



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

VEGETATION, RIPARIAN AND WETLAND
ENVIRONMENTS

Environmental and Social Impact Assessment for the Troilus Mine Project

VEGETATION, RIPARIAN AND WETLAND ENVIRONMENTS

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Acronyms and abbreviations

CDPNQ	Centre de données sur le patrimoine naturel du Québec (Quebec Natural Heritage Data Center)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPRS-U	Coupe avec protection de la régénération et des sols uniformes
CQDE	Centre québécois du droit à l'environnement
DC	Déclaration de conformité (Declaration Of Compliance)
ECCC	Environment and Climate Change Canada
EFE	Exceptional Forest Ecosystem
EFEE	Espèces floristiques exotiques envahissantes (Invasive alien plant species)
ESDMV	Espèce susceptible d'être désignée menacée ou vulnérable (Species likely to be designated as threatened or vulnerable)
ESIA	Environmental and Social Impact Assessment
IAAC	Impact Assessment Agency of Canada
LADTF	Loi sur l'aménagement durable du territoire forestier (Sustainable Forest Development Act)
LCPN	Loi sur la conservation du patrimoine naturel (Natural Heritage Conservation Act)
LEMV	Loi sur les espèces menacées ou vulnérables (Act respecting threatened or vulnerable species)
LQE	Loi sur la qualité de l'environnement (Environment Quality Act)
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
MHH	Milieu humide et hydrique (Wetlands and Bodies of Water)
MRNF	Ministère des Ressources naturelles et des Forêts
PDA	Project Development Area
PFIP	Peuplements forestiers d'intérêt phytosociologique
RADF	Règlement sur l'aménagement durable des forêts du domaine de l'État (Regulation respecting the sustainable development of forests in the domain of the State)
RAMHHS	Règlement sur les activités dans des milieux humides, hydriques et sensibles (Regulation respecting activities in wetlands, bodies of water and sensitive areas)
REAFIE	Règlement sur l'encadrement d'activités en fonction de leur impact sur l'environnement (Regulation respecting the regulatory scheme applying to activities on the basis of their environmental impact)
REFMVH	Règlement sur les espèces floristiques menacées ou vulnérables et leurs habitats (Regulation respecting threatened or vulnerable plant species and their habitats)
RSA	Regional Study Area
SARA	Species at Risk Act
TSF	Tailings Storage Facility
UA	Unité d'aménagement (Management Unit)
VC	Valued component
VIN	Vieux inéquien (Uneven-Aged Old-Growth)
VIR	Vieux irrégulier (Irregular Old-Growth)

16. Vegetation, Riparian and Wetland Environments

16.1 Scope of assessment

16.1.1 Regulatory and Policy Setting

16.1.1.1 Guidelines from Environmental Assessment Regulators

The environmental impact assessment of vegetation, wetlands and riparian areas was prepared in accordance with the Quebec guidelines (Appendix A.1) and the requirements of the Impact Assessment Agency of Canada (IAAC) guidelines (Appendix A.2).

16.1.1.2 Environment Quality Act

Under the first paragraph of section 22 of the Environment Quality Act (chapter Q-2) (LQE), no one may, without first obtaining authorization from the Minister, carry out any work, construction or other intervention in a wetland or bodies of water.

According to the LQE (section V.1, art. 46.0.2), wetlands and bodies of water refer to areas of natural or man-made origin that are characterized by the permanent or temporary presence of water, which may be diffused, occupy a bed or saturate the ground and whose state may be stagnant or flowing. When water is flowing, it may flow constantly or intermittently. Wetlands and bodies of water include:

1. Lakes and watercourses, including the St. Lawrence Estuary, the Gulf of St. Lawrence and the seas surrounding Québec.
2. The shores, banks and littoral zones of a lake or watercourse, as defined by government regulation.
3. The flood zones of a lake or watercourse and channel migration zones of a watercourse established in accordance with this division and whose boundaries are disseminated by the Government or, where such boundaries have not been established, as defined by government regulation.
4. A pond, marshes, swamps, or peatlands.

16.1.1.3 Regulation respecting the regulatory scheme applying to activities on the basis of their environmental impact

The Regulation respecting the regulatory scheme applying to activities on the basis of their environmental impact (Q-2, r. 17.1) (REAFIE) specifies the supervision of activities carried out in wetlands and bodies of water (exemption, declaration of compliance, authorization) as part of the application of section 22 of the LQE. In particular, it identifies activities exempt from an authorization under section 22 of the LQE, and those eligible for a declaration of compliance (DC), the impact of which is to exempt these activities from obtaining authorization under section 22 of the LQE.

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16.1.1.4 Regulation respecting activities in wetlands, bodies of water and sensitive areas

The Regulation respecting activities in wetlands, bodies of water and sensitive areas (chapter Q-2, r. 0.1) (RAMHHS) came into force at the same timing as the REAFIE. To simplify the writing of the REAFIE, the implementation standards associated with wetlands and bodies of water have been brought together and integrated into the RAMHHS. These two regulations therefore go hand in hand and must be consulted in parallel if an intervention in wetlands and bodies of water is planned. The RAMHHS applies mainly to activities that are not subject to authorization under section 22 of the LQE, notably those that are exempt or eligible for a DC. Article 2 of the RAMHHS specifies which conditions or prohibitions always apply, and therefore also to authorizations.

16.1.1.5 Act respecting threatened or vulnerable species

In Quebec, the Act respecting threatened or vulnerable species (chapter E-12.01) (LEMV) governs the protection and management of threatened or vulnerable plant species and species likely to be so designated and their habitats. It aims to protect species and their habitats, in particular by implementing measures to avoid their decline and prevent their disappearance.

16.1.1.6 Regulation respecting threatened or vulnerable plant species and their habitats

The regulation respecting threatened or vulnerable plant species and their habitats (chapter E-12.01, r. 3) (REFMVH) identifies designated species and describes their habitats. In particular, it specifies the rules applicable to annual harvesting of species vulnerable to harvesting.

16.1.1.7 Natural Heritage Conservation Act

The Natural Heritage Conservation Act (chapter C-61.01) (LCPN) provides five land conservation measures:

- Natural settings designated by the Ministry.
- Northern conservation areas.
- Protected areas for sustainable use, biodiversity reserves, ecological reserves and marine reserves.
- Nature reserves.
- Man-made landscapes.

In addition, there are Indigenous initiated protected areas, which can take various forms within the conservation measures listed above.

The Ministry of Environment, the Fight against Climate Change, Wildlife and Parks (MELCCFP) may also designate a natural environment located on public or private land. The purpose of this designation is to ensure the maintenance of biodiversity, and the ecological functions associated with it. To do so, he must first consult the ministers, municipal authorities, Indigenous communities, watershed organizations,

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regional round tables and regional environmental councils concerned, as well as the landowner, where applicable (CQDE, 2024).

16.1.1.8 Sustainable Forest Development Act

In public forests, the provincial government is responsible for implementing sustainable forest management. As such, it must ensure compliance with several key sustainable development principles, notably wealth creation, ecosystem protection, social acceptability and responsibility.

The Sustainable Forest Development Act (A-18.1) (LADTF) also makes it possible to set aside forested areas in the public domain as experimental forests, teaching and research forests, forest stations, biological refuges, exceptional forest ecosystems or wetlands of interest.

To optimize the management of public forests, the government delimits public forest areas according to their use. Public forest lands can be classified into seven categories, including management units (UA). In the adapted forestry regime of the territory covered by the Paix des brave Agreement, most of which is in Northern Quebec, the boundaries of management units are defined based on Cree traplines. UA represent the basic territorial unit of public forest management. The calculation of allowable cut, the planning of interventions in the forest and the execution of work are carried out at the UA level.

As the Troilus Gold Corp. project is located on public forest land within the boundaries of UA 02661 (Government of Quebec, 2024b), it is subject to the LADTF.

16.1.1.9 Regulation respecting the sustainable development of forests in the domain of the State

In public forests, the Ministère des Ressources naturelles et des Forêts (MRNF) oversees forest management activities through the Regulation respecting the sustainable development of forests in the domain of the State (chapter A-18.1, r. 0.01) (RADF). In the context of the Troilus Mine project, the following activities, without limitation, are governed by the RADF: mining, deforestation, construction of a road, bridge or culvert.

16.1.1.10 Federal Policy on Wetland Conservation

Federal guidance for wetland conservation is provided by the Federal Policy on Wetland Conservation (Government of Canada, 1991), which includes the principle of no net loss of wetland functions. The federal policy applies to projects on federal lands and waters, to projects receiving federal funding, or to wetlands of international importance. Although this policy does not apply to this project, as it does not meet any of the above criteria, it will be used as guidance.

16.1.1.11 Species at Risk Act

The Species at Risk Act (S.C. 2002, c. 29) (SARA), assented to on December 12, 2002, protects federally listed species at risk and designated critical habitat. SARA is administered across Canada by Environment and Climate Change Canada (ECCC). The objectives of SARA are to prevent wildlife species from becoming extinct in Canada, to provide for the recovery of wildlife species that are

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extirpated (no longer existing in the wild in Canada), endangered or threatened due to human activity, and to manage species of special concern to prevent them from becoming endangered or threatened. The SARA includes prohibitions against killing, harming, harassing, capturing or taking individuals of species at risk, damaging or destroying residences or critical habitats, and may impose restrictions on development and construction projects likely to affect species at risk.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent body of experts, evaluates wildlife and plant species based on a wide range of scientific data. The committee meets annually to review status reports on species suspected of being at risk and provides assessments to the government and the public. The federal cabinet then decides whether these species will receive legal protection under SARA. These decisions are made after consultation with relevant stakeholders and other groups.

The SARA is implemented by the Government of Canada to protect species at risk (particularly plants for this Valued Component [VC]) in Canada and applies to wildlife species listed on Schedule 1 (Government of Canada, 2024) of SARA and their critical habitat.

16.1.2 Influence of Consultation and Engagement

From the outset of the project, Troilus engaged in an extensive consultation and communication process with various project stakeholders, as presented in Chapter 4 of the ESIA report. Where community knowledge has been made available by the Cree Nations through mobilization, information gathering and voluntary information sharing, it has been considered and incorporated into the impact assessment, where appropriate.

Table 16.1 presents the main themes and key information, Indigenous Knowledge and concerns raised by parties in relation to vegetation, riparian and wetland environments. 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 the Cree communities related to the importance of progressive revegetation using native species.

