



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

CUMULATIVE IMPACTS ASSESSMENT



# Environmental and Social Impact Assessment for the Troilus Mine Project

## CUMULATIVE IMPACTS ASSESSMENT

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## Acronyms and abbreviations

IAAC	Impact Assessment Agency of Canada
AMQ	Association minière du Québec (Quebec Mining Association)
AMW	Albanel-Mistissini-Waconichi
CEAA	Canadian Environmental Assessment Act
CEAA	Canadian Environmental Assessment Agency
CNG	Cree Nation Government
COMEX	Comité d'examen des répercussions sur l'environnement et le milieu social (Environmental and Social Impact Review Committee)
COPCs	Contaminants of Potential Concern
CSB	Cree School Board
CSB	Cree School Board
CSMO Mines	Comité sectoriel de main-d'oeuvre de l'industrie des mines
EC	Environment Canada
ECCC	Environment and Climate Change Canada
EIJBRG	Eeyou Istchee James Bay Regional Government
ÉRCFQ	Équipe de rétablissement du caribou forestier du Québec (Quebec woodland caribou restoration team)
ESIA	Environmental and Social Impact Assessment
EVEE	Espèces végétales exotiques envahissantes (Invasive Alien Plant Species)
GCC	Grand Council of the Crees
GDP	Gross Domestic Product
GHG	Greenhouse Gas
INSPQ	Institut national de santé publique du Québec
IPCC	Intergovernmental Panel on Climate Change
JBNQA	James Bay and Northern Quebec Agreement
LEMV	Loi sur les espèces menacées ou vulnérables (Act respecting threatened or vulnerable species)
LQE	Loi sur la qualité de l'environnement (Environmental 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 the Environment, the Fight against Climate Change, Wildlife and Parks)
MFFP	Ministère des Forêts, de la Faune et des Parcs
NNADAP	National Native Alcohol and Drug Abuse Program
OBCN	Ouje-Bougoumou Cree Nation
PDA	Project Development Area
RSA	Regional Study Area
SEBJ	Société d'énergie de la Baie-James
SIGÉOM	Système d'information géominière du Québec
TNO	Territoire non organisé (Unorganized territory)
VC	Valued Component



## 25. Cumulative impacts

Cumulative impacts are changes to the environment, health, social and economic conditions as a result of the project's residual impacts combined with the impacts of other past, existing and reasonably foreseeable projects and physical activities. These impacts can accumulate over time and space, and their assessment is essential to understand a project's overall impact on the environment and communities.

### 25.1 Scope of assessment

#### 25.1.1 Regulatory and policy setting

The cumulative impacts of a designated project must be considered in the project's environmental assessment process, in accordance with the Impact Assessment Act. The Environmental Quality Act (LQE) also provides for the analysis of cumulative impacts. Therefore, the cumulative impact analysis for the Troilus mine project was prepared in compliance with both federal and provincial environmental assessment procedures, and in a manner that meets the requirements and provisions of the Tailored Impact Statement Guidelines (TIS Guidelines) individual federal guidelines and the provincial guidelines for the Troilus mine project.

#### 25.1.2 Cumulative impact assessment approach

The approach used for conducting the cumulative impacts assessment follows the Policy Framework for Assessing Cumulative Effects under the Impact Assessment Act (Impact assessment agency of Canada [IAAC], 2023) as well as the Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012 (CEAA, 2012; IACC, 2018).

The federal government's policy framework recommends that the following steps (five) be followed to complete a project's cumulative impact assessment:

#### 1. **Scoping: Identification of relevant Valued Components (VCs), spatial and temporal boundaries, and other relevant projects and physical activities.**

This first step is essential to provide a rigorous framework for cumulative impact assessment. It aims to identify relevant VCs, the spatial and temporal boundaries of analysis, and physical activities likely to generate residual impacts in the same zone of influence as the project under study - in this case, the Troilus project.

The aim is to identify situations where a VC is subject to residual impacts from both the Troilus project and other past, present or future activities within a specific territory. A cumulative impact occurs when there is a spatial and/or temporal overlap of residual impacts affecting the same VC. This overlap may occur within the project study area or beyond, when it overlaps with the study area of another physical activity affecting the same VC.

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To conduct this analysis, it is first needed to list the relevant physical activities within an area defined according to the sensitivity and nature of each VC (e.g. water quality, caribou habitat, traditional land uses). The spatial boundary should be based on ecological or social understanding of territorial dynamics, not chosen arbitrarily.

At the same time, it is important to set the relevant temporal boundaries. This means assessing the persistence of potential residual impacts generated by the Troilus project, and whatever they might overlap with the residual impacts of other projects or activities in the region. These temporal boundaries may be different depending on the VC (for example, impacts on surface water quality may last several decades after mine closure).

#### **2. Analysis: Assessment of potential cumulative impacts on selected VCs, considering interactions between residual impacts of the project and those of other activities.**

Cumulative impact analysis aims to assess how the residual impacts of the Troilus project interact with those of other physical activities to create combined impacts on the selected VCs. This step is based on an integrated understanding of spatial and temporal interaction mechanisms, as well as the trajectories of change affecting each VC.

In practical terms, this means determining whether the residual impacts of the project, even if mitigated, contribute to cumulative pressure on certain VCs already affected by other human activities. These impacts may be additive (simple accumulation), synergistic (impacts amplified by interaction), or delayed in time (deferred or prolonged impacts).

For each VC, the analysis is based on the following elements:

1. Characterization of the project's residual impacts (direction, magnitude, duration, reversibility, frequency, environmental or social context);
2. Identification of relevant residual impacts of other physical activities in the area of influence (mining, forestry, hydroelectric projects, linear infrastructures, etc.);
3. Assessment of the combination of impacts: this includes overlap in space (shared impact zones), overlap in time (persistent or simultaneous impacts), and the cumulative vulnerability of the VC (existing state of health or pressure);
4. Analysis of the reference context: it is essential to consider the current state of the VC, its evolutionary trend (degradation or resilience), as well as its importance for Indigenous communities or biodiversity.

The aim of this step is to develop a clear and substantiated characterization of significant cumulative impacts for each VC. This analysis serves as a foundation for subsequent steps, including the identification of mitigation measures specifically targeting cumulative impacts, and the planning of long-term monitoring.

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#### **3. Mitigation measures: Identification and assessment of measures to mitigate adverse cumulative impacts.**

Once the cumulative impacts have been identified and characterized, the next step is to propose specific mitigation measures aimed at reducing their magnitude, duration or reversibility. Unlike conventional mitigation measures, that address the project's direct impacts, the measures at this stage are designed to address on the combined impacts of the project and other, past, present or reasonably foreseeable activities.

The objective is to ensure that the Troilus project does not contribute significantly to the cumulative degradation of VCs, particularly in contexts where some of them are already under environmental or social pressure.

Mitigation measures may include:

1. Project design adjustments to avoid cumulatively affected sensitive areas (e.g. relocating infrastructure away from critical habitats or already fragmented wildlife corridors);
2. Enhanced ecological compensation measures, targeting VCs already weakened by all regional pressures (e.g. wetland restoration, creation of equivalent habitats);
3. Inter-project or inter-sector collaboration, to pool mitigation efforts on a regional scale (e.g. regional wildlife management plan, concerted land access plan);
4. Integration of Indigenous knowledge, particularly to guide measures towards traditional land uses, culturally or spiritually sensitive sites, and natural resources of importance to Cree communities.

It is also important to document the limits of mitigation: some cumulative impacts may not be entirely avoidable or reversible. In such cases, the proponent must demonstrate that reasonable options have been explored and justify the selected strategy.

Finally, mitigation measures must be integrated into project commitments and monitored over time to assess their effectiveness, in alignment with the next stage of the strategic framework: monitoring and adaptive management.

#### **4. Description of cumulative impacts: Characterization of cumulative impacts in terms of magnitude, geographical extent, duration, frequency, reversibility.**

This step aims to provide a detailed characterization of the identified cumulative impacts, using a rigorous and consistent method to describe their magnitude, severity and scope. It serves as a bridge between the technical analysis of impacts and its integration into the decision-making process.

The description of cumulative impacts focuses on VCs that present an overlap of residual impacts from the Troilus project and other physical activities. Each cumulative impact is assessed according to a set of qualitative and quantitative criteria, including:

1. Magnitude: level of intensity of the combined impact on the VC (low, moderate, high), in relation to its resilience or state of degradation;

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2. Geographic extent: area or spatial extent affected by the cumulative impact (e.g. watershed, wildlife corridor, traditional territory);
  3. Duration: time during which the cumulative impact is expected to persist (short, medium or long term, including post-closure);
  4. Frequency: continuity or recurrence of the impact over time (one-off, seasonal, permanent);
  5. Reversibility: ability of the environment or VC to return to its previous state after activities have ceased.
- 5. Follow-up: Development of follow-up programs to verify the effectiveness of mitigation measures and monitor cumulative impacts over time.**

The monitoring of cumulative impact aims to validate the environmental and social predictions made during the analysis, and to assess the actual effectiveness of the proposed mitigation measures. This step is essential to ensure adaptive management of the Troilus project, and to enable real-time adjustments if cumulative impacts turn out to be greater than anticipated.

Unlike a standard monitoring program, a cumulative impact monitoring program must:

1. Focus on VCs targeted by the combined impacts of several physical activities;
2. Be designed on a broader scale, sometimes regional, going beyond the immediate limits of the project;
3. Rely on indicators that are sensitive to the accumulation of pressures, whether environmental (e.g. surface water quality, habitat integrity) or social (e.g. land access, quality of life in Indigenous communities).

The monitoring program will include the following elements:

1. Measurable indicators clearly linked to affected VCs and anticipated cumulative impacts;
2. A monitoring frequency sufficient to detect trends or gradual deterioration over time;
3. Accountability mechanisms, including public reports, local community participation, and transparency in the interpretation of results;
4. An adaptive management approach, allowing the revision of mitigation measures, the modification of project practices or the use of compensatory measures if necessary.

Cumulative impact monitoring will provide an opportunity to establish partnerships with other developers, public agencies or Indigenous governments to pool monitoring efforts, share data, and coordinate responses to regional issues (e.g. habitat fragmentation, pressure on water resources, infrastructure saturation).

This process is designed to be flexible and tailored to each project, depending on the VCs involved and the specific context. However, it should be approached with caution to identify the VCs most likely to be affected, in order to implement the appropriate monitoring programs.

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Thus, the cumulative impact analysis will follow the steps recommended by the Strategic Framework for Cumulative Impact Assessment, as well as the Tailored Impact Statement Guidelines and the guidelines issued by the Ministry of Environment, the Fight Against Climate Change, Wildlife and Parks (MELCCFP) according to the general methodology selected to complete the cumulative impact assessment, as described in detail in Chapter 7 (Assessment Methodology) of the Environmental and Social Impact Assessment (ESIA) report.

As mentioned in section 7, two conditions must be met to initiate a cumulative impact assessment on a VC:

- The project is assessed as having adverse residual impacts on a VC;
- The adverse residual impacts from the project may overlap spatially and temporally with residual impacts of other physical activities on a VC.

If either of these conditions is not met, the cumulative impact assessment will not be completed. The temporal overlap between the residual impacts of the project and the residual impacts of other physical activities on a VC considers the project phases and temporal boundaries described in section 7.5. Once the projects and activities that may interact with the Troilus project have been identified, the assessment of cumulative impacts follows the same iterative process used for project impacts: analysis and determination of impacts pathways, identification of potential mitigation and enhancement measures, description of the impact, followed by characterization of the impact.

#### **25.1.3 Physical activities considered for cumulative impact assessment**

Cumulative impact assessment must consider reasonably foreseeable projects and physical activities in the past, current and future. It is important to clearly define the scope of a VC's impacts and to assess the potential for overlapping impacts.

For each VC presented in this ESIA (Chapters 8 to 23), the current conditions presented reflect the cumulative impacts of past and present physical activities. The past and present physical activities identified as part of this cumulative impact assessment provide an understanding of how current environmental conditions have emerged and how these activities may have affected, or may currently be affecting, the Valued Components.

Projects included in the cumulative impact assessment are those that are certain to proceed or reasonably foreseeable. Otherwise, future physical activities must meet one of the following criteria:

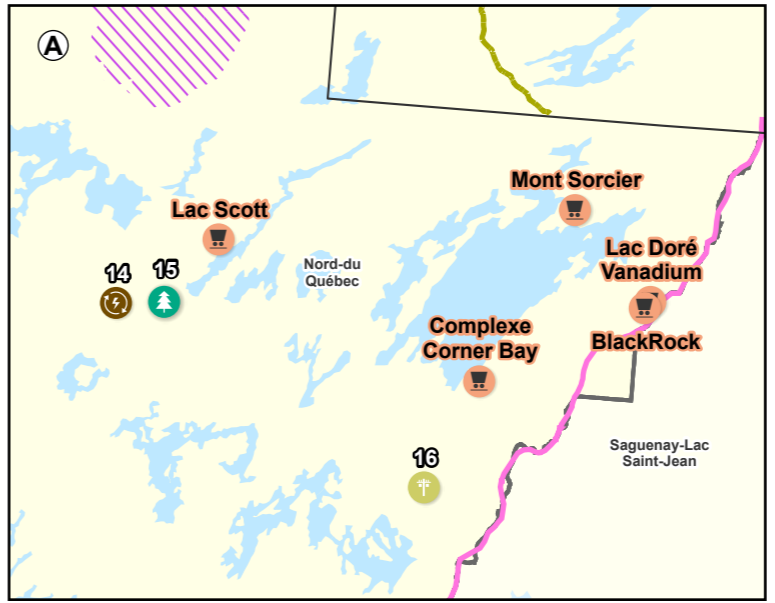
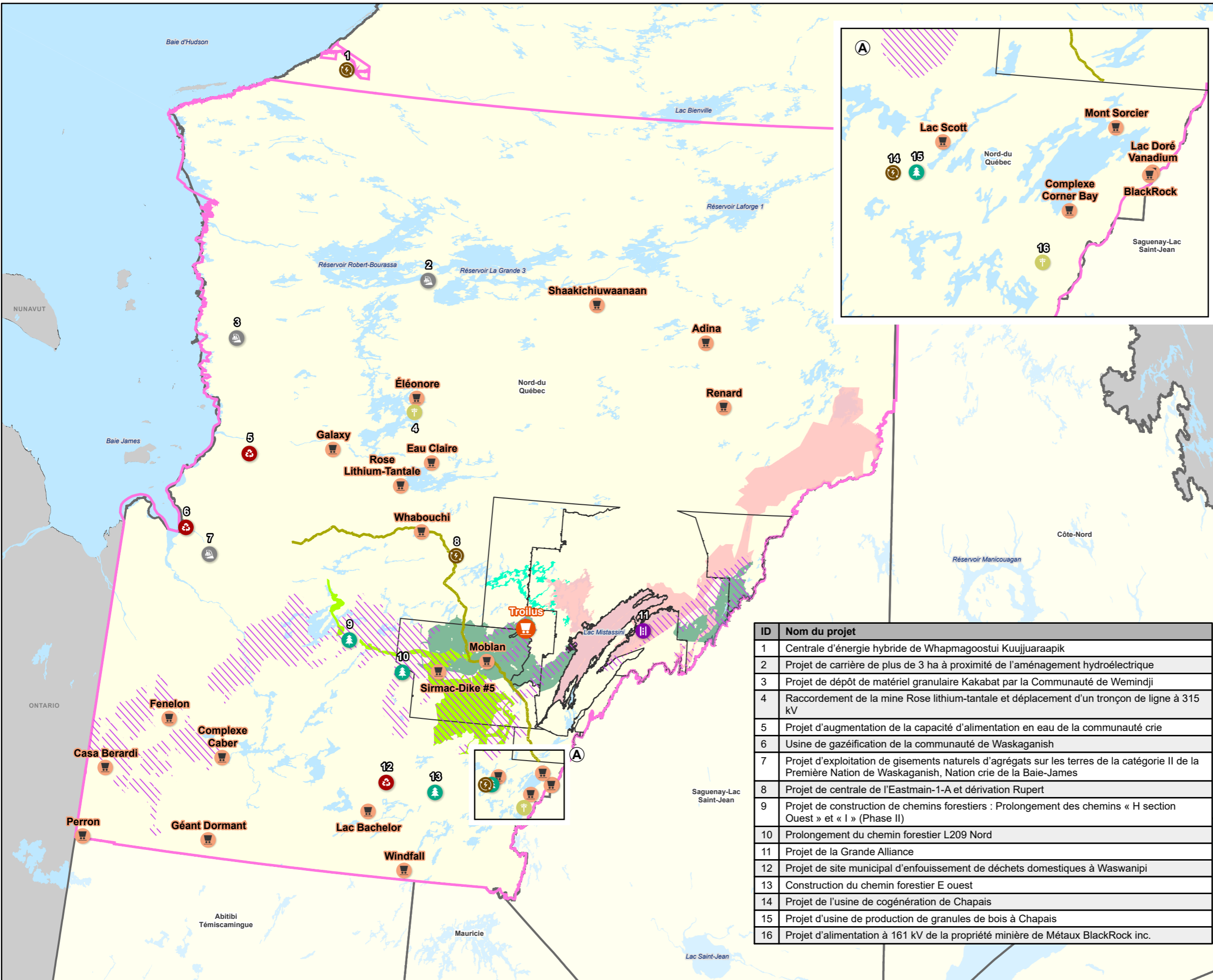
- Site preparation or construction work has begun or is underway;
- Regulatory permits and authorizations have been approved;
- The activity has been publicly announced by the proponent;
- The activity is undergoing an environmental assessment process;
- The activity is part of an approved land use and development plan;
- The activity must be carried out to enable the implementation of a project.

