

### 3.3.2 TAIGA PLAINS LOW SUBARCTIC (LS) ECOREGION



Typical landscapes in the Taiga Plains Low Subarctic (LS) Ecoregion are a mosaic of uplands and wetlands. In the colder northern part of the Ecoregion shown in the photo above, semi-closed to open upland stands of black spruce with understories of dwarf birch, northern and common Labrador tea, moss and reindeer lichen are interspersed with treed or shrubby bogs and fens. Open white spruce and birch stands with discontinuous understories of red bearberry and mountain cranberry and lichens are often found on drier sites. Warmer conditions to the south promote the development of white spruce, paper birch and aspen forests on moist sites; jack pine dominated stands are common on well-drained sandy or gravelly soils. Organic Cryosols and Gleysols are typical wetland soils; Brunisols are common on drier upland sites.



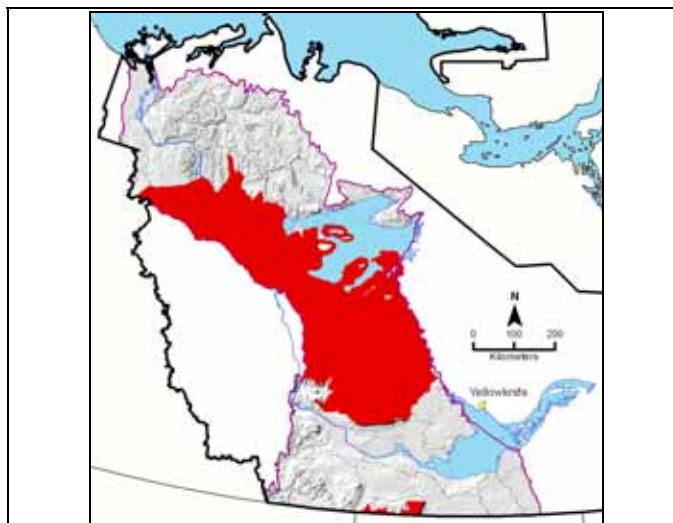
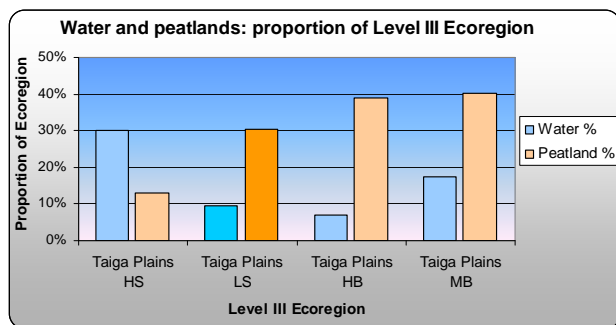
Open and semi-closed stands of slow-growing black and white spruce with shrubby understories of dwarf birch, northern and common Labrador tea, mosses and lichens interspersed with bogs and fens are a common landscape pattern in the Taiga Plains LS Ecoregion.



Cloudberry or baked-apple (*Rubus chamaemorus*) is a low, creeping herb that is common throughout the Taiga Plains in wet bogs, usually with peat mosses. It is particularly common in the Taiga Plains HS and Taiga Plains LS Ecoregions, and its range extends north of tree line.

### 3.3.2 TAIGA PLAINS LOW SUBARCTIC (LS) ECOREGION

**Overview:** *The Taiga Plains LS Ecoregion occupies the central third of the Taiga Plains. Level to undulating till plains with white or black spruce stands or regenerating shrub communities are typical of uplands, and peatlands with permafrost are characteristic of low, wet areas.*



**Total area:** 161,435 km<sup>2</sup> (34% of Taiga Plains).  
Ecoregion shown in red.

#### General Description

The Level III Taiga Plains LS Ecoregion includes fourteen Level IV ecoregions that occupy the central third of the Taiga Plains at elevations of 200 mASL to over 1000 mASL and one outlying Level IV ecoregion along the Northwest Territories – Alberta border. This Ecoregion spans about 650 km in a north – south direction. Toward the north and at higher elevations, the increased incidence of cold-climate permafrost features such as polygonal peat plateaus and runnels and the decreased incidence of relatively tall and dense upland forests indicate harsher climates. Level to gently sloping and undulating imperfectly- to poorly-drained glacial till occurs over much of the Ecoregion. Peatlands are extensive, particularly on plains in the southern half. Recent fires have burned over much of this Ecoregion, and regenerating shrub lands and young regenerating forests share dominance with low-canopied open black or white spruce forests and peat plateaus. Diverse mixed-wood, deciduous or conifer forests are limited to warm and well-drained microsites.

#### Climate

Norman Wells is the only station from which climate data have been collected over long periods within the Taiga Plains LS Ecoregion, and climate statistics are therefore determined through interpolated models using the limited available data. Polygonal peat plateaus and slow-growing open conifer stands across most of the region are indicative of a Low Subarctic climate, as defined by the Ecoregions Working Group (1989). Climate models (Agriculture and Agri-Food Canada 1997) provide the following general statistics. The mean annual temperature ranges from –3.5 to –9.0°C. The mean temperature in January, the coldest month, ranges from –25.5 to –29.0°C, and from 11.0 to 16.5°C in July, the warmest month. Mean annual precipitation is between 230 and 350 mm, with the wettest period in June through August and the driest period in December through April; about half falls as rain and half as snow. The mean annual daily solar input (refer to Section 1.4.1 for further explanation) ranges

between 9.5 and 11 MJ/m<sup>2</sup>/day, with low values of 0.2 to 1.5 MJ/m<sup>2</sup>/day in December and highs of 21.5 to 22.5 MJ/m<sup>2</sup>/day in June.

#### Topography, geology, soils, and hydrology

The Taiga Plains LS Ecoregion includes extensive low-lying plains, uplands, and hill systems embedded in the uplands; slopes are mainly level to very gentle. Devonian limestone underlies the eastern third of the Ecoregion, where numerous calcareous ponds and fens indicate limestone influences on groundwater. Level to undulating and hummocky till is the dominant surficial material; in places it has been deeply grooved by glacial ice movement. Permanently frozen peatlands cover vast areas particularly in the south part of the Ecoregion. Soils are dominantly mineral and Organic Cryosols. Lac la Martre, Keller Lake, and Blackwater Lake are the largest lakes, and there are thousands of small lakes scattered throughout.

#### Vegetation

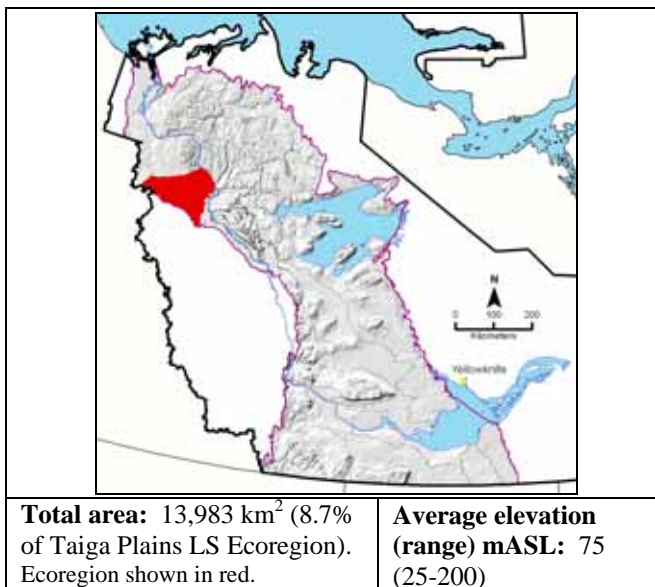
Open mixed black and white spruce stands with a shrubby understory of dwarf birch, northern and common Labrador tea, mosses and lichens are the primary upland vegetation type on areas that have not recently burned; dwarf birch – mixed spruce stands are extensive on recently burned areas, with jack pine on coarse-textured materials. Bogs, collapse scar fens and nearly treeless lichen – Labrador tea – peat moss communities occur across vast areas in association with permafrost features such as peat plateaus, polygonal peat plateaus, and runnels. The northern limits of mixed-wood and jack pine forests are reached within the Taiga Plains LS Ecoregion at about 65° N latitude, and diverse stands exhibiting better growth are restricted to warm and well-drained microsites.

### 3.3.2.1 Arctic Red Plain LS Ecoregion

**Overview:** *A nearly flat to gently sloping complex of shallow ponds and poorly-drained frost-affected mineral and organic soils vegetated by black spruce forests, bogs and post-fire regeneration characterizes the Arctic Red Plain LS Ecoregion.*

#### Summary:

- Complex of level to gently sloping poorly-drained and fine-textured lacustrine and till materials with organic veneers and extensive deep, frozen peatlands.
- Numerous ponds in the central portion.
- Much of the area has been burned, and black spruce forests, bogs with open stunted black spruce, and regenerating shrublands are dominant.



#### General Description

The Arctic Red Plain LS Ecoregion occupies a broad, gently sloped plain. It is bordered on the west and northeast by the higher-elevation Level II Taiga Cordillera Ecoregion and the Travailant Upland HS Ecoregion, respectively. The east and south boundary is the shallow valley of the North Mackenzie Plain LS Ecoregion, and the northern boundary is an arbitrary, broad line separating the Arctic Red Plain LS Ecoregion from the physiographically similar but colder Arctic Red Plain HS Ecoregion. A nearly level lacustrine plain trending northwest to southeast with many shallow lakes and extensive peatlands occupies the central portion of this Ecoregion. The western and eastern sections are a complex of gently sloping till plains with organic veneers and blankets. An undulating area near the base of the foothills is dominated by peatlands, and the sloping till plain between this area and the lacustrine plain contains few lakes. Almost the entire area is imperfectly- to poorly-drained, and much of it has recently burned. Open, low-canopied black spruce – shrub forests on mineral soils or thin organic veneers, and bogs with open stunted black spruce on peat plateaus are the primary vegetation types.

#### Geology and Geomorphology

The main mineral surficial deposits in this Ecoregion are level, fine-textured lacustrine plains and gently inclined and undulating till plains. Alluvial floodplains confined within steep-walled but shallowly incised meandering river channels occupy less than ten percent of the Ecoregion but contrast strongly with the surrounding landscapes. Organic veneers from a few centimeters to less than a meter thick are widespread on mineral soils; thicker peatlands occur over nearly half of the area.

#### Soils

Both fine-textured, imperfectly- to poorly-drained Turbic Cryosol mineral soils (often associated with earth hummocks) and Organic Cryosols are dominant throughout the area. Regosols occur on alluvial floodplains on recent sediment deposits.

#### Vegetation

Frequent fires and poor drainage influence present-day vegetation patterns. Fine-textured imperfectly- to poorly-drained permafrost-modified tills support open stands of slow-growing black spruce with an understory of red bearberry, northern and common Labrador tea, willows, and lichen. Peat plateaus are extensive with open stunted black spruce and lichen. Small internal collapse scars are wet and are vegetated by sedges, cotton-grass and peat mosses. Burned areas often have a cover of dwarf birch or regenerating Alaska paper birch and white spruce. Northern ribbed fens with scattered larch on the raised ribs occur infrequently. Alluvial plains, lakeshores and streambanks with favourable microclimate, drainage and nutrient conditions are the only areas where taller, denser and relatively diverse white spruce–black spruce forests are found.

#### Water and Wetlands

The Arctic Red River flows north through the northwest corner of the Ecoregion to the Mackenzie River. The Ontaratué River flows east into the Mackenzie River, and runs parallel to the northern boundary of the Arctic Red Plain LS Ecoregion. The meandering Ramparts River occupies a shallow, broad valley that arcs from west to east across the southern third of the Ecoregion. Thousands of shallow lakes connected by a network of slow-flowing streams dominate the central lacustrine plain and smaller areas to the east and west. Perennially frozen bogs on peat plateaus and collapse scar bogs are the most common wetland types; northern ribbed fens and horizontal fens are infrequent.

