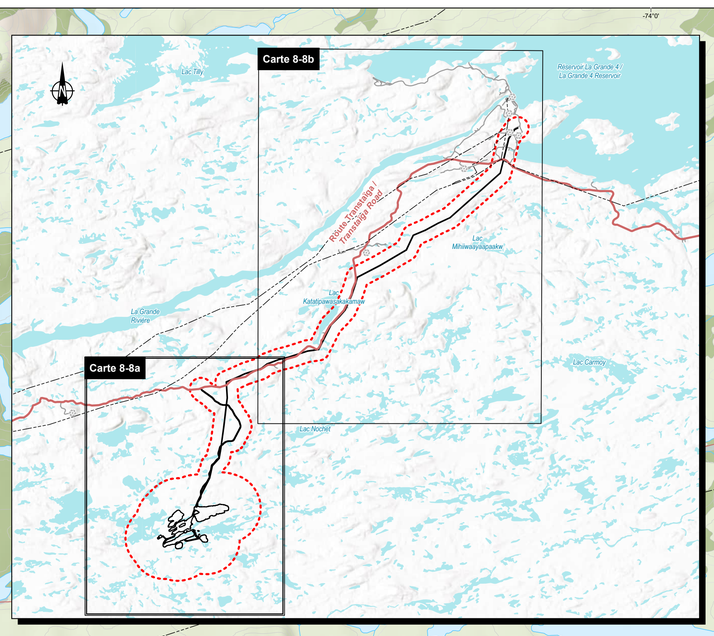


Zones d'étude / *Study Areas*
- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Faune aviaire à statut particulier / *Special-Status Avian Species*

Observation / *Observation*
- Engoulevent d'Amérique / *Nighthawk*
- Hibou des marais / *Short-eared owl*

Habitat potentiel / *Potential Habitat*
- Engoulevent d'Amérique
- Hibou des marais / *Short-eared owl*

Infrastructures / *Infrastructure*
- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*
- Route collectrice municipale / *Municipal collector road*

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*
- Marécage arborescent / *Treed swamp*
- Marécage arbustif / *Shrubby swamp*
- Tourbière minérotrophe boisée / *Treed fen*
- Tourbière minérotrophe ouverte / *Open fen*
- Tourbière ombrotrophe boisée / *Treed bog*
- Tourbière ombrotrophe ouverte / *Open bog*
- Marais / *Marsh*
- Eau peu profonde / *Shallow water*
- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*
- Intermittent / *Intermitent*
- Permanent / *Permanent*

Milieux terrestres / *Terrestrial Environments*
- Feuillu / *Deciduous*
- Mixte / *Mixed-wood*
- Résineux / *Softwood*
- Arbustaie / *Scrubland*
- Lande à lichens / *Lichen tundra*
- Régénération / *Regeneration*

Autres milieux / *Other Environments*
- Anthropique / *Anthropogenic*
- Champ de blocs / *Boulder field*
- Île / *Island*
- Surface dénudée / *Dry barren*

Projet minier Shaakichiuwaanaan / ***Shaakichiuwaanaan Mining Project***

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 8-8a / *Map 8-8a*
Empiètement du projet sur l'habitat potentiel des oiseaux crépusculaire / *Project Encroachment on Potential Habitat for Crepuscular Birds*

Sources / Sources
AQréseaux, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017
MRNF, Végétation du Nord québécois, 2013
WSP, Photo interprétation et validation terrain, 2024-2025 / BBA, Photo interprétation, 2023
GRHQ, Réseau hydrique, 2024

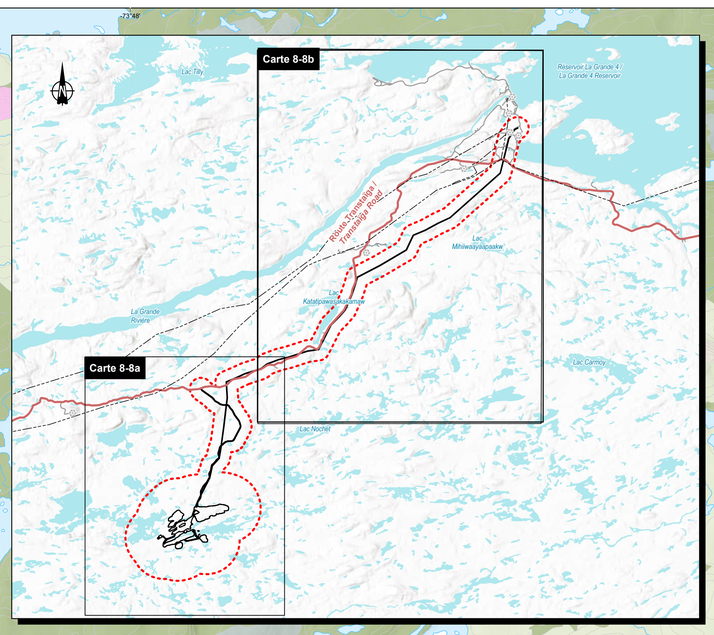
0 210 420 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

Préparation / Prepared by : C. Villeneuve
Dessin / Drawn by : M. Dupraz
Approbation / Approved by : E. D'Astous
CA0001724_3318_wie_c008_c05_07_260309.aprx
CA0001724_3318_wie_c08_8_132_ceq_cmpuscr_260325_AO

wsp

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.



-73°48'
-73°42'
-73°36'
-73°30'
53°54'
53°48'
53°42'

Réservoir La Grande 4

Route Transtaiga / Transtaiga Road

Lac Nochet

L781 L780 L762 L822 L792 L771 L770 L804 L805 L815 L816 L817 L820 L821 L812 L806 L798 L768 L769 L764 L761 L759 L758 L753 L752 L728 L831

Zones d'étude / *Study Areas*
- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Habitat potentiel / *Potential Habitat*
- Engoulevent d'Amérique
- Hibou des marais / *Short-eared owl*

Infrastructures / *Infrastructure*
- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*
- Route collectrice municipale / *Municipal collector road*
- Locale

Composantes de l'écosystème / *Ecosystem Components*

Milieux humides et hydriques / *Wetlands and Hydrous Environments*
- Marécage arborescent / *Treed swamp*
- Marécage arbustif / *Shrubby swamp*
- Tourbière minérotrophe boisée / *Treed fen*
- Tourbière minérotrophe ouverte / *Open fen*
- Tourbière ombrotrophe boisée / *Treed bog*
- Tourbière ombrotrophe ouverte / *Open bog*
- Marais / *Marsh*
- Eau peu profonde / *Shallow water*
- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*
- Intermittent / *Intermittent*
- Permanent / *Permanent*

Milieux terrestres / *Terrestrial Environments*
- Mixte / *Mixed-wood*
- Résineux / *Softwood*
- Arbustaie / *Scrubland*
- Lande à lichens / *Lichen tundra*
- Régénération / *Regeneration*

Autres milieux / *Other Environments*
- Anthropique / *Anthropogenic*
- Champ de blocs / *Boulder field*
- Île / *Island*
- Ligne de transport d'énergie / *Electric power transmission line*
- Surface dénudée / *Dry barren*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / Environmental Impact Assessment

Carte 8-8b / *Map 8-8b*
Empiètement du projet sur l'habitat potentiel des oiseaux crépusculaire / *Project Encroachment on Potential Habitat for Crepuscular Birds*

Sources / Sources

ADIrésion, Réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017
MRNF, Végétation du Nord québécois, 2013
WSP, Photo interprétation et validation terrain, 2024-2025 / BBA, Photo interprétation, 2023
GRHQ, Réseau hydrique, 2024

0 310 620 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

Préparation / Prepared by : C. Villeneuve
Dessin / Drawn by : M. Dupraz
Approbation / Approved by : É. D'Astous
CA0001724_3318_ele_c05_07_260309.aprx
CA0001724_3318_ele_c08_8_132_ois_crepusc_260325_A0

wsp

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. /
Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Noise and vibrations," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," and Planning, land use, and land tenure" sections may apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

All wildlife groups

- During the orientation training, employees will be educated about the species of special status that can be observed at the Shaakichiuwaanaan site. As part of the forestry road traffic procedure, wildlife signage will be added (P02).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop a training module to teach employees how to identify and manage the presence of species of special status and nests of migratory birds (P38).

Large wildlife and other mammals

- Develop a system for reporting sightings of large wildlife (P41).

Chiropterans

- If an active shelter or maternity roost used by bats is discovered, establish a 100-metre buffer zone, free of human activity, around the perimeter of the habitat and maintain it until a biologist has confirmed that the bats have left (P03).
- If one or more natural cavities or old tunnels are discovered that are not flooded, verify whether they are used as hibernacula by bats and, if so, establish a 500-metre buffer zone free of human activity around the entire underground network constituting the habitat used, and notify the MELCCFP of the discovery (P04).
- Whenever possible, preserve the forest cover along the road of the mining site and revegetate bare areas with native plants after completion of the work (P23).

Avian fauna

- Regrade the slopes of borrow pits to an incline of less than 70° where feasible, in order to reduce the attractiveness of active borrow pits as nesting habitat for bank swallows (P39).

Assessment of residual impact

Large wildlife and other mammals

During the construction phase, despite the implementation of the various proposed mitigation measures, the work will result in a net loss of potential habitat for caribou and southern bog lemming, leading to a **medium** level of disturbance for these species. Given the high value placed on wildlife species of special status, the intensity of the impact is **high**.

The loss of breeding and feeding grounds accounts for the majority of the impacts on these species caused by construction. These impacts will be felt within the **project site** throughout the construction and operations phases, which will last for a **medium** duration. This will result in a residual impact of **moderate** significance. The probability of occurrence of these impacts is **high**, and the reversibility potential is **medium**, as habitat rehabilitation will be carried out during the restoration phase.

Despite the implementation of the various proposed mitigation measures, the risk of disturbance from nuisances (noise, vibrations, light, and dust) and mortality from collisions remains. These will result in a **medium** level of disturbance, which, combined with the high value placed on these species, will lead to a **high** intensity of impact. These impacts will be felt within the **project area** throughout the construction and operations phases, which will last for a **medium** duration. The residual impact is therefore of **moderate** significance in terms of disturbance and collision risk. The probability of occurrence of the disturbance is **high**, whereas the probability of a collision is **medium**. The reversibility of these impacts is considered **high** because the construction-related activities that could cause them will cease once this phase is completed.

<table>
<tr><th colspan="4">Impact on the activities of large wildlife species and other mammals of special status</th></tr>
<tr><td>Intensity:</td><td>High</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate</td></tr>
<tr><td>Extent:</td><td>Project</td></tr>
<tr><td>Duration:</td><td>Medium</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">High (habitat loss, disturbance)
Medium (collision risk)</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">Medium (habitat loss)
High (disturbance and collision risk)</td></tr>
</table>

Chiropterans

During the construction phase, despite the implementation of the various proposed mitigation measures, the work results in a net loss of potential habitat for bats of special status, leading to a **medium** level of disturbance for these species. Given the high value placed on wildlife species of special status, the intensity of the impact is **high**. The loss of preferred breeding habitat for bats at the project site is estimated at 406.7 ha for the mine area, 69.2 ha for the power transmission line area, and 44.3 ha for the access road area, respectively, for a total of 550.2 ha. This represents 10.1% of the total area of this habitat within the local study area (5,140.2 ha). The loss of preferred breeding habitat accounts for the majority of the impacts associated with construction. These impacts will be felt within the footprint of the **project** area and will last no longer than the operations phase (**medium** duration), as habitat restoration (revegetation with native species) will be carried out during the closure phase. Therefore, the resulting residual impact is of **moderate** significance. The probability of occurrence of these impacts is **high**, and the reversibility potential is **medium**, as habitat rehabilitation will be carried out during the restoration phase.

With regard to disturbances (noise, vibrations, dust, and light) as well as the risks of collisions that could result in mortality and contaminant spills, these impacts will be felt within the **project area** during the construction phase, i.e., for a **short duration**. Therefore, the resulting residual impact is of **moderate** significance. The probability of occurrence is **high** for disturbance, **medium** for collision risk, and **low** for accidental spills. The reversibility of the impact of disturbance/mortality is considered **high**, since these effects cease as soon as the activities causing them come to an end. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

Impact on the activities of bat species of special status			
Intensity:	Medium	**Significance:**	Moderate
Extent:	Project		
Duration:	Medium (habitat loss) Short (disturbance/collision risk and accidental spills)		
Probability of occurrence:		High (habitat loss/disturbance) Medium (collision risk) Low (accidental spills)	
Reversibility:		High (disturbance/collision risk) Medium (habitat loss, accidental spills)	

Avian fauna

The construction phase will result in a net loss of potential habitat for bird species of special status, which translates to a **medium** level of disturbance for these species. Given the high value placed on wildlife species of special status, the intensity of the impact is **high**. The impact of habitat loss will be felt within the footprint of the **project area** for a period not exceeding that of the operations phase (**medium** duration), since habitat restoration (revegetation with native species) will be carried out during the closure phase. This results in a residual impact of **moderate** significance.

Several proposed mitigation measures address impacts related to disturbance, the risk of collisions that could result in mortality, and the potential for accidental spills. Thus, the degree of disturbance is considered **low** for an impact of **medium** intensity. Among birds, population density decreases in the vicinity of infrastructure, and this effect can extend up to approximately 1 km (Benítez-López et al., 2010), which corresponds to the **local study area**. Noise, vibration, and light levels harmful to birds are not expected to extend beyond this area. As for potential spills and collision risks, they will be limited to the **project area**. The disturbance and collision risks associated with construction activities are of **short** duration, as they cease once this phase is completed. Accidental spills also have impacts of **short** duration, as they result from one-time events. As a result, the residual impact is of **moderate** significance in terms of disturbance and of **minor** significance in terms of collision risks and accidental spills.

The probability of occurrence is **high** for habitat loss and disturbance, **medium** for collision risk, and **low** for accidental spills. The reversibility potential of habitat loss is **medium** since habitat similar to that which existed prior to the work will be restored during the restoration process. The reversibility of the impact of the disturbance and the risk of collision is considered **high**, since these effects cease as soon as the construction activities causing them are completed. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

Impact on the activities of bird species of special status			
Intensity:	High (habitat loss) Medium (disturbance/collision risk and accidental spills)	**Significance:**	Moderate (habitat loss, disturbance/collision risk) Minor (collision risk, accidental spills)
Extent:	Local (disturbance) Project (habitat loss, collision, accidental spills)		
Duration:	Medium (habitat loss) Short (disturbance/collision risk, accidental spills)		
Probability of occurrence:		High (habitat loss, disturbance) Medium (collision risk) Low (accidental spills)	
Reversibility:		High (disturbance/mortality) Medium (habitat loss, accidental spills)	

Operations phase

Statement of potential impact

Disturbance of activities of wildlife species of special status.

Sources of the impact

- Presence and operation of new infrastructure.
- Water use and management.
- Transportation and traffic related to ore and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Large wildlife and other mammals

Alteration of predator–prey dynamics associated with mining activities, buildings, and infrastructure.

As noted for the construction phase, recent forest clearings required for the development of certain infrastructure may ultimately promote an increase in moose densities, which in turn supports higher populations of gray wolves and indirectly increases predation pressure on caribou (Courtois et al., 2007; Beauchesne et al., 2013; Leblond et al., 2013; Raymond-Bourret, 2017). Habitat fragmentation also increases caribou vulnerability to predation by making movements more predictable and by concentrating individuals within residual habitat patches (St-Laurent et al., 2014; Dickie et al., 2023). Finally, the presence of open areas and edge habitats may benefit the American black bear (Ursus americanus) due to increased food resource availability, which may in turn increase predation on forest caribou calves (Raymond-Bourret, 2017).

Relative to baseline conditions, the segment of the transmission line located approximately between 30 and 50 km from the mine's zones of influence could generate the most significant impact in terms of predator accessibility and predation risk for forest caribou (Figure 8-5). Around this segment of the transmission line, existing linear infrastructure under baseline conditions includes the Trans-Taiga Road and existing transmission lines, which already function as travel corridors used by predators. However, increased linear infrastructure further facilitates predator movements, particularly for gray wolves (Whittington et al., 2011). This new infrastructure could therefore enhance predator access to habitats located southeast of this transmission-line segment, increasing encounter rates between wolves and caribou and, consequently, the risk of predation on caribou (Whittington et al., 2011).

Considering that the nearest mature forest stands to the new TL segment are located approximately 2 to 3 km away (taking into account the infrastructure footprint), forest caribou are more likely to encounter predators within these potential habitats. In addition, because this TL segment is largely surrounded by habitats with vegetation communities aged 16 to 39 years under baseline conditions, predation risk for forest caribou could increase over the medium to long term, assuming that caribou would make greater use of these forest stands once they reach 40 years of age or older.

Although moose, an alternative prey species for forest caribou, generally avoid heavily used roads (Laurian et al., 2008), a study conducted in Norway suggested that moose do not avoid transmission lines and may even use these corridors for movement when topography allows (Bartzke et al., 2015). Under baseline conditions, habitats disturbed by 16- to 39-year-old forest fires surrounding the TL alignment may provide cover for moose but do not necessarily offer the food resources they seek. However, the construction of a new TL, whose right-of-way is maintained, creates potentially attractive habitat for moose due to increased food availability. As a result, apparent competition may occur south of the 30–50 km TL segment, potentially leading to increased predation risk for forest caribou. Consequently, this TL segment could result in long-term changes to predator–prey dynamics through increased availability of alternative prey and predators. Such effects are not expected along the TL segment extending from the mine site to approximately 30 km, an area that may be avoided by moose due to proximity to the road (Laurian et al., 2008).

Around the mining infrastructure, food availability for moose depends on a range of factors. In the event that food resources are abundant and moose become habituated to human presence, gray wolves could benefit from higher moose densities. Although these infrastructures are not expected to substantially alter predator accessibility, an increase in prey availability could lead to greater gray wolf presence in habitats adjacent to mining infrastructure. However, the impact of increased gray wolf presence on forest caribou may remain negligible due to the potential avoidance of mining infrastructure by caribou (Weir et al., 2007).

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

Most of the impacts associated with disturbance and the risk of collision are essentially the same as during the construction phase. Disturbances caused by mining operations and traffic on roads built for this purpose could affect caribou habitat selection and behaviour (Weir *et al.*, 2007; Lessard *et al.*, 2026) throughout the duration of the mine's operations. Despite the woodland caribou's tendency to avoid anthropogenic infrastructure and activities, the risk of collisions with vehicles remains.

Chiropterans

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

Most of the impacts associated with disturbance and the risk of collision are essentially the same as during the construction phase. The impacts associated with disturbances (noise, light, vibration, dust) resulting from site operations during the operations phase will include, in particular, mining operations and equipment use and movement.

Deterioration of the quality of the environment due to accidental leaks and spills of petroleum products or other hazardous materials into surface water and soil caused by the operation of equipment that uses these products or simply during their handling

As the anticipated effect is similar to what was assessed for the construction phase, it was not considered necessary to describe in detail the impacts already discussed in the previous section.

Avian fauna

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

The indirect impacts caused by increased disturbance—such as vibrations, noise, light, and dust emissions—during the operations phase will be comparable to those identified for the construction phase.

Deterioration of the quality of the environment due to accidental leaks and spills of petroleum products or other hazardous materials into surface water and soil caused by the operation of equipment that uses these products or simply during their handling

The risk of spills is the same as that anticipated during the construction phase.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the “Ambient air,” “Noise and vibrations,” “Soil, surface water, and sediment quality,” “Vegetation and wetlands,” “Wildlife and wildlife habitat,” and Planning, land use, and land tenure” sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

All wildlife groups

- During the orientation training, employees will be educated about the species of special status that can be observed at the Shaakichiuwaanaan site. As part of the forestry road traffic procedure, wildlife signage will be added (P02).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop a training module to teach employees how to identify and manage the presence of species of special status and nests of migratory birds (P38).

Large wildlife and other mammals

- Develop a system for reporting sightings of large wildlife (P41).

Chiropterans

- If an active shelter or maternity roost used by bats is discovered, establish a 100-metre buffer zone, free of human activity, around the perimeter of the habitat and maintained until a biologist has confirmed that the bats have left (P03).
- If one or more natural cavities or old tunnels are discovered that are not flooded, verify whether they are used as hibernacula by bats and, if so, establish a 500-metre buffer zone free of human activity around the entire underground network constituting the habitat used, and notify the MELCCFP of the discovery (P04).

Avian fauna

- Regrade the slopes of borrow pits to an incline of less than 70° where feasible, in order to reduce the attractiveness of active borrow pits as nesting habitat for bank swallows (P39).

Assessment of residual impact

Large wildlife and other mammals

Despite the implementation of the various proposed mitigation measures, risks related to disruption of predator–prey dynamics, as well as disturbance and collision, remain present at the project site, resulting in a moderate level of disturbance and leading to a high impact intensity. The impacts will be felt within the project area over a **medium** duration. The residual impact is therefore of **moderate** significance in terms of disturbance and collision risk. The probability of occurrence of the disturbance and collision risk is **high**, and reversibility is considered **high** since these impacts will disappear at the end of operations.

Impact on the activities of large wildlife species and other mammals of special status			
Intensity:	High	**Significance:**	Moderate
Extent:	Project		
Duration:	Medium		
Probability of occurrence:		High	
Reversibility:		High	

Chiropterans

During the operations phase, despite the implementation of the various proposed mitigation measures, impacts related to disturbance, collision risk, and habitat degradation caused by accidental spills will persist. However, the expected level of disturbance is **low** for these species. Given the high value placed on wildlife species of special status, the intensity of the impact is **medium**. These impacts will be felt within the **project** area. The duration will be **medium** for disturbance and collision risk, as these will persist throughout the operations phase. However, the duration will be short for accidental spills, which typically trigger rapid responses to contain and recover the contaminated material. The residual impact is therefore of **moderate** significance for disturbance and collision risk, and **minor** for accidental spills.

The probability of occurrence is **high** for disturbance, whereas it is **low** for collision risks and accidental spills. The reversibility of the impact of the disturbance and the risk of collision is considered **high**, since these effects cease as soon as the activities causing them are completed. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

<table>
<tr><th colspan="4">Impact on the activities of bat species of special status</th></tr>
<tr><td>Intensity:</td><td>Medium</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate (disturbance/collision risk)
Minor (accidental spills)</td></tr>
<tr><td>Extent:</td><td>Project</td></tr>
<tr><td>Duration:</td><td>Medium (disturbance/collision risk)
Short (accidental spills)</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">High (disturbance)
Low (collision risk, accidental spills)</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">High (disturbance/collision risk)
Medium (accidental spills)</td></tr>
</table>

Avian fauna

The residual impacts related to disturbance, collision risk, and the potential for accidental spills during the operations phase will be comparable to those during the construction phase. Several proposed mitigation measures target these impacts. Thus, the degree of disturbance is considered **low** for these residual impacts, given the **medium** intensity of the impact and the high value placed on wildlife species of special status.

These impacts will be felt within the footprint of the **project** area. Disturbance and collision risk are impacts of medium duration, as they will be felt throughout the operations phase. However, the duration will be **short** for accidental spills, which typically trigger rapid responses to contain and recover the contaminated material. The residual impact is therefore of **moderate** significance for disturbance and collision risk, and **minor** for accidental spills.

The probability of occurrence for disturbance is **high**, but it is **low** for collision risk and accidental spills. The reversibility of the impact of disturbance and collision risk is considered **high**, since these effects cease as soon as the operations phase ends. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

Impact on the activities of bird species of special status			
Intensity:	Medium (disturbance/collision risk and accidental spills)	**Significance:**	Moderate (disturbance/collision risk) Minor (accidental spills)
Extent:	Project (disturbance, collision risk, accidental spills)		
Duration:	Medium (disturbance/collision risk) Short (accidental spills)		
Probability of occurrence:		High (disturbance) Low (collision risk, accidental spills)	
Reversibility:		High (disturbance/mortality) Medium (accidental spills)	

Closure phase

Identification of potential impacts

Improvement of habitats favouring the resumption of activities by wildlife species of special status

Sources of the impact.

- Presence of site remains.
- Final restoration.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Large wildlife and other mammals, chiropterans and avian fauna

During the closure phase, the main risks to these two wildlife groups include disturbance caused by nuisances, the risk of collisions that could result in mortality, and accidental spills or leaks of petroleum products or other hazardous materials. In addition, habitat restoration and the significant reduction in activities at the site will have a positive impact.

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

The anticipated impacts on disturbance, collision risk, and mortality will be similar to those assessed during the construction and operations phases, but on a smaller scale, as only restoration work will be taking place.

Deterioration of the quality of the environment due to accidental leaks and spills of petroleum products or other hazardous materials into surface water and soil caused by the operation of equipment that uses these products or simply during their handling

The anticipated impact will be similar to what was assessed in the construction and operations phases.

Restoration of habitats/Temporary shelter or use as maternity roosts/Use of the site (feeding)/Reduction of population disturbance

The restoration of the mine site involves the removal of most of the buildings and infrastructure, soil remediation (soil loosening and reprofiling), the spreading of organic soil set aside for this purpose, and the revegetation of the cleared areas as well as the various tailings and overburden stockpiles. This work will allow the various species involved to reclaim these areas for some of their activities.

It should be noted that the buildings and other structures that will be dismantled are likely to be used as temporary shelters or as maternity roosts by the big brown bat or, to a lesser extent, bats of the genus *Myotis* (Tremblay and Jutras, 2010).

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Noise and vibrations," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," and Planning, land use, and land tenure" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

All wildlife groups

- Cooperate with the tallyman of trapline CH39 in the rehabilitation, restoration, and revegetation activities and returning the site to its natural state. (P22).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop a training module to teach employees how to identify and manage the presence of species of special status and nests of migratory birds (P38).

Large wildlife and other mammals

- Develop a system for reporting sightings of large wildlife (P41).

Chiropterans

- If an active shelter or maternity roost used by bats is discovered, establish a 100-metre buffer zone, free of human activity, around the perimeter of the habitat and maintain it until a biologist has confirmed that the bats have left (P03).
- If one or more natural cavities or old tunnels are discovered that are not flooded, verify whether they are used as hibernacula by bats and, if so, establish a 500-metre buffer zone free of human activity around the entire underground network constituting the habitat used, and notify the MELCCFP of the discovery (P04).
- Before demolishing buildings and other structures during the closure phase, carry out an inspection to verify the possible presence of bat hibernacula or maternity roosts, or bird nests (P42).

Avian fauna

- Before demolishing buildings and other structures during the closure phase, carry out an inspection to verify the possible presence of bat hibernacula or maternity roosts, or bird nests (P42).

Assessment of residual impact

During the closure phase, the negative impacts are related to disturbance, collision risk, and accidental spills, affecting all wildlife groups of special status. However, these impacts will be less significant than during the construction and operations phases. In addition, the project will have a positive impact by restoring habitats through a revegetation campaign.

Thus, the degree of disturbance is considered **low** for these negative residual impacts, with a **medium** intensity for the impact, considering the high value placed on wildlife species of special status. The impacts will be felt in the **project** area for a **short** duration, as the spills, disturbances, and collision risks will cease once the restoration work is complete. The anticipated residual impact is expected to be of **minor** significance. The probability of occurrence is **high** for disturbances and **low** for collision risks and spills. The reversibility of the impact of the disturbance and the collision risk is considered **high**, since these effects cease as soon as the activities causing them are completed. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

The closure phase will result in the creation of habitats for species of special status, leading to an expected **medium** degree of improvement for these species and, consequently, a **high** intensity of positive impact. The impact of habitat creation will be felt in the **project** area and will persist beyond the restoration work (**long** duration), resulting in a **positive** residual impact of **major** significance. The probability of occurrence is **high**.

<table>
<tr><th colspan="4">Impact on the activities of species in various wildlife groups of special status</th></tr>
<tr><td rowspan="3">Intensity:</td><td>High (+ habitat creation)
Medium (- disturbance and collision risk, spills)</td><td rowspan="3">Significance:</td><td rowspan="3">Major (+ habitat creation)
Minor (- disturbance and collision risk, spills)</td></tr>
<tr><td>Extent:</td><td>Project (-) (+)</td></tr>
<tr><td>Duration:</td><td>Long (+ habitat creation)
Short (- disturbance/collision risk, spills)</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">High (-) (+)</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">High (- disturbance/collision risk)
Medium (- spills)</td></tr>
</table>

8.2.3.3 Terrestrial wildlife (large wildlife and other mammal species, avian fauna including migratory birds)

Terrestrial wildlife includes all large wildlife species (e.g., moose, bear, wolf), other mammal species (e.g., beaver, hare, fisher), and birds that may be disturbed by activities in the construction, operation, and closure phases. It should be noted that, within the framework of the project, terrestrial wildlife is assigned a low ecosystem value because, although it attracts interest, there is little concern regarding its conservation and protection. It is also assigned a medium socioeconomic value, as it is considered important and is utilized by a portion of the populations concerned. Since the value to be applied is the higher of the two, a **medium** value will be used to analyze the impacts of this VEC.

Summary of current conditions

Large wildlife and other mammals

The project's biophysical LSA is home to several species of large wildlife of ecological and cultural significance, including woodland and migratory caribou, moose, black bears, and grey wolves. Large wildlife remains at the heart of conservation and sustainable land management efforts, both for biodiversity and for Indigenous and non-Indigenous communities.

The sectoral report on caribou indicates that migratory caribou from the LRH use the biophysical LSA, but their presence may have declined since 2015, which could be linked to the reduced availability of suitable habitat and the extent of recent anthropogenic disturbances (Map 8-9).

The aerial survey conducted in January 2023 identified 27 moose divided into 14 groups within the biophysical LSA. The moose density was estimated at 0.23 moose per 10 km² after adjusting for detectability, which is expected at the northern limit of this species' range. According to sport hunting data, it appears that the population in Hunting Zone 22, where the project is located, is stable or even growing (Société de la faune et des parcs, 2003; Gouvernement du Québec, 2025c). This potential growth could be due to improved habitat conditions, particularly in connection with an increase in the area of mixedwood and hardwood stands. The biophysical LSA habitat of the project, characterized by a mosaic of regenerating environments and older softwood forests, appears favourable to moose, providing both feeding sites and winter cover (Niigaan, 2023).

According to the most recent data (from the 1990s), the black bear has an estimated density of approximately 0.20 bears per 10 km² in Hunting Zone 22, corresponding to a population of about 5,600 individuals. Incidental observations made during field surveys confirmed its presence in the project area. For black bears, habitat selection is particularly guided by the availability of food resources. Regenerating forest stands—resulting from logging or natural disturbances and abundant in the project area—provide an abundance of small fruits (berries) and insects, making them highly valuable habitats for the species (Samson, 1996; Desnoyers and Dussault, 2014) in the spring and summer. In the fall, the species tends to prefer hardwood forests with tree species that produce hard fruits (e.g., acorns, walnuts, beechnuts). Bears have a very varied diet, but may opportunistically prey on moose and caribou calves.

According to Jolicoeur and Hénault (2002), the grey wolf is estimated to have a population density in Hunting Zone 22 of between 0.3 and 0.5 wolves per 100 km². In the boreal forest, grey wolves prefer large, unfragmented forest areas with little human presence and sufficient availability of their main prey to ensure the viability of their packs. In the James Bay region, habitat fragmentation, increased road access, and trapping pressure may locally influence the distribution and dynamics of grey wolf packs. Although wolves generally avoid areas with high human infrastructure density, they may use linear infrastructure, such as forest roads and power lines, to facilitate their movements and access certain food resources, including ungulate carcasses left behind after hunting or trapping (Whittington et al., 2011; Lesmerises *et* coll., 2013). Moose are among their favourite prey, but they also hunt caribou.

An inventory of small mammals was carried out, resulting in the capture of eight species within the biophysical LSA, the most abundant of which were the southern red-backed vole and the deer mouse. These species have been observed in a variety of habitats, including softwood stands, regenerating environments, peatlands, and lichen tundra.

No specific inventory has been conducted for other mammals, but several species are likely to be present, including the snowshoe hare, the American porcupine, the muskrat, the beaver (which has been observed within the biophysical LSA), the American marten, the ermine, the least weasel, the American mink, the river otter, the coyote, the Canadian lynx, the red fox, the Arctic fox, the striped skunk, the red squirrel, the northern lying squirrel, and the woodchuck. Several of these species are of great importance to Indigenous communities, which consume animals such as the snowshoe hare and the porcupine and trap muskrats, American martens, least weasels, and American minks for their fur.

Avian fauna

The various inventories carried out in 2023, 2024, and 2025 identified 25 species of waterfowl and other water birds, 9 species of shorebirds, 15 species of birds of prey, and 65 species of land birds, for a total of 114 species.

Most of these species are migratory; only thirteen species were observed during the winter inventories.

Construction phase

Statement of potential impact

Disturbance of the activities of terrestrial wildlife (large wildlife and other mammal species, avian fauna including migratory birds).

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Transportation and traffic related to materials and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Large wildlife and other mammals

Loss and fragmentation of breeding and feeding habitats due to site preparation, stripping and clearing activities

The construction of mining and electrical infrastructure results in a direct loss of functional habitat for migratory caribou, primarily due to avoidance behaviours toward infrastructure at various spatial scales (Plante *et al*., 2018). Studies have shown that migratory caribou from the Leaf River herd (LRH) and the George River herd (GRH) actively avoid various types of anthropogenic disturbances, including mines, mineral exploration sites, roads, and buildings, thereby reducing their use of significant portions of their seasonal ranges (Plante et al., 2018; Plante *et al*., 2020). The areas of influence associated with mine infrastructure could extend for several kilometres, reaching up to approximately 23 km in some cases (Boulanger *et al*., 2012; Plante *et al*., 2018).

The rate of disturbance to the habitat of migratory caribou in the biophysical LSA was estimated by comparing the impacts of the mining project with the baseline condition. The method used takes into account the inclusion of avoidance zones for migrating caribou, encompassing not only disturbances but also the functional loss of habitat associated with these disturbances. Thus, the buffer zones associated with anthropogenic disturbances were determined based on the work of Plante *et al*. (2018) on the migratory caribou of the Leaf River herd. For more details on the method used, see the sectoral report on caribou in Appendix 6-21. The rate of habitat disturbance for migratory caribou in the biophysical LSA is estimated at 71,1% (Table 8-11), an increase of 0.1% compared to the baseline estimate. The project's encroachment on the potential habitat of the woodland caribou is shown in Map 8-9.

For migratory caribou, the transmission line could be associated with asymmetric habitat use on either side of the infrastructure, reflecting habitat fragmentation and a reduction in local connectivity, as observed in wild reindeer in Norway (Vistnes et al., 2004). During the winter period, when mobility is constrained by snow cover and energy balance is particularly sensitive, this barrier effect may limit access to certain foraging or resting areas and constrain movements to longer or less energetically favorable routes (Vistnes et al., 2004; Plante et al., 2018; Plante et al., 2020). During this time of year, fragmentation caused by linear infrastructure may therefore limit the ability of migratory caribou to finely adjust space use in response to snow conditions, resource availability, and predation risk, thereby reducing their resilience to interannual environmental variability (Vistnes et al., 2004; Plante et al., 2018; Plante et al., 2020).

Landscape connectivity is essential to maintaining the large seasonal migrations of migratory caribou, which enable individuals to access wintering and calving areas and support population maintenance or growth (Boulanger et al., 2024; Fullman et al., 2025). However, analyses of habitat use by the TRAF migratory caribou, presented in the sectoral report (see Appendix 6-21), suggest that the proposed location of the new transmission line could have negligible impacts on TRAF migratory behavior. Indeed, during the 2016–2024 period, part of the proposed transmission-line alignment was encompassed within overall use areas (95% and 99% kernel ranges), indicating low use of this sector. Two areas appeared to be more intensively used by TRAF caribou (50% and 75% kernel ranges). One of these areas was located north of the Trans-Taiga Road, while the other was located west of Lac de la Corvette. This suggests that TRAF caribou may cross more regularly the segment of the Trans-Taiga Road and existing transmission lines, but would infrequently cross the segment located northeast of the mine site, where the new transmission line is planned.

Finally, the work of Vistnes et al. (2004) also showed that transmission lines, particularly when parallel to or combined with roads, may be associated with marked differences in lichen biomass on either side of the infrastructure, with higher biomass observed in areas that have become less accessible to caribou.

For moose, the available data cover Hunting Zone 22 and indicate a stable and potentially growing population. The small area of potential habitat lost—approximately 519 hectares of forest cover (softwood and regenerating) within Hunting Zone 22—does not pose a significant risk to the population trends of this species.

Table 8-11 Rate of disturbance to migratory caribou habitat in the biophysical LSA

Mine's area of influence (km)	Type of disturbance	Area (km²)			Proportion of disturbed areas (%)
		Disturbance	Without disturbance	Total[1]	
0–5	Anthropogenic	62.4	0.0 (0.0%)	62.4	100.0
	Natural	0.0			0.0
5–10	Anthropogenic	192.4	0.0 (0.0%)	192.4	100.0
	Natural	0.0			0.0
10–20	Anthropogenic	621.0	55.4 (7.4 %)	749.4	82.9
	Natural	73.0			9.7
20–30	Anthropogenic	646.7	328.3 (24.8 %)	1,322.8	48.9
	Natural	347.7			26.3
30–40	Anthropogenic	655.5	600.4 (31.8 %)	1,886.7	34.7
	Natural	630.7			33.4
40–50	Anthropogenic	686.7	904.3 (38.9 %)	2,322.8	29.6
	Natural	731.9			31.5
0–50	**Anthropogenic**	**2,864.7**	**1,888.5 (28.9 %)**	**6,536.5**	**43.8**
	Natural	**1,783.4**			**27.3**

Note: 1 Excluding the surface water network.

Similarly, for black bears and grey wolves, the anticipated loss of forest cover is not expected to have a significant negative impact on these species. The bear's opportunistic nature allows it to make use of the wide variety of habitats surrounding the site. Although black bears tend to avoid areas with high human activity, the presence of new potential food sources (such as food waste) could attract them to the outskirts of facilities. As for the grey wolf, it appears that the presence of new forest roads—such as those built for the project—may enhance the wolf's hunting success by facilitating its movement across the territory.

What's more, habitat loss will affect all other mammals, though to varying degrees depending on their relative abundance in the area, the land area required for their survival, and their dependence on a specific type of habitat. It should be noted, however, that of the 519 hectares of forest cover to be cleared by the project, 96% of this area consists of softwood stands and regenerating stands—two vegetation types that dominate the territory of the biophysical LSA and RSA. Thus, among other mammals, the species most likely to be affected include those that may occur in higher densities (e.g., small mammals, hares, squirrels) and whose displacement due to habitat loss could lead to increased competition for their respective territories.

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

Although work on power transmission lines is generally temporary, disturbances associated with noise, vehicle traffic, and human presence can lead to localized avoidance of adjacent habitats during the winter, a period when caribou have limited ability to compensate energetically for such disturbances (Plante *et al*., 2018).

In fact, according to Shannon *et al*., 2015; Kunc and Schmidt, 2019; and Mancera, 2017, noise can have a negative effect on mammals in general. It appears that noise levels exceeding 52 dBA may cause animals to avoid noisy areas, affect reproductive success, and impair communication among gregarious species. The noise levels modelled for the construction phase show that this noise level (Leq, 12h) is only perceptible at the construction site and within a radius of approximately 700 metres around the site.

The risk of collisions increases due to the higher number of vehicles and machinery moving around the site. However, the relatively low density of various large wildlife species in the area reduces the risk of collisions, although such incidents remain possible. In fact, all mammals, due to their constant movement in search of food and other resources, are at risk of being struck by vehicles or machinery.