Table 16.1 Summary of key information, Indigenous Knowledge and Concerns for the Project Related to Vegetation, Wetland and Riparian Environments

Theme	Key information, Indigenous Knowledge and concerns	Influence on the Assessment	Where information is addressed in the ESIA
Vegetation and wetlands	Land users have expressed concerns about: Vegetation that has not returned to normal after reclamation of the former mine. Impacts of concentrator residue (thickened) on vegetation in the tailing storage facility (TSF). Brushing/trimming required along Troilus access road to ensure visibility, especially around curves. Land users have inquired about the possibility of progressive revegetation.	Troilus will progressively reclaim the mine site. The final closure and reclamation plan and the question of future uses of the reclaimed land will be developed later, in collaboration with government agencies, Cree communities and land users.	Sections 16.3.1.2 and 16.3.2.2
Terrestrial and avian wildlife	Restore the site with native vegetation attractive to moose and other wildlife.		Sections 16.3.1.2 and 16.3.2.2

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16.1.3 Potential Impacts, Pathways and Measurable Parameters

Table 16.2 summarizes the project's potential environmental impacts on plant communities, the measurable parameters and the reasons for their selection. These potential environmental impacts and measurable parameters were selected based on professional judgment and recent environmental assessments for mining projects.

Table 16.2 Potential Impacts, Impacts Pathways and Measurable Parameters Vegetation, Riparian and Wetland Environments

Potential Impact	Impact Pathway	Measurable Parameters and Units of Measurement
Change in the diversity of terrestrial communities and species	<p>Deforestation and soil disturbance activities may result in:</p> <ul style="list-style-type: none"> • Loss or disturbance of plant communities, including rare communities. • Loss or disturbance of species of interest to Indigenous communities. • Vehicle and machinery traffic can lead to the alteration of plant communities through the introduction of invasive alien species. 	<p>Presence and distribution of species of interest to Cree communities and invasive alien species. Abundance (number or area [ha]) of:</p> <ul style="list-style-type: none"> • Native plant communities. • Rare plant communities.
Change in the functions, connectivity and diversity of terrestrial communities and species	<p>Clearing and soil disturbance activities can result in:</p> <ul style="list-style-type: none"> • Loss or disturbance of wetlands and bodies of water (Riparian). • Change in wetland type. • Modifications to surface and groundwater flow may affect wetland and bodies of water (Riparian) functions. • Vehicle and machinery traffic can alter plant communities through the introduction of invasive alien species. 	<p>Area of wetland and riparian area lost or disturbed. Area of terrestrial vegetation removed in the zone contaminated by airborne pollution. Qualitative discussion of disturbed habitat functions.</p>

16.1.4 Boundaries

16.1.4.1 Spatial Boundaries

The spatial boundaries presented in this VC represent the areas where data were compiled/collected to enable an understanding of vegetation, wetland and riparian environments in support of project-specific impact assessment and cumulative impact assessment.

The Project Development Area (PDA) encompasses the project footprint and represents the anticipated area of physical disturbance associated with project construction, operation and

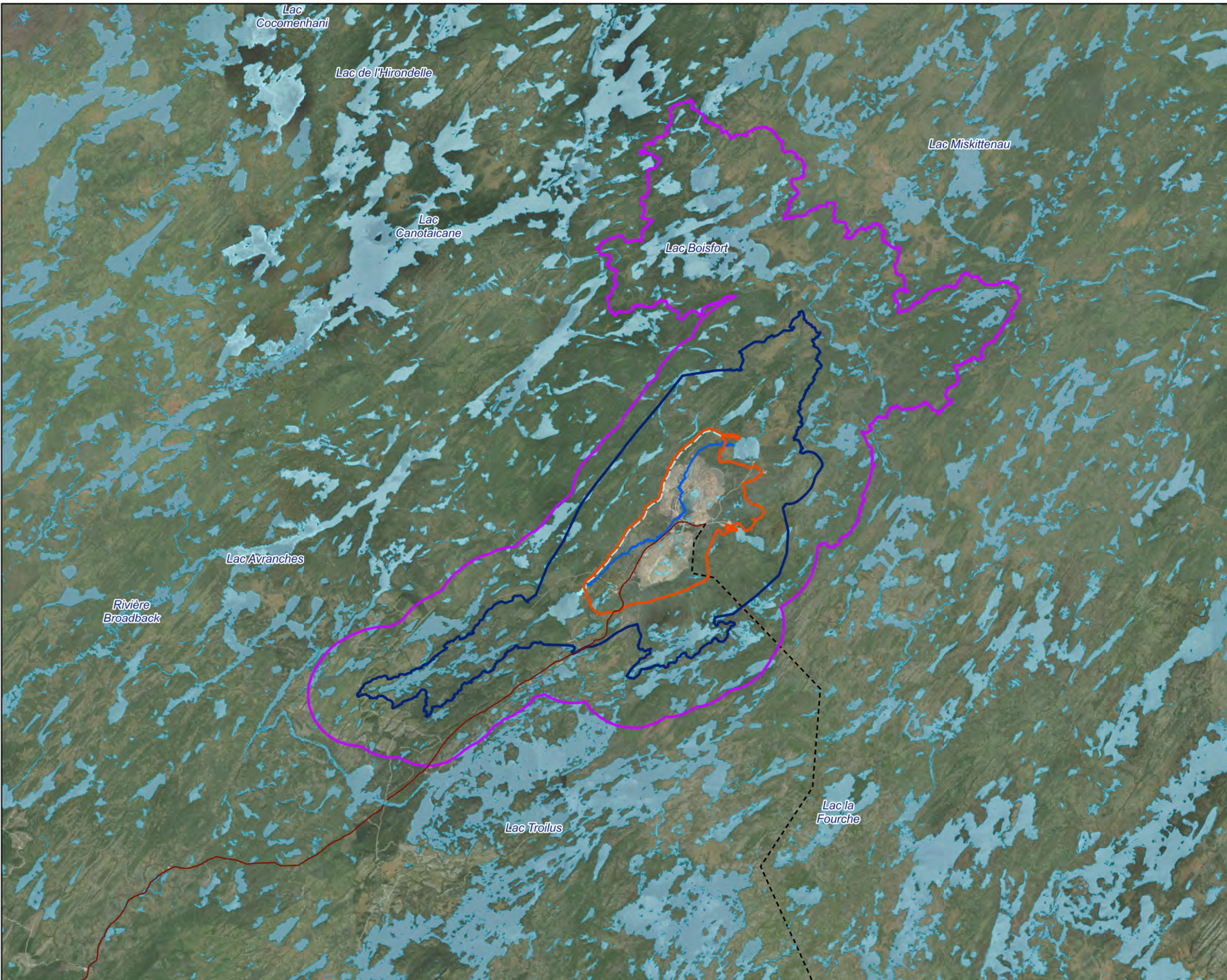
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decommissioning/closure. It covers the pits, stockpiles, tailings storage facility, industrial complexes and other mining infrastructure, as well as the relocation of the access road and power line (Map 16.1).

The Local Study Area (LSA) for vegetation, riparian and wetlands environments 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 corresponds to the area covered by the Hydrological Regime and Hydrogeology LSAs, since changes in surface and groundwater flow may affect wetlands. The LSA includes the PDA, the Boisfort Lake tributary watershed draining the PDA, the sub-watersheds crossed by the realigned mine access road and areas potentially impacted by the groundwater drawdown. The LSA is shown on Map 16.1).

The Regional Study Area (RSA) provides the context for determining the significance of project-specific impacts. It corresponds to the Hydrological Regime RSA, which includes Lac Boisfort, as well as the sub-watersheds downstream of the LSA draining into Lac Boisfort, and a 2 km buffer zone around the LSA (Map 16.1).



LÉGENDE / LEGEND

Composante de projet / Project Component

- Zone de développement du projet / Project Area
- Zone d'étude régionale / Regional Study Area
- Zone d'étude locale / Local Study Area

Infrastructure

- Ligne de transport d'énergie privée / Private Power Transmission Line

Hydrologie - GRHQ / Hydrology

- Étendue d'eau / Waterbody

Autre / Other

- Déviation du ruisseau Bibou / Bibou Creek Diversion
- Ruisseau Bibou / Bibou Creek
- Réseau routier / Road

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

RÉFÉRENCES/REFERENCES
 Base Map: Bing, 06 June 2023

NOTES

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ÉCHELLE (m) / SCALE (m)

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 végétation et des milieux humides et riverains / Vegetation, Wetlands and Riparian Study Areas

NO. PROJET / PROJECT NO. 240433/167040485	DATE 2025/ 06/ 02
CONÇU / CHECKED L. Essegnaier	RÉVISÉ / VERIFIED J. Massicotte
DESSINÉ / DRAWN R. Tulloch	Figure No. 16.1
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16.1.4.2 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, the project phases include:

- Construction (Year -3 to Year -1)
- Operation:
 - Operation phase 1 (Year 1 to Year 21): processing with ore extraction
 - Operation phase 2 (Year 22): processing without 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.

16.1.5 Residual Impacts Characterization

The characterization criteria used to assess residual impacts on vegetation, riparian and wetland environments are presented in Table 16.3.

Table 16.3 Characterization of Residual Impacts on Vegetation, Riparian and Wetland Environments

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	Long-term trend of residual impact	<p>Positive - increase in number, area or quality of vegetation communities (terrestrial, wetland and riparian), including habitat for species of interest.</p> <p>Adverse - decrease in number, area or quality of plant communities (terrestrial, wetland or riparian vegetation), including habitat for species of interest.</p>
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions.	<p>No Measurable Change – no measurable change in the impact can be noted</p> <p>Low - measurable change in the number, area (ha) or quality of plant communities (terrestrial vegetation or wetland and riparian), where the change does not threaten the long-term viability of that type of plant community in the RSA.</p> <p>Moderate - measurable change in the number, area (ha) or quality of plant communities (terrestrial and wetland/riparian), likely to affect the resilience to future change of this type of plant community in the RSA.</p>

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Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		High - measurable change in the number, area (ha) or quality of plant communities (terrestrial and wetland/riparian) relative to existing conditions, likely to threaten the long-term viability of this plant community type in the RSA.
Geographic extent	The geographical area in which a residual impact occurs.	PDA - residual impacts are limited to the PDA. LSA - residual impacts extend into the LSA. RSA - residual impacts extend into the RSA.
Timing	Considers when the residual impact is expected to occur, where relevant to the VC.	No sensitivity - seasonal does not affect the residual environmental impact on plant communities. Moderate sensitivity – timing may affect the VC during lower sensitivity period, but the effects are manageable with proper planning and mitigation measures. High sensitivity – residual effects occur during high sensitivity period.
Duration	Time required until the measurable parameter or the VC returns to its existing conditions, or the residual impact can no longer to be measured or otherwise perceived.	Short term - the residual environmental impact is limited to construction or active closure. Medium-term - the residual environmental impact extends throughout construction, operation and active closure. Long term - 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.	Single event - the residual environmental impact occurs once during the project. Multiple irregular event (no set schedule) - the residual environmental impact occurs sporadically, at irregular intervals, and is not predictable. Multiple regular event - the residual environmental impact occurs regularly, at predictable intervals or at specific timings. Continuous - 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	Reversible - the residual impact is likely to be reversed after completion and reclamation. Irreversible - the residual impact is unlikely to be reversed.