#### Notable Features

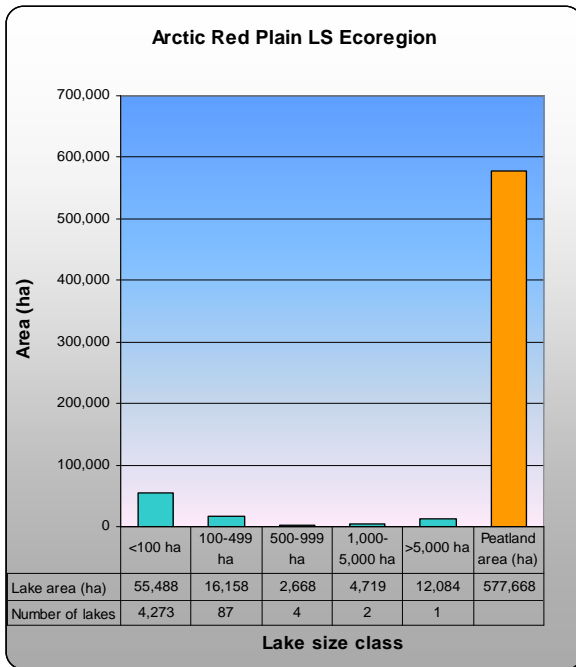
The Arctic Red River, Ramparts River and proximity to the western Cordillera provide local areas of diversity within this Ecoregion.



Level, extensively burned lacustrine plains with peat plateaus and many shallow thermokarst ponds are typical of the Arctic Red Plain LS Ecoregion.



Better black and white spruce growth occurs along stream channels, where slopes are well drained and permafrost is not as close to the surface as it is on the adjacent uplands dominated by a complex of wet peat plateaus with small collapse scars and open black spruce forests.



Proportion of Ecoregion occupied by lakes: 7%  
 Proportion of Ecoregion occupied by bogs and fens: 41%



This westerly image shows the shallow valley of the Ramparts River and its floodplain that includes wetlands, shrublands, and tall white spruce forests on alluvial terraces. In the midground, many small, shallow ponds dot the wet, frozen organic and till complex characteristic of the Ecoregion.

### 3.3.2.2 North Mackenzie Plain LS Ecoregion

**Overview:** *Level to gently undulating glacial till deposits with low-canopied coniferous stands and recently burned shrublands within the Mackenzie River valley are typical of the North Mackenzie Plain LS Ecoregion.*

#### Summary:

- Till deposits are dominant, with significant areas of lacustrine, fluvial and glacio-fluvial materials.
- Closed to open mixed spruce – shrub – moss – lichen stands on unburned sites, with dwarf birch and Alaska paper birch regeneration on extensive burned areas.
- Runnel permafrost forms are locally common in the north and south parts of the Ecoregion.



**Total area:** 16,016 km<sup>2</sup> (9.9% of Taiga Plains LS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 175 (100-350)

#### General Description

The North Mackenzie Plain LS Ecoregion parallels the Mackenzie River for over 300 km. It occupies a narrow, gently sloped valley 15 to 30 km wide between the Norman Range LS and the eastern boundary of the Level II Taiga Cordillera Ecoregion, widening to over 60 km at the north and south ends. This Ecoregion is transitional between the Level II Taiga Plains and Taiga Cordillera Ecoregions. It has been assigned to the Taiga Plains Ecoregion because it lies northeast of the main Cordilleran ranges and is likely influenced more by continental than by mountain climates. The Ecoregion includes three main landform types. Fluvial or glacio-fluvial terraces parallel the Mackenzie River and its major tributaries. Lacustrine plains occupy narrow discontinuous bands along the river in the central portion of the Ecoregion but are more extensive around the Great Bear River and Brackett Lake in the south and adjacent to the Arctic Red Plain LS Ecoregion to the north. Undulating to hummocky till veneers and blankets cover upland areas. Recent fires have had a major influence across this Ecoregion, and regenerating white and black spruce – Alaska paper birch – dwarf birch communities are dominant. The gap at Tulita marks the approximate northern limits of trembling aspen and mixed aspen – white spruce forests on sites with average moisture and nutrients, as well as the approximate northern limits of jack pine.

#### Geology and Geomorphology

A complex of medium- to coarse-textured lacustrine, alluvial and glacio-fluvial deposits parallels the Mackenzie River and its major tributaries. An extensive glacio-fluvial deposit occurs along the Mountain River near its confluence with the Mackenzie. Sand dunes and plains also occur. Undulating to hummocky till deposits occupy higher terrain. Bedrock is exposed in places; the Ramparts and Fossil Lake near Fort Good Hope are evidence of past and present water erosion of Devonian limestones by the Mackenzie River and glacial meltwater streams.

#### Soils

Turbic Cryosols are probably the most common soil type throughout, with Brunisolic and Luvisolic soils on glacio-fluvial, coarse-textured lacustrine, and alluvial soils. Turbic Cryosols and Organic Cryosols are associated with runnels and peat plateaus.

#### Vegetation

Extensive fires have had a major influence on vegetation development. Most of the till uplands have burned in the recent past, and large areas are covered by dwarf birch, green alder and Alaska paper birch shrublands, or regenerating mixed black and white spruce and Alaska paper birch communities. Productivity trends are difficult to discern in burned areas, but remnant stands along rivers, on terraces and islands, and around lakes give some indications of decreasing vigour and diversity toward the north. The most common deciduous tree is Alaska paper birch. Stunted trembling aspen occurs on southerly slopes and coarse-textured materials throughout most of the Ecoregion, and scattered trembling aspen – white spruce stands on till and alluvial deposits in the Great Bear River gap mark the approximate northerly limits of this species on sites with average nutrients and moisture. Remnant white spruce and spruce – birch forests occur along rivers, on alluvial and lacustrine plains and around lakes, and appear to be more vigorous toward the south. On unburned till uplands, mixed open white and black spruce stands with shrub, moss and lichen understories are common. Peat plateaus are scattered throughout, though mainly to the north. East-facing slopes above Brackett Lake show excellent permafrost-related runnel development. A large fen – pond complex occurs on lacustrine plains and peatlands south of Brackett Lake.

#### Water and Wetlands

The Mackenzie, Great Bear, Carcajou, Mountain and Hare Indian Rivers are the major watercourses within this Ecoregion. Brackett, Rory, Carcajou, Loon, Fossil and Three Day Lakes are the largest named lakes. Brackett Lake is surrounded by an extensive network of horizontal fens, net fens, northern ribbed fens, and peat plateaus.

#### Notable Features

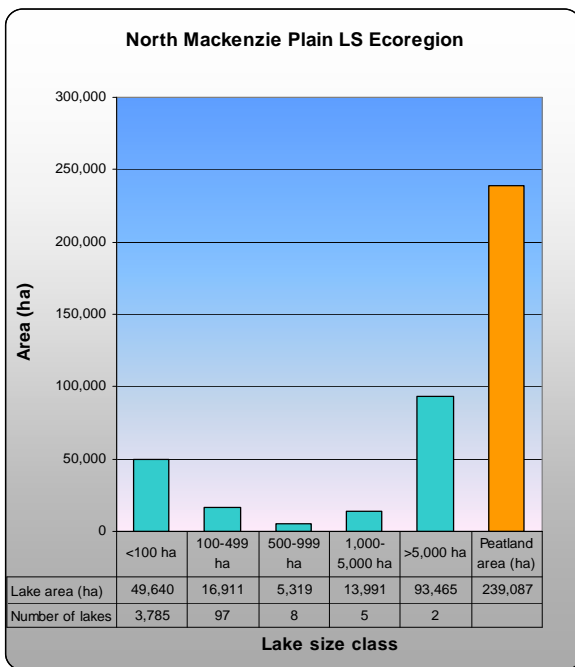
The Ramparts and Fossil Lake, and the extensive wetland complex around Brackett Lake are notable features of this Ecoregion.



This southeast view across the North Mackenzie Plain LS Ecoregion shows extensive gray burned areas, bright green shrub regeneration in moist channels, and dark green residual forests along the river. Bear Rock, Tulita and the Mackenzie River are in the background.



An extensive wetland complex near Brackett Lake in the south portion of the Ecoregion includes horizontal fens, shore marshes, ponds, and peat plateaus, and provides important wildlife habitat.



Proportion of Ecoregion occupied by lakes: 11%  
 Proportion of Ecoregion occupied by bogs and fens: 15%



In the Fossil Lake area near the Ramparts, a glacial meltwater channel is cut into limestone in the background, with relatively tall and dense white spruce forests on alluvial flats in the foreground.

### 3.3.2.3 Norman Range LS Ecoregion

**Overview:** *Well-defined rocky ridges, a central dissected plateau and deep meltwater channel, and diverse vegetation communities comprise the Norman Range LS Ecoregion.*

**Summary:**

- Major landforms are bedrock ridges, eroded interior plateau, till deposits, and a large meltwater channel.
- Vegetation is a complex of mixed-wood forests on westerly slopes and lacustrine deposits, mixed spruce stands on the interior plateau and slopes, and extensively burned areas.
- Permafrost features are more common to the east.



**Total area:** 7,521 km<sup>2</sup> (4.7% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 300 (200-1025)

#### General Description

The Norman Range LS Ecoregion is a complex landscape of steep-sided bedrock ridges and till-covered bedrock plains, dissected plateaus and deeply incised meltwater channels, reaching maximum elevations of about 1000 mASL southeast of Norman Wells. It is surrounded by the lower-elevation North Mackenzie Plain LS Ecoregion to the north and west, and by the Great Bear Upland LS Ecoregion to the east. The Norman Range LS Ecoregion is transitional between the Level II Taiga Plains and Taiga Cordillera Ecoregions. It is assigned to the Taiga Plains because its average elevation is much lower than that of the Mackenzie Mountains to the west and the Franklin Mountains to the south, and because it consists of several well-separated ridges rather than a continuous mountain range. Narrow rocky ridges with treeless alpine tundra and exposed rock generally above 500 mASL define the outer boundaries of the Ecoregion. The interior area between the main ridges is a rolling, ridged and often deeply eroded plateau, through which glacial meltwaters have carved a deep channel over 100 km from north to south that is presently occupied by wetlands and lakes. Forest cover and permafrost features show definite east to west trends. The western and northwestern portions have a relatively high proportion of mixed-wood deciduous and conifer forests and white spruce stands, with scattered peat plateaus. Towards the east, low-canopied mixed spruce stands with moss or lichen understories are more common, as are peat plateaus and runnel patterns. Much of the area has recently burned.

#### Geology and Geomorphology

Dolomites and limestones of Cambrian to Devonian age underlie much of this Ecoregion and form the main ridges. Till veneers and blankets over bedrock and rolling to hummocky fine- to medium-textured tills are the dominant landform. Fine- to coarse-textured lacustrine and glacio-fluvial deposits are common in the northwest between the ridges and in the main meltwater channels. Talus slopes occur below steep ridges. Organic deposits occur on valley floors or as thin veneers on slopes.

#### Soils

Turbic Cryosols are probably the most common soil type in the eastern portion, with Brunisolic and Luvisolic soils on southerly and westerly slopes. Regosols and non-soils are associated with talus slopes and exposed bedrock ridges.

#### Vegetation

Vegetation and permafrost patterns indicate apparent west to east climatic variations. Mixed-wood forests including trembling aspen, Alaska paper birch and white and black spruce with shrub understories and relatively vigorous white spruce forests are most common on slopes below the western ridges, in the lower-elevation lacustrine and till plains surrounding the northernmost ridges, and on southerly slopes in the interior plateau. Mixed black and white spruce stands with shrub, moss and lichen understories occur throughout the Ecoregion, but are generally taller and have denser canopies to the west. Vast areas have burned in the recent past, and fires burned extensive areas of the northern interior plateau in 2005. Regenerating stands of Alaska paper birch, black and white spruce, and dwarf birch are typical, with better growth to the west. Jack pine stands occur only near the southern limits of the Ecoregion. Runnel patterns and peat plateaus are localized in western parts, but become more common towards the east especially on easterly and northerly slopes. Sedge and shrub communities are the dominant vegetation of horizontal and channel fens and marshes along meltwater and stream channels. Tundra communities occur on ridgetops above about 500 m.

