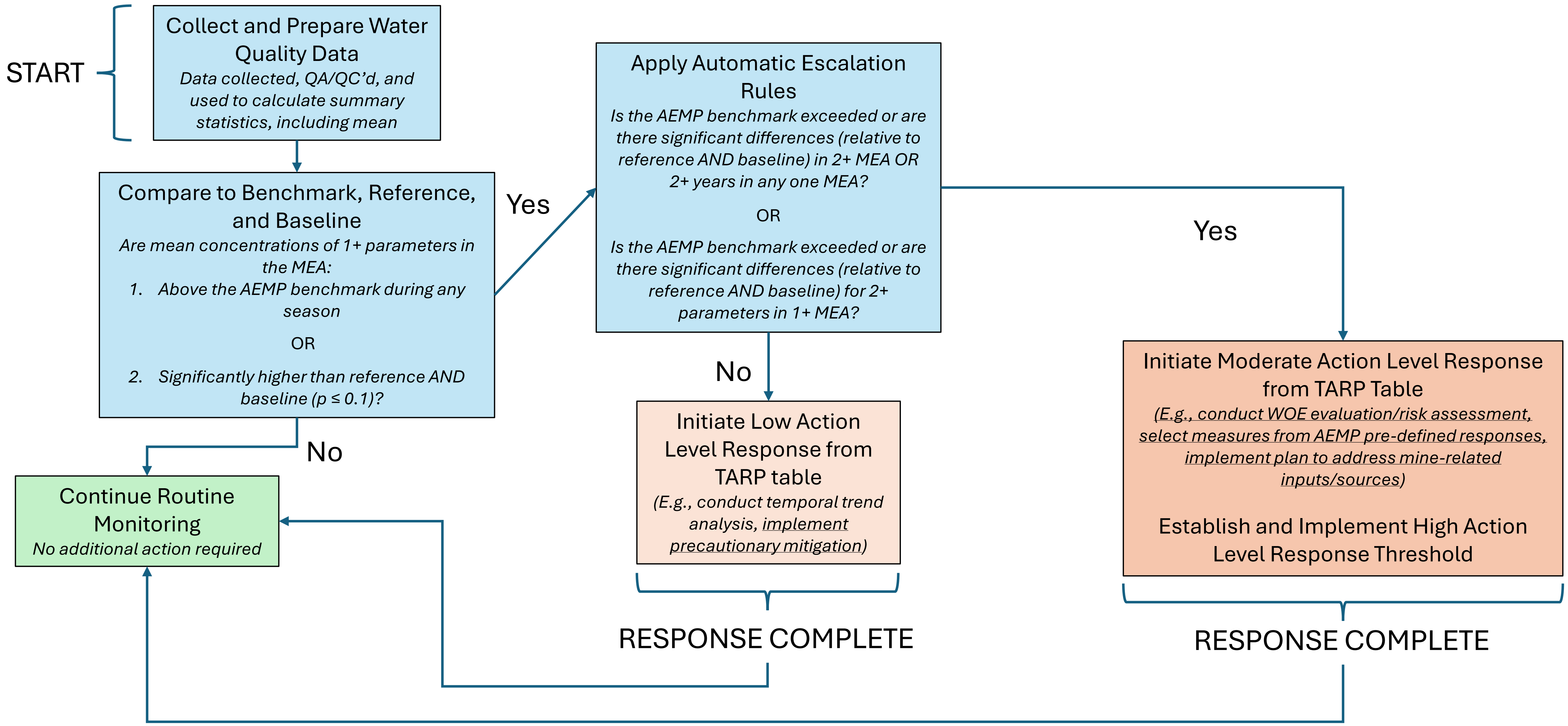

Figure 1: Decision Tree for Evaluating Water Quality Data, Mary River Mine Aquatic Effects Monitoring Plan (AEMP)

Notes: QA/QC = Quality Assurance/Quality Control; MEA = Mine-exposed Area; MOD = Magnitude of Difference; CES = Critical Effect Size; TARP = Trigger Action Response Plan; WOE = Weight of Evidence. Underlined activities are identified as having greater reliance on professional judgement than those that are not underlined.