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The areas of influence of projects can be different, and it is important to make reasonable assumptions when assessing the likelihood of implementation of projects, as this would result in significant cumulative impacts on VCs. It is important to emphasize that physical activities must be likely to have an impact on the same VCs affected by the Troilus project.

The projects located in the Eeyou Istchee James Bay Territory, whether completed, in operation, under study, interrupted or temporarily suspended (uncertainty as to possible resumption), which have or could have an influence on the VCs selected for the Troilus project, are listed in the tables of interaction of the Troilus project with other projects and physical activities (tables 25.1 to 25.5) for the selected VCs. This list of projects is based primarily on information gathered from environmental assessment procedures for projects underway or approved at both provincial and federal levels. These projects are all located within the boundaries of the Regional Study Areas (RSAs) for all the project components presented in Chapters 9 to 25 of the ESIA. Map 25.1 illustrates the location of these projects (Système d'information géomineière du Québec [SIGÉOM], 2025; MELCCFP, 2025 and Comité d'examen des répercussions sur l'environnement et le milieu social [COMEX], 2025).



**LÉGENDE / LEGEND**

**Composante de projet / Project Component**

- Zone de développement du projet / Project Development Area
- Zone d'étude locale-régionale / Local-Regional Study Area
- Unité d'aménagement (UA) 026-61 / Forest Management Unit
- Région / Region

**Projets et activités physiques futures / Future Project And Physical Activities**

- Mine / Mining
- Foresterie / Forestry
- Extraction de substances minérales de surface / Surface Mineral Extraction
- Développement communautaire / Community Development

**Infrastructure de transport / Transport Infrastructure**

- Électricité / Electricity
- Énergie / Energy

**Aire protégée / Protected area**

- Parc national Nibiischii / Nibiischii National Park
- Réserve de conservation / Conservation Reserve
- Territoire mis en réserve / Reserved Territory
- Territoire réserve faunique / Wildlife Reserve Territory
- Mesure intérimaire pour les caribous forestiers

**Réseau routier / Road network**

- Route du Nord

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

**RÉFÉRENCES/REFERENCES**

1. Système de coordonnées : NAD 1983 Québec Lambert. 2. Composante de projet / Project Component: BluMetric (2024) & Stantec (2024). 3. Projets et activités physiques futures / Future Project And Physical Activities : Comex, 2025 & SIGEOM, 2024. 4. Réseau routier / Road Network : Adresses Québec, 2024. 5. Aire protégée et territoire réserve faunique / Protected Area and Wildlife Reserve Territory : MELCCFP, 2025. 5.Limite administrative : MRNF, 2019

**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**

**Projets et activités physiques futures / Future Project And Physical Activities**

ID	Nom du projet
1	Centrale d'énergie hybride de Whapmagoostui Kuujuaaraapik
2	Projet de carrière de plus de 3 ha à proximité de l'aménagement hydroélectrique
3	Projet de dépôt de matériel granulaire Kakabat par la Communauté de Wemindji
4	Raccordement de la mine Rose lithium-tantale et déplacement d'un tronçon de ligne à 315 kV
5	Projet d'augmentation de la capacité d'alimentation en eau de la communauté crie
6	Usine de gazéification de la communauté de Waskaganish
7	Projet d'exploitation de gisements naturels d'agrégats sur les terres de la catégorie II de la Première Nation de Waskaganish, Nation crie de la Baie-James
8	Projet de centrale de l'Eastmain-1-A et dérivation Rupert
9	Projet de construction de chemins forestiers : Prolongement des chemins « H section Ouest » et « I » (Phase II)
10	Prolongement du chemin forestier L209 Nord
11	Projet de la Grande Alliance
12	Projet de site municipal d'enfouissement de déchets domestiques à Waswanipi
13	Construction du chemin forestier E ouest
14	Projet de l'usine de cogénération de Chapais
15	Projet d'usine de production de granules de bois à Chapais
16	Projet d'alimentation à 161 kV de la propriété minière de Métaux BlackRock inc.

**BluMetric** Environnement **Stantec**

NO. PROJET / PROJECT NO. 240433/167040485 DATE 20-06-2025

CONÇU / CHECKED L. Essegheier RÉVISÉ / VERIFIED L-S. Banville

DESSINÉ / DRAWN G. Anderson FIGURE NO. 25.1 ED./REV. 0



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#### **25.1.4 Spatial and Temporal Boundaries**

As presented in section 7.5.1 of chapter 7 (Assessment Methodology) of the ESIA report, three areas were defined for the assessment of each selected VC: a Project Development Area (PDA) encompassing the project footprint, a Local Study Area (LSA) where project-related impacts (direct or indirect) can be predicted or measured with a significant level of accuracy and confidence. Finally, a Regional Study Area (RSA), specific to each VC, is used to establish the significance of the project's specific impacts. It is also the area within which potential cumulative impacts may extend. The RSAs encompass the PDA and the VC-specific LSAs.

No RSA has been established for the greenhouse gas (GHG) VC since GHGs emitted by the project will disperse and mix with other GHGs in the global atmosphere, so the spatial boundary of potential impacts is global in scope.

As for temporal scope, a specific limit for each VC is determined as part of the cumulative impact analysis, depending on the duration and timing of these impacts on each VC.

#### **25.1.5 Influence of consultation and engagement**

Troilus Gold Corp (Troilus) has engaged in an extensive consultation and communication process with potentially affected Cree and Jamesian communities, regulatory authorities, the public and stakeholders. Details of the consultation and engagement process can be consulted in Chapter 4 of the ESIA and in Appendix E.

The concerns raised relate to disturbances experienced by land users due to annoyance such as dust, noise and vibrations, the quality and quantity of water resources, the protection of terrestrial and avian fauna, the protection of fish and fish habitat, infrastructures and services capacity issues, and the economic development of Cree and Jamesian communities. No concerns were directly expressed in relation to cumulative impacts. However, it should be noted that Nibiischii Corporation expressed concerns about their Dark Sky Preserve project. These concerns have been considered in the assessment of the residual impact of the Troilus project following the proposed measures (see Chapter 8 [Atmospheric conditions]).

Table 25.1 below presents a summary of the topics, key information, including Indigenous knowledge, and concerns that Troilus identified through its consultation and engagement initiatives.

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**Table 25.1 Summary of key information, indigenous knowledge, and concerns for the project related to cumulative impact assessment**

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the ESIA
Coexistence of uses	<p>The Nibiischii Corporation emphasized the need for the Troilus project to have no impact on tourism activities offered and practiced within the reserve.</p> <p>Lake A camps will be located within the study area.</p>	<p>Troilus is committed to working with the Nibiischii Corporation to implement specific mitigation measures to reduce the project's impact on recreational activities offered by the Nibiischii Corporation and visitors to the wildlife reserves. Among these measures, Troilus will be able to adapt travel schedules to summer periods, establish a procedure for communicating activities and ensure tourist safety by setting up a traffic procedure on the Route du Nord. Mitigation measures involving other VCs, such as air quality and the acoustic environment, will also help reduce the project's impact on the quality of recreational activities offered in wildlife reserves.</p> <p>Troilus is committed to relocating the camps located in the Lake A sector.</p>	<p>Section 19.4.1.2 Section 20.4.3.2 Section 25.3.2</p>

## 25.2 Justification of valued components not included in cumulative impact assessment

### 25.2.1 Atmospheric environment

The atmospheric environment was not selected as a VC for the cumulative impact assessment, as the residual impacts of the project will only occur in the PDA. No other source of impact, past or future, is close enough to the PDA to anticipate significant cumulative impacts.

Acoustic Environment Acoustic Environment was not considered in the assessment of cumulative impacts, as simulations showed no potential exceedance of noise criteria. Consequently, the impact is qualified as low during the construction and operation phases of the project. Considering the regulatory requirements (provincial and federal) in the study area, the anticipated low impact and the other sources of impact, the cumulative impact on the Acoustic Environment is considered negligible.

### 25.2.2 Climate (Greenhouse gases emissions)

According to data from Environment and Climate Change Canada (ECCC, 2025), annual mining-related GHG emissions represented less than 1% of total emissions in Canada over the past 20 years (Table 25.2 for data between 2018 and 2023), taking all Intergovernmental Panel on Climate Change (IPCC)

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sectors into account. Consequently, it was determined that the project's contribution to GHG emissions in Canada, which represents only a fraction of 1%, was not significant enough to warrant a cumulative impacts assessment for this VC.

**Table 25.2 Contribution of the mining sector to total GHG emissions in Canada between 2018 and 2023**

GHG emissions (Mt CO <sub>2</sub> eq)	2018	2019	2020	2021	2022	2023
Total	747	747	682	694	700	694
Mining operations	6	6	5,2	5,8	5,8	5,5
%	0,80	0,80	0,76	0,84	0,83	0,79

#### 25.2.3 Hydrological regime

Hydrology Regime was not included in the cumulative impacts assessment, as the residual impacts of the project, i.e. changes to the hydraulic regime, are limited to the LSA and are reversible. No cumulative impacts are therefore expected on the watersheds within the LSA, specifically the Natastan watershed of the Rupert River and that of the Broadback River.

#### 25.2.4 Surface water quality

Surface water quality was not considered in the cumulative impacts assessment, as the residual impacts of the project, although high and potentially extending to the RSA, are reversible. However, cumulative impacts on surface water quality, as a component of the receiving environment that is of use to communities, will be covered as part of the Land and Resource Use VC cumulative impact assessment.

#### 25.2.5 Hydrogeology

Hydrogeology was not included in the cumulative impact assessment, as the project's residual impacts, although irreversible and continuous in some cases (such as modification of the level of aquifers and drying of wetlands and watercourses), will be limited to the LSA, and no other past or future sources of impact are expected in this area.

#### 25.2.6 Groundwater quality

Groundwater quality was not considered in the cumulative impacts assessment, since the residual impacts of the project, i.e. groundwater contamination and accumulation, are small, confined to the PDA and reversible.

#### 25.2.7 Soils and sediments

Soil and sediment quality were not considered in the cumulative impacts assessment, given the reversible nature of the project's residual impacts and their low magnitude. In fact, once restoration is complete, no cumulative impacts are expected from other sources of impact.

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#### **25.2.8 Vegetation, Riparian and Wetland Environments**

Vegetation was not included in the cumulative impact assessment because of the low magnitude and reversibility of the project's impacts. This applies to plant species of interest to the Cree and Stand of Phytosociological Interest, invasive alien plant species (EVEE) and habitat fragmentation. As presented in chapter 16, no species at risk have been identified in the project area. Consequently, no loss or alteration of plant species at risk is anticipated because of vegetation clearing and soil disturbance associated with the project.

Riparian and Wetland Environments have not been included in the cumulative impact assessment, as changes related to temporary and permanent encroachments will remain limited to the PDA. Once the mine operation is completed, specific measures will be implemented to restore the affected environments to their initial state or even improve their condition. Compensatory actions will also be taken to replace destroyed habitats, by creating new ones in other suitable areas. These combined efforts will help maintain the ecological balance and minimize long-term environmental consequences.

#### **25.2.9 Fish and Fish Habitat**

Fish and Fish Habitat was not selected as a VC for the cumulative impact assessment, as temporary and permanent losses of fish habitat, especially those associated to the Bibou Creek diversion, will be subject to compensation. However, some compensation for fish habitat losses will be provided directly within the newly diverted section.

#### **25.2.10 Landscape**

Landscape was not considered in the cumulative impacts assessment, as the residual impacts of the project are limited to Cree users of the LSA. Consequently, other sources of impact do not accumulate with those of the present project. However, the project's residual impacts on the landscape, as visual landmarks for Cree users, will be considered indirectly in the cumulative impacts assessment of Land and resource use VC.

### **25.3 Cumulative impacts assessment of selected valued components**

This section presents the cumulative impacts assessment for the Troilus project. It identifies and assesses the impacts that the project could cause when combined with those of other projects or activities in the region, whether past, ongoing or reasonably foreseeable in the short term. The assessment focuses on potential interactions on the biophysical and human environments, from an integrated and territorial perspective. It aims to identify issues arising from the convergence of multiple impacts, in order to inform decision-making and recommend appropriate mitigation measures.

#### 25.3.1 Terrestrial and avian fauna

##### 25.3.1.1 Existing conditions and evolutionary trend

###### Existing conditions

There are several mammals in the Troilus mining project area. To simplify the assessment of cumulative impacts on terrestrial fauna and its habitat, the analysis of terrestrial wildlife will focus on one species in particular: the Woodland Caribou.

The Woodland Caribou is sensitive to human activity and disturbance, and requires special conditions:

"« Les connaissances acquises à ce jour permettent d'identifier les caractéristiques de l'habitat essentiel du caribou forestier, soit de vastes étendues de forêt boréale mature, des landes à lichens, des tourbières présentant un haut niveau de connectivité et un faible taux de perturbations naturelles et anthropiques. En hiver, ce caribou tend à sélectionner les secteurs avec une forte biomasse de lichens et où l'épaisseur de neige est moindre." <sup>1</sup> (Ministère des Forêts, de la Faune et des Parcs [MFFP], 2021, P.23)

Caribou's sensitivity to anthropogenic and natural impacts, as well as its status as a species of concern, make it an indicator species for environmental health, particularly through its presence and density.

A sentinel species is one whose presence, abundance or health reflects the overall condition of its environment or an ecosystem. It serves as an indicator to monitor environmental quality, detect changes or threats, and guide conservation or management actions.

The Boreal Woodland Caribou (*Rangifer tarandus caribou*) can be considered as a sentinel species, as its population is highly sensitive to changes in its habitat, including forest degradation, land fragmentation, pollution and human activities such as logging and mining. Its health and demographic trends therefore reflect the state of the boreal forest ecosystem. The woodland caribou can also be considered an umbrella species, meaning that by monitoring the woodland caribou, researchers and managers can detect signs of ecological degradation at an early stage, enabling measures to be taken to preserve biodiversity and environmental quality. So, protecting the Woodland Caribou also benefits the protection of many other species.

The Woodland Caribou (boreal) was designated as a vulnerable species in Quebec in February 2005, under the Act respecting threatened or vulnerable species (LEMV) (decree 75, 2005). As a result, the Quebec Government within its jurisdiction and obligations, developed and implemented a provincial woodland caribou restoration plan. The plan was prepared by a team composed of specialists and organizations involved in the protection of this species (Équipe de rétablissement du caribou forestier du Québec [ÉRCFQ]). A first Woodland Caribou restoration plan was developed for the 2005-2012 period

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<sup>1</sup> Knowledge acquired to date allows us to identify the characteristics of the woodland caribou's critical habitat: vast expanses of mature boreal forest, lichen barrens and peat bogs with a high level of connectivity and a low level of natural and anthropogenic disturbance. In winter, this caribou tends to select areas with high lichen biomass and lower snow depths

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ÉRCFQ, 2008), and a second version was submitted to Quebec authorities in May 2013 (ÉRCFQ, 2013). The ÉRCFQ also developed guidelines for the management of woodland caribou habitat, published in a first version in 2010 (ÉRCFQ, 2010), and revised in 2013 (ÉRCFQ, 2013). The study area for the Troilus mining project is located in the central part of the area covered by Woodland Caribou restoration plan (WSP, 2019).

Woodland Caribou live at very low densities, varying from 1 to 2 individuals/100 km<sup>2</sup> according to surveys carried out in the 1990s (Courtois, 2003). A 2003 survey in the Assinica and Broadback sectors revealed a corrected density (based on an 85% detection rate) of 1.5 caribou/100 km<sup>2</sup>, for a total of 515 individuals (Brodeur et al., 2003). In a 2013 survey of the Assinica herd, density was estimated at 2.4 caribou/100 km<sup>2</sup> (Brodeur et al., 2017). Applying the 87.5% visibility rate, the population size was estimated at 580 caribou. The proposed Troilus project is located within the overlapping range of two Woodland Caribou herds, the Témiscamie and Assinica herds (WSP, 2019).