16.1.6 Significance Definition

The significance of residual impacts is determined by the following thresholds:

- No Measurable Change /low: a negative residual impact, following the application of avoidance and mitigation measures, resulting in the reduction of a small area of plant communities or on a temporary basis.

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- Moderate: a residual negative impact resulting in a reduction in the availability of species of interest to the Cree communities but not compromising access to this resource in the RSA or reducing the area of plant communities or modifying their quality, but which would not compromise their viability and the maintenance of their long-term functions in the RSA.
- High: a residual impact resulting in the loss of species of interest to the Cree communities that would compromise access to this resource in the RSA, or in the reduction of the area of plant communities or modification of their quality that would compromise their viability and the maintenance of their long-term functions in the RSA.

16.2 Existing Conditions

This section provides a summary of pre-project (pre-1996) and existing conditions for vegetation, riparian and wetland environment, as well as the methods used to characterize existing conditions. Further details are provided in the characterization reports available in Appendix G3.

16.2.1 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; consultation feedback; Indigenous Knowledge studies; and site-specific field inventories of natural heritage features and species occurrence. These sources of information are described in the following sections.

16.2.1.1 Literature review

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

- Map of occurrences of species in precarious situations from the Quebec Natural Heritage Center (CDPNQ, 2024).
- Outil potentiel¹ (MELCCFP, 2024a).
- Carte interactive de l'ensemble des aires protégées du Québec² (Government of Quebec, 2024a);
- Open maps - Critical Habitat for Species at Risk National Dataset - Canada (Government of Canada, 2022).
- Forêt ouverte : carte interactive sur les données écoforestières³ (MRNF, 2025);
- Données ouvertes - milieux humides potentiels⁴(MELCCFP, 2025);

¹ Potential Tool

² Interactive Map of Protected Areas in Québec

³ Open Forest – Interactive Map of Ecoforestry Data

⁴ Open Data – Potential Wetlands

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- Vegetation outside the field inventory area is described using the cartes écoforestières⁵ (MRNF, 2025) and MELCCFP data on potential wetlands (MELCCFP, 2025).

16.2.1.2 Field inventory

The area surveyed in the field by Wachihi Ressources (2020 and 2024) covers 57 km², essentially the Local Study Area to west of Lake PE1. Wachihi Ressources' objectives were to establish the baseline status of several components of the biophysical environment, including vegetation, wetlands and bodies of water, plant species of conservation concern, invasive alien plant species and stands of phytosociological interest.

Field validation of the presence of invasive alien plant species (EFEE) was carried out simultaneously with the other vegetation surveys, considering the list of EFEE deemed a priority by the MELCCFP (2024b).

Terrestrial vegetation

Floristic inventories were carried out in the area inventoried by Wachihi Ressources in July 2019 (50 stations) and in summer 2023 from August 22 to 29 (197 stations). The vegetation inventory, carried out during the week of July 7, 2019, focused mainly along the tributary of Lake A (PE43) and the edge of this body of water. Stations were not positioned systematically or randomly, but rather to validate the presence of wetlands and bodies of water (MHH) on the territory. Additional stations were then positioned in the terrestrial environments to be able to describe these ecosystems. It should be noted that the remaining portion of the territory (north of Lake A [PE43]) was surveyed in early summer 2024. The results will be updated when the complementary study is available.

The description of vegetation and wetlands is largely based on the results of the 3D photo interpretation and floristic inventory carried out by Wachihi Ressources in the study area. The surveys focused mainly on wetlands and riparian environments, plant species at risk and invasive alien plant species.

Wetlands

The sampling strategy (non-systematic random sampling design) was designed to achieve a higher sampling intensity in potential wetland and terrestrial habitats in the project's impact zone, where mining project components will be concentrated. In the northern portion (north of Lake A [PE43]), sampling intensity is lower due to the absence of mining components. It was this portion of the surveyed area that was the focus of additional surveys in early summer 2024 (June 26 to 29) to validate the composition of vegetation units derived from preliminary mapping.

In all, 197 floristic inventory stations were carried out in the area inventoried in 2023. The 36 stations in the northern portion will be added in 2024 to validate the presence of MHH. In 2024, additional stations have also been positioned in terrestrial environments to better describe these ecosystems. We must also consider the 1,300 validation points that were made in 2023 to specify the delimitation of MHH in the field. Basic information was taken at each of these validation points (soil, drainage, dominant vegetation, etc.)

⁵ Ecoforestry Maps

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to confirm the type of environment present (wetland, bodies of water or terrestrial). There are also the first 50 stations, which were completed in 2019 (Wachiih Ressources, 2020) and serve as support.

Depending on the year in which the inventories were carried out, the stations were based on the methods recommended in the guides "Identification et délimitation des milieux humides du Québec méridional" produced by Lachance et al. (2021) and Bazoge et al. (2015).

A decision key developed by Wachiih Ressources (2024) was used to adjust the initial diagnosis from the Lachance et al. (2021) guide to better reflect vegetation, soil and hydrological dynamics in a northern context. This decision key is presented in Appendix 2 of Wachiih Ressources (2024) (Appendix G3). Thus, in the absence of a hydromorphic mineral soil or in the presence of a folisol or fibric organic soil of non-phenic or sphagnic origin, arborescent species such as black spruce (*Picea mariana*) and tamarack (*Larix laricina*), normally considered indicative of wetlands in the southern part of the province, were not considered in the dominance calculation. Where the tree layer was non-indicative, either before or after this manipulation, a similar exercise was carried out in cases where Labrador tea (*Rhododendron groenlandicum*) was present. An absolute cover of 10% of this shrubby species, also considered a wetland indicator in the Lachance et al. (2021) guide, is sufficient in southern Quebec for the vegetation to be considered typical of wetlands. However, like black spruce, this species often grows on dry soils in the boreal forest.

16.2.2 Pre-mine conditions

According to Entraco (1993), the 77 km² study area was located within the moss spruce stand domain. The forest cover had been significantly disturbed by fire in the northern part and by logging activities in the south. Black spruce dominated the forest cover. Jack pine (*Pinus banksiana*) forests, remnants of former fires, were found throughout the well-drained sites. Intolerant hardwood stands such as White birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*), the result of disturbances such as fires and logging, were infrequent and rarely formed large areas.

Approximately 70% of Entraco's (1993) study area is thought to have suffered a forest fire in 1969.

Formations dominated by balsam fir (*Abies balsamea*) were rare, occurring almost exclusively in the southern part of the study area on rich, well-drained sites. Peatlands occupied large areas in the first two-thirds of the study area. Alder thicket generally formed thin linear strips along the edges of watercourses.

16.2.3 Existing conditions

16.2.3.1 Regional context

The LSA is in Nord-du-Quebec region, in the spruce-moss bioclimatic domain, in the closed boreal forest subzone between latitudes 48°N and 52°N (Government of Quebec, 2022). The vegetation cover is predominantly composed of coniferous forests, with black spruce being the dominant species. The most representative forests are the black spruce-moss and ericaceous forests and the black spruce-fir-moss forests. The former, almost always established after a fire, have a dense ericaceous shrub canopy. The

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latter are a mixture of black spruce and balsam fir, often with the addition of white birch. Both have moss-covered soils.

16.2.3.2 Terrestrial vegetation

Terrestrial vegetation covers some 67% of the total area of the surveyed zone (Table 16.4), and 69% in the LSA (Map 16.2). These are mainly coniferous stands, dry bares, mixed stands and regenerating stands, but there are also a few hardwoods stands. Anthropogenic environments have also been identified, mainly associated with the former mine site, access roads and borrow pits. Detailed data collected at each station are presented in the form of characterization sheets in the Wachihih Ressources (2024) report (Appendix G3).

Table 16.4 Summary of terrestrial environments in the surveyed area and the LSA

Type	Sub-type	Inventoried area		Local Study Area	
		Surface area (ha) ¹	Proportion (%)	Area (ha) ²	Proportion (%)
Softwood stands	Mature ³	1 589,02	27,0	3 576,21	33,6
	Young ⁴	176,32	3,0	507,77	4,8
Hardwood stands	Mature ³	25,76	0,4	42,72	0,4
	Young ⁴	2,14	<0,1	2,14	<0,1
Mixed stand	Mature ³	300,28	5,1	372,90	3,5
	Young ⁴	45,72	0,8	121,34	1,1
Regenerating stand (0 to 20 years) ⁵	-	324,30	5,5	947,78	8,9
Dry bare	-	625,30	10,6	924,04	8,7
Anthropogenic environment ⁶	-	833,90	14,2	844,72	7,9
Total terrestrial environments	-	3923,7	66,6	7304,86	69,0
Wetlands	-	1128,70	19,7	1756,013	16,5
Water of bodies	-	838,05	14,2	1524,722	14,3
Not determined	-	1	<0,1	8,78	<0,1
Total area	-	5 890,04	100,00	10 629,13	100,00

Notes:

1 From Wachihih Ressources 2024

2 From Wachihih Ressources 2024, MRNF 2025 and MELCCFP 2025

3 Mature stands: 41 years and older.

4 Young stand: 21 to 40 years old

5 Regenerating stands include recent cuttings and plantations 20 years old or less.

6 Anthropogenic environments include mine reclamation areas, roads and borrow pits.

Softwood stands occupy almost a third (27%) of the total area of the inventory zone. The largest areas are concentrated in the eastern portion of the Local Study Area. These are black spruce, jack pine and undifferentiated softwood stands.

Mixed stands (6%) tend to be scattered throughout the survey area. The largest areas are concentrated near the western and southeastern limits of the survey area. Mixed stands are dominated by black spruce and white birch, with tree crown cover varying from 20% to 85% (average 60%).

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Hardwood stands are rather rare in the Local Study Area, representing 0.4% of the surveyed area. They are concentrated mainly in the southern part of the study area. These are mainly white birch forest on the southern slopes of small hills. The plant community is much more diverse than that found in the other terrestrial environments in the survey area. The tree layer (85% cover) is dominated by white birch, with occasional American Mountain-ash (*Sorbus americana*) and black spruce.

Regenerating stands (6%) comprise forest stands and plantations less than 20 years old. They are mainly located in recently logged areas in the Lac Amont sector (PE2). These stands are located in the Coupe avec protection de la régénération et des sols uniformes⁶ (CPRS-U) area, in (which were carried out in 2017. Black spruce planting was subsequently carried out in 2020. The vegetation is characterized by the virtual absence of a tree layer, except at one site (station S13) where it is present (40% cover) and represented by black spruce and white birch.

Dry bares, accounting for 11% of the area surveyed, are terrestrial environments where forest regeneration is difficult to establish. It is mainly the impact of the 1962 forest fire (MFFP, 2017), combined with xeric soil conditions and the more rigorous climatic conditions at this latitude, that is responsible for the presence of dry bares lands in the study area. Significant concentrations of this type of environment are found east of the tailings storage facility, south of Lake A, north and west of the J4 pit, and around Lake PE50 (A2). Vegetation is generally characterized by patches or scattered stems of black spruce or jack pine (*Pinus banksiana*), as well as a ground cover of ericaceous plants and lichens. Rock also outcrops in several places.

