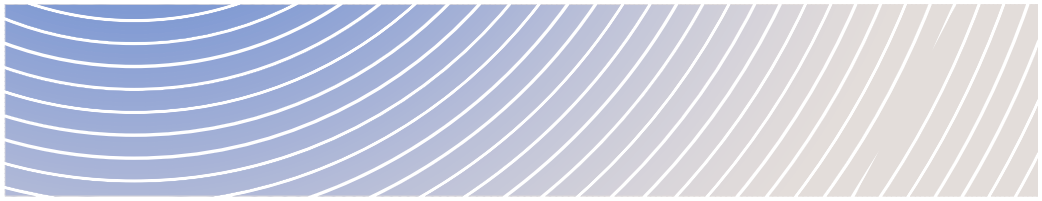
Valentine Gold Project

DRAFT ENVIRONMENTAL ASSESSMENT REPORT



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Projet aurifère de Valentine – Rapport provisoire d’évaluation environnementale

Executive Summary

Marathon Gold Corporation (the Proponent) proposes to construct, operate, decommission, rehabilitate and close an open pit gold mine near Valentine Lake, approximately 55 kilometres southwest of Millertown in Newfoundland and Labrador. The Valentine Gold Project (the Project) would include two open pits, disposal piles, crushing and stockpiling areas, site infrastructure, a tailings management facility, and mine-site haul and access roads. Ore material would be mined and processed up to 10,960 tonnes per day with an operation life of 13 years.

The Impact Assessment Agency of Canada (the Agency) is carrying out an environmental assessment of the Project in accordance with the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). The Project is subject to CEAA 2012 because it involves activities described in the schedule to the *Regulations Designating Physical Activities* as follows:

- item 16 (c) *:* The construction, operation, decommissioning and abandonment of a new rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 tonnes per day or more.

The Project was also subject to a provincial environmental review under subsection 33(2) of the Newfoundland and Labrador *Environmental Assessment Regulations, 2003*. The Agency and the province of Newfoundland and Labrador coordinated the environmental assessments, to ensure simultaneous review periods, and avoid duplication of effort to the extent possible.

The draft Environmental Assessment Report provides a summary of the analysis conducted by the the Agency in reaching its conclusion, in accordance with CEAA 2012, on whether the Project is likely to cause significant adverse environmental effects after taking into account the proposed mitigation measures. The Agency prepared this draft report with expert advice from federal authorities—Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), Natural Resources Canada (NRCan), Transport Canada, and Health Canada and from the Government of Newfoundland and Labrador, Department of Fisheries, Forestry and Agriculture. Furthermore, this draft report was informed by comments submitted throughout the environmental assessment process by Indigenous communities and the public.

The Agency analyzed environmental effects on areas of federal jurisdiction in relation to section 5 of CEAA 2012, including: fish and fish habitat; migratory birds; current use of lands and resources for traditional purposes by Indigenous peoples; health and socio-economic conditions of Indigenous peoples; physical and cultural heritage; and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance for Indigenous peoples. The Agency also assessed the potential adverse effects of the Project on species listed in the *Species at Risk Act* and their critical habitat as well as transboundary effects, in relation to direct greenhouse gas emissions.

In reviewing the potential environmental effects from the Project, the Agency considered factors such as effects due to potential accidents and malfunctions, extreme and periodic weather events and cumulative changes in conjunction with other past, existing and reasonably foreseeable future projects or activities.

The Agency has identified key mitigation and follow-up measures that would prevent or reduce potential adverse effects, verify the accuracy of the environmental assessment predictions, and verify the effectiveness of mitigation measures in relation to section 5 of CEAA 2012. In selecting key mitigation and follow-up program measures, the Agency was informed by the Proponent's commitments, expert advice from federal authorities and the province, and comments from Indigenous communities and the public.

Key mitigation measures include restoring, creating, or enhancing fish habitat to offset fish habitat losses associated with the development of the Project; conducting ongoing geochemical testing of the waste

rock and tailings during any period that waste rock and tailings are produced; carrying out project activities in a manner that protects and avoids harming, killing or disturbing migratory birds, nests or eggs; developing and implementing a country foods and air quality monitoring plan with Indigenous groups to share information related to the Project; and developing a heritage and cultural resources protection plan.

The Agency focussed the analysis of potential effects on terrestrial mammal species at risk, namely bats, American marten and caribou. The Agency is of the view that the measures implemented by the Proponent to meet regulatory requirements and the key mitigations described in this draft report would avoid or lessen any potential adverse effects on species at risk. The Agency acknowledges that the Project would result in adverse effects on caribou.

Public comments received followed the same areas of concerns as the comments received by Indigenous communities. The Agency has identified key mitigation measures that address adverse effects on the areas of concern.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects, taking into account the implementation of key mitigation measures. These key measures will be considered by the Minister of Environment and Climate Change (the Minister) in establishing conditions as part of the Decision Statement under CEAA 2012. Conditions accepted by the Minister would become legally binding on the Proponent if the Minister ultimately issues a Decision Statement indicating that the Project may proceed.

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List of Abbreviations and Acronyms

Abbreviation/Acronym	Definition
Agency	Impact Assessment Agency of Canada
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
Crown	Government of Canada
CWQG-FAL	*Canadian Water Quality Guidelines for the Protection of Aquatic Life*
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
ELCA	Ecological land classification area
IAA	*Impact Assessment Act*
MDMER	*Metal and Diamond Mining Effluent Regulations*
Minister	Minister of Environment and Climate Change
NRCan	Natural Resources Canada
Project	Valentine Gold Project
Proponent	Marathon Gold Corporation
SARA	*Species at Risk Act*

Glossary

Abbreviation/Acronym	Definition
Acid rock drainage	Some rocks, typically those containing an abundance of sulfide minerals, when exposed to water and air can release water which is more acidic than the natural surrounding environment. Often associated with metal leaching.
Cyanidation	A technique for extracting gold from low-grade ore, using a chemical reaction that involves a solution of cyanide.
Contact water	Water which has come into contact with Project components and their associated infrastructure.
Ecological Land Classification Area	Area in which detailed habitat data was collected by the Proponent and was used by the Proponent to assess quantitative effects on habitat
Effluent	Liquid waste flows from project activities or components, including releases from mine operations, tailings management facility, seepage and surface drainage.
Environmental impact statement	The document prepared by the Proponent that identifies and assesses the environmental effects of the Project, and the measures proposed to mitigate those effects, in accordance with the Environmental Impact Statement Guidelines provided by the Agency.
Environmental impact statement guidelines	A document prepared by the Agency that identifies the requirements for the preparation of the Environmental Impact Statement. This document specifies the nature, scope and extent of the information required from the Proponent for the Project.
Follow-up program	A program, whose elements are outlined by the Agency, to verify the accuracy of environmental conclusions and evaluate the effectiveness of mitigation measures.
Furbearer	An animal whose fur is valued commercially.
Metal leaching	The release of metals from rocks exposed to water and air, which can increase the concentrations of these metals in contact water. Often associated with acid rock drainage.
Overburden	Material overlying the ore deposit, including rock as well as soil and other unconsolidated (loose) materials.
Process water	Water that is added to the crushed ore during extraction of gold at the ore processing plant.
Riparian habitat	Habitat found along the banks of a river, stream or other actively moving source of water such as a spring.
Tailings	The mixture of ore material, water, and residual chemicals left over after gold is removed from ore in the ore processing plant. Solid material in tailings is usually the size of sand grains or smaller.

Waste rock	Rock which does not contain any minerals in sufficient concentration to be considered ore, but which must be removed in the mining process to provide access to the ore.

1. Introduction

Marathon Gold Corporation (the Proponent) proposes to construct, operate, decommission, rehabilitate and close an open pit gold mine near Valentine Lake, approximately 55 kilometres southwest of Millertown in Newfoundland and Labrador. The Valentine Gold Project (the Project) would include two open pits, disposal piles, crushing and stockpiling areas, site infrastructure, a tailings management facility, and mine-site haul and access roads. Ore material would be mined and processed up to 10,960 tonnes per day with an operation life of 13 years.

The draft Environmental Assessment Report provides a summary of the analysis conducted by the Impact Assessment Agency of Canada (the Agency) in reaching its conclusion, in accordance with the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), on whether the Project is likely to cause significant adverse environmental effects after taking into account the proposed mitigation measures (Appendix D). The Minister of Environment and Climate Change (the Minister) will consider this report when issuing the Environmental Assessment Decision Statement to the Proponent of the Project under CEAA 2012.

1.1. Scope of Environmental Assessment

1.1.1. Environmental Assessment Requirements

On August 28, 2019, the *Impact Assessment Act* (IAA) came into force and CEAA 2012 was repealed. However, in accordance with the transitional provisions of the IAA, the environmental assessment of this project continued under CEAA 2012.

The Project is a designated project, pursuant to item 16(c) of the *Regulations Designating Physical Activities* under CEAA 2012:

> ***The construction, operation, decommissioning and abandonment of a new rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 t/day or more***

Based on the Project Description the Proponent presented in April 2019, the Agency conducted a preliminary review and a comment period to determine potential effects and if an environmental assessment was required under CEAA 2012. On May 31, 2019, after determining that an environmental assessment was required, the Agency started an environmental assessment of the Project.

The Project was also subject to a provincial environmental review under subsection 33(2) of the Newfoundland and Labrador *Environmental Assessment Regulations, 2003*. The Agency and the province of Newfoundland and Labrador coordinated the environmental assessments, to ensure simultaneous review periods, and avoid duplication of effort to the extent possible. Examples of collaboration included a simultaneous public review period of the Environmental Impact Statement (EIS) summary document, and incorporation of provincial expertise in the federal review process and federal expertise in the provincial process.

1.1.2. Factors Considered in the Environmental Assessment

The Agency issued guidelines to the Proponent to help in its preparation of the EIS. The EIS Guidelines identify the potential environmental effects and the factors to consider in the assessment of the Project. They focus the assessment by identifying components that have particular value or significance that may be affected by the Project. The EIS Guidelines are available on the Canadian Impact Assessment Registry[1].

The assessment considered the valued components under federal jurisdiction, pursuant to section 5 of CEAA 2012, as well as the species at risk under subsection 79(2) of the *Species at Risk Act* and effects on species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The valued components considered by the Agency are presented in Table 1.

Table 1: Valued Components Selected by the Agency

Valued Component	Rationale
Effects identified pursuant to subsection 5(1) of the Act	
Fish and fish habitat	Direct mortality, changes in fish health, habitat quality and quantity, and changes to water quantity and quality that could affect fish and fish habitat.
Migratory birds	Sensory disturbances, mortality risk, and changes to terrestrial, aquatic and wetland habitat that could result in potential effects on migratory birds.
Current use of lands and resources for traditional purposes by Indigenous people	Changes to the quantity or quality of resources, access or restriction to lands and resources, and harvesting experience.
Health and socio-economic conditions of Indigenous people	Changes to the availability of or access to resources and harvesting activities, changes to air and surface water quality, and from ingestion of potentially contaminated country foods.
Physical and cultural heritage resources of Indigenous people	Changes from project activities resulting in the loss or disturbance of resources.
Transboundary Effects: Greenhouse Gases	Project-related changes to greenhouse gas emissions, which contribute to global climate change.
Effects identified pursuant to subsection 79(2) of the Species at Risk Act and species designated by COSEWIC	
Species at Risk	Disturbance of the terrestrial and aquatic environment that could affect listed species at risk and their critical habitat.

[1] The Valentine Gold Project - EIS Guidelines are available at the following: Final Environmental Impact Statement Guidelines - Canada.ca (iaac-aeic.gc.ca).

As well, pursuant to subsection 19(1) of CEAA 2012, the Agency considered the following factors in the environmental assessment:

- the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other physical activities that have been or will be carried out;
- the significance of the effects;
- comments from the public;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;
- the requirements of the follow-up program in respect of the Project;
- the purpose of the Project;
- alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
- any change to the Project that may be caused by the environment; and
- the results of any relevant study conducted by a committee established by the Minister to study the effects of existing or future physical activities carried out in a region.

Additional valued components pertaining to environmental effects defined in subsection 5(2) of CEAA 2012 were not considered because no additional environmental effects are anticipated related to any potential federal decisions or authorizations.

1.1.3. Methodology and Approach

To complete its analysis of potential adverse effects on each valued component, the Agency reviewed:

- the EIS;
- additional information provided by the Proponent in response to the Agency's information requirements;
- supplemental information provided by the Proponent related to the changes in design as well as information on its level of care and control of the proposed transmission line to deliver electrical power to the Project;
- comments received from Indigenous groups and the public; and
- advice from federal and provincial government departments.

The Agency assessed the significance of adverse effects on each valued component, following the application of mitigation measures, in accordance with the Agency's Operational Policy Statement.[2] The

[2] Canadian Environmental Assessment Agency. 2012. *Operational Policy Statement "Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act"*, available on the Agency's website: https://www.canada.ca/en/environmental-assessment-agency/news/media-room/media-room-2015/determining-whether-designated-project-is-likely-cause-significant-adverse-environmental-effects-under-ceaa-2012.html

Agency characterized the residual effects on valued components by using the following assessment criteria:

- magnitude;
- geographic extent;
- duration;
- frequency;
- reversibility; and
- ecological and social context.

Appendix B, Table 1 includes the definition of each of these assessment criteria, as well as the specific definitions/limits adapted from the EIS for each of the assessment criteria for each valued component.

The Agency used a decision matrix (Appendix B, Table 2), which combines the levels assigned to each of the assessment criteria (magnitude, extent, duration, frequency, and reversibility) to make an overall assessment of the significance of the residual impact on each valued component (Appendix C).

The Agency's analysis and conclusions on the significance of environmental effects on valued components are presented in section 6. The Agency also considered the effects of accidents and malfunctions that may occur in connection to the Project (section 7.1), effects of the environment on the Project (section 7.2), and cumulative environmental effects (section 7.3).

2. Project Overview

2.1. Project Location and Boundaries of the Environmental Assessment

The Project is located in the central region of the Island of Newfoundland, 49 kilometres from the nearest community of Buchans and 55 kilometres southwest of the town of Millertown (Figure 1). The area has a history of mining exploration and development and other land and resource use such as commercial forestry, hydroelectric developments, outfitting and recreational land use. An existing public resource road extending south from Millertown approximately 88 kilometres to the Project's existing exploration camp, is used to access the mine site.

Spatial boundaries of an environmental assessment define the area within which a project may interact with the environment and cause effects. The Proponent defined three types of spatial boundaries for the Environmental Assessment: project area, local assessment area, and regional assessment area (Figure 2 and 3).

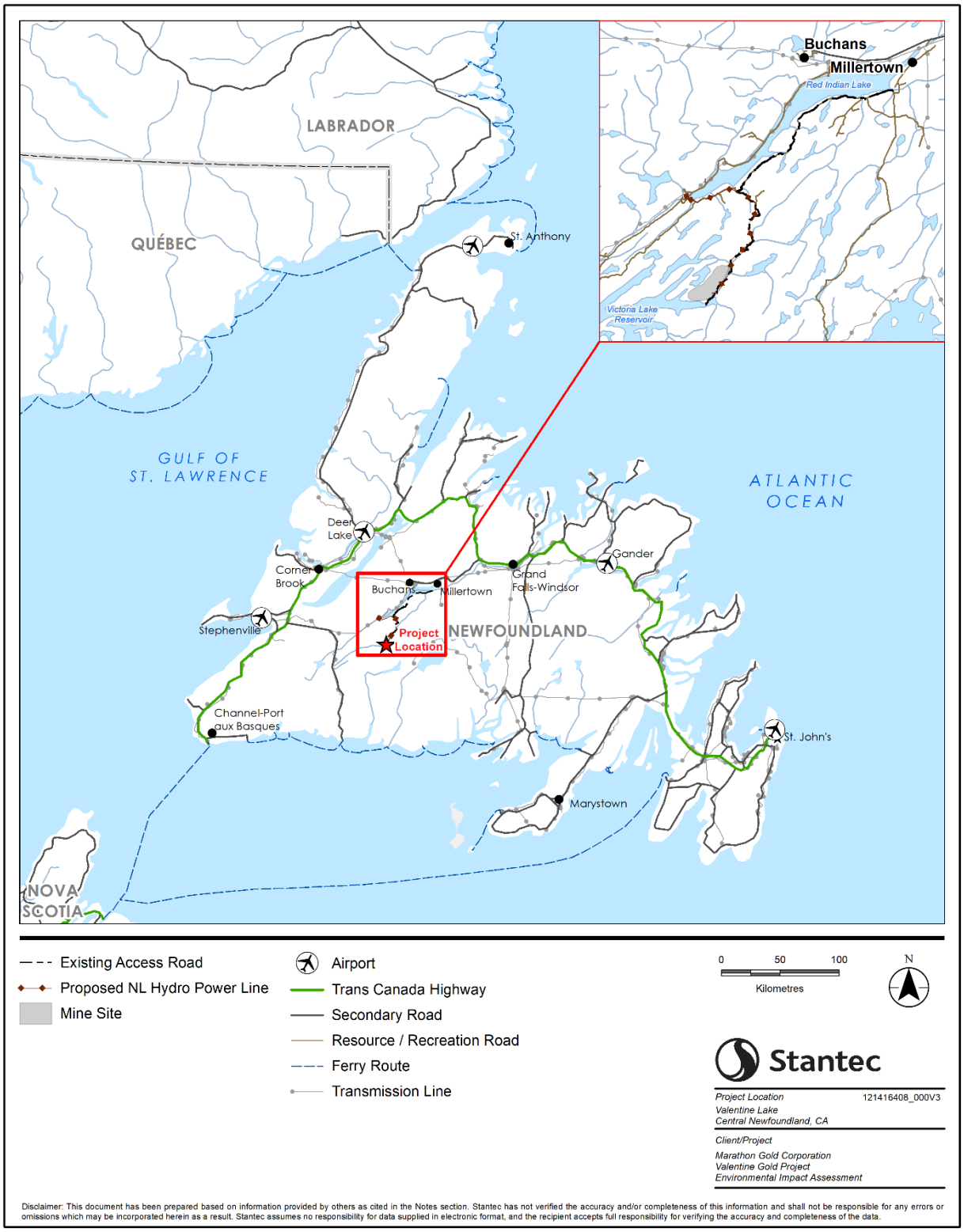
Proponent's Project Area: includes two distinct areas: the mine site and the access road. The mine site includes the project infrastructure area where most of the project activities and components would occur, and the access road is the existing road to the site plus a 20-metre-wide buffer on each side. The project area is the anticipated area of direct physical disturbance associated with the construction, operation, decommissioning, rehabilitation and closure of the Project.

Proponent's Local Assessment Area: includes the area in which project-related environmental effects (direct or indirect) can be predicted or measured for assessment. The local assessment area, which is specific to each valued component, includes the project area and the geographic extent of effects on the given valued component.

Proponent's Regional Assessment Area: includes the area established for context in the determination of significance of project-specific effects. It is also the area that the Proponent used to assess accidental events and to inform the assessment of cumulative effects. The regional assessment area is valued component specific and encompasses both the project area and the local assessment area.

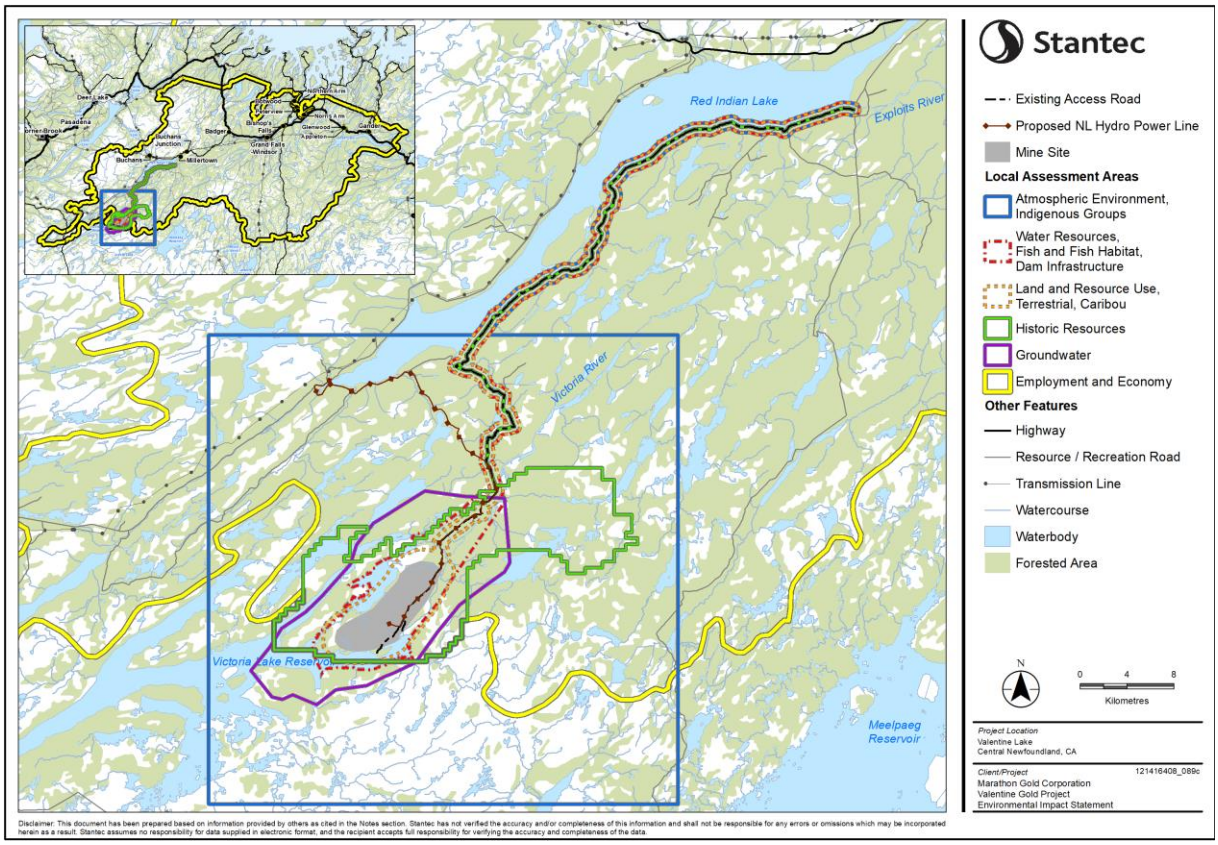
The Proponent defined temporal boundaries based on the timing and duration of project activities that could cause environmental effects. The purpose of the temporal boundaries is to identify when an effect may occur in relation to specific project phases and activities. Temporal boundaries for this assessment mirror phases of the Project (construction; operation; and decommissioning, rehabilitation and closure) as outlined below in section 2.2.2.

Figure 1: Location of the Project



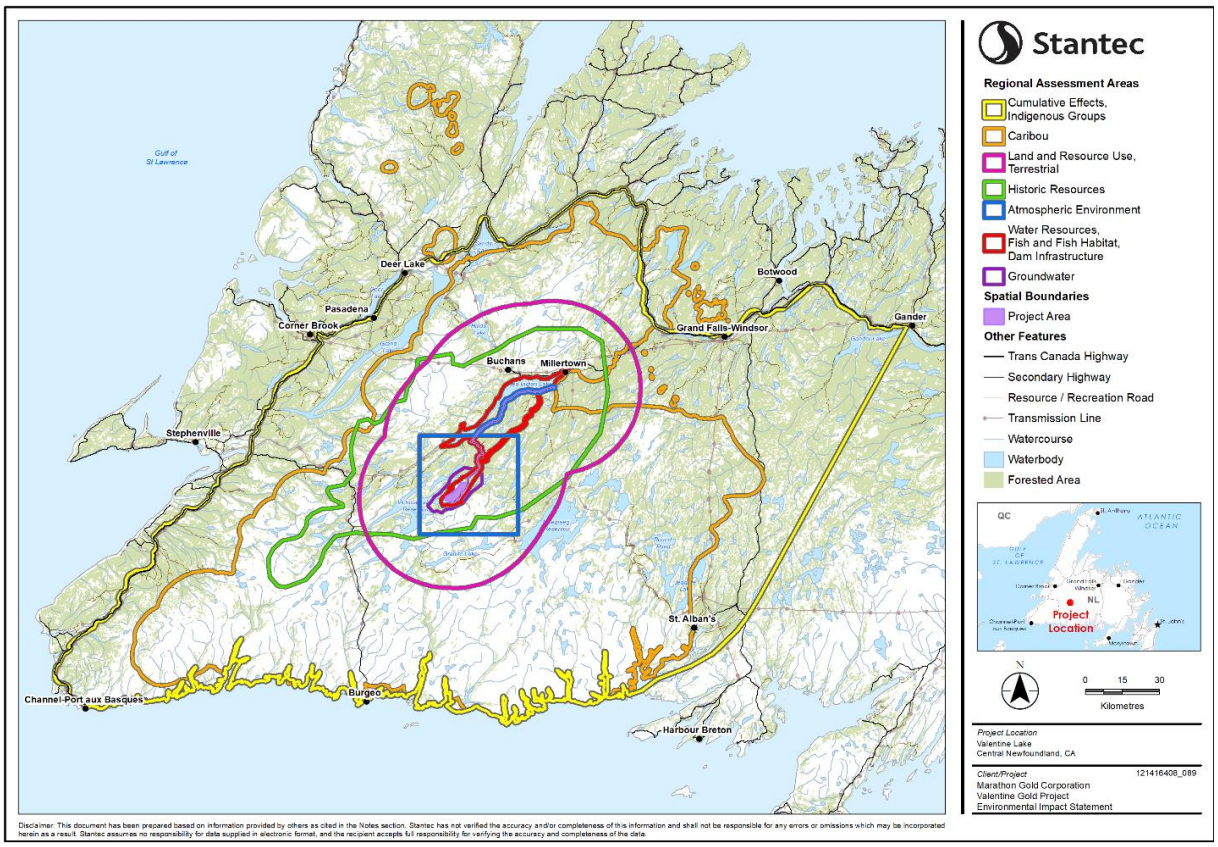
Source: Valentine Gold Project: Environmental Impact Statement, 2020.

Figure 2: Proponent's Combined Local Assessment Areas for the Valued Components



Source: Valentine Gold Project: Environmental Impact Statement, 2020

Figure 3: Proponent's Combined Regional Assessment Areas for the Valued Components



Source: Valentine Gold Project: Environmental Impact Statement, 2020

2.2. Project Components and Activities

2.2.1. Project Components

Table 2 lists the project components and Figure 4 illustrates their proposed geographic locations.

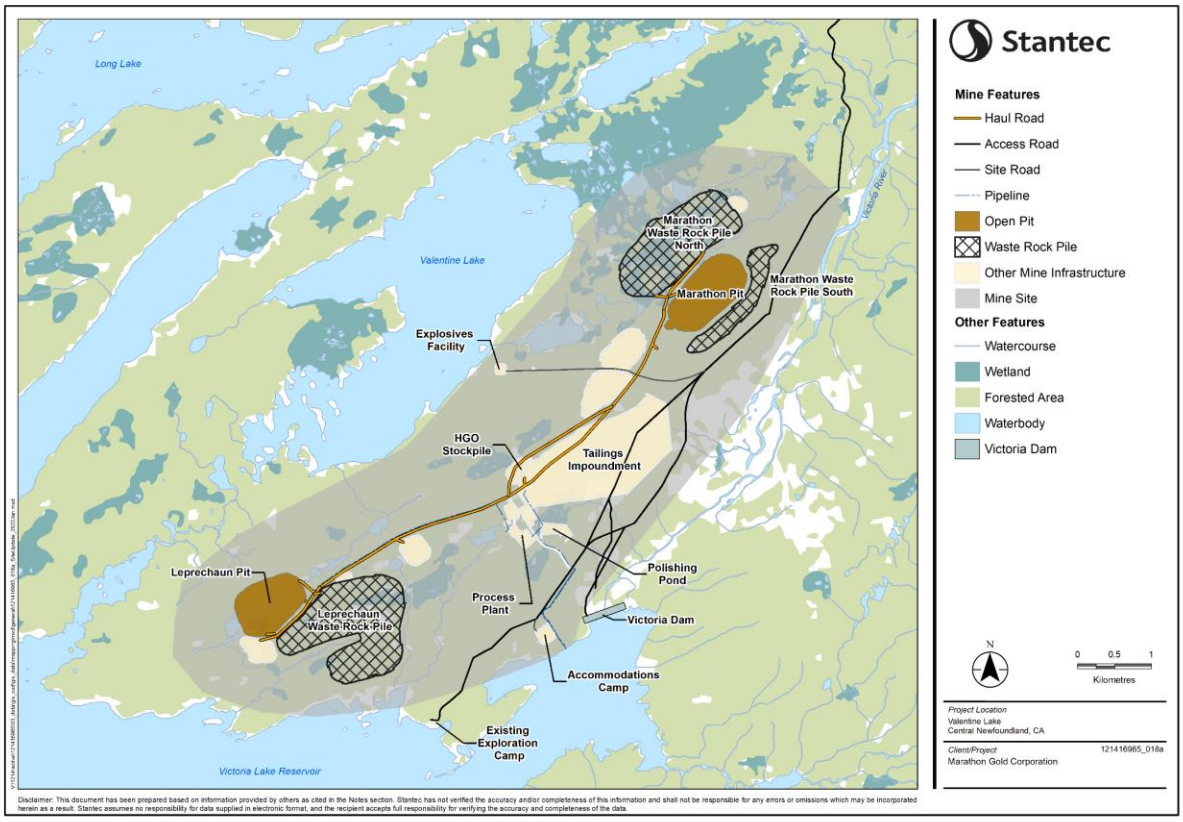
Table 2: Key Project Components for Valentine Gold Mine

Component	Description
Open Pits	• The Project would consist of two open pits: the Leprechaun and Marathon deposits. • The Leprechaun pit would have an area of about 70 hectares with a maximum depth of 285 metres. • The Marathon pit would have an area of about 58 hectares with a maximum depth of 270 metres (located seven kilometres northeast of Leprechaun). • The Leprechaun pit would be mined out after nine years of operation and the Marathon pit would be mined out after 10 years.
Ore, Waste Rock, Topsoil and Overburden Stockpiles	• Each pit would have associated waste rock pile(s), topsoil and overburden stockpiles, and a low-grade ore stockpile. • One high-grade ore stockpile would be located between the two open pits and used to store high-grade ore from both the Marathon pit and the Leprechaun pit.
Process Plant Facilities	• Ore would be mined and processed at 6,850 tonnes per day, increasing to 10,960 tonnes per day. • Ore would be milled and put through flotation and cyanidation processes to recover the gold. Gold would be extracted via gravity/leach process in phase one; and gravity/flotation/leach process in phase two. The final product, gold doré would be shipped from the site.
Tailings Management Facility	• Tailings produced from the gold milling process would be deposited in the tailings management facility for the first nine years of the project operation phase using a thickened tailings process. • The facility would be designed to store 30 megatonnes of tailings produced during the initial nine years of the mine life and would be constructed primarily from mine waste rock with a geomembrane liner to retain water within the impoundment. • Once the Leprechaun open pit is exhausted in year nine, newly produced tailings would be pumped into it via pipeline. Approximately 11 megatonnes of tailings are expected to be piped to the Leprechaun pit in years 9-13.
Water Treatment Plant and Polishing Pond	• The Water Treatment Plant would receive discharge water from the tailings management facility and would treat the water to meet *Metal and Diamond Mining Effluent Regulations* (MDMER) limits.

	• Following treatment, the water would be retained in the polishing pond for an estimated five days prior to being discharged to Victoria Lake Reservoir. • Located downstream of the tailings management facility, the footprint of the polishing pond would be approximately 4.1 hectares. The pond would be constructed as part of the initial tailings management facility with an operational capacity of 44,000 cubic metres and lined with a geomembrane. The pond would be designed to provide time for the solids to settle.
Storm Water Management Infrastructure	• Water management components consist of sedimentation ponds, berms, drainage ditches, and pumps to collect and contain surface water runoff from waste rock, stockpiles and pits.
Water Intake and Distribution	• Raw water would be taken from Victoria Lake Reservoir, pumped to the raw water tank, and distributed to the process plant and the potable water treatment system. • Water would be used for fire suppression, potable water supply, and process water. • Water would be pumped from Victoria Lake Reservoir to help fill the exhausted mined pits during the closure phase.
Sanitary Effluent	• Sewage generated within the project site would be collected via an underground sanitary sewer network to a common location where it would be treated by a mechanical sewage treatment plant. Sludge generated from treatment would be collected for offsite disposal.
Substation and Power Distribution	• Site power would be provided from a 66-kilovolt high voltage electrical transmission line entering the project area approximately 20 kilometres north of the mine site along the access road. Electricity would be distributed by overhead power lines. • A peak electricity demand of 23 megawatts is required for the Project. • Four standby diesel generators would be at the site throughout the operation phase.
Other Plant Site Buildings	• Plant site buildings include an administration office (23 metres by 64 metres), warehouse, laboratory (180 square metres), security gate, maintenance and storage, and a mine services area.
Roads	• Access to the Project would be via existing gravel public access roads from Millertown. The initial eight kilometres from Millertown, is a public roadway, which is operated and maintained by the Province of Newfoundland and Labrador. The remainder of the route would be upgraded by the Proponent to a 7.3-metre wide driving surface with ditching on both sides and culverts for drainage. Existing bridges and culverts would be inspected for possible upgrades or replacement. Rock and gravel would be sourced from existing borrow pits along the route and possibly from site generated rock material. • Access roads to site buildings would be six metres wide. • Onsite roads would be built to access infrastructure and would be designed to haul ore and waste materials from the open pits to the

	scheduled destinations. The width of these roads would be about 30 metres wide with dual-lane and berms on both edges.
Fuel Storage and Fueling Stations	• The fuel station would consist of a 30 metre by 20 metre open-air, reinforced, concrete containment area and would service the on-site mine equipment and vehicles. • Diesel fuel would be stored on site (total volume of fuel stored would be 450 cubic metres). The site would include offloading pumps, dispensing pumps, associated piping and electronic fuel control/tracking.
Accommodations Camp	• A permanent 300-person accommodations camp with associated services would be located to the south of the process plant.
Explosives Storage and Production	• The explosives storage and production area, to be located to the northwest of the tailings management facility, would consist of four main components: bulk ammonium nitrate storage, bulk emulsion storage, an emulsion production facility, and storage for explosive and blasting accessories (e.g., detonators, boosters, detonating cords). • The gated 150 metre by 150 metre explosive pad would have a buffer of at least 1.1 kilometres to all other site facilities and operations.

Figure 4: Main Project Components



Source: Valentine Gold Project: Environmental Impact Statement Project Refinements, 2022

2.2.2. Project Activities and Schedule

Listed below are key activities and schedules associated with construction; operation; and decommissioning, rehabilitation and closure of the Project.

Construction (16 to 20 months)

Site Preparation - cutting and clearing of vegetation and removing organic material and overburden on areas to be developed; installing water and erosion control; and creating access roads.

Earthworks - facilitating construction of infrastructure development areas (excavating, preparing excavation bases, placing structural filling and grading); stripping and stockpiling organic and overburden materials from open pits; and use of open pit development rock for earthworks (structural fill and road gravel).

Infrastructure Construction - placing concrete foundations and constructing buildings and infrastructure.

Equipment Installation - installing project equipment and supporting infrastructure.

Utilities Installation - constructing and connecting power, water and fuel supply infrastructure.

Tailings Management Facility Construction - constructing the first phase of the tailings management facility including the Phase 1 dam, water treatment plant and polishing pond.

Operation – (13 years)

Operations - would be 24 hours a day, seven days a week, on a 12-hour shift basis. Ten years of pit operations with 3 years of processing of stockpiled ore materials.

Open-Pit Mining - blasting, loading, and hauling ore from the open pits to the mill or stockpiles. Both pits (Marathon and Leprechaun) would be mined simultaneously with one blast per day, alternating pits, such that each pit would be blasted once every two days.

Use of Excavated Rock – excavated rock from the open pits that would not be processed for gold would be used as backfill for post-construction site development, maintenance and rehabilitation, or would be deposited in waste rock piles.

Ore Hauling – ore would be trucked to stockpiles and the processing area where it would be crushed and ground, then processed to extract the gold via gravity, leaching and flotation processes.

Tailings Management – process waste (tailings) would be pumped to a tailings management facility in years one to nine and then to the exhausted Leprechaun open pit after year nine. Progressive tailings dam raises would be constructed to achieve storage capacity.

Contact Water and Effluent Management and Treatment – contact water and process effluent would be managed onsite and treated to remove sediments and deleterious substances before discharging to the environment. Water would be diverted around site features where possible and contact and process water would be reused where practicable. Treatment of discharge from the tailings impoundment would be carried out via a water treatment plant and polishing pond before being released to the environment.

Transportation, Storage and Use of Reagent, Hazardous Materials and Fuels – would be in accordance with applicable regulations and guidelines.

Decommissioning, Rehabilitation and Closure (six-10 years)

Progressive rehabilitation would be completed throughout the mine operation prior to closure wherever it is practicable to do so, as use of individual components/ infrastructure ceases.

Closure rehabilitation would be undertaken to restore and/or reclaim the Project to close to its pre-mining condition. Activities include demolition and removal of site infrastructure; re-vegetation of disturbed areas; breaching of sedimentation ponds (following water quality testing); grading to re-establish drainage patterns; flooding of open pits with surface water runoff, potential pumping of water from Victoria Lake Reservoir, and other activities that would be detailed in the Rehabilitation and Closure Plan as required by the *Newfoundland and Labrador Mining Act*.

Post-closure monitoring would occur for six-10 years after final closure activities are completed, to determine if the rehabilitation is successful.

3. Purpose of and Alternative Means of Carrying out the Project

3.1. Purpose of the Project

The purpose of the Project is to produce gold doré (a semi-pure alloy of gold) bars for sale worldwide. The Proponent anticipated the Project would contribute to economic development for the Province of Newfoundland and Labrador and for Canada. The Proponent notes that in addition to gold as jewelry and investments, it is also used in electronics and technology, medicine, and dentistry.

3.2. Alternative Means of Carrying Out the Project

Under CEAA 2012, the environmental assessment of a project must account for alternatives that are technically and economically feasible and consider their environmental effects. The Agency's *Operational Policy Statement Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012* sets out the general requirements and approach to address the alternative means of carrying out the designated project under CEAA 2012. The Proponent identified and evaluated alternatives for the main components of the Project to justify each preferred option. In addition to the alternatives highlighted in Table 3 the Proponent also considered alternatives for pit dewatering, overburden material storage and management, transportation, life of the mine, waste rock pile rehabilitation, overburden and organic stockpile rehabilitation, ore stockpile rehabilitation, and labour supply and working conditions.

Table 3: Project Activities/Components and Preferred Alternative chosen by the Proponent

Alternatives Considered	Proponent Determination
Mining Methods • Placer mining • In-situ mining • Open-pit mining • Underground mining	The Proponent identified open-pit mining as the only technically feasible option for the Project. Open-pit mining is a commonly preferred method in situations where there is a sufficient mineral resource relatively close to the ground surface.
Waste Rock Management • Disposal in a natural waterbody • Creation of an on-land waste rock pile(s) • Disposal in-pit during operation or at the end of the mine life • Use as construction aggregate for the development of the Project • Use/sale as construction aggregate for other developments or markets	With the exception of in-pit disposal, all waste rock management options were considered technically feasible. In-pit disposal was not considered feasible based on the need to mine both pits simultaneously, the distance between the two pits, and the negative environmental and economic issues with respect to backfilling at the end of mine life. Of the technically feasible options, in-lake disposal and the use of waste rock as aggregate in other

	developments or markets were not considered feasible alternatives based on stakeholder engagement, regulatory considerations, and lack of opportunity to use aggregate for other purposes. As such, the Proponent considered on-land waste piles and use of waste rock for aggregate for site development to be the preferred option for waste rock disposal.
Waste Rock Storage Area • Area south of the pit • Area northwest of the pit • Areas to the southwest and northeast of the pit • Areas at greater distance in any direction	The Proponent considered location and related factors in the design for three waste rock piles. Key considerations included sterilization of potentially economic ore, distance from the pit to the waste rock pile, potential impacts to surface water resources as well as fish and fish habitat, topography, general environmental factors and caribou migration routes. While all proposed locations were considered technically and economically feasible, due to environmental and socio-economic considerations, three waste rock piles were identified. One site to the south of the Leprechaun pit was identified as a preferred option for that pit. Two waste rock sites were selected for the Marathon pit with approximately 75 percent of the material to be located on the northwest side of the pit and approximately 25 percent to be located to the southeast of the pit. The waste rock piles at the Marathon Pit would be situated to divert migrating caribou from the open pit (Figure 4).

Ore Processing
• General Process Alternatives
  ○ Heap leach only
  ○ Heap leach and mill
  ○ Mill only
• Leaching Reagents
  ○ Cyanide
  ○ Thiosulphate
  ○ Thiourea
  ○ Halides
	General Processing Alternatives
	In addition to technical and economic feasibility of options, the Proponent considered the size of the footprint for each option, as well as stakeholder concerns and the risk of leakage from containment. While all three variations of the general process are considered technically and economically feasible, the Proponent considers the mill-only option to be the preferred option, as it has the lowest footprint overall and is

	generally more accepted by stakeholders. **Leaching Reagents** The Proponent noted that cyanide has been safely and economically used as a reagent by most gold producers and has been used on a commercial scale. No alternatives are as cost effective and well controlled as cyanide, therefore the Proponent has identified cyanide as the preferred reagent for the Project.

Tailing Management and Tailing Disposal
• Alternate Locations (Figure 5)
  ○ Option 1
  ○ Option 13
  ○ Option 14
• Tailings Disposal
  ○ Disposal in a waterbody
  ○ In-pit disposal
  ○ Co-disposal with waste rock
  ○ Tailings impoundment
  ○ Dry stack
	Tailing Management Location
	
	To determine a suitable location for the tailings management facility, environmental factors, economics, schedule, and third-party infrastructure were considered. Several options were assessed and only three alternate location options were considered suitable for further review: Option 1, 13 and 14. All locations identified were determined to be technically feasible. While Option 14 had a higher cost, the location would avoid fish habitat, and interactions with Victoria Like Reservoir and Dam, therefore it was the preferred location.
	
	Tailings Disposal
	With respect to tailings disposal, the Proponent did not consider co-disposal with waste rock and dry stacking to be feasible options due to climate conditions. While disposal in a waterbody would be technically and economically feasible, the Proponent indicated that strong opposition may be received from stakeholders and the public, and therefore it was not considered further. Both engineered tailings impoundment and in-pit disposal were considered technically and economically feasible and viable options in relation to environmental, socio-economic, and implication of failure considerations. Based on the current project plans, the Proponent has indicated that engineered tailings impoundment would be used for the first nine years of operation, and there

	would be a switch to in-pit disposal for the remaining four years of operation.
Water Supply • Surface water, Valentine Lake and Victoria Lake Reservoir • Surface water, on-site ponds and streams • Surface water, off-site waterbodies • Groundwater • Re-use and recycling of project contact water	On-site and off-site ponds, streams and groundwater sources were considered to have insufficient volumes to be technically feasible as water supplies. The Proponent noted that multiple water sources would be needed to reduce the impacts to water resources. The preferred primary water source would be re-use and recycling of site contact water, with the primary freshwater source from Victoria Lake Reservoir.

