Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

Goliath Gold Project

Draft Environmental Assessment Report

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Executive Summary

Treasury Metals Inc. (the proponent) is proposing the construction, operation, decommissioning, and abandonment of an open-pit and underground gold mine and associated infrastructure. The Goliath Gold Project (the Project), located 20 kilometres east of the City of Dryden, Ontario, will have an ore production capacity of 5424 tonnes per day and an ore input capacity of 3240 tonnes per day with an anticipated mine and mill life of 12 years. Over the 12 years of operations, the average ore production and ore input capacity of the mine and mill would be 2700 tonnes per day.

The Canadian Environmental Assessment Agency (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.*

This draft Environmental Assessment Report (this report) summarizes the assessment conducted by the Agency, including the information and analysis on the potential environmental effects of the Project, and the Agency's conclusions on whether the Project is likely to cause significant adverse environmental effects, after taking into account the implementation of mitigation measures. The Agency prepared this report with expert advice from federal authorities—Environment and Climate Change Canada, Fisheries and Oceans Canada, Natural Resources Canada and Health Canada. Furthermore, this report was informed by comments submitted throughout the environmental assessment process by Indigenous communities and the public.

An individual environmental assessment has not been required by the province of Ontario. However, the following provincial ministries provided support upon request on areas within their expertise and within the scope of their regulatory roles: Ministry of Natural Resources and Forestry; Ministry of the Environment, Conservation and Parks; Ministry of Tourism, Culture and Sport; and Ministry of Energy, Northern Development and Mines.

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 Aboriginal peoples; health and socio-economic conditions of Aboriginal peoples; physical and cultural heritage; and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance for Aboriginal peoples. The Agency also assessed effects related to changes to the environment that are directly linked or necessarily incidental to federal decisions that may be required for the Project by Environment and Climate Change Canada, Fisheries and Oceans Canada, and Natural Resources Canada, including wetlands and Snapping Turtles. The assessment also considered transboundary effects, in relation to direct greenhouse gas emissions.

This report outlines several Aboriginal or Treaty rights, including Métis rights, held by First Nations communities and Métis citizens that could be potentially affected by the Project, including hunting, trapping, fishing, plant harvesting, and the use of sites and areas of cultural importance for the exercise of rights.

The main residual environmental effects from the Project in relation to section 5 of CEAA 2012 are:

- effects on fish and fish habitat from fish mortality and fish health, and the loss or alteration of fish habitat;
- effects on migratory birds due to impacts on nests or critical habitat, risk of collisions with vehicles, and exposure to contaminants in project components with open water;
- effects on the current use of lands and resources for traditional purposes by Indigenous people, including from loss or alteration of access for Indigenous use;
- effects on the health of Indigenous peoples due to exposure to air and water contaminants by inhalation, ingestion, or dermal contact; and reduced ability to harvest subsistence and economic resources; and,
- effects on wetlands and Snapping Turtles due to the loss of waterbodies or the alteration of surface water quantity and quality.

In reviewing the environmental effects from the Project, the Agency considered factors, such as:

- effects due to potential accidents or malfunctions, including in the case of a tailings storage facility dam failure;
- effects on the Project due to extreme and periodic weather events, including drought, flooding, temperature fluctuations, forest fires, and seismic activity; and
- cumulative effects from the Project, especially in consideration of the region's history related to mercury contamination from the Domtar Dryden Pulp Mill, which affected both the English and Wabigoon River systems.

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. The Agency, in selecting key mitigation and follow-up program measures, was informed by the proponent's commitments, expert advice from federal authorities and provincial ministries, and comments from Indigenous communities and the public.

Key mitigation measures include implementing an offsetting plan for serious harm to fish; managing potentially acid generating materials, along with seepage from the tailings storage facility, waste rock storage area and low-grade ore stockpile during all phases of the Project; managing the discharge of effluent; carrying out project activities in a manner that protects and avoids harming, killing or disturbing migratory birds, nests, eggs or critical habitat; providing access to land to Indigenous communities to the extent that it is safe and protective of health; minimizing effects of changes in air quality, noise and the visual landscape, and the availability of land and fish-bearing waterbodies on traditional land and resource uses; protecting archaeological artifacts; and the implementation of a progressive rehabilitation plan.

Key mitigation and follow-up program measures to address effects on Indigenous use, in accordance with section 5 of CEAA 2012, would also serve as accommodation of potential impacts on Aboriginal or Treaty rights. Measures include commitments by the proponent to establish an Environmental Management Committee with Indigenous communities. The Environmental Management Committee would provide

Indigenous communities with opportunities to provide up-to-date information about their use of the area and traditional knowledge throughout all phases of the Project, and inform the proponent's actions in meeting its obligations, both federal and provincial. The proponent is working with the Indigenous communities on agreements, which would serve as additional mechanisms for accommodating potential impacts. The Agency is of the view that the Project's potential impacts on Aboriginal or Treaty rights have been adequately identified and appropriately mitigated or accommodated for the purpose of decision-making under CEAA 2012.

Public comments received followed the same areas of concerns as the comments received by Indigenous communities.

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
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
the Agency	Canadian Environmental Assessment Agency
the Project	Goliath Gold Project
the proponent	Treasury Metals Inc.
this report	Draft Environmental Assessment Report
the Minister	Minister of Environment and Climate Change

Glossary

Term	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.
Contact water	Water which has come into contact with project components and their associated infrastructure. For the purposes of this report, contact water is that which stays on the site of the project.
Cyanidation	A technique for extracting gold from low-grade ore, using a chemical reaction that involves a solution of cyanide.
Effluent	Liquid waste flows from project activities or components, including releases from mine operations, tailings storage facility, seepage and surface drainage. For the purposes of this report, effluent is that which leaves the project site through seepage, runoff and the effluent discharge location.[1]
Effluent discharge location	Location where effluent from the water treatment plant would be discharged during the construction and operation phases.
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 assessment predictions and verify the effectiveness of mitigation measures.
Indigenous use	Current use of lands and resources for traditional purposes, as described in paragraph 5(1)(c) of CEAA 2012.
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.
Particulate matter (PM_{10})	Airborne particles with diameters of 10 micrometres or less.
Fine particulate matter ($PM_{2.5}$)	Airborne particles with diameters of 2.5 micrometres or less.
Pit lake	Lake that will be created by filling the open pit after operations.
Project study area	Defined in Section 1.2.5 of this report.

[1] The definition of effluent in the *Metal and Diamond Mining Effluent Regulations* is a combination of the definitions for contact water and effluent found in this report.

Process water	Water that is added to the crushed ore during extraction of gold at the ore processing facility.
Property boundary	Defined in Figure 4.
Tailings	The mixture of ore material, water, and residual chemicals left over after gold is removed from ore in the ore processing facility. Solid material in tailings is usually the size of sand grains or smaller.
Tree Nursery ponds	Three ponds located on Thunder Lake Tributaries 2 and 3 north of the project study area, also referred to as irrigation ponds.
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

1.1 Purpose of the Draft Environmental Assessment Report

Treasury Metals Inc. (the proponent) is proposing the construction, operation, decommissioning, and abandonment of an open-pit and underground gold mine and associated infrastructure. The Goliath Gold Project (the Project), located 20 kilometres east of the City of Dryden, Ontario, will have an ore production capacity of 5424 tonnes per day and an ore input capacity of 3240 tonnes per day with an anticipated mine and mill life of 12 years. Over the 12 years of operations, the average ore production and ore input capacity of the mine and mill would be 2700 tonnes per day. There would be a greater ore production rate and stockpiling of ore in the first three years of mining, and a lower ore production rate in the following nine years. Ore would be processed on-site to produce a final doré bar that would be shipped off-site for further refining and upgrading.

The purpose of the Environmental Assessment Report (this report) is to summarize the assessment conducted by the Canadian Environmental Assessment Agency (the Agency), including the information and analysis considered by the Agency in reaching its conclusion on whether the Project is likely to cause significant adverse environmental effects, after taking into account the implementation of key mitigation measures. The Minister of Environment and Climate Change (the Minister) will consider the final version of this report, which would include comments received from Indigenous groups and the public on this draft, in her decision under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) on the significance of any adverse environmental effects of the Project and in establishing conditions for inclusion in her Decision Statement should it be ultimately allowed to proceed.

1.2 Scope of Environmental Assessment

1.2.1 Environmental assessment requirements

On November 28, 2012, the Agency initiated a screening of a description of the Project from the proponent, which included consultation with federal authorities, the public and Indigenous communities, to determine if an environmental assessment was required. At the conclusion of the screening, the Agency determined that an environmental assessment was required and commenced the assessment on January 17, 2013. Following a subsequent consultation period on the draft Environmental Impact Statement Guidelines, the Agency finalised and issued the guidelines to the proponent on February 21, 2013.

The Project is subject to an environmental assessment by the Agency under CEAA 2012 because it involves a designated activity under item 16(c) of the schedule to the *Regulations Designating Physical Activities* (the Regulations):

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

An individual environmental assessment has not been required by the province of Ontario. However, the following provincial ministries provided support upon request on matters within their area of expertise and within the scope of their regulatory roles: Ministry of Natural Resources and Forestry; Ministry of the Environment, Conservation and Parks; Ministry of Tourism, Culture and Sport; and Ministry of Energy, Northern Development and Mines.

The Project is subject to the following provincial Class Environmental Assessments under Ontario's *Environmental Assessment Act*:

- Ministry of Transportation (MTO) Class Environmental Assessment for Provincial Transportation Facilities; and
- Ministry of Natural Resources and Forestry Class Environmental Assessment for Resource Stewardship and Facility Development (category B).

In addition to the provincial Class Environmental Assessments, the Project would likely require provincial regulatory approvals in relation to the following provincial legislative frameworks:

- a Certified Closure Plan under Ontario's *Mining Act* from the Ontario Ministry of Energy, Northern Development and Mines;
- Environmental Compliance Approvals under the *Environmental Protection Act* and the *Ontario Water Resources Act* from the Ontario Ministry of the Environment, Conservation and Parks;
- Permit to Take Water under the *Ontario Water Resources Act, and* permits under the *Endangered Species Act* from the Ontario Ministry of the Environment, Conservation and Parks;
- various approvals or permits under the *Lakes and Rivers Improvement Act, Public Lands Act, Crown Forest Sustainability Act and Aggregate Resource Act* from the Ontario Ministry of Natural Resources and Forestry; and
- a clearance letter under the *Ontario Heritage Act* from the Ontario Ministry of Tourism, Culture, and Sport.

1.2.2 Factors considered in the environmental assessment

Pursuant to section 19 of CEAA 2012, the following factors were considered in the environmental assessment:

- the environmental effects of the Project, including 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, are or will be carried out;
- the significance of those effects;
- comments from the public;
- mitigation 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
- community knowledge and Indigenous traditional knowledge.

The federal environmental assessment also considered the adverse effects of the project on species at risk, pursuant to subsection 79(2) of the *Species at Risk Act*, and their critical habitat, and effects on species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

1.2.3 Federal decisions that may be required

Several federal decisions may be required for the Project to proceed (Table 1). Therefore, in accordance with subsection 5(2) of CEAA 2012, the environmental assessment considered:

- changes other than those referred to in paragraphs 5(1)(*a*) and (*b*), that may be caused to the environment that are directly linked or necessarily incidental to any federal decisions pursuant to other legislation; and
- effects other than those referred to in paragraph 5(1)(*c*), of any changes that may be caused to the environment, referred above, on health and socio-economic conditions, physical and cultural heritage, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Table 1 Decisions pursuant to other federal legislation that may be required before the Project can proceed

Potential Federal Decision	Project Component, Activity, or Effect related to Decision
Metal and Diamond Mining Effluent Regulations under the *Fisheries Act* • Schedule 2 Amendment	Use of fish-frequented waterbodies for mine waste disposal
Fisheries Act • Section 35 Authorization	Serious harm to fish (including the death of fish or any permanent alteration to, or destruction of, fish habitat)
Explosives Act • Section 7 Licence	Facilities for the manufacture and storage of explosives

1.2.4 Selection of valued components

Valued components are environmental and socio-economic features of the environment that may be affected by the Project and that have been identified to be of concern by the proponent, government agencies, Indigenous communities or the public. The valued components, selected by the Agency to focus the environmental assessment and the associated analysis, are presented in Table 2.

In accordance with subsection 5(1) of CEAA 2012, the environmental assessment considered the significance of the potential adverse environmental effects on environmental components that are within federal jurisdiction, including:

- effects on fish and fish habitat;
- effects on migratory birds;
- transboundary effects; and
- effects on Aboriginal peoples of any change that may be caused to the environment on the current use of lands and resources for traditional purposes, health and socio-economic conditions, physical and cultural heritage, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Table 2 Valued components selected by the Agency

Valued Component	Rationale
Effects identified pursuant to subsection 5(1) and 5(2) of CEAA 2012	
Fish and fish habitat	Project-related changes in water quantity and quality, noise, and vibration from blasting, which may affect fish and fish habitat.
Migratory birds and wetlands	Project-related changes in noise levels, and the disturbance of terrestrial, aquatic and wetland habitat could adversely affect migratory bird mortality and behaviour and wetlands, which play an important ecosystem function, and are difficult to restore.
Health and socio-economic conditions of Aboriginal peoples	Project-related changes to the atmospheric, terrestrial, and aquatic environments, and changes to country foods may affect the health and socio-economic conditions of Aboriginal peoples.
Indigenous uses: current use of lands and resources for traditional purposes by Aboriginal peoples[2]	Project-related changes to the atmospheric, aquatic and terrestrial environments may affect the use of lands and resources for traditional purposes by Aboriginal peoples.
Transboundary effects: greenhouse gas emissions	Project-related emissions of greenhouse gases may contribute to climate change.
Effects identified pursuant to subsection 79(2) of the *Species at Risk Act*	
Species at risk	Project-related disturbance of terrestrial and aquatic environments could affect species at risk and their critical habitat.

1.2.5 Spatial and temporal boundaries

Spatial boundaries define the areas within which the Project may interact with the environment and cause environmental effects. Temporal boundaries identify when an effect may occur in relation to specific project activities. Generally, these boundaries are based on a single project phase, or a combination of phases, to reflect the timing and duration of project activities that are likely to cause adverse environmental effects on valued components.

[2] There is no cultural heritage valued component because no sites of physical or cultural heritage were identified through the proponent's Environmental Impact Statement.

Several spatial boundaries are considered in this report:

- **Project study area:** The geographic area overprinted by mining-related project components (i.e., open pit, underground mine, tailings storage facility, waste rock storage area, low-grade ore stockpile, ore processing facility, administration office and road connecting it, water pipeline, explosives storage, and habitat offsetting areas). This area covers 188 hectares (1.88 square kilometres). The project study area is shown in Figure 1.
- **Local study areas:** Areas studied for each valued component, which correspond to where effects extending outside the project study area are most predicted to occur.
- **Regional study areas:** Areas studied for each environmental discipline to ensure a robust understanding of baseline conditions, capture cumulative effects on a regional scale, and account for geographic extent of potential effects.

These local study areas and regional study areas are described in Table 3.

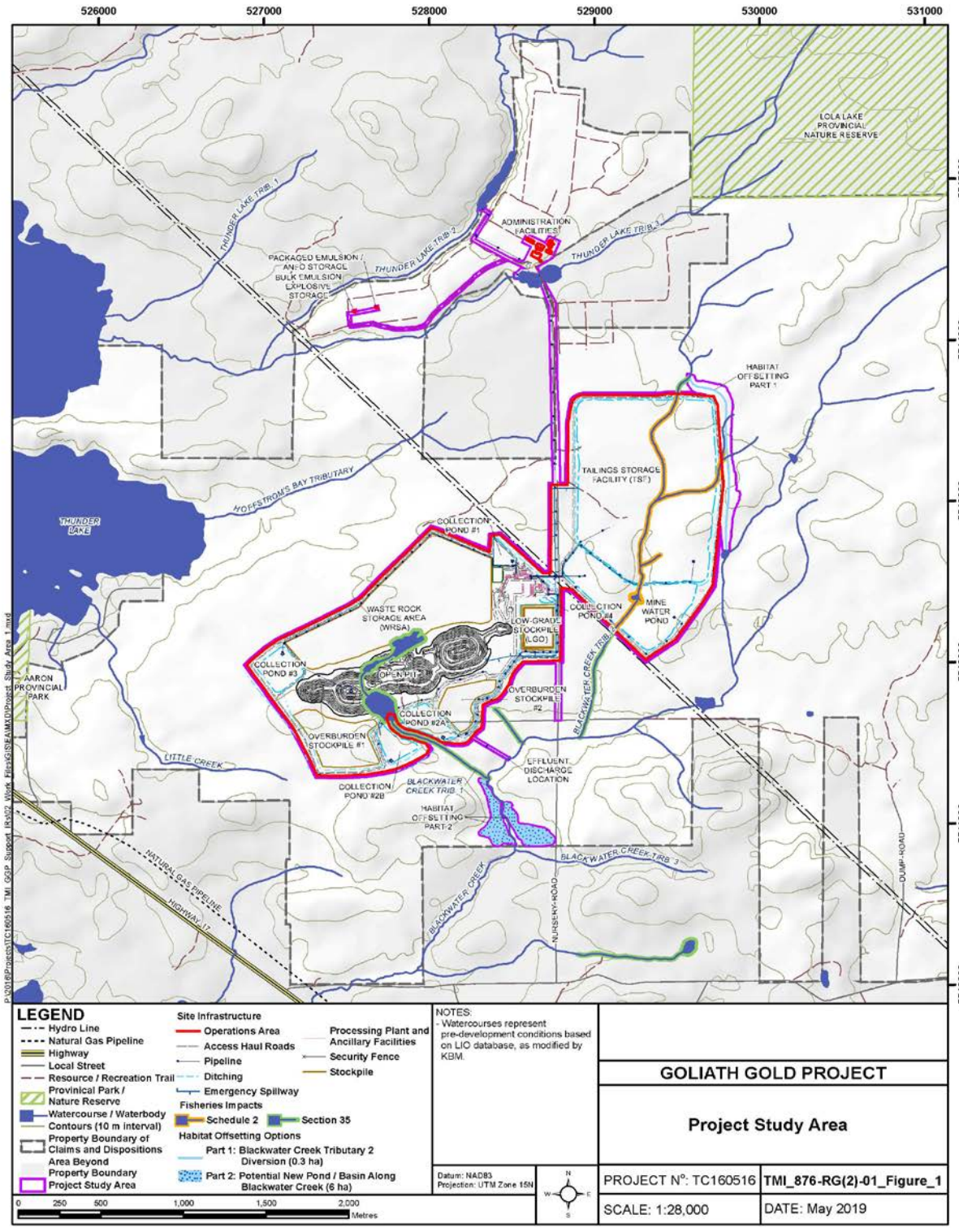
Table 3 Local and regional study areas

Valued Component	Local study area	Regional study area
Fish and fish habitat (Figure 2)	The lands and waters of the Thunder Lake and Wabigoon Lake watersheds, including the catchment areas for Blackwater Creek, Hoffstrom's Bay Tributary, Little Creek, and Thunder Lake Tributaries 2 and 3.	Includes the local study area, as well as Wabigoon Lake and Thunder Lake to which the watercourses in the local study area are tributaries.
Migratory birds and wetlands (Figure 3)	The lands and waters of the Thunder Lake and Wabigoon Lake watersheds.	The Wabigoon Ecoregion (Figure 3).
Transboundary environment – greenhouse gas emissions (Figure 4)	A rectangular area 20 km by 20 km generally centred on the main mine features.	Global.
Health and socio-economic conditions of Aboriginal peoples; current use of lands and resources for traditional purposes by Aboriginal peoples (Figure 5)	The lands and waters of the Thunder Lake and Wabigoon Lake watersheds, including the catchment areas for Blackwater Creek, Hoffstrom's Bay Tributary, Little Creek, and Thunder Lake Tributaries 2 and 3.	The Wabigoon Ecoregion.

Four project phases are considered in the Report:

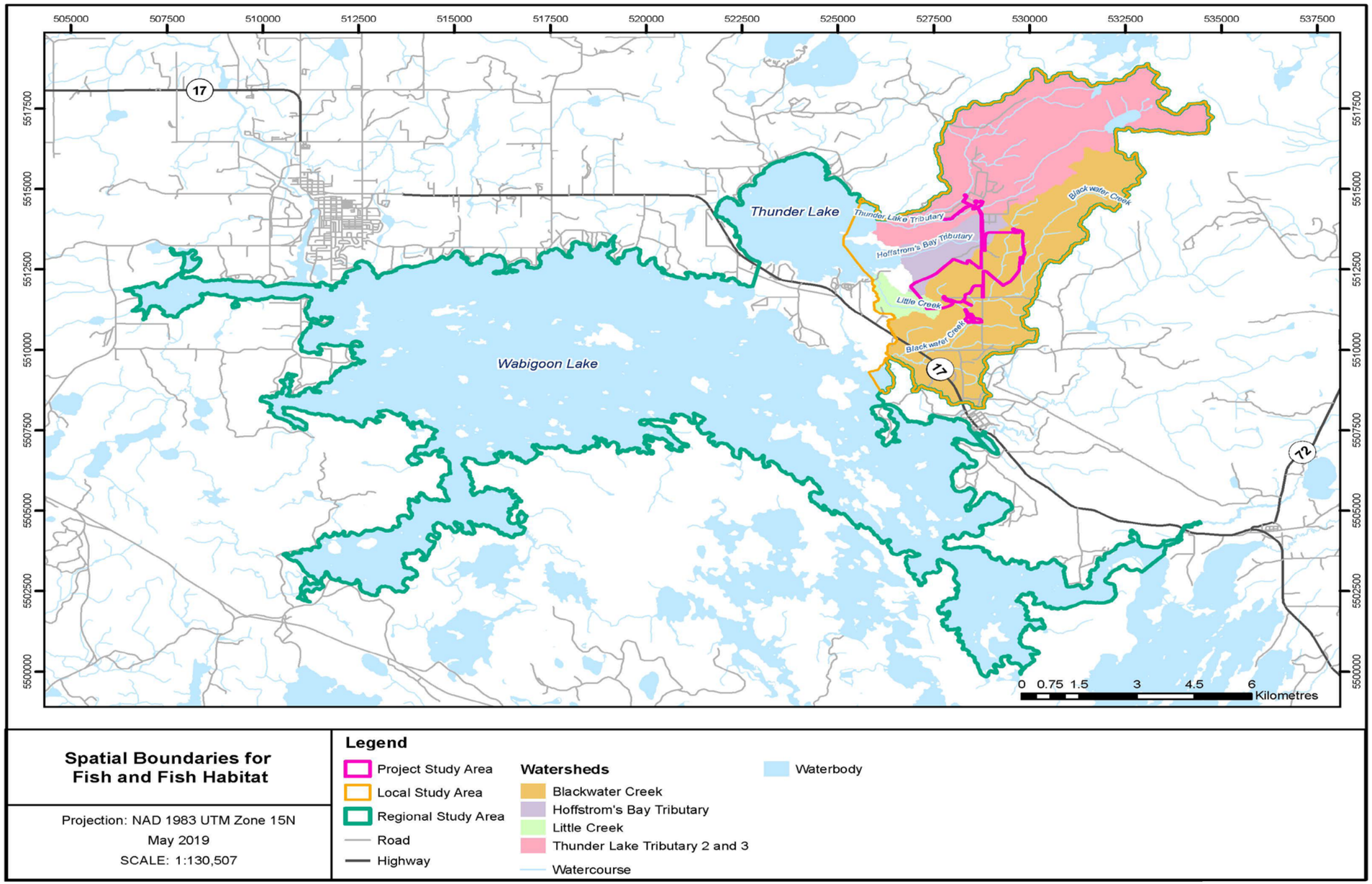
- **Construction** (two years). When physical activities are undertaken in connection with vegetation clearing, site preparation, and building or installing any component of the Project, prior to operations.
- **Operations** (12 years). When commercial production takes place. Open pit mining occurs from the start of operations and ceases after approximately three years. Underground mining begins in the fourth year of operations and continues for approximately nine years.
- **Decommissioning** (three years). After commercial production has permanently ceased, when project components related to operations are removed and rehabilitation of the project study area begins.
- **Abandonment** (up to six years). After decommissioning activities have been completed, during the period in which the open pit is filled with water, and monitoring activities are continued.

Figure 1 Project Study Area



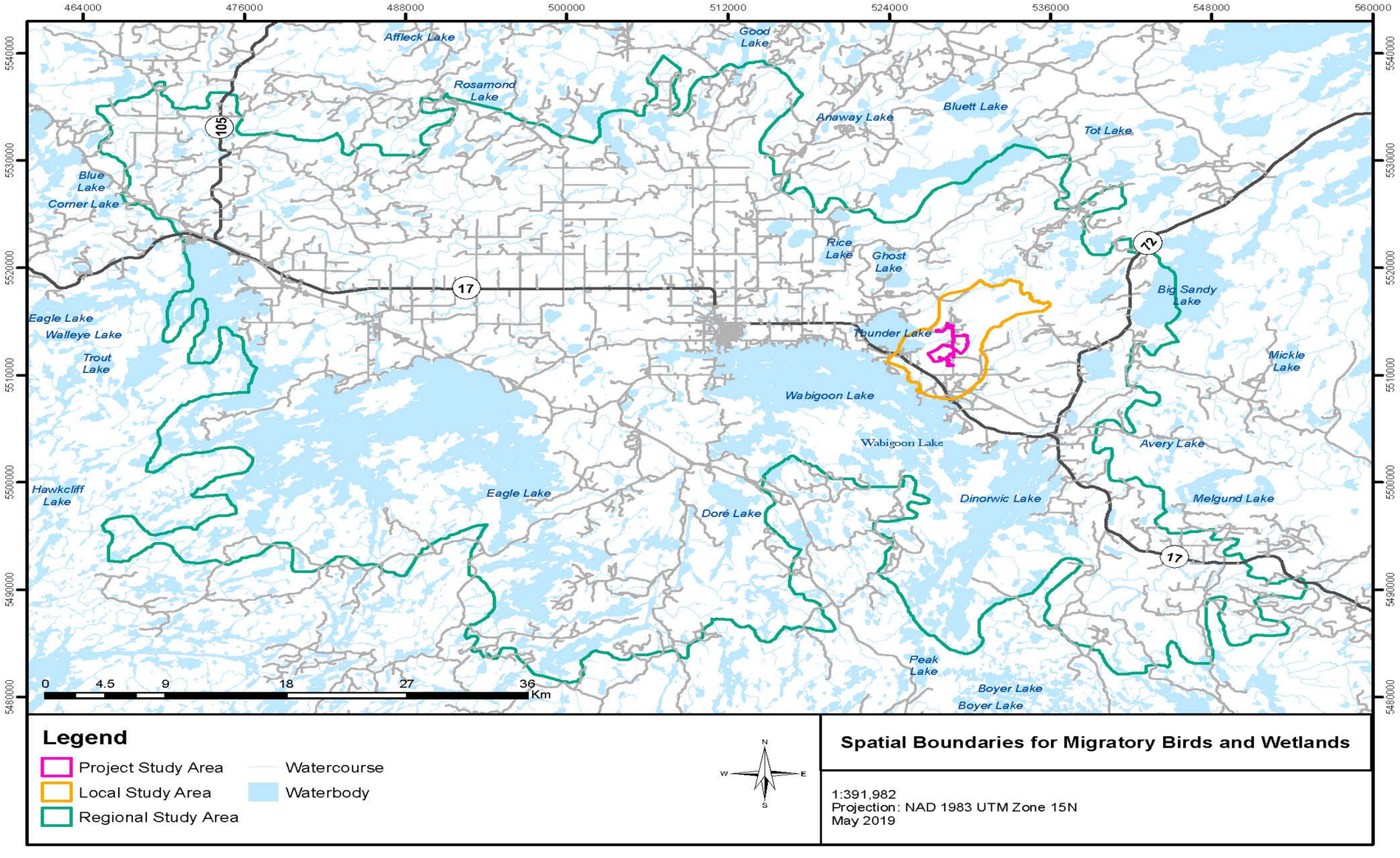
Source: Wood PLC 2018

Figure 2 Spatial boundaries for fish and fish habitat



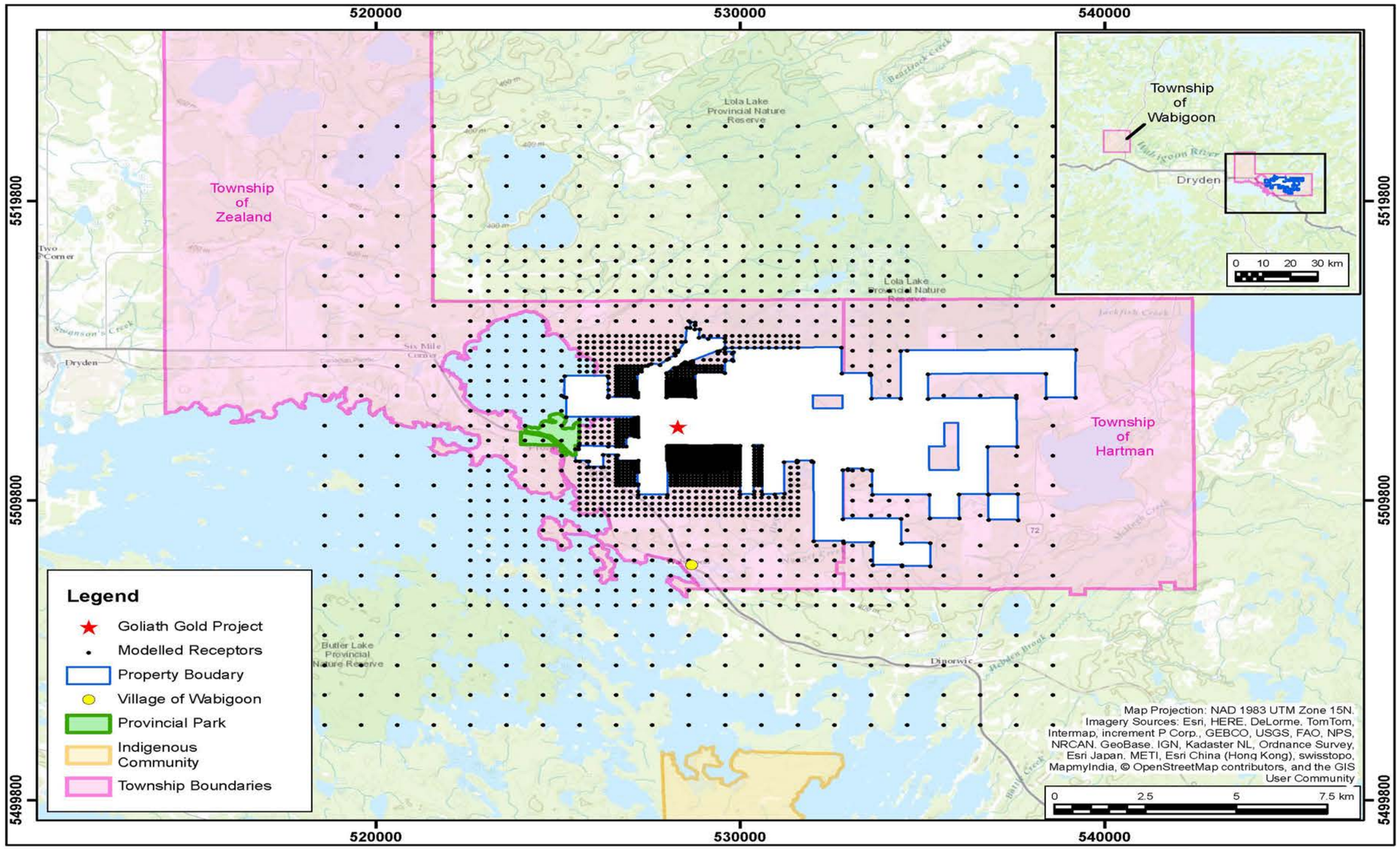
Source: KBM Resources Group

Figure 3 Spatial boundaries for migratory birds and wetlands



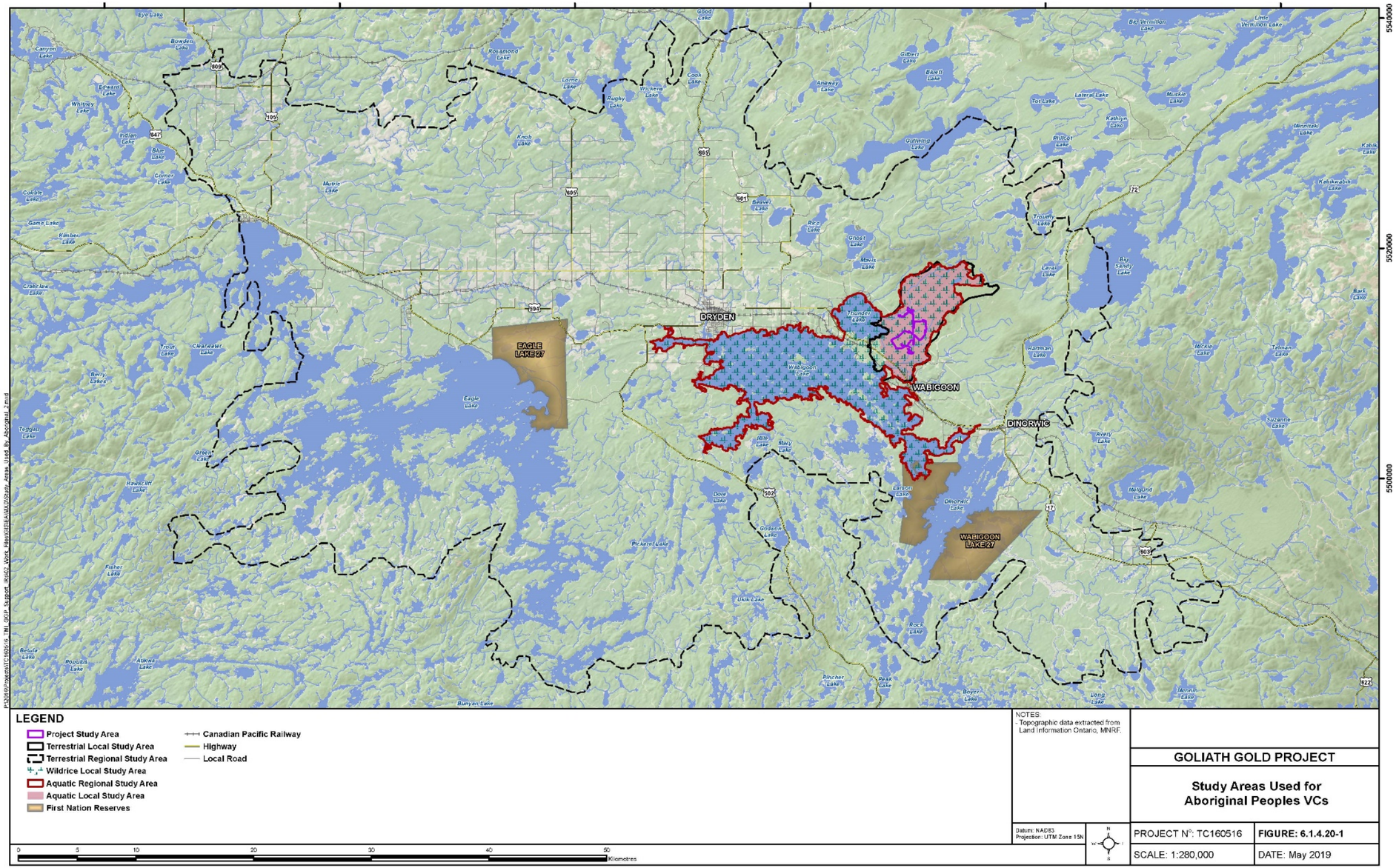
Source: Treasury Metals Inc., 2018

Figure 4 Spatial boundaries for atmospheric environment



Source: Treasury Metals Inc., 2018

Figure 5 Spatial boundaries for health and socio-economic conditions of Aboriginal peoples; current use of lands and resources for traditional purposes by Aboriginal peoples



Source: Treasury Metals Inc., 2018

1.2.6 Methods and approach

The Agency reviewed various sources of information in conducting its analysis, including:

- the Environmental Impact Statement and revised Environmental Impact Statement submitted by the proponent in April 2015 and April 2018, respectively;
- additional information provided by the proponent during the course of the environmental assessment, including responses to information requests issued by the Agency;
- advice from federal and provincial government reviewers; and
- comments received from the public and Indigenous communities.

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.[3] The Agency characterized the residual adverse effects on valued components by using the following assessment criteria:

- **Magnitude:** Severity of the adverse effect
- **Geographic extent**: Spatial reach of the adverse effect
- **Duration:** Length of time that a valued component would be affected by the adverse effect
- **Timing:** Applied to a valued component when relevant (e.g., species breeding season, Indigenous spiritual and cultural practices)
- **Frequency:** Rate of recurrence of the adverse effect
- **Reversibility:** Degree to which the environmental conditions can recover after the adverse effect occurs

The Agency also considered ecological and social context for all valued components and across all the criteria listed above. Context refers generally to the current state of the valued component and its sensitivity and resilience to the change caused by the Project.

Appendix A (Table 17 and Table 18) provides the definitions and limits used to assign the level of effect for each rating criterion. The Agency used a grid (Table 19) which combines the predicted degree of effect after considering the mitigation measures to determine the significance of the residual effects on the valued components. Appendix B summarizes the residual effects assessment for all valued components during all phases of the Project. The Agency's analysis and conclusions on the significance of adverse environmental effects are presented in Chapter 7.

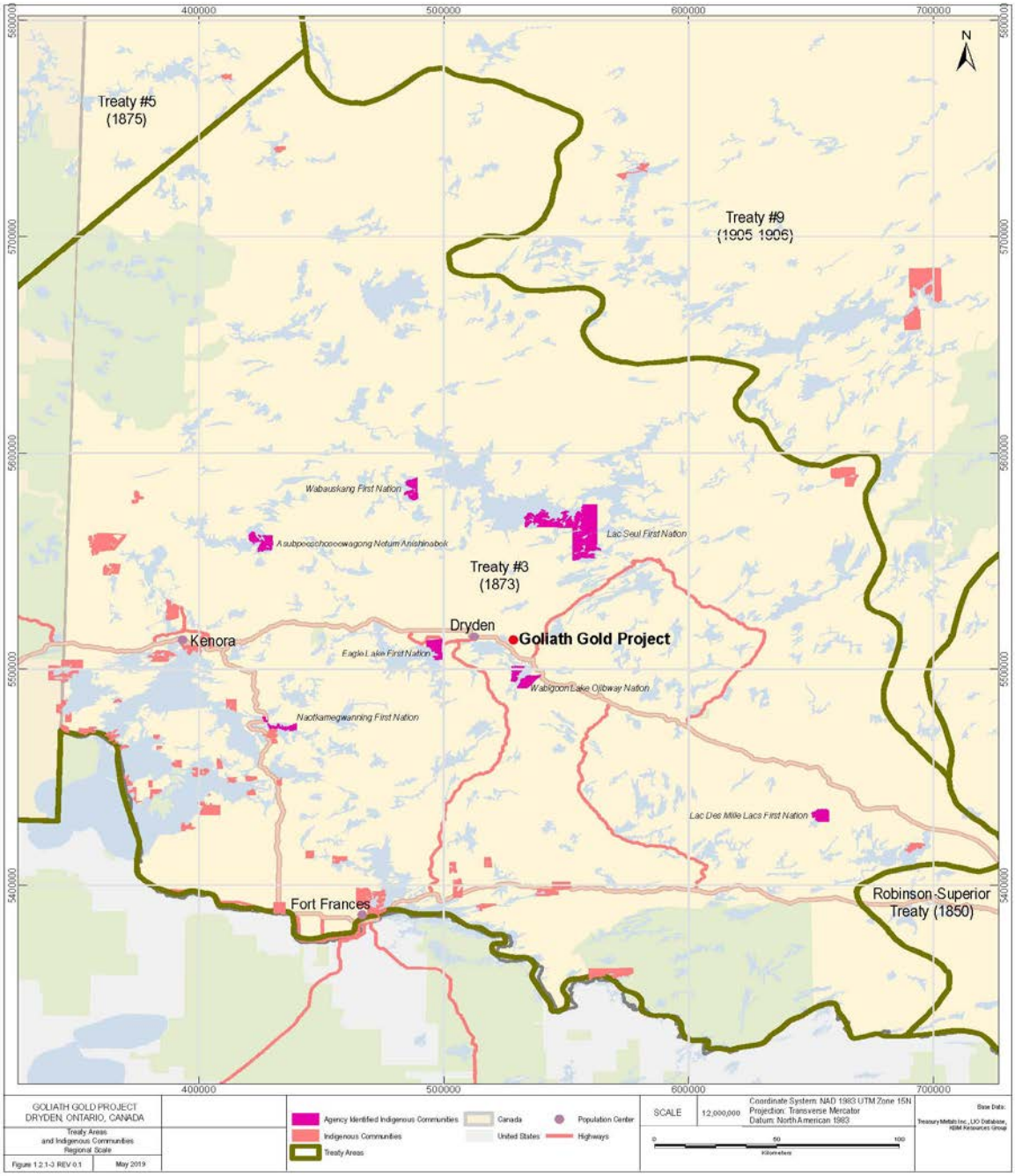
[3] Canadian Environmental Assessment Agency. 2012. Operational Policy Statement "*Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act*", available on the Agency's website: https://www.canada.ca/en/environmental-assessment-agency/news/media-room/media-room-2015/dete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

2 Project Overview

2.1 Project Location

The Project is located approximately four kilometres northwest of the village of Wabigoon and 20 kilometres east of Dryden, Ontario. It is located approximately 335 kilometres west-northwest of Thunder Bay. The Project is located within the Treaty 3 area of Ontario.

Figure 6 Location of the Goliath Gold Project



Source: Treasury Metals Inc.. 2018

2.2 Project Components

The main project components are listed in Table 4 and their proposed geographic locations are illustrated in Figure 7.

Table 4 Project components

Component	Detail
Open pit	The open pit would cover an area of approximately 31.8 hectares. It would be comprised of three separate pit bottoms that would be mined in sequence, from west to east. The deepest pit bottom would be 180 metres deep. At decommissioning, the pit would be allowed to fill with water to create a pit lake. Once water quality objectives[4] are met and the pit is fully flooded, a spillway would be created to Blackwater Tributary 1.
Underground mine	The underground mine is proposed to extend to a depth of 600 metres, and would be accessed with a ramp system from a portal at the surface to the north east of the open pit. Underground mining would commence in year four of operations. Secondary portals may be established within the open pit to limit haul distances (Figure 8). The development of the ramp system to reach the initial underground mining levels would be completed approximately 18 months after the start of operations; however, ramp and level access development will continue throughout operations as underground mining goes deeper. The ramp dimensions are expected to be on the order of five metres wide by five metres high to allow for truck traffic. Approximately 2 million tonnes of waste rock will be generated during underground mining. Some of this waste rock would be used in the development of the ramp system for the underground mine. The rest of the waste rock would be used in backfilling the open pit bottoms or stopes, or hauled to the surface to be placed into the waste rock storage area. At decommissioning, the ramps will be backfilled and the portals would be sealed using non-acid generating waste rock.
Mine water collection system	During all phases of the Project, a mine water collection system would be maintained involving collection ditches around the tailings storage facility, minewater pond, waste rock storage area, low-grade ore stockpile, overburden stockpiles and ore processing facility, as well as a series of collection ponds and pipelines to collect water for use in the process and for initiation of the tailings storage facility during operations. The collected water would be stored in a minewater pond, located south of the tailings storage facility. Any water collected from dewatering the open pit or the underground mine would also be directed to the minewater pond. Seepage from the tailings storage facility would be collected using a series of collection ditches beneath the surface of the tailings storage facility and also directed to the minewater pond.

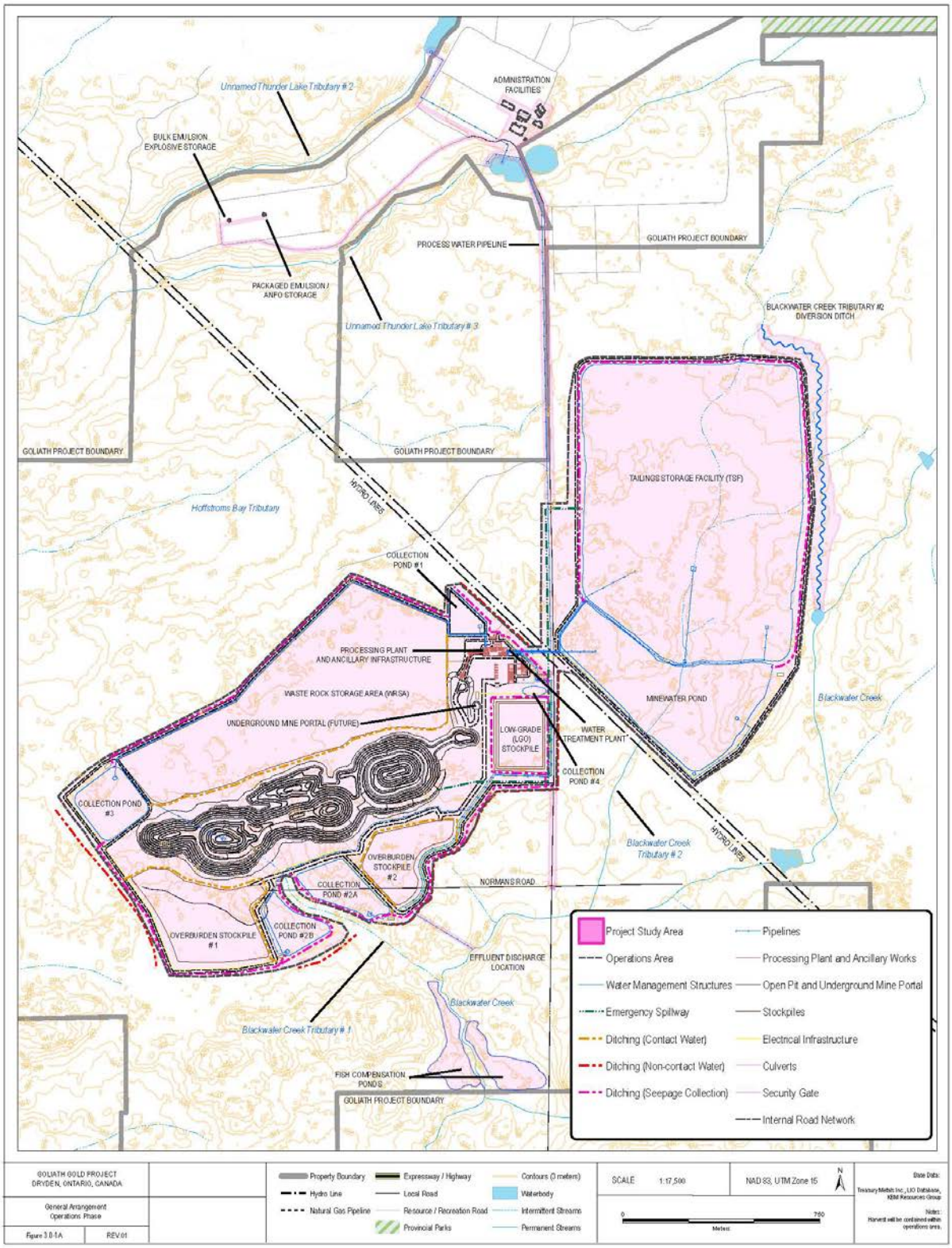
[4] The proponent has committed to meeting Ontario Provincial Water Quality Objectives (PWQO) for all parameters, *Canadian Water Quality Guidelines for the Protection of Aquatic Life* values where no PWQO value exists and background if background concentrations are above the PWQO. For mercury, the proponent committed to meeting background concentrations and for sulphate, the concentrations would be kept less than 20 milligrams per litre.

	Seepage and runoff from the waste rock storage area and low-grade ore stockpile would be collected in segregated collection ponds (Collection Ponds # 3 and 4, respectively), tested for acid rock drainage, and if necessary, treated using batch lime addition prior to the integration with the mine water collection system. All collection ditches would include erosion and sedimentation control measures, and collection ditches that carry contact water would contain a high density polyethylene liner on the outbound side of the ditch, and include a slush grout or clay barriers if conditions that pose challenges to seepage collection are encountered. The ore processing facility would require approximately 3 000 cubic metres of water per day. The majority of the process water would be obtained from the minewater pond. It is expected that there would be a sufficient inventory of water collected during the site preparation and construction phase to support the process and operations without the need for accessing additional sources of water off-site, with the exception of a small amount of fresh water which would be required for the ore processing facility. This water would be obtained from three Tree Nursery ponds within the administration area as required and would amount to about 21 000 cubic metres annually based on the proposed draw of no more than five percent of the daily inflows to the ponds. In addition, water from the minewater pond would also be used for dust suppression within the project study area. Surplus water in the minewater pond would be pumped to the effluent treatment plant for treatment and discharge to Blackwater Creek when levels in the pond are approaching containment limits for safety in storm events. Such releases are predicted to occur in every month of the year.
Pipelines	Onsite Pipelines: Water, tailings and natural gas pipelines would be required throughout the project study area. Water and tailings slurry pipelines would be above ground except where pipelines cross roadways and portions of the tailings storage facility pipeline. All above ground pipelines would be insulated. The main pipelines are described below: • Fresh water from the Tree Nursery ponds within the administration area north of the project study area would be transported via a pipeline to the ore processing facility; • Tailings from the ore processing facility would be pumped via a pipeline from the ore processing facility to the tailings storage; • Reclaimed water from the tailings storage facility would be returned to the ore processing facility for reuse in the process; • Treated effluent will be pumped to the discharge location in Blackwater Creek via a pipeline; and • A pipeline for natural gas delivery from a main pipeline running adjacent to Highway 17 up to the ore processing facility.
Effluent treatment plant	During operations, excess water from the minewater pond would be sent to the effluent treatment plant, located near the ore processing facility, prior to discharge to Blackwater Creek. In the effluent treatment plant, contaminants such as metals would be removed in two steps: a multimedia filtration and reverse osmosis membrane filtration. The tailings from the cyanide destruction and the reject stream from the reverse osmosis treatment will be disposed into the tailings storage facility.

Effluent discharge location	The effluent would be pumped to the discharge location in Blackwater Creek via a pipeline and discharged into a constructed pool through an in-stream diffuser. The pool would be designed to reflect the natural environment and be of sufficient depth to ensure that the discharge remains unfrozen during the winter months. Storage of water in onsite storage facilities (e.g., the minewater pond) would allow for the effective management of water, reducing the need for discharge during periods when conditions are not suitable such as during periods of low flow in Blackwater Creek.
Tailings storage facility	The tailings storage facility (70.6 hectares), including a clay foundation, a high density polyethylene liner, containment dams and dykes, and a mine water collection system involving perimeter ditching around the entire facility, would be located northeast of the open pit and ore processing facility, on the east side of Tree Nursery Road. The facility would store approximately 8.2 million cubic metres.
Waste rock storage area	The waste rock storage area (approximately 37 hectares) would be immediately north of the open pit. It would hold approximately 15 million tonnes of mine rock and be up to 30 metres tall. The waste rock storage area would include a mine water collection system, involving perimeter ditching around the entire area.
Overburden stockpile	Soils and overburden removed during construction would be stored in two overburden stockpiles located directly to the south of the open pit, on either side of Blackwater Creek Tributary 1. The total area covered by the stockpiles would be 26 hectares, with a maximum height of 20 metres and total capacity of 5.9 million tonnes. The overburden stockpiles would include a mine water collection system, involving perimeter ditching around the entire stockpiles and directing the collected water to the minewater pond.
Low-grade ore stockpile	A nine hectare area would be constructed, approximately 10 to 15 metres tall, located directly east of the open pit, adjacent to the ore processing facility, to store approximately 2.2 million tonnes of mined ore. This stockpile would be created during the construction of the open pit when more ore is mined than can be processed. All the mined ore would be processed by the end of operations.
Ore processing facility	An ore processing facility and associated infrastructure would include a crusher, conveyor and cyanide treatment circuit. Ore would be hauled to the ore processing facility and gold doré bars would be produced via a gravity / carbon-in-leach circuit. Leached slurry would be treated in the cyanide treatment circuit to reduce the level of cyanide prior to discharge to the tailings storage facility via a pipeline. The pipeline would be partly underground where it crosses Tree Nursery Road.
Power supply	The power for the Project would be supplied from the Hydro One 115 kilovolt power line circuit M2D. This transmission line runs directly adjacent to the Project.
Sewage treatment facility	All sanitary waste would be stored on site in holding tanks. The contents of the holding tanks would be removed by truck and delivered to a third-party off-site sewage treatment plant.
Solid waste disposal	Non-hazardous solid waste would be stored temporarily for subsequent transport to an existing off-site landfill facility.

