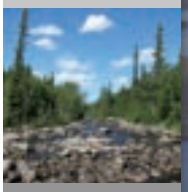
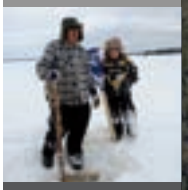
STATUS REPORT

Parc national *Assinica* project

Eenou Culture in all its Natural Beauty





Québec

STATUS REPORT

Parc national *Assinica* project

Eenou Culture in all its Natural Beauty

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FOREWORD

In 1977, the Gouvernement du Québec enacted the *Parks Act* (CQLR chapitre P-9). The primary purpose of this act was to ensure the conservation and permanent protection of areas representative of the natural regions of Québec and of natural sites with outstanding features. The Québec national parks network currently includes 26 parks. It also includes one marine park created jointly with the federal government (Map 1).

The Parc national Assinica project has its origins in the *Agreement Concerning a New Relationship between le Gouvernement du Québec and the Crees of Québec*, known as the *"Paix des Braves"*, signed February 7, 2002. In Schedule G of the Agreement, the Gouvernement du Québec undertook "to enter discussions with" the Cree Nation "of Oujé-Bougoumou with the objective of transforming the Assinica Wildlife Sanctuary to an Assinica Cree Heritage Land, in the context of the Québec park network." In 2004, the Oujé-Bougoumou Cree community presented a park concept for "the ancestral lands of the Assinica Cree." On November 7, 2011, the Gouvernement du Québec reached an agreement[1] with the Cree Nation formalizing the creation of a new 3193-km² protected area – the Assinica national park reserve. In addition to preserving sites of natural and cultural interest for the Crees, the creation of Parc national Assinica will contribute to the social and economic development of the Oujé-Bougoumou Cree community, promote tourism and help its young people envisage new opportunities for the future.

This document presents the current state of knowledge of the territory being studied for the Parc national Assinica project. It reviews the regional, human, economic, physical, biological and cultural characteristics of the area. It provides the basic information needed to produce the *Provisory Master Plan*, which will propose a zoning plan and a development concept to guide the management, protection and development of the planned park. Once the park has been created, this document can also serve as a reference for conservation and for developing education programs and park facilities.

1 The Final *Settlement Agreement Related to Certain Issues Referred to in Schedule G of the Agreement Concerning a New Relationship between le Gouvernement du Québec and the Crees of Québec* primarily regularizes the situation of the Oujé-Bougoumou community and its integration into the *James Bay and Northern Quebec Agreement* in order to treat it like the other Cree communities, but it also addresses other commitments under previous agreements that had not been fully implemented.

SUMMARY

The Parc national Assinica project has its origins in the "Paix des Braves", signed in 2002. Like all national parks, its primary purpose is to ensure the conservation and permanent protection of areas representative of the natural regions of Québec and of natural sites with outstanding features. In addition to preserving sites of natural and cultural interest for the Crees, the creation of Parc national Assinica will contribute to the social and economic development of the Oujé-Bougoumou Cree community, promote tourism in the region and help its young people envisage new opportunities for the future.

This document presents the current state of knowledge of the territory being studied for the Parc national Assinica project. It provides the basic information needed to produce the Provisory Master Plan, which will propose a zoning plan and a development concept. It is useful during the public consultation to inform on the interests of this territory. Once the park is created, this document can also serve as a reference for conservation and for developing education programs and park facilities.

The area is located north of the 50th parallel, in the Nord-du-Québec administrative region, in the James Bay territory. It is entirely located on the territory governed by the James Bay and Northern Québec Agreement (JBNQA). It also consists of Category II and Category III lands. The towns or villages closest to the area main entrance are Chapais, Chibougamau and Oujé-Bougoumou.

The area is located primarily in the Rupert Plateau natural region. A small portion in its northwest section is located in the James Bay Lowlands natural region.

The area is subject to a subpolar and subhumid continental climate and an average growing season. Summers are short and relatively cool. Winters are cold and long.

The study area is located in the Superior geological province, on the Canadian Shield, which are among the oldest geological formations on Earth. Intrusive rocks compose most of the area, except for two wide belts of volcanic and sedimentary rocks that cross the study area from west to east. These belts are known for their precious metal deposits (including copper, gold and silver).

Glaciers have marked the surface deposits by leaving landforms of narrow and elongated shapes, in the orientation of the glaciers meltdown. The landscapes feature low-elevation landforms, with wetlands in the south and the north, great lakes in the middle and a long sinuous river that runs from the west and up to the north. The summits are often rocky, the highest being at 622 meters elevation. The main landforms include dead-ice moraines, drumlinoids, crag and tail, eskers and dykes. Subaerial delta has been observed and is unusual.

The area includes three drainage basins: the Broadback, Nottaway and Rupert rivers.

The study area is representative of the spruce-moss forest bioclimatic sub-domain. Black spruce is the most frequent specie, jack pines come second and firs are rarer. Paper birch and aspen are sometimes seen alongside. Forest fires are frequent. Bogs are the most common type of wetlands and are mostly composed of sphagnum, heath, sedge and sometimes black spruce.

Two vascular plants likely to be designated threatened or vulnerable were inventoried in the study area: sand heather and dragon's mouth. The carpet-like flapwort, the delicate notchwort, the rounded rustwort and the two-lobed flapwort are also present and are on the list of bryophytes likely to be designated threatened or vulnerable in Québec.

The many lakes and rivers, the boreal forest and the wetlands give rise to a large diversity of habitats and fauna, characteristic of the boreal zone. These include the bald eagle and the woodland caribou, two species designated vulnerable in Québec, as well as the lake sturgeon, the common nighthawk, the olive-sided flycatcher and the rusty blackbird, which are on the list of species likely to be designated endangered or vulnerable in Québec.

For more than 5 000 years, humans have visited the region. The permanent settlement of the James Bay region began about 3,500 years ago. The 41 archaeological sites inventoried in the area testify this prehistoric and historic heritage. Crees still live on the territory and keep their traditions alive. The James-Bay and Northern Québec Agreement establishes rules related to hunting, fishing and trapping for beneficiaries and non beneficiaries. Once the park is created, beneficiaries' rights and advantages will still apply according to the JBNQA. The study area includes 28 traplines: 9 from Waswanipi, 8 from Mistissini, 7 from Ouje-Bougoumou and 4 from Nemaska.

The first logging took place in the early 1980s. Since 2011, the territory covered by the Assinica national park reserve is no longer subject to forestry operations. Logging may however take place

in the study area. Since 2007, most of the study area has been subject to exploration prohibitions and a suspension of issuing mineral titles. Before that date, 38 surface mineral leases were issued for sand and gravel exploitation. Also, mining exploration showed a strong potential in gold, silver, zinc, copper and for architectural stone.

The study area and Assinica national park reserve overlap with part of the Assinica Wildlife Sanctuary. Hence, the creation of Parc national Assinica will result in modifications to the boundaries of the wildlife sanctuary. Two outfitters offer lodging and services in the park reserve: Broadback Fishing Camp and Americree Outfitter (Bushland Adventure). The area of operation of the non-exclusive outfitter Pavillon Square Tail Lodge coincides in part with the study area. Moreover, two vacation leases and six leases for the construction of rough shelter have been granted along the Rivière Broadback. In addition, the Cree have built encampments in a number of locations in the study area.

Hydro-Québec operates five power transmission lines that cross the study area. These five lines are excluded from the park reserve and will be excluded from Parc national Assinica upon its creation. Hydro-Québec also holds land rights for the use of two telecommunications towers within the study area.

The Istchee Baie-James Regional Government holds a lease for municipal purposes for the Cheniapiscau rest area on Route du Nord. And lastly, the Centre d'expertise hydrique du Québec holds a permit for a hydrometric station on the Rivière Broadback.

The status report shows the interest for conservation of this territory. Its large lakes, the Rivière Broadback, the extensive boreal forests and numerous wetlands offer a wide range of habitats for plants and animals, some of them being listed for their precarious status. The living cree culture will give a unique attractiveness to the national park project.

Â TIPÂTUTÂCH

An kâ nâkitiwâyihtâkuhch Assinica aschî, âkut-h wâhchipiyich an kâ misinihûsunâniwich “Paix des Braves” niskumuwin, 2002 kâ ispiyich. Muyâm anihî kutikh aschîh kâ nâkitiwâyitâkuhch-h, âukw wâhchi chî ushihtâkiniwich châ châshtinâtâyâyihtâkuhch chihchiwâ châ nâkitiwâyihtâkuhch aschî nâshch â chîhkâyâyihtâkuhch utâh Quebec aschîhch. An châ ishi nâkitiwâyihtâkuhch aschî kiyâh châ chî chishtâyihtâkiniwiyich îyiyiuch/înûch utiyihtuwiniwâu, âukw kiyâh châ ishi wîchihîwâpiyich û kâ nâkitiwâyihtâkuhch Assinica aschî anit-h châ chî uhchi ushihtâkiniwich âpitisîwin Oujé-Bougoumou ihtâwinihch, â nîshtâmishtâkiniwich nûchimânitâu âpitisîwin anit-h aschîhch kiyâh châ wîchihîkuhch uschinîchiuch châ wâpihtihch â ushkâyich châykwâyiu châ ishi âpihîpiyiyich anitâh ishi nîshtâmihch.

Û misinihîkin, âkut-h mâsinâtâch mâkwâch â ishi chischâyihtâkuhch an â ishi nitûchischâyihtâkiniwich â nâkitiwâyihtâkuhch Assinica aschî. Âkut-h mâsinâtâch chischâyihtimuwin â nitiwâyihtâkuhch châ chî ushihtâkiniwich â uwâyâpihtâkiniwich châ ishi chischiniwâpihtâkiniwich, kiyâh âkut-h châ wîshtâch tân châ itisinihîkiniwich aschî kiyâh â mâmitunâyihtâkiniwich châ ushihtâkiniwich châkwân. Miywâpitin mâkwâch â nitûchischâyihtâkiniwich â itâyihtimihîwâch châkwân âkw mâk châ chî chischâyihtimûhîwâniwich an â wîh ihtûtâkiniwich û aschî. Mishû ushihtâkiniwichâ û â nâkitiwâyihtâkuhch aschî, chiki wîchihîwâpiyiu û misinihîkin châ uhchi nûsunihîkiniwich â miyukiniwâyihtâkiniwich châkwân aschîhch kiyâh châ chî ushihtâkiniwich châkwân châ uhchi chiskutimâsunâniwich kiyâh châ wîkâpuwihtâkiniwich châkwân anit-h kâ nâkitiwâyihtâkuhch aschî.

Û aschî atimâpîsimw ihtikun uhchi an 50 kâ itisinâtâch kâ pimâpâkishtâch aschîusinihîkinihch, atimâpîsimw Québec â uhchi nânâkichihtâkiniwich châkwân â pimipiyihtâkiniwich, anitâh James Bay aschîhch. Nâshtîch misiwâ ihtikun anit-h an aschî â uhchi tipâyihtâkuhch James Bay kiyâh chîwâtin Québec niskumuwinihch (JBNQA). Âukw an nîshu kiyâh nishtu â itisinâtâch-h aschîh. Anihî ihtâwinh mâuch piyâshunâkuhch-h, âukunh Chapais, Chibougamau kiyâh Oujé-Bougoumou.

Û aschî, âukw usâ anitâh â ihtikuhch Rupert Plateau aschîhch. Pishch in aschî anitâh pâshtâchîwâtinihch, âkutâh â ihtikuhch James Bay Lowlands aschîhch.

Û aschî, âukw tâhkâyâch kiyâh âkâ nâshch chimuhch kiyâh kîpwâ â ishinâkuhch châ chî nihtâuchihch châkwân. Tihkwâu kiyâh nimuyi nâshch chishitâu â nîpihch. Tihkâyâu kiyâh nâush pipun.

Anit-h kâ nitûchischâyihtâkiniwich, âkut-h anit-h Superior â ishi nitûchischâyitâkusit asinî aschîhch, anit-h Canadian Shield kâ ishinihkâtâch â pâpâchipiskâch, âukw û mâuch wâshkich asinî â ihtât misihtâskimich aschîhch. Usâ pâpâchipiskâu, kiyâh âukw nîshuyich â pimâpâkipit asinî â chî mûschikisut kiyâh â pâhpîhtiwisît uhchi anitâh achishtû ishi anitâh wâpinûtâhch. Û nîshuyich â pimâpâkipit asinî, âkut-h châschâyihtâkuhch â ihtikuhch â chîhkâyâyihtâkuhch piywâpiskw (chich kâ usâwâpiskâch piywâpiskw, shûyânâpiskw kiyâh kâ wâpâpiskâch shûyânâpiskw).

Âukw â nûkuhch â chî ihtât kâchichâsikw uhchi â itâmiskâch aschî an â ati shâkiwâch-h kiyâh â chinwâch-h â ushâyâpiskâch, âukw âkw an anitâh kâ ati ispiyit kâchichâsikw kâ ati tihchisit. Nimuyi nâshch ishpitinâu, kiyâh âukw â ati mischâkiwich anitâh pîsimwâhtâhch kiyâh atimâpîsimw, kiyâh â mimishikimâch-h sâkihîkinh tâuskimich kiyâh â chinwâshtikwâyâch-h sîpîh â uhtâchiwich-h achishtû kiyâh atimâpîsimw. Pâpâchipiskâu anitâh tikuhtâmitiniu, 622 tipâpâskunikin mâuch â ishpitinâch. Âukw â ishinâkuhch aschî â wâyâmiskâch, â ushâyâch, kiyâh â ushâyâuhkâch. Âukw kiyâh kâ wâpihtâkiniwich â iyichishtiwishtikwâch sîpî kiyâh âukw û nimi nâshch ishinâkun.

Nishtinh sîpîh â pimâchiwich-h: Iyichipiskunâu Sîpî, Nâtuweu Sîpî kiyâh Wâskâhîkanishîu Sîpî.

Û kâ ishi nitûchischâyihtâkiniwich aschî, âukw nâhtâuchich îyiyâtikuch kiyâh wâpiskimikw. Âukw usâ â nihtâuchit îyiyâhtikw, châk mîn uschisk kiyâh mîn îyâsht. Âukw tâpishkun wiyâpimâkiniwich â nihtâuchich wishkui kiyâh mîtus. Âskû ihtikun mûshtâu, an â wîhtâch â mishtikuskâch. Âukw kiyâh â mischâkiwich kiyâh âkut-h nâhtâuchihch awâshish ashchîsh, uschischipikw, mishkushiuh kiyâh niyânikutunh îyiyâhtikw.

Nîshu nihtâuchihchikinh kwâshwân chiki itichihtikiniwiuh â kuspinâtâyihtâkuhch-h châ chî mâhchihuch-h chî wâpihtâkiniwiuh ut-h aschîhch: yâkâhch kâ nihtâuchihch heather kâ ishinihkâtâch nihtâuchihchikin kiyâh dragon’s mouth kâ ishinihkâtâch nîpîsh. An muyâm kâ itâkishtâch kâ ishinâkuhch nihtâuchihchikin flapwort kâ ishinihkâtâch, kiyâh an kâ shâuhch notchwort kâ ishinihkâtâch, kiyâh an kâ nûtimâch nihtâuchichikin rustwort kâ ishinihkâtâch kiyâh an îtû kâ iyichishtiwinihtâuchihch nihtâuchihchikin flapwort kâ ishinihkâtâch, âukunh â ihtikuhch-h nihtâuchihchikinh kiyâh

kwâshwân châk châ itichihtikiniwich-h â kuspinâtâyihtâkuhch châ chî mâhchihuch-h utâh Québec aschîhch.

Mihchânh sâkihîkinh kiyâh sîpîh, âukw kiyâh â mishtikuskâch kiyâh â mischâkiwich kiyâh âkut-h ninâhkû nâhtâuchihch châkwân kiyâh ninâhkû â isinâkusich auhkânich ut-h â mishtikuskâch aschî. Âukw pikunichâ â ihtât michisiu, pikuchiskimich atihkw, nîshu auhkânich â kuspinâtâyihtâkusich châ ati mâhchihuch utâh Québec aschîhch, kiyâh âukw â ihtât nimâu, pîshkw, akumishîsh kiyâh chihchikiyiu, âukunich uchî auhkânich kwâshwân châk châ itichimâkiniwich â kuspinâtâyihtâkusich châ chî mâhchihuch utâh Quebec aschîhch.

Shâsh wishtâh 5 000 tihtu pipunh chî pâchi ihtâuch awânichî ut-h aschîhch. 3,500 tihtu pipunh ishi utâhch ushkich chihchiwâ chî wîchiuch awânichî utâh James Bay aschîhch. 41 ihtinh anit-h â chî nûchihtikuhpâniwich kiyâh âkut-h chiyâshtinâtâyâyihtâkuhch wâshkich â chî ihtâniwikupinâ. Âshkw wîchiuch îyiyiuch/înûch ut-h aschîhch kiyâh âshkw kiniwâyihtimuch utiyihtuwiniwâuh. An James-Bay kiyâh chîwâtin Quebec niskumuwin uhchi wîshutâu châ ishinâkuhch â nitûhûnâniwich, â nûtimâsâniwich kiyâh â winihîchâniwich uhchi anichî â astisinâsuch kiyâh âkâ astisinâsuch niskumuwinihch. Mishû ushihtâkiniwichâ û kâ nâkitiwâyihtâkuhch aschî, âshkw ayâpich chiki nânâkichihtâkiniwiyiuh ukischihuwiniwâuh anichî kâ astisinâsuch JBNQA niskumuwinihch. An aschî kâ nitûchischâyihtâkiniwich, âukw 28 â ihtich-h nitûhûschîh: 9 uhchi Waswanipi, 8 uhchi Mistissini, 7 uhchi Ouje-Bougoumou kiyâh 4 uhchi Nemaska.

Wîpich 1980s kâ ispiyich ushkich chî nûtâhtikwâniwiu. Ispin 2011 kâ ispiyich, an â akunihîchâpiyich kâ nâkitiwâyihtâkuhch Assinica aschî, nimuyi shâsh chiki chî pimipiyihtâkiniwiu nûtâhtikwâu âpitisîwin. Mikw mâk kîpwâ châ chî nûtâhtikwâniwich anit-h an aschî kâ nitûchischâyihtâkiniwich. Ispin 2007 ispiyich, an aschî kâ nitûchischâyihtâkiniwich, âkut-h usâ kâ nikâhîkiniwich châ chî nânitiwâyichichâniwich châkw asinî â ihtât kiyâh â chipihîkiniwich â miyiwâniwich-h misinihîkinh châ chî nûtisinâniwich. Âhmwâya mâk an, 38 misinihîkinh chî miyiwâniwiuh ustiskimich châ chî nûtisinâniwich uhchi an yâkâu kiyâh asinâmiskw châ chî utinikiniwich. An mâk â nânitiwâyihchichâniwich châkw asinî â ihtât, âukw kâ nûkuhch kwâshwân â ihtikuhch shûyânâpiskw, kâ wâpâpiskâch shûyânâpiskw, piywâpiskw, kâ usâwâpsikâch piywâpiskw kiyâh asinî â iyâpichihâkiniwich â ushihtâkiniwich châkwân.

An kâ nitûchischâyhtâkiniwich aschî kiyâh an kâ nâkitiwâyihtâkuhch Assinica aschî, pishch anitâh ishi iyâniskiwâkishtâu Assinica â uhchi nâkitiwâyihtâkusich auhkânich. Mishû mâk ushihtâkiniwichâ kâ nâkitiwâyihtâkuhch Assinica aschî, âukw châ ishi âhchihtâkiniwich anit-h îskw yâyi â uhchi nâkitiwâyihtâkusich auhkânich. Nîshu nitûhûkimikwh pimipiyihtâkiniwiuh anit-h kâ nâkitiwâyihtâkuhch aschî: Broadback Fishing Camp uchikwâchichâukimikw kiyâh Americree Outfitter nitûhûkimikw (Bushland Adventure). Anit-h aschîyiu â uhchi pimiyihtâch Pavillon Square Tail Lodge unitûhûkimikuwâu, âkut-h pishch â âkunihîchâpiyiych aschîyiu kâ nitûchischâyihtâkiniwiyich. Nîshu kiyâh îwâshîukimikwh chî pichistishuwâtikiniwiuh châ chî ushihtâkiniwich-h kiyâh kutwâshch wâskâhîkinish-h chiki chî ushihtâkiniwiuh yâyishtikw lyichipiskunâu Sîpîhch. Tihtu kiyâh chî ushihtâuch îyiyiuch/înûch nitûhûkimikush-h anit-h aschîyiu kâ nitûchischâyihtâkiniwiyich.

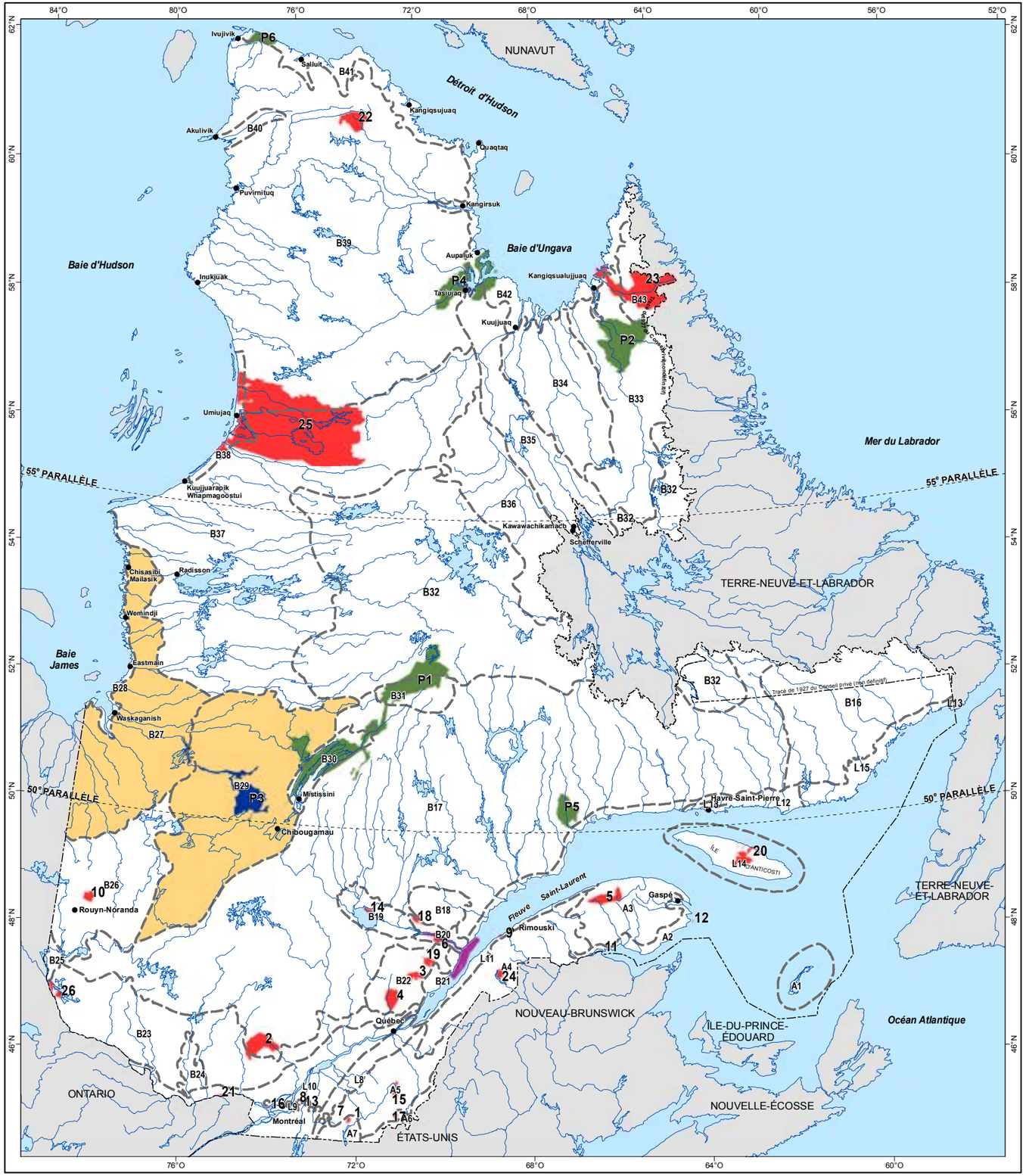
Hydro-Québec pimipiyihtâu niyâyu nimischîushkutâwâyâpîh anit-h an aschî kâ nitûchischâyihtâkiniwich. Uhî niyâyu kâ pimâpâkimuch-h nimischîushkutâwâyâpîh, nimuyi ashchipiyiuh anit-h kâ nâkitiwâyihtâkuhch aschî kiyâh nimuyi chiki ashchipiyihtâkiniwiuh mishû ushihtâkiniwichâ an kâ nâkitiwâyihtâkuhch Assinica aschî. Hydro-Québec nânâkichihtâu uyâh aschîh anit-h â ihtikuhch-h nîshu ayimuyâpîuwâhtikwh pîhch an kâ nitûchischâyihtâkiniwich aschî.

An Îyiyiu Aschî Baie-James tipâyihchihchâwin nânâkichihtâuch â uhchi pimipiyihtâkiniwich an Cheniapiscau â îwâshinâniwich anitâh Route du Nord mâskinâhch. Âukw kiyâh Centre d'expertise hydrique du Québec â nânâkichihtâch anit-h â uhchi nitûchischâyihtâkiniwich nipî anitâh lyichipiskunâu Sîpîhch.

An tipâchimûsinihîkin nûkun â nitiwâyihtâkiniwich châ miyukiniwâyihtâkiniwich û aschî. Anihî kâ mishikimâch-h sâkihîkinh, lyichipiskunâu Sîpî, â mishtikuskâch kiyâh â ati mischâkiwich, âkut-h ninâhkû nâhtâuchihch-h nihtâuchihchikinh kiyâh â ati ihtâch auhkânich, pishch mâk kuspinâtâyihtâkuniyiu châ mâhchihuch. An kiyâh pâmâtihch îyiyiu/înû ihtuwin, âukw châ wîchihîwâpiyich châ uhchi miyunâkuhch û â nâkitiwâyihtâkuhch aschî.

Parc national Assinica project

Map 1
Québec national parks and natural regions



NATIONAL PARK

1. MONT-ORFORD, DU
2. MONT-TREMBLANT, DU
3. GRANDS-JARDINS, DES
4. JACQUES-CARTIER, DE LA
5. GASPÉSIE, DE LA
6. FJORD-DU-SAGUENAY, DU
7. YAMASKA, DE LA
8. ÎLES-DE-BOUCHERVILLE, DES
9. BIC, DU
10. AIGUEBELLE, D'
11. MIGUASHA, DE
12. ÎLE-BONAVENTURE-ET-DU-ROCHER-PERCÉ, DE L'
13. MONT-SAINT-BRUNO, DU
14. POINTE-TAILLON, DE LA
15. FRONTENAC, DE
16. OKA, D'
17. MONT-MÉGANTIC, DU
18. MONTS-VALIN, DES
19. HAUTES-GORGES-DE-LA-RIVIÈRE-MALBAIE, DES
20. ANTICOSTI, D'
21. PLAISANCE, DE
22. PINGUALUIT, DES
23. KUURURJUAQ
24. LAC-TÉMISCOUATA
25. TURSUJUQ
26. OPÉMICAN, D'

MARINE PARK

SAGUENAY – SAINT-LAURENT, DU

NATIONAL PARK PROJECT

P1. ALBANEL-TÉMISCAMIE-OTISH
P2. ULITTANIUJALIK
P3. ASSINICA
P4. BAIE-AUX-FEUILLES, DE LA
P5. LAC-WALKER, DU
P6. CAP-WOLSTENHOLME, DU

NATURAL REGION

A1. LES ÎLES-DE-LA-MADELEINE
A2. LE VERSANT DE LA BAIE DES CHALEURS
A3. LE MASSIF GASPÉSIEN
A4. LES MONTS NOTRE-DAME
A5. LES CHAÎNONS DE L'ESTRIE, DE LA BEAUCE ET DE BELLECHASSE
A6. LES MONTAGNES FRONTALIÈRES
A7. LES MONTS SUTTON
L8. LES BASSES-TERRES APPALACHIENNES
L9. LES COLLINES MONTÉRÉGIENNES
L10. LES BASSES-TERRES DU SAINT-LAURENT
L11. LE LITTORAL SUD DE L'ESTUAIRE
L12. LA PLAINE CÔTIÈRE DE LA HAUTE-CÔTE-NORD ET DE LA MOYENNE-CÔTE-NORD
L13. LES CUESTAS DE LA CÔTE-NORD
L14. L'ÎLE D'ANTICOSTI
L15. LA CÔTE ROCHEUSE DE LA BASSE-CÔTE-NORD
B16. LE PLATEAU DU PETIT MÉCATINA
B17. LES LAURENTIDES BORÉALES
B18. LE MASSIF DU MONT VALIN
B19. LES BASSES-TERRES DU SAGUENAY–LAC-SAINT-JEAN
B20. LE FJORD DU SAGUENAY
B21. LA CÔTE DE CHARLEVOIX
B22. LE MASSIF DES LAURENTIDES DU NORD DE QUÉBEC
B23. LES LAURENTIDES MÉRIDIONALES
B24. LA VALLÉE DE LA GATINEAU
B25. LES BASSES-TERRES DU TÉMISCAMINGUE
B26. LA CEINTURE ARGILEUSE DE L'ABITIBI
B27. LES BASSES-TERRES DE LA BAIE JAMES
B28. LES ÎLES ET MARAIS DE LA BAIE JAMES
B29. LE PLATEAU DE LA RUPERT
B30. LE LAC MISTASSINI
B31. LES MONTS OTISH
B32. LE PLATEAU LACUSTRE CENTRAL
B33. LE PLATEAU DE LA GEORGE
B34. LA PLAINE DE LA RIVIÈRE À LA BALEINE
B35. LA FOSSE DU LABRADOR
B36. LE PLATEAU DE LA CANIAPISCAU
B37. LE PLATEAU HUDSONIEN
B38. LES CUESTAS HUDSONIENNES
B39. LE PLATEAU DE L'UNGAVA
B40. LES MONTS DE PUVIRNITUQ
B41. LA CÔTE À FJORDS DU DÉTROIT D'HUDSON
B42. LA CÔTE DE LA BAIE D'UNGAVA
B43. LES CONTREFORTS DES MONTS TORNGAT

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 100 200 300 400 km

1/8,000,000

Sources

Data	Organizations
Base générale et administrative du Québec (BGAQ) at the scale of 1/2,000,000	Ministère de l'Énergie et des Ressources naturelles
Natural regions	Ministère du Loisir, de la Chasse et de la Pêche, 1986

Produced by

Direction des parcs nationaux

Forêts, Faune et Parcs
Québec

1 INTRODUCTION

The Parc national Assinica project has its origins in Schedule G of the *Agreement Concerning a New Relationship between le Gouvernement du Québec and the Crees of Québec* (ANRQC or "Paix des braves"), signed February 7, 2002. As part of the implementation of the agreement, the Oujé-Bougoumou Cree community proposed to the government, in December 2004, a boundary encompassing about 6,600 km² for the Parc national Assinica project. This area included the majority of the Assinica Wildlife Sanctuary, an area to the south of the sanctuary and a corridor along the Rivière Broadback to the north side of Lac Evans. The Oujé-Bougoumou Crees justified these boundaries by their interest in protecting the habitats of wildlife species important to maintaining their traditional way of life and by the presence of heritage sites and of regions part of their tourism development plan. Following discussions over the winter of 2005, several hundred square kilometres were excluded from the area due to the presence of mineral titles. Consequently, the Gouvernement du Québec established a study area for the Parc national Assinica project of 6,198 km² (Map 3), which is the subject of this Status Report.

To establish the boundaries of the planned national park, the initial proposal made by the Oujé-Bougoumou Cree was reviewed in light of conservation goals for the region and the economic and social issues related to impacts on the forestry industry. At the close of negotiations on November 7, 2011, the Gouvernement du Québec and the Cree signed the Final Settlement *Agreement Related to Certain Issues Referred to in Schedule G of the ANRQC ("Final Settlement Agreement")*, which gave 3,193 km² the status of national park reserve. The park reserve is a protected area where forestry and mining operations are prohibited. The reserve area set out in the agreement is a preliminary area being considered for a new park in Québec's national park network. Moreover, the agreement states that the new park would be operated by the Oujé-Bougoumou Cree. To this end, a delegation agreement for the management of park operations, activities and services will be entered into with the community prior to the creation of the park.

The study area is entirely in boreal forest north of the 50th parallel, about twenty kilometres northwest of the Cree village of Oujé-Bougoumou. The closest towns are Chapais (60 km away) and

Chibougamou (80 km away). The study area is located in the Nord-du-Québec administrative region. In addition to the residents of these communities, the study area is frequented by trappers from Mistissini, Waswanipi and Nemaska.

The study area is located primarily in the Rupert Plateau natural region, with a smaller portion in the James Bay Lowlands natural region (Ministère du Loisir, de la Chasse et de la Pêche, 1986, Map 1). It includes geomorphic features typical of these natural regions, such as glacial and glaciofluvial deposits, as well as exceptional features including a concentric bog and sand dunes, vestiges of proglacial lake Barlow-Ojibway. Many lakes, rivers and wetlands, including several peatlands, mark its landscape. It includes dense forest stands typical of the boreal forest, as well as exceptional features like jack pine and white spruce old growth forests, which are rare at this latitude. It is home to many plant and animal species, including two wildlife species listed as vulnerable in Québec (woodland caribou and bald eagle), as well as two vascular plants (sand heather and dragon's mouth) and four bryophytes (*Jungermannia caespiticia, Lophozia capitata, Marsupella sparsifolia and Nardia insecta*) likely to be designated endangered or vulnerable. A number of archeological sites have been identified, particularly near the major lakes and rivers, indicating a human presence that dates back millennia. The Cree continue to practice their traditional way of life in the area.

This document will first present the study area within the socio-economic context of the Nord-du-Québec region. It then describes the biophysical and human features of the area: climate, geology, geomorphology, hydrography, vegetation, wildlife, archaeology, history and human presence. The information presented is based on a literature review, government databases, discussions with resource people and data collected over several field studies conducted by the Direction des parcs nationaux of the Ministère des Forêts, de la Faune et des Parcs (MFFP).

2 REGION

2.1 LOCATION OF THE STUDY AREA

The study area for the Parc national Assinica project is located north of the 50th parallel, in the southern portion of the Nord-du-Québec administrative region (Map 2). This region covers an area of nearly 718,229 km², which represents almost 55% of Québec's land mass (Institut de la statistique du Québec, 2014). It is divided into two territories, Kativik and James Bay. It is entirely subject to the James Bay and Northern Québec Agreement (JBNQA), signed on November 11, 1975 between the governments of Québec and Canada and the Cree and Inuit.

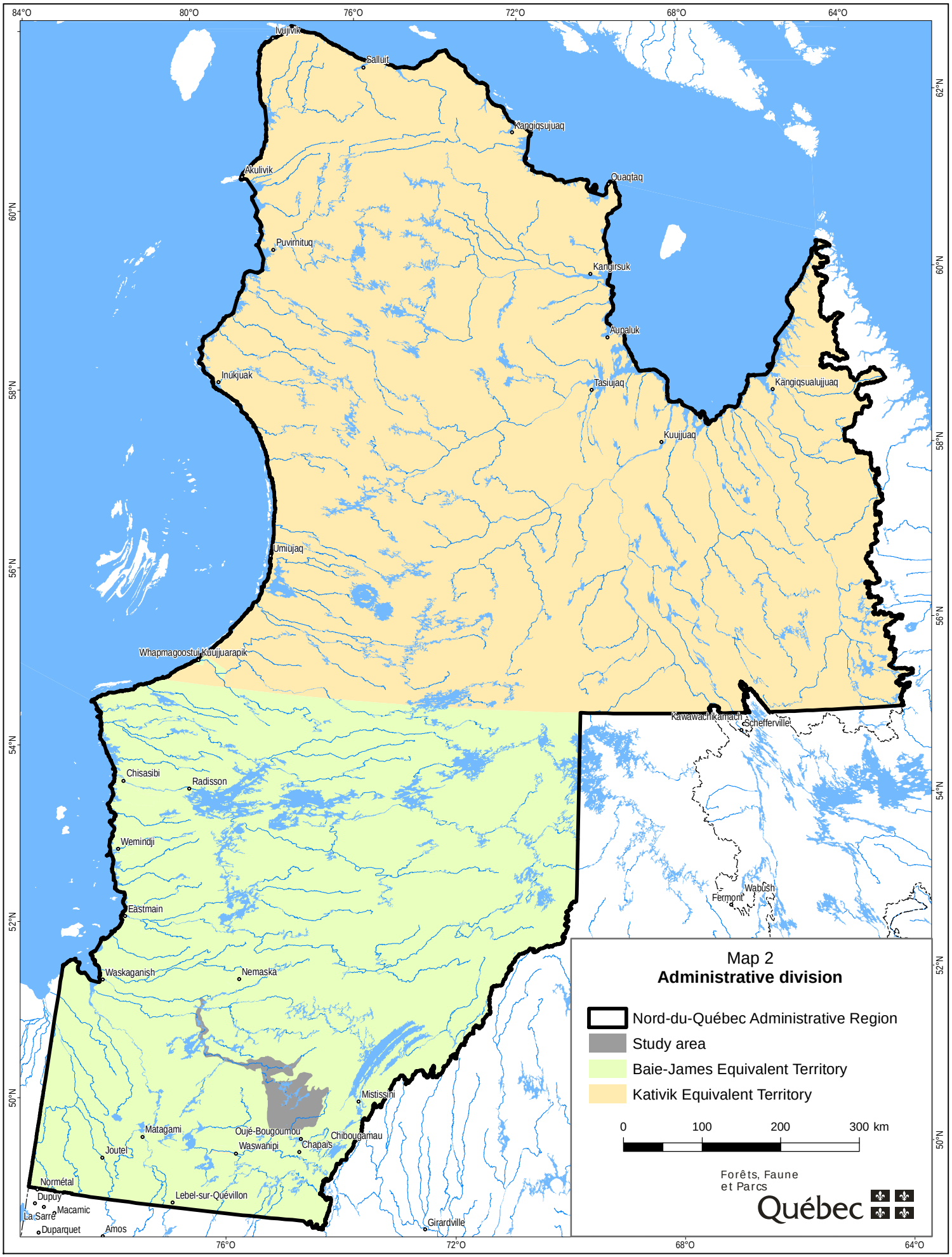
The 6,198 km² study area is located between 50°0' and 51°30' north and 74°30' and 77°0' west. It is approximately twenty kilometres northwest of the Cree village of Oujé-Bougoumou. The closest towns are Chapais (60 km away) and Chibougamou (80 km away).

The study area is irregular in shape. Two sections can be distinguished: a main section shaped somewhat like a large square and a linear section north of the first (Map 3). These two sections are linked by a short, wide corridor. The western boundary of the main section roughly follows a logging road. To the south, it follows the Rivière Chibougamau for several kilometres. It is irregular to the east and includes Lac Samuel Bédard and a portion of Lac Frotet (Baie Moléon). The latter lake is the most northerly point in the main section, which also includes lakes Assinica, Cachisca, Comencho and Opataca. The second section – the northern corridor – includes both sides of the Rivière Broadback. It includes all of Lac Lebeau to the east and follows the Rivière Broadback before curving north to Lac Nemiscau. It also includes Lac Giffard and a portion of lakes Evans and Némiscau.

In 2011, the Gouvernement du Québec and the Cree agreed[2] that the Parc national Assinica project would have an initial area of 3,193 km². The parties also agreed to enter into discussions to identify areas for future expansion in accordance with Gouvernement du Québec protected area guidelines and based on the

2 The Final Settlement *Agreement Related to Certain Issues Referred to in Schedule G of the Agreement Concerning a New Relationship between le Gouvernement du Québec and the Crees of Québec.*

expectations of the Oujé-Bougoumou Crees. Under this agreement, the parties agreed to negotiate a delegation agreement for the Oujé-Bougoumou Crees to manage the future park's operations, activities and services.