Composante du projet / *Project Component*

- Projet minier Shaakichiuwaanann / *Shaakichiuwaanann Mining Project*

Zones d'étude / *Study Areas*

- Projet / *Project*
- Biophysique - Régionale / *Biophysical - Regional*
- Zone d'influence de la mine / *Mine's area of influence*

Habitat potentiel / *Potential habitat*

- Arbustaie / *Scrubland*
- Lande à lichens / *Lichen tundra*
- Résineux / *Softwood*
- Tourbière ouverte / *Open peatland*

Perturbations / *Disturbances*

Conditions actuelles / *Currents Conditions*

- Anthropique et naturelle / *Anthropogenic and natural*

Conditions futures / *Futures Conditions*

- Anthropique - Permanente / *Anthropogenic*

Infrastructures / *Infrastructure*

- Prélèvement d'eau potable / *Drinking water withdrawal*
- Aérodrome / *Aerodrome*
- Hydroaérodrome / *Hydroaerodrome*
- Site d'extraction ouvert / *Open extraction site*
- Bâtiment industriel / *Industrial building*
- Tour de télécommunication / *Telecommunication tour*
- Centrale hydroélectrique / *Hydroelectric power plant*
- Poste électrique / *Electrical substation*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*
- Locale / *Local road*

Composante du milieu / *Component of the Environment*

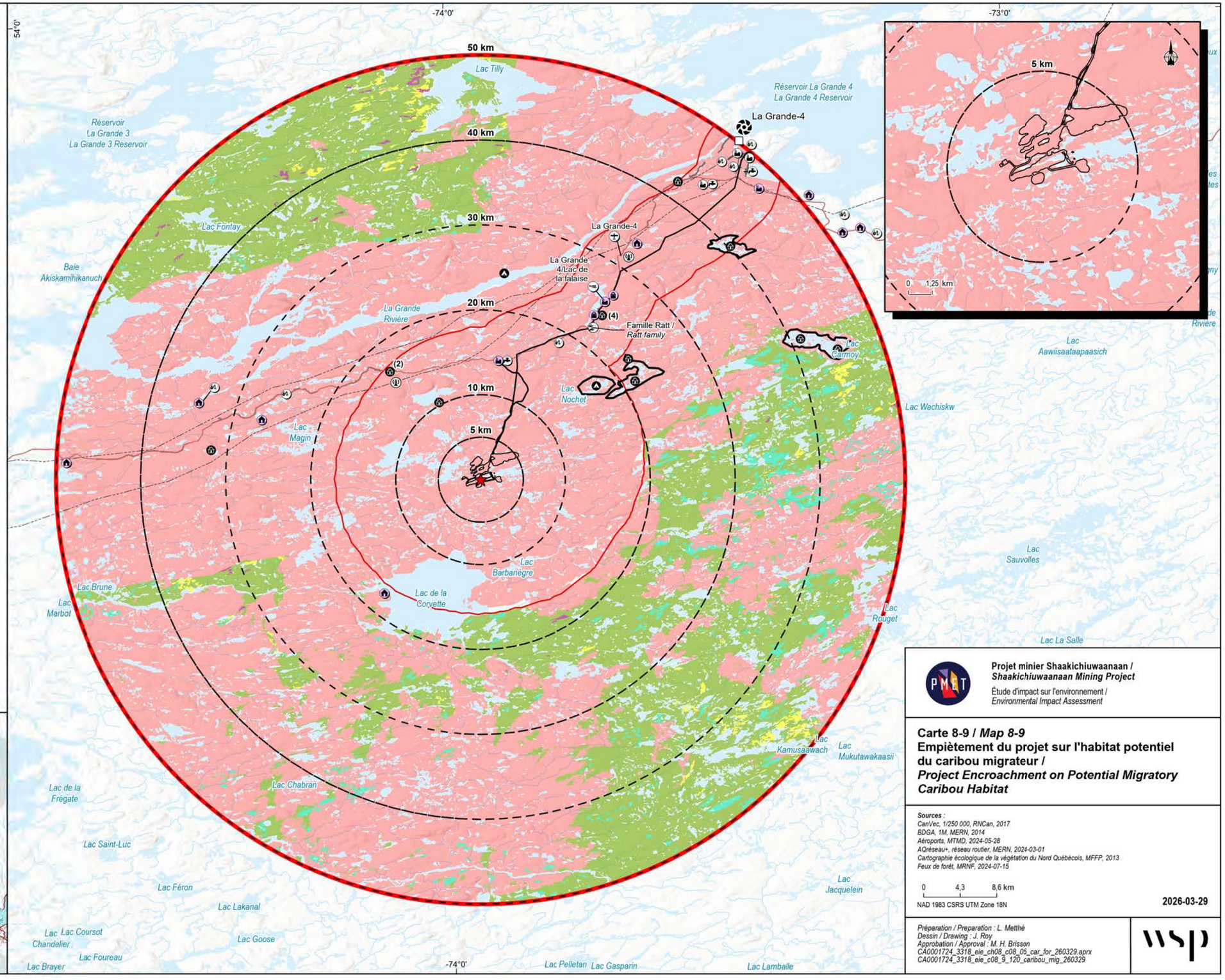
- Anthropique / *Anthropogenic*

Utilisation du territoire / *Land Use*

Baux / *Leases*

- Fins de villégiature / *Leisure purpose*
- Fins commerciales / *Commercial purpose*
- Fins industrielles / *Industrial purpose*
- Camp cri permanent / *Cree permanent Camp*
- Campement cri temporaire / *Cree temporary camp or campsite*
- Aire de camps et de campements / *Camps and campsites area*
- Autre type de camp / *Other camp type*
- Site de chasse / *Hunting site*





Projet minier Shaakichiuwaanann / *Shaakichiuwaanann Mining Project*

Étude d'impact sur l'environnement / Environmental Impact Assessment

Carte 8-9 / *Map 8-9*

Empiètement du projet sur l'habitat potentiel du caribou migrateur / *Project Encroachment on Potential Migratory Caribou Habitat*

Sources :

CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Aéroports, MTMD, 2024-05-28
AQréseau+, réseau routier, MERN, 2024-03-01
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Feux de forêt, MRNF, 2024-07-15

0 4,3 8,6 km

NAD 1983 CSRS UTM Zone 18N

2026-03-29

Préparation / Preparation : L. Metthé
Dessin / Drawing : J. Roy
Approbation / Approval : M. H. Brisson
CA0001724_3318_ele_ch08_c08_05_car_for_260329.aprx
CA0001724_3318_ele_c08_9_120_caribou_mig_260329

Avian fauna

The impacts on migratory birds are similar to those identified for bird species of special status (Section 8.2.3.2).

Loss and fragmentation of nesting and feeding habitats due to various construction projects involving clearing, soil stripping, earthwork, and drainage

During the construction phase (and throughout the life of the mine), the overall footprint of the infrastructure will result in the loss of terrestrial habitats and wetlands used by migratory birds. In total, 519 hectares of forest cover will be affected, including softwood forests (250.4 ha), regenerating forests (246.6 ha), scrubland (19.6 ha), and lichen tundra (2.59 ha). In addition to this loss, there will be a permanent reduction of 177.4 hectares of wetlands and water environments, including 104.7 hectares of wetlands consisting of wooded ombrotrophic bogs (30%; 31.9 ha), open ombrotrophic bogs (27%; 28.6 ha), treed swamps (25%; 26.3 ha), and shrub swamps (14%; 14.4 ha), as well as 57.2 ha of water environments.

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

Indirect impacts caused by increased disturbances—such as vibrations, noise, light, and dust emissions—are to be expected during the construction phase due to infrastructure work and equipment installation.

The effect of noise has been shown in the literature to have a potential negative effect on avian wildlife (Ortega, 2012; McClure et al., 2013; Kunc and Schmidt, 2019; Senzaki et al., 202). The threshold at which impacts could be felt is 40 dBA (Reijnen et al., 1997; Shannon et al., 2015). In fact, noise from infrastructure construction, site traffic, and refuelling and maintenance of mobile equipment could result in avoidance of certain noisy areas, changes in the reproductive success of certain species, and changes in interspecific communication. Human presence would also result in the avoidance of areas used by certain bird species. However, the noise generated by the project on the outskirts of the mine site is not expected to exceed this threshold by a significant margin, since the prescribed noise limits are 40 dBA at night and 45 dBA during the day (hourly average).

Few studies have been done on the impact of vibration on birds. However, Ferguson-Lee and Christie (2005) suggest that the upper limit is 10 kHz to 20 kHz and the lower limit is 50 kHz to 300 Hz. In some species of birds of prey, it would be between 1 kHz and 6 kHz (Yamazaki et al., 2004). The main source of vibration during the construction phase of the project will be surface blasting activities. It should be noted, however, that these activities will be carried out on a sporadic basis and will be concentrated in specific areas, such as for the construction of roads and ponds.

In the case of light disturbance, nighttime lighting could have an effect on migrating birds, attracting groups of birds to operations and diverting them from their migratory route. This may occur particularly under foggy conditions, resulting in a risk of mortality from collisions (Ogden, 1996).

Heavy vehicles and equipment traffic also pose a risk to birds. In Canada, it is estimated that 3,462 birds per 100 km are struck by vehicles each year during the breeding season (Bishop and Borgan, 2013).

Deterioration of the quality of the environment due to accidental leaks and spills of petroleum products or other hazardous materials into surface water and soil caused by the operation of equipment that uses these products or simply during their handling

Accidental spills of hazardous materials—particularly those related to equipment maintenance, traffic, or breakdowns of mobile equipment—could, in some cases, have direct and indirect impacts on birdlife. Contamination of soil or surface water can expose birds to various hydrocarbons. This exposure can cause the feathers to become fouled, compromising their waterproofing and thermal insulation properties, as well as causing toxic effects resulting from the ingestion or inhalation of contaminants. Some products may also have an impact on embryonic development and thus affect reproduction (King et al., 2021). Such exposures can alter behaviour, reduce survival rates, and compromise the reproductive success of birds. Similarly, heavy metals such as lead and mercury are known to affect the nervous, endocrine, and reproductive systems (ECCC, 2020b).

Contamination of surface water and soil can also have indirect effects by degrading habitats or affecting the survival and reproduction of food sources, such as plants, insects, and small mammals. Some contaminants can accumulate in the tissues of these prey animals, leading to secondary contamination in the birds that feed on them.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Noise and vibration," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," and "Planning, land use, and land tenure" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

All wildlife groups

- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop a training module to teach employees how to identify and manage the presence of species of special status and nests of migratory birds (P38).

Large wildlife and other mammals

- Develop a system for reporting sightings of large wildlife (P41).

Avian fauna

- Regrade the slopes of borrow pits to an incline of less than 70° where feasible, in order to reduce the attractiveness of active borrow pits as nesting habitat for bank swallows (P39).

Assessment of residual impact

Large wildlife and other mammals

During the construction phase, despite the implementation of the various proposed mitigation measures, the work will result in a net loss of potential habitat for large wildlife and other mammals, leading to a **medium** level of disturbance for these species. Given the medium value placed on wildlife species of special status, the intensity of the impact is **medium**.

The loss of breeding and feeding grounds accounts for the majority of the impacts of construction on large wildlife and other mammals. These impacts will be felt within the **project site** throughout the construction and operations phases, which will last for a **medium** duration. This will result in a residual impact of **moderate** significance. The probability of occurrence of these impacts is **high**, and the reversibility potential is **medium**, as habitat rehabilitation will be carried out during the restoration phase.

Despite the implementation of the various proposed mitigation measures, the risk of disturbance from nuisances (noise, vibrations, light, and dust) and mortality from collisions remains. These will result in a **medium** level of disturbance, which, combined with the high value placed on these species, will lead to a **medium** intensity of impact. These impacts will be felt within the **project area** throughout the construction and operations phases, which will last for a **medium** duration. The residual impact is therefore of **minor** significance in terms of disturbance and collision risk. The probability of occurrence of the disturbance is **high**, whereas the probability of a collision is **medium**. The reversibility of these impacts is considered **high** because the construction-related activities that could cause them will cease once this phase is completed.

<table>
<tr><th colspan="4">Impact on the activities of large wildlife and other mammal species</th></tr>
<tr><td>Intensity:</td><td>Medium</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate (habitat loss)
Minor (disturbance and collision)</td></tr>
<tr><td>Extent:</td><td>Project</td></tr>
<tr><td>Duration:</td><td>Medium (habitat loss)
Short (disturbance and collision)</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">High (habitat loss and disturbance)
Medium (collision risk)</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">Moderate (habitat loss)
High (disturbance and collision)</td></tr>
</table>

Avian fauna

The construction phase will also result in a net loss of potential habitat for migratory birds. Most of the residual impacts will result from this habitat loss, which suggests a **medium** degree of disturbance for these species and, consequently, a **medium** impact intensity, given the **medium** value assigned to terrestrial wildlife. The impact of habitat loss will be felt within the **project** area until the end of operations (**medium** duration), resulting in a residual impact of **moderate** significance.

Several proposed mitigation measures target impacts related to disturbance, collision risk, and the potential for accidental spills. Thus, the degree of disturbance is considered **low** for these residual impacts, with a **low** impact intensity. Among birds, population density decreases in the vicinity of infrastructure, and this effect can extend up to approximately 1 km (Benítez-López et al., 2010), which corresponds to the **local** study area. Noise, vibration, and light levels harmful to birds are not expected to extend beyond this area. As for potential spills, they will be limited to the **project area**. Disturbances and collision risks are impacts of **medium** duration, as they begin during the construction phase and persist throughout subsequent phases. However, the impacts of accidental spills are of **short** duration, as they result from one-time events. The residual impact will therefore be of **minor** significance for both of these aspects.

The probability of occurrence of habitat loss and disturbance or collision-related mortality is **high**, but **low** for accidental spills. The reversibility potential for habitat loss is **medium** because habitats can be restored to a predetermined target state, but it is difficult to fully restore them to their original condition in the short term, especially in the case of mature stands or wetlands. The reversibility of the impact of disturbance or mortality is considered **high**, since these effects cease as soon as the activities causing them come to an end. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

<table>
<tr><th colspan="4">Impact on the activities of terrestrial wildlife (avian fauna, including migratory birds)</th></tr>
<tr><td>Intensity:</td><td>Medium (habitat loss)
Low (disturbance/collision and accidental spills)</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate (habitat loss)
Minor (disturbance/collision risk, accidental spills)</td></tr>
<tr><td>Extent:</td><td>Local (disturbance/collision risk)
Project (habitat loss, accidental spills)</td></tr>
<tr><td>Duration:</td><td>Medium (habitat loss, disturbance/collision risk)
Short (accidental spills)</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">High (habitat loss, disturbance/collision risk)
Low (accidental spills)</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">High (disturbance/collision risk)
Medium (habitat loss, accidental spills)</td></tr>
</table>

Operations phase

Statement of potential impact

Disturbance of the activities of terrestrial wildlife (large wildlife and other mammal species, avian fauna).

Sources of the impact

- Presence and operation of new infrastructure.
- Transportation and traffic related to ore and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Large wildlife and other mammals

Alteration of predator–prey dynamics associated with mining activities, buildings, and infrastructure.

This impact is primarily associated with migratory caribou. For other large wildlife species and other mammals, impacts related to habitat loss and fragmentation are similar to those described for the construction phase.

Linear infrastructure can indirectly influence the risk of predation faced by migratory caribou. Roads, access roads, and right-of-ways associated with PTLs can facilitate the movement of predators, such as the grey wolf, by providing more efficient movement corridors in snow-covered landscapes, which may increase the likelihood of predator-prey encounters (Plante *et al.*, 2020). A detailed description of this impact is provided in Section 8.2.3.2, *Species with Special Status*, under the subsection addressing large wildlife and other mammals.

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

Throughout the operations phase, disturbances associated with noise, vehicle traffic, and human presence may cause localized avoidance of adjacent habitats during the winter, a period when caribou have limited ability to compensate energetically for such disturbances (Plante et al., 2018). In addition, migrating caribou may occasionally forage along roadsides (Post and Klein, 1999), increasing the risk of collisions with vehicles (Fahrig and Rytwinski, 2009).

For other species of large wildlife and other mammals, the impacts associated with habitat loss and fragmentation are similar to those described for the construction phase. It should be noted that, with regard to the noise levels modelled during the operations phase, it appears that levels exceeding 52 dBA (Leq, 1h) are only perceived at the construction site and within a radius of 1,500 m to 2,000 m around the site.

Avian fauna

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

The indirect impacts caused by increased disturbance—such as vibrations, noise, light, and dust emissions—during the operations phase will be comparable to those identified for the construction phase.

Deterioration of the quality of the environment due to accidental leaks and spills of petroleum products or other hazardous materials into surface water and soil caused by the operation of equipment that uses these products or simply during their handling

As far as spill risks are concerned, they are the same as those anticipated during the construction phase.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the “Ambient air,” “Noise and vibrations,” “Soil, surface water, and sediment quality,” “Vegetation and wetlands,” “Wildlife and wildlife habitat,” and Planning, land use, and land tenure” sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

All wildlife groups

- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop a training module to teach employees how to identify and manage the presence of species of special status and nests of migratory birds (P38).

Large wildlife and other mammals

- Develop a system for reporting sightings of large wildlife (P41).

Assessment of residual impact

Large wildlife and other mammals

Despite the implementation of the various proposed mitigation measures, risks of disruption to predator–prey dynamics, as well as disturbance and collision, remain present at the project site, causing a medium degree of disturbance that results in an impact of **high** intensity. The impacts will be felt within the project area over a **medium** duration. The residual impact is therefore of **moderate** significance in terms of disturbance and collision risk. The probability of occurrence of the disturbance and collision risk is **high**, and reversibility is considered **high** since these impacts will disappear at the end of operations.

Impact on the activities of terrestrial wildlife (large wildlife and other mammal species)			
Intensity:	High	**Significance:**	Moderate
Extent:	Project		
Duration:	Medium		
Probability of occurrence:		High	
Reversibility:		High	

Avian fauna

Several proposed mitigation measures target impacts related to disturbance, the risk of collision-related mortality, and the potential for accidental spills. Thus, the degree of disturbance is considered **low** for these residual impacts, with a **low** impact intensity given the **medium** value assigned to terrestrial fauna.

Noise, vibration, and light levels harmful to birds are not expected to extend beyond the **local** study area. As for potential spills, they will be confined to the **project** area. Disturbance and collision risk are impacts of medium duration, as they occur throughout the operations phase. However, the impacts of accidental spills are of **short** duration, as they result from one-time events. As a result, the residual impacts of these factors are of **minor** significance.

The probability of occurrence of disturbance or mortality due to collisions is **high**, but **low** for accidental spills. The reversibility potential of the impact of disturbance or mortality is considered **high**, since these effects cease as soon as the activities causing them come to an end. Accidental spills have **medium** reversibility, as there remains a possibility that some contaminants will persist in the environment despite remediation efforts.

Impact on the activities of terrestrial wildlife (avian fauna, including migratory birds)			
Intensity:	Low (disturbance/collision and accidental spills)	**Significance:**	Minor (disturbance/collision risk, accidental spills)
Extent:	Local (disturbance/collision risk) Project (accidental spills)		
Duration:	Medium (disturbance/collision risk) Short (accidental spills)		
Probability of occurrence:		High (disturbance/collision risk) Low (accidental spills)	
Reversibility:		Low (habitat loss) High (disturbance/collision risk) Medium (accidental spills)	

Closure phase

Statement of potential impact

Habitat improvements that promote the resumption of activities of terrestrial wildlife (large wildlife and other mammal species, avian fauna).

Sources of the impact

- Presence of site remains.
- Final restoration.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Large wildlife and other mammals and Avian fauna

Disturbances caused by vibrations, noise, light, and dust, as well as the risk of collisions associated with transport and heavy vehicle and equipment traffic, which can lead to mortality

As in the construction and operations phases, dismantling activities and the moving around of mobile equipment will cause disturbances and pose a risk of fatal collisions.

Deterioration of the quality of the environment due to accidental leaks and spills of petroleum products or other hazardous materials into surface water and soil caused by the operation of equipment that uses these products or simply during their handling

As for these spill risks, they are the same as those anticipated during the construction and operations phases.

Habitat creation through site restoration

At the end of operations, habitats will be restored or recreated and may once again serve as habitats for some of the bird species of special status. In the short term, the restored areas may be used by some bird species, including those that inhabit regenerating environments with sparse vegetation or young stands.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Noise and vibration," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," and "Planning, land use, and land tenure" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

All wildlife groups

- Work together with the tallyman of trapline CH39 in carrying out rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop a training module to teach employees how to identify and manage the presence of species of special status and nests of migratory birds (P38).

Large wildlife and other mammals

- Develop a system for reporting sightings of large wildlife (P41).

Avian fauna

- Before proceeding with the demolition of buildings and other structures during the closure phase, inspect them to check for the possible presence of bat hibernacula or maternity roosts, or bird nests (P42).

Assessment of residual impact

During the closure phase, the negative impacts are linked to disturbance, collision risk, and accidental spills, affecting all terrestrial wildlife. However, these impacts will be less significant than during the construction and operations phases. In addition, the project will have a positive impact by restoring habitats through a revegetation campaign.

Thus, the degree of disturbance is considered **low** for negative residual impacts, with a **low** impact intensity given the **medium** value assigned to terrestrial fauna. The impacts will be felt in the **project** area for a **short** duration, as disturbances and collision risks will cease once restoration work is complete. The anticipated residual impact is expected to be of **minor** significance. The probability of occurrence is **high** for disturbances and **low** for collision risk and spills. The reversibility of the impact of the disturbance and the collision risk is considered **high**, since these effects cease as soon as the activities causing them are completed.

The closure phase will result in the creation of habitats for species of special status, leading to an expected **medium** degree of improvement for these species and, consequently, a **high** intensity of positive impact. The impact of habitat creation will be felt in the **project** area and will persist beyond the restoration work (**long** duration), resulting in a **positive** residual impact of **major** significance. The probability of occurrence is **high**.

Impact on the activities of terrestrial wildlife			
Intensity:	Medium (+ habitat creation) Low (- disturbance/collision and - accidental spills)	**Significance:**	Medium (+ habitat creation) Minor (- disturbance/collision risk, - accidental spills)
Extent:	Local (+ habitat creation, - disturbance/collision risk) Project (- accidental spills)		
Duration:	Long (+ habitat creation) Short (- accidental spills, disturbance/collision)		
Probability of occurrence:		High (+ habitat creation, - disturbance) Low (- accidental spills, collision)	
Reversibility:		High (- disturbance/collision risk) Medium (- accidental spills)	

8.2.3.4 Forest cover

Forest cover refers to all terrestrial plant communities that may be disturbed by activities in the construction, operations, and closure phases. It should be noted that, within the framework of the project, forest cover is assigned a medium ecosystem value because, while it attracts significant interest, there is not necessarily a consensus on its conservation and protection. It is also considered to have low socioeconomic value because, due to its nature and low density, it is rarely harvested. Since the value to be applied is the higher of the two, a **medium** value will be used to analyze the impacts of this VEC.

Summary of current conditions

The biophysical LSA is located within the spruce-lichen stand bioclimatic domain (western subdomain) and within the Eastmain and Sakami River, Robert Bourassa Reservoir, and Lac Naococane ecological regions. The landscapes of the open boreal forest are not very diverse due to harsh climatic conditions and frequent vegetation fires. They are heavily dominated by black spruce. Black spruce-lichen stands, characterized by an open forest canopy and a lichen mat are the most abundant type of stand in the area (MRNF, 2023).

More specifically, the main groupings of terrestrial vegetation include, in order of increasing area, regenerating forest areas, coniferous stands, lichen tundra, scrubland, mixedwood stands, and hardwood stands. They cover a total of 15,513 hectares of the biophysical LSA, or 75.1% of the total surface area of the biophysical LSA, which is 20,661 ha. Of these groups, two stand out, namely:

- Regenerating forest areas, which account for 42.5% of the biophysical LSA (8,774 ha). They are primarily the result of disturbances caused by forest fires that occurred several decades ago. The tree stratum is not dominant there, as most tree species are still in the shrub stage.

- Softwood stands, which account for 26.1% of the biophysical LSA (5,814 ha). They consist mainly, in order of importance, of spruce-moss stands, spruce-lichen stands, and jack pine stands. The dominant species in spruce stands is the black spruce.

Two other types of mixedwood and hardwood stands are present, but in smaller quantities, accounting for only 0.1% (28 ha) and 0.002% (0.3 ha) of the LSA, respectively. Finally, scrubland, which consists of areas undergoing regeneration but containing less than 10% trees, accounts for 1.8% (378 ha) of the LSA, while lichen tundra—open habitats where lichens dominate over shrubs—account for 2.5% (519 ha) of the LSA.

Construction phase

Statement of potential impact

Loss of forest cover associated with clearing land required for mine infrastructure and operations

Source of the impact

- Site organization, stripping, and clearing
- Surface preparation and access layout

Detailed description of the impact

The primary impact associated with forest cover stems from the permanent loss of vegetation due to clearing the areas required for the development of mining facilities (roads, the main mine site, stockpiles and other storage areas, as well as the locations of power transmission towers and substations), totalling 519 ha, or 2.5% of the LSA. The stands in question include softwood forests (250.4 ha), regenerating forests (246.6 ha), scrubland (19.6 ha), and lichen tundra (2.59 ha). Preparing the surfaces and traffic routes requires the removal of stumps, roots, and the organic layer (which is stored in stockpiles for potential future site restoration), thereby eliminating any possibility of natural regrowth on these surfaces for the duration of the facilities' operational life. As for the right-of-way of the power line (excluding the locations of the towers), only the tree canopy will be cleared; stumps, saplings, shrubs, and other vegetation will be left in place. The area of the right-of-way where the tree layer will be affected by this impact (in terrestrial and wetland environments) is estimated at 201.5 ha.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," and Planning, land use, and land tenure" sections that apply in whole or in part to impacts on forest cover. In addition to these, the following specific measures must be taken into account:

- Work together with the tallyman of trapline CH39 in carrying out rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- Whenever possible, preserve the forest cover along the mining site road and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the construction phase, the implementation of the various proposed mitigation measures, combined with the abundance of the main types of forest cover in the biophysical LSA, suggests that the level of disturbance to the affected plant groupings will be **low**. Given the medium value attached to soils, the intensity of the impact is **low**. This impact will be felt within the project area throughout the construction and operations phases (medium duration), resulting in a residual impact of **minor significance**. The probability of occurrence of this impact is **high**, and its reversibility potential is **high** due to the possibility of regenerating the affected areas once operations have ceased.

Impact on forest cover			
Intensity:	Low	**Significance:**	Minor
Extent:	Project		
Duration:	Medium		
Probability of occurrence:		High	
Reversibility:		High	

Operations phase

Statement of potential impact

Disturbance of forest cover maintained on the edges of the site (damage caused by traffic, dust)

Source of the impact

- Presence and operation of new infrastructure.
- Transportation and traffic related to ore and supplies.

Detailed description of the impact

During the operations phase, the main impacts on forest cover and its components include:

- any potential need for additional space that has not yet been anticipated and that would result in further cutting;
- damage caused to vegetation bordering the facilities by off-road vehicle and machinery traffic;
- dust generated by activities can settle on plants, potentially limiting their growth (by reducing their ability to photosynthesize).

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," and Planning, land use, and land tenure" sections that apply in whole or in part to impacts on forest cover. In addition to these, the following specific measures must be taken into account:

- Work together with the tallyman of trapline CH39 in carrying out rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- Whenever possible, preserve the forest cover along the road of the mine and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Spray water on the non-active areas of stockpiles using a water truck when necessary (P28).
- Apply dust suppressants on the slopes and final (outer) surfaces of the stockpiles (P29).

Assessment of residual impact

During the operations phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance to the affected plant groupings. Given the medium value attached to soils, the intensity of the impact is **low**. This impact will be felt primarily within the project area, but also at the local level (dust), throughout the entire operations phase (medium duration), resulting in a residual impact of **minor significance**. The probability of occurrence of this impact is **high**, and its reversibility potential is **high** due to the possibility of the affected areas regenerating once operations cease, and due to regular rainfall from spring through fall, which washes some or all of the dust off the vegetation.

Impact on forest cover			
Intensity:	Low	**Significance:**	Minor
Extent:	Local		
Duration:	Medium		
Probability of occurrence:		High	
Reversibility:		High	

Closure phase

Identification of potential impacts

Potential damage to forest cover components and area not cleared for revegetation

Restoration of cleared areas through revegetation.

Source of the impact

- Transport and traffic during the work.
- Presence of site remains.
- Final restoration.

Detailed description of the impact

The main impact during the closure phase is positive, as it involves the freeing up and restoration of a large portion of the surface area associated with the project. The restoration of these areas involves loosening the soil, spreading organic matter stored for this purpose, and replanting with native tree species typical of the local forest cover. Nevertheless, transportation and traffic can cause certain temporary impacts by encroaching beyond the work zones, and the presence of mine site remnants may limit the ability to fully revegetate the previously occupied areas.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Soil, surface water, and sediment quality," "Vegetation and wetlands," and Planning, land use, and land tenure" sections that apply in whole or in part to impacts on forest cover. In addition to these, the following specific measures must be taken into account:

- Cooperate with the tallyman of trapline CH39 in the rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- Whenever possible, preserve the forest cover along the mining site road and revegetate bare areas with native plants after completion of the work (P23).An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance to the affected plant groupings and a **high** degree of improvement. Given the medium value assigned to soils, the intensity of the negative impact is **low**, while that of the positive impact is **high**. These impacts will be felt primarily within the project area, only during the closure period in the case of negative impacts (short duration) and over the long term in the case of positive impacts. The result is a negative residual impact of **minor significance**, whereas the positive impact will be of **major significance**. The probability of occurrence of these impacts is **high** and the reversibility potential of the negative impact is **high** due to the very nature of the ongoing work, which is ultimately aimed at restoring the site.

Impact on forest cover			
Intensity:	Low (-) and high (+)	**Significance:**	**Minor (-) and Major (+)**
Extent:	**Project**		
Duration:	**Short (-) and Long (+)**		
Probability of occurrence:		High (-) (+)	
Reversibility:		High (-)	

8.2.4 Issue 4 – Preserving the quality of life of the local population

8.2.4.1 Air quality

Air quality refers to compliance with existing standards for concentrations of air pollutants and dust that may be affected by construction, operations, and closure activities. It should be noted that, within the framework of the project, air quality is a subject of significant interest and concern; for this reason, a **medium** ecosystem value has been assigned to this VEC.

Summary of current conditions

According to data from the Radisson station of the National Air Pollution Surveillance (NAPS) program—the nearest station at a latitude equivalent to that of the project site—the initial concentrations specified for northern projects in the *Guide d'instructions – Préparation et réalisation d'une modélisation de la dispersion des émissions atmosphériques – Projets miniers* ["Instruction Manual – Preparation and Implementation of Atmospheric Emission Dispersion Modelling – Mining Projects"] (MELCCFP, 2025a) as well as those in the *Normes et critères de qualité de l'air du Québec [NCQQA v10](MELCCFP, 2025b)*, Quebec's air quality standards and criteria, the initial concentrations selected and considered to be existing at the mining site are presented in Table 6-5. Based on the concentrations measured, air quality in the project area is considered very good to excellent.

Construction phase

Statement of potential impact

Alteration of air quality due to the emission of air pollutants and dust

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Construction of structures and infrastructure.
- Transportation and traffic related to materials and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Construction work during the preparation of the mine site will involve several types of activities that may generate air emissions, including:

- Exhaust emissions from various types of mobile construction equipment, which are sources of particulate matter and combustion gases (nitrogen oxides, sulphur dioxide, hydrocarbons, carbon monoxide, volatile organic compounds, etc.).
- All operations involving the unloading, handling, and compaction of fill material that result in fugitive emissions of particulate matter.
- Vehicle traffic on unpaved sections is also a source of particulate matter.
- Blasting and drilling operations for the extraction of granular material used in the preparation of road surfaces and building foundations, as well as site preparation, are sources of particulate matter and combustion gases.

Anticipated emissions during the construction phase were not assessed through the dispersion modelling presented in the sectoral atmospheric dispersion modelling report, as it was determined that atmospheric emissions would be significantly lower during construction than during the operational phase. Indeed, it is expected that even during the most intensive construction days, the various parameters considered—including total and fine particulate matter, CO, NO_2, SO_2, VOCs, metals, and crystalline silica—would not exceed applicable criteria and standards at sensitive receptor locations.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the “Ambient air” and “Vegetation and wetlands” sections that apply in whole or in part to the impacts on air quality. In addition to these, the following specific measures must be taken into account:

- Gradually restore Stockpiles 1 and 2 to reduce the areas susceptible to wind erosion and erosion from runoff (P01).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and develop solutions to the issues that may arise during the mine’s phases (P18).
- Whenever possible, preserve the forest cover along the road of the mine and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Spray water on the non-active areas of stockpiles using a water truck when necessary (P28).
- Apply dust suppressants on the slopes and final (outer) surfaces of the stockpiles (P29).

Assessment of residual impact

During the construction phase, the limited concentrations emitted, the distance from sensitive receptors, and the implementation of the various proposed mitigation measures suggest that the degree of disturbance related to changes in air quality will be **low**. Given the medium value attached to soils, the intensity of the impact is **low**. This impact will be felt within the **local** area and only during the construction period (**short** duration), resulting in a residual impact of **minor significance**. The probability of occurrence of this impact is **high** for exhaust emissions associated with machinery operation and blasting, but **medium** for the risk of dust emissions. The reversibility potential of these impacts is **high** because the air emissions generated during the construction phase will cease once that phase is over.

Impact on air quality			
Intensity:	Low	**Significance:**	**Minor**
Extent:	**Local**		
Duration:	**Short**		
Probability of occurrence:		High (exhaust emissions, blasting) Medium (dust emissions)	
Reversibility:		High	

Operations phase

Statement of potential impact

Alteration of air quality due to the emission of air pollutants and dust.

Sources of the impact

- Presence and operation of new infrastructure;
- Transportation and traffic related to ore and supplies;
- Production and management of residual and hazardous materials.

Detailed description of the impact

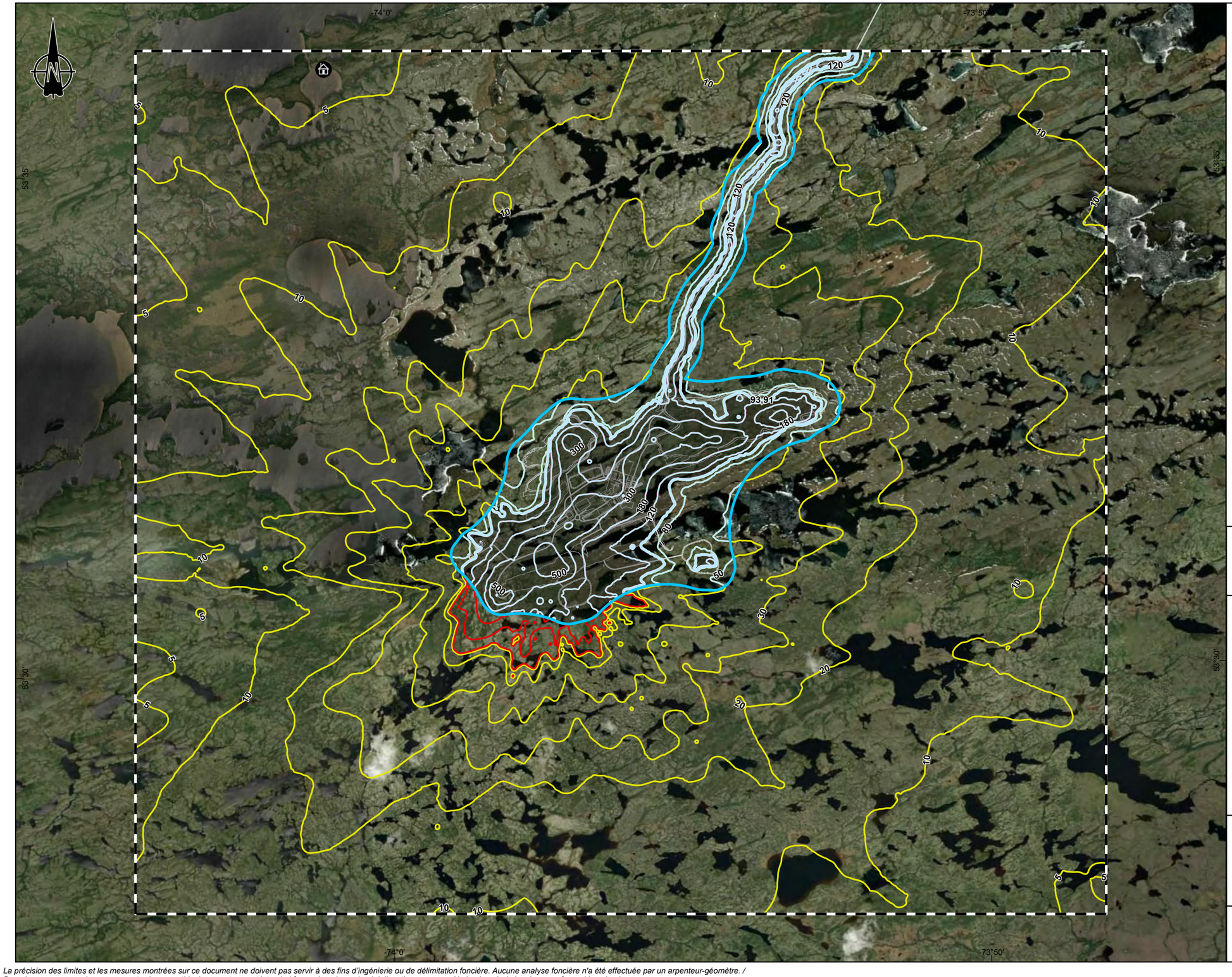
Operations at the mine site will involve several sources of air emissions, including:

- Exhaust emissions from various types of mobile equipment used in mine operations, which are sources of particulate matter and combustion gases (nitrogen oxides, sulphur dioxide, hydrocarbons, carbon monoxide, volatile organic compounds, etc.).
- All operations involving the loading, handling, and unloading of ore and various tailings that are sources of fugitive particulate matter emissions.
- Vehicle traffic on the mine site's internal road network and on the Trans-Taiga Road, which are unpaved, also contributes to fugitive emissions of particulate matter.
- Blasting and drilling operations for the extraction of overburden and ore are sources of particulate matter and combustion gases.

- The presence and operation of new point sources, including dust collectors and generators, will also contribute to air emissions.
- The exhaust outlets of the underground mine's ventilation equipment, which will emit combustion gases and particulates.
- The release of metals and metalloids present in the dust generated by mine operations.

Projected emissions during the operations phase were estimated using a modelling approach described in detail in the sectoral report on atmospheric dispersion modelling (Appendix 6-1). The modelled concentrations were evaluated over a domain measuring 16 km by 18 km (area of 592.4 ha). Based on the results of this modelling, the following conclusions can be drawn:

- All substances considered in the modelling comply with the Quebec and Canadian standards and criteria applicable to the various sensitive receptors (5) identified around the site. These receptors are located at distances ranging from approximately 6 km to 15.5 km from the mine site.
- Quebec's criteria and standards for some of the substances are exceeded within the modelling area (beyond 300 m from the mining infrastructure) , specifically:
  - Total particulate matter emissions over a 24-hour period for an area to the south, near the open pit (Map 8-10). This exceedance is detected over a distance of less than 1.5 km and is believed to be primarily caused by dust emitted by passing trucks (+95%). It should be noted that although these exceedances could occur throughout the entire duration of operations, they will rarely be noticeable at the maximum modelled distance (approximately 1.5 km).
  - Fine particulate matter ($PM_{2.5}$) emissions over a 24-hour period for an area to the south, near the open pit (Map 8-11). This exceedance is noticeable over a distance of approximately 500 metres and is believed to be primarily due to dust generated by truck traffic (75%), as well as emissions from the process plant and vehicle exhaust (25%). It should be noted that although these exceedances could occur throughout the entire duration of operations, they will rarely be noticeable at the maximum modelled distance (approximately 500 m).
  - Acetaldehyde emissions over a 4-minute period in a southern section near the open pit (see Appendix 6-1 for more details). This exceedance is detected over a distance of approximately 325 m from the infrastructure (25 m from the application limit) and is believed to be primarily due to emissions from vehicle exhaust. This concerns sporadic and infrequent events.
  - Crystalline silica emissions over a 1-hour period during blasting and without blasting in the pit (Map 8-12, see Appendix 6-1 for the infrequent scenario involving blasting). When there is no blasting, the impact over a one-hour period is primarily felt south of the open pit within a distance of less than 2.5 km and is believed to be mainly caused by dust generated by truck traffic. During blasting operations, the impact is felt for an hour around the site within a radius of less than 6 km. It should be noted that blasting operations are currently scheduled only two to three times a week, whereas the modelling assumed a frequency of one blast per day. These are therefore rare occurrences whose effects subside within an hour or so after the blasting.
  - Crystalline silica emissions over a one-year period for all mining operations (Map 8-13). The impact is felt throughout the site within a radius of less than 3 km and is believed to be primarily caused by dust kicked up by passing trucks.



Composante du projet / *Project Component*

Infrastructure actuelle ou projetée / *Existing or projected infrastructure*

Modèle de dispersion atmosphérique / *Atmospheric Dispersion Model*

Domaine de modélisation / *Modeling domain*

Limite d'application des normes et critères / *Limits of application of standards and criteria*

Récepteurs / *Receptors*

Camp permanent / *Permanent camp*

Courbes isoconcentrations / *Isoconcentrations Curves* (µg/m³)

Supérieure à la valeur limite / *Above the limit value*

Inférieure à la valeur limite / *Below the limit value*
(considérant la concentration initiale) /
(considering the initial concentration)

Hors domaine d'application / *Outside application domain*

Valeur limite : 120 µg/m³ / *Limit: 120 µg/m³*
Concentration initiale : 26.09 µg/m³ / *Initial concentration: 26.09 µg/m³*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 8-10 / *Map 8-10*

Concentrations maximales modélisées
Substance : Particules totales (PMT)
Période : 24 heures
Scénario : Exploitation
Type de limite : MELCCFP (Norme)

Maximum Modelled Concentrations
Substance : Total Particulates (PMT)
Period : 24-hours
Scenario : Operations
Limit type : MELCCFP (Standard)

Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 700 1 400 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

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CA0001724_3318_eie_c08_10_13_resultat_260325

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. /
Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.