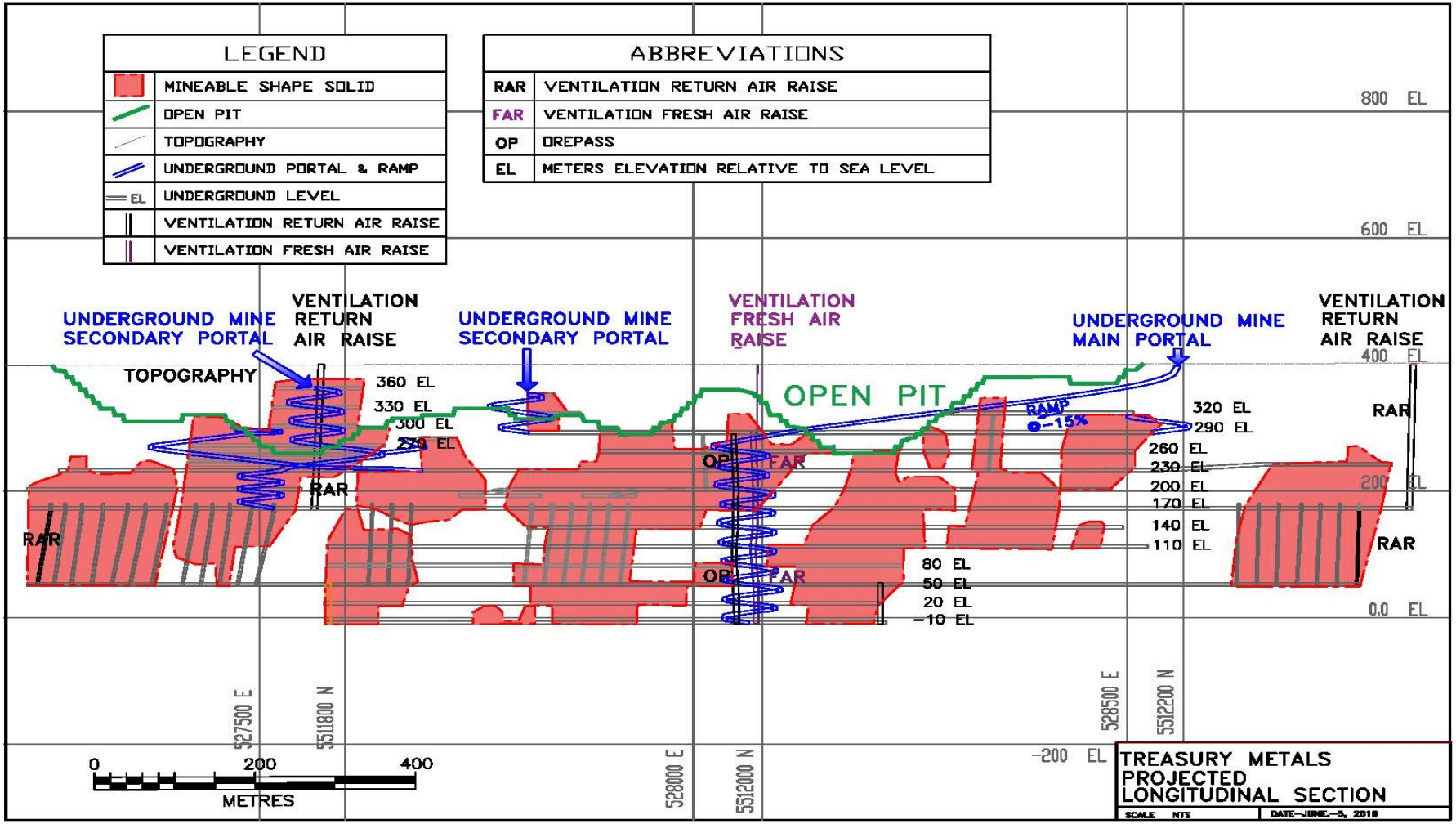
Support and ancillary infrastructure	This would include the administration buildings, warehouse, maintenance facilities onsite, explosives storage and three 150 kilowatt diesel generators to provide back-up power. • The administration buildings will be located at the north end of Tree Nursery Road. • The explosives storage magazine would be located at the north end of Tree Nursery Road, west of the administrative buildings. The locations of other structures would be selected within the project study area.
Access	Access to the project study area will be from Tree Nursery Road via Anderson Road off Highway 17. The final 2.5 km of Tree Nursery Road, ending at the administration area, will be closed to public use with a mine entrance security gate.
Aggregate	Aggregate used for the Project would be sourced either from materials on site that are found to be non-potentially acid-generating. Should an insufficient amount of material be found, existing commercial suppliers of aggregate would be used to source aggregate.
Blackwater Creek Tributary 2 diversion channel	Blackwater Creek Tributary 2 would be partly overprinted by the tailings storage facility. Prior to this overprinting, it would be diverted to create the Blackwater Creek Tributary 2 diversion channel. The Blackwater Creek Tributary 2 diversion channel would be 1219 metres long and would be directed around the east side of tailings storage facility, but remain within the project study area. The Blackwater Creek Tributary 2 diversion channel would drain into Blackwater Creek upstream and to the east of the project study area.

Figure 7 Project components



Source: Treasury Metals Inc., 2018

Figure 8 Underground mine



Source: Treasury Metals Inc., 2019

2.3 Project Activities and Schedule

Key project activities that would occur during each project phase are listed in Table 5. The table also shows the expected duration of each project phase.

Table 5 Project Activities and Duration

Project Phase and Duration	Project Activities
Construction (2 years)	Clearing, grubbing and site grading and construction of the following project components: • mine water collection system; • pipelines; • tailings storage facility; • waste rock storage area; • overburden stockpile; • low-grade ore stockpile; • ore processing facility; • roads used for project operations; • the Blackwater Creek Tributary 2 diversion channel; and • support and ancillary infrastructure.
Operation (12 years)	The period of time during which commercial production takes place. Open pit mining would occur from the start of operations and cease after approximately 3 years. Underground mining would begin at year 4 and continue for approximately 9 years. Activities would include: • Maintaining a 1.2 metre water cover over the tailings to ensure the tailings solids are kept in a saturated condition and thus minimize the potential for acid generation; • Constructing and operating the open pit, including drilling, blasting, loading and hauling of ore and waste rock to designated areas; • Storing and using of explosives; • Constructing the effluent treatment plant; • Constructing of underground mine, including development of a portal and ramp system over 18 months, then underground ore extraction for up to 9 years; • Milling and processing at a constant feed of 2 700 tonnes of ore per day for 12 years through the ore processing facility; • Pumping of tailings from the ore processing facility to the tailings storage facility. • Water withdrawal from the Tree Nursery ponds within the administration area north of the project study area to supply potable

	and process water (as needed over 12 years);
	• Managing contact water, including:
	  - dewatering of the open pit and underground mine;
	  - pumping of process water to the effluent treatment plant for treatment;
	  - pumping of effluent to the effluent discharge location at Blackwater Creek for release; and
	• Progressively rehabilitating the project study area, including revegetation, as possible of waste rock storage areas.

Decommissioning (3 years)	Removal of project components that support ore extraction, processing and transport, including: • Filling the open pit through natural runoff, groundwater flows, over a 6-8 year period, and a one-time transfer of the treated supernatant water[5] from the tailings storage facility. Monitoring and treating the pit lake water quality, as needed, to meet the applicable water quality criteria[6] during filling; • Removing the water cover over the tailings storage facility and treating the contact water at the effluent treatment plant prior to discharge at the effluent discharge location. Covering the dewatered tailings storage facility with a granular material to physically isolate the tailings and then placing a permanent water cover; • Removing pipelines, include at the effluent discharge location and to and from the tailings storage facility; • Removing of the infrastructure of the underground mine; • Natural flooding of the underground mine through groundwater inflow; • Sealing of the portal to the underground mine using non-acid generating rock; • Placing of a multi-layered, low permeability cover on the waste rock storage area to encapsulate potential acid generating rock and control long term acid rock drainage;[7] and • Grading of surfaces and placement of overburden and soil, and revegetation of the project study area.

[5] Water that would be floating on top of the tailings storage facility during operations, which would be removed, treated and use to fill the pit lake during decommissioning.

[6] Listed in Table 8 of Section 6.2 of this report.

[7] The cover applied to the waste rock storage area would be in accordance with Section 59 of the Mine Rehabilitation Code of Ontario (O. Reg. 240/00).

Abandonment (3-6 years)	After decommissioning, the Project would continue to be monitored while the open pit continues to fill with water, creating a pit lake. • Periodic monitoring of the pit lake as it fills and batch treatment as necessary so that water meets the applicable water quality criteria[4]; • Connecting, once the pit lake is full and the water quality meets the applicable water quality criteria[4], the pit lake, using a spillway, with Blackwater Creek Tributary 1; • Monitoring the success of progressive rehabilitation in the project study area; and • Monitoring and maintaining the permanent water cover over the tailings storage facility.

3 Purpose of Project and Alternative Means

3.1 Purpose of Project

The purpose of the Project is to produce gold doré (alloy of gold and silver) bars for sale worldwide. The proponent anticipates the Project would contribute to economic development in northern Ontario, in particular for Indigenous communities, in the form of employment and business opportunities. Indigenous communities have expressed an interest in employment and economic development opportunities for community members and businesses, along with an interest in sustainable development.

3.2 Alternative Means of Carrying Out the Project

CEAA 2012 requires that an environmental assessment of a designated project take into account the alternative means of carrying out the project that are technically and economically feasible, and consider the environmental effects of any such alternative means. 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.[8] The proponent identified alternatives for major project components included an evaluation of their economic, technical, and environmental considerations, and a rationale for selecting the preferred option. The most critical project components are considered in this report.

3.2.1 Alternatives Assessment

Mining methods

Three available alternatives for mining the Goliath deposit were considered:

1. Open pit mining;
2. Underground mining; and
3. A combination of open pit and underground mining.

Alternative 3, a combination of open pit and underground mining, was considered the preferred alternative as it would result in similar effects to the environment as Alternative 1 while providing the additional economic benefit of the underground mine.

[8] Canadian Environmental Assessment Agency. (2012). Operational Policy Statement Addressing "Purpose of" and "Alternative Means", available on the Agency's website: https://www.canada.ca/en/environmental-assessment-agency/news/media-room/media-room-2015/addressing-purpose-alternative-means-under-canadian-environmental-assessment-act-2012.html

Tailings storage facility and tailings disposal

A number of alternatives were assessed for the disposal of mine waste, including the location of the tailings storage facility, the tailings disposal methodology, as well as the type of cover at decommissioning.[9] Nine different potential locations of the tailings storage facility were assessed and the preferred location was selected due to location in close proximity to the open pit thereby minimizing the distance that tailings from the ore processing facility would be pumped to the tailings storage facility, reducing cost and environmental risk. With respect to tailings disposal methodology, the preferred alternative was conventional slurry disposal as this methodology is predicted to result in lower potential to generate fugitive dust emissions outsides the property, and a smaller amount of water requiring treatment before discharge. With regard to decommissioning of the tailings storage facility, two alternatives were considered: (1) dry cover or (2) wet cover. Alternative 2 was selected as creation of a wet cover was predicted to be better at minimizing oxidation and the potential for acid rock drainage.

Waste rock storage area

Three alternatives for waste rock storage areas were considered:

1. Waste rock storage area north of the open pit;
2. Waste rock storage area south of the open pit; and
3. Waste rock storage area north of the open pit with co-disposal within the excavated open pit.

Alternative 3 was selected as the preferred alternative due to the smaller surface area as a portion of the waste rock would be stored in previously completed pit bottoms.

Decommissioning of the open pit

In addition to backfilling the open pit with a portion of the waste rock as described above, two alternatives for the decommissioning of the open pit were assessed:

1. Natural pit filling from groundwater inflow; and
2. Enhanced pit filling from natural groundwater inflow, plus management of runoff and addition of treated supernatant water from the tailings storage facility.

Alternative 2 was preferred because it would provide for a water cover to exposed pit walls over a shorter period of time, with little additional work needed as most of the mine water collection systems will already be in place at decommissioning. Further, it would return the disturbed area to a more natural state over a shorter period of time, thereby reducing the effects to Indigenous uses.

[9] Environment and Climate Change Canada. (2011). *Guidelines for the Assessment of Alternatives for Mine Waste Disposal*, available on Environment and Climate Change Canada's website.

Ore processing facility and gold recovery

The location of the ore processing facility to the west of the open pit was selected for operational efficiency and compatibility with other facilities.

Three methods for gold recovery were considered:

1. Gravity concentration and cyanide leaching;
2. Gravity and floatation concentration, and off-site processing; and
3. Gravity and floatation, and intensive cyanide leaching.

Since all alternatives were equivalent from a technical perspective and would achieve the same environmental standard due to a commitment by the proponent to meet applicable water quality guidelines, the focus of this assessment was on the economics of the alternatives. Alternative 1 was preferred as it was the most economical.

Freshwater supply

Most of the ore processing facility water needs will be met by water recovered though the mine water collection system, however, a small amount of freshwater will also be required in the process. Four alternatives for the freshwater supply for the Project were assessed:

1. Wabigoon Lake;
2. Thunder Lake;
3. Tree Nursery ponds; and
4. Groundwater.

Alternative 3 was chosen as the preferred alternative as it avoided concerns from stakeholders associated with Alternatives 1 and 2; and technical concerns due to Alternative 4. Alternative 3 was selected as the required freshwater would amount to no more than five percent of the daily inflows to the ponds which is within the natural variation of Thunder Lake Tributaries 2 and 3 that flow through the ponds, and is not likely to affect fish or fish habitat in the system.

Effluent discharge location

Five alternative locations for effluent discharge location were considered:

1. Wabigoon Lake;
2. Thunder Lake;
3. Hartman Lake;
4. Thunder Lake Tributary 3 at the Nursery Ponds; and
5. Blackwater Creek.

Both Wabigoon Lake and Thunder Lake have been identified by Indigenous communities as commercially, culturally and spiritually important. While Indigenous communities selected Hartman Lake as the preferred discharge location, it would result in the greatest environmental effects due to the distance from the Project and the requirement for multiple water crossings associated with a pipeline. The preferred alternative was determined to be Blackwater Creek due to minimal concerns from Indigenous communities and fewer environmental effects compared to other alternatives.

Agency Analysis and Conclusion

The proponent's alternatives assessment considered the cost-effectiveness, technical applicability, reliability, environmental effects, and feedback from Indigenous communities on the selected alternative means of carrying out the Project. Based on its review of this analysis, the Agency is satisfied that the proponent has sufficiently assessed alternative means of carrying out the Project for the purposes of assessing the environmental effects of the Project under CEAA 2012.

4 Consultation Activities and Advice Received

Comments from Indigenous communities and public participants during the environmental assessment were considered by the Agency in its analysis and conclusions regarding the Project. Local and traditional knowledge about the project location was also considered in identifying potential environmental effects.

Advice received from federal authorities and key information shared between the Agency and the province of Ontario further informed and supported the Agency's review of the Project.

The Agency provided three previous opportunities for the public, Indigenous communities, and government reviewers to participate in the environmental assessment process. Notices of these opportunities to participate were posted on the Canadian Environmental Assessment Registry's Internet Site. During these opportunities, comments were solicited on:

- whether an environmental assessment is required (December 3 to 23, 2012),
- the draft Environmental Impact Statement Guidelines (January 18 to February 17, 2013), and
- the proponent's Environmental Impact Statement (April 24 to May 24, 2015).

As a fourth and final opportunity for comment, the Agency is seeking comments on this report and potential conditions to support the Minister's Decision Statement. This report includes the Agency's conclusions and recommendations. After taking into consideration the comments received from the public, Indigenous communities and government reviewers, the Agency will finalize and submit the Environmental Assessment Report to the federal Minister of Environment and Climate Change to consider when issuing her Decision Statement under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

4.1 Public Participation

4.1.1 Public participation led by the Agency

During the Environmental Impact Statement review period, the Agency participated in public open houses with the proponent and representatives from federal authorities and provincial ministries. These public open houses were held in the Village of Wabigoon on May 6, 2015, and in the City of Dryden on May 7, 2015. These sessions provided opportunities for members of the public to learn and provide comments about the environmental assessment process, the Project and the proponent's Environmental Impact Statement. During this period, comments were also received from the public in written form. In addition, in March 2013, the Dryden Development Corporation and the City of Dryden sent a joint letter of support for the Project. In January and February 2018, respectively, the Thunder Bay Community Economic Development Commission and the Thunder Bay Chamber of Commerce also sent letters of support for the Project.

4.1.2 Public participation led by the proponent

The proponent held a number of public open houses and information sessions in the Village of Wabigoon and in the City of Dryden from 2013 to 2018. In addition, the proponent consulted other potentially affected or interested stakeholders including local land users, business and community organizations and municipal government agencies.

Public consultation and engagement activities by the proponent included holding meetings, hosting open houses, conducting site visits and developing and issuing plain language materials (e.g., fact sheets and newsletters) to share information and receive feedback about the Project.

4.2 Crown consultation and engagement with Indigenous communities

4.2.1 Crown consultation led by the Agency

The Crown has a duty to consult Indigenous communities, and, where appropriate, to accommodate, when its proposed conduct might adversely impact Aboriginal and Treaty rights protected in section 35 of the *Constitution Act, 1982*.[10] Crown consultation is also undertaken more broadly as an important part of good governance, sound policy development and appropriate decision making.

For the purposes of the federal environmental assessment, the Agency served as Crown Consultation Coordinator to facilitate a whole-of-government approach to consultation. Indigenous communities that were invited to participate in consultations included those identified as having an interest in the Project by reason of the potential for the Project to adversely impact Aboriginal and Treaty rights.

In order to fulfill the Crown consultation obligations, the Agency conducted Indigenous consultation in an integrated manner with the environmental assessment process. The Agency provided opportunities throughout the environmental assessment for dialogue with Indigenous communities about their concerns through phone calls, correspondence and meetings. The Agency provided regular updates to the Indigenous communities to keep them informed of key developments and to solicit feedback. In addition, the communities were invited to participate in the four formal consultation opportunities noted above with the exception of the Lac des Mille Lacs First Nation that engaged in the environmental assessment process in 2016, after the comment period on the Environmental Impact Statement.

The Agency administers funding from its Participant Funding Program to support Indigenous communities' participation in the environmental assessment process. Funds were provided to support eligible activities of Indigenous communities that participated in the environmental assessment. A total

[10] (1) The existing Aboriginal and Treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed;
(2) In this Act, "Aboriginal peoples of Canada" includes the Indian, Inuit and Métis peoples of Canada;
(3) For greater certainty, in subsection (1) "Treaty rights" includes rights that now exist by way of land claims agreements or may be so acquired;
(4) Notwithstanding any other provision of this Act, the Aboriginal and Treaty rights referred to in subsection (1) are guaranteed equally to male and female persons.

of $365,934 was allocated to the Indigenous communities listed in Table 6. Lac Seul First Nation is also participating in the environmental assessment process, but did not apply for funding.

Table 6 Participant Funding Program allocations to Indigenous communities

Indigenous community	Amount allocated
Aboriginal People of Wabigoon	$34,872.00
Eagle Lake First Nation	$55,200.00
Asubpeeschoseewagong Netum Anishinabek (Grassy Narrows First Nation)	$44,959.97
Lac des Mille Lacs First Nation	$10,500.00
Métis Nation of Ontario	$54,000.00
Naotkamegwanning First Nation (Whitefish Bay First Nation)	$60,750.00
Wabauskang First Nation	$60,652.50
Wabigoon Lake Ojibway Nation	$45,000.00
TOTAL	**$365,934.47**

The Agency met with Eagle Lake First Nation, Naotkamegwanning First Nation, Wabauskang First Nation and Wabigoon Lake Ojibway Nation as well as Bimose Tribal Council on February 10 to 12, 2015, to provide an update on the environmental assessment process for the Project and discuss the communities' preliminary concerns with the environmental assessment and the Project.

The Agency endeavoured to meet with Eagle Lake First Nation, Asubpeeschoseewagong Netum Anishinabek, Naotkamegwanning First Nation, Wabauskang First Nation and Wabigoon Lake First Nation, to discuss the proponent's Environmental Impact Statement and invite any questions or comments. The Agency was successful in holding meetings with Eagle Lake First Nation and Wabigoon Lake Ojibway Nation on May 05, 2015 and May 11, 2015, respectively. In 2015, a scheduled community meeting with Asubpeeschoseewagong Netum Anishinabek was cancelled at the request of that community. The Agency met with Lac des Mille Lacs First Nation on March 08, 2016, to discuss the Project.

The Agency participated in an information session led by Grand Council Treaty #3 and attended by Eagle Lake First Nation, Naotkamegwanning First Nation, and Wabigoon Lake Ojibway Nation and the proponent on April 5, 2017, to discuss the potential effects of the Project on water. The Agency participated in a meeting led by Grand Council Treaty #3 and attended by Eagle Lake First Nation, Lac des Mille Lacs First Nation, Lac Seul First Nation, Naotkamegwanning First Nation, Wabauskang First Nation and Wabigoon Lake Ojibway Nation on April 12, 2018, to discuss the status of the environmental assessment process and the path forward for participation of the Indigenous communities.

Between July 16 and 20, 2018, the Agency met with Eagle Lake First Nation, Asubpeeschoseewagong Netum Anishinabek, Naotkamegwanning First Nation and Wabauskang First Nation to discuss the

Project and the proponent's revised Environmental Impact Statement, and invite any comments and questions.

The key issues raised by Indigenous communities during the environmental assessment include the following:

- The location and long term safety of the tailings storage facility;
- Degradation of water quality in surrounding waterbodies;
- The potential for release of mercury and creation of methylmercury in the aquatic environment; and
- The potential impacts of the Project on Aboriginal or Treaty rights.

The proponent is working with Indigenous communities to develop agreements. No letters of support from Indigenous communities have been provided by the communities to date.

Potential effects of the Project on Indigenous uses are discussed further in Sections 7.3, 7.4 and 7.5 of this report, while potential impacts on Aboriginal and Treaty rights are discussed in Chapter 9.

4.2.2 Engagement with Indigenous communities led by the proponent

The proponent engaged all Indigenous communities identified by the Agency to discuss issues by holding meetings, hosting open houses and conducting site visits to share information and receive feedback.

The proponent offered some financial support to communities to retain technical experts to review the Environmental Impact Statement and other documents, and conduct traditional knowledge and traditional land and resource use studies.

4.3 Participation of Federal and Other Experts

Pursuant to section 11 of CEAA 2012, federal authorities in possession of specialist or expert information or knowledge with respect to the Project provided advice in relation to determining whether a federal environmental assessment was required. Federal authorities also participated in the review of the Environmental Impact Statement Guidelines and the proponent's Environmental Impact Statement, and provided input into the preparation of this report and potential conditions to support the Minister's decision statement.

The following federal authorities provided input on each phase of the environmental assessment process based on specialist or expert information or knowledge:

- Fisheries and Oceans Canada: related to fish, fish habitat and fish passage.
- Environment and Climate Change Canada: related to air quality, mine waste disposal and effluent management, water quality, species at risk, migratory birds, wetlands, and accidents and malfunctions.

- Natural Resources Canada: related to hydrogeology, geochemistry, characterization of mined materials, acid rock drainage and metal leaching, and mine waste management.
- Transport Canada: related to navigation.
- Health Canada: related to potential effects on Indigenous health related to country food, human health risk assessment, water quality, noise levels and air quality.

The following provincial ministries also provided advice to the Agency: the Ministry of Natural Resources and Forestry; Ministry of Environment, Conservation and Parks; Ministry of Tourism, Culture and Sport; and the Ministry of Energy, Northern Development and Mines.

5 Geographical Setting

The area downstream of the Project has seen historic industrial activity, leaving the English and Wabigoon Rivers contaminated due to mercury releases from a chlor-alkali plant in Dryden in the 1960s and 1970s and from Dryden Chemical in the 1970s. The Ontario Ministry of the Environment, Conservation and Parks has established a trust to fund, develop and implement a remediation plan for the English and Wabigoon Rivers, downstream of the Project.[11] While this historic context influences the perceptions of the Project by local citizens, including Indigenous communities (see Section 9.3), the Project lies upstream from the historical contamination plume and is not anticipated to exacerbate the existing contamination levels downstream.

5.1 Biophysical Environment

Atmospheric environment

The area is characterized by air quality typical of other forested areas of northern Ontario. Noise levels are dominated by sounds of nature and human activity typical of a rural setting. Transportation corridors, such as Highway 17, secondary roads and logging roads that traverse the area are the dominant local sources of air and noise quality changes.

Water (groundwater and surface water)

The Project straddles the following four subwatersheds of Wabigoon Lake and Thunder Lake (Figure 9):

- Blackwater Creek, draining southwest into Wabigoon Lake
- Little Creek, draining northwest into Thunder Lake
- Hoffstrom's Bay Tributary, draining southwest into Thunder Lake
- Thunder Lake Tributary 2 and 3, draining southwest into Thunder Lake

The project study area is almost completely in the Blackwater Creek watershed, north of Blackwater Creek itself. Surface water and groundwater quality generally meets Ontario Provincial Water Quality Objectives with occasional exceedances of a few parameters, including total iron. Such exceedances are not unusual due to the metal-rich nature of the bedrock of the Canadian Shield region. Groundwater flows generally southwesterly, from the elevated wetland to the north, then splitting off in the general vicinity of the project study area to the south towards Wabigoon Lake and to the west towards Thunder Lake.

Topography, climate, flora and fauna

The geographic area is characterized by low ridges and hills flanked by flat areas. The regional climate is considered continental, characterized by short mild summers and long cold winters with a relatively low

[11] For more information on provincial plans, please refer to the implementation of Ontario's *English and Wabigoon Rivers Remediation Funding Act, 2017*.

precipitation. The mean annual precipitation is 720 millimetres, with approximately 23 percent falling as snow.

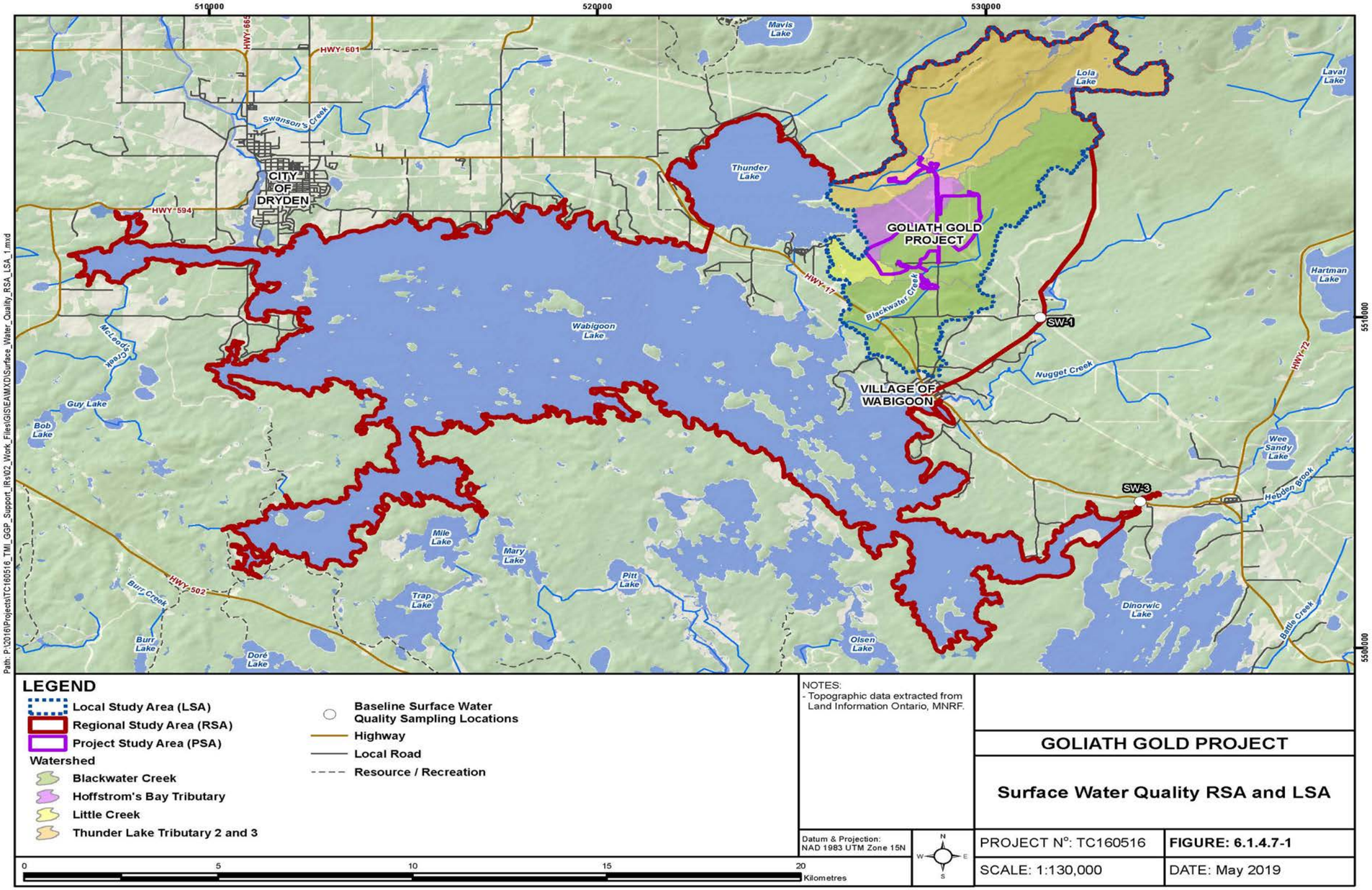
The Project is located within the Canadian Shield, in the west-central portion of a hydrological basin containing low to moderate relief topographic features, including low lying wetlands and marsh type lands, exposed bedrock ridges and a range of boreal forest types. Among avian species in the area are the olive-sided flycatcher, the bald eagle and the Canada warbler. Several large mammals and furbearers also characterize the area, including moose, white-tailed deer, black bear, American beaver, red fox and snowshoe hare. Thunder Lake is a coldwater lake that supports a fish community including Lake Trout, Lake Whitefish, Walleye, Northern Pike and Smallmouth Bass. It has several areas of spawning habitat for Lake Whitefish and Lake Trout. Thunder Lake supports both recreational and commercial fishing. Wabigoon Lake is a coolwater lake. In particular, there are two fish sanctuaries on Wabigoon Lake created to protect spawning Walleye and Sauger. Wabigoon Lake supports an active sport fishery focused on Walleye and Muskellunge angling.

5.2 Human Environment

The Project is located within the Hartman and Zealand townships. The nearest communities are the Village of Wabigoon and the City of Dryden, with populations of 373 and 7749 respectively. The Project is located in an area used by the public for recreational fishing, hunting, boating, and commercial activities including tourism, fishing, trapping, and wild rice and bait harvesting. For example, Thunder Lake is popular for fishing and hiking trails, and snowmobile trails exist in the area.

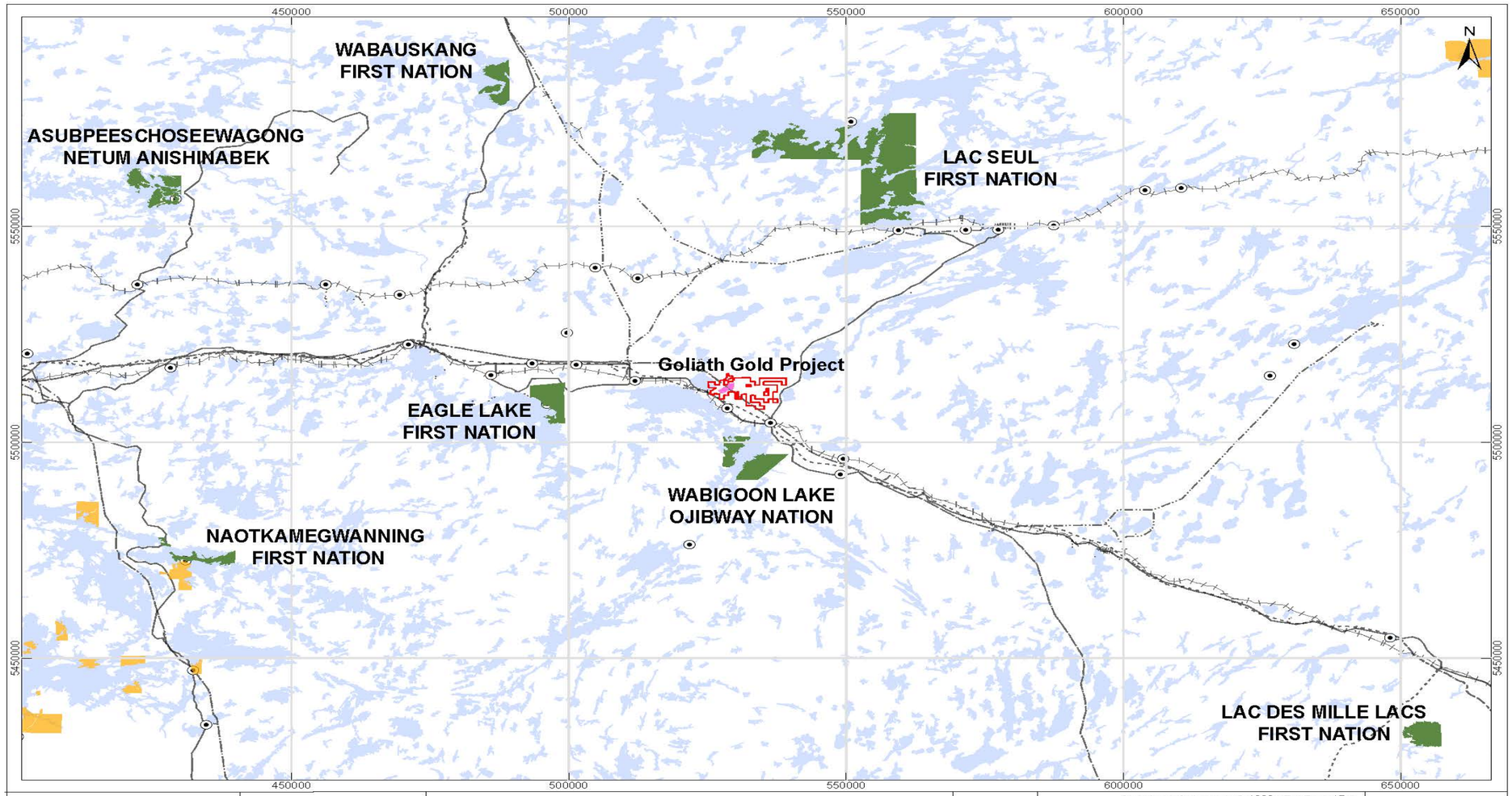
The Project is located within the Treaty 3 (1873) area of Ontario, which affords hunting, trapping and fishing rights and protections to its signatories throughout the Treaty territory. The Indigenous communities nearest to the Project are Eagle Lake First Nation and Wabigoon Lake Ojibway Nation. Members and citizens of other Indigenous communities also use sites throughout the regional assessment area for current use of lands and resources for traditional purposes. These communities include Asubpeeschoseewagong Netum Anishinabek, Lac des Mille Lacs First Nation, Lac Seul First Nation, Métis Nation of Ontario, Naotkamegwanning First Nation and Wabauskang First Nation. Figure 10 illustrates the location of the Project relative to those communities.

Figure 9 Regional subwatersheds



Source: Treasury Metals Inc., 2018

Figure 10 Indigenous communities locations



Source: Treasury Metals Inc., 2018

6 Predicted Changes to the Environment

6.1 Atmospheric Environment

The Project could cause residual effects on the atmospheric environment through:

- changes to ambient air concentrations of contaminants;
- changes to ambient noise levels; and
- changes to vibrations from blasting activities.

The Agency's summary of the proponent's assessment of the changes to the atmospheric environment considered the views expressed by federal departments, provincial ministries and Indigenous communities. The Agency used this summary in its analyses of effects on fish and fish habitat (Section 7.1), Indigenous use (Section 7.3) and human health (Section 7.4.1), including the mitigation and follow-up program measures.

Description of the Existing Environment

Existing concentrations of total particulate matter, including particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), nitrogen dioxide, sulphur dioxide, carbon monoxide and metals are below applicable air quality standards[12]. Existing noise levels are below applicable provincial standards[13], and consist mostly of wind, small animals, bird noise and vehicle noise from the nearby Trans-Canada Highway. Existing vibration levels were not measured.

6.1.1 Changes to ambient air concentrations of contaminants

Proponent's Assessment of Environmental Effects, and Proposed Mitigation and Monitoring

Air emissions were modelled using conservative assumptions for the construction, operations and decommissioning phases. Combustion source emissions such as $PM_{2.5}$ and nitrogen dioxide are anticipated to be higher in the operations phase, and would be higher to the south and east of the project study area due to the location of the open pit and ore processing facility. Particulate emissions, measured as total suspended particulate and PM_{10}, are anticipated to be higher in the construction and decommissioning phases, and would be spread out across the project study area.

Emissions of particulate matter, metals and nitrogen oxides are expected during the construction, operations and decommissioning phases from unpaved haul roads, bulldozers, loaders and excavators; during the construction and operations phases from blasting; and during the operations phase from vent raises, heaters and back-up generators. Emissions of particulate matter and metals are also expected during the construction, operations and decommissioning phases from material handling; during the

[12] *National Ambient Air Quality Objectives*, *Canadian Ambient Air Quality Standards*, and Ontario *Ambient Air Quality Criteria*
[13] Ontario Ministry of Environment, Conservation and Parks's *Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning Publication* (NPC-300) limits

construction and operations phases from crushers; and during the operations phase from wind erosion of tailings.

Concentrations of nitrogen dioxide are expected to increase within the local study area. Infrequent exceedances (up to 0.3 percent of the time) of applicable air quality standards[12] are predicted just beyond the project study area to the north and south, and also to the east of the project study area for 1-hour average concentrations of nitrogen dioxide. While there would be increases in 24-hour average concentrations of PM_{10} and $PM_{2.5}$, no exceedances of applicable air quality standards are predicted outside of the project study area for either parameter.

Measures to reduce the effects of the Project on air quality include:

- Conduct blasting in a phased manner that minimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week.
- Load material into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck.
- Ensure that all internal combustion engines are properly maintained and all emission control systems (e.g., diesel particulate filters) are in good working order.
- Implement a best management plan for dust to provide specific directions for operators. Use water and chemical suppressants for dust control on the haul roads at the mine site when temperatures are above freezing.

Ambient air monitoring will include a continuous air monitoring station near the security gate, south of the project study area, and to the west of Normans Road, which will analyze total suspended particulate (either $PM_{2.5}$ or PM_{10}) and nitrogen dioxide, with time averaging periods to be determined. Passive sampling of nitrogen dioxide would occur to the west of the project study area on Thunder Lake Road and to the south of the project study area at Anderson Road. Particulate matter would be collected passively over a 30-day period using dustfall jars at locations to be determined through consultation with Indigenous communities and analyzed for metals content.

Views expressed

Eagle Lake First Nation, Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Lac des Mille Lacs First Nation and Naotkamegwanning First Nation indicated that mitigation measures should minimize the amount of air pollutants released beyond the project study area into the surrounding area, and requested that air quality be monitored with the methodology and collected data shared with Indigenous communities. The proponent noted that proposed mitigation measures will limit air pollutants that leave the project study area. The proponent will also work with Indigenous communities to assess the effects of air quality on traditional land use and will continue to consult with Indigenous communities throughout the monitoring program.

6.1.2 Changes to ambient noise levels

Proponent's Assessment of Environmental Effects, and Proposed Mitigation and Monitoring

The noise model assumed the worst-case hour during a worst-case year, throughout the operations phase. All sources of noise are conservatively modelled as being on the surface, to discount the shielding effects from the open pit. Noise emissions would result from onsite equipment use for construction, mining and processing, and decommissioning and reclamation activities; from traffic throughout the Project; and from blasting during construction and operations.

Potential exceedances of provincial noise standards[13] are predicted within 200 metres of the project study area, particularly to the east and south of the open pit due to the location of the noisier activities at the ore processing facility and the open pit. Noise levels are anticipated to remain below 50 decibels, a level considered protective of wildlife including birds, at all locations outside of the project study area. Noise levels from blasting are expected to remain within provincial blasting noise standards[14] outside of the project study area. The locations of the waste rock storage area and overburden stockpiles would be expected to act as noise berms to reduce the levels of noise off site.

Measures to reduce the effects of the Project on noise levels include:

- Conduct blasting in a phased manner that minimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week.
- Conduct heavy equipment activity between the hours of 7:00 am and 10:00 pm, if possible, to reduce the noise effects to neighbouring residents.
- Advise nearby residents of significant noise-causing activities, such as blasting, and endeavour to schedule those events to reduce disruption to residents.
- Ensure that all internal combustion engines are fitted with appropriate muffler systems.

An ambient noise monitoring program would be developed at selected sensitive receptors, including at selected receptors along East Thunder Lake Road and along Tree Nursery Road. The program is proposed to be carried out during the summer, once during the construction phase, every three years during operations, and once during decommissioning for human receptors only. A wildlife noise monitoring program would also identify the extent of areas where noise could affect wildlife. That program would occur once during construction and once during operations. A blasting noise monitoring program would also be implemented when operations at the open pit are in the westernmost portion of the pit and close to the surface. In the event that complaints lead to the identification of specific sources of concern through monitoring, source-specific abatement such as noise walls, berms or operational restrictions will be employed, as appropriate.

[14] Ontario Ministry of Environment, Conservation and Parks *Blasting, Model Municipal Noise Control By-Law* (NPC-119) limit of 128 decibels

6.1.3 Changes to vibrations from blasting activities

Proponent's Assessment of Environmental Effects, and Proposed Mitigation and Monitoring

Blasting in the open pit and the associated underground mine would be the only expected source of vibrations during the Project. Federal standards[15] would not be exceeded at the edge of Blackwater Creek, which is located 519 metres from the proposed perimeter of the open pit. The federal standard for peak particle velocity would be exceeded at the Blackwater Tributary 1, which is closer to the proposed perimeter of the open pit. Potential effects to fish and fish habitat in this tributary are discussed in Section 7.1.

During construction and operations, the blast design would meet the provincial standard for human receptors[16], and each blasting event will be monitored in accordance with provincial requirements. Measures to reduce the effects of the Project on vibration levels include:

- Implement a modern blasting program that minimizes the blast area, the overall amount of explosives required, and through detonating procedures, minimize the amount of explosives per delay.
- Advise nearby residents of significant noise-causing activities, such as blasting, and endeavour to schedule those events to reduce disruption to residents.

Blasting vibration would be monitored on the main stem of Blackwater Creek, at the location closest to the open pit. A campaign would also occur to monitor blasting vibration when operations at the open pit are in the westernmost portion of the pit and close to the surface.

6.2 Water Resources

The Project could cause changes in water resources through:

- decrease in mean annual flow in Thunder Lake Tributaries 2 and 3;
- decrease in mean annual flow in Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2; and
- increase in concentration of contaminants in Blackwater Creek.

The Agency's summary of the proponent's assessment on the changes to water resources considered the views expressed by federal departments, provincial ministries and Indigenous communities. The Agency used this summary in the analyses of effects on fish and fish habitat (Section 7.1), Indigenous use (Section 7.3), and human health and socio-economic conditions (Section 7.4), including mitigation and follow-up program measures.

[15] Fisheries and Oceans Canada *Guidelines for the Use of Explosives In or Near Canadian Fisheries Water* (1998) state that no explosive is to be detonated in or near fish habitat that produces, or is likely to produce, an instantaneous pressure change (i.e., overpressure) greater than 100 kilopascals (14.5 pounds per square inch) in the swimbladder of a fish.
[16] Ontario Ministry of Environment, Conservation and Parks *Blasting, Model Municipal Noise Control By-Law* (NPC-119) limits for human receptors (peak particle velocity of 12.5 millimetres per second) in all cases.

Description of the Existing Environment

The local and regional assessment areas for groundwater and surface water are shown in Figure 9. The project study area is located approximately one kilometre east of Thunder Lake and two kilometres northeast of Wabigoon Lake. Thunder Lake ultimately discharges into Wabigoon Lake, through Thunder Creek.

The project study area is surrounded by local sub-watersheds that drain into either Thunder Lake or Wabigoon Lake. Thunder Lake Tributaries 2 and 3 are located on the northern end of the project study area and drain into Thunder Lake. Thunder Lake Tributaries 2 and 3 have three ponds, collectively referred to as the Tree Nursery ponds.

Hoffstrom's Bay Tributary and Little Creek are located on the northwest and southwest sides of the project study area, respectively, and drain into Thunder Lake. Blackwater Creek Tributaries 1 and 2 merge into Blackwater Creek located on the south side of the Project Site and drain into Wabigoon Lake.

Groundwater flow in the local study area is largely controlled by local topography and flows south towards Wabigoon Lake and to the west towards Thunder Lake. Baseline concentrations of dissolved metals in groundwater, including aluminum, arsenic, chromium, copper, iron, tungsten, vanadium, and zinc exceed the Ontario Provincial Water Quality Objectives.[17]

The baseline surface water quality data for Blackwater Creek, Thunder Lake Tributaries 2 and 3, Little Creek and Hoffstrom's Bay Tributary showed that the concentrations of parameters were largely below the Ontario Provincial Water Quality Objectives, with only a few samples showing elevated levels of total silver, cobalt, copper, lead, selenium, zinc and vanadium compared to Provincial Water Quality Objectives[17]. Concentrations of total iron were found to exceed the Provincial Water Quality Objectives in majority of the samples; however, these elevated concentrations are attributed to the location of the Project in the Canadian Shield region of Ontario, which has high iron in the bedrock and soils.

6.2.1 Decrease in mean annual flow in Thunder Lake Tributaries 2 and 3

Proponent's Assessment of Environmental Effects, and Proposed Mitigation and Monitoring

A decrease in mean annual flow is predicted in Thunder Lake Tributaries 2 and 3 during operations due to water withdrawal from the Tree Nursery ponds and due to reduction in groundwater flow that feeds into Thunder Lake Tributaries 2 and 3 caused by the development of the open pit and dewatering of the underground mine. The combined effect of these two changes would cause a maximum reduction in mean annual flow of 5 percent compared to baseline levels (Table 7)[18]. These changes in Thunder Lake Tributaries 2 and 3 are not expected to change the water level or flows downstream in Thunder Lake.

[17] For baseline concentrations, the proponent presented the 50th percentile data. The proponent acknowledges that the Ontario Ministry of Environment, Conservation and Parks receiving water assessment policy advises the use of the 75th percentile data to determine baseline concentrations.

[18] Under the 1-in-20 dry year condition, which refers to a drought condition that has a 5 percent chance of occurring in any given year.

As discussed in Section 2.3, during operations water would be taken from the Tree Nursery ponds of Thunder Lake Tributaries 2 and 3 to supply potable and process water. To mitigate changes in mean annual flow in Thunder Lake Tributaries 2 and 3, water flowing into the Tree Nursery ponds from Thunder Lake Tributaries 2 and 3 would be monitored in real-time throughout operations to ensure that water withdrawal from these ponds does not exceed 5 percent of the daily flows into the Tree Nursery ponds (Box 7.1-2). Water withdrawal from the Tree Nursery ponds would also be subject to an approval by the Ontario Ministry of Environment, Conservation and Parks.[19] As the open pit fills with water during abandonment, the groundwater levels in the local study area would return to near baseline conditions, and no further changes in flow of Thunder Lake Tributaries 2 and 3 would occur.

Table 7 Maximum decline in mean annual flow of waterbodies

Waterbody	Maximum decline in mean annual flow compared to baseline (percent)
Thunder Lake Tributary 2	5.0
Thunder Lake Tributary 3	5.6
Little Creek	8.7
Hoffstrom's Bay Tributary	7.8
Blackwater Creek Tributary 1	6.7[a]
Blackwater Creek Tributary 2	7.3

a – this decline in mean annual flow includes the discharged treated effluent from the mine.

Views expressed

Wabigoon Lake Ojibway Nation and Eagle Lake First Nation expressed concerns about the effect of water withdrawal from the Tree Nursery ponds of Thunder Lake Tributaries 2 and 3 on Lola Lake and its wetlands. The proponent responded that the Lola Lake and its wetlands are upstream of the Tree Nursery ponds and would not be affected. Further views on the effects on wetlands from the Project are described in Section 6.3.2.

Wabauskang First Nation raised concerns about the flows in Tree Nursery ponds during a drought year. The proponent assessed changes in water quantity from potential drought conditions, from operations to abandonment (discussed in Section 8.3). The proponent explained that during drought conditions, the water withdrawal from the Tree Nursery ponds would continue to be less than five percent of the total daily inflows, and would therefore be protective of fish and fish habitat. The proponent would attempt to reduce the water withdrawal from the Tree Nursery ponds further during drought conditions by

[19] The permit to take water (PTTW) is required if more than 50 000 litres of water is taken from the environment. Further details on PTTW can be found in: https://www.ontario.ca/page/permits-take-water

reclaiming water from the collection ponds and using treated water from the effluent treatment plant if necessary.

6.2.2 Decrease in mean annual flow in Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2

Proponent's Assessment of Environmental Effects, and Proposed Mitigation and Monitoring

A decrease in mean annual flow in Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2 is predicted from operations to decommissioning due to a reduction in groundwater flow because of the development of the open pit and dewatering of the underground mine, and reduction in surface water runoff because of the construction of project components.

The maximum decline in mean annual flow of Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2 is expected during operations as the open pit continues to develop, and dewatering of the open pit and underground mine creates a groundwater drawdown force that pulls the groundwater from the surrounding watersheds towards it. As a result, less groundwater would be available to feed into Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2.

Furthermore, the construction of project components in the project study area would redirect the surface water runoff away from the watersheds and cause a reduction in the flow of water. The maximum predicted decline in mean annual flow would range from 6.7 to 8.7 percent in Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2 compared to baseline conditions (Table 7).

The proponent would mitigate changes in mean annual flow of Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2 by minimizing the project study area. The proponent also predicts that as the open pit fills after operations, groundwater will return to near-baseline conditions, and mean annual flow would increase from levels during operations for Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek Tributaries 1 and 2. To verify the predicted changes in mean annual flow of Little Creek and Hoffstrom's Bay Tributary, both groundwater and surface water would be monitored during all phases of the Project (Box 7.1-2).

Views Expressed

Fisheries and Oceans Canada raised uncertainties related to the reduction in water flow in Blackwater Creek, downstream of Blackwater Creek Tributaries 1 and 2. The proponent stated that fish habitat in Blackwater Creek is not directly correlated with the changes in flow and is largely determined by beaver activity. The mean annual flows would be monitored in Blackwater Creek Tributaries 1 and 2 to verify predictions (Table 7).

6.2.3 Increase in contaminant concentrations in Blackwater Creek

Proponent's Assessment of Environmental Effects, and Proposed Mitigation and Monitoring

The concentrations of several parameters in Blackwater Creek would exceed the baseline levels during operations due to discharge of treated effluent and seepage from the project components, and during abandonment due to connection with the pit lake. Concentrations of these parameters, shown in Table 8, are predicted to remain within the applicable water quality criteria[4]. Thresholds were established to meet the applicable water quality criteria at the effluent discharge point for most parameters. Mercury and sulphate concentrations at the effluent discharge point would be maintained at concentrations lower than the applicable water quality criteria during operations to mitigate the production of methylmercury[20].

Treated effluent would be discharged at a location approximately 500 metres southeast of the open pit in Blackwater Creek (Figure 7). The discharge is predicted to meet the *Metal and Diamond Mine Effluent Regulations* and other applicable water quality criteria[4]. It is predicted to increase the concentrations of parameters listed in Table 8 in Blackwater Creek from baseline concentrations.

Table 8 Maximum concentration of parameters in Blackwater Creek and pit lake

Parameter[a]	Baseline concentration	Predicted concentration during operations	Applicable water quality criteria[c]	*Metal and Diamond Mine Effluent Regulations* (Schedule 4)	Established thresholds at the effluent discharge point during operations	Established thresholds at the pit lake[b]
Antimony	0.00060	0.0051	0.020	-	0.020	0.020
Arsenic	0.0010	0.024	0.10	0.50	0.10	0.10
Chloride	1.03	28.3	120	-	120	120
Chromium	0.0010	0.0028	0.0089	-	0.0089	0.0089
Copper	0.0011	0.0020	0.0050	0.30	0.0050	0.0050
Cyanide	0.0020	0.0027	0.0050	1.0	0.0050	0.0050
Lead	0.0010	0.0019	0.0050	0.20	0.0050	0.0050
Mercury	0.000010	0.000010	0.00020	-	0.000010	0.00020
Sulphate	1.65	5.86	500	-	20	20

[20] Methylmercury is a toxic form of mercury for human consumption, which can bioaccumulate and biomagnify in fish tissue, particularly in predatory species like pike, walleye and bass.

Nitrate (as N)	0.030	3.01	13	-	13	13
Selenium	0.0050	0.027	0.10	-	0.10	0.10
Zinc	0.0033	0.0094	0.030	0.50	0.030	0.030

a – All concentrations of parameters are presented in milligrams per litre.
b – These concentrations would be met prior to pit lake's connection with the Blackwater Creek during abandonment.
c – The proponent committed to meeting Ontario Provincial Water Quality Objectives (PWQO) for all parameters, *Canadian Water Quality Guidelines for the Protection of Aquatic Life* values where no PWQO value exists and background if background concentrations are above the PWQO. For mercury, the proponent committed to meeting background concentrations and for sulphate, the concentrations would be kept less than 20 milligrams per litre.

As mitigation for changes in water quality of the Blackwater Creek during operations, contact water would be collected in four collection ponds scattered around the open pit and waste rock storage area (Collection Ponds # 1, 2A, 2B, 3 and 4 in Figure 7) and a mine water pond south of the tailings storage facility. Water collected in these ponds would be used to meet the requirements of the ore processing facility. Excess water would be sent to the effluent treatment plant and then discharged.

To collect the contact water for treatment and discharge, a mine water collection system would be established to capture seepage and surface runoff around the tailings storage facility, mine water pond, waste rock storage area, low-grade ore stockpile, overburden stockpiles and ore processing facility. All of the collection ditches would have erosion and sedimentation control measures, and collection ditches carrying contact water would be lined (Section 2.2). Seepage and surface runoff from the waste rock storage area and low-grade ore stockpile would be collected in segregated collection ponds (Collection Pond # 3 and 4, respectively), tested for acidity, and treated as necessary, prior to inclusion with the mine water collection system (Box 7.1-1). Process water and tailings would be treated for cyanide in the ore processing facility before they are discharged into the tailings storage facility (Box 7.1-1).