84°O
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76°O
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64°O
62°N
60°N
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Ivujivik
Salluit
Kangiqsujuaq
Akulivik
Quaqtaq
Puvirnituq
Kangirsuk
Aupaluk
Inukjuak
Tasiujaq
Kangiqsualujjuaq
Kuujjuaq
Umiujaq
Whapmagoostui
Kuujjuarapik
Kawawachikamach
Schefferville
Chisasibi
Radisson
Wemindji
Eastmain
Waskaganish
Nemaska
Wabush
Fermont
Mistissini
Matagami
Oujé-Bougoumou
Chibougamau
Waswanipi
Chapais
Joutel
Normétal
Dupuy
Macamic
La Sarre
Duparquet
Amos
Lebel-sur-Quévillon
Girardville
Map 2
Administrative division
Nord-du-Québec Administrative Region
Study area
Baie-James Equivalent Territory
Kativik Equivalent Territory
0
100
200
300 km
Forêts, Faune
et Parcs
Québec

2.2 LAND REGIME AND ADMINISTRATION OF JAMES BAY TERRITORY

Use of public land in Nord-du-Québec is governed by the JBNQA, which is implemented by *An Act Respecting the Land Regime in the James Bay and New Québec Territories* (CQLR chapitre R-13.1). It is also subject to other agreements with the Crees, notably the ANRQC and the *Agreement on Governance*.

The JBNQA created a three-category land regime. Category I lands in the James Bay Territory are divided into Category IA lands (land belonging to Québec but for which the administration, management and control were transferred to the Government of Canada for the exclusive use of the Crees) and Category IB lands (the ownership of which was transferred by the Gouvernement du Québec to the Crees). The former are under federal jurisdiction and managed by the band council of each community. The Category IB lands are under provincial jurisdiction and managed by Cree landholding corporations. While mineral rights remain the property of the Gouvernement du Québec, the Cree communities must give their consent before a mining deposit can be developed. The Category I lands are located in and around the Cree villages, and their use is reserved for members of the Cree communities. The Cree Regional Authority (CRA), formed in 1978 under the JBNQA, is the legal entity that represents Cree interests. The CRA has recently been renamed as the Cree Nation Government, in application with the *Agreement on Governance in the Eeyou Istchee James Bay Territory between the Crees of Eeyou Istchee and the Gouvernement du Québec* (see below).

Category II land is public land under provincial jurisdiction where beneficiaries of the JBNQA have exclusive rights to hunt, fish, trap and operate outfitting facilities, but do not have a special right to occupy them. Each of the nine Cree communities in Québec has its own Category II lands. Beneficiaries have the right to authorize non-beneficiaries to hunt or fish on the lands, subject to the provisions of JBNQA, Section 24.

Category III lands are also lands in the domain of the State but have specific conditions for wildlife harvesting. Both JBNQA beneficiaries and non-beneficiaries have the right to hunt and fish in accordance with current regulations. However, beneficiaries have exclusive trapping rights for certain fur bearing animals and fishing rights for certain aquatic species. On these lands, the Gouvernement du Québec, Hydro-Québec, the James Bay Energy Corporation and the James Bay Development Corporation have specific resource development rights.

The study area does not include any Category I lands. Nearly 23% of the study area consists of Category II lands, of which 1684 km² are allocated to the community of Oujé-Bougoumou and 22 km² to the community of Waswanipi. The remainder of the study area is located on Category III lands (Map 3). The allocation of Category II lands to Oujé-Bougoumou is the result of the 2011 *Complementary Agreement No. 22* to the JBNQA and the Final *Settlement Agreement*.

Since July 24, 2012, the James Bay Territory has been subject to the *Agreement on Governance in the Eeyou Istchee James Bay Territory between the Crees of Eeyou Istchee and the Gouvernement du Québec* ("Agreement on Governance"). The intent of this agreement is to promote development in the region and a more equal relationship between the Crees and Jamésiens[3]. It makes major changes to the municipal and regional administrative bodies in James Bay Territory. On the one hand, the Eeyou Istchee James Bay Regional Government ("Regional Government") has replaced the Municipalité de Baie-James, which was attributed municipal and supramunicipal powers and responsibilities on Category III lands. For the first 10 years of operation, the seats and votes of the council of the Regional Government are allocated equally between the Crees and the Jamésiens. On the one hand, the Cree Nation Government was established and attributed municipal and supramunicipal powers and responsibilities on Category II lands. The Cree Nation Government replaces the Cree Regional Authority. These structures came into force on January 1, 2014, as set out in *An Act establishing the Eeyou Istchee James Bay Regional Government* (CQLR c G-1.04). Although the study area is located within the area subject to the Agreement on Governance, this agreement will have no impact on the creation or management of Parc national Assinica.

2.3 ASSINICA WILDLIFE SANCTUARY

Assinica Wildlife Sanctuary (Map 3) covers 8,885 km², of which almost 3,906 km² are within the study area, accounting for 63% of the latter total. The portion of the wildlife sanctuary within park boundaries will be transferred to the park upon its creation. Under the Final Settlement Agreement, the national park and Assinica Wildlife Sanctuary will be managed by a single corporation designated by the Oujé-Bougoumou Crees.

3 Jamésiens : non-native residents of James Bay Territory

2.4 POPULATION

According to the Institut de la statistique du Québec data for 2011, the Nord-du-Québec region had 42,300 residents, or 0.5% of the population of Québec. Of the 30,489 residents of James Bay Territory, almost 55% – 16,350 people – live in Cree communities. The remainder – 14,139 people – live in the non-native communities of the James Bay region (Table 1). The Cree village of Oujé-Bougoumou (pop. 725) and the towns of Chapais (1,160) and Chibougamau (7,541) are the nearest localities to the study area's main access roads. The Crees of the villages of Mistissini (pop. 3,427), Waswanipi (1,777) and Nemaska (712) are also frequent users of the area.

Table 1 Nord-du-Québec population distribution by age group and MRC or equivalent territory, 2011

Region	Community	Town or village	Population
Baie-James	Cree	Chisasibi	4,484
		Eastmain	767
		Oujé-Bougoumou	725
		Mistissini	3,427
		Nemaska	712
		Waswanipi	1,777
		Waskaganish	2,206
		Wemindji	1,378
		Whapmagoostui	874
		Total	**16,350**
	Non-native	Baie-James (municipality)	1,303
		Chapais	1,610
		Chibougamau	7,541
		Lebel-sur-Quévillon	2,159
		Matagami	1,526
		Total	**14,139**
Kativik	Inuit and non-native	Total (14 villages)	12,090
Nord-du-Québec		**Total**	**42,579**

Source: Institut de la statistique du Québec, 2011.

Map 3
JBNQA land regime and wildlife sanctuaries

- Category I lands
- Category II lands
- Assinica Wildlife Sanctuary
- Lacs-Albanel-Mistassini-et-Waconichi Wildlife Sanctuary
- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note 1: The limits of the Oujé-Bougoumou Category I and II lands shown are not official.

Note 2: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

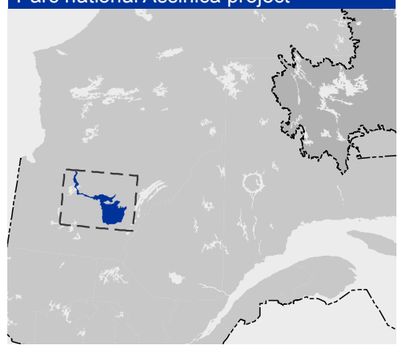
Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



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Québec

Although it is the largest of Québec's administrative regions, Nord-du-Québec is the least densely populated, with barely 0.1 residents per square kilometre (Institut de la statistique du Québec, 2011). For the period 2006-2011, it posted an annual average population growth of 10 per thousand residents, above the Québec average of 8.9 (Institut de la statistique du Québec, 2011). This increase is mostly attributable to a high birth rate in the region's native communities. Indeed, Cree and Inuit communities had the highest average growth in Québec (20.3 and 16.4 per thousand, respectively). In contrast, the non-native communities recorded a decrease in population (-5.6 per thousand residents) between 2006 and 2011. According to 2006-2031 population projections, the non-native population will decline by 25.2% by 2031, while the population will grow by 32.8% in Cree communities.

In addition, the Nord-du-Québec region also has a population that is significantly younger than the Québec average. Its median age[4] in 2012 was 29.0, compared to 41.5 for Québec as a whole. In Nord-du-Québec, 36.4% of the population was under 20, compared to 21.4% for the entire province (Institut de la statistique du Québec, 2013a). The proportion of the population 65 and over (6.8%) is markedly smaller than for Québec as a whole (16.2%). This significant difference in the proportions of age groups is primarily attributable to the Cree and Inuit populations, for which the median age was below 25.1 in 2012, while it was 40.4% in the non-native population.

English is the most spoken in Nord-du-Québec. In 2011, 40% said they only spoke English, 28% only French, 23% English and French and 9% neither English nor French (Institut de la statistique du Québec, 2013b).

Photo 1. Young Crees from Ouje-Bougoumou

4 Median age : the age that divides the population into two numerically equal groups

2.5 ACCESSING THE AREA

Given the considerable distances between settlements, the isolation of some communities, the distance from the major population centres and the harsh climate, the transportation of people and goods is a constant challenge in Nord-du-Québec. Nonetheless, James Bay Territory is accessible year-round by land, rail and air. The communities along the James Bay coast are also served by ship during summer.

Initially, roads were developed in the region for the exploitation of natural resources. During the 1950s and 1960s, approximately 1,000 km of roads were built in the southern portion of the James Bay region. During the 1970s and 1980s, the James Bay Development Corporation built nearly 1,500 km of roads to develop the La Grande hydroelectric complex, including the James Bay highway. This 620-km asphalt road links Matagami to Radisson. In 1993, the Route du Nord was added to the road network. This 407-km gravel road runs from Chibougamau (where it intersects with Route 167 Nord 20 km east of the town), through the Cree community of Nemaska, to KM 274 of the James Bay highway. There are a number of municipal roads in the southern portion of the region, such as Route 113, which links the access road to Oujé-Bougoumou, as well as many commercial logging roads and a few mining project access roads.

Every town or village in James Bay Territory is linked to the road network (Map 4). The study area can be reached from Abitibi via Route 113 and from Lac-Saint-Jean via Route 167. Table 2 shows the distances between towns and villages around the study area, as well some of Québec's major centres.

Table 2 **Distance (km) and travel time (h:mm) by road between the towns and villages in the Eeyou Istchee James Bay Territory and select urban centres in Québec[5]**

	Chapais	Chibougamau	Lebel-sur-Quévillon	Mistissini	Oujé-Bougoumou	Waswanipi	Montréal	Québec	Roberval	Val-d'Or
Chapais	–	45 0:33	213 2:25	113 1:44	38 0:32	118 1:32	720 8:08	540 6:11	284 3:17	364 4:09
Chibougamau		–	257 2:56	68 1:12	59 0:46	163 2:03	700 7:55	520 5:58	264 3:04	408 4:40
Lebel-sur-Quévillon			–	326 4:08	250 2:55	154 1:57	622 7:05	752 8:34	496 5:40	155 1:49
Mistissini				–	127 1:58	231 3:15	768 9:06	688 7:09	332 4:16	477 5:52
Oujé-Bougoumou					–	155 2:02	734 8:21	554 6:24	298 3:30	401 4:39
Waswanipi						–	772 8:57	658 7:41	402 4:48	305 3:41

5 Travel time and distances were calculated using the MTQ travelling distance estimating tool, April 25, 2012 [online] [http://www.quebec511.info/en/distances/index1.asp]. Caution: Travel time and distance calculations are based on ideal driving conditions and do not account for delays caused by weather, congestion, road work or traffic lights.

A rail network has been developed in the southern portion of the Nord-du-Québec region. One segment links Matagami to Barraute in Abitibi. Two other segments, one originating in Chapais and the other in Chibougamau, merge and continue south through Lac-Saint-Jean (Ministère des Transports, 2012).

James Bay Territory has seven airports: Chibougamau-Chapais, Lebel-sur-Quévillon, Matagami, Waskaganish, Eastmain, Wemindji and Chisasibi. In addition to these public airports, Hydro-Québec operates La Grande–Radisson and Nemaska airports (as well as those located at the hydroelectric generating stations along the Trans-Taiga Road). There are private water aerodromes in Chibougamau (on Lac Caché), near Waskaganish (at KM 237 of the James Bay highway), in Mistissini (on Baie du Poste) and on Rivière Témiscamie (near Route 167), and two private heliports in Chibougamau. Helicopter and floatplane transportation is very common across the area, operating from locations with temporary and rudimentary infrastructure. Helicopters are used primarily for the exploration and development of mining, forestry and hydroelectric resources. Floatplanes are mainly used to transport trappers to their traplines and hunters and anglers to the outfitters operations scattered through the region (Ministère des Transports, 2013).

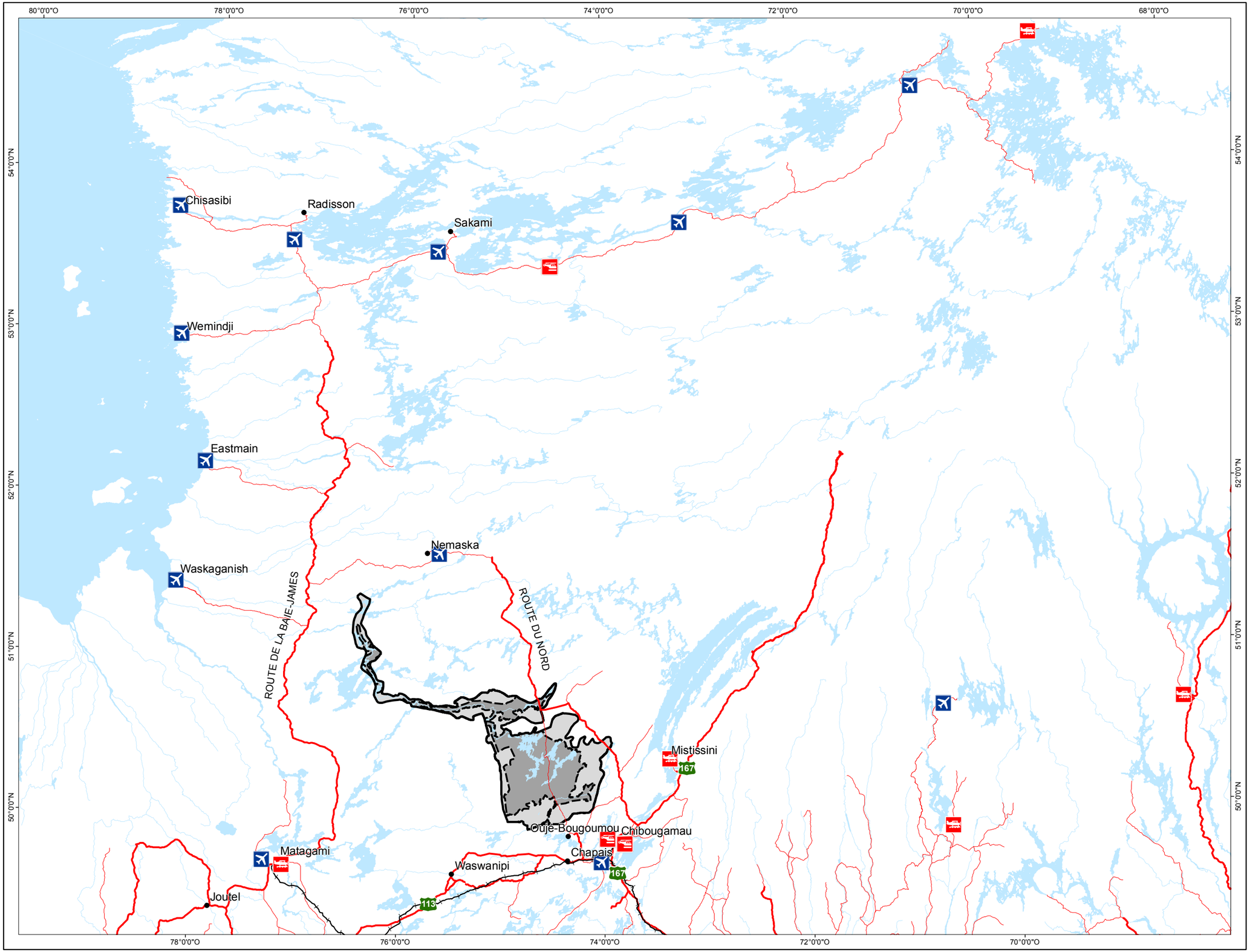
2.6 ECONOMY

The Nord-du-Québec region is known as a resource-based region, since its economy is largely based on mining, forestry and hydroelectricity. It leads all Québec regions in mining development. Gold, copper, silver, zinc, nickel, vanadium, titanium, platinum, palladium, chrome, diamond and lithium are the subject of exploration activities, and in some cases, active mining. The forestry industry also plays a major development role in the region. The forest annual allowable cut accounts for about 16% of the Québec total. The volume harvested supplies 14 sawmills, including five in the James Bay region. The region is Québec's largest electricity producer with 49% of total potential from twenty four generating stations. Finally, the Nord-du-Québec region represents 87% of the technical wind power potential in all of Québec (Ministère de l'Énergie et des Ressources naturelles, 2013a).

In 2011, the workforce consisted of 6,526 people between 25 and 64 in the non-native communities of James Bay Territory (77.2% of all possible workers) and 4,657 in the Cree communities (64.7%) (Institut de la statistique du Québec, 2013a). The unemployment rate for "Côte-Nord and Nord-du-Québec"[6] was 7.6% (Institut de la statistique du Québec, 2013).

6 Statistics Canada combines the two regions in its data.

Map 4
Regional access routes



Airport

Water aerodrome

Heliport

Paved road

Unpaved road

Railway line

Study area (6,198 km²)

Parc national Assinica project (3,193 km²)

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 25 50 75 100 km

1/2,500,000

Sources

Data

Base de données géographiques et administratives (BDGA) at the scale of 1/1,000,000

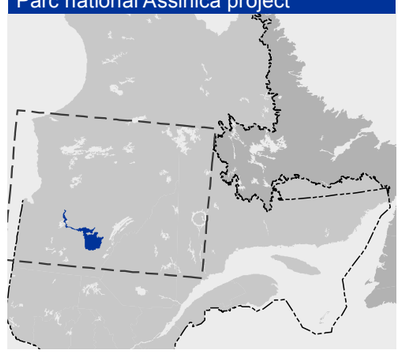
Organization

Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs

Québec

At 6.4%, the proportion of the region's jobs that are in the primary sector of the economy[7] is three times greater than that for Québec as a whole (2.1%) (Ministère de l'Économie, de l'Innovation et des Exportations, 2014). The manufacturing and construction sectors employ 17% and 8.5% of the workforce, respectively. Nearly all manufacturing sector jobs involve the processing of natural resources. The tertiary sector[8] is smaller (68.1%) than in Québec as a whole (79.4%), but trends show it developing (Ministère de l'Économie, de l'Innovation et des Exportations, 2014).

Census data from 2006 for the James Bay Territory show that 17.3% of jobs in non-native communities were in the primary sector, compared to 1.9% in the Cree communities. Conversely, tertiary sector jobs were clearly more important in the Cree communities in relation to non-native communities (93% vs. 58.6%) (Ministère des Affaires municipales et des Régions, 2007a and 2007b). This is explained by the fact that the treaties and agreements signed between the Crees and the governments have allowed the Cree communities to finance institutions that provide services to the population, particularly in health and social services, education and culture, as well as law enforcement and the administration of justice.

In 2010, the current dollar gross domestic product (GDP) for the Nord-du-Québec region was $2.7 billion, representing 0.9% of Québec's GDP (Institut de la statistique du Québec, 2013). The region has the highest per capita GDP of all Québec administrative regions, with $66,131 compared to the Québec average of $39,351. The high GDP in Nord-du-Québec is a sign of large capitalization industry in the region (Institut de la statistique du Québec, 2013).

2.7 TOURISM

2.7.1 Importance of tourism to the region

Tourist volumes in Nord-du-Québec remain low. In 2011, the region was the least-visited in Québec, with about 127,000 visitors – of whom 87,000 visited the James Bay Territory – compared to a total volume of 30.5 million visitors for Québec as a whole (Ministère du Tourisme, 2013). Tourists to the non-native communities came primarily from Québec, while Americans accounted for the majority of tourists to the Cree communities (Ministère du Tourisme, 2013). Total tourist spending in the region was nearly $56 million (Ministère du Tourisme, 2013).

The main tourist attractions are its major hydroelectric facilities and hunting and fishing. Winter tourism is also growing. The region is an increasingly popular snowmobiling destination thanks to its excellent and abundant snow conditions. In 2009, tourism in Nord-du-Québec and Côte-Nord generated 2,600 jobs on an annual basis[9]. In the Baie-James and Eeyou Istchee tourist regions, there are 98 and 17 tourism-related businesses, respectively (Ministère du Tourisme, 2010).

Wildlife tourism (hunting, fishing and wildlife observation) contributes $20 million to the region's economy, nearly 75% of which is attributable to sport fishing (Ministère des Ressources naturelles et de la Faune, 2007). According to the same report, the region has 8,163 fishermen, 4,896 hunters, 9,402 outdoor enthusiasts and 5,926 wildlife observation enthusiasts. Together, they spend nearly $22 million in Québec, with 60% associated with fishing.

The unique landscapes and natural environments of Nord-du-Québec, together with it's cultural diversity have strong potential for developing ecotourism, adventure and cultural tourism. These activities respect local concerns – particularly in native communities – that regional development should be sustainable. The development of national parks will help bring tourists to the region.

2.7.2 Services touristiques offerts dans la région

There are 107 outfitters in Nord-du-Québec, including three with exclusive rights[10] (Ministère des Ressources naturelles et de la Faune, 2010). Most outfitter operations are located north of the 52nd parallel and a number are owned by natives (Ministère des Ressources naturelles et de la Faune, 2010). Under the JBNQA, Québec non-residents must use the services of an outfitter for specific hunting and fishing activities on the territory covered by the agreement.

Assinica Wildlife Sanctuary (8,885 km²) and Lacs-Albanel-Mistassini-et-Waconichi Wildlife Sanctuary (16,400 km²) – among the largest of their kind in Québec – contribute to enhancing the wildlife resources in the region.

7 The primary sector is the sector of the economy that makes direct use of natural resources.

8 The tertiary sector primarily describes economic activities that provide services to the population.

9 Statistics Canada combines the two regions in its data.

10 Outfitters with exclusive rights have been leased the exclusive hunting, fishing or trapping rights for a given territory by the minister responsible for the application of the Act Respecting the Conservation and Development of Wildlife (CQLR c 61.1). Like wildlife sancturaries and ZECs (zone d'exploitation contrôlée, or controlled harvesting zone), these territories have specific wildlife management plans.

Snowmobiling is an important winter attraction for the region and is one of the signature attractions promoted by James Bay Tourism (James Bay Tourism, 2012). Over 1,100 km of marked and maintained snowmobile trails criss-cross the southern portion of the territory, linking a number of communities between Villebois and Mistissini, such as Matagami, Lebel-sur-Quévillon, Waswanipi, Chapais, Oujé-Bougoumou and Chibougamau.

Dogsledding and ice fishing are very popular winter activities. A number of companies and associations operate over 6,500 km of canoe and kayak routes on some forty rivers, including the Assinica, Chibougamau and Broadback. There are hiking trails in the Chapais and Chibougamau areas. Obalski Regional Park in Chibougamau has over 37 km of walking, snowshoeing, cross-country skiing and biking trails.

Photo 2. Ice fishing

In the past ten years, tourism in the region has become more organized and structured, thanks to two regional associations: James Bay Tourism and Eeyou Istchee Tourism. They spearhead the promotion of tourism for the territories and provide information to potential visitors. For example, the Cree communities are developing tourism activities (hunting, fishing, snowmobile, guided visits, etc.) that celebrate their culture, an understanding of the land and a traditional way of life.

2.7.3 Tourist attractions in and around the study area

In the study area, two fishing outfitters (Bushland Adventure and Broadback Outfitter) and the SÉPAQ (through the Assinica Wildlife Sanctuary) offer facilities, lodging and activities in the natural environment (Map 5). Within a 100-km radius, the towns of Chapais, Chibougamau and the village of Oujé-Bougoumou offer lodging that could accommodate visitors to the future national park (Table 3 and Appendix 1). Nemaska also has a motel that could welcome visitors in the northern part of the national park.

2.8 PROTECTED AREAS*

The 255 protected areas in the James Bay Territory cover a total of 34,460 km², or just over 10% of the region and 24% of Québec's network of protected areas (Map 6). Biological refuges predominate (with 209), but represent only 1.5% of the region's protected area (Table 4). Conversely, the 15 proposed biodiversity reserves cover 21,755 km², or 63% of the region's protected area network. Over 99% of the region's protected areas are designated IUCN Category I, II or III, the most strict protected area management categories, which prohibit the commercial-scale use of natural resources. National parks are in IUCN Category II.

Three proposed biodiversity reserves are within 50 km of the study area, near the Rivière Broadback corridor in its northwest section: the proposed Waskaganish Biodiversity Reserve, the proposed Lac Dana Biodiversity Reserve and the proposed Tourbières-Boisées–du-Chiwakamu Biodiversity Reserve. About 25 km northeast of the study area is the proposed Albanel-Témiscamie-Otish Biodiversity Reserve, which is in the process of becoming a national park. In addition, 15 biological refuges with a total area of 39 km² are included or partially included in the study area.

The creation of Parc national Assinica will contribute to the government's goal of protecting 12% of Québec by 2015 with a network of protected areas that are representative of its biodiversity. The criteria for representivity are based on the Ecological Reference Framework (ERF), developed by the Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (Ministère de l'Environnement, 1999). ERF classification primarily takes into account landforms, their organization in space and drainage network topology, irrespective of the natural resources present. It considers the territory, from general to specific, and places it in a multi-level hierarchy. At the top level, the ERF describes the 15 natural provinces within Québec borders and five bordering natural provinces that have small sections in Québec. The Parc national Assinica project would help represent the Mistassini

* The Broadback River Protected Area, established by the Agreement to Resolve the Baril-Moses Forestry Dispute between the Cree Nation of Eeyou Istchee and the Gouvernement du Québec, is not taken into account in this document, because the writing of the document was finished at the signing of the Agreement. The protected area covers 9134.81 km².

highlands natural province, as well as somewhat represent the Abitibi and James Bay Lowlands natural province.

In 1985, the Ministère du Loisir, de la Chasse et de la Pêche identified a portion of the study area as one of the "27 natural sites the most likely to be of significant interest for the conservation of the natural and cultural heritage" of Nord-du-Québec. The area was selected to protect the population of giant brook trout from overfishing.

Table 3 Number of rooms, by lodging type, in localities near the study area

	Town or community			
Type of lodging	Chapais	Chibougamau	Oujé-Bougoumou	Nemaska
Lodges and inns	–	9	–	–
Hotel and motel	18	234	12	10
Total	**18**	**243**	**12**	**10**

Table 4 Protected areas in the Eeyou Istchee James Bay Territory

Designation	Name	IUCN category	Number	Area[11] (km²)	Proportion of James Bay Territory (%)
Migratory bird sanctuary	Baie de Boatswain	Ia	1	96	0,03
Québec national park reserve	Assinica	II	1	3,193	0,93
Protected area reserve		II	2	8,749	2,56
	Lac-Burton-Rivière-Roggan-et-la-Pointe-Louis-XIV (land portion)			8,631	2,52
	Lac-Burton-Rivière-Roggan-et-la-Pointe-Louis-XIV (maritime portion)			118	0,03
Exceptional forest ecosystem		III	10	38	0,01
	Old-growth		7	37	0,01
	Rare		3	1	0,00
Proposed aquatic reserve		III	2	404	0,12
	Haute Harricana			154	
	Rivière Harricana Nord			250	
Proposed biodiversity reserve		III	15	21,755	6,36
	Lac Taibi			266	0,08
	Lac-Dana			347	0,10
	Péninsule de Ministikawatin			895	0,26
	Baie de Boatswain			109	0,03
	Esker-Mistaouac			456	0,13
	Ruisseau Niquet			165	0,05
	Plaine de la Missisicabi			761	0,22
	Hirondelle			322	0,09
	Collines de Muskuchii			801	0,23
	Tourbières-Boisées-du-Chiwakamu			158	0,05
	Albanel-Témiscamie-Otish			11,871	3,47
	Waskaganish			1,063	0,31
	Anneaux-Forestiers			134	0,04
	Paakumshumwaau-Maatuskaau (land portion)			4,392	1,28
	Paakumshumwaau-Maatuskaau (maritime portion)			147	0,04
Wildlife habitat		VI	15	5	0,00
	Heronry		14	4,93	0,00
	Muskrat habitat		1	0,07	0,00
Biological refuge		IV	209	509	0,15
TOTAL for James Bay Territory			**255**	**34,460**	**10,1**

Source: MDDEFP, 2013g

11 Some protected areas cross administrative region boundaries. Area shown in the table corresponds to total protected area, except the Total line, which is for James Bay Territory only.

Map 5
Outdoor recreational activities and equipment

- Outfitter without exclusive rights (PSDE)
- Area of operation of outfitters affected by the study area
- Shelter, refuge
- Boat launch ramp
- Cross-country skiing trail
- ATV trail
- Snowmobile trail
- Assinica Wildlife Sanctuary
- Lacs-Albanel-Mistassini-et-Waconichi Wildlife Sanctuary
- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)
- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an initial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system Map projection	NAD83; compatible with WGS84 Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/900,000

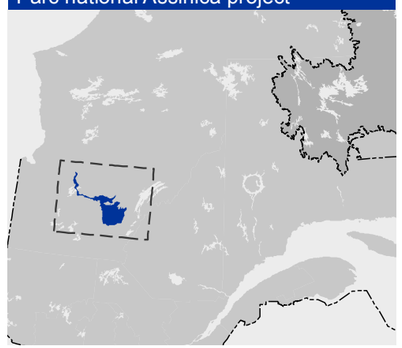
Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

Map 6
Protected areas

- Exceptional forest ecosystem
- Proposed biodiversity reserve
- Biological refuge
- Planned biological refuge
- Boatswain Bay Migratory Bird Sanctuary
- Lac-Burton-Rivière-Roggan-et-la-Pointe-Louis-XIV Protected Area Reserve
- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)
- Paved road
- Unpaved road

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/1,300,000

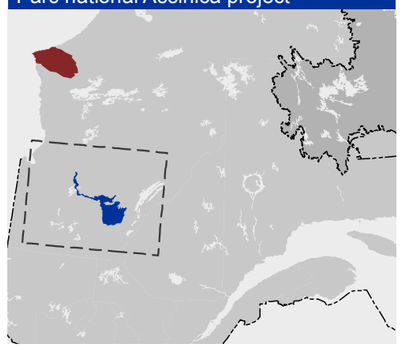
Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

3 NATURAL REGIONS

The primary purpose of a national park is to ensure the conservation and permanent protection of areas representative of the natural heritage of Québec and of natural sites with outstanding features. To identify the territories to protect and ensure that the national park network is representative, in 1985, the Ministère du Loisir, de la Chasse et de la Pêche (whose responsibility for parks has since been transferred to the MFFP) created a subdivision of the territory of Québec based on physical criteria, such as relief, hydrography, geology and vegetation. This identified 43 natural regions in Québec. The initial goal was to create one park for each natural region.

According to this natural region classification, (Ministère du Loisir, de la Chasse et de la Pêche, 1986), the study area is located primarily in the Rupert Plateau natural region. However, a small portion – 500 km², or 8% of the study area – in its northwest section is located in the James Bay Lowlands natural region (Map 1).

3.1 RUPERT PLATEAU NATURAL REGION

The Rupert Plateau natural region (B-29) stretches between 48° and 52° north latitude. Its average elevation is 450 m, with a few summits around 700 m. It has ancient basement rock that is part of the Superior geological province. The natural region is divided into two geographic units: a clay plain scattered with many peatbogs, and to the east, a hilly plateau characterized by a large number of rock outcrops surrounded by glacial deposits. Its hydrography is characterized by many lakes that serve as the headwaters of major rivers like the Rupert, Broadback and Nottaway. Deposits of glacial (such as moraines, eskers and drumlins) and glaciofluvial origin dominate the region, with the exception of the clay plain in its western section (Tremblay, 1987).

The well-drained soils of this natural region are covered by a dense boreal forest dominated by black spruce (*Picea mariana*) and jack pine (*Pinus banksiana*). This coniferous forest and the surrounding wetlands are home to wildlife typical of the boreal forest, such as moose, black bear, beaver and the forest-dwelling

ecotype of the woodland caribou, a species legally designated vulnerable in Québec. Its lakes and rivers abound with fish, including brook trout, northern pike, yellow walleye and lake whitefish.

The poorly-drained soils support significant wetlands, which are generally characterized by extensive peatlands dominated by sphagnum, sedges, heath and occasionally black spruce.

3.2 JAMES BAY LOWLANDS NATURAL REGION

The James Bay Lowlands natural region (B-27) is characterized by low elevations, gently rolling topography and a significant coverage of unconsolidated deposits. Its basement rock is primarily composed of rocks of volcanic origin, with some sedimentary rock. The lowlands are made up of vast clay plains in the south and flat, low-lying rocky terrain in the north, where occasional isolated hills rise no more than 200 m in elevation (Tremblay, 1988). The drainage network is very extensive and includes a considerable number of lakes and rivers, including the Harricana, Nottaway and Rupert. The clay deposits give the smaller rivers their characteristic dendritic form and milky waters. Boreal coniferous forest abounds, with the vegetation cover becoming progressively sparser to the north, where vast peatlands dominate the landscape. The wildlife is similar to that of the Rupert Plateau natural region.

4 PHYSICAL GEOGRAPHY

4.1 CLIMATE

4.1.1 General

Under the Litynski (1988) classification, the study area is subject to a subpolar and subhumid continental climate and an average growing season. This climate type is generally characterized by a mean annual temperature of -6.3°C to 4.3°C, total annual precipitation of 800 to 1,000 mm and a highly continental character due to the absence of a large body of water nearby (Proulx et al., 1987). However, the presence of many water bodies in the study area has somewhat of a moderating influence on the climate, and contributes to the formation of microclimates.

The meteorological data used to determine the climate of the study area were collected at the Chapais 2 weather station (Environment Canada, 2012), in Chapais, about 30 km from the study area (Table 5). It covers the period 1971-2000 and is based on monthly means calculated from daily data.

4.1.2 Temperature

The annual mean temperature at Chapais weather station is 0°C (Table 5 and Map 7). In comparison, the annual mean temperatures for the cities of Québec and Montréal are 4°C and 6.2°C, respectively. There is a wide temperature range of 35°C between the monthly means of the warmest (July) and coldest (January) months. In southern Québec, the temperature range is approximately 30°C.

Summers are relatively cool at Chapais weather station. The daily mean temperature of the warmest three months (June, July and August) is 15°C. However, summer temperatures occasionally exceed 30°C. July is the warmest month, with a daily mean temperature of 16.3°C.

Winters are cold and long. The mean temperature of the coldest three months (December, January and February) is -16.7°C, almost 6°C less than the city of Québec. Winter temperatures can drop below -40°C. January is the coldest month, with a mean

Table 5 Climate summary

	Weather station		
	Chapais	**Québec**	**Montréal**
Location			
Latitude	49° 47' N	46° 48' N	45° 28' N
Longitude	74° 51' W	71° 23' W	73° 45' W
Elevation (m)	396	74	36
Measurement			
Mean annual temperature (°C)	0	4	6.2
Mean temperature, January (°C)	-18.8	-12.8	-10.2
Mean temperature, July (°C)	16.3	19.2	20.9
Mean temperature, 3 warmest months (June-July-August) (°C)	15	17.9	19.6
Mean temperature, 3 coldest months (December-January-February) (°C)	-16.7	-11	-8.3
Minimum temperature extreme (°C)	-43.3	-36.1	-37.8
Maximum temperature extreme (°C)	35	35.6	37.6
Total annual precipitation (mm)	961	1,230	979
Annual snowfall (cm)	302	316	217
Snow-precipitation ratio (%)[1]	31	26	22
Growing degree-days[2]	1,235	1,713	2,098

Source: Environment Canada, 2012

1 Snow-precipitation ratio: Proportion of total precipitation that falls as snow

2 Growing degree-day: The difference between the daily mean temperature and a threshold value. In this case, values above 5°C are considered one growing degree-day. Commonly used in agriculture to predict crop growth rates.

temperature of -18.8°C. One must wait until May for the daily mean temperature to climb above the freezing point.

The number of growing degree-days recorded at Chapais station is 1,235, compared to 1,713 in the city of Québec and 2,098 in Montréal.

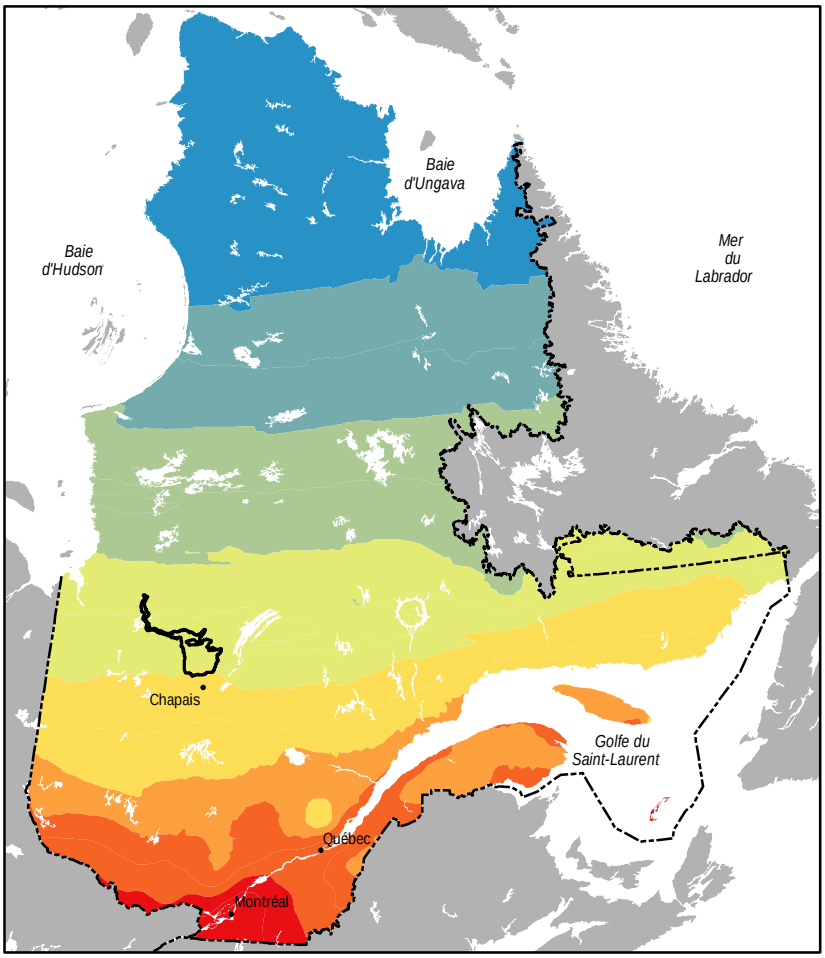
4.1.3 Precipitation

Mean annual precipitation is 961.4 mm (Table 6 and Map 8), which is comparable to Montréal (978.9 mm) but less than the city of Québec (1,230.3 mm). The months with the most precipitation are July (121 mm), August (105 mm) and September (125 mm). Conversely, the driest months are during winter: February (39 mm), March (49 mm) and April (55 mm). Mean annual snowfall is 302 cm, which is 31% of total annual precipitation. Snowfall (Map 9) is slightly less than in Québec City (316 cm) but more than in Montréal (217 cm). The months with the most abundant snowfall are December (57 cm) and January (58 cm). Snow cover reaches its maximum in March (approximately 77 cm). The greatest snow cover – 135 cm – was observed in March 1992.

