Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

# Whabouchi Mining Project

## Draft Environmental Assessment Report

**May 6, 2015**

Canada

# Executive Summary

Nemaska Lithium Inc. ("the Proponent") is proposing to develop and operate a spodumene deposit in Whabouchi ("the Project"). The Project is located 30 km east of Nemaska and 280 km from Chibougamau. It is located entirely on Category III land under the jurisdiction of the *James Bay and Northern Quebec Agreement,* and is managed by the Eeyou Istchee regional government. The Project primarily involves the construction, operation, restoration and decommissioning of an open-pit and underground spodumene mine, a waste rock and tailings pile, an ore processing plant, and administrative and maintenance buildings. The mine would have an average ore production rate of 3 000 tonnes per day over a life of 26 years.

The Project is subject to an environmental assessment by the Canadian Environmental Assessment Agency (the Agency) under the *Canadian Environmental Assessment Act*, *2012,* as it constitutes a designated activity under subsection 16(a) of the *Regulations Designating Physical Activities*:

> *"the construction, operation, decommissioning and abandonment of a new metal mine, other than a rare earth element mine or gold mine, with an ore production capacity of 3 000 t/d or more."*

The Project also underwent a provincial environmental and social impact assessment by the Government of Quebec under Section 22 of the James Bay and Northern Quebec Agreement. No federal-provincial cooperation agreement exists for Projects subject to the provincial process. However, to improve the application of the two environmental assessment processes, the Agency maintained cooperative ties with the Government of Quebec throughout the environmental assessment.

The Agency prepared this environmental assessment report in consultation with the Cree Nation of Nemaska, the public, Fisheries and Oceans Canada, Natural Resources Canada, Environment Canada, Health Canada, Aboriginal Affairs and Northern Development Canada and the Cree Nation Government. This report was written following a technical review of the Proponent's environmental impact assessment and an assessment of the Project's potential environmental effects.

As part of this environmental assessment, the Agency examined the Project's potential impacts on environmental components under federal jurisdiction, which are as described in subsection 5(1) of the Act:

- fish and fish habitat, and migratory birds;
- in the case of the Cree Nation of Nemaska, the effects of changes to the environment on the current use of lands and resources for traditional purposes, health and socio-economic conditions, physical and cultural heritage, and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;
- Wild species identified in the *Species at Risk Act*: Rusty Blackbird , Common Nighthawk, Olive-Sided Flycatcher, and the woodland caribou (Boreal population).

The changes to the environment considered in the environmental assessment that could potentially affect the valued components described above are the atmospheric environment, groundwater and surface water, the noise environment and terrestrial environments (vegetation and wetlands).The environmental assessment also took into account the effects resulting from accidents or malfunctions, alternatives to the Project, and the impacts of changes the Project could have on the environment.

The environmental assessment conducted by the Agency identified the concerns of the Cree and the public as well as the following potential adverse environmental effects:

- alteration, disturbance and loss of fish habitat following changes in surface runoff conditions caused by the construction of mine infrastructure and by mine dewatering, which could have an impact on fish;
- degradation of surface water quality caused by the discharge of contaminants (mine effluent and dust), that could affect fish and fish habitats;
- alteration, disturbance and loss of terrestrial and wetland habitats due to site clearing and stripping and to noise and dust generated by mining activities, which could have an impact on birds, their eggs and their nests and species at risk;
- alteration, disturbance and loss of terrestrial and wetland habitats due to site clearing and stripping and to noise and dust generated by mining activities, which could lead to the reduction or contamination of resources traditionally hunted, trapped or gathered by the Nemaska Cree;
- potential degradation of water and air quality, which could affect health conditions and expose the Cree to contaminants;
- potential degradation of air quality, the noise environment and the landscape, which could detract from use of the Bible camp, a location highly valued by the Nemaska Cree as a meeting place and activity area.

The Proponent has undertaken to incorporate mitigation measures into the Project to minimize or offset the Project`s effects on the environment. Key mitigation measures would include:

- relocation of the waste rock and tailings pile as well as settling ponds away from sensitive locations identified by the Nemaska Cree and a reduction of the mine site footprint;
- underground mining operations starting in year 21 to limit the pit's footprint on habitats;
- a water management plan that includes the collection and treatment of all mine water, including pit water;
- a dust management plan to limit emissions beyond the mine site;
- a noise management plan that includes the suspension of mining operations during the spring goose hunt (goose break);
- a compensation plan to offset serious harm to fish;
- measures to mitigate losses associated with Aboriginal land use.

The Agency has determined that the Project could impact a number of Aboriginal rights under the *James Bay and Northern Quebec Agreement,* including fishing, hunting and trapping. The Agency believes that

the key mitigation measures identified in the environmental assessment serve as accommodation for these potential impacts.

If the Project proceeds, the Agency believes that the Proponent should create an environmental monitoring program and a follow-up program to ensure the Project's compliance with acts and regulations, to validate the assessment of effects, and to verify the effectiveness of mitigation measures. These programs would enable the Proponent to take any necessary corrective action. The results would be submitted to the Agency for review in collaboration with federal authorities, and would be shared with representatives of the Cree Nation of Nemaska.

The Agency concludes that the Whabouchi Mining Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the key mitigation measures, and will make this recommendation to the Minister of the Environment.

The Agency has identified the key mitigation measures and follow-up program requirements to be recommended to the Minister of the Environment (the Minister) for consideration in deciding whether the Project is likely to cause significant adverse environmental effects. If the Minister concludes that the Project is not likely to cause significant adverse environmental effects as defined in section 5 of the Act, the Minister will establish conditions as part of the decision statement issued to the Proponent.

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# List of Abbreviations and Acronyms

| Abbreviation/Acronym | Definition |
|---|---|
| the Act | Canadian Environmental Assessment Act, 2012 |
| the Agency | Canadian Environmental Assessment Agency |
| EIS | Environmental Impact Statement |
| $m^2$ | square metre |
| $m^3$ | cubic metre |
| km | Kilometre |
| $km^2$ | square kilometre |

# 1 Introduction

## 1.1 Purpose of the Draft Environmental Assessment Report

Nemaska Lithium Inc. (the proponent) is proposing to construct, operate and decommission an open-pit surface and underground spodumene mine within the James Bay territory for the purpose of producing lithium. The mine would have a production capacity of approximately 3 000 tonnes per day over an estimated mine life of 26 years. The Project is located 30 kilometres east of the Cree Nation of Nemaska and 280 kilometres north-northwest of the municipality of Chibougamau.

The purpose of this environmental assessment report is to provide a summary of information and analysis considered by the Canadian Environmental Assessment Agency (the Agency) in reaching its conclusion, pursuant to the *Canadian Environmental Assessment Act, 2012* (the Act), on whether the Whabouchi Mine Project is likely to cause significant adverse environmental effects, taking into account the proposed mitigation measures.

The federal Minister of the Environment will review this report as well as the comments received from Aboriginal groups and the public before announcing her decision regarding the significance of the adverse environmental effects referred to in section 5 of the Act. The Minister may request additional information or may require that additional measures be taken in response to comments received from the public and Aboriginal groups.

## 1.2 Scope of Environmental Assessment

The scope of the environmental assessment establishes the framework and limits of the analysis conducted by the Agency, including the regulatory and legislative requirements of the environmental assessment, the involvement of the federal authorities, the factors considered, the selection of valued components and the spatial and temporal boundaries of the analysis.

### 1.2.1 *Environmental assessment requirements*

The Whabouchi Mining Project is subject to a federal environmental assessment under the Act, as it is a designated activity that is likely to have significant adverse effects on environmental components. The Project corresponds to the activity designated under paragraph 16(*a*) of the *Regulations Designating Physical Activities* (DORS/2013-147):

“The construction, operation, decommissioning and abandonment of a new metal mine, other than a rare earth element mine or gold mine, with an ore production capacity of 3 000 tons/day or more.”

The following federal acts and regulations could apply to the Whabouchi Mine Project:

- Canadian Environmental Protection Act (SC 1999, c. 33)
- Explosives Act (R.S.C. 1985, c. E-17)
- Fisheries Act (RSC 1985, c. F-14)
- Species at Risk Act (SC 2002, c. 29)

- Transportation of Dangerous Goods Act, 1992 (SC 1992, c. 34)
- Canada Transportation Act (SC 1996, c. 10)
- Hazardous Products Act (RSC 1985, c. H-3)
- Migratory Birds Convention Act, 1994 (SC 1994, c. 22)
- Metal Mining Effluent Regulations (SOR/2002-222)
- Environmental Emergency Regulations (SOR/2003-307)

The Project was also subject to Quebec's environmental and social impact assessment procedure under Section 22 of the James Bay and Northern Quebec Agreement. No federal-provincial cooperation agreement applies to this Project. However, in order to ensure increased efficiency in the application of the various processes, the Agency has established co-operative relationships throughout the environmental assessment of the Project with the Quebec Department of Sustainable Development, Environment and the Fight against Climate Change.

### 1.2.2 *Factors considered in the environmental assessment*

In the environmental assessment of the Whabouchi Mining Project, the Agency considered the following factors, which appear in subsection 19(1) of the Act:

- The environmental effects of the designated Project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated Project and any cumulative environmental effects that are likely to result from the designated Project in combination with other physical activities that have been or will be carried out;
- The significance of the effects referred to in paragraph (*a*);
- Comments from the public;
- Mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated Project;
- The requirements of the follow-up program in respect of the designated Project;
- The purpose of the designated Project;
- Alternative means of carrying out the designated Project that are technically and economically feasible and the environmental effects of any such alternative means;
- Any change to the designated Project that may be caused by the environment;
- Species at risk listed in Schedule 1 of the *Species at Risk Act* or designated by the Committee on the Status of Endangered Wildlife in Canada (under paragraph 19(1)(*j*) of CEAA 2012).
- Community knowledge and Aboriginal traditional knowledge were also considered in the federal Environmental Assessment of the Project.

### 1.2.3 *Selection of valued components*

The environmental effects that must be considered under the Act are changes that may be caused to the components of the environment that are within federal jurisdiction and that are described in section 5 of the Act, including:

- Fish and fish habitat as defined in the *Fisheries Act*;
- Migratory birds as defined in the Migratory Birds Convention Act, 1994;
- A change that may be caused to the environment that would occur on federal lands, in another province or outside Canada;
- With respect to Aboriginal peoples, a change that may be caused to the environment on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The Agency also assessed the adverse effects of the Project on species and critical habitat listed under the *Species at Risk Act* (subsection 79(2)), and the effects on species designated by the Committee on the Status of Endangered Wildlife in Canada.

Valued components refer to the components of the environment that are valued as related to their role in the ecosystem and value placed on them by humans. In its analysis of the environmental effects of the Project, the Agency considered the valued components identified to be of concern by the proponent, the public or Aboriginal peoples, and that are within federal jurisdiction. This report addresses the six valued components described in Table 1.

The Agency did not consider the effects of the Project on aquatic species as contemplated by subparagraph 5(1)(*a*)(ii) of the Act because none of these species are likely to be affected by the Project. Similarly, no additional components were selected under paragraph 5(1)(*b*) of CEAA 2012 since the Project is not likely to affect federal lands or to have transboundary effects. Lastly, no valued components were selected under subsection 5(2) of the Act[1] since no effects will be directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function other than those already contemplated in subsection 5(1).

[1] Subsection 5(2) refers to "a change […] that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated Project or the Project."

**Table 1 Valued components selected by the Agency**

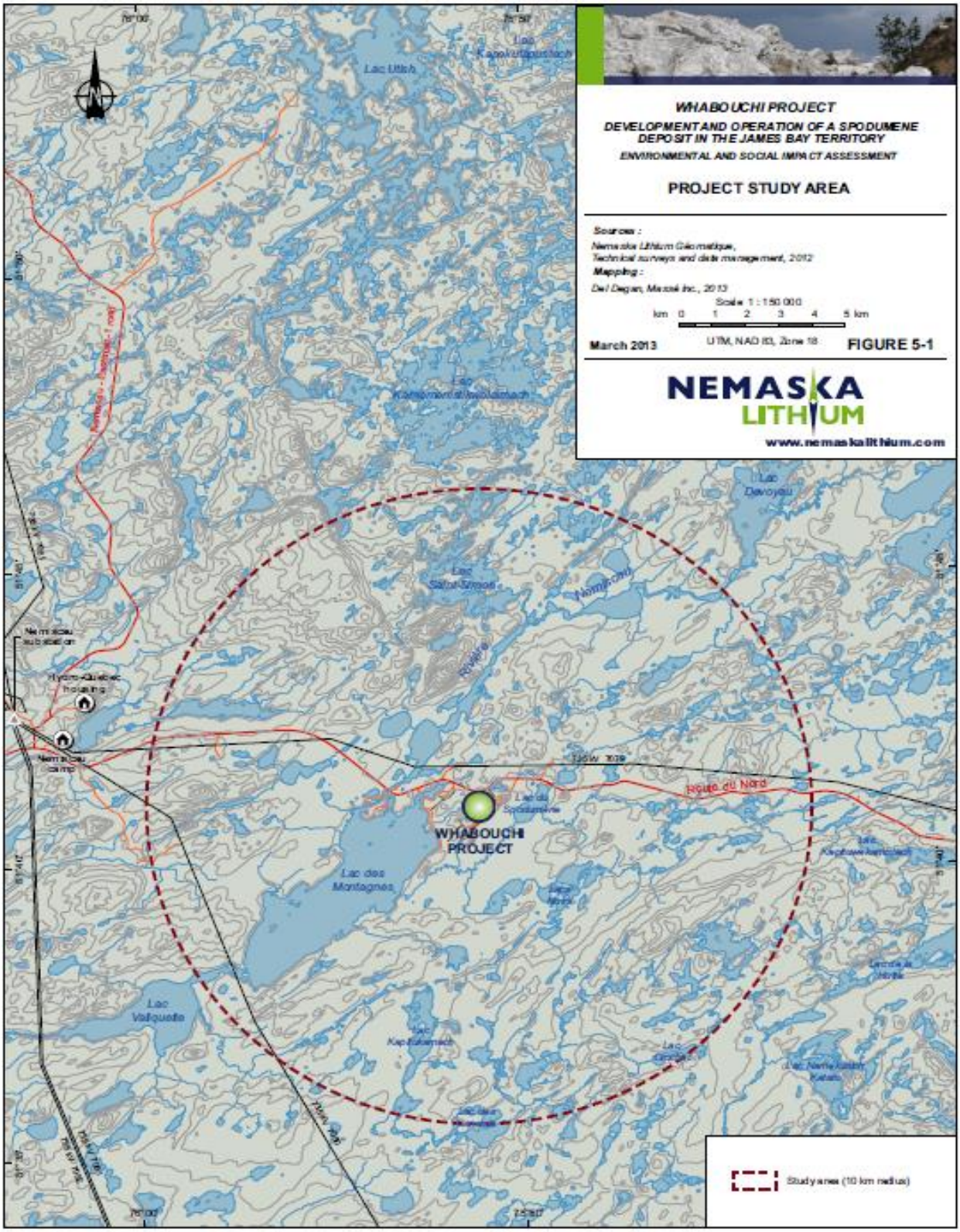
| Valued component | Rationale | |
|---|---|---|
| | Anticipated effects of the Project | Addresses concerns raised by: |
| Effects identified under subsection 5(1) of the Act | | |
| Fish and fish habitat | Changes to water quantity and quality that could have potential effects on fish and fish habitat. | Cree Nation of Nemaska |
| Migratory birds and their habitat | Increased noise levels and disturbance of terrestrial and wetland areas that could have potential effects on migratory bird populations and their habitat. | Cree Nation of Nemaska |
| Current use of lands and resources for traditional Aboriginal purposes | Increased noise levels and disturbance of terrestrial and wetland areas that could have effects on the current use of lands and resources for traditional purposes. | Cree Nation of Nemaska |
| Health and socio-economic conditions of Aboriginal peoples | Degradation of water and air quality, and increased noise levels that could have effects on health and socio-economic conditions of Aboriginal peoples. | Cree Nation of Nemaska<br>Public |
| Physical and cultural heritage of Aboriginal peoples | Disturbance of terrestrial and wetland areas that could have effects on the physical and cultural heritage of Aboriginal peoples. | Cree Nation of Nemaska |

### 1.2.4 *Spatial and temporal boundaries*

Temporal boundaries are set to take account all Project activities likely to cause adverse environmental effects. With respect to this environmental assessment, the temporal boundaries considered include the construction, operation and decommissioning of the Project.

Figure 1 illustrates the limits of the study area selected by the proponent. On the basis of this study area, the environment in which the Whabouchi Project will be carried out is described and its impacts are assessed. The site is centered on the future mine site and covers an area of approximately 314 $km^2$. It includes all physical, biological and human elements likely to be affected by the Project. The proponent has adjusted the boundaries of the study area for a number of the components selected in the environmental impact statement in order to conduct a more targeted assessment for those components. For example, to assess the impact of the Project on the use of land by Aboriginal peoples, the proponent defined the spatial boundaries on the basis of the traplines of the Cree Nation of Nemaska located on the periphery of the Project's footprint. The proponent has also included the area around the Route du Nord between the Project site and the municipality of Chibougamau in order to take into account the effects of the Project on other Cree communities or on owners of camps located along the road.

**Figure 1 Local and Regional Study Areas**




Source: Environmental and Social Impact Statement, Nemaska Lithium, March 2013

### 1.2.5 *Methods and approach*

The Agency, in collaboration with the federal committee (see section 4.3), defined and assessed the adverse environmental effects of the Project on the basis of the following information:

- The environmental impact statement prepared by the proponent;
- The proponent's answers to the questions and comments received from the federal committee;
- The proponent's answers to the questions and comments received from the provincial review committee;
- Information obtained during public and Aboriginal consultations;
- Expert opinions obtained from federal departments and from the Cree Nation Government.

The Agency examined the environmental changes considered by the proponent and likely to cause residual negative effects on the valued components mentioned in Table 1. To measure the significance of the residual effects on the valued components, the Agency used the same assessment criteria as the proponent, namely intensity, extent and duration. It also considered one additional criterion, i.e., reversibility/irreversibility of the effect. These assessment criteria are defined by the Agency as follows (See annex B):

- Intensity: relative significance of the consequences of an effect relative to the Project on the structure or function of a valued component.
- Extent: area of the territory affected or proportion of individuals affected.
- Duration: period of time during which the activity is felt by the valued component.
- Reversibility/Irreversibility: probability that a valued component cannot return to its original state (prior to the environmental effect) over the life of the Project.

The Agency assessed the degree of residual effect (low, medium, high) for each of these criteria on the basis of the definitions or preset limits (see Annex B). The degree of residual effect is determined after taking into account the implementation of the proponent's mitigation measures and key mitigation measures recommended by the Agency to be considered by the Minister, including compensation, if applicable. The Agency then used a grid for determining the significance of the residual effects on the valued components (see Annex C), which combines the degree of residual effect of each criterion for a given valued components. Using the grid, the Agency was able to judge the overall significance of the residual effects on each valued components.

When the significance of the residual effects is very high or high, the effects are considered significant, whereas when the significance of the residual effects is moderate, low or very low, the effects are considered not significant.

# 2 Project Overview

## 2.1 Project Location

The mining Project is located in the administrative region of Nord-du-Québec within the territory of the municipality of Baie-James in Quebec. The geographic coordinates are 75º51'49.7" West and 51º40'42.0" North (Figure 2).

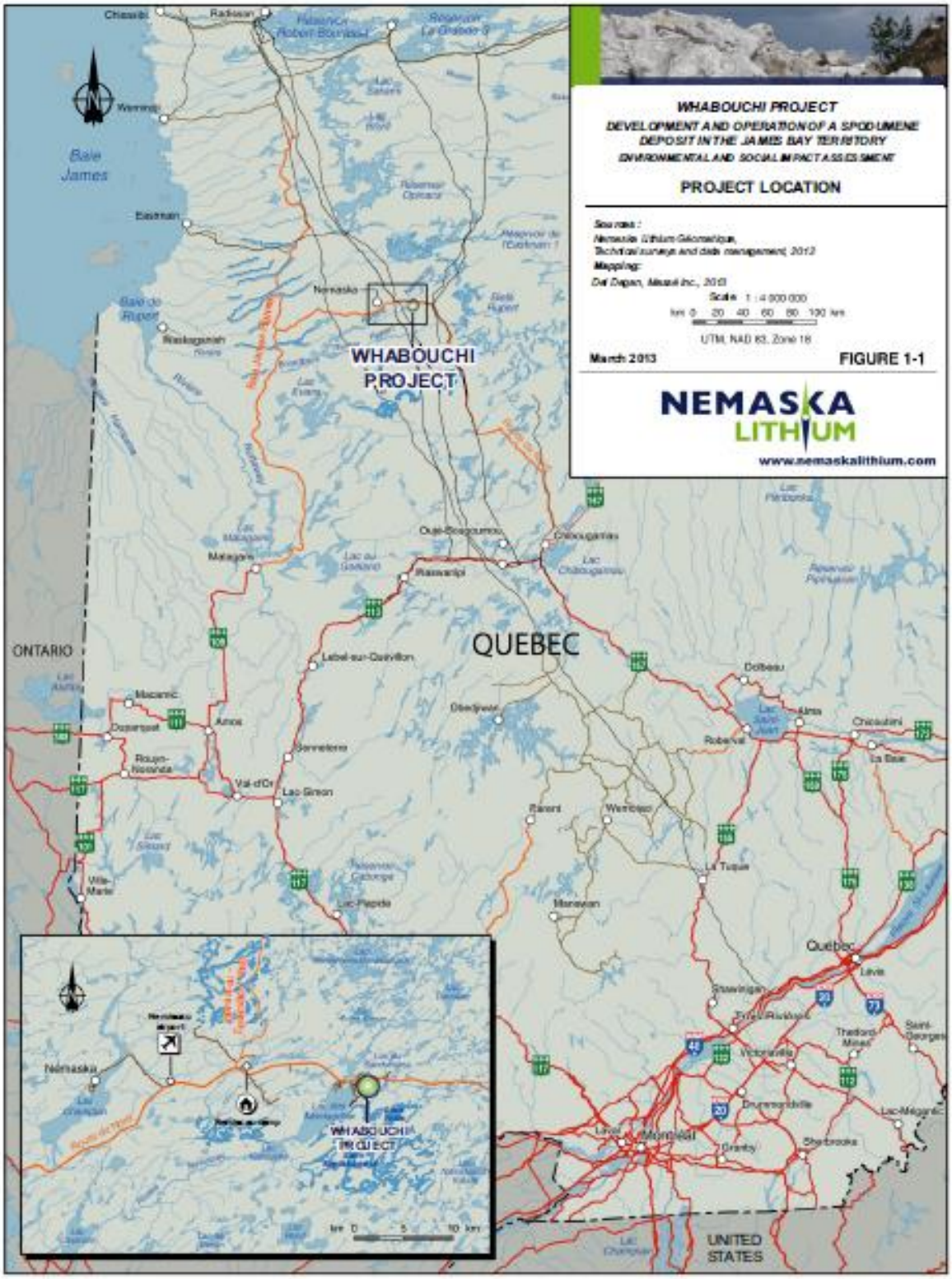
## 2.2 Project Components

The components of the Project subject to this environmental assessment are illustrated in Figure 3 and include:

**The mine:**

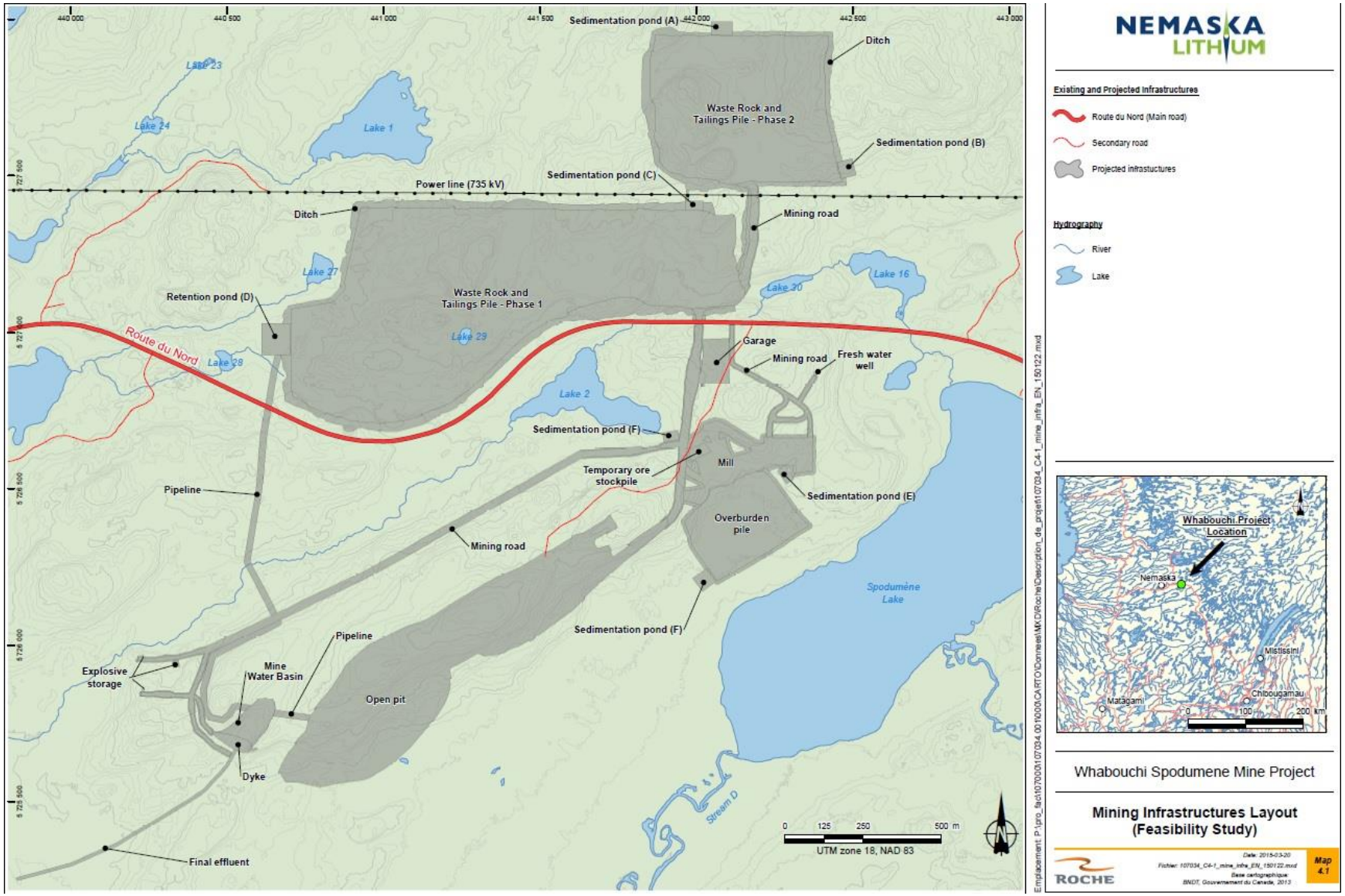
- **An open-pit with related surface infrastructure** – The open-pit will be approximately 0.28 $km^2$ and 150 meter deep;
- **Underground operations** – The construction of underground tunnels for the underground mining of the ore starting in year 21 for 6 years. The maximum ore processing rate will be slightly over 3 400 tons per day during the underground mining operations;
- **Ore processing plant with related buildings** – The ore will be crushed, milled and processed on site. The mine will supply the processing plant with approximately 3 000 tons of ore per day;
- **Temporary ore stockpile** – The temporary ore stockpile will have a capacity of approximately 20 450 tons and will cover an area of 0.0023 $km^2$;
- **Waste rock and tailings pile** – The waste rock and tailings pile will be constructed in two phases for a total area of 0.84 $km^2$. Phase 1 will reach a height of 60 meters and Phase 2 will reach 40 meters;
- **Overburden storage area** – The overburden storage area will have a capacity of 1.5 million cubic meters ($m^3$), approximately 0.41 million $m^3$ of which will be re-used for the areas to be replanted;
- **Network of drainage collection ditches** – The network of drainage water collection ditches will be equipped with five collection basins constructed at the main low points of the waste rock and tailings pile, with capacities of 6 800 $m^3$, 6 500 $m^3$, 6 600 $m^3$, 4 400 $m^3$, 8 400 $m^3$ and 6 600 $m^3$;
- **Holding pond and mine water collection pond** – The holding pond, which will be filled with water from all collection basins, will be located southwest of the waste rock and tailings pile and will have a capacity of 30 000 $m^3$. The mine water collection pond, which will be the final pond, will be located southwest of the pit and will have a capacity of 26 000 $m^3$.

**Figure 2 Location of the Whabouchi Mining Project**




Source: Environmental and Social Impact Statement, Nemaska Lithium, March 2013

**Figure 3 Key Project Components**




Source: Answers to questions and comments by the Agency, December 2014, Nemaska Lithium

**Related facilities**:

- Support infrastructure (administrative and technical offices, maintenance garage and parts storage facility, water pumping station for fires, etc.);
- Drinking water intakes and two domestic water treatment systems;
- Service roads;
- A fuel storage area with a capacity of 100 000 liters;
- Three explosives storage areas.

To house workers, the proponent plans to use a camp managed by the Cree Construction and Development Company located 12 kilometers from the mine site. Given that this camp is an existing structure, it is not considered part of the related Project facilities whose effects must be assessed as part of this environmental assessment.

The proponent also plans to construct a lithium hydroxide and lithium carbonate production plant in Salaberry-de-Valleyfield in southern Quebec to process the spodumene mineral from the Whabouchi mine. However, this related activity (plant) is not included in the scope of this federal environmental assessment because it is a separate Project located in an industrial sector for which no adverse environmental effects are anticipated on components within federal jurisdiction. In addition, the construction of the plant is governed by provincial environmental regulations. Ore transport on the existing roads and rail line is not included in the scope as they have previously been assessed.

## 2.3 Project Activities

The proponent is anticipating a construction phase of 19 months and an open-pit mine operation phase of approximately 20 years, followed by underground operations from years 21 to 26 (Table 2). The waste rock and tailings pile will be gradually rehabilitated starting in the 7$^{th}$ year of operations; two years are planned for mine closure and final site reclamation starting in 2043. A follow-up program will then be put in place for a minimum duration of five years in order to validate the effectiveness of the post-closure remediation measures. The estimated post-closure filling period is approximately 43 years.

.

## Table 2 Project activities and schedule

| Preliminary work and construction phase | Mine operations phase | Mine closure phase (decommissioning and reclamation) | Post-closure |
|---|---|---|---|
| **19 months** | **26 years** | **2 years*** | **5 years or more** |
| ➢ Site clearing and grading;<br>➢ Construction of support infrastructure (administrative and technical offices, maintenance garage and parts storage facility, water pumping station for fires, etc.);<br>➢ Heavy equipment and vehicle use, maintenance and movements;<br>➢ Installation of a surface and ground water management system (ditches, collection basins, culverts, water treatment system);<br>➢ Construction of a holding pond and mine water basin;<br>➢ Preparation for mining: stripping, blasting, separate storage of topsoil and overburden;<br>➢ Installation of the waste rock and tailings pile;<br>➢ Installation of water pumping systems;<br>➢ Draining of Lake 29 for the waste rock and tailings pile;<br>➢ Management of waste and hazardous materials;<br>➢ Construction of service roads and access roads;<br>➢ Implementation of environmental monitoring and follow-up programs. | ➢ Drilling and blasting;<br>➢ Extraction, handling, storage and transportation of waste rock, tailings and overburden;<br>➢ Handling and storage of explosives;<br>➢ Water pumping to drain the pit;<br>➢ Handling and storage of explosives;<br>➢ Ore processing (crushing, milling, concentration of spodumene);<br>➢ Water management: effluent, mine water, process water, drinking water and wastewater;<br>➢ Maintenance of collection ponds, holding ponds and mine water basins;<br>➢ Management of waste and hazardous materials;<br>➢ Maintenance of four settling ponds and retention dikes;<br>➢ Heavy equipment and vehicle use, maintenance and movements;<br>➢ Gradual rehabilitation of the waste rock and tailings pile beginning in the 7th year of operation;<br>➢ Extraction of ore through underground tunnels (explosives);<br>➢ Implementation of environmental monitoring and follow-up programs. | ➢ Dismantling of buildings and support infrastructure;<br>➢ Flooding of pit and construction of a spillway;<br>➢ Final seeding of the waste rock and tailings pile;<br>➢ Backfilling of the ditches;<br>➢ Reclamation of collection ponds, retention ponds and mine water basins;<br>➢ Dismantling of the mine effluent pipe;<br>➢ Dismantling of infrastructure and facilities;<br>➢ Management of waste and hazardous materials;<br>➢ Heavy equipment and vehicle use, maintenance and movements;<br>➢ Reclamation of the mine site and roads;<br>➢ Implementation of environmental monitoring and follow-up programs. | ➢ Monitoring program for mine effluent, surface and ground water quality, fish populations and their habitat, air quality, community wellbeing, inspection program of works following completion of the reclamation work. |

* Rehabilitation of the waste rock and tailings pile starting in the 7th year of operation.

# 3 Purpose of Project and Alternative Means

The following sections describe the purpose of the Project and a description and analysis of the main alternatives considered by the proponent, including the justification of the proponent's preferred option based on environmental, social, technical and economic criteria. Lastly, the Agency concludes on the choice and analysis of the alternatives conducted by the proponent.

## 3.1 Purpose of Project

The mine would produce approximately 3 000 tons of spodumene ore per day over a period of 26 years. According to the proponent, this spodumene deposit is the largest in North America and the second largest in the world. The demand for lithium on the world market is rising, due primarily to its use in the manufacture of batteries for electric vehicles and electronics (tablets, telephones, laptops, etc.).

## 3.2 Alternative Means of Carrying Out the Project

The proponent assessed alternatives for the main components or activities of the Whabouchi Project. The relevant alternatives for the needs of this environmental assessment are summarized below. Annex D presents details of the assessment of the alternatives on the basis of technical, environmental, economic and social criteria.

### 3.2.1 *Technology alternatives*

*Ore extraction*

The proponent considered two options: underground extraction alone or open-pit surface extraction followed by underground extraction. The proponent's analysis shows that the option of underground extraction alone would have a less significant environmental effect, but is not economically viable due to the considerable losses of ore at the surface and at depth that would have to be left in place in order to maintain the structure of the underground tunnels. The selected option is open-pit surface mining followed by underground mining for the last six years for technical, economic and environmental reasons. Starting at a certain depth, it would become more technically difficult and more costly to continue the open-pit operations. The pit would have to be widened for the construction of the access roads at the far end of the mine, taking into account the gradeability of the trucks. The underground extraction of the ore located at depth would reduce both the amount of rock waste to be managed at the surface and the ultimate footprint of the pit compared to open-pit extraction for the same ore at depth.

*Waste rock storage*

The proponent examined two options: returning the waste rock to the pit or storing it in a permanent waste rock pile. The first option would require temporarily storing the waste rock in a pile during the operation of the mine and then returning it to the pit, which would be flooded at the time of Project closure. This option may be advantageous in the case of acid-generating waste rock, because the anoxic conditions produced by flooding would slow down the oxidation mechanisms that cause water contamination by acid mine drainage. In this case, the waste rock is deemed by the proponent to be non-acid-generating and non-leachable. As a result, considering the fact that once the waste rock is broken into pieces, not all of it can be returned to the pit and

that the presence of a permanent pile would still be required, returning the material to the pit has no environmental or technical advantages. In addition, the costs associated with returning the material to the pit would be very high and would make the Project economically non-viable. The option of the permanent waste rock pile, without returning the waste rock to the pit, would allow for gradual restoration of the site and is economically viable.

### *Tailings pile (co-disposal with waste rock)*

Two options were considered for tailings disposal: slurry tailings impoundment and filtered tailings storage. The latter option was selected on the basis of environmental criteria, including a reduced volume of tailings, recirculation of water to the processing plant, reduced risk of impacts on water quality and the possibility of co-disposal with waste rock. Although the co-disposal of waste rock and tailings in the same pile is the most costly option, it was selected due to its environmental advantages.

### *Power supply*

Three power supply options were considered for providing approximately 7.5 megawatts of electricity per year: the use of five 2 megawatt diesel generators, the construction of a, 25-kilovolt-power line (20 kilometers in length), and a combination of the two options. According to the proponent, supplying power to the site using diesel generators alone would have much more significant adverse environmental effects. However, powering the equipment in the pit with electricity would be more technically complex. The selected option, namely a combination of the two energy sources, would make it possible to reduce the adverse effects associated with the use of diesel generators while meeting the technical requirements of the mine operations.

### *Waste disposal*

Three management approaches were evaluated by the proponent: on-site management, use of the landfill of the community of Nemaska and use of the secure landfill of the municipality of Chibougamau. On-site management would require a new secure landfill, which would increase the Project's footprint, the potential environmental and social impacts, and the Project costs. The use of the secure landfill of the municipality of Chibougamau, located 300 kilometers from the mine site, would have adverse environmental and social impacts associated with greenhouse gas emissions, increased traffic, and higher operating costs. The selected option is the use of the landfill of the community of Nemaska, which is roughly 20 kilometers from the mine site. This option would have fewer adverse environmental effects (fewer greenhouse emissions, smaller footprint given that there is no requirement for the construction of a new landfill) and would be less costly (lower gasoline consumption, no new infrastructure to be built).

### *Water supply*

Two water supply options were technically feasible: a surface water supply and a groundwater supply. Using surface water as the source of water supply would consist in pumping water from Lac du Spodumène. This option would involve the installation of an underground water pipe and the construction of an access road between the lake and the ore processing plant. For economic (construction and maintenance costs), technical (complexity of construction, risk of accidents) and environmental reasons (disturbance of soil and vegetation, disturbance of fish), this option was rejected. The proponent opted for the installation of a well near the processing plant. The fresh water requirements of the process would be significantly reduced using the option of producing filtered, unsaturated tailings, which would allow for maximum reuse of the water.

### *Housing of workers*

The proponent assessed the options of housing the workers on site or using the "Le Relais routier" site, which is owned by the Cree. On-site housing would involve the construction of additional buildings and related infrastructure, thereby increasing the Project's footprint. The use of an existing camp would contribute to the local economy. The option of using existing infrastructure was selected on the basis of economic and environmental factors.

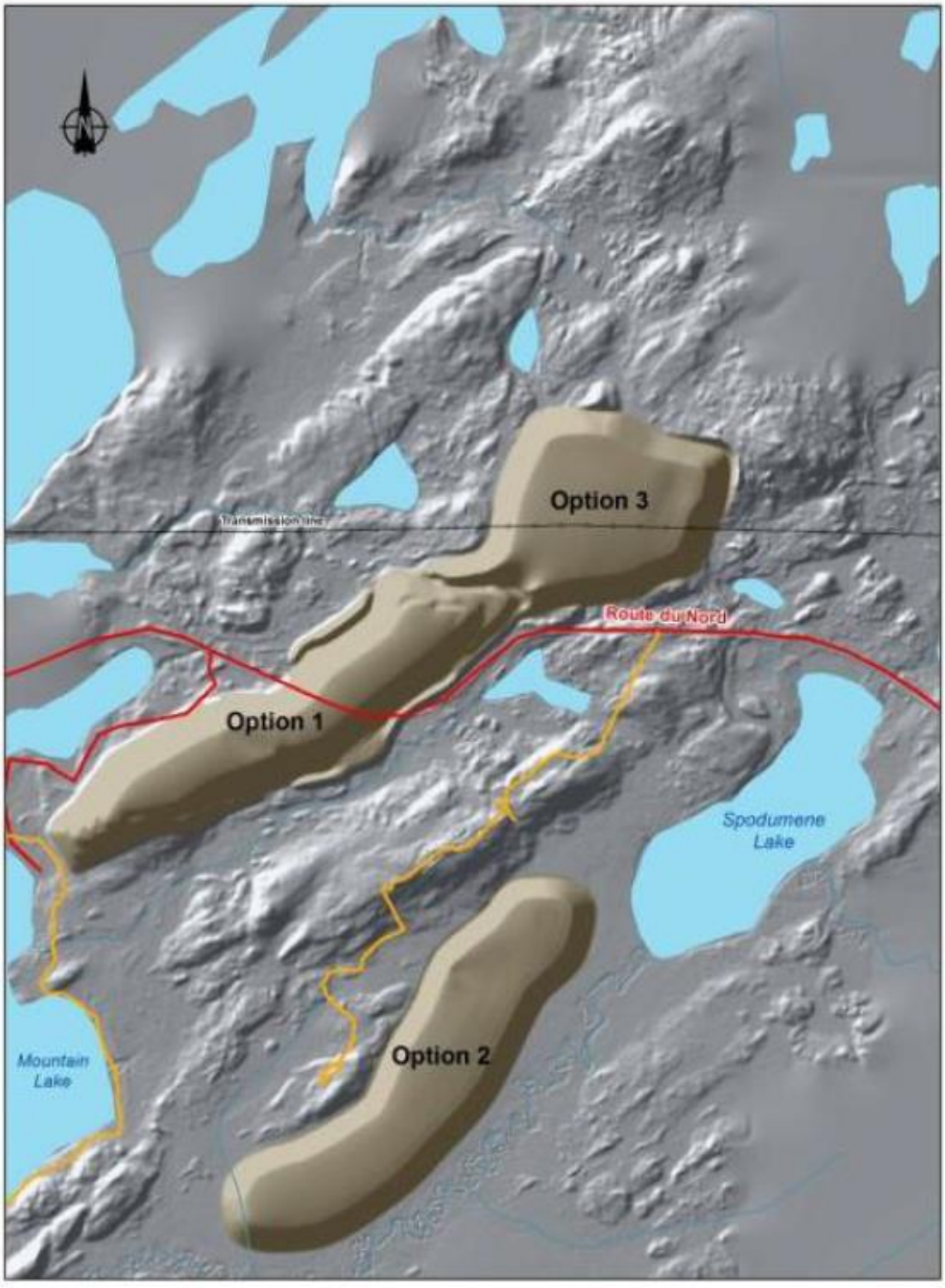
### *Location of the piles and final effluent*

In the preliminary economic study, three options were considered (see Figure 4). The option selected at that time –option 1– allowed for the protection of a significant wetland and the continuation of activities within the territory, and it did not affect the existing power line. In response to concerns raised by the Cree Nation of Nemaska during consultations, the proponent considered a new option –option 4– (see Figure 5), whereby the overburden, tailings and waste rock piles would be located further away from Lac des Montagnes and sensitive sectors, such as the Bible Camp, while maintaining the same advantages as option 1.