The tailings storage facility would be lined with a high-density polyethylene liner to prevent seepage entering the natural environment. The liner would reduce the seepage from the tailings storage facility from 200 cubic metres per day[21] to 3.13 cubic metres per day. The majority of this seepage would be captured by the mine water collection system, with 0.19 cubic metres per day (during operations) and 0.8 cubic metres per day (during decommissioning and abandonment) escaping into Blackwater Creek. The predicted concentrations of parameters during operations, as shown in Table 8, are expected to decrease during decommissioning and abandonment compared to levels during operations as the discharge of effluent ceases. All parameters would continue to remain within the Ontario Provincial Water Quality Objectives during decommissioning and abandonment.

To mitigate acid rock drainage in the tailings storage facility, during operations, the tailings would remain in a saturated state, and an oxygen-limiting barrier would be placed over the majority of the tailings.[22] Although a portion of the tailings beaches would be exposed to the atmosphere, the exposed

[21] Rate of seepage assumed for the tailings storage facility if there was no liner.

[22] The tailings would be isolated from the atmosphere by either a low permeability dry cover, or a wet cover of non-process water. Both cover scenarios were assessed in the Environmental Impact Statement, with a preference for a wet cover. The

tailings beaches would frequently be covered with fresh tailings, and tailings discharge location would be rotated using spigotting to limit exposure to oxygen, cover the exposed tailings evenly, and maintain the tailings beaches in a saturated condition.

Two options are being considered for covering the tailings storage facility at decommissioning and abandonment - the wet cover and dry cover option. If the preferred wet cover option is chosen, a layer of material (silt and sand) would be deposited over the tailings to physically isolate the tailings, supernatant water would be removed, and a layer of non-process water taken from the collection ponds and minewater pond would be added of sufficient depth to ensure that a water cover can be maintained during drought conditions (discussed in detail in Section 8.3). Therefore, the period of time when the tailings storage facility is susceptible to the onset of acid rock drainage during closure for both wet and dry cover options ranges from 6 months to 21 months, which is less than the predicted onset time for acid rock drainage of 24 months. A follow-up program (Box 7.1-2) would be implemented to verify the effectiveness of the oxygen-limiting barrier (wet or dry cover options) in mitigating changes in water quality of the surrounding waterbodies due to acid rock drainage.

The waste rock storage area would remain uncovered during operations, and it was assumed that the materials within the waste rock storage area would undergo acid rock drainage and metal leaching throughout operations.[23] Due to proximity of the waste rock storage area to the open pit, the majority of the seepage from the waste rock storage area during operations is predicted to be captured by the open pit. During decommissioning and abandonment, the waste rock storage area will be capped with a low-permeability and multi-layered cover, including a layer of overburden and vegetation.[24]This would minimize the generation of acid rock drainage, reduce the rate of seepage through the waste rock, and induce lateral movement so that the contact water is collected by the collection ditches and the open pit. Groundwater modelling predicted that the rate of seepage escaping the waste rock storage area would be 30 cubic metres per day during decommissioning and abandonment, of which 20 cubic metres per day would be captured by the open pit and 10 cubic metres per day would reach Thunder Lake. This seepage was assumed to be acidic and incorporated into the surface water quality assessment for Thunder Lake. The results showed that the parameters continue to remain largely unchanged from baseline conditions and within the applicable water quality criteria[4]. A follow-up program would be implemented to verify the effectiveness of the cover placed over the waste rock storage, as well as the predicted seepage quantity and quality from the waste rock storage area (Box 7.1-2).

At decommissioning and abandonment, supernatant water on the tailings storage facility, and surface water runoff and seepage from the tailings storage facility, waste rock storage area, minewater pond, and collection ponds would be redirected towards the open pit for filling. All the contact water would be

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detailed design of the oxygen-limiting barrier would be determined as part of the Certified Closure Plan pursuant to Ontario's *Mining Act*, administered by Ontario Ministry of Energy, Northern Development and Mines.

[23] The geochemical testing showed that the acid rock drainage for waste rock can happen within 2 years (24 months).

[24] For the multi-layered cover, the proponent would consider options such as lime addition, application of bacteriocides, phosphate, alkaline irrigation and oxygen-consuming organic covers in consultation with the Ontario Ministry of Energy, Northern Development and Mines as part of the application for the Certified Closure Plan pursuant to Ontario's *Mining Act.*

treated to meet the Ontario Provincial Water Quality Objectives, if necessary, prior to discharge into the open pit. Water in the open pit would be monitored to meet the concentrations of parameters identified in Table 8, and batch treatment of contact water would be conducted as necessary. When the open pit is filled and the water quality is demonstrated to meet the concentration of parameters identified in Table 8, the pit lake would be connected with Blackwater Creek through a channel.

Views expressed

Environment and Climate Change Canada; Ontario Ministry of Environment, Conservation and Parks; Wabigoon Lake Ojibway Nation and Eagle Lake First Nation expressed concerns with the use of reverse osmosis treatment technology for discharge of effluent in Blackwater Creek. Environment and Climate Change Canada noted that Natural Resources Canada expressed concerns that the contaminant concentrations in seepage may be underestimated, amplifying the concerns with the efficacy of effluent treatment process. Environment and Climate Change also reinforced concerns with the water quality modeling given omission of factors such as the release of acid rock drainage from low-grade ore. The proponent explained that the reverse osmosis treatment would be designed with back-up systems and the option of adding customizable and modular vendor packages like multimedia filtration prior to reverse osmosis. The proponent modelled the influent water quality, and presented data gathered from effluent treatment vendors to confirm that the chosen treatment method would have capacity to meet the requirements of Schedule 4 of the *Metal and Diamond Mine Effluent Regulations* under the *Fisheries Act,* and the applicable water quality criteria[4] for all parameters. The proponent would implement follow-up program measures to verify the water quality predictions, and ensure that the mitigation measures are effective as predicted.

Environment and Climate Change Canada and Natural Resources Canada questioned the proponent's conclusions that the concentrations of contaminants released into the surrounding environment from seepage would decrease during decommissioning and abandonment compared to levels during operations. This is because the minewater pond, which would be used to fill the open pit during decommissioning and abandonment, may contain seepage from the waste rock storage area and tailings storage facility and therefore could contain high concentrations of some contaminants. Environment and Climate Change Canada expressed uncertainty that the water in the pit lake would stratify, such that the contaminants settle to the bottom over time, once the pit lake is filled. The proponent predicted that over time, with the installation of mitigation measures such as the cover over the waste rock storage area, the inflow water quality to the pit lake would improve. The proponent also noted that a concentration density difference between water at the surface and water at depth could develop to a point that could maintain permanent stratification. Nevertheless, the proponent also noted that it would not connect the pit lake to the surrounding waterbodies until water quality criteria are met (Table 8).

Environment and Climate Change Canada; Natural Resources Canada; Ontario Ministry of Environment, Conservation and Parks; Ontario Ministry of Energy, Northern Development and Mines; Wabigoon Lake Ojibway Nation; Wabauskang First Nation; and Eagle Lake First Nation raised concerns related to the viability of the proposed wet cover for the tailings due to factors like progressive degradation of the liner and climate change. Environment and Climate Change Canada and Natural Resources Canada also stated that the measures proposed by the proponent to manage seepage and acid rock drainage might

require active human intervention in perpetuity. The proponent predicted that with the installation of the liner in the tailings storage facility, 3.13 cubic metres per day of seepage would escape into the natural environment from operations through abandonment. To assess worst-case scenarios, the proponent provided an assessment of changes to surface water quality of the surrounding waterbodies using the scenario of a degraded liner (seepage rate of 31.1 cubic metres per day) and a no-liner case (seepage rate of 200 cubic metres per day). In both scenarios, extreme weather events and climate change factors were also considered. The results showed that under both scenarios the concentrations of parameters remained below the Ontario Provincial Water Quality Objectives. The proponent predicted that the life of the liner would be over 400 years, with its life extended by covering the liner with a soil cover as soon as possible to prevent wrinkles due to potential changes in temperature, which could increase leakage. Environment and Climate Change Canada expressed concern that the worst-case scenarios related to acid rock generation were not properly characterized and therefore the concentrations of contaminants would be higher than predicted and more complex to treat. The proponent committed to creating an Independent Tailings Review Board composed of qualified third party experts who would provide oversight to ensure that tailings storage facility is designed to ensure that the predictions made in relation to water quality in the environmental assessment are met.

Environment and Climate Change Canada; Natural Resources Canada; Ontario Ministry of Energy, Northern Development and Mines; Ontario Ministry of Environment, Conservation, and Parks; and Wabauskang First Nation expressed uncertainties with the long-term viability and effectiveness of the cover that would be placed over the waste rock storage area during decommissioning. The proponent conducted a sensitivity analysis where the modelled rate of seepage through the waste rock storage area was increased to allow 50 percent of the precipitation falling on the waste rock storage area to infiltrate. The results showed negligible effects on downstream water quality receivers and the concentration of parameters would remain within the Ontario Provincial Water Quality Objectives. In addition, as part of the Certified Closure Plan pursuant to Ontario's *Mining Act,* the proponent committed to carefully considering factors that may contribute to deterioration of the cover of the waste rock storage area, such as effects of compacted clay layer associated with freeze thaw, the grade and length of slopes, and effects from frost, erosion, burrowing animals and human disturbance.

Environment and Climate Change Canada; Natural Resources Canada; and Ontario Ministry of Environment, Conservation, and Parks expressed uncertainty with the studies conducted by the proponent to determine the onset of acid rock drainage and the seepage quality in the tailings, waste rock, low-grade ore and underground mine walls. Environment and Climate Change Canada expressed concerns that the onset of acid rock drainage within these project components may be more rapid than predicted. The proponent committed to ongoing geochemical studies in accordance with the Mine Environment Neutral Drainage program's *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (2009)*, from operations to abandonment to refine the seepage and surface water quality modelling for the tailings storage facility, waste rock storage area and low-grade ore stockpile, and make adjustments to the mitigation measures, as necessary. The proponent also indicated that as part of the Certified Closure Plan pursuant to Ontario's *Mining Act,* the proponent would consider the feasibility of placing a benign layer of tailings in the tailings storage facility with options such as addition of lime, desulphurizing the tailings, or mixing a caustic material with the tailings during the final years of operations to delay the onset of acid rock drainage. Similarly, the proponent committed to implement a

multi-layer low-permeability cover over the waste rock storage area to minimize the generation and delay the onset of acid rock drainage. For this cover, the proponent committed to consider options such as lime addition, application of bacteriocides, phosphate, alkaline irrigation and oxygen-consuming organic covers in consultation with the Ontario Ministry of Energy, Northern Development and Mines as part of the Certified Closure Plan pursuant to Ontario's *Mining Act.*

Environment and Climate Change Canada, Natural Resources Canada and Eagle Lake First Nation raised concerns with the use and disposal of the low-grade ore if it was not used during operations, noting that the water quality model of the pit lake does not consider the addition of the low-grade ore, which could result in higher concentrations of contaminants than predicted. The proponent indicated that the low-grade ore stockpile would be gold-bearing and would normally be depleted during operations. Any low-grade ore that is not used during operations would be placed in the mined-out sections of the open pit where it will be covered with water once the open pit is allowed to flood. The proponent noted that the flooding of the pit involves monitoring of water quality, and treatment as needed, and the pit lake would only be connected with Blackwater Creek when the water quality thresholds are met (Table 8). Eagle Lake First Nation and Natural Resources Canada expressed concerns that low-grade ore can be exposed to the atmosphere and generate acid rock drainage. The proponent explained that the low-grade ore stockpile would be lined and a collection ditch would be established around it to control the flow of any seepage leading into the natural environment. The proponent also stated that as part of the Certified Closure Plan pursuant to Ontario's *Mining Act*, the proponent would be required to set aside sufficient funds with the Ontario Ministry of Energy, Northern Development and Mines to allow successful closure of the Project, including removal and appropriate disposal of the low-grade ore at the end of operations.

6.3 Terrestrial Environment

The Project could cause residual effects on the terrestrial environment through:

- Loss of habitat;
- Changes to quality and function of habitat; and
- Changes to the visual landscape.

The Agency's summary of the proponent's assessment of the changes to the terrestrial environment considers the views expressed by federal departments, provincial ministries and Indigenous communities. The Agency used this summary in its analyses of effects to fish and fish habitat (Section 7.1), migratory birds (Section 7.2), Indigenous use (Section 7.3), other effects related to federal decisions (Section 7.6) and species at risk (Section 8.1), including mitigation and follow-up program measures.

Description of the Existing Environment

The local and regional study areas for vegetation communities are shown in Figure 3. The regional study area of 313 848 hectares is located in the Lake Wabigoon Ecoregion and is characterized by upland forest (61 percent of the area), aquatic systems (21 percent) including wetlands (15 percent), and disturbed areas (three percent). Historically, human activities including logging, agriculture, mining, and

mineral exploration have disturbed vegetation communities within the regional study area. The regional study area provides suitable habitat for migratory birds (Section 7.2), wildlife that are of interest to Indigenous communities (Sections 7.3 and 7.4) and species at risk (Section 8.1).

6.3.1 Loss of Habitat

Proponent's Assessment of Environmental Effects, Mitigation and Monitoring

Approximately 334 hectares of upland, wetland, open water and disturbed habitat would be removed to accommodate the project components listed in Section 2.2. An additional 38 hectares would be indirectly impacted by noise and dust generation, as well as by alterations to wetland hydrology. Table 9 provides a summary of direct and indirect habitat loss from the Project categorized by habitat type. Indirect alterations to wildlife habitat quality and function are discussed in further detail in Section 6.3.2.

Table 9 Estimated loss of terrestrial wildlife habitat in the Project, Local and Regional Study Areas

Habitat type		Area of habitat in each study area (ha)			Direct loss of habitat (ha)	Indirect loss of habitat (ha)[b]	Area rehabilitated after decommissioning and abandonment (ha)	Permanent loss of habitat due to Project after rehabilitation (%)		
		PSA	LSA[a]	RSA				PSA	LSA	RSA
Upland	Coniferous forest	195	2415	101 807	195	13	19	*97*	*8*	*0.2*
	Deciduous forest	76	1184	79 132	76	8	17	*89*	*6*	*<0.1*
	Mixedwood forest	0	0	731	0	0	0	*0*	*0*	*0*
	Shrubland	2	59	3536	2	0	27	*0*	*0*	*0*
	Grassland	1	83	6304	1	0	183	*0*	*0*	*0*
	Barren	3	35	484	3	0	0	*100*	*7*	*0.5*
Upland Subtotal[c]		***278***	***3777***	***191 994***	***278***	***21***	***246***	***19***	***1***	***<0.1***
Wetland	Marsh	5	161	8347	5	0.2	24[d]	*0*	*0*	*0*
	Swamp – coniferous	24	574	22 770	24	8	8	*100*	4	0.1
	Swamp - deciduous	10	156	7274	10	6	6	*100*	7	0.1
	Fen	1	820	9685	1	1	0.5	*100*	0.2	<0.1
	Bog	0	0	29	0	0	0	*0*	*0*	*0*
Wetland Subtotal[c]		***41***	***1710***	***48 104***	***41***	***16***	***39***	***42***	***1***	***<0.1***
Disturbed		12	292	8474	12	1	67	*0*	*0*	*0*
Open Water		4	280	65 275	4	0.2	21	*0*	*0*	*0*
Total Habitat[c]		**334**	**6059**	**313 848**	**334**	**38**	**373**	**0**	**0**	**0**

RSA = regional study area; LSA = local study area; PSA = project study area; ha = hectares; % = percent.

[a]LSA excludes PSA.

[b]Indirect effects include noise and dust generation, and alterations to wetland hydrology. These effects would extend into the LSA and RSA.

[c]Subtotals and totals may not be exact due to rounding errors.

[d]The area of rehabilitated marsh includes the creation of marsh habitat as part of the fish habitat offsetting plan.

Despite the removal of terrestrial habitat, similar upland and wetland habitat would remain available within the local study area and regional study area during all phases of the Project. Progressive

rehabilitation of the project study area would be implemented to partially restore cleared areas, including the waste rock storage area, overburden stockpiles (as project components are filled to capacity) and roads used for project operations that are no longer required.[25] A total of 246 hectares of upland habitat and 39 hectares of wetland habitat in the project study area would be rehabilitated during decommissioning and abandonment, and may require multiple decades to mature as potential habitat. A follow-up program will be implemented to monitor rehabilitation during operations, decommissioning and abandonment until rehabilitation objectives are confirmed (Box 7.2-2).

Views expressed

Environment and Climate Change Canada and Eagle Lake First Nation expressed concerns with the spatial boundaries that define the project and local study areas, as well as the proponent's mapping and classification of habitat in these areas. The proponent expanded the project study area to include all project components and expanded the local study area to include the groundwater zone of influence. They also conducted additional surveys, reclassified the habitat to upland (coniferous, deciduous, mixed wood, shrubland, grassland, barren) and wetland (marsh, swamp, fen, bog) types, and revised the mapping and footprints of these habitat types (Table 9). The proponent reassessed the direct effects of the Project on wetland habitat loss using the updated maps.

6.3.2 Changes to quality and function of habitat

Proponent's Assessment of Environmental Effects, Proposed Mitigation, and Monitoring

Project activities may indirectly alter wildlife habitat quality and function as a result of vegetation clearing, dust and noise generation (Section 6.1), and disturbance to hydrological systems (Section 6.2). Although there may be localized effects to wildlife habitat within the project study area and local study area, habitat quality and function for wildlife across the regional study area would be maintained.

The existing habitat within the project study area is fragmented from harvesting, anthropogenic development, utility corridors and access roads. Project components have the potential to further reduce the connectivity of wildlife habitat, thereby restricting wildlife movement within the project study area and local study area. However, the Project is unlikely to impact overall connectivity in the regional study area.

Indirect effects to wildlife habitat from exposure to dust (Section 6.1) would be restricted within the local study area during construction, operation and decommissioning phases. An increase in dust from unpaved roads and blasting could cause a reduction in the quality and function of wildlife habitat. For example, increased dust may decrease the health of upland and wetland vegetation, and cause adverse effects to the health of herbivorous wildlife such as moose. However, dust would be controlled during all phases of the Project with the implementation of mitigation measures such as application of dust suppressants to haul roads (Section 6.1). Therefore, indirect effects to wildlife and wildlife habitat would be minimal.

[25] In accordance with the Certified Closure Plan pursuant to Ontario's *Mining Act* from the Ontario Ministry of Energy, Northern Development and Mines.

Increases in noise levels (Section 6.1) during construction, operation, and decommissioning would affect wildlife habitat quality and function but the effects would be restricted to the local study area and would cease at decommissioning. Noise abatement measures (such as using mufflers on equipment) and follow-up program measures would be implemented to limit and verify the effects of noise on migratory birds (Boxes 7.2-1 and 7.2-2), which would also be protective of wildlife (Section 7.3).

The Project would alter surface water and groundwater quality and quantity within the project study area and local study area during construction, operation, decommissioning, and abandonment (Sections 6.1 and 6.2). Wetland function within the local study area may be degraded due to changes to the quality and quantity of surface water and groundwater, but wetland function across the regional study area would be retained. Mitigation measures for wetland quality and function include erosion and sediment controls, and progressive rehabilitation of wetlands (Box 7.6-1).

Measures to manage invasive species would be implemented to prevent the establishment and spread of invasive species, and to promote recovery of wildlife habitat with native species. These measures would be implemented during construction, operation and decommissioning of the Project. Examples of these measures include washing all machinery and equipment off-site before entering the project study area, limiting vegetation removal and using herbicides to manage the spread of invasive species. The proponent would also conduct surveys of existing invasive species populations within the project study area prior to construction and continue monitoring throughout operations and decommissioning.

Views expressed

Eagle Lake First Nation requested that the proponent evaluate the effects of noise from project activities on wildlife habitat. The proponent completed this assessment, determining effects in terms of the amount of habitat lost from “indirect” effects, which also includes effects from dust, excess light and alterations to wetland hydrology. These are shown in Table 9.

Wabigoon Lake Ojibway Nation, Eagle Lake First Nation and Wabuskang First Nation expressed concern regarding the impacts of the Project on the quality and function of wetlands within the project, local and regional study areas. Eagle Lake First Nation requested that the proponent review the effects of dewatering activities in wetlands (i.e., changes in water levels) on wildlife habitat quality and function. The proponent stated that dewatering activities would impact wetlands associated with the portion of Blackwater Creek Tributary 1 that is adjacent to the project study area and the wetlands associated with Blackwater Creek Tributary 4 that are underlain by granular material (kame deposit). The proponent predicted that wetland areas associated with Thunder Lake, Wabigoon Lake and Hoffstrom’s Bay Tributary would not be impacted because changes in water levels and flows would be within the range of natural variation. A follow-up program would be implemented to monitor groundwater flows and levels to verify the predictions on surface water quantity at Blackwater Creek, Thunder Lake, Wabigoon Lake and Hoffstrom’s Bay (Box 7.1-2).

The Ontario Ministry of Natural Resources and Forestry informed the proponent that the Project would likely impact the quality and function of wetlands in Lola Lake Nature Reserve, a protected and extensive wetland area that is dominated by fen habitat and located in the local study area, approximately two kilometres northeast of the project study area. The Ontario Ministry of Natural Resources and Forestry requested the proponent to conduct hydrological studies and collect fen inventories in Lola Lake Nature

Reserve to understand the baseline conditions and to predict the effects of the Project. The proponent updated its groundwater modelling and indicated that Lola Lake Nature Reserve is located upstream of project components and would not receive effluent from the mine, and that water would not be withdrawn from its wetlands. The proponent also indicated that Lola Lake Nature Reserve is located outside of the zone of influence for groundwater drawdown, so dewatering activities would not affect water levels of its wetlands. The proponent has committed to develop mitigation measures and a monitoring program in consultation with Environment and Climate Change Canada and Ontario Ministry of Natural Resources and Forestry to verify the environmental assessment predictions related to Lola Lake Nature Reserve, as well as other wetlands within the local and regional study area (Box 7.6-2).

6.3.3 Changes to visual landscape

Proponent's assessment of environmental effects, mitigation and monitoring

The project study area is relatively flat, so project components such as the waste rock storage area, overburden stockpiles and low-grade ore stockpile would be visible from some areas of Thunder Lake from the operation phase through the abandonment phase. These project components would not be visible from Wabigoon Lake. Potential changes to the visual landscape would be managed by reducing the overall height of visible project components to the extent possible, maintaining a natural looking slope for the stockpiles, and vegetating the overburden stockpile and waste rock storage area. The construction and vegetation, as part of progressive rehabilitation, of the waste rock storage area would begin on its western edge, to improve its aesthetics when viewed from Thunder Lake. The low-grade ore stockpile would be processed during the operation phase (when underground mining would occur), and any remaining stockpile material would be placed in the open pit during decommissioning.

Views expressed

Wabigoon Lake Ojibway Nation indicated that the view of Thunder Lake has cultural significance to elders of the community and expressed concerns related to alterations to this visual landscape. Members of the public who live close to the Project indicated that the visual appeal of the area would be reduced due to the mounds of processed materials. The proponent conducted visual analyses of the waste rock storage area from various locations of Thunder Lake and determined that the waste rock storage area would likely be indistinguishable from the landscape once it is fully vegetated. The views expressed by Indigenous communities on the visual landscape in relation to land use and resources for traditional purposes are discussed in Section 7.3.

7 Predicted Effects on Valued Components

7.1 Fish and Fish Habitat

The Project could cause residual effects on fish and fish habitat through:

- fish mortality and fish health; and
- loss or alteration of fish habitat.

The Agency is of the view that the Project is not likely to cause significant adverse effects on fish and fish habitat, after taking into account the proposed key mitigation measures (Box 7.1-1). The Agency recommends follow-up program measures (Box 7.1-2) to evaluate the accuracy of the predictions related to fish and fish habitat, and to determine the effectiveness of mitigation measures proposed to minimize effects on fish and fish habitat.

The Agency's summary of the proponent's assessment on the effects to fish and fish habitat considered the views expressed by Indigenous communities, provincial ministries, as well as Environment and Climate Change Canada, Natural Resources Canada, and Fisheries and Oceans Canada.

Description of the Existing Environment

Fish species in Blackwater Creek (Figure 2) include Northern Redbelly Dace, Finescale Dace, Pearl Dace and Brook Stickleback. Blackwater Creek also serves as a potential spawning habitat for White Sucker. The main branch of the creek and its tributaries have extensive beaver activity.

A wetland habitat along the shore of Thunder Lake, Little Creek and Hoffstrom's Bay Tributary provides a suitable habitat for Northern Pike spawning. The dominant fish species in Little Creek and Hoffstrom's Bay include Finescale Dace, Pearl Dace and Brook Stickleback. Beaver activity is also common in both Little Creek and Hoffstrom's Bay Tributary.

Thunder Lake Tributaries 2 and 3 have dams that block upstream fish migration. Thunder Lake Tributary 2 also has falls downstream from the dam that pose a barrier to upstream fish migration. Some areas of Thunder Lake Tributaries 2 and 3 are suitable for White Sucker and Walleye spawning. The common fish species in these tributaries include Fathead Minnow, Pearl Dace, Finescale Dace and Brook Stickleback. No fish species at risk have been documented, and are not anticipated to be found in the local study area.

7.1.1 Fish mortality and fish health

Proponent's assessment of environmental effects, mitigation and monitoring

Fish mortality due to construction of project components in or near waterbodies, blasting at the open pit and water withdrawal are expected to be negligible after the implementation of mitigation measures. Negligible effects on fish health are predicted from increases in contaminant concentrations

in Blackwater Creek (Section 6.2.3) due to discharge of effluent during operations, seepage[26] from operations to abandonment, and connection of Blackwater Creek with the pit lake at abandonment.

Construction of project components in the project study area, such as the tailings storage facility, mine water pond, berms and collection ditches (Section 2.2), would result in overprinting of portions of Blackwater Creek Tributaries 1 and 2. Blackwater Creek Tributary 1 would also be affected by the blasting in the open pit and associated underground mine. Combined, overprinting and blasting activities could cause mortality to 50 percent of the fish that are found in overprinted portions of Blackwater Creek Tributaries 1 and 2.[27] Measures would be implemented to salvage and relocate fish to an appropriate location prior to overprinting portions of these waterbodies according to relocation measures to be developed pursuant to the *Fisheries Act* (Box 7.1-1). Blasting at the open pit would be controlled to reduce fish mortality or injuries to fish in Blackwater Creek Tributary 1. A follow-up program would be implemented to verify the effectiveness of the mitigation measures to protect fish and fish habitat from blasting activities (Box 7.1-2).

As discussed in Sections 2.2 and 6.2, water would be taken from the Tree Nursery ponds of Thunder Lake Tributaries 2 and 3 for use at the ore processing facility. Water withdrawal activities could cause entrainment and impingement of fish, and result in mortality of fish at the Tree Nursery ponds. To mitigate this, fish screens would be installed at the water intake structures (Box 7.1-1).[28]

The discharge of treated effluent and seepage into Blackwater Creek during operations would result in an increase in concentration of parameters above baseline levels but within the applicable water quality criteria[4] (Section 6.2). Effluent would be treated to mitigate changes in water quality that could affect fish health in Blackwater Creek, and monitored to comply with Schedule 4 of the *Metal and Diamond Mine Effluent Regulations* and other applicable water quality criteria[4]. Additionally, contact water would be collected to mitigate changes in the water quality of Blackwater Creek and other waterbodies in the project and local study areas, such as Thunder Lake Tributaries 1 and 2, Little Creek, Hoffstrom's Bay Tributary, Thunder Lake and Wabigoon Lake (Box 7.1-1).

Monitoring of groundwater and surface water would be conducted from operations to abandonment at Blackwater Creek, Thunder Lake Tributaries 1 and 2, Little Creek, Hoffstrom's Bay Tributary, Thunder Lake and Wabigoon Lake. Fish health surveys would also be conducted in the same waterbodies to verify the environmental assessment prediction that fish health would not be adversely affected by changes in water quality (Box 7.1-2).

During abandonment, Blackwater Creek would be connected with the pit lake through a channel, after the water quality is demonstrated to meet the concentrations of parameters identified in Table 8. The water in the open pit would be monitored as it is filling, and continue to be monitored after it is filled

[26] Seepage is expected from the tailings storage facility, waste rock storage area, low-grade ore stockpile and overburden stockpiles.

[27] The portion of Blackwater Creek Tributary 1 that would be overprinted due to construction project components is largely the same as the portion that would be affected by blasting of the open pit.

[28] Fish screens would be installed in accordance with Fisheries and Oceans Canada's Freshwater Intake End-of-Pipe Fish Screen Guideline and pursuant to the *Fisheries Act* requirements to avoid serious harm to fish.

and connected with Blackwater Creek, to determine whether batch treatment would be required to ensure compliance with the established water quality thresholds (Table 8) at the pit lake (Box 7.1-2).

Views Expressed

Environment and Climate Change Canada, Ontario Ministry of Environment, Conservation and Parks, Eagle Lake First Nation, Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation, Asubpeeschoseewagong Netum Anishinabek, and Métis Nation of Ontario raised concerns related to the production of methylmercury in Blackwater Creek due to the discharge of effluent. Ontario Ministry of Environment, Conservation and Parks also noted that mercury is considered a hazardous substance under Policy 4 of the Ontario Provincial Water Quality Objectives.[29] The proponent committed to treating the effluent discharged into Blackwater Creek to ensure that mercury concentration does not exceed the baseline concentration of 0.00001 milligrams per litre, and sulphate concentration does not exceed 20 milligrams per litre[30]. The proponent also proposed follow-up program measures to verify that changes in surface water quantity and quality do not adversely affect the fish health (Box 7.1-2).

Agency Analysis and Conclusion

The Agency is of the view that the Project is not likely to cause significant adverse effects on fish mortality and fish health after taking into account the implementation of mitigation measures described in Box 7.1-1. The Agency recommends follow-up program measures in Box 7.1-2 to evaluate the accuracy of the predictions and the effectiveness of mitigation measures related to fish mortality and fish health.

The Agency notes that the overprinting of waterbodies, blasting at the open pit, and inadvertent impingement and entrainment of fish in the water intake structures could result in fish mortality in the project study area. The Agency also acknowledges that the proponent has proposed mitigation measures to ensure that these effects would not change the overall health of fish within the local study area. The proponent would relocate fish from waterbodies overprinted by project components, or affected by blasting, to minimize serious harm to fish.

While fish health could be affected due to changes in water quality, these effects would not change the overall population levels of fish within the local study area. The proponent would mitigate the effects on fish in the Blackwater Creek by managing water quality as discussed in Section 6.2. The proponent would meet Schedule 4 of the *Metal and Diamond Mining Effluent Regulations* and other applicable water quality criteria[4] during operations for all parameters. After effluent discharge ceases in Blackwater Creek, federal and provincial regulatory requirements would continue to apply during decommissioning

[29] Policy 4 ensures that special measures are taken on a case-by-case basis to minimize the release of hazardous substances that have not been banned. For these hazardous substances, it is not appropriate to use the assimilative capacity of receiving waters and mixing zones to attenuate the treated wastes. https://www.ontario.ca/page/water-management-policies-guidelines-provincial-water-quality-objectives

[30] Ullrich, 2001 and Jeremiason et al. 2006 indicated that the rates of methylmercury production increases when sulphate concentrations are in the range of 20 and 50 milligrams per litre. The proponent committed to treatment of effluent such that the sulphate concentration in the effluent is below 20 milligrams per litre.

and abandonment.[31] The Agency agrees with the views expressed by Environment and Climate Change Canada and Natural Resources Canada (Section 6.2.3) that the measures proposed by the proponent to manage acid rock drainage and seepage from the waste rock storage area and the tailings storage facility might require active human intervention in perpetuity. The Agency also notes that the concerns regarding viability of the wet cover option over the tailings management facility (Section 6.2) were factored into the proponent's water quality assessment through inclusion of drought and flooding conditions in the proponent's modelling (discussed in detail in Section 8.3). The Agency is aware that as part of the Certified Closure Plan pursuant to Ontario's *Mining Act,* the proponent would be required to provide financial assurance, which will take into account rehabilitation activities that may require long-term monitoring and intervention.[32] The Agency recommends follow-up program measures (Box 7.1-2) to verify the proponent's prediction that water quality in the local study area would remain protective of fish health, to evaluate the effectiveness of the mitigation measures on fish health and to determine the need for adaptive management measures.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of effects of the Project on fish mortality and fish health would be low since effects on individual fish are not expected to affect the regional health and populations of fish. The geographic extent would be moderate, extending into the local study area. The duration of the effects would be long-term, occurring into abandonment. The effects would occur intermittently and are reversible once project activities cease. The timing of project activities would be rated as moderate, as it may affect some sensitive activities in the fish lifecycle, such as spawning.

7.1.2 Loss or alteration of fish habitat

Proponent's assessment of environmental effects, mitigation and monitoring

Effects on fish habitat would occur as a result of habitat loss and alteration due to construction of project components. Table 10 summarizes the anticipated habitat losses either from overprinting or from changes in water levels and flows in the local study area.

In-stream activities during construction of project components would cause loss or alteration of waterbodies and would be conducted in accordance with the applicable provincial guidelines[33]. Effects

[31] Provincial regulations would continue to enforce water quality requirements for releases from the Project through an Environmental Compliance Approval pursuant to the Ontario *Water Resources Act*. These requirements would be incorporated into the Closure Plan pursuant to the Ontario's *Mining Act*. These requirements are likely to be more stringent than the requirements of the *Metal and Diamond Mining Effluent Regulations* under the *Fisheries Act.*

[32] Financial Assurance, as part of the Certified Closure Plan, is a financial guarantee held by the Ministry of Energy, Northern Development and Mines, which equals the cost of the rehabilitation work required for the Project. https://www.mndm.gov.on.ca/en/mines-and-minerals/mining-sequence/evaluation/advanced-exploration/financial-assurance

[33] Ontario Ministry of Natural Resources and Forestry has guidelines to restrict in-water work during certain periods to protect fish during spawning migrations and other critical life stages. https://www.ontario.ca/document/water-work-timing-window-guidelines

on fish habitat from potential erosion and sedimentation would be mitigated by standard sedimentation control measures, including the use of sediment traps, and rip-rap[34] and non-woven geotextile over the geosynthetic liner within the collection ditches (Box 7.1-1)

Any loss or permanent alteration of fish habitat that cannot be avoided or mitigated would require an offsetting plan as part of an application for authorization under the *Fisheries Act.* An equal or greater area of fish habitat would be created as part of the offsetting plan. As any new habitats would require time to establish, a follow-up program would be undertaken to ensure that the fish habitat created as part of the offsetting plan is functioning as intended, and adjustments would be made as necessary.

Table 10 Loss of fish habitat due to construction of project components

Waterbody/Wetland	Description of impact to fish habitat	Area (square metres)
Blackwater Creek Tributary 1	Permanent loss of fish habitat due to overprinting by project components and a permanent alteration of fish habitat due to flow reduction.	39 483
Blackwater Creek Tributary 2	Permanent loss of fish habitat due to overprinting by project components and a permanent alteration of fish habitat due to flow reduction.	5238
Unnamed Tributary to Blackwater Creek	Permanent alteration of fish habitat due to flow reduction.	327
Blackwater Creek Tributary 4 and WLD5	Permanent loss of the fish habitat due to dewatering of the open pit draining the open water within.	6657
Hoffstrom's Bay Tributary	Permanent loss of fish habitat due to overprinting by project components and a permanent alteration of fish habitat due to flow reduction.	3096
Total		**54 801**

Views Expressed

Eagle Lake First Nation raised questions regarding potential effects on fish habitat from the Blackwater Creek Tributary 2 diversion channel (Section 2.2). The proponent explained that the Blackwater Creek Tributary 2 diversion channel is one of the options that will be presented to Fisheries and Oceans Canada and Environment and Climate Change Canada as part of the fish habitat offsetting plan to counterbalance the loss of fish habitat presented in Table 10. The proponent further indicated that the Blackwater Creek Tributary 2 diversion channel will be designed and constructed to emulate the natural habitat upstream of the diversion channel, and will be able to accommodate both low and high-flow conditions to allow fish passage.

[34] Rip-rap consists of a layer of large stones interlocked together that are used to manage erosion in areas of concentrated runoff.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of mitigation measures described in Box 7.1-1 and the follow-up program measures in Box 7.1-2, the Project is not likely to cause significant adverse effects on fish habitat. The Agency notes that the Project could have adverse effects on fish habitat from the construction of project components and that the proponent has committed to implementing a fish habitat offsetting plan to meet federal regulatory requirements.[35] In addition, the Agency recommends that the follow-up program evaluate the effectiveness of the measures to offset fish habitat.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of effects of the Project on fish habitat would be low, as any loss of fish habitat due to the Project would be counterbalanced by the fish habitat offsetting plan (Table 10). The geographic extent would be moderate, as the effects would extend into the local study area. The duration of the effects would be medium-term, as habitat created as part of the fish habitat offsetting plan would be established around the same time as the loss of habitat but would require time during operations to become fully established and functional. The frequency of the effect would be continuous and reversible, as the habitat gains expected from the created habitats through the offsetting plan would counterbalance any habitat losses in the long-term. The timing of project activities would be rated as inconsequential, as project activities in or near waterbodies would be conducted during the fisheries timing window and would not affect sensitive activities in the fish lifecycle.

Box 7.1-1: Key mitigation measures to address effects on fish and fish habitat

Mitigation Measures for fish mortality and fish health

- Salvage and relocate fish before any work is conducted in or near water during construction and operations through a fish salvage and relocation plan conducted in accordance with the *Fisheries Act* requirements to avoid serious harm to fish.
- Install screens on the water intake structures in the Tree Nursery ponds of Thunder Lake Tributaries 2 and 3, in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* and pursuant to the *Fisheries Act* requirements to avoid serious harm to fish.
- Control acid rock drainage and metal leaching, in consultation with relevant authorities, during all phases of the Project such that all effluent and seepage from the Project comply with Schedule 4 of the *Metal and Diamond Mine Effluent Regulations* and the *Fisheries Act*. The Proponent shall implement, at a minimum, the following mitigation measures:
    - Design and construct the project components, including the tailings storage facility, and mine water collection system to accommodate 1-in-100 dry year conditions, and the Environmental Design Storm events described in Table A of the Additional Clarification Requests in the May 14, 2019 email [36];

[35] Under section 35 of the Fisheries Act, Fisheries and Oceans Canada requires an offsetting plan, and Environment and Climate Change Canada requires a fish habitat compensation plan under the Metal and Diamond Mining Effluent Regulations. In both cases, the purpose is to counterbalance the loss of fish habitat.

[36] Submitted to the Agency as part of the clarification questions on the response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 36).

- Avoid using potentially acid generating material for any construction purposes;
- Install a liner underneath the low-grade ore stockpile and in the tailings storage facility prior to the deposition of any ore or tailings, respectively, to reduce seepage;
- Place the remaining low-grade ore into the open pit during decommissioning;
- Cover the tailings with an oxygen-limiting barrier before the onset of acid rock drainage, maintain the oxygen-limiting barrier to avoid acid rock drainage and maintain the tailings in a isolated state during all phases of the Project; and
- Cover the waste rock storage area with an oxygen-limiting barrier during decommissioning and abandonment to avoid acid rock drainage.

- Manage water quality in mine effluents to meet the *Metal and Diamond Mining Effluent Regulations*; and to meet the requirements of the *Fisheries Act* in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary and Little Creek, while taking into account the Canadian Council of Minister of the Environment's *Canadian Water Quality Guidelines for Protection of Aquatic Life*. This includes, but may not be limited to:
  - Intercept and collect surface water runoff and seepage, from operations through abandonment, from the waste rock storage area, overburden stockpiles, low-grade ore stockpile and tailings storage facility through the mine water collection system, and treat as necessary prior to discharging excess water into Blackwater Creek;
  - Intercept and collect the seepage and runoff, from operations through abandonment, from the low-grade ore stockpile and waste rock storage area in a segregated pond, test and treat the collected water for acid rock drainage as needed, prior to integrating the collected water with the mine water collection system;
  - Install a liner in the contact water collection ditches to minimize seepage during all phases of the Project and in consultation with relevant authorities; and
  - During decommissioning and abandonment, collect and treat the contact water around the waste rock storage area, tailings storage facility, low-grade ore stockpile and overburden stockpiles, and direct it to the open pit.
- Develop a recovery strategy, to be implemented in the event of a tailings breach, which includes cleaning of any tailings spilled within one year of a breach, to prevent the onset of acid rock drainage.

Mitigation Measures for loss or alteration of fish habitat

- Implement an offsetting plan for any serious harm to fish caused by the Project, pursuant to the *Fisheries Act*, and a fish habitat compensation plan for any fish habitat losses related to contact water disposal for the Project, pursuant to section 27.1 of the *Metal and Diamond Mining Effluent Regulations*. These plans would be developed with Fisheries and Oceans Canada and with Environment and Climate Change Canada, and through engagement with Indigenous communities.
- Conduct any in-stream work required for construction and maintenance of project components during the fisheries timing window determined in consultation with the Indigenous communities and relevant authorities.
- Apply erosion and sediment control measures during construction, operation and decommissioning, within the contact water collection ditches, in accordance with the requirements of the *Fisheries Act*.

Box 7.1-2: Follow-up program measures recommended for fish and fish habitat

Follow-up program measures to address effects on fish and fish habitat

- Develop and implement, in consultation with Fisheries and Oceans Canada, a follow-up program to verify effectiveness of the mitigation measures in relation to the proposed blasting at the open pit during construction and operations for avoiding serious harm to fish, pursuant to the *Fisheries Act*.
- Implement, during construction and operations, quantitative monitoring measures for fish habitat creation described in the offsetting plan pursuant to the *Fisheries Act,* and in consultation with the Indigenous

communities and Fisheries and Oceans Canada, to assess whether the created habitats are functioning as intended. In the event that measures described in the plan are ineffective, the proponent would implement adaptive management measures as required under the *Fisheries Act*.

- Monitor, during operations and in real-time, daily inflows from the Thunder Lake Tributaries 2 and 3 into the Tree Nursery ponds, to ensure that the water withdrawal from the Tree Nursery ponds does not exceed 5 percent of the daily inflows.
- Conduct fish health surveys, from operations to abandonment, and in consultation with Indigenous communities, Environment and Climate Change Canada and relevant authorities, to comply with the *Fisheries Act* and with the *Metal and Diamond Mine Effluent Regulations*, including the Environmental Effects Monitoring, to verify that the changes in surface water quantity and quality in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Thunder Lake and Wabigoon Lake do not cause adverse effects on fish and fish habitat. The follow-up program measures should include, at a minimum:
    - Monitor concentration of parameters in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Thunder Lake and Wabigoon Lake to verify the environmental assessment predictions in Tables W9-1 to W9-3 in the Water Addendum (R.3)[37].
    - Monitor surface water flows and levels in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary and Little Creek to verify the environmental assessment predictions listed in Table 7; and
    - 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.
- Implement, during all phases, a seepage and surface water quality monitoring program upgradient, downgradient and cross-gradient of the tailings storage facility, minewater pond, waste rock storage area, overburden stockpiles, low-grade ore stockpile and underground mine to evaluate the effectiveness of mitigation measures that are necessary to protect fish and fish habitat. 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 magnitude and onset of acid rock drainage and its impact on groundwater and surface water quality of Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay, Little Creek, Wabigoon Lake and Thunder Lake. Use the results of the ongoing geochemical testing to adjust the mitigation measures for the tailings storage facility and waste rock storage area, as necessary;
    - Monitor groundwater flows, levels and quality to understand impacts on surface water quality, and to verify that the predicted groundwater concentrations of parameters in Table W8-1 and W8-3 in the Water Addendum (R.3)[37] are not exceeded, so as to avoid degradation of surface water quality of Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Wabigoon Lake and Thunder Lake. In the event monitoring data shows degradation of groundwater, construct adaptive management measures and monitor their effectiveness.
- Monitor, and treat if necessary, during decommissioning and abandonment and in consultation with Indigenous communities, Environment and Climate Change Canada 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, prior to its connection with Blackwater Creek, does not exceed the concentrations of parameters

[37] Water Addendum (R.3) was submitted to the Agency as part of response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 33).

in Table W6-3 in the Water Addendum (R.3)[37]. Where treatment is not effective, implement adaptive management measures, and monitor their effectiveness.

7.2 Migratory Birds

The Project could cause residual effects on migratory birds through:

- Exposure to contaminants in project components with open water;
- Increased risk of collisions with vehicles; and
- Loss of nests or critical habitat.

The Agency is of the view that the Project is not likely to cause significant adverse effects on migratory birds, after taking into account the proposed key mitigation measures (Box 7.2-1). The Agency recommends follow-up program measures (Box 7.2-2) to evaluate the accuracy of the predictions related to migratory birds and to determine the effectiveness of mitigation measures proposed to minimize adverse effects on migratory bird from project activities. Non-migratory birds that are species at risk are discussed in Section 8.1.

The Agency's conclusions are based on its analysis of the proponent's assessment as well as the views expressed by Environment and Climate Change Canada, the Ontario Ministry of Natural Resources and Forestry and Indigenous communities.

Description of the Existing Environment

There are 81 species of migratory birds listed under the *Migratory Birds Convention Act* (1994) that were identified within the regional study area, of which six are listed as threatened or of special concern under Schedule 1 of the *Species at Risk Act* (2002) (Table 11). Potential habitat for an additional five migratory birds that are species at risk were identified within the regional study area, but none of those species were observed during field studies (Table 11).

Habitat for migratory birds include all habitat types described in Table 9, including upland coniferous, deciduous and mixedwood forests (e.g., Canada Warbler[38] habitat), grasslands (e.g., Common Nighthawk[39] habitat), shrublands (e.g., Yellow Rail[40] habitat), barren lands (e.g. Eastern Whip-poor-will[41] habitat), wetlands and open water (e.g., waterfowl habitat), and disturbed areas (e.g., Barn Swallow habitat[42]).

[38] *Cardellina canadensis*

[39] *Chordeiles minor*

[40] *Coturnicops noveboracensis*

[41] *Antrostomus vociferous*

[42] *Hirundo rustica*

7.2.1 Exposure to contaminants in project components with open water

Proponent's assessment of environmental effects, mitigation and monitoring

Project components with open water that are predicted to have elevated contaminant levels (i.e., tailings storage facility, onsite ponds, and the pit lake) could have adverse effects on the health of migratory birds. These effects could occur during operations and decommissioning (from exposure to tailings storage facility and onsite ponds) as well as during abandonment (from exposure to the pit lake). Short-term exposure to open water from operations to abandonment is not expected to cause mortality or affect migratory bird populations.

The tailings storage facility and onsite ponds would be used to manage mine water throughout operations. The predicted water quality of the tailings storage facility during operations would not harm migratory birds with the exception of Barn Swallows, as Barn Swallows have more conservative and protective guidelines as a species at risk. The predicted concentrations of cyanide in the tailings storage facility exceed the allowable limit for birds that are species at risk (the "no observable effect level[43]"). A follow-up program would be conducted to monitor the use of the tailings storage facility (as well as the pit lake and onsite ponds) by migratory birds from operations to abandonment. If migratory birds, including Barn Swallows, are observed to use the tailings storage facility or the concentrations of contaminants in the tailings storage facility are higher than predicted, adaptive management measures such as bird deterrents would be implemented to discourage use of the tailings storage facility.

During decommissioning and abandonment, the onsite ponds would be decommissioned and rehabilitated, which would ensure that water quality meets the requirements set in accordance with the Certified Closure Plan pursuant to Ontario's *Mining Act* (Section 6.2). During decommissioning, the supernatant water in the tailings storage facility would be treated and drained into the open pit (Section 6.2). Therefore, the pit lake would provide habitat for migratory birds during abandonment, upon filling of the open pit. Adverse effects to migratory birds exposed to the pit lake during abandonment are not expected as the water in the pit lake will be treated and monitored (Section 6.2). If water from the pit lake does not meet the applicable water quality guidelines[44], contingency treatment would be applied. Therefore, during all phases, the water quality of project components with open water is not expected to pose acute lethality to individual migratory birds or affect migratory birds at a population level.

Views Expressed

Environment and Climate Change Canada, the Ontario Ministry of Natural Resources and Forestry, Naotkamegwanning First Nation, Métis First Nation, Eagle Lake First Nation and Wabigoon Lake Ojibway Nation commented that the predicted water quality in the tailings storage facility, onsite ponds, and pit lake may pose a risk to migratory birds and requested further assessment of the potential effects on migratory birds that may use these waterbodies. In response, the proponent revised their risk assessment which included assessing additional contaminants of concern. The proponent also

[43] Highest concentration at which there is no observed adverse effect.

[44] The established thresholds for water quality parameters in the pit lake are listed in Table 8 of this report.

committed to implementing mitigation measures (e.g., installation of bird deterrents) to restrict access of migratory birds to the project components with open water if water quality exceeded relevant water quality guidelines (Section 6.2). Environment and Climate Change Canada recommended that the proponent monitor all project components with open water for use by migratory birds to ensure that adverse effects to migratory birds are avoided. The proponent committed to implementing a follow-up program in which the mitigation measures will be monitored for their effectiveness in discouraging migratory birds from accessing the open water.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of the key mitigation measures described in Box 7.2-1 and the follow-up program measures in Box 7.2-2, the Project is not likely to cause significant adverse effects on migratory birds due to interactions with the project components with open water.

The tailings storage facility, onsite ponds, and pit lake may contribute to adverse effects to the health of migratory birds that use these waterbodies during the operation, decommissioning, and abandonment phases. The Agency recommends follow-up program measures to monitor the use by migratory birds of project components with open water during operations at the tailings storage facility and onsite ponds, and during decommissioning and abandonment at the pit lake (Box 7.2-2). If water quality of the open water features does not meet the applicable water quality guidelines, adaptive management measures (water treatment as discussed in Section 6.1 and bird deterrents) would be implemented to address the potential effects of exposure to elevated contaminant levels on migratory birds.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of the effect on migratory birds is considered low as there is minimal likelihood of mortality or harm to migratory birds. The geographic extent for the residual effect is associated with project components within the project study area and is therefore rated as low. The duration would be long-term as the effect would occur throughout project operation, decommissioning and abandonment, and the frequency would be rated as continuous. The effect would be reversible as the effect is predicted to cease once the water quality in the tailings storage facility, onsite ponds and the pit lake meet the applicable water quality guidelines.

7.2.2 Increased Risk of Collisions with Vehicles

Proponent's assessment of environmental effects, mitigation and monitoring

The Project would result in increased traffic during the construction, operation and decommissioning phases. As a result, vehicle collisions with wildlife, including migratory birds, may increase. The proponent anticipates that this effect would be low for most migratory bird species. However, aerial insectivores that forage within anthropogenic habitat such as Common Nighthawk would have a moderate risk of mortality from vehicle collisions. Wildlife-vehicle collisions would be recorded during all phases of the Project (Box 7.2-2). If collisions between project vehicles and migratory birds are recorded within the project study area, the proponent will develop and implement adaptive management

measures to avoid collisions. These mitigation measures may include reducing speed limits on roads used for project operations within the project study area.

Views Expressed

Métis Nation of Ontario expressed concern with the potential of migratory bird mortality due to vehicular collisions and requested the proponent to assess this risk and its effects. Environment and Climate Change Canada recommended that a follow-up program should be implemented to assess Common Nighthawk activity along roads within the project study area. Where Common Nighthawk are observed roosting along roads, Environment and Climate Change Canada suggests deployment of additional mitigation measures, including scheduling traffic to avoid peak Common Nighthawk activity periods. The proponent agrees to complete surveys for Common Nighthawk along roads within the project study area and implement adaptive management measures as necessary prior to construction and during construction, operation and decommissioning phases.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of the key mitigation measures described in Box 7.2-1 and the follow-up program measures in Box 7.2-2, the Project is not likely to cause significant adverse effects on migratory birds due to increased vehicle traffic in the project study area.

The Agency notes that increased vehicle traffic may result in adverse effects to migratory birds. Follow-up program measures to monitor Common Nighthawk activity and vehicle-wildlife collisions along roads would be implemented during project operations within the project study area and the potential for collisions between migratory birds and vehicles would be reduced, if required, with the implementation of adaptive management measures.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of the effects of vehicular collision on migratory birds would be moderate, since Common Nighthawk use roads as foraging habitat. The geographic extent would be low, as it is associated with roads within the project study area. The duration of the effect would be medium-term, as the effect would last throughout construction, operations and decommissioning phases with continuous frequency. The effect would be considered reversible as the effect would end once vehicle traffic in the project study area ceases.

7.2.3 Loss of Nests or Critical Habitat

Proponent's assessment of environmental effects, mitigation measures and monitoring

Direct and indirect[45] habitat losses may impact migratory birds, including their nests and eggs (Table 11). As described in Table 9, there will be removal of 334 hectares of upland, wetland, disturbed and open

[45] Indirect habitat loss refers to displacement of migratory birds or alteration of habitat due to changes to the environment such as noise, dust, light, or alterations to wetland hydrology.

water migratory bird habitat from the project study area during construction. In addition, approximately 38 hectares of habitat may be indirectly altered as a result of noise, dust, light or alterations to wetland hydrology, which could decrease the quality of migratory bird habitat and alter movement and behaviour. Groundwater drawdown associated with dewatering the open pit may result in indirect loss and alterations of wetland habitat within the local study area (Section 6.2).

In assessing effects of habitat loss, migratory birds were categorized based on two types of habitat: upland (which includes upland forests, grasslands, shrublands, barren lands) and wetland (which includes wetlands and open water) (Table 11). Species-specific assessments were also conducted on migratory birds that are identified as species at risk and found within the local study area (Barn Swallow, Canada Warbler, Common Nighthawk, Eastern Whip-poor-will, Olive-Sided Flycatcher[46] and Wood Thrush[47]) or are likely to occur within the local study area (Bobolink[48], Chimney Swift[49], Eastern Wood-pewee[50], Least Bittern[51] and Yellow Rail) (Table 11).