Table 6 Mean monthly and annual precipitation, Chapais 2 station

Month	Total precipitation (mm)	Rain (mm)	Snow (cm)	Snow cover (cm)
January	60.9	2.8	58.1	58.9
February	38.7	1.7	37.0	74.9
March	49.4	8.6	40.9	77.2
April	55.4	28.2	27.2	45.7
May	77.5	71.9	5.6	2.1
June	95.9	95.6	0.4	0.0
July	120.7	120.7	0.0	0.0
Aug	105.3	105.3	0.0	0.0
September	125.0	123.4	1.5	0.1
October	89.1	66.7	22.4	1.1
November	83.4	31.7	51.7	10.9
December	60.1	3.1	57.0	34.1
Annual total	**961.4**	**659.7**	**301.7**	**n/a**

Source: Environment Canada, 2012



Map 7

Mean annual temperature in Québec (1966-1996)

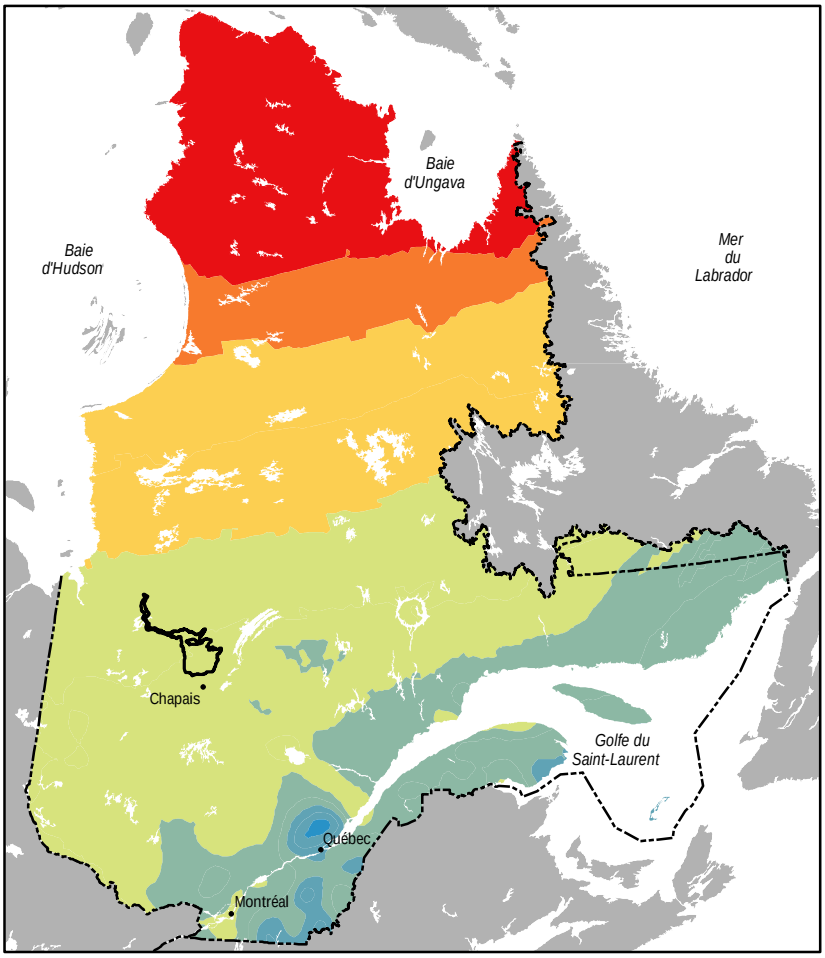
- 6 °C and less
from - 6 °C to -4 °C
from - 4 °C to -2 °C
from - 2 °C to 0 °C
from 0 °C to 2 °C
from 2 °C to 3 °C
from 3 °C to 5 °C
from 5 °C to 7 °C

Study area (6,198 km²)

0 100 200 300 400 km

Sources

Data	Organizations
La Base générale et administrative du Québec (BGAQ) at the scale of 1/2,000,000 Programme de surveillance du climat	Ministère de l'Énergie et des Ressources naturelles Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques



Map 8

Mean annual precipitation in Québec (1966-1996)

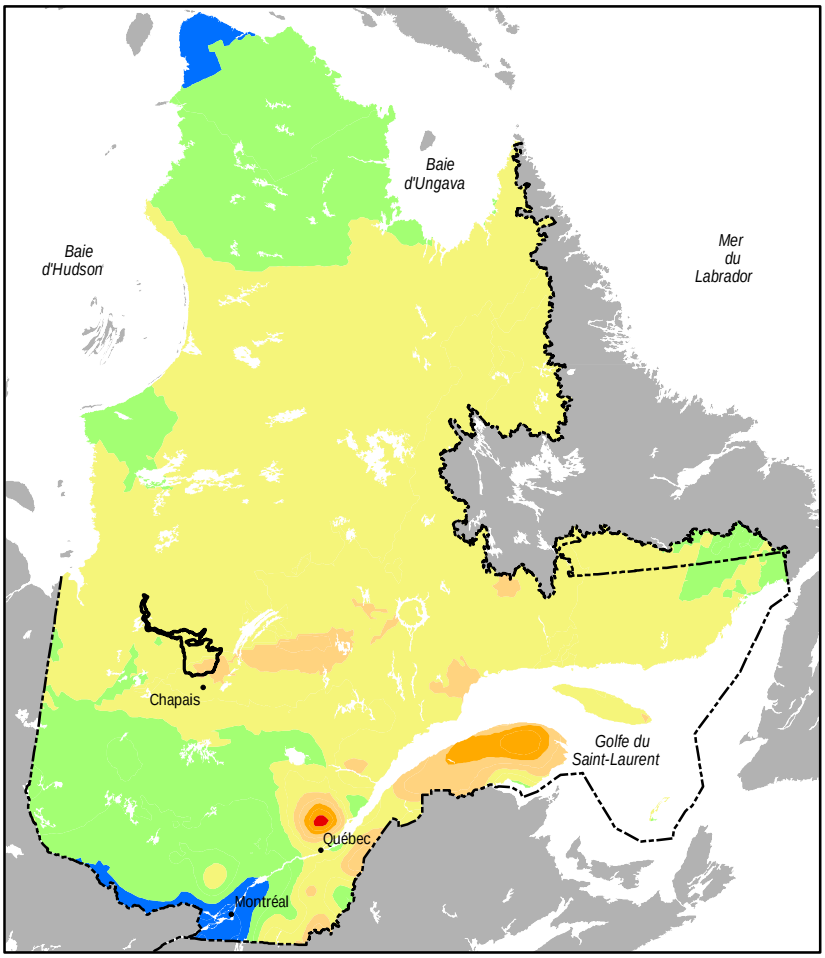
from 400 mm to 500 mm
from 500 mm to 600 mm
from 600 mm to 800 mm
from 800 mm to 1 000 mm
from 1 000 mm to 1 200 mm
from 1 200 mm to 1 400 mm
from 1 400 mm to 1 500 mm

Study area (6,198 km²)

0 100 200 300 400 km

Sources

Data	Organizations
La Base générale et administrative du Québec (BGAQ) at the scale of 1/2,000,000 Programme de surveillance du climat	Ministère de l'Énergie et des Ressources naturelles Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques



Map 9
Mean annual snowfall (1980 - 2010)

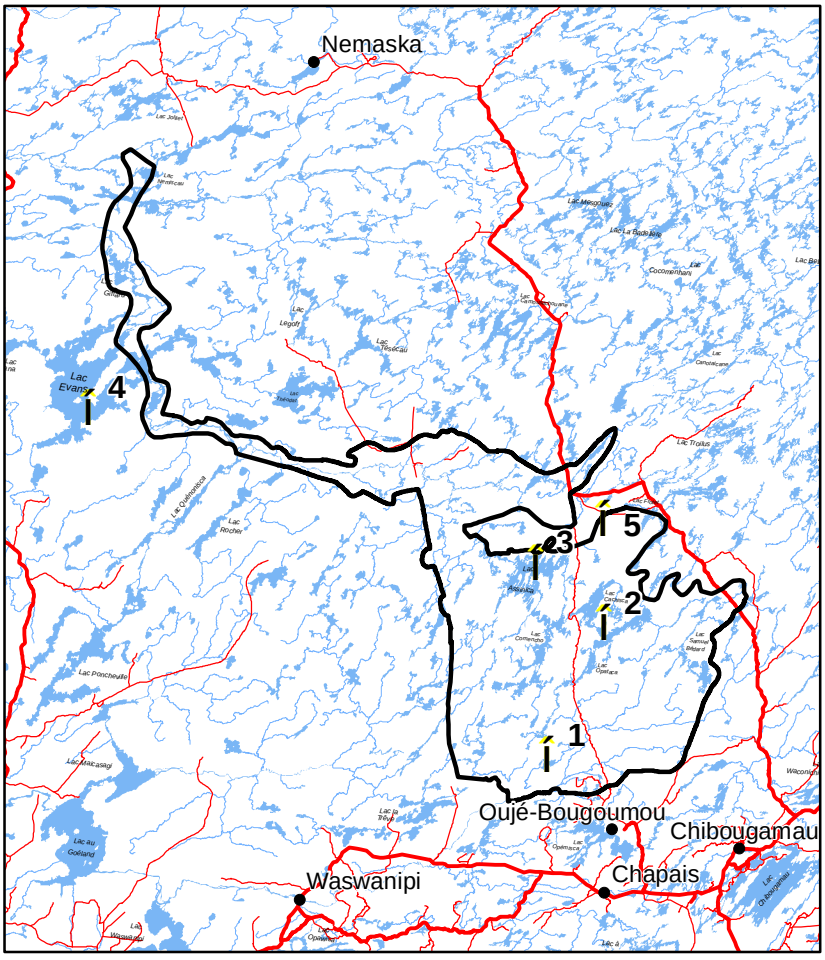
- from 150 mm to 200 mm
- from 200 mm to 250 mm
- from 250 mm to 300 mm
- from 300 mm to 350 mm
- from 350 mm to 400 mm
- from 400 mm to 425 mm

Study area (6,198 km²)

0 100 200 300 400 km

Sources

Data	Organizations
La Base générale et administrative du Québec (BGAQ) at the scale of 1/2,000,000	Ministère de l'Énergie et des Ressources naturelles
Programme de surveillance du climat	Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques



Map 10
Sectors used to describe the wind regime in the study area

Sectors used to describe the wind regime in the study area

1. Lac à l'Eau Noire
2. Lac Opataca
3. Lac Assinica
4. Lac Evans
5. Lac Garnier

Study area (6,198 km²)

0 20 40 60 km

Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

4.1.4 Wind

Data in this section is taken from the Canadian Wind Energy Atlas (Environment Canada, 2003). Its data is based on simulations carried out using an Environment Canada atmospheric model. Five sectors of the study area were used to describe the wind regime (Table 7). Map 10 shows the location of these sectors.

The mean annual wind speed for the five sectors is 23 km/h, compared to 13.6 km/h for Québec City and 14.3 km/h for Montréal. Prevailing winds are from the northwest in the centre and southern portions of the study area, and from the southwest in its northern portion (Lac Evans). In winter, when wind speeds reach their maximum (19.4 to 28.3 km/h), prevailing winds are from the northwest. In summer, wind speeds are at their annual minimum (15.1 to 22.2 km/h), and blow primarily from the southwest.

The relief has an incidence on the wind direction and speed. When moving air meets an obstacle, such as a mountain, wind speed increases. This explains why mean annual wind speed is higher at Lac Garlier (25.7 km/h), which has a relief composed of low hills, than at Lac à l'Eau Noire (17.5 km/h), which has relatively flat relief.

Table 7 Prevailing winds and mean seasonal wind speed

	Sector of the study area									
	Lac à l'Eau Noire		Lac Opataca		Lac Assinica		Lac Evans		Lac Garlier	
Coordinates (decimal degrees)	Lat.: 50.077 Long.: -75.108		Lat.: 50.404 Long.: -74.943		Lat.: 50.533 Long.: -75.219		Lat.: 50.788 Long.: -76.958		Lat.: 50.652 Long.: -74.983	
Period	Mean speed (km/h)	Prevailing wind	Mean speed (km/h)	Prevailing wind	Mean speed (km/h)	Prevailing wind	Mean speed (km/h)	Prevailing wind	Mean speed (km/h)	Prevailing wind
Winter (Dec. - Feb.)	19.4	Northwest	26.2	Northwest	27.9	Northwest	25.9	Southwest	28.3	Northwest
Spring (Mar. - May)	17.6	Northwest	23.1	Northwest	24.4	Northwest	22.6	North	25.2	Northwest
Summer (Jun. - Aug.)	15.1	Southwest	20.1	Northwest	21.7	Northwest	21.0	Southwest	22.2	Southwest
Fall (Sep. - Nov.)	18.5	Southwest	25.1	Northwest	27.1	Southwest	25.8	Southwest	28	Southwest
Annual	**17.5**	**Northwest**	**23.4**	**Northwest**	**25.1**	**Northwest**	**23.5**	**Southwest**	**25.7**	**Southwest**

Source: Environment Canada, Canadian Wind Energy Atlas, 2003

4.2 GEOLOGY

4.2.1 Superior geological province

The study area is located in the Superior geological province, on the Canadian Shield. Its rocks were formed during the Precambrian, at the end of the Archean eon, more than 2.5 Ga (billion years) ago. They formed the planet's first continental nuclei, and are among the oldest geological formations on Earth.

Superior province covers a large portion of Canada, including one-third of Québec and extends as far south as Minnesota, United States. It is world-renowned for its copper, gold, zinc, nickel, silver and diamond deposits. It is bordered to the east by Churchill province and to the southeast by Grenville province, two other geological provinces of the Canadian Shield.

Superior province is divided into seven subprovinces on the basis of lithology, metamorphism, structure and chronology (Simard, n/a). The study area extends across four subprovinces (Map 11):

- Opatica, which is composed of sequences of metavolcanic-sedimentary and Archean plutonic suites (Perreault, 2004) and covers 82% of the study area.
- Abitibi, which is composed primarily of volcano-plutonic rock. This subprovince is the best-known of Superior province due to the presence of several mines that are responsible for nearly all of the minerals extracted in Superior province. About 15% of the study area is in this subprovince.
- Opinaca, which is composed of metamorphic sedimentary rock (Lapointe, 2008) and accounts for only 2% of the study area.
- La Grande, which is an assembly of volcano-plutonic rock (Lapointe, 2008) and is barely represented in the study area (1%).

There is little documentation on the geology of the two latter subprovinces.

4.2.2 Geology of the study area

Intrusive igneous rock

Nearly 78% of the study area is composed of intrusive igneous rock (Table 8 and Map 12), which is formed from magma as it slowly cools and solidifies within the Earth's crust, giving minerals the time to crystalize (Landry et al., 1992). Intrusive rocks may form large bodies of 10 to 20 km in diameter called plutons that are exposed at the Earth's surface. Granitoid rock accounts for more than half of the rock in the study area. Granite, tonalite, diorite, gabbro, metagabbro and ultramafic rock round out the plutonic rock encountered.

Table 8 Proportions of rock types in the study area

Origin	Rock	Percentage of study area
Intrusive	Granitoid	53.4
	Granite	12.0
	Tonalite	11.5
	Diorite, gabbro, metagabbro	0.6
	Ultramalfic rock	0.2
	Total	77.7
Sedimentary	Sandstone, arkose, graywacke	8.4
Metamorphic volcano-sedimentary	Amphibolite	6.6
Volcanic	Felsic volcanic	1.2
	Basalte, métabasalte	3.0
	Total	4.2
Metamorphic	Paragneiss	3.1

Source: Geology from the Ministère des Ressources naturelles et de la Faune du Québec. Compiled by the Service des parcs in April 2013.

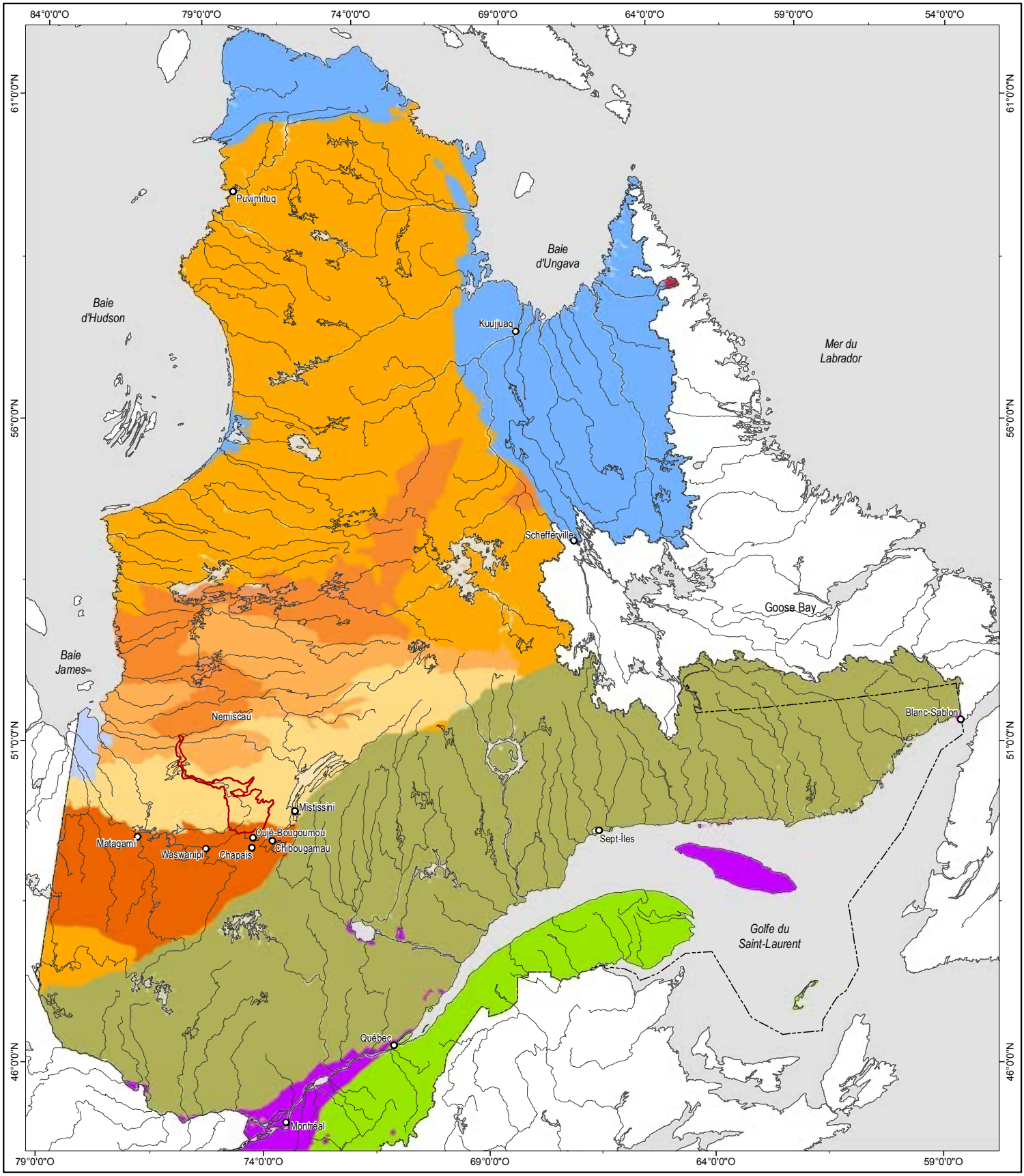
Volcanic and sedimentary rock sequences

Two wide belts of a sequence of volcanic, sedimentary and metamorphic volcano-sedimentary rocks cross the study area from west to east. Together, these belts cover 19% of the study area. They are known for their precious metal deposits (including copper, gold and silver). The belt north of Lac Assinica and along the Rivière Broadback is associated with the Frotet-Evans volcanic belt, in the Opatica subprovince. It is the oldest belt in Superior province, dated at 2.7 billion years old (Larouche, 2005). It extends over 250 km from James Bay to Lac Mistassini, varying between 5 and 20 km in width (Simard, 1983). This belt was first explored in 1957 following the discovery of an erratic block with copper and nickel mineralization. Rocks sampled near Lac Assinica included basalts and amphibolites, as well as igneous rocks (Brisson, 1997).

The other belt, in the southern portion of the study area, is part of the Chibougamau-Matagami belt in the Abitibi subprovince, and

Map 11

Geological provinces of Québec



Metadata

Geodetic reference system: NAD83; compatible with WGS84
Map projection: Lambert conformal conic, with two standard parallels (46° and 60°)

Sources

Data

La Base générale et administrative du Québec (BGAQ) at the scale of 1/2,000,000

Geological Provinces

Organization

Ministère de l'Énergie et des Ressources naturelles

Atlas of Canada, 2007

0 100 200 300 km

1/9,000,000

Produced by

Direction des parcs nationaux

Geological province

Canadian Shield
- Churchill
- Supérieur
  - Subprovince (Supérieur)
    - Opatica
    - Opinaca
    - De La Grande
    - Abitibi
- Nain
- Grenville
- Hudson Bay Platform
- St. Lawrence Platform
- Appalachians

Study area (6,198 km²)

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

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consists of alternating east-west belts of volcanic and metamorphic sedimentary rock (Trudel, 1979), with greenstone predominating (Simard, n/a). In the study area, this belt consists of sandstone, arkose, graywacke, amphibolite, basalt and metabasalt.

Benn and Moyen (2008) report three theories to explain the presence of these two belts. The traditional theory is that they resulted from successive accretions[12] of continental blocks. Collisions between these blocks are said to have formed volcanic arcs, which correspond to these belts. Another theory posits that the area is actually a single terrane[13] that has undergone phases of volcanism and magmatism as a hotspot moved from north to south under the terrane. The most recent theory postulates that the terrane that forms Abitibi and Opatica subprovinces originated as an Archean oceanic plateau in an oceanic basin that came into contact with magma in a subduction zone[14]. This would have been followed by a number of magmatic episodes.

Metamorphic rocks

Metamorphic rocks come from old sedimentary deposit. They can be found in lakes Giffard and Nemiscau (in the northern portion of the study area). They form the southern tip of a vast complex of these rocks typical of Opinaca province. The area consists primarily of paragneiss.

Landforms associated with the geology

Several faults are found in both the southern section and the northern arm of the study area. In the south, they are oriented east-west, while in the north they form a grid, with faults oriented east-west and north-south. The difference in fault line orientations is due to the fact that the southern sector is part of Abitibi subprovince, while the northern sector is in Opatica subprovince (Lacina, 1996).

Dikes in the study area form a series of belts running northeast to southwest crossed by another series running northwest to southeast, which are visible in the landscape as long narrow hills. They formed when magma seeped into fissures in country rock. Over time, the softer country rock eroded away, leaving behind the hills of igneous rock. The dikes are found in a number of locations in the area, but the Rivière Brock dike is the easiest to identify. This dike forms a hill that is 50 m high (419 m elevation) and 2.15 km long. Black spruce are found at its base, while aspen cover its upper reaches, with the exception of its rocky summit.

Photo 3. Dike close to Rivière Brock

4.3 GEOMORPHOLOGY

Over the long geological history of the study area, geological events modified the crust producing mountain relief. Subsequently, over hundreds of thousands of years, the major ice ages eroded the basement rock, softening the relief. The last glaciation in particular had a marked impact on the formation of the surface deposits visible today. Since the glacial melt, wind, water and the action of biotic components have been slowly altering the landscape of the study area, leaving behind river, lake, wind and peat deposits.

The geomorphological description of the study area is draws heavily on the work of Denis Bellavance (2010).

4.3.1 Glaciation and surface deposit formation

The Quaternary, the most recent period on the geologic time scale, began about 1.64 million years ago. This period has been characterized by significant temperature variations, which resulted in periods when ice covered significant portions of the Earth (Table 9). It is also known as the Great Ice Age (Bourque, 2010). The last glaciation to affect Québec was the Wisconsin Glacial Episode, which began about 80,000 years ago and reached its maximum 18,000 years ago. At that time, the Laurentide ice sheet[15] covered the study area with more than 3,000 m of ice. When temperatures started to rise about 14,000 years ago, the glaciers began

12 Accretion: Increase of the volume of a body by the addition of outside material (adapted from Foucault and Raoult, 1992).

13 Terrane: Fragment of crustal material accreted to the nucleus of an ancient continent (Genest, 2000).

14 Subduction: Process by which one portion of the crust is forced under another (Foucault and Raoult, 1992).

15 Ice sheet : A mass of glacial ice that covers all or a large portion of a continent (Source: Office québécois de la langue française, 1985).

their retreat, punctuated by cycles of glacial growth when the climate cooled. Ice movement abraded the underlying substrate and plucked up tonnes of various types of rock debris (erratic blocks, rocks, stones, gravel, sand and silt), carrying them great distances. When the glacier melted, all of the accumulated and transported material was deposited as glacial till or carried away with the meltwater to form glaciofluvial deposits. Today, glacial deposits make up the majority of the unconsolidated deposits in the study area and make for a varied landscape.

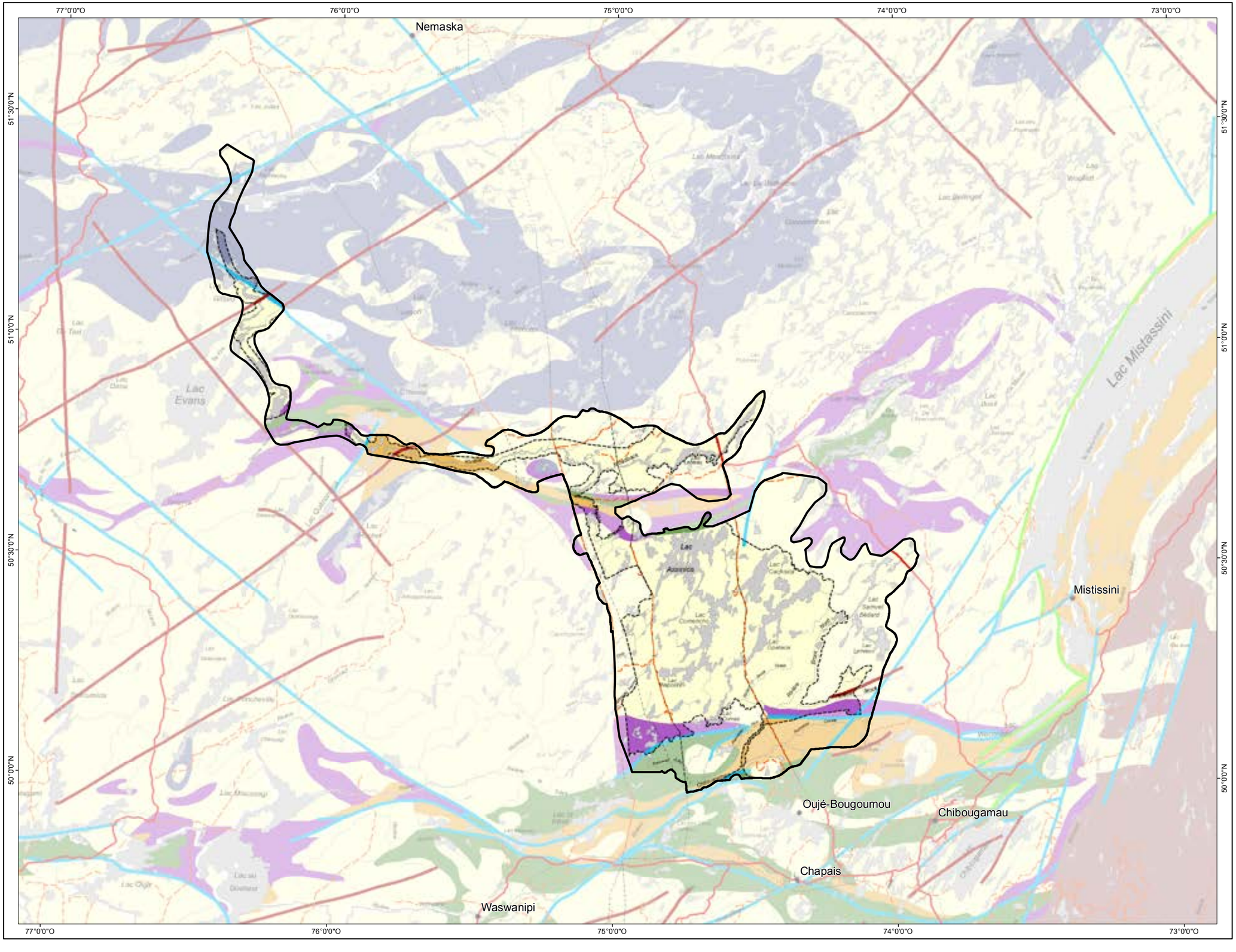
The weight of the ice sheet depressed the crust by several metres. Once the ice receded, seawater from what is today Hudson Bay flooded the surrounding landscape – including the extreme northwest of the study area – to an elevation of 290 m, creating the Tyrrell Sea (Tremblay, 1987; Bourque 2010). As the ice melted, the meltwater was trapped by the ice front further north, preventing it from running off naturally. This resulted in the formation of a massive lake, proglacial Lake Ojibway, which became a sedimentation basin for the fine particles washed out of the glacial till (see glacial lacustrine silts section).

Table 9 Known glacial and interglacial periods

Period	Epoch		Stage	Series	Approximate age (thousands of years)
Tertiary	Pliocene		Nebraskan (glacial)		1 870
					1 640
Quaternary	Pleistocene	Lower			1 200
			Aftonian (interglacial		1 000
			Kansan (glacial)		790
		Middle			600
			Yarmouthian (interglacial)		400
			Illinoian (glacial)		130
		Upper	Sangamonian (interglacial)		80
			Wisconsinan (glacial)	Lower	60
				Middle	25
				Upper	10
	Holocene				

Source: Adapted from Robitaille and Allard, 1996

Map 12
Geology



Rock origin

- Intrusive rock
- Metamorphic intrusive rock
- Sedimentary rock
- Metamorphic sedimentary rock
- Volcano-sedimentary rock
- Volcanic rock

Type of fault

- Unconformity
- Undetermined
- Dikes

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/900,000

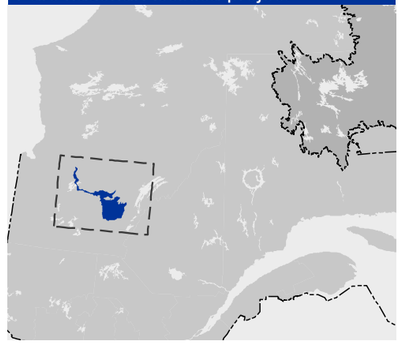
Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



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4.3.2 Unconsolidated surface deposits

Unconsolidated surface deposits are accumulations of material that originate from passing glaciers, the action of water courses, and, to a lesser degree, by different types of erosion (e.g., frost wedging and wind) or the accumulation of organic material. Nearly 70% of surface deposits in the study area are of glacial or glaciofluvial origin (Table 10). Organic deposits account for 27.5%.

Table 10 Surface deposits in the study area

Type of deposit	Proportion of deposits in the study area (%)
Glacial	59.4
Glaciofluvial	9.5
Glaciolacustrine	3.0
Organic	27.5
Fluvial	0.2
Wind	0.1
Bare rock (no deposits)	0.3

Glacial deposits

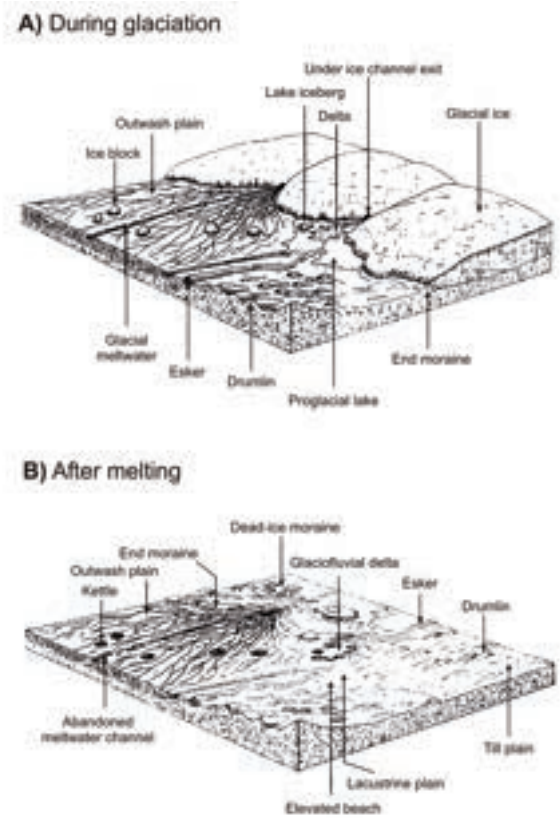
As the ice retreated, the glaciation left behind large amounts of material and sediment of various kinds. This till was a heterogeneous mix of material of varying sizes (i.e., blocks, stones, gravel and sand). In the study area, till collected in various sizes and through various processes. The most common forms are ground moraines (formed under the ice sheet as it expands), dead-ice moraines (resulting from the disintegration and ablation of the ice), and De Geer moraines (deposited at the bottom of lakes adjacent to the glacier) (Figure 1).

Photo 4. Drumlinoids in lac Assinica

Two types of **ground moraine** can be found in the study area: an undifferentiated ground moraine and drumlinoids. The undifferentiated ground moraine is composed of till laid down under the glacier when increased friction with the ground immobilized the sub-glacial debris layer while the glacier continued to move. In the study area, it forms a continuous cover over the bedrock, except on uneven sites (escarpments or rocky ridge lines), where it forms a till veneer. In general, the till is poor in clay but rich in sand. In many locations, the undifferentiated ground moraine is covered by glaciofluvial, glaciolacustrine or organic deposits.

Some **drumlinoids**[16] can be found in the northeastern portion of the study area, where the topography is relatively flat. They are small, streamlined cigar-shaped hills about 1 to 5 km long that result from till being eroded by the ice as it is deposited or a short time after. Peatlands generally occupy the depressions between the drumlinoids.

Figure 1. Types of glacial deposits (Source: adapted from Robitaille and Allard, 1996)



16 In relation to drumlins, drumlinoids are distinguished by being arranged in tight rows that make it difficult to determine where one ends and the next begins and by being lower in elevation (Genest, 2000).

Dead-ice moraines form at the edge of the glacier as it ceases to move. They are characterized by hummocky terrain composed of thick, heterogenous and very rocky material. The till that makes up dead-ice moraines is less compact than that of ground moraines. Dead-ice moraines are found throughout the study area. Their form can vary from one area to the next and they are generally found above ground moraines. In fact, the boundaries between the two are so subtle that it is often difficult to determine where one ends and the other begins.

De Geer moraines are successive parallel ridges from 1 to 10 m high and 50 to 1,500 m long that are spaced between 150 and 300 m apart. They were deposited on the bottom of a glacial lake adjacent to the retreating ice sheet. De Geer moraines are ubiquitous in the study area. They are particularly concentrated around the Rivière Broadback, west of Lac Labeau.

Photo 5. De Geer moraines

Another type of glacial deposit found in the study area is the **crag and tail** landform. These elongate landforms consist of a hill of basement rock (the crag) and a sloping ridge of sediment (generally till) pointing in the down-ice direction (the tail) (Travaux Publics et Services Gouvernementaux Canada, 2013). The tail of sediment can extend over several kilometres and consist of glacial till (particularly in up-ice locations) and portions of the nucleus itself. Several crag-and-tail formations are located in the western portion of the study area, east of Lac Capichigamau and between lakes Comencho and Opataca.

Photo 6. Grag-and-Tail

Glaciofluvial deposits

Glaciofluvial complexes are made up of sand, gravel and blocks transported to their resting place by glacial meltwater. The eskers in the study area are of particular interest for their characteristic form and number. An esker is a long, winding ridge of sediment deposited by a meltwater stream in a tunnel under a glacier. The sediment forms regular layers of sand and gravel. They always run perpendicular to the glacier front.

Photo 7. Esker to the east of Lac Assinica

The eskers in the study area are easily identifiable on aerial photos and the surface deposit map. They form a regular pattern of subparallel lines about 10 to 15 km apart and oriented north-northeast to south-southwest that show the direction of glacial flow. They are generally about 500 m wide and can stretch over dozens of kilometres. Many kettles[17] are found nearby, sometimes forming a chain on and next to the eskers.

17 A kettle landform is a depression in glaciofluvial sediment. They form when blocks of ice calve from a glacier, become buried in the till and subsequently melt, leaving a kettle-shaped hole. Kettles are generally 200 to 300 m in diameter.

Map 13
Primary surface deposits

Surface deposit

- Glacial
- Glaciofluvial
- Glaciolacustrine
- Fluvial
- Organic
- Wind
- Bare rock

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system: NAD83; compatible with WGS84
Map projection: Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

Sources

Data

Base de données topographiques et administratives (BDTA) at the scale of 1/250,000
Base de données sur l'aménagement du territoire (BDAT) at the scale of 1/100,000

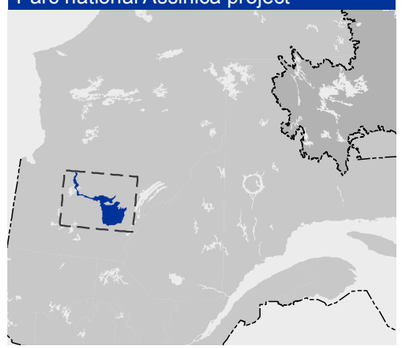
Organization

Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



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Lake Ojibway significantly reorganized surface deposits in the study area – enough to make the eskers less readily identifiable than in other parts of Québec. Indeed, the margins of some eskers are accompanied by beach ridges, formed as various forces re-worked the Lake Ojibway shoreline. Some eskers suddenly end, while others are interrupted by breaches of varying widths. That is the case of two eskers north of the Rivière Broadback, one southwest of Lac Milletière and the other south of Lac des Diortites. These eskers end in landforms of sediment characterized by knolls and hummocks of indistinct morphology. Shoreline changes significantly altered the initial form of this complex.

Glaciolacustrine deposits

Glaciolacustrine deposits are composed of fine sediment deposited on the bottom of a large proglacial lake. **Proglacial Lake Ojibway** was formed 8,500 years ago when water was trapped between the ice front to the north and the drainage divide to the south. For about 2,110 years, it covered most of the Abitibi region and the area around James Bay to Sakami moraine. The maximum elevation of these shorelines was 457 metres (Vincent and Hardy, 1977), and the volume of the lake was 15 times that of Lake Superior today. It completely drained into the Tyrrell Sea 7,900 years ago.

Evidence of this proglacial lake is very limited in the study area as it is generally buried under organic deposits. The clearest evidence are the rings of bare rock found on hill slopes at an elevation of 415 metres that were created by the erosion of unconsolidated deposits by wave action on the proglacial lake. The strips of bare rock (or relict beaches) are between 5 and 6 metres wide and located on the hill slopes most exposed to the elements (generally NE-SO). Several hills in the study area have these characteristic rings, notably in the area of hillocks and low hills northwest of Lac Waposite (see Section 4.3.3).

The landscape north of the Rivière Broadback, particularly downstream of Lac Giffard, is characterized by glaciolacustrine deposits (silt and clay) left behind by proglacial Lake Ojibway. This area is also the only part of the study area with traces of glaciomarine sediment in the form of clay and silt from the Tyrrell Sea as well as some littoral sand.

Organic deposits

Organic deposits form when organic matter decomposes more slowly than it accumulates. This occurs in the absence of conditions favourable to decomposition, such as in poorly-drained environments (due to flat terrain or impermeable soil) that become saturated with water, or due to climate. Shallow lakes, wet hollows filled with near-stagnant water and sites with fine-textured deposits on level ground are commonly associated with organic deposits (Robitaille and Allard, 2007).

Organic deposits are particularly evident on the poorly-drained glaciolacustrine and glaciomarine sediment in the south and northwest of the study area. To the south, they stretch over large areas. These organic deposits take the form of peatlands, composed primarily of sphagnum, moss, heath and sedge debris. The entire area is scattered with peatlands of varying sizes and shapes. Section 4 details the characteristics of the peatlands in the study area.

Fluvial and aeolian deposits

Fluvial and aeolian deposits form following the retreat of a glacier. They cover a tiny portion of the study area (0.2% and 0.1%, respectively), and their formation is ongoing.

Fluvial deposits occur in a river bed or flood plain, often in segments of low gradient, which are more favourable to sedimentation (Robitaille, 2007). They are generally composed of sand and gravel eroded by river action from other types of deposits (glaciofluvial deposits or till) and transported to locations favourable to sedimentation. Fluvial sediments are sorted and stratified by the water. Typically, they appear as a series of terraces separated by slopes. In the study area, fluvial deposits are found near major rivers (the Assinica, Broadback, Brock, Brock Nord and Chibougamau). They form beaches or sand banks, depending upon variations in river water levels. Fluvial deposits are subject to erosion at any time as a function of water flow in the river, precipitation and spring runoff.

Aeolian deposits form by wind action. In the study area, they are mainly in the form of crescent-shaped (parabolic) dunes of pre-existing sandy deposits of glaciofluvial, glaciolacustrine or marine origin. Most of the dunes consist of layers of medium-grained sand up to several metres thick. They are generally covered with stabilizing vegetation and therefore inactive. There

Photo 8. Beach on lac Assinica

are three groups of stabilized dunes in the study area. The first is on the north shore of the Rivière Chibougamau (near the mouth of the Rivière Brock), the second is on both sides of the Rivière Broadback south of Lac Théodat and the third is in the extreme southeast of the study area, near Lac Sauvage.