Composante du projet / *Project Component*

Infrastructure actuelle ou projetée / *Existing or projected infrastructure*

Modèle de dispersion atmosphérique / *Atmospheric Dispersion Model*

Domaine de modélisation / *Modeling domain*

Limite d'application des normes et critères / *Limits of application of standards and criteria*

Récepteurs / *Receptors*

Camp permanent / *Permanent camp*

Courbes isoconcentrations / *Isoconcentrations Curves* (µg/m³)

Supérieure à la valeur limite / *Above the limit value*

Inférieure à la valeur limite / *Below the limit value*
(considérant la concentration initiale) /
(considering the initial concentration)

Hors domaine d'application / *Outside application domain*

Valeur limite : 30 µg/m³ / *Limit: 30 µg/m³*
Concentration initiale : 10.42 µg/m³ / *Initial concentration: 10.42 µg/m³*

Projet minier Shaakichiuwaanaan /
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Carte 8-11 / *Map 8-11*

Concentrations maximales modélisées
Substance : Particules fines ($PM_{2,5}$)
Période : 24 heures
Scénario : Exploitation
Type de limite : MELCCFP (Norme)

Maximum Modelled Concentrations
Substance : Fine Particulates ($PM_{2,5}$)
Period : 24-hour
Scenario : Operations
Limit type : MELCCFP (Standard)

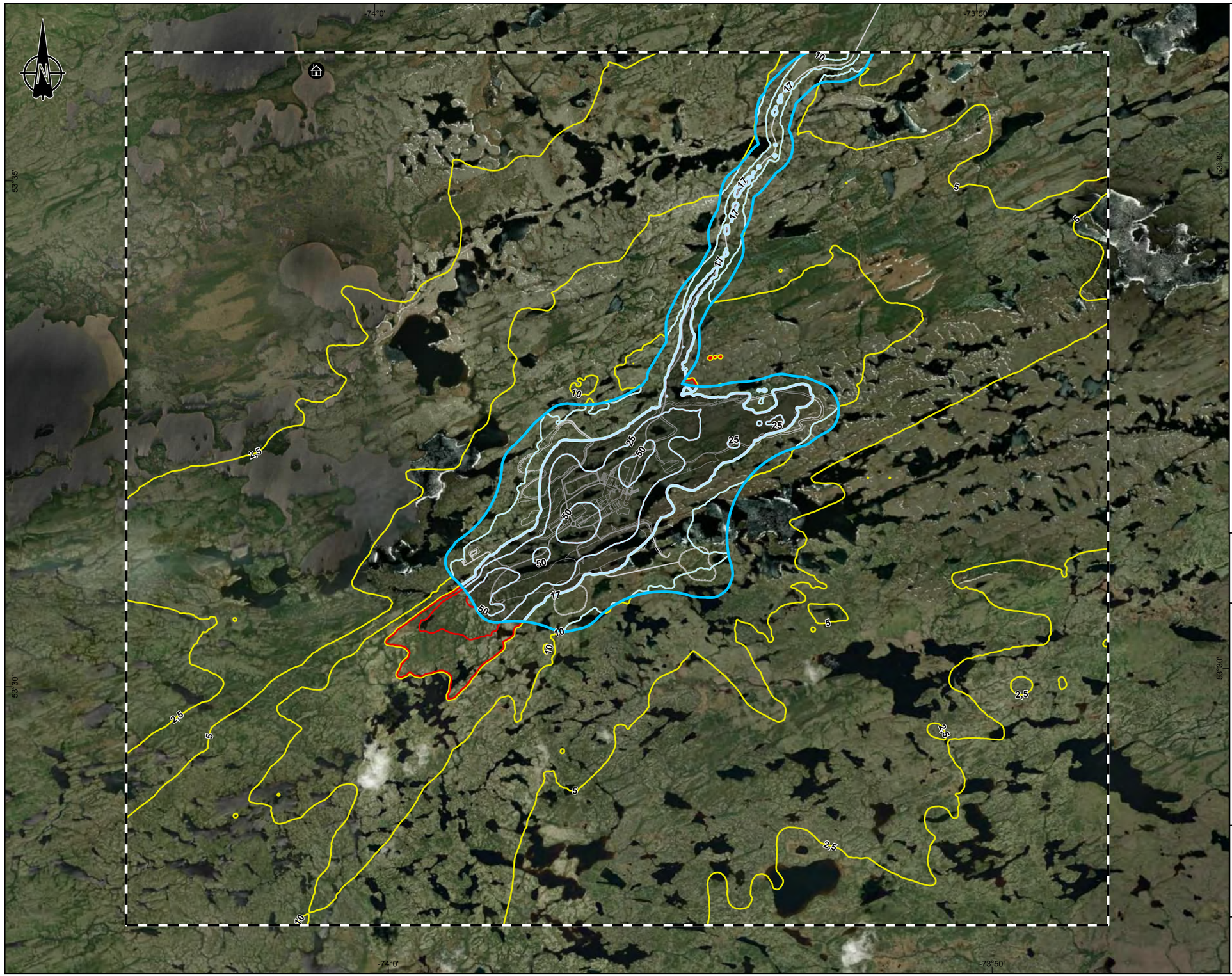
Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 700 1 400 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

Préparation / Prepared by : V. Lamothe
Dessin / Drawn by : S. Samson
Approbation / Approved by : J. Poirier
CA0001724_3318_eie_ch08_c10_13_260325.aprx
CA0001724_3318_eie_c08_10_13_resultat_260325

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Composante du projet / *Project Component*

Infrastructure actuelle ou projetée / *Existing or projected infrastructure*

Modèle de dispersion atmosphérique / *Atmospheric Dispersion Model*

Domaine de modélisation / *Modeling domain*

Limite d'application des normes et critères / *Limits of application of standards and criteria*

Récepteurs / *Receptors*

Camp permanent / *Permanent camp*

Courbes isoconcentrations / *Isoconcentrations Curves* (µg/m³)

Supérieure à la valeur limite / *Above the limit value*

Inférieure à la valeur limite / *Below the limit value*
(considérant la concentration initiale) /
(considering the initial concentration)

Hors domaine d'application / *Outside application domain*

Valeur limite : 23 µg/m³ / *Limit: 23 µg/m³*
Concentration initiale : 6 µg/m³ / *Initial concentration: 6 µg/m³*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 8-12 / *Map 8-12*

Concentrations maximales modélisées
Substance : Silice cristalline (SiO_2)
Période : 1 heure
Scénario : Exploitation - Sans sautage
Type de limite : MELCCFP (Critère)

Maximum Modelled Concentrations
Substance : Crystalline Silica (SiO_2)
Period : 1-hour
Scenario : Exploitation - No Blasting
Limit type : MELCCFP (Criterion)

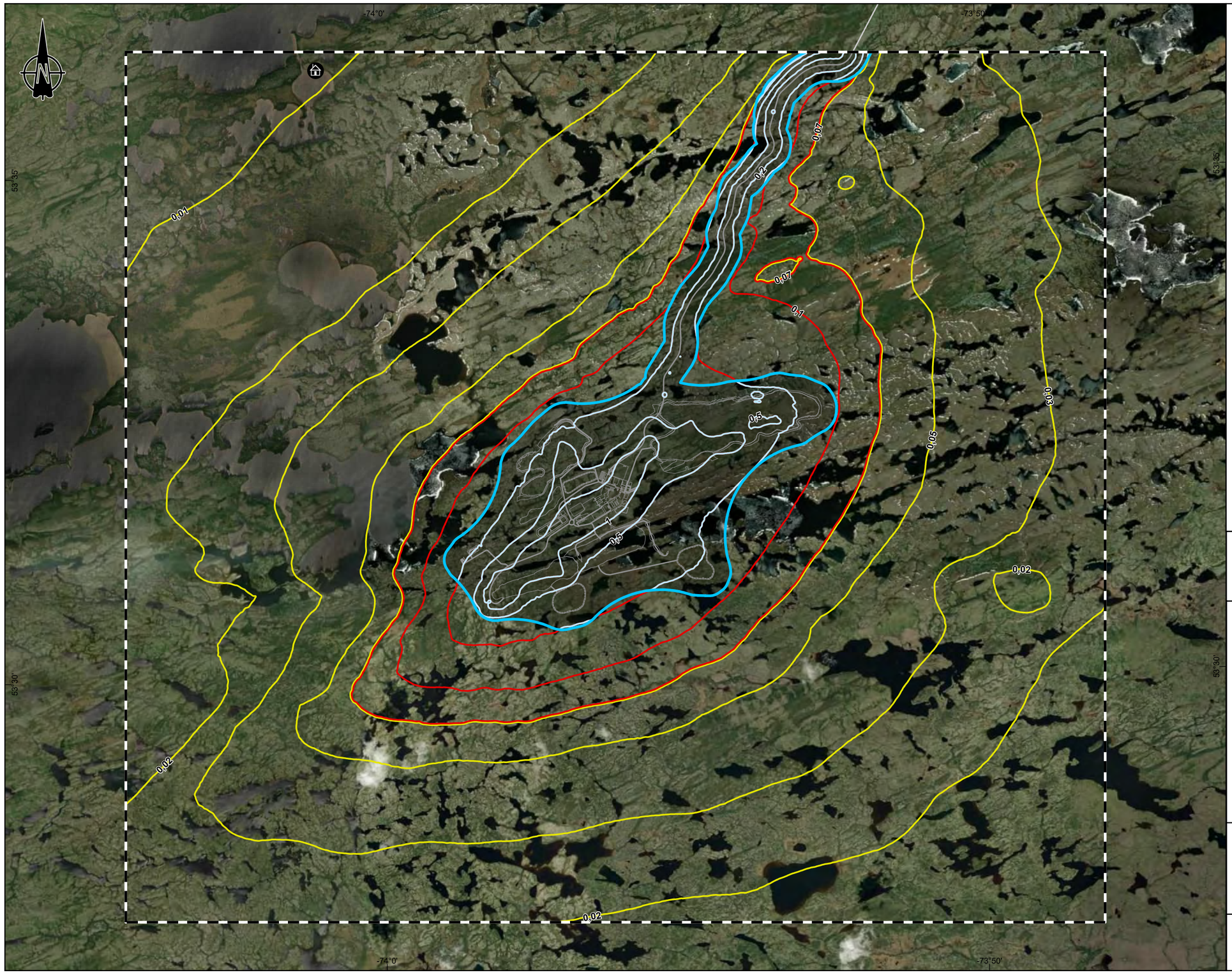
Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 700 1 400 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

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CA0001724_3318_eie_c08_10_13_resultat_260325

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Composante du projet / *Project Component*

Infrastructure actuelle ou projetée / *Existing or projected infrastructure*

Modèle de dispersion atmosphérique / *Atmospheric Dispersion Model*

Domaine de modélisation / *Modeling domain*

Limite d'application des normes et critères / *Limits of application of standards and criteria*

Récepteurs / *Receptors*

Camp permanent / *Permanent camp*

Courbes isoconcentrations / *Isoconcentrations Curves* (µg/m³)

Supérieure à la valeur limite / *Above the limit value*

Inférieure à la valeur limite / *Below the limit value*
(considérant la concentration initiale) /
(considering the initial concentration)

Hors domaine d'application / *Outside application domain*

Valeur limite : 0.07 µg/m³ / *Limit: 0.07 µg/m³*
Concentration initiale : 0 µg/m³ / *Initial concentration: 0 µg/m³*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact sur l'environnement /
Environmental Impact Assessment

Carte 8-13 / *Map 8-13*

Concentrations maximales modélisées
Substance : Silice cristalline (SiO_2)
Période : 1 an
Scénario : Exploitation
Type de limite : MELCCFP (Critère)

Maximum Modelled Concentrations
Substance : Crystalline Silica (SiO_2)
Period: 1-year
Scenario : Operations
Limit type : MELCCFP (Criterion)

Sources / Sources
AQréseau+, réseau routier, MERN, 2016
BDGA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 700 1 400 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-25

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- Canada's criteria and standards for certain substances are exceeded within the modelling area, namely:
  - Fine particulate matter, for the same reasons outlined above regarding Quebec's standards and criteria (see Appendix 6-1 for more details).
  - The one-hour nitrogen dioxide (NO_2) concentration that would be felt around the site within a radius of less than 4.5 km (results do not take into account the initial concentration used in the modelling, which is 50% of the Canadian standard). (see Appendix 6-1 for more details). These emissions are primarily related to vehicle engine emissions.

These results show that Quebec and Canadian standards and criteria are met for the majority of the substances in question. For the few substances where exceedances are noticeable, their effects are generally only observed at relatively short distances, and at greater distances, only during infrequent (one-time) events. Lastly, it must be emphasized that under no circumstances do the emissions affect the sensitive receptors located around the mine site.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air" section that apply in whole or in part to impacts on air quality. In addition to these, the following specific measures must be taken into account:

- Gradually restore Stockpiles 1 and 2 to reduce the areas susceptible to wind erosion and erosion from runoff (P01).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine's phases (P18).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Spray water on the non-active areas of stockpiles using a water truck when necessary (P28).
- Apply dust suppressants on the slopes and final (outer) surfaces of the stockpiles (P29).

Assessment of residual impact

During the operations phase, the limited concentrations emitted, the distance from sensitive receptors, and the implementation of the various proposed mitigation measures suggest that the degree of disturbance related to changes in air quality will be **low**. Given the medium value attached to soils, the intensity of the impact is **low**. This impact will be felt primarily at the **local** level, which will be the value used for the analysis. In fact, although the results for crystalline silica indicate a regional extent (with an impact radius of between 3 km and 6 km), these impacts occur sporadically and are detectable for only very short periods—a few hours at most. The effects of changes in air quality will be noticeable throughout the operations phase **(medium** duration), resulting in a residual impact of **minor** significance. The probability of occurrence of these impacts is **high**, and the reversibility potential is also **high**, as the air emissions generated during the operations phase will cease once that phase comes to an end.

Impact on air quality			
Intensity:	Low	**Significance:**	Minor
Extent:	Local		
Duration:	Medium		
Probability of occurrence:		High	
Reversibility:		High	

Closure phase

Statement of potential impact

Progressive improvement of air quality.

Sources of the impact

- Transport and traffic during the work.
- Final restoration.
- Production and management of residual and hazardous materials.

Detailed description of the impact

The impact associated with this VEC in the closure phase is primarily positive, as the main activities generating air emissions and dust will cease, the vacated areas and stockpiles will be revegetated, and the pit will gradually fill with water, reducing the amount of exposed bare ground. However, the restoration work associated with this phase will require machinery operations and traffic, demolition work, and the reworking of the topsoil to prepare it for planting and to restore the natural flow of rainwater and meltwater. These activities will generate air emissions and dust, although to a lesser extent than during the construction phase. Since modelling has shown that emissions during the construction phase did not exceed the relevant standards and criteria and did not affect sensitive receptors, it is anticipated that the same conclusion will apply during the closure phase.

Mitigation measures

The common mitigation measures are presented in Appendix 8-2; in particular, those listed in the Ambient air section that apply to and improve the expected positive impact for this VEC. No specific measures are required for this VEC during the closure phase.

Assessment of residual impact

During the closure phase, the limited concentrations emitted, the distance from sensitive receptors, and the implementation of the various proposed mitigation measures suggest that the degree of disturbance due to the negative impact related to changes in air quality will be **low**. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt at the **local** level and only during the closure phase (**short** duration), resulting in a negative impact of **minor significance**. The probability of occurrence of this impact is **high**, and the reversibility potential is also **high**.

As for the positive impact, the degree of improvement will be **high**, resulting in a **high** intensity. The extent of this impact will be **local** and it will have a **long** duration. As a result, it will have a positive impact of **major** significance, with a **high** probability of occurrence.

Impact on air quality			
Intensity:	Low (-) High (+)	**Significance:**	Minor (-) Major (+)
Extent:	Local (-)		
Duration:	Short (-) Long(+)		
Probability of occurrence:		High (-) (+)	
Reversibility:		High (-)	

8.2.5 Issue 5 – Preservation of the health, safety, and socioeconomic conditions of the regional population (Health, social, and economic conditions of Indigenous Peoples)

8.2.5.1 Physical, psychological, and social health

Physical, psychological, and social well-being encompasses all the factors that define the overall condition of a community (in this case, Indigenous and non-Indigenous communities), which may be disturbed by construction, operations, and closure activities. It should be noted that, within the framework of the project, this VEC is considered essential to community activities and is a major concern if it deteriorates, which is why it has been assigned a **high** socioeconomic value.

Summary of current conditions

The baseline state of human health in the study area is characterized by a close interaction between the biophysical and social determinants of health. For the Cree communities of Eeyou Istchee, health is understood through a holistic approach to well-being (*miyupimaatisiiun*), which encompasses physical, mental, social, cultural, and spiritual dimensions and is rooted in a close relationship with the land. The use of traditional lands, particularly the traplines associated with the Cree communities of Chisasibi, Wemindji, and Mistissini—including areas along the Billy-Diamond Highway and the Trans-Taiga Road—is a key determinant of health. These areas are used for traditional, cultural, and subsistence activities (hunting, fishing, gathering, and campsite stays), contributing to food security, cultural continuity, social connections, and the psychosocial well-being of individuals and families.

The regional context is shaped by structural and historical factors, including the lingering effects of colonialism, forced displacement, and past development projects, which influence the observed social inequalities in health. At the systemic level, communities have access to Indigenous health and social services, but these services face challenges related to geographic remoteness, the burden of travel to access specialized care, and population growth. The key health challenges identified in the baseline assessment include the high prevalence of certain chronic diseases, mental health vulnerabilities, and safety concerns that disproportionately affect certain groups, particularly women and people in vulnerable situations. These conditions are also influenced by immediate factors such as housing, the cost of living, food insecurity, and the continuity of cultural and territorial practices.

Construction and operations

Statement of potential impact

Disruption to the physical, psychological, and social health of regional populations.

Sources of the impact

- Water use and management;
- Transportation and traffic related to materials and supplies.
- Production and management of residual and hazardous materials.
- Labour and purchase of goods.

Detailed description of the impact

A more detailed description of the impact is provided in the sectoral report on health.

The project is likely to have multifaceted impacts on human health, due to the mobilization of a large workforce—most of whom will shuttle to and from the site—and changes in land use, which is a key determinant of health and well-being for the Cree.

In terms of the socioeconomic determinants of health, job creation and increased income serve as protective factors, contributing to financial security, self-reliance, and the ability to meet family needs. For several Cree workers, these benefits can indirectly support health by facilitating access to food, housing, and participation in community and cultural life, particularly through the acquisition of equipment that enables them to engage in activities on the land.

However, working conditions in the mining industry (irregular schedules, long periods of absence, fatigue, and sleep disturbance) pose risks to the physical and mental health of workers. The presence of a highly male-dominated work culture, combined with the stigma surrounding mental health, can limit access to support services and encourage risky coping strategies, such as alcohol or substance use. These challenges can exacerbate pre-existing health conditions and negatively impact psychological well-being in the medium and long term. At the camp, women—and Indigenous women in particular—may be at risk of becoming victims of gender-based violence.

The effects on health also extend to the family environment, particularly among the families of workers who shuttle between home and work. Spouses—mostly women—take on an increased burden in their partner's absence, which can lead to stress, burnout, social isolation, and constraints on employment or community participation. These family dynamics influence mental health, family cohesion, and, indirectly, children's well-being.

Furthermore, the land is a fundamental determinant of the Cree people's overall, cultural, and spiritual well-being. Changes associated with the project—noise, dust, increased traffic, linear construction, new infrastructure, and the prolonged presence of workers—can affect the quality of life and, consequently, well-being in the area, causing stress and contributing to a sense of loss of control over an environment that is essential to well-being.

Traditional activities at the CH39 traplines, which are attended by more than 40 people from Chisasibi (not counting children), include fishing, hunting, and gathering, which directly contribute to well-being (miyupimaatisiiun) through food security, cultural continuity, and psychosocial health. Fishing takes place on lakes in the area, including Lake 027—which has been identified as a lake indirectly receiving mine effluent—and gatherers are already selecting sites away from road dust. In this context, the projected changes in surface water quality associated with the discharge of effluent—assessed as a low, local residual impact during the operations phase—may result in indirect health effects. Regardless of compliance with discharge standards, concerns about the safety of fish and water may lead to avoidance behaviours already observed in situations of uncertainty (abandonment of sites, non-consumption), with potential repercussions on the consumption of country foods, food security, and the psychosocial well-being associated with spending time on the land.

The results of the environmental characterization and the analysis of potential exposure sources indicate that the project is not expected to result in exceedances of the regulatory criteria for contaminants in the air (8.2.4) at sensitive receptors (camps) or water (8.2.2) for biological environments likely to be used by local populations. Atmospheric dispersion models and assessments of surface and groundwater quality show that the anticipated concentrations of contaminants remain below established quality standards at sensitive receptors and in lake L27, both for the protection of human health and for the protection of ecosystems.

In this context, no complete and significant pathway of exposure has been identified for human receptors, including exposure through inhalation, drinking water, or eating country foods. In the absence of anticipated exceedances of standards and measurable health risks, a quantitative human health risk assessment (HHRA) is not required. However, given the significance of land use, the consumption of country foods, and the concerns raised during consultations, a precautionary approach and proactive monitoring have been adopted. An environmental follow-up program will be implemented to track changes in the quality of environments that may indirectly affect public health. This program includes;

- monitoring the quality of surface water;
- monitoring to detect any potential contamination in fish meat, game meat (snowshoe hare), and plant tissues (fruits – blueberries and leaves – Labrador Tea) that are consumed by Indigenous communities;

These follow-up measures will help confirm the environmental assessment's assumptions, quickly detect any unexpected changes in contaminant concentrations, and, if necessary, guide the implementation of appropriate mitigation or adaptive management measures.

Safety issues on the land are also a major determinant of health, particularly for women, girls, and the most vulnerable. Increased traffic on unpaved roads, the duration of construction work, and the presence of a large number of workers can heighten stress, feelings of insecurity, and the perceived risk of accidents. It may also increase the exposure of women, girls, and 2LGBTQ+ individuals to vulnerable situations in remote contexts, exacerbating the risks identified by the National Inquiry into Missing and Murdered Indigenous Women and Girls regarding safety, gender-based violence, and mental and psychosocial health issues, as well as barriers to safe access to the land.

Changes in access to the land (new paths on the mining site, restrictions, fences, or increased access) have mixed effects on health. While they may make access easier for some, they can also lead to increased visitor numbers, a perceived decline in tranquility, and a reduction in the abundance and quality of resources, which can affect mental health, spiritual well-being, and the transmission of traditional knowledge and practices, particularly among younger generations.

Lastly, certain factors may have occasional positive effects on health and well-being, such as access to certain camp services for local residents or the opportunity for some Cree workers to spend more time on the land thanks to their employment. However, these effects vary depending on the individual and the uses.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular those in the "Ambient air," "Noise and vibrations," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," "Planning, land use, and land tenure," "Quality of life and well-being," and "Traditional land use by Indigenous Peoples," which apply in whole or in part to the impacts on this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).
- Continue to organize cultural activities to promote intercultural exchange and a respectful work culture (P16).
- Continue to raise workers' awareness of the various forms of harassment and implement complaint procedures. Ensure compliance with the Workplace Harassment Policy and take appropriate corrective action when a report is found to be substantiated (P17).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine's phases (P18).
- Construct a cultural site that incudes a teepee so that workers can meet and practise traditional activities, particularly cooking and handicrafts and sharing stories handed down by their ancestors, as well as a recreation centre accessible to all workers (P19).
- Continue the psychosocial support program to help Cree and non-Cree workers balance work and family life (P20).
- Ensure that reliable means of communication are offered at the work camp to facilitate communication between workers and their families (P21)
- Whenever possible, preserve the forest cover along the road of the mine site and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Obtain the contact information of permanent or regular users in the area to set up a notification system for reaching them in the event of an accident and informing them of safety instructions for evacuating to a safe location (P26).
- In the FjFl-2 archaeological area (Area 126), an archaeological excavation must be carried out in the event that an unplanned activity occurs on the site (P36).
- Work with the tallyman of trapline CH39 to implement a program to improve wildlife habitats around the mine site (P43).

- Work collaboratively with local and regional services to monitor the impacts of hiring workers on community needs for child and family services (P45).
- Develop policies that promote healthy lifestyles for employees, taking into account gender-differentiated realities, including by promoting healthy food options in the cafeteria that meet diverse needs, as well as dedicated time for physical activity and accessible mental wellness programs tailored to all employees (P46).
- Operation of the workers' camp will be governed by the Proponent's alcohol and drug management policies applicable to field activities and worksites, which prohibit the possession and consumption of alcohol and drugs on site (P47).
- In collaboration with Cree health stakeholders, communities, and workers, develop complementary measures to the Employee and Family Assistance Program (EFAP) for off-duty periods to support psychosocial well-being and prevent isolation, stress, and high-risk behaviours (P48).
- Develop recurring mental health promotion campaigns, with particular attention to subgroups that may be reluctant to seek support (men and 2SLGBTQ+ individuals) (P49).
- A member of the nursing staff will be on site and, as needed, will be able to follow up with employees who have specific medical needs (such as diabetes or hypertension). Preference will be given to staff with experience providing culturally safe, trauma-informed care (P50).
- Establish collaboration with Cree and non-Indigenous health services for emergency management and the management of specialized medical follow-ups (P51).
- Medical services at the project camp must have sexual health expertise and be trained to respond appropriately to situations involving sexual assault (P52).
- Explicitly prohibit hitchhiking and informal transportation by workers; prohibit and actively monitor off-camp travel (hours, routes, behaviours); and apply clear sanctions in cases of non-compliance (P53).
- Include women's safety in discussions with the SDBJ transportation department (P54).
- Mandatory, recurring training for all workers and contractors, including all subcontractors required to travel on the Project roads (ore transport, construction), on Indigenous women's safety and gender-based violence, and required as a contractual condition. Where possible, ensure the training is co-developed with Cree women representatives (P55).
- Prohibit the use of personal vehicles for work purposes (P56).
- Translate all signage at the worksite into Cree (P57).
- Provide financial literacy services to workers, with the option to access them in Cree (P58).
- Organize, together with the community, or support activities to recognize the contribution of the company's Indigenous workers (P59).
- Communicate anticipated workforce needs to local and municipal authorities and to regional housing organizations to better anticipate potential housing needs (P60).
- Communicate with local and municipal authorities regarding their planned strategies and residential development projects (P61).

It is also worth noting the development of an environmental follow-up program, described in Chapter 13, which includes a component addressing the risk of bioaccumulation in animal and fish flesh as well as in plant tissues.

Assessment of residual impact

Although the project's anticipated impacts affect recognized determinants of health and well-being, the extent of the disturbance is considered **low** according to the assessment grid, as they do not result in any substantial, irreversible, or structural changes to the health status of the population or the functional integrity of the territory. The qualitative analysis highlights real and complex psychosocial effects; however, strictly speaking, according to the classification criteria, these effects do not result in a structural impairment of the health component, which justifies the assessment of the level of disturbance as low. The identified effects stem primarily from indirect and mediated mechanisms, such as perceptions of risk, temporary adjustments to practices, or social reorganizations associated with working arrangements and the project's presence, without causing any lasting change in the quality, distribution, or use of the valued components. Land use, cultural practices, and support networks remain generally viable and active, although they may vary across time or space for certain individuals or subgroups. Given the high socioeconomic value of health and well-being, the **intensity of the impact is considered medium.**

Its extent is **regional**, as it affects both local residents and, more broadly, the non-Indigenous and Indigenous communities in the region. The duration of the impacts is considered **medium**, as they are primarily associated with the construction and operations phases of the project. The anticipated effects are temporary, likely to change over time as activities stabilize, and are not permanent in nature; they will not persist beyond the final restoration period and are expected to subside once project activities cease. Thus, **the significance of the residual impact is moderate.**

The probability of occurrence is medium, in that the anticipated effects are plausible and were raised during consultations, but they vary depending on individuals and families, the time period, and the project's progress. Furthermore, these impacts are closely tied to contextual factors (intensity of activities, traffic, dissemination of monitoring results, quality of communications), which limits their inevitability.

Reversibility is considered medium because the impacts on health determinants are manifested within a resilient social system based on strong political and social self-determination.

<table>
<tr><th colspan="4">Impact on the physical, psychological, and social health of regional populations</th></tr>
<tr><td>Intensity:</td><td>Low</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate</td></tr>
<tr><td>Extent:</td><td>Regional</td></tr>
<tr><td>Duration:</td><td>Medium</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">Medium</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">Medium</td></tr>
</table>

Closure phase

Identification of potential impacts

Disturbance of the physical, psychological, and social health of the regional population

Sources of the impact

- Presence of site remains.

- Final restoration.
- Production and management of residual and hazardous materials.
- Workforce and procurement of goods and services.

Detailed description of the impact

The closure of the project is likely to result in temporary socioeconomic and psychosocial impacts, primarily related to job losses and changes in family and community dynamics. However, it is associated with positive effects on the land and the well-being of the community, particularly through the reduction of nuisances, the restoration of sites, and the gradual reclaiming of the land. The impacts associated with the closure work remain temporary and localized, and the long-term effects depend primarily on the socioeconomic resilience of the individuals and communities affected.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular those in the "Ambient air," "Noise and vibrations," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Wildlife and wildlife habitat," "Planning, land use, and land tenure," "Quality of life and well-being," and "Traditional land use by Indigenous Peoples," which apply in whole or in part to the impacts on this VEC. In addition to these, the following specific measures must be taken into account:

- Maintain and ensure the visibility of job opportunities in the local community by participating in various local and regional initiatives (e.g., career day) (P06).
- Continue the development of specific and transferable employee skills by supporting professional development activities in line with the employee's duties and PMET's needs (P10).
- Participate in implementing a committee on business opportunities, training, and employment governed by the potential Impact and Benefit Agreement (IBA) with the Cree First Nation of Chisasibi and the Cree Nation Government (P11).
- Prioritize the reassignment of local employees to mine closure activities (P13).
- Continue the psychosocial support program to help Cree and non-Cree workers balance work and family life (P20).
- Cooperate with the tallyman of trapline CH39 in the rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- Establish an employee assistance program to support employees during the transition to the end of operations (P40).
- Develop policies that promote healthy lifestyles for employees, taking into account gender-differentiated realities, including by promoting healthy food options in the cafeteria that meet diverse needs, as well as dedicated time for physical activity and accessible mental wellness programs tailored to all employees (P46).
- In collaboration with Cree health stakeholders, communities, and workers, develop complementary measures to the Employee and Family Assistance Program (EFAP) for off-duty periods to support psychosocial well-being and prevent isolation, stress, and high-risk behaviours (P48).

- Explicitly prohibit hitchhiking and informal transportation by workers; prohibit and actively monitor off-camp travel (hours, routes, behaviours); and apply clear sanctions in cases of non-compliance (P53).
- Include women's safety in discussions with the SDBJ transportation department (P54).
- Mandatory, recurring training for all workers and contractors, including all subcontractors required to travel on the Project roads (ore transport, construction), on Indigenous women's safety and gender-based violence, and required as a contractual condition. Where possible, ensure the training is co-developed with Cree women representatives (P55).
- Prohibit the use of personal vehicles for work purposes (P56).

Assessment of residual impact

The intensity of the impacts is **low** because the project's closure may result in temporary psychosocial impacts, primarily related to the stress and uncertainty associated with career transitions and loss of income for some workers and households, without causing long-term harm to the health of the population. The extent of the impacts is **regional**, as they affect both local land users and, more broadly, the non-Indigenous and Indigenous communities in the region. The effects will be of **medium** duration, as they are primarily linked to the transition period following the closure, and will tend to diminish as career, family, and community trajectories stabilize in the years following the closure. Thus, the significance of the residual impact is considered **moderate**. The probability of occurrence is **high** and the reversibility potential is considered **medium**.

The closure is also associated with positive effects on well-being, particularly through the reduction of nuisances, improved peace and quiet, a greater sense of safety and a better connection to the land following the site's restoration. The impact will be **medium** in intensity and will be felt at the **regional** level for a **long** duration. The positive impact is therefore considered to be of **major** significance.

Impact on the physical, psychological, and social health of regional populations			
Intensity:	Low(-) Medium (+)	**Significance:**	Moderate (-) Major (+)
Extent:	Regional (-) (+)		
Duration:	Medium (-) Long(+)		
Probability of occurrence:		High (-) (+)	
Reversibility:		Moderate (-)	

8.2.5.2 Economic benefits (job creation, economic partnerships)

The economic benefits VEC encompasses all initiatives aimed at ensuring the vitality of local and regional development (job creation, procurement of goods and services, vocational training, etc.) that could be disturbed by construction, operations, and closure activities. It should be noted that, within the framework of the project, this VEC is considered essential because it affects all local and regional communities involved in the project. It was therefore assigned a **high** socioeconomic value.

Summary of current conditions

In 2022, the gross domestic product (GDP) of the Nord-du-Québec administrative region reached $5.8 billion, representing approximately 1% of the provincial GDP. Between 2014 and 2022, the region experienced an average annual growth rate of 6.7%, the highest among all of Quebec's administrative regions. Despite this economic performance, labour force participation and employment rates there remained lower than those observed across the province as a whole, while the unemployment rate was comparable.

Mineral resource extraction alone accounted for 18.1% of the region's GDP. Investments made by mining companies operating in the region accounted for 1.8% of total mining sector investments in Quebec. In addition, the Nord-du-Québec region accounted for 4,075 direct mining jobs, representing 26.1% of total employment in the sector province-wide.

In Radisson, the labour force participation rate (86.7%) and the employment rate (76.7%) were well above the Quebec averages (64.1% and 59.3%). In contrast, Matagami had lower rates (62.6% and 59.1%), which were below the provincial average. In terms of unemployment, Radisson (7.7%) was close to overall Quebec rate (7.6%), while Matagami had a lower rate (4.9%). In both localities, the economy relied heavily on the energy, mining, and forestry sectors. The primary sector accounted for 10.6% of employment there, a significantly higher proportion than in the Nord-du-Québec region as a whole (7.1%).

The Cree communities of Chisasibi, Wemindji, and Mistissini had lower labour force participation and employment rates than those observed across Quebec as a whole. The unemployment rates in Chisasibi (8.0%) and Wemindji (8.8%) were higher than the provincial average, while Mistissini had a rate of 5.9%. Employment in these communities was concentrated primarily in the service sector, particularly in public administration, health care, and education.

Construction phase

Statement of potential impact

Contribution to local and regional economic development.

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Construction of structures and infrastructure.
- Transportation and traffic related to materials and supplies.
- Workforce and procurement.

Detailed description of the impact

During the construction phase, the anticipated impact is primarily positive, as construction of the open-pit mine is expected to support approximately 7,500 person-years of employment in Québec, including nearly 3,400 direct jobs. This corresponds to an average of approximately 2,200 jobs per year over the duration of the construction phase, including about 180 jobs per year at the regional level. For the underground mine, the construction phase is expected to support approximately 3,600 person-years of employment in Québec, including about 1,400 direct jobs, representing an annual average of approximately 1,000 jobs, including nearly 75 regional jobs per year.

Mitigation measures

The common measures are presented in Appendix 8-2, particularly those in the "Population, economy and employment" and the "Quality of life and well-being" sections that apply to and enhance the expected positive impact of this VEC. In addition to the standard measures, the following specific enhancement measures will be applied:

- To favour the hiring and retention of women that are equally qualified, as well as a local and First Nations workforce, with priority given to the people of the Cree First Nation of Chisasibi, the other Cree Eeyou Istchee communities, the regions of Nord-du-Québec and Abitibi-Témiscamingue, Quebec, and Canada, all in accordance with the existing Hiring Policy (P05).
- Maintain local procurement and participation of local suppliers of goods and services in supply chain opportunities, applying the existing Responsible Procurement Policy (P07).
- Encourage the development of local businesses aligned with PMET's needs and requirements, more specifically businesses held by Indigenous Peoples, as provided in the Responsible Procurement Policy (P08).
- Continue holding regular information sessions with the local entrepreneurs of the Cree community of Chisasibi to inform them about the future needs for services in relation to the mine's activities (P12).

Assessment of residual impact

During the construction phase, the implementation of the various proposed mitigation measures is expected to result in a **medium** level of improvement in economic benefits. Given the high value assigned to this VEC, the impact intensity is **high**. This impact will be felt at the **regional** level and only during the construction period (**short** duration), resulting in a positive impact of **major significance**. The probability of occurrence of this impact is **high**, and since the impact is primarily positive, the reversibility potential does not apply.

Impact on economic benefits			
Intensity:	High	**Significance:**	Major (+)
Extent:	Regional		
Duration:	Short		
Probability of occurrence:		High	
Reversibility:		N/A	

Operations phase

Statement of potential impact

Contribution to local and regional economic development.

Sources of the impact

- Presence and operation of new infrastructure.
- Transportation and traffic related to ore and supplies.
- Workforce and procurement.

Detailed description of the impact

During the operation phase, the anticipated impact is primarily positive, as over the entire operating period, which includes operations and sustaining capital, the project is expected to support approximately 66,200 person-years of employment in Québec, including about 43,600 direct jobs, corresponding to an average of approximately 3,500 jobs per year. At the regional level, economic benefits are estimated at an average of approximately 490 jobs per year over the duration of the operating phase.

It should be noted that, as operations wind down, there will be phased layoffs leading up to the complete closure. These layoffs could have a negative impact on the local and regional economy.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the “Population, economy, and employment” and “Quality of life and well-being” sections that apply to and enhance the expected positive impact of this VEC. In addition to these, the following specific measures must be taken into account:

- To favour the hiring and retention of women that are equally qualified, as well as a local and First Nations workforce, with priority given to the people of the Cree First Nation of Chisasibi, the other Cree Eeyou Istchee communities, the regions of Nord-du-Québec and Abitibi-Témiscamingue, Quebec, and Canada, all in accordance with the existing Hiring Policy (P05).
- Maintain local procurement and participation of local suppliers of goods and services in supply chain opportunities, applying the existing Responsible Procurement Policy (P07).
- Encourage the development of local businesses aligned with PMET’s needs and requirements, more specifically businesses held by Indigenous Peoples, as provided in the Responsible Procurement Policy (P08).
- Continue holding regular information sessions with the local entrepreneurs of the Cree community of Chisasibi to inform them about the future needs for services in relation to the mine’s activities (P12).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine’s phases (P18).

Assessment of residual impact

During the operations phase, the implementation of the various proposed commitments is expected to result in a **medium** level of improvement in economic benefits. Given the high value assigned to this VEC, the impact intensity is **high**. This impact will be felt at the regional level and throughout the operations phase (medium duration), resulting in a positive impact of **major significance**. The probability of occurrence of this impact is **high**, and since the impact is primarily positive, the reversibility potential does not apply.

With regard to the phased layoff process, the proposed measures suggest that disturbances during this phase of the project will be **low**. Given the high value assigned to this VEC, the impact intensity is **medium**. This impact will be felt at the regional level and throughout the operations phase (medium duration), resulting in a negative impact of **moderate significance**. The probability of occurrence of this impact is **high**, and since the impact is mainly positive, the reversibility potential is **medium**.

Impact on economic benefits			
Intensity:	Low(-) and High (+)	**Significance:**	Moderate (-) and Major (+)
Extent:	Regional		
Duration:	Medium		
Probability of occurrence:		High (-) (+)	
Reversibility:		Moderate (-)	

Closure phase

Statement of potential impact

Loss of local and regional economic benefits.

Sources of the impact

- Final restoration.
- Workforce and procurement of goods and services.

Detailed description of the impact

In the closure phase, the anticipated impact is both positive and negative. It is positive because some jobs will be retained for the duration of the restoration work, as well as for the various follow-up activities to be carried out after the facilities close. It takes on a negative aspect in terms of the loss of most of the jobs that had been created during the operations phase.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the “Population, economy, and employment” and “Quality of life and well-being” sections, which apply to and mitigate the negative impacts associated with the economic activities. In addition to these, the following specific measures must be taken into account:

- To favour the hiring and retention of women that are equally qualified, as well as a local and First Nations workforce, with priority given to the people of the Cree First Nation of Chisasibi, the other Cree Eeyou Istchee communities, the regions of Nord-du-Québec and Abitibi-Témiscamingue, Quebec, and Canada, all in accordance with the existing Hiring Policy (P05).

- Maintain local procurement and participation of local suppliers of goods and services in supply chain opportunities, applying the existing Responsible Procurement Policy (P07).
- In partnership with the local training institutes, continue collaborating in the development of training programs adapted to the mining industry and the regional context (P09).
- Continue the development of specific and transferable employee skills by supporting professional development activities in line with the employee's duties and PMET's needs (P10).
- Participate in implementing a committee on business opportunities, training, and employment governed by the potential Impact and Benefit Agreement (IBA) with the Cree First Nation of Chisasibi and the Cree Nation Government (P11).
- Continue holding regular information sessions with the local entrepreneurs of the Cree community of Chisasibi to inform them about the future needs for services in relation to the mine's activities (P12).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine's phases (P18).
- Implement an employee assistance program to support employees during the transition to the end of operations (P40).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures is expected to result in a **low** degree of improvement and disturbance to the economic benefits. Given the high value assigned to this VEC, the intensity of the impact is **medium** for both positive and negative impacts. This impact will be felt at the regional level; the positive impact will be of **short** duration, while the negative impact will be of **medium** duration, resulting in a positive and negative impact of **moderate significance.** The probability of occurrence of these impacts is **high**, and the reversibility potential is **medium** for the negative impact.

<table>
<tr><th colspan="4">Impact on economic benefits</th></tr>
<tr><td>Intensity:</td><td>Medium</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate(+)(-)</td></tr>
<tr><td>Extent:</td><td>Regional</td></tr>
<tr><td>Duration:</td><td>Short (+)
Medium (-)</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">High</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">Medium (-)</td></tr>
</table>

8.2.5.3 Road safety

Road safety concerns issues related to traffic on the Trans-Taiga Road and the Billy-Diamond Highway, which may be disrupted by increased traffic volumes during various phases of the project. It should be noted that, within the framework of the project, this VEC is considered to be of considerable importance as it affects a significant proportion of the local and regional populations involved in the project. It was therefore assigned a **medium** socioeconomic value.

Summary of current conditions

Traffic volumes on the Trans-Taiga Road are relatively low, as demonstrated by the results of two camera-based traffic count campaigns conducted over two 7-day periods in March and May 2025. In March, a total of 181 vehicles were recorded in both directions, including 74 heavy vehicles, mainly on weekdays (Monday through Friday). In May, a total of 374 vehicles travelled in both directions, including only 64 heavy vehicles, and traffic was still primarily weekday traffic. The increase in traffic in May was due to the Goose Break, which led to an increased movement of Indigenous community members travelling to and from their hunting grounds.

Construction phase

Statement of potential impact

Increased risks of deterioration in road safety.

Sources of the impact

- Transportation and traffic related to materials and supplies.

Detailed description of the impact

Road safety can be affected in three main ways, which are, in fact, closely related. This involves an increase in the number of vehicles travelling on the roads in question, particularly the Trans-Taiga Road and the Billy-Diamond Highway, which poses a risk of deterioration in the condition of these roads and an increased risk of accidents.

A traffic study was conducted to assess existing traffic on the Trans-Taiga Road and the impact of the additional vehicles and trucks required for the construction and operations of the mine site (WSP, 2025; Appendix 6-20). This study found that the Trans-Taiga Road, which is unpaved, had a capacity of several hundred vehicles per hour. Camera counts were conducted during two distinct periods: one week in March, representing a typical week of activity, and one week in May, during the “Goose Break” when many members of the Cree communities go goose hunting. The results showed that the peak traffic flow in March was fewer than 10 vehicles per hour, with an average daily maximum of 51 vehicles. During the month of May, the peak hourly traffic volume was similar on weekdays but exceeded 10 vehicles per hour on weekends (reaching up to 12 vehicles per hour on Sundays). The maximum 24-hour traffic volume was 80 vehicles. Given that the Trans-Taiga Road has a capacity of several hundred vehicles per hour, current traffic volumes leave significant room for growth before reaching potential capacity limits. As for Billy-Diamond Highway, since it is paved and the speed limit ranges from 70 km/h to 90 km/h, its theoretical capacity would be between 1,500 and 1,800 vehicles per hour.

With regard to accident risks in the Jamésie RCM—which includes the Trans-Taiga Road and the Billy-Diamond Highway but excludes the specific territories of the Cree communities—a total of 177 accidents were reported in 2024. These accidents resulted in 6 deaths, 6 serious injuries (requiring hospitalization), and 59 minor injuries (SAAQ, 2026). Nevertheless, according to data from the SAAQ 2024, consulted online in 2026, for the Nord-du-Québec region, an 18% decline in accidents was observed between 2018 and 2022, with a total of 298 accidents in 2022. The 2024 data appear to confirm this downward trend, with a total of 266 accidents in the Nord-du-Québec region—an additional 11% decrease (SAAQ, 2026).

