

3 Ecological description

3.1 General information⁸

The four proposed biodiversity reserves are located in the natural province⁹ of the Abitibi and James Bay Lowlands. This natural province, which covers 99,917 km², corresponds to a plain that slopes gradually from the southeast down towards the northwest to the banks of James Bay. It is characterized by a relatively flat topography and the influence of specific Quaternary events.

When the polar ice sheet melted, it opened up like a zipper, from south to north (9,000 to 10,000 years ago). The Harricana Moraine was formed between the two ice masses by sandy-gravelly till that was left there. During this period, the meltwater was blocked in the north by ice and in the south by the water divide of James Bay and the St. Lawrence River. The territory underwent a lacustrine period ahead of the glacier (creation of glacial lake Barlow-Ojibway). About 8,000 years ago, as the glacier receded, the opening of the passage towards James Bay caused Ojibway lake to drain into the Tyrrell, submerging the land pushed down by the weight of the glaciers, in the northern part of the natural province. This marine episode deposited clay on which numerous organic deposits developed.

The Opasatica lake, Des Quinze lake, and Decelles reservoir proposed biodiversity reserves are all three located in the Lake Témiscamingue Lowlands natural region¹⁰ (13,505 km²), which is located in the extreme southern part of the natural province. It largely corresponds to the Pontiac geological sub province, an Archean core (> 2.9 billion years) that integrated itself into the Superior geological province at the beginning of the Proterozoic period (2.7 to 2.6 billion years). The geological composition of the substratum (granitic and paragneiss) is more resistant to erosion than the territories located further north (volcanic and sedimentary rock); this region's topography is therefore rougher than those of the Abitibi Plain and Turgeon River Plain. Within the natural region, there is a vast dip running northwest/southeast in the axis of large tectonic fractures.

The **Opasatica lake and Des Quinze lake proposed biodiversity reserves** are located in the physiographic complex of the Rogers lake knolls¹¹ (3,972 km²), characterized by lacustrine silt (Des Quinze lake), which occasionally includes till mounds and rock interspersed with faults oriented northwest/southeast (Opasatica lake).

The **Decelles reservoir proposed biodiversity reserve** lies within the physiographic complex of the Decelles reservoir knolls (2,871 km²). Like the preceding physiographic complex, it is composed of a silt plain and till and rock knolls interspersed with faults oriented northwest/southeast. It is distinguished by a larger proportion of till and rock knolls, by a large dip occupied by the hydroelectric reservoir and by a portion of the Harricana Interlobate Moraine.

The **Piché-Lemoine forest proposed biodiversity reserve** is located in the natural region of the Abitibi Plain (29,957 km²). The rocky outcrop is essentially composed of volcanic rock that forms a relatively flat topography covered in lacustrine silt and organic deposits. This plain, with an elevation varying between 200 and 300 metres, is dotted with hills up to 200 metres high. They are generally intrusions of plutonic rock (gneiss, tonalite and granite) originating from an ancient subduction zone. The flat topography of this natural region is also dotted with a few important fluvio-glacial formations oriented northsouth/southwest.

Specifically, the **Piché-Lemoine forest proposed biodiversity reserve** lies within the plain of Preissac lake (2,722 km²), which is characterized by flat topography covered with numerous lakes and dotted with a few till hillocks and, in the northeast, by a complex of rock knolls. The plain is mainly covered in poorly drained lacustrine silt and organic deposits. A small area to the southeast is also within the physiographic complex of the plain of Sabourin lake (4,161 km²).

The four proposed biodiversity reserves are essentially under the influence of a mild, subpolar and subhumid climate with a long growing season (SpDSHL) (Gerardin and McKenney, 2001). The Piché-Lemoine forest, however, is also partly characterized by a subpolar, subhumid climate with an average growing season (SpSHM). Winters are cold and dry and summers are hot

⁸ The maps on pages 7 to 10 illustrate the features and phenomena covered in this section.

⁹ Level 1 of the Ecological Reference Framework.

¹⁰ Level 2 of the Ecological Reference Framework.

¹¹ Level 3 of the Ecological Reference Framework.

with no dry season (see table 1). Winds are predominantly westerly.

Table 1 Climate data

	SpDSHL	SpSHM
Average annual temperature T°	2.19 °C	0.13 °C
Average T° of 3 hottest months	16.01 °C	14.72 °C
Average T° of 3 coldest months	-13.45 °C	-16.44 °C
Total annual precipitation (mm)	997.92	967.37
Nbr of growing days	180.23	166.93

T°: temperature

These climatic conditions are revealed by two bioclimatic domains, namely, the balsam fir-yellow birch forests, whose northern limit is at a higher latitude to the west, and the balsam fir-white birch forests. The Opasatica lake and Des Quinze lake proposed biodiversity reserves are entirely situated in the domain of the balsam fir-yellow birch. The Piché-Lemoine forest is entirely situated in the balsam fir-white birch domain. The Decelles reservoir proposed biodiversity reserve is adjacent to these two bioclimatic domains.