Waste Water Management
• Process/tailings effluent treatment
  ○ In-mill cyanide destruction
  ○ Downstream natural plus treatment
  ○ Downstream natural only
• Processing Effluent Management
  ○ Recycling
  ○ No Recycling
• Additional Process Effluent Management Options
  ○ Tailings Pond
  ○ Polishing Pond
  ○ Water Treatment Plant
• Effluent Discharge Point Locations
  ○ Multiple discharge points
  ○ Reduced number or single discharge point
	Wastewater from the Project includes process and tailings effluent and sanitary effluent. The selection of management alternatives depends on regulatory requirements for each wastewater type.
	
	Processing Effluent Management
	The primary consideration with the treatment of process-effluent is the management of cyanide contained within it. Cyanide may be treated at any point in the process-effluent management system including at the mill, in the tailings impoundment, water treatment plant or polishing pond. The Proponent indicated that cyanide would be treated with a cyanide destruct unit at the mill, prior to pumping of effluent to the tailings impoundment. The Proponent notes that this approach is a common effluent management practice that reduces the environmental risks associated with effluent containing higher levels of cyanide entering the tailings management facility.
	
	The downstream natural only treatment option was considered not technically feasible. Downstream natural plus treatment was considered technically and economically feasible, but was not preferred due to an increased risk associated with tailings management facility seepage, leaks or failures with higher levels of cyanide, as well as a higher risk and consequence if failure of the tailings management facility occurred.

	Process Effluent System Recycling of wastewater is also a key consideration within the process effluent system. The Proponent considered removing water from the tailings streams prior to pumping the tailings to the impoundment, and recycling it back into the mill. Another option considered was to recycle water from the downstream process effluent management system. The Proponent indicated that water from the tailings pond would be reused in the mill, which would further reduce the volume of water leaving the tailings pond to be treated in the water treatment plant, then pass through the polishing pond prior to discharge to the environment. **Additional Process Effluent Management Options** Primary options for the treatment of process effluent outside of the mill could include tailings pond management, polishing pond, and a water treatment plant. The Proponent indicated that all three methods of treatment would be used. The tailings pond would be designed to optimize effluent quality leaving the pond. A water treatment plant would process the water discharged from tailings pond before pumping it to a polishing pond and eventual discharge to the Victoria Lake Reservoir. **Effluent Discharge Point Locations** A number of factors would be considered in the decision to proceed with either multiple effluent discharge points or reduced or single effluent discharge point that include the size of the site, number and spacing of mine site components, downstream impacts, topography, predicted water chemistry and other site features. While both multiple discharge points and reduced number or single discharge points were considered by the Proponent as technically and economically feasible, multiple discharge points would be the preferred option based on environmental considerations and

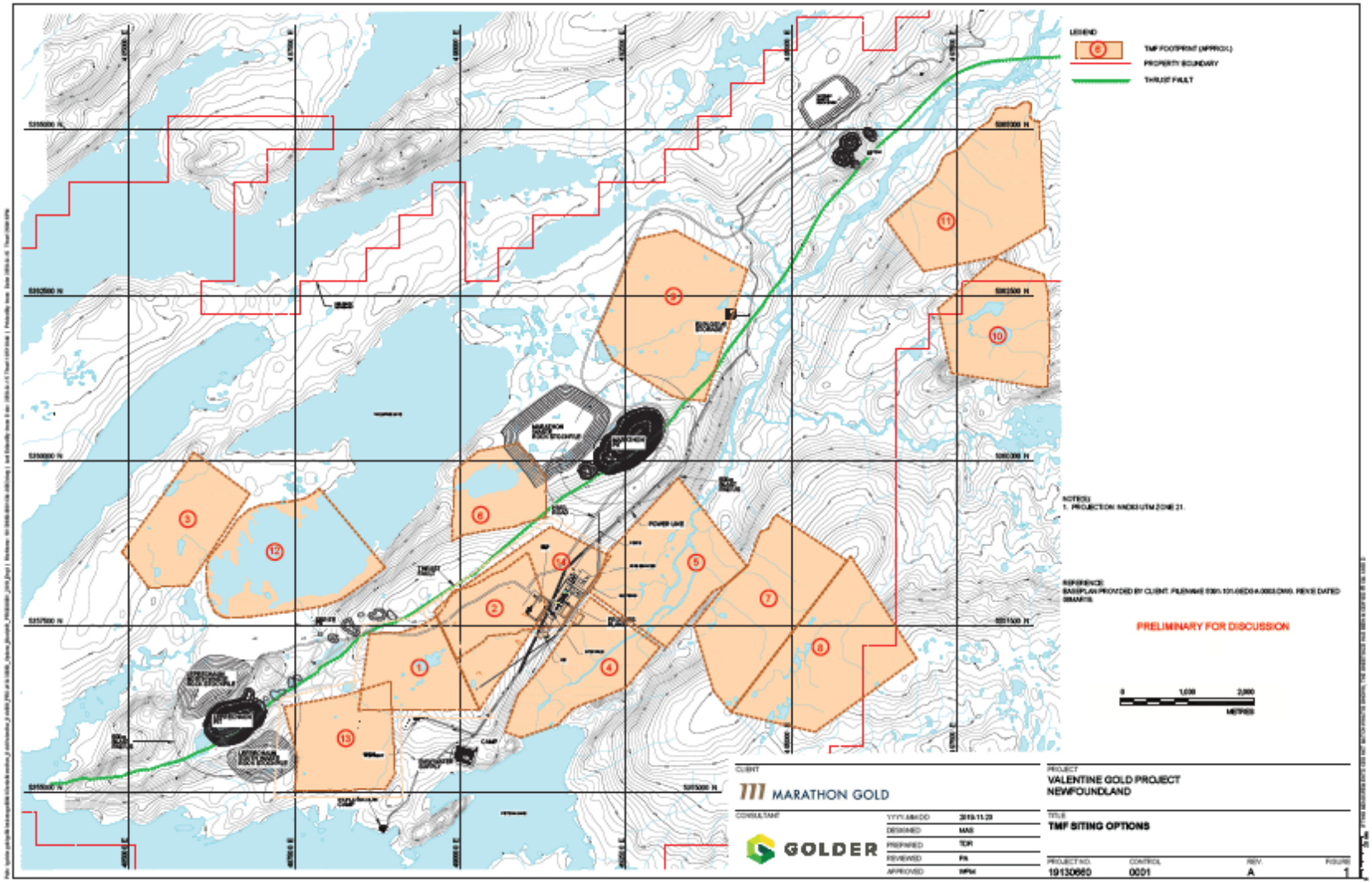
	risks of mechanical and pipeline malfunction and failure.
Transportation • Routing of Access Roads • Alternate Means of Transporting Gold Concentrate	The Proponent considered four economically and technically feasible options for the routing of access roads, each option with varying degrees of improvements required (e.g., widening, bridge upgrades, and signage) Factors considered in determining the preferred option included the condition of existing routes, as well as the length of the road. The Proponent identified the existing route to Millertown as the preferred access road alternative given it would be the shortest overall route, required the fewest improvements, and it would link the Project to the Central Region of the province. Gold bars produced at the mine would be shipped to central Canada via the Trans-Canada Highway, other routes would be secondary highways and are not considered viable options.
Power Supply and Transmission • Power Supply • Power Transmission	Electrical power for the Project could be provided via a direct connection to the existing power grid, or could be generated by the Proponent using diesel generators, solar panels, or wind turbines. The Proponent identified connection to the existing power grid as the preferred option, as solar is not considered technically feasible; wind turbines would have a large footprint and ecological interactions, and diesel generators would require substantial capital and operating cost and emissions. The Proponent continues to consult with NL Hydro, owners of the proposed electric transmission line, regarding the permitting, construction, operation and maintenance, and decommissioning of the transmission lines. The Proponent has requested that the transmission line follow the site access roads, in particular within caribou migration corridors, to reduce potential effects on migrating caribou, and reduce maintenance costs.

Rehabilitation Methods	

Open Pit Rehabilitation
• Allowing the open pit to flood with water
  ○ Natural Flooding
  ○ Pumping from Lakes
• Backfill the pit using waste rock
• Use of the pit for tailings storage
	The Proponent determined that backfilling the pit with waste rock was not economically feasible. As such, the Proponent identified backfilling with tailings and flooding as the only available options.
	
	Based on groundwater and surface modelling the Proponent predicted that open pits would take in the range of 40 years to fill naturally, and during that time would represent a health and safety hazard to people and wildlife in the area. The Proponent therefore chose pumping water from Victoria Lake Reservoir and Valentine Lake to fill Leprechaun and Marathon pit respectively as the preferred option for flooding the open pit. This would reduce flooding time to eight years, therefore resulting in a shorter closure period.

Tailings Management Facility Rehabilitation • Removal of the tailings and dam materials for in-pit disposal • Rehabilitation via cover and revegetation in-place. Within this alternative there is an option to leave the tailings pond as-is or reduce the size of the pond • Monitor and/or improve tailings density to achieve 'landform' classification for the tailings deposit	The Proponent considered relocation of tailings at the end of mine life not economically feasible and so rehabilitation in place was identified as the only option for the tailings management facility. The Proponent also identified an option to allow the tailings to densify naturally or through engineering so that the tailings no longer require engineered dams to remain in place, as a preferred option. However, the technical feasibility of the alternative would require operational and even initial closure monitoring. The Proponent noted this would be a preferred option if future monitoring indicated that it was technically feasible.

Figure 5: Tailings Management Facility Siting Options



Source: Valentine Gold Project: Environmental Impact Statement, 2020

The Proponent's evaluation of alternatives took into account the economic and technical feasibility including regulatory and market factors respectively, environmental and socio-economic considerations, implication of failure or malfunction, legal acceptability, as well as comments from the public, and government experts. The Agency is of the view that the Proponent has sufficiently assessed the technically and economically feasible alternatives and their environmental effects under CEAA 2012.

4. Engagement

The Agency considered comments from Indigenous groups and public participants during the environmental assessment and during its analysis of the potential environmental effects of the Project. The Agency was also informed by advice from federal and provincial authorities with a regulatory interest in the Project.

To date, the Agency provided three opportunities for Indigenous groups and the public to participate in the environmental assessment including an invitation to review and comment on the summary of the Project Description, the draft EIS Guidelines, and a summary of the EIS. Table 4 provides the dates and durations of the comment periods.

Table 4: Comment Opportunities during the Environmental Assessment

Document or Subject	Dates
Summary of the Project Description	April 16, 2019 – May 6, 2019 (20 days)
Draft EIS Guidelines	May 31, 2019 – June 30, 2019 (30 days)
Summary of the EIS	November 3, 2020 - December 23, 2020 (50 days)

In addition, on November 25 and 26, 2020, during the public comment period on the summary of the EIS, the Agency held virtual information-sharing sessions with Indigenous groups and the public, respectively. Presentations from the Agency and Proponent, as well as the summary report from the session are available on the Impact Assessment Agency of Canada Registry at:

- Summary of Engagement Sessions with Indigenous Groups on Environmental Impact Statement - Canada.ca (iaac-aeic.gc.ca)
- Summary of Public Engagement Sessions on Environmental Impact Statement - Canada.ca (iaac-aeic.gc.ca).

Notices of these opportunities were posted on the Canadian Impact Assessment Agency Registry website, and individuals and groups who had expressed an interest in the Project during earlier phases were notified directly.

In light of the challenges experienced by Indigenous groups resulting from the COVID-19 pandemic, the Agency also met virtually with individual Indigenous groups during the environmental assessment.

The Agency now invites the public to provide comments on the content, conclusions and recommendations in this draft Environmental Assessment Report. After taking into consideration the comments received from the public, the Agency will finalize and submit the report to the Minister of the Environment for consideration in their decision.

4.1. Engagement with Indigenous Peoples

4.1.1. Agency-Led Engagement Activities with Indigenous Groups

For this environmental assessment, the Agency engaged Miawpukek First Nation and Qalipu First Nation, on the Island of Newfoundland in the environmental assessment process for the Project. The two Mi'kmaq groups were engaged to reflect the Agency's support for the Crown's commitment to implement

the *United Nations Declaration on the Rights of Indigenous Peoples* and to advance reconciliation with Indigenous peoples, based on the principles of respect, cooperation and partnership.

Indigenous groups were invited to apply to the Agency's Participant Funding Program to support their participation in engagement activities. Miawpukek First Nation and Qalipu First Nation submitted applications and the Agency approved a total combined allocation of $24,600 to both groups.

Following public comment periods on the EIS Guidelines, and review of the EIS and EIS Summary, the Agency considered input from Indigenous groups and revised the Guidelines, and requested additional information requirements from the Proponent, respectively.

The main areas of concern raised by Indigenous groups throughout the environmental assessment include:

- Potential loss of historic or cultural sites;
- Involvement of Indigenous peoples for environmental monitoring programs;
- Impact to water quality and changes in water flows;
- Potential for mercury contamination;
- Cumulative effect on Atlantic Salmon;
- Protection of fish, species at risk, migratory birds, caribou and culturally important species; and
- Alteration or loss of lands and resources for traditional use.

See Appendix E for a summary of comments provided by Indigenous groups during the environmental assessment, up to and including their review of the EIS, along with the Agency's responses. A subset of comments from Indigenous groups are discussed in the context of individual valued components throughout section 6 and 7, under various sub-sections entitled "Views Expressed by Indigenous Groups."

4.1.2. Engagement Activities with Indigenous Groups Organized by the Proponent

The EIS Guidelines required the Proponent to engage with potentially affected Indigenous groups. The Proponent was required to obtain their views on the Project and the effects of changes to the environment on Indigenous peoples (health and socio-economic conditions; physical and cultural heritage, including any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and current use of lands and resources for traditional purposes).

The Proponent noted its engagement with Qalipu First Nation and Miawpukek First Nation commenced before the submission of the Project Description, meeting with both groups between April and July 2019. In addition, in December 2019, the Proponent conducted a one-day workshop with representatives of both groups to discuss the project design and potential environmental effects, including effects on Indigenous interests.

During the development of the EIS the Proponent corresponded and met both groups (via teleconferences or in person) to provide Project updates and to seek input on issues prescribed by the EIS Guidelines that included potential effects and mitigation measures. The EIS notes the Proponent's commitment to engage with Qalipu First Nation and Miawpukek First Nation during the environmental assessment process and throughout the life of the Project.

As per section 4.2 of the EIS Guidelines, the Proponent was required to make reasonable efforts to collaborate with the Indigenous groups to collect and incorporate Indigenous knowledge into the EIS. The

Proponent provided funding to Qalipu First Nation to conduct *A Collection of Current Land Use and Traditional Knowledge Study*; the Proponent noted that the information collected was incorporated into the EIS. The Proponent provided funding to Miawpukek First Nation to complete a Mi'kmaq Knowledge, Land Use and Occupancy Study (Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study), which is now complete. The Proponent noted that the information gathered from the Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study will be used to enhance the Proponent's understanding of Miawpukek First Nation's land and resource use within the project area. If the Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study identifies additional land or resource uses that may be potentially impacted by the Project, the Proponent has committed to adjust proposed mitigation and monitoring measures, accordingly.

4.2. Public Participation

4.2.1. Public Participation Led by the Agency

The Agency supported public participation in the environmental assessment through its Participant Funding Program. A total of $48,315 was allocated to a member of the public, Newfoundland and Labrador Outfitters Association, Mining Watch Canada, and Canadian Parks and Wilderness Society.

In response to the public notice during the comment period on the EIS summary, submissions were received from Mining Watch Canada, Snowshoe Lake Hunting and Fishing (Outfitter), Canadian Parks and Wilderness Society, Newfoundland and Labrador Outfitters Association, Grand Lake Adventures; and eight individual members of the public.

The main concerns raised by the public during the public comment period on the EIS summary were related to the following factors:

- Potential impact of the Project on caribou populations;
- Potential impact of noise and air emissions from the Project on wildlife, and human health;
- Efficacy of Proposed mitigation measures;
- Availability of baseline data;
- Tailings management;
- Sufficiency of the rehabilitation measures;
- Need for post-closure monitoring;
- Effects on local Outfitters;
- Increased access and pressure on recreational fisheries; and
- Cumulative effects.

In addition to the above concerns raised, there was also general expression of support from some public stakeholders and disapproval from other public stakeholders.

Specific views related to changes to the environment and to effects on valued components are outlined in sections 6 and 7 of this draft report.

4.2.2. Public Participation Activities Organized by the Proponent

The Proponent conducted engagement activities with communities and stakeholder groups that have traditionally been engaged in resource development projects or expressed an interest in industrial developments in the province.

The Proponent indicated it began engaging with six communities closest to the proposed Project site (Towns of Buchans, Millertown, Badger, Grand Falls – Windsor, Bishop's Falls and the Local Service District of Buchans Junction) in 2019. Engagement included community meetings, surveys, regular and ongoing communication (emails, conference calls, quarterly newsletters, social media), and virtual public meetings.

The Proponent also indicated its engagement with stakeholders, fish and wildlife associations and environmental non-government organizations which included the provision of information through newsletters, public information sessions, conference calls, and face-to-face or virtual meetings to discuss issues of common concern. The Proponent has committed to continued community and stakeholder engagement on the Project.

In addition, the Proponent has met or has been in communication with cabin owners in the project area, individual outfitters as well as various industry and trade organizations.

The Proponent noted key stakeholder concerns on key subjects noted by the Proponent included: waterways and fish habitat; water quality; wildlife habitat; air quality; tailings management; rehabilitation and closure; employment and business opportunities; economic benefits; and need for ongoing engagement.

The Proponent's engagement activities and issues raised by communities and stakeholders are summarized in Appendix 3A, and Tables 3.4 - 3.11, of the EIS.

4.3. Participation of Federal and Other Experts

Federal departments and provincial departments in possession of specialist or expert information or knowledge with respect to the Project provided advice to the Agency, in accordance with section 20 of CEAA 2012. The following federal and provincial authorities reviewed and provided advice on the Proponent's EIS and the preparation of this draft Environmental Assessment Report:

- Fisheries and Oceans Canada (DFO): input related to fish, fish habitat, and the availability of applicable monitoring plans.
- Environment and Climate Change Canada (ECCC): input related to available baseline data, water and sediment quality, climate change, greenhouse gas emissions, migratory birds, species at risk, fish and fish habitat, mine waste disposal and effluent management, acid rock drainage mitigation, and closure and post-closure rehabilitation.
- Transport Canada: input related to implications of navigable waters.
- Natural Resources Canada (NRCan): input related to hydrogeology, geochemistry including acid rock drainage and metal leaching, mine waste management, characterization of minded material and water quality.
- Health Canada: input related to potential impacts on Indigenous health related to country foods, water quality, noise levels and air quality.
- Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture: input in relation to effects on caribou.

5. Geographical Setting

5.1. Biophysical Environment

The Project is located on the Island of Newfoundland within the Central Newfoundland Forest Ecoregion. The region has the warmest summers and coldest winters on the Island of Newfoundland, with the potential for night frost year-round. Daily average temperatures at the nearby Town of Buchans range between -8°C to 16°C, with the lowest average temperatures occurring in February and the highest occurring in July. Total annual average precipitation is 1,236 millimetres, with 359 centimetres of snow and 877 millimetres of rain. While forest fires can occur in the region, they are infrequent mainly due to relatively long winters and abundant precipitation. There have been seven forest fires within 100 kilometres of the project area from 1986 to 2018.

The ecoregion is comprised of boreal forests interspersed with wetlands in lower areas and basins. The project area spans terrain that includes rolling hills, thin to thick glacial material, bedrock outcrops and patterned bogs and fens scattered throughout. The natural overburden material in the project area is generally classified as discontinuous glacial till of varying thickness and drainage overlying bedrock with a thin layer of overlying rootmat. Central Newfoundland is considered a low risk area for seismic activity by the Geological Survey of Canada. There have been 21 earthquakes in Newfoundland since 1985, however, all were considered to be small (ranging in magnitude from 1.9 to 2.9) and none were recorded within the project area.

Groundwater quality is characterized as slightly alkaline, with moderate acid buffering potential and low conductivity. Guidelines for Canadian Drinking Water Quality values were generally met except for pH, true colour, total dissolved solids, turbidity, arsenic, iron, and manganese, which exceeded either the aesthetic objective or maximum allowable concentration.

The headwaters of the Victoria River lay to the east of the project area, which combines with Valentine Lake to the northwest and flows into Beothuk Lake (formerly known as Red Indian Lake)[3], which then feeds into the Exploits River. The Exploits River is important due to the number of Atlantic salmon that return to the river to spawn. Sea-run and landlocked Atlantic salmon (known as ouananiche), brook trout, Arctic char, American eel, and threespine stickleback are also known to be present in the region (see section 6.1 for more information on fish and fish habitat). With the construction of the Victoria Dam in 1967, the Victoria Lake Reservoir was created, which diverted the waters of Victoria Lake southerly into Burnt Lake and Granite Lake to power hydrogeneration stations.

Mammal species in the project area include woodland caribou, moose, black bear, Canada lynx, coyote, red fox, mink, ermine, muskrat, river otter, southern red-backed vole, meadow vole, snowshoe hare, and American red squirrel. Several species listed under the *Species at Risk Act* occur near or in the project area, such as the Buchans, Grey River, Gaff Topsails, and La Poile caribou herds, the American marten (Newfoundland population), the Northern Myotis and Little Brown Myotis (See section 6.3 for more information on species at risk).

The bird (avifauna) groups present in this area include passerines, waterfowl, upland gamebirds and raptors. Three bird species at risk were identified during field surveys in the vicinity of the project area: olive-sided flycatcher, common nighthawk, and rusty blackbird. A Sensitive Wildlife Area located along the Victoria River contains important waterfowl habitat. The Proponent notes that this area was established to protect wetland habitat used as breeding, brood rearing, and staging grounds for

[3] Beothuk Lake nomenclature changed during the development of this draft environmental assessment report. Figures will be amended to reflect this change in the final report.

waterfowl. However, while the boundaries overlap with the project area, the waterfowl habitat that is the focus of the Sensitive Wildlife Area is to the north of the mine site and outside of the project area.

Baseline studies found that concentrations of air contaminants are likely to be low and close to average background concentrations for similar rural locations in Newfoundland, with measured concentrations of air contaminants being below the regulatory standards. Sound levels are typical of a quiet rural or suburban environment with noise generated primarily by natural causes such as wind, rain, and wildlife.

5.2. Human Environment

The Project is located in a rural region in central Newfoundland where there is a history of mineral exploration and mining activities. Although there are currently no active mines, mineral exploration activity takes place throughout the region. Other land and resource use in the area include commercial forestry, multiple hydroelectric developments, outfitting, cabins, harvesting (e.g., trapping, hunting and fishing), and recreational land use such as hiking, boating, all-terrain vehicles, snowmobiling, angling, and camping.

The closest communities are the Town of Millertown and the Town of Buchans, 55 and 49 kilometres (straight line distance) respectively from the mine site. There are approximately 21 outfitters and 14 cabins in the Land and Resource Use local assessment area. Fourteen cabins are located within the local assessment area and two are located within the project area.

There are three provincially protected areas in the Land and Resource Use regional assessment area, including Little Grand Lake Ecological Reserve, Little Grand Lake Wildlife Reserve, and T'Railway Provincial Park, none of which overlap with the project area. There are no federal lands located within 45 kilometres of the project area. There are no known archaeological sites within the mine site; however, there is the potential for archaeological resources in the area.

There are two Mi'kmaq First Nation groups on the Island of Newfoundland potentially affected by the Project: Miawpukek First Nation and Qalipu First Nation. The Miawpukek Mi'kamawey Mawi'omi Reserve is located at the mouth of the Conne River on the south coast of the Island of Newfoundland, approximately 113 kilometres from the project area. The area of the reserve is approximately 620 hectares. The total registered membership of Miawpukek First Nation is 3,063, of which approximately 33 percent live on reserve. Although a registered band, Qalipu First Nation does not manage any reserve lands. Its members reside within 67 communities across the Island of Newfoundland, including within the nearby communities of Buchans and Millertown. Qalipu First Nation currently has approximately 22,000 members.

Miawpukek First Nation noted that, while in the past its members harvested for traditional purposes in the area of the Project, use of land and resources in the area has declined in recent years. Qalipu First Nation noted areas around the Victoria Lake Reservoir have been used for the harvest of trout, moose and ptarmigan, however no use was identified within the project area.

6. Predicted Effects on Valued Components

Section 6 discusses the potential effects of the Project on the valued components considered by the Agency. Potential effects on terrestrial species at risk (caribou, bats and marten) are specifically considered in section 6.3, but where the valued component may include relevant species at risk (e.g., fish and fish habitat [section 6.1], and migratory birds [section 6.2]) the species at risk are considered in those sections. The potential effects of an accident or malfunction on these valued components are discussed in section 7.1.

As described in the analysis in the sub-sections below and taking into account the implementation of key mitigation measures, the Agency concludes that the Project is not likely to cause significant adverse environmental effects on fish and fish habitat, migratory birds, or the current use, health and socioeconomic conditions of Indigenous peoples.

6.1. Fish and Fish Habitat

The Agency considered the following potential effects of the Project on fish and fish habitat:

- habitat loss, including direct loss due to pit development and mine infrastructure, and indirect loss due to changes in water quantity and quality from Project water management;
- decreased quality of fish habitat (primarily water quality); and
- decreased fish health and survival.

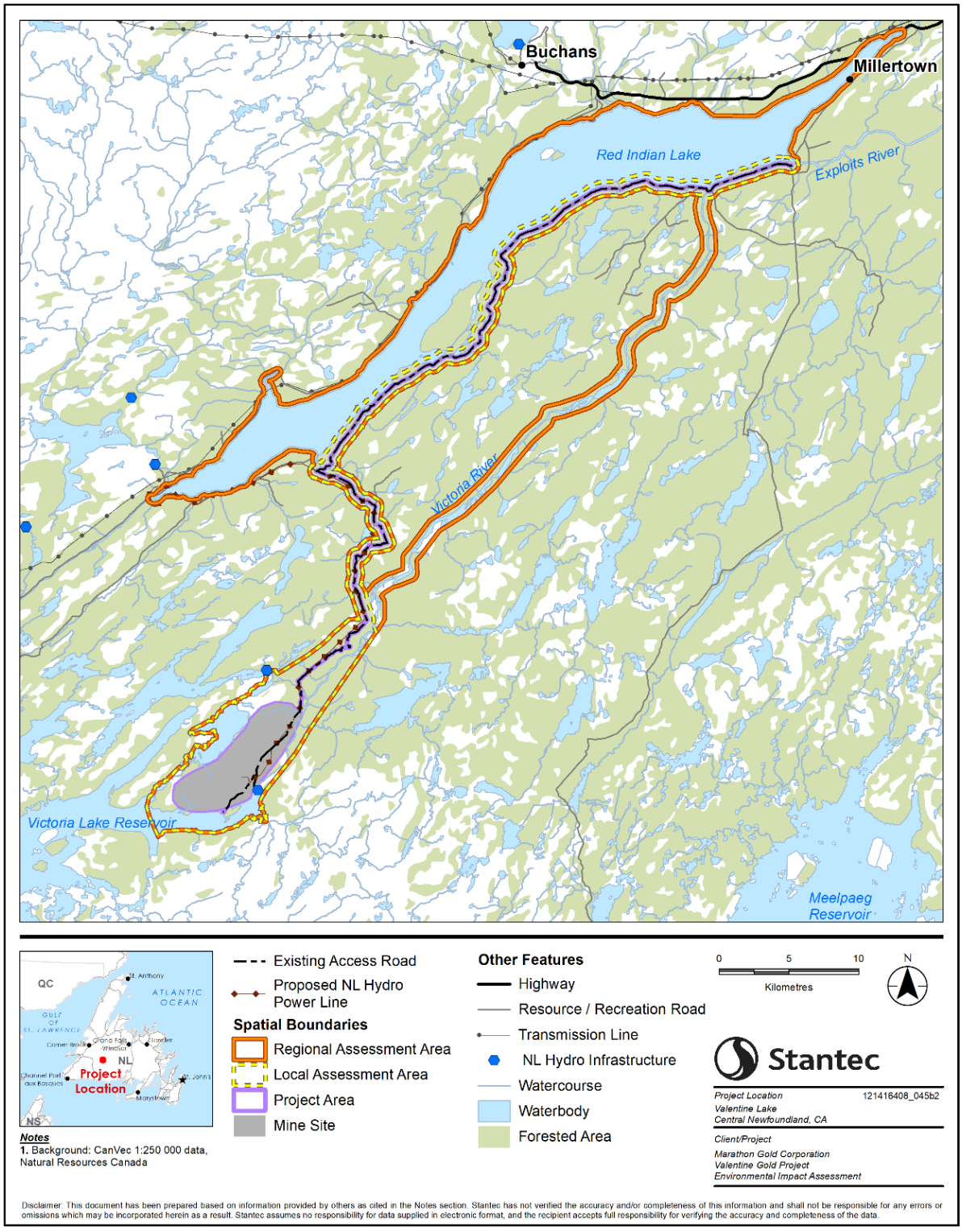
The Agency is of the view that the Project is not likely to result in significant adverse environmental effects to fish and fish habitat after taking into account the implementation of proposed key mitigation and follow-up measures. The Agency based this conclusion on its analysis of the Proponent's assessment, federal authority expert review and comments provided by Indigenous groups and the public.

6.1.1. Proponent's Assessment of Environmental Effects

Existing Environment

The Proponent determined the potential for fish habitat in ponds, lakes and streams within the local assessment area (Figure 6). The Proponent noted that the area has been subject to substantial changes since the construction of Victoria Dam and the Victoria Canal for the Bay d'Espoir Hydro Electric Development in the late 1960s. Victoria River, which formerly drained Victoria Lake, has narrowed, and the Victoria Lake Reservoir is now part of the White Bear Watershed to the south of the project area. Victoria Lake Reservoir and Valentine Lake were found to contain suitable habitat for threespine stickleback, brook trout, and Atlantic salmon. Potential habitat for Arctic char was also identified in Victoria Lake Reservoir. Some streams provide potential spawning and rearing habitat for Atlantic salmon and brook trout.

Figure 6: Regional and Local Assessment Area for Fish and Fish Habitat



Source: Valentine Gold Project: Environmental Impact Statement, 2020

Fish species observed during baseline studies were landlocked Atlantic salmon (ouananiche), brook trout, and threespine stickleback. The Proponent noted that while sea-run Atlantic salmon are known to occur in the regional assessment area, Victoria Lake Reservoir and Valentine Lake are not accessible to them due to numerous dams within the Exploits River and White Bear watersheds. Although Arctic char was not observed during field studies, the Proponent stated that it has previously been observed in Victoria Lake Reservoir and is presumed to also have the potential to occur in Valentine Lake. American eel, which is classified as threatened by COSEWIC, was also not observed in field studies, but is known to occur along the access road on the south side of Beothuk Lake. The Proponent noted that there are no *Species at Risk* Act-listed aquatic species known to occur with the project area, local assessment area, or regional assessment area (Appendix A).

The Proponent noted that total aluminum and iron were above *Canadian Water Quality Guidelines for the Protection of Aquatic Life*[4] (CWQG-FAL) at most of its baseline sampling stations. Some samples were also above these guidelines for other metals, however most were within guideline limits. The Proponent identified elevated levels of arsenic in sediment, noting that naturally occurring high arsenic is not uncommon on the Island of Newfoundland, particularly near areas of copper or gold mineralization. Iron floc was also present in some water samples. The Proponent noted that based on a review of available regional data, several metals (aluminum, cadmium, copper, iron and lead) were also detected above CWQG-FAL at regional monitoring locations, suggesting that metals are found in naturally elevated levels in both local and regional surface water.

Primary productivity[5] was characterized as low for lakes in the project area, and low to moderate for streams. Benthic community density was variable across all habitat types, with moderate diversity of species.

Predicted Effects

Fish Habitat Quantity

The Proponent noted that fish habitat loss would occur during site construction, operation, and decommissioning when the open pits are flooded, and assessed the combined effect of all project phases to determine the total predicted extent of Project-related habitat alteration, disruption or destruction likely to require authorization under the *Fisheries Act*. As shown in Table 5, the Proponent's EIS estimated 186,705 square metres of fish habitat within the local assessment area would be directly or indirectly lost as a result of Project infrastructure and activities. A map of the potential direct and indirect fish habitat loss is provided in Figure 7, which reflects project refinements since the EIS submission. The Proponent noted that the loss of fish habitat quantified in the EIS represents a maximum, and will likely be lower as a result of project refinements and ongoing consultation with DFO as part of the *Fisheries Act* Authorization process for the Project.

Of the fish habitat potentially lost as described in the EIS, an estimated 30 percent is used by salmon, trout or char, with the remaining 70 percent used by sticklebacks. As part of the authorization pursuant to the *Fisheries Act*, the Proponent would develop an offsetting plan in consultation with DFO to counterbalance the predicted loss of fish habitat, with the aim of net gain of fish habitat. The Proponent is consulting with DFO regarding potential for offsetting in Victoria River Steady No. 5, North Twin Brook and the outlet of Valentine Lake.

[4] Canadian Water Quality Guidelines for the Protection of Aquatic Life. Accessible at: https://ccme.ca/en/resources

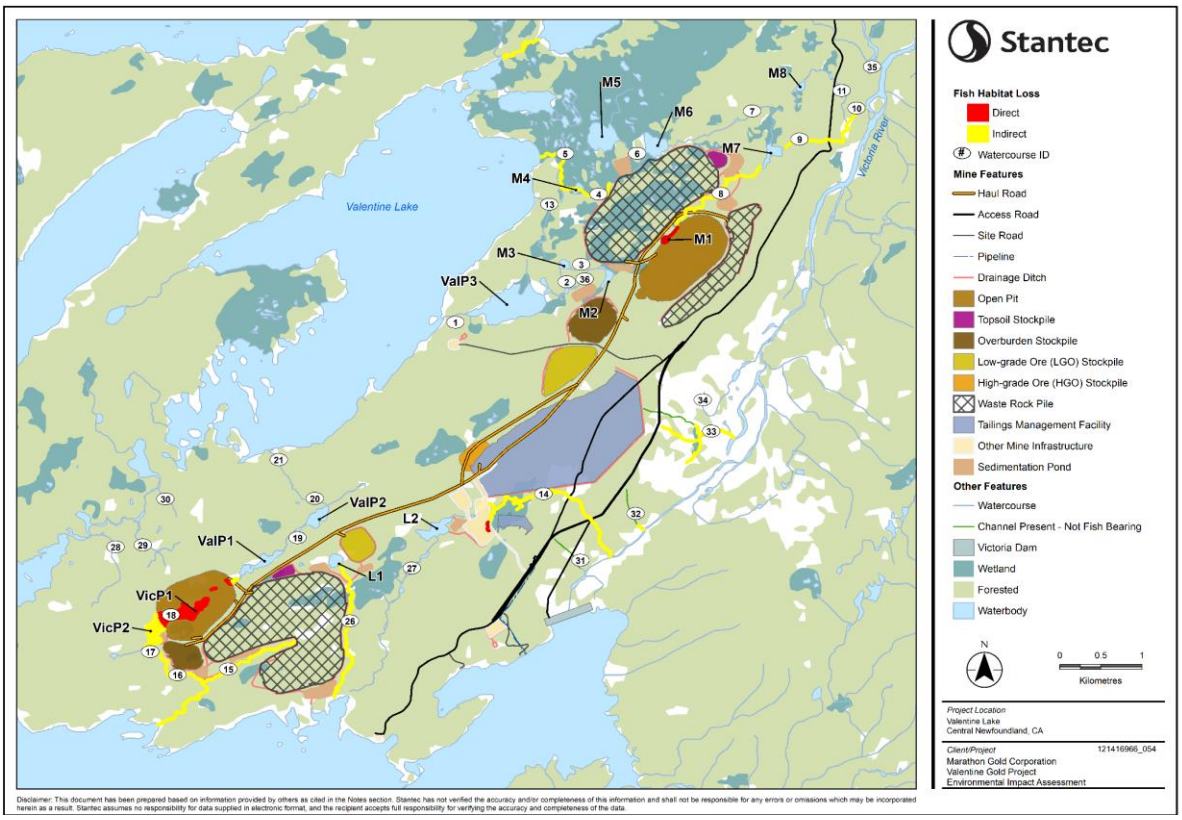
[5] Primary productivity is a measure of plant and algae activity.

Table 5: Summary of Anticipated Loss of Fish Habitat Quantity (Direct and Indirect) in the Local Assessment Area during All Project Phases

Loss	Type of Loss	Feature	Location	Amount (m2)
Direct	Destruction	Ponds	VicP1, VicP2, M1, ValP1	79,498
Indirect	Harmful Alteration or Disruption	Ponds	VicP2, M1	55,403
Direct	Destruction	Lakes	Victoria Lake Reservoir	4,000
Direct	Destruction	Streams	Site and Access Roads 8, 14	6,801
Indirect	Harmful Alteration or Disruption	Streams	3, 4, 5, 8, 13, 14, 15, 16, 26, 32, 33 and Outlet of Valentine Lake	41,003
			Total:	186,705

Source: Valentine Gold Environmental Impact Statement, 2020

Figure 7: Potential Direct and Indirect Fish Habitat Loss in the Local Assessment Area



Source: Valentine Gold Project: Environmental Impact Statement, 2020

Fish Habitat Quality

The Proponent stated that changes to surface water quality would be minimal during the construction phase of the Project, noting that effects of work near water on fish and fish habitat are well documented, and DFO's *Measures to Protect Fish and Fish Habitat*[6] would be followed to mitigate adverse effects.

The Proponent predicted mined materials from the Marathon pit would have higher potential for acid generation than those from the Leprechaun pit. The Proponent estimated an average acid rock drainage onset time of four years in potentially acid-generating low-grade ore based on conservative inputs from laboratory leaching rates. The Proponent stated that as preferable mitigation, non- potentially acid-generating low-grade ore would be preferentially stockpiled. Potentially acid-generating low-grade ore would be preferentially directed to the mill feed, so long as the grade requirement for the mill feed is met. Adaptive management of acid rock drainage and metal leaching from low-grade ore would include segregation of the Marathon low-grade ore stockpile effluent to allow acid rock drainage treatment, if required. The Proponent noted that high-grade ore from the Leprechaun and Marathon deposits would be stockpiled together and would not be expected to generate acid rock drainage due to short storage time, as these materials would be constantly replaced on the stockpile. The Proponent further noted that drainage from the high-grade ore stockpile would flow to the tailings management facility by gravity and potential acidity would be neutralized in the decant pond or in the mill process.

The Project's water management would include effluent discharge points that discharge to Victoria Lake Reservoir or to tributaries that ultimately drain to Victoria Lake Reservoir, Valentine Lake or Victoria River. The Proponent conducted water quantity and quality modelling to simulate proposed water management for the Project, and an assimilative capacity assessment to estimate the water quality of watercourses and waterbodies receiving discharges directly from effluent discharge points, as well as the three ultimate receivers of Valentine Lake, Victoria Lake Reservoir and Victoria River. During operations, the Proponent predicted that contaminants of concern in the three ultimate receiving waterbodies[7] would return to baseline or levels below CWQG-FAL within 300 metres under conservative worst-case conditions[8]. The Proponent also noted that effluent water quality at discharge points is predicted to be below limits set out in the MDMER and that effluent, surface water and groundwater monitoring would be conducted during operation to verify its predictions. Further, the Proponent indicated that it would implement adaptive management strategies as required based on monitoring results, such as sedimentation pond or drainage ditch adaptations or a containerized water treatment system to correct unanticipated exceedances of regulatory limits. The Proponent stated that the magnitude of effects of operations on fish habitat quality would be low, and not expected to affect sustainability and productivity of recreational fisheries.

Potential effects of reduced water quality on fish habitat quality in Victoria River and Victoria Lake Reservoir during the post-closure phase were predicted to be of low magnitude and long-term duration, with some exceedances of CWQG-FAL predicted in the Victoria River and Victoria Lake Reservoir for aluminum, copper, zinc, and fluoride. The Proponent stated that passive treatment such as constructed wetlands would be implemented during rehabilitation and closure to remediate the quality of water seeping from the mine site infrastructure. Mitigation would also include grading and revegetating waste rock piles to promote run-off and reduce water infiltration, as well as potential conversion of perimeter ditches into subsurface flow Permeable Reactive Barrier trenches and/or into subsurface "French Drains" to convey effluent to the constructed wetland treatment system. The Proponent stated that selection of the best option would be based on the results of a pilot study and further water quality assessment as

[6] Measures to protect fish and fish habitat - https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html

[7] Aluminum, arsenic, copper, lead, zinc, fluoride and phosphorous were predicted to exceed CWQG-FAL up to 300 metres within the ultimate receiving waterbodies of Valentine Lake, Victoria Lake Reservoir and Victoria River . This is a cumulative list; not all contaminants were predicted to exceed guidelines at all locations.

[8] The Proponent's worst-case model assumed high effluent concentrations [95th percentile or MDMER limits], and low flow (lowest flow averaged over a period of seven consecutive days that can be statistically expected to occur once every 10 climatic years) and poor water quality (75th percentile) conditions in receiving water.

closure and post-closure planning proceeds. Watercourses would also be monitored post-closure, and the Proponent expects the passive treatment system to maintain water quality within CWQG-FAL over the long term.

The Proponent conducted analysis of sediment load and chemistry to evaluate potential effects on sediment quality in receiving waters. The Proponent predicted no exceedances of applicable sediment quality thresholds in sediments from contact areas discharging from Project sedimentation ponds. It also predicted that average sediment deposition depth downstream of effluent discharge points into Victoria River and Victoria Lake Reservoir would be comparable to natural (background) deposition rates for receiving waterbodies with similar flows and water levels.

The Proponent stated that flooding the tailings management facility could have adverse effects on fish habitat quality from methylmercury production in organic soils or terrestrial vegetation. However, it predicted that these would be negligible to low in magnitude because the tailings management facility would be cleared of vegetation prior to flooding to reduce the potential for methylmercury production. The tailings would cover the base of the tailings management facility early in the operation phase, and collected water would be treated in the water treatment plant and polishing pond prior to release to meet MDMER limits. The Proponent further noted that the seepage collection system will cycle seepage from the tailings management facility back to the facility, thus mitigating potential concerns and reducing effects on fish habitat quality.

The Proponent stated that given their depth, pit lakes would become stratified (layered) following closure. The deepest layer would have low dissolved oxygen and elevated concentrations of metals, while the surface water layer would be well oxygenated and would discharge to streams once water quality discharge limits are met. The Proponent acknowledged that if full turnover of water in a pit lake were to occur, it could mix poor quality water at depth with good quality water at surface, possibly resulting in a release of water that could affect fish and fish habitat. However, it stated that while turnover may occur in the upper part of the water column, full turnover of the pit lakes from top to bottom would not be expected due to site specific conditions (e.g., lower temperature of groundwater, multiple water sources to maintain water depth, and chemical and biogenic conditions). The Proponent also stated that pond outlets will be designed with subsurface inlets to mitigate against chemical stratification in ponds.

The Proponent committed to developing and implementing an environmental effects monitoring plan in accordance with MDMER requirements, as well as five years of water quality monitoring post-closure, with adaptive management, including additional monitoring or mitigation, implemented as required.