During the construction phase, the traffic study shows that the projected increase in vehicle traffic will result in an average daily increase of 3 to 12 vehicles, the majority of which are heavy-duty vehicles delivering construction equipment and materials, supplies (food, chemicals, cement, etc.), and fuel (diesel and natural gas). This additional number of vehicles will have only a minor impact on current traffic flow. Therefore, no significant impact on road deterioration or accident risks is anticipated.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the "Quality of life and well-being," "Traditional use of land by Indigenous Peoples," and "Infrastructure and public services" sections that apply in whole or in part to this VEC.

In addition to these, the following specific measures must be taken into account:

- Develop and implement a transportation management plan for the project (P25).
- Implement a mandatory road safety training program for employees who are required to travel on the Trans-Taiga Road and Billy-Diamond Highway, regardless of the type of vehicle (P33).
- Consider setting up a GPS tracking system to monitor the speed of vehicles travelling on the mine site and on the Trans-Taiga Road and Billy-Diamond Highway. (P34).
- Establish an official link with the SDBJ's transportation department (P35).

Assessment of residual impact

During the construction phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance on road safety. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt at the **regional** level and during the construction phase (**short** duration), resulting in a residual impact of **minor significance**. The probability of occurrence of these impacts is **low**, and the reversibility potential is **high**, specifically once the work is completed.

Impact on road safety			
Intensity:	Low	**Significance:**	Minor
Extent:	Regional		
Duration:	Short		
Probability of occurrence:		Low	
Reversibility:		High	

Operations phase

Statement of potential impact

Increased risks of deterioration in road safety.

Sources of the impact

- Transportation and traffic related to ore and supplies.

Detailed description of the impact

During the operations phase, the traffic study shows that the projected increase in vehicle traffic will result in an average of 70 to 71 additional vehicles per day, the majority of which are heavy-duty vehicles transporting concentrate to Matagami (59 trucks per day) or supplies to the mine site (approximately 10 trucks per day). This additional number of vehicles will have only a moderate impact on current traffic flow. Therefore, no significant impact on road deterioration or accident risks is anticipated.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the "Quality of life and well-being," "Traditional use of land by Indigenous Peoples," and "Infrastructure and public services" sections that address, in whole or in part, and enhance the expected positive impact for this VEC.

In addition to these, the following specific measures must be taken into account:

- Develop and implement a transportation management plan of the project (P25).
- Implement a mandatory road safety training program for employees who are required to travel on the Trans-Taiga Road and Billy-Diamond Highway, regardless of the type of vehicle (P33).
- Consider setting up a GPS tracking system to monitor the speed of vehicles travelling on the mine site and on the Trans-Taiga Road and Billy-Diamond Highway . (P34).
- Establish and maintain an official link with the SDBJ's transportation department (P35).

Assessment of residual impact

During the operations phase, the implementation of the various proposed mitigation measures is expected to result in a **low** degree of disturbance to road safety. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt at the regional level throughout the entire period of operations (medium duration), resulting in a residual impact of **medium significance**. The probability of occurrence of these impacts is **low**, and the reversibility potential is **high** once operations cease at the end of the operations.

<table>
<tr><th colspan="4">Impact on road safety</th></tr>
<tr><td>Intensity:</td><td>Low</td><td rowspan="3">Significance:</td><td rowspan="3">Moderate</td></tr>
<tr><td>Extent:</td><td>Regional</td></tr>
<tr><td>Duration:</td><td>Medium</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">Low</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">High</td></tr>
</table>

Closure phase

Statement of potential impact

Reduced risk of road safety disruption.

Sources of the impact

- Final restoration.

Detailed description of the impact

During the closure phase, the number of vehicles on the road will have decreased significantly as operations cease, which will have a positive impact on this VEC. It should be noted, however, that a number of vehicles will remain in operation—albeit mainly at the mine site—during the restoration work. This number is expected to be lower than during the construction phase, and therefore no significant impact on road deterioration or accident risks is anticipated.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the "Quality of life and well-being," "Traditional use of land by Indigenous Peoples," and "Infrastructure and public services" sections that address, in whole or in part, and enhance the expected positive impact for this VEC.

In addition to these, the following specific measures must be taken into account:

- Develop and implement a transportation management plan for the project (P25).
- Implement a mandatory road safety training program for employees who are required to travel on the Trans-Taiga Road and Billy-Diamond Highway, regardless of the type of vehicle (P33).
- Consider setting up a GPS tracking system to monitor the speed of vehicles travelling on the mine site and on the Trans-Taiga Road and Billy-Diamond Highway. (P34).
- Establish and maintain an official link with the SDBJ's transportation department (P35).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance to road safety, whereas the suspension of traffic associated with the operations phase will result in a **medium** level of improvement. Given the medium value assigned to this VEC, the intensity of the negative impact is **low**, whereas the intensity of the positive impact is **medium**. These impacts will be felt at the **regional** level: the negative impact will be felt during the closure phase (**short** duration), while the positive impact will be felt for a **long** duration. The result is a negative residual impact of **minor significance** and a positive impact of **major significance**. The probability of occurrence of the negative impact is **low,** while that of the positive impact is **high**. Lastly, the reversibility potential of the negative impact is **high**, as the traffic associated with the closure will cease once the work is completed.

Impact on road safety			
Intensity:	Low (-) and Moderate (+)	**Significance:**	Minor (-) and Major (+)
Extent:	Regional		
Duration:	Short (-) and Long (+)		
Probability of occurrence:		Low (-) and high (+)	
Reversibility:		High	

8.2.6 Issue 6 – Preservation of the traditional activities and practices of the Indigenous population and the activities and practices of the non-Indigenous population (Current use of lands and resources for traditional purposes)

8.2.6.1 Hunting and trapping of terrestrial wildlife and waterfowl

Hunting and trapping of terrestrial wildlife and waterfowl encompasses all such activities, carried out by both Indigenous and non-Indigenous people, that may be disturbed by construction, operations, and closure work. It should be noted that, within the framework of the project, this VEC is considered to be of considerable importance as it affects a significant proportion of the local populations involved in the project. It was therefore assigned a **medium** socioeconomic value.

Summary of current conditions

The project site including all associated infrastructure is located on trapline CH39. The tallyman and his family spend time at the trapline mostly from March to November, but also during other months of the year, except for July, which is considered too hot and prone to mosquitoes. They go goose hunting in the spring, mainly from late March to late April, particularly during the “Goose break.” The tallyman and his family have a camp 11 km northwest of the project site, built by PMET in 2024, which they use during goose hunting season, as it is located in an area valued for goose hunting. In the past, goose hunting took place mainly along the Trans-Taiga Road, due to easier access. Other areas, including the tallyman’s main campsite, are still used for goose hunting. Moose hunting, which takes place mainly in the fall, is conducted at various locations throughout the trapline. The tallyman does not hunt every year, given the large amount of meat provided by a single animal taken. As for caribou, users of the traplines continue to hold their annual hunt, even though they have observed a decline in the population in the area and that the Chisasibi Council recommends avoiding this activity to allow population recovery. Some also report a change in the taste of the meat, which they attribute to a possible decline in the health of the herds. The tallyman and his family also hunt ptarmigan. Some users argue that traffic on the Trans-Taiga Road affects the quality of the meat, claiming that birds taken from disturbed areas are less palatable than those from more remote areas. Beavers, porcupines, and hares are also hunted, while bears are hunted and trapped in the fall and spring. Several users have noted that the presence of infrastructure (hydroelectric facilities, transmission lines, the Trans-Taiga Road, borrow pits, etc.) has led to a significant decline in small mammals. However, they have observed an increase in the number of Arctic foxes and bird species that were previously rare in the area.

The project site is located approximately 20 km from the VC26 trapline (Wemindji). The co-tallymen and their families hunt there in the fall and winter. According to them, access to the territory for hunting is governed by a customary right specific to Cree communities, which is little known to outside users. With workers arriving at the site, they fear increased pressure on wildlife resources in the area. The co-tallymen also hunt geese, ducks, and bears there in the fall and spring.

The project site is also located approximately 2 km from the M02A trapline (Mistissini). The tallyman and other users, who come from various Cree communities, visit the trapline mainly in the spring, for goose hunting, and in the fall. There are several goose hunting areas identified there. Hunters also hunt ptarmigan, spruce grouse, moose, and caribou there, particularly in March and December, as well as bears and beavers. Camps belonging to the tallyman and his family are located on trapline CH39. Their use varies from year to year. A goose hunting camp located on trapline CH39, about 20 km east of the project, was destroyed in the 2023 wildfires, while two other goose hunting camps are located in the eastern part of the trapline, farther from the site (approximately 60 km northeast and 70 km east of the site). The tallyman of the M02A trapline has reported several areas likely to have moose on the CH39 and M02A traplines, particularly in the Lac de la Corvette region.

Despite a decline in enrollment over the years, a significant proportion of residents in Chisasibi, Wemindji, and Mistissini benefit from the Economic Security Program (ESP)—17%, 10%, and 8%, respectively. The program encourages the Cree to continue their traditional activities (hunting, trapping, and fishing) by providing a guaranteed income, benefits, and other incentives.

Twelve leases issued for vacationing purposes are listed in the local study area, including one located 18 km southwest of the mine site, on the western shore of Lac de la Corvette. There are no outfitters in this area. The former Mirage outfitter, located approximately 75 km east of the project at km 358 of the Trans-Taiga Road, was transferred to the Chisasibi First Nation in 2024. Since the ban on recreational caribou hunting, several outfitters in the region have ceased operations.

It should be noted that an ecotoxicological analysis to determine the natural concentrations of metals in the edible parts of the hare will be conducted before construction begins.

Construction phase

Statement of potential impact

Disturbance of hunting and trapping activities.

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Transportation and traffic related to materials and supplies.

Detailed description of the impact

Any activity that has a negative impact on wildlife is likely to indirectly affect hunting and trapping. Site preparation, stripping of surfaces, and tree clearing are likely to disturb wildlife in the vicinity of the work areas. However, the noise generated by the construction work is expected to remain below regulatory thresholds, and the main vibrations—caused by surface blasting—are expected to be sporadic and limited to specific areas. Site preparation, stripping, and clearing could also result in the loss or fragmentation of breeding and feeding habitats. The increase in transport of materials and supplies could also have an impact on wildlife. Although speed is monitored at construction sites, traffic on the Trans-Taiga Road and the access road to the mine site moves at high speeds, increasing the risk of local-scale collisions with wildlife.

The activities planned for the construction phase are therefore likely to disturb some wildlife species found near the project site. These nuisances could cause wildlife to temporarily move to quieter areas, thereby forcing those who use the land to adapt their practices. However, the overall harvest potential will remain unchanged, as wildlife is expected to redistribute itself to the outskirts of the work zones and resource availability will remain stable. It should also be noted that users have already made adjustments in response to the displacement of large wildlife caused by previous mining exploration activities. Although construction activities are not expected to have a significant impact on traffic volume and flow on the Billy-Diamond Highway and the Trans-Taiga Road (see Section 8.2.5.3. Road safety), they could cause occasional disruptions and inconveniences for members of the local communities who use these roads. These roads remain important access routes to traplines, including those without road access.

PMET strictly prohibits any recreational hunting by its employees on the mine site, and this rule will remain in effect. However, it is possible that some employees may violate this policy. Only the tallyman of the CH39 trapline and his family members are authorized to harvest large game on the Shaakichiuwaanaan property.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, including those in the “Quality of life and well-being,” “Traditional use of land by Indigenous Peoples,” “Planning, land use, and land tenure," “Wildlife and wildlife habitat,” and “Noise and vibrations” sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).
- Establish a new Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and develop solutions to the issues that may arise during the mine’s phases (P18).
- Whenever possible, preserve the forest cover along the road of the mine site and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Work with the tallyman of trapline CH39 to implement a program to improve wildlife habitats located around the mine site (P43).

Assessment of residual impact

During the construction phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance to the hunting and trapping of terrestrial wildlife and waterfowl, while construction activities will cause some hunting activities to be relocated but will not compromise their practice. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt at the regional level due to transportation, as many users hunt and trap along the Trans-Taiga Road and Billy-Diamond Highway, and during the construction period (short duration), resulting in a residual impact of **minor significance**. The probability of occurrence of these impacts is **high**, and the reversibility potential is **high**, once the work is completed.

Impact on hunting and trapping activities			
Intensity:	Low	**Significance:**	Minor
Extent:	Regional		
Duration:	Short		
Probability of occurrence:		High	
Reversibility:		High	

Operations phase

Statement of potential impact

Disturbance of hunting and trapping activities.

Sources of the impact

- Presence and operation of new infrastructure.
- Water use and management.
- Transportation and traffic related to ore and supplies;

Detailed description of the impact

Mining operations will disrupt hunting and trapping activities for terrestrial wildlife and waterfowl due to the proximity of the proposed infrastructure. Users of the CH39 traplines, will need to adjust to the presence of the mine and its daily operations. However, this adaptation process would already be underway, since exploration activities have been taking place for some time and construction work will have been completed. Some users of the CH39 trapline may temporarily relocate part of their activities to other areas while the mine is in operation. Perceptions of the quality of wildlife resources harvested near the site could also be affected, leading to a loss of interest in this area.

Mining operations could degrade the quality of wildlife habitats due to the generation of noise and dust. However, these disturbances would remain confined to the project area. Furthermore, the impact on water quality will be limited by the presence of the industrial wastewater treatment plant, the sewage treatment plant, and the polishing pond, as well as compliance with the discharge standards set forth in Directive 019.

The anticipated increase in project-related traffic on Billy-Diamond Highway and the Trans-Taiga Road during the operations phase could increase the risks of collision relative to the construction phase.

Finally, the ban on recreational hunting on the site for employees will remain in effect throughout the operations phase.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, including those in the "Quality of life and well-being," "Traditional use of the land by Indigenous Peoples," "Planning, land use, and land tenure," "Wildlife and wildlife habitat," "Noise and vibrations," and "Soil, surface water, and sediment quality" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine's phases (P18).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Work with the tallyman of trapline CH39 to implement a program to improve wildlife habitats around the mine site (P43).

It is also worth noting the development of an environmental monitoring program, described in Chapter 13, which includes a component addressing the risk of bioaccumulation in animal flesh.

Assessment of residual impact

During the operations phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance to the hunting and trapping of terrestrial wildlife and waterfowl, while activities during the operations phase will cause the relocation of certain hunting sites and activities, though without compromising the practice of hunting itself. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt at the local level due to transportation, as many users hunt and trap along the Trans-Taiga Road, and will persist throughout the mine's 24-year lifespan (**long** duration), resulting in a residual impact of **moderate significance**. The probability of occurrence of these impacts is **high**, and the reversibility potential is **high**, once operations cease.

Impact on hunting and trapping activities			
Intensity:	Low	**Significance:**	Moderate
Extent:	Regional		
Duration:	Long		
Probability of occurrence:		High	
Reversibility:		High	

Closure phase

Statement of potential impact

Gradual improvement in hunting and trapping conditions.

Sources of the impact

- Presence of site remains.
- Final restoration.
- Production and management of residual and hazardous materials.

Detailed description of the impact

The activities associated with the mine's closure will have effects similar to those observed during the construction and operations phases, but of lesser intensity and over a shorter period of time. This work could therefore disrupt the hunting and trapping activities of the Cree users of the CH39 trapline. Users of the VC26 and M02A traplines, as well as those engaging in trapping activities near Billy Diamond Highway and the Trans-Taiga Road, may also be affected by road traffic.

The closure phase will generate waste and hazardous materials, which will be managed off-site. Improper storage or inadequate handling at the site could lead to a leak or accidental spill, posing a risk to the quality of hunting territories and to hunted species.

In addition, the planned work will restore habitats for local wildlife, allowing for the gradual reclaiming of the land for traditional activities, including hunting and trapping. They will also help restore the site's natural character, in harmony with its surroundings. Where possible, some infrastructure, including the multi-use path that facilitates access to trapline CH39, may be left in place at the tallyman's request.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, including those in the "Quality of life and well-being," "Traditional use of the land by Indigenous Peoples," "Planning, land use, and land tenure," "Wildlife and wildlife habitat," "Noise and vibrations," and "Soil, surface water, and sediment quality" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Work together with the tallyman of trapline CH39 in carrying out rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).

– An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance to the hunting and trapping of terrestrial wildlife and waterfowl. Although the work may cause some nuisances, users will have long since moved their hunting and trapping activities outside the project area and its surroundings. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt within the **project area**, although it could also be felt at the local level in the event of poor management of waste materials and hazardous substances, and during the closure phase (**short** duration), resulting in a residual impact of **minor significance.** The probability of occurrence of these impacts is **high**, and the reversibility potential is **high**, upon completion of the work.

Once the project area has been restored, users of the CH39 trapline will once again be able to hunt and trap there. The work planned for the project's closure phase is therefore expected to result in a **medium** intensity improvement, which will become apparent as users begin to reuse and reclaim the mine site for hunting and trapping. The positive impact will be felt primarily within the **project area**, but for a **long** duration, resulting in an improvement of **major** significance. The probability of occurrence of the improvement is **high**.

Impact on hunting and trapping activities			
Intensity:	Low (-) Medium (+)	**Significance:**	Minor (-) Major (+)
Extent:	Project (- and +)		
Duration:	Short (-) Long (+)		
Probability of occurrence:		High (-) High (+)	
Reversibility:		High (-)	

8.2.6.2 Fishing

Fishing affects all Indigenous and non-Indigenous communities that engage in it and who may be disturbed by construction, operations, and closure activities. It should be noted that, within the framework of the project, this VEC is considered to be of considerable importance as it affects a significant proportion of the local and regional populations involved in the project. It was therefore assigned a **medium** socioeconomic value.

Summary of current conditions

The tallyman of CH39 and his family fish for various species, including sturgeon, brook trout, and chub, on their trapline. Fishing takes place mainly in the La Grande River and in certain lakes within the region, which users prefer not to name. Although the tallyman and his family regularly visit the area around the LG-2 dam to fish—where they may stay for up to a month—they generally avoid reservoirs, believing that the quality of the fish there is inferior.

Lake *Shaakichiuwaanaan Anaadohyateh* (L27) is rarely fished by the tallyman and his family, despite the presence of whitefish, lake trout, and brook trout. In addition, the family is cautious about eating fish from Lake Mihiiwaayaapaakw, as they are concerned about mercury contamination and the history of hydroplane activity associated with the former Nouchimi outfitter. Lastly, the Elders of the family believe that the wildfires that occurred in 2023 may have affected fish populations in the area. According to them, it takes about six years for lakes located in the heart of wildfires to recover their fish populations.

The co-tallymen of VC26 and their families primarily fish for lake trout, walleye, lake whitefish, and sturgeon, particularly in the Pontois and Corvette rivers as well as in certain lakes within the trapline. According to the tallyman, the walleye is found in the spawning grounds near a culvert on the Trans-Taiga Road, and the sturgeon feed on the eggs there. This species, which is valued by users, is caught in the spring and fall. However, users refrain from overfishing and avoid using nets or fishing in spawning areas and during spawning seasons.

Lac de la Corvette is a valued fishing spot for users of the M02A trapline, who catch many different species there. The area is, in fact, designated as a protected area by the Cree Nation Government.

The holder of a lease for vacationing purposes on the west shore of Lac de la Corvette fishes primarily on this body of water. He fishes there for walleye, pike, and both lake and brook trout.

Lastly, it should be noted that two species traditionally fished—pike and lake trout—have undergone ecotoxicological tests to determine the natural concentrations of metals in the parts of these fish that are consumed. To this end, four sampling quadrats were selected: two located within the project's potential area of influence based on prevailing winds, and two located outside this area. The initial results do not indicate any concentrations that would raise concerns.

Construction phase

Statement of potential impact

Disturbance of fishing activities.

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Transportation and traffic related to materials and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Any activity that has a negative impact on fish populations is likely to indirectly affect fishing practices. The first phase of the work, which includes diking and partial draining of Lake L01 to create an open pit mine, will result in the direct loss of approximately 56 hectares of fish habitat. Despite the relocation of the fish to the eastern part of the lake, the draining of the lake will directly disturb aquatic wildlife—particularly benthic communities—even before the planned relocation takes place. Subsequently, the diking activities, the pumping required for drainage, and the commissioning of the diversion channel will alter the hydrology of the bodies of water and watercourses located downstream of Lake L01, all the way to Lake L27. These changes could affect the stability of riverbeds and banks, alter habitat distribution, and influence the conditions essential for fish passage, feeding, and reproduction.

Stripping, material handling, pumping, and traffic on the site will cause an increase in suspended solids in certain bodies of water, particularly Lakes L01 and L27. This increase will cause higher turbidity, reducing light penetration and oxygenation for aquatic organisms. It will also cause sediment to settle in the outflow basin of Lake L27 and in some downstream watercourses. These deposits could degrade habitat quality by clogging spawning substrates and disturbing benthic communities, which serve as a vital food source for several fish species.

Construction work could result in accidental oil leaks or spills, particularly those associated with the use of mobile equipment. Surface water contamination can occur directly when these activities take place near a body of water or a watercourse. It can also be indirect when runoff carries contaminants from the soil into aquatic environments. Poor management of hazardous waste—particularly if it is improperly stored or exposed to the elements—could also be a source of contamination in fish habitats.

PMET strictly prohibits any recreational fishing by its employees on the mine site, and this rule will remain in effect. However, it is possible that some employees may violate this policy.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the "Soil, surface water, and sediment quality," "Hydrology and hydrogeology," "Vegetation and wetlands," and "Traditional use of land by Indigenous Peoples" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine's phases (P18).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the construction phase, the anticipated impact suggests that there will be a **low** level of disturbance to fishing, given that Lake L01 is not used for fishing by the tallyman of CH39 and his family, while Lake L27 is used very little for that purpose. Furthermore, the impact is expected to limit the abundance of the resource but not prevent fishing on Lakes L01 and L27. The water bodies and watercourses located on traplines VC26 and M02A, as well as Lac de la Corvette, will not be affected. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt within the **project area**, affecting Lake L01, the bodies of water and watercourses located downstream of it, all the way to Lake L27, and during the construction period (**short** duration), resulting in a residual impact of **minor significance.** The probability of occurrence of the impact is **low**, as it is not expected to affect the lakes used by the tallyman of CH39 and his family. In addition, the reversibility potential is **high**, as users can resume their fishing activities once the work is completed.

Impact on fishing activities			
Intensity:	Low	**Significance:**	Minor
Extent:	Project		
Duration:	Short		
Probability of occurrence:		Low	
Reversibility:		High	

Operations phase

Statement of potential impact

Disturbance of fishing activities.

Sources of the impact

- Water use and management.
- Transportation and traffic related to ore and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

The operations phase is characterized by the continued impact that began during the construction phase, namely the loss of aquatic habitats due to the continued partial draining of Lake L01. The effects on water quality, particularly in the bodies of water and watercourses located downstream of Lake L01, all the way to Lake L27, will be mitigated by the industrial wastewater treatment plant, the sewage treatment unit, the polishing pond, and the diversion channel.

During the operations phase, the use of mobile equipment could still result in accidental oil spills or leaks. The generation and management of waste and hazardous materials also remain potential sources of contamination of fish habitats, particularly when managed improperly.

PMET will maintain the strict ban on recreational fishing by its staff at the mine site.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the “Soil, surface water, and sediment quality,” “Hydrology and hydrogeology,” “Vegetation and wetlands,” and “Traditional use of land by Indigenous Peoples” sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).

- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and determine solutions to the issues that may arise during the mine's phases (P18).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

It is also worth noting the development of an environmental monitoring program, described in Chapter 13, which includes a component addressing the risk of bioaccumulation in fish flesh.

Assessment of residual impact

During the operations phase, the anticipated impact suggests that there will be a **low** level of disturbance to fishing, given that Lake L01 is not used for fishing by the tallyman of CH39 and his family, while Lake L27 is used very little, which mitigates the extent of the disturbance. Furthermore, the impact is expected to limit the abundance of the resource but not prevent fishing on Lakes L01 and L27. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt in the **local** area, affecting Lake L01 and the bodies of water and watercourses located downstream of it, all the way to Lake L27, and will persist throughout the operations period (**medium** duration), resulting in a residual impact of **minor significance**. The probability of occurrence of the impact is **low**, as it is not expected to affect the lakes used by the tallyman of CH39 and his family, nor Lac de la Corvette or the lakes fished by users of traplines VC26 and M02A. In addition, the reversibility potential is **high**.

Impact on fishing activities			
Intensity:	Low	**Significance:**	Minor
Extent:	Local		
Duration:	Medium		
Probability of occurrence:		Low	
Reversibility:		High	

Closure phase

Statement of potential impact

Gradual improvement in conditions for fishing activities.

Sources of the impact

- Final restoration.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Once the mine closes, the pit will gradually fill up naturally. Existing hydraulic structures, such as diversion channels and dikes, will be maintained to ensure the hydraulic stability of the site during and after this filling process. PMET will also carry out revegetation of riparian zones and disturbed areas, thereby promoting a gradual improvement in the quality of aquatic and riparian habitats.

Once again, the use of mobile equipment could lead to accidental oil leaks or spills, and the generation and management of waste and hazardous materials remain a potential source of contamination.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the “Soil, surface water, and sediment quality,” “Hydrology and hydrogeology,” “Vegetation and wetlands,” and “Traditional use of land by Indigenous Peoples" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Work together with the tallyman of trapline CH39 in carrying out rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures suggests that the level of disturbance to fishing will be **low**. Although the work may cause only some nuisances, land users should not use Lake L01, as well as the ponds and waterways located downstream from it, all the way to Lake L27. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt within the **project area** and during the closure phase (**short** duration), resulting in a residual impact of **minor significance**. The probability of occurrence of this impact is **medium**, and the reversibility potential is **medium**.

Once the pit is filled, users of trapline CH39 will be able to fish in Lake L01. The work planned for the project’s closure phase is therefore expected to result in an improvement of **medium** intensity, which will become apparent as users will begin to use and reclaim the restored water bodies and watercourses in the mine area for fishing purposes. The positive impact will be felt primarily within the **project area**, but over a **long** duration, resulting in an improvement of **moderate** significance. The probability of occurrence of the improvement is **medium.**

<table>
<tr><th colspan="4">Impact on fishing activities</th></tr>
<tr><td>Intensity:</td><td>Low (-)
Medium (+)</td><td rowspan="3">Significance:</td><td rowspan="3">Minor (-)
Moderate (+)</td></tr>
<tr><td>Extent:</td><td>Project (- and +)</td></tr>
<tr><td>Duration:</td><td>Short (-)
Long (+)</td></tr>
<tr><td colspan="2">Probability of occurrence:</td><td colspan="2">Moderate (-)
Medium (+)</td></tr>
<tr><td colspan="2">Reversibility:</td><td colspan="2">High (-)</td></tr>
</table>

8.2.6.3 Harvesting of valued plant species

The harvesting of valued plant species primarily concerns Indigenous communities and includes both the gathering of fruits and other edible plants as well as plants with medicinal properties. This activity may be disturbed by construction, operations, and closure work. It should be noted that, within the framework of the project, this VEC is considered to be of considerable importance as it affects a significant proportion of the local populations involved in the project. It was therefore assigned a **medium** socioeconomic value.

Summary of current conditions

Users of the CH39 trapline harvest various berries in the area, away from the future mine site, including blueberries, blackberries, gooseberries, cloudberries, and mountain cranberries. They use a particular spot at kilometre 310 of the Trans-Taiga Road because it is easy to access. Areas affected by wildfires are also sought-after harvesting spots.

During plant inventories, special attention was given to the species valued by the tallyman of CH39, his family, and members of the Cree Nation of Chisasibi. More than 200 species were identified in the study area, 48 of which have traditional uses: 7 tree species, 25 shrub species or genera, 15 herbaceous species or genera, and a group of non-vascular species (peat mosses). Overall, the plant species of interest are abundant both within the study area and at the regional level.

Two traditionally used species, blueberries and Labrador tea, were subjected to ecotoxicological tests to determine the natural concentrations of metals in the parts of the plants that are consumed. To this end, four sampling quadrats were selected: two located within the project's potential area of influence based on prevailing winds, and two located outside this area. The initial results do not indicate any concentrations that would raise concerns.

Construction phase

Statement of potential impact

Disturbance of activities involving the gathering of valued plant species.

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Transportation and traffic related to materials and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

Any activity that could adversely affect valued plant species may indirectly impact harvesting activities. The stripping and clearing required for the development of the facilities will result in an estimated permanent loss of 519 hectares of vegetation, consisting mainly of softwood forests, regenerating stands, scrubland and lichen tundra. Surface preparation and the construction of access roads will prevent any natural regeneration from occurring in these areas for the entire duration of the mine's operations. Within the power line right-of-way, only the tree canopy will be removed; stumps, saplings, shrubs, and other vegetation will be left in place. The project will also have a permanent impact on wetlands during the construction phase, primarily due to site preparation and the construction of access roads. The work will result in a net loss of 104.7 hectares of wetlands, including wooded and open ombrotrophic bogs, as well as treed and shrub swamps.

Wetlands and terrestrial plant habitats could also be affected by dust deposited as a result of construction work and traffic.

Surface soils that support habitats of interest to valued plant species could be contaminated by accidental leaks or spills of petroleum products or hazardous waste.

In addition, the work being carried out in the project area could cause nuisances to users wishing to collect valued plant species there.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Soil, surface water, and sediment quality," "Vegetation and wetlands," "Planning, land use, and land tenure" and "Traditional land use by non-Indigenous peoples" sections may apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).
- Establish an Environmental Monitoring Committee, the terms of which will be specified in the IBA, to discuss and develop solutions to the issues that may arise during the mine's phases (P18).
- Whenever possible, preserve the forest cover along the road of the mine site and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the construction phase, the anticipated impact suggests that there will be a **low** level of disturbance to harvesting activities, given that users of trapline CH39 have stated that they do not gather within the project area. Furthermore, the valued plant species appear to be abundant both within the study area and regionally. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt within the **project area** and during the construction phase (**short** duration), resulting in a residual impact of **minor significance.** The probability of occurrence of this impact is **low**, as it is not expected to affect the harvesting sites used by the tallyman of CH39 and his family. In addition, the reversibility potential is **high**, as users can resume their harvesting activities once the work is completed.

Impact on activities involving the gathering of valued plant species			
Intensity:	Low	**Significance:**	Minor
Extent:	Project		
Duration:	Short		
Probability of occurrence:		Low	
Reversibility:		High	

Operations phase

Statement of potential impact

Disturbance of activities involving the gathering of valued plant species.

Sources of the impact

- Presence and operation of new infrastructure;
- Water use and management;
- Transportation and traffic related to ore and supplies;
- Production and management of residual and hazardous materials;

Detailed description of the impact

During the exploration phase, the impact on the harvesting of valued plant species is characterized by the continuation of that impact into the construction phase. The presence and use of new infrastructure will prevent the natural regeneration of vegetation and wetlands that have been removed, thereby reducing potential habitats for valued plant species. This will also limit harvesting activities within the project area.

Mining operations could degrade the quality of plant habitats if petroleum products or hazardous materials accidentally leak or spill into the soil . However, such incidents would remain confined to the project areaand would be mitigated promptly.

Traffic-related dust generation could be higher during the operations phase due to the expected increase in traffic resulting from the transport of spodumene concentrate.

Lastly, it is possible that PMET staff would still collect valued plant species within the project area.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Soil, surface water, and sediment quality," "Vegetation and wetlands," “Planning, land use, and land tenure" and “Traditional land use by non-Indigenous peoples” sections may apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).

- Continue to raise awareness of all non-Indigenous workers and subcontractors about Cree culture and traditional practices during the orientation session and subsequent training activities for the supervisors (P15).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P25).

It is also worth noting the development of an environmental monitoring program, described in Chapter 13, which includes a component addressing the risk of bioaccumulation in plant tissues.

Assessment of residual impact

During the operations phase, the implementation of the various proposed mitigation measures is expected to result in a **low** level of disturbance, as users do not visit the project area to engage in harvesting activities. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt within the **project area** and throughout the life of the mine—24 years (**medium** duration)—resulting in a residual impact of **minor significance.** The probability of occurrence of these impacts is **low**, and the reversibility potential is **high**, upon completion of operations.

Impact on activities involving the gathering of valued plant species			
Intensity:	Low	**Significance:**	Minor
Extent:	Project		
Duration:	Medium		
Probability of occurrence:		Low	
Reversibility:		High	

Closure phase

Identification of potential impacts

Gradual improvement in harvesting conditions for valued plant species

Sources of the impact

- Presence of site remains;
- Final restoration;
- Production and management of residual and hazardous materials.

Detailed description of the impact

During the closure phase, the anticipated impacts are mostly positive due to the freeing up of spaces previously occupied by mining facilities and due to their restoration. The site restoration involves loosening the soil, adding organic matter, and replanting with native species. However, the presence of site remains could limit the full revegetation of the previously occupied areas. In addition, at the request of the tallyman of CH39, some infrastructure—including the access road—could be kept in place to facilitate access to new harvesting areas and support the continuation of this traditional activity.

The work planned during the closure could nevertheless have certain impacts—albeit on a smaller scale—related to dust generation, localized erosion, and the management of waste and hazardous materials.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2; in particular, those in the "Ambient air," "Soil, surface water, and sediment quality," "Vegetation and wetlands," “Planning, land use, and land tenure" and “Traditional land use by non-Indigenous peoples” sections may apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- Continue to inform the public about the progress of the project, the major work to come, the environmental impacts and the preventive measures to mitigate them, as well as the safety measures in place (P14).
- Work together with the tallyman of trapline CH39 in carrying out rehabilitation, restoration, and revegetation activities and returning the site to its natural state (P22).
- Whenever possible, preserve the forest cover along the road of the mine site and revegetate bare areas with native plants after completion of the work (P23).
- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures is expected to result in only a **low** level of disturbance to harvesting activities. As the work may cause some nuisances, land users should not enter the project area for this purpose. Given the medium value assigned to this VEC, the impact intensity is **low**. This impact will be felt within the **project area** and during the closure phase (**short** duration), resulting in a residual impact of **minor significance**. The probability of occurrence of these impacts is **low**, and the reversibility potential is **high** once the work is completed.

Once the final restoration work is complete, land users will be able to reclaim the project site, if they wish, for harvesting purposes. Keeping the access road could even make it easier to reach the area. The work planned for the project’s closure phase is therefore expected to result in an improvement of **medium** intensity, which will become apparent as land users begin to use and reclaim the site of the project area. The positive impact will be felt primarily within the **project area**, but over a **long** duration, resulting in an improvement of **moderate** significance. The probability of occurrence of the improvement is **medium.**

Impact on activities involving the gathering of valued plant species			
Intensity:	Low (-) Medium (+)	**Significance:**	Minor (-) Moderate (+)
Extent:	Project (- and +)		
Duration:	Short (-) Long (+)		
Probability of occurrence:		Low (-) Medium (+)	
Reversibility:		High (-)	

8.2.6.4 Well-being on the land

Well-being on the land refers to all activities carried out on the land that are closely linked to Indigenous culture (the transmission of values and language, mental health and healing, ancestral memory, etc.). After assessment, it was determined that this VEC largely overlaps with the one related to physical, psychological, and social health. The project's impacts on well-being on the land were therefore addressed in Section 8.2.5.1 on health.

8.2.7 Issue 7 – Consideration of climate change

8.2.7.1 Climate change mitigation (GHG emissions, Energy transition)

Climate change mitigation concerns all construction, operations, and closure activities that generate GHG emissions likely to contribute to climate change. The scientific consensus is that these GHG emissions are causing global climate change phenomena. Quantities of GHG emissions, which consist primarily of carbon dioxide (CO2), methane (CH4), and nitrous oxides (N2O), are determined using MELCCFP (2025a) and Environment and Climate Change Canada (2025) estimating methodologies.

It should be noted that, within the framework of the project, this VEC is considered to be of considerable importance as it affects a significant proportion of the local and regional populations involved in the project. It was therefore assigned a **medium** socioeconomic value.

Summary of current conditions

In Canada, total GHG emissions, based on 2023 data, amounted to 694 Mt CO_2eq, while for the mining sector, the total was 78 Mt CO_2eq.

In Quebec, total GHG emissions, based on 2023 data, amounted to 78 Mt CO_2eq, while emissions from the Industry category—which includes mining activities—amounted to 24.7 Mt COeq.

Construction phase

Statement of potential impact

Contribution to the overall increase in GHG emissions.

Sources of the impact

- Site organization, stripping, and clearing.
- Surface preparation and access layout.
- Construction of structures and infrastructure.
- Transportation and traffic related to materials and supplies.
- Production and management of residual and hazardous materials.

Detailed description of the impact

The inventory boundaries considered for the project description correspond to the construction activities for the waste rock, overburden, and ore stockpiles; the tailings storage facility; the process plant; the water and mine effluent treatment plant; the paste backfill plant; and the conventional infrastructure for a hybrid mining project. The quantities of GHG emissions were compared to the reporting thresholds of the two levels of government, provincial and federal, and put in context by comparison with total emissions on a federal and provincial basis.

During the construction phase, the main sources of GHG emissions are associated with vehicle and machinery traffic in work areas, clearing activities, and logistics-related transport (supply). A technical note in Appendix 5-12 provides a detailed breakdown of the calculations and references used to describe GHG emissions during the construction phase, and Table 8-12 summarizes the emissions generated during the work.

In Canada, the project's average annual GHG emissions during the construction phase are estimated to account for 0.0006% of emissions from this industry, which totalled 78 MT of CO_2eq in 2023. The contribution of direct emissions associated with the project's construction is therefore negligible.

In Quebec, the project under study is part of the Industry sector. During the construction phase, annual GHG emissions would account for 0.002% of emissions from the Industry sector—which totalled 24.7 Mt CO_2eq in 2023—and 0.0006% of total provincial emissions (78 Mt CO_2eq in 2023). The contribution of direct emissions is therefore negligible.

Table 8-12 Summary of GHG emissions during the construction phase

Source	Consumable	GHG emissions (Kt CO_2eq)
Machinery (Construction)	68,867 litres diesel	0.2
Machinery (Pre-production)	1,585,000 litres diesel	4.3
Deforestation	1122 ha of vegetation	88.0
Logistics-related transport	768,805 litres diesel	2.1
TOTAL:		**94.6**
Annual average (over 2 years)		47.3

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the "Ambient air" and "Vegetation and wetlands" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop and implement a transportation management plan for the project (P25).

Assessment of residual impact

During the construction phase, the implementation of the various proposed mitigation measures is expected to result in only a **low** level of disturbance to climate change mitigation. Given the medium value assigned to climate change mitigation, the intensity of the impact is **low**. This impact will be felt at the regional/provincial level and only during the construction phase (**short** duration), resulting in a residual impact of **minor significance** (for total emissions during the construction phase). The probability of occurrence of this impact is **high**, and the reversibility potential is **low**, since once emitted, GHGs are difficult to eliminate in the short or medium term.

Impact on climate change mitigation (GHG emissions, energy transition).			
Intensity:	Low	**Significance:**	Minor
Extent:	Regional/provincial		
Duration:	Short		
Probability of occurrence:		High	
Reversibility:		Low	

Operations phase

Statement of potential impact

Contribution to the overall increase in GHG emissions.

Sources of the impact

- Presence and operation of new infrastructure;
- Transportation and traffic related to ore and supplies;
- Production and management of residual and hazardous materials.

Detailed description of the impact

The inventory boundaries considered for the project description correspond to the activities involving the stockpiles (waste rock, overburden, and ore), the tailings storage facility, the process plant, the water and mine effluent treatment plant, the paste backfill plant, and the conventional infrastructure for a hybrid mining project. The quantities of GHG emissions were compared to the reporting thresholds of the two levels of government, provincial and federal, and put in context by comparison with total emissions on a federal and provincial basis.

During the operations phase, the main sources of GHGs are associated with generators, natural gas-powered equipment (heating, concentrator plant equipment, etc.), the fleet of vehicles and machinery, the use of explosives, electricity consumption, logistics-related transport (transport of concentrate to Matagami and supply), and rail transportation (between Matagami and the La Baie port facility in Saguenay). A technical note in Appendix 5-12 provides a detailed breakdown of the calculations and references used to describe GHG emissions during the construction phase, and Table 8-13 summarizes the emissions generated during the work.

In Canada, the project's average annual GHG emissions during the construction phase are estimated to account for 0.0011% of emissions from this industry, which totalled 78 MT of CO_2eq in 2023. The contribution of direct emissions associated with the project's construction is therefore negligible.

In Quebec, the project under study is part of the Industry sector. During the construction phase, annual GHG emissions would account for 0.0034% of emissions from the Industry sector—which totalled 24.7 Mt of CO_2eq in 2023—and 0.0011% of total provincial emissions (78 Mt of CO_2eq in 2023). The contribution of direct emissions is therefore negligible.

Table 8-13 Summary of GHG emissions during the operations phase

Sources	Emissions	Consumables	t CO_2 eq
Additional clearing	Total project	855 ha of vegetation	**90,000**[1]
Generator[2]	Total project	1,895,431 litres diesel	**5,199**
Natural gas equipment	Annual average	163,087 GJ	8035
	Total project	3,261,743 GJ	**160,692**
Mobile equipment (off-road)	Annual average	16,438,150 litres diesel	44,901
	Total project	328,659,012 litres diesel	**897,736**
Explosives	Annual average	6,178 tonnes of explosives	1,050
	Total project	21,000 tonnes of explosives	**123,560**
Electricity	Annual average	258,961 MWh	492
	Total project	4,920,262 MWh	**9,348**
Logistics-related transport (truck)	Annual average	9,393,412 litres diesel	25,768
	Total project	187,866,054 litres diesel	**515,354**
Total annual average:			85,006 (85 Kt)
Total project:			**1,711,889 (1,711.9 Kt)**

1 This total was added to that of the generators, then spread over 20 years of operations (4,760 t CO_2eq/year) and added to the total annual average.

2 It was assumed that the generators would operate continuously for two years at the start of production until the connection to the Hydro-Québec grid was completed.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the “Ambient air” and “Vegetation and wetlands” sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop and implement a transportation management planfot the project (P25).

Assessment of residual impact

During the operations phase, the implementation of the various proposed mitigation measures is expected to result in only a **low** level of disturbance on climate change mitigation. Given the medium value placed on climate change mitigation, the intensity of the impact is **low**. This impact will be felt at the regional/provincial level and during the operations phase (**medium** duration), resulting in a residual impact of **moderate significance** (for total emissions during the operations phase). The probability of occurrence of this impact is **high**, and the reversibility potential is **low**, since once emitted, GHGs are difficult to eliminate in the short or medium term.

