6.2.9 Sediments

Sediment sampling was carried out during three sampling campaigns, in October 2024 and in May and June 2025. Since the first sampling carried out in 2024, several additional stations were added to accommodate the planned mining infrastructure (Map 6-10). In total, sediment quality was analyzed at 19 sampling stations, including 6 stations in the area which would potentially be exposed to the mine effluent and 13 stations in the reference area, including at the reference lake. Three stations are located in watercourses, while 16 stations are located in small waterbodies and lakes. All of the information (results and certificates of analysis) concerning sediment quality are included in the sediment quality report provided in Appendix 6-7. A summary of the key results obtained is presented in the following paragraphs.

The values obtained for the various sediment samples collected were compared to the criteria for assessing sediment quality in freshwater environments established by ECCC and the MDDEP (2007). These guidelines include three thresholds that can be used to assess whether a given sediment concentration could have an impact on aquatic fauna. These thresholds are as follows:

- rare effect concentration (REC);
- threshold effect concentration (TEC);
- probable effect concentration (PEC).

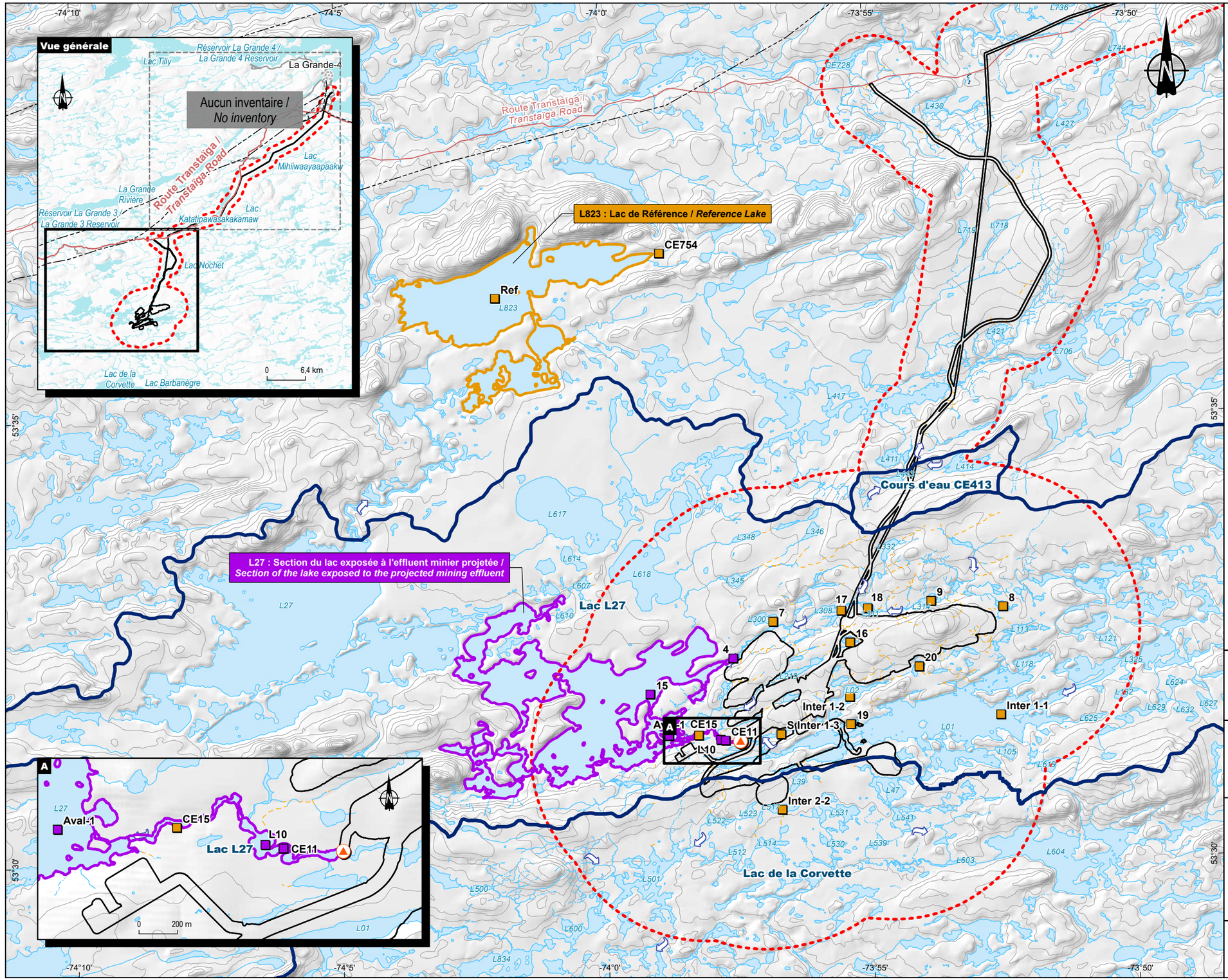
The REC and the TEC correspond to the two contamination prevention indicators. The observation of a value equal to or greater than the TEC indicates an onset of contamination, while if the observations are maintained below the REC, no impact is expected on aquatic life. The PEC is the threshold value used to guide decisions regarding site restoration. A concentration exceeding the PEC indicates that further analysis is desirable to assess the relevance of undertaking such work.

Table 6-15 shows all parameters for which a criterion exceedance was noted in sediment samples collected in 2024 and 2025.

Among the sediment samples collected at the 19 stations, exceedances of the TEC and REC were observed for metals such as arsenic, cadmium, chromium, copper, mercury, lead, and zinc. In addition, exceedances of the PEC were observed for arsenic (Stations 8, S Inter 1-3, and 15) and mercury (Station 16). The concentrations measured were generally within the geochemical background levels for the region, i.e., close to the metal content naturally present in the region’s soils and sediments. The presence of these metals in sediments is likely linked to regional geology, as their mobilization is influenced by local geochemical conditions—including pH, redox potential, and the presence of iron and manganese oxides.

In addition to metals, exceedances were observed in Lakes L10 and L27 (both which could potentially be exposed to mine effluent) for a polycyclic aromatic hydrocarbon (PAH), dibenz(a,h)anthracene. This compound is generally associated with the incomplete combustion of organic matter, with potential sources including long-range atmospheric fallout, emissions from forest fires, or historical natural inputs.

In terms of granulometry, the substrate of the lakes was mainly composed of clay and silt, sometimes mixed with sand. The substrate collected from the watercourses had the same characteristics.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Composantes du projet projetées / *Projected Project Components*

- Effluent / *Effluent*

Hydrologie / *Hydrology*

- Sens d'écoulement de l'eau / *Waterflow direction*
- Bassin versant principal / *Principal watershed*

Milieux hydriques / *Hydrous Environments*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Intermittent partiellement souterrain / *Partially underground intermittent*
- Souterrain / *Underground*

Station d'échantillonnage / *Sampling Station*

Type d'échantillon / *Sample type*

- Sédiments

Catégorie d'échantillon / *Sampling Category*

- Exposée à l'effluent minier projetée / *Exposed to the projected mining effluent*
- Référence / *Reference*

Infrastructure / *Infrastructure*

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

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-10 / *Map 6-10*
Stations d'échantillonnage des sédiments / *Sediment Sampling Stations*

Sources :
CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Synergis, État de référence du milieu aquatique pour le projet Shaakichiuwaanaan, 12-2025

0 800 1 600 m
NAD 1983 CSRS UTM Zone 18N

2026-03-25

Préparation / Preparation : I. Cartier
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
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CA0001724_3318_eie_c06_XX_116_XXXX_260324

Table 6-15 Summary of exceedances of sediment quality criteria

Zone type	Lake/ Watercourse	Station	Parameter	Exceedance of criterion
Reference	L01	Inter 1-1-1, Inter 1-1-3, Inter 1-1-4, Inter 1-1-5	Arsenic, cadmium, chromium, copper, mercury, zinc	REC
		Inter 1-1-2	Cadmium, chromium, copper, mercury, zinc	REC
		Inter 1-1-1, Inter 1-1-2, Inter 1-1-3, Inter 1-1-4	Cadmium	TEC
		19-1, 19-2, 19-3, 19-4, 19-5	Arsenic	TEC, REC
		19-2,19-4, 19-5	Cadmium, chromium, mercury	REC
		19-1, 19-3	Chromium	REC
	L02	Inter 1-2-1, Inter 1-2-2, Inter 1-2-3, Inter 1-2-4, Inter 1-2-5	Arsenic	TEC, REC
		Inter 1-2-1	Lead	REC
		Inter 1-2-1, Inter 1-2-2, Inter 1-2-3, Inter 1-2-4, Inter 1-2-5	Cadmium, copper, mercury,	REC
		Inter 1-2-1, Inter 1-2-4	Mercury	TEC, REC
		Inter 1-2-5	Chromium	REC
	CE11	S Inter 1-3-1, S Inter 1-3-2, S Inter 1-3-3, S Inter 1-3-4, S Inter 1-3-5	Arsenic	TEC, REC, PEC
		S Inter 1-3-1, S Inter 1-3-2, S Inter 1-3-3, S Inter 1-3-4, S Inter 1-3-5	Cadmium, mercury, lead	REC
		S Inter 1-3-3	Chromium	REC
	L18	20-1, 20-2, 20-3, 20-4, 20-5	Arsenic	TEC, REC
	L323	8-1, 8-2, 8-3, 8-4, 8-5	Arsenic	TEC, REC, PEC
		8-1, 8-2, 8-3, 8-4, 8-5	Mercury	REC
		8–4	Cadmium	REC
	L314	9-1, 9-2, 9-3, 9-4, 9-5	Cadmium	REC
		9-1, 9-3	Mercury	REC
		9–1	Arsenic	REC
	L220	16–2	Mercury	TEC, REC, PEC
	L517	Inter 2-2-1, Inter 2-2-2, Inter 2-2-3, Inter 2-2-4, Inter 2-2-5	Cadmium	TEC, REC
		Inter 2-2-1, Inter 2-2-2, Inter 2-2-3, Inter 2-2-4, Inter 2-2-5	Zinc	REC
	L311	18-1, 18-2, 18-3, 18-4, 18-5	Mercury	REC
		18–1	Arsenic	REC
		18–2	Cadmium	REC
	L823 (reference lake)	Ref-1, Ref-2, Ref-3, Ref-4, Ref-5	Arsenic, cadmium	TEC, REC
		Ref-1, Ref-2, Ref-3, Ref-4, Ref-5	Chromium, mercury, zinc	REC
		Ref-2, Ref-3, Ref-5	Lead	REC
Potentially exposed to future mine effluent	L27	Aval 1-1, Aval 1-5	Arsenic, cadmium, chromium, mercury	REC
		Aval 1-2, Aval 1-3, Aval 1-4	Arsenic, cadmium, chromium	REC
		4–3	Arsenic	REC
		4–4	Arsenic, mercury	REC
		15-1, 15-2, 15-3, 15-5	Arsenic	TEC, REC, PEC
		15–4	Arsenic	TEC, REC
		15–3	Cadmium	REC
		15-1, 15-2, 15-4, 15-5	Cadmium	TEC, REC
		15-1, 15-2	Chromium	REC
		15–1	Dibenz(a,h)anthracene	REC
		15-3, 15-4, 15-5	Copper, chrome	REC
		15-4, 15-5	Mercury and zinc	REC
	L10	L10-3, L10-5	Dibenz(a,h)anthracene	REC

6.2.10 Hydrogeology

A conceptual hydrogeological model of the project site was developed following the review of existing information. The review included data from the baseline hydrogeological study carried out in 2024 by BBA (BBA, 2024; Appendix 6-8), BBA's technical report on packer testing (BBA, 2025a; Appendix 6-9), the hydrogeological characterization study of section CV5 of the mine site (BBA, 2025b; Appendix 6-10), the technical note on hydrogeological assessment for the underground mine and open pit by Mailloux Hydrogéologie inc. (Mailloux, 2026; Appendix 6-11), as well as the baseline hydrogeological study and numerical modelling of stockpile 002 by AtkinsRéalis (AtkinsRéalis, 2026; Appendix 6-12).

A review of the hydrogeological studies undertaken for the project makes it possible to define the hydrostratigraphic units, the hydraulic properties of the rock and unconsolidated deposits, the structural elements (faults), groundwater flow, aquifer recharge, and estimates of groundwater infiltration rates in the future mine (pit and underground).

6.2.10.1 Hydrostratigraphic units

Superficial deposits at the project site consist mainly of glacial till (sand with varying proportions of fine particles [silt and clay]) (Appendix 6-8) (Map 6-6).

In the project area, the thickness of unconsolidated deposits generally varies between 0.8 m and 20.6 m, according to BBA drilling reports (2024).

Based on the superficial deposit map and the results of hydrogeological characterization work, four hydrostratigraphic units were defined for the hydrogeological model:

- Glacial deposits, consisting of ablation till or undifferentiated till;
- Shallow rock;
- Intermediate rock;
- Deep rock.

It should be noted that structural elements (faults and shear zones) were also taken into account when establishing the hydrogeological model.

The following sections describe in more detail the different hydrostratigraphic units identified in the local study area of the biophysical environment.

Unconsolidated deposits

The unconsolidated deposits are found around Lake L01 and consist of sand with varying proportions of fine particles (silt and clay). Sediments present at the bottom of the lake, collected during ice drilling carried out by BBA in 2024 (BBA, 2024), consisted of layers of silt or clay. According to the mapping by the Ministère des Ressources naturelles et des Forêts (MRNF), these unconsolidated deposits are described as follows (MRNF, 2025):

- Undifferentiated till: Glacial diamicton whose exact origin could not be determined.
- Melt-out till or ablation till: Loose-grained diamicton, generally weathered, associated with slow ice ablation and usually exceeding 1 m in thickness. Surface generally dotted with numerous pebbles and boulders.

- Undifferentiated lake sediment: Sediment deposited in a current lake system, but whose exact origin could not be determined.

Permeability tests were conducted in the till unit to measure hydraulic conductivity, which ranges from 3×10^{-8} to 3.9×10^{-6} m/s for all unconsolidated deposits (BBA, 2024). The geometric mean of the hydraulic conductivity values is 1.1×10^{-6} m/s (Appendix 6-8).

Rock

The rock geology is part of the Superior geological province. Two general types of geology are found here, namely:

- a Mesoarchean lithology of the Guyer Group consisting of amphibolite derived from basalt, felsic to intermediate tuff, iron formation, wacke, and mudrock;
- an Archean lithology of the Langelier complex composed of tonalite and tonalitic gneiss.

The rock was divided into three different layers to better represent the hydraulic conductivities found during permeability and packer tests (Mailloux, 2026; Appendix 6-11):

1. A shallow rock layer corresponding to the first 50 metres of rock. Permeability tests measured hydraulic conductivity between 4×10^{-9} and 2×10^{-6} m/s. The geometric mean of the hydraulic conductivity values is 2×10^{-7} m/s (Appendix 6-11).
2. An intermediate layer divided into two thicknesses, either 50 to 100 m and 100 to 150 m. Hydraulic conductivities range from 2.3×10^{-9} to 8.2×10^{-8} and 2.9×10^{-9} to 8.2×10^{-8}, with geometric means of 2.3×10^{-8} and 1.5×10^{-8} (Appendix 6-11).
3. A deep layer, divided into two thicknesses, 150 to 200 m and 200 to depth. The hydraulic conductivities range from 1.7×10^{-9} to 5.2×10^{-8} and from 8.6×10^{-10} to 6.7×10^{-8}, with geometric means of 5.6×10^{-9} and 6.6×10^{-9} (Appendix 6-11).

The hydraulic conductivity of the bedrock was assessed as part of the BBA 2024 study (Appendix 6-8), and six faults were identified in the vicinity of the pits and underground workings in the BBA 2025 study (Appendix 6-10). Hydraulic tests conducted near or within these faults indicate that hydraulic conductivity values are low.

6.2.10.2 Piezometry

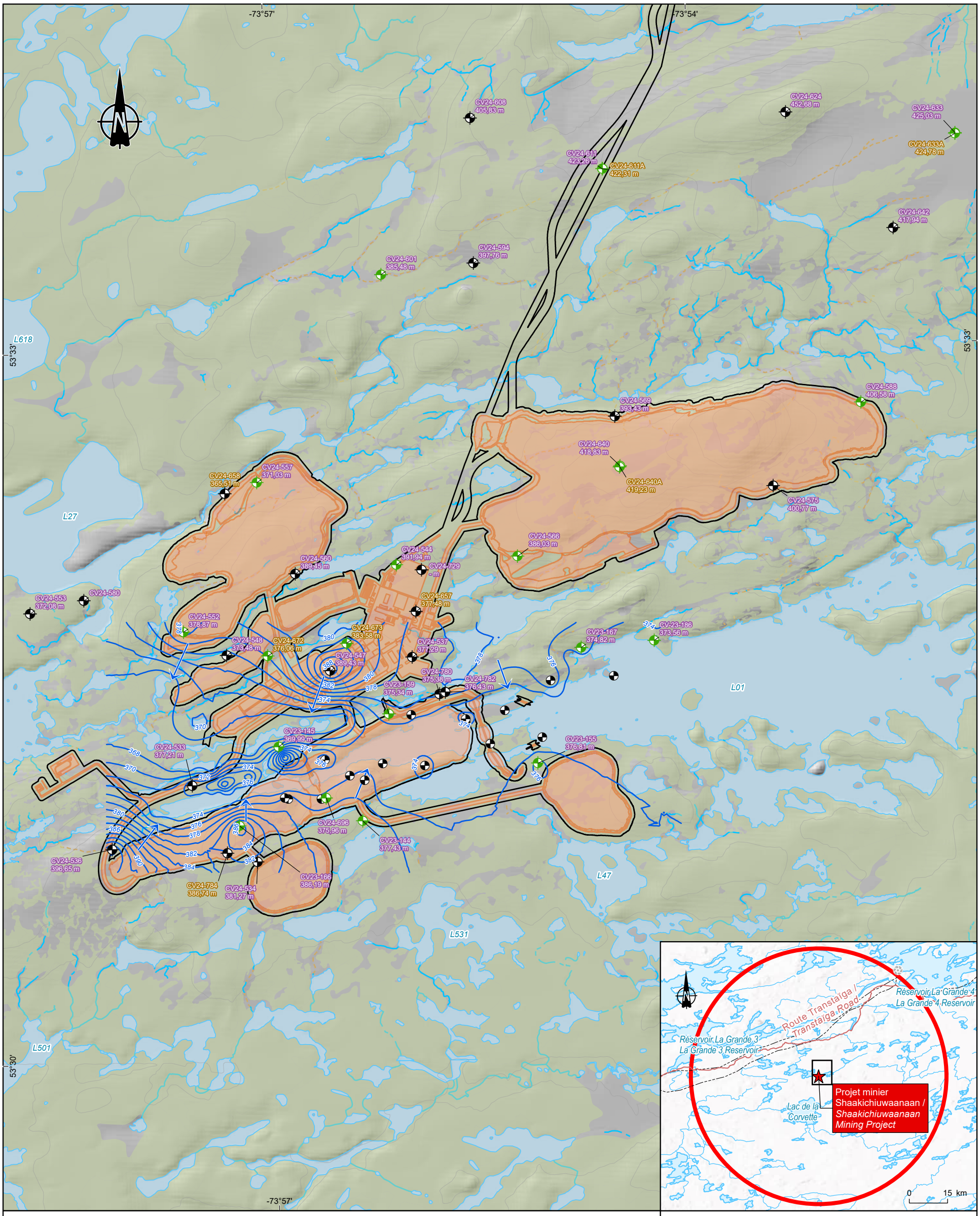
Groundwater levels measured in 2023 and 2024 are generally close to the ground surface, with measured depths ranging from 0.11 m to 7.4 m for rock and 0.13 m to 2.67 m for unconsolidated deposits (BBA, 2025b, Appendix 6-10). In general, groundwater flow directions are controlled by topography, flowing from higher rock formations to lower locations such as lakes and marshes.

Map 6-11 shows the piezometry of the rock, which was defined based on the groundwater level survey conducted in June 2024 and generated by BBA (Appendix 6-10).

The measured water levels were presented in Mailloux's study (Appendix 6-11) and are shown in Table 6-16.

Table 6-16 Piezometry for the various wells

Well	Measured water level (m)	Well	Measured water level (m)
CV23-153	378.51	CV24-536	377.4
CV23-150	373.72	CV24-537	377.08
CV23-147	375.80	CV24-544	391.99
CV23-194	375.29	CV24-547	390.43
CV23-199	372.20	CV24-548	373.34
CV23-192	375.20	CV24-552	378.78
CV23-174	374.35	CV24-553	372.08
CV23-169	377.60	CV24-557	371.03
CV23-164	378.02	CV24-560	389.45
CV23-157	375.59	CV24-566	386.03
CV23-167	374.82	CV24-569	393.43
CV23-159	375.3	CV24-575	400.77
CV23-145	370.01	CV24-588	406.58
CV23-166	387.72	CV24-594	397.76
CV23-144	377.95	CV24-601	385.48
CV23-155	376.91	CV24-640	417.93
CV23-186	374.1	CV24-640A	418.42
CV24-533	377.1	CV24-657	377.48
CV24-534	381.2	CV24-658	364.66
CV24-673	383.58	CV24-672	376.06



Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Biophysique / *Regional - Biophysical*

Piézométrie / *Piezometry*

- Courbe piézométrique (m) / *Piezometric level curve (m)*
- Direction d'écoulement / *Flow direction*
- Forage / *Borehole*
- Puit d'observation / *Monitoring well*
- Puit d'observation échantillonné / *Sampled monitoring well*
- CV24-536 396,65 m — Nom de la station / *Station name*; Élévation du niveau d'eau / *Water level elevation*; Couleur / *Color*; Unité hydrostratigraphique / *Dydrostratigraphic unit*
- CV24-536 — Roc / *Rock*
- CV24-536 — Dépôt meuble/ *Unconsolidated deposit*

Composante du projet / *Project Component*

- Projetée / *Projected*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Souterrain / *Underground*

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*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-11 / *Map 6-11*
Piézométrie du roc (août à novembre 2024) et emplacement des forages et des puits / *Rock Piezometry (August to November 2024) and Borehole and Well Locations*

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

0 300 600 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-30

Préparation / Prepared by : A. Hamel
Dessin / Drawn by : M. Dupraz
Approbation / Approved by : M-H. Brisson
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CA0001724_3318_eie_c06_11_125_piezo_260330

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.

6.2.11 Groundwater quality

6.2.11.1 Current conditions

Data on groundwater quality are available for the years 2023 and 2024 in the previous studies consulted. Map 6-11 shows the location of the wells used to determine current conditions. Twenty-three wells (15 from the bedrock aquifer and 6 from sandy deposits) were sampled during three annual campaigns. The list of wells identified in previous studies is presented in Table 6-17.

Table 6-17 List of wells sampled in 2023–2024

Nº	Name	X (UTM_U18)	Y (UTM_U18)	Ground elevation (m)	Intercepted unit	Well depth (m)	Water level rise (m)	No. of campaigns
1	CV23-167	-73,91344045	53,5288629	374.92	Rock	25.00	374.82	1
2	CV23-159	-73,93625753	53,5244027	375.59	Rock	50	375.34	3
3	CV23-145	-73,9493151	53,522208	372.69	Rock	50	369.99	3
4	CV23-166	-73,95403741	53,5166582	389.14	Rock	50	386.19	3
5	CV23-144	-73,93950767	53,5168807	379.98	Rock	25	377.43	3
6	CV23-155	-73,91874594	53,5207668	379.81	Rock	25	376.81	3
7	CV23-186	-73,90479995	53,5292874	374.16	Rock	50	373.56	2
8	CV24-544	-73,93509	53,5348646	393.4	Rock	14.65	391.94	1
9	CV24-552	-73,96033836	53,5303495	379.38	Rock	11.47	378.87	1
10	CV24-557	-73,95143556	53,540789	371.5	Rock	7.77	371.03	1
11	CV24-558	N/A	N/A	N/A	Unconsolidated deposit	N/A	N/A	1
12	CV24-566	-73,92078893	53,53533863	387.23	Rock	11.2	386.03	1
13	CV24-588	-73,87996875	53,54580411	408.93	Rock	19	406.58	1
14	CV24-601	-73,93640375	53,55529042	386.04	Rock	9.45	385.48	1
15	CV24-611	-73,91008761	53,56248745	423.37	Rock	23.9	423.26	1
16	CV24-611A	-73,91005719	53,56249616	422.52	Unconsolidated deposit	12.34	422.31	1
17	CV24-633	-73,86834256	53,56465267	426.17	Rock	20.6	425.03	1
18	CV24-633A	-73,86835909	53,56459889	427.24	Unconsolidated deposit	9.4	424.78	1
19	CV24-640	-73,90851171	53,54159146	421	Rock	21.52	418.83	1
20	CV24-640A	-73,90857368	53,54152911	421.09	Unconsolidated deposit	18.44	419.23	1

Nº	Name	X (UTM_U18)	Y (UTM_U18)	Ground elevation (m)	Intercepted unit	Well depth (m)	Water level rise (m)	No. of campaigns
21	CV24-672	-73,95043968	53,5285821	376.41	Unconsolidated deposit	5.62	376.06	1
22	CV24-673	-73,94111074	53,52940774	383.99	Unconsolidated deposit	5.24	383.58	1
23	CV24-696	-73,9437798	53,51854557	379.26	Rock	100	375.96	1

N/A : information not available

6.2.11.2 Analysis program

The choice of parameters was based on the risks associated with the use of the site and the requirements of Directive 019 (MELCCFP, 2025). The campaigns for the groundwater quality studies took place in March, April, and September 2023 and from July to September 2024. Groundwater samples were analyzed for one or more of the following parameters:

- inorganic compounds (total cyanides, fluorides, total sulphides);
- nitrogen compounds;
- C_{10}-C_{50}; petroleum hydrocarbons (PH);
- major ions (bicarbonates, calcium, carbonates, chlorides, magnesium, potassium, sodium and sulphates);
- dissolved metals;
- radionuclides (2023, 2024);
- Physicochemical parameters (pH, electric conductivity, oxidation-reduction potential and temperature).

6.2.11.3 Water quality criteria

Considering that the groundwater of the biophysical LSA could be resurgent in the surface water, the chemical analysis results with the resurgence in surface water criteria (RES) of the *Response Manual — Soil Protection and Contaminated Sites Rehabilitation* of the MELCCFP (Beaulieu, 2021). The identified potential receptors are the streams and lakes within the biophysical LSA.

The results of the groundwater sampling program for 2020 and 2021 were compared to the RES and the drinking water (EC) presented in the Response Manual. All of the 2023–2024 results are presented in the Table 6-18 (radionuclides) and in the tables of Results of Appendix 6-10 (radionuclides).

Table 6-18 Analytical results for radionuclides (2023, 2024)

Parameters	Units	CV23-166A 2024-07-28	CV24-558 2024-08-19	CV24-558 2024-09-20	CV24-633 2024-09-18
Radionuclides					
Lead-210	Bq/L	<1	<1	<1	<1
Radium-226	Bq/L	<1	<1	<1	<1
Radium-228	Bq/L	<0.5	<0.5	<0.5	<0.5
Thorium-228	Bq/L	<0.1	<0.1	<0.1	<0.1
Thorium-232	Bq/L	-	-	-	-
Uranium-234	Bq/L	-	-	-	-
Uranium-238	Bq/L	<0.01	0.03	<0.01	0.125

Analysis results

For the 2023–2024 campaigns, exceedances of EC criteria were observed for dissolved antimony (1 sample), dissolved arsenic (24), molybdenum (1), dissolved manganese (17), ammoniacal nitrogen (11), sulphide in the form of S2- (9), and fluoride (1). Exceedances of RES criteria were observed for dissolved copper (2) and for sulfide (9). No HP C10-C50 was detected in the test results. Table 6-19 summarizes the exceedances observed during this period.

Table 6-19 Summary of exceedances observed for the 2023–2024 campaign

Parameter (criteria At/RES/EC µg/l)	Number of analyses	Frequency of exceedances, 2023–2024 campaign		
		Alert threshold (AT)	Resurgence in surface water (RES)	Drinking water (DW)
Antimony (550/1100/6)	34	0	0-	**1**
Arsenic (170/340/0.3)	34	0	0	**24**
Copper (3.65/7.3/1000)	34	2	2	0
Manganese (1150/2300/50)	34	0	0	**17**
Ammoniacal nitrogen (-/-/0.05)	21	-	-	**11**
Molybdenum (14 500/29000/40)	34	0	0	**1**
Fluoride (2/4/1.5)	28	0	0	**1**
Sulphide–S_2^- (-/-/0.05)	33	1	9	9

LEGEND:

100	: > RES criterion
100	: > Alert threshold
100	: > Criterion/recommendation Drinking water

Piper diagrams were compiled to categorize the groundwater at the site (BBA, 2024; Appendix 6-8). The groundwater is considered to be between bicarbonated, calcic, and magnesian; and bicarbonated, sodic, and potassic.

6.3 Biological environment

6.3.1 Vegetation and wetlands

Vegetation and wetlands are described at the scale of the biophysical LSA, covering an area of 20,661 ha. Detailed information used as a basis for assessing the project's impacts on this component is presented in the vegetation and wetlands baseline study reports in Appendices 6-13 and 6-14.

According to the ecological classification of the territory (MRNF, 2023), the biophysical LSA is located in the spruce-lichen stand bioclimatic domain (western subdomain) and in the ecological regions of the Eastmain and Sakami rivers, the Robert-Bourassa reservoir, and Lake Naococane. The landscapes of the open boreal forest are not very diverse due to harsh climatic conditions and frequent 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).

Plant communities

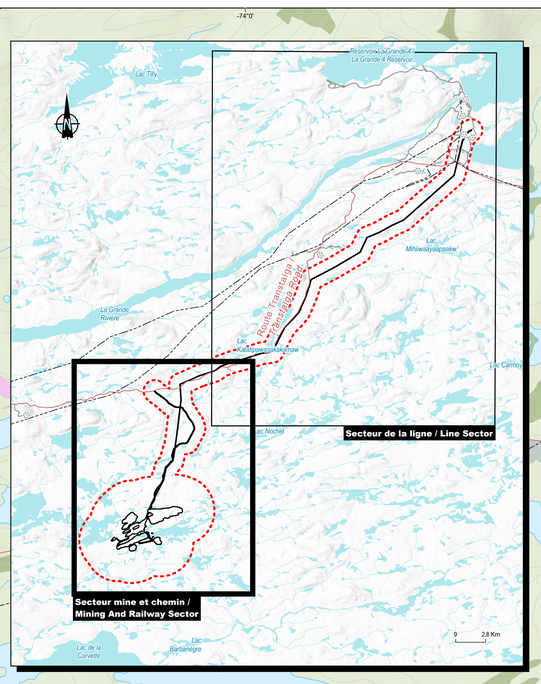
Following fieldwork and photo interpretation in 2023, 2024, and 2025, 14 plant communities were identified and mapped in the biophysical LSA (Table 6-20). Terrestrial and wetland environments occupy 75.1% and 11.8% of the biophysical LSA, respectively (Map 6-12). The main types of terrestrial environments in the biophysical LSA are, in ascending order of area, forest regeneration areas, softwood stands, lichen tundra, scrublands, mixedwood stands, and hardwood stands.

The main types of wetlands are, in ascending order of surface area, wooded ombrotrophic bogs, open ombrotrophic bogs, tree swamps, shrub swamps, open fens, wooded fens, ponds or shallow waters, and marshes.

Water bodies (lakes and large watercourses) cover 2,547 ha, or 12.3% of the biophysical LSA. Lastly, the biophysical LSA includes a very small proportion of other environments, such as anthropogenic environments (130 ha).

Table 6-20 Areas of natural environments in the biophysical LSA

Type of environment	Area (ha)	Proportion of biophysical LSA (%)
Terrestrial environments		
Scrublands	378	1.8
Hardwood	0.3	0.002
Lichen tundra	519	2.5
Mixedwood	28	0.1
Regenerating forest	8,774	42.5
Softwood	5,814	28.1
Subtotal	**15,513**	**75.1**
Wetlands		
Pond/shallow water	15	0.1
Marshes	6	0.03
Tree swamp	372	1.8
Shrub swamp	245	1.2
Wooded fen	67	0.3
Open fen	177	0.9
Wooded ombrotrophic bog	820	4.0
Open ombrotrophic bog	728	3.5
Sub-total	**2,430**	**11.8**
Other environments		
Anthropogenic	130	0.6
Block field	5	0.02
Body of water	2,547	12.3
Island	34	0.2
Bare surface	2	0.01
Subtotal	**2,718**	**13.2**
Total	**20,661**	**100**



Route Transtaiga / Transtaiga Road

Lac Nochet

-74°0'
-73°54'
-75°48'
53°36'
53°30'

Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

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*
- Permanent partiellement souterrain / *Partially underground permanent*
- Permanent souterrain / *Underground permanent*
- Souterrain / *Underground*

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*
- Ligne de transport d'énergie / *Electric power transmission line*
- Surface dénudée / *Dry barren*

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*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-12a / *Map 6-12a*
Végétation - Secteur de la mine et du chemin / *Vegetation - Mining And Road Sector*

Sources / Sources

AQReseau+, 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

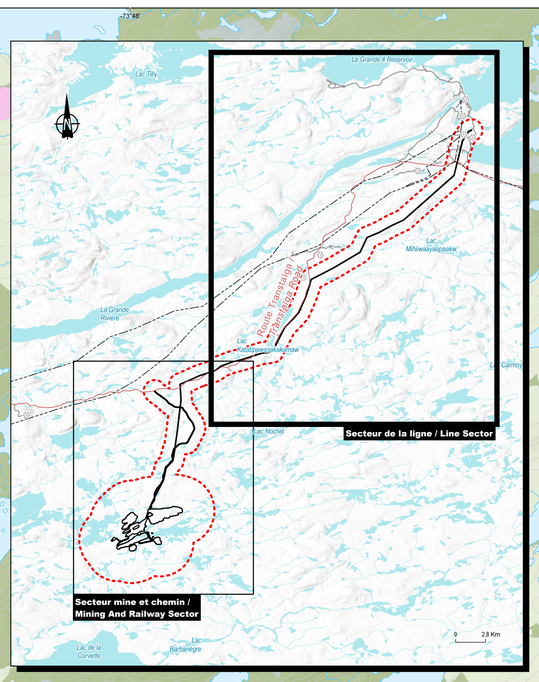
0 190 380 m
UTM, fuseau 18, NAD83 (CSRS)

2026-03-20

Préparation / Prepared by S. Faucher
Dessin / Drawn by: E. Khoiri
Approbation / Approved by: S. Faucher
CA0001724_3318_eie_c06_c12_260305.aprx
CA0001724_3318_eie_c06_12_105_vegetation_260320_A0

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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'



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

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*
- Permanent partiellement souterrain / *Partially underground permanent*
- Permanent souterrain / *Underground permanent*
- Souterrain / *Underground*

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*
- Ligne de transport d'énergie / *Electric power transmission line*
- Surface dénudée / *Dry barren*

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*
- Route locale / *Local road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-12b / *Map 6-12b*
Végétation - Secteur de la ligne électrique / *Vegetation - Electrical Line Sector*

Sources / Sources

ADIIstaum, Réseau routier, MERN, 2016
BDGA, YM, MERN, 2014
Carrilec, 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)

2026-03-20

Préparation / Prepared by: S. Faucher
Dessin / Drawn by: E. Khaki
Approbation / Approved by: S. Faucher
CA0001724_3318_ele_ch06_c12_260305.aprx
CA0001724_3318_ele_c06_12_105_vegetation_260320_A0

wsp

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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.

Terrestrial environments

Regenerating forest areas are the most commonly observed terrestrial environments in the biophysical LSA, accounting for 42.5% (8,774 ha). These are natural environments resulting from disturbances, most of which correspond to forest fires dating back several decades. These areas do not have a dominant tree stratum, but rather regeneration consisting mainly of black spruce, jack pine, and tamarack (*Larix laricina*) in the shrub stage, with a canopy cover of more than 10%. It is therefore estimated that these areas will become wooded again in the long or short term if they are not disturbed again. Other shrub species observed in these environments include dwarf birch (*Betula glandulosa*), mountain alder (*Alnus alnobetula subsp. crispa*), leatherleaf (*Chamaedaphne calyculata*), Labrador tea (*Rhododendron groenlandicum*), and lowbush blueberry (*Vaccinium angustifolium*). The herbaceous layer is generally not very dense, but wavy hairgrass (*Avenella flexuosa*), yellow clintonia (*Clintonia borealis*), bunchberry (*Cornus canadensis*), Sitka ground-cedar (*Diphasiastrum sitchense*), and wild lily-of-the-valley (*Maianthemum canadense*) are common. The soil in regenerating environments is in most cases composed of a sandy horizon and sometimes a thin organic horizon resting on rock.

Softwood stands are also abundant in the biophysical LSA, accounting for 28.1% (5,814 ha) of the total area. The most common stand type observed in the field is spruce-moss, followed by spruce-lichen and jack pine. Spruce stands are dominated by black spruce. Spruce-lichen stands differ from spruce-moss stands in that lichens dominate the ground cover rather than mosses. The main shrub species in spruce stands are regenerating black spruce, leatherleaf, Labrador tea, lowbush blueberry, velvetleaf huckleberry (*Vaccinium myrtilloides*), and dwarf birch. As for herbaceous vegetation, it is denser in spruce-moss stands forests than in spruce-lichen stands. The main species observed in abundance are three-fruited sedge (*Carex trisperma*), yellow clintonia, bunchberry, woodland horsetail (*Equisetum sylvaticum*), stiff clubmoss (*Spinulum annotinum* subsp. *annotinum*), and cloudberry (*Rubus chamaemorus)*. The soil in spruce stands is generally composed of sand, or sandy loam, sometimes with a thin organic horizon on the surface. These are sites where drainage varies from good to poor and where rock is sometimes close to the soil surface. As for jack pine stands, shrub and herbaceous vegetation is generally less abundant than in spruce stands. The main shrub species are sheep-laurel, Labrador tea, lowbush blueberry, mountain serviceberry (*Amelanchier bartramiana*), prairie willow (*Salix humilis*), and regenerating black spruce and jack pine, while the most common herbaceous plants are yellow clintonia, bunchberry, and wild lily-of-the-valley. The soil of jack pine stands consists of sand, often over shallow rock.

Other wooded areas, namely mixedwood and hardwood stands, are much less abundant, accounting for 0.1% (28 ha) and 0.002% (0.3 ha) of the biophysical LSA, respectively.

The only characterized hardwood forest is a white birch stand located on soil with very little organic matter on rock. The tree stratum is sparse, dominated solely by white birch (*Betula papyrifera*), while the shrub stratum is dense, also dominated by white birch, with mountain alder, squashberry (*Viburnum edule*), and skunk currant (*Ribes glandulosum*). The stiff clubmoss is the only dominant herbaceous species.

Two mixedwood groupings were identified, both located along banks on very thin fibrous soil over rock. This is a mature stand of black spruce and white birch with moderately dense shrub strata, dominated by mountain alder and mountain serviceberry, and herbaceous species such as stiff clubmoss and yellow clintonia. The other grouping is quite similar, with a predominance of black spruce and mature trembling aspen (*Populus tremuloides*) in the tree stratum. The shrub and herbaceous strata are dense and dominated by speckled alder (*Alnus incana* subsp. *rugosa*) and red-osier dogwood (*Cornus sericea*) among the shrubs, and by long beechfern (*Phegopteris connectilis*), northern lady fern (*Athyrium angustum*), and bunchberry among the herbaceous plants.

Scrublands, of which 20 were inventoried in the field, represent 1.8% (378 ha) of the biophysical LSA. Scrublands are environments characterized by little or no tree regeneration (less than 10% coverage), shrub cover of more than 70%, and/or a predominance of shrubs over lichens. Most of the scrubland is dominated by heath plants, mainly Labrador tea, leatherleaf, and lowbush blueberry. Some scrublands are dominated by mountain alder or dwarf birch. Yellow clintonia, bunchberry, and wavy hairgrass are the most common and abundant herbaceous plants in these environments. The soils in these environments generally had good drainage, being composed partly or entirely of sand or thin organic soil resting on till or rock.

Lichen tundra is not very abundant in the biophysical LSA, accounting for 2.5% (519 ha). Twelve (12) such environments have been characterized in the field. As with scrublands, these are natural environments where tree regeneration is absent or scarce (less than 10% cover), but where lichens dominate over shrubs. Dwarf birch, Labrador tea, lowbush blueberry, and sheep-laurel generally form the shrub stratum. The herbaceous plants provide sparse cover. Thin soil (15 cm on rock) or sandy soil supports the characterized environments.

Wetlands

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 vegetation groupings, wooded ombrotrophic bogs and open ombrotrophic bogs predominate. In fact, these two types of plant communities account for 63.7% of the wetlands in the biophysical LSA (1,548 ha out of 2,430 ha).

Although most open peatlands are not very diverse and are dominated by heaths, some open peatlands, particularly those located along watercourses, contain a greater diversity of herbaceous and shrub species. These riparian peatlands are minerotrophic (fens), which differ from ombrotrophic peatlands (bogs) in terms of their water source. Ombrotrophic bogs are wetlands fed mainly by precipitation (rain and snow), while the water supply in fens also comes from surface water that has been enriched with minerals through contact with the soil in neighbouring habitats. Fens therefore contain a much greater species richness. Wooded peatlands differ from open peatlands in terms of tree cover, which is greater than 25% in wooded peatlands. All of the characterized peatlands have organic soils ranging in thickness from 30 cm to over 100 cm and therefore rest on so-called hydromorphic soils.

Ombrotrophic bogs are generally lacking in diversity, and whether wooded or open, the plant species found there are essentially the same. Although they are still dominated by black spruce in the tree stratum, it is not uncommon to also see tamarack. These species are also abundant in the shrub stratum. The shrub stratum, which is normally dense in wooded environments, is dominated by heaths (*Ericaceae*) and mainly includes the following species: bog rosemary (*Andromeda polifolia* var. *latifolia*), leatherleaf, Labrador tea, black crowberry (*Empetrum nigrum*), creeping snowberry (*Gaultheria hispidula*), pale bog laurel (*Kalmia polifolia*), lowbush blueberry, velvetleaf huckleberry, small cranberry (*Vaccinium oxycoccos*), and bog bilberry (*Vaccinium uliginosum*). Speckled alder, dwarf birch, sweet gale (*Myrica gale*), and common juniper (*Juniperus communis*) are also common, especially in open peatlands. As for the non-woody stratum, it is still dominated by peat mosses. Herbaceous plants are more abundant in open peatlands, with the main species being few-seeded sedge (*Carex oligosperma*), three-fruited sedge, starry false Solomon's seal (*Maianthemum stellatum*), cloudberry, and tufted clubrush (*Trichophorum cespitosum*). Although rarely dominant in terms of coverage, the boreal bog sedge (*Carex magellanica* subsp. *irrigua*), the few-flowered sedge (*Carex pauciflora*), the threeleaf goldthread (*Coptis triflora*), the dew plant (*Drosera rotundifolia*), the wood horsetail, the northern comandra (*Geocaulon lividum*), the stiff clubmoss, the buckbean (*Menyanthes trifoliata*), the pitcher plant (*Sarracenia purpurea*), and the marsh scheuchzeria (*Scheuchzeria palustris*) have been observed very frequently in open ombrotrophic bogs.