#### Water and Wetlands

Turton and Kelly Lakes occupy the meltwater channel; Chick, Moon and Oscar Lakes are the other three named lakes. Numerous intermittent streams drain the slopes. Locally extensive horizontal fens and channel marshes occupy the meltwater channel between Turton and Kelly Lakes and low areas adjacent to Chick and Oscar Lakes.

#### Notable Features

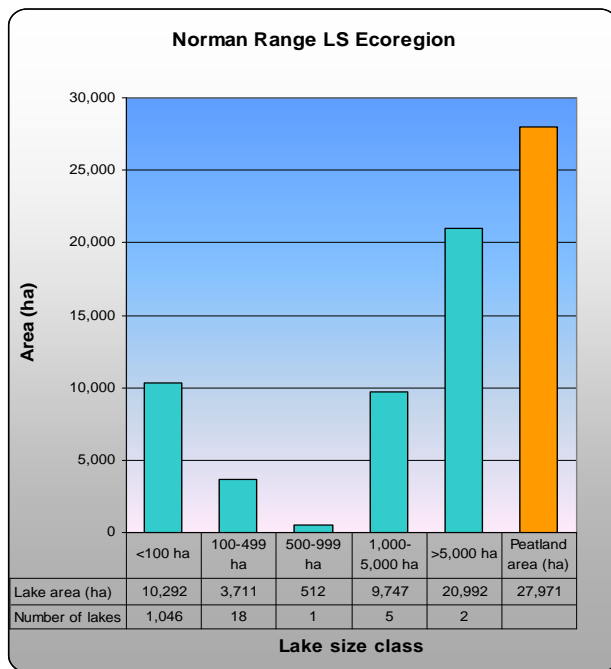
This Ecoregion is unique in the Taiga Plains because of its varied physiography, high-elevation terrain, and vegetation. Rock glaciers are an interesting geologic feature and occur mainly below cliffs along westerly and northerly ridges.



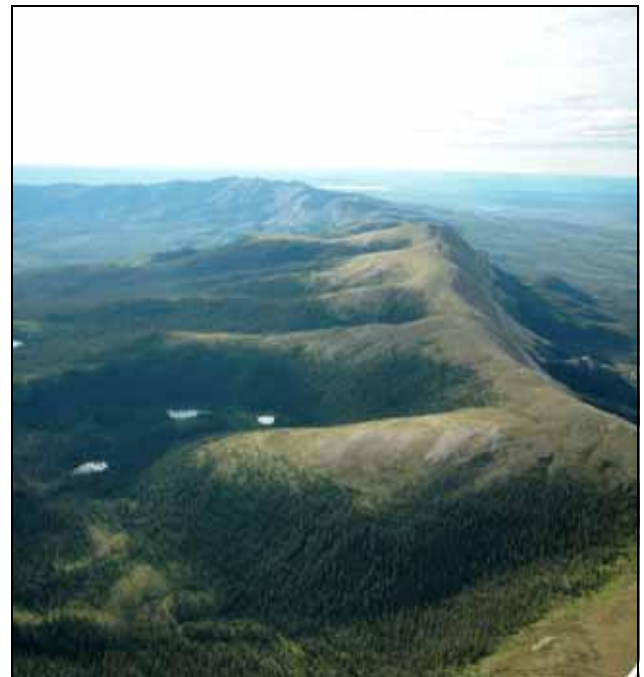
This late afternoon southern view shows the westernmost spine of the Norman Range; the North Mackenzie Plain LS Ecoregion and the Mackenzie River lie to the right of this ridge. Tundra and subalpine forests occur on the ridgetops and upper slopes.



The Ecoregion includes a dissected central plateau; Alaska paper birch regeneration on a recent burn produces bright green tones in this image. The Mackenzie River is visible in the distance.



Proportion of Ecoregion occupied by lakes: 6%  
 Proportion of Ecoregion occupied by bogs and fens: 4%



The northernmost ridge in the Ecoregion includes a complex of arctic – alpine tundra along the ridge and upper slopes and black spruce – white spruce forests on the lower slopes.

### 3.3.2.4 Great Bear Upland LS Ecoregion

**Overview:** *The Great Bear Upland LS Ecoregion is the third largest Level IV ecoregion in the Taiga Plains; its size and elevation range produce a wide range of climatic and site conditions with corresponding diversity in landscapes, permafrost features and vegetative cover.*

#### Summary:

- Till deposits over much of the area; major hill systems on Sahoyúé – šehdacho and paralleling the southern lakeshore.
- Spruce forests are extensive, and become more open and stunted to the north and at higher elevations.
- Dwarf birch occurs extensively over recently burned areas.
- Polygonal peat plateaus and runnels increase northward.

#### General Description

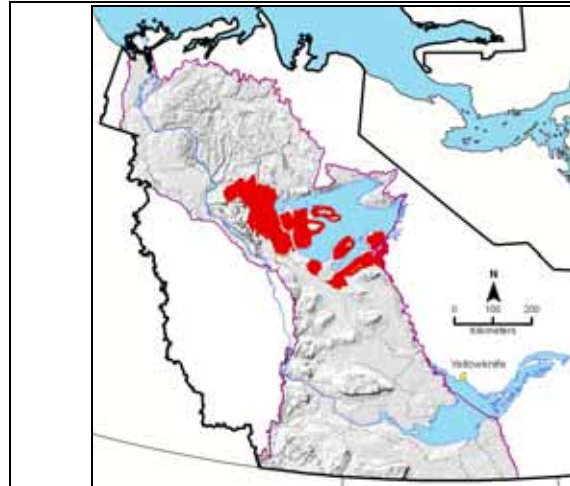
The Great Bear Upland LS Ecoregion includes three units surrounding Great Bear Lake to the south and west and three units including major hill systems on large peninsulas (Sahoyúé – šehdacho) jutting north and east into the lake. It is a highly variable ecoregion, spanning a range of nearly 300 km south to north and over 400 m from the lowest to highest points. The resulting range of climatic conditions together with variable parent materials and bedrock geology produce a gradient of permafrost and forest types. The relative proportion of polygonal peat plateaus to other permafrost features increases northward. Vegetation diversity and productivity is highest on the southern peninsulas and uplands. Within the northern units a complex of mature and sparse, stunted spruce – dwarf birch – lichen woodlands and recently burned areas with regenerating dwarf birch shrublands combine to form the main cover over vast areas.

#### Geology and Geomorphology

Most of the Ecoregion is underlain by middle and upper Cretaceous conglomerates and shales. Devonian limestones, dolomites and sandstones that lie beneath the northwest portion are exposed in places along meltwater channels or as rocky islands; outcroppings of Proterozoic sediments occur in the far southeast. Most of the area is covered by medium- to fine-textured, undulating, inclined and hummocky till, about 20 to 30 percent of which is mantled by organic layers. Slope failures are extensive along steeper slopes on the two peninsulas. Deeply incised meltwater channels now occupied by the Hare Indian River and Lac à Jacques cross the northernmost part of this Ecoregion, and extensive alluvial terraces support plant communities that are relatively vigorous and diverse for this area.

#### Soils

Organic Cryosols are the dominant soil type in wetlands. Turbic Cryosols occur with mineral soils.



**Total area:** 30,719 km<sup>2</sup> (19.0% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 275 (150-650)

#### Vegetation

Coniferous forests are the dominant cover type across most of the Ecoregion, but their vigour and canopy closure varies widely with latitude, elevation, slope and parent material. Vegetation types that have been described for Sahoyúé – šehdacho (EBA 2005) are probably generally distributed across the southern part of this Ecoregion. Relatively tall and diverse white spruce forests with shrubby understories occur extensively on slopes. More open-canopied slow-growing stands characterize coarse-textured well-drained beach ridges and eolian deposits, and poorly-drained runnels, peat plateaus and polygonal peat plateaus. Mixed black and white spruce stands grow on undulating to hummocky till. Deciduous and mixed-wood stands are uncommon, occurring only as small patches along rivers, on well-drained sites and on slopes; jack pine stands occur only in the extreme south. To the north, colder conditions restrict conifer growth, and open forests give way to low-canopied, widely spaced spruce with an understory of dwarf birch and lichen. Across the Ecoregion, recent fires have resulted in large treeless areas dominated by regenerating dwarf birch.

#### Water and Wetlands

Tunago and Mahoney Lakes, Lac à Jacques, and the Great Bear and Hare Indian Rivers are the main water bodies in this Ecoregion. Peat plateaus, runnels and polygonal peat plateaus are the main wetland types. Runnels become more clearly defined towards the north, sparsely treed peat plateaus and treeless, lichen-covered polygonal peat plateaus occur around many of the numerous small ponds that become more numerous north of the Great Bear River. Northern ribbed fens are relatively uncommon and occur mostly in the south.

#### Notable Features

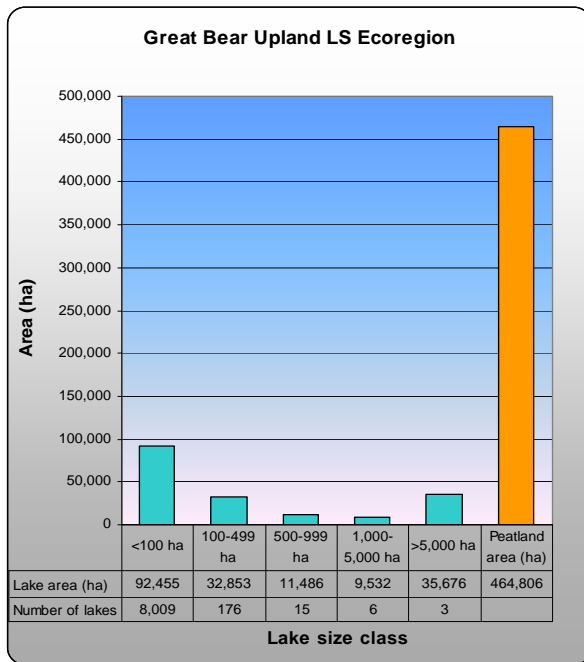
Sahoyúé – šehdacho has recently been designated as a national historic site and lies mostly within this Ecoregion.



Extensive polygonal peat plateaus (light areas), peat plateaus, and shallow ponds occur on level to gently undulating terrain due east of Norman Wells and reflect extensive permafrost.



In the southern part of the Ecoregion, peat plateaus and somewhat better forest growth are characteristic.



Proportion of Ecoregion occupied by lakes: 6%  
 Proportion of Ecoregion occupied by bogs and fens: 15%



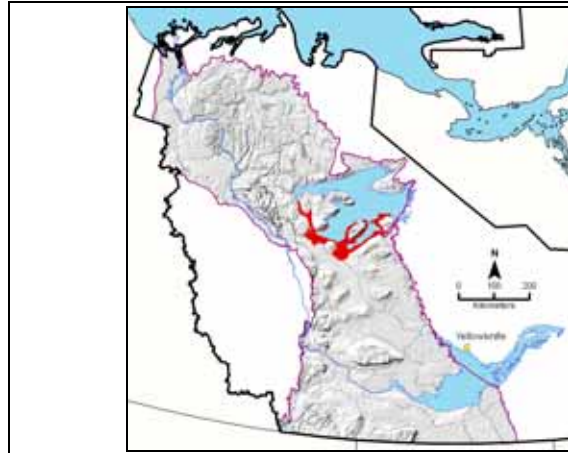
Fall colors are appearing in mid-August 2005 on the southerly sideslope of Sahoyué. Patchy deciduous stands indicate warmer, drier microclimates within the Taiga Plains LS Ecoregion.