Anthropogenic environments cover 14% of the inventoried area. They mainly include mine reclamation areas, access roads, forestry roads and borrow pits. The site of the former Troilus mine has been undergoing reclamation since 2011. Reclamation of the site includes revegetation work in the tailing storage facility, as well as in the waste rock and overburden piles. Revegetation is generally good, with some sites showing weaker recovery.

Exceptional forest ecosystems

Exceptional forest ecosystems (EFE) protected under the *Sustainable Forest Development Act* include rare forests, old-growth forests and refuge forests. According to the carte interactive des aires protégées au Québec of the MELCCFP (Government of Quebec, 2024a), the Regional Study Area does not include any EFE.

According to Troilus' 2019 consultations with land users (tallymen M-40 and M-34), no old-growth forests have been identified by land users because of forest fires in the project area.

Geomatic queries based on the Ministère des Forêts, de la Faune et des Parcs (MFFP) carte écoforestière of 2017 (4 th Decennial inventory) conducted by Wachiih Ressources (2024) confirm the presence of old-growth forest stands in the study area. With a total area of 514.51 ha, these old-growth stands are mainly located south of the tailing storage facility and around Lac Amont but are also found in the western and northern portions of the study area (Wachiih Ressources, 2024: map in Appendix 1). The following age classes were considered by Wachiih Ressources (2024): 70 (61 to 80 years), 90 (81 to 100

⁶ cutting areas with protection of regeneration and uniform soils

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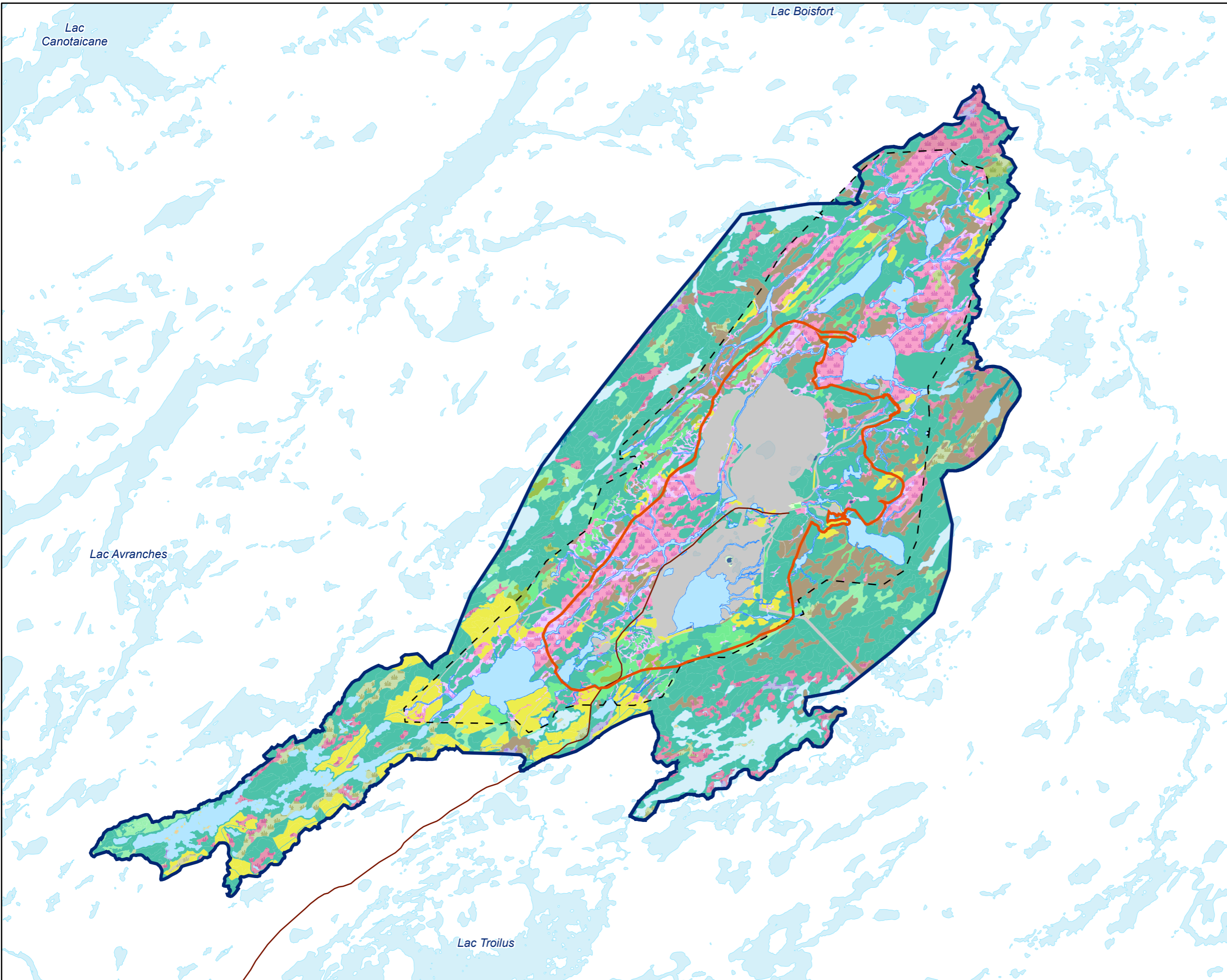
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years), 120 (101 years and older), uneven-aged old ([VIN], over 80 years) and irregular old ([VIR], over 80 years) (MFFP, 2015). Age class 70 was included in the exercise, as the ecoforest map already dates back to 2014 in this sector.

Forest stands of phytosociological interest

Analysis of the forest stands of phytosociological interest (PFIPs) carried out by Wachiih Ressources (2024) using the Hydro-Québec method (NOVE Environnement, 1990) reveals the presence of eight PFIPs, totalling 27.49 ha, scattered along the southwestern and eastern boundaries of the inventory area, five of which are located within the PDA. These are mature white birch forests. The tree layer (85% cover) is dominated by white birch, with occasional American mountain-ash and black spruce. The shrub layer (35-70% cover; average 46%) is more diversified and is mainly represented by Green Alder (*Alnus viridis* ssp. *crispa*), Common Winterberry (*Ilex verticillata*), Sheep Laurel (*Kalmia angustifolia*), black spruce, Serviceberry (*Amelanchier* spp.), American mountain-ash and Lowbush Blueberry (*Vaccinium angustifolium*). Finally, the non-woody stratum (40-75% cover; average 55%) is dominated by Stiff club-moss (*Spinulum annotinum* subsp. *annotinum*), Canadian Bunchberry (*Cornus canadensis*) and yellow clintonia (*Clintonia borealis*). The soil in hardwood stands has an organic horizon on the surface, considered to be forest humus, varying in thickness from 3 to 13 cm. Beneath this thin layer of organic matter, a mineral horizon with a sandy and sometimes loamy texture is present.

Rock is also found at a depth of 35 cm in the stand west of pit J4. These soils are typical of podzols. Drainage is good (class 2) and the groundwater has not been reached in any of the profiles surveyed. The soil in these environments is not hydromorphic. At the LSA scale, white birch forest over 50 years old cover an area of 18 ha, and 231 ha at the RSA scale.



LÉGENDE / LEGEND

Composante du projet / Project component

- Zone de développement du projet / Project development area
- Zone d'étude locale / Local study area
- Zone inventoriée / Sampled Area - Wachihih

Milieu humide / Wetland

- Étang / Pond
- Marais / Marsh
- Marécage arborescent / Wooded swamp
- Marécage arbustif / Shrub swamp
- Tourbière boisée / Wooded peatland
- Tourbière ouverte indifférenciée
- Tourbière ouverte minérotrophe / Open fen
- Tourbière ouverte ombrotrophe / Open bog

Milieu terrestre / Terrestrial environment

- Anthropique / Anthropic

Dénudé humide / Humid bare

- Dénudé sec / Dry bare

Île / Island

- Peuplement en régénération / Regenerating stand
- Peuplement feuillu / Hardwood stand
- Peuplement mixte / Mixed stand
- Peuplement résineux / Softwood stand

Hydrologie-zone inventoriée / Hydrology in the Sampled Area - Wachihih

- Littoral / Body of water
- Rive / Bank

Hydrologie / Hydrology - GRHQ

- Étendue d'eau / Lake

Autre / Other

- Réseau routier / Road network

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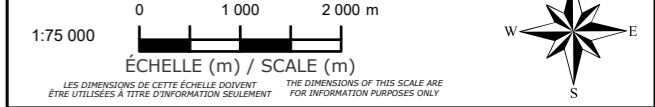
RÉFÉRENCES/REFERENCES

1. Système de coordonnées / Coordinate system : NAD 1983 CSRS UTM Zone 18N. 2. Composante du projet / Project component : Stantec, 2025. 3. Milieu humide / Wetland : Wachihih (2024) et Ministère de la Lutte contre les changements climatiques, Faune et Parcs (MELCCFP, 2025). 4. Milieu terrestre / Terrestrial environment : Wachihih (2024) et Ministère des Ressources naturelles et des Forêts (MRNF, 2025). 5. Hydrologie des zones d'études / Hydrology of the study areas : Wachihih (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

Végétation, milieux humides et riverains dans la zone d'étude locale / Vegetation, Wetlands and Riparian Environments in the Local Study Area

NO. PROJET / PROJECT NO. 240433/167040486	DATE 2025/ 05/ 28
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16.2.3.3 Wetlands

The LSA is located in the Mistassini Highlands Natural Province. According to the *Plan régional de conservation des milieux humides et de leurs terres hautes adjacentes* in Nord-du-Quebec region (Ducks Unlimited Canada, 2009), this territory has 603,766 ha of unclassified wetlands, largely dominated by peatlands, which often occupy vast areas. Wetlands account for 7.3% of the upland area and 15.7% of wetlands in Nord-du-Quebec region. Wetlands are mainly of the peatland type and are concentrated in the central and southeastern parts of the territory. The landscape is predominantly forested (80% of the territory), including moss spruce and lichen spruce in its northern portion. Heathland is present in places. This area is prone to fire. The main pressures on these environments are mining activities and the road network.

The inventoried area includes a variety of wetlands typical of northern environments. Wetlands are also represented by a number of swamps, marshes and ponds. Overall, wetlands occupy 1,128.25 ha, corresponding to 19.2% of the total area surveyed (Table 16.4). Peatlands alone account for 99.1% (1,180.0 ha) of all wetlands inventoried (Table 16.5). Many of these form complexes. Two major peatland complexes have been identified, one between Lac Amont (PE-2) and the former mine site tailings area, and the other around lakes A (PE43), PE48 and PE50.