Fish Health and Survival

The Proponent indicated it did not expect any residual effects to fish health and survival due to construction and installation of structures, since these structures would be designed to avoid harm to fish and to allow fish passage in accordance with DFO's *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater*. It also committed to undertaking fish rescue prior to construction of these works to avoid fish mortality. In-water construction activity would be timed to avoid direct mortality of fish larvae or eggs by respecting DFO *Timing windows to conduct projects in or around water* for the Island of Newfoundland. Additionally, workers would be prohibited from fishing at the mine site or bringing angling gear on site. The Proponent also committed to avoid using explosives in or near water when possible; if required, blasting would be conducted in accordance with DFO guidelines to ensure it results in few, if any, fish mortalities in nearby waterbodies.

The Proponent stated that residual effects to fish health could occur due to changes in water quality. However, it indicated it did not expect direct mortality of fish given that water would be managed and treated to meet authorized limits prior to discharge. Additionally, it did not anticipate sub-lethal effects since contaminants of potential concern would meet the CWQG-FAL within a short distance of mixing in the receiving environment (i.e., under worst-case conditions, within 300 metres in the ultimate receivers of Valentine Lake, Victoria Lake Reservoir and Victoria River).

The Proponent stated that the contaminants predicted to exceed CWQG-FAL in discharges are not bioaccumulative and would not be expected to bioconcentrate or bioaccumulate in fish or other aquatic organisms, except for arsenic, which was elevated in background surface water and sediment samples. However, the Proponent further noted that most studies available suggest that concentrations of inorganic arsenic decrease with transfer from one trophic level to the next (i.e., biodiminution), due to the conversion of inorganic arsenic to less toxic organic forms of arsenic. The Proponent predicted that metal concentrations (including arsenic) in receiving waterbodies would not change from baseline case concentrations as a result of the Project, and stated it is reasonable to conclude that concentration of arsenic in fish tissues would similarly be unchanged from baseline. The Proponent also committed to country foods monitoring to verify the EIS predictions through monitoring the quality of aquatic and terrestrial country foods harvested from within the local assessment area over the life of the Project.

Regarding the presence of iron floc in some baseline water samples and potential effects on fish, the Proponent noted that fish were confirmed to be present during baseline surveys in streams with naturally occurring iron floc, and that although discharged tailings historically result in “red water” in the lakes, there is no evidence of adverse effects on fish and fish habitat from other iron ore mines. Given the predicted concentrations of iron in the receiving environment, the Proponent stated that effects to fish and fish habitat would not be anticipated.

To reduce the potential for stranding of fish during filling of the open pits during decommissioning, the Proponent committed to sourcing water from areas where withdrawal should not cause stranding, and to monitoring stream flows.

The Proponent stated that during decommissioning, rehabilitation and closure, the surface water layer of the pit lakes is expected to be well oxygenated and discharge is predicted to meet MDMER limits. As such, the Proponent predicted that residual adverse effects on fish health and survival resulting from changes to water quality during this Project phase would be low to moderate in magnitude.

6.1.2. Views Expressed

Federal Authorities

DFO noted the importance of erosion and sedimentation control planning, and stated that key mitigations would include proper installation, inspection and maintenance, as well as ensuring that downstream flows are maintained when sedimentation/erosion controls are in use (i.e., cofferdams).

ECCC requested more information on planned mitigation, monitoring and follow-up programs to avoid the deposit of deleterious substances into fish habitat via seepage from the tailings management facility post-closure. The Proponent indicated it would implement a focused passive treatment strategy to remediate toe seepage water quality from the mine site infrastructure and to meet acceptable requirements in watercourses with water quality exceedances. The passive treatment testing program would be described in the Rehabilitation and Closure Plan submitted to Newfoundland and Labrador Department of Industry, Energy and Technology. Watercourses would continue to be monitored post-closure, and the Proponent expects that the passive treatment system would maintain water quality in the listed watercourses within CWQG-FAL guidelines over the long term.

With respect to potential for methylmercury, ECCC noted that due to the low pH and limited buffering capacity of Valentine Lake and Victoria Lake, Project discharges that include sulphate could result in lake acidification, which is known to stimulate methylmercury production and increase metal bioavailability. It recommended the addition of surface water monitoring sites in offshore areas of these lakes, beyond effluent discharge points, to monitor potential impacts of water discharges on lake water quality.

NRCan reviewed the Proponent’s groundwater model, which forecasted how Project-induced changes in groundwater discharge could affect surface water quantity in surrounding water bodies. Over the course of the technical review, the Proponent made revisions to its model boundaries, inputs calibration and outputs to address NRCan comments and to incorporate refinements to the Marathon low-grade ore

stockpile and waste rock pile, and the tailings management facility and associated ditches. NRCan was satisfied with the revised model, but noted that the results showed instances where seepage forecasts for various mine components vary from the original predictions of the EIS. To address this uncertainty, NRCan recommended that the revised model results be used to inform the Proponent's monitoring and follow-up program, to be implemented over the life of the mine and into closure to validate the model results and mitigation measures.

With respect to the potential for acid rock drainage and metal leaching to affect fish habitat quality, NRCan identified data gaps in the Proponent's baseline geochemical sampling and testing program, and requested additional detail to ensure risks were appropriately characterized. The Proponent undertook additional sampling over the course of the technical review process (December 2020 to February 2022), and provided the results, along with a preliminary plan which delineated steps, decisions and actions to manage potentially acid-generating materials. The Proponent also noted the need to update its acid rock drainage block model and water quality model, as well as its acid rock drainage and metal leachate management plan, in consideration of ongoing testing and analysis, environmental assessment conditions and permitting.

NRCan disagreed with the Proponent's exclusion of chromium as a contaminant of potential concern in the assimilative capacity assessment, given that some baseline water quality samples exceeded CWQG-FAL for hexavalent chromium. It recommended that chromium be considered as a contaminant of potential concern in the follow-up program, which should consider peak effluent concentration predictions, as well as water and sediment quality predictions in both Victoria and Valentine lakes. During effluent and environmental monitoring, provincial and federal regulators could use these values when reviewing effluent and environmental monitoring data to identify any additional mitigation measures that may be required, such as modifications to waste rock or tailings management.

Indigenous Groups

Miawpukek First Nation expressed concern about the potential for materials used in mine construction to be potentially acid-generating as well as the potential for acid generation at the Marathon low-grade ore stockpile, noting that processing of this mined material is not planned to begin until year nine of operations, well after the predicted six year period for acid generation. NRCan expressed similar concern, stating that the Proponent's assumption that the low-grade ore stockpile would not become acidic during the time that it is stockpiled is not reasonably conservative. The Proponent noted that all potentially acid-generating materials would be identified and tracked, and that seepage from the low-grade ore stockpiles would be monitored separately, with additional mitigation (e.g., water treatment) introduced at the stockpile if seepage water quality were to approach regulatory limits.

Qalipu First Nation and Miawpukek First Nation expressed concern about potential contamination of surface water from the Project, including recommendations for parameters to be considered in the monitoring program (nitrogen, phosphorous, cyanide species and ammonia). The Proponent noted that there are no contaminants of potential concern predicted to exceed the MDMER at effluent discharge points and that, as required by MDMER, monitoring would be conducted at each effluent discharge point over the life of the Project. Contingency measures would be implemented as required in the event of exceedances, including surface water quality sampling to confirm the exceedance, an investigation into the cause of the exceedance, and remedial measures such as sedimentation ponds or drainage ditch adaptations or a containerized water treatment system. Post-remedial sampling would also be conducted to ensure the exceedance has been addressed. Results would be shared with regulators, Indigenous groups and stakeholders.

Miawpukek First Nation raised concern that the Proponent did not include mercury as a contaminant of potential concern despite predicted exceedance of CWQG-FAL for mercury at the Marathon complex, Leprechaun complex, and tailings management facility. The Proponent noted that although the results of the geochemical water quality modelling showed that the concentrations of mercury in Victoria Lake Reservoir, Valentine Lake and Victoria River would not change from baseline concentrations, it identified

mercury as a contaminant of potential concern for its human health risk assessment due to community concerns.

Miawpukek First Nation and ECCC expressed concern about effects of water withdrawal, specifically during summer low flow season, which is critical for aquatic life and maintenance of water users rights to water supply. The Proponent noted that Valentine Lake is relatively deep along the shoreline, therefore the potential reduction in lake water level has minimal effect on the lake surface area. As such, the water taking for pit filling is not expected to affect the assimilative capacity of Valentine Lake nor alter the assimilative capacity assessment completed in the EIS. Similarly, Victoria Lake Reservoir also has steep shorelines and deep nearshore areas where Project discharges require mixing zones; therefore, the Proponent does not anticipate any change in Victoria Lake Reservoir mixing zones due to water withdrawal for pit filling. The Proponent noted that flow proportional water withdrawal could be used to withdraw water in consideration of natural lake water levels and environmental flows in order to reduce potential Project related effects. For example, additional water could be pumped from Valentine Lake during spring high flow months and reduced (or interrupted) in summer, with criteria for alternating pumping rate developed in consultation with regulators. The Proponent also noted that a water level and flow monitoring program will be implemented specifically to monitor potential effects of the water withdrawal.

Miawpukek First Nation expressed concern that blasting and the removal of ore and waste rock from the open pits could create larger cracks that could allow contaminated water to enter the local and regional groundwater systems. It recommended that the Proponent continue to monitor the integrity of the pit base and walls to ensure that the isolation of groundwater systems is intact and will not become a source of potential contamination, post-closure.

Public

Submissions from the public, including Mining Watch Canada, stated concerns about potential effects from Project discharges and the need for wastewater treatment. The Proponent noted that no contaminants of potential concern are predicted to exceed the MDMER at effluent discharge points and that as required by regulations, monitoring will be conducted at each effluent discharge point over the life of the Project. Should exceedances be detected, contingency/mitigation measures would be implemented.

6.1.3. Agency Analysis and Conclusion

Analysis of the Effects

Fish Habitat Quantity

The Project would have adverse effects on fish habitat from the construction of mine infrastructure and associated facilities, during operation from changes in water levels and flows, and during decommissioning when the open pits are flooded. The Proponent committed to implement an offsetting plan for the alteration, disruption or destruction of an estimated 186,705 square metres of fish habitat, to be developed as part of the requirements of the application for authorization under the *Fisheries Act*. The Agency notes the concerns of ECCC and Miawpukek First Nation regarding effects of water withdrawal on lake levels in Valentine Lake and Victoria Lake Reservoir, as well as NRCan concerns regarding uncertainty in surface water flow predictions resulting from modelling. The Proponent committed to developing criteria for alternating the pumping rate to mitigate adverse effects of water withdrawal, and the Agency has recommended this mitigation be developed in consultation with DFO and ECCC. The Agency has also recommended follow-up monitoring to verify the Proponent's effects predictions for surface and groundwater level and flow. The Proponent would be required to consult with ECCC, DFO, NRCan and Indigenous groups in the development of the follow-up program.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix B, the magnitude of effects on fish habitat quantity is considered to be moderate, as both direct and indirect fish habitat loss would be mitigated via offsetting approved by DFO. The duration would be long-term as most of the offsetting would be established prior to the loss of habitats and would require time to become fully established and functioning as intended. Habitat loss and alteration would occur continuously during construction, operations and decommissioning. Effects on the overprinted habitat would be irreversible; however, habitat gains expected from offsetting, would counterbalance habitat losses in the long-term.

Fish Habitat Quality

All phases of the Project have the potential to affect quality of surface water and sediment in receiving waters. The Agency recognizes that surface water quality was a key concern for Indigenous groups and the public. As recommended by DFO, the Proponent would be required to implement erosion and sediment control measures to avoid the deposition of deleterious substances into fish habitat as a result of surface water runoff, consistent with DFO's *Measures to protect fish and fish habitat*. The Proponent committed to management of waste rock, including that used in construction, to ensure identification and segregation of potentially acid-generating material. The Proponent also committed to monitoring for potential acid rock drainage and metal leaching. In addition, the Agency notes the concern of Miawpukek First Nation regarding the potential for acid generation and the need to ensure materials are properly segregated, as well as NRCan's recommendations regarding data gaps and options for management and treatment of runoff. The Proponent would be required to characterize and manage potentially acid-generating materials taking into account the Mine Environment Neutral Drainage Program's *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials,* including avoiding the use of potentially acid generating materials in site earthworks and grading.

The Agency is of the view that localized effects on surface water quality would occur during operations and post-closure downstream of treated wastewater discharge points, at outflows from the Marathon and Leprechaun pits, and as a result of groundwater seepage from waste rock storage and the tailings management facility. There is potential for exceedance of applicable guidelines (i.e., CWQG-FAL) for some contaminants[9] up to 300 metres within ultimate receiving waterbodies in worst-case conditions. The Agency notes that the Proponent's conservative worst-case scenario assumed low flows in receiving waters that statistically occur only once in ten years. The Agency notes that the Proponent would be required to comply with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act* as it pertains to the deposition of effluent into receiving waters, including the treatment of effluent to meet regulatory limits and the conduct of an environmental effects monitoring program. With respect to post-closure effects, the Agency notes that the Proponent committed to develop a Rehabilitation and Closure plan in consultation with the province, which would include passive treatment subject to pilot study and provincial approval before implementation. The Proponent also committed to five years of post-closure monitoring of surface and groundwater. To address Miawpukek First Nation's concern about potential for blasting and ore removal to cause cracks that could seep contaminated groundwater into nearby waterbodies, the Agency has recommended that follow-up include monitoring of open pits for the development of high hydraulic conductivity zones. The Proponent would also be required to intercept and redirect seepage from mine infrastructure, including the open pits, in accordance with MDMER requirements.

The Agency notes that the Proponent has committed to clearing of vegetation in the tailing management facility containment zone prior to flooding to reduce potential for methylmercury generation. The Agency shares ECCC's concern about buffering capacity of receiving waters and potential implications for metal bioavailability. In light of this uncertainty, and in keeping with ECCC recommendations, the Proponent would be required to ensure that follow-up for surface water quality includes monitoring stations further

[9] Aluminum, arsenic, copper, lead, zinc, fluoride and phosphorous were predicted to exceed CWQG-FAL up to 300 metres within the ultimate receiving waterbodies of Valentine Lake, Victoria Lake Reservoir and Victoria River . This is a cumulative list; not all contaminants were predicted to exceed guidelines at all locations.

afield from effluent discharge points to verify effects predictions with respect to assimilative capacity of receiving waters. To address concerns from Miawpukek First Nation and NRCan, monitoring of mercury, chromium, nitrogen, phosphorous, ammonia and cyanide would be required during follow-up. The Proponent would be required to consult with Indigenous groups in the development of this follow-up program, and provide groups with regular updates.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix B, the magnitude of effects on fish habitat quality is rated as low to moderate, with localized changes to water quality that will be measurable but are not anticipated to affect the ability of fish to use this habitat. Geographic extent of these effects are limited to the local assessment area. Effects would be continuous through the life of the Project and beyond. Given that effects would extend beyond the life of the mine, they are considered irreversible; however, it is noted that effects will be mitigated through rehabilitation of the mine site, which would include the development of passive treatment for outflows from the Marathon and Leprechaun pits.

Fish Health and Survival

The Project would have adverse effects on fish health and survival due to construction of Project infrastructure, changes in water quality from Project-related discharges, blasting and water extraction, The Proponent committed to designing culverts to maintain fish passage, salvaging and relocating fish prior to in-water works or drawdown, and installing intake screens to minimize harm to fish in accordance with DFO's *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater*. Further, the Proponent committed to avoiding blasting if possible and, when required, undertaking blasting in accordance with DFO's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Water*. The Proponent also committed to timing in-water construction to respect DFO's *Timing windows to conduct projects in or around water*. The Proponent would be required to consult with DFO and Indigenous groups when determining appropriate construction timing windows. The Agency notes that the Proponent would also be required to conduct regular acute and sublethal toxicity testing of effluent in accordance with the MDMER.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix B, the magnitude of effects on fish health is rated as low to moderate. Mortality from construction activities is not anticipated as a result of mitigation such as fish relocation, and effects to fish health as a result of project discharges are not expected to affect the regional status of fish populations and health. The geographic extent of effects would be limited to the local assessment area. The duration of the effects is rated as long-term since the effects would occur during the life of the Project and beyond. Effects would occur continuously and are considered irreversible, given that discharges affecting water quality and thus fish health, would extend beyond the life of the mine. Since activities would likely occur throughout the year, they may impact sensitive lifecycle periods, such as spawning; this will be mitigated by the requirement for the Proponent to time construction activities to avoid overlap with these sensitive periods.

Key Mitigation Measures to Avoid Significant Effects

The Agency has considered the mitigation measures proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups and the public in identifying the following key mitigation measures to be implemented with respect to fish and fish habitat.

Fish Habitat Quantity and Quality

- Follow DFO's *Measures to protect fish and fish habitat*[10] in keeping with the fish and fish habitat protection provisions of the *Fisheries Act*. For works, undertakings, and activities where Standards

[10] *Measures to protect fish and fish habitat* accessible at: https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

and Codes of Practice do not exist, submit a Request for Review to DFO's Fish and Fish Habitat Protection Program.

- Restore, create or enhance fish habitat to offset fish habitat losses associated with the development of the Project, in consultation with DFO, as required for a *Fisheries Act* Authorization.
- Maintain minimum flows in watercourses and design culverts to maintain fish passage.
- Use flow proportional water withdrawal to mitigate adverse effects on lake levels, with higher rates of withdrawal during high flow months and reduced or interrupted withdrawal in low flow months. Develop criteria for alternate withdrawal rates in consultation with DFO, ECCC and NRCan.
- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity:
    - Limit access to banks or areas adjacent to waterbodies;
    - Limit grubbing on watercourse banks to the area required for the footprint of works, undertaking or activity;
    - Construct access points and approaches perpendicular to the watercourse or waterbody;
    - Re-vegetate the disturbed area with native species suitable for the site.
- Prevent discharges that would be deleterious to fish or fish habitat, in accordance with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act*, and taking into account the Canadian Council of Ministers of the Environment's CWQG-FAL. This would include, but is not limited to:
    - Employ sedimentation and erosion control measures, taking into account future climate change scenarios, including periods of high water, heavy rainfall and wind:
        - Install effective control measures prior to beginning work in order to stabilize all erodible areas;
        - Regularly inspect and maintain the control measures during all phases of the Project;
        - Avoid fording watercourses;
        - Operate machinery on land in dry stable areas;
        - Keep control measures in place until all disturbed ground has been permanently stabilized;
        - Biodegradable sediment control materials should be used whenever possible;
        - Remove all exposed, non-biodegradable sediment control materials once the site is stabilized;
        - Schedule work to avoid wet, windy, and rainy periods that may result in high flow volumes and/or increase erosion and sedimentation;
        - Dispose and stabilize all excavated material above the high water mark of any waterbodies to prevent re-entry into the water;
        - All materials placed in or near water should be clean, free of fines, concrete or any other deleterious substance and of sufficient size to resist displacement;

    - Channel runoff to detention/sedimentation ponds prior to release to the receiving environment;
    - Configure detention/sedimentation pond inlet and outlet structures to reduce inlet velocity and scour, and to meet sedimentation requirements. Design pond outlets with subsurface inlets to mitigate against chemical stratification in ponds, thermal heating of discharge and ice blockage of outlets;
    - Ensure sediment control structures are appropriate to the task to which they are being applied, and that downstream flows are maintained during use;
    - Ensure no seepage or spillage of concrete or concrete residues outside of the work site;
    - Dispose all demolition material, especially any demolished timber and concrete, at an approved waste disposal site.
- Remove vegetation within the tailings management facility containment zone during construction and prior to filling/flooding to reduce potential generation of methylmercury.
- Install contact water collection ditches around overburden stockpiles, ore stockpiles and waste rock piles to collect toe seepage. Design contact water collection ditches with positive gradients to limit standing water and maintain positive flow.
- Intercept shallow groundwater seepage from the tailings management facility with seepage collection ditches and pump collected seepage back to the tailings management facility via sump pumps.
- Collect runoff and groundwater seepage from the open pits, with water pumped to sedimentation ponds before being discharged to each pits' pre-development watershed area.
- Taking into account the recommendations of the *Mine Environment Neutral Drainage Program's Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials*, and in consultation with NRCan and ECCC, characterize the acid rock drainage and metal leaching potential of the overburden and other mine rock used for construction, update the acid rock drainage block model to further refine and delineate estimates for potentially acid generating rock volume and reactivity, and develop testing and segregation procedures to ensure that potentially acid generating materials are not used for site earthworks and grading. Model updates should include estimates for potentially acid generating rock exposure in the pit walls. Share testing results, updated acid rock drainage block model, and sample selection rationale for any subsequent testing with NRCan and ECCC.Treat discharge water from the tailings management facility prior to discharge to a polishing pond for retention of effluent prior to discharge to the environment.
- Treat effluent to meet requirements of the MDMER and to ensure that receiving water concentrations of contaminants are at or below predictions in the Assimilative Capacity Assessment (Appendix 7C of the EIS). Maintain effluent discharge rates to below the highest rate used in the Assimilative Capacity Assessment (Appendix 7C of the EIS).

Fish Health and Survival

- Salvage and relocate fish from the local study area during construction and relocate to similar habitat within the local study area. Fish salvage and location planning should be undertaken in consultation with DFO and in accordance with all applicable laws including any conditions of authorization issued under the *Fisheries Act.*
- Limit the duration of work in or around water so as to not diminish the ability of fish to carry out one or more of their life processes (spawning, rearing, feeding, and migrating). Conduct these activities

during timing windows of least risk to fish in the area[11], as established in DFO's *Timing windows to conduct projects in or around water,* unless otherwise agreed to by relevant federal and provincial authorities. If in-water construction activities cannot be conducted during identified timing windows of least risk, develop and implement additional mitigation measures, in consultation with DFO, to protect fish during sensitive life stages.

- Install, prior to construction, screens on the water supply intake structures in accordance with DFO's *Interim Code of Practice for End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater*[12] and in accordance with any conditions of authorization issued under the *Fisheries Act* and its regulations requirements to avoid harming fish.
- Conduct blasting, following consultation with DFO and other relevant authorities, in accordance with DFO's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*[13] and in accordance with any conditions of authorization issued under the *Fisheries Act* and its regulations.

The Agency also notes that progressive reclamation of disturbed areas on the mine site, a key mitigation recommended for transboundary effects (section 6.5), will also contribute to mitigating adverse effects on fish and fish habitat by reducing potential for erosion and sedimentation at the mine site.

Follow-up

The Agency considered the follow-up and monitoring programs proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups in identifying the following programs to verify the predictions of effects to fish and fish habitat and the effectiveness of mitigation measures:

- Regularly monitor watercourses for signs of sedimentation during all phases of the Project and take corrective action if sedimentation is observed;
- Develop and implement, during all phases, a groundwater and surface water quality monitoring program with vertically distributed monitoring wells upgradient, downgradient and cross-gradient of the tailings management facility, polishing pond, waste rock storage area, overburden stockpiles, low-grade ore stockpile and open pits to evaluate the effectiveness of mitigation measures that are necessary to protect fish and fish habitat. The follow-up program must be developed in consultation with Indigenous groups, DFO, ECCC, NRCan and provincial authorities, in keeping with the proposed monitoring framework presented in section 7.9.1 of the EIS and with the requirements of the *Fisheries Act* and the MDMER, including required Environmental Effects Monitoring. The monitoring measures, at a minimum, should include:
    - Conduct ongoing geochemical testing of the waste rock and tailings during any period that waste rock and tailings are produced, taking into account the Mine Environment Neutral Drainage program's *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (2009)* and in consultation with relevant authorities, to confirm the predictions of the magnitude and onset of acid rock drainage and its impact on groundwater and surface water quality and to update the acid rock drainage block model;
    - Monitor open pits for the development of high hydraulic conductivity zones that may enhance groundwater flow;

[11] As identified by DFO's *Timing Windows to Conduct Projects in or Around Water* for Newfoundland and Labrador, accessible at https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html.

[12] *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater* accessible at: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html

[13] *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* accessible at: https://publications.gc.ca/collections/Collection/Fs97-6-2107E.pdf

- Use groundwater and surface water monitoring results to validate and update numerical models through mine life and post-closure, including the surface water quality model and forecasting of potential seepage from the flooded open pits in post-closure. Adapt mitigation measures for the tailings management facility, open pitsand waste rock storage areas, as necessary based on model predictions;
- Monitor surface water and groundwater flows, levels and quality to verify modelling predictions. In the event monitoring data shows changes beyond that predicted by water quantity, quality and assimilative capacity modelling (Appendices 7A, 7B and 7C to the EIS), construct adaptive management measures, such as sedimentation ponds, drainage ditch adaptations or a containerized water treatment system, and monitor their effectiveness.
- Include in monitoring the contaminants of concern and the surface water sampling locations identified in section 7.9.1 of the EIS, as well as mercury, chromium, nitrogen, phosphorous, ammonia and cyanide and any additional contaminants of concern identified by federal or provincial authorities. Downstream surface water sampling will include locations in offshore areas of Valentine Lake and Victoria Lake, away from effluent discharge points and predicted zone of influence for measurable effects on water quality, as determined in consultation with ECCC. Use the results of the monitoring measures to inform whether implementation of additional mitigation measures is required. In case additional measures are implemented, also monitor the effectiveness of those measures.

- Monitor, and treat if necessary, during decommissioning and abandonment and in consultation with Indigenous communities, ECCC and other relevant authorities, the water quality of the pit lake during filling to ensure that the water quality of the impending open pit overflow does not cause adverse effects on fish and fish habitat. Where treatment is not effective, implement adaptive management measures, and monitor their effectiveness.

Agency Conclusion

Taking into account the implementation of the mitigation and follow-up measures described above, the Agency is of the view that the Project is not likely to cause significant adverse environmental effects on fish and fish habitat. The Agency notes that the Project would take place in a disturbed ecological context, as the local assessment and regional assessment areas have been subject to previous fish habitat alteration from hydroelectricity development.

6.2. Migratory Birds

Project activities have the potential to affect birds, their eggs, nests and habitats, including bird species listed in Schedule 1 of the *Species at Risk Act, 2002*. Migratory birds are defined as those listed in the *Migratory Birds Convention Act, 1994*.

The Agency considered the following potential effects of the Project on migratory birds: habitat loss and alteration, sensory disturbances (i.e., artificial light and noise), and increased mortality risk from destruction of nests (with eggs and young), collisions, and toxicity. This chapter includes an assessment on migratory birds including those listed under the *Species at Risk Act* that have the potential to be affected by the Project (Appendix A).

The Agency is of the view that the Project is not likely to result in significant adverse environmental effects to migratory birds, including species at risk, after taking into account the implementation of proposed key mitigation and follow-up measures. The Agency based this conclusion on its analysis of the Proponent's assessment, federal authority expert review, and comments provided by Indigenous groups and the public.

6.2.1. Proponent's Assessment of Environmental Effects

Existing Environment

The Proponent observed 56 species of migratory birds listed under the *Migratory Birds Convention Act, 1994* within the project area and local assessment area. Three of the species in the vicinity of the project area and local assessment area are listed under the *Species at Risk Act*, including common nighthawk, olive-sided flycatcher, and rusty blackbird. The Proponent also noted three additional species at risk with the potential to occur within the local assessment area: bank swallow and red crossbill *percna* subspecies, and evening grosbeak. Refer to Appendix A for species status. None of the species at risk have defined critical habitat in the local assessment area. The historical record of the bank swallow indicated that it was observed on the edge of the local assessment area.

The Proponent used three spatial boundaries for the assessment for migratory birds. The project area, local assessment area and ecological land classification area (Figure 8). The Proponent used the ecological land classification area for the determination of significance of project-specific effects instead of the regional assessment area. The ecological land classification area (1,830 square kilometres) is smaller than the Proponent's defined regional assessment area (8,917 square kilometres) and would therefore represent an ecologically conservative estimate in relation to significance of effects.

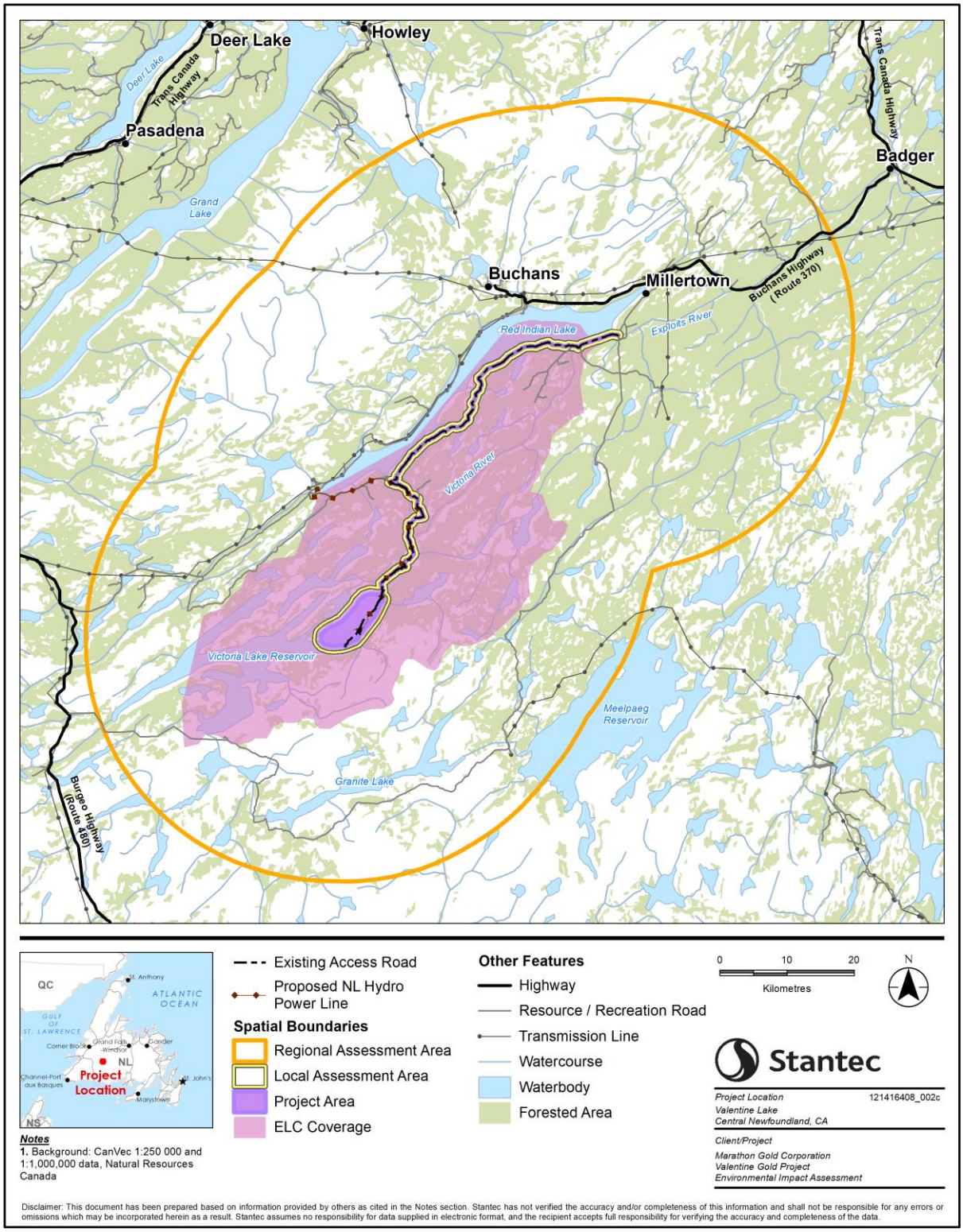
Migratory bird habitat identified in the ecological land classification area includes anthropogenic altered area, alder thicket, balsam fir forest, black spruce forest, kalmia-black spruce woodland, mixed wood forest, open water, open wetland, regenerating forest, riparian thicket, exposed sand/gravel shoreline, and wet coniferous forest[14].

Predicted Effects

The Proponent assessed habitat use for migratory birds by selecting representative species from each of the main groups of birds including landbirds, waterfowl, raptors, upland gamebirds and species at risk. Habitat requirements were evaluated for the representative species using field observations, existing literature and discussion with experts. The representative species for each of the main groups of birds and the percentage of habitat loss in the ecological land classification area is found in Table 6.

[14] The Proponent estimated habitats using representative species (for example, all land birds were defined by habitats used by Lincoln's sparrow and yellow-bellied flycatcher).

Figure 8: Migratory Birds Project Area, Local Assessment Area, Regional Assessment Area, and Ecological Land Classification Area



Source: Valentine Gold Project: Environmental Impact Statement, 2020

Table 6: Estimated Direct and Indirect Habitat Loss by Species in the Ecological Land Classification Area.

Group	Common Name	Area of Habitat (km2)1	Area of Direct Loss of Habitat (km2) 2	Area of Indirect Loss of Habitat (km2)	Maximum Percent of Habitat Loss (Direct and Indirect) 3
Landbirds	Lincoln's Sparrow	817.8	15.1	24.7	5
	Yellow-bellied Flycatcher	906.8	23.2	38.6	7
Waterfowl [4]	Canada Goose American Black Duck	690.8	5.9	8.4	2
Raptors	Northern Harrier	434.9	6.8	9.5	4
	Osprey	956.0	19.7	26.3	5
Upland Gamebirds	Spruce Grouse	1,123.8	28.7	42.4	7
	Ruffed Grouse	555.1	14.6	32.5	9
Species at Risk	Olive-sided Flycatcher	644.1	11.4	16.5	5
	Rusty Blackbird	663.0	11.5	23.1	6

[1] Area of the ecological land classification area includes the area of the project area.
[2] Area of Direct Loss of Habitat is the project area.
[3] Percent values were rounded to the next whole value.
[4]The EIS presents the same value for Canada Goose and American Black Duck.

The Proponent predicted that migratory birds may experience adverse effects from the Project as a result of habitat loss and alteration, sensory disturbances (e.g., artificial light and noise), and increased mortality risk. Overall, the Proponent predicted that with the implementation of mitigation and environmental protection measures, the residual adverse environmental effects on avifauna are not significant.

Change in Habitat

The Proponent noted that the majority of the habitat loss and alteration would occur in the construction phase due to the clearing of vegetation. Approximately 35 square kilometres of potential habitat would be lost within the project area based on the conservative assumption that all habitat would be removed due to a combination of site clearing, habitat fragmentation and sensory disturbance. The Proponent concluded that birds within the local assessment area are not limited by their breeding habitat and that habitat of varying quality would be made available in the Project area following Project rehabilitation activities post closure. Rehabilitation and closure plans would not likely result in the complete reversal of some project effects but would provide some suitable bird habitat. The Proponent has committed to develop a rehabilitation and closure plan that meets the requirements of provincial regulators.

The Proponent predicted that project activities may cause sensory disturbances to birds from noise and light and may cause birds to abandon important habitat features. The Proponent predicted that in addition to the direct loss of the project area, about 51 square kilometres of adjacent habitat could be altered from sensory effects including edge effects, noise and light pollution.

Alteration of behaviour from chronic noise may cause changes in foraging and anti-predator behaviour, reproductive success, density and community structure and habitat avoidance. It noted that studies have reported avoidance behaviour for noise levels greater than 40 decibels. The Proponent stated that the effects of noise would be localized to the area around the mine site and may extend beyond the local assessment area; however, it modelled that at five kilometres from the mine site, the sound would be below 35 decibels (background levels). The Proponent has committed that during the bird breeding season, blasting would occur outside of the prominent bird singing/calling and activity period (i.e., sunrise to approximately 9:30 am). The Proponent also indicated it would maintain vehicles and heavy equipment in good working order and equip them with appropriate mufflers to reduce noise as well as design project facilities and infrastructure to limit noise emissions.

Project lighting may cause adverse effects for local and migrating birds that may be attracted to the lights. The Proponent indicated that project lighting would be limited to what is necessary for safe and efficient project activities and that lighting design guidelines such as Commission Internationale de L'Éclairage, International Dark Sky Association, and Illuminating Engineering Society would be followed.

Change in Mortality Risk

The Proponent predicted that an increase in mortality risk is anticipated from clearing and cutting of vegetation during the mine site preparation phase. The effect would be greatest during sensitive time periods (e.g., during the breeding period) for eggs or unfledged birds. It stated the risk of mortality would be reduced by avoiding clearing vegetation during the breeding bird season.

The Proponent indicated that collision with Project traffic would also result in direct increase to mortality risk. The Proponent stated that the average Project-related traffic on the access road over the 16-20 month construction period would be six vehicles per day, with a peak of 18 vehicles per day on rotation change days. It noted it would incorporate mitigations to reduce the overall likelihood of bird mortalities related to vehicle collision such as: setting speed limits (set in accordance with provincial regulations and industry standards), clearing vegetation along road shoulders and reducing overall traffic by transporting employees by bus.

The Proponent does not anticipate an increase in mortality risk from ingestion and/or absorption of water in the tailings and/or polishing pond. However, it committed to clearing the embankments of the tailings management facility and sedimentation ponds to reduce attraction by waterfowl for foraging or breeding.

6.2.2. Views Expressed

Federal Authorities

To better understand potential effects, ECCC required additional information on migratory birds found or likely to be found in the study area with a focus on use of the project area by migratory bird species at risk. The Proponent provided ECCC field data collected during the 2021 field season and preliminary analysis. ECCC has provided a response to the preliminary analysis and is waiting on a response from the Proponent. In response to monitoring of the species at risk, the Proponent indicated it would develop the Avifauna Management Plan in consultation with regulators. Additionally, the Proponent committed to conducting an environmental effects monitoring program for all migratory birds, including species at risk that may be present in the project area. The Proponent would develop the program in consultation with ECCC.

ECCC expressed concerns with the potential for clearing or grubbing of vegetation within the migratory breeding bird season between April 15 and August 15. ECCC does not recommend the use of nest searches or pre-clearing surveys for active bird nests during the breeding season as a mitigation, given the difficulty associated with finding nests reliably and the high likelihood of disturbing nesting birds when searching. Instead, ECCC recommended that clearing and grubbing activities not be conducted during the breeding bird season.

ECCC required more information on the potential risk and deterrents to migratory birds using the tailings and/or polishing ponds. In response, the Proponent completed an avian risk assessment for the tailings management facility water following the Federal Contaminated Sites Assessment Program guidance. The Proponent indicated it would develop an adaptive management strategy in the Avifauna Management Plan where thresholds would trigger adaptive measures as needed. These may include visual deterrents, auditory deterrents, floating balls or netting. ECCC was satisfied with the Proponent's responses and its proposed measures to reduce the Project's effects on migratory birds.

Indigenous Groups

Miawpukek First Nation raised concerns about the lack of mitigation measures to deter migratory birds from tailings management facilities and Project water bodies (e.g., polishing and sedimentation ponds). The Proponent committed to additional monitoring and management plans.

Miawpukek First Nation requested additional information on avoidance and mitigation for olive-sided flycatcher. The Proponent noted that olive-sided flycatcher and other migratory birds displaced by the Project are likely to find breeding habitat elsewhere within the local and regional assessment areas.

Miawpukek First Nation requested evidence to support that nearby suitable habitats are below carrying capacity for species at risk birds (in particular, the olive-sided flycatcher). The Proponent stated that overwintering habitat is often more of a limiting factor than the breeding habitat. Given these are species at risk, the habitats for these species are not limited in Newfoundland and Labrador. The Proponent also indicated that the Ecological Land Classification showed suitable habitat in the surrounding area. Of the eight species at risk species, none were predicted to lose more than nine percent of their habitat in the ecological land classification area. The Proponent noted that the olive-sided Flycatcher frequently re-nest within 200 metres of a failed nest, suggesting that returning birds would be able to find suitable nest sites. The Proponent committed to, through the Avifauna Management Plan, additional mitigation measures to reduce avian disturbance such as staff training and altered timing for blasting.

Qalipu First Nation expressed concerned about the potentially unknown adverse effects of the Project on birds, and in particular, the traditionally important species ptarmigan. Ptarmigan would be considered under the provincial regulatory regime.

Public

The public raised concerns related to the risk to habitat loss for species at risk (Olive-sided Flycatcher). The Proponent has stated that wetlands would be avoided wherever possible; however, some wetland habitat loss is unavoidable. The Proponent has committed to additional monitoring and management plans.

6.2.3. Agency Analysis and Conclusion

Analysis of the Effects

The Agency notes that the Project would remove migratory bird habitat, including habitat for species at risk. This would likely result in alterations to migratory bird movement and local abundance; however, the Agency agrees with the Proponent that the loss in habitat would be low in magnitude for migratory birds (less than 10 percent habitat loss in the ecological land classification area) and moderate in magnitude for species at risk (five to 10 percent habitat loss in the ecological land classification area). The maximum

habitat loss per guild would be nine per cent (Upland Gamebirds) of the ecological land classification area. The Agency agrees that there are no habitat types lost within the ecological land classification area that are critical to the survival of migratory birds, including species at risk. Further, the implementation of a rehabilitation program would promote recovery of migratory bird habitat.

The Agency concurs with the Proponent that noise and light produced by the Project may cause birds to abandon important habitat features, however the Agency notes that with mitigations, the effect of noise and light would be low in magnitude. The Agency considers that the sensory effects would be localized, extend for the life of the Project but be reversible after decommissioning.

The Agency understands that vegetation-clearing activities would have an adverse effect on mortality risk for migratory birds, including species at risk. Clearing would result in the direct mortality of eggs or flightless young birds, primarily if these activities were to occur during the nesting period of migratory birds. The Agency is of the view that with the avoidance of vegetation clearing during the breeding bird season, mortality risk would be low in magnitude.

The Agency notes the Project-related traffic on the access road over the 16-20 month construction period would be six vehicles per day, with a peak of 18 vehicles per day on staff change days. This increase in traffic (during all phases) could result in a direct increase to mortality for migratory birds, including species at risk. The Agency is of the view that the mitigation measures proposed by the Proponent such as setting speed limits, clearing roadside vegetation and transporting employees by bus, would reduce the likelihood of mortalities.

In relation to possible ingestion or absorption of water from the tailings management facility, the Agency noted the Proponent's avian risk assessment predicted that the tailings management facility water would not to be toxic to birds and that ECCC agrees with this finding. The implementation of a monitoring program for water quality objectives are to be developed in consultation with ECCC. The Proponent also plans to reduce attraction to the area, through mitigations such as keeping the embankments of the tailings management facility and the sedimentation ponds free of vegetation. The Agency is therefore of the view that the mortality risk for migratory birds, including species at risk, from ingestion and or absorption of toxins would be low in magnitude.

Key Mitigation Measures to Avoid Significant Effects

The Agency has considered the mitigation measures proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups and the public in identifying the following key mitigation measures to be implemented with respect to migratory birds, including migratory birds that are listed species at risk:

- Carry out the Project, including vegetation clearing and blasting, in a manner that protects migratory birds and avoids harming, killing or disturbing them or destroying, removing or disturbing their nests or eggs. For this purpose, meet ECCC's Avoidance Guidelines "Avoiding harm to migratory birds" when developing the Avifauna Management Plan. The Avifauna Management Plan should be developed in consultation with ECCC and mitigation measures for migratory birds, including survey methods, avoidance windows, and setback distances should be updated to align with ECCC's current Avoidance Guidelines. Actions when carrying out the Project shall comply with the *Migratory Birds Convention Act, 1994*, the *Migratory Birds Regulations* and the *Species at Risk Act*.
- Do not conduct vegetation clearing activities, including clearing and grubbing during the migratory breeding bird season, where practicable.
- Limit vegetation clearing to the project area.
- Ensure vehicles and heavy equipment use noise-dampening technologies and are kept in good working order with regular inspection.