### 3.3.2.5 Great Bear Plain LS Ecoregion

**Overview:** *The Great Bear Plain LS Ecoregion occupies low-lying, gently sloping and undulating till and peatlands along the south shore of Great Bear Lake; open white spruce – shrub stands occupy a variety of sites.*

#### Summary:

- Till and peatlands with widespread permafrost
- White spruce – dwarf birch – lichen communities occur on peat plateaus, polygonal peat plateaus, runnels, till, and beach ridge or eolian deposits.



**Total area:** 6,314 km<sup>2</sup> (3.9% of Taiga Plains LS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 175 (100-300)

#### General Description

The Great Bear Plain LS Ecoregion occupies low-lying areas along the southern shore of Great Bear Lake and the shallow northern valley between two parts of the Great Bear Upland LS Ecoregion. It is a complex of ancient beach ridges and eolian deposits, gently sloping, undulating and terraced till, level lacustrine materials, and frozen organic terrain. Low-canopied white spruce – shrub forests are common on permafrost-modified mineral soils. Bogs having open, stunted white or black spruce cover occur on slopes along with sloped or horizontal fens with sedges, peat mosses and dense shrublands; thin organic veneers over permafrost-modified mineral soils are typical. Small patches of mixed conifer and deciduous stands and occasionally jack pine stands occur on well-drained warm microsites.

#### Geology and Geomorphology

Dolomite, limestone and sandstone of Cambrian to Devonian age underlie the southern shore of Great Bear Lake, including Sahoyúé; calcareous ponds between Keith and McVicar Arms attest to the influence of these formations on groundwater chemistry. Much of the area is covered by medium- to fine-textured, undulating, inclined and hummocky till, about half of which is mantled by organic layers. In the southwest portion of this Ecoregion, gently sloping till deposits with thin organic veneers and coniferous forests alternate with level lichen-covered polygonal peat plateaus and peat plateaus to form a distinctive steplike terrace pattern. Sandy and gravelly beach ridges and eolian deposits well above the current lake level are evidence of both the former levels of glacial Lake McConnell and the processes of isostatic rebound (the increase in elevation of land surfaces after the downward pressure of glacial ice has been removed). A lacustrine – organic complex occupies a former bay of the glacial lake around Lac St. Therese.

#### Soils

Organic Cryosols are the dominant soil type in wetlands. Turbic Cryosols occur on mineral soils; Brunisols are associated with coarse-textured soils.

#### Vegetation

Vegetation studies on Sahoyúé – šehdacho (EBA 2005) report that open to closed white spruce – dwarf birch – lichen forests are the dominant cover type on upland sites in Sahoyúé and that black spruce forests are uncommon in this area. Observations made in 2005 for the current Taiga Plains classification indicate that the white spruce type occurs across a wide range of site conditions. In runnel areas, stunted and open-canopied white spruce – dwarf birch – lichen stands grow on organic veneers with a shallow active layer over fine-textured frozen till. Widely spaced white spruce with understories of dwarf birch and lichen also occupy coarse-textured well-drained beach ridges and eolian deposits and poorly-drained, frozen peat plateaus and polygonal peat plateaus. Somewhat taller closed-canopy mixed black and white spruce – dwarf birch forests grow on undulating and hummocky till. On recently burned areas, dwarf birch communities form the main cover type. Deciduous, mixed-wood and jack pine forests are found only in small patches along rivers, on well-drained sites and on southerly aspects. Nearly treeless polygonal peat plateaus occupy parts of the offshore islands and a narrow belt along the north-facing shore of Great Bear Lake. This interesting “reverse tree line” effect could be related in part to locally cooler conditions near the lake; surface water temperatures may not exceed 5°C even in summer (World Lakes Database, n.d.) and would likely moderate nearshore air temperatures (refer to Section 3.3.1.11 for further discussion of lake effect). Winter winds that blow across the ice probably contribute to treeless tundra-like conditions along shorelines through dessication and ice crystal abrasion of the few trees that do become established.

#### Water and Wetlands

Lac St. Therese and the Johnny Hoe and Great Bear Rivers are the main named water bodies in this Ecoregion. Runnels, peat plateaus and polygonal peat plateaus are the main permafrost wetland types.

#### Notable Features

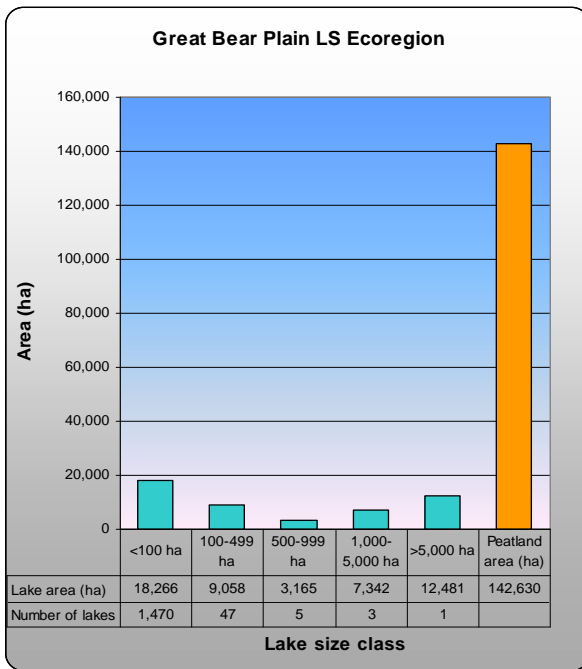
Sahoyúé – šehdacho has recently been designated as a national historic site. Parts of Sahoyúé’s lower slopes are included in the Great Bear Plain LS Ecoregion.



A gently sloping steplike pattern of polygonal peat plateaus (light tones on level areas) and runnels (dark tones, on gentle slopes) forms an interesting and unique pattern in this west-facing view along the southwest shore of Great Bear Lake.



In this detailed view of a runnel, the darker stripes are white spruce – shrub forests on wet, fine-textured soils in shallow channels, and the lighter areas are open white spruce – lichen stands on shallow frozen organic deposits.



Proportion of Ecoregion occupied by lakes: 8%  
 Proportion of Ecoregion occupied by bogs and fens: 23%



A large triangular sandy glacio-fluvial deposit with open white spruce – lichen woodlands occurs a short distance inland from the lakeshore near Cloud Bay. The white areas are unvegetated windblown sands.

### 3.3.2.6 Blackwater Upland LS Ecoregion

**Overview:** *The Blackwater Upland LS Ecoregion parallels the Franklin Mountains for over 250 km; both variable topography and climate changes from north to south produce diverse ecosystems.*

**Summary:**

- Undulating to rolling till upland with open black spruce forests throughout, patchy deciduous, mixed-wood and jack pine forests in the south and extensive polygonal peat plateau and runnel areas in the north.
- Colder climates in the north part of the Ecoregion as indicated by permafrost and vegetation features.



**Total area:** 16,157 km<sup>2</sup> (10.0% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 375 (150-600)

#### General Description

The Blackwater Upland LS Ecoregion parallels the eastern slopes of the Franklin Mountains and includes terrain between about 300 and 600 mASL. The Franklin Mountains rise steeply to define its western boundary, and the low-elevation, nearly flat Keller Plain LS Ecoregion surrounds it to the east. The narrow easterly extension along the southern boundary is a low gently domed upland that separates the slightly higher and colder Keller Plain LS Ecoregion from the Bulmer Plain LS Ecoregion; this landscape is more similar to the Blackwater Upland LS Ecoregion than it is to the Lac Grandin Upland LS Ecoregion. In the southern half, several rolling hill systems form peninsulas that jut east into the Keller Plain LS Ecoregion, reaching elevations of over 500 mASL. Rolling, inclined and undulating till covers much of the Ecoregion; glacio-fluvial deposits occur in places between the hills. Permafrost features vary across the Ecoregion; polygonal peat plateaus and runnels are more common in the north half, and peat plateaus are common throughout the area. Vegetation is similarly variable. The characteristic forest type for this Ecoregion is open low-canopied black spruce with a shrubby understory; in the south half, scattered regenerating jack pine stands occur and deciduous, mixed-wood and white spruce forests occur in small patches on slopes and till ridges.

#### Geology and Geomorphology

Glacial till covers most of this Ecoregion. Along the western boundary, colluvial deposits from the adjacent Franklin Mountains form small fans. Coarse-textured glacio-fluvial deposits occur locally around the hill bases. Organic veneers from a few centimeters to less than a meter thick are widespread on mineral soils; thicker peatlands occur over about a third of the area.

#### Soils

Both fine-textured, imperfectly- to poorly-drained Turbic Cryosol mineral soils and Organic Cryosols occur. Southward, on warmer southerly slopes, discontinuous Brunisols and Luvisols would be expected.

#### Vegetation

The Blackwater Upland LS Ecoregion is over 250 km from north to south. Vegetation and permafrost patterns reflect climate trends over this distance as well as topographic and parent material influences. The characteristic vegetation for this Ecoregion is open, low-canopied black spruce with a Labrador tea, willow, and lichen understory; this type is typical of much of the Taiga Plains LS Ecoregion. White spruce may be codominant with black spruce or replace it. Trembling aspen and Alaska paper birch occur as scattered trees on well-drained uplands in the northern part. Towards the south, particularly near the Franklin Mountains, southerly slopes and glacial flutings are forested by small patches of trembling aspen, mixed-wood and conifer stands with shrubby understories including typical Boreal species such as low-bush cranberry and green alder. Coarse-textured soils on recently burned areas mainly south of Blackwater Lake support dense young jack pine stands with sparse low shrub and lichen understories. Peat plateaus and polygons are vegetated by open, stunted black spruce with nearly continuous lichen cover. The striped runnel patterns perpendicular to slope in the northern part of the Ecoregion are produced by black and white spruce with dwarf birch and willow (dark stripes), and mixed spruce – lichen (light stripes) (see upper right image, facing page and p. 9, Figure 7).

#### Water and Wetlands

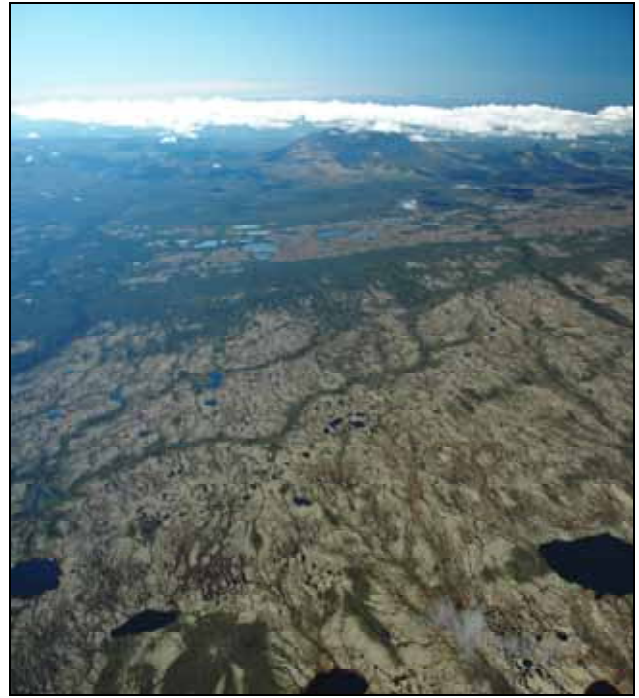
Blackwater, Fish and Greasy Lakes are the main water bodies; Blackwater Lake drains to the west via the Blackwater River that flows through a gap in the Franklin Mountains. A few small intermittent streams flow down the slopes. Shallow ponds usually occupy depressions in fluted terrain. Polygonal peat plateaus, often with thermokarst ponds, are extensive in the north. Peat plateaus occur throughout, with larger collapse scars in the south indicative of warmer conditions.