Table 11 Predicted loss of suitable migratory bird habitat in the local and regional study areas

Migratory bird	Suitable habitat	Construction and Operations			Post-Abandonment (Post-Rehabilitation)	
		Maximum Direct Loss (ha)	Maximum Indirect Loss (ha)[a]	Habitat Loss within the RSA (%) prior to rehabilitation	Irreversible habitat loss (ha)	Habitat loss within RSA (%)
Migratory birds grouped by habitat type						
Upland birds	• upland forests • grasslands • shrublands • barren	278	21	0.2	53	<0.1
Wetland birds	• wetlands • open water	39[b]	16	<0.1	0.4	0
Migratory bird species at risk observed within the LSA						
Barn Swallow	• artificial structures for nesting and roosting	1[c]	0	<0.1	1[c]	<0.1
	• foraging habitat	24	3	<0.1	0	0
Canada Warbler	• upland forests	271	21	0.2	37	0.1
Common Nighthawk[a]	• open habitat • disturbed areas • regenerating forests	18	2	0.1	0	0
Eastern Whip-poor-will	• regenerating forests • disturbed areas • barren	2	0	<0.1	0	0
Olive-sided Flycatcher	• sparse forests • disturbed areas • regenerating forests	195	13	0.2	188	0.2
Wood Thrush	• deciduous and mixedwood forests	76	8	0.1	67	<0.1

[46] *Contopus cooperi*

[47] *Hylocichla mustelina*

[48] *Dolichonyx oryzivorus*

[49] *Chaetura pelagica*

[50] *Contopus vierns*

[51] *Ixobrychus elixis*

	• regenerating forests					
Migratory bird species at risk with potential habitat observed within the LSA[(d)]						
Bobolink	• grasslands • graminoid peatlands	1.5	0	<0.1	0	0
Chimney Swift	• artificial structures for nesting and roosting	1[(c)]	0	<0.1	1[(c)]	<0.1
	• foraging habitat	24	3	<0.1	0	0
Eastern Wood-pewee	• regenerating forests	76	8	0.1	67	<0.1
Least Bittern	• marshes	5	0.2	<0.1	5	0
Yellow Rail	• marshes • grasslands • shrublands	5	0.2	<0.1	5	0

RSA = regional study area; LSA = local study area; ha = hectares; % = percent.

[(a)] Indirect loss includes displacement due to noise, light and dust generation, and alterations to wetland habitat hydrology.

[(b)] This value represents the sum of direct loss of wetlands (41 hectares; Table 9) and open water (4 hectares; Table 9) minus wetlands that would be created (6 hectares) as part of the fish habitat offsetting plan pursuant of the *Fisheries Act* or the fish habitat compensation plan pursuant of the *Metal and Diamond Mining Effluent Regulations* under the *Fisheries Act*.

[(c)] The number of anthropogenic structures (not the number of hectares)

[(d)] Migratory bird has not been identified within the LSA but its potential habitat is present within the LSA.

There is no unique habitat critical for the survival of migratory birds located within the project study area. Based on Table 11, adverse effects to migratory birds from loss of nests or critical habitat within the project and local study areas would be minimal with no population effects, as the amount of habitat lost relative to the available suitable habitat in the regional study area would be low. The proponent predicted that the loss of suitable bird habitat would displace 118 individual migratory birds from the regional study area (there are over one million individuals expected to be in the regional study area prior to project construction and operations). It is predicted that the displaced migratory birds would relocate elsewhere in the regional study area.

There would be permanent removal of less than one percent of migratory bird habitat, including habitat for migratory birds that are species at risk, within the regional study area. The loss of nests or critical habitat is considered to have a moderate ecological effect because the habitat types are common within the local and regional study areas (Table 11). Progressive rehabilitation of the project and local study areas would create between one to three percent of additional habitat suitable for Bobolink, Common Nighthawk and Eastern Whip-poor-will within the regional study area during abandonment.

The Project will result in the direct loss of nesting and foraging habitat for Barn Swallow, a migratory bird species at risk. Approximately 24 hectares (less than 0.1 percent of the regional study area) of Barn Swallow foraging habitat (i.e. non-forested clearings, grassland, shrubland, wetland and disturbed areas) would be lost or altered due to vegetation clearing, noise, dust and light generation. It is anticipated that Barn Swallows will be displaced to locations within the local and regional study areas. During construction, buildings in the tree nursery that support Barn Swallow nests will be demolished. To mitigate, new nesting habitat would be created to meet provincial requirements[52]. The new nesting habitat would be monitored annually for three years after installation to assess nesting activity and use (Box 7.2-2). Direct and indirect effects of habitat loss on Barn Swallows are predicted to be low as there will be replacement nesting habitat created.

[52] Ontario's *Endangered Species Act* (2007), administered by the Ontario Ministry of Environment, Conservation, and Parks

Potential Chimney Swift foraging habitat (e.g., waterbodies) and roosting habitat (e.g., chimneys and large-diameter cavity trees) were identified within the project study area. However Chimney Swifts were not observed foraging or roosting during field surveys. Loss of potential foraging and roosting habitat within the project study area would be minimal in relation to the amount of habitat available in the local and regional study areas.

Overall, the Project would reduce migratory bird abundance in the project and local study areas but would not affect overall populations. To reduce the predicted adverse effects of habitat loss on migratory birds, habitat loss would be minimized by restricting vegetation clearing to the project study area and minimizing vegetation clearing to adjacent vegetation and watercourses. Vegetation clearing would be conducted in accordance with federal guidelines[53], and restricted from occurring during bird nesting periods. Vegetated buffers of 120 metres would also be provided along rivers, creeks and wetlands wherever feasible. Noise abatement measures (such as using mufflers on equipment) would be implemented in alignment with federal guidelines[54] to minimize the effects of noise on migratory birds. A monitoring program would be implemented during construction and operations to verify the geographic extent in which noise may affect wildlife. Light would be directed to reduce excess light entering the surrounding environment. Water and chemical suppressants would be used for dust control on roads within the project study area during construction, operations and decommissioning, as described in Section 6.1.

In addition, through progressive rehabilitation, cleared areas would be revegetated during operations, decommissioning and abandonment of the Project. Measures to manage invasive species and promote recovery of wildlife habitat with native species would also be implemented, as discussed in Section 6.3.2. The proponent proposed to rehabilitate 246 hectares of upland habitat and 39 hectares of wetland habitat through progressive rehabilitation of project components and the fish habitat offsetting plan. Furthermore, the pit lake would provide open water habitat within the project study area.

Views Expressed

Eagle Lake First Nation and Naotkamegwanning First Nation indicated that migratory birds have been observed foraging within the regional study area and expressed concern regarding impacts of the Project on migratory bird habitat. Asubpeeschoseewagong Netum Anishinabek, Métis Nation of Ontario, Wabuskang First Nation and Eagle Lake First Nation also requested that the proponent include in their assessment the effects to migratory birds that are species at risk, including those that were not observed during field surveys but have suitable habitat present in the regional study area. Further, the assessment should include indirect effects to the habitat of migratory birds (e.g., air, noise, light and water quality) and the capacity of adjacent habitat to support the displacement of migratory birds. In response, the proponent revised its assessment to incorporate these requests. The proponent also determined that a minimum of 90 percent of each habitat type (e.g., upland forests, grasslands, wetlands, etc.) would remain available in the local study area to support displaced migratory birds.

[53] Environment and Climate Change Canada guidelines on *General Nesting Periods of Migratory Birds in Canada*

[54] Environment and Climate Change Canada *Guidelines to reduce risk to migratory birds.*

The Ontario Ministry of Natural Resources and Forestry requested the proponent to create or enhance Barn Swallow habitat, including nesting habitat, to compensate for the loss of Barn Swallow nesting sites. Ontario Ministry of Natural Resources and Forestry also requested the proponent complete an Information Gathering Form and Avoidance Alternatives Form to provide information on the potential impacts of the Project on Barn Swallows. The proponent submitted the requested provincial forms and has committed to creating appropriate replacement habitat in consultation with Ontario Ministry of Natural Resources and Forestry. A follow-up program will be implemented to monitor the use of the replacement habitat (Box 7.2-2).

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of the key mitigation measures described in Box 7.2-1 and the follow-up program measures in Box 7.2-2, the Project is not likely to cause significant adverse effects on migratory birds due to loss of nests or critical habitat.

The Project would result in a loss of migratory bird habitat within the project and local study areas. Habitat loss would result in alterations to migratory bird movement and reductions in migratory bird abundance in the local study area, but not at the population level. The Agency notes that there are no habitat types within the project study area that are critical to the survival of migratory bird species, including those that are species at risk. The nesting habitat for Barn Swallow, a species at risk, will be removed during construction but the proponent will create new nesting habitat in accordance with provincial requirements.[52] Noise and light mitigation measures would restrict sensory disturbance within the local study area, and a progressive site rehabilitation plan that meets provincial regulatory requirements[55] would partially restore lost migratory bird habitat.

The Agency recommends the implementation of follow-up program measures (Box 7.2-2) to assess the effectiveness of mitigation measures for the loss of nests or critical habitat including noise and light mitigation and the progressive rehabilitation plan. The Agency also requires the proponent to complete additional surveys for migratory birds including those that are species at risk prior to construction within the project and local study areas.

Given the proposed mitigation measures and definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of habitat loss and alteration would be moderate, since the loss of suitable habitat would not result in a measureable change in the abundance of migratory birds in the project study area and the local study area. The geographic extent would be moderate, as habitat loss and alteration will be restricted to the local study area. The duration would be long term with continuous frequency. The effect would be partially reversible, as rehabilitation will revegetate areas that were cleared during operations, decommissioning and abandonment but would still not fully restore the area to pre-project conditions. The timing would be inconsequential, as the proponent will conduct vegetation clearing in accordance with federal guidelines[53] and schedule such activities outside of the identified migratory bird nesting periods. The ecological and social context of habitat loss and alteration on migratory birds is moderate, as there are six known and five potential

[55] Required in the Certified Closure Plan under Ontario's *Mining Act.*

migratory birds that are species at risk that may be impacted by the loss of nests or critical habitat and alteration, including the loss of known Barn Swallow nesting habitat.

The assessment of the loss of migratory bird habitat on the current use of lands and resources for traditional purposes by Indigenous communities is further discussed in Section 7.3.

Box 7.2-1: Key mitigation measures to address effects on migratory birds

Mitigation measures to address exposure to contaminants in project components with open water

- Implement mitigation measures for water quality listed in Box 7.1-1.

Mitigation measures to address loss of nests or critical habitat

- Carry out all phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds, or destroying, disturbing or taking their nests or eggs, and remains in compliance with the *Migratory Birds Convention Act* (1994) and with the *Species at Risk Act* (2002), while taking into account Environment and Climate Change Canada's *Avoidance Guidelines*, *General Nesting Periods of Migratory Birds in Canada* guidance document, and *Guidelines to reduce risk to migratory birds*. This includes conducting vegetation clearing outside of bird nesting periods to avoid potential mortality to birds and implementing noise abatement measures.
- In consultation with relevant authorities, develop and implement prevention and mitigation measures to minimize the risk of harm to migratory birds and help maintain viable populations of migratory birds. If active nests (with eggs or young) are discovered, work must be interrupted and a buffer zone established until nesting is finished.
- Control direction, timing, and intensity of lighting required for the construction, operation, and decommissioning of the Project to avoid effects on migratory birds.
- In consultation with relevant authorities and Indigenous communities, implement the progressive rehabilitation of project components during operations, decommissioning, and abandonment of the Project to revegetate areas that were cleared and to create habitat suitable for migratory birds using native species. The measures implemented should avoid the introduction of invasive species. The progressive rehabilitation plan would be consistent with the Certified Closure Plan pursuant to Ontario's *Mining Act*.
- Maintain vegetated buffers of 120 metres along rivers, creeks, and wetlands within the project study area using native species during construction and operations.
- In consultation with relevant authorities, implement measures to create or enhance Barn Swallow habitat, including constructing Barn Swallow nesting habitat, to compensate for the loss of Barn Swallow nesting sites. These measures would meet the requirements of Ontario's *Endangered Species Act* (2007), administered by the Ontario Ministry of Environment, Conservation and Parks, and the proposed Recovery Strategies developed under the federal *Species at Risk Act*.

Box 7.2-2: Follow-up program recommended for migratory birds

Follow-up program measures to address exposure to contaminants in project components with open water

- Develop and implement, in consultation with relevant authorities and Indigenous communities as part of the communication and engagement plan (described in Box 7.3-2), , a monitoring and follow-up program to verify the environmental assessment predictions and the effectiveness of proposed mitigation measures:
    - Monitor, at times migratory birds may be present in the project study area, the use by migratory birds of the tailings storage facility and onsite ponds from operations to abandonment until such time that water quality in these structures meets the water quality predictions in the table titled

"Table 2. Refined Ecological Toxicity Assessment for Mammals and Birds"[56]. Implement adaptive management measures including bird deterrents if migratory birds are observed accessing these components prior to water quality meeting the predicted concentrations.

- Monitor the use of the pit lake by migratory birds, including Barn Swallows, from the time the pit lake is being filled to when the pit lake is permitted to connect to the receiving environment (as described in Box 7.1-2). If migratory birds are observed accessing the pit lake before the pit lake has met the applicable water quality guidelines (Box 7.1-1), implement adaptive management measures including installation of deterrents to reduce exposure of the pit lake to migratory birds.

- Implement follow-up program measures related to water quality in Box 7.1-2 and Box 7.4-2.

Follow-up program measures to address increased risk of collisions with vehicles

- Develop and implement, in consultation with relevant authorities and Indigenous communities (described in Box 7.3-2), a monitoring and follow-up program to verify the environmental assessment predictions and the effectiveness of proposed mitigation measures:
  - Conduct surveys for Common Nighthawk along the roads within the project study area one year prior to construction and annually during construction, operations, and decommissioning.
  - Monitor collisions between project vehicles and migratory birds within the project study area continuously during construction, operations, and decommissioning, and implement adaptive management measures in consultation with Environment and Climate Change Canada if vehicle collisions with migratory birds are recorded.

Follow-up program measures to address loss of nests or critical habitat

- Develop and implement, in consultation with relevant authorities and Indigenous communities as part of the communication and engagement plan (described in Box 7.3-2), a follow-up program to verify the environmental assessment predictions and the effectiveness of proposed mitigation measures, including:
  - Conduct surveys prior to construction to verify suitable habitat, including fen habitat, as described in MMC-11.1 in the document "R.2 Goliath Gold Project Mitigation, Monitoring and Commitments (May 9, 2019)"[57], and in consultation with Environment and Climate Change Canada.
  - Survey migratory birds in the project and local study areas to assess changes in migratory bird populations caused by the Project. The proponent shall determine, in consultation with relevant authorities and Indigenous communities, the frequency and location of surveys.
- Monitor progressive rehabilitation measures for habitat suitable for migratory birds during operations, decommissioning and abandonment until rehabilitation objectives are confirmed. The Proponent shall determine, in consultation with relevant authorities and Indigenous communities, the frequency and location of surveys.
- Monitor noise levels within the project study area and local study area during construction and operations to identify the geographic extent in which noise may affect migratory birds. The program will include adaptive management measures to be undertaken if noise levels exceed predicted values. The Proponent shall determine, in consultation with relevant authorities and Indigenous communities, the frequency and location of surveys.
- Monitor Barn Swallow replacement habitat annually for three years after installation, to assess nesting activity and structure use, in accordance with Ontario's *Endangered Species Act*.

[56] Found in Final Round 2 Wildlife Information Requests submitted as part of response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 33)

[57] Submitted as part of response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 33)

7.3 Aboriginal Peoples – Current Use of Lands and Resources for Traditional Purposes

The Project could cause residual effects on current use of lands and resources for traditional purposes (Indigenous use[58]) through:

- reduction of quality and availability of resources for Indigenous use;
- loss or alteration of access for Indigenous use;
- alteration to travel routes or archaeological resources; and
- reduction of overall quality of experience during Indigenous use.

The Agency is of the view that the Project is not likely to cause significant adverse effects on Indigenous use due to the residual effects listed above after taking into account the proposed key mitigation measures (Box 7.3-1). The Agency recommends follow-up program measures (Box 7.3-2) to evaluate the accuracy of predictions related to Indigenous use and to determine the effectiveness of proposed mitigation measures. The Agency's conclusions are based on its analysis of the proponent's assessment of effects on fishing, hunting, plant harvesting, trapping and the use of lands for cultural purposes, as well as input from Indigenous communities.

Description of the Existing Environment

As discussed in Section 5.2, the Project is located within the Treaty 3 area. Wabigoon Lake Ojibway Nation and Eagle Lake First Nation are the Indigenous communities closest to the Project. Métis Nation of Ontario has completed a traditional knowledge and land use study for the proponent to use in the assessment of potential effects to Indigenous use. Eagle Lake First Nation is in the process of completing a traditional knowledge and land use study for the proponent to further inform the assessment of potential effects to Indigenous use during the life of the Project. The study areas for Indigenous uses are described in Table 3. Indigenous communities listed in Section 4.2.1 indicated that the local and regional study areas (Figure 5) are used for hunting, fishing, trapping, plant gathering and cultural purposes. The Tree Nursery Road is an important road for accessing Indigenous use areas that traverses the middle of the project study area, from Highway 17 to the former Tree Nursery and Tree Nursery pond just into the local study area. The area proximate to the former Tree Nursery is important for Indigenous use including but not limited to plant harvesting and bait fishing. Waterbodies within the regional study area such as Thunder and Wabigoon lakes have been identified as important for other Indigenous uses, including fishing and wild rice harvesting.

Plant gathering

Wabigoon Lake Ojibway Nation, the Aboriginal Peoples of Wabigoon, and Eagle Lake First Nation harvest wild rice within the local and regional study areas. Wabigoon Lake Ojibway Nation is the licence holder for wild rice harvesting zone #10, which is located in the local study area. Wabigoon Lake Ojibway

[58] The Agency notes that the definition of Indigenous uses includes traditional practices, including the use of sacred sites, including archaeological resources. In addition, the definition of Indigenous uses allows for the consideration of uses that may have ceased due to external factors, but may be reasonably expected to resume once conditions change.

Nation, Eagle Lake First Nation, Wabauskang First Nation, Asubpeeschoseewagong Netum Anishinabek and the Métis Nation of Ontario reported harvesting berries and wild mushrooms within the local and regional study areas. Medicinal plants including cedar, white birch, red osier dogwood and Labrador tea have been harvested within the local study area.

Fishing

Key species identified within the local study area in Wabigoon Lake include Black Crappie, Cisco, Lake Herring, Lake Whitefish, Muskellunge, Northern Pike, Redhorse Sucker, Rock Bass, Sauger, Smallmouth Bass, Walleye, White Sucker and Yellow Perch. In Thunder Lake, Lake Trout, Northern Pike, Smallmouth Bass, Walleye and White Sucker were identified. Naotkamegwanning First Nation identified 20 lakes, including Thunder Lake and Wabigoon Lake, which are used for commercial and harvesting purposes in the regional study area, in which they have held 28 commercial fishing licenses. Eagle Lake First Nation indicated that they possess two commercial fishing licenses in Wabigoon Lake and Thunder Lake.

Traditional knowledge from local Indigenous communities indicated that Blackwater Creek supports baitfish species. Baitfish have also been identified as occurring in the Tree Nursery ponds, and in creeks and beaver ponds within the project study area. Wabigoon Lake Ojibway Nation, Eagle Lake First Nation and Aboriginal People of Wabigoon baitfish for minnows in the Tree Nursery ponds that are outside the project study area just into the local study area. Wabigoon Lake Ojibway Nation and Eagle Lake First Nation stated that baitfishing in Blackwater Creek Tributaries 1 and 2 and other creeks in the local study area is an important activity that supports traditional practices.

Hunting

Indigenous communities harvest moose, deer, rabbit and furbearers including beaver and marten, and waterfowl such as geese. Wabigoon Lake Ojibway Nation, Eagle Lake First Nation, Naotkamegwanning First Nation, Wabauskang First Nation, Lac Seul First Nation, Asubpeeschoseewagong Netum Anishinabek and the Métis Nation of Ontario identified hunting practices within the regional study area. Habitat associated with moose, deer, migratory birds, waterfowl and furbearers is common in the local and regional study areas.

Trapping

Trapping within the local and regional study areas has taken place historically by Indigenous communities. Wabigoon Lake Ojibway Nation and Eagle Lake First Nation have indicated that traditional trapping for marten and beaver took place historically within the project study area. There are three trap lines in the local study area (DR026, DR027 and DR021). These trap lines are owned by Wabigoon Lake Ojibway Nation and Eagle Lake First Nation. Trap lines DR026 and DR027 both include the project study area. Trap line DR026 covers an area of 22, 711 ha and DR027 covers an area of 21, 990 ha. DR021 is located outside of the project study area and would not be disturbed by the Project. Naotkamegwanning First Nation has indicated its members have trap lines within the local study area, in addition to the trap lines indicated above.

Use of land for cultural and traditional purposes

No cultural or heritage sites were found within the project study area. Wabigoon Lake Ojibway Nation identified ceremonial sites of stone circles on residential properties around the project study area and within the local study area. Eagle Lake First Nation identified spirit rocks of cultural significance on

Wabigoon Lake, within the regional study area. Wabigoon Lake Ojibway Nation and Asubpeeschoseewagong Netum Anishinabek have identified historical travel routes within the local study area. Wabigoon Lake Ojibway Nation has also identified Thunder Lake as a traditional canoe route to Rice Lake. Asubpeeschoseewagong Netum Anishinabek has identified an additional historical travel route along Wabigoon River into Dryden, Ontario.

7.3.1 Reduction of quality and availability of resources

Proponent's assessment of effects, mitigation and monitoring

The possible effects of the Project were assessed on the quality and availability of resources related to Indigenous use, including plant gathering, fishing, hunting and trapping. An Environmental Management Committee would be formed to ensure that uses are maintained.

Plant gathering

Areas of importance to Indigenous communities for plant gathering, including timber, wild rice, berries, mushrooms and medicines, would be lost during construction in the project study area. Additionally, access would be altered just into the local study area and last until abandonment (Section 6.3.1). Additional habitat just into the local study area may be indirectly altered from contamination as a result of dust deposition from project components (Section 6.1), and from changes to water quantity and quality (Section 6.2) over the life of the Project. The Project would overprint an area of known blueberry harvesting near the proposed tailings storage facility.

In the local study area, mitigation measures for air quality (Section 6.1.1) would reduce uptake of contaminants by plants from dust deposition onto soil, and mitigation measures for water quantity and quality (Sections 6.2) would reduce uptake of contaminants in water by plants. Measures to prevent introduction of invasive species will be in place during all phases, such as limiting vegetation stripping (and soil exposure to invasive species) to areas required for project activities. In addition, progressive rehabilitation in the project study area, incorporating plant species of interest to Indigenous communities, would occur where possible during operations and decommissioning (Sections 6.3 and 7.2.2).

Indigenous communities would be provided an opportunity to harvest plants, including blueberries and chanterelles, during construction, on the north side of the project study area and just into the local study area along Tree Nursery Road. Four wild rice sites would be sampled to confirm predictions of the effects of the Project, and to ensure harvesting quality. These locations would be at the mouth of Blackwater Creek, south shore of Wabigoon Lake adjacent to the Butler Lake Nature Reserve, the channel connecting Dinorwic Lake and Wabigoon Lake, and the south end of Rice Lake (Figure 11). The exact locations for wild rice sampling would be finalized prior to construction of the Project through consultation with Indigenous communities that harvest wild rice within the local and regional study areas. Additional mitigation measures to address the perceived risk of contamination (such as sampling harvested foods during harvesting seasons) are referenced in Section 7.4.

Fishing

Indigenous communities fish in the local and regional study areas. Fish habitat loss and alteration would occur due to construction of project components. To offset any unavoidable and permanent alteration

or destruction of fish habitat, a fish habitat offsetting plan will be required as part of an application for authorization under the *Fisheries Act* (discussed in Section 7.1). Negligible effects are predicted on fish health and mortality, including baitfish, during all phases of the Project. Measures would be in place to mitigate potential effects on baitfish in Tree Nursery ponds from the water-taking activities (Section 7.1).

Hunting

Limited hunting occurs in the project study area, and an abundance of large-game habitat is found in the local and regional study areas. There would be minimal effects to hunting from the Project, and any effects would be reversible with the application of mitigation measures to protect wildlife including progressive revegetation and altered access to the project study area (see Box 7.3-1), along with the progressive rehabilitation of habitat (see Section 7.2). The direct removal of habitat within the project study area, and indirect effects of project activities in the local study area, would reduce the available habitat for moose, deer, migratory birds, waterfowl and furbearers. Indigenous users would be able to continue to harvest moose, deer, furbearers and waterfowl elsewhere in the local and regional study areas, as they are expected to remain viable within the regional study area. During operations, the project study area would be fenced to prevent wildlife injury and mortality. Some wildlife mortality may be caused by traffic and human-wildlife encounters. Collisions between project vehicles and wildlife will be monitored within the project study area during all phases of the Project (Box 7.3-2). If collisions between project vehicles and wildlife are noted, then adaptive management measures to avoid collisions, such as reducing speed limits, would be implemented.

Trapping

The loss of habitat and displacement of wildlife species may reduce trapping success. The expected removal of 62 hectares of terrestrial furbearer habitat would represent 4.8 percent of available habitat in the local study area, while the expected removal of 96 hectares of American marten habitat would represent 7.4 percent of the available American marten habitat in the local study area. Ample beaver habitat would be available in the local study area, with minimal removal due to the Project, resulting in a change of 6.0 percent loss in the local study area and 0.03 percent in the regional study area. The Project is likely to result in potential effects but would be minimal with the application of mitigation measures outlined in (Box 7.3-1).

The loss of habitat for wildlife species would be reduced by minimizing the project footprint. Additional traditional land use information will be collected through dialogue with Indigenous communities, to inform the development of community-specific mitigation and accommodation measures as required. The follow-up program may be amended throughout the life of the Project to ensure that community-specific mitigation measures related to current use, including trapping, are effective.

Views Expressed

The Aboriginal People of Wabigoon, Naotkamegwanning First Nation, Asubpeeschoseewagong Netum Anishinabek and the Métis Nation of Ontario expressed concern regarding the effect of the Project on traditional trapping, fishing, hunting, berry and medicinal plant gathering, and timber harvesting. Asubpeeschoseewagong Netum Anishinabek expressed concern regarding the adequacy of baseline data collection for wildlife with an emphasis on moose, deer and furbearers such as muskrat, and

whether traditional knowledge of Indigenous communities had been considered in its collection. Eagle Lake First Nation, Wabigoon Lake Ojibway Nation and Métis Nation of Ontario expressed concern about impacts of contamination on traditional gathering and hunting activities. Eagle Lake First Nation raised concern with the proposed mitigation to exclude wildlife from the active project components, requesting the proponent implement fencing around the perimeter of the Project footprint. In response, the proponent committed to installing a perimeter fence around the project study area.

Further views expressed by federal authorities on the valued components relevant to Indigenous uses are found in Sections 7.1 and 7.2.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures as described in Box 7.3-1, the Project is not likely to cause significant adverse effects on the quality and availability of resources for plant gathering, fishing, hunting and trapping. The Agency acknowledges that the Project will result in the loss of areas of importance for plant gathering, fishing, hunting and trapping in the project study area. Additionally, the Agency acknowledges that the proponent has taken an approach which assumes that any predicted effect of the Project on the environment would impact Indigenous use for all communities.

The Agency is satisfied that plant gathering activities can continue safely outside the project study area and that mitigation measures for air quality given in Section 6.1.1 would reduce the dispersion of dust on plants, and that continued use of country food and medicinal plants would remain safe (Section 7.4). The Agency is satisfied with the proponent's commitments to limit vegetation stripping and removal to only the areas required for Project activities, thereby limited exposed soil for infiltration of invasive species.

With respect to fishing, the Agency is of the view that fish health and fish population would be maintained, that the loss of fish habitat would be offset (Section 7.1) and that fishing can continue outside the project study area. The Agency expects the proponent to notify Indigenous communities about any changes in water quality that may impact fishing (Sections 7.1 and 7.4).

For hunting and trapping, the Agency is of the view that that the health and population of species of interest to Indigenous communities would be maintained (Section 6.3). The Agency also notes fencing would limit the mortality risk for wildlife (Section 6.3). However, the Agency also proposes a follow-up program measure to verify wildlife collisions with vehicles and if collisions are observed, adaptive management measures, such as reduced speed limits, would be applied. The Agency acknowledges that Indigenous use outside the project study area can continue, and a detailed rehabilitation plan will be developed in consultation with regulatory authorities and Indigenous communities as part of the Certified Closure Plan[59]. Further, the Agency notes the proponent's commitment to include the involvement of Indigenous communities in an Environmental Management Committee for the review of environmental management plans and follow-up program measures. The Agency notes that the project

[59] Under Ontario's *Mining Act* from the Ontario Ministry of Energy, Northern Development and Mines.

study area will be reclaimed and the land restored to a naturalized state for hunting and trapping after decommissioning.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the effects would be low in magnitude and moderate in extent, as changes to the quality and availability of resources used for gathering plants, hunting, trapping and fishing would lead to Indigenous use occurring in a similar manner in the local study area. The effects would be continuous and of medium-term duration, as it would last from construction to decommissioning. They would be partially reversible as parts of the project study area would be rehabilitated and changes to air quality (dust) would be lessened after operations, thus reversing some of the changes to quality and availability of plants, wildlife and fish for harvesting.

7.3.2 Loss or alteration of access for Indigenous use

Proponent's assessment of effects, mitigation and monitoring

Indigenous use could be affected through:

- the alteration of access through the project study area during construction, operations and decommissioning;
- the restriction of access along Tree Nursery Road during construction, operations and decommissioning, which would alter access to the plant harvesting and baitfishing sites in the local study area immediately outside the project study area;
- the loss of trapline areas, including 309 hectares which encompasses 1.3 percent of trapline DR026 and 0.5 hectares which encompasses 0.02 percent of trapline DR027 during construction and decommissioning; and
- the overprinting of Blackwater Creek Tributary 1 and 2 by the open pit and tailings storage facility, which would remove areas used for fishing.

An access management plan would be maintained for Indigenous communities practicing traditional use, to mitigate the loss and alteration of access. Accompanied access would be maintained along Tree Nursery Road through the project study area, which would lead to altered but unaccompanied access to the plant harvesting areas between the open pit and former Tree Nursery administrative offices, and to fishing within the Tree Nursery pond located just into the local study area. There are 379 hectares where access will require accompaniment for safety and security reasons. Access restrictions will be removed during decommissioning. Indigenous communities will be consulted in order to develop community-specific access management plans, taking into account Indigenous use as well as health and safety concerns within the project study area.

Views Expressed

Wabigoon Lake Ojibway Nation, Eagle Lake First Nation and Asubpeeschoseewagong Netum Anishinabek raised concerns about the ability to access plant harvesting areas, including blueberries and medicinal plants, in between the open pit and the former Tree Nursery offices just into the local study area. Wabigoon Lake Ojibway Nation also raised concerns about the access to chanterelles identified near the former Tree Nursery. Asubpeeschoseewagong Netum Anishinabek and Naotkamegwanning

First Nation indicated that accompanied access in the Tree Nursery area may alienate members from traditional use. Métis Nation of Ontario indicated concern about reduced access to areas preferred by their citizens. Asubpeeschoseewagong Netum Anishinabek indicated that accompanied access will impact collection of sacred and medicinal plants due to confidentiality concerns. The proponent has committed to develop community-specific access management plans with Indigenous communities consistent with the site safety needs, and the sensitive nature of traditional and recreational harvest. Mitigation and follow-up program measures in Section 7.4 would address concerns on perception of contamination through timely publishing of sampling results on contaminant levels in chanterelles, berries, wild rice and fish.

Agency's Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures as described in Box 7.3-1, the Project is not likely to cause significant adverse effects on access to areas of Indigenous use. The Agency acknowledges that there are anticipated impacts on Indigenous use as a result of the alteration of access to the project study area. The proponent would provide accompanied access along Tree Nursery Road through the project study area, and unaccompanied access within the blueberry, chanterelle and harvesting areas as well as to Tree Nursery ponds just into the local study area. After decommissioning, uninhibited access would be restored. The Agency also acknowledges that plant harvesting sites and fishing locations would be removed due to overprinting from construction of the open pit and tailings storage facility where Indigenous use has occurred. The Agency notes the proponent's commitment to consulting with Indigenous communities to develop community-specific access management plans to ensure health and safety as well as Indigenous traditional use within the local study area. The Agency also notes that the proponent will develop community-specific access management and a risk communication protocol to inform Indigenous communities of temporary access restrictions due to project activities and ensure the sensitive nature of traditional and recreational harvest is upheld. The Agency recommends a follow-up program to verify with Indigenous communities that the proposed access plan by the proponent is viable and satisfactory to inform current use of lands and resources (Box 7.3-2).

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the effects of the Project on access would be moderate in magnitude and moderate in extent, as the effect would modify access of the harvesting and fishing areas located in the local study area. The effect would be continuous, of medium-term duration, from construction until decommissioning, and would likely be reversible due to the reestablishment of all access points after decommissioning.

7.3.3 Alteration to travel routes or archaeological resources

Proponent's assessment of effects, mitigation and monitoring

There have not been any identified spiritual or cultural sites within the project study area that would be directly impacted by the Project. However, the proponent committed to prevent disturbance should any archaeological sites or areas of cultural significance, such as travel routes, be discovered. The proponent has committed to leave a 50-metre buffer zone if any previously undocumented archaeological

resources were discovered; alteration of the site would immediately stop and a licensed consultant archaeologist would carry out fieldwork in compliance with subsection 48(1) of the *Ontario Heritage Act*. The proponent would restrict activities and development, in areas within 300 metres of historical travel routes, to only those areas where an archaeological assessment has been completed.

Agency's Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures described in Box 7.3-1, the Project is not likely to cause a significant adverse environmental effects due to alteration to travel routes or archaeological resources. With the application of the mitigation measures proposed by the proponent and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the effects due to alteration to travel routes or archaeological resources would be low in magnitude and low in extent, as the lack of identified travel routes or archaeological resources within the project study area would not lead to direct effects. The Agency recognizes there could be indirect effect in these areas surrounding the project study area due to alteration of access and changes to experience. The effect would be continuous and of medium-term duration as it would last from construction to decommissioning and would be fully reversible during decommissioning of the Project.

7.3.4 Reduction of overall quality of experience during Indigenous use

Proponent's assessment of effects, mitigation and monitoring

Indigenous communities could find a diminished quality of experience to Indigenous use, or be deterred from practicing activities near the project components where there are locations for plant harvesting including but not limited to blueberries and chanterelles, along with fishing, hunting and trapping. The quality of experience just into the local study area between the open pit and former Tree Nursery may be reduced by sensory disturbances from increased dust (Section 6.1.1) and increased noise due to project activities, including blasting (Section 6.1.2). The existing visual landscape visible from certain areas of Thunder Lake would be changed due to the presence of the waste rock storage area. This component would last until decommissioning and be indistinguishable after revegetation. As noted in Section 6.3, revegetation during decommissioning and abandonment may require multiple decades to mature as potential habitat.

Mitigation measures for air quality that are detailed in Section 6.1.1 and Section 7.4.2 would reduce the levels of dust experienced by users of the local study area. Mitigation measures for noise, detailed in Section 6.1.2, would reduce the noise heard in the local study area and provide some predictability as construction would occur in daytime hours and blasting would occur between 10:00 am and 4:00 pm. Progressive revegetation described in Box 7.3-1 would ensure that changes to the visual landscape, in particular the waste rock storage area, would rehabilitated.

Views Expressed

Wabigoon Lake Ojibway Nation, Eagle Lake First Nation, Asubpeeschoseewagong Netum Anishinabek and Naotkamegwanning First Nation indicated a reliance on lands and resources within the local and regional study areas and raised concerns that the Project could affect the overall experience in those

areas. The inability to use lands for hunting, fishing and gathering near the project study area could have potential adverse effects on community members for current and future use. Further, community members may avoid areas perceived to have been contaminated in light of historic contamination in the regional study area, or otherwise affected by the Project, including dust on plants and blueberries and perceived contamination to water and fish. The proponent would implement measures to mitigate the perception of contamination (discussed in Section 7.4). Eagle Lake First Nation and Wabigoon Lake Ojibway Nation have expressed concern about blasting activities deterring wildlife from the project and local study areas which would reduce availability of wildlife as a country food source. Métis Nation of Ontario has expressed concern about the ammonia residue that could result from blasting explosives and the contamination of run-off water effecting surrounding areas in the project and local study areas. The proponent has committed to limiting blasting activities between 10:00 am and 4:00 pm, while avoiding statutory holidays except when necessary for safety reasons.

Agency's Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures described in Box 7.3-1, the Project is not likely to cause a significant adverse effect on quality of experience due to sensory disturbances and changes to visual landscape. The Agency notes that the presence of dust, noise and large project components could impede the enjoyment and deter Indigenous use of the land. The proposed mitigation measures to limit dust, noise and visual disturbances through rehabilitation and revegetation would allow changes to be confined to an area immediately outside the project study area. The Agency is of the view that the commitment from the proponent to limit blasting activities between 10:00 am and 4:00 pm, while avoiding statutory holidays except when necessary for safety reasons, will bring some predictability to noise disturbances. The Agency notes that the proponent committed to avoiding blasting on days of cultural importance, determined in consultation with Indigenous communities. This would minimize some of the effects to quality of experience, while communicating blasting schedules with Indigenous communities will allow Indigenous users to plan around anticipated noise and vibrations from blasting, thus reducing the likelihood of unexpected noise. Furthermore, the noise from blasting would reduce as the open pit develops and blasting happens at a deeper level. Following decommissioning, dust and noise disturbances would be eliminated. The Agency understands that the proponent has committed to revegetation of the waste rock storage area, which will minimize the effects on the visual landscape, however these will still be visible at Thunder Lake.

The Agency acknowledges that there could be perceived effects from changes to air, water and terrestrial environment, and these could be compounded by the changes to the visual landscape. However, the Agency notes that the proponent would adapt the environmental management and monitoring plans based on ongoing communications and feedback from Indigenous communities (Box 7.4-1).

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the effects on the quality of experience during Indigenous use would be low in magnitude and moderate in extent, as the changes in experience should allow Indigenous use to continue in a similar manner to now and is limited to the local study area. The effects would be continuous and of long-term duration as it would last through all phases of the Project. The

effects would also be partially reversible as changes to air quality and noise would be reversed during operations but the change to the visual landscape, which is the view of the waste rock storage area, would remain (Section 6.3).

Box 7.3-1: Key mitigation measures to address effects on current use of lands and resources for traditional purposes

Mitigation measures to address the reduction of quality and availability of resources

- As part of the measures to revegetate areas that were cleared, stated in Box 7.2-1:
  - Prevent the introduction of invasive species into the project study area.
  - Identify plant species of interest to Indigenous communities in consultation with the Indigenous communities.
  - Implement the mitigation measures identified in Box 7.1-1 related to fish and fish habitat that would minimize effects on fish population and fish health, as well as fish habitat.
  - Implement the mitigation measures identified in Box 7.4-1 related to air quality.

Mitigation measures to address the loss or alteration of access

- Develop community-specific access management plans in consultation with Indigenous communities as part of the communication and engagement plan in Box 7.3-2, during construction, operations and decommissioning.
- Provide accompanied access to Indigenous communities between the open pit and former Tree Nursery, and unaccompanied access to harvesting sites just into the local study area as well as the Tree Nursery pond for bait fishing.

Mitigation measures to address the reduction of overall quality of experience

- Conduct blasting between 10:00 am and 4:00 pm, avoiding statutory holidays and days of cultural importance that shall be determined in consultation with Indigenous communities, unless required for safety reasons. In the event that blasting is required outside of these times, or on statutory holidays or days of cultural importance, the proponent shall notify Indigenous communities, as part of the community and engagement plan in Box 7.3-2.
- As part of the communication and engagement plan in Box 7.3-2, provide information to Indigenous communities related to schedules for blasting, with a mechanism to provide a minimum of 48 hour notice in advance of a change in the blasting schedule taking effect.
- Implement the mitigation measures identified in Box 7.2-1 related to progressive revegetation.
- Implement the mitigation measures identified in Box 7.4-1 related to air quality.
- Mitigation measures to address alteration of connection to traditional areas and artifacts of physical and cultural heritage.
- Restrict activities and development within 300 metres of historical travel routes. If an archaeological discovery is made, a 50 metre buffer zone will be left around remaining watercourses and traditional travel routes identified within the project study area.

Box 7.3-2: Follow-up program measures recommended for current use of lands and resources for traditional purposes

Follow-up program measures to address the reduction of quality and availability of resources

- Develop a communication and engagement plan in conjunction with leadership of each Indigenous community affected by the Project. Engage Indigenous communities in the review of monitoring reports; discuss any unforeseen impacts on Indigenous uses outside the project study area; and, if required, develop

and implement additional mitigation measures. Validate Indigenous use with communities and ensure that appropriate mitigation measures are developed and implemented.

- Develop, prior to construction and in consultation with Indigenous communities, a follow-up program to verify the accuracy of the environmental assessment and to determine the effectiveness of mitigation measures as it pertains to the adverse environmental effects of the Project on the current use of lands and resources for traditional purposes. The follow-up program would be implemented during all phases of the Project and would take into account available Indigenous knowledge and input from Indigenous communities.
- Implement follow-up program measures to monitor wildlife collisions with vehicles, and where necessary, apply adaptive management measures.

Follow-up program measures to address the loss or alteration of access

- As part of the communication and engagement plan, validate Indigenous use with communities, and ensure that appropriate mitigation measures are developed and implemented, whereby at a minimum, continued access to sites of importance to Indigenous communities is maintained.

Follow-up program measures to address the reduction of overall quality of experience

- As part of the communication and engagement plan, validate Indigenous use and avoidance due to perceived concerns about contamination with Indigenous communities, including recreational or commercial land users. In the event that avoidance of areas is noted due to perception, provide information that would assist the Indigenous communities to maximize Indigenous uses. In the event that unforeseen impacts to experience are identified by Indigenous communities, ensure that appropriate mitigation measures are developed and implemented.
- Follow-up program measures to address alteration of connection to traditional areas, and artifacts of physical and cultural heritage.
- Develop, prior to construction and in consultation with Indigenous communities, a follow-up program to verify the archaeological assessment as it relates to use of lands for cultural and traditional purposes, and determine the effectiveness of mitigation measures as it pertains to the adverse environmental effects of the Project on the current use of lands and resources for traditional purposes.

7.4 Aboriginal Peoples – Health and Socio-Economic Conditions

The Project could cause residual effects on health and socio-economic conditions through:

- exposure to air and water contaminants by inhalation, ingestion or dermal contact; and
- reduced ability to harvest subsistence and economic resources.

The Agency is of the view that the Project is not likely to cause significant adverse effects on health and socio-economic conditions of Aboriginal Peoples, after taking into account the proposed key mitigation measures (Box 7.4-1). The Agency recommends follow-up program measures (Box 7.4-2) to evaluate the accuracy of the predictions and mitigation measures related to human health and socio-economic conditions.

The Agency's conclusions are based on its analysis of the proponent's assessment as well as views expressed by Health Canada, Environment and Climate Change Canada and Indigenous communities.

Description of the Existing Environment

The local study area for health is shown in Figure 5. Fish consumption advisories exist for Wabigoon Lake and Thunder Lake due to presence of mercury and polychlorinated biphenyls. As noted in Section 6.2,

seven metals (aluminum, cobalt, iron, phosphorus, silver, thallium and uranium) exceed their respective provincial and federal water quality guidelines[60]; however none exceed Health Canada's maximum acceptable concentration protective of drinking water quality. The existing hazard quotient[61] for cobalt, thallium and zinc are currently above the Health Canada benchmark.

Traditional harvesting occurs just into the local study area, including harvesting of migratory birds, moose and deer, traplines belonging to members of Wabigoon Lake Ojibway Nation and Eagle Lake First Nation, and baitfishing sites in the Tree Nursery. Plant harvesting, including but not limited to berries, takes place just into the local study area proximate to the Tree Nursery administrative offices. As described in Section 7.3, Naotkamegwanning First Nation has indicated that additional traplines exist in the local study area. Eagle Lake First Nation and Wabigoon Lake Ojibway Nation harvest wild rice within the local study area.

7.4.1 Exposure to Air and Water Contaminants by Inhalation, Ingestion or Dermal Contact

Proponent's assessment of effects, mitigation and monitoring

The assessment of effects on human health included the following exposure pathways: inhalation of air particulates; ingestion of surface water and country foods (animals, plants and fish); and dermal (skin) contact with surface water and soil.

As discussed in Section 6.1, increases in nitrogen dioxide and particulate matter as PM_{10} and $PM_{2.5}$ may occur in the local study area. Infrequent exceedances of applicable air quality standards[62] for 1-hour average concentrations of nitrogen dioxide would be possible in locations within the local study area where Indigenous use could occur (Section 7.3). The air quality model is considered conservative, with the probability of these exceedances likely overestimated. The human health risk assessment does not identify potential health risks to humans from inhalation during use of the local study area, or outside of the project study area. Exposure to diesel particulate matter was further evaluated as a carcinogen; increases in incremental lifetime cancer risk from exposure to these contaminants outside the project study area would be considered negligible.

Excess water that is discharged into Blackwater Creek would have been treated to meet the applicable water quality criteria[4]. The same metals that exceed provincial and federal water quality guidelines[63] in the existing environment are predicted to continue exceeding those water quality thresholds during the Project, with negligible to no contribution from the Project. No potential risk to human health was identified via exposure to surface water, and therefore a quantitative assessment was not required as part of the human health risk assessment. With respect to mercury, a commitment has been made to meet background concentrations, which is estimated to be approximately 0.00001 milligrams per litre or one-twentieth of the current provincial guidelines (Table 8). Sulphate concentrations are expected to

[60] *Canadian Water Quality Guidelines for Protection of Aquatic Life* and Ontario Provincial Water Quality Objectives
[61] The hazard quotient is the ratio of exposure concentration to the health-based threshold.
[62] *National Ambient Air Quality Objectives*, *Canadian Ambient Air Quality Standards*, and Ontario *Ambient Air Quality Criteria*
[63] *Canadian Water Quality Guidelines for Protection of Aquatic Life* and Ontario Provincial Water Quality Objectives

remain below 20 milligrams per litre in Blackwater Creek and other waterbodies (Section 6.2), which would minimize the production of methylmercury.

Exposure to country foods was also considered, with the conservative assumption that an Indigenous person would consume half of their country foods every day of the year from foods harvested in the local study area. Potential risks were identified related to arsenic, cobalt, thallium and zinc, although in all cases, the predicted hazard quotient for the Project would be similar to the existing environment, with minimal contributions from the Project. Potential changes to hazard quotients would be driven by ingestion of moose and wild rice for cobalt, fish and moose for thallium, and Mallard duck for arsenic and zinc. A likely source of uncertainty in the country foods assessment is the use of modelled country food data instead of measured baseline data.

Mitigation measures for air quality (Section 6.1), water resources (Section 6.2) and fish health (Section 7.1) would be protective of human health. Fencing would be used to ensure that people and ungulates such as moose are not exposed to the waste rock or to the supernatant water from the tailings storage facility, though it is acknowledged that this would not be fully effective at reducing exposure for birds and small mammals. Although the results of the human health risk assessment indicate that risk management or mitigation measures would not be required for Indigenous use, as part of the sign in and access policy, appropriate personal protective equipment would be offered to those who prefer to wear it while within the property boundary, outside the project study area, where traditional practices would occur.

Proposed monitoring for air quality includes periodic sampling of either PM_{10} or $PM_{2.5}$, continuous monitoring of nitrogen dioxide and sampling of metals from particulate matter, to verify that mitigation measures are effective to reduce emissions of contaminants into the air (see Section 6.1.1). Water quality in Blackwater Creek, the receiving waterbody, would be monitored to verify that it would meet the applicable water quality criteria, as predicted. Monitoring of water quality at the pit lake, as it is filling, would be used to confirm whether pit lake discharge into Blackwater Creek would meet the applicable water quality criteria, with further treatment to be implemented as required. A commitment has been made to undertake a sampling program prior to construction to verify the predicted concentrations of metals in country foods in the existing environment. This program would include country foods relied on for commercial purposes, including wild rice, blueberries, chanterelle mushrooms and fish. Sampling and analysis of country foods would continue during the Project, in consultation with Indigenous communities.

Views Expressed

Asubpeeschoseewagong Netum Anishinabek, Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation, Métis Nation of Ontario and Eagle Lake First Nation expressed concern regarding impacts of contaminants such as mercury, ammonia and arsenic from effluent and sediment on water quality in adjacent waterbodies and watercourses. Asubpeeschoseewagong Netum Anishinabek has requested that the assessment of the Project take into account the community's vulnerable status, due to historic mercury contamination and the associated impact on the overall health of community members. Eagle Lake First Nation, Wabigoon Lake Ojibway Nation and Métis Nation of Ontario have expressed concern about the potential impacts of contaminants on medicinal plants, berries, hunted and trapped animals

(such as moose, deer, grouse, fox, bear and ruffed grouse) which would increase human health risks and create a consumption exposure pathway. Wabigoon Lake Ojibway Nation and Eagle Lake First Nation expressed concern about the potential impacts to wild rice as both a source of food and economic development. The proponent indicated that the human health risk assessment does not indicate potential effects on human health due to changes from the Project.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures described in Box 7.4-1 and the follow-up program measures in Box 7.4-2, the Project is not likely to cause significant adverse effects on health related to exposure to air and water contaminants by inhalation, ingestion or dermal contact. The Agency notes that there would be limited exposure to contaminants from changes to air quality, as only infrequent exceedances of air quality criteria for nitrogen dioxide are anticipated (1 day per year). The Agency agrees with Health Canada's recommendation to the Agency that the follow-up program should include, at a minimum, monitoring of $PM_{2.5}$ and nitrogen dioxide at locations within the property boundary (Figure 4) where Indigenous use could continue during construction, operations and decommissioning. The Agency also notes the proponent's commitment to installing dustfall jars, in consultation with Indigenous communities, in areas where traditional use would occur, for trace metal analysis, to verify environmental assessment predictions and the effectiveness of mitigation measures, and to alleviate perceptions of contamination of country foods near the Project.

The Agency notes that the proponent's commitment to meeting applicable water quality criteria[4] in Blackwater Creek will minimize potential exposure to chemicals of concern such as mercury and methylmercury due to consumption of water and fish. The follow-up program measures recommended in Box 7.1-2 for fish and fish habitat would include measures that would also apply for human health. In addition, the Agency notes the proponent's commitments to maintain mercury in the effluent discharge to the background concentration in Blackwater Creek of approximately 0.00001 milligrams per litre during operations, and sulphate concentrations below 20 milligrams per litre in the local study area. The Agency recommends inclusion of both as part of the follow-up program for human health to verify that the Project would not lead to further effects through mercury or methylmercury. While the Agency acknowledges that predicted high levels of thallium are likely highly conservative background measurements, as part of the follow-up program, the Agency proposes that the proponent monitors thallium in Blackwater Creek prior to construction to establish a background concentration, through construction and at least for the first two years of operations. This would verify the proponent's assumption that there would be no change in thallium concentrations in Blackwater Creek due to the Project. The Agency proposes that the proponent inform Indigenous communities and relevant authorities on the findings of thallium concentrations to validate that the contributions of the Project are negligible.

The Agency notes the proponent's prediction of high hazard quotients for arsenic, cobalt, thallium, and zinc, and their attribution of the high values to background concentrations and assumptions regarding consumption of country foods. The Agency acknowledges the proponent's commitment to develop a follow-up program to verify concentrations of metals in country foods in the existing environment, prior to construction. The Agency agrees with Health Canada's recommendation that this follow-up program

include, at a minimum, arsenic, cobalt, mercury, thallium and zinc. In addition, uncertainties inherent to the methods used in the human health risk assessment to assess risk from lead were raised by Health Canada, and the proponent has committed to include lead in the follow-up program. This follow-up program would include country foods relied on for commercial purposes including, at a minimum, wild rice, blueberries, chanterelle mushrooms and fish. The Agency believes that the intent of the country foods monitoring program is best fulfilled by the proponent consulting with the Indigenous communities to select the species to be monitored, along with the sampling locations, and where necessary, a sampling methodology to ensure that resources are not wasted in the fulfillment of the program. The Agency also notes the proponent's commitment to erect fencing to ensure that wildlife are kept out of the tailings storage facility, and believes that the fencing should remain through abandonment to limit exposure to the water in the wet cover by animals.

The Agency acknowledges the proponent's commitment to provide personal protective equipment to Indigenous users for use while within the proponent's property boundary. A communication and engagement plan, developed prior to construction for implementation at the beginning of the Project, will allow for dissemination of results from monitoring programs to Indigenous communities, and proactive agreement on additional mitigation measures that can be taken if the findings are not favourable.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the effects on human health would be moderate in magnitude, as the Project would lead to a change to exposures below but nearing health-based standards. The effects would be moderate in geographic extent, as it would extend into the local study area. The effect would be continuous, of medium-term duration as it would last until decommissioning, and would be partially reversible as changes to air and water quality should gradually return towards pre-project conditions over time.

7.4.2 Reduced Ability to Harvest Subsistence and Economic Resources

Proponent's assessment of effects, mitigation and monitoring

The ability to harvest subsistence and economic resources would be affected by the loss of habitat in the local study area, including 309.5 hectares owned by members of Wabigoon Lake Ojibway Nation and Eagle Lake First Nation (Section 7.3.2), which represents approximately 0.7 percent of the total area for traplines DR026 and DR027. Access would also be affected (Section 7.3.2) to plant harvesting areas, including but not limited to blueberries and chanterelles, just into the local study area in between the open pit and former Tree Nursery. Additionally, due to changes in water flow in Blackwater Creek (which flows into Wabigoon Lake), the quality and availability of wild rice may be affected by the Project and have a socio-economic impact on Indigenous communities.