Table 16.5 Summary of wetlands in the inventoried area and in the LSA

Type	Sub-type	Inventoried area ¹		Local Study Area ²	
		Area (ha)	Proportion (%)	Area (ha)	Proportion (%)
Bog	Forested peatland	379,80	6,5	439,3	4,1
	Open bog	720,10	12,2	1075,7	10,2
	Open fen	18,05	0,3	43,5	0,4
	Undifferentiated open peatland	0,0	0,0	5,6	0,1
Swamp	Forested Swamp	2,05	0,3	166,9	1,6
	Shrubby Swamp	1,50	0,3	17,8	0,2
Marsh	-	4,30	< 0,1	4,30	< 0,1
Pond	-	2,45	< 0,1	2,45	< 0,1
Total wetlands		1 128,25	19,2	1 748,8	16,5
Total area		5 890,04	100,00	10 594,38	100,00

Notes:

¹From Wachiih Ressources (2024).

²From Wachiih Ressources (2024) and MELCCFP (2025).

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Ponds, occupying 2.45 ha in the inventoried area, are concentrated within or along the boundaries of the former mine site. They are open stretches of water, isolated or hydrologically connected to watercourses, with a depth at low water of less than 2 m. They were formed during the mine's operation or reclamation phase. In general, aquatic and riparian vegetation is sparse and dominated by broad-leaved cattail (*Typha latifolia*), floating bur-reed (*Sparganium fluctuans*) and soft rush (*Juncus effusus*).

Marshes, totalling 4.3 ha, are scarce in the surveyed area, and are concentrated mainly west of the southern end of pit 87, just north of the exploration camp site, and finally in the eastern part of the tailing storage facility. Most are of anthropogenic origin.

Shrubby swamps occupy only 1.5 ha of the surveyed area. They are found within the boundaries of the former mine site, along the eastern edge of the tailing storage facility and northwest of pit 87. A forested swamp, totalling 0.8 ha, is found in the former mine site, more precisely between the area of the pits and the tailings storage facility.

Open peatland occupy 720.1 ha of the inventoried area. Very large open peatlands are found in the southern portion, on either side of Bibou Creek, and to the north in the area of lakes A (PE43), PE48 (A1) and PE50 (A2). These are mainly ombrotrophic peatlands (bogs), i.e., their main source of water and mineral elements is atmospheric precipitation. Their flora is dominated by sphagnum and ericaceae. A few minerotrophic peatlands (fens) have also been identified. These peatlands are supplied with water and mineral elements by both precipitation and circulating water, which is enriched with minerals on contact with the surrounding soils. They are generally characterized by a more varied flora of mosses and cyperaceae. Some of these peatlands are even patterned or contain pools. Patterned peatlands are composed of elongated pools separated by mounded strips.

Forested peatland, with a surface area of 379.8 ha, are scattered throughout the survey area. Generally speaking, the forested peatlands identified have not been disturbed. They are generally low-density black spruce stands with a shrub understory of black spruce, speckled alder (*Alnus incana subsp. rugosa*) and ericaceae.

Ecological functions of wetlands and bodies of water (riverbanks)

Ecological functions, as described by the Act to affirm the collective nature of water resources and promote better governance of water and associated environments (chapter C-6.2), and their insertion in the project context are presented below and are taken from Wachiih Ressources (2024).

By retaining and evaporating a portion of rainwater and meltwater, wetlands and bodies of water regulate water levels, reducing the risk of flooding and erosion, and helping to recharge the groundwater. Data collected during floristic inventories indicate that 79% of stations in wetlands (isolated or riparian) were characterized by soil that was flooded or saturated with water in the first 30 centimetres. It is likely that most wetlands in the area surveyed perform this function to varying degrees, buffering the flow of watercourses in the watershed. More locally, riparian wetlands are particularly important in this respect, as they border or are at the head of the watercourses identified in the inventoried area.

Wetlands and water of bodies act as pollution filters, preventing and reducing pollution from surface and groundwater. They also help to reduce the input of sediment from soils by acting as a bulwark against

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erosion and retaining sediment. Wetlands along or near watercourses in the inventory area filter water by capturing sediments that are transported (Hanson et al., 2008).

Wetlands and bodies of water also play a role in conserving biological diversity, as they are important habitats for many species of flora and fauna. Connectivity with other natural environments enables, among other things, the movement of fauna and the dispersal of flora, which contributes to genetic diversity. Among other things, they provide habitats for feeding, sheltering and breeding wildlife. In some areas, wetlands provide temporary water pools for insect hatching. Chiropterans mostly hunt near waterbodies at dusk (Prescott and Richard, 2014). Insectivorous birds also benefit. Other bird species, such as waders and waterfowl, are dependent on wetlands.

Wetlands and bodies of water also act as natural sunscreens and windbreaks, maintaining vegetation to protect water from overheating and soil and crops from wind damage. These functions, mainly associated with wooded environments (forested peatland and forested swamps), but also with certain shrubby environments (shrubby open peatland), are more pronounced with regard to the warming of watercourses for riparian or adjacent wetlands. However, their role as natural windbreaks is limited, given the absence of cultivated land and residences in the surveyed area.

The carbon sequestration function is performed primarily by peatlands, which are characterized by slow productivity and have the capacity to store carbon over the long term, even several thousand years (Rydin and Jeglum, 2013; Garneau and Van Bellen, 2016). Peatlands cover 1,219.4 ha, or 21.3% of the total area inventoried.

By enabling the conservation of an area's natural character and associated landscape attributes, wetlands and bodies of water contribute to the quality of the landscape and thus to the value of neighboring land. The Nord-du-Quebec region is well endowed with wetlands like those in the inventoried area. These are not unique to the regional landscape.

16.2.3.4 Riparian Wetlands and Riverbanks

Shoreline vegetation

The shoreline of watercourses and bodies of water covers a total area of 614.3 ha in the inventoried zone (Wachih Ressources, 2024). A total of 45 inventory stations were set up in these bodies of water. These stations in the littoral are divided into the following plant communities: one in marshes, eight in shrubby swamps, six in forested peatland and 30 in open peatlands.

Shoreline vegetation varies according to the type of riparian wetland encountered. Tree cover is dominated by black spruce, tamarack and occasionally jack pine. The shrub layer is mainly represented by Speckled alder, Leatherleaf (*Chamaedaphne calyculata*) and Sweet gale (*Myrica gale*). Labrador tea and black spruce have also been observed. The non-woody stratum is often dominated by Sphagnum Moss, Bluejoint reedgrass (*Calamagrostis canadensis*), Few-seeded Sedge (*Carex oligosperma*) and Woolly Sedge (*Carex pellita*).

Shoreline soils were considered hydromorphic at 84% of Wachih Ressources stations (2024). Characterized soils are in most cases covered by a surface organic deposit, mainly mesic or humic,

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varying in thickness from 1 to over 120 cm. Mineral soils generally have a sandy or loamy texture, with a matrix at the organomineral interface.

Riparian vegetation

Riverbanks widths of 10 or 15 m were determined using geomatic queries based on the slope and bank height of streams and waterbodies in the inventory area (Wachiih Ressources, 2024). The banks of watercourses and waterbodies cover a total area of 223.75 ha in the inventory zone. The riverbanks are divided into the following plant communities: shrubby swamps, forested swamps, open peatlands, forested peatlands, softwood stands, mixed stands and anthropogenic environments, which are described in the preceding sections.

16.2.3.5 Floristic Species with Conservation Concern

Consultation of the carte interactive du Centre de données sur le patrimoine naturel du Québec (CDPNQ 2024) revealed no occurrences of plant species with conservation concern. An 8 km buffer zone was applied to the boundaries of the Regional Study Area.

The interactive map of the Government of Canada's Critical Habitat for Species at Risk National Dataset (2022) was also consulted. No critical habitat for plant species at risk is mapped within the RSA.

The results of using the MELCCFP *Potential* tool (2024) indicate that 38 plant species are likely to be present in the habitats mapped in the inventoried area (Appendix G3). This list includes 26 species belonging to the bryophyte group (non-vascular plants such as mosses) and 12 species belonging to the embryophyte group (vascular plants). Two of these species are designated as threatened in Quebec under the LEMV. These are the Geyer's yellow monkeyflower (*Eryhranthe geyeri*) and the southern Twayblade (*Neottia bifolia*), both of which are embryophytes. The other 36 species are likely to be designated as threatened or vulnerable. A species is likely to be designated as threatened or vulnerable when the information available suggests that it is at risk and requires special attention. The list of these species is determined by a ministerial order published in the official gazette of Quebec.

Based on specialized literature and a review of favorable habitats, Wachiih Ressources (2024) indicates that 11 plant species with conservation concern have a potential presence deemed significant in the inventoried area. These species are all likely to be designated as threatened or vulnerable (ESDMV) in Quebec (table 16.6). No species at risk (federal status) is listed.

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Table 16.6 Floristic species with conservation concern with a potential of presence deemed significant in the surveyed area

English name	Latin name	Status			Preferred habitat of the species
		LEMV1	SARA2	COSEWIC ³	
Orange Agoseris	<i>Agoseris aurantiaca</i> var. <i>Aurantiaca</i>	Susceptible ⁷	None	None	Grassy slopes to wet meadows at medium to high altitudes
Brown-edged pussytoes	<i>Antennaria rosea</i> subsp. <i>confinis</i>	Susceptible	None	None	Mesic to dry slopes, fluvial terraces and open forests, rocky outcrops, from plains to alpine zones
Calypso	<i>Calypso bulbosa</i> var. <i>americana</i>	Susceptible	None	None	Pure cedar stands, Cedar-larch on-peat stands, Fir-white spruce, Fir-white birch and Fir-black spruce stands, black spruce on moss stands; always on calcareous sites.
Richardson's sedge	<i>Carex richardsonii</i>	Susceptible	None	None	Dry rocky slopes and forests of the mountainous region. Sun; sandy or rocky soil; meadows, open woods, cliffs, moors, forest edges
Striped coralroot	<i>Corallorhiza striata</i> var. <i>striata</i>	Susceptible	None	None	Coniferous or mixed forests and peat cedars; almost exclusively on limestone or dolomite
Ojibway waterwort	<i>Elatine ojibwayensis</i>	Susceptible	None	None	Riparian; river or stream banks, in shallow water or on periodically exposed substrate, marshes
Limestone swamp bedstraw	<i>Galium brevipes</i>	Susceptible	None	None	Fens, riverbanks, lakeshores, swamps
Nahanni Oak Fern	<i>Gymnocarpium continentale</i>	Susceptible	None	None	Cliffs, ridges or cornices, slopes and rocky slopes; high pH (basic) soils.
Little tree willow	<i>Salix arbusculoides</i>	Susceptible	None	None	Lakeshores, stream banks and fens
McCalla's willow	<i>Salix maccalliana</i>	Susceptible	None	None	Wet meadows, open forests, shrubby or wooded fens and bogs, marly or stony banks
False mountain willow	<i>Salix pseudomonticola</i>	Susceptible	None	None	Forested fens and bogs, floodplains

Notes:

¹ LEMV status: according to the act respecting the conservation and development of wildlife refers to species designated as threatened or vulnerable.