In addition, a subaerial delta is found south of Lac aux Diorites, just north of the Rivière Broadback. Created during the ice age, this zone is now subject to wind erosion and forms aeolian deposits. The formation of this delta is described in the next section.

4.3.3 Landforms of interest

Subaerial delta

A subaerial delta was observed on a berm north of the Rivière Broadback and south of Lac aux Diorites at approximately 300 metres elevation. This subaerial delta consists of several hummocks and mounds that are completely covered by sand and gravel. It covers an area of about 5 km by 4 km. The presence of sand and gravel on a berm at this altitude is unusual, and gives rise to a number of questions about how it got there.

The most plausible explanation is that it has its origins as glacial outwash that formed a subaerial delta. In other words, the sand and gravel transported by rivers inside the glacier formed outwash plains or glaciofluvial deltas when they flowed out of the ice sheet and into Lake Ojibway. Once the lake drained, these expanses of sand and gravel were left visible. Today, the wind is shaping these deposits.

Photo 9. Subaerial delta North of Rivière Broadback

Stabilized dunes at the confluence of the Brock and Chibougamau rivers

The largest cluster of stabilized parabolic dunes is found in the southernmost reaches of the study area, at the western edge of the esker that follows the Brock and Chibougamau rivers and next to the outwash plain that cuts through it. This complex of dunes covers more than 150 hectares. Its vegetation cover varies between low-density stands of jack pine and open areas that are bare or covered in lichen and/or moss. Consisting mostly of fine sand, this environment is host to colonies of sand heather, an at-risk plant species. This field of parabolic dunes is characterized by significant variations in elevation over short distances.

Photo 10. Dunes close to Rivière Brock

Former Lake Ojibway raised beachlines

Block fields form strings along the slopes of some hills in the study area at 415 metres. Little known in Québec, these block fields are associated with the ancient beaches of Lake Ojibway. They were deposited by waves and currents that tore fine material away from glacial deposits leaving in place the bigger rocks.

The strings average 5 metres in width and can stretch over a distance of more than 800 metres. Most of the blocks are between 15 and 25 cm in diameter and have a variety of shapes, from angular to rounded. The apparently-bare rocks are covered by a diverse range of rock-dwelling lichens (which prefer rocky substrates).

Photo 11. String of blocks littoral in origin (ancient raised beaches) on a slope northwest of Lac Waposite, revealed by a forest fire.

Photo 12. Ground view of a former shoreline on the side of a hill northwest of Lac Waposite.

4.3.4 Landscape

A landscape is defined as an area of land from a human perspective. Landscape features are produced by natural or human factors, and are the result of a combination of the long natural evolution of its geology and geomorphology and human use through the ages (Ducruc and Côté, 2012). Without question, ice sheets significantly influenced the area's landscapes. The frequent recurrence of forest fires also had an impact in some sectors. Industrial activities have changed the landscape, but to a moderate degree compared to southern Québec. This is notably the case with the four power lines and associated roads that cross the area from north to south. Similarly, recent logging and its associated roads.

Generally speaking, the landscapes of the study area feature low-elevation landforms (Map 14), small vertical drops and gentle slopes (Map 15). Seen from above, some sectors are distinguished by vast expanses of flat land, while others have a little more relief. For the purposes of this Status Report, the MFFP has divided the study area into four sectors based the different landforms that shape the landscape (Map 16). The intent is to create areas of interest where visitors will be able to explore the most significant landscapes in the future park. The four landscape sectors are (Table 11):

- One sector each for the vast low-lying peneplains – the Broadback and Assinica valley in the north and the peatlands in the south of the study area
- One sector including the medium-altitude knolls around lakes Opataca, Cachisca, Comencho and Waposite
- One sector featuring the low hills of greater elevation north of the large lakes.

Table 11 Dominant landforms in the landscapes of the study area

Type of landscape	Dominant landform	Height	Percentage (%) of study area
Peneplains of the Broadback and Assinica rivers and the Southern Peatlands	Mound	10 to 25 m	25.8
	Hummock	25 to 50 m	21.3
	Plain	0	22.6
	Terrace	0	1.7
	Hillock	50 to 100 m	0.3
Knolls and Large Lakes	Knoll	50 to 100 m	18.8
Low hills	Low hill	100 to 200 m	9.5

1- Peneplains of the Broadback and Assinica rivers and the Southern Peatlands

This type of landscape covers most of the study area (71.7%) and can be described as a peneplain where relatively flat ground is interrupted by mounds, knolls and hummocks (low-altitude landforms). It is found in two distinct sectors, the Assinica and Broadback river valleys in the north and the great bog complexes in the south.

The relief in the Assinica and Broadback river valley is strongly influenced by the ice flow that established its structural components and defined its drainage network. To the west, elevations are between 230 and 260 metres. This section is characterized by a highly dynamic fluvial ecosystem of clayey lacustrine deposits. It also features many terrasses and a series of meanders. Vestiges of the saltwater intrusion of the Tyrrell Sea (marine clays) are found in this area. The east of the sector is dominated by depressions that are filled by elongated lakes or bog complexes dotted with mounds and hummocks. These mounds and hummocks are drumlinoids and crag-and-tail formations. The relief is also interspersed with eskers.

Photo 13. Peneplains landscape near Rivière Broadback

The southern sector is characterized by a uniformly flat and low-lying landscape that rarely exceeds 25 metres in elevation and is dominated by bog complexes. These peatlands are often accompanied by large eskers and successive parallel ridges from 1 to 10 metres in elevation that form De Geer moraines. In some locations, small rock hummocks break the uniformity of the landscape. Around Lac Samuel-Bédard, these rock outcrops reach elevations between 30 and 40 metres. Near Lac Turgis, the hummocks are more rugged and abrupt, and may be associated with small crag-and-tail formations. In addition, a dike along the Rivière Brock adds some relief to the peneplain (see Section 4.2.2).

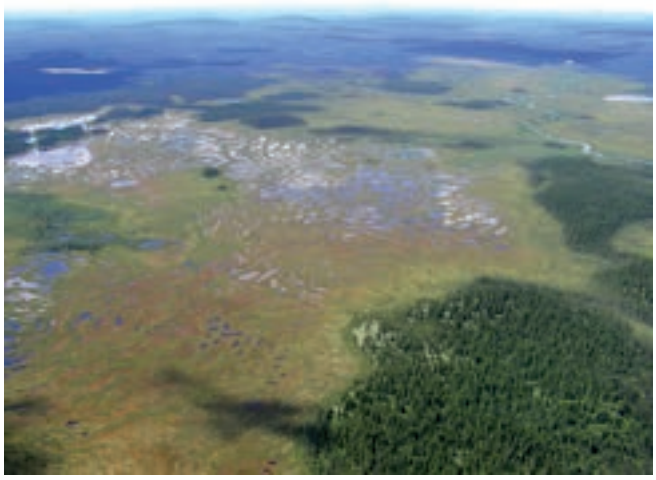


Photo 14. Concentric bog near Rivière Brock

2- Knolls and the Large Lakes: Opataca, Cachisca, Comencho and Waposite

A collection of large lakes (Opataca, Cachisca, Comencho and Waposite) surrounded by knolls are located in the heart of the study area. These elongated lakes run along a northeast-southwest axis, recalling the direction of ice flow. The knolls are elongated along the same axis, with elevations between 50 and 60 metres. Their slopes are steep and peaks narrow and craggy. Many De Geer moraine ridges cross the knolls, and several eskers snake through the knoll formation. The flat terrain at the base of the knolls is generally covered in peatlands.

Photo 15. Lac Assinica

A small formation of hills southeast of Lac Opataca stands in contrast to the surrounding peneplain. Its five irregularly-shaped narrow rocky summits are separated by a small axial subsidence. Their slopes have an average gradient of 40% and feature a number of rock benches.

One peak of this formation, Mont aux Amélanchiers[18], at 583 metres elevation, is the second highest summit in the study area. Its conical form is topped by a small flat area that offers 360 degree views of the study area. It rises 219 metres off the peneplain, and its slopes have a constant gradient of 45%, apart from two rock benches at 460 metres.

Photo 16. View from Mont aux Amélanchier

3- Low Hills

The low hills correspond to the most uneven terrain of the study area, as well as the highest elevations. The minimum elevation of this sector is 350 metres, while its highest peak tops out at 622 metres. Three distinct hilly areas stand out for their distinctive morphology and location in the study area.

The area to the north and northeast of Lac Cachisca is characterized by a large massif of low, irregularly shaped hills. About twenty rise to 550 metres, three exceed 600 metres and the tallest reaches 622 metres. Their summits are small and rolling, with bedrock outcrops, and their irregular slopes are steep near the summit but more gradual lower down. Their average vertical drop is between 130 and 180 metres.

The low hills west of Lac Comencho are smaller, but individually distinct thanks to the clear depressions and valleys between them. Excluding the steepest pitches, their slopes are generally straight and regular, becoming more gradual towards the summits and in periphery. About a dozen peaks reach 500 metres. The average rise is 124 metres. Traces of the ancient beaches of Lake Ojibway are visible northwest of Lac Waposite.

The formation of low hills west of Lac à l'Eau Noire have elongated heterogeneous summits and abrupt slopes. They are interrupted by valleys that are oriented in the direction of glacial flow. This formation is believed to be volcanic in origin, part of the Chibougamau-Matagami belt (see section 4.2.2).

Photo 17. Low hills north of Lac Cachisca

4.4 DRAINAGE

The drainage in over half (58%) of the study area is categorized as moderate (Map 17). This type of drainage is associated with the areas with more relief, such as the low hills, hummocks and knolls. Imperfect drainage is also present in these areas, covering 14% of the study area. Poor drainage is found in 28% of the study area and is associated with its organic deposits – the large peatlands in the north and south. Rapidly and excessively drained soils are found in less than 1% of the study area. They are associated with rock outcrops and, in some cases, eskers.

18 Name given by the tallyman; not officially approved by the Commission de toponymie du Québec. This process may be initiated upon the creation of the park.

Map 14
Relief

Elevation

- less than 300 m
- 300 to 350 m
- 350 to 400 m
- 400 to 450 m
- 450 to 500 m
- 500 m and more

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line
- Peak in the study area
- Peak in the parc national Assinica project

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

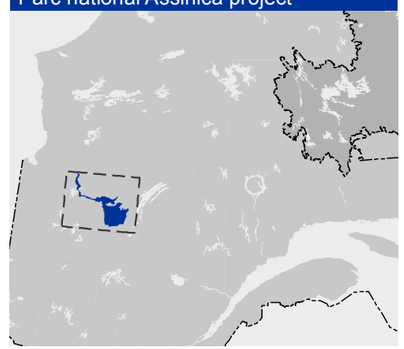
Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

Map 15
Slopes

Class
- Level to very gentle (0 à 8 %)
- Gentle (8 à 15 %)
- Moderate (15 à 30 %)
- Strong (30 à 45 %)
- Steep (45 % et +)

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

Sources

Data

Base de données topographiques et administratives (BDTA) at the scale of 1/250,000

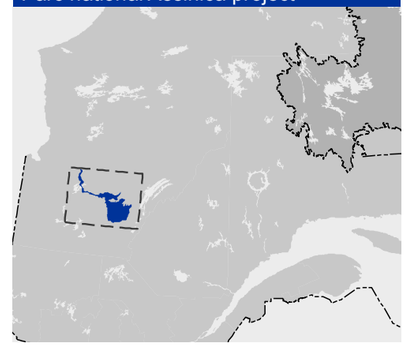
Organization

Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

Map 16
Landscapes

Type of landscape

- Knolls and the Large Lakes: Opataca, Cachisca, Comencho and Waposite
- Low Hills
- Peneplains of the Broadback and Assinica rivers and the Southern Peatlands

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system Map projection	NAD83; compatible with WGS84 Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

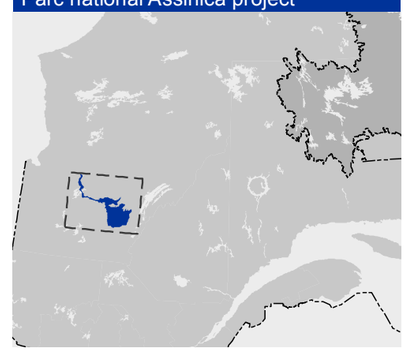
Sources

Data	Organization
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

Map 17
Drainage

Type of drainage

- Rapid (excessive and rapid)
- Moderate (well, moderately well and complex)
- Imperfect
- Poor (poor and very poor)

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

Sources

Data

Base de données topographiques et administratives (BDTA) at the scale of 1/250,000 Extract from SIEF (December 2013)

Organizations

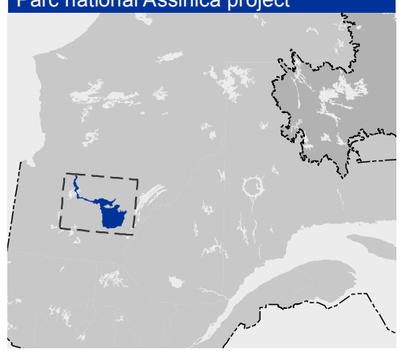
Ministère de l'Énergie et des Ressources naturelles

Ministère des Forêts, de la Faune et des Parcs

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

4.5 HYDROGRAPHY

4.5.1 Hydrography of the natural region

Rupert Plateau natural region includes most of the drainage basins of the Broadback, Nottaway and Rupert rivers. These drainage basins are among the largest in terms of area in Québec (Tremblay, 1987). Starting in the early 1960s, they were the subject of studies for the construction of the hydroelectric complex known as the Rivières Nottaway-Broadback-Rupert (or NBR) Complex, a project was that abandoned by Hydro-Québec in 2007.

Due to the general inclination of the terrain, the region drains into James Bay. The water regime of the region is characterized by winter baseflow[19], a heavy spring freshet resulting from the snow melt, a relatively constant flow in summer and high water in the fall due to heavy rain (Tremblay, 1987).

4.5.2 Drainage basins

The study area has three main drainage basins (Broadback, Nottaway and Rupert) that can be broken into seven secondary catchment areas (Table 12 and Map 18). The Rivière Broadback drainage basin covers 64% of the study area. One of its secondary catchment areas, the Rivière Assinica catchment area, covers 37% of the study area and drains its central section. More than two-thirds of the Assinica's drainage basin is within the study area.

The Rivière Nottaway watershed – the fourth-largest in Québec, at 64,900 km² (Institut de la statistique du Québec, 2010) – drains over one-third of the study area. Four of the Nottaway's tributaries drain the southern section of the study area.

The remainder (2%) is in the Rivière Rupert drainage basin, located in the northwest tip of the study area.

Table 12 Main drainage basins in the study area

Primary drainage basin	Level	Secondary drainage basin	Total area (km²)	Area within the study area (km²)	Proportion within the study area (%)
Broadback	2	Broadback	15 050	1 598,0	10,6
	2	Coigne	298	99,2	33,3
	2	Assinica	3 434	2 293,9	66,8
	2	Théodat	1 103	6,1	0,6
Nottaway	4	Brock	2 154	1 348,6	62,6
	4	Chibougamau	4 380	80,2	1,8
	4	Trève	1 350	510,8	37,8
	4	Maicasagi	2 650	161,2	6,1
Rupert	2	Rupert	24 400	94,6	0,4
	2	Martre	4 578	5,1	0,1

19 Baseflow : Lowest average water flow in a water course

Table 13 Major rivers in the study area

Secondary drainage basin (Level 2 or 4)	River	Cree Names	Total run (km)	Run within study area (km)	Proportion within study area (%)
Broadback	Rivière Broadback	Ch enwaapuskaau sibi	451,0[1]	220	48,8
	Rivière Châtillon		36,0[1]	2,2	6,1
	Rivière Nipukatasi		70,0[2]	0,9	1,3
	Rivière Salamandre		20,0[2]	2,8	14
	Ruisseau Nuskanu		12,0[2]	1,4	11,7
	Ruisseau Rabbit		4,0[2]	1,3	32,5
Coigne	Rivière Coigne		26,0[2]	22,2	85,4
Assinica	Rivière Assinica	Asinikaw sibi	60,0[2]	60	100
Brock	Rivière Brock	Saakahiikan sibi	80,0[2]	35	43,7
	Rivière Brock Nord	Geywatan Wapisiyou sibi	45,0[2]	45	100
	Rivière Brock Ouest		20,0[2]	20	100
	Rivière Chibougamau		200,0[1]	17	8,5
	Ruisseau Noir		4,6[2]	4,6	100
	Ruisseau Crinkle		11,0[2]	11	100
Trève	Ruisseau Julien		3,8[2]	3,8	100
	Ruisseau Naomi	Gachijuices sibi	12,0[2]	12	100
Macaisagi	Rivière Omo	Umuweu sibi	ND	3,3	ND

[1] Source : Commission de toponymie du Québec.
[2] Source : Direction des parcs nationaux, MFFP

4.5.3 Major rivers

Three major rivers cross the study area: the Broadback (in the north), Assinica (middle) and Brock (in the south). Many rivers and streams of varying sizes run through the area, as well as the numerous intermittent streams that drain its peatlands and wetlands. Three rivers and four streams are completely contained within the study area, while the others are contained in a proportion varying from 1.3 to 85.4% (Table 13).

Rivière Broadback

The Rivière Broadback is one of the major rivers flowing into James Bay. Its mouth is on Baie de Rupert, in the southern end of James Bay, near the Cree village of Waskaganish. Its average annual flow is 312 m³/s (Ministère de l'Environnement, 2002). Its headwaters are at Lac Frotet and it flows west, occasionally widening into lakes Labeau, Evans and Giffard. Within the study area, there are two falls on the Rivière Broadback. The first has a vertical drop of five metres and is located five kilometres west of Lac Quénonisca, and the second drops ten metres and is located between Lac Evans and Lac Giffard. The river is a popular canoe-camping destination. A hydrometric station at the mouth of Lac Quénonisca is operated by the Centre d'expertise hydrique du Québec.

The name of the river has been used since the end of the 19th century, although its origin is unclear (Commission de toponymie du Québec, 2013). Henry O'Sullivan, a land surveyor in the area between 1897 and 1899, reported that the Cree had three different names for it, depending on the section of the river. From its mouth to a point about 110 km upstream, they called it the Little Nottaway, due to its proximity to the Rivière Nottaway. Further upstream, they called it the Broadback, i.e. "wide behind". Finally, from Lac Evans to its source (within the study area), they called it Swellback, i.e. "swollen behind". The toponym could therefore be descriptive, translated from Cree to English, that illustrates the many rapids and widenings of the river where its waters swell significantly.

Map 18
Hydrography

Drainage basin limit

- Rivière Broadback
- Rivière Nottaway
- Rivière Rupert
- Secondary drainage basin

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

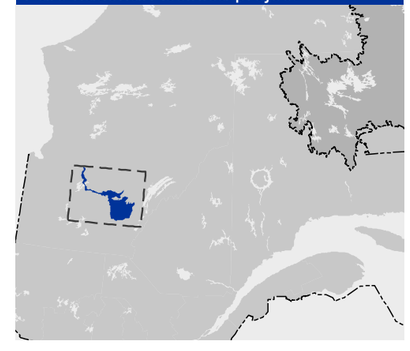
Sources

Data	Organization
Base de données sur l'aménagement du territoire (BDAT) at the scale of 1/100,000	Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

Rivière Assinica

The Rivière Assinica has its source in the lake of the same name, and it changes direction several times before flowing into the Rivière Broadback. Its entire length is within the study area. There are several widenings in the river, which form lakes Trépezet, Thiballier and Boissy. With the exception of a few sections of large rapids and one waterfall, its waters are relatively calm. The six-metre waterfall is 11 km upstream of where it meets the Rivière Broadback. The name Assinica comes from Cree word "asinikaw", which means "river filled with stones" (Commission de toponymie du Québec, 2013).

Rivière Brock

The Rivière Brock is a tributary of the Rivière Chibougamau, a well-known canoe camping route. Its headwaters rise in Lac Brock, outside the study area. Less than half (43%) of the Rivière Brock is in the study area, where it runs due west without any widenings of significance. The section of the river in the study area follows a geological fault line.

The two main tributaries of the Rivière Brock are the Rivière Brock Nord and Rivière Brock Ouest. The entire length of the Rivière Brock Nord is within the study area and has its source in Lac Samuel-Bédard. Lac Lemieux is a major tributary that flows into Rivière Brock Nord to the south of Lac Samuel-Bédard. Unlike the Rivière Brock, the Rivière Brock Nord is winding and widens at several locations, particularly over its first 16 kilometres. In places, its bed is characterized by a trickle of water running over water-worn boulders. There are at least six rapids along its length. The Rivière Brock Ouest is also very sinuous. Its headwaters are in the small lakes and bog complexes east of Lac Dumas and southwest of Lac Opataca. There are six sets of rapids, all in the six kilometre stretch upstream of where it meets the Rivière Brock. The entire length of the river is within the study area.

The Rivière Brock is named for Reginald W. Brock, director of the Geological Survey of Canada, who, at the end of a survey in 1896, carried out a geological reconnaissance of the canoe route between lakes Waswanipi and Mistassini.

Rivière Chibougamau

This river marks the southern limit of the study area. Lac Chibougamau is its principal source, and the Rivière Brock is a major tributary. The section of the Rivière Chibougamau in the study area has no rapids or widenings. An esker runs along its north bank.

Its name has been interpreted in several ways (Commission de toponymie du Québec, 2013). Some say that it comes from "Shabogamaw", which is formed from the Cree roots "shabo", meaning "across" and "gamaw", meaning "lake" or "body of water". Shabogamaw could therefore mean a lake crossed by a river. Others believe that it contains an Innu word that means "meeting place". Still others suggest it means "where the water is blocked" or "very narrow straits".

The Rivière Chibougamau is a canoe route recognized by the Fédération québécoise du canot et du kayak.

4.5.4 Major lakes

There are over 650 bodies of water in the study area, including more than 630 without a recognized toponym (Appendix 2). Eighteen of them cover more than 5 km², and four over 40 km² (Table 14). The four large lakes – Assinica (95 km²), Opataca (61 km²), Comencho (50 km²) et Cachisca (41 km²) – are in the centre of the study area. Together, they account for 4% of the study area. Despite their impressive sizes, they are all fairly shallow. Lakes Cachisca and Opataca, the only ones for which bathymetry is available, are 20 and 33 metres at their deepest points, respectively. Their shapes are influenced by the type of glacial deposits that surround them. Connected by rivers and portage routes, they have good potential for canoe camping. However, given their large sizes, the wind could be a significant factor and make navigation by canoe difficult (Daniel Arbour et Associés, 2008). Navigation is also made difficult by the many rocks close to the surface that can be difficult to see. Lac Evans also covers a large area (55 km²), but only a narrow corridor of it is included in the study area.

Table 14 Major lakes (surface area > 5 km²) in the study area

Primary drainage basin	Major lakes	Cree Names	Coordinates (centroid of lake)		Total area (km²)	Surface area in study area (km²)	Proportion in study area (%)
			x	y			
Broadback	Lac Assinica	Kaa mimeniskamikaau	–75,227567	50,519685	96,5	96,5	100
	Lac Opataca	Kaa upataaukaau	–74,900107	50,392779	61,4	61,4	100
	Lac Evans	Chishe saakahiikan	–76,930680	50,881007	469,6	55,1	12
	Lac Comencho	Kaamanchusuuhsh	–75,162908	50,367525	49,9	49,9	100
	Lac Cachisca		–74,991643	50,465115	41,0	41,0	100
	Lac Giffard		–76,896306	51,144486	29,3	29,3	100
	Lac Waposite		–75,243983	50,259060	24,5	24,5	100
	Lac Labeau	Chenwaapuskau	–75,245739	50,744962	11,4	11,4	100
	Lac Frotet	Waskwaayaastinuu	–74,665072	50,736514	58,7	10,3	18
	Lac Blanchet	Kaa pihtunikaau	–74,906231	50,449254	10,1	10,1	100
	Lac La Chevardière		–75,478670	50,482093	8,2	8,2	100
	Lac Dumas		–75,133579	50,157602	7,6	7,6	100
	Lac Regnault		–74,791696	50,626384	21,2	6,1	29
	Lac Thiballier		–75,418846	50,566071	5,3	5,3	100
Nottaway	Lac Lemieux	Kaa sikanikaaii	–74,562911	50,321827	23,5	23,5	100
	Lac Samuel-Bédard	Kaa upaskwe yaau	–74,570735	50,476532	9,4	9,4	100
	Lac des Petites Plages		–75,363716	50,098450	7,5	7,5	100
Rupert	Lac Nemiscau	Namiscow	–76,749120	51,389618	130,8	27,2	21

Lac Assinica

Lac Assinica is dotted with islands and peninsulas, and bays are scattered along its perimeter. It flows northwest by the Rivière Assinica, a tributary of the Rivière Broadback.

Lac Comencho

This lake flows north into Lac Assinica. It is fed from Lac Waposite to the south and Lac Cachisca to the northeast. It has several large-sized long bays. The origin and meaning of its name are uncertain (Commission de toponymie, 2013). According to the Cree, Comencho means “where a creature lives”. This refers to a legend about a creature that hides in the lake.

Lac Cachisca

Lac Cachisca flows into Lac Comencho. It has an elongated form and several long bays. Its name is an abbreviated form of Capacwachipsca, a Cree word that means “lake with the rock in shallow water” (Commission de toponymie du Québec, 2013).

Lac Waposite

Lac Waposite flows into Lac Comencho. It has an irregular shape, with several widenings and narrows. The Commission de toponymie has no information about the origins of its name. Accord to the Cree it means “barren landscape with many rocks”, a reference to landscapes without shrub vegetation (due to forest fires) where many rocks are visible.

Lac Opataca

Lac Opataca is elongated in form. It is fed by Lac Dumas in the southwest, as well as many small streams. It flows into Lac Cachisca. Its name, which is of Cree origin, means “where the water narrows between two hills”. The local topography lends credence to this theory (Commission de toponymie du Québec, 2013).

Lac Samuel-Bédard

Lac Samuel-Bédard, the primary source of the Rivière Brock Nord, extends over a dozen kilometres. Its toponym refers to Samuel Bédard, the Péribonka farmer who sheltered the novelist Louis Hémon during the summer of 1912. The characters of the father (Samuel) and mother in his famous novel Maria Chapdelaine were apparently inspired by Bédard and his wife (Commission de toponymie du Québec, 2013).

Lac Evans

A small portion of Lac Evans is within the study area. This lake is a widening of the Rivière Broadback and is located in a boggy area. Long, rounded bays give it an irregular shape. It is named for Sir John Evans (1823-1908), an English archeologist, geologist and paper manufacturer and influential member of a number of learned societies.

Lac Nemiscau

Lac Nemiscau is in the far northwest of the study area. A portion of the lake is included in the study area. It is a widening of the Rivière Nemiscau, which flows into the Rivière Rupert. In Cree, Nemiscau means “where the fish are plentiful” (Commission de toponymie, 2013).

5 ECOLOGY

5.1 FOREST ECOSYSTEMS

The information in this section is taken from the Système d'information écoforestière (SIEF; ecoforest information system) of the Ministère des Forêts, de la Faune et des Parcs (MFFP). The 4th 10-year forest inventory covers almost all of the study area, with the exception of the area north of Lac Evans. In addition, the report prepared by Robert Gauthier (2004) informed the descriptions of ecosystems found within the study area.

For the purposes of this document, and based on the MFFP databases used for the analysis, forest ecosystems are defined as areas that exclude bodies of water, wetlands, flooded environments, alder groves, dry bare land and all human infrastructure such as gravel pits, resorts, fallow land and power transmission lines. Wetlands and scrubland are defined as environments were trees occupy less than 25% of the basal area and are characterized by insufficient drainage for the former and excessive drainage for the latter.

The study area is in the boreal zone and the continuous boreal forest sub-zone. It is part of the western spruce-moss forest bioclimatic sub-domain (Ministère des Forêts, de la Faune et des Parcs, 2013b). Forest ecosystems[20] cover 72% of the landmass, or over 3,700 km², while wetlands account for nearly 23% and scrubland for just over 4% (Table 15).

20 Also known as "productive forest land" by forestry engineers.

Table 15 Major ecosystems of the study area

Ecosystem	Area (km²)	Proportion of study area landmass[21] (%)
Forest ecosystems	3549	71
Other ecosystems	(1461)	(29)
Alder grove	17	0.3
Wetland	1172	23.4
Scrubland	234	4.7
Power transmission line	39	0.8

21 Territory photo-interpreted and covered by the Système d'information écoforestière.

5.1.1 Forest ecosystem characteristics

The forest ecosystems are 78% softwood (Table 16). Stands of black spruce (*Picea mariana*) and jack pine (*Pinus banksiana*) respectively represent 46% and 23% of the forest ecosystems in the study area, while balsam fir stands are extremely rare, accounting for only 0.1% (Table 17). Mixed stands – of varying proportions of black spruce, jack pine, white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*) – cover another 7%. Less than 1% of the area has hardwood-dominated stands (primarily white birch and trembling aspen). For 15% of all forest stands inventoried, regeneration is not sufficiently advanced to be considered forest cover.

Table 16 Major forest cover in the study area

Forest cover type	Area (km²)	Proportion of forest ecosystems
Softwood	2751	78
Mixed	263	7
Hardwood	23	1
Regenerating	511	14

Table 17 Forest composition by dominant species

Dominant forest species	Area (km²)	Proportion of forest ecosystems
Black spruce	1641	46.3
Jack pine	806	22.7
Softwood-dominated (several species)	79	2.2
Balsam fir	4	0.1
Mixed (softwood and hardwood)	120	3.4
White birch	55	1.6
Trembling aspen	7	0.2
Hardwood-dominated (several species)	7	0.2
Undetermined	829	23.4

Map 19
Types of forest cover

Forest cover

- Hardwood
- Mixed
- Softwood
- Wetland
- Scrubland
- Regenerating
- Data non available

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

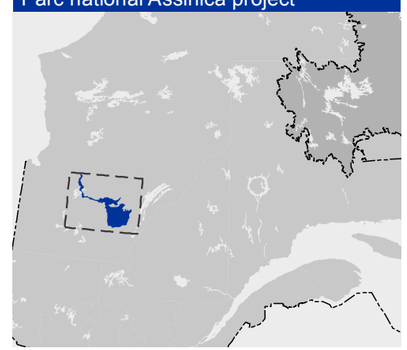
Sources

Data	Organizations
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000 Extract from SIEF (December 2013)	Ministère de l'Énergie et des Ressources naturelles Ministère des Forêts, de la Faune et des Parcs

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

Map 20
Dominant forest species

Forest species

- Black spruce
- Jack pine
- Softwood-dominated
- Fir
- Mixed
- White birch
- Trembling aspen
- Hardwood-dominated
- Unforested
- Data non available

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

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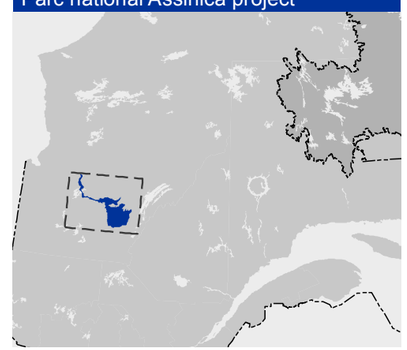

Forêts, Faune et Parcs
Québec

Black spruce stands

Black spruce-dominated stands are the most frequent and abundant in the study area. The floristic composition and stand structure of spruce stands is dependent on local forest cover density and drainage conditions. Four main types of black spruce stands are found in the study area: black spruce/moss, black spruce/heath/moss, black spruce/lichen and black spruce/sphagnum.

Black spruce/moss

Black spruce/moss forests are most dense on mesic sites. In these stands, a carpet of moss, dominated by Schreber's moss (*Pleurozium schreberi*), covers the ground. The next most common mosses are glittering wood-moss (*Hylocomium splendens*) and plume moss (*Ptilium crista-castrensis*). In some very dense stands, so little light infiltrates to the understory that no shrubs or herbaceous plants grow.

Black spruce/heath

Where the tree canopy is relatively open, the shrub *Kalmia angustifolia* becomes increasingly dominant, to the point of forming a dense shrub cover that can also include *Ledum groenlandicum*. This high density of shrubs shades the soil to the detriment of the moss and lichen layer.

Black spruce/lichen

Black spruce stands on dry ground are covered with a thick carpet of lichens, particularly fruticose lichens of the genus *Cladonia* (*Cladonia rangiferina, C. mitis, C. stellaris* and *C. uncialis*); very little or no heath is present. The black spruce trees that form the canopy are scattered in this carpet. Black spruce and *Cladonia* forests are uncommon in the study area.

Black spruce/sphagnum

Black spruce/sphagnum stands form at the edges of peatlands and on poorly-drained sites. Black spruce grows on the water-logged peat, accompanied by a carpet of sphagnum mosses. They grow in stands of varying sizes and densities, often surrounded by scrubland of leatherleaf (*Chamaedaphne calyculata*) or speckled alder (*Alnus incana subsp. rugosa*).

Jack pine stands

Jack pine stands are the only kind of pine forest found in the study area. In several locations, they grow in large monospecific stands, particularly in the extreme south, west and extreme east of the study area (Map 20). These stands grow primarily on sandy deposits that are rapidly-drained or xeric. They have an understory of heath (particularly *Kalmia angustifolia*, along with *accinium angustifolium*) and lichen (*Cladonia* spp.) in varying proportions. Jack pine stands are generally open, and due to the difficulty of the species to reproduce itself, become increasingly open as forest fire recurrence intervals increase. Consequently, the trees in jack pine stands are even-aged. On the ground, the discontinuous moss layer consists of *Pleurozium schreberi* and lichens. Aside from pure stands, jack pine is found across the territory in mixed black spruce stands.

Several particularly old jack pine specimens were inventoried in the study area. They are located next to bodies of water, which protects them from forest fire. A jack pine over 200 years old was found on the shore of Lac Labeau, and another near the southern portion of Lac Assinica. The presence of individuals of this age is rare in the area because jack pines are generally either killed by forest fire or die of senescence around the age of 150.

Photo 18. Old Jack Pine

Birch stands

The birch stands in the study area are white birch stands. They are mainly found in the large lakes sector (Map 20). Most are of medium density with an understory of green alder (*Alnus viridis* subsp. *crispa*) and heath, such as *Ledum groenlandicum, Vaccinium angustifolium* and *Kalmia angustifolia*. The moss layer consists primarily of *Pleurozium screberi*.

In a birch stand southwest of Lac Assinica, the diameter at breast height (DBH) of the largest birch trees range from 20 to 35 cm. Trembling aspen, of which one individual measured 43 cm DBH, are found alongside the birch. Individuals of this size are exceptional for the region. In addition, there is greater diversity of herbaceous plants in these birch stands than in the black spruce or jack pine stands. Aside from the common boreal forest species, several ferns such as *Dryopteris* and *Aralia nudicaulis,* a rare species in nordic regions, cover the ground.

Aspen stands

Stands of trembling aspen are rare in the study area. Those that were inventoried are found on the top of eskers and cover less than a hectare. In hardwood stands, it is common to see trembling aspen alongside birch.

5.1.2 Age of forest stands

Nearly 40% of the forest ecosystems in the study area are in the 61-100 year age class (Table 18). Old forests (101 years and over) account for 19% of forest ecosystems. These old stands are often found in locations protected from forest fire, such as next to lakes and wetlands and on steep slopes facing east, where snow accumulates. Regenerating areas (0-20 years) represent 31% of forest ecosystems, while young stands (21-60 years) represent 10%. The large proportion of stands of less than 60 years can be explained by the frequent forest fires in the region.

Table 18 Forest ecosystem age classes in the study area

Age (Years)	Area (km²)	Proportion of forest ecosystems
Regeneration (0 - 20)	1,111	31
Young (21 - 60)	345	10
Mature (61 - 100)	1,410	40
Old growth (over 100)	682	19

5.1.3 Natural disturbances and logging

Recurring forest fires and, to a lesser degree, blowdown and insect infestations have significant impacts on the ecology of forest stands in the study area. The region between Lac Waswanipi, James Bay and Lac Mistassini has a high recurrence of forest fires and is known in some quarters as the “triangle of fire”. The fire-return interval is estimated at 50 to 100 years. A large proportion of forest stands never reach maturity (Ministère des Ressources naturelles, 2000). This results in a natural mosaic of many young even-aged stands[22] of varying ages created by forest fires of various sizes. Nonetheless, a percentage of stands do reach maturity, and some even become old-growth forests, although the latter is rare.

Partial and total burns affect up to 34% of forest ecosystems and represent 83% of all disturbances in the study area (Table 19 and Map 22). The forest fires of 1983, 1996 and 2005 affected large areas, each consuming between 4% and 6% of the forest ecosystems in the study area (from 133 to 227 km²).

The study area has been logged since the early 1980s. Logging took place in 6% of the study area’s productive forest.

Table 19 Forest ecosystems in the study area affected by disturbances[23]

Disturbance	Area (km²)	Proportion of total disturbances (%)	Proportion of forest ecosystems (%)
Fire	1225	83	34
Blowdown	89	6	3
Insect infestation	12	1	0
Logging (includes cut after fire)	87	6	2
Planting or fill planting	68	5	2
Precommercial thinning	24	2	1
Total	1473		

5.1.4 Forest features of interest

From a conservation perspective, a number of rare forest features in the study area are of interest (Map 23). The balsam fir (*Abies balsamea*) stands are rare and located on the islands in its large lakes. They could be an indicator of old forest ecosystems, since fir is only found in areas that have not been subject to forest fires over long periods.

The mature stands of hardwoods are also rare. The most notable are located south of Lac Assinica, around a hill south of the Rivière Brock, and on the south and southeast flanks of hills south of Lac Opataca.

Lastly, some white spruce (*Picea glauca*) trees have reached exceptional ages and sizes, but are not part of pure stands. The average age of these individuals is 200 years and they are over

22 Even-aged stand : Stand of trees of the same age.
23 Several disturbances can affect the same area.

20 metres tall. These trees have escaped forest fires. They are located in the southern portion of the study area (on the banks of the Chibougamau and Brock rivers), on islands and at the spillway on Lac Opataca and on the southern flanks of the hills north of Lac à l'Eau Noire.

5.2 WETLANDS

Wetlands – primarily peatlands – cover over 22% of the study area. A relatively flat landscape combined with insufficient drainage and clay deposits with low permeability led to the formation of many large peatland complexes, concentrated mainly in the southern portion of the area. Aquatic weed beds and alder groves are two other types of wetlands present in the study area.

Peatlands

There are two main types of peatland: bogs (ombrotrophic peatland) and fens (minerotrophic peatland).

- *Bogs*

The water in bogs is derived entirely from precipitation. As a bog develops, it acquires a dome shape, resulting in water circulating only from the centre of the bog outward to its periphery. This isolates the bog from the surrounding mineralized ground water. Consequently, it is highly acidic and nutrient-poor. Only highly-adapted plants colonize this type of peatbog. A few species of trees are able to grow, including the black spruce and tamarack (*Larix laricina*). Heath is the primary shrub present, and sedge the main herbaceous plant. Sphagnum is the dominant ground cover and is mostly responsible for the formation and accumulation of the highly acidic peat that forms the substrate of ombrotrophic bogs. There are two types of ombrotrophic bogs: flat bogs and string bogs.

In the study area, flat bogs are colonized by a uniform community of plants. They are characterized by large, low mounds of *Sphagnum fuscum* scattered with clusters of black spruce in shallow depressions. *Rubus chamaemorus* grows in the sphagnum, as do a few species of heath, mostly *Chamaedaphne calyculata* and *Kalmia angustifolia*, in a dwarf form a dozen centimetres tall. *Sarracenia purpurea* and *Eriophorum vaginatum* subsp. *spissum* occasionally appear on the mounds.

In string bogs, the types of vegetation on the ridges that separate the water surfaces vary by elevation. The immediate pond margins are colonized primarily by *Carex limosa, Rhynchospora alba* and *Scheuchzeria palustris*. On the lowest ridges, *Trichophorum cespitosum* is accompanied by *Carex limosa* and *Drosera anglica*. Ridges of medium height are covered in low mounds of *Sphagnum rubellum. Trichophorum cespitosum* grows in tufts, along with *Eriophorum vaginatum* subsp. *spissum* and *Chamaedaphne calyculata*. On the highest ridges, *Sphagnum fuscum* dominates, through which *Rubus chamaemorus* and *Chamaedaphne calyculata* grow.