#### Notable Features

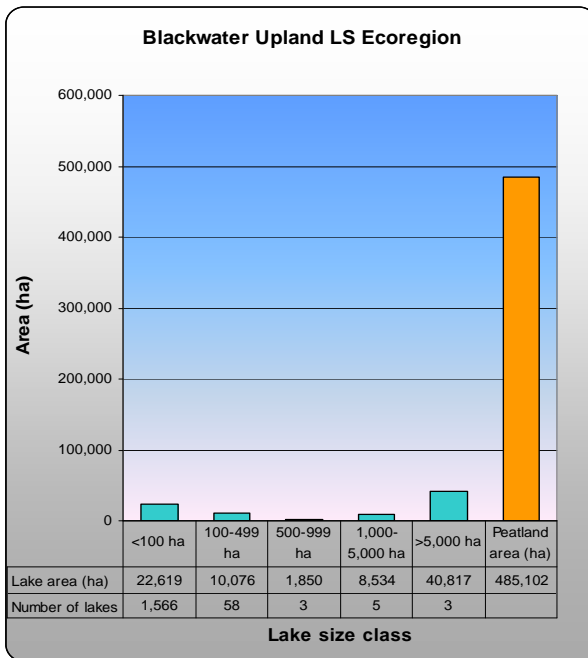
Significant plant and wildlife diversity could be expected in this Ecoregion because of climatic and topographic variability.



This typical landscape in the relatively warm south part of the Blackwater Upland LS Ecoregion shows the mix of young regenerating mixed-wood forests on well-drained uplands and peat plateaus with large collapse scars in depressions.



This high-altitude view of the steplike runnel (dark-toned) – polygonal peat plateau (light-toned) pattern on fluted terrain at the north end of the Blackwater Upland LS is a different pattern than that seen in the south and reflects cooler climates. The Franklin Mountains rise in the distance.



Proportion of Ecoregion occupied by lakes: 5%  
 Proportion of Ecoregion occupied by bogs and fens: 30%



The gravelly shoreline of Fish Lake is lined by white spruce – Alaska paper birch forests; the Franklin Mountains are in the distance.

### 3.3.2.7 Keller Plain LS Ecoregion

**Overview:** *The Keller Plain LS Ecoregion is a long, narrow till plain with well-developed glacial fluting, and level organic areas with numerous lakes; sparsely treed bogs on peat plateaus or polygonal peat plateaus are the dominant cover type.*

#### Summary:

- Linear and curved glacial fluting covers more than half of the area, with regenerating shrublands or spruce – low shrub – moss forests on the flutes and peat plateaus and shrubby fens in the swales.
- Level to gently undulating till vegetated by burned or sparsely treed shrub – moss or spruce – moss – lichen bogs on peat plateaus.



**Total area:** 14,494 km<sup>2</sup> (9.0% of Taiga Plains LS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 250 (150-450)

#### General Description

The Keller Plain LS Ecoregion is a long, relatively narrow and nearly level till plain bordered by the higher-elevation Blackwater Upland LS Ecoregion to the west and south, and the Lac Grandin Plain LS and Great Bear Plain LS Ecoregions to the east and north. Parallel glacial flutings many kilometers in length with shallow linear ponds, fens and peat plateaus in the depressions are a striking feature of this Ecoregion. There are also broad gently undulating till plains with hundreds of shallow lakes and widespread peat plateaus. The Ecoregion extends over 300 km from north to south, and changes in permafrost and vegetation features are indicative of climatic variability over that distance. Conifer forests are the dominant upland cover type; they exhibit generally better growth in the southernmost part of the Ecoregion and on small till uplands. Polygonal peat plateaus are absent from the southern half, but occupy extensive areas north of Keller Lake.

#### Geology and Geomorphology

Glacial ice movements created linear and curved fluted terrain over more than half of the Ecoregion. Nearly level fine-textured till plains cover most of the remainder, and are mantled by thick peatlands. Less than ten percent of the area is moderately well-drained upland till; these deposits occur adjacent to the Blackwater Upland LS Ecoregion. An extensive local glacio-fluvial plain lies southwest of Keller Lake at the base of the Blackwater Upland HS Ecoregion.

#### Soils

Permafrost is present in both mineral and organic soils. Organic Cryosols are the dominant soil type in this Ecoregion. Turbic Cryosols, mixed by frost action and permanently frozen at some depth, are the dominant mineral soil type; most of these are poorly-drained Gleysolic subgroups, but Brunisolic Turbic Cryosols and Brunisols occur infrequently on better-drained sites. Horizontal fens and polygonal peat plateaus are the most common wetland types.

#### Vegetation

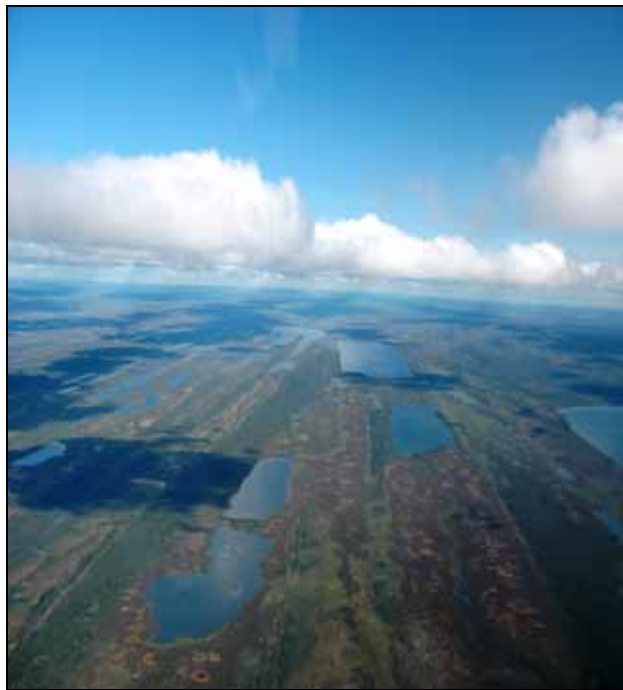
The two main landform types – gently undulating till plains mantled by peatlands, and glacial flutings – produce different vegetation complexes. On the broad poorly-drained till plains, regenerating dwarf birch – lichen – peat moss communities on burned peat plateaus and stunted spruce – lichen bogs on unburned peat plateaus are the dominant cover types over 80 percent of that landform type. Slightly raised, somewhat better drained uplands in these areas are vegetated by regenerating dwarf birch shrublands on recently burned sites or by open spruce stands. Nearly treeless lichen-dominated polygonal peat plateaus cover hundreds of square kilometers between Keller Lake and the northern limits of this Ecoregion. On glacial flutings, low-canopied white and black spruce – shrub – lichen – moss stands or post-fire regenerating dwarf birch shrublands are typical on the ridged uplands, with horizontal fens vegetated by sedges and shrubs and sparsely treed or burned peat plateaus in the swales between ridges. Where medium- to coarse-textured undulating to hummocky till deposits produce gently sloping and better drained conditions, closed canopy forests of mixed black and white spruce, Alaska paper birch, trembling aspen and jack pine may achieve relatively good growth for this area. Relatively vigorous and diverse white spruce communities occur in narrow riparian belts along the Johnny Hoe River and other watercourses.

#### Water and Wetlands

Keller Lake, Birch Lake, Tache Lake, and the meandering Johnny Hoe River are the main named waterbodies in the Keller Plain LS Ecoregion. A dense network of linear lakes in fluted areas and shallow circular lakes on level organic terrain covers almost the entire Ecoregion except for a few slightly elevated upland areas.

#### Notable Features

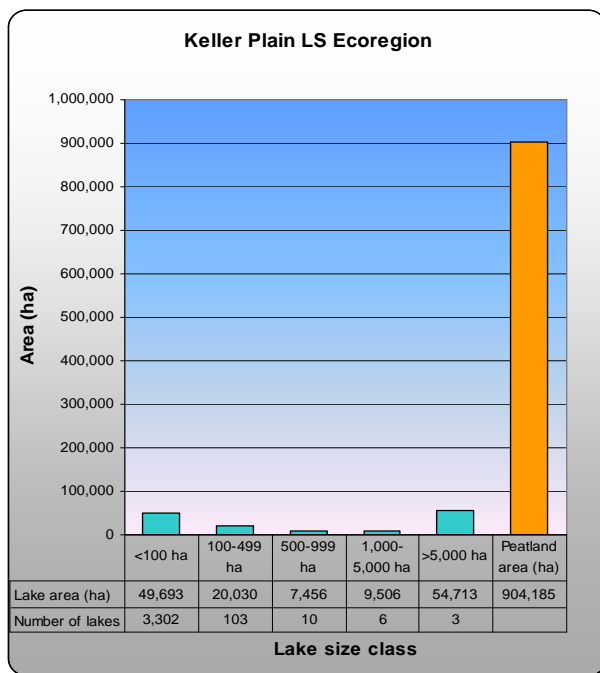
Polygonal peat plateaus in the northern part of the Ecoregion appear to be melting, and many thermokarst lakes now occupy what were formerly lichen – shrub communities on permafrost.



Glacial fluting caused by ice scouring is a striking feature of the Keller Plain LS Ecoregion. White and black spruce forests or regenerating shrublands grow on the elevated flutes. Brown-toned peat plateaus, shallow ponds and horizontal fens occupy the interflute areas.



The whitish areas are lichen-covered polygonal peat plateaus. The permafrost underlying them is melting, as indicated by the dense network of thermokarst ponds and the golden-brown collapse scar areas that occupy what formerly were polygonal ice-wedge cracks.



Proportion of Ecoregion occupied by lakes: 10%  
 Proportion of Ecoregion occupied by bogs and fens: 62%



On this level peat plateau plain in the northeastern part of the Ecoregion, the brownish areas are peat plateaus, and the dark green areas are moderately dense, low-canopied white and black spruce forests.

### 3.3.2.8 Lac Grandin Plain LS Ecoregion

**Overview:** *Ridged and hummocky till, calcareous bedrock and frequent fires across the Lac Grandin Plain LS Ecoregion produce a complex of mixed spruce upland types, regenerating shrublands, and young jack pine and deciduous stands.*

#### Summary:

- Complex glacial landscape of fluted and hummocky terrain with local elevation variability of up to 200 m.
- Much of the Ecoregion is underlain by limestone bedrock that influences vegetation, soils and groundwater.
- Mixed black and white spruce stands are most common; relatively tall and diverse white spruce and mixed-wood stands in the south.

#### General Description

The Lac Grandin Plain LS Ecoregion is a complex landscape of undulating, hummocky, ridged and deeply fluted till overlying limestone bedrock. Although it slopes generally toward the northeast, local topographic variations of up to 200 m above the general terrain level occur throughout. It is bounded by Precambrian Shield granites of the Level II Taiga Shield Ecoregion to the east, by the geologically similar Great Slave Plain HB Ecoregion to the south, by the lower and wetter Bulmer Plain LS and Keller Plain LS Ecoregions to the west, and by the higher uplands of the Great Bear Upland LS Ecoregion to the north. Two upland areas above 500 mASL belonging to the Lac Grandin Upland LS Ecoregion are embedded within the Lac Grandin Plain LS Ecoregion. Much of the area has recently burned, and the dominant vegetation cover is either closed to open white spruce – black spruce with shrub, moss and lichen understories or regenerating dwarf birch. Calcareous ponds and net fens form complexes with these stands over much of the landscape. Relatively diverse and vigorous closed mixed-wood and white spruce forests or fire-successional jack pine stands occupy rolling to ridged glacial flutings in the southwest portion and scattered patches in hummocky till along the eastern boundary. Peat plateaus can be locally extensive on level terrain around or adjacent to lakes in the central and northwestern portion of the Ecoregion; elsewhere they are restricted to relatively small pockets in hummocky and ridged till.