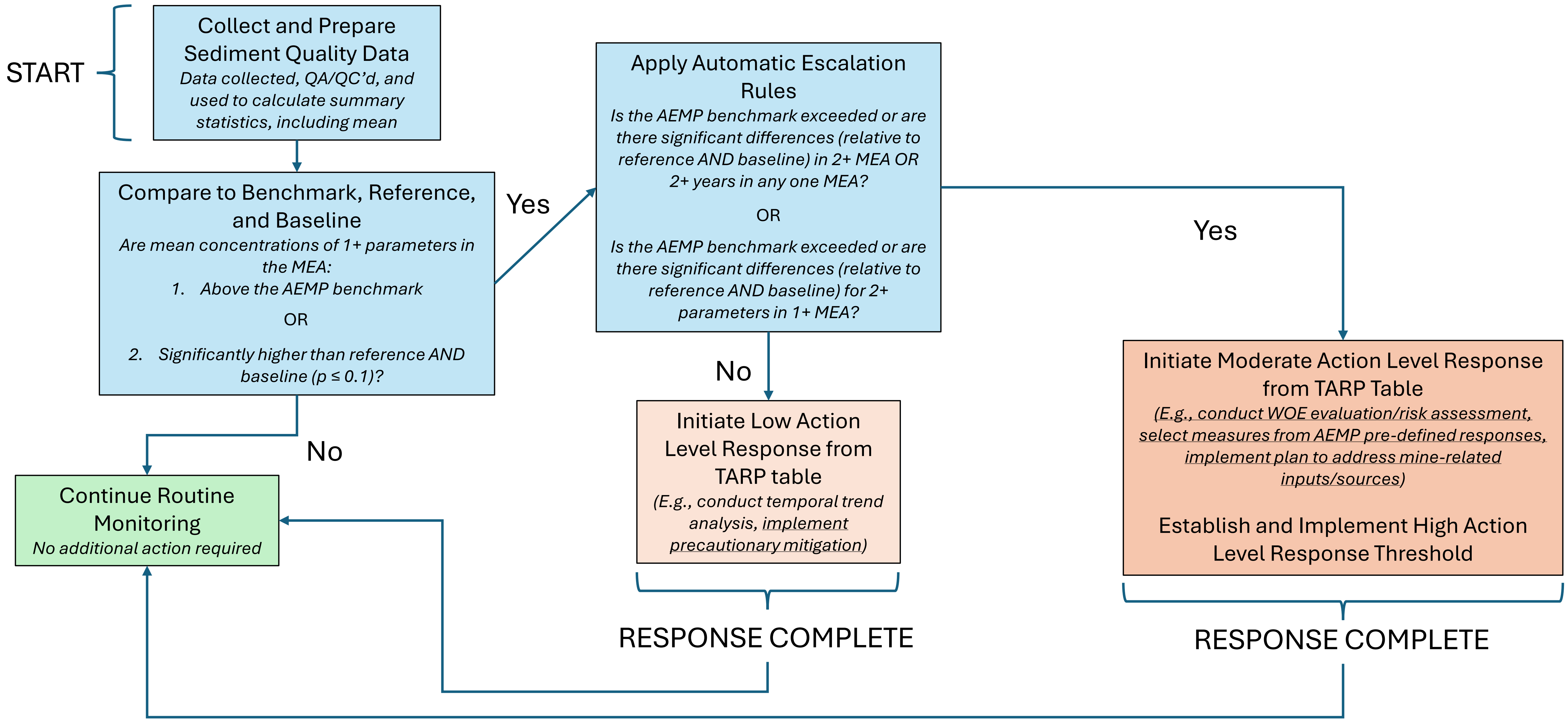

Figure 2: Decision Tree for Evaluating Sediment Quality Data, Mary River Mine Aquatic Effects Monitoring Plan (AEMP)

Notes: QA/QC = Quality Assurance/Quality Control; MEA = Mine-exposed Area; MOD = Magnitude of Difference; CES = Critical Effect Size; TARP = Trigger Action Response Plan; WOE = Weight of Evidence. Underlined activities are identified as having greater reliance on professional judgement than those that are not underlined.