The geology, relief and main Quaternary surface deposits are elements of the physical environment that have largely contributed to modelling the representativeness of the four territories of the natural province.

3.2 Ecological units: revelations of the landscape

To appreciate the ecological diversity of each of the territories of the proposed biodiversity reserves, a series of summary sheets is presented in sections 3.2.1 to 3.2.4. Each sheet summarizes the key natural features of the ecological units. Without in themselves reflecting the Ecological Reference Framework, because the boundaries of the proposed biodiversity reserves do not correspond to their specific ecological boundaries, the ecological units that are presented correspond to the key landscapes (relief, surface deposits, forest cover, hydrography) observed. The ecological units can be observed in the field and therefore can be mapped.

3.2.1 Ecological units of the Opasatica lake proposed biodiversity reserve

Protection of Opasatica lake and part of its watershed

The Opasatica lake proposed biodiversity reserve (see appendix 2) aims to protect Opasatica lake and part of its watershed. Opasatica lake is situated at the head of the Barrière river watershed. The proposed biodiversity reserve also includes the head of the watersheds of the Pontleroy and Larder (Ontario) rivers, which belong to the Blanche river watershed. Opasatica lake forms a head lake that flows to the St. Lawrence by way of the Ottawa river.

The substratum of this territory is mainly made up of granitic rock. The northern part is on ultramafic and paragneiss rock whereas the western part, near Hébert lake, is a conglomerate.

The general relief, which is an undulating plain with a few isolated knolls, has an elevation ranging from 265 to 390 metres with an average elevation of 301 metres.

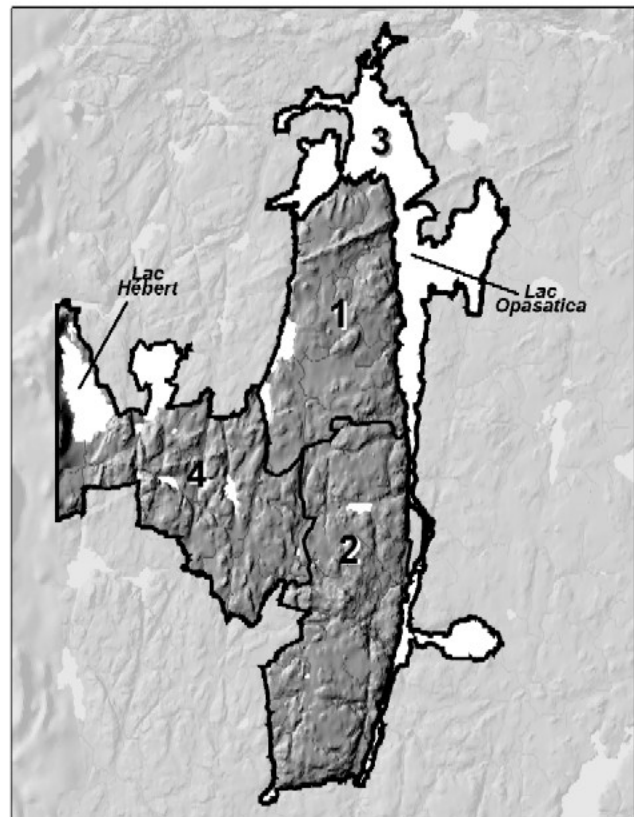
The forest cover is composed of mixed stands (50%) and softwoods (33%). The key species are black spruce and white birch. Other species, such as jack pine and trembling aspen, are also abundant. Over 60% of the forest cover consists of average-age trees (50-70 years) and less than 15% of the trees are 90 years and more.

This territory was divided into four distinct ecological units (see map to the right):

- plain (1)
- plateau (2)
- Opasatica lake (3)
- complex of knobs (4)

Aside from Opasatica lake which, on account of its size, is an ecological unit on its own, the three terrestrial ecological units are distinguished mainly by the

combination of their land forms and surface deposits. The vegetation cover of each of these units is influenced by these physical features. The natural and anthropogenic disturbances are also influenced by forest growth dynamics.



3.2.1.1 Ecological unit 1 – The plain (54 km²)

Relief and surface deposits

- Glaciolacustrine plain of silts and clays with till hillocks
- A few depressions occupied by organic deposits: thin ombrotrophic bogs over till and thin forested minerotrophic bogs over silt and clay
- East-northeast/west southwest ridge about 25 metres high caused by erosion with thin colluvion over rock at its base
- Elevation between 266 and 356 metres and an average of 310 metres
- 40-metre average difference in elevation