Option 4 is now the proponent's preferred option. It would also eliminate any encroachment on stream F, avoid wetland losses associated with the location of the overburden pile, move the explosives storage away from the settling pond dikes, avoid any realignment of Route du Nord, and reduce the Project's overall footprint.

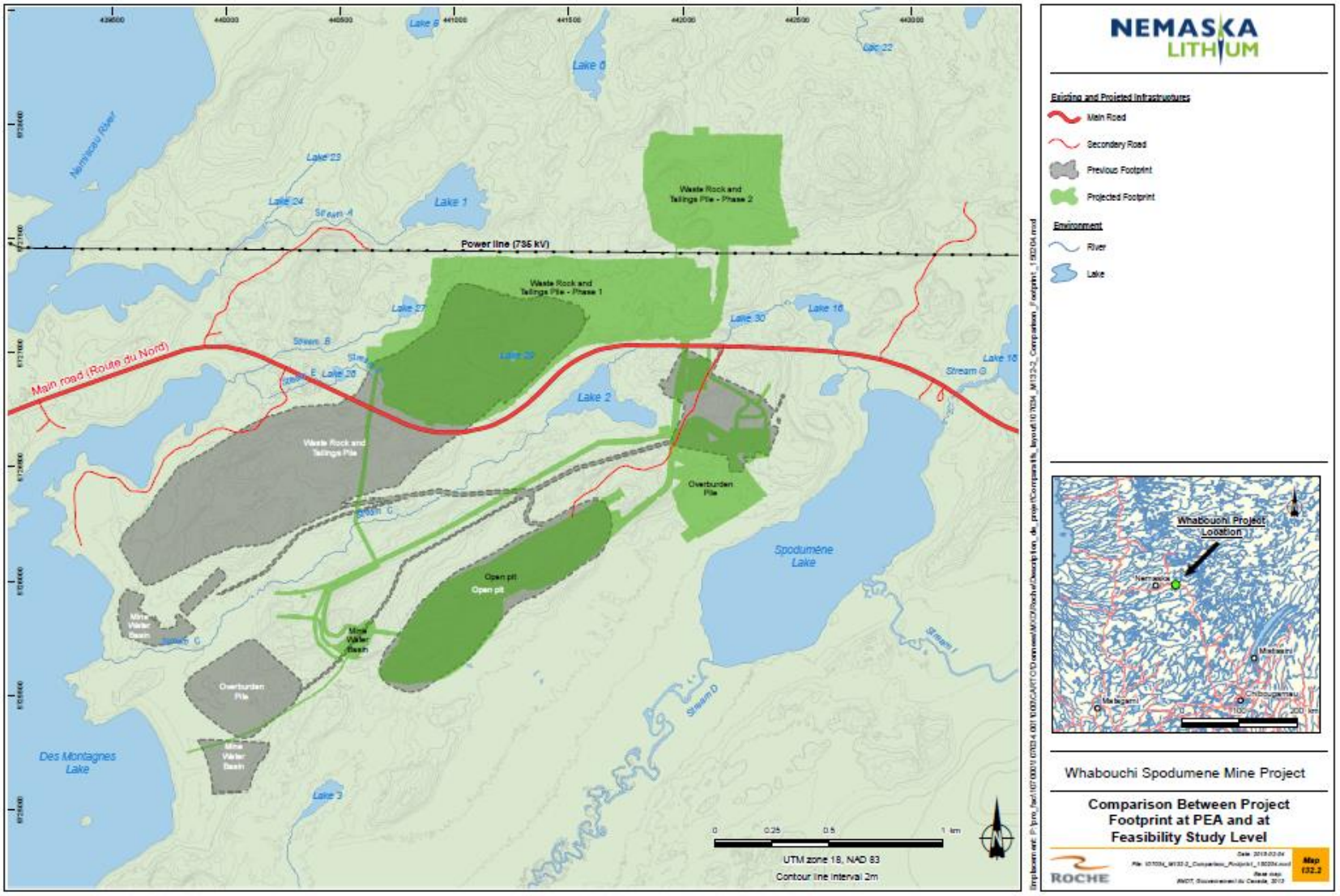
The relocation of the various facilities outline in option 4 involves a change to the water management approach which supports the construction of a single final discharge point for the mine site. The final effluent would be discharged to Lac des Montagnes through a 1.4 kilometers underwater pipe. By comparison, the option previously selected by the proponent in the preliminary economic study called for two discharge points, one into Stream C for water from the waste rock and tailings pile and a second into Lac des Montagnes for water from the pit and mine complex.

**Figure 4** **Location of options 1,2 and 3 proposed by the proponent for the location of the waste rock and tailings pile**




Source: Environmental and Social Impact Statement, Nemaska Lithium, March 2013

**Figure 5 Comparison between the location of all mine facilities under option 1 (shaded areas) and that provided for in option 4 (green areas).**




Source: Answers to questions and comments by the Agency, Nemaska Lithium, April 2014.

### 3.2.2 *Comments received*

*Government authorities*

According to Environment Canada, despite the relocation of the settling ponds, the risk of spills of potentially contaminated water in Lac des Montagnes remains in case of damage to the dike. The proponent believes that the consequences of a breach in the dike of the sedimentation pond would be very limited. First, the dike will retain only 26 000 cubic meters of sediments; its design will exceed the safety standards required by the Government of Quebec; and finally, a program to monitor the integrity of the dike of the sedimentation pond will be implemented. Moreover, the dike will be located at approximately one kilometer from the Lac des Montagnes, the terrain between the pond and the Lake has a low gradient (between 1 and 6 percent) and vegetation between the pond and the Lake could filter suspended solids carried by the water from the pond following any damage to the dike.

*Aboriginal communities*

The Cree Nation of Nemaska voiced its concerns regarding the location of the settling ponds and waste rock and tailings pile proposed by the proponent in option 1. The Cree were concerned about the possible impact of an accidental spill from the ponds into Lac des Montagnes and of the aesthetics and noise impacts of the waste rock and tailings pile on Cree camps located in the vicinity of the Nemiscau River and Bible Camp. The proponent took these concerns into account and proposed an option that would move the infrastructure further away from the sensitive areas (option 4).

## 3.3 Conclusion of the Agency on the selected alternatives

The Agency is satisfied with the alternatives analysis conducted by the proponent for the purposes of the environmental assessment. Taking into account the technical and economic criteria for this type of Project, the proponent took the concerns raised by the Cree Nation of Nemaska into consideration in its choice of alternatives having the least environmental effects.

# 4 Consultation Activities and Advice Received

Public and Aboriginal consultations strengthen the quality and credibility of environmental assessments. The comments and concerns received during the consultations contribute to identifying the potential effects of a Project, as early as its planning stage. The Agency, in collaboration with the federal environmental assessment committee, conducted a number of public and Aboriginal consultation activities for the Whabouchi Mining Project.

## 4.1 Public Participation

The Act provides for three official opportunities for the public to participate in the screening, analysis of the environmental impact statement and preparation of the draft environmental assessment report. The Agency also held consultations on the draft guidelines for the preparation of an environmental impact statement by the proponent.

Under its Participant Funding Program, the Agency provided $10 200 in funding to the Société pour Vaincre la Pollution to support its participation in the consultations on the environmental impact statement and draft environmental assessment report.

### 4.1.1 *Public participation led by the Agency*

During the first public consultation on the preliminary screening, held from December 14, 2012, to January 3, 2013, the Agency received a comment from the public concerning the impact on the Project on the Little Brown myotis, a bat species designated as endangered by the Committee on the Status of Endangered Wildlife in Canada. The second consultation was held from January 29 to February 28, 2013, seeking comments on the draft guidelines. No public comments were received by the Agency.

The third consultation was held from October 3 to November 2, 2013, seeking comments on the summary of the proponent's environmental impact statement. At that consultation, the Agency received a brief prepared by the Société pour Vaincre la Pollution. It voiced a number of concerns regarding the effects of mine effluent, blasting and settling pond dike failures on water quality.

For the fourth consultation, the Agency invites the public to comment on the content, conclusions and recommendations set out in this draft environmental assessment report. After taking in consideration the comments received from the public, the Agency will finalize and submit the report to the Minister of the Environment. The Agency also invites the public to comment on the potential conditions set as part of the environmental assessment, which are outlined in a separate document available on the Canadian Environmental Assessment Registry's Internet site. They comprise the potential conditions the Agency is recommending to the Minister of the Environment should she determine that the Project is not likely to cause significant adverse environmental effects under Section 5.

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

The Agency supported public participation in the environmental assessment through its Participant Funding Program. A total of 10 200$ was allocated to the Société pour Vaincre la Pollution to support its participation in the consultations on the environmental impact statement and draft environmental assessment report.

### 4.1.2 *Public participation activities organized by the proponent*

In 2009, the proponent presented his Project to the mayor and to the City Council of Chibougamau. According to the proponent, the anticipated effects expected by the municipal authorities are of an economic nature and are perceived positively. An open house event was held in 2013.

## 4.2 Aboriginal Consultation

The federal government has a duty to consult and, where appropriate, to accommodate Aboriginal groups when it contemplates conduct that might adversely impact established or potential Aboriginal and treaty rights. Moreover, The Act requires that federal environmental assessments take into consideration changes to the environment that may affect Aboriginal peoples, such as:

- Health and socio-economic conditions;
- Physical and cultural heritage;
- Current use of lands and resources for traditional purposes;
- Any structures, sites or things that is of historical, archaeological, paleontological or architectural significance.

The federal Government has a duty to consult Aboriginal groups, and, where appropriate, to accommodate, when its proposed conduct might adversely impact an established or potential Aboriginal or Treaty right. Aboriginal 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 environmental assessment, the Agency served as Government Consultation Coordinator to facilitate a whole-of-government approach to consultation. Aboriginal groups that were invited to participate in consultations included those identified as having an interest in the Project: the Cree Nation of Nemaska and the Cree Nation of Mistissini.

With respect to the Cree Nation of Mistissini, the Agency found that the Project was not likely to infringe on their rights, particularly because none of their traplines were likely to be affected by the Project. Although the Cree of Mistissini voiced concerns about increased traffic on the Route du Nord that could result from the Project, the Agency determined that this effect did not fall within the scope of the current federal environmental assessment since it had already been taken into account in the environmental assessment conducted for the construction of the road. For these reasons, the Agency did not hold separate consultations with the community of Mistissini. However, the Cree Nation of Mistissini contacted the Agency and asked to be kept informed of the conduct of the environmental assessment of the Project. The Agency sent the community the relevant documents for each public participation opportunity in keeping with this request.

The Agency and the Grand Council of the Crees agreed on an approach to allow participation of the Cree Nation in the federal environmental assessment process. Under this approach, a representative of the Cree Nation

Government took part in the work of the federal environmental assessment committee and had an opportunity to participate in the development of the consultation plans for the Cree Nations, in the consultation activities, in the analysis of the environmental impact statement and the review of the draft environmental assessment report.

### 4.2.1 *Aboriginal consultation led by the Agency*

In order to fulfill the federal Government consultation obligations, the Agency conducted Aboriginal consultations in an integrated manner with the environmental assessment process.

The Agency provided the Cree Nation of Nemaska with a consultation plan that outlined consultation activities at the various phases of the environmental assessment.

The Cree Nation of Nemaska was invited to participate in the same formal public consultations opportunities described in the previous subsection and now has the opportunity to comment on this draft environmental assessment report. The Agency informed the band council of the Cree Nation of Nemaska through correspondence and notices on the Canadian Environmental Assessment Registry Internet site and in local newspapers and radio stations.

A total of $35 828 from the Participant Funding Program was allocated to the Cree Nation of Nemaska to support their participation in the consultations related to the environmental assessment and the draft environmental assessment report. For the first two consultations, the Cree Nation of Nemaska did not provide comments to the Agency on the summary of the Project description and draft guidelines.

In the third consultation opportunity, the Cree Nation of Nemaska commented on the potential environmental effects of the Project, its potential impacts on treaty rights and the accuracy of the information provided by the proponent in its environmental impact statement. The brief presented by the Cree Nation of Nemaska also contained proposals regarding the follow-up of the environmental effects. The Agency, in collaboration with the members of federal environmental assessment committee, held meetings with various stakeholders on November 19, 20 and 21, 2013, in the community of Nemaska. The Agency heard the concerns of the band council, the Jolly and Wapachee families, users of the territory of the Wapachee family, the tallyman of trapline R20, a group of elders, a group of women and a group of young people from the community, particularly with respect to the anticipated impacts on human health and the environment (see Annex E). These groups had asked to meet with the Agency. The potential effects on the Cree Nation of Nemaska are discussed in sections 7.4, 7.5 and 7.6.

The present draft environmental assessment report is the object of the fourth opportunity of consultation. The Agency invites the Cree Nation of Nemaska to comment on the content, conclusions and recommendations of this draft environmental assessment report. The comments sent to the Agency will be presented to the Minister of the Environment to inform a decision on the environmental assessment of this Project. The Agency also invites the Cree Nation of Nemaska to comment on the potential conditions set as part of the environmental assessment, which are outlined in a separate document available on the Canadian Environmental Assessment Registry's Internet site. They comprise the potential conditions the Agency is considering imposing if the Minister of the Environment decides that the implementation of the Project is authorized.

### 4.2.2 *Aboriginal consultation and engagement activities organized by the proponent*

From the outset of the exploration work, the proponent has held a number of meetings with representatives of the Cree Nation of Nemaska in order to discuss the Project.

The proponent indicated that it held meetings in 2011 with the administrative staff of the Cree Nation of Nemaska, stakeholder groups and the band council in order to gain a better understanding of the social, economic and cultural context and to identify their concerns and expectations vis-à-vis the Project. The proponent also indicated that it consulted with the users of the territory on approximately ten occasions to obtain a representative picture of the current use of the territory and of the anticipated impact of the Project on the territory. In September 2012, it held a public meeting open to the entire population. In addition, to facilitate dialogue with the Cree Nation of Nemaska, the proponent opened a local office in Nemaska in 2012 and hired a Cree liaison officer responsible for gathering the community's concerns and communicating information related to the Project.

In 2012, the proponent also set up a community advisory committee to establish a line of communication with a large number of stakeholders from Nemaska. The committee is composed of representatives of local organizations, the band council, the Cree trappers' association, hunters, young people, elders, and families whose hunting territory is most likely to be affected by the Project. Three meetings were held between February 2012 and June 2013.

The many consultation activities carried out by the proponent led to the signing of the Chinuchi agreement[2] on November 7, 2014. This agreement is about an economic and social partnership agreement between the Cree Nation of Nemaska and Nemaska Lithium (the Proponent) for the development and operation of the Whabouchi Project on Cree territory.

## 4.3 Participation of Federal and Other Experts

Expert departments provided expert information or knowledge with respect to the Project in accordance with section 20 of the Act. The following federal authorities provided advice in connection with the review of the proponent's environmental impact statement and the preparation of this environmental assessment report: Fisheries and Oceans Canada, Environment Canada, Natural Resources Canada, Health Canada and Aboriginal Affairs and Northern Development Canada. A representative of the Cree Nation Government also joined the committee and participated in the review of the environmental impact statement by providing advice on the content of the report. The committee also contributed to the planning and conduct of the public and Aboriginal consultations throughout the federal environmental assessment process.

More specifically, Fisheries and Oceans Canada, which has regulatory and legal responsibilities under the *Fisheries Act*, provided comments and information on the potential adverse effects of the Project on fish and fish habitat and aquatic species at risk. As part of the environmental assessment of the Whabouchi Mine Project,

[2] The Chinuchi agreement was signed by the Grand Council of the Crees (Eeyou Istchee), the Cree Nation Government, the Cree Nation of Nemaska and Nemaska Lithium Inc. This agreement concerns the development and operation of Nemaska Lithium's Project.

Fisheries and Oceans Canada indicated that it could require authorizations and approvals under the *Fisheries Act* to implement the Project.

Environment Canada has regulatory and legal responsibilities under the *Canadian Environmental Protection Act, 1999*, the *Migratory Birds Convention Act, 1994* and the *Species at Risk Act*, and is responsible for administering the pollution prevention provisions under the *Fisheries Act*, including the *Metal Mining Effluent Regulations*. Environment Canada provided comments and information regarding the potential adverse effects of the Project on migratory birds and their habitat, species at risk, water quality, air quality, chemicals management, environmental emergencies and the application of the *Metal Mining Effluent Regulations*.

Natural Resources Canada has regulatory and legal responsibilities under the *Explosives Act*. It provided comments and information on the storage of explosives. It also provided specialist information in the areas of geology, hydrogeology and geochemistry.

Health Canada provided comments and information on the potential adverse effects of changes to air, water quality, noise environment and contamination of traditional resources on the health of Aboriginal communities.

The Cree National Government provided comments on the anticipated impacts on Cree nations.

# 5 Geographical Setting

## 5.1 Biophysical Environment

The Whabouchi Mine Project is located in the Canadian Shield, in the Superior Province, which consists mainly of igneous and metamorphic rock. The deposit at the site of the Whabouchi Mine Project is of volcanic-sedimentary origin and consists of a spodumene-bearing pegmatite. The terrain elevation at the mine site ranges from 50 to 75 meters.

The climate of the region is subarctic cold continental, with mean daily temperatures of -20 celcius in January and 17 celcius in July. The mean annual precipitation recorded for the site is 77.2 centimeters of rain and snow.

The vegetation in the region is characterized by boreal forest composed of a mosaic of peat bogs and conifer and hardwood stands. Over half of the mine property is covered by recent burns or is in post-fire regeneration.

The mine site is located entirely within the Rupert River watershed, which covers an area of 43 400 $km^2$ and drains towards Rupert Bay. Upstream of the mine site is the watershed of the Nemiscau River, a tributary of the Rupert River. Various lakes and streams are located in the vicinity of the Project site, the two largest of which are Lac des Montagnes and Lac du Spodumène. There are two aquifers at the mine site: a surficial aquifer and a regionally important fractured bedrock aquifer.

The proponent recorded 13 species of fish in the local study area, including Lake Whitefish, Pearl Dace, Walleye and Brook Trout. Four amphibian species were recorded in field surveys conducted in the summer of 2012.

According to the proponent, hundred and thirty one bird species were observed or recorded at or near the site, including the Common Nighthawk, which is protected by the federal government under the *Species at Risk Act*.

Three species of large mammals are likely to be present in the study area, Moose, Caribou and Black Bear,.ten species of small mammals were observed, including the Little Brown Myotis and Northern Myotis , which were recently designated endangered under the *Species at Risk Act*.

## 5.2 Human Environment

The Project is located 30 kilometers east of the Cree Nation of Nemaska and 280 kilometers north-northwest of the municipality of Chibougamau in the Nord-du-Québec administrative region, which is occupied by Jamesian, Cree and Inuit communities. In 2011, the Nord-du-Québec region had a total of 42 330 inhabitants, including 7 541 in the municipality of Chibougamau, 772 in the Cree Nation of Nemaska and 3 467 in the community of Mistissini.

The territory is governed by a number of organizational and administrative structures established under various acts and agreements, including the James Bay and Northern Quebec Agreement, which provides for the subdivision of the territory into Category I, II and III lands. The levels of exclusive hunting, fishing and trapping rights granted to the Cree are established on the basis of each category. The local study area is located on Category III lands, where the Cree have the exclusive right to harvest certain aquatic species and certain furbearing animals, but not to the exclusion of non-Aboriginal users, who may hunt and fish on the lands for recreational purposes.

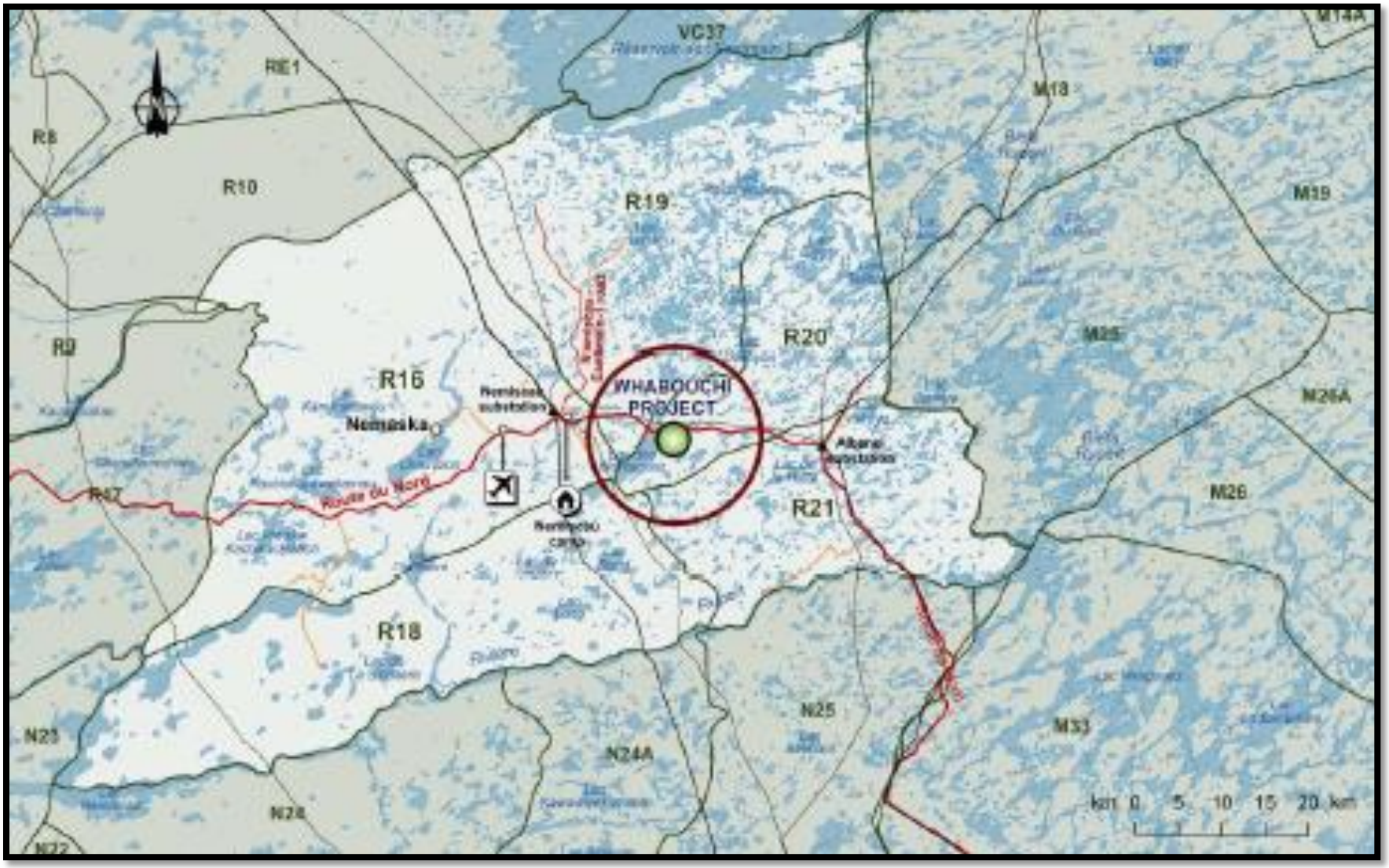
The Grand Council of the Crees (*Eeyou Istchee*), together with the Cree Nation Government as administrative entity, represents the Cree and has the power and authority to promote, coordinate and administer programs designed to protect the traditional way of life, Cree culture and community development.

The Project site is located within the boundaries of trapline R20 (see Figure 6), in which trapping activities are focused on the area around Lac des Montagnes and along the Nemiscau River. The trapline holders fish, trap furbearer in winter, hunt large game in fall, hunt goose in spring, and pick berries, wood and medicinal plants. Trapline R20 is characterized by hunting camps, snowmobile trails, valued sites, portage trails and navigable streams. The Bible Camp, a cultural camp that welcomes families from Nemaska during religious gatherings, traditional ceremonies and youth summer camps, is also located in the area.

Hunting camps used by the Cree are also found near the mine site along the Route du Nord, which runs through the mine site.

Close to 25 percent of all jobs in the Cree communities within the Nord-du-Québec administration region are directly tied to the primary sector (hydroelectricity, forests, and mineral resources). However, the community of Nemaska is an important administrative center for the territory of *Eeyou Istchee*, where 86 percent of all jobs are in health services, social and education services, and municipal or other government services sectors.

**Figure 6 Location of the Traplines in the study area**




Source: Environmental and Social Impact Statement, Nemaska Lithium, March 2013

# 6 Predicted Changes to the Environment

The Agency examined the changes that the Project is likely to cause to the environment, which are defined in the Act. The environment includes components of the Earth, specifically, land, water and air, including all layers of the atmosphere, all organic and inorganic matter and living organisms, and the interacting natural systems that include components referred to above.

The predicted changes to the environment resulting from the Project that could have a residual effect on the valued components outlined in Section 1.2.3 are associated with the atmospheric environment, groundwater and surface water, the noise environment and terrestrial environments (vegetation and wetlands).

## 6.1 Atmospheric Environment

This section examines air quality issues, particularly the dispersion of airborne particulate. The Agency considered the Project's effects on air quality given their potential impacts on fish and fish habitat and on the health of the Cree Nation of Nemaska.

The Project site is not located near a major population center or industrial activities. It is located near Route du Nord in an area with hunting, fishing and trapping camps used by the Cree Nation of Nemaska, as well as water bodies that serve as a source of drinking water. It is also located near the Bible Camp, a site that accommodates Nemaska Cree Nation families for religious gatherings and children for summer camps. The major existing atmospheric emission sources likely to affect air quality come from vehicles driven on Route du Nord. According to the Proponent, there do not appear to be any particular issues with air quality near the Whabouchi Project site at this time.

### 6.1.1 Proponent's assessment of environmental effects

*Anticipated Effects*

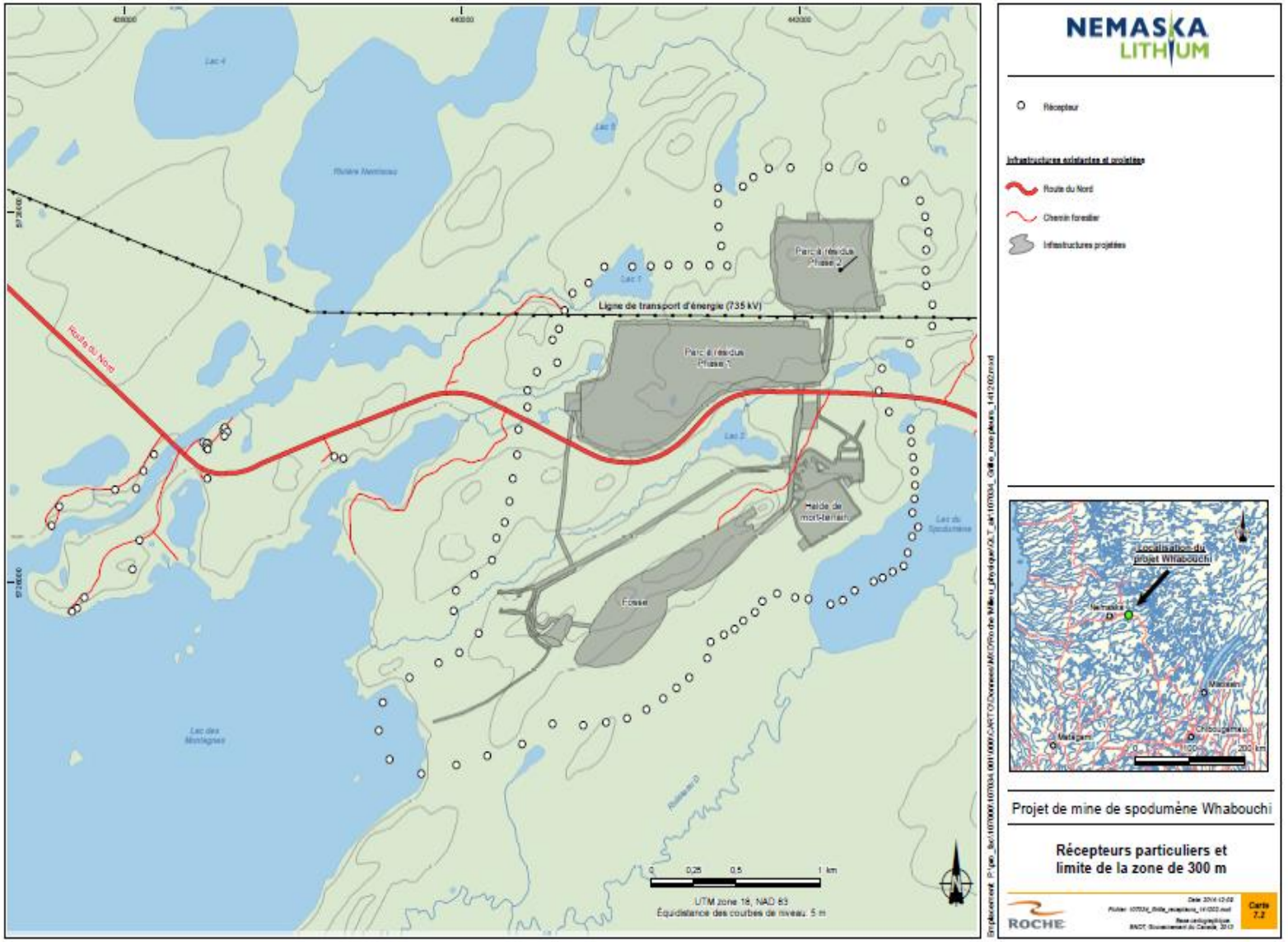
Air quality could be affected by suspended dust and gaseous contaminants generated by land clearing and site preparation, mining operations (ore extraction and processing), drilling, the use of generators and explosives, on-site traffic, and the transportation and storage of ore, waste rock and tailings. Poor maintenance and the idling of heavy machinery, vehicles and equipment could also generate gaseous compounds.

Atmospheric emission modelling was used to evaluate the potential impact of total and fine particulate emissions, gaseous compounds (sulfure dioxyde, nitrogen dioxyde, carbon monoxyde) and metal compounds (barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel and zinc) on air quality during the operational phase. The 23 receptors considered sensitive are the 22 Cree camps and the Bible Camp located near the mine site (see Figure 7). Years 7 and 16 were selected for modelling purposes since they are associated with the periods of most intense activity at the mine site. In year 7, the processing plant will be running at peak production, and the rate of ore and waste rock extraction from the pit will be higher than in any other year in the Project's life cycle. In year 16, although waste rock extraction from the pit will be lower than in year 7, the second waste rock and tailings cell will be brought in use, and the processing plant production rate will remain at the peak level. Emission sources considered in the modelling are those associated with the various mine operations, particularly vehicle traffic, truck loading and unloading, blasting in the pit, wind erosion and

vehicle/heavy equipment emissions. In its modelling, the Proponent considered mining activities performed simultaneously or more frequently than is actually the case. This approach overestimates the frequency at which standards will be exceeded, but also provides a precautionary margin for the modelling results.

The modelling results show that all standards applicable to gas and metal contaminants would be met beyond a 300-meter radius of the mine facilities for the duration of the Project. However, the modelling also predicted several exceedances of the ambient air standards set out in the provincial *Clean Air Regulation* in relation to total particulate and a very small number of exceedances in relation to fine particulate. Exceedances would be less frequent in year 16 than in year 7, and would occur primarily in winter. Vertical dilution of contaminants tends to decrease in January, February and December, which could result in high contaminant levels during these winter months. Such levels would be present at a maximum distance of approximately 500 meter southeast of the mining area. The modelling showed only one exceedance in a single year at the Cree camps and Bible Camp. However, with the implementation of the proposed mitigation measures, the proponent does not anticipate any exceedances of the standards to occur for any contaminants (particles, gas and metals) at the site of the 23 sensitive receptors considered for modelling purposes, i.e., the 22 Cree camps and the Bible Camp.

**Figure 7 Specific air quality modelling receptors**




Source: Atmospheric Emissions Dispersion Modelling, page 40, map 7.2, Nemaska Lithium, December 2014

*Proposed Mitigation Measures*

The Proponent committed to implementing various mitigation measures to limit the adverse environmental effects on the atmospheric environment (Appendix A). These measures include measures designed to limit particle emissions through a dust management program, including the appropriate use of dust-control agents, speed limits of 30 kilometer per hour on the Project site, and progressive restoration of the waste rock and tailings pile.

The Proponent has committed to implementing a follow-up program for air quality around the mine facilities. The purpose of the follow-up program is to verify the results of the atmospheric emissions modelling and to monitor air quality near the mine site to allow for any necessary corrective action.

*Anticipated Residual Effects*

With the implementation of mitigation measures (Appendix A), the Proponent is of the view that the significance of the residual impact on air quality will be moderate. The intensity of the residual effect will be moderate due to a number of exceedances of air quality criteria that are anticipated near the mining zone. This effect is local in extent, will be felt for the life of the Project (moderate duration) and would be completely reversible given that air emissions will cease at the end of the Project.

### 6.1.2 *Views expressed*

*Federal authorities*

With respect to the Project's impact on air quality, Health Canada is of the view that if the contaminant concentrations measured during mining operations are similar to the modelled concentrations, the Project should not cause adverse health effects to neighboring Aboriginal populations. Environment Canada believes that a 95% reduction in dust levels through the application of the mitigation measures, as suggested by the Proponent, is overly optimistic. The use of this reduction rate in atmospheric dispersion modelling could underestimate the predicted air contaminant concentrations. Health Canada therefore considers it important to verify the accuracy of the modelling and the actual effectiveness of mitigation measures by means of the air quality monitoring program, especially at the location of sensitive receptors in the vicinity (e.g., hunting camps, Bible camp).

The Proponent did not submit an estimate of dust deposition in surrounding environments. In the absence of data, Environment Canada remains concerned about the potential effect of dust deposition (metals and non-metals) in the receiving environment, particularly in aquatic environments, such as Lac du Spodumène, which is located in the path of prevailing winds. Dustfall could also combine with discharges of metals and suspended solids from the effluent. According to Health Canada, the assessment of the long-term health effects of dustfall on metal concentrations in soil, water and traditional food sources should have been more exhaustive.

The Proponent committed to implementing mitigation measures and a dust management program to mitigate any dust emissions generated by the Project. It will also establish a follow-up program for air quality around the mine facilities to measure the impact of mining activities on air quality and to take any necessary corrective action to comply with the applicable standards. The Proponent also proposed follow-up of water quality in water bodies around the mine site, as discussed in Section 6.2 below.

*Aboriginal Groups*

The Cree Nation of Nemaska has expressed concerns about the possible toxicity of dust generated by the mining activities. These concerns are discussed in Section 7.5.

## 6.2 Groundwater and Surface Water

The Agency has considered the effects of the Project on the quantity of groundwater and surface water given their potential effects on fish and fish habitat, migratory birds and the health of the Cree Nation of Nemaska.

The mine site is located along two large lakes: Lac des Montagnes to the west, covering an area of 13 750 000 $m^2$, and Lac du Spodumène to the southeast, covering 610 000 $m^2$. The local study area also includes six low-flow streams and several small lakes (from 1 440 $m^2$ to 64 000 $m^2$). Stream A flows into the Nemiscau River, and streams B, C, D, E and F flow into Lac des Montagnes (see Figure 8). Groundwater primarily recharges through the infiltration of surface water and discharges into surface streams that flow into the Nemiscau River, Lac des Montagnes and Lac du Spodumène.

Studies conducted by the Proponent show that baseline surface water quality in the local study area is acidic (pH between 4.7 and 7). This is not consistent with the Quebec government surface water criteria or the Canadian Water Quality Guidelines for the Protection of Aquatic Life.[3] Exceedances of the criteria and guidelines have also been noted in the case of baseline dissolved oxygen, fluorides, C10-C50 petroleum hydrocarbons, mercury, aluminum, arsenic, beryllium, copper, iron, lead and zinc. The largest number of exceedances was observed in small lakes and streams near the site and involve pH, aluminum, mercury, lead, beryllium and dissolved oxygen. The Proponent's sampling revealed levels exceeding the bacteriological standards of the Quebec *Regulation Respecting the Quality of Drinking Water* for total coliforms.

The characterizations conducted by the Proponent show that the groundwater in the local study area is contained in two aquifers, one in surface deposits and the other in rock. According to the Quebec government groundwater classification guide (MDDEFP, 1999), the quality of groundwater in surface deposits in Quebec is not suitable for consumption (Category III[4]). The Proponent claims that groundwater in the bedrock fracture system could be used as a drinking water source, but would probably require treatment to make it potable.

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[3] The MDDEFP surface water quality criterion (2009) is pH 5 to 9.5 for acute exposure. For chronic exposure, the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME) recommend a pH range of 6.5 to 9.

[4] I Highly vulnerable and irreplaceable for a substantial or ecologically vital population.

II A Current drinking water source.

II B Potential drinking water source.

III A Not a drinking water source: hydraulic connection moderate to high; poor quality; cannot be purified or has insufficient quantity potential or cannot be considered an economically viable alternative, in whole or in part, to the current water source.

III B Not a drinking water source: hydraulic connection limited; poor quality; and cannot be purified.

### 6.2.1 Proponent's assessment of environmental effects

*Anticipated Effects*

**Water Volume**

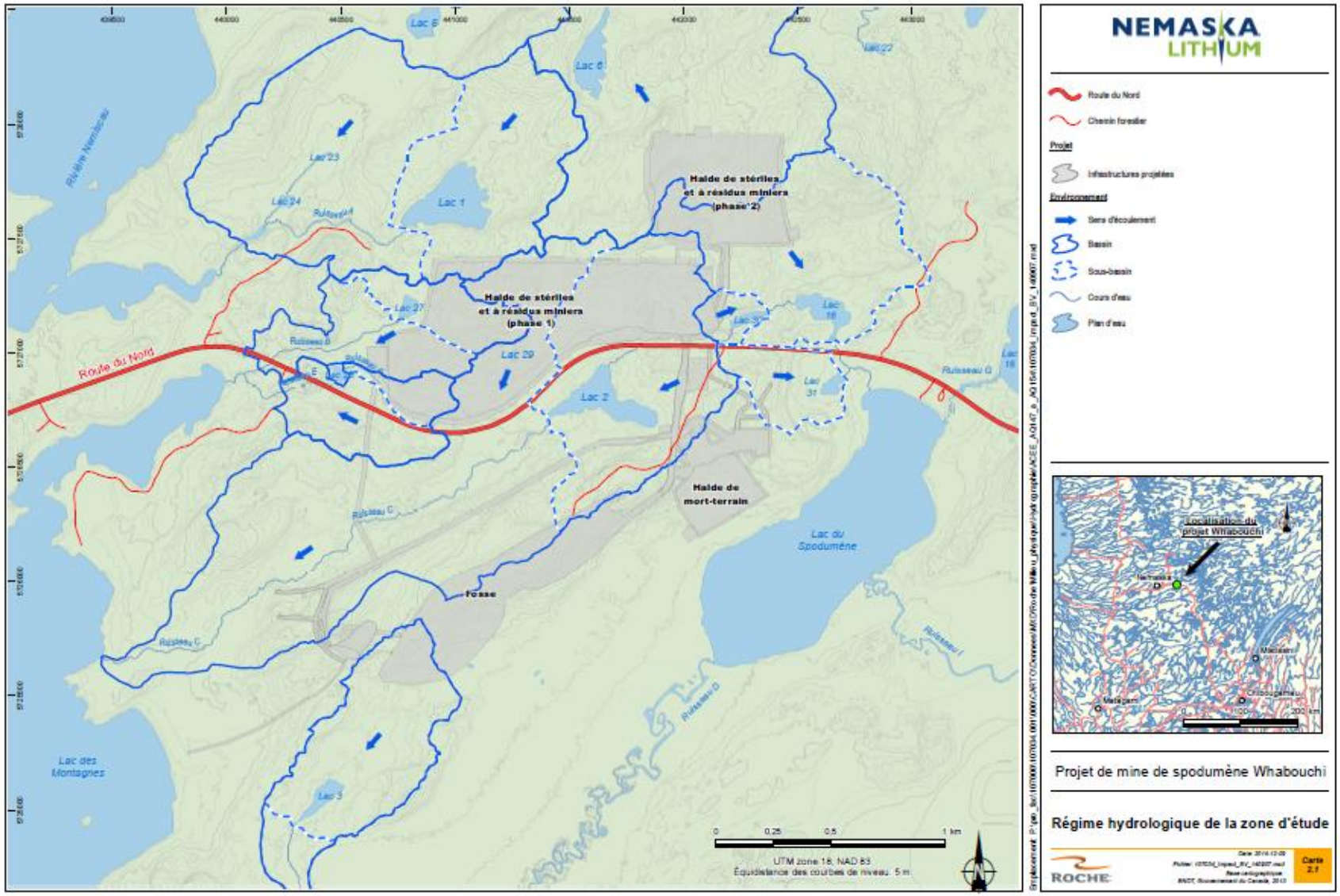
The assessment of the Project's impacts on surface and groundwater quantity targets the watersheds identified in Figure 8. Streams B, C, E and F and Lakes 2, 27 and 28 would be the most seriously affected by site preparation and mine development. Although there would be no encroachment on these lakes and streams, the installation of the waste rock and tailings pile and the construction of buildings and ditch system around this infrastructure would reduce the area of their watersheds and thus, their inflows. Lake 29, which covers an area of 1.44 $km^2$, would be destroyed for the installation of the waste rock and tailings pile; however, it has no surface hydrological connection to the other lakes or streams.

During the operation phase, water pumping to ensure mine dewatering would cause significant groundwater drawdown, which could have impacts on the hydrographic network and surrounding wetlands. Including the ditch, the total estimated area of the drawdown area would reach 4.06 $km^2$.

Stream C and Lake 2 would be affected by the combined effect of groundwater drawdown and watershed reduction resulting from the presence of the mine facilities.

Tables 3 and 4 present the current and anticipated water levels identified by the Proponent for the lakes and streams affected by the Project.