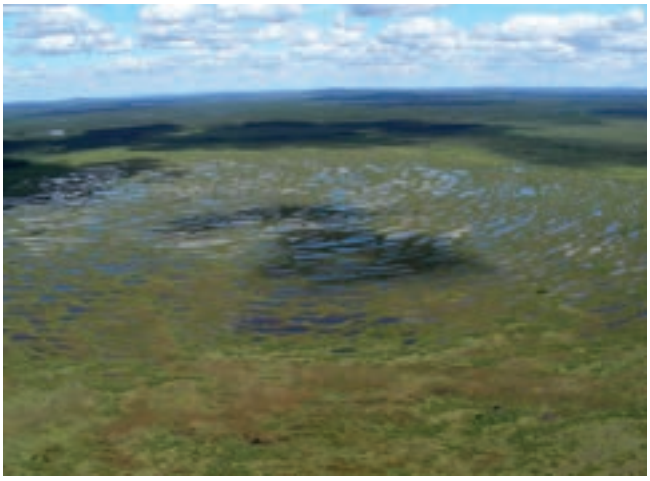

Photo 19. Circular bog north of Rivière Brock

- *Fens*

Fens are primarily fed by mineral-rich surface water or groundwater. This type of peatbog has a flat profile or slightly sloped profile. The water running through fens has varying levels of dissolved minerals, a significantly richer source of plant nutrients than rainwater. Fens have a much higher diversity of plant life than bogs.

Sedges (*Carex oligosperma*), a species that grows in the most nutrient-poor fens, dominate the fens of the study area. A thick carpet of sphagnum, dominated by *Sphagnum fallax* in the wettest sedgelands and by *Sphagnum rubellum* on sites where the water table is lowest, also covers these fens. These sedgelands are often punctuated by wetter depressions where *Sphagnum majus* and *Carex limosa* grow. However, some areas are completely devoid of sphagnum, replaced by a dense growth of fine black liverwort, accompanied by *Trichophorum cespitosum*.

In somewhat more nutrient-rich fens, other typical fen species like *Carex exilis, Menyanthes trifoliata* subsp. *verna* and *Sphagnum papillosum* are present.

Some nutrient-poor fens have long deep pools separated by raised strips that are colonized by mounds of *Sphagnum fuscum* with *Chamaedaphne calyculata* and copses of black spruce. On the margins of the pools, *Carex oligospera-Sphagnum fallax* sedgeland can be found.

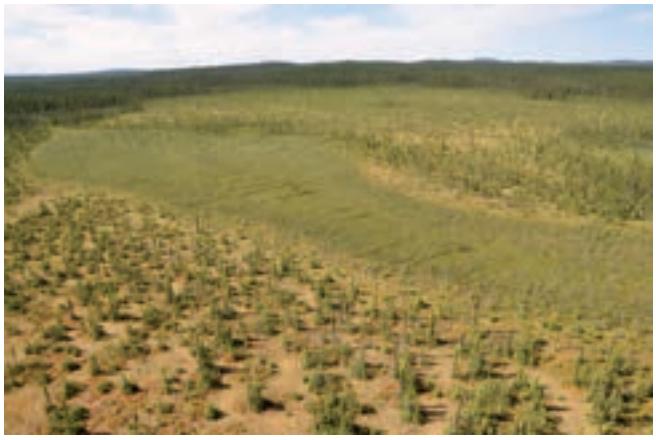

Photo 20. Fen close to rivière Brock

Marshes

Aerial surveys identified the presence of wet meadows at some wider river locations and in the bays of large lakes. These marshes were not inventoried, but based on visual observations, they appear to be dominated by various species of sedges (*Carex* spp. and *Scirpus* spp.) as well as a number of other herbaceous plants. The aquatic grass beds that were also observed may be dominated by a number of species of bur-reed (*Sparganium* spp.) and pondweed (*Potamogeton* spp.).

Alder groves

Speckled alder groves (*Alnus incana* subsp. *rugosa*) are common along the rivers and streams in the study area. Like the marshes, no inventory was carried out, but aerial surveys and field visits identified pin cherry (*Prunus pennsylvanica*), and upland willow (*Salix humilis*) in some locations, with Labrador tea (*Ledum groenlandicum*) and raspberry (*Rubus idaeus*) in the understory.

5.3 SCRUBLAND

The plants in scrublands rarely exceed shrub height. Like in the peatbogs, forest cover is under 25% . Scrubland covers over 4% of the study area. They consist primarily of a species of heath called sheep-laurel (*Kalmia angustifolia*), which is particularly well-adapted to the conditions following a fire or logging (Thiffault et al., 2005). These scrublands are mostly located west and north of Lac Assinica, where recent burns have ravaged large areas.

A number of other species from the heath family are present, but are less abundant. The most frequently-encountered is blueberry (*Vaccinium angustifolium*). Where shrub density is low, a carpet of lichens, like *Cladonia*, covers the ground. Trees, such as jack pine, white birch and black spruce as well as green alder (*Alnus viridis* subsp. *crispa*) thickets are occasionally scattered in the sheep laurel scrubland. Black spruce is the most common tree species, sometimes at a density close to that of a black spruce stand.

Photo 21. Sheep-laurel

5.4 FLORA

The vascular flora in the study area was documented by Marcel Blondeau during field studies in 2004 and 2008 (Blondeau, 2008). The botanist Jean Deshaies collected vascular plants in the territory in 1992 for studies related to the Nottaway, Broadback and Rupert hydroelectric project (Foramec Inc., Dryade, Ltd., 1992). In addition, the botanists Jean Gagnon (between 2004 and 2012) and Robert Gauthier (in 2004) collected vascular plants, bryophytes and lichens in the study area. Finally, the botanist Jean Faubert carried out a study focused primarily on bryophytes in the summers of 2009 and 2010.

5.4.1 Vascular flora

A total of 282 vascular plant species from 71 families have been identified (see list in Appendix A). The most common families are Cyperacae (50 species and 2 hybrids), Poaceae (21 species), Asteraceae (20 species), Rosaceae (17 species),

Map 21
Forest ecosystem age classes

Age classes

- Regeneration (0 - 20)
- Young (21 - 60)
- Mature (61 - 100)
- Old growth (over 100)
- Unforested
- Data non available

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

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Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

Sources

Data

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Organizations

Ministère de l'Énergie et des Ressources naturelles

Ministère des Forêts, de la Faune et des Parcs

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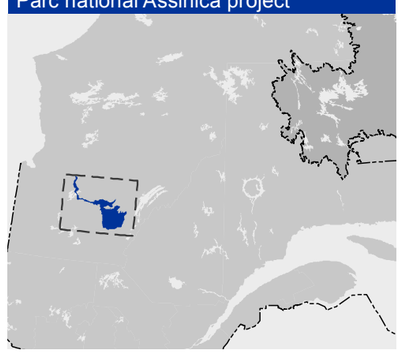

Forêts, Faune et Parcs

Québec

Map 22
Forest management and natural disturbances

Type of disturbance

- Burn
- Blowdown
- Insect infestation
- Logging (includes cut after fire)
- Planting or fill planting
- Precommercial thinning
- Data non available

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
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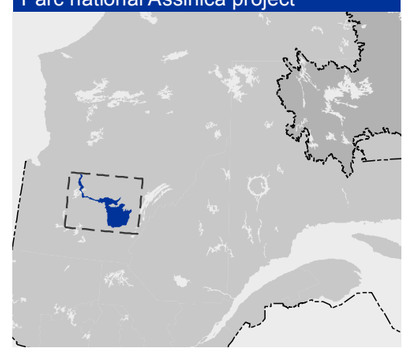

Forêts, Faune et Parcs
Québec

Map 23
Forest features of interest

Old stand

- Fir forest
- Black spruce forest
- White spruce forest
- Jack pine forest
- Mature hardwood forest
- Data non available

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

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0 10 20 30 40 km

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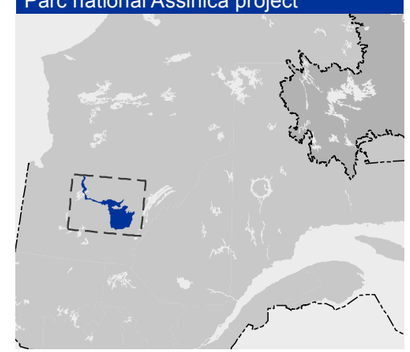


Forêts, Faune et Parcs
Québec

Ericaceae (15 species), Salicaceae (10 species) and Lycopodiaceae (10 species). The majority of the species present (198 or 70% of the vascular flora of the study area) are typical of the boreal forest. However, 54 species (19%) are typical of temperate environments and are near or at the northern limits of their ranges in Québec. Two species typical of arctic alpine environments, *Carex bigelowii* and *Huperzia selago*, are confined to exposed summits over 500 m. Finally, 16 of the vascular plant species present were introduced from Eurasia – nearly 6%, a relatively low percentage.

Threatened or vulnerable vascular plants

Two vascular plants likely to be designated threatened or vulnerable were inventoried in the study area: sand heather (*Hudsonia tomentosa*) and dragon's mouth (*Arethusa bulbosa*). Sand heather colonizes sand dunes and the sandy banks of water courses. Three communities of this species were documented in the study area: a subaerial delta north of the Rivière Broadback, the shores of Lac Labeau and a dune field at the mouth of the Rivière Brock. Dragon's mouth orchid was found in a peatbog near the Rivière Brock Nord (Centre de données sur le patrimoine naturel du Québec, May 2013).

Photo 22. Sand heather

Historical background

It is interesting to note that 25 vascular plant species in the study area were described by the French botanist André Michaux (1746-1802) based on specimens he collected during his voyage from Lake Champlain to Lac Mistassini and the Rivière Rupert in 1792 (Michaux, 1803). He also catalogued one moss and one lichen species. The names of two vascular plants and one liverwort found in the study area honour the botanist: Michaux's sedge (*Carex michauxiana*), Michaux's dwarf birch (*Betula michauxii*) and *Anastrophyllum michauxii*, a liverwort.

5.4.2 Nonvascular flora

The nonvascular flora of the study area includes bryophytes (mosses and liverworts) and lichens (see list in Appendix 4). Other major nonvascular groups (fungi, algae, myxomycetes) were not documented but are present.

Bryophytes

A review of current knowledge on the bryophytes of the study area is found in Faubert, Gagnon and Gauthier (2012). A total of 188 species from 49 families were inventoried. They include 69 species of liverwort from 22 families, 98 species of moss from 26 families and 21 species of sphagnum (peat mosses).

The most common families are the Sphagnaceae (21 species), the Dicranaceae (19 species), the Lophoziaceae (17 species), the Polytrichaceae (12 species) and Grimmiaceae (9 species).

Among these species, one, the carpet-like flapwort (*Jungermannia caespiticia*), was found for the first time in Québec. This species, along with the delicate notchwort (*Lophozia capitata*), the rounded rustwort (*Marsupella sparsifolia*) and the two-lobed flapwort (*Nardia insecta*) are on the list of bryophytes likely to be designated threatened or vulnerable in Québec.

Lichens

A total of 114 species were identified. The most common genera are the Cladonia (18 species) and the Rhizocarpon (10 species). Most of the species inventoried are typical of the boreal forest, with the exception of a number arctic species, like *Arctoparmelia centrifuga, Cetraria islandica, C. laevigata* and *Umbilicaria hyperborea. Rhizocarpon oederi*, one of the lichens associated with ferruginous rock, is rare in Québec.

5.4.3 Traditional Cree medicinal plants

Through the ages, the Cree have looked to the woods for their medicines. Their traditional medicine helped them survive disease and injury, and their knowledge has inspired advances in modern medicine. Table 20 presents some examples of how the Cree use certain plants.

Table 20 Examples of medicinal plants used by the Cree[24]

Species	Cree name	Medicinal or practical use
Serviceberry	Ottomin	The boiled bark prepared as an herbal tea is used to fight colds
Fir	Staagounn	Fir resin boiled in water is used as an antiseptic.
Tamarack	Wachinakan	An infusion of the leafless branches of young tamarack trees is used to treat coughs and consumption.
Blue flag	Otishwalwi	The rhizome, though toxic, was used to treat toothaches.
Sheep laurel	Uschischipak	An infusion of the leaves boiled in water is used to treat fatigue and shivers.
Trembling aspen	Mitus	An infusion of the wood and bark of smaller aspens boiled in water was used to treat intestinal worms.
Ledum (Labrador tea)	Kachischepak	The leaves are used as a poultice to treat the flu and pulmonary congestion.
Sphagnum	Aschi	Dried sphagnum moss was used as a baby diaper and a sanitary napkin.

Ethnobotanical studies on the use of medicinal plants were carried out in Eeyou Istchee by the researcher Alain Cuerrier of Université de Montréal in collaboration with other researchers (Cuerrier et al., 2012). In particular, they explored the use of extracts of shrubs in the Ericacae (heath) family in the treatment of diabetes.

5.5 FAUNA

A number of wildlife species found in the study area are characteristic of the boreal zone. The variety of terrestrial (forest, shrublands, and peatlands) and aquatic (lakes and streams) ecosystems give rise to a large diversity of habitats and fauna.

The information in this section is drawn from the reports of MFFP field studies carried out between 2008 and 2010 and a review of the literature on the region's fauna (Gagnon, 2011a-b-c-d).

Based on their used of the territory through the centuries, the Oujé-Bougoumou Crees have a detailed knowledge of the area and its wildlife habitats. They have identified these habitats on maps when producing forest management plans and in other projects carried out by the Cree communities. However, as the Cree consider the information on these maps to be of a sensitive nature, it is not presented in this status report for the Parc national Assinica project. The information will nonetheless be available to the director of the national park, who will be able to use it in developing the park.

5.5.1 Fish

The countless water bodies in the James Bay area are home to an abundance of fish species. Recreational fishing is a major activity. The region is famous for the number of trophy fish caught there each year. In the waters of the study area, 27 freshwater fish species are found or likely to be found (Appendix 5).

The lakes and rivers of the study area have long provided subsistence for the Cree. A special provision of the JBNQA gives them exclusive rights to fish lake sturgeon, lake whitefish, white and longnose sucker, burbot and lake herring (Table 21).

Sport fishing of yellow walleye, northern pike, lake trout and brook trout is permitted for all users of its lakes and rivers. Yellow walleye and northern pike are the two most common species and particularly prized in sport fishing.

Table 21 Main fish species identified in study area

Reserved for JBNQA beneficiaries	Suitable for sport fishing	Other
Lake sturgeon	Yellow walleye	Lake chub
Lake whitefish	Northern pike	Common shiner
White sucker	Lake trout	Spottail shiner
Longnose sucker	Brook trout	Blacknose dace
Burbot		Creek chub
Lake herring		Ninespine stickleback
		Mottled sculpin
		Yellow perch

24 Source: Cosset and Mansion, 2009 (Cosset, A. and Mansion, H, 2009. Mistissini – Terre des Cris. Édition Cornac, Québec, 197 p.)

Yellow walleye

Yellow walleye is the most common fish species in the study area and the most prized fish by sports fishermen (Paradis and Beaudet, 2004). The large annual catch and the ease of fishing this particular species makes it an ideal indicator for managing fish stocks in the large lakes of the study area (Paradis and Beaudet, 2004).

Yellow walleye spawns in the spring over rock in areas of moderate current (Scott and Crossman, 1974). Its ecological niche is associated with all sediment types and unconsolidated materials of all thicknesses (Hazel and Fortin, 1986). It is found most often in large deep lakes with irregular shores and good water oxygenation.

Photo 23. Yellow walleye from Lac Assinica

Northern pike

Northern pike is the second most harvested species. However, nearly 50% of all catches are released by anglers, who have little interest in consuming it (Société de la faune et des parcs du Québec, 2003). This species spawns in the spring, immediately after the ice melts (Scott and Crossman, 1974). It prefers to spawn in the weedy floodplains of rivers, marshes and bays on large lakes and spends the rest of its lifecycle in a variety of habitats (MDDEFP, 2013d).

Photo 24. Northern pike

Lake trout

Lake trout is another species prized by anglers in the study area, including the Cree. Their average weight is between 0.7 and 1.5 kg, though some specimens exceed 5 kg. Lake trout reproduces in the fall, in lakes and occasionally rivers with rocky or stony bottoms at a depth varying from 0.5 to 12 m. In more northern regions, its habitat includes rivers, shallow lakes and occasionally the brackish water of estuaries (MDDEFP, 2013f).

Photo 25. Lake trout

Brook trout

Brook trout, which can be found in the lakes and water courses throughout the study area, is another prized game fish (Paradis and Beaudet, 2004). Lac Assinica is known for the size of brook trout caught there, some of up to 5 kg (Paradis and Beaudet, 2004). Some specimens were used as founding stock for fish farms and stocking lakes in the states of Maine, Connecticut, Michigan and New York (National Fisheries Center-Leetown,

1981). The Broadback Fishing Camp allows only one "trophy" brook trout per customer to preserve the quality of fishing and maintain reproductive stock. However, there has been a reduction in the size of brook trout caught in recent years.

The brook trout inhabits well-oxygenated clear fresh water streams and lakes (Scott and Crossman, 1974). When surface water warms, it seeks out lower-temperature water, generally at greater depth. Similarly, in rivers, it heads to deeper water or abandons the river for a lake. Brook trout generally spawn on a gravel bed in the shallow water at the head of a stream. Reproduction can also occur on shoals in lakes where groundwater percolates up through the gravel (MDDEFP, 2013e).

In the James Bay area, the reproductive success of this species is significantly lower than in the south (Société de la faune et des parcs, undated). They reproduce later than in the south and their habitat is much less productive. As a result, they are more sensitive to the degradation or destruction of their spawning habitat.

Photo 26. Brook Trout

Endangered and vulnerable species

Lake sturgeon, which is found in the Rivière Broadback and Rivière Brock, is on the list of species likely to be designated endangered or vulnerable in Québec. The low population densities observed in the region are thought to be the result of slow individual growth rates and habitat disruptions, such as hydroelectric projects and logging road construction (Moisan and Laflamme, 1999). The very productive sections of large rivers and lake shoals with mud or gravel bottoms at a depth of 5 to 9 metres are the preferred habitats of lake sturgeon (MDDEFP, 2013c). It is occasionally found in brackish waters. It spawns in May or June in the fast-running water of rapids or at the foot of waterfalls, at shallow depths (0.6 to 4.9 m).

5.5.2 Amphibians and reptiles

Unlike regions further south, conditions in Nord-du-Québec are unfavourable to amphibian and particularly reptile species, due to its cold temperatures and short growing season (Société de la faune et des parcs du Québec, 2003). Twelve amphibian and reptile species are found in the Nord-du-Québec region (Société de la faune et des parcs du Québec, 2003). However, given the lack of inventories, large areas to cover, minimal interest in these animals and the challenges associated with observing them may explain in part the low number of species inventoried. Nonetheless, the region's many wetlands offer good habitats for few amphibian and reptile species.

Four amphibians and one reptile species were observed in the study area (Appendix 6). The amphibians were the American toad, the wood frog, the mink frog and the spring peeper. The only reptile observed was the common garter snake, which is the garter snake species with the northernmost range in Québec (Cimon, 1986). It is also the only reptile ever observed – and only sporadically at that – in the Nord-du-Québec region (Société de la faune et des parcs du Québec, 2003).

Six other species of amphibians could potentially be present at these latitudes: the eastern red-backed salamander, yellow-spotted salamander, blue-spotted salamander, two-lined salamander, green frog and leopard frog. The range of the eastern red-backed salamander overlaps the study area, but its presence has not been confirmed. The other five species were observed near the boundaries of the study area. None of the species observed or likely to be observed in the study area are endangered or vulnerable, nor are they likely to be given that designation.

5.5.3 Birds

Birds are the most diverse faunal group in the study area, with 179 species observed or likely to be present (Appendix 7) representing 44 families. The order Passeriformes is particularly well-represented, accounting for 22 of those families. Among them, the families Parulidae (New World warblers) and Emberizidae (sparrows) are well-represented, with 23 and 13 species each. Black-throated blue warblers, blackburninan warblers, bay-breasted warblers, Connecticut warblers and ovenbird are at the northern limits of their ranges and rare at this latitude (Gagnon, 2011a). They are nonetheless included in the species likely to be present in the study area since the Québec bird population database (Étude

des populations d'oiseaux du Québec) notes observations within 30 kilometres of its boundaries.

The area's proportion of aquatic environments is reflected in the presence of many associated species: 24 species of Anatidae (geese and ducks), 12 species of Scolopacidae (shorebirds) and 5 species of Laridae (seagulls and terns). Among them, the American wigeon, the blue-winged teal and the red-necked phalarope are considered rare migrators to the study area, but may be present since they have been observed in Chibougamau (Gagnon, 2011a), thirty kilometres to the south.

The Picidae and Fringillidae families are represented in the study area by 8 and 9 species, respectively. Some of these species are among the most common in the study area: the northern flicker, the Arctic three-toed woodpecker and the black-backed woodpecker among the Picidae, and the white-winged crossbill and the pine siskin among the Fringillidae. The other most commonly-observed species are: the Canada jay, the common raven, the tree swallow, the boreal chickadee, the winter wren, the ruby-crowned kinglet, the hermit thrush, the American robin, the yellow-rumped warbler, the white-throated sparrow and the dark-eyed junco. All of these species are common in Québec's boreal forests.

The red-necked grebe, common in western and central Canada, is an unexpected visitor to this region. In Québec, it has been observed in Abitibi and about one hundred kilometres from Chibougamau (Gauthier and Aubry, 1995). It is found on shallow lakes, ponds and sheltered bays bordered by emergent plants, in both forest and meadow environments.

Seventeen species of birds of prey have been observed or are likely to be observed. The diurnal birds of prey are classified into four families: the Accipitridae (hawks), Cathartidae (turkey vulture), Pandionidae (osprey) and Falconidae (falcons). The osprey, red-tailed hawk and American kestrel are the most commonly-observed species. The presence of the gyrfalcon and the turkey vulture is noteworthy. The gyrfalcon is considered an unexpected visitor, since its range extends across the arctic and subarctic regions of the northern hemisphere (Gauthier and Aubry, 1995). For its part, although the turkey vulture has been extending its range northward for a number of years, it is nonetheless considered rare or uncommon at this latitude (Gagnon, 2011a). All species of nocturnal birds of prey observed or likely to be seen are part of the Strigidae family. The most commonly-observed species in the study area is the northern hawk-owl.

Among the species in the study area, some are specific to northern regions and are therefore of ornithological interest, including the snowy owl, the gyrfalcon, the sandhill crane and the common redpoll.

Threatened or vulnerable species

The study area is home to one species listed as vulnerable in Québec – the bald eagle – and three species likely to be listed as endangered or vulnerable – the common nighthawk, the olive-sided flycatcher and the rusty blackbird (MDDEFP, 2013a). The bald eagle and the rusty blackbird nest in the study area, while the common nighthawk is considered a probable breeder (Gagnon, 2011a). Bald eagles usually nest in tall trees in mature forests near large bodies of water (Gauthier and Aubry, 1995); their nests have been observed on islands on Lac Assinica and Lac Opataca and close to the Rivière Broadback.

The red-headed woodpecker, a bird species listed as threatened in Québec, is likely to be observed in the study area. A sighting was recorded in July 2010, about 9 kilometres south of the study area (Gagnon, 2011a). This species is considered an extremely rare visitor to the region because its nesting grounds are primarily in the St. Lawrence Lowlands, and in the Outaouais, Montérégie, Estrie and Montréal regions (Gauthier and Aubry, 1995).

5.5.4 Mammals

A total of 25 mammal species have been observed in the study area, with another 21 likely to be observed (Appendix 8). Many are common in Québec, like the snowshoe hare, the eastern chipmunk, the red squirrel, the Canadian beaver, the woodchuck, the American porcupine, the striped skunk, the red fox, the grey wolf, the black bear and the moose.

Among small mammals, the southern red-backed vole, the deer mouse, the meadow jumping mouse, the cinereous shrew and the American water shrew have been observed in the study area. The rock vole, the southern bog lemming, the Norway rat, the northern short-tailed shrew and the smoky shrew could also be present since they were captured about thirty kilometres from the study area, where they are at the northern limit of their ranges (Desrosiers et al., 2002). The northern bog lemming is another species that is likely to be observed, since the area is at the southern limit of its range.

Although the moose is found in the James Bay area to the tree line, its population density is significantly lower than in southern Québec (Société de la faune et des parcs du Québec, 2003). The most recent aerial inventory of hunting zone 22, which covers the study area, was conducted in 1991. At the time, the density of moose was estimated at 0.29 individuals per 10 km² in the Assinica Wildlife Sanctuary (Paradis and Beaudet, 2004). The habitat of this large mammal consists mostly of ponds and small puddles near peatbogs (for its food supply and to cool itself off). It is also found in areas recently disturbed by fire or logging, as they are dominated by the hardwood species that it uses for food.

Photo 27. Moose

The black bear is found everywhere in Nord-du-Québec except the far north. However, due to a lack of studies, the region's black bear population is mostly undocumented (Société de la faune et des parcs du Québec, 2003). Due to the black bear's elusiveness and winter hibernation, population inventories are challenging. Since the Plan de gestion de l'ours noir 1998-2002, which estimated the population at 0.20 individuals per 10 km² in hunting zone 22, there have been no indications of density fluctuations (Lamontagne et al., 2006).

The wolf is found in the study area, and is associated with large mammals like the moose and the woodland caribou. The wolf and the black bear are the only large natural predators observed in the study area. The Canadian lynx, which is sometimes considered a large predator, is also found in the study area. Among the small predators, the American marten, the fisher, the American mink, the red fox and the arctic fox were observed. The presence of the arctic fox, a circumpolar species, is somewhat unusual, but can be explained by the fact that it occasionally heads south when food is scarce (Prescott and Richard, 1996).

Threatened or vulnerable mammal species

Le forest-dwelling ecotype of the woodland caribou, commonly known simply as the "woodland caribou", is found in the study area, particularly in its southeast and southwest, as well as around Lac Assinica. This species is listed as vulnerable in Québec (MDDEFP, 2013b). The woodland caribou is closely associated with the boreal forest. The southern limit of its range has been in constant retreat since the mid-19th century (MDDEFP, 2013b). An aerial survey of 23,850 km² conducted in March 2013 estimated the Assinica herd at 580 individuals (MFFP, unpublished). A total 509 individuals were observed, of which 31% were male, 54% female and 15% fawns[25].

Woodland caribou lives in low-density populations and has low recruitment potential, which limits population growth. However, other causes have been advanced to explain its decline (Équipe de rétablissement du caribou forestier du Québec, 2013). Alterations to its habitat and the accompanying changes to predator-prey relationships, as well as sport hunting are considered to be the primary reasons for the current historic decline of its populations across its North American range. These habitat changes are due to an increase in forest area logged and extensions to the road network, primarily for the needs of the forestry industry. The resulting improved access to the forest also disrupts the tranquility of the woodland caribou. Consequently, woodland caribou retreat into residual habitat, which makes them more vulnerable to predators.

In addition to the woodland caribou, seven species that may be present in the study area are likely to be designated endangered or vulnerable: the wolverine, the least weasel, the rock vole, the southern bog lemming, the silver-haired bat, the hoary bat and the eastern red bat. These species are rarely observed in Québec.

5.5.5 Traditional importance of wildlife to the Cree

Wildlife is an important part of Cree culture. It has been essential to their subsistence for thousands of years and dictated their movement across the territory (Francis and Morantz, 1984). The caribou was the preferred prey of Cree hunters, particularly liked for its meat, but also for its carcass, which was used to make clothing and tools.

The beaver was also much appreciated by the Cree for its meat and the quality of its pelt. It was an important part of the fur trade with Europeans, along with the marten. The black bear was highly valued by the Cree for both its meat and its religious

25 Based on the 16 active radio collars on caribou in the study area, a rate of visibility of 87.5% was calculated during the aerial survey. This rate was used to estimate the size of the Assinica herd at about 580 caribou.

symbolism. The hare was important for subsistence, although it was not abundant enough to be an exclusive part of the diet. Even more than hare, fish was an essential part of the Cree diet. Their preferred fish species were whitefish (lake herring and lake whitefish), sturgeon, trout (brook and lake trout), chub and northern pike. In addition, partridge, geese and Canada geese were the birds most hunted by the Cree.

Some animal parts were used to treat illness. Table 22 presents some examples.

Table 22 Examples of animal parts used by Cree in traditional medicine[26]

Species	Medicinal use
Beaver kidney (musk glands)	A few drops from beaver castor sacs were boiled with watsnagan branches to treat coughs, including whooping cough.
Fish skin	Fish skin was used to treat arm wounds.
Fish eggs	Fish eggs were minced, boiled, then eaten as a soup to treat constipation.
Bear bile	A few drops of bear bile in a glass of water were used to treat coughs. Women would use the bile of a male bears, while men would use the bile of a female bear.

26 Source: Cosset and Mansion, 2009 (Cosset, A. and Mansion, H, 2009. Mistissini – Terre des Cris. Édition Cornac, Québec, 197 p.)

Photo 28. Meat cooked on traditional wood fire

Photo 29. Moose hide, after tanning

6 LOCAL HISTORY AND CULTURE

6.1 AVAILABILITY OF ARCHAEOLOGICAL DATA

Archaeological data on the study area is quite limited. Before the mid-1970s, the Assinica region had never been the subject of archaeological study (Pintal, 2005). Power transmission line projects in the James Bay area (Archéotec Inc., 1978; 1979; 1983; Arkeos, 1981; Cérane Inc., 1985; 1990), and later the project to develop the Nottaway-Broadback-Rupert Hydroelectric Complex (Archéotec Inc., 1981; 1992; Codère 1992) resulted in archaeologists becoming interested in the region. In 1990, the construction of the Route du Nord and the development of the Troïlus mine made it possible to expand our knowledge of the archaeology near the limits of the study area (Arkeos, 1990; 1993; 1994; 1995). More recently, archaeological studies were carried out as part of planning for the future Parc national Assinica (Pintal, 2005; Marcoux et Bosum, 2009; Marcoux, 2010).

Between 1972 and 2009, 41 archaeological sites were inventoried in the study area (Table 23). They are listed in the Inventaire des sites archéologiques du Québec (Québec inventory of archaeological sites), produced by the Ministère de la Culture et des Communications. In addition, the Oujé-Bougoumou Crees have referred to the existence of a number of other non-inventoried sites during working meetings (Map 24).

Table 23 Archaeological and historic sites in the study area listed in the Inventaire des sites archéologiques du Québec[27]

Borden	Culture	Year of work	Nature of work[28]	Sources
EbFs-1	Prehistoric Amerindian, date indeterminate (12,000-450 BP[29])	1978	Surface survey/Survey	Groison, D. (1978) Archéotec inc. (1983)
EbFs-2	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1978	Surface survey/Survey	Groison, D. (1978) Archéotec inc. (1983)
EbFs-4	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EbFs-5	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EbFt-1	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EbFt-2	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFr-1	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFr-2	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFr-2	Modern historical Amerindian 1900-1950	2009	Survey	Marcoux, F. (2010)
EcFr-3	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFr-4	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFr-5	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	2009	Surface survey/Survey	Marcoux, F. (2010)
EcFs-1	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1981	Survey	Archéotec inc. (1983) Rocheleau, C. (1981)
EcFs-1	Modern historical Amerindian 1900-1950	1982	Survey	Bibeau, P. (1982)
EcFs-2	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1981	Survey	Bibeau, P. (1982) Archéotec inc. (1983)
EcFs-2	Modern historical Amerindian 1900-1950	1982	Survey	Rocheleau, C. (1981)
EcFs-3	Modern historical Amerindian 1900-1950	1981	Survey	Archéotec inc. (1983) Rocheleau, C. (1981)
EcFs-3	Modern historical Amerindian 1900-1950	1982	Survey	Bibeau, P. (1982)
EcFs-4	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1981	Survey	Bibeau, P. (1982) Archéotec inc. (1983)
EcFs-4	Ancient historical Amerindian 1500-1899	1982	Excavation	Rocheleau, C. (1981)
EcFs-5	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1981	Surface survey	Archéotec inc. (1983) Rocheleau, C. (1981)
EcFs-6	Prehistoric Amerindian, date indeterminate (12,000-450 BP) Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFs-7	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFs-8	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFs-9	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFt-1	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFt-2	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EcFt-3	Prehistoric Amerindian, date indeterminate (12,000-450 BP) Historical Amerindian, date indeterminate 1500-1950	2009	Survey	Marcoux, F. (2010)
EdFt-1	Modern historical Amerindian 1900-1950	2008	Survey	Marcoux, F. et J.P. Bosum (2009)
EdFt-2	Prehistoric Amerindian, date indeterminate (12,000-450 BP) Modern historical Amerindian 1900-1950	2009	Surface survey/Survey	Marcoux, F. (2010)

27 Source: Ministère de la Culture et des Communications.
28 Surface survey: Collection of surface artifacts; Survey: Preliminary excavation and inventory; Excavation: Extensive sampling of the entire site
29 BP : Before Present

Borden	Culture	Year of work	Nature of work[28]	Sources
EdFt-3	Prehistoric Amerindian, date indeterminate (12,000-450 BP) Modern historical Amerindian 1900-1950	2009	Surface survey/Survey	Marcoux, F. (2010)
EeFs-1	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1978	Surface survey/Survey	Groison, D. (1978) Archéotec inc. (1983)
EeFs-2	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1978	Surface survey	Archéotec inc. (1983) Groison, D. (1978)
EhGf-1	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1972	Surface survey	Chism, J. V. (1973) Pentz, B. (2009)
EhGf-1	Historical 1800-1899	2008	Surface survey	Roy, C. (2009)
EhGf-1	Historical 1608-1759 Historical 1760-1799 Historical 1900-1950	1988	Surface survey/Survey	Denton, D. and Chism, J. V. (1991)
EhGf-2	Historical 1900-1950	1988	Visual inspection, evaluation	Denton, D. and Chism, J. V. (1991)
EhGf-2	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	2008	Surface survey/Survey	Roy, C. (2009) Pentz, B. (2009)
EiGf-1	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	2008	Surface survey	Pentz, B. (2009)
EiGf-1	Prehistoric Amerindian, date indeterminate (12,000-450 BP)	1988	Survey	Denton, D. and J. V Chism. (1991)
EiGf-2	Amerindian	1997	Visual inspection, evaluation	Arsenault, D. and L. Gagnon (1999) Arsenault, D. (2008) Vaillancourt, P. (2003)

6.2 PREHISTORY (8,000 BP TO 1,600 AD)

6.2.1 Prehistoric presence

Over 6,000 years ago, most of the James Bay region was covered by the massive Laurentian ice sheet, which made it uninhabitable (Denton, 2012). According to Pintal (2005), Aboriginals may have occasionally visited the Assinica region on hunting expeditions between 6,000 and 5,000 BP. No group visited on a regular basis. One piece of evidence of these visits is the discovery of Mistissini quartzite, a stone from the Colline-Blanche site (on the Rivière Témiscamie east of Mistissini), in archaeological sites in Abitibi, Haute-Mauricie, Lac-Saint-Jean, Côte-Nord and even in New England and the Maritime provinces (Denton, 2012). People at the time may have visited the study area on their way to Colline-Blanche to gather quartzite.

Quartzite is a shiny fine-grained stone that is mostly white with some grey and other colours. It was prized for making stone tools, such as projectile tips, knives and scrapers. Quartzite became the most used lithic material in central Québec about 1,700 years ago (Ministère de la Culture et des Communications, 2013).

The permanent settlement of the James Bay region began about 3,500 years ago. The many domestic households unearthed in archaeological excavations in the Lac Mistassini area show that

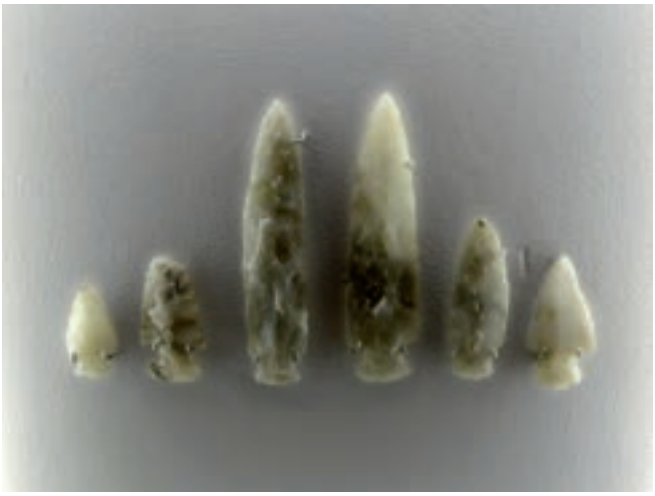


Photo 30. Quartzite projectile tips, Cree Cultural Institute

Aboriginals visited the study area on a regular basis starting about 2,000 BP (Pintal, 2005). Archaeological digs also show the presence of prehistoric domestic households in the Nemaska region (Denton and Chism, 1991). In 1948, Rogers and Rogers found arrowheads on portage trails near Lac Chibougamau and Lac au Doré, but their study did not date them (Rogers, 1967). During this expedition, they also surveyed the shores of Lac Mistassini and Lac Albanel and found a great deal of archaeological evidence of an ancient Aboriginal presence.

6.2.2 Traditional way of life of James Bay Aboriginals

Well before Europeans arrived, Aboriginals in the James Bay region were hunting (mammals and avifauna), fishing and, to a lesser degree, gathering (Francis and Morantz, 1984). These Aboriginals did not limit themselves to any specific species, but rather exploited those available to them to best advantage. The animal preferred by the hunters was the caribou, followed by the beaver (Francis and Morantz, 1984). The relative importance of caribou and beaver in the diet of James Bay Aboriginals was a function of the north-south ecological gradient. The beaver dominated in densely wooded southern regions, while caribou dominated the spruce-lichen stands in the northern portion (Denton, 2012).

Over the centuries, the ancestors of the James Bay Cree developed techniques for hunting and living in the forest, which allowed them to travel the land efficiently, survive the sometimes rigorous boreal climate and feed and clothe themselves adequately. According to Rogers (1967), a number of the tools and materials used by the Mistissini Cree remained in use until the early 1950s. Rogers (idem) presents an interesting overview of the cultural material used by the Cree around 1950, detailing articles adapted or borrowed from the European Canadians and those made by the Cree.

Photo 31. Cree making a snowshoe

The James Bay Cree had a set of religious beliefs and practices based on the need for each individual to have a personal relationship with good and evil spirits (Speck, 1935; Tanner, 1979). They believed that all living beings, including humans, have a spirit, and that each hunter must appease the spirits so that it would allowed him to kill the animal they were hunting. Hunting therefore took on a religious meaning, like all other aspects of daily life. The Cree had a wide range of other religious and supernatural beliefs and practices, like respecting the beaver and caribou spirits, destiny and healing rituals. They also placed the bones of animals they ate in trees with care and chanted to them animals in hope or in thanks for a good hunt (Francis and Morantz, 1984).