Individuals located closest to the mine were less than 3.6 km from the mine site centroid. These results correspond to a density of around 5.97 caribou per 100 km<sup>2</sup>. Considering an observation rate of 85%, i.e. a correction factor of 15% (Courtois, 1999), the estimated number of individuals would thus be around 128, with an adjusted density of 7.01 caribou per 100 km<sup>2</sup> in the inventoried area (WSP, 2019).

#### Evolutionary trends of the VC

The Assinica and Témiscamie populations are currently considered to be not self-sustaining, with the situation expected to worsen further due to continued habitat degradation caused by activities such as logging, climate change, and pollution (Rudolph et al., 2012).

The literature review on the factors contributing in the decline of woodland caribou populations in Quebec, conducted by the MFFP (2021), analyzes the threats to the woodland caribou population and assesses their degree of impact. The main threats identified are:

- Changes in habitat configuration;
- Changes in habitat composition;
- Industrial development activities;
- Transportation infrastructure and other linear structures;
- Recreational and tourism activities.

Other threats were identified, but rated as low:

- Interspecific competition for food resources;
- Predation;
- Disease and parasites;
- Climate;
- Road collisions;

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- Harvesting for food, ceremonial or social purposes by Indigenous communities members;
- Illegal harvesting (poaching).

Finally, the risks associated with certain threats (listed bellow) have not been assessed for Quebec populations, or could not be assessed due to lack of data in Quebec:

- Fire;
- Insect outbreaks (recently identified as a concern in the Quebec sector of Côte-Nord);
- Noise and light disturbance (not assessed in Quebec, but assessed as low to moderate across Canada);
- Climate change;
  - Habitat modification;
  - Changes in climatic conditions;
- Pollution.

#### 25.3.1.2 Study area

The range of the Assinica population is estimated at 27,900 km<sup>2</sup> and that of the Témiscamie herd at 47,500 km<sup>2</sup> (Rudolph et al., 2012).

For the caribou baseline conditions, the study area is delimited by a circle with a radius of 50 km from the center of the proposed mine, representing an area of 7,850 km<sup>2</sup>. This boundary was established in consideration of the guidelines for the management of woodland caribou habitat (ÉRCFQ, 2013, which specifies, in Element 6, that the minimum area of analysis units for the rate of disturbance of woodland caribou habitat is 5,000 km<sup>2</sup>). The information available to the MFFP was collected at this scale. Given its size, the study area will allow to clearly identify the boreal caribou's migration corridors by analyzing the points of occurrence of telemetric collars installed on woodland caribou in the area in recent years. The caribou inventory zone covers an area of 1,825 km<sup>2</sup>, i.e., a square covering 20 km on either side of the central point of the mine facilities (1,600 km<sup>2</sup>), plus a square of 225 km<sup>2</sup> covering the access road leading to the mine (see map 17.1 in chapter 17 [Terrestrial and avian fauna] of the ESIA).

It should be noted that 56.5% of the study area lies north of the territorial limit of attributable forests and is therefore not directly affected by anthropogenic disturbances related to forestry operations. However, this area remains susceptible to other natural disturbances, such as forest fires and insect outbreaks, which could become more frequent or intensified due to climate change.

Assessing impacts over time can only be done within a time boundary for which confidence in the predictions is sufficiently high, otherwise the assessment is deemed pointless.

In the case of terrestrial and avian fauna, and more specifically woodland caribou, the evolution of habitat disturbance in the study area since 1970 enables us to predict with a sufficiently high level of confidence what the cumulative impacts would be 50 years from now if no concrete protection measures were put in place (status quo scenario).

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Although discussions are ongoing and protective measures for woodland caribou are expected to be adopted, the MELCCFP is currently not able to make a definitive statement regarding these measures. Therefore, they cannot be considered in the current assessment.

#### 25.3.1.3 Identification of residual impacts with potential to interact cumulatively

Table 25.3 presents the physical activity inclusion list, which identifies other future physical activities planned within the RSA. Where the residual environmental impacts of the project may interact cumulatively with those of other physical activities, a cumulative impact assessment is carried out. Map 25.1 illustrates the location of these projects.

**Table 25.3 List of projects and physical activities with potential for cumulative impacts on the valued component of terrestrial and avian fauna**

Projects and physical activities	Potential cumulative impacts		
	Disturbance of wildlife and its habitat	Risk of mortality	Change in movement patterns
<b>Past and present projects and physical activities</b>			
Mining	√	√	√
Surface mineral extraction	√	√	√
Community development	√	√	√
Forestry	√	√	√
Transportation	√	√	√
Energy	√	√	√
Recreational activities	√	√	√
Hunting, fishing, trapping	-	-	-
<b>Future projects and physical activities</b>			
Mining			
Moblan Lithium Project	√	√	√
Sirmac-Dike 5	-	-	-
Mont Sorcier	-	-	-
Scott Lake project	-	-	-
Black Rock	-	-	-
Corner Bay Complex	-	-	-
Bachelor	-	-	-
Windfall	-	-	-
Géant Dormant	-	-	-
Complexe Caber	-	-	-
Fénelon	-	-	-
Casa Berardi	-	-	-
Perron	-	-	-
Whabouchi	-	-	-
Rose lithium-tantalum	-	-	-

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Projects and physical activities	Potential cumulative impacts		
	Disturbance of wildlife and its habitat	Risk of mortality	Change in movement patterns
Galaxy	-	-	-
Eau Claire	-	-	-
Éléonore	-	-	-
Renard	-	-	-
Adina	-	-	-
Shaakichuwaanaan	-	-	-
Extraction of surface mineral substances			
Proposed extraction of natural deposits of aggregates on Category II lands by the First Nation of Waskaganish, James Bay Cree Nation	-	-	-
Quarry in the Area of the La Grande-3 Hydroelectric Development	-	-	-
Kakabat Granular Material Deposit Project by Cree Nation of Wemindji	-	-	-
Community development			
Municipal domestic waste landfill site in Waswanipi	-	-	-
Eastmain Water Supply System Phase II	-	-	-
Gasification Plant Project for the Community of Waskaganish	-	-	-
Forestry			
Logging operations on forest management unit UA 026-61	√	√	√
Wood pellet facility in Chapais	-	-	-
Transportation			
La Grande Alliance	-	-	-
Construction of forest access roads " H section West " and " I "	-	-	-
Extension of forest road L209-Nord	-	-	-
Construction of forest road E west	-	-	-
Energy - Electricity			
Chapais Énergie cogeneration plant - Temporary stormwater detour	-	-	-
Chapais Énergie cogeneration plant - Increase in untreated bark storage capacity	-	-	-
Whapmagoostui Kuujjuaraapik hybrid power plant project	-	-	-
EM-1-A / EM-1-A-Rupert / Rivière Rupert	-	-	-
Connection of the Rose lithium-tantalum mine	-	-	-
161 kV BlackRock Metals mining property electricity service project BlackRock inc.	-	-	-
Recreational activities			

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Projects and physical activities	Potential cumulative impacts		
	Disturbance of wildlife and its habitat	Risk of mortality	Change in movement patterns
Nibiischii National Park	√	√	√
Albanel-Mistissini-Waconichi Lakes Wildlife Preserve Dark Sky Project	√	√	√
Conservation activities			
Interim Measures For Woodland Caribou	√	√	√
Territories set aside as reserves	√	√	√

**Notes:**

√ = Other physical activities whose residual impacts are likely to interact cumulatively with the residual impact of the project.

- = Interactions between residual impacts of other physical activities and residual impacts of the project are not anticipated or the project is located outside the RSA.

Existing terrestrial and avian fauna conditions associated with past and present physical activities in the RSA are presented in Section 17.2.3 of Chapter 17 of the ESIA (Terrestrial and Avian Fauna). Thus, the contribution of current projects and activities, including impacts related to the Troilus mine development, is considered in the assessment of the project's residual impacts (Section 17.4 of Chapter 17 of the ESIA).

The assessment of cumulative environmental impacts likely to result from the Troilus mine project in combination with other physical activities is presented in the following sections. Because of the uncertainty surrounding development, i.e., the timing, location and magnitude of reasonably foreseeable future activities, mitigation measures and reclamation of each physical activity, the assessment of cumulative impacts is largely qualitative.

#### 25.3.1.4 Cumulative impact assessment

##### Cumulative Impact Pathway

A mining project in the advanced exploration phase, Moblan project, has been identified in the study area, approximately 42 km from the Troilus site. According to the impact study carried out in 2019 for Moblan development, approximately 161 hectares will be deforested in the project area. In addition to this area, a linear infrastructure, a 25 kV power line, is proposed

The preliminary compensation study (Hatch, 2019), carried out as part of the environmental and social assessment of Moblan project, states that, " Les données écoforestières consultées auprès du MFFP montrent que l'emprise de vingt mètres du tracé proposé couvre 82 ha, dont 62 de forêt productive soit près de 75 % du tracé, principalement composée de peuplements âgés de zéro à vingt ans. "<sup>2</sup>

<sup>2</sup> Ecoforestry data consulted with the MFFP show that the twenty-metre right-of-way of the proposed route covers 82 ha, including 62 ha of productive forest, or nearly 75% of the route, mainly composed of stands between zero and twenty years old.

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The potential impacts of the Moblan project include a permanent disturbance of 223 ha, part of which lies outside the study area, specifically the eastern portion of the proposed power line. It is important to note that the Moblan project is undergoing a revision of its environmental assessment, which could lead to adjustments in anticipated disturbances.

It should be recalled that 56.5% or 4,435 km<sup>2</sup> of the study area (the portion north of the mine) is outside the forest harvesting zone, and therefore only the southern portion representing 43.5% or 3,414 ha of the study area is subject to anthropogenic disturbances associated with forest harvesting. Of this remaining area, 932 km<sup>2</sup> of temporary anthropogenic disturbance corresponding to logging areas are currently inventoried. In addition, 640.8 km<sup>2</sup> of temporary natural and anthropogenic disturbance have been identified in the study area.

It is important to note that temporary anthropogenic disturbances, such as logging, can, after several decades, go back to potential habitat for woodland caribou. However, as indicated in the study conducted by the MFFP in 2021, forest management, by modifying habitat composition and configuration, leads to increased predation pressure on caribou, resulting in an apparent competition phenomenon. Thus, even if some disturbances are temporary, habitat modifications may become permanent, potentially reducing the probability of caribou occurrence in these areas.

#### Mitigation Measures for Cumulative Impacts

While any industrial project will have some impact, the context of the current project and the proposed mitigation measures mean that the relative impact of the Troilus project on the Assinica and Témiscamie populations of woodland caribou is low compared with more disruptive anthropogenic disturbances on a regional scale. Furthermore, Troilus Gold's proposed compensation projects, including forest road closures, if approved, could effectively restore a greater area of habitat than the new project plans to disturb, if we consider a 750 m buffer zone around forest roads.

The residual impacts of the Troilus project on woodland caribou, a sentinel and umbrella species of terrestrial wildlife in the region, are expected to be mitigated by the following facts and measures:

- Implementation of an awareness program and transportation protocol to reduce the risk of collision and disturbance of woodland caribou;
- Troilus Gold will reduce the opening of forest roads to the minimum necessary and will favour exploration by helicopter when no existing access is available;
- The proposed project will take place in an already disturbed area that is avoided by woodland caribou;
- No major new linear infrastructure is anticipated (e.g. power line, access road). A few modifications to existing linear infrastructure are proposed, but these represent detour from the existing mine;
- The development of future mining infrastructures (waste rock piles, pits, tailing facilities) is mostly located within the 750 m buffer zone of existing disturbances, so the increase in the disturbance zone is negligible, especially considering that the occurrence density of 0 to 5 km from the mine is 0.3 and 0.1 occurrences per km<sup>2</sup> for the Assinica and Témiscamie populations respectively;

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- Compensation projects aimed at the permanent closure of access roads within the Assinica and Témiscamie herd areas are proposed. Their implementation would help reduce fragmentation and degradation of caribou habitat, limit access to the territory and, consequently, reduce the risk of poaching and predation.

#### Residual Cumulative Impacts

The existing Troilus mine site, including the access road to the site and the power line serving the site, represents approximately 131 km<sup>2</sup> of permanent anthropogenic disturbance. It should be noted that part of this disturbance is due to the presence of the Route du Nord, which is not considered an impact specific to the project. The impacts of the project would represent a negligible increase in anthropogenic disturbance, being all located within the 0 to 5 km sector of the existing mine, which is already highly avoided by woodland caribou (0.3 and 0.1 caribou/km<sup>2</sup>, Assinica and Témiscamie populations respectively). Furthermore, the impact of noise and light disturbance associated with industrial and recreational activities on caribou behaviour is considered low (MFFP, 2021).

According to the study conducted by Rudolph et al (2012) and presented to the MRNF and the Grand Council of the Crees (GCC), the critical values theoretically required to ensure population stability have not been reached for the Assinica and Témiscamie herds.

This conclusion, reached in 2012, indicates that the decline of the Assinica-Témiscamie woodland caribou population has probably worsened since then, despite the implementation of protection measures. Several factors limit the exploitation of new areas in the study zone. Most of the forest harvesting areas have already been logged, reducing the availability of harvestable land. In addition, the presence of temporary and permanent disturbances such as forest fires, existing mining infrastructure and linear infrastructure (roads, power lines) further limits anticipated disturbances. Finally, approximately 56.5% of the study area is not subject to logging, confirming the low potential for opening new areas.

Woodland Caribou are particularly sensitive to disturbance. Its preferred habitat comprises vast areas of mature boreal forest, peat bogs and lichen barrens, characterized by high connectivity and a low rate of natural and anthropogenic disturbance (Environment Canada [EC], 2008 and 2012; Équipe de rétablissement du caribou forestier du Québec, 2013). Based on these observations, cumulative impacts, assessed at the spatial and temporal boundaries of the study area, are considered high, but comparable to the impacts already present.

#### 25.3.1.5 Cumulative impact without the project

It is reasonable to assume that the development of other future physical activities, particularly in the mining sector, will continue in the RSA, whether the project occurs or not. Indeed, the Troilus project is just one of 14 mining projects currently under consideration in the Nord-du-Québec region, where the mining industry represents a major vector of economic development.

It is also reasonable to assume that current physical activities, such as forestry and infrastructure improvements, will continue regardless of the project's status. In the same way, the many conservation projects undertaken by the Cree Nations and the provincial government, particularly regarding woodland caribou, will help to preserve the region's environment and protect areas of interest.

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Historically, as illustrated in Map 25.1, past and present physical activities have mainly been concentrated along existing roads, and it is likely that areas located near these and other existing infrastructures will continue to serve as areas for future development.

Thus, in the absence of the project, the anticipated cumulative impacts on terrestrial and avian fauna should remain comparable to those projected with its completion.

#### **25.3.1.6 Summary of residual cumulative impacts**

Table 25.4 summarizes the residual impacts on terrestrial and avian fauna.



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**Table 25.4 Residual cumulative impacts of the project on terrestrial and avian fauna**

Residual Cumulative Impacts	Residual Cumulative Impacts Characterization						
	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
<b>Loss Habitat And Fragmentation</b>							
With project	N	H	RSA	HS	MT-LT	C	R
Without project	N	H	RSA	HS	MT-LT	C	R
<b>Mortality risks</b>							
With project	A	H	RSA	HS	MT-LT	C-IR	I
Without project	A	H	RSA	HS	MT-LT	C-IR	I
<b>Change intravel habits</b>							
With the project	A	H	RSA	HS	MT-LT	C	R
Without project	A	H	RSA	HS	MT-LT	C	R

**KEY**  
See Chapter 7 for detailed definitions

**Direction:**  
P: Positive  
A: Adverse

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

**Geographic Extent:**  
PDA: Project Development Area  
LSA: Local Study Area  
RSA: Regional Study Area

**Timing:**  
NS: No sensitivity  
MS: Moderate sensitivity  
HS: High sensitivity

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

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

**Reversibility:**  
R: Reversible  
I: Irreversible



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#### **25.3.1.7 Prediction Confidence**

The impact of climate change was not included in the cumulative impacts assessment due to the lack of sufficient data on its specific influence on the woodland caribou population. However, it is reasonable, with a high level of confidence, to assume that these changes could increase the probability of natural disturbances such as insect outbreaks and forest fires. Changes in interspecific competition could also occur, but their impact is likely to remain low due to the temporal limits examined and the level of influence of this element on woodland caribou. Furthermore, current and future climate change could lead to a northward shift in the caribou's climatic niche and a reduction in its range (Gamache and Payette, 2005; Racey, 2005; Harsch et al., 2009; Masood et al., 2017; Barber et al., 2018).

