



**Environmental and Social Impact  
Assessment for the Troilus Mine Project**

TERRESTRIAL AND AVIAN FAUNA



# Environmental and Social Impact Assessment for the Troilus Mine Project

## TERRESTRIAL AND AVIAN FAUNA

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### Acronyms and abbreviations

AONQ	Québec Breeding Bird Atlas
CDPNQ	Center de données du patrimoine naturel du Québec
COSEWIC	Committee of the Status of Endangered Wildlife in Canada
DRL	Dénombrement à rayon limité (Point Counts)
ESIA	Environmental and Social Impact Assessment
ECCC	Environment and Climate Change Canada
ÉPOQ	Étude des populations d'oiseaux du Québec
ERCFQ	Équipe de rétablissement du caribou forestier du Québec (Quebec woodland caribou restoration team)
ESMV	Espèce susceptible d'être désignée menacée ou vulnérable (Species likely to be designated as threatened or vulnerable)
GIS	Geographic Information System
GRHQ	Géobase du réseau hydrologique du Québec
IAS	Invasive Alien Species
IPA	Index of Abundance
IUCN	International Union for Conservation of Nature
LEMV	Loi sur les espèces menacées ou vulnérables (Act respecting threatened or vulnerable species)
LSA	Local Study Area
MELCCFP	Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (Ministry of Environment, the Fight Against Climate Change, Wildlife and Parks)
MFFP	Ministère des Forêts, de la Faune et des Parcs
SARA	Species at Risk Act
UGAF	Unité de gestion de la faune à fourrure (Fur-bearing Animal Management Units)
RSA	Regional Study Area
PDA	Project Development Area



## **17. Terrestrial and avian fauna**

### **17.1 Scope of Assessment**

#### **17.1.1 Regulatory and Policy Setting**

##### **17.1.1.1 Directive issued by the Direction générale de l'évaluation environnementale stratégique<sup>1</sup>**

The assessment of impacts on terrestrial wildlife, avifauna and species at risk and their habitats was prepared in accordance with the provincial terms of reference (Appendix A.1) and the Tailored Impact Statement Guidelines (Appendix A.2).

The various federal and provincial laws and regulations pertaining to birds, including protected species and their habitat, are as follows:

- Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22):

This law applies to migratory birds and their habitats. It prohibits the discharge of a substance harmful to migratory birds into waters or an area frequented by these birds. It is also prohibited to discharge a substance which, when mixed with one or more other substances, results in a substance harmful to migratory birds into waters or an area frequented by migratory birds, or into any other place from which the harmful substance could enter such waters or area.

- Migratory Birds Regulations (2022) (SOR/2022-105):

The Migratory Birds Regulations are made under the Migratory Birds Convention Act, 1994. Under the Regulations, no person shall capture, kill, harm or harass a migratory bird. It is also forbidden to destroy, take or disturb an egg, or damage, destroy, remove or disturb a nest.

- Species at Risk Act (S.C. 2002, c. 29):

The Species at Risk Act (SARA) was passed in 2002. Its purpose is "prevent wildlife species in Canada from disappearing, to provide for the recovery of wildlife species that are extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened" (Government of Canada 2016). It is applied by the Government of Canada and concerns species listed in Schedule 1 of SARA.

- Act respecting threatened or vulnerable species (RLRQ, chapter E-12.01):

It is under this Act that threatened or vulnerable wildlife species are designated. However, they are governed by the Act respecting the conservation and development of wildlife.

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<sup>1</sup> Directorate for Strategic Environmental Assessment

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- Act respecting the conservation and development of wildlife (RLRQ, chapter C-61.1):

The purpose of this Act is to conserve wildlife and its habitat, to develop them with a view to sustainable development, and to recognize the right of all persons to hunt, fish and trap in accordance with the law. Under this law, it is forbidden to disturb, destroy or damage the beaver dam or the eggs, nest or den of any animal. It is also under this law that wildlife reserves can be established. The project is located on the territory of two wildlife reserves: Albanel-Mistassini-and-Waconichi Lakes Wildlife Reserve and Assinica Wildlife Reserve.

### 17.1.2 Influence of Consultation and Engagement

From the outset of the project, Troilus has engaged in an extensive consultation and communication process with various project stakeholders, as presented in Chapter 4 of the Environmental and Social Impact Assessment (ESIA) report. Where indigenous knowledge has been made available by Indigenous nations through mobilization, information gathering and voluntary information sharing, it has been considered and incorporated into the impact assessment, where appropriate.

Table 17.1 presents the main themes and key information, indigenous knowledge and concerns raised by parties in relation to terrestrial and avian fauna. The table also shows how this information has been addressed in this section and how these commitments influence the assessment of the project's impacts and are considered in Troilus' commitments. The main concerns raised by indigenous communities related to the protection of species with special designation and the application of mitigation measures.

**Table 17.1 Summary of key information, indigenous knowledge and concerns for the project related to terrestrial and avian fauna**

Theme	Key information, Indigenous knowledge and concerns	Influence on assessment	Where information is addressed in the ESIA
Terrestrial and avian wildlife	<p>Land users and community members have expressed concerns about:</p> <ul style="list-style-type: none"> <li>• Protection of species with special designation;</li> <li>• Management of animal populations (e.g. proper trapping of beavers);</li> <li>• Excessively steep slopes for infrastructures such as existing stockpiles, which can impede wildlife movement.</li> </ul> <p>Land users have made the following recommendations to Troilus: provide passageways on the site for the movement of large wildlife during closure.</p>	Troilus will progressively restore the mine site. The final closure and reclamation plan and the question of future uses of the reclaimed land will be developed at a later date, in collaboration with government agencies, Indigenous communities and land users; Troilus plans to apply several mitigation measures to reduce the impact of the project on wildlife and its habitat	Section 17.4
Vegetation and wetlands	Restore site with native vegetation attractive to moose and other wildlife	The final closure and restoration plan and the question of future uses of the reclaimed land will be developed at a later date, in collaboration with government agencies,	Sections 16.3.1.2 and 16.3.2.2

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Theme	Key information, Indigenous knowledge and concerns	Influence on assessment	Where information is addressed in the ESIA
		Indigenous communities and land users.	

### 17.1.3 Potential impacts, pathway and measurable parameters

Based on the expertise of provincial and federal environmental assessment specialists, including some in the mining field, in conducting environmental assessments of projects including mining projects, a list of potential environmental impacts of the project on terrestrial and avian fauna has been developed. This list also reflects the concerns and comments received during the consultation and mobilization process involving the various project stakeholders, including the Cree and Jamesian communities. Table 17.2 presents the potential environmental impacts of the project, the measurable parameters and the reasons for their selection.

**Table 17.2 Potential impacts, Impacts Pathways and Measurable Parameters Terrestrial and Avian Fauna**

Potential impact	Impact Pathway	Measurable parameters and Units of Measurement
Disturbance of wildlife and wildlife habitat (including species at risk)	Project construction, operation and/or closure activities could result in the direct loss or fragmentation of habitat, notably through clearing activities, loss of wetlands, site development including road development. Direct or indirect disturbance and modification of wildlife habitat can cause sensory disturbance (dust, noise, light), or the introduction of invasive alien species (IAS) or contaminants (spills, effluent). These pathways could affect species with special designation (woodland caribou, bats, Common Nighthawk, rock vole, etc.).	Area (ha) of wildlife habitat directly and/or indirectly lost or altered (e.g.: sensory disturbance) Area of critical habitat for species with special designation, directly or indirectly lost or altered (habitat for woodland caribou, brown bat, etc.). Number of nesting sites (birds), maternity sites (bats) or calving sites (caribou) of officially defined species at risk directly or indirectly affected
Risk of wildlife mortality	Direct and/or indirect activities associated with the construction, operation and/or rehabilitation of the mine could result in interactions and collisions with wildlife, leading to an increase in the risk of mortality or in the number of deaths of wildlife species.	Qualitative and/or quantitative assessment (number of animals potentially affected) of the risk of: Mortality resulting from vegetation clearing, preparation and maintenance (e.g., risk of destruction or abandonment of active nests; loss of breeding or wintering habitat area for amphibians); collisions with vehicles and/or project infrastructure; human-wildlife conflict; increased predation due to changes in predator-prey dynamics.
Changes in movement patterns	Direct and/or indirect activities associated with mine construction, operation and/or rehabilitation could result in changes to movement corridors and wildlife movement patterns.	Quantitative risk of the project creating physical barriers to wildlife movement: Extent of area (ha) causing movement barrier to (regional scale) (e.g. mine sites)

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Potential impact	Impact Pathway	Measurable parameters and Units of Measurement
		Length of open trench (m or km)

#### 17.1.4 Boundaries

##### 17.1.4.1 Spatial Boundaries

The Local Study Area (LSA) for Terrestrial and Avian Fauna encompasses the boundaries of the site where the direct and indirect impacts of the project can be predicted or measured with a reasonable level of accuracy and confidence. It aligns with the vegetation LSA, as indirect impacts on wildlife should be align with habitat characteristics. It corresponds to the project watershed, which covers an area of 57 km<sup>2</sup>.

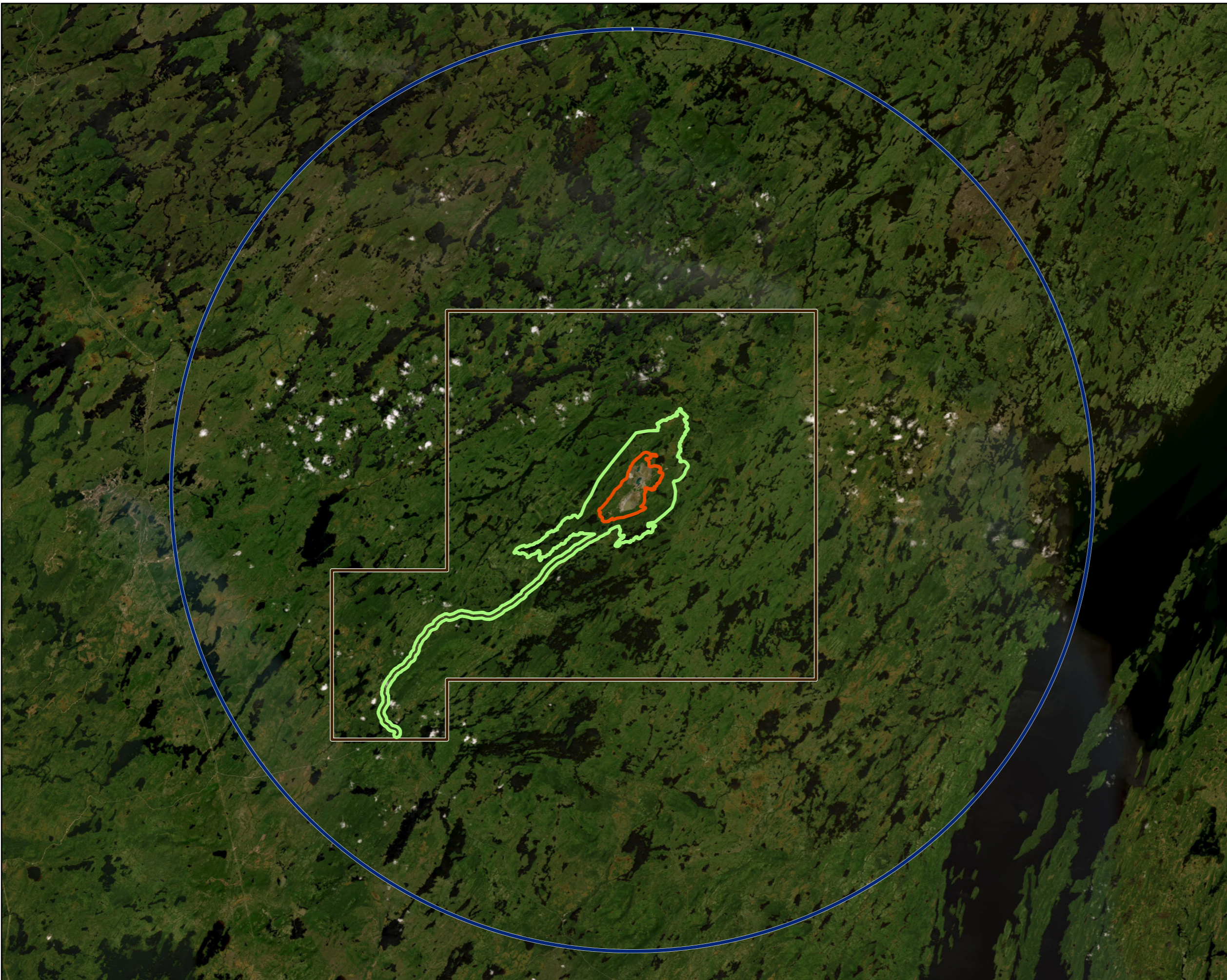
The Regional Study Area (RSA) provides the context for determining the significance of project-specific impacts. It corresponds to an area of 1829 km<sup>2</sup> centered on the LSA for all wildlife groups except caribou. It also includes the mine access road. The LSA for woodland caribou corresponds to the RSA for the other wildlife groups, i.e. an area of 1829 km<sup>2</sup> centred on the project and including the access road. The caribou RSA has a total area of 7852 km<sup>2</sup>, or a radius of 50 km around the mine center (Map 17.1).

##### 17.1.4.2 Temporal Boundaries

The temporal boundary of the assessment includes all phases of the project, from the start of construction to the end of closure. According to the current project schedule, project phases include:





- Construction (year -3 to year -1)
- Operation
  - Operations phase 1 (year 1 to year 21): processing with ore extraction
  - Operations phase 2 (year 22): processing with no ore extraction
- Decommissioning and closure
  - Active closure (year 22 to year 24)
  - Passive closure (year 24+)

Refer to Chapter 3 of the ESIA (Project Description) for a detailed description of activities planned during each phase.



**LÉGENDE / LEGEND**

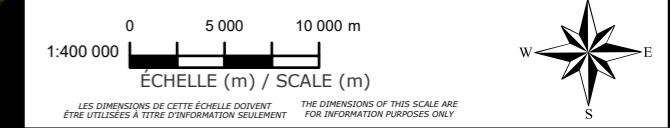
**Composante de projet / Project Component**

-  Zone de développement du projet / Project Development Area
-  Zone d'étude locale faune terrestre et aviaire / Terrestrial and Avian Wildlife Local Study Areas
-  Zone d'étude régionale du Caribou / Caribou Regional Study Area
-  Zone d'étude régionale faune terrestre et aviaire / Terrestrial and Avian Wildlife regional Study Areas et  
Zone d'étude locale du caribou / Caribou Local Study Areas

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RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.

**RÉFÉRENCES/REFERENCES**  
 Base Map: Bing, 06 June 2023

**NOTES**  
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**CLIENT**

**Troilus Gold Corp.**

**PROJET/PROJECT**

**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**

**Zones d'étude de la faune terrestre et aviaire / Terrestrial and Avian Wildlife Study Areas**





<b>NO. PROJET / PROJECT NO.</b> 240433/167040485	<b>DATE</b> 2025/ 06/ 12
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<b>CONÇU / CHECKED</b> L. Essegahier	<b>RÉVISÉ / VERIFIED</b> J. Massicotte
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<b>DESSINÉ / DRAWN</b> M. Arcand	<b>Figure No.</b> 17.1	<b>ED./REV.</b> 0
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### 17.1.5 Residual Impacts Characterization

Table 17.3 presents measures to characterize the residual impacts.

**Table 17.3 Characterization of residual impacts on terrestrial and Avian Fauna, species with special designation and their habitats**

Characterization	Description	Quantitative measure or definition of qualitative category
Direction	The long-term trend of the residual impact.	<p><b>Positive</b> increase in area (ha) of wildlife habitat including for species with special designation, decrease in mortality risk, increase in wildlife movement.</p> <p><b>Negative</b> - decrease in surface area (ha) of wildlife habitats including for species with special designation, an increase in the risk of mortality, a decrease in wildlife movement.</p>
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions.	<p><b>No Measurable Change</b> – no measurable change in the impact can be noted</p> <p><b>Low</b> - A measurable change in wildlife habitat area, or mortality within normal variation from existing conditions and that does not affect wildlife viability in the RSA or the creation of a semi-permeable barrier that does not affect wildlife movement.</p> <p><b>Moderate</b> - A measurable change in wildlife habitat area or mortality risk that is unlikely to affect wildlife viability in the RSA, or the creation of a semi-permeable barrier that is likely to affect wildlife movement.</p> <p><b>High</b> - A measurable change in wildlife habitat area or mortality risk that may affect the viability of wildlife in the RSA, or the creation of an impermeable barrier that may affect wildlife movement.</p>
Geographic extent	The geographic area in which a residual impact occurs.	<p><b>PDA</b> - residual impacts are limited to the PDA.</p> <p><b>LSA</b> - residual impacts extend into the LSA.</p> <p><b>RSA</b> - residual impacts extend into the RSA.</p>
Timing	Considers when the residual impact is expected to occur, where relevant to the VC.	<p><b>Not applicable (N/A)</b> - seasonal aspects are unlikely to affect wildlife habitats, mortality risk or movement.</p> <p><b>Applicable</b> - seasonal aspects may affect wildlife habitats, mortality risk or wildlife displacement.</p>
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual impact can no	<p><b>Short term</b> - the residual environmental impact is limited to construction or active closure.</p>

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Characterization	Description	Quantitative measure or definition of qualitative category
	longer be measured or otherwise perceived.	<b>Medium-term</b> - the residual environmental impact extends throughout construction, operation and active closure. <b>Long term</b> - the residual environmental impact extends beyond the active closure phase.
Frequency	Identifies how often the residual impact occurs and how often during the project or in a specific phase.	<b>Single event</b> - the residual environmental impact occurs once during the project. <b>Multiple irregular event</b> - the residual environmental impact occurs sporadically, at irregular intervals, and is not predictable. <b>Multiple regular event</b> - the residual environmental impact occurs regularly, at predictable intervals or at specific timings. <b>Continuous</b> - the residual environmental impact occurs continuously.
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases.	<b>Reversible</b> - the residual impact is likely to be reversed after activity completion and reclamation. <b>Irreversible</b> - the residual impact is unlikely to be reversed.

## 17.2 Existing Conditions

This section provides a summary of pre-project (pre-1996) and current conditions for terrestrial and avian fauna, as well as the methods used to characterize existing conditions. Further details are provided in the characterization reports available in Appendix G.4.

### 17.2.1 Methods

The description of pre-project conditions, i.e. prior to mine construction in 1996, is based on data collected as part of the environmental and social impact study for the original Troilus Mine project (Entraco 1993).

The description of existing conditions is based on a review of existing public data; feedback from consultation; Indigenous knowledge studies; and field inventories to survey natural heritage features and collect data on the presence of species. These sources of information are described in the following sections.

#### 17.2.1.1 Literature review

General information and data were collected and reviewed to determine the characteristics of the natural heritage. Information sources included:

- Atlas des amphibiens et des reptiles du Québec;
- Quebec breeding birds Atlas ;
- Atlas des micromammifères du Québec;
- Avibase;

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- eBird;
- Center de données du patrimoine naturel du Québec (CDPNQ);
- Étude des populations d'oiseaux du Québec (ÉPOQ);
- Recovery strategies and plans;
- Various documents and maps made available by the Canadian and Quebec governments;
- Scientific articles.

Some of these data have been compiled in the environmental characterization studies available in Appendix G.4.

Information on wildlife use in the region was also obtained from discussions with Indigenous communities and Indigenous Knowledge studies.

#### 17.2.1.2 Field inventories

##### Large fauna

For the purposes of this study, large fauna refers to the following species: woodland caribou (*Rangifer tarandus caribou*), moose (*Alces alces*) and black bear (*Ursus americanus*). Of these species, only the woodland caribou has special status. It was designated as a threatened species in Canada under the Species at Risk Act in June 2003, and as a vulnerable species in Quebec in February 2005.