Photo 32. Bones of animals carefully placed in a tree by Crees

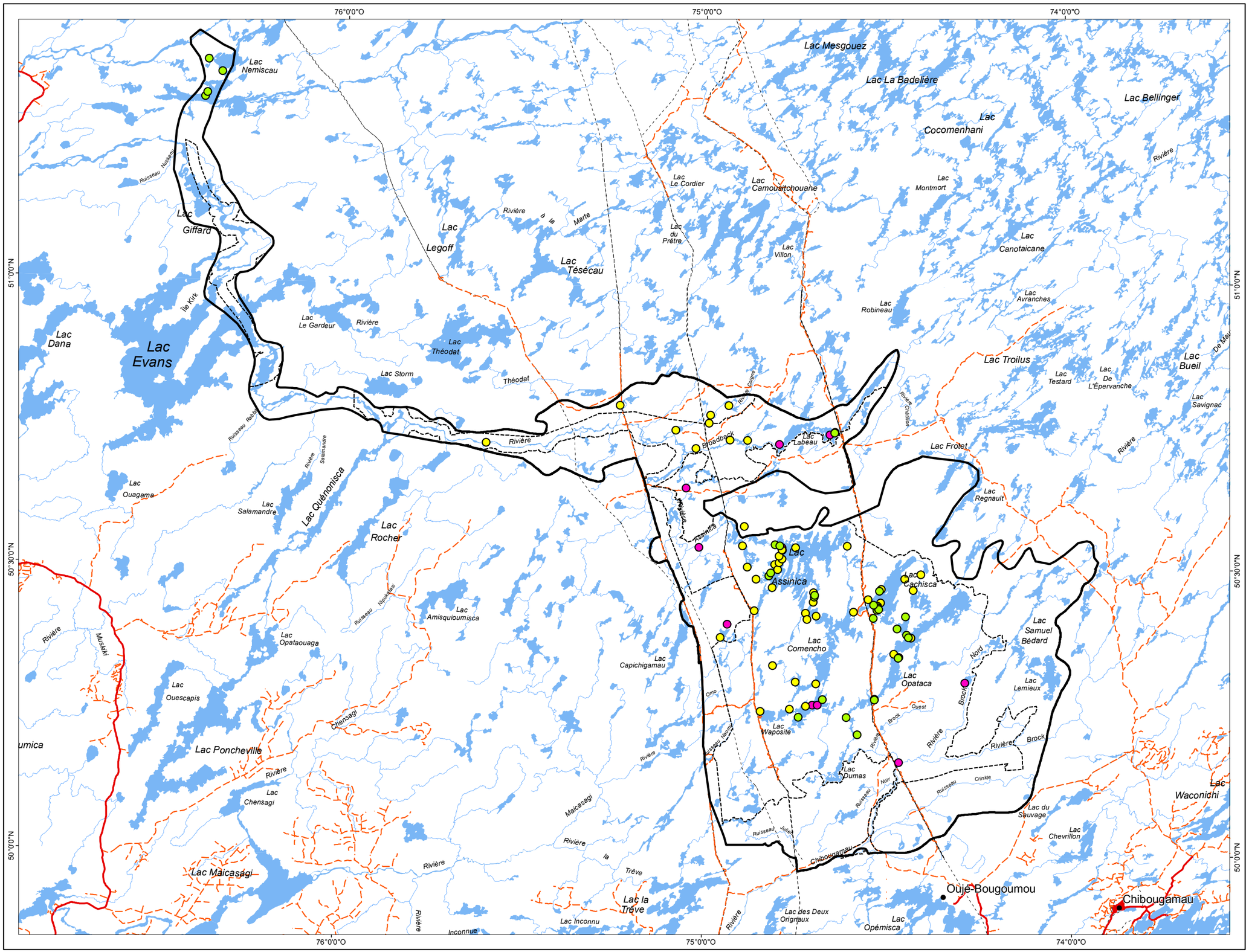
6.3 HISTORIC PERIOD (FROM 1600 AD)

6.3.1 Origin of the name Cree

The name “Cree” refers to Aboriginals who live close to James Bay. Derived from “Christinaux”, “Critinos” then “Cris”, the name was given them by the first French explorers and missionaries that encountered them. The name refers to the crosses some of them wore, which they received from Protestants (Ministère du Développement durable, de l’Environnement et des Parcs, 2005).

In 1911, the anthropologist Alanson Skinner identified the Aboriginals on the east coast of James Bay as Cree (from Western Canada), but in 1923, the anthropologist F. G. Speck challenged this assertion, arguing that the Aboriginals of the east coast had no political or social connections with the Western Cree. He preferred grouping them with the Montagnais (today known as Innu) due to the similarity of their dialects. This view is shared by linguists today (Francis and Morantz, 1984). Indeed, the Cree had regular contact with other groups in the Algonquian language family of eastern James Bay, like the Innu, the Naskapi, the Atikamekw and the Algonquin (Preston, 2012). However, because the education policies of the Anglican Church and the federal government encouraged grouping the peoples of James Bay

Map 24
Archaeological sites



Archaeological sites

- Identified site
- Site mentioned by the Cree (not excavated)
- Cree burial site

- Study area (6,198 km²)
- Parc national Assinica project (3,193 km2)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/700,000

Sources

Data

Base de données topographiques et administratives (BDTA) at the scale of 1/250,000

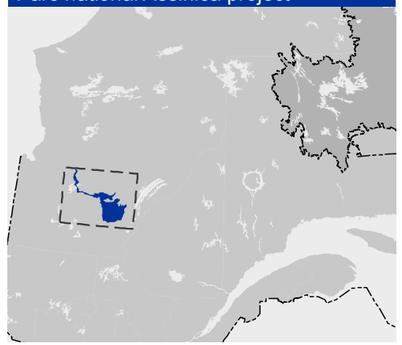
Organization

Ministère de l'Énergie et des Ressources naturelles

Produced by

Direction des parcs nationaux

Parc national Assinica project



Forêts, Faune et Parcs
Québec

with the Crees of western Canada, the Aboriginals from eastern James Bay were called "Cree". These same education policies separated the James Bay Cree from the Montagnais, since the former received an English education and the latter a French one (Francis and Morantz, 1984).

6.3.2 The fur trade

Before the arrival of Europeans, the Aboriginals of James Bay maintained close ties with those of the Québec and Côte-Nord regions, traveling through the Saguenay and Lac Saint-Jean (Pintal, 2005). The nomadic populations of the north traded what they hunted for agricultural products (cereals, corn and tobacco) produced by the sedentary populations of the south. Samuel de Champlain made the first mention of this trading network in 1603. At the time, the Aboriginals would gather in specific locations each summer. One of these, Nekoubau (Lac Ducharme), was well-known among the Aboriginals and brought together producers from as far afield as Québec, Saguenay and Trois-Rivières (Rousseau, 1999). A point was made to keep the Europeans out of this gathering (Rousseau, 1999). Jesuit missionaries mentioned this meeting during a 1661 expedition (The Crees of Waskaganish Frist Nation, 2013). This trade network ultimately provided the basis for the fur trading network.

The first recorded meeting between Europeans and James Bay Aboriginals took place in 1661. The Discovery, under the command of the famous English navigator Henry Hudson, spent the winter trapped in the ice. An Aboriginal leader is said to have visited him, making for a first contact.

The first fur trading post in Canada was established at Tadoussac, around 1600 (Rogers, 1963). Starting in 1635, French traders began exploring the interior to expand their trading territory. The first French reference to meeting "Mistassins" is dated 1642-1643. The first trading post on Lac Saint-Jean was established around 1650.

The first English fort on James Bay, Rupert House, was built in 1668, on the site of the current-day Cree village of Waskaganish (The Cree of Waskaganish First Nation, 2013). Following satisfactory results from this trading post, London awarded a fur trading monopoly to the Hudson's Bay Company over the 3 million square miles of the Hudson Bay watershed (Francis and Morantz, 1984). This territory was known as Rupert's Land, a reference to Prince Rupert of the Rhine, the first Governor of the Hudson's Bay Company and son of King Charles I of England. Several English trading posts were subsequently established on James Bay.

The French responded to this competition by increasing their presence in the interior and establishing their own trading posts (Rogers, 1963). Father Albanel visited Mistissini in 1671, with the goal of establishing a Jesuit mission in the interior. Father Albanel was accompanied by Paul Denys, who was charged with taking possession of the entire territory between the St. Lawrence River and Davis Strait, including Hudson's Bay, in the name of the King of France, and establishing a fur trade with the Aboriginals (Boileau, 1999). The first trading post in Mistissini was built in 1679 by Louis Jolliet (Collette, 2012).

The Aboriginals agreed to trade with the new European arrivals because they saw an advantage in the rare and useful articles they used to trade (Francis and Morantz, 1984). Five types of articles were traded: hunting articles (muskets, black powder, munitions, metal traps, hatchets and knives) and textile products (cloth, blankets, greatcoats, thread, needles, awls); and later in the 19th century, some food staples (biscuits, flour, porridge) and luxury items (mirrors, medals, combs, stain). Finally, brandy and tobacco were used as ceremonial trade currency between traders and Cree trading captains (Collette, 2012). Fur harvesting always remained secondary to subsistence hunting, much to the displeasure of European traders (Francis and Morantz, 1984).

For European traders, the participation of Aboriginals in the fur trade was invaluable since they did not have the skills to travel into the hinterland where fur-bearing animals were found (Francis and Morantz, 1984). The James Bay lowlands were not very inviting to the Europeans, since a large portion was covered in water, peatbogs and swamps. In addition, the rivers ran fast and there were many rapids. Thus, the first English fur traders preferred setting up along the James Bay and Rupert Bay coasts and having the Aboriginals travel to the coastal forts or trading posts in the interior (Francis and Morantz, 1984).

Over the centuries, many trading posts were set up, abandoned and reopened. They were also intermittently used by both the English and the French. The main posts in the region of the study area were on Lac Nemiscau, Big Lake (Lac Evans), Lac Waswanipi, Lac Rush, Lac Chibougamau and Lac Mistassini (Roy, 2009).

6.3.3 From trading post to Aboriginal village

Over the centuries, the trading posts changed the Crees' seasonal activities. They began travelling to the trading posts in May and June to trade pelts. While there, they celebrated reunions, marriages and baptisms. During the summer, many men found work in mines, logging camps and transporting merchandise. In the fall, the families left the trading post to return to the forest. They spent the winter ice fishing, trapping and hunting. Come spring, on their way back to the trading post, they hunted Canada goose, duck and loon and fish (Frenette, 1985). Thus, over time the trading posts became a gathering place for the Cree.

In the 1960s, to streamline administrative procedures, the Canadian government decided to register Cree bands by trading post (Frenette, 1985). This resulted in the Cree being associated with different bands and the creation of villages. Today, the bands that are associated with the villages of Nemaska, Waswanipi, Mistissini and Oujé-Bougoumou are those that visit the study area.

Nemiscau trading post

In 1661, a trading post was built on Lac Nemiscau, a widening of the Rivière Rupert in the northern tip of the study area. The trading post was used intermittently by the English and French and was permanently operated by The Hudson's Bay Company from 1908 until its closure in 1970. Without access to a store, the residents relocated to Waskaganish and Mistissini, however they made the site of the old trading post their summer home until 1979. The Crees began demanding that a new village be built. These demands were more pressing once it became clear that the village could be flooded to develop the NBR complex. In response to those demands, the new village of Nemaska was built in 1980 on Lac Champion.

The name "Nemaska" means "where the fish are plentiful" (Commission de toponymie du Québec, 2013).

Waswanipi trading post

Around 1775, the North West Company established the first year-round trading post in the Waswanipi region on Lac Goéland (Cree First Nation of Waswanipi, 2013b). The region was known to boast a high population of beavers, lynx and marten, which were prized for their coats. The post moved to Lac Waswanipi around 1800. In 1821, the North West Company merged with the Hudson's Bay Company, and switched its supply routes (previously to the south) to routes north to Fort Rupert (today the village of Waskaganish). For a century until the completion of the railway connecting it to Senneterre and southern Québec in 1914, trade in Waswanipi was linked with Fort Rupert.

The Cree began setting up their first permanent camps in Waswanipi between 1900 and 1920 (Marshall, 1987). Previously, they had only visited the post. The establishment of permanent camps can be explained by: the arrival of an Anglican missionary in Waswanipi, who established a summer school, prompting the Cree to spend the summer on the post; the construction of the rail line to Senneterre and the resulting increased contact with the south; and the development of the global fur market (Marshall, 1987). When the Hudson's Bay Company store was closed in 1965, band members initiated the planning for the construction of a village on the shores of the Rivière Waswanipi. The JBNQA made this project possible, and in 1977 the first houses were erected on the current village site.

The name Waswanipi means "reflection on the water" in Cree, a reference to the traditional night-time fishing method using torches practiced by residents (Cree First Nation of Waswanipi, 2013a).

Mistissini trading post

In 1672, Intendant Jean Talon sent Father Albanel to found a mission on the shores of Lac Mistassini with the goal of improving trading ties and limiting the influence of the Hudson's Bay Company in the James Bay area (Frenette, 1985). The first fortified French trading post was built in 1672 on the shores of Lac Mistassini by Louis Jolliet (Collette, 2012). Later, the North West Company, founded in 1779, operated the Mistassini trading post as well as posts on lakes Abitibi and Waswanipi, as it engaged in intense competition with the Hudson's Bay Company. Both companies attempted to wrest control of the James Bay fur trade from the other on several occasions, until their merger in 1821. The trading post was moved several times until 1835, when it was established on the site of the current village.

Canoe brigades organized and made up of Cree supplied the village of Mistissini from Fort Rupert until 1926, then from Lac Oskelaneo (until 1949) and from Lac Chibougamau (until 1964). In 1964, the road network reached Lac Mistassini and the village itself in 1970 (Ottertooth.com, 2013).

Over the years, Mistissini and the region's trading posts were known as Dorval House, Patagoosh, Abatagoushe, Mistassini and Baie-du-Poste (Wikipedia contributors). The region is known as a country rich in furs – particularly beaver and marten (Cree First Nation of Waswanipi, 2013b)

According to Rogers (1967), in 1953 the Mistissini trading post was a gathering place for several Cree bands which would summer there. The bands each had their spots on Baie du Poste. The Nichicun, Neoskekau and Nemaska bands formed a group to the north – near the current-day Boulevard Mistissini – where the government buildings and trading post were located. The Mistissini band camped on the land next where the Mistissini Lodge is now located, which was the site of the Hudson's Bay Company store. The Chibougamau band (now Oujé-Bougoumou) occupied the land on the other side of Baie-du-Poste.

The name Mistissini is from the Cree expression "mista assini", meaning big rock. Legend has it that a great medicine man was killed here by another, stronger medicine man and that his body was transformed into a big rock. That rock is found near the discharge of Lac Mistassini into the Rivière Rupert (Cosset and Mansion, 2009).

Until 1992, the lake and surrounding area were known as "Mistassini". At the request of the Cree, the Commission de toponymie du Québec changed the village name to "Mistissini". The lake however retained its original name (Cosset and Mansion, 2009).

Oujé-Bougoumou trading post

In 1815, the Hudson's Bay Company established the trading post on Lac Rush, near the current village of Oujé-Bougoumou. The post was closed in 1822 after the two companies merged (Cournoyer, 2012). In 1909, following the construction of a winter road between Saint-Félicien and Lac Chibougamau, the Hudson's Bay Company established a trading post on the shore of Lac Chibougamau (Frenette, 1985). The local Cree started visiting the post for supplies and to meet, and the Hudson's Bay Company identified them as the Chibougamau band. Among the Cree, the band was known as the Oujibogamau innu, "Lake Chibougamau people".

Although the Hudson's Bay Company closed Chibougamau trading post in the early 1940s, the Chibougamau Cree continued to come to the area near the lake. Their encampments were relocated multiple times to make way for road construction or mining activities. Without a permanent camp, the Cree were most often spread out, and, for administrative reasons, were associated with the Mistissini band. The government of Canada strongly encouraged them to settle in the village of Mistissini, but many did not feel at home (Frenette, 1985).

During the negotiations leading up to the JBNQA, the Chibougamau Cree unsuccessfully pressured the governments of Canada and Québec to recognize their identity. This pressure increased in 1984, and, in 1989, an agreement between the Chibougamau Cree and the Gouvernement du Québec set aside the land needed to establish the community. Its official recognition as a band was then negotiated with the Government of Canada. A 1992 agreement made it possible to establish the village of Oujé-Bougoumou at its current location on the shore of Lac Opémisca.

Since then, the village has been recognized by a number of international organizations, which it lists on its website: a United Nations award "for our efforts in the course of constructing our new village", the Together Foundation and the United Nations Centre for Human Settlements "Best Practices for Human Settlements" designation, recognition from the International Advisory Board to Expo 2000 as an example of "the balancing of mankind, nature, and technology", an honourable mention from the Canada Mortgage and Housing Corporation (CMHC) for "housing innovations", and the Global Citizen Award from the United Nations Association for "having built a community which was both environmentally and people-friendly" (Oujé-Bougoumou, 2013).

6.3.4 Exploitation of natural resources and the founding of non-Aboriginal towns

In 1870, the Geological Survey of Canada sent geologists to explore the territory north of Lac Saint-Jean (Boileau, 1999). One of the areas they visited was Lac Chibougamau. Their reports refer to a number of deposits of interest, particularly in the Lac Opémiska and Lac Chibougamau areas (Girard, 2012b). A number of reconnaissance expeditions were carried out over a thirty year period, but it would not be until 1903 that the region's mineral resources were uncovered (Boileau, 1999). Peter McKenzie found gold at Pointe Copper on Île du Portage on Lac Chibougamau (Frenette, 1985). In 1906, over 250 prospectors spent the summer in the area. With this amount of interest, the Québec government of the day was under a great deal of pressure to build access roads to the area. The Premier of Québec and the Minister of Mines decided to create the Chibougamau Mining Commission (Boileau, 1999). However, given the Commission's

negative recommendations in its 1910 report and the historical context of the Great Depression of 1930 and the two world wars (1914-1918 and 1939-1945), mining did not begin until the late 1940s (Girard, 2012a).

Between 1960 and 1972, the Chapais-Chibougamau mining camp was the largest producer of copper in eastern Canada (Girard, 2012b). Copper production reached its peak in 1971. Around that time, gold became very important on global markets, much to the benefit of the region. Year after year, the camp's mines were responsible for 25%, 24% and 17%, respectively, of Québec's gold, copper and silver production (Girard, 2012b). In the 1960s and 1970s, the mining sector was the economic driver of the southern James Bay region.

Forestry also made major contributions to the development of towns and the economic prosperity of the James Bay region. The first logging took place in 1943 at Rapide-des-Cèdres, near Lebel-sur-Quévillon. That year, over 1200 workers lived in bush camps and cut wood for mills in Ontario (Girard, 2012b). The first sawmill was built in 1948 in Rapide-des-Cèdres.

The development of the mining and logging industries led to non-Aboriginals settling in the region and the founding of several towns. Chibougamau was the first such town in the Assinica region, founded in 1954 (Girard, 2012a) when demand for the region's metals grew following the Second World War. In addition to the mining sector, Chibougamau became a major logging town with the arrival of Chantiers Chibougamau in 1963. At the time, this family business supplied the wood needed for building mining structures.

The Ville de Chapais was incorporated in 1955 as a mining village (Girard, 2012a). The village grew and its economy diversified with the construction of the Produits forestiers Chapais mill in 1974. The following year, the company sold the mill and its assets to Barette-Chapais Inc.

6.4 CREE TRADITIONS: A LIVING CULTURE

Most Crees over 50 were born in the forest, and, until recently, those who died in the forest were buried there. People remember the locations of these burial sites and return from time to time, passing down their locations from generation to generation. As they are sacred to the Cree, many prefer not to share their locations in public documents. Thus, most of these sites are not presented in this document, but their locations are known by the community. As the need arises, the future park manager – the Oujé-Bougoumou Crees – will have to contact the respective communities to set up a process to share this information.

Through the years, the Cree have built many encampments in the study area. Still today, encampments used by Cree families during different periods can be found in the area. The location of these camps will later be shared with the future park manager.

Cree culture is expressed in the Cree language, which is spoken in the villages to this day. Its expression can also be found in the placenames of the area. In some cases, these toponyms describe the environment (hydrography, topography or geomorphology), in other cases, they warn of potential danger (such as thin ice), point to the best places to hunt or fish, or refer to stories or legends. The hydrography, flora and fauna sections of this document refer to some of the Cree placenames and words connected to the study area.

Photo 33. Walking Out Ceremony in Oujé-Bougoumou

The Cree are deeply rooted in their traditions and ceremonies and go to great lengths to preserve them. For example, the Walking Out Ceremony, which almost disappeared thirty years ago, is now held once every spring at sunrise. It marks the first steps a child takes outdoors and teaches respect for nature and all it offers. A similar ceremony is held in the winter to mark the first steps

in snowshoes. The Cree organize other community activaties to promote and pass down Cree culture. Elders have an important role in teaching the younger generations about their culture and ceremonies (Lathoud, 2005).

Photo 34. Passing down traditions amongs a Cree family

The mission of the Aanischaaukamikw Cree Cultural Institute in Oujé-Bougoumou is to capture, maintain, share, celebrate, and practice Cree culture. It houses a museum, an archive, a library, a learning space and a cultural centre. Its architecture joins together Cree tradition and modern design to make the Institute a place where Cree stories, legends, music, images and objects can be all brought together and shared.

Photo 35. Aanischaaukamikw Cree Cultural Institute in Oujé-Bougoumou

7 TERRITORY

7.1 JBNQA LAND DIVISION

The entire study area is located on lands in the domain of the State. It is also on the territory of the James Bay and Northern Quebec Agreement (JBNQA), which divided the land into three categories. Category I and II lands were set assigned to each Cree and Inuit community and allocated based on the population of beneficiaries at the time of the signing of the JBNQA. Essentially all land not in Categories I and II falls into Category III.

This national park project does not affect any Category I lands. Nearly 1,684 km² of Category II lands associated with the Oujé-Bougoumou Cree community are found in the study area (Map 25). In addition, 18 km² along the Rivière Broadback are Category II lands of the Waswanipi Cree community. The remainder of the study area is located on Category III lands.

The Category II lands are in the domain of the State. As specified by the JBNQA, the James Bay Cree have exclusive rights to hunt, fish and trap. They also have the exclusive right to establish and operate outfitter operations on these lands. Non-beneficiaries of the JBNQA must obtain the consent of the Cree to hunt and to fish.

On Category III lands, the Cree have exclusive trapping rights (with some exceptions in the southern portion of the territory covered by the agreement) and have a pre-emption right to acquire outfitter operations. Non-beneficiaries of the JBNQA may engage in sport hunting and fishing, as well as commercial fishing, under certain conditions.

Once the park is created, beneficiaries will continue to benefit from their rights and advantages under the JBNQA. Thus, they will be able to continue to hunt, fish and trap, in accordance with the terms of the JBNQA.

7.2 HUNTING, FISHING AND TRAPPING

Beaver reserves were put in place between 1938 and 1948 to allow its population to rebound following a significant drop. Only Aboriginals may trap these fur-bearing animals within the beaver reserves. Three beaver reserves are located in the study area: Mistassini, Nottaway and Abitibi (Map 25).

7.2.1 Hunting

An Act respecting hunting and fishing rights in the James Bay and New Québec territories (CQLR c D-13.1) implemented the provisions of Section 24 of the JBNQA on the rights of beneficiaries to harvest wildlife and established the terms and zones of application in the territory. Sport hunting is permitted for non-beneficiaries of the JBNQA on Category III lands, under certain conditions. In all cases, the principle of conservation of the resource takes precedence over all other rights and is the basis for wildlife management.

Québec is divided into 29 hunting and fishing zones that allow for the application of specific rules by species. The study area is covered by hunting zone 22 (Gouvernement du Québec, 2008), in which the use of crossbows is not permitted. Under the hunting regulations for the 2013-2014 season, only JBNQA beneficiaries may hunt caribou (ministère des Forêts, de la Faune et des Parcs, 2014). Hunting small game (snowshoe hare, ruffed grouse and spruce grouse) and moose is permitted for non-beneficiaries.

With regards to hunting moose, harvesting adult males and calves is permitted every year, but harvesting adult females is only permitted in alternate years (in 2013, 2015, 2017 and 2019). According to ministère des Forêts, de la Faune et des Parcs 2013 hunting data for zone 22, 2 adult males were harvested by bow and 138 by rifle, and 43 females and 6 calves were harvested by rifle (ministère des Forêts, de la Faune et des Parcs, 2013).

Table 24 2012 Sport fishing statistics – Assinica Wildlife Sanctuary

Fishing location	Fishing effort (R-D)	YELLOW WALLEYE			NORTHERN PIKE			LAKE TROUT			BROOK TROUT		
		#	Catches* Fish/ Day	Mass Average (kg)	#	Catches* Fish/ Day	Mass Average (kg)	#	Catches* Fish/ Day	Mass Average (kg)	#	Catches* Fish/ Day	Mass Average (kg)
Baie Moléon	82	692	8,44	0,801	164	2,00	1,814	–	–	–	–	–	–
Lac Assinica	253	3 140	12,41	–	390	1,54	3,813	–	–	–	16	0,06	1,057
Lac Cachisca	247	1 951	7,90	0,914	150	0,61	1,865	–	–	–	–	–	–
Lac Comencho	350	3 370	9,63	1,073	357	1,02	2,373	–	–	–	–	–	–
Lac Frotet	357	3 311	8,83	0,829	940	2,51	1,571	–	–	–	1	0,00	–
Lacs Labeau et Jacquin	64	706	11,03	0,799	80	1,25	2,814	–	–	–	–	–	–
Lac Lemieux	180	1 374	7,63	1,151	311	1,73	2,377	–	–	–	–	–	–
Lac Mineray	6	57	9,50	1,361	21	3,50	2,500	–	–	–	–	–	–
Lac Opataca	502	3 933	7,83	0,781	257	0,51	2,121	–	–	–	1	0,00	2,270
Lac Perkins	2	2	1,00	0,750	1	0,50	–	–	–	–	–	–	–
Lac Pétrée	36	328	9,11	0,998	72	2,00	1,175	–	–	–	–	–	–
Lac Samuel-Bédard	156	1 480	9,49	0,820	277	1,78	2,171	–	–	–	–	–	–
Lac Waposite	19	449	23,63	–	12	0,63	–-	3	0,16	–	–	–	–
Riv. Assinica	2	3	1,50	1,360	3	1,50	–	2	1,00	0,170	–	–	–
Riv. Broadback	87	196	2,25	0,889	20	0,23	2,162	1	0,01	0,700	–	–	–
Total	2 354	8 424	274,15	25,898	700	46,84	35,607	3	0,12	10,000	51	11,25	4,535

* Includes catch and release

Source : Sepaq, 2012

7.2.2 Fishing

The study area is part of fishing zone 22 south (Gouvernement du Québec, 2010). JBNQA beneficiaries have exclusive fishing rights for lake herring (non-anadromous), sturgeon, chub, burbot, goldeye and mooneye on the territory governed by the agreement. Sport fishing is permitted for non-beneficiaries of the JBNQA on Category III lands, under certain conditions. They may also fish on Category II lands, but only with the authorization of the local Cree community.

According to 2011 sport fishing statistics for Assinica Wildlife Sanctuary (SEPAQ, 2012), the most popular fish species are yellow walleye (the most-fished species) and northern pike (Table 24). Lake trout and brook trout have a limited presence. The most-visited lakes in the study area are: Opataca (381 person-days), Assinica (360), Cachisca (271), Comencho (247), Lemieux (201), Samuel-Bédard (169) and Frotet (159).

7.2.3 Trapping

JBNQA beneficiaries have exclusive trapping rights on the territory governed by the agreement (with some exceptions in the southern area). The Cree maintain a network of traplines, allocated by community, on Category I, II and III lands and assign a tallyman for each trapline (Map 25). The tallyman supervises wildlife harvesting activities on the trapline entrusted to him by his community. The study area includes 28 traplines, of which 9 are controlled by the Waswanipi community, 8 by the Mistissini community, 7 by the Oujé-Bougoumou community and 4 by the Nemaska community (Table 25 and 26).

Photo 36. Crees installing a trap

Table 25 2012-2013 Trapping statistics for furbearer management units (UGAF) that include the study area[30]

UGAF	Weasel	Beaver	Coyote	Squirrel	Wolf	Otter	Canadian lynx	Bobcat	Marten	Skunk
87	0	40	1	0	1	4	7	1	127	0
88	0	314	1	0	5	10	28	0	239	0
90	0	26	0	0	0	3	3	0	64	0
91	4	412	1	0	8	47	24	0	429	0

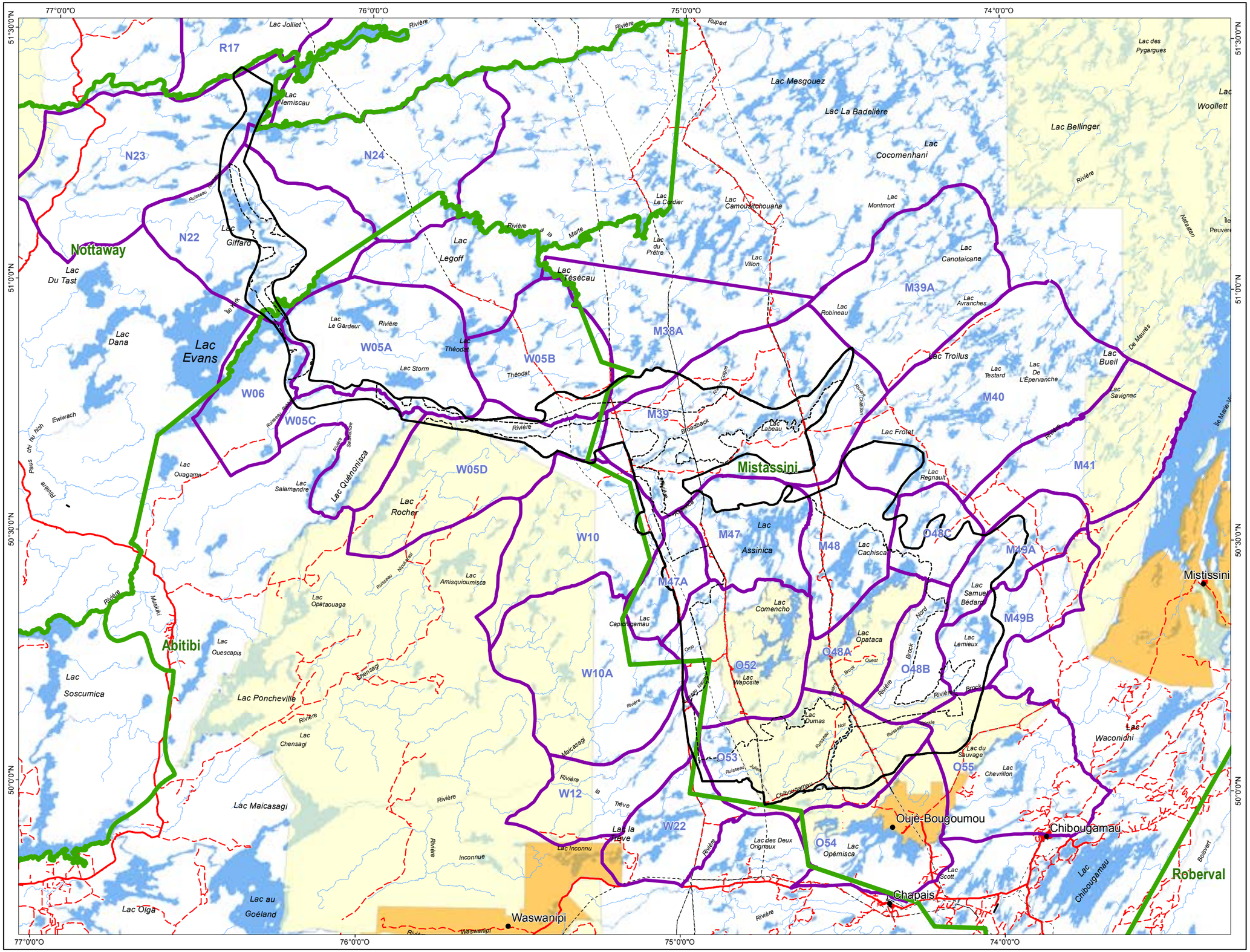
Source : Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs, 2013h.

30 Trapping statistics take into account the annual number of raw pelts, by species and by Furbearer Management Unit (UGAF). They are based exclusively on declarations made by trappers or hunters when selling their raw pelts. These statistics do not correspond to the annual trapping harvest for each UGAF, but rather the number of pelts sold each year. For species that have the status of both furbearing and game animal (black bear, wolf, coyote, fox and racoon), these statistics may also include animals that have been harvested by hunting. The reporting period runs from September 1 to August 31 of the following year.

Table 26 Traplines in the study area

Number	Tallyman	Community	Area in study area (km²)	Percentage of study area	Area in the National Park Reserve (km²)	Percentage of the National Park Reserve
M38A	Joseph Trapper	Mistissini	64	1	5	0
M39	Murray Neeposh	Mistissini	870	14	410	13
M40	Simeon Petawabano	Mistissini	141	2	–	–
M47	John Bosum and Jimmy Bosum	Mistissini	438	7	415	13
M47A	Charlie John Coon and Denis Coon	Mistissini	160	3	63	2
M48	William Bosum Jr.	Mistissini	513	8	349	11
M49A	Mary Mianscum	Mistissini	190	3	–	–
M49B	Willie Mianscum	Mistissini	199	3	26	1
		Total	2575	42	1268	40
N22	Isaiah Jolly	Nemaska	297	5	151	5
N23	Abel Wapachee	Nemaska	96	2	–	–
N24	Andrew Moar	Nemaska	6	0	–	–
R17	William Wapachee	Nemaska	3	0	–	–
		Total	403	7	151	6
O48A	Sam JP Bosum	Oujé-Bougoumou	411	7	408	13
O48B	David G. Bosum Jr.	Oujé-Bougoumou	344	6	206	6
O48C	Robert S. Blacksmith	Oujé-Bougoumou	181	3	38	1
O52	David Bosum Sr.	Oujé-Bougoumou	792	13	692	22
O53	Charlie Bosum	Oujé-Bougoumou	770	12	182	6
O54	Johnny and Walter Capissisit	Oujé-Bougoumou	6	0	–	–
O55	Wesley Mianscum	Oujé-Bougoumou	117	2	16	0
		Total	2621	43	1554	48
W05A	Don Saganash	Waswanipi	109	2	53	2
W05B	Abel Kitchen and Robert Kitchen	Waswanipi	78	1	25	1
W05C	Bruno Blacksmith	Waswanipi	69	1	19	1
W05D	Wally Saganash	Waswanipi	210	3	87	3
W06	Randy Ottereyes	Waswanipi	38	1	28	1
W10	Joseph Neeposh and George Neeposh	Waswanipi	43	1	5	0
W10A	Johnny Trapper	Waswanipi	3	0	–	–
W12	Simeon Mianscum	Waswanipi	33	1	7	0
W22	Willy Wapachee	Waswanipi	13	0	2	0
		Total	594	10	226	7

Map 25
JBNQA Category I, II and III lands and trapping areas



Category I lands
Category II lands
Category III lands
Beaver reserve
Trapline

Study area (6,198 km²)
Parc national Assinica project (3,193 km2)

Paved road
Unpaved road
Power transmission line

Note 1: The limits of the Oujé-Bougoumou Category I and II lands shown are not official.

Note 2: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/800,000

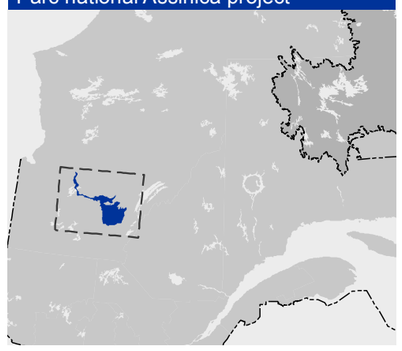
Sources

Data	Organizations
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000	Ministère de l'Énergie et des Ressources naturelles
Trapping areas	Administration Régionale Crie

Produced by

Direction des parcs nationaux

Parc national Assinica project



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7.3 COMMERCIAL USES

7.3.1 Logging

The study area overlaps management units 26-61, 26-63, 26 64, 26-65, 86-65 and 86-66 (Map 26). These units are the territorial reference units for managing forest on public lands (Ministère des Forêts, de la Faune et des Parcs, 2014). At the time of the creation of the Assinica national park reserve in 2011, the study area included areas under two forest management agreements (FMAs) with Corporation foncière de Waswanipi and Corporation forestière Eenatuk. These FMAs gave the holder right to harvest wood from public land and sell it to wood processing companies. The study area was also subject to nine timber supply and forest management agreements (TSFMA). These TSFMAs were held by mill owners: Barrette Chapais ltée, Bois K.M.S (GMI) ltée, Les Chantiers Chibougamau ltée, Papiers de publication Kruger inc. (Trois-Rivières), les Entreprises Alain Maltais inc., Produits forestiers Nabakatuk 2008, S.E.n.C., Industries Norbord inc. (La Sarre-Panneaux), Matériaux Blanchet inc., Scierie Landrienne inc., Abitibi Bowater Canada inc. (now Produits forestiers Résolu) Division Comtois and Eacom Timber Corporation (Matagami). A TSFMA guaranteed a long term supply in terms of wood volume but required the agreement holder to manage the forests to maintain or even increase its production.

The coming into force of the new forest regime in April 2013 brought major changes to forest management, including the manner in which timber rights are awarded. FMAs were replaced by permits to harvest timber to supply a wood processing plant. These permits are allocated by management unit. Two companies hold permits in the study area: Corporation foncière de Waswanipi (management units 026-63 and 26-65) and Corporation forestière Eenatuk (management units 26-61 and 26-62). The TSFMAs were replaced by timber supply guarantees that are now awarded by region, in contrast to TSFMAs, which were awarded by management unit. The companies that held harvesting rights in 2013 in the Nord-du-Québec region are listed in Table 27. Note that since timber supply guarantees are awarded by region, not all of these companies harvest timber in the study area.

The territory covered by the Assinica national park reserve was withdrawn from the allowable cut in 2011 and is no longer subject to forestry operations. In addition, the northern territorial limit of awarded timber crosses the northern tip of the study area. Commercial timber harvesting is not permitted north of this limit, which already excluded 415 km² from forestry operations, or 7% of the study area.

A logging camp is located near the study area, on a road that runs along power lines 7081 and 7082, near the Rivière Assinica. It is operated by Barrette-Chapais.

The first logging took place in the early 1980s. Approximately 5% of the study area has been subject to forestry operations, such as logging, precommercial thinning and planting (see Section 5.1.3). A little more than 1,300 km of logging roads cover the study area (Map 26 and Table 28).

Table 27 Supply guarantees and timber harvest licences to supply wood processors awarded in Nord-Du-Québec Region[31]

Type[32]	Name of company	Species/Species group[33]	Volume (m^3)
GA	Bois K.M.S. (GMI) Itée	Jack pine	700
GA	PF Résolu Canada (Senneterre)	SEPM	35,300
GA	Tembec (Senneterre)	SEPM	76,900
GA	Tembec (La Sarre)	SEPM	343,500
GA	Eacom Timber Corporation (Matagami)	SEPM	308,700
GA	Scierie Landrienne inc.	SEPM	132,700
GA	Matériaux Blanchet inc. (Amos)	SEPM	133,350
GA	PF Résolu Canada (Comtois)	SEPM	411,200
GA	Industries Norbord inc. (La Sarre Panneaux)	White birch	4,850
GA	Industries Norbord inc. (La Sarre Panneaux)	Poplar	68,550
GA	Industries Norbord inc. (Val-d'Or)	Poplar	16,700
GA	Barrette-Chapais Itée	SEPM	410,200
GA	Les Chantiers de Chibougamau Itée	SEPM	306,100
GA	Produits forestiers Nabakatuk 2008, S.E.N.C.	SEPM	70,000
GA	Les Entreprises Alain Maltais inc.	Hardwood	200
GA	Les Entreprises Alain Maltais inc.	Poplar	200
PRAU	Corporation foncière de Waswanipi – 026-63	SEPM	60,100
PRAU	Corporation foncière de Waswanipi – 026-65	SEPM	64,900
PRAU	Corporation forestière Eenatuk – 026-61	SEPM	59,800

Table 28 Logging roads in the study area and the park reserve

Road class[34]	Study area (km^2)	Park reserve (km^2)	Total (km^2)
Class 2	37	0	38
Class 3	317	249	566
Class 4	121	83	203
Winter road	236	98	335
Unknown	67	58	125
Total	812	495	1308

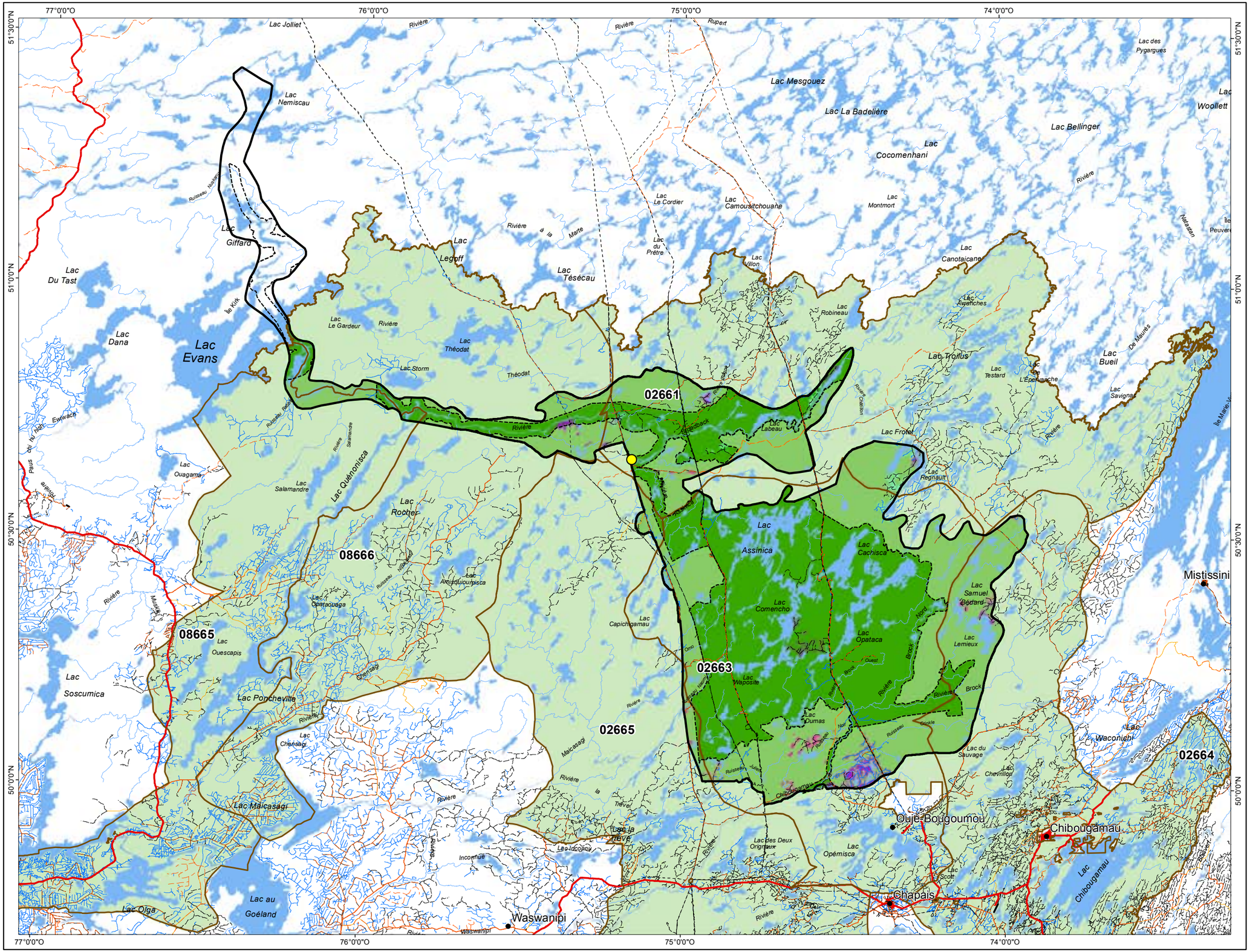
31 The licence holders operating within the study area cannot be determined since supply guarantees are awarded for the entire region.