#### **25.3.2 Land and Resource Use**

##### **25.3.2.1 Existing conditions and evolutionary trend**

The Troilus project site lies within the territory of the Eeyou Istchee James Bay Regional Government (EIJBRG) and is located northwest of the community of Mistassini, across Lake Mistassini, on land reserved for the Cree of this community. The project is located in an unorganized territory (TNO), on Category II and III lands. The nearest communities are the Cree communities of Mistissini and Oujé-Bougoumou, and the towns of Chapais and Chibougamau.

The Cree community of Mistissini is located along the shores of Lake Mistassini and is accessible via Route 167. It is the largest community in the region. Its traditional territory covers approximately 127,700 km<sup>2</sup>. Following major mining developments in the region over the years, the Oujé-Bougoumou Cree community relocated several times, and finally settled in 1992 on the shores of Lac Opémisca, near Chibougamau. It was recently recognized as a distinct community and granted Category I and II lands.

Chapter 19 (section 19.2.3) of the ESIA presents a detailed picture of current land use by Cree communities in the project study area. This area includes several traplines (M34, M35A, M39A, M40) actively used for traditional activities such as hunting, fishing, trapping and gathering. Two permanent Cree camps are located near Lake A, and several other camps, including seasonal sites, are scattered throughout the region. Relocation projects are underway for some of them in anticipation of the mine's reopening.

Transportation across the territory is carried out via the Route du Nord, forest roads, unmarked snowmobile trails and waterways with portages. Hunting activities target moose, bear, ptarmigan and hare, while beaver is the main species trapped. Fishing is practiced in several lakes, including Lac A, Boisfort, Canotaicane, Robineau and Troilus, where harvested species include walleye, pike, speckled trout and whitefish. Blueberries, Labrador tea and other medicinal plants are also common.

Subsistence harvesting is central to the lifestyle of Cree families. Some families estimates that up to 70% of their food comes from hunting, fishing and gathering. This food is shared with extended families, strengthening community ties. Important cultural elements are also present in the area, such as Maskawuti Hill, birth site, burial sites and a legend site.

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Finally, navigation is practiced on several lakes and rivers, although some waterways within the PDA are considered non-navigable at present. All these uses reflect a deep and continuing connection between the Cree communities and their territory, a connection that the mining project could significantly affect if mitigation measures are not implemented.

Historically, the Cree have carefully planned the use of their territory, respecting the land, animals and natural resources. This traditional planning encompassed hunting, fishing, trapping, gathering and transportation, always with a view to sustainability and balance.

With the increasing arrival of non-indigenous and the development of activities such as the fur trade, mining, forestry, hydroelectricity and tourism, ecosystems have been transformed. These changes have disrupted traditional practices and wildlife behavior. Despite this, the Cree have continued to plan their lives on the land use, while adapting to these new realities (Hennigs, 2017).

Since the signing of the James Bay and Northern Quebec Agreement in 1975, the Cree Nation has established more than 75 agreements with the federal and provincial governments. This agreement constitutes the fundamental charter of Cree rights, covering areas such as governance, health, education, justice, environment, hunting and fishing rights, and economic development. It has been amended several times to adapt to the Nation's changing needs. The following sections outline the key agreements between the Cree Nation and government entities that have shaped governance particularly with respect to land use (Cree Nation Government [CNG], 2015).

In 2002, the Paix des Braves Agreement marked a turning point by establishing a new relationship between the Cree and the Government of Quebec, based on collaboration and mutual respect. It gave the Cree greater autonomy in economic and community development, while introducing an adapted forestry regime and conflict resolution mechanisms.

In 2008, a similar agreement was signed with the Government of Canada. This federal agreement enabled the Cree to assume certain federal responsibilities, receive long-term funding, and negotiate a governance agreement.

The 2012 Governance Agreement strengthened Cree autonomy on Category II lands and established a public regional government on Category III lands, shared between the Cree and Jamesians.

In 2017, the Cree Nation Governance Agreement and the Cree Constitution were adopted, replacing the Cree-Naskapi (of Quebec) Act. These instruments give the Cree the power to legislate on a wide range of local and regional matters, without federal oversight, consolidating their right to self-government.

Thus, current planning aims to maintain the balance: developing and protecting Eeyou Istchee so that future generations can continue to live, hunt, learn and work there (CNG, 2015).

According to consultations conducted by the Eeyou Planning Commission in 2017, the issues identified by the community include pressure from the forest industry, the decline in Cree occupation and cultural transmission, limited control over development, access to the territory and non-Cree occupation. The vision for the future focuses on protecting the environment, integrating land users into decision-making, supporting the transmission of Cree knowledge, recognizing Cree governance and preparing the next generation.

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#### 25.3.2.2 Study area

As mentioned in section 19.1.4.1 of Chapter 19 of the ESIA, the RSA of the Land and resource use VC has been delimited to correspond to the territory where potential cumulative impacts may occur. The RSA corresponds to the boundaries of traplines M34, M39A, M40 and M35A, as shown on Map 19.1 in Chapter 19.

#### 25.3.2.3 Identification of residual impacts with potential to interact cumulatively.

Table 25.5 presents the physical activities inclusion list, which identifies other future physical activities planned in the RSA. Where the residual environmental impacts of the project may interact cumulatively with those of other physical activities, a cumulative impact assessment is carried out.

**Table 25.5 List of projects and physical activities with potential for cumulative impacts on the valued component of Land and resource use**

Projects and physical activities	Potential cumulative impacts		
	Change in Cree land and resource use	Change in land use and recreational resources of Jamesian communities	Change in navigation
<b>Past and present projects and physical activities</b>			
Mining	√	√	√
Surface mineral extraction	√	√	√
Community development	√	√	√
Forestry	√	√	√
Transportation	-	√	√
Energy	√	√	√
Recreational activities	-	-	-
Hunting, fishing, trapping	-	-	-
<b>Future projects and physical activities</b>			
Mining			
Moblan Lithium Project	√	√	-
Sirmac-Dike 5	-	-	-
Mont Sorcier	-	-	-
Scott Lake project	-	-	-
Black Rock	-	-	-
Corner Bay Complex	-	-	-
Bachelor	-	-	-
Windfall	-	-	-
Géant Dormant	-	-	-
Complexe Caber	-	-	-
Fénelon	-	-	-
Casa Berardi	-	-	-
Perron	-	-	-

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Projects and physical activities	Potential cumulative impacts		
	Change in Cree land and resource use	Change in land use and recreational resources of Jamesian communities	Change in navigation
Whabouchi	-	-	-
Rose lithium-tantalum	-	-	-
Galaxy	-	-	-
Eau Claire	-	-	-
Éléonore	-	-	-
Renard	-	-	-
Adina	-	-	-
Shaakichuwaanaan	-	-	-
Extraction of surface mineral substances			
Proposed extraction of natural deposits of aggregates on Category II lands by the First Nation of Waskaganish, James Bay Cree Nation	-	-	-
Quarry in the Area of the La Grande-3 Hydroelectric Development	-	-	-
Kakabat Granular Material Deposit Project by Cree Nation of Wemindji	-	-	-
Community development			
Municipal domestic waste landfill site in Waswanipi	-	-	-
Eastmain Water Supply System Phase II	-	-	-
Gasification Plant Project for the Community of Waskaganish			
Forestry			
Logging operations on forest management unit UA 026-61	✓	✓	✓
Wood pellet facility in Chapais	-	-	-
Transportation			
La Grande Alliance	-	✓	-
Construction of forest access roads "H section West" and "I"	-	-	-
Extension of forest road L209-Nord	-	-	-
Construction of forest road E west	-	-	-
Chibougamau intermodal logistics center project (CLIC)	-	-	-
Energy - Electricity			
Chapais Énergie cogeneration plant - Temporary stormwater detour	-	-	-
Chapais Énergie cogeneration plant - Increase in untreated bark storage capacity	-	-	-
Whapmagoostui Kuujjuaraapik hybrid power plant	-	-	-
EM-1-A / EM-1-A-Rupert / Rivière Rupert	-	-	-

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

### CUMULATIVE IMPACTS ASSESSMENT

Projects and physical activities	Potential cumulative impacts		
	Change in Cree land and resource use	Change in land use and recreational resources of Jamesian communities	Change in navigation
Connection of the Rose lithium-tantalum mine	-	-	-
161 kV BlackRock Metals mining property electricity service project BlackRock inc.	-	-	-
Recreational activities			
Nibiischii National Park	✓	✓	✓
Albanel-Mistissini-Waconichi Lakes Wildlife Preserve Dark Sky Project	✓	✓	✓
Conservation activities			
Interim Measures for Woodland Caribou	✓	✓	✓
Territories set aside as reserves	✓	✓	✓

**Notes:**

✓ = Other physical activities whose residual impacts are likely to interact cumulatively with the residual impact of the project.

- = Interactions between residual impacts of other physical activities and residual impacts of the project are not anticipated or the project is located outside the RSA

Existing land-use conditions associated with past and present physical activities in the LSA and RSA are presented in Section 19.2 of Chapter 19 of the ESIA. Thus, the contribution of existing projects and activities, including impacts related to mine development, is considered in the assessment of the project's residual impacts (Section 19.4 of Chapter 19 of the ESIA).

The assessment of cumulative impacts likely to result from the Troilus Mine project in combination with other physical activities is presented in the following sections. Because of the uncertainty surrounding future development, i.e., the timing, location and magnitude of reasonably foreseeable future activities, mitigation measures and reclamation of each physical activity, the assessment of cumulative impacts is largely qualitative.

#### 25.3.2.4 Cumulative Impact Assessment

##### Cumulative Impact Pathway

Potential cumulative impacts arising from past, present and future physical activities have the same impact pathways as those of the Chapter 19 ESIA project. They also are likely to result in a cumulative increase on changes in land and resource use for both Cree and Jamesian users.

Future physical activities may generate disturbance (noise, dust) that could disrupt the tranquility of the area and affect land users, including both Cree and Jamesian users (loss of traditional harvesting sites and Cree use of the land, disruption of recreational activities of on-Indigenous visitors to the Assinica and Albanel-Mistassini-and-Waconichi (AMW) Wildlife Reserves, such as camping, water sports and fishing).

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#### Mitigation measures for Cumulative Impacts

The mitigation measures proposed in sections 19.4.1.2 and 19.4.2.2 of Chapter 19 of the ESIA, including measures to reduce the footprint of new physical activities on the territory, the disturbances (atmospheric, noise and landscape) and those related to restoration activities developed in collaboration with land users, should reduce and mitigate the cumulative impacts of the Troilus project and other projects and physical activities on Land and resource use in the RSA. No additional mitigation measures are proposed to reduce the project's contribution to cumulative impacts on Land and resource use.

Future physical activities may require provincial or federal permits and approvals. These processes require future proponents to identify and assess potential impacts on VCs that could affect Land and resource use (for example, Surface Water Quality and Groundwater Quality, Atmospheric Conditions, Acoustic Environment, Vegetation, Riparian and Wetland Environments, or terrestrial and avian fauna as well as Fish and Fish Habitat), and to identify and implement mitigation measures identified through the permitting and approval processes, where appropriate, to reduce their contributions to cumulative impacts on environmental quality, which affect land use.

#### Residual cumulative impacts

Existing conditions reflect the cumulative impacts of past and present physical activities. Past and present physical activities that have been or are being carried out have influenced existing conditions of Land and resource use in the LSA (Section 19.2 of Chapter 19 of the ESIA).

With regard to changes in Cree land and resource use, the adverse residual impacts of the project, including impacts on navigation activities, are expected to be low to moderate in magnitude, limited to the PDA for navigation and to the RSA for other traditional activities, of short to medium duration, continuous, but reversible for land use, whereas they will be irreversible for the loss of navigation. Regarding impacts on changes in land use and recreational resources for Jamesian communities, residual impacts are expected to be low in magnitude, short to medium duration, continuous, but reversible.

Given the project's location, users of the LSA territory are among those most impacted by the mining project. For this reason, Troilus has been working with land users and the Cree Nation since early project development stages of the new mine, to integrate several mitigation measures into the project design. For example, Bibou Creek was designed to maintain fish passage between PE2 (Upstream Lake) and PE43 (Lake A). This connection will be maintained after closure, as requested by land users. Their concerns about the former mining operation (closed in 2008) were also considered during the ESIA design and process. The recreational activities offered by the Nibiischi Corporation were also considered, as were the measures proposed by Troilus, notably in terms of road safety and light pollution reduction. These measures will continue to enable the coexistence of uses between the mine and Nibiischi Corporation.

Future physical activities could lead to additional health-related changes in the RSA. Certain projects or interventions, such as forestry activities, could cause temporary disturbances to air quality, noise and large fauna. Other activities, such as mining or road construction, could have longer-term impacts.

Within the boundaries of the RSA, two mineral exploration projects are likely to interact with the Troilus Mine in terms of cumulative impacts on Land and resource use.

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First, the Moblan Lithium project, located about 45 km southwest of the Troilus project, could have similar impacts to those predicted for the Troilus project. Several of these infrastructures, including the electrical installations that will be the subject of another independent project led by Hydro-Québec, are located on the same trapline boundaries, i.e. M40 and M39. The project could also disrupt caribou migration corridors, notably through its footprint. The combination of the Troilus project and the Moblan mine could therefore have a combined impact on wildlife disturbance. Habitat disturbance may cause some species to modify their movement patterns to access new habitats more suited to their needs, while barriers created by linear infrastructure or transmission lines may reduce connectivity between wildlife habitats. Avoidance of the area on a border scale could be observed as it would encompass both the Troilus and Moblan project zones. Thus, changes in wildlife behaviour leading to avoidance of the area could alter, or even compromise, harvesting habits and success of land users. As was the case during the former Troilus mining operation, users will have to adapt their harvesting activities to the new wildlife movement corridors, until the mine is fully rehabilitated and wildlife species reclaim the former mining sites.

Like all mining projects, the Frotet mine project, still in the exploration phase, could also have impacts similar to those of the Troilus and Moblan mines, and could therefore intensify pressures on Land and resource use. Disturbance associated with the increased presence of trucking in the area could be perceived cumulatively by land users, particularly those living on the periphery of access roads and the Route du Nord. Fishing activities should not be disrupted by the accumulation of projects in the LSA, except for the Frotet project, which is in the same watershed as the Troilus project. The possibility of Troilus' residual impacts accumulating with those of the Frotet project should be considered, although it is difficult to assess at this stage. Indeed, given the uncertainties surrounding the Frotet project's start date and scope, it is difficult to assess the exact magnitude of the cumulative impact with the Troilus project.

Finally, the adverse impacts of the Troilus project on navigation are low and limited to the PDA and should not be added to the other projects mentioned above. The accumulation of mining projects in the region, more specifically in the RSA, namely Troilus, Moblan and Frotet, as well as potential forestry projects, nonetheless accentuates the pressure on land use traditionally occupied by Cree communities. The associated disturbances to land and resource use would be of moderate to high in magnitude, of long duration, continuous but reversible. Troilus' contribution to cumulative impacts is considered moderate. Furthermore, many of the adverse land-use impacts associated with the disruption of harvesting activities can be considered mitigated by other current and future projects in the LSA.

The cumulative impacts of the Troilus project with potential forestry activities in the forest management unit UA 026-61 within the RSA are negligible to low, since the potential for forestry activities in the RSA is evaluated low. In fact, considering that the areas nearby the PDA and along la Route du Nord have already been logged in the past, and that various conservation projects limit industrial activities, including mining and logging, the potential for future logging remains limited. In addition, part of the LSA, and especially the PDA, is subject to the Interim measures for woodland caribou, where logging is not permitted until the Provincial Woodland and Mountain Caribou Strategy is in place. The new Assinica park project, associated with the various biological refuges and reserved areas, constitutes a physical and regulatory barrier to the expansion of industrial activities. This protection contributes indirectly to mitigate the cumulative impacts of the Troilus project by reducing the overall footprint expected from human disturbance in the RSA. Indeed, these conservation projects, developed through partnerships between

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the Cree Nation and the government of Quebec, aim to preserve sensitive ecosystems and maintain traditional uses within a framework of shared governance. The Troilus project should therefore generate a few adverse cumulative impacts with these projects.

As for the residual environmental impact of a change in air quality and ambient lighting, which is expected to be negligible, and considering that the noise levels predicted during the various phases meet federal guidelines, the Troilus project's contribution to cumulative impacts related to disturbance is considered negligible to low for Cree and Jamesians land users, as well as for visitors.

In conclusion, considering the proposed measures by Troilus to reduce disturbance (noise, light and dust), ensure better cohabitation of uses and a continuous collaboration and communication with local stakeholders, including the Nibiischi Corporation, the residual cumulative impacts on increased use of the territory by visitors are low, limited to the RSA, long-term, continuous but reversible.