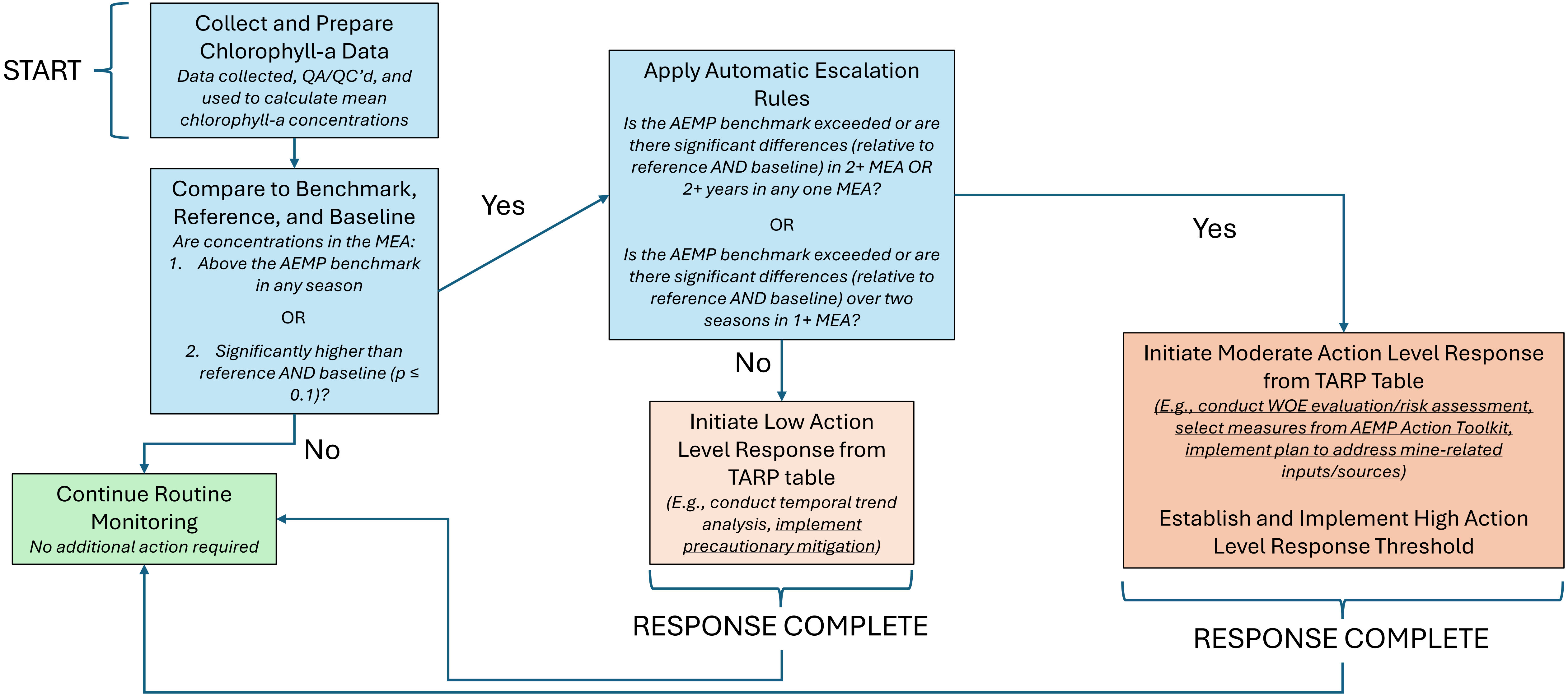

Figure 3: Decision Tree for Evaluating Aqueous Chlorophyll-a Concentrations, Mary River Mine Aquatic Effects Monitoring Plan (AEMP)

Notes: QA/QC = Quality Assurance/Quality Control; MEA = Mine-exposed Area; MOD = Magnitude of Difference; CES = Critical Effect Size; Trigger Action Response Plan; WOE = Weight of Evidence. Underlined activities are identified as having greater reliance on professional judgement than those that are not underlined.