**Figure 8 Location of Lake and Stream Watersheds**




Source: Appendix 148.1, map 2.1, Nemaska Lithium, December 2014

### Table 3 Current and Anticipated Water Levels in the Major Streams Affected

| Stream | Average Depth (cm) | | | Average Annual Flow (l/s) | | |
|---|---|---|---|---|---|---|
| | Initial | Planned | Loss (cm) | Initial | Planned | Reduction % |
| Stream B | 5 | 4 | 1 | 4.4 | 2.9 | 33 |
| Stream C* | | | | | | |
| Upstream | 5 to 12 | 0 to 6 | 5 to 7 | 13.3 | 1.2 | 91 |
| Central | 8 to 19 | 0 to 12 | 5 to 8 | 25.4 | 4.9 | 81 |
| Downstream | 9 to 21 | 6 to 17 | 3 to 4 | 41.0 | 20.2 | 51 |
| Stream E | 15 | 14 | 1 | 5.3 | 4.2 | 21 |
| Stream F | 6 | 2 | 4 | 1.3 | 0.1 | 92 |

*The Proponent performed a monthly assessment of the anticipated drop in water levels and water flows in Stream C.

Source: Adapted from the Proponent's responses to CEAA requests for clarification, Nemaska Lithium, December 2014

### Table 4 Current and Planned Water Levels of Major Lakes Affected

| Parameters | Lake | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Lake 2 | | Lake 3 | | Lake 27 | | Lake 28 | | Lake 30 | |
| Lake Area ($m^2$) | 47,247 | | 11,586 | | 5,453 | | 2,315 | | 6,319 | |
| Water Volume ($m^3$) | 62,576 | | 36,609 | | 8,135 | | 1,370 | | 8,746 | |
| Average Depth (m) | 1.4 | | 2.9 | | 1.4 | | 0.6 | | 1.4 | |
| Maximum Depth (m) | 4.2 | | 5.3 | | 4.4 | | 1.2 | | 4.9 | |
| | Initial | Planned | Initial | Planned | Initial | Planned | Initial | Planned | Initial | Planned |
| Watershed Area ($km^2$) | 0.70 | 0.23 | 0.43 | 0.37 | 0.15 | 0.05 | 0.07 | 0.01 | 0.05 | 0.03 |
| Decrease in Watershed Area (%) | 67 | | 13 | | 67 | | 83 | | 36 | |
| Outgoing peak flow ($m^3/s$) | 0.669 | 0.202 | 0.444 | 0.384 | 1.198 | 0.076 | 0.085 | 0.039 | 0.088 | 0.066 |
| Water level reduction (cm) | 14 | | 2 | | 7 | | 16 | | 3 | |

Source: Adapted from the Proponent's responses to CEAA requests for clarification, Nemaska Lithium, December 2014

**Water Quality**

Changes in surface and groundwater quality could result from sediment loading to lakes and streams, potential acid mine drainage, metal leaching or contamination carried by chemical or bacterial products.

During the construction phase, site preparation and development work could cause erosion, increase the quantity of suspended solids and thus alter water quality in the following sub-watersheds:

- Stream A: includes Lake 1;
- Stream B: includes Lakes 27 and 28 and Streams E and F;
- Stream C: includes Lake 2;
- Stream D: includes Lac du Spodumène and Lakes 3, 16, 30 and 31.

During the operational phase, water quality in Lac des Montagnes could be affected by the discharge of mine effluent, since the final discharge point for mine water from the retention basins would be located in the lake.

The Proponent states that according to the modelling study of the mine effluent dispersion plume in Lac des Montagnes, the anticipated low level of contaminants in the effluent and the presence of a mixing area at the discharge site would make it possible to comply with the receiving environment requirements, whether under the government of Quebec Guideline 019 or the federal *Metal Mining Effluent Regulations*. The Proponent has undertaken with the Government of Quebec to install a water treatment unit at the outlet of the mine water retention basin for preventive purposes. This unit could be quickly brought online if water quality standards are not met.

Tests by the Proponent indicate a low potential for acid drainage from waste rock and tailings given that they contain, on average, 0.20% to 0.14% sulphides, respectively. The ore would have no potential to generate acid given that its sulphide content ranges from 0.04% to 0.06%, below the level specified in Quebec's Guideline 019.[5] Ore leaching tests show levels below the Government of Quebec's acute toxicity criteria for protecting aquatic life, except for beryllium. According to the Proponent, the beryllium test result is very conservative because it magnifies field conditions. The Proponent therefore claims that the actual beryllium levels in the leachate of the temporary ore pile are below the Quebec acute toxicity criterion. The Proponent's tests also indicated a low probability of metal leaching (uranium, mercury, copper, aluminum and iron) in surface water and groundwater.

Furthermore, the application of dust control agents and de-icing salts on roads could contribute to a change in water quality. However, the Proponent stated that considering the limited use of de-icing salts and dilution and dispersion phenomena, a significant change in water quality caused by de-icing salts is unlikely.

The use of explosives in mining operations could lead to the presence of ammonia and nitrate in water bodies and streams near the mine site. However, the Proponent opted for an emulsion-type explosive,[6] which has very

[5] According to *Directive 19 sur l'industrie minière* (MDDEFP, 2012), a mine material (waste rock, ore or processing residues) is unlikely to exhibit acid-generating potential if the sulphur content is below 0.3%.

[6] Emulsions contain 73% ammonium nitrate, 10% sodium nitrate, 10% water, 5% oil and 1% emulsifier.

limited water solubility and contains 20.6% less nitrogen than Ammoniac Nitrate Fuel Oil,[7] which is generally used and more water soluble.

Domestic wastewater discharge could also lead to bacterial contamination of surface water. According to the Proponent, these effects would be avoided given that the surface hydric system and septic tanks would be periodically emptied by an authorized company.

During the decommissioning phase, the dismantling of mine infrastructure (ditches, buildings and ponds) and shoreline work carried out on the littoral of Lac des Montagnes for the dismantling of the mine effluent conduit would occasionally result in increased turbidity and suspended solids levels.

*Proposed Mitigation*

The Proponent undertakes to implement various mitigation measures to reduce the adverse environmental effects on groundwater quality and on the quantity and quality of surface water (Appendix A). They include the following:

- Fully recycle and recirculate process water.
- Provide a drainage system and runoff management plan for all contaminated water and water in contact with the mine site and channel it to the mine water retention pound.
- Install a water treatment unit at the outlet of the mine water retention pound for preventive purposes.
- Minimize land clearing, especially along the shores of lakes and streams, and restore disturbed areas.

The Proponent undertakes to conduct the following monitoring in connection with water resources:

- Monitoring of groundwater quality and levels during construction, operation and post-closure periods in accordance with the requirements of Quebec government Guideline 019. Monitoring will include the creation of an observation well and piezometric monitoring upstream and downstream of facilities considered at risk. If criteria are exceeded or if readings are abnormal, the necessary measures will be taken to correct the situation.
- Monitoring of the final effluent discharge to Lac des Montagnes in accordance with the requirements of the federal Metal Mining Effluent Regulations and Quebec Guideline 019. Monitoring will detect changes in water quality and allow for appropriate corrective action as necessary.
- Given the proximity of the infrastructure, monitoring of surface water quality for aquatic life, covering the major lakes and streams potentially affected by the Project, i.e., Lakes 2, 27 and 28 and Streams C and F, and at control stations located in lakes upgradient from the Project or in a watershed unaffected by it, such as Lake 18.

[7] ANFO contains 95% ammonium nitrate and 5% diesel oil.

*Anticipated Residual Effects*

**Water Volume**

With the implementation of the mitigation measures (Appendix A), the Proponent is of the view that the significance of the residual impact on water quality would be moderate. The surface hydraulic dynamic would change slightly over the mine site as a whole, but the combined impact of groundwater drawdown could affect several water bodies and streams in the sub-watersheds of streams A, B, C and D. Changes to the hydraulic system would be noticeable outside the Project area and the impact would be long-lasting considering that it would persist after the decommissioning phase. The Proponent undertakes to provide compensation for the loss of Lake 29 through the wetlands and bodies of water compensation programs provided for under the Quebec government *Act Respecting Compensation Measures for the Carrying Out of Projects Affecting Wetlands or Bodies of Water* (2012, c. 14).

**Water Quality**

With the implementation of mitigation measures (Appendix A), the Proponent is of the view that the significance of the residual impact on water quality would be moderate due primarily to the amount of suspended solids in surface water. It is also of the view that the extent of the impact will be local and the duration will be moderate will be felt for the life of the Project given that water quality will return to its original condition once the Project ends.

### 6.2.2 *Views expressed*

*Federal authorities*

In response to requests from Natural Resources Canada and Fisheries and Oceans Canada, the Proponent provided additional information on the groundwater drawdown modelling used to assess the anticipated flow and levels of lakes and streams. Based on this information concerning the hydrologic connection between surface water and groundwater and the modelling of the Project's effects on the reduction of surface water inflows, Fisheries and Oceans Canada was able to assess the potential impacts on fish habitat resulting from changes in the water balance of the watersheds included in the Project's area of influence, as shown in Section 7.1. The Proponent has undertaken to monitor surface water volumes and levels in certain lakes and streams (see Section 7.1).

Environment Canada expressed concerns about the risk of overflows of the mine water ponds during heavy flooding throughout the Project's life cycle. The Proponent has increased the capacity of these ponds to ensure they can accommodate floods who occurs every 100 years.

According to Environment Canada and Natural Resources Canada, there remains some uncertainty regarding the characterization of the various excavated materials (sample representativeness) and the results of leaching tests. Furthermore, Government of Quebec water quality criteria were not met for three metals during leaching tests: aluminum, copper and beryllium. Environment Canada is of the view that the Proponent should pursue the material characterization program during the operation phase to identify any new leachable substance that might enter the water and take the results into account when developing its follow-up program. It should also establish groundwater protection measures if required. Environment Canada and Natural Resources Canada

more specifically recommended that the results of the *in situ* kinetic test using the "barrel" procedure be performed to confirm the relevance of installing a membrane beneath the waste rock and tailings.

A discharge limit was set for copper under the *Metal Mining Effluent Regulations*, and aluminum is one of the substances to be monitored through Environmental Effects Monitoring studies as prescribed by the same Regulations. Despite information submitted by the Proponent to support the non-toxicity of lithium, Environment Canada remains concerned about the possible discharge of lithium into the aquatic environment. Lithium is listed on the Domestic Substances List of the *Canadian Environmental Protection Act, 1999*, and is therefore considered to have intrinsic properties that are toxic to the environment, particularly to aquatic organisms. Environment Canada has ongoing concerns about the contamination risks associated with lithium and beryllium, two substances not covered by the requirements of the *Metal Mining Effluent Regulations*. It recommends that these substances be added to pre-discharge effluent monitoring, subject to the same requirements as the other parameters specified in Schedule 5 of the Regulations, namely, four times a year.

In addition to complying with the requirements of government of Quebec's Guideline 019 and the *Metal Mining Effluent Regulations*, the Proponent has undertaken to monitor the following substances at the effluent outfall and in the receiving environment, i.e., Lac des Montagnes: beryllium (Be), lithium (Li), cesium (Cs), rubidium (Rb), chromium (Cr), potassium (K), sodium (Na), magnesium (Mg), manganese (Mn), petroleum hydrocarbons (C10-C50). The Proponent has also undertaken to install a water treatment unit at the mine water pond outfall and to put it into operation, as necessary, to quickly respond to any exceedances detected.

### *Aboriginal Groups*

Members of the Cree Nation of Nemaska are concerned about possible human health problems that could result from eating fish or waterfowl that could be contaminated by the water. The Proponent's responses are presented in Section 7.1.

### *Public*

The Société pour vaincre la Pollution (SVP) voiced concerns about potential water contamination at the mine effluent discharge site, resulting either from leaching of ore or the use of ammonium nitrate-based explosives, and requested an independent validation of the Proponent's models. The modelling results were found to be acceptable by Natural Resources Canada and Environment Canada, although some monitoring will have to be done to ensure the accuracy of the modelling and take corrective action as necessary for water management in order to comply with the regulations.

Société pour Vaincre la Pollution questions the application of the *Metal Mining Effluent Regulations* to the Whabouchi mine, stating that the mine is a rare earth mine and indicating that it is concerned about the possible discharge of uranium to water. Environment Canada considers that the *Metal Mining Effluent Regulations* apply to this mine since it will produce a concentrated metal, and specified that all harmful substances listed in Schedule 4 of the *Metal Mining Effluent Regulations* are covered by the general prohibition in subsection 36(3) of the *Fisheries Act*, which prohibits the deposit of harmful substances into water frequented by fish.

## 6.3 Noise Environment

The effects of the Project on the noise environment were considered by the Agency due to their potential effects on use of the territory and the heritage of the Cree Nation of Nemaska, on migratory birds and on species at risk.

The noise environment at the Project site is attributable to natural noise (wind, wildlife, etc.) and human noise (vehicle traffic on Route du Nord and aircraft at the Nemiscau airport). The actual noise levels recorded at the Project site were 43.5 decibels A during the day and 36.4 decibels A during the night, which corresponds to a relatively quiet environment. Sound levels authorized in the *Note d'instructions 98-01 sur le bruit* published by the MDDEFP, June 2006: 55 decibels A daytime and 50 decibels A nighttime.

### 6.3.1 Proponent's assessment of environmental effects

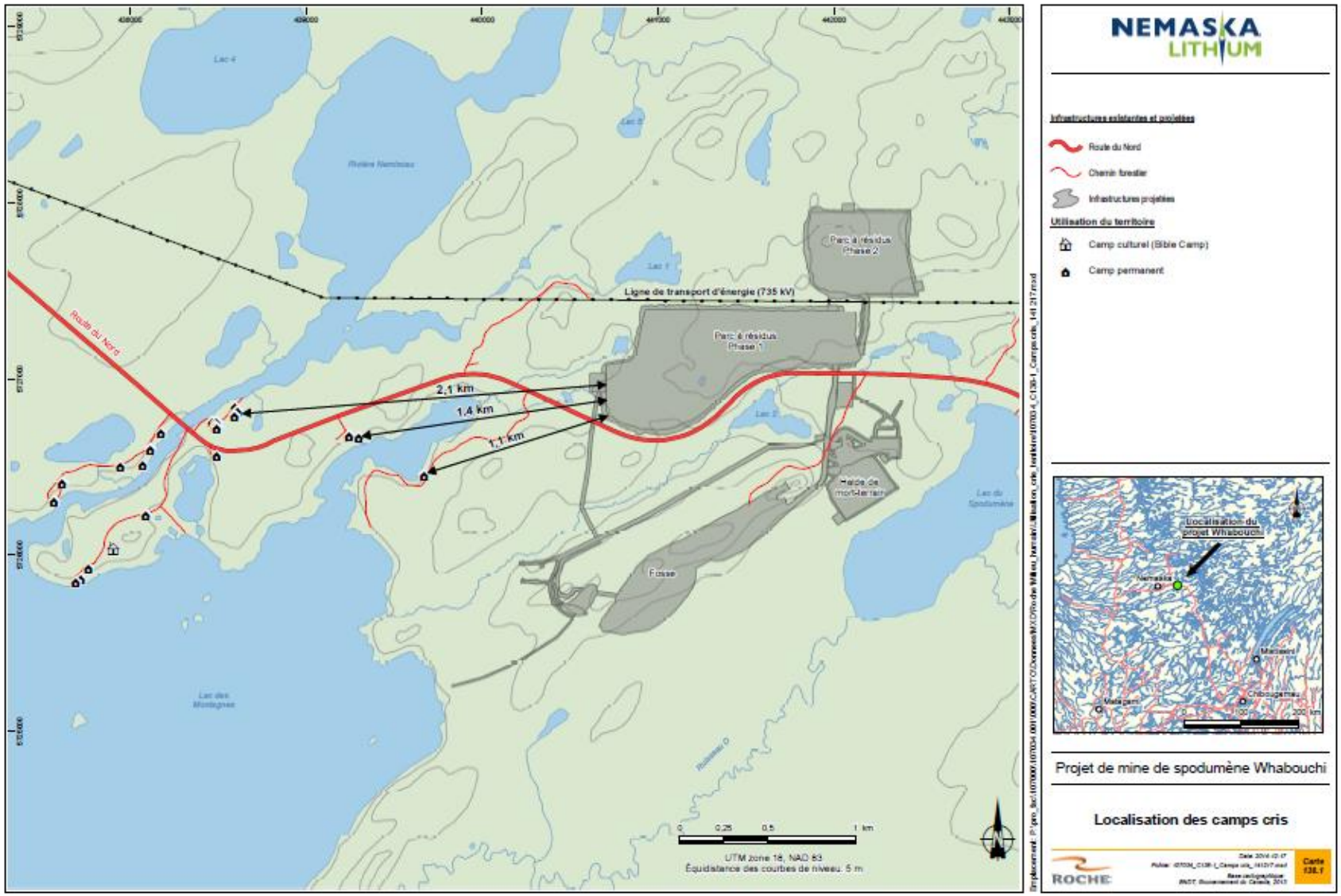
*Anticipated Effects*

The Cree camps located closest to the mine site are 1 to 2 km from the waste rock and tailings pile and approximately 3 km from the Bible Camp (see Figure 9). Modelling of the Project's effects on the noise environment made it possible to assess the potential effects during all phases of the Project on the 23 sensitive receptors. The Category III zoning established under the government of Quebec *Note d'instructions 98-01* was used to determine the noise limits applicable to the 23 receptors. This zoning category corresponds to an area intended for commercial use or recreational parks with daytime noise limits of 55 decibels A and nighttime limits of 50 decibels A. In terms of the noise created by blasting activities, the limit is 128 linear decibels.

The sources of Project effects on the noise environment include the use of equipment and heavy machinery, drilling and blasting, the dismantling of mine site infrastructure, as well as vehicle traffic at different phases of the Project.

According to the modelling results, the anticipated noise levels will be lower than the government of Quebec authorized limits and will not lead to a significant increase in percent highly annoyed (one of the indicators used by Health Canada for noise assessments).

**Figure 9 Location of Cree Camps and Bible Camp**




Source: Page 3-114, map 138.1, Nemaska Lithium, December 2014

*Proposed Mitigation Measures*

Changes in the location of the waste rock and tailings pile made it possible to move one major source of noise generated by the Project farther away from sensitive receptors.

Although the Proponent does not anticipate any major significant effects resulting from the Project on sound perceived at the various sensitive receptor locations, it plans to implement certain additional mitigation measures, including an equipment maintenance plan and execution of the noisiest activities during the day.

The Proponent undertakes to implement an acoustic monitoring program during the construction and operation phases to ensure compliance with noise levels, to verify mitigation measures and to make any necessary corrections.

*Anticipated Residual Effects*

With the implementation of mitigation measures, the Proponent is of the view that the residual effect would be moderate. Considering that the noise levels would meet the limits authorized by the Government of Quebec at all times and would not exceed the limit recommended by Health Canada, the Proponent believes that the magnitude of the effect would be low and the extent would be local. The duration of the effect would be moderate given that the noise environment would return to what it was prior to the Project.

### 6.3.2 *Views expressed*

*Federal authorities*

Given the noise-related concerns of area users, the Agency asked the Proponent to quantify the significance of the Project's impacts on the noise environment and to suggest mitigation measures. In response to this request, the Proponent updated the noise environment modelling following changes in the location of mine infrastructure. The results confirm no significant effect on the noise environment. Health Canada believes that if noise levels measured in the field during mine operations are similar to the modelled levels, the Project should not have harmful effects on the health of the Cree Nation of Nemaska. According to Health Canada, it is very important to verify the modelling results and the effectiveness of mitigation measures in order to validate the findings of the noise environment impact study and to implement additional mitigation measures if necessary.

Environment Canada considers that the noise generated by mining activities during all phases of the Project may be a source of disturbance to migratory birds, including species at risk. This issue is discussed in more detail in Section 7.2.

*Aboriginal Groups*

The Cree Nation of Nemaska is concerned that blasting noise could bother users of the Bible Camp, a calm and peaceful site enjoyed by the community. It is also concerned that wildlife will be disturbed by the noise and will leave the area targeted by the Project. Section 7.6 contains responses to these concerns.

## 6.4 Terrestrial Landscape

The Project's effects on terrestrial and wetland environments have been considered by the Agency given their potential effects on use of the land and on the physical and cultural heritage of the Cree Nation of Nemaska, and on migratory birds and species at risk.

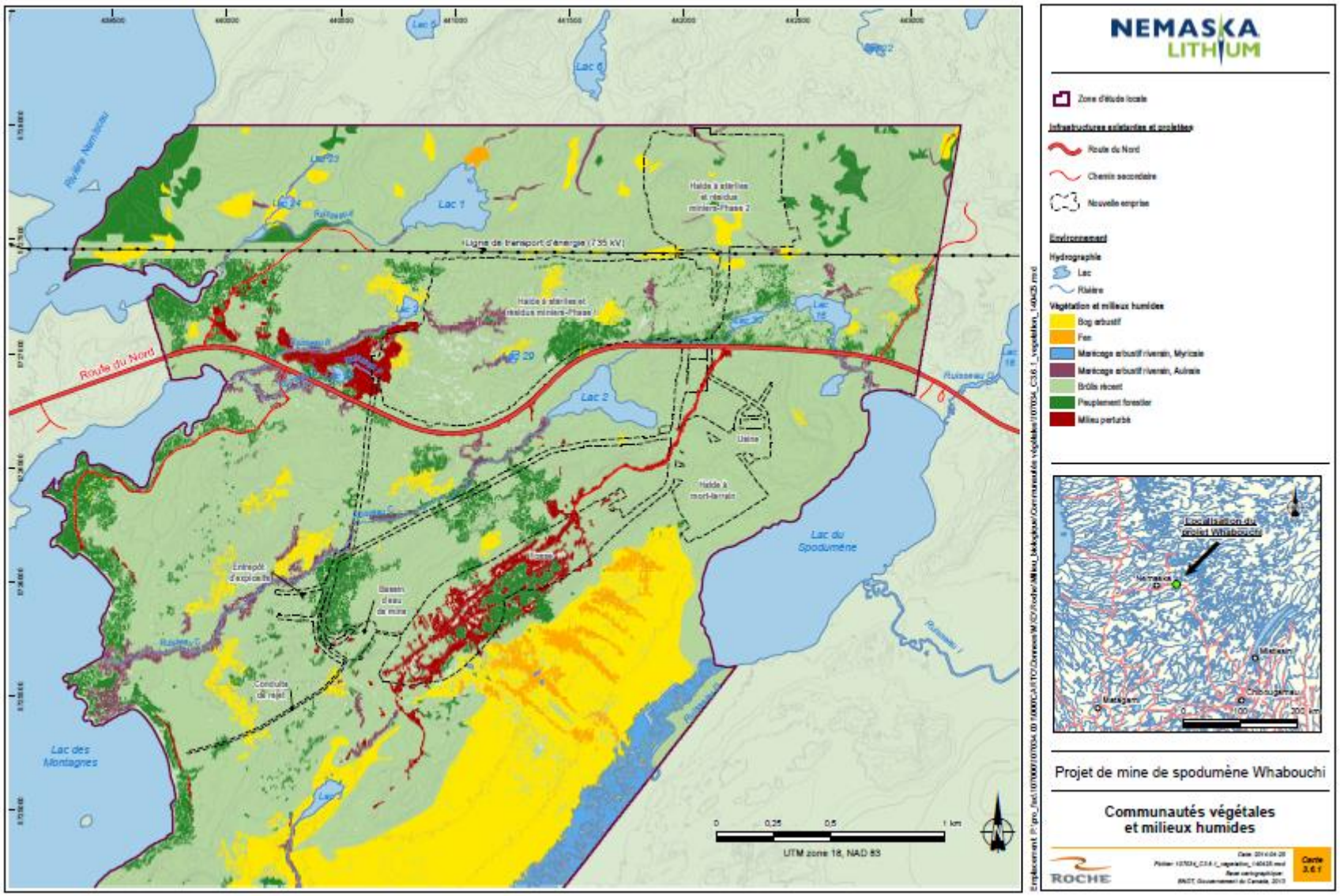
Terrestrial environments include forest stands (conifer and deciduous), recent burns caused by forest fires in 2002 and areas previously disturbed by land clearing during the operation phase, as well as temporary storage areas for construction materials, among others. Wetlands include bogs and fens, as well as shoreline shrub swamps. The Lac du Spodumène bog is located to the south of the pit. Figure 10 shows that the site is located in an area covered largely by recent burns.

The study area contains no unique or significant forest ecosystems or protected areas.

Terrestrial and wetland environments are suitable habitats for mammals and birds. Several small (furbearing animals, micromammals and bats) and large (caribou, moose and black bear) wildlife species use the terrestrial and wetland habitats present in the study area.

Burns, disturbed environments and bogs provide suitable habitat for several bird species designated under Species At Risk Act (see Section 7.3). Wetlands are likely used by birds for feeding, nesting, breeding, rearing and resting.

**Figure 10 Characterization of the Terrestrial Environment of the Whabouchi Project**




Source: Nemaska Lithium, April 2014

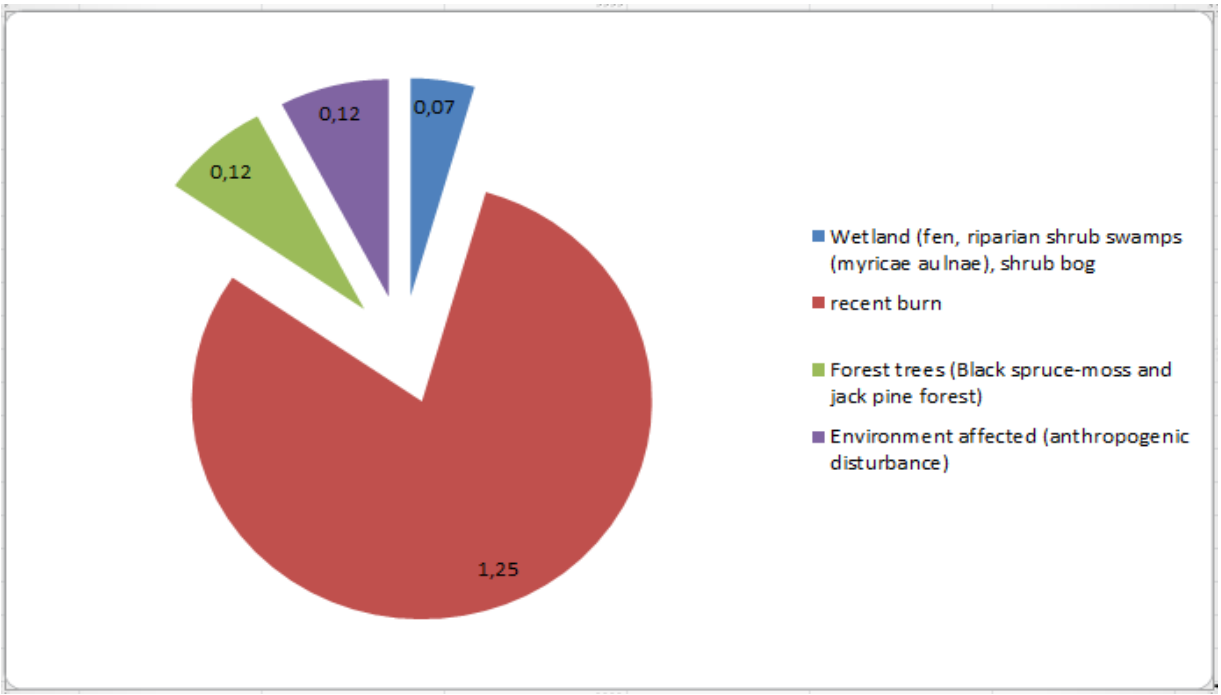
### 6.4.1 Proponent's assessment of environmental effects

*Anticipated Effects*

The Proponent believes that activities involved in site preparation (clearing and grading), pit excavation, construction and dismantling of mine site infrastructure, the management of unconsolidated deposits, installation of the waste rock and tailings pile and mine dewatering would result in the loss of terrestrial and wetland environments. As Section 6.2.1 describes, pumping would cause a significant drawdown of groundwater, which could affect the Lac du Spodumène bog. In the summer of 2015, the Proponent will update the geotechnical study to identify the nature of the substrate and hydraulic connections between the bog and the aquifer in order to determine the effect of the drawdown.

In all, the Project would cause the temporary loss of approximately 1.55 $km^2$ of habitat, including 1.25 $km^2$ of recent burns (see Figure 11). After restoration of the mine site, the permanent loss of 0.28 $km^2$ of vegetation would result from the presence of the flooded pit and piles, which would destroy 0.074 $km^2$ of wetlands (including Lake 29 and its marsh).

**Figure 11 Area ($km^2$) of Terrestrial and Wetland Environment Affected by the Whabouchi Project**




Source: Adapted from Figure 7-1, page 7-6 of the Environmental and Social Impact Assessment, Nemaska Lithium, March 2013

Habitat losses related to site preparation and development range from 0.16 $km^2$ and 1.55 $km^2$ for furbearing animals, micromammals, small bats and small and large mammals (see Table 5).

The destruction of Lake 29 to develop the waste rock and tailings pile would have impacts on a breeding pair of waterfowl. Preparation and development of the mine site could also affect aquatic birds through the loss of wetlands. According to the Proponent, the area lost for certain landbirds (grouse, crows and woodpeckers) is

negligible because they could move to similar environments along the edge of the mine site or elsewhere in the study area. Losses likely to affect birds are listed in Table 5.

According to the Proponent, changes to habitat caused by mine infrastructure could benefit certain species. The adverse impacts caused by the loss of breeding habitat during the construction phase could be partly offset by a temporary gain in anthropogenically created habitat (stripped sites, roadsides and piles) for Killdeer, Spotted Sandpiper, Belted Kingfisher, Tree Swallow, Common Nighthawk and Common Raven. This gain would be temporary since the mine site would be re-vegetated upon Project closure.

The change in terrestrial and wetland environments caused by the waste rock and tailings pile could alter landscape elements such as views from the Bible Camp and hunting camps.

### Table 5 Area of Potential Mammal and Bird Habitat Likely to be Affected by the Whabouchi Mining Project

| Mammal | Area affected ($km^2$) |
|---|---|
| Small wildlife * | 1.55 |
| Migrating Caribou | 1.41 |
| Woodland Caribou | 0.16 |
| Moose | 1.44 |
| Black Bear | 1.55 |
| Wild birds | |
| Waterfowl | 0.0016 |
| Waterbirds | 0.075 |
| Landbirds | 1.48 |
| Olive-Sided Flycatcher | 1.27 |
| Common Nighthawk | 1.43 |
| Short-Eared Owl | 0.004 |
| Rusty Blackbird | 0.07 |

Furbearing animals (beaver, mink, fox, etc.), micromammals (voles, mice, shrews, etc.) and bats

*Proposed Mitigation and Follow-Up Measures*

The Proponent undertakes to implement a number of mitigation measures to limit the adverse environmental effects on terrestrial and wetland environments (Appendix A). They include the following:

- Establish a committee composed of the Project's major stakeholders to develop a wetland loss compensation plan.
- Clearly identify work areas to reduce the size of terrestrial and wetland environments affected.
- Keep land clearing to the minimum necessary for the restoration of disturbed areas.
- Carry out progressive revegetation of the waste rock and tailings pile (as operating conditions allow).

The Proponent undertakes to perform the monitoring specified below in connection with habitat loss:

- Monitor the effectiveness of revegetation of disturbed sites following progressive restoration and mine closure. Reseeding work will be performed in areas of insufficient regrowth.
- Monitor changes in the hydrological, ecological and habitat functions of the Lac du Spodumène bog and adjacent shrub marsh to determine the actual effect of mine dewatering. As applicable, the Proponent undertakes to recommend suitable compensation measures for submission to the government of Quebec.

*Anticipated Residual Effects*

With the implementation of mitigation measures (Appendix A), the Proponent is of the view that the significance of the residual impact of the Project on the terrestrial environment (forest stands, burns and stressed environments) is moderate. The magnitude of the residual impact would be moderate given that the impact would occur only once, during the construction of mine infrastructure, and that most of the area covered by land vegetation at the mine site would be affected temporarily or permanently. The extent of the effect would be local since the effect would be limited to the mine site, primarily the site of the mine infrastructure and facilities. The duration of the effect would be long-lasting since the land vegetation in the pit area would be lost. The effect would be irreversible, considering that the land vegetation at the mine site would be destroyed, although the loss would be offset by the restoration work planned during the decommissioning phase.

The Proponent is of the view that the significance of the residual impact on wetlands would be low, primarily because the extent of the effect would be site-specific since it would affect a limited area of the mine site, and partial compensation for the wetlands would be made under the government of Quebec *Act Respecting Compensation Measures for the Carrying Out of Projects Affecting Wetlands or Bodies of Water* (2012, chapter 14). The duration of the effect would be long-lasting since wetland restoration would require several years. The effect is partly irreversible given that wetland environments would be destroyed to carry out the Project and would not be restored.

Given the abundance and common nature of the terrestrial and wetland environments regionally, the Proponent finds that the anticipated losses in these environments will have no significant impact either locally or regionally.

Furthermore, the Proponent undertakes to compensate for wetland losses in order to meet the requirements of Quebec regulations. A committee would be created to develop a compensation program. If a decision is made to proceed with wetland development, the relevant activities will be subject to a monitoring starting at the construction phase. The monitoring program would be established within the framework of the application of the Quebec *Environment Quality Act*.

### 6.4.2 *Views expressed*

*Federal authorities*

To better assess the Project's effects on migratory bird species and species at risk, Environment Canada asked the Proponent to provide further details on anticipated wetland losses, particularly in terms of habitat function losses. The Proponent provided additional information discussed in Chapters 7.2 and 7.3.

Natural Resources Canada believes that the explanation of the methodology used to estimate water exchanges between streams and groundwater provided by the Proponent is incomplete and does not permit a satisfactory conclusion to be drawn as to the effects of pit pumping on the Lac du Spodumène bog. According to NRCan, the Proponent did not extensively document the hydrologic connection between the Lac du Spodumène bog and the underlying aquifer. However, the Proponent did characterize this bog in the field as being of the ombrotrophic type. This type of bog is fed only by precipitation, and in theory, would be unaffected by any change in the hydrogeology below the bog. According to the Proponent, exchanges between the local aquifer and groundwater in the bog could be limited or non-existent. The Proponent undertakes to gather additional data on the nature of the substrate underlying the bog and on the local hydrology during the geotechnical study update planned in the summer of 2015 to further clarify the potential impact of groundwater drawdown on the bog and on other biological components, such as plants and wildlife (including migratory birds).

*Aboriginal groups*

Many members of the Nemaska community have expressed concerns that use of the Bible Camp will be disturbed by the visual impact caused by the presence of mine infrastructure in the terrestrial environment. See Section 7.6.2 for the Proponent's response to this question.

# 7 Predicted Effects on Valued Components

**Approach**

The Agency assessed whether the anticipated environmental changes related to the Whabouchi Project could affect the valued components selected in Section 1.2.3 and whether the Proponent's proposed mitigation measures would reduce these effects.

All of the mitigation measures proposed by the Proponent are specified in Appendix A. When necessary, the Agency identified mitigation measures that it considers key in order to find that the effects on valued components are not significant. These key mitigation measures recommended by the Agency to the Minister, are the basis for development of potential conditions. Appendix F presents a summary of the anticipated residual effects for each federal valued component, as well as the Agency's determination of the significance of the effects following mitigation measures.

## 7.1 Fish and Fish Habitat

### 7.1.1 *Proponent's assessment of environmental effects*

According to information obtained by the Proponent from the Commission régionale sur les ressources naturelles et le territoire de la Baie-James, 33 species of freshwater fish occur in the James Bay hydro-geographic region. During inventory work by the Proponent in the mine area in 2010, 2011 and 2012, only 13 fish species were captured. Among them, Brook Trout, Northern Pike, Yellow Perch, Walleye, Burbot and Lake Whitefish are considered sport fish, and White Sucker and Longnose Sucker are valued in traditional Cree culture.

Figure 8 shows the major lakes and streams in the study area. The largest lakes comprising fish habitat are Lac des Montagnes, in which White Sucker, Longnose Sucker, Northern Pike, Lake Whitefish and Walleye occur, and Lac du Spodumène, in which Northern Pike, Lake Whitefish, Yellow Perch and Walleye occur. Several small lakes also support fish populations, particularly Lake 2, which contains brook trout and Lake 3, which contains Northern Pike.

The streams that constitute fish habitat in the study area are for the most part small, namely streams A, B, C, D, E and F (Figure 8). Few fish were captured during inventories in streams, except Stream C—the outlet of Lake 2 in which brook trout occurs. Other streams support Burbot, Northern Pike and Brook Stickleback populations. The only river in the Project area is the Nemiscau River, which supports primarily Walleye and Lake Whitefish. No effects are anticipated in this river given the remoteness of the site.

Various potential natural obstacles to fish movement were noted during the fish habitat characterization in Stream A, which flows into the Nemiscau River, and streams B, C and E, which flow into Lac des Montagnes. These obstacles correspond to sections of streams that flow underground or the presence of dense wood waste.

No mining infrastructure will be located in any stream or water body considered to be fish habitat. Only Lake 29 will be destroyed by the installation of the waste rock and tailings pile (Figure 8), although it is not considered

fish habitat given the absence of any hydrologic connection to the surface, an acid pH, hypoxic conditions and the absence of fish during characterization of the lake.

The Proponent stated that the results of kinetic tests and testing for acid water generation potential indicated that there would be no releases of harmful substances into water bodies used by fish from acid mine drainage.

### *Anticipated Effects*

The Project could have adverse effects on fish and fish habitat related to the following effects:

- The increased sediment load in water bodies;
- Contamination of water quality in aquatic environments;
- Increased pressure from fishing;
- Reduced inflow of water.

### *Increased sediment load in lakes*

Site preparation, primarily during the construction phase, could generate erosion in certain streams that provide fish habitat and could increase suspended solids in the streams. Those most likely to be affected are streams B, C, E and F given their proximity to the waste rock and tailings pile. Small streams near the processing plant and Lac du Spodumène could also be affected. Increased suspended solids in the water column could have physiological effects (i.e., gill damage, etc.), behavioural effects (i.e., decline in predation success, avoidance of turbidity zones, change in the abundance and diversity of prey, etc.) and effects on fish habitat (i.e., deposition on spawning substrate, localized water temperature increases, etc.).

### *Contamination of water quality in aquatic environments*

Runoff and leachate from the mine site, the use of residual and hazardous materials and fuel, the use of dust control agents or de-icing salts and the discharge of effluent into Lac des Montagnes all have the potential to impact water quality in aquatic environments near the site. The water bodies most likely to be affected are streams B, C, E and F, lakes 1, 2, 27, and 28, and Lac des Montagnes. All waters on the mine site will be redirected to the mine water settling pond and, lastly, to the mine effluent outfall in Lac des Montagnes.

Modelling of the mine effluent dispersion plume in Lac des Montagnes suggests a low potential for water quality contamination by effluent in this lake. The mine effluent outfall will be located 1.8 km from potential Walleye spawning sites located northeast of Lac des Montagnes. Therefore, no impact on these sites is anticipated. The major effect associated with the discharge of effluent is avoidance by fish. There is a risk that some species of fish, such as Lake Whitefish, will avoid the zone of initial dilution.

### *Increased Fishing Pressure*

The presence of workers could also increase fishing pressure on water bodies, particularly in Lac des Montagnes, Lac du Spodumène and the Nemiscau River, which could affect the abundance of fish populations.

### *Changes to Hydrological Regimes*

According to hydrogeological and hydrological modelling, the effects of surface water reductions would be more evident than those of groundwater drawdown. The variation in water levels for all lakes affected would be low

and within the natural range. Therefore, the Proponent believes that lacustrine habitat that could potentially be affected by the lowered water level would already be partly dried up under natural conditions.

The potential loss of fish habitat in littoral areas would primarily occur in Lakes 2, 27 and 28 and in Stream C (see Tables 6 and 7). The maximum area of fish habitat likely to dry up is estimated at 7,814 $m^2$, or 2,664 $m^2$ for water bodies and 5,150 $m^2$ for streams.

The Proponent is of the view that these losses will affect a total 5,498 $m^2$ of habitat used by species of interest to a recreational or Aboriginal fishery, including 750 $m^2$ in lakes 2 and 3 and 4,748 $m^2$ in Stream C (Table 6 and 7).

**Table 6 Overview of Fish Habitat Losses in Water Bodies Affected by the Project**

| Waterbody name | Area ($m^2$) | Maximum depth (m) | Volume ($m^3$) | Habitat function | Fish species | Anticipated decline in water level (m) | Fish habitat loss ($m^2$) |
|---|---|---|---|---|---|---|---|
| Lake 2 | 47,247 | 4.2 | 52,576 | Feeding | Brook trout | 0.14 | 470* |
| Lake 3 | 11,586 | 5.3 | 36,609 | Feeding, rearing and spawning | Northern Pike | 0.02 | 280* |
| SUBTOTAL LOSS OF FISH HABITAT USED BY SPECIES OF INTEREST TO A RECREATIONAL OR ABORIGINAL FISHERY* | | | | | | | 750* |
| Lake 27 | 5,453 | 4.4 | 8,135 | Feeding, rearing and spawning | Brook stickleback | 0.07 | 1 026 |
| Lake 28 | 2,315 | 1.2 | 1,370 | Feeding, rearing and spawning | No capture | 0.16 | 838 |
| Lake 30 | 6,319 | 4.9 | 8,746 | Feeding, rearing and spawning | Pearl dace | 0.03 | 50 |
| TOTAL LOSS OF FISH HABITAT | | | | | | | 2,664 |

* Loss of fish habitat in lakes frequented by species of interest to a recreational or Aboriginal fishery within the meaning of the *Fisheries Act*.