Wooded fens are not very common in the biophysical LSA, covering 0.3% (67 ha). Wooded fens feature a tree stratum dominated by black spruce. Leatherleaf, speckled alder, Labrador tea, and black spruce regeneration are the main species in the shrub stratum. The herbaceous strata of the characterized wooded fens were sparse, with three-fruited sedge, few-flowered sedge, and cloudberry being the most common and abundant species. Open fens are also few in number in the biophysical LSA (177 ha, or 0.9%). Black spruce and tamarack are common there, both as trees (with low cover) and as shrubs. Leatherleaf and sweet gale clearly dominate the shrub stratum and are often accompanied by bog rosemary. Speckled alder, dwarf birch, blue honeysuckle (*Lonicera caerulea*), and several species of heath plants are also very common here, but rarely dominant. As for the herbaceous stratum, it is generally dense and diverse, with the main dominant species being Canada bluejoint (*Calamagrostis canadensis*), meagre sedge (*Carex exilis*), mud sedge (*Carex limosa*), few-seeded sedge, three-leaved Solomon's seal (*Maianthemum trifolium*), buckbean, bog aster (*Oclemena nemoralis*), cloudberry, tufted clubrush, and horned bladderwort (*Utricularia cornuta*).

Shrub swamps, and tree swamps cover only 245 ha (1.2%), and 372 ha (1.8%) respectively in the biophysical LSA. The vegetation present in these groupings is similar to that found in wooded ombrotrophic bogs. The thickness of organic matter (<30 cm) on the surface is the main element differentiating them from peatlands. The tree swamps are dominated by black spruce in the tree stratum, sometimes co-dominant with tamarack. In shrub swamps, black spruce trees can reach a cover of up to 20%. Speckled alder, dwarf birch, leatherleaf, sweet gale, Labrador tea, and black spruce or tamarack regeneration are the main shrub species found in these swamps. Three-fruited sedge, Canada bluejoint (*Calamagrostis canadensis*), bunchberry, wood horsetail, stiff clubmoss, creeping snowberry, northern starflower (*Lysimachia borealis*), cloudberry, and dwarf raspberry (*Rubus pubescens*) are the main herbaceous species in these swamps, but are less abundant in shrub swamps. The soils of these swamps are generally composed of a thin organic horizon over a sandy mineral horizon and are often covered with peat moss.

Ponds and shallow waters cover 15 ha (0.1%) of the biophysical LSA. These are shallow bodies of water that are not connected to beaver activity and have no woody vegetation. Unlike shallow waters, ponds characterized in the field are isolated from the hydrographic network. In both cases, vegetation is sparse, but varies greatly in species diversity from one habitat to another. Buckbean, yellow cowlily (*Nuphar variegata*), marsh scheuchzeria, boreal bog sedge (*Carex magellanica* subsp. *irrigua*), and russet sedge (*Carex saxatilis*) are among the species observed in these flooded environments.

The marshes in the study area are either riparian, located on the edges of lakes or watercourses, or isolated from the hydrographic network. They cover 6 ha (0.03%) of the biophysical LSA. The marshes in question have poor or very poor drainage and, at the time of the visit, all had waterlogged soil, sometimes flooded. The vegetation is dominated by herbaceous water plant species, including sedges (Carex spp.), rushes (Juncus spp.), tufted clubrush, and buckbean.

Only 4% of the characterized wetlands had been disturbed by human activities (roads, partial logging, drainage), while approximately 11% had been disturbed by natural events, such as recent forest fires (10%), or by beaver activity (1%).

Plant species of special status

In general, boreal forests dominated by spruce-moss stands or spruce-lichen stands, such as those in the biophysical LSA, follow a dynamic associated with the fire regime and generally have a relatively undiversified vascular flora. The habitats are fairly homogeneous, and the relative lack of noteworthy plant life is characteristic of the territory as a whole.

The interactive map of occurrences of species at risk from the Quebec Natural Heritage Data Centre (CDPNQ, 2025) was consulted to obtain known occurrences of species of special status within a 15 km radius of the biophysical regional study area (biophysical RSA). It turns out that there are no occurrences in this area.

Taking into account the influence of substrate on plant communities, research was conducted to identify the geology and nature of soils in the biophysical LSA, by consulting data from maps of surface deposits in northern Quebec (MRNF, 2024a) and the interactive regional geology map of the Quebec geomining information system (SIGÉOM) (MRNF, 2024b). A few small areas of ultramafic/ultrabasic intrusive rock formations, composed of metaperidotite and metapyroxenite, are found beneath the soils of the biophysical LSA. These rock formations, which are exposed in places or subject to the action of water, could provide favourable conditions for basophilous plant species, including several species of special status.

A query performed using the CDPNQ (2024) *Potential* tool yielded a list of 95 vascular plant species of special status identified in the Nord-du-Québec region. Analysis of each of the listed species revealed that the vast majority had a zero probability of occurrence in the biophysical LSA based on the distribution of known occurrences and the absence of their preferred habitat. Table 6-21 lists the 10 species with the potential to be present in the biophysical LSA. All of these species are likely to be designated as threatened or vulnerable in Quebec, and none have a status under Schedule 1 of Canada's *Species at Risk Act* (Government of Canada, 2025b).

In the field, an inventory of plant species of special status was carried out in parallel with the work to characterize the environments. The environments targeted by the sampling plan, which generally have characteristics conducive to harbouring species of special status, were surveyed in greater detail. During field trips, particular attention was also paid to all habitats with distinctive characteristics, such as certain open peatlands (ombrotrophic and minerotrophic), shorelines, rocky outcrops, boulder fields, and riparian wetlands. No plant species of special status were observed during field surveys conducted in 2023, 2024, and 2025.

Table 6-21 Plant species of special status likely to be present in the biophysical LSA

Common name	Scientific name	Status in Quebec[a]/ Canada	Ideal observation period	Habitat type	Probability of being present
Brown-edged pussytoes	*Antennaria rosea subsp. confinis*	LDTV/None	Late spring/early summer	Dry to moist sandy herbaceous meadow and bushes and foot of escarpment.	Low
Modest aster	*Canadanthus modestus*	LDTV/None	Late summer/early fall	Shores, wet scrublands, peaty fields.	Low
Spatulate moonwort	*Botrychium spathulatum*	LDTV/None	Late spring/early summer	Open gravelly or rocky, well-drained areas, often near the sea; very open grasslands and scrublands, usually in association with Virginia strawberry.	Low
Botrychium ascendens	*Botrychium ascendens*	LDTV/None	Late spring/early summer	Open mesic to relatively xeric habitats, herbaceous coastal grasslands, sandy or sandy-stony, behind the crest of the backbeach.	Low
Ojibway waterwort	*Elatine ojibwayensis*	LDTV/None	Summer	Clayey, exposed riverbanks.	Low
Rocky Mountain willowherb	*Epilobium saximontanum*	LDTV/None	Summer	Mainly wet silty-clay or rocky banks; also sandy edges of paths and subalpine meadows.	Low
Limestone swamp bedstraw	*Galium brevipes*	LDTV/None	Late summer/early fall	Marly ponds, marshes, and moderately rich fens.	Low
Nahanni oak fern	*Gymnocarpium continentale*	LDTV/None	The entire growing season	Stabilized schistose talus slopes and cracks and ledges of rocky escarpments.	Low
Purple meadow-rue	*Thalictrum dasycarpum*	LDTV/None	Summer	Riverbanks on clay or peaty substrate; also, herbaceous wildland.	Low
McCall willow	*Salix maccalliana*	LDTV/None	Summer	Banks, peatlands, burned areas, willow stands, and black spruce stands; at least partially on basic substrate.	Medium

Note: a LDTV: Species likely to be designated as threatened or vulnerable in Quebec.

Invasive alien species

Invasive alien plant species (IAPS) are plants that have been introduced outside their natural range and may pose a threat to the environment and biodiversity. Because of their ability to disperse and grow rapidly, these species have competitive advantages over native species, allowing them to become dominant in the plant community of a given environment or even to locally eliminate some uncompetitive native species.

For Quebec's IAPS, the MELCCFP's online tool for detecting invasive alien species (MELCCFP, 2025) was consulted to verify the presence of IAPS occurrences in the biophysical RSA. Field inventories were specifically designed to identify the presence of IAPS considered to be priorities by the MELCCFP (Gouvernement du Québec, 2025a).

The IAPS-specific inventories were conducted simultaneously with the general plant group inventories. The search for species was conducted visually in the inventory areas. Particular attention was paid to environments particularly favourable to IAPS, such as roadsides, logging roads, anthropogenic environments, disturbed areas, and areas near these environments. During the inventories, no IAPS were observed in the biophysical LSA.

Vascular plants having traditional uses

During the plant inventories, special attention was paid to plants of interest that are traditionally used by the Cree communities. The plant species observed during the inventory campaigns carried out in 2023, 2024, and 2025 for which a traditional use is known were collected and catalogued (Uprety et al., 2012).

Of the more than 200 plant species observed overall in the biophysical LSA, 48 have known traditional uses for members of the Cree community (Table 6-22). These include seven tree species, 25 shrub species or genera, 15 herbaceous species or genera, and a group of non-vascular species (peat mosses).

Overall, species of traditional interest observed in the field are abundant in the biophysical LSA and common at the regional level.

Plant ecotoxicology

Two plants traditionally valued by local land users, blueberries (*Vaccinium spp.*) and Labrador tea, were sampled and sent for analysis to determine the natural concentration of metals in the plant parts known to be consumed by land users. To this end, four plant sampling plots were selected for ecotoxicological monitoring, two of which were within the potential radius of influence of future project activities based on prevailing winds, and two located outside the area of influence.

In 2025, 72 samples of structural tissue (excluding duplicate soil samples) were collected, including Labrador tea leaves and blueberry plant berries. These were analyzed in the laboratory to measure the median concentrations of 25 metals in the tissues. It should be noted that there are no thresholds (criteria) for the parameters analyzed in blueberries and Labrador tea leaves. In fact, there are currently no standards set by the Canadian Council of Ministers of the Environment (CCME) or the MELCCFP for the presence of metals in vegetation.

For this initial sampling and analysis effort, no parameter showed a concentration high enough to cause concern in the plants studied. For both blueberries and Labrador tea, most of the metals found in the samples, including antimony, silver, tin, lithium, uranium, arsenic, and lead, are below the detection limit or have very low median concentrations. Manganese is the most abundant metal, followed by iron, both of which are present at levels consistent with the natural levels in the species studied. Detailed results of the ecotoxicological analysis are available in Appendix 6-15.

Table 6-22 Vascular and non-vascular plants with traditional Cree uses observed in the biophysical LSA

Scientific name	French name	English name	Cree name	Parts used
Trees				
Abies balsamea	Sapin baumier	Balsam fir	Pikew-ahtik, nupukasik, pīkowāhtik, napakāsīt, nāpukasītuk, nāpukasī	Resin, needles, bark, wood, stems
Betula papyrifera	Bouleau à papier	Paper birch	Htik, owkimawa, waskway, waskwah, waskwaha, wasgwah, waskwayahtik, wuskwi-atik	Twigs, buds, stems, leaves, roots, bark, wood, sap
Larix laricina	Mélèze laricin	Tamarack	Waachinaakan	Inner bark
Picea glauca	Épinette blanche	White spruce	Wapiskimnahik, Eyinatik, Minuhik, Mīnahik, Sī(h)ta	Buds, bark, sap, gum, wood, leaves
Picea mariana	Épinette noire	Black spruce	Inaatuk	Buds, bark, sap, gum, wood, leaves, cones
Pinus banksiana	Pin gris	Jack pine	Ushichishk	Cones and inner bark
Populus tremuloides	Peuplier faux-tremble	Trembling aspen	Mitos, mitosinipiah	Inner bark
Shrubs				
Alnus alnobetula subsp. *crispa*	Aulne crispé	Green alder	Mathato	Leaves
Alnus incana subsp. *rugosa*	Aulne rugueux	Mountain alder	Utuspii	Bark
Andromeda polifolia var. *latifolia*	Andromède glauque	Glaucous-leaved bog rosemary	Kakouboushk	Twigs
Cornus sericea	Cornouiller hart-rouge	Red-osier dogwood	Unknown	Bark, fruit, pith, and roots
Empetrum nigrum	Camarine noire	Crowberry, Curlewberry	Askīmināsiht, Ebshjimend	Fruit
Gaultheria hispidula	Petit thé	Creeping snowberry	Unknown	Leaves and fruit
Ilex mucronata	Némopanthe mucroné	Mountain holly	Unknown	Leaves
Juniperus communis	Genévrier commun	Juniper	Kaahkaachiiminaahtikw	Roots
Kalmia angustifolia	Kalmia à feuilles étroites	Sheep laurel	Uschipikwh	Leaves
Prunus pensylvanica	Cerisier de Pennsylvanie	Pine cherry	Pusawemina, pasisāwimin, pāsuwiymayātik	Bark and roots
Prunus virginiana	Cerisier de Virginie	Chokecherry	Takwahīminăna, takwēhiminān, tākwuhiymin	Bark, leaves, stems, and roots
Rhododendron groenlandicum	Thé du Labrador	Labrador tea	Kachebuk	Leaves
Ribes americanum	Gadelier d'Amérique	American black currant	Unknown	The whole plant
Ribes glandulosum	Gadellier glanduleux	Skunk currant	Mithicimin	Stems
Rubus idaeus	Framboisier sauvage	Raspberry	Athoskan, athoskunatikwah, ayosikan, uyooskan, ayuwskun, ayooskunak, anosh'kanek	Stems, roots and fruit
Salix bebbiana	Saule de Bebb	Bebb's willow	Nepise, nepiseatik, wekope, atikwupamuk, nīpīsīs, nīpīsī, nīpīsīah, nīpīsīgībī, nīpīstakwah	Bark, twigs, and roots
Salix discolor	Saule discolore	Pussy willow	Nīpisī	Inner bark
Salix planifolia	Saule à feuilles planes	Tea-leaved willow	Waskayabaduk	Bark
Salix sp.	Saules	Willow	Utusphi	Inner bark
Sorbus americana	Sorbier d'Amérique	American mountain-ash	Esniywachiywa, maskominanatik	Bark and roots
Sorbus decora	Sorbier plaisant	Northern mountain-ash	Maskōminānātik	Bark, branches, and leaves
Vaccinium angustifolium	Bleuet à feuilles étroites	Early lowbush blueberry	Unknown	Roots and fruits
Vaccinium myrtilloides	Bleuet fausse-myrtille	Velvet-leaved blueberry	Sipikomin, ithinimina, iynimin, iyinimin, inimena	Stems, roots and fruit
Vaccinium vitis-idaea	Airelle rouge	Mountain cranberry	Wesakemina, wīsaki(h)min, wiysukiymin	Stems, roots and fruit
Viburnum edule	Viorne comestible	Squashberry	Moosomina, mōsomina, moosominahtik, mōsōminā(h)tik	Twigs, buds, leaves, and stems
Herbaceous plants				
Chamaenerion angustifolium	Épilobe à feuilles étroites	Fireweed	Hapaskwa, askapask, athkāpask, ākāpuskwah, liy(h)kāpusk	The whole plant
Dryopteris carthusiana	Dryoptère spinuleuse	Spinulose shield fern	Ku(h)kuguwpuk	Fronds
Dryopteris expensa	Dryoptère dressée	Spreading wood fern	Unknown	Young fronds and roots
Equisetum arvense	Prêle des champs	Field horsetail	Mistatimosoy, okotāwask, enskowusk, kiychiwiykusk	Green shoots and stems
Equisetum hyemale	Prêle d'hiver	Scouring rush, Horsetail	Unknown	The whole plant
Equisetum sylvaticum	Prêle des bois	Horsetail	Mistatimosoy, okotawask, enskowusk, kiychiwiykusk	The whole plant
Fragaria spp.	Fraises	Strawberry	Otehimina, otīhīminah, okdeamena, owtiyhiymin, otīhīminipukwah	The whole plant
Geocaulon lividum	Comandre livide	Northern comandra	Unknown	Fruit
Lycopodium clavatum	Lycopode claviforme	Common club-moss	Unknown	The whole plant
Maianthemum canadense subsp. *canadense*	Maïanthème du Canada	Wild lily-of-the-valley	Sosowipukosak, soskopukwagoh	Leaves
Nuphar variegata	Grand nénuphar jaune	Yellow pond lily	pwakumosikum, oskotamo, waskātamow, wāskātamo, waskutamo, ōskītīpak, waskītīpak	The whole plant
Sagittaria cuneata	Sagittaire cunéaire	Arrowhead	Unknown	Leaves
Sarracenia purpurea	Sarracénie pourpre	Pitcher plant	Ayekitas, ayikitās, ayīkicās, athīkacās	The whole plant
Symphyotrichum puniceum	Aster ponceau	Purple-stemmed aster	Mistasakewusk, mistahīsakwīwask, mstahiysāgiywusk, pāwistiko(h)maskīhkīh, bigonbimaskgigiah, pikōnbīmaskīgīah, pikwanpīmāskīgah	The whole plant
Triglochin maritima	Troscart maritime	Seaside arrow-grass	Mminahikos	The whole plant
Mosses				
Sphagnum sp.	Sphaigne	Peat moss	Uske, muskak, askiyah, mikaskwahkawow, asaskumkwa, eskiya, awasistche	The whole plant

6.3.2 Ichthyofauna and benthos

6.3.2.1 Current conditions

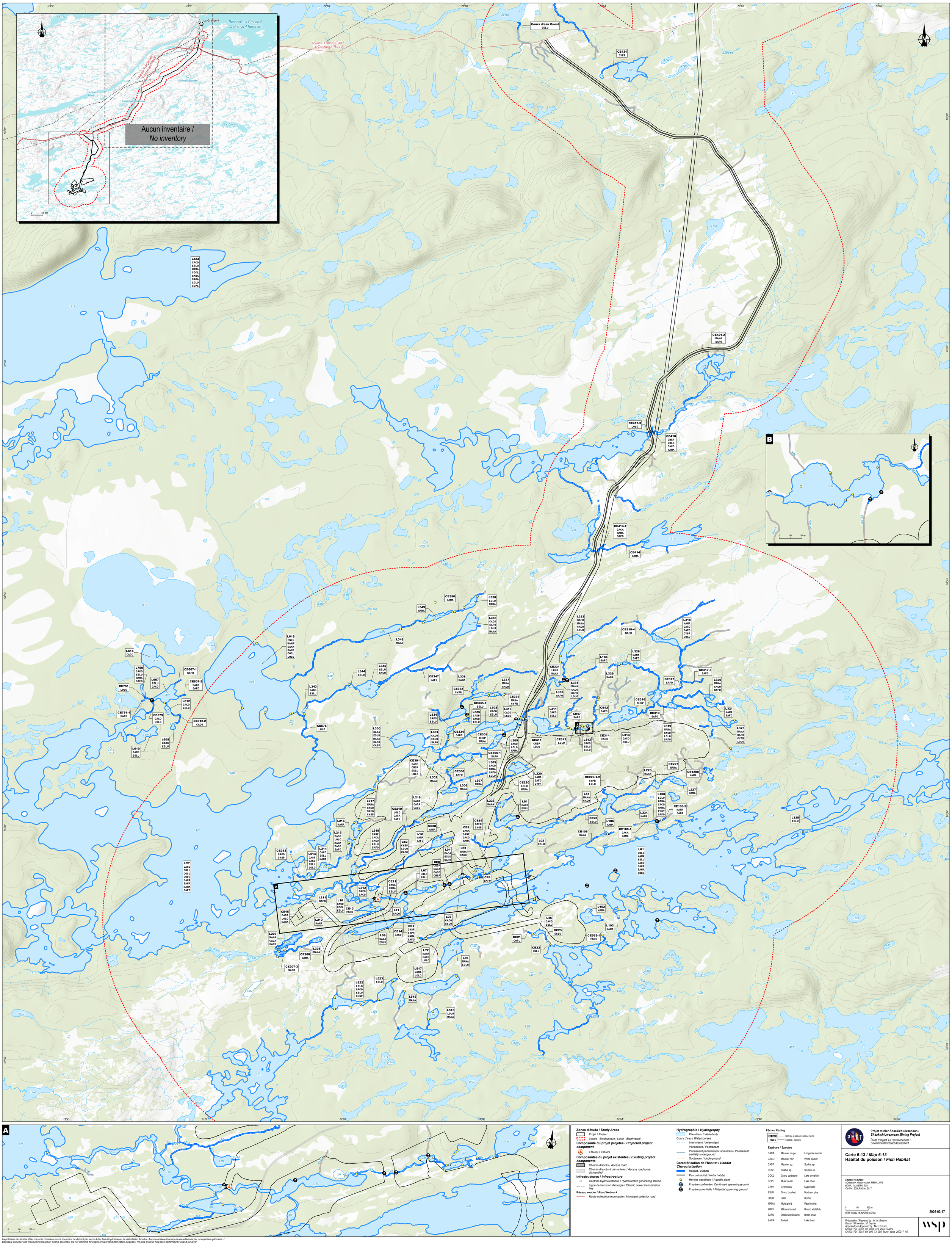
Field inventories for characterizing fish and benthic invertebrate habitats were conducted between 2022 and 2025 (Niigaan, 2025a,b). These inventories covered all bodies of water and watercourses that may be directly or indirectly affected by the project's planned infrastructure, including components of the water environment exposed to the potential future mine effluent and reference features that will be used to detect any changes in the aquatic environment through project construction and operations. All information concerning the baseline environment for fish habitat, benthic invertebrates and the analysis of metal content in fish flesh is presented in Appendices 6-16 to 6-18.

There are two major watersheds in the biophysical LSA: Lac de la Corvette (part of the Pontois River watershed) and La Grande, which is subdivided into northern and southern sectors (Map 6-8).

Between 2022 and 2025, the following activities were carried out in the biophysical LSA:

- characterization of water bodies (bathymetry and morphometry, water physiochemistry, fish inventory, sampling of benthic invertebrates, metal content in fish flesh);
- characterization of watercourses (physiochemistry of water, fish inventory, sampling of benthic invertebrates);
- assessment of fish habitat (potential, species description, ecological functions).

The data collected throughout four years of field studies form the basis for assessing the potential impacts of the project on the aquatic environment and for the development of aquatic habitat monitoring and proposed compensation measures. The tables in the following sections, as well as Maps 6-13 and 6-14, present a summary of the inventories carried out to characterize the aquatic environment.



Zones d'étude / *Study Areas*

Projet / *Project*

Locale - Biophysique / *Local - Biophysical*

Composante du projet projetée / *Projected project component*

Effluent / *Effluent*

Composantes du projet existantes / *Existing project components*

Chemin d'accès / *Access road*

Chemin d'accès à démanteler / *Access road to be dismantled*

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*

Hydrographie / *Hydrography*

Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

Intermittent / *Intermittent*

Permanent / *Permanent*

Permanent partiellement souterrain / *Permanent partially underground*

Souterrain / *Underground*

Caractérisation de l'habitat / *Habitat Characterization*

Habitat / *Habitat*

Pas un habitat / *Not a habitat*

Herbier aquatique / *Aquatic plant*

Frayère confirmée / *Confirmed spawning ground*

Frayère potentielle / *Potential spawning ground*

Pêche / *Fishing*

CE20 — Nom de la station / *Station name*

ESLU — Espèce / *Species*

Espèces / *Species*

CACA	Meunier rouge	Longnose sucker
CACO	Meunier noir	White sucker
CASP	Meunier sp.	Sucker sp.
CHSP	Chabot sp.	Sculpin sp.
COCL	Grand corégone	Lake whitefish
COPL	Mulet de lac	Lake chub
CYPR	Cyprinidés	Cyprinidae
ESLU	Grand brochet	Northern pike
LOLO	Lotte	Burbot
MAMA	Mulet perlé	Pearl mullet
PRCY	Ménomini rond	Round whitefish
SAFO	Omble de fontaine	Brook trout
SANA	Touladi	Lake trout

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-13 / *Map 6-13*
Habitat du poisson / *Fish Habitat*

Sources / Sources

ADIrisseur+, réseau routier, MERN, 2016
BDCA, 1M, MERN, 2014
CanVec, 250k,RNCan, 2017

0 180 360 m

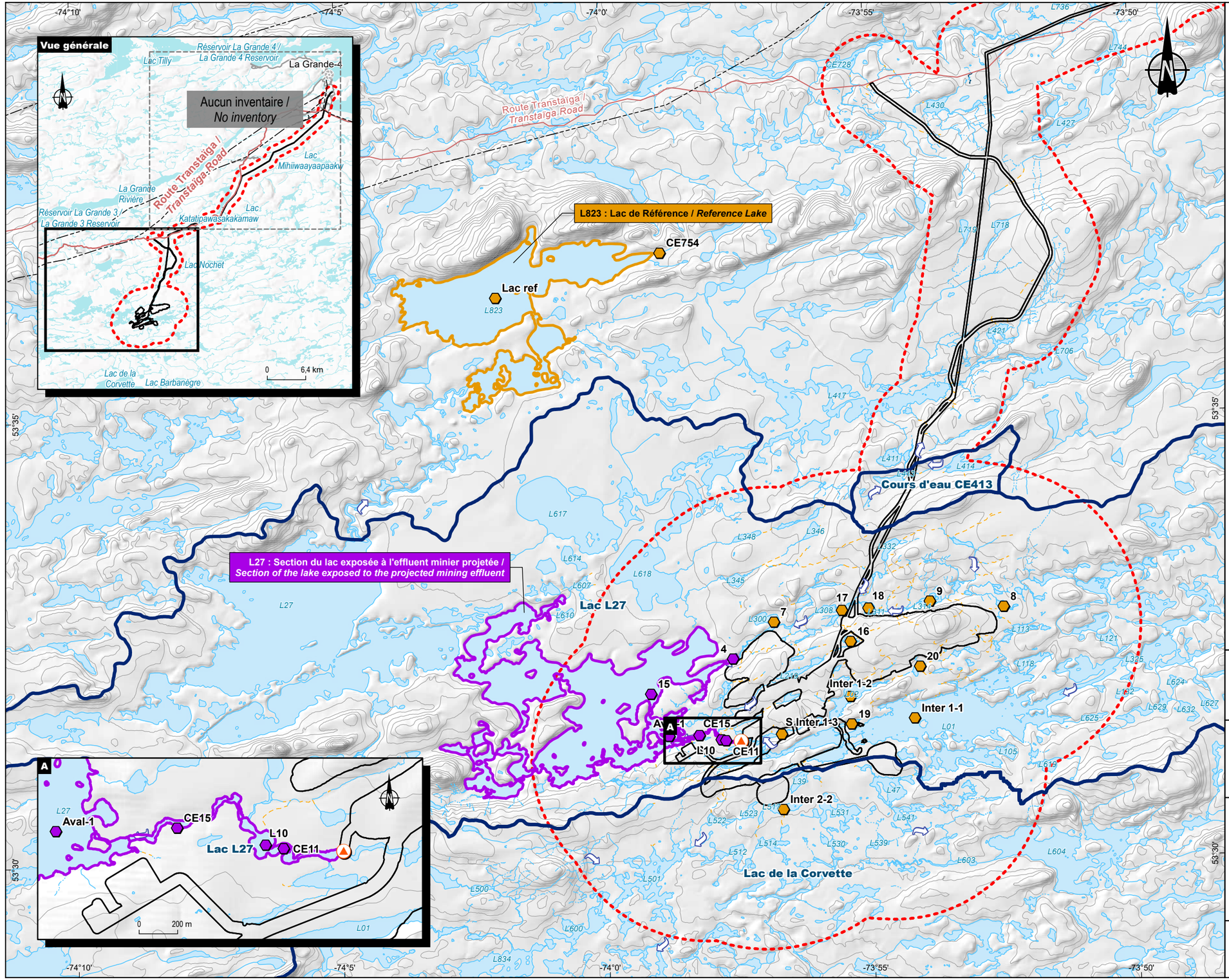
UTM, fuseau 18, NAD83 (CSRS)

2026-03-17

Préparation / Prepared by : M.-H. Brisson
Dessin / Drawn by : M. Duprat
Approbation / Approved by : M-H. Brisson
CA0001724_3318_eie_ch06_c13_260310.aprx
CA0001724_3318_eie_ch6_13_596_faune_aqua_260317_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.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Composantes du projet projetées / *Projected Project Components*

- Effluent / *Effluent*

Hydrologie / *Hydrology*

- Sens d'écoulement de l'eau / *Waterflow direction*
- Bassin versant principal / *Principal watershed*

Milieux hydriques / *Hydrous Environments*

- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Intermittent partiellement souterrain / *Partially underground intermittent*
- Souterrain / *Underground*

Station d'échantillonnage / *Sampling Station*

Type d'échantillon / *Sample type*

- Benthos

Catégorie d'échantillon / *Sampling Category*

- Exposée à l'effluent minier projetée / *Exposed to the projected mining effluent*
- Référence / *Reference*

Infrastructure / *Infrastructure*

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

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-14 / *Map 6-14*
Stations d'échantillonnage du benthos / *Benthos Sampling Stations*

Sources :
CanVec, 1/250 000, RNCan, 2017
BDGA, 1M, MERN, 2014
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Synergis, État de référence du milieu aquatique pour le projet Shaakichiuwaanaan, 12-2025

0 800 1 600 m
NAD 1983 CSRS UTM Zone 18N

2026-03-25

Préparation / Preparation : I. Cartier
Dessin / Drawing : J. Roy
Approbation / Approval : M.-H. Brisson
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CA0001724_3318_eie_c06_XX_116_XXXX_260324

Sampling of benthic invertebrates

Sampling of benthic invertebrates took place in October 2024 and September 2025, during which time most taxa would have reached a sufficient size to be captured. A total of 13 stations were inventoried in the reference area and six in the area which could be potentially exposed to future mine effluent. Analysis of benthic indicators was used to assess the structure of communities in lakes and watercourses. Most of these lakes, characterized by their oligotrophic nature, are shallow (between 0.5 m and 6 m), with the exception of Lake L01 (18 m) and Lake L27 (18 m), and have a substrate composed mainly of silt or clay.

Stations located in areas that could be potentially exposed to the future mine effluent (Aval-1, 4, 15, CE15, L10, CE11) and certain reference stations (Inter 2-2, S Inter 1-3, 17) reveal significant variability in the structure of benthic communities (Table 6-23). Stations CE15, Inter 2-2, S Inter 1-3, 4, 17, and L10 are characterized by high organism densities, significant taxonomic richness, and low Simpson evenness indices, reflecting diverse and well-distributed communities. In contrast, Stations 15, Inter 1-1, Inter 1-2, 9, 16, 18, 19, 20, and Lac ref have poorer profiles, characterized by low diversity, lower densities, and a marked dominance of certain taxa, which may limit the availability of varied prey for fish and indicate increased sensitivity to disturbances.

Table 6-23 Ecological indicators by benthos sampling station in 2024 and 2025

Name of watercourse/body of water	Station	Total number of organisms	Total density (number of organisms/m^2)	Taxonomic richness (number)	Simpson evenness index*	Shannon diversity index**
Reference area						
Lake L01	Inter 1-1	22	319	14	0.69	3.55
	19	8	116	6	0.76	2.41
Watercourse CE11	S Inter 1-3	146	2116	26	0.24	3.45
Lake L02	Inter 1-2	43	623	8	0.47	2.22
Lake L18	20	20	739	14	0.58	3.35
Lake L220	16	51	739	14	0.58	3.35
Lake L308	17	200	2899	21	0.29	3.25
Lake L322	7	149	2159	21	0.29	3.25
Lake L323	8	53	768	16	0.23	2.48
Lake L311	18	3	259	6	0.23	1.58
Lake L314	9	60	870	12	0.42	2.92
Lake L517	Inter 2-2	202	2928	27	0.42	3.92
Lake L823	Lac ref	2	29	2	1	1
Area potentially exposed to future mine effluent						
Lake L27	15	22	319	11	0.73	3.23
	Aval-1	86	1246	23	0.46	3.90
	4	194	2812	30	0.36	3.96
Watercourse CE15	CE15	282	4087	28	0.41	2.95
Lake L10	L10	163	2362	20	0.48	3.15
Watercourse CE11	CE11	135	1957	14	0.13	1.69

* The Simpson evenness index assesses the distribution of individuals among taxa by combining dominance and richness, indicating that a value close to 1 reflects low diversity.

** The Shannon diversity index measures benthic diversity by integrating richness and evenness, where high values indicate a homogeneous distribution of individuals and greater diversity.

From a taxonomic point of view, arthropods dominate most stations, mainly represented by chironomids, followed by mollusks (bivalves and gastropods). Some stations have a balanced mix of arthropods and mollusks (e.g., CE15, L10, S Inter 1-3), while others are heavily dominated by a single phylum (e.g., Inter 2-2, CE11 by arthropods; Inter 1-2 by mollusks).

The diversity and structure of the benthic communities observed at the various stations highlight significant ecological heterogeneity, making it possible to identify areas with diverse communities and others with more limited diversity.

Fish inventory

Fish inventories, supplemented by eDNA analyses, confirmed the presence of several species in the lakes and watercourses of the biophysical LSA, including northern pike (*Esox lucius*), brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), white sucker (*Catostomus commersonii*) and Northern sucker (*Catostomus catostomus*), Allegheny pearl dace (*Margariscus margarita*), burbot (*Lota lota*), round whitefish (*Prosopium cylindraceum*), sculpins (*Cottus sp.*), and various cyprinids (*Cyprinidae sp.*). Among these, northern pike, brook trout, lake trout, lake whitefish, and burbot are of interest to both Indigenous and non-Indigenous communities. No rare, threatened, or vulnerable species were identified in the study area or within a 10-kilometre radius of the project site. No invasive alien species were detected.

To facilitate the representation and understanding of the results, the biophysical LSA, characterized by a large area with a high number of aquatic environments, has been subdivided into seven sectors. This approach made it possible to structure the analysis of data from inventories carried out on nearly 150 waterbodies and just under 250 permanent, intermittent, or underground watercourses. The main waterbodies and watercourses likely to be impacted by the construction of future project infrastructure are presented for the Lake L01, La Grande A, and Lake L27 sectors, due to their ecological importance and proximity to the planned development areas (Tables 6-24 and 6-25). The rest of the inventoried sectors can be found in the baseline fish and fish habitat report (Niigaan, 2025a; Appendix 6-16).

Lake L01 sector

The Lake L01 sector contains 12 bodies of water and 51 watercourses that have been characterized. Most of the water bodies in this sector, including L01, L72, L102, L103, L106, L108, and L325, are considered confirmed fish habitats, while L48 is also recognized as such due to its connectivity to the water network. In contrast, ponds L101 and L107, which are isolated and show no catches or detection by eDNA, are not considered to be fish habitats. Lake L01 is particularly noteworthy for its great fish diversity, with ten species recorded, and for its physical characteristics that are conducive to the growth, feeding, and spawning of lithophilic (coarse substrate) and phytophilic (vegetated areas) guilds. However, despite a favourable environmental context, the targeted inventory of potential spawning shoals proved inconclusive, and the potential for lake trout remains limited due to the presence of clogged substrate. Connected water bodies, particularly L72 and L325, offer favourable conditions for spawning and fry rearing, although they have lower diversity. L102 is dominated by Allegheny pearl dace, while L108, despite its small size, has notable diversity due to its connectivity. The other ponds in the area have limited potential for fish breeding due to their shallow depth and often restrictive physical and chemical conditions. Among the watercourses, CE1, CE27, CE102, CE105, CE106, CE108, CE108-1, CE108-2 and CE1208 are confirmed as fish habitats, while others, such as CE1-2, CE1-4, CE1-5, CE1-51, CE19, CE26, CE103, CE104, CE106-3 and CE107, are considered potential habitats due to their connectivity despite modest flows or partially underground segments. CE1 and CE27 are distinguished by their alternating areas of white water, pools, and sills that can serve as spawning grounds for lithophilic species, while CE26 has a high presence of aquatic vegetation favourable for phytophilic species. Lastly, the remaining waterways, CE1-13 and CE1208-3, do not appear to be fish habitats due to the presence of impassable sills located upstream of the inventoried segments.

La Grande A sector

The La Grande A sector, located just north of Lake L01 in the La Grande Sud watershed, includes 27 characterized water bodies and 106 characterized watercourses. Most of the bodies of water connected to the main network, including L02, L03, L04, L05, L06, L07, L08, L09, L10, L11, L12, L18, L61, L63, L16, L210, L211, L212, L218, L219, L220, L223, L224, L226, L227, and L228 are confirmed fish habitats based on experimental fishing or eDNA analysis, while some very shallow ponds, including L06, L08, L63, and L161, have more marginal conditions and have not yielded any fish, ruling them out as fish habitats. Lake L10 stands out for having the greatest species diversity in the sector, with ten species detected mainly through eDNA analysis, and for its varied shoreline, which includes submerged grass beds that are favourable for fry rearing and feeding. Lake L02, the main hydrological hub in the sector, has physical characteristics that are conducive to feeding and shelter, although its species richness is lower. Water bodies L03, L05, L10, and L18 have coarse substrates and grass beds suitable for both lithophilic and phytophilic species, while the ponds upstream of L10, notably L12, L212, L218, L219, and L220, have strong plant growth that supports fry rearing, but their diversity is limited by their shallow depth. Among the watercourses, CE2, CE3, CE4, CE4-1, CE5, CE6, CE7, CE8, CE9-1, CE9-2, CE10, CE11, CE13, CE14, CE15, CE20, CE28, CE31, CE34, CE53, CE54, CE55, CE211, CE212-1, CE218-2, CE219, CE220, CE220-1, CE223, CE223-1, CE224, CE226, CE226-51, CE226-1-2 and CE227 are confirmed fish habitats, while other watercourses with intermittent flows or underground segments, such as CE2-1, CE29, CE30, CE33, CE35, and CE36, are considered potential habitats. Several segments, particularly those connecting L02 to L07 and those located downstream of L10, feature a succession of river pools, sills, and grass beds that can serve as spawning grounds for lithophilic species or preferred areas for phytophilic species.

Lake L27 sector

The L27 lake sector, located in the La Grande watershed downstream from the La Grande A, La Grande B, and La Grande C sectors, is one of the largest and most interconnected water systems in the inventory area. It includes 42 bodies of water, including 12 lakes and 30 ponds, as well as 82 watercourses characterized between 2022 and 2025. The presence of fish has been confirmed in 23 bodies of water, the largest of which are lakes L27, L618, L350, L346, L345, and L216, recognized as confirmed habitats for various species present in the area. The other bodies of water were not considered fish habitats due to their lack of hydraulic connectivity, absence of catches, or absence of eDNA detection, while lakes L609 and L1200 have inconclusive hydrographic potential, with their fish status unable to be confirmed. In this sector, Lake L27 plays a major structural role as it is the largest body of water in the study area and is located directly downstream from the planned discharge point for mine effluent, making it a lake of priority interest for assessing fish habitat potential and essential ecological functions. The watercourses in the Lake L27 sector exhibit a wide range of flow variability, ranging from permanent segments to intermittent or entirely underground sections, the latter being common in several areas. The facies observed are mainly glides, with the notable exception of CE348, which includes a waterfall. A significant number of these are confirmed fish habitats, notably CE213, CE214, CE215, CE216, CE344, CE345, CE346, CE347, CE348, CE349, CE350, CE350-1, as well as several watercourses in the CE576 to CE612-2 and CE751 series. The dominant functions are fry rearing and feeding, generally of low to medium quality due to organic substrates, shallow depths, and limited widths. Some watercourses offer slightly more functional habitats, such as CE217, CE577, and CE607-2, due to the presence of aquatic vegetation. Watercourses without hydraulic connectivity or with underground flows, such as CE38, CE342-1, and CE342-2, are not considered fish habitats. Overall, the sector features a mosaic of scattered fish habitats, dominated by fry rearing and feeding functions, with generally marginal spawning potential.

Reference sector

Lake L823, located approximately 5 km north of Lake L27, is a large body of water with morphometric parameters comparable to those of Lakes L27 and L01, and will be used as a reference lake for monitoring environmental effects. Conventional fishing confirmed the presence of the vast majority of species associated with the mine sector, including CACO, CACA, COCL, ESLU, MAMA, SANA, COPL, and LOLO (see footnote to Table 6-24 for full names).

Metal content in fish flesh

The fishing trips to collect specimens for metal content analysis were carried out from July 31 to August 9, 2024, and from July 9 to 16, 2025. The three bodies of water selected to establish the reference state for heavy metal concentrations in fish flesh are Lakes L27, L01, and reference lake L823. This reference lake provides a point of comparison for detecting any changes attributable to the mining project or natural variations in the environment. The analysis focuses primarily on arsenic, mercury, and lead, in accordance with Health Canada guidelines (CFIA, 2025) governing the marketing of fishery products.

Mercury concentrations measured in the flesh of northern pike and lake trout between 2024 and 2025 (Table 6-26) are comparable to the averages observed in natural lakes in the Canadian Shield, where levels frequently exceed standards, regardless of fish size. Large specimens from exposed lakes exceed Health Canada criteria, while medium-sized specimens from the reference lake remain below the threshold of 0.5 mg/kg, unlike those from exposed lakes. Arsenic and lead were also measured, as federal guidelines exist for certain fishery products (e.g., fish protein concentrate), although no maximum concentration has been established for fresh fish muscle.

However, statistical analysis reveals no significant difference between mercury concentrations in northern pike from exposed areas and those from the reference lake. The established values will now be used to compare changes in metal content between exposed areas and the reference area as the mining project develops, so as to distinguish anthropogenic effects from natural variations.