Geology

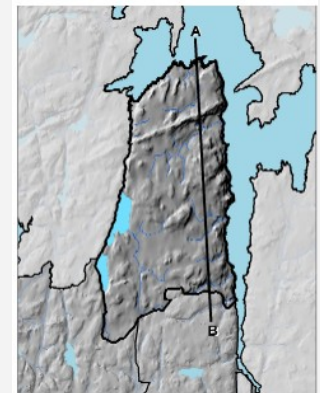
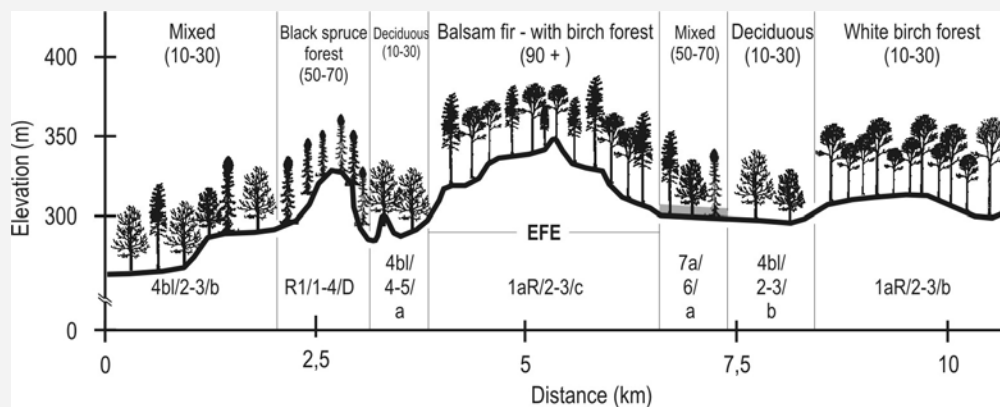
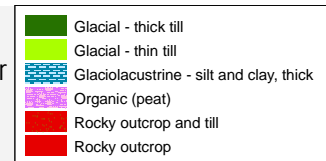
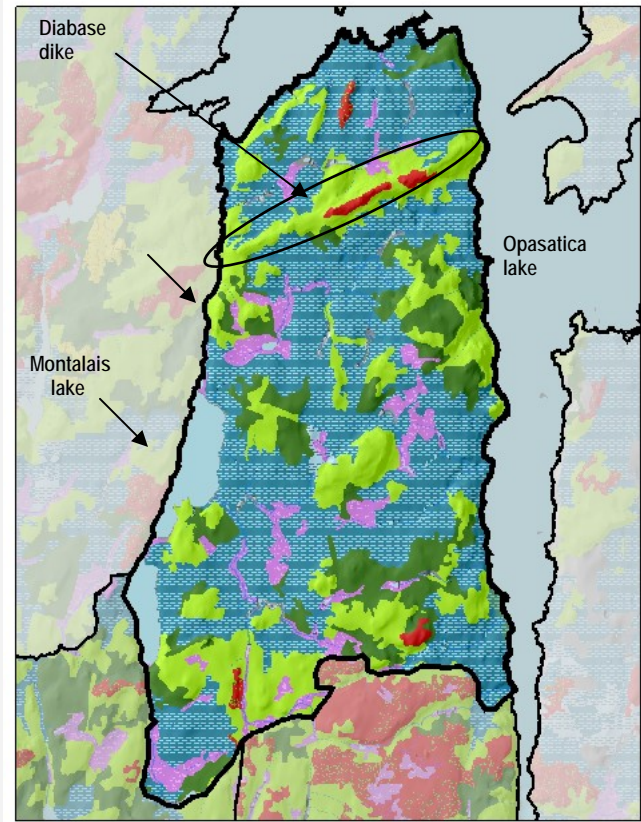
- Granitic rock to the south, metasedimentary rock (paragneiss) in the centre and ultramafic rocks in the north
- Part of a diabase dike: intrusive mass of tholeiitic composition (ferromagnesian); mafic minerals derived from the upper mantle at a depth of 50 km

Watercourses and lakes

- Only two lakes named: Granville (1.33 km²) and Montalais (0.68 km²)
- Granville river and a few streams