- Require project vehicles to comply with posted speed limits on temporary and permanent roads, including the access road, site roads and haul roads. Speed limits will be set in accordance with provincial regulations and industry standards.
- Develop, prior to construction, mitigation measures to control the direction, timing and intensity of lighting within the project area (including on migratory birds), while meeting engineering requirements for safe facility operation. These measures must be implemented during all phases of the Project. As part of these measures, the Proponent must: direct light fixtures toward active construction areas during construction and towards the working area during operation; use down-cast light fixtures during operation; install glare reduction technologies on individual light fixtures; and require that all motor vehicles use low-beam headlights within the project area.
- Maintain embankments of the tailings management facility and the sedimentation ponds free of vegetation.
- The Proponent shall install, prior to operation, and use a cyanide destruction circuit to reduce cyanide concentrations in tailings before the tailings are directed to the tailings management facility during operation.

The Agency also notes that as per the conditions of release from the provincial environmental assessment process, the Proponent would be required to develop a Rehabilitation and Closure Plan that meets the requirements of the Department of Industry, Energy and Technology. The plan will be reviewed and updated regularly until implemented.

Follow-up

The Agency considered the follow-up and monitoring programs proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups in identifying the following programs to verify the predictions of effects to migratory birds, including species at risk, and the effectiveness of mitigation measures:

- The Proponent shall develop, prior to construction and in consultation with relevant authorities and Indigenous Groups, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the use by migratory birds of surface water facilities. As a part of the implementation of the follow-up program, the Proponent shall:
    - Monitor the use by migratory birds of the tailings management facility, open aquatic areas and other key Project locations during all phases of the Project until such time that water quality in these structures meet legislative requirements and water quality objectives. The water quality objectives are to be developed in consultation with relevant authorities;
    - If results of the monitoring indicate that migratory birds use the tailing management facility, open aquatic areas and/or other key Project locations, develop and implement mitigation measures including but not limited to deterrent measures and/or exclusionary measures. The Proponent shall submit these measures to the Agency before implementing them.
- Develop and implement, in consultation with relevant authorities, including ECCC, a program to determine the effectiveness of all mitigation measures to avoid harm to migratory birds and migratory bird species at risk, their eggs and nests. As part of this program, have a qualified individual conduct post-construction breeding bird surveys and species at risk surveys, similar to the pre-construction surveys every year for the first three years to verify the Proponent's predictions. After three years, determine, in consultation with ECCC, the frequency of additional surveys based on the results of the follow-up program.

Agency Conclusion

Taking into account the implementation of the mitigation and follow-up measures described above, the Agency is of the view that the Project is not likely to cause significant adverse environmental effects on migratory birds, including migratory bird species at risk.

6.3. Species at Risk

Subsection 79(2) of the *Species at Risk Act* requires the Agency to identify the adverse effects of the Project on wildlife species listed in Schedule 1 of the *Species at Risk Act* and associated critical habitat. The Agency must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plan.

For the purpose of this assessment, the Agency defined species at risk as species listed in Schedule 1 of the *Species at Risk Act* or assessed as endangered, threatened or of Special Concern by COSEWIC (Appendix A). As the effects analysis, key mitigations and follow-up identified in section 6.1 (fish and fish habitat) and section 6.2 (migratory birds) are also applicable to fish and migratory bird species at risk, the Agency focussed the analysis in this section on potential effects of the Project on terrestrial mammal species at risk, namely bats, American Marten (Newfoundland population) and Caribou (Newfoundland population). There were no listed plant species at risk observed in the project area.

6.3.1. Proponent's Assessment of Environmental Effects

The Proponent identified sixteen *Species at Risk Act*-listed species as potentially occurring within the regional assessment area (Appendix A).

Existing Environment

Bats

On the Island of Newfoundland, Little Brown Myotis and Northern Myotis hibernate together during the winter months at underground sites including caves and abandoned mines, as well as sinkholes and fissures. The Proponent stated that there is one known hibernaculum in the regional assessment area, located approximately 12 kilometres from the project area, with a maximum of 38 individuals observed there during surveys over the last 11 years. The Proponent indicated that the site has tested positive for white-nose syndrome; the largest threat to bats in North America with mortality rates typically high in affected areas. The populations of Little Brown Myotis and Northern Myotis at known hibernacula in eastern Canada have declined by 94 percent since the arrival of white-nose syndrome[15].

Habitat requirements vary between the two species during the spring and summer. Northern Myotis are generally more forest-dependent, forming maternity colonies in trees, where females give birth to and raise their young. Little Brown Myotis typically form maternity colonies in human structures such as barns, attics, or sheds. Little Brown Myotis may also form maternity colonies in live or decaying trees, or snags that are typically found in mature forest stands. The Proponent conducted habitat value rankings and mapping for Northern Myotis in the project area, local assessment area, and ecological land classification

[15] A disease named for the white fungus that grows on the muzzle of affected bats while they hibernate. Bats affected by white nose syndrome arouse frequently during hibernation, depleting their limited resources (stored water, electrolytes and fat) and making them more likely to die (ECCC, 2015).

area[16] noting that this species was more conservatively chosen to represent both bat species based on its heavy reliance on forest habitats, in comparison to the more generalist Little Brown Myotis. Within the ecological land classification area and project area respectively, the Proponent identified a total of approximately 1,287 square kilometres and 24 square kilometres (Table 7) as high- and moderate-ranked Northern Myotis habitat.

Table 7: Habitat Area Summary Table

Species	Habitat Value Ranking	Total Existing Habitat by Habitat Value Ranking in Project Area (Km2)	Total Existing Habitat by Habitat Value Ranking in LAA (Km2)	Total Existing Habitat by Habitat Value Ranking in Ecological Land Classification Area (Km2)
Northern Myotis	**High**	16.6	51.6	539.3
	Moderate	7.3	36.1	748.0
	Low	10.8	39.2	543.3
	Total	34.7	127.0	1,830.6
American Marten (Newfoundland Population)	**High**	13.0	38.4	490.7
	Moderate	9.6	27.6	388.0
	Low	12.1	61.0	951.9
	Total	34.7	127.0	1,830.6
Caribou (Newfoundland Population)	**High**	18.7	52.5	849.1
	Moderate	9.8	46.5	718.5
	Low	6.2	28.0	263.0
	Total	34.7	127.0	1,830.6

Source: Valentine Gold Environmental Impact Statement (2020)

American Marten (Newfoundland Population)

The Proponent stated that American marten is primarily associated with mature forests. It indicated that females establish dens in holes in trees (e.g., hollow trees, woodpecker holes), or on the ground in rock piles, squirrel middens or openings at the bases of trees. Further, females use two types of dens: a natal

[16]The Proponent indicated that while the extent of the ecological land classification data does not fully cover the project area, local assessment area or regional assessment area, it was used to assess quantitative effects on habitat. The ecological land classification area was used as a surrogate for the regional assessment area, as, in the Proponent's view, it is an area of sufficient size to provide regional context and is the area for which comparable ecological land classification data is available. (EIS, p. 12.5)

den where the kits are born, and a series of up to ten maternal dens where the young are reared. The Proponent stated that the project area overlaps Little Grand Lake/Beothuk Lake area, one of three core areas for the west-central Newfoundland Amercian marten population. This core area is estimated as having between 237 and 481 individuals.

The provincial recovery plan for American marten identified approximately 6,200 square kilometres of critical American marten habitat on the Island of Newfoundland. Of this total, approximately six square kilometres (0.10 percent) overlap the project area and approximately 42 square kilometres (0.67 percent) overlap the local assessment area. Within the ecological land classification area and project area respectively, the Proponent identified approximately 879 square kilometres and 23 square kilometres as high- and moderate-ranked American marten habitat (Table 7).

In addition to threats from habitat loss or alteration, mortality from trapping and snaring is also an important factor affecting American marten populations on the Island of Newfoundland. In the Little Grand Lake/ Beothuk Lake area, reports from 2007 indicated that trapping and snaring accounted for nearly 50 percent of American marten mortalities. The Proponent noted that American marten have been confirmed in the local assessment area with most sightings having occurred along the access road, and one sighting within the proposed project area.

Caribou (Newfoundland Population)

The federal *Species at Risk Act* considers Woodland Caribou on the Island of Newfoundland as a single population (Caribou, Newfoundland Population) and lists it as Special Concern, although there are approximately 14 distinct sub-populations (herds) that are differentiated based on annual movement patterns, spatial affiliations and genetic structure[17]. According to the Proponent, caribou require large interconnected, lichen-rich, mature coniferous forests interspersed with barrens and wetlands. The Proponent stated that lichens are the most important vegetation for woodland caribou and are consumed as forage in all seasons. Caribou also consume mosses and shrubs, as well as some herbs and grasses and their diet varies seasonally.

The Proponent determined that the regional assessment area falls within the ranges of the South Coast sub-population comprised of the Buchans, Gaff Topsails, Grey River and La Poile herds. Collectively, these herds represent approximately 36 percent of the caribou population on the Island of Newfoundland. These herds, moving between seasonal habitats, share their winter ranges but have separate calving and summer areas.

Of them, the Buchans herd travels the longest distance between areas. The Proponent determined that the summer and winter migration routes of the Buchans herd overlaps the project area (Figures 9 and 10). According to the Proponent, the project area overlaps with 5.5 km of the length of the migration corridor, equal to approximately 3.8% of its total length. The project area overlaps approximately 1.3% of the total area of the spring migration paths, and approximately 1.7% in fall. The Grey River herd's calving grounds are located to the south of Victoria Lake Reservoir and approximately 2.5 kilometres south of the project area.The Proponent stated that the winter, calving and spring migration / pre-calving ranges of the Grey River herd overlapped the project area, however, the percentage of overlap was less than 2% of the Grey River herd seasonal range. The Proponent indicated that there is no overlap between the La Poile herd's seasonal range and the project area. The Gaff Topsails herd seasonal range does not overlap the mine site and only a small amount of overlap exists with the existing access road (0.4 square kilometres) during the winter.

Within the Ecological Land Classification Area and project area respectively, the Proponent identified approximately 1,568 square kilometres and 29 square kilometres as high- and moderate-ranked caribou habitat (Table 7). The Proponent notes that habitat loss or alteration is an important factor affecting caribou populations across North America. Caribou habitat can be directly affected through loss or

[17] *COSEWIC Assessment and Status Report on the Caribou Rangifer tarandus Newfoundland population, Atlantic-Gaspsie population, Boreal Population* (COSEWIC 2014). Accessible at Caribou,Rangifer tarandus caribou (canada.ca)

alteration. While habitat may remain intact, it may be affected indirectly through mechanisms such as sensory disturbance, which would reduce its suitability for caribou.

According to the Proponent, recent surveys indicate that although populations of some herds in the south coast sub-population may be stabilizing, research also indicates that caribou populations on the Island of Newfoundland continue to be limited by poor calf survival and, subsequently, poor recruitment rates. The Proponent indicated that predation[18] is the primary cause of caribou calf mortality accounting for approximately 90 percent of calf deaths. The decrease in calf survival since the mid-1990s is due to an increase in predation rate.

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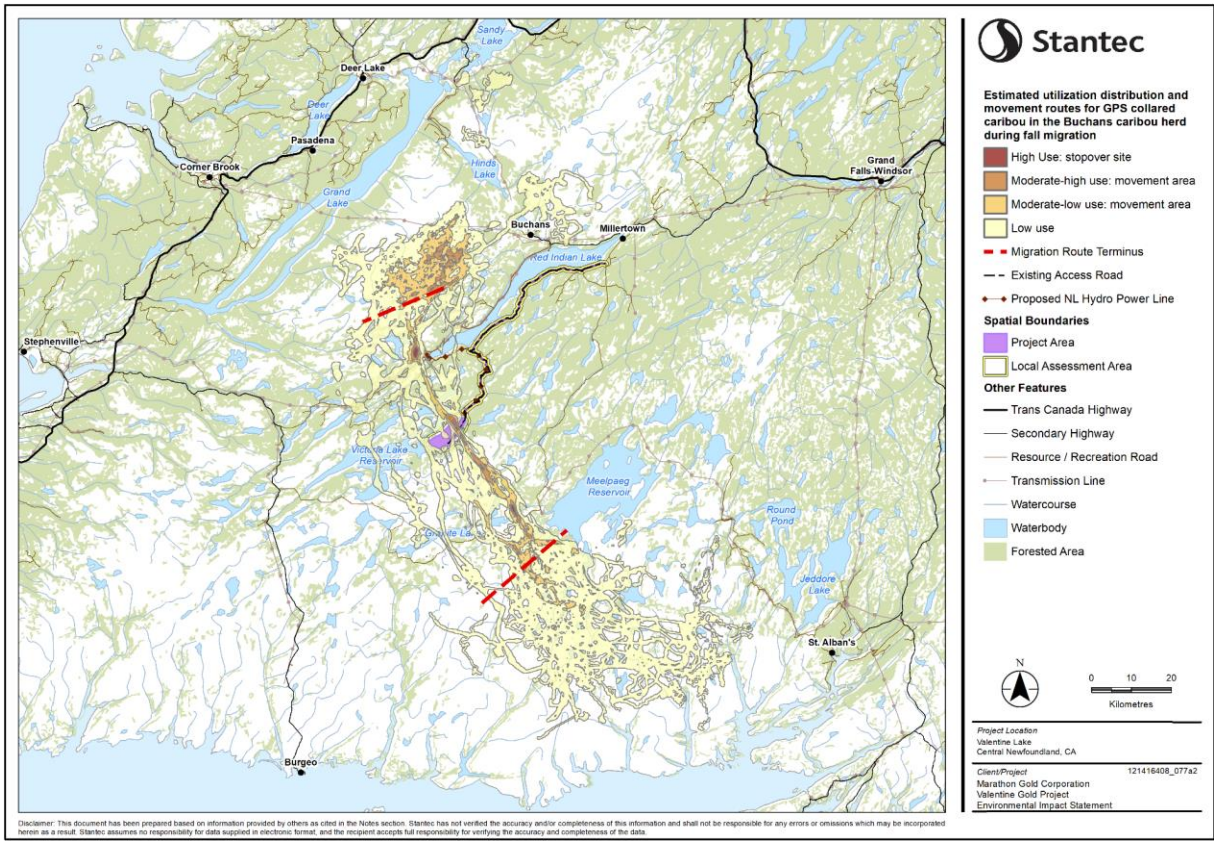
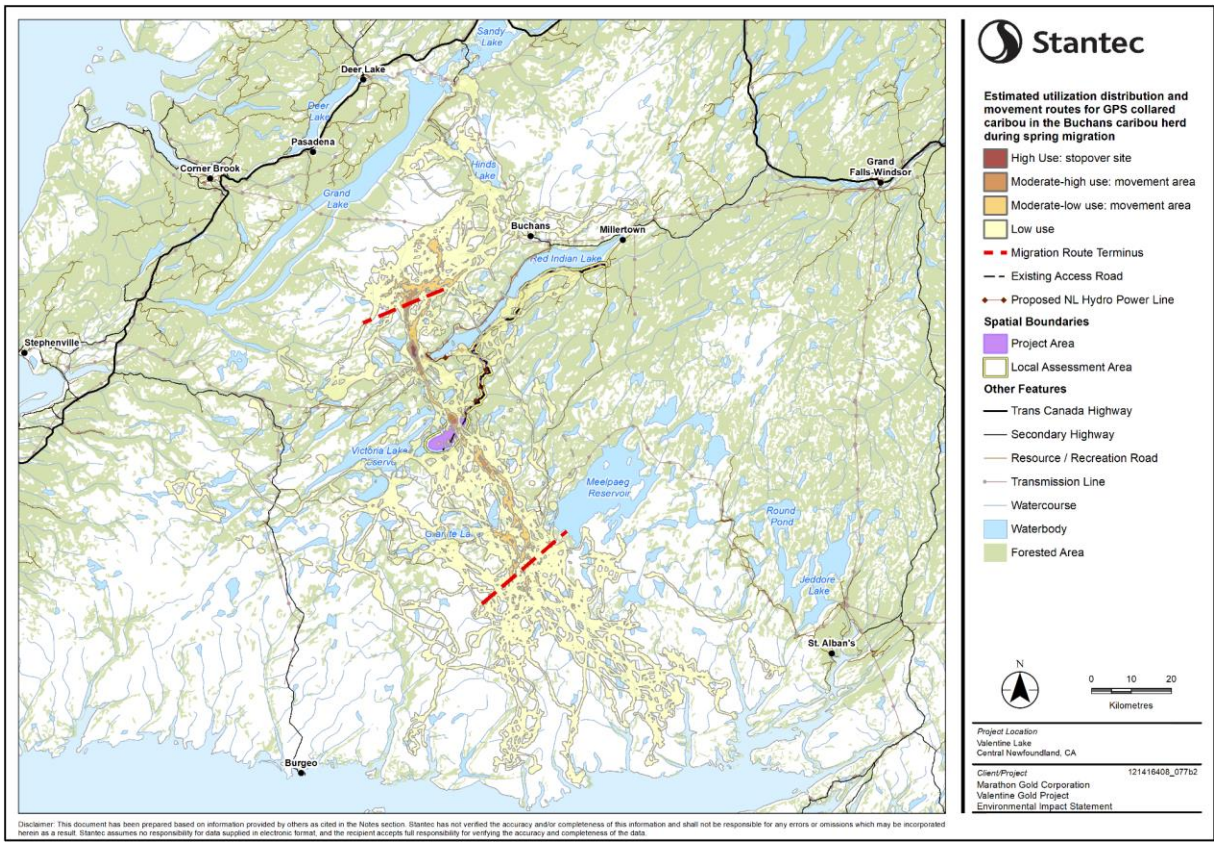
[18] Black Bear and Coyote are the primary predators of Caribou calves on the Island of Newfoundland but calves are also preyed upon by Bald Eagle, Golden Eagle and Canada Lynx (Valentine Gold Project: Environmental Impact Statement, 2020).

Figure 9: Estimated Utilization Distribution and Migration Corridors for GPS Collared Caribou in the Buchans Herd During Fall Migration



Source: Valentine Gold Environmental Impact Statement, 2020

Figure 10: Estimated Utilization Distribution and Migration Corridors for GPS Collared Caribou in the Buchans Herd During Spring Migration



Source: Valentine Gold Environmental Impact Statement, 2020

Predicted Effects

Bats

The Proponent noted that should a hibernaculum exist within the local assessment area, blasting and other loud noises could result in disturbance to hibernating bats. The noise from project blasting would also result in underground vibrations, which could result in the alteration or collapse of an underground hibernacula. Noise and underground vibrations could also wake hibernating bats causing them to use their limited fat reserves and potentially affect reproductive success. Additionally, white-nose syndrome results in more frequent arousals during hibernations and the effects from disturbance within hibernacula could be considerable. However, the Proponent noted that there no known bat hibernacula in the project area, with the only known hibernation site over 12 kilometres away.

The Proponent estimated that within the ecological land classification area, the Project would result in the direct loss of up to approximately 24 square kilometres of high- and moderate-ranked Northern Myotis habitat, with an additional approximately 28 square kilometres indirectly lost through sensory disturbance and edge effects (Table 8). Combined, these losses would represent approximately four percent of the total high and moderate ranked habitat in the Ecological Land Classification Area. The Proponent committed to identifying, flagging and maintaining buffer zones, prior to construction,around sensitive areas (e.g., hibernacula and roosts) where feasible. The Proponent also proposed design considerations to reduce the extent of direct disturbance of habitat where practicable, which would reduce the total amount of habitat lost during construction and operation. The Proponent would also implement acoustic monitoring for bats before and during construction and operation as recommended by the Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture-Wildlife Division.

Table 8: Habitat Loss from the Project

Species	Total high and moderate value habitat loss in Ecological Land Classification Area (direct) [Km2]	Total high and moderate value habitat loss in Ecological Land Classification Area (indirect) [Km2]	Percent high and moderate value habitat loss in Ecological Land Classification Area (direct and indirect)
Northern Myotis	23.9	28.4	4.1%
American Marten (Newfoundland Population)	22.6	25.6	5.5 %
Caribou (Newfoundland Population)	28.5	57.3	3.8 %

With the exception of changes to habitat, the Proponent concluded that adverse effects would be reversible and would not threaten the long-term viability of Little Brown Myotis, Northern Myotis Myotis.

American Marten (Newfoundland Population)

The Proponent estimated that vegetation clearing in the project area would result in the direct loss of up to 23 square kilometres of high- and moderate-ranked American marten habitat, with an additional approximately 26 square kilometres lost indirectly (e.g., through sensory disturbance and edge effects) Combined, these losses would represent approximately six percent of the total high- and moderate-ranked habitat for American marten in the Ecological Land Classification Area (Table 8). The Proponent

further noted the potential for disturbance of a small portion (0.67 percent) of the 6,200 square kilometre proposed critical American marten habitat given the area of overlap with the local assessment area.

The Proponent committed to identifying, flagging and maintaining buffer zones, prior to construction, around sensitive areas (e.g., American marten dens) where feasible, and to developing a monitoring plan for American marten that would continue through construction, operation, and decommissioning to assess changes in American marten presence compared to existing conditions.

The Proponnent acknowledged that there would be some habitat loss from construction activities that would be irreversible as some project components would be permanent features on the landscape (e.g., flooded open pits) and some vegetation communities would not be expected to return to existing conditions. With the exception of changes to habitat, the Proponent concluded that adverse effects would be reversible and would not threaten the long-term viability of American marten once the Project has been decommissioned.

Caribou (Newfoundland Population)

The Proponent predicted that the Project would affect caribou through a change in habitat, movement and mortality risk. The Project is predicted to have an effect on both the Buchans and Grey River herds, and to a portion of the Grey River herd calving grounds.

The Proponent indicated that caribou require large, interconnected tracts of lichen-rich forest, and changes in habitat that affect the connectivity between optimal habitat patches can affect caribou, as can the loss of habitat. The Proponent calculated that within the Ecological Land Classification Area, 28.5 square kilometres of high and moderate-ranked caribou habitat would be directly lost through site preparation (e.g., vegetation removal, earthworks) in the project area equal to approximately 2% of caribou habitat in the total Ecological Land Classification Area (Table 8). An additional 57.3 square kilometres of habitat would be lost due to indirect changes (e.g., sensory disturbance, traffic). The Project-related habitat loss due to direct and indirect effects would affect approximately 3.8%of high and moderate ranked caribou habitat in the ecological land classification area.

The Proponent indicated that maintaining the functionality of migration paths by preserving connectivity between seasonal ranges is vital to sustaining the affected caribou herds. The Marathon open pit and waste rock pile would be developed within the primary migration corridor for the Buchans herd. The Proponent noted that this development would create a permanent obstacle, which migrating caribou would be forced to avoid. In addition to the physical obstacle, site activities and associated sensory disturbance would also affect caribou within proximity to the mine site, and direct interaction with Project features and activities such as access road or haul road traffic could result in injury or mortality.

The Proponent stated that development and operation of the Project presents risks to migrating caribou and noted the uncertainty associated with the reaction of caribou to Project effects (combination of physical obstacle and sensory disturbance). The Proponent identified three potential responses for migrating Buchans caribou:

- Caribou may continue to migrate through the existing, preferred corridor, navigating around but close to the Marathon open pit and waste rock pile.
- Caribou may avoid the Project and migrate along alternate paths that will be longer and result in greater energetic consumption.
- Caribou may fail to migrate, subsequently remaining either north or south of the Project year-round.

These potential responses by migrating caribou may occur at the individual, group, or population level. A mixed response by caribou to the Project is also possible, whereby individuals or groups may react

differently to the Project (e.g., some caribou migrate through the site and other caribou migrate via alternate, longer pathways).

The Proponent noted that there is difficulty in assessing how caribou would respond to the Project, and at what level the response would be (e.g., individuals, groups, population). It suggested that literature indicates that caribou migration patterns are frequently affected by disturbance and that a herd-wide failure to migrate has not been reported as a response to disturbance.The Proponent stated that there is also evidence related to the creation of the Star Lake reservoir (approximately 20 kilometres northwest of the Project), that caribou altered their path of travel during construction and returned post construction. The creation of the reservoir altered the migratory route temporarily but did not stop the migratory behavior of the herd.

Since the time the Proponent provided the initial project description document to the Agency, it has modified the project design, in consultation and discussion with the Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture-Wildlife Division, as a means to mitigate potential effects on caribou. Changes have included:

- Removal of the Victory pit (most northern pit) from the original Project design, reducing the overall project footprint and eliminating activity on one side of the caribou migration zone;
- The process plant was moved further away from the primary caribou migration zone to the west of the new tailings management facility location, reducing potential sensory disturbance along the migration paths
- The Marathon waste rock pile was relocated and reconfigured, reducing the footprint within the migration path;
- In consultation with Newfoundland and Labrador Hydro, the proposed power line route was aligned with the existing access road, and would follow existing access roads along its entire route to the Star Lake generating station avoiding the creation of a new linear feature and located further away from potential alternate caribou migration routes; and
- Refinement of the layout and location of the low-grade ore and overburden stockpiles associated with the Marathon pit to open a corridor between the stockpiles and open pit/waster rock pile through which caribou can travel.

To further mitigate potential effects on caribou, the Proponent has proposed to vary project activities according to caribou behavioral patterns throughout the year. These include limiting or restricting mining activities during migration periods, delaying blasting activity if caribou are in the vicinity, facilitating caribou crossings across snowbanks or ditches, and aligning crossing points with existing migration paths. The Proponent would also adjust activity levels as needed, any time of the year when caribou are detected within close proximity to the project area. The Proponent committed to undertaking regular reviews of collar data and visual surveys and/or drone surveys for caribou prior to blasting during construction and operations (the search zone would be one kilometre from the blast and 500 metres once blasting is more than 50 metres below the pit crest). Blasting would be delayed if caribou are observed within blasting zones. If caribou are detected outside the blasting zones but within a three-kilometre radius of the blast, visual monitoring of the caribou would be conducted to determine if the caribou have an adverse reaction to the blast event. Activity levels would be predetermined based on specific triggers identified in the Caribou Protection and Environmental Effects Monitoring Plan.

The Proponent indicated that adverse effects of the Project on the Gaff Topsails, Grey River and La Poile herds are expected to be low in magnitude. For the Buchans herd, the adverse effects of change in habitat and mortality risk are expected to be low, however, the effects on change in caribou movement for this herd are anticipated to be high in magnitude and likely to occur due to the overlap between the Project and the migration path used by over 50% of the Buchans herd. Changes to caribou habitat and movement are considered to be irreversible, as conditions would not be restored following closure. With implementation of mitigation measures, and given the uncertainties described above, the Proponent

indicated it conservatively predicted the residual adverse effect of change in movement for the Buchans herd to be significant. The Proponent concluded no significant effect on the Gaff Topsails, Grey River and La Poile herds.

6.3.2. Views Expressed

Provincial Authorities

Bats

The Province noted that Little Brown Myotis and Northern Myotis are now both listed under the provincial *Endangered Species Act* (as of May 2021) and have prohibitions on disturbing, harassing, injuring or killing these species and that their residences, including colony sites, are also protected under this Act. A Section 19 permit under the *Endangered Species Act* will be required if there will be any impact on bat individuals or their residences.

Caribou (Newfoundland Popoulation)

The Province raised concerns over the synthesis of information on caribou for a comprehensive risk assessment for the potential impacts to the population as a whole if caribou fail to migrate, the impacts to calving success including poor body condition on pregnancy, impacts from the haul road, and effects of dust for all phases of the Project. Additionally, the Province requested more information on cumulative effects, including functionality of the remaining habitat and its connectivity, and applying cumulative effects to the risk assessment for the Buchans herd. The analysis of cumulative effects is found in section 7.3. The Province also requested more detail for targeted mitigations, including measures to be taken in the event that if caribou do not avoid the mine site. Some of the Proponent's mitigation measures are outlined in the section above. The Proponent has engaged with the Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture–Wildlife Division for the provincial environmental assessment under the Newfoundland *Environmental Protection Act, 2002*.

The Government of Newfoundland and Labrador's approval of the Project (March 17, 2022) includes conditions related to caribou including adherence to mitigation, monitoring and commitments stated in the EIS, including reducing the overall Project footprint to increase the distance from the primary caribou migration route, suspending or limiting high disturbance activities during periods of caribou vulnerability, and periodic review and update of the Caribou Protection and Environmental Effects Monitoring Plan in collaboration with the Province which shall be undertaken for the duration of the Project.

Federal Authorities

ECCC indicated that it has obligations under s.79 of the *Species at Risk Act* for Little Brown Myotis, Northern Myotis, American Marten and Newfoundland Caribou. ECCC has considered effects on these species at risk. ECCC confirmed that the information available through the environmental assessment was appropriate and sufficient, and that the analysis appears sound.

ECCC indicated that the Caribou Protection and Environmental Effects Monitoring Plan should include adaptive management, to adjust mitigation measures in response to observed effects to caribou through monitoring.

Indigenous Groups

Miawpukek First Nation and Qalipu First Nation requested additional information about American marten occupancy in the regional assessment area, justification for the Proponent's conclusions, and additional and specific mitigation and monitoring measures that include observations and mortality events. The Indigenous groups recommended that community members be included in the planning, execution, and

analysis of American marten monitoring. The Proponent would develop a monitoring plan for American marten for all Project phases that assesses changes in American marten presence compared to existing conditions. The Proponent committed to working with Qalipu First Nation and Miawpukek First Nation, to involve these groups in environmental monitoring and to exchange environmental information regarding the Project.

Miawpukek First Nation and Qalipu First Nation requested additional field studies to examine the presence and hibernacula sites of Little Brown Myotis and Northern Myotis in the local assessment area where the additional studies inform the development of additional bat related mitigation measures specifically relating to known occupancy areas, and that community members be included in the planning, execution, and analysis of the bat monitoring. The Proponent would conduct acoustic monitoring for bats in the project area and local assessment area both before and during construction and during operation as recommendation by the Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture–Wildlife Division.

The requested information from Miawpukek First Nation and Qalipu First Nation for additional information and clarification on caribou was similar to provincial requests and is reflected in the section above under Federal and Provincial Authorities.

Public

The public requested bat surveys be completed to understand the distribution of Little Brown Myotis and Northern Myotis. This was addressed above in the Indigenous Groups views expressed.

The request from the public for additional information and clarification on American marten and caribou was similar to that requested by the province and Indigenous groups and is reflected in the sections above.

6.3.3. Agency Analysis and Conclusion

Analysis of the Effects

As required by section 79(1) of the *Species at Risk Act*, the Agency advised the Minister of Environment and Climate Change that the Project has the potential for adverse effects on species at risk. ECCC noted that the Province of Newfoundland and Labrador is the lead jurisdiction for the management of Little Brown Myotis and Northern Myotis, Newfoundland Caribou, and American marten within the province. ECCC and DFO reviewed the assessment of effects on species at risk and their critical habitats and confirmed that the potential effects on fish and bird species at risk would be the same as those effects described for fish and fish habitat (Section 6.1) and migratory birds (Section 6.3) and that the information provided satisfies requirements under Subsection 79(2) of the *Species at Risk Act*. ECCC confirmed that the information available through the environmental assessment was appropriate and sufficient, and that the analysis appears sound.

Bats

The Agency notes that the largest threat to bat populations on the Island of Newfoundland is white-nose syndrome and that the one known hibernaculum in the regional assessment area, which is located at 12 kilometres from the project area has tested positive for it. The Agency acknowledges that disturbance from Project activities could adversely affect bats should an unknown hibernaculum be located in the vicinity of the Project. However, the Agency is of the view that given the distance between the Project and the closest known hibernaculum, the Project is not likely to result in sensory disturbance to hibernating bats. The Agency notes that the Proponent committed to identification and avoidance of sensitive bat sites and the development and implementation of acoustic monitoring for bats in consultation with Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture–Wildlife Division.

American Marten (Newfoundland Population)

The Agency agrees with the Proponent that the long-term viability of the American marten population is not likely threatened by the Project. While the Project would have direct and indirect effects on approximately six percent of the high- and moderate-ranked habitat in the Proponent's Ecological Land Classification Area, the project area overlaps only six square kilometres of critical habitat identified by the province, representing approximately 0.1 percent of the total area of critical habitat on the Island of Newfoundland. The Agency notes that the Proponent committed to identification and avoidance of American marten dens when possible, as well as to the implementation of an American marten monitoring program.

Caribou (Newfoundland Population)

The Agency acknowledges that the project area overlaps caribou migration routes and would result in adverse effects on caribou migration. The Agency notes that considerable re-design to the Project has been undertaken in consultation with Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture–Wildlife Division to reduce overlap with the migration path. Further, the Proponent has committed to continuing to update its Caribou Protection and Environmental Effects Monitoring Plan in consultation with the Province, scientific experts, Indigenous groups and stakeholders. The Agency notes that the Government of Newfoundland and Labrador is the leading expert authority on caribou within the province and that caribou potentially affected by the Project are located entirely on provincial lands. Therefore, the Agency looks to the province to determine the potential effects and any required mitigation measures for caribou. Furthermore, the Proponent will continue to engage with provincial experts as outlined in the Government of Newfoundland and Labrador conditions of release[19] for the Project. As required by the *Species at Risk Act*, the Agency has advised ECCC of the potential for adverse effects to species at risk, including caribou and ECCC confirms that the information available through the environmental assessment was appropriate and sufficient, and that the analysis appears sound.

Key Mitigation Measures

The Agency has considered the mitigation measures provided by the proponent, advice from expert authorities, and comment received from Indigenous groups and the public in identifying the following key mitigation measures to be implemented with respect to caribou.

- Identify, prior to construction, time periods during which Project activities must be carried out to protect caribou during sensitive life stages.
- Prioritize the avoidance of destruction or alteration of habitat over minimizing the destruction or alteration of habitat, to minimizing the destruction or alteration of habitat over restoring altered or destroyed habitat on-site, and to restoring altered or destroyed habitat on-site over offsetting.

Agency Conclusion

The Agency notes that the key mitigations described above and in the other valued component sections (section 6.2) would reduce adverse effects on species at risk such as avoiding sensitive life stages, managing surface runoff and wastewater to protect local water quality, limiting vegetation clearing to the project area, and implementing measures to reduce noise effects. The Agency is also of the view that the measures implemented by the Proponent to meet the Agency and provincial regulatory requirements would avoid or lessen any potential adverse effects on species at risk. These measures are consistent with the proposed recovery strategies for the identified federal species at risk and meet the section 79 obligation under the *Species at Risk Act.*

[19] Government of Newfoundland and Labrador terms and conditions for the Valentine Gold Project: https://www.gov.nl.ca/ecc/files/EA-2015-Valentine-Gold-Project-Decision-Letter.pdf

6.4. Indigenous Peoples

The Agency considered the following potential effects of the Project on Indigenous peoples:

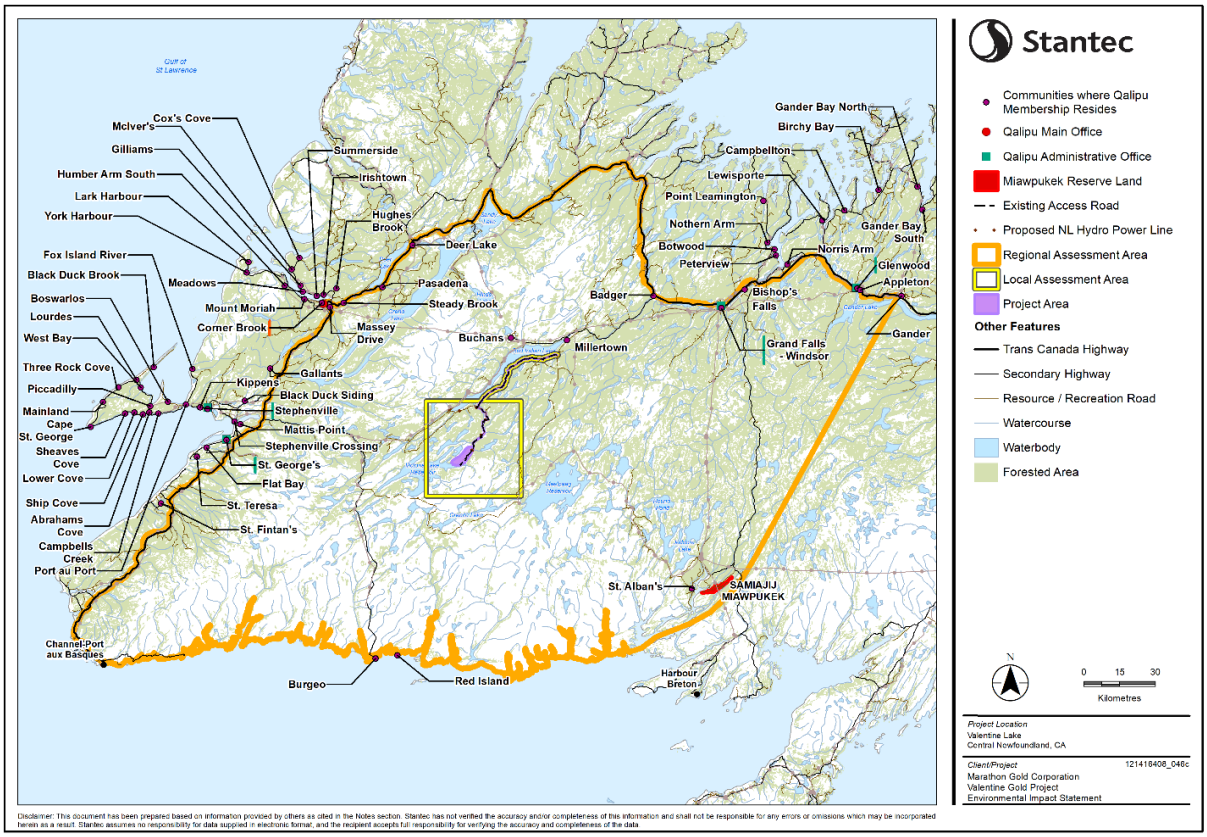
- change in current use of lands and resources for traditional purposes due to project activities impacting the quantity or quality of resources, access or restriction to lands and resources, and harvesting experience;
- change in physical and cultural heritage resources from construction activities resulting in the loss or disturbance of resources;
- change in socio-economic conditions through effects on availability or access to resources and harvesting activities; and
- change in Indigenous health conditions resulting from changes to air and surface water quality, and from ingestion of potentially contaminated country foods.

The Agency is of the view that the Project is not likely to result in significant adverse effects to Indigenous peoples after taking into account the implementation of proposed key mitigation and follow-up measures. The Agency based this conclusion on its analysis of the Proponent's assessment, federal authority expert review, and comments provided by Indigenous groups and the public.

6.4.1. Description of the Existing Environment

Two Mi'kmaq Indigenous Groups, Qalipu First Nation and Miawpukek First Nation, would potentially be affected by the Project (Figure 11). The Proponent's assessment of potential effects on Indigenous peoples included consideration of current use of lands and resources for traditional purposes, physical and cultural heritage resources, and health and socio-economic conditions, within the regional assessment area.

Figure 11: Qalipu First Nation and Miawpukek First Nation Communities on the Island of Newfoundland



Source: Valentine Gold Environmental Impact Statement, 2020

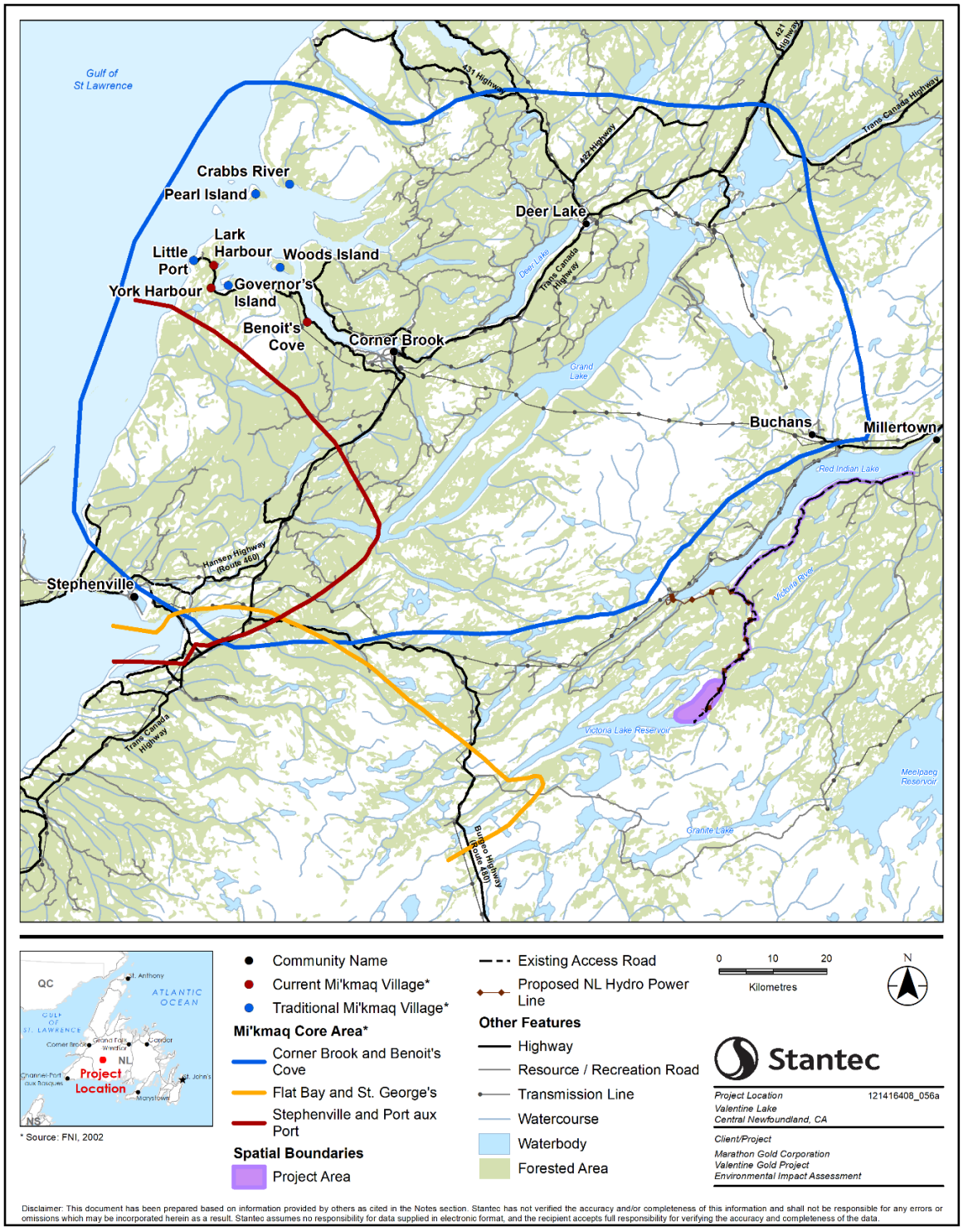
Current Use of Lands and Resources for Traditional Purposes

The Proponent's assessment on current land and resource use for traditional purposes considered publicly available documents, discussions with Miawpukek First Nation and Qalipu First Nations, and the studies: "The Collection of Current Land Use and Aboriginal Traditional Knowledge Study[20]" (ATK), and a Traditional Use Study (TUS)[21] on the Mi'kmaq. Miawpukek First Nation completed a Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study for the Proponent immediately prior to the publication of this draft environmental assessment report. This study would further inform the Proponent's monitoring programs and mitigation measures on potential effects to Miawpukek First Nation's land and resource use. The Proponent indicated the Mi'kmaq use areas in western Newfoundland (Figure 12 and 13).