Source: Nemaska Lithium, December 2014

**Table 7 Overview of Fish Habitat Losses in Watercourses Affected by the Project**

| Stream name | BW (m)[1] | Habitat function | Fish species | Water depth (m) | Length of stream (m) | Reduction in water level (m) | Maximum habitat loss (m2) |
|---|---|---|---|---|---|---|---|
| Stream C Upstream reach | 2.0 | Food | Brook trout | 0.05 - 0.12 | 660 | 0.05 - 0.06 | 1,320* |
| Stream C Middle reach | 2.5 | Food | Brook trout | 0.08 - 0.19 | 1,216 | 0.07 - 0.08 | 3,040* |
| Stream C Downstream reach | 1.5 | Food | Brook trout | 0.09 - 0.21 | 776 | 0.03 – 0.04 | 388* |
| SUBTOTAL LOSS OF FISH HABITAT USED BY SPECIES OF INTEREST TO A RECREATIONAL OR ABORIGINAL FISHERY* | | | | | | | 4,748* |
| Stream B | 0.6 | Food | Brook stickleback | 0.05 | 730 | 0.01 | 175 |
| Stream E | 1.0 | Food | Brook stickleback | 0.15 | 430 | 0.01 | 52 |
| Stream F | 0.8 | Food | Brook stickleback | 0.06 | 175 | 0.04 | 175 |
| TOTAL LOSS OF FISH HABITAT | | | | | | | 5,150 |

[1]BW: bankfull width, i.e., the width of a stream channel at the point where over-bank flow begins during a flood event.

*Fish habitat losses in streams frequented by species of interest to a recreational or Aboriginal fishery within the meaning of the *Fisheries Act*.

Source: Appendix 148.1, page 25, Nemaska Lithium, December 2014

According to the Proponent, Lake 2 contains Brook Trout and will experience a drop in water level of 5 centimeters to 14 centimeters, resulting in the loss of fish habitat through dewatering over an area of 470 $m^2$. The dewatered zone is apparently used infrequently by fish given its limited depth and the fact that it remains submerged for only a short period of the year. The drop in water level in Lake 2 would have little impact on the life cycle of Brook Trout, which do not use this type of habitat for spawning, although it could affect its feeding over a very brief period of time.

The water level in Lake 3 would drop by about 2 centimeters, resulting in habitat loss of approximately 280 $m^2$. Potential Northern Pike spawning areas are located all around the lake. However, the Proponent is of the view that given the small area that would dry up relative to the entire potential spawning area, the lake's Northern Pike population will not be affected.

No fish species of interest to a recreational or Aboriginal fishery within the meaning of the *Fisheries Act* has been inventoried by the Proponent in Lakes 27 and 28. Brook Stickleback is the only species captured in Lake 27, and it is likely to occur in Lake 28. The decline in their water level would be 7 centimeter and 16 centimeter, respectively, which would trigger habitat losses in the littoral area of 1,026 m² and 838 m².

The Proponent believes water levels in Stream C will vary between 3 centimeter and 8 centimeter, resulting in the loss of brook trout feeding habitat over an estimated 4,748 $m^2$. Fish movement will be particularly affected between December and April in the upstream reach and in March in the middle reach. Fish present in the upstream and middle reaches during this time period will move downstream or toward Lake 2 as the water level falls. However, the drop in water level will not prevent the brook trout from reaching their spawning sites in Stream C during the fall spawning run.

No species of interest to a recreational or Aboriginal fishery within the meaning of the *Fisheries Act* is present in streams B, E or F. The drop in their water level is apparently 1 centimeter for streams B and E and 4 centimeter for Stream F, which implies losses of 175 $m^2$ for Stream B, 32 $m^2$ for Stream E and 175 $m^2$ for Stream F.

### *Proposed Mitigation, Monitoring and Follow-up Measures*

The Proponent undertakes to implement a series of mitigation measures to reduce the Project's effects on fish and fish habitat (see Appendix A). Key mitigation measures are as follows:

- Implement a compensation program for the loss of 5,498 m² of habitat used by species of interest to a recreational or Aboriginal fishery in collaboration with the Cree Nation of Nemaska and in accordance with the requirements and objectives established under the Fisheries Act.
- Maintain habitat functions and the free passage of fish in streams and water bodies where water level changes are likely. If hydraulic monitoring detects any impact, specific measures will be taken to mitigate the effect in question. For example, as applicable, a control level could be established at certain strategic locations to raise the water level and maintain the functions of the initial fish habitat (i.e., downstream of an obstacle that has become impassable).
- Perform work during the low flow season and comply with restriction periods for water activities to protect spring reproduction and reduce fish mortality.
- Collect all potentially contaminated water and treat it as necessary prior to discharge into the aquatic environment.
- Install a water treatment unit at the mine water pond outlet for preventive purposes.
- Avoid the transport of fine particulate matter to the aquatic environment beyond the work area (revegetation of disturbed sites and water management).

The Proponent also undertakes to perform the following monitoring in connection with fish and fish habitat:

- Environmental Effects Monitoring under the *Metal Mining Effluent Regulations* to determine the effects of mining waste on benthic organisms and fish in Lac des Montagnes.
- Water quality monitoring at the effluent outfall in Lac des Montagnes in accordance with the *Metal Mining Effluent Regulations*. This monitoring will detect cases in which standards have been exceeded and adjust mitigation measures as necessary. In addition to the requirements of government of Quebec's Guideline 019

and the *Metal Mining Effluent Regulations*, the Proponent has undertaken to monitor the following substances at the effluent outfall and in the receiving environment, i.e., in Lac des Montagnes: beryllium (Be), lithium (Li), cesium (Cs), rubidium (Rb), chromium (Cr), potassium (K), sodium (Na), magnesium (Mg), manganese (Mn), petroleum hydrocarbons (C10-C50).

- Monitoring of water levels in water bodies and streams whose water regime is likely to change, i.e., Lakes 2, 27 and 28 as well as Lac des Montagnes, and Streams C and F.
- Given the proximity of infrastructure, monitoring of surface water quality for aquatic life to cover the major water bodies and streams potentially affected by the Project, i.e., lakes 2, 27 and 28 and streams C and F, as well as baseline stations in water bodies upgradient from the Project or in a watershed unaffected by it, such as Lake 18.
- Monitoring of groundwater quality and levels in accordance with the requirements of the Quebec Guideline 019, including piezometric monitoring to assess the effects of mine dewatering, particularly in the Lac du Spodumène sector.
- Monitoring of progress on achieving the Project's fish habitat compensation plan in accordance with Fisheries and Oceans Canada requirements.

*Anticipated Residual Effects*

With the implementation of mitigation measures (Appendix A), the Proponent is of the view that the magnitude of the Project's effect would be moderate. Although fish is valued by users of the area, only a very small area of fish habitat will be directly lost as a result of the Project and most potential effects would result from partial dry out, rather than encroachment. The duration of the effect would be moderate since most of the anticipated impacts would occur during the construction and operation phases. The effects would be irreversible, since the disturbances caused by the Project in certain water bodies and streams would persist after the Project ends. With the implementation of mitigation measures, the Proponent is of the view that the significance of the Project's residual effects on fish and fish habitat would be moderate.

### 7.1.2 *Views expressed*

*Federal Authorities*

Fisheries and Oceans Canada is of the view that the Proponent adequately identified the Project's environmental effects on fish, but disagrees with some of the Proponent's conclusions concerning the assessment of serious harm to fish. According to Fisheries and Oceans Canada, the changes in the water balance of Lake 2 and creek C will impact adversely the maintenance of the Brook trout population which occur in these environments. Fisheries and Oceans Canada considers the overall area of Lake 2 as well as all as the areas in the center and upstream of creek C in the assessment of serious harm to fish which amounts to an area of approximately 52 000 $m^2$. For lakes 27 and 28, streams B, E and F as well as Lake 30, serious harm will total approximately 2 600 $m^2$. Thus this department concludes that the Project would result in serious harm to fish for a total of approximately 54 600 $m^2$ of fish habitat.

Given that the habitats of Lake 2 and the upstream and middle reaches of Stream C will be considered in the assessment of serious harm to fish, maintaining habitat functions and free passage of fish in these areas, as proposed by the Proponent, is not considered necessary.

To ensure that the effects of groundwater drawdown on surface water have not been underestimated in the Proponent's modelling, Fisheries and Oceans Canada recommends that water volumes and levels in Lac du Spodumène and its outlet (Stream D) be monitored, as well as flows and levels in the downstream reach of Stream C. Such monitoring would also document the emergence of any obstacles to the passage of fish, particularly access to the potential spawning area in Stream G and maintenance of the brook trout spawning area functions of Stream C. This follow-up program will be developed in detail in collaboration with Fisheries and Oceans Canada in the regulatory compliance phase relating to *Fisheries Act* requirements. Corrective action could be required under the *Fisheries Act*, depending on the monitoring results.

Since the Proponent did not provide a characterization of the habitat present in Lac des Montagnes in the sector in which the mine effluent outfall is planned, Fisheries and Oceans Canada was unable to reach an opinion concerning the potential effects of this structure on fish habitat. Fisheries and Oceans Canada will obtain further information on this matter in the regulatory compliance phase relating to *Fisheries Act* requirements and will be able to adjust the compensation plan to take into account any serious additional harm to fish as appropriate.

To protect the spring spawning grounds of Northern Pike, Walleye and white sucker and the fall spawning grounds of Lake Whitefish, Fisheries and Oceans Canada recommends that the work involved in the burial and installation of the final effluent discharge pipe in Lac des Montagnes be completed between June 30 and August 31.

The Proponent has undertaken to implement all of the recommendations by Fisheries and Oceans Canada, i.e., to consider losses of 54,600 $m^2$ in developing its compensation plan, to comply with the restriction period for the effluent pipe installation in Lac des Montagnes and to add the monitoring of water volumes and levels and the maintenance of habitat functions in streams C, D and G and Lac du Spodumène in its monitoring program.

As discussed in section 6.1, Environment Canada believes that dustfall containing metals and metalloids may affect the quality of surface water in water bodies near the mining facilities. The department recommends that water quality monitoring be carried out for lakes near mine infrastructure, especially for Lac du Spodumène, to ensure that it remains free of harmful substances. The Proponent has undertaken to add annual water quality monitoring at Lac du Spodumène to its monitoring program, which already provides for water quality monitoring in Lakes 2, 27 and 28, as well as a control lake, i.e., Lake 18.

As discussed in section 6.2, Environment Canada is concerned by the potential leaching of certain substances present in the ore into the effluent and the possibility that it might contain substances harmful to fish. Environment Canada therefore recommends adding lithium and beryllium, two substances not covered by the *Metal Mining Effluent Regulations*, to the Proponent's effluent quality monitoring program. The monitoring should meet the same requirements that apply to other parameters specified in Schedule 5 of the Regulations, i.e., four times a year, and detect possible problem areas in the event that criteria governing the protection of aquatic life for these substances is exceeded.

### *Aboriginal Groups*

Members of the Cree Nation of Nemaska expressed various concerns about fish and their habitat, including changes to the Walleye spawning grounds at the mouth of Stream D and the loss of fish habitat in general. It also expressed a concern that a fish habitat compensation plan would not be developed. After modelling the

mine effluent dispersion plume, the Proponent repositioned the discharge site in an area of Lac des Montagnes more conducive to dilution. Accordingly, the discharge site was moved so that it was 1.8 km from the potential Walleye spawning area at the mouth of Stream D, rather than 750 meter as provided for in the previous design. Considering the distance and the Projected effluent dispersion, the Proponent does not anticipate any effects on this spawning area. As for the loss of fish habitat, the Proponent undertakes to develop and implement a compensation plan in accordance with the requirements of Fisheries and Oceans Canada.

### 7.1.3 *Agency Analysis and Conclusion*

In the Agency's opinion, the anticipated negative residual effects on fish and fish habitat would cause serious harm to fish over approximately 54,600 $m^2$ of fish habitat primarily in Lake 2 and in the middle and upstream reaches of Stream C. Other water bodies and streams affected are Lakes, 3, 27, 28 and 30 as well as Streams B, E and F. These losses are primarily due to changes in the water balance of water bodies and streams caused by infrastructure, water management at the mine site and dewatering. The Project design avoids any encroachment on fish habitat, and the mine effluent outfall has been located to allow for maximum dilution and at a distance from potential Walleye spawning sites in Lac des Montagnes. Serious harm to fish is deemed acceptable by Fisheries and Oceans Canada since the Proponent undertakes to develop and implement a compensation plan. The assessment of serious harm to fish could be adjusted in the regulatory compliance phase relating to *Fisheries Act* requirements based on any additional information received by Fisheries and Oceans Canada.

The Agency notes the Proponent's commitment to monitor effluent quality in Lac des Montagnes, in accordance with the *Metal Mining Effluent Regulations,* and surface water quality in Lakes 2, 27 and 28 (as well as a control lake, Lake 18) given their proximity to mine infrastructure and considering Quebec government requirements. Such monitoring would enable the Proponent to detect the presence of substances harmful to fish and to take the necessary corrective measures to resolve the situation as appropriate. Given the concerns raised by Environment Canada in connection with the potential effects of dust deposition in water bodies and the potential leaching of metals not covered by the *Metal Mining Effluent Regulations*, the Agency considers it necessary to monitor surface water quality in Lac du Spodumène and Lakes 2, 18, 28, and believes that beryllium and lithium should be added to the effluent monitoring program that the Proponent has undertaken to implement.

The Proponent responded to the concerns raised by the Cree Nation of Nemaska and by Fisheries and Oceans Canada by reducing the Project's footprint, moving the waste rock and tailings pile and dikes farther away from Lac des Montagnes and relocating the mine outfall.

The Agency is of the view that the negative residual effects on fish and fish habitat would be low given the implementation of a compensation plan to offset serious harm to fish and the Proponent's water management plan as well as its compliance with the *Metal Mining Effluent Regulations*. The magnitude of the effect would be low considering that serious harm to fish would be offset. The extent of the effects would be site-specific since they would be limited to a small area of the Project site, primarily Lake 2 and Stream C. The duration of the effects would be long-lasting given that they would persist after the mine's closure. Serious harm to fish associated with changes in surface hydrology would be irreversible, although the effects associated with groundwater drawdown would disappear once the pit was completely flooded at the end of operations.

*Key Mitigation Measures to Avoid Significant Effects*

The Agency considered the mitigation measures proposed by the proponent, the opinion of expert federal authorities, the comments of Aboriginal groups and the public to identify key mitigation measures which are required to ensure the Project will not cause significant environmental effect on fish and fish habitat:

- Implementing a mine contact water management program to ensure its collection and treatment prior to discharge to the environment;
- Ensuring the treatment of the final effluent in compliance with the *Metal Mining Effluent Regulations,* the *Fisheries Act* and the Quebec government's requirements for the mining industry, and installing a wastewater treatment unit at the mine water pond discharge point to ensure compliance with those standards and requirements;
- Offsetting serious damage likely to be cause to fish that will be authorized pursuant paragraph 35 (2) (b) of the *Fisheries Act, and implementing a* compensation plan, in collaboration with Fisheries and Oceans Canada;
- In order to implement the compensation plan to offset serious harm to fish associated with the Project's construction, the Proponent in collaboration with the Cree Nation of Nemaska, shall adopt measures to avoid or limit adverse effects:
    - on migratory birds and their habitats;
    - on species at risk and their habitats;
    - on the current use of lands and resources for traditional purposes by the Cree Nation of Nemaska;
    - on sites of cultural importance to the Cree Nation of Nemaska

*Need for Follow-up and Follow-up Requirements*

To ensure that the planned mitigation measures for fish and fish habitat are effective, the Proponent must conduct the following follow-up activities:

- Monitoring of progress toward achieving the objectives of the serious harm to fish compensation plan as per the requirements set out under paragraph 35(2)(b) of the *Fisheries Act*. Details of this follow-up program will be establish in collaboration with Fisheries and Oceans Canada in the context of the regulatory process link to the *Fisheries Act*;
- Monitoring of effluent quality in accordance with the requirements set out in the *Metal Mining Effluent Regulations*, including lithium and beryllium monitoring in the final effluent prior to its discharge into the environment, subject to the same requirements governing other parameters specified in Schedule 5 of the Regulations, i.e., four times a year;
- Monitoring of environmental effects under the *Metal Mining Effluent Regulations* (section 7 and schedule 5) to assess the effects of the mine effluent discharge on the receiving environment, including benthic organisms and fish in Lac des Montagnes.
- Annual monitoring of surface water quality in Lac du Spodumène and Lakes 2, 18 and 28, and implementation of any necessary corrective measures in the event that the applicable criteria and

recommendations are not met. Monitoring shall begin with construction and end five years after decommissioning. The monitoring shall include the following elements:

- Submission of the measured levels for parameters specified in section 7, Schedule 5 of the *Metal Mining Effluent Regulations* taking into account the recommendations set out in the Environment Canada guidance document *Metal Mining Technical Guidance for Environmental Effects Monitoring* (EEM);

- Comparison of the measured parameter levels against chronic aquatic life parameters as specified in the Quebec government surface water quality criteria and the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* developed by the Canadian Council of Ministers of the Environment, as well as the levels established in previous annual monitoring activities and those in the water bodies prior to Project implementation.

Given the uncertainty regarding the effects of groundwater drawdown associated with mine dewatering on surface water levels and the possible risks to fish associated with surface water contamination, and as suggested by Fisheries and Oceans Canada and Environment Canada, the Agency recommends that the Proponent perform the following additional monitoring activities and that they be taken into account by the Minister in reaching her decision:

- Monitoring of water flows and levels and the functions of brook trout spawning areas in Stream D and in the downstream reach of Stream C, and in a control watercourse not affected by pumping of the pit, as well as monitoring of water levels in Lac du Spodumène and the accessibility of the potential Brook trout spawning area in Stream G. The follow-up program will be developed in detail in collaboration with Fisheries and Oceans Canada in the regulatory compliance phase relating to *Fisheries Act* requirements.
- Submit to the Agency the results of the analyses conducted to confirm that the metals and metalloids contained in the waste rock, the tailings and the ore from the Project are not leachable over the long term before the start of the work. If necessary, add any new leachable substance to the follow-up program for the quality of effluent and its receiving environment and implement mitigation measures to protect groundwater.

*Conclusions*

Taking into account the implementation of mitigation measures and compensation programs, as well as the monitoring described above, the Agency is of the view that the Project would not cause any significant adverse effects to fish or fish habitat.

## 7.2 Migratory Birds

### 7.2.1 *Proponent's assessment of environmental effects*

*Effects Analysis*

The migratory birds discussed in this section include aquatic birds, waterfowl, landbirds, shorebirds (waders) and migratory birds at risk. This section also covers the habitat of these migratory birds, including forest stands, open areas, wetlands, water bodies and streams.

At least 24 species of Waterfowl, 27 species of aquatic birds, 19 species of birds of prey and 61 species of landbirds are likely to occur in the study area. Waterfowl, particularly Canada Goose, and landbirds, such as Grouse and Ptarmigan (family Phasianidae), are species valued by the Cree Nation of Nemaska.

Only one special-status species was observed, i.e., Common Nighthawk, a species designated under the Species at Risk Act. Burns, disturbed areas and bogs cover most of the study area and comprise suitable habitat for Common Nighthawk. The study area also contains habitat suitable for other bird species designated in the Species at Risk Act: the Olive-Sided Flycatcher, an endangered species, and Rusty Blackbird, one species of special concern. The burn located in the study area provides excellent potential habitat for the Olive-Sided Flycatcher. The large bog to the south of the pit provides suitable habitat for Rusty Blackbird, as does Lake 29, with its small bog and alder grove. The mine Project site is currently used by bird species during the spring and fall migrations, and during breeding and rearing.

### *Anticipated Effects*

The potential adverse environmental effects of mine construction, operation and closure activities on birds, including species at risk, are the loss and alteration of suitable bird habitat, the potential mortality of young birds and the destruction of eggs caused particularly by land clearing and machinery traffic, as well as disturbances due to noise and mine activities.

The loss of terrestrial habitats and wetland environments as described in Section 6.4.1 is the main impact on birds, including species at risk. Such losses force the affected birds to move to other similar habitat in the region. Approximately 471 breeding pairs of landbirds, 1 to 3 breeding pairs of shorebirds, and no more than 1 breeding pair of waterfowl would likely be affected by habitat loss, especially during the mine construction and operation phases. The maximum potential abundance of breeding pairs in the region would decline as a result of the anticipated habitat losses. During the decommissioning phase, the site will be restored and re-vegetated. According to the Proponent, approximately 301 breeding pairs of forest birds could benefit from the creation of habitat similar to the softwood forest stands in the region.

The Proponent estimates that these losses could affect 4 breeding pairs of Common Nighthawk, 10 breeding pairs of Olive-Sided Flycatcher, and 1 breeding pair of Rusty Blackbird. According to the Committee on the Status of Endangered Wildlife in Canada, the decline of the flycatcher could be caused by a reduction in breeding or overwintering habitat. If that is the case, breeding pairs potentially affected by the Project will have no difficulty finding new breeding habitat. In the opposite case, the lack of habitat could reduce the species' survival and reproductive success as a result of intraspecies competition.

Changes in certain bird behaviours (feeding and reproduction) are another potential effect of the Project activities and the presence of workers (hunting and domestic waste).

Site clearing, stripping and grading in preparation for site development could result in the destruction of bird nests.

### *Proposed Mitigation, Monitoring and Follow-up*

The Proponent undertakes to implement a series of mitigation measures to reduce the Project's effects on migratory birds and their habitat, including some specific to species at risk (see Appendix A). Key mitigation measures would include:

- Perform clearing, stripping and grading in the Project sector outside the peak migratory bird breeding season (April 20 to the end of August) to minimize the risk of nest destruction. On performing work outside this period, pay careful attention to the possible presence of active nests of early- or late-nesting species, more specifically, Common Nighthawk nests on the ground in stripped areas.
- Take the following measures when a nest is discovered during work:
    - Stop all disruptive activities in the nesting area until breeding is complete (i.e., until hatchlings leave the nest area permanently);
    - Protect any nests found by establishing a buffer zone based on an appropriate protective distance for the species until hatchlings leave the nest area permanently. The appropriate protective distance can vary considerably by species, e.g., 200 meters for Common Nighthawk and 300 meters for Olive-Sided Flycatcher and Rusty Blackbird;
    - In no case should the nest itself be identified by signage tape or another similar material, which would only increase the risk of predation. If necessary, signage tape may be placed around the buffer zone.
- During the Common Nighthawk nesting period (late May to late July), cover areas that are naturally bare or that have been stripped for construction purposes with a membrane if they are left untouched for several days in order to prevent specimens from building nests inside the work area.

No bird monitoring program is planned at the mine site since the affected habitat would be destroyed. However, the Proponent undertakes to monitor bird species that use the Lac du Spodumène bog during the breeding period in order to assess whether breeding birds, including species at risk, use the Lac du Spodumène bog and whether they are being affected by changes in the bog associated on groundwater drawdown.

The Proponent also undertakes to conduct a summer inventory prior to the start of work (late June/early July) to determine use of the study area, and more specifically the sectors identified for infrastructure installation, by the tree migratory birds at risk (Olive-Sided Flycatcher, Common Nighthawk and the Rusty Blackbird) during the breeding season.

### *Predicted Residual Effects*

The Proponent is of the view that, during the construction phase, the magnitude of the effect on birds in general would be low since only 16% (1.55 $km^2$ of 9.87 $km^2$) of the available bird habitat would be affected in the study area. The extent of the effect would be local and its duration would be long-term since the habitat loss caused by the disappearance of Lake 29 and through the pit right-of-way would be permanent. Therefore, with the implementation of mitigation measures, the Proponent is of the view that the significance of the residual effect of the construction phase on birds would be moderate.

The Proponent is of the view that, with the implementation of mitigation measures, the magnitude of the effect would be low during the operating phase because any disturbed birds would slightly alter their distribution in the study area depending on their tolerance of disturbance. The extent of the effect would be local and the duration of the effect would be moderate since it would be felt throughout the entire period of mine operation. The significance of the effect in the operating phase is therefore also considered moderate.

With respect to the decommissioning phase, the Proponent assessed the positive effect of revegetation rather than the adverse effect of mine closure activities. Accordingly, it considers that the Project's residual impact will be neutral and indirect, since it would primarily owe to rehabilitation and revegetation of sites that would create suitable habitat for birds.

With respect to migratory birds at risk, the Proponent is of the view that the significance of the residual effect would be moderate. This assessment is based primarily on the limited number of breeding pairs that would be affected.

### 7.2.2 *Views expressed*

*Federal Authorities*

Environment Canada is of the view that that the Proponent provided an accurate picture of the Project's environmental negative effects on migratory birds and that the Project's residual effects are not likely to cause significant adverse effects on migratory bird populations following implementation of the mitigation measures proposed by the Proponent as well as those identified by the department as essential. At the request of the federal committee, the Proponent estimated the habitat losses for bird species at risk and completed an assessment of the residual effects, especially in relation to wetland habitat losses. It also provided an estimate of the number of breeding pairs potentially affected. Following updating of the geotechnical study to be performed in the summer of 2015, as discussed in section 6.4, Environment Canada recommends that the Proponent update the overview of wetland losses, adjust the wetlands compensation program accordingly and propose mitigation measures to limit the loss of wetland functions, as appropriate. Environment Canada recommends that the Proponent's proposal for wetland compensation Projects (see Section 6.4.2) include the creation and protection of habitat suitable for species at risk, and particularly for Olive-Sided Flycatchers and Rusty Blackbirds.

According to Environment Canada, if work is performed during the breeding period, migratory bird nests may be inadvertently destroyed, and it recommends that the Proponent pay special attention to the possible presence of Common Nighthawk nests. The incidental take of nests and eggs is a violation of subsection 6(a) of the *Migratory Birds Regulations*, which prohibits disturbing, destroying or taking nests or eggs of migratory birds. Environment Canada recommends that additional mitigation measures be taken to prevent the incidental take of migratory birds, their nests or their eggs.

Noise generated by mining operations and vehicle traffic could disturb breeding pairs near the site. Such disturbances could result in nest abandonment and could cause birds to move to quieter sites. More specifically, such disturbances during the migration period could also affect waterfowl that use the lakes around the site as resting and feeding areas. However, Environment Canada experts consider it highly likely that the waterfowl will adapt or use neighboring environments if the disturbance is excessive.

Environment Canada is concerned about the presence of artificial water bodies (pools, treatment ponds, etc.) at the mine site that could attract aquatic birds and waterfowl and that might contain substances harmful to migratory birds.

With respect to natural lakes around the mine site used by waterfowl and aquatic birds, Environment Canada is concerned about the risk of their contamination by dust generated by mining activities and its effects on birds.

In the absence of data provided by the Proponent on the amount of dust likely to settle in the receiving environment, Environment Canada cannot offer an opinion on the risk of contamination of natural lakes, and recommends that water quality in the natural lakes around the mine site be monitored.

Environment Canada confirms that the Proponent's analysis of the environmental effects during site restoration in the decommissioning phase is accurate and detailed. However, in its opinion, there are still some unknowns with respect to the creation of terrestrial environments suitable for birds, including species at risk, following progressive and final site restoration. The Proponent responded that it would not be performing any post-closure bird monitoring. In its opinion, recolonization of the area by bird populations will depend on the quality of the habitats produced following the restoration of disturbed sites. Considering that the mine site is located in the boreal forest, it is very likely that a relatively open, lichen or moss spruce-type forest will become established. The Proponent therefore anticipates that the bird species recolonizing this new forest will resemble those present in similar habitat in the region. During site restoration, the Proponent intends to recreate habitat similar to that already present in the region.

Uncertainties remain regarding the cause of the decline of migratory birds at risk and the effects associated with additional habitat losses or changes, despite the presence of abundant habitat in the vicinity. Environment Canada suggests that the Proponent develop a monitoring and follow-up program for the migratory birds at risk. The monitoring program should identify activities and operations likely to affect species at risk as well as measures to ensure that activities and operations do not harm or disturb the birds, their nests or their eggs, especially during the nesting period. Environment Canada proposes the implementation of a monitoring program for Common Nighthawk, Olive-Sided Flycatcher, Rusty Blackbird and Short-Eared Owl based non-migratory bird (see section 8). To assess the effectiveness of restored sites after mine closure, Environment Canada suggests monitoring the use of the restored sites by birds, particularly bird species at risk.

The mitigation measures proposed by the Proponent and considered essential by Environment Canada relate to the following principles: management of incidental take, application of Environment Canada's guidelines on avoidance related to general migratory bird nesting periods; and management of noise light and waste at the site.

*Aboriginal Groups*

The Cree Nation of Nemaska has expressed concerns that noise from the mine will scare Canada geese away from the site and that they will not return to the Project area. The Proponent's response is provided in Section 7.4. According to Environment Canada, it is highly likely that migrating waterfowl will adapt or will use adjacent areas (or other sectors of the lake) if the disturbance is excessive (noise and lighting). The area used for goose hunting in the northwest section of Lac des Montagnes seems relatively far from the mine infrastructures to excessively bother waterfowl, according to Environment Canada.

### 7.2.3 *Agency analysis and conclusion*

The Agency is of the view that approximately 471 breeding pairs of landbirds, 1 to 3 breeding pairs of shorebirds, and no more than 1 breeding pair of waterfowl would likely be affected by habitat loss resulting from the Whabouchi Project. The Project would also affect 4 breeding pairs of Common Nighthawk, 10 breeding pairs of Olive-Sided Flycatcher and 1 breeding pair of Rusty Blackbird. Activities such as clearing and stripping,

performed during the breeding period, could result in the incidental take of migrating birds (destruction of nests, eggs and fledglings), and in decreased reproduction and increased mortality in migratory birds. The maximum potential abundance of the number of breeding pairs in the region will decline following the anticipated habitat losses. During the decommissioning phase, the site will be restored and re-vegetated, and several breeding pairs of landbirds could benefit from the creation of these habitats, which will likely evolve toward habitat similar to the region's softwood forest stands.

The Proponent undertakes to perform site clearing and grading outside the migratory bird breeding season and to ensure the protection of active nests discovered during the work. The Proponent addressed some of the concerns raised by the Cree Nation of Nemaska and Environment Canada by agreeing to implement noise, light, and waste and residual materials management measures at the mine site.

For Environment Canada, there remains some uncertainty as to the risk involved in the use of contaminated artificial water bodies by birds, and the Agency therefore considers it necessary to take measures to monitor birds using these sites. With respect to the potential contamination of natural water bodies around the mine site from dust that could affect birds, Environment Canada recommends water quality monitoring in the natural lakes around the mine site. Surface water quality monitoring in water bodies near the mine site is discussed in Section 7.1.

The Agency believes that the negative residual effects on migratory birds, including species at risk, would not be significant (see Appendix F). The magnitude of the effect would be low considering that the birds could move to similar habitats elsewhere in the region. The extent of the effect would be local since the noise disturbance would exceed the Project's footprint. The duration of the effect would be long-term considering the habitat losses caused by the presence of the pit and the waste rock and tailings pile. Habitat losses related to development of the pit would not be reversible, but losses associated with the piles would be partly reversible since the disturbed soil at the mine site will be re-vegetated.

### *Key mitigation measures to prevent significant effects*

The Agency considered the mitigation measures proposed by the proponent, the opinion of expert federal authorities, the comments of Aboriginal groups and the public to identify key mitigation measures which are required so that the Project causes no significant environmental effect on migratory birds and their habitat:

- The proponent shall carry out all phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds or destroying or taking their nests or eggs. In doing so, the proponent hall take into account the Avoidance Guidelines, the edition modified in 2014 by the Department of the Environment. The proponent's actions in applying the Avoidance Guidelines shall be in compliance with the Migratory Birds Convention Act, 1994 and with the Species at Risk Act.
- The proponent shall put in place a program to monitor the impact of the Designated Project on migratory birds to assess the effectiveness of the mitigation measures used to avoid harm to migratory birds, their eggs and nests. The proponent shall conduct this monitoring from the start of the operations until the end of the decommissioning phase. Documentation shall be provided to the Agency indicating the results of any monitoring under condition 4.1. The documentation shall demonstrate whether the mitigation measures have proven effective and if additional measures were required to comply with condition 4.1..

*Conclusions*

Taking into account the implementation of the mitigation measures put forward by the Proponent, particularly the key measures described earlier, the Agency is of the view that the Project would not cause significant adverse effects on migratory birds.

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

In an environmental assessment, "current use of lands and resources for traditional purposes" is defined as any practice or activity that forms part of the distinctive culture of the Aboriginal group and that it commonly carried out over a period extending from the recent past to the present, determined on a case-by-case basis, according to the practice or specific activity. In the area covered by the Project, the current use of lands and resources for traditional purposes involves the hunting, fishing and trapping of furbearing animals and the picking of berries, plants and wood.

### 7.3.1 *Proponent's assessment of environmental effects*

The Project is located inside trapline R20, near traplines R16, R18, R19 and R21 of the Cree Nation of Nemaska (Figure 6). The tallyman and two Cree families engage in hunting, fishing and trapping. Hunting camps used by the Cree are also located near the mine site, along Route du Nord, which runs through the site.

The Proponent determined that only trapline R20 would be affected by the Project, and more specifically, only the southwest part of the trapline, which includes the northern part of Lac des Montagnes where the Bible camp and several hunting camps are located.

Big game hunting, focused primarily on moose, takes place in fall and winter in the northern section of Lac des Montagnes and along a water route up the Rivière Nemiscau, and in the north part of trapline R20.

Other species, such as Woodland caribou, Tundra caribou and Black bear, are hunted less frequently. No Woodland caribou were seen in the study area during the inventories. The species is rather rare in the area due to the presence of Route du Nord and an abundance of burns, which are typically avoided by the species.

During at least two weeks in the spring, the Nemaska Cree hunt waterfowl (Geese, Ducks and Loons) in Lac des Montagnes and in the large Lac du Spodumène bog. Highly valued by the Cree, this hunt also takes place during the fall migration to a lesser degree. Ponds in the Lac des Montagnes area offer sites conducive to this hunt. The Cree Nation of Nemaska also hunts Grouse and Ptarmigan, primarily along the hydro line right-of-way and in the northern portion of trapline R20.

Fishing is carried out in the large lakes and rivers on trapline R20. In summer and fall, the major fishing sites are located in the Nemiscau River, Teilhard Lake—a widening of the Nemiscau River located at the eastern boundary of trapline R20—and Lac des Montagnes. Ice fishing primarily targets sturgeon. Valued species include Walleye, Northern Pike, Sturgeon, Longnose Sucker, Lake Trout, Lake Whitefish, Cisco and Brook Trout. Near the mine site, angling is carried out in Lakes 1 and 2, while net fishing is carried out in Lac des Montagnes, Lake Noirs and a nameless lake to the west.

Fur trapping is carried out primarily in winter in the Lac du Spodumène sector and along hunting grounds that run northeast to south of Teilhard Lake and on the northeast shore of Lac des Montagnes. The species targetted include beaver, river otter, mink and marten. All of trapline R20 is conducive to beaver, specifically along the edge of highways and roads, and along the Nemiscau River in the Biggar Lake area to the northwest of Teilhard Lake.

The entire sector around the mine is conducive to berry gathering (raspberry, cranberry and snowberry). Two sectors are used for gathering cranberries and blueberries: the shores of Lac des Montagnes and the northern section of Lac Spodumène.

The Nemaska Cree have several drinking water collection points: Lac des Montagnes, Lakes 1, 2, 5, 6, 18 and 28 as well as an unnumbered lake between Route du Nord and Lac des Montagnes (see Figure 12).

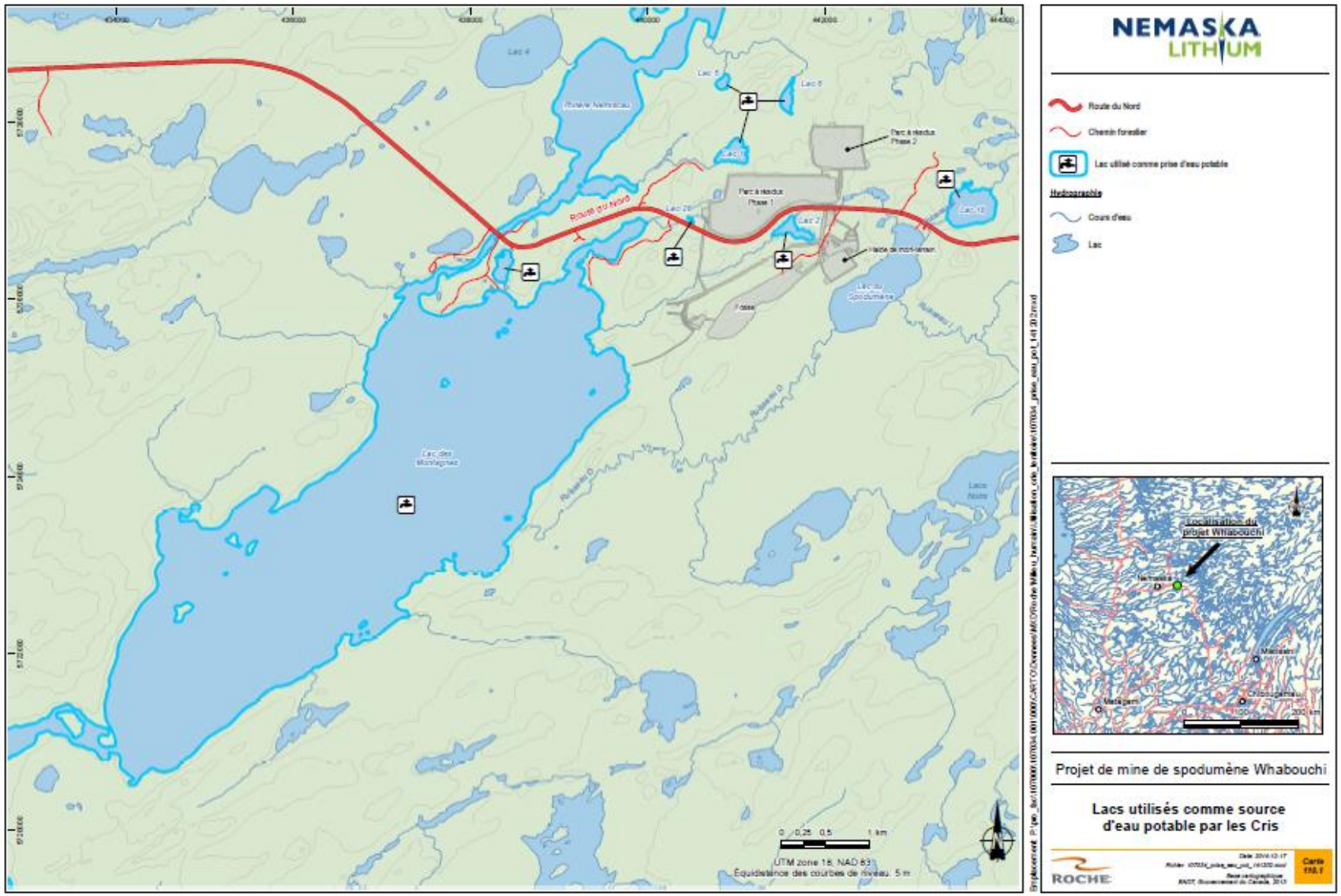
### *Predicted Effects*

A 10-$km^2$ safety zone was established as part of the negotiation of the Chinuchi agreement. The purpose of this zone is to maintain a safe minimal distance from the pit area, where blasting activities will be centred, and the waste rock and tailings pile. The Proponent established the boundaries of the area with the help of the tallyman affected in order to facilitate the location of the area in the field using natural elements (i.e., the eastern shore of Lac du Spodumène, Stream D, the northern boundary of Lac des Montagnes, the service road to the said beach, etc.). This would result in the loss of 10 $km^2$ for hunting, fishing, trapping and berry picking, access to hunting camps, access to lakes for water and roads within the area (see Figure 13).

Hunting, fishing, and fur trapping as well as berry, plant and wood harvesting would also be affected by:

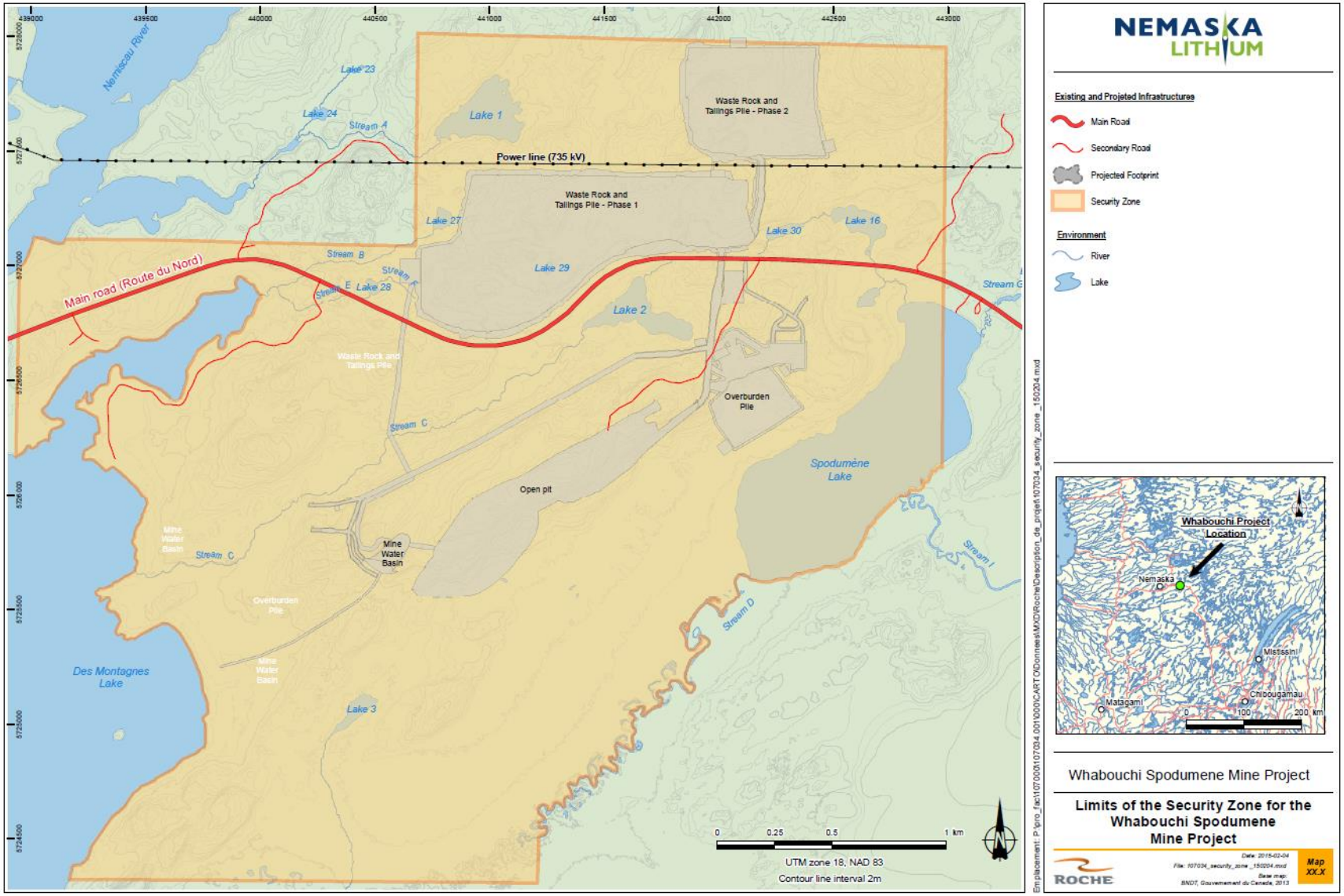
- Loss and displacement of wildlife resources following the loss of or changes to aquatic and terrestrial habitat (safety perimeter);
- Disturbance and mortality of wildlife resources associated with mine operations (noise, vibration, dust, transportation);
- Loss of wildlife resources caused by increased hunting pressures associated with the presence of workers.