#### **25.3.2.5 Cumulative impact without the project**

It is reasonable to assume that the development of other future physical activities in the RSA will continue to occur, and that current physical activities such as forestry, mining and recreational activities offered by the Outfitterand wildlife reserves (Assinica and AWM) will continue, whether the project occurs or not

Historically, as illustrated in Map 25.1, past and present physical activities have been concentrated mainly along existing roads, and it is likely that areas located near these and other existing infrastructures will continue to serve as areas for future development. Thus, without the Project, future cumulative impacts on Land and resource use are likely to be less, but similar.

#### **25.3.2.6 Summary of residual cumulative impact**

Table 25.6 summarizes the residual cumulative impacts on Land and resource use.

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**Table 25.6 Residual cumulative impacts of the project on Land and Resource Use**

Residual Cumulative Impacts	Residual Cumulative Impacts Characterization						
	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Change in Cree use of land and resources							
With project	N	M	RSA	N/A	ST-MT	C	R
Without project	N	M	RSA	N/A	MT	C	R
Change in land use and recreational resources in Jamesian communities							
With project	A	L	RSA	N/A	ST-MT	C	R
Without project	A	L	RSA	N/A	LT	C	R
Change in navigation							
With project	A	L	PDA	N/A	MT	C	I
Without project	A	L	RSA	N/A	MT	C	I

**KEY**

See Chapter 7 for detailed definitions

**Direction:**

P: Positive

A: Adverse

**Magnitude:**

NMC: No Measurable Change

L: Low

M: Moderate

H: High

**Geographic Extent:**

PDA: Project Development Area

LSA: Local Study Area

RSA: Regional Study Area

**Timing:**

NS: No sensitivity

MS: Moderate sensitivity

HS: High sensitivity

**Duration:**

ST: Short term

MT: Medium-term

LT: Long-term

N/A: Not applicable

**Frequency:**

S: Single event

IR: Irregular event

R: Regular event

C: Continuous

**Reversibility:**

R: Reversible

I: Irreversible

### 25.3.2.7 Prediction Confidence

Confidence in predictions for the determination of other future activities is considered moderate, although it is based, as far as possible, on public information such as impact studies for future projects. Given the uncertainty surrounding whether the projects occurs or not, which remain dependent on economic conditions, the level of confidence derived from the literature review, especially from interviews, is considered "moderate to high", insofar as this is a recognized and proven methodology in the social sciences.

#### 25.3.3 Infrastructure and Services

##### 25.3.3.1 Existing conditions and evolutionary trend

###### Existing Conditions

The Troilus mining project's Local Study Area (LSA) and Regional Study Area (RSA) are in a territory historically shaped by mining and forestry exploration. These activities have had a profound influence on Land and resource use, infrastructure distribution and public services organization. Today, these resources are concentrated in a few key regional hubs: the towns of Chibougamau and Chapais, and the Cree communities of Oujé-Bougoumou and Mistissini, as illustrated in chapter 20 of the ESIA.

Founded in 1954 and 1955 respectively, Chibougamau and Chapais experienced strong economic growth during the 1960s and 1970s, becoming major copper production centers in Eastern Canada (Ville de Chibougamau, 2021; CTQ, 2012; Boileau, 1999). Industrial development has structured transportation, health, supply and education networks. However, these networks, designed for a high-intensity extractive economy, struggle today to meet contemporary needs, both in terms of capacity and quality of service. Nevertheless, these two municipalities continue to play a strategic role in the delivery of services on a regional scale, including to neighboring Cree communities.

Oujé-Bougoumou stands out for its resilience. Following multiple forced relocations in the 20th century due to the expansion of the mining and forestry industries, the community established its permanent village in 1992, near Lac Opémisca, close to Chibougamau. Although this territorial recognition is relatively recent, the community still faces challenges to access to public services and participating in land-use planning decision-making processes (OBCN, 2025; Noisecat, 2020).

Mistissini, with a population of 3,731 in 2021 (Statistics Canada, 2022), is the largest population center in Eeyou Istchee, and with well-established institutions in health, education and governance, it acts as an essential complementary regional hub, particularly regarding services for Cree populations (CNG, 2023; Cree School Board [CSB], 2023).

In this context, public infrastructure and services within the LSA/RSA are already showing signs of saturation. The towns of Chapais and Chibougamau face several challenges, including housing shortages, limited sewer system capacity, underfunded health services and increased use of transportation infrastructure.

According to the 2016 and 2021 censuses, the vacancy rate in Chapais and Chibougamau remains well below the equilibrium threshold of 3%, indicating a tight rental market. In Chapais, nearly 18% of households live in core housing need conditions, a rate three times higher than the provincial average. This situation is exacerbated by the high proportion of housing inadequate to the size of the concerned households.

Sanitation and waste management services are also affected. The absence of a wastewater treatment plant in Chapais results in direct discharges into the environment. Although improvement projects are underway, the town is still dependent on the Chibougamau landfill site. The deployment of a regional composting platform could help reduce this pressure.

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The regional healthcare system relies primarily on the Centre de santé René-Richard in Chapais and the Hôpital de Chibougamau. These establishments are facing a chronic shortage of medical staff, limiting their ability to meet the growing demand for health care, particularly in the surrounding Indigenous communities, where access to services is often restricted by distance, lack of qualified human resources and the complexity of organizing care. In addition, the supply of specialized services, particularly for seniors and in mental health, remains inadequate throughout the territory. Although certain projects are under development, such as the construction of a seniors' center in Mistissini, these will have to be rolled out rapidly to meet the growing needs of the population and ensure equitable access to services for all vulnerable groups.

Transportation infrastructures are also in demand, mainly due to the expansion of the mining industry. The Route du Nord, Troilus Road and other regional roads are essential to the logistics of current projects, particularly for the transportation of workers and materials. Their current capacity raises concerns regarding safety, sustainability and maintenance. In a vast, sparsely populated and poorly served territory, the towns of Chapais and Chibougamau act as key hubs for transportation, supply and specialized services. However, their capacity to absorb additional pressure is limited. Regional air transport, likely to be intensified by the mobilization of workforce, could put further pressure on already limited airport infrastructures.

#### Evolutionary trends of the VC

The current dynamics reveal a growing imbalance between the intensification of industrial activities and the capacity of infrastructure and services to support this growth in the LSA/RSA.

Initially designed to support occasional occupation of the territory by isolated industrial projects, regional networks are now showing their limits in the face of constant pressure. The demographic characteristics (growth of the Cree community and decline of the Jamesian community), the increase in the number of people coming from outside the region for employment, the evolution of social needs and the growth of economic projects, including the Troilus project, accentuate these constraints.

Cree communities, though strengthened by solid local governance, continue to face structural challenges in terms of access to specialized services, particularly in health, housing and support for the elderly. The arrival of new industrial projects could exacerbate these tensions if investment and planning measures are not put in place to adjust regional capacities.

In the medium to long term, failure to proactively adapt infrastructure could:

- Strengthen social and territorial inequalities;
- Compromise quality of life;
- Undermine regional cohesion and the social acceptability of projects.

An integrated strategic response is therefore essential to support the transformation of the territory in a perspective of sustainability and equity.

The past temporal limit corresponds to the creation of the town of Chibougamau in 1954, while the future temporal limit corresponds to the closure and decommissioning of the mine scheduled for around 2055.

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### 25.3.3.2 Study area

As mentioned in Section 20.1.4.1 of Chapter 20 of the ESIA, the RSA for the Infrastructure and Services VC has been delimited to correspond to the area where potential cumulative impacts may occur. This RSA for infrastructure and services overlaps with the LSA, since the latter already encompasses a sufficiently large area to assess cumulative impacts. The LSA/RSA is shown on Map 20.1 in Chapter 20.

### 25.3.3.3 Identification of residual impacts with potential to interact cumulatively

Table 25.7 presents the physical activity inclusion list, which identifies other future physical activities planned within the RSA/LSA. Where the residual environmental impacts of the project may interact cumulatively with those of other physical activities, a cumulative impact assessment is carried out.

**Table 25.7 List of projects and physical activities with potential for cumulative impacts on the valued component of infrastructure and services**

Projects and physical activities	Potential cumulative impacts		
	Change in availability of temporary housing and accommodation	Change in demand for infrastructures and services	Change in demand for transport infrastructure
<b>Past and present projects and physical activities</b>			
Mining	√	√	√
Surface mineral extraction	√	√	√
Community development	√	√	√
Forestry	√	√	√
Transportation	-	√	√
Energy	√	√	√
Recreational activities	√	√	√
Hunting, fishing, trapping	-	-	-
<b>Future projects and physical activities</b>			
Mining			
Moblan Lithium Project	√	√	√
Sirmac-Dike 5	√	√	√
Mont Sorcier	√	√	√
Scott Lake project	√	√	√
Black Rock	√	√	√
Corner Bay Complex	√	√	√
Bachelor	-	-	-
Windfall	-	-	-
Géant Dormant	-	-	-
Complexe Caber	-	-	-
Fénelon	-	-	-
Casa Berardi	-	-	-

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Projects and physical activities	Potential cumulative impacts		
	Change in availability of temporary housing and accommodation	Change in demand for infrastructures and services	Change in demand for transport infrastructure
Perron	-	-	-
Whabouchi	✓	✓	✓
Rose lithium-tantalum	-	-	-
Galaxy	-	-	-
Eau Claire	-	-	-
Éléonore	-	-	-
Renard	✓	✓	✓
Adina	✓	✓	✓
Shaakichuwaanaan	-	-	-
<b>Extraction of surface mineral substances</b>			
Proposed extraction of natural deposits of aggregates on Category II lands by the First Nation of Waskaganish, James Bay Cree Nation	-	-	-
Quarry in the Area of the La Grande-3 Hydroelectric Development	-	-	-
Kakabat Granular Material Deposit Project by Cree Nation of Wemindji	-	-	-
<b>Community development</b>			
Municipal domestic waste landfill site in Waswanipi	-	-	-
Eastmain Water Supply System Phase II	-	-	-
Gasification Plant Project for the Community of Waskaganish			
<b>Forestry</b>			
Logging operations on forest management unit UA 026-61	✓	✓	✓
Wood pellet facility in Chapais	✓	✓	✓
<b>Transportation</b>			
La Grande Alliance	✓	✓	✓
Construction of forest access roads H section West " and " I "	-	-	-
Extension of forest road L209-Nord	-	-	-
Construction of forest road E west	-	-	-
Chibougamau intermodal logistics center project (CLIC)	✓	✓	✓
<b>Energy - Electricity</b>			
Chapais Énergie cogeneration plant - Temporary stormwater detour	✓	✓	✓
Chapais Énergie cogeneration plant - Increase in untreated bark storage capacity	✓	✓	✓
Whapmagoostui Kuujjuaraapik hybrid power plant	-	-	-

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Projects and physical activities	Potential cumulative impacts		
	Change in availability of temporary housing and accommodation	Change in demand for infrastructures and services	Change in demand for transport infrastructure
EM-1-A / EM-1-A-Rupert / Rivière Rupert	-	-	-
Connection of the Rose lithium-tantalum mine	-	-	-
161 kV BlackRock Metals mining property electricity service project BlackRock inc.	✓	✓	✓
Recreational activities			
Nibiischii National Park	✓	✓	✓
Albanel-Mistissini-Waconichi Lakes Wildlife Preserve Dark Sky Project	✓	✓	✓
Conservation activities			
Interim Measures For Woodland Caribou	✓	✓	✓
Territories set aside as reserves	✓	✓	✓

**Notes:**

✓ = Other physical activities whose residual impacts are likely to interact cumulatively with the residual impact of the project.

- = Interactions between residual impacts of other physical activities and residual impacts of the project are not anticipated or the project is located outside the RSA

Existing infrastructure and services conditions (i.e., housing and temporary accommodation, utilities, health and social services and infrastructure, education and childcare services and infrastructure, and transportation infrastructure services) associated with past and present physical activities in the RSA/LSA are presented in Section 20.2 of Chapter 20 of the ESIA. Thus, the contribution of current projects and activities, including impacts related to the Troilus mining development, is considered in the assessment of the project's residual impacts (Section 20.4 of Chapter 20 of the ESIA).

The assessment of cumulative impacts likely to result from the Troilus mine project in combination with other physical activities is presented in the following sections. Because of the uncertainty surrounding the development, mitigation and reclamation of each physical activity, the assessment of cumulative impacts is largely qualitative.

#### 25.3.3.4 Cumulative Impact Assessment

##### Cumulative Impact Pathway

According to a report by the Quebec Mining Association (AMQ) (EcoTec Consultants, 2024), the workforce available in the Nord-du-Québec region for the mining sector is limited, and it did not exclude that the project may require recruitment from outside the RSA/LSA and the Nord-du-Québec region. Future projects and physical activities, particularly those related to mining and forestry, are also likely rely on external workforce, which will result in new residents settling in the towns of Chapais and Chibougamau. The impact pathways for cumulative impacts on infrastructure and services are thus similar to those resulting from the project. Indeed, the influx of newcomers to the region and to the

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communities of the RSA/LSA to meet the labour needs of the Troilus project, and other projects that overlap within the spatial and temporal limits of the Troilus project, will lead to an increase in the population of the Jamesian communities. This increase in the number of inhabitants is likely to increase the demand for housing, thus accentuating the current housing shortage in the RSA/LSA, as well as the demand for services and infrastructure. Moreover, some projects will use the same roads as those selected for the Troilus project, such as the Route du Nord. Increased traffic on local road networks could therefore affect road conditions and pose additional safety risks for road users.

#### Mitigation measures for Cumulative Impacts

The mitigation measures proposed in sections 20.4.1.2, 20.4.2.2 and 20.4.3.2 of Chapter 20 of the ESIA should reduce and mitigate the cumulative impacts of the Troilus project and projects and physical activities on infrastructure and services in the RSA/LSA.

Indeed, Troilus' commitment to local recruitment - prioritizing hiring in local communities and in the region, training and education, shift accommodations, and traditional and cultural activities for Cree employees - should help reduce pressures on the housing and temporary housing market. Safety and emergency measures implemented on the Troilus site itself, as well as Troilus' various internal policies and training programs, will help reduce demands on local community infrastructure and services, including transportation infrastructure and services. Troilus also relies on continuous communication, collaboration and partnerships with local Cree and Jamesian communities to help them manage and adapt services and infrastructure throughout the life cycle of the mining project.

In addition to the measures already proposed to reduce the residual impacts of the project, no other measures have been taken to limit the cumulative impacts of the project with other activities on infrastructure and services.

Future physical activities may require provincial or federal permits and approvals. These processes require future proponents to identify and assess potential impacts on VCs that could affect that of infrastructure and services (e.g., economic conditions and health), and to identify and implement appropriate mitigation measures. Present and future physical activities are expected to implement mitigation measures identified through permitting and approval processes, where appropriate, to reduce their contributions to cumulative impacts on environmental quality, which affects the physical and social determinants of health.

#### Residual cumulative impacts

Past and present natural resource development projects and activities, including mining, have shaped the history of the towns of Chapais and Chibougamau, as well as that of the Cree communities of Oujé-Bougoumou and Mistissini, as presented in section 25.4.5.1. The cumulative impacts of these activities reflect the current conditions of infrastructures and services in the RSA/LSA (section 20.2 of chapter 20 [Infrastructure and services] of the ESIA).

The residual adverse impact on housing availability in the RSA/LSA of the Troilus project was considered to be of moderate magnitude, limited to the LSA/RSA, over the medium term and will occur on a continuous basis. The residual impact was considered to be of moderate significance. As for the residual

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adverse impact on infrastructure and services in the RSA/LSA, it was considered to be low to moderate in magnitude, limited to the LSA/RSA, over the medium term and occurring on a continuous basis. The residual impact was judged to be moderate. Adverse residual impacts on transport infrastructures and services during the construction, operation and closure phases were considered moderate, limited to the LSA/RSA and over the medium term, continuous and reversible. The significance of the residual impact was therefore evaluated as moderate.

The influx of new workers into the RSA/LSA for the Troilus project will occur primarily during the construction phase, but also during the mine operation. As presented in section 21.2.2.6 of Chapter 21 [Economic Conditions] of the ESIA, the vacancy rate in the mining sector in Nord-du-Québec up to 2028 would be 46%. To meet the needs of the Troilus mining project and given the limited size of the workforce available in the LSA/RSA, the project may have to recruit from outside the LSA/RSA and the Nord-du-Québec region. A proportion of the workforce to be recruited from outside the LSA/RSA could settle with their families in the communities of the LSA/RSA (Chibougamau and Chapais), thereby increasing the number of residents in these communities. This influx of new residents for the Troilus project, which will be the largest during mine operation, will put additional pressure on available housing and temporary dwellings, infrastructure and services, including transportation infrastructure and services.