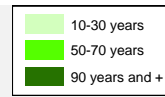
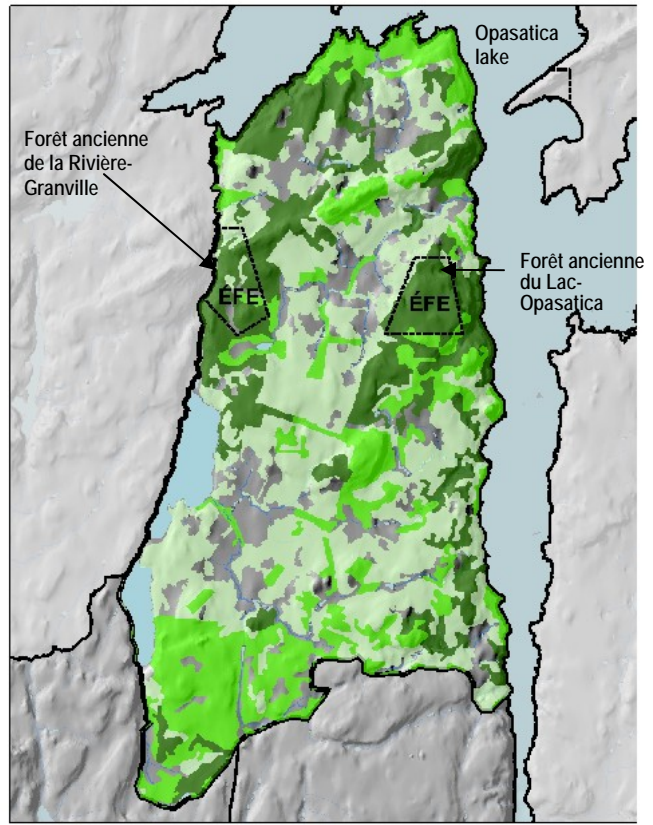
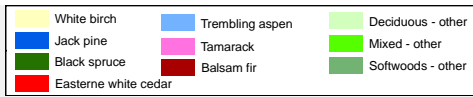
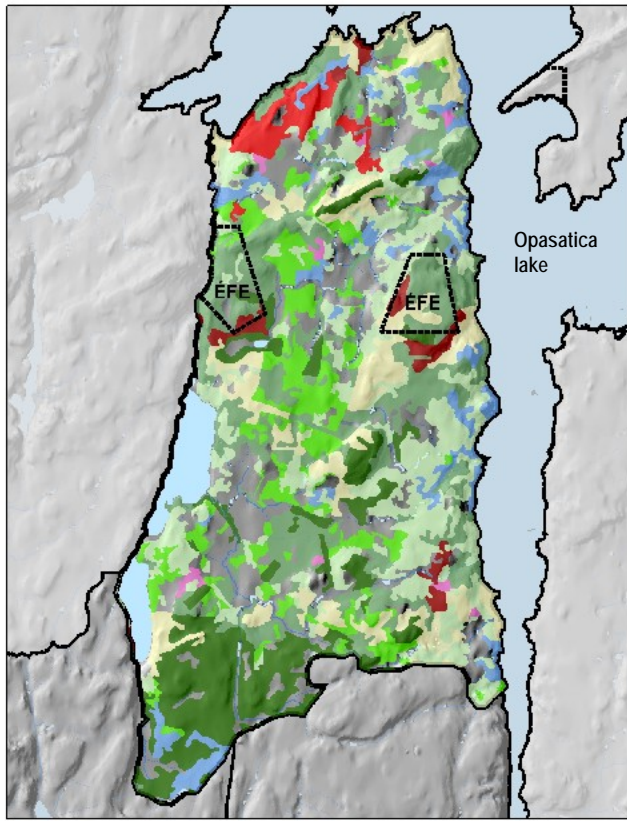
Vegetation

- White birch and black spruce occupy the till hillocks.
- The clay-silt plain is populated with mixed and deciduous forests.
- Two exceptional forest ecosystems (EFEs) (balsam fir-white birch and cedar stands), namely, the Granville river and Opasatica lake old-growth forests are in this ecological unit.
- Cedar groves occupy the banks of Baie Lamy bay.
- Although the majority of the forests are young (10-15 years), this unit contains most of the old-growth forests of the proposed biodiversity reserve.
- This unit is mostly composed of mixed forests undergoing regeneration (recent forest cuts).



Location of transect

See appendices 6 and 7 for indications concerning readings of all the transects and the land form glossary



View of the glaciolacustrine plain from the ridge formed by the dike



Mature forest on the outskirts of the Opasatica lake ÉFE

3.2.1.2 Ecological unit 2 – The plain (70 km²)

Relief and surface deposits

- Plateau at 40 to 50 metres over the plain
- Large amount of rock outcrops with thin till
- Steep slope near Opasatica lake
- Clay and silt deposits at lower elevations east of the ecological unit, near Opasatica lake
- Organic deposits in depressions: presence of thin ombrotrophic bogs over till and thin forested minerotrophic bogs over clay and silt
- Elevation between 270 and 390 metres with average elevation of 345 metres
- Element of interest: organic deposit (forest humus: folisol) over rock along the south and southeast boundary

Geology

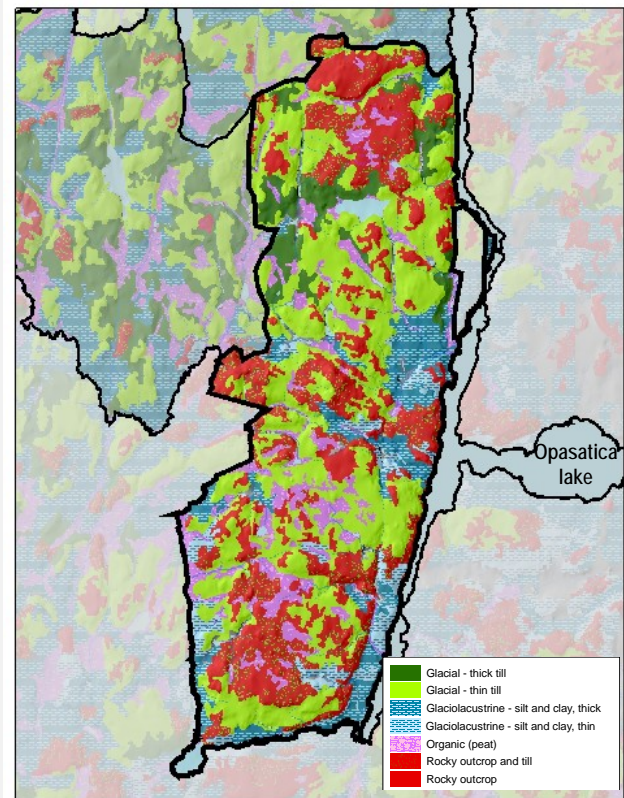
- Rocks are entirely granitic
- Paragneiss at the southern end of Opasatica lake in Baie Solitaire bay