**Figure 12 Nemaska Cree Drinking Water Sources**




Source: Map Appendix, Nemaska Lithium, December 2014

**Figure 13 Mine Safety Zone Corresponding to the Loss of Access to Land**




Source: Additional information, Nemaska Lithium, 2015

*Proposed Mitigation Measures, Monitoring and Follow-Up*

The Proponent undertakes to establish various mitigation measures to reduce the adverse effects of the Project on the current use of lands and resources for traditional purposes, such as:

- With the tallyman, establish a beaver and black bear trapping program in the zone exclusively dedicated to the mine, prior to the start of construction work;
- Turn over materials obtained during clearing in all phases of the Project to Cree users of the area or to the Nemaska community;
- Relocate camps, if necessary, as agreed during discussions with the affected tallyman and his family;
- Limit the disturbance and mortality of wildlife resources harvested by the Cree Nation of Nemaska due to the mining operations (see Appendix A, noise environment and land vegetation measures);
- Install a fence around the pit during the decommissioning phase to restrict access to it by large wildlife;
- Stop all mining activity (blasting, rock piling, etc.) during the spring goose hunting season (goose break);
- Determine a blasting schedule jointly with the Environment Committee created under the Resource Development Partnership Agreement;
- Limit hunting pressures caused by the presence of workers;
- Prohibit wildlife harvesting activities (hunting, fishing and trapping) by employees within the area of the mining lease and surface use leases;
- Allow access to beaches located to northeast of Lac des Montagnes.

The Proponent undertakes to keep Cree users of the area informed of the schedule of mining activities to facilitate management and, as necessary, to reorganize their harvesting activities.

A number of previously described mitigation and follow-up measures designed to reduce the Project's effects on water and air quality, terrestrial and wetland environments, migratory birds, and fish and fish habitat would also contribute to reducing the impacts on the current use of lands for traditional purposes (see Appendix A).

The Proponent undertakes to establish a program to monitor the use of the land and to document the presence of large wildlife specimens near the mine site in order to confirm the effectiveness of these measures. Mechanisms related to such monitoring are among the items provided for in the Resource Development Partnership Agreement between the Proponent, the Grand Council of the Crees (Eeyou Istchee), the Cree Nation Government and the Cree Nation of Nemaska (Chinuchi Agreement). Through this monitoring, the users of the land can decide on the effectiveness of the mitigation measures and suggest adjustments as necessary.

*Predicted Residual Effects*

According to the Proponent, the significance of the residual adverse effects on current use of the territory and resources for traditional purposes would be moderate. The effect would be of moderate magnitude, considering that the current use of part of the area and the resources of trapline R20 would be modified, that the extent would be local and the duration would be moderate, given that the effect would be felt throughout the entire Project, but would end when the Project was completed. Furthermore, given that the terrestrial environments in

the study area are relatively homogeneous, land-based wildlife, including the Woodland caribou, could use similar environments along the borders of the mine site, in the study area or in the adjacent region.

### 7.3.2 *Views expressed*

*Federal Authorities*

According to Environment Canada, the likelihood of finding woodland caribou in the study area is low given that the habitats present in the study area do not have the characteristics sought by this species. Furthermore, population monitoring performed over several years confirms that Woodland Caribou rarely, if ever, occur in this area. Given the low potential for the presence of woodland caribou in this area of the mine, Environment Canada considers the mitigation measures put forward by the Proponent to limit the Project's effects on the Woodland Caribou to be adequate.

Environment Canada recommends the implementation of a monitoring program for all wildlife species listed in the *Species at Risk Act*, including the Woodland Caribou.

*Aboriginal Groups*

The Cree Nation of Nemaska expressed a number of concerns about the current use of lands and resources for traditional purposes. They are presented in Appendix E. Some of these concerns deal with the disturbance of wildlife (Canada Geese and Moose) and hunting and fishing pressures by mine workers.

In response to these concerns, the Proponent reviewed the mine site layout to move the infrastructure farther away from Lac des Montagnes and waterfowl hunting areas. Based on the update of noise impact study modelling following the relocation of infrastructure, the Proponent finds that there would be little if any significant impact on the noise environment in waterfowl hunting areas. Stopping noisy activities is one of the measures taken during the "Goose break" to address this concern. With respect to moose, its home range is 5 to 10 $km^2$ according to the Government of Quebec wildlife sector. Moose that currently occur in the site targeted by the mine Project would move to other areas of trapline R20.

In addition to prohibiting future employees from hunting or fishing on lands within the area of the mining lease and surface use leases, the Proponent would prohibit anyone in possession of a weapon of any kind on the mine site, except duly authorized individuals. The Proponent undertakes to hold discussions with the Cree Nation of Nemaska, the Quebec Department of Sustainable Development, Environment and the Fight against Climate Change, as well as the Société Weh-Sees Indohoun to oversee hunting and fishing by workers of the Eastmain-1-A–Sarcelle–Rupert Project and other users of the territory, including the Whabouchi mining Project. As for hunting and fishing in neighbouring areas, workers should comply with the applicable regulations in the Weh-Sees Indohoun and Eastmain sectors.

The Cree Nation of Nemaska has voiced concerns about revitalization of the mine site. It mentions that many industrial sites have been abandoned, with waste being left behind (barrels, propane tanks and metal structures). The Proponent has undertaken to manage and treat waste generated during construction, renovation and closure of the site. As mentioned earlier, restoration and revegetation work at the mining site will be performed by the Proponent.

### 7.3.3 *Agency analysis and conclusion*

*Analysis of the effects*

The Agency asked the Proponent for additional information on the Project's possible impact on nearby traplines, plant species harvested by the community of Nemaska, fishing and the integration of traditional knowledge in the environmental assessment of the Whabouchi Project. The Agency notes that users of the land, members of the community and Cree experts have had multiple opportunities to share their knowledge of plant and wildlife species and their use of the land.

At the Agency's request, the Proponent provided a map showing the lakes used by the Cree Nation of Nemaska for their water supply. The safety zone around the mine site, which would encompass Lakes 1, 2 and 28, would prevent the Cree from using them as a water supply source. The safety zone would also cause the loss of a little over 10 $km^2$ of land for hunting, fishing, trapping, berry picking, access to hunting camps and roads. Following site restoration, there will be a loss of suitable wildlife habitat due to the presence of the pit and piles. The loss of use and access to Nemaska Cree lands are addressed in the Chinuchi Agreement. The Agency believes there would be no significant impact on Woodland caribou since this species is unlikely to occur in the study area.

The Agency is of the view that several previously described mitigation and follow-up measures designed to reduce the Project's effects on water and air quality, terrestrial and wetland environments, migratory birds, and fish and fish habitat would also contribute to reducing the effects on current use of lands for traditional purposes (see Appendix A). The Agency believes that informing the Cree Nation of Nemaska of the results of these monitoring programs would alleviate their perception of the risk of contamination generated by mining activities.

The measure proposed by the Proponent to control hunting, fishing or trapping on mine property partially addresses the issue raised by the Cree that falls within the jurisdiction of the Quebec Department of Forests, Wildlife and Parks of Quebec. The Cree Nation of Nemaska will have to discuss the mechanisms to be implemented to resolve this issue with the Quebec government. The Proponent has informed the Quebec government of this concern.

The Agency believes that the residual adverse effects on the current use of land and resources in the Lac des Montagnes, Lac du Spodumène and Nemiscau River areas would be insignificant (see Appendix F) following the implementation of the mitigation measures proposed by the Proponent and the additional measures specified by the Agency and set out below. The magnitude of the effect would be moderate considering the changes in the use of the land, but the integrity of the use would not be compromised. The extent of the effect would be local considering that the changes would be felt beyond the Project's footprint, although they would be limited to the southwest section of trapline R20. The duration of the effect would be long-lasting given that several changes in the use of the land would persist after the mine's closure, particularly in relation to the fact that the pit would become a water body rather than a terrestrial environment. The effects on current use of lands would be partly reversible given that access to the land would once again be possible following mine closure, including access to lakes used as drinking water sources, and that resource avoidance may be less frequent. Changes in habitat, such as the pit and the waste rock and tailings piles, would nevertheless be permanent.

*Key Mitigation Measures to Avoid Significant Effects*

The Agency considered the mitigation measures proposed by the proponent, the opinion of expert federal authorities, the comments of Aboriginal groups and the public to identify key mitigation measures which are required so that the Project causes no significant environmental effect on the current use of lands and resources for traditional purposes by Aboriginal persons:

- Prohibit wildlife hunting, fishing and trapping by employees within the limits of the mining lease and surface use leases.
- Establish a communication plan with the Cree Nation of Nemaska to keep it informed about the schedule of mining activities and the results of wildlife and habitat monitoring programs. This strategy will also allow the Proponent to gather the observations and recommendations of the Cree Nation of Nemaska concerning use of the territory affected by the Project by wildlife species of interest. The implementation of this communication plan begins with the Project construction and ends following the decommissioning of the Designated Project.
- In consultation with the tallyman of the trapline affected by the Project, establish a recovery program for all natural resources of interest to the Cree Nation of Nemaska (wood, berries, medicinal plants and wildlife species of interest for the Nation) that could be destroyed by the Project or part of it.
- Carry out a follow-up program on the Project site for wildlife species of interest and consult with the Cree Nation of Nemaska about its design, implementation and the corrective measures, if applicable. This program will start with Project construction and end following the Project decommissioning.
- Carry out progressive restoration of habitats affected by the Project or part of it in order to promote the return of natural resources of interest for the Cree Nation of Nemaska (wood, berries, medicinal plants and wildlife species of interest).

*Conclusions*

Taking into account the implementation of mitigation measures and follow-up programs put forward by the Proponent concerning terrestrial and wetland environments, migratory birds and fish and fish habitat, and the key measures described earlier, the Agency does not believe that the Project would have a significant adverse effect on current use of lands and resources for traditional purposes.

## 7.4 Aboriginal People – Health and Socio-Economic Conditions

This subsection of the report deals more specifically with the effects of the environmental changes on Aboriginal health and socio-economic conditions. The following aspects are most relevant considering the Project and territory in question:

- health effects resulting from the presence of contaminants in traditional sources of food obtained from hunting, fishing and berry gathering;
- health effects caused by changes in air and water quality.

*Predicted Effects*

According to the Proponent, modelling confirms that air emissions will not have any effect on fishing and trapping camp sites, or on berries since the consumption of traditional food (large wildlife, waterfowl, fish and

berries) was considered in the air quality modelling. The Proponent found that the Project would have little effect on air quality outside the mine site (section 6.1).

Water quality would also be relatively unaffected given the low levels of contaminant anticipated at the effluent discharge point, the low potential for acid drainage from waste rock and tailings, compliance with the *Metal Mining Effluent Regulations* and control of domestic wastewater (section 6.2). The Nemaska Cree draw water from several points as specified in Section 7.4. These lakes would no longer be accessible during operation of the mine but would become available to the Cree again after the mine closes. With the exception of Lac des Montagnes, Lakes 1, 2, 5, 6, 18 and 28 are located upgradient from the mine wastewater treatment plant outfall (final effluent). The Proponent will comply with provincial and federal criteria concerning surface and underground water quality, including that of Lac des Montagnes and the small lakes mentioned above.

On the basis of these findings, the Proponent determined that the changes in water and air quality would have no effects on the health or socioeconomic conditions of the Cree.

### *Proposed Mitigation Measures*

The Proponent undertakes to implement mitigation measures (Appendix A) to control changes in air and water quality that would be likely to have adverse effects on health and socioeconomic conditions. In particular, the Proponent undertakes to:

- Implement a dust management program and appropriate dust control, impose a speed limit of 30 km/h for vehicles at the Project site and carry out the progressive restoration of the waste rock and tailings pile.
- Implement a program for managing water that comes into contact with mine tailings, including mine water and water from the waste rock and tailings pile, to ensure its collection and treatment prior to being discharged to the environment. Final effluent will be treated to meet the water quality criteria, adjusted according to the environmental discharge objectives set by provincial authorities, as well as the standards of the *Metal Mining Effluent Regulations.*

In addition to its commitment to comply with air and water quality standards, the Proponent will adequately monitor the situation and, as necessary, find solutions to minimize the risk to the health of residents by:

- monitoring air quality and atmospheric emissions;
- monitoring dust deposition near the site through the installation of dustfall gauges;
- monitoring water and sediment quality;
- monitoring benthic communities;
- monitoring fish populations and fish tissue contamination;
- developing a strategy for communicating monitoring results to the Cree Nation of Nemaska.

As applicable, the Proponent would use the results of the various monitoring activities to identify other mitigation measures in an adaptive management approach.

*Predicted Residual Effects*

The Proponent believes that the negative residual effects on the health of Aboriginal peoples caused by the consumption of country foods should be minor given that contaminant releases should meet federal and provincial standards governing emissions and discharges.

### 7.4.2 *Views expressed*

*Federal Authorities*

As suggested by Health Canada, the Agency asked the Proponent to assess the potential effects of changes to the environment (e.g., air quality, noise environment, water quality, potential decrease in the quality of traditional foods) on the health of users of the land in the study area. In response to this request, the Proponent demonstrated that there was a low probability of contamination based on compliance with environmental protection emission thresholds for air pollutants or aquatic environment pollutants. Health Canada is of the view that the Proponent's case is not conclusive because the thresholds used are not necessarily based on human health effects and do not take account of either the quantity of traditional food consumed by Aboriginal people or the contaminant levels in this food. These thresholds may therefore be insufficient for assessing the health risks associated with the consumption of traditional foods.

Although the results of air quality modelling suggest that there would be no exceedances of atmospheric emissions standards outside the mine site or at the 23 sensitive receptor sites, i.e., the 22 Cree camps and the Bible Camp, the Proponent has undertaken to perform various monitoring activities, including the monitoring of dust deposition near the site to take corrective action to minimize the health risks to the Cree Nation of Nemaska as necessary.

As discussed in section 6.1, Environment Canada believes that dustfall, especially if it contains metals and non-metals, could affect the quality of surface water in water bodies located near the mine facilities. The Proponent has proposed to implement a water quality monitoring program in water bodies located near the mine site, including Lakes 2, 18 and 28, used by the Cree as a source of drinking water. Following discussions with the Agency, the Proponent has undertaken to add Lakes 1 to 6 to the monitoring program in order to address the

*Aboriginal Groups*

The Cree Nation of Nemaska has concerns about the potential contamination of lakes, streams and drinking water sources as a result of the use of explosives and the presence of the waste rock and tailings pile and about the possible emergence of human health problems from eating fish. The Proponent has undertaken to implement a program to manage dust and water flowing on the mine site and to take various measures to reduce contaminants (see Appendix A). The Proponent has undertaken to monitor air quality, water quality and fish tissue contamination. According to the Proponent, the results of the air and water quality monitoring would dispel the fears and concerns of Cree users and mitigate the potential avoidance of resource harvesting (wildlife, aquatic life and plants) due to perceived contamination.

According to Health Canada, compliance with environmental regulations (concerning air emissions and waste water, for example) may not guarantee that human health will be protected given that such regulatory standards and criteria do not necessarily take account of all exposure pathways (e.g., ingestion) or the possibility

that some contaminants may be transferred to the food chain and bioaccumulate or biomagnify in various links ingested by Aboriginal people as traditional food.

The Cree are also concerned that their lands will be contaminated by overflows of the flooded pit following closure of the mine site, as well as overflow or leaks from settling ponds. In response to this concern, the Proponent reviewed the site plan for these ponds and moved them further away from Lac des Montagnes.

The Cree Nation of Nemaska has asked the Proponent to provide more information on the impact of inhaling dust generated by mining activities on the health of users of hunting, fishing and trapping camps, and on the consumption of harvested products (wildlife, plants and berries). Among other things, the community would like to know whether this dust might be toxic. According to the Proponent, spodumene concentrate is an inert, non-toxic compound that poses no serious threat to aquatic or terrestrial plants and animals, and presents no tendency to bioaccumulate.

The Proponent is also of the view that there will be no exceedances of the criteria applicable to mining effluent under the *Metal Mining Effluent Regulations* or of the air quality standards under the Quebec *Clean Air Regulation*.

The Cree Nation of Nemaska also voiced concerns about eating the meat of Canada geese that could be contaminated by water from the settling ponds or flooded mine pit or by berries eaten by the birds near the mine site. The Proponent stated that the tests conducted have shown that the anticipated metal levels in the ponds would not pose a significant risk to the health of birds.

### 7.4.3 *Agency analysis and conclusion*

*Analysis of the effects*

The Agency notes that the changes made to the location of the mine infrastructure and the programs proposed to control dust and pollutants emitted to the environment would be effective in reducing the effects on health conditions.

Given that air quality should meet provincial and federal criteria, the Proponent concludes that the potential for accumulation of dust on trapline R20 is limited. According to the Agency, there remains some uncertainty regarding this conclusion since dust deposition rates were not modelled in the Proponent's analysis. The Agency notes that the question of dust contamination is at the heart of the concerns of the Cree Nation of Nemaska, that the consumption of traditional food is part of their way of life, and that any damage to the quality of traditional food could have an effect on Cree health conditions. Given the concerns raised by Environment Canada regarding the attainment of the dust control objectives and the fact that fish and berries are the elements most likely to be contaminated by dust, the Agency is of the view that rigorous implementation of a dust management program is key to compliance with the applicable ambient air standards.

With respect to the Project's potential adverse effects on the quality of water that might be used for drinking, the Agency is of the view that the measures required to ensure compliance with standards and monitoring requirements under the *Metal Mining Effluent Regulations*, as well as the water quality criteria prescribed in the government of Quebec's Guideline 019, as listed in Section 7.1, would reduce the risk of contamination of the drinking water supply. As described in Section 6.2, the sampling performed by the Proponent shows that there

are currently exceedances of the bacteriological standards of Quebec's *Regulation Respecting the Quality of Drinking Water* for total coliform in several of the water bodies used by the Cree Nation of Nemaska. To ensure that the Project does not put more contaminants in water bodies used by the Cree during operation and after closure of the mine, the Agency believes that water quality monitoring in Lac des Montagnes as well as Lakes 1, 2, 6 18 and 28 is necessary, applying the *Canadian Drinking Water Guidelines*.

The Agency believes that the adverse residual effects on the health and socio-economic conditions of Aboriginal people would not be significant (see Appendix F) following implementation of the mitigation measures put forward by the Proponent. The magnitude of the effect would be low considering compliance with air quality standards, the anticipated low level of contaminants in the effluent and the low potential for acid mine drainage from waste rock and tailings. The extent of the effect would be local, given that the effects would extend beyond the Project's footprint, although they would be limited to the immediate vicinity of the Project site. The duration of the effect would be long-term given that the effects on water quality could persist after the mine closure. The effects on health conditions would be reversible given that the emission of potential contaminants should cease with the mine's closure.

### *Key Mitigation Measures to Avoid Significant Effects*

Changes to the site plan are the most effective mitigation measure in the circumstances, although the Agency has determined that implementation of the following mitigation measures, in addition to the mitigation measures and follow-up provided in Section 7.1, is required to ensure that the Project will not cause significant adverse effects on health and socio-economic conditions.

- The Proponent shall, for all phases of the Project, at the 23 sensitive receptors sites (hunting camps and Bible Camp) meet the air quality standards set out in the *Canadian Ambient Air Quality Standards* of the Canadian Council of Ministers of the Environment and the Quebec *Clean Air Regulation* by implementing a dust management program that includes the following mitigation measures:
    - use of dust-control measures;
    - imposition of a speed limit of 30 km per hour at the Project site during construction, operation and decommissioning;
    - progressive restoration of the waste rock and tailings pile.

### *Need for Monitoring and Requirements of Follow-up*

To avoid major health and socio-economic effects, the Agency is of the view that the following monitoring activities by the Proponent are necessary:

- Annual monitoring of heavy metal concentrations in fish meat and fish liver for species likely to be eaten by the Nemaska Cree (Walleye, Northern Pike and Lake Whitefish) in Lac des Montagnes and Lac du Spodumène. Monitoring shall begin with construction and end five years after decommissioning.
- Monitoring of air quality to verify the effectiveness of key mitigation measures. The monitoring will begin with the start of construction and end when the decommissioning phase is done.

- The Proponent shall alert the Cree Nation of Nemaska in the event that the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards or the *Quebec Clean Air Regulations* are exceeded at the sensitive receptor closest to the Project.
- Before the construction, the Proponent shall establish a communication plan to share the results of the follow-up programs with the Cree Nation of Nemaska and consult them about the result of the programs regarding health and socio-economic conditions and about the implementation of any appropriate corrective measures, if required. The implementation of this communication plan begins with the construction and ends following Project decommissioning.

*Conclusions*

Taking into account the implementation of the mitigation and follow-up measures described earlier, the Agency is of the view that the Project would not have significant adverse effects on the health and socio-economic conditions of Aboriginal people.

## 7.5 Aboriginal Groups - Physical or Cultural Heritage, and Effect on Historical, Archeological, Paleontological or Architectural Sites or Structures

On the land concerned by the Project, archaeological heritage is the first component examined in this section. The second component examined relates to cultural heritage, which more specifically addresses the Project's potential effects on the Bible Camp and the multiple activities associated with it. A number of social issues, such as cultural erosion and the presence of alcohol and drugs, were brought to the Agency's attention. Given that monitoring these issues is the responsibility of the Quebec government, they were not addressed in the federal environmental assessment of the Whabouchi Project.

### 7.5.1 *Proponent's assessment of environmental effects*

The inventory that was conducted following the study of archaeological potential did not uncover any artefacts. Interviews with tallymen generated relevant information on the location of old camps or facilities. No artefacts of human settlement prior to the 1950s were identified during the archaeological inventories.

The Cree Nation of Nemaska has identified valued sites and birth site, as well as a gathering site, the Bible Camp, in the Project area. The Bible Camp, a significant site to the Cree Nation of Nemaska, provides a gathering place for families during cultural and religious events and a summer camp for the community's youth. Located on the edge of Lac des Montagnes, it is also the site of numerous recreational activities, such as fishing, swimming and canoeing.

*Predicted Effects*

The mine's presence and operations could affect the tranquil nature of the Bible Camp and its use, particularly due to:

- The limited access to Lac des Montagnes;
- Noise nuisances;
- Landscape deterioration.

The limited access to Lac des Montagnes was addressed in the context of its use by local users in Section 7.4 (current land use). The Proponent has undertaken to maintain access to the beaches located to the northeast of Lac des Montagnes despite encroachment by the safety zone set up by the Proponent on these beaches (see Figure 13). Other beaches on the same lake remain accessible since they are not located within the mine security zone.

Changes to terrestrial and wetland environments caused by the waste rock and tailings could alter aspects of the landscape with the addition of infrastructure located near the Bible Camp and camps, and could become a nuisance to the Cree Nation of Nemaska. However, visual simulations performed by the Proponent indicate that the pile will not be highly visible from the mouth of the Nemiscau River in Lac des Montagnes, where the Bible Camp and Cree camps close to the mine site are located. The final effluent discharge pipe in Lac des Montagnes will be buried over a distance of approximately 100 meters before it enters the lake in order to limit the visual impact on lake users.

With respect to noise nuisance, as described in Section 6.3, the Proponent does not expect the Project to have any significant effects on the sound quality perceived at the various camps or the Bible Camp.

### *Proposed Mitigation Measures*

The Proponent undertakes to implement various measures to limit the effects, particularly in relation to:

Archaeological artefacts:

- In the event that any archaeological artefacts are accidentally discovered during the work, the archaeological site(s) discovered will be managed in accordance with the requirements of the Quebec *Cultural Property Act* (R.S.Q., c. B-4);
- If archaeological artefacts are discovered at the mine, site supervisors are required to report the discovery immediately to the Project manager and, as necessary, halt work at the location of the discovery until it can be fully assessed by archaeologists. Nemaska Lithium will inform the Cree tallyman and Cree authorities, among others.

The Bible Camp and its activities:

- Prohibit pit blasting between 7:00 p.m. and 7:00 a.m.;
- Assess the possibility of relocating the Bible Camp if necessary;
- Bury the effluent discharge pipe over a distance of approximately 100 meters along the shoreline and in the initial part of the littoral area to limit the visual impact on users of Lac des Montagnes, including the Bible Camp;
- Carry out progressive revegetation of the waste rock and tailings pile and restore the mine site after its closure.

In addition to these measures, the Proponent plans to establish measures to reduce noise and visual nuisances (including lights) (see Appendix A).

To confirm the effectiveness of these measures, the Proponent undertakes to create a Bible Camp user monitoring program and conduct specific monitoring for noise and vibration at the Bible Camp. Users could assess the mitigation measures and suggest adjustments to them. The mechanisms involved in this monitoring will be discussed within the framework of an impact and benefit agreement between the Proponent, the Grand Council of the Crees (Eeyou Istchee), the Cree Nation Government and the Cree Nation of Nemaska (Chinuchi Agreement).

*Predicted Residual Effects*

Given that no historical or archaeological artefacts have been found in the Project study area, no potential effects on the archaeological heritage are expected during the work planned on mine property.

According to the Proponent, the significance of the residual effect on the Bible Camp and its activities would be moderate following the implementation of mitigation measures.

### 7.5.2 *Views expressed*

*Aboriginal Groups*

A number of members of the community voiced concerns about the possibility that the visual and auditory impacts of mine operations will disrupt use of the Bible Camp.

In response to these concerns, the Proponent reviewed the mine site layout to move the infrastructure farther away from Lac des Montagnes. The waste rock and tailings pile will be installed to the north of Route du Nord. Mine water ponds and the overburden pile will also be relocated more than 750 meters from Lac des Montagnes.

### 7.5.3 *Agency analysis and conclusion*

*Analysis of the effects*

Changes made to the mine layout plan made it possible to move sources of nuisance away from the Bible Camp. The updated modelling of the noise environment performed following changes made to the site plan confirms the absence of any significant effects on the Bible Camp. Visual simulations by the Proponent and submitted to the provincial review committee (Roche, April 2014) indicate that the waste rock and tailings pile will be highly visible from the area at the mouth of the Nemiscau River in Lac des Montagnes, where the Bible Camp and Cree camps closest to the mine site are located.

The Agency is of the view that the negative residual effects on Aboriginal physical and cultural heritage will not be significant (see Appendix F) following implementation of the mitigation measures put forward by the Proponent. The magnitude of the effect will be low given that studies and inventories have not uncovered any artefacts, and visual simulations and air quality and effluent modelling indicate a limited impact on the environment. The extent of the effect would be local considering that the archaeological heritage effects would be limited to the site of the Project, but the effects on the environment could extend beyond the Project's footprint to the Bible Camp over 1 km away. The duration of the effect would be long-term given that the visual nuisance related to the presence of the waste rock and tailings pile would persist after the mine's closure. However, the nuisances in question would be minor. The effects on heritage would be partly reversible

considering that the visual nuisance surrounding the pile would persist after the mine's closure, but the effects related to air quality and noise would cease once the mine is no longer in operation.

### *Key Mitigation Measures to Avoid Significant Effects*

Changes to the mine layout plan are an effective mitigation measure, but the Agency has determined that the following key mitigation measures that would prevent significant adverse residual effects on the "physical and cultural heritage or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance" component would be necessary:

- In the event that archaeological artefacts are discovered on the mine site, comply with the requirements of the Quebec *Cultural Property Act* and inform the tallyman who would be directly affected by Project construction, as well as the Cree Nation of Nemaska;
- Optimize the Project to reduce visual nuisances by implementing the following among other measures:
    - Bury the effluent discharge pipe over a distance of approximately 100 m away from the shoreline, and in the first part of the littoral zone; in accordance with the Fisheries and Oceans Canada requirements, in order to prevent serious harm to fish;
    - Carry out progressive revegetation of the waste rock piles and tailings;
    - Restore the mine site after decommissioning activities are completed;
- Ensure access at all time to the northeastern part of Lac des Montagnes to allow Bible Camp users to continue engaging in all activities related to the lake and its shores, such as swimming and canoeing;
- Implement a noise level monitoring program at the Bible Camp during the construction and operation phases to ensure compliance with the noise levels prescribed by the Quebec *Note d'instructions 98-01 sur le bruit*, to verify mitigation measures and to take any necessary corrective action;
- Implement a communication plan to share the results of the follow-up program with the Cree Nation of Nemaska and consult them on the implementation of corrective measures, should any be required.

### *Conclusions*

Taking into account the implementation of mitigation measures described earlier, the Agency is of the view that the Project would not have significant adverse effects on natural or cultural heritage.

# 8 Other Effects Considered

## 8.1 Effects of the Project on Species at Risk

The Agency has assessed the Project's adverse effects on the species and critical habitat listed under the federal *Species at Risk Act* as required by subsection 79(2) of the Act. Species at risk likely to be affected by the Project are the Olive-Sided Flycatcher, Common Nighthawk, Rusty Blackbird, Short-Eared owl, Woodland caribou, Wolverine, Little Brown myotis and Northern myotis.

The significance of the Project's effects on species at risk that constitute environmental components to be considered in applying the Act is addressed in the valued components section of Chapter 7. The Project's effects on migratory birds at risk are covered in Section 7.2, and the effects on Woodland caribou are covered in Section 7.3 since this species is hunted by the Cree Nation of Nemaska.

### 8.1.1 *Proponent's assessment of environmental effects*

**Short-Eared Owl**

The Short-Eared Owl is not protected by the 1994 *Migratory Birds Convention Act*, but it is listed as a species of concern under the federal *Species at Risk Act.* According to the proponent, the Lac du Spodumène peatland is the only potential habitat for the short-eared owl in the Project area. According to the proponent, the Lac du Spodumène peatland could have between one to three pairs of short-eared in times of abundance of prey.

*Proposed mitigation*

The proponent is committed to implement a number of mitigation measures to mitigate the effects on migratory birds (section 7.2) that would reduce the impact on the Short-Eared Owl (see appendix A). The proponent commits to implement the following mitigation measures:

- Protect all nests found using a buffer zone based on an adequate distance of protection to the species until the chicks have left the vicinity of the nest on a permanent basis. The distance of adequate protection would be 500 meters for the Short-Eared Owl;
- Conduct an inventory of the Short-eared Owl in the Lac du Spodumène peatland before the beginning of the work to determine whether the site is used;
- Monitor the impact of the drawdown of the water table on the Lac du Spodumène peatland which includes monitoring the avian wildlife at risk in the breeding season.

*Anticipated residual effects*

The proponent considers the impact of the loss of habitat for the Short-eared Owl weak given the small area affected approximately 0.0037 $km^2$ and because there would be no breeding pairs of the species affected by these habitat loss. According to the proponent, the main effect of the Project on this species will be caused by the disturbance (artificial lighting, noise, human presence). As described in section 7.2, the proponent considers that the significance of the residual effect on bird species at risk (including the Short-Eared Owl) would be moderate taking into account the low number of breeding pairs that would be affected.

**Bats**

The range of the Northern myotis (*Myotis septentrionalis*) and Little Brown myotis (*Myotis lucifugus*), two species designated endangered under the federal *Species at Risk Act*, also includes the study area. The inventories performed show that the Northern myotis and the Little Brown myotis could be present in the study area near Lac du Spodumène. A maternity colony of approximately 300 small brown bats is located 625 m east of the mine site. This maternity colony has been monitored by the Quebec Department of Forests, Wildlife and Parks for many years.

**Wolverine**

The study area falls within the range of the Wolverine, specie designated endangered under the *Species at Risk Act*. According to the Proponent, it is unlikely that Wolverines occur in the study area given the presence of only a small number of large mammals, which form the bulk of the species' diet.

#### *Proposed Mitigation*

The Proponent undertakes to implement various mitigation measures for mammals that could reduce the Project's effects on bats and wolverines, particularly in relation to sound and ambient light (see Appendix A). It also undertakes to implement the following measures specifically for the Little Brown myotis:

- Inform and raise worker awareness of the presence of the Little Brown myotis maternity colony near Route du Nord (Chiroptera);
- Perform annual monitoring of the number of specimens present in the species' maternity colony near Lac du Spodumène.

#### *Anticipated Residual Effects*

Although terrestrial environments in the study area are fairly homogeneous, and although terrestrial wildlife could move or use similar environments to those disturbed by mining operations near the site, the Proponent considers the significance of the residual effect on bats to be moderate given the proximity of the maternity colony used by the species to the mine infrastructure.

No effects are anticipated on Wolverines taking into account that it is not very probable whether he is in the zone of study.

### 8.1.2 *Views Expressed*

#### *Federal Authorities*

**Short-Eared Owl**

According to Environment Canada, the great lac du Spodumene peatland would not be the only suitable habitat for the species in the study area because the recently burned-over areas may also be used by the Short-eared Owl. The Department recommends that the use of the lac du Spodumene peatland by the Short-Eared Owl be confirmed before the start of the work and that in the event it is used that the proponent proposes and applies additional mitigation measures during the breeding season. As described in section 7.2.2 Environment Canada proposes that a follow-up program for migratory birds at risk and the Sort-Eared Owl.

**Bats**

According to the Committee on the Status of Endangered Wildlife in Canada status report on the Little Brown myotis and Northern myotis, the impact of mining activities during exploration and extraction stages could become a concern if noise and vibration disturb hibernating bats.

Noise caused by vehicle traffic could cause the bats to change their hunting patterns, and increased road system density could reduce the size of available feeding areas.

Considering that the Project would not significantly increase noise and light in the Little Brown myotis maternity colony, and that the bats will be able to move into other environments to feed during the life of the mine, the effects on the maternity colony should be limited. Environment Canada believes that the mitigation measures proposed by the Proponent to limit noise and light generated by mine activities are essential in order to reduce the adverse effects of the Project on bats (7.2.3).

**Wolverine**

Environment Canada confirms that the potential for the presence of Wolverines in Quebec is low, and believes that the mitigation measures proposed by the Proponent for small and large mammals (Appendix A) would be sufficient to reduce the risk of adverse effects on the species. Environment Canada considers the significance of the residual effect on this species to be low to negligible.

*Public*

One member of the public expressed concern about the Project's potential effects on the Little Brown myotis given the species' vulnerability. To limit any possible impact of the Project on the Little Brown myotis maternity colony located near Lac du Spodumène, the Proponent undertakes to perform annual monitoring of the number of specimens in the maternity colony.

### 8.1.3 *Agency analysis and conclusion*

The Agency has determined that key mitigation measures proposed by the proponent and those described in section 7.2 to reduce adverse effects on birds at risk would avoid disturbing the Short-Eared Owl and its recovery.

Noise and light are two factors identified by Environment Canada as potentially harmful to bats. Given these factors and the proximity of the Little Brown myotis maternity colony, the Agency recommends that the Proponent implement the proposed measures to mitigate the intensity of noise and light generated by the Project and that it conduct annual monitoring of the maternity colony and take corrective action as necessary (7.2.3). These measures could prevent harm to the species or to their recovery.

Given the limited possibility of the wolverine's presence in the study area, the Agency has no specific recommendations regarding this species.

## 8.2 Proponent's Assessment of Accidents and Malfunctions

Accidents and malfunctions can occur at various phases of the Project, from construction of the mine site to the post-closure phase.

The Proponent evaluated and estimated the technological risks based on criteria that take into account the severity of the consequences of an undesired event, the probability that such events would occur, the level of uncertainty (about the consequences and probable occurrence) and the risk acceptability criteria. The estimated level of risk takes account of the prevention and mitigation measures implemented.

The Proponent conducted an overall analysis of technological risks, including risks to workers and the public, environmental risks and property risks. The analysis did not identify any high technological risks. The risks most likely to affect the environment are associated with potential surface or groundwater contamination. Such contamination could occur as a result of the storage or handling of petroleum and chemical products or the occurrence of a fire (see Table 8).

The Proponent undertakes to ensure the effectiveness of control measures and mitigation plans, and to ensure procedures are in place. Considering that the mine site is located far from resources that could be deployed in the event of a major accident, the Proponent will provide the necessary resources to respond diligently in the event of a major accident. It also intends to establish mutual assistance agreements with other companies in the area as well as the Cree Nation of Nemaska in order to share emergency response resources.

**Table 8 Summary of Technological Risks that can Cause Environmental Damage**

| Hazard Identification | Description of Risk | Consequences* | Probabilities* | Uncertainty level* | Risks* |
|---|---|---|---|---|---|
| Petroleum products (fuel oils, fuels) | Spill | M | L | L | M |
| Petroleum products (fuel oils, fuels) | Fire | H | L | L | M |
| Petroleum products (oils, greases) | Spill | L | L | L | L |
| Miscellaneous chemical products | Spill | M | L | L | M |

* VH: very high; H: high; M: moderate; L: low; VL: very low.

Source: Environmental and Social Impact Assessment, Nemaska Lithium, March 2013

### *Predicted Effects and Mitigation Measures Proposed by the Proponent*

#### *Petroleum Product Spills*

The Proponent's impact assessment indicates that petroleum product spills could contaminate surface and groundwater as well as soil. Spills could result from multiple causes: corrosion and breakdown of storage equipment and vehicles, accidents causing spills from vehicles during shipment, and human error during maintenance or refuelling.

#### *Proponent's Prevention and Mitigation Measures*

- Use double-wall petroleum product storage tanks.

- Establish methods for detecting hydrocarbon levels in tanks and preventing spills.
- Provide spill containment devices in storage, distribution and use areas (i.e., slabs).
- Provide a water-hydrocarbon separator in the fuel storage area.
- Establish hydrocarbon receiving and distribution procedures with employee training.
- Provide double-wall daily supply tanks.
- Keep spill kits with absorbents on site.
- Train and raise awareness about environmental protection among employees.
- Establish an emergency plan with a specific response procedure.

### *Fire*

According to the Proponent's impact assessment, a fire could occur in the processing plant, fuel storage areas, or daily supply tanks, as well during the shipping and distribution of daily supply tanks. Causes can include hydraulic oil and lubricant leaks, welds on equipment with an interior rubber lining and conveyor belt friction. Fires could result in the contamination of surface water, groundwater and soil.

### *Proponent's Prevention and Mitigation Measures*

- Use lubricants and hydraulic oils with a low flashpoint.
- Maintain conveyors and equipment to prevent belt slippage and friction and prevent hydrocarbon leaks and spills.
- Control wildling of equipment using an interior rubber lining.
- Base fire prevention measures on National Fire Protection Association standards.
- Provide equipment to detect and fight fires and smoke, such as:
    - a hydraulic fire-fighting system and fire hydrants at the conveyor and near the petroleum product storage area;
    - a supply of foam to combat hydrocarbon fires;
    - a 200,000-gallon US fire water system (757.1 $m^3$).
- Have a spill kit with absorbents.
- Establish an emergency response team.
- Have an emergency response plan in place with an alerting procedure and employee training.

### *Chemical Spills*

According to the Proponent's impact assessment, a number of chemical products required by operations will be stored and transported, including vehicle fuels, lubricants, blasting explosives, reactants or additives for processing ore in the processing plant. Equipment failure and human error occurring during handling of these substances, as well as accidents during shipment could result in the spillage of hazardous products that would contaminate surface water and soil. Accidental chemical spills could occur during the use, maintenance or refuelling of heavy machinery and vehicles.

*Proponent's Prevention and Mitigation Measures*

- Establish a maintenance program to prevent leaks caused by corrosion or equipment failure.
- Comply with the requirements of the *Transportation of Dangerous Goods Regulations* (SOR/2008-34) for products classified as dangerous goods.
- Create dedicated storage areas for chemical products and means for preventing and containing leaks, including tank level indicators equipped with alarms and containment basins for each tank;
- Have spill kits with absorbents on hand.
- Establish chemical handling and use procedures and provide employee training.
- Establish an emergency response plan with specific response procedures.

*Mine Water Pond Dam Failure*

The mine water pond dam would be the only dam used for the Project. For environmental reasons, the Proponent has opted to dispose of its tailings in filtered form, which does not require the installation of tailings ponds or dams.

With respect to the significance of the impact of a possible failure of the mine water pond dam, the Proponent stated that the pond would have a capacity of 26 000 $m^3$, which is small compared to the tailings pond dams generally installed on mine sites, which can reach several million cubic meters. The consequences of a dam breach for the Whabouchi Project would be the release of all or part of the water and slurry accumulated in the pond to the environment. The Proponent is of the view that these consequences would be limited considering the small capacity of the pond and the fact that it would be used only to settle out the suspended solids, with no further treatment, since the ore and waste rock will not generate acid drainage or leach materials. Furthermore, the pond will be located 1 kilometer from Lac des Montagnes and the land is gently sloped and covered with vegetation, which will trap the sediment. The Proponent does not expect any significant effects on Lac des Montagnes.