Concerning the ability to harvest for commercial resources, a socio-economic assessment was provided to characterize potential socio-economic effects to members of Indigenous communities for identified commercial and socio-economic interests, and to provide mitigation and follow-up program measures. Commercial fisheries, harvesting and sale of wild rice, chanterelles and blueberries, and tourism have been identified to be of commercial interest to Indigenous communities. No direct effects to these

interests are predicted due to the Project. A mitigation measure is proposed (Box 7.4-1) to minimize concerns of perceived contamination of these foods by Indigenous users, by posting the results of the sampling of country foods such as chanterelles, berries, fish and wild rice on a public forum such as a website, with the frequency and timing determined through consultation with Indigenous communities.

Effects to traplines in the local study area would be minimized through mitigation measures to reduce loss of wildlife habitat, wildlife mortality risk and movement of wildlife (Box 7.2-1). Wildlife habitat would be rehabilitated at decommissioning, with input from Indigenous communities.

The effects on baitfishing in the Tree Nursery ponds associated with Thunder Lake Tributaries 2 and 3 would be mitigated through measures proposed in Section 7.1. Annual sampling of fish tissues from fish of various trophic levels would be collected for chemical analysis to capture any potential effects of the Project on quality of fish harvested for consumption, subsistence or economic use. Indigenous communities would be consulted to identify preferred species for consumption and commercial sale in Wabigoon Lake and Thunder Lake, and results from the annual sampling program will be shared with the Indigenous communities and nearby land users or consumers outlined in Box 7.4-1.

Views Expressed

Wabigoon Lake Ojibway Nation and Eagle Lake First Nation raised concerns that the reduced availability of traditionally harvested foods such as blueberries just into the local study area would cause socio-economic impacts on their community members. Wabigoon Lake Ojibway Nation and Eagle Lake First Nation expressed that chanterelles and wild rice have high economic value to the communities. Wabigoon Lake Ojibway Nation and Naotkamegwanning First Nation expressed concern about the Project's potential effect on local tourism, which includes sport and recreational fishing, tourist camps and local employment as fishing guides. Naotkamegwanning First Nation and Eagle Lake First Nation expressed concern about the potential effects of the Project on commercial fishing, and the perception that fish will be contaminated due to proximity to the Project and the impact it will have on their viability as an economic resource. In response, the proponent has committed to annual sampling of fish species to be identified in consultation with Indigenous communities and publishing sampling results to a public avenue, such as a website to inform consumers.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures in Box 7.4-1 and the follow-up program measures in Box 7.4-2, the Project is not likely to cause significant adverse effects on socio-economic conditions related to the reduced ability to harvest subsistence and economic resources. The provision of accompanied access along Tree Nursery Road through the project study area, and unaccompanied access to blueberry and chanterelle harvesting areas just into the local study area (Box 7.3-1) would provide the continued ability to harvest for subsistence and economic purposes. Mitigation measures for wildlife habitat (Box 7.2-1) and fish habitat (Box 7.1-1) and the reduction of the footprint of the Project reduces the effects to socio-economic conditions as a result of reduced ability to harvest subsistence and economic resources.

The Agency recognizes that commercial fishing has been a source of income for Indigenous communities. The Agency recognizes the proponent's commitment to consult with Indigenous

communities to identify preferred species for consumption and sale in both Wabigoon Lake and Thunder Lake. The Agency notes that according to the Ontario Ministry of Natural Resources and Forestry, a commercial fishing license on Thunder Lake was last issued in the 2007 fishing season for Whitefish, Walleye and Northern Pike.[64] A commercial fishing license for Whitefish, Walleye, Northern Pike, Yellow Perch, Suckers, Tullibee and Burbot was last issued in 2016 for Wabigoon Lake.[65] The annual sampling will determine the quality of fish for consumption that would be harvested for subsistence or economic use. Additionally, the Agency acknowledges that the proponent has committed to inform Indigenous communities as well as nearby land users and consumers on a public forum, such as a website, of the results of sampling of wild rice, fish, blueberries and chanterelles, with sampling timing to coincide with harvesting seasons during the life of the Project. The Agency is of the view that this commitment, proposed as a key mitigation measure in Box 7.4-1 and supported by a follow-up program measure in Box 7.4-2, would reduce the perception of risk for nearby recreational or commercial land users or consumers, and reduce the likelihood of a significant adverse effect on socio-economic conditions on Indigenous peoples. The Agency expects that the proponent will consult with Indigenous communities in developing sampling locations of country foods, the timing of harvesting samples and the timing of public reporting.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency believes the effects to socio-economic conditions due to the reduced ability to harvest subsistence and economic resources will be moderate in magnitude as the harvesting may require some alteration in behaviour, and moderate in extent as it would be contained to just into the local study area. The effect would be continuous, of medium-term duration as it would last until decommissioning, and would be reversible as access to areas for plant harvesting, baitfishing and trap lines could resume after decommissioning.

Box 7.4-1: Key mitigation measures to address effects on health and socio-economic conditions

Mitigation measures to address exposure to air and water contaminants

- As part of the communication and engagement plan in Box 7.3-2, communicate results of the follow-up program in Box 7.4-2. This should include communication of any associated health risks, and adaptive management measures to be taken to further reduce the release of contaminants or the exposure to contaminants.
- Meet the standards set out in the *Canadian Ambient Air Quality Standards* and the *Ontario Ambient Air Quality Criteria* by implementing a dust management program to control fugitive particulate emissions from on-site roadways and material handling during construction, operations, and decommissioning, which includes:
    - Control fugitive dust emissions from roads, material handling and storage areas/stockpile by applying water sprays, use of surfactants, dust sweeping, gravel application, truck wheel washing stations, and enclosure of dust sources;
    - Use dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust; and

[64] License DR7560 as provided by the Ontario Ministry of Natural Resources and Forestry

[65] License DR2049 as provided by the Ontario Ministry of Natural Resources and Forestry

- Equip crushers with dust collection systems (baghouse or equivalent) to control fugitive emission during ore crushing and transfer.

- Provide personal protective equipment to Indigenous people, and provide information regarding the advisability of the use of the equipment during traditional land use activities within the proponent's property boundary.
- Implement adaptive management measures to deter ungulates from using the tailings storage facility, from the time that the facility becomes operational to abandonment;
- Implement the key mitigation measures identified in Box 7.1-1 for water quality and fish and fish habitat, to reduce exposure to metals from contact with water and from ingestion, and to reduce potential bioaccumulation in fish.

Mitigation measures to address reduced ability to harvest subsistence and economic resources

- Implement the mitigation measures identified in Box 7.1-1 related to fish and fish habitat that would protect fish habitat, fish population and fish health.
- Implement the mitigation measures identified in Box 7.3-1 related to providing access and progressive rehabilitation of the project study area.
- Post sampling information on blueberries, wild rice, chanterelles and fish, obtained through the follow-up program measure identified in Box 7.4-2, to a public forum, such as a website, available to Indigenous communities and nearby recreational or commercial land users to inform quality of harvested food. The frequency and timing of the postings will be developed in consultation with Indigenous communities.

Box 7.4-2: Follow-up program measures recommended for health and socio-economic conditions

Follow-up program measures to address exposure to air and water contaminants

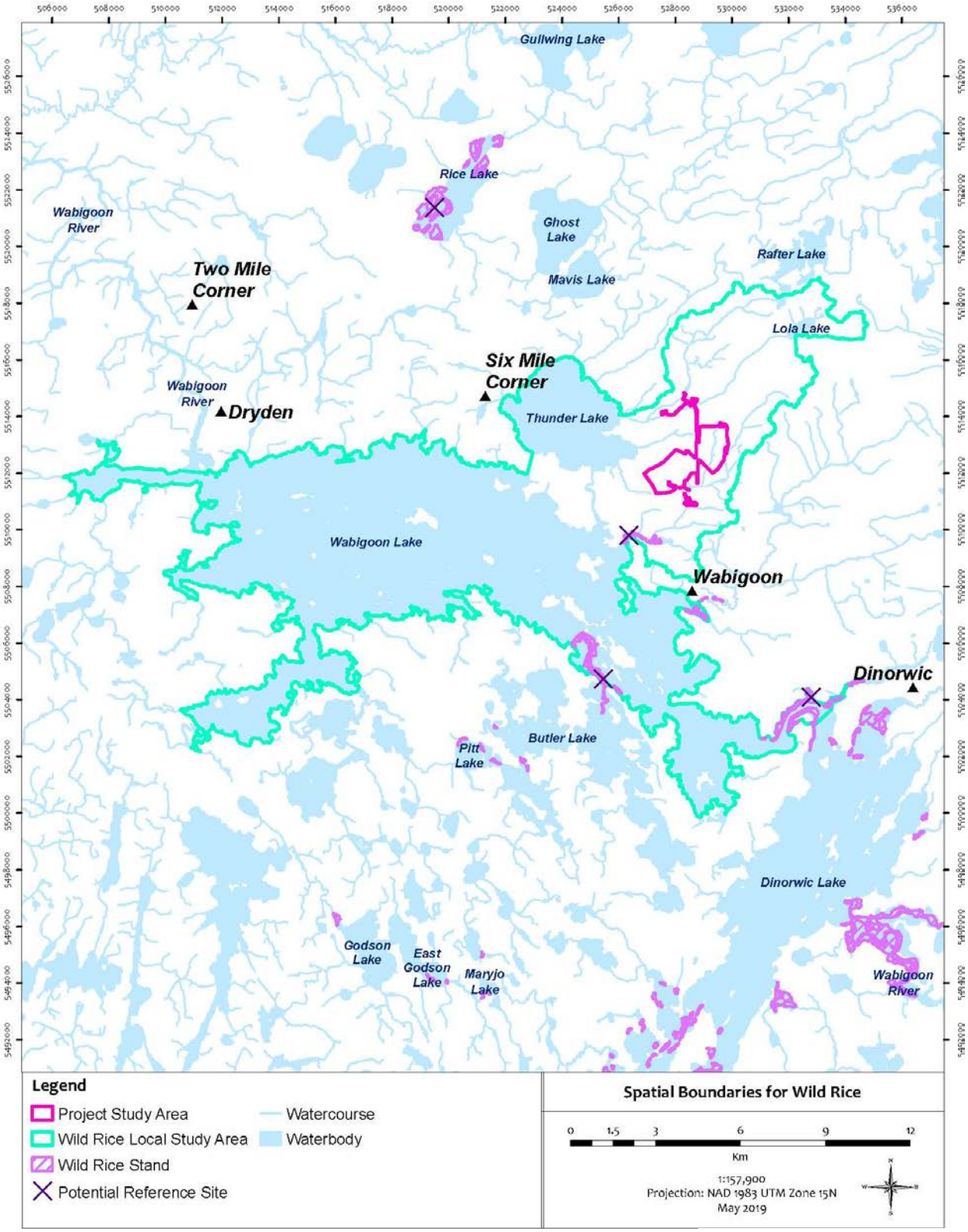
- Develop and implement follow-up program measures related to the health of Indigenous peoples to verify the accuracy of the environmental assessment predictions related to air quality, and to determine the effectiveness of the mitigation measures. Do so, in consultation with Indigenous communities, as part of the communication and engagement plan in Box 7.3-2, during construction, operations and decommissioning, and include measures at a minimum to monitor:
    - Fine particulate matter ($PM_{2.5}$) and nitrogen dioxide, at locations within areas used by Indigenous communities for traditional purposes or within areas representative of air quality in areas used by Indigenous communities for traditional purposes, within the project study area or local study area, in real-time;
    - Particulate matter (PM_{10}), including trace metal analysis, at the same locations, and at a frequency that is sufficient to understand temporal trends in the concentrations of these components (at a minimum of monthly)
- Implement follow-up program measures identified in Box 7.1-2 related to surface water quality. Develop and implement follow-up program measures related to the health of Indigenous peoples, in consultation with Indigenous communities, as part of the communication and engagement plan in Box 7.3-2, which include, at a minimum to monitor:
    - Thallium in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Thunder Lake and Wabigoon Lake, three months prior to construction, during construction and for a minimum of two years in operations, to verify the environmental assessment prediction for the "Project Only" contribution of thallium during "Site Preparation and Construction" and "Operations" in Table 3.5.3.4-1 of the Final Human Health and Ecological Risk Assessment (February 2019).[57] The monitoring results would inform whether implementation of additional mitigation measures is required. In case additional measures are implemented, also monitor the effectiveness of the measures;
    - Mercury in the effluent discharge to verify the environmental assessment prediction that it would not exceed the background concentration in Section 6, Table 6.8.2.1-1 of the revised

Environmental Impact Statement, submitted in April 2018 (Canadian Environmental Assessment Registry Reference Number 80019, document number 28); and

- Sulphate in the effluent discharge during construction, operations and decommissioning to verify the environmental assessment prediction that concentrations would not exceed 20 milligrams per litre.

- Develop and implement follow-up program measures to verify the baseline concentrations for country foods, to verify the accuracy of the environmental assessment predictions for country foods, and to determine the effectiveness of the mitigation measures. Do so, in consultation with Indigenous communities, as part of the communication and engagement plan in Box 7.3-2, and identify any vegetation, fish and animal species that must be monitored, along with a protocol for collection of vegetation or tissue samples. Do so for three months prior to construction, and during construction, operations, and decommissioning, at minimum on an annual basis. Include measures at a minimum to verify concentrations of arsenic, cobalt, lead, mercury, methylmercury, thallium and zinc in the following, at locations at a minimum within the property boundary where Indigenous use would occur:
  - Wild rice in and downstream of Blackwater Creek;
  - Tissue from Walleye; and other fish species identified in consultation with Indigenous communities
  - Chanterelle mushrooms and blueberries; and
  - Small mammals.

Figure 11 Potential Referencing Sites for Wild Rice Sampling



Source: Treasury Metals Inc.. 2018

7.5 Transboundary Effects – Greenhouse Gas Emissions

The Project could cause residual transboundary effects through emissions of greenhouse gases. Greenhouse gases are atmospheric gases that absorb and re-emit infrared radiation resulting in the warming of the lower levels of the atmosphere. These gases disperse at a global scale and this dispersion is considered a transboundary environmental effect for the purposes of CEAA 2012. The main greenhouse gases include carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, ozone, hydrofluorocarbons and perfluorocarbons. Estimates of greenhouse gas are usually reported in units of tonnes of carbon dioxide equivalent[66] per year. As of 2017, projects that emit over 10 000 tonnes of carbon dioxide equivalent per year are required to report emission levels to Environment and Climate Change Canada. The Agency is of the view that the Project is not likely to cause significant transboundary effects due to emissions of greenhouse gases.

7.5.1 Emissions of greenhouse gases

Proponent's assessment of environmental effects, mitigation and monitoring

Greenhouse gas emissions (carbon dioxide, methane and nitrous oxide) during construction would result from the combustion of diesel fuel in heavy earth-moving equipment and from equipment used for construction of project components. Changes in land use during construction would also release greenhouse gases from the removal and use of vegetation including timber (e.g., by burning) and the reduction in carbon sequestration and release from forests and wetlands that have been drained. The estimated annual greenhouse gas emissions from construction of the Project are 16 718 tonnes of carbon dioxide equivalent, occurring for a period of two years.

Greenhouse gas emissions during operations would result from fuel combustion from mining and drilling equipment, heavy haul trucks, dozers, graders and excavators. Other sources of greenhouse gas emissions during operations include natural-gas combustion in the underground mine heating system and testing diesel-powered backup generators. Changes in land use during operations would also release greenhouse gases from the removal and use of vegetation including timber, the decay of removed vegetation (e.g. buried roots, litter and deadwood), and the reduction in carbon sequestration and release from forests and wetlands that have been drained. Emissions would be highest during operations with an estimated maximum annual emission of 20 189 tonnes of carbon dioxide equivalent (during the maximum daily operating scenario). The total direct emissions would be approximately 0.0122 percent of the total greenhouse gas emissions from Ontario in the 2015 reporting year. Table 12 provides a breakdown of the predicted greenhouse gas emissions from the Project during the maximum operating year.

Greenhouse gas emissions during decommissioning and abandonment would result from the combustion of diesel fuel in mobile equipment used for the removal of project components and the implementation of rehabilitation activities. Changes in land use during decommissioning and

[66] Emissions of greenhouse gases are calculated and expressed as carbon dioxide equivalent to facilitate comparison. The emission rate of each substance is multiplied by its global warming potential relative to carbon dioxide.

abandonment would also release greenhouse gases from the removal and use of vegetation including timber, the decay of removed vegetation (e.g. buried roots, litter and deadwood), and the reduction in carbon sequestration and release from forests and wetlands that have been drained. The maximum annual greenhouse gas emissions during decommissioning and abandonment would be 17 845 tonnes of carbon dioxide equivalent.

Table 12 Predicted greenhouse gas emissions from the Project during operations

Source Description	Estimated greenhouse gas emissions (tonnes per year)			
	Carbon dioxide	Methane	Nitrous oxide	Total carbon dioxide equivalent emissions
Mobile equipment[a]	10 377	0.58	3.86	11 585
Backup generators[b]	1216	0.08	0.01	1222
Natural gas heating[a,c]	1589	0.03	0.03	1598
Land use change[d]	1215	215.49	0.14	5784
Total	**14 397**	**216.18**	**4.04**	**20 189**

[a] Emissions for mobile equipment and mine heating are calculated based on maximum activity levels and continuous operations throughout the year.

[b] Emissions for the backup generators are calculated assuming 1 hour of operations per month.

[c] Emissions from heating would occur once the underground mine starts operations. Annual emissions associated with mine heating are overestimated as heating may not be required throughout the year.

[d] Emissions from land use during operations would be from the removal and use of vegetation including timber, the decay of removed vegetation (e.g. buried roots, litter, and deadwood), and the reduction in carbon sequestration and release from forests and wetlands that have been drained.

The measures that would be implemented to reduce air contaminant emissions (Section 6.1) would concurrently reduce greenhouse gas emissions. In addition, the distances of truck haul would be minimized due to the compact footprint of the Project and the strategic placement of the waste rock and overburden storage areas.

Emission monitoring and reporting would be a component of the proposed greenhouse gas management plan, and would occur in accordance with federal and provincial requirements.[67]

Agency analysis and conclusion

The Agency is of the view that the Project is not likely to cause significant adverse and transboundary effects due to emissions of greenhouse gases. The Agency notes that greenhouse gas emissions from Ontario have reduced from 166 000 kilotonnes of carbon dioxide equivalent for the 2015 reporting year to 158 700 kilotonnes of carbon dioxide equivalent for the 2017 reporting year. As such, the relative percentage of the predicted maximum annual emission estimate for the Project would be slightly higher, at approximately 0.0127 percent of the provincial emissions for the 2017 reporting year. The Agency considers the relative contribution of direct emissions from the Project's operations to be low in

[67] Environment and Climate Change Canada's Greenhouse Gas Reporting Program, and Ontario's *Greenhouse Gas Emissions: Quantification, Reporting and Verification Regulations* (O. Reg 390/18), under Ontario's *Environmental Protection Act*.

magnitude compared to Ontario and Canada's greenhouse gas inventories. The Agency did not identify any key mitigation measures in relation to greenhouse gas emissions. The Agency also notes that the proponent would be required to monitor and report its greenhouse gas emissions annually to Environment and Climate Change Canada. The proponent committed to incorporating measures related to greenhouse gas emission management that adhere with federal and provincial requirements.[67]

Given the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of greenhouse gas emissions predicted from the Project would be low in comparison to provincial and national emission levels.

7.6 Other Effects Related to Federal Decisions

In accordance with paragraphs 5(2)(a) and 5(2)(b) of CEAA 2012, the Agency considered changes to the environment and the effects of those changes that are directly linked or necessarily incidental to other federal decisions, pursuant to other legislation (listed in Table 1), that may be required for the Project. This included consideration of the potential effects excluding those to fish and fish habitat, migratory birds and Indigenous peoples, which have already been discussed in Sections 7.1 to 7.5 of this report.

The Agency focused its assessment of effects under subsection 5(2) of CEAA 2012 on the changes resulting from the removal of waterbodies and the alteration of surface water quantity and quality, for which the proponent intends to pursue one or more decisions under the *Fisheries Act* and *Metal and Diamond Mining Effluent Regulations.*[68] The removal of waterbodies and the alteration of surface water quantity and quality linked or incidental to these federal decisions may cause potential adverse environmental effects, including:

- effects to wetlands; and
- effects to Snapping Turtles.[69]

The Agency is of the view that the Project is not likely to cause significant adverse effects on wetlands and Snapping Turtles due to the loss of waterbodies or the alteration of surface water quantity and quality, after taking into account the proposed key mitigation measures (Box 7.6-1). The Agency recommends follow-up program measures (Box 7.6-2) to evaluate the accuracy of the predictions and to determine the effectiveness of mitigation measures proposed to minimize the effects from project activities linked to other federal decisions.

The Agency's conclusions are based on its analysis of the proponent's assessment as well as the views expressed by Fisheries and Oceans Canada, Environment and Climate Change Canada, Ontario Ministry of Natural Resources and Forestry, and Indigenous communities.

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[68] At the time of this environmental assessment, it was not yet confirmed which waterbodies would be administered as an authorization under section 35 of the *Fisheries Act* or an amendment to Schedule 2 of the *Metal and Diamond Mining Effluent Regulations* under the *Fisheries Act*.

[69] *Chelydra serpentine*; listed as a species of Special Concern in Schedule 1 of the *Species at Risk Act* and by the Committee on the Status of Endangered Wildlife in Canada.

Description of the Existing Environment

Wetlands provide habitat for amphibians, reptiles (including Snapping Turtles), furbearers, waterfowl and fish in the regional study area, and are important contributors to the ecosystem. As shown in Table 9, within the regional study area, there are 48 104 hectares of wetlands including both mineral wetlands (such as marshes and forested swamps) and peatlands (such as bogs and fens).

Snapping Turtles use a wide variety of aquatic environments, including marshes and ponds that are located along rivers and small streams.[70] The winter habitat of Snapping Turtles include permanent waterbodies, large wetlands, bogs and fens. While there is suitable habitat for Snapping Turtles within the regional study area[71], no Snapping Turtle was observed within the regional study area.

7.6.1 Effects to wetlands

Proponent's assessment of environmental effects, mitigation and monitoring

As described in Table 9, the Project would cause a direct loss of 41 hectares of wetlands in the regional study area (e.g., through vegetation clearing). An additional 16 hectares of wetlands would be indirectly lost from alterations to the quantity and quality of surface water and groundwater. Together, the amount of wetland loss would represent less than 0.1 percent of wetland habitat in the regional study area. The loss of wetlands, as shown in Figure 12, would be linked to the federal decisions. The predicted changes to the wetland environment were further described in Section 6.3.

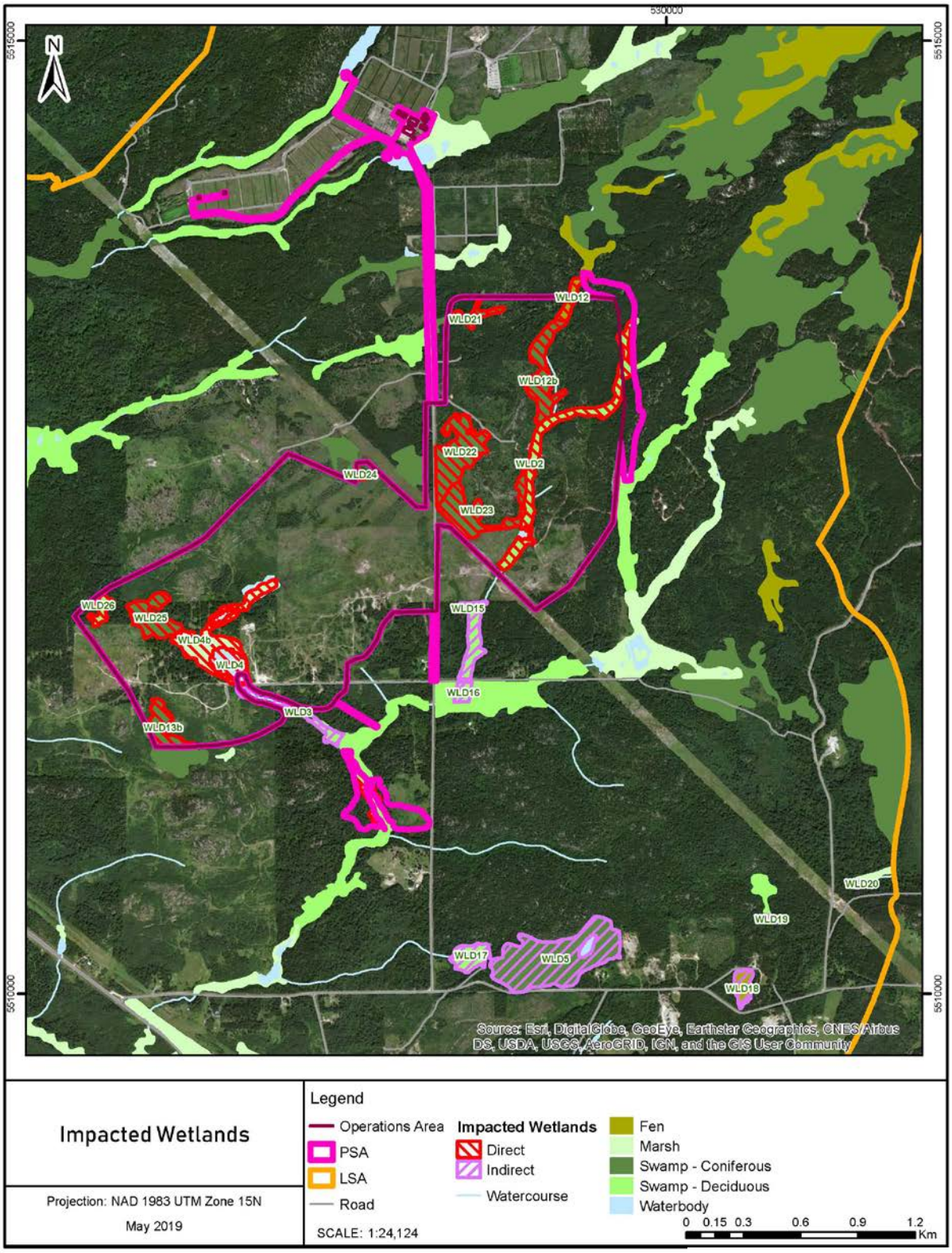
As discussed in Section 6.1, there would be changes in water quantity and quality from conducting project activities, such as the development of the open pit and the withdrawal of water from Tree Nursery ponds associated with Thunder Lake Tributaries 2 and 3. These effects on wetlands would extend into the local study area and would occur throughout all phases of the Project.

To reduce the adverse effects to wetlands, mitigation measures would be implemented to minimize the amount of wetland vegetation removal (e.g., by retaining forested areas wherever feasible and by avoiding broadcast spraying of herbicides), and to re-establish wetland habitat and native wetland vegetation progressively during operations, decommissioning and abandonment of the Project (Box 7.2-1). Approximately 15 hectares of wetland habitat would be rehabilitated and an additional 24 hectares of wetlands would be created during decommissioning and abandonment. The fish habitat offsetting plan (Box 7.1-1) would include features that support the rehabilitation of wetlands. Follow-up program measures would verify the predictions of effects and the effectiveness of the progressive rehabilitation (Boxes 7.1-2 and 7.2-2).

[70] Environment and Climate Change Canada. 2016. Management Plan for the Snapping Turtle (Chelydra serpentina) in Canada [Proposed]. *Species at Risk Act* Management Plan Series. Environment and Climate Change Canada, Ottawa. iv + 39 p.

[71] Information provided by the Ontario Ministry of Natural Resources and Forestry.

Figure 12 Loss and Alteration of Wetlands Linked to a Federal Decision



Source: Treasury Metals Inc., 2018

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of the key mitigation measures described in Box 7.6-1 and the follow-up program measures in Box 7.6-2, the Project is not likely to cause significant adverse effects on wetlands.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of the effects on wetlands is low as the Project would result in the loss of less than 0.1 percent of wetlands in the regional study area. The Agency notes that the effects on wetlands would impact ecosystem function including carbon sequestration, erosion control (including shoreline erosion control), habitat for flora and fauna (including species at risk), flood abatement, groundwater recharge, nutrient retention and contaminant filtration within the local study area.

The geographic extent of wetland loss would be moderate, as the wetland loss would occur within the project and local study areas. The duration of wetland loss would be long term with effects extending into abandonment, with a continuous frequency during construction, operations and decommissioning. A fish habitat offsetting plan and progressive site rehabilitation (Boxes 7.1-2, 7.2-1, and 7.6-1) would create approximately 24 hectares of wetlands and restore approximately 15 hectares of wetlands. Consequently, the effect of the Project on wetland habitat would be considered partially reversible.

7.6.2 Effects to Snapping Turtles

Proponent's assessment of environmental effects, mitigation and monitoring

Though Snapping Turtles were not observed during field surveys, suitable habitat for Snapping Turtles exists within the project, local and regional study areas. Approximately nine hectares of suitable habitat in the local study area (less than one percent of suitable habitat within the regional study area) would be removed during construction, which would affect Snapping Turtles until suitable habitat is created or restored. A portion of this loss of habitat would be associated with the loss and alteration of waterbodies that are linked to federal decisions (Figure 12). However, suitable habitat is common and well distributed within the regional study area. In addition, the implementation of the fish habitat offsetting plan and progressive rehabilitation plan would partially restore wetland habitat within the local and project study areas, in alignment with the broad strategies and conservation measures presented in the federal management plan for Snapping Turtles[70] (Boxes 7.1-1, 7.2-1 and 7.6-1).

Additional effects to Snapping Turtles include potential vehicle collisions on roads within the project study area. Vehicle collisions with wildlife, including Snapping Turtles, would be monitored (as described in Section 7.2 and Box 7.2-1) and if collisions were observed, adaptive management measures would be implemented to avoid collisions. An education plan to help Project workers identify and report Snapping Turtles would also be developed in consultation with Ontario Ministry of Natural Resources and Forestry and Indigenous communities. Snapping Turtles that are found within the project study area during the construction phase would be captured and relocated.

Views Expressed

The Ontario Ministry of Natural Resources and Forestry informed the proponent that there are established Snapping Turtle nesting sites within the local and regional study areas and requested that the proponent assess the effects of the Project on Snapping Turtles. Eagle Lake First Nation indicated that the proponent's assessment lacked surveys on Snapping Turtle habitat, including winter and nesting habitat. The proponent modified its assessment and provided detailed information on the direct and indirect effects of the Project on habitat loss for Snapping Turtles, and concluded that the potential effects of the Project on Snapping Turtles would be low. The proponent committed to developing a monitoring plan in consultation with the Ontario Ministry of Natural Resources and Forestry and Indigenous communities to monitor the project study area for Snapping Turtles during construction, operations and decommissioning. If Snapping Turtles are observed within the project study area, the proponent would relocate individuals away from the project study area.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of the key mitigation measures described in Box 7.6-1 and the follow-up program measures in Box 7.6-2, the Project is not likely to cause significant adverse effects on Snapping Turtles.

The Agency assessed the potential impacts on Snapping Turtles due to the loss and alteration of waterbodies that are linked to federal decisions. Mitigation measures to reduce the impacts to Snapping Turtles and their habitat include measures that are used to mitigate the effects to fish and fish habitat from changes in water quantity and quality (Box 7.1-1). Monitoring of Snapping Turtles in the project study area would be conducted in consideration of other monitoring activities (e.g., wildlife monitoring, wetland monitoring, groundwater monitoring). While Snapping Turtles were not observed in the project study area during field surveys, if any were found during construction, operation or decommissioning, they would be captured and relocated (Box 7.6-2). Monitoring of collisions of Snapping Turtles with vehicles would occur, and if observed, adaptive management measures would be implemented.

Given the proposed mitigation measures and the definitions of the environmental effects rating criteria in Appendix A, the Agency is of the view that the magnitude of the residual effects on Snapping Turtles is low as the Project would result in the loss of less than one percent of wetlands in the regional study area and should not affect Snapping Turtle populations. The geographic extent of the residual effects on Snapping Turtles would be moderate, as the effect would extend into the local study area. The duration of the residual effects to Snapping Turtles would be medium-term because the effects are predicted to occur during construction, operations and decommissioning, with continuous frequency. The residual effects to Snapping Turtles would be partially reversible upon the rehabilitation of wetland habitat during decommissioning. In addition, the establishment of a fish habitat offsetting plan (Section 7.1) would provide habitat for Snapping Turtles.

Box 7.6-1: Key mitigation measures to address effects to wetlands and Snapping Turtles

Mitigation measures to address effects to wetlands
• Minimize the amount of wetland and vegetated area to be cleared by retaining forested areas wherever feasible and by avoiding broadcast spraying of herbicides.

- In consultation with relevant authorities and Indigenous communities, implement the progressive rehabilitation of project components during operations, decommissioning, and abandonment of the Project to revegetate areas that were cleared. The measures implemented should avoid the introduction of invasive species. The progressive rehabilitation plan would be consistent with the Certified Closure Plan pursuant to Ontario's *Mining Act*.
- Maintain vegetated buffers of 120 metres along rivers, creeks, and wetlands within the project study area using native species during construction and operations.
- Implement mitigation measures related to fish and fish habitat (described in Box 7.1-1)

Mitigation measures to address effects to Snapping Turtles

- Implement mitigation measures related to fish and fish habitat (described in Box 7.1-1)

Box 7.6-2: Follow-up Program recommended to address effects to wetlands and Snapping Turtles

Follow-up program measures to address effects to wetlands

- In coordination with relevant authorities, develop a follow-up program to verify the predictions of effects and the effectiveness of the progressive rehabilitation (Boxes 7.1-2, 7.2-1, and 7.6-1) to wetlands within the local study area and the regional study area. The program should verify the predicted spatial limits of the groundwater drawdown zone identified in Figure TMI_871-WL(2)-02_Figure 1[56] before and during operations, by mapping the extent of wetlands and monitoring wetland water levels.

Follow-up program measures to address effects to Snapping Turtles

- Develop a monitoring plan in consultation with relevant authorities and Indigenous communities to monitor the project study area for Snapping Turtles during construction, operations, and decommissioning. If Snapping Turtles are observed in the project study area, implement mitigation measures, such as relocation from the project study area.
- Implement follow-up program measures to monitor collisions of Snapping Turtles with vehicles, and where necessary, apply adaptive management measures.

8 Other Effects Considered

8.1 Effects of the Project on Species at Risk

Subsection 79(2) of the *Species at Risk Act* requires the Agency to identify if and how a project is likely to adversely affect wildlife species that are listed in Schedule 1 of the *Species at Risk Act* or associated critical habitat. This requires the Agency to ensure measures are taken to avoid or lessen adverse effects on species at risk and to ensure that appropriate monitoring and follow-up programs are considered if a project is carried out. The measures must be consistent with applicable recovery strategies and action plans.

The Agency is of the view that the Project is not likely to cause adverse effects to species at risk due to habitat loss, after taking into account key mitigation measures and monitoring programs described in Sections 7.2 (for migratory birds) and 7.3 (for Indigenous use) of this report.

The Agency's conclusions are based on its analyses of the proponent's assessments as well as the views expressed by Environment and Climate Change Canada, the Ontario Ministry of Natural Resources and Forestry, and Indigenous communities.

This assessment focuses on non-aquatic species at risk and species at risk that are not migratory birds, but are species listed in Schedule 1 of the *Species at Risk Act* or assessed as endangered, threatened or of special concern by the Committee on the Status of Endangered Wildlife in Canada. An assessment of effects on migratory birds is provided in Section 7.2.

Proponent's assessment of environmental effects, mitigation, and monitoring

Eleven species at risk were identified within the regional study area (Table 13). Potential habitat for an additional seven species at risk was identified within the regional study area, but none of those species were observed. The assessment in this section is focussed on the effects of direct habitat loss (i.e., habitat removal) and indirect habitat loss (i.e., by noise, light, and dust). The Project's effects on migratory birds that are species at risk are discussed in Section 7.2 and the effects on Snapping Turtle are discussed in Section 7.6. There were no fish or plant species at risk that were predicted to be affected by the Project.

Table 13 Species at Risk Potentially Affected by the Project

Species		Observed in RSA/LSA	Migratory Bird[a]	Status	
Common Name	Scientific Name			SARA (Schedule 1)	COSEWIC
Birds					
Barn Swallow	*Hirundo rustica*	LSA	Yes	Threatened	Threatened
Bobolink	*Dolichonyx oryzivorus*	-[b]	Yes	Threatened	Threatened
Canada Warbler	*Cardellina canadensis*	LSA	Yes	Threatened	Threatened
Chimney Swift	*Chaetura pelagica*	-[b]	Yes	Threatened	Threatened
Common Nighthawk	*Chordeiles minor*	LSA	Yes	Threatened	Special Concern
Eastern Wood-pewee	*Contopus vierns*	-[b]	Yes	Special Concern	Special Concern

Eastern Whip-poor-will	*Antrostomus vociferous*	LSA, RSA	Yes	Threatened	Threatened
Least Bittern	*Ixobrychus elixis*	-[b]	Yes	Threatened	Threatened
Olive-sided Flycatcher	*Contopus cooperi*	LSA	Yes	Threatened	Special Concern
Rusty Blackbird	*Euphagus carolinus*	LSA	No	Special Concern	Special Concern
Short-eared Owl	*Asio flammeus*	-[b]	No	Special Concern	Special Concern
Wood Thrush	*Hylocichla mustelina*	LSA	Yes	Threatened	Threatened
Yellow Rail	*Coturnicops noveboracensis*	-[b]	Yes	Special Concern	Special Concern
Mammals					
Grey Fox	*Urocyon cinereoargenteus*	RSA	No	Threatened	Threatened
Little Brown Myotis	*Myotis lucifugus*	LSA	No	Endangered	Endangered
Northern Myotis	*Myotis septentrionalis*	LSA	No	Endangered	Endangered
Reptiles					
Snapping turtle	*Chelydra serpentina*	-[b]	No	Special Concern	Special Concern
Insects					
Monarch	*Danaus plexippus*	RSA	No	Special Concern	Endangered

RSA= regional study area; LSA = local study area;
SARA = *Species at Risk Act*; COSEWIC = Committee on the Status of Endangered Wildlife in Canada;
[a]As defined by the *Migratory Bird Convention Act* (1994)
[b]The species was not identified within the RSA but its potential habitat was identified within the RSA.

Non-Migratory Birds

Rusty Blackbird

Rusty Blackbird[72] habitat includes coniferous-dominated forests near wetlands including bogs, marshes, swamps and beaver ponds.[73] Rusty Blackbirds were identified within the local study area. The Project will cause the direct loss of approximately 41 hectares and the indirect loss of approximately 15 hectares of habitat suitable for Rusty Blackbird (0.1 percent of regional study area). However, this type of habitat is common locally and regionally, and 39 hectares of suitable habitat for Rusty Blackbirds will be rehabilitated (e.g., through revegetation) or created (e.g. wetland creation) through the fish habitat offsetting plan (described in Section 7.1).

[72] *Euphagus carolinus*

[73] Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2017. COSEWIC assessment and status report on the Rusty Blackbird *Euphagus carolinus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi +64 pp.

Short-eared Owl

Short-eared Owls[74] use a wide variety of open habitat found within the project study area and local study area, including grasslands, bogs, marshes, shrublands and agricultural fields.[75] Although Short-eared Owls were not observed within the local study area, approximately 20 hectares of suitable habitat (0.1 percent of regional study area) would be removed or altered. The Project is not expected to have an adverse effect on Short-eared Owls because suitable habitat is common and well distributed throughout the regional study area. In addition, the implementation of the fish habitat offsetting plan (described in Section 7.1) and progressive rehabilitation would create and restore 267 hectares of habitat, in alignment with the broad strategies and conservation measures presented in the federal management plan for Short-eared Owl (Boxes 7.1-1, 7.2-1 and 7.6-1).[76]

Mammals

Grey Fox

Grey Fox[77] habitat includes deciduous forest, with dens located adjacent to water sources in dense brush. The most important threats facing Grey Fox in Canada are hunting, trapping and road mortality. Grey Fox were observed within the regional study area and potential habitat was identified within the project study area. The Project will cause the direct loss of approximately 76 hectares of suitable habitat and the indirect loss of approximately 8 hectares of suitable habitat (0.1 percent of regional study area). The Project is not expected to have an adverse effect on Grey Fox because suitable habitat is common and well distributed throughout the regional study area. In addition, progressive rehabilitation of the habitat would partially restore habitat within the project and local study areas (17 hectares total), in alignment with the broad strategies and conservation measures presented in the federal management plan for Grey Fox (Box 7.2-1).[78]

Bats

Little Brown Myotis[79] and Northern Myotis[80] overwinter in cold and humid hibernacula such as caves or mine entrances. Little Brown Myotis establish summer maternity colonies in buildings or large diameter trees, and forage over waterbodies, watercourses, forest edges and forest gaps. Northern Myotis rarely occupy anthropogenic structures for roosting as they prefer large trees and forage in forest gaps.

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[74] *Asio flammeus*

[75] COSEWIC. 2008. COSEWIC assessment and update status report on the Short-eared Owl *Asio flammeus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.

[76] Environment and Climate Change Canada. 2016. Management Plan for the Short-eared Owl (*Asio flammeus*) in Canada [Proposed]. Species at Risk Act Management Plan Series. Environment and Climate Change Canada, Ottawa. iv + 35 p.

[77] *Urocyon cinereoargenteus*

[78] Environment and Climate Change Canada. 2017. Recovery Strategy for the Grey Fox (*Urocyon cineroargenteus*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. ix+42 p.

[79] *Myotis lucifugus*

[80] *Myotis septentrionalis*

Little Brown Myotis and Northern Myotis were recorded within the local study area and potential maternity roost habitat was identified within the project study area. The availability of habitat such as maternity sites (trees, rock crevices, buildings, bat houses) and hibernacula (cave, mine or buildings) is important for Little Brown Myotis and Northern Myotis.[81]

During construction, approximately 76 hectares of potential habitat for Little Brown Myotis and Northern Myotis will be cleared within the project study area and an additional 8 hectares of potential habitat in the local study area will be indirectly lost or altered (0.1 percent of regional study area). This would result in displacement of Little Brown Myotis and Northern Myotis individuals to the local or regional study areas for foraging and roosting during construction, operations and decommissioning of the Project.

To reduce the predicted adverse effects of the Project on non-migratory birds and mammals, habitat loss would be restricted by minimizing the size of the project study area (Box 7.2-1). Vegetated buffers of 120 metres would be provided along rivers, creeks and wetlands wherever feasible and vegetation would be cleared outside of bird nesting periods, which would also protect roosting bats. In addition, a fish habitat offsetting plan (described in Section 7.1) and progressive rehabilitation would restore wetlands and revegetate cleared areas (8 hectares in total) during operations, decommissioning and abandonment of the Project, as discussed in Sections 6.4, 7.1 and 7.2.

Insects

Monarch

Monarch[82] breeding and nectar habitat are confined to habitat containing milkweed[83] including disturbed areas, grasslands, wetlands and open forests.[84] Although Monarchs were not observed within the local study area during field surveys, the extent of Monarch occurrence includes the regional study area. Swamp milkweed[85] was also identified within the local study area. The Project will cause the direct loss of approximately 41 hectares and the indirect loss of approximately 18 hectares of suitable habitat for Monarch (0.1 percent of regional study area). The Project is not expected to have an adverse effect on Monarch populations because the local study area contained limited numbers of swamp milkweed individuals and Monarchs were not identified during field surveys.

Views Expressed

Environment and Climate Change Canada, Métis Nation of Ontario, Eagle Lake First Nation and the Ontario Ministry of Natural Resources and Forestry requested that the proponent assess the effects of

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[81] Environment Canada. 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.

[82] *Danaus plexippus*

[83] *Asclepias* spp.

[84] COSEWIC. 2016. COSEWIC assessment and status report on the Monarch *Danaus plexippus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 59 pp.

[85] *Asclepias incarnata*

the Project on all known and potential species at risk within the regional study area and provide a follow-up program to monitor the effects. The proponent increased the number of species at risk in their assessment of effects. The proponent also used habitat loss as an indicator with updated project study areas and local study areas for each species. The proponent has also developed a follow-up program for species at risk which includes monitoring the amount of habitat lost, mortality, habitat compensation and habitat utilization during all phases of the Project.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the implementation of key mitigation measures described in Section 7.1 (regarding the fish habitat offsetting plan), Section 7.2 (to reduce adverse effects on migratory birds), and Section 7.6 (to reduce adverse effects on Snapping Turtle), the Project is not likely to cause adverse effects to species at risk. The key mitigation measures discussed in Section 7.2 include avoiding vegetation clearing during nesting periods and progressively rehabilitating cleared areas using native species. The Agency recommends that the proponent consider applicable recovery strategies and action plans for species at risk that may be affected by the Project as outlined under the *Species at Risk Act* to reduce or prevent the decline of these species.[86]

8.2 Effects of Accidents and Malfunctions

Proponent's assessment of environmental effects and mitigation

There is potential for accidents and malfunctions to occur throughout all phases of the Project, which could lead to adverse impacts on the Project and its surrounding environment. The proponent has described the potential effects of project-related accidents and malfunctions, as well as corresponding preventative and response measures.

The proponent assessed accidents and malfunctions including dam failure at the tailings storage facility, failure of the tailings pipeline, and chemical spills or releases (e.g. diesel fuel, gasoline, cyanide). The effects of environmental hazards (e.g., flooding, drought, fire) on the Project are discussed in Section 8.3.

Tailings storage facility dam failure

A failure of the tailings storage facility dam has potential to occur during a 1-in-100-year storm event.[87] In such event, the worst case scenario was assumed in which the full contents of the liquid in the tailings storage facility (880 000 cubic metres of supernatant water and 62 478 cubic metres of storm water) would be released into Blackwater Creek and flow into Wabigoon Lake. In the same scenario, the tailings solids (753 480 cubic metres) would be released onto land, with a portion of the solids entering Blackwater Creek but never reaching Wabigoon Lake. Potential environmental effects from failure of the

[86] A federal recovery strategy is in place for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Gray Fox (*Urocyon cinereoargenteus*). A federal management plan is in place for Snapping Turtle (*Chelydra serpentina*), Monarch (*Danaus pleixppus*), Short-eared Owl (*Asio flammeus*) and Rusty Blackbird (*Euphagus carolinus*).

[87] 1-in-100 year storm event refers to a storm event that has a one percent chance of occurring in any given year.

tailings storage facility dam include a temporary increase in surface water flows and levels that can cause erosion and destroy fish habitat in Blackwater Creek (e.g., by smothering vegetation and substrate of the creek bed). Fish mortality could also occur from the physical blow of the high surface flows and from high levels of suspended solids in the water. Though tailings solids are not predicted to reach Wabigoon Lake, there would be an increase in contaminant concentrations that exceed Ontario Provincial Water Quality Objectives for several contaminants (aluminum, arsenic, cadmium, cobalt, copper, cyanide, iron, lead, mercury, selenium, silver, thallium, uranium and zinc) in Blackwater Creek and Kelpyn Bay[88]. Levels of contaminants, especially cadmium, lead, and mercury, could biomagnify[89] across the aquatic food chain. This would have implications for human consumption of fish including Northern Pike and Walleye, due to potentially elevated contaminant levels in the fish tissue.

The wild rice stands that are located at the mouth of Blackwater Creek are important to Indigenous communities for harvesting and consumption. The expected height and velocity of the water released from the dam failure would cause limited physical damage to the wild rice stands. The concentration of metals in the wild rice (*via* uptake from the contaminated sediment) due to the Project would not harm human health or wildlife when the rice is consumed (Section 7.4.1).

The tailings storage facility dams and the reclaim pond would be constructed in stages as the volume of tailings increases and water pooling changes. Further, tailings in the form of slurry would be transported by pipeline from the ore processing facility to the tailings storage facility. In addition to these preventative design measures, the proponent has committed to the following:

- Create an Independent Tailings Review Board to review the project designs to reduce the likelihood of accidents and malfunctions related to tailings (Section 6.2.3).
- Incorporate the 1-in-100-year flood event[90] and the maximum credible earthquake into the project design[91] (Box 7.1-1).
- Design all dams according to the recommendations for mining dams from the Canadian Dam Association's Dam Safety Guidelines and satisfy the requirements of the Ontario Ministry of Natural Resources and Forestry or the Ontario Ministry of Energy, Northern Development and Mines, as applicable.[92,93]

[88] Kelpyn's Bay is located immediately downstream of Blackwater Creek, at its mouth in Wabigoon Lake.

[89] Process by which a compound increases its concentration in the tissues of organisms as it travels up the food chain.

[90] 1-in-100 year flood event refers to a flood event that has a one percent chance of occurring in any given year.

[91] The tailings storage facility dam is designed to withstand the maximum earthquake in accordance with the *Canadian Dam Association Dam Safety Guidelines*, Ontario's *Lakes and Rivers Improvement Act* and Ontario's *Mining Act*.

[92] Requirements of the *Lakes and Rivers Improvement Act* fall under the purview of the Ontario Ministry of Natural Resources and Forestry and apply to dam structures in watercourses. Dam structures that are entirely land-based fall under the purview of the Ontario Ministry of Northern Development and Mines, pursuant to Ontario Regulation *O.Reg. 240/00: Mine Development and Closure under Part VII of the Act*.

[93] The *Dam Safety Guidelines* is an important reference document for dam safety in Canada, published by the Canadian Dam Association in 2007 and revised in 2013. These guidelines encompass principles that can apply to all dams and outline of processes and criteria for management of dam safety in accordance with the principles.

- Implement a site-specific Operations, Maintenance and Surveillance Manual that establishes clear performance standards for the tailings storage facility.[94]

In the event of a dam failure or imminent failure in the tailings storage facility, the proponent would initiate its emergency response plan. The initial response would be to protect worker health and safety and shut down the pumping of tailings into the facility. In addition, the emergency response plan would include the following:

- Cease operations of ore processing facility and seepage reclaim.
- Undertake emergency repairs.
- Re-route the reclaim system to transfer water back to the ore processing facility if capacity is available, or pump to the open pit for temporary storage.
- Contain the spill using temporary devices, including sediment traps in Blackwater Creek to prevent sediment re-mobilization.
- Report the incident in accordance with statutory responsibilities.

The details of the recovery strategy would be dependent on the extent and nature of the spill, but would include removal and disposal of the tailings spilled on land, as well as contaminated soil, into the tailings storage facility as soon as the tailings storage facility is stabilized (Box 7.1-1). The removal of tailings solids from Blackwater Creek would be completed in consultation with Fisheries and Oceans Canada during winter months when the ground is frozen and water flows are low to facilitate access of heavy equipment. As the tailings are potentially acid-generating, the remediation would occur prior to the onset of acid rock drainage (Box 7.1-1). A monitoring program would be developed to determine metal concentrations of wild rice samples taken from the mouth of Blackwater Creek (as described in Sections 7.3 and 7.4) as well as water, sediment, and fish tissue samples collected from Wabigoon Lake (Box 7.1-1).

Other Accidents and Malfunctions

Additional accidents and malfunctions that could cause adverse environmental effects include failure of the tailings pipeline and chemical spills or releases.

In relation to a failure of the tailings pipeline, the spilled tailings slurry would be fully contained within the project study area and would be captured by perimeter ditching that surrounds project components. Failure of the tailings pipeline would lead to an emergency shutdown of the ore processing facility. The facility would remain shut down until the pipeline is repaired or replaced. The spilled tailings slurry, along with contaminated soils, would be collected and deposited into the tailings storage facility. Runoff from the tailings liquid would be captured in the perimeter ditching and directed to the mine water pond, then reused on-site or treated to meet water quality guidelines prior to discharge into Blackwater Creek.[4]

[94] The standards under the *Operation, Supervision and Maintenance Manual* would be in accordance with the principles in the Mining Association of Canada *Guide to the Management of Tailings Facilities*; Canadian Dam Association *Dam Safety Guidelines*, applicable international guidelines and standards; and all commitments to regulators and stakeholders.

Spills or releases related to diesel fuel and gasoline are considered to have low environmental risk, as these chemicals would be stored and used within contained areas (e.g. diesel fuel and gasoline would be stored in double-walled tanks in a bermed facility with a petroleum resistant liner). Spills of diesel fuel and gasoline would be contained within perimeter ditching that surrounds project components. An Emergency and Spill Response Management Plan would be developed and implemented to the standards of federal regulations to respond to, report and remediate spills or releases.

An accident or malfunction involving the cyanide treatment circuit in the ore processing facility has potential to occur during operations which could lead to the release of cyanide (as hydrogen cyanide gas) into the air. The ore processing facility, where the hydrogen cyanide gas would be stored, would be equipped with alarmed sensors. Once the gas is detected at unacceptable levels, the ore processing facility would be shut down and the Emergency and Spill Response Management Plan would be executed. The gas would be allowed to dissipate into the natural environment.