#### Geology and Geomorphology

Dolomites and limestones of Cambrian to Devonian age underlie much of the Lac Grandin Plain LS Ecoregion. Bedrock is exposed in places as horizontally-bedded strata or produces karst topography (sinkhole lakes), particularly in the central part of the Ecoregion. Thousands of calcareous ponds provide evidence of bedrock influence on local hydrology. Hummocky, calcareous and often bouldery till is the dominant glacial parent material throughout the eastern third and on higher terrain to the west. Ice scouring has produced rolling to ridged fluted till in the southwestern portion. Undulating to level till plains occur in the central and northwest parts of this Ecoregion and peatlands are most common and extensive in these areas. Coarse-textured glacio-fluvial and eolian deposits are scattered throughout the Ecoregion.



**Total area:** 26,034 km<sup>2</sup> (16.1% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 325 (175-600)

#### Soils

Turbic Cryosols are the most common soil type, with calcareous Brunisols on well-drained terrain in the southern part. Organic Cryosols occur with peat plateaus and runnels.

#### Vegetation

Low-canopied white and black spruce stands with variable canopy closure and shrub, moss and lichen understories occur on well- to imperfectly-drained till uplands throughout the Ecoregion. Fire has been a major recent influence, and large areas are vegetated by dwarf birch shrublands. Young jack pine and Alaska paper birch or trembling aspen forests occur in patches on hummocky tills adjacent the Shield border and on ridged tills in the southwest. Mixed-wood and conifer stands occur in steeply ridged and fluted terrain to the southwest, along some of the streams, and in patches near the larger lakes; those occurring in the fluted terrain grow more vigorously here than elsewhere in the Taiga Plains LS Ecoregion. Horizontal fens vegetated by sedges and shrubs are common throughout the Lac Grandin Plain LS Ecoregion, but are not extensive. Bogs containing open black spruce – lichen communities and collapse scar bogs with peat moss – sedge complexes are extensive in the central and northwestern parts of the Ecoregion.

#### Water and Wetlands

Lac la Martre is the largest lake in this Ecoregion; other named lakes include Lac Grandin, Agira, Rome, Dennison, Etna, and Hottah Lakes. Rivière à Martre and Rivière Grandin are the major rivers. Thousands of small ponds surrounded by horizontal fens occur throughout; many are calcareous. Peat plateaus are common, but runnels and polygonal peat plateaus are uncommon.

#### Notable Features

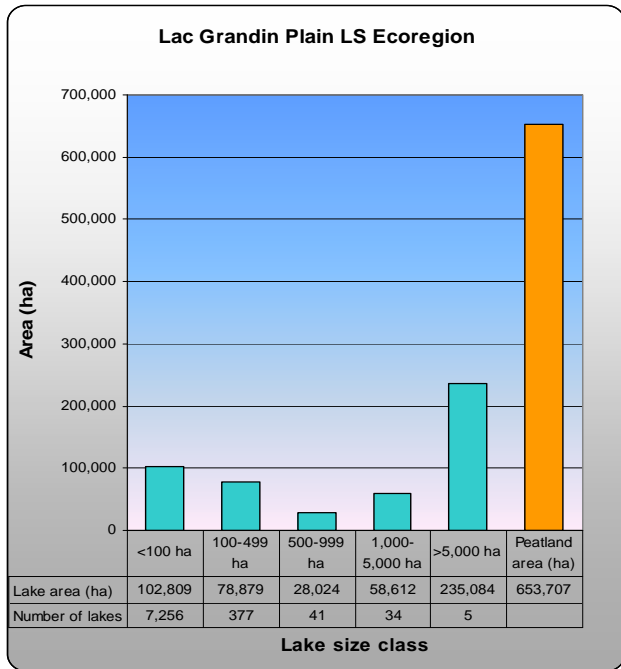
Some of the tallest and most diverse forests in the Taiga Plains LS Ecoregion area are found on the deeply fluted terrain in the southwest corner of the Lac Grandin Plain LS Ecoregion.



White and black spruce stands with variable canopies and calcareous horizontal fens and marl ponds are typical of much of the Ecoregion; this image was taken near Rivière Grandin.



Deeply fluted terrain in the southwestern part of the Ecoregion supports relatively tall, diverse closed white spruce, trembling aspen and Alaska paper birch stands.



Proportion of Ecoregion occupied by lakes: 19%  
 Proportion of Ecoregion occupied by bogs and fens: 25%



Fire is an active agent of change in this and other ecoregions.

### 3.3.2.9 Lac Grandin Upland LS Ecoregion

**Overview:** *The Lac Grandin Upland LS Ecoregion occupies hummocky and rolling terrain over 500 mASL and is largely mature or regenerating forest with limited permafrost occurrence.*

**Summary:**

- Consists of two hummocky to rolling till units at elevations over 500 mASL.
- Vegetation cover on the southern unit is more diverse and more vigorous than that of the northern unit, and has fewer permafrost features.



**Total area:** 1,771 km<sup>2</sup> (1.1% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 525 (325-725)

#### General Description

The Lac Grandin Upland LS Ecoregion consists of two isolated hills separated by about 100 km north to south and includes terrain at elevations above 500 mASL. This Ecoregion is embedded within the Lac Grandin Plain LS Ecoregion; rolling and hummocky till is the dominant landform. The southern upland is a patchwork of mixed spruce stands, mixed deciduous – coniferous forests and early-successional dwarf birch and willow shrublands. There are numerous small circular pothole lakes, and permafrost features are uncommon. The northern upland is more homogeneous, with mixed white and black spruce stands or regenerating dwarf birch shrublands as the main cover types; peat plateaus are a common component. These features indicate that the southern unit is influenced by both High Boreal and Low Subarctic climates, whereas the northern upland is controlled by colder Low Subarctic climates.

#### Geology and Geomorphology

Cretaceous marine shales lie beneath upper elevations of the Lac Grandin Upland LS, and in contrast to the surrounding Lac Grandin Plain LS, ponds and lakes are typically not calcareous. Calcareous springs and ponds do occur in lower slope positions, reflecting the influence of deeper Devonian limestone strata. Hummocky and rolling medium- to fine-textured till deposits are dominant in both areas.

#### Soils

Turbic Cryosols are probably the most widespread soil type on the northern upland. Brunisols are probably more common on the southern upland. Organic Cryosols are associated with peat plateaus.

#### Vegetation

There are notable differences in vegetation composition between the north and south units. Trembling aspen forms patchy stands that may be mixed with white spruce on the southern upland. Recent burns with early successional willow – dwarf birch shrublands are extensive. Peat plateaus are uncommon. On the northern upland, white and black spruce closed-canopy stands with dwarf birch, feathermoss and lichen understories, and dwarf birch shrublands on recently burned areas are the dominant cover types. Trembling aspen and Alaska paper birch are usually scattered within coniferous stands mainly on southerly aspects, and rarely form pure stands. Black spruce communities on peat plateaus are more common in the northern upland, often on lower slope positions. Taller conifers with denser canopy closure on the southern upland indicate better forest growth there. These trends in composition, permafrost occurrence and growth are similar to the latitude-related trends discussed for the Blackwater Upland LS, Keller Plain LS, and Great Bear Upland LS Ecoregions.

#### Water and Wetlands

There are no named lakes or rivers in this Ecoregion. Hundreds of small pothole lakes dot the landscape; peat plateaus, slope fens, northern ribbed fens and spring fens occur in depressions and lower slope positions.

#### Notable Features

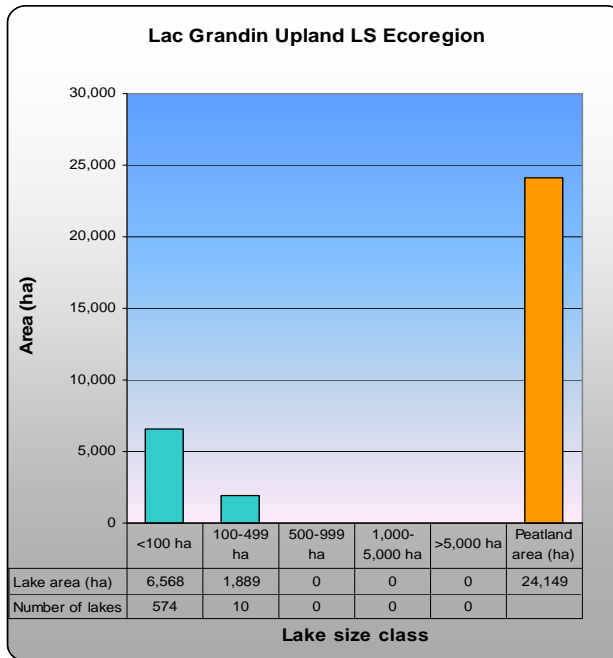
The southern upland together with the adjacent fluted area in the Lac Grandin Plain LS likely provide a large area of good wildlife habitat.



Climatic conditions favor the growth of deciduous and mixed-wood stands in the southern unit of the Lac Grandin Upland LS Ecoregion; hummocky till is a common landform



Burns are extensive; the gray tones in this image are burned snags, and the greenish tints are regenerating shrubs growing between the snags.



Proportion of Ecoregion occupied by lakes: 5%  
 Proportion of Ecoregion occupied by bogs and fens: 14%



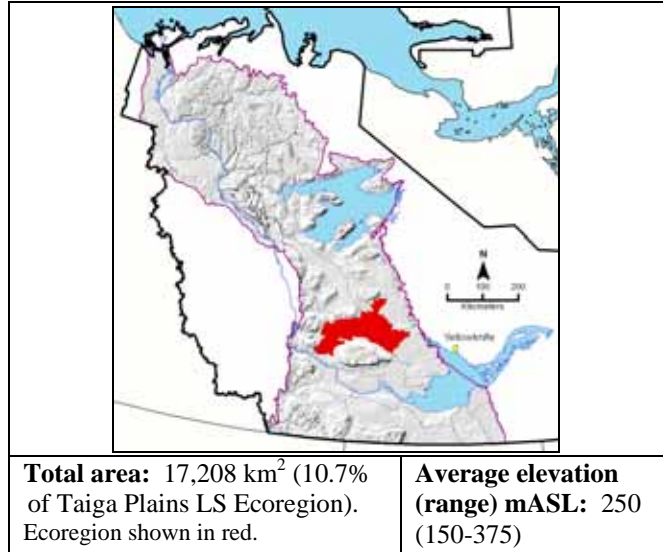
This northward-facing view shows open white spruce stands on a northeast slope in the northern upland unit; colder conditions are indicated by the absence of deciduous and mixed-wood stands and by shrub tundra on hilltops.

### 3.3.2.10 Bulmer Plain LS Ecoregion

**Overview:** Extensive burned peat plateaus on nearly level terrain with regenerating coniferous forests and shrublands on bouldery till uplands characterize the Bulmer Plain LS Ecoregion.

**Summary:**

- Level plain dominated by peat plateaus; much of the area has burned recently.
- Thousands of shallow ponds that are calcareous east of Bulmer Lake.
- Bouldery till uplands with regenerating black spruce, jack pine, and dwarf birch; deciduous and mixed-wood stands are uncommon.



#### General Description

The Bulmer Plain LS Ecoregion surrounds the north side of the Horn Plateau, bordered on the west and south by the higher terrain of the Ebbutt Upland HB and Horn Slopes LS Ecoregions, on the north by the low ridge of the Blackwater Upland LS Ecoregion, and on the east by the slightly higher Lac Grandin Upland LS Ecoregion. Most of the area is covered by level peatlands with a dense network of shallow ponds; east of Bulmer Lake, these ponds are often calcareous. Peat plateaus are the characteristic landform feature, but level to gently sloping or undulating bouldery till occurs over about thirty percent of the Ecoregion. Much of the area has recently burned, and regenerating black spruce on peat plateaus is the most common vegetation type. Upland communities are typically regenerating black spruce, dwarf birch, and occasionally white spruce and jack pine. A few marginally productive areas are found on river valley slopes and in very narrow belts along stream drainages.