*Proponent's Prevention and Mitigation Measures*

Although it has not analyzed the technological risks potentially associated with the failure of the mine water pond dam, the Proponent plans to implement a procedure for monitoring the soundness of the mine water pond dam (and other structures on site). This monitoring will involve systematic visual inspections performed year-round (daily, weekly and annual inspections or inspections following observed abnormalities). Any defect or failure in the dam would mean shutting off the water flow to the mine water pond. The dam would first have to be stabilized once the risks were assessed. The necessary repairs would be made to close (repair) the breach and recover as much of the solids spilled downstream from the point of leakage or breach as possible. The resumption of the use of the mine water pond would not be permitted until it was inspected by a geotechnical expert. In this regard, the Proponent undertakes to conduct a geotechnical study in the summer of 2015 to validate the location of the accumulation areas and their future stability, as well as the location of the mine water pond dam. The Proponent also states that the dam was designed to exceed the safety criteria prescribed by Quebec mine regulations to withstand static and dynamic stresses.

*Residual Effects According to the Proponent*

The Proponent is of the view that the risk assessment process adopted and applied in the Whabouchi Project would ensure a low probability of residual negative effects following accidents or malfunctions. The Proponent would develop an emergency response plan that took account of accidents and malfunctions. The plan would identify the roles, equipment, response techniques and specific response procedures for risks of fire, explosions and spills of various petroleum and chemical products.

### 8.2.2 *Views Expressed*

*Aboriginal Groups*

The initial Project design called for two settling ponds located near Lac des Montagnes. The Cree Nation of Nemaska expressed its concerns about the location of the ponds and the potential impacts in the event of an accidental spill from the ponds into Lac des Montagnes. To address the concerns of the Cree Nation of Nemaska, the Proponent decided to review the initial Project design. The Project now consists of only one mine water pond, located farther away from Lac des Montagne, so that any potential failure of the pond would no longer pose a risk to the lake.

*Federal Authorities*

In the initial Project design, a mine water pond was located near the explosives depot. To limit the risk of a mine water pond failure in the event of an explosion, Environment Canada asked the Proponent to consider another site for the explosives depot. The Proponent now plans to have three small depots located at a distance from the new mine water pond, which was also relocated farther away from Lac des Montagnes. According to Environment Canada, even though the mine water pond has been moved farther from Lac des Montagnes to limit the risk of spills to the aquatic environment, there is still a risk of spill from the mine water pond or from the waste rock and tailings pile water containment pond. The Proponent undertakes to monitor the soundness of the mine water pond dam and to take any necessary action to recover solids in the event of a dam failure. The Proponent believes that given the 1kilometer distance between the dam and Lac des Montagnes and the fact that the terrain at this location is gently sloped, sediment from a potential dam breach would be trapped by vegetation. Environment Canada is of the view that the assessment of the impacts of a potential dam failure provided by the Proponent appears to be valid, and that it is reasonable to believe that the quantity of water and sludge that reached the lake would be limited. However, the Department recommends that the Proponent provide mitigation and contingency measures in its emergency response plan in the event of dam failure to limit the risk of environmental contamination, especially of soil and surface water.

Environment Canada also recommends that the Proponent identify specific measures for migratory birds in its emergency response plan, particularly for migratory bird species at risk, in the event of accidental spills, limits inadvertent exceedance of standards, migratory bird mortality or the observation of abnormal behaviour in birds present in the mine water pond (a component to include in the environmental monitoring program). If such events or situations were observed, the Proponent should make the necessary corrections. As necessary, the Proponent could contact the Canadian Wildlife Service for advice on appropriate action.

### 8.2.3 *Analysis of Effects and Agency Conclusion*

*Analysis of Effects*

The Agency is of the view that the Proponent has identified and assessed the potential accidents and malfunctions associated with the Project and that it has taken into account the concerns of the Aboriginal groups and federal authorities regarding the risk of dam failure. The Agency notes that the Proponent has taken the identified risks into account in the Project design to prevent such scenarios, and has undertaken to implement the emergency response plans developed in the event of an accident. Given the potential risks of contamination that could occur in the event of a failure of a dam or water pond, especially the waste rock and tailings pile water pond that would be located along Stream F and Lake 28, the Agency is of the view that mitigation and contingency measures in the event of a failure should be included in the Proponent's emergency response plan.

Given the risks of bird mortality or cases of abnormal behavior following accidental spills or inadvertent exceedance of standards in relation to the water quality in the mine water pond, the Agency is of the view that the Proponent should take all reasonable steps to prevent accidents and malfunctions and should implement mitigation and contingency measures in its emergency response plans that take account of the effects of accidents on migratory birds.

*Key Mitigation Measures to Avoid Significant Effects*

The Agency has considered the mitigation measures proposed by the proponent, expert advice from federal authorities, and comments received from Aboriginal groups and the public in identifying the following key mitigation measures as necessary to ensure no significant adverse environmental effects to accidents and malfunctions:

- Takes all reasonable measures to prevent accidents and malfunctions that could result in adverse environmental effects and is ensuring the implementation of mitigation and contingency measures in its emergency response plans developed for the purposes of the Project;
- In the event of an accident or malfunction that could result in adverse environmental effects, the Proponent:
    - Notifies the Agency of the occurrence as soon as possible;
    - Implements, as soon as possible, measures to mitigate the adverse environmental effects of the accident or malfunction;
- Submits a written report to the Agency as soon as possible given the circumstances, but no later than 30 days after the accident or malfunction. The written report must detail the following:
    - A description of the accident or malfunction and of its adverse environmental effects;
    - The measures that were taken to mitigate the environmental effects of the occurrence;
    - A description of any residual environmental effects, and any additional measures required to address residual environmental effects;

- If an emergency response plan was implemented, details concerning its implementation; and
- Changes made to avoid a subsequent occurrence of the accident or malfunction.

The Proponent shall prepare and implement a communication strategy in consultation with the Cree Nation of Nemaska that shall include:

- The types of accidents or malfunctions that require a notification to the Cree Nation of Nemaska;
- The manner by which the Cree Nation of Nemaska shall be notified of an accident or malfunction; and
- A contact person for the Proponent and for the Cree Nation of Nemaska.

*Conclusion*

Taking into account the implementation of the preventive, monitoring and mitigation measures put forward by the Proponent and the addition of the above measures, the Agency considers it unlikely that accidents or malfunctions will occur that could lead to significant adverse residual environmental effects.

## 8.3 Effects of the Environment on the Project

### 8.3.1 *Proponent's Assessment of Effects*

*Predicted Effects*

Extreme rainfall can have an adverse effect on the various structures at the mine site and on roads (overflows, flooding, loss of materials, erosion, etc.). According to the Proponent, wetlands located near the mine site would have the capacity to retain rainwater, thus reducing the risk of serious flooding in the event of extreme rainfall. This water retention by wetland vegetation would help slow the downstream flow of flood waters, reduce erosion and limit the transport of suspended solids associated with such water.

A seismic analysis performed in 2012 confirmed that the identified mine site is located in a low-risk area. This means that the probability of significant damage to infrastructure every 50 years from an earthquake is less than 1%.

The Proponent has indicated that the Nemiscau region and the study area were hit by forest fires in 2002. This type of event could involve the interruption of mining activities, the evacuation of workers, the deterioration of certain surface infrastructure and increased risk of explosions if hazardous product depots are affected.

According to the Proponent, climate change in the Nord-du-Québec region could translate into higher temperatures and more abundant rainfall at the Whabouchi mine Project site. These climate changes could also involve an increased risk of forest fires over time.

*Proponent's Mitigation Measures*

The Proponent states that civil engineering works and mine structures of the Whabouchi mining Project have been sized and located to take into account the probability of occurrence of extreme events, particularly the level of severity in the event of a breach or failure. For example, the sizing of the drainage ditches and retention ponds was based on a 100-year flood recurrence interval, which made it possible to determine flow in drainage

ditches and the retention volumes required for the basins. The structures will be sized as a function of the seismic factors for the area in question and located outside flood zone.

The Proponent's emergency plan will take account of events resulting from climate change, including forest fires, floods, strong winds and snow storms.

### 8.3.2 *Agency Analysis and Conclusion*

The Agency is of the view that the Proponent has taken into account the possible effects of the environment on the Project in the design of the mine site structures. Moreover, considering that appropriate response measures for each risk identified will be incorporated into the emergency response plans, it is not likely that the environment will have significant adverse effects on the Project.

## 8.4 Cumulative Environmental Effects

The cumulative environmental effects of a Project are the effects that a Project is likely to cause when a residual effect acts in combination with the effects of other Projects or activities that will be or have been carried out. The Agency based its assessment of cumulative effects on the Operational Policy Statement Addressing Cumulative Environmental Effects.[8]

### 8.4.1 *Methodology and Scope*

- The methodological approach proposed by the Proponent for the assessment of cumulative effects includes the following steps:
- Determination the scope of the assessment, specifically, identify regional issues of concern, select the valued components and identify the spatial and temporal boundaries;
- Identification past, present and future Projects, actions or events capable of affecting valued components currently or in the future;
- Identification the cumulative effects for each valued component selected;
- Determination mitigation and follow-up measures for cumulative effects as required.

The cumulative effects assessment performed by the Proponent covered 12 valued components in the physical, biological and human environments. The Proponent selected these valued components based on concerns raised by the Cree Nation of Nemaska during consultation activities, on the advice of specialists concerning the effects of similar Projects and on the legal protected status of affected species. To evaluate the cumulative effects of the Whabouchi Project, the Agency considered the valued components selected by the Proponent that relate to valued components within the meaning of subsection 5(1) of the Act and *species at risk Act*. These components are fish and fish habitat, migratory birds, current use of lands and resources used for traditional Aboriginal purposes, and species at risk.

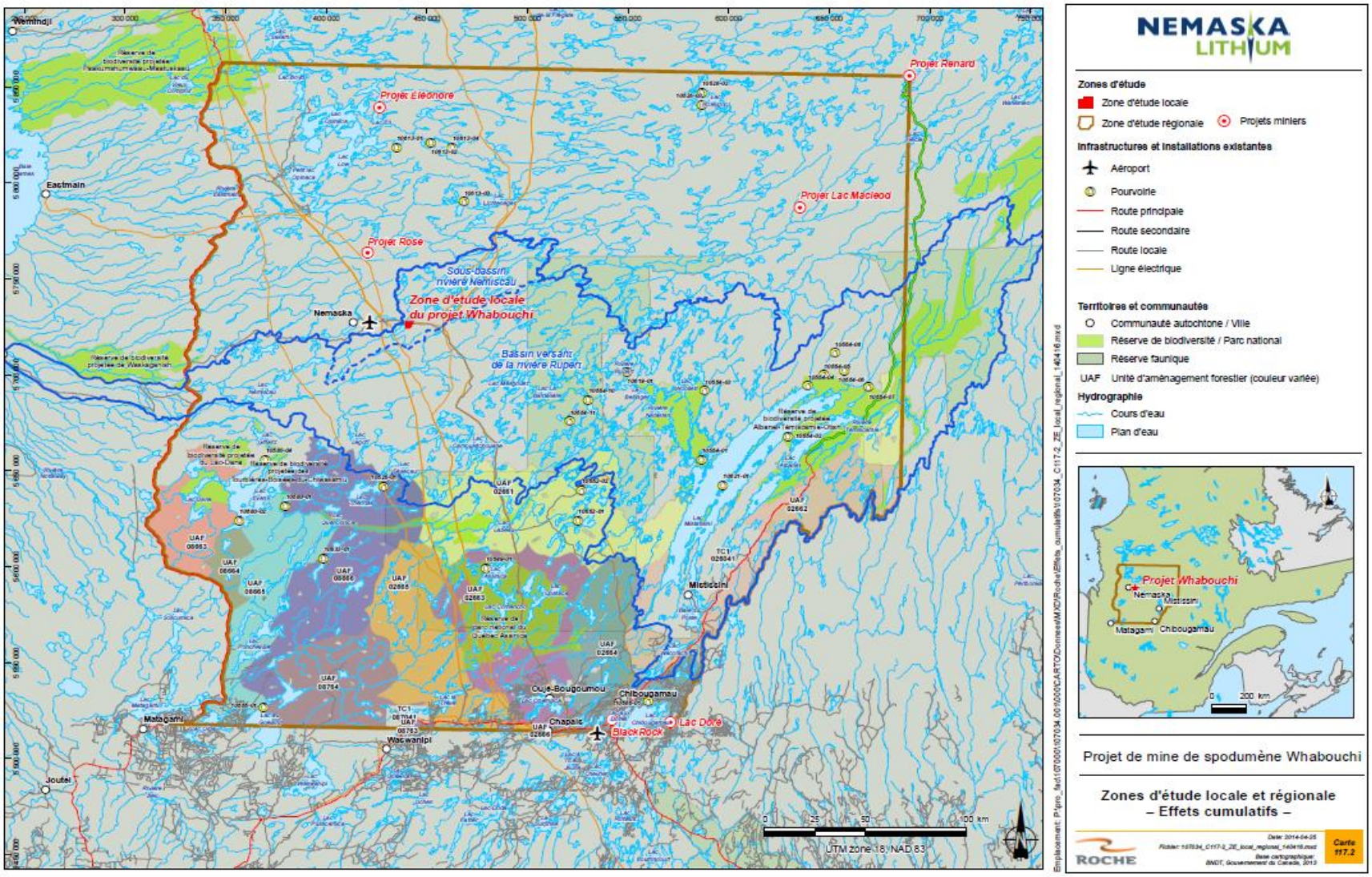
[8] Canadian Environmental Assessment Agency. 2013. Operational Policy Statement Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012* (See https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=1DA9E048-1).

The Proponent has identified spatial and temporal boundaries for each of the valued components selected. For "fish and fish habitat," the spatial boundaries are the watersheds draining into Lac des Montagnes (103 km²) and affected by mine activities. With respect to other biological components, the Proponent has identified the spatial boundaries as being the regional study area (110,928 km²) including the ranges of the species concerned. The regional study area was also considered for the valued components of the human environment in order to include regional communities and towns, as well as other major Projects (mining, hydroelectric, road, etc.) (see Figure 14). The temporal boundary for the Proponent's cumulative effects assessment covers a period of approximately 70 years, from the signing of the James Bay and Northern Quebec Agreement in 1975 to the end of the mine decommissioning phase, planned for 2043.

The Proponent's assessment of cumulative effects did not take into account any regional environmental studies as none has been conducted in the Project area.

Table 9 provides a list of the past, present and future Projects, activities or events having an impact on the valued components taken into account by the Proponent in assessing cumulative environmental effects. This list was based on various sources of information and discussions with the Cree Nation of Nemaska. The Projects have been grouped into five categories: hydroelectric, transportation infrastructure, resource development, wildlife/protected areas, and others.

**Figure 14 Local and Regional Study Areas – Cumulative Effects**




Source: Responses to questions and comments from the Agency, Nemaska Lithium, April 2014

## Table 9 Activities, Projects and Events Considered by the Proponent in Assessing Cumulative Effects

| Project, activity or event | Past | Present | Future |
|---|---|---|---|
| Small hydroelectric Projects | | | |
| Eastmain-1 | X | - | - |
| Eastmain-1-A-Sarcelle-Rupert | X | X | - |
| Hydro-Québec power station and transmission lines | X | - | - |
| Opinaca reservoir | X | - | - |
| Transportation infrastructure | | | |
| Nemiscau airport | X | - | - |
| Route du Nord | X | | |
| Route 167 Nord extension to Monts Otish | - | X | X |
| Resource development | | | |
| Forestry operations | X | X | X |
| Mining exploration activities | X | X | X |
| Mining Projects | | | |
| Troilus Mine | X | - | - |
| Renard Project | - | - | X |
| Lac Macleod Project | - | - | X |
| Rose Project | - | - | X |
| Éléonore Project | - | - | X |
| BlackRock Project | - | - | X |
| Wildlife/protected areas | | | |
| Outfitters | X | X | X |
| Wildlife reserves | X | X | X |
| Protected areas | X | X | X |
| Biodiversity reserves | - | - | X |
| Albanel-Témiscamie-Otish National Park Project and Assinica National Park Reserve | - | X | X |
| Other | | | |
| Forest fires | X | X | X |
| Woodland caribou recovery strategy 2005-2012 | X | - | - |
| Working group on woodland caribou recovery | X | X | X |
| Société Weh-Sees Indohoun | X | X | X |

According to the Proponent, the Eastmain-1 and Eastmain-1-A-Sarcelle-Rupert hydroelectric Projects played a role in the fragmentation of the regional Project study area. These power plants are located 88 km north of Nemiscau and have an installed capacity of 507 MW and 768 MW, respectively. These large-scale hydroelectric Projects included the construction of dams, roads, power stations, substations and power transmission lines, as well as a 735-kiloVolt line crossing the study area. The creation of the Opinaca reservoir located roughly 100 kilometers north of Nemaska to divert water from the Eastmain watershed to the Grande Rivière has also contributed to altering the hydrologic regime of the regional study area.

According to the Proponent, transportation infrastructure, i.e., the Nemiscau airport, Route du Nord and the extension of 167 Nord to Mont-Otish, also contributed to altering the regional study area of the Project.

Six mining Projects were considered in the Proponent's assessment of cumulative effects in the regional study area. The exploration and development phases of these Projects are relatively advanced. Five mining Projects are in the development or implementation stage. The Troilus mine Project is no longer in operation and the decommissioning of its infrastructure continued until 2012. These Projects are located far from one another (see Figure 14).

According to the Proponent, various forest activities have taken place in the area since 1975, primarily in the south part of the regional study area.

The Proponent also took into account activities related to hunting, fishing and trapping, i.e., 12 outfitters, the Assinica and Lacs-Albanel-Mistissini-et-Waconichi wildlife reserves, and the management of activities in Cree territory by the Société Weh-Sees Indohoun. Other regional activities were considered, such as the woodland caribou recovery strategy and the woodland caribou recovery working group, which gave the Proponent a better understanding of the situation facing this species at risk and helped it propose concrete action. The Proponent's assessment of cumulative effects also takes into account the fact that the Whabouchi Project is located in a restricted Government of Quebec forest fire protection area. In the Nemaska sector, a total of 1,876 $km^2$ of forest burned between 2004 and 2012, primarily caused by lightening.

According to the Proponent's assessment of cumulative effects, only local effects associated with the 735-kiloVolt power transmission line and Route du Nord could interact cumulatively with the Whabouchi Project. These cumulative effects could alter some of the valued components selected by the Proponent, such as air quality, noise environment, water resources, wetlands, and fish and fish habitat. In the Proponent's assessment, these cumulative effects are not significant.

### 8.4.2 *Potential Cumulative Effects on Fish and Fish Habitat*

The Proponent has analyzed the Project's cumulative effects on fish and fish habitat in light of the applicable regulations and concerns raised by the Cree Nation of Nemaska relating to the importance of the fish in their diet.

The key Projects whose effects could interact cumulatively with the Whabouchi Project are a Hydro-Québec power transmission line and Route du Nord. Maintenance clearing at substations and around transmission lines has caused and will continue to cause water quality changes by bringing sediment into suspension and could contaminate the water through accidental leaks (hydrocarbons and heavy metals). It is also associated with

permanent losses of fish habitat or changes in the use of fish habitat by fish. In addition to the above-mentioned effects, Route du Nord would also increase fishing pressure in the Whabouchi Project area by opening up access to the area.

The anticipated effects of the Whabouchi Project on fish and fish habitat are changes in water quality caused by contaminants (hydrocarbons, heavy metals, suspended solids, etc.) and serious harm to fish resulting from the combined effect of reduced surface water inflow and groundwater drawdown in certain water bodies and streams. For the most part, these effects would be limited to watersheds affected by the mine's activities.

The Proponent anticipates an undesired increase in fishing pressure despite its intention to prohibit fishing by mine employees at the mine site.

Apart from the mitigation and follow-up measures presented in Section 7.1, the Proponent has not proposed any other specific measures for limiting cumulative effects.

The Proponent provided few details about its assessment of the Project's cumulative effects on fish and fish habitat except to say that it considers the effect moderate and believes the only Projects that could have effects that interact cumulatively with those of the Whabouchi Project are the Hydro-Québec power transmission line and Route du Nord. The Proponent did not consider fish habitat compensation in its analysis of the cumulative effects on this component. Fisheries and Oceans Canada has no additional concerns apart from those mentioned by the Proponent in connection with the cumulative effects on fish and fish habitat.

*Agency Analysis and Conclusion*

The Agency is of the view that the cumulative effect that the Whabouchi Project could have on effects caused to fish and fish habitat by other Projects is low, primarily because the residual effect of the Whabouchi Project on fish and fish habitat in terms of encroachment is limited to the immediate Project area and involves small decreases in the area of certain lakes and streams. The magnitude of the residual effect is also low since serious harm to fish will be offset in accordance with the *Fisheries Act*.

The Agency is also of the view that the residual negative effects of the Whabouchi Project on increasing suspended solids in water that could combine with the water quality effects of Route du Nord and transmission line maintenance Projects would be low given the implementation of the water quality mitigation and follow-up measures proposed by the Proponent.

Accordingly, the Agency finds that the Project is not likely to cause significant adverse cumulative effects on fish and fish habitat and considers that no additional mitigation or follow-up measures are necessary.

### 8.4.3 *Potential Cumulative Effects on Migratory Birds*

The Proponent analyzed the cumulative effects of the Project on waterfowl given its value to the Cree and the federal migratory bird regulations. It also assessed the cumulative effects on three migratory bird species at risk: Olive-Sided Flycatcher, Common Nighthawk and Rusty Blackbird. Section 8.3.5 contains the Proponent's analysis in this regard.

With respect to waterfowl, the Proponent is of the view that the effects of all of the Projects listed in Table 9 are likely to combine with the effects of the Whabouchi Project given that these birds use large expanses of land.

The activities involved in these Projects have or will cause changes in certain behaviours, such as feeding and reproduction, potential mortality in young birds and habitat losses, particularly in streams, lakes and wetlands due to the installation of infrastructure. For example, development of the Eastmain-1-A power station and diversion of the Rupert River flooded large areas of land and the volume of water in some streams was reduced or simply diverted.

Apart from the mitigation and follow-up measures set out in Section 7.2 for birds, the Proponent is not proposing any other specific measure to reduce cumulative effects.

The Proponent provided little explanation of how it assessed the Project's cumulative effects on waterfowl except to say that it considers the effect to be moderate taking into account the residual effects and that the footprint of the Whabouchi Project is quite small compared to several large-scale Projects that have characterized development in the James Bay area and that may have affected waterfowl in the study area.

*Agency Analysis and Conclusion*

The Agency is of the view that the cumulative effect of the Whabouchi Project and other Projects on migratory birds is low. This is primarily because the surrounding environment is relatively undisturbed by other Projects or infrastructures and because the birds are able to relocate to similar habitats near the mine site.

The Agency therefore finds that the Project would not cause significant adverse cumulative effects on waterfowl or migratory birds in general, and finds that no additional mitigation or follow-up measures are necessary.

### 8.4.4 *Potential Cumulative Effects on Aboriginal Peoples*

Taking into account the results of air and water quality modelling, the Proponent is of the view that it is reasonable to conclude that the risk of contamination will be low and even insignificant. It therefore believes that the Project will have no impact on the quality of traditional food harvested in the vicinity of the mine site. For that reason, the Proponent did not include the cumulative effects of the Project on Aboriginal health in its assessment.

In Section 7.5 on Aboriginal health, the Agency found that the information provided by the Proponent was insufficient to conclude that the Project would have no effects on Aboriginal health. However, the Agency believes that the follow-up programs proposed by the Proponent will be able to detect any health issues, particularly the possibility of effects caused by atmospheric deposition of contaminants in water bodies used as drinking water sources. The Proponent has undertaken to take any necessary corrective actions. Given that the possible effects on Aboriginal health will be local in nature, and that other Projects likely to affect Aboriginal health are located far from the Whabouchi Project, the Agency is of the view that the Whabouchi Project is not likely to result in cumulative effects with the effects of other Projects. The Agency therefore did not require that an assessment of the cumulative effects on Aboriginal health be conducted.

The Proponent analyzed the cumulative effects of the Project on Aboriginal peoples primarily in light of concerns raised by the Cree Nation of Nemaska relating to hunting, fishing and trapping, and to their traditional way of life and cultural identity. To this end, the Proponent focused on the valued components of "hunting, fishing and trapping," "community well-being," "community infrastructure" and "socio-economic aspects." For the purposes of this report, the Agency will discuss only the first two components analyzed by the Proponent in the following

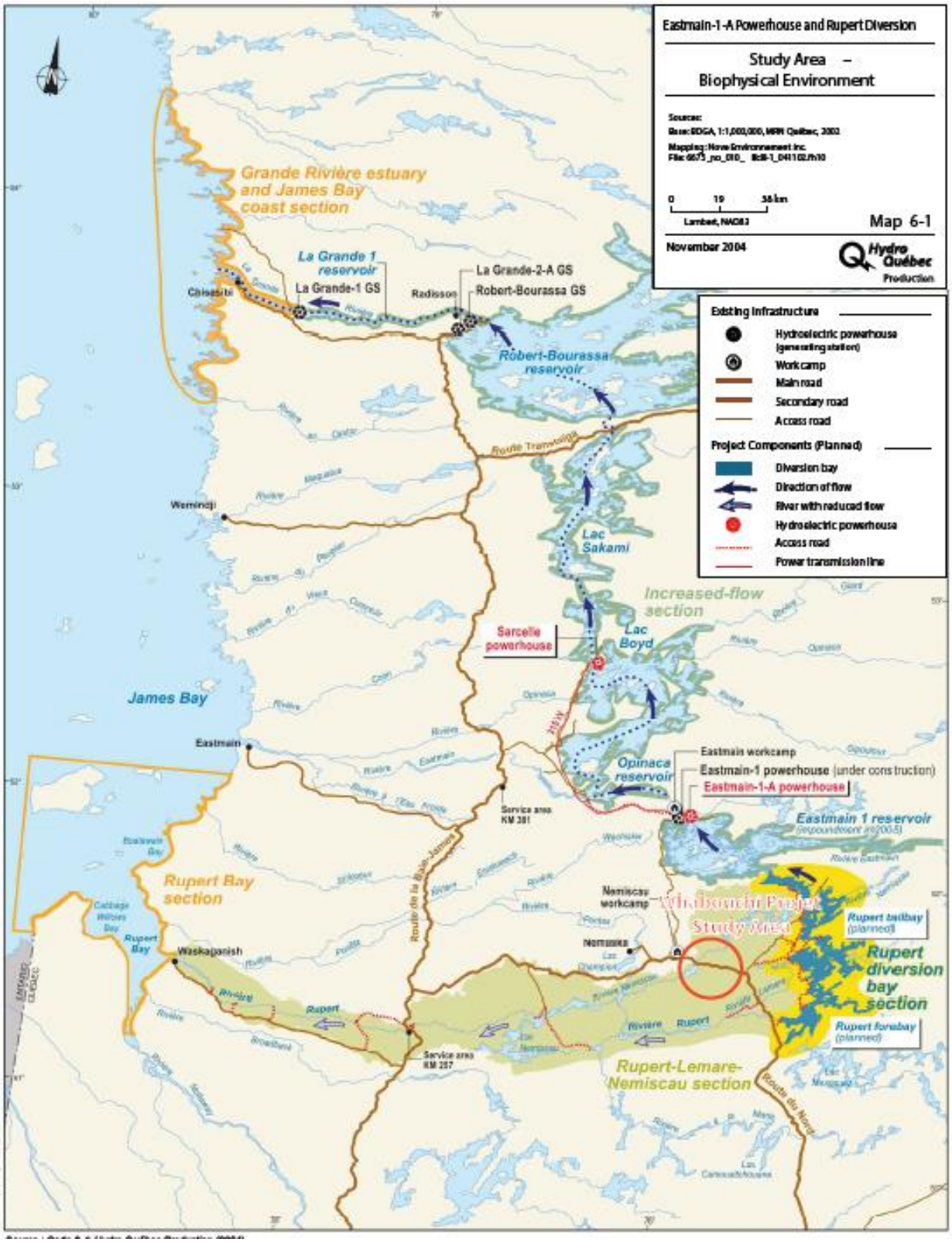
paragraphs, given that "community infrastructure" and "socio-economic aspect" components concern issues not covered by federal environmental assessments.

The Proponent considered the effects of all of the Projects listed in Table 9 as being likely to combine with the effects of the Whabouchi Project on Aboriginal peoples, given that the traplines and use of the land in general cover vast expanses of territory.

### *Hunting, Fishing and Trapping*

According to the Proponent, with the development of James Bay and the implementation of major hydroelectric Projects, the users of the area have adapted their activities to this new environment. Parts of the area that were once accessible and used became inaccessible and were therefore abandoned by users. For example, the drop in water levels in the Rupert River resulted in changes in how permanent camps on five traplines of the Cree Nation of Nemaska were used. Fishing activities on the Nemiscau River and Teilhard Lake changed. Overall, the Eastmain-1-A hydroelectric Project and the diversion of the Rupert River affected 36 traplines, including trapline R20, which is also affected by the Whabouchi Project. Figure 15 compares the study areas of two Projects.

**Figure 15 Location of the Whabouchi Project Study Area in Relation to the Eastmain-1-A-Sarcelle-Rupert Hydroelectric Project Study Area**




Source: Responses to questions and comments from the Agency, Map Appendix, Roche, April 2014

Road construction has opened up the territory, making it more accessible and possibly increasing pressure on wildlife harvesting. This is true of both Route du Nord, which runs along the site of the Whabouchi Project, and the Route 167 Nord extension to Monts Otish, which will affect seven traplines. According to the Proponent, the Projects identified in the study area (Table 10) will not prevent hunting, fishing and trapping activities, but will change how they are carried out in the territory.

According to the Proponent, the recent destruction of potential terrestrial habitat for waterfowl and terrestrial wildlife species over most of the Whabouchi Project site by forest fires means that the Project's effects on this valued component are primarily limited to the local study area.

To minimize the potential cumulative effects on hunting, fishing and trapping, the Proponent will establish a monitoring and follow-up program to monitor use of the area and its resources, particularly potential changes caused by the Whabouchi and other Projects. Accordingly, hunting, fishing and trapping activities by Cree and other users in the region of the Project will be documented in order to address the concerns raised by the Cree Nation of Nemaska.

Considering its distance from other past, present and future Projects, activities or events, the Proponent is of the view that the Whabouchi Project will not compromise harvesting activities in the regional study area. Therefore, the Proponent considers the cumulative effect on this valued component to be of moderate significance.

#### *Agency Analysis and Conclusion*

The Agency is of the view that the Proponent conducted an accurate assessment of the potential cumulative effects of the Project on hunting, fishing and trapping and that it took Aboriginal concerns into account in its analysis. The Agency therefore concludes that the Project is not likely to cause significant adverse cumulative effects on hunting, fishing or trapping and that no additional mitigation or follow-up measures are necessary.

### 8.4.5 *Potential Cumulative Effects on Species at Risks*

Given the vulnerability of species at risk, the federal environmental assessment committee asked the Proponent to assess the cumulative effects on each species at risk likely to be affected by the Project, namely the Little Brown myotis, Woodland caribou, Olive-Sided Flycatcher, Common Nighthawk and Rusty Blackbird. The Proponent did not perform an assessment for the Northern myotis, which was not designated a species at risk under the *Species at Risk Act* until after the environmental impact statement and additional information were submitted by the Proponent.

#### *Little Brown Myotis*

As mentioned in Chapter 8.1, a Little Brown myotis maternity colony comprising approximately 300 bats is located roughly 625 meters east of the mine site. The indicator used by the Proponent to measure the cumulative effect on the Little Brown myotis is a decline in the use or occupancy of the maternity colony. According to the Proponent's cumulative effects assessment, several other Projects, activities and events in the regional study area (Table 9) have impacted or will impact Little Brown myotis habitat. Given that these Projects are relatively far from the both Whabouchi Project and Little Brown myotis maternity colony and that a forest fire recently destroyed a large number of this species' potential habitats, the Proponent is of the view that it is unlikely that the cumulative effect on the Little Brown myotis will be significantly increased by the Whabouchi

Project. According to the Proponent, the cumulative effect on this valued component will therefore be of moderate significance, primarily because of the species' status.

### *Views Expressed (myotis)*

The Agency is of the view that the anticipated effects on the Little Brown myotis could also affect the northern myotis. Environment Canada indicated that the Proponent will have to take into account the recovery strategies developed for the Little Brown myotis and Northern myotis when they become available on the Species at Risk Public Registry website in order to ensure that its Project meets the objectives of the recovery strategies and that it makes the appropriate corrective adjustments to its follow-up program or additional mitigation measures, as necessary.

### *Woodland Caribou*

The following three indicators were used to measure the cumulative effects on Woodland caribou: habitat alteration/disturbance, diminished habitat quality and area of land affected.

Site clearing carried out as part of other Projects mentioned in Table 9 has significantly disturbed caribou habitat over the years. For example, the construction of Route 167 Nord to Monts Otish required the clearing of 35.52 $km^2$ of land, and the Eastmain-1-A power station and Rupert diversion caused the loss of 95 $km^2$ of high-potential winter caribou habitat. Logging and mining Projects in the regional study area require the construction of roads, which further fragments the caribou's habitat and leads to movements of their predators. Forest fires also cause changes to the habitat of caribou, which prefer mature, relatively undisturbed coniferous forests.

With respect to the Whabouchi Project, the potential loss of Woodland caribou habitat is relatively low at 0.16 $km^2$. The area covered by this Project is rarely used by the woodland caribou and is located in the Weh Sees Indohoun sector, where sports' hunting of the caribou is prohibited.

Given that the woodland caribou could be affected by habitat loss and fragmentation and by disturbance, the Proponents consider the significance of cumulative effects on the woodland caribou to be moderate.

### *Views Expressed (Woodland Caribou)*

As mentioned in Section 7.3, Environment Canada considers it unlikely for woodland caribou to occur in the study area given that the habitat in question does not have the characteristics required by this species and that the species makes little or no use of the sector.

According to the recovery strategy for the woodland caribou (Boreal population), many of the threats to this species and its habitat are related and may interact, in which case they can have cumulative effects that may not be evident when threats are examined individually. Additionally, cumulative effects related more specifically to the size and distribution of local caribou populations may have a lag effect, which can years to manifest. Environment Canada is therefore of the view that it is important to remain vigilant and to look at the effects as a whole over a vast area.

According to Environment Canada, most of the Projects or activities identified by the Proponent involve the construction of linear infrastructure, such as roads and hydroelectric lines. These contribute to habitat fragmentation (barrier effect of roads), increased risk of collision with vehicles, and increased poaching and

predation by wolves, which degrade the quality of caribou habitat and make the species more vulnerable. These effects should have been considered in the Proponent's cumulative effects assessment.

In fact, as a major survival strategy against predators, the caribou geographically isolates itself from predators and other prey, thus maintaining a low population density across its range. Therefore, local populations must have access to vast, undisturbed stretches of acceptable quality land to ensure their self-sufficiency.

Given the limited use of the study area by Woodland caribou, Environment Canada considers that the monitoring and observation log suggested by the Proponent are good means of monitoring this species in the circumstances, particularly since the Proponent is using an adaptive management approach to take into account any issues observed in order to be able to take the necessary corrective action as soon as possible. Environment Canada advises the Proponent to forward all information collected on woodland caribou to organizations responsible for its recovery, particularly the Quebec Department of Forestry, Wildlife and Parks and Environment Canada.

### *Olive-Sided Flycatcher and Common Nighthawk*

The main effects of other Projects (Table 10) that could interact cumulatively with the effects of the Whabouchi Project on the Olive-Sided Flycatcher and Common Nighthawk concern habitat loss, primarily terrestrial and wetland environments and open environments, mortality of young birds, and changes in certain behaviours such as feeding and reproduction caused by disturbances resulting from site clearing and mine operation.

According to the Proponent, the cumulative effect on the Olive-Sided Flycatcher and Common Nighthawk would be felt at the regional study area level. It considers the cumulative effect to be moderate given that the Whabouchi Project will result in a loss of habitat of interest to these species and its distance from other past, present or future Projects, activities or events, relative to the site of the Whabouchi mine Project.

### *Rusty Blackbird*

The main effects of other Projects (Table 9) that could combine with the effects of the Whabouchi Project on the Rusty Blackbird concern habitat loss, primarily wetlands and large bogs, mortality of young birds, and changes in certain behaviours, such as feeding and reproduction caused by the disturbance resulting from site clearing and mine operation.

According to the Proponent, the cumulative effect on Rusty Blackbird would be felt at the regional study area level. It considers the cumulative effect as low given that the Whabouchi Project will not generate any significant loss of wetlands of interest to this species, given their distance from other past, present or future Projects, activities or events relative to the site of the Whabouchi mine Project. The Proponent has also undertaken to offset any unanticipated wetland loss revealed by its follow-up program. The Proponent did not submit specific mitigation or follow-up measures for species at risk other than those described in Section 7.3.

### *Views Expressed (Migratory Birds at Risk)*

Given the uncertainty surrounding the reasons for the decline in bird species at risk, Environment Canada is of the view that any additional losses or changes in habitat will affect those species. It believes that the activities of the Whabouchi mine Project and other past, present and future Projects, actions and events identified by the Proponent could have cumulative effects on the species' breeding habitat (habitat alteration and loss) and

nesting activities (disturbance caused by the presence of the mine and mining activities). Therefore, although habitats are abundant in the vicinity, the cumulative residual negative effects could reduce the availability of high-quality habitats for species at risk and also increase intra and inter-specific competition in these species. In Environment Canada's opinion, a follow-up program for species at risk could, to some extent, alleviate the uncertainty surrounding the residual and cumulative negative effects of the mine Project on four bird species at risk.

### *Agency Conclusion*

The Agency is of the view that the cumulative effects assessment for the Whabouchi Project determined that all species at risk considered within the framework of the Project could be affected by habitat loss and fragmentation and by disturbance from other Projects in the study area. However, the Agency concludes that the adverse cumulative effects would not be significant considering the availability of similar habitat nearby and the implementation of the mitigation measures proposed by the Proponent (Appendix A). The Agency recommends that the Proponent keep an eye out for the release of any new recovery strategy for species at risk likely to be affected by the Project. The Proponent should ensure that it meets the recovery strategy objectives, makes corrective adjustments to its follow-up programs or implements additional mitigation measures, if necessary.

# 9 Impacts on Potential or Established Aboriginal or Treaty Rights

## 9.1 Impacts on Potential or Established Aboriginal or Treaty Rights in the Project Area

The Project is located on Cree land as defined in the James Bay and Northern Quebec Agreement , an Aboriginal treaty protected by section 35 of the *Constitution Act, 1982*. The Convention provides for a territorial regime that divides the land into three categories. The Whabouchi Project is located on Category III lands, which are Quebec government lands on which Aboriginal and non-Aboriginal people may hunt and fish. Aboriginal users nevertheless have exclusive rights to harvest certain aquatic species and furbearing animals[9] and participate in administering and developing the land.

The rights and guarantees granted to the Cree under the hunting, fishing and trapping regime in force on Category III lands are governed by Chapter 24 of the Convention. This regime includes the traditional land use system and the current uses of Cree traplines. Each trapline is the responsibility of a tallyman who belongs to one of the nine Cree communities.

The Project is located on trapline R20, associated with the Cree Nation of Nemaska. The tallyman and approximately 40 local Cree use the area for hunting, fishing and trapping. It includes permanent and temporary camps.

## 9.2 Potential Adverse Impacts of the Project on Potential or Established Aboriginal or Treaty Rights

The Cree have hunting, fishing and trapping rights. Section 7.4 provides a detailed explanation of the Project's potential effects on the rights of the Nemaska Cree in the context of current land and resource uses for traditional purposes.

The impact on rights would relate to:

- The loss of hunting, fishing and trapping land covering slightly more than 10 $km^2$ (mine infrastructure and safety zone) as well as the inability to erect hunting camps, to move around or to harvest resources in the area using current and traditional methods (including firearms);
- A reduction in wildlife populations and degradation of the quality of animal meat along with disturbance of hunting camps in sectors adjacent to the mine infrastructure and safety zone.

This impact would occur in the southwest part of trapline R20. No effects are expected on other traplines.

[9]The list includes mustelids, beaver, lynx, fox, polar bear, muskrat, porcupine, groundhog, black bear, wolf, freshwater seal, non-anadromous whitefish, sturgeon, suckers, burbot, mooneye and goldeye.

## 9.3 Proposed Accommodation Measures

The Proponent is working together with the Nemaska Cree and federal and provincial authorities to develop mitigation measures that also serve as accommodation measures. The aim of these measures is to minimize or avoid potential adverse effects on rights under the Convention.

In response to concerns about the protection of hunting, fishing and trapping, the Proponent reviewed the mine site layout to relocate infrastructure away from Lac des Montagnes. The waste rock and tailings pile would be developed to the north of Route du Nord. The settling ponds and overburden pile have also been relocated more than 750 meters from Lac des Montagnes. As a result of these measures, the Project has been moved away from valued geese and waterfowl hunting sites and from trapping and fishing areas. In addition to this change, the Proponent has provided for measures to mitigate the Project's effects on wildlife species and on the quality of their meat. These measures are described in sections 7.4 and 7.5.

The Proponent is working with Fisheries and Oceans Canada to develop a compensation plan that would offset any serious harm to fish resulting from the implementation of the Project.

Lastly, the Proponent, the Grand Council of the Crees (Eeyou Istchee), the Cree Nation Government and the Cree Nation of Nemaska have signed an agreement on the impact and benefits of developing and operating the Whabouchi Project. The Chinuchi Agreement is a binding agreement that will govern the relationship between Nemaska Lithium and the Cree parties during all phases of the Whabouchi Project. Among other things, it provides for training, employment and business opportunities for the Crees during Project construction, operation and closure, and sets out the principles of social, cultural and environmental respect under which the Project will be managed. The Chinuchi Agreement also includes a mechanism by which the Cree parties will benefit financially from the success of the Project on a long-term basis.

## 9.4 Issues to be Addressed During the Regulatory Approval Phase

For the Proponent, the regulatory approval phase of the Project consists of obtaining federal authorizations, licenses and approvals. For the Whabouchi Project, the only authorization anticipated is a *Fisheries Act* authorization. Depending on the decision by the Minister of the Environment, Fisheries and Oceans Canada could issue an authorization under the *Fisheries Act* conditional clauses in the implementation of the following elements:

- The mitigation measures required to avoid and reduce serious harm to fish;
- A compensation plan to offset serious harm to fish;
- A follow-up program to monitor the Project's effects on fish and fish habitat.