Future physical activities could lead to further changes in infrastructure and services in the RSA/LSA. Some projects or interventions, such as further mining projects and forestry activities, could create additional pressure on infrastructure and services that could extend over the medium to long term. Other activities, such as road construction, could, on the contrary, enhance existing infrastructures. The future activities most likely to cause cumulative impacts, as they are likely to occur at similar times to Troilus, are the mining projects currently under development in the area, namely Moblan Lithium, currently undergoing the environmental assessment process, and BlackRock, which has been authorized. The other mining projects, Mont Sorcier and Sirmac-Dike 5 could also start up while the Troilus mine is in operation.

The Moblan Lithium project is located 45 km from the Troilus mine site. According to the available provincial impact study report (Hatch, 2019), the approximately 200 employees of the Moblan mine will be housed at the mine site during the construction and operation phases. Weekly shuttles between Chibougamau, Mistissini and the mine site will provide transportation for employees. As for the BlackRock mining project (approximately 133 km from the Troilus site), the workers' camp initially planned on the mine site was abandoned as part of the application to amend the project's global certificate of authorization. It is now planned to install the 165 workers required during construction in housing available in the region (WSP, 2018). While these projects also intended to promote local employment and are expected to implement standard mitigation measures to avoid or reduce their impact on infrastructure and services, a residual cumulative impact on the change in availability of temporary housing and dwellings is anticipated, especially if the Mont Sorcier and Sirmac-Dike 5 mines are added. As for future mining exploration activities that could place additional demands on available housing, they will only act cumulatively with the Troilus project if they coincide in time. Given the labour shortage in the region, the forestry sector also relies on foreign workforce to meet its needs. Logging and Troilus activities could therefore have a cumulative impact on housing. Chantiers Chibougamau, one of the main actors in the sector, has already implemented measures to mitigate the impacts of these activities on housing capacity in the town of Chibougamau, notably by building residential quarters for its foreign employees (Paradis,

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2021). Furthermore, as explained in section 20.4.1.3 in chapter 20 (Infrastructure and services), it is not impossible that the housing shortage problem could be temporarily transposed to the hotel industry. Troilus' activities could then exert additional pressure on the availability of temporary accommodation, which must also meet the needs of the tourism sector within the RSA/LSA, particularly in view of the activities of the Lacs Albanel-Mistissini-Waconichi (AMW) and Assinica wildlife reserves and the new Nibiischii National Park.

The increase in population within the RSA/LSA for the current and future projects mentioned above will also have cumulative impacts on demand for services and infrastructure such as health, emergency and police services, education and teaching services, and municipal services (water and waste management). These impacts will accumulate mainly during Troilus mine operation, since it is assumed that it is during this phase that the greatest number of foreign workers will settle in the RSA/LSA. Troilus plans to set up health and emergency services on the mine site and provide cultural awareness training for new employees, with a view to maintain positive relationship, ensure safety with nearby communities, and coordinate and communicate with the various entities in the RSA (emergency infrastructures and communities) in order to reduce the residual impacts of the project on infrastructure and services in the study area. This collaboration between Troilus and the local communities should also provide the latter with a more global view of the activities and projects planned in the region, enabling them to better guide their development projects. At mine closure, no adverse residual cumulative impacts are expected, since the end of the various present and future projects and activities will not coincide in time.

In terms of transportation infrastructure, as previously mentioned, several mining and forestry projects, notably the Moblan mine, are likely to frequently use the main roads in the RSA/LSA, namely Route du Nord and Route 167. These same roads are also used by vacationers enjoying tourist and recreational activities proposed in the region. With the establishment of the new Nibiischi National Park and other potential reserve projects, the number of these road users could also increase in the future. The project of centre logistique intermodal de Chibougamau (CLIC), whose first phase was initially designed to meet the specific needs of Nemaska Lithium for the Whabouchi mining project (located on the Route du Nord, 122 km from the Troilus mine), could offer new business opportunities for companies in the region, like the Troilus mine. By enabling intermodality and access to a major rail corridor, the CLIC project could generate increased vehicle and truck traffic on RSA/LSA roads, including the Route du Nord. A adverse cumulative impact of the Troilus project with other activities, leading to additional pressure on road infrastructure and safety, is therefore foreseeable, although the contribution of Troilus is marginal, given that 28 and 29 passages per day are expected during the construction and operation phases. As part of La Grande Alliance, several transportation infrastructures are planned, including improvements to the Route du Nord. The implementation of this project would reduce the residual impact of the Troilus project and the cumulative impact on the road infrastructure within the RSA/LSA.

Finally, no impact on services and infrastructures in Indigenous communities is expected.

In summary, residual cumulative impacts are likely to occur as multiple irregular event irregular events, as new projects and activities are implemented in the RSA/LSA. These impacts could be short-term in the case of certain developments, such as forestry work, while they could extend over the medium to long term for other projects, including the opening of new mines. Overall, these impacts are considered potentially reversible. Thus, the Troilus project's contribution to cumulative impacts on the availability of

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housing and temporary dwellings, infrastructure and services, and transportation infrastructure and services within the area where such cumulative impacts on infrastructure and services may occur, is judged to be relatively moderate.

The Troilus project could also have positive impacts on the demand for housing and infrastructure and services in the event of a planned increase in the supply of housing and infrastructure and services. Positive residual impacts are not considered in cumulative impact assessment. However, the settlement of new workers and their families in the region, and their economic contribution to the towns and region, would redistribute the tax burden of housing to a larger number of residents, and also offer the possibility of providing better services and infrastructure, including education services and vocational training centers.

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#### **25.3.3.5 Cumulative impact without the project**

It is reasonable to assume that the development of other future physical activities in the RSA/LSA will continue to occur in the future, and that current physical activities such as forestry, infrastructure development and improvement will continue whether the project occurs or not.

Past and present physical activities, as illustrated on Map 25.1, are largely concentrated along existing roads, such as Route du Nord or Route 167 North, and are located not far from the communities of Chapais and Chibougamau, which have historically been shaped by mining and forestry. Given the various government strategies and development plans dedicated to the Nord-du-Québec region by La Société du Plan Nord and Société de développement de la Baie-James (SDBJ) (e.g. Plan d'action nordique [Government of Quebec, 2025] and Plan de développement 2021-2023 [SDBJ, n.d.]), it is certain that the communities and sectors of the RSA/LSA will remain potential areas for future development. Without the Troilus mining project, future cumulative impacts on infrastructure and services should therefore be similar.

#### **25.3.3.6 Summary of residual cumulative impacts**

Table 25.8 summarizes the residual impacts on infrastructure and services.



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**Table 25.8 Residual cumulative impacts of the project on infrastructure and services**

Residual Cumulative Impacts	residual cumulative impacts Characterization						
	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Change in availability of temporary housing and accommodation							
With project	A	M - H	LSA/RSA	N/A	CT-MT	IR	R
Without project	A	M - H	LSA/RSA	N/A	LT	IR	R
Changing demand for services and infrastructure							
With project	A	M - H	LSA/RSA	N/A	CT-MT	IR	R
Without project	A	M - H	LSA/RSA	N/A	LT	IR	R
Change in demand for transport infrastructure							
With project	A	M	LSA/RSA	N/A	CT-MT	IR	R
Without project	A	M	LSA/RSA	N/A	CT-MT	IR	R

KEY  
See Chapter 7 for detailed definitions

Direction:  
P: Positive  
A: Adverse

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

Geographic Extent:  
PDA: Project Development Area  
LSA: Local Study Area  
RSA: Regional Study Area

Timing:  
NS: No sensitivity  
MS: Moderate sensitivity  
HS: High sensitivity

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

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

Reversibility:  
R: Reversible  
I: Irreversible



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### CUMULATIVE IMPACTS ASSESSMENT

#### **25.3.3.7 Prediction confidence**

Confidence in predictions for the determination of other future activities is considered moderate, although it is based, as far as possible, on publicly available information such as project impact studies. Despite the known effectiveness of the standard mitigation measures that would be put in place as part of the project, confidence in predictions for the Troilus project's contribution to cumulative impacts is considered low to moderate, since it is based on external factors that are difficult to predict, such as whether the projects and activities occurs or not, and the future capacities of housing and infrastructure and services.

#### **25.3.4 Economic conditions**

##### **25.3.4.1 Existing conditions and evolutionary trend**

###### Existing conditions

The Troilus mining project is part of a socio-economic context specific to the Nord-du-Québec region, more specifically the Eeyou Istchee James Bay territory. This vast northern territory is sparsely populated, with no permanent settlements in the immediate vicinity of the project site and relies on a limited number of high value-added economic activities.

Mining is the main driver of regional economic development, followed by forestry and nature-based tourism. These sectors account for a significant proportion of regional employment and income. Mining projects currently in operation generate thousands of direct and indirect jobs every year, as well as economic benefits worth several hundred million dollars (AMQ, 2024). A significant portion of these benefits directly profit Cree communities, notably through royalties and socioeconomic agreements with proponents (Descôteaux, 2015).

In addition to its sectoral characteristics, the regional economic context is strongly influenced by the territory's demographic composition. The population structure has a direct impact on the labour availability, the pressure on public infrastructures, as well as on training and professional integration needs.

In 2021, the region will have a population of around 45,300, including 18,131 members of the Cree communities, representing 40% of the total population. Between 2016 and 2021, the non-Indigenous population declined by 1.5%, mainly due to demographic aging and the exodus to southern urban centers. Conversely, the Indigenous population, particularly the Cree, grew by 8.2% over the same period. This sustained demographic growth is attributable to a younger age structure - 42% of Cree community members are under 20, compared with 21% of non-Indigenous - and a birth rate almost twice the provincial average. This demographic trend represents both a challenge and an opportunity for economic development, particularly in terms of succession planning, training and integration into the labour market.

Although the local workforce has considerable expertise in the mining sector, its availability remains limited. In 2021, the employment rate in Cree communities ranged from 45% to 55%, compared with a provincial average of 60%. The unemployment rate was over 15%, compared with 5.3% for Quebec as a

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whole. These disparities reflect structural economic vulnerability, exacerbated by geographical remoteness, unequal access to specialized training, as well as linguistic and cultural barriers.

In addition to human factors, regional economic development also depends on the ability of infrastructure to support industrial projects. Transportation, communications and public service networks are concentrated in a few regional hubs, notably Chibougamau, Chapais and certain Cree communities. These centers play a strategic role in providing the logistical support, supply and specialized services required for economic activity. However, their capacity remains limited, creating a significant operational dependency for large-scale industrial projects, such as the Troilus project.

Finally, the territory's economic development take place within a distinct governance framework, defined by the James Bay and Northern Quebec Agreement. This agreement gives the Cree Nations a central role in land management, development planning and project assessment. The Troilus project must therefore be implemented in close collaboration with the regional authorities and the Indigenous communities concerned.

#### Evolutionary trends of the VC

Prospects for growth in the mining sector in Eeyou Istchee James Bay are expected to intensify pressures on the labor market. As described in chapter 21.2.2.6, approximately 540 positions will need to be filled in this sector between 2023 and 2028, representing nearly 6.7% of projected needs at the provincial level (i.e., approximately 8,000 positions). These positions will include ore processing machine operators, heavy equipment mechanics, industrial electricians, health and safety technicians and environmental specialists.

In a context already marked by labor scarcity, this increased demand could lead to interproject competition and increased dependence on outside labor if local training, attraction and retention capacities are not strengthened. The regional market is facing increasing competition for qualified workers, particularly in mining, forestry and construction sectors. This dynamic generates upward pressure on wages and can compromise recruitment in sectors offering less competitive conditions, while accentuating socioeconomic gaps between communities.

In this respect, the Troilus project plans to support existing vocational training initiatives and develop partnerships with regional institutions such as the Centre de formation de la Baie-James. These collaborations aim to enhance the availability of training programs in specialized mining trades, while ensuring a better alignment between employers' needs and the skills of local workers. Efforts will also be devoted to promoting mining careers among young people and members of Indigenous communities, to encourage their sustainable integration into the labour market.

Moreover, the participation of women in the mining industry remains limited, representing less than 15% of the workforce on operating sites. The Troilus project intends to help reverse this trend by implementing concrete measures to encourage the hiring, training and retention of women in technical, professional and management positions, in line with the principles of equity, diversity and inclusion.

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#### 25.3.4.2 Study area

As mentioned in section 21.1.4 of chapter 21 of the ESIA (Economic Conditions), the Economic Conditions RSA has been delimited to correspond to the area where potential cumulative impacts may occur. This Economic Conditions RSA overlaps with the LSA, since the latter already encompasses a sufficiently large area to assess cumulative impacts. The LSA/RSA is presented on Map 21.1 in Chapter 21 (Economic conditions). This RSA covers local authorities, economic organizations and public structures involved in territorial development dynamics. This choice of analysis scale aims to reflect economic interactions in the area concerned in a representative way, by integrating issues related to employment, workforce availability, supply and social and fiscal benefits.

#### 25.3.4.3 Identification of residual impacts with potential to interact cumulatively

Table 25.9 presents the physical activity inclusion list, which identifies other future physical activities planned in the RSA. Where the residual environmental impacts of the project may interact cumulatively with those of other physical activities, a cumulative impact assessment is carried out.

**Table 25.9 List of projects and physical activities with potential for cumulative impacts on the valued component of economic conditions**

Projects and physical activities	Potential cumulative impacts		
	Change in Employment	Change in Business	Change in Provincial Economy
<b>Past and present projects and physical activities</b>			
Mining	✓	✓	✓
Surface mineral extraction	✓	✓	✓
Community development	✓	✓	✓
Forestry	✓	✓	✓
Transportation	-	✓	✓
Energy	✓	✓	✓
Recreational activities	✓	✓	✓
Hunting, fishing, trapping	-	-	-
<b>Future projects and physical activities</b>			
Mining			
Moblan Lithium Project	✓	✓	✓
Sirmac-Dike 5	✓	✓	✓
Mont Sorcier	✓	✓	✓
Scott Lake project	✓	✓	✓
Black Rock	✓	✓	✓
Corner Bay Complex	✓	✓	✓
Bachelor	✓	✓	✓
Windfall	✓	✓	✓
Géant Dormant	✓	✓	✓

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Projects and physical activities	Potential cumulative impacts		
	Change in Employment	Change in Business	Change in Provincial Economy
Complexe Caber	√	√	√
Fénelon	√	√	√
Casa Berardi	√	√	√
Perron	√	√	√
Whabouchi	√	√	√
Rose lithium-tantalum	√	√	√
Galaxy	√	√	√
Eau Claire	√	√	√
Éléonore	√	√	√
Renard	√	√	√
Adina	√	√	√
Shaakichiuwaanaan	√	√	√
<b>Extraction of surface mineral substances</b>			
Proposed extraction of natural deposits of aggregates on Category II lands by the First Nation of Waskaganish, James Bay Cree Nation	-	-	-
Quarry in the Area of the La Grande-3 Hydroelectric Development	-	-	-
Kakabat Granular Material Deposit Project by Cree Nation of Wemindji	-	-	-
<b>Community development</b>			
Municipal domestic waste landfill site in Waswanipi	-	-	-
Eastmain Water Supply System Phase II	-	-	-
Gasification Plant Project for the Community of Waskaganish	-	-	-
<b>Forestry</b>			
Logging operations on forest management unit UA 026-61	√	√	√
Wood pellet facility in Chapais	√	√	√
<b>Transportation</b>			
La Grande Alliance	√	√	√
Construction of forest access roads H section West " and " I "	-	-	-
Extension of forest road L209-Nord	-	-	-
Construction of forest road E west	-	-	-
Chibougamau intermodal logistics center project (CLIC)	√	√	√
<b>Energy - Electricity</b>			
Chapais Énergie cogeneration plant - Temporary storm water detour	√	√	√
Chapais Énergie cogeneration plant - Increase in untreated bark storage capacity	√	√	√

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Projects and physical activities	Potential cumulative impacts		
	Change in Employment	Change in Business	Change in Provincial Economy
Whapmagoostui hybrid power plant Kuujuaaraapik P1	-	-	-
EM-1-A / EM-1-A-Rupert / Rivière Rupert	-	-	-
Connection of the Rose lithium- tantalum mine	-	-	-
161 kV BlackRock Metals mining property electricity service project BlackRock inc.	✓	✓	✓
Recreational activities			
Nibiischii National Park	✓	✓	✓
Albanel-Mistissini-Waconichi Lakes Wildlife Preserve Dark Sky Project	✓	✓	✓
Conservation activities			
Interim Measures for Woodland Caribou	✓	✓	✓
Territories set aside as reserves	✓	✓	✓

**Notes:**

✓ = Other physical activities whose residual impacts are likely to interact cumulatively with the residual impact of the project.