[20] The ATK Study was conducted by Qalipu First Nation in 2020, represents the results of 22 members of Qalipu Mi'kmaq First Nation surveyed about the frequency of hunting moose, bear, caribou, and waterfowl, trapping furbearing animals, and frequency of consumption of these species. Figures 3.1 to 3.24 and the proximity to the Area of Interest and buffers analysis are in Figures 4.0 to 4.3, in EIS Appendix 17.

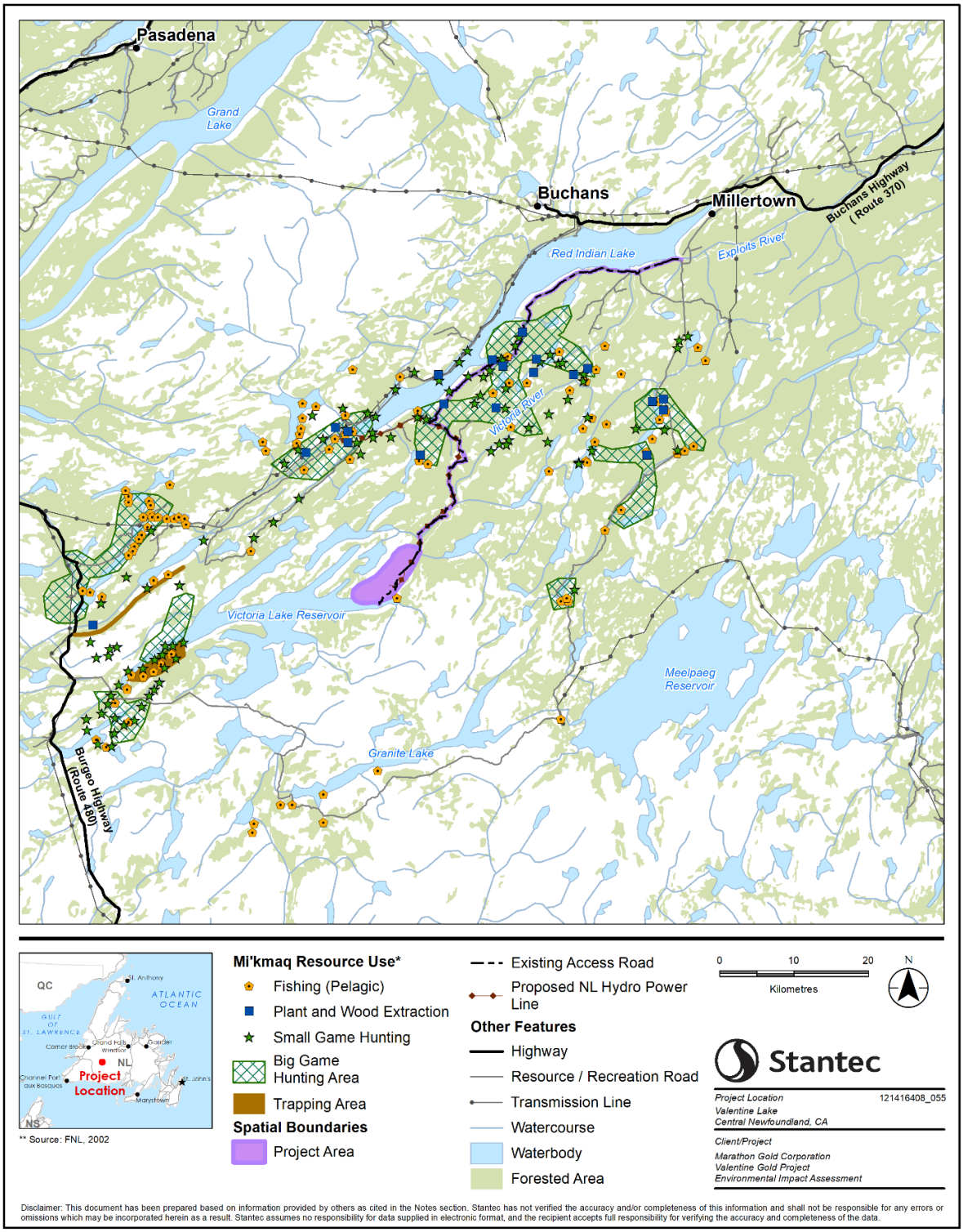
[21] The TUS on the Mi'kmaq of the Island of Newfoundland was published in 2002 by the Federation of Newfoundland Indians (FNI). The FNI represented nine Mi'kmaq bands. TUS survey participants included members who are now Qalipu First Nation. TUS is mentioned in section 17.2 of the EIS.

Figure 12: Mi'kmaq Use Areas in Western Newfoundland



Source: Valentine Gold Environmental Impact Statement, 2020

Figure 13: Mi'kmaq Resource Use Surrounding the Project Area



Source: Federation of Newfoundland and Labrador Indians Traditional Use Study, 2002

Fishing

The Proponent noted at least one Qalipu First Nation member actively harvests trout within the local assessment area. Qalipu First Nation identified eight trout fishing areas or points which overlap with the local assessment area. Fishing activity is also known to occur within the regional assessment area. The Proponent reported that Miawpukek First Nation harvesting of brook trout and landlocked Atlantic salmon in the local assessment area has declined in recent years.

Hunting and Trapping

The Proponent indicated that Mi'kmaq use land and resources south and east of the project area, in close proximity to the Victoria Lake Reservoir, for trapping; and north and south of the project area for hunting caribou during fall migration. In addition to caribou, Miawpukek First Nation indicated they traditionally harvested moose, partridge, beaver, rabbits, muskrats, and snowshoe hare.

The Proponent noted that Qalipu First Nation harvest caribou, moose, partridge, and snowshoe hare, which are present in the local assessment area. According to the ATK, Qalipu First Nation harvest caribou within 50 kilometres of the local assessment area, and the caribou consumption rate by members ranges from 'never' to 'occasionally or 'a few times a year'. The Proponent noted Qalipu First Nation also consumed moose from 'about once a month' to 'occasionally or a few times a year'. Of the 22 Qalipu First Nation members interviewed, two indicated they consumed moose meat once a week and one actively hunted moose within the local assessment area; and historically used the lands east of the project area for trapping, and north and south of the project area for hunting caribou.

Gathering

The Proponent reported that Qalipu First Nation harvest native plants for food, and medicinal reasons within the local assessment area. Likewise, Miawpukek First Nation gather and harvest plants for medicinal purposes and although these plant species are present in the local assessment area, based on engagement with Miawpukek First Nation, the Proponent suggested there is a reduction in Miawpukek First Nation's gathering activities in the local assessment area in recent years.

Spiritual, Cultural and Recreation Use of Lands and Resources

The Proponent stated on a regional scale that rivers and waterways are important for travel, resource use, communal and spiritual activities as well as recreation. Several of these travel ways on the Island of Newfoundland remain important to Qalipu First Nation.

The Mi'kmaq continue to use the lands and resources in southwestern and central Newfoundland for subsistence, cultural and medicinal purposes. The Mi'kmaq maintain campsites and cabins (identified around Victoria Lake Reservoir), visit sacred grounds, as well as gather speciality wood and plants within the regional assessment area.

Physical and Cultural Heritage

The Proponent noted that information on physical and cultural heritage specific to Miawpukek First Nation and Qalipu First Nation was not available and no cultural and spiritual sites had been identified within the project area by Indigenous peoples at the time of the EIS submission. The Proponent further noted there were no registered heritage sites within the project area. However, it did consider general information on the Mi'kmaq of the Island of Newfoundland including several sites that indicated Mi'kmaq occupation south of the project area. The Proponent's review of existing archaeological data indicated that there may be potential for archaeological resources to exist in the local assessment area.

Socio-Economic and Health Conditions

The Proponent provided a general overview of the health and socio-economic conditions of the Qalipu First Nation and Miawpukek First Nation communities, including information on population demographics, statistics on employment and income, and types of services available at the community level, where available. The Proponent noted that Qalipu First Nation members reside and work in communities occupied by Indigenous and non-Indigenous peoples throughout Newfoundland and Labrador. Qalipu First Nation members access available health and educational services provided by municipal and provincial agencies, private businesses and other service agencies in the communities where they reside. Miawpukek First Nation members who reside on reserve land can access services managed by Miawpukek First Nation. Miawpukek First Nation own and operate several businesses on reserve land as well as operate in partnership with other communities. Qalipu First Nation leads several corporate development initiatives, commercial enterprises and business partnerships. In addition to commercial fishing, Qalipu First Nation members harvest firewood which is an important component of the subsistence economy and collect speciality wood to make crafts for commercial sale.

The Proponent noted specific information on subsistence and recreational fishing activities within the local assessment area was not publicly available. Through engagement with the Proponent, Miawpukek First Nation explained that their members harvest resources from the land and sea throughout the Island of Newfoundland and follow the principle of 'Netukulimk', the use of resources to support the nutrition and economic well-being of an individual without jeopardizing the integrity, diversity or productivity of the environment.

6.4.2. Proponent's Assessment of Effects

Current Use of Lands and Resources for Traditional Purposes

The Proponent stated project activities may result in the loss or restriction of access to areas currently used for hunting, trapping, fishing and/or gathering within the local assessment area. Further, the Proponent noted access to lands within the mine site would be restricted for the life of the Project.

The Proponent indicated that vegetation clearing during construction could result in the loss of habitat of wildlife, fish and plant species traditionally harvested by Qalipu First Nation and Miawpukek First Nation. The Proponent noted that wildlife mortality could occur from vehicular collisions, human-wildlife conflicts, and predation, reducing the availability of resources for First Nation communities. It also indicated that sensory disturbances could cause behavioural changes in wildlife species. Both of these changes could result in displacement of wildlife species, increased harvesting pressure or reduced harvesting rates for harvesters within the local assessment area. The Proponent's assessment of effects on migratory birds, fish and other animals is discussed in sections 6.1, 6.2 and 6.3.

The Proponent indicated that an indirect change to current use during construction and operation could occur from sensory (noise, visual) disturbances affecting the quality of the harvesting experience. However, it was stated that less than one percent of the area near the mine site was being used for harvesting activities by Qalipu First Nation. The Proponent also predicted physical works would be visible from outside the local assessment area and result in a visual disturbance to Indigenous peoples potentially using cultural and spiritual sites and areas for harvesting resources or recreational activities. While there was limited information available on use of lands and resources for traditional purposes by Miawpukek First Nation and Qalipu First Nations, the Proponent conservatively assumed the local assessment area was used for traditional purposes. The Proponent predicted the adverse effects on use of lands and resources by Indigenous peoples, in the local assessment area are anticipated to be low in magnitude.

Physical and Cultural Heritage

The Proponent noted that ground disturbance during construction has the potential to adversely affect physical and cultural sites. As there are no known registered heritage sites within the project area and given Miawpukek First Nation and Qalipu First Nations have not identified any cultural and spiritual sites within the project area, the Proponent did not predict any direct effects to physical and cultural sites. However, the Proponent noted there would be the potential for the unexpected discovery of heritage resources during construction activities. In the event that a physical or cultural heritage site was inadvertently destroyed or permanently altered, the Proponent predicted the effects would be high in magnitude and irreversible. Therefore, prior to the start of the Project, the Proponent indicated it would develop a Heritage and Cultural Resources Protection Plan to mitigate potential impacts to physical or heritage features identified during construction.

Socio-Economic Conditions

The Proponent noted adverse effects to Indigenous socio-economic conditions are anticipated to be related to harvesting activities in the regional assessment area. Effects in harvesting may occur as a result of changes to access to lands, availability of wildlife species, and harvesting success. The Proponent stated that since the adverse effects on land and resource use is predicted to be low in magnitude, the associated socio-economic effects related to harvesting is also predicted to be low in magnitude.

The Proponent predicted there would be a positive effect, on socio-economic conditions for Indigenous peoples, as a result of an increase in employment and business opportunities from the Project. To address Miawpukek First Nation and Qalipu First Nation's access to economic, training and employment opportunities related to the Project, the Proponent is currently negotiating Socio-economic Agreements with Miawpukek First Nation and Qalipu First Nation and committed to engage with Miawpukek First Nation and Qalipu First Nation to develop a Benefits Agreement and Gender Equity, Diversity and Inclusion Plan, required by the province of Newfoundland and Labrador.

Indigenous Health

The Proponent noted it used an approach consistent with Health Canada's guidance to assess the potential effects of the Project on Indigenous health and considered the following pathways: changes in air quality, water quality, country foods (quality, access and availability) and sound quality.

The Proponent predicted that air contaminants would exceed Canadian Ambient Air Quality Standards in a small area within the project area less than one percent of the time. The Proponent stated that its model predicted no exceedances of Canadian Ambient Air Quality Standards at receptor locations outside the project area and therefore, unlikely to result in a change to Indigenous health conditions in the local and regional assessment areas.

For water quality, the Proponent predicted that concentrations of contaminants of concern at the receiving waterbodies would be lower than health-based screening levels; therefore, residual effects to water quality would be negligible. As discussed in section 6.1 (Fish and Fish Habitat), the results of the Proponent's water quality indicated that in worst-case conditions, concentrations of heavy metals would return to baseline or below CWQG-FAL within 300 metres in the ultimate receiving waterbodies of Victoria Lake Reservoir, Victoria River and Valentine Lake. As such, the Proponent indicated that changes to the quality of aquatic (fish) country foods would be unlikely.The Proponent committed to country foods monitoring to verify the EIS predictions including monitoring the quality of country foods harvested from within the local assessment area over the life of the Project.

The Proponent noted that there is minimal harvesting activity by Miawpukek First Nation and Qalipu First Nation within the local assessment area and it is unlikely that the country foods harvested would constitute a substantial portion of an Indigenous person's diet. The Proponent completed a Human Health Risk Assessment which the Proponent assumed human (both Indigenous and non-Indigenous) receptors

spent 100 percent of their time in the local assessment area and harvested 100 percent of the country foods (wild meat, berries, fish and traditional plants) within the local assessment area. Also, the Proponent's assessment assumed that the country food consumption rate for receptors was based on 95th percentile grams of traditional food per day[22]. Based on the results of the Human Health Risk Assessment, the Proponent predicted there would be a negligible change in human health risk for Indigenous peoples due to low potential of inhalation exposure to air contaminants, infrequent direct contact exposures to contaminants in soil and surface water, and low potential of ingestion exposures from the consumption of country foods. The Proponent committed to undertake ongoing monitoring related to country foods, and if further mitigation measures are identified, these would be developed in collaboration with Indigenous groups. Further, the Proponent will consider new Indigenous knowledge information provided by Miawpukek First Nation or Qalipu First Nation, in the design of follow-up and monitoring programs and committed to seek input from Miawpukek First Nation or Qalipu First Nation in the development of these programs.

The Proponent predicted that sound at sensitive receptor locations would not exceed thresholds and so there would be no effect on Indigenous health from sound.

6.4.3. Views Expressed

Indigenous Groups

Qalipu First Nation expressed concern that the Project may limit Qalipu First Nation's access to lands and resources used for traditional purposes, and the possibility that the land would not be available for traditional activities in the future.

Miawpukek First Nation expressed concern about the loss of habitat of species harvested by Miawpukek First Nation and habitat compensation should be provided for loss of areas used for traditional purposes.

Miawpukek First Nation noted that caribou are of environmental, cultural and economic importance to Miawpukek First Nation. Miawpukek First Nation and Qalipu First Nation raised concern about disruption to caribou migration and calving habitats; and are of the view that the Project would result in adverse, long-term significant impacts. To address potential effects of the Project on caribou, the Proponent implemented changes to the design and layout of some of the mine site infrastructure and developed, with input from Newfoundland and Labrador Wildlife and Indigenous groups, a preliminary Caribou Protection and Environmental Effects Monitoring Plan. More information on potential effects on caribou are presented in section 6.3.

Miawpukek First Nation expressed concern that Indigenous knowledge including knowledge of historic and archaeological sites was not gathered in any meaningful way and Miawpukek First Nation has not been adequately engaged in any archaeological research. Miawpukek First Nation also advised that the Proponent should have a training program for project personnel and that members of Miawpukek First Nation should be involved in future archaeological fieldwork. In response, the Proponent engaged with Miawpukek First Nation to undertake a Mi'kmaq Knowledge, Land Use and Ocupancy Study. Miawpukek First Nation presented the results of the Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study to the Proponent in spring 2022 immediately prior to the publication of this draft environmental assessment report. The Propoent indicated that if necessary, the results of this study could be used to adjust mitigation and monitoring measures to avoid or mitigate adverse impacts upon Indigenous interests. In collaboration with Qalipu First Nation and Miawpukek First Nation, the Proponent committed to develop a Heritage and Cultural Resources Protection Plan to mitigate the potential adverse effects on historic resources resulting from an accidental discovery.

[22] As reported in the First Nations Food, Nutrition and Environment Study, noted in IR 61A response, Appendix: Human Health Risk Assessment, Technical Modelling Report

Miawpukek First Nation is concerned about the effects from the Project on concentrations of contaminants in fish and is of the view that the measures taken to mitigate contaminants are insufficient. It noted that mercury is a contaminant of extreme concern due to its toxicity and ability to bioaccumulate in fish, which may be consumed by its members. The Proponent noted that although the results of water quality modelling showed that the concentrations of mercury in Victoria Lake Reservoir, Valentine Lake and Victoria River would not change from baseline concentrations, it identified mercury as a contaminant of potential concern for its human health risk assessment due to community concerns. Miawpukek First Nation requested the Proponent undertake a country food survey in collaboration with Miawpukek First Nation to evaluate the effects of the Project on concentrations of contaminants in fish and other country foods. The Proponent would consider Traditional Knowledge and Land Use Study information provided by Miawpukek First Nation in the development of monitoring programs, including monitoring of air and water quality and potential impacts upon country foods. The Proponent stated it would invite Miawpukek First Nation to participate in monitoring measures, and it intends to work in cooperation with Miawpukek First Nation as the Project progresses. The Proponent committed to country foods monitoring to verify the EIS predictions through monitoring the quality of aquatic and terrestrial country foods harvested from within the local assessment area over the life of the Project. Further, the Proponent has committed to the development of a process to address grievances and any Indigenous groups concerns related to impacts from the Project on land and resource use, health, socio-economic conditions and heritage resources.

A complete summary of issues raised by Indigenous groups on all phases of the Project up to and including the review of the EIS is presented in Appendix E.

Federal Authorities

Health Canada is of the view that there are uncertainties associated with the predicted Project impacts on human health. It does not agree with the Proponent's conclusion that the health risks due to exposure to contaminants or ingestion to contaminants through consumption of country foods would be negligible. Health Canada notes that the exposure of contaminants in country foods was not quantitatively evaluated, and contaminants that bioaccumulate or biomagnify were not considered in the Proponent's Human Health Risk Assessment. It recommended that the Proponent's monitoring programs for air, water and country foods be informed by Indigenous community input and to include pre-identified mitigations. Health Canada further recommended that the monitoring programs be used to verify the predicted contaminant levels and underlying assumptions in the Proponent's Human Health Risk Assessment.

6.4.4. Agency Analysis and Conclusion

Analysis of the Effects

The Agency agrees that the project activities would restrict access to the project area and adjacent areas used by Indigenous peoples for hunting, fishing, and gathering. However, based on the information currently available, the Agency understands that Miawpukek First Nation and Qalipu First Nation use of the project area is limited. While there is limited use of the project area currently, the Agency notes resources harvested for traditional purposes may be present in the project area, and construction activities may change the availability of resources due to the loss of habitat, mortality, displacement or behavioural changes of species traditionally harvested by Qalipu First Nation and Miawpukek First Nation. The Agency understands that should Miawpukek First Nation's Traditional Knowledge and Land Use Study confirm land and resource use of the project area or surrounding areas by Miawpukek First Nation, the Proponent would adjust mitigation and monitoring measures to avoid or mitigate adverse impacts on Indigenous interests. The Proponent has committed to the development of follow-up measures which would consider new Indigenous knowledge information provided by Indigenous groups to address potential effects to the current use of lands and resources, and monitoring programs, including testing for contaminants in country foods harvested by Indigenous peoples. The Agency is of the view that the magnitude of effect to from changes in the availability of resources and access of lands and resources would be low given the limited use of the area. The geographic extent of the loss of access to land resources is limited to the local assessment area and predicted to occur during construction,

operation and decommissioning. Residual effects would occur continuously and would be reversible after the completion of rehabilitation and mine closure. The Agency is also of the view that adverse effects on socio-economic conditions of Indigenous peoples related to changes to harvesting activities in the regional assessment area would be low in magnitude because less than one percent of the project area is used for harvesting activities.

At the time of the assessment, there were no cultural or spiritual sites identified by Indigenous peoples and no known registered heritage sites within the project area, therefore, no direct effects to sites as a result of physical disturbance are anticipated. The Proponent committed to develop and implement a Heritage and Cultural Resources Protection Plan, in consultation with Indigenous groups, prior to the start of Project activities which would include measures to mitigate the potential of adverse effects on the unexpected discovery of a site. Therefore, the Agency is of the view that the effects on physical or cultural heritage features would be negligible to low in magnitude.

Although exceedances of Canadian Ambient Air Quality Standards are predicted at locations outside the project area, the Agency is of the view that the potential for exposure to air contaminants by Indigenous people would be low. The Agency acknowledges the concerns identified by Health Canada and notes that the Proponent would be required to consider new Indigenous Knowledge information, including areas of use and country foods consumed, in the design of follow-up programs and to adjust mitigations as necessary, in collaboration with Indigenous groups. Further, the Proponent has committed to the development and implementation of an Air Quality Management Plan as part of its Environmental Protection Plan which would specify mitigation measures for the management and reduction of air emissions during Project construction and operation. To address the uncertainties identified by Health Canada and the recommendations by Miawpukek First Nation, the Proponent would be required to develop and implement follow-up monitoring to verify its predictions for potential changes to health risk of Indigenous peoples in relation to effects on quality of air, water, and country foods in consultation with Indigenous groups. Although the Proponent identified a low potential for bioaccumulation and biomagnification of contaminants of concern, the Agency acknowledges the concern raised by Health Canada and Indigenous groups and would require the Proponent to develop follow-up monitoring for contaminants of concern for water quality, including mercury, chromium, nitrogen, phosphorous, ammonia and cyanide at locations identified in Section 7.9.1 of the EIS. The Agency would also require monitoring of methylmercury, chromium and arsenic in fish tissue (see section 6.1.3 of this report). The Agency also recommends the Proponent monitor other country foods for contaminants, should any be identified by Indigenous groups, to verify predictions made. With the implementation of these monitoring programs and limited use of the area by Indigenous people, the Agency is of the view that potential changes to health risks of Indigenous peoples due to direct exposure to contaminants or ingestion of contaminants through the consumption of country foods would be negligible to low.

Key Mitigation Measures

The Agency has considered the mitigation measures proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups and the public in identifying the following key mitigation measures to be implemented with respect to Indigenous peoples:

Current Use of Lands and Resources

- Develop and implement, prior to construction and in consultation with Indigenous groups, a communication plan to share information related to the Project. The communication plan would include the following:
    - The location and timing of Project activities that may affect Indigenous groups' use of lands and resources;
    - Procedures for Indigenous groups to provide feedback to the Proponent related to access to and use of lands for traditional purposes;

- Procedures for the Proponent to document and respond in a timely manner to the concerns received and demonstrate how issues have been addressed.

Physical and Cultural Heritage

- Develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a Heritage and Cultural Resources Protection Plan, to mitigate the potential adverse effects on historical resources resulting from accidental discovery.

Indigenous Health Conditions

- Implement the mitigation and follow-up measures identified in section 6.1 – Fish and Fish Habitat for water quality and fish and fish habitat to reduce the potential exposure to metals from contact with water and from the ingestion of contaminated fish.

Follow-up

The Agency considered the follow-up and monitoring programs proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups in identifying the following programs to verify the predictions of effects to Indigenous peoples (current use of lands and resources for traditional purposes, physical and cultural heritage, and health and socio-economic conditions on Indigenous peoples) and the effectiveness of mitigation measures:

- Develop and implement in consultation with Indigenous groups, Health Canada and other relevant authorities, a follow-up program, to verify the accuracy of the environmental assessment predictions for effects of changes in the quality of air, water, and country foods on the health of Indigenous Peoples and to determine the effectiveness of the mitigation measures.The follow-up program should be informed by any updated traditional knowledge information provided by indigenous groups. Parameters for consideration must include monitoring and testing for potential contaminants in country foods harvested by Indigenous peoples. Include at a minimum, measures to monitor:
    - Mercury, chromium and arsenic in surface water where use by Indigenous peoples is expected, starting at the Project construction phase;
    - Methylmercury, chromium and arsenic in tissue of fish species identified through consultation with Indigenous groups and Health Canada in water bodies where use by Indigenous peoples is expected;
    - Ambient air concentrations of contaminants of concern as described in section 5.9 of the EIS;
    - Contaminants of concern that have the potential to affect other country foods identified and harvested by Indigenous groups within the area for potential project effects.

Agency Conclusion

Taking into account the implementation of the mitigation and follow-up measures described above, the Agency is of the view that the Project is not likely to cause significant adverse effects on current use of lands and resources for traditional purposes, physical and cultural heritage, and health and socio-economic conditions of Indigenous peoples

6.5. Transboundary Effects – Greenhouse Gas Emissions

Greenhouse gases are those within the Earth's atmosphere that absorb and re-emit infrared radiation resulting in the warming of the lower levels of the atmosphere. They are recognized as being one of the causes of climate change that can have various effects on ecosystems and human health. These gases disperse at the global scale and, for the purposes of CEAA 2012, are considered transboundary environmental effects.

The main greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), ozone (O_3), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Greenhouse gas estimates are usually reported in units of tonnes of carbon dioxide equivalent (CO_2e) per year. To calculate this unit, the emission rate of each substance is multiplied by its global warming potential relative to CO_2. As of 2017, projects that emit over 10,000 tonnes of CO_2e per year are required to report those emission levels to ECCC[23].

The Agency acknowledges that any Project-related greenhouse gas emissions have the potential to affect Canada's ability to meet reduction targets. However, it is of the view that the Project is not likely to cause significant adverse transboundary effects due to emissions of greenhouse gases given that relative contribution of the Project is expected to be a minute fraction of national and provincial total emissions and the Project would be subject to legislated provincial reduction targets over the life of the mine.

6.5.1. Proponent's Assessment of Environmental Effects

The Proponent stated that sources of direct greenhouse gas emissions during construction and operation would include exhaust from heavy-duty off-road equipment, on-road trucks and vehicles, and stationary generators, as well as blasting using an ammonium nitrate/fuel oil emulsion. Land clearing and grubbing would also contribute to direct greenhouse gas emissions during the construction phase, both from operation of equipment and from the change of land use in the area that is cleared and grubbed (e.g., deforestation, biomass decay). The Proponent estimated land clearing to be the highest-emitting activity during construction, followed by on-road transportation and use of off-road heavy-duty mobile equipment. The latter two were also estimated to be the highest-emitting activities for Project operations. The Proponent noted greenhouse gas emissions would also occur during decommissioning, rehabilitation and closure activities because of the combustion of diesel fuel in heavy equipment. It stated that these emissions were assessed qualitatively given they would be similar to, or less than, greenhouse gas emissions during construction and operations.

The Proponent also considered sources of indirect greenhouse gas emissions, including shipping of supplies to the site during construction and operation, as well as electricity consumption and product deliveries during operation.

The Proponent estimated annual greenhouse gas emissions for each year of construction and operation. Table 9 indicates the maximum estimated annual greenhouse gas emissions during construction and operation phases, anticipated to happen in year one of construction and year three of operation.

[23] Under Environment and Climate Change Canada's Greenhouse Gas Reporting Program pursuant to the Canadian Environmental Protection Act, 1999, a notice is published every year in Part I of the Canada Gazette, outlining the greenhouse gas reporting requirements for the corresponding calendar year. https://gazette.gc.ca/rp-pr/p1/2021/2021-02-13/html/sup1-eng.html

Comparison to annual national and provincial emissions totals (based on ECCC's 2020 National Inventory Report)[24] is also shown.

Table 9: Maximum Estimated Annual Greenhouse Gas Emissions during Construction and Operation Phases, and Comparison to Annual National and Provincial Emissions Totals

Parameter	Units	Total (expressed as CO2e)	
		Construction	Operation
Direct annual Project greenhouse gas emissions[a]	tonnes per year	33,060	93,842
Indirect annual Project greenhouse gas emissions[b]	tonnes per year	277	3,441
Total annual Project greenhouse gas emissions	tonnes per year	33,336	97,283
Newfoundland and Labrador total annual greenhouse gas emissions[c]	tonnes per year	11,000,000	11,000,000
Canada total annual greenhouse gas emissions[c]	tonnes per year	729,000,000	729,000,000
Maximum annual Project emissions as a portion of Newfoundland and Labrador total annual greenhouse gas emissions	percent	0.3%	0.88%
Maximum annual Project emissions as a portion of Canada annual total greenhouse gas emissions	percent	0.005%	0.01%

Notes:

a. Includes emissions from land clearing equipment but does not include emissions resulting from land use change (i.e., loss of living biomass and decay of organic matter); the Proponent did not consider land use change emissions in its calculation of annual contribution to provincial and national emission totals.
b. Indirect emissions include electricity and fuel associated with shipping product and delivery of consumables.
c. Provincial and national totals are taken from ECCC National Inventory Report 2020.

Source: Valentine Gold Environmental Impact Statement, 2020 and Supplementary Information

[24] Environment and Climate Change Canada (ECCC). 2020b. National Inventory Report for Canada to the United Nations Climate Change. Available online at: https://unfccc.int/ghg-inventories-annex-i-parties/2020

During the construction year with the highest greenhouse gas emissions, the Proponent estimated that approximately 33,336 tonnes CO_{2e} would be released (including both direct emissions from equipment and blasting, and indirect emissions). The Proponent noted that this quantification included emissions from grubbing equipment and tree clearing equipment. The Proponent's estimate of peak construction emissions would represent approximately 0.30 percent and 0.005 percent of provincial and national greenhouse gas emission totals, respectively. The Proponent did not include land use change emissions in this calculation, stating that national inventory reporting excludes these emissions and comparison would not be appropriate.

Based on an estimate of nine square kilometres of vegetation to either be cleared or grubbed during construction, the Proponent conservatively estimated that an additional 197,000 tonnes CO_2e would be emitted due to land use change (i.e., the loss of the living biomass and decay of organic matter). This number is considered conservative, as it assumed a larger cleared buffer around Project feature footprints than required. Factoring in this additional emission estimate, the Proponent conservatively estimated total emissions during construction to be approximately 253,000 tonnes CO_2e. The Proponent ranked Project emissions during construction as low in magnitude regardless of whether land use changes were included.

For Project operations, the Proponent estimated that annual greenhouse gas emissions (including both direct and indirect emissions) would range from 5,824 tonnes to 97,283 tonnes of CO_2e. On the maximum annual basis, the Proponent estimated that Project emissions from operations represent approximately 0.88 percent and 0.01 percent of provincial and national annual emission totals, respectively. The Proponent predicted that the total project lifetime emissions for the operations phase to be about 657,738 tonnes CO_2e.

The Proponent noted that Project-related greenhouse gas emissions have the potential to affect Canada's ability to meet Paris Agreement reduction targets, as well as Newfoundland and Labrador's ability to meet provincial reduction targets. However, the Proponent concluded that the relative contribution of the Project is expected to be a small fraction of national and provincial total emissions.

The Proponent noted that the Project will be subject to the requirements of the provincial *Management of Greenhouse Gas Act* in years that greenhouse gas emissions are predicted to be greater than 15,000 tonnes CO_{2e}/year, and reduction targets will apply in years that emissions exceed 25,000 tonnes CO_{2e}/year (predicted for the first eight years of operation). The Proponent stated that greenhouse gas emissions from the first three years of operation would serve as baseline on which reduction targets under the *Management of Greenhouse Gas Act* would be set. Reduction targets would be phased in over the subsequent six years (Project operational years four to nine), with the required percent reduction becoming more stringent until it reaches 12 percent in year eight, after which subsequent years would be required to continue operating at a 12 percent reduction from the baseline emission intensity.

The Proponent committed to lower fuel consumption, which it indicated as directly proportional to lower greenhouse gas emissions, and identified measures such as preventive maintenance of equipment and vehicles, and reduction of idling times and cold starts. The Proponent also committed to the development of a Greenhouse Gas Management Plan based on provincial and federal reporting requirements, and to include policy updates, emission source descriptions, data management framework, greenhouse gas emission intensity reduction strategies, effectiveness of mitigation, follow-up, monitoring and regulatory reporting of greenhouse gases. The Proponent indicated it would develop a rehabilitation and closure plan in accordance with requirements of the provincial *Mining Act;* this would include progressive rehabilitation to as close to pre-development conditions as practicable, or to a suitable condition for an alternate use upon Project closure.

6.5.2. Views Expressed

A comment from the public noted the importance of managing greenhouse gas emissions over the life of the Project.

ECCC advised that it agreed with the Proponent's characterization of greenhouse gas emissions, including those related to land use change. It noted that the land use change emission estimate reflects a change in the CO_2 flux and not an actual emission, and therefore it is reasonable to exclude land use change emissions when comparing to national and provincial emission inventories. ECCC further noted that any greenhouse gas emissions hinder Canada's ability to meet targets and thus there is a need to minimize emissions. It recommended that the Proponent endeavour to use the most fuel efficient equipment available.

6.5.3. Agency Analysis and Conclusion

Analysis of the Effects

During the construction year with the highest greenhouse gas emissions, the Project is estimated to emit approximately 33,336 tonnes CO2e, representing approximately 0.30 percent and 0.005 percent of annual provincial and national greenhouse gas emission totals, respectively. An additional estimated 197,000 tonnes of CO_2e emissions would result from the loss of the living biomass and decay of organic matterThe Agency notes that land clearing and emissions from land use change make up the majority of construction emissions. The Proponent would be required to limit vegetation clearing and implement progressive reclamation over the course of operations and closure, including revegetation to re-establish the site as a carbon sink to the extent possible. However, the Agency notes that the stock of carbon in the area to be cleared would likely remain permanently lower than if the Project did not proceed.

The Project is estimated to emit a total of 657,738 tonnes of CO_2e over the 13 years of operation. During the year with highest operation emissions, the Project is estimated to emit 97,283 tonnes CO2e, representing a maximum of approximately 0.88 percent and 0.01 percent of provincial and national emission totals, respectively. The Agency notes that annual emission estimates range depending on the year of operations, and that emissions would decrease from the year-three maximum in accordance with provincially legislated reduction targets over years four to nine of operations. The Proponent predicted emissions as low as 5,800 tonnes CO_2e in latter years of operation. The Agency also notes that the Project would rely on the existing primarily[25] renewable energy grid for electricity needs, thereby achieving a low level of indirect emissions from electricity purchase. The highest emitting activities during Project operations were predicted to be road transportation and off-road heavy duty equipment operation; as such, the Agency has identified key mitigation to design haul roads to minimize transportation distances and to ensure equipment is maintained and operated efficiently to keep greenhouse gas emissions within predicted levels.

The Agency agrees with the Proponent's assessment that although Project-related greenhouse gas emissions have the potential to affect Canada's ability to meet Paris Agreement reduction targets, as well as Newfoundland and Labrador's ability to meet provincial reduction targets, the relative contribution of the Project is expected to be a minute fraction of national and provincial total emissions. The Project would also be subject to legislated provincial reduction targets over the life of the mine. As such, the Agency is of the view that Project emissions would be low in magnitude and would not impact the achievement of greenhouse gas reduction targets for Canada and Newfoundland and Labrador. Greenhouse gas emissions would be continuous in frequency, medium term in duration (i.e., the lifetime of the Project), and considered irreversible due to the persistence of greenhouse gases in the atmosphere. While the effects of greenhouse gases from the Project in a particular location cannot be measured, the geographic extent of the environmental effects is beyond regional due to the cumulative nature of greenhouse gas emissions and their contribution to climate change at the global level.

[25] Newfoundland and Labrador generates 95% of its electricity from hydroelectric sources, as noted by Canada Energy Regulator at: https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-newfoundland-labrador.html

Key Mitigation Measures to Avoid Significant Effects

The Agency has considered the mitigation measures proposed by the Proponent, expert advice from federal authorities, and comments from the public in identifying the following key mitigation measures to be implemented with respect to greenhouse gas emissions:

- Limit the Project footprint and disturbed areas to the extent practicable, including limiting clearing for road construction to the width required for road embankment, drainage requirements, and safe line of sight requirements'. Ensure boundaries of areas to be cleared are well marked prior to the start of clearing activities.
- Design haul roads and infrastructure and optimize activities assocatied with operations to reduce transportation and haul distances.
- Ensure engines and exhaust systems of construction and mining equipment are subject to comprehensive equipment preventative maintenance to maintain fuel efficiency and performance.
- Develop and implement prior to construction and in consulation with relevant authorities, a policy to reduce fuel consumption of equipment and vehicles, including avoidance of idling and cold starts.
- Conduct progressive reclamation in areas disturbed by the Project that would establish self-sustaining plant communities similar to pre-disturbance conditions.

The Agency also notes that the Proponent has committed to incorporate greenhouse gas emission management and reduction measures that adhere to provincial legislative requirements.

Follow-up

The Agency considered the Proponent's assessment and expert advice from federal and provincial authorities and determined that additional programs are not required to verify the predictions of transboundary effects or the effectiveness of mitigation measures. The Agency notes that in years with annual greenhouse gas emissions above 10,000 tonnes of CO_2e, the Proponent would be required to report emissions to ECCC under the Greenhouse Gas Reporting Program pursuant to the *Canadian Environmental Protection Act*, 1999. The Proponent would also be subject to provincial greenhouse gas reporting requirements under the *Management of Greenhouse Gas Act*.

Agency Conclusion

Taking into account the implementation of mitigation measures and regulatory requirements, the Agency is of the view that the Project is not likely to result in significant greenhouse gas emissions as compared to provincial and national emission levels and is not likely to significantly impact the achievement of greenhouse gas reduction targets for Newfoundland and Labrador or Canada.

7. Other Effects Considered

7.1. Effects of Accidents and Malfunctions

Accidents and malfunctions have the potential to occur during all phases of the Project and CEAA 2012 requires that a federal environmental assessment take into account the effects that may result from them. The Proponent has described the potential effects of project-related accidents and malfunctions, as well as corresponding preventative and emergency response measures.

The Proponent assessed each accident and malfunction scenario during the construction, operation and/or decommissioning, rehabilitation and closure phases. Its assessment included an identification of the valued components potentially affected, the adverse environmental effects (before and after design and safety measures and application of emergency response measures), and proposed mitigation measures for each scenario.

The accidents and malfunctions considered by the Proponent included tailings management facility malfunction, fuel and hazardous materials spill, unplanned release of contact water, low-grade ore and high-grade ore stockpiles and waste rock piles slope failure, and fire/explosion. The Proponent also identified open pit slope failure, sewage treatment plant failure, over blasting, and vehicle accidents but did not carry forward those scenarios as it determined these to be unlikely to result in residual environmental effects. The Agency has focused its analysis on tailings management facility malfunction, fuel and hazardous material spills, unplanned releases of contact water, and fire and explosions as these are the scenarios where environmental effects would be most severe and extend beyond the project footprint.

The Agency is of the view that the Project is not likely to result in significant adverse effects from accidents and malfunctions after taking into account the implementation of proposed key mitigation and follow-up measures. The Agency based this conclusion on its analysis of the Proponent's assessment, federal authority expert review,and comments provided by Indigenous groups and the public.

7.1.1. Proponent's Assessment of Environmental Effects

Tailings Management Facility Malfunction

Tailings would be managed for the first nine years of operation in the tailings management facility and then would be pumped via pipeline to the completed Leprechaun open pit once it has been mined out. The Proponent considered piping[26] and dam overtopping[27] to be the most plausible malfunctions to occur for the Project and assessed the worst-case outcome for each scenario.

The Proponent presented a tailings management facility design in the EIS and modelled a theoretical dam breach at three locations which represent the main worst-case malfunction scenarios for the tailings management facility. Subsequently, the Proponent provided a refined tailings management facility design which included relatively small adjustments to the dam alignments, and the relocation of the polishing pond westward, closer to the mill. Theoretical dam breaches at the three locations have been updated for the refined design, and this information is summarized below.

The three dam breach locations and the associated parameters (e.g., failure type, dam height, free water retention, hydrological conditions) were assessed to determine the worst-case malfunction scenarios. Tailings management facility malfunction Scenarios Locations A (East Dam) and B (South Dam) were scenarios resulting in a dam breach which corresponded to the largest volume released of both tailings and water towards Victoria River. Location B is the location where, if a breach were to occur, the resulting flow path is closest to the Victoria Dam. At Location C (West Dam), while there is no potential for water to be released, a tailings breach at this location is a potential risk to the plant site and personnel. Models were run for both fair-weather conditions and probable maximum precipitation conditions. There is no

[26] Piping is the internal erosion of embankment material due to the flow of water. Construction and design issues, burrowing animals, decaying root systems below the pond reservoir level or cracking caused by deformation are all potential causes for piping. (EIS, p. 21.13).

[27] Dam overtopping is caused by the inflow to the pond exceeding its storage and discharge capacities and a rise of water level higher than the dam crest. This has the potential to result in rapid down cutting as the flowing water erodes the dam fill (EIS, p. 21.13).

water ponded on the southern and western portions of the tailings management facility; therefore, the risk of a breach is much lower and a breach of the dam at those locations (Locations B and C, respectively) would release tailings only. The worst-case predicted volumes of tailings and water released for each scenario can be found below in Table 10.

Table 10: Modelled Tailings and Water Volumes Released Based on Main Worst-Case Malfunction Scenarios (Probable Maximum Precipitation Conditions)

Location	Total Tailings Released (cubic metres)	Total Water Released (cubic metres)
Location A (East Dam)	292,000	1,458,000
Location B (South Dam)	6,200,000	0 Note 2
Location C (West Dam)	1,050,000 Note 1	0 Note 2

Note 1: Tailings release volume includes tailings movement within and immediately downstream of the TMF; total tailings runout distance is 2 km or less downstream of the TMF.

Note 2: No free water release at this breach location, as tailings pond contrained to northeast section of the TMF.