## 9.5 Outstanding Items

The measure proposed by the Proponent to prohibit all hunting, fishing or trapping on the mine property partially addresses the issue of the pressure by workers on wildlife resources. Since hunting, fishing and trapping are regulated by the Government of Quebec, the Agency recommends that the Cree Nation of Nemaska refer to the province to discuss the mechanisms required to resolve this issue. The Proponent has informed the Quebec government of this concern.

Measures proposed by the Proponent to reduce the effects of increased traffic on Route du Nord do not entirely address the concerns of the Cree Nation of Nemaska regarding dust and noise caused by traffic. This issue is outside the scope of the federal environmental assessment, but the Agency has transmitted the concern to the Proponent.

The Cree Nation of Nemaska remains concerned about the rehabilitation of the mine site since many industrial sites have been abandoned, with waste left behind (barrels, propane tanks and metal structures) on the land. The Quebec *Mining Act* contains provisions to ensure the restoration of land affected by mining activities. Under the Act, the Proponent is required to submit a rehabilitation plan and financial guarantee to the Government of Quebec.

## 9.6 Agency Conclusion Regarding Impacts on Aboriginal or Treaty Rights

The Agency is satisfied that the potential impacts of the Project on rights established under the James Bay and Northern Quebec Agreement have been adequately identified The Proponent's mitigation measures, the conditions recommended to the Minister of the Environment and the possible conditions ties to federal licenses could mitigate and accommodate impacts on these rights. Furthermore, signature of the agreement between the Proponent and the Cree establishes mutual conditions for better management of the Project with respect for Cree rights.

# 10 Conclusions and Recommendations of the Agency

To conclude on the matter of the Project's significant adverse environmental effects and to define the key mitigation measures and follow-up that the Proponent should implement, the Agency has taken into account the Proponent's environmental impact statement, technical reports and complementary information documents, as well as comments received from the public, Aboriginal groups, government organizations and the Cree Nation Government. The Agency received comments from the federal authorities on the draft of this environmental assessment report. Appendix E contains a summary of the comments received and the Agency's responses.

The environmental effects of the Project have been determined using assessment methods and analytical tools that reflect current best practices of environmental and socio-economic assessment practitioners, including the consideration of cumulative effects and potential accidents or malfunctions.

The Agency concludes that the Whabouchi mining Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the key mitigation measures and follow-up programs described in this environmental assessment report (see Appendix G).

The Agency has identified the key mitigation measures and follow-up program requirements to be recommended to the Minister of the Environment (the Minister) for consideration in deciding whether the Project is likely to cause significant adverse environmental effects. If the Minister concludes that the Project is not likely to cause significant adverse environmental effects as defined in section 5 of the Act, the Minister will establish conditions as part of the decision statement issued to the Proponent.

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# 12 Appendixes

## Appendix A Summary of the Mitigation Measures Proposed by the Proponent

This Appendix contains mitigation measures proposed by the Proponent for valued components of the Impact Statement identified by the Agency in evaluating the environmental effects of the Whabouchi Project. The measures are commitments undertaken by the Proponent at various stages of the environmental assessment process and come from different (sources). Furthermore, the Proponent could implement additional mitigation measures, including measures that could be prescribed in connection with the authorization required to conduct the Project, issued by the federal government. Certain mitigation measures could be applicable to more than one valued component.

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| Air quality | |
| • Ensure that heavy machinery, vehicles and equipment are in good working order (adequate maintenance).<br>• Ensure that anti-pollution systems on heavy equipment and vehicles perform effectively.<br>• Avoid idling of heavy equipment, vehicles and equipment when not in use.<br>• Use electrical equipment as much as possible.<br>• Promote energy efficiency and use green technology where possible.<br>• Use diesel fuel for road vehicles that meets Environment Canada standards.<br>• Spread dust-control agents authorized by the MDDELCC or water on service roads (including ramps) when necessary.<br>• Limit vehicle traffic to 30 km/h on the Project site.<br>• Where possible, limit heavy machinery and vehicle traffic movements as well as the distances travelled.<br>• Ensure adequate maintenance of service roads and ramps.<br>• Introduce a dust management program, including appropriate dust-control agents. | • Construction, operation, decommissioning |
| • Use covered conveyors to transport dry product. | • Operation |
| • Equip air exhausts on the building that houses the grinders and crushers with dust extractors (ex., a grinding circuit equipped with a fine mist sprayer).<br>• Gradually restore the waste rock and tailings pile. | • Operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| Noise Environment | |
| • Provide high-performance, operational mufflers on equipment, heavy machinery and vehicles and maintain them in good working order.<br>• Install anti-noise devices on pneumatic and/or hydraulic hammers.<br>• Equip trucks with white noise back-up alarms (multi-frequency sound).<br>• Insulate or soundproof stationery motorized equipment, such as generators.<br>• Position equipment as far as possible from sensitive receptors (such as the bog to the south).<br>• Perform regular maintenance of all equipment, including lubrication and replacement of broken parts, especially exhaust systems.<br>• Limit traffic speeds to 30 km/h on serviced roads.<br>• Perform the noisiest work during the day.<br>• Shut off all engines when equipment is not in use for a period of time (such as lunch breaks and others).<br>• Where possible, use equipment that runs on electrical power rather than generators.<br>• Where possible, use low-noise equipment.<br>• Where possible, use construction materials for infrastructure with a high STC3 (Sound Transmission Class) rating. | • Construction, operation, decommissioning |
| Water Quality and Quantity | |
| *Hydrogeology and Groundwater Quality* | |
| • Provide specific locations for the storage of heavy machinery, vehicles and equipment.<br>• Ensure that heavy machinery, vehicles and equipment are in good working order (adequate maintenance).<br>• Perform maintenance on heavy machinery and vehicles at the locations provided (garage).<br>• Minimize the number of machinery refuelling locations.<br>• Provide for a containment system for storage areas in the event of leaks or accidental spills.<br>• Develop a hazardous materials spill or leak prevention and response plan.<br>• Provide an emergency clean-up kit for petroleum product and hazardous product spills (absorbent materials and appropriate containers) at strategic locations on site (fast, easy access).<br>• Provide training for employees to ensure they are able to respond quickly, effectively and safely to accidental spills or | • Construction, operation |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| leaks of petroleum hydrocarbons or hazardous materials.<br>• Dispose of waste in accordance with proper procedures. | |
| • Recover and monitor water that comes in contact with tailings, including pit water and water from the waste rock and tailings pile.<br>• Manage runoff water from ore storage areas and related activities near the processing plant and garage using a runoff collection system, including drainage ditches around the area and conduits for directing the water collected to the settling ponds.<br>• Restrict movements of heavy equipment and other mobile equipment to access roads and work areas.<br>• Use abrasives rather than de-icing salts in winter.<br>• Maintain heavy equipment and vehicles at the sites provided.<br>• Design maintenance areas in such a way as to prevent contamination of the environment in the event of spills or leaks.<br>• As necessary, install a hydraulic trap once the pit is flooded. | • Operation |
| Hydrology | |
| • Minimize clearing activities and restore planted areas, if possible.<br>• Ensure the free flow of water and prohibit the dumping of waste or debris into water bodies and streams.<br>• Perform work in sensitive areas in winter, if possible.<br>• Limit work along the shorelines of water bodies and streams. | • Construction, operation |
| • Limit shoreline erosion at Stream C if necessary. | • Operation |
| Quality of Surface Water and Sediment | |
| • Completely recycle/recirculate process water. | • Operation |
| • Provide a drainage system and a runoff water management plan to prevent direct contact with nearby water bodies.<br>• Manage drainage and seepage water from the waste rock and tailings pile in accordance with the provisions of Guideline 019.<br>• Minimize runoff in areas that could be a source of contamination (ex., by limiting impermeable surfaces when possible).<br>• Regularly inspect hazardous substance and petroleum product containers and tanks and take any necessary corrective action.<br>• Install drainage ditches to collect runoff water from the waste rock and tailings pile, from the overburden pile and from | • Operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| the pit and ensure they flow freely during operations.<br>• Limit erosion of storage areas through stable installation.<br>• Regularly inspect containment structures to ensure their physical stability. | |
| • Minimize clearing activities and, to the extent possible, restore disturbed areas.<br>• Manually cut vegetation on the shorelines of water bodies and streams Prevent debris from entering water bodies and streams and quickly remove any debris present already.<br>• Stabilize slopes.<br>• To the extent possible, avoid performing work on steep slopes.<br>• To the extent possible, avoid undertaking major work along the edge of water bodies or streams in heavy rain.<br>• As needed, install additional sediment retention and control structures (sediment barriers, straw bales, filtering berm, sediment trap, etc.) to limit the transport of sediment into streams and water bodies.<br>• Avoid installing refuelling locations near water bodies and streams.<br>• Store heavy machinery, vehicles and equipment in locations designated for that purpose.<br>• Ensure that heavy machinery and vehicles are in good working order.<br>• Prohibit heavy equipment from fording streams.<br>• Establish a spill prevention and response program.<br>• Provide an emergency spill kit for petroleum product and hazardous product spills (appropriate absorbents and containers) at strategic locations on site (fast, easy access).<br>• Provide training for employees to ensure they are able to respond quickly, effectively and safely to accidental spills or leaks of petroleum hydrocarbons or hazardous substances.<br>• Dispose of waste in accordance with proper procedures.<br>• Collect and treat all contaminated water prior to discharge into the aquatic environment. Collect and control water in contact with tailings, including water from the ore treatment plant and pit water. | • Construction, operation, decommissioning |
| • Use emulsion explosives rather than ANFO to reduce the production of residual ammonium in surface water.<br>• Select the location of the final effluent discharge point so as to take advantage of environmental features that encourage the dispersion of treated effluent and to minimize the impacts on the aquatic environment.<br>• Treat the final effluent in order so as to meet the water quality criteria adjusted to the environmental discharge objectives (EDO) set by the regional branch of the MDDEFP, as well as MMER standards. | • Operation |
| • Enforce the environmental monitoring program. | • Decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| • Restore surface drainage. | |
| Terrestrial Vegetation | |
| • Encourage the use of surfaces previously disturbed by exploration work to accommodate machinery and the installation of temporary storage areas for construction materials.<br>• Carefully identify and delineate construction zones to reduce the amount of land plants affected.<br>• Restrict heavy machinery and vehicle traffic to predetermined locations (e.g., service roads and work areas) to reduce the amount of terrestrial vegetation affected.<br>• Impose a speed limit of 30 km/h on service roads to reduce the amount of dust generated by traffic.<br>• To the extent possible, operate heavy machinery only on surfaces to be cleared.<br>• To the extent possible, use abrasives rather than de-icing salts in winter.<br>• In summer, use water as a dust-control agent on service roads (including ramps) when necessary.<br>• Re-vegetate disturbed sites upon completion of the work to restore natural conditions as soon as possible; use native species and, as necessary temporary protection materials on surfaces during revegetation.<br>• Prohibit the use of herbicides for controlling plant growth; use mechanical or manual methods instead.<br>• Ensure that an emergency spill kit is available on site to control and recover harmful substances (oil, gasoline, chemical substances, etc.) and provide appropriate training to employees.<br>• Comply with storage and handling standards governing harmful substances and ensure that employees receive adequate training. | • Construction, operation, decommissioning |
| • Use stockpiled overburden to gradually restore the waste rock and tailings pile.<br>• Restore the waste rock and tailings pile gradually (as operating conditions permit).<br>• Establish an erosion and vegetation monitoring program at locations likely to be affected and, as necessary, apply corrective measures. | • Operation, decommissioning |
| Wetlands | |
| • Favour the use of areas previously disturbed during exploration work for heavy machinery traffic and for temporary construction material storage areas.<br>• Clearly identify the limits beyond which heavy equipment and vehicle traffic is prohibited.<br>• Restrict heavy equipment and vehicle traffic to predetermined locations (e.g., service roads and work areas) to reduce the area of wetlands affected. | • Construction, operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| • Impose a speed limit of 30 km/h on service roads to reduce the amount of dust generated by traffic.<br>• To the extent possible, use abrasives rather than de-icing salts in winter.<br>• In summer, use water as a dust-control agent on service roads (including ramps) when necessary.<br>• Provide for specific locations for the storage of heavy machinery, vehicles and equipment.<br>• Ensure that heavy machinery, vehicles and equipment are in good working order (adequate maintenance).<br>• Perform maintenance on heavy machinery and vehicles at the locations designated for that purpose (garage).<br>• Minimize the number of heavy machinery and vehicle refuelling points.<br>• Develop a response and prevention plan for accidental spills or hazardous product leaks.<br>• Provide training for employees to ensure they are able to respond quickly, effectively and safely to accidental spills or leaks of petroleum hydrocarbons or hazardous materials.<br>• Dispose of waste in accordance with proper procedures.<br>• Use machinery and equipment suited to soil conditions to limit physical disturbances.<br>• If possible, begin work near wetlands in winter.<br>• Ensure that an emergency spill kit is available on site to control and recover harmful substances (oil, gasoline, chemical substances, etc.) and provide appropriate training to employees.<br>• Comply with storage and handling standards governing harmful substances and ensure that employees receive proper training.<br>• Install culverts for groundwater drainage when a service road crosses wetlands.<br>• Avoid over-digging drainage ditches near wetlands to limit groundwater drawdown.<br>• Take account of surface runoff and wetland water reserves in the installation of the waste rock and tailings pile to avoid causing wetlands to dry up or flood. | |
| Fish and Fish Habitat | |
| *Site preparation and development* | |
| • Encourage the use of surfaces previously disturbed by exploration work to accommodate machinery and the installation of temporary storage areas for construction materials.<br>• Permanently dispose of clearing and close cut clearing materials (trees, stumps, shrubs, branches, brush, dead wood and other plant debris) at least 60 m away from the shoreline of lakes or streams, or from any flood area, swamp, marsh or bog. | • Construction, operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| • Do not dump debris into the aquatic environment and remove any debris entering the water as soon as possible.<br>• Maintain a buffer of at least 30 m along streams and water bodies (screen, filtration of contaminants from roads and storage areas, land corridor and habitat for species) and up to 60 m in areas used to stockpile debris or organic materials and in areas used for fuel/hazardous substance storage or refuelling.<br>• For emergency work only, if clearing is absolutely necessary within 20 m of a stream, cut trees manually and dispose of wood debris above the high-water mark. This makes it possible to cause trees to fall away from streams and water bodies and to maintain the integrity of the soil by protecting it from machinery.<br>• Perform work during low-flow periods and in compliance fish restriction periods (including installation of the final effluent discharge point in Lac des Montagnes).<br>• Always control erosion at source and slow the speed of runoff water to limit the force of erosion.<br>• Promote infiltration of runoff water from the work area into the soil.<br>• Collect all potentially contaminated water and treat it if necessary prior to discharge to the aquatic environment.<br>• Avoid transport of fine particulate into the aquatic environment outside the work area.<br>• Keep land clearing to a strict minimum, i.e., only at the direct location of stream crossings.<br>• Do not carry out earthworks or excavation activities near streams during period of high water or heavy rain.<br>• Prohibit fording of streams with heavy equipment.<br>• Encourage streambank stabilization as quickly as possible using accepted plant engineering techniques.<br>• Re-vegetate disturbed sites upon completion of the work to limit erosion.<br>• If fish habitat is damaged by the Project, develop a compensation program to offset any residual loss. | |
| Use and Maintenance of machinery, road traffic and storage and management of hazardous materials and fuel | |
| • Reduce vehicle speeds (speed limit 30 km/h on Project site and 70 km/h on side roads).<br>• Prohibit machinery movements outside the boundaries of work area, unless authorized.<br>• Prohibit vehicle movements within 30 m of a stream. | • Construction, operation, decommissioning |
| • Identify and delineate heavy machinery and vehicle traffic areas.<br>• Restrict machinery and truck traffic to access roads and work areas<br>• Maintain, clean and refuel machinery and perform mechanical inspections in stable, safe locations more than 60 m from streams, lakes or any other water body.<br>• Inspect machinery, trucks and back-up generators before entering the work site and regularly thereafter to ensure they | • Operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| remain in good working order, free of any hydrocarbon leaks.<br>• Ensure that heavy machinery, vehicles and equipment are properly maintained.<br>• Develop a hazardous materials spill or leak prevention and response plan.<br>• Minimize the number of heavy machinery and vehicle refuelling points.<br>• Manage hazardous substances in accordance with Regulation Respecting Hazardous Materials and the Transportation of Dangerous Goods Regulations. Manage petroleum products in accordance with *the Loi sur les produits pétroliers et les équipements pétroliers* and the *Règlement sur les produits pétroliers pour la gestion du matériel et des produits pétroliers*. | |
| • Equip hazardous materials and petroleum products storage areas with a containment platform of sufficient capacity to contain accidental spills and leaks.<br>• Dispose of waste in accordance with proper procedures.<br>• Keep an emergency spill kit on site for the recovery of petroleum products and hazardous materials and ensure it is available at all times at the required locations.<br>• Provide a storage area confinement system in the event of leaks or accidental spills.<br>• Design maintenance areas in such a way as to prevent contamination of the environment in the event of spills or leaks.<br>• Report all accidental spills immediately to the officer in charge of implementing the Project's emergency response plan. This plan will be developed and approved in advance of the work. The affected area will be immediately delineated and cleaned up.<br>• Ensure that all equipment is in good working order to avoid any fuel, oil or grease leaks. Prohibit the cleaning of equipment near or in the aquatic environment.<br>• Establish an employee awareness program on the effects of sports fishing.<br>• Prohibit fishing within the area of the mining lease and surface use leases.<br>• Provide training for employees to ensure they are able to respond quickly, effectively and safely to accidental spills or leaks of petroleum hydrocarbons or hazardous substances.<br>• To the extent possible, use abrasives rather than de-icing salts in winter.<br>• In summer, use water as a dust-control agent on service roads (including ramps) as required.<br>• Ensure that dust-control agents used are MDDELCC-compliant or approved. | • Construction, operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| Water Management | |
| • Direct runoff and drainage water to the settling ponds installed for that purpose.<br>• Maintain habitat functions and the free passage of fish in streams and water bodies likely to undergo water level changes. In the event that an impact is detected by monitoring of hydrologic conditions, specific measures will be taken to mitigate the impact. For example, as appropriate, a control level could be established at various strategic locations to raise water levels and maintain the initial functions of the fish habitat (i.e., downstream from an obstacle that has become impassable).<br>• Re-vegetate disturbed sites upon completion of the work to limit erosion, including on steeper slopes where overburden will be deposited from berms in the holes between blocks of waste rock, to ensure its stability and the stability of seeds that fall on it (hydroseeding and natural revegetation). | • Construction, operation, decommissioning |
| • Ensure that the mine effluent meet the environmental discharge objectives for mine effluent set out by the MDDELCC, Guideline 019, and the Metal Mining Effluent Regulations designed to protect fish habitat. | • Operation, decommissioning |
| • Locate the final effluent outfall some 1.4 km from the shore and at a depth of 14 m to promote effluent dispersion.<br>• Equip the mine effluent outfall with a diffuser to promote effluent dispersion and rapid dilution. | • Operation |
| • During the mine decommissioning phase, dismantle the settling ponds (gradually empty them to avoid releasing particulates into the environment flatten out the dikes, backfill the pond and re-vegetate).<br>• During the decommissioning phase, flood the pit gradually to avoid bringing sediments into suspension.<br>• Re-vegetate the shoreline to promote the productivity of the environment (through environmental inputs) and to minimize the increase in surface water temperature.<br>• Create hydrologic connections with the natural environment to ensure the free passage of fish.<br>• During the dismantling of the effluent discharge pipe:<br>• Select methods capable of limiting the re-suspension of solids in the water column and comply with applicable regulations;<br>• Perform dismantling operations in calm weather to limit the re-suspension of solids through water turbulence. | • Decommissioning |
| • During installation of the effluent discharge pipe in Lac des Montagne:<br>• Clearly delineate the work area;<br>• Provide devices for controlling erosion and the transport of sediment to streams and water bodies (ex., rock embankments, turbidity curtain, settling ponds); | • Construction |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| • Identify machinery access points to mitigate the impacts on shorelines, soil and plant cover;<br>• On dismantling temporary access points, do not place aggregates used to construct ramps near water bodies. | |
| Labour and Procurement | |
| • Establish an employee awareness program on the effects of sports fishing.<br>• Prohibit fishing within the area of the mining lease and surface use leases. | • Construction, operation, decommissioning |
| Pit and Mine Operations, Ore Handling and Storage | |
| • Comply with guidelines governing the use of explosives in or near Canadian fishing waters.<br>• Prohibit the use of ammonium nitrate and diesel in or near fishing waters given the production of toxic by-products (ammonia).<br>• Recover and remove all blast tubes and cables after each blasting operation.<br>• Prohibit the use of explosives in or near fish habitat since they can trigger an instantaneous pressure change exceeding 100 kPa.<br>• Prohibit the use of explosives which produce or could produce a peak particle velocity exceeding 13 mm/s in spawning areas during the egg incubation period. | • Operation |
| Mammals | |
| • Encourage the use of areas previously disturbed by exploration work for machinery movements and the installation of temporary construction materials storage areas.<br>• Clearly identify the limits beyond which heavy equipment and vehicle traffic is prohibited.<br>• Restrict heavy equipment and vehicle traffic to predetermined locations (e.g., service roads and work areas) to reduce the area of land environment affected.<br>• Operate machinery only on areas that will be cleared.<br>• To the extent possible, use abrasives rather than de-icing salts in winter and use water in summer as a dust-control agent, as required.<br>• In summer, use water as a dust control agent (micromammal).<br>• Re-vegetate disturbed sites upon the completion of work to restore them to their original, natural condition as quickly as possible.<br>• Impose a speed limit of 30 km/h on mining site service roads. | • Construction, operation, Decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| • Establish procedures to properly manage waste at the mine site.<br>• Raise employee awareness on the importance of not feeding animals or leaving food unattended and not attracting animals to the site.<br>• Prohibit hunting by employees on property covered by the mining lease or surface use leases.<br>• Inform and raise worker awareness of the presence of the little brown myotis maternity colony near Route du Nord (Chiroptera).<br>• Provide a containment system for storage areas in the event of accidental spills or leaks.<br>• Design maintenance areas in such a way as to prevent contamination of the environment in the event of spills or leaks.<br>• Develop a hazardous materials spill or leak prevention and response plan. | |
| • Gradually restore the waste rock and tailings pile as soon as the elevation level is reached. | • Operation, decommissioning |
| • Re-vegetate the site with native plant species (grasses, shrubs and trees).<br>• Install a fence around the pit to limit access by large wildlife. | • Decommissioning |
| Avian wildlife | |
| • Limit the Project's footprint to restrict clearing, stripping and soil disturbance to the smallest area possible.<br>• Perform clearing, stripping and grading outside the peak migratory bird breeding season (April 20 to the end of August) for the area (nesting zone C6) to minimize the risk of nest destruction. However, remain vigilant at all times when working outside this period to detect the possible presence of active nests of species that nest early or late in the season.<br>• Raise employee awareness about the potential presence of bird nests in the work area (construction and restoration), more specifically, the ground nests of Common Nighthawk in stripped areas.<br>• Take the following measures when a nest is discovered during the course of work:<br>  ○ Cease all activities that cause disturbance in the nesting area until the breeding season is over (i.e., until the chicks leave the nest area permanently, which may take several days or a week, depending on the species and stage of development);<br>  ○ Protect any nests found using a buffer zone over a protective distance appropriate for the species until chicks leave the nest area permanently. The appropriate protective distance can vary considerably by species (the proposed distances for species at risk are 500 m for short-eared owl, 200 m for Common Nighthawk and 300 m for Olive-Sided Flycatcher and Rusty Blackbird);<br>  ○ In all cases, the nest should not be identified by signage tape or another similar material since that would only increase the risk of predation. If necessary, signage tape may be placed around the buffer zone.<br>• Document the implementation of protective measures following the discovery of a nest (abandoned or not) and perform | • Construction, operation |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| a monitoring visit, causing as little disturbance to the birds as possible.<br>• During the Common Nighthawk breeding season (late May to late July), cover surfaces that are naturally bare or stripped for construction work with a membrane if they are left inactive for several days to prevent specimens from building their nests inside the work area.<br>• Maintain the forested edge within a 30-m buffer strip from the natural high-water mark of a stream, lake or wetland, except at stream crossing points. To this end, identify the edge of the right-of-way in the field (orange ribbon or fencing).<br>• Use overburden and native species to naturalize the waste rock and tailings pile.<br>• Restore the waste rock and tailings pile gradually as operating conditions allow.<br>• Cease ore extraction activities for two weeks (goose break) during the spring waterfowl migration. | |
| • Do not perform mine effluent pipe installation work in Lac des Montagne during waterfowl migration or nesting periods. | • Construction |
| • Restrict heavy equipment and vehicle traffic to predetermined locations (e.g., service roads and work areas).<br>• Impose a speed limit of 30 km/h on vehicle traffic on service roads at the mine site.<br>• Locate noisy equipment as far as possible from sensitive receptors (such as the bog to the south).<br>• Ensure proper waste collection and storage to avoid attracting opportunistic bird species, such as common raven, American crow, gray jay and herring gull.<br>• If possible, restrict heavy machinery movements to areas to be cleared.<br>• Encourage the use of areas already disturbed by exploration work for heavy machinery traffic and temporary construction materials storage areas.<br>• Perform heavy equipment and vehicle maintenance at the locations designated for that purpose (garage).<br>• Dispose of residual materials in accordance with proper procedures.<br>• Re-vegetate disturbed areas with native species immediately upon completion of the work to restore the sites to their original, natural condition as quickly as possible.<br>• Prohibit employees from hunting within the area the mining lease and surface use leases.<br>• Create an awareness program for employees on the use of wildlife resources | • Construction, operation, decommissioning |
| • When restoring the site to its natural condition, use native species (grasses, shrubs and trees) where possible.<br>• Dismantle buildings before or after the migratory bird breeding season (April 20 to the end of August) in the area (nesting zone 06), as recommended by Environment Canada. | • Decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| Land and Resource Use | |
| • To avoid disturbing spring goose hunting activities, the mine will cease all operations (blasting, stockpiling of waste rock, etc.) during the spring hunt (or goose break).<br>• Regularly inform Cree users of the area of the mining activity schedule to facilitate management and, as necessary, to allow them to reorganize their harvesting activities.<br>• Inform Cree users of the area and community members of the results of environmental monitoring and consult them regularly about their observations and recommendations concerning the presence of wildlife species of interest in the area.<br>• Return by-products of forest clearing to Cree users of the territory or to the Nemaska community during all phases of the Project.<br>• Take protective measures to maintain the safety of Cree users along snowmobile routes that could become blocked by mine activities. Install adequate signage at appropriate intersections near the mining site.<br>• Pursue discussions about the Bible Camp and with Cree users of camps affected by mine activities.<br>• Prohibit wildlife harvesting activities (hunting, fishing and trapping) by employees on mine property.<br>• If necessary, relocate camps as agreed during discussions with the Wapachee family.<br>• Assess the possibility of relocating the Bible Camp if necessary.<br>• Do not install fencing at the point of access to the Lac des Montagnes beach to ensure it remains open.<br>• Monitor contaminant levels in fish tissue as part of the Environmental Effects Monitoring (EEM). | • Construction, operation, decommissioning |
| • In cooperation with the tallyman of trapline R20, James Wapachee, establish a beaver and black bear trapping program prior to the start of construction work, as necessary. | • Before the construction |
| • If possible, design the waste rock and tailings pile in such a way as to limit the propagation of noise to the Bible Camp. | • Construction, operation |
| • Install a fence around the pit to limit access by large wildlife. | • Decommissioning |
| • Select a final mine effluent discharge point that takes advantage of the natural features of the environment to promote dispersion of the treated effluent and minimize the impacts on the aquatic environment.<br>• Treat the final effluent water in compliance with water quality criteria adjusted to take account of the environmental discharge objectives (EDO) set by the regional branch of the MDDELCC | • Operation |
| • Bury the effluent discharge pipe over a distance of close to 100 m on the shoreline and in the first part of the littoral zone to limit the visual impact on Lac des Montagnes users. | • Construction |
| • Establish a community advisory committee to serve as a channel of communications between the Proponent and | • Before the construction, |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| representatives of various community interests (including the general public and camp users) and ensure that the committee remains active after work begins.<br>• Develop and sign a resource development partnership agreement (RDPA) that includes collaboration by the signatories in order to provide the Cree with regular, appropriate information on the Whabouchi Project (e.g., newsletters, radio interviews, theme-based workshops, community meetings, etc.). The partnership agreement provides for the establishment of an Environment Committee that could also be called upon to play a role in communicating information to members of the Nemaska community. | construction, operation, decommissioning |
| • Share information about the Project, its activities and the actual potential risks of contamination and convert it into terms understandable by a general audience in order to dispel fears and concerns among Cree users and mitigate the potential avoidance of resource harvesting (wildlife, aquatic and plant resources). | • Before the construction, construction, operation |
| Community Well-Being | |
| • Produce and distribute the mine newsletter to the Nemaska community. | • Construction, operation, decommissioning |
| • Conduct periodic surveys on issues of community well-being. Keep a record of the information gathered and produce periodic reports including a summary of information collection protocols, meetings held and solutions considered.<br>• Create a ground vibration and air pressure monitoring system near sensitive receptors located nearest the site during construction and operation of the mine. The Environment Committee will ensure communication with users to obtain their comments | • Construction, operation |
| • Prohibit blasting at the pit between 7 p.m. and 7 a.m. The planned blasting schedule provides for one explosion a week, involving the use of 20,000 kg of explosives. This schedule will be discussed and determined jointly with the Environment Committee established under the RDPA to adapt it as situations require. | • Operation |
| Cultural and Archeological Heritage (no artefacts were identified during the archeological inventories) | |
| • In the event that archaeological artefacts are accidentally discovered during the work, manage the archaeological site(s) discovered in accordance with the requirements of the Quebec Cultural Property Act (R.S.Q., c. B-4).<br>• In the event that archaeological artefacts are discovered at the site of the mine, the site supervisors are required to immediately inform the Project manager and, as necessary, to halt work at the discovery site until a full assessment can be made by archaeologists. Nemaska Lithium will also inform the tallyman and Cree authorities.<br>• Pursue discussions about the Bible Camp and with Cree users of camps affected by mine activities. | • Construction, operation, decommissioning |

| Mitigation measures proposed by the Proponent based on valued components of the Impact Statement | Project phase |
|---|---|
| Landscape | |
| • Gradually re-vegetate the waste rock and tailings pile, restore areas altered by the Project and monitor effectiveness. To maximize the effectiveness of the growth of plan cover and the visual appearance of the waste rock and tailings pile, use native species and take the necessary measures to ensure that the shape of the pile is as natural as possible, i.e., giving it a rounded shape. | • Operation, decommissioning |
| • During planning, favour the use of materials that optimize the visual harmonization of the facility with the landscape. | • Before the construction |
| • As needed, install visual screens to conceal aesthetically offensive infrastructure.<br>• Direct lights toward the ground (work areas) rather than toward the sky or horizon (ambient light measure applicable to landscape).<br>• Light only those locations required and avoid any loss of outdoor lighting at locations requiring lighting (ambient light measure applicable to landscape).<br>• Use timers or motion detectors to limit unnecessary lighting (i.e., to turn off lights when a site is not in use) (ambient light measure applicable to landscape).<br>• Turn lights off when a site is not in use (ambient light measurement applicable to landscape). | • Construction, operation, decommissioning |
| • If possible, design the waste rock and tailings pile in such a way as to limit the propagation of noise to the Bible Camp.<br>• Design lighting in such a way as to obtain an optimal amount of light, i.e., sufficient lighting at the sites and facilities, in compliance with applicable OHS standards, avoiding excessive wattage.<br>• Limit the use of "blue" lighting as much as possible (wavelength below 540nm) (ambient light measure applicable to landscape). | • Construction, operation |

# Appendix B Residual Effect Assessment Criteria Used for Each Valued Component

| Evaluation Criteria | Degree of Residual Effect | | |
|---|---|---|---|
| Magnitude of impact | Low | Medium | High |
| The relative importance of consequences (negative or positive) resulting from a change/alteration in a Project activity on the structure or function of a valued component. | The effect changes the quality, use or integrity of the component very little | The effect changes the level of quality of the component or its use without necessarily compromising its environmental integrity | The effect compromises the environmental integrity of the component or significantly changes its quality or use |
| Geographic extent of impact | Site-specific | Local | Regional |
| Refers to the spatial scale or number of persons affected. | The effect is felt over a limited, clearly delineated area or by a small percentage of the population in the study area. | The effect is felt over an area larger than the Project's footprint or by a limited portion of the population in the study area. | The effect is felt throughout the study area or by a majority of the population in the study area. |
| Duration of effect | Short | Medium | Long |
| Refers to the length of time for which the effects of the activity will affect the valued component. | The effect is considered short-lasting when the effects are perceived continuously or intermittently during construction or closure of the mine site. | The effect is considered moderate when the effects are perceived continuously or intermittently for the entire duration of the Project (from construction to closure), during the operation period or during construction and closure periods. | The effect is considered long-lasting when it is perceptible continuously or intermittently, beyond the closing period. |
| Reversibility / Irreversibility | Low | Medium | High |
| The probability that a valued component cannot revert to its original condition (before the environmental effect) during the Project's life cycle. | The effect is completely reversible. | The effect is partially reversible. | The effect is irreversible. |

# Appendix C Residual Effect on Valued Components – Significance Determination Grid

| Magnitude | Extent | Duration | Reversibility/ Irreversibility | Significance |
|---|---|---|---|---|
| High | Regional | Long | High | Very high |
| | | | Medium | Very high |
| | | | Low | High |
| | | Medium | High | Very high |
| | | | Medium | Very high |
| | | | Low | High |
| | | Short | High | High |
| | | | Medium | High |
| | | | Low | High |
| | Local | Long | High | High |
| | | | Medium | High |
| | | | Low | High |
| | | Medium | High | High |
| | | | Medium | High |
| | | | Low | Medium |
| | | Short | High | High |
| | | | Medium | High |
| | | | Low | Medium |
| | Site-specific | Long | High | High |
| | | | Medium | High |
| | | | Low | Medium |
| | | Medium | High | High |
| | | | Medium | Medium |
| | | | Low | Medium |
| | | Short | High | High |
| | | | Medium | Medium |
| | | | Low | Medium |

| Magnitude | Extent | Duration | Reversibility/ Irreversibility | Significance |
|---|---|---|---|---|
| Medium | Regional | Long | High | High |
| | | | Medium | Medium |
| | | | Low | Medium |
| | | Medium | High | High |
| | | | Medium | Medium |
| | | | Low | Medium |
| | | Short | High | Medium |
| | | | Medium | Medium |
| | | | Low | Medium |
| | Local | Long | High | Medium |
| | | | Medium | Medium |
| | | | Low | Medium |
| | | Medium | High | Medium |
| | | | Medium | Medium |
| | | | Low | Medium |
| | | Short | High | Medium |
| | | | Medium | Medium |
| | | | Low | Low |
| | Site-specific | Long | High | Medium |
| | | | Medium | Medium |
| | | | Low | Low |
| | | Medium | High | Medium |
| | | | Medium | Medium |
| | | | Low | Low |
| | | Short | High | Medium |
| | | | Medium | Low |
| | | | Low | Low |

| Magnitude | Extent | Duration | Reversibility/ Irreversibility | Significance |
|---|---|---|---|---|
| Low | Regional | Long | High | Medium |
| | | | Medium | Low |
| | | | Low | Low |
| | | Medium | High | Medium |
| | | | Medium | Low |
| | | | Low | Low |
| | | Short | High | Medium |
| | | | Medium | Low |
| | | | Low | Low |
| | Local | Long | High | Low |
| | | | Medium | Low |
| | | | Low | Low |
| | | Medium | High | Low |
| | | | Medium | Low |
| | | | Low | Very Low |
| | | Short | High | Low |
| | | | Medium | Very Low |
| | | | Low | Very Low |
| | Site-specific | Long | High | Low |
| | | | Medium | Low |
| | | | Low | Very Low |
| | | Medium | High | Low |
| | | | Medium | Very Low |
| | | | Low | Very Low |
| | | Short | High | Low |
| | | | Medium | Very Low |
| | | | Low | Very Low |

* Only residual impacts with very high and high significance have a significant effect within the meaning of the *Canadian Environmental Assessment Act 2012*.