A study was conducted in 2019 (WSP, 2019) to establish a picture of land use by large fauna. This study can be found in Appendix G.4.1.1. The methodology used to describe the environment includes a documentary search of several sources, including Quebec government data, a literature review, the former Troilus impact study in 1993 (Groupe Conseil Entraco, 1993) and consultation with tallymen. In addition, biologists conducted an aerial survey for caribou. This survey covered an area of 1,825 km<sup>2</sup>, corresponding to a radius of 20 km on either side of the proposed mine's central point (1,600 km<sup>2</sup>), to which a 225 km<sup>2</sup> survey block was added to ensure coverage from the mine road to its junction with the Route du Nord. An aerial survey was also carried out specifically for moose. This covered an area of 100 km<sup>2</sup>, a square of 5 km on either side of the center of the mine site. A multi-criteria analysis model that considers natural and anthropogenic components to assess the quality of caribou habitat was used to evaluate the relative probability of occurrence. This was developed using the habitat selection model of Leblond et al. (2014). Analysis of the rate of habitat disturbance was used to characterize the current state of habitat in the study area. A second study was carried out in 2024 (WSP, 2024) to update data on disturbance, land use by woodland caribou and habitat conditions for this species. The analysis of land use by woodland caribou was based on the most recent telemetry data, from 2020 to May 2024 inclusive. The same multi-criteria analysis model used in 2019 (WSP) was used to assess the quality of woodland caribou habitat. For the disturbance rate assessment, an expanded buffer zone of 750 m (rather than the 500 m used in 2019) was applied to map anthropogenic features and their combined impacts of predation and increased avoidance. The use of a 750 m zone was requested by the Cree Nation Government and is based on the study by St-Laurent et al. (2023). This study shows that woodland caribou avoid several habitats around a disturbed environment, such as forest roads, up to a distance of 750 m.

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### Mammals

Several mammal species have a potential of presence in the Local Study Area. Specific surveys of micromammals, chiropterans and small mammals, have been carried out to better understand their use of the territory.

Observations of wolf (*Canis Lupus*) activity were collected as part of the large wildlife study (WSP, 2019). Signs of presence or sightings of other species of interest were noted during the aerial survey, particularly regarding to wolves.

A chiropteran survey was carried out in the summer of 2022 (Wavx, 2023 ) and can be found in Appendix G.4.2.1. This survey covered a study area of approximately 120 hectares, which corresponds roughly to the LSA. A total of seven stations were deployed in environments favourable to the presence of chiropterans. The survey was carried out during the breeding season. SM-BAT mini (Wildlife Acoustics) type devices with multidirectional microphones were installed two or three meters above the ground, directly on tree trunks. Recordings began at sunset and continued until sunrise, lasting approximately 6 hours per night, and more as the season progressed. A total of 180 hours of recording per station were accumulated, but only recordings made under favorable weather conditions were analyzed.

Another study was carried out to assess the potential presence of hibernacula for chiropterans, by analyzing lidar images and geological maps, and by evaluating former underground mining sites (Spéleo Québec, 2023). The study is available in Appendix G.4.2.2.

A survey of potential roosting sites for cave-dwelling bats was carried out in 2024 (Wachiih, 2024). The potential of trees and man-made structures as roosting sites was assessed. The best roosting sites were inspected for evidence of presence, and a nocturnal survey was also conducted near sites with high potential. This study is available in Appendix G.4.2.3.

Two micromammals inventories were carried out in an inventory area of approximately 57 km<sup>2</sup>, i.e. the LSA apart from the portion upstream of Lac Amont. The first inventory was conducted in 2019 ( Wachiih et FaunENord, 2020 a) and the second in 2020 (FauneENord, 2020 ). These are available in Appendix G.4.3, respectively Appendices G.4.3.1 and G.4.3.2. In the first study, 420 trap were used, while 553 were used in the second study. Traps were either Victor type or pitfall traps. Captured specimens were frozen and identified in the laboratory using an identification key.

Winter transect surveys also enabled us to identify several mammal species based on their tracks and the habitats they frequent (Wachiih, 2025).

### Herpetofauna

Three surveys were carried out to describe the herpetofauna in a study area of approximately 57 km<sup>2</sup>, i.e. the LSA apart from the portion upstream of Lac Amont. The first was carried out from June 14 to 20, 2019 (Wachiih and FaunENord, 2019) and included active listening for anurans and active searching for stream salamanders. A second survey was carried out from May 3 to 6 and July 6 to 9, 2021 (FaunENord, 2021a) and included listening for anurans only. Finally, acoustic detectors were deployed from June 22 to July 22, 2022 to cover the breeding period, then during another period from September 7 to October 9,

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2022, then in 2023 from May 5 to June 6, June 6 to July 6 and finally from September 5 to October 10. These surveys detected the presence of several anuran species (Wachih, 2025). The surveys are available in Appendix G.4.4 (respectively Appendices G.4.4.1, G.4.4.2 and G.4.4.3).

#### Avifauna

An avifauna inventory targeting passerines, woodpeckers, Common Nighthawk (*Chordeiles minor*) and short-eared owl (*Asio flammeus*) was conducted in 2019 (Wachih and FaunEnord, 2020a) (Appendix G.4.5.1) in an inventory area of approximately 57 km<sup>2</sup>, corresponding to the LSA except for the portion upstream of Lac Amont. Passerines and woodpeckers were surveyed using point counts (DRL) and index of abundance (IPA) techniques at 14 survey stations between June 12 and 19, 2019. For the Common Nighthawk, visits were made to seven stations in areas favorable to the species, at dusk, to detect its presence. For Short-Eared Owls, visual or auditory observations were recorded at five inventory stations, which were visited from 90 minutes before sunset to 30 minutes after. These surveys took place in spring and summer 2019. As part of the same study, Cree tallyman families were consulted to share their knowledge of birdlife, among other things (Wachih and FaunEnord, 2020a).

An inventory was conducted from May 24 to 29, 2021 specifically for Waterfowl (FaunEnord, 2021b) (appendix G.4.5 .2). In this study, several orders using aquatic environments were included in the inventory, namely Anseriformes, Charadriiformes, Gaviiformes, Gruiformes, Pelecaniformes and Podicipiformes. The aim was to detect nesting species, i.e. those most likely to be affected by the project.

Finally, another study, conducted by Wachih in 2022, 2023 and 2024 (Wachih, 2025) (appendix G.4.4.3), extended the coverage (65 km<sup>2</sup> area), i.e. an area similar to the LSA, and increased sampling of the various bird groups, as well as enabling inter-annual comparison and understanding of habitat use during the nesting period. It covers the breeding (June and July 2022 and 2023, June 2024), spring migration (May 2023, spring 2024) and fall migration (September and October 2022 and 2023) periods, as well as the winter period (February 2023). The study included recording stations (sound level meters), listening point inventories as well as transects and listening points carried out in winter.

Ten recording stations (Song Meter 4 type sound level meters) were operated at a rate of three minutes of recording per 15-minute period over a 24-hour cycle, giving a total of 4.8 hours of recording per inventory day. They operated autonomously for an average of 30 consecutive days for each period, i.e. the breeding period in 2023 and 2024, the fall migration period in 2022 and 2023, and the spring migration period in 2023 and 2024. Just over 10% of the recorded files were analyzed, or around 7.1 hours per station. As these data were collected over two years, species richness and dissimilarity in species assemblage could be compared between survey periods.

In the same study, 388 listening points of 10-minut were surveyed in 8 habitat groups. These surveys were carried out during the breeding season, i.e. from June 22 to July 8, 2022 and from June 11 to July 6, 2024, using DRL and IPA techniques. These inventories enabled us to characterize the use of each habitat group by avifauna, and to define the nesting status of the various species in each one.

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To count Nighthawks and short-eared owls, 14 crepuscular stations were positioned in the study area in suitable habitats, particularly in open areas. The 7 recording stations used for bats were also used to detect Nighthawks.

Three helicopter overflights were carried out in the LSA during the breeding season, on June 28 and July 2 and 6, 2024, to survey waterfowl and detect nests of birds of prey. These overflights were carried out opportunistically when a helicopter was available.

The winter inventory comprised 32 rectangular transects, each 1 km long, spread over an area roughly corresponding to the Project Development Area (PDA), on which three listening points were positioned to count birds. Each listening point lasted 3 minutes. In all, 96 listening points were conducted between February 17 and 22, 2023.

#### 17.2.2 Pre-mining Conditions

The Environmental and Social Impact Assessment for the original Troilus Mine project (Groupe Conseil Entraco, 1993) provides data on several wildlife groups, including moose, black bear, American beaver (*Castor canadensis*), fur-bearing animal, small game and waterfowl. Information was gathered mainly from government sources and Indigenous knowledge. Helicopter surveys were also carried out on a few occasions, specifically to monitor beaver colonies.

Overall, the environment was described as having poorly diversified wildlife habitats and a low capacity to support these habitats. Moose density varied from low to medium in the area. Four ravages were mapped and their presence confirmed by tallyman. A winter habitat with good moose potential was identified north and northwest of Lac Troilus, and a second covered part of the former mining site. Black bears were frequent and widely distributed. Beaver density was described as low. This species was found mainly in small watercourses at the head of watersheds. Small game such as gallinaceous birds, snowshoe hare (*Lepus americanus*), and American marten (*Martes americana*) were found throughout the territory, but in higher concentrations around Testard and L'Épervanche lakes. Waterfowl were mainly observed in spring during migration to the first ice-free aquatic habitats. The Canada goose (*Brenta canadensis*) was the most observed species.

#### 17.2.3 Existing Conditions

##### 17.2.3.1 Mammals

###### Large fauna

Three species of large mammals are likely to frequent the Local Study Area and the Regional Study Area. These are woodland caribou, moose and black bear.

###### Woodland Caribou

Woodland caribou from the local populations (herds) designated as Témiscamie and Assinica are the most likely to frequent the RSA and LSA. The project is located in the overlap zone of these two herds, Témiscamie to the east and Assinica to the west (Szor and Gingras, 2024). This species is protected in

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Quebec, having been designated vulnerable in February 2005 under the Act respecting threatened or vulnerable species (LEMV) (Government of Quebec, 2024a). This species is also protected in Canada, having been listed as threatened in Schedule 1 of the Species at Risk Act since June 2003 (Government of Canada 2024). The project is located in a territory where interim measures for the protection of caribou apply. These measures are characterized by an exclusion from forest harvesting for these territories (Government of Québec, 2022) (Map 17.2).

The types of environment used by caribou vary according to the season. In winter, caribou prefer mature softwood forests, with or without lichens. In spring, they prefer dry barrens such as lichen barrens, Softwood forests over 90 years old and open Softwood stands. During calving, females isolate themselves and use young, open stands and peatlands according to their availability. In summer, caribou select softwood forests over 50 years old, peatlands and dry barrens (lichen barrens), but logging is usually avoided in order to spatially separate themselves from predators (ERCFQ, 2013).

Several woodland caribou inventories have been carried out by the Ministère des Forêts, de la Faune et des Parcs (MFFP) in recent decades. The inventory carried out for the MFFP in 2003 (Brodeur *et al.* 2003) for the Assinica and Broadback herds generated an estimate of 1.5 individuals per 100 km<sup>2</sup>, for a total of 515 individuals. The inventory conducted for the MFFP in 2013 (Brodeur *et al.* 2017) for the Assinica herd indicates an estimate of 2.4 per 100 km<sup>2</sup> for a total of 580 caribou. Following the inventory conducted in winter 2023, the total abundance of the Assinica woodland caribou population would be estimated at 949 individuals for a density of 3.2 caribou per 100 km<sup>2</sup>. Assinica population growth is estimated at around 32% over the past 10 years (Szor and Gingras 2024).

The aerial survey carried out in 2019 as part of the project (Appendix G.4.1) located 109 caribou, corresponding to 5.97 caribou/100km<sup>2</sup>. With a correction rate of 15%, the estimated number of individuals would be 128, with an adjusted density of 7.01 caribou/100km<sup>2</sup>. This high density, compared with MFFP data from 2003, 2013 and 2023 (Brodeur *et al.* 2003, Brodeur *et al.* 2017, Szor and Gingras 2024), suggests that some sectors of the surveyed area (1825 km<sup>2</sup>) are used intensively and continuously by caribou.

According to data from the MFFP's Direction de la gestion de la faune du Nord-du-Québec, derived from caribou inventories and monitoring in the Regional Study Area, 65 individuals wearing telemetric collars frequented the RSA between 2004 and 2024, for a density of 4.7 occurrences/km<sup>2</sup>. A total of five individuals frequented the 5 km zone around the mine center, which corresponds roughly to the LSA, for the same period. A visual comparison of the maps for the period 2004-2019 and 2020-2024 shows that caribou have abandoned the mine area and the access road. Between 2020 and 2024, 10 individuals frequented the area within a 5-10 km radius of the mine, for a density of 5.9 occurrences/km<sup>2</sup>. Most of these visits occurred in autumn and winter and were located south of the mine in a wintering area. This is located to the south of the mine site, around 3 km from its centroid. This area is located behind a mountain massif (WSP, 2024).

Disturbance results are similar for the 2019 (WSP, 2019) and 2024 (WSP, 2024) analyses. Within a 5-km radius of the mine, disturbances are entirely anthropogenic and related to mining activities and the presence of forest roads. The level of disturbance in this area increased by 18.8% to 43.4 km<sup>2</sup> in 2024. However, this increase is mainly due to the change in buffer zone calculation from 500 m in 2019 to 750 m in 2024.

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Overall, the land-use areas identified by the families consulted align with the ranges defined from inventory data from WSP (2019) and MFFP telemetry monitoring. Forest fires, logging and major hydroelectric projects are the main sources of disturbance to caribou habitat, according to the families consulted.

#### Moose

Moose density in hunting zone 22, where the project is located, is one of the lowest in Quebec (Morin, 2015). In the boreal region, moose density is low, mainly because the habitat is not very productive. A total of 84 moose were harvested in hunting zone 22 in 2023 and 72 as of September 23, 2024 (Government of Quebec 2024b).

The moose inventory (WSP, 2019) identified two trail networks within the RSA corresponding to moose wintering areas, one of which overlaps the LSA to the west of the mining complex. A total of three individuals (a female, a calf and an undetermined) were observed, corresponding to an estimated density of 0.40 moose/10 km<sup>2</sup>. According to the moose management plan for hunting zone 22, moose densities for the region are estimated between 0.31 and 0.5 moose/10km<sup>2</sup> (Morin, 2015). During the aerial survey covering an area of 1825 km<sup>2</sup> by WSP (2019), a total of 14 trail networks corresponding to moose wintering areas were also located (20 km x 20 km sector) and 11 moose were counted and classified, including six females, four males and one calf. Two of the wintering areas are located near the access road to the mine.

Overall, the wintering areas located during the 2019 survey by WSP (2019) overlap with land-use areas identified by Cree families.

Moose prefer young forests to older ones, as well as mixed forests with white birch (*Betula papyrifera*), Trembling aspen (*Populus tremuloides*) and Balsam fir (*Abies balsamea*) (Courtois 1993; Potvin *et al.*, 1998). Moose find the species they consume in environments with a dense shrub layer or in aquatic environments (Courtois 1993; Peek 1998).

In the boreal forest, in order to protect the young, calving usually occurs along lake and watercourses shores, in softwood stands and, above all, on hilltops (Chekchak *et al.*, 1997).

Moose winter foraging habitat is concentrated in mixed forests, particularly recently disturbed sites, because they are richer in browse (Courtois, 1993). When the snow cover is thick, moose remain under cover in dense softwood stands to reduce the energy expenditure during movement (Jackson *et al.* 1991, Courtois 1993).

#### Black bear

Black bears frequent a variety of habitats, depending on their food requirements. Deforested or recently burned areas are important habitats, as they provide large quantities of berries (Larivière, 2001).

The presence of black bears has been confirmed within the Local Study Area and the Regional Study Area. According to the Cree families consulted, the black bear is present throughout the territory. This species frequents areas where food is found, such as riverbanks, burnt forest areas and along access

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roads. Black bears also frequent the landfill on the mine site and the tailing storage facility, where the herbaceous layer is abundant. According to some families, the population is stable or even increasing.

Recreational bear hunting is prohibited in hunting zone 22, as the activity is exclusive to the Cree communities. There are therefore no harvest statistics (Government of Quebec 2024c). Black bear density in this zone is estimated at 0.2 bears/10 km<sup>2</sup> in the 2006-2013 Black Bear Management Plan (Lamontagne *et al.*, 2006).

#### Fur-Bearing Animal and Small Wildlife

Few regional data exist on the presence of small wildlife, but trapped fur-bearing animals are subject to a trapping registry in Quebec. The LSA is located in fur-bearing Animal Management Units (UGAF) number 91. Species trapped include weasel (*Mustela erminea*), beaver, snowshoe hare, wolf, North American river otter (*Lontra canadensis*), Canadian lynx (*Lynx canadensis*), American marten, Common muskrat (*Ondatra zibethicus*), red fox (*Vulpes vulpes*) and American mink (*Mustela vison*). For the 2022-2023 trapping period, marten (94 pelts) and beaver (19) were the most harvested species (Government of Quebec, 2024c).

Several species of fur-bearing animals and small wildlife are likely to frequent the Local Study Area, depending on their distribution range (Table 17.4). The presence of seven different species of fur-bearing animals or small fauna has been observed in the LSA. Five species were recorded as part of winter inventories (Wachih, 2025) and during the various fieldwork carried out between 2019 and 2024, where incidental sightings were recorded. Red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare and American marten were the most frequently encountered. Canada lynx, ermine, red fox and American marten, species not previously reported in previous studies, were also identified. The presence of beavers was observed in numerous locations by Cree land users. In addition, during the 2019 aerial surveys (WSP, 2019), two wolf tracks networks, involving 3 or 4 individuals, were observed in the Caribou Regional Study Area.

**Table 17.4 Fur-bearing Species and Small Fauna Potentially Present in the Local Study Area**

Common Name	Latin Name	Confirmed Presence in the LSA
Ermine	<i>Mustela erminea</i>	x
Least weasel	<i>Mustela nivalis</i>	
American Beaver (Beaver)	<i>Castor canadensis</i>	x
Coyote	<i>Canis Latrans</i>	
Snowshoe hare	<i>Lepus americanus</i>	x
Grey wolf	<i>Canis lupus</i>	x
North American river otter	<i>Lontra canadensis</i>	
Canadian Lynx	<i>Lynx canadensis</i>	x
Woodchuck	<i>Marmota monax</i>	
American marten	<i>Martes americana</i>	x
Striped skunk	<i>Mephitis mephitis</i>	
Fisher	<i>Martes pennanti</i>	

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Common Name	Latin Name	Confirmed Presence in the LSA
North American porcupine	<i>Erethizon dorsatum</i>	
Common Muskrat	<i>Ondatra zibethicus</i>	
Raccoon	<i>Procyon lotor</i>	
Red fox	<i>Vulpes vulpes</i>	x
American Mink	<i>Mustela vison</i>	

During winter surveys (Wachih, 2025), mixed forests, mature mixed Softwood, mature jack pine forests and, to a lesser extent, mature spruce forests were the habitats with the highest activity indices. Mature mixed Softwood and mature spruce stands were the richest, with more than six mammal species recorded.

#### Micromammals

Regarding micromammals, 18 species are likely to be present in the LSA, depending on their distribution range and the available habitats (Table 17.5) (Ministry of Environment, the Fight Against Climate Change, Wildlife and Parks [MELCCFP], 2024). Surveys conducted by Wachih and FaunENord (2020 b) and FaunENord (2020) identified nine species of micromammals in the LSA including Southern red-backed vole (*Myodes gapperi*), Meadow vole (*Microtus pennsylvanicus*), Southern bog lemming (*Synaptomys cooperi*), Ungava vole (*Phenacomys ungava*), individuals of the *peromyscus* genus, probably the deer mouse (*Peromyscus maniculatus*) given its distribution range, northern flying squirrel (*Glaucomys sabrinus*), red squirrel (*Tamiasciurus hudsonicus*), Masked Shrew (*Sorex cinereus*) and pigmy shrew (*Sorex hoyi*). Sixteen individuals of Southern bog lemming, a species likely to be designated as threatened or vulnerable (ESMV), were recorded (see section 17.2.3.6).