Table 6-24 Summary of information collected in water bodies

Lake	Area (ha)	General description	Fish inventory	Habitat characterization	Physicochemical parameters (surface)				Fish species caught
					Water temperature (°C)	Dissolved oxygen (mg/l)	Specific conductivity (µs/cm)	pH	
Lake L01 sector									
L01	447.83	Lake L01 is the largest body of water in the area and will be directly impacted by the project, with plans to develop an open pit mine that will drain the western portion of the lake. It is fed by several tributaries, the main one coming from Lake L325, and its outlet (CE1) is located on the north bank. The lake has a high riparian quality index, indicating good potential for spawning grounds and diverse habitats. Connected watercourses serve as migration corridors and nursery areas, despite limited connectivity due to several underground and intermittent sections.	This body of water has ten species, genera, or families, seven of which are caught by conventional fishing and the rest detected by eDNA, including COPL, PRCY, and COSP.	The segmentation of the banks indicates a predominantly coarse substrate over more than 80% of the coastline, with areas of rocky substrate, fine sediments, and aquatic grass beds covering less than 20%. Shallow areas and potential spawning grounds for phytophilic and lithophilic species have been identified. Its morphology, with an average depth of 6.3 m and a maximum depth of 18 m, remains conducive to winter survival. The lake exhibits marked summer thermal stratification with a thermocline at around 14 m, influencing the distribution of aquatic habitats, while autumn mixing restores homogeneous conditions favourable to all species. The pH and dissolved oxygen values meet the optimal thresholds for protecting aquatic life (CCME, 2018).	19.4 (August 2024)	9.02	10.4	6.9	CACO ESLU SANA CACA COCL LOLO MAMA
L72	N/A	Lake L72, connected by an underground watercourse to Lake L01, has less diversity, but its coarse, vegetated banks are conducive to lithophilic spawning and fry rearing.	Three species were caught by conventional fishing and one species of the genus *Salvelinus* was detected by eDNA, bringing the species richness to four species.	The moderately indented shoreline and coarse substrate banks, covering approximately two thirds of the perimeter, provide favourable refuges for the growth and spawning of lithophilic species, while the dense vegetation to the west promotes fry rearing and feeding.	6.3 (October 2022)	10.73	10.0	6.0	LOLO MAMA CACO
L325	100.37	Lake L325, separated upstream from Lake L01 by a passable sill, offers similar conditions but is shallower, which limits the presence of species such as lake trout; only northern pike have been observed there. However, the sill and some tributaries could be suitable for lithophilic fish to spawn.	Only one phytophilic species was captured in this body of water.	The lake shores are mainly composed of coarse substrate. There are numerous shoals here, offering a variety of habitats conducive to feeding and breeding. A potential spawning ground for lithophilic species has been identified, although these species have not been documented. It is the second largest lake in the area, both in terms of surface area and riparian quality index, with a maximum depth of 6 m.	n/a	n/a	n/a	n/a	ESLU
L102	4.34	Lake L102 is isolated and dominated by Allegheny pearl dace; it offers favourable conditions for the biological cycle of this species. Located near the mining complex, it could be connected to the hydrological network during periods of high water via an adjacent wetland.	Only one lithophilic species was captured in this body of water.	The banks are mainly composed of fine substrate, and the lake has an average depth of 2.9 m, with a maximum depth of 5.5 m.	16.1 (Sept. 2024)	9.76	3.8	5.9	MAMA
L108	0.11	Despite its small size, Lake L108 is home to six species of fish, possibly due to its connectivity with L01. It offers a variety of habitats that are favourable for spawning and feeding.	Six species were caught in this body of water.	The banks are mainly composed of grass beds, with a smaller proportion of coarse substrate. The maximum depth is 4.8 m and the average depth is 1.4 m. The lake offers varied conditions: some banks have a gravelly to coarse substrate favourable to lithophilic species, while other areas with flooded vegetation are conducive to feeding and fry rearing. No phytophilic species were recorded.	11.1 (Sept. 2023)	8.76	16.6	5.5	CACO LOLO MAMA PRCY CACA SAFO

Lake	Area (ha)	General description	Fish inventory	Habitat characterization	Physicochemical parameters (surface)				Fish species caught
					Water temperature (°C)	Dissolved oxygen (mg/l)	Specific conductivity (µs/cm)	pH	
La Grande A sector									
L02	23.57	Lake L02 is the main body of water in the La Grande A sector and acts as a transitional lake between Lakes L01 and L27. It is also surrounded by planned future mine infrastructure (buildings, open pit, and waste rock stockpile).	Genetic surveys (eDNA) identified six species, highlighting a diverse fish community despite limited overall reproductive potential.	The bathymetry shows an average depth of 2.8 m and a maximum depth of 6.1 m, with a moderate riparian quality index. Its habitat is dominated by coarse substrate covering most of the shoreline, with three shoals located mainly in the eastern part of the water body and the presence of aquatic vegetation, which provides some structural diversity. Fish habitats are well represented, but the potential for lithophilic spawning remains low, as does that for fry rearing, which varies from low to moderate depending on the area. The feeding potential is high due to the diversity of coastal habitats and shoals. The physicochemical conditions measured indicate an environment favourable to species typical of the cool, well-oxygenated waters of the boreal region.	17.6 (July 2024)	8.94	13.0	6.5	ESLU CACA COCO COSP COPL LOLO
L61	3.59	Lake L61 is located upstream of Lake L02 and is directly connected to it by CE1. This is a body of water entirely bordered by banks dominated by aquatic grass beds, mainly composed of emergent plants that form the dominant coastal structure.	Two species were caught in this body of water, indicating good potential for complementary habitats.	The lake has an average depth of 1.2 m and a maximum depth of 3.2 m, and its substrate is mainly fine, contributing to a homogeneous structure favourable to feeding. The emerging vegetation also provides favourable conditions for the spawning of phytophilic species, particularly northern pike.	6.5 (October 2022)	11.45	16.9	6.1	ESLU CACO
L07	4.46	Lake L07 is a widening of the watercourse located downstream of Lake L02 and upstream of Lake L27. The planned open-pit mining area, which would result in the drainage of part of Lake L01, previously flowed directly into it.	Two predatory species were captured there.	The lake has an average depth of 1.0 m and a maximum depth of 3.5 m, and its banks are mainly composed of coarse substrate, offering potential for lithophilic spawning.	1.9 (October 2024)	13.13	10.0	6.8	LOLO ESLU
L10	1.26	Lake L10 is located between L07 and L27 and is a transitional lake with notable ecological diversity.	Three species were captured there and eight others were identified by eDNA, namely CACA, COSP, COPL, ESLU, LOLO, PRCY, SANA, and SLSP.	The banks show a varied composition, including rocky, coarse, and fine substrates, accompanied by aquatic vegetation. The average depth of the water body is 1.2 m, with a maximum depth of 3.7 m. The habitat is dominated by submerged aquatic plants, which occupy most of the water body.	8.2 (October 2022)	11.99	9.0	6.6	CACO COCL UNKN
L12	3.03	Pond L12 is located at the heart of the planned infrastructure. Its tributaries would be partially drained and its water level reduced.	Fishing using bait traps, gill nets, and trap nets confirmed the habitat of brook trout and Allegheny pearl dace.	With an average depth of 0.9 m and a maximum depth of 1.1 m, the pond has aquatic vegetation that can serve as a spawning site for phytophilic species, and a mainly fine substrate on the banks.	6.1 (October 2022)	11.82	15.6	5.8	MAMA SAFO
Lake L27 sector									
L27	879.36	Lake L27 is the largest body of water in the study area and will be affected by the project, particularly by the discharge of mine effluent.	Inventories conducted using gill nets, line fishing, and visual observations have detected several species of fish.	The substrate is mainly coarse along the banks on nearly 80% of the area, with shoals and aquatic vegetation covering just under 20%. The riparian quality index is high, reflecting a good diversity of habitats. The lake has an average depth of 6.4 m and a maximum depth of 18 m. The oxygen profile is relatively stable and remains favourable for ichthyofauna throughout the year. The spawning potential is higher for phytophilic species than for lithophilic species, which seem to use nearby watercourse areas more for breeding.	20.5 (August 2024)	8.85	11.9	7.5	ESLU CACO COCL SANA CACA MAMA SAFO COPL
L618	121.13	Lake L618 is one of the main bodies of water connected to Lake L27 by a slow-moving, lentic watercourse.	Fishing using bait traps, gill nets, and seine nets caught several fish.	The water body has an average depth of 1.6 m and a maximum depth of 7.9 m, a substrate combining coarse and fine materials, and the presence of aquatic grass beds providing a favourable habitat.	17.2 (Sept. 2024)	9.23	11.2	6.8	ESLU CACO MAMA COCL SANA UNKN

Measurements of the physicochemical parameters presented in the table were taken at a depth of between 0.3 m and 0.5 m below the surface.
CACA = Northern sucker (Catostomus catostomus); CACO = white sucker (Catostomus commersonii); CASP = sucker sp. (Catostomus sp.); COSP = sculpin sp., COCL lake whitefish (Coregonus clupeaformis); COPL = lake chub; CRSP = Coregonus sp., CYPR = cyprinids; ESLU = northern pike (Esox lucius); LOLO = burbot (Lota lota); MAMA – Allegheny pearl dace (Margariscus margarita); PRCY = round whitefish (Prosopium cylindraceum); SAFO = brook trout (Salvelinus fontinalis); SANA = lake trout (Salvelinus namaycush); SLSP = Salvelinus sp. UNKN = unidentified species.
Species were ranked in order of relative abundance based on catch data.
n/a Not applicable. The bathymetry of ponds, bodies of water less than 2 m deep, was not carried out.

Table 6-25 Summary of information collected in watercourses

Watercourse	Length characterized (m)	Coastal limit (min-max) (m)	Depth (min-max) (m)	General description	Fish inventory	Habitat characterization	Fish species caught
Lake L01 sector							
CE1	261	7–30	0.2–0.8	Outlet of Lake L01 connecting Lake L27 via Lake L07, CE11, Lake L10, and CE15 through the La Grande A sector.	Electric fishing and line fishing confirming the presence of a diversity of species.	Alternating sections of whitewater and pools that provide favourable conditions for feeding and spawning lithophilic species. Dominant substrate of boulders and cobbles.	SAFO CYPR COSP MAMA
CE27	146	11–26	0.5–1.8	Main tributary of Lake L01 coming from Lake L325 from the northeast.	Presence of fish confirmed.	Transition between lotic and lentic environments favourable for spawning of lithophilic species. Dominant substrate of boulders and cobbles.	N/A
La Grande A sector							
CE5	400	2.2–7.0	0.1–0.9	Outlet of Lake L02 flowing toward L07.	Electric fishing	Diverse substrate spawning potential and aquatic vegetation. Permanent and partially underground flow in a mainly lentic environment.	CACO CACA CASP MAMA
CE11	852	11–30	0.20–0.75	Outlet from L07 flowing to L10, which will receive the mine effluent.	Electric fishing and visual observation	Spawning potential for lithophilic species such as brook trout over an area of 240 m². Permanent flow passing from a lotic channel to a lentic channel alternating with a shallow current, a channel, and a shallow lentic area.	CACA MAMA ESLU
CE15	755	14–30	0.4–1.3	Outlet of L10 flowing into L27.	Electric fishing	Spawning potential via a diverse substrate and aquatic vegetation. Permanent flow alternating between a shallow current and a lentic channel.	LOLO MAMA CACA
Lake L27 sector							
CE576	1103	>30	0.29	Outlet of Lake L618 flowing into Lake L27.	Electric fishing	Transitional watercourse of the shallow, lentic type with permanent flow over a substrate of sand and organic matter.	LOLO
CE300	892	4–30	0.25–1.0	Water connectivity link between lakes north of the planned infrastructure that flow into Lake L27. CE300 receives intermittent partially underground watercourses CE37, CE38, and CE39, which will be partially drained by waste rock stockpile 001. These watercourses are not considered fish habitats due to the presence of impassable obstacles.	Electric fishing	Series of rapids and lentic channels including aquatic beds of emergent plants in more lentic sections.	UNKN

CACA = Northern sucker (Catostomus catostomus); CACO = white sucker (Catostomus commersonii); CASP = sucker sp. (Catostomus sp.); COSP = sculpin sp., COCL lake whitefish (Coregonus clupeaformis); COPL = lake chub; CRSP = Coregonus sp., CYPR = cyprinids; ESLU = northern pike (Esox lucius); LOLO = burbot (Lota lota); MAMA – Allegheny pearl dace (Margariscus margarita); PRCY = round whitefish (Prosopium cylindraceum); SAFO = brook trout (Salvelinus fontinalis); SANA = lake trout (Salvelinus namaycush); SLSP = Salvelinus sp.
Species were ranked in order of relative abundance based on catch data.
n/a Not applicable.

Table 6-26 Metal content in fish caught in Lakes L01, L27, and L823

Lake	Species	Size class (mm)	Total number of individuals analyzed	Average mercury content (mg/kg)	Average arsenic content (mg/kg)	Average lead content (mg/kg)
L01	Northern pike	400 - 550	10	0.200	0.0288	0.00107
		550–700	23	**0.513**	0.0586	0.00143
		≥ 700	1	**0.610**	0.0280	0.00020
	Lake trout	≥ 450	2	0.300	0.1100	0.00225
		450–550	12	**0.554**	0.0077	0.00066
		550 - 700	2	**0.505**	0.0126	0.00655
L27	Northern pike	400–550	10	0.229	0.0208	0.00129
		550–700	15	**0.605**	0.0272	0.00187
		≥ 700	9	**0.898**	0.0350	0.00388
	Lake trout	450–550	1	0.160	0.0120	0.00200
		550–700	6	**0.622**	0.0074	0.00133
L823	Northern pike	550–700	15	0.301	0.0162	0.00062
		≥ 700	15	**0.580**	0.0202	0.00066

* The averages in bold indicate that Health Canada's criteria of 0.5 mg/kg for mercury content in fishery products, 3.5 mg/kg for arsenic in processed products, and 0.5 mg/kg for lead have been exceeded.
n/a Not applicable.

6.3.3 Herpetofauna

6.3.3.1 Current conditions

No species inventory was carried out in the field as part of the project. However, alongside the 2023 and 2024 inventories for avian fauna, opportunistic surveys were carried out and particular attention was paid to this wildlife group. Details regarding this component are presented in Appendix 6-19 (Niigaan, 2025a). A summary of the methodology and results obtained is presented in the following sections.

Existing literature

A literature review was conducted to provide an overview of the herpetofauna likely to use the biophysical RSA. This was done by considering the following sources of information:

- Aires de répartition des mammifères terrestres, des reptiles, des amphibiens et des poissons d'eau douce du Québec [Distribution ranges of land mammals, reptiles, amphibians, and freshwater fish in Quebec] (Données Québec, 2025);
- Amphibiens et reptiles du Québec et des maritimes [Amphibians and reptiles of Quebec and the Maritimes] (Desroches and Rodrigue, 2004);
- Atlas des amphibiens et reptiles du Québec (AARQ) [Atlas of amphibians and reptiles of Quebec] (SHNVSL, 2025);
- Centre de données sur le patrimoine naturel du Québec [Quebec Natural Heritage Data Centre] (CDPNQ, 2025);

- Observations from iNaturalist (2025) accessed via the Global Biodiversity Information Facility database (GBIF, 2025).

Inventories

Opportunistic surveys of amphibians and reptiles were conducted in June and July 2024, in parallel with bird surveys. Observations were made at listening stations during trips between listening points and around camps. In addition, when analyzing data from sound level meters for the bird inventory, observations of anurans were also collected.

An active search was conducted within a 5-metre radius of each station, including inspection of rocks, wood debris, and rocky streams. Targeted searches were also conducted in open areas suitable for the common garter snake (*Thamnophis sirtalis*).

Field data from 2023 and 2024, including analysis of collected sound recordings, identified five species of anurans, namely, in order of relative importance, the spring peeper (*Pseudacris crucifer*), the American toad (*Bufo americanus*), the mink frog (*Rana septentrionalis*), the wood frog (*Rana sylvatica*) and the northern leopard frog (*Rana pipiens*). These species were widely distributed throughout the biophysical LSA, with the exception of the northern leopard frog (*Rana pipiens*). No reptiles were detected.

Among the species potentially present according to their distribution ranges, the blue-spotted salamander (*Ambystoma laterale*) and the Northern two-lined salamander (*Eurycea bislineata*) were not observed. However, the northern leopard frog was detected even though it is not on the list of potentially present species due to its range being located mainly further south of the biophysical LSA.

No herpetofauna species of special status have been documented in the biophysical RSA, and no observations were made during the inventories carried out.

6.3.4 Avian fauna

6.3.4.1 Current conditions

Proposed general approach

Inventories

As part of this project, several inventories of avian fauna during breeding, migration, and wintering periods were carried out within and near the biophysical LSA. These were, in chronological order, as follows:

- transects and listening stations during the winter (2023);
- automated recording stations during breeding and migration periods (2023 and 2024);
- helicopter survey for waterfowl, waterfowl and other water birds, and birds of prey during the breeding season (2024 and 2025) and spring migration (2025);
- daytime listening stations and twilight observation stations during the breeding season (2024 and 2025).

The sectoral studies, including the methodology used and the results obtained, are presented in Appendices 6-19 and 6-20 (Niigaan, 2025a, 2025b). A summary of these is presented in the following sections.

Existing literature

A literature review was conducted to provide an overview of the bird species likely to use the biophysical RSA. The following sources of information were considered:

- Aires de répartition des mammifères terrestres, des reptiles, des amphibiens et des poissons d'eau douce du Québec [Distribution ranges of land mammals, reptiles, amphibians, and freshwater fish in Quebec] (Données Québec, 2025);
- Hydro-Québec's Environment & Communities Documentation Centre;
- Centre de données sur le patrimoine naturel du Québec [Quebec Natural Heritage Data Centre] (CDPNQ, 2025);
- eBird data (Cornell et al., 2025);
- Data from the Quebec Breeding Bird Atlas (northern project) (Birds Canada et al., 2025);
- eBird: Trends Maps and public sites (2025);
- North American Breeding Birds Survey (Ziolkowski et al., 2024);
- Observations from iNaturalist (2025) accessed via the Global Biodiversity Information Facility database (GBIF, 2025).

The list of species identified during inventories in the biophysical LSA and nearby areas, as well as those mentioned in the literature consulted regarding the biophysical LSA and RSA, are presented in Appendices 6-19 and 6-20.

Waterfowl, other water birds, shorebirds, and birds of prey

Specific methodology

Helicopter surveys were conducted to document the presence of waterfowl, other water birds, and nesting birds of prey, targeting three types of habitats: bodies of water, peatlands, and rock faces. The flyovers were conducted according to the protocols of the Black Duck Joint Venture (BDJV) (Bordage and Plante, 1997; Bordage et al., 2003). These species were also inventoried during ground observations from stations located near potential habitats.

Helicopter surveys totalled 12.0 flight hours in June 2024 and 25.5 hours in May and June 2025, divided between spring migration (8.5 hours) and breeding (17 hours). The entire biophysical LSA was covered under favourable observation conditions.

Results

During all inventories conducted from 2023 to 2025, a total of 34 species of waterfowl, shorebirds, and other water birds were observed. In addition to the species recorded during helicopter surveys (Tables 6-9 and 6-10), snow geese (*Anser caerulescens*), common eiders (*Somateria mollissima*), and long-tailed ducks (*Clangula hyemalis*) were detected using sound level meters. The American woodcock (*Scolopax minor*), the semipalmated sandpiper (*Calidris pusilla*) and the semipalmated plover (*Charadrius semipalmatus*) were also recorded using this method.

Nesting has been confirmed only for the sandhill crane (*Grus canadensis*) through observation of diversionary behaviour. Apart from one shorebird, the lesser yellowlegs, no other species of special status was observed.

During spring migration, 14 species of waterfowl were recorded, including four species of dabbling ducks and nine species of diving ducks (Table 6-27). The most abundant species include the common merganser (*Mergus merganser*), the surf scoter (*Melanitta perspicillata*), and the American black duck (*Anas rubripes*). Flocks of migratory ducks have been observed, consisting of long-tailed ducks, black scoters (*Melanitta americana*), and surf scoters. In addition, breeding pairs of bufflehead (*Bucephala albeola*) (3 pairs), Northern pintail (*Anas acuta*) (1 pair), and mallard (*Anas platyrhynchos*) (1 pair) were also recorded. Five species of shorebirds and three other species of water birds were also observed.

Table 6-27 Occurrence of waterfowl and other water bird species detected during helicopter surveys during the spring migration period in 2025

Group	Species	Total number of individuals	Occurrence
Geese (*Branta* and *Anser* genus)	Canada goose	2	7
	Subtotal	*2*	*7*
Dabbling ducks	Mallard	1	1
	American black duck	41	15
	Northern pintail	1	1
	Common teal	11	6
	Subtotal	*54*	*23*
Diving ducks	Ring-necked duck	2	2
	Lesser scaup	35	8
	Common goldeneye	4	2
	Bufflehead	5	3
	Common merganser	85	29
	Hooded merganser	56	11
	Red-breasted merganser	18	7
	Black scoter	55	2
	Surf scoter	35	13
	Subtotal	*295*	*77*
Total		**351**	**107**

Group	Species	Total number of individuals	Occurrence
Shorebirds	Least sandpiper	5	11
	Wilson's snipe	2	9
	Greater yellowlegs	6	9
	Lesser yellowlegs	5	6
	Solitary sandpiper	2	2
Other water birds	American herring gull	4	2
	Red-throated loon	2	1
	Common loon	8	5

Note: Species of special status are in **bold**.

Thirteen (13) species of waterfowl, including three dabbling ducks and nine diving ducks, were recorded during aerial surveys conducted during the nesting season (Table 6-28). The species most commonly encountered were the American black duck, the common teal (*Anas crecca*), the common merganser, and the hooded merganser (*Lophodytes cucullatus*). In 2024, family groups of American black ducks and common teals were observed, confirming their status as breeders in the biophysical LSA. In addition, six species of shorebirds and six other species of water birds were recorded.

Table 6-28 Occurrences and densities of waterfowl and other water bird species surveyed by helicopter during the nesting season in 2024 and 2025

Group	Species	2024			2025		
		Total number of individuals	Occurrence	Density (IP/100 km^2)	Total number of individuals	Occurrence	Density (IP/100 km^2)
Goose	Canada goose	19	4	0.00	78	13	7.87
	Subtotal	*19*	*4*	*0.00*	78	13	7.87
Dabbling duck	American black duck	84	16	16.00	61	15	12.69
	Common teal	28	10	8.60	20	13	10.5
	Wood duck	0	0	0.00	3	2	1.75
	Subtotal	*112*	*26*	*24.60*	*84*	*30*	*24.94*
Diving duck	Ring-necked duck	5	3	3.10	11	4	3.50
	Lesser scaup	6	1	0.00	11	5	4.37
	Bluebill sp.	0	0	0.00	4	2	n/a
	Common goldeneye	15	1	0.00	19	4	1.75
	Bufflehead	0	0	0.00	5	2	2.62
	Common merganser	7	5	0.80	29	14	8.75
	Hooded merganser	12	5	1.60	43	17	9.62
	Red-breasted merganser	10	7	3.10	13	7	6.12
	White-winged scoter	2	1	0.00	0	0	0.00
	Surf scoter	6	5	0.80	54	23	21.00
	Subtotal	63	28	9.40	189	78	57.73
Total		**194**	**58**	**34**	**351**	**121**	**90.54**

Group	Species	2024			2025		
		Total number of individuals	Occurrence	Density (IP/100 km^2)	Total number of individuals	Occurrence	Density (IP/100 km^2)
Shorebirds	Least sandpiper	1	1	n/a	0	0	0.00
	Wilson's snipe	4	3	n/a	0	0	0.00
	Spotted sandpiper	6	6	n/a	5	5	n/a
	Solitary sandpiper	17	12	n/a	7	3	n/a
	Greater yellowlegs	22	16	n/a	8	8	n/a
	Lesser yellowlegs	1	1	n/a	0	0	0.00
	Yellowlegs sp.	5	4	n/a	2	2	n/a
	Shorebird sp.	0	0	0.00	1	1	n/a
Other water birds	American herring gull	10	8	n/a	18	7	n/a
	Sandhill crane	1	1	n/a	5	4	0.87
	Bonaparte's gull	2	2	n/a	3	2	0.87
	Red-throated loon	2	1	0.80	2	2	0.00
	Common loon	4	3	0.00	12	9	2.62
	Arctic tern	1	1	n/a	0	0	0.00

Notes: IP: indicated pair.
Species of special status are in **bold**.
n/a : not applicable.

Inventories conducted in 2023, 2024, and 2025 identified several species of interest, in addition to species at risk. In addition to various species of ducks, the biophysical LSA is home to the Canada goose (*Branta canadensis*), the snow goose, Wilson's snipe (*Gallinago delicata*), and the American woodcock, all of which are migratory birds considered game in Canada (Canadian Wildlife Service Waterfowl Technical Committee, 2023).

Birds of prey and corvids

During all inventories carried out between 2023 and 2025, a total of 13 species of birds of prey were recorded. These species are the golden eagle, American goshawk (*Accipiter atricapillus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), northern hawk-owl (*Surnia ulula*), sharp-shinned hawk (*Accipiter striatus*), peregrine falcon, great horned owl (*Bubo virginianus*), short-eared owl, long-eared owl (*Asio otus*), boreal owl (*Aegolius funereus*), Northern saw-whet owl (*Aegolius acadicus*), and bald eagle. Common raven (*Corvus corax*) was also observed. Several of these species were detected using sound level meters. Three of the recorded bird of prey species are considered to have special status: the golden eagle, the short-eared owl, and the bald eagle.

Helicopter surveys of birds of prey were conducted simultaneously with those of waterfowl. Five species of birds of prey were observed during these flyovers (Table 6-29). In 2024, the red-tailed hawk was confirmed as a breeding bird thanks to the discovery of an active nest containing at least one egg. In 2025, an active nest of a rough-legged hawk (*Buteo lagopus*) was detected on the outskirts of the biophysical LSA, representing a notable mention at the southern limit of its known range. The short-eared owl has been observed several times during the breeding season, notably through the observation of a pair regularly sighted in a favourable habitat, suggesting probable nesting. Lastly, several bald eagles (both adults and immature birds) were recorded, but no nesting structures were identified. A northern hawk-owl was also observed, with no signs of nesting.

Table 6-29 Observations of birds of prey and corvids during helicopter surveys in 2024 and 2025

Species	Migration		Nesting			
	2025		2024		2025	
	Total number of individuals	Occurrence	Total number of individuals	Occurrence	Total number of individuals	Occurrence
Red-tailed hawk	17	3	5	4	6	5
Rough-legged hawk	3	16	0	0	6	6
Hawk sp.	0	0	0	0	1	1
Northern hawk-owl	0	0	1	1	0	0
Short-eared owl	0	0	3	2	3	3
Bald eagle	2	2	5	5	7	4

Land birds

Nesting and migration periods – Sound level meters

In 2023 and 2024, a bird inventory was conducted using 18 automated recording stations (sound level meters), covering the spring migration, breeding, and fall migration periods, from April to October.

Approximately 10% of the recordings were analyzed, totalling 628.5 hours of listening time. The analysis detected 98 bird species, including 74 breeding migrants, 23 residents, and one non-breeding migrant. Among them, 64 species are land birds, 22 are waterfowl and other water birds or shorebirds, and 12 are birds of prey, including five nocturnal species.

were detected at all stations. The American robin (*Turdus migratorius*) and the grey jay (*Perisoreus canadensis*) were also frequently observed. In 2023, across all species, a total of 28,266 individuals were detected, compared to 19,214 in 2024.

Nine species at risk have been identified, namely the lesser yellowlegs, golden eagle, common nighthawk, peregrine falcon, short-eared owl, bank swallow, olive-sided flycatcher, bald eagle, and rusty blackbird. Most of the species at risk detected using sound level meters were much more abundant in 2024, possibly due to the forest fires of 2023.

The species richness and abundance of land birds vary according to the season (Table 6-30). Similar communities are observed in spring and summer. However, a distinct composition is observed in the fall, characterized by the predominance of Canada geese and American robins. In 2023, species richness and abundance were generally higher, except during the breeding season. In fact, in 2024, greater diversity was observed.

Among the species of land birds of interest, we have noted the presence of the ruffed grouse (*Bonasa umbellus*), the spruce grouse (*Canachites canadensis*), and the willow ptarmigan (*Lagopus lagopus*), species prized for hunting that have been observed during inventories (Gouvernement du Québec, 2025a).

Some species, such as the white-throated sparrow (*Zonotrichia albicollis*) and the dark-eyed junco (*Junco hyemalis*),

Nesting season - Listening stations and twilight observations

Inventories were conducted at listening points for 10 minutes using two methods: fixed-radius point count (FRPC of 50 m; Bibby et al., 2000) and point abundance index (PAI). In 2024, 522 stations were visited, while in 2025, 121 stations were randomly sampled from the grids produced in 2024. Twilight surveys were conducted in the evening in accordance with federal and provincial protocols, at 24 stations in 2024 and 15 in 2025. These inventories specifically targeted the detection of the common nighthawk and the short-eared owl, two species of special status.

In 2024, 73 species were recorded, including 62 migratory and 11 resident species. These included 48 species of land birds, 18 species of waterfowl and other water birds, four species of diurnal birds of prey, and three species of nocturnal birds of prey. Nesting was confirmed for 19% of species, considered probable for 52%, and considered possible for 27%. Six species at risk were recorded, namely the common nighthawk, short-eared owl, bank swallow, olive-sided flycatcher, bald eagle, and rusty blackbird.

The average density observed is 37.0 breeding pairs per 10 ha for all habitats (Table 6-31). The most commonly observed species were the white-throated sparrow, the ruby-crowned kinglet (*Regulus calendula*), the dark-eyed junco, and the hermit thrush (*Catharus guttatus*). Species richness varies depending on habitat type, with open spruce stands and peatlands hosting distinct bird communities. The dominant species are similar in all habitats, with the exception of certain species associated with specific wetlands or softwood forests.

In 2025, 45 species were recorded, including 34 species of land birds, 8 species of waterfowl and other water birds, and three diurnal birds of prey. The most abundant species were the dark-eyed junco, the ruby-crowned kinglet, and the white-throated sparrow. Nesting was confirmed only for the grey jay. In addition, nesting was assessed as likely for 11% of species and possible for 76%. The average density observed is 35.0 breeding pairs per 10 ha (Table 6-31).

Eight species at risk were detected during the 2025 inventories, for a total of 73 recorded observations. In order of number of occurrences, these are the rusty blackbird, the common nighthawk, the bald eagle, the bank swallow, the lesser yellowlegs, the short-eared owl, the olive-sided flycatcher, and the evening grosbeak. The average density observed is 35.1 breeding pairs per 10 ha for all habitats (Table 6-31).

Table 6-30 Species richness and abundance observed at automated recording stations by year and inventory period

Year	Period	Number	Species richness					Abundance (number of recorded observations)				
			Total	Mean	Standard deviation	Minimum	Maximum	Total	Mean	Standard deviation	Minimum	Maximum
2023	Spring	18	70	26.3	8.7	13	45	11,388	632.7	316.9	232	1,642
2024	Spring	17	72	35.9	10.3	0	48	11,506	639.2	226.3	0	857
2023	Breeding	18	65	22.8	4.9	13	33	8,718	484.3	148.6	143	730
2024	Breeding	15	59	28.1	4.3	21	35	7,503	468.9	60.6	355	596
2023	Fall	17	54	23.5	4.3	15	29	8,064	474.4	327.1	157	1,470
2024	Fall	18	51	19.2	3.4	12	24	1,531	85.1	23.7	35	131
Total		**103**	**380**	**26.0**	**6.0**	**0**	**48**	**48,710**	**464.1**	**183.9**	**0**	**1,642**

Table 6-31 Species richness and density counted by habitat in 2024 and 2025

Parameter	2024						2025				
	Swamp	Regenerating	Mixedwood	Softwood	Peat bogs	All[a]	Regenerating	Mixedwood	Softwood	Peat bogs	All[a]
Number of listening points	96	55	49	271	51	**522**	46	8	65	2	**121**
Number of species (FRPC < 50 m)[b]	32	28	28	42	30	**56**	18	10	26	3	**30**
Number of species (FRPC < 100 m)[c]	38	30	27	47	33	**61**	29	13	33	9	**40**
Total number of species	52	41	42	60	49	**68**	32	16	38	11	**45**
Average richness ± standard deviation (FRPC < 50 m)	3.0 ±1.8	3.0 ±1.8	3.3 ±1.5	3.4 ±1.8	3.0 ±1.6	**3.2 ±1.8**	1.9 ±1.6	2.6 ±0.7	3.5 ±1.4	1.5 ±0.7	**2.8 ±1.6**
Average richness ± standard deviation (PAI)	10.1 ±2.8	8.9 ±2	8.9 ±2.3	8.6 ±2.3	9.4 ±2.5	**9.0 ±2.5**	5.8 ±2.5	5.8 ±1.4	7.1 ±2.4	6.5 ±3.5	**6.5 ±2.5**
Density Couples/10 ha (FRPC < 50 m)	34.0	32.1	36.8	39.7	33.7	**37.0**	23.9	32.6	43.7	19.1	**35.0**

Notes: a All habitats combined.
b FRPC (< 50 m): counting within a radius of 50 m from the observer.
c FRPC (< 100 m): counting within a radius of 100 m from the observer.

Winter period – Listening stations and transects

In 2023, an inventory was carried out in winter. It covered 483 listening points spread across 160 transects. A total of 13 bird species were recorded (Table 6-32). The willow ptarmigan is the most widespread species, having been identified in 16.4% of the segments studied. It is also likely that several recorded observations of grouse are attributable to this species. The spruce grouse, the grey jay, and the common redpoll (*Acanthis flammea*) were observed in more than 2% of the segments. The transects richest in species have up to six species detected.

The presence of birds was most pronounced in black spruce stands (58.7% of segments), followed by areas undergoing shrub regeneration (16.5%) and mixed softwood forests (11.5%). No species at risk were detected.

The grey jay is the species most frequently observed at listening points (17.2%), although this frequency may be overestimated due to the species' tendency to follow observers. Other species such as the pine grosbeak (*Pinicola enucleator*), the common redpoll, the Boreal chickadee (*Poecile hudsonicus*), and the common raven were also frequently observed.

Table 6-32 Presence and frequency of bird species recorded at segments and transects in winter 2023

Species	Segments (n = 1,607)		Transects (n = 160)	
	Presence	Frequency (%)	Occurrence	Frequency (%)
Willow ptarmigan	263	16.37	3	0.62
Grouse sp.	160	9.96	0	0.00
Grey jay	109	6.78	83	17.18
Spruce grouse	44	2.74	2	0.41
Common redpoll	40	2.49	15	3.11
Pine grosbeak	26	1.62	17	3.52
Common raven	23	1.43	12	2.48
Boreal chickadee	22	1.37	13	2.69
Picidae sp.	19	1.18	1	0.21
White-winged crossbill	6	0.37	4	0.83
Black-backed woodpecker	6	0.37	2	0.41
American three-toed woodpecker	3	0.19	4	0.83
Red crossbill	2	0.12	1	0.21
Crossbill sp.	2	0.12	1	0.21
American goshawk	1	0.06	0	0.00
Finch sp.	1	0.06	0	0.00
Snow bunting	1	0.06	1	0.21
Total	**728**	**-**	**159**	**-**

Species of special status

Based on the literature consulted and known distribution ranges, 15 avian species at risk have been observed or are likely to be observed within a 50 km radius of the project area on an annual basis (Table 6-33).

During field campaigns conducted from 2023 to 2025, 11 bird species at risk were recorded (Table 6-33, Map 6-15), for a total of 474 sightings. The most frequently observed species were the rusty blackbird, the olive-sided flycatcher, and the common nighthawk. Other species such as the short-eared owl and bald eagle were observed opportunistically, while the peregrine falcon, golden eagle, lesser yellowlegs, bank swallow, red crossbill, and evening grosbeak were each recorded fewer than 10 times. The harlequin duck, the short-billed dowitcher, Barrow's goldeneye, and the yellow rail have not been recorded in the biophysical LSA, but are likely to be observed there. The list of bird species of special status potentially present in the biophysical LSA, their status, details concerning their sightings, and their preferred habitat are presented in the following sections and in the sectoral report on avian fauna in Section 2.3 (Appendix 6-19). Potential habitats of special-status species with nesting potential were reassessed at the scale of the biophysical local study area (LSA). The results of this analysis are presented in Chapter 8, which addresses impact identification and assessment.

Golden eagle

The golden eagle was detected only once by a sound level meter (Map 6-15) during the spring migration period. As with the peregrine falcon, the absence of cliffs suitable for nesting in the biophysical LSA suggests that the individuals observed are migrant or non-breeding. No reproductive behaviour was observed. Since no suitable cliffs were identified, the potential habitat of this species has not been mapped.

The species is threatened by accidental trapping, contamination by lead and other toxins, human disturbance near nests, collisions with infrastructure, and illegal hunting. Conservation objectives aim to maintain and improve population monitoring, protect nesting sites, monitor emerging threats, and raise public awareness (EROP, 2020).

Harlequin duck

The harlequin diver nests in habitats where there are fast-flowing watercourses and waterfalls. The species was not recorded during inventories or in the literature consulted. However, the biophysical LSA is part of its breeding range (MELCCFP, 2026).

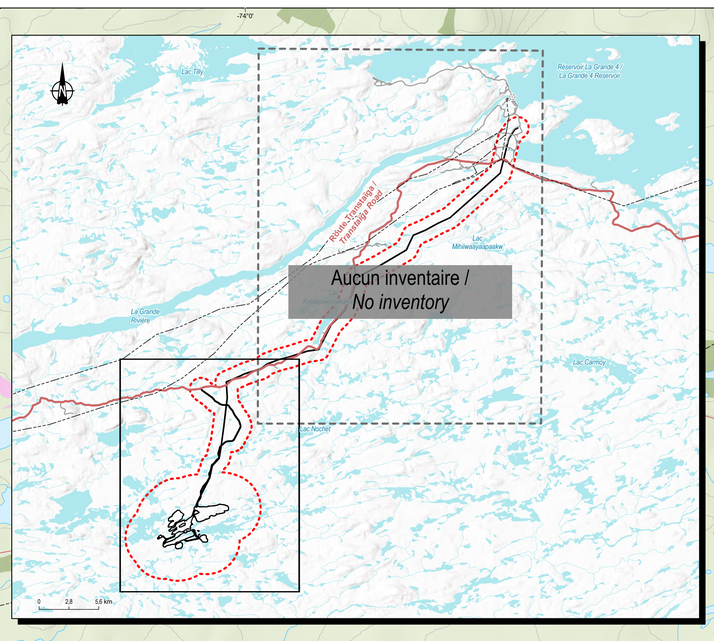
Pollution, habitat destruction or degradation, accidental mortality, aquaculture, disturbance and persecution, as well as consumption (illegal or accidental hunting) are the main threats to the harlequin duck (EC, 2007).

The objectives of the management plan are to better understand and mitigate threats to the harlequin duck, assess the status of the population, and protect key habitats for breeding, moulting, wintering, and gathering (EC, 2007). They also include working with governments, industry, Indigenous communities, and citizens to identify and reduce threats, as well as implementing targeted education and stewardship programs. An analysis of existing knowledge should help fill in the gaps, and increased cooperation with Greenland is sought to strengthen conservation efforts at the international level.

Table 6-33 List of bird species at risk recorded in the biophysical LSA in 2023, 2024, and 2025 or are likely to be found there

Group	Species	Scientific name	Species detected during inventories	Status[a]		
				LEMVQ[b]	COSEWIC[c]	SARA[d]
Birds of prey	Golden eagle	*Aquila chrysaetos*	X	Vulnerable	-	-
	Peregrine Falcon *anatum/tundrius*	*Falco peregrinus anatum/tundrius*	X	Vulnerable/LDTV	-	-
	Short-eared Owl	*Asio flammeus*	X	LDTV	Special concern	Special concern
	Bald eagle	*Haliaeetus leucocephalus*	X	Vulnerable	-	-
Waterfowl and other water birds	Harlequin duck	*Histrionicus histrionicus*	-	Vulnerable	Special concern	Special concern
	Barrow's Goldeneye	*Bucephala islandica*	-	Vulnerable	Special concern	Special concern
	Yellow rail	*Coturnicops noveboracensis*	-	Threatened	Special concern	Special concern
Shorebirds	Short-billed dowitcher	*Limnodromus griseus*	-	-	Threatened	Pending
	Lesser yellowlegs	*Tringa flavipes*	X	-	Threatened	Pending
Land birds	Red crossbill, *percna* subspecies	*Loxia curvirostra percna*	X	-	Threatened	Threatened
	Common nighthawk	*Antrostomus vociferus*	X	LDTV	Special concern	Special concern
	Evening grosbeak	*Coccothraustes vespertinus*	X	-	Special concern	Special concern
	Bank swallow	*Riparia riparia*	X	-	Threatened	Threatened
	Olive-sided flycatcher	*Contopus cooperi*	X	Vulnerable	Special concern	Special concern
	Rusty blackbird	*Euphagus carolinus*	X	LDTV	Special concern	Special concern

Notes: a: Status: LDTV: likely to be designated as threatened or vulnerable.
b: Ministère des Forêts, de la Faune et des Parcs Gouvernement du Québec, 2025b); List of threatened or vulnerable wildlife species in Quebec (LEMVQ).
c: Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2024); List of species at risk in Canada.
d: Government of Canada (Government of Canada, 2025). *Species at Risk Act.* List of species at risk.



-74°0'
-73°54'
-75°48'
53°30'
53°36'
Route Transtaiga / Transtaiga Road
Lac Nochet

Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

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*

Faune aviaire / *Avifauna*

Type d'observation / *Observation Type*

- Observation d'espèce à statut / *Species at risk observation*

Étiquette / *Label*

- HIMA Code d'espèce / *Species code*

CODE	ESPÈCE	SPECIES
AIRO	Aigle royal	Royal eagle
BCSA	Bec-croisé des sapins	Red crossbill
ENAM	Engoulevent d'Amérique	Nighthawk
FAPE	Faucon pèlerin	Peregrine falcon
GBER	Grive-bec errant	Evening grosbeak
HIMA	Hibou des marais	Short-eared owl
HIRI	Hirondelle de rivage	Bank swallow
MOCO	Moucherolle à côtés olive	Olive-sided flycatcher
PECH	Petit Chevalier	Lesser Yellowlegs
PYTB	Pygargue à tête blanche	Bald eagle
QURO	Quiscale rouilleux	Rusty blackbird

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*
- Permanent partiellement souterrain / *Partially underground permanent*
- Souterrain / *Underground*

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 6-15 / *Map 6-15*
Occurrences d'espèces de faune aviaire à statut et leur habitat / *Occurrences of Special-Status Avian Species and Associated Habitats*

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

0 200 400 m

UTM, fuseau 18, NAD83 (CSRS)

2026-03-17

Préparation / Prepared by : C. Villeneuve
Dessin / Drawn by : P. Boulay
Approbation / Approved by : É. D'Astous
CA0001724_3318_ele_c06_c15_260310.aprx
CA0001724_3318_ele_c06_15_110_avifaune_260317_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.

Short-billed dowitcher

The short-billed dowitcher nests in peat bogs. It was not recorded in the inventories or in the literature consulted. However, the biophysical LSA is part of its breeding range (Government of Canada, 2025a).

Sport hunting and subsistence hunting in its wintering grounds are the main threats to the species. Other major threats include the loss and degradation of wetlands and other habitats at migratory stopover sites, wintering grounds, and, increasingly, breeding sites. The species is also vulnerable to the effects of climate change and extreme weather events throughout its annual cycle (Government of Canada, 2025a).

Given that the species is currently under review for possible listing in Appendix 1 of the SARA, no conservation objectives have yet been established in a recovery strategy.

Red crossbill

The red crossbill is associated with coniferous forests. Although the *percna* subspecies (associated with type 8) is known to nest only on the islands of Newfoundland and Anticosti, red crossbills that could belong to the *percna* subspecies have been observed elsewhere in Quebec (COSEWIC, 2016).

Between 2023 and 2025, a total of six red crossbills were observed. Two individuals were detected by sound level meter in the spring of 2023, and three others were recorded during winter surveys using listening points and transects. An individual was heard at listening stations in 2024, but was identified as type 1. Since not all individuals observed between 2023 and 2025 were identified to subspecies level, undetermined occurrences were still represented on Map 6-15.

Threats identified in the recovery strategy for the red crossbill, *percna* subspecies, include habitat degradation caused by forestry activities, reduced food resources due to insect infestations and conifer diseases, and increased competition for seeds with other species, particularly the red squirrel (*Tamiasciurus hudsonicus*) (EC, 2006). Added to this are the effects of low density, which compromise the viability of the remaining populations.

To counter these threats, the recovery plan sets out objectives that include confirming the presence and distribution of the red crossbill in Newfoundland, studying its movements, habitat, and threats, and assessing the feasibility of recovery. These include identifying critical habitat, setting population targets, developing mitigation measures, and implementing stewardship and awareness programs (EC, 2006).

Common nighthawk

The common nighthawk nests in lichen tundra, open pine forests, and cutover areas. The species was recorded 98 times between 2023 and 2025 (Map 6-15), mainly using automated recording stations (sound level meters) and twilight observation stations. The species is associated with open environments undergoing regeneration, particularly burned areas. It is mainly present in late spring and during the breeding season, but rarely in fall. Although nesting has not been confirmed, the abundance and distribution of recorded entries suggest probable breeding status in the biophysical LSA.

The most serious threat to the common nighthawk is the decline in the insect populations on which it feeds (EC, 2016a). Other causes include forest fires, loss of breeding habitat, extreme temperatures and storms, and collisions with vehicles, aircraft, and buildings.

The objectives of the recovery plan were to halt the national decline by 2025 (less than a 10% decrease) and ensure a positive trend over the following ten years, as well as to maintain the current range of occurrence in Canada (EC, 2016a).

Peregrine falcon

The peregrine falcon was observed only during spring migration (Map 6-15), with no evidence of nesting. As with the golden eagle, the absence of cliffs suitable for nesting in the biophysical LSA suggests that the species is considered non-breeding, probably represented by migrating or hunting individuals. Since no suitable cliffs were identified, the potential habitat of this species has not been mapped.