The Proponent indicated that in the event of a tailings management facility malfunction, effects on groundwater quality could extend from the tailings management facility toward Victoria River. The Proponent predicted residual effects on groundwater to be of low magnitude in areas where tailings solids could be remediated and would remain within the groundwater resources local assessment area. However, residual effects could potentially be irreversible if tailings are not effectively removed from the ground surface.

In the above scenarios, liquid tailings would be released to the environment. The Proponent predicted that most of the released tailings would be deposited along the Victoria River main channel and flood plains within 1 to 2 kilometres downstream of the tailings management facility, with some travelling downstream to Beothuk Lake. Tailing solids could also be deposited along low-lying areas extending from the breach location and sediments could be transported downstream, potentially causing localized infilling with solid tailings and dam material of vegetated areas and waterbodies. This could affect natural drainage patterns, cause increased speed of water flows, localized rises in water levels and infilling of deep pools. Aquatic vegetation and local bathymetry could also be affected by deposits of sediments within Beothuk Lake. The Proponent predicted that residual effects to surface water from a tailings management facility malfunction could be of high magnitude, long term and irreversible.

The Proponent indicated that potential effects to ground and surface water could in turn affect fish and fish habitat through increased concentrations of contaminants and sediment deposition in fish habitat. This could cause potential change in fish health, growth or survival. If a tailings management facility dam breach were to occur during spawning, sediment deposition could smother fish eggs as well as alter substrates used for spawning. The Proponent predicted that residual effects to fish and fish habitat from a tailings management facility malfunction could be of high magnitude, long term but reversible.

The Proponent further noted that a release from a tailings management facility malfunction could also affect wildlife (including migratory birds) habitat, change in movement patterns, increased mortality risk and/or change to wildlife health. The Proponent predicted that prompt stabilization and remediation of an accident scenario would limit potential effects as vegetation would reestablish after several growing seasons. The primary migration path for the Buchans caribou herd overlaps the project area and the effects of a malfunction would likely be additive to the predicted high magnitude effect of routine project activities, especially if a malfunction were to occur during the migration period. In addition, released water could potentially exceed the MDMER for cyanide total, unionized ammonia and copper. Wildlife, including birds, could ingest the contaminants resulting in injury or mortality. The Proponent predicted that residual

effects to birds and other wildlife from a tailings management facility malfunction could be of moderate to high magnitude, medium to long term and irreversible.

The Proponent indicated that contaminants ingested by wildlife could in turn affect the health of any person harvesting or consuming plants or animals from the area. The Proponent predicted that health risks would be low given remediation measures, including covering or removing the affected soils. The terrestrial area affected would likely be a small area of the home range of larger mammals, and therefore their exposures to affected soils would be limited. In relation to fish, the Proponent indicated there could be contamination of fish tissue for several decades until affected waterbody sediments return to pre-breach conditions, the Proponent committed to posting fish advisories until monitoring of fish tissues could confirm safe consumption levels. If needed, public advisories on water consumption from Beothuk Lake would also be issued until monitoring confirmed that it was suitable for human use. In the event of a tailings management facility malfunction, the Proponent would initiate the MDMER emergency response plan and a public safety plan that outlines notification procedures. The Proponent predicted that residual effects to community health (including Indigenous groups) from a tailings management facility malfunction could be of low to high magnitude, medium term and potentially irreversible.

The Proponent stated that the majority of risks to the tailings management facility would be mitigated through adherence to industry standards (e.g., the Canadian Dam Association and Mining Association of Canada Guidelines), and operational and emergency protocols and plans.

The Proponent predicted a potential significant effect on surface water resources, fish and fish habitat, caribou, and community health in relation to a worst-case scenario tailings management facility malfunction but indicated that emergency response plans and contingency measures would limit potential environmental effects. It determined that when taking into account design and safety measures to reduce the likelihood of an accident or malfunction and the emergency response plans and contingency measures, significant effects from a tailings management facility malfunction are unlikely to occur.

Fuel and Hazardous Materials Spill

A spill of fuel or hazardous material could occur due to equipment or vehicle malfunction, human error, or severe weather conditions. The Proponent indicated that adverse effects would be generally localized, rapidly dispersed, and below concentration levels that would affect wildlife.

The Proponent conducted spill modelling of diesel fuel, sodium cyanide, and ammonium nitrate into the Victoria River to assess the worst-case scenario. The worst-case scenario volumes modelled were 12,000 litres per hour of diesel fuel, 47 kilograms per hour of sodium cyanide, and 108.70 kilograms per hour of ammonium nitrate (resulting in the release of 25 kilograms of cyanide, 25 kilograms of nitrate and 83.75 kilograms of ammonia). The scenario of a fuel truck accident on a bridge over the Victoria River was chosen for an accidental hazardous materials spill, based on the highest potential for downstream effects on Atlantic salmon populations. A United States Department of Transportation highway spills database was used by the Proponent to identify a plausible worst-case outcome for that event. As part of the project refinements, an ammonium nitrate emulsion material (Dyno Nobel TITAN 1000 G (ungassed)) was proposed as an alternative blasting agent that would be prepared offsite and trucked into the mine site. Spill modelling was conducted, assuming that 200 kilogrammes of TITAN 1000 G would be released to the Victoria River. The ammonium nitrate emulsion would break down to diesel and ammonium nitrate. In order to evaluate the effects of different hydrodynamic conditions in the receiving environment on fate and transport of each hazardous material, spill modelling was conducted under the following three modelling scenarios: low inflows to Beothuk Lake and low water level in the lake; mean annual inflows to the lake and mean annual lake level; and high inflows to the lake and maximum average monthly water level in the lake.

Results indicated that diesel could attach to nearshore and shoreline vegetation and shallow sediments resulting in the potential for persistence of diesel in the environment. Ammonia concentrations would exceed MDMER limits from one to seven days. Concentrations of ammonia and cyanide would also exceed water quality guideline limits with the former predicted to drop below thresholds in one to five

days. Cyanide, ammonia and nitrate were not predicted to persist in the environment or to bioaccumulate. Results of the spill modelling of the ammonium nitrate emulsion indicated that the maximum concentrations of total ammonia, unionized ammonia, and nitrate at the Exploits River dam were below the CWQG-FAL limit. The total ammonia, unionized ammonia and nitrate were not expected to persist in the environment, nor result in potential bioaccumulation.

The Proponent noted that a spill of fuel or hazardous materials could contaminate soil, groundwater and surface water, thereby potentially adversely affecting fish and fish habitat, and terrestrial vegetation. This could result in the ingestion and uptake of contaminants by wildlife and affect access to these resources. A spill of fuel or hazardous material and the subsequent clean-up efforts would likely cause caribou and other wildlife to avoid these areas. The Proponent stated that the results of a large spill could be additive to the high magnitude effect predicted for the Buchans caribou herd, particularly if it were to occur during migration.

To reduce the potential for fuel and hazardous materials spills, the Proponent committed to following regulatory requirements and routine inspections and maintenance. The Proponent would implement plans as per an Emergency Management System to redirect resources to contain and clean up spills and to test for efficacy.

In the unlikely event of a worst-case scenario spill of hazardous materials, the Proponent indicated that there is the potential for significant residual adverse effects to surface water resources and fish and fish habitat. However, when taking into account design and safety measures in place to reduce the likelihood of an accident or malfunction and the emergency response plans and contingency measures that would be in place to limit potential environmental effects, the Proponent predicted that significant effects from a fuel and hazardous materials spill on all valued components are unlikely to occur.

Unplanned Release of Contact Water

Contact water is any runoff, groundwater or process water that has come into direct contact with mine rock, tailings, or terrain where mine workings and infrastructure occur. Contact water would be collected and managed through a variety of drainage ditches, pipes and sump pits constructed around project infrastructure and directed to either the tailings management facility or sedimentation ponds. Malfunction of the catchment sumps, ditches and channels, and sedimentation ponds and accidental seepage where contact water is stored could lead to the unplanned release of contact water.

Given that the water collection system is located throughout the project area, including near waterbodies, the Proponent noted that an unplanned release of contact water to the environment has the potential to adversely affect groundwater, surface water quality, and fish and fish habitat. The Proponent predicted water quality would meet the MDMER limits at the outlet of the sedimentation ponds and a release of sediment laden water would be expected to temporarily increase total suspended solids in the Victoria River, Victoria Lake Reservoir, Valentine Lake or their tributaries. Contact water is predicted to contain sediment and minor dissolved metals and other potential constituents like ammonia at very low concentrations and therefore the Proponent stated it would not pose increased mortality risk to wildlife or people. The Proponent indicated that an unplanned release of contact water is not expected to result in lethal effects on fish, but depending on the volume released, there is the potential for physical disturbance of fish habitat. However, effects would be temporary and benthic and fish communities would be expected to recover.

Effects from an accidental release of contact water on migratory birds, wildlife species at risk and Indigenous use of lands and resources would be related to the quality of water released. The Proponent indicated that untreated and contaminated water could be ingested by wildlife or people, however potential exposure is limited as adverse effects are mainly localized to the project area and there is a low level of wildlife activity or resource users expected to be in the immediate areas of project activities.

To reduce the risk of unplanned water releases, the Proponent indicated it would design the water management infrastructure to minimize operational risks and environmental impacts by reducing contact water inventory, controlling high precipitation events and reducing contact water effluent discharge points.

It noted it has developed a Water Management Plan to guide the construction, operation and closure of the Project. The Proponent also indicated a water quality monitoring program would be implemented during normal operating conditions to detect exceedances of water quality guidelines in the event of an unplanned release of contact water. If exceedances are detected, remedial steps would be taken to reduce and eliminate the release through repairs to water management systems. A tailings/effluent emergency response plan would also be required through the *Metals and Diamond Mining Effluent Regulations* in order to address the personnel, equipment and procedures required to react to an unplanned release of effluent.

The Proponent indicated its standard operating procedures and emergency response measures would include sediment fencing in the event of an unplanned release of contact water in order to reduce potential sediment release, pumping of water back into the collection system, and monitoring of affected water bodies. Remedial actions would be done in consultation with regulators.

The Proponent predicted negligible adverse effects to migratory birds, wildlife species at risk and Indigenous use of lands and resources and indicated it did not anticipate health risks for people that eat country foods as there would be limited interaction with wildlife. The Proponent predicted that the adverse effect of an unplanned release of contact water on all valued components would not be significant.

Fire/Explosion

A fire/explosion could result from accidental events associated with project activities, such as equipment malfunction, human error or uncontrolled explosions. A fire/explosion could result in potential effects to atmospheric environment, surface water resources, fish and fish habitat, vegetation and wetlands, and wildlife (including species at risk). The Proponent indicated that immediate concern would be for community health and safety, as well as concerns for habitat loss, direct mortality to wildlife and loss or damage of property.

Fire could result in the release of emissions to the atmosphere affecting air quality. Emissions consist of smoke and CO_2 and could also include carbon monoxide, nitrogen oxides, and sulfur dioxide. The Proponent noted timely emergency response procedures would limit the extent and duration of atmospheric emissions and would return to pre-fire conditions shortly after extinguishing the fire.

The Proponent noted that surface water quality and fish habitat could be affected by a fire or explosion due to surface runoff containing ash, sediment, or chemicals, or from the extraction of surface water to control the fire. The Proponent expected these effects to be localized and temporarily increase suspended particulate matter with possible minor traces of hydrocarbon.

The Proponent noted that wildlife habitat adjacent to the project area could be altered from a fire or explosion and could result in direct mortality of wildlife and influence the sustained presence of wildlife populations. Fire could result in the avoidance and loss of breeding, nesting, rearing, or other habitat for birds and other wildlife species. The Proponent also indicated that caribou may potentially avoid burned forests, particularly in winter as caribou may select other more suitable habitat types.

The Proponent also noted that fires and explosions are a risk to community health and safety and burned areas can affect land use by resource users.

Along with fire prevention and management measures, the Proponent has committed to the development of Emergency Response Plans to mitigate the potential effects of fires and explosions that would include training, responsibilities, response equipment and materials, and contact and reporting procedures.

The Proponent predicted that an accidental fire or explosion would have a potential significant effect on caribou. However, it indicated that significant effects to caribou from a fire or explosion would be unlikely to occur given the project design and safety measures in place. It was also of the view that the emergency response plans and contingency measures would limit potential environmental effects.

7.1.2. Views Expressed

Federal Authorities

ECCC noted that although the Proponent modeled the fate of an accidental release of cyanide and its effect in Beothuk Lake, there is no discussion on the potential of hydrogen cyanide to enter the atmosphere from the lake's water. The Agency notes that hydrogen cyanide gas degrades quickly and naturally in the environment due to sunlight and oxidation, and will not have any long-term effects on the environment. ECCC agrees that the gas plume would quickly dissipate once entering the natural environment and no further response or environmental effects would be expected.

Overall, ECCC was satisfied with the Proponent's modelling and analysis for accidents and malfunctions. It advised the Agency that the mitigation measures, monitoring commitments, and follow-up programs proposed by the Proponent as well as those recommended by the Agency would adequately address the potential effects from accidents and malfunctions.

Public

Mining Watch Canada noted that the EIS did not provide a qualitative analysis of the risk of the accidents and malfunctions scenarios occurring across all phases of the Project. Mining Watch Canada also requested information on how it was determined that the worse case scenario for a tailings management facility malfunction and for fire or explosions was unlikely to occur. In response, the Proponent provided a risk matrix of likelihood versus severity of impact to present its qualitative risk assessment for accident and malfunction scenarios. The Proponent noted that the term risk considers the likelihood of an accidental event (or the expected frequency) and the severity of the expected consequences. The determination of likelihood was based on the probability of the accident occurring given project design and construction, monitoring and inspection programs proposed, implementation of mitigation measures and professional judgement and experience.

7.1.3. Agency Analysis and Conclusion

Effects Analysis

The Agency is of the view that the Proponent has appropriately identified and assessed potential accidents and malfunctions associated with the Project. The Proponent assessed tailings management facility malfunction, release of fuel/hazardous materials, unplanned release of contact water, and fire/explosions. Preventative measures have been taken into account in the project design to minimize accidents and malfunctions. Emergency and Spill Response Plans and adhering to the Canadian Dam Association Dam Safety Guidelines would limit potential environmental effects in the event of an accident or malfunction. The Agency further notes that the Proponent would be required to adhere to provincial requirements, including those related to dam structures. While a tailings management facility malfunction could cause a potential significant effect on surface water resources, fish and fish habitat, caribou, and the health of Indigenous people a fuel and hazardous materials spill could cause a potential significant effect on surface water resources and fish and fish habitat; and a fire/explosion could have a potential significant effect on caribou, the Agency notes that the Proponent predicted a very low likelihood of such an event occurring given the project design and safety measures committed to and as outlined in the analysis above.

Key Mitigation Measures to Avoid Significant Effects

The Agency recognizes that the Proponent committed to meeting or exceeding mine design, construction, operation and closure in accordance with the Canadian Dam Association's Guidelines, global industry

standards on tailings management and Mining Association of Canada Guidelines, as well as regulatory requirements for fuel and hazardous materials.

The Agency has considered the mitigation measures proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups and the public in identifying the following key mitigation measures to be implemented with respect to accidents and malfunctions. The Proponent shall:

- Take all reasonable measures to prevent accidents and malfunctions that may result in adverse environmental effects and mitigate any adverse environmental effect from accidents and malfunctions that do occur.
- Adhere to the Canadian Dam Association, global Industry Standards on Tailings Management, and Mining Association of Canada Guidelines as well as applicable provincial requirements for design, construction, operation and closure.
- Store fuel and hazardous materials a minimum of 200 metres from a salmon river or tributary and 100 metres from all other waterbodies.
- Develop and implement emergency response plans in relation to the Project including:
    - a spill response plan for fuel and other hazardous materials;
    - Measures to mitigate the potential effects of accidental releases from the tailings management facility, fires and explosions. These measures would include training; responsibilities; response equipment/ materials; and response, contact and reporting procedures.
- Develop a Communication Plan, which will identify the notifications procedures, warnings and alarms to be implemented in the event of a failure. In the event of an accidental release from the tailings management facility, issue fish advisories until monitoring of fish tissues confirm safe consumption levels. If needed, issue public advisories on water consumption from Beothuk Lake until monitoring confirms that it is suitable for human use.

The Agency considers these mitigation measures together with the Proponent's design measures, emergency response approach, monitoring activities, and remediation actions to be adequate in managing the risk of an accident or malfunction scenario.

Follow-up

The Agency considered the follow-up and monitoring programs proposed by the Proponent, expert advice from federal authorities, and comments received from Indigenous groups in identifying the following to verify the predictions of effects from accidents and malfunctions and the effectiveness of mitigation measures.

In the event of an accidental release the Proponent shall carry out monitoring of fish tissues until confirmation of safe consumption levels. Also, water monitoring shall be carried out until it is confirmed that it is suitable for human use.

Conclusions

Taking into account the mitigation and follow-up measures described above (including those outlined in section 6.1, Fish and Fish Habitat, 6.2 Migratory Birds, 6.3 Species at Risk, 6.4 Caribou, and 6.5 Indigenous Current Use and Health), of the Agency is of the view that the Project is not likely to cause significant adverse environmental effects due to accidents and malfunctions. Although some worst-case scenarios suggest that adverse environmental effects may take place, the possibility of these scenarios taking place is considered to be low.

7.2. Effects of the Environment on the Project

Section 7.2 discusses the potential effects of the environment on the Project. The Proponent evaluated weather and climate conditions, as well as geological stability and seismicity as factors that could have an effect on the Project. These factors may damage project components and increase the potential for accidents and malfunctions (section 7.1).

The Agency is of the view that the Proponent has adequately addressed the effects of the environment on the Project after taking into account the implementation of proposed key mitigation and follow-up measures (in the previous valued component sections). The Agency based this conclusion on its analysis of the Proponent's assessment, federal authority expert review, and comments provided by Indigenous groups and the public.

7.2.1. Proponent's Assessment of Environmental Effects

Weather and Climate Conditions

Weather

The Proponent stated that extreme precipitation has the potential to affect project infrastructure and operation, in particular the potential for overloading the Project's water management infrastructure and the tailings management facility, and could result in the release of sediment to surface waterbodies, or the unplanned release of contact water or a tailings management facility malfunction. A dam breach for the tailings management facility would result in the release of untreated water and tailings reaching the Victoria River and the processing plant. The potential effects of a breach in the tailings management facility is presented in section 7.1. To prevent this, the Project's water management infrastructure would be designed to attenuate a one in 100-year flood event, plus the 30-day snowmelt. Additionally, pond spillways would be designed to manage a one in 200-year event. Water-retaining dams would be designed in accordance with *Canadian Dams Association Guidelines*. In addition, the Project is situated on a natural topographic divide resulting in no upstream catchments and is surrounded by natural attenuation features such as Valentine Lake with low-lying wetlands and Victoria Lake Reservoir. Further mitigations include using appropriately specified natural materials to resist scour and erosion.

The Proponent stated that extreme snow and ice have the potential to damage Project infrastructure through increased loadings on buildings. Additionally, the low temperatures in winter may affect water intake and effluent discharge, through increased ice thickness on local lakes, including Victoria Lake Reservoir. In very low temperatures, construction material flexibility may be reduced, making it more susceptible to breakage. The Proponent indicated that to reduce the potential for damage to infrastructure and equipment due to weather variables, the Project would be designed and constructed to meet applicable engineering codes, standards and best management practices.

Drought conditions could reduce water levels in surrounding watersheds, such as Victoria Lake Reservoir, which would reduce the availability of water for mining operations. The Proponent determined that the current water supply is adequate for the needs of the Project. However, water levels within Victoria Lake Reservoir are controlled by Newfoundland and Labrador Hydro based on factors including power supply requirements and potential flooding seasons. The Proponent indicated that water intake design has accounted for the fluctuations in water level with water intake being located at depths below low water and ice cover depth.

Forest Fires

The Proponent indicated that forest fires are infrequent in the area; however, if they were to occur, a forest fire would have the potential to damage Project infrastructure and equipment. To reduce the

potential effects of forest fires, the Proponent would prepare emergency response measures, provide training, monitor wildfires, and ensure on-site fire prevention and response equipment is available and regularly maintained.

Climate Change

The Proponent obtained climate change precipitation and temperature data and the projected change in precipitation for the period between 2011-2040[28] (based on the expected operational life of the Project. The Proponent indicated that future climate change could result in increased temperatures, frequency and intensity of extreme precipitation, frequency and magnitude of storm events, and incidence of flooding and erosion in the project area, which could result in damage to project infrastructure and equipment. To mitigate the potential effects of climate change on water management infrastructure, the Proponent accounted for climate change in its design.

Geological Stability and Seismicity

Seismicity

A seismic event could affect project infrastructure, however, the project area is located in an area considered as having a low seismic hazard (Geological Survey of Canada, 2015). The Proponent noted that compacted rockfill and foundation soils are not considered susceptible to liquefaction during an extreme seismic event and that geotechnical investigation at the tailings management facility is required to confirm the subsurface conditions during the next stage of design. To reduce the likelihood of seismic activity induced damage, project infrastructure (e.g., buildings, dams, ore, waste rock piles, and overburden stockpiles) would be designed to account for any seismic event and in accordance with the requirements of the National Building Code of Canada.

Slope Failure

Slope failure in the open pits could occur due to unanticipated geological or hydrogeological conditions, which could cause the open pit walls to slump. The Proponent advised that extensive geological mapping and testing across the site indicates there is an absence of overburden soil and bedrock types that would be prone to landslides, slope instability and other geological hazards. The Proponent indicated that project design, along with inherent geological features and natural topography result in low risk geological hazards at the project site. The mapping and testing results would be used to inform the final Project design with consideration to geological hazards.

7.2.2. Views Expressed

Federal Authorities

Overall, ECCC and NRCan were satisfied with the Proponent's modelling and analysis for effects of the environment on the Project and are of the view that the Proponent has considered the appropriate data and is putting in place the appropriate monitoring to understand the potential effects of the environment on the Project. In response to concerns identified by ECCC about the climate data used to inform the description of climate for the project effects assessment, the Proponent committed to the installation of an automated data logging and telemetered climate station on site, which would inform site water resources monitoring and surveillance. The Proponent also indicated that it would design and construct the Project

[28] The Proponent used the Climate Atlas of Canada's online tool (Climate Change in Canada | Climate Atlas of Canada) and the Intergovernmental Panel on Climate Change Representative Concentration Pathway 4.5 emission scenario to generate data.

to meet applicable engineering codes, standards and best management practices to account for extreme weather conditions that could affect the structural integrity of buildings and infrastructure.

ECCC requested information on the risk of flooding, how flooding could adversely affect the Project, and measures to mitigate adverse effects of the environment on the Project. The Proponent predicted a negligible risk of flooding of Project facilities due to natural features at and near the mine site that would attenuate potential flooding. The Proponent indicated that it would design water management infrastructure for the Project to reduce flood risk taking into account the worst-case flooding scenario. The Proponent does not anticipate effects to the environment from flooding of the project facilities. The Proponent committed to conducting routine maintenance, inspections, and monitoring to prevent deterioration of Project infrastructure and equipment.

Agency Analysis and Conclusions

Taking into account the implementation of the mitigation and follow-up measures described in other valued component sections, the Agency is satisfied that the Proponent has adequately considered the effects of the environment onthe Project and response activities are appropriate to account for the potential effects of the environment on the Project.

7.3. Cumulative Environmental Effects

Cumulative environmental effects are defined as the effects of a project that are likely to result when a residual effect acts in combination with those of other projects or activities that have been or will be carried out. This cumulative effects assessment was guided by the Agency's *Operational Policy Statement Assessing Cumulative Effects Under CEAA 2012*[29], which recommends that cumulative effects analysis consider effects in areas of federal jurisdiction as described in section 5 of CEAA 2012 or effects on valued components noted by Indigenous people and the public to be of specific interest. For the Project, the Agency specifically focused its analysis on:

- Fish and Fish Habitat and Migratory Birds, both within federal jurisdiction; and
- Caribou, a species of concern identified in comments received from Indigenous groups and the public.

The Agency is of the view that effects on the other valued components identified in this report are unlikely to act in combination with the effects of other past, present or reasonably foreseeable projects or activities, given the negligible to low magnitude and limited geographic extent of the Project's anticipated residual effects on these components. The Agency therefore excluded the other valued components from the analysis of cumulative effects.

The Agency is of the view that the Project, in combination with past, present and reasonably foreseeable future projects or activities, is not likely to result in significant adverse cumulative effects on fish and fish habitat, and migratory birds and that additional mitigation or follow-up program measures are not required. The Agency is of the view that the Project will cause adverse cumulative effects on caribou. The Agency based this conclusion on its consideration of the project effects, the effects of other past, present and reasonably foreseeable projects or activities, the Proponent's assessment, federal and provincial authority expert review, commentsprovided by Indigenous groups and the public, the proposed mitigation measures, and existing federal and provincial regulations.

[29] *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* accessible at: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/assessing-cumulative-environmental-effects-under-canadian-environmental-assessment-act-2012.html

7.3.1. Proponent's Approach and Scope

The Proponent noted that its approach to the cumulative effects assessment was guided by The Agency's *Operational Policy Statement for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (2015), which acknowledges that, "present-day conditions reflect the cumulative effects of many past and existing physical activities". The Proponent reasoned that baseline condition characterizations for its residual effects analysis were reflective of historical effects, and the assessment of residual effects on valued components generally considered effects from past and existing projects and physical activities. When defining the scope of its cumulative effects assessment, the Proponent therefore focussed on the combination of Project-specific residual effects with the residual effects of ongoing and future physical activities. However, it provided summary information on past, present and foreseeable future projects and activities for each valued component that include other mining and exploration; forestry; hunting, outfitting, trapping, and fishing; off-road vehicles; hydroelectric developments, and linear features (Table 11).

The Proponent evaluated cumulative effects when the Project was predicted to have adverse residual environmental effects on a valued component that overlapped spatially and/or temporally with the effects of other projects and physical activities.

A cumulative effects regional assessment area (Figure 14) was developed to encompass the other projects or physical activities that have the potential to cumulatively interact with the Project, as well as to account for the larger movements and distributions of the various biological and socio-economic components.

With respect to the period over which the Project could contribute to cumulative effects, the Proponent used the same temporal boundaries as for the project-specific effects assessment of each valued component; from the start of the construction period through to the end of post-closure monitoring.

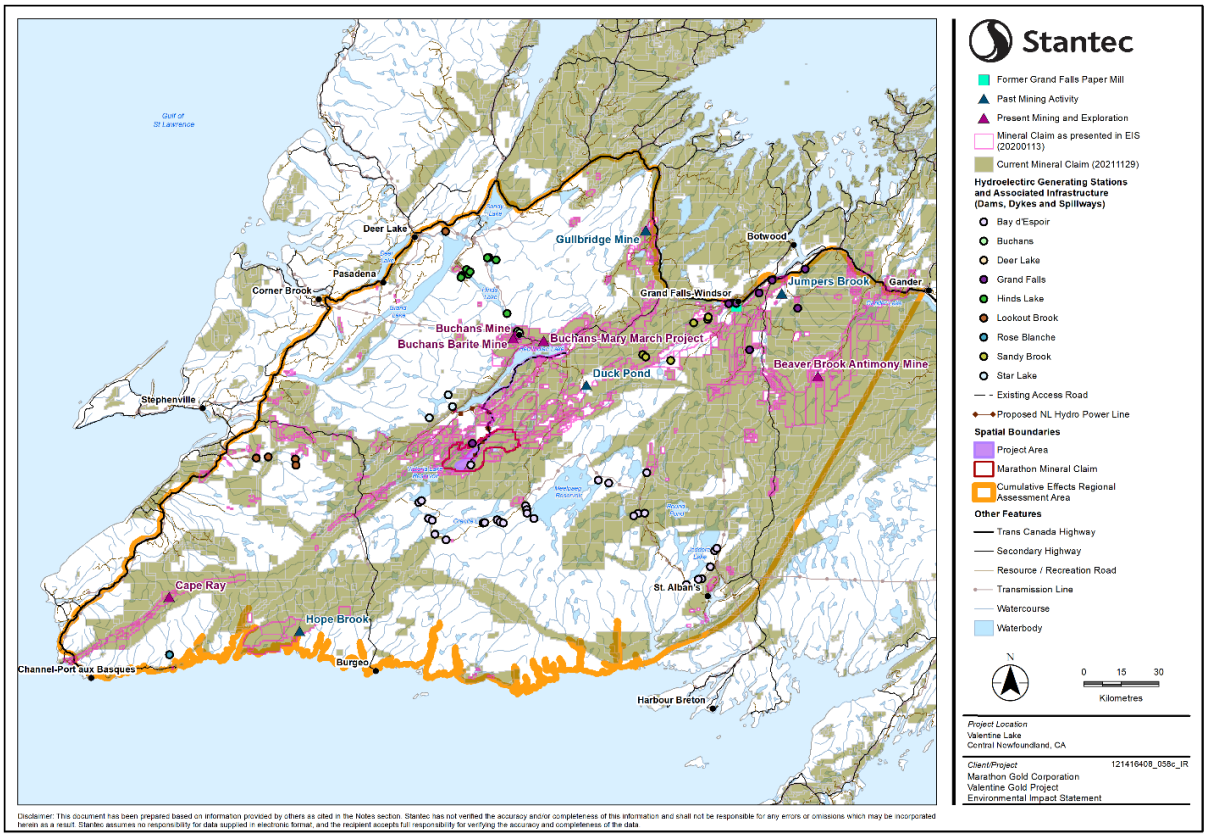
Table 11: Past, existing, and reasonably foreseeable future projects or activities included in the Cumulative Effects Assessment

Project/Activity	Distance to the Project	Description	Status
Buchans Barite Plant	47 kilometres	Supplied drilling mud to oil and gas exploration activities.	Closed
Barite Mud Services	47 kilometres	Recovers barite from the tailings remaining from past mining operations. (Former Buchans Mine Tailings Processing).	Ongoing/ Seasonal
Buchans Mine	48 kilometres	Copper, zinc and lead mine that operated until 1984.	Closed
Buchans-Mary March Mining Project	51 kilometres	Phase I of a drill program was conducted for this site in 2019, with further geochemical and geophysical studies anticipated.	Ongoing
Duck Pond Mine	51 kilometres	Copper and zinc mine that ceased operation in 2015; decommissioning and rehabilitation phases are ongoing.	Closed
Hope Brook Gold Mine	91 kilometres	Gold mine that ceased operation in 1997.	Operation ceased
Gullbridge Mines	111 kilometres	Copper mine that operated from 1967 to 1971.	Closed
Jumpers Brook – Terra Nova Granite (2007) Inc.	137 kilometres	Produced blank monuments, architechtural and landscape products, and countertop slabs mainly for export.	Closed
Beaver Brook Antimony Mine	139 kilometres	Antimony ore mine that was restarted in 2019. 160,000 tonnes of antimony ore will be mined per year and processed into stibnite concentrate. Mine life span is expected to be three and a half years.	Ongoing
Mineral Exploration	N/A	Approximately 100 mineral exploration companies are active in Newfoundland and Labrador.	Ongoing
Forestry	N/A	The province of Newfoundland and Labrador is divided into 24 Forest Management Districts. The project area is located within two of them.	Ongoing

Hunting and Outfitting	N/A	Primary species of interest for hunting are moose, caribou, black bear, small game and migratory birds (e.g., geese, ducks and snipe).	Ongoing
Trapping	N/A	A variety of furbearer species are subject to trapping activity in the area.	Ongoing
Angling/Fishing	N/A	Angling occurs on a number of waterbodies in the cumulative effects regional assessment area, mainly for salmon and brook trout, however, Arctic char are also targeted on select waterbodies. The Exploits River has the highest runs of sea-run Atlantic salmon in Newfoundland.	Ongoing
Aquaculture	89 kilometres	Aquaculture activity occurs along the southern coast with 27 aquaculture licences in the cumulative effects regional assessment area. The nearest aquaculture licence is 89 kilometres from the project area.	Ongoing
Off-road Vehicles (Snowmobiling and All-Terrain Vehicles)	N/A	The use of off-road vehicles occurs in the cumulative effects regional assessment area on official trails as well as unofficial use of Crown and private lands (e.g., forestry roads and power lines).	Ongoing
Hydroelectric Development (Victoria Dam and Reservoir)	500 metres	The cumulative effects regional assessment area is an area of substantial hydroelectric development, with the following hydroelectric generating stations in the cumulative effects regional assessment area: • Bay d'Espoir • Buchans • Deer Lake • Grand Falls • Hinds Lake • Lookout Brook • Rose Blanche • Sandy Brook • Star Lake The closest development to the Project is the Victoria Dam and Victoria Lake Reservoir, which are part of the Bay d'Espoir Hydroelectirc Development and are located 500 metres from the project area.	Ongoing
Existing Linear Features (i.e., highways/roads and power lines	N/A	Linear activities such as highways, roads and power lines occur throughout the cumulative effects regional assessment area, including extensive forestry roads.	Ongoing

Cape Ray Gold Mine Project	126 kilometres	Proposal to construct, operate, decommission and reclaim a gold/silver mine and milling complex.	Future
Buchans Resources Limited Project	48 kilometres	A new Mineral Resource Estimate was announced for the Lundberg base metal deposit located at the former Buchans Mine.	Future
Newfoundland and Labrador Hydro Powerline from Star Lake to the Project Area	Connects to the Project	A power line from Star Lake to the mine site will be required for the Project and will be constructed and operated by Newfoundland and Labrador Hydro.	Future

Figure 14: Other Projects and Activities Considered in the Cumulative Effects Assessment



Source: Valentine Gold Environmental Impact Statement, 2020

7.3.2. Proponent's Assessment of Cumulative Effects

Fish and Fish Habitat

Cumulative effects on fish and fish habitat include change in fish habitat quantity, fish habitat quality and fish health and survival. The Proponent noted that projects and activities that would contribute to cumulative effects on fish and fish habitat via similar effects pathways as the Project include mining and exploration, hydroelectric developments, existing linear projects, outfitting or fishing, aquaculture, and forestry activities.

Cumulative effects to fish habitat quantity and quality include direct and indirect habitat loss, water quality effects from site runoff and direct discharges of effluent, and changes to watershed areas and stream water flow. As noted in Section 6.1, habitat loss associated with the Project was estimated in the EIS at a maximum of 186,705 square metres, and fish habitat quality was anticipated to be affected up to 300 metres in the ultimate receiving waterbodies of Valentine Lake, Victoria Lake Reservoir, and Victoria River. Quantitative estimates for changes to fish habitat quantity and quality associated with Cape Ray Gold Project, Buchans Resources Limited Project and the NL Hydro Power line are not available. The Proponent noted that available information for the Cape Ray Gold Project indicated that good salmonid spawning and rearing habitat was observed during habitat mapping, however the distance from the Project (126 kilometres) would limit the potential for cumulative effects, particularly given that different Atlantic salmon populations would be affected by the two projects. The Proponent asserted that although the Buchans Resources Limited Project has the potential to affect fish habitat quantity and quality, the surface area of the potential pit for that project is less than one square kilometre, smaller than both the Marathon and Leprechaun pits combined, and therefore unlikely to contribute significantly to cumulative effects. The Proponent recognized that hunting, outfitting, trapping, fishing and the presence of linear features, including the NL Hydro Power Line from Star Lake, could cause a change in fish habitat by contributing to erosion and sedimentation at water crossings. However, given standard fish habitat mitigations as well as fisheries catch quotas and seasonal closures, it stated that cumulative effects are anticipated to be low in magnitude. The Proponent further noted that the salmon population in the Project's local assessment area, the Northeast Newfoundland Atlantic salmon population, is not at risk, and therefore cumulative effects on habitat quantity and quality would not be anticipated to affect sustainability of the population.

The Proponent notes that changes in fish health and survival may be associated with the use of equipment in or near water, placement of infrastructure or open pits in fish habitat, effluent management, and use of explosives, water extraction and recreational fishing. It surmised that these interactive pathways stem from activities that require regulated compliance as well as mitigations to reduce potential effects. Combined with the mitigation measures implemented for the Project, the Proponent concluded with moderate confidence that cumulative effects to fish health and survival will not result in a change to productivity or sustainability of fish populations within the regional assessment area for cumulative effects.

The Proponent reasoned that other projects will be required to meet similar regulatory standards as the Project. With the implementation of these mitigation measures and follow-up programs and those required for the Project, the Proponent concluded that potential cumulative effects from the Project and reasonably foreseeable future activities are predicted to be low in magnitude and would not be significant.

Migratory Birds

Cumulative effects on migratory birds include change in habitat and mortality risk. Potential cumulative effects on migratory birds from mining and other exploration, hydroelectric developments, existing and future linear projects, as well as forestry activities and off-road vehicles include similar effect pathways as those from the Project.

The Proponent indicated that potential effects would include a direct loss of habitat resulting from removal of vegetation or flooding, or an indirect loss of habitat resulting from sensory disturbance during all phases of the Project. In addition, a change in mortality risk may occur from vegetation removal activities, collisions between birds and project-related traffic, linear infrastructure and equipment, as well as from increased access to birds by predators and hunters.

The Proponent indicated that Cape Ray Gold Project, Buchans Resources Limited Project, and the NL Hydro Power Line would contribute to migratory bird habitat loss in the cumulative effects regional assessment area. Quantitative estimates of habitat loss were not available for these projects. However, the Proponent noted anecdotal reports suggest that the Cape Ray Gold Project area may be used by migrating waterfowl in the spring and fall, and that waterfowl production in the project area is not considered substantial. The Proponent also stated that the distance from the Project (126 kilometres) would limit the potential for cumulative effects in combination with Project-related residual adverse effects. The Proponent noted that the scale of the Buchans Resources Limited Project would likely result in migratory bird habitat changes at a smaller or similar scale as the Project, and that it would not be expected to contribute significantly to cumulative change. The NL Hydro Power Line would result in a change in habitat for birds from vegetation removal and sensory disturbance. The distance and route were not known at the time of writing the EIS, therefore, assumptions were made regarding the typical width of a cleared right-of-way (i.e,, 15 metres) , a portion of which would be within the project area.

The Proponent stated that habitat for migratory birds is widespread throughout the cumulative effects regional assessment area, and noted that the habitat that would be removed or disturbed by the Project represents less than a 0.13 percent reduction from existing conditions within the cumulative effects regional assessment area (41,641 square kilometres).

The Proponent indicated that project-related contributions to cumulative effects on change in mortality risk would be confined primarily to the construction phase, and that risk would be highest for nesting birds, with lower risks associated with traffic-related collisions during all phases of the Project. Mortality risk would eventually return to existing conditions post-closure. The Proponent stated that the contribution of Project-related residual adverse effects to cumulative effects on mortality risk would be low in magnitude, since the residual adverse effect on migratory birds for the Project is predicted to be within the normal variability of existing conditions. Effect pathways for future potential projects would be similar to those described for the Project, and the Proponent reasoned that the Project's mitigation measures as well as those for other projects to reduce mortality to avifauna (e.g., avoiding clearing activity during the nesting period or, when this is not feasible, use of nesting bird surveys), would reduce the potential for cumulative effects. The Proponent predicted that cumulative effects on mortality risk would not result in substantial change in the abundance of migratory birds in the cumulative effects regional assessment area, though there would be potential for temporary local shifts in distributions.

The Proponent predicted that cumulative effects resulting from the Project and reasonably foreseeable future activities on migratory birds were predicted to be low in magnitude, contained to the regional assessment area, long term, and single to continuous events, reversible and within an already disturbed context. Some upland and wetland habitat would be lost or altered for birds, including species at risk; however, habitat would be abundant and widespread throughout the cumulative effects regional assessment area. The Proponent stated that reasonably foreseeable future projects or activities combined with potential Project effects (i.e., changes in habitat) would not be expected to measurably affect the abundance or sustainability of migratory birds in the cumulative effects regional assessment area. The Proponent predicted that with mitigation, the cumulative effects from the Project and reasonably foreseeable future projects or activities would not be significant.

Caribou

The Proponent considered cumulative effects on caribou to include change in habitat, change in movement, and change in mortality risk (including calf mortality). The Proponent noted that projects and activities that would contribute to cumulative effects on caribou include other mining and exploration; forestry; hunting, outfitting, off-road vehicles; hydroelectric developments; and linear features.

The Proponent indicated that project effects on change in caribou habitat, movement, and mortality risk would act cumulatively with similar effects resulting from reasonably foreseeable projects and activities. According to the Proponent, the primary source of potential adverse effects to caribou (whether through changes in habitat, movement or mortality, or these in combination) would be the mining infrastructure itself. The Proponent's mitigation measures to reduce effects of infrastructure are discussed in section 6.3.

Caribou Habitat

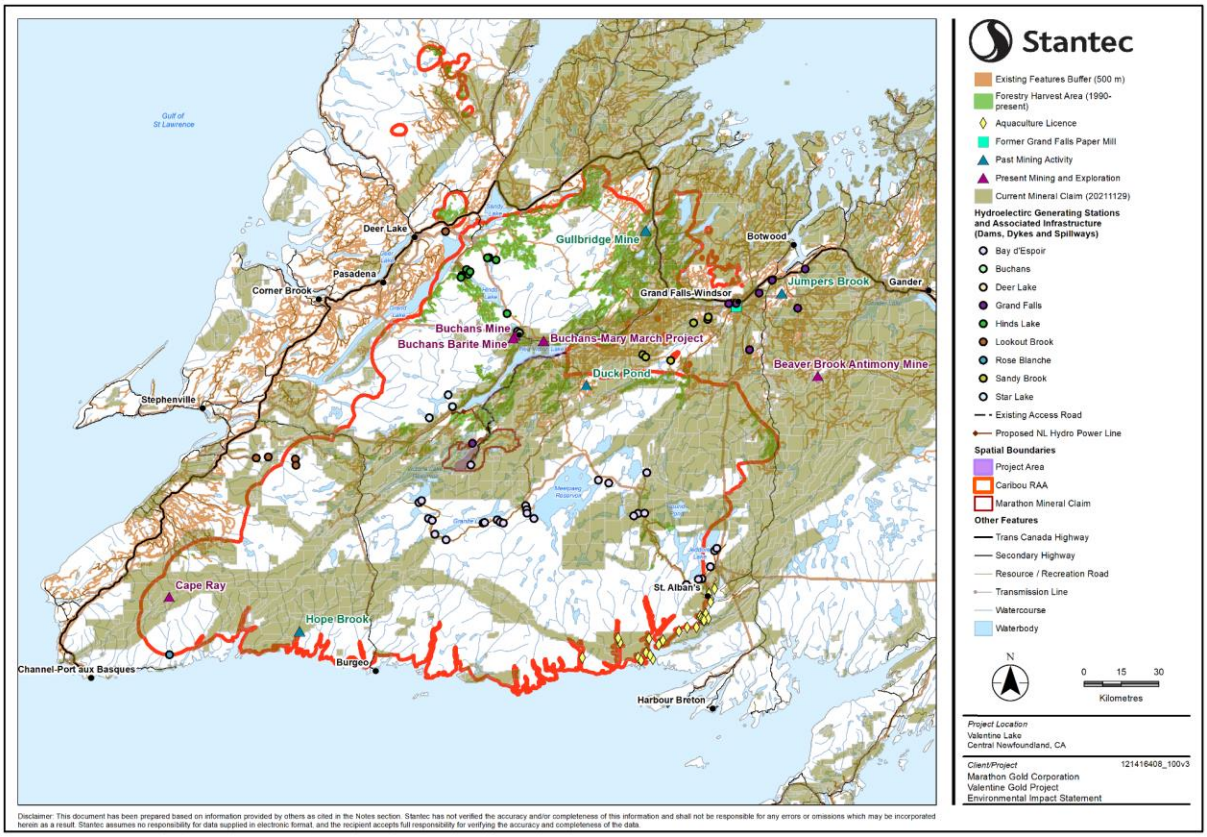
Mining and exploration projects; forestry; hunting, outfitting, trapping, and fishing; off-road vehicles; hydroelectric developments; and linear features have similar pathways of effects as the Project, including a change in habitat resulting from direct habitat loss and sensory disturbance (e.g., noise and light emissions).