**Table 17.5 Micro-mammal Species Potentially Present in the Local Study Area**

Common Name	Latin Name	Confirmed Presence in the LSA
Northern bog lemming	<i>Synaptomys borealis</i>	
Southern bog lemming	<i>Synaptomys cooperi</i>	x
Southern red-backed vole	<i>Myodes gapperi</i>	x
Meadow vole	<i>Microtus pennsylvanicus</i>	x
Rock vole	<i>Microtus chrotorrhinus</i>	
Star-nosed mole	<i>Condylura cristata</i>	
Red squirrel	<i>Tamiasciurus hudsonicus</i>	x
Northern flying squirrel	<i>Glaucomys sabrinus</i>	x
Arctic shrew	<i>Sorex arcticus</i>	
Cinereus shrew	<i>Sorex cinereus</i>	x
Smoky shrew	<i>Sorex fumeus</i>	
American water shrew	<i>Sorex palustris</i>	
Western Pygmy shrew	<i>Sorex hoyi</i>	x
Ungava vole	<i>Phenacomys ungava</i>	x
Woodland jumping mouse	<i>Napaeozapus insignis</i>	

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Common Name	Latin Name	Confirmed Presence in the LSA
Meadow jumping mouse	<i>Zapus hudsonius</i>	
Deer mouse	<i>Peromyscus maniculatus</i>	x
Eastern chipmunk	<i>Tamias striatus</i>	

### Chiroptera

Six species of chiropteran are potentially present in the Local Study Area (MFFP, 2021) (Table 17.6). Surveys carried out in the summer of 2022 (Wavx, 2023) confirmed the presence of three of these species: the silver-haired bat (*Lasionycteris noctivagans*), the hoary bat (*Lasiurus cinereus*) and the little brown Myotis (*Myotis lucifugus*). All three have special status (see section 17.2.3.5). The big brown bat (*Eptesicus fuscus*), the Eastern red bat (*Lasiurus borealis*) and the northern myotis (*Myotis septentrionalis*) could be present on the study site given their ranges but were not recorded during this inventory. The hoary bat is the most common species on the site (1,232 passages), followed by the little brown myotis (111) and the silver-haired bat (3). The average activity index for all species was 11.7 passages per night. This corresponds to a higher index than comparable projects in Northern Quebec (Fabianek, 2022).

**Table 17.6 Bat species Potentially Present in the Local Study Area**

Common Name	Latin Name	Observation in the LSA
Silver-Haired Bat	<i>Lasionycteris Noctivagans</i>	x
Eastern Red Bat	<i>Lasiurus borealis</i>	
Hoary Bat	<i>Lasiurus cinereus</i>	x
Little Brown Myotis	<i>Myotis lucifugus</i>	x
Northern Myotis	<i>Myotis septentrionalis</i>	
Big Brown Bat	<i>Eptesicus fuscus</i>	

Little brown myotis and northern Myotis are considered forest species, preferring to feed under the forest canopy, on trails and edges. They prefer mature stands and avoid clearings or heavily deforested habitats. Little Brown Myotis are more likely to be found on the edges of waterbodies and wetlands, compared with northern myotis (Grindal, 1999; Segers & Broders 2014).

Both hoary and silver-haired bats are migratory species. The hoary bat is a species that roosts in tree foliage during the breeding season, while the silver-haired bat prefers shelter in cavities or under tree bark. Both species use foraging habitats spread across a home range of several square kilometers in the summer season (Kunz & Lumsden 2003; Gorresen et al. 2015).

No trees or anthropogenic structures that could serve as a roosting site for cave-dwelling bats species such as the little brown myotis and silver-haired bats (Wachi, 2024) were recorded during nighttime inspections and inventories in the PDA.

Geographic map analysis did not reveal the presence of soluble rocks, and hence of caves associated with this type of rock. Nor did lidar image analysis reveal the presence of under-roof shelters or cavities that could serve as bat hibernacula (Spéléo Québec, 2023).

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#### 17.2.3.2 Herpetofauna

Surveys carried out in 2019, 2021 and 2023 (Wachih and FaunENord 2019, FaunENord 2021a, Wachih 2025) identified the following species: Northern spring peeper (*Pseudacris crucifer*), eastern American toad (*Anaxyrus americanus*), wood frog (*Lithobates sylvaticus*), Mink frog (*Lithobates septentrionalis*), green frog (*Lithobates clamitans*), Northern leopard frog (*Lithobates pipiens*), two-lined salamander (*Eurycea bislineata*), blue-spotted salamander (*Ambystoma laterale*) and common gartersnake (*Thamnophis sirtalis*). No species of herpetofauna with special designation has the potential to occur in the Regional Study Area.

#### 17.2.3.3 Avifauna

During surveys conducted between 2019 and 2024, 124 species belonging to 33 families were recorded in the Local Study Area. Among these, 99 species are migratory birds under the 1994 Migratory Birds Convention Act. Thirty-six of these species have been identified as nesting within the Local Assessment Area, while 21 species have been assigned probable nesting status.

According to data from the second Québec Breeding Bird Atlas (AONQ) (northern project), for the past 24 years, no other species have been identified within or near the Regional Study Area (AONQ, 2024).

The project is located in Quebec's Bird Conservation Region 8, the boreal coniferous forest. The conservation strategy for this region includes 94 priority species, either because they are vulnerable or because they represent the regional avifauna (Environment Canada, 2013). Forty-five of the species observed during inventories in the LSA are among the priority species.

During specific waterfowl surveys (FaunENord, 2021b), a total of 268 birds belonging to 15 distinct taxa were observed. The Canada goose was the most frequently observed species. Among the species observed, seven exhibited behaviour suggesting that they were likely to nest in the LSA: Killdeer (*Charadrius vociferus*), Spotted Sandpiper (*Actitis macularius*), Wilson's Snipe (*Gallinago delicata*), Common Loon (*Gavia immer*), Canada Goose, Surf Scoter (*Melanitta perspicillata*) and a duck species that could not be precisely identified (*Anas* sp.) (FaunENord 2021b). In 2024, helicopter surveys confirmed the nesting of American black duck (*Anas ribripes*) and common loon.

The recording station inventory detected a total of 104 bird species, including 14 that were not detected by ornithologists. White-crowned sparrow (*Zonotrichia leucophrys*), Hermit thrush (*Catharus guttatus*), Dark-eyed Junco (*Junco hyemalis*) and Ruby-crowned kinglet (*Corthylio calendula*) were consistently present at every station, year and period surveyed. Ten species were only present during spring migration, 11 were only detected during breeding season and eight were only present during fall migration. These results suggest that the LSA habitats have a relatively weak migratory staging area for avifauna, since their species composition is similar from one period to another (Wachih, 2025).

The 2019 and 2022-2024 listening-point surveys recorded 98 species. All the species counted by this method in 2019 were also observed in 2022, 2023 or 2024. Of these 98 species, 70 are land birds, six are water birds, nine are waterfowl, six are shorebirds and seven are birds of prey (Wachih and FaunENord, 2020a, Wachih 2025). At the listening points, Ruby-crowned Kinglet (*Corthylio calendula*), White-crowned Sparrow and Hermit Thrush were heard or seen most often. The average breeding pair density

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for the LSA was 50.27 pairs/10 ha in 2022 and 60.6 in 2024. In 2022, three habitat groups showed above-average pair densities: deciduous and mixed forests, very young cutovers and plantations (including recent anthropogenic disturbances) and young jack pine stands. The average richness detected in the DRL was highest in hardwood and mixed forests (5.6 species), followed by very young cuts and plantations (4.9 species) and young pine stands (4.9 species) (Wachiih, 2025). In 2024, five habitat groups showed an above-average density of pairs: other young or mature conifers, mature spruce forests, deciduous and mixed forests, mature pine stands and young jack pine stands. The average richness detected in the DRL was highest in other young or mature softwoods (6.1 species) and young jack pine (6 species) (Wachiih, 2025).

During the winter segment surveys, 14 avian species were recorded. Willow ptarmigan tracks were noted in 39 segments. Common raven and Canada jay were observed most frequently. Forests with a Hardwood component (mixed or Hardwood forest) showed a higher overall activity index than other habitats. Only four bird species were observed at the listening points (Wachiih, 2025).

Eight species of special status were observed, including short-eared owl, common nighthawk, olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), bald eagle (*Haliaeetus leucocephalus*), Bank swallow (*Hirundo riparia*), evening grosbeak (*Coccothraustes vespertinus*) and lesser yellowlegs (*Tringa flavipes*) (see section 17.2.3.6).

During consultations, Cree tallymen mentioned the presence of species with special designation, including the Evening Grosbeak (*Coccothraustes vespertilla*), Canada Warbler (*Cardellina canadensis*) and Red-necked Phalarope (*Phalaropus lobatus*). These birds were not necessarily observed within the study area by the tallymen, but rather throughout their traplines territory.

#### 17.2.3.4 Protected Areas and Wildlife Habitats

There are two protected areas in the caribou Regional Study Area: the Albabel-Témiscamie-Otish Projected Biodiversity Reserve within the northeastern sector of the caribou RSA, and the Assinica National Park Reserve to the southwest. Both areas are classified as Category II by the International Union for Conservation of Nature (IUCN) (Government of Quebec, 2024a).

Consultation of MELCCFP data on wildlife habitats legally protected by the Regulation respecting wildlife habitats reveals that no recognized wildlife habitat is present in the LSA (MELCCFP, 2025a).

#### 17.2.3.5 Species Valued by the Cree

In the interviews conducted with tallymen in 2024, they identified seven wildlife species of interest: Canada goose, willow ptarmigan (*Lagopus lagopus*), moose, black bear, caribou, snowshoe hare and beaver (Table 17.7).

The Cree families identified three areas used by caribou, two along the access road and the Route du Nord, and one north of Testard Lake. They also identified four caribou migration corridors, one located near the Route du Nord and the access road, a corridor of about 51 km<sup>2</sup> located southeast of the LSA, another small one of 25 km<sup>2</sup> at 15 km southeast of the project, and finally a larger corridor, in the eastern sector of the RSA, extending from south to north. One family also mentioned hunting caribou in two other

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areas, these are located to the west of the project, at distances of 10 and 20 km from the mine. Overall, the caribou land-use zones identified by the families consulted overlap with the distribution ranges defined based on the inventory and telemetry data (WSP 2019 and 2024).

Regarding moose, the Cree have identified five areas used in the RSA, three in the LSA and two along the access road. Numerous areas have been identified outside the RSA.

The tallymen reports that black bear numbers have increased in the LSA since the re-vegetation of the PDA. In the north of Lake A (PE 43), a black bear feeding area has been identified. The presence of a sucker spawning ground would attract bears to this area. A total of 11 areas were identified as being used by black bears. Two overlapping zones intersect the LSA, and the others are located to the east, outside the RSA. The presence of bear dens was mentioned; they are located more than 20 kilometers east of the project site.

The tallymen located two beaver lodges in the PDA. They also mentioned that they trap this species north of the access road, but outside the RSA. The same area is also used for willow ptarmigan and hare hunting.

Lac Robineau, a small lake southwest of Lac Robineau and Lac Miskittenau have been identified as areas where goose hunting is practised. However, these sites are all outside the RSA.

**Table 17.7 Species Valued by the Cree in the LSA**

Common Name	Latin Name	Observation in the LSA
Canada goose	<i>Branta canadensis</i>	x
American Beaver (Beaver)	<i>Castor canadensis</i>	x
Moose	<i>Alces alces</i>	x
Black bear	<i>Ursus americanus</i>	x
Willow ptarmigan	<i>Lagopus lagopus</i>	x
Snowshoe hare	<i>Lepus americanus</i>	x
Woodland caribou	<i>Rangifer tarandus caribou</i>	x

#### 17.2.3.6 Species with Special Designation

A total of 13 species with special designation were identified in the Local Study Area . The CDPNQ (2024) does not mention any other species with special designation apart from woodland caribou for the Regional Study Area. Some species with special designation could have been present on the project site, since their distribution range and the habitats they use correspond to the project site, but these were not observed during the various surveys. All these species and their status are summarized in Table 17.8.

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**Table 17.8 Species at Risk Present or Potentially Present in the Local Study Area**

Group	Common Name	Latin Name	Confirmed Presence	Potential Presence	Status	
					Provincial <sup>1</sup>	Federal <sup>2</sup>
Large wildlife	Woodland caribou	<i>Rangifer tarandus caribou</i>	x		Vulnerable	Threatened
Chiroptera	Hoary bat	<i>Lasiurus cinereus</i>	x		Susceptible	Endangered*
	Silver-haired bat	<i>Lasionycteris noctivagans</i>	x		Susceptible	Endangered*
	Little brown myotis	<i>Myotis lucifugus</i>	x		Threatened	Endangered
	Red bat	<i>Lasiurus borealis</i>		Low	Vulnerable	Endangered*
	Northern myotis	<i>Myotis septentrionalis</i>		Moderate	Threatened	Endangered
Micromammals	Southern bog lemming	<i>Synaptomys cooperi</i>	x		Susceptible	None
	Rock vole	<i>Microtus chrotorrhinus</i>		Moderate	Susceptible	None
Avifauna	Common Nighthawk	<i>Chordeiles minor</i>	x		Susceptible	Special concern
	Short-eared owl	<i>Asio flammeus</i>	x		Susceptible	Special Concern
	Rusty Blackbird	<i>Euphagus carolinus</i>	x		Susceptible	Special Concern
	Olive-sided Flycatcher	<i>Contopus cooperi</i>	x		Susceptible	Special Concern
	Lesser yellowlegs	<i>Tringa flavipes</i>	x		None	Threatened*
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	x		Vulnerable	Not at risk
	Barrow's goldeneye, Eastern population	<i>Bucephala islandica</i>		Low	Vulnerable	Special Concern
	Canada Warbler	<i>Cardellina canadensis</i>		Moderate	Susceptible	Threatened
	Harlequin Duck, Eastern population	<i>Histrionicus histrionicus</i>		Low	Vulnerable	Special concern
	Red-necked phalarope	<i>Phalaropus lobatus</i>		Low	None	Special concern
	Evening Grosbeak	<i>Coccothraustes vespertinus</i>	x		None	Special concern
	Bank swallow	<i>(Hirundo riparia)</i>	x		None	Threatened

<sup>1</sup>Status according to Act respecting threatened or vulnerable species (Government of Quebec 2024f)

<sup>2</sup>Status under Schedule 1 of the Canadian Species at Risk Act (Government of Canada 2024)

\*Not listed on Schedule 1 of the Species at Risk Act, status according to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).



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Among mammals, the Assinica and Tesmiscanie woodland caribou herds are both protected provincially (LEMV) and federally (SARA).

Among micromammals, sixteen Southern bog lemmings, an ESMV, have been recorded. The Southern bog lemming frequents several types of habitats but prefers moss-covered environments. It can be found in wetlands, but also in mixed forests bordering clearings resulting from logging operations (Desrosiers, Morin et Jutras, 2002). In the LSA, 12 individuals were recorded in different habitats, including moss spruce stand, jack pine forest and ombrotrophic bog in 2020 (FaunENord, 2020), and four individuals were recorded in a mature mixed stand and a hardwood -dominated mixed stand in 2019 (Wachiih and FaunENord 2020b). The rock vole, another ESMV could be present given its geographical distribution, but was not observed during the two inventory campaigns. This species frequents wet slopes between rocks, the foot of cliffs and rock outcrops. It also frequents transitional habitats and recently logged areas (Desrosiers, Morin and Jutras, 2002). The potential for its presence is considered moderate, as some of the habitats used by this species are found in the LSA.

The silver-haired bat, the hoary bat and the little brown myotis were recorded during acoustic surveys, and all three have protected status at both provincial and federal levels.

The silver-haired bat was observed only three times, at station 6 near a watercourse and immediately north of the tailing storage facility. The little brown myotis was detected at all stations but was more present at station 6. The hoary bat, which was frequently detected at all stations, was also more present near station 7 (WAVX, 2023). Two other species with special designation, the red bat and the northern myotis, could be present, as the LSA's habitats are suitable for these species. The potential for the presence of the red bat is low, as the project is located in the potential distribution range and not in the known distribution range of this species. More precisely, this species has already been observed at these latitudes, but it has not been confirmed that breeding females are permanently established there. The hoary bat is less common in northern environments than other migratory species (ERCSQ 2021, WAVX 2023). The potential for the presence of northern myotis is moderate, as the project is located within the known range of this species (ERCSQ 2019).

In terms of avifauna, eight bird species of conservation interest have been identified: Common Nighthawk, rusty blackbird, olive-sided flycatcher, bald eagle, short-eared owl, Bank swallow, evening grosbeak and lesser yellowlegs. Lesser yellowlegs is not listed on Schedule 1 of SARA, but its status is assessed as threatened in Canada by COSEWIC. The Rusty Blackbird is a confirmed breeder, while the Common Nighthawk and Olive-sided Flycatcher are probable breeders in the study area. The bald eagle is a possible breeder. The lesser yellowlegs is a transient migratory species. The nesting status of the Evening Grosbeak has not been defined, as it was identified only by song analysis.

The Common Nighthawk breeds in various open environments such as clearings, recently burned areas, peatland or any other rocky or sandy environment (COSEWIC, 2019a). It was detected at numerous locations in the Local Study Area. A total of 10 individuals were observed at four of the fourteen crepuscular stations. The Common Nighthawk was recorded in the southwestern part of the study area at stations CO2, C03, C05, C06 (Wachiih and FaunENord 2020a). Analysis of recordings made using recording stations revealed the presence of this species at 5 of these 7 stations. It was absent from stations STCH1 and STCH8. The common nighthawk is a probable breeder in the LSA (Wachiih 2024b).

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The short-eared owl is a specialist of open environments (Hachey and Lemaître 2021, Équipe de rétablissement des oiseaux de proie du Québec 2021), avoiding forests and nesting in peatlands, high marshes, wet meadows, island environments and dune environments (Shaffer, 2019). This species has only been observed once in an ombrotrophic bog, northeast of Lake A (Wachiih and FaunENord, 2020a). This observation makes it impossible to determine whether it is a breeder in the LSA.

The Olive-sided Flycatcher frequents relatively open habitats with perches that offer good visibility. The habitats it favors are recently burned areas, the edges of logging cuts, clearings or peatlands, wooded stream banks and beaver ponds (COSEWIC, 2019b).

In sound-meter inventories, Olive-sided Flycatchers were recorded at all periods except winter (spring, breeding and fall), and were present at more than 50% of stations during the breeding season. During the listening point surveys, the Olive-sided Flycatcher was the most frequent species with special designation, having been detected at 11 stations (5.7% of stations). It is present throughout the LSA and is a possible breeder in young or mature stands of other softwoods, in very young cuttings and plantations, in wetlands and probably in mature spruce stands (Wachiih, 2024b).

Bald eagles usually nest in mature forests near large waterbodies where fish are abundant (Équipe de rétablissement des oiseaux de proie du Québec, 2019). It uses dominant trees over 20 metres high for nesting (Government of Quebec, 2024e). This species was observed during listening point surveys (1 time), during dusk surveys (1 time) and on six occasions on an ad hoc basis. It is a possible nester in young jack pine forests and has been observed more frequently in the northeastern part of the LSA (Wachiih, 2024b).

The Rusty Blackbird nests in peatlands, swamps, forest-edge marshes, wet forest environments and shrublands where standing water persist (Environment Canada, 2014). This species was observed on several occasions during the various surveys throughout the LSA. It is a possible breeder in mature spruce stands, in very young cuts and plantations and probable in young spruce stands and wetlands (Wachiih, 2024b).

Bank swallows nest in vertical structures made of silt or sand (Falconer et al. 2016). In natural environments, colonies are usually set up along river cliffs. Bank swallow colonies can, however, be found in artificial environments such as aggregate quarries, for example (Garrison, 1999; COSEWIC, 2013a; Falconer et al., 2016). However, if there is no regular excavation of sediments, these artificial environments may no longer be suitable for nesting after 3 to 5 years (Environment Canada, 2021). Unoccupied burrows were observed in 2019 and a colony was observed in an embankment in 2024.

The Lesser Yellowlegs nests on dry ground near peatlands, marshes, ponds and other wetlands in the boreal forest and taiga. In winter and during migration, the species frequents coastal saltwater marshes, estuaries and ponds, as well as lakes and other freshwater wetlands (COSEWIC, 2021). The Lesser Yellowlegs 's presence was detected using sound level meter recordings near lakes PE2 and PE5 and north of lake PE29. It is a transient migratory species (Wachiih, 2025).

The Evening grosbeaks nest in mature and open forests where fir or white spruce are predominant. Evening grosbeaks were detected using sound level meter recordings during spring migration near the Bibou Creek (Station S167-01) (Wachiih, 2025).

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Other avian species with special designation could be present on the project site, since their distribution range and the habitats they use coincide with the project, but these were not observed during the various surveys. These include the eastern population of Barrow's goldeneye (*Bucephala islandica*), the Canada warbler (*Cardellina canadensis*), the harlequin ducks (*Histrionicus histrionicus*) and the Red-necked phalarope (*Phalaropus lobatus*).

During the breeding and duckling rearing periods, the Barrow's goldeneye is mainly found in small, fishless lakes located at high altitudes and in rugged terrain. They nest in tree cavities (Environment Canada, 2013b). Their potential presence is considered low, as the project is at the northwestern limit of their distribution range (MELCCFP, 2025b).