An accident or malfunction to the cyanide treatment circuit could also produce tailings with a higher cyanide concentration than normal, which could be harmful to migratory birds (Section 7.2).[95] However, higher concentrations of cyanide in the tailings would be temporary, as concentrations would return to normal when the cyanide treatment circuit is repaired. The supernatant in the tailings storage facility would also dilute the cyanide. All project components that handle cyanide would be designed to comply with the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold.[96]

Views expressed

Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Eagle Lake First Nation and Naotkamegwanning First Nation expressed concerns regarding the potential failure of the tailings storage facility dam and requested information on the potential worst-case scenario along with the preventative measures that are incorporated into the Project design. Residents of Dryden, Thunder Lake and Village of Wabigoon also requested information on the fate of the released tailings and the proponent's ability to rehabilitate contaminated land and compensate affected residents. The proponent responded that an accident or malfunction related to the tailings storage facility is highly unlikely. The tailings storage facility dam would be designed to withstand a 1-in-100 year flood event (discussed in Section 8.3) and the maximum credible earthquake. It would comply with guidelines set by the Canadian Dam Association and provincial regulation requirements.[92,93] The design of the tailings storage facility would also be reviewed by an Independent Tailings Review Board (Section 6.2.3). The proponent also modelled the potential effects of a tailings storage facility failure under the worst-case scenario in which the full contents of the tailings storage facility were released. In this scenario, the tailings solid would be released onto land with a portion entering Blackwater Creek, while the tailings supernatant would be released into Blackwater Creek and Wabigoon Lake at Kelpyn's Bay. The

[95] Failure of the cyanide treatment circuit would release cyanide at a concentration of 150 milligrams per litre, compared to less than one milligram of cyanide per litre during normal operations.

[96] The International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold ("Cyanide Code") focuses on the safe management of cyanide in gold mining projects and includes requirements related to financial assurance, accident prevention, and emergency response.

proponent noted that they will ensure that all appropriate insurance policies are in place prior to construction so that any possible events will be covered to the level that is reasonable for industry standards. The proponent affirms that they would be wholly and legally responsible for the clean-up associated with a failure of the tailings storage facility during all phases of the Project.

Naotkamegwanning First Nation requested an assessment of the effects of a tailings storage facility failure on the fisheries in the area, including the effects on the consumers' perception of the fisheries. Asubpeeschoseewagong Netum Anishinabek requested information on the effects of cyanide release from a tailings storage facility failure. The proponent noted that there could be a short-term increase in contaminant concentrations, including cyanide, in Kelpyn's Bay, but that these concentrations would be below thresholds for acute toxicity to fish. Therefore, the proponent indicated that a tailings storage facility failure would be unlikely to have a noticeable effect on fish health and fish quality, especially for higher trophic level species such as walleye and pike. The predicted concentrations of cyanide would also not be fatal to humans or wildlife. The proponent indicated that they recognize that the perception of risk is a concern, and has committed to working with Indigenous communities that hold commercial fishing licenses on Wabigoon Lake and Thunder Lake to develop strategies to help manage perceived risks associated with the fisheries.

Asubpeeschoseewagong Netum Anishinabek requested for the engagement of Indigenous communities in the development of remediation strategies and a communication strategy in the event of an accident or malfunction. The proponent committed to developing community-specific risk communication plans to notify Indigenous communities in the event of accidents and malfunctions, and to engage Indigenous communities in the remediation strategy.

Agency Analysis and Conclusion

The Agency is of the view that the proponent has appropriately identified and assessed potential accidents and malfunctions associated with the Project. The proponent has identified preventative and safeguard measures within the design of the Project, as well as an Emergency and Spill Response Management Plan, to minimize the environmental risks of accidents and malfunctions. While a tailings storage facility dam failure could cause significant adverse effects to aquatic habitat, the Agency is of the view that the probability of such an event occurring would be low, given the preventive measures (described in Box 7.1-1) that the proponent committed to implement. In addition, the Agency would require implementation of other mitigation and follow-up program measures (described in Boxes 7.1-1, 7.1-2, 7.2-1 and 7.2-2) to protect fish, fish habitat and wildlife. The Agency notes the proponent's intention to adhere to federal standards for responding to environmental emergencies and is aware that the proponent would also be subject to provincial reporting of spills and releases.[97,98]

The Agency has considered the measures proposed by the proponent and the comments received from Indigenous communities, and concludes that the Project is not likely to result in significant adverse environmental effects as a result of accidents and malfunctions.

[97] The *Environmental Emergency Regulations*, *2019*, under the *Canadian Environmental Protection Act* will come into force on August 24, 2019.
[98] Ontario legislation regarding the reporting of spills include the *Environmental Protection Act*.

8.3 Effects of the environment on the Project

Pursuant to paragraph 19(1)(h) of CEAA 2012, the environmental assessment must take into account any changes to the Project that may be caused by the environment, including extreme and periodic weather events.

Proponent's assessment of environmental effects

Several environmental factors could have an effect on the Project, including drought, flooding, temperature fluctuations, forest fires and seismic activities. These factors may damage project components and increase the potential for accidents and malfunctions (Section 8.2).

Drought

As a result of climate change, the frequency of extreme weather events including droughts is projected to increase. Drought conditions during operations could lead to reduced water availability for project activities, which would reduce the amount of water available to take from the Tree Nursery ponds within the administration area north of the project study area. To mitigate this, the Project has been designed for 1-in-100 year dry conditions so that the operations can continue in dry conditions. Water uptake from the Tree Nursery ponds would be limited, while reclaimed water would be taken from the collection ponds.

Drought conditions during decommissioning and abandonment have the potential to affect the depth of the water cover[99] in the tailings storage facility due to factors like increase in evaporation and decrease in precipitation. To test whether a water cover can be maintained during 1-in-100 year dry conditions[100], a conservative approach was used in the modelling to assume that 1-in-100 dry year precipitation and 1-in-100 dry lake evaporation occurred in the same year. The results showed that the depth of water cover in the tailings storage facility would drop from 2 metres to 1.7 metres above the maximum heights of the tailings.

Flooding

Extreme flood events have the potential to flood project components including the open pit and cause structural failure of the tailings storage facility. To protect site infrastructure against the risk of extreme floods, the tailings storage facility was designed to accommodate a 1-in-100 year 24-hour rainfall event above the maximum water level[100]. During heavy rainfall conditions (between 125 and 435 millimetres per 24-hour event), the emergency spillway (which connects the tailings storage facility to the open pit) would prevent overfilling of the tailings storage facility by directing excess tailings liquid to the open pit, thereby ensuring complete containment of the tailings within the project study area. Tailings liquid in the open pit would be returned to the tailings storage facility once the tailings storage facility is stabilized or would be treated prior to discharge into the environment. The minewater pond, collection ponds and a mine water collection system involving perimeter ditching would be constructed and would

[99] Water cover would be formed during decommissioning and abandonment by transferring water from the minewater pond and the collection ponds into the tailings storage facility after treatment. An average water depth of 1.2 metres would be required to prevent acid rock drainage.

[100] 1-in-100 year 24-hour rainfall event above the maximum water level refers to a rainfall event that has a one percent chance of occurring in any given year and occurs and occurs when water levels are already at maximum levels.

provide contingency containment of contact water. Together, these structures would keep excess water from damaging the project components and would prevent unintended releases to Blackwater Creek during extreme flood events.

Temperature fluctuations

Larger temperature fluctuations would cause more frequent freeze-thaw events and increased precipitation during the winter and spring, which could cause freezing of water management equipment. To prevent this, adequate freeze protection would be used, such as heat tracing, insulation or stainless-steel wrapping. Project components would be regularly inspected and damage would be promptly repaired.

Forest fires

Forest fires near the Project could spread to the project study area. This could ignite on-site fuel storage and other flammable materials, and result in explosions during operations and the loss of habitat created from progressive rehabilitation. To minimize the likelihood of forest fires spreading onto the project study area, fuel would be stored behind a non-vegetated buffer and active fire suppression systems would be constructed to protect key buildings.

Seismic activity

A seismic event could affect project components, however, the Project is located in an area with a low level of seismic activity.[101] To minimize the likelihood of seismic activity induced damage, project components (including dams, infrastructure and buildings) would be designed, constructed and monitored in accordance with federal and provincial standards.[91]

Views expressed

Métis Nation of Ontario and Eagle Lake First Nation requested an assessment of the effects of climate change on project activities including water management. Wabauskang First Nation expressed concern regarding the effects of drought on the watercourses downstream of the Tree Nursery ponds. The proponent recognizes that climate change will impact long-term precipitation patterns in the regional study area, in which annual precipitation would increase. However, the proponent anticipates that the long-term impacts of climate change would not have a measurable effect on the Project during its life of 17 years. Nonetheless, the proponent explained that adaptive management measures have been built into the Project design to protect the Project against extreme weather that could arise as a result of climate change, even after the abandonment phase. In regards to water management, the proponent explained that the Tree Nursery ponds receive their flow from upstream areas that would not be affected by the Project. The proponent would minimize the water withdrawal from these ponds by restricting withdrawal to a maximum of five percent of the flow in the ponds. Other sources of water would also be used by reclaiming water from the tailings storage facility, dewatering activities, and minewater pond. During a drought year, treated water from the effluent treatment plant could also be used, if required.

[101] The determination of the rating for seismic activity hazard is based on the Seismic Hazard Map (2010) by Geological Survey of Canada.

Agency Analysis and Conclusion

The Agency is satisfied that the proponent has adequately considered the effects of the environment on the Project and that the proposed mitigation measures and response activities are appropriate to account for the potential effects of the environment on the Project.

8.4 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 the effects of other projects or activities that have been or would be carried out. The cumulative effects assessment was guided by the Agency's Operational Policy Statement.[102] Under CEAA 2012, the "environmental effects" to be considered for the cumulative effects analysis are those effects in areas of federal jurisdiction as described in section 5 of the CEAA 2012. For the Project, the Agency specifically focused its analysis on:

- migratory birds, and
- current use of lands and resources for traditional purposes (Indigenous uses).

In Sections 7.2 and 7.3, the Agency concluded that the effects of the Project on these two valued components are not significant, after taking into account the key mitigation and follow-up program measures. However, the effects can be combined with the effects of other past, existing and reasonably foreseeable physical activities.

The Agency is of the view that the Project, in combination with past, existing and reasonably foreseeable projects, is not likely to cause significant adverse cumulative environmental effects and that additional mitigation or follow-up program measures are not required. In making this determination, the Agency considered the project effects, views expressed by federal departments, provincial ministries, Indigenous communities, the public, the proposed mitigation measures (Section 7), the effects of other projects, and the existing federal and provincial regulatory regimes.

Proponent's Approach and Scope

Past, existing and reasonably foreseeable physical activities that could interact with the Project and cause cumulative effects include the proponent's own exploration program, forestry activities, transportation networks, electrical transmission lines and a pulp mill (Table 14; Figure 13). The activities were assessed for their potential for cumulative effects with the Project in relation to migratory birds and Indigenous uses. Cumulative effects regarding social and economic valued components are described in Section 9.

In the assessment of cumulative effects, the proponent defined specific study areas in consultation with Indigenous communities for migratory birds and Indigenous uses (Figure 14). The cumulative effects assessments considered magnitude, geographic extent, duration, timing, frequency, reversibility,

[102] *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012*

ecological context, social context, and the existing regulatory regimes that influence how projects are managed.

Table 14 Past, existing and reasonably foreseeable projects and activities included in the cumulative effects assessment.

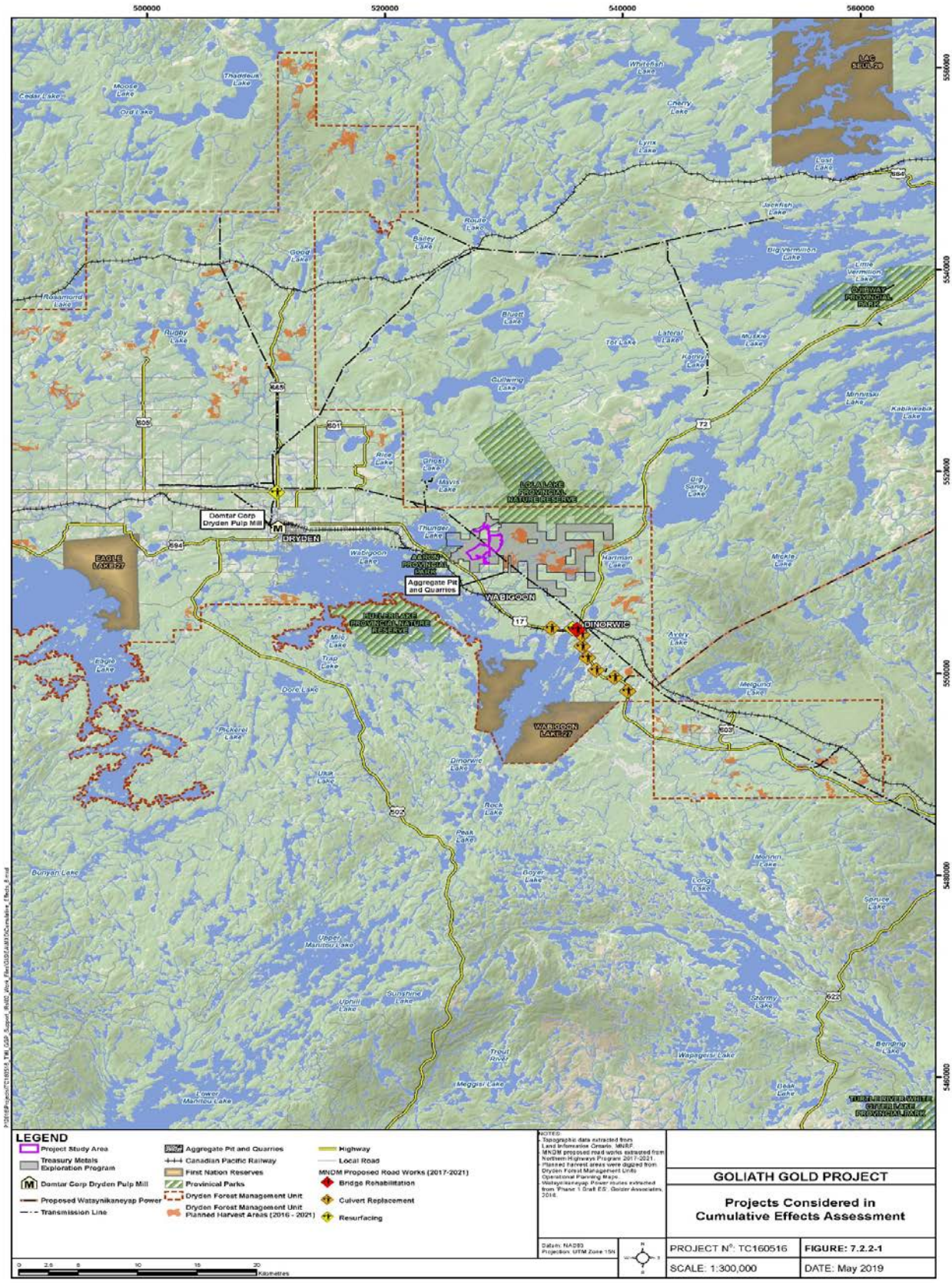
Projects/activities	Description	Interaction with the Project related to migratory birds	Interaction with the Project related to Indigenous uses
Treasury Metals Exploration Program	• Mineral exploration related to the Project located within the proponent's property boundaries • Activities may include prospecting, surveys, and exploration drilling	Spatial[a] and temporal overlap	Spatial[a] and temporal overlap
Highway 17	• An existing portion of the Trans-Canada Highway approximately two kilometres south of the Project • Upcoming maintenance work includes resurfacing and replacement of culvert and highway overpass	Temporal overlap	Spatial[b] and temporal overlap
Canadian Pacific Railway	• Existing railway that runs near-parallel to Highway 17 • Activities include annual vegetation management along the tracks	Spatial[a] and temporal overlap	Spatial[a] and temporal overlap
Dryden Forest Management Company Limited	• Large forestry management area in Northwestern Ontario in which the Project's footprint and majority of its study areas are located • A management plan is in place for 2011-2021 with a planned harvest area of 11 952 hectares	Spatial[a] and temporal overlap	Spatial[a] and temporal overlap
Domtar Corporations Dryden Pulp Mill	• Pulp mill in Dryden, Ontario (approximately 15 kilometres west of the Project) producing cellulose fiber with annual production capacity of 327 000 tonnes	Temporal overlap	Spatial[b] and temporal overlap
Aggregate Pit and Quarries	• An aggregate pit located within the footprint of Treasury Metals Exploration Program	Spatial[a] and temporal overlap	Spatial[a] and temporal overlap
Wataynikaneyap Power Project	• Transmission project that provides power to remote communities in Northwestern Ontario by means of diesel generation • The power line begins approximately 20 kilometres southeast of the Project and extends northeast.	Temporal overlap	Spatial[b] and temporal overlap
Local Infrastructure	• Development of local infrastructure and minor road upgrades in Dryden, Ontario (20 kilometres west of the Project) and Wabigoon, Ontario (8 kilometres east of the Project)	Spatial[a] and temporal overlap	Spatial[b] and temporal overlap

[a] Spatial overlap occurs within the local study area;

[b] Spatial overlap occurs within the regional study area;

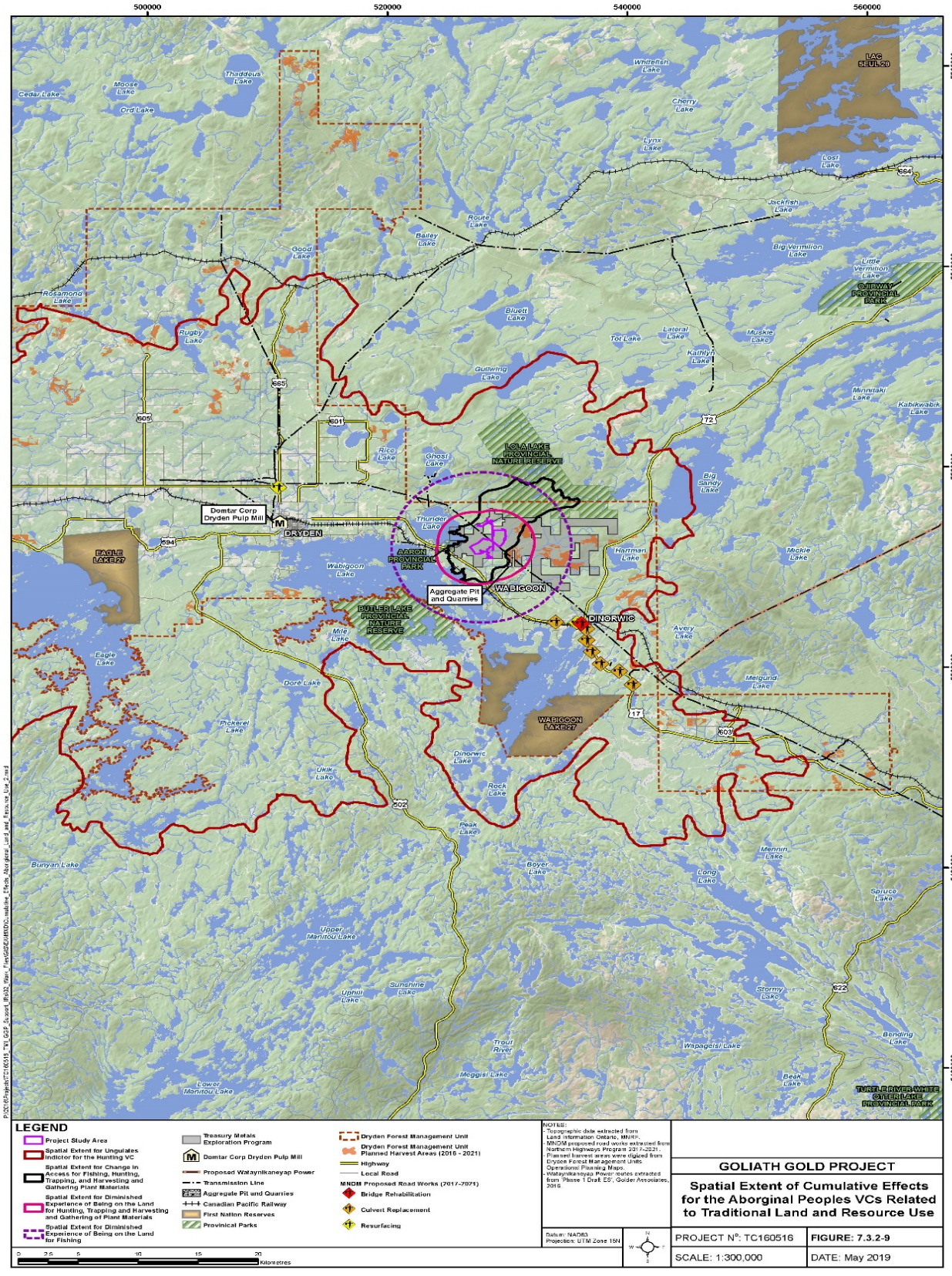
Source: Goliath Gold Project Environmental Impact Statement, Wood Group.

Figure 13 Projects or activities that could potentially interact with the Project's effects



Source: Treasury Metals Inc., 2018

Figure 14 Study areas for migratory birds and Indigenous uses[a]



Source: Treasury Metals Inc., 2018

- [a] spatial extent for change in access to fishing, hunting, trapping, and harvesting is equivalent to the spatial extent for wildlife.

8.4.1 Migratory Birds

Proponent's assessment of environmental effects, mitigation and monitoring

The cumulative effects on migratory birds were assessed for the Project in consideration of five other projects that would overlap spatially and temporally with the Project (Treasury Metals Exploration Program, Canadian Pacific Rail, Dryden Forest Management Company, aggregate pit/quarries and local infrastructure development; Table 14). However, cumulative adverse effects to migratory birds are only expected from the interaction of the Project's effects with the effects of the activities of Dryden Forest Management Company. The cumulative amount of habitat loss for migratory birds predicted in the regional study area would be approximately 360 hectares. Of this total, approximately 354 hectares would be lost due to the Project and six hectares would be lost from forest harvesting activities associated with the Dryden Forest Management Unit (Table 15). Habitat removal by both projects is assumed to occur simultaneously over the construction period (two years) of the Project.

Table 15 Predicted cumulative loss or alteration of migratory bird habitat

Migratory bird type	Effect[a]	Activity		Cumulative effect
		Goliath Gold Project	Dryden Forest Management Company	
Upland birds	Loss of nests or critical habitat (hectares)	278	0	278
	Alteration of nests or critical habitat (hectares)	21	0	21
Wetland birds	Loss of nests or critical habitat (hectares)	39[b]	6	45
	Alteration of nests or critical habitat (hectares)	16	0	16
	Total	**354**	**6**	**360**

[a] Effects occur during all project phases.
[b] This value represents the sum of direct loss of wetlands (41 hectares; Table 9) and open water (4 hectares; Table 9) minus wetlands that would be created (6 hectares) as part of the fish habitat offsetting plan pursuant of the *Fisheries Act* or the fish habitat compensation plan pursuant of the *Metal and Diamond Mining Effluent Regulations* under the *Fisheries Act*.

The cumulative habitat loss from the activities of the Project and Dryden Forest Management Company would be 360 hectares, which is approximately 0.1 percent of the regional study area for migratory birds. The predicted loss of nests or critical habitat would therefore have little impact on the abundance of migratory birds in the regional study area. Planned forestry activities, which would include the removal of habitat, would be subject to provincial legislation to ensure the proper consideration of potential effects to the environment including the sustainable management of forests.[103] Progressive rehabilitation of the project and local study areas would restore habitat during operations, decommissioning and abandonment (Section 6.3 and Box 7.2-1), thereby further minimizing long-term cumulative effects.

[103] Any forestry activity in the Forestry Management Unit requires a Sustainable Forest License, and is subject to Ontario's *Crown Forest Sustainability Act.* Furthermore, the Project would be subject to an Ontario Ministry of Natural Resources and Forestry Class Environmental Assessment for Resource Stewardship and Facility Development (category B) under Ontario's *Environmental Assessment. Act.*

Agency Analysis and Conclusion

The Agency is of the view that, after taking into account the effects of the Project and their interactions with effects from past, existing, and reasonably foreseeable projects or activities identified in Table 14, the Project is not likely to cause significant adverse cumulative effects on migratory birds due to loss of migratory bird nests and critical habitat.

The Agency notes that provincial forestry management practices consider conservation of biodiversity as well as the enhancement or protection of wildlife habitat and watersheds. The Agency also acknowledges that the provincial forestry management process sets objectives for indicator species prior to determining areas where timber harvesting is permitted and considers the implications of private lands, mining activities, locations of natural resource features, and land uses and values of interest to Indigenous peoples. As the current forestry management plan for Dryden Forest Management Company will expire in 2021, the Agency is aware that future management plans, which are re-established every ten years, would include updated forest resource inventories that reflect known changes to the forest. Cumulative effects on habitat loss of migratory birds would be partially reversible as progressive rehabilitation of the project site would restore 246 hectares of upland habitat and 39 hectares of wetland habitat during operations, decommissioning and abandonment. Therefore, the Agency is of the view that further mitigation and follow-up program measures are not required for the Project.

8.4.2 Indigenous uses: Current use of lands and resources for traditional purposes

Proponent's assessment of environmental effects, mitigation and monitoring

The cumulative effects on Indigenous uses were assessed for the Project in consideration of eight other projects that would overlap spatially and temporally with the Project (Treasury Metals Exploration Program, Highway 17, Canadian Pacific Railway, Dryden Forest Management Company, Domtar Corporations Dryden Pulp Mill, aggregate pit/quarries, Wataynikaneyap Power Project and local infrastructure development; Table 14). From this list, cumulative adverse effects to Indigenous uses are expected from the interactions of the Project's effects with the effects of the activities of Dryden Forest Management Company and Wataynikaneyap Power Project.

The forestry operations of Dryden Forest Management Company include the clearing of forests in the local and regional study areas, and would result in the loss of berry harvesting areas, forest stands and wetlands that could be used for harvesting and plant gathering. Forest clearing would also result in the loss of habitat for wildlife, which could result in a decrease in the abundance of species that Indigenous communities hunt and trap including furbearers, waterfowl and ungulates. The Wataynikaneyap Power Project would also result in habitat loss for ungulates within the regional study area. Cumulative effects would occur due to the additive effects of habitat loss on Indigenous uses (Table 16).

Table 16 Cumulative area lost for Indigenous uses including plant harvesting, hunting and trapping

Valued component	Indicator	Effect[a]	Activity			Cumulative effect
			Goliath Gold Project	Dryden Forest Management Company	Wataynikaneyap Power Project	
Harvesting and plant gathering	Berry harvesting	Loss of potential harvest area (hectares)	260	49	0	309
	Medicinal plant gathering	Loss of forest area (hectares)	138	45	0	183
		Loss of wetland area (hectares)	57[b]	6	0	63
		Total	185	51	0	236
Hunting[c]	Ungulates (moose)	Habitat loss (hectares)	141	56	6	203
	Furbearers	Habitat loss (hectares)	80	42	0	122
	Waterfowl	Habitat loss (hectares)	55	0	0	55
Trapping[c]	Furbearers	Habitat loss (hectares)	80	42	0	122

[a] Effects occur during all project phases.
[b] Value shown is the highest level during operations, due to reductions in groundwater levels altering wetlands in the project study area.
[c] Habitat loss of wildlife represents a combination of direct and indirect effects. Indirect effects include noise and dust generation, and alterations to wetland hydrology. These effects would extend into the local study area and regional study area.

Views Expressed

Asubpeeschoseewagong Netum Anishinabek, Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation, Eagle Lake First Nation and residents of Dryden and Thunder Lake expressed concerns regarding potential cumulative effects of mercury in waterbodies at and downstream of the project study area, and on the Indigenous communities' ability to fish. The proponent noted that although the Project would not utilize or produce mercury, mercury that is naturally present in acid-generating rock could be liberated. To prevent increases in mercury in waterbodies and effects on the ability to fish, the proponent has committed to treating effluent such that mercury concentrations would be at or below the background concentrations of mercury in Blackwater Creek (described in Sections 7.1 and 7.4). The proponent's assessment determined that interactions between the effects of the Project and the effects of Domtar Dryden Pulp Mill are not expected to cause cumulative effects to surface water (i.e., no cumulative increase in contaminant concentrations (including mercury) in surface water), fish and fish habitat, and commercial, recreational and Aboriginal fisheries.

Eagle Lake First Nation and Naotkamegwanning First Nation expressed that the extent of the local and regional study areas should be broadened to ensure that the assessment of cumulative effects thoroughly consider Indigenous uses. Wabauskang First Nation also noted the lack of information on forestry activities in the assessment of cumulative effects. In response, the proponent considered larger local and regional study areas that captured additional projects and activities that could have effects that interact with those from the Project, including the forestry activities of Dryden Forest Management Company Limited. The updated assessment also evaluated cumulative effects on Indigenous uses. For

example, the revised assessment included a local study area for wild rice to reflect the importance of wild rice to Indigenous communities.

Asubpeeschoseewagong Netum Anishinabek requested that the Agency complete a regional cumulative effects assessment to gain information that reflects the community's traditional use and the region's baseline. Please refer to Section 9.3.

Agency Analysis and Conclusion

The Agency is of the view that, after taking into consideration the effects of the Project and their interactions with effects from past, existing, and reasonably foreseeable projects or activities identified in Table 14, the Project is not likely to cause significant cumulative effects on Indigenous uses.

As discussed in Section 7.3, the Agency acknowledges that the Project would affect Indigenous uses by changing the availability and accessibility of lands and resources for traditional purposes (e.g., harvesting and gathering of berries, chanterelles and medicinal plants; hunting; and trapping). In addition, the quality of experience due to sensory disturbances could be affected. These changes in availability and access to lands and resources, as well as changes to the quality of experience, could displace or alter the patterns of Indigenous uses. However, traditional territory is extensive and the interactions of the Project's effects with the effects of other projects in the local and regional study areas would be minimal. In addition, the Agency is aware that, as described in Section 8.4.1, provincial forestry management practices are consistent with principles of sustainable development and consider land uses, including mining and Indigenous uses, within the management area.[103] Therefore, the Agency is of the view that additional mitigation and follow-up program measures are not required for the Project.

9 Impacts on Aboriginal and Treaty rights

In alignment with the Agency's overall approach to consultation and the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (March 2011), the Agency sought information from all potentially impacted Indigenous communities about the nature of their Aboriginal and Treaty rights protected under section 35 of the *Constitution Act, 1982*[104] (Aboriginal and Treaty rights) and how they may be impacted by the Project. The Agency considered any new information arising from the proponent about the potential impacts of the Project, as they emerged, in an effort to better understand the nature, scope and extent of adverse impacts on rights. Where potential impacts on Aboriginal and Treaty rights were identified, the Agency took into account the appropriate mitigation measures before determining the severity of the potential impacts.

This section summarizes how the Project may potentially impact Aboriginal Treaty rights. Appendix D summarizes all issues of concern identified by Indigenous communities throughout the environmental assessment until this report is issued. Appendix E, referenced in Section 9.2.1, summarizes where potential environmental effects from the Project may impact the exercise of rights related to traditional resources of Indigenous communities.

9.1 Existing Aboriginal and Treaty rights

The Project is located within the Treaty 3 (1873) area of Ontario (Figure 6), which defines rights that include hunting, trapping and fishing throughout the treaty territory. Other traditional uses of the lands and resources within the study areas, which are Aboriginal rights protected pursuant to section 35 of the *Constitution Act, 1982*, include trapping, plant harvesting, and the use of lands and resources for cultural purposes. Seven Treaty 3 communities were identified for consultation: Wabigoon Lake Ojibway Nation, Eagle Lake First Nation, Naotkamegwanning First Nation, Asubpeeschoseewagong Netum Anishinabek, Wabauskang First Nation, Lac Seul First Nation and Lac Des Mille Lacs First Nation.

The Project is located within an area identified by the Métis Nation of Ontario as Métis Nation of Ontario Treaty 3, Lake of the Woods/Lac Seul and Rainy Lake/Rainy River Consultation Protocol Area, and Region 1 traditional harvesting area, which includes the Sunset Country Métis Council, Kenora Métis Council, Dryden Métis Council and Atikokan Métis Council. The Métis established Métis rights through the *R. v. Powley* (2003) Supreme Court decision. The Métis also hold Aboriginal rights which are protected under section 35 of the *Constitution Act, 1982*. The Métis Nation of Ontario indicated that numerous Métis citizens live and harvest within, or extensively use, the study areas.

Overall, nine Indigenous communities have been identified for consultation for the Project, seven First Nation communities who are Treaty 3 signatories, the Métis Nation of Ontario and Aboriginal Peoples of

[104](1) The existing Aboriginal and Treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed.
(2) In this Act, "Aboriginal peoples of Canada" includes the Indian, Inuit and Métis peoples of Canada.
(3) For greater certainty, in subsection (1) "Treaty rights" includes rights that now exist by way of land claims agreements or may be so acquired.
(4) Notwithstanding any other provision of this Act, the Aboriginal and Treaty rights referred to in subsection (1) are guaranteed equally to male and female persons.

Wabigoon. While the Project is within an area where the Aboriginal People of Wabigoon have asserted Aboriginal rights, the Agency does not have any information indicating Aboriginal Peoples of Wabigoon represent a group of collective rights holders.

As noted in Section 4.2.1, the Agency commenced consultation with all nine communities in 2012, with the exception of Lac des Mille Lacs First Nation, where consultation was commenced in 2016 due to new information received from the community regarding their traditional territory.

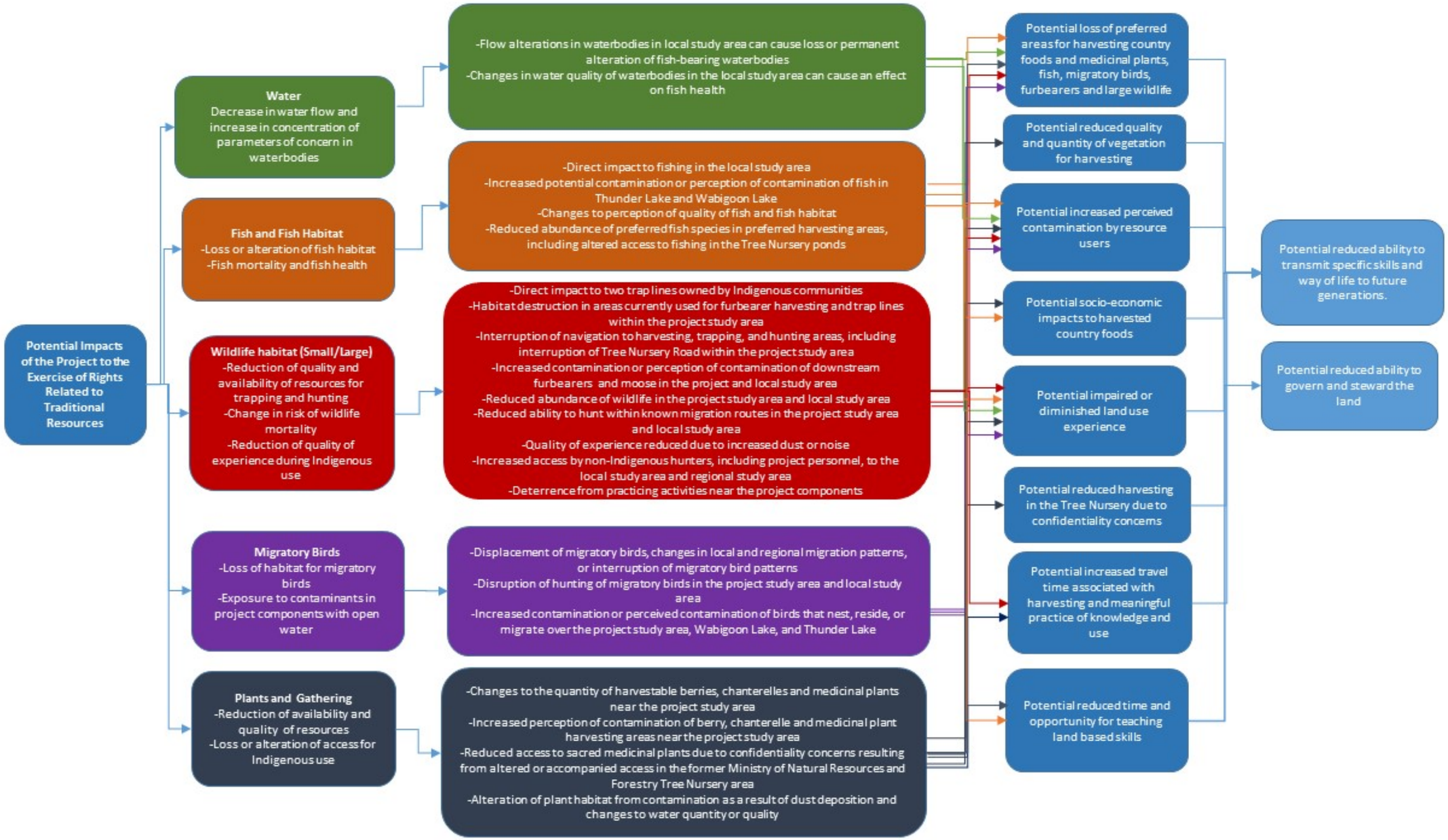
9.2 Potential adverse impacts of the Project on Aboriginal and Treaty rights

The Project has the potential to cause adverse environmental effects (see Chapters 6 and 7), which may also lead to adverse impacts on Aboriginal and Treaty rights related to the practice of fishing, hunting, trapping and traditional use plant harvesting, as well as cultural practices of Indigenous communities. Due to proximity of the Project to identified traditional lands used for the exercise of rights, the following Indigenous communities are most likely to be directly impacted by the Project: Wabigoon Lake Ojibway Nation, Eagle Lake First Nation, Naotkamegwanning First Nation, Asubpeeschoseewagong Netum Anishinabek, Wabauskang First Nation and Métis Nation of Ontario. Potential impacts include overprinting by project infrastructure of sites for harvesting plants and berries, hunting, trapping, fishing, teaching and cultural connection to the land, in addition to indirect effects such as diminished "on the land" experience. The potential adverse impacts of the Project on Aboriginal and Treaty rights are discussed below.

9.2.1 Pathways for Potential Impacts on the Exercise of Rights Related to Traditional Resources

On February 5, 2019, the Agency received a written request from Naotkamegwanning First Nation to collaboratively develop an assessment of potential impacts on Naotkamegwanning First Nation's rights due to the Project. The Agency committed to developing a supplemental assessment on rights to solicit comments from all Indigenous communities impacted by the Project during the consultation on the draft Environmental Assessment Report. This supplemental assessment is provided in Appendix E of this report and is entitled *Pathways for Potential Impacts on the Exercise of Rights Related to Traditional Resources*. This appendix provides written and visual descriptions of the potential impacts on the environment and pathways for potential impacts on the exercise of rights related to traditional resources. This appendix was developed based on information in the proponent's Environmental Impact Statement and related documents and information gathered by the Agency during all comment periods as well as written submissions from communities and notes from community meetings and is reflective of Naotkamegwanning First Nation as well as all potentially impacted Indigenous communities. This appendix, while prepared in response to the request from Naotkamegwanning First Nation, will provide all potentially impacted communities with an opportunity to view the pathways for potential impacts and provide their views during the comment period on the draft Environmental Assessment Report. The visual summarization of Appendix E is included below in Figure 15.

Figure 15 Potential Pathways to Rights Visual



Source: Appendix E Goliath Gold Project: Pathways for Potential Impacts on the Exercise of Rights Related to Traditional Resources

Proponent's Assessment

The proponent provided information about the exercise of Indigenous communities' Treaty rights and uses in the area. Through the assessment of Indigenous uses, health, socio-economic conditions, physical and cultural heritage and description of cultural importance of activities, the proponent assessed the biophysical effects of the Project on traditional land use practices (see Sections 7.3 and 7.4). The proponent has acknowledged that the Project may impact communities' ability to exercise Aboriginal and Treaty rights and has proposed mitigation measures to limit these impacts such as those related to fishing, hunting, trapping and plant gathering in Section 7.3 and Box 7.3-1. Based on the assessment, the proponent is of the view that there are no significant impacts on Aboriginal and Treaty rights from the Project.

Hunting and trapping

Indigenous Communities' Views

Asubpeeschoseewagong Netum Anishinabek, Eagle Lake First Nation, Naotkamegwanning First Nation, Wabauskang First Nation, Wabigoon Lake Ojibway Nation and the Métis Nation of Ontario raised the importance of the project study area, local study area and regional study area for the practice of Aboriginal and Treaty rights in relation to hunting and trapping. These communities highlighted the importance of the project study area for hunting, and expressed concerns about the loss of moose and furbearer habitat due to overprinting by project components and loss of unaccompanied access along Tree Nursery road. As discussed in Section 7.3, members of Wabigoon Lake Ojibway Nation and Eagle Lake First Nation are the owners of trap lines which are located within the local study area. Wabigoon Lake Ojibway Nation raised concerns about the ability of their members to be able to continue to access and successfully use these traplines due to the Project.

Agency's Analysis

The Agency notes that hunting and trapping could be modified through the removal of, or alteration of access to, hunting and trapping sites, changes to species' habitat and/or changes to the experience of community members who hunt or trap due to alterations to sensory conditions; for instance due to changes to noise, air quality or the visual landscape. The Agency is aware of the overlap of the project study area with parts of trap lines held by Wabigoon Lake Ojibway Nation and Eagle Lake First Nation in the project study area.

The proponent has committed to providing accompanied access to areas of importance for hunting and trapping, specifically to the areas proximate to the open pit and Tree Nursery just into the local study area which require use of Tree Nursery Road. The proponent has additionally committed to develop community-specific access management plans to provide Indigenous communities with altered access for traditional use, including trap lines. The Agency is satisfied that changes to species habitat would be restricted to the project study area (Section 6.3) and that access to hunting and trapping sites would be maintained with the proponent's proposed mitigation measures. With respect to changes in experiences due to sensory disturbances, the Agency is satisfied that this would be confined to an area immediately outside the project study area (Section 7.3.4). In addition, the proponent has in place measures to protect human health (Section 7.4). The Agency is satisfied that hunting and trapping can continue as presently practiced elsewhere in the local and regional study areas.

Fishing

Indigenous Communities' Views

Wabigoon Lake Ojibway Nation and Eagle Lake First Nation stated that baitfishing in the Tree Nursery pond and other creeks in the project study area is an important traditional activity for community members. These Indigenous communities also stated that fishing in surrounding lakes such as Wabigoon Lake and Thunder Lake are important for establishing connection to the land and traditional use. Concerns were expressed by Indigenous communities about the residual environmental changes from the Project on the availability and health of the fish in Wabigoon Lake and surrounding waterbodies. Wabigoon Lake Ojibway Nation, Eagle Lake First Nation, Asubpeeschoseewagong Netum Anishinabek, Naotkamegwanning First Nation and Wabauskang First Nation requested ongoing monitoring of water quality, in particular for mercury and methylmercury levels. There are longstanding concerns from Indigenous communities regarding the water quality in the surrounding watershed, due to historic mercury contamination downstream from the Dryden Pulp Mill, leading to concerns regarding the potential for the Project to exacerbate effects to water quality in surface waterbodies in the area as well as the impacts on fish. Asubpeeschoseewagong Netum Anishinabek noted the inability to fish commercially or consume fish due to the historic contamination and related impacts to the overall wellbeing of community members, including physical and mental health.

Agency's Analysis

The Project is not expected to have a significant effect on fish health or populations, and no changes to safe consumption of fish tissue are anticipated (Section 7.1.1). A follow-up program measure related to fish health and population is proposed and described in Box 7.1-2. As discussed in Section 7.3, there is the potential for sensory disturbances to Indigenous use in nearby areas and perceived changes to fish health which could deter community members from utilizing the resource, thus limiting the practice of fishing rights.

The abundance of baitfish in surrounding creeks (including Blackwater Creek) and tributaries would not be affected during all phases of the Project. Baitfish habitat loss would be offset by constructing new fish habitat, as referenced in Section 7.1 and recommended as a key mitigation measure in Box 7.1-1. Measures that were proposed to offset permanent alteration or destruction of fish habitat would also be protective of fishing rights. Fisheries and Oceans Canada is expected to consult on the offsetting plan as part of an application from the proponent for authorization under the *Fisheries Act* (Table 10). The Agency is satisfied with implementation of key mitigation and follow-up program measures (Box 7.1.1 and Box 7.1.2) that the practice of fishing can continue uninterrupted outside the project study area. The Agency acknowledges the Project, due to historic contamination of the Dryden Pulp Mill, is likely to be a cause of concern to Indigenous communities effected, including Asubpeeschoseewagong Netum Anishinabek. The Agency is satisfied that any effects related to the Project would remain upstream of the area subject to historic contamination.

Plant Gathering

Indigenous Communities' Views

Wabigoon Lake Ojibway Nation, Asubpeeschoseewagong Netum Anishinabek, Eagle Lake First Nation and Aboriginal Peoples of Wabigoon noted the importance of the project study area and local study area

for plant gathering, including medicinal plants, blueberries, wild rice and chanterelles. They raised concerns about the overprinting of harvesting locations by project components. Wabigoon Lake Ojibway Nation, Eagle Lake First Nation, Wabauskang First Nation, Asubpeeschoseewagong Netum Anishinabek and the Métis Nation of Ontario reported harvesting berries and wild mushrooms within the local study area and regional study area.

Agency's Analysis

The Project would result in impacts such as the removal of habitat in the project study area (Section 6.3.1), alteration of access to areas in between the open pit and former Tree Nursery ((Section 7.3) and sensory disturbances that may affect the ability of Indigenous communities to harvest plants in areas immediately outside the project study area (Section 7.3). The Agency recognizes that the altered access could result in potential changes in harvesting behaviour and perhaps even reduced uses. Wabigoon Lake Ojibway Nation and Eagle Lake First Nation have indicated that they harvest plants in this area such as berries, wild rice, and medicines; however, none of the Indigenous communities indicated the area as a preferred gathering location. The proponent has proposed allowing impacted Indigenous communities to have accompanied access along Tree Nursery Road and then unaccompanied access in the harvesting areas within the local study area but outside the project study area for safety reasons (Section 7.3.3). Additionally, the proponent has committed to develop community-specific access management plans in consultation with Indigenous communities prior to site preparation and construction (Box 7.3.1). The Agency is satisfied that mitigation measures proposed by the proponent to minimize dust emissions (Section 6.1.1) would reduce dust depositing on plants. These measures would allow Indigenous communities to continue practicing their gathering rights throughout the local study area and regional study area. However, Indigenous communities may face the potential for reduced harvesting of sacred and medicinal plants in the Tree Nursery area due to concerns regarding the lack of confidentiality associated with accompanied access and increased perceptions of contamination. The Agency is satisfied that gathering can continue as presently practiced elsewhere in the local and regional study areas.

Cultural and Spiritual Connection to the Land

Indigenous Communities' Views

Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation and Asubpeeschoseewagong Netum Anishinabek have expressed cultural and spiritual connection to the land impacted by the Project, including archaeological artifacts. Wabigoon Lake Ojibway Nation raised concerns that there may be archaeological sites which could be underwater due to historic flooding, and were therefore not accessed. Asubpeeschoseewagong Netum Anishinabek has indicated two community members are active in the collection of cultural artifacts along the English River system. Wabigoon Lake Ojibway Nation also noted that the view of Thunder Lake has cultural importance to elders, as it informs their connection to the land and is important to be maintained.

Agency's Analysis

The Agency acknowledges the views of Indigenous communities related to cultural and spiritual connection to the land. As noted in Section 7.3, the proponent has indicated there are no known archeological resources within the project study area. The Agency notes commitments from the proponent (Box 7.3-1 and Box 7.3-2) that would leave a 50-metre buffer zone if undocumented

archaeological resources are discovered, restrict activities by only allowing these activities in areas where an archaeological assessment has been completed, and develop, prior to construction and in consultation with Indigenous communities, a follow-up program to verify the archaeological assessment as it relates to cultural and spiritual connection to the land.

The Agency notes that the only visible presence of the Project from a distance would be limited views of the waste rock storage area from certain areas of Thunder Lake. No part of the Project will be visible from Wabigoon Lake. The waste rock storage area would likely be fully indistinguishable once fully vegetated at decommissioning. The Agency is satisfied that archeological resources would be protected and the cultural and spiritual connection of Indigenous communities to the land would be maintained.

9.3 Consultation with Asubpeeschoseewagong Netum Anishinabek

Historical Context

The Dryden Pulp Mill was first established in 1913, and purchased by Reed Limited in 1960. Between 1960 and its decommissioning in 1975, the Mill released approximately 10 metric tonnes of mercury into Wabigoon River, which affected both the English and Wabigoon River systems. The contaminated areas begin approximately 15 kilometres downstream of the Project and the effects of the Project are not anticipated to exacerbate the historical contamination. One of the identified and affected Indigenous communities is Asubpeeschoseewagong Netum Anishinabek, commonly referred to as Grassy Narrows First Nation. Asubpeeschoseewagong Netum Anishinabek has faced health effects related to mercury contamination, including effects related to physical and mental health.

The Province of Ontario has set aside funding to undertake remediation of the mercury contamination. Environment and Climate Change Canada is providing expert advice to the Province of Ontario in relation to contaminated sediment remediation.

Asubpeeschoseewagong Netum Anishinabek's views

Historic mercury contamination has affected the community's overall wellbeing, physical and mental health, and their ability to transmit cultural knowledge and practice traditional activities within their traditional territory. The community is no longer able to commercially fish in those waterbodies. Still, two-thirds of community members engage in fishing in nearby waterbodies but are concerned about negative health impacts from consumption of the fish. Asubpeeschoseewagong Netum Anishinabek has indicated that due to the inability to practice commercial fishing or consume fish for subsistence, there have been impacts to their overall wellbeing including physical and mental health.

Asubpeeschoseewagong Netum Anishinabek provided a Community Health Assessment Report[105] to the Agency and expressed concern about mercury and methylmercury from the Project potentially adding to historical degradation of the English-Wabigoon River System.

[105] Asubpeeschoseewagong Netum Anishinabek, 2018. Asubpeeschoseewagong Netum Anishinabek Community Health Assessment Report (May 2018) ["Mergler 2018"].

Asubpeeschoseewagong Netum Anishinabek stated that due to historic contamination and perception of risk of mercury in the regional study area, traditional use has shifted North and East from their reserve lands to include the local and regional study area.

Agency engagement with Asubpeeschoseewagong Netum Anishinabek

As noted in Section 4.2.1, the Agency has been consulting with Asubpeeschoseewagong Netum Anishinabek throughout the environmental assessment process, commencing in 2012. The Agency has made efforts to understand the concerns of the community regarding the past historic contamination and to ensure that the proponent is aware of the concerns. As outlined in Sections 7.1 and 7.4, the Agency has identified key mitigation and follow-up program measures to manage water quality, release of mercury and ensure downstream monitoring in area where harvesting may occur by Indigenous communities to ensure that the interaction between the Project and the historic contamination can be avoided. In the paragraph below, the Agency has outlined some of the key meetings that transpired between the Agency and Asubpeeschoseewagong Netum Anishinabek throughout the environmental assessment process where the issue of historic contamination was raised:

The Agency received written comments from Asubpeeschoseewagong Netum Anishinabek in April 2015 pertaining to historic mercury contamination. Asubpeeschoseewagong Netum Anishinabek raised concerns surrounding the Project's potential to contaminate and also referenced historic mercury contamination during a meeting held in July 2018. The community also brought up concerns regarding effects on water quality. During a meeting in January 2019, Asubpeeschoseewagong Netum Anishinabek discussed concern regarding cumulative effects due to historic mercury contamination and potential interaction with effects of the Project. All comments received from the community to the Agency are included within Appendix D of this report.

In June 2019, the Agency plans to meet with Asubpeeschoseewagong Netum Anishinabek to discuss the draft Environmental Assessment Report in order to inform the final Environmental Assessment Report.

Agency's Views

The Agency has selected mitigation and follow-up program measures to minimize the impact of the Project on Asubpeeschoseewagong Netum Anishinabek. Due to the proximity of the Project to the Dryden Pulp Mill, the Agency recognizes the potential for perception of risk for Indigenous communities, such as Asubpeeschoseewagong Netum Anishinabek, who have experienced adverse effects related to historic mercury contamination.

The Agency has taken into account considerations of historic mercury contamination raised by Asubpeeschoseewagong Netum Anishinabek, as heard throughout the environmental assessment, as well as the Community Health Assessment Report provided by the community. The potential impact of mercury contamination on water quality, health and fish and fish habitat due to the Project, as it relates to the concerns of Asubpeeschoseewagong Netum Anishinabek, would be lessened through key mitigation, follow-up program measures and conditions outlined in Section 6.2, 7.4 and 7.1, respectively.

The Agency is of the view that, after taking into consideration the effects of the Project and their interactions with effects from past, existing, and reasonably foreseeable projects or activities identified

in Table 14 of Section 8.4, the Project would not exacerbate and add to impacts of the historic mercury contamination on Asubpeeschoseewagong Netum Anishinabek.

The Agency acknowledges the concern of Asubpeeschoseewagong Netum Anishinabek that a catastrophic failure of the Project, including a tailings storage facility dam failure, could result in effects on water quality, fish and fish habitat and health of community members, outlined in Section 8.2. While a tailings storage facility dam failure could cause significant adverse effects to aquatic habitat, the Agency is of the view that the probability of such an event occurring would be low, given the mitigation and preventative measures described in Box 7.1-1 and Section 8.2.

The Agency is satisfied that the concern with respect to potential mercury contamination from the project, due to the historic contamination and potential accidents or malfunctions have been addressed through key mitigation and preventative measures in the proponent's project design. The Agency also notes that the proponent's follow-up program would verify the accuracy of the predictions made in the environmental assessment and assess the effectiveness of the mitigation measures. These measures would minimize any impacts to the rights of Asubpeeschoseewagong Netum Anishinabek.

9.4 Issues to be addressed during the regulatory approval phase

If the Project is permitted to proceed, federal authorities with a regulatory role as outlined in Section 1.2.3 would continue consultation with Indigenous communities during the post-environmental assessment regulatory phase of the project. The federal authorities will consult Indigenous communities, as appropriate, prior to making decisions. The Agency has submitted the comments from Indigenous communities that were received during the environmental assessment directly to the federal authorities for their consideration, as appropriate, prior to making their decisions. As applicable, the decisions by the federal authorities would take into account the outcomes of ongoing consultation with Indigenous communities as well as the consultation record resulting from the environmental assessment.