Vegetation clearing could result in habitat fragmentation. The Proponent indicated that some forest fragmentation would occur as a result of the project mine site and future activities and projects, in particular, the NL Hydro Power Line, given its location within the Caribou local assessment area and within the same corridor as the access road. As linear features such as roads and power lines are often avoided by caribou, the creation of linear features within the cumulative effects regional assessment area has the potential to fragment the habitat further.

The Proponent noted that while a small amount of caribou habitat would be lost, suitable habitat remains abundant and widespread throughout the cumulative effects regional assessment area for caribou (Figure 15)[30]. The Proponent noted that project-specific contributions represent a small proportion of the cumulative disturbed areas, indicating that the ecological functions of these areas should remain relatively consistent.

[30] Although similar in area, the Proponent used a different cumulative effects regional assessment area for caribou than the one used for the rest of the biological valued components such as Fish and Fish Habitat and Migratory birds discussed in this chapter.

Figure 15: Extent of Existing and Planned Anthropogenic Disturbance Footprints



Source: Valentine Gold Environmental Impact Statement, 2020

The Proponent indicated that guidance provided in the Amended Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada (ECCC 2020) provides means for interpreting cumulative effects on the Newfoundland population of caribou. The amended recovery strategy identifies a threshold of 65 percent of undisturbed habitat in a herd's range to provide a measurable probability for local populations to be self-sustaining. For three of the four caribou herds, Buchans, Grey River and La Poile, the predicted undisturbed habitat for present and reasonably foreseeable projects or activities in the cumulative effects regional assessment area is above the 65 percent threshold, ranging from 77 to 94 percent of total range (Table 12). The fourth herd, Gaff Topsail, was estimated at approximately 40 percent, which is below the 65 percent threshold.[31]. The Proponent predicted increases of one to two percent in the area of disturbed habitat for each herd. Based on the guidance provided in ECCC (2020), the Proponent noted the quantity of undisturbed habitat available for caribou from the Buchans, Grey River, and La Poile herds is sufficient to provide a measurable probability for the population to be self-sustaining. Although the level of undisturbed habitat for the Gaff Topsails herd range falls below the recommended threshold defined for Boreal Caribou, the Project is anticipated to have minimal effect on this range (only resulting in 0.4 square kilometres lost).

Table 12: Area of Exisiting and Percent of Existing and Planned Disturbance Footprints within Caribou Herd Ranges

Caribou Herd	Range of Caribou Herd (Km2)	Area (Km2) predicted to be disturbed (Project contribution to total) (Km2)	Percent of area predicted to be disturbed (Percent of Project contribution to total)	Minimum Percentage of Undisturbed Habitat within Herd Range
Gaff Topsails	5,685	3,390 (0.4)	59.8 (<0.1)	40.2
Buchans	15,650	3,562 (340)	23.0 (2.2)	77.2
Grey River	15,456	2,320 (165)	15.0 (1.1)	85.0
La Poile	11,183	625 (-)	5.60 (-)	94.4

Caribou Movement

The Proponent indicated that future mining projects anticipated within the cumulative effects regional assessment area could affect caribou movement as those project sites may be avoided by caribou. However, while the activities of mining projects are expected to have similar effects as the Project, neither the Cape Ray Gold nor Buchans Resources Limited mining projects appear to overlap a caribou migration corridor.

[31] The Proponent indicated that the Project has little to no overlap with the La Poile and Gaff Topsails ranges.

Though there may still be some avoidance of the Project by caribou, the Proponent predicted the magnitude of effects to be low if those developments do not overlap with a migration path.

The Proponent indicated that the NL Hydro Power Line could also affect caribou movement through avoidance. As the power line would occur within the range of the Buchans herd, and would likely be situated near the existing migration corridor, it is possible that its construction would incrementally contribute to cumulative effects. It is anticipated that mitigation measures designed to reduce the effects to caribou movement would be implemented by NL Hydro.

The Proponent noted that caribou react to both the presence of physical structures in their habitat and to sensory disturbances caused by human activity. Caribou avoidance was predicted to decrease with increasing distance from the project area based on research that shows avoidance of roads by woodland caribou at distances greater than two kilometres, with avoidance dissipating exponentially with increasing distance. The Proponent indicted that this suggests that while caribou may avoid habitats beyond the footprint of the Project, those habitats would not be lost to all caribou. Disruptions to existing migration paths may result in caribou using lower suitability habitat during migration, and altered migration routes would have potential implications on energetic demand, body condition, pregnancy rates, and predation risk.

The Proponent indicated that project-related contributions to cumulative effects on change in movement have the potential to disrupt the preferred migration path of the Buchans herd. As the Project overlaps an existing well-defined and well-used migration path, caribou may alter their use in over 50 percent of the route. According to the Proponent, future activities combined with potential Project effects, specifically changes in movement, could measurably affect the abundance or sustainability of caribou (i.e., the Buchans herd) in the cumulative effects regional assessment area.

Caribou Mortality

The primary cause of caribou mortality on the Island of Newfoundland is predation. While adult mortality rates have remained consistent, the Proponent noted that calf mortality rates have increased. Increased development, as well as hunting, outfitting, trapping and fishing can cause increased access to caribou habitat and an increase in harvest rates and access to caribou herds. The Project could contribute to a small change in caribou mortality risk; however, it is not anticipated to affect the viability of caribou in the cumulative effects regional assessment area.

The Proponent predicted that with the implementation of the project-specific mitigation measures and regulatory requirements (discussed in section 6.3) the overall cumulative effects on caribou is characterized as low (change in habitat and mortality risk) to high (Buchans Herd movement) magnitude, within the cumulative effects regional assessment area, short to long-term, continuous, reversible (sensory disturbance) to irreversible (direct change in habitat), and within an already disturbed context. The Proponent predicted cumulative effects from the Project and reasonably foreseeable activities to be significant.

7.3.3. Views Expressed

Public

The Canadian Parks and Wilderness Society noted that the Proponent provided a qualitative description of the different projects that exist or are proposed in the regional assessment area and not a quantitative analysis of total landscape disturbance levels provided for the cumulative effects assessment. In response to additional information requests, and described above the Proponent provided quantitative estimates of potential habitat disturbance from present and reasonably foreseeable projects or activities and noted that project-specific contributions represent a small proportion of the cumulative disturbed areas, indicating that the ecological functions of these areas should remain relatively consistent.

7.3.4. Agency Analysis and Conclusion

The Agency notes that the Proponent focussed its analysis primarily on future projects and activities, stating that potential cumulative effects of past projects and activities were accounted for in the existing conditions and analysis of residual Project effects. The Agency concurs with this approach noting that the cumulative effects assessment area for each valued component has been strongly influenced by drivers such as historical and active forestry and alteration of watersheds for hydroelectric development such as the Victoria Dam and the Victoria Canal for the Bay d'Espoir Hydro Electric Development in the late 1960s.

Fish and Fish Habitat

Fish and fish habitat in the cumulative effects regional assessment area may be affected by the Project in combination with effects of other projects and activities. The Agency notes that fish and fish habitat in the local and regional assessment area have been subject to substantial watershed-level changes as a result of past hydroelectric development. The Project's baseline is therefore not reflective of pristine conditions, with the presence of landlocked salmon that have become isolated from other populations.

The Agency notes that the future projects that would potentially affect the same populations of fish as the Project are smaller in scale and are not anticipated to contribute substantially to cumulative effects in combination with Project-related residual effects. The Agency concurs with the Proponent's view that these projects would be subject to compliance with the *Fisheries Act* and mitigations similar to those for the Project. The Agency therefore accepts the assertion that given the implementation of Project mitigation and follow-up programs in combination with regulatory controls on other projects and activities, cumulative changes to fish and fish habitat will not result in a change to productivity or sustainability of fish populations.

Potential cumulative effects are predicted to be low in magnitude and limited to the regional assessment area. As with Project-related effects on fish and fish habitat, cumulative effects are predicted to be long-term in duration, continuous in frequency, irreversible, and occurring in an ecological context that has been subject to past disturbance. Taking into account the predicted residual effects of the Project, the proximity to other projects or activities, the implementation of mitigation measures and the recommended follow-up programs for Project effects outlined in section 6.1, the Agency concludes that the Project, in combination with past, existing and reasonably foreseeable projects or activities, is not likely to cause significant adverse cumulative effects on fish and fish habitat.

Migratory Birds

Migratory birds in the cumulative effects regional assessment area may be affected by the Project in combination with effects of other projects or activities. The Agency acknowledges there will be loss of habitat and potential mortality risk, however the Agency is of the view that mitigation measures outlined in Section 6.2 such as avoidance of vegetation clearing during the breeding bird season and limiting clearing to the project area would reduce the cumulative effects to migratory birds and their habitat.

Potential cumulative effects on migratory birds are predicted to be low in magnitude and within the cumulative effects regional assessment area. Effects would range from short, single events (e.g., construction-related disturbance) to long-term and continuous (e.g., habitat loss, discharges during operations). Effects would be primarily reversible although permanent alterations to the landscape due to certain Project components would result in irreversible effects. Effects would occur in both disturbed and undisturbed environments in the cumulative effects regional assessment area. ECCC confirms that the information available through the environmental assessment was appropriate and sufficient, and that the analysis appears sound. Taking into account the predicted residual effects, the proximity to other projects or activities, the implementation of mitigation measures and the recommended follow-up programs for Project effects outlined in Section 6.2, the Agency concludes that the Project, in combination with past, existing and reasonably foreseeable projects or activities, is not likely to cause significant adverse cumulative effects on migratory birds.

Caribou

Caribou and their habitat in the cumulative effects regional assessment area may be affected by the Project in combination with effects of other projects and activities.

The Agency acknowledges that the project area as well as the proposed power line both overlap caribou migration routes and would result in adverse effects on caribou migration. The Agency notes that re-design to the Project has been undertaken in consultation with Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture Wildlife Division to reduce overlap with the migration path. Further, as discussed in section 6.3, the Proponent has committed to continuing to update its Caribou Protection and Environmental Effects Monitoring Plan in consultation with regulators, scientific experts, Indigenous groups and stakeholders. The Agency is of the view that the key mitigations described in the other valued component sections would reduce adverse effects on caribou such as limiting vegetation clearing to the project area, implementing measures to reduce noise effects, and developing a Rehabilitation and Closure Plan (sections 6.1 and 6.2). The Agency notes that the Government of Newfoundland and Labrador is the leading expert authority on caribou within the province and that caribou are located entirely on provincial lands in relation to the Project. Therefore, the Agency has primarily relied on the provincial expertise to assess the potential cumulative effects and any required mitigation measures for caribou. The Proponent will continue to engage with provincial experts as outlined in the Government of Newfoundland and Labrador conditions of release[32] for the Project.

The Agency is of the view that the proposed measures to be implemented by the Proponent as described in section 6.3 would reduce adverse cumulative effects on caribou. The Agency recommends that the Proponent consider applicable recovery strategies and action plans for caribou that may be affected by the Project, as outlined under the *Species at Risk Act,* to reduce or prevent the decline of this species.

[32] Government of Newfoundland and Labrador terms and conditions for the Valentine Gold Project: https://www.gov.nl.ca/ecc/files/EA-2015-Valentine-Gold-Project-Decision-Letter.pdf

8. Conclusion and Recommendations of the Agency

In preparing the draft Environmental Assessment Report, the Agency took into account the Proponent's EIS, its responses to information requests, and the views of government agencies, Indigenous groups, and the public.

The environmental effects of the Project and their significance as well as the potential for cumulative environmental effects have been determined using assessment methods and analytical tools that reflect current accepted practices of environmental and socio-economic assessment, including the assessment of the consequences of potential accidents and malfunctions.

The Agency focussed the analysis of potential effects on terrestrial mammal species at risk, namely bats, American marten and caribou. The Agency is of the view that the measures implemented by the Proponent to meet regulatory requirements and the key mitigations described in this report would avoid or lessen any potential adverse effects on species at risk. The Agency acknowledges that the Project would result in adverse effects on caribou.

The Agency concludes that, taking into account the implementation of mitigation measures, the Project is not likely to cause significant adverse environmental effects as defined in CEAA 2012.

The Agency has identified key mitigation measures and follow-up program measures for consideration by the Minister of Environment and Climate Change in establishing conditions as part of the Environmental Assessment Decision Statement, in the event that the Project is permitted to proceed.

In addition, it is the Agency’s expectation that for the Project to be carried out in a careful and precautionary manner, all of the Proponent’s commitments, as outlined in the EIS and its supporting documents available on the Impact Assessment Agency of Canada’s Registry Internet Site, would be implemented as proposed.

9. References

Canadian Council of Ministers of the Environment (CCME). 2003. *Canadian Water Quality Guidelines forthe Protection of Aquatic Life: Guidance on the Site-Specific Application of water quality guidelines in Canada: Procedures for deriving numerical water quality objectives*. In: Canadian Environmental Quality Guidelines. Winnipeg. Accessible at: https://ccme.ca/en/resources.

Canada Energy Regulator. 2021. "Provincial and Territorial Energy Profiles – Newfoundland and Labrador." Accessible at: https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-newfoundland-labrador.html.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2019. Accessible at : https://www.cosewic.ca/index.php/en-ca/.

Environment and Climate Change Canada (ECCC). 2015. Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. ix + 110 pp.

Environment and Climate Change Canada (ECCC). 2020. Amended Recovery Strategy for the Woodland Caribou (*Rangifer tarandus* caribou), Boreal population, in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. xi + 138 pp.

Environment and Climate Change Canada (ECCC). 2020. National Inventory Report for Canada to the United Nations Climate Change. Available online at: https://unfccc.int/ghg-inventories-annex-i-parties/2020

Fisheries and Oceans Canada (DFO). 2019. "Measures to Protect Fish and Fish Habitat." Accessible at: https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html

Fisheries and Oceans Canada (DFO). 2019. "Timing windows to conduct projects in or around water." Accessible at: https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html.

Fisheries and Oceans Canada (DFO). 2020. "Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater." Accessible at: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html.

Fisheries and Oceans Canada (DFO). 2021. Angler's Guide 2021-2022 – Annex 7 – Newfoundland and Labrador Scheduled Salmon Rivers. (Angler's Guide 2021-2022 - Annex 7 - Newfoundland and Labrador scheduled Salmon Rivers (dfo-mpo.gc.ca))

Geological Survey of Canada. 2015. "Seismic Hazard Map, Newfoundland." Accessible at: https://earthquakescanada.nrcan.gc.ca/hazard-alea/simphaz-en.php#NL.

Government of Canada. 1985. *Fisheries Act*. Act current to 2022-04-04 and last amended on 2019-08-28. https://laws-lois.justice.gc.ca/eng/acts/F-14/.

Government of Canada. 1994. *Migratory Birds Convention Act, 1994*. Current to 2022-04-04 and last emended on 2017-12-12. https://laws-lois.justice.gc.ca/eng/acts/m-7.01/

Government of Canada. 1999. *Canadian Environmental Protection Act, 1999*. Act current to 2022-04-04 and last amended on 2021-05-01. https://laws-lois.justice.gc.ca/eng/acts/c-15.31/.

Government of Canada. 2002. *Metal and Diamond Mining Effluent Regulations* current to 2022-04-04 and last amended on 2022-02-21. https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html.

Government of Canada. 2002. *Species at Risk Act*. Act current to 2022-04-04 and last amended on 2022-02-03. https://laws-lois.justice.gc.ca/eng/acts/s-15.3/.

Government of Canada. 2012. *Canadian Environmental Assessment Act, 2012*. Act current to 2022-04-04 and last amended on 2019-08-28. https://laws-lois.justice.gc.ca/eng/acts/c-15.21/index.html.

Government of Canada. 2012. *Regulations Designating Physical Activities*. Regulations are current to 2022-04-04 and last amended on 2014-12-31. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-147/FullText.html.

Government of Newfoundland and Labrador. 2022. "Re: Valentine Gold Project EIS Review." Accessible at: https://www.gov.nl.ca/ecc/files/EA-2015-Valentine-Gold-Project-Decision-Letter.pdf.

Impact Assessment Agency of Canada. 2015. *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012*. Available online at: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/assessing-cumulative-environmental-effects-under-canadian-environmental-assessment-act-2012.html

Impact Assessment Agency of Canada. 2015. *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012*. Available online at: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/determining-whether-designated-project-is-likely-cause-significant-adverse-environmental-effects-under-ceaa-2012.html

Impact Assessment Agency of Canada. 2019. *Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012 – Valentine Gold Project – Marathon Gold Corporation*. Accessible at: https://iaac-aeic.gc.ca/050/evaluations/document/132674.

Mahoney, S.P. and J.A. Schaefer. 2002. "Long-term changes in demography and migration of Newfoundland caribou." *Journal of Mammalogy* 83: 957-963.

Marathon Gold Corporation. 2020. *Valentine Gold Project: Environmental Impact Statement.* Accessible at: https://iaac-aeic.gc.ca/050/evaluations/document/136521.

Marathon Gold Corporation. 2021. Project Refinements-Supplemental Information. Accessible at: https://iaac-aeic.gc.ca/050/documents/p80169/142667E.pdf.

Marathon Gold Corporation. 2022. Project Refinements-Caribou Mitigation. Accessible at: https://iaac-aeic.gc.ca/050/documents/p80169/142647E.pdf.

Newfoundland and Labrador Department of Environment and Conservation, Wildlife Division. 2010. *Recovery plan for the threatened Newfoundland population of American marten* (*Martes americana atrata*) (Newfoundland Marten Recovery Team 2010). Accessible at: https://www.gov.nl.ca/ffa/files/wildlife-endangeredspecies-marten-recovery-plan.pdf

Wright, D.G. and Hopky, G.E. 1998. *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*. Accessible at: https://publications.gc.ca/collections/Collection/Fs97-6-2107E.pdf.

Appendices

Appendix A: Species at Risk Potentially Occurring in the Regional Assessment Area

Species	Observed	Status	
		SARA	COSEWIC
Birds			
Bank Swallow (*Riparia riparia*)	Yes	Threatened	Threatened
Barrow's Goldeneye (*Bucephala islandica*)	No	Special Concern	Special Concern
Chimney Swift (*Chaetura pelagica*)	No	Threatened	Threatened
Common Nighthawk (*Chordeiles minor*)	Yes	Threatened	Special Concern
Evening Grosbeak (*Coccothraustes vespertinus*;	Yes	Special Concern	Special Concern
Harlequin Duck (*Histrionicus histrionicus*)	No	Special Concern	Special Concern
Ivory Gull (*Pagophila eburnean*)	No	Endangered	Endangered
Olive-sided Flycatcher (*Contopus cooperi*)	Yes	Threatened	Special Concern
Red Crossbill percna subspecies (*Loxia curvirostra percna*)	Yes	Threatened	Threatened
Rusty Blackbird (*Euphagus carolinus)*	Yes	Special Concern	Special Concern
Short-eared Owl (*Asio flammeus*)	Yes	Special Concern	Threatened
American Eel (*Anguilla rostrata*)	Yes	Not on Schedule 1	Threatened
American Marten (Newfoundland population) (*Martes americana atrata*)	Yes	Threatened	Threatened
Caribou (Newfoundland population) (*Rangifer tarandus*)	Yes	Special Concern	Special Concern
Little Brown Myotis (*Myotis lucifungus*)	Yes	Endangered	Endangered
Northern Myotis (*Myotis septentrionalis*)	Yes	Endangered	Endangered

SARA = Species at Risk Act; COSEWIC = Committee on the Status of Endangered Wildlife in Canada

Appendix B: Environmental Effects Rating Criteria

Table 1 General Definitions of Criteria Used to Assess Residual Environmental Effects

Rating criteria	Rating
Relevant to all Valued Components	
Magnitude – The amount of change in measurable parameters or the VC relative to existing conditions.	**Negligible** – no measurable change. **Low** – defined by valued component. **Moderate** – defined by valued component. **High** – defined by valued component.
Geographic Extent – The geographic area in which a residual effect occurs.	**Project Area** – residual effects are restricted to the project area. **Local Assessment Area** – residual effects extend into the local assessment area. **Regional Assessment Area** – residual effects interact with those of other projects in the regional assessment area.
Timing – Considers when the residual environmental effect is expected to occur. Timing considerations are noted in the evaluation of the residual environmental effect, where applicable or relevant.	**Not Applicable** – seasonal aspects are unlikely to affect the valued component. **Applicable** – seasonal aspects may affect the valued component.
Duration – The period of time required until the measurable parameter or the VC returns to its existing (baseline) condition, or the residual effect can no longer be measured or otherwise perceived.	**Short Term** – residual effect restricted to no more than the duration of the construction phase (16 to 20 months) or decommissioning, rehabilitation and closure phase (six to 10 years). **Medium Term** – residual effect extends through the operation phase (13 years). **Long Term** – residual effect extends beyond the operation phase (greater than 13 years). Permanent – recovery to baseline conditions unlikely.
Frequency – Identifies how often the residual effect occurs and how often during the Project in a specific phase.	**Single Event** – occurs once **Intermittent** - Occurs occasionally or intermittently during one or more phases of the Project. **Continuous** – occurs continuously
Reversibility –	**Reversible** – the residual effect is likely to be reversed after activity completion and rehabilitation. **Irreversible** – the residual effect is unlikely to be reversed.

Describes whether a measurable parameter or the VC can return to its existing condition after the project activity ceases.	
Ecological and Socio-economic Context – Existing condition and trends in the area where residual effects occur.	**Undisturbed** – area is relatively undisturbed or not adversely affected by human activity. **Disturbed** – area has been substantially previously disturbed by human development or human development is still present. **Not Resilient** – VC is not able to assimilate the additional change because of having little tolerance to imposed stresses due to fragility or near a threshold.
Fish and Fish Habitat	
Magnitude	**Change in Fish Habitat Quality / Quantity** **Negligible** – no measurable change in habitat area (m^2) or monthly flows or habitat quality. **Low** – a measurable change in habitat area or monthly flows or habitat quality that is within the range of natural variability. **Moderate** – a measurable change in habitat area or monthly flows (<10%) or habitat quality that is greater than the range of natural variability, however, that does not affect the ability of fish to use this habitat to carry out one or more of their life processes. **High** – a measurable change in habitat area or monthly flows (>10%) or habitat quality that is greater than the range of natural variability and large enough that fish can no longer rely on this habitat to carry out one or more of their life processes.
	Change in Fish Health and Survival **Negligible** – no measurable change in the abundance or survival of local fish populations. **Low** – a measurable change in the abundance or survival of local fish populations that is within the range of natural variability. **Moderate** – a measurable change in the abundance or survival of local fish populations that is greater than the range of natural variability however, does not affect the sustainability of fish populations. **High** – a measurable change in abundance or survival of local fish populations that is greater than the range of natural variability and is large enough to potentially affect the sustainability of fish populations.
Duration	**Short term** – residual effect restricted to construction or decommissioning, rehabilitation and closure phases. **Medium term** – residual effect extends three to nine years (one to three generations of local salmonid species, based on fish being able to spawn at age 3 years). **Long term** – residual effect extends more than nine years (three generations) of local salmonid species or beyond the life of the Project. Permanent – recovery to baseline conditions unlikely.

Ecological and Socio-economic Context	**Change in Fish Habitat Quality/Quantity** **Undisturbed** – area is relatively undisturbed or not adversely affected by human activity. **Disturbed** – area has been substantially previously disturbed by human development or human development is still present.
	Change in Fish Health and Survival **Resilient** – populations are stable and able to assimilate the additional change. **Not Resilient** – populations are not stable and are not able to assimilate the additional change because of having little tolerance to imposed stresses due to fragility or near a threshold.
Migratory Birds	
Magnitude	**Change in Habitat** **Negligible** – no measurable change in habitat for avifauna, including SAR. **Low** – project changes less than 10% of high and moderate value habitat in the ecological land classification area (ELCA) for representative avifauna species, or less than 5% of high and moderate value habitat in the ELCA for representative avifauna SAR. **Moderate** – project changes 10-20% of high and moderate value habitat in the ELCA for representative avifauna species, or 5-10% of high and moderate value habitat in the ELCA for representative avifauna SAR. **High** – project changes more than 20% of high and moderate value habitat in the ELCA for representative avifauna species, or more than 10% of high and moderate value habitat in the ELCA for representative avifauna SAR.
	Change in Mortality Risk **Low** – a substantial change in the abundance of avifauna in the local assessment area is not anticipated, although temporary local shifts in distribution in the local assessment area could occur. **Moderate** – a substantial change in the abundance and/or distribution of avifauna in the local assessment area might occur, although a measurable change in the abundance of avifauna in the regional assessment area is not anticipated. **High** – a substantial change in the abundance and/or distribution of avifauna in the regional assessment area could occur.
Indigenous Groups - Current Use of Lands and Resources for Traditional Purposes, Physical and Cultural Heritage, and Health and Socio-economic Conditions	
Magnitude	**Indigenous Health Conditions** **Negligible** – no measurable change from existing conditions to Indigenous health conditions and Project-related environmental exposures are less than the target benchmarks established by a recognized health organization.

Low – measurable change from existing conditions, however, is below environmental and/or regulatory criteria, and Project-related environmental exposures marginally exceed target benchmarks established by a recognized health organization.

Moderate – a measurable change from existing conditions that exceeds the target benchmarks established by a recognized health organization and/or may result in a long-term, substantive change in human health.

High – a measurable change from existing conditions that exceeds the target benchmarks established by a recognized health organization and/or is likely to result in long-term, substantive change in human health.

Indigenous Socio-Economic Conditions

Negligible – no measurable change in land or resource use capacity; use or access to, or interference with infrastructure; and/or baseline levels of local employment, goods and services, and economic activity.

Low – Means:

land and resource use and capacity can take place at or near similar levels as baseline;

capacity of community services and infrastructure will be at or near to existing conditions; and

a measurable change in employment and economy, however, residual effect cannot be distinguished from existing conditions within normal range of variability.

Moderate – Means:

baseline land, resource use and capacity conditions can continue to occur with some reductions or restrictions ;

demand for community services and infrastructure approaches current capacity, standard or threshold, however, will not result in a reduction in standards of service; and

measurable change, however, not likely to pose a serious risk or benefit to employment and economy.

High – Means:

baseline land, resource use and capacity conditions cannot take place at similar levels as under baseline conditions;

demand for community services and infrastructure exceeds current capacity, standard or thresholds that result in a reduction in standards of service; and

measurable change that is likely to pose a serious risk or benefit to employment and economy.

Current Use and Physical and Cultural Heritage

Negligible – no measurable change to availability and access to resources, culturally important sites, or the cultural value of sites currently used for traditional purposes.

Low – the residual effect will not reduce the ability to access or use resources and sites for traditional purposes. Current use is able to continue at current levels, with minor alteration of behavior required to continue current traditional practices.

	Moderate – the residual effect will reduce the ability to access or use resources and sites for traditional purposes. Current use is able to continue at a reduced level or with some restrictions on current practice and some alteration of behavior to continue current use and traditional practices. **High** – the residual effect will substantially diminish or remove the ability to access or use resources and sites for traditional purposes or substantially increase the difficulty and or travel distance to conduct traditional practices. Current use cannot continue or cannot continue without substantial changes to current practices and substantial restriction on ability to engage in current practice and use.
Transboundary Environmental Effects – Greenhouse Gas Emissions	
Magnitude	**Negligible** – no measurable change in GHG emissions. **Low** – although a change is measurable, based on Agency guidance (CEAA 2003 and ECCC 2020a) and professional judgment, relatively small changes are expected in provincial and national GHG emissions. **Moderate** – based on Agency guidance (CEAA 2003) and professional judgment, notable changes are expected in provincial and national GHG emissions. **High** – based on Agency guidance (CEAA 2003) and professional judgment, material changes are expected in provincial and national GHG emissions.

Table 2 Decision Matrix for Determining Overall Significance of a Residual Effect

Magnitude[33]	Geographic Extent	Duration	Frequency	Reversibility	Significance
Moderate	Project Area	Any duration	Any level of frequency	Any level of reversibility	Not significant
	Local Assessment Area	Any duration	Any level of frequency	Any level of reversibility	Not significant
	Regional Assessment Area	Short-term	Any level of frequency	Any level of reversibility	Not significant
		Medium-term	Single event or intermittent	Any level of reversibility	Not significant
			Continuous	Reversible	Not significant
				Irreversible	**Significant**

[33] All effects of negligible and low magnitude were considered not significant, regardless of other criteria.

		Long-term/Permanent	Single event	Any level of reversibility	Not significant
			Intermittent or continuous	Reversible	Not significant
				Irreversible	**Significant**
High	Project Area	Short-term	Single event	Any level of reversibility	Not significant
			Intermittent or continuous	Reversible	Not significant
				Irreversible	**Significant**
		Medium-term	Single event or intermittent	Reversible	Not significant
				Irreversible	**Significant**
			Continuous	Any level of reversibility	**Significant**
		Long-term/Permanent	Any level of frequency	Any level of reversibility	**Significant**
	Local Assessment Area	Short-term	Single event or intermittent	Reversible	Not significant
				Irreversible	**Significant**
			Continuous	Any level of reversibility	**Significant**
		Medium-term	Single event	Reversible	Not significant
				Irreversible	**Significant**
			Intermittent or continuous	Any level of reversibility	**Significant**
		Long-term/Permanent	Any level of frequency	Any level of reversibility	**Significant**
	Regional Assessment Area	Any duration	Any level of frequency	Any level of reversibility	**Significant**

Appendix C: Summary of Environmental Effects Assessment

Potential Residual Adverse Environmental Effects	Characterization of Potential Residual Adverse Environmental Effects	Significance of Residual Adverse Environmental Effects
Fish and Fish Habitat		
Change in Fish Habitat Quantity	**Magnitude:** Moderate - a measurable change in habitat area or monthly flows (<10%) that does not affect the ability of fish to use this habitat to carry out one or more of their life processes. **Geographic extent:** Project area – residual effects are restricted to the project area **Frequency:** Continuous – occurs continuously **Duration:** Long term – residual effect extends more than nine years (three generations) of local salmonid species or beyond the life of the Project. **Reversibility:** Irreversible – the residual effect is unlikely to be reversed **Ecological and Socio-economic Context:** Disturbed – area has been substantially previously disturbed by human development or human development is still present.	**Not Significant** With mitigation, offsetting and environmental protection measures in place, the Project is not likely to result in significant adverse environmental effects on fish and fish habitat.
Change in Fish Habitat Quality	**Magnitude:** Low – a measurable change in habitat quality that is within the range of natural variability. **Geographic extent:** Local assessment area – residual effects extend into the local assessment area. **Frequency:** Continuous – occurs continuously **Duration:** Long term – residual effect extends more than nine years (three generations) of local salmonid species or beyond the life of the Project. **Reversibility:** Irreversible – the residual effect is unlikely to be reversed **Ecological and Socio-economic Context:** Disturbed – area has been substantially previously disturbed by human development or human development is still present.	**Not Significant -** With mitigation, offsetting and environmental protection measures in place, the Project is not likely to result in significant adverse environmental effects on fish and fish habitat.

Change in Fish Health and Survival	**Magnitude:** Negligible to low (operation) -No measurable change (negligible); to a measurable change (low) in the abundance or survival of local fish populations that is within the range of natural variability; Low to moderate (construction and decommissioning) – measurable change in the abundance or survival of local fish populations that is within the range of natural variability (low) to greater than the range of natural variablility however, does not affect the sustainability of fish populations (moderate). **Geographic extent:** Local assessment area – residual effects extend into the local assessment area. **Frequency:** Continuous – occurs continuously **Duration:** Long term – residual effect extends more than nine years (three generations) of local salmonid species or beyond the life of the Project. **Reversibility:** Irreversible – the residual effect is unlikely to be reversed **Ecological and Socio-economic Context:** Resilient – populations are stable and able to assimilate the additional change.	**Not Significant -** With mitigation, offsetting and environmental protection measures in place, the Project is not likely to result in significant adverse environmental effects on fish and fish habitat.
Migratory Birds		
Change in Habitat	**Magnitude:** Low to moderate – project changes less than 10 % of high and moderate value habitat in the ELCA for representative avifauna species or less than 5% of high and moderate value habitat in the ELCA for representative avifauna SAR (low); to project changes 10-20% of high and moderate value habitat in the ELCA area for representative avifauna species, or 5-10% of high and moderate value habitat in the ELCA for representative avifauna species at risk (moderate). **Geographic extent:** Local assessment area - residual effects extend into the local assessment area. **Frequency:** Continuous - occurs continuously **Duration:** Medium term (operation and decommissioning) - residual effect extends through the operation phase (12 years or greater than 12 years). Long term (construction) residual effect extends beyond the operation phase (12 years or greater than 12 years). **Reversibility**: Irreversible (construction) - the residual effect is unlikely to be reversed. Reversible (operation and decommissioning) the residual effect is likely to be reversed after activity completion and rehabilitation. **Ecological and Socio-economic Context:** Disturbed - area has been substantially previously disturbed by human development or human development is still present.	**Not Significant –** With the implementation of mitigation and environmental protection measures, the Project is not likely to result in significant adverse environmental effects on avifauna.

Change in Mortality Risk	**Magnitude:** Low - a substantial change in the abundance of avifauna in the local assessment area is not anticipated, although temporary local shifts in distribution in the local assessment area could occur. **Geographic extent:** Local assessment area - residual effects extend into the local assessment area. **Frequency:** Irregular event – occurs at no set schedule. **Duration:** Short term (construction) - residual effect restricted to no more than the duration of the construction phase (16 to 20 months) decommissioning, rehabilitation and closure phase. Medium term (operation and decommissioining) - residual effect extends through the operation phase (12 years). **Reversibility:** Reversible – the residual effect is likely to be reversed after activity completion and rehabilitation. **Ecological and Socio-economic Context:** Disturbed - area has been substantially previously disturbed by human development or human development is still present.	**Not Significant -** With the implementation of mitigation and environmental protection measures, the Project is not likely to result in significant adverse environmental effects on avifauna.
Indigenous Groups – Current Use of Lands and Resources for Traditional Purposes, Physical and Cultural Heritage, and Health and Socio-economic Conditions		
Change in Current Use	**Magnitude**: Negligible to Low - no measurable change to availability and access to resources, culturally important sites, or the cultural value of sites currently used for traditional purposes (negligible); to the residual effect will not reduce the ability to access or use resources and sites for traditional purposes. Current use is able to continue at current levels, with minor alteration of behavior required to continue current traditional practices (low). **Geographic extent:** Project area to local assessment area – residual effects are restricted to the project area and to the local assessment area. **Frequency:** Irregular to continuous - occurs at no set schedule (irregular), to occurs continuously (continuous). **Duration:** Short term (construction) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase. Short term to permanent (operation and decommissioning) residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase (short-term); to recovery to baseline conditions unlikely (permanent). **Reversibility:** Reversible (construction) - the residual effect is likely to be reversed after activity completion and rehabilitation. Reversible/irreversible (operation and decommissioning) - the residual effect is likely to be reversed after activity completion and rehabilitation/the residual effect is unlikely to be reversed.	**Not Significant -** With mitigation and environmental protection measures, the Project is not likely to result in significant environmental effects on Indigenous groups current use.

	Ecological and Socio-economic Context: Resilient – VC is able to assimilate the additional change.	
Change in Health Conditions	**Magnitude**: Negligible to Low – no measurable change from existing conditions to Indigenous health conditions and project-related environmental exposures are less than the target benchmarks (negligible); to measuresable change from existing conditions, however is below environmental and/or regulatory criteria and project-related environmental exposures marginally exceed target benchmarks (low). **Geographic extent:** Project area to local assessment area – residual effects are restricted to the project area or to the local assessment area. **Frequency:** Continuous - occurs continuously. **Duration**: Short term (construction) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase. Short term to medium term (operation and decommissioning) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase (short term); to residual effect extends through the operation phase (12 years) (medium term). **Reversibility:** Reversible - the residual effect is likely to be reversed after activity completion and rehabilitation. **Ecological and Socio-economic Context:** Resilient – VC is able to assimilate the additional change.	**Not Significant -** With mitigation and environmental protection measures, the Project is not likely to result in significant environmental effects on Indigenous groups health conditions.
Change in Socio-economic conditions	**Magnitude**: Negligible to Low - no measurable change to availability and access to resources, culturally important sites, or the cultural value of sites currently used for traditional purposes (negligible); to the residual effect will not reduce the ability to access or use resources and sites for traditional purposes. Current use is able to continue at current levels, with minor alteration of behavior required to continue current traditional practices (low). **Geographic extent:** Project area to regional assessment area – residual effects are restricted to the project area or to the regional assessment area. **Frequency:** Irregular to continuous - occurs at no set schedule, to occurs continuously. **Duration**: Short term (construction) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase. Short term to permanent (operation and decommissioning) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase (short term); to recovery to baseline conditions unlikely (permanent). **Reversibility:** Reversible (construction) - the residual effect is likely to be reversed after activity completion and rehabilitation.	**Not Significant -** With mitigation and environmental protection measures, the Project is not likely to result in significant environmental effects on Indigenous groups socio-economic conditions.

	Reversible/irreversible (operation and decommissioning) - the residual effect is likely to be reversed after activity completion and rehabilitation/the residual effect is unlikely to be reversed. **Ecological and Socio-economic Context:** Resilient – VC is able to assimilate the additional change.	
Change to Physical and Cultural Heritage (inside project footprint)	**Magnitude**: Negligible to high - no measurable change to availability and access to resources, culturally important sites, or the cultural value of sites currently used for traditional purposes (negligible); to a measurable change from existing conditions that exceeds the target benchmarks established by a recognized health organization and/or is likely to result in long-term, substantive change in human health (high). **Geographic extent:** Project area – residual effects are restricted to the project area. **Frequency:** single event – effects occur once **Duration:** Short term to permanent - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase (short term); to recovery to baseline conditions unlikely (permanent). **Reversibility:** Reversible/irreverstible - the residual effect is likely to be reversed after activity completion and rehabilitation/ the residual effect is unlikely to be reversed. **Ecological and Socio-economic Context:** Resilient – VC is able to assimilate the additional change.	**Not Signficant -** With mitigation and environmental protection measures, the Project is not likely to result in significant environmental effects on Indigenous groups physical and cultural heritage (inside project footprint).
Change to Physical and Cultural Heritage (outside project footprint)	**Magnitude**: Negligible to Low - no measurable change to availability and access to resources, culturally important sites, or the cultural value of sites currently used for traditional purposes (negligible); to the residual effect will not reduce the ability to access or use resources and sites for traditional purposes. Current use is able to continue at current levels, with minor alteration of behavior required to continue current traditional practices (low). **Geographic extent:** Project area to local assessment area – residual effects are restricted to the project area or to the local assessment area. **Frequency:** Irregular to continuous - occurs at no set schedule, to occurs continuously. **Duration**: Short term (construction) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase. Short term to permanent (operation and decommissioning) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase (short term); to recovery to baseline conditions unlikely (permanent). **Reversibility:** Reversible (construction) - the residual effect is likely to be reversed after activity completion and rehabilitation.	**Not Signficant -** With mitigation and environmental protection measures, the Project is not likely to result in significantenvironmental effects on Indigenous groups physical and cultural heritage (outside project footprint).

	Reversible/irreversible (operation and decommissioning) - the residual effect is likely to be reversed after activity completion and rehabilitation/the residual effect is unlikely to be reversed. **Ecological and Socio-economic Context:** Resilient – VC is able to assimilate the additional change.	
Transboundary Environmental Effects – Greenhouse Gas Emissions		
Change in greenhouse gas emissions	**Magnitude**: Low (construction) - although a change is measurable, based on Agency guidance (CEAA 2003 and ECCC 2020a) and professional judgment, relatively small changes are expected in provincial and national GHG emissions. Moderate (operation) - based on Agency guidance (CEAA 2003) and professional judgment, notable changes are expected in provincial and national GHG emissions. Negligible (decommissioning) - no measurable change in GHG emissions. **Geographic extent:** N/A **Frequency:** Continuous (construction and operation) - occurs continuously. Irregular (decommissioning) -occurs at no set schedule. **Duration:** Short term (construction and decommissioning) - residual effect restricted to no more than the duration of the construction phase and decommissioning, rehabilitation and closure phase. Medium term (operation) - residual effect extends through the operation phase (12 years). **Reversibility:** Irreversible - the residual effect is unlikely to be reversed. **Ecological and Socio-economic Context:** Disturbed – area has been substantially previously disturbed by human development or human development is still present.	**Not Significant -** The project GHG emissions during construction and operation represent a small contribution to provincial and national GHG emissions. On the maximum annual basis, the construction emissions contribute approximately 0.30% and 0.005% to provincial and national GHG emission totals, respectively. The operation contributes approximately 0.84% and 0.013% to the provincial and national emission totals, respectively. Based on these results and the characterization of residual effects, the Project is not likely to result in significant environmental effects from GHG emissions.