Canada warblers are mainly found in moist mixed forests with a well-developed shrub layer. It also uses riparian shrub forests, regenerating stands and forests bordering beaver ponds and on scrubby slopes (COSEWIC, 2008). Its potential presence is moderate, since the habitats in the LSA are suitable for the species, but its presence was not detected during the various surveys.

Harlequin ducks live along the coast, but move inland for the breeding season in spring, where they live along swift and turbulent watercourses (COSEWIC, 2013b). The study site is not in its distribution range, and the habitats present in the LSA do not correspond to its needs. Its potential presence in the LSA is therefore low. The harlequin duck could, however, be a transient migratory species.

Red-necked phalarope nest in arctic and subarctic wetlands. During their migration, they mainly frequent lakes, but also inland wetlands and other non-riparian waterbodies. Red-necked phalaropes overwinter in low-latitude marine environments (COSEWIC, 2014). Its potential presence in the LSA is therefore low. It could, however, be a transient migratory species.

### 17.3 Project Interactions with terrestrial and Avian Fauna

Table 17.9 identifies the project components and physical activities likely to interact with terrestrial and avian fauna and their habitats. These interactions are indicated by a check mark and are discussed in section 17.4 regarding the significance of residual impacts, mitigation measures and residual impact predictions.

**Table 17.9 Project Interactions with Terrestrial and Avian Fauna**

Activities	Potential impacts		
	Habitat loss and fragmentation	Risk of mortality	Change in movement patterns
<b>Construction</b>			
Labour, equipment and materials transport to the site.		√	
Vehicles and equipment operation and maintenance within the PDA.		√	
Tree cutting, vegetation clearing, soil stripping and earthworks.	√	√	√

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Activities	Potential impacts		
	Habitat loss and fragmentation	Risk of mortality	Change in movement patterns
Handling and use of explosives, including blasting.	√	√	√
Construction of temporary and permanent buildings, including wastewater treatment system and drinking water collection and distribution system.	√		√
Construction of mining infrastructures such as stockpiles, pits and the raising of tailings management facility.	√	√	√
Construction of roads and preparation of construction surfaces including the crushing of material used for construction. Relocation of a section of the access road and power line.	√	√	√
Construction of water management systems including ditches, diversion channel, sedimentation ponds and the water treatment plant	√		√
Dewatering of natural water bodies and pits, lowering water level in tailings management facility and management of contact water.	√	√	√
Diversion of Bibou Creek (CE2).	√	√	√
Management of waste materials, including hazardous waste.		√	√
Purchase of goods and services.			
Employment and expenditures.		√	√
<b>Operation</b>			
Labour, equipment and materials transport to the site.		√	
Vehicles and equipment operation and maintenance within the PDA.		√	
Handling and use of explosives, including blasting.	√	√	√
Ore extraction from pits including drilling and hauling of waste rock.	√	√	√
Ore, waste rock and tailings storage.			
Ore processing including conveyor, crushing, loading and hauling on site.	√	√	√
Transportation of concentrate to a smelter or a wharf.		√	
Management and treatment of water on the mine site and to the environment, including drainage and contact water.		√	
Progressive reclamation of disturbed areas.			

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Activities	Potential impacts		
	Habitat loss and fragmentation	Risk of mortality	Change in movement patterns
Management of waste materials, including hazardous waste.		√	√
Purchase of goods and services.			
Employment and expenditures		√	√
<b>Decommissioning and Closure</b>			
Labour, equipment and materials transport to the site.		√	
Vehicles and equipment operation and maintenance within the PDA.		√	
Decommissioning, dismantling and disposal of buildings and equipment.	√		√
Pit flooding. Surface and groundwater management.	√		√
Reclamation of disturbed areas, including earthworks, placement of overburden and revegetation.	√		√
Management of waste materials, including hazardous waste.		√	√
Purchases of goods and services.			
Employment and expenditures <sup>1</sup> .		√	√

Notes:

√ = Potential interaction

– = No interaction

Generally speaking, non-interaction can be justified for two reasons. Either the impacts of the activity are localized and passive, and are included in other, larger-scale activities, or there is no channel through which the activity can have an impact on wildlife and its habitat.

## 17.4 Assessment of Residual Impact

### 17.4.1 Disturbance of wildlife and its habitat

Wildlife and habitat disturbance refers to the direct loss or alteration of the physical environment (its availability, quality or structure) where a species lives. The quantitative assessment of direct disturbance to wildlife and its habitat is based on the Geographic Information System (GIS). By overlapping the PDA on spatial data of measurable parameters, i.e. the preferred habitat types for each species or group of species under consideration, it is possible to determine which area will be affected. Habitat information comes mainly from studies of environmental components derived from ecoforestry map data (MRNF, 2017) and data from the Géobase du réseau hydrologique du Québec (GRHQ, 2019). The existing mine footprint, which includes several disturbed environments such as roads, pits and existing stockpiles, will not be considered in the assessment of habitat loss.

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Indirect disturbance of wildlife and wildlife habitat refers to habitats that will be less suitable for wildlife or avoided by wildlife due to sensory changes such as noise, light, air quality and increased risk of predation. Indirect disturbance can also affect feeding or pair-forming ability, as well as causing stress. Zones of indirect impact vary in size according to the sensitivity of each species group and will be analyzed qualitatively. The impact of disturbance may be greater if it occurs during important periods such as nesting, breeding or hibernation, for example. Indirect sensory disturbance could affect the quality of habitats on the periphery of the PDA.

#### 17.4.1.1 Project Pathways

##### Construction

Construction activities could result in the direct loss or fragmentation of habitat, notably through deforestation activities, site development including road development, power line relocation, Bibou Creek Diversion, dewatering of waterbodies and infrastructure construction. Construction could reduce the amount of habitat required for wildlife to complete their life cycle (e.g. feeding, birthing, hibernation habitats, etc.). This stage of the project may also affect structures such as nests, dams, dens and hibernation site. Deforestation activities fragment habitats and can have adverse impacts onto species with large distribution ranges or those requiring large, homogeneous habitats, among other things, because they promote edge effects. However, edge effects can be beneficial for certain wildlife groups. Several animal species, notably amphibians, require both terrestrial and aquatic habitats to complete their life cycle, and will therefore be affected by disturbances in both environments.

Construction activities can also have an indirect impact on wildlife and its habitat by causing sensory disturbances (such as noise, light and vibration). They can also generate edge effects, dust deposits and changes in hydrology. Some animals may avoid or abandon areas where noise and light are too disturbing. Species that live mainly in the center of mature forests, such as marten, lynx and several species of forest birds, could be affected more than other species. Thus, habitats on the periphery of the PDA would be indirectly affected by these components, making them potentially less suitable.

##### Operation

The operation phase will not result in any additional habitat loss or fragmentation. Although site reclamation will occur progressively for various developments such as the tailing storage facility, some waste rock piles and open pits, these areas will only be considered at mine closure. Hydrological changes could affect vegetation and alter habitat types, particularly wetlands. Indirect impacts caused by the presence of facilities, activities and machinery traffic will be similar to or greater than those assessed for the construction phase, since operating activities (blasting, crushing, grinding, etc.) will take place over a long period and on a regular basis.

##### Decommissioning and closure

No deforestation or stripping will take place during the decommissioning and closure period. Earthworks and overburden spreading activities could modify habitats, but these activities will be concentrated in already disturbed areas. Re-vegetation of disturbed areas will improve habitats for certain wildlife species.

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Use of restored habitats will vary over time, as plant communities evolve. Indirect impacts will decrease over time after mine closure, as activity levels and traffic will be significantly reduced.

#### 17.4.1.2 Mitigation and Enhancement measures

- The project footprint will be limited by primarily using the existing disturbed footprint.
- Permits required under applicable wildlife laws and regulations will be obtained prior to construction.
- Sensitive areas will be clearly delineated before site preparation begins to ensure that clearing and stripping activities remain within the planned footprint.
- The clearing and stripping techniques used will be appropriate for the preservation of natural habitats (e.g., felling trees to ensure they fall within the project footprint and not in natural environments).
- Sediment barriers will be installed to prevent runoff into water of bodies and wetlands.
- Vegetation clearing activities will be carried out outside of breeding periods (birds and bats).
- Dewatering and diversion of waterbodies will be carried out outside breeding periods (herpetofauna and aquatic birds).
- Where possible, vegetation will be maintained along access roads and activity zones to reduce indirect disturbance (noise, light, dust and vibration) in natural environments.
- The use of directional lighting will be recommended to limit diffused light outside the PDA.
- Measures will be implemented to mitigate the impact of light on nocturnal species.
- A survey of potential Bank swallow nesting sites will be completed prior to any modifications to piles, pits, tailing storage facility or other structures favourable to the species' nesting, if work is planned during the nesting period.
- For the duration of the operation, gentler slopes will be created in waste rock piles, pits, tailing storage facility or other structures favourable to Bank swallow nesting, since this species prefers steep slopes. The slopes will be gradually redesigned to encourage the presence of the species during the closure period.
- Training will be provided to site supervisors during the construction phase, to enable them to recognize species with special designation potentially present in the PDA.
- Progressive reclamation will be carried out during the construction and operation phases to promote the return of wildlife and bird species as quickly as possible.
- A communication system will be set up to alert employees and subcontractors to any observations or signs of caribou presence along roads leading to the mine site.
- A training module will be developed for employees and subcontractors to make them aware of the precarious nature of caribou populations and develop their ability to distinguish possible signs of presence.
- An action plan will be put in place in the event of the presence of a caribou near the mine.

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- Employees will be informed of the presence of caribou near mine infrastructures or on access roads, to increase their level of vigilance and limit the risk of disturbance or collision.
- Transportation schedule will be intensified during the day and reduced at night, due to the higher risk of collision.
- Noisy equipment will be properly maintained, and personnel will ensure that silencers and catalytic converters are functioning correctly.
- All necessary measures will be taken to limit noise at the source.
- Equipment will be regularly maintained.
- Any materials that may generate noise, as well as noise-reduction devices (silencers), will be maintained in good working condition.
- An awareness program will be implemented for machinery operators to prevent laming of tailgates and objects falling from great heights, and to optimize work methods.
- Stationary equipment on site, excluding transient equipment (e.g. 10-wheel craft trucks) and equipment used for short periods should be equipped with white noise back-up alarms.
- During restoration work, the use of resinous species will be recommended to avoid the colonization by deciduous species (stripping).

#### 17.4.1.3 Project Residual Impact

##### Large fauna

By using the existing mine footprint, the project is optimized and minimizes impacts on terrestrial wildlife, including this fauna group. However, deforestation and grubbing, as well as stripping and excavation, will cause direct and indirect habitat loss.

Tables 17.10 and 17.11 show the areas of preferred habitat for each species or group of species that will be affected, and their availability in the LSA.

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**Table 17.10 Woodland Caribou - Area of Preferred Habitat Affected in Construction Phase**

Wildlife Group	Preferred Habitat	Current LSA Habitat Area (ha)	Direct Permanent Encroachment on Caribou Habitat (ha)	Project-Related Disturbance in Caribou Habitat (ha)	Encroachment and Disturbance in Previously Disturbed Areas (ha)	Percentage of Caribou Habitat Encroached Within LSA (%)	Percentage of Caribou Habitat Disturbed in LSA (%)
Woodland Caribou	Softwood stand, hardwood stand, mixed stand, dry barrens, shrub swamps and marshes, bogs, waterbody (when frozen).	77787,21	56,47	699,86	2924,16	0,07	0,9



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**Table 17.11 Large Fauna - Area of Preferred Habitat Affected During Construction Phase**

Wildlife Group	Preferred Habitats	Total LSA Area (ha)	Area of LSA Encroachment (ha)		Proportion of Preferred Habitat Affected LSA (%)	
			Permanent	Temporary	Permanent	Temporary
Moose (a species valued by Cree)	Mixed stand, shrub swamps and marshes, riverbanks	467,72	113,17	5,23	24,20	1,11
Moose (calving) (species valued by the Cree)	Softwood stand, riverbanks	6275,58	723,45	34,13	11,53	0,54
Black bear	Softwood stand, hardwood stand, mixed stand, regenerating stand (0 to 20 years), dry barrens, shrub swamps and marshes, peatland	9943,35	1116,62	59,40	11,23	0,60

#### Woodland caribou

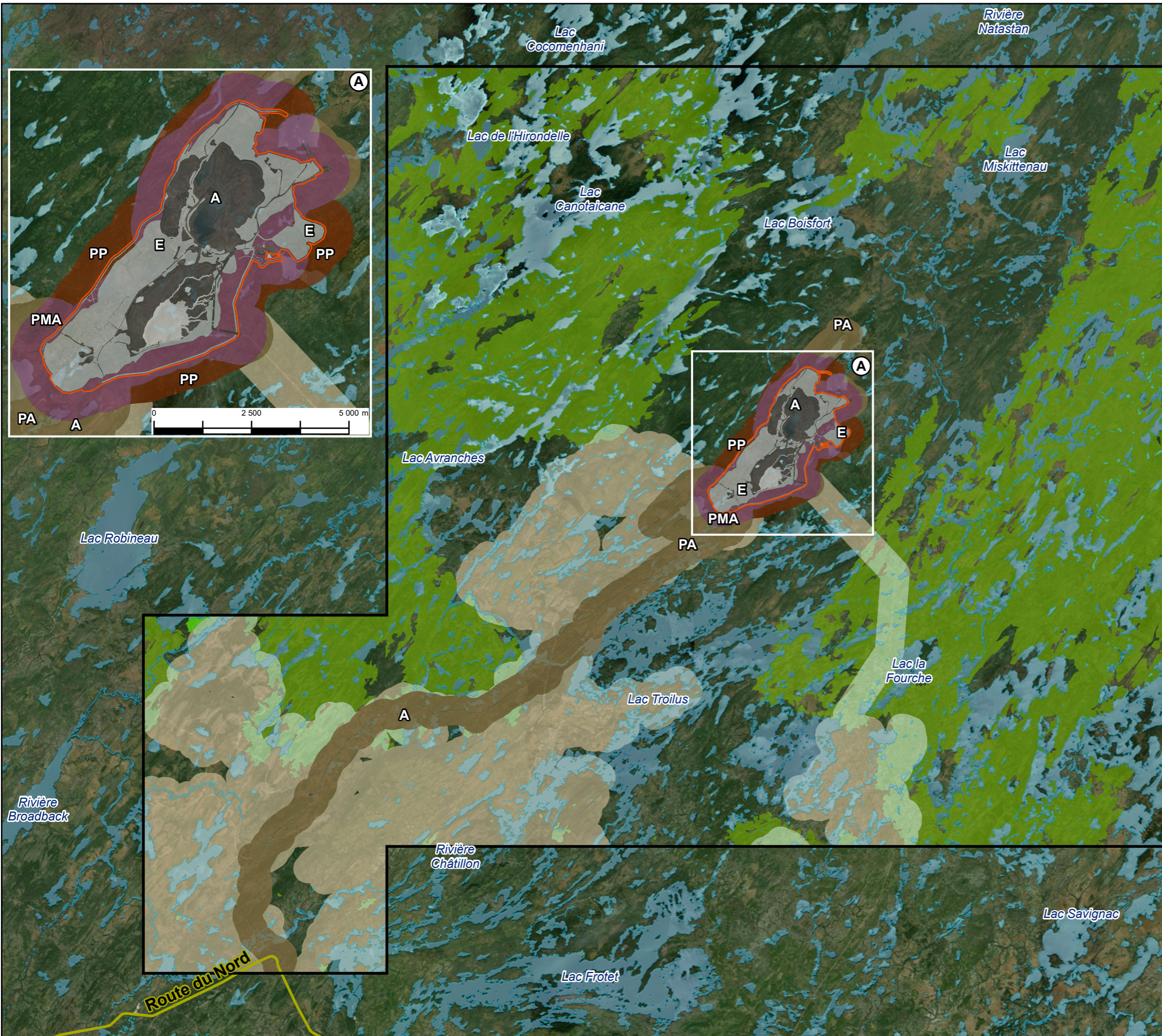
For caribou, all types of natural habitat were considered in the disturbance analysis, regardless of the period of activity (calving, calf rearing, rutting and wintering), in the belief that any natural habitat is good habitat and can be used by caribou, including during their movements. Moreover, many types of habitats are essential for caribou to complete their life cycle, and many of these habitats can be used for more than one period. It is difficult to determine when each period of activity takes place, and it is therefore imprecise to use temporal data to describe the habitat used by caribou during different periods of their life cycle.

A 750-metre zone around the periphery of all disturbances, including roads, buildings, power lines and all cleared areas, is considered to be avoided by caribou and therefore of lesser value. This zone of influence is based on the study by St-Laurent et al (2023) and has also been recommended by the Cree Nation Government (Eliane Grant, biologist, pers. comm. 2024). It is stricter than that prescribed in the *les lignes directrices pour l'aménagement de l'habitat du caribou forestier* (ERCFQ, 2023) and the Scientific Assessment to Inform the Identification of Critical Habitat for Woodland Caribou, Boreal Population, in Canada, which recommends a 500 m zone (Environment and Climate Change Canada [ECCC], 2011). This modification artificially increases the area of habitat considered disturbed compared to the 2019 study (WSP), but it also implies a greater level of disturbance for the current project. Changes in the level of disturbance can be found in the 2025 study (WSP). The 750-metre zone includes all indirect disturbances that lead to the avoidance of caribou habitats, such as increased predation, noise, light, etc. Noise and light disturbances are also included. Noise and light disturbances trigger short-term behavioural and physiological responses in boreal caribou. Sustained or repeated disturbances may cause avoidance of certain areas and reduce use of suitable caribou habitat.

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The construction of the various infrastructures will therefore result in three types of encroachment for the caribou. Firstly, areas where no direct or indirect disturbance was present will be directly affected. Secondly, areas already affected by indirect disturbances could be directly encroached upon. These areas are not considered caribou habitat. Finally, areas that were not disturbed could be affected indirectly. Encroachment into caribou habitat was therefore calculated using the following formula: (current project footprint + 750 m buffer zone) - (projected permanent encroachment + 750 m buffer zone). Map 17.2 shows the various encroachments and disturbances in caribou habitat. The project's direct footprint in caribou habitat is 56.47 ha, or 0.07% of the LSA. The project's indirect disturbances of caribou habitat is estimated at 699.86 ha, or 0.90% of the LSA. A total of 2924.16 ha corresponds to disturbances, but which will take place in already altered environments. Disturbance rates currently stand at 57.2% for the RSA as a whole (WSP 2025). Projected disturbances (direct and indirect) in caribou habitat will increase the disturbance rate by 0.1% in the RSA to 57.3%. To ensure the self-sufficiency of local populations, caribou must have access to continuous areas of undisturbed habitat and of acceptable quality. The disturbance rate for the entire federal conservation unit QC6, in which the project is located, is 32%. A woodland caribou population requires a range with less than 35% disturbance of its habitat area in order to be self-sustaining (Environment Canada, 2020). Direct and indirect disturbances will persist throughout the operation and decommissioning phases.



**LÉGENDE / LEGEND**

**Composante du projet / Project component**

- Zone de développement du projet / Project Development Area
- Zone d'étude locale - Caribou forestier / Local Study Area - Boreal Woodland Caribou

**Perturbation de la mine dans l'habitat du Caribou forestier / Disturbance of the Mine on Boreal Woodland Caribou Habitat**

- A - Milieu anthropique / Anthropogenic Environment
- PA - Perturbation actuelle / Current Disturbance
- E - Empiètement permanent / Permanent Encroachment
- PP - Perturbation liée au projet projeté / Disturbance Related to the Planned Project
- PMA - Perturbations en milieu déjà altéré / Disturbance in an Already Altered Environment

**Perturbation sur le Caribou forestier / Disturbance to Boreal Woodland Caribou**

- Anthropique / Anthropogenic
- Naturelle et anthropique / Natural and Anthropogenic
- Naturelle 0 - 25 ans / Natural 0-25 years
- Naturelle 26 - 50 ans / Natural 26-50 years

**Hydrologie/Hydrology - GRHQ**

- Étendue d'eau / Waterbody

**Autre / Other**

- Route du Nord

0				
RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.

**RÉFÉRENCES/REFERENCES**

1. Système de coordonnées / Coordinate system : NAD 1983 CSRS UTM Zone 18N. 2. Composante du projet / Project component : Stantec, 2025. 3. Empiètement sur l'habitat du Caribou forestier / Encroachment on Boreal Woodland Caribou habitat : Stantec, 2025. 4. Hydrologie / Hydrology : GRHQ - MRNF, 2025. 5. Route du Nord : Adresses Québec, 2025. 6. Imagerie / Imagery : Esri World, 2023.