The main threats include residential and commercial development, intensification of agriculture, energy production and mining, legal and illegal logging, and recreational activities. Added to this are the presence of invasive or problematic species, pollution, and the impacts of climate change, particularly severe weather events (EROP, 2018).

The conservation objectives for the peregrine falcon in Quebec are to maintain and improve population monitoring, ensure the long-term protection of nesting sites, strengthen monitoring of emerging threats to prevent further decline, and disseminate the knowledge necessary for the recovery of the species (EROP, 2018).

Barrow's goldeneye

No Barrow's goldeneye was observed during the inventories carried out between 2023 and 2025 or in the literature consulted. It is unlikely that the species is present in the biophysical LSA, as its nesting and wintering range in Quebec is limited to the eastern part of the province (EC, 2013a; Robert et al., 2019). Since adult males moult in the Arctic, along the coasts of Hudson Bay and Ungava Bay, sightings during migration are still possible, but highly unlikely. For this reason, the potential habitat of this species has not been mapped.

According to the management plan, the main threats to the eastern population are logging and stocking of fishless lakes, in addition to oil spills, hunting, and sediment contamination (EC, 2013a).

The objective is to maintain the eastern population of the Barrow's goldeneye at a minimum of 6,800 individuals over the next ten years and, in the long term, to maintain or increase its size and range in Canada (EC, 2013a).

Evening grosbeak

For nesting, the evening grosbeak generally prefers mature, open mixedwood forests. It was not detected during species inventories, but was observed opportunistically once in June 2025 (Map 6-15). Since the biophysical LSA is located north of the range of the evening grosbeak, it would be surprising if it nested there.

The main threats to the species include collisions with windows and vehicles, as well as habitat loss and fragmentation (ECCC, 2022a). Across Canada, the overall impact of threats remains low.

The management objectives for the evening grosbeak in Canada are to achieve a stable or increasing population trend over 30 years by 2036, and then to maintain this stability in the long term. It is also a matter of preserving the species' current range in Canada (ECCC, 2022a).

Short-eared owl

The short-eared owl is associated with large peatlands and shrubby marshes. The species was detected 28 times between 2023 and 2025, mainly through automated recording stations and helicopter surveys (Map 6-15). Probable nesting was noted in 2024, with the repeated presence of a pair in a favourable habitat. Other recorded entries refer to males heard on recordings or adults detected during helicopter flyovers in habitats suitable for nesting. In 2025, the species was recorded four times.

The loss and fragmentation of large areas of habitat caused by human activities represent the main threat to the short-eared owl (ECCC, 2018). These disturbances compromise habitats that are essential to the species during the various phases of its life cycle, thereby contributing to the decline of its populations.

The objectives of the management plan are to stabilize or increase the population of the short-eared owl between 2018 and 2028, while maintaining an area of occupancy of approximately 1,500,000 km². In the longer term, starting in 2028, the goal is to ensure a positive trend over ten years and increase the area of occupancy, particularly through the gradual recolonization of habitats located in the southern part of its Canadian range (ECCC, 2018).

Bank swallow

The bank swallow nests on sandy banks, along roadsides, and in sand pits. The species was observed mainly during the breeding season, with sightings concentrated in the northern part of the biophysical LSA, along the road leading to the mine site (Map 6-15). In 2025, an active colony was confirmed, comprising approximately 30 to 35 occupied cavities and at least 14 adults. Although no nesting sites were detected in 2023 or 2024, this observation confirms the nesting status of the species in the biophysical LSA.

Since 1970, the bank swallow has declined by 93% due to cumulative threats. This decline is mainly due to the decrease in flying insects, but also to water management, dam construction, the closure of quarries limiting nesting areas, accidental mortality due to collisions with vehicles, as well as predation and parasitism of nests (ECCC, 2022b).

The objectives of the recovery program are to maintain the current range of the bank swallow in Canada, as defined by critical habitat. In the short term, by 2033, the goal is to reduce the rate of decline and maintain a population that is at least 80% of the 2021 level. In the long term, by 2053, the goal is to achieve a stable trend over ten years while maintaining the population above 90% of the reference level (ECCC, 2022b).

Olive-sided flycatcher

The olive-sided flycatcher nests near beaver ponds, marshes, and burned areas. It was observed 119 times between 2023 and 2025 (Map 6-15), mainly by listening stations. The species has mainly been detected in swamps, peatlands, and burned scrublands.

It is present in late spring and summer, but rarely observed in fall. Nesting is considered likely, given the restless behaviour observed. Its distribution is stable in the wetland habitats of the biophysical LSA.

The most significant threats to the olive-sided flycatcher include reduced availability of insect prey, suppression of fires, and deforestation and land conversion (EC, 2016b).

The objectives of the recovery program are to halt the national decline by 2025 by limiting the population decline to less than 10%, and then to ensure a positive demographic trend over ten years after that period (EC, 2016b). There are also plans to maintain the current area of occurrence, which encompasses the geographical distribution of all known populations.

Lesser yellowlegs

The lesser yellowlegs nests in marshes and peatlands. This bird has been observed twice during the nesting season, mainly in peatlands. However, most sightings occur during spring migration. Data obtained in the biophysical RSA do not confirm its presence as a breeder, but the species is considered a probable breeder in areas located more than 50 km away, particularly along the North Road, northwest and northeast of the biophysical LSA (eBird, 2025). Its nesting status in the biophysical LSA remains possible.

The lesser yellowlegs is particularly sensitive to the cumulative effects of several threats, including the exploitation of biological resources, habitat loss and degradation, and the impacts of climate change and extreme weather events (COSEWIC, 2020).

Given that the species is currently under review for possible listing in Appendix 1 of the SARA, no conservation objectives have yet been established in a recovery strategy.

Bald eagle

The bald eagle builds its nests in mature forests near water bodies and watercourses. This bird of prey was observed 20 times between 2023 and 2025 (Map 6-15), mainly through opportunistic observations and helicopter flyovers. The individuals detected were isolated adults or immature birds, with no associated nesting structures. Although some individuals were observed during the breeding season, no evidence of nesting was found in the biophysical LSA. This species is therefore classified as non-nesting, likely consisting of individuals present during the summer but not breeding, or adults nesting near the biophysical LSA.

In Quebec, the main threats to bald eagles are habitat loss; disturbance caused by human activity; accidental trapping; collisions with vehicles, wind turbines, or power lines; illegal killing; and contamination by toxic substances (Comité de rétablissement du pygargue à tête blanche au Québec, 2002).

The objectives of the recovery plan were to maintain or exceed 50 active nests, ensure an annual productivity rate of more than 0.7 fledglings per active nest with at least 50% of productive nests at control sites inventoried twice, and establish a conservation strategy for 90% of known nests (CRPTBQ, 2002). The first two objectives of the recovery plan have been achieved or even exceeded, while the third has been almost entirely achieved (EROP, 2019).

Rusty blackbird

The rusty-blackbird breeds in peatlands, swamps, and marshes on the edge of forests. Between 2023 and 2025, 180 observations of the rusty blackbird were reported (Map 6-15), making it the most frequently detected species of special status during the surveys. The occurrences were identified using several inventory methods, including sound level meters, listening stations, and helicopter surveys. The species is widely distributed in wooded wetlands, often near bodies of water. Nesting was confirmed in the biophysical LSA in 2023 and 2024. In fact, adults have been observed carrying materials for nest building as well as food for chicks. The rusty-blackbird was observed during spring and fall migration periods as well as during the breeding season.

The most concerning threat to the species is the conversion of wetlands in the wintering area and in the migration area south of the boreal region (EC, 2015). Added to this are other losses or degradation of its habitat, deforestation, pollution in the form of mercury contamination, acidification of wetlands and agricultural pesticide residues, climate change, and the drying up of wetlands.

The objectives of the management plan are to first halt the decline in population and maintain the level reached in 2014, then to increase its abundance to ensure a ten-year increase in the population in Canada (EC, 2015).

Yellow rail

The yellow rail breeds in shallow, low-vegetation wetlands. No yellow rails were detected during the surveys conducted from 2023 to 2025, nor in the literature consulted. The main habitats occupied by this species are located along the banks of the Gulf of St. Lawrence and the St. Lawrence River (Robert et al., 2019). In the interior of Quebec, there is only one recorded instance of yellow rail nesting in Témiscamingue. In the Nord-du-Québec region, a breeding population has been confirmed along the coast of James Bay (EC, 2013b; Robert et al., 2019). However, no sightings of the species have been reported in the biophysical RSA located inland. Considering the documented habitat of the yellow rail, its presence in the biophysical LSA is unlikely. Thus, the potential habitat of this species has not been mapped.

The main threat to this species is the loss of wetlands due to human development and hydrological changes, exacerbated by invasive species, accidental mortality, overgrazing, pollution, recreational activities, and climate change (EC, 2013b).

The objectives of the management plan are to identify and monitor key sites used by the yellow rail, to conserve and effectively manage its habitat, to fill gaps in knowledge about threats and conservation practices, and to develop communication tools to raise awareness and mobilize public and private stakeholders (EC, 2013b).

6.3.5 Mammals – Large wildlife

6.3.5.1 Current conditions

Documentary research was conducted to obtain a picture of the large mammal species likely to occupy the biophysical RSA, in particular through public, institutional, and scientific data sources. The following sources of information were consulted:

- Carte des occurrences d'espèces en situation précaire via le Centre de données sur le patrimoine naturel du Québec [Map of occurrences of species at risk via the Quebec Natural Heritage Data Centre] (CDPNQ, 2025);
- Aires de répartition des mammifères terrestres [Distribution ranges of land mammals] (Données Québec, 2025);
- Global Biodiversity Information Facility (GBIF, 2025);
- Catalogue of Hydro-Québec documentation centres (CherLoc, 2025).

The biophysical RSA of the project is occupied by various species of large mammals, including woodland and migratory caribou (*Rangifer tarandus caribou*), moose (*Alces alces*), black bear (*Ursus americanus*), and grey wolf (*Canis lupus*). These species, which play an important ecological role in boreal ecosystems, are the focus of particular attention in this project. A sectoral study was conducted in 2025 to provide an up-to-date picture of the demographics, habitat quality, and habitat use of woodland and migratory caribou in the biophysical RSA. This study is presented in Appendix 6-21.

Woodland caribou (forest)

The woodland caribou plays a central role in the boreal forest, where it depends on vast, mature, undisturbed forest areas for its survival and reproduction. Its critical habitat consists mainly of mature softwood forests rich in lichens, open or wooded peatlands, as well as lichen tundra and rocky outcrops. These environments provide both food resources and protection from predators (Bastille-Rousseau et al., 2012; Leblond et al., 2014).

The woodland caribou is considered an “umbrella species.” This concept is based on the idea that protecting its essential habitat, namely vast, mature, minimally disturbed forest areas, benefits a multitude of other species that share the same environment, including forest birds, mammals, and insects. By preserving territories large enough to meet the ecological needs of caribou, the preservation of boreal biodiversity and essential ecological functions, such as the regulation of food webs and carbon sequestration, is indirectly ensured (Bichet et al., 2016; Labadie et al., 2024).

Caribou are particularly sensitive to anthropogenic disturbances, which cause fragmentation and a reduction in the size of high-quality habitat patches (Bastille-Rousseau et al., 2012). Disturbances can also cause an edge effect, which manifests itself in avoidance of the interface between natural and disturbed environments (Fortin et al., 2013). Caribou avoidance of human infrastructure can extend well beyond directly affected areas, resulting in functional habitat loss (Leblond et al., 2014). Disturbed environments can also lead to increased predation pressure on caribou (Raymond-Bourret, 2017).

Regenerating environments may have higher densities of alternative prey, such as moose (Brown et al., 2003; Whittington et al., 2011), which is favourable to predators such as grey wolves and black bears. In addition, disturbed environments, particularly linear infrastructure, generally promote predator movement within the habitat (Whittington et al., 2011).

In Quebec, the woodland caribou has been designated as a vulnerable species since 2005 under the *Act respecting threatened or vulnerable species* (LEMV; CQLR, c. E-12.01). This status has led to the development of recovery plans and guidelines for habitat management (ÉRCFQ, 2013a, 2013b) and the implementation of interim measures to limit the loss and fragmentation of woodland caribou habitat. In the James Bay region, the woodland caribou population is monitored using telemetry and aerial surveys (Szor and Gingras, 2020). In Canada, the woodland caribou has been listed as a threatened species under the *Species at Risk Act* (SARA; S.C. 2002, c. 29). A recovery strategy has been developed by Environment and Climate Change Canada (ECCC), defining critical habitat, population self-sufficiency indicators, and imminent threats to woodland caribou (ECCC, 2020, 2024).

The biophysical RSA for the project is located in the western portion of the James Bay woodland caribou knowledge acquisition area. Despite the vastness of the James Bay territory and its inclusion in the continuous range of the woodland caribou, knowledge about the status and dynamics of populations in this area remains limited. Relatively few comprehensive inventories have been conducted north of known populations, and the interpretation of historical data is complicated by the fluctuating presence of migratory caribou herds (Szor and Gingras, 2020).

According to the inventory conducted by Szor and Gingras in 2020, the average corrected density of woodland caribou in the West James Bay sector was very low, at 0.17 caribou/100 km². The total abundance estimated for this sector was approximately 166 individuals (95% CI: 82–277) divided into small groups (Szor and Gingras, 2020). The demographic structure indicated a ratio of 31.9 males per 100 females and a recruitment rate of 42.6 calves per 100 females, corresponding to 24.4% of calves among the individuals observed. Within the biophysical RSA of the project, no woodland caribou were observed during an aerial survey conducted in January 2023 (Niigaan, 2023).

Szor and Gingras (2020) estimated the total corrected abundance in the inventory area at 798 individuals (95% CI: 606–989). Despite a total population exceeding the threshold of 300 individuals generally recognized as the minimum criterion for a population's self-sufficiency (ECCC, 2024), the population in the West James Bay sector could be at high risk of extinction. This situation can be explained in particular by the combination of a finite growth rate potentially lower than 1 ($\lambda \approx 0.97$ for neighbouring sectors) and a habitat disturbance rate exceeding the critical threshold of 35% for woodland caribou. The disturbance rate in the biophysical RSA for woodland caribou is estimated at 48.2% according to the provincial method and at 42.5% according to the federal method.

For further details, the sectoral study is presented in Appendix 6-21.

Migratory caribou

Migratory caribou play a central role in the northern ecosystems of Quebec and Labrador. In Quebec, the migratory caribou population is divided into two herds: the Leaf River herd (LRH) and the George River herd (GRH). As the biophysical RSA of the project overlaps the southern boundary of the LRH's range, this herd is most likely to visit this area, particularly during the wintering period.

The migratory caribou of the LRH are among the mammals that undertake the longest terrestrial migrations (Milner-Gullan et al., 2011), using ecosystems seasonally according to the needs inherent to their life cycle (Taillon et al., 2016). Through its seasonal movements across vast territories, it shapes the structure and dynamics of the tundra and taiga landscapes. Migratory caribou are also a key species for certain predators in northern Quebec, such as grey wolves and black bears (Messier et al., 1988; Crête and Huot, 1993; Taillon et al., 2016). The LRH's wintering area is mainly located north of the La Grande hydroelectric complex, but may occasionally extend further south depending on winter conditions and food availability (Taillon et al., 2016).

In Quebec, migratory caribou are protected by measures relating to their calving grounds, which are recognized as critical habitats under the A*ct respecting the conservation and development of wildlife* (LCMVE, CQLR, C-61.1). The project's biophysical RSA does not include any identified calving areas or recognized critical habitat for migratory caribou, but it is a potential wintering area and travel corridor. In Canada, the eastern migratory caribou population was the subject of a 2017 COSEWIC recommendation for listing under SARA as an endangered species (COSEWIC, 2017), although this listing has not yet been formalized. To date, no specific federal legal protections apply to the migratory caribou of the LRH.

At the population level, the demographic dynamics of the LRH were marked by strong growth between 1975 and 2001, followed by a steady decline. Thus, the population peaked at an estimated 628,000 individuals in 2001 (Couturier et al., 2004; Taillon et al., 2016), declining to 175,000 individuals according to the most recent estimates (Brodeur et al., 2023). This decline represents a decrease of approximately 70% in its population since 2001 (MFFP, 2018; Gouvernement du Québec, 2025a). No migratory caribou were observed during an aerial survey conducted in January 2023 in the project's biophysical RSA (Niigaan, 2023).

LRH telemetry tracking data for migratory caribou indicate that the intensity of use of the biophysical RSA has varied over the years. A peak in use was observed between 2009 and 2015, with a maximum of 113 distinct individuals detected in 2009. Since 2016, there has been a decrease in use of the central part of the biophysical RSA, with areas of intensive use shifting further north and west of the proposed mine site, particularly between the La Grande 3 and La Grande 4 dam reservoirs and west of Lac de la Corvette.

The project is located on the traditional territory of the Cree Nation of Chisasibi, in the Eeyou Istchee James Bay region. Migratory caribou occupy a central place in Cree culture, both in terms of food and spirituality (AFNQL – FNQLSDI, 2022). However, the dramatic decline in the population of migratory caribou herds has prompted authorities to ask local communities to significantly reduce caribou hunting for conservation purposes (Cree Nation Government, 2025). Consultations with members of the Chisasibi community highlighted their concerns about declining caribou populations and changes in migration routes, as well as the importance of preserving habitats and continuing traditional activities (Gagnon et al., 2023; Cree Nation Government, 2025).

For further details, the sectoral study is presented in Appendix 6-21.

Moose

The moose is the largest species in the deer family in Quebec and occupies a very large range across the province (Gouvernement du Québec, 2025b). Its territory covers almost the entire forested area of Quebec, from the southern regions to the northern limits of the boreal forest. In the north, the northern limit of moose distribution corresponds to the transition between the boreal forest and the taiga, around the 52nd parallel. Beyond this limit, moose density declines rapidly due to the predominance of spruce-moss stands, taiga, and tundra, which are environments that are not conducive to the species (Lefort and Massé, 2015). In the James Bay region, moose are the main prey of grey wolves (Jolicoeur and Hénault, 2002).

Hunting zone 22, which covers most of the James Bay territory, has historically had a low moose population, but this has been growing over the past few decades. An aerial survey conducted in 1991 estimated the density at 0.26 moose per 10 km², representing a population of 8,841 individuals (after taking into account hunting harvests) across the hunting zone. A simulation conducted in 1997 suggested a density of 0.31 moose per 10 km², indicating an annual population growth of approximately 3%. Applying a growth rate of 3% between 1991 and 2012, the moose population in the hunting zone was estimated at 9,872 individuals, representing a density of 0.5 moose/10 km² (Société de la faune et des parcs, 2003; Lefort and Massé, 2015).

During the aerial survey conducted in January 2023 in the project's biophysical RSA, a total of 27 moose divided into 14 groups were counted. The observed demographic composition was balanced, with 37% females, 41% males, and 22% calves, representing a male-to-female ratio close to parity and an estimated productivity of 0.6 calves per female (60 calves/100 females). Moose density in the biophysical RSA was low, reaching 0.18 moose/10 km², or 0.23 moose/10 km² after correction for detectability (82%). This density is lower than the regional average estimated at 0.5 moose/10 km² for hunting zone 22, which is to be expected since the biophysical RSA is located near the northern limit of the species' range. Within the project's biophysical LSA, four moose were counted near the access road (Niigaan, 2023).

Sport hunting data for this area also suggest that the regional moose population is stable or even growing, with relatively constant annual harvests (Société de la faune et des parcs, 2003; Gouvernement du Québec, 2025c). In hunting zone 22, 84 and 87 moose were harvested by sport hunters in 2023 and 2024, respectively (Gouvernement du Québec, 2025c).

Moose select their habitat based on the availability of food, the presence of shelter from harsh weather and predators, and the structure of the forest landscape. In Quebec, moose prefer forest mosaics composed of hardwood and mixedwood stands, as well as recently disturbed areas (logging, burning, insect epidemics), which offer an abundance of browse (leaves and twigs) and a high diversity of food (Courtois, 1993). Dense softwood stands are used primarily as shelter, especially in winter, to minimize energy expenditure associated with travelling through snow and to protect against the cold (Samson et al., 2002).

In summer, moose seek out wetlands to access aquatic plants rich in minerals, which are essential for antler growth, lactation, and thermoregulation. They also seek out shaded areas to avoid heat stress when temperatures exceed 63 °F (Samson et al., 2002). In winter, they prefer mixedwood and hardwood stands rich in browse, but take refuge in dense softwood forests when the snow becomes deep or crusted (Courtois, 1993).

Moose habitat selection varies depending on the season and landscape structure. They have home ranges covering several dozen square kilometres, within which they seek an optimal mix of feeding and shelter sites (Samson et al., 2002). Habitat quality is therefore maximal when food and shelter are juxtaposed, reducing travel and optimizing periods of grazing, resting, and rumination (Courtois, 1993). The habitat's carrying capacity for moose depends on the proportion of young stands (5 to 30 years old), the diversity of hardwood species, the presence of water bodies, and the availability of softwood refuges. The highest moose densities are found in mixedwood forests and landscapes structured by natural or anthropogenic disturbances, which promote regeneration and diversity of food resources (Samson et al., 2002).

The potential growth of the moose population in hunting zone 22 could be attributable to improved habitat conditions, particularly the increase in the area of mixedwood and hardwood stands (+30% between 1970 and 1990) (Lefort and Massé, 2015). 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).

Moose are of great importance to local Indigenous communities, both culturally and as a food source. It is an essential wildlife resource for subsistence, traditional practices, and knowledge transfer. Moose thus remain central to the identity, food autonomy, and way of life of the region's Indigenous communities (Lefort and Massé, 2015).

Black bear

The black bear has a wide range covering the entire province of Quebec (Gouvernement du Québec, 2025d). In the Nord-du-Québec region, where the project's biophysical RSA is located, the status of black bear populations remains relatively poorly documented (Société de la faune et des parcs, 2003). No inventory focusing on this species has been conducted in this administrative region; the nearest inventories were conducted around Lac Péribonka, in the Saguenay–Lac-Saint-Jean region (Dussault et al., 2024a; 2024b).

In the early 1990s, the density of black bears was estimated at approximately 0.20 bears per 10 km² in hunting zone 22, corresponding to a population of approximately 5,600 individuals. This estimate is based on an indirect approach using annual harvest statistics provided by the Cree Trappers Association, combined with a demographic simulation model incorporating biological parameters adapted to northern conditions. However, this method has several limitations, including the relative reliability of harvest statistics, which may be incomplete or underreported, as well as uncertainty related to the transposition of biological parameters from studies conducted mainly in southern Quebec (Lamontagne et al., 1999; Lapointe, 1997, Société de la faune et des Parcs, 2003).

In hunting zone 22, black bear hunting and trapping activities are reserved exclusively for Indigenous Peoples, in accordance with the traditional practices and harvesting rights of these communities, as set out in the JBNQA and related agreements (Bédard, 2023). Sport hunting statistics, which are accessible and updated annually, cannot therefore be used as an indicator of the abundance of the species in the biophysical RSA or LSA.

A few black bears were observed opportunistically during a field survey in the biophysical LSA in the summer of 2022 (BBA, 2022).

For black bears, habitat selection is particularly guided by the availability of food resources. In spring, black bears prefer open areas and forest edges, where they find digestible herbaceous plants, young shoots, and insects. Regenerating forest stands, resulting from logging or natural disturbances, offer an abundance of small fruits (berries) and insects, making them valuable habitats for the species (Samson, 1996; Desnoyers and Dussault, 2014). Access to high-quality food resources is particularly important in the fall, since this is when black bears build up their fat reserves that will enable them to survive and reproduce during hibernation (Noyce and Garshelis, 1994; Samson and Huot, 1995).

In the fall, black bears show a strong preference for hardwood forests with species that produce hard fruits (e.g., acorns, nuts, beechnuts), such as oaks (*Quercus* spp.; Inman and Pelton, 2002), hickory trees (*Carya* spp.; Elowe and Dodge, 1989), and beech trees (*Fagus* spp.; Hugie, 1982). The black bear is also an opportunistic predator of caribou and moose calves (Bonin et al., 2020; McLaren et al., 2021). Black bears also use anthropogenic resources (Rogers, 1987), particularly when natural resources are scarce in their habitat (Elowe and Dodge, 1989; Zeller et al., 2019).

Grey wolf

The grey wolf is a wild canid that inhabits almost the entire territory of Quebec, with the exception of the regions south of the St. Lawrence River. It is permanently present in the James Bay region, where it plays a key ecological role as a top predator in boreal and subarctic ecosystems (Gouvernement du Québec, 2025e).

Estimates of grey wolf density in the James Bay region vary depending on the method used and the availability of prey. According to Jolicoeur and Hénault (2002), the wolf density in hunting zone 22 is estimated to be between 0.3 and 0.5 wolves per 100 km². Monitoring parameters suggest that grey wolf populations occupying the James Bay area are stable (MELCC, 2021).

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. Preferred habitats include black spruce-moss stands, mature mixedwood forests, areas with higher densities of moose (Jolicoeur and Hénault, 2002), as well as riparian environments and areas with high densities of beavers (*Castor canadensis*), which can be an important food resource, especially in the spring and summer (Hénault and Jolicoeur, 2003).

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; Lesmeries et al., 2012).

The diet of wolves in northern Quebec is primarily composed of moose, but also includes caribou, beaver, snowshoe hare (*Lepus americanus*), and, opportunistically, other small mammals or carcasses found in the territory. The selection of prey varies according to the season, local availability, and the vulnerability of individuals (Hénault and Jolicoeur, 2003).

In hunting zone 22, grey wolf hunting and trapping activities are reserved exclusively for Indigenous Peoples, in accordance with the traditional practices and harvesting rights of these communities, as set out in the JBNQA and related agreements (Gouvernement du Québec, 2025f).

The grey wolf plays an important role in local Indigenous communities, both culturally and economically. Harvesting this species through trapping contributes to the transmission of traditional knowledge and food autonomy in these communities (Hénault and Jolicoeur, 2003).

6.3.6 Mammals – Chiropterans

Inventories were carried out in 2023, 2024, and 2025 using 16 acoustic monitoring stations distributed across an inventory area of approximately 114.25 km^2, corresponding to a 2 km buffer zone around the project infrastructure and a 1 km buffer zone around the planned access road (Map 6-16). The results of this work are presented in a sectoral study (Appendix 6-22). These inventories aimed to establish a profile of the chiropterans visiting the inventory area at different times of the year (spring and fall) and to search for maternity roosts and hibernacula.

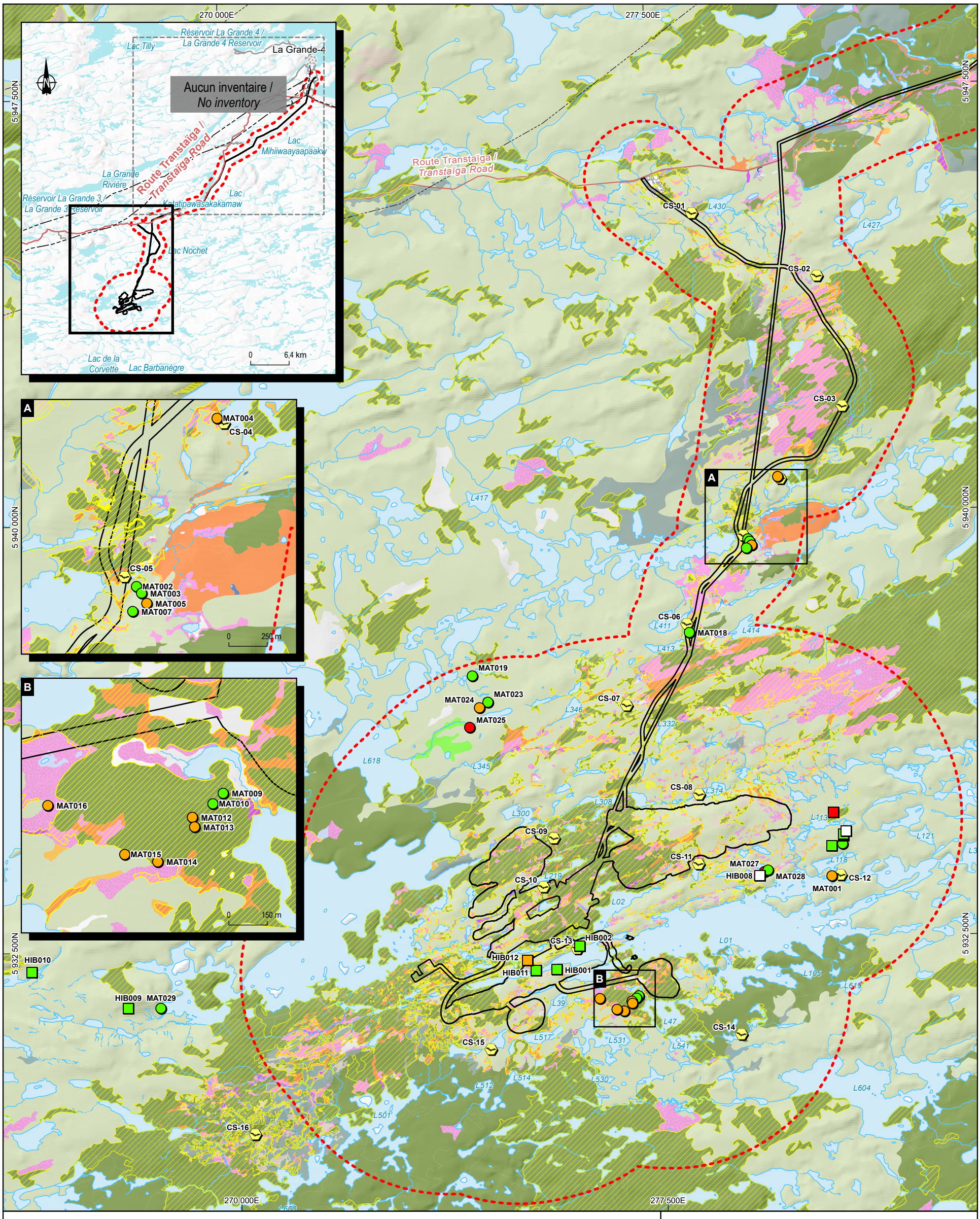
Inventories confirmed the presence of two resident species, the northern long-eared bat (*Myotis septentrionalis*) and the little brown bat (*Myotis lucifugus*), as well as other bats of the genus *Myotis*. In terms of migratory species, the silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), and red bat (*Lasiurus borealis*), as well as the big brown bat (*Eptesicus fuscus*) and silver-haired bat (*Lasionycteris noctivagans*) complexes have been confirmed. It should be noted that the hoary bat was the species most frequently identified.

Existing literature

According to available information, three of the eight bat species found in Quebec are likely to be found in the biophysical LSA, namely the red bat, the brown bat, and the northern long-eared bat (Jutras et al., 2012; ECCC, 2018; ERCSQ, 2019; ERCSQ, 2021).

A summer colony of bats, observed in 2001 in a cottage located approximately 23 km east of the biophysical LSA, is mentioned in the Neighbourhood Bat Watch database. In addition, a network of several artificial bat roosts, one of which is occupied by a few individuals, is located approximately 69 km south of the biophysical LSA (Neighbourhood Bat Watch, 2025).

Data collected by the *Réseau québécois d'inventaire acoustique de chauves-souris* **[**Quebec bat acoustic inventory network] between 2003 and 2020 in the Chibougamau area, approximately 400 km south of the biophysical LSA, indicate the presence of the big brown bat, silver-haired bats, and red bats, and bats of the genus *Myotis* (Desrosiers and Berthiaume, 2024).



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Chiroptères / *Chiroptera*

- Station acoustique / *Acoustic station*
- Habitat préférentiel de reproduction / *Preferred breeding habitat*

Résultats d'inventaire / *Inventory Results*

Étiquette : Nom de la station / *Label : Station name*
MAT-01 — Forme : Type d'habitat / *Shape : Habitat type*
Couleur : Potentiel de maternité / Color *: Maternity potentiel*

Type d'habitat / *Type of habitat*
- Hibernacle / *Hibernaculum*
- Maternité / *Maternity*

Potentiel / *Potential*
- Nul / *Null*
- Faible / *Low*
- Moyen / *Medium*
- Élevé / *High*

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 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*
- Permanent partiellement souterrain / *Partially underground permanent*
- Souterrain / *Underground*

Milieux terrestres / *Terrestrial Environments*

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

Autre milieu / *Other Environment*

- Autre milieu / *Other Environment*

Infrastructures / *Infrastructure*

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

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-16 / *Map 6-16*
Résultats d'inventaire des chiroptères / *Chiroptera Inventory Results*

Sources

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Géobase du réseau hydrographique du Québec (GRHQ), MELCC et MERN, 2021

0 675 1 350 m

NAD 1983 CSRS UTM Zone 18N

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Acoustic inventories of chiropterans

The fixed acoustic inventory confirmed the presence of five species (northern long-eared bat, silver-haired bat, hoary bat, red bat, and the big brown bat), as well as brown/silver-haired bat and Myotis complexes. These include the little brown bat, the northern long-eared bat, and the eastern small-footed bat. In total, 35 passes were recorded in 2023, 220 passes in 2024, and 367 passes in 2025. It should be noted that only the fall migration period was recorded in 2023, which explains the differences between years.

The hoary bat is the species most commonly identified during inventories, accounting for up to 91% of records, while other species have only been recorded occasionally (Table 6-34).

Table 6-34 Species recorded and respective percentages for the 2023, 2024, and 2025 seasons

Species/Complex	Percentage (%) of recordings		
	2023	2024	2025
Myotis Complex	2.9	5.5	2.2
Northern long-eared bat	0	0.9	0
Big brown bat	0	1.4	0
Big brown/silver-haired complex	0	0.5	0
Silver-haired bat	5.7	0	0.3
Hoary bat	45.7	88.2	91.3
Red bat	11.4	0	3.0
Undetermined	34.3	3.6	3.3

More specifically, during the spring dispersal and migration period (2024 and 2025), only migratory species of the genus *Myotis* and the hoary bat were identified. Activity is therefore very low, with an average of 0.02 to 0.13 passes per night per station. During the breeding season, all species and species complexes are represented in the 2024 and 2025 inventories. The hoary bat largely dominates this period, accounting for approximately 90% of the records, and all stations were visited by one or more of the species present. Excluding the unidentified species and the big brown bat/silver-haired bat complex, since it includes a resident species and a migratory species, resident species are poorly represented, accounting for 2.1% (2024) and 6.2% (2025) of records, compared to 71.8% (2024) and 92% (2025) for migratory species. The number of passes per night and per station is very low, with a maximum of 0.41 passes per night in 2024 and 1.15 passes per night in 2025.

During the fall migration (2023, 2024, and 2025), all species and species complexes were recorded. The hoary bat is the species most often observed, with the number of passes per night varying from 0.05 to 1.12 per station. The other bats have a lower number of passes, equivalent to approximately 0.02 passes/night per station (Tables 4 to 7 of the sectoral study presented in Appendix 6-22).

Search for chiropteran hibernacula

Only two hibernacula are known to exist in the Nord-du-Québec region, one north of Lebel-sur-Quévillon (approximately 500 km southwest of the study site) and the other near Chibougamau (approximately 400 km south of the study site). Thus, no known hibernaculum is located near the biophysical LSA. According to data obtained from SIGÉOM, the *Gîtes métallifères du Québec* [Quebec metal-bearing deposits] website, and the *Carte des mines active et en maintenance du Québec* [map of mines in operation and under care and maintenance in Quebec] (Gouvernement du Québec, 2024a, 2024b, and 2024c), no human intervention has created openings suitable for a bat hibernaculum near the biophysical LSA, and no abandoned mines are listed in the biophysical LSA.

Furthermore, no speleological cavities with the potential to serve as bat hibernacula have been reported in the Eeyou Istchee James Bay administrative region (Gauthier et al., 1995). Lastly, it would be highly unlikely to find a bat hibernaculum in a natural cavity due to the excessively cold temperatures of the biophysical LSA.

Although it is unlikely that a hibernaculum would be found in the biophysical LSA, 12 rock outcrops within the LSA were nevertheless visited in the field to assess the potential for the presence of a chamber that could accommodate a hibernating bat population. Of these, 2 have zero potential, 8 have low potential, 1 has average potential, and 1 has good potential. However, no evidence of bat presence was found during the assessment of these various sites.

Search for chiropteran maternity roosts

The preferred breeding habitat of bats is found throughout the biophysical LSA, with areas of higher density in the centre and south of the LSA, as well as near the existing access road.

A total of 29 potential maternity roosts of natural origin were observed during daytime research activities. Among these sites, 2 were deemed to have high potential for use by bats, 9 had medium potential, 12 had low potential, and 6 had no potential. The potential maternity roosts of natural origin were mainly composed of stumps.

Furthermore, the potential presence of maternity roosts in the immediate vicinity of each fixed acoustic monitoring station was zero or low for most stations, with the exception of stations CS-12, CS-13, CS-04, and CS-01, which have average potential (Map 6-16). In fact, station CS-12 is located in a burned area with several large stumps. Stations CS-04 and CS-01 are located in forested areas, but several stumps have been observed.

No physical evidence of bats (guano) was observed, and no sounds (scratching or cries) were heard during the daytime assessment of potential maternity roosts.

Species of special status

In Quebec, recordings of chiropterans belonging to the Myotis genus complex generally include three species whose sonograms are difficult to differentiate: the little brown bat, the northern long-eared bat, and the eastern small-footed bat. As the latter species is very rare, it is considered absent from the region (Jutras et al., 2012). Thus, the recordings attributed to the *Myotis* genus are likely to be from the northern long-eared bat and/or the little brown bat. Both species are endangered in Canada according to Schedule 1 of the *Species at Risk Act* (Government of Canada, 2025b) and threatened in Quebec according to the *Act respecting threatened or vulnerable species* (Gouvernement du Québec, 2025).

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).

The hoary, silver-haired, and red bats were recently assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2023), although these species are not yet included in Schedule 1 of the *Species at Risk Act* (Government of Canada, 2025b).

6.3.7 Mammals – Other species

6.3.7.1 Existing literature

A review of the literature was carried out to obtain a picture of other mammal species likely to occupy the biophysical LSA, particularly using public, institutional, and scientific data sources. The following sources of information were consulted:

- Carte des occurrences d'espèces en situation précaire via le Centre de données sur le patrimoine naturel du Québec [Map of occurrences of species at risk via the Quebec Natural Heritage Data Centre] (CDPNQ, 2025);
- Aires de répartition des mammifères terrestres [Distribution ranges of land mammals] (MELCCFP, 2025);
- Atlas des micromammifères du Québec [Atlas of small mammals of Quebec] (Desrosiers *et al*., 2002);
- Global Biodiversity Information Facility (GBIF, 2025);
- Catalog of Hydro-Québec documentation centres (CherLoc, 2025).

6.3.7.2 Small mammals

An inventory of small mammals was conducted in September 2023 as part of establishing the project's reference wildlife status (Niigaan, 2025c, Appendix 6-23). The main objective of this campaign was to document the species diversity and relative abundance of small mammals in the various types of habitats present in the biophysical LSA, while paying particular attention to the detection of species of special status.

The inventory of small mammals was conducted in accordance with the *Protocole standardisé pour les inventaires de micromammifères au Québec* [Standardized protocol for small mammal inventories in Quebec] (MELCCFP, 2023). Sixteen (16) 320-metre transects were set up across three sectors representative of the site's habitats. Each transect included 33 inventory stations, each equipped with two peanut butter-baited traps, for a total of 66 traps per transect. The traps were checked every morning for five consecutive days at the end of summer 2023, the optimal period for this type of inventory. The specimens captured were identified in the laboratory, mainly using the identification key by Fauteux et al. (2014).

A total of eight species of small mammals were recorded in the three areas surveyed: the southern red-backed vole (*Myodes gapperi*), the deer mouse (*Peromyscus maniculatus*), the eastern heather vole (*Phenacomys ungava*), the meadow vole (*Microtus pennsylvanicus*), the northern bog lemming (*Synaptomys borealis*), the southern bog lemming (*Synaptomys cooperi*), the meadow jumping mouse (*Zapus hudsonius*), and the cinereous shrew (*Sorex cinereus*). These species have been observed in a variety of habitats, including softwood stands, regenerating areas, peat bogs, and lichen tundra. Table 6-35 shows the number of individuals caught by species.

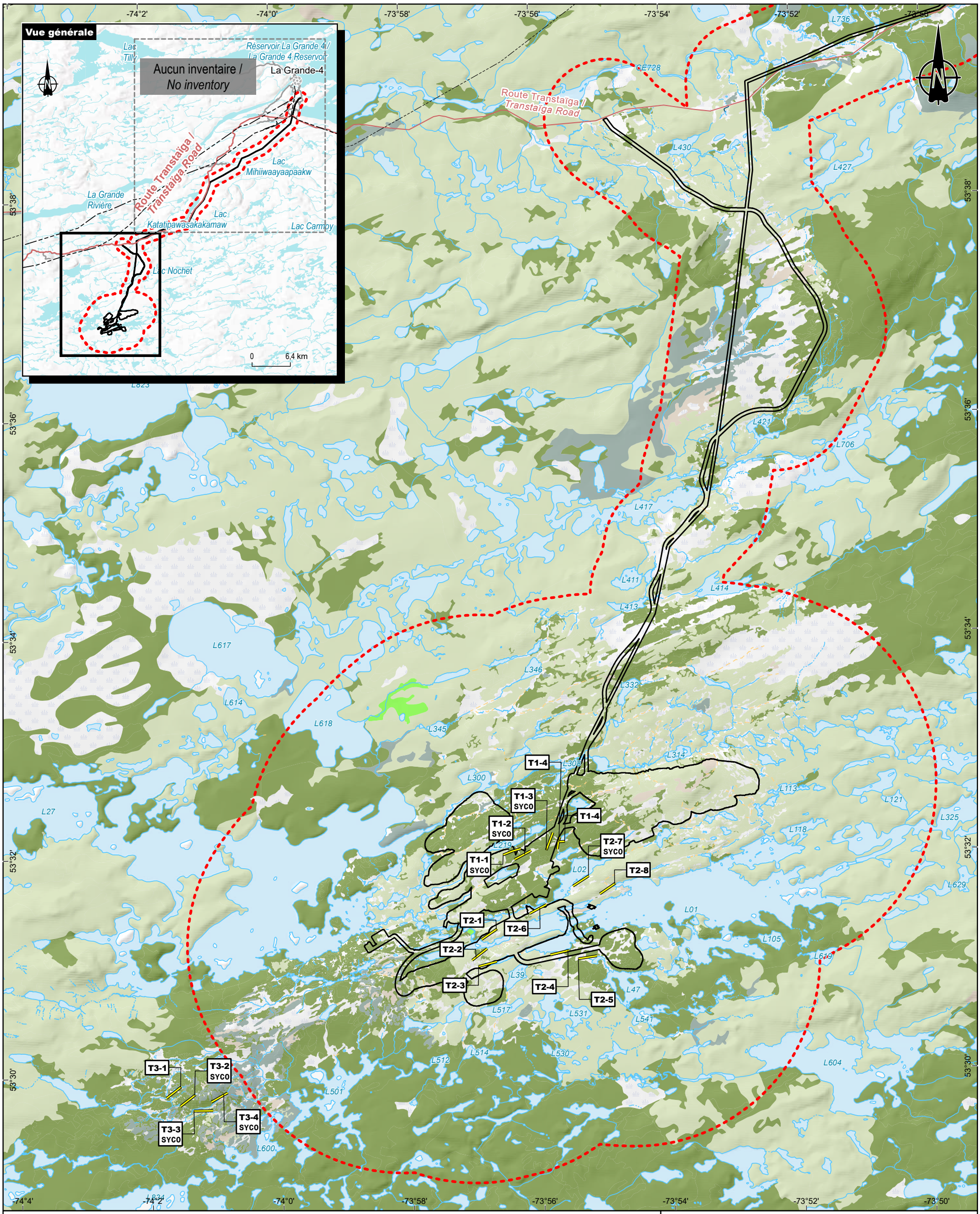
Table 6-35 Species and number of individuals captured per species during the small mammal inventory

Common name	Scientific name	Number of individuals captured
Southern red-backed vole	*Myodes gapperi*	345
Deer mouse	*Peromyscus maniculatus)*	192
Eastern heather vole	*Phenacomys ungava*	63
Meadow vole	*Microtus pennsylvanicus*	60
Northern bog lemming	*Synaptomys borealis*	39
Southern bog lemming[1]	*Synaptomys cooperi*	16
Cinereous shrew	*Sorex cinereus*	14
Meadow jumping mouse	*Zapus hudsonius*	12

Note: 1 Species likely to be designated as threatened or vulnerable in Quebec.