Watercourses and lakes

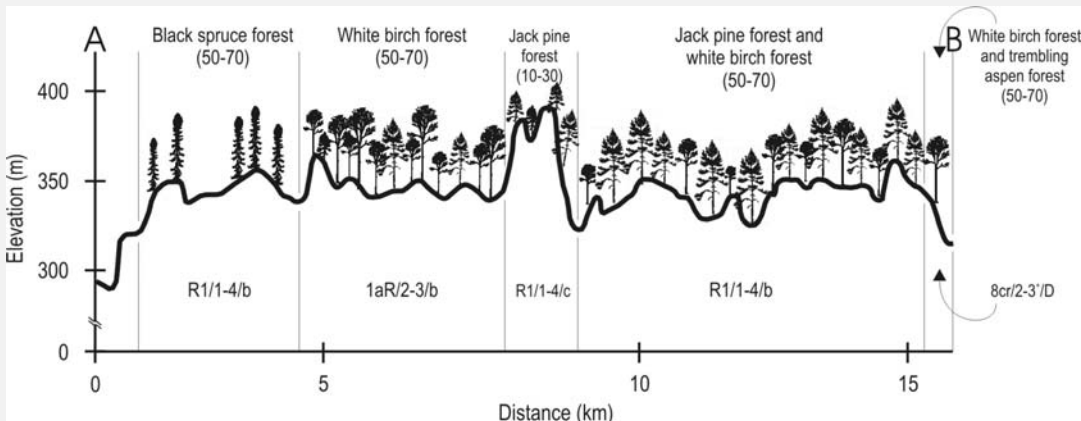
- Only two small lakes are named: Petit lac Bull Rock lake (0.36 km²) and Gingras lake (0.38 km²)
- Bull Rock stream and a few streams

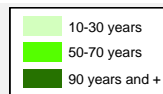
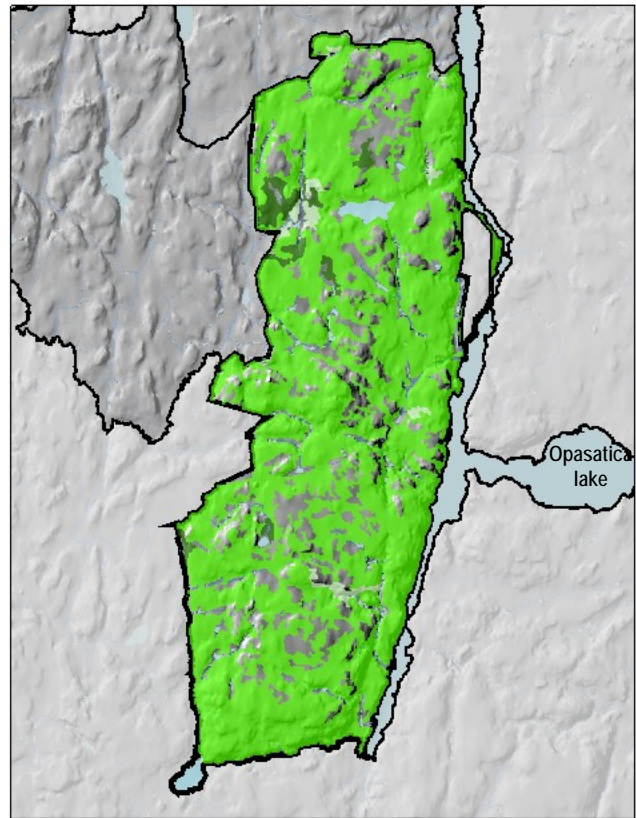
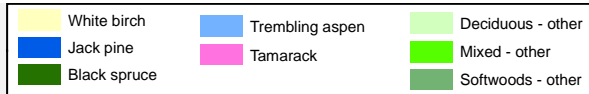
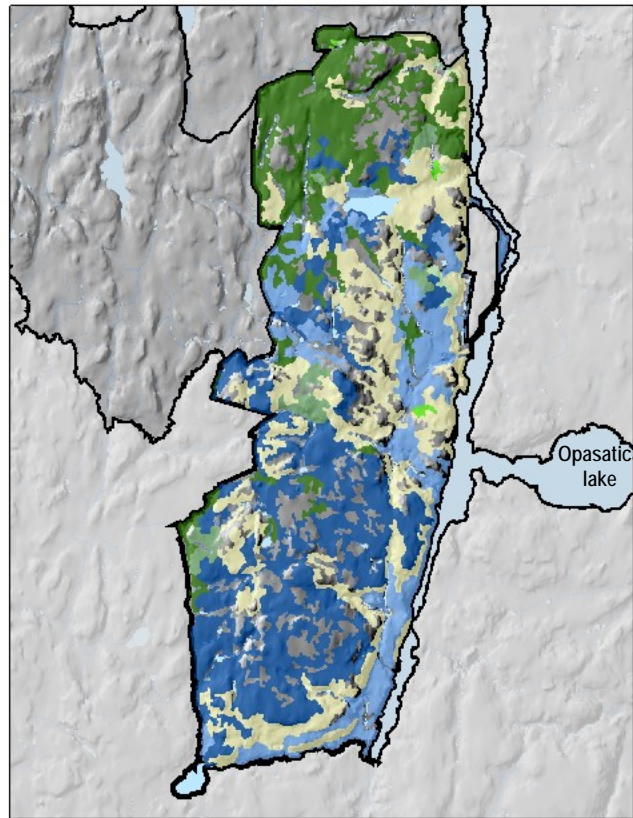
Vegetation