- = Interactions between residual impacts of other physical activities and residual impacts of the project are not anticipated or the project is located outside the RSA

Existing economic conditions (i.e. employment and labour market, business activity and provincial economy) associated with past and present physical activities in the LSA/RSA are presented in Section 21.2 of Chapter 21 (Economic Conditions) of the ESIA. Thus, the contribution of current projects and activities, including impacts related to the Troilus mining development, is considered in the assessment of the project's residual impacts (Section 21.4 of Chapter 21 of the ESIA).

The assessment of cumulative impacts likely to result from the Troilus mine project in combination with other physical activities is presented in the following sections. Because of the uncertainty surrounding the development, mitigation and reclamation of each physical activity, the assessment of cumulative impacts is largely qualitative.

#### 25.3.4.4 Cumulative impact assessment

##### Cumulative Impact Pathway

Potential cumulative impacts arising from past, present and future physical activities have the same impact pathways as those of the project (Section 21.4 of Chapter 21 [Economic Conditions] of the ESIA) and may lead to changes in employment, business and the provincial economy.

The demand for labour and the business opportunities for the supply of goods and services generated by the project may have positive impacts on direct and indirect job creation, business income and tax revenues for the Quebec government. However, the project may also have adverse impacts if these demands for labour and goods and services exceed the actual capacities that the market can supply

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within the RSA/LSA. In such cases, increases in labor and goods and services costs as well as supply chain issues may be observed.

Future physical activities may also affect the economic market, generating positive economic benefits in terms of job creation and the generation of business opportunities in the supply of goods and services. The magnitude of the cumulative impacts of the Troilus project and future activities in the RSA/LSA would likely be positive on economic conditions, but the extent of these impacts will depend on the capacity of the workforce (in terms of availability) and the business market at the time the projects overlap.

#### Mitigation Measures for Cumulative Impacts

The mitigation measures presented in Section 21.4 of Chapter 21 of the ESIA (Economic Conditions) are expected to reduce and mitigate the project's contribution to cumulative impacts on changes in labour market, business activities and provincial economic economy. These measures will also help reduce potential cumulative impacts on economic conditions, and no additional mitigation measures are therefore proposed to reduce the project's contribution to cumulative impacts.

Future physical activities may require provincial or federal permits and approvals. These processes require future proponents to identify and assess potential impacts on VCs that could affect economic conditions (e.g. Land and resource use, infrastructure and services, and health, chapters 19, 20 and 22 respectively), and to identify and implement appropriate mitigation measures. Present and future physical activities are expected to implement mitigation measures identified through permitting and approval processes, where appropriate, to reduce their contributions to cumulative impacts on employment, business and the provincial economy.

#### Residual cumulative impacts

Past and present physical activities that have been or are being carried out have influenced existing economic conditions in the RSA/LSA (Section 21.2 of Chapter 21 of the ESIA).

The project is expected to have positive impacts on employment, businesses and the economy during all phases of the project (construction, operation and demobilization). Positive impacts in the form of direct, indirect and induced employment and labour income in the LSA and in other regions of Quebec and Canada, as well as contributions to local, regional, provincial and federal Gross Domestic Product (GDP) and government revenues, result from the project's demand for and expenditure on labour, goods and services. These positive residual impacts are not considered in the assessment of cumulative residual impacts.

As for adverse residual impacts on businesses, these are expected to be low in magnitude during all phases of the project (construction, operation, remediation and closure). These impacts result from competition for labour and upward pressure on wages. Indeed, the mining sector may be more attractive than other sectors, due in part to higher wages. Companies would therefore find themselves under pressure to compete with such salaries and may have difficulty recruiting or retaining workers. During the closure phase, the cessation of the mine's activities will represent a loss of direct jobs and business opportunities for local companies, which will represent a loss of revenue for the government. The measures proposed by Troilus will help reduce these residual impacts by prioritizing the employment of

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local workers, whose wages will be in line with those of the Quebec mining industry and local businesses for its supply. Troilus will also establish committees and agreements with the Jamesian and Cree communities to maximize economic benefits within the LSA/RSA.

For its part, the Troilus project will generate a contribution of \$445.8 million to GDP during the construction phase and \$3.0 billion during operation, as well as 3,496 and 20,942 jobs respectively to support the project. 1,100 workers will be directly employed during construction and 650 during the operation phase, and 35% of these are expected to be local (see section 21.4). The development of other mining projects could also have significant positive and adverse impacts on economic conditions that could accumulate to those of Troilus if they are carried out in similar time. The mining projects most likely to interact with the Troilus Mine in terms of cumulative residual impacts include the BlackRock mining project, already authorized, and Moblan Lithium, whose environmental assessment process is currently underway.

As previously mentioned, the Troilus project will have positive residual impacts on the employment market by creating new employment opportunities in the RSA/LSA during the construction and operation phases. However, if several mining projects are carried out in parallel with the Troilus project, increased demand for labour in the mining sector could have adverse impact on the job market, if that demand exceed the actual labor capacity within the RSA/LSA. According to current forecasts, which consider active, inactive and prospective mining projects at the end of 2022, the mining workforce in Nord-du-Québec should reach 12,821 by 2028. However, with retirements and emigration, 5,935 positions will remain vacant (CSMO, 2023). The project's workforce scenarios are expected to range from 46% to 53% vacancies (see section 21.2.2.6). Thus, although Troilus plans to put implement several training measures, including targeted training plans, some especially for Indigenous, the project workforce could be supplemented by recruitment from outside the RSA and the Nord-du-Québec region. Consequently, the cumulative labour demands of other mining projects likely to operate at the same time as Troilus are not expected to have adverse cumulative impact on employment in the RSA during the construction and operation phases. On the other hand, should the mining projects close at the same time, residual cumulative impacts related to direct job losses would be anticipated. However, if the closure of the Troilus mine overlaps with the potential opening of new mines, these new mining projects would offset the residual adverse impact of the project by simply transferring former Troilus mine workers.

In terms of cumulative residual impacts, given the possibility that the Moblan Lithium and BlackRock mines will be active at the same time as Troilus, there could be increased demand and competition for labour, which will further challenge companies in other sectors that will have to compete with the mines to recruit and retain their workforce.

In the decommissioning and closure phase, the Troilus project will no longer contribute to GDP growth, which constitutes an irreversible adverse residual impact. This residual adverse impact could accumulate with that of other mines that also cease operations at the same time. On the other hand, if other mining projects are launched at the same time as the Troilus project, the project's losses to the provincial economy could be offset. Similarly, the implementation of other physical activities, such as the operation of the new Assinica Park, which would contribute to a diversified regional economy, would also reduce the adverse residual impacts associated with the closure of the Troilus mine.

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In summary, residual adverse cumulative impacts on employment, business and the provincial economy are likely to occur in the form of multiple irregular events, as new projects and activities, essentially related to mining activity, are implemented in the RSA/LSA. During the construction and operation phases, these adverse cumulative impacts on employment and business activities would be moderate and would extend over the short to medium term, in a continuous and reversible manner. Impacts on the regional economy would be low, long-term and irreversible in the restoration and closure phases. Thus, the Troilus project's contribution to cumulative impacts on employment, business activities within the RSA/LSA and the provincial economy is considered relatively low.

#### **25.3.4.5 Cumulative Impact Without the Project**

The mining industry is the region's main lever for economic development, and the future of mining activities represents a major economic interest for Quebec. Troilus is just one of 14 mining projects planned for the Nord-du-Québec region. So, whether the Troilus project goes ahead, it is certain that several other mining projects will be developed in the RSA/LSA and in the Nord-du-Québec region. Forestry and nature-based tourism are also mainstays of the region's economy, so new projects should also be developed. Thus, even without the Troilus mine project, future cumulative impacts on economic conditions are expected to be similar.

#### **25.3.4.6 Summary of residual cumulative impacts**

Table 25.10 summarizes the residual cumulative impacts on Economic conditions.

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**Table 25.10 Residual cumulative impacts of the project on economic conditions**

Residual Cumulative Impacts	Residual Cumulative Impacts Characterization						
	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Change in Employment							
With the project	A	M	LSA/RSA	N/A	ST-MT	C	R-I
Without project	A	M	LSA/RSA	N/A	LT	C	R-I
Change in Business							
With project	A	M	LSA/RSA	N/A	ST-MT	C	R-I
Without project	A	M	LSA/RSA	N/A	LT	C	R-I
Change in Provincial Economy							
With project	A	L	LSA/RSA	N/A	ST-MT	C	R-I
Without project	A	L	LSA/RSA	N/A	ST-MT	C	R-I

**KEY**  
See Chapter 7 for detailed definitions

**Direction:**  
P: Positive  
A: Adverse

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

**Geographic extent:**  
PDA: Project Development Area  
LSA: Local Study Area  
RSA: Regional Study Area

**Timing:**  
NS: No sensitivity  
MS: Moderate sensitivity  
HS: High sensitivity

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

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

**Reversibility:**  
R: Reversible  
I: Irreversible



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#### **25.3.4.7 Prediction confidence**

Although the determination of other future activities is based, as far as possible, on public information such as project impact studies, the level of confidence in the predictions for these activities is considered moderate, since several uncertainties remain as to whether the project occurs or not, their extent and the mitigation measures that will be implemented by these projects in relation to economic conditions. Predictions for the Troilus project's contribution to cumulative impacts, on the other hand, are considered low to moderate, since they are based on external factors that are difficult to predict, and uncertainties surrounding whether the project occurs or not, which remain dependent on economic conditions.

#### **25.3.5 Health**

##### **25.3.5.1 Existing conditions and evolutionary trend**

###### Existing Conditions

With the signing of the James Bay and Northern Quebec Agreement (JBNQA) in 1975, the reality of the Cree nations was considerably transformed, particularly regarding traditional activities such as hunting, fishing and trapping. These changes were accentuated by the construction of the La Grande and Eastmain-Sarcelle-Rupert hydroelectric complexes, which significantly impacted the environment and communities lifestyle.

At the same time, the towns of Chibougamau and Chapais formed an important regional economic hub, based primarily on mining and forestry. Although predominantly inhabited by non-indigenous populations, these towns were located close to Cree territories. Relations between indigenous communities and these urban centers were marked by tensions, largely due to the lack of recognition of First Nations territorial rights prior to the JBNQA (Gagnon, 1984).

The cultural, territorial and environmental upheavals intensified by the hydroelectric projects undertaken in James Bay from the 1970s have generated a strong sense of loss and sadness in the Cree communities. These transformations have also generated tensions and resentments in the region (COMEX, 2013; Hydro-Québec Production, 2004). The resulting psychosocial impacts can sometimes be rekindled by specific events, such as Hydro-Québec's refusal to repair a road in Mistissini, despite major changes to the trapline (COMEX, 2013).

These dynamics are also accompanied by significant social and economic issues. A COMEX report (2013) points out that hiring Cree workers for mining or hydroelectric projects can accentuate inequalities within communities. Once the work is over, some people find themselves facing debt or reintegration difficulties. These barriers can generate tensions and undermine social cohesion. In some cases, an increase in alcohol consumption has been observed among individuals who have financially benefited from these projects.

The arrival of external workers in Cree communities, as part of various projects, also raises concerns. It can generate tensions and a feeling of insecurity, particularly due to increased traffic on the territory and the risk of road accidents (COMEX, 2013). Additional concerns relate to health and the quality of natural

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resources, such as exposure to electromagnetic fields from power lines, mercury contamination in fish flesh, and changes in water quality.

These findings concur with those from a literature review by the Institut national de santé publique du Québec (INSPQ, 2017), which provides an overview of the various physical, psychological and social health issues related to mining projects in northern communities. Among the issues identified are exposure to environmental disturbances (noise, dust, sleep disturbance), social tensions linked to the arrival of temporary workers, and increased pressure on community services. This context is also marked by a feeling of loss of control over territorial development and by inequalities in the distribution of economic benefits, which can affect social cohesion and collective well-being.

Regarding exposure to toxic substances, an INSPQ study (2005) carried out in Oujé-Bougoumou revealed moderately high concentrations of contaminants linked to mining residues left over from the 1950s. The results highlighted the presence of cadmium (mainly related to smoking), lead (related to hunting and game consumption), as well as mercury and PCBs, probably due to high consumption of predatory fish. Such findings not only raise physical health concerns, but can also affect the overall well-being of communities, generating stress, persistent worries and a sense of insecurity about the environment and past and future industrial practices.

More directly related to the present project, it's important to remember that the previous mining operation, active from 1996 to 2010, left a significant mark on the concerned Cree and Jamesian communities. The concerns expressed during the consultations carried out for the present project reflect this. Several participants raised issues of racism, particularly regarding contracts allocation, promotion opportunities and employment relationship dynamics perceived as particularly unfavorable to members of the Cree communities. Others mentioned environmental disturbances associated with past operations, such as dust emissions and noise levels, which may have disrupted traditional activities such as hunting. These past experiences may still influence the overall wellness of the populations affected by the project, by rekindling feelings of mistrust, marginalization or loss.

#### Evolutionary trends of the VC

In the years surrounding the signing of the JBNQA, initiatives were put in place to address health and well-being issues in indigenous communities, while reflecting the evolving social and political context. In the 1970s, the National Native Alcohol and Drug Abuse Program (NNADAP) was launched as a pilot project. In response to the extent of substance abuse problems in First Nations and Inuit communities, it was formalized as a permanent program in 1982 (Government of Canada, 2019). Today, NNADAP supports over 550 prevention initiatives and mobilizes more than 700 stakeholders, the vast majority of whom are from Indigenous communities. This program is widely recognized by community stakeholders as essential and beneficial (Gifford, 2009). However, it faces several limitations, including insufficient funding, limited access to continuous training for service providers, and a lack of integration with other health services (Gifford, 2009).

Substance abuse remains a major concern among Indigenous populations. Contributing factors are numerous, at both individual (poverty, unemployment, social isolation) and structural levels, including systemic racism, the legacy of colonization, intergenerational residential school trauma, socioeconomic

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disadvantage and barriers to accessing culturally safe care, such as language barriers and lack of adapted services (Gifford, 2009).

Around the same time, efforts were made to better understand and mitigate environmental risks. In the 1980s, a program to monitor mercury in fish in Northern Quebec was set up by the INSPQ, the Direction de santé publique des Terres crie de la Baie-James, Health Canada and other partners (Robinson, 2003). As previously mentioned, high mercury levels were detected in several members of the Cree Nation, leading to consumption advisories aimed at limiting exposure to this contaminant. This follow-up program has led to several advances, including a better understanding of the sources of contamination (such as the impoundment of hydroelectric reservoirs, deforestation and atmospheric transport), increased community awareness of the risks associated with consumption choices, and improved public health thanks to targeted recommendations (Robinson, 2003).

In this context of gradual transformation of relations between Cree communities and government institutions, we should mention the signing, in 2002, of Agreement amending again the Agreement concerning a new relationship between le Gouvernement du Québec and the Crees of Québec. This agreement was aimed at transforming relations and settling outstanding disputes between the Grand Council of the Crees, the Cree Regional Authority, the Crees of Québec and the Cree communities, on the one hand, and Hydro-Québec and SEBJ, on the other. The Cree nations of Mistissini and Oujé-Bougoumou were among the nine communities<sup>3</sup> that signed up to the provisions of this agreement.

The past time limit corresponds to the signing of the JBNQA in 1975, while the future time limit corresponds to mine closure and reclamation, scheduled for around 2055.

#### 25.3.5.2 Study area

As indicated in Section 22.1.4.1 of Chapter 22 of the ESIA (Health), the health study area encompasses the region in which cumulative impacts on health may occur and is specific to both biophysical and social determinants of health. Biophysical determinants of health include the LSA's outer spatial boundaries of surface water quality, atmospheric conditions, Acoustic Environment, terrestrial and Avian Fauna and Vegetation, Riparian and Wetland Environments. For social determinants of health, the spatial boundaries are based on the two Cree communities of Mistissini and Oujé-Bougoumou, the two Jamesian communities of Chibougamau and Chapais, the Cree health region of the région de santé crie de la Région des Terres-Cries-de-la-Baie-James et la Région du Nord-du-Québec for the Jamesian.

The RSA for biophysical determinants of health is shown on Map 22.1, while the RSA for social determinants of health is shown on Map 22.2.

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<sup>3</sup> The other Cree stakeholders were: the Cree Nation of Chisasibi, the Eastmain Band, the Cree Nation of Nemaska, the Cree of the Waskaganish First Nation, the Waswanipi Band, the Cree Nation of Wemindji and the Whapmagoostui First Nation.

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#### 25.3.5.3 Identification of residual impacts with potential to interact cumulatively

Table 25.11 presents the inclusion list of physical activities, which identifies other future activities planned in the RSA. Where the residual environmental impacts of the project may interact cumulatively with those of other physical activities, a cumulative impact assessment is carried out.