The Agency recognizes that the Project is subject to approvals under provincial legislation, and that associated regulations, guidelines and policies provide for the protection of relevant aspects of both the natural and human environments. Consultation by the province, as applicable, on those authorizations will also provide opportunities to Indigenous communities to address their concerns. The provincial Crown has a duty to consult Indigenous communities, as appropriate, prior to making decisions.

9.5 Agency Conclusion Regarding Impacts to Aboriginal Rights

The Agency acknowledges that there are potential changes to the exercise of rights due to the Project. This includes, but is not limited to, the potential reduced ability to transmit specific skills and way of life to future generations such as culture, language and spirituality. Additionally, there is a potential of reduced ability to govern and steward the land in the project study area. The Agency has identified mitigation and follow-up program measures to be included as conditions of approval, which would include consultation with Indigenous communities where applicable. In preparing this report, the

Agency took into account the proponent's Environmental Impact Statement, its responses to information requests, and the views of government agencies and Indigenous communities to form analysis and conclusions related to Aboriginal or Treaty rights.

Based on the analysis of environmental effects of the Project on Indigenous communities and the related mitigation measures outlined in Section 6 and 7, the potential impacts and accommodation measures discussed above, as well as pathways of rights outlined in Appendix E, the Agency is satisfied that the potential impacts of the Project on Aboriginal or Treaty rights have been adequately identified and appropriately mitigated or accommodated. The application of mitigation, accommodation measures and follow-up program measures should allow the continued exercise of Aboriginal and Treaty rights of Indigenous communities in a similar manner as before the Project.

The Agency recognizes that consultation is ongoing and further information regarding potential residual impacts may still be forthcoming. Input from Indigenous communities on the draft Environmental Assessment Report and potential conditions will be considered and will assist the Agency is finalizing its conclusions regarding potential impacts from the project on Aboriginal and Treaty rights.

10 Conclusions and Recommendations of the Agency

In preparing this report, the Agency took into account the proponent's Environmental Impact Statement, its responses to information requests, and the views of Indigenous communities and government agencies.

The environmental effects of the Project and their significance have been determined using assessment methods and analytical tools that reflect currently accepted practices of environmental and socio-economic assessment practitioners, including consideration of potential accidents and malfunctions and the potential for cumulative environmental effects. The Agency also considered historic contamination in its analysis, and determined that there would be no overlap between the historic contamination and effects from the Project.

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 Decision Statement, in the event that the Project is ultimately permitted to proceed.

In addition, it is the Agency's expectation that all of the proponent's commitments would be implemented as outlined in the Environmental Impact Statement and its supporting documents, including the document titled "*R.2 Goliath Gold Project Mitigation, Monitoring and Commitments (May 9, 2019)*", in order for the Project to be carried out in a careful and precautionary manner. The documents are available on the Canadian Environmental Assessment Registry's Internet Site under reference number 80019.

Appendices

Appendix A Environmental Effects Rating Criteria

Table 17 Assessment Criteria for Significance

Assessment Criterion	Low	Moderate	High
Magnitude	Specific to each valued component (Table 18)		
Geographic Extent	**Site-specific** within project study area	**Local** within the local study area	**Regional** within the regional study area
Duration	**Short-term or temporary** Effects that occur within the construction phase (<3 years) OR that occur within one generation or recovery cycle of the environmental component For current use of lands and resources for traditional purposes: effect lasts less than one complete seasonal round (<1 year)	**Medium-term**[106] Effects that occur through the operation and decommissioning phases (from 3 to 15 years) OR that extend to one or two generations or recovery cycles of the environmental component For current use of lands and resources for traditional purposes: effect lasts less than one generation of land users (< 25 years)	**Long-term** Effects that occur into decommissioning and beyond (>15 years) OR that extend for more than two generations or recovery cycles of the environmental component For current use of lands and resources for traditional purposes: effect last for more than one generation of land users (> 25 years)
Frequency	**Once**	**Intermittent**	**Continuous**

[106] For medium-term effects related to changes to the atmospheric environment (i.e. noise, light and air quality), the effects would be mainly due to activities occurring during the open pit phase of operations, and therefore effects would occur only from 3 to 6 years.

Assessment Criterion	Low	Moderate	High
	Occurs once during any phase of the Project.	Occurs occasionally or at intermittent intervals during one or more phases of the Project.	Occurs continuously during one or more phases of the Project.
Reversibility	**Reversible** Reversible within the lifetime of the Project or at abandonment.	**Partially reversible** Partially reversible within the lifetime of the Project or at abandonment.	**Irreversible** Irreversible, persisting after abandonment.
Timing*	**Inconsequential** Inconsequential, timing of predicted project activities not expected to affect sensitive activities.	**Moderate** Moderate, timing of predicted project activities may affect some sensitive activities.	**Unfavourable** Unfavourable, timing of predicted project activities will affect some sensitive activities.
Ecological and Social Context	Taken into account when considering the key criteria in relation to particular valued components, as the context may help better characterize whether adverse effects are significant. For example, information on the context is useful when it reveals: a unique characteristic of the area (e.g., proximity to park lands, ecologically critical or fragile areas, valuable heritage resources); unique values or customs of a community that influence the perception of an environmental effect (including cultural factors); or a valued component that is important to the functioning of an ecosystem, ecological community or community of people.		

* Timing is a valued component-specific consideration, applied to fish and fish habitat, where disturbance may occur during sensitive life stages, and for the current use of lands and resources, which may be affected seasonally by changes to the environment.

Table 18 Description of Magnitude Rating

Valued Component	Rating for Magnitude		
	Low	Moderate	High
Fish and fish habitat	Little to no effect on fish health or fish habitat in the receiving environment.	Measurable effect on fish health or fish habitat in receiving environment, but would not likely result in changes to the regional status of fish health and populations.	Measurable effect on fish health or fish habitat in the receiving environment which could result in changes to the regional status of fish health and populations.

Valued Component	Rating for Magnitude		
	Low	Moderate	High
Migratory birds	Little to no effects on migratory birds or unique migratory bird habitats.	Measurable effect to migratory birds or unique migratory bird habitats, but would not likely change the status of the regional populations or availability of unique habitats.	Measurable effect on the majority of migratory birds or unique migratory bird habitats which would result in changes to the status of regional populations or availability of unique habitats.
Wetlands	No measurable residual effect to the abundance and distribution of wetlands.	Measurable residual effect to the abundance and distribution of wetlands within the local study area, but the changes are well within the predicted adaptive capability of wetland ecosystems to be self-sustaining.	Residual effect to the abundance and distribution of wetlands within the regional study area approaching the predicted adaptive capability of wetland ecosystems to be self-sustaining.
Valued components included under subsection 5(2): Snapping turtles	Little to no effect on amphibian populations in the receiving environment.	Measurable effect on amphibian populations in the receiving environment, but one which would not likely result in changes to the regional status of amphibian populations.	Measurable effect on amphibian populations in the receiving environment which could result in changes to the regional status of amphibian populations.
Health of Aboriginal peoples	The effect results in a change to exposure that would be negligible or low and exposure does not approach health-based standards.	The effect results in a change to exposures below but nearing health-based standards.	The effect results in a change to exposures above health-based standards.
Socio-economic conditions of Aboriginal peoples	Negligible change in a current activity that would require little to no alteration in behaviour to carry out the activity.	Measurable change in a current activity that would require some alteration in behaviour to carry out the activity.	Measurable change in a current activity that would mean the activity no longer can be carried out.

Valued Component	Rating for Magnitude		
	Low	Moderate	High
Indigenous uses: current use of lands and resources for traditional purposes by Aboriginal peoples	The effect results in a change in an activity or use by an Indigenous community, but this practice could continue in a similar manner as before.	The effect results in a change to the preferred locations or means to practice an activity or use by an Indigenous community such that it may be modified or limited.	The effect results in a change such that an activity or use can no longer be carried out by an Indigenous community in its preferred locations or manner.
Transboundary effects – greenhouse gas emissions	Emissions represent a negligible contribution to provincial or national emissions objectives or standards.	Emissions represent a moderate contribution to provincial or national emissions objectives or standards but are within regulatory limits and objectives.	Emissions cause exceedances of provincial or national emissions objectives or standards.

Table 19 Decision Tree for Determining Overall Significance of a Residual Effect

Magnitude*	Geographic Extent	Duration	Frequency	Reversibility	Significance
Moderate	Site-specific	Short-term or medium-term	Once or Intermittent	Any Level of Reversibility	Not Significant
			Continuous	Fully or Partially Reversible	Not Significant
				Irreversible	Not Significant
		Long-term	Any Level of Frequency	Fully or Partially Reversible	Not Significant
				Irreversible	**Significant**
	Local	Short-term	Once or Intermittent	Any Level of Reversibility	Not Significant
			Continuous	Fully or Partially Reversible	Not Significant
				Irreversible	**Significant**
			Once	Any Level of Reversibility	Not Significant
		Medium-term or long-term	Intermittent or Continuous	Fully or Partially Reversible	Not Significant
				Irreversible	**Significant**
	Regional	Short-term	Once or Intermittent	Any Level of Reversibility	Not Significant
			Continuous	Any Level of Reversibility	**Significant**
		Medium-term	Once	Any Level of Reversibility	Not Significant
			Intermittent or Continuous	Any Level of Reversibility	**Significant**
		Long-term	Any Level of Frequency	Any Level of Reversibility	**Significant**

Magnitude*	Geographic Extent	Duration	Frequency	Reversibility	Significance
High	Site-specific	Short-term or medium-term	Any Level of Frequency	Any Level of Reversibility	Not Significant
		Long-term	Any Level of Frequency	Fully or Partially Reversible	Not Significant
				Irreversible	**Significant**
	Local	Any Duration	Any Level of Frequency	Fully or Partially Reversible	Not Significant
				Irreversible	**Significant**
	Regional	Any Duration	Any Level of Frequency	Any Level of Reversibility	**Significant**

*All effects of low magnitude were considered not significant, regardless of other criteria**.**

Appendix B Summary of Environmental Effects Assessment

Residual Effect	Predicted Degree of Residual Effect						Significance of Residual Effect
	Magnitude	Geographical Extent	Duration	Frequency	Reversibility	Timing	
Valued Component – Fish and Fish Habitat							
Fish mortality and fish health	**Low** *Fish mortality and health effects on individual fish are not expected to affect the regional status of fish health and populations.*	**Moderate** *Effect predicted to extend to the local study area.*	**Long - term** *Effect predicted to extend into abandonment.*	**Intermittent** *Effect predicted to occur at intermittent intervals from construction to abandonment.*	**Reversible** *Effect predicted to be fully reversible once project activities cease.*	**Moderate** *Timing of Project activities may affect some sensitive activities in the fish lifecycle, such as spawning.*	**Not significant** *It is expected that there would be fish mortality and health effects on individual fish but populations of fish would not be affected outside of the local study area.*
Loss or alteration of fish habitat	**Low** *54 801 square metres of fish habitat would be lost due to the Project, which would be counterbalanced by the fish habitat offsetting plan*	**Moderate** *Effect predicted to extend to the local study area.*	**Medium - term** *Habitats created as part of the fish habitat offsetting plan would be established around the same time as the loss of habitats, but would require time during operations to become fully established and functional.*	**Continuous** *Effect predicted to occur continuously during construction and part of operations.*	**Reversible** *Habitat gains expected from the created habitats through the fish habitat offsetting plan would counterbalance any habitat losses in the long-term.*	**Inconsequential** *Timing of habitat removal would not affect sensitive activities in the fish lifecycle, such as spawning, as project activities in or near waterbodies would be conducted during the fisheries timing window.*	**Not significant** *No net loss of habitat expected through the fish habitat offsetting plan, pursuant to the* Fisheries Act.

Residual Effect	Predicted Degree of Residual Effect						Significance of Residual Effect
	Magnitude	Geographical Extent	Duration	Frequency	Reversibility	Timing	
Valued Component – Migratory Birds							
Exposure to contaminants in project components with open water	**Low** *Given the minimal likelihood of mortality or harm to migratory birds.*	**Low** *Effect predicted to occur within the project study area.*	**Long - term** *Effect predicted to extend into abandonment*	**Continuous** *Effect predicted to occur continuously from operations to abandonment.*	**Reversible** *Effect predicted to be fully reversible once water quality meets the applicable water quality guidelines.*	**N/A**	**Not significant** *The contaminant concentrations in open water are predicted to not cause significant adverse effects to migratory birds, but follow-up program measures, such as use of deterrents, would be implemented if water quality in project components with open water exceeds the applicable water quality guidelines.*
Increased risk of collisions with vehicles	**Moderate** *As Common Nighthawk use roads as foraging habitat, many individual migratory birds can be affected but a regional change in populations is not expected.*	**Low** *Effect predicted to occur within the project study area.*	**Medium - term** *Effect predicted to extend into decommissioning.*	**Continuous** *Effect predicted to occur continuously during construction, operations and decommissioning.*	**Reversible** *Effect predicted to be fully reversible once vehicle traffic within the project study area ceases.*	**N/A**	**Not significant** *It is expected that there would be effects on individual migratory birds due to collisions with vehicles but populations of migratory birds would not be affected outside of the project study area.*
Loss of nests or critical habitat	**Moderate** *Loss of suitable nests or critical habitat would not result in a measurable change in the abundance of migratory birds in the project study area and the local study area.*	**Moderate** *Effect predicted to extend to the local study area.*	**Long - term** *Effect predicted to extend into abandonment.*	**Continuous** *Effect predicted to occur continuously during all phases of the Project.*	**Partially Reversible** *Effect predicted to be partially reversible as pre-project conditions would not be fully achieved.*	**Inconsequential** *Timing of habitat removal would not affect sensitive activities in the migratory bird lifecycle, such as nesting, as project activities like vegetation clearing would be restricted from occurring during bird nesting periods.*	**Not significant** *Suitable nests or critical habitats are available within the local and regional study areas. Site rehabilitation in accordance with the provincial requirements would partially restore the project study area in the long term.*

Residual Effect	Predicted Degree of Residual Effect						Significance of Residual Effect
	Magnitude	Geographical Extent	Duration	Frequency	Reversibility	Timing	
Valued Component –Current Use of Lands and Resources for Traditional Purposes							
Reduction of quality and availability of resources	**Low** *Changes to the quality and availability of resources used for plant gathering, fishing, hunting, and trapping would lead to Indigenous use occurring in a similar manner to now.*	**Moderate** *Effect predicted to extend just into the local study area.*	**Medium - term** *Effect predicted to occur for under 25 years (construction through decommissioning).*	**Continuous** *Effect predicted to occur continuously during its duration.*	**Partially Reversible** *Parts of the project study area are expected to be rehabilitated, and changes to air quality (dust) would be lessened after operations, thus reversing some of the changes to quality of plants and availability of plants, wildlife and fish for harvesting.*	**N/A**	**Not significant** *Changes in the quality and availability of resources would occur at locations in and near the project study area. Plants, wildlife and fish would be found in other parts of the local study area and into the regional study area.*
Loss or alteration of access for Indigenous use	**Moderate** *Access to Tree Nursery ponds and harvesting area just into the local study area would be maintained but modified by the Project.*	**Moderate** *Effect predicted to extend just into the local study area.*	**Medium - term** *Effect predicted to occur for under 25 years (construction through decommissioning).*	**Continuous** *Effect predicted to occur continuously during its duration.*	**Reversible** *Access points will be re-established after decommissioning.*	**N/A**	**Not significant** *Indigenous communities would be able to access areas within the harvesting and fishing locations within the Tree Nursery ponds just into the local study area from construction to decommissioning, albeit with altered access.*

Residual Effect	Predicted Degree of Residual Effect						Significance of Residual Effect
	Magnitude	Geographical Extent	Duration	Frequency	Reversibility	Timing	
Alteration to travel routes or archaeological resources	**Low** *No archaeological site or travel routes have been identified or would be directly impacted within the project study area.*	**Moderate** *Effect predicted to extend just into the local study area outside of the project study area.*	**Medium – term** *Effect predicted to occur for under 25 years (construction through decommissioning).*	**Continuous** *Effect predicted to occur continuously during its duration.*	**Reversible** *Indirect effects such as alteration of access and changes to experience would be re-established after decommissioning*	**N/A**	**Not Significant** *No traditional travel routes or archaeological resources were found within the project study area. There could be indirect effect in areas surrounding the project study area due to alteration of access and changes to experience. The proponent committed to prevent disturbance through establishing buffer zones should any archaeological sites or areas of cultural significance were discovered.*
Reduction of overall quality of experience during Indigenous use	**Low** *Changes to experience should lead to Indigenous use occurring in a similar manner to now.*	**Moderate** *Effect predicted to extend into the local study area.*	**Long - term** *Effect predicted to occur for more than 25 years (construction through abandonment).*	**Continuous** *Effect predicted to occur continuously during its duration.*	**Partially Reversible** *Changes to air quality and noise would be reversed over time, but changes to the visual landscape, such as the view of the waste rock storage area, would remain.*	**N/A**	**Not significant** *Changes in the quality of experience are expected during the Project, but these would occur at locations just into the local study area. Indigenous use could still occur without loss of quality of experience in other parts of the local study area and into the regional study area.*
Valued Component – Health and Socio-Economic Conditions							
Exposure to air and water contaminants by inhalation, ingestion or dermal contact	**Moderate** *The Project would lead to a change to exposures to water and air contaminants that are below but nearing health-based standards*	**Moderate** *Effect predicted to extend into the local study area.*	**Medium - term** *Effect predicted to occur from construction through decommissioning.*	**Continuous** *Effect predicted to occur continuously during its duration.*	**Partially Reversible** *Changes to air quality and water quality are expected to be reversed to pre-project conditions over time.*	**N/A**	**Not significant** *Exposure to contaminants from water and fish are not likely to contribute to health effects.*

Residual Effect	Predicted Degree of Residual Effect						Significance of Residual Effect
	Magnitude	Geographical Extent	Duration	Frequency	Reversibility	Timing	
Reduced ability to harvest subsistence and economic resources	**Moderate** *Harvesting activities may require some alteration in behaviour of Indigenous communities.*	**Moderate** *Effect predicted to extend just into the local study area outside of the project study area.*	**Medium - term** *Effect predicted to occur from construction through decommissioning.*	**Continuous** *Effect predicted to occur continuously during its duration.*	**Reversible** *Traplines, plant harvesting and baitfishing could resume after decommissioning.*	**N/A**	**Not significant** *Changes to availability and access to trapline, fish and harvested plants areas are not likely to contribute to effects to socio-economic conditions.*
Valued Component – Transboundary Effects							
Emissions of greenhouse gases	**Low** *Emissions would be up to 0.0091 percent of annual Ontario emissions from 2017.*	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**Not significant** *Project would not contribute a significant quantity of greenhouse gases into the atmosphere compared to Ontario and Canada's greenhouse gas inventories.*
Valued Component – Subsection 5(2) Effects							
Effects to wetlands	**Low** *The Project would result in a loss of less than 1 percent of wetlands in the regional study area.*	**Moderate** *Habitat loss and alterations to habitat quality and function will extend to the local study area due to changes in surface and groundwater levels.*	**Long - term** *Effect predicted to extend into abandonment*	**Continuous** *Effect predicted to occur continuously during construction, operation, and decommissioning.*	**Partially reversible** *Effect would be partially reversible due to implementation of progressive rehabilitation and fish habitat offsetting plan*	**N/A**	**Not significant** *Wetland habitats are available in abundance in the local and regional study areas. Wetlands would be partially restored by progressive rehabilitation and fish habitat offsetting plan.*

Residual Effect	Predicted Degree of Residual Effect						Significance of Residual Effect
	Magnitude	Geographical Extent	Duration	Frequency	Reversibility	Timing	
Effects to Snapping Turtles	**Low** *Removal of less than 1 percent of wetland within the regional study area will have little to no effect on populations of Snapping Turtles.*	**Moderate** *Effect predicted to extend into the local study area.*	**Medium - term** *Effect predicted to occur during construction, operations and decommissioning.*	**Continuous** *Effect predicted to occur continuously during construction, operations and decommissioning.*	**Partially Reversible** *Effect predicted to be partially reversible as pre-project conditions would not be fully achieved.*	**Moderate** *Timing of disturbance may affect breeding activities of Snapping Turtles*	**Not significant** *Snapping turtle habitat is available within the local and regional study areas. . Wetlands would be progressively rehabilitated and additional wetlands would be created as part of the fish habitat offsetting plan, which would partially restore habitat in the project and local study areas in the long term.*

Appendix C List of Key Mitigation Measures, Monitoring and Follow-Up Considered by the Agency

Valued Component	Mitigation Measures
Effects identified under subsection 5(1) of CEAA 2012	
Fish and Fish Habitat	**Mitigation Measures for fish mortality and fish health** • Salvage and relocate fish before any work is conducted in or near water during construction and operations through a fish salvage and relocation plan conducted in accordance with the *Fisheries Act* requirements to avoid serious harm to fish. • Install screens on the water intake structures in the Tree Nursery ponds of Thunder Lake Tributaries 2 and 3, in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* and pursuant to the *Fisheries Act* requirements to avoid serious harm to fish. • Control acid rock drainage and metal leaching, in consultation with relevant authorities, during all phases of the Project such that all effluent and seepage from the Project comply with Schedule 4 of the *Metal and Diamond Mine Effluent Regulations* and the *Fisheries Act*. The Proponent shall implement, at a minimum, the following mitigation measures: o Design and construct the project components, including the tailings storage facility, and mine water collection system to accommodate 1-in-100 dry year conditions, and the Environmental Design Storm events Described in Table A of the Additional Clarification Requests in the May 14, 2019 email [107]; o Avoid using potentially acid generating material for any construction purposes; o Install a liner underneath the low-grade ore stockpile, and in the tailings storage facility prior to the deposition of any ore or tailings, respectively, to reduce seepage; o Place the remaining low-grade ore into the open pit during decommissioning; o Cover the tailings with an oxygen-limiting barrier before the onset of acid rock drainage, maintain the oxygen-limiting barrier to avoid acid rock drainage, and maintain the tailings in a isolated state during all phases of the Project; and o Cover the waste rock storage area with an oxygen-limiting barrier during decommissioning and abandonment to avoid acid rock drainage. • Manage water quality in mine effluents to meet the *Metal and Diamond Mining Effluent Regulations*; and to meet the requirements of the *Fisheries Act* in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary and Little Creek, while taking into account the Canadian Council of Minister of the Environment's *Canadian Water Quality Guidelines for Protection of Aquatic Life*. This includes, but may not be limited to:

[107] Submitted to the Agency as part of the clarification questions on the response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 36).

Valued Component	Mitigation Measures
	○ Intercept and collect surface water runoff and seepage, from operations through abandonment, from the waste rock storage area, overburden stockpiles, low-grade ore stockpile and tailings storage facility through the mine water collection system, and treat as necessary prior to discharging excess water into Blackwater Creek; ○ Intercept and collect the seepage and runoff, from operations through abandonment, from the low-grade ore stockpile and waste rock storage area in a segregated pond, test and treat the collected water for acid rock drainage as needed, prior to integrating the collected water with the mine water collection system; ○ Install a liner in the contact water collection ditches to minimize seepage during all phases of the Project and in consultation with relevant authorities; and ○ During decommissioning and abandonment, collect and treat the contact water around the waste rock storage area, tailings storage facility, low-grade ore stockpile and overburden stockpiles, and direct it to the open pit. • Develop a recovery strategy, to be implemented in the event of a tailings breach, which includes cleaning of any tailings spilled within one year of a breach, to prevent the onset of acid rock drainage. **Mitigation Measures for loss or alteration of fish habitat** • Implement an offsetting plan for any serious harm to fish caused by the Project, pursuant to the *Fisheries Act*, and a fish habitat compensation plan for any fish habitat losses related to contact water disposal for the Project, pursuant to section 27.1 of the *Metal and Diamond Mining Effluent Regulations*. These plans would be developed with Fisheries and Oceans Canada and with Environment and Climate Change Canada, and through engagement with Indigenous communities. • Conduct any in-stream work required for construction and maintenance of project components during the fisheries timing window determined in consultation with the Indigenous communities and relevant authorities. • Apply erosion and sediment control measures during construction, operation and decommissioning, within the contact water collection ditches, in accordance with the requirements of the *Fisheries Act*. **Follow-up program measures to address effects on fish and fish habitat** • Develop and implement, in consultation with Fisheries and Oceans Canada, a follow-up program to verify effectiveness of the mitigation measures in relation to the proposed blasting at the open pit during construction and operations for avoiding serious harm to fish, pursuant to the *Fisheries Act*. • Implement, during construction and operations, quantitative monitoring measures for fish habitat creation described in the offsetting plan pursuant to the *Fisheries Act,* and in consultation with the Indigenous communities and Fisheries and Oceans Canada, to assess whether the created habitats are functioning as intended. In the event that measures described in the plan are ineffective, the proponent would implement adaptive management measures as required under the *Fisheries Act*. • Monitor, during operations and in real-time, daily inflows from the Thunder Lake Tributaries 2 and 3 into the Tree Nursery ponds, to ensure that the water withdrawal from the Tree Nursery ponds does not exceed 5 percent of the daily inflows.

Valued Component	Mitigation Measures
	• Conduct fish health surveys, from operations to abandonment, and in consultation with Indigenous communities, Environment and Climate Change Canada and relevant authorities, to comply with the *Fisheries Act* and with the *Metal and Diamond Mine Effluent Regulations*, including the Environmental Effects Monitoring, to verify that the changes in surface water quantity and quality in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Thunder Lake and Wabigoon Lake do not cause adverse effects on fish and fish habitat. The follow-up program measures should include, at a minimum: o Monitor concentration of parameters in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Thunder Lake and Wabigoon Lake to verify the environmental assessment predictions in Tables W9-1 to W9-3 in the Water Addendum (R.3)[108]. o Monitor surface water flows and levels in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, and Little Creek to verify the environmental assessment predictions listed in Table 7; and o 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. • Implement, during all phases, a seepage and surface water quality monitoring program upgradient, downgradient and cross-gradient of the tailings storage facility, minewater pond, waste rock storage area, overburden stockpiles, low-grade ore stockpile, and underground mine to evaluate the effectiveness of mitigation measures that are necessary to protect fish and fish habitat. The monitoring measures, at a minimum, should include: o 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 magnitude and onset of acid rock drainage and its impact on groundwater and surface water quality of Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay, Little Creek, Wabigoon Lake and Thunder Lake. Use the results of the ongoing geochemical testing to adjust the mitigation measures for the tailings storage facility and waste rock storage area, as necessary; o Monitor groundwater flows, levels and quality to understand impacts on surface water quality, and to verify that the predicted groundwater concentrations of parameters in Table W8-1 and W8-3 in the Water Addendum (R.3)[37] are not exceeded, so as to avoid degradation of surface water quality of Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Wabigoon Lake and Thunder Lake. In the event monitoring data shows degradation of groundwater, construct adaptive management measures and monitor their effectiveness.

[108] Water Addendum (R.3) was submitted to the Agency as part of response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 33).

Valued Component	Mitigation Measures
	• Monitor and treat if necessary, during decommissioning and abandonment and in consultation with Indigenous communities, Environment and Climate Change Canada 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, prior to its connection with Blackwater Creek, does not exceed the concentrations of parameters in Table W6-3 in the Water Addendum (R.3)[37]. Where treatment is not effective, implement adaptive management measures, and monitor the effectiveness of the adaptive management measures.
Migratory birds	**Mitigation measures to address exposure to contaminants in project components with open water** • Implement mitigation measures for water quality listed in Box 7.1-1. **Mitigation measures to address loss of nests or critical habitat** • Carry out all phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds, or destroying, disturbing or taking their nests or eggs, and remains in compliance with the *Migratory Birds Convention Act* (1994) and with the *Species at Risk Act* (2002), while taking into account Environment and Climate Change Canada's *Avoidance Guidelines*, *General Nesting Periods of Migratory Birds in Canada* guidance document, and *Guidelines to reduce risk to migratory birds*. This includes conducting vegetation clearing outside of bird nesting periods to avoid potential mortality to birds and implementing noise abatement measures. • In consultation with relevant authorities, develop and implement prevention and mitigation measures to minimize the risk of harm to migratory birds and help maintain viable populations of migratory birds. If active nests (with eggs or young) are discovered, work must be interrupted and a buffer zone established until nesting is finished. • Control direction, timing, and intensity of lighting required for the construction, operation, and decommissioning of the Project to avoid effects on migratory birds. • In consultation with relevant authorities and Indigenous communities, implement the progressive rehabilitation of project components during operations, decommissioning, and abandonment of the Project to revegetate areas that were cleared and to create habitat suitable for migratory birds using native species. The measures implemented should avoid the introduction of invasive species. The progressive rehabilitation plan would be consistent with the Certified Closure Plan pursuant to Ontario's *Mining Act*. • Maintain vegetated buffers of 120 metres along rivers, creeks, and wetlands within the project study area using native species during construction and operations. • In consultation with relevant authorities, implement measures to create or enhance Barn Swallow habitat, including constructing Barn Swallow nesting habitat, to compensate for the loss of Barn Swallow nesting sites. These measures would meet the requirements of Ontario's *Endangered Species Act* (2007), administered by the Ontario Ministry of Environment, Conservation and Parks, and the proposed Recovery Strategies developed under the federal *Species at Risk Act*.

Valued Component	Mitigation Measures
	Follow-up program measures to address exposure to contaminants in project components with open water • Develop and implement, in consultation with relevant authorities and Indigenous communities as part of the communication and engagement plan (described in Box 7.3-2), , a monitoring and follow-up program to verify the environmental assessment predictions and the effectiveness of proposed mitigation measures: o Monitor, at times migratory birds may be present in the project study area, the use by migratory birds of the tailings storage facility and onsite ponds from operations to abandonment until such time that water quality in these structures meets the water quality predictions in the table titled "Table 2. Refined Ecological Toxicity Assessment for Mammals and Birds"[109]. Implement adaptive management measures including bird deterrents if migratory birds are observed accessing these components prior to water quality meeting the predicted concentrations. o Monitor the use of the pit lake by migratory birds, including Barn Swallows, from the time the pit lake is being filled to when the pit lake is permitted to connect to the receiving environment (as described in Box 7.1-2). If migratory birds are observed accessing the pit lake before the pit lake has met the applicable water quality guidelines (Box 7.1-1), implement adaptive management measures including installation of deterrents to reduce exposure of the pit lake to migratory birds. • Implement follow-up program measures related to water quality in Box 7.1-2 and Box 7.4-2. **Follow-up program measures to address increased risk of collisions with vehicles** • Develop and implement, in consultation with relevant authorities and Indigenous communities (described in Box 7.3-2), a monitoring and follow-up program to verify the environmental assessment predictions and the effectiveness of proposed mitigation measures: o Conduct surveys for Common Nighthawk along the roads within the project study area one year prior to construction and annually during construction, operations, and decommissioning. o Monitor collisions between project vehicles and migratory birds within the project study area continuously during construction, operations, and decommissioning, and implement adaptive management measures in consultation with Environment and Climate Change Canada if vehicle collisions with migratory birds are recorded. **Follow-up program measures to address loss of nests or critical habitat**

[109] Found in Final Round 2 Wildlife Information Requests submitted as part of response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 33)

Valued Component	Mitigation Measures
	• Develop and implement, in consultation with relevant authorities and Indigenous communities as part of the communication and engagement plan (described in Box 7.3-2), a follow-up program to verify the environmental assessment predictions and the effectiveness of proposed mitigation measures, including: o Conduct surveys prior to construction to verify suitable habitat, including fen habitat, as described in MMC-11.1 in the document "R.2 Goliath Gold Project Mitigation, Monitoring and Commitments (May 9, 2019)"[110], and in consultation with Environment and Climate Change Canada. o Survey migratory birds in the project and local study areas to assess changes in migratory bird populations caused by the Project. The proponent shall determine, in consultation with relevant authorities and Indigenous communities, the frequency and location of surveys. • Monitor progressive rehabilitation measures for habitat suitable for migratory birds during operations, decommissioning and abandonment until rehabilitation objectives are confirmed. The Proponent shall determine, in consultation with relevant authorities and Indigenous communities, the frequency and location of surveys. • Monitor noise levels within the project study area and local study area during construction and operations to identify the geographic extent in which noise may affect migratory birds. The program will include adaptive management measures to be undertaken if noise levels exceed predicted values. The Proponent shall determine, in consultation with relevant authorities and Indigenous communities, the frequency and location of surveys. • Monitor Barn Swallow replacement habitat annually for three years after installation, to assess nesting activity and structure use, in accordance with Ontario's *Endangered Species Act*.
Current use of lands and resources for traditional purposes by Aboriginal peoples	**Mitigation measures to address the reduction of quality and availability of resources** • As part of the measures to revegetate areas that were cleared, stated in Box 7.2-1: o Prevent the introduction of invasive species into the project study area. o Identify plant species of interest to Indigenous communities in consultation with the Indigenous communities. o Implement the mitigation measures identified in Box 7.1-1 related to fish and fish habitat that would minimize effects on fish population and fish health, as well as fish habitat. o Implement the mitigation measures identified in Box 7.4-1 related to air quality. **Mitigation measures to address the loss or alteration of access**

[110] Submitted as part of response to Information Request #2 of the Environmental Impact Statement (Canadian Environmental Assessment Registry Reference Number 80019, document number 33)

Valued Component	Mitigation Measures
	• Develop community-specific access management plans in consultation with Indigenous communities as part of the communication and engagement plan in Box 7.3-2, during construction, operations and decommissioning. • Provide accompanied access to Indigenous communities between the open pit and former Tree Nursery, and unaccompanied access to harvesting sites just into the local study area as well as the Tree Nursery pond for bait fishing. **Mitigation measures to address the reduction of overall quality of experience** • Conduct blasting between 10:00 am and 4:00 pm, avoiding statutory holidays and days of cultural importance that shall be determined in consultation with Indigenous communities, unless required for safety reasons. In the event that blasting is required outside of these times, or on statutory holidays or days of cultural importance, the proponent shall notify Indigenous communities, as part of the community and engagement plan in Box 7.3-2. • As part of the communication and engagement plan in Box 7.3-2, provide information to Indigenous communities related to schedules for blasting, with a mechanism to provide a minimum of 48 hours notice in advance of a change in the blasting schedule taking effect. • Implement the mitigation measures identified in Box 7.2-1 related to progressive revegetation. • Implement the mitigation measures identified in Box 7.4-1 related to air quality. • Mitigation measures to address alteration of connection to traditional areas, and artifacts, of physical and cultural heritage. • Restrict activities and development within 300 metres of historical travel routes. If an archaeological discovery is made a 50 metre buffer zone will be left around remaining watercourses and traditional travel routes identified within the project study area. **Follow-up program measures to address the reduction of quality and availability of resources** • Develop a communication and engagement plan in conjunction with leadership of each Indigenous community affected by the Project. Engage Indigenous communities in the review of monitoring reports; discuss any unforeseen impacts on Indigenous uses outside the project study area; and, if required, develop and implement additional mitigation measures. Validate Indigenous use with communities, and ensure that appropriate mitigation measures are developed and implemented. • Develop, prior to construction and in consultation with Indigenous communities, a follow-up program to verify the accuracy of the environmental assessment and to determine the effectiveness of mitigation measures as it pertains to the adverse environmental effects of the Project on the current use of lands and resources for traditional purposes. The follow-up program would be implemented during all phases of the Project and would take into account available Indigenous knowledge and input from Indigenous communities. • Implement follow-up program measures to monitor wildlife collisions with vehicles, and where necessary, apply adaptive management measures.

Valued Component	Mitigation Measures
	Follow-up program measures to address the loss or alteration of access • As part of the communication and engagement plan, validate Indigenous use with communities, and ensure that appropriate mitigation measures are developed and implemented, whereby at a minimum, continued access to sites of importance to Indigenous communities is maintained. **Follow-up program measures to address the reduction of overall quality of experience** • As part of the communication and engagement plan, validate Indigenous use and avoidance due to perceived concerns about contamination with Indigenous communities, including recreational or commercial land users. In the event that avoidance of areas is noted due to perception, provide information that would assist the Indigenous communities to maximize Indigenous uses. In the event that unforeseen impacts to experience are identified by Indigenous communities, ensure that appropriate mitigation measures are developed and implemented. • Follow-up program measures to address alteration of connection to traditional areas, and artifacts of physical and cultural heritage. • Develop, prior to construction and in consultation with Indigenous communities, a follow-up program to verify the archaeological assessment as it relates to use of lands for cultural and traditional purposes, and determine the effectiveness of mitigation measures as it pertains to the adverse environmental effects of the Project on the current use of lands and resources for traditional purposes.
Health and socio-economic conditions of Aboriginal peoples	**Mitigation measures to address exposure to air and water contaminants** • As part of the communication and engagement plan in Box 7.3-2, communicate results of the follow-up program in Box 7.4-2. This should include communication of any associated health risks, and adaptive management measures to be taken to further reduce the release of contaminants or the exposure to contaminants. • Meet the standards set out in the *Canadian Ambient Air Quality Standards* and the *Ontario Ambient Air Quality Criteria* by implementing a dust management program to control fugitive particulate emissions from on-site roadways and material handling during construction, operations, and decommissioning, which includes: o Control fugitive dust emissions from roads, material handling and storage areas/stockpile by applying water sprays, use of surfactants, dust sweeping, gravel application, truck wheel washing stations, and enclosure of dust sources; o Use dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust; and o Equip crushers with dust collection systems (baghouse or equivalent) to control fugitive emission during ore crushing and transfer. • Provide personal protective equipment to Indigenous people, and provide information regarding the advisability of the use of the equipment during traditional land use activities within the proponent's property boundary. • Implement adaptive management measures to deter ungulates from using the tailings storage facility, from the time that the facility becomes operational to abandonment;

Valued Component	Mitigation Measures
	• Implement the key mitigation measures identified in Box 7.1-1 for water quality and fish and fish habitat, to reduce exposure to metals from contact with water and from ingestion, and to reduce potential bioaccumulation in fish. **Mitigation measures to address reduced ability to harvest subsistence and economic resources** • Implement the mitigation measures identified in Box 7.1-1 related to fish and fish habitat that would protect fish habitat, fish population and fish health. • Implement the mitigation measures identified in Box 7.3-1 related to providing access and progressive rehabilitation of the project study area. • Post sampling information on blueberries, wild rice, chanterelles and fish, obtained through the follow-up program measure identified in Box 7.4-2, to a public forum, such as a website, available to Indigenous communities and nearby recreational or commercial land users to inform quality of harvested food. The frequency and timing of the postings will be developed in consultation with Indigenous communities. **Follow-up program measures to address exposure to air and water contaminants** • Develop and implement follow-up program measures related to the health of Indigenous peoples to verify the accuracy of the environmental assessment predictions related to air quality, and to determine the effectiveness of the mitigation measures. Do so, in consultation with Indigenous communities, as part of the communication and engagement plan in Box 7.3-2, during construction, operations and decommissioning, and include measures at a minimum to monitor: o Fine particulate matter ($PM_{2.5}$) and nitrogen dioxide, at locations within areas used by Indigenous communities for traditional purposes or within areas representative of air quality in areas used by Indigenous communities for traditional purposes, within the project study area or local study area, in real-time; o Particulate matter (PM_{10}), including trace metal analysis, at the same locations, and at a frequency that is sufficient to understand temporal trends in the concentrations of these components (at a minimum of monthly) • Implement follow-up program measures identified in Box 7.1-2 related to surface water quality. Develop and implement follow-up program measures related to the health of Indigenous peoples, in consultation with Indigenous communities, as part of the communication and engagement plan in Box 7.3-2, which include, at a minimum to monitor: o Thallium in Blackwater Creek, Thunder Lake Tributaries 2 and 3, Hoffstrom's Bay Tributary, Little Creek, Thunder Lake and Wabigoon Lake, three months prior to construction, during construction and for a minimum of two years in operations, to verify the environmental assessment prediction for the "Project Only" contribution of thallium during "Site Preparation and Construction" and "Operations" in Table 3.5.3.4-1 of the Final Human Health and Ecological Risk Assessment (February 2019).[57] The monitoring results would inform whether implementation of additional mitigation measures is required. In case additional measures are implemented, also monitor the effectiveness of the measures;

Valued Component	Mitigation Measures
	○ Mercury in the effluent discharge to verify the environmental assessment prediction that it would not exceed the background concentration in Section 6, Table 6.8.2.1-1 of the revised Environmental Impact Statement, submitted in April 2018 (Canadian Environmental Assessment Registry Reference Number 80019, document number 28); and ○ Sulphate in the effluent discharge during construction, operations and decommissioning to verify the environmental assessment prediction that concentrations would not exceed 20 milligrams per litre. • Develop and implement follow-up program measures to verify the baseline concentrations for country foods, to verify the accuracy of the environmental assessment predictions for country foods, and to determine the effectiveness of the mitigation measures. Do so, in consultation with Indigenous communities, as part of the communication and engagement plan in Box 7.3-2, and identify any vegetation, fish and animal species that must be monitored, along with a protocol for collection of vegetation or tissue samples. Do so for three months prior to construction, and during construction, operations, and decommissioning, at minimum on an annual basis. Include measures at a minimum to verify concentrations of arsenic, cobalt, lead, mercury, methylmercury, thallium and zinc in the following, at locations at a minimum within the property boundary where Indigenous use would occur: ○ Wild rice in and downstream of Blackwater Creek; ○ Tissue from Walleye; and other fish species identified in consultation with Indigenous communities; ○ Chanterelle mushrooms and blueberries; and ○ Small mammals.
Effects identified under subsection 5(2) of CEAA 2012	
Other effects related to Federal Decisions	**Mitigation measures to address effects to wetlands** • Minimize the amount of wetland and vegetated area to be cleared by retaining forested areas wherever feasible and by avoiding broadcast spraying of herbicides. • In consultation with relevant authorities and Indigenous communities, implement the progressive rehabilitation of project components during operations, decommissioning, and abandonment of the Project to revegetate areas that were cleared. The measures implemented should avoid the introduction of invasive species. The progressive rehabilitation plan would be consistent with the Certified Closure Plan pursuant to Ontario's *Mining Act*. • Maintain vegetated buffers of 120 metres along rivers, creeks, and wetlands within the project study area using native species during construction and operations. • Implement mitigation measures related to fish and fish habitat (described in Box 7.1-1) **Mitigation measures to address effects to Snapping Turtles** • Implement mitigation measures related to fish and fish habitat (described in Box 7.1-1) **Follow-up program measures to address effects to wetlands**

Valued Component	Mitigation Measures
	• In coordination with relevant authorities, develop a follow-up program to verify the predictions of effects and the effectiveness of the progressive rehabilitation (Boxes 7.1-2, 7.2-1, and 7.6-1) to wetlands within the local study area and the regional study area. The program should verify the predicted spatial limits of the groundwater drawdown zone identified in Figure TMI_871-WL(2)-02_Figure 1[56] before and during operations, by mapping the extent of wetlands and monitoring wetland water levels. **Follow-up program measures to address effects to Snapping Turtles** • Develop a monitoring plan in consultation with relevant authorities and Indigenous communities to monitor the project study area for Snapping Turtles during construction, operations, and decommissioning. If Snapping Turtles are observed in the project study area, implement mitigation measures, such as relocation from the project study area. • Implement follow-up program measures to monitor collisions of Snapping Turtles with vehicles, and where necessary, apply adaptive management measures.

Appendix D Summary of the Crown Consultation with Indigenous communities

Indigenous Communities	Summary of comment	Summary of Proponent's Response	Agency Response
Effects Identified under Subsection 5(1) of CEAA 2012			
Fish and Fish Habitat			
Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation, Aboriginal People of Wabigoon, Lac des Mille Lacs First Nation	Concerns about water quality degradation in surrounding waterbodies due to possibility of seepage or discharge from project components, such as tailings storage facility, mine water pond, waste rock storage area, overburden stockpiles, and low-grade ore stockpile). Requested comprehensive groundwater modelling and an assessment of its effects on surface water quality.	The proponent predicted that changes to surface water quality would be negligible after implementation of mitigation measures. These include collection ditches around the project components, such as the tailings storage facility to collect seepage. The proponent committed to monitoring groundwater and surface water quality to verify the predictions made in the environmental assessment.	The Agency is satisfied with the proponent's response. The Agency has identified key mitigation measures and follow-up program measures in Boxes 7.1-1 and 7.1-2, 7.4-1 and 7.4-2. The Agency notes that the proponent will be required to manage water quality in mine effluent to meet Schedule 4 of the *Metal and Diamond Mining Effluent Regulations*, which are protective of fish and fish habitat, while also taking into account the Canadian Council of Ministers of the Environment's *Canadian Water Quality Guidelines for the Protection of Aquatic Life*.
Eagle Lake First Nation, Métis Nation of Ontario, Wabigoon Lake Ojibway Nation	Concerns regarding the sufficiency of baseline data collected for water and sediments, and the effects on local waterbodies and waterways from contaminants such as mercury, ammonia, and arsenic. Concerns that the increase in contaminants due to effluent discharge can negatively impact the health of local fish and expose consumers to adverse health effects. Requested that the proponent institute long-term monitoring of local waterbodies, waterways, and local fish tissue for contamination. Data collected from monitoring, as well as an effluent treatment	The proponent is of the view that there is sufficient baseline data collected for water and sediments to understand and characterize the potential effects of the Project. At the effluent discharge location, the proponent committed to meet Ontario Provincial Water Quality Objectives for all parameters, *Canadian Water Quality Guidelines for the Protection of Aquatic Life* where no Provincial Water Quality Objective exists, and background concentrations if background concentrations are above the Provincial Water Quality Objective. The proponent has also committed to having the effluent	The Agency is satisfied with the proponent's response. The Agency has identified key mitigation measures and follow-up program measures in Boxes 7.1-1 and 7.1-2. Furthermore, the Agency notes that the proponent will be required to manage water quality in mine effluent to meet Schedule 4 of the *Metal and Diamond Mining Effluent Regulations*, which are protective of fish and fish habitat, while also taking into account the Canadian Council of Ministers of the Environment's *Canadian Water Quality*

	plan, should be shared with Indigenous communities in the event of exceedances of water quality guidelines.	discharge meet background concentrations for mercury, and keeping concentrations of sulphate under 20 milligrams per litre.	*Guidelines for the Protection of Aquatic Life*. The Agency recommends follow-up program measures described in Box 7.1-2 to conduct fish health surveys, from operations to abandonment, and in consultation with Indigenous communities, Environment and Climate Change Canada and relevant authorities, to comply with the *Fisheries Act* and with Schedule 4 of the *Metal and Diamond Mine Effluent Regulations*, to verify changes in surface water quantity and quality.
Eagle Lake First Nation, Métis Nation of Ontario, Naotkamegwanning First Nation, Asubpeeschoseewagong Netum Anishinabek	Requested traditional knowledge to be included in the assessment of effects, and mitigation measures for fish and fish habitat. Concerns that baseline levels for contaminants, such as mercury, may bioaccumulate and affect the health of Indigenous peoples who consume such fish.	The proponent has included traditional knowledge into its environmental assessment where available, and has engaged with Indigenous communities to conduct further traditional knowledge studies. The proponent also plans to collect more information on baseline conditions of fish and fish habitat. The proponent acknowledged the historic contamination of local waterways, and is of the view that the Project will not overlap with the historic contamination. The risk to human health *via* exposure to contaminants is expected to be low. The proponent will monitor water quality, in consultation with Indigenous communities and relevant authorities, to determine if concentrations of mercury and sulphate in the receiving environment exceed the predicted levels in the environmental assessment. The proponent also committed to conducting fish health surveys to verify changes in water quantity and quality in the receiving	The Agency considered both the impact on rights as well as the impacts on Indigenous uses of the land. The Agency considered each Indigenous communities and its rights separately, including in the assessment on fish and fish habitat outlined in Sections 7.1. In addition, the Agency considered specific information submitted by communities on how they may be impacted by the Project. The Agency's conclusions, outlined in Sections 7.3, 7.4, and 9 of this report, is that with the application of mitigation and accommodation measures outlined by the proponent as well as the recommendations from the Agency for the follow-up program, the Project is not likely to have a significant impact on Indigenous communities.

		environment are protective of fish and fish habitat.	
Eagle Lake First Nation, Wabigoon Lake Ojibway Nation	Concerns regarding dust from waste rock causing a degradation of water quality.	The proponent would implement best management practices for dust control. This will include identification of all potential sources of dusts, so that mitigation measures could be applied accordingly. In consultation with Indigenous communities, the proponent will target dustfall monitoring jars to be placed in areas that overlap with areas where traditional lands and resource use occurs. To preserve water quality, the proponent would implement sediment and erosion controls, such as sediment traps within collection ditches, to mitigate potential degradation of surrounding waterbodies.	The Agency acknowledges that the proponent also committed to meet the *Canadian Ambient Air Quality Standards* and the *Ontario Ambient Air Quality Criteria* by implementing a dust management program to control fugitive particulate emissions from on-site roadways and material handling during construction, operations, and decommissioning. The Agency also acknowledges the proponent's commitment to installing dustfall jars for trace metal analysis in areas where traditional use would occur, in consultation with Indigenous communities. This monitoring data would be used to verify environmental assessment predictions and the effectiveness of mitigation measures, and to alleviate perceptions of contamination of country foods near the Project.
Naotkamegwanning First Nation, Wabigoon Lake Ojibway Nation, Eagle Lake First Nation	Concerns regarding exposure to oxygen of potentially acid-generating materials in the waste rock storage area and tailings storage facility during decommissioning and abandonment, and effects on water quality, as degradation of water quality could impact fish and aquatic habitat in the Blackwater Creek and Wabigoon Lake. Request that the Closure Plan, developed by the proponent pursuant to requirements of Ontario's *Mining Act*, be reviewed by Indigenous communities and relevant	The proponents' assessment of Project effects has identified mitigation measures, such as placement of a wet or dry cover over any potentially acid-generating materials in the tailings storage facility and a low-permeability dry cover on waste rock storage area during decommissioning and abandonment. This would limit exposure to oxygen of potentially acid-generating materials and avoid the generation of acid rock drainage. The proponent will collect, monitor and treat the seepage and runoff from the	The Agency is satisfied with the proponent's response. The Agency has identified key mitigation measures and follow-up program measures in Box 7.1-1 and Box 7.1-2. The proponent will be required to manage water quality in mine effluent to meet Schedule 4 of the *Metal and Diamond Mining Effluent Regulations*, which are protective of fish and fish habitat, while also taking into account the Canadian Council of Ministers of the Environment's *Canadian Water Quality*

	authorities to ensure that the tailings storage plans meet safety criteria.	waste rock storage area and tailings storage facility. The tailings storage facility would also be lined to minimize the flow of seepage into the natural environment. An Independent Tailings Review Board consisting of third party reviewers would also be established to ensure that the tailings storage facility is designed to minimize chances of causing effects to the environment.	*Guidelines for the Protection of Aquatic Life*. The Agency is also aware that should the Project proceed, a Certified Closure Plan pursuant to Ontario's *Mining Act* would be required. The plan would include conditions for site closure and monitoring. The Agency understands that the mine closure requirements of Ontario's *Mining Act* includes consultation with potentially impacted Indigenous communities and considers future land and resource use.
Métis Nation of Ontario	Concerns about the fluctuations in water flows in Blackwater Creek due to overprinting of portions of Blackwater Creek Tributaries, as these changes in water flows can affect fish species in Blackwater Creek. Request for monitoring of flow levels in waterbodies, and offsetting of any fish habitat that is lost due to the Project.	The proponent predicted that the changes in water levels and flows in waterbodies will be within natural variation, and not cause adverse effects on fish and fish habitat. The proponent committed to monitoring water levels and flows to verify the environmental assessment predictions. Any loss of fish habitat due to overprinting or permanent alteration of waterbodies would be counterbalanced by a fish habitat offsetting plan. For portions of waterbodies that would be overprinted by project components, measures would be implemented to salvage and relocate fish to an appropriate location in accordance with the *Fisheries Act,* prior to construction of the project components.	The Agency is satisfied with the proponent's response. The Agency is of the view that, after taking into consideration the implementation of key mitigation measures and follow-up program measures described in Box 7.1-1 and Box 7.1-2, the Project is unlikely to have a significant effect on fish habitat. As part of federal regulatory requirements under the *Fisheries Act*, the proponent would require a fish habitat offsetting plan to counterbalance the fish habitat lost due to the Project. The Agency notes that the Indigenous communities would be consulted in the development of the fish habitat offsetting plan.
Eagle Lake First Nation	Concerns about the design of the pit lake, and water quality of the Blackwater Creek upon its connection with the pit lake. If the water quality of the pit lake and Blackwater Creek is not managed, it will be unsafe for	The proponent indicated that any materials deposited into the open pit during decommissioning and abandonment will have a water cover to inhibit acidification of materials. Additionally, the proponent committed to ensuring that the water in	The Agency is satisfied with the proponent's response. The Agency has identified key mitigation measures and follow-up program measures in Box 7.1-1 and Box 7.1-2. The Agency is also aware that the proponent would be