² SARA status: according to Schedule 1 of the Species at Risk Act.

³ COSEWIC status: as assessed by the Committee on the Status of Endangered Wildlife in Canada.

⁷ Likely to be designated

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No plant species at risk were observed in the inventoried area during floristic inventories conducted from August 22 to 29, 2023 (Wachiih Ressources, 2024). The same was true of the floristic inventories carried out from July 8 to 12, 2019 (Wachiih Ressources, 2020).

An additional inventory was carried out from June 25 to July 2, 2024, to confirm the presence of spring-flowering species with conservation concern, including orchids associated with peaty environments. No species with conservation concern were observed.

16.2.3.6 Invasive Alien Plant Species

One EFEE, reed canarygrass (*Phalaris arundinacea*), was observed in the tailing storage facility. The species is currently not very abundant (a few clumps of 1 m²) (Wachiih Ressources, 2020). This species is not considered a priority by the MELCCFP (2024 b). The EFEE is considered a priority in terms of control efforts (prevention, detection, monitoring and control) and mitigation measures.

16.2.3.7 Species or Communities of Importance to the Cree Communities

The study area is used by land users to harvest plant species, mainly berries. Each trapline is used differently.

In trapline M34, traditional medicinal plants such as tree bark (species unknown), tamarack and Labrador tea are harvested. However, the harvest is not located near the project area. Community members also harvest blueberries, mainly near forest roads. One land user mentioned that the vegetation used to revegetate the Troilus mine site (former operations) (mainly grasses) was not favourable to moose. Willows would be preferred to encourage the return of this species.

Within the M39A trapline, blueberries are harvested everywhere. Cranberries are also harvested on the southwestern shore of Lac Robineau, in the southwestern part of the trapline.

16.3 Project interactions with vegetation, Riparian and Wetland Environments

Table 16.7 identifies, for each potential impact, the activities likely to interact with the VC and result in the identified impact. These interactions are indicated by a check mark or dash and are discussed in detail in section 16.4, in the context of impacts pathways, standard and project-specific mitigation/enhancement measures and residual impacts.

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Table 16.7 Project interaction with Vegetation, Riparian and Wetland Environment

Physical Activities	Potential impacts	
	Change in diversity of terrestrial communities and species	Change in wetland and riparian cover and function
Construction		
Labour, equipment and materials transport to the site.	-	-
Vehicles and equipment operation and maintenance within the PDA.	√	√
Tree cutting, vegetation clearing, soil striping and earthworks.	√	√
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 tailing 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.	-	-
Purchases of goods and services.	-	-
Employment and expenditures.	-	-
Operation		
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.	√	√
Management of waste materials, including hazardous waste.	-	-
Purchases of goods and services.	-	-
Employment and expenditures.	-	-
Decommissioning and Closure		
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.	-	-
Pits flooding, surface and groundwater management.	-	√

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Physical Activities	Potential impacts	
	Change in diversity of terrestrial communities and species	Change in wetland and riparian cover and function
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	-	-

Notes:

√ = potential interaction

- = no interaction

Project activities and construction works that do not have the potential to have a measurable interaction with vegetation, riparian and wetland environments are not considered in the remainder of the assessment. A rationale for non-interacting impacts is provided below by project activity.

The transportation of labour, equipment and goods to the site is unlikely to interact with vegetation, riparian and wetland environments, as it will take place on existing roads. Similarly, residual materials will be managed in the existing in trench landfill on the mine site or transported by land to the technical landfill site in Chibougamau.

Activities during the operation and closure phases that have the potential to interact with vegetation, riparian and wetland environments are those that may have indirect impacts (modification of surface and groundwater flow) or reclamation and revegetation activities. Other activities will take place in anthropized areas during construction.

The purchase of goods and services, as well as employees generated by the project, will not interact with vegetation, riparian and wetland environments since these activities are not physical in nature.

16.4 Assessment of Residual Impacts on Vegetation, Riparian and Wetland Environments

16.4.1 Change in diversity of terrestrial communities and species

This section describes the project's pathways, mitigation measures and anticipated residual impacts related to changes in plant community and terrestrial species diversity. Change in plant communities and species diversity is quantified by overlaying project boundaries with plant and community occurrence data, based on field inventories, publicly available data and mapping results.

16.4.1.1 Project Pathways

Deforestation and vegetation clearing in the PDA during the construction phase can potentially result in the loss of plant species important to the Cree as well as rare plant communities that may exist in the PDA. No plant species with conservation concern have been observed in the PDA.

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Vegetation clearing may also cause indirect edge impacts that may affect -important plant species for Cree Communities or rare plant communities adjacent to the PDA through changes in light, moisture and hydrology. These impacts may occur within the LSA.

Vegetation clearing can also cause habitat fragmentation by isolating or separating stands. These fragmentations can modify the reproductive and propagation cycles of species, thus influencing the species composition and density of plant communities in the remaining plots.

During operation, maintenance of facilities and infrastructure may include activities such as clearing brush and pruning trees within the project footprint. This can affect plant communities of interest by repeatedly impacting communities adjacent to the project footprint (maintained in an herbaceous or shrubby state).

Project activities, including the use of vehicles and equipment during the construction, operation and closure phases, have the potential to introduce or spread invasive alien plant species. In addition, the use of vehicles and equipment may also cause edge impacts on plant species important to the Cree Nations adjacent to the project footprint due to fugitive dust emissions and the potential introduction or spread of invasive plants. Invasive alien plant species are a management concern, as they have the potential to reduce biodiversity in the region, can supplant native species, affect ecosystem structure and function, and can have economic impacts (e.g., the cost of managing invasive alien plant species).

16.4.1.2 Mitigation and Enhancement Measures

The following mitigation measures have been incorporated into the project design and/or are proposed to avoid or reduce project-related impacts on plant communities:

- Progressive clearing of areas required for operations (as required).
- Mark clearing limits prior to site preparation to keep clearing activities within the approved project area.
- Limit machinery traffic to work areas.
- Avoid rutting and soil compaction, which limit surface water runoff and infiltration into the soil, by using vehicles adapted to the bearing capacity of the soil, and by avoiding driving on wet soils.
- Develop and implement an erosion and sediment control plan.
- Prevent the introduction of invasive alien species, ensuring that construction equipment used on the mine site is cleaned of mud, animals and plant fragments before arrival.
- Avoid unnecessary traffic in areas where EFEEs are present, to avoid spreading them over the territory.
- Progressively revegetate disturbed areas within the project area to reduce the risk of colonization of disturbed areas by invasive alien plant species.
- Implement dust suppression measures to reduce dust generation and deposition on vegetation adjacent to project activities.
- Allow time to Cree land users to harvest plant species of interest in the project area.

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- At the end of construction work, reprofile disturbed surfaces and seed work areas with a seed mix free of invasive alien species and containing seeds of native species appropriate to the hardiness zone, thus avoiding the establishment of invasive alien plant species and accelerating the revegetation process.
- Progressive restoration and rehabilitation of the site for various facilities such as the tailing's storage facility, certain waste rock piles and open pits. The various facilities will be restored and revegetated at the end of their operations to facilitate the final restoration of the site.
- Incorporate plant species of importance to the Cree into reclamation planning, if habitat is deemed appropriate.
- The final closure and reclamation plan and the question of future uses of the reclaimed land will be developed later, in collaboration with government agencies, Cree communities and land users.
- Use stockpiled unconsolidated deposits (overburden piles) to progressively rehabilitate waste rock and tailings piles.
- Integrate rare plant communities into reclamation planning, if habitat is deemed appropriate.

16.4.1.3 Project Residual Impact

Characterization of residual impacts on terrestrial plant species, including plant species at risk, plant species of interest to the Cree Nations and invasive alien species, is provided for the construction, operation and closure phases of the project.

No plant species at risk have been identified in the project area. Consequently, no loss or alteration of plant species at risk is anticipated as a result of vegetation clearing and ground disturbance associated with the project.

Construction

Plant species of interest to the Cree Communities

Site preparation and clearing during construction will result in the direct loss of plant species important to Indigenous nations. No change in the region's vegetation species richness is expected as a result of project construction, as the species that have been identified in the PDA are common and widely distributed in the region and are expected to be present and persist in the LSA and RSA. Edge impacts are expected after site clearing during construction. Edge impacts are likely to differ according to species' habitat requirements. Shade-intolerant species are likely to increase in abundance near edges, while shade-dependant species are likely to decrease in abundance. Changes in temperature and wind (microclimates) can also lead to warmer, drier conditions in areas close to the edges of new forests. As a result, species composition may change over time to adapt to different conditions.

Invasive alien species

Project activities during construction and operation can potentially lead to the introduction and spread of invasive alien plant species, which could have an impact on native plant and ecological communities. One invasive alien species (reed canarygrass) is listed in the PDA. It is possible that such activities could

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spread this invasive alien species, or that additional species could be brought to the site through the transport of construction equipment and spread through soil movement and disturbance. However, mitigation measures to reduce the risk of introducing invasive alien plant species are well known and will be implemented as part of the mitigation measures for the project. If invasive species are introduced to the site, standard mitigation measures to control them will be implemented.

Stand of Phytosociological Interest

Site preparation and clearing during construction will result in the direct loss of around 5 ha of stands of phytosociological interest. These stands are mature White birch forest. They are characterized as phytosociologically interesting because they are stable, evolved and rare stands based on age, species longevity and frequency of occurrence in the region (Nove Environnement inc., 1990).

White birch forest in the RSA covers a minimum area of 309 ha. The northern portion of the LSA is not covered by the ecoforestry map (MRNF, 2025). The presence of these stands is mainly (90%) associated with the forest fires of 1962 and 1993. Approximately 231 ha are mature stands. The project would therefore impact 2% of these stands in the RSA. Younger White birch stands (10- to 30-year age class), and old uneven-aged stands are present in the RSA, covering an area of around 106 ha, or 34% of the White birch stands. This stand is therefore regenerating in the RSA.

Habitat fragmentation

Site preparation and clearing during project construction will result in an anticipated direct loss of approximately 703 ha of natural terrestrial environments, or about 11% of the LSA's terrestrial environments (Map 16.3, Table 16.8). Much of the project's encroachment is already in anthropogenic environments (about 788 ha). The biggest loss of terrestrial natural environments will be softwood stands, at around 478 ha, followed by dry bares environments, at around 103 ha. Smaller amounts of mixed stands (approx. 62 ha), regenerating stands (approx. 55 ha) and hardwood stands (approx. 5 ha) will also be removed during construction. The plant communities impacted are representative of the vegetation in the LSA, with proportions of encroachment to area in the LSA ranging from 11.1% to 12.5%, except for regenerating stands, which are less present in the PDA (5.8%). These area losses will reduce the size of the remaining terrestrial communities and lead to habitat fragmentation, which may have an indirect impact on flora and fauna. Other indirect edge impacts could affect terrestrial vegetation and further reduce community size. The indirect edge impacts of construction in the PDA could extend into the LSA with changes in light, wind and hydrology.