**Table 25.11 List of projects and physical activities with potential for cumulative impacts on the valued component of health**

Projects and physical activities	Potential cumulative impacts		
	Changes in environmental quality	Changes in land use	Changes in population dynamics
<b>Past and present projects and physical activities</b>			
Mining	✓	✓	✓
Surface mineral extraction	✓	✓	✓
Community development	✓	✓	✓
Forestry	✓	✓	✓
Transportation	-	✓	-
Energy	✓	✓	✓
Recreational activities	-	-	-
Hunting, fishing, trapping	-	-	-
<b>Future projects and physical activities</b>			
Mining			
Moblan Lithium Project	✓	✓	✓
Sirmac-Dike 5	✓	✓	✓
Mont Sorcier	✓	✓	✓
Scott Lake project	✓	✓	✓
Black Rock	✓	✓	✓
Corner Bay Complex	✓	✓	✓
Bachelor	✓	✓	✓
Windfall	✓	✓	✓
Géant Dormant	✓	✓	✓
Complexe Caber	✓	✓	✓
Fénelon	✓	✓	✓
Casa Berardi	✓	✓	✓
Perron	✓	✓	✓
Whabouchi	✓	✓	✓
Rose lithium-tantalum	✓	✓	✓
Galaxy	✓	✓	✓
Eau Claire	✓	✓	✓
Éléonore	✓	✓	✓
Renard	✓	✓	✓

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Projects and physical activities	Potential cumulative impacts		
	Changes in environmental quality	Changes in land use	Changes in population dynamics
Adina	✓	✓	✓
Shaakichiuwaanaan	✓	✓	✓
Extraction of surface mineral substances			
Proposed extraction of natural deposits of aggregates on Category II lands by the First Nation of Waskaganish, James Bay Cree Nation	✓	✓	✓
Quarry in the Area of the La Grande-3 Hydroelectric Development	✓	✓	✓
Kakabat Granular Material Deposit Project by Cree Nation of Wemindji	✓	✓	✓
Community development			
Municipal domestic waste landfill site in Waswanipi	✓	✓	✓
Eastmain Water Supply System Phase II	-	-	-
Gasification Plant Project for the Community of Waskaganish			
Forestry			
Logging operations on forest management unit UA 026-61	✓	✓	✓
Wood pellet facility in Chapais	✓	✓	✓
Transportation			
La Grande Alliance	-	✓	-
Construction of forest access roads "H section West" and "I"	-	✓	-
Extension of forest road L209-Nord	-	✓	-
Construction of forest road E west	-	✓	-
Chibougamau intermodal logistics center project (CLIC)	✓	✓	✓
Energy - Electricity			
Chapais Énergie cogeneration plant - Temporary stormwater detour	✓	✓	✓
Chapais Énergie cogeneration plant - Increase in untreated bark storage capacity	✓	✓	✓
Whapmagoostui Kuujjuaraapik hybrid power plant	✓	✓	✓
EM-1-A / EM-1-A-Rupert / Rupert River	✓	✓	✓
Connection of Rose lithium-tantalum mine	✓	✓	✓
161 kV BlackRock Metals mining property electricity service project BlackRock inc.	✓	✓	✓
Recreational activities			
Nibiischii National Park	-	-	-
Albanel-Mistissini-Waconichi lakes wildlife preserve dark sky project	✓	✓	✓

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Projects and physical activities	Potential cumulative impacts		
	Changes in environmental quality	Changes in land use	Changes in population dynamics
Conservation activities			
Interim measures for woodland caribou	√	√	√
Territories set aside as reserves	√	√	√

√ = Other physical activities whose residual impacts are likely to interact cumulatively with the residual impact of the project.

- = Interactions between residual impacts of other physical activities and residual impacts of the project are not anticipated or the project is located outside the RSA

Existing health conditions (i.e., community context, environmental quality, physical health, mental health and social well-being, and community safety) associated with past and present physical activities in the LSA and RSA are presented in Section 22.2 of Chapter 22 of the ESIA (Health). Thus, the contribution of current projects and activities, including impacts related to mine development, is considered in the assessment of the project's residual impacts (Section 22.4 of Chapter 22 of the ESIA [Assessment of Potential Health Impacts]).

The assessment of cumulative environmental impacts likely to result from the Troilus Mine project in combination with other physical activities is presented in the following sections. Because of the uncertainty surrounding development, i.e., the timing, location and magnitude of reasonably foreseeable future activities, mitigation measures and reclamation of each physical activity, the assessment of cumulative impacts is largely qualitative.

#### 25.3.5.4 Cumulative impact assessment

##### Cumulative Impact Pathway

Potential cumulative impacts arising from past, present and future physical activities have the same impact pathways as those of the project (Section 22.4 of Chapter 22 of the ESIA (Health Conditions)) and are likely to result in a cumulative increase in risk to human health.

Future physical activities may affect physical health, mental health and social well-being, as well as community safety through changes in environmental quality, land use and population dynamics.

##### Mitigation measures for Cumulative Impacts

The mitigation measures presented in Section 22.4 of Chapter 22 of the ESIA (Health) are intended to reduce and mitigate the project's contribution to cumulative impacts on physical health, mental health, social well-being and community safety. The project mitigation measures presented in Chapter 22, sections 22.4.2.2 and 22.4.2.3 of the ESIA, including measures to reduce sensory disturbance and those related to social and economic conditions that can mitigate potential changes in physical health, mental health and social well-being, will also contribute to reducing potential cumulative health impacts. No additional mitigation measures are proposed to reduce the project's contribution to cumulative health impacts.

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Future physical activities may require provincial or federal permits and approvals. These processes require future proponents to identify and assess potential impacts on VCs that could affect health (e.g. water quality, air emissions), and to identify and implement appropriate mitigation measures. Present and future physical activities are expected to implement mitigation measures identified through permitting and approval processes, where appropriate, to reduce their contributions to cumulative impacts on environmental quality, which affects the physical and social determinants of health. Federal and provincial agencies, as well as municipalities, are responsible for services and programs that protect the health and safety of the community, which are funded by various taxes (e.g. income tax, sales tax) that would be generated by other physical activities in the RSA.

#### Residual cumulative impacts

Existing conditions reflect the cumulative impacts of past and present physical activities. Past and present physical activities that have been or are being carried out have influenced existing health conditions in the LSA/RSA (ESIA Chapter 22 [Health] Section 22.2).

With regard to changes in physical health, mental health and social well-being, as well as community safety, and depending on the project's impact pathways (land use, environmental quality, demographic dynamics), residual impacts are expected to be neutral or adverse, low to moderate in magnitude, limited to the LSA (biophysical changes) and the RSA (social changes), of short to medium duration, with irregular to regular frequency, but reversible:

- In terms of food security, Troilus is planning measures to encourage the participation of Indigenous employees in order to limit the project's impact on traditional activities. In addition, wildlife conservation measures in the AMW Lakes and Assinica wildlife reserves help protect the rights of Indigenous people to hunt, fish or set traps in these areas. Project-related population growth and the arrival of temporary workers during the construction phase should not increase competition for traditional food resources within Indigenous communities. No change in traditional diets is anticipated;
- The project could have a positive impact on social well-being, notably through the improvement or creation of new infrastructures, community investments and the strengthening of social connectivity. These elements would help to break down isolation and loneliness, and strengthen the sense of belonging within the concerned communities;
- Impacts on road safety and health will be mitigated through safe driving training provided by Troilus to its employees, as well as the implementation of a concern management mechanism to address the issues raised;
- Although Troilus implements various policies and programs such as a Code of Business Conduct and Ethics, a Diversity and Inclusion Policy, as well as cultural awareness training, some endemic concerns remain beyond its reach. As a result, discrimination issues cannot be entirely eliminated;
- With regard to exposure to contaminants of potential concern (COPCs), inhalation of airborne contaminants and ingestion of fish are the main routes of exposure that can lead to health impacts. The atmospheric contaminant Concentrations associated with the Project are not expected to pose unacceptable risks to human health during the construction, operation, decommissioning and rehabilitation phases. However, as some COPC are non-threshold contaminants, any increase in

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exposure could have adverse health impacts (e.g. PM<sub>2.5</sub>). It is therefore recommended to implement a dust management plan as well as an air quality monitoring program. The proposed mitigation measures should make it possible to reduce particulate emissions to levels below the modelled concentrations, thereby further reducing health risks;

- As far as fish consumption is concerned, the main contaminant likely to affect health is mercury. Its presence in fish is already a regional concern in Quebec, independent of the project. The MELCCFP has issued consumption recommendations for the entire province, including near the PDA (e.g., Lake Mistassini). It is recommended that surface water and fish quality in the study area be monitored at key stages of the project;
- Although the project's impacts on soil quality, vegetation and wildlife are considered minimal and limited, concerns may persist regarding possible chemical contamination. Troilus will hold regular community meetings to address these concerns;
- Regarding the acoustic environment, the distance between the mining facilities and the nearest human receptors allows us to anticipate low, temporary and reversible residual impacts at the end of project activities. Noise levels predicted for the various phases are within federal guidelines, as are estimated variations in the percentage of people significantly affected;
- Given the project's remoteness from sensitive receptors in the LSA, the presence of intervening forested areas that attenuate light visibility, and the implementation of mitigation measures to limit sky glow, no adverse impacts related to intrusive light are anticipated. Consequently, the residual impacts of the project on ambient light are considered negligible;
- The Project is expected to generate positive economic benefits at all stages (construction, operation, decommissioning), including direct, indirect and induced job creation, as well as labour income and contributions to GDP and government revenues. However, increased competition for labor could harm some local businesses by increasing pressure on wages. Measures will be implemented to encourage the participation of underrepresented groups, although significant changes in employment equity in the LSA are not expected. Overall, increased employment is expected to reduce unemployment, improve incomes and provide transferable work experience;
- Although the Project offers well-paid jobs, working conditions, including shift work and isolation in camps, can lead to stress and encourage risky behaviours such as substance abuse. Prolonged absence from families can also undermine family dynamics, causing loneliness, stress, instability, even divorce and neglect. The arrival of temporary workers in this isolated northern region could also increase the transmission of infectious diseases, particularly sexually transmitted infections, which are already more common among the Cree of Eeyou Istchee. To mitigate these impacts, Troilus is planning a support program for employees and their families, as well as a continuous nursing presence on site. Health services are available to both Cree (in Mistissini and Oujé-Bougoumou) and Jamesians (in Chapais and Chibougamau).

Troilus Gold recognizes that, given the location of the PDA, certain impacts, such as the alteration of current land and resource use, could disproportionately affect Indigenous nations compared to the non-Indigenous population.

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Future physical activities could lead to further changes in health in the RSA. Some projects or interventions, such as cutblocks or temporary work areas, could cause temporary disturbances to air and water quality, even after the work has been completed and rehabilitated. Other activities, such as mining or road construction, could have longer-term impacts.

Among the projects most likely to interact with the Troilus mine in terms of cumulative health impacts, the Moblan Lithium project could have similar impacts (albeit of lesser magnitude) to those predicted for the Troilus project. Located in the RSA, around 45 km southwest of the Troilus project, the Lac Moblan mine could, despite the uncertainty surrounding its start-up date, have an impact on air and water quality, noise, vegetation and wildlife. The mine proponent is expected to implement mitigation measures comparable to those planned for the Troilus project. The Moblan project will also have positive residual impacts on population and demographics (by mobilizing local workers and attracting migrant workers), economic conditions and education and training.

Located approximately 73 km from the Troilus project, within its RSA, the Sirmac-Dike 5 project could enter the operational phase during the life of the Troilus mine. The planned operating period is four years, with six months of activity per year. At this stage of the assessment process, no other activities are planned, apart from site development. Existing infrastructures (road, energy or rail) are expected to be used. The adverse impacts that are expected to result should not significantly influence the VC of the Troilus project.

The Mont Sorcier, Lac Scott, BlackRock and Corner Bay complex mining projects, which are currently being assessed, could result in additional traffic in the surrounding communities, particularly Chibougamau and Chapais, and the hiring of Cree and Jamesians at the mine sites. The adverse impacts that could result, however, are not expected to significantly influence the Health VC in relation to the overall impacts on it.

The Rose Lithium-Tantale, Galaxy and Eau Claire mining projects, also under evaluation, and the Whabouchi mining project, currently in the construction phase, are presumed to have similar implications, but which, due to the distance of the project's RSA, are also not expected to exert a significant influence on the Health VC.

Mining exploration activities generally entail short-term, small-scale disturbances. As mentioned in section 19.2.3.2 (Land and resource use), there are 3,940 active mining claims in the RSA. However, these exploration activities generally rely on existing roads and trails. As a result, their contribution to cumulative health impacts on a regional scale generally remains limited, both in time and space.

Road development projects aim to improve infrastructure, travel safety and accessibility. By facilitating access to services, they enhance residents' sense of security and help reduce stress. However, impacts whose magnitude depends on the scope of these infrastructures can disturb vegetation, alter air or water quality, thus disrupting the local environment.

Ongoing forestry activities may also have an impact on health. However, a portion of the Troilus project's RSA, including the PDA, is covered by Interim measures for woodland caribou. In this zone, forest harvesting is prohibited at least until the Woodland and Mountain Caribou Strategy comes into effect, which considerably limits potential disturbance. For the rest of the territory where cumulative impacts on

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health conditions could occur, it should be remembered that in Quebec, allowable cuts are established according to sustainable forest management principles. These calculations consider regeneration, long-term productivity and the preservation of other resources, including traditional activities such as hunting, fishing and trapping. In addition, forestry operations are presumed to comply with provincial requirements aimed at mitigating impacts on water quality and quantity, particularly at water crossing points, in riparian zones and in catchment areas. These standards govern operating conditions in areas where forestry operations are authorized, to minimize impacts on the environment and the health of local populations.

Due to their nature or distance from the Troilus project, the community, energy or recreational development projects presented in Table 25.1 are not likely to contribute significantly to cumulative impacts on the VC of health.

In summary, residual cumulative impacts are likely to occur as one-off, irregular events as new projects and activities are implemented in the region. These impacts could be short-lived in the case of certain developments, such as forestry work, while they could extend over the medium to long term for other projects, such as the opening of new mines. Overall, these impacts are considered potentially reversible. Thus, the Troilus project's contribution to cumulative impacts on physical health, mental health, social well-being and community safety, with the study area in which cumulative impacts on health conditions may occur, is considered relatively low to moderate.

#### **25.3.5.5 Cumulative Impact Without the Project**

It is reasonable to assume that the development of other future physical activities, particularly in the mining sector, will continue in the RSA, independently of the project. Indeed, the Troilus project is just one of 14 mining projects currently under consideration in the Nord-du-Québec region, where the mining industry represents a major vector of economic development.

It is also reasonable to assume that current physical activities, such as forestry and infrastructure improvements, will continue regardless of the project's status. Historically, as illustrated in Map 25.1, past and present physical activities have been concentrated mainly along existing transportation corridors, and it is likely that areas near these and other existing infrastructures will continue to be favored hubs for future development.

Thus, in the absence of the project, the anticipated cumulative health impacts should remain comparable to those projected with its completion.

#### **25.3.5.6 Summary of Residual Cumulative Impacts**

Table 25.12 summarizes the residual cumulative health impacts.

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**Table 25.12 Residual cumulative impacts of the project on health**

Residual Cumulative Impacts	Residual Cumulative Impacts Characterization						
	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Residual cumulative impacts on physical health							
With project	A	L - M	RSA	NS	ST-LT	S-IR	R
Without project	A	L - M	RSA	NS	ST-MT	S-IR	R
Residual cumulative impacts on mental health and social well-being							
With project	A	L - M	RSA	NS	ST-LT	S-IR	R
Without project	A	L - M	RSA	NS	ST-LT	S-IR	R
Residual cumulative impacts on community safety							
With project	A	L - M	RSA	NS	ST-LT	S-IR	R
Without project	A	L - M	RSA	NS	ST-LT	S-IR	R

**KEY**  
 See Chapter 7 for detailed definitions  
**Direction:**  
 P: Positive  
 A: Adverse  
  
**Magnitude:**  
 NMC: No Measurable Change  
 L: Low  
 M: Moderate  
 H: High

**Geographic extent:**  
 PDA: Project Development Area  
 LSA: Local Study Area  
 RSA: Regional Study Area  
  
**Timing:**  
 NS: No sensitivity  
 MS: Moderate sensitivity  
 HS: High sensitivity  
  
**Duration:**  
 ST: Short term  
 MT: Medium term  
 LT: Long term  
 N/A : Not applicable

**Frequency:**  
 S: Single event  
 IR: Irregular event  
 R: Regular event  
 C: Continuous  
  
**Reversibility:**  
 R: Reversible  
 I: Irreversible



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#### **25.3.5.7 Prediction confidence**

The level of confidence associated with this prediction is considered moderate, due to uncertainties surrounding the timing, location and magnitude of reasonably foreseeable future activities, as well as potential mitigation measures that could be implemented to limit their health impacts.

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