- The eastern slope, on Opasatica lake, and the zones at lower elevations are colonized by white birch and trembling aspen.
- There are a few yellow birch.
- White birch also occupy the steeper sectors.
- The average age forests (50-70 years) make up 95% of the vegetation cover.
- There is a large number of jack pine stands on the rocky outcrops in the southern part.
- Black spruce forests occupy the rocky outcrops in the northern part.
- This unit is mostly made up of mixed and softwood forests.



Location of transect





At the foot of the steep slopes on the west bank of Opasatica lake

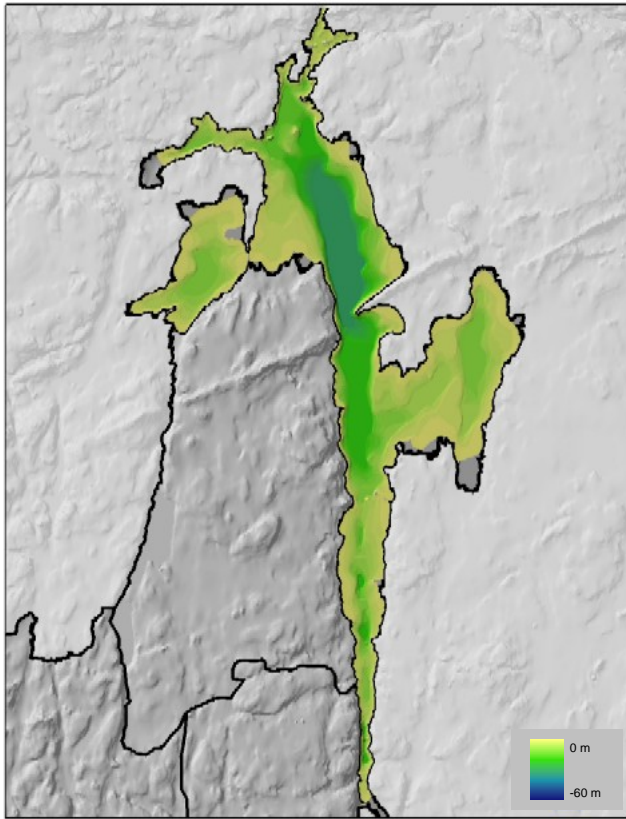


View of Opasatica lake from the plateau

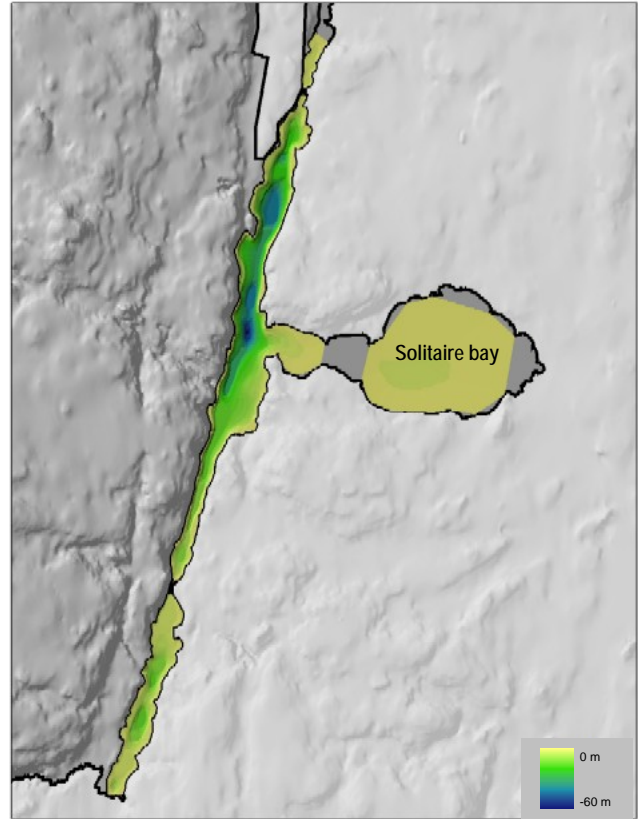
3.2.1.3 Ecological unit 3 – Opasatica lake (48 km²)