Among the species inventoried, the southern bog lemming is likely to be designated as threatened or vulnerable in Quebec. This species was captured in seven transects, with greater abundance in the T3 area (Map 6-17), characterized by the presence of lichen tundra. It has also been observed in the T1 sector, where a variety of habitats, including peat bogs and bodies of water, seem to favour its presence. However, its presence was more marginal in the T2 sector, dominated by regenerating stands, suggesting that this type of habitat is less favourable to the species.

The rock vole (*Microtus chrotorrhinus*), also a species likely to be designated as threatened or vulnerable, was not detected during the inventory. However, its preferred habitat (i.e., moist rocky slopes near water sources) is potentially present in the biophysical LSA, which justifies considering this species as potentially present. Considering the known distribution ranges of small mammal species (Desrosiers et al., 2002; MELCCFP, 2025), the northern water shrew (*Sorex palustris*), the pygmy shrew (*Sorex minutus*), and the star-nosed mole (*Condylura cristata*) are also small mammal species that may be present in the biophysical LSA.



Zones d'étude / *Study Areas*

- Projet / *Project*
- Locale - Biophysique / *Local - Biophysical*

Micromammifères / *Small Mammals*

- Transect d'inventaire de micromammifère / *Small mammal inventory transect*

Étiquette / *Label*

T1-1 SYCO
- Nom de la station / *Station name*
- Résultat d'inventaire / *Inventory result*

Code / *Code*	Espèce / *Species*
SYCO	Campagnol-lemming de Cooper / *Soutern bog lemming*

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*

- Milieu humide / *Wetland environment*
- Plan d'eau / *Waterbody*

Cours d'eau / *Watercourses*

- Intermittent / *Intermitent*
- Permanent / *Permanent*
- Permanent partiellement souterrain / *Partially underground permanent*
- Souterrain / *Underground*

Milieux terrestres / *Terrestrial Environments*

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

Autre milieu / *Other Environment*

- Autre milieu / *Other Environment*

Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-17 / *Map 6-17*
Résultats d'inventaire des micromammifères / *Small Mammal Inventory Results*

Sources

BDGA, 1/1 000 000, MRN Québec, 2014
AQréseau+, réseau routier, MERN, 2024-03-01
Cartographie écologique de la végétation du Nord Québécois, MFFP, 2013
Géobase du réseau hydrographique du Québec (GRHQ), MELCC et MERN, 2021

0 650 1 300 m

NAD 1983 CSRS UTM Zone 18N

2026-03-24

Préparation / Preparation : V. Roy
Dessin / Drawing : P. Boulay
Approbation / Approval : M.H. Brisson
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6.3.7.3 Other land mammals

Although no targeted inventory was conducted for other land mammal species, several small to medium-sized species are likely to be present in the biophysical LSA. The diversity of available habitats, including forests, wetlands, banks of bodies of water, and open areas, encourages the presence of a wide range of mammals. This assessment is primarily based on the known ranges of land mammal species (MELCCFP, 2025).

Among the most common species are the snowshoe hare, well adapted to softwood stands and areas undergoing regeneration, and the American porcupine (*Erethizon dorsatum*), a discreet but widespread species. The muskrat (Ondatra zibethicus) found in wetlands and along riverbanks, while the Canadian beaver actively shapes aquatic environments. A few beavers were also spotted opportunistically in 2022 during field surveys in the biophysical RSA (BBA, 2022).

Mustelids are well represented, with the American marten (*Martes americana*), the ermine (*Mustela erminea*), the least weasel (*Mustela nivalis*), and the American mink (*Neovison vison*), which use a wide variety of microhabitats, from mature forests to wooded banks and aquatic environments. The river otter (*Lontra canadensis*) is also associated with watercourses and lakes.

The coyote (*Canis latrans*), the Canadian lynx (*Lynx canadensis*), the red fox (*Vulpes vulpes*), and the Arctic fox (*Vulpes lagopus*) are likely to occupy open and forested areas, while the striped skunk (*Mephitis mephitis*) may be found in riparian areas and disturbed environments.

Among rodents, the red squirrel, the northern flying squirrel (*Glaucomys sabrinus*), and the groundhog (*Marmota monax*) are species likely to be present in the biophysical LSA. These species are found in undergrowth, forest edges, and open areas.

Although not all of these species were directly inventoried as part of this study, their presence is considered plausible. It should be noted that none of these species currently has a special conservation status in Quebec. They are all considered common or widespread in boreal environments and are not designated as threatened, vulnerable, or likely to be designated as such according to the Quebec government’s official lists. These species are also not listed as being at risk by COSEWIC.

Issues for First Nations

The project is located on Cree Nation territory in the Eeyou Istchee region, where local communities have a close relationship with wildlife rooted in hunting, trapping, and gathering practices passed down from generation to generation. These practices are protected by the hunting, fishing, and trapping regime established by the JBNQA which recognizes Cree rights to harvest wildlife for subsistence and cultural purposes.

Among the small and medium-sized mammal species whose range overlaps with that of the project, several are historically and culturally important to Indigenous communities. In particular, the snowshoe hare is a species widely consumed for its meat and frequently hunted in boreal forests. The American porcupine, although rarely seen, is also used for its meat and quills, which can be used for craft purposes.

The muskrat is a semi-aquatic species whose fur is traditionally harvested, particularly through trapping. Mustelids such as the American marten, least weasel, and American mink are also of interest for trapping, due to the quality of their fur and their economic value in Cree communities.

Although these species do not have special conservation status, they play an important role in First Nations traditional practices and ways of life. Their presence in the biophysical LSA must be considered when assessing the project's impacts, particularly with regard to habitat preservation, the continuity of subsistence activities, and respect for Indigenous rights.

6.3.8 Plant and wildlife species of special status

6.3.8.1 Reference state

The various species of special status present or potentially present in the biophysical LSA, as well as the components to which they relate in the previous sections, are presented in Table 6-36.

Table 6-36 List of plant and wildlife species of special status present or potentially present in the biophysical LSA

Common name	Scientific name	Status		Confirmed presence in the local study area (Yes/No)
		Quebec[1]	Canada[2]	
Brown-edged pussytoes	*Antennaria rosea subsp. confinis*	LDTV	–	No
Modest aster	*Canadanthus modestus*	LDTV	–	No
Spatulate moonwort	*Botrychium spathulatum*	LDTV	–	No
Botrychium ascendens	*Botrychium ascendens*	LDTV	–	No
Ojibway waterwort	*Elatine ojibwayensis*	LDTV	–	No
Rocky Mountain willowherb	*Epilobium saximontanum*	LDTV	–	No
Limestone swamp bedstraw	*Galium brevipes*	LDTV	–	No
Nahanni oak fern	*Gymnocarpium continentale*	LDTV	–	No
Purple meadow-rue	*Thalictrum dasycarpum*	LDTV	–	No
McCall willow	*Salix maccalliana*	LDTV	–	No
Golden eagle	*Aquila chrysaetos*	V	NAR	Yes
Harlequin duck	*Histrionicus histrionicus*	V	SC	No
Short-billed dowitcher	*Limnodromus griseus*	-	TH	No
Red crossbill (*percna* subspecies)	*Loxia curvirostra percna*	-	TH	Uncertain[3]
Common nighthawk	*Chordeiles minor*	LDTV	SC	Yes
Peregrine falcon	*Falco peregrinus*	LDTV	NAR	Yes
Evening grosbeak	Coccothraustes vespertinus	–	SC	Yes
Barrow's goldeneye	Bucephala islandica	V	SC	No
Short-eared owl	*Asio flammeus*	LDTV	SC (COSEWIC: TH)	Yes
Bank swallow	*Riparia riparia*	–	TH	Yes
Olive-sided flycatcher	*Contopus cooperi*	V	SC	Yes

Common name	Scientific name	Status		Confirmed presence in the local study area (Yes/No)
		Quebec[1]	Canada[2]	
Lesser yellowlegs	*Tringa flavipes*	–	TH	Yes
Bald eagle	*Haliaeetus leucocephalus*	V	NAR	Yes
Rusty blackbird	*Euphagus carolinus*	LDTV	SC	Yes
Yellow rail	*Coturnicops noveboracensis*	TH	SC	No
Woodland caribou (forest)	*Rangifer tarandus caribou*	V	TH	Yes
Little brown bat	*Myotis lucifugus*	TH	ES	Yes
Northern long-eared bat	*Myotis septentrionalis*	TH	ES	Yes
Silver-haired bat	*Lasionycteris noctivagans*	LDTV	– (COSEWIC: ES)	Yes
Hoary bat	*Lasiurus cinereus*	LDTV	– (COSEWIC: ES)	Yes
Red bat (eastern)	*Lasiurus borealis*	V	– (COSEWIC: ES)	Yes
Southern bog lemming	*Synaptomys cooperi*	LDTV	-	Yes
Rock vole	*Microtus chrotorrhinus*	LDTV	-	No

Note: Species potentially present in the local study area were identified through a literature review as part of the impact assessment conducted in 2025–26. This documentary research consisted of conducting a literature review and consulting geospatial databases within a 50 km radius of the mine site's centroid.

1: Species status in Quebec (July 2025): LDTV: Likely to be designated as threatened or vulnerable; V: Vulnerable; TH: Threatened.

2: Species status in Canada (SARA) (July 2025): SC: Special concern, Th Threatened, ES: Endangered species, NAR: Not at risk

3: Six red crossbills were observed, but only some of them were confirmed as type 1, while the others remain uncertain. Although it is unlikely that they belong to the *percna* subspecies, this possibility could not be completely ruled out.

6.4 Human environment

The project is located in Québec in the Nord-du-Québec administrative region (number 10), which is divided into two territories: Eeyou Istchee James Bay and Nunavik (Kativik Regional Government). Located north of the 49th parallel, entirely on the Canadian Shield, the region covers just over half of Québec's total area and is the province's largest administrative region, covering 860,553 km² (MAMH, 2023).

More specifically, the project is located in the territory of the Eeyou Istchee James Bay Regional Government (EIJBRG), which replaced the municipality of James Bay in 2014. This territory, located between the 49th and 55th parallels, corresponds to Category III lands under the James Bay and Northern Quebec Agreement (JBNQA), where the Cree have exclusive rights to trap fur-bearing animals and fish certain species). The EIJBRG exercises the powers, functions, and authorities conferred on a regional county municipality (RCM). It is a joint Cree-Jamesian regional government, with 11 Indigenous representatives and 11 non-Indigenous representatives). It also includes one representative from the Government of Québec, but without voting rights.

The territory of Eeyou Istchee, represented by the Cree Nation Government, consists of 10 Cree First Nations[4], and the territory of Jamésie consists of four local municipalities and three non-Indigenous communities. The list is presented in Table 6-37.

The local human environment study area includes the traditional territory of three Cree communities: Chisasibi (whose village is located 330 km to the west), Wemindji (330 km southwest) and Mistissini (350 km south) (Map 6-18). However, all the infrastructure planned for the project is located on the traditional territory of the Cree Nation of Chisasibi.

The regional human environment study area is crossed by the Trans-Taiga Road and Billy-Diamond Highway, which will be used to transport materials and equipment during construction and for transporting ore concentrate during project operations. Thus, in addition to the territories mentioned above, the regional study area includes the territories of the Cree communities of Eastmain, Waskaganish, Nemaska, and Waswanipi, as well as the municipality of Matagami.

The lands governed by the JBNQA are divided into traplines by community, each of which is under the responsibility of a tallyman, who is considered the steward, guardian, and custodian of the territory (CTA, 2009). The trapline directly affected by the Shaakichiuwaanaan Project is CH39 (formerly VC7), which forms part of the traditional territory of Chisasibi. The local study area also touches on the M02A trapline held by Mistissini and the VC26 trapline held by Wemindji (Map 6-19).

The information in the following sections is based on documentary research, extensive work experience in the region, and a series of group meetings, individual interviews, and discussions with members of the affected communities and project stakeholders conducted by PMET and WSP. The results of these interviews are detailed in Chapter 3.

[4] Only nine of them are currently included in the JBNQA. The First Nation of Washaw Sibi is in the process of creating its own community, which is expected to be established in the Matagami area.

Table 6-37 Indigenous and non-Indigenous communities in the Eeyou Istchee James Bay territory, and distance from the local human environment study area

Location	Population (2021)	Road distance from the community to the planned project infrastructure site (km)[a]	Straight-line distance between the traditional territory and the planned project infrastructure (km)	Planned ore transport through traditional territory
Cree communities				
Chisasibi	4,985	420	0	Yes
Wemindji	1,562	395	< 15	Yes
Mistissini	3,731	940	< 1	Yes
Eastmain	924	570	130	Yes
Waskaganish	2,536	680	230	Yes
Nemaska	832	590	195	Yes
Waswanipi	1,836[b]	1,000	305	Yes
Oujé-Bougoumou	797	895	330	No
Whapmagoostui	1,022	NA	125	No
Total population in Cree communities in the regional study area	*16,406*			
Jamesian municipalities (M) and localities (L)				
Chapais (M)	1,468	935	N/A	N/A
Chibougamau (M)	7,233	890	N/A	N/A
Lebel-sur-Quévillon (M)	2,091	920	N/A	N/A
Matagami (M)	1,402	815	N/A	N/A
Radisson (L)	203	350	N/A	N/A
Valcanton[c] (L)	339	1,020	N/A	N/A
Villebois (L)	173	1,020	N/A	N/A
Total population in the localities/municipalities of the regional study area	*1,605*			

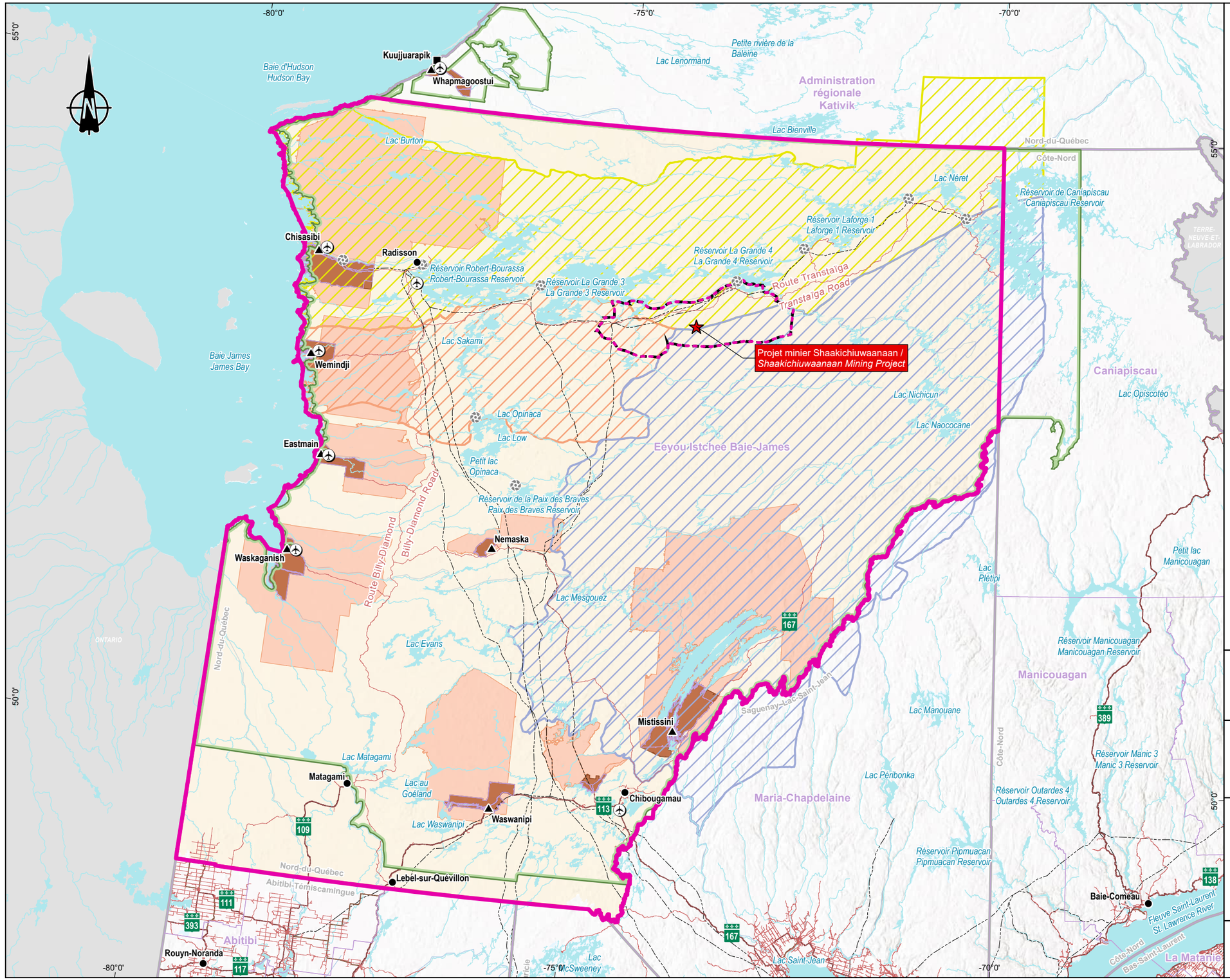
a: Up to the intersection of Trans-Taiga Road (kilometer 270) and the road leading to the project. Add approximately 20 km to the proposed mining site.

b: Data revised by Statistics Canada in December 2023.

c: Merger of Beaucanton (153 residents) and Val-Paradis (186 residents).

Note: Locations appearing in grayed out lines are not included in the regional study area.

Source: Statistics Canada, 2025.



Projet / *Project*

- Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

Zones d'étude / *Study Areas*

- Régionale - Humain / *Regional - Human*
- Locale - Humain / *Local - Human*

Repères géographiques / *Geographical Landmarks*

- Communauté crie / *Cree community*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Terrains de trappage des communautés cries / *Cree Communities Traplines*

- Chisasibi
- Mistissini
- Wemindji

Infrastructures / *Infrastructure*

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

Réseau routier / *Road Network*

- Route nationale / *National road*
- Route régionale / *Regional road*
- Autre / *Other*

Limites / *Boundaries*

- Municipalité régionale de comté (MRC) et Territoires autochtones / *Regional County Municipality (RCM) and First Nations Territories*
- Territoire d'application du régime de protection de l'environnement et du milieu social (chap. 22, CBJNQ) / *Territory covered by the environmental and social protection regime (chap. 22, JBNQA)*

Terres de catégorie (CBJNQ) / *Category Lands (JBNQA)*

- Terres de catégorie I / *Category I lands*
- Terres de catégorie II / *Category II lands*
- Terres de catégorie III / *Category III lands*

Projet minier Shaakichiuwaanaan /
Shaakichiuwaanaan Mining Project
Étude d'impact environnementale /
Environmental Impact Assessment

Carte 6-18 / *Map 6-18*
Inventaire du milieu humain dans la zone d'étude régionale /
Inventory of the Human Environment in the Regional Study Area

Sources
SDA, 1/20 000, MRNF, 2024-02
RNCan, Frontières géopolitiques, 2002 / CBJNQ, Chap. 22, 1975
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 / Bail de villégiature, MERN, mars 2021
FTGQ, MRNF Québec, 2010 / Réseau aéroportuaire, MTQ, 2024
Cree Trappers Association, 2018 / Contraites et restrictions, GESTIM, 2022

0 32,5 65 km
NAD 1983 Quebec Lambert

2026-03-30

Préparation / Prepared by : M. Lachance
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
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Zones d'étude / *Study Areas*

- Projet / *Project*
- Régionale - Humain / *Regional - Human*
- Locale - Humain / *Local - Human*

Occupation du territoire cri / *Cree Territory Occupation*

- Terrain de trappage / *Trapline*

Repères géographiques / *Geographical Landmarks*

- Communauté crie / *Cree community*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Camps et installations / *Camps and Facilities*

- 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*
- Prélèvement d'eau potable / *Drinking water withdrawal*

Infrastructures / *Infrastructure*

- Aérodrome / *Aerodrome*
- Hydroaérodrome / *Hydroaerodrome*
- Héliport / *Heliport*
- 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*

Contamination des sols / *Soil contamination*

- Site listé au Répertoire des terrains contaminés (RTC) du MELCCFP / *Site listed in the Contaminated Sites Directory (RTC) of the MELCCFP*

Baux de location / *Leases*

- Fins de villégiature / *Leisure purpose*
- Fins commerciales / *Commercial purpose*
- Fins industrielles / *Industrial purpose*
- Fins municipales / *Municipal purpose*

Parcs et aires protégées / *Parks and Protected Areas*

- Projet d'aire protégée / *Proposed protected area*

Feux de forêt / *Forest Fires*

- Feux 2023 / *2023 fires*

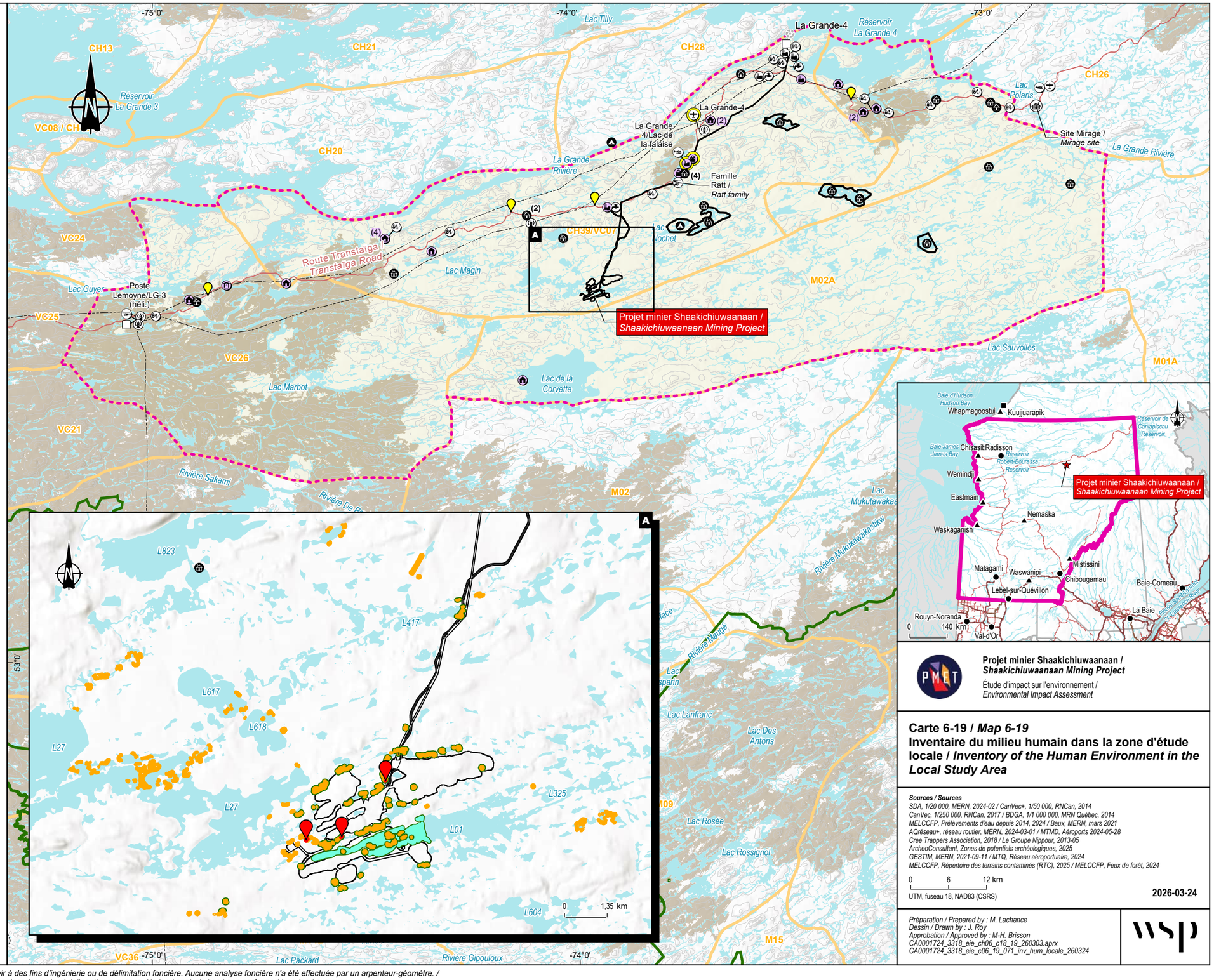
Archéologie / *Archaeology*

Zones de potentiel archéologique / *Areas of Archaeological Potential*

- Fort / *High*
- Moyen / *Medium*
- Subaquatique / *Underwater*
- Zone de l'inventaire 2025 / *2025 field inventory area*

Hydrographie / *Hydrography*

- Plan d'eau / *Waterbody*
- Cours d'eau / *Watercourse*



Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-19 / *Map 6-19*

Inventaire du milieu humain dans la zone d'étude locale / *Inventory of the Human Environment in the Local Study Area*

Sources / Sources

SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
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MELCCFP, Répertoire des terrains contaminés (RTC), 2025 / MELCCFP, Feux de forêt, 2024

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UTM, fuseau 18, NAD83 (CSRS)

2026-03-24

Préparation / Prepared by : M. Lachance
Dessin / Drawn by : J. Roy
Approbation / Approved by : M-H. Brisson
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6.4.1 Land tenure and governance

Land tenure of the James Bay and Northern Quebec Agreement (JBNQA)

The project is located within the territory covered by the JBNQA, on Category III lands. The environmental and social protection regime applicable in the James Bay region is established under Chapter 22 of the JBNQA and is governed by the provisions of Title II of the *Environment Quality Act* (EQA).

The land regime established by the JBNQA is a key factor in land use and ensures Cree participation in forestry, mining, and hydroelectric development across the territory. It divides the territory into Category I, II, and III lands. Under this regime, Category II and III lands form part of the public domain of the Government of Québec. The government may grant land rights for various projects while ensuring a diversity of land uses, compliance with applicable laws and regulations, and proper land use planning.

Category III lands represent all lands in the treaty territory that are not included in Category I and II lands. On these lands, the Cree have exclusive rights to trap fur-bearing animals and certain advantages in the outfitting industry without exclusive rights. They may establish any camp necessary for hunting, fishing, and trapping without requiring title from the Québec government. Non cree people are also permitted to hunt and fish on Category III lands. Mining rights, however, belong to the provincial government.

The hunting, fishing, and trapping regime established by the JBNQA applies to land mammals, freshwater and anadromous fish, migratory birds, and marine mammals, and grants Cree and Inuit beneficiaries the right to harvest any wildlife species at any time and in any place within the territory to meet their subsistence needs. Beneficiaries also have exclusive rights to harvest certain species such as beaver, bear, polar bear, and sturgeon (CNG, 2025).

Eeyou Istchee James Bay Regional Government (EIJBRG)

In addition to the JBNQA, the legislative and legal context of Nord-du-Québec is also governed by the Agreement Concerning a New Relationship Between the Government of Québec and the Crees of Québec, also known as the “Paix des Braves”. Based on the values of trust and mutual respect, the agreement aims to promote respect for the traditional Cree way of life and to foster greater autonomy for the Cree in the development of their own communities. Following this agreement, the Agreement on Governance in the Eeyou Istchee James Bay Territory was signed by the Cree of Eeyou Istchee and the Government of Québec in July 2012, with the objective of modernizing the governance regime and establishing a joint Cree–Jamesian regional government.

The EIJBRG is governed by Québec law and exercises the same powers, functions, and authorities over Category III lands located in the Eeyou Istchee James Bay territory as those that were, until 2014, assigned to the Municipality of James Bay. The regional government has the option of declaring its jurisdiction as a regional county municipality (RCM). It also acts as a regional conference of elected officials (CRÉ) with respect to the territory and resources (EIJBRG, 2025a).

The EIJBRG has adopted urban planning regulations applicable to its territory of intervention, i.e., the territory outside of Category I and II lands as designated by the *Act respecting the land regime in the James Bay and New Québec territories* (chapter R-13.1). These regulations designate the preferred uses for the various parts of Category III lands, such as housing, vacation homes, businesses and services, leisure and recreation, public and institutional, agriculture, forestry, resources, and conservation. With its application, the preferred uses for each of these zones are defined, along with the standards to be considered for these uses (EIJBRG, 2020). The project is located in zone 53-12-R, with resource exploitation (R) as the dominant use.

The issuance of resort leases has been subject to an administrative suspension throughout the Eeyou Istchee James Bay territory since the signing of the new governance agreement for the territory in 2012 (MRNF, personal communication, January 2023, in WSP, 2023).

6.4.2 Land use planning and development

The Ministère des Ressources naturelles et des Forêts (MRNF) usually plays a management role regarding Québec's territory and resources. However, the territory of Nord-du-Québec is governed by specific agreements, such as the JBNQA, which provide for management and planning mechanisms that are distinct from those in the rest of Québec. As a result, the EIJBRG manages land use planning on Category III lands under the JBNQA. The Cree Nation Government manages planning for Category II lands, and each First Nation, through its council, manages planning for its Category I lands.

Local integrated resource and land management tables

Under the *Sustainable Forest Development Act*, the EIJBRG establishes and coordinates local integrated resource and land management tables (ILRM). The role of these tables is to ensure that the interests and concerns of individuals and organizations involved in integrated forest management activities are taken into account (EIJBRG, 2025b).

These tables, which are linked to activities in forest management units (FMU), cover the southern section of the regional study area, namely the Cree communities of Waskaganish, Nemaska, Waswanipi, and Mistissini, as well as the municipality of Matagami. The project infrastructure is therefore not affected by these local round tables, which instead cover part of the territory where ore transportation is planned (EIJBRG, 2025b).

Eeyou Planning Commission

A land use planning body, the Eeyou Planning Commission (EPC), was established by the Cree Nation Government to fulfill its responsibilities for land and resource planning in Eeyou Istchee (primarily on Category II lands). The Land and Resource Use Planning in Eeyou Istchee initiative was introduced following the signing of the 2012 Agreement on Governance in Eeyou Istchee. This initiative aims to balance economic development with environmental protection while taking into account the social, cultural, environmental, and economic interests of all stakeholders. Its objective is to define a shared vision for the future of Eeyou Istchee while enabling communities to express their concerns and priorities regarding land management. Consultations were held in each Cree community for this purpose in 2017 (EPC, 2025).

Land and Resource Planning is an essential tool for protecting the lands, wildlife, and way of life of the Cree (Eeyou Eetun). It is also a strategic lever for the development of a strong and sustainable Cree economy. Regional Land and Resource Use Plan (RLRUP), which focuses primarily on the development and management of Category II lands.

On Category III lands, the EPC works in collaboration with regional partners to ensure the harmonization of the various land use plans throughout the Eeyou Istchee territory. These partnerships include Cree First Nations councils, the EIJBRG Natural Resources Committee, which is responsible for Category III land planning, and the Eeyou Marine Region Planning Commission, which is responsible for offshore marine area planning. The goal of this collaboration is to ensure that the various land use plans are harmonized and reflect the collective vision of the Cree people as closely as possible, while respecting their aspirations and priorities. This process also aims to strengthen inter-community relations and establish common goals based on the principles of sustainable development and environmental preservation, while ensuring the autonomy of Cree communities.

Land and Resource Planning is a strategic tool for managing the Eeyou Istchee territory and protecting the cultural and environmental values of Cree communities. It provides a framework for coordinating development and land-use activities in a way that meets the needs of the Cree while respecting the principles of sustainable development. This process is essential to ensure that land management decisions align with the communities' goals and expectations, while also guaranteeing their active participation at every stage of the planning process.

Regional infrastructure

The project is located south of the Trans-Taiga Road, about 20 km from kilometer 270. Built in 1979, the Trans-Taiga Road extends approximately 666 km in an east–west direction, providing access to Caniapiscau and several facilities within the La Grande hydroelectric complex. The road is administered by Hydro-Québec but maintained by the Société de développement de la Baie-James (SDBJ) and is primarily gravel (James Bay Road, undated).

The main road in the regional study area is the Billy-Diamond Highway, formerly known as James Bay Road. Running north–south through the regional study area, the 620-km highway was built in the 1970s to provide access to the James Bay hydroelectric projects. The Trans-Taiga Road begins at kilometer 544 of the Billy-Diamond Highway. The highway, which connects Matagami to Radisson, features a roadside service point at kilometer 381 (the only service station along the route) as well as six emergency telephones. It has a special classification that allows for the transport of heavy and oversized loads. The highway is administered and maintained by the SDBJ, which has been mandated by the Québec government to carry out rehabilitation work on the road. Section 6.4.6 – Traffic presents the traffic conditions for the roads affected by the project, namely the Billy-Diamond Highway and the Trans-Taiga Road.

Various types of leases are located less than 300 meters from the Trans-Taiga Road and Billy-Diamond Highway, between the project site and Matagami. There are 13 leases for telecommunications towers, 9 municipal leases, 4 industrial leases, 3 community leases—including one for camping—as well as 2 public utility leases and 2 for billboards.

The Cree communities are also served by access roads, either from the Billy-Diamond Highway (for Waskaganish, Eastmain, Wemindji, and Chisasibi), the Northern Road (Nemaska), Route 167 (Mistissini), and Route 113 (Waswanipi). It should also be noted that most Cree communities are served by an airport, owned by Transport Canada and operated by the communities themselves. In the Cree community of Chisasibi, Robert Kanatewat Airport welcomes Air Creebec flights and also provides medical transportation services for the James Bay Cree Board of Health and Social Services (CBHSSJB) (Cree Nation of Chisasibi, 2024).

The region is also served by other airports and aerodromes. La Grande 4 aerodrome is located approximately 30 km northeast of the project. This facility serves the La Grande 4 hydroelectric facilities and is owned by Hydro-Québec, although operation of the facilities has been gradually transferred to the SDBJ. Reserved for Hydro-Québec's use, discussions are underway to allow PMET to use the La Grande 4 aerodrome facilities. In addition, the La Grande-Rivière regional airport is located in the municipality of Radisson (see section 6.4.4). It is operated by the SDBJ (SDBJ, 2024). According to the Executive Director of the Baie-James Regional Administration (ARBJ), during discussions with PMET on the project, the region is working to improve airport infrastructure in Jamésie, in particular to enable air transportation for workers in the region. In addition, a landing strip is available at Camp Mirage Aventure, about 40 kilometers east of the local study area. This airfield is used by workers at the PMET exploration camp, with one flight per week carrying 10 to 20 passengers.

The regional study area includes various hydroelectric facilities, particularly those related to the La Grande and Eastmain-Sarcelle-Rupert hydroelectric complexes. It is therefore crossed by several power transmission lines and includes various substations and power plants.

The local study area is crossed by nearly 290 km of power lines, including a 735 kV line connecting the Tilly and Le Moyne substations. The project will be supplied by the Tilly substation with the planned construction of a new transmission line approximately 50 km long.

Territorial development outlook

On February 17, 2020, the Cree Nation Government and the Government of Québec signed the Memorandum of Understanding on the Cree-Québec Sustainable Infrastructure Development Program in the Eeyou Istchee James Bay region. with the relevant Québec government ministries in order to connect, develop, and protect the territory of the Eeyou Istchee James Bay region over a 30-year horizon.

La Grande Alliance's main objective is to develop transportation infrastructure in the Eeyou Istchee James Bay region, particularly in response to growth in the industrial and mining sectors.

Among the projects envisaged by La Grande Alliance are the paving of access roads to the communities of Waskaganish, Eastmain, Wemindji, and Nemaska, as well as the construction of a railway line along the Billy-Diamond Highway to reduce truck traffic and increase transportation efficiency. La Grande Alliance also plans to reopen the Grevet-Chapais railway, extend the Billy-Diamond Highway to the Cree and Inuit community of Whapmagoostui/Kuujjuarapik, extend Route 167 from the Renard Mine to Trans-Taiga Road, and build an airport in Mistissini. These various projects under consideration would strengthen connectivity and facilitate access to the different regions of Eeyou Istchee-James Bay (VEI and WSP, 2024).

6.4.3 Cree communities of Eeyou Istchee

Eeyou Istchee, the traditional territory of the Cree, covering an area of over 400,000 km^2, comprises nine communities located on the shores of James Bay (Waskaganish, Eastmain, Wemindji, and Chisasibi), Hudson Bay (Whapmagoostui), and inland (Nemaska, Waswanipi, Mistissini, and Oujé-Bougoumou) (CNG, 2024). Since 2003, Washaw Sibi[5] has been the tenth community of the Cree Nation, with 350 members. The Cree Nation Government has also recognized MoCreebec Eeyoud, located on the Ontario shore of James Bay, as the eleventh community for its members residing or having previously resided in Moose Factory or Moosonee (Ontario).

[5] Washaw Sibi, which did not previously have a designated territorial base, is currently being established near Matagami and will eventually be integrated into the JBNQA (Guindon, 2023).

The traditional Cree territory, Eeyou Istchee, includes more than 300 traplines, which can be described as traditional family hunting and trapping grounds (Cree Nation Government, 2023). Each Cree community is administered by an independent local government (band council), whose elected chief sits on the board of directors of the Grand Council of the Crees (Eeyou Istchee) (GCC) and the board of the Cree Nation Government.

The Cree are among the most populous Indigenous nations in the province and make up more than one-third (35%) of the population of Nord-du-Québec. The total population of the nine communities included in the 2021 census was 18,225[6]. Chisasibi and Mistissini are the two most populous communities, together accounting for nearly half of the population of the nine communities of Eeyou Istchee. The largest community is Chisasibi, with a population of 4,985 (Statistics Canada, 2023a). In contrast, the communities of Nemaska and Oujé-Bougoumou are the least populated, with respective populations of less than 850 (Statistics Canada, 2023a).

Between 2016 and 2021, the population of Cree communities grew at a faster rate than that of Québec (6.1% versus 4.1%). Population growth in these communities has been notable for several years. For example, the Cree population more than tripled between 1971 and 2011, while in Québec, the increase was around 30% (Hydro-Québec, 2024). Nearly 50% of the Cree population living in communities was under the age of 25 in 2021.

All Cree communities are administered by two regional political and administrative organizations: the Grand Council of the Crees (GCC) and the Cree Nation Government. Although legally distinct entities, they have identical membership and are managed as a single organization by the Cree Nation (Cree Nation Government, 2024).

The GCC, headquartered in Nemaska, is responsible for representing the interests of the Cree of Quebec at the provincial, national, and international levels and ensuring the proper implementation of the JBNQA. The Cree Nation Government may hold municipal authority (local or regional) over all or part of Category II lands. It is also responsible for establishing, administering, and coordinating services or programs on Category I lands at the request of Cree communities and for promoting the development and well-being of these communities. The Cree Nation Government represents the Cree in areas covered by the JBNQA, including the environment, hunting, fishing, and trapping, as well as economic and community development (Cree Nation Government, 2024). It comprises seven departments: Administrative Services, Traditional Activities, Cree Human Resources Development, Community Services, Culture and Language, Environment, and Trade and Industry.

Each community also includes representatives from regional or government organizations such as the Cree Trapper Association (CTA), the Cree Nation Youth Council, the Cree Hunters and Trappers Income Security Board (CHTISB), and the Cree Health and Social Services Council.

Cree individuals wishing to maintain a traditional lifestyle may benefit from the Cree Hunters Economic Security Program (ESP) (formerly the Cree Hunters and Trappers Income Security Program [ISP]), established in 1976 under the JBNQA. This program provides a guaranteed income for participants engaged in hunting, fishing, or trapping for more than 120 days per year. For the period 2020-2021, the highest participation rates were in Whapmagoostui, Chisasibi, and Waswanipi (between 21% and 15%) and the lowest in Nemaska, Waskaganish, Wemindji, and Mistissini (between 5% and 9%) (Hydro-Québec, 2024).

The director of the James Bay Cree Health and Social Services Board (CBHSSJB), who was consulted by PMET, indicated that the nine Cree communities offer a total of nine clinics, one hospital (under expansion), and one birthing center. Furthermore, nursing homes and psychiatric care centers are either under construction or in the

6 Compiled with WSP based on Statistics Canada data (2021 census) for the nine communities.

planning stages. In total, the current facilities and the management of the public health system employ more than 3,000 people. Working in collaboration with the CBHSSJB, the Public Health Department – James Bay Cree Lands provides prevention and health promotion services. According to a representative from this department who was consulted as part of the project, it also has expertise in assessing risks related to contaminants. The department can conduct risk assessments and, particularly in the mining sector, carry out emergency environmental health interventions, for example in the event of spills into water bodies.

Community health and well-being

A detailed picture of the health of Cree communities can be found in the human health assessment report (Appendix 6-24).

The social determinants of health among the Cree of Eeyou Istchee are rooted in a historical context marked by colonialism, residential schools, and forced displacements such as the relocation of Fort George. These events have caused intergenerational trauma, disrupted cultural transmission, and led to lasting mistrust of public institutions, which continues to influence relationships with health services and psychosocial well-being today.

At the systemic level, the organization of health services remains a major factor. The burden of travel required to access specialized care is very high, health human resources are limited, and local infrastructure is under pressure. Despite the self-determination reinforced by the James Bay and Northern Quebec Agreement and the creation of the CBHSSJB, inequities in access to care persist. These challenges are compounded by difficult socioeconomic conditions, including a cost of living significantly higher than the average, lower incomes, housing that is often overcrowded or in need of repairs, and lower graduation rates that limit access to skilled employment.

Immediate determinants also contribute significantly to the observed health disparities. Food insecurity remains high due to the cost of store-bought foods and unequal access to traditional foods, which are essential to cultural, economic, and nutritional well-being. Working conditions—particularly fly-in/fly-out or commuting arrangements in the mining sector— affect lifestyle habits, increase fatigue, undermine nutrition, and place additional pressure on families, particularly on women who often bear a heavy domestic and parental workload.

Finally, from the Cree perspective, cultural continuity is a key determinant of health. However, it is threatened by cumulative impacts on the territory, including development projects, forest fires, and climate change, which complicate the practice of traditional activities and compromise the transmission of knowledge. Taken together, these determinants highlight that community health is closely linked to social, economic, territorial, and cultural conditions.

As a result, several indicators show significant differences compared with the rest of Quebec. Life expectancy at birth remains lower, and premature mortality is high, including for causes that are theoretically preventable or treatable. Chronic diseases are more prevalent, particularly type 2 diabetes—whose prevalence is several times higher than the provincial average—as well as hypertension and various respiratory and cardiovascular diseases. Hospitalization rates are higher for all causes, and sexually transmitted infections remain common despite a recent downward trend. Teenage pregnancies are much more frequent than in the rest of Quebec, and while suicide rates remain comparable to the provincial average, hospitalizations for suicide attempts are significantly higher.

The sections below describe some of the characteristics of the communities of Chisasibi, Wemindji, and Mistissini, as these three communities are most likely to be affected by the project (see Table 6-37). However, because the project is located on Chisasibi territory, this community is described in greater detail. According to the Cree Nation Government, Chisasibi remains the community with the potential to be most directly affected by the project, since all planned project infrastructure is located within its traditional territory[7].