Appendix D: List of Key Mitigation Measures, Monitoring and Follow-up Considered by the Agency

Valued Component (VC)	Mitigation	Follow-up

Fish and Fish Habitat (Section 6.1)	**Fish Habitat Quantity and Quality**
	• Follow DFO's *Measures to protect fish and fish habitat* in keeping with the fish and fish habitat protection provisions of the *Fisheries Act*. For works, undertakings, and activities where Standards and Codes of Practice do not exist, submit a Request for Review to DFO's Fish and Fish Habitat Protection Program.
	• Restore, create or enhance fish habitat to offset fish habitat losses associated with the development of the Project, in consultation with DFO, as required for a *Fisheries Act* Authorization.
	• Maintain minimum flows in watercourses and design culverts to maintain fish passage.
	• Use flow proportional water withdrawal to mitigate adverse effects on lake levels, with higher rates of withdrawal during high flow months and reduced or interrupted withdrawal in low flow months. Develop criteria for alternate withdrawal rates in consultation with DFO, ECCC and NRCan.
	• Limit impacts on riparian vegetation to those approved for the work, undertaking or activity:
	  ○ Limit access to banks or areas adjacent to waterbodies;
	  ○ Limit grubbing on watercourse banks to the area required for the footprint of works, undertaking or activity;
	  ○ Construct access points and approaches perpendicular to the watercourse or waterbody;
	  ○ Re-vegetate the disturbed area with native species suitable for the site.
		• Regularly monitor watercourses for signs of sedimentation during all phases of the Project and take corrective action if sedimentation is observed;
		• Develop and implement, during all phases, a groundwater and surface water quality monitoring program with vertically distributed monitoring wells upgradient, downgradient and cross-gradient of the tailings management facility, polishing pond, waste rock storage area, overburden stockpiles, low-grade ore stockpile and open pits to evaluate the effectiveness of mitigation measures that are necessary to protect fish and fish habitat. The follow-up program must be developed in consultation with Indigenous groups, DFO, ECCC, NRCan and provincial authorities, in keeping with the proposed monitoring framework presented in section 7.9.1 of the EIS and with the requirements of the *Fisheries Act* and the MDMER, including required Environmental Effects Monitoring. The monitoring measures, at a minimum, should include:
		  ○ Conduct ongoing geochemical testing of the waste rock and tailings during any period that waste rock and tailings are produced, taking into account the Mine Environment Neutral Drainage program's *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (2009)* and in consultation with relevant authorities, to confirm the predictions of the magnitude and onset of acid rock drainage and its impact on groundwater and surface water quality and to update the acid rock drainage block model;
		  ○ Monitor open pits for the development of high hydraulic conductivity zones that may enhance groundwater flow;
		  ○ Use groundwater and surface water monitoring results to validate and update numerical models through mine life and

- Prevent discharges that would be deleterious to fish or fish habitat, in accordance with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act*, and taking into account the Canadian Council of Ministers of the Environment's CWQG-FAL. This would include, but is not limited to:
    - Employ sedimentation and erosion control measures, taking into account future climate change scenarios, including periods of high water, heavy rainfall and wind:
        - Install effective control measures prior to beginning work in order to stabilize all erodible areas;
        - Regularly inspect and maintain the control measures during all phases of the Project;
        - Avoid fording watercourses;
        - Operate machinery on land in dry stable areas;
        - Keep control measures in place until all disturbed ground has been permanently stabilized;
        - Biodegradable sediment control materials should be used whenever possible;
        - Remove all exposed, non-biodegradable sediment control materials once the site is stabilized;
        - Schedule work to avoid wet, windy, and rainy periods that may result in high flow volumes and/or increase erosion and sedimentation;
        - Dispose and stabilize all excavated material above the high water mark of any waterbodies to prevent re-entry into the water;
        - All materials placed in or near water should be clean, free of fines, concrete or any other deleterious substance and of sufficient size to resist displacement;
        - Channel runoff to detention/sedimentation ponds prior to release to the receiving environment;

    post-closure, including the surface water quality model and forecasting of potential seepage from the flooded open pits in post-closure. Adapt mitigation measures for the tailings management facility, open pitsand waste rock storage areas, as necessary based on model predictions; Monitor surface water and groundwater flows, levels and quality to verify modelling predictions. In the event monitoring data shows changes beyond that predicted by water quantity, quality and assimilative capacity modelling (Appendices 7A, 7B and 7C to the EIS), construct adaptive management measures, such as sedimentation ponds, drainage ditch adaptations or a containerized water treatment system, and monitor their effectiveness.

    - Include in monitoring the contaminants of concern and the surface water sampling locations identified in section 7.9.1 of the EIS, as well as mercury, chromium, nitrogen, phosphorous, ammonia and cyanide and any additional contaminants of concern identified by federal or provincial authorities. Downstream surface water sampling will include locations in offshore areas of Valentine Lake and Victoria Lake, away from effluent discharge points and predicted zone of influence for measurable effects on water quality, as determined in consultation with ECCC. Use the results of the monitoring measures to inform whether implementation of additional mitigation measures is required. In case additional measures are implemented, also monitor the effectiveness of those measures.

- Monitor, and treat if necessary, during decommissioning and abandonment and in consultation with Indigenous communities, ECCC and other relevant authorities, the water quality of the pit lake during filling to ensure that the water quality of the impending open pit overflow does not cause adverse effects on fish and fish habitat. Where treatment is not effective, implement adaptive management measures, and monitor their effectiveness.

- Configure detention/sedimentation pond inlet and outlet structures to reduce inlet velocity and scour, and to meet sedimentation requirements. Design pond outlets with subsurface inlets to mitigate against chemical stratification in ponds, thermal heating of discharge and ice blockage of outlets;
- Ensure sediment control structures are appropriate to the task to which they are being applied, and that downstream flows are maintained during use;
- Ensure no seepage or spillage of concrete or concrete residues outside of the work site;
- Dispose all demolition material, especially any demolished timber and concrete, at an approved waste disposal site.

- Remove vegetation within the tailings management facility containment zone during construction and prior to filling/flooding to reduce potential generation of methylmercury.
- Install contact water collection ditches around overburden stockpiles, ore stockpiles and waste rock piles to collect toe seepage. Design contact water collection ditches with positive gradients to limit standing water and maintain positive flow.
- Intercept shallow groundwater seepage from the tailings management facility with seepage collection ditches and pump collected seepage back to the tailings management facility via sump pumps.
- Collect runoff and groundwater seepage from the open pits, with water pumped to sedimentation ponds before being discharged to each pits' pre-development watershed area.
- Taking into account the recommendations of the *Mine Environment Neutral Drainage Program's Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials*, and in consultation with NRCan and ECCC, characterize the acid rock drainage and metal leaching potential of the overburden and other mine rock used for construction, update the acid rock drainage block model to further refine and delineate estimates for potentially acid generating rock volume and reactivity, and develop testing and segregation procedures to ensure that potentially acid generating materials are not used for site earthworks and grading. Model updates should include estimates for potentially acid generating

rock exposure in the pit walls. Share testing results, updated acid rock drainage block model, and sample selection rationale for any subsequent testing with NRCan and ECCC.Treat discharge water from the tailings management facility prior to discharge to a polishing pond for retention of effluent prior to discharge to the environment.

- Treat effluent to meet requirements of the MDMER and to ensure that receiving water concentrations of contaminants are at or below predictions in the Assimilative Capacity Assessment (Appendix 7C of the EIS). Maintain effluent discharge rates to below the highest rate used in the Assimilative Capacity Assessment (Appendix 7C of the EIS).

Fish Health and Survival

- Salvage and relocate fish from the local study area during construction and relocate to similar habitat within the local study area. Fish salvage and location planning should be undertaken in consultation with DFO and in accordance with all applicable laws including any conditions of authorization issued under the *Fisheries Act.*

- Limit the duration of work in or around water so as to not diminish the ability of fish to carry out one or more of their life processes (spawning, rearing, feeding, and migrating). Conduct these activities during timing windows of least risk to fish in the area, as established in DFO's *Timing windows to conduct projects in or around water,* unless otherwise agreed to by relevant federal and provincial authorities. If in-water construction activities cannot be conducted during identified timing windows of least risk, develop and implement additional mitigation measures, in consultation with DFO, to protect fish during sensitive life stages.

- Install, prior to construction, screens on the water supply intake structures in accordance with DFO's *Interim Code of Practice for End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater* and in accordance with any conditions of authorization issued under the *Fisheries Act* and its regulations requirements to avoid harming fish.

- Conduct blasting, following consultation with DFO and other relevant authorities, in accordance with DFO's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* and in accordance with any conditions of authorization issued under the *Fisheries Act* and its regulations.

	The Agency also notes that progressive reclamation of disturbed areas on the mine site, a key mitigation recommended for transboundary effects (section 6.5), will also contribute to mitigating adverse effects on fish and fish habitat by reducing potential for erosion and sedimentation at the mine site.	

Migratory Birds (including Migratory Bird Species at Risk) [Section 6.2]	• Carry out the Project, including vegetation clearing and blasting, in a manner that protects migratory birds and avoids harming, killing or disturbing them or destroying, removing or disturbing their nests or eggs. For this purpose, meet ECCC's Avoidance Guidelines "Avoiding harm to migratory birds" when developing the Avifauna Management Plan. The Avifauna Management Plan should be developed in consultation with ECCC and mitigation measures for migratory birds, including survey methods, avoidance windows, and setback distances should be updated to align with ECCC's current Avoidance Guidelines. Actions when carrying out the Project shall comply with the *Migratory Birds Convention Act, 1994*, the *Migratory Birds Regulations* and the *Species at Risk Act*.
	• Do not conduct vegetation clearing activities, including clearing and grubbing during the migratory breeding bird season, where practicable.
	• Limit vegetation clearing to the project area.
	• Ensure vehicles and heavy equipment use noise-dampening technologies and are kept in good working order with regular inspection.
	• Require project vehicles to comply with posted speed limits on temporary and permanent roads, including the access road, site roads and haul roads. Speed limits will be set in accordance with provincial regulations and industry standards.
	• Develop, prior to construction, mitigation measures to control the direction, timing and intensity of lighting within the project area (including on migratory birds), while meeting engineering requirements for safe facility operation. These measures must be implemented during all phases of the Project. As part of these measures, the Proponent must: direct light fixtures toward active construction areas during construction and towards the working area during operation; use down-cast light fixtures during operation; install glare reduction technologies on individual light fixtures; and require that all motor vehicles use low-beam headlights within the project area.
		• The Proponent shall develop, prior to construction and in consultation with relevant authorities and Indigenous Groups, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the use by migratory birds of surface water facilities. As a part of the implementation of the follow-up program, the Proponent shall:
		  ○ Monitor the use by migratory birds of the tailings management facility, open aquatic areas and other key Project locations during all phases of the Project until such time that water quality in these structures meet legislative requirements and water quality objectives. The water quality objectives are to be developed in consultation with relevant authorities;
		  ○ If results of the monitoring indicate that migratory birds use the tailing management facility, open aquatic areas and/or other key Project locations, develop and implement mitigation measures including but not limited to deterrent measures and/or exclusionary measures. The Proponent shall submit these measures to the Agency before implementing them.
		• Develop and implement, in consultation with relevant authorities, including ECCC, a program to determine the effectiveness of all mitigation measures to avoid harm to migratory birds and migratory bird species at risk, their eggs and nests. As part of this program, have a qualified individual conduct post-construction breeding bird surveys and species at risk surveys, similar to the pre-construction surveys every year for the first three years to verify the Proponent's predictions. After three years, determine, in consultation with ECCC, the frequency of additional surveys based on the results of the follow-up program.

	• Maintain embankments of the tailings management facility and the sedimentation ponds free of vegetation. • The Proponent shall install, prior to operation, and use a cyanide destruction circuit to reduce cyanide concentrations in tailings before the tailings are directed to the tailings management facility during operation. The Agency also notes that as per the conditions of release from the provincial environmental assessment process, the Proponent would be required to develop a Rehabilitation and Closure Plan that meets the requirements of the Department of Industry, Energy and Technology. The plan will be reviewed and updated regularly until implemented.	
Species at Risk (Section 6.3)	The Agency notes that the key mitigations described in the other valued component sections would reduce adverse effects on species at risk such as managing surface runoff and wastewater to protect local water quality, limiting vegetation clearing to the project area, implementing measures to reduce noise effects, and developing a Rehabilitation and Closure Plan (sections 6.1 and 6.2).The Agency is also of the view that the measures implemented by the Proponent to meet provincial regulatory requirements would avoid or lessen any potential adverse effects on species at risk. These measures are consistent with the proposed recovery strategies for the identified federal species at risk and meet the section 79 obligation under the *Species at Risk Act.*	

Indigenous Peoples (6.4)	**Current Use of Lands and Resources**
	• Develop and implement, prior to construction and in consultation with Indigenous groups, a communication plan to share information related to the Project. The communication plan would include the following:
	  ○ The location and timing of Project activities that may affect Indigenous groups' use of lands and resources;
	  ○ Procedures for Indigenous groups to provide feedback to the Proponent related to access to and use of lands for traditional purposes;
		• Develop and implement in consultation with Indigenous groups, Health Canada and other relevant authorities, a follow-up program, to verify the accuracy of the environmental assessment predictions for effects of changes in the quality of air, water, and country foods on the health of Indigenous Peoples and to determine the effectiveness of the mitigation measures. The follow-up program should be informed by any updated traditional knowledge information provided by indigenous groups. Parameters for consideration must include monitoring and testing for potential contaminants in country foods harvested by Indigenous peoples. Include at a minimum, measures to monitor:

	○ Procedures for the Proponent to document and respond in a timely manner to the concerns received and demonstrate how issues have been addressed. **Physical and Cultural Heritage** • Develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a Heritage and Cultural Resources Protection Plan, to mitigate the potential adverse effects on historical resources resulting from accidental discovery. **Indigenous Health Conditions** • Implement the mitigation and follow-up measures identified in section 6.1 – Fish and Fish Habitat for water quality and fish and fish habitat to reduce the potential exposure to metals from contact with water and from the ingestion of contaminated fish.	○ Mercury, chromium and arsenic in surface water where use by Indigenous peoples is expected, starting at the Project construction phase; ○ Methylmercury, chromium and arsenic in tissue of fish species identified through consultation with Indigenous groups and Health Canada in water bodies where use by Indigenous peoples is expected;. ○ Ambient air concentrations of contaminants of concern as described in section 5.9 of the EIS; ○ Contaminants of concern that have the potential to affect other country foods identified and harvested by Indigenous groups within the area for potential project effects. •
Transboundary Effects - Greenhouse Gas Emissions(Section 6.5)	• Limit the Project footprint and disturbed areas to the extent practicable, including limiting clearing for road construction to the width required for road embankment, drainage requirements, and safe line of sight requirements'. Ensure boundaries of areas to be cleared are well marked prior to the start of clearing activities. Design haul roads and infrastructure and optimize activities assocatied with operations to reduce transportation and haul distances. • Ensure engines and exhaust systems of construction and mining equipment are subject to comprehensive equipment preventative maintenance to maintain fuel efficiency and performance. • Develop and implement prior to construction and in consulation with relevant authorities, a policy to reduce fuel consumption of equipment and vehicles, including avoidance of idling and cold starts. • Conduct progressive reclamation in areas disturbed by the Project that would establish self-sustaining plant communities similar to pre-disturbance conditions. The Agency also notes that the Proponent has committed to incorporate greenhouse gas emission management and reduction measures that adhere to provincial legislative requirements.	The Agency considered the Proponent's assessment and expert advice from federal and provincial authorities and determined that additional programs are not required to verify the predictions of transboundary effects or the effectiveness of mitigation measures. The Agency notes that in years with annual greenhouse gas emissions above 10,000 tonnes of CO_2e, the Proponent would be required to report emissions to ECCC under the Greenhouse Gas Reporting Program pursuant to the *Canadian Environmental Protection Act*, 1999. The Proponent would also be subject to provincial greenhouse gas reporting requirements under the *Management of Greenhouse Gas Act*.

Effects of Accidents and Malfunctions (Section 7.1)

The Agency recognizes that the Proponent committed to meeting or exceeding mine design, construction, operation and closure in accordance with the Canadian Dam Association's Guidelines, global industry standards on tailings management and Mining Association of Canada Guidelines, as well as regulatory requirements for fuel and hazardous materials.

- Take all reasonable measures to prevent accidents and malfunctions that may result in adverse environmental effects and mitigate any adverse environmental effect from accidents and malfunctions that do occur.
- Adhere to the Canadian Dam Association, global Industry Standards on Tailings Management, and Mining Association of Canada Guidelines as well as applicable provincial requirements for design, construction, operation and closure.
- Store fuel and hazardous materials a minimum of 200 metres from a salmon river or tributary and 100 metres from all other waterbodies.
- Develop and implement emergency response plans in relation to the Projectincluding:
    - a spill response plan for fuel and other hazardous materials;
    - Measures to mitigate the potential effects of accidental releases from the tailings management facility, fires and explosions. These measures would include training; responsibilities; response equipment/ materials; and response, contact and reporting procedures.
- Develop a Communication Plan, which will identify the notifications procedures, warnings and alarms to be implemented in the event of a failure. In the event of an accidental release from the tailings management facility, issue fish advisories until monitoring of fish tissues confirm safe consumption levels. If needed, issue public advisories on water consumption from Beothuk Lake until monitoring confirms that it is suitable for human use.

The Agency considers these mitigation measures together with the Proponent's design measures, emergency response approach, monitoring activities, and remediation actions to be adequate in managing the risk of an accident or malfunction scenario.

In the event of an accidental release the Proponent shall carry out monitoring of fish tissues until confirmation of safe consumption levels. Also, water monitoring shall be carried out until it is confirmed that it is suitable for human use.

Cumulative Environmental Effects (Section 7.3)	Mitigation for this project would contribute to the mitigation of cumulative environmental effects.	Follow-up, and monitoring would contribute to the monitoring of cumulative environmental effects.

Appendix E: Summary of Engagement with Indigenous Groups

The table below briefly describes key comments and concerns raised by Indigenous groups during the environmental assessment process, prior to the release of the draft Environmental Assessment Report, along with the Agency response(s). The Agency developed its responses using information from the Proponent's EIS and responses to information requirements, as well as input from the federal authorities.

In most cases, the comments and concerns described in the table have been summarized from more detailed written submissions provided by Indigenous groups to the Agency. The complete comment submissions received during the environmental assessment process are available on the Canadian Impact Assessment Registry at: Valentine Gold Project - Canada.ca (iaac-aeic.gc.ca) (click the "View Comments" button to access a list of all submissions).

In some cases, the Agency's response(s) have been summarized from more detailed sections elsewhere in this report, and in these cases the reader is referred to the relevant sections for more information.

Group	Comment or Concern	Summary of Proponent's Response	Agency Response
Fish and Fish Habitat			
Miawpukek First Nation	Concern about mitigation measures for the loss of flow to watercourses especially if they are fish-bearing watercourses. Asked for a fish compensation plan for the loss of fish habitat in these watercourses.	The Proponent noted that a water level and flow monitoring program would be implemented specifically to monitor potential effects of the water withdrawal, and that criteria for alternating the pumping level will be developed in consultation with regulators. The Proponent committed to implementing an offsetting plan for the alteration, disruption or destruction of an estimated 186,705 square metres of fish habitat within the local assessment area, to be developed as part of the requirements of the application for authorization under the *Fisheries Act*. Section 6.1 on Fish and Fish Habitat of the Environmental Assessment Report states that the Proponent is considering offsetting opportunities to restore flow and improve substrate quality at two locations within the Exploits River Watershed, North Twin Brook and the outlet of Valentine Lake, both of which were historically modified to facilitate log driving.	The Agency is satisfied with the Proponent's response. The Agency has identified key mitigation measures and follow-up measures in section 6.1 in relation to surface and groundwater level and flow, as well as in relation to the fish habitat offsetting plan. The Proponent would be required to consult with relevant authorities and Indigenous groups in the development of the follow-up program.
Miawpukek First Nation	Concern that the local assessment area and regional assessment	The Proponent defines its spatial boundaries for fish and fish habitat in section 8.0 of the EIS. The Proponent selected boundaries based on an understanding of the extent of project-related effects, literature	The Agency is satisfied with the Proponent's response and is of the view that the Proponent included acceptable spatial boundaries within its assessment of fish and fish habitat. Taking

	area characterized by the Proponent are not conservative enough in order to evaluate effects to fish and fish habitat.	review, and professional judgement; the Proponent stated that this approach to selection of assessment boundaries is consistent with accepted practice and has been used for other federally and provincially approved project-specific assessments. The Proponent identified the local assessment area for fish and fish habitat as incorporating the project area and watersheds that intersect with the project area. The local assessment area also includes portions of Victoria Lake Reservoir in the expected effluent mixing zones, which are considered to be up to several hundred metres from points of discharge in the lake. The local assessment area includes Valentine Lake and Victoria River to the point downstream where project-affected tributaries converge with the main branch of the river. A 500 m buffer has also been applied to the access road to capture potential upstream and downstream effects related to upgrading (i.e., replacement of culverts and bridges) and operation and maintenance of the access road. The Proponent identified the regional assessment area for fish and fish habitat as incorporating the project area and local assessment area, and extending to include where potential Project interactions may be observed (Valentine Lake, a portion of Victoria Lake Reservoir, the Victoria River, and Beothuk Lake, including its discharge at the head of the Exploits River). This area encompasses the potential downstream receivers of surface water that may flow from the project area and is the area within which accidental events are assessed. The regional assessment area also informs the assessment of cumulative effects.	into account the implementation of the mitigation measures, the Agency is of the view that the Project would not result in significant effects on fish and fish habitat.
Miawpukek First Nation	Additional baseline information requested on fish and fish habitat, e.g., Arctic char.	The Proponent provided additional habitat information for Arctic char, including habitat maps by life stage, within the local assessment area.	The Proponent was required to provide clarification on potential Artic char habitat in the project area. The Agency is satisfied with the Proponent's response and the additional information provided has been considered in the Agency's analysis.
Miawpukek First Nation	Request for involvement in the development, implementation and monitoring associated	The Proponent indicated that it would continue to engage with Qalipu First Nation and Miawpukek First Nation to formalize relationships in terms of communication, engagement, employment and procurement opportunities, and environmental reporting and monitoring as the Project progresses. The Proponent indicated that it is committed to	The Agency agrees with the Proponent's commitment to involve Indigenous groups in the mitigation, follow-up, and monitoring proposed for the Project. The Agency has identified key mitigation measures and follow-up measures in section 6.1 in relation to fish and fish habitat, as well as in relation to the fish

	with the Fish Habitat Compensation Plan.	working with Qalipu and Miawpukek First Nation to involve these groups in environmental monitoring and to exchange environmental information regarding the Project.	habitat offsetting plan. The Proponent would be required to engage with Indigenous groups in the development of fish habitat creation measures.
Miawpukek First Nation	Concerns regarding Atlantic salmon	The Proponent provided baseline information in the EIS on Atlantic salmon and noted that while sea-run Atlantic salmon are known to occur in the regional assessment area, Victoria Lake Reservoir and Valentine Lake are not accessible to them due to numerous dams within the Exploits River and White Bear watersheds.	The Agency is satisfied with the Proponent's information on Atlantic salmon. The Agency has identified key mitigation measures and follow-up measures in section 6.1 in relation to fish and fish habitat. The Proponent would be required to consult with relevant authorities and Indigenous groups in the development of the follow-up program.
Water Quality			
Qalipu First Nation	Concern about risk of surface water contamination and spills	The Proponent stated that that changes to surface water quality would be minimal during the construction phase of the Project, noting that effects on fish and fish habitat of work near water are well documented, with established standards and codes of practice to mitigate adverse effects. The Proponent responded that there are no parameters of potential concern predicted to exceed the MDMER at effluent discharge points and therefore no further water quality treatment is planned at effluent discharge points The Proponent noted that, as required by the MDMER, monitoring would be conducted at each effluent discharge point over the life of the Project, and that contingency mitigation measures would be implemented as required in the event of exceedances. The Proponent predicted that in relation to an accidental spill, emergency response plans and contingency measures would limit potential environmental effects.	The Agency notes that the Proponent would be required to comply with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act* as it pertains to the deposition of effluent into receiving waters, including treatment of effluent to meet regulatory limits and an environmental effects monitoring program.
Miawpukek First Nation	Concern about potential acid generating rock used in construction.	The Proponent responded that it plans to use waste rock developed from the open pits for earthworks construction. All bulk earthworks, including roads, building and stockpile pads, embankments for ditching and water management ponds and dams for the tailings	The Agency is satisfied with the Proponent's response. The Agency has identified key mitigation measures and follow-up measures in section 6.1 in relation to acid rock drainage. The Proponent would be required to develop and implement a

		management facility would be constructed using waste rock. The Proponent also plans to crush and screen non-potentially acid generating waste rock for more detailed earthworks. The Proponent indicated that additional testing would be completed during excavation of waste rock materials from the open pits for use in construction, as required to ensure that only non-potentially acid generating rock is used. The Proponent committed to management of waste rock, including that used in construction, to ensure identification and segregation of potentially acid-generating material.	groundwater and surface water quality monitoring program to evaluate the effectiveness of mitigation measures that are necessary to protect fish and fish habitat. The monitoring program would include conducting ongoing geochemical testing of waste rock during any period that waste rock is produced to confirm the magnitude and onset of acid rock drainage and its impact on groundwater and surface water quality. Monitoring would be done in consultation with relevant authorities.
Miawpukek First Nation	Comment that water quality samples should be compared to both MDMER and CQWG-FAL guidelines and that the most protective guidelines should be used for the protection of aquatic life.	The Proponent conducted modelling to predict surface water quality during operations and post-closure at effluent discharge points for the tailings management facility, waste rock groundwater seepage, and outflow from the Marathon and Leprechaun pits. In its model, the Proponent considered parameters of potential concern that were above CWQG-FAL in baseline samples and listed in the MDMER. The Proponent committed to developing and implementing an environmental effects monitoring plan in accordance with MDMER requirements, as well as five years of water quality monitoring post-closure, with adaptive management, including additional monitoring or mitigation, implemented as required.	The Agency notes that the Proponent would be required to comply with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act* as it pertains to the deposition of effluent into receiving waters, including treatment of effluent to meet regulatory limits and an environmental effects monitoring program. The Proponent would also be required to take into account the CWQG-FAL.
Miawpukek First Nation	Concern about water quality treatment specifically for metals (cadmium, mercury and selenium) and nutrients and suggest constructed wetlands prior to effluent discharge points as part of the treatment train.	The Proponent responded that there are no parameters of potential concern predicted to exceed the MDMER at effluent discharge points and therefore no further water quality treatment is planned at effluent discharge points. The Proponent noted that, as required by MDMER, monitoring would be conducted at each effluent discharge point over the life of the Project, and that contingency mitigation measures would be implemented as required in the event of exceedances. This would include surface water quality monitoring, as well as monthly acute toxicity and bi-annual sublethal toxicity for effluent. Results would be shared with regulators, Indigenous groups and stakeholders. Mitigation would include grading and revegetating waste rock piles to promote run-off and reduce water infiltration, as well as potential conversion of perimeter ditches into subsurface flow Permeable Reactive Barrier (PRB) trenches and/or into subsurface “French	The Agency notes that the Proponent would be required to comply with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act* as it pertains to the deposition of effluent into receiving waters, including treatment of effluent to meet regulatory limits and an environmental effects monitoring program. The Proponent would also be required to take into account the Canadian Council of Minister of the Environment’s *Canadian Water Quality Guidelines for Protection of Aquatic Life*

		Drains" to convey effluent to an engineered wetland treatment system. The Proponent expects the passive treatment system to maintain water quality within *Canadian Council of Minister of the Environment's Canadian Water Quality Guidelines for Protection of Aquatic Life* over the long term.	
Miawpukek First Nation	Concern about water quality of the local and regional groundwater throughout the life of the mine and past post-closure. These integrity check should ensure that there are no preferential pathways for contamination to enter these groundwater systems.	The Proponent stated that its groundwater monitoring program would include quarterly groundwater sampling of the parameters of primary concern and that follow-up monitoring results would be compared with applicable regulatory standards set out in *Guidelines for Canadian Drinking Water Quality, Canadian Water Quality Guidelines for Protection of Freshwater Aquatic Life*, and Project-specific regulatory approvals. The groundwater monitoring plan would also include specific actions to be implemented should there be exceedances of a designated threshold criteria. The Proponent further stated that it is committed to working with Indigenous groups to involve them in environmental monitoring and to exchange environmental information regarding the Project.	NRCan provided review of the Proponent's groundwater model, which predicted how groundwater seepage would affect surface water quality in surrounding water bodies. Its technical input included comments and questions on model boundaries, inputs, calibration and outputs such as base flow. The Agency is satisfied with the information provided on groundwater. The Agency has identified key mitigation measures and follow-up measures in section 6.1. The Proponent would be required to develop and implement a groundwater and surface water quality monitoring program to evaluate the effectiveness of mitigation measures that are necessary to protect fish and fish habitat. The monitoring program would include conducting ongoing geochemical testing of waste rock during any period that waste rock is produced to confirm the magnitude and onset of acid rock drainage and its impact on groundwater and surface water quality. Monitoring would be done in consultation with relevant authorities.
Miawpukek First Nation	Request training and hiring program for Indigenous monitoring of water quality.	The Proponent responded that it continues to engage with Indigenous groups on the Project including with respect to communication, engagement, employment and procurement opportunities, and environmental reporting and monitoring. The Proponent is committed to working with Indigenous groups to involve them in environmental monitoring and exchange environmental information regarding the Project.	The Agency agrees with the Proponent's commitment to involve Indigenous groups in the mitigation, follow-up, and monitoring proposed for the Project.
Miawpukek First Nation	Where water quality exceeds water quality guideline parameters, water treatment must be	The Proponent stated that the parameters predicted to exceed *Canadian Water Quality Guidelines for Protection of Aquatic Life* in discharges are not bioaccumulative and would not be expected to bioconcentrate or bioaccumulate in fish or other aquatic organisms.	The Agency recognizes concerns expressed by Miawpukek First Nation and Qalipu First Nation with respect to potential for contamination of fish, and notes that the Proponent has committed to monitoring of country foods. The Agency has

	in place to treat the exceedances. Baseline studies must be carried out to determine levels of contaminants in fish species. A country food survey should be carried out to evaluate effects of the Project on contaminants in fish.	The Proponent noted that an exception to this general assertion would be arsenic, which was elevated in background surface water and sediment samples, and has the potential to bioaccumulate. However, it noted that most studies available suggest that concentrations of inorganic arsenic decrease with transfer from one trophic level to the next (i.e., biodiminution), due to the conversion of inorganic arsenic to less toxic organic forms of arsenic. Further, it noted that geochemical water quality modelling predicted that metal concentrations (including arsenic) in receiving waterbodies would not change from baseline case concentrations as a result of the Project, and therefore it is reasonable to conclude that concentration of arsenic in fish tissues would similarly be unchanged from baseline. The Proponent also committed to country foods monitoring to verify the EIS predictions through monitoring the quality of aquatic and terrestrial country foods harvested from within the local assessment area over the life of the Project.	recommended that this follow-up program include fish tissue sampling for methylmercury, chromium and arsenic in response to concerns expressed by Indigenous groups and federal authorities.
Miawpukek First Nation	Some contaminants that could negatively impact fish habitat are missing from the Proponent's list of measurable parameters that could cause a change in habitat quality. Concerns for impacts of mercury and methyl mercury.	The Proponent noted that although the results of the geochemical water quality modelling showed that the concentrations of mercury in Victoria Lake Reservoir, Valentine Lake and Victoria River would not change from baseline concentrations, it identified mercury as a contaminant of potential concern for human health risk assessment due to community concerns regarding the potential for mercury and methylmercury to bioaccumulate in aquatic country foods.	With respect to potential for methylmercury, ECCC advised the Agency that due to the low pH and limited buffering capacity of Valentine Lake and Victoria Lake, Project discharges that include sulphate could result in lake acidification, which is known to stimulate methylmercury production and increase metal bioavailability. It recommended the addition of surface water monitoring sites in offshore areas of these lakes, beyond effluent discharge points, to monitor potential impacts of water discharges on lake water quality. The Agency notes that the Proponent would be required to comply with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act* as it pertains to the deposition of effluent into receiving waters, including treatment of effluent to meet regulatory limits and an environmental effects monitoring program. The Proponent would also be required to take into account the CWQG-FAL.

Miawpukek First Nation	Concerns regarding the number of effluent discharges points that would be used to discharge effluent into receiving water.	The Proponent stated that discharge from multiple points from the Project would travel downstream to the edge of the mixing zone in the final receiving lake or river (i.e., Victoria Lake Reservoir, Valentine Lake and Victoria River) in less than one day. Project discharges, under the worst-case scenario, were reached 100 metres into the final receiver (i.e., into Victoria Lake Reservoir, Valentine Lake and the Victoria River), except in a few cases for some parameters of potential concern where a mixing zone would reach up to 300 metres from the effluent discharge point. Taken cumulatively and considering the conservatism inherent in the worst-case regulatory scenario, the extension of the effluent mixing zone 100 to 300 metres into the ultimate receivers represents the long-term, cumulative boundary of water quality effects. The Proponent noted that, as required by the MDMER, monitoring would be conducted at each effluent discharge point over the life of the Project, and that contingency mitigation measures would be implemented as required in the event of exceedances. This would include surface water quality monitoring, as well as monthly acute toxicity and bi-annual sublethal toxicity for effluent. Results would be shared with regulators, Indigenous groups and stakeholders.	The Agency notes that the Proponent would be required to comply with the requirements of the MDMER and the pollution prevention dispositions of the *Fisheries Act* as it pertains to the deposition of effluent into receiving waters, including treatment of effluent to meet regulatory limits and an environmental effects monitoring program. The Proponent would also be required to take into account the CWQG-FAL.
Migratory Birds			
Miawpukek First Nation	Request for enhanced avoidance and mitigation for long-term habitat integrity of waterfowl. Request for mitigations to prevent impacts from interactions with the tailings management facility and other industrial water. Miawpukek First Nation community members	The Proponent conducted an avian risk assessment based on a comparison of modelled contaminant values with toxicity reference guidelines and concluded that contaminant concentrations in the tailings management facility would represent a negligible risk to migratory bird health. In addition, the Proponent has committed to mitigations that include the maintenance of embankments and clearing ponds of vegetation to deter bird presence in the tailings management facility and to consult with ECCC should monitoring indicate the need for additional deterrence measures. The Proponent concluded that birds or other wildlife that may contact or ingest this water or adjacent vegetation would not be at an increased risk of mortality.	The Agency is satisfied with the Proponent's response. The Agency has identified key mitigation measures and follow-up measures in section 6.2 in relation to migratory birds. The Proponent would be required to monitor birds use of the tailings management facility ponds, open aquatic areas and other key project locations.

	must be included in waterfowl monitoring.		
Species at Risk			
Qalipu First Nation **Miawpukek First Nation**	Concern related to protective measures for species at risk and surveys for Northern Myotis and Little Brown Myotis	With the exception of changes to habitat, the Proponent concluded that adverse effects are reversible and will not threaten the long-term viability of Little Brown Myotis, Northern Myotis or the Newfoundland population of American marten once the Project has been decommissioned. With the application of mitigation and environmental protection measures, the effects of the Project on both bat species and Newfoundland population of American marten are predicted to be not significant. The Proponent would conduct acoustic monitoring for bats in the project area and local assessment area both before and during construction and during operation as a follow-up and monitoring program for bats as recommendation by the NLDFFA-Wildlife Division.	The Agency has determined that the measures the Proponent would implement to meet provincial regulatory requirements and the key mitigation measures described in section 7.2 (Migratory Birds) and section 7.3 (Fish and Fish Habitat) would reduce adverse effects on species at risk. These measures are consistent with the proposed recovery strategies (where they exist) for the identified federal species at risk.
Miawpukek First Nation	Concerns about effects to caribou. Request additional baseline studies be carried out on caribou.	The Proponent predicted that mitigation measures would reduce Project effects on caribou movement. However, the majority of the mitigation measures would be designed to reduce disturbance. In addition, the Proponet re-designed aspects of the Project to reduce the overlap of the Project with the migration paths of the caribou. The Province has raised concerns over the synthesis of information for a comprehensive risk assessment for the potential impacts to the population as a whole if caribou fail to migrate, the impacts to calving success including poor body condition on pregnancy, impacts from the haul road, and effects of dust for all phases of the Project. Additionally, the Province requires more information on the cumulative effects including functionality of the remaining habitat and its connectivity for direct and indirect loss of caribou habitat resulting from avoidance. The Province has requested more detail for targeted mitigation, including if caribou do not avoid the mine site. Finally, the Province requested information on cumulative effects applied to the risk assessment for the Buchans herd. The Proponent committed to continued engagement with the Province of Newfoundland and Labrador's Department of Fisheries, Forestry and Agriculture –	The Agency notes that considerable re-design to the Project has been undertaken in consultation with Newfoundland and Labrador's Department of Fisheries, Forestry and Agriculture Wildlife Division to reduce overlap with the migration path. Further, the Proponent has committed to continuing to update its Caribou Protection and Environmental Effects Monitoring Plan in consultation with regulators, scientific experts, Indigenous groups and stakeholders. The Agency notes that the key mitigations described in the other valued component sections would reduce adverse effects on species at risk such as managing surface runoff and wastewater to protect local water quality, limiting vegetation clearing to the project area, implementing measures to reduce noise effects, and developing a Rehabilitation and Closure Plan (sections 6.1 and 6.2). Caribou are located entirely on provincial lands with respect to this Project and thus the Agency is relying on the Provincial mitigation measures to manage the potential effects on caribou.

		Wildlife Division for the provincial Environmental Assessment process under the Newfoundland *Environmental Protection Act, 2002*.	
Miawpukek First Nation	Concerns related to American marten species at risk.	The Proponent responded that the long-term viability of Newfoundland population of American marten is not likely threatened by the Project. The main threat to population decline of the American marten is trapping and snaring (EC 2013). Critical habitat lost to the Project will be 6.26 km2 (0.3%), which is the project area and a portion along the existing access road. The Project could account for a total loss of 5.5% of high- and moderate-ranked habitat in the ELCA. The Proponent would develop a monitoring plan for the American marten that would continue through construction, operation, and decommissioning that assesses changes in American marten presence compared to existing conditions.	The Agency is satisfied with the Proponent's response. ECCC notes that the Province of Newfoundland and Labrador takes the lead for the management of American marten within the province.
Miawpukek First Nation	Concerns about Olive-sided Flycatcher	The Proponent stated that Olive-sided Flycatcher wetland habitat would be avoided wherever possible; however, some wetland habitat loss is unavoidable. The Proponent stated that wetland habitat for Olive-sided Flycatcher is abundant throughout the local assessment area and ecological land classification area with less than five percent of the habitat lost within the ecological land classification area. The Proponent committed to blasting outside of the prominent bird singing/calling and activity period (i.e., sunrise to approximately 9:30 am) during bird breeding season and training site staff on active nest disturbance and associated avian response behaviour and requiring them to check facilities, equipment and vehicles for evidence of nesting prior to use. The Proponent also committed to conducting environmental effects monitoring which would include further consideration of Olive-sided Flycatcher habitat requirements.	The Agency is satisfied with the Proponent's response. The Agency has identified key mitigation measures and follow-up measures in section 6.2 in relation to migratory birds. The Proponent would be required to monitor the effectiveness of mitigation measures proposed for migratory birds (including Olive-sided Flycatcher) and their habitat.
Current Use			
Qalipu First Nation **Miawpukek First Nation**	Concern about habitat alteration and documentation of traditional use in the project area. Concerned about the destruction of	The Proponent noted that the Traditional Use Study (TUS) indicated that the Mi'kmaq continue to use the lands and resources in southwestern and central Newfoundland for subsistence, cultural and medicinal purposes. The Mi'kmaq maintain campsites and cabins (identified around Victoria Lake Reservoir), visit sacred grounds, as well as gather specialty wood and plants on the	While there is limited use of the project area, the Agency notes resources harvested for traditional purposes may be present in the project area, and construction activities may change the availability of resources due to the loss of habitat, mortality, displacement or behavioural changes of species traditionally harvested by Qalipu First Nation and Miawpukek First Nation. If

	wetlands and potential for plants harvested for traditional practices to be impacted.	periphery of the local assessment area and within the regional assessment area. The Proponent predicted project activities within the project area may result in the loss of areas or restricted access to areas currently used for hunting, trapping, fishing and/or gathering. The Proponent noted access to lands within the mine site would be restricted for the life of the Project. According to the Proponent, although the Qalipu First Nation and Miawpukek First Nation use of the mine site is to be limited, species traditionally harvested by Qalipu First Nation and Miawpukek First Nation, are known to be present in the local assessment area, including the mine site. Vegetation clearing during construction may result in the loss of habitat of wildlife, fish and plant species traditionally harvested by Qalipu First Nation and Miawpukek First Nation.	the Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study (received by the Proponent in Spring 2022) indicates Miawpukek First Nation use the Project or surrounding areas, and is potentially impacted by the Project, the Proponent committed to adjust mitigation and monitoring measures to avoid or mitigate any adverse impacts on Indigenous interests. The Proponent would be required to consider additional information on Indigenous Knowledge or land and resources use, provided by Miawpukek First Nation and Qalipu First Nation in the development of monitoring programs.
Miawpukek First Nation	Comment that Proponent should providing funding for traditional knowledge and land use study and a socio-economic study. Capacity funding should be provided.	The Proponent considered "The Collection of Current Land Use and Aboriginal Traditional Knowledge Study" (ATK), completed by Qalipu First Nation in 2020, and a TUS on the Mi'kmaq published by the Federation of Newfoundland Indians in 2002 as well as general, publicly available information on the Mi'kmaq of the Island of Newfoundland. The ATK indicated land and resource use by Qalipu First Nation in Central Newfoundland. Miawpukek First Nation completed a Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study for the Proponent, and the results of the study would further inform the Proponent's monitoring programs and mitigation measures with respect to effects on Miawpukek First Nation's land and resource use.	The Agency is satisfied with the Proponent's response. In addition to the Proponent's efforts, the Agency supported participation of Indigenous groups in the environmental assessment process by offering them funding through its Participant Funding Program.
Physical and Cultural Heritage			
Qalipu First Nation and Miawpukek First Nation	Concern about adverse effects on resources of cultural, historical and traditional importance and appropriate mitigation to protect them.	The Proponent noted that that ground disturbance during construction has the potential to adversely affect physical and cultural sites. However, according to the Proponent there are no known registered heritage sites within the project area and given Miawpukek First Nation and Qalipu First Nation have not identified any cultural and spiritual sites within the project area, the Proponent does not anticipate any direct effects to physical and cultural sites. However, there is the potential for sensory disturbance (visual, noise, and dust)	The Agency is satisfied with the Proponent's response. The Agency has identified key mitigation measures and follow-up measures in section 6.5 in relation to Indigenous peoples current use of lands and resources, physical and cultural heritage, socio-economic conditions, and health. The Proponent would be required to monitor the effectiveness of mitigation measures in consultation with Indigenous groups to ensure that updated traditional knowledge information provided by

		to extend beyond the project area, which may affect the use and enjoyment of cultural and spiritual sites and the experience of using the land within the local assessment area. The Proponent noted there is the potential for the unexpected discovery of heritage resources during construction activities. To mitigate any potential impacts to physical or heritage features identified during construction, the Proponent committed to implementing a Heritage and Cultural Resources Protection Plan.	Indigenous groups is used to inform the design and implementation of mitigation measures to address effects to current use of lands and resources for traditional purposes.
Miawpukek First Nation	Comment requesting engagement/participation in archaeological research.	The Proponent engaged with Miawpukek First Nation to undertake a Miawpukek First Nation Mi'kmaq Knowledge, Land Use and Occupancy Study. Miawpukek First Nation presented the results to the Proponent in spring 2022. If necessary, the results of this study could be used to adjust mitigation and monitoring measures to avoid or mitigate adverse impacts on Indigenous interests. The Proponent plans to develop a Heritage and Cultural Resources Protection Plan to mitigate the potential adverse effects on historic resources resulting from an accidental discovery.	The Agency agrees with the Proponent's commitment to involve Indigenous groups in the mitigation, follow-up, and monitoring proposed for the Project.
Miscellaneous			
Miawpukek First Nation	Request being involved in the design or execution of monitoring plans.	The Proponent indicated that it would continue to engage with Qalipu First Nation and Miawpukek First Nation to formalize relationships in terms of communication, engagement, employment and procurement opportunities, and environmental reporting and monitoring as the Project progresses. The Proponent indicated that it is committed to working with Qalipu and Miawpukek First Nation to involve these groups in environmental monitoring and to exchange environmental information regarding the Project.	The Agency agrees with the Proponent's commitment to involve Indigenous groups in the mitigation, follow-up, and monitoring proposed for the Project.