Impact on climate change mitigation (GHG emissions, energy transition).			
Intensity:	Low	**Significance:**	Moderate (total emissions during operations)
Extent:	Regional/provincial		
Duration:	Medium		
Probability of occurrence:		High	
Reversibility:		Low	

Closure phase

Statement of potential impact

Reduction in overall GHG emissions.

Sources of the impact

- Transport and traffic during the work.
- Final restoration.
- Production and management of residual and hazardous materials.

Detailed description of the impact

During the closure phase, the activities likely to generate GHG emissions are mainly associated with dismantling of infrastructure. The work planned during this phase will have similar or lesser impacts than during the construction phase. The GHG emissions were not calculated because the necessary details for dismantling are not confirmed at this project stage.

Mitigation measures

Common mitigation measures are presented in Appendix 8-2, particularly those in the "Ambient air" and "Vegetation and wetlands" sections that apply in whole or in part to this VEC. In addition to these, the following specific measures must be taken into account:

- An environmental supervisor will conduct regular inspections of work areas, ensure that all parties strictly comply with the various commitments, obligations, measures, and other requirements, assess the quality and effectiveness of the measures implemented, and document any non-compliance observed (P24).
- Develop and implement a transportation management plan for the project (P25).

Assessment of residual impact

During the closure phase, the implementation of the various proposed mitigation measures suggests that the degree of disturbance on climate change mitigation will be **low**. Given the medium value assigned to climate change mitigation, the intensity of the impact is **low**. This impact will be felt at the regional level and only during the closure phase (short duration), resulting in a residual impact of **minor significance** (for total emissions during the closure phase). The probability of occurrence of this impact is **high**, and the reversibility potential is **low**, since once emitted, GHGs are difficult to eliminate in the short or medium term.

Nevertheless, the cessation of mining activities represents the elimination of a source of GHGs at the regional level for a long period, which constitutes a medium-intensity positive impact alongside a positive residual impact of **major** significance.

Impact on climate change mitigation (GHG emissions, energy transition).			
Intensity:	Low(-) Medium(+)	**Significance:**	Minor (-) Major (+)
Extent:	Regional/provincial		
Duration:	Short (-) Long(+)		
Probability of occurrence:		High (-) (+)	
Reversibility:		Low (-)	

9 Cumulative Impact Assessment

Under the requirements of the EQA, cumulative impacts must be considered in the environmental assessment of a project. Furthermore, the Directive issued for the Shaakichiuwaanaan mining project (ref. 3214-14-072; March 2024) indicates the elements to be considered and the method to be employed in the cumulative impact assessment, i.e., the project's effects on a given valued ecosystem component (VEC) combined with other past, present, or future activities (with a high probability of occurrence).

Cumulative impacts must be assessed in relation to the main project issues and, more specifically, to the VECs that have been selected for the impact assessment. The choice of the various parameters must be justified. The methodology applied is presented in Section 9.1, the various parameters selected are defined in Section 9.2, and the cumulative impact assessment for the VECs selected is carried out in Section 9.3. Section 9.4 provides a brief summary of the conclusions of this assessment.

9.1 Methodology

Cumulative impacts are changes to the environment that are caused by an action in combination with other past, present, and future human actions. Human actions include events, actions, projects, and activities of an anthropogenic nature (Hegmann et al., 1999). Natural disturbances must also be taken into account.

This definition suggests that any impact associated with a given project may interfere, temporally or spatially, with the effects of another past, current, or future project, thereby causing additional direct or indirect consequences on one or more environmental components.

The methodological approach applied for the cumulative impact assessment involves the following steps:

1. the identification of VECs;
2. the determination of the spatial and temporal boundaries of each VEC, as well as a description of the indicators used;
3. the identification of projects, actions, or events that may have affected the VECs, that are currently affecting them, or that are very likely to affect them in the future;
4. the description of the reference state of each VEC and their historical trends;
5. Identification and assessment of cumulative impacts for each VEC, including assessment of the need to apply additional mitigation measures or monitoring programs to those applied in the study of direct and indirect impacts.

To be selected as a VEC, an ecosystem component must:

Be a key project issue , which means that it must:

a. be highly valued by the populations concerned or by specialists, or be protected or designated by legislation;

b. be likely to be significantly disrupted or altered by the project;

c. be likely to be altered by a combination of project-specific and external sources of impact;

d. be amenable to analysis based on reliable and sufficient information and data, both for the reference state and for historical trends.

The cumulative impact assessment is covered in a separate chapter so that readers can clearly distinguish cumulative impacts from the direct or indirect impacts of the project.

9.1.1 Selected valued components

The assessment of the project's effects helped identify the main project issues and potential impacts on the physical and social environment. It also helped identify the main concerns of the local land users and the Cree Nation of Chisasibi, which were gathered during information and consultation activities. These two aspects combined made it possible to identify the VECs associated with the project and, where appropriate, to select those that should be subject to a cumulative impact assessment.

In fact, the cumulative impact assessment requires that VECs be issues within the scope of the project, that there be potential for cumulative effects between VECs and other projects or actions in the cumulative impact assessment area(s), and that sufficient data be available to carry out the assessment.

9.1.2 Determination of spatial and temporal boundaries

This step involves identifying the spatial and temporal boundaries of the VECs selected for the cumulative impact assessment to provide a framework for their analysis.

9.1.2.1 Spatial boundaries

Spatial boundaries should encompass an area large enough to cover all locations where cumulative impacts may be felt, without being overly extensive (Hegmann et al., 1999). However, overly narrow boundaries may overlook certain impacts. Therefore, the areas of influence of the various projects or actions under consideration (past, present, and future) must be determined, and boundaries must be set beyond which the cumulative effects are likely to become negligible. Spatial boundaries can be adapted to each VEC selected. The choice of spatial boundaries therefore implies:

- understanding the spatial distribution of the effects of the project under study;
- identifying the similar effects of other projects, activities, events, and other factors that overlap geographically;
- ensuring that boundaries take into account the abundance and distribution of VECs;

- ensuring that the boundaries are acceptable from an ecological and social perspective;
- ensuring that the boundaries allow for the collection and analysis of measurable data for each VEC.

According to Hegmann et al. (1999), spatial boundaries must be flexible. It is preferable to set multiple spatial boundaries, i.e., boundaries that expand or contract depending on the ecological or social relationships observed and the VECs analyzed.

9.1.2.2 Temporal boundaries

With regard to temporal boundaries, two boundaries must be identified, one being in the past and the other in the future. Theoretically, the boundary in the past begins before the effects of the actions or projects considered in the assessment occur, while the boundary in the future corresponds to the point at which the environmental conditions that prevailed before the project will be restored or when these baseline conditions will have returned to a certain equilibrium (Hegmann et al., 1999).

Thus, boundaries in the past can be chosen by considering the following aspects:

- the importance of choosing a period for which sufficient information is available on VECs to provide a good description of the baseline or reference state;
- when the effects associated with the proposed action first occurred;
- the point in time at which effects similar to those of concern first occurred;
- the time at which a certain land use designation was made;
- pre-disturbance conditions (i.e., the historical baseline).

Boundaries in the future can be chosen by considering the following aspects:

- the end of operational life of a project;
- after project closure and site reclamation;
- after recovery of VECs to pre-disturbance conditions;
- the availability of information relating to other projects.

In practice, it should be noted that when looking far back in time (more than 10 years) and projecting into the future (more than 5 years), information becomes difficult to obtain and analysis can therefore become speculative. As a result, uncertainty about forecasts increases in line with the duration of the projection of cumulative effects into the future. It is generally accepted that it is very difficult to predict with certainty the likelihood of future projects or actions occurring beyond a 10-year period (Bérubé, 2007).

9.1.3 Identification, selection, and description of past, present, and future activities, projects, and events

As part of the cumulative impact assessment, it is necessary to compile as comprehensive an inventory as possible, based on available information, of projects, activities, and other interventions that may have had an effect on the VECs selected for assessment, that are currently affecting them, or that may affect them in the future. This assessment must be carried out within the specified spatial and temporal boundaries. This inventory must include:

- projects of any kind;
- human actions of any kind;
- events of any kind;
- the laws and regulations of the two main levels of government (Quebec and Canadian governments) that influence or are likely to influence the VECs studied.

Next, it is necessary to identify the actions, projects, events, laws, and regulations that may have had a significant impact on each VEC and briefly describe this impact using indicators. Cumulative impact assessment focuses only on the negative effects caused by an action (Hegmann et al., 1999).

Indicators are known elements that can be used to gauge the impact of the various actions and other interventions mentioned above throughout time and space. It should be noted that VECs can themselves be indicators (Hegmann et al., 1999).

9.1.4 Description of the baseline conditions and historical trends

The baseline conditions correspond to the situation that prevailed a certain number of years ago, i.e., the temporal boundary in the past. This state is described based on the available information. For some VECs, this information will be very limited. This is why the data available for each VEC must be considered when establishing the temporal boundary.

Historical trends are established based on an analysis of the combined influence of the most significant projects, actions, and events. These trends incorporate the results of identifying actions that could significantly affect VECs; they are expressed starting from the reference state to the completion of the project-specific impact assessment.

9.1.5 Identification and significance of cumulative effects

This step involves determining, for each VEC, whether or not there are cumulative effects or whether there is potential for cumulative effects. The determination is based on the consideration of the following factors:

- historical trends;
- projects, actions, events, and other activities, whether ongoing or probable (within the initially determined temporal boundary in the future).

According to Hegmann et al. (1999), in the case of a cumulative impact assessment, determining the significance of effects is fundamentally the same as in an impact assessment, i.e., cumulative effects can be assessed in terms of intensity, duration, and extent. Incorporating these criteria makes it possible to classify a project's cumulative residual impacts as very low, low, medium, high, or very high, according to the impact assessment grid.

Cumulative impact assessment may involve quantitative analysis and discussions of qualitative aspects. Qualitative analysis is used when there is no quantitative analysis technique available or when it is relevant to examine qualitative aspects. The analysis of cumulative effects remains essentially qualitative overall. It is carried out using resources that will experience a residual effect after the mitigation measures identified in the project impact assessment have been implemented.

The cumulative effect will be significant if experts determine that the project contributes significantly to the degradation of the VEC. Conversely, the cumulative effect will be considered insignificant if the VEC is not significantly affected by the project relative to all actions on it. If the information is insufficient and does not allow a decision to be made on the project's cumulative effect on a component, the cumulative effect will be unknown.

Hegmann et al. (1999) specify that the following issues must be considered when assessing the likelihood of a cumulative effect resulting from the implementation of a project:

- Are the environmental effects adverse?
- Are the adverse environmental effects significant?
- Are the significant adverse effects likely?

9.2 Assessment parameters

9.2.1 Review of the project's issues

According to the Project's EIA guidelines issued by the MLECCFP, it is the responsibility of the proponent to define the key issues relating to their proposed project. PMET organized several information and discussion sessions with government regulators, project stakeholders, and Indigenous communities between 2022 and 2025. These sessions will continue throughout the life of the project. These various consultation sessions brought to light a variety of concerns that were taken into account in the project planning, and PMET will continue to consider them in the further design and development of its project. Seven key issues stood out and were selected as the issues to be assessed in the EIA:

- **Preservation of aquatic habitat quality.** This issue is associated with four valued ecosystem components (VECs): hydrodynamic and hydro-sedimentary conditions, surface water quality, sediment quality, and wildlife and wildlife habitats. It should be noted that only three of these VECs were moved forward into the impact assessment. The VEC relating to sediment quality was not selected because, due to the water quality control measures put in place, no long-term effects on sediment quality are expected. The cumulative potential of the three selected VECs will be assessed in the following section to determine whether they will be included in the cumulative impact assessment.

- **Preservation of soil and groundwater quality.** This issue is associated with two VECs: soil quality and groundwater quality. Since both VECs were selected for impact analysis, they will be evaluated in the following section to determine whether they will be included in the cumulative impact assessment.
- **Preservation of wetlands and habitats of interest to terrestrial wildlife and plants.** This issue is associated with six valued ecosystem components (VECs): wetlands and water environments, special-status wildlife species, special-status plant species, invasive plant and wildlife species, terrestrial wildlife (large wildlife and other mammal species, avian fauna), and terrestrial forest cover. It should be noted that only three of these VECs were selected for the impact assessment. The three VECs that were not moved forward into the impact assessment were special-status plant species, invasive plant and wildlife species (as none of these species were recorded in the project study area), and terrestrial forest cover (as the impact on this was assessed to be marginal). The potential of the three VECs selected for the impact assessment will be assessed in the following section to determine whether they will be included in the cumulative impact assessment.
- **Preservation of the quality of life of the local population.** This issue is associated with four valued ecosystem components (VECs): air quality, noise environment and vibration, ambient light, and landscape. It should be noted that only air quality was selected to be included in the impact assessment. The other three VECs were not selected due to the distance between the project study area and identified sensitive receptors. The cumulative potential of air quality will be assessed in the following section to determine whether this VEC will be included in the cumulative impact assessment.
- **Preservation of the health, safety, and socioeconomic conditions of the regional population (Health, social, and economic conditions of Indigenous Peoples).** This issue is linked to three VECs: physical, psychological, and social health; economic activities; and road safety. As these three VECs were selected for the impact analysis, they will be evaluated in the following section to determine whether they will be included in the cumulative impact assessment.
- **Preservation of the traditional activities and practices of the Indigenous population and the activities and practices of the non-Indigenous population (Current use of lands and resources for traditional purposes).** This issue is associated with six valued ecosystem components (VECs): hunting and trapping of terrestrial wildlife and waterfowl; gathering of valued plant species; fishing; well-being on the land; navigation; and archaeological remains, natural and cultural heritage. It should be noted that only four of these VECs were selected for the impact assessment. The two VECs that were not selected were navigation (because the study area does include navigable waterways of interest to local communities) and archaeological remains (because the project study area does not include areas with high archaeological potential). The cumulative potential of the four VECs selected will be assessed in the following section to determine whether they will be included in the cumulative impact assessment.
- **Consideration of climate change**. This issue is associated with two valued ecosystem components (VECs): adapting infrastructure to climate change and mitigating climate change (GHG emissions). It should be noted that only the second component was selected for the impact assessment. The adaptation of infrastructure to climate change has not been included as it is addressed separately in a dedicated chapter of the impact assessment. The cumulative potential of climate change mitigation will be assessed in the following section to determine whether it will be included in the cumulative impact assessment.

It should be noted that, as communication activities related to the project continue, changes may be made to these issues and other issues may eventually be identified.

9.2.2 Identification and rationale for selected VECs

As mentioned in the introduction to this chapter and in Section 9.1.1, the VECs that will be assessed to determine whether they could experience a cumulative effect are those that are associated to a project issue and for which an impact assessment has been conducted.

For a VEC to be included in the cumulative impact assessment process, the residual impact assigned to it must be medium or high, and sufficient reliable information and data must be available, both on its baseline condition and on the associated historical trends. Lastly, it should be noted that VECs that result in a positive residual impact on the project have not been selected for the cumulative impact assessment.

Table 9-1 presents, for each of the project's issues, the VECs that were selected for the assessment of the project's environmental impacts. For each of these VECs, the table indicates whether it has been selected for the cumulative impact assessment and provides the rationale for this decision.

Table 9-1 Identification of VECs selected for the cumulative impact assessment

Environmental component	Selected		Rationale
	Yes	No	
Issue 1: Preservation of aquatic habitat quality			
Hydrodynamic and hydro-sedimentary conditions		**X**	The hydrodynamic and hydro-sedimentary conditions in the project area have undergone significant changes due to the construction of various dams and dikes as part of the overall James Bay hydroelectric project. These changes occurred during the 1970s and 1980s, and since then a new artificial equilibrium (maintained by the presence of dams and dikes) has been established. Any further disturbance of the existing conditions could have an effect on the existing equilibrium. The changes brought about by the project mainly concern the construction of dams on Lake L01 and a diversion between this lake and Lake L05. A Technical Note prepared by Atkins Realis in September 2025 on the effects of this work on the risks of flooding, erosion, and contaminant dispersion showed that only limited impacts on erosion at specific locations are anticipated, resulting in minor residual impacts. Given these results, this VEC has not been selected for the cumulative impact assessment.
Surface water quality	**X**		The project's impact on surface water quality will mainly be felt in a limited portion of the biophysical LSA. All intercepted surface water as well as water generated by mining activities will be collected and treated to established discharge standards before being released into Watercourse CE11 located just upstream of Lakes L09 and L10, watercourse CE15 and Lake L27. A moderate residual impact is anticipated for this component, and it has therefore been selected for the cumulative impact assessment.
Aquatic wildlife (fish) and habitat	**X**		The Project will cause various encroachments on fish habitat as a result of project construction and the draining of part (13%) of Lake L01 to access the ore via an open pit. In addition, water drawdown caused by pumping from the open pit and underground mine, as well as the redirection of some surface water from the stockpile area, will affect water levels in certain fish habitats. Given its impacts, the residual impact is anticipated to be of medium significance, and this VEC has been selected for the cumulative impact assessment.

Environmental component	Selected		Rationale
	Yes	No	
Issue 2: Preservation of soil and groundwater quality			
Soil quality		**X**	The impacts on soils will be localized within the project footprint and are unlikely to generate cumulative impacts, given the absence of other activities that could cause physical or chemical disturbance to the soil. The significance of the residual impact for this VEC was deemed minor. This component is therefore not included in the cumulative impact assessment.
Groundwater quality		**X**	The potential project impacts on this component involve contamination risks and some drawdown of the water table. However, the highly localized nature of the effects experienced (generally limited to the project study area) and the implementation of common mitigation measures will limit the residual impacts to a low level. For these reasons, this component will not be included in the cumulative impact assessment.
Issue 3: Preservation of wetlands and habitats of interest to terrestrial fauna and flora			
Wetlands and water environments	**X**		Wetlands are relatively well represented in the project study area, and significant impacts are generated during the construction phase, resulting in potential water level declines. The recognized importance of these sensitive and fragile ecosystems, combined with the effects described above, supports the inclusion of this component in the cumulative impact assessment.
Special-status wildlife species	**X**		A total of 16 special-status species have been confirmed within the project's biophysical LSA, including woodland caribou, 11 bird species, 4 bat species, and one small mammal. Habitat loss and disturbance caused by the construction and operation of the project, as well as the increased risk of collision with some of these species (road traffic), have led to the medium residual impact for this VEC during the construction and operations phases. It is therefore included in the cumulative impact assessment.
Terrestrial wildlife and wildlife habitats (large wildlife and other mammal species, avian fauna including migratory birds)	**X**		The various project developments (access road, electrical corridor, physical installations, stockpiles, and tailings storage facility) will result in a loss of terrestrial wildlife habitat and disturbances in the use of the land by terrestrial wildlife, as well as an increased risk of collisions with these species (road traffic). The various disturbances anticipated on this VEC have led to the assignment of a medium impact during the operations phase and its selection for the cumulative impact assessment.
Forest cover		**X**	The forest cover to be cleared for the project is very common in the region and consists mainly of regenerating forest and low-density softwoods, which has led to the assignment of a minor impact for this VEC. Forest cover has therefore not been selected for the cumulative impact assessment.
Issue 4: Preserving the quality of life of the local population			
Air quality		X	The atmospheric emission modeling results for the project show that air emissions comply with the various provincial and federal standards and criteria for sensitive receptors located around the project site. Therefore, this component is not included in the cumulative impact assessment.

Environmental component	Selected		Rationale
	Yes	No	
Issue 5: Preservation of the health, safety, and socioeconomic conditions of the regional population (Health, social, and economic conditions of Indigenous Peoples)			
Physical, psychological, and social health of the regional population	**X**		The project's construction poses a risk of reigniting tensions observed during major developments in the region since the 1970s. Furthermore, the arrival of additional non-native workers may exacerbate certain social issues that have arisen since the region's initial development including a stress increase on existing social services such as health care facilities and difficulties for women to integrate a male dominated work environment such as the mining sector. The project also may limit access to parts of the territory, thus affecting transmission of traditional knowhow. This component is therefore included in the cumulative impact assessment.
Economic benefits (job creation, economic partnerships)		**X**	The project's impact on economic activities adds to a series of other projects that have helped develop the region's economy and secure long-term, high-quality jobs for local workers. As this VEC represents a positive impact, it has not been selected for the cumulative impact assessment.
Road safety	**X**		Although the project will result in a significant increase in vehicle traffic on the Trans-Taiga Road and Billy-Diamond Highway, this will have little effect on traffic flow, as these roads were designed to handle much higher volumes. The project increases the risk of traffic accidents, due to the increase in heavy truck traffic and the deterioration of road infrastructure, mainly during the operations phase. These factors led to the assignment of a residual impact of medium significance. For these reasons, this VEC has been selected for the cumulative impact assessment.
Issue 6: Preservation of the traditional activities and practices of the Indigenous population and the activities and practices of the non-Indigenous population (Current use of lands and resources for traditional purposes)			
Hunting and trapping (terrestrial wildlife and waterfowl)	**X**		The physical presence of the project is considered a source of disturbance to wildlife and a potential source of bioaccumulation of contaminants (metals), making the occupied and surrounding areas less attractive for hunting and trapping. This VEC has therefore been selected for the cumulative impact assessment.
Fishing		**X**	The limited use of lakes L01 and L27 by the CH39 tallyman and his family, along with the continued access to these lakes during the harvesting season, results in a minor residual impact. Therefore, this VCE is not included in the cumulative impact assessment.
Harvesting of valued plant species		**X**	Interviews with the CH39 tallyman established that his family did not use the project site area for harvesting valuable plants. Therefore, the residual impact is of minor significance. This VCE is thus not included in the cumulative impact assessment.
Well-being on the land	**X**		The physical presence of the project could affect the Cree people's traditional land use and way of life. This VEC was therefore selected for the cumulative impact assessment.
Issue 7: Consideration of climate change			
Climate change mitigation (GHG emissions) (Energy transition)	**X**		Given the importance placed on Quebec and Canada's GHG reduction targets, any increase in emissions be taken into account to ensure an up-to-date picture at the provincial and national levels. A cumulative impact assessment was therefore considered for this component.

In summary, the following ten VECs were retained and will be assessed for cumulative impacts:

- surface water quality;
- aquatic wildlife (fish) and habitat;
- wetlands and water environments;
- special-status wildlife species;
- terrestrial wildlife and habitats (large wildlife and other mammal species, avian fauna including migratory birds);

- the physical, psychological, and social health of the regional population (health, social, and economic conditions of Indigenous Peoples);
- road safety;
- hunting and trapping (terrestrial wildlife and waterfowl);
- well-being on the land;
- climate change mitigation (GHG emissions) (Energy transition).

These VECs are related to five of the seven environmental issues raised during the various consultations held for this project (see Section 9.1.1). The only issues not represented are issue no. 2: Preservation of soil and groundwater quality and no. 4: Preserving the quality of life of the local population.

9.2.3 Spatial and temporal boundaries

Table 9-2 presents the spatial and temporal boundaries as well as the indicators for each valued component selected for the cumulative impact assessment. It should be noted that due to the specific characteristics of each valued component, they may have different spatial and temporal ranges.

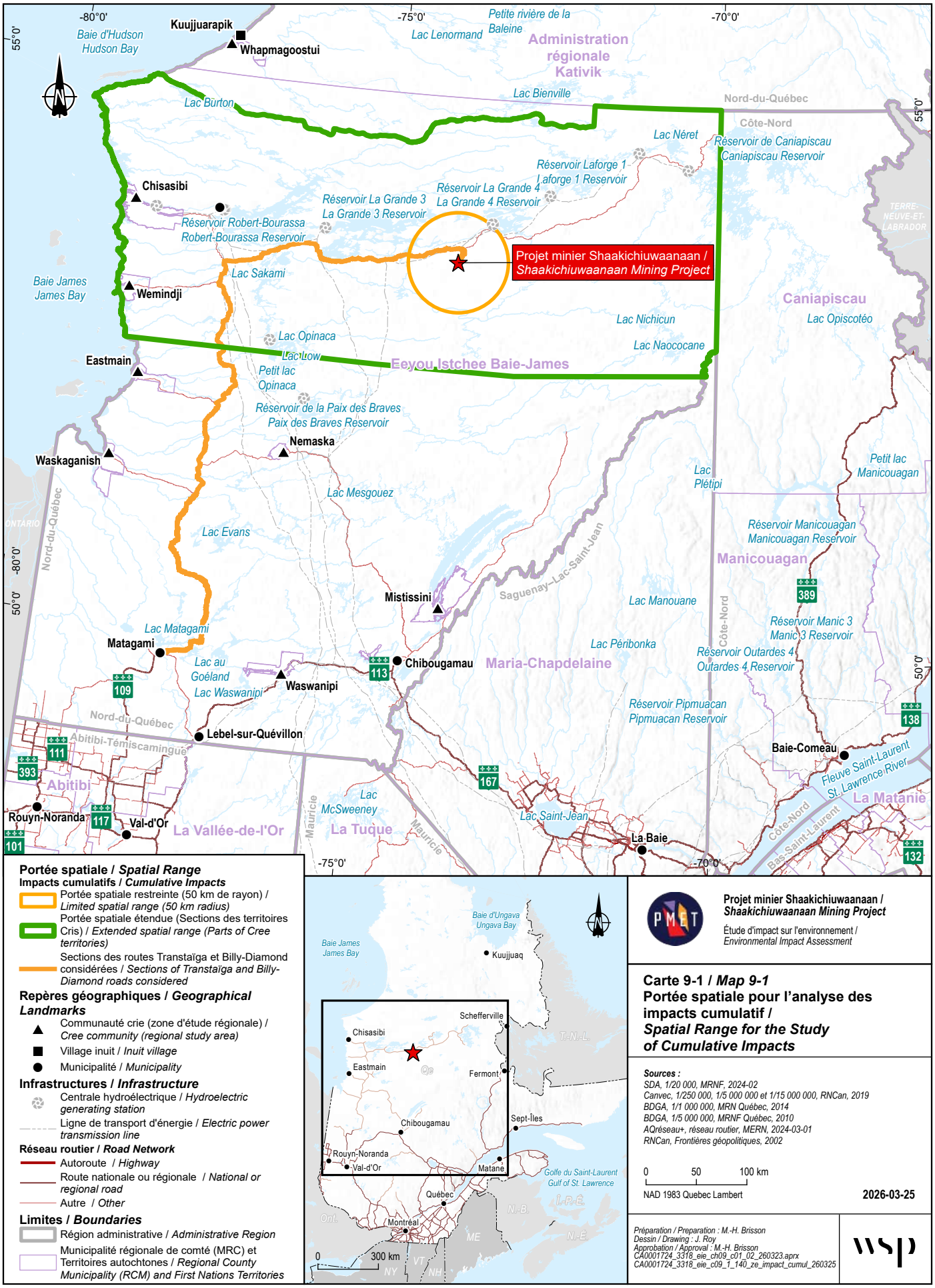
Table 9-2 Temporal and spatial boundaries and indicators related to the valued components selected for the cumulative impact assessment

Valued component	Indicator	Temporal boundaries	Spatial boundaries
Issue 1: Preservation of aquatic habitat quality			
Surface water quality	Number of watercourses receiving effluent	1970–2035	Limited (50 km radius around the project site)
Aquatic fauna and habitats	Surface area of wildlife habitat affected	1970–2035	Limited (50 km radius around the project site)
Issue 2: Preservation of soil and groundwater quality			
No VECs related to this issue were selected for the cumulative impact assessment.			
Issue 3: Preservation of wetlands and habitats of interest to terrestrial fauna and flora			
Wetlands and water environments	Surface area affected	1970–2035	Limited (50 km radius around the project site)
Special-status wildlife species	Surface area affected	1970–2035	Limited (50 km radius around the project site)
Terrestrial wildlife and wildlife habitats (large wildlife and other mammal species, avian fauna including migratory birds)	Surface area affected	1970–2035	Limited (50 km radius around the project site)

Valued component	Indicator	Temporal boundaries	Spatial boundaries
Issue 4: Preserving the quality of life of the local population			
No VECs related to this issue were selected for the cumulative impact assessment.			
Issue 5: Preservation of the health, safety, and socioeconomic conditions of the regional population (Health, social, and economic conditions of Indigenous Peoples)			
Physical, psychological, and social health of the regional population	Set of indicators specific to these aspects	1970–2035	Extended (Land cutting through all or part of the communities of Chisasibi, Mistissini, and Wemindji)
Road safety	Data on the frequency of maintenance work to repair the Trans-Taiga Road and Billy Diamond Highway Number of accidents associated with traffic involving project vehicles.	1970–2035	Specific (Route of the Trans-Taiga Road and Billy Diamond Highway)
Issue 6: Preservation of the traditional activities and practices of the Indigenous population and the activities and practices of the non-Indigenous population (Current use of lands and resources for traditional purposes)			
Hunting and trapping (terrestrial wildlife and waterfowl)	Possible area of interaction	1970–2035	Limited (50 km radius around the project site)
Well-being on the land	Set of indicators specific to this aspect	1970–2035	Extended (Land cutting through all or part of the communities of Chisasibi, Mistissini, and Wemindji)
Issue 7: Consideration of climate change			
Climate change mitigation (GHG emissions) (Energy transition)	% increase in emissions	2008–2035	Extended (Land cutting through all or part of the communities of Chisasibi, Mistissini, and Wemindji)

Map 9-1 shows the boundaries of the study areas considered for the cumulative impact assessment. It presents the three main areas considered for the cumulative impact assessment, namely:

- a circular area centred on the proposed mining site with a radius of 50 km (Limited spatial boundary);
- an area including the boundaries of the ancestral territory of the community of Chisasibi, most of the ancestral territory of the community of Wemindji, and part of the ancestral territory of the community of Mistissini (Extended spatial boundary);
- 3 km on either side of the Trans-Taiga Road between the access to the mine site and the Billy-Diamond Highway (Specific spatial boundary).



Portée spatiale / *Spatial Range*

Impacts cumulatifs / *Cumulative Impacts*

- Portée spatiale restreinte (50 km de rayon) / *Limited spatial range (50 km radius)*
- Portée spatiale étendue (Sections des territoires Cris) / *Extended spatial range (Parts of Cree territories)*
- Sections des routes Transtaïga et Billy-Diamond considérées / *Sections of Transtaïga and Billy-Diamond roads considered*

Repères géographiques / *Geographical Landmarks*

- Communauté crie (zone d'étude régionale) / *Cree community (regional study area)*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Infrastructures / *Infrastructure*

- Centrale hydroélectrique / *Hydroelectric generating station*
- Ligne de transport d'énergie / *Electric power transmission line*

Réseau routier / *Road Network*

- Autoroute / *Highway*
- Route nationale ou régionale / *National or regional road*
- Autre / *Other*

Limites / *Boundaries*

- Région administrative / *Administrative Region*
- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Étude d'impact sur l'environnement / *Environmental Impact Assessment*

Carte 9-1 / *Map 9-1*
Portée spatiale pour l'analyse des impacts cumulatif / *Spatial Range for the Study of Cumulative Impacts*

Sources :

SDA, 1/20 000, MRNF, 2024-02
Canvec, 1/250 000, 1/5 000 000 et 1/15 000 000, RNCan, 2019
BDGA, 1/1 000 000, MRN Québec, 2014
BDGA, 1/5 000 000, MRNF Québec, 2010
AQréseau+, réseau routier, MERN, 2024-03-01
RNCan, Frontières géopolitiques, 2002

0 50 100 km

NAD 1983 Quebec Lambert

2026-03-25

Préparation / Preparation : M.-H. Brisson
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
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CA0001724_3318_eie_c09_1_140_ze_impact_cumul_260325

wsp

La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

9.2.4 Projects, activities, and events considered in the assessment

An exhaustive inventory of past, current, and future local and regional projects, activities, and events was made through a review of available documentation and various meetings with Indigenous and non-Indigenous regional stakeholders. Numerous websites, such as those of the MELCCFP, the James Bay Advisory Committee on the Environment, the IAAC, the MRNF, Hydro-Québec, EIJBRG, etc., and environmental impact assessment reports for projects in the same territory as the mine project or nearby (e.g., the Bonterra mine project) were consulted to obtain information on the relevant effects of these projects.

Tables 9-3 and 9-4 present a list of past, current, and future projects, actions, and events for each of the selected VECs. This list is organized into six themes:

- use of natural resources, mainly mining activities and electricity generation (dams, levees, reservoirs, and power plants). There are no forestry operations;
- infrastructure and services: including power substations and power lines, as well as roads, airports, airfields, and railways (planned);
- land use (recreational hunting and fishing activities), mainly including campsites and temporary shelters, as well as a former outfitting operation that has been converted into an activity centre for the Cree Nation of Chisasibi;
- wildlife areas or protected areas, including parks;
- natural and other disturbances, mainly forest fires;
- governance and land use planning, including laws, agreements, development plans, restoration plans concerning Indigenous communities, and the protection of environmental components.

Map 9-2 presents the projects, past or present, considered for the assessment of cumulative impacts affecting the area and for which location data is available.

Tableau 9-3 Projects, actions, and events likely to influence the valued components selected for the cumulative impact assessment

Projects, activities, and events	Past	Present	Future	Surface water quality	Aquatic fauna and habitats	Wetlands and water environments	Terrestrial wildlife and wildlife habitats	Special-status wildlife species
Natural resource development								
Mining exploration activities	X	X	X	Contribution to the degradation of local surface water quality through discharge associated with mining exploration activities.	Contribution to the degradation of aquatic habitats due to mining exploration activities.	Contribution to the loss of wetland and water environment surface area and to their degradation due to mining exploration activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to mining exploration activities.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to mining exploration activities.
Shaakichiuwaanaan mine		X	X	Contribution to the degradation of local surface water quality due to discharge associated with mine construction and operations.	Contribution to the degradation and loss of aquatic habitat due to discharge associated with mine construction and operations.	Contribution to the loss of wetland and water environment surface area and to their degradation due to construction, the presence of facilities, and mining activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
Adina mine	X	X	X	Contribution to the degradation of local surface water quality due to discharge associated with mine construction and operations.	Contribution to the degradation and loss of aquatic habitat due to construction and operations and the presence of mine components.	Contribution to the loss of wetland and water environment surface area and to their degradation due to construction, the presence of facilities, and mining activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
Tilly mine			X	Contribution to the degradation of local surface water quality due to discharge associated with mine construction and operations.	Contribution to the degradation and loss of aquatic habitat due to construction and operations and the presence of mine components.	Contribution to the loss of wetland and water environment surface area and to their degradation due to construction, the presence of facilities, and mining activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
Cancet mine			X	Contribution to the degradation of local surface water quality due to discharge associated with mine construction and operations.	Contribution to the degradation and loss of aquatic habitat due to construction and operations and the presence of mine components.	Contribution to the loss of wetland and water environment surface area and to their degradation due to construction, the presence of facilities, and mining activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
Éléonore mine	X	X	X	Contribution to the degradation of local surface water quality due to discharge associated with mine construction and operations.	Contribution to the degradation and loss of aquatic habitat due to construction and operations and the presence of mine components.	Contribution to the loss of wetland and water environment surface area and to their degradation due to construction, the presence of facilities, and mining activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
Renard mine	X	X	X	Contribution to the degradation of local surface water quality due to construction and operations and the presence of mine components.	Contribution to the degradation and loss of aquatic habitat due to construction and operations and the presence of mine components.	Contribution to the loss of wetland and water environment surface area and to their degradation through construction, the presence of facilities, and site maintenance activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and site maintenance activities.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and site maintenance activities.
Borrow pits	X	X	X	Contribution to the degradation of local surface water quality due to the opening and use of borrow pits.	Contribution to the degradation and loss of aquatic habitat due to the opening and operation of borrow pits.	Contribution to the loss of wetland and water environment surface area and to their degradation through the opening and use of borrow pits.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to the opening and use of borrow pits.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to the opening and use of borrow pits.
Power generation facilities located within the territory, including La Grande-1, La Grande-2A, Robert-Bourassa, La Grande-3, La Grande-4, Laforge-1, Laforge-2, Brisay, and Sarcelle (offices, dams and dikes, powerhouses, and related infrastructure).	X	X	X	Contribution to the deterioration of local surface water quality due to the filling of reservoirs and the use of these facilities.	Contribution to the degradation of aquatic habitat quality due to the filling of reservoirs and the presence and use of these facilities.	Contribution to the loss of wetland and water environment surface area and to their degradation due to construction, the presence of facilities, and mining activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.

Projects, activities, and events	Past	Present	Future	Surface water quality	Aquatic fauna and habitats	Wetlands and water environments	Terrestrial wildlife and wildlife habitats	Special-status wildlife species
Infrastructure and services								
Various existing stations and lines related to Hydro-Québec projects	X	X	X	Contribution to the degradation of local surface water quality during their construction and due to some operations and maintenance activities.	Contribution to the degradation of aquatic habitat quality due to the presence and use of these facilities.	Contribution to the loss of wetland and water environment surface area and to their degradation due to the construction of facilities and operational activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
New 120 kV line, approximately 53 km (Option 1), between the Tilly substation and the Shaakichiuwaanaan mine site (2028–2029) (BBA, 2025) This project includes two substations, one 315-120 kV substation near the Tilly substation and a second 120 kV/13.8 kV substation at the mine site. The line will be installed on a 21-metre-high H-shaped wooden structure. The right-of-way will be 38 m wide.			X	Contribution to the degradation of local surface water quality during its construction and maintenance.	Contribution to the degradation of aquatic habitat quality due to the construction, presence, and operations of these facilities.	Contribution to the loss of wetland and water environment surface area and to their degradation due to the construction of facilities and operational activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
Trans-Taiga Road (unpaved), Billy-Diamond Highway (paved), and James Bay Road (unpaved), as well as various access roads in the area.	X	X	X	Contribution to the deterioration of local surface water quality during their construction, operation, and maintenance activities.	Contribution to the degradation of aquatic habitat quality during their construction, operation, and maintenance activities.	Contribution to the loss of wetland and water environment surface area and to their degradation due to the construction of facilities and operational activities.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.
La Grande Alliance – Levelling and paving of the access road to Wemindji from the Billy-Diamond Highway (150 km).			X	Contribution to the deterioration of local surface water quality during levelling and paving works and through future maintenance.	Contribution to the degradation of aquatic habitat quality during levelling and paving works and through future maintenance.	Contribution to the loss of wetland and water environment surface area and to their degradation during levelling and paving work and through future maintenance.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife during levelling and paving work and through future maintenance.	Contribution to the disturbance of habitats and activities of special-status wildlife species during levelling and paving work and through future maintenance.
La Grande Alliance – Development of a section of road connecting Route 167 to the Trans-Taiga Road (approximately 125 km)			X	Contribution to the deterioration of local surface water quality during any construction work and due to its future maintenance.	Contribution to the degradation of aquatic habitat quality during any construction work and due to its future maintenance.	Contribution to the loss of wetland and water environment surface area and to their degradation during any construction work and due to its future maintenance.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife during any construction work and due to its future maintenance.	Contribution to the disturbance of habitats and activities of special-status wildlife species during any construction work and due to its future maintenance.
La Grande Alliance – Development of a road between Radisson and Wapmagoostui (approximately 175 km)			X	Contribution to the deterioration of local surface water quality during any construction work and due to its future maintenance.	Contribution to the degradation of aquatic habitat quality during any construction work and due to its future maintenance.	Contribution to the loss of wetland and water environment surface area and to their degradation during any construction work and due to its future maintenance.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife during any construction work and due to its future maintenance.	Contribution to the disturbance of habitats and activities of special-status wildlife species during any construction work and due to its future maintenance.
La Grande Alliance – Development of a rail corridor from km 257 of the Billy-Diamond Highway to the intersection with the Trans-Taiga Road (287 km)			X	Contribution to the deterioration of local surface water quality during any construction work and due to its future maintenance.	Contribution to the degradation of aquatic habitat quality during any construction work and due to its future maintenance.	Contribution to the loss of wetland and water environment surface area and to their degradation during any construction work and due to its future maintenance.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife during any construction work and due to its future maintenance.	Contribution to the disturbance of habitats and activities of special-status wildlife species during any construction work and due to its future maintenance.
Airports and airfields (La Grande, LG-3, LG-4, Fontange, Lac-Pau, Chisasibi, Wemindji, Pourvoirie Mirage, Éléonore mine, and Renard mine)	X	X	X	Contribution to the degradation of local surface water quality during their construction, operations, and maintenance work.	Contribution to the degradation of aquatic habitat quality during construction, operations, and maintenance work.	Contribution to the loss of wetland and water environment surface area and to their degradation due to the construction of facilities and operations.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife due to construction, the presence of facilities, and operations.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to construction, the presence of facilities, and operations.