Chisasibi

Chisasibi, which means *Big River* in Cree, is the northernmost community in Eeyou Istchee accessible by road. It is connected to the Billy-Diamond Highway by a 90-km paved east–west road that begins at kilometer 600 of the highway. In February 2025, the First Nation had 4,822 registered members, the vast majority of whom (4,510) lived in Chisasibi. The remaining members lived off-reserve (203 members) or in another reserve (109 members) (CIRNAC, 2025).

Formerly located on Fort George Island, the community of Chisasibi was relocated to the mainland at the mouth of La Grande Rivière on the east coast of James Bay in 1981. This new location was designated following negotiations with the provincial government and Hydro-Québec, as the community was threatened by hydroelectric developments planned on the river (Commission de toponymie du Québec, 2016).

The community's territory consists of 37 traplines extending between the mouth of La Grande Rivière and the Caniapiscau Reservoir. The community covers an area of 1,305 km², including 825 km² of Category IA land and 480 km² of Category IB land. The traditional territory, including Category II and III lands, covers 81,199.56 km². Chisasibi is the largest Cree community in terms of both population (4,985 residents in 2021) and territorial area.

Socioeconomic conditions

Population

The population of Chisasibi was 4,985 in the 2021 Census (Statistics Canada, 2023), compared with 4,872 in 2016, representing an increase of 2.3% over this period. The difference in the proportion of men and women is minimal, with 50.5% men and 49.5% women. Young people aged 0 to 14 account for 31.1% of the population in Chisasibi (1,550 people) (Table 6-38). Only 7.4% of the community's population is aged 65 and over, compared with 20.6% at the provincial level. The average age in Chisasibi (30 years) is considerably lower than that of the province (42.8 years). The median age in the Cree community is 26.6 years, compared with 43.2 years in Québec.

The population density of the Chisasibi community was six residents per square kilometer in 2021, comparable to the provincial average of 6.5 for the same year.

[7] It should be noted that a dispute exists regarding the boundaries of the traplines between CH39 and M02A, stemming from differing interpretations of agreements reached between former tallymen, particularly in the 1980s following hydroelectric developments on La Grande River. According to the tallyman for trapline M02A (Mistissini), the project area falls within that trapline. However, the tallyman for CH39 maintains that the boundary of the trapline should extend farther south than the boundary shown on the official maps of the Cree Nation Government, which are used in this project.

Table 6-38 Gender and age groups in Chisasibi

Age group	Chisasibi					
	Male		Women		Total	
	Number	%	Number	%	Number	%
0 to 14 years	785	31.2	765	31.0	1550	31.1
15 to 24	460	18.3	395	16	845	16.9
25 to 44	630	25.2	655	26.6	1,300	26.0
45 to 64	460	18.4	470	19.0	925	18.5
65 and over	180	7.2	190	7.7	370	7.4
Total	**2,515**	**100.0**	**2470**	**100.0**	**4985**	**100.0**

Note: Due to rounding, totals may not add up exactly.
Source: Statistics Canada, 2023a.

According to projections studied by the Institut de la statistique du Québec (ISQ), Chisasibi is expected to become the largest community in the Nord-du-Québec region by 2041, with 6,215 residents, surpassing Chibougamau in terms of population (ISQ, 2024a).

Languages and identity

In addition to the main mother tongue, Cree (*iiyiyuu aymuun*), spoken by 81.3% of the population of Chisasibi, in the last census, 70.1% of Chisasibi residents (3,485 people) reported knowing English, and 24.7% reported knowing both English and French. Only 0.6% of the population (175 people) reported knowing only French as an official language, and 4.6% of the population of Chisasibi (220 people) spoke neither English nor French. The language most often spoken at home remains Cree (71.2% of the population) (Statistics Canada, 2023a).

Of the total population of the community, almost all (4,755 people) identified as Indigenous in the last census (Statistics Canada, 2023a).

According to Statistics Canada (2023a), approximately twenty Inuit were residing in Chisasibi at the time of the most recent census, whereas the gouvernement du Québec (2025) estimated this population at close to one hundred in 2025.

Housing

The community had 1,281 private[8] dwellings in 2021. Of these, 1,056 were occupied by households[9], resulting in a vacancy rate of 17.6%. The vast majority of households (735) lived in housing provided by the First Nation (local government). As in other Cree communities in Eeyou Istchee, households in Chisasibi predominantly occupy housing allocated by their Council (First Nation) (Table 6-39). Only 160 households were homeowners, and the same number (160) were tenant households.

[8] According to Statistics Canada, a dwelling is considered private if it has its own private entrance. This entrance may be located outside the building or inside, accessed from a common hall, vestibule, or staircase (Statistics Canada, 2022)

[9] Sample data: 25%.

It should be noted that more than half of the occupied dwellings had four or more bedrooms (56.4%). The average size of private households in Chisasibi was 4.7 persons in 2021, compared with 2.2 for the province as a whole (Statistics Canada, 2023a).

Of the 1,055 occupied dwellings, 16.6% required major repairs. This proportion is lower than that observed for occupied dwellings across Cree communities as a whole, but higher than the provincial average (6.3%).

In 2021, a critical need for more than 2,000 affordable housing units was identified across the Cree communities of Eeyou Istchee. To help address this need, the Canada Mortgage and Housing Corporation announced a $17.4 million investment to build 55 modular homes in the nine Cree communities. Of these, about ten homes were planned for construction in Chisasibi (CMHC, 2021).

It should also be noted that multigenerational households are generally more common in Cree communities than in the rest of the province. In Chisasibi, they represented 26.1% (275) of total households (1,055) in 2021. By comparison, multigenerational households accounted for only 1.4% province-wide.

Table 6-39 Housing occupancy patterns and rates for Chisasibi and the Cree communities of Eeyou Istchee, 2021

Community	Proportion of private households by type of occupancy (%)			Private housing occupancy rates (%)
	Owner	Renter	Housing provided by local government	
Chisasibi	15.2	15.2	69.7	82.4
Cree communities of Eeyou Istchee	13.8	14.6	71.5	83

Source: Statistics Canada, 2023a and WSP compilation

Education

According to the most recent census in 2021, 39.7% of people aged 15 and over, or 1,360 people, reported having at least a high school diploma or equivalent. This proportion is higher for women (47.1%) than for men (32.7%). Women are also more numerous, nearly double, in having attained a bachelor's degree or higher (140 women and 75 men) (Table 6-40). Men are more numerous in having, as their highest degree, a certificate or diploma from an apprenticeship or trade school (240 men, compared to 120 women).

Table 6-40 Highest level of education attained in Chisasibi in 2021

Level of education	Chisasibi					
	Total		Men		Women	
	Number	%	Number	%	Number	%
No certificate, diploma, or degree	1,745	50.9	980	56.8	765	45.1
High school diploma or equivalent	545	15.9	225	13	315	18.6
Apprenticeship or vocational school diploma/certificate (vocational training)	360	10.5	240	13.9	120	7.1
College diploma or certificate, or some university studies below the bachelor's level	560	15.3	205	11.9	355	20.9
Bachelor's degree or higher	220	6.4	75	4.3	140	8.3
Total	**3,430**	**100.0**	**1725**	**100.0**	**1695**	**100.0**

Note: Due to rounding, totals may not add up exactly.
Source: Statistics Canada, 2023a

According to the classification of educational programs, the three main areas of postsecondary study were, in ascending order: Business, management, and public administration (for 240 people, including 265 women); Architecture, Engineering, and Related Trades (for 220 individuals, including 190 men in construction and mechanical trades); and Personal, Protective, and Transportation Services (for 160 individuals, including 105 men, mainly in transportation and security, and 55 women, mainly in culinary and personal services).

The Cree School Board provides services to four schools in the community of Chisasibi. Uupichinaasiun Elementary School (newly built and opened in 2024) offers preschool and kindergarten in Cree and grades1and 2 in Cree, English, and French. Waapinichikush Elementary School offers grades 3 through 6 in Cree, English, and French. Big River High School (formerly known as James Bay Eeyou High School), which opened in 2024, also offers education in all three languages. In addition, the community has the Sabtuan Adult Education Center, a learning and vocational training center for adults. It also has three daycare centers for preschool-aged children.

The director of the adult training center, when interviewed as part of this project, indicated that the center is run by the Cree School Board and has agreements with other trade schools in the province (Montreal, Abitibi, Charlesbourg). Before the center was created, adults had to travel to Waswanipi to receive training in trades in a Cree environment. He mentioned that training is offered in various fields, including water treatment, carpentry, heavy equipment operation (11 people recently trained), accounting, home care, and medical secretarial work. In addition, new training programs are also planned, including heavy equipment mechanics (to begin in fall 2025), Class 3 trucking, and cooking.

According to the director, the fact that students do not always meet the prerequisites to begin vocational training (Secondary III) represents a significant challenge. For this reason, a pre-vocational training program has been established for candidates who do not hold a high school diploma.

The Sabtuan Adult Education Center can also offer customized job-focused training with cohorts of 15 people. In addition, an official from the Chisasibi Eeyou Research and Resource Institute (CERRI) who was interviewed as part of the project indicated that many young people wanted to be trained in the environmental field in Chisasibi, but lacked the funds to complete these training programs.

Income

In 2020, the median gross annual income in Chisasibi was $43,200 for the population aged 15 and over. The average income reached $48,800 before taxes. Both figures were slightly lower than those recorded in Nord-du-Québec ($43,600 and $50,600, respectively).

Within the community, median and average annual incomes were higher for women ($50,000 and $54,100, respectively) than for men ($37,200 and $43,240, respectively). This difference may be related to the higher level of education among women in the community (Table 6-40).

Across Québec, the median gross annual income was $40,800 in 2020 and was higher for men than for women. The average annual income before taxes was $51,160.

In Chisasibi, 215 people (4.2% of men and 4.4% of women) were living in low-income[10] situations, based on the low-income measure, after-tax. Unlike the situation in Nord-du-Québec as a whole (where 9.3% of the population lives in low income), women aged 65 and over were the least affected by low income in Chisasibi (2.5% of women, compared with 16.6% in Nord-du-Québec).

Employment

Among the working-age population[11], the labor force participation rate was 60.2% in Chisasibi in 2021, while the employment rate was 55.4% and the unemployment rate was 8% (see Table 6-41). Labour force participation and employment were higher among women than among men, resulting in a higher unemployment rate among men in the community. The unemployment rate in Chisasibi is also higher than that of Nord-du-Québec as a whole (7.3%), but comparable to that of Québec overall (see Table 6-46 in Section 6.4.5).

Table 6-41 Key labor market indicators for Chisasibi and all Cree communities, 2021

	Activity status			
	Chisasibi			All Cree communities
	Total	Men	Women	
Population aged 15 and over (number)	3,430	1,725	1,695	11,625
Employed persons (number)	1,900	925	975	6,510
Unemployed (number)	165	100	65	560
Inactive (number)	1,360	700	665	4,555
Activity rate (%)	60.2	59.4	61.4	61.0
Employment rate (%)	55.4	53.6	57.5	56.0
Unemployment rate (%)	8.0	9.8	6.3	8

Source: Statistics Canada (2023a) and WSP compilation.

Approximately 36% of the total working-age population (3,430) worked full-time throughout the year, while 20% worked part of the year and/or part-time. The largest occupational category within the community is sales and services, which employs the most people (515). The second largest category is education, law, and social, community, and government services (405 people, including 290 women). This is followed by business, finance, and administration (365 people, including 300 women) and trades, transportation, machinery, and related fields (355 people, including 330 men).

[10] Based on the low-income measure, after-tax (LIM-AT), which is defined as a fixed percentage (50%) of the median adjusted after-tax income of private households. “Adjusted” indicates that household needs are taken into account (Statistics Canada).

[11] According to Statistics Canada, the population aged 15 and over is considered to be of working age.

In terms of sectors of activity, the tertiary sector, particularly health care, public administration, education, and commerce, accounts for the largest share of workers. The primary sector (including mining and quarrying, with 1.2% of the labor force) is one of the least represented sectors of activity. The construction and manufacturing industries, in the secondary sector, employ 9.7% of the working population in Chisasibi (Statistics Canada, 2023a).

Economic structure

At the community level in Chisasibi, two local institutions contribute to the community's economic development: the Chisasibi Business and Development Group Inc. and the Chisasibi Business Service Center. These institutions help local businesses and economic initiatives to flourish.

According to the study on the socioeconomic impacts and benefits of La Grande Alliance (VEI-WSP, 2024), Chisasibi had various types of businesses, such as sole proprietorships, corporations, partnerships, non-profit organizations, and a cooperative, for a total of 67 businesses identified in 2023. The construction sector leads the economy in Chisasibi, with 19 contractors employing 631 workers. In the construction sector, the Chisasibi Business Development Corporation and Gestion CBCC Inc. stand out in terms of capacity and size, employing 300 and 200 people respectively.

Chisasibi has a single Cree wholesaler, Petronor, which supplies fuel to the entire Eeyou-Istchee-James Bay region. The community also has 15 retailers and 10 businesses in the food service and accommodation sector. Chisasibi thus has a competitive local market for essential goods (VEI-WSP, 2024). The Northern Store in Chisasibi, owned by The North West Company, offers groceries and a variety of essential products and services for residents and visitors (North West Company, 2025).Other organizations offer specialized services, such as CERRI, which conducts research projects integrating Western research methods with traditional Cree ecological knowledge, and Niigan, which offers environmental field work, site assessments and other services.

The land-based economy is also a significant sector for the Cree economy. A total of 974 members of Chisasibi (representing 574 family units) have joined the Cree Hunters Economic Security Program (formerly the Income Security Program) to ensure their livelihood, sometimes in combination with other casual jobs, in 2021-2022 (see section on Current use of land and resources).

Services, Infrastructure, and Equipment

Health services

The Chisasibi Regional Hospital provides primary and secondary health care services to the population of Eeyou Istchee, and the Cree Board of Health and Social Services has its headquarters there. A detailed overview of health services is provided in the sectoral report on health impacts.

Public safety

Chisasibi has a public safety service (Eeyou Eenou Police Force detachment) and a fire department, available at all times. The police service works closely with the Sûreté du Québec and Chisasibi emergency services.

In Chisasibi, the possibility of one of the dams on La Grande Rivière breaking and flooding the community remains a concern among the population. For this reason, a large parking lot has been built on high ground in the forest, eight kilometers from the community's center. There are plans to build infrastructure there to accommodate people in the event of an evacuation of the community.

Waste and water management

According to a public health official in Chisasibi, who was interviewed as part of the project, waste and water management is an issue in Chisasibi and the surrounding area, as landfills are at maximum capacity, as is the water treatment process, and the population is growing. However, the community has had a new water treatment plant since 2023.

The Land and Environment Department oversees land and resource management to maintain ecological balance with a view to sustainable development. The department's mandate includes raising public awareness of the community's collection service for recycling household and hazardous waste.

Traditional Land Use

General land use

Among the most important values that emerged from the 2017 report of the Chisasibi Eeeyou Planning Commission (EPC Chisasibi, 2017) was the land, gathering together on the land, and the transmission of Cree culture, knowledge, and values.

The Big River (La Grande Rivière) represent a large part of the identity of Chisasibi members. It has played a crucial role in the history of the community as a route of travel, a site for gatherings, and for food and cultural activities, before being heavily impacted by the hydroelectric development mentioned above. In addition to the construction of four reservoirs along its course, the current flow of the river in front of the Chisasibi community is about three times what it was under natural conditions, a result of numerous watersheds being diverted within the La Grande complex. It remains a highly significant place in the eyes of community members (EPC Chisasibi, 2017, cited in WSP, 2024).

Camps and cultural sites on the territory are highly valued, and their protection is essential to maintaining the connection to the land and to identity. Indeed, the dramatic changes that the Cree way of life has undergone over recent decades have made the preservation of cultural identity a challenge, which the Cree Nation of Chisasibi seeks to meet with determination for future generations (EPC Chisasibi, 2017, cited in WSP, 2024).

In their vision of the future, the Chisasibi community members who participated in the 2017 EPC survey intend to do everything possible to protect the territory that has not yet been altered and which is valued as a land use area including sites of cultural significance. They wish to be involved in decisions regarding the territory so that development occurs according to the values and wishes of the community. They also believe that programs and other opportunities could facilitate travel and the presence of members on the territory. Finally, the trapline system should be reviewed to ensure that its implementation respects Cree values (EPC Chisasibi, 2017, cited in WSP, 2024).

Among Cree communities, the Cree Nation of Chisasibi had the highest participation in the Economic Security Program (ESP) in 2022-2023. Seventeen percent of residents were enrolled in the program to ensure their livelihood, sometimes in combination with other casual jobs. This represents 519 family units, or 664 adults and 223 children. The previous year, this number was slightly higher (574 family units) (Table 6-42). overall, the number of people enrolled in the ESP has tended to decline over the years in Cree communities.

Table 6-42 Chisasibi – Economic Security Program (ESP) recipients, 2021-2022

Chisasibi – family units (number)	Total (adults and children)	Total days spent in the woods (number)	Average per family unit (days paid)	Average allowance per family unit ($)
519	887	101,290	199	$18,597
574	974	115,548	201	$17,893

Source: CHESB compilation, 2021–2022 and 2022–2023 annual reports.

A total of 101,290 days spent on the land were paid to land users in that same year, for an average of $18,597 per family unit (see Table 6-42). More than ten years earlier (2011–2012), the number of registered individuals was slightly higher (976), representing 24% of the population, but the number of registered family units was lower (496) (CHESB, 2012, 2022, and 2023). Fluctuations in participation in the ESP can be explained by several factors, such as the economic climate, employment opportunities, and adjustments to eligibility criteria.

Many Chisasibi community members who are not enrolled in the ESP spend time on the territory whenever possible. For example, more than 100 land users were identified on a single trapline near James Bay (VEI-WSP, 2024). Other, less accessible traplines are reached by helicopter or snowmobile for goose, moose, or caribou hunting, as well as fishing. Some users also engage in trapping (beaver and wolf).

The administrator of the Chisasibi CTA, who was consulted for this project, indicated that changes in ice cover have restricted snowmobile use in certain areas. In particular, community members no longer use snowmobiles for subsistence activities in the LG2 reservoir area as they did in the past, because there is no longer any ice cover.

Land use in the study area

The description of land use is based on an understanding of the information provided by the trapper and their family. Additional efforts have been made to validate this understanding. However, it is acknowledged that the full description of land use and its associated values is not exhaustive and could be improved and further clarified by the users.

The project site is located on trapline CH39 (Map 6-19), which is frequented by many Cree people. This land is also crossed by the Trans-Taiga Road, which will be used for transportation as part of the project. This section describes the camps used on trapline CH39, as well as the movements and activities carried out there, as shared with PMET over the past several years. The following information reflects PMET's current understanding, is included to provide context and may require further validation and confirmation by land users.

The tallyman and his family most often and preferably like to visit the study area from March to November, except in July, which is considered too hot and prone to mosquitoes. In 2023, the tallyman and his family were unable to access the study area due to forest fires. He notes that exploration activities in the area do not affect his use of the land, although noise from work, particularly helicopters, can occasionally scare away local wildlife.

Camps

Several camps are used by the tallyman's extended family, which includes many siblings. These camps are mainly located in the northern section of the trapline, along the Trans-Taiga Road or La Grande Rivière. Two camps are located at kilometer 258 of the Trans-Taiga Road, and three others are located at two sites in the Katatipawasakakamaw Lake area (also known as Cladonia Lake), on the northern edge of the Trans-Taiga Road. The main infrastructure of a former outfitter (Nouchimi) was dismantled in 2022 in this area at kilometer 286 of the Trans-Taiga Road (COMEV, 2025). Four additional camps are located along the Trans-Taiga Road, east of this sector. In total, nine camps have been identified along the Trans-Taiga Road, including the tallyman's camp at kilometer 341.

Other camps are located inland along the shores of lakes such as Camoy and Mihiiwaayaapaakw, east of the trapline, and closer to the proposed mining site in the Lake Nochet sector, approximately 10 km east of the proposed site. Some of these camps are used by Mistissini Cree or by non-Indigenous users. One camp, built in 2024 by PMET for the tallyman's family, is located 11 km from the proposed mine site, near an area valued for goose hunting.

The tallyman and his family regularly visit the area, but do not systematically visit all of the camps.

Water supply

The tallyman's extended family collects water from different sources depending on the location of their camp and the time of year. In winter, they use melted snow. Water from certain lakes does not need to be boiled. Three drinking water collection sites have been identified: one near the camps at kilometer 258 (although water levels there are very low), another south of kilometer 230, and a third at the new camp built in 2024 (Lake Shambo), northwest of the project site. In addition, the water at kilometer 286 (at the former Nouchimi camp) has been tested and is still considered safe.

Some family members also drink water from lakes where they hunt or alternatively bring bottled water that they purchase. They do not use water found under existing power lines, in accordance with the former tallyman's recommendations. A drinking water collection site, including a small shack (see Map 6-19), is located within the planned right-of-way of the new power line that will supply the project facilities.

Access and transportation

Before the Trans-Taiga Road was built in 1979, users traveled to their camps by seaplane. Landing sites have been identified along La Grande Rivière, Lake Magin, and Lake Mihiiwaayaapaakw. The Trans-Taiga Road is now the main access route to the area and is particularly busy from March to November. Users hunt by driving along the road and stopping when they spot an animal.

Snowmobile trails have also been identified by users to reach goose hunting and fishing sites on various lakes and near La Grande Rivière. Users also travel by boat.

Regarding navigability, all the lakes within the biophysical LSA are considered navigable, although only Lake L27 is currently used for navigation by land users. Some lakes are hydrologically interconnected, allowing for continuous navigation, while others remain isolated. A limited number of watercourses near the mining area are considered navigable based on their physical characteristics (navigable in fact). Lakes L01, L05, L07 and L10, as well as watercourses CE8, CE11 and CE15, would be the most suitable for navigation within the project area.

Fishing activities

Various species are fished on the trapline, notably sturgeon, brook trout, and whitefish. Fishing takes place in La Grande Rivière and in certain lakes on the trapline, which users prefer not to name. They avoid fishing in the reservoirs, believing that the taste of the fish there is inferior. The tallyman and his family, however, frequent the area around the LG2 dam for fishing and may spend up to a full month there.

They are cautious about the quality of fish in Lake Mihiiwaayaapaakw, even though large trout are present, due to mercury contamination and the activities of seaplanes from the former Nouchimi outfitter. In addition, the 2023 forest fire may have affected fish populations, as one elder in the family noted that it can take about six years for fish to repopulate lakes in areas affected by fires.

Lake Shaakichiuwaanaan (identified as Lake L01) is virtually untouched by fishing, although whitefish, lake trout, and speckled trout, among others, are found there.

Goose hunting

This traditional and culturally important activity for the Cree takes place in spring, mainly between late April and late May, during the northward migration of geese. It is an occasion for family gatherings, sharing, and cultural transmission, and includes all generations in Cree communities. On trapline CH39, families also gather for the annual “Goose Break.” The area around the new camp is valued for goose hunting, and having a camp there now makes hunting easier. Before this, hunting was mainly practiced along the Trans-Taiga Road, which was easily accessible without snowmobiles or ATVs. Other areas, including the location of the tallyman’s main camp, continue to be used.

Moose and caribou hunting

Moose hunting takes place in various locations on the trapline, particularly in the fall by the tallyman. He notes that he does not need to hunt every year because of the amount of meat a single moose provides. However, he is concerned about intensive hunting by users coming from other traplines via the Trans-Taiga Road. Moose move around and can be found in different locations.

As for caribou, users are seeing fewer and fewer of them in the territory, but community members continue to hunt them in some years. Some believe that caribou meat has changed in taste, which could indicate a decline in the animals’ health.

Other species

Ptarmigan are also hunted on the trapline. Some users have noted that traffic affects the quality of their meat, as birds from disturbed areas do not taste the same as those from more remote areas.

Bears can be hunted or trapped in the fall or early spring, and the meat is shared with elders. It was noted that in fall 2023, bears were hungry due to the previous summer's forest fires.

Beavers, porcupines (which are believed to have healing properties), and hares are also harvested. However, some users have reported that construction and infrastructure on the territory (such as hydroelectric developments, power lines, the Trans-Taiga Road, and borrow pits) have affected the environment, so small mammals are now scarce.

Users have also observed bird species coming from the south that were not previously seen on the trapline. Other species, such as the arctic fox, are now more prevalent.

A hunting site used by tallyman CH39 and his family is located within the planned right-of-way of the project's future power line.

Gathering activities

Users also harvest berries in the area, including blueberries, blackberries, gooseberries, cloudberries, and cranberries, away from the mining exploration site. A favorite picking spot is located at km 310, because it is easily accessible.

Historical and cultural heritage, and sites and elements of significance

The *General land use* section discusses the connection to the land, identity, and the importance of preserving cultural sites and former camps for the Cree of Chisasibi. Despite the changes it has undergone, La Grande Rivière also remains a very significant place for the community (EPC Chisasibi, 2017).

Every year, community members gather on Fort George Island, at the mouth of La Grande Rivière near Chisasibi. The community lived there until it was forcibly relocated to Chisasibi in 1981 due to hydroelectric developments that threatened the island with significant erosion. In addition to the community's relocation, Chisasibi's traplines were impacted by flooding, resulting in major environmental changes and impacts on the land users' way of life. Land users have shared that the fish tastes differently in the reservoirs. La Grand Riviere doesn't freeze anymore and there is often a mist over it, which is a point of stress for community members. This period caused trauma for the Chisasibi Cree, and the annual gathering on the island remains important for healing and for passing on this history. The Chisasibi Cultural Center includes a museum that traces the community's history and also provides a space for cultural events.

More specifically within the study area, stakeholders interviewed by PMET indicated that some family members were born on or near the trapline (north bank of La Grande Rivière). These birthplaces are valued by family members. Burial sites and sacred sites were also identified by family members interviewed by PMET. Of the sites identified, the closest are more than 5 km from the project components: one burial site east of Magin Lake and another north of Lake Corvette. These sites are kept confidential but are identified as protected zones within PMET to ensure they are not disturbed by any project activities.

Archaeological sites and the archaeological potential in the study area are discussed in Section 6.4.7.

The following sections provide a description of the social context at two communities with territories adjacent to the project. Wemindji and Mistissini are not considered primary communities of interest to the project since none of the project development or infrastructure will be located on their traditional territories or traplines.

Wemindji

Wemindji, which means “painted hills” or “red ochre mountain” (depending on the source), is located at the mouth of the Maquatua River on the coast of James Bay. In February 2025, the First Nation had 1,665 registered members, the vast majority of whom (1,467) lived in Wemindji (CIRNAC, 2025).

The Wemindji territory consists of 21 traplines on either side of the Maquatua River. It includes Boyd and Sakami lakes, which were affected by hydroelectric development in 1980 (Phase 1 of the La Grande complex).

The community can be reached from the Billy-Diamond Highway via an access road built in the early 1990s. The nearest town by road is Radisson, located 203 km away. By air or water, the communities of Eastmain (to the south) and Chisasibi (to the north) are both approximately 100 km away as the crow flies, but 366 km and 264 km away by road, respectively.

Socioeconomic conditions

Population

The population of Wemindji was 1,562 in 2021, compared to 1,444 in 2016, representing an increase over five years (8.2%). By comparison, the increase for Québec as a whole was 4.1% (Statistics Canada, 2023a).

Young people aged 0 to 14 represent 29.1% of the population in Wemindji (455 people). The number of boys and girls is approximately the same. Only 6.7% of the community’s population is aged 65 and over, while province-wide, this segment of the population represents 20.6%. There are more women in this age group (65, compared to 40 men). In Wemindji, the average age (31) and median age (28.6) are considerably lower than those of the province (42.8 and 43.2, respectively).

Language and identity

The vast majority of Wemindji’s population speaks Cree as their mother tongue (78.8%). The first official language spoken is English (94.9% of the population), although the language most spoken at home is Cree (53.8%) (Statistics Canada, 2023a). Of the total population of the community, almost all (1,510 people) identified as Indigenous in the last census (Statistics Canada, 2023a).

Housing

Of the 400 occupied dwellings in Wemindji, the vast majority (75.0%) are provided by the band council, while nearly 8.8% of households are renters and 16.3% are homeowners. In 2021, nearly one-third of dwellings (31.1%) in Wemindji required major repairs (Statistics Canada, 2023a), which is significantly higher than the data for Québec as a whole (6.3%) and other Cree communities (24%).

Education

In 2021, more than one-third of the population of Wemindji aged 15 and over had a certificate, diploma, or degree as their highest level of postsecondary education (36.7% of men and 38.1% of women). Approximately half of the population aged 15 and over, or 52.8% of men and 46% of women, did not have a high school diploma or equivalent, which is a higher proportion than for Québec as a whole (men 22.6% and women 18.6%) (Statistics Canada, 2023a).

Overall, 12.6% of the population (including 20.2% of men) had an apprenticeship or trade school certificate or diploma as their highest level of education. Only a small proportion of women had this level of education (7.1%); however, more women had obtained a certificate or diploma from a college, CEGEP, or other institution (non-university or below the bachelor's level) (22.2% of women compared to 11.9% of men).

Wemindji has an elementary school (Joy Ottereyes Rainbow Memorial) and a high school (Maquatua Eeyou).

Income

In 2020, the median total income among beneficiaries aged 15 and over in Wemindji was $42,800 ($37,200 for men and $50,000 for women), while the average total income was $46,000 ($41,000 for men and $50,600 for women) (Statistics Canada, 2023a).

Employment

The participation and employment rates in Wemindji (62.6% and 58.1% respectively in 2021) are higher than the Cree averages (61% and 56% respectively) and lower than the Québec averages (64% and 59% respectively). The unemployment rate was quite high in Wemindji for men (10.9%), while it was lower for women (6.8%). For Québec as a whole, the unemployment rate is 7.7% for men and 7.4% for women.

The participation and employment rates have increased relatively steadily over the past 20 years. Several economic sectors have experienced growth during this period, with education and the "agriculture, forestry, and mining" category recording the most significant increases. The public administration sector and the health and education sectors employ the largest share of the population, representing approximately 62% of the working-age population (VEI-WSP, 2024).

Economic structure

The community has nearly 30 businesses, institutions, or public agencies. The Tawich Holdings Corporation, owned by the First Nation Council, has several subsidiaries (notably in construction, mining exploration, transportation, and mining camp services), employing a total of 621 people from Wemindji and elsewhere in 2021. A total of 455 people (more than 30%) are officially employed in the community by 28 businesses and public institutions or agencies. The other main employers in Wemindji were the clinic and the elementary school. (TDC, 2021 and VEI-WSP, 2024).

According to an article (Décarie, 2019), Tawich's portfolio is diverse, but the nation's basic objective, through its numerous holdings, is to play an active role in the development of Nord-du-Québec. The Tawich Development Corporation has set up a company that drills for the many prospectors searching for gold or diamond deposits in the territory. It has also launched a trucking company (Kepa) in partnership with the Cree Nation of Chisasibi, which supplies the northern territory with essential goods from terminals in Montreal. In addition, one division is responsible for maintaining Hydro-Québec's transmission lines, and another distributes petroleum products, natural gas, and diesel fuel to Radisson. The Tawich Construction Inc. division carries out infrastructure and civil engineering work for companies operating north of the 50th parallel, including Hydro-Québec and the Éléonore Mine. Another division, Wolf Camp Corporation, provides janitorial and cafeteria services for the Éléonore mining complex (Décarie, 2019).

The construction sector is well developed in Wemindji. According to a study conducted as part of La Grande Alliance, VCC General Contractor Inc. is the leading company, employing approximately 50 people on a permanent basis. Pavage Wemindji, with 26 permanent employees, has also developed significant expertise through its involvement in Hydro-Québec projects in the region, while Tawich Construction reportedly employs three permanent staff. Wemindji also has several small businesses offering hospitality services, cultural products, and professional services specializing in consulting, construction, and transportation (VEI-WSP, 2024).

La Grande Alliance study also highlights the interest of Wemindji members in business development, mainly related to activities in the territory (e.g., resource harvesting, management, ecotourism). The importance of unity and collaboration among the communities of Eeyou Istchee was emphasized as a driver of economic, political, and cultural development in Eeyou Istchee (VEI-WSP, 2024).

Finally, it should be noted that in 2011, the Cree Nation of Wemindji, the GCC, and the CRA entered into a cooperation agreement concerning the Éléonore Mine (formerly owned by Goldcorp). The agreement includes provisions on Cree participation (employment and business opportunities) as well as training and education initiatives. For the 2012-2014 period, 80% of 467,000 hours of employment were allocated to Indigenous people (Desfor, 2014). In 2024, the mine employed a total of 700 people. It has one of its three administrative offices in Wemindji (Guindon, 2024).

Services, infrastructure, and facilities

The Cree Nation of Wemindji is served by the Wemindji Community Miyupimaatisiiun Centre (CMC). The CMC is a health center that provides front-line services and represents the local presence of the CBHSSJB. The Wemindji CMC includes a walk-in clinic and community health clinics for different age groups. The Wemindji CMC has five permanent employees and two additional employees for the home and community care program. The Awash (children aged 0 to 9 and pregnant women) and Uschinîchisû (youth aged 10 to 29) teams are understaffed; two of the three Awash nurse positions remained vacant throughout 2022, as did the school-based position.

Wemindji has a public safety department that includes emergency management, search and rescue, ambulance service, firefighting, home inspections, and public health.

With regard to waste management infrastructure, the community aims to become Canada’s first zero-waste First Nation. It offers waste collection, recycling, and composting services (coming soon), and also has an eco-center located outside the community that is open at all times. In addition, a recovery and repair center is in the works. It would create jobs while processing and recycling various materials and objects on site (Cree Nation of Wemindji, 2023a).

The community garage works closely with the roads department to carry out necessary repairs. It also maintains the entire fleet of vehicles and equipment of the Cree Nation of Wemindji for all services, including the airport and Transport Canada equipment. In total, there are 62 vehicles, 39 pieces of equipment, plus accessories and small engines that require maintenance (Cree Nation of Wemindji, 2023b).

Traditional land use

General land use

Like other Cree communities, the people of Wemindji maintain a strong connection to the land and regularly return to their camps and traplines. As noted in the 2017 Wemindji EPC report, what matters most to community members in this regard is continuing to be able to hunt, trap, fish, and spend time on the land.

For many community members, even if they do not spend extended periods on the land during the year, they go whenever possible, even if only for short stays. For example, as part of consultations conducted for La Grande Alliance, more than 100 people were identified as frequenting a single trapline (WSP, 2024). On another trapline, several areas were reported to be used for hunting (moose, goose, ptarmigan), trapping (beaver, porcupine, marten, hare), and fishing (sturgeon, walleye, whitefish, trout). Some practice trapping for the sale of fur, while others trap beavers for meat and use the fur for craft purposes (VEI-WSP, 2024).

According to the First Nation's website, traditional activities and events, such as spring and fall goose hunting and first steps ceremonies, remain essential parts of community life. Today, one-third of the population still lives on the land year-round, while others return to family traplines on weekends or during their free time (Cree Nation of Wemindji, 2023c).

The Wemindji territory is characterized by an abundance of wetlands and protected areas. In addition, a large-scale biodiversity reserve is planned, as the community wishes to conserve the watersheds of the Vieux-Comptoir and Peuplier rivers. The Maquatua River estuary, located across from the community, is heavily used by community members for various activities. The Billy-Diamond Highway and the Trans-Taiga Road are also important corridors used to access traplines, including neighboring areas for which there is no other road access.

In the late 1970s, the development of the La Grande Complex impacted some of Wemindji's traplines. The creation of the Opinaca reservoir, the construction of the La Sarcelle power station, and the change in water levels in Boyd and Sakami lakes caused by the operation of the hydroelectric development altered the availability and quality of resources and travel on the territory and on these bodies of water. Subsequent developments (ESR complex) and climate change have amplified these disruptions, forcing users to find new ways to adapt[12] (WSP, 2024).

In addition to hydroelectric developments, Wemindji has seen the development of mining activities on its territory, such as the Éléonore underground gold mine, located on the east shore of the Opinaca reservoir. During a consultation conducted as part of the 2017 EPC, Wemindji members described their concerns about the impacts of industrial development, particularly the multiple mining explorations and projects whose activities are beginning even though studies have not been completed. Others are also concerned that traditional wildlife monitoring methods no longer seem adequate for assessing pressure on wildlife due to overexploitation by community members, particularly during fishing competitions (EPC Wemindji, 2017).

[12] For more information on this subject, readers may refer to the *Monitoring of Cree Land Use – Eastmain-Sarcelle-Rupert Complex* (Consortium Genivar-Waska, 2020).

Finally, it should be noted that for the year 2022-2023, 162 members of Wemindji (146 adults and 16 children) were enrolled in the Cree Hunters and Trappers Income Security Program, representing 10% of the population, and received income for the days spent on the territory (CHTISB, 2021). This number has remained proportionally stable compared to a few years earlier (2014-2015), when there were 147 registrants (134 adults and 13 children), also representing 10% of the population (CHESB, 2024 and CHTISB, 2016).

Specific use in the study area

The description of land use is based on an understanding of the information provided by the trapper and their family. Additional efforts have been made to validate this understanding. However, it is acknowledged that the full description of land use and its associated values is not exhaustive and could be improved and further clarified by the users.

The project site is located on a Chisasibi trapline (CH39), adjacent to the Wemindji trapline VC26 (Map 6-19). The traplines are accessed by the Trans-Taiga Road, which is the only public access road leading to the project. Other traplines are also crossed by the Trans-Taiga Road and Billy Diamond Highway that will be used for transportation of project materials and spodumene concentrate, namely traplines VC26, VC25, VC24, VC20, and VC16 along the Trans-Taiga Road, and traplines VC12, VC13, VC17, VC18, VC19, and VC23 along the Billy-Diamond Highway.

Consultations conducted by PMET provide an overview of land use on trapline VC26, particularly in its eastern portion, which is located not far from the proposed mine site.

Camps, users, water sources, and access

Trapline VC26 from Wemindji community has two co-tallymen, who are brothers. One of their camps is located along the Trans-Taiga Road, which they use to access it, in the northwestern part of the trapline. They use nearby water bodies as a source of drinking water.

The condition of the Trans-Taiga Road varies and is poor at kilometer 184 due to the presence of large rocks. On the trapline, there are old trails used by the co-tallymen's grandparents. Some of these access routes have been used by exploration company machinery, and cut trees and logs now obstruct hare trails, according to interviews with the tallymen.

Fishing activities

Lake trout, walleye, whitefish, and sturgeon are fished by users of this trapline. Fishing takes place in rivers (the Pontois and Corvette) and in certain lakes. Users report that walleye spawn at a culvert along the Trans-Taiga Road and that sturgeon feed on these eggs. Sturgeon is an important species for users, who consume it in the spring and fall while taking care not to overfish. They do not use nets in spawning areas and avoid fishing during the spawning period. Every two years, they set a net overnight. The co-tallymen believe that a spawning site near the Trans-Taiga should be improved, as water levels are sometimes very low.

Moose hunting

Members of the co-tallymen's family hunt in the fall and winter. They do not hunt calves or females.

A high-quality moose habitat has been identified, and the co-tallymen indicate that no one should hunt there, in accordance with a customary right recognized by the coastal Cree communities (including Chisasibi and Wemindji). However, they note that other users are not aware of this customary right, and concerns about overhunting have been raised by land users during discussions with PMET.

Goose hunting

Users interviewed hunt geese and ducks on the trapline in the spring and fall. Goose Break is a centuries old tradition practiced by Cree in northern Quebec, where communities all but close down for a few weeks each Spring, usually in May. During Goose Break, people head out on the land to hunt geese and spend time with family and friends.

Bears (hunting or trapping)

Bears are hunted in the spring and fall, in accordance with Cree customs. They are then brought back to the community and provide an opportunity to share a large meal (feast).

Historical and cultural heritage, and sites and elements of significance

The Cree Nation of Wemindji seeks to strengthen Cree culture through traditional skills, language, and values. The cultural and wellness department offers Cree language classes, traditional cooking workshops, a wild berry festival, and other cultural activities throughout the year (VEI-WSP, 2024).

CBA results indicate that culture and values are central to the Wemindji Cree, particularly in supporting the continuation of hunting, trapping, fishing, and maintaining a presence on the land. In this context, knowledge sharing is essential, as is environmental quality. Respect for animals and the protection of water are also key considerations. Respondents emphasized that development should be carried out in accordance with values and practices associated with the land and through an inclusive approach (EPC Wemindji, 2017, in VEI-WSP, 2024).

To support the continuity of Wemindji's culture and history, an annual gathering is held at the traditional Old Factory site, located on an island approximately 45 km south of Wemindji. This gathering highlights the importance of the site, where families historically stayed during the summer after spending the winter inland.

More specifically, within the project's local study area, the two tallymen did not identify any specific cultural or historical sites on trapline VC26 that could be affected by the project.

Mistissini

Mistissini, meaning "big rock" in Cree, is an inland Cree community located approximately 350 km south of the proposed mining project, on the shores of Lake Mistassini. As of April 2025, the First Nation had 4,256 registered members, the vast majority of whom (3,857) resided in Mistissini (CIRNAC, 2025).

The Mistissini territory is composed of 77 traplines covering 117,844 km², extending from the southern part of Lake Mistassini to the northern part of the Caniapiscau Reservoir. It is the largest territory, and includes the greatest number of traplines, among the Cree communities of Eeyou Istchee.

The community is accessible via a 15 km paved access road completed in the early 1970s, connecting to Route 167 at kilometre point (KP) 304. The nearest Cree community is Oujé-Bougoumou, located approximately 150 km away by road. Mistissini is also located less than 90 km from Chibougamau, where the nearest airport is situated. The construction of an airport in Mistissini is currently being considered as part of the La Grande Alliance feasibility studies.

Socioeconomic conditions

Population

In 2021, Mistissini had a population of 3,731, up from 3,523 in 2016, representing an increase of 5.9%, which is higher than the increase for Québec as a whole (4.1%) (Statistics Canada, 2023a).

With a young population, Mistissini's demographic profile is proportionally similar to other Cree communities. In Mistissini, young people aged 0 to 14 represent 28.0% of the population, or 1,045 people, with approximately equal numbers of boys and girls. Only 7.2% of the community's population is aged 65 and over, while province-wide, this segment of the population represents 20.6%. In Mistissini, the average age (31.3 years) and median age (29 years) are considerably lower than those of the province (42.8 years and 43.2 years), but relatively similar to those of Wemindji and Chisasibi.

Language and identity

The vast majority of Mistissini residents have Cree as their mother tongue (74.5%). The first official language spoken is English (82.3%), although Cree remains the language most commonly spoken at home (62.1%) (Statistics Canada, 2023a). Nearly all residents (3,445 people) identified as Indigenous in the most recent census (Statistics Canada, 2023a).

Housing

Of the 1,020 occupied dwellings in Mistissini, most (60.3%) are provided by the band council. In addition, 20.6% of households are renters, while a similar proportion are homeowners (19.6%). In 2021, 21.1% of dwellings required major repairs. This is comparable to the Cree average (24%), but significantly higher than the rate for Québec as a whole (6.3%) (Statistics Canada, 2023a; VEI-WSP, 2024).

Education

In 2021, one-third of the population aged 15 and over held a certificate, diploma, or postsecondary degree as their highest level of education (30.7% of men and 36.5% of women). More than half of the population in Mistissini did not have a high school diploma or equivalent (59.7% of men and 57.4% of women), a proportion nearly three times higher than the Québec average (22.6% for men and 18.6% for women) (Statistics Canada, 2023a).