**NOTES**

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**CLIENT**

**Troilus Gold Corp.**

**PROJET/PROJECT**

**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**

**Empiètement du projet sur la composante Caribou forestier / Encroachment of the project on the Boreal Woodland Caribou component**

NO. PROJET / PROJECT NO. 240433 / 167040485 DATE 2025/06/11

CONÇU / CHECKED F. Côté RÉVISÉ / VERIFIED J. Massicotte

DESSINÉ / DRAWN C-É Dubé-Poirier FIGURE NO. 17.2 ED./REV. 0



## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

#### Black bear

As the black bear is a generalist species, all habitat types are considered suitable for the species. Construction of the project will therefore have a direct impact on 1116.62 ha of black bear habitat on a permanent basis and 59.40 ha on a temporary basis during the construction period. This corresponds to 11.23% and 0.6% of the LSA respectively, since the habitats are largely present in these areas. Bears can become accustomed to anthropogenic activities, and it is expected that they will remain present in LSA habitats during all phases of the project, as well as occasionally using certain areas of the LSA, especially where intensive industrial activities are less prevalent.

Habitat disturbances will cease as soon as the decommissioning phase is completed, and the species will quickly benefit from the newly revegetated habitats it uses for feeding.

#### Moose

The situation will be similar for moose, which use a wide range of habitats to meet their needs throughout the year. The impact on its general habitat will be on an area of 113.17 ha on a permanent basis and on an area of 5.23 ha on a temporary basis, i.e. 24.20% and 1.11% of the LSA respectively. More specifically, 723.45 ha of its calving habitat (softwood stand and riverbanks) will be permanently impacted, and 34.13 ha temporarily.

#### Small Wildlife and Fur-Bearing Animal

By using the existing mine footprint, the project is optimized and minimizes impacts on terrestrial wildlife, including this fauna group. However, deforestation and grubbing, as well as stripping and excavation, will cause direct and indirect habitat loss.

Table 17.12 shows the areas of critical habitat for each species or group of species that will be affected, and their availability in the LSA. Beavers frequent ponds, small lakes, watercourses and the forest environments that border them. The construction phase will therefore affect 98.25 ha of preferred habitats on a permanent basis and 2.90 ha on a temporary basis for this species. This represents 6.83% and 0.20% respectively of the LSA. Two beaver lodges in the PDA will be potentially affected by the project. The beavers will have to relocate elsewhere. For all other species, given their use of a multitude of environments, all habitat types will be considered favourable for their presence. The areas affected for all small wildlife and fur-bearing animals are therefore 1116.62 ha (permanent) and 59.40 ha (temporary). As these habitats are very present in the LSA, permanent habitat loss represents 11.23% and temporary habitat loss is 0.60%.

Habitat disturbances will be similar during the operation phase and will cease during the decommissioning phase, and the various species will quickly benefit from the newly revegetated habitats.

## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

**Table 17.12 Small Wildlife and Fur-Bearing Animals - Area of Preferred Habitat Affected During Construction Phase**

Wildlife Group		Total LSA Area (ha)	Area of LSA Encroachment (ha)		Proportion of Preferred Habitat Affected LSA (%)	
			Permanent	Temporary	Permanent	Temporary
Beaver (species valued by the Cree)	Waterbodies and riverbanks	1436,70	98,25	2,90	6,83	0,20
All other small mammals	Softwood stands, hardwood stands, mixed stands, regenerating stands (0 to 20 years), dry barrens, shrub swamps and marshes, peatlands	9943,35	1116,62	59,40	11,23	0,60

#### Micromammals

By using the existing mine footprint, the project is optimized and minimizes impacts on terrestrial wildlife, including this faunal group. However, deforestation and grubbing, as well as stripping and excavation, will cause direct and indirect habitat loss. Table 17.13 shows the areas of critical habitat for each species or group of species that will be affected, and their availability within the LSA.

Southern bog lemming are mainly found in wetlands and the mixed stands that border them. It can also be found in forest cuttings. The construction phase will therefore affect 859.87 ha permanently and 59.08 ha temporarily the preferred habitats for this species. This represents 10.03% and 0.69% respectively of the habitats available in the LSA. For all other species, given their use of a multitude of environments, all habitat types will be considered favourable for their presence. The areas affected for all micromammals are therefore 1116.62 ha permanent and 59.40 ha temporary. As these habitats are very present in the LSA, the loss of habitat represents only 11.23% (permanent) and 0.60% (temporary) of the LSA. Table 17.13 shows the habitat areas affected by the project.

**Table 17.13 Micromammals - Area of Preferred Habitat Affected During Construction Phase**

Wildlife Group		Total LSA Area (ha)	Area of LSA Encroachment (ha)		Proportion of Preferred Habitat Affected LSA (%)	
			Permanent	Temporary	Permanent	Temporary
Southern bog lemming	Softwood stands, hardwood stands, mixed stands, regenerating stands (0 to 20 years), shrub swamps and marshes	8568,13	859,87	59,08	10,03	0,69

## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

Wildlife Group		Total LSA Area (ha)	Area of LSA Encroachment (ha)		Proportion of Preferred Habitat Affected LSA (%)	
			Permanent	Temporary	Permanent	Temporary
All Micromammals	Softwood stands, hardwood stands, mixed stands, regenerating stands (0 to 20 years), dry barrens, shrub swamps and marshes, peatlands	9943,35	1116,62	59,40	11,23	0,60

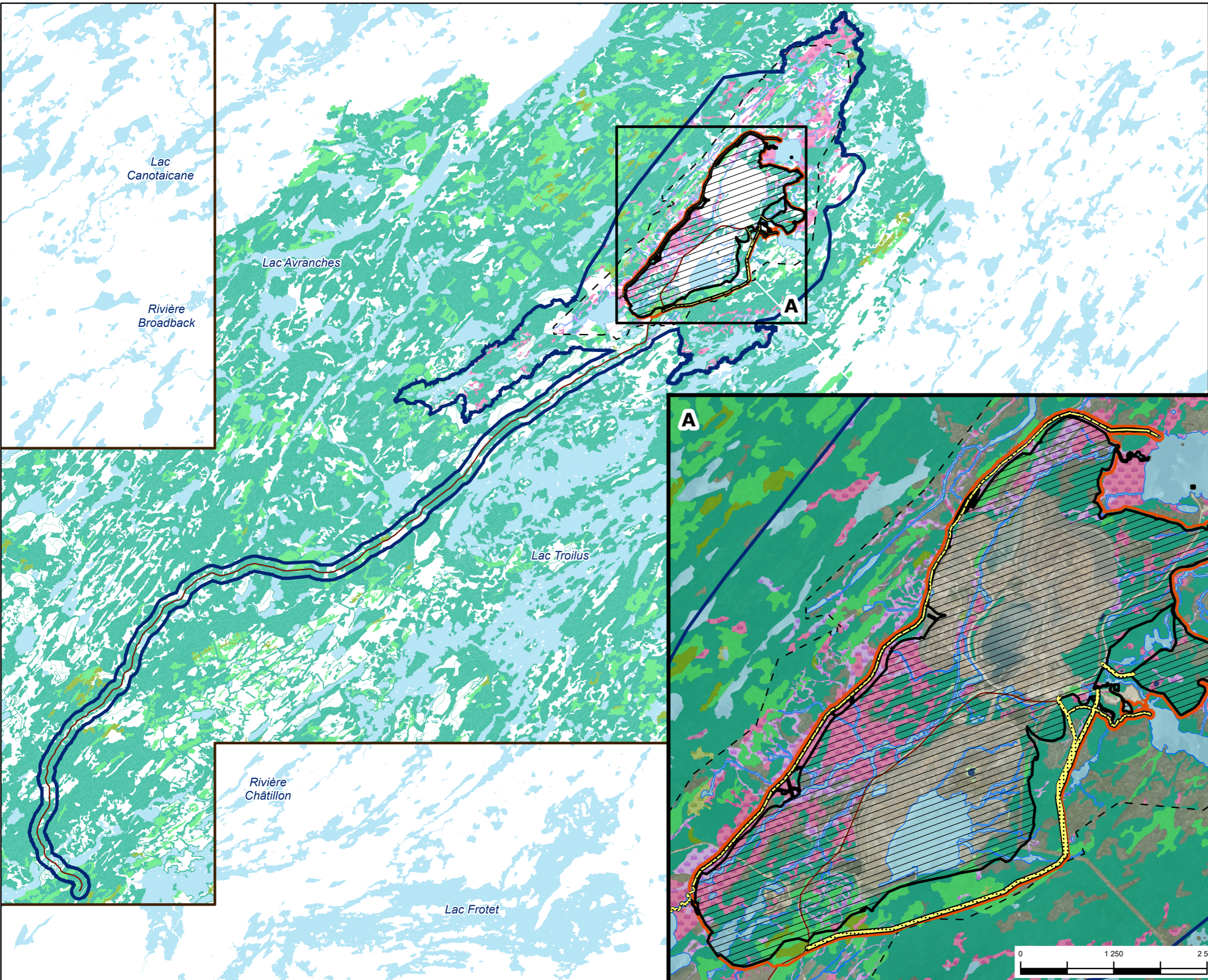
### Chiroptera

Silver-haired bats and hoary bats mainly use tree roosts, while little brown myotis may also use buildings and rock structures in addition to trees as roosts (Tremblay and Jutras, 2010). Deforestation and related work can result in the loss of potential roosting sites for all three bat species. Older stands with numerous snags are most likely to host silver-haired bats and little brown myotis, as they prefer cavities in mature trees, while hoary bats are most likely to use any type of tree, as they roost in foliage or branches (Tremblay and Jutras, 2010). Since both silver-haired bats and hoary bats feed in open areas, around waterbodies, in open forests, but also above the tree canopy (Tremblay and Jutras, 2010), construction will reduce feeding and movement habitat for both species in all affected natural environments. The areas affected are shown in Table 17.11 and Map 17.3. They correspond to 1185.83 ha of permanent encroachment and 63.79 ha of temporary encroachment, i.e. 10% and 0.54% of the LSA.

The little brown myotis tends to feed mainly in mature stands and their edges. It also uses forest roads, watercourses and the edges of waterbodies as both foraging habitat and travel corridors. Finally, open wetlands such as swamps and ponds are also good foraging habitats (Grindal et al., 1999) except for peatlands, which are not good environments for insect production. The areas to be affected are shown in Table 17.14 and Map 17.3. They correspond to 753.12 ha of permanent encroachment and 36.88 ha of temporary encroachment, or 9.63% and 0.47% of the LSA respectively.

Indirect disturbances can also reduce the quality of habitat for chiropterans in the vicinity of new infrastructures, through the creation of edge effects, vibrations, noise and light pollution. It will therefore affect the quality of habitats on the periphery of the PDA. Anthropogenic noise during the construction and operation phases could cause difficulties for bats, as they use echolocation to locate prey and move around. The impact may vary depending on the type of frequencies produced and the species (Bunkley et al. 2015). The use of heavy machinery could also have an indirect impact on the use of nearby roosts, by producing vibrations (Bunkley et al. 2015).





**LÉGENDE / LEGEND**

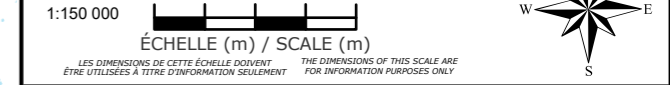
Composante du projet / Project Component	Milieu terrestre / Terrestrial environment
Zone de développement du projet / Project Development Area	Dénudé humide / Humid Bare
Zone inventoriée / Sampled Area - Wachihi	Peuplement feuillu / Hardwood Stand
Zone d'étude locale / Local Study Area	Peuplement mixte / Mixed Stand
Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area	Peuplement résineux / Softwood Stand
Impact permanent / Permanent Impact	<b>Hydrologie / Hydrology</b>
Impact temporaire / Temporary Impact	Étendue d'eau / Waterbody
<b>Milieu humide / Wetland</b>	Rive / Bank
Étang / Pond	Réseau routier / Road Network
Marais / Marsh	
Tourbière boisée / Wooded Peatland	
Tourbière ouverte minérotrophe / Open Fen	
Tourbière ouverte ombrotrophe / Open Bog	
Tourbière ouverte indifférenciée / Undifferentiated Bog	

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RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.

**RÉFÉRENCES/REFERENCES**  
 1. Système de coordonnées / Coordinate system : NAD 1983 CSRS UTM Zone 18N. 2. Composante du projet / Project component : Stantec, 2025. 3. Milieu humide / Wetland : Wachihi (2024) et Ministère de la Lutte contre les changements climatiques, Faune et Parcs (MELCCFP, 2025). 4. Milieu terrestre / Terrestrial environment : Wachihi (2024) et Ministère des Ressources naturelles et des Forêts (MRNF, 2025). 5. Hydrologie des zones d'études / Hydrology of the study areas : Wachihi (2024) & MRNF (2025). 6. Hydrologie / Hydrology - GRHQ : MRNF, 2025. Réseau routier / Road network : MRNF, 2025. Imagerie / Imagery : Esri World, 2023.

**NOTES**  
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**CLIENT**  
**Troilus Gold Corp.**

**PROJET/PROJECT**  
**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**  
**Empiètement dans l'habitat de chauves-souris / Encroachment into bat habitats**



**NO. PROJET / PROJECT NO.**  
 240433 / 167040485

**DATE**  
 2025/06/11

**CONÇU / CHECKED**  
 F. Côté

**RÉVISÉ / VERIFIED**  
 J. Massicotte

**DESSINÉ / DRAWN**  
 V. Faucher

**Figure No.**  
 17.3

**ED./REV.**  
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## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

**Table 17.14 Chiroptera with Special Designation - Area of Preferred Habitat Affected in Construction Phase**

Wildlife Group		Total LSA Area (ha)	Area of LSA Encroachment (ha)		Proportion of Preferred Habitat Affected LSA (%)	
			Permanent	Temporary	Permanent	Temporary
Little Brown Myotis	Softwood stands, hardwood stands, mixed stands, shrub swamps and marshes, waterbodies	7824,54	753, 12	36,88	9,63	0,47
Silver-haired bats and hoary bats	Softwood stands, hardwood stands, mixed stands, regenerating stand (0-20 years), dry barrens, shrub swamps and marshes, waterbodies, peatlands	11855,13	1185,83	63,79	10,00	0,54

### Herpetofauna

The project has been optimized to minimize impacts on terrestrial wildlife, including herpetofauna. However, deforestation and grubbing, stripping and excavation, and work in aquatic environments will cause loss and changes in habitat structure for these species.

The project footprint will affect terrestrial environments that are important, in particular, for the common gartersnake and, to a lesser extent, certain anurans species such as the American toad and certain salamander species such as the blue-spotted salamander. Wetlands and waterbodies, which are important habitats for several species found on the project site, will also be disturbed.

In all, 1,249.62 ha of potential habitat will be affected by the project: 1,185.83 ha permanently, and 63.79 ha temporarily (Table 17.15). Changes in the water regime could also alter the availability and type of wetlands around the periphery of the PDA, but it is difficult to estimate to what extent. However, many wetlands, hydric and terrestrial environments of interest are found on the periphery of the facilities and may harbour the same species as those inventoried. Permanent disturbance of herpetofauna habitat represents 10% of the LSA's surface area. It should be noted that Bibou Creek, which will be diverted, will provide new habitat for several species of herpetofauna.

Anthropogenic noise, particularly during the breeding season, can inhibit or stimulate the singing of male frogs and affect their reproductive success (Sun and Narins 2004, Lengagne 2008). Light pollution can also have an impact on anurans physiology, among other things (Yixin et al., 2023).

## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

**Table 17.15 Herpetofauna - Area of Preferred Habitat Affected During Construction Phase**

Wildlife Group	Preferred Habitat	Total LSA Area (ha)	Area of LSA encroachment (ha)		Proportion of Preferred Habitat Affected-LSA (%)	
			Permanent	Temporary	Permanent	Temporary
All herpetofauna	Softwood stands, hardwood stands, mixed stands, regenerating stand (0 to 20 years), dry barrens, shrub swamps and marshes, waterbodies, peatlands	11855,13	1185,83	63,79	10,00	0,54

#### Avifauna

As with other wildlife species, the birdlife component will be affected mainly by habitat loss due to deforestation. However, the project is optimized and minimizes the footprint on natural environments by using the existing footprint. Deforestation and stripping during the construction period can also lead to edge effects. This is particularly detrimental to forest breeding birds (Akresh et al. 2024). Some species, such as the White-crowned sparrow, will benefit from the edge effect, as their abundance and diversity may increase up to a distance of 50 metres (Paton, 1994). In some cases, the work may favour the presence of certain species, such as the Bank swallow and the Killdeer, which use anthropogenic structures or cleared areas for nesting. Habitat loss will mainly affect migratory breeding birds (passerines, waterfowl) and resident birds (woodpeckers, owls, partridges). Habitat loss may also affect migratory birds (waterfowl and shorebirds), but to a lesser extent, since no concentration areas have been identified in the LSA. Impacted habitats are described in more detail for each species group in the following sections. Construction work, traffic and ore extraction and processing activities will increase noise, light, dust and vibrations. As a result, habitats found beyond the PDA may also be less suitable for birds. The physiological impacts of noise on avian fauna appear at exposure levels of 55 to 60 dBA (Barber et al. 2010), but a change in species diversity can be observed at levels of 40 dBA (Barber et al. 2010). Predicted sound levels in the LSA are around 40dBA and 45dBA (see section 9). Some nocturnal birds could also be affected by the light, including night owls and migratory birds.

#### Waterfowl, waterbirds and shorebirds

For these different species groups specifically, the affected areas of waterbodies and open wetlands with water, which represent their preferred habitats, are 315.90 ha (314.67 permanent, 1.22 temporary). This represents 11.95% of the available habitats in the LSA encroached upon on a permanent basis, and 0.05 on a temporary basis.

Table 17.16 summarizes the areas of preferred habitats that will be affected by the Project. A total of eighteen breeding species could be affected by habitat loss, including eight waterfowl species (common merganser [*Mergus merganser*], common goldeneye [*Bucephala clangula*], Northern pintail [*Anas acuta*], American black duck, Canada goose, Blue-winged teal [*Spatula discors*], Green-winged teal [*Anas crecca*] and Surf scoter [*Melanitta perspicillata*]), six species of shorebird (Least Sandpiper [*Calidris minutilla*], Spotted Sandpiper [*Actitis macularius*], Solitary Sandpiper [*Tringa solitaria*], Greater Yellowlegs

## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

[*Tringa melanoleuca*], Killdeer [*Charadrius vociferus*] and Wilson's snipe [*Gallinago delicata*] and four waterbird species (glaucous gull [*Larus hyperboreus*], sandhill crane [*Antigone canadensis*], common loon and common tern [*Sterna hirundo*]).

#### Birds of prey

Birds of prey use a wide variety of habitats for feeding and breeding. However, most birds of prey found on the project site potentially nest in forested areas. The surface area of habitats directly disturbed by the project is therefore 824.16 ha permanent and 58.57 ha temporary. This corresponds to 9.68% and 0.69% respectively of the available habitats in the LSA (table 17.16). Only the osprey is a confirmed nester; however, the nest observed was not in the LSA, but in the RSA, so it will not be affected by the project (Wachiih 2025).

**Table 17.16 Avifauna-Other - Area of Preferred Habitat Affected in Construction Phase**

Wildlife Group		Total LSA Area (ha)	Area of LSA Encroachment (ha)		Proportion of Preferred Habitat Affected LSA (%)	
			Permanent	Temporary	Permanent	Temporary
Waterfowl, waterbirds and shorebirds	Shrub swamps and marshes, waterbodies, open peat bogs	2633,98	314,67	1,23	11,95	0,05
Birds of prey	Softwood stands, Hardwood stands, Mixed stands, Regenerating stands (0 to 20 years)	8511,69	824,16	58,57	9,68	0,69

#### Forest landbirds

To ensure a fair comparison, the same habitat categories as those described in the reference study (Wachiih, 2025) were used to calculate encroachment areas. Using data from the ecoforestry map (MRNF, 2017), forest stands and land cover types were classified according to the same eight habitat groups to determine their total area in the LSA. Table 17.17 shows the encroachment of each habitat group. Four habitat groups will lose more than 15% of their total area in the LSA. The « coupes et plantations très jeunes »<sup>2</sup> is the habitat group that will be the most affected. An area of 905 ha of permanent encroachment and 6 ha of temporary encroachment will affect this habitat. This corresponds to 44.6% of this type of habitat in the LSA. This is one of the habitat groups with the highest number of breeding pairs, with 70/ha. The area of mature jack pine stands will be reduced by 27% in the LSA. This habitat has 48.9 breeding pairs per hectare, a density comparable to the average. Other young and mature softwoods stands will be permanently reduced by 232 ha and temporarily by 31 ha. Overall, 84% of this habitat type will remain available in the LSA. This habitat group has a below-average diversity and number of breeding pairs.