Opasatica lake

- Average elevation of 265 metres
- Surface area of 48 km² and 33 kilometres long from north to south
- Six kilometres wide at the north end
- Tremendous variations in depth and maximum depth up to 60 metres across from Baie Solitaire bay
- Empties into the Solitaire river, which feeds Rémigny lake
- East and north banks occupied by resort dwellings; the west bank is steep and unoccupied



Opasatica lake (north part) - bathymetry



Opasatica lake (south part) - bathymetry



View of Opasatica lake from Baie Bergeron bay



Opasatica lake

3.2.1.4 Ecological unit 4 – The complex of hillocks (72 km²)

Relief and surface deposits

- Complex of till hillocks of varying depth and rocky outcrops interspersed with clay and silt glaciolacustrine deposits
- A few depressions occupied by organic deposits (bogs)
- Two sectors of fluvioglacial deposits of ice-contact sand south of Hébert lake
- The Dufay lake island is made up of fluvioglacial ice-contact sand
- Two sectors of thin colluvium over rock west of Hébert lake
- Elevation varying between 271 and 385 metres with an average of 295 metres
- Average difference in elevation of 35 metres

Geology

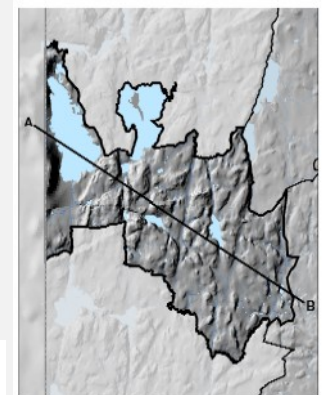
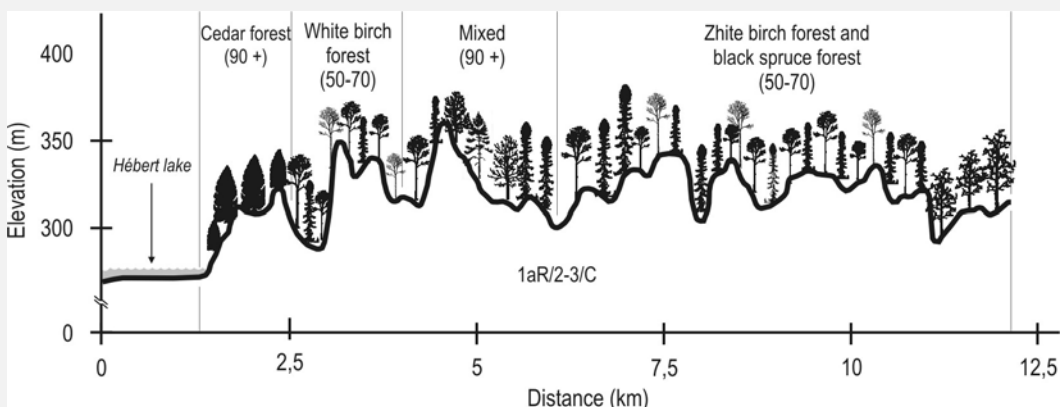
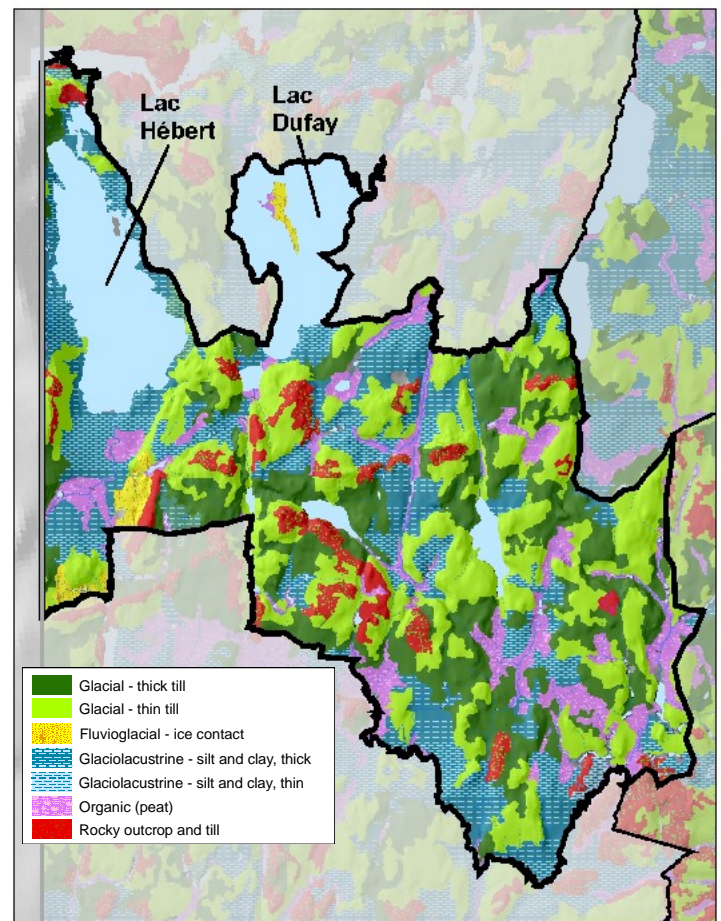
- Conglomerate composed of silici-clastic rocks in the west part, near Hébert and Dufay lakes
- Granitic rocks in the eastern part