Voyageur Memorial School is located in the centre of the Cree community of Mistissini and consists of three buildings (a high school, an elementary school, and a preschool building). There are also two adult education centers, known as *sabtuans*, located next to the high school, which offer courses in Cree culture, as well as a new vocational training centre that meets the growing training needs of the Cree communities of Eeyou Istchee. In 2024, training programs in accounting, carpentry, and automotive mechanics were offered (Compétences Québec, 2025). Apatisiiwin Skills Development also provides skills development and job readiness programs, and its coordination office for Cree communities is located in Mistissini.

Income

In 2020, the median total income among beneficiaries aged 15 and over in Mistissini was $43,200 ($40,800 for men and $46,000 for women), while the average total income was $51,200 ($49,900 for men and $52,400 for women) (Statistics Canada, 2023a).

Employment

Mistissini's labour force participation rate (60.4%) and employment rate (56.4%) in 2021 are comparable to the Cree averages (61% and 56%, respectively) and lower than the Québec averages (64% and 59%). The unemployment rate was lower for women (5.5%) than for men (6.3%). Across Québec, unemployment rates are higher (7.7% for men and 7.4% for women).

According to the census, approximately 1,540 people have worked in the community since 2016. Labour force participation and employment rates have increased slightly over the past 20 years. Several economic sectors have grown during this period, with education, retail trade and services, and construction experiencing the most significant increases. Public administration, as well as the health care and education sectors, employ the largest share of the population, representing approximately 63% of the working-age population (VEI-WSP, 2024).

Economic structure

A study conducted as part of La Grande Alliance indicates that, as the second most populous Cree community after Chisasibi, Mistissini has a well-diversified economy, with 91 businesses and organizations covering nearly all sectors. The public sector includes approximately 14 institutions employing a total of 504 workers, representing about 34% of the workforce. Most of these employees work in health care and social assistance or in education. The majority of workers are employed in the private sector, across 77 businesses, representing approximately 66% of the workforce. This is by far the highest proportion of private sector employment among the Cree (VEI-WSP, 2024).

Services, infrastructure, and facilities

The Cree Nation of Mistissini is served by the Mistissini Community Miyupimaatisiiun Centre (CMC), which provides medical services (including cancer screening, occupational therapy, speech therapy, and physiotherapy) as well as more specialized services for children, youth, and adults. A detailed overview of health services is provided in the sectoral study on health impacts.

The community includes a hardware store, a shopping centre, a family resource centre, a fire station, a hotel, a transitional home for seniors, a municipal garage, a post office (in the former police station), and a youth centre. Public services in Mistissini include road maintenance and snow removal, waste collection and recycling, water treatment, and wastewater treatment (Cree Nation of Mistissini, 2020a).

Traditional land use

General land use

Lake Mistassini plays a central role in the history and culture of the community. Its shores have long served as gathering places (well before the establishment of a trading post in 1821), its waters have sustained Cree families for generations, and it remains an important travel route for accessing other parts of the territory (Mistissini PLE, 2017). Located on the shores of Québec's largest natural lake, the First Nation has developed strong traditions and expertise in canoe travel (Cree Nation of Mistissini, 2020).

The EPC Mistissini report indicates that community members greatly value the opportunities the lake provides for traditional activities. In addition to its abundant resources, Lake Mistassini offers relatively easy access to numerous traplines.

Over the years, Mistissini has been affected by mining, forestry, and hydroelectric development. While these developments have had various impacts on the territory and on the families who use it, they have been limited to certain areas. In terms of hydroelectric development, the flooding of the Caniapiscau Reservoir in the late 1970s affected the northeastern part of the territory. Later, the creation of the Paix des Braves Reservoir in 2007 and the Rupert diversion bays in 2009, in the southwestern part of the territory, affected other families by flooding some of their land use areas. These developments also led to the construction of new access routes, such as the Trans-Taiga Road, which provides access to traplines in the northern part of the Mistissini territory. Finally, the former diamond mine (Stornoway's Renard Mine[13]) and the construction of the road leading to it have also altered land use. Several main camps are now located along this road, where hunting (moose and goose), fishing, and trapping activities take place. According to land users consulted as part of La Grande Alliance studies, noise and vibrations from the mine, when it was in operation, drove animals away from the area (WSP, 2024).

The EPC report also highlights opposition to forestry activities because of the irreversible damage they cause to the land and the disruption they cause to traditional activities. A general impression of non-compliance with rules and disregard for communities by forestry companies emerged from the consultations conducted as part of the EPC in Mistissini (EPC Mistissini, 2017).

As noted in the EPC Mistissini report, the land occupies a central place in the lives of community members. Activities on the land are "the focal point of traditional Cree cultural life. (…) The land is thought of and cared for as part of the family, one of which Crees knowingly depend for subsistence" (EPC Mistissini, 2017, in VEI-WSP, 2024).

In 2022-2023, 8% of Mistissini members were recipients of the Economic Security Program (ESP). This represents 191 family units, or 278 adults and 71 children, who received income for days spent on the territory. The previous year, this number was slightly higher, with 197 family units. As mentioned above, the number of people enrolled in the ESP has generally tended to decrease over time in Cree communities, although fluctuations occur depending on economic conditions, employment opportunities, or changes in eligibility criteria.

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13 This mine ceased operations in 2023, and Winsome Resources has filed a purchase option to assess the potential for using its processing infrastructure for the Adina lithium project, located approximately 60 kilometres north of the site (Arsenault, 2025).

Many Mistissini members take advantage of the opportunities offered by Mistassini Lake for short trips or stays on the land. However, the proportion of those who remain for extended periods and live off the land tends to be decreasing.

Land use in the study area

The description of land use is based on an understanding of the information provided by the trapper and their family. Additional efforts have been made to validate this understanding. However, it is acknowledged that the full description of land use and its associated values is not exhaustive and could be improved and further clarified by the users.

The project site is located on a Chisasibi trapline (CH39) bordering the Mistissini trapline M02A (Map 6-19). Some members of the Mistissini community use the Trans-Taiga Road to access traplines in the northern portion of their territory.

Consultations conducted by PMET provide an overview of land use by the tallyman of trapline M02A and his family members, particularly near the proposed mine site. A dispute exists regarding the boundary between traplines CH39 and M02A, due in part to differing interpretations of agreements made by previous tallymen.

Camps, users, water sources

The tallyman and users of this land come from several Cree communities. They use the area in spring for goose hunting and in fall for hunting, fishing, and trapping. A camp located along the Trans-Taiga Road (on CH39) consisted of four buildings that were destroyed during the 2023 forest fires; reconstruction was underway in 2025. A water source is located nearby, east of the camp and the Trans-Taiga Road.

Other camps belonging to the tallyman and his extended family are also located on traplines CH39 and M02A, though their use varies annually due to accessibility constraints (cost and travel time). A goose hunting camp on trapline CH39, about 20 km east of the project site, was destroyed in the 2023 forest fires. Another camp, approximately 10 km east of the project, burned down in 2019. Three additional camps, including two used for goose hunting, are located further east within the traplines. Three former campsites used by family members, including the tallyman’s grandfather, have been identified within a 10 km radius to the south and west of the site, on CH39 and M02A.

Access and means of transportation

The tallyman’s family uses the Trans-Taiga Road to reach their camp at kilometre 281. They hunt and carry out activities on traplines CH39 and M02A.

A snowmobile trail runs from this camp (km 281) to the Lake Corvette area, and another leads to the goose hunting camp that may have burned in 2023 (approximately 20 km east of the project site). Goose hunting camps east of the site are also connected to the Trans-Taiga Road by snowmobile trails. Users generally park along the Trans-Taiga Road, near the former Mirage outfitter, and continue by snowmobile. From the hunting camps, additional trails lead to hunting areas around nearby lakes.

Before the Trans-Taiga Road was built, users accessed the territory by floatplane, including landing on Lake Corvette. Users interviewed indicated that there was no other human presence in the area at that time, but once the road was built, more people began visiting, likely to hunt ptarmigan.

The tallyman's family plans to use the road constructed by PMET to access the Lake Corvette area. The tallyman intends to build a camp there, though they still occasionally travel by floatplane.

Fishing activities

Lake Corvette is a valued fishing area, in particular, and users fish for various species there. According to them, the water is of very good quality. This area is registered as a protected area with the Cree Nation Government.

Hunting activities - birdlife

Users frequent various goose hunting areas. They also hunt ptarmigan and grouse. The tallyman indicated that exploration work in the area sometimes disturbs wildlife, particularly due to helicopter noise.

Hunting activities – large wildlife and beaver

Users hunt moose, especially in December and March. Several areas with prime moose habitat have been identified on traplines M02A and CH39, including around Lake Corvette. In March 2025, the family harvested caribou and moose. Before mining exploration began, many moose were observed in the southeastern project area, but helicopter use and drilling activities may have affected moose presence. Bears and beavers are also harvested by users.

Historical and cultural heritage, and sites and elements of significance

According to the EPC Mistissini report, ease of access to the land is highly valued in Mistissini and is closely linked to cultural vitality. However, some community members have observed a decline in the transmission of language and culture, particularly in relation to land use, as fewer people spend extended periods on the land to support themselves. Cultural programs and community events held on the land aim to help offset this decline (EPC Mistissini, 2017, in VEI-WSP, 2024).

In Mistissini, cultural programs and development are overseen by the health and social services department, reflecting the strong connection between wellness and culture. For example, the wellness journey provides an opportunity to reconnect with culture as part of the healing process; it consists of a snowshoe excursion that brings participants to traditional camps and sites on the land. Other initiatives offered by the department include evening cultural workshops at the *Sabtuaan*, Cree language classes, the annual traditional gathering, the tallyman camp program, and the remote tallyman program. Cultural recreational activities (canoeing, snowshoeing, traditional Cree games) are also offered by the Recreation Department, while the canoe brigade is organized by the Youth Department (Cree Nation of Mistissini, 2020b).

These activities are considered important opportunities for the transmission and acquisition of Cree knowledge. One of the community's objectives is to build on and expand these programs to ensure their continued transmission (EPC Mistissini, 2017).

More specifically within the project area, it should be noted that Lake Corvette, located south of the proposed mining site, has long been a valued area for the tallyman's family. The lake and its surrounding area are registered as a protected area with the Cree Nation Government.

6.4.4 Jamesian localities and municipalities

Jamésie includes four municipalities (Chapais, Chibougamau, Lebel-sur-Quévillon, and Matagami) and three localities (Radisson, Valcanton, and Villebois) (Table 6-37). Each municipality and locality is administered by a municipal council. The population of Jamésie was 13,448 in 2023 (Institut de la statistique du Québec, 2024b). This section focuses on Radisson and Matagami, and for certain aspects, on the broader regions of Nord-du-Québec and Québec as a whole. Radisson is the Jamesian community located closest to the project (approximately 350 km by road), while Matagami is the location where mineral transshipment to rail is planned. Accordingly, the sections below present key characteristics of these two communities, as they are the most likely to be affected by the project. More general considerations are provided in Sections 6.4.1 (Land tenure and governance), 6.4.2 (Land use planning and development), and 6.4.5 (Regional economy).

Locality of Radisson

Radisson is located approximately 250 km west of the project and is the only non-Indigenous community in Québec north of the 53rd parallel.

It was established in 1974 to serve as a regional hub for the James Bay hydroelectric development led by Hydro-Québec. This development consisted of a series of hydroelectric facilities, primarily within the La Grande River watershed. Over the course of these development phases, the village experienced rapid population growth and was equipped with infrastructure capable of supporting several thousand residents. Formerly administered by the Société de développement de la Baie-James, Radisson obtained official locality status in 1994 (Localité de Radisson, 2024).

Municipality of Matagami

Matagami, located at the 50th parallel in the southwestern section of the Eeyou Istchee James Bay territory, is one of four municipalities that make up Jamésie.

Situated at the confluence of the Bell, Allard, and Waswanipi rivers, Matagami (meaning “meeting of waters” in Cree) was founded in 1963 following the arrival of mining explorers and the establishment of Camp Matagami. The Québec government’s plan to build a modern mining town was realized shortly thereafter. In the early 1970s, Matagami experienced significant economic growth linked to the James Bay hydroelectric developments. Its population increased rapidly, and businesses expanded. Today, Matagami has modern infrastructure, and its local economy is based on mining and forestry (Matagami, 2024).

Matagami is the administrative seat of the Eeyou Istchee James Bay Regional Government and marks the starting point of the Billy-Diamond Highway, as well as the junction with the railway. The municipality includes a transshipment centre, a strategic hub for intermodal freight transport between Eeyou Istchee James Bay and the rest of the province.

Socioeconomic conditions

Much of the socioeconomic data presented in this section is based on the 2021 Statistics Canada census. However, due to the small population of Radisson, most gender-disaggregated data are not available.

Population

In 2021, Radisson had a population of 203, while Matagami had a population of 1,402. In both communities, men significantly outnumbered women (Table 6-43). The 25 to 65 age group is the largest, representing 70.8% of the population in Radisson and 54.9% in Matagami, both higher than in Nord-du-Québec as a whole (47.9%). As a result, Radisson has a relatively low proportion of youth aged 0 to 14 (9.8%), compared with Nord-du-Québec (27.9%) and, to a lesser extent, Matagami (16.7%).

Overall, the population of Radisson is older than that of Matagami and Nord-du-Québec. In 2021, the median age in Radisson was 50.4 years (with an average age of 46), which is eight years higher than in Matagami (and five years higher for the average age). The gap is even greater compared with Nord-du-Québec, where the median age is close to 30 (and the average age is 32.6).

Since 2016, both Radisson and Matagami have experienced population decline. This decrease is particularly pronounced in Radisson, where the population dropped from 468 to 203 residents over five years (-56.6%). Matagami's population declined by 3.5% over the same period. In contrast, Nord-du-Québec and Québec as a whole experienced population growth of 2.6% and 4.1%, respectively (Statistics Canada, 2023b).

According to staff at the Radisson Health Centre, this population decline has been accelerated by the increasing use of fly-in/fly-out work arrangements by regional employers. These observations are supported by a survey commissioned by the James Bay Regional Administration (ARBJ), which found that 56% of former residents left the region within three years of settling there. Most respondents were not originally from Jamésie and had intended their stay to be temporary, primarily for employment. Workers engaged in fly-in/fly-out arrangements reported seeing little advantage in relocating permanently to the region when they could work there without leaving their home communities (Groupe DDM, 2024). According to the same source, difficulties in retaining workers and the gradual decline of local communities are interrelated issues that are being exacerbated by the growing reliance on fly-in/fly-out practices.

Table 6-43 Genders and age groups in Radisson and Matagami

Age groups	Radisson				Matagami				Nord-du-Québec	
	Total		Men	Women	Total		Men	Women	Total	
	Number	%	Number	Number	Number	%	Number	Number	Number	%
0 to 14 years	20	9.8	10	10	235	16.7	130	105	12,780	27.9
15 to 24	15	7.3	10	5	165	11.7	75	90	6895	15.1
25 to 44	55	26.9	30	15	360	25.6	180	165	12,000	26.2
45 to 64	90	43.9	55	25	410	29.3	215	195	9910	21.7
65 and over	30	14.6	15	10	235	16.7	125	105	4155	9.1
Total	**205**	**100**	**120**	**80**	**1405**	**100**	**730**	**670**	**45,740**	**100**

Note: Due to rounding to the nearest 5, totals may not add up exactly.
Source: Statistics Canada, 2023b.

Nord-du-Québec has recorded a negative interregional migration balance for several years. In 2023, 279 residents left the administrative region, including 138 who had been living in Jamésie prior to their departure. However, the population of Nord-du-Québec is projected to grow by 16.9% between 2021 and 2051. It is expected to be the only administrative region where births will outnumber deaths; elsewhere in Québec, the opposite trend is projected to begin in 2039 (ISQ, 2024b). In Matagami, however—as in other non-Indigenous communities in Nord-du-Québec—the population is expected to decline. According to ISQ projections, it is expected to decrease from 1,407 to 1,233 residents by 2041 (-12.4%) (ISQ, 2024a). No projections are available for the locality of Radisson.

Population density in 2021 was 42.1 residents/km² in Radisson and 18.7 residents/km² in Matagami, both significantly higher than the provincial average of 6.5 residents/km².

Language and identity

In Radisson, nearly all residents (97.6%) reported speaking French at home, compared with 93.6% in Matagami. Approximately one-third of residents in both communities reported knowledge of both French and English (29.6% in Matagami and 36.6% in Radisson). Only in Matagami did a small proportion of residents report speaking English only (0.7%).

Fifty individuals (3.6%) in Matagami and approximately 10 individuals (5.9%) in Radisson reported an Indigenous identity (First Nations or Métis).

Housing

At the time of the last census, 61.9% of households in Radisson were single-person households, a proportion significantly higher than in Matagami (31.5%), Nord-du-Québec (23.2%), and Québec overall (35.1%).

The occupancy rate of private dwellings in Radisson was 44.7% in 2021, substantially lower than in Matagami and Nord-du-Québec (both close to 84%) (Table 6-44). Between 2016 and 2021, this rate declined by 16.6% in Radisson, reflecting the population outflow observed in the community (Statistics Canada, 2023b; 2017). While the homeownership rate in Matagami exceeds the rental rate, the opposite is true in Radisson, where more than half of households (55%) are renters. By comparison, this proportion is 30.9% across Québec (Statistics Canada, 2023b). However, according to the Director General of Radisson, the community faces a housing shortage, as many private dwellings are used to accommodate seasonal or fly-in/fly-out workers. Housing needs are estimated at approximately 200 units.

Table 6-44 Dwelling tenure and occupancy rates

		Radisson	Matagami	Nord-du-Québec	Québec
Private households by tenure (%)	Owner	45.0	78.5	35.6	59.9
	Renter	55.0	21.5	44.4	39.9
Occupancy rate of private housing[a]		44.7	83.8	83.9	92.6

a: The occupancy rate of private dwellings was calculated as follows: number of private dwellings occupied by usual residents divided by the total number of private dwellings.

Source: Statistics Canada, 2023b.

Access to housing has been identified as a barrier to the settlement of new households in Jamésie in a study on labour issues, commuting, and tax incentives in the James Bay region commissioned by the James Bay Regional Administration (Raymond Chabot Grant Thornton, 2022). In addition to availability, housing quality is also a concern, as the housing stock in some municipalities is aging. In Radisson (80%) and Matagami (76%), most dwellings were built between 1961 and 1980. In Radisson, 20% of homeowner households reported core housing[14] needs, a much higher proportion than in Matagami (4.3%). However, no dwellings in Radisson required major repairs, compared with 5% in Matagami. By comparison, this proportion is 16.9% in Nord-du-Québec and 6.3% in Québec overall (Statistics Canada, 2023b).

The average value of dwellings was $84,000 in Radisson and $98,000 in Matagami, both significantly lower than the Québec average of $143,000 (Statistics Canada, 2023b). Construction costs can sometimes exceed market values, and in some Jamésie communities—where the economy is based on natural resource development—housing prices may fluctuate with economic activity. In this context, the closure of the Matagami mine in 2022 likely contributed to a decline in housing prices in the municipality.

According to a representative from Centraide Abitibi-Témiscamingue and Nord-du-Québec consulted as part of the project, household composition is changing in the region. She noted that 30% of people aged 60 and over now live alone in Nord-du-Québec, contributing to increased demand for housing and raising concerns related to social isolation.

Education

In 2021, the proportion of the population with at least a high school diploma in Radisson (83.3%) was similar to that of Québec (79.4%). By comparison, this proportion was lower in Matagami (67.4%) and in Nord-du-Québec (50.2%).

Radisson stands out for its relatively high proportion of individuals with a trade or vocational diploma (or apprenticeship certificate), a type of qualification that remains more common among men (Table 6-45). Like Matagami (11.7%) and Nord-du-Québec (7.4%), Radisson (10.0%) had a lower proportion of individuals holding a bachelor's degree or higher than Québec as a whole (23.5%) (Statistics Canada, 2023b).

Table 6-45 Highest level of education attained by the population aged 15 and over, 2021

Level of education	Radisson			Matagami			Nord-du-Québec	Québec
	Total (%)	Men (number)	Women (number)	Total (	Men (number)	Women (number)	Total (%)	Total (%)
No certificate, diploma, or degree	16.7	15	10	28.3	160	165	44.0	18.2
High school diploma or equivalent	20.0	20	10	20	90	140	18.7	21.4
Apprenticeship or vocational school diploma/certificate (vocational training)	33.3	30	15	22.6	200	65	14.6	15.8
College diploma or certificate, or some university studies below the bachelor's level	20.0	10	10	17	85	105	15.3	21.1
Bachelor's degree or higher	10.0	0	15	11.7	65	70	7.4	23.5

Note: Due to rounding, totals may not add up exactly.
Source: Statistics Canada, 2023b.

[14] A household is considered to be in core housing need if it lives in a dwelling that does not meet one or more standards of adequacy, suitability, or affordability, and if it would have to spend at least 30% of its pre-tax income to obtain alternative housing in the community that meets all three standards.

Under the responsibility of the James Bay School Service Centre, Jacques-Rousseau School is located in the locality of Radisson. The school provides educational services from preschool through Secondary V (Grade 11) (CSSBJ, 2023). Although the locality has relatively few school-aged children, the Coordinator of Sports, Recreation, Culture, Tourism, and Community Life indicated that the James Bay School Service Centre is working on the construction of a new school in Radisson. The nearest CEGEP is in Abitibi-Témiscamingue, with campuses in Rouyn-Noranda, Amos, and Val-d'Or, all located approximately 600 km south of Radisson as the crow flies (or about 800 to 900 km by road).

In Matagami, Galinée Elementary School and Delta High School each serve approximately 100 students. A childcare centre (CPE) can accommodate up to 39 children on-site and coordinates an additional 15 home-based childcare spaces. In addition, an adult general education centre provides a range of services and resources to the population (Matagami, 2024).

At the regional level, the James Bay Vocational Training Centre (CFP Baie-James), located in Chibougamau, offers a wide range of training programs across several sectors, including mining, forestry, construction, mechanics, welding, health, and administration. To ensure alignment between training and regional labour market needs, program offerings are developed in collaboration with the Commission de la construction du Québec, the regional agency, and Emploi-Québec. CFP Baie-James operates two service points, one in Matagami and the other in Lebel-sur-Quévillon. Since 2007, it has entered into agreements with mining companies operating in Nord-du-Québec to deliver the mineral extraction program at their facilities. The centre also offers training in ore processing equipment operation, drilling, and blasting. Since 2025, new programs have been introduced, including Electric and Hybrid andConstruction Equipment Mechanics and Electrical and Telecommunications Line Installation (CSSBJ, 2025; CFPBJ, 2025).

Income

In Matagami, the median gross income for the working-age population (15 years and over) was $48,800 in 2020. The average pre-tax income reached $56,800. These figures are higher than those for the Nord-du-Québec region, where the median gross income was $43,600 and the average total income was $51,080. However, it should be noted that in Matagami, men's incomes are nearly double those of women. Median total income was $64,500 for men compared with $34,800 for women, while average total income was $72,800 for men and $39,000 for women. Gender disparities are much less pronounced across Nord-du-Québec and Québec as a whole, although women's incomes remain generally lower.

In Matagami, 75 individuals (6.2% of women and 4.4% of men) were living in low income, based on the after-tax low-income measure. In the Nord-du-Québec region, a larger share of the population is in a low-income situation (9.6% of women and 9% of men). In both areas, women aged 65 and over are the most affected (20% in Matagami and 16.6% in Nord-du-Québec).

For confidentiality reasons, Statistics Canada does not publish income data for Radisson. However, according to stakeholders from the Radisson Health Centre consulted as part of this project, the locality has a very high level of social deprivation.

Employment situation

In Radisson, the labour force participation rate (86.7%) was significantly higher than in Matagami and Nord-du-Québec (Table 6-46). However, the participation rate among women (83.3%) was lower than that of men (94.1%). This gender gap is much wider in Radisson than in Matagami and Québec as a whole (5.9 and 6.5 percentage points, respectively). By contrast, for Nord-du-Québec overall, the gap is minimal (0.8 percentage points) (Statistics Canada, 2023b).

Overall, both the participation rate and the employment rate in Nord-du-Québec were lower than those observed for Québec as a whole, while unemployment rates were similar (see Table 6-10).

Table 6-46 Labour force participation, employment, and unemployment rates, 2021

	Radisson			Matagami			Nord-du-Québec	Québec
	Total	Men	Women	Total	Men	Women	Total	Total
Working-age population aged 15 and over (number)	130	80	50	720	400	325	20,615	4,435,465
Employed persons (number)	115	80	45	680	385	295	19,115	4,100,450
Unemployed (number)	10	10	10	35	10	30	1,500	335,015
Participation rate (%)	86.7	94.1	83.3	62.6	66.1	60.2	63.1	64.1
Employment rate (%)	76.7	94.1	75.0	59.1	63.6	54.6	58.5	59.3
Unemployment rate (%)[a]	7.7	12.5	20.0	4.9	2.5	9.2	7.3	7.6

a: At least one Statistics Canada data point for unemployment rates in Radisson appears to be inconsistent.
Source: Statistics Canada, 2023b.

In Radisson, no one was employed in the primary sector, unlike in Matagami, where about one-quarter of the labour force, primarily men, worked in this sector (Table 6-47). Although most jobs in both Matagami and Radisson were in the tertiary sector, the proportion was lower than in Nord-du-Québec and Québec as a whole.

Table 6-47 Distribution of the labour force by sector of activity, 2021

	Primary sector	Secondary sector	Tertiary sector	Not applicable
Radisson (%)	0	8.0	68.8	0
Matagami (%)	25.7	9.8	60.6	1.4
Nord-du-Québec (%)	6.9	9.9	80.7	2.4
Québec (%)	2.4	16.8	78.7	2.0

Source: Statistics Canada 2023b, WSP compilation.

Economic structure

The economies of the Jamésie municipalities are largely dependent on the energy, mining, and forestry sectors. In 2021, the share of employment in the primary sector was higher in Jamésie municipalities (10.6%) than in Nord-du-Québec (7.1%) (see previous section – Employment situation).

More specifically, Radisson's economy is centred on hydroelectric power, which employs more than one-third of the workforce. In the late 1970s, Radisson had a population of approximately 2,500, consisting mainly of workers involved in the construction of the Hydro-Québec dam and generating station and their families. Today, the locality is home primarily to the families of Hydro-Québec employees responsible for maintaining the James Bay hydroelectric complexes. In addition to Hydro-Québec, the Director General of Radisson identified Transport Taïga, Air Inuit, CBJ Mécanique, Construction Paradox Inc., and Distribu-Nord as major local employers. A portion of the population is also employed in the growing tourism sector, which represents an avenue for diversifying the local economy (Grand Québec, 2025).

Matagami, for its part, originated as a mining town. According to the municipality, the closure of Matagami Mine in June 2022, after 59 years of operation, has contributed to local economic diversification and to the community taking greater control over its future (Matagami, 2025). A significant share of current economic activity is tied to the development of mining projects located near and north of the town. In this context, the Director General of Matagami, interviewed as part of this study, indicated that the municipality aims to position itself as a regional transportation hub, particularly in connection with the development of the critical and strategic minerals sector. These projects are expected to generate substantial traffic at the Matagami transshipment yard for decades to come. More broadly, the exploitation of natural resources in the region continues to play a key role in the town's economic vitality (Matagami, 2025). Following the acquisition of facilities by Chantiers Chibougamau in January 2025, operations at the Matagami sawmill are expected to resume. In addition, the municipality is developing its cultural sector through an urban revitalization program that includes a community greenhouse, public art installations, and an art gallery (Matagami, 2025).

The expansion of transportation infrastructure being studied as part of La Grande Alliance could stimulate the local economy by creating jobs in the transportation, construction, and logistics sectors, particularly through the presence of temporary workers assigned to industrial and mining projects. These improvements could also support the development of services and businesses in Radisson, Matagami, and Cree communities to meet the growing needs of workers and residents.

Community well-being and human health

The James Bay Regional Health and Social Services Centre (CRSSSBJ) is the sole institution providing health and social services to the Jamésie population. It operates as a general and specialized hospital, a local community service centre (CLSC), a residential and long-term care centre, and a rehabilitation centre. It maintains health centres in five Jamésie communities: Chapais, Chibougamau, Lebel-sur-Quévillon, Matagami, and Radisson.

In terms of social well-being, Centraide Abitibi-Témiscamingue and Nord-du-Québec plays an important role as a sustainable driver of development aimed at improving collective well-being and reducing social inequalities. Its actions focus on four areas: youth success, meeting basic needs, inclusion of vulnerable and marginalized individuals, and the development of inclusive living environments. One of the organization's representatives, interviewed as part of this study, identified several key challenges facing Jamésie residents, including housing shortages, social isolation, access to services, and food security (quality, variety, and freshness), particularly given the vastness of the territory. She noted that Centraide relies primarily on private partners rather than government funding. The organization is also working to establish a social development committee for Nord-du-Québec, with a coordinated approach to social investment that prioritizes structured rather than sporadic funding for community initiatives. In addition, it is involved in implementing the Mining Industry Social Investment Fund (FISIM), which is funded by mining sector stakeholders and aims to support both social and environmental restoration in communities hosting mining projects.

The 2020-2021 Québec Population Health Survey provides insight into the health status of the population and its determinants. In Nord-du-Québec, four indicators (self-perceived poor health, unintentional injury, psychological distress, and serious thoughts of suicide) have remained relatively stable since the 2014-2015 survey (Marleau, 2024). In 2020-2021, the proportion of Jamésie residents experiencing high psychological distress was significantly lower than elsewhere in Québec (34% compared with 39%). A similar trend is observed for generalized anxiety (8% compared with 11%). This may be explained by lower dissatisfaction with social life (i.e., less perceived isolation), stronger family support, a greater sense of belonging to the community, and a better balance between work and personal or family responsibilities. Overall, while most health indicators are similar to those observed across Québec, Nord-du-Québec presents a more favourable mental health profile (Marleau, 2024).

A representative from the CRSSSBJ Public Health Department interviewed for this study identified child development, educational success, youth mental health (particularly among adolescents), substance use (drugs and alcohol), social cohesion, access to early childhood education services, and food insecurity as priority health and social issues in Jamésie. With respect to food security, he noted that the region is not self-sufficient. Food prices are high and quality can vary. For many residents and stakeholders, this situation highlights the need to develop greater local food expertise. The representative also identified seniors and individuals with chronic illnesses as the most vulnerable groups and emphasized the challenges faced by residents of remote communities in accessing specialized health care.

Radisson

The Radisson Health Centre provides services similar to those of a local community service centre (CLSC), with the addition of emergency care. According to the centre's manager, interviewed in 2025 as part of this project, the staff includes a family physician (available almost at all times), two nurses, an administrative assistant, and a team leader. The centre primarily serves the approximately 150 residents of Radisson, as well as temporary workers, particularly those employed by Hydro-Québec and Air Inuit. No patients are hospitalized at the Radisson Health Centre; instead, they are transferred to facilities in Abitibi-Témiscamingue. The centre also deploys two pre-hospital emergency response teams along the Billy-Diamond Highway. It operates in partnership with the Chisasibi Hospital Centre, where residents can access specialist consultations, radiological examinations, and other clinical and medical services.

According to health centre staff interviewed, the main health and social issues in Radisson are mental health and substance use (drugs and alcohol). Oral health is also a recurring concern, as residents only have access to a dental hygienist twice a year and no dentist visits the community. In addition, residents with chronic illnesses cannot be treated locally and must leave the community to receive care. Access to specialized health services is therefore limited, increasing the vulnerability of those who require such care due to the community's isolation.

With regard to community well-being, stakeholders noted that businesses in the region are increasingly relying on fly-in/fly-out (FIFO) work arrangements. This trend has contributed to the gradual departure of permanent residents and, consequently, to a weakening of the community's social fabric. Radisson is also characterized by a very high social deprivation index. In addition, according to a local stakeholder interviewed as part of this study, the presence of transient populations, such as commuting workers, seasonal workers, and residents of nearby Indigenous communities, can raise public safety concerns.

Environmental factors also affect the well-being of Radisson residents. Stakeholders emphasized the impacts of climate change on public health, particularly forest fires such as the 2023 event, which significantly affected air quality and led to the evacuation of the community. Extreme weather events can also restrict access to the territory, especially when they result in the closure of the Billy-Diamond Highway, Route du Nord, or Trans-Taiga *Road*. Such closures can in turn disrupt supply chains and food security, as Radisson relies on truck deliveries to supply its grocery store.

Stakeholders also noted that some FIFO workers prefer to bring their own supplies rather than shop locally. Many residents rely in part on "country foods," but this practice has become increasingly difficult to maintain since the moratorium on caribou hunting and the introduction of restrictions on moose hunting. According to those interviewed, fishing appears to be relatively uncommon. However, other stakeholders raised concerns about poaching and non-compliance with hunting and fishing quotas, noting that the local wildlife office has limited resources to educate commuting workers about regulatory requirements.

Matagami

The Isle-Dieu Health Centre in Matagami, which is part of the James Bay Regional Health and Social Services Centre, provides family medicine services through a team of five family physicians, supported by associate and locum physicians. The emergency department has a low patient volume and functions both as a walk-in clinic and as a trauma stabilization centre. CLSC-type services by appointment are also available, along with short-term hospitalization (four beds) and long-term care and accommodation services (also four beds). Teleconsultation, teleradiology, and other technology-based services are offered to address the region's remoteness from major urban centres (CRSSSBJ, undated).

Land use and infrastructure

Radisson

Infrastructure

Radisson is located at the northern end of the Billy-Diamond Highway, the only road link connecting the town—and the Cree communities of Waskaganish, Eastmain, Wemindji, Nemaska, and Chisasibi—to the rest of Québec.

The town also has an airport that primarily serves air transportation related to the hydroelectric industry (see Section 6.4.2). Radisson lies at the heart of the La Grande hydroelectric complex, which includes the Robert-Bourassa and La Grande-2-A generating stations, the La Grande-2 and Radisson substations, and various related technical facilities and transmission infrastructure. This energy infrastructure is the cornerstone of the local economy. Although limited, the commercial sector includes essential services such as grocery stores, retail outlets, and administrative services. However, some stakeholders reported a decline in local services in recent years. For example, Société de l'assurance automobile du Québec (SAAQ) offices are now located in Chisasibi, and the local credit union has closed. Residents now rely on ATMs, which charge higher service fees.

In terms of water supply and sanitation, Radisson has systems adapted to the needs of its population, although they are modest compared to those of larger urban centres. The community also handles wastewater and domestic waste from the Shaakichiuwaanaan exploration camp and supplies it with drinking water.

Vacationing, recreational activities, and existing and planned recreational facilities

Residents and visitors can enjoy a variety of outdoor activities, including fishing, hunting, hiking, and water sports on La Grande Rivière and the Robert-Bourassa reservoir. In winter, the region is well suited to cross-country skiing and snowmobiling. The 2.5-km Radisson Linear Park provides access to a lookout with views of La Grande Rivière and the Robert-Bourassa hydroelectric facilities.

The lands along the Trans-Taiga Road are popular moose hunting areas for local residents. Stakeholders noted that Radisson previously had an outfitter, which closed following the moratorium on sport hunting of caribou. This outfitter had offered rentals of recreational equipment such as snowmobiles, ATVs, boats, and hunting and fishing gear. No such rental services are currently available.

The town also has a sports complex with an arena and a soccer field, as well as a community centre for social and cultural events (Localité de Radisson, 2024). Radisson maintains local snowmobile trails and three heated shelters, one of which follows the Billy-Diamond Highway to Duncan Lake (FCMQ, 2024). However, according to the Coordinator of Sports, Recreation, Culture, Tourism, and Community Life, the organization relies on only two active volunteers, making it difficult to maintain the trails and shelters. The local trail network is not part of a structured regional system and must comply with rights of way on Cree lands. The community hopes to collaborate on the development of a snowmobile trail network along the Trans-Taiga Road.

Radisson has three hotels serving both workers and tourists, as well as a campground with 40 sites. Visitors can tour the La Grande-1 and Robert-Bourassa hydroelectric facilities. Notably, Radisson is home to the last restaurant and gas station along the Billy-Diamond Highway beyond the kilometre 381 truck stop, located more than 200 km away.

Matagami

Infrastructure

The Town of Matagami owns the transshipment yard located near the junction of Highway 109 and the Billy-Diamond Highway. It has a local rail network of more than 3 km used for rail transshipment and also provides supply management, bulk materials handling, and indoor and outdoor storage services.

The Société de développement de la Baie-James (SDBJ) manages the Matagami aerodrome, which is owned by the Ministère des Transports et de la Mobilité durable (MTMD). Flights operate to destinations including the Éléonore Mine and Rouyn-Noranda.

Vacationing, recreational activities, and existing and planned recreational facilities

Residents and visitors can take part in a variety of recreational and tourism activities, such as hunting and fishing. The municipality also features a network of hiking trails totalling 67 km. Lake Matagami is well suited to water sports.

Most socio-cultural and sporting activities take place at the Matagami civic centre. The facility includes a swimming pool, a library, a bowling alley, and a multipurpose hall. It also houses a seniors' centre and a youth centre. Matagami also has an arena, which is converted into a skate park for roller sports during the summer. The arena also hosts playground activities and various special events, such as the Nord-du-Québec Youth Gathering, the Seniors' Gathering, and Family Week. Near the arena, there is a tennis court and a multi-sport field with surfaces for hockey, basketball, and badminton. The municipality also has a golf course.

Regional snowmobile trail 396, which connects Lebel-sur-Quévillon to Saint-Dominique-du-Rosaire, is accessible from Matagami. It also provides access to Trans-Québec trail 93, which crosses the administrative regions of Abitibi-Témiscamingue, Saguenay–Lac-Saint-Jean, and Côte-Nord. Several local snowmobile trails also originate at the junction with regional trail 396. One follows Highway 109, while others provide access to Nottaway and Bell streets, as well as Matagami Boulevard, the Bell River, and Lake Matagami (FCMQ, 2024).

The municipality offers a range of accommodations, including a hotel, a motel, and bed-and-breakfast establishments. During the summer season, a campground with 85 sites is available to visitors.

Local study area

Infrastructure

Infrastructure within the local study area is described in Section 6.4.2.

Resort, recreational facilities, and hunting and fishing activities

The project site is located in hunting zone 22 North and overlaps fur-bearing animal management units (UGAF) 91 and 94 (Government of Québec, 2022a, 2022b). Fishing for lake trout and walleye is also a popular activity. As noted, the Shaakichiuwaanaan mining project is located on Category III lands. These lands are open to all; however, the Cree retain exclusive hunting and trapping rights for fur-bearing species, as well as fishing rights for certain aquatic species, including lake whitefish, yellow sturgeon, burbot, and sucker species.

There are no active outfitters in the local study area. The former Mirage Aventure outfitter, located approximately 75 km east of the project at kilometre 358 of the Trans-Taiga Road, was transferred to the Chisasibi First Nation in 2024 (Sections 6.4.2 and 6.4.3). It should also be noted that the infrastructure of the former Nouchimi outfitter, located at kilometre 286 of the Trans-Taiga Road, along with some of its satellite camps, was dismantled in 2022 (COMEV, 2025). Since the ban on sport hunting of caribou—introduced in 2018 for the Rivière aux Feuilles herd and in 2011 for the Rivière George herd—several outfitters have ceased operations (Lecavalier, 2017).

According to the Executive Director of Tourisme Baie-James, the local study area may be visited for recreational tourism purposes by adventure tourism enthusiasts and vanlife travellers. However, no recreational tourism projects are currently under development in the area.

The nearest recreational lease is located approximately 18 km southwest of the project site, on the west shore of Lake Corvette (Map 6-19). Eleven (11) additional recreational leases are located within the local human environment study area.

Mining titles and extraction areas

The local study area includes, in whole or in part, 10,032 active exclusive exploration rights (formerly mining claims) held by 70 companies or individuals. PMET holds 463 of these, representing 4.6% of all identified claims. Other major holders include Azimut Exploration Inc. (1,692), Glenn Griesbach (740), SOQUEM Inc. (735), Qi Énergétique Québec Ltée (660), Midland Exploration Inc. (499), NQC Lithium Corp. (473), and Rio Tinto Exploration Canada Inc. (417).

The local study area also includes 15 active extraction sites, most of which are located along the Trans-Taiga Road (Map 6-19). These surface mineral extraction sites include four gravel pits, nine sand pits, and two crushed stone quarries, which are generally operated under certain conditions. They are owned in particular by the Société d'énergie de la Baie-James, the Société de la Baie-James, Hydro-Québec, and the former Mirage outfitter.

In 2023, in the exceptional context of forest fires that prevented certain mineral exploration work from being carried out during the summer, the Ministère des Ressources naturelles et des Forêts announced a one-year suspension of the validity period of certain mining claims (effective August 14, 2023), particularly in the Eeyou Istchee James Bay region (MRNF, 2023). It should also be noted that the *Act to amend the Mining Act and other provisions* (2024, chapter 36), adopted in November 2024, introduced several changes to Québec's mining regime. In particular, the method for granting claims, now referred to as "exclusive exploration right", as well as certain conditions governing their exercise, were revised.

6.4.5 Regional economy

In 2022, the gross domestic product (GDP) of the Nord-du-Québec administrative region totalled $5.844 billion, representing 1% of Québec's overall GDP of $505.160 billion. Between 2014 and 2022, the region recorded an average annual GDP growth rate of 6.7%, the highest among Québec's administrative regions during this period (ISQ, 2024b). Based on 2022 GDP, the region's main economic sectors were mining, quarrying, and oil and gas extraction (45.9%); construction (13.3%); public utilities (8.9%); public administration (7.3%); and health care and social assistance (6.3%) (ISQ, 2024b).

The mineral resource extraction sector accounted for 18.1% of Nord-du-Québec's GDP. Investment expenditures by mining companies in the region represented 1.8% of total investment spending in this sector across Québec. The Nord-du-Québec administrative region had 4,075 direct jobs related to mining, representing 26.1% of all mining jobs in the province—the second-largest share after Abitibi-Témiscamingue among Québec's administrative regions (EcoTec Consultants, 2024).

Mining sector workforce

In 2023, the Nord-du-Québec region had 6,059 jobs in the mining industry (CSMO Mines, 2024), more than half of which (52.3%) were in mining operations. According to forecasts by the Comité sectoriel de main-d'œuvre de l'industrie des mines (CSMO Mines), the mining workforce in Nord-du-Québec is expected to reach 6,886 workers in 2028 and 6,979 in 2033, representing a 12% increase compared to 2022. Between 2023 and 2028, the region will need to fill 5,938 mining jobs, accounting for 41% of all mining positions to be filled in Québec (CSMO Mines, 2024). CSMO Mines estimates that 56% of mining jobs to be filled in Québec by 2033 will require a vocational diploma. In Nord-du-Québec, the main occupations in demand are expected to include miners (1,095 positions); drillers and diamond drill assistants (819); heavy equipment mechanics, hydraulic mechanics, and mobile heavy equipment mechanics (511); ore processing machine operators (479); heavy equipment operators (464); cooks and assistant cooks (158); and industrial mechanics (152). In addition to positions requiring vocational training, openings are also expected for geologists (179), which require university education, as well as for metalworking labourers (166) and exploration labourers (145), which do not require specific training. Greater participation by underrepresented groups in the mining industry, particularly Indigenous workers, could help address part of the labour demand (CSMO Mines, 2024).

Use of commuting

According to a study on labour issues, commuting, and tax incentives specific to the James Bay territory conducted by Raymond Chabot Grant Thornton (2022), slightly more than one in four jobs in Eeyou Istchee–James Bay[15] is filled by a commuting worker, excluding jobs in Cree communities. The study indicates that between 2017 and 2021, the number of job vacancies[16] in the Nord-du-Québec–Côte-Nord region increased by an average of 9.7% (4,585 vacant positions)[17]. In the health and social services sector specifically, vacancies rose by an average of 16.9% per year. Although the vacancy rate in the Nord-du-Québec–Côte-Nord region is expected to decline in 2024, it will likely remain among the highest in Québec, at 4.5%, with 3,235 positions to be filled (ISQ, 2025).