<sup>2</sup> Very young cuttings and plantations



## Environmental and Social Impact Assessment for the Troilus Mine Project

### TERRESTRIAL AND AVIAN FAUNA

**Table 17.17 Habitat area, Richness and Density of Birds Affected During the Construction Phase**

	Other Young and Mature Softwoods	Very Young Cuttings and Plantations	Young Spruce Stands	Mature Spruce Stands	Young And Mature Deciduous and Mixed Forests	Wetlands	Young Grey Pine Forests	Mature Jack Pine Forests
Total area in LSA	1666,0	2038,8	1558,4	2103,6	178,9	2379,7	1064,3	1314,8
Area of permanent encroachment	232,3	905,9	138,2	81,0	9,5	314,7	52,6	344,8
Area of temporary encroachment	31,8	2,4	6,784	9,4	3,4	12,4	4,3	5,7
Percentage available in LSA after encroachments	84,1	55,4	90,7	95,7	92,8	86,3	94,7	73,3
Average richness and density of breeding pairs by habitat group (Wachihih 2025)								
Average richness (DRL)	3,1	4,9	2,5	3,6	5,6	3,1	4,9	3,6
Average richness (IPA)	4,1	6,9	4,4	4,3	5,9	6,8	4,9	5,0
Couples / 10 ha	46,28	70,03	30,98	49,85	72,15	47,33	64,72	48,86



## Environmental and Social Impact Assessment for the Troilus Mine Project

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#### Avian Species with Special Designation

The presence of eight bird species with special designation was observed in the LSA during the baseline studies. The habitats they use and the areas that will be encroached upon are summarized in Table 17.18. As with other bird groups, direct habitat loss will be mainly due to deforestation, stripping and draining of waterbodies. Indirect loss is due to increased noise, light, dust and vibration. The area of preferred habitat for the whip-poor-will is 8897.59 ha. The proportion of permanently encroached habitats is estimated at 21.13% (1880.84 ha) of the total habitats available in the LSA, while the proportion temporarily encroached is 0.41% (36.39 ha) (Map 17.4). Some of the habitats used by the common nighthawk are anthropogenic (gravel pits, roads, waste rock piles, etc.) and will remain so during the various phases of the Project. It is because these environments are currently inactive that they are beneficial to the species. They will gradually revert to favourable habitats for the species during the closure period. Preferred olive-sided flycatcher habitat currently totals 7671.47 ha in the LSA. The project's permanent encroachment is 948.63 ha, while the temporary encroachment is 36.64 ha. These encroachments are equivalent to 10.92% and 0.41% of all preferred habitats in the LSA (map 17.5). The lesser yellowlegs, a migratory shorebird, mainly uses wetlands. The estimated area of this preferred habitat in the LSA is 1860.37 ha. Planned permanent encroachment corresponds to 20.76% (386.22 ha) of this habitat, while temporary encroachment is 0.49% (9.22 ha) (Map 17.6). The Bald eagles use coniferous and mixed stands for nesting and bodies of water for feeding. Together, these habitats are estimated at 7736.75 ha in the LSA, with planned encroachment equivalent to 9.27% (717.40 ha of permanent encroachment) and 0.48% (36.88 ha of temporary encroachment) (map 17.7). Preferred Rusty Blackbird habitat is estimated at 1709.00 ha, of which 151.76 ha will be permanently encroached and 9.31 ha temporarily (Map 17.8). The Short-eared owls use mainly marshes and open bogs, and the area of these is estimated at 1421.07 ha in the LSA. Planned permanent encroachment corresponds to 20.57% (292.42 ha), while temporary encroachment corresponds to 0.06% (0.82 ha) (map 17.9). Bank swallows mainly use the anthropogenic environment (952.69 ha), which, being the main component of the project footprint, will be affected permanently by 93.76% (893.27 ha) and temporarily by 0.13% (1.30 ha). As with the common nighthawk, this anthropogenic environment will remain an anthropogenic environment, which may be beneficial to the Bank swallow from the closure period onwards. In addition, the final layout of several embankments will be designed to encourage nesting by the species. The preferred habitat of the Evening Evening grosbeak is mainly softwood and hardwood stands. These habitats cover an area of 6523.84 ha in the LSA. They will be encroached upon by 695.14 ha permanently and 36.49 ha temporarily, corresponding to 10.65% and 0.56% of their area respectively (Map 17.10).



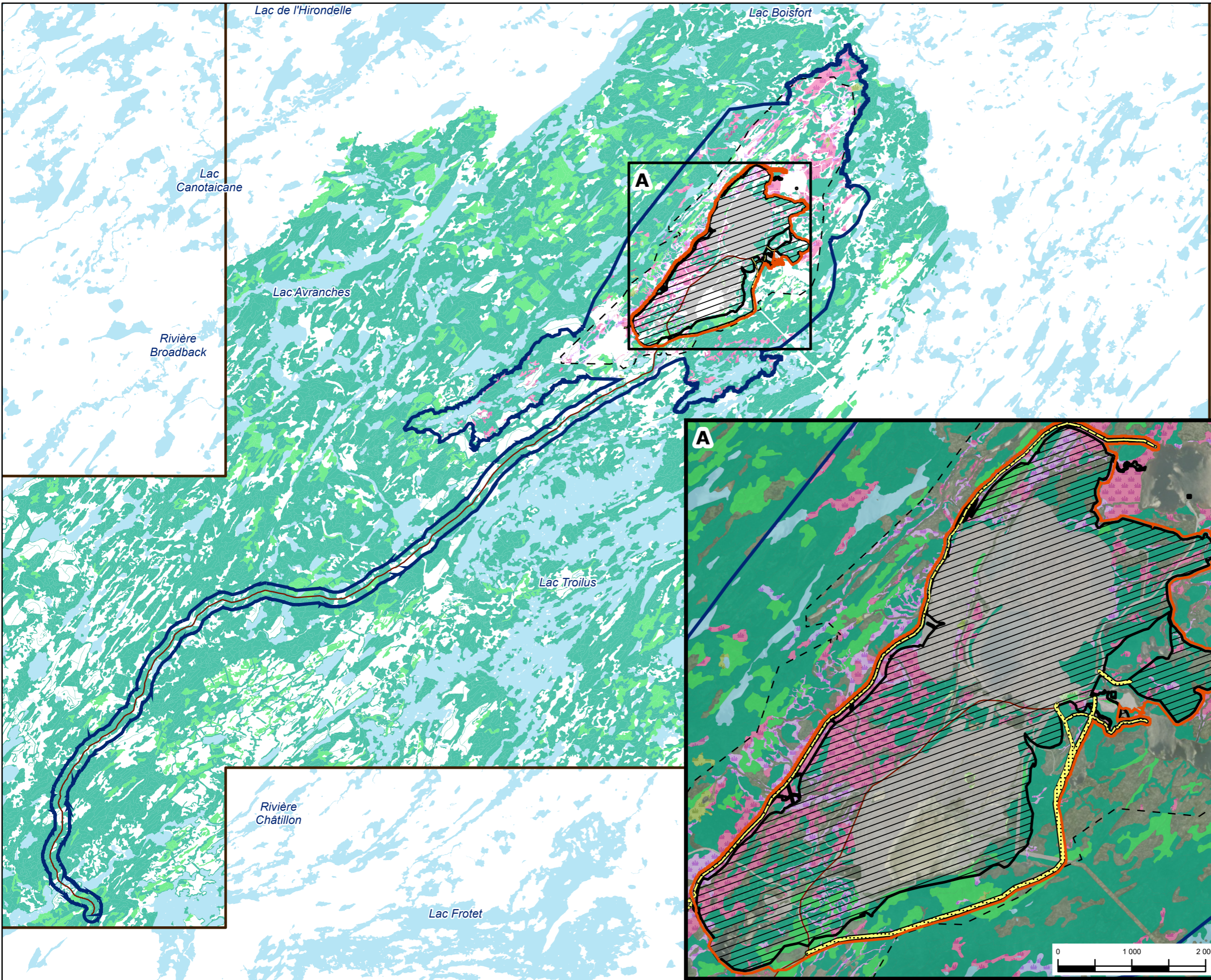
**Environmental and Social Impact Assessment for the Troilus Mine Project**

TERRESTRIAL AND AVIAN FAUNA

**Table 17.18 Species of Birdlife with Special Designation - Area of Preferential Habitat Affected During Construction Phase**

Common Name	Preferred Habitat	Status			Nesting	Encroached Habitat Area (ha)		Preferred Habitat Area-ZEL (ha)	Proportion of Preferred Habitat Affected-ZEL (%)		Maps
		Provincial Status	Federal Status (SARA)	COSEWIC Status		Permanent	Temporary		Permanent	Temporary	
Common Nighthawk	Mixed and coniferous stands; peatlands, marshes, anthropogenic	SDEM	Special concern	Special concern	Confirmed	1880,84	36,39	8897,59	21,13	0,41	17.4
Olive-sided Flycatcher	Mixed forests, coniferous forests, ombrotrophic bogs, riverbanks and waterbodies	Vulnerable	Special concern	Special concern	Probable	948,63	36,64	7671,47	10,92	0,41	17.5
Lesser yellowlegs	Wooded bog, ombrotrophic open bog, minerotrophic open bog, marshes and swamps			Threatened	N.D.	386,22	9,22	1860,37	20,76	0,49	17.6
Bald eagle	Softwood and mixed stands, waterbodies	Vulnerable		Not at risk	Possible	717,40	36,88	7736,75	9,27	0,48	17.7
Rusty Blackbird	Wooded bog, marsh, swamp, waterbodies	SDEM	Special concern	Special concern	Confirmed	151,76	9,31	1709,00	8,88	0,54	17.8
Short-eared owl	Marsh, ombrotrophic open bog, minerotrophic open bog	Susceptible	Special concern	Susceptible	N.D.	292,42	0,83	1421,07	20,57	0,06	17.9
Bank swallow	Anthropogenic		Threatened	Threatened	Confirmed	893,27	1,30	952,69	93,76	0,13	
Evening Grosbeak	Softwood and mixed stands		Special concern	Special concern	N.D.	695,14	36,49	6523,84	10,65	0,56	17.10





**LÉGENDE / LEGEND**

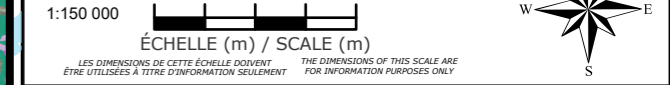
<b>Composante du projet / Project Component</b>	<b>Milieu humide / Wetland</b>
Zone de développement du projet / Project Development Area	Marais / Marsh
Zone inventoriée / Sampled Area - Wachih	Tourbière boisée / Wooded Peatland
Zone d'étude locale / Local Study Area	Tourbière ouverte indifférenciée
Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area	Tourbière ouverte minérotrophe / Open Fen
Impact permanent / Permanent Impact	Tourbière ouverte ombrotrophe / Open Bog
Impact temporaire / Temporary Impact	<b>Hydrologie / Hydrology</b>
<b>Milieu terrestre / Terrestrial environment</b>	Étendue d'eau / Waterbody
Anthropique / Anthropic	<b>Autre / Other</b>
Peuplement mixte / Mixed Stand	Réseau routier / Road Network
Peuplement résineux / Softwood Stand	

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RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.

**RÉFÉRENCES/REFERENCES**  
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**CLIENT**  
**Troilus Gold Corp.**

**PROJET/PROJECT**  
**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**  
**Empiètement dans l'habitat de l'engoulevent d'Amérique / Encroachment into Common Nighthawk habitats**



**NO. PROJET / PROJECT NO.**  
 240433 / 167040485

**DATE**  
 2025/06/10

**CONÇU / CHECKED**  
 F. Côté

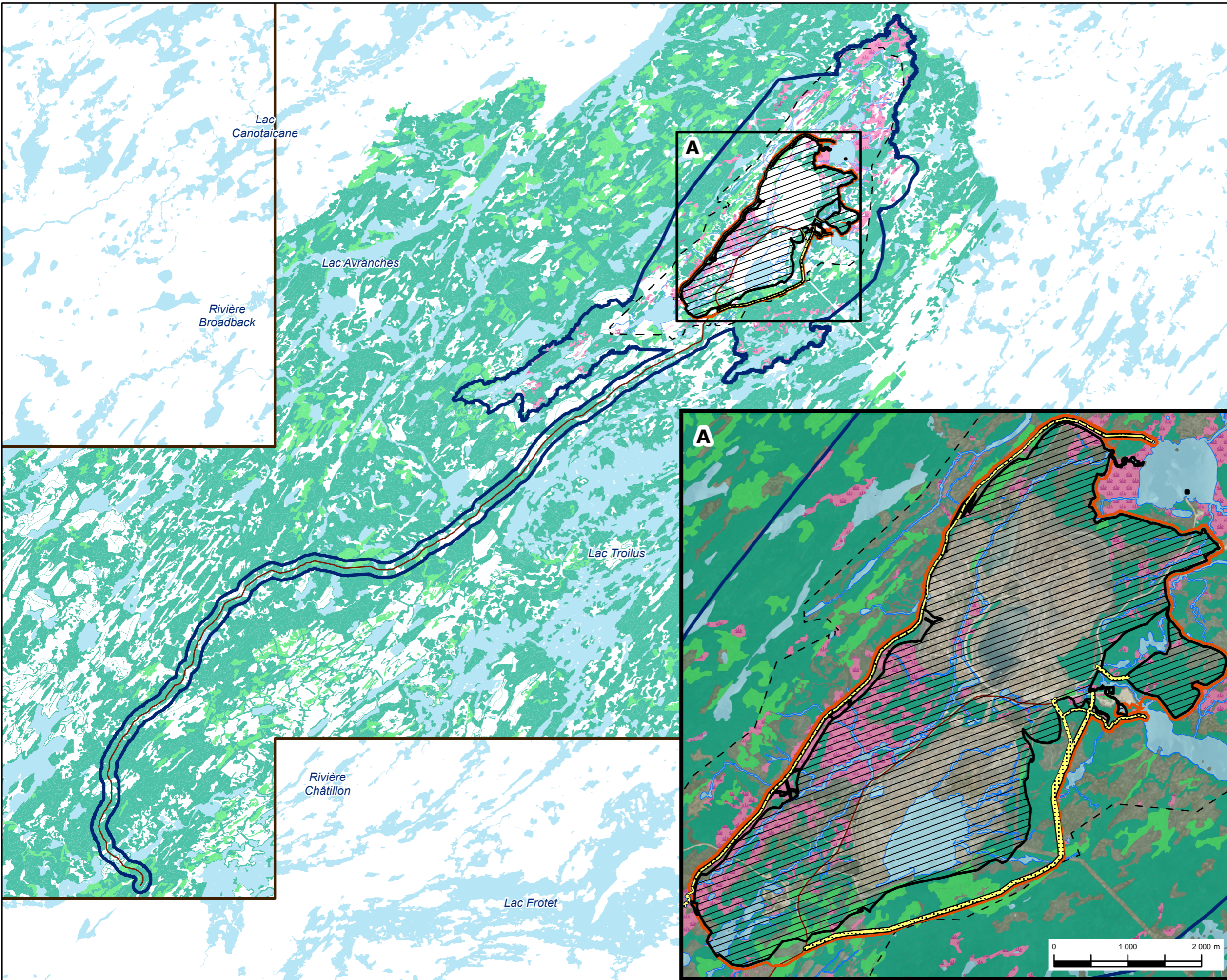
**RÉVISÉ / VERIFIED**  
 J. Massicotte

**DESSINÉ / DRAWN**  
 V. Faucher

**Figure No.**  
 17.4

**ED./REV.**  
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**LÉGENDE / LEGEND**

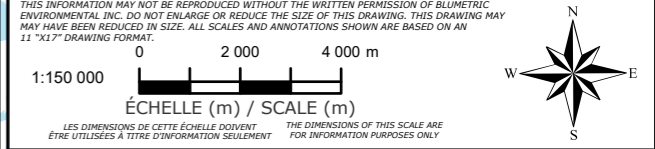
<b>Composante du projet / Project Component</b>	<b>Milieu terrestre / Terrestrial Environment</b>
Zone de développement du projet / Project Development Area	Peuplement mixte / Mixed Stand
Zone inventoriée / Sampled Area - Wachih	Peuplement résineux / Softwood Stand
Zone d'étude locale / Local Study Area	<b>Hydrologie / Hydrology</b>
Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area	Étendue d'eau / Waterbody
Impact permanent / Permanent Impact	Rive / Bank
Impact temporaire / Temporary Impact	<b>Autre / Other</b>
<b>Milieu humide / Wetland</b>	Réseau routier / Road Network
Tourbière ouverte ombrotrophe / Open Bog	

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RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.
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**RÉFÉRENCES/REFERENCES**  
 1. Système de coordonnées / Coordinate system : NAD 1983 CSRS UTM Zone 18N. 2. Composante du projet / Project component : Stantec, 2025. 3. Milieu humide / Wetland : Wachih (2024) et Ministère de la Lutte contre les changements climatiques, Faune et Parcs (MELCCFP, 2025). 4. Milieu terrestre / Terrestrial environment : Wachih (2024) et Ministère des Ressources naturelles et des Forêts (MRNF, 2025). 5. Hydrologie des zones d'études / Hydrology of the study areas : Wachih (2024) & MRNF (2025). 6. Hydrologie / Hydrology - GRHQ : MRNF, 2025. Réseau routier / Road network : MRNF, 2025. Imagerie / Imagery : Esri World, 2023.

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**Troilus Gold Corp.**

**PROJET/PROJECT**  
**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**  
**Empiètement dans l'habitat du moucherolle à côtés olive/ Encroachment into Olive-sided Flycatcher habitats**



**NO. PROJET / PROJECT NO.**  
 240433 / 167040485

**DATE**  
 2025/06/11

**CONÇU / CHECKED**  
 F. Côté

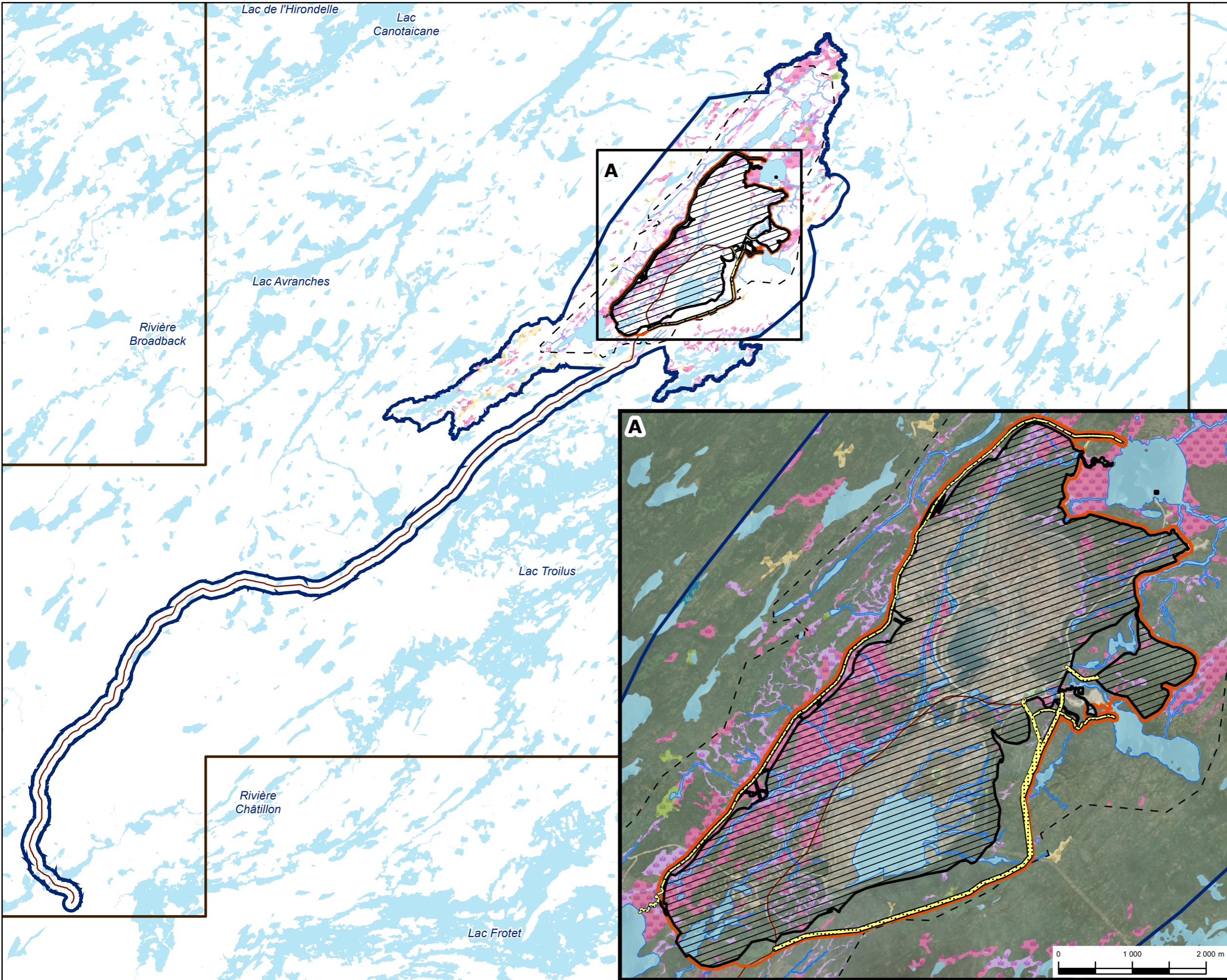
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**DESSINÉ / DRAWN**  
 V. Faucher

**Figure No.**  
 17.5

**ED./REV.**  
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**LÉGENDE / LEGEND**

**Composante du projet / Project Component**

- Zone de développement du projet / Project Development Area
- Zone inventoriée / Sampled Area - Wachih
- Zone d'étude locale / Local Study Area
- Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area
- Impact permanent / Permanent Impact
- Impact temporaire / Temporary Impact

**Milieu humide / Wetland**

- Marais / Marsh
- Marécage arborescent / Wooden Swamp
- Marécage arbustif / Shrub Swamp
- Tourbière boisée / Wooded Peatland
- Tourbière ouverte minérotrophe / Open Fen
- Tourbière ouverte ombrotrophe / Open Bog

**Hydrologie / Hydrology**

- Étendue d'eau / Waterbody
- Rive / Bank

**Autre / Other**

- Réseau routier / Road Network

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RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.