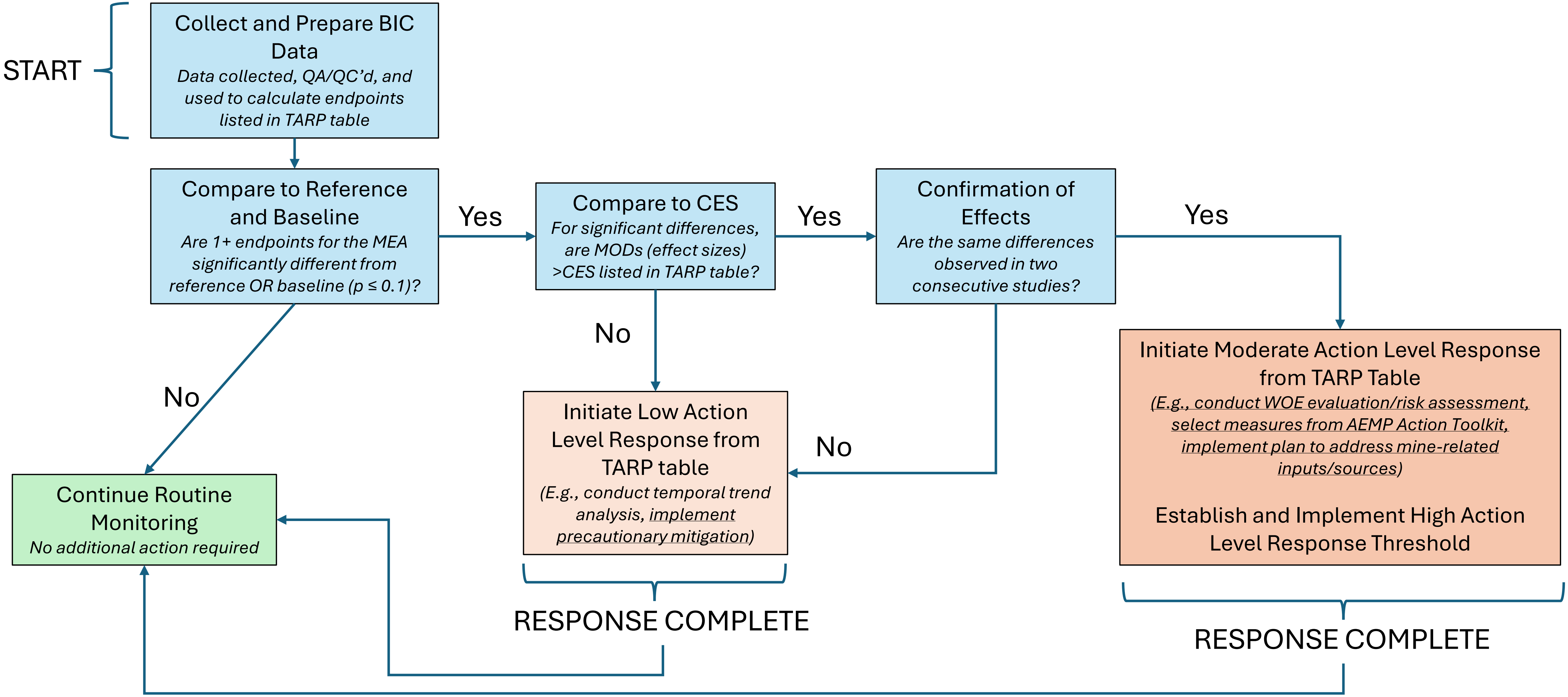

Figure 4: Decision Tree for Evaluating Benthic Invertebrate Community (BIC) Endpoints, Mary River Mine Aquatic Effects Monitoring Plan (AEMP)

Notes: QA/QC = Quality Assurance/Quality Control; MEA = Mine-exposed Area; MOD = Magnitude of Difference; CES = Critical Effect Size; TARP = Trigger Action Response Plan; WOE = Weight of Evidence. Underlined activities are identified as having greater reliance on professional judgement than those that are not underlined.