32 GA:Garantie d'approvisionnement, or Timber Supply guarantee; PRAU: Permis de récolte aux fins de l'approvisionnement d'une usine de transformation du bois or Permit to Harvest Timber to Supply a Wood Processing Plant.

33 The SEPM is the French acronym for the group that includes balsam fir, white spruce, black spruce, jack pine and tamarack.

34 Road classes are based on thickness of road surface, materials used and maximum speed allowed. For example, a Class 2 road is wider and the speed limit is higher than a Class 3 road.

Map 26
Forestry



Management unit

Management unit

Forestry operation

- Cut
- Reforestation
- Thinning
- Post-burn salvage logging

Logging road class

- Class 1
- Class 2
- Classes 3 and 4
- Winter road

Study area (6,198 km²)

Réserve de parc national (3 193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

Metadata

Geodetic reference system	NAD83; compatible with WGS84
Map projection	Lambert conformal conic, with two standard parallels (46° and 60°)

0 10 20 30 40 km

1/800,000

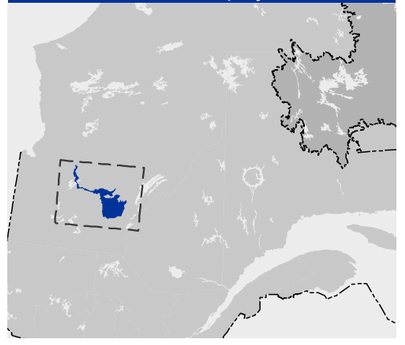
Sources

Data	Organizations
Base de données topographiques et administratives (BDTA) at the scale of 1/250,000 Extract from SIEF (December 2013)	Ministère de l'Énergie et des Ressources naturelles Ministère des Forêts, de la Faune et des Parcs

Produced by

Direction des parcs nationaux

Parc national Assinica project



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7.3.2 Hydro-electricity facilities

Hydro-Québec operates five power transmission lines that cross the study area (Table 32 and Map 27). These five lines are excluded from the park reserve and will be excluded from Parc national Assinica upon its creation.

Hydro-Québec built a number of roads during the construction of these power lines, some of which continue to be used for maintenance. The primary access routes to the territory run along the power line. Some access roads have now closed up due to vegetation growth and are difficult to visually identify. However, Hydro-Québec may need to use these roads in the future. Prior to maintaining or reopening these roads, the Hydro-Québec must seek MFFP authorization, as required by the Park Act.

Table 29 Hydro-Québec power transmission lines in the study area

Power transmission line	Substations connected by the line	Land access number (MAD)	Width of right-of-way (m)
Lines 7076 and 7077 (735 kV)	Chibougamau – Albanel	205-T	199
Lines 7081 and 7082 (735 kV)	Abitibi – Nemiscau	220-T	162
Line 7080 (735 kV)	Abitibi – Nemiscau	223-T	122
Line 7078 (735 kV)	Chissibi – Jacques-Cartier	261-T	90
Lines 4003 and 4004 (450 kV)	Des Cantons – Radisson	102-T	60

7.3.3 Mineral exploration and gravel pits

Between 1991 and 2004, the Ministère de l'Énergie et des Ressources naturelles issued 38 surface mineral leases (sand and gravel) in the study area, including 23 within the Assinica national park reserve (Map 27 and Table 30). All of these leases have since expired. Other sites were also used as gravel pits before 1991, but today they are difficult or impossible to discern.

Since 2006, a portion of the territory north of Lac Assinica is a land reserved to the State, limiting mining exploration and extraction to sand and gravel. Since 2007, most of the study area has been subject to exploration prohibitions and a suspension of issuing mineral titles. In the portion of the study area where the prohibition and suspension are not in force, 18 mineral titles were active as of January 6, 2014. In addition, 32 metallic and 7 non-metallic indicators[35] are found within this area. Seven metallic and 1 non-metallic indicators are found in the Assinica national park reserve. The metallic indicators and the many mineral titles in the study area and its surrounding area show a strong potential in gold, silver, zinc and copper. The non-metallic indicators show strong potential for architectural stone.

Table 30 Surface mineral leases issued (but expired)

Type of right	Study area	Park reserve
Surface mineral lease	38	23
Non-exclusive lease	35	21
Authorization without lease	3	2
Leases issued before 1991	3	1

7.3.4 Controled wildlife territory

Two non-exclusive outfitter camp leases have been granted in the study area (Map 27). Both are held by Cree businesses. One is for a parcel on the shore of Lac Assinica and is held by Oujé-Bougoumou Enterprises Inc., doing business as Broadback Fishing Camp. This outfitter is accessible by float plane from Lac Caché near Chibougamau. It is also within the national park reserve. The other lease is for a parcel on the shore of Lac Evans and is held by Américri Ltd., doing business as Bushland Adventures. This outfitter is accessible by float plane from the water aerodrome at kilometre 237 on the James Bay highway. Both outfitters offer sport fishing. Their respective areas of operation

Photo 37. Broadback Fishing Camp on Lac Assinica

35 An indicator is a site where the concentration of a mineral exceeds normal thresholds. The threshold is different for each mineral species, and is determined by the Ministère de l'Énergie et des Ressources naturelles.

coincide in part with the study area and the Assinica national park reserve (Map 5).

In addition, the area of operation of the non-exclusive outfitter Pavillon Square Tail Lodge (a non-Cree company) coincides in part with the study area in the Lac Frotet and Lac Regnault area (Map 5). None of this outfitter's facilities are located within the study area.

All outfitters who want to offer activities in the park will have to sign an agreement with MFFP.

The study area and Assinica national park reserve overlap with part of the Assinica Wildlife Sanctuary. Hence, the creation of Parc national Assinica will result in modifications to the boundaries of the wildlife sanctuary.

7.4 LAND USE RIGHTS

7.4.1 Vacation leases and rough shelter

The Ministère de l'Énergie et des Ressources naturelles has granted two vacation leases for parcels on the north bank of the Rivière Broadback (at the outlet of Lac Quenonisca, Map 27). It has also awarded six leases for the construction of rough shelter on parcels along or near the Rivière Broadback (3 on the Rivière Broadback, 2 on Lac Evans and 1 on Rivière Salamandre, a tributary of the Broadback).

Vacation leases allow the leaseholder to build a cabin on the assigned parcel of land. Parcels are generally 4,000 m2. The rough shelter lease allows for the construction of a shelter with no permanent foundation, with a platform not exceeding 20 m2 on an area of 100 m2.

It should be noted that a number of tallymen have mentioned the presence of illegal camps in the study area.

In addition, the Cree have built encampments in a number of locations in the study area. Since they are not required to obtain authorization to build encampments, the government does not have any information about their locations, although their locations are well-known by the Cree users of the land. JBNQA beneficiaries will retain these encampments and the right to build new ones once the national park is created.

Photo 38. Temporary Cree campv

7.4.2 Telecommunications towers

Hydro-Québec holds land rights for the use of two telecommunications towers within the study area (Table 31). Both of these sites consist of a heliport, a fuel tank, a tower and various buildings for the radio equipment, generator sets and other equipment. These sites are accessible by land along the access roads for the power transmission lines. Access is by vehicle in the summer and snowmobile in the winter. Electricity for these sites is supplied by the ground wire of the transmission line. The sites are secured with fences. Only the Cachisca tower is in the national park reserve.

Table 31 Hydro-Québec telecommunications towers in the study area

Telecommunications towers	Land access number (MAD)	Area (ha)
Lucière site	068-T	7.32
Cachisca site	100-T	11.32

Map 27
Land use

Surface mineral lease
- Non-exclusive lease
- Authorization without lease
- Undetermined

Land right
- Vacation lease
- Rough shelter
- Rest area
- Hydrometric station
- Telecommunications tower
- Americree (Bushland Adventure) outfitter
- Broadback Fishing Camp outfitter
- Furbearer management unit
- Study area (6,198 km²)
- Parc national Assinica project (3,193 km²)

- Paved road
- Unpaved road
- Power transmission line

Note: The limits of the study area do not correspond to the final boundaries of the national park. The Gouvernement du Québec and the Cree agreed to an intial area defined as national park reserve. This initial area may be expanded to meet Québec guidelines for protected areas.

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0 10 20 30 40 km

1/800,000

Sources

Data	Organization
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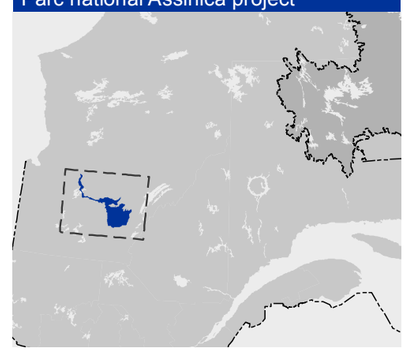
Produced by

Direction des parcs nationaux

Parc national Assinica project



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7.4.3 Leases for municipal purposes

The Municipality of Baie-James (now known as Eeyou Istchee Baie-James Regional Government holds a lease for municipal purposes for the Cheniapiscau rest area at kilometre 132 on Route du Nord, on the Rivière Broadback. The rest area's facilities include picnic tables, toilets, a lookout and primitive camping sites.

Photo 39. Cheniapiscau rest area, Route du Nord

7.4.4 Hydrometric station

The Centre d'expertise hydrique du Québec holds a permit for hydrometric station 080809 on the Rivière Broadback at the outlet of Lac Quenonisca (Centre d'expertise hydrique du Québec, 2013), where it measures river flow (m^3/s).

7.5 TRAILS

The Oujé-Bougoumou Crees have developed and maintain a snowmobile trail between the village and Rivière Brock. The MRN did not issue any permits for this trail. Some Cree use the trail for cross-country skiing and snowshoeing. It is found in the southern portion of the study area. A snowmobile trail linking Ouje-Bougoumou and Nemaska is under study. This trail would go through the future park, but would be used only by Crees. Tallymen also maintain several portage trails at various locations in the study area to reach lakes that are not accessible by road.

The Broadback, Assinica and Chibougamau rivers are known for their canoe-camping routes. The Fédération québécoise du canot et du kayak publishes a description of these routes (Fédération québécoise du canot et du kayak, 2005).

No federation-recognized ATV or snowmobile trails cross the study area.

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Appendix 1 ACCOMMODATIONS IN THE REGION[1]

Type of lodging	Location	Lodging/Guest capacity
Outfitters		
Pourvoirie Broadback inc.	Lac Assinica (Assinica Wildlife Sanctuary)	8 chalets/20 guests
Pourvoirie Square-Tail Lodge	Lac Frotet and Lac Troilus (Assinica Wildlife Sanctuary)	6 chalets/20 guests
Pourvoirie Bushman Outfitters	Lac Evans and Lac Weakwaten	4 chalets/40 guests
Camp de pêche Pomerleau inc.	Lac Chibougamau	5 camps, 8 chalets/ND
Pourvoirie J.C. Bou	South of Chibougamau	9 chalets/38 guests
Excursions Aigle-Pêcheur	Lac Mistassini	5 chalets/20 guests
Association de pourvoirie du lac Mistassinie	Lac Mistassini and Rivière Rupert	11 camps, 4 chalets, 8 tent pads/38 personnes
Aventures Plein-air Awashish inc.	Rivière Rupert	Prospector tents/ND
Wildlife sanctuaries		
Assinica Wildlife Sanctuary	North of Chapais and Oujé-Bougoumou	• Primitive camping with no services or conveniences • 8 sites used
Albanel-Mistassini-et-Waconichi Wildlife Sanctuary	North of Chibougamau	• Camping Baie Pénicouane: 27 sites • Camping Lac Albanel: 48 sites with no services • 11 chalets at Lac Waconichi (44 guest capacity)
Lodges		
Gîte de la Rivière	Lac Dulieux (between Chapais and Chibougamau)	2 rooms/Capacity: 4 guests
Gîte Le domaine de la mine d'or	Lac aux Dorés (Chibougamau)	4 rooms/4 to 8 guests
Gîte L'antre-temps	Lac Caché (Chibougamau)	2 rooms/Capacity: 4 guests
Hotels		
Hôtel Opémiska	Chapais	10 unités
Motel le Routier	Chapais	18 units
Auberge Le Relais du Lac Caché	Junction Routes 113 and 167	22 units
Hôtel Chibougamau	Chibougamau	60 units
Hôtel-Motel Harricana	Chibougamau	100 units
Hôtel-Motel Nordic	Chibougamau	52 units
Auberge Mistissini Lodge	Mistissini	20 units
Auberge Capissisit Lodge	Oujé-Bougoumou	12 units
Campgrounds		
Camping Opémiska	Chapais	109 sites
Éco-Camping Chibougamau	Chibougamau	42 sites
Other		
Chalets Opémiska	Lac Opémiska	3 units/5-11 guests

1 Sources: *2010-2011 Baie-James & Eeyou Istchee Offical Tourist Guide* [online at: http://www.mddep.gouv.qc.ca/biodiversite/aires_protegees/registre/reg-design/index.htm (consulted on January 11, 2013); Website of the Québec Outfitters Federation (http://www.pourvoiries.com/en/); Website of the Société des établissements de plein-air du Québec (www.sepaq.com)

Appendix 2 LAKES WITH A TOPONYM IN THE STUDY AREA

Toponym	Cree name	Coordinates (centroid of lake)		Total area (km²)	Surface area in study area (km²)	Proportion in study area (%)
		x	y			
Lac Assinica	Kaa mimeniskamikaau	–75,2275674	50,5196852	96,52	96,52	100
Lac Opataca	Kaa upataaukaau	–74,9001069	50,3927793	61,42	61,42	100
Lac Evans	Chishe saakahiikan	–76,9306805	50,8810075	469,60	55,09	12
Lac Comencho	Kaamanchusuuhsh	–75,1629076	50,3675245	49,93	49,93	100
Lac Cachisca		–74,9916434	50,4651146	41,01	41,01	100
Lac Giffard		–76,8963061	51,1444861	29,25	29,25	100
Lac Nemiscau	Namiscow	–76,7491203	51,3896184	130,79	27,17	21
Lac Waposite		–75,2439833	50,2590602	24,47	24,47	100
Lac Lemieux	Kaa sikanikaaii	–74,5629106	50,3218269	23,54	23,54	100
Lac Labeau	Chenwaapuskau	–75,2457386	50,7449618	11,44	11,44	100
Lac Frotet	Waskwaayaastinuu	–74,6650724	50,7365143	58,65	10,34	18
Lac Blanchet	Kaa pihtunikaau	–74,9062311	50,4492536	10,13	10,13	100
Lac Samuel-Bédard	Kaa upaskwe yaau	–74,5707346	50,4765321	9,43	9,43	100
Lac La Chevardière		–75,4786703	50,4820931	8,17	8,17	100
Lac Dumas		–75,1335786	50,1576023	7,56	7,56	100
Lac des Petites Plages		–75,363716	50,09845	7,50	7,50	100
Lac Regnault		–74,7916958	50,6263842	21,20	6,14	29
Lac Thiballier		–75,4188459	50,5660715	5,34	5,34	100
Lac Triart		–75,3733052	50,5272092	4,97	4,97	100
Lac à l'Eau Noire		–75,1035008	50,0772019	4,76	4,76	100
Lac aux Quatre Coins		–75,3643882	50,1592125	4,09	4,09	100
Lac Thomelet		–75,3994015	50,0650272	3,54	3,54	100
Lac Trépezet		–75,3523237	50,5562537	3,44	3,44	100
Lac à l'Eau Claire		–75,1717251	50,1739784	3,35	3,35	100
Lac Clinchamp		–75,6891854	50,8056666	3,29	3,29	100
Lac Revercourt		–75,059288	50,7814544	3,29	3,29	100
Lac Turgis		–75,2752405	50,1741253	3,14	3,14	100
Lac Caplan		–75,2277606	50,4504075	2,98	2,98	100
Lac Ikuskau Esachistuwach		–76,9528105	51,1859487	2,86	2,86	100
Lac Capichigamau	Kaa pisikamass	–75,5762032	50,3732586	18,52	2,80	15
Lac en Boucle		–75,4152563	50,1141058	2,78	2,78	100
Lac Laloire		–74,9939275	50,5752855	2,73	2,73	100
Lac Harnois		–75,4621511	50,2281378	2,64	2,64	100
Lac Mineray		–75,321175	50,6766315	3,45	2,28	66
Lac Wettigo		–76,9400804	51,287959	2,09	2,09	100

Toponym	Cree name	Coordinates (centroid of lake)		Total area (km²)	Surface area in study area (km²)	Proportion in study area (%)
Rivière Broadback		–76,7372375	51,057034	2,03	2,03	100
Lac des Trois Îles	Sinikaw saakahiikan	–75,1637819	50,1435212	2,60	1,85	71
Lac Guigues	Kâ minishtikuchiwan	–74,6958921	50,5323897	2,59	1,69	65
Lac Gaulin		–75,0436573	50,5143087	1,57	1,57	100
Lac La Milletière		–75,3382482	50,7694529	1,54	1,54	100
Lac Boissy		–75,4946142	50,5593094	1,16	1,16	100
Lac Olmstead		–75,0891234	50,5246258	1,05	1,05	100
Lac Maybank		–75,0670519	50,126138	0,97	0,97	100
Lac Lagnel		–75,0795967	50,5190882	0,96	0,96	100
Lac Pasquale		–75,1116518	50,6487728	0,97	0,94	97
Lac Charlie		–75,1103749	50,522972	0,93	0,93	100
Lac aux Bleuets		–75,1851388	50,1105208	0,91	0,91	100
Lac Lafargue		–75,4911421	50,5202226	0,85	0,85	100
Lac Kiwi		–75,202746	50,1854876	0,77	0,77	100
Lac Claire	Kâ matâpetûtâniwich	–74,8230837	50,1472943	0,75	0,75	100
Petit lac à l'Eau Noire		–75,1332225	50,0764242	0,74	0,74	100
Lac Ruth		–75,4937832	50,1675367	1,61	0,72	44
Lac Dalogny		–75,4520738	50,595084	0,69	0,69	100
Lac en Coude		–75,2129461	50,0330341	0,68	0,68	100
Lac aux Deux Granites		–75,2805421	50,1121355	0,61	0,61	100
Lac Julien		–75,2434178	50,0298599	0,60	0,60	100
Lac de la Moraine		–75,1888376	50,0601646	0,57	0,57	100
Lac Garlier		–74,9591783	50,6449152	0,57	0,57	100
Lac du Poudingue		–75,1379811	50,1221976	0,51	0,51	100
Lac de l'Anomalie		–75,1627836	50,0328348	0,45	0,45	100
Lac Porphyre		–75,3439654	50,0272937	0,33	0,33	99
Lac Mair		–75,1005166	50,5291794	0,28	0,28	100
Lac Perkins		–75,2990375	50,6763321	0,93	0,27	29
Lac Kachimaskuwanahikanuch		–76,8682364	51,2023511	0,26	0,26	100

Appendix 3 VASCULAR PLANTS IN THE STUDY AREA[1]

Abies balsamea (L.) P. Mill.
Acer spicatum Lam.
Achillea millefolium L.
Agrostis scabra Willd.
Alnus incana Moench subsp. *rugosa* (Du Roi) Clausen
Alnus viridis (Chaix) DC. subsp. *crispa* (Aiton) Turrill
Amelanchier bartramiana (Tausch) Roemer
Amelanchier sanguinea (Pursh) DC. var. *gaspensis* Wieg.
Anaphalis margaritacea (L.) Clarke
Andromeda polifolia L. var. *glaucophylla* (Link) DC.
Apocynum androsaemifolium L. subsp. *androsaemifolium*
Aralia hispida Vent.
Aralia nudicaulis L.
Athyrium filix-femina (L.) Roth ex Mert. var. *angustum* (Willd.) Laws.
Betula glandulosa Michx.
Betula michauxii Sargent
Betula minor (Tuckerm.) Fern.
Betula papyrifera Marsh.
Betula pumila L.
Calamagrostis canadensis (Michx.) Beauv.
Calamagrostis stricta (Timm) Koel. subsp. *inexpansa* (Gray) C. W. Greene
Calla palustris L.
Callitriche palustris L.
Caltha palustris L.
Cardamine pensylvanica Muhl.
Carex adusta Boott
Carex aquatilis Wahlenb.
Carex arctata F.Boott in W. J. Hooker
Carex bigelowii Torr.
Carex brunnescens (Pers.) Poir. *s l.*
Carex buxbaumii Wahlenb.
Carex canescens L.
Carex chordorrhiza Ehrh. ex L. f.
Carex crawfordii Fern.
Carex deflexa Hornem.
Carex disperma Dewey
Carex echinata Murray
Carex exilis Dewey

1 Sources : Centre de données sur le patrimoine naturel du Québec; M. Blondeau, 2008. *Liste annotée des plantes vasculaires du projet de parc Assinica*, 11 p. [Non publié].
Taxonomy based on Database of Vascular Plants of Canada (VASCAN) :
http://data.canadensys.net/vascan/search/?q=xyris+montana&lang=fr.

Carex flava L.
Carex foenea Willd. var. *foena*
Carex houghtoniana Torr. ex Dewey
Carex interior Bailey
Carex lasiocarpa Ehrh. subsp. *americana* (Fern.) Hultén
Carex lenticularis Michx.
Carex leptalea Wahlenb.
Carex leptonervia (Fern.) Fern.
Carex limosa L.
Carex magellanica Lam. subsp. *irrigua* (Wahl.) Hiit.
Carex michauxiana Boeckeler
Carex oligosperma Light.
Carex pauciflora Light.
Carex rostrata Stokes
Carex tenuiflora Wahlenb.
Carex trisperma Dewey
Carex umbellata Schkuhr ex Willd. [incl. var. *tonsa* Fern.]
Carex utriculata Boott
Carex vaginata Tausch
Carex vesicaria L.
Carex viridula Michx.
Carex wiegandii Mackenzie in Britton *et al.*
Carex x limula T. Fries (pro sp.)
Carex x stenolepis Lessing *(C. saxatilis x C. utriculata)*
Cerastium fontanum Baumg. subsp. *vulgare* (Hartman) Greuter & Burdet
Chamaedaphne calyculata (L.) Moench
Chamerion angustifolium (L.) Holub
Cicuta bulbifera L.
Cinna latifolia (Trevir.) Griseb.
Clintonia borealis (Ait.) Raf.
Comarum palustre L.
Coptis trifolia (L.) Salisb.
Corallorhiza trifida Châtelain
Cornus canadensis L. subsp. *canadensis*
Cornus sericea (Michx.) Raf.
Corydalis sempervirens (L.) Pers.
Cypripedium acaule Ait.
Danthonia spicata (L.) Beauv.
Dasiphora fruticosa (L.) Rydberg subsp. *floribunda* (Pursh) Kartesz
Deschampsia flexuosa (L.) Trin.
Dicchanthelium acuminatum (Sw.) Gould & Clark subsp. *columbianum* (Scribn.) Freckmann & Lelong
Diervilla lonicera Mill.
Doellingeria umbellata (P. Mill.) Nees
Drosera anglica Huds.
Drosera rotundifolia L.
Drosera x obovata Mert. & W. D. J. Koch [*D. anglica x D. rotundifolia*]

Dryopteris carthusiana (Vill.) H. P. Fuchs [*Dryopteris spinulosa* (O. F. Muell.) Watt s. l.]
Dryopteris expansa (C. Presl) Fraser-Jenkins & Jermy
Dryopteris intermedia (Muhl.) A. Gray
Eleocharis acicularis (L.) Roemer & J. A. Schultes
Eleocharis nidita Fern.
Eleocharis palustris (L.) R. & S. s. l.
Elymus repens (L.) Gould
Empetrum nigrum L. subsp. *hermaphroditum* (Lange) Böcher
Epigaea repens L.
Epilobium ciliatum Raf. subsp. *ciliatum*
Epilobium palustre L.
Equisetum arvense L.
Equisetum fluviatile L.
Equisetum palustre L.
Equisetum sylvaticum L.
Eriophorum brachyantherum Trautvetter & C. A.Meyer in A. T. von Middendorff
Eriophorum gracile W. D. J. Koch
Eriophorum tenellum Nutt.
Eriophorum vaginatum L. subsp. *spissum* (Fern.) Boivin
Eriophorum virginicum L.
Eriophorum viridicarinatum (Engelm.) Fern.
Eurybia radula (Sol. in Ait.) Nesom [*Aster radula* Ait.]
Eutrochium maculatum (L.) E. E. Lamont [*Eupatorium maculatum* L.]
Festuca rubra L.
Fragaria virginiana Duchesne
Galium asprellum Michx
Galium labradoricum (Wieg.) Wieg.
Galium trifidum L.
Galium triflorum Michx.
Gaultheria hispidula Muhl. ex Bigelow [*Chiogenes hispidula* (L.) T. & G.]
Gentiana linearis Fröl
Geocaulon lividum (Richardson) Fernald
Glyceria borealis (Nash) Batchelder
Glyceria canadensis (Michx.) Trin.
Glyceria striata (Lam.) A. Hitchc. var. *stricta* (Scribn.) Fern.
Goodyera repens (L.) R. Br. ex Ait. f.
Gymnocarpium dryopteris (L.) Newman subsp. *dryopteris* [*Dryopteris disjuncta* auct. am.]
Hieracium aurantiacum L.
Hieracium caespitosum Dumort. [*H. pratense* auct.]
Hieracium scabrum Michx.
Hudsonia tomentosa Nutt.
Huperzia lucidula (Michaux) Trevisan
Huperzia selago (L.) Bernh.
Hypericum ellipticum Hook.
Iris versicolor L.
Isoetes echinospora Durieu

Isoetes macrospora Durieu
Juncus brevicaudatus (Engelm.) Fern.
Juncus filiformis L.
Juncus stygius L. subsp. *americanus* (Buch.) Hultén
Juncus tenuis E. Meyer
Juniperus communis var. *depressa* Pursh
Kalmia angustifolia L.
Kalmia polifolia Wieg.
Larix laricina (Du Roi) K. Koch
Leontodon autumnalis L.
Leucanthemum vulgare Lam.
Linnaea borealis L. subsp. *americana* Hultén ex Clausen
Listera auriculata Wieg.
Listera cordata (L.) R. Br.
Lobelia dortmanna L.
Lonicera villosa (Michx.) R. & S.
Luzula acuminata Raf.
Luzula parviflora (Ehrhart) Desvaux var. *parviflora*
Lycopodiella inundata (L.) Holub [*Lycopodium inundatum* L.]
Lycopodium annotinum L.
Lycopodium clavatum L.
Lycopodium complanatum L.
Lycopodium dendroideum Michx. [*L. obscurum* var. *dendroideum* (Michx.) D. C. Eat.]
Lycopodium lagopus (Laestad. ex Hartm.) Zinserl. ex Kuzen
Lycopodium sitchense Rupr.
Lycopodium tristachyum Pursh
Lycopus uniflorus Michx.
Lysimachia terrestris L.
Maianthemum canadense Desf.
Maianthemum trifolium (L.) Sloboda
Matricaria discoidea de Candolle
Melampyrum lineare Desr.
Menyanthes trifoliata L. subsp. *verna* (Raf.) Gervais & Parent
Mitella nuda L.
Monotropa uniflora L.
Muhlenbergia uniflora (Muchenberg) Fernald
Myrica gale L.
Myriophyllum farwellii Morong
Myriophyllum tenellum Bigel.
Nemopanthus mucronatus (L.) Trel.
Nemopanthus mucronatus (L.) Trel.
Nuphar lutea (L.) Sm. subsp. *pumila* (Timm) E. O. Beal
Nuphar lutea (L.) Sm. subsp. *variegata* (Dur.) E. O. Beal
Oclemena nemoralis (Ait.) Greene
Oenothera biennis L.
Orthilia secunda (L.) House subsp. *secunda*

Osmunda claytoniana L.
Osmunda regalis L. var. *spectabilis* (Willdenow) A. Gray
Oxalis montana Raf.
Packera aurea (L.) A.Löve & D.Löve
Petasites frigidus (L.) Fries var. *palmatus* (Ait.) Cronq.
Phalaris arundinacea L.
Phegopteris connectilis (Michx.) Watt [*Dryopteris phegopteris* (L.) C. Christens]
Phleum pratense L. – Introduit de l'Eurasie
Photinia melanocarpa (Michx.) K. R. Robertson & J. B. Phipps [*Aronia melanocarpa*]
Picea glauca (Moench) Voss
Picea mariana (P. Mill.) B. S. P.
Pingulcula vulgaria L. subsp. *vulgaris*
Pinus banksiana Lamb.
Pipapterum pungens (Torrey ex Sprengel) Barkworth
Piptatherum canadense (Poir.) Barkworth [*Oryzopsis canadensis* (Poir.) Torr.]
Plantago major L.
Platanthera aquilonis Sheviak
Platanthera dilatata (Pursh) Lindl. ex Beck [*Habenaria dilatata* (Pursh) Gray]
Poa annua L. – Introduit de l'Eurasie
Poa compressa L.
Poa palustris L.
Poa pratensis L.
Pogonia ophioglossoides (L.) Ker-Gawl
Polygonum cilinode Michx.
Polypodium virginianum L.
Populus tremuloides Michx.
Potamogeton epihydrus Raf.
Potamogeton gramineus L.
Potamogeton natans L.
Potamogeton richardsonii (A. Bennett) Rudberg
Potentilla norvegica L.
Primula mistassinica Michaux
Prunus pensylvanica L. f.
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desvaux) Underweed ex A. Heller
Ranunculus flammula L. var. *reptans* (L.) E. Meyer
Ranunculus lapponicus L.
Rhamnus alnifolia L'Her.
Rhododendron groenlandicum (Oeder) Kron & Judd [*Ledum groenlandicum* Oeder]
Rhynchospora alba (L.) Vahl
Ribes glandulosum Grauer
Ribes hirtellum Michx.
Ribes triste Pall. – Et est-asiatique
Rosa nitida Willd.
Rubus arcticus L. subsp. *acaulis* (Michx.) Focke
Rubus chamaemorus L.
Rubus idaeus L. subsp. *strigosus* (Michx.) Focke

Rubus pubescens Raf.
Rumex acetosella L. subsp. *acetosella*
Salix argyrocarpa Anderss.
Salix bebbiana Sargent
Salix discolor Mühl.
Salix humilis Marsh.
Salix lucida Muhl.
Salix pedicellaris Pursh
Salix pellita (Anderss.) Anderss. ex Schneid.
Salix planifolia Pursh
Salix pyrifolia Anderss.
Sarracenia purpurea L.
Scheuchzeria palustris L. subsp. *americana* (Fern.) Hultén
Schoenoplectus subterminalis (Torr.) Soják
Scirpus atrocinctus (Sarg.) Schneid.
Scirpus microcarpus J. Presl & C. Presl
Selaginella selaginoides (L.) Link
Sibbaldiopsis tridentata (Ait.) Rydb. [*Potentilla tridentata* Ait.]
Solidago hispida Mühl.
Solidago macrophylla Pursh
Solidago rugosa P. Mill
Solidago uliginosa Nutt.
Sorbus americana Marsh.
Sorbus decora (Sarg.) Schneid.
Sparganium angustifolium Michx.
Spiraea alba Du Roi var. *latifolia* (Ait.) Dippel
Stellaria borealis Big. subsp. *borealis*
Streptopus amplexifolius (L.) de Candolle
Symphyotrichum puniceum (L.) A. & D. Löve
Symphyotrichum robynsianum (J. Rousseau) Brouillet & Labrecque
Thalictrum pubescens Pursh
Tofieldia glutinosa (Michx.) Pers.
Triadenum virginicum (L.) Rafinesque
Trichophorum alpinum (L.) Pers.
Trichophorum caespitosum (L.) Hartm.
Trientalis borealis Raf.
Trifolium aureum Pollich
Trifolium hybridum L.
Trifolium pratense L.
Trifolium repens L.
Triglochin maritimum L.
Typha latifolia Michx.
Utricularia cornuta Michx.
Utricularia intermedia Hayne
Utricularia macrorhiza Le Conte
Utricularia minor L.

Vaccinium angustifolium Ait.
Vaccinium gaultherioides Bigel.
Vaccinium myrtilloides Michx.
Vaccinium oxycoccos L.
Vaccinium uliginosum L.
Vaccinium vitis-idaea L. var. *minus* Lodd.
Viburnum edule (Michx.) Raf.
Viola incognita Brainerd
Viola labradorica Schrank
Viola mackloskeyi Lloyd subsp. *pallens* (Banks ex DC.) M. S. Baker
Xyris montana Ries

Appendix 4 INVASCULAR PLANTS IN THE STUDY AREA

1. Lichens[1]

Acarospora fuscata (Schrader) Arnold
Acarospora sinopica (Wahlenb.) Körber
Adelolecia pilati (Hepp) Hertel & Hafellner
Amandinea punctata (Hoffm.) Coppins & Scheid.
Amygdalaria elegantior (H. Magn.) Hertel & Brodo
Amygdalaria panaeola (Ach.) Hertel & Brodo
Arctoparmelia centrifuga (L.) Hale
Aspicilia arctica (Lynge) Oxner
Aspicilia subplicigera (H. Magn.) Oxner
Bryoria furcellata (Fr.) Brodo & D. Hawksw.
Bryoria lanestris (Ach.) Brodo & D. Hawksw.
Bryoria nitidula (Th. Fr.) Brodo & D. Hawksw.
Bryoria trichodes (Michaux) Brodo & D. Hawksw. *subsp. trichodes*
Buellia erubescens Arnold
Caloplaca holocarpa (Hoffm. ex Ach.) A. E. Wade
Caloplaca xanthostigmoidea (Räsänen) Zahlbr.
Cetraria islandica (L.) Ach. *ssp. crispiformis* (Asahina) Kärnefelt
Cetraria laevigata Rass.
Cladonia amaurocraea (Flörke) Schaerer
Cladonia arbuscula (Wallr.) Flotow subsp. *mitis* (Sandst.) Ruoss
Cladonia borealis S. Stenroos
Cladonia botrytes (K. G. Hagen) Willd.
Cladonia coniocraea (Flörke) Sprengel
Cladonia cornuta (L.) Hoffm. *subsp. cornuta*
Cladonia crispata (Ach.) Flotow
Cladonia cristatella Tuck.
Cladonia deformis (L.) Hoffm.
Cladonia fimbriata (L.) Fr.
Cladonia gracilis (L.) Willd. subsp. *gracilis*
Cladonia gracilis (L.) Willd. subsp. *turbinata* (Ach.) Ahti
Cladonia macrophylla (Schaerer) Stenh.
Cladonia phyllophora Hoffm.
Cladonia rangiferina (L.) F. H. Wigg.
Cladonia stellaris (Opiz) Pouzar & Vëzda
Cladonia stygia (Fr.) Ruoss

1 Identification of macrolichens by : Claude Roy, Herbier Louis-Marie, Université Laval, Québec, Québec.
Identification of crustose lichens by: Pak Yau Wong, Musées Nationaux, Gatineau, Québec.
Names based on Esslinger, 2014. A Cumulative Checklist for the Lichen-forming, Lichenicolous and Alllied Fungi of the Continental United States and Canada, Version 19 [online]
http://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm#X

Cladonia uncialis (L.) F. H. Wigg.
Cladonia verticellata (Hoffm.) Schaerer
Evernia mesomorpha Nyl.
Flavocetraria nivalis (L.) Kärnefelt & Thell
Fuscidea arboricola Coppins & Tønsberg
Gowardia nigricans (Ach.) P. Halonen, L. Myllys, S. Velmala, & H. Hyvärinen
Hypocenomyce friesii (Ach.) P. James & Gotth. Schneider
Hypogymnia physodes (L.) Nyl.
Imshaugia aleurites (Ach.) S. F. Meyer
Ionaspis lacustris (With.) Lutzoni
Lecanora atrosulphurea (Wahlenb.) Ach.
Lecanora circumborealis Brodo & Vitik.
Lecanora intricata (Ach.) Ach.
Lecanora polytropa (Hoffm.) Rabenh.
Lecanora saligna (Schrader) Zahlbr.
Lecanora symmicta (Ach.) Ach.
Lecidea brunneofusca H. Magn.
Lecidea plana (J. Lahm) Nyl.
Lecidea turgidula Fr.
Lecidella carpathica Körber
Lecidella euphorea (Flörke) Hertel
Lecidella stigmatea (Ach.) Hertel & Leuckert
Lecidoma demissum (Rutstr.) Gotth. Schneider & Hertel
Lepraria lobificans Nyl.
Leptorhaphis epidermidis (Ach.) Th. Fr.
Melanelia disjuncta (Erichsen) Essl.
Melanelia hepatizon (Ach.) Thell
Melanelia panniformis (Nyl.) Essl.
Melanohalea septentrionalis (Lynge) O. Blanco *et al.*
Mycoblastus affinis (Schaerer) T. Schauer
Mycoblastus sanguinarius (L.) Norman
Ochrolechia androgyna (Hoffm.) Arnold
Ochrolechia frigida (Sw.) Lynge
Ochrolechia upsaliensis (L.) A. Massal.
Parmelia saxatilis (L.) Ach.
Parmelia sulcata Taylor
Parmeliopsis ambigua (Wulfen) Nyl.
Parmeliopsis capitata R. C. Harris ex J. W. Hinds & P. L. Hinds
Parmeliopsis hyperopta (Ach.) Arnold
Phaeocalicium curtisii (Tuck.) Tibell
Placynthiella oligotropha (J. R. Laundon) Coppins & P. James
Placynthium flabellosum (Tuck.) Zahlbr.
Porpidia cinereoatra (Ach.) Hertel & Knoph
Porpidia contraponenda (Arnold) Knoph & Hertel
Porpidia flavocaerulescens (Hornem.) Hertel & A. J. Schwab
Porpidia macrocarpa (DC.) Hertel & A. J. Schwab

Porpidia melinodes (Körber) Gowan & Ahti
Porpidia tuberculosa (Sm.) Hertel & Knoph
Protoparmelia badia (Hoffm.) Hafellner
Rhizocarpon badioatrum (Flörke ex Sprengel) Th. Fr.
Rhizocarpon cinereovirens (Müll. Arg.) Vainio
Rhizocarpon concentricum (Davies) Beltr.
Rhizocarpon eupetraeum (Nyl.) Arnold
Rhizocarpon ferax H. Magn.
Rhizocarpon geographicum (L.) DC.
Rhizocarpon grande (Flörke ex Flotow) Arnold
Rhizocarpon jemtlandicum (Malme) Malme
Rhizocarpon oederi (Weber) Körber
Rhizocarpon submodestum (Vainio) Vainio
Schaereria cinereorufa (Schaerer) Th. Fr.
Staurothele fissa (Taylor) Zwackh
Stereocaulon condensatum Hoffm.
Stereocaulon grande (H. Magn.) H. Magn.
Stereocaulon saxatile H. Magn.
Trapelia glebulosa (Sm.) J. R. Laundon
Trapeliopsis granulosa (Hoffm.) Lumbsch
Tremolecia atrata (Ach.) Hertel
Tuckermannopsis americana (Sprengel) Hale
Tuckermannopsis sepincola (Ehrh.) Hale
Umbilicaria deusta (L.) Baumg.
Umbilicaria hyperborea (Ach.) Hoffm.
Umbilicaria mammulata (Ach.) Tuck.
Umbilicaria muehlenbergii (Ach.) Tuck.
Umbilicaria polyrhiza (L.) Fr.
Usnea filipendula Stirton
Verrucaria aethiobola Wahlenb.
Verrucaria calkinsiana Servit
Vulpicida pinastri (Scop.) J.-E. Mattsson
Xylographa parallela (Ach. : Fr.) Behlen & Desberger

2. Bryophytes[2]

2.1. Liverworths

Blasia pusilla L.
Anastrophyllum michauxii (F. Weber) H. Buch
Anastrophyllum minutum (Schreb.) R. M. Schust.
Aneura pinguis (L.) Dum.
Barbilophozia atlantica (Kaal.) Müll. Frib.
Barbilophozia attenuata (Mart.) Loeske

2 Source : J. Faubert, J. Gagnon et R. Gauthier, 2012. « Les bryophytes de la région du lac Assinica, Québec nordique », *Carnets de bryologie*, no 2, p. 20-47.