Watercourses and lakes

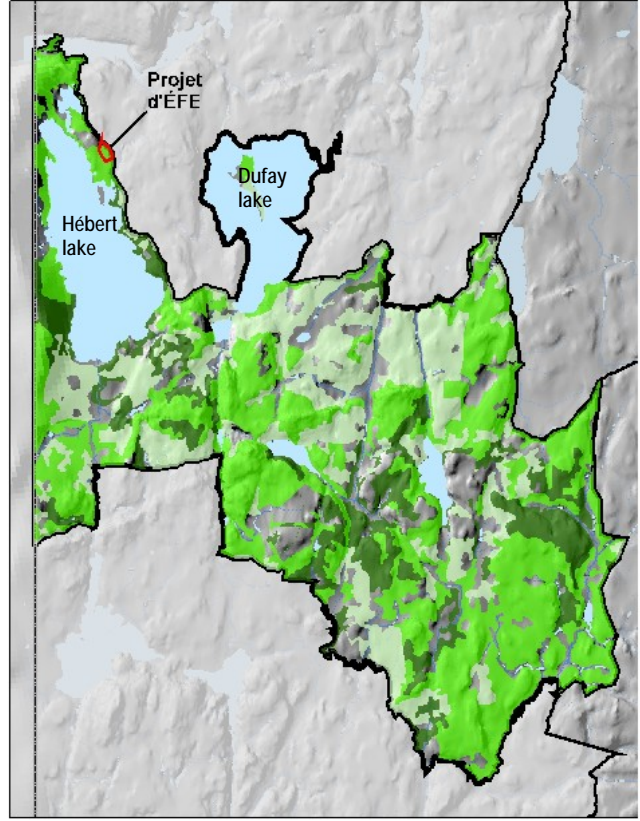
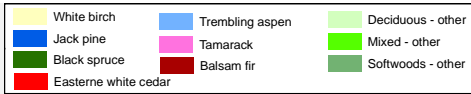
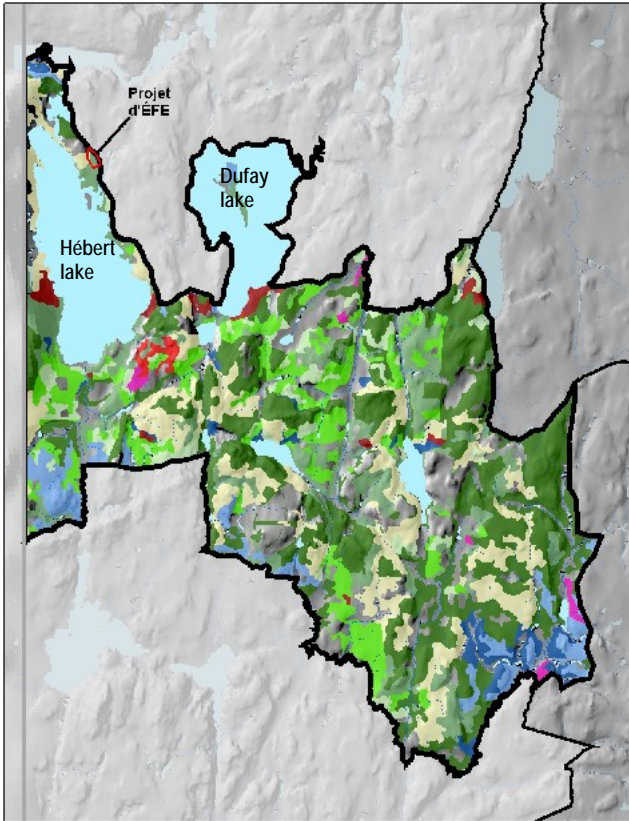
- Only four small lakes are named: Hébert (5.5 km²), Dufay (4.4 km²), Senaka (0.46 km²) and Abénakis (0.26 km²)
- Laberge river and a few streams

Vegetation

- White birch and black spruce colonize the till hillocks and slopes.
- The EFE project (rare forest: white pine-red spruce stand) is in this unit.
- The cedar groves occupy a hillock southeast of Hébert lake.
- Other species, like trembling aspen, jack pine, tamarack and balsam fir are found throughout this ecological unit.
- The forests are mostly of average age (50-70 years) and forests of 90 years and more are rare.
- This unit is mostly composed of mixed and softwood forests.



Location of transect



Hébert lake



Deforested plain occupied by grasses