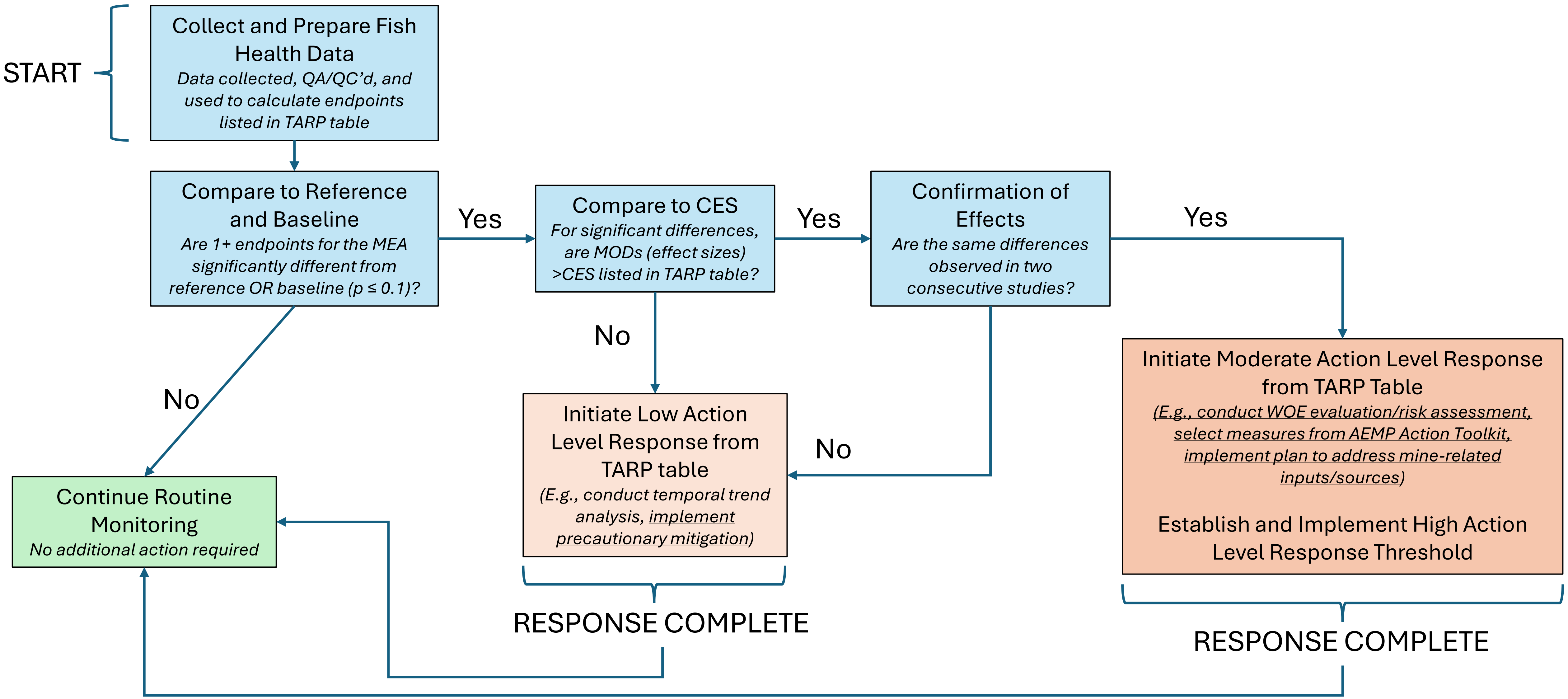

Figure 5: Decision Tree for Evaluating Fish Health Endpoints, Mary River Mine Aquatic Effects Monitoring Plan (AEMP)

Notes: QA/QC = Quality Assurance/Quality Control; MEA = Mine-exposed Area; MOD = Magnitude of Difference; CES = Critical Effect Size; TARP = Trigger Action Response Plan; WOE = Weight of Evidence. Underlined activities are identified as having greater reliance on professional judgement than those that are not underlined.