Table 16.8 Permanent project encroachment on terrestrial plant communities in the LSA

Plant community	Total LSA area (ha)	Area of encroachment (ha)	Proportion of encroachment (%)
Softwood stands	4 049,22	478,1	11,8
Hardwood stands	44,86	5,2	11,6
Mixed stand	494,24	61,8	12,5
Regenerating stand (0 to 20 years)	947,78	55,1	5,8
Dry bare	924,04	102,7	11,1
Total terrestrial vegetation	6 460,14	702,9	10,9

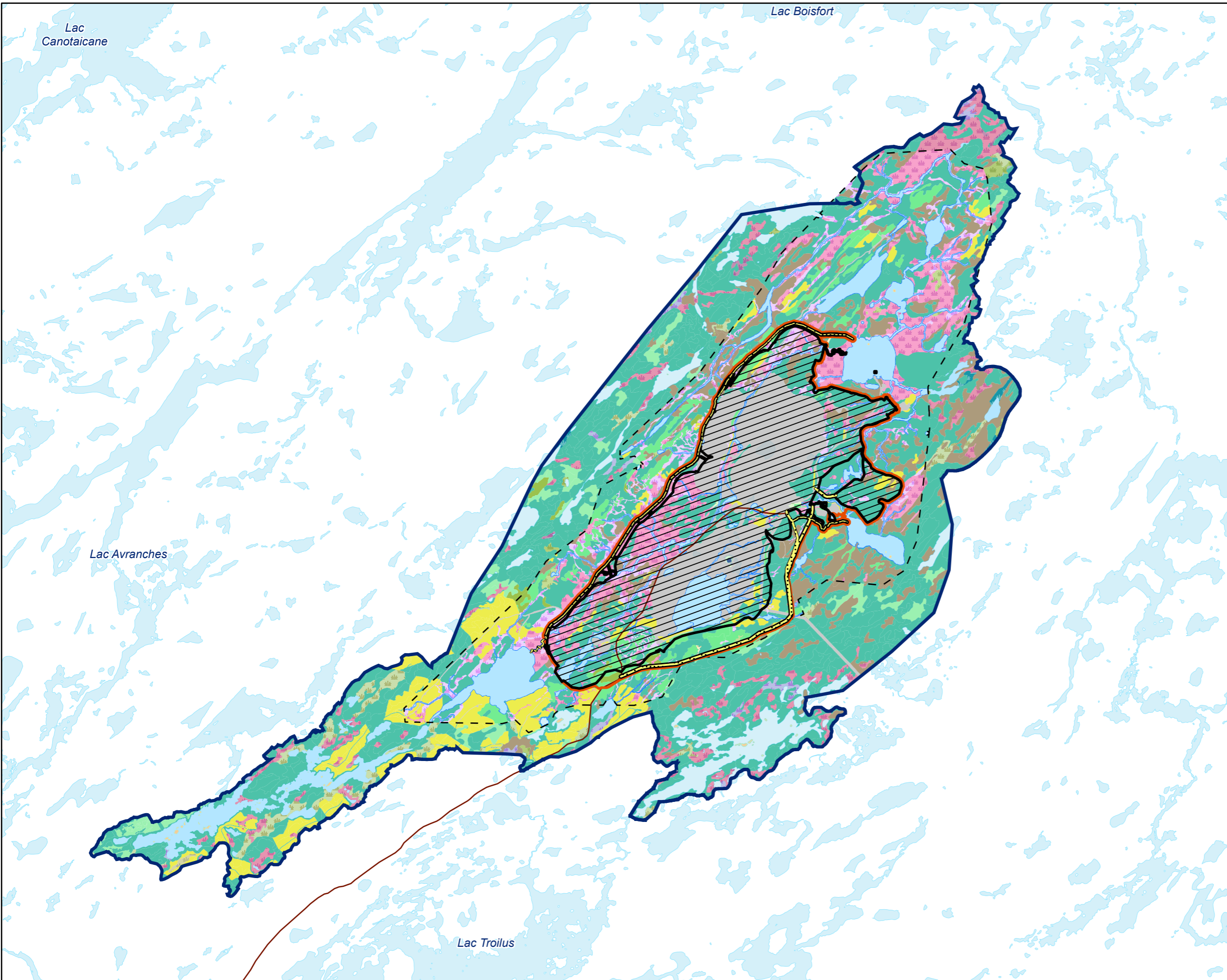
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In addition to permanent encroachments, site preparation and clearing during project construction will result in the temporary encroachment of approximately 26.5 ha of natural terrestrial environments, or 0.4% of the LSA's terrestrial environments (Map 16.3, Table 16.9). A very small percentage of these environments will be affected by temporary encroachments. These temporary encroachments will mainly be temporary work areas and temporary storage areas that will be restored once project construction is complete.

Table 16.9 Temporary encroachment of the project on terrestrial plant communities in the LSA

Plant community	Total LSA area (ha)	Area of encroachment (ha)	Proportion of encroachment (%)
Softwood stands	4 049,22	3,4	0,2
Hardwood stands	44,86	1,1	3,9
Mixed stand	494,24	7,8	2,3
Regenerating stand (0 to 20 years)	947,78	3,4	1,1
Dry bare	924,04	10,8	1,7
Total terrestrial vegetation	6 460,14	26,5	0,4



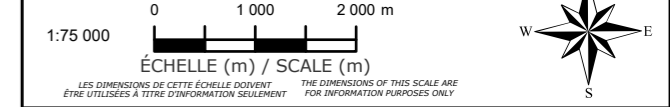
LÉGENDE / LEGEND

	Impact permanent / Permanent Impact		Milieu terrestre / Terrestrial environment
	Impact temporaire / Temporary Impact		Anthropique / Anthropic
Composante du projet / Project component			Dénudé humide / Humid bare
	Zone de développement du projet / Project development area		Dénudé sec / Dry bare
	Zone d'étude locale / Local study area		Île / Island
	Zone inventoriée / Sampled Area - Wachih		Peuplement en régénération / Regenerating stand
Milieu humide / Wetland			Peuplement feuillu / Hardwood stand
	Étang / Pond		Peuplement mixte / Mixed stand
	Marais / Marsh		Peuplement résineux / Softwood stand
	Marécage arborescent / Wooded swamp	Hydrologie-zone inventoriée / Hydrology in the Sampled Area - Wachih	
	Marécage arbustif / Shrub swamp		Littoral / Body of water
	Tourbière boisée / Wooded peatland		Rive / Bank
	Tourbière ouverte indifférenciée	Hydrologie / Hydrology - GRHQ	
	Tourbière ouverte minérotrophe / Open fen		Étendue d'eau / Lake
	Tourbière ouverte ombrotrophe / Open bog	Autre / Other	
			Réseau routier / Road network

1	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 : 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.

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 de végétation, de milieux humides et riverains impactées / Impacted Vegetation, Wetlands and Riparian Areas



NO. PROJET / PROJECT NO.
 167040485

DATE
 2025/ 05/ 28

CONÇU / CHECKED
 M. Demers

RÉVISÉ / VERIFIED
 J. Massicotte

DESSINÉ / DRAWN
 M. Arcand

Figure No.
 16.3

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Operation

Plant species of interest to the Cree Communities and Stand of Phytosociological Interest

There is little potential for change in the abundance of plant species important to the Cree Nations and stands of phytosociological interest after the first few years of project operation, since the majority of vegetation clearing will have taken place during construction and the first few years of operation (encroachments have been accounted for in the construction phase). Indirect impacts such as dust deposition and ongoing edge impacts will be the dominant impacts during the operating phase. Dust deposition on vegetation can affect vegetation growth by reducing physiological processes such as photosynthesis and respiration.

Invasive Alien species

During operations, the continuous use of vehicles and maintenance of roads and peripheral areas maintain conditions conducive to the introduction and ongoing spread of invasive alien plant species. The transportation and circulation of machinery in the work area could contribute to the introduction or spread of EFEE on the territory. However, the rather harsh climatic conditions prevailing in the study area limit the potential growth of certain invasive species found mainly in the southern part of the province. Mitigation measures are set out in section 16.4.1.2 to reduce the risk of introduction and spread of such species in work areas during operation and maintenance activities.

Habitat fragmentation

Impacts on plant communities due to increased fragmentation during operations should be limited to edge impacts associated with vegetation management in adjacent habitat.

Decommissioning and Closure

Project closure could result in the introduction or spread of invasive alien plants through ground disturbance, vehicle movement and soil displacement. However, the introduction of native plant species during restoration and closure activities will reduce the potential for the spread of invasive alien species.

No other adverse measurable changes to species of interest to the Cree Nation and Stand of Phytosociological Interest are expected during project closure, as the area will have been previously cleared during construction. With the implementation of a reclamation plan, impacts on terrestrial vegetation are expected to be positive, with the potential to re-establish natural plant communities, increase the size of terrestrial communities, and to reverse the indirect impacts of project construction and operation.

Summary

The change in abundance and distribution of plant species important to the Cree Nation due to project activities is expected to be adverse, low in magnitude, long-term and reversible after the end of project activities. The impact will occur continuously during project activities. The risk to plant species important to the Cree is low.

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Impacts of invasive alien plant species on native plants and ecological communities are expected to be of low magnitude. Impacts of invasive alien species, if introduced or discovered, would occur within the LSA. Given mitigation measures, impacts are expected to be short-term and reversible, as control methods comply with industry-standard and are effective. The spread of invasive alien species could occur in several irregular events. The risk of introduction and spread of EFEE to communities is low.

The loss of stands of phytosociological of interest is expected to be adverse and of low magnitude, due to the small impacted area of mature White birch forest in the RSA (2%) and the presence of young stands that will replace losses of mature White birch forest in the long term.

During the construction phase of the project, reductions in the size of terrestrial plant communities and community fragmentation are expected to be adverse and moderate in magnitude, due to the areas lost and the fact that terrestrial vegetation is characteristic of the area. Residual impacts of fragmentation are expected to be reversible over the long term through mine closure and reclamation.

16.4.2 Changes in wetland and riparian cover and function

This section describes the pathways, mitigation measures and residual impacts anticipated from the project related to changes in wetland cover and in the ecological functions of wetlands and riparian areas. The change in wetland and bodies of water cover and functions is quantified by overlaying project boundaries with wetland and riparian delineation data, based on field inventories, publicly available data and mapping results.

16.4.2.1 Project Pathways

Clearing of vegetation in the PDA during the construction phase is likely to alter the abundance of wetlands and riparian areas and affect their ecological functions.