Projects, activities, and events	Past	Present	Future	Surface water quality	Aquatic fauna and habitats	Wetlands and water environments	Terrestrial wildlife and wildlife habitats	Special-status wildlife species
Infrastructure and services								
Landfills	X	X	X	Contribution to the degradation of local surface water quality during their construction and due to their operations.	Contribution to the degradation of aquatic habitat quality during their construction and operations.	Contribution to the loss of wetland and water environment surface area and to their degradation due to their construction and use.	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife during the construction and use of these facilities.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to the construction and operations of these facilities.
Telecommunications towers	X	X	X	Not applicable	Not applicable	Not applicable	Contribution to the loss/disturbance of terrestrial wildlife habitats and disturbance of associated wildlife during the construction and maintenance of these towers.	Contribution to the disturbance of habitats and activities of special-status wildlife species due to the construction and maintenance of these facilities.
Human occupation on the land								
Cree community villages (Wemindji and Chisasibi)	X	X	X	Villages can generate wastewater and rainwater runoff that can affect surface water quality.	Villages can generate wastewater and rainwater runoff that can affect the quality of aquatic habitats.	Villages can generate rainwater runoff that can affect the quality of wetlands.	Village activities can disturb the activities of surrounding wildlife.	Village activities can disturb the activities of special-status wildlife species in the surrounding area.
Temporary and permanent Cree campsites	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Campsite and temporary shelter (non-Indigenous). An administrative suspension of private vacation leases is currently in effect in the Eeyou Istchee James Bay region. Only those already allocated are therefore considered.	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Wildlife or protected area								
National parks, territorial reserves for protected area purposes, and proposed biodiversity reserve	X	X	X	Protection of water quality by controlling activities that may take place on these lands.	Protection of the quality of aquatic habitats and associated wildlife by controlling activities that may take place on these lands.	Protection of wetlands and water environments by controlling activities that may take place on these lands.	Protection of the quality of terrestrial wildlife habitats and associated wildlife by controlling activities that may take place on these lands.	Protection of special-status wildlife species and their habitat by controlling activities that may take place on these lands.
Natural and other disturbances								
Forest fires (cyclical phenomenon).	X		X	Disturbance of surface water quality due to ashes (TSS, pH, etc.) entering the water.	Disturbance of aquatic habitat quality due to ashes (TSS, pH, etc.) entering the water.	Disturbance of the quality of wetlands and water environments due to the burning of plant species and ashes (MES, pH, etc.) entering these environments.	Disturbance of the quality of terrestrial wildlife habitats and associated wildlife due to the burning of the vegetation stratum, which alters existing habitats, as well as health problems (smoke inhalation, burns) and wildlife mortality.	Disturbance of the quality of terrestrial wildlife habitats and associated special-status wildlife species due to the burning of the vegetation stratum, which alters existing habitats, as well as health problems (smoke inhalation, burns) and wildlife mortality.
White-nose syndrome (WNS) (detected in Quebec in 2010).	X	X	X	Not applicable	Not applicable	Not applicable	Infection of chiropterans and increased mortality in their populations. Changes in the dynamics of various species (resident vs. migratory).	Seven of the eight chiropteran species in Quebec have federal or provincial protection status. Among these, three species are susceptible to being affected by WNS. Infection of chiropterans and increased mortality in their populations. Changes in the dynamics of various species (resident vs. migratory).
Governance and land use planning								
Residential schools	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Signing of the JBNQA (1975)	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Projects, activities, and events	Past	Present	Future	Surface water quality	Aquatic fauna and habitats	Wetlands and water environments	Terrestrial wildlife and wildlife habitats	Special-status wildlife species
Governance and land use planning								
Paix des Braves Agreement, Nadoshtin, Boumhounan, and Niskamoon Agreements, and Agreement on Governance in the Eeyou Istchee James Bay Territory.	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Plan Nord	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
La Grande Alliance	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Woodland Caribou Recovery Plan (2005-2012) and Plan update (2012-2022).	X	X		Not applicable	Not applicable	Not applicable	Not applicable	Protection and implementation of a recovery plan for caribou populations.
Assignment of special status under the Species at Risk Act and the Act respecting threatened or vulnerable species that involves protection of the habitat of special-status species.	X	X	X	Not applicable	Protection of fish species and their habitat	Not applicable	Protection of species and their habitat	Protection of species and their habitat

Table 9-4 Projects, activities, and events that may influence valued components

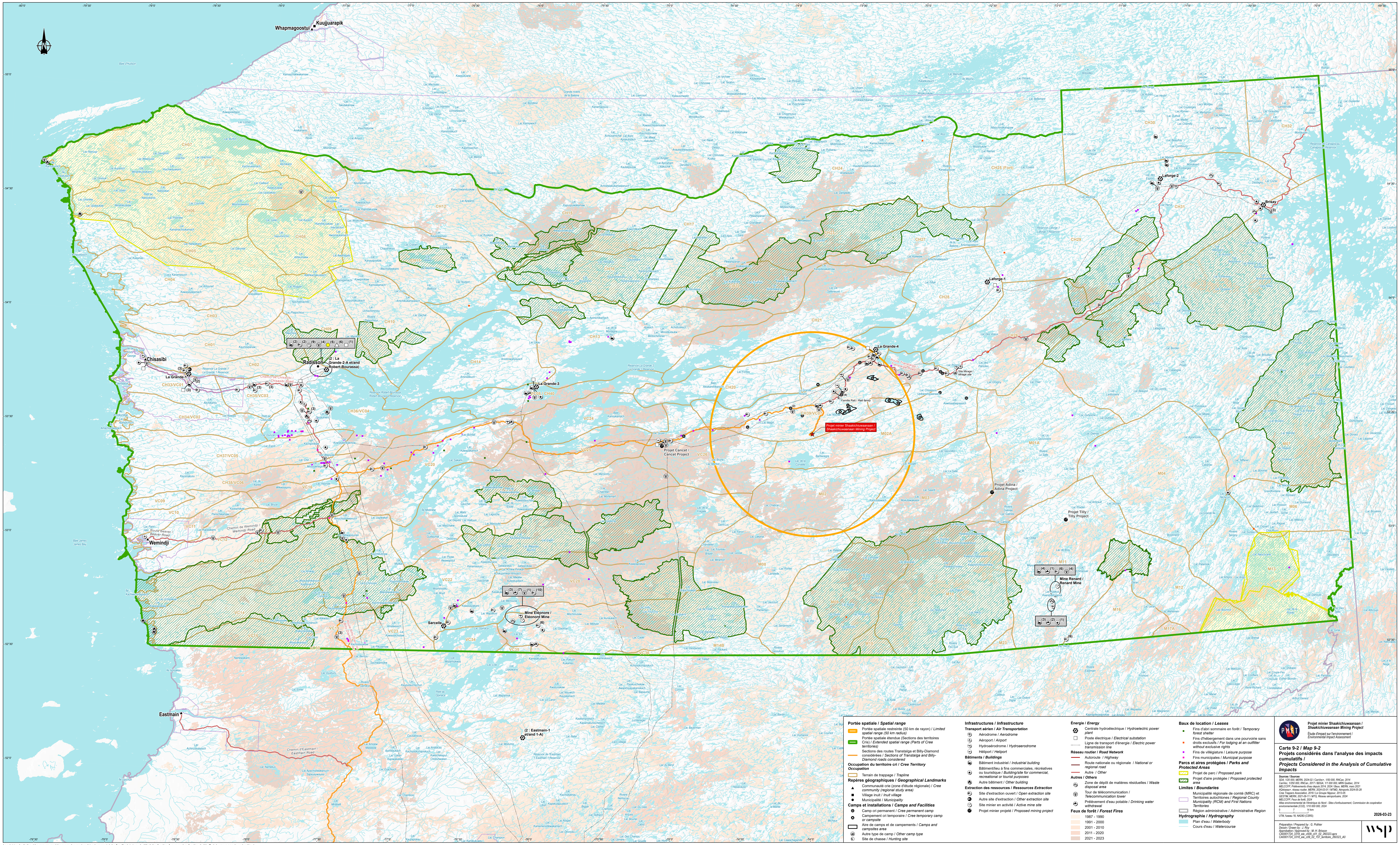
Projects, activities, and events	Past	Present	Future	Physical, psychological, and social health of the regional population	Road safety	Well-being on the land	Hunting and trapping	Climate change mitigation (GHG emissions)
Natural resource development								
Mining exploration activities	X	X	X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in these activities.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway and increased risk of accidents due to increased traffic from trucks and other vehicles.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of territory caused by the increase of access roads and drilling areas. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.
Shaakichiuwaanaan mine		X	X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway and increased risk of accidents due to increased traffic from trucks and other vehicles.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the increasing number of access roads and the development of facilities. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.
Adina mine	X	X	X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway and increased risk of accidents due to increased traffic from trucks and other vehicles. However, it is possible that traffic will be routed via a new road connecting the Trans-Taiga Road to Route 167 N.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the increasing number of access roads and the development of facilities. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.
Tilly mine			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway and increased risk of accidents due to increased traffic from trucks and other vehicles. However, it is possible that traffic will be routed via a new road connecting the Trans-Taiga Road to Route 167 N.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the increasing number of access roads and the development of facilities. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.
Cancet mine			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway and increased risk of accidents due to increased traffic from trucks and other vehicles. However, it is possible that traffic will be routed via a new road connecting the Trans-Taiga Road to Route 167 N.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the increasing number of access roads and the development of facilities. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.
Éléonore mine	X	X	X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway and increased risk of accidents due to increased traffic from trucks and other vehicles.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the increasing number of access roads and the development of facilities. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.

Projects, activities, and events	Past	Present	Future	Physical, psychological, and social health of the regional population	Road safety	Well-being on the land	Hunting and trapping	Climate change mitigation (GHG emissions)
Natural resource development								
Renard mine	X	X	X	Not applicable	As the mine is currently closed, traffic on Route 167N is minimal, so this aspect is not applicable.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the increasing number of access roads and the development of facilities. Changes in land use patterns.	Not applicable as the mine is currently not in operation.
Borrow pits	X	X	X	Not applicable	Using these borrow pits generates road traffic that can lead to road deterioration and increase the risk of accidents.	Not applicable	The use of borrow pits can disturb hunting and trapping activities in surrounding areas.	The use of borrow pits can contribute to GHG emissions through the machinery and trucks required.
Power generation facilities located within the territory, including La Grande-1, La Grande-2A, Robert-Bourassa, La Grande-3, La Grande-4, Laforge-1, Laforge-2, Brisay, and Sarcelle (offices, dams and dikes, powerhouses, and related infrastructure).	X	X	X	Confirmed social tensions within communities and documented problems regarding negative influences resulting from contact with workers who are not from the region. Some documented effects on the health of workers associated with the project.	Contribution to the deterioration of the Trans-Taiga Road due to truck and other vehicle traffic during the operation and maintenance of facilities.	Decline in the quality of the land experience due to restrictions on access to resources, and a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by more access roads as well as production facilities and reservoirs. Changes in land use patterns.	Contribution to regional and provincial GHG emissions through the transportation and operation of equipment and vehicles.
Infrastructure and services								
Various existing stations and lines related to Hydro-Québec projects		X	X	Confirmed social tensions within communities and documented problems regarding negative influences resulting from contact with workers who are not from the region. Some documented effects on the health of workers associated with the project.	Contribution to the deterioration of the Trans-Taiga Road and some secondary roads due to truck and other vehicle traffic during the operation and maintenance of facilities.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure due to the creation of a new right-of-way to facilitate access to the area. Alteration and loss of territory caused by the presence of the right-of-way and the power line. Changes in land use patterns.	Contribution to regional and provincial GHG emissions due to the movement and operation of equipment and vehicles used in the operation and maintenance of these facilities.
New 120 kV line, approximately 53 km (Option 1), between the Tilly substation and the Shaakichiuwaanaan mine site (2028–2029) (BBA, 2025) This project includes two substations, one 315-120 kV substation near the Tilly substation and a second 120 kV/13.8 kV substation at the mine site. The line will be installed on a 21-metre-high H-shaped wooden structure. The right-of-way will be 38 m wide.			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and some secondary roads due to increased traffic from trucks and other vehicles during the construction and maintenance of facilities.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure due to the creation of a new right-of-way to facilitate access to the area. Alteration and loss of territory caused by the presence of the right-of-way and the power line. Changes in land use patterns.	Contribution to regional and provincial GHG emissions due to the movement and operation of equipment and vehicles used in the operation and maintenance of these facilities.

Projects, activities, and events	Past	Present	Future	Physical, psychological, and social health of the regional population	Road safety	Well-being on the land	Hunting and trapping	Climate change mitigation (GHG emissions)
Infrastructure and services								
Trans-Taiga Road (unpaved), Billy-Diamond Highway (paved), and James Bay Road (unpaved), as well as various access roads in the area.	X	X	X	Generation of social tensions within communities due to the pros and cons of greater accessibility to the land.	Not applicable	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure due to the creation of new access roads to facilitate access to the area. Alteration and loss of territory caused by the presence of roads and access roads. Changes in land use patterns.	Contribution to regional and provincial GHG emissions from the movement and operation of equipment and vehicles for their maintenance.
La Grande Alliance – Levelling and paving of the access road to Wemindji from the Billy-Diamond Highway (150 km).			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Improvement of road safety on this access road through levelling and paving.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security.	Not applicable	Contribution to regional and provincial GHG emissions from the movement and operation of equipment and vehicles related to the completion of the work and its future maintenance.
La Grande Alliance – Development of a section of road connecting Route 167 to the Trans-Taiga Road (approximately 125 km)			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga Road and Route 167 N due to increased traffic from trucks and other vehicles during the construction of the new road.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security. Increased wildlife harvesting pressure due to the creation of new access roads to facilitate access to the area.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the new road. Changes in land use patterns.	Contribution to regional and provincial GHG emissions from the movement and operation of equipment and vehicles related to the construction and maintenance of this new road.
La Grande Alliance – Development of a road between Radisson and Wapmagoostui (approximately 175 km)			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga and the Billy-Diamond Highway due to increased traffic from trucks and other vehicles during the construction of the new road.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security. Increased wildlife harvesting pressure due to the creation of new access roads to facilitate access to the area.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the new road. Changes in land use patterns.	Contribution to regional and provincial GHG emissions from the movement and operation of equipment and vehicles related to the construction and maintenance of this new road.
La Grande Alliance – Development of a rail corridor from km 257 of the Billy-Diamond Highway to the intersection with the Trans-Taiga Road (287 km)			X	Potential for social tensions within communities and concerns about negative influences resulting from contact with workers who are not from the region. Concern for the health of workers in the region involved in the project.	Contribution to the deterioration of the Trans-Taiga and the Billy-Diamond Highway due to increased traffic from trucks and other vehicles during the construction of the new road.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security. Increased wildlife harvesting pressure due to the creation of a new railway line facilitating access to the land.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the new railroad. Changes in land use patterns.	Contribution to regional and provincial GHG emissions from the movement and operation of equipment and vehicles related to the construction and maintenance of this new railway.
Airports and airfields (La Grande, LG-3, LG-4, Fontange, Lac-Pau, Chisasibi, Wemindji, Pourvoirie Mirage, Éléonore mine, and Renard mine)	X	X	X	Generation of social tensions within communities due to the pros and cons of greater accessibility to the land.	Contribution to the deterioration of the Trans-Taiga Road and Billy-Diamond Highway due to truck traffic and other vehicles involved in their use and maintenance.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security.	Increased wildlife harvesting pressure and changes in land and resource use due to improved land access (creation of new access roads). Loss of land caused by the facilities. Loss and changes in land use patterns.	Contribution to regional and provincial GHG emissions due to the movement and operation of equipment and vehicles used in the operation and maintenance of these facilities.
Landfills	X	X	X	Landfills can contribute to health deterioration depending on the nature of the materials buried and the risks of exposure to local populations.	Road traffic associated with the use of these sites can contribute to the deterioration of road quality and an increase in local and regional traffic.	Decline in the quality of the land experience due to a reduction in the quality of the environment, peacefulness, and sense of security.	The use of the landfill may disturb hunting and trapping activities in the surrounding areas.	Vehicle traffic and machinery operation associated with landfill operations contribute to GHG emissions.
Telecommunications towers	X	X	X	Not applicable	Road traffic associated with the construction of these towers may contribute to the deterioration of road quality and an increase in local and regional traffic.	Not applicable	The construction of these towers may disturb hunting and trapping activities in the surrounding areas.	Vehicle traffic and machinery operation associated with tower construction contribute to GHG emissions.

Projects, activities, and events	Past	Present	Future	Physical, psychological, and social health of the regional population	Road safety	Well-being on the land	Hunting and trapping	Climate change mitigation (GHG emissions)
Human occupation on the land								
Cree community villages (Wemindji and Chisasibi)	X	X	X	Not applicable	Traffic associated with the presence of these villages contributes to road deterioration and increased local and regional traffic.	Not applicable	The presence of villages limits hunting activities and can disturb trapping activities in surrounding areas.	The various activities associated with villages are sources of GHG emissions (traffic, heating, etc.).
Temporary and permanent Cree campsites	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Campsite and temporary shelter (non-Indigenous). However, an administrative suspension of private vacation leases is currently in effect in the Eeyou Istchee James Bay region. Only those already allocated are therefore considered.	X	X	X	Not applicable	Not applicable	Decline in the quality of the land experience due to a reduction in peacefulness and sense of security.	Disruption of traditional hunting and trapping activities. Decreased sense of security.	Not applicable
Wildlife or protected area								
National parks, territorial reserves for protected area purposes, and proposed biodiversity reserve	X	X	X	Protecting habitats and natural resources for future generations	Not applicable	Not applicable	Safeguarding the way of life of First Nations communities and supporting biodiversity.	Not applicable
Natural and other disturbances								
Forest fires (cyclical phenomenon).	X		X	Possible health effects on residents of the region due to exposure to smoke. Risk of property damage, injury, and death associated with the spread of these fires to regional communities	Possible damage to the road surface of Billy-Diamond Highway and other paved road segments due to heat from fires. Risk to the safety of road users travelling through fire zones.	Decline in the quality of the land experience due to a reduction in the quality of the environment and sense of security.	Disruption of wildlife harvesting activities. Changes in land and resource use. Temporary loss of land.	Contribution to GHG emissions parallel to human activities.
White-nose syndrome (WNS) (detected in Quebec in 2010).	X	X	X	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Governance and land use planning								
Residential schools	X	X	X	Not applicable	Not applicable	Have caused significant social and economic upheaval and cultural erosion, limiting the use of the land by these generations of Indigenous people.	Have caused significant social and economic upheaval and cultural erosion, limiting the use of the land by these generations of Indigenous people.	Not applicable
Signing of the JBNQA (1975)	X	X	X	Not applicable	Not applicable	Establishment of the Program to assist hunting, fishing and trapping Exclusive harvesting rights on the land. Marking of common use areas and responsible administrative entities (land categories). Reduction in the time devoted to traditional activities on the land (full-time jobs in the various institutions created), leading to changes in land use patterns.	Establishment of the Program to assist hunting, fishing and trapping Exclusive harvesting rights on the land. Marking of common use areas and responsible administrative entities (land categories). Reduction in the time devoted to traditional activities on the land (full-time jobs in the various institutions created), leading to changes in land use patterns.	Not applicable

Projects, activities, and events	Past	Present	Future	Physical, psychological, and social health of the regional population	Road safety	Well-being on the land	Hunting and trapping	Climate change mitigation (GHG emissions)
Governance and land use planning								
Paix des Braves Agreement, Nadoshtin, Boumhounan, and Niskamoon Agreements, and Agreement on Governance in the Eeyou Istchee James Bay Territory.	X	X	X	Not applicable	Not applicable	Increased control over the land and its use by Cree communities. Increase in the number of projects on the land.	Increased control over the land and its use by Cree communities. Increase in the number of projects on the land, thereby reducing hunting and trapping areas.	Not applicable
Plan Nord	X	X	X	Not applicable	Not applicable	Interference between industrial development and land use (perception of environmental contamination)	Interference between industrial development and subsistence activities (perception of environmental contamination)	Promotes the expansion of transportation infrastructure northward as well as resource development projects, which will lead to increased GHG emissions due to higher traffic and projects that use hydrocarbons in their operations.
La Grande Alliance	X	X	X	Not applicable	Several projects to repair existing roads will improve road safety. However, there will also be plans for new roads that will increase traffic in the area, which could lead to safety issues.	Increased access to the area through the construction of new roads and railways, promoting greater use of the area by Indigenous communities. However, it also promotes access to the area for non-Indigenous people.	Increased access to the area through the construction of new roads and railways, facilitating travel for hunting and trapping, but further fragmenting wildlife habitats.	Increased traffic of internal combustion vehicles due to improvements in road and rail networks, which will increase the region's GHG emissions.
Woodland Caribou Recovery Plan (2005-2012) and Plan update (2012-2022).	X	X		Not applicable	Not applicable	May lead to certain restrictions on land use, particularly in relation to hunting.	May mean a restriction on hunting this species to promote its recovery.	Not applicable
Assignment of special status *under the Species at Risk Act and the Act respecting threatened or vulnerable species* that involves protection of the habitat of special-status species.	X	X	X	Not applicable	Not applicable	May result in certain restrictions on land use, particularly in relation to hunting, trapping, fishing, and gathering.	May mean restrictions on hunting and trapping these species to promote their recovery.	Not applicable



La précision des limites et les mesures montrées sur ce document ne doivent pas servir à des fins d'ingénierie ou de délimitation foncière. Aucune analyse foncière n'a été effectuée par un arpenteur-géomètre. / Boundary accuracy and measurements shown on this document are not intended for engineering or land delineation purposes. No land analysis has been performed by a land surveyor.

9.2.4.1 Natural resource development

This theme covers various past, present, and planned activities related to the use of natural resources, including mining, borrow pits, forestry, and energy production (power plants).

Mining activities

The area under consideration for mining activities corresponds to that designated for land use by Indigenous communities, primarily those of Chisasibi, Wemindji, and Mistissini. This vast territory is mainly used for mineral exploration activities, but also includes four mine sites that are either under development or in operation.

Mining exploration is concentrated along two main axes (SIGÉOM, 2025a), namely:

- Along an east-west axis located south of the reservoirs of the La Grande hydroelectric complex, stretching from the Robert-Bourassa reservoir in the west to Lac Nichicun in the east. This area is being explored mainly for lithium, but also for copper and gold, and to a lesser extent for various other metals (molybdenum, cobalt, nickel, silver, tantalum, iridium, palladium, platinum, rhodium, rubidium, etc.). Most of the designated exploration areas do not have a defined level of development (development stage unknown on SIGEOM) or are at the basic or intermediate exploration stage.
- Along a northwest/southeast axis between Robert-Bourassa Reservoir and Lac Sakami. This area is divided between gold and lithium exploration activities, with a few areas focused on nickel and another on total rare earth elements. Prospecting for other metals is also carried out at certain sites, particularly for silver, copper, iridium, palladium, platinum, and rhodium. These sites are mainly at the basic or intermediate exploration stage of development. Some areas do not have a defined level of development (development stage unknown on SIGEOM).

The areas subject to mineral exploration occupy part (mainly near the southern boundary) of Chisasibi's traditional territory, part of the northern boundary of Mistissini's traditional territory, and about one third of Wemindji's traditional territory (central part of the land).

With regard to mining operations, the following three sites have moved beyond the exploration stage (SIGÉOM, 2025a):

- The Shaakichiuwaanaan Project formerly known as the Corvette mine site (project currently under assessment). This lithium mine project, managed by the proponent PMET Resources Inc. (Innova Lithium Inc.) is in the development stage and is currently undergoing an environmental impact assessment. Exploration work is also still ongoing.
- The Adina mine site, covering an area of 46 km², is being developed and managed by the proponent Winsome Resources Ltd. Discovered in 2014, it has undergone exploratory drilling since 2018, which has confirmed the deposit's potential and led Winsome Resources to submit its preliminary economic assessment technical study in October 2024 (Winsome Resources, 2025a). There had been plans to develop the Adina mine by converting the Renard mine's mineralized material processing plant to process lithium ore. However, due to market conditions in 2025, Winsome has decided not to proceed with the acquisition of the Renard mine site, at least for the time being. Drilling work is continuing and technical and environmental studies have been initiated.

- The Tilly mine project site, covering an area of 47 km², is located 20 kilometers southeast of the Adina mine project. This project is part of Winsome Resources Ltd.'s portfolio. It is a potential lithium deposit that underwent extensive exploration in 2025, with the collection of 56 samples (Windsome Resources, 2026) reportedly revealing high-quality lithium mineralization. Further exploration work is planned for the potential development of the site.
- The Cancet mine project site, covering an area of approximately 200 km², is located approximately 155 km east of Radisson as the crow flies. This project is part of Winsome Resources Ltd.'s portfolio. This is a potential lithium deposit that has been the subject of numerous drilling operations (5216 m to date) and metallurgical tests (Windsome Resources, 2026). These operations reportedly confirmed the presence of high-quality lithium ore (2.91% Li2O). Exploration work is ongoing.
- The Renard mine, which was operated for diamond extraction by the developer Stornoway Diamonds Inc. (Canada). Development of the site began in July 2014 and it became operational in 2016. However, mining operations have faced various financial problems, particularly due to the fall in the value of diamonds. It permanently ceased operations in the fall of 2023. In April 2024, Winsome Resources signed an exclusive option agreement to purchase the mine site with a view to eventually converting its infrastructure to process lithium ore extracted from the Adina mine, located approximately 60 km north of the Renard mine (Journal de Montréal, 2024, Winsome Resources, 2025b). However, as indicated above, this option has been abandoned for the time being.
- The Éléonore mine was inaugurated in 2015 by Goldcorp to mine a gold deposit. It produces approximately 245,000 ounces of gold per year. A transaction led to the sale of the deposit to the American company Newmont in 2019 and, most recently in 2024, to a British company, Dhilmar (La Presse, November 26, 2024). The mine is expected to operate for 22 years, with an estimated extraction of nearly 14 million ounces of gold (COMEX, 2025). The site includes an underground mine accessed via a shaft reaching a depth of 1,500 metres. The extracted ore is processed on site at a plant with a capacity of 3,500 tonnes per day, which can be increased to 7,000 tonnes per day. The process includes crushing, gravity concentration, a sulphide flotation unit, cyanide leaching, and gold recovery using a carbon-in-pulp (CIP) process. The mine is connected to the Billy-Diamond Highway by an unpaved access road stretching over 140 km. It has its own airport and is supplied with electricity by Hydro-Québec via a 120 kV power line.

Borrow pits

Several open borrow pits (>40) are present throughout the area defined by the extended spatial boundary covering parts of the Cree territories of Chisasibi, Wemindji and Mistissini. These borrow pits are mainly located along existing roads and around the facilities of the various Hydro-Québec generating stations.

Energy production

The region represents the source of the most important energy production in the province, in the form of hydroelectric power, which included the large scale construction of dams and reservoirs on the La Grande River in the 1970s and 1980s. Some of the energy production facilities in this complex also required the diversion of the Caniapiscau River and part of the Grande Rivière de la Baleine basin via the Laforge River diversion, as well as diversions from the Eastmain and Rupert Rivers. The complex created a new watershed covering more than 200,000 km², significantly altering the affected areas.

Along the La Grande River, there are eight hydroelectric power plants generating more than 15,000 MW, requiring the construction of 304 dams, six 735 kV power lines, one 450 kV direct current line, six airports, seven villages, and 2,100 km of roads (SEBJ, 2025). The power plants include, from west to east, La Grande-1, Radisson, La Grande-3, La Grande-4, Laforge-1, Laforge-2, Brisay, and Caniapiscau.

The area covered by the extended spatial boundary also includes the Sarcelle generating station, which is part of the Eastmain-Sarcelle-Rupert complex. This station has an installed capacity of 150 MW and is located at the outlet of the Opinaca Reservoir, at the level of the Eleonore mine (Hydro-Québec, 2026). Construction began in 2007 and it was commissioned in 2013.

9.2.4.2 Infrastructure and services

Substations and power lines

Within the extended spatial boundary considered for the cumulative impact assessment, there are several substations and power lines of various voltages. The various infrastructure facilities are as follows, from east to west:

- At the La Grande-4 (LG-4) power station, there are two electrical substations: the 735 kV LG-4 substation and the 735/315 kV Tilly substation. Two 735 kV lines begin at the LG-4 substation and connect to the 735 kV Lemoyne substation at Lac Goyer, following the Trans-Taiga Road on the south side. Another 735-kilovolt line begins at the Tilly substation and also connects to the Lemoyne substation, following the Trans-Taiga Road on the north side. Lastly, a 315 kV line from the Nikamo substation (at the Laforge-1 power plant) enters the Tilly substation, bypassing the LG-4 reservoir to the south.
- At the La Grande-3 (LG-3) power station, there are two 735 kV electrical substations: the LG-3 and Chisasibi substations. Two 735 kV power lines start at the LG-3 substation. One reaches Lemoyne substation by following the Tans-Taiga Road on the north side, and the other crosses this road and descends southward to reach Albanel substation at Nemasaka. A 735 kV line begins at the Chisasibi substation and runs to the Sakami-1 substation along the north side of the Trans-Taiga Road.
- Two 735-kilovolt lines start at the 735-kilovolt Lemoyne substation and connect to the Albanel substation.
- The Robert-Bourassa power plant sector includes numerous electrical substations operating at various voltages ranging from 44 kV to 735 kV. The hydroelectric complex itself includes the La Grande-2 (735 kV), La Grande-2-A (315 kV), Radisson (735 kV), Carcajou and Des Groseillers (69 kV), and Brisson (44 kV) substations. A bit further south, there are also the Desaulniers and Duncan Limnimètre-020 substations (69 kV) and the Électrode Duncan substation (44 kV). There is also a decommissioned 69 kV substation, known as the Despins substation.
- Two 735 kV lines begin at the LG-2 substation: one connects to the Sakami substation located at the lake of the same name south of the Robert-Bourassa reservoir and along the Trans-Taiga Road, and the other connects to the Albanel substation.
- Two 735 kV lines begin at the Radisson substation and connect to the Opinaca-2 and Opinaca-3 substations near the community of Eastmain. A 450 kV line also begins at this substation and connects to the Grondines substation in the municipality of Deschambault-Grondines.

- A 515 kV line connects the La Grande-2A, Radisson, and La Grande-1 substations located near the LG-1 power plant.
- A 69 kV line connects the LG-2, Carcajou, Des Groseillers, Desaulniers, and Duncan Limnimètre-020 substations.
- A 44 kV line connects the Radisson, Brisson, and Électrode Duncan substations.
- At the LG-1 power plant, there is only the LG-1 substation. This substation is connected to the Radisson substation by a 315 kV line running along the north side of James Bay Road. It is also connected to the Chisasibi substation by a 120 kV line that supplies power to the community of the same name. Lastly, a second 120 kV line connects to the Wemindji substation, which supplies this community.

Road network

The main roads in the area considered within the extended spatial boudary include:

- The Trans-Taiga Road, which is unpaved. It connects Billy-Diamond Highway (to the west) to the Caniapiscau hydroelectric site (to the east), where it ends.
- The Billy-Diamond Highway, which is a 620 km paved road connecting the LG-1 power plant site to Matagami in the south.
- The James Bay Road, which is a paved road approximately 100 km long that connects the LG-1 power plant area to the community of Chisasibi.
- The unpaved Wemindji Road, approximately 100 km long, which connects the community of the same name to the Billy-Diamond Highway.
- Part of the unpaved access road to the Éléonore mine, which joins the Billy-Diamond Highway further south after a stretch of more than 140 km.

Apart from these roads, the various sites of the LG-1 power plants in Caniapiscau include a local network of paved and dirt roads. Lastly, there are also various forest roads in the area connecting to power lines, borrow pits, mining exploration areas, isolated campsites and, further south, logging areas.

Development projects planned under the Grand Alliance

La Grande Alliance, signed in 2020, is a memorandum of understanding between the Cree Nation Government and the Quebec government aimed at greater collaboration to improve connectivity, development, and protection of the land. As part of the discussions arising from this protocol, various projects have been proposed for the study area under consideration to assess the cumulative impacts on land use by Indigenous communities, including (Grande Alliance, 2021):

- improving access to the community of Wemindji (Phase I);
- the construction of a railway parallel to the Billy-Diamond Highway to kilometre 544 (Phase II);
- the construction of a road between Radisson and Whapmagoostui (approximately 175 km) (Phase II), for which a preliminary route was presented in 2023 (Grande Alliance, 2023);
- the extension of Route 167 to connect it to the Trans-Taiga Road (approximately 175 km) (Phase II);

- a railway connecting Radisson and Whapmagoostui/Kuujjuarapik (approximately 225 km) (Phase III);
- the extension of the Trans-Taiga Road to Schefferville (approximately 200 km) (Phase III).

To date, only the feasibility study for these projects has been completed in 2022, and an initial route for the Radisson-Whapmagoostui Road has been presented. No fieldwork has been completed, and there is no schedule available for the planned work.

Airport, airfield, and hydroplane base

Three airports and seven airfields are located within the study area defined for the assessment of cumulative impacts on land use by Indigenous communities. One airport and four airfields are associated with the various hydroelectric power plants, namely:

- La Grande Airport, which has served the La Grande-1 and Radisson sites since 1970 and whose buildings were rebuilt in 1991, is managed by the Société de Développement de la Baie-James (SDBJ) (Ministère de la Culture et des Communications, 2025). The airport has an asphalt runway and lighting that allows aircraft to land 24 hours a day, 7 days a week. It is accessible via the Billy-Diamond Highway and is located approximately 30 km south of the Radisson facilities.
- The La Grande-3 and La Grande-4 airfields, which serve the sites of the same name and are managed by Hydro-Québec. These facilities are located along the Trans-Taiga Road, near the hydroelectric facilities of the same name.
- The Fontange airfield, which serves the Laforge-1, Laforge-2, and Brisay sites and is managed by the SDBJ. This airfield is located along the Trans-Taiga Road near the Laforge-2 facilities.
- The Lac-Pau airfield, which serves the Caniapiscau site and various outfitters via a hydroplane base, is also located on Lac Caniapiscau. These facilities are located on the shores of Lac Pau at the eastern end of the Trans-Taiga Road.

The other two airports are located in the communities of Chisasibi and Wemindji. They are used by both communities and are located along the La Grande River, at the northern end of the village of Chisasibi and inland to the northwest of the village of Wemindji. The last three airfields are private facilities managed by the community of Chisasibi (near the site of the former Mirage outfitter), the Renard mine, and the Éléonore mine, respectively. The airfield of the former Mirage Outfitter is located along the Trans-Taiga Road, southeast of the LG4 reservoir. The Renard mine airfield is located along the extension of Route 167, which connects the mine site to the town of Chibougamau. Lastly, the Éléonore mine's airfield is located immediately north of the mine facilities, which are connected to the Billy-Diamond Highway by an access road.

Two private seaplane bases are also located in the extended spatial area: one on the shores of Lake Katatipawasakakamaw, on the northern edge of the Trans-Taiga Road south of LG-4 Airport, and the other near the Mirage site airfield. Finally, a heliport is located at the level of the Cancet mining project facilities.

Landfills

According to the MELCC's 2021 list of authorized and operational trench landfill sites (LEET), only four LEETs are located within the areas considered for the cumulative impact assessment, namely:

- The LG-4 trench landfill site, for which the operating permit is held by Hydro-Québec, a government corporation.
- The Radisson trench landfill site, whose operating permit holder is the Eeyou Istchee James Bay Regional Government.
- The Éléonore mine's trench landfill site, for which Goldcorp Canada was the permit holder in 2021. As this mine site has since been sold to the British company Dhilmar, it is assumed that Dhilmar is now the holder of the permit.
- The Renard mine trench landfill site, whose permit holder is Stornoway Diamonds (Canada) Inc.
- Two landfill sites of uncertain nature and ownership, that is one located between the Laforge-2 and Brisay power plants, north of the Trans-Taiga road and another located southwest of the Brisay power plant.

Telecommunications towers

Thirty telecommunications towers have been located within the local human study area. These towers are mainly located near the various roads, at Hydro-Québec power plants and at active mining sites.

9.2.4.3 Human occupation on the land

Cree communities

Two Cree communities are located within the area considered for the cumulative impact assessment: the communities of Wemindji and Chisasibi. Section 6.4 of the EIA present a full description of these communities. The community of Chisasibi, founded in 1978, is located on the banks of the La Grande River, near its mouth at James Bay. This community of over 5,000 inhabitants is the largest in the James Bay area. Heavily influenced by the development of hydroelectric complexes on the La Grande River, the population divides its time between traditional activities and various jobs in the public service, services, tourism, various Hydro-Québec sites, mining exploration work, and active mining projects. The community is connected to Billy-Diamond Highway by James Bay Road.

The community of Wemindji is located on the banks of the Maquatua River, near its mouth on James Bay. The community has just over 1,400 inhabitants, and its population makes extensive use of the land, continuing traditional activities such as hunting, trapping, fishing, and gathering. The people also hold positions in infrastructure and land management, contribute as workers in the region's major mining projects, and are employed by Hydro-Québec and forestry operations. The village is connected to the Billy-Diamond Highway by the Wemindji Road, which is approximately 100 km long.

Both communities have their own airport as well as a range of residential, commercial, and public areas.

Indigenous campsites

Temporary and permanent Cree campsites have been identified within the restricted spatial boundary. Two temporary campsites have been identified, one on the banks of the La Grande River north of the Trans-Taiga Road, at the intersection of the project access road and the Trans-Taiga road. The other temporary campsite is located about 15 kilometres northeast of the project. Seventeen permanent campsites have been located, eight of which are along the Trans-Taiga Road and the other nine scattered across the area south of the Trans-Taiga Road, mainly between the project area and the eastern edge of the social LSA. The nearest permanent campsite is located approximately 9 km northwest of the project.

Campsites and temporary shelters (non-Indigenous)

Across the entire extended spatial area, leases for temporary shelters (17), community camping (4), outfitting without exclusive rights (8), and vacation properties (102) were identified. The vast majority of these leases are located on either side of the territory's main roads (Tans-taïga and Billy-Diamond) while the remainder are widely dispersed. Precise information on the landowners is not available.

9.2.4.4 Wildlife areas or protected areas

National parks

The northern section of the new Parc national Nibiischii, which extends from Lac Mistissini to the Renard mine (east of the mine), is included in the area considered for the assessment of cumulative impacts related to Indigenous land use. This park, created in December 2024, covers nearly 12,000 km^2 and will be managed by the Mistissini Cree community. It protects a significant portion of the wildlife and plants typical of the boreal forest north of the 50th parallel.

Territorial reserves for protected area purposes and proposed biodiversity reserves

Two proposed biodiversity reserves and eight territorial reserves for protected area purposes are located wholly or partly within the boundaries of the area considered for the cumulative impact assessment relating to Indigenous land use.

The listed proposed biodiversity reserves include:

- The Paakumshumwaau-Maatuskaau Reserve, located between the communities of Wemindji (approximately 20 km to the south) and Eastmain (approximately 32.5 km to the north), covers a vast area of 453,900 ha stretching from the shores of James Bay to the east of the Billy-Diamond Highway (Gouvernement du Québec, 2010). This reserve is located in the natural province of the Grande-Rivière low hills, in the natural region of the Lac Duncan plain and the Opinaca hills. It will protect a representative sample of the James Bay coastline, as well as a hydrographic system and part of the lower Opiniaca River plateau.

- The Hirondelle Reserve covers an area of 32,204 ha approximately 300 km northeast of the village of Mistissini (Gouvernement du Québec, 2009). Located on Category III lands under the James Bay and Northern Quebec Agreement, it overlaps three Cree traplines. It is crossed by the boundary between the natural provinces of the Nord-du-Québec Central Plateau and the low hills of the Grande Rivière, and more specifically, it is part of the natural region of the Buttons des lacs Noacocane and Nichicun, as well as the Lac Orillat buttes. It is characterized by the lichen-spruce bioclimatic domain and is dominated by spruce-moss stands and wooded heathland with shrubs, sometimes accompanied by lichens.

Territorial reserves for protected area purposes allow for the recognition of an area until its legal protection status is confirmed. The reserves are located north and south of the La Grande complex and its reservoirs. They include:

- The Namewaakamiishtikw-Piskuchitishu-Siipii Reserve, located between the Paakumshumwaau-Maatuskaau proposed biodiversity reserve and the village of Eastmain (MELCCP, 2025a). Covering an area of 229,800 ha, this reserve is intended to protect the traplines of the Eastmain community. It corresponds to the watersheds of the Conn and Pêche rivers.
- The Wichishkw-Uubauquushduuk Reserve consists of two separate spatial units located east of the proposed Paakumshumwaau-Maatuskaau Biodiversity Reserve and southwest of Lac Corvette (MELCCFP, 2025b). This 351,600-hectare reserve is heavily used by the Wemindji community as hunting grounds. It is part of the Sakami River watershed, which flows into the Grande Rivière, and is part of the wintering grounds of the migratory caribou herd of the Rivière aux Feuilles (Leaf River).
- The Pipunishiwin-Saahkamiishtikw Reserve is located east of the Wichishkw-Uubauquushduuk Reserve and the proposed Hirondelle Biodiversity Reserve, southeast of Lac Corvette (MELCCFP, 2025c). This reserve covers an area of 508,600 ha and was selected to represent the territorial area of the Rogen plain, which is part of the Pontois river basin. This territory is also part of the wintering grounds for the migratory Leaf River caribou herd.
- The Nord-Est-du-Lac-Nichicun reserve is located south of the Caniapiscau reservoir and immediately north of Nibiischii National Park (MELCCFP, 2025d). This reserve covers 259,700 ha and aims to protect the Caniapiscau Depression area and provide connectivity between the reserves located north of the La Grande Complex and those to the south. This territory is closely linked to the Cree community of Mistissini and is part of the range of the Caniapiscau woodland caribou population.
- The Minahiku-Wachî reserve is located immediately west of the Caniapiscau reservoir and south of the Lafroge-2 and Brisay power plants (MELCCFP, 2025e). Covering an area of 221,200 hectares, this reserve, like the previous one, protects part of the Caniapiscau Depression area. It is also part of the range of the Caniapiscau woodland caribou population.
- The Aawiitakuch Reserve consists of three distinct areas separated by the Trans-Taiga Road: two sections on the south side and one on the north side, at the LG-3 reservoir (MELCCFP, 2025f). The reserve covers a total area of 170,200 ha and, like the two previous reserves, its main purpose is to preserve the characteristics of the Caniapiscau Depression. It also includes numerous family camps belonging to Cree communities and is part of the wintering grounds of the Leaf River migratory caribou herd.

- The Rivière-Kanaaupscow-et-Lac-Kukamaw reserve is a group of areas of varying sizes located north of the Robert-Bourassa and LG-3 reservoirs (MELCCFP, 2025g). This reserve, covering a total area of 571,900 hectares, aims in particular to protect a representative area of the rolling plains of the Rivière à la Baleine. It also addresses the need to protect many cultural elements of the Cree community of Chisasibi.
- The Lac Burton-Rivière Roggan-et-la-Pointe-Louis-XIV reserve is a vast territory covering 875,000 ha located north of the community of Chisasibi, stretching from the shores of James Bay and Hudson Bay to the Radisson power plant (MELCCFP, 2025h). It provides protection for sites of interest such as Point Louis XIV, which has unique climate, plant, and wildlife that are characteristic of this latitude. It also includes one of the most remarkable drumlin fields and part of the Sakami Moraine.

9.2.4.5 Natural and other disturbances

Forest fires

Forest fires periodically affect Cree traplines and terrestrial ecosystems in the areas considered for the cumulative impact assessment. These areas are entirely located in the northern protection zone of the Société de protection des forêts contre le feu (SOPFEU).

SOPFEU provides statistical information on forest fires that have occurred in two main zones, the intensive prevention zone and the northern zone. The 50- and 100-kilometre cumulative impact assessment zones are entirely located in the northern region that covers northern Quebec from Lebel-sur-Quévillon. The available statistics for the northern region indicate that in 2023 and 2024, a total of 313 fires were recorded, with 147 in 2023 and 166 in 2024. The fires recorded in 2023 burned 3.2 million hectares, while those in 2024 burned 177,306 hectares.