# Appendix D Summary of Alternatives and Options Chosen by the Proponent

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| **Mining** | | |
| Operation of an open pit followed by underground mining ***(chosen option)*** | Technical | The geology of the deposit is that of an elongated mineralized body. It runs flush with the surface |
| | Environmental | Environmental and social impacts greater than underground mining (↑ dust, ↑ noise, ↑ ambient light, larger footprint, more intense surface traffic by heavy machinery) |
| | Economic | Higher restoration costs<br>Cost effective |
| | Social | More significant alteration of the current landscape than an underground mine |
| Underground only | Technical | More complex engineering (support, ventilation, surface pillars) |
| | Environmental | More limited environmental impacts than an open pit operation (reduction of Project's footprint, reduction of surface level waste rock). However, noise impact associated with the ventilation system for underground infrastructure if not properly designed. |
| | Economic | Higher capital costs<br>Higher operating costs<br>Ore extraction by underground means would result in a significant loss of surface-level ore and deep-level ore and would not be cost effective |
| | Social | Less extensive social impact than an open pit mine (more limited visual impact, less impact on quality of life, i.e., noise, dust, etc.) |
| **Waste rock disposal** | | |
| Return to pit followed by flooding | Technical | Temporary pile (operating period)<br>↑risk of accidents from dual handling of waste rock<br>Platform to be built at edge of pit for truck loading<br>Longer restoration at end of operations |
| | Environmental | Flooding of the pit is beneficial where waste rock generates acid (not the case here)<br>Greater use of trucks (greenhouse gas emissions), more dust and more noise<br>Solids suspended in the pit water and potential impact following spillover or transfer of |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | waste rock<br>Change in habitat of the remaining rock pile |
| | Economic | Higher restoration costs (pit backfilling and remaining waste rock pile)<br>Not economically viable |
| | Social | Job creation (trucking)<br>Access to the land delayed at end of operations<br>No gradual restoration during work; impact on landscape during construction of the pile and during movement of waste rock at end |
| Storage in permanent waste rock piles (**chosen option**) | Technical | Permanent pile<br>Gradual restoration and shorter period of work at end of operation |
| | Environmental | Larger footprint<br>Less impact in terms of the duration of activities given the possibility of gradual restoration of the pile to mitigate the impact on the landscape<br>Permanent impact on the hydrological regime<br>Change in type of vegetation on the pile compared to initial conditions |
| | Economic | Higher operating costs because of gradual restoration but overall lower restoration costs |
| | Social | Permanent impact on landscape at end of activities<br>Shorter duration of activities hence less noise and fewer air emissions associated with heavy machinery (a few years less) |
| **Tailings disposal** | | |
| Paste tailings option | Technical | Risk of accidents (dike or pipe failure)<br>Complexity of construction or operation (tailings site, dikes and water management)<br>↑ complexity of restoration work (dike and flooded areas) |
| | Environmental | ↑ tailings dust, ↑ footprint, impact on soil quality due to exfiltration of process water into soil<br>Potential impact on groundwater quality due to seepage of process water into soil<br>Disturbance of the hydrologic regime due to presence of a tailings site<br>Potential impact on surface water quality following dike failure |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | Greater loss of vegetation due to tailings<br>Large volume of process water through tailings<br>Greater loss of habitat due to presence of a tailings site, larger footprint because of the need for a separate waste rock pile as well |
| | Economic | Higher restoration costs |
| | Social | Visual impact of the tailings site and waste rock pile<br>Greater loss of land given the need for a waste rock pile |
| Co-disposal of filtered tailings option ***(chosen option)*** | Technical | Cannot be pumped<br>No need to build dikes to contain tailings (page 2-56 of responses dated May 9, 2014)<br>No water build-up at tailings site |
| | Environmental | ↑noise (truck transport to pile)<br>Very little process water in tailings; water is reused by processing plant, therefore less need for outside water<br>Higher rate of reactant reuse in process and thus less input<br>Potential contamination by percolation of water from tailings site, but lower risk with only rain water to consider<br>Allows for progressive restoration |
| | Economic | Higher capital costs given that filtered tailings require additional infrastructure<br>Higher operating costs given that filtered tailings require additional infrastructure<br>More costly but option chosen for environmental and social reasons |
| | Social | Less of a visual impact due to progressive restoration of the pile during operations |
| **Power supply** | | |
| Diesel generators | Technical | Known and proven solution<br>Use of 5 diesel generators, each 2 MW<br>Suited to remote regions without existing hydroelectric service<br>Decontamination potentially necessary for site restoration |
| | Environmental | Production of greenhouse gas emissions<br>↑ noise |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | Risk of spills with road transportation of hydrocarbons, which could require soil, surface water and groundwater decontamination |
| | Economic | Higher operating costs |
| | Social | Negative perception of burning diesel to produce electricity when hydroelectric infrastructure exist nearby |
| Hydro | Technical | On-site transformer required for electrical distribution. A distribution system must be created on site. Connection to Albanel station.<br>Technically less safe to power equipment at bottom of pit<br>No alternative in the event of an electrical power outage<br>Dismantling of the overhead line at the mine site on closure of the mine |
| | Environmental | Limited loss of vegetation with electric power line installation<br>Potential disturbance of habitat |
| | Economic | Higher capital costs<br>Higher restoration costs given the need to dismantle the transmission line |
| | Social | Potential disruption on Route du Nord and along its shoulder during power line construction<br>Jobs related to power line construction<br>20 km disturbance of landscape<br>Potential delivery of electricity to camps located along the edge of the mine property |
| Generator/hydroelectricity combination **(chosen option)** | Technical | On-site transformer required for electrical distribution. A distribution system must be created on site. Connection to Albanel station.<br>Back-up in the event of a failure of the hydroelectric system<br>Provides a safer way to power equipment at the bottom of the pit (using generators)<br>Dismantling of the overhead line at the mine site on closure of the mine<br>Decontamination may be necessary during site restoration. |
| | Environmental | GHG emissions and airborne contaminants but less than with the use of diesel generators alone<br>↑ noise levels but less than with the use of diesel generators alone<br>Potential impact on soil quality, and surface and groundwater quality in the event of a |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | hydrocarbon spill<br>Potential disturbance of habitat<br>Lower risk of spills due to the transportation of less diesel by road, i.e., only enough to power generators at the bottom of the pit |
| | Economic | Less costly and safer to operate mining equipment in the pit using diesel generators<br>Higher restoration costs given the need to dismantle the power line and possible decontamination due to the use of diesel |
| | Social | Potential disruption on Route du Nord and along its shoulder during construction of the power line<br>Jobs related to power line construction<br>20 km disruption of landscape<br>Negative perception of burning diesel to produce electricity when hydroelectric infrastructure exist nearby<br>Potential delivery of electricity to camps located along the edge of the mine property |
| **Waste management** | | |
| Mine site management | Technical | Involves construction and management of a new infrastructure<br>Known and proven solution<br>Involves ↑ restoration work |
| | Environmental | ↑ Project footprint, potential impact on soil quality<br>Risk of groundwater contamination, impact on water balance due to landfill site, impact on surface water quality<br>Loss of vegetation due to ↑ Project footprint<br>Potential loss of wildlife habitat due to ↑ Project footprint, may attract harmful wildlife species (ex: bears) |
| | Economic | Higher capital costs<br>Higher restoration costs<br>No trucking costs |
| | Social | Perceived potential health risk with the presence of an engineered landfill site<br>Potential impact during construction of engineered landfill on cultural and archaeological |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | heritage<br>Change in landscape with the addition of engineered landfill site<br>Addition to new infrastructure to the community's territory |
| Nemaska community landfill ***(chosen option)*** approximately 20 km away | Technical | Limits on-site management<br>↑ traffic on Route du Nord<br>Known and proven solution |
| | Environmental | Does not increase Project's footprint at the site<br>Impact on air quality due to traffic on Route du Nord to engineered landfill site and GHG emissions<br>More noise (trucking)<br>Possibility of collisions with wildlife during travel between the mine site and Nemaska |
| | Economic | Use of a nearby, existing infrastructure (20 km) |
| | Social | ↑ waste materials in the Nemaska engineered landfill<br>Involves the Nemaska community, trucking jobs |
| Engineered landfill site in Chibougamau, approximately 300 km away | Technical | ↑ traffic on Route du Nord<br>Known and proven solution |
| | Environmental | Does not increase Project's footprint at the site<br>Impact on air quality: ↑ GHG, ↑ dust,↑ noise from truck traffic<br>Possibility of collisions with wildlife during travel between the mine site and Chibougamau |
| | Economic | Higher operating costs (high trucking costs - 300km) |
| | Social | ↑ waste materials in the Chibougamau engineered landfill<br>Trucking jobs<br>Use of infrastructure existing in the community |
| **Water Supply** | | |
| Surface water (at Lac du Spodumène) | Technical | Requires a water intake with a long pipe to bring water to the processing plant and an adjacent road (access, maintenance and monitoring)<br>Accident risk due to ↑ risk of frozen pipes |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | Complexity of construction and operation since water intake would be constructed to have ↓ potential impact on fish and fish habitat |
| | Environmental | Soil disturbance due to Project's ↑ footprint resulting from access road that will have to be built to Lac du Spodumène<br>Minor disruption of water natural balance naturel in Lac du Spodumène<br>Loss of vegetation due to construction of the access road to Lac du Spodumène and a conduit<br>Encroachment on fish habitat and potential fish mortality at water intake<br>Potential loss of wildlife habitat due to Lac du Spodumène access road |
| | Economic | Higher capital costs, operating costs and restoration costs due to more extensive maintenance that required by a well |
| | Social | Limited access to a portion of Lac du Spodumène because of water intake<br>Impact on landscape: water intake in lake would be visible; presence of access road |
| Groundwater (well) **(chosen option)** | Technical | Requires pumping station and tank inside processing plant (760,000 L)<br>Installation is possible directly near the processing plant |
| | Environmental | Local dewatering of aquifer compared to well<br>Smaller footprint |
| | Economic | Cost savings |
| | Social | Not considered |
| **Worker accommodation** | | |
| Mine site housing complex | Technical | Construction and maintenance of a housing complex at the mine site |
| | Environmental | Additional lighting at the mine site for the housing complex<br>↑ Project footprint due to the housing complex<br>Additional need for water for the housing complex<br>Change in the water balance due to construction of the housing complex<br>Potential impact of household waste water effluent discharge<br>Loss of habitat (terrestrial and vegetation and wetlands, for wildlife) given the Project's ↑ footprint |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | ↑ potential fishing around the housing complex |
| | Economic | More costly due to higher capital and restoration costs |
| | Social | ↑ potential pressure on wildlife resource harvesting<br>Possible random discovery of archaeological or cultural artefacts<br>Addition of man-made infrastructure to the existing landscape |
| Site transit system (**chosen option**) | Technical | ↑ risk of accidents from bus traffic on Route du Nord |
| | Environmental | ↑ dust and noise due to bus traffic<br>Environment already disturbed |
| | Economic | Comparable operating costs but capital and restoration costs non existent |
| | Social | Job creation within Cree community<br>Use of existing infrastructure |
| **Location of piles and final effluent** | | |
| **Option 1** variation considered in the preliminary economic study | Technical | A short section of Route du Nord will have to be redirected<br>Construction in several phases will ensure gradual restoration of the pile during operations<br>Will not affect Hydro-Québec power transmission line<br>Storage of explosives near mine water settling pond dikes<br>Multi-phase construction enables gradual restoration of the pile<br>Two mine effluent outfalls (Stream C and Lac des Montagnes), more complex water management |
| | Environmental | Impact on streams C, E and F, loss of a portion of stream F and dry out of Lake 29<br>Loss of terrestrial vegetation and wetlands<br>Wildlife habitat loss |
| | Economic | Higher capital and operating costs due to more complex management of water and two mine effluents<br>Costs of moving part of Route du Nord (but only after 10 years of operation) |
| | Social | During consultations, the Cree community of Nemaska expressed dissatisfaction with the Proponent's choice of this option. The community had concerns about the potential |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | effects of the pile's proximity on water quality and wildlife habitats in Lac des Montagnes and its bays. Some members of the community were concerned about the visual impact of the pile. Lac des Montagnes is known as a traditional hunting and fishing sector. |
| **Option 2** variation considered in the feasibility study ***(chosen option)*** | Technical | Mining effluent<br>Avoids the need to diver Route du Nord (page 1-2 response dated May 9, 2014) |
| | Environmental | No encroachment on streams or rivers in the region. Significantly reduced hydrological impact. Only one mining effluent in Lac des Montagnes<br>Avoids the loss of wetlands (page 1-2 response dated May 9, 2014)<br>Project footprint smaller |
| | Economic | Not considered |
| | Social | Infrastructure farther away in Lac des Montagnes making them less visible |
| **Location of final effluent outfall** | | |
| Nemiscau River – A variation considered in the draft economic study | Technical | Risk of accident due to risk that the pump conduit would freeze in winter<br>The most complex solution given the distance and need to build and access road; would require pumping effluent to the Nemiscau River<br>↑ of footprint to restore at end of operations<br>Strong flow ensures good mixing |
| | Environmental | Noise associated with pumping system<br>Impact on soil given the length of the pumping conduit to run to the Nemiscau River and requiring construction of an access road<br>Positive dilution potential; potential for physical-chemical change in surface water quality<br>Loss of terrestrial vegetation and wetlands due to the installation of a pumping conduit and access road<br>Loss of potential fish habitat and potential change of fish community patterns<br>Potential loss of wildlife habitat resulting from installation of pumping conduit and access road |
| | Economic | Higher capital, operation and restoration costs |
| | Social | Location highly valued by the Cree community, effluent discharge point would be located |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | upstream from Cree camps |
| Lac du Spodumène – A variation considered in the preliminary economic study. | Technical | Risk of accidents caused by potential freezing of the pump pipe in winter<br>Requires pumping effluent to Lac du Spodumène<br>↑ of footprint to restore at end of operations |
| | Environmental | Noise associated with pumping system<br>Impact on soil with the installation of a pumping conduit to Lac du Spodumène and requiring the construction of an access road<br>Potential change in physical-chemical quality of surface water<br>Loss of terrestrial vegetation and wetlands due to installation of the pumping conduit and access road<br>Loss of potential habitat and potential change of fish community dynamics<br>Potential loss of wildlife habitat resulting from installation of pumping conduit and access road |
| | Economic | |
| | Social | A location valued and used by area users<br>Possibility of a random discovery of archaeological or cultural artefacts during installation of the pumping conduit and access road<br>Change in the current landscape with the addition of an access road |
| Lac des Montagnes ***(chosen option)*** – Considered in variations of the draft economic study and feasibility study | Technical | Topography favours gravity-driven flow |
| | Environmental | Noise associated with pumping system<br>Low dilution potential; potential physical-chemical alteration of surface water quality<br>Loss of potential habitat and potential change of fish community dynamics |
| | Economic | |
| | Social | Lake valued and used by area users, but outfall location is not in proximity to Cree camps |
| Stream C – Considered in variations of the draft economic study | Technical | Topography favours gravity-driven flow |
| | Environmental | No noise since no pumping system is required<br>Increased flow in Stream C and potential shoreline erosion<br>Low dilution potential; potential physical-chemical alteration of surface water quality |

| Activity / Alternatives | Criteria | Comment |
|---|---|---|
| | | Loss of potential habitat and potential change of fish community dynamics |
| | Economic | |
| | Social | Stream rarely used by area users |

↑: increase ↓: decrease

# Appendix E Summary of the Concerns Raised by the Cree Nation of Nemaska

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| Atmospheric environment | | |
| Question about the Proponent's planned measures to mitigate the increased amount of traffic on Route du Nord. Will dust control agents be sufficient? Should paving the road be considered? | The Proponent will use six 100-tonne trucks rather than 38 38-tonne semi-trailers to transport concentrate from the mine site to the rail terminal in Chapais. Furthermore, discussions between the Proponent, the James Bay Development Corporation and the Quebec Department of Transport are in progress to ensure road maintenance in relation to dust and damage that could be caused by heavy truck traffic. | This issue is outside the scope of the federal environmental assessment. The Agency nevertheless shared the concern with the Proponent. |
| Surface water – Quality and quantity | | |
| Concerns about the water treatment by the Proponent, i.e., to limit treatment to suspended solids removal from water from the waste rock and tailings pile. A number of people wonder whether this will be sufficient. Concerns that Lac des Montagnes will be contaminated. | According to the Proponent, the discharge of effluent to Lac des Montagnes will not affect the lake. The Proponent undertakes to monitor water quality in Lac des Montagnes and the groundwater, in accordance with the applicable provincial and federal standards. The Proponent will verify the non-leaching potential of the mining waste by performing an additional test. | The Agency is of the view uncertainties remain regarding the risk of discharging harmful substances into the receiving environment through mine effluent in connection with the characterization of the various materials excavated and the results of leaching tests. Based on the opinion of Environment Canada, the Agency will recommend that beryllium and lithium be added to the list of substances monitored and that the results of the on-site test (barrel procedure) be forwarded to it. If new leachable substances are identified, the Proponent will have to take them into account in its effluent monitoring program. The Agency, on the advice of Environment Canada, will recommend the installation of a treatment unit as a preventive measure. The treatment unit could be used where exceedances of the applicable standards have been observed or are anticipated. This measure is one of the potential conditions recommended to the Minister of the Environment. The Agency is of the view that following the implementation of additional water quality measures and monitoring by the Proponent, the water quality of Lac des Montagnes will meet Quebec and federal government standards. |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| Concerns about the location of settling ponds (near Lac des Montagnes) and the impacts of an accidental spill into Lac des Montagnes. | In order to address the concerns of the Cree -Nation of Nemaska, the Proponent decided to reconsider the location of the waste rock and tailings pile, settling ponds and outfall to move them away them from Lac des Montagnes and thus from the Bible Camp.<br><br>According to the Proponent, the consequences, however unlikely, of a breach in the mine water pond dike would be very limited given that the capacity of the settling ponds is only 26,000 $m^3$ and considering its location approximately 1 km away from Lac des Montagnes. It will only be used to settle out suspended solids. The area between the pond and the lake is gently sloped and covered with vegetation. Because of these two factors, any suspended solids transported by the water (in the event of a breach) would be filtered through the vegetation.<br><br>To prevent failure of the dam, the Proponent is including a facility inspection program in its monitoring program. | Following a review of the relocation of the mine infrastructure, the Proponent moved the waste rock and tailings pile and settling ponds further away from Lac des Montagnes. Environment Canada is of the view that the impact assessment provided by the Proponent appears to be valid and that it is reasonable to believe that the quantity of water and sludge that reached Lac des Montagnes in the event of dam failure would be limited.<br>The Agency recommends that the Proponent take all reasonable steps to prevent accidents and failures resulting in adverse effects, and ensure the implementation of mitigation and contingency measures in the emergency response plans developed for this Project. This should include measures to address any breach of the settling pond dam or waste rock and tailings pile water pond. This measure is one of the potential conditions recommended to the Minister of the Environment. |
| Current use of lands and resources for traditional purposes | | |
| Concerns that noise from the mine will frighten away Canada geese and moose hunted by the Nemaska Cree in the vicinity of the Project. | Following an update of the modelling performed for the noise impact study to consider relocating the waste rock and tailings pile, the Proponent concluded that there would be no significant effects on the noise environment outside the mine site.<br>In addition to implementing noise control measures, the Proponent undertakes to cease all mining activity (blasting, stockpiling of waste rock, etc.) during the spring waterfowl hunting season (Goose Break). | Environment Canada considers the Proponent's noise management measures to be adequate.<br>Environment Canada is of the view that the sector used for goose hunting in northwest part of Lac des Montagnes appears to be far enough away from the mine infrastructure to avoid causing excessive disturbance to waterfowl. If migrating waterfowl were disturbed by the noise, they could adapt and use adjacent areas or other parts of Lac des Montagnes.<br>Based on the opinion of Environment Canada, the Agency finds the Proponent's analysis and commitments to protect waterfowl hunting to be satisfactory.<br>According to the Government of Quebec wildlife sector, the home range of moose is 5 to 10 $km^2$. It is therefore possible that moose currently present in the future site of the |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| | | Whabouchi mine also use other sectors of trapline R20. The noise environment beyond the boundaries of the mine site would be altered and would not constitute a factor affecting moose behaviour.<br>The Agency is of the view that the implementation of noise management measures by the Proponent is sufficient to reduce any significant adverse environmental effects on wildlife of interest to the Cree Nation of Nemaska. |
| Community desire to control hunting and fishing by mine workers by establishing the boundaries of the area to which such activities will be restricted. An awareness program and a monitoring body (joint Cree-Proponent) should be established to control the pressure exerted on resources. | The Proponent will prohibit the future employees from hunting or fishing within the area of the mining lease and surface use leases in order to limit these activities. Furthermore, the Proponent will prohibit individuals from possessing a weapon of any kind on the mine site unless authorized for the purposes of their duties. Furthermore, discussions will be held between the Cree Nation of Nemaska, the Quebec Department of Sustainable Development, Environment and the Fight against Climate Change and the Société Weh-Sees Indohoun to supervise hunting and fishing by workers of the Eastmain-1-A–Sarcelle–Rupert Project and other users of the area, including the Whabuchi mining Project. In terms of hunting and fishing in neighbouring areas, workers must comply with the regulations governing the Weh-Sees Indohoun and Eastmain sectors. | This issue is outside the scope of the federal environmental assessment. The Agency nevertheless shared this concern with the Proponent. |
| Concerns about rehabilitation of the mine site. Many industrial sites in the area have been abandoned with waste left behind (barrels, propane canisters and metal structures). | Debris generated during construction, renovation and closure of the site will be processed separately since these types of debris are usually large and take up considerable space. Remaining materials will be sent to the site ecocentre or stored for later shipment to a recycler. The Proponent will perform site restoration and revegetation work to transform anthropogenically altered sectors of the mine site. | The Agency is satisfied with the Proponent's waste management and site restoration commitments. Furthermore, the *Mining Act* establishes requirements to ensure the restoration of land affected by mining activities (see the Quebec Guidelines for Preparing a Mining Site Rehabilitation Plan and General Mining Site Rehabilitation Requirements). Under the *Mining Act*, the Proponent is required to submit a rehabilitation plan and financial guarantee to the Government of Quebec. |
| Health and socio-economic conditions | | |
| The Project could destroy drinking water collection | In the Proponent's description, the only drinking water well in the Project area is located at the Bible Camp, upgradient from the | A 10 $km^2$ buffer zone was established during the Chinuchi Agreement negotiation process. This zone will no longer |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| site located on the Project site. The Project could cause drinking water access problems. Access should be maintained. | proposed mine site. Some users draw their drinking water from small lakes also located upgradient from the discharge point of the mine waste water treatment basin. Lac des Montagnes also comprises a source of water into which final effluent will be discharged in accordance with the applicable provincial and federal criteria. According to the Proponent, this discharge will have no impact on groundwater or surface water, including the small lakes mentioned above or Lac des Montagnes. The Proponent undertakes to monitor water quality in Lac des Montagnes and the groundwater, in accordance with the applicable provincial and federal standards. In addition, given their proximity to the mine infrastructure, the Proponent also undertakes to perform water quality monitoring in certain water bodies near the mine, i.e., Lakes 2, 18, 27 and 28. | allow access to certain water bodies used by the Nemaska Cree for drinking water (Lakes 1, 2, 28).<br>The Agency will recommend that the Proponent maintain access to Lac des Montagnes and perform annual monitoring of surface water quality at Lac du Spodumène and Lakes 2, 18 and 28 and that it implement corrective measures as required.<br><br>Although Lakes 2 and 28 will not be available to the Cree Nation while the mine is in operation given the presence of the safety zone, the Agency will ask the Proponent to forward the results of all water quality monitoring activities to the Cree Nation of Nemaska and to consult the community about corrective action. This will ensure the potential detection of issues and the necessary action to maintain the resource intact when access to the lakes resumes after the mine closes. These measures and monitoring are part of the potential conditions recommended to the Minister of the Environment. |
| Concerns about the consumption of fish, duck and other hunting products as well as well as small fruit (primarily blueberries and cranberries) in the vicinity of the Project. Fears that the dust and the settling ponds (if birds land on them) as well as mine waste will contaminate traditional foods and create health problems for members of the community. | The Proponent will take various steps to dispel the fears and concerns of Cree users and mitigate the potential resource harvesting avoidance effect (wildlife, aquatic and plant) due to perceived contamination. Measures include:<br><br>- installation of dustfall gauges to analyze the metal content of the atmospheric dust collected. The location of the gauges could be selected to ensure representativeness of potential fallout affecting the nearby lake.<br>- communication and dissemination of information in non-technical language about the Project, its activities and the actual potential risks of contamination;<br>- monitoring of fish tissue contaminant levels under the Environmental Effects Monitoring (EEM) program;<br>- continuation of the activities of the Community Advisory | The Agency will ensure that the Proponent implements its dust management program to reduce the dispersal of contaminants generated at the mining site.<br>Since the Proponent did not submit any estimate of dust and metal deposited into the surrounding aquatic and terrestrial environments, Environment Canada considers that some uncertainty surrounds their impact on water bodies. The Agency will recommend that the Proponent monitor air quality for the duration of the mining Project and monitor heavy metal levels in the liver of fish eaten by the Nemaska Cree (Walleye, Northern Pike and Lake Whitefish) in Lac des Montagnes and Lac du Spodumène which are likely to be affected by dust deposits. The Agency also recommends that the Proponent forward the results to the Cree Nation of Nemaska and establish corrective measures if any effects |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| A toxicity study should be conducted by an independent expert to document this risk. | Committee (CAC) and dissemination of information about the various monitoring activities and their results.<br><br>The Proponent conducted a review of the literature on the toxicity of spodumene and lithium and concluded that there would be no effects. | are noted.<br><br>As mentioned earlier, the Agency will recommend that beryllium and lithium be added to the list of monitored substances and that the results of field tests be forwarded to it. If new leachable substances are identified, the Proponent will have to include them in its effluent monitoring program. The Agency will also recommend the installation of a treatment unit as a preventive measure.<br><br>With respect to the use of the artificial water ponds by waterfowl, the Agency will recommend that the Proponent monitor such activity at the settling ponds during the operation and decommissioning phases, and that it take the necessary corrective action if deaths or unusual behaviour are observed in the birds. The Agency is of the view that the effects of the Whabouchi mining Project on the contamination of food from hunting, fishing or gathering would be low following the implementation of measures and additional monitoring to limit the Project's effects on water and air quality.<br><br>The measures and monitoring recommended by the Agency are among the potential conditions recommended to the Minister of the Environment. |
| Concern about the level of noise emitted by Project activities (blasting, stockpiling of waste rock and tailings), especially for community members who use campgrounds near the site. | Updated noise impact modelling following the relocation of the waste rock and tailings pile found no significant impact on the noise environment beyond the mine site. | The Agency is satisfied with the Proponent's efforts to document the Project's effects on the noise environment. The Agency has determined that the potential environmental effects of the Project on use of the land by the Cree Nation of Nemaska will be low. |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| Questions about the extent of noise, namely, whether residents of the village of Nemaska will hear noise from the mine site. | Updated noise impact modelling following the relocation of the pile found there would be no significant effect on the noise environment beyond the mine site. | The Agency is satisfied with the Proponent's efforts to document the Project's effects on the noise environment. Since Nemaska is 30 km away from the mining site, noise from the mine is unlikely to become a nuisance. |
| Increased traffic on Route du Nord could affect the safety of users. | To reduce traffic on Route du Nord, the Proponent will use six 100-tonne trucks rather than 38 38-tonne semi-trailers to transport concentrate from the mine site to the rail terminal in Chapais. Furthermore, discussions between the Proponent, the James Bay Development Corporation and the Quebec Department of Transport are in progress to ensure road maintenance in relation to dust and damage that could be caused by heavy truck traffic. | This issue is beyond the scope of the federal environmental assessment. The Agency nevertheless shared the concern with the Proponent. |
| Concern about the Project's effects on social and economic aspects, such as the loss of connection to the land, cultural erosion, road safety, drug and alcohol control, etc., which are not taken into account in the federal environmental assessment. | The Proponent has agreed to monitor the well-being of the Cree community of Nemaska. The terms and conditions of the monitoring (activities, indicators, etc.) will be determined with the Cree through the implementing committee (Whabouchi Implementation Committee).<br>Monitoring will focus on various concerns raised by the Nemaska Cree community, such as:<br>The effectiveness of measures implemented by Nemaska Lithium in collaboration with the Cree parties that signed the agreement on the impacts and benefits of developing and operating the Whabouchi Project and the agencies responsible for delivering health and social services to the Nemaska Nation;<br>Development of a drug and alcohol use prevention program in conjunction with the Cree Board of Health and Social Services of James Bay (CBHSSJB) and the Nemaska Nation wellness centre;<br>The application of strict, zero-tolerance disciplinary measures governing drug and alcohol for mine workers;<br>The introduction of controls on the purchase and circulation of alcohol at the worker camp;<br>Social cohesion (integration of the mine worksite, impacts of the workers' presence and aspects related to economic opportunities). | These issues are beyond the scope of the federal environmental assessment. The Agency nevertheless shared the concern with the Proponent. |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| Physical and cultural heritage | | |
| The Project's impacts on Bible Camp users, a site highly valued by the community and located on Lac des Montagnes. Fears that noise, dust, mine waste and landscape alteration will harm the various recreational (e.g., swimming) and community uses (e.g., addiction treatment). | In order to address the concerns of the Cree Nation of Nemaska, the Proponent decided to review the location of the waste rock and tailings pile and settling ponds to move them away from Lac des Montagnes and thus from the Bible Camp. The Proponent plans to catch runoff and seepage from the waste rock and tailings pile in a system of peripheral ditches and to direct it to collection basins and ultimately to a treatment unit prior to discharge into Lac des Montagnes. Discharge quality monitoring will be performed during the mine's life cycle, including the decommissioning and post-closure phases. The noise impact study modelling carried out following the relocation of the pile determined there would be no significant impact on the noise environment. Despite the relocation of the pile to reduce and avoid the potential effects associated with dust emissions, the Proponent will implement mitigation measures such as the application of dust-control agents and imposition of a 30 km/h speed limit. It also undertakes to monitor dust deposited in the terrestrial environment at locations likely to be affected, and to share the results of the monitoring with the Cree Nation of Nemaska. With respect to landscape alteration, the Proponent undertakes to carry out progressive revegetation of the pile, to restore altered areas of the mine site and, as necessary, to install visual screens to conceal aesthetically offensive infrastructure and to use materials that optimize visual harmony between the facilities and the landscape. Mitigation measures will be reviewed after the Proponent completes the new air quality modelling and follow-up of the effectiveness of revegetation. | The Agency recommends implementing a noise monitoring program at the Bible Camp during the construction and operation phases to ensure compliance with the sound levels dictated by the Quebec *Note d'instructions 98-01 sur le bruit* and to make any necessary changes. The monitoring recommended by the Agency is among the potential conditions recommended to the Minister of the Environment.<br>The Agency found that the potential environmental effects on the Bible Camp are low. |
| Impact statement methodology | | |
| The section of the impact study on traditional knowledge appears to disregard the Proponent's discussions with users of the area concerning fish. | According to the Proponent, participation by the Nemaska Cree in sectoral studies made a vital contribution to ensuring that the Cree outlook and knowledge of the land would be taken into account. The following major themes were discussed during the consultation activities: land use, wildlife harvest distribution (primarily species of interest), locations used by families and the Nation and changes in | In its environmental impact assessment, the Proponent documented an extensive consultation process with the Cree Nation of Nemaska. The Agency notes that users of the land, members of the community and the Cree experts had multiple opportunities to share their knowledge of wild plants and animals. The consultation process generated a |

| Comment/Concern | Summary of Proponent's Response | Agency Response |
|---|---|---|
| Their knowledge would have been particularly useful to the Lac du Spodumène and Lac des Montagnes study. | the socio-economic conditions of the Nemaska Nation.<br><br>Furthermore, the Proponent considers that changes made to the Project through the feasibility study took into account the concerns raised in connection with traditional knowledge of the land. | detailed map of the various traditional land uses and the location of the various resources.<br><br>The Agency is of the view that the Proponent made a sufficient effort to gather and take into account traditional knowledge. |
| The community challenges the relevance of using a perfectly circular study area with a 10-km radius. Would it not have been more appropriate to use a study area that follows natural physical boundaries (winds, rivers or mountains)? | According to the Proponent, the direct impact on use of the land and its resources will be limited to a 10-km radius around the mine site. It is within this area, which runs through the southwest portion of trapline R20, that the most extensive surveys were conducted.<br><br>Also, to ensure that all of the proposed activities and their direct and indirect effects on social components of the environment are taken into account, the study zone was extended to cover not only trapline 20, but also adjacent traplines R16, R18, R19 and R21 to the north, south and west. This therefore includes the community of Nemaska, located on trapline R16. | The Agency is of the view that the study area used by the Proponent is based on a methodology that enables a satisfactory assessment of the Project's environmental effects. |

# Appendix F Summary of Potential Residuals Effects on Valued Components Under Section 5 of CEAA 2012 for the Whabouchi Mining Project

| Affected Valued Component | Residual Effect (After Mitigation Measures) | Degree of Residual Effect | | | | Agency Assessment of Significance of Residual Effect |
|---|---|---|---|---|---|---|
| | | Magnitude | Extent | Duration | Reversibility/ Irreversibility | |
| Fish and fish habitat | Reduced surface water and groundwater inflow to lakes, leading to total losses of 54,600 m² for lakes 2, 3, 27, 28 and 30 and for streams C and F. However, the losses will be offset under the *Fisheries Act*. | **Low**<br><br>Effects considered to affect the integrity of the component very little, because the losses will be offset under the *Fisheries Act*. | **Site-specific**<br><br>Effects considered to be limited to the Project site. | **Long**<br><br>Effects anticipated for the entire duration of the Project and beyond the closing period. | **High**<br><br>The habitat losses are irreversible but will be offset. | **Not significant** (low)<br><br>The habitat losses will be offset under the *Fisheries Act*.<br><br>Implementation of water management by the proponent and compliance with the *Metal Mining Effluent Regulations*. |
| Migratory birds | Loss of 1.55 $km^2$ of habitat (1.47 $km^2$ of terrestrial habitat and 0.73 $km^2$ of wetland habitat).<br>Slight alteration to the distribution of birds in the study area depending on their tolerance of disturbance (noise, vibrations, night-time artificial lighting). | **Low**<br><br>The lost habitats are abundant in the study area.<br><br>The bird populations will be able to move to other suitable | **Local**<br><br>Disturbance by noise and vibrations considered to exceed the boundaries of the Project's footprint (e.g., large peat bog | **Long**<br><br>Some anticipated effects would be permanent (loss of terrestrial habitat due to the presence of the pit and waste rock and | **Medium**<br><br>Effects partially reversible. Remediation and revegetation of the mine site. Cessation of disturbance by noise, vibrations and artificial | **Not significant** (low) |

| Affected Valued Component | Residual Effect (After Mitigation Measures) | Degree of Residual Effect | | | | Agency Assessment of Significance of Residual Effect |
|---|---|---|---|---|---|---|
| | | Magnitude | Extent | Duration | Reversibility/ Irreversibility | |
| | Four breeding pairs of Common Nighthawk, ten breeding pairs of Olive-Sided Flycatcher and one breeding pair of Rusty Blackbird could be affected by the development of the mining Project sites. | habitats. | south of the pit). | tailings pile). | lighting after closure. | |
| Aboriginal peoples – Current use of lands and resources for traditional purposes | Potential loss of slightly more than 10 $km^2$ of land, and changes to access to the land.<br>Loss and displacement of wildlife resources following the loss of or changes to aquatic and terrestrial habitat.<br>Disturbance and mortality of wildlife resources associated with operations.<br>Potential loss of a wildlife resource caused by increased hunting pressures associated with the presence of workers.<br>Avoidance of traditional foods due to the perception that local resources are contaminated by mine waste. | **Medium**<br><br>There will be changes to the use of lands, but they will not affect the integrity of the component. | **Local**<br><br>Effects felt over an area larger than the Project's footprint but limited to the southwest section of trapline R20. | **Long**<br><br>Effects anticipated beyond the closing period (habitat loss at the pit site). | **Medium**<br><br>Effects partially reversible (loss of use and avoidance of resources) because the waste piles will be restored and the infrastructure will be dismantled. The habitat loss at the pit site is irreversible (approximately 0.27 $km^2$). | **Not significant** (medium) |

| Affected Valued Component | Residual Effect (After Mitigation Measures) | Degree of Residual Effect | | | | Agency Assessment of Significance of Residual Effect |
|---|---|---|---|---|---|---|
| | | Magnitude | Extent | Duration | Reversibility/ Irreversibility | |
| Aboriginal peoples – Health and socio-economic conditions | Exposure of Crees to contaminants from consuming water, animal flesh and fruit and from breathing in dust. | **Low**<br>According to atmospheric emission modelling and in light of the anticipated low concentrations of contaminants in the effluent and the low potential of the waste rock for acid rock drainage, it is unlikely that Crees will be exposed to contaminants related to mine operations. | **Local**<br>Effects felt over an area larger than the Project's footprint but limited to the zone immediately surrounding the Project. | **Long**<br>Effects could occur after the closure of the mine. | **Low**<br>Effects will be completely reversible because the emission of potential contaminants should end with the closure of the mine. | **Not significant** (low) |
| Aboriginal peoples – Physical and cultural heritage | Loss of archaeological heritage during excavation and mine development work.<br>Loss of enjoyment of the Bible Camp due to degradation of air quality, noise and visual nuisances. | **Low**<br>Studies and surveys found no artefacts.<br>Visual simulations and modelling of air quality and effluent show little impact on the environment. | **Local**<br>Effects on archaeological heritage considered to be limited to the Project site. The Bible Camp is located just over 1 km from the mine site. | **Long**<br>Effects related to visual nuisances will be perceptible beyond the closing period (however, the nuisances themselves are considered low). | **Medium**<br>Effects related to visual nuisances are not reversible, but effects related to air quality and noise will end with the mine activities. | **Not significant** (low) |

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

| Valued Component | Mitigation, Monitoring and Follow-up Measures |
|---|---|
| Effects identified under subsection 5(1) of CEAA 2012 | |
| Fish and fish habitat | **Mitigation measures**<br><br>Implement a mine contact water management program to ensure its collection and treatment prior to discharge to the environment.<br><br>Ensure the treatment of the final effluent in compliance with the standards of the *Metal Mining Effluent Regulations*, the *Fisheries Act* and the Quebec government's requirements for the mining industry, and install a wastewater treatment unit at the mine water pond discharge point to ensure compliance with those standards and requirements.<br><br>Offset serious damage likely to be cause to fish that will be authorized pursuant paragraph 35(2)(*b*) of the *Fisheries Act,* and implement a compensation plan, in collaboration with Fisheries and Oceans Canada.<br><br>In order to implement the compensation plan to offset serious harm to fish associated with the Project's construction, the Proponent shall adopt measures in collaboration with the Cree Nation of Nemaska, to avoid or limit adverse effects on<br>o migratory birds and their habitats;<br>o species at risk and their habitats;<br>o current use of lands and resources for traditional purposes by the Cree Nation of Nemaska; and<br>o sites of cultural importance to the Cree Nation of Nemaska.<br><br>**Monitoring and follow-up**<br><br>Monitoring of progress toward achieving the objectives of the compensation plan for serious harm to fish as per the requirements set out under paragraph 35(2)(b) of the *Fisheries Act*. Details of this follow-up program will be establish as part of the regulatory process link to the *Fisheries Act*.<br><br>Monitoring of effluent quality in accordance with the requirements set out in the *Metal Mining Effluent Regulations*, including lithium and beryllium monitoring in the final effluent prior to its discharge to the environment, subject to the same requirements governing other parameters specified in Schedule 5 of the Regulations, i.e., four times a year.<br><br>Monitoring of environmental effects under the *Metal Mining Effluent Regulations* (section 7 and schedule 5) to assess the effects of the mine effluent discharge on benthic organisms and fish in Lac des Montagnes.<br><br>Annual monitoring of surface water quality in Lac du Spodumène and Lakes 2, 18 and 28, and implementation of any |

| Valued Component | Mitigation, Monitoring and Follow-up Measures |
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| | necessary corrective measures in the event that the applicable criteria and recommendations are not met. Monitoring shall begin with construction and end five years after decommissioning. The monitoring shall include the following elements:<br>○ Submit the measured levels for parameters specified in section 7 of Schedule 5 to the *Metal Mining Effluent Regulations*, taking into consideration in the Environment Canada's guidance document *Metal Mining Technical Guidance for Environmental Effects Monitoring*.<br>○ Compare the measured parameter levels against chronic aquatic life parameters as specified in the Quebec government surface water quality criteria and the Canadian Water Quality Guidelines for Protection of Aquatic Life developed by the Canadian Council of Ministers of the Environment, as well as the levels established in previous annual monitoring activities and those in the water bodies prior to Project implementation.<br>Monitoring of water volume and level and the functions of brook trout spawning areas in Stream D, the downstream reach of Stream C and in a control watercourse not affected by pumping of the pit, as well as monitoring of water levels in Lac du Spodumène and the accessibility of the potential brook trout spawning area in Stream G. The follow-up program will be developed in detail in collaboration with Fisheries and Oceans Canada in the regulatory compliance phase relating to *Fisheries Act* requirements.<br>Submission to the Agency the results of the analyses conducted to confirm that the metals and metalloids contained in the waste rock, the tailings and the ore for the Project are not leachable over the long term before the start the work. If necessary, addition any new leachable substance to the follow-up program for the quality of effluent and its receiving environment and implement mitigation measures in place to protect groundwater. |
| Migratory birds | **Mitigation measures**<br>Carry out all phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds or destroying their nests and eggs. Shall take into account the Avoidance Guidelines, the edition modified in 2014 by the Department of the Environment. The proponent's actions in applying the Avoidance Guidelines shall be in compliance with the Migratory Birds Convention Act, 1994 and with the Species at Risk Act.<br>**Monitoring and follow-up**<br>The Proponent shall put in place a program to monitor the impact of the Designated Project on migratory birds to assess the effectiveness of the mitigation measures used to avoid harm to migratory birds, their eggs and nests. The Proponent shall conduct this monitoring from the start of the operations until the end of the decommissioning phase. Documentation shall be provided to the Agency indicating the results of any monitoring under condition 4.1. The documentation shall demonstrate whether the mitigation measures have proven effective and if additional measures were required to comply with condition 4.1. |

| Valued Component | Mitigation, Monitoring and Follow-up Measures |
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| Current use of lands and resources for traditional purposes | **Mitigation measures**<br><br>Shall implement a follow-up program for the presence of wildlife species of interest in the Project Area and shall consult with the Cree Nation of Nemaska on development and implementation of the program and on any corrective measures to be taken.. The follow-up shall begin at the same time as the construction phase and end when the decommissioning phase of the Designated Project is completed.<br><br>Establish a communication plan with the Cree Nation of Nemaska to keep it informed about the schedule of mining activities and the results of the wildlife and habitat monitoring programs on wildlife species of interest. The implementation of this communication plan shall begin with the Project construction and ends following the decommissioning of the Project.<br><br>In consultation with the tallyman of the trapline affected by the Project, establish a recovery program for all natural resources of interest to the Cree Nation of Nemaska (wooded areas, small fruits, medicinal plants and wildlife species of interest) that could be impacted by the Project or part of it.<br><br>Prohibit wildlife hunting, fishing and trapping by employees within the area of the mining lease and surface use leases.<br><br>Carry out progressive restoration of habitats impacted by the Project such a way as to encourage the return of natural resources of interest for the Cree Nation of Nemaska (wooded area, berries, medicinal plants and wildlife species of interest). |
| Health and socio-economic conditions | **Mitigation measures**<br><br>For all phases of the Project, at the 23 sensitive receptor sites (hunting camps and Bible Camp) meet the air quality standards set out in the *Canadian Ambient Air Quality Standards* of the Canadian Council of Ministers of the Environment and in the Quebec *Clean Air Regulation* by implementing a dust management program that includes the following mitigation measures:<br>o Use of dust-control measures<br>o Imposition of a speed limit of 30 kilometers per hour at the Project site during the construction, operating and decommissioning phases and;<br>o Progressive restoration of the waste rock and tailings pile<br><br>**Monitoring and follow-up**<br><br>Implementation of the following monitoring activities to ensure the accuracy of the predicted effects of the Project on health and socio-economic conditions:<br>o Annual monitoring of heavy metal concentrations in fish meat and fish liver for species likely to be eaten by the Nemaska Cree (Walleye, Northern Pike and Lake Whitefish) in Lac des Montagnes and Lac du Spodumène. |

| Valued Component | Mitigation, Monitoring and Follow-up Measures |
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| | Monitoring shall begin with construction and end five years after decommissioning.<br><br>o Monitoring of air quality to verify the effectiveness of key mitigation measures. The monitoring will begin with the start of construction and end when the decommissioning phase is done:<br><br>i. The proponent shall alert the Cree Nation of Nemaska in the event that the Canadian Ambient Air Quality Standards developed by the Canadian Council of Ministers of the Environment or the requirements of the Quebec Clean Air Regulation are not met at the sensitive receptor closest to the Project.<br><br>Before the construction, the Proponent shall establishment a communication plan to share the results of the follow-up programs with the Cree nation of Nemaska and consult them about the result of the programs regarding health and socio-economic conditions and about the implementation of any corrective measures, if required. The Implementation of this communication plan begins with the construction and ends following Project decommissioning. |
| Physical and cultural heritage and sites and structures of historical, archaeological, paleontological or architectural significance | **Mitigation measures**<br><br>In the event archaelogical artefacts are discovered on the Project area, comply with the requirements of the Quebec *Cultural Property Act* and inform the tallyman directly affected by the Project, as well as the Cree Nation of Nemaska.<br><br>To reduce visual nuisances, implement the following measures, among others:<br><br>o Burial of the effluent discharge pipe over a distance of at least 100 meters away from the shoreline and in the initial part of the littoral zone, in accordance with the Fisheries and Oceans Canada requirements, in order to prevent serious harm to fish.<br><br>o Carry out progressive revegetation of the waste rock and tailings pile.<br><br>o Restore the mine site after decommissioning activities are completed.<br><br>Ensure access at all time to the northeastern part of Lac des Montagnes at all times to allow Bible Camp users to continue engaging in all activities related to the lake and its shores, such as swimming and canoeing.<br><br>**Monitoring and follow-up**<br><br>Implement a noise level monitoring program at the Bible Camp during the construction and operating phases to ensure compliance with the noise levels prescribed by the Quebec *Note d'instructions 98-01 sur le bruit*, to verify mitigation measures and implement any corrective action.<br><br>Implement a communication plan to share the results of the follow-up program with the Cree nation of Nemaska and consult them on the implementation of any corrective measures, should any be required. |

| Valued Component | Mitigation, Monitoring and Follow-up Measures |
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| Accidents and malfunctions | • Take all reasonable measures to prevent accidents and malfunctions that could result in adverse environmental effects, and ensure the implementation of mitigation and contingency measures in its emergency response plans developed for the purposes of the Project.<br>• In the event of an accident or malfunction that could result in adverse environmental effects,<br>o Notify the Agency and other relevant regulatory authorities of the occurrence as soon as possible;<br>o Implement, as soon as possible, measures to mitigate the adverse environmental effects of the accident or malfunction;<br>o Submit a written report to the Agency as soon as possible given the circumstances, but no later than 30 days after the accident or malfunction. The written report must detail the following:<br>▪ Description of the accident or malfunction and its adverse environmental effects<br>▪ Measures that were taken to mitigate the environmental effects of the occurrence<br>▪ Description of any residual environmental effects and any additional measures required to address residual environmental effects<br>▪ If an emergency response plan was implemented, details concerning its implementation; and<br>▪ Changes made to avoid a subsequent occurrence of the accident or malfunction<br>o Develop and implement a communication mechanism in collaboration with the Cree Nation of Nemaska that shall include:<br>▪ The types of accidents or malfunctions that require a notification to the Cree Nation of Nemaska<br>▪ The manner by which the Cree Nation of Nemaska shall be notified of an accident or malfunction; and<br>▪ A contact person for the Proponent and for the Cree Nation of Nemaska |