	Indigenous use, and for commercial and traditional use of fisheries. Request for alternatives to the current design, and that pit lake be monitored and treated as needed in order to preserve the water quality of the fish bearing habitat in Blackwater Creek.	the pit Lake remains below or at Ontario Provincial Water Quality Objectives. The water in the open pit would be monitored as the open pit is filling, and continue to be monitored after it is filled to determine whether additional treatment would be required prior to connection with Blackwater Creek. Water in the open pit would be monitored to meet the concentrations of parameters identified in Section 6.2.3 Table 8, and batch treatment of contact water would be conducted as necessary.	required to provide details about the closure and rehabilitation of the open pit, and other project components as part of the Certified Closure Plan pursuant to the Ontario's *Mining Act.*
Migratory Birds			
Métis Nation of Ontario	Concerns regarding effects to migratory birds from exposure to project components with open water (e.g. tailings storage facility, onsite ponds, and the pit lake), increased traffic during operations and decommissioning, and from vegetation clearing. Requested that migratory birds be assessed and that mitigation and follow-up program measures be developed in consultation with Indigenous communities. Also requested monitoring the use of project components with open water by migratory birds to ensure that the risk assessment was correct.	The proponent committed to implementing mitigation measures that would reduce the Project's effects on migratory birds. Deterrents will be installed around project components with open water to discourage the use of open water by migratory birds and vegetation clearing will comply with federal regulations (e.g. *Migratory Birds Convention Act*) to prevent harm to migratory birds. The proponent will develop and implement, in consultation with relevant authorities and Indigenous communities, a follow-up program to monitor the use of project components with open water by migratory birds and their collisions with vehicles.	The Agency is satisfied with the proponent's response, and recommends the implementation of key mitigation measures described in Box 7.2-1 and the follow-up program measures described in Box 7.2-2. The Agency recommends monitoring the use of project components with open water by migratory birds during operations at the tailings storage facility and onsite ponds, and during decommissioning and abandonment at the pit lake. If water quality of project component do not meet the applicable water quality guidelines, adaptive management measures, such as water treatment and bird deterrents would be implemented to address the potential effects of exposure to elevated contaminant levels on migratory birds. The Agency notes that the proponent will consult with

			Environment and Climate Change Canada and Indigenous communities to design a monitoring and rehabilitation program for migratory birds and their habitats.
Wabigoon Lake Ojibway Nation	Requested the proponent to conduct a comprehensive assessment of the cumulative effects of exposure to the tailings storage facility on the health of migratory bird populations, and whether these effects would impact traditional use. Requested for the implementation of measures to deter waterfowl and wildlife from accessing the project study area including the tailings storage facility.	Project components with open water that are predicted to have elevated contaminant levels (i.e. tailings storage facility, onsite ponds, and the pit lake) could have adverse effects on the health of migratory birds. These effects could occur during operations and decommissioning (from exposure to tailings storage facility and onsite ponds) as well as during abandonment (from exposure to the pit lake). Short-term exposure to open water from operations to abandonment is not expected to cause mortality or affect migratory bird populations. Nonetheless, if migratory birds are observed to use the tailings storage facility or the concentrations of contaminants in the tailings storage facility are higher than predicted, adaptive management measures such as bird deterrents would be implemented to discourage use of the tailings storage facility.	The Agency considered the Project's effects on migratory birds from exposure to contaminants in project components with open water in Section 7.2.1. The Agency recommends, for consideration in the Minister's Decision Statement, follow-up program measures described in Box 7.2-2 to monitor the use of the tailings storage facility by migratory birds during all phases of the Project. With the application of the follow-up program measures, the Agency is of the view that impacts to migratory birds due to interactions with the project components would not likely cause cumulative effects on the health of migratory bird populations.
Current Use of Lands and Resources for Traditional Purposes			
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Eagle Lake First Nation	Concern surrounding the impact of the Project on local wetlands. Further concerns that the proposed mitigation and rehabilitation efforts are insufficient to properly ensure the restoration of vital wetlands. Requests that Indigenous communities be informed of measures to monitor and rehabilitate the lands, including wetlands,	The proponent has proposed mitigation measures that would reduce the Project's effects on wetlands. The proponent notes the mitigation and follow-up program measures that are in place would be sufficient in rehabilitating wetlands. In addition, the proposed fish habitat offsetting plan is estimated to create approximately 24 hectares of wetlands.	The Agency is satisfied with the proponent's response, and identified key mitigation measures and follow-up program measures related to wetlands in Boxes 7.6-1 and 7.6-2. The Agency is also aware that should the Project proceed, a Certified Closure Plan pursuant to Ontario's *Mining Act* would be required. The Certified Closure Plan would include conditions for site

	and that traditional knowledge be included in the rehabilitation plans. Additionally, Indigenous communities would like to consulted and informed of all developments throughout the abandonment phase of the Project.	Progressive rehabilitation of disturbed land would begin during operations and continue through to abandonment and would rehabilitate 373 hectares of land. The proponent has committed to providing information to Indigenous communities using the Environmental Management Committee as a forum throughout the life of the Project.	closure and monitoring, and incorporate water quality targets that are consistent with those established by the Ontario Ministry of the Environment, Conservation and Parks. The Agency also understands that the mine closure requirements under the Ontario's *Mining Act* includes consultation with Indigenous communities and considers future land and resource use.
Eagle Lake First Nation	Questions about the rehabilitation efforts, its anticipated level of success, and its effects on biodiversity. Requested that disturbed areas be rehabilitated to support traditional uses.	The proponent has committed to revegetating the slopes around the open pit to encourage the development of riparian habitat. The waste rock storage area will be revegetated using species that are not traditionally used for medicinal purposes or consumption, thereby deterring these types of plants from growing in potentially contaminated areas. Plant species that promote diverse habitats and biodiversity will be selected for use in progressive rehabilitation. A detailed rehabilitation plan will be developed in consultation with relevant authorities and Indigenous communities as part of the Certified Closure Plan pursuant to Ontario's *Mining Act*.	The Agency is satisfied with the proponent's response. The Agency notes that the proponent has detailed the estimated loss of terrestrial wildlife habitat in the project, local and regional study areas, in Table 9 of Section 6.3 of this report. The Agency acknowledges that despite the removal of terrestrial habitat, similar upland and wetland habitat would remain available within the local study area and regional study area during all phases of the Project. Progressive rehabilitation of the project study area would partially restore cleared areas, including the waste rock storage area, overburden stockpiles, and roads used for project operations that are no longer required.
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario	Concerns regarding the removal of beavers and beaver habitat in the project study area. Requested the development of a beaver management plan and for any effects to beaver habitat to be compensated or mitigated. Further concerns regarding the effects of beaver management on hydrology	The proponent's assessment found that project operations will have little effects on local beaver populations. Prior to construction, several active beaver dams and wetlands will be removed. The proponent will work with local trappers and Indigenous communities in removing and relocating beaver populations to	The Agency acknowledges that beaver dams within the project study area will be removed. Given the importance of beaver for trapping and hunting, the Agency recommends that the removal of beaver dams be carried out in consultation with local trapping councils and Indigenous communities.

	of downstream watercourses and waterbodies.	adjacent waterbodies to create new habitat, as required.	
Eagle Lake First Nation	Concerns that the increase in project personnel will create pressure on traditional resources from the environment such as fish and wildlife.	The proponent recognizes the concerns that Indigenous communities have related to the effects on the environment. The proponent will engage with Indigenous communities to assess the effects, including the effects of project personnel on traditional resources in the project study area, and amend the mitigation and follow-up program measures as required.	The Agency is satisfied with the proponent's response and recognizes that Indigenous communities have the opportunity to participate in the Environmental Management Committee to ensure effectiveness of the environmental management plans and follow-up programs during the life the Project.
Eagle Lake First Nation, Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation	Concerns that the Project will prevent the use of lands in the project study area for traditional purposes such as hunting, trapping, harvesting, and fishing. Requested for further details on the community-specific effects to hunting and trapping, including the effects to important species, trap lines, and access to hunting and trapping grounds. Also requested that effects to Indigenous uses be mitigated and monitored with the input and involvement of Indigenous communities.	The proponent designed the Project to minimize its overall environmental footprint and any potential effects to the use of land for traditional purposes. The proponent indicated it applied a conservative approach, assuming that all areas where the Project was predicted to have an effect on current use of lands and resources for traditional purposes would apply for all Indigenous communities.	The Agency is of the view that, after taking into account the implementation of key mitigation and follow-up program measures as described in Boxes 7.3-1 and 7.3-2, the Project is not likely to cause significant adverse effects on the quality or availability of resources for hunting, trapping, harvesting and fishing. Additional traditional land use information will be collected through dialogue with Indigenous communities and would inform the development of community-specific mitigation measures as required. The follow-up program may be amended throughout the life of the Project to ensure that community-specific mitigation measures are effective.
Eagle Lake First Nation	Concerns regarding the use of chemical herbicides in vegetation management would become an exposure pathway for contaminants through the consumption of country foods. Requested that alternative methods be used instead of chemical herbicides for vegetation	The proponent acknowledges the concern of chemical use in managing vegetation within the project study area. The proponent has worked with Indigenous communities to create a vegetation management plan that outlines alternative methods of plant management.	The Agency is satisfied with the proponent's response and acknowledges the proponent's commitment to develop a vegetation management plan in consultation with Indigenous communities.

	management and for Indigenous communities to be consulted in the selection of alternative methods of vegetation management.	The proponent will only use herbicides when necessary to reduce the spread of invasive species as per the vegetation management plan developed in conjunction with Indigenous communities. Broad spraying of herbicides will be avoided.	
Wabauskang First Nation, Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Asubpeeschoseewagong Netum Anishinabek, Naotkamegwanning First Nation	Concerns about the potential impacts and restrictions on Indigenous communities' ability to access lands for hunting and harvesting plants. Additional concerns regarding restricted access to the Tree Nursery Road, wild rice stands, and canoe routes within Rice Lake and along Wabigoon River. Requested that Indigenous communities be consulted in developing measures to mitigate the loss of access due to the Project.	The proponent has proposed an access management plan that would be implemented for Indigenous communities practicing traditional use, so that the loss and alteration of access along the Tree Nursery Road due to the Project would be mitigated. Accompanied access would be provided along Tree Nursery Road through the project study area, to minimize health and safety risks associated with unaccompanied access. However, once safe use of Tree Nursery Road has been ensured, Indigenous communities would have unaccompanied access to the harvesting areas between the open pit and former Tree Nursery administrative offices, and would be able to fish within the Tree Nursery Pond.	The Agency is satisfied with proponent's response and notes the proponent's commitment to developing community-specific access management plans during the active life of the Project. The Agency notes the proponent's assertion that there are no known traditional travel routes through the project study area, and that there will be no residual effects on traditional travel routes to Rice Lake via Thunder Lake. Key mitigation and follow-up program measures related to current use of lands and resources for traditional purposes are outlined in Box 7.3-1 and 7.3-2.
Eagle Lake First Nation, Naotkamegwanning First Nation, Wabigoon Lake Ojibway Nation	Concerns surrounding the effects of the Project on local wildlife, including the health of wildlife due to metal and chemical contaminants, and harm to habitat and species of interest to Indigenous communities. Seeking ongoing monitoring to protect and affirm ecological health. Requested consultation in the development of mitigation measures and follow-up programs to prevent wildlife from accessing the tailings storage facility.	The proponent indicates that the Project's effects to health of wildlife and its habitat will be minimal. The proponent committed to implementing mitigation measures including fencing of the project study area to minimize exposure of the project components to wildlife. The proponent also committed to the monitoring of wildlife communities (i.e. species diversity and abundance) within the local study area. The proponent will share the results of the monitoring programs with Indigenous communities through the	The Agency is satisfied with the proponent's response and the identified mitigation measures, including progressive rehabilitation, which will restore disturbed habitat (Box 7.3-1). The effects would be limited to the local study area. The creation of the Environmental Management Committee, as proposed by the proponent, would include members from Indigenous communities that would review

		Environmental Management Committee and annual reporting.	rehabilitation activities, monitoring results, and mitigation measures. In addition, the Agency notes that the Project is subject to regulatory authorization from the Ontario Environment, Conservation and Parks pursuant to the *Endangered Species Act*, which may include requirements for habitat offsetting.
Métis Nation of Ontario, Eagle Lake First Nation	Concerns regarding noise and light pollution generated from the Project and their potential to degrade the quality of land for local wildlife, fish, traditional and recreational use, as well as spiritual, cultural, and harvesting activities.	The proponent acknowledges that Indigenous communities could have a diminished quality of experience from Indigenous use, or be deterred from practicing activities near the project components where cultural and harvesting activities currently take place. The quality of experience near the boundary of the local study area, between the open pit and former Tree Nursery, may be affected by sensory disturbances from increased dust and noise due to project activities, including blasting.	The Agency considered the Project's effects on Indigenous use in Section 7.3 and is of the view that after taking into account the implementation of key mitigation measures described in Box 7.3-1, the Project is not likely to cause a significant adverse effect on quality of experience due to sensory disturbances. The proposed mitigation measures to limit dust, noise, and visual disturbances would allow effects to be confined to an area immediately outside the project study area.
Wabigoon Lake Ojibway Nation	Concerns regarding loss of baitfish habitat including the Tree Nursery ponds and surrounding waterbodies.	The proponent acknowledges the concern regarding the loss of baitfish habitat. The proponent has committed to Install screens on the water intake structures in the Tree Nursery ponds of Thunder Lake Tributaries 2 and 3, in accordance with Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* and pursuant to the *Fisheries Act* requirements to avoid serious harm to fish. The proponent indicates that any loss or permanent alteration of fish habitat that	The Agency acknowledges that a fish habitat offsetting plan will be required as part of an authorization under the *Fisheries Act* in order to compensate the permanent alteration or destruction of fish habitat. The Agency notes that the proponent has proposed an alternative access to the Tree Nursery ponds for Indigenous communities to continue collecting baitfish during the life of the Project as outlined in Box 7.3-1.

		cannot be avoided or mitigated would require a fish habitat offsetting plan as part of an application for authorization under the *Fisheries Act*. An equal or greater area of fish habitat would be created as part of the fish habitat offsetting plan.	The Agency also considered impacts to fish and fish habitat, including effects of vibration from blasting, and notes that blasting at the open pit would be controlled to reduce fish mortality or injuries to fish in Blackwater Creek Tributary 1. A follow-up program would be implemented to verify the effectiveness of mitigation measures to protect fish and fish habitat from blasting activities (Box 7.1-2).
Naotkamegwanning First Nation, Eagle Lake First Nation	Concerns regarding the Project's effects to wetlands. The Indigenous communities indicated that local wetlands provide vital habitat for both wildlife and vegetation species that are of interest to Indigenous communities. Requested that a monitoring program be implemented to monitor overall ecosystem stability and recovery.	The proponent notes that any effects to wetlands and wetland species from the Project would be minimized by restricting the amount of wetland vegetation removal. In addition, the fish habitat offsetting plan would create approximately 24 hectares of wetlands. The proponent will also implement a monitoring program to verify the predictions of effects and the effectiveness of progressive rehabilitation of wetlands within the local study area and regional study area.	The Agency considered the Project's effects on wetlands that would be affected by project activities that are necessarily incidental to other federal decisions in Section 7.6.1, and concluded that the Project is not likely to cause significant adverse effects on these wetlands after implementation of key mitigation measures (Box 7.6-1) and follow-up program measures (Box 7.6-2). The Agency notes that the effects on wetlands could impact ecosystem function including habitat for flora and fauna (including species at risk). A fish habitat offsetting plan and progressive site rehabilitation (Boxes 7.1-2, 7.2-1, and 7.6-1) would create approximately 24 hectares of wetlands and restore approximately 15 hectares of wetlands.
Aboriginal Health and Socio-Economic Conditions			
Eagle Lake First Nation, Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Lac des Mille Lacs First Nation,	Requested that air quality be monitored and mitigation measures be undertaken to minimize the amount of air pollutants released into the surrounding area. Requested that Indigenous communities be included in the development of mitigation	The proponent indicated that the Project will have minimal impact on surrounding air quality, as the proponent has developed mitigation measures to limit the spread of air pollutants into the local study area. The proponent has committed to placing	The Agency is satisfied with the proponent's conclusion, and understands that the experience of Indigenous use would not be meaningfully impacted due to changes in air emissions (Section 7.4). The

Naotkamegwanning First Nation	measures, and that data and methodology of air quality assessments be shared with Indigenous communities.	monitoring stations to measure air quality. The proponent has also consulted with Indigenous communities to assess the effects of air quality on traditional land use and will continue to consult with Indigenous communities throughout the monitoring program.	Agency has identified follow-up program measures to verify the proponent's predictions with respect to air emissions (Box 7.4-2). The proponent would monitor air quality in areas where Indigenous uses are predicted to occur. Furthermore, the Agency notes that the proponent's commitment to create an Environmental Management Committee would provide a forum for Indigenous communities to engage with the proponent and identify impacts from air quality and allow the proponent to share the findings of the follow-up program.
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Naotkamegwanning First Nation, Eagle Lake First Nation	Concerns about potential effects on country foods such as wild rice, chanterelles, blueberries, and sage due to changes to water quality. Concerns regarding human health risk from exposure to contaminants through local food and water sources (e.g. arsenic, cyanide, mercury, and phosphorous) and the methods used in those determining effects. Requested protection of areas that contain plants of interest to Indigenous communities from the Project's effects, and mitigation of any potential effects. Requested that the proponent verify the safe consumption of these country foods through an adequate monitoring system.	The proponent acknowledged the importance of country foods to Indigenous communities, and assessed the effects of the Project on local country foods and their quality for consumption. It determined that the concentrations of metal and carcinogenic compounds would be below thresholds that would pose a threat to human health. No risks to humans from the consumption of country foods are anticipated. The proponent committed to collecting additional baseline data for wild rice, along with collections of environmental (soil, water, air, sediment, and groundwater) and Project-specific media (waste rock, tailings supernatant water, pit lake water) to confirm the exposure point concentrations relied upon in the human health risk assessment. The proponent also committed to sampling and testing country food items from terrestrial and aquatic food webs in consultation with	The Agency acknowledges that the proponent completed the Human Health and Ecological Risk Assessment using conservative assumptions regarding contaminant uptake, exposure frequency, and exposure duration, and therefore represents the maximum risk anticipated for the pathways of exposure (i.e. *via* local food and water sources). The Agency has identified key mitigation measures related to water quality in Box 7.1-1 and Box 7.4-1. Follow-up program measures outlined in Box 7.4-2 include verification of the accuracy of the predictions for country foods through monitoring and sample analyses, to be completed in consultation with Indigenous communities.

		the Indigenous communities. The proponent committed to developing community-specific risk communication plans to notify Indigenous communities in the event that the predictions were not correct.	
Naotkamegwanning First Nation	Concerns regarding the potential impacts of the Project on traditional activities such as fishing, blueberry gathering, harvesting wild rice, and visiting cultural sites. These activities may be avoided due to fears of adverse health effects from the Project. A loss of trust in the safety of local foods and activities may lead to socio-economic impacts on Indigenous communities.	The proponent understands perception may influence when, how, and where current use activities and practices take place, and indicated that some existing local users may be concerned of health risks. The proponent committed to minimizing the project study area and minimizing risks to these activities. The proponent believes that the creation of the Environmental Management Committee will provide opportunities to receive feedback from Indigenous communities in developing monitoring and mitigation measures to address perceptions of risk.	The Agency considered the Project's effects on human health and socio-economic conditions in Section 7.4.1 and 7.4.2. The Agency is of the view that while the presence of dust, noise, and large project components could impede enjoyment and deter Indigenous use of the land, the proposed mitigation measures to limit dust, noise, and visual disturbances would allow effects to be confined to the area near the boundary of the project study area. Therefore, the effects are unlikely to be significant after the implementation of key mitigation measures and follow-up program measures outlined in Box 7.3-1, Box 7.4-1 and Box 7.4-2.
Métis Nation of Ontario, Naotkamegwanning First Nation, Wabigoon Lake Ojibway Nation	Concerns with how potential social and economic impacts are assessed. Requested verification from the proponent that the environmental assessment will include community-specific effects, mitigation measures, and recovery plans for effects to education, poverty, crime, and property values as well as employment and income levels.	The proponent updated its socio-economic assessment of potentially affected communities, which will act as a basis for future monitoring programs. This includes socio-economic impacts from changes to wild rice, blueberries, chanterelles, fish, and tourism. Furthermore, the proponent has committed to developing and implementing employment practices that give preference to local and regional labour, including Indigenous communities, whenever possible.	The Agency acknowledges the proponent's response. The Agency is satisfied with the mitigation measures outlined in Box 7.4-1 and the follow-up program measures outlined in Box 7.4-2 in providing sufficient consideration and protection on socio-economic effects that are within the scope of the federal environmental assessment.
Asubpeeschoseewagong Netum Anishinabek,	Concerns about the potential impacts of the Project on the feasibility and sustainability of	The proponent is of the view that Project-related effects will be negligible on the	The Agency acknowledges the concerns regarding potential perceptions of risk

Eagle Lake First Nation, Wabauskang First Nation, Métis Nation of Ontario, Naotkamegwanning First Nation	commercial fishing activities led by Indigenous communities.	commercial fishing activities led by Indigenous communities. However, as part of the socio-economic monitoring and management plan, the proponent will continue to work with potentially affected stakeholders to develop mitigation measures, monitoring, and management programs to ensure quality of the fisheries. The proponent is committed to working with Indigenous communities to ensure that fish tissue, sediment, and water quality samples are sampled annually to determine any potential effects from the Project.	related to fisheries contamination from the historic contamination in the regional study area as well as the proximity of the Project to Wabigoon Lake and Thunder Lake. The Agency acknowledges that the proponent committed to meeting the Provincial Water Quality Objectives for all parameters, outlined in Table 8 of Section 6.2.3. The proponent also committed to sample fish of various trophic levels annually and in consultation with Indigenous communities outlined in Box 7.4-1 and 7.4-2.
Physical or Cultural Heritage, and Effect on Historical, Archaeological Sites or Structures			
Naotkamegwanning First Nation, Wabigoon Lake Ojibway Nation, Eagle Lake First Nation	Concerns regarding effects to archaeological and cultural sites and artifacts. Requested further investigation of these effects using Indigenous knowledge and involvement, and requested that protective measures be implemented for these sites as required.	The proponent conducted an archaeological and heritage assessment on lands in and adjacent to the Project and indicated that there was low potential for disturbance to cultural/heritage sites from the Project. The proponent committed to minimizing the overall footprint of the Project and will continue to engage with Indigenous communities to determine whether additional mitigation measures would be required to protect conceptual archaeology and heritage resources. The proponent has made commitments, in accordance with the Ontario Heritage Act, including to maintain a buffer zone of 50 metres around any discovered archaeological resources and immediately stop any site alteration.	The Agency notes that no cultural or heritage sites were found within the project study area, and that the committed to maintain a buffer zone of 50 metres around any discovered archaeological resources and immediately stop any site alteration (Box 7.3-2).
Comments related to other factors, including section 19 of CEAA 2012			
Federal Species at Risk – Effects identified under section 79(2) of the *Species at Risk Act*			
Métis Nation of Ontario	Concerns that more work is required to identify the impacts on wildlife populations,	The proponent stated that it is has identified 11 species at risk within the	The Agency considered the effects of the Project on species at risk (Section

	to ensure all Species at Risk have been identified and effects to them have been assessed adequately. Request consultation with Indigenous communities to determine the impact of the project on any Species at Risk.	regional study area and noted that seven other species at risk may be present in the habitat eco types, but that those species were not observed. The proponent assessed potential effects on the Project on all identified species to identify specific threats and found that Project is unlikely to have a significant impact of those identified species. The proponent will develop a monitoring program that will assess loss of habitat, mortality, habitat compensation and utilization during all phases of the Project in consultation with Indigenous communities.	8.1) in accordance with subsection 79(2) of the *Species at Risk Act*. The Agency is satisfied that mitigation and follow-up program measures proposed by the proponent would be consistent with any applicable recovery strategy and action plans.
Accidents and Malfunctions			
Eagle Lake First Nation, Métis Nation of Ontario	Request further details on the emergency preparedness and response plan. Requests that Indigenous communities have opportunity and capacity to be involved in the development and assessment of the emergency preparedness and response plan.	The proponent has committed to developing an Emergency and Spill Response Management Plan in the unlikely event of an accident or malfunction to identify immediate actions. Additional mechanisms such as the Environmental Management Committee will allow Indigenous communities with the opportunity to provide input.	The Agency acknowledges the development of an emergency preparedness and response plan in consultation with Indigenous communities. The Agency is of the view that the Project is not likely to cause significant adverse effects due to accidents and malfunctions due to design and preventative features of the project and the mitigation and follow-up program measures identified by the proponent.
Wabigoon Lake Ojibway Nation, Eagle Lake First Nation	Concerns regarding the adequacy of the proponent's ability to cover costs of accidents and malfunctions. Request for compensation plan for Indigenous communities in the wake of an accident or malfunction that affects Aboriginal or Treaty Rights.	The proponent indicated that in the unlikely event of a tailings storage facility failure or otherwise catastrophic failure or accident, the proponent would immediately carry out emergency response plans developed in consultation with Indigenous communities. Consultation would immediately begin with applicable government agencies to develop a	The Agency acknowledges that in the unlikely event of a tailings storage facility dam failure, there would be potential environmental effects outside the project study area. However, the Agency is satisfied that the proponent would incorporate a number of preventative measures into its plans, including designing all dams according

		remediation plan based on the nature and scale of the event. The proponent indicated that it will carry reasonable insurance for operational failures as per federal and provincial guidelines.	to the recommendations from the Canadian Dam Association's *Dam Safety Guidelines*, and meet the requirements of the Ontario Ministry of Energy, Northern Development and Mines, as applicable. As part of the Certified Closure Plan pursuant to Ontario's *Mining Act*, the proponent would have to provide a financial assurance, which will take into consideration the design of the project components and the costs of rehabilitation after decommissioning.
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Naotkamegwanning First Nation, Eagle Lake First Nation	Concerns regarding the potential for accidents and malfunctions related to the tailings storage facility, including potential releases of contaminants. Noted that a worst-case scenario accident and malfunction should be considered on the environmental effects on current use of lands and resources for traditional purposes. Requested that design features and mitigation measures in response to socio-economic and cumulative effects are developed in consultation with Indigenous communities.	The proponent identified preventative and safeguard measures within the design of the Project, such as an Emergency and Spill Response Management Plan, to minimize environmental risks from potential accidents and malfunctions. The proponent indicated that the tailings dam would be designed to contain the 1-in-100-year storm event without discharge, and to withstand the maximum credible earthquake in the geographic region. The tailings dam would be designed in accordance with the Canadian Dam Association's *Dam Safety Guidelines* and *Application of Dam Safety Guidelines to Mining Dams*, along with requirements of Ontario Ministry of Natural Resources and Forestry or the Ontario Ministry of Energy, Northern Development and Mines, as applicable. The proponent has proposed mitigation measures that minimize risk in the design of project components, and will establish an Independent Tailings Review Board to	The Agency considered accidents and malfunctions in Section 8.2, and is of the view that the proponent took the risks of accidents and malfunctions into consideration in the design of the Project to minimize the likelihood of a tailings storage facility dam failure. While a tailings storage facility dam failure could cause significant adverse effects, including on socio-economic and cumulative effects, the probability of such an event occurring would be low, given the preventive mitigation and follow-up program measures that the proponent has committed to implement. The Agency notes that the preventative measures built into the design of the Project would reduce the probability of accidents and malfunctions occurring due to the Project, and should there be an environmental emergency, the proponent would adhere to federal and provincial standards of recovery.

		review the design of the tailings storage facility.	
Naotkamegwanning First Nation, Eagle Lake First Nation	Concerns regarding the storage of fuel and chemicals such as cyanide. Improperly stored fuel and chemicals could lead to adverse environmental effects, including effects to water and wildlife. Requested the implementation of the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold.	The proponent indicated that fuel and chemicals would be stored in double walled tanks according to provincial regulations and industry standards. These standards will ensure that chemicals will be safely stored, and would prevent releases into the environment for the safety of human and wildlife health. The proponent agrees to comply with the International Cyanide Management Code.	The Agency acknowledges the proponent's response.
Effects of the Environment on the Project			
Métis Nation of Ontario, Eagle Lake First Nation, Naotkamegwanning First Nation	Concerns regarding how the environment, such as natural disasters, tornados, flooding, droughts, and climate change, will affect the Project.	The proponent indicated that its assessment considered extreme events and changes in weather conditions due to climate change. Extreme weather events and climate change may increase the risk of environmental effects due to accidents or malfunctions, however the increase in risks will not be significant as the proponent has identified preventive measures and procedures and management plans to minimize risk.	The Agency's assessment of effects of the environment on the Project is included in Section 8.3 of this report. The Agency is satisfied that the proponent has adequately considered the effects of the environment on the Project and that the proposed design measures, mitigation measures and response measures are appropriate to account for the potential effects of the environment on the Project. The Agency notes that the proponent would communicate any effects to Indigenous communities *via* the Environmental Management Committee.
Cumulative Effects			
Métis Nation of Ontario, Naotkamegwanning First Nation, Wabauskang First Nation, Eagle Lake First Nation, Wabigoon Lake Ojibway Nation,	Concerns regarding the adequacy of the spatial boundary of the regional study area to capture potential cumulative effects, including impact on fish and fish habitat, from interactions with nearby projects, including other forestry and mining activities,	The proponent examined past, existing, and reasonably foreseeable activities that could potentially interact with the Project in its evaluation of cumulative effects. Such activities included exploration programs, forestry operations, transportation networks, electrical transmissions lines and	The Agency's assessment of cumulative effects is described in Section 8.4. The Agency is satisfied with the proponent's response, and is of the view that the proponent included acceptable spatial boundaries and factors within its cumulative effects

Asubpeeschoseewagong Netum Anishinabek	and the downstream effects of the Project's own potential accidents and malfunctions.	a pulp mill (. The proponent defined study areas for migratory birds, wildlife including ungulates, and Indigenous uses in consultation with Indigenous communities. The cumulative effects assessments considered magnitude, geographic extent, duration, timing, frequency, reversibility, ecological context, social context of the effects, and the existing regulatory regimes that influence how projects are managed. The proponent indicated that although the Project would not utilize or produce mercury, mercury that is naturally present in acid-generating rock could be liberated. To prevent the effects of mercury in waterbodies and the communities' ability to fish, the proponent has committed to treating effluent such that mercury concentrations would be at, or below, the background concentrations of mercury in Blackwater Creek (described in Sections 7.1 and 7.4).	assessment. The Agency acknowledges the region's history in relation to mercury contamination from the Domtar Dryden Pulp Mill, which affected both the English and Wabigoon River systems (discussed in detail in Section 9.3).
Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation	Concerns regarding the cumulative effects of the Project with forestry and other mining projects on wild rice and moose populations, with a request for a more detailed cumulative effects assessment on moose and moose habitat. Requested that the cumulative impacts in the regional study area are included in the assessment of the Project on Aboriginal and Treaty rights, and current use of lands and resources for traditional purposes.	The proponent indicated that there would be potential for the effects of the Project to interact with past, existing, and reasonably foreseeable projects, which will cause cumulative effects to Indigenous uses. However, significant cumulative adverse effects to fish, ungulates, surface water, air quality, or plant harvesting are not expected, due to distance from the Project. The proponent utilized spatial boundaries for ungulates and Indigenous land uses that were developed in consultation with Indigenous communities.	The Agency is satisfied with the proponent's response. The Agency's assessment of cumulative effects is described in Section 8.4.
Métis Nation of Ontario	Concerns that cumulative impacts of the Project in conjunction with other existing and	The proponent considered five other reasonably foreseeable projects (Treasury	The Agency's assessment of cumulative effects is described in Section 8.4.The

	proposed anthropogenic activities will impact migratory bird populations.	Metals Exploration Program, Canadian Pacific Rail, Dryden Forest Management Company, aggregate pit/quarries, and local infrastructure development) in its assessment of cumulative effects on migratory birds. The proponent states that the cumulative effects on migratory birds will be minimal.	Agency is of the view that the Project is unlikely to cause significant cumulative effects on migratory birds after taking into account the implementation of key mitigation measures and follow-up program measures outlined in Section 7.2.
Alternatives Assessment			
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Eagle Lake First Nation, Naotkamegwanning First Nation	Concerns raised about the limited scope of the alternatives assessment of project components. Request that the alternatives assessment include community-specific information such as unique rights, current use or interests, and that Indigenous communities be engaged and consulted in the alternatives assessment.	The proponent indicated a commitment to continually engage with Indigenous communities to ensure that traditional knowledge of individual communities were collected and incorporated into the Project's design. The proponent utilized available traditional knowledge and land use to assess alternatives. The design of some project components were altered, notably the placement of the waste rock storage area, due to the inclusion of traditional knowledge provided by Indigenous communities.	The Agency acknowledges the proponent's response, and is satisfied that the proponent considered Indigenous interests in the development of the alternatives assessment.
Environmental Assessment Process			
Asubpeeschoseewagong Netum Anishinabek, Métis Nation of Ontario, Wabigoon Lake Ojibway Nation, Naotkamegwanning First Nation	Concerns regarding the effectiveness of the proposed Environmental Management Committee. Requested that Indigenous communities be involved in designing the Environmental Management Plan to ensure that the plan addresses concerns of Indigenous communities through the development and implementation of appropriate mitigation measures.	The proponent has committed to the formation of an Environmental Management Committee, which would be comprised of representatives from Indigenous communities. The Committee would act as a forum for the proponent to share information and for the communities to provide feedback on management plans and monitoring results. In the event that mitigation measures are ineffective, the committee would be involved in further planning.	The Agency acknowledges the proponent's commitment to establish an Environmental Management Committee. The Agency recommends, for consideration in the Minister's Decision Statement, that the proponent continuously engages and consults with Indigenous communities throughout the life of the Project in a manner that is appropriate for the Indigenous communities.

Eagle Lake First Nation	Questions and concerns regarding the consultation process, such as how different views and opinions were implemented, and whether the comments are actually reviewed and analyzed. Indigenous communities would like a demonstration of how their views were considered in the Agency's and proponent's analysis.	The proponent considered the views of Indigenous communities in developing the Environmental Impact Statement, but noted that where no direct information was provided by Indigenous communities, it drew conclusions based on available information and an assumption that any effect due the Project would affect all Indigenous communities. The proponent also noted that it responded to comments and issues raised during all phases of the environmental assessment process, including issues that were brought to its attention by the Agency.	The Agency is of the view that it has adequately captured the comments and concerns raised by Indigenous communities throughout this report. The Agency provided verbal responses to Indigenous communities during meetings, and written responses to letters and other inquiries during the environmental assessment process. This appendix summarizes the comments raised by Indigenous communities during the entire environmental assessment process and was updated based on comments received on the draft prior to finalizing this report for the Minister's Decision Statement. The Agency will continue to solicit the views of Indigenous communities to inform the Agency's analysis and conclusions related to the Project's effects on Indigenous uses, community rights, mitigation and follow-up program measures, and conditions.
Aboriginal and Treaty Rights			
Eagle Lake First Nation, Wabigoon Lake Ojibway Nation, Aboriginal People of Wabigoon, Métis Nation of Ontario, Grand Council Treaty #3, Naotkamegwanning First Nation, Asubpeeschoseewagong Netum Anishinabek, Wabauskang First Nation	Concerns regarding the Project's impact to Aboriginal and Treaty rights at a local and regional scale, including how impacts are assessed from the perspective of each Indigenous community, and the factors utilized in the environmental assessment process. Concerns regarding the lack of a clear and meaningful action plan provided by the proponent throughout the environmental assessment process.	The proponent provided engagement opportunities for Indigenous communities throughout all phases of the environmental assessment. The proponent has committed to continue documenting all comments, issues, and concerns raised by Indigenous communities, and will continue to engage with the communities throughout the life of the Project. Furthermore, the proponent will create a formal feedback system, enabling Indigenous communities to alert the proponent of specific concerns.	The Agency's consultation steps in relation to the Project is described in Section 4.2 of this report. The Agency utilized all available information in its assessment, including submissions from each Indigenous community impacted by the Project throughout the environmental assessment process. Furthermore, the Agency examined the comments, information, and concerns provided from each Indigenous community to inform the impact on Treaty rights. This is further outlined in

	Requests development of community-specific work plans that ensure meaningful engagement throughout all steps of the environmental assessment process and the Project.		Section 9. The Agency is of the view that it has effectively responded to concerns raised by Indigenous communities throughout the environmental assessment process and has appropriately identified key mitigation and follow-up program measures for the Project.
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Naotkamegwanning First Nation, Eagle Lake First Nation, Asubpeeschoseewagong Netum Anishinabek, Wabauskang First Nation	Concerns that traditional knowledge has not been incorporated in the development of spatial boundaries, valued components, and effect thresholds. Seeking additional consultation and the incorporation of traditional knowledge in the development of these topics. Request for additional resources for Indigenous communities to conduct Traditional Knowledge and Land Use studies and to use this information to inform analysis.	The proponent noted that through its engagement activities with Indigenous communities, it have welcomed, collected, and incorporated traditional knowledge, where available, in identifying valued components and collecting baseline data. The proponent has also utilized traditional knowledge to adjust spatial boundaries and in the design of the waste rock storage area, to minimize the Project's effects on valued components. The proponent has committed to the formation of an Environmental Management Committee, which would act as a forum for environmental concerns, and which will enable traditional knowledge to be incorporated into mitigation measures and management plans.	The Agency recommends that the proponent continue to collect information from the Indigenous communities in developing spatial boundaries that reflect valued components of traditional territories. The Agency conducted its own consultation with Indigenous communities to inform its assessment of potential impacts of the Project (Section 4.2). The Agency utilized all available information, including available data that emerged from Traditional Knowledge Land Use studies. The Agency recommends, for consideration in the Minister's Decision Statement, that the proponent engage and consult with Indigenous communities throughout the life of the Project in a manner that is appropriate for the Indigenous communities.
Wabigoon Lake Ojibway Nation, Métis Nation of Ontario, Naotkamegwanning First Nation, Eagle Lake First Nation, Asubpeeschoseewagong Netum Anishinabek,	Concerns that traditional knowledge has not been incorporated in the development of baseline data for the Project and that the baseline data has not been shared, or verified, with Indigenous communities. Requested for additional baseline data related to waterbodies (e.g. Blackwater	The proponent conducted a Human Health and Ecological Risk Assessment that examined baseline conditions in the project, local and regional study areas in relation to country foods including plants and wildlife of interest to Indigenous communities and water quality. The proponent has initiated a monitoring	The Agency acknowledges the proponent's response. The Agency requires that the proponent consult with Indigenous communities on the design of monitoring plans that relate to country foods, wildlife and wildlife habitat, wetlands, plants, water quality and fish tissue that reflect Indigenous

Wabauskang First Nation	Creek) and the levels of contaminants in the water and aquatic species. Additional baseline data is also requested for country foods, wildlife and wildlife habitat, wetlands, plants, and groundwater.	program that is intended to update and contribute to baseline data collection of wildlife and habitats and will continue collecting samples and monitoring local resources for contamination in consultation with Indigenous communities. The proponent has indicated that project-specific traditional knowledge as it relates to cultural, spiritual, and ceremonial sites will be reflected as part of continuing project development. The proponent notes that it gathered project-specific traditional knowledge to inform its assessment on effects as part of the Environmental Impact Statement and will continue to collect it through the Environmental Management Committee.	use (Box 7.3-1, Box 7.4-1). Through consultation, a plan for communicating results of the follow-up program would also be formulated.
Grand Council Treaty #3, Métis Nation of Ontario, Naotkamegwanning First Nation, Aboriginal People of Wabigoon, Asubpeeschoseewagong Netum Anishinabek	Concerns that the assessment is missing community-specific traditional knowledge and data on current use and land use, and request for the proponent to identify how it will obtain this data, incorporate it into its assessment, mitigate potential effects, and complete related follow-up program measures.	The proponent has indicated it has and will continue to make concerted efforts to gather input, including traditional knowledge, from the Indigenous communities and peoples while respecting their protocols regarding engagement. The proponent has engaged with Indigenous communities in discussions surrounding the completing and scoping of Traditional Knowledge and Land Use studies. The proponent is committed to working with each community to build community-specific plans for addressing concerns, implementing mitigation measures, and updating the mitigation and follow-up program measures as required for the life of the Project.	The Agency acknowledges that the proponent has applied conservative approach where it is assumed that all areas where the Project is predicted to have an effect would also have an effect on current use of land and resources for traditional purposes by members of Indigenous communities. The Agency notes that the proponent would develop and implement appropriate mitigation measures in the event that unforeseen impacts to Indigenous use are identified by Indigenous communities and incorporated the proponent's commitment as part of the follow-up program measures identified in Box 7.3-2.
Other Comments			

Naotkamegwanning First Nation	Request that the proponent provide Indigenous people with employment opportunities related to the Project.	The proponent has committed to develop and implement employment practices that give preference to local and regional labour, including Indigenous peoples. This includes participation in job fairs and the direct distribution of employment opportunities to local Indigenous administration offices to encourage qualified Aboriginal persons to seek employment opportunities with the Project.	While outside the scope of the Federal Environmental Assessment, the Agency acknowledges the comment.
Aboriginal People of Wabigoon	Concerns related to potential impacts to future Métis land claims of area near the Project.	The proponent notes that the Project has been designed to have a small project study area, with limited potential effects outside of the project study area.	The Agency acknowledges the comment and the proponent's response. The Agency notes that the environmental assessment process cannot determine future land claims, and thus, is outside the scope of the process.
Wabigoon Lake Ojibway Nation	Concerns regarding the impacts on local tourism activities. Requested that the potential effects be assessed.	The proponent assessed effects to socio-economic conditions in Indigenous communities in the revised Environmental Impact Statement. The proponent recognized that members of Indigenous communities are concerned about commercial interests due to the Project, and has committed to look for opportunities to contribute to the growth of local tourism through sponsorship of local events in the area.	The Agency acknowledges the proponent's response and its' commitment to consult with Wabigoon Lake Ojibway Nation and other Indigenous communities to find opportunities to promote local tourism, such as sponsorship.

Appendix E Pathways for Potential Impacts on the Exercise of Rights Related to Traditional Resources

Potential Environmental Effects of the proposed Project	Description of potential changes to the environment	Potential Pathways	Preliminary description of potential changes to the exercise of rights	Preliminary description of mitigation measures and potential conditions to address potential changes to exercise of rights[i]	Indigenous Communities Comment *Opportunity for impacted Indigenous communities to provide comment on the potential pathway, description of changes to exercise of rights and mitigation measures identified within this column.*
Overarching Traditional Resource: Water			Potential loss of preferred areas for harvesting country foods, sacred and medicinal plants, water, fish, migratory birds, furbearers, and large wildlife. **(1, 2, 4, 6, 11)** Potential reduced quality and quantity of vegetation for harvesting **(10-12)** Potential increased perceived contamination by resource users, including reduced confidence in resources because on potential impacts to local and regional air quality and water quality **(1-4, 7, 10, 12)** Potential socio-economic impacts to harvested plants and food such as wild rice, blueberries, fish and chanterelles due to risk of contamination at sites proximal to the project study area **(2, 3, 10-12)** Potential impaired or diminished land use experience and reduced confidence in subsistence resources **(1, 2, 4, 7, 9, 10, 12)** Potential reduced harvesting in the Tree Nursery area due to confidentiality concerns **(10, 11)** Potential increased travel time associated with harvesting and meaningful practice of knowledge	*There are no preferred sites identified within the project study area related to traditional resources. Overall, traditional resources are going to be protected, but to manage resources the following* ***key mitigation and follow-up program measures***[111] ***related to resources, access and on the land experience*** *have been identified*. **Key mitigation and follow-up program measures associated with resources:** Develop, prior to construction and in consultation with Indigenous communities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures as it pertains to the adverse environmental effects of the Project on the current use of lands and resources for traditional purposes. Taking into account available Indigenous knowledge and input from Indigenous communities. (Box 7.3-2)[112] Control acid rock drainage and metal leaching, in consultation with relevant authorities, during all phases of the Project such that all effluent and seepage from the Project comply with Schedule 4 of the *Metal and Diamond Mine Effluent Regulations* and the *Fisheries Act*. (Box 7.1-1) A fish habitat offsetting plan would ensure no net loss of fish habitat, which would be finalized as part of a *Fisheries*	*Please provide comment here.*
1. Decrease in water flow, and increase in concentration of parameters of concern in waterbodies (Sections 6.2.1 to 6.2.3)	Water-intake activities, construction of project components, and development of the open pit and dewatering of the underground mine can cause changes in water quantity of waterbodies in the local study area. Discharge of treated effluent and seepage during operations, and connection of the pit lake with Blackwater Creek at abandonment can result in exceedances of baseline concentrations of parameters in Blackwater Creek.	The flow alterations in waterbodies in the local study area can cause a loss or permanent alteration of fish-bearing waterbodies. Changes in water quality of waterbodies in the local study area can cause an effect on fish health.			
Fish and Fish Habitat					[...]
2. Loss or alteration of fish habitat (Section 7.1.2)	Permanent loss or alteration of 54 801 square metres of fish habitat in Blackwater Creek Tributary 1 and 2, Unnamed Tributary to Blackwater Creek, Blackwater Creek Tributary 4, wetland WLD5 and Hoffstrom's Bay Tributary due to construction of project components, and flow reduction.	Direct impact to fishing in the local study area. Increased potential contamination or perception of contamination of fish in Thunder Lake and Wabigoon Lake. Changes to perception of quality of fish and fish habitat.			
3. Fish mortality and fish health (Section 7.1.1)	Construction of project components in or near waterbodies, blasting at the open pit, water-taking activities, and effluent discharge in Blackwater Creek can cause fish mortality and effects on fish health.	Reduced abundance of preferred fish species in preferred harvesting areas, including altered access to fishing in the Tree Nursery ponds.			[...]
Furbearers and other small wildlife					[...]
4. Reduction of quality and availability of resources for trapping (Section 7.3.1)	Loss or alteration to habitat for furbearers, including displacement of beaver and marten, within the project study area and adjacent areas.	Direct impact to two trap lines owned by Indigenous communities. Habitat destruction in areas currently used for furbearer harvesting and trap lines within the project study area. Interruption of navigation to harvesting, trapping, and hunting areas, including			

[111] The mitigation identified as part of this appendix does not represent all mitigation associated with resources, access and experience. A comprehensive list of all mitigation measures can be found in the identified sections of this report.

[112] The Agency recognizes this mitigation measure as an opportunity to verify effects related to current of lands and resources for traditional purposes and their impact on the following rights: potential reduced time and opportunity for teaching land based skills, potential reduced ability to govern and steward the land and potential reduced ability to transmit specific skills and ways of life to future generations.

Potential Environmental Effects of the proposed Project	Description of potential changes to the environment	Potential Pathways	Preliminary description of potential changes to the exercise of rights	Preliminary description of mitigation measures and potential conditions to address potential changes to exercise of rights[i]	Indigenous Communities Comment *Opportunity for impacted Indigenous communities to provide comment on the potential pathway, description of changes to exercise of rights and mitigation measures identified within this column.*
		interruption of Tree Nursery Road within the project study area. Increased contamination or perception of contamination of downstream furbearers including beavers in Wabigoon Lake and Thunder Lake.	and use due to altered access of Tree Nursery Road **(4, 11)** Potential reduced time and opportunity for teaching land based skills including fishing, gathering, hunting, and trapping due to altered access and loss of habitat due to the Project **(2, 11)** Potential reduced ability to govern and steward the land in the project study area **(1-12)** Potential reduced ability to transmit specific skills and way of life to future generations (culture, language, and spirituality) related to traditional resources **(1-12)**	*Act* authorization with Fisheries and Oceans Canada. (Box 7.1-1) A fish habitat offsetting plan would reduce the potential effects on the baitfish harvesting area, although this area would become accessible after decommissioning. (Box 7.1-1) Post sampling information on blueberries, wild rice, chanterelles and fish, obtained through the follow-up program measure identified in Box 7.4-2, to a public forum, such as a website, available to Indigenous communities and nearby recreational or commercial land users to inform quality of harvested food. The frequency and timing of the postings will be developed in consultation with Indigenous communities.. (Box 7.4-1) Prevent the introduction of invasive species into the project study area. (Box 7.3-1) In consultation with relevant authorities, develop and implement prevention and mitigation measures to minimize the risk of harm to migratory birds and help maintain viable populations of migratory birds. If active nests (with eggs or young) are discovered, work must be interrupted and a buffer zone established until nesting is finished. (Box 7.2-2) Identify plant species of interest to Indigenous communities in consultation with the Indigenous communities. (Box 7.3-1) Meet air quality standards by implementing a dust management program to control dust deposition (Box 7.4-1).	
5. Change in risk of wildlife mortality (Section 7.3.1)	Increased mortality of wildlife due to collisions with vehicles.	Reduced abundance of wildlife in the project study area and local study area.			[...]
Migratory Birds					
6. Loss of nests or critical habitat for migratory birds (Section 7.2.3)	Reduced amount of habitat for migratory birds through direct such as loss of nests or critical habitat Avoidance of the Project and the local study area by migratory birds due to operational noise, dust, light, or alterations to wetland hydrology.	Displacement of migratory birds, changes in local and regional migration patterns, or interruption of migratory bird patterns. Disruption of hunting of migratory birds in the project study area and local study area.			[...]
7. Exposure to contaminants in project components with open water (Section 7.2.1)	Exposure to contaminants in project components with open water, such as tailings storage facility, onsite ponds and the pit lake.	Increased contamination or perceived contamination of birds that nest, reside, or migrate over the project study area, Wabigoon Lake, and Thunder Lake.			[...]
Large wildlife					
8. Reduction of quality and availability of resources for hunting (Section 7.3.1)	Increased dust may decrease the health of upland and wetland vegetation and cause adverse effects to the health of herbivorous wildlife such as moose. Project components have the potential to further reduce the connectivity of wildlife habitat and restrict wildlife movement within the project study area and local study area.	Reduced ability to hunt within known migration routes in the project study area and local study area.			[...]
9. Reduction of overall quality of experience during Indigenous use (Section 7.3.4)	Sensory disturbance for wildlife from lighting and noise, which may impact wildlife presence and movement in the project study area and local study area during construction and operation of the Project.	Increased contamination or perception of contamination of moose in the project study area and the local study area. Quality of experience reduced due to increased dust or noise. Deterrence from practicing activities near the project components			[...]

Potential Environmental Effects of the proposed Project	Description of potential changes to the environment	Potential Pathways	Preliminary description of potential changes to the exercise of rights	Preliminary description of mitigation measures and potential conditions to address potential changes to exercise of rights[i]	Indigenous Communities Comment *Opportunity for impacted Indigenous communities to provide comment on the potential pathway, description of changes to exercise of rights and mitigation measures identified within this column.*
		Increased access by non-Indigenous hunters, including project personnel, to the local study area and regional study area.		**Key mitigation associated with access:** Provide accompanied access to Indigenous communities between the open pit and former Tree Nursery, and unaccompanied access to harvesting sites just into the local study area as well as the Tree Nursery pond for bait fishing (Box 7.3-1) Develop community-specific access management plans in consultation with Indigenous communities as part of the communication and engagement plan during construction, operations and decommissioning (Box 7.3-1) **Key mitigation and follow-up program measures associated with on the land experience:** Meet the standards set out in the *Canadian Ambient Air Quality Standards* and the *Ontario Ambient Air Quality Criteria* by implementing a dust management program to control fugitive particulate emissions from on-site roadways and material handling, which includes: (Box 7.4-1) - Control fugitive dust emissions from roads, material handling and storage areas/stockpile by applying water sprays, use of surfactants, dust sweeping, gravel application, truck wheel washing stations, and enclosure of dust sources; - Use dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust; and	
Plants: Food and Medicinal					
10. Reduction of availability of resources for plant gathering (Section 7.3.1)	Changes in habitat, and therefore decrease in quantity, within the project study area due to overprinting of upland and wetland habitats by project components. This includes known harvesting areas in the former Ontario Ministry of Natural Resources and Forestry Tree Nursery area.	Changes to the quantity of harvestable berries, chanterelles and medicinal plants near the project study area. Increased perception of contamination of berry, chanterelle and medicinal plant harvesting areas near the project study area.			[...]
11. Loss or alteration of access for Indigenous use (Section 7.3.2)	Alteration of access to preferred berry, chanterelle and medicinal plant harvesting areas within the former Ontario Ministry of Natural Resources Tree Nursery area.	Reduced access to sacred medicinal plants due to confidentiality concerns resulting from altered or accompanied access in the former Ministry of Natural Resources and Forestry Tree Nursery area.			[...]
12. Reduction of quality of resources for plant gathering (Section 7.3.1 and 7.4.2)	Potential decrease in quality of plant harvesting areas especially berries and traditional plants for subsistence use due to dust.	Alteration of plant habitat from contamination as a result of dust deposition and changes to water quantity or quality.			[...]

Potential Environmental Effects of the proposed Project	Description of potential changes to the environment	Potential Pathways	Preliminary description of potential changes to the exercise of rights	Preliminary description of mitigation measures and potential conditions to address potential changes to exercise of rights[i]	Indigenous Communities Comment *Opportunity for impacted Indigenous communities to provide comment on the potential pathway, description of changes to exercise of rights and mitigation measures identified within this column.*
				- Equip crushers with dust collection systems (baghouse or equivalent) to control fugitive emission during ore crushing and transfer Conduct blasting between 10 am and 4 pm, avoiding statutory holidays and days of cultural importance that shall be determined in consultation with Indigenous communities, unless required for safety reasons. In the event that blasting is required outside of these times, or on statutory holidays or days of cultural importance, the Proponent shall notify Indigenous communities, as part of the community and engagement plan. (Box 7.3-2)	

[i] **Resources**: Ability to use and rely on resources, including means, diversity, quantity, quality, and availability of resources and habitat, in culturally important areas. Governance and management of resources that support the exercise of rights, including the relationship to key species and the perception of quality and quantity of resources.
Access: Ability to access culturally important places and resources without additional difficulty, effort or cost, and without posing health or safety risks. Ability to access a full cultural landscape of sites that are connected to one another.
Experience: Ability to spend time as families in culturally important places enjoying the peace and quiet of them and connection of these places within a cultural landscape.