Barbilophozia barbata (Schmidel. ex Schreb.) Loeske
Barbilophozia floerkei (F. Weber & D. Mohr) Loeske
Barbilophozia kunzeana (Huebener) Müll.Frib.
Blepharostoma trichophyllum (L.) Dumort.
Calypogeia integristipula Steph.
Calypogeia neesiana (C. Massal. & Carestia) Müll. Frib
Calypogeia sphagnicola (Arnell & J.Perss.) Warnst. & Loeske
Cephalozia bicuspidata (L.) Dumort.
Cephalozia lunulifolia (Dumort.) Dumort.
Cephalozia pleniceps (Aust.) Lindb.
Cephaloziella divaricata (Sm.) Schiffn.
Cephaloziella grimsulana (Jack) Lacouture
Cephaloziella hampeana (Nees) Schiffn.
Cephaloziella rubella (Nees) Warnst.
Cephaloziella varians (Gottsche) Steph.
Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dumort.
Cladopodiella fluitans (Nees) H.Buch
Cladopodiella francisci (Hook.) Joerg.
Fossombronia foveolata Lindb.
Frullania oakesiana Austin
Gymnocolea inflata (Huds.) Dumort.
Harpanthus scutatus (F. Weber & D. Mohr) Spruce
Jungermannia caespiticia Lindb.
Jungermannia gracillima Sm.
Jungermannia leiantha Grolle?
Kurzia pauciflora (Dicks.) Grolle
Leiomylia anomala J. J. Engel & Braggins
Lejeunea cavifolia (Ehrh.) Lindb.
Lepidozia reptans (L.) Dumort.
Lophozia ascendens (Warnst.) R. M. Schust.
Lophozia bicrenata (Schmid. ex Hoffm.) Dumort.
Lophozia capitata (Hook.) Macoun
Lophozia longidens (Lindb.) Macoun
Lophozia polaris (R. M. Schust.) R. M. Schust. & Damsh.
Lophozia sudetica (Nees ex Hueb.) Grolle
Lophozia ventricosa (Dicks.) Dumort.
Marchantia polymorpha L. subsp. *ruderalis* Bischl. & Boisselier
Marsupella emarginata (Ehrh.) Dumort.
Marsupella sparsifolia (Lindb.) Dumort.
Mylia taylorii (Hook.) Gray
Nardia geoscyphus (De Not.) Lindb.
Nardia insecta Lindb.
Odontoschisma denudatum (Mart.) Dumort.
Odontoschisma elongatum (Lindb.) A. Evans
Pallavicinia lyellii (Hook.) Carruth.
Pellia epiphylla (L.) Corda

Pellia megaspora R. M. Schust.
Pellia neesiana (Gottsche) Limpr.
Plagiochila porelloides (Torrey ex Nees) Lindenb.
Pleurocladula albescens (Hook.) Grolle
Preissia quadrata (Scop.) Nees subsp. *quadrata*
Ptilidium ciliare (L.) Hampe
Ptilidium pulcherrimum (Weber) Vain.
Radula complanata (L.) Dumort.
Riccardia latifrons (Lindb.) Lindb.
Scapania curta (Mart.) Dumort.
Scapania irrigua (Nees) Nees
Scapania nemorea (L.) Grolle
Scapania paludicola Loeske & Müll.Frib.
Scapania umbrosa (Schrad.) Dumort.
Scapania undulata (L.) Dumort.
Tritomaria exsecta (Schmidel.) Schiffn. ex Loeske
Tritomaria exsectiformis (Breidl.) Loeske

2.2. Mosses

Andreaea rupestris Hedw. var. *rupestris*
Atrichum tenellum (Röhl.) Bruch & Schimp (sub nomen *A. altecristatum*)
Aulacomnium palustre (Hedw.) Schwägr.
Bartramia pomiformis Hedw.
Brachythecium erythrorrhizon Schimp.
Brachythecium populeum (Hedw.) Schimp.
Bucklandiella microcarpa (Hedw.) Ochyra & Bednarek-Ochyra
Callicladium haldanianum (Grev.) H. A. Crum
Campylium stellatum (Hedw.) Lange & C. E. O. Jensen
Ceratodon purpureus (Hedw.) Brid.
Climacium dendroides (Hedw.) F. Weber & D. Mohr
Codriophorus aciculare (Hedw.) P. Beauv.
Codriophorus fasicularis (Hedw.) Bednarek-Ochyra & Ochyra
Cynodontium polycarpon (Hedw.) Schimp.
Cynodontium strumiferum (Hedw.) Lindb.
Cynodontium tenellum (Schimp.) Limpr.
Dichelyma falcatum (Hedw.) Myrin
Dicranella cerviculata (Hedw.) Schimp.
Dicranella heteromalla (Hedw.) Schimp.
Dicranoweisia crispula (Hedw.) Lindb.
Dicranum acutifolium (Lindb. & Arnell) C. E. O. Jensen
Dicranum elongatum Schleich. ex Schwägr.
Dicranum flagellare Hedw.
Dicranum fuscescens Sm.
Dicranum montanum Hedw.
Dicranum polysetum Sw. ex anon.

Dicranum scoparium Hedw.
Dicranum spadiceum J. E. Zetterst.
Dicranum undulatum Schrad. ex Brid.
Ditrichum lineare (Sw.) Lindb.
Ditrichum pusillum (Hedw.) Hampe
Fissidens osmundioides Hedw.
Fontinalis hypnoides C. Hartm.
Funaria hygrometrica Hedw.
Grimmia longirostris Hook.
Grimmia unicolor Hook.
Hedwigia ciliata (Hedw.) P. Beauv.
Heterocladium dimorphum (Brid.) Schimp.
Hygrohypnum luridum (Hedw.) Jenn.
Hylocomium splendens (Hedw.) Schimp.
Hypnum cupressiforme Hedw.
Hypnum fauriei Cardot
Hypnum imponens Hedw.
Hypnum lindbergii Mitt.
Hypnum recurvatum (Lindb. & Arnell) Kindb.
Isopterygiopsis muelleriana (Schimp.) Z. Iwats.
Kindbergia praelonga (Hedw.) Ochyra
Neckera pennata Hedw.
Niphotrichum canescens (Hedw.) Bednarek-Ochyra & Ochyra
Oncophorus virens (Hedw.) Brid.
Oncophorus wahlenbergii Brid.
Orthotrichum obtusifolium Brid.
Paraleucobryum longifolium (Hedw.) Loeske
Plagiomnium ciliare (Müll.Hal.) T. J. Kop.
Plagiothecium laetum Schimp.
Plagiothecium latebricola Schimp.
Pleuridium subulatum (Hedw.) Rabenh.
Pleurozium schreberi (Willd. ex Brid.) Mitt.
Pogonatum dentatum (Menzies ex Brid.) Brid.
Pogonatum pensilvanicum (W. Bartram ex Hedw.) P. Beauv.
Pogonatum urnigerum (Hedw.) P. Beauv.
Pohlia cruda (Hedw.) Lindb.
Pohlia nutans (Hedw.) Lindb.
Pohlia schimperi (Müll. Hal.) A. L. Andrews
Polytrichastrum formosum (Hedw.) G. L. Sm.
Polytrichastrum longisetum (Sw. ex Brid.) G. L. Sm.
Polytrichastrum pallidisetum (Funck) G. L. Sm.
Polytrichum commune Hedw. var. *commune*
Polytrichum commune Hedw. var. *perigoniale* (Michx.) Hampe
Polytrichum juniperinum Hedw.
Polytrichum piliferum Hedw.
Polytrichum strictum Brid.

Ptilium crista-castrensis (Hedw.) De Not.
Ptychostomum pallens (Sw.) J. R. Spence
Pylaisia polyantha (Hedw.) Schimp.
Racomitrium lanuginosum (Hedw.) Brid.
Rhabdoweisia crispata (Dicks.) Lindb.
Rhizomnium pseudopunctatum (Bruch & Schimp.) T. J. Kop.
Rhizomnium punctatum (Hedw.) T. J. Kop.
Rhytidiadelphus triquetrus (Hedw.) Warnst.
Sanionia uncinata (Hedw.) Loeske
Sarmentypnum exannulatum (Schimper) Hedenäs
Schistidium agassizii Sull. & Lesq.
Schistidium apocarpum (Hedw.) Bruch. & Schimp subsp. *canadense* (Dupret) Blom ex Allen & Pursell
Scorpidium cossonii (Schimp.) Hedenäs
Scorpidium revolvens (Sw. ex anon.) Rubers
Scorpidium scorpioides (Hedw.) Limpr.
Sphagnum angustifolium (Warnst.) C. E. O. Jensen
Sphagnum capillifolium (Ehrh.) Hedw.
Sphagnum centrale C. E. O. Jensen
Sphagnum compactum Lam. & DC.
Sphagnum fallax (H. Klinggr.) H. Klinggr.
Sphagnum fuscum (Schimp.) H. Klinggr.
Sphagnum girgensohnii Russow
Sphagnum lindbergii Schimp.
Sphagnum magellanicum Brid.
Sphagnum majus s.l.
Sphagnum papillosum Lindb.
Sphagnum pulchrum (Lindb. ex Braithw.) Warnst.
Sphagnum quinquefarium (Braithw.) Warnst.
Sphagnum riparium Ångstr.
Sphagnum rubellum Wilson
Sphagnum russowii Warnst.
Sphagnum squarrosum Crome
Sphagnum subfulvum Sjors
Sphagnum subsecundum Nees
Sphagnum warnstorfii Russow
Sphagnum wulfianum Girg.
Straminergon stramineum (Dick. ex Brid.) Hedenäs
Tetraphis pellucida Hedw.
Tetraplodon angustatus (Hedw.) Bruch & Schimp.
Tomenthypnum falcifolium (Nichols) Tuom.
Tomenthypnum nitens (Hedw.) Loeske
Trematodon ambiguus (Hedw.) Hornsch.
Ulota curvifolia (Wahlenb.) Lilj.
Warnstorfia fluitans (Hedw.) Loeske

Appendix 5 FISH FOUND IN OR LIKELY TO BE FOUND IN THE STUDY AREA[1]

French name[2]	Scientific name	English name	Cree name[3]	Family
Esturgeon jaune	Acipenser fulvescens	Lake sturgeon	Nameu	Acipenseridae
Laquaiche aux yeux d'or*	Hiodon alosoides	Goldeye	Napakachisuu = laquaiche	Hiodontidae
Laquaiche argentée*	Hiodon tergisus	Mooneye	Napakachisuu = laquaiche	Hiodontidae
Méné de lac	Couesius plumbeus	Lake chub		Cyprinidae
Méné à nageoires rouges	Luxilus cornutus	Common shiner		Cyprinidae
Mulet perlé	Margariscus margarita	Creek chub		Cyprinidae
Méné émeraude*	Notropis atherinoides	Emerald shiner		Cyprinidae
Queue à tache noire	Notropis hudsonius	Spottail shiner		Cyprinidae
Naseux noir de l'Est	Rhinichthys atratulus	Eastern blacknose dace		Cyprinidae
Naseux des rapides	Rhinichthys cataractae	Longnose dace		Cyprinidae
Mulet à cornes	Semotilus atromaculatus	Creek chub		Cyprinidae
Ouitouche	Semotilus corporalis	Fallfish		Cyprinidae
Meunier rouge	Catostomus catostomus	Longnose sucker	Mihkuhaasuuu, mihkuchikaash	Catostomidae
Meunier noir	Catostomus commersonii	White sucker	Namepii	Catostomidae
Grand brochet	Esox lucius	Northern pike	Chinusheu	Esocidae
Cisco de lac	Coregonus artedi	Cisco	Utiilipi, utuulipish	Salmonidae
Grand corégone	Coregonus clupeaformis	Lake whitefish	Atihkamekw	Salmonidae
Ménomini rond	Prosopium cylindraceum	Round whitefish		Salmonidae
Omble de fontaine	Salvelinus fontinalis	Brook trout	Maasimekush, maasimekw	Salmonidae
Touladi	Salvelinus namaycush	Lake trout	Namekush	Salmonidae
Omisco	Percopsis omiscomaycus	Trout-perch		Percopsidae
Lotte	Lota lota	Burbot	Miyaahkatuu	Lotidae
Épinoche à cinq épines	Culaea inconstans	Brook stickleback		Gastérostéidae
Épinoche à neuf épines	Pungitius pungitius	Ninespine stickleback		Gastérostéidae
Chabot tacheté	Cottus bairdii	Mottled sculpin		Cottidae
Chabot visqueux	Cottus cognatus	Slimy sculpin		Cottidae
Chabot à tête plate	Cottus ricei	Spoonhead sculpin		Cottidae
Perchaude	Perca flavescens	Yellow perch	Usaawew	Percidae
Fouille-roche zébré	Percina caprodes	Logperch		Percidae
Doré jaune	Sander vitreus	Walleye	Ukaau	Percidae
Doré noir*	Sander canadensis	Sauger		Percidae

1 Source : S. Gagnon, 2011. *Projet de parc national Assinica : faune ichtyenne*, 38 p.
2 Bold indicates that the species has been observed in the study area. An asterisk (*) indicates its presence is fairly unlikely but possible.
3 Sources : *Dictionnaire du cri de l'Est de la Baie James*, [Online]. [http://www.eastcree.org]; F. Berkes et M. Mackenzie, 1978. « Cree fish names from Eastern James Bay, Quebec », *Arctic*, vol. 31, no 4, p. 489-495

Appendix 6 AMPHIBIANS AND REPTILES FOUND IN OR LIKELY TO BE FOUND IN THE STUDY AREA[1]

French name[9]	Scientific name	English name	Cree name[10]	Family
Salamandre à points bleus	Ambystoma laterale	Blue-spotted salamander		Ambystomatidae
Salamandre maculée	Ambystoma maculatum	Yellow-spotted salamander		Ambystomatidae
Salamandre à deux lignes	Eurycea bislineata	Northern two-lined salamander		Plethodontidae
Salamandre cendrée	Plethodon cinereus	Eastern redback salamander		Plethodontidae
Crapaud d'Amérique	Anaxyrus americanus	American toad	Ayikw = crapaud	Bufonidae
Rainette crucifère	Pseudacris crucifer	Northern spring peeper	Maachishkuuchish	Hylidae
Grenouille verte	Lithobates clamitans	Green frog	Tehteu = grenouille	Ranidae
Grenouille léopard	Lithobates pipiens	Northern leopard frog	Tehteu = grenouille	Ranidae
Grenouille du Nord	Lithobates septentrionalis	Mink frog	Tehteu = grenouille	Ranidae
Grenouille des bois	Lithobates sylvaticus	Wood frog	Tehteu = grenouille	Ranidae
Tortue peinte	Chrysemys picta	Painted turtle	Kaamuskuwaachipiskunet = tortue	Emydidae
Couleuvre rayée	Thamnophis sirtalis	Common garter snake	Chinepuk = serpent	Colubridae

1 Source : S. Gagnon, 2011. *Projet de parc national Assinica : herpétofaune,* 22 p.
2 Bold indicates that the species has been observed in the study area.
3 Source : *Dictionnaire du cri de l'Est de la Baie James,* [Online]. [http://www.eastcree.org].

Appendix 7 BIRDS FOUND IN OR LIKELY TO BE FOUND IN THE STUDY AREA[1]

French name[2]	Scientific name	English name	Cree name[3]	Family
Oie des neiges	Chen caerulescens	Snow goose	Waapawehweu, (oie) wehweu, (jeune) wehwesh	Anatidae
Bernache cravant	Branta bernicla	Brant	Iwaapuweu, (jeune) iwaapuwesh	Anatidae
Bernache du Canada	Branta canadensis	Canada goose	Nisk, (oison) niskash / nischis	Anatidae
Cygne siffleur	Cygnus columbianus	Tundra swan	(Cygne) waapisuu	Anatidae
Canard branchu	Aix sponsa	Wood duck	Kaa mamaahtaaushtikwaanet	Anatidae
Canard d'Amérique	Anas americana	American wigeon		Anatidae
Canard noir	Anas rubripes	American black duck	Makahteship	Anatidae
Canard colvert	Anas platyrhynchos	Mallard	(Femelle) waapaship	Anatidae
Sarcelle à ailes bleues	Anas discors	Blue-winged teal		Anatidae
Canard souchet	Anas clypeata	Northern shoveler		Anatidae
Canard pilet	Anas acuta	Northern pintail	Uminikw, (jeune) uminikush	Anatidae
Sarcelle d'hiver	Anas crecca	Green-winged teal	Chiishchipish	Anatidae
Fuligule à collier	Aythya collaris	Ring-necked duck		Anatidae
Fuligule milouinan	Aythya marila	Greater scaup		Anatidae
Petit fuligule	Aythya affinis	Lesser scaup		Anatidae
Macreuse à front blanc	Melanitta perspicillata	Surf scoter	Akwaahiikan	Anatidae
Macreuse brune	Melanitta fusca	White-winged scoter	(canard) kuiskushipaatam	Anatidae
Macreuse à bec jaune	Melanitta nigra	Black scoter	(canard) kuiskushipaatam	Anatidae
Harelde kakawi	Clangula hyemalis	Long-tailed duck (oldsquaw)	Aahaaweshiish	Anatidae
Petit garrot	Bucephala albeola	Bufflehead		Anatidae
Garrot à œil d'or	Bucephala clangula	Common goldeneye		Anatidae
Harle couronné	Lophodytes cucullatus	Hooded merganser		Anatidae
Grand harle	Mergus merganser	Common merganser	Usikw, (jeune) usikush, (ooshick réf. S. Mattawashish)	Anatidae
Harle huppé	Mergus serrator	Red-breasted merganser		Anatidae
Gélinotte huppée	Bonasa umbellus	Ruffed grouse	Paashkii, (jeune) paashkiish	Phasianidae
Tétras du Canada	Falcipennis canadensis	Spruce grouse	Mishtikuhyeu, (jeune) mishtikuhyesh	Phasianidae
Lagopède des saules	Lagopus lagopus	Willow ptarmigan	Waapihyeu, (jeune) waapihyesh	Phasianidae
Tétras à queue fine	Tympanuchus phasianellus	Sharp-tailed grouse	Aahchiskuu, (jeune) aahchiskuush	Phasianidae
Plongeon catmarin	Gavia stellata	Red-throated loon	Aashimwaakw, (jeune) aashimwaakush	Gaviidae
Plongeon huard	Gavia immer	Common loon	Mwaakw, (jeune) mwaakush	Gaviidae

1 Source : S. Gagnon, 2011. *Projet de parc national Assinica : avifaune*, 123 p.

2 Bold indicates that the species has been observed in the study area. The other species were observed close to the study area limits, i.e. at less than 24 km to the South or South-East.

3 Source : *Dictionnaire du cri de l'Est de la Baie James*, [Online]. [http://www.eastcree.org].

French name[2]	Scientific name	English name	Cree name[3]	Family
Grèbe à bec bigarré	Podilymbus podiceps	Pied-billed grebe		Podicipedidae
Grèbe jougris	Podiceps grisegena	Red-necked grebe		Podicipedidae
Cormoran à aigrettes	Phalacrocorax auritus	Double-crested cormorant	Kaahkaahchiiship	Phalacrocoracidae
Butor d'Amérique	Botaurus lentiginosus	American bittern		Ardeidae
Grand héron	Ardea herodias	Great blue heron	(Héron) muuhkuhuusuu, (jeune) muuhkuhuushiish	Ardeidae
Bihoreau gris	Nycticorax nycticorax	Black-crowned night-heron		Ardeidae
Urubu à tête rouge	Cathartes aura	Turkey vulture		Cathartidae
Balbuzard pêcheur	Pandion haliaetus	Osprey	(intérieur des terres) akusimeseu, (jeune, intérieur des terres) ukusimesesh	Pandionidae
Pygargue à tête blanche	Haliaeetus leucocephalus	Bald eagle	Michisuu, (jeune) michishiish	Accipitridae
Busard Saint-Martin	Circus cyaneus	Northern harrier		Accipitridae
Épervier brun	Accipiter striatus	Sharp-shinned hawk		Accipitridae
Autour des palombes	Accipiter gentilis	Northern goshawk	Kwehkwehkw	Accipitridae
Petite buse	Buteo platypterus	Broad-winged hawk		Accipitridae
Buse à queue rousse	Buteo jamaicensis	Red-tailed hawk	Saahkutam, (jeune) saahkutamish	Accipitridae
Buse pattue	Buteo lagopus	Rough-legged hawk		Accipitridae
Crécerelle d'Amérique	Falco sparverius	American kestrel		Falconidae
Faucon émerillon	Falco columbarius	Merlin		Falconidae
Faucon gerfaut	Falco rusticolus	Gyrfalcon	Pipunisuu	Falconidae
Râle de Virginie	Rallus limicola	Virginia rail		Rallidae
Marouette de Caroline	Porzana carolina	Sora		Rallidae
Grue du Canada	Grus canadensis	Sandhill crane	Uchichaahkw, (jeune) uchichaahkush	Gruidae
Pluvier argenté	Pluvialis squatarola	Black-bellied plover		Charadriidae
Pluvier semipalmé	Charadrius semipalmatus	Semipalmated plover	Chuuhesk, (jeune) chuuheskash	Charadriidae
Pluvier kildir	Charadrius vociferus	Killdeer		Charadriidae
Chevalier grivelé	Actitis macularius	Spotted sandpiper		Scolopacidae
Chevalier solitaire	Tringa solitaria	Solitary sandpiper		Scolopacidae
Grand chevalier	Tringa melanoleuca	Greater yellowlegs	(Pattes jaune) shesheshuu	Scolopacidae
Petit chevalier	Tringa flavipes	Lesser yellowlegs	(Pattes jaune) shesheshuu	Scolopacidae
Tournepierre à collier	Arenaria interpres	Ruddy turnstone		Scolopacidae
Bécasseau semipalmé	Calidris pusilla	Semipalmated sandpiper		Scolopacidae
Bécasseau à croupion blanc	Calidris fuscicollis	White-rumped sandpiper		Scolopacidae
Bécasseau à poitrine cendrée	Calidris melanotos	Pectoral sandpiper		Scolopacidae
Bécassin roux	Limnodromus griseus	Short-billed dowitcher		Scolopacidae
Bécassine de Wilson	Gallinago delicata	Wilson's snipe	Taashkw	Scolopacidae
Bécasse d'Amérique	Scolopax minor	American woodcock		Scolopacidae

French name[2]	Scientific name	English name	Cree name[3]	Family
Phalarope à bec étroit	Phalaropus lobatus	Red-necked phalarope		Scolopacidae
Mouette de Bonaparte	Chroicocephalus philadelphia	Bonaparte's gull		Laridae
Goéland à bec cerclé	Larus delawarensis	Ring-billed gull		Laridae
Goéland argenté	Larus argentatus	Herring gull	(Mouette) chiyaashkw	Laridae
Guifette noire	Chlidonias niger	Black tern		Laridae
Sterne pierregarin	Sterna hirundo	Common tern	(Sterne) chiyaashkush	Laridae
Pigeon biset	Columba livia	Rock pigeon		Columbidae
Tourterelle triste	Zenaida macroura	Mourning dove		Columbidae
Coulicou à bec jaune	Coccyzus americanus	Yellow-billed cuckoo		Cuculidae
Grand-duc d'Amérique	Bubo virginianus	Great horned owl	(Chouette) uuhuumisuu, (jeune) uuhuumishiish	Strigidae
Harfang des neiges	Bubo scandiaca	Snowy owl	(Chouette blanche) waapikayuu, (jeune) waapikayesh	Strigidae
Chouette épervière	Surnia ulula	Northern Hawk owl		Strigidae
Chouette rayée	Strix varia	Barred owl		Strigidae
Chouette lapone	Strix nebulosa	Great gray owl		Strigidae
Nyctale de Tengmalm	Aegolius funereus	Boreal owl	Papayechisuu, (jeune) papayechishiish	Strigidae
Engoulevent d'Amérique	Chordeiles minor	Common nighthawk	Tipiskaaupiyeshiish	Caprimulgidae
Colibri à gorge rubis	Archilochus colubris	Ruby-throated hummingbird		Trochilidae
Martin-pêcheur d'Amérique	Megaceryle alcyon	Belted kingfisher	Uchiischiminisuu	Alcedinidae
Pic à tête rouge	Melanerpes erythrocephalus	Red-headed woodpecker		Picidae
Pic maculé	Sphyrapicus varius	Yellow-bellied sapsucker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Pic mineur	Picoides pubescens	Downy woodpecker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Pic chevelu	Picoides villosus	Hairy oodpecker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Pic à dos rayé	Picoides dorsalis	American three-toed oodpecker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Pic à dos noir	Picoides arcticus	Black-backed woodpecker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Pic flamboyant	Colaptes auratus	Northern flicker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Grand pic	Dryocopus pileatus	Pileated woodpecker	(Pic bois) paashpaashteu, (jeune) paashpaashtesh	Picidae
Moucherolle à côtés olive	Contopus cooperi	Olive-sided flycatcher		Tyrannidae
Moucherolle à ventre jaune	Empidonax flaviventris	Yellow-bellied flycatcher		Tyrannidae
Moucherolle des aulnes	Empidonax alnorum	Alder flycatcher		Tyrannidae
Moucherolle tchébec	Empidonax minimus	Least flycatcher		Tyrannidae

French name[2]	Scientific name	English name	Cree name[3]	Family
Moucherolle phébi	Sayornis phoebe	Eastern phoebe		Tyrannidae
Pie-grièche grise	Lanius excubitor	Northern shrike		Laniidae
Viréo à tête bleue	Vireo solitarius	Blue-headed vireo		Vireonidae
Viréo de Philadelphie	Vireo philadelphicus	Philadelphia vireo		Vireonidae
Viréo aux yeux rouges	Vireo olivaceus	Red-eyed vireo		Vireonidae
Mésangeai du Canada	Perisoreus Canadensis	Gray jay		Corvidae
Geai bleu	Cyanocitta cristata	Blue jay	Wiiskichaanish	Corvidae
Corneille d'Amérique	Corvus brachyrhynchos	American crow		Corvidae
Grand corbeau	Corvus corax	Common raven	Kaahkaachuu, (jeune) kaahkaahchiish	Corvidae
Alouette hausse-col	Eremophila alpestris	Horned lark		Alaudidae
Hirondelle bicolore	Tachycineta bicolour	Tree swallow	Uchihchipishiish	Hirundinidae
Hirondelle de ravage	Riparia riparia	Bank swallow	(Hirondelle) miichihkuleshiish and miichihkushiish	Hirundinidae
Hirondelle à front blanc	Petrochelidon pyrrhonota	Cliff swallow	(Hirondelle) miichihkuleshiish and miichihkushiish	Hirundinidae
Hirondelle rustique	Hirundo rustica	Barn swallow		Hirundinidae
Mésange à tête noire	Poecile atricapillus	Black-capped chickadee		Paridae
Mésange à tête brune	Poecile hudsonica	Boreal chickadee	(Tête noire) pipunipiyeshiish, (mésange) pichikiishkishiish	Paridae
Sittelle à poitrine rousse	Sitta canadensis	Red-breasted nuthatch	Wiichaapishiish	Sittidae
Grimpereau brun	Certhia americana	Brown creeper		Certhiidae
Troglodyte des forêts	Troglodytes hiemalis	Winter wren		Troglodytidae
Roitelet à couronne dorée	Regulus satrapa	Golden-crowned kinglet		Regulidae
Roitelet à couronne rubis	Regulus calendula	Ruby-crowned kinglet		Regulidae
Merlebleu de l'Est	Sialia sialis	Eastern bluebird	Waaseskuneuchishiish	Turdidae
Grive à joues grises	Catharus minimus	Gray-cheeked thrush		Turdidae
Grive à dos olive	Catharus ustulatus	Swainson's thrush		Turdidae
Grive solitaire	Catharus guttatus	Hermit thrush	Chimuuneuchishiish, (intérieur des terres) chihchip	Turdidae
Merle d'Amérique	Turdus migratorius	American robin		Turdidae
Moqueur chat	Dumetella carolinensis	Gray catbird	Piihpiihcheu, (jeune) piihpiihchesh	Mimidae
Moqueur roux	Toxostoma rufum	Brown thrasher		Mimidae
Étourneau sansonnet	Sturnus vulgaris	European starling		Sturnidae
Pipit d'Amérique	Anthus rubescens	American pipit		Motacillidae
Jaseur boréal	Bombycilla garrulus	Bohemian waxwing		Bombycillidae
Jaseur d'Amérique	Bombycilla cedrorum	Cedar waxwing		Bombycillidae
Plectrophane lapon	Calcarius lapponicus	Lapland longspur	Miishui	Calcariidae
Plectrophane des neiges	Plectrophenax nivalis	Snow bunting		Calcariidae
Paruline obscure	Vermivora peregrina	Tennessee warbler	Waapiyekushiish	Parulidae

French name[2]	Scientific name	English name	Cree name[3]	Family
Paruline verdâtre	Vermivora celata	Orange-crowned warbler		Parulidae
Paruline à joues grises	Vermivora ruficapilla	Nashville warbler		Parulidae
Paruline jaune	Dendroica petechia	Yellow warbler		Parulidae
Paruline à flancs marron	Dendroica pensylvanica	Chestnut-sided warbler	(oiseau jaune) usaaupiyeshiish	Parulidae
Paruline à tête cendrée	Dendroica magnolia	Magnolia warbler		Parulidae
Paruline tigrée	Dendroica tigrina	Cape May warbler	Chimuunipiyeshiish	Parulidae
Paruline bleue	Dendroica caerulescens	Black-throated blue warbler		Parulidae
Paruline à croupion jaune	Dendroica coronata	Yellow-rumped warbler		Parulidae
Paruline à gorge noire	Dendroica virens	Black-throated green warbler		Parulidae
Paruline à gorge orangée	Dendroica fusca	Blackburnian warbler		Parulidae
Paruline à couronne rousse	Dendroica palmarum	Palm warbler		Parulidae
Paruline à poitrine baie	Dendroica castanea	Bay-breasted warbler		Parulidae
Paruline rayée	Dendroica striata	Blackpoll warbler		Parulidae
Paruline noir et blanc	Mniotilta varia	Black-and-white warbler		Parulidae
Paruline flamboyante	Setophaga ruticilla	American redstart		Parulidae
Paruline couronnée	Seiurus aurocapilla	Ovenbird		Parulidae
Paruline des ruisseaux	Seiurus noveboracensis	Northern waterthrush		Parulidae
Paruline à gorge grise	Oporornis agilis	Connecticut warbler	Chuuhchuushchishiish	Parulidae
Paruline triste	Oporornis philadelphia	Mourning warbler		Parulidae
Paruline masquée	Geothlypis trichas	Common yellowthroat		Parulidae
Paruline à calotte noire	Wilsonia pusilla	Wilson's warbler		Parulidae
Paruline du Canada	Wilsonia canadensis	Canada warbler		Parulidae
Bruant hudsonien	Spizella arborea	American tree sparrow		Emberizidae
Bruant familier	Spizella passerina	Chipping sparrow		Emberizidae
Bruant vespéral	Pooecetes gramineus	Vesper sparrow		Emberizidae
Bruant des prés	Passerculus sandwichensis	Savannah sparrow		Emberizidae
Bruant fauve	Passerella iliaca	Fox sparrow	Utakahamupiyeshiish	Emberizidae
Bruant chanteur	Melospiza melodia	Song sparrow		Emberizidae
Bruant de Lincoln	Melospiza lincolnii	Lincoln's sparrow		Emberizidae
Bruant des marais	Melospiza georgiana	Swamp sparrow		Emberizidae
Bruant à gorge blanche	Zonotrichia albicollis	White-throated sparrow		Emberizidae
Bruant à couronne blanche	Zonotrichia leucophrys	White-crowned sparrow		Emberizidae
Junco ardoisé	Junco hyemalis	Dark-eyed junco		Emberizidae
Cardinal rouge	Cardinalis cardinalis	Northern cardinal		Emberizidae
Cardinal à poitrine rose	Pheucticus ludovicianus	Rose-breasted grosbeak		Emberizidae

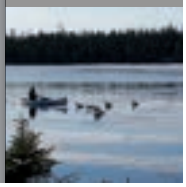
French name[2]	Scientific name	English name	Cree name[3]	Family
Carouge à épaulettes	Agelaius phoeniceus	Red-winged blackbird		Icteridae
Quiscale rouilleux	Euphagus carolinus	Rusty blackbird	Chihchikiyuu and chihchikaluu	Icteridae
Quiscale bronzé	Quiscalus quiscula	Common grackle		Icteridae
Vacher à tête brune	Molothrus ater	Brown-headed cowbird		Icteridae
Durbec des sapins	Pinicola enucleator	Pine grosbeak		Fringillidae
Roselin pourpré	Carpodacus purpureus	Purple finch		Fringillidae
Bec-croisé des sapins	Loxia curvirostra	Red crossbill		Fringillidae
Bec-croisé bifascié	Loxia leucoptera	White-winged crossbill		Fringillidae
Sizerin flammé	Carduelis flammea	Common redpoll		Fringillidae
Sizerin blanchâtre	Carduelis hornemanni	Hoary redpoll		Fringillidae
Tarin des pins	Carduelis pinus	Pine siskin		Fringillidae
Chardonneret jaune	Carduelis tristis	American goldfinch		Fringillidae
Gros-bec errant	Coccothraustes vespertinus	Evening grosbeak	(oiseau jaune) usaaupiyeshiish	Fringillidae
Moineau domestique	Passer domesticus	House sparrow	(oiseau jaune) usaaupiyeshiish	Passeridae

Appendix 8 MAMMALS FOUND IN OR LIKELY TO BE FOUND IN THE STUDY AREA[1]

French name	Scientific name	English name	Cree name[2]	Family
Loup gris	Canis lupus	Grey wolf	Mahiihkanish = jeune loup	Canidae
Renard arctique	Vulpes lagopus	Arctic fox	Waapahcheshuu = renard blanc	Canidae
Renard roux	Vulpes vulpes	Red fox	Usaauhcheshuu, mahcheshuu = renard	Canidae
Castor du Canada	Castor canadensis	American beaver	Amiskw	Castoridae
Caribou des bois	Rangifer tarandus caribou	Woodland caribou	Atihkw	Cervidae
Orignal	Alces americanus	Moose	Muus	Cervidae
Campagnol à dos roux de Gapper	Myodes gapperi	Southern red-backed vole		Muridae
Campagnol des champs	Microtus pennsylvanicus	Meadow vole		Muridae
Campagnol des rochers	Microtus chrotorrhinus	Rock vole		Muridae
Campagnol-lemming boréal	Synaptomys borealis	Northern bog lemming		Muridae
Campagnol-lemming de Cooper	Synaptomys cooperi	Southern bog lemming		Muridae
Phénacomys	Phenacomys ungava	Eastern heather vole		Muridae
Rat musqué	Ondatra zibethicus	Muskrat	Wachishkw	Muridae
Rat surmulot	Rattus norvegicus	Norway rat	Paahkuchishkw	Muridae
Souris sylvestre	Peromyscus maniculatus	Deer mouse	Aapikushiish = souris	Muridae
Peromyscus sp. Cf. Souris sylvestre	Peromyscus sp.			Muridae
Souris sauteuse des bois	Napaeozapus insignis	Woodland jumping mouse	Aapikushiish = souris	Dipodidae
Souris sauteuse des champs	Zapus hudsonius	Meadow jumping mouse	Aapikushiish = souris	Dipodidae
Porc-épic d'Amérique	Erethizon dorsatum	American porcupine	Kaakw	Erethizontidae
Cougar	Puma concolor	Cougar		Felidae
Lynx du Canada	Lynx canadensis	Lynx	Pishhuu	Felidae
Lièvre d'Amérique	Lepus americanus	Snowshoe hare	Waapush = lapin	Leporidae
Mouffette rayée	Mephitis mephitis	Striped skunk	Shikaakw	Mephitidae
Belette à longue queue	Mustela frenata	Long-tailed weasel	Shihkushiish = belette/hermine	Mustelidae
Belette pygmée	Mustela nivalis	Least weasel	Shihkushiish = belette/hermine	Mustelidae
Belette sp.				Mustelidae
Carcajou	Gulo gulo	Wolverine	Kuikuhaacheu	Mustelidae
Hermine	Mustela erminea	Ermine	Shihkushiish = belette/hermine	Mustelidae
Loutre de rivière	Lontra canadensis	Northern river otter	Nichikw	Mustelidae
Martre d'Amérique	Martes americana	American marten	Waapishtaan	Mustelidae
Pékan	Martes pennanti	Fisher	Uchekw	Mustelidae
Vison d'Amérique	Neovison vison	Mink	Achikaash	Mustelidae

1 S. Gagnon, 2011. *Projet de parc national Assinica : mammifères*, 42 p.
2 Source : *Dictionnaire du cri de l'Est de la Baie James*, [Online]. [http://www.eastcree.org].

French name	Scientific name	English name	Cree name[2]	Family
Écureuil roux	Tamiasciurus hudsonicus	American red squirrel	Nikuchaash	Sciuridae
Grand polatouche	Glaucomys sabrinus	Northern flying squirrel	Papaamihyaanikuchaash, chischeyuunikuchaash	Sciuridae
Marmotte commune	Marmota monax	Woodchuck		Sciuridae
Tamia rayé	Tamias striatus	Eastern chipmunk	Saasaakunikuchaash	Sciuridae
Grande musaraigne	Blarina brevicauda	Short-tailed shrew		Soricidae
Musaraigne arctique	Sorex arcticus	Arctic shrew		Soricidae
Musaraigne cendrée	Sorex cinereus	Maskedshrew		Soricidae
Musaraigne fuligineuse	Sorex fumeus	Smoky shrew		Soricidae
Musaraigne palustre	Sorex palustris	American water shrew		Soricidae
Musaraigne pygmée	Sorex hoyi	Pigmy shrew		Soricidae
Musaraigne sp.				Soricidae
Condylure à nez étoilé	Condylura cristata	Star-nosed mole	Nasipaachinischesuu = taupe	Talpidae
Ours noir	Ursus americanus	Black bear	Kaakuush (intérieur des terres), miskw, chesheyaakw	Ursidae
Chauve-souris argentée	Lasionycteris noctivagans	Silver-haired bat	Pahkwaachiish = chauve-souris	Vespertilionidae
Chauve-souris cendrée	Lasiurus cinereus	Hoary bat	Pahkwaachiish = chauve-souris	Vespertilionidae
Chauve-souris nordique	Myotis septentrionalis	Northern long-eared bat	Pahkwaachiish = chauve-souris	Vespertilionidae
Chauve-souris rousse	Lasiurus borealis	Red bat	Pahkwaachiish = chauve-souris	Vespertilionidae
Petite chauve-souris brune	Myotis lucifugus	Little brown bat	Pahkwaachiish = chauve-souris	Vespertilionidae
Chauve-souris sp.				



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