#### Geology and Geomorphology

Horizontally bedded dolomite, limestone and sandstone of Cambrian to Devonian age underlie this Ecoregion east of Bulmer Lake. Solution waters derived from groundwater seeping through limestones are high in dissolved solids, and white calcium carbonate deposits form on the bottom and along the shorelines of shallow ponds in the east part of the Ecoregion. Bouldery glacial till overlies bedrock throughout all of this Ecoregion with the exception of a small lacustrine area to the east. Thick peatlands mantle about 65 percent of the area.

#### Soils

Organic Cryosols are the dominant soil type. Turbic Cryosols occur on imperfectly- to poorly-drained perennially frozen till deposits; Brunisols are common on well- to moderately well-drained till.

#### Vegetation

The very flat terrain, dominance of peatlands, and recent fire history has produced a relatively simple sequence of vegetation communities. The characteristic vegetation type for this Ecoregion is regenerating spruce bog with slow-growing black spruce seedlings, northern and common Labrador tea, cloudberry, and sparse lichen, with sedges, peat mosses and cotton-grasses in the collapse scars. Dense young jack pine stands with sparse species-poor understories develop after fire on well-drained upland till deposits. On well- to poorly-drained sites, regenerating species include black spruce, larch, dwarf birch, Alaska paper birch, and occasionally white spruce. Open, low-canopied black spruce with a Labrador tea, willow, and lichen understory is the most common upland type where fire has been absent for several decades. There are only a few locales where better forest growth occurs, such as the valley slopes of the Willowlake River and within narrow belts paralleling streams. Northern ribbed fens with sedges, shrubs, and scattered larch are interspersed with peat plateaus on gently sloping areas.

#### Water and Wetlands

Bulmer Lake and the Willowlake and Horn Rivers are the major named water bodies in this Ecoregion. Thousands of small ponds are interspersed with peat plateaus and are densest east of Bulmer Lake. Peat plateaus with large collapse scars indicating permafrost thawing are dominant; thermokarst lakes occur throughout the Ecoregion. Northern ribbed fens and net fens are locally extensive.

#### Notable Features

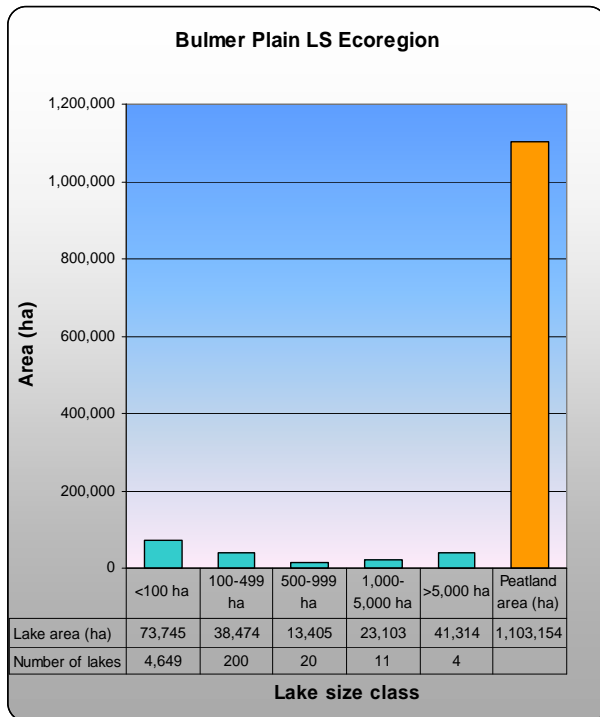
Northern pitcher plants, reported as rare in the Northwest Territories by McJannet *et al.* (1995), were found in collapse scars within burned peat plateaus north of the Horn River during field work in 2005.



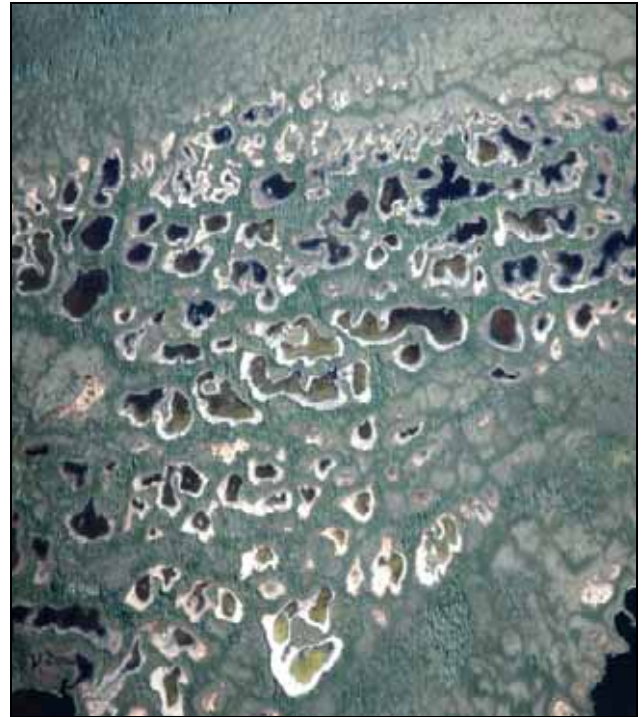
Burned peat plateaus (dark brown with brownish-orange collapse scars) and calcareous thermokarst ponds (fine-textured tan-colored features with many small ponds) are dominant throughout much of the Ecoregion.



This image shows a large collapse scar with sedges, cottongrasses, shrubs and mosses. An elevated and burned peat plateau surrounds the collapse scar and rises about a meter above it.



Proportion of Ecoregion occupied by lakes: 11%  
 Proportion of Ecoregion occupied by bogs and fens: 64%



Groundwater and geology interact to produce an interesting calcareous net fen – thermokarst pond pattern east of Bulmer Lake.

### 3.3.2.11 Ebbutt Upland LS Ecoregion

**Overview:** *The Ebbutt Upland LS Ecoregion is a small island of peat plateaus and weakly developed runnels at the highest elevations of the Ebbutt Hills.*

**Summary:**

- Mix of undulating and hummocky till and organic veneers and blankets.
- Peat plateaus with small collapse scars and weakly developed runnel patterns are typical permafrost forms associated with Low Subarctic climates.



**Total area:** 83 km<sup>2</sup> (0.1% of Taiga Plains LS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 625 (600-650)

#### General Description

The Ebbutt Upland LS Ecoregion is a very small unit at the highest elevations (600 mASL) within the Ebbutt Hills, and is completely surrounded by the Ebbutt Upland HB Ecoregion. The smallest Level IV ecoregion in the Taiga Plains, it is distinguished from the surrounding Level IV Ebbutt Upland HB Ecoregion by the presence of weakly developed runnels, peat plateaus with relatively small collapse scars, and a shallow (less than 40 cm to permafrost) active layer in late summer, all characteristic of Low Subarctic climates. The landscape is a mix of undulating to hummocky till, peat plateaus, and weakly developed runnel patterns on which open black spruce-dominated forests and bogs with stunted black spruce have developed.

#### Geology and Geomorphology

Horizontally bedded Cretaceous shales underlie level to undulating and hummocky till deposits. Peatlands of variable thickness have developed over about 40 percent of the Ecoregion.

#### Soils

Organic Cryosols are the dominant soil type in wetlands. Gleysols and Cryosols occur in association with black spruce stands on mineral soils.

#### Vegetation

The characteristic vegetation type is a species-poor bog; open, stunted black spruce, common and northern Labrador tea, cloudberry, lichen, peat mosses and feathermosses occur on frozen peat plateaus, with sedges, cotton-grasses and peat mosses in the collapse scars. Imperfectly- to poorly-drained upland sites are typically forested by open, slow-growing black spruce with common and northern Labrador tea, alpine bilberry, lichen, and feathermoss understories.

#### Water and Wetlands

There are no named waterbodies in this Ecoregion, and only a few small, shallow lakes. Wetlands are mainly peat plateaus, with weakly developed runnel patterns in a few places.

#### Notable Features

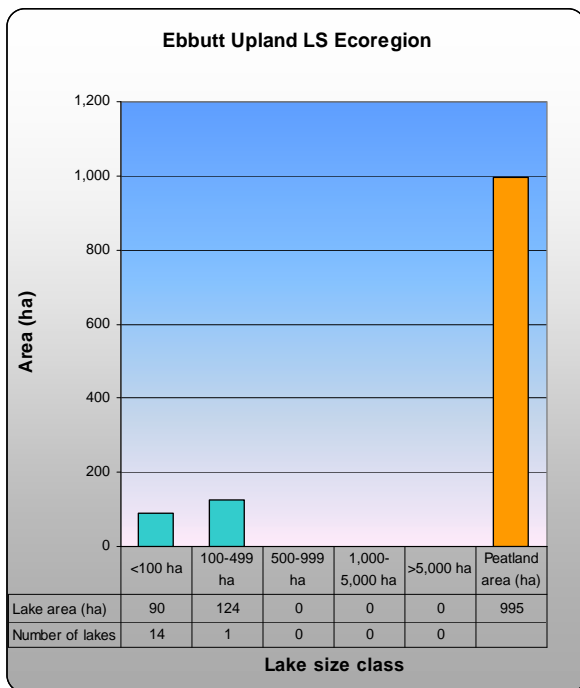
The Ebbutt Upland LS Ecoregion possibly contains the most southerly occurrences of runnel permafrost features in the Northwest Territories Taiga Plains.



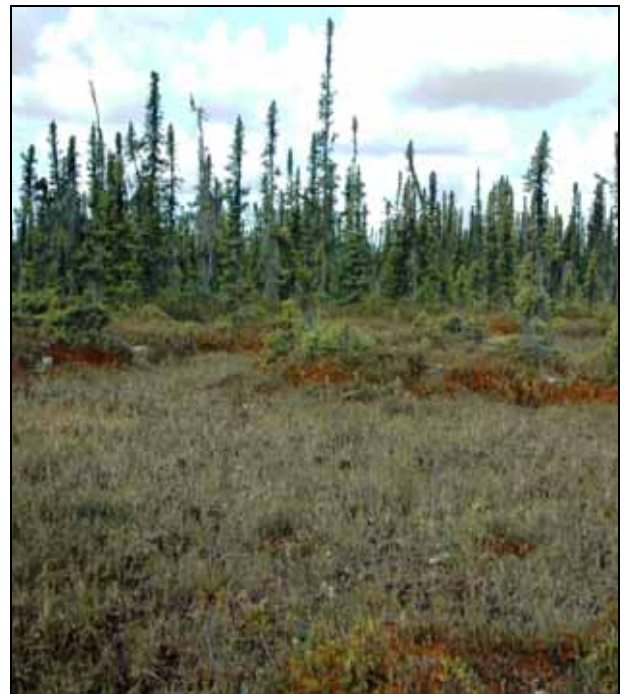
Peat plateaus with small collapse scars and thermokarst lakes are characteristic of the Ebbutt Upland LS Ecoregion.



This image shows a detail of a runnel (a permafrost feature), and a minor creek drainage with somewhat taller white spruce. The whitish tones are lichen ground cover showing through a very open black spruce canopy.



Proportion of Ecoregion occupied by lakes: 3%  
 Proportion of Ecoregion occupied by bogs and fens: 12%



Permafrost occurs at about 30 cm below the surface in early August in the forested peat plateau, which rises about 50 to 70 cm above the wet sedge – shrub fen occupying the collapse scar in the foreground where permafrost is over a meter deep.