Vegetation clearing may also generate indirect edge impacts that may affect adjacent wetlands and riparian areas through changes in light and wind exposure, as well as changes in hydrology, particularly decreased recharge rates and groundwater infiltration. The water management system to manage contact water and divert non-contact water can have localized hydrological impacts by extracting moisture from surrounding wetlands. However, the water management plan has been designed to imitate local hydrology wherever possible. Changes in surface water quantity may result in localized impacts on drainage and soil moisture.

Vegetation clearing can also cause habitat fragmentation by isolating or separating wetlands or wetland complexes. These fragmentations can alter the reproduction and propagation cycles of species, thus influencing the composition and density of wetland and riparian species in the remaining habitats.

The Bibou Creek Diversion and groundwater pumping required for mining operations could lower the groundwater table and reduce water inflows to wetlands and watercourses in the Local Study Area (LSA).

Maintenance of facilities and infrastructure during operation may include activities such as clearing brush and felling trees within the project footprint. This can affect wetlands and riparian areas by repeatedly impacting communities adjacent to the project footprint (maintained in an herbaceous or shrubby state).

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Project closure and revegetation of the site could re-disturb wetlands and riparian areas adjacent to the project footprint, cause sedimentation in wetlands and riparian areas, or introduce or spread invasive alien plants in wetlands and riparian areas within or adjacent to the footprint through equipment movement.

16.4.2.2 Mitigation and Enhancement Measures

The following mitigation measures have been incorporated into the project design and/or are proposed to avoid or reduce project-related impacts on wetlands:

- Progressive clearing of areas required for operations (as needed).
- Mark clearing limits prior to site preparation to keep clearing activities within the approved project area.
- Maintain drainage conditions in wetlands outside work areas.
- Limit machinery traffic to work areas.
- Avoid rutting and soil compaction, which limit surface water runoff and infiltration into the soil, by using vehicles adapted to the bearing capacity of the soil, and by avoiding driving on wet soils.
- Develop and implement an erosion and sediment control plan.
- Prevent the introduction of invasive alien species, ensuring that construction equipment used on the mine site is cleaned of mud, animals and plant fragments before arrival.
- Avoid unnecessary traffic in areas where EFEE is present, to avoid spreading them over the territory.
- Implement dust suppression measures to reduce dust generation and deposition on vegetation adjacent to project activities.
- If machinery is to operate in a conserved wetland, carry out work on frozen ground or during periods of low runoff, if possible.
- If machinery must operate in a conserved wetland, use vehicles and construction equipment with low ground pressure. Drive on a wood mat or fascines, etc.
- Maintain the hydrological connectivity of wetlands or watercourses conserved or temporarily disturbed by the project, using appropriate features such as properly placed and sized culverts.
- Direct runoff and drainage to bypass areas where soils are susceptible to erosion. If it is not possible to avoid them, install protective structures (berm, detour swale).
- Allow time Cree land users to harvest plant species of interest in the project area.
- At the end of the work, reprofile disturbed surfaces and seed work areas with a seed mix that is free of invasive alien species, suitable for wetlands and bodies of water, and containing seeds of native species appropriate to the hardiness zone.
- Integrate plant species important to Cree communities into reclamation planning, if habitat is deemed appropriate.
- Integrate wetlands into reclamation planning, where habitat is deemed appropriate.

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- Develop a wetland compensation plan to offset unavoidable wetland losses. A conceptual wetland compensation plan has been developed and is presented in Section 26 of the ESIA.

16.4.2.3 Project Residual Impact

The characterization of residual impacts on wetlands and riparian areas is provided for the construction, operation and closure phases of the project.

Construction

The "avoid-minimize-compensate" mitigation approach was applied during project design to avoid wetland and body of water losses as much as possible, and to reduce impacts on the receiving environment. Efforts were made to concentrate the project area in the same location as the former mine (anthropogenic and disturbed environment). In addition, the reuse of existing facilities, such as the southwest pit for tailings management, was planned rather than creating a new tailings storage facility in the natural environment. In addition, the configuration of waste rock pile 87 and the location of ore pile LG2 were reviewed to avoid the body of water (including riparian environments) formed by lakes and associated watercourses. The configuration of the ore pile was adapted to avoid encroaching on the large complex of wetlands and bodies of water nearby.

Site preparation and clearing during project construction will result in an anticipated direct loss of approximately 415 ha of wetlands and riparian areas, or 21% of wetlands and riparian areas in the LSA (Map 16.3, Table 16.10). The biggest loss of wetlands will be open bog, with around 235 ha, followed by forested peatlands, with around 94 ha. Smaller amounts of marshes (4.2 ha), ponds (2.3 ha), open fens (1.5 ha), shrubby swamps (1.3 ha) and forested swamps (0.6 ha) will be lost during construction. Site preparation and clearing during project construction will result in an anticipated direct loss of approximately 76 ha of riparian environments (Map 16.3, Table 16.10).

The ecological functions of wetlands and riparian areas identified in section 1.6.2.3.3 will be affected. However, given the abundance of residual wetlands and riparian areas in the LSA, they will continue to provide all the ecological functions of wetlands and riparian areas within the LSA and RSA.

Table 16.10 Permanent encroachment of the project on wetlands and riparian areas in the LSA

Type of environment	LSA area (ha)	Area of encroachment (ha)	Proportion of encroachment (%)
Forested peatland	439,3	93,8	21,4
Open bog	1075,7	235,5	21,9
Open fen	43,5	1,5	3,4
Undifferentiated open peatland	5,6	0	0,0
Forested Swamp	166,9	0,6	0,4
Shrubby Swamp	17,8	1,3	7,3
Marsh	4,3	4,2	97,7
Pond	2,5	2,3	92,0
Total wetlands	1 755,6	339,2	19,3

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Type of environment	LSA area (ha)	Area of encroachment (ha)	Proportion of encroachment (%)
Riparian areas	223,8	76,0	34,0
Total LSA	1 979,4	415,2	21,0

In addition to permanent encroachments, site preparation and clearing during project construction will result in the temporary encroachment of approximately 22 ha of wetlands and riparian areas, or 1.1% of the LSA's wetlands and riparian areas (Map 16.3, Table 16.11). A very small percentage of these areas will be affected by temporary encroachment. These areas will be restored once project construction is complete.

Table 16.11 Temporary encroachment of the project on wetlands and riparian areas in the LSA

Type of environment	LSA area (ha)	Area of encroachment (ha)	Proportion of encroachment (%)
Forested peatland	439,3	8,3	1,9
Open bog	1075,7	10,3	1,0
Open fen	43,5	0,6	1,4
Undifferentiated open peatland	5,6	0	0,0
Forested Swamp	166,9	0	0,0
Shrubby Swamp	17,8	0	0,0
Marsh	4,3	0	0,0
Pond	2,5	0	0,0
Total wetlands	1 755,6	19,2	1,1
Riparian areas	223,8	2,5	1,1
Total LSA	1 979,4	21,7	1,1

The Bibou Creek Diversion will result in the local loss of riparian habitats, but also in the creation of new ones. This work will potentially cause a drawdown of the groundwater table and have a temporary impact on aquifer levels within the LSA. However, based on the hydrogeological model (Appendix H6), almost all the wetlands in the LSA are only marginally supplied by groundwater and should therefore not be impacted by the Bibou Creek Diversion. Direct losses in wetland and riparian area are accounted for in Table 16.10.

Other indirect edge impacts on wetlands and riparian areas outside the PDA are expected due to changes in wind, light and hydrology. Hydrological changes could affect wetland and riparian communities through changes in drainage, resulting in drier conditions for the wetland and riparian community. Indirect edge impacts will extend into the LSA with changes in light and wind, while changes in hydrology may extend further into the LSA and RSA depending on the extent of hydrological impacts.

Operation

Direct impacts on wetlands and riparian areas will continue during the operational phase due to ongoing construction activities (e.g., expansion of mine components). However, impacts on wetlands and riparian

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areas during the operational phase are expected to be mainly indirect, and limited to edge impacts associated with vegetation management in adjacent habitat.

Dewatering of the pits will potentially result in a lowering of the groundwater table and temporary impacts on aquifer levels in the LSA. However, based on the hydrogeological model (Appendix H6), almost all of the wetlands in the LSA have very little groundwater inflow and should therefore not be impacted.

The management of hazardous and residual materials, the transportation and circulation of machinery, and the use and maintenance of equipment could result in accidental hydrocarbon spills into the environment, mainly associated with the refuelling or breakdown of machinery. Appropriate work practices will be put in place to avoid accidental spills, and in the event of such a spill, contaminated soil will be managed in compliance with current regulations. Recycling and recovery of non-hazardous residual materials will be encouraged during the construction phase. As a result, the environmental risks associated with spills are low, and if they do occur, they will be localized to the work site.

Decommissioning and Closure

During project closure, no measurable negative change in wetland and riparian area cover and function is anticipated, as the PDA will have been previously cleared during construction and operation.

Summary

Over the life of the project, the loss of wetland and riparian community abundance and function is expected to be adverse and moderate in magnitude and will occur within the PDA. Residual impacts on wetland and riparian communities are expected to be reversible to irreversible, as some areas of wetland and riparian communities may not be possible to restore during reclamation.

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16.4.3 Summary of project residual impacts

Table 16.12 summarizes project residual impacts on vegetation, riparian and wetland environments.

Table 16.12 Project Residual Impacts on vegetation, riparian and wetland environments

Residual impact	Residual Impact Characterization							
	Project phase	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Change in diversity of terrestrial communities and species	C/ O / D	A	L/ M	PDA/LSA	NS	MT/ LT	S/ IR/ C	R
Change in wetland and riparian cover and functions	C/ O/ D	A	M	PDA/LSA	NS	LT	S/ IR / C	R/ I

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

Geographic Extent:
PDA: Project Development Area
LAS: Local Study Area
RAS: 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

The loss of vegetation communities will be partially offset by progressive site restoration and revegetation activities during operations and site closure. Wetland compensation measures will also be developed to offset unavoidable wetland losses.

Impacts related to changes in the diversity of terrestrial communities and species are considered moderate, as although there will be a reduction in the availability of species of interest to the Cree, access to this resource within the RSA will be maintained. The area of plant communities and their quality will be reduced, but their viability and long-term functions will be maintained in the RSA.

16.5 Prediction Confidence

The level of confidence in the predictions made for the assessment of the project's residual impacts on vegetation, riparian and wetland environments is considered as moderate to high. The level of confidence is based on the following elements:

- Quantity and quality of available data (field inventories).
- The quality and accuracy of available data (public photo-interpretation data).
- Reference studies carried out to date.
- A conservative approach to environmental impact assessment.
- Professional judgment.
- Mitigation measures recognized as effective.

Although confidence in the predictions is high for most components of this assessment, particularly regarding the presence and distribution of the various plant species and wetland and riparian environments, some uncertainty remains for a few components, such as the delineation of the various environments, the indirect impacts on vegetation and wetland sustainability, and the dynamics of re-vegetation during site restoration. For this reason, overall confidence in the predictions is considered as moderate to high.

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