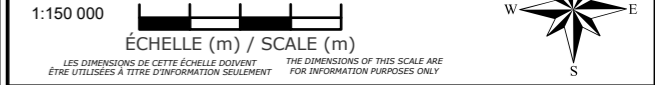
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**CLIENT**

**Troilus Gold Corp.**

**PROJET/PROJECT**

**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**

**Empiètement dans l'habitat du petit chevalier / Encroachment into Lesser Yellowlegs habitats**

**NO. PROJET / PROJECT NO.**  
240433 / 167040485

**DATE**  
2025/06/11

**CONÇU / CHECKED**  
F. Côté

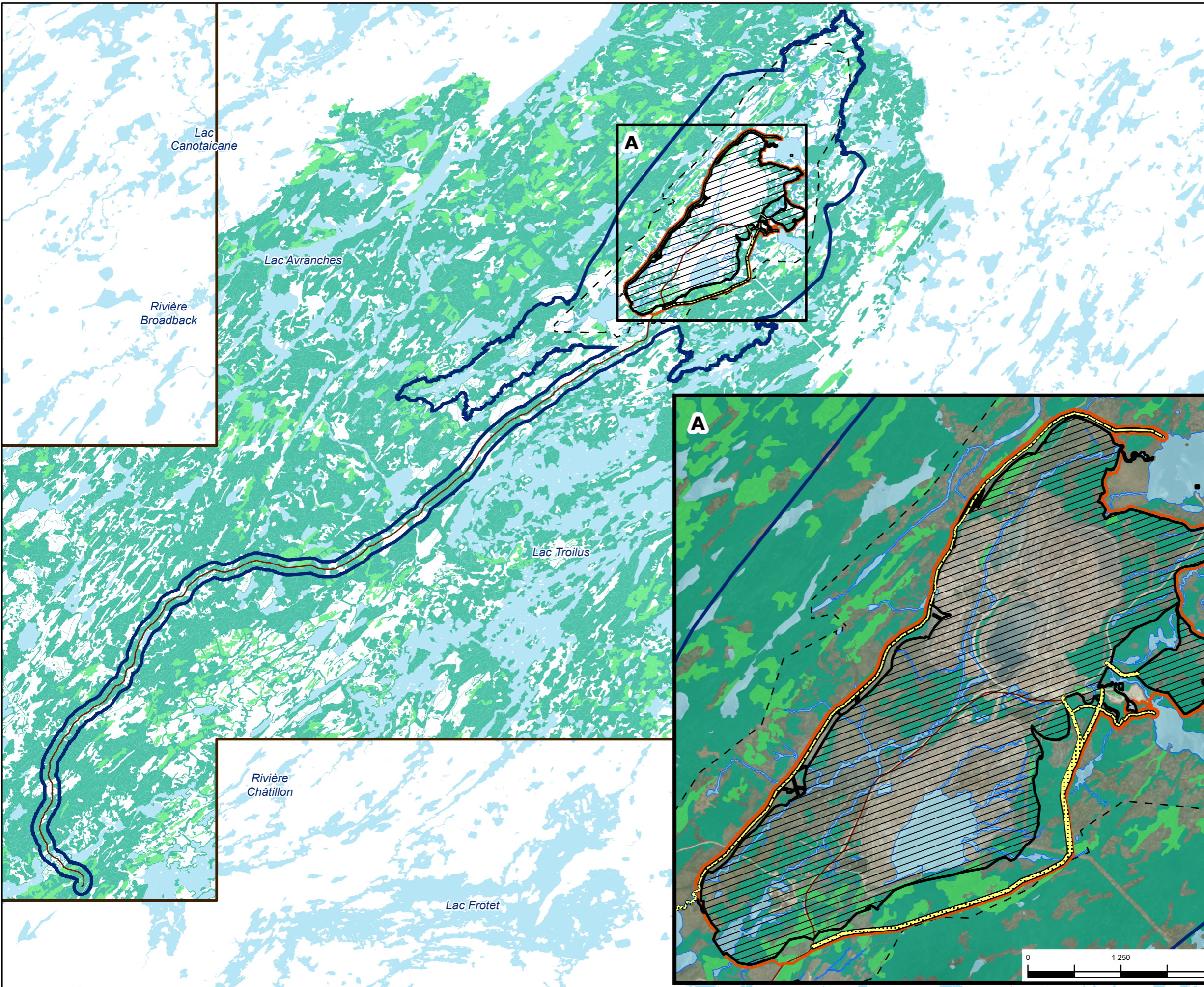
**RÉVISÉ / VERIFIED**  
J. Massicotte

**DESSINÉ / DRAWN**  
V. Faucher

**Figure No.**  
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**LÉGENDE / LEGEND**

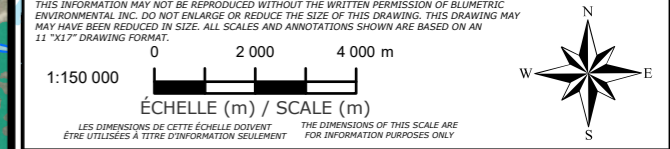
<b>Composante du projet / Project Component</b>	<b>Milieu terrestre / Terrestrial Environment</b>
Zone de développement du projet / Project Development Area	Peuplement mixte / Mixed Stand
Zone inventoriée / Sampled Area - Wachih	Peuplement résineux / Softwood Stand
Zone d'étude locale / Local Study Area	<b>Hydrologie / Hydrology</b>
Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area	Étendue d'eau / Waterbody
Impact permanent / Permanent Impact	Rive / Bank
Impact temporaire / Temporary Impact	<b>Autre / Other</b>
	Réseau routier / Road Network

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**PROJET/PROJECT**  
**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**  
**Empiètement dans l'habitat du pygargue à tête blanche / Encroachment into Bald Eagle habitats**



**NO. PROJET / PROJECT NO.**  
 240433 / 167040485

**DATE**  
 2025/06/11

**CONÇU / CHECKED**  
 F. Côté

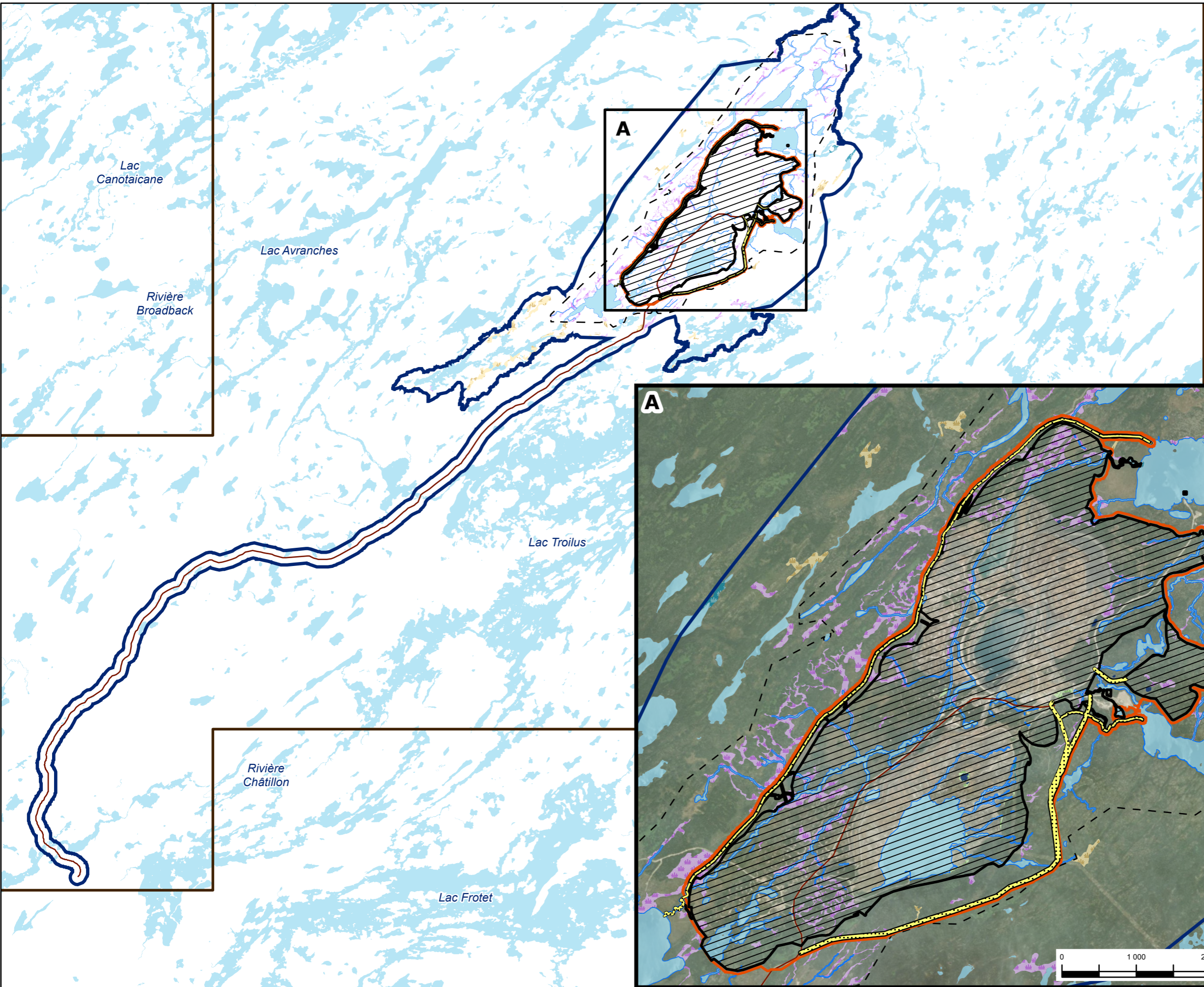
**RÉVISÉ / VERIFIED**  
 J. Massicotte

**DESSINÉ / DRAWN**  
 V. Faucher

**Figure No.**  
 17.7

**ED./REV.**  
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**LÉGENDE / LEGEND**

<b>Composante du projet / Project Component</b>	<b>Milieu humide / Wetland</b>
Zone de développement du projet / Project Development Area	Étang / Pond
Zone inventoriée / Sampled Area - Wachih	Marais / Marsh
Zone d'étude locale / Local Study Area	Marécage arborescent / Wooded Swamp
Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area	Marécage arbustif / Shrub Swamp
Impact permanent / Permanent Impact	Tourbière boisée / Wooded Peatland
Impact temporaire / Temporary Impact	<b>Hydrologie / Hydrology</b>
	Étendue d'eau / Waterbody
	Rive / Bank
	<b>Autre / Other</b>
	Réseau routier / Road Network

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RÉV.	DESCRIPTION	DD/MM/YY	BY	VERIF.

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ÉCHELLE (m) / SCALE (m)

LES DIMENSIONS DE CETTE ÉCHELLE DOIVENT ÊTRE UTILISÉES À TITRE D'INFORMATION SEULEMENT / THE DIMENSIONS OF THIS SCALE ARE FOR INFORMATION PURPOSES ONLY

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**PROJET/PROJECT**  
**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**  
**Empiètement dans l'habitat du quiscal rouilleux / Encroachment into Rusty Blackbird habitats**

**NO. PROJET / PROJECT NO.**  
 240433 / 167040485

**DATE**  
 2025/06/11

**CONÇU / CHECKED**  
 F. Côté

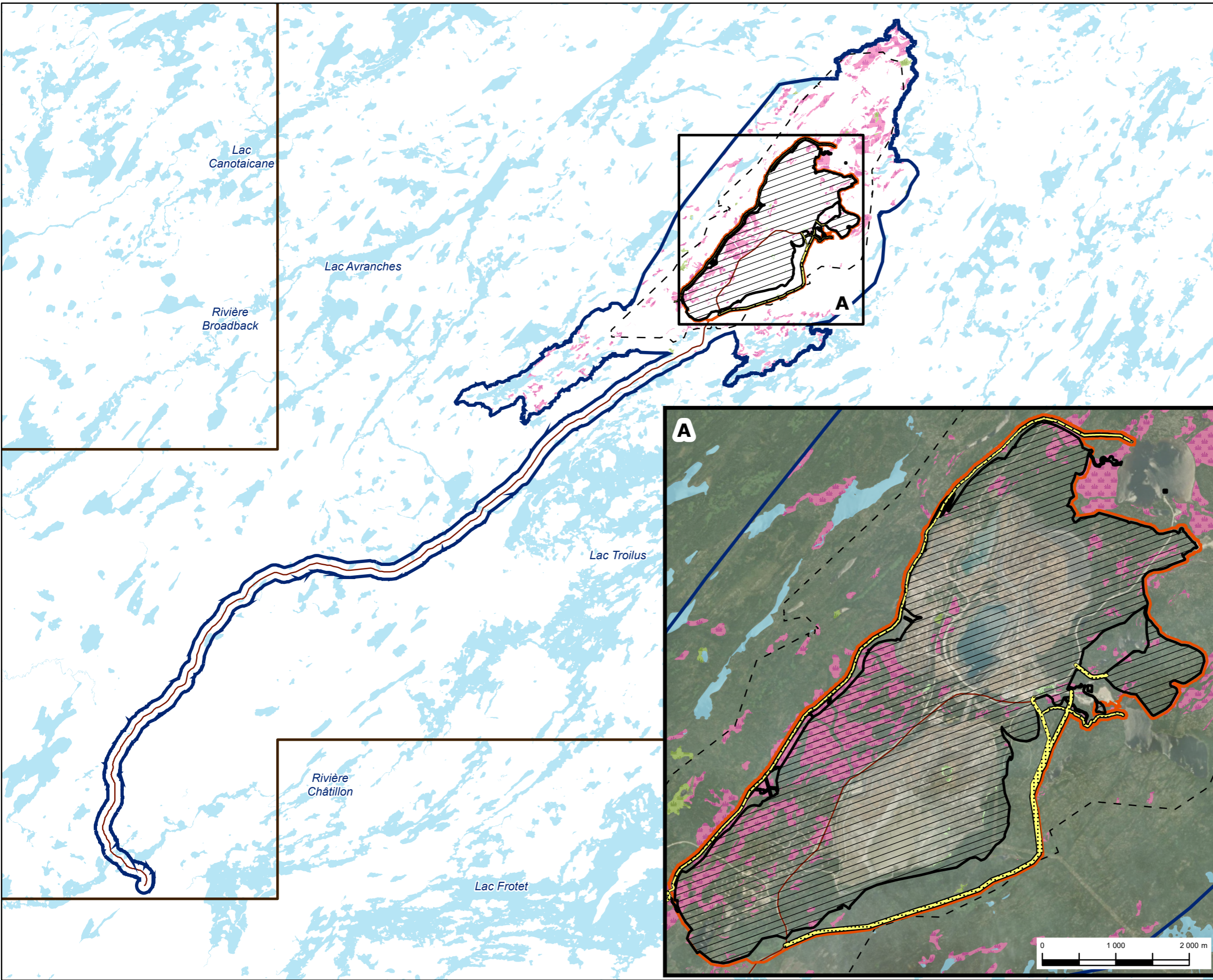
**RÉVISÉ / VERIFIED**  
 J. Massicotte

**DESSINÉ / DRAWN**  
 V. Faucher

**Figure No.**  
 17.8

**ED./REV.**  
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**LÉGENDE / LEGEND**

**Composante du projet / Project Component**

- Zone de développement du projet / Project Development Area
- Zone inventoriée / Sampled Area - Wachih
- Zone d'étude locale / Local Study Area
- Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area
- Impact permanent / Permanent Impact
- Impact temporaire / Temporary Impact

**Milieu humide / Wetland**

- Marais / Marsh
- Tourbière ouverte minérotrophe / Open fen
- Tourbière ouverte ombrotrophe / Open bog

**Hydrologie / Hydrology**

- Étendue d'eau / Waterbody

**Autre / Other**

- Réseau routier / Road Network

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**PROJET/PROJECT**

**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**

**Empiètement dans l'habitat du hibou des marais / Encroachment into Short-eared Owl habitats**

**NO. PROJET / PROJECT NO.**  
240433/167040485

**DATE**  
2025/06/11

**CONÇU / CHECKED**  
F. Côté

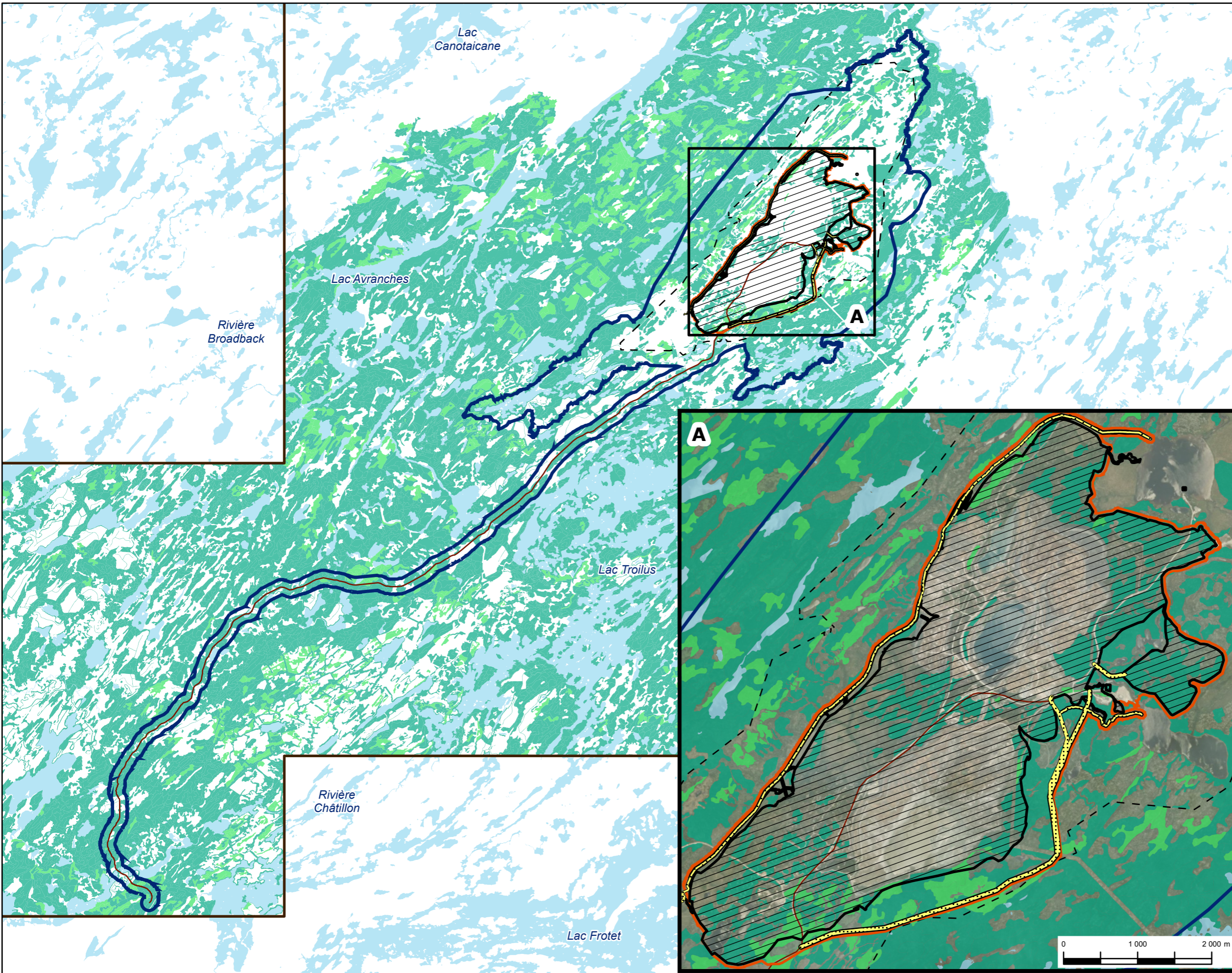
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J. Massicotte