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15 Data are based on all companies surveyed (16) for the study. Statistics Canada reported that 17.6% of workers in the region were commuters in 2016 (Raymond Chabot Grant Thornton, 2022).

16 The job vacancy rate measures unmet labour demand and indicates how easily companies are able to fill their workforce needs.

17 These data exclude industries with headquarters located outside the region. As a result, the actual number of job vacancies may be underestimated.

Employers in the region identify the lack of qualified, skilled, and experienced candidates, as well as the remote and isolated nature of the workplace, as the main factors contributing to recruitment difficulties. Salary conditions are also cited as a barrier. In recent years, widespread wage increases across Québec in response to labour shortages have reduced the gap with the salary incentives that once distinguished the James Bay region. In Côte-Nord and Nord-du-Québec, only the trades, transportation and equipment sector and the manufacturing and utilities sector offer average wages above the Québec average (by 13.3% and 28.1%, respectively). As a result, recruitment challenges at the regional level are prompting companies to rely more heavily on commuting to fill vacant positions (Raymond Chabot Grant Thornton, 2022).

Certain sectors related to natural resource development find it easier to recruit commuting workers, as they offer more attractive salary conditions than those available in workers' home regions (Tremblay, 2020). Mining companies in particular rely on commuting to meet their labour needs. According to a 2022 study on the economic impact of Québec's mining industry, only 13.5% of workers employed in mines in Nord-du-Québec resided in the region, while 32.1% came from Abitibi-Témiscamingue (EcoTec Consultants, 2024).

In 2022, the mining sector offered an average annual salary of $117,916—more than twice the median employment income in Québec, which stood at $54,328 (EcoTec Consultants, 2024).

6.4.6 Traffic

Existing traffic volumes on the Trans-Taiga Road were determined through two camera-based counting campaigns conducted over seven consecutive days, from March 15 to 21, 2025, and from May 1 to 7, 2025. Counts were carried out near the current mining camp, approximately 268 km east of the Billy-Diamond Highway and about 40 km west of the La Grande-4 (LG-4) dam.

Between March 15 and 21, 2025, a total of 181 vehicles were recorded in both directions, including 74 heavy vehicles (41% of all vehicles counted). Of these, 141 vehicles (78%) travelled on weekdays. Heavy vehicles also predominantly travelled on weekdays, with 63 recorded (85% of all heavy vehicles). Wednesday was the busiest day, with 48 vehicles, including 23 heavy vehicles. Eastbound traffic accounted for 101 vehicles (55% of total traffic), with heavy vehicles representing 43% of eastbound traffic. This period is considered representative of typical traffic conditions on the Trans-Taiga Road. Overall, traffic volumes were low, with peak flows of fewer than 10 vehicles per hour in both directions combined and fewer than 40 vehicles over a 24-hour period.

Between May 1 and 7, 2025, a total of 374 vehicles were recorded in both directions, including 64 heavy vehicles (15% of all vehicles counted). As in March, most traffic occurred on weekdays, with 242 vehicles (64.7% of total traffic). Heavy vehicles also travelled mainly on weekdays, with 53 recorded (82.8% of all heavy vehicles). Weekend traffic increased, with 132 vehicles recorded—an increase of 13.3% compared to the March period—although heavy vehicle traffic remained unchanged. Eastbound traffic remained predominant, with 244 vehicles (65.2% of total traffic).

Sunday was the busiest day, with 70 vehicles recorded, followed closely by Wednesday with 68 vehicles. This period corresponds to increased traffic associated with the "Goose Break," when members of Cree communities travel to the territory for goose hunting. Although overall traffic volumes were higher, the increase is mainly attributable to weekend travel, with vehicle counts rising from 40 to 132. Despite this increase, traffic volumes remain relatively low. There are therefore no current traffic-related issues on the Trans-Taiga Road, which has a theoretical capacity of several hundred vehicles per hour in each direction.

6.4.7 Archeology

An archaeological potential study was conducted by Archéoconsultant (2024) to cover the area surrounding the mining sector (Appendix 6-26). Following this analysis, an archaeological inventory was carried out in 2025 to identify areas with archaeological potential within the sector targeted by the work (Appendix 6-27).

6.4.7.1 Known archaeological sites

Four archaeological sites have been identified along the shores of Hammerhead Lake (Lake Katatipawasakakamaw), located approximately 30 km northeast of the project site, along the Trans-Taiga Road. No other known sites are located near the project site (Archéoconsultant, 2024).

6.4.7.2 Archaeological and cultural potential of the area

The study area is bordered by several watercourses and bodies of water: Lake Corvette to the south, La Grande Rivière to the north, Lake Magin to the west, and Lake Nochet to the east (Archéoconsultant, 2024). Although secondary, the local hydrographic network may have served as a travel corridor between the Lake Corvette basin and La Grande Rivière, used by the Eeyouch and their ancestors.

It should also be noted that birth sites, burial sites, and former camps identified by land users consulted as part of this project are discussed for each community in the sections on historical and cultural heritage and on sites and features of significance.

Paleohistoric sites in Eeyou Istchee typically consist of camp remains buried at shallow depths, often less than 30 cm. Earlier paleohistoric sites are primarily composed of lithic debris and roughly shaped tools, reflecting occupation by small nomadic groups making short stays at strategic locations.

Later paleohistoric sites show a similar lithic composition but with increased use of materials sourced within the territory—notably grey chert from the Labrador Trough and Mistissini quartzite—suggesting stronger exchanges between groups and a more sustained occupation of inland areas.

During the colonial period, marked by the expansion of the fur trade, archaeological sites are characterized by the presence of goods of European origin, and trading posts became structuring hubs in seasonal movements. In the 20th century, residential schools, forced relocations, and the creation of reserves profoundly transformed patterns of land use, although occupation remained active during the second half of the century (Archéoconsultant, 2024). The study area is remote from the main non-Indigenous developments, with the nearest former trading posts (Neoskweskau, Nichikun, Kaniapiskau, and Kanaaupscow) located more than 150 km from the project site. However, former camps of explorers, surveyors, or prospectors may be found near lakes and waterways within the study area (Archéoconsultant, 2024).

6.4.7.3 Archaeological potential study and inventory

Covering an area of 74 km², the archaeological potential study area was subdivided into 354 sectors with Indigenous archaeological potential, including 273 sectors with medium potential (3.42 km²) and 81 with high potential (0.21 km²). The remainder of the area was assessed as having low to no archaeological potential (Appendix 6-21).

In 2025, Archéoconsultant conducted an archaeological inventory to verify the presence of remains in 131 of the areas identified as having potential. In the event of a discovery, the objective was to assess its heritage value, evaluate potential project impacts, and recommend appropriate mitigation measures (Appendix 6-22).

Archaeological remains were identified in four areas: zones 72 (25-FG-2), 96 (25-FG-3), and 126 (25-FG-1), as well as an additional area identified during fieldwork. Two sites were assigned Borden codes: FjFI-3 (zone 72) and FjFI-2 (zone 126). All remains are associated with Indigenous occupation of the area during the Paleohistoric and Colonial periods. The sites are concentrated along the corridor linking Lake Shaakichiuwaanaan to its outlet and extending to the unnamed lake into which it flows to the northwest. This concentration suggests the presence of a travel corridor between Lake Corvette and La Grande Rivière during these periods.

A multifunctional Ramah quartzite tool, approximately 5 cm in length, was discovered in zone 72. Despite surrounding disturbances caused by drilling, its immediate context remained intact. The artifact was found a few metres from a rocky bank approximately 1 m high overlooking Lake Shaakichiuwaanaan. Two non-exclusive hypotheses may explain its presence: it may represent the remains of an ancient Indigenous camp or a ritual deposit. Given this potential spiritual dimension, site FjFI-3 is considered to have significant heritage value. However, no other evidence of occupation was identified during the survey, suggesting the site contains only this single artifact, which has since been removed for conservation. Consequently, the risk of impact from the proposed project remains low, and no additional protective measures are considered necessary.

A tin teapot lid, likely dating from the first half of the 20th century, was discovered in zone 96. It was likely lost during a stopover, possibly by an Indigenous occupant. No other artifacts were identified, either during subsurface testing or on the surface.

Zone 126 yielded seven quartz flakes clustered within an area of approximately 10 to 20 m². Site FjFI-2, located near a small bay at the mouth of the river draining Lake Shaakichiuwaanaan, may correspond to a small Paleohistoric Indigenous camp. The site is not threatened by the current project, as the planned footprint does not encroach on it. However, if the project design were to change to include this area, the site's heritage value would warrant the implementation of additional mitigation measures. This is also the only area considered likely to contain additional remains.

Following a recommendation from a Cree worker involved in the drilling program, a site located outside the inventory area was subject to an unplanned visual inspection. A small grouping of flat stones arranged vertically and partially resting on moss was observed. The presence of stones resting on moss suggests a relatively recent arrangement, although a natural origin cannot be ruled out. An inspection within a 300 m radius of this presumed structure revealed no additional evidence of occupation.

In the event of a chance discovery of archaeological remains during the work, those responsible will immediately notify the appropriate authority and follow the prescribed procedures. Any discoveries related to First Nations heritage will be reported to the relevant Indigenous authorities, including the local council and the Cree Nation Government.

An action plan for accidental discoveries, included in the technical documentation of the archaeological potential study, may be consulted if required. As the archaeological inventory focused exclusively on terrestrial areas, the portion of Lake Shaakichiuwaanaan that will be dewatered during the work will be subject to the chance discovery procedure.

6.4.8 Landscape

The landscape analysis related to the project was carried out in accordance with standard approaches, including a review of existing documentation, analysis of aerial photographs, and a field visit during which photographs of surrounding landscapes and key viewpoints were taken. This section summarizes the main findings of the sectoral report presented in Appendix 6-28.

6.4.8.1 Regional landscape

The human environment study area overlaps the eastern portion of the La Grande Rivière Hills natural province (Li and Ducruc, 2019). This province is characterized by a very cold, dry climate with a short growing season, except in its southeastern tip, where the climate is more humid and the growing season is of average length. The terrain consists of an undulating plain dotted with abundant exposed bedrock, particularly near the coasts of James Bay and Hudson Bay and in the central portion of the territory. To the east, small buttes and hills appear in a dense spatial pattern. Elevation ranges from sea level to approximately 400 m in the eastern part of the province and reaches up to 600 m at the foothills of the Otish Mountains in the southeast. Two major tectonic depressions structure the territory: the La Grande Rivière depression, which includes the Robert-Bourassa and La Grande 3 reservoirs, and the Lac Guillaume-Delisle graben. The hydrographic network is dense, nearly parallel, and generally oriented east–west, clearly reflecting the structural pattern of the bedrock. It includes the lower reaches of the Sakami River, La Grande Rivière, the Great Whale River, and the Little Whale River. A defining feature of this network is the presence of the large Robert-Bourassa and La Grande 4 hydroelectric reservoirs. Vegetation cover is predominantly coniferous, consisting mainly of open coniferous forests and sparse woodlands. Lichen heaths, wooded heaths, and burn areas cover nearly 40% of the territory. The population is concentrated in Radisson and Kuujjuarapik, and the regional economy is based primarily on hydroelectric development.

6.4.8.2 Landscape of the study area

The landscape of the study area is an uninhabited natural environment. In its northern portion, the study area includes part of the La Grande Rivière depression, which contains the river of the same name. La Grande Rivière crosses the area from east to west, linking the La Grande 3 and La Grande 4 reservoirs. The Trans-Taiga Road, along with two energy transmission corridors, also follows this axis, strongly structuring the landscape in this sector.

The central portion of the study area is characterized by numerous lakes nestled between hills. To the south, Lake Corvette stands out due to its larger surface area compared to other water bodies in the area. The lake is bordered by hills to the north, east, and south, from which it receives runoff. Undulating plains, which gradually widen toward the west, form a transition between the lake and the surrounding hills.

Vegetation cover in the study area consists mainly of low-density forests, generally spruce stands with lichens and mosses, along with areas of lichen heath. In addition, as wildfires have occurred in the region over the past 20 years, several areas of forest regeneration are present.

6.4.8.3 Specific landscape components

Tourist route

On its official tourism website, the Eeyou Istchee James Bay Regional Government highlights the Trans-Taiga Road as a tourist route renowned[18] for its remarkable landscapes (Map 6-20). It can therefore be considered a scenic route.

Areas of visual interest

The Cree communities of Eeyou Istchee value La Grande Rivière, Lake Corvette, and their surrounding areas. These features can be considered areas of visual interest (Map 6-20). The communities also place importance on areas of the territory that remain undisturbed.

6.4.8.4 Landscape units

The study area has been divided into a number of landscape units, grouped into four types based on the homogeneity of permanent landscape features and prevailing visual characteristics, as follows:

- valley landscape (Va);
- hilly landscape (Co);
- undulating plain landscape (Pl);
- lake landscape (La).

These landscape units are illustrated in Map 6-20 and described in Tables 6-48 to 6-50. Photos 6-1 to 6-5 present representative views of each landscape unit.

[18] Eeyou Istchee Baie-James. 2025. Motorcycle Touring. https://www.eeyouistcheebaiejames.com/fr/quoi-faire/mototourisme/

Zones d'étude / *Study Areas*

- Humain - Locale / *Human - Local*

Repères géographiques / *Geographical Landmarks*

- Communauté crie / *Cree community*
- Village inuit / *Inuit village*
- Municipalité / *Municipality*

Composantes du projet / *Project Components*

- Projetées / *Projected*

Unités de paysage / *Landscape units*

- CO Collines / *Hills*
- LA Lacustre / *Lacustrine*
- LA Plaine ondulée / *Rolling plain*
- VA Vallée / *Valley*

Composantes particulières du paysage / *Specific Components of the Landscape*

- Secteurs d'intérêt visuel / *Area of visual interest*
- Route touristique / *Tourist road*

Camps et installations / *Camps and Facilities*

- Camp cri permanent / *Cree permanent Camp*
- Campement cri temporaire / *Cree temporary camp or campsite*
- Autre type de camp / *Other camp type*
- Aire de camps et de campements / *Camps and campsites area*

Feux de forêt / *Forest Fires*

- Feux 2023 / *2023 fires*

Infrastructures / *Infrastructure*

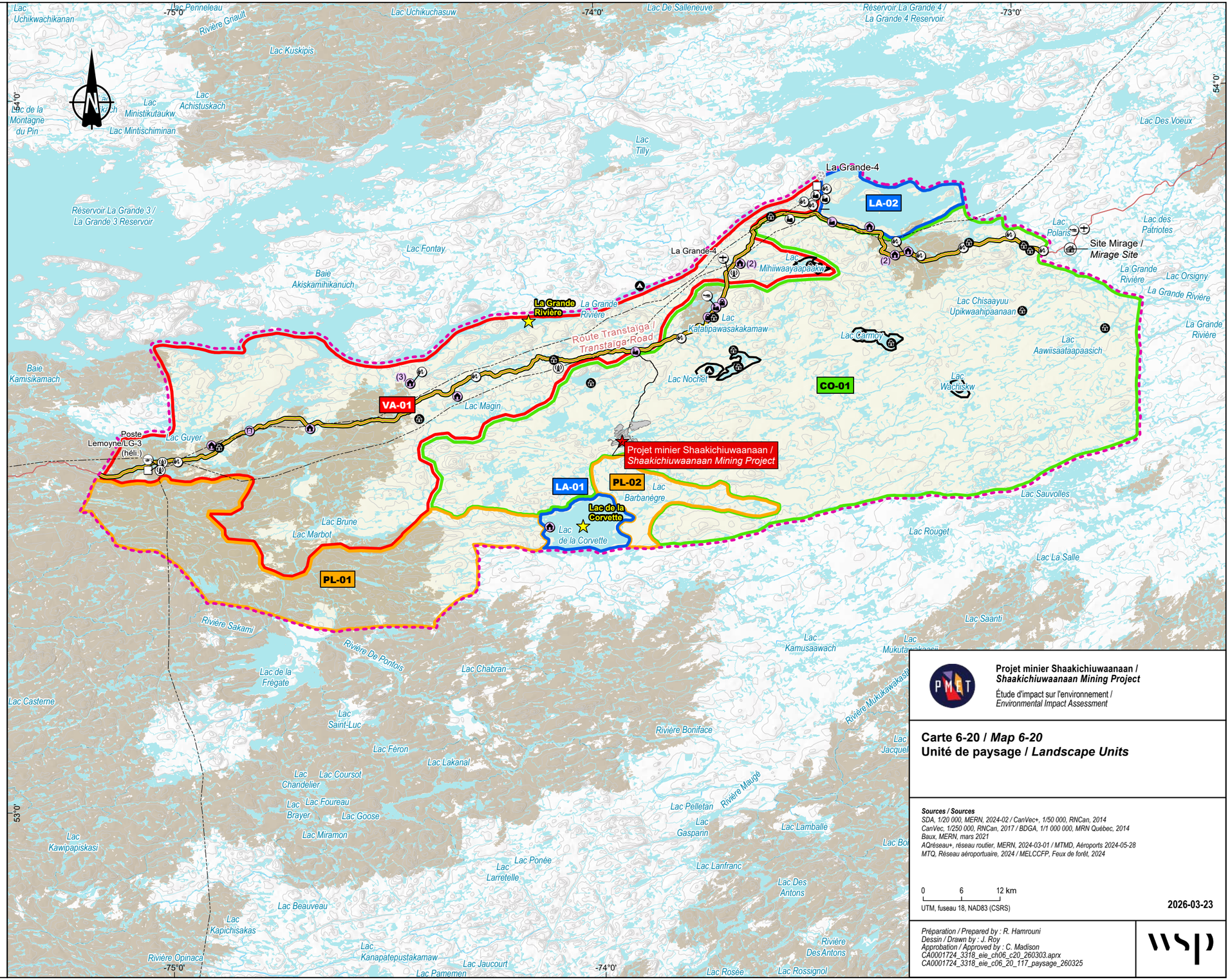
- Aérodrome / *Aerodrome*
- Hydroaérodrome / *Hydroaerodrome*
- Héliport / *Heliport*
- Bâtiment industriel / *Industrial building*
- Tour de télécommunication / *Telecommunication tour*
- Centrale hydroélectrique / *Hydroelectric power plant*
- Poste électrique / *Electrical substation*
- Site d'extraction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

Réseau routier / *Road Network*

- Route collectrice municipale / *Municipal collector road*

Baux de location / *Leases*

- Fins de villégiature / *Leisure purpose*
- Fins commerciales / *Commercial purpose*
- Fins industrielles / *Industrial purpose*
- Fins municipales / *Municipal purpose*



Projet minier Shaakichiuwaanaan / *Shaakichiuwaanaan Mining Project*

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

Carte 6-20 / *Map 6-20*
Unité de paysage / *Landscape Units*

Sources / Sources
SDA, 1/20 000, MERN, 2024-02 / CanVec+, 1/50 000, RNCan, 2014
CanVec, 1/250 000, RNCan, 2017 / BDGA, 1/1 000 000, MRN Québec, 2014
Baux, MERN, mars 2021
AQréseau+, réseau routier, MERN, 2024-03-01 / MTMD, Aéroports 2024-05-28
MTQ, Réseau aéroportuaire, 2024 / MELCCFP, Feux de forêt, 2024

0 6 12 km
UTM, fuseau 18, NAD83 (CSRS)

2026-03-23

Préparation / Prepared by : R. Hamrouni
Dessin / Drawn by : J. Roy
Approbation / Approved by : C. Madison

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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.

Valley landscape unit (VA-01)



Photo 6-1 Aerial view from the top of a hill looking southeast (landscape unit VA-01)



Photo 6-2 Deep perspective along the La Grande Rivière axis looking southwest (landscape unit VA-01)[19]

Table 6-48 Valley landscape unit (VA-01)

Components	Description
Boundaries and specific land use	– The main visible features are La Grande Rivière and its slopes, which are covered by coniferous forest of varying density. – There is a single valley landscape unit (VA-01), located in the northwest of the study area, representing approximately one-third of its total area. – Unit VA-01 includes permanent Cree camps.
Traffic routes and transportation corridors	– Trans-Taiga Road – La Grande Rivière – Four energy transmission corridors are connected to the Lemoyne substation. Two long corridors link the substation to the LG-4 reservoir, crossing the unit along an east–west axis. Two shorter corridor segments extend westward from the substation, crossing the western portion of the unit along north–south and west-oriented axes. – A few forest roads connect to the Trans-Taiga Road and, in some cases, to the energy transmission corridors.
Land use elements	– Vacation lease – Traplines also used for hunting and fishing activities – La Grande Rivière
Special landscape features	– La Grande Rivière – Natural landscape – Trans-Taiga Road (tourist route)
Relief	– The relief of the unit is characterized by a large valley with gentle slopes that stretches from east to west. Isolated hills, rising to an altitude of 485 m, dot the southern portion of La Grande Rivière in particular. – The unit is characterized by a broad valley with gentle slopes extending along an east-west axis. Isolated hills, reaching elevations of up to 485 m, are found mainly south of La Grande Rivière.
Hydrography	– La Grande Rivière, along with streams, lakes, and wetlands, is present within this valley landscape unit.
Vegetation	– Coniferous forest covers most of the unit, except within the energy transmission corridors. In some areas, regenerating conifer stands are present, resulting from past disturbances, often forest fires dating back several decades.

[19] Toolforge. 2025. *Wikimap* [carte interactive]. https://wikimap.toolforge.org/?wp=false&cluster=false&zoom=16&lat=053.620310&lon=-074.387484

Components	Description
Spatial organization	– Landscape unit VA-01 is organized around linear elements oriented along an east–west axis within a predominantly natural setting. – La Grande Rivière forms the northern boundary of the unit and reaches widths of up to approximately 1.5 km, acting as a key structuring feature of the territory. – The winding alignment of the Trans-Taiga Road follows the irregular topography, skirting isolated hills. – The energy transmission corridors (approximately 100 to 150 m wide) are characterized by low vegetation that contrasts with the surrounding, variably dense forest cover. – The irregular terrain and continuous forest cover create visual screening from transportation routes. – Numerous lakes are scattered throughout the unit, providing areas of visual openness proportional to their surface area. – Vacation leases and permanent Cree camps are located relatively close to the Trans-Taiga Road..
Observers	– Occupants of permanent Cree camps and vacation leases (temporary fixed observers) – Community members engaged in traditional activities (mobile or temporary fixed observers) – Users of transportation routes, as well as helicopter or airplane passengers and boaters (mobile observers)
Field of view	– The field of view is generally limited or filtered by terrain and forest cover. However, it can be extensive along the La Grande Rivière axis and along energy transmission corridors. Along the Trans-Taiga Road, visibility varies depending on the curvature of the route.
Pictorial qualities and visual perspectives	– The visual quality of the valley landscape unit is based on its natural character and the contrast between water bodies and adjacent wooded hills. – La Grande Rivière, the larger lakes, and the energy transmission corridors provide long, open sightlines.

Landscape unit VA-01 has moderate sensitivity, due to its natural character and the presence of La Grande Rivière, which is highly valued by the Cree communities of Eeyou Istchee. Overall visual accessibility is low because of forest cover and the limited number of observers, except along the Trans-Taiga Road and La Grande Rivière corridors.

Hills landscape unit (CO-01)



Photo 6-3 Aerial view from a helicopter looking east (landscape unit CO-01)

Table 6-49 Hills landscape unit (CO-01)

Components	Description
Boundaries and specific land use	– The main visible features of the unit consist of a succession of hills with coniferous forest cover of varying density, along with numerous lakes of different sizes and shapes. – There is a single hills landscape unit (CO-01), occupying approximately half of the study area. – The unit includes permanent Cree camps as well as one temporary Cree camp. – The Project infrastructure will be located within unit CO-01.
Traffic routes and transportation corridors	– Trans-Taiga Road – A few forest roads connected to the Trans-Taiga Road. – Hydroairport
Land use elements	– Vacation leases – Traplines that also host hunting and fishing activities
Special landscape features	– Natural landscape – Trans-Taiga Road
Relief	– The relief is characterized by a succession of small hills, some reaching elevations of over 535 m.
Hydrography	– The unit includes several watercourses, numerous lakes—many elongated along an east-west axis—and wetlands.
Vegetation	– Coniferous forest covers about half of the unit. The remainder consists of regenerating conifer stands resulting from natural disturbances and, in many cases, forest fires that occurred several decades ago.
Spatial organization	– The hills landscape unit forms a mosaic of numerous lakes surrounded by hills. These lakes create areas of visual openness and contrast strongly with the surrounding wooded hills. – The irregular terrain and forest cover create visual screening from transportation routes. – The winding alignment of the Trans-Taiga Road follows the irregular topography, skirting isolated hills and water bodies in the northern portion of the unit. – Some permanent Cree camps are located relatively close to the Trans-Taiga Road, while others—along with the temporary camp—are situated farther away, near water bodies.
Observers	– Occupants of permanent Cree camps, the temporary Cree camp, and vacation leases (temporary fixed observers) – Community members engaged in traditional activities and mine workers (mobile or temporary fixed observers) – Users of transportation routes, as well as helicopter or airplane passengers and boaters (mobile observers)
Field of view	– The field of view is typically limited or filtered by terrain or forest cover. However, it can be extensive from the highest elevations and in areas without dense vegetation. It may also be open and far-reaching where a lake is present in the foreground. Visibility along the Trans-Taiga Road varies depending on the curvature of the route.
Pictorial qualities and visual perspectives	– The visual quality of the hills landscape unit is based on its natural character and the contrast between water bodies and adjacent wooded hills. – Larger lakes provide long, open sightlines.

The CO landscape unit has moderate sensitivity, due to its natural character, which is highly valued by the Cree communities of Eeyou Istchee. Visual accessibility is generally low because of forest cover and the limited number of observers, except along the Trans-Taiga Road, from the highest elevations, and where medium-sized lakes occur in the foreground.

Rolling plain landscape unit (PL-01 and PL-02)



Photo 6-4 Aerial view from a helicopter looking southeast (landscape unit PL-01)

Table 6-50 Undulating plain landscape units (PL-01 and PL-02)

Components	Description
Boundaries and specific land use	– The main visible features are undulating plains with coniferous forest cover of varying density. – There are two undulating plain landscape units: PL-01, located west of Lake Corvette, and PL-02, located east of the lake.
Traffic routes and transportation corridors	– An energy transmission corridor is located at the western end of unit PL-01. It runs along a north–south axis from the Lemoyne substation near the Trans-Taiga Road..
Land use elements	– Traplines also used for hunting and fishing activities
Special landscape features	– Natural landscape
Relief	– The terrain consists of a plain dotted with a few low hills, some reaching elevations of up to 460 m.
Hydrography	– Watercourses, lakes, and wetlands are present in these landscape units.

Components	Description
Vegetation	– PL-01: primarily composed of regenerating conifer stands – PL-02: primarily composed of coniferous forest
Spatial organization	– The spatial structure of units PL-01 and PL-02 is characterized by a broad plain where rivers and lakes are interspersed among low rolling hills.
Observers	– Community members engaged in traditional activities (mobile or temporary fixed observers) – Helicopter and airplane passengers (mobile observers)
Field of view	– The field of view is generally limited or filtered by terrain or forest cover. It may extend to varying degrees along watercourses depending on their sinuosity, and is more open along the energy transmission corridor.
Pictorial qualities and visual perspectives	– The visual quality of the undulating plain landscape units is based on their natural character and the contrast between water bodies and surrounding wooded hills. – Watercourses and the energy transmission corridor provide long, open sightlines.

Landscape units PL-01 and PL-02 have moderate sensitivity, due to their natural character, which is highly valued by the Cree communities of Eeyou Istchee. Visual accessibility is generally low because of forest cover and the limited number of observers.

Lake landscape units (LA-01 and LA-02)

There are two distinct lake landscape units within the study area:

- LA-01, centered on Lake Corvette;
- LA-02, covering a portion of the La Grande 4 reservoir.



Photo 6-5 Aerial view from a helicopter looking southeast (landscape unit LA-01)

Table 6-51 Lake landscape units

Components	Description
Boundaries and specific land use	– Two distinct lake landscape units are present in the study area: LA-01 and LA-02. – Landscape unit LA-01 is centred on Lake Corvette, located in the south-central part of the study area. The main visible features include the large lake, a few wooded islands, and coniferous forest cover of varying density surrounding the lake. – Landscape unit LA-02, located in the northeast of the study area, covers the southern portion of the LG-4 reservoir. Its main visible features include the large reservoir, wooded islands, and coniferous forest cover of varying density along the shoreline.
Traffic routes and transportation corridors	– LA-01: No transportation routes or energy transmission corridors. – LA-02: The Trans-Taiga Road and an energy transmission corridor run along part of the southern boundary of the unit. A few access roads associated with Hydro-Québec facilities are also present along the western boundary.
Land use elements	– LA-01: Lake Corvette, a vacation lease, and traplines also used for hunting and fishing activities. – LA-02: The LG-4 reservoir (whose infrastructure is not accessible to the public) and traplines also used for hunting and fishing activities.
Special landscape features	– – LA-01: Lake Corvette, natural landscape. – – LA-02: LG-4 reservoir, altered natural landscape.
Relief	– LA-01: The flat surface of Lake Corvette contrasts with the surrounding terrain. – LA-02: The flat surface of the LG-4 reservoir contrasts with the surrounding relief.

Components	Description
Hydrography	– In addition to Lake Corvette, unit LA-01 includes watercourses and wetlands along the lakeshore. – In addition to the LG-4 reservoir, which dominates unit LA-02, small lakes and watercourses are present along its shores.
Vegetation	– LA-01: Coniferous forest is present in the eastern part of the unit, while regenerating conifer stands occupy the western part. – LA-02: Coniferous forest cover is present along the shoreline and on the few islands within the unit.
Spatial organization	– LA-01: The unit is structured around Lake Corvette, a large central feature that contrasts with the surrounding terrain and forest cover. A vacation lease is located on the western shore of the lake. – LA-02: The unit is organized around the southern portion of the LG-4 reservoir and its intersecting islands. The presence of a dike, the main dam, the LG-4 generating station, and associated buildings also marks the western end of the unit.
Observers	– LA-01: – Occupants of the vacation lease (temporary fixed observers) – Community members engaged in traditional activities (mobile or temporary fixed observers) – Helicopter or airplane passengers and boaters (mobile observers) – LA-02: – Community members engaged in traditional activities and workers at the LG-4 facilities (mobile or temporary fixed observers) – Road users, helicopter or airplane passengers, and boaters (mobile observers)
Field of view	– LA-01 and LA-02: The field of view is generally open when a large body of water is present in the foreground.
Pictorial qualities and visual perspectives	– LA-01: The visual quality of this unit is based on its natural character and the contrast between Lake Corvette and the surrounding wooded hills. The lake provides long, open sightlines. – LA-02: The visual quality is based on the contrast between the reservoir, wooded islands, and surrounding hills. The presence of Hydro-Québec's LG-4 facilities alters the natural landscape at the western edge of the unit. The reservoir provides long, open sightlines.

Landscape unit LA-01 has high sensitivity, due to its natural character and the presence of Lake Corvette, which is highly valued by the Cree communities of Eeyou Istchee. Visual accessibility is high because of the lake. The proposed mining site will be invisible or barely visible from this unit.

Landscape unit LA-02 has low sensitivity, due to its mixed character—both anthropogenic (Hydro-Québec facilities) and natural (LG-4 reservoir and forest cover). While the Cree communities of Eeyou Istchee place high value on natural environments, they place less value on Hydro-Québec facilities. Visual accessibility is high due to the dominance of the reservoir within the unit.

7 Identification of issues

7.1 Issues identified by the regulators during consultations

The Impact Assessment Agency of Canada (IAAC) held a public consultation on the project description summary from February 19 to March 16, 2025. A summary of the questions received was sent to the proponent (Summary of Issues: https://iaac-aeic.gc.ca/050/evaluations/document/161673). These concerned the potential effects of the project on:

- the physical, psychological, and social health and safety of Indigenous Peoples;
- navigation;
- the use of land and resources for traditional purposes by Indigenous Peoples;
- the release of contaminants into the environment (groundwater and surface water, air, soil, traditional food);
- the natural and cultural heritage of Indigenous Peoples;
- road safety;
- hydrology and hydrogeology;
- fish and fish habitat;
- species that are culturally significant to Indigenous Peoples, including boreal caribou, migratory caribou, lake sturgeon, moose, bear, beaver, and Canada goose.

In addition, the following valued components are included in the federal government guidelines sent to the proponent:

- migratory birds;
- job creation and economic partnerships;
- clean energy transition.

On October 22 and 23, 2025, IAAC held a consultation in the community of Chisasibi, and a summary of concerns heard to date were shared with participants, including:

- water quality;
- air quality;
- food security;
- women's safety;
- community health and well-being;
- cumulative impacts.

The guidelines, stakeholder questions, and the list of concerns presented by IAAC were taken into consideration in the process of identifying issues. With regard to COMEX, the consultation process will begin once the impact assessment has been reviewed and deemed complete.

7.2 Issues raised during information sessions and consultations

Recognizing the importance of involving Indigenous groups, local communities and regulators, interest groups, and land users in the design, planning, and development of the Project, PMET organized information sessions beginning in 2022, which intensified throughout 2023, 2024, and 2025.

As part of these efforts, the complete list of issues raised was presented to several key bodies. It was discussed with the MELCCFP during a meeting held at their offices on July 18, 2025, and then shared with IAAC and CNG during a joint meeting on September 29, 2025. This same list was also presented to the tallyman and his family (CH39 trapline) , as well as to the public, during an information session held in the community of Chisasibi on October 22 and 23, 2025, organized by IAAC.

Various communication channels have been used since 2022 to establish and maintain dialogue with the regulators, stakeholders, and Indigenous groups.

The concerns identified during the various engagement activities are detailed in Chapter 3 (sections 3.3.4 and 3.4.3). These concerns have been taken into account in the project planning, and PMET will continue to consider them in the further design and development of its project.

7.3 Issues selected

An issue is defined as a major concern for the government, the scientific community, or the public, including affected Indigenous communities, the assessment of which could influence the government’s decision to approve or reject the project. Valued ecosystem components (VECs) can be defined as all significant elements and relevant components of the natural and social environments that are likely to be affected by project activities.

Table 7-1 presents the seven issues selected and the VECs selected or not selected for the impact assessment. The reasons for selecting these issues and VECs are explained in the table, and the sections of the EIA report where they are addressed are also indicated. It should be noted that the issues are numbered arbitrarily, not in order of priority.

Furthermore, although some VECs may be included under more than one issue, they are only addressed under one issue to avoid redundancy.

Table 7-1 List of issues arising from the project and associated valued ecosystem components, selected or not selected for the impact assessment

Issues		Valued ecosystem components		Justification/comments	Reference
Name of the issue	**Selected for the impact assessment (Y/N)**	**Component name**	**Selected for the impact assessment (Y/N)**		
Preservation of aquatic habitat quality	Y (Issue No. 1)	Hydrodynamic and hydro-sedimentary conditions	Y	The project will result in a change in flow patterns due to the construction of dikes, the partial draining of Lake L01, and the development of a diversion channel. The project could lead to potential changes in flow rates and sediment dynamics in the watercourse receiving the industrial effluent.	Appendix 6-6
		Surface water quality	Y	Maintaining surface water quality is a major concern for several stakeholders. The project could lead to a change in the quality of surface water downstream from the industrial effluent discharge point, which will contain surface water from the waste rock stockpiles.	Appendices 5-10 and 6-7
		Sediment quality	N	The anticipated concentrations of contaminants in industrial effluent water, which will comply with the requirements of Directive 019, are considered too low to have a long-term effect on sediments.	Appendices 5-10 and 6-7
		Fish and habitat	Y	Losses of local fish habitat cannot be avoided in the development of the project's infrastructure, but regional improvements are planned through various habitat compensation projects identified by stakeholders.	Appendices 6-16 and 6-17
Preservation of soil and groundwater quality	Y (Issue No. 2)	Soil quality	Y	The project involves soil disturbance and temporary loss of fertile soil. Furthermore, the storage of fuels on site poses a risk of soil contamination in the event of an accidental spill.	Appendices 6-4 and 6-5
		Groundwater quality	Y	Since the project involves deep excavation work, the industrial zone could potentially come into contact with groundwater. The accumulation of mine waste poses a risk of leaching at one of the waste rock and tailings stockpiles (stockpile no. 2).	Appendices 6-10 to 6-12
Preservation of wetlands and habitats of interest to terrestrial fauna and flora	Y (Issue No. 3)	Wetlands and water environments	Y	Losses of local wetlands and water bodies cannot be avoided in the development of infrastructure, but regional improvements are planned through various compensation projects identified by stakeholders.	Appendices 6-13 and 6-14
		Wildlife species of special status	Y	The project could impact the habitats of bird, bat, and small mammal species with special status that have been observed at the project site. The woodland caribou, although present regionally, will not be significantly affected by the project since the project site does not provide quality habitat for this species.	Appendices 6-19, 6-20, 6-21, 6-22 and 6-23
		Plant species of special status	N	Searches on the CDPNQ (Quebec Natural Heritage Data Centre) databases showed no occurrences of plants with special status within a 15 km radius of the project site. Furthermore, out of a list of 95 status species present in the Nord-du-Québec region, only ten species were likely to be present in the biophysical LSA. Specific field surveys carried out within the biophysical LSA did not identify any plant species with special status.	Appendices 6-13 and 6-14
		Invasive alien plant and wildlife species	N	Neither the research conducted using the MELCCFP's online tool for invasive alien species nor the field surveys carried out identified the presence of invasive alien plants or wildlife.	Chapter 6, section 6.3
		Terrestrial wildlife (large animals, avifauna including migratory birds)	Y	The project will have an impact on terrestrial wildlife as it will result in habitat loss, cause disturbances (noise, dust, light), and increase the risk of collisions on the various roads used by haul trucks and transport trucks.	Appendices 6-19, 6-20, 6-21, 6-22 and 6-23
		Forest cover	Y	The project will have an impact on forest cover as the development footprint must be cleared. This forest cover consists mainly of conifers and regenerating forests with low density.	Appendices 6-13 and 6-14

Issues		Valued ecosystem components		Justification/comments	Reference
Name of the issue	**Selected for the impact assessment (Y/N)**	**Component name**	**Selected for the impact assessment (Y/N)**		
Preserving the quality of life of the local population	Y (Issue No. 4)	Air quality	Y	Potential project impacts on air quality are assessed during the operations phases of the project. Dust and exhaust fumes from mining machinery and trucks, in particular, could affect air quality on a local scale.	Appendix 6-1
		Sound environment and vibrations	N	The project will not have a significant impact on the sound environment as the mining site will be located far from sensitive receptors. The sectoral report in Appendix 6-2 presents the modelling results for the projected conditions. However, it should be noted that the sound environment will be taken into account in the analysis of the Terrestrial wildlife VEC as a nuisance that may affect terrestrial wildlife.	Appendix 6-2
		Ambient light	N	The project will not have a significant impact on ambient light as the mining site will be located far from sensitive receptors. The sectoral report in Appendix 6-3 presents the modelling results for the projected conditions. However, it should be noted that ambient light will be taken into account in the analysis of the Terrestrial wildlife VEC as a nuisance that may affect terrestrial wildlife.	Appendix 6-3
		Landscape	N	The project will not have a significant impact on the landscape as the mining site will be located far from sensitive receptors. The sectoral report in Appendix 6-28 presents the landscape assessment. However, it should be noted that landscape will be taken into account in the analysis of the Well-being on the land VEC as an element that may affect the overall perception of well-being.	Appendix 6-28
Preservation of the health, safety, and socioeconomic conditions of the regional population (Health, social, and economic conditions of Indigenous Peoples)	Y (Issue No. 5)	Physical, psychological, and social health	Y	A potential impact on the social climate in the community can be anticipated given the tensions caused by the construction of the LG-4 hydroelectric power plant, which could be reignited by this new development project. The arrival of a large number of workers raises certain concerns about the negative impact this could have on certain social issues (e.g., drugs, prostitution, violence). In addition, the influx of workers could, to some extent, increase pressure on certain public services. However, these impacts will be limited by the relative remoteness of the camp from local communities in the region. Furthermore, since workers would be housed in a camp set up on the mining site, the project will not result in increased pressure on housing. The health of project workers is also a concern (exposure to contaminants, dust, drug and alcohol use, lifestyle habits, impact of commuting on families), and more specifically for the Cree (cultural safety, racism, impact on families, lifestyle habits).	Appendix 6-24
		Economic benefits (job creation, economic partnerships)	Y	The project will bring employment and business opportunities to communities in the region.	Appendix 5-13
		Road safety	Y	The increase in heavy traffic on the road network surrounding the project (Billy-Diamond Highway, Trans-Taiga Road, access road to the mining site) during the project's construction phase (transport of materials) and operations phase (ore transport by trucks) will be accompanied by an increase in road safety risks.	Appendix 6-25
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)	Y (Issue No. 6)	Hunting and trapping of terrestrial wildlife and waterfowl	Y	The project offers the potential to improve access to hunting and trapping grounds. This could be accompanied by increased pressure on wildlife resources. Furthermore, changes in ambient sound and light around the project site could drive game species away from areas they traditionally frequent. Lastly, some concerns raised by land users regarding the project involve the risk of contaminants accumulating in the flesh of the animals they consume.	Appendices 6-2 and 6-3
		Harvesting of valued plant species	Y	Some concerns expressed by land users about the project involve the risk of contaminant accumulation in plants they consume (e.g., blueberries, Labrador tea).	Appendix 6-15
		Fishing	Y	The body of water downstream from the effluent is used for fishing. Lastly, some concerns raised by land users about the project involve the risk of contaminants accumulating in fish flesh.	Appendix 6-18

Issues		Valued ecosystem components		Justification/comments	Reference
Name of the issue	**Selected for the impact assessment (Y/N)**	**Component name**	**Selected for the impact assessment (Y/N)**		
		Well-being on the land	Y	General concerns were raised about the deterioration of environmental quality and cumulative impacts on the land, which are likely to influence the continuation of the Cree way of life. In fact, time spent on the land is associated with various aspects of Cree culture and well-being, such as the transmission of Cree values and language, mental health and healing, memory, etc.	Chapter 6, sections 6.4.3 and 6.4.4
		Navigation	N	The watercourses and water bodies on the project site are not navigable waterways of interest to local communities, which do not engage in fishing activities on those directly impacted by the project (L01, L05, CE8, L07, CE11, L10, and CE15). Fishing sometimes takes place on Lake L27, but this will not affect its navigability.	Chapter 6, sections 6.4.3 and 6.4.4
		Archaeological remains, natural and cultural heritage	N	The project involves soil disturbance that could potentially damage archaeological remains that are as yet unknown. An archaeological survey and an archaeological potential study were therefore carried out to minimize this risk. They revealed the existence of several sites with archaeological potential in the project area, and four of the areas surveyed yielded remains of archaeological interest. However, none of the four areas will be affected by the facilities and works planned for the project. However, it should be noted that a procedure for chance discoveries will be put in place before work begins.	Appendices 6-26 et 6-27
Consideration of climate change	Y (Issue No. 7)	Adapting infrastructure to climate change	N	An assessment of climate change resilience is planned as part of the project. Throughout the entire useful life of the project, PMET would like to ensure the resilience of all its components and the receiving environment. Therefore, this component will be the subject of a separate section in the impact assessment (Chapter 11). Measures to adapt to climate change will be proposed based on the identified climate hazards and the risks they pose. Adaptation to climate change is therefore considered a project issue at the design stage, but not in the context of the impact assessment.	Appendix 11-1
		Climate change mitigation (GHG emissions) (Energy transition)	Y	Construction, operations, and closure activities will involve machinery traffic and equipment use powered by fossil fuels. These will generate GHG emissions.	Appendix 5-12