According to data available on the website of the Ministère des Ressources naturelles et des Forêts, consulted in April 2025 (MRNF, 2025b), 36 fires occurred within a 100 km radius of the project site between 2007 and 2023, including six fires covering 5 000 ha or more. All of these fires affected a total of approximately 1,536,000 ha. It is important to note that all of the fires that occurred between 2007 and 2022 (26 in total) accounted for only 2% of the affected area, with only one fire covering more than 5,000 ha, which occurred in 2012 and came within 10 km southeast of the mine site. The vast majority of the area affected by forest fires was burned in 2023, when 10 fires occurred within a 100 km radius of the project site, covering a total of approximately 1,498,000 ha. Three of these fires covered areas greater than 155,000 ha, namely:

- A fire that burned 155,500 hectares and came within approximately 52 km southeast of the mine site.
- A fire that covered 376,650 hectares and came within approximately 54 kilometres north of the mine site. This fire remained just north of the LG-3 and LG-4 reservoirs.
- A fire that covered 837,701 hectares and came within 25 km south-southeast of the mine site. This was the largest fire to affect the Eeyou Istchee James Bay Territory in 2023.

In addition to these three major fires in 2023, three other fires covering more than 5,000 hectares were also recorded in the same year, namely:

- A fire covering 8,242 hectares located on the south bank of the LG-4 reservoir and 47 km northeast of the mine site.
- A fire covering 25,290 hectares located on both sides of the Trans-Taiga Road, near the LG-3 reservoir. It was 35 km west of the mine site.

- A fire covering 91,351 hectares, only a tiny fraction of which is within a radius of 100 km. This fire occurred near Lac des Vœux, on both sides of the Trans-Taiga Road, approximately 94 km northeast of the mine site.

White-nose syndrome

WNS is a fungal infection that affects bats, particularly cave-dwelling species, in northeastern North America including Quebec. Bat populations affected by this disease often suffer mass mortalities accompanied with a characteristic whitish fungal growth on parts of the body, particularly the nose (Gouvernement du Québec, 2026; ECCC, 2018).

Discovered in the winter of 2006–2007 in Howe Cave, New York, WNS spread to the provinces of Ontario and Quebec in 2010. Since WNS is spreading at a rapid rate of 300 km per year, the area and number of bats at risk continue to increase year after year. Therefore, WNS is currently the primary threat to bat populations in northeastern North America (ECCC, 2018).

9.2.4.6 Governance and land use planning

Residential schools system

The residential school system refers to schools (religious) and day schools (schools administered by the federal government) for Indigenous Peoples (including First Nations) that have existed since the 17th century, but during the 19th and 20th centuries, a formal system was established, only to be shut down by the federal government in the early 1970s (Parks Canada, 2025). In Quebec, some schools were open as early as the 1930s. Indigenous children were forced to leave their families to become boarders at these schools, where they were separated from their brothers and sisters and forbidden to speak their language. Compulsory attendance at these schools has been described as “cultural genocide,” since it was aimed at the cultural assimilation of Indigenous Peoples. The absence of children from their families caused family units to break down, deprived children of the education provided by their parents, and prevented the transmission of cultural knowledge. All of this was compounded by physical and sexual violence.

It should be noted that on June 11, 2008, Prime Minister Harper issued a full apology on behalf of Canadians regarding Indian residential schools (Government of Canada, 2025). In addition, on September 1, 2020, the Government of Canada announced the designation of the Residential School System as a national historic event through the National Program of Historical Commemoration. Lastly, several of these former residential schools have since been designated as national historic sites (Parks Canada, 2025).

Signing of the JBNQA (1975)

When major dam projects were launched in James Bay and the Nord-du-Québec region in 1971, Indigenous and Inuit communities opposed the projects, going so far as to file a lawsuit that is still ongoing (La Sentinelle, 2015, The Canadian Encyclopedia, 2019). The court required the parties to reach a negotiated agreement on land management, which led to the signing of the James Bay and Northern Quebec Agreement in 1975. By signing the Agreement, Crees and Inuit ceded their rights to the territory in exchange for various specific rights and financial compensation. The Agreement established harvesting rights, defined land categories, and put in place resource management regimes. It also led to the establishment of school boards, the restructuring of health services, and the creation of regional governments.

The three land categories resulting from the Agreement (Cree-Québec Forestry Board, 2018) are:

- Category I lands, which are exclusively used by Cree and Inuit communities, generally villages and their surrounding areas;
- Category II lands, on which the Cree and Inuit have exclusive hunting, fishing, and trapping rights, but not mineral rights;
- Category III lands, on which the Cree and Inuit have exclusive trapping rights and the exclusive right to establish outfitters. Although they do not have exclusive hunting and fishing rights, they may engage in these activities on these lands.

Paix des Braves Agreement, Nadoshtin, Boumhounan, and Niskamoon Agreements, and Agreement on Governance in the Eeyou Istchee James Bay Territory.

The Paix des Braves Agreement was signed in February 2002 with the Cree communities and is valid for 50 years (Gouvernement du Québec, 2002). This political and economic agreement is intended to facilitate the implementation of major hydroelectric, mining, and forestry projects in Cree territory, in exchange for:

- the establishment of a “nation-to-nation” (Cree and Quebec) relationship;
- a partnership based on cooperation, trust, and mutual respect for the development of the region;
- greater autonomy for the Cree and recognition of their increased responsibility for their economic and community development;
- respect for the principles of sustainable development and the traditional Cree way of life.

The agreement also implies that the two nations will share the revenues generated by projects carried out on Cree territory.

The Nadoshtin Agreement was signed in 2002 by the Grand Council of the Crees, certain Cree band councils, Hydro-Québec, and the SEBJ (Commission de la construction du Québec—CCQ, 2008). It granted authorization for the construction of the Eastmain-1 power plant. It aims to promote partnerships and job creation for Cree communities as part of this project.

The Boumhounan Agreement, signed in 2002, is similar to the previous agreement but includes the establishment of an implementation process and full Cree participation in the environmental study leading to the construction of the Eastmain-1-A and Sarcelle power plants and the diversion of the Rupert River (CCQ, 2008).

In 2005, the Niskamoon Agreement was signed between the Grand Council of the Crees and Hydro-Québec (CCQ, 2008). The main purpose of this new agreement was to merge the old agreements and other accords to simplify their management mechanisms and facilitate their implementation.

The Agreement on Governance in the Eeyou Istchee James Bay Territory was ratified in July 2012 between the Cree and the Government of Quebec (Grand Council of the Cree, 2025). This agreement builds on the JBNQA and the Paix des Braves agreements to establish a partnership between the Cree, Quebec, and the Jamesian communities for the governance of the Eeyou Istchee territory. This agreement has two main components: it provides for greater Cree autonomy on Category II lands (jurisdiction, functions, and power) with respect to land and natural resource planning and management, regional development, and municipal management. It also provides for the creation of a public Regional Government on Category III lands. Composed equally of representatives of the Cree and the Jamesian communities, this government exercises powers of municipal management, economic development, and resource planning.

Plan Nord

The first version of the Plan Nord was proposed in 2010, but it was poorly received by Indigenous communities, who felt excluded. However, after several years of numerous working meetings, it was relaunched in 2015 (Gouvernement du Québec, 2015). The Société du Plan Nord was created to coordinate the development of the territory in consultation with all stakeholders and to structure government interventions by the relevant departments and agencies. The plan also calls for the creation of a marketing office to liaise between Quebec companies, Indigenous businesses, and contractors regarding the goods and services needed to carry out the projects. At the same time, the Fonds du Plan Nord aims to finance strategic infrastructure and social, economic, and environmental measures for the development and protection of the territory.

The Plan aims to enhance the economic potential of the territory while seeking to protect 50% of it by 2035 (Gouvernement du Québec, 2011 and 2015). It also aims to improve the quality of life of northern communities, notably through enhanced support for community planning and structuring, the promotion of education and training, the advancement and recognition of cultural development, and support for families and seniors.

More recently, the Government of Québec released the Northern Action Plan 2023–2028, which builds on the Plan Nord and serves as an updated operational framework. Coordinated by the Société du Plan Nord, this action plan is intended to address the specific economic, social, and environmental development challenges of the territory located north of the 49th parallel. It provides for total investments exceeding $2.5 billion over a five-year period, involving more than 25 government ministries and agencies.

The Northern Action Plan is structured around major orientations that include improving connectivity and transportation and telecommunications infrastructure, strengthening northern economic sectors and the local benefits of major projects, supporting community vitality, and protecting the environment while promoting a transition toward less polluting energy sources. These orientations constitute a structuring framework within which development projects are carried out.

La Grande Alliance

Signed in February 2020, La Grande Alliance is a memorandum of understanding aimed at increasing collaboration between the Cree Nation and the Quebec government to connect, develop, and protect the territory. The agreement provides for investments to improve and develop transportation infrastructure (roads, railway, and deep-water port), as well as the electrification of some projects and the protection of part of the territory to safeguard its environmental uniqueness and the traditional activities and sites located there. The proposed projects will be developed in three distinct phases over a 30-year period (Radio-Canada, 2020 and 2021).

Species at Risk Act (federal) and Act respecting threatened or vulnerable species (provincial)

Adopted in 2002, the main objective of the Species at Risk Act is to prevent the disappearance of Canada's wildlife species by providing for the recovery of those species that no longer exist in the wild in Canada (extirpated), that are endangered, or that are threatened as a result of human activities. It also manages species of special concern to prevent them from becoming endangered or threatened species. As of November 2025, a total of 23 extirpated species, 291 endangered species, and 146 threatened species are listed in Schedule 1 of the Act (Government of Canada, 2025b).

Adopted in 1989, the objective of the Act respecting threatened or vulnerable species is to:

- prevent the disappearance of species living in Quebec;
- prevent a decline in the population of wildlife or plant species designated as threatened or vulnerable;
- ensure the conservation of habitats of species designated as threatened or vulnerable;
- restore populations and habitats of species designated as threatened or vulnerable;
- prevent any species from becoming threatened or vulnerable.

This law allows the government to establish a list of species that may be designated as threatened or vulnerable, implement programs and activities to assess the status of species, determine the characteristics of the habitats of designated species, and implement appropriate protection measures (Ministère des Ressources naturelles et de la Faune, 2010). As of November 2025, a total of 86 plant species and 64 wildlife species are designated as threatened or vulnerable, and 422 plant species and 115 wildlife species are likely to be designated as threatened or vulnerable (MELCCFP, 2025i).

Woodland Caribou Recovery Plan

The Woodland Caribou Recovery Plan was created in 2005 following the work of a recovery team established in 2003 and the recommendation of Quebec's advisory committee on threatened or vulnerable wildlife species (CAEFMVQ), which led the Government of Quebec to grant woodland caribou vulnerable species status under the Act respecting threatened or vulnerable species (Woodland Caribou Recovery Team, 2013). The first Plan covered the period from 2005 to 2012 and was replaced in May 2013 by a new Recovery Plan covering the period 2013–2023.

The main goal of the recovery plan is to enable woodland caribou to return to a satisfactory status throughout their range so that they can be removed from the list of threatened or vulnerable species. To achieve this, four main objectives have been defined, namely:

- conserve habitats suitable for woodland caribou;
- attain and maintain a population of at least 11,000 woodland caribou (1.7 caribou per 100 km²), distributed evenly throughout the Plan's area of application;
- obtain public support and the involvement of First Nations and stakeholders in the territory;
- continue acquiring knowledge.

A total of 30 actions divided into 11 measures have been planned to achieve these objectives.

9.3 Cumulative impact assessment

9.3.1 Surface water quality

The cumulative impact assessment for surface water is addressed in conjunction with the Aquatic fauna and habitat VEC, as both VECs address the same cumulative aspects and impacts.

9.3.2 Aquatic wildlife (fish) and habitat

The assessment of cumulative impacts on aquatic fauna (fish) and habitat refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.2.1 Baseline conditions

The area under consideration for establishing the reference state of aquatic wildlife and habitat encompasses two secondary watersheds within the primary watershed of the La Grande River: those of the La Grande A and Pontois Rivers. This area includes a number of facilities and infrastructure concentrated in its northern half, on either side of the Trans-Taiga Road. The main facility is the LG-4 power plant and its associated infrastructure (dam, power plant, dikes, substation, work camp, various buildings, etc.), located on the northeastern edge of the area in question. Power line corridors are also present and extend westward from Substation LG-4 to the Lemoyne substation, located west of the 50 km study area under consideration. Lastly, still in connection with the LG-4 power plant, there is an airport south of the Trans-Taiga Road, about ten kilometres southwest of the power plant. In addition to these facilities and those associated with the mining project, the area in question includes a few camps, borrow pits, and telecommunications towers. Despite the presence of these facilities and infrastructure, the vast majority of the area remains unoccupied and is characterized by a high density of bodies of water and watercourses, the main features of which are a section of the La Grande River and Lac de la Corvette.

The water quality sampling campaign conducted in the water bodies within the biophysical LSA revealed a slightly acidic pH (average pH of 6 to 6.5), good oxygenation of surface waters, and, in general, low biological productivity. The main exceedances observed in surface water samples were for pH, dissolved oxygen, and certain total extractable metals, notably aluminum, iron, and mercury. A few instances of exceedances of fluoride and zinc concentrations were also observed. The metals with the highest exceedances were aluminum (CWQG) and mercury (CPC [EO], CPC [O], and CFTP). These exceedances are likely related to the local geology and rock composition of the region. Lastly, samples taken from the reference lake located to the northwest outside the biophysical LSA also exceeded quality criteria for pH, dissolved oxygen, and aluminum.

A total of ten fish taxa were recorded in the biophysical LSA. Some occurrences were identified at the species level, while others were identified only at the genus or family level. The fish recorded in the inventory that have not been identified at the species level belong to the Cottidae, Salmonidae, Cyprinidae, and Catostomidae families (Table 9-5).

Table 9-5 List of fish species recorded in the biophysical LSA (Niigaan, 2025)

Common name	Scientific name	Code	English name	Cree name	Guild
Sculpin sp.	Cottidae sp.	COSP	Sculpin	-	Phyto-lithophilic
Whitefish sp.	Coregonus sp.	CRSP	Whitefish	-	Lithophilic
Cyprinid sp.	Cyprinidae sp.	CYPR	Cyprinids	-	Phyto-lithophilic
Northern pike	Esox Lucius	ESLU	Northern pike	Cinusew	Phytophilic
Lake whitefish	Coregonus clupeaformis	COCL	Lake whitefish	Atihkamek	Lithophilic
Burbot	Lota lota	LOLO	Burbot	Miyâhkatuw	Lithopelagophilic
Round whitefish	Prosopium cylindraceum	PRCY	Round whitefish	-	Lithophilic
White sucker	Catostomus commersoni	CACO	White sucker	Namepiy	Lithophilic
Longnose sucker	Catostomus catostomus	CACA	Longnose sucker	-	Lithophilic
Sucker sp.	Catostomus sp.	CASP	Sucker	-	Lithophilic
Lake chub	Couesius plumbeus	COPL	Lake chub	-	Lithophilic
Pearl dace	Margariscus margarita	MAMA	Pearl dace	-	Lithophilic
Char sp.	Salvelinus sp.	SLSP	Char	-	Lithophilic
Brook trout	Salvelinus fontinalis	SAFO	Brook trout	Mâsamek	Lithophilic
Lake trout	Salvelinus namaycush	SANA	Lake trout	Namekuss	Lithophilic

It should be noted that no rare, threatened, or vulnerable species have been recorded in the biophysical LSA or within a 10-kilometre radius of the project site. No invasive alien species were detected.

Niigaan has identified a total of 140 bodies of water and 390 potential watercourses or streams within the biophysical LSA. Of these, several were not selected for sampling because the characteristics observed suggested low or even no potential for fish habitat. In the end, 136 bodies of water and 202 watercourses were sampled to determine whether they contained fish habitat. The results indicate that 76 bodies of water and 126 watercourses serve as fish habitats, while three bodies of water and 56 watercourses have the potential to serve as fish habitats.

Benthic inventories revealed considerable variability in the structure of benthic communities and several instances where high organism density, significant taxonomic richness, and indicators of diverse and well-distributed communities were confirmed. From a taxonomic point of view, arthropods dominate most stations, mainly represented by chironomids, followed by mollusks (bivalves and gastropods).

9.3.2.2 Historical trends

The area under consideration for the cumulative impact assessment (a 50-kilometre radius around the mine site) overlaps with a territory in which the northern third has undergone significant changes to aquatic habitats attributable to the development of the La Grande hydroelectric complex. This development, which took place mainly during the 1970s and 1980s, involved the construction of dams and dikes to create large reservoirs, resulting in significant changes to the hydrological regimes in the La Grande River watershed. In addition to these physical disturbances, a mercury contamination issue has arisen as a result of the decomposition of trees that were cut down and left at the bottom of the reservoirs. Although mercury concentrations have now returned to levels comparable to those found in nature, Hydro-Québec continues to monitor mercury levels in the flesh of fish consumed by Indigenous communities (Hydro-Québec, 2002).

The community of Chisasibi is the community most affected by Hydro-Québec projects. Eight of the eleven dams are located on their traditional territory. Their traplines were impacted by flooding and it resulted in major environmental changes and impacts on the land users' way of life. The fish tastes differently in the reservoirs, the river doesn't freeze anymore and there is often a mist over it.

In the immediate vicinity of the project—that is, in the area surrounding the biophysical LSA—there had been little or no change attributable to human activities prior to the start of project-related exploration activities. However, the facilities planned for the project involve diverting a portion of the surface water and discharging mine effluent into Watercourse CE11, which flows into Watercourse CE15 and Lake L27, both of which are considered fish habitats.

With regard to the quality of aquatic habitats, a characterization study was conducted on watercourses and bodies of water that will and will not be exposed to mine effluent. In general, components of the aquatic environment that will not be exposed to the mine effluent exceed several provincial and federal standards for aluminum, iron, mercury, zinc, and fluorides. In addition, these bodies of water and watercourses have dissolved oxygen levels below the federal standard (CWQG) and a pH below the optimal range. For aquatic components that will be exposed to the mine effluent, issues similar to those observed in reference environments have been noted. However, these components are also affected by the presence of copper, which was detected at a sampling station.

Given the physicochemical characteristics of the proposed mine effluent, the implementation of a water treatment system that complies with regulatory requirements, and the planned management measures, it is anticipated that the discharge of mine effluent could cause localized changes in water quality in the receiving aquatic environments, primarily in the immediate vicinity of the discharge point. The parameters most likely to be affected include certain dissolved metals, suspended solids, and general physicochemical conditions (pH, dissolved oxygen). However, treatment of the mine effluent prior to discharge will ensure that concentrations downstream of the discharge point remain in compliance with provincial and federal criteria for the protection of aquatic life. Thus, although measurable deviations from baseline conditions may be observed, the anticipated effects of mine effluent discharges on the quality of aquatic habitats and fish habitats are expected to be low.

9.3.2.3 Significant projects, activities, or events

Significant projects, activities, or events that could have a cumulative impact on aquatic wildlife and habitats in conjunction with the project are those that could affect, within a 50-kilometre radius of the project, one of the two main watersheds involved in the project: those of the La Grande and Pontois rivers. These include the following:

- mining exploration activities.

- operational activities of the borrow pits located on either side of Trans-Taiga Road.
- operations and maintenance activities at the La Grande-4 facility.
- maintenance work at the LG-4 and Tilly substations, as well as on the lines connecting these substations to the Lemoyne substation (to the west) and the Laforge substation (to the east).
- any maintenance work on the Trans-Taiga Road.
- operations and maintenance activities associated with LG-4 Airport;
- operation of the LG-4 landfill site.
- the effects of some forest fires.

9.3.2.4 Cumulative impacts

The project's impacts on aquatic wildlife (fish) and habitats that could result in cumulative effects when combined with other projects, activities, or events include the loss of aquatic habitat (the partial drainage of Lake L01, the diversion of surface water altering flow rates in some water bodies and watercourses) and the introduction of a treated effluent into the aquatic environment. Among the selected projects, only exploration activities and forest fires are likely to cause similar disturbances to the aquatic components of the watersheds associated with the project. Aquatic habitat loss due to mining exploration and forest fires is unlikely. However, they can be a source of contaminants (hazardous materials, the introduction of suspended solids, and changes in pH due to ash deposition) that can reach water bodies and watercourses. However, the likelihood that these effects will occur in the same watersheds as those affected by the project is low. Taking these various factors into account, a low-intensity effect, of local extent, and of short to medium duration is anticipated for this VEC, primarily in connection with mineral exploration activities. This results in a cumulative impact of low significance.

9.3.2.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for aquatic fauna (fish) and habitat. Note also that an important fish habitat compensation program is planned as detailed in Chapter 14.

9.3.3 Wetlands and water environments

The assessment of cumulative impacts on wetlands and water environments refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.3.1 Baseline conditions

In the biophysical LSA, wetlands cover 2,430 ha, or 11.8% of the area, and consist of eight types of groupings. Among all wetland types, wooded ombrotrophic bogs and open ombrotrophic bogs are the most prevalent, covering 1,548 hectares, or 63.7% of all wetlands in the area. In addition to these two groups, the biophysical LSA includes open (177 ha) and wooded (67 ha) fens, shrub (245 ha) and treed (372 ha) swamps, ponds and shallow waters (15 ha), and marshes (6 ha).

Wetlands in the area of the mine site are distributed throughout the biophysical LSA, with a higher concentration to the northeast of Stockpile 02 and to the southwest of the open pit. There is another area with a concentration of wetlands, bounded on the east by the access road to the mine site and on the west by the power line. These habitats are also relatively abundant along the power line from the mine site to roughly where LG-4 airport is located. Further on, up to the Tilly substation, wetlands are less common along the power line, with the exception of the area near and at the intersection with the Trans-Taiga Road.

9.3.3.2 Historical trends

To date, only 4% of the wetlands characterized in the biophysical LSA had been disturbed by human activities (roads, partial logging, drainage), while approximately 11% had been disturbed by natural causes, such as recent forest fires (10%), or by beaver activity (1%). However, it is certain that within the 50 km spatial scope defined for this VEC, other human and natural disturbances have occurred, particularly in connection with the development of various facilities at the La Grande-4 Hydroelectric Complex, the construction of LG-4 Airport, power line corridors, and substations, the construction of the Trans-Taiga Road, the borrow pits located on both sides of the road, and various forest fires that occurred in this area.

The project will encroach on 104.7 hectares of wetlands and 15.5 hectares of aquatic environments, for a total of 120.2 hectares.

9.3.3.3 Significant projects, activities, or events

Significant projects, activities, or events that could have a cumulative impact, when combined with the project, on wetlands and water environments are those located within a 50-kilometre radius of the project. These include the following:

- mining exploration activities.
- operational activities of the borrow pits located on either side of Trans-Taiga Road.
- operations and maintenance activities at the La Grande-4 facility.
- maintenance work at the LG-4 and Tilly substations, as well as on the lines connecting these substations to the Lemoyne substation (to the west) and the Laforge substation (to the east).
- any maintenance work on the Trans-Taiga Road.
- operations and maintenance activities associated with LG-4 Airport;
- the operation of the LG-4 landfill.
- The effects of some forest fires.

9.3.3.4 Cumulative impacts

Among the selected projects, only exploration activities and forest fires are likely to cause additional wetland loss. Mining exploration is relatively extensive within the 50 km zone, while the unpredictability of forest fires makes it difficult to predict a cumulative effect. Taking these various factors into account, an effect of moderate intensity, local extent, and medium duration is anticipated for this VEC, primarily in relation to mining exploration activities. This results in a cumulative impact of moderate significance.

9.3.3.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for wetlands and water environments. Note that an important wetland compensation program is planned for the project as detailed in Chapter 14.

9.3.4 Wildlife species of special status

The assessment of cumulative impacts on wildlife species of special status refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

The species of special status selected for cumulative impact assessment are those confirmed to be present during inventories carried out in the project study area in 2023, 2024, and 2025 (WSP, 2025). A total of 18 wildlife species of special status were confirmed as present, including 11 bird species (golden eagle, common nighthawk, peregrine falcon, red crossbill [*percna* subspecies], evening grosbeak, short-eared owl, bank swallow, olive-sided flycatcher, lesser yellowlegs, bald eagle, and rusty blackbird), one large mammal (woodland caribou), five bat species (little brown bat, northern long-eared bat, silver-haired bat, hoary bat, and eastern red bat), and one small mammal (southern bog lemming).

It should be noted that, in addition to the five bat species and the bat species complex of special status, the big brown bat—which does not have any special status—was also recorded at the site during the inventories. Since this is the only bat species without a special status and its ecological characteristics are similar to that of the other species, the potential impacts on this species are also discussed in this section.

9.3.4.1 Baseline conditions

Large wildlife and other mammals

Of the large wildlife species found in the area, only the woodland caribou is protected under both provincial and federal laws. The biophysical RSA is located in the northeastern portion of the James Bay Sector, a knowledge-gathering area for woodland caribou. This population is characterized by a scattered distribution, low density, and limited knowledge of its population dynamics.

Knowledge-gathering initiatives have been carried out in recent years to document the presence and abundance of woodland caribou in the James Bay Sector. During a survey conducted in 2020, 82 individuals, divided into small groups, were observed in the western sector of the survey area, which encompasses the biophysical RSA. After adjusting for detection rates, the total abundance was estimated at approximately 166 caribou for the West James Bay Sector, and the average density at approximately 0.17 caribou per 100 km² (Szor and Gingras, 2020). During another survey conducted in 2023 by Niigaan, no woodland caribou were observed. These results suggest that woodland caribou make little use of the biophysical RSA.

Furthermore, no telemetry tracking data for woodland caribou fitted with telemetry collars has been reported within the biophysical RSA for the period 2004–2024. However, this lack of data does not completely rule out the possibility that the area is being used, given the small proportion of individuals being tracked via telemetry in this region.

A few opportunistic caribou sightings were reported in 2025 near the exploration camp and along the Trans-Taiga Road, including a group of approximately 30 individuals observed in the spring. However, uncertainty remains regarding the ecotype of these observed individuals, particularly for observations made in the spring, given that telemetry tracking data compiled between 2004 and 2024 showed that migratory caribou from the Leaf River herd used the biophysical RSA between October and May.

An analysis of the disturbance rate of woodland caribou habitat within the biophysical RSA reveals a high level of disturbance, primarily attributable to forest fires. Although ongoing anthropogenic disturbances remain relatively limited within the biophysical RSA, the high proportion of natural disturbances reduces the availability and connectivity of high-quality habitats, contributing to a regional situation that is unfavourable for maintaining a self-sustaining population of woodland caribou. Although current knowledge does not provide a clear picture of the population trend for woodland caribou in this area, the likelihood of stable or increasing numbers could be relatively high (ECCC, 2024). According to a recent assessment of the vulnerability of woodland caribou populations in Quebec, the population in the James Bay Sector faces a “moderate to very high risk of extinction” (MELCCFP, 2026a).

The only species of small mammal of special status that has been recorded is the southern bog lemming. This species was captured in three areas of the biophysical LSA where inventories of small mammals were conducted. A higher abundance was observed in the western pit area, characterized by the presence of lichen tundra, as well as in the northern part of the biophysical LSA, where a variety of habitats—including peatlands and water bodies—appears to favour its presence. However, this species was less common in the central area, which was dominated by regenerating stands, suggesting that this type of habitat is less favourable to the species. Although it was not detected during the 2023 inventory in the biophysical LSA, the rock vole (*Microtus chrotorrhinus*)—another species that could be classified as threatened or vulnerable—is likely to be present there, as its preferred habitat is presumably found in the area. Therefore, this species should be considered potentially present. Although these two species are found throughout much of the province, they are closely associated with quite specific habitats and are therefore relatively rare within their range (Desrosiers et al., 2012; Gouvernement du Québec, 2025).

Chiropterans

A total of five bat species and species complexes of special status were recorded within the biophysical LSA during fixed-point acoustic surveys conducted between 2023 and 2025, including bats of the *Myotis* genus, the northern long-eared bat, the silver-haired bat, the hoary bat, and the red bat. The *Myotis* genus includes the northern long-eared bat and the little brown bat, both of which are species of special status. It should be noted that the big brown bat has also been recorded, but this species does not have a special status.

Of all the species recorded at the site, the hoary bat stands out for its abundance: up to 91% of the recordings are of this species. Other species have been recorded only sporadically, particularly during the breeding season. Overall, the activity levels recorded for the various bat species were very low (fewer than one sighting per night per station across all years and periods), despite a significant survey effort.

It should be noted that field surveys did not identify any hibernacula or maternity roosts. However, the presence of maternity roosts in the biophysical local study area remains a possibility. The study area of the local biophysical environment has numerous snags, and several species of bats regularly change their summer roosts using a network of sites in the same area (ECCC, 2018; ERCSQ, 2019). It is therefore possible that the sites inspected were used by chiropterans at another time, or that areas containing several snags that are less suitable were used preferentially.

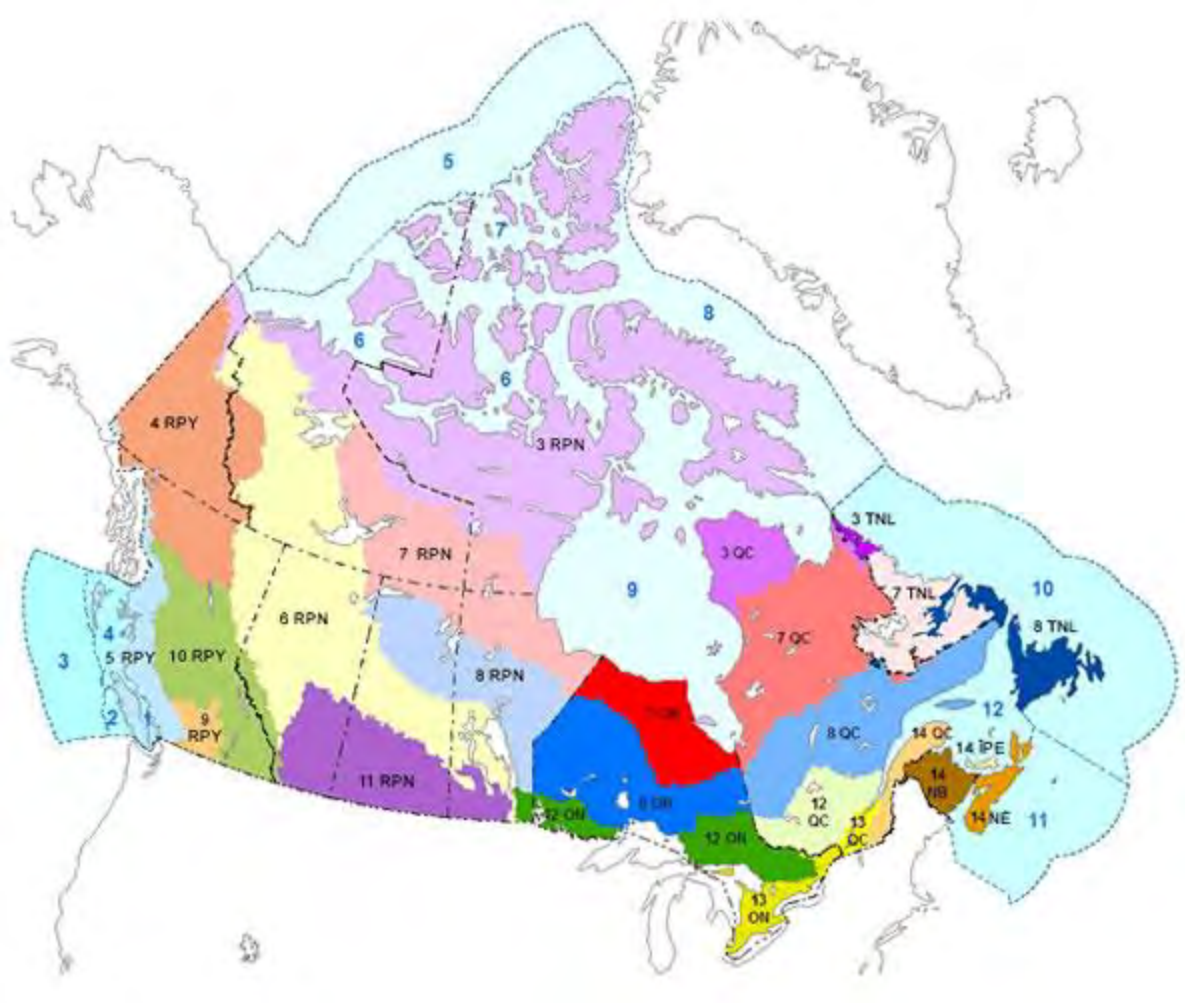
Avian fauna

A total of fifteen species of special status are potentially present in the biophysical LSA. Of these species, eleven were identified during inventories conducted from 2023 to 2025. Six of these species have the potential to nest in the biophysical LSA: the short-eared owl, the lesser yellowlegs, and the bank swallow, each of which has been recorded on a few occasions, as well as the rusty blackbird, the olive-sided flycatcher, and the common nighthawk, which have been observed frequently. For the other species, their potential to nest was ruled out due to their range, the absence of breeding-related behaviour, the lack of suitable nesting habitats, or the fact that historical records or inventory data were collected outside the breeding season.

The information presented below has been compiled for species of special status that are likely to nest to establish a quantifiable reference state of their use of the biophysical LSA. Several occurrences of short-eared owls have been recorded, including one report of probable nesting, where a pair was observed on several occasions in suitable habitat. As for the lesser yellowlegs, no signs of nesting or presence during the breeding season were observed in the biophysical LSA, but potential habitats for this species have been identified, and some will be affected by the project. An active colony of bank swallows has been confirmed, comprising approximately 30 to 35 occupied cavities and at least 14 adults. The common nighthawk has been consistently detected, with 42 individuals observed during twilight surveys at 18 of the 24 stations visited in 2024 and 14 individuals at 10 of the 15 stations visited in 2025. For land birds whose density was calculated using point counts in 2024 (the year with the highest number of stations sampled), the olive-sided flycatcher had a density of 0.5 indicated pairs per hectare across all habitat types, while the rusty blackbird had a density of 3.3 indicated pairs per hectare.

Bird Conservation Regions (BCRs) are ecologically distinct regions in North America with similar bird communities, habitats, and resource management approaches (Birds Canada and NABCI, 2014). They are delineated by the Commission for Environmental Cooperation (CEC) and are based on a flexible-scale hierarchical framework of nested ecological units.

The project is located in BCR 7, which is associated with the Taiga Shield and the Hudson Plains. The establishment of the reference status for the six selected species is therefore based on data from BCR 7, which were analyzed for the geographic analysis level covering the Taiga Shield and the Hudson Plains on the Canadian scale (Figure 9-1).



Source: EC, 2017

Figure 9-1 Bird Conservation Regions (BCRs) in Canada

For each of the selected species, the annual index is presented in Table 9-6 for the years 1970, 2016, and 2023. The index recorded in 2023 is still lower than that of 1970, indicating a potential decline in the populations of these species.

Table 9-6 Annual index of abundance of bird species of special status for the BCR 7 in Canada for the reference year (1970), 2016, and 2023

Species	Annual index[1]		
	1970	2016[2]	2023[3]
Common nighthawk	0.16	0.05	0.06
Short-eared owl [4]	n/a	n/a	n/a
Bank swallow	2.03	1.87	1.40
Olive-sided flycatcher	1.50	0.87	0.81
Lesser yellowlegs	7.93	2.19	1.79
Rusty blackbird	12.40	1.71	1.46

Notes: 1 Indicates the estimated average abundance along the transects of the Breeding Bird Survey (BBS) long-term monitoring program for breeding bird populations, as recorded by an average observer during a given year.
2 2016 corresponds to a period prior to the first drilling operations carried out by PMET.
3 The most recent year that reliable data is available for BCR 7 is 2023.
4 Insufficient data for the analysis of annual indices.
n/a Not applicable.
Source: Smith et al., 2025

9.3.4.2 Historical trends

Large wildlife and other mammals

On the Quebec scale, the woodland caribou experienced a marked and prolonged decline during the 20th century (Courtois et al., 2003). Historical data indicate varying population densities, ranging from nearly 7 caribou per 100 km² (e.g., 6.67 caribou per 100 km² in the Praslin-Betsiamites area in 2006) to less than 0.5 caribou per 100 km² (e.g., 0.21 caribou/100 km² north of Saguenay–Lac-Saint-Jean in 2004). Since the 2010s, estimated densities have more frequently been less than 2 caribou per 100 km², although some populations have higher densities, reaching more than 3 caribou per 100 km² (e.g., 6.29 caribou per 100 km² north of the Manicouagan Reservoir). For woodland caribou populations that have been surveyed at least twice, the trend is generally toward a decline in abundance and density (MFFP, 2021). On the Quebec scale, recent surveys suggest that the population of woodland caribou ranges between 6,800 and 8,900 individuals (MELCCFP, 2026a).

Population studies indicate that several local populations of woodland caribou in Quebec have annual survival rates for adult females below the 85% threshold required for stability, as well as recruitment rates below the threshold of 28.9 calves per 100 females, which contributes to the overall downward trend (Courtois et al., 2003; MFFP, 2021; MELCCFP, 2026a).

On the scale of the James Bay Sector, survey results suggest a very low density of woodland caribou. In 2020, the estimated average density for the entire surveyed area was approximately 0.55 caribou per 100 km², but the distribution of individuals was heavily skewed toward the eastern sector of the survey area, while the western sector showed sparse and discontinuous occurrence (Szor and Gingras, 2020). In 2001, a survey conducted in the southwestern part of James Bay indicated a significantly higher density of 3.5 caribou per 100 km² (Paré and Jourdain, 2002), suggesting a marked decline in caribou abundance in that area.

There is little data available on the two species of small mammals of special status whose presence in the region has been confirmed or is suspected: southern bog lemming and the rock vole (Gouvernement du Québec, 2025). Available data suggest that southern bog lemming populations experience significant fluctuations in population size from year to year (Desrosiers et al., 2012), as is the case for most species of small mammals (Hanski, 2001; Korpimäki, 2005). The rock vole, on the other hand, is rarely captured and has been recorded only in low densities in Quebec (Desrosiers et al., 2012; Gouvernement du Québec, 2025). It is therefore not possible to identify historical trends for these two species.

Chiropterans

Information concerning chiropterans in the Nord-du-Québec region is too scarce and fragmentary to define historical trends for the populations of the various species. Only the data from the *Réseau québécois d'inventaire acoustique de chauves-souris*, the Quebec network of acoustic bat inventories (the Network), published in the CHIROPS newsletter (Desrosiers and Berthiaume,2024), provide annual monitoring data for the city of Chibougamau from 2003 to 2020. However, the number of observations is too small to make a meaningful comparison of relative abundances from one year to the next. Furthermore, it is known that, as a result of climate change, several bat species are experiencing a northward expansion of their range (Festa et al., 2023), although data are currently lacking to assess this trend in Quebec.

The main factor affecting chiropteran population trends is undoubtedly the emergence of white-nose syndrome (WNS), first identified in Quebec in 2010 (U. S. Fish and Wildlife Service, 2025; RCSF, 2026) and observed since the winter of 2011–2012 in the Nord-du-Québec region up to Chibougamau (U. S. Fish and Wildlife Service, 2025; RCSF, 2026). WNS has indeed caused significant mortalities (more than 90% of known populations) in resident bat populations, particularly among species of the *Myotis* genus (U. S. Fish and Wildlife Service, 2025).

The effects of human development projects on bat populations are mainly associated to habitat loss (Tremblay and Jutras, 2010). In northern Quebec, several development projects have resulted in the alteration or loss of bat habitat, even though these projects are very localized. Whether they involve infrastructure and service projects (e.g., the construction of the La Grande hydroelectric complex [see Section 9.3.2.2] or mining projects [e.g., the James Bay-Galaxy lithium mine project], all involve clearing and encroachment on wetlands, which are potential sources of bat habitat loss and alteration. These projects are also associated with the creation of roads and/or power transmission corridors that also contribute to these habitat losses, but may also be sources of positive effects for chiropterans. In fact, when moving from one site to another, bats generally use linear forest structures for guidance, such as road or power line rights-of-way (Grindal and Brigham, 1998; Henderson and Broders, 2008). Forest edges are also potential feeding sites for several species (ERCSQ, 2018).

In addition, several forest fires also occurred within the spatial boundaries considered for cumulative impacts, particularly in 2023, affecting large areas of forest habitat, some of which likely served as potential habitats for bats. It should be noted that clearing activities, as well as forest fires, also contribute to fragmentation of forest habitats and result in the creation of linear features that will be used by some chiropteran species (ECCC, 2018).

In 2012, noting the mass mortality of bats caused by WNS, COSEWIC recommended endangered status for three bat species: tri-coloured bat, little brown bat, and northern long-eared bat. This status was reviewed and confirmed in November 2013 (COSEWIC, 2014), and these species were subsequently added to Schedule 1 of SARA on December 17, 2014 (Government of Canada, 2014). The little brown bat and the northern long-eared bat had no special provincial or federal status until then. Since 2023, these three species have also been added to Quebec's list of threatened species (Gouvernement du Québec, 2025).

In 2023, COSEWIC recommended that the three species of migratory bats—the silver-haired, hoary, and red bats—be classified as “endangered” (COSEWIC 2023). Although there is little data on population status and exact decline rates, migratory species face several threats, the most significant of which is mortality in wind farms (COSEWIC 2023). At this time, these three species have not been added to Schedule 1 of the SARA (Government of Canada, 2026). In Quebec, the hoary bat and the silver-haired bat are likely to be designated as threatened or vulnerable, while the red bat is considered vulnerable (Gouvernement du Québec, 2025).

In conclusion, due to the lack of specific data on regional population dynamics, there is no clear trend for the study area considered. We can therefore only assume that the populations there have declined in a similar way to the rest of Quebec, since the main cause appears to be WNS. Habitat loss is also a major concern for bats, although in northern Quebec, disturbances generally remain localized. Furthermore, climate change could lead to shifts in community composition and changes in the relative abundance of certain species, but there is still insufficient data to identify a trend.

Avian fauna

As with the reference state, the data compiled for BCR 7 were used to describe the historical trends of the six selected species. Since data for BCR 7 covering only Quebec are not available, data for the entire BCR 7 region were used. It should be noted that there was insufficient data on the short-eared owl to allow for analysis.