**DESSINÉ / DRAWN**  
V. Faucher

**Figure No.**  
17.9

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**LÉGENDE / LEGEND**

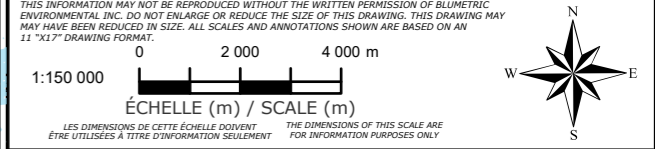
<b>Composante du projet / Project Component</b>	<b>Milieu terrestre / Terrestrial environment - MRNF</b>
Zone de développement du projet / Project Development Area	Peuplement mixte / Mixed Stand
Zone inventoriée / Sampled Area - Wachih	Peuplement résineux / Softwood Stand
Zone d'étude locale / Local Study Area	<b>Hydrologie / Hydrology</b>
Faune terrestre - Zone d'étude régionale / Terrestrial Wildlife - Regional Study Area	Étendue d'eau / Waterbody
Impact permanent / Permanent Impact	<b>Autre / Other</b>
Impact temporaire / Temporary Impact	Réseau routier / Road Network

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**PROJET/PROJECT**  
**Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project**

**TITRE/TITLE**  
**Empiètement dans l'habitat du gros-bec errant / Encroachment into Evening Grosbeak habitats**



**NO. PROJET / PROJECT NO.**  
 240433/167040485

**DATE**  
 2025/06/11

**CONÇU / CHECKED**  
 F. Côté

**RÉVISÉ / VERIFIED**  
 J. Massicotte

**DESSINÉ / DRAWN**  
 V. Faucher

**Figure No.**  
 17.10

**ED./REV.**  
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# Environmental and Social Impact Assessment for the Troilus Mine Project

## TERRESTRIAL AND AVIAN FAUNA

### 17.4.2 Risk of Mortality

The risk of project-induced mortality is assessed qualitatively, based on a review of the literature, consideration of factors that may contribute to the susceptibility of different species or groups of species to different project processes, and professional judgment. Collisions with mobile equipment and machinery, power lines collisions and accidental spills have the highest potential to cause mortality. Indirect sources of mortality include changes in the predator-prey relationship, increased hunting pressure and disease.

#### 17.4.2.1 Project Pathway

##### Construction

The direct and/or indirect activities associated with the construction of the mine could result in interactions and collisions with wildlife, leading to an increased risk of mortality or death of wildlife species. Several roads already exist in the LSA, and the risk of collisions is already present. Several roads will be added, increasing existing disturbances. The presence of new roads may alter prey/predator relationships. Secondly, the increase in traffic also increases the risk of collision. However, it also increases avoidance, or in other words, decreases the willingness of animals to cross a path (Yun Wang, 2023). Accidental spills of chemicals, oils or gasoline for machinery during construction could cause direct or indirect mortality. The dewatering of waterbodies and the Bibou Creek Diversion could cause mortality of some aquatic species. Finally, the presence of workers may increase hunting pressure or encourage poaching.

##### Operation

As in the construction phase, the direct and/or indirect activities associated with the operation could lead to interactions and collisions with wildlife, increasing the risk of mortality or the number of deaths of wildlife species. All activities involving the transport of materials and the movement of machinery could increase the risk of collisions. The risk of accidental spills of chemicals, oils or gasoline required by machinery will always be present, and over a longer period of time, and could cause direct or indirect mortality. Wastewater management may also bring an additional risk of mortality in the event of failure. The presence of a new power line could cause bird mortality through collisions. Finally, the presence of a workforce may increase hunting pressure or encourage poaching.

##### Decommissioning and closure

The direct and/or indirect activities associated with rehabilitation, such as the use of machinery and the transportation of equipment or personnel, could lead to interactions and collisions with wildlife, with a consequent risk of mortality for certain wildlife species. However, impacts will be less in this phase than in other phases and are expected to diminish over the duration of the project. Impacts are expected to be nil once closure is complete.

# Environmental and Social Impact Assessment for the Troilus Mine Project

## TERRESTRIAL AND AVIAN FAUNA

### 17.4.2.2 Mitigation and Enhancement Measures

- Wildlife hazing or exclusion measures will be implemented prior to the construction phase whenever possible.
- Specific measures will be developed on a case-by-case basis where the need is justified and monitoring will be conducted to ensure their effectiveness.
- Clearing work will be carried out outside breeding periods (birds and bats).
- Dewatering and diversion of waterbodies will be carried out outside breeding periods (herpetofauna and aquatic birds).
- Adaptations will be made to make roads less dangerous for wildlife. Barriers (e.g., textile barrier), small wildlife crossings (culverts), and signage at strategic locations will be installed at strategic points.
- Site Access will be restricted by gates and checkpoints.
- To limit pressure on wildlife resources, mine personnel will not be allowed to hunt or possess firearms on the project site.
- A register will be set up to record collisions, near-collisions between vehicles and wildlife, or observed wildlife mortality on roads, so that the information can be used to improve practices.
- Residual materials will be managed according to current best practices to reduce wildlife attraction to the site, and staff will be encouraged to report all incidents and interactions with wildlife caused by the presence of residual materials or other attractants.
- Staff will be encouraged to report any wildlife sightings that may pose a risk to wildlife or operations.
- In areas where a road is located on the edge of a forest or wetland, regular vegetation clearing will be conducted to discourage moose from foraging near roads (Tanner and Leroux, 2015).
- A communication system will be set up to alert employees and subcontractors to any sightings or signs of caribou along access roads to the mine site.
- A training module for employees and subcontractors will be developed to make them aware about the vulnerability of caribou populations and to develop their ability to distinguish possible signs of presence.
- An action plan will be implemented in the event of the presence of caribou near the mine.
- Employees will be informed of the presence of caribou near mine infrastructures or on access roads, to increase their level of vigilance and limit the risk of disturbances or collision.
- Transportation schedule will be intensified during the day and reduced at night, due to the higher risk of collision.
- To reduce the use of the ponds by waterfowl for breeding and feeding, no vegetation will be planted along the banks of the tailings and sedimentation ponds. During the restoration phase, a water quality analysis in sedimentation ponds will be assessed prior to revegetation to ensure that only ponds with adequate water quality are made available and used by waterfowl.

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### 17.4.2.3 Project Residual Impacts

By using the existing mine footprint, the project is optimized and minimizes impacts on terrestrial and avian wildlife. Implementation of the mitigation measures suggested in the previous section will reduce the magnitude and duration of impacts on the risk of wildlife mortality. On this basis, mortality directly attributable to the Project can be expected to be low compared with mortality in the RSA.

#### Caribou

The risk of road-related mortality is minimal, mainly due to the rarity of collisions. Indeed, woodland caribou populations have low abundances and avoid roads in portions of their range where the road network is developed (ERCFQ, 2013; St-Laurent et al. 2023). Mitigation measures will help minimize interactions with caribou and detect their presence early in the Project Development Area, thereby ensuring their safety.

#### Large Wildlife

The risk of collision mortality is greater for moose than for caribou, because they use roads more frequently. Moose are attracted to roadside salt ponds if de-icing salts are used (Laurian et al., 2005), as well as to young vegetation growing within road right-of-way (de Bellefeuille and Poulin, 2004). In Quebec, the highest-risk months for this species are May, June, July and October. In autumn, the increased movement of cervids during the rutting season makes them more vulnerable to road collisions. In Quebec, this period is concentrated in October for moose (de Bellefeuille and Poulin, 2004). Hunting pressure could increase for this species, as well as for the black bear, due to the increased accessibility resulting from the expansion of roads on the territory. Black bears and wolves are also at risk of collision, since they use roads to move more quickly and gain access to new territories. However, both species prefer roads with low traffic levels (Hill et al. 2021). Poor waste management could attract black bears to the PDA, thereby increasing interactions with the personnel present. If a black bear poses a safety risk, it may have to be captured or shot. The increased presence of roads and regenerating habitat may increase the presence of moose. Secondly, the increased presence of moose can also lead to the increased presence of predators such as wolves and black bears, which could then prey on other animals, such as caribou.

#### Small Wildlife and Fur-Bearing Animals

The risk of mortality for small fauna will be influenced by the timing of activities, depending on the species' life cycles. Hibernating species will be more sensitive to construction if it takes place in late autumn or winter. The risk of road collisions will have a greater impact during migration or breeding periods, when some species are more active and on the move. The risk of collisions will be lower for species that avoid roads, such as the lynx, for example, which tends to cross roads during periods of low traffic only (Baigas et al. 2017). In the particular case of the beaver, dismantling beaver lodges could cause mortality. The risk of mortality would be lower if they were destroyed and the beavers relocated in July rather than autumn or winter.

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### Micromammals

The period of highest risk for micromammals mortality is the construction period, mainly due to clearing and stripping. These animals have a reduced rate of mobility and will not be seen by machinery operators.

### Chiroptera

During the construction period, there will be a risk of mortality during clearing activities. Surveys have not identified any roosting sites in forest stands, where the potential is highest. Bats are highly mobile and can move away quickly in the event of disturbance, except during the birthing period when the juveniles are not yet flying. During the closure period, the risk of mortality is more related to the demolition of buildings where bats may have established a maternity colony. Although it is possible that individuals may collide with vehicles, this phenomenon is poorly documented and difficult to quantify.

### Herpetofauna

Amphibians are more vulnerable than other vertebrates to the adverse impacts of roads and activities involving clearing and stripping. This is partly due to their seasonal migration patterns, slow movement and their tendency to stand still when a vehicle is moving in their direction (Yixin et al. 2023). For the common garter snake, which hibernates in groups, the destruction of a hibernacula can lead to mortality and harm the population if work involving ground disturbance takes place in winter. The draining of waterbodies could lead to mortality of eggs or tadpoles. Mitigation measures that prioritize interventions outside sensitive periods will minimize the risk of mortality.

### Avifauna

An increase in mortality is to be expected due to clearing and stripping. Forest birds are more at risk than other bird groups, as they are the species most present in the LSA. Birds of prey and wetland birds may also be at risk. However, the application of mitigation measures, mainly deforestation outside breeding periods, will limit the risk. The risk of mortality during clearing activities is lower for shorebirds and waterfowl.

The risk of mortality from collisions between birds and vehicles during the breeding season and the period when young birds leave their nests is highest along roads that cross wetlands and hardwood or mixed forests (Bishop and Brogan 2013). The species most at risk are those that hunt along roadsides, such as owls for example, species that nest in ecotones created by roads, such as passerines, and scavenger species that feed on other animals killed along roadsides, such as crows and birds of prey. Passerines are the bird group most frequently involved in collisions with vehicles in North America (Bishop and Brogan 2013). Mitigation measures taken to limit speed will reduce the possibility of collisions. Collisions with shorebirds, waterfowl and waterbirds are uncommon.

Increased hunting pressure for waterfowl could increase the risk of mortality for this group in particular.

#### 17.4.3 Change in movement patterns

Changes in movement patterns are assessed qualitatively, based on professional judgment and including an assessment of habitat connectivity, and considerations of the sensitivity of the species or group of species to anthropogenic presence. Given the direct link between habitat loss caused by project development and the creation of barriers to wildlife movement, this impact is therefore considered from the start of the construction phase through to full project closure. Generally speaking, habitat disturbance, physical barriers such as infrastructure, roads and fences, and sensory disturbances are the main causes of changes in movement patterns.

##### 17.4.3.1 Project Pathways

###### Construction

Direct and/or indirect activities associated with construction could result in changes to travel corridors and wildlife movement patterns. All construction activities that involve habitat loss, increased traffic or the presence of a larger workforce may result in changes to wildlife movement patterns. The construction of the new power line over a distance of around 2150 metres will create a new travel corridor for certain species but could disrupt the movements of species that avoid open areas.

###### Operations

Direct and/or indirect activities associated with the operation could result in changes to travel corridors and wildlife movement patterns. All operational activities involving increased traffic or the presence of a workforce may result in changes to wildlife movement patterns. No additional habitat will be lost during this phase, so the impact of infrastructure development will remain the same as during the construction phase.

###### Decommissioning and Closure

Direct and/or indirect activities associated with closure could result in changes to travel corridors and wildlife movement patterns. All activities that generate traffic or the increased presence of labour may result in changes to wildlife movement patterns. No additional habitat loss will occur during this phase, and the impact should diminish over the years until complete closure.

##### 17.4.3.2 Mitigation and Enhancement measures

- The project footprint will be limited by largely using the existing footprint.
- Where possible, vegetation will be maintained along access roads and activity areas to reduce indirect disturbances (noise, light, dust and vibration) in natural environments.
- Measures will be implemented to mitigate the impact of noise.
- The use of directional lighting will be recommended to limit diffused light outside the PDA.
- Measures will be implemented to mitigate the impact of light on nocturnal species.
- Progressive reclamation will be carried out during the construction and operation phases to encourage the return of wildlife and bird species as quickly as possible.

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- A communication system will be set up to inform employees and subcontractors to any observations or signs of caribou presence along roads leading to the mine site.
- A training module will be developed for employees and subcontractors to make them aware of the precarious nature of caribou populations and develop their ability to detect any signs of presence.
- An action plan will be put in place in the event of the presence of a caribou near the mine.
- Employees will be informed of the presence of caribou near mine infrastructures or on access roads, to increase their level of vigilance and limit the risk of disturbance or collision.
- Transportation schedule will be intensified during the day and reduced at night, due to the higher risk of collision.
- Noisy equipment will be properly maintained, and personnel will ensure that silencers and catalytic converters are functioning correctly.
- All necessary measures will be taken to limit noise at source.
- Equipment will be regularly maintained.
- • Any materials that may generate noise, as well as noise-reduction devices (silencers), will be maintained in good working condition.
- An awareness program will be implemented for machinery operators to prevent lammings of tailgates and objects falling from great heights, and to optimize work methods.
- Stationary equipment on site, excluding transient equipment (e.g. 10-wheel craft trucks) and equipment used for short periods, should be fitted with a white noise back-up alarm.
- During restoration work, the use of resinous species will be recommended to avoid the colonization by deciduous species (stripping).

#### 17.4.3.3 Project Residual Impact

As discussed in 17.4.1, habitat disturbance may cause some species to modify their movement patterns to access new habitats more suited to their needs. Some species will benefit from the presence of edge habitat. Similarly, the presence of new roads may act as a barrier for some species, while benefiting others.

Caribou have high spatial requirements for their seasonal movements and may find their movements constrained by roads (Rudolph, 2011), as has been demonstrated in migratory caribou and reindeer following the construction of roads, railways and power transmission lines (Curatolo and Murphy, 1986; Nellemann et al., 2000; Vistnes et al., 2008, ECCC 2020).

The study by St-Laurent et al (2023) showed that they avoided areas adjacent to roads for a distance of around 750 metres. At low traffic densities, however, roads can sometimes serve as travel corridors during migrations (ERCFQ, 2013). Since the entire project is located on the footprint of the existing project, which is mainly composed of habitats avoided by caribou, it compromises little the connectivity or accessibility to quality habitats for the species. A study of caribou locations between 2020 and 2024 shows that they generally avoid the PDA and access road (WSP, 2025).

Habitat fragmentation could force bats to make more extensive movements to alternative feeding sites. Roads can be a barrier to bat movement (Bennett and Zurcher, 2013; Bennett et al., 2013). A road more than 2 m wide is enough to cause bats to turn back (Bennett and Zurcher 2013). However, the presence of new roads in forested areas and the Bibou Creek diversion may create new travel corridors for bats,

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particularly the little brown myotis (Grindal et al., 1999). Similarly, the new power line will create a new travel corridor for these species (Cambell et al. 2024). The light produced to illuminate the new infrastructures could alter the movement and feeding habits of chiropterans, since they are nocturnal species. Illuminated areas may increase the risk of predation and force bats to avoid this habitat. However, artificial light can also have beneficial impacts by attracting prey (ERCSQ, 2019).

For small wildlife, the presence of new roads enables faster movement and, at the same time, access to habitats that were previously unavailable (O'Farrell & Uptain 1987, Raiter et al. 2018, Latham et al. 2011).

Barriers created by roads, infrastructure and new open environments, such as those found near transmission lines, can reduce connectivity between important wildlife habitats. The impact of these barriers is higher for species with reduced mobility, such as amphibians, and can be detrimental to the vitality of local populations (Cushman, 2006). Mitigation measures, such as culverts, can reduce the impact of road infrastructure.

Apart from the direct and indirect disturbance of bird habitats, which will lead to changes in the use of different environments according to the life habits of the various species, the impact on the movement patterns of the various bird groups will be low, due to their high mobility.

### 17.4.4 Summary of Project Residual Impacts

Table 17.19 summarizes the residual impacts on terrestrial and avian fauna.

**Table 17.19 Project Residual Impacts on Terrestrial and Avian Fauna**

Residual impact	Residual Impacts Characterization							
	Project phase	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Disturbance of wildlife and its habitat	C	A	M	PDA, LSA	HS	MT, LT	C	R
	O	A	L	PDA, LSA	HS	MT, LT	C, IR	R
	D	A/P	L	PDA, LSA	HS	CT	C	R
Risk of Mortality	C	A	L, M	PDA, LSA	HS	LT	IR, C	R, I
	O	A	NMC, L	PDA, LSA	HS	LT	IR	R, I
	D	A	NMC, L	PDA, LSA	HS	LT	IR	R, I
Change in movement patterns	C	A	NMC, L, M	PDA, LSA	HS	LT	C	R

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Residual impact	Residual Impacts Characterization							
	Project phase	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
	O	A	NMC/L	PDA, LSA	HS	LT	C	R
D	A/P	NMC/L	PDA, LSA	HS	LT	C	R	

### KEY

See Chapter 6 for detailed definitions

Project phase:  
C: Construction  
O: Operation  
D: Decommissioning

Direction:  
P: Positive  
A: Adverse

Magnitude:  
NMC: No Measurable Change  
L: Low  
M: Moderate  
H: High

Geographical extent:  
PDA: Project Development Area  
LSA: Local Study Area  
RSA: Regional Study Area  
Timing:  
NS: No sensitivity  
MS: Moderate sensitivity  
HS: High sensitivity

Duration:  
ST: Short-term  
MT: Medium-term  
LT: Long term  
N/A: Not applicable

Frequency:  
S: Single event  
IR: Irregular event  
R: Regular event  
C: Continuous

Reversibility:  
R: Reversible  
I: Irreversible

## 17.5 Prediction Confidence

Confidence in predictions is considered moderate to high. The level of confidence is based on :

- Quantity and quality of available data;
- Reference studies carried out to date;
- A conservative approach to environmental impacts assessment;
- Professional judgment;
- Mitigation measures recognized as effective.

Although confidence in the predictions is high for most of the components of this assessment, particularly regarding the presence and distribution of different species, some uncertainty remains for a few components, such as the abundance of certain species and the presence of migration corridors, for example, which is why overall confidence in the predictions is considered moderate to high.

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