Thus, long-term population trends in BCR 7 show a certain decline. In fact, historical trends assessed since 1970 show that numbers have declined for all bird species included in the cumulative impact assessment. However, in the short term, the trends appear to be more favourable. In fact, common nighthawk populations are showing an increasing trend. In addition, the downward trend observed in the bank swallow, the olive-sided flycatcher, and the rusty blackbird is less pronounced. Only the trend for lesser yellowlegs populations remains virtually unchanged in both the short and long term, i.e., they are declining.

Data on population sizes available for the entire BCR 7 region in Canada indicate that this region is home to 300,000 common nighthawks, 5,100 short-eared owls, 82,000 bank swallows, 110,000 olive-sided flycatchers, and 4,600,000 rusty blackbirds, representing 1.30%, 0.22%, 0.28%, 5.79%, and 67.65% of the total numbers of these overall populations, respectively (PIF, 2020; Table 9-7). Therefore, the majority of the common nighthawk breeding population is located in BCR 7. On the Quebec scale, 32.35% of the overall population of the rusty blackbird is found in BCR 7.

As for the short-eared owl, trends are difficult to estimate given the scarcity of data. Overall, however, the various sources agree that there has been a marked and widespread decline in the population, despite uncertainty regarding the exact extent of this decline. The best estimates indicate that the Canadian population consists of approximately 31,000 mature individuals, and that the species has experienced significant declines, ranging from 70% to 79% since 1970, as well as around 30% over the past three generations (COSEWIC, 2021).

For the lesser yellowlegs, although the population estimation method used on the BCR scale does not include shorebirds (PIF, 2020), the overall population is estimated at a minimum of 527,000 mature individuals, of which approximately 80%, or nearly 422,000, nest in Canada (COSEPAC, 2020).

Table 9-7 Population trends of bird species of special status that are likely to nest in the RSA

Species	Population (number)			Proportion of the population		Annual population trend (%)	
	BCR 7-Quebec	BCR 7-Canada	Overall	BCR 7-Quebec/Overall	BCR 7-Canada/Overall	BCR 7-Canada	
						Short term	Long term
Common nighthawk	n/a	300,000	23,000,000	n/a	1.30 %	-3.87	-1.65
Short-eared owl [1]	n/a	5,100	2,300,000	n/a	0.22 %	n/a	n/a
Bank swallow	45,000	82,000	29,000,000	0.16 %	0.28 %	-2.04	-5.86
Olive-sided flycatcher	42,000	110,000	1,900,000	2.21 %	5.79 %	-0.75	-1.20
Lesser yellowlegs[2]	n/a	n/a	660,000	n/a	n/a	-2.81	-2.77
Rusty blackbird	2,200,000	4,600,000	6,800,000	32.35 %	67.65 %	-2.35	-3.95

Notes: 1 Insufficient data for the analysis (n/a)
2 Population estimates were calculated only for land birds (n/a)
n/a Not applicable
Sources: Smith et al., 2025; PIF, 2020; ECCC and Birds Canada, 2024

9.3.4.3 Significant projects, activities, or events

Significant projects, activities, or events that could have a cumulative impact, in conjunction with the project, on wildlife species of special status are those located within a 50-kilometre radius of the project. These include the following:

- Mining exploration activities;
- The operational activities of the borrow pits located on either side of Trans-Taiga Road.
- Operations and maintenance activities at the La Grande-4 facility.
- Maintenance work at the LG-4 and Tilly substations, as well as on the lines connecting these substations to the Lemoyne substation (to the west) and the Laforge substation (to the east).
- Any maintenance work on the Trans-Taiga Road;
- Operations and maintenance activities associated with LG-4 Airport;
- The operation of the LG-4 landfill site;
- The effects of some forest fires;
- White-nose syndrome (WNS).

9.3.4.4 Cumulative impacts

The project's effects on wildlife species of special status—which could result in cumulative impacts when combined with the effects of other projects, activities, or events—relate to three main aspects: the loss and fragmentation of existing habitats (vegetation clearing and site grading), disturbance of their activities in the area (noise, dust, and light), and, to a lesser extent, the risk of habitat degradation (accidental spills or leaks of contaminants).

Of the projects, events, and activities listed in the previous section, only mining exploration activities and forest fires are likely to contribute to habitat loss and fragmentation for the various wildlife groups under consideration.

With regard to the disruption of the activities of the species in question, all of the projects described above are likely to cause adverse effects, including WNS, which can harm the health of bats and even cause their death. It should be noted, however, that apart from mining exploration activities, forest fires, and WNS, other activities are located too far away (>5 km) from the project site for the nuisances they generate (related to site operations and maintenance) to have a cumulative effect with those generated by the project. With regard to forest fires, it appears that the largest fire near the project site occurred in 2012 and came within about 10 km to the southeast. The areas affected by the fire are currently undergoing forest regeneration.

Lastly, the risks of habitat degradation due to accidental spills or leaks of contaminants are associated with isolated incidents that are closely linked to the project's area of operations. The only activities that could potentially pose a contamination risk near the project site are those associated with mineral exploration.

Large wildlife and other mammals

The anticipated significance of the project's overall residual impact on woodland caribou and the southern bog lemming is moderate. Given that mining exploration activities in the area in question may have cumulative effects, as may past forest fires—the most recent of which occurred in 2012—and considering that the woodland caribou is very scarce and that habitats suitable for the southern bog lemming are relatively abundant, make it possible to anticipate a low-intensity effect, of local extent and medium duration. The resulting cumulative impact would therefore be of **low** significance.

Chiropterans

The anticipated significance of the project's overall residual impact on bats is moderate to low. Given that only the mining exploration activities taking place in the area in question are likely to have cumulative effects, and considering the most recent forest fires dating from 2012 (the extent of WNS in the region is unknown), the anticipated cumulative impacts will likely be negligible and will consist mainly of increased disturbance to bats in the vicinity of the project, as well as isolated losses and alterations to their habitat. Consequently, a low-intensity effect, of local extent and medium duration, is anticipated, resulting in a cumulative impact considered to be **low**. . Therefore, the project will not result in significant cumulative impacts on chiropterans.

Avian fauna

The anticipated significance of the project's overall residual impact on bird species of special status is moderate to low. Given that mining exploration activities in the area in question, as well as past forest fires—the most recent of which occurred in 2012—may have a cumulative effect on habitat loss and fragmentation, an effect of moderate intensity, local extent, and medium duration is anticipated, and a **moderate** cumulative impact is anticipated. As for disturbances associated with nuisances, only activities related to certain mining exploration sites located near the project are likely to have an effect of which the intensity is considered to be low, with local extent and medium duration, resulting in a cumulative impact of **low** significance.

9.3.4.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for wildlife species of special status

9.3.5 Terrestrial wildlife and wildlife habitats

The assessment of cumulative impacts on terrestrial wildlife and wildlife habitats refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.5.1 Reference state

Large wildlife and other mammals

The biophysical RSA overlaps the range of the Rivière-aux-Feuilles migratory caribou herd (RAFH). Although a few individuals from the Rivière George herd (RGH) have also used the biophysical RSA, the area was predominantly used by individuals from the RAFH during the 2004–2024 period.

The biophysical RSA is a potential wintering area for migratory caribou. Telemetry tracking data collected between 2004 and 2024 show that migratory caribou, primarily of the LRH, were present in the biophysical RSA between October and May, with marked year-to-year variations. The number of individuals that visited the biophysical RSA was highest in 2009, at 113. Starting in 2016, a significant decline in the annual number of individuals visiting the biophysical RSA has been observed, with the number ranging from 1 to 7 through 2024. However, it is important to note that individuals fitted with telemetry collars represent only a small proportion of the caribou population. The population density of migratory caribou is unknown.

For moose (*Alces alces*), an aerial survey conducted in 2023 in the biophysical RSA identified 27 individuals divided into 14 groups, corresponding to a low density of 0.23 moose per 10 km². The observed population structure (37% females, 41% males, and 22% calves) suggests a balanced composition in a northern context. In addition, within the biophysical LSA, four moose were observed near the access road (Niigaan, 2023).

No targeted survey of black bears (*Ursus americanus*) has been conducted in the study area, but the species is known to be present throughout the James Bay region. Historical regional estimates for Hunting Zone 22 indicate a density of approximately 0.20 bears per 10 km², although these values are based on indirect methods and are subject to a high degree of uncertainty (Lamontagne et al., 1999; Société de la faune et des parcs, 2003). The presence of black bears in the biophysical LSA is also confirmed by opportunistic sightings made during field surveys in the summer of 2022 (BBA, 2022).

No specific survey has been conducted for the grey wolf (*Canis lupus*) in the biophysical RSA. However, its presence in the James Bay region is constant and well documented. In 2002, wolf densities north of the 50th parallel were estimated to be between 0.3 and 0.5 wolves per 100 km² (Jolicoeur and Hénault, 2002).

With regard to small mammals, the survey conducted in 2023 to establish the project's reference state for wildlife (Niigaan, 2025) identified eight of the twelve species potentially present in the biophysical LSA. However, there is no data on population trends, particularly at this latitude. Small mammals are in fact known for the marked cyclical fluctuations in their populations, particularly as a result of predation (Hanski, 2001; Korpimäki, 2005).

Avian fauna (including migratory birds)

The various inventories conducted in 2023, 2024, and 2025 identified 114 species, including 25 species of waterfowl and other water birds, 9 species of shorebirds, 15 species of birds of prey, and 65 species of land birds. The total estimated density of land birds based on point count surveys was 3.7 indicated pairs per hectare across all habitats in 2024, and 3.5 in 2025. Based on an average of 3.6 indicated pairs per hectare, it is estimated that the biophysical LSA is home to 74,520 indicated pairs, including 4,320 in the project study area.

Bird Conservation Regions (BCRs) are ecologically distinct regions in North America with similar bird communities, habitats, and resource management approaches (Birds Canada and NABCI, 2014). They are delineated by the Commission for Environmental Cooperation (CEC) and are based on a flexible-scale hierarchical framework of nested ecological units.

The project is located in BCR 7, which is associated with the Taiga Shield and the Hudson Plains. Data from BCR 7 on the Quebec and Canadian scales were consulted to document the reference status of bird populations, particularly migratory birds. Bird populations in the Quebec portion of BCR 7 are estimated to number approximately 155 million individuals, based on assessments of 51 land species, representing an average of 5.39% of the overall population for all species (PIF, 2020). On the Canadian scale, there are an estimated 596 million birds in BCR 7 across the 105 land species analyzed, representing an average of 10.16% of the overall population for these species.

However, an analysis of population trends in the course of developing the bird conservation strategy for BCR 7 in the Quebec region highlights a major obstacle: a widespread lack of monitoring data, attributable to the vast expanse and limited accessibility to the territory. For example, 57% of priority species are assigned the "Assess/maintain" status due to a lack of sufficient information to clearly document their population trends. In total, 52 of the 54 priority species are identified as requiring critical improvements in our understanding, which underscores the fragmentary nature of the historical data available.

9.3.5.2 Historical trends

Large wildlife and other mammals

The LRH and GRH have experienced significant population fluctuations in recent decades. The LRH migratory caribou population experienced strong growth between the 1970s and the early 2000s, rising from approximately 56,000 individuals in 1975 to an estimated peak of 628,000 caribou in 2001, before entering a phase of sustained decline beginning in 2013 (Couturier et al., 2004; Taillon et al., 2016). According to the most recent data, the LRH population has been estimated at 136,000 caribou in 2025, representing a decline of approximately 78% since the population peak reached in 2001.

The GRH migratory caribou reached a population peak in the late 1980s and early 1990s, numbering approximately 800,000, before experiencing a significant decline in numbers beginning in 1993. In 2018, the population reached its lowest recorded level, with 5,500 caribou. In 2020, the population size was estimated at 8,100 caribou (Brodeur et al., 2022). According to the most recent data, the GRH population has been estimated to be 8,600 caribou in 2025, representing a decline of approximately 99% since the population peak reached in 1990.

In Quebec, moose populations grew significantly between the early 1990s and the late 2000s, roughly doubling to reach nearly 120,000 individuals in 2010. This expansion phase was followed by a slowdown in growth between 2004 and 2010, and a stabilization of populations in several hunting zones, particularly north of the St. Lawrence River (Lefort and Massé, 2015). On the Quebec scale, the moose population monitoring indicators recently published by the Quebec government suggest that the moose population is relatively stable (MELCCFP, 2026b).

According to the Quebec government, the black bear population in Quebec has been growing steadily since 1998. This increase is attributed to the species' high adaptability, increased food availability in managed landscapes, and prudent harvest management. The most recent estimates put the black bear population in Quebec at between 70,000 and 75,000 individuals, and trends are considered generally stable to slightly increasing, although they vary by region (Bédard, 2023).

Population trends for the grey wolf in Quebec are documented indirectly using harvest data (trapping and hunting) and provincial harvest reports. These data suggest that the grey wolf is present throughout most of Quebec north of the St. Lawrence River, and that its populations have remained generally stable for several decades, despite local fluctuations (MELCCFP, 2022).

Due to the lack of available data on small mammals at this latitude, and especially given the significant year-to-year fluctuations in their population sizes—primarily linked to predation and, more specifically, to the impact of specialist predators (Hanski, 2001; Korpimäki, 2005)—it is not possible to assess historical trends for the various species recorded or potentially present in the region.

Avian fauna (including migratory birds)

Due to a lack of data, general trends in the bird populations of BCR 7 remain difficult to assess, particularly on the Quebec scale. For many species, there is insufficient data to calculate trends.

On the Canadian scale, the report entitled "The State of Canada's Birds" (Birds Canada and ECCC, 2024) assesses 463 bird species regularly observed across the country. Of these species, 36% are declining, 31% are increasing, 21% are relatively stable, and 12% lack sufficient data to determine a trend. Despite some notable improvements in certain groups, several bird categories are experiencing marked and persistent declines, reflecting significant pressures on ecosystems across the country.

However, some groups are responding positively to conservation measures. Historical data show a cumulative increase of 46% for waterfowl, 35% for birds of prey, and 21% for wetland birds since 1970, reflecting the effectiveness of targeted strategies such as wetland restoration and the reduction of environmental contaminants (e.g., the ban on DDT).

In contrast, several guilds are experiencing severe and ongoing declines. Grassland birds are the most affected group, with a 67% decline in their populations since 1970, primarily due to agricultural conversion and widespread degradation of native grasslands. Shorebirds, many of which migrate across continents, have also seen a substantial decline of 42%. Aerial insectivores have shown a cumulative decline of 43%, consistent with the documented decline in insect populations and the intensification of agricultural practices. Despite a recent stabilization, current levels remain well below historical averages.

With regard specifically to migratory birds, long-distance migrants have experienced a marked population decline, with an estimated 29% decrease in their numbers since 1970. Short-distance migrants, which primarily migrate to the temperate regions of North America and Europe, show a more moderate decline of 12%. By comparison, resident species showed a net increase of 9% over the same period. These contrasting findings suggest that long-distance migration exposes the species in question to a range of additional environmental stresses, including habitat degradation outside Canada, the cumulative impacts of climate change, and an increase in human-induced threats along migration routes.

9.3.5.3 Significant projects, activities, or events

Significant projects, activities, or events that could have a cumulative impact on terrestrial wildlife and wildlife habitats in conjunction with the project are those located within a 50-kilometre radius of the project. These include the following:

- Mining exploration activities;
- The operational activities of the borrow pits located on either side of Trans-Taiga Road.
- Operations and maintenance activities at the La Grande-4 facility.
- Maintenance work at the LG-4 and Tilly substations, as well as on the lines connecting these substations to the Lemoyne substation (to the west) and the Laforge substation (to the east).
- Any maintenance work on the Trans-Taiga Road;
- Operations and maintenance activities associated with LG-4 Airport;
- The operation of the LG-4 landfill site;
- The effects of some forest fires.

9.3.5.4 Cumulative impacts

The project's effects on wildlife species and wildlife habitats—which could result in cumulative impacts when combined with the effects of other projects, activities, or events—relate to three main aspects: the loss and fragmentation of existing habitats (vegetation clearing and site grading), disturbance of their activities in the area (noise, dust, and light), and, to a lesser extent, the risk of habitat degradation (accidental spills or leaks of contaminants).

Of the projects, events, and activities listed in the previous section, only mining exploration activities and forest fires are likely to contribute to habitat loss and fragmentation for the various wildlife groups under consideration.

With regard to the disruption of the activities of the species in question, all of the projects described above are likely to cause nuisances. It should be noted, however, that apart from mining exploration activities and forest fires, other activities are located too far away (>5 km) from the project site for the nuisances they generate (related to site operations and maintenance) to have a cumulative effect with those generated by the project. With regard to forest fires, it appears that the largest fire near the project site occurred in 2012 and came within about 10 km to the southeast. The areas affected by the fire are currently undergoing forest regeneration.

Lastly, the risks of habitat degradation due to accidental spills or leaks of contaminants are associated with isolated incidents that are closely linked to the project's area of operations. The only activities that could potentially pose a contamination risk near the project site are those associated with mineral exploration.

Large wildlife and other mammals

The anticipated significance of the project's overall residual impact on migratory caribou, moose, black bears, grey wolves, and other mammals is moderate to low. Given that mining exploration activities in the area in question may have cumulative effects, as may past forest fires—the most recent of which occurred in 2012—and given that migratory caribou are scarce while other mammal populations in the area are stable,a low-intensity effect, of local extent and medium duration, is anticipated, resulting in a cumulative impact of **low** significance on this wildlife group.

Avian fauna

The anticipated significance of the project's overall residual impact on the avian fauna of the biophysical LSA is moderate to low. Given that mining exploration activities in the area in question, as well as past forest fires—the most recent of which occurred in 2012—may have a certain cumulative effect on habitat loss and fragmentation, an effect of moderate intensity, local extent, and medium duration is anticipated, resulting in a moderate cumulative impact. As for disturbances associated with nuisances, only activities related to certain mining exploration sites located near the project are likely to have an effect of low itensity, with local extent and medium duration. This results in a cumulative impact of **low** magnitude.

9.3.5.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for terrestrial wildlife and wildlife habitats.

9.3.6 Physical, psychological, and social health of the regional population (health, social, and economic conditions of Indigenous Peoples)

The assessment of cumulative impacts on the physical, psychological, and social health of the regional population refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.6.1 Baseline conditions

The overall health status of Cree communities is characterized by a lower life expectancy at birth than that of the Nord-du-Québec region and Quebec as a whole, but life expectancy begins to approach provincial averages starting at age 65 (WSP, 2026). The higher infant mortality rate is believed to be due to the lack of access to prenatal care, perinatal and postnatal care, and family support.

In terms of physical health, type 2 diabetes was a significant concern, as it affected more than 30% of the population. Cancer rates are similar to those in the rest of Quebec, with the most common types being kidney, lung (the most prevalent in the region, accounting for 44% of cases), colon, and breast cancer. Its prevalence has risen from 2.1% 30 years ago to 3.6% of the population today. High blood pressure is the leading risk factor for cardiovascular disease, with one in three people in the region reportedly affected. Although the data are not fully representative, it appears that heart disease and chronic obstructive pulmonary disease (COPD) are more prevalent in the Nord-du-Québec region than in the rest of the province. Sexually transmitted diseases have shown a significant decline in recent years, while hepatitis C and HIV are reportedly rare or nonexistent. However, teenage pregnancy rates are significantly higher among 14- to 17-year-olds and 18- to 19-year-olds. Lastly, the hospitalization rate is significantly higher than in the rest of Quebec, with the most common causes related to the respiratory system, the digestive system, injuries, the circulatory system, and the genitourinary system. These are more or less the same factors that account for the majority of causes of death.

With regard to mental health, the suicide rate per 100,000 residents is slightly lower than that of the rest of the province, but the number of hospitalizations for suicide attempts is nearly four times higher. Between 2014–2015 and 2020–2021, a 7% increase in cases of psychological distress was observed among people aged 15 and older across Quebec, rising from 32% to 39%. However, this trend did not appear to extend to the Nord-du-Québec region, which remained relatively stable during the same period (33% to 34%). Women and high school students are reportedly the most likely to be affected. Lastly, the proportion of people reporting high levels of daily stress was only 12% in the Nord-du-Québec region between 2019 and 2020, compared to 23% for the rest of the province.

9.3.6.2 Historical trends

The Cree communities of Eeyou Istchee have been deeply affected by colonial policies that have led to persistent structural injustice, resulting in significant impacts on their physical, psychological, and social health (WSP, 2026).

Among the events that were most disruptive to Cree communities were:

- The residential school system, which caused intergenerational trauma, the loss of languages and cultures, as well as physical and psychological abuse. These effects have led to major upheavals in the transmission of traditional knowledge and practices.
- Displacement resulting from hydroelectric development, as well as the loss of land and valuable sites that have been submerged by the reservoirs. This relocation led to major social and economic changes, and trauma persists in Chisasibi due to the hydroelectric facilities upstream from the village.

It is also important to highlight the challenges associated with the often-necessary travel to healthcare facilities located outside the region, which are rarely culturally appropriate, thereby compromising the quality of care. However, some medical care is provided by the Chisasibi Hospital, which will soon be replaced by the Eeyou Istchee Regional Health Centre (currently under construction).

On the other hand, the development of families, of communities, and of First Nations, as well as culture, the land, and self-determination, are identified as factors that promote protection and resilience at both the individual and collective levels. These factors, which are believed to mitigate the effects of racism, structural discrimination, and historical trauma, are reflected in a series of events that have contributed to them, namely:

- The signing of the JBNQA in 1975 marked a major milestone for Cree self-determination by recognizing their territorial rights and enabling the establishment of their own governance structures, which led to the creation of regional institutions to manage essential services.
- The establishment of the Cree Board of Health and Social Services of James Bay (CBHSSJB), which manages health and social services for people living permanently or temporarily in the region. This Board enables the Cree people to take charge of their own services while advancing their self-determination, strengthening their collective resilience, and helping to reduce social inequalities in health. The CBHSSJB regularly consults with communities to improve services and adopts a holistic approach that better aligns with the expectations of the communities involved.

9.3.6.3 Significant projects, activities, or events

Significant projects, activities, or events that could have a cumulative effect, in conjunction with the project, on the physical, psychological, and social health of the regional population are those that may have an impact within the territory encompassing all or part of the communities of Chisasibi, Mistissini, and Wemindji. These include the following:

- Mining exploration activities, including in particular those associated with the Cancet and Tilly projects of Winsome Resources Ltd.
- Operations at the Éléonore and Andina mines;
- The operations of borrow pits located within the defined area;
- Operations and maintenance activities at the facilities of the La Grande complex and Sarcelle complex;
- Maintenance and operation of all substations and power lines within the defined area;
- The operation and maintenance of the Trans-Taiga Road and the Billy-Diamond Highway;
- The completion of various road and rail projects planned under the Grand Alliance agreement;
- The operation and maintenance of the various airports and airfields located within the defined area;
- The operation of landfills located within the defined area;
- The construction and presence of telecommunications towers within the defined area;
- Forest fires occurring within the area;
- Residential schools;
- The signing of the JBNQA (1975);
- The Paix des Braves agreement and other accords;
- The Plan Nord
- La Grande Alliance.

9.3.6.4 Cumulative impacts

The project's effects on the health and well-being of Indigenous communities in the region include:

- Restrictions on access to certain areas of the territory;
- The fragmentation of this territory;
- The opening of new access routes to the territory;
- The physical and mental health risks associated with working outside the community;
- The social disruption caused by the growing presence of non-Indigenous people in the area and by the increasing wealth of a segment of the community.

All resource development projects taking place within the area in question may have a cumulative impact on the members of the communities living in that area. When combined with existing roads and airports, they result in some restrictions on access to the area while contributing to the fragmentation of its components. More frequent contact between members of Indigenous communities and predominantly non-Indigenous environments can contribute to the erosion of the social fabric through the adoption of non-traditional lifestyles. Several mining projects are already underway or in the planning stages, not to mention mining exploration, which remains very active. In addition, the Great Alliance agreement calls for the implementation of major infrastructure projects (roads, ports, railways) that will further open up the territory of the Cree communities while providing them with easier access to non-Indigenous communities in the south. These projects, combined with forest fires, will generate various pollutants that could alter the quality of life for Indigenous communities and affect their health in the medium and long term. It should be noted, however, that many of the anticipated projects are only planned for the medium to long term, and that some of the existing mining projects could be completed before these new ones are even launched. Nevertheless, given the importance of this VEC to Indigenous communities, an effect of moderate intensity, regional extent, and medium duration is anticipated, resulting in a cumulative impact of **moderate** significance.

9.3.6.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for this VEC. Nevertheless, it would be important for PMET to consider participating in any regional committee established by the Government of Eeyou Istchee to ensure better management of the territory and its development, as well as greater involvement of Cree communities in decision-making processes related to their territory.

9.3.7 Road safety

The assessment of cumulative impacts on road safety refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.7.1 Baseline conditions

The baseline conditions for road traffic is based on two distinct categories of information: the existing capacity—in terms of traffic volume—of the Trans-Taiga Road and the Billy-Diamond Highway, as well as the most recent available statistics on accidents that have occurred within the territory of the Jamésie RCM, where these two roads serve as the main thoroughfares.

With regard to current traffic volumes on the Trans-Taiga Road, a traffic study conducted as part of the project shows that they are relatively low for a road with a theoretical capacity of several hundred vehicles per hour in both directions. In fact, as shown by the results of two camera-based traffic count campaigns conducted over two 7-day periods (March and May 2025), the maximum hourly traffic volumes peaked at less than 10 vehicles during the March 2025 campaign and at a maximum of 12 vehicles during the May campaign. Although no recent traffic counts have been conducted on Billy-Diamond Highway, data covering the period from 2014 to 2017, provided by Quebec's transport ministry (Ministère des Transports du Québec) in 2018 as part of another project, showed an annual traffic volume of approximately 56,000 vehicles (in both directions), consisting mainly of pickup trucks (65%) and semi-trailers (20%). By spreading this figure over the course of the year and then over 12 hours of active traffic per day, a very rough estimate of 13 vehicles per hour is obtained for a road with a theoretical capacity of at least 1,500 vehicles per hour in both directions.

With regard to accidents recorded in the Jamésie RCM, primarily on the Trans-Taiga Road and the Billy-Diamond Highway, SAAQ statistics (2026) show a total of 177 accidents in 2024, resulting in 6 fatalities, 6 serious injuries (requiring hospitalization), and 59 minor injuries.

9.3.7.2 Historical trends

There is no doubt that since the construction of the Billy-Diamond Highway and the Trans-Taiga highway in the 1970s, traffic in the area has been particularly heavy throughout the development of the La Grande hydroelectric complex and, later, the Laforge and Caniapiscau power plants. Subsequently, traffic levels stabilized in line with the operational needs of these power plants and the traffic associated with the Cree communities along James Bay. The gradual upgrading of the Billy-Diamond Highway beginning in 2015 (L'Aurore, 2025) coincides with significant mining exploration activities and the development of certain mature mining projects. Nevertheless, most of the projects currently under development are located south of the Trans-Taiga Road, and the increase in traffic that may result from them primarily affects the Billy-Diamond Highway. Exploration activities targeting the formation, which includes spodumene pegmatite intrusions that are a key focus of the project, will help increase traffic on both the Billy-Diamond Highway and the Trans-Taiga Road. However, the expected increase in traffic resulting from the project will mean an additional 70 to 71 vehicles per day during the operations phase, which remains well below the capacity of the two roads. Several other projects, primarily mining projects, could also increase traffic on these two roads, but no data is currently available regarding the expected number of additional vehicles.

Lastly, the various projects outlined in the Grand Alliance agreement could change this picture, since:

- The Billy-Diamond Highway should be extended to Whapmagoostui, where a deep-water port should be built. The new section could increase traffic on existing roads, but the port's opening could provide a new supply route for communities and various development projects and active sites, thereby reducing traffic on the Billy-Diamond Highway.

- Extending Route 167 to the Trans-Taiga Road could provide an additional route to the south for the supply and transport of mining and other products generated by various projects, thereby reducing traffic on certain sections of the Trans-Taiga Road and the Billy-Diamond Highway.
- Extending the railway from Matagami to, eventually, Whapmagoostui could lead to a significant reduction in heavy truck traffic on the Billy-Diamond Highway, as supplies to the region and the transport of resources southward could be handled by this new mode of transportation.

However, it should be noted that projects related to this agreement are planned for a minimum period of 30 years, theoretically beginning in 2028.

According to data from the SAAQ (2026), in the Nord-du-Québec region, which includes the Jamésie RCM, an 18% decline in accidents was observed between 2018 and 2022, with a total of 298 accidents in 2022. The 2024 data appear to confirm this downward trend, with a total of 266 accidents in the Nord-du-Québec region—an additional 11% decrease.

9.3.7.3 Significant projects, activities, or events

Significant projects, initiatives, or events that could have a cumulative impact on road safety in conjunction with this project include those that may affect the Trans-Taiga Road between the former Mirage outfitter's airfield and its junction with the Billy-Diamond Highway, as well as the Billy-Diamond Highway between that intersection and the transfer station in Matagami. These include the following:

- mining exploration activities;
- operations at the Éléonore Mine;
- operations at the borrow pit;
- operations and maintenance activities at the facilities of the La Grande complex;
- the maintenance and operations of all substations and lines that use these roads as access routes;
- the use and maintenance of the Trans-Taiga Road and the Billy-Diamond Highway;
- the completion of various road and rail projects planned under the Grand Alliance agreement;
- the operation and maintenance of the various airports and airfields connected to these two roads;
- the operation of the landfills connected to these two roads;
- the construction and maintenance of telecommunications towers accessible via these roads;
- the various Cree villages that use these roads for the transportation of their people and supplies;
- forest fires occurring in the area that could affect the pavement of the Billy-Diamond Highway.

9.3.7.4 Cumulative impacts

The main risks to road safety stem from increased traffic and deteriorating road conditions, which lead to a higher risk of accidents. The preceding sections show that existing roads have design capacities that exceed both current traffic volumes (which are considered low) and the traffic volumes anticipated with the addition of traffic generated by the project. Since 2015, Billy-Diamond Highway has undergone major improvements to both its alignment and its road surface. The most recent work began in 2024 (L'Aurore, 2025) and includes, in particular, the replacement of 259 culverts. In the Trans-Taiga Road section, apart from mining exploration activities, no other major projects that could significantly increase traffic on this road are planned in the short or medium term. However, regarding the Billy-Diamond Highway, several mining projects located south of the Cree community of Wemindji are expected to begin operations at the same time as the project. Lastly, it is worth noting the significant shift in current traffic patterns that will result from the construction of a deep-water port in Whapmagoostui and the northward extension of Billy-Diamond Highway and Route 167. This is in addition to the expected gradual reduction in truck traffic on the Billy-Diamond Highway, which should result from the planned extension of the railway from Matagami to, eventually, Whapmagoostui.

Lastly, given the factors outlined above and the strict measures that will be implemented to regulate the flow of project vehicles, a low-intensity effect, of regional extent and medium duration, resulting in a cumulative impact of **moderate** significance on road safety.

9.3.7.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for road safety.

9.3.8 Hunting and trapping

The assessment of cumulative impacts on hunting and trapping refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.8.1 Baseline conditions

Hunting and trapping are very important activities for the three Cree communities whose territories overlap with the spatial scope considered for this VEC. The area in question is primarily accessed via the Trans-Taiga Road, and hunting and trapping areas that are not directly accessible from the roadside are reached by all-terrain vehicle and snowmobile. Although certain areas are more suitable for hunting and trapping specific species, these activities take place throughout the entire region. The following are the species that are commonly hunted:

- Wild geese, which are primarily hunted in the spring; they migrate extensively across the region as many families head to hunting camps. These are occasions for festive gatherings that are very popular with the communities.
- Ducks in the fall and spring; ptarmigans and grouse year-round.
- Moose, in the fall and winter and sometimes in the spring, particularly in the Lac de la Corvette area.

- Caribou, although hunting for this species is less common due to its scarcity in the territory.
- Bears in the spring and fall.
- Various other mammals, including beavers, porcupines, and hares.

9.3.8.2 Historical trends

The information gathered from the tallymen does not indicate any issues regarding hunting success, except for caribou, whose population has declined sharply in the region since the development of the La Grande complex. Nevertheless, opening up the territory makes it more accessible, particularly to people who do not belong to communities with direct traditional rights to these hunting grounds. Concerns have been raised about overhunting, particularly with regard to moose. The gradual fragmentation of the land is also a cause for concern regarding the potential impact on the population decline of certain species and the loss of prized hunting grounds. It was mentioned that the right-of-way for the new power line will cross a hunting site belonging to the tallyman of trapline CH39. Lastly, several community members reported that meat from game hunted in areas disturbed by various activities tasted worse than meat from game harvested in undisturbed areas.

At this time, aside from the project itself, only mining exploration activities could pose new threats to hunting and trapping (loss of access and bioaccumulation). The only other mining project currently under development in the vicinity, the Adina mine, is located 100 km southeast of the project. Nevertheless, the surge in demand for lithium could lead to the development of additional mining sites in the sector over the medium to long term.

Finally, it is important to note that since the 1970s, various agreements have been signed with provincial and federal governments granting Cree communities increasing control over the regional territory, particularly with regard to its use and development. One significant outcome was the creation of traplines, which allow the families associated with them to exclusively harvest wildlife resources within those areas.

9.3.8.3 Significant projects, activities, or events

Significant projects, activities, or events that could have a cumulative impact on hunting and trapping activities in conjunction with the project are those located within a 50-kilometre radius of the project. These include the following:

- mining exploration activities, in particular those of the Tilly and Cancet projects of Winsome Resources Ltd.
- operational activities of the borrow pits located on either side of Trans-Taiga Road.
- operations and maintenance activities at the La Grande-4 facility.
- maintenance work at the LG-4 and Tilly substations, as well as on the lines connecting these substations to the Lemoyne substation (to the west) and the Laforge substation (to the east).
- any maintenance work on the Trans-Taiga Road, as well as the increase in traffic observed there;
- operations and maintenance activities associated with LG-4 Airport;
- the operation of the LG-4 landfill site;
- campsites and temporary shelters associated with non-Indigenous activities;
- the effects of some forest fires;

- the governance issues that have had both negative and positive impacts on the activities of Indigenous communities include residential schools, the signing of the JBNQA and the Paix des Braves agreement (and related agreements), agreements related to the Plan Nord and the Grande Alliance, the Caribou Recovery Plan, and regulations concerning the protection of wildlife species of special status.

9.3.8.4 Cumulative impacts

Past projects (the La Grande complex) and ongoing activities have significantly altered habitats in the area along the Trans-Taiga Road and to the north of it, but the subsequent establishment of traplines has allowed for the redistribution of hunting grounds among Indigenous communities. The Trans-Taiga Road and various access roads that have been built have opened up the region, making new hunting grounds accessible to members of Cree communities, but potentially also to hunters from other communities (both Indigenous and non-Indigenous). Mining exploration activities may disrupt hunting, but such disruptions generally affect limited areas over sporadic stretches of time. The agreements signed between governments and Cree communities have enabled these communities to exercise greater control over their territory and the management of their resources, particularly wildlife. Other projects, activities, and events primarily cause occasional disturbances, mainly related to noise and dust emissions, which are only noticeable in the immediate vicinity of these sites. Taking these factors into account, along with their distribution over time, the effects of the project's activities on this component—combined with impacts of other past, present, and future projects—is considered of moderate intensity, local extent and medium duration, resulting in a cumulative impact of **moderate** significance.

9.3.8.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for hunting and trapping activities.

9.3.9 Well-being on the land

Well-being on the land refers to all activities carried out on the land that are closely linked to Indigenous culture (the transmission of values and language, mental health and healing, ancestral memory, etc.). After assessment, it was determined that this VEC largely overlaps with the one related to physical, psychological, and social health. The cumulative impacts related to well-being on the land were therefore addressed in Section 9.3.6 on physical, psychological, and social health.

9.3.10 Climate change (GHG emissions, energy transition)

The assessment of cumulative impacts on climate change mitigation refers to the project's residual impacts on this VEC, which may potentially be additive to those of other existing projects or events, or those that may occur within the territorial boundaries (spatial scope) set out in Table 9-2.

9.3.10.1 Baseline conditions

The baseline conditions for GHG emissions are presented in Section 8.2.7.1 of the chapter on impact analysis. Thus, in Canada, total GHG emissions, based on 2023 data, amounted to 694 Mt CO_2eq, while for the mining sector, the total was 78 Mt CO_2eq.

In Quebec, total GHG emissions, based on 2023 data, amounted to 78 Mt CO_2eq, while emissions from the Industry category—which includes mining activities—amounted to 24.7 Mt COeq.

9.3.10.2 Historical trends

At the provincial level, recent major trends are reported below (MELCC, 2025):

- From 1990 to 2023, GHG emissions in Quebec have decreased by 8.5% and during this period, the population has increased by 26.5%. Meanwhile, they rose by 14.4% in Canada.
- In the short term, from 2019 to 2023, Quebec's GHG emissions decreased by 4.7%, from 81.8 Mt CO_2eq in 2019 to 78.0 Mt CO_2eq in 2019.
- In 1990, Quebec's GHG emissions were 86.7 Mt CO_2eq. Then, from 2003 to 2020, these emissions gradually declined, reaching 74 Mt in 2020, during the pandemic. Subsequently, emissions rose to nearly 80 Mt CO_2eq, before beginning to decline again in 2023 to 78 Mt CO_2eq.
- The sector that produced the most GHG emissions in Quebec in 2023 was transportation (road, air, sea, rail, and off-road) (34.9 Mt CO_2eq). Between 1990 and 2023, GHG emissions from the transportation sector increased by 27.7%.
- The industrial sector, which includes mining projects, ranked second, with 24.7 Mt CO_2eq, accounting for 31.7% of total emissions in 2023.
- From 1990 to 2023, emissions from the industrial sector decreased by 22.6%, from 32.1 to 24.7 Mt CO_{2eq}.
- The residential, commercial, and institutional (building heating) sector ranked third, with 6.2 Mt CO_{2eq}, or 7.9% of emissions (2023).

The proposed project is a lithium mine that would produce approximately 800,000 tonnes per year of lithium concentrate. Lithium is an essential input in the manufacture of lithium-ion batteries, which are used notably in electric and plug-in hybrid vehicles, energy storage systems associated with renewable energy sources, and various technological applications. As such, lithium supply is closely linked to the energy transition and economic decarbonization objectives pursued by the Government of Québec. Lithium mining projects therefore support the deployment of technologies related to electrification and energy storage by providing a raw material recognized as necessary for these uses, in accordance with provincial strategies related to critical and strategic minerals.

9.3.10.3 Significant projects, activities, or events

Significant projects, activities or events that could have a cumulative effect on climate change mitigation, along with the project, are generally those that generate GHGs. These include the following:

- mining exploration activities;
- operations at the Éléonore and Andina mines and activities related to the monitoring of the Renard mine;
- operations of borrow pits located within the defined area;
- operations and maintenance activities at the facilities of the La Grande complex;
- maintenance and operation of all substations and power lines within the defined area;
- the use and maintenance of the Trans-Taiga Road and the Billy-Diamond Highway;

- the completion of various road and rail projects planned under the Grand Alliance agreement;
- operation and maintenance of the various airports and airfields located within the defined area;
- operation of landfills located within the defined area;
- the construction and presence of telecommunications towers within the defined area;
- Cree community villages;
- the governance aspects of the Plan Nord and the Grande Alliance that promote development in the Nord-du-Québec region.

Forest fires also generate atmospheric emissions, but the Quebec government generally accounts for these separately from emissions resulting from human activities.

It should be noted that total GHG emissions remain an unknown factor, as only a portion of the emissions associated with the significant projects, activities, or events mentioned above are accounted for and included in the provincial and federal annual inventories for the relevant sector (industry, forestry, transportation, etc.).

9.3.10.4 Cumulative impacts

In 2023, Quebec's total GHG emissions were 78 Mt CO2eq, or 8.8 t per capita, representing 11.3% of Canada's total emissions of 693.9 Mt CO2eq. During operations of the Shaakichiuwaanaan project, GHG emissions (both direct and indirect) are estimated to average approximately 108.2 kt CO_2eq/year. These emissions account for 0.0044% of annual emissions from the industrial sector (24.7 Mt of CO_2eq) and 0.0014% of total emissions province-wide.

In addition to past and current activities that are included in the annual GHG emissions reports prepared by the Quebec government, there are also GHG sources that will eventually be added to the overview by the end of project activities. These sources include:

- The construction and operation of the Adina lithium mine, whose emissions are likely to be on a similar scale to those of the project.
- The various infrastructure projects outlined in the Grand Alliance agreement, which will eventually contribute to GHG emissions due to the major construction work they entail and the increased traffic they will generate (road, rail, and port). Nevertheless, although these projects have already undergone pre-feasibility studies outlining preliminary routes and locations, their implementation is expected to span a minimum of 30 years, with a tentative "Year 0" set for 2028 (WSP, 2024). It is therefore possible that some of these projects may not yet have been initiated—or at least completed—by the time the mining project ceases operations (scheduled for 2048 to 2052).

Given the temporal scope under consideration (2008 to 2035) and the project's very limited contribution to the GHG emissions balance at the industrial level and at the provincial level, the anticipated effect would be of low intensity, with regional extent and medium duration, resulting in a **low** magnitude ofn anticipated cumulative impact of the mining project, combined with other existing and foreseeable activities.

9.3.10.5 Mitigation, compensation, and follow-up measures

No additional mitigation measures or environmental follow-up other than those identified in Chapter 8 and the table in Appendix 8-2 are required for this valued component (GHG).

9.4 Review of cumulative impacts

An analysis of the cumulative impacts on the ten assessed components leads to the conclusion that the project is expected to result in only moderate cumulative impacts on wetlands and water environments, species of special status (avian fauna), terrestrial wildlife and wildlife habitat (avian fauna), the physical, psychological, and social health of the regional population, well-being on the land, and hunting and trapping. Low cumulative impacts are anticipated on surface water quality, aquatic fauna (fish) and habitat, wildlife species of special status (mammals and chiropterans), terrestrial wildlife and wildlife habitat (mammals), road safety, and climate change mitigation.

Consequently, no mitigation measures or monitoring are specifically required for cumulative impacts, beyond those already planned for direct and indirect impacts (Chapter 8 and Appendix 8-2). However, it is important to ensure rigorous implementation of existing measures and ongoing collaboration with communities to monitor the evolution of social, cultural, and environmental issues within a territory undergoing change.