### 3.3.2.12 Horn Slopes LS Ecoregion

**Overview:** *Gently inclined northerly slopes with fire-successional dwarf birch and undulating to hummocky westerly slopes with a mix of spruce – shrub forests and peat plateaus typify the Horn Slopes LS Ecoregion.*

**Summary:**

- Gently north-sloping till deposits with extensive regenerating dwarf birch shrublands and remnant spruce stands.
- Till and organic complex on undulating to hummocky northwest and west slopes with closed spruce – shrub and open spruce – lichen forests, and peat plateaus.



**Total area:** 5,460 km<sup>2</sup> (3.4% of Taiga Plains LS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 400 (250-775)

#### General Description

The Horn Slopes LS Ecoregion includes the smooth, gently inclined northerly slopes and undulating to hummocky, somewhat steeper westerly slopes of the Horn Plateau. Its southern and eastern upper boundary with the Horn Plateau LS Ecoregion is marked by a subtle change in topography from gently sloped within the Ecoregion to nearly level on the Horn Plateau LS Ecoregion, and by the scattered occurrence of polygonal peat plateaus in the latter Ecoregion. It grades into the lower-elevation Horn Plain HB and Bulmer Plain LS Ecoregions. Many small, intermittent streams drain down the slopes from the Horn Plateau. Peat plateaus are common on lower slope positions. Most of the northerly slopes have burned and regenerating dwarf birch communities are widespread. Undulating and hummocky, often boulder-strewn till deposits mainly on the upper portions of west- and northwest-facing slopes support closed-canopy mixed white and black spruce forests with shrubby understories and more open spruce – lichen mixtures. Scattered jack pine and mixed-wood communities occur mainly on northwesterly and westerly slopes on locally elevated terrain or along stream valleys.

#### Geology and Geomorphology

Horizontally stratified Upper Cretaceous marine shales and conglomerates underlie the Horn Plateau and the Horn Slopes LS Ecoregion. Seepage from these formations might contribute to local streamflow and soil moisture conditions. Most of the area is covered by medium- to fine-textured, bouldery till. Organic veneers and blankets cover between 30 and 50 percent of the landscape.

#### Soils

Permafrost is present in both the mineral and organic soils. Organic Cryosols are the dominant soil type in peat plateaus. Turbic Cryosols, mixed by frost action and permanently frozen at depth, are the dominant mineral soil type.

#### Vegetation

Much of the Horn Slopes LS Ecoregion has recently burned, and along most of the gentle northern slopes, dwarf birch is the dominant cover type with remnant white and black spruce stands as narrow stringers along stream channels. Undulating and hummocky well- to poorly-drained till deposits are found mainly on the upper half of west and northwest facing slopes; they support closed-canopy mixed black and white spruce stands with dwarf birch, willow, green alder and feathermoss understories, and open spruce – lichen stands. Mixed-wood communities and jack pine stands are infrequent, occurring on well-drained slopes or fluvial terraces. Bogs on perennially frozen organic terrain (peat plateaus) are scattered across upper slope positions, but become nearly continuous on mid to lower slope positions, interspersed with slope fens and northern ribbed fens; most have been recently burned. Runnel patterns are weakly developed.

#### Water and Wetlands

The Willowlake and Horn Rivers flow in parallel channels down the approximate centre of the Ecoregion and diverge at the slope base to the west and east, respectively. Many small intermittent streams drain the slopes and are tributaries to these rivers. There are a few small, shallow ponds along the upper western and northwestern slopes. Peat plateaus are the most common wetland type; northern ribbed fens and slope fens also occur on lower slope positions.

#### Notable Features

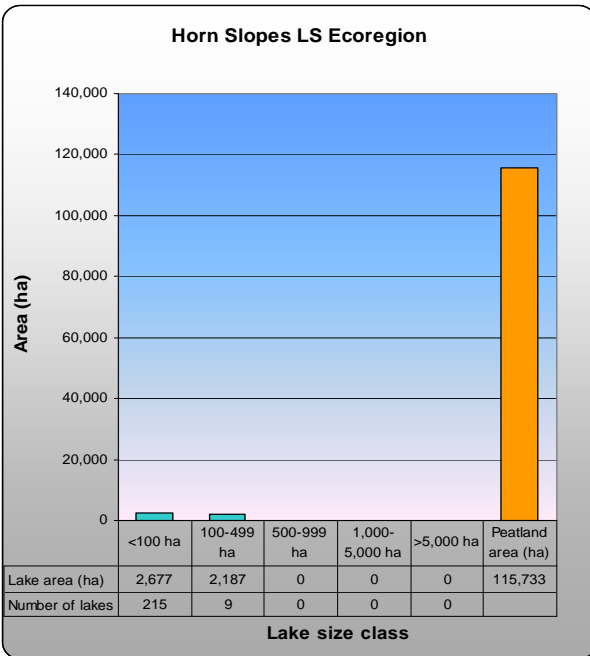
This Ecoregion is ecologically very different from the Horn Slopes MB Ecoregion. Northerly slopes combined with low sun angles at this latitude result in a lower intensity of incident solar radiation compared to the Horn Slopes MB Ecoregion. Consequently, vegetation, soil, and permafrost patterns typical of colder conditions occur.



Upper slopes in the western portion of the Horn Slopes LS Ecoregion have mixed black and white spruce and open spruce – lichen stands on undulating to hummocky till.



Open white spruce – black spruce forests have lichen and shrub understories that lend a grayish-white tone.



Proportion of Ecoregion occupied by lakes: 1%  
 Proportion of Ecoregion occupied by bogs and fens: 21%



This west-facing view across the smooth, gentle northern slopes shows that most of the forests have burned off in recent fires, leaving remnant stands along streams. Scattered peat plateaus occur, increasing in frequency downslope.

### 3.3.2.13 Horn Plateau LS Ecoregion

**Overview:** *The Horn Plateau LS Ecoregion is an undulating to hummocky recently burned till plain elevated well above the surrounding plains, with permafrost features typical of more northerly locations.*

**Summary:**

- Hummocky to undulating till plain, with locally extensive peat veneers and blankets.
- Regenerating shrublands on burned areas, with remnant black spruce–lichen woodlands; locally taller and denser white spruce and mixed-wood stands.
- Locally common peat plateaus and polygonal peat plateaus, the latter similar to those occurring several hundred kilometers north.



**Total area:** 3,837 km<sup>2</sup> (2.4% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 700 (500-825)

#### General Description

The Horn Plateau LS Ecoregion is an undulating to hummocky till plateau rising over 400 m above the surrounding plains and lowlands. The Horn Slopes LS Ecoregion borders it on the west and north and the Horn Slopes MB Ecoregion borders it on the south; gentle to abrupt slope breaks define the boundaries. Undulating and hummocky till deposits are the dominant landform; organic veneers and blankets cover most level to gently undulating till areas. Recent fires have burned over much of the plateau and regenerating shrub communities are the dominant cover type; open black spruce – low shrub – lichen forests are characteristic of unburned uplands. Relatively tall and dense white spruce or mixed trembling aspen – spruce communities occur infrequently on southerly slopes, and small regenerating jack pine stands occur on coarser-textured tills. Peat plateaus and veneer bogs are the dominant wetland types, but treeless, lichen-covered polygonal peat plateaus are locally common on level areas or northerly slopes in the eastern half of the Ecoregion.

#### Geology and Geomorphology

Horizontally stratified Upper Cretaceous marine shales and conglomerates underlie the Horn Plateau. Most of the area is covered by medium-textured, often bouldery till. Organic veneers and blankets cover between 30 and 50 percent of the landscape.

#### Soils

Permafrost is present in both mineral and organic soils. Organic Cryosols are the dominant soil type in peat plateaus and polygonal peat plateaus. Turbic Cryosols, soils that have been mixed by frost action and that are permanently frozen at some depth, are the dominant mineral soil type, with Brunisols and Luvisols on well-drained slopes and coarse-textured materials.

#### Vegetation

A resource assessment for the Edézhíe candidate protected area, which includes the Horn Plateau, indicates that most of the Horn Plateau has burned within the last 25 years (EBA-CWS 2005). This assessment identifies thirteen community types for the Edézhíe area, of which four or five types probably occur in the Horn Plateau LS Ecoregion. Dwarf birch and willow shrublands

are typical of burned upland areas. Fire-successional jack pine stands occur in small scattered patches, usually on coarse-textured till pockets. Unburned uplands are vegetated by closed to open, generally low-canopied black spruce stands with dwarf birch, northern and common Labrador tea and lichen understories, but taller, denser white spruce and occasionally mixed trembling aspen – white spruce stands occur on moderate southerly slopes such as those found on the local hill system south of Big Island Lake. Peat plateaus and veneer bogs are common on level to gently undulating terrain throughout the Ecoregion, and like the upland areas, have been mostly burned over. Burned peat plateaus and veneer bogs are dark-colored and vegetated by dwarf birch – Labrador tea – peat moss communities; stunted black spruce – lichen – peat moss bogs are characteristic of unburned wetlands. Sedges, cotton-grasses and peat mosses grow in collapse scars within peat plateaus. Nearly treeless polygonal peat plateaus with continuous lichen mats, sparse dwarf birch and northern and common Labrador tea cover, and permafrost within 30 cm of the surface in late summer are locally common on level areas and northerly slopes in the eastern half of the Ecoregion. These features are similar to those noted in the Keller Lake LS Ecoregion about 200 km north, and their occurrence on the Horn Plateau LS Ecoregion is probably attributable to colder local climates at higher elevations that have preserved characteristics of a colder climatic regime in the past.

#### Water and Wetlands

Willow, Hornel, Big Island and Mustard Lakes are the main named waterbodies. The Willowlake and Horn Rivers drain the plateau. Numerous smaller lakes surround Big Island Lake and the south and west sides of Willow Lake. Drainage systems on the Plateau are local and internal; a flowing cold iron-stained spring observed on an island in Willow Lake is probably indicative of local groundwater recharge-discharge systems. Polygonal peat plateaus and peat plateaus are the dominant wetland types.

#### Notable Features

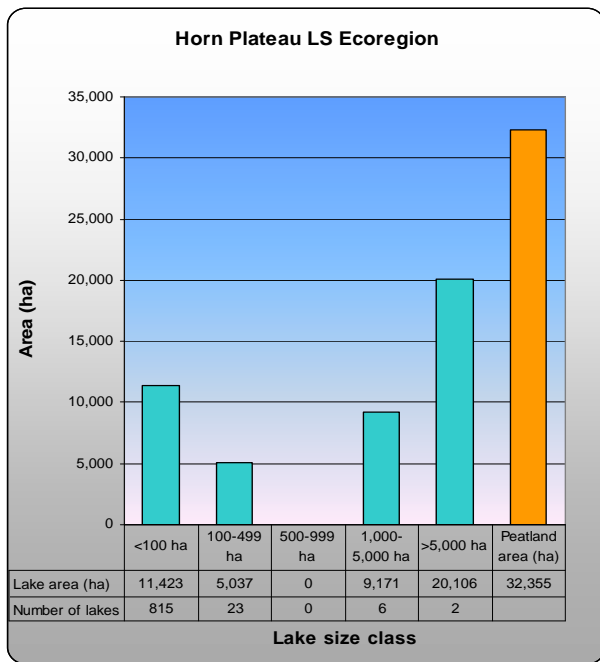
A large portion of the Horn Plateau LS Ecoregion is an International Biological Program site (Nettleship and Smith 1975), and is included in the Edézhíe candidate protected area under the Northwest Territories Protected Areas Strategy.



A high-altitude view of the Horn Plateau HS Ecoregion shows light brown burned peat plateaus with golden-brown collapse scars in the foreground and darker-toned remnant black spruce forests and woodlands in background.



Mixed-wood and trembling aspen forests occur on well drained, relatively warm sites on hummocky till south of Willow Lake.



Proportion of Ecoregion occupied by lakes: 12%  
 Proportion of Ecoregion occupied by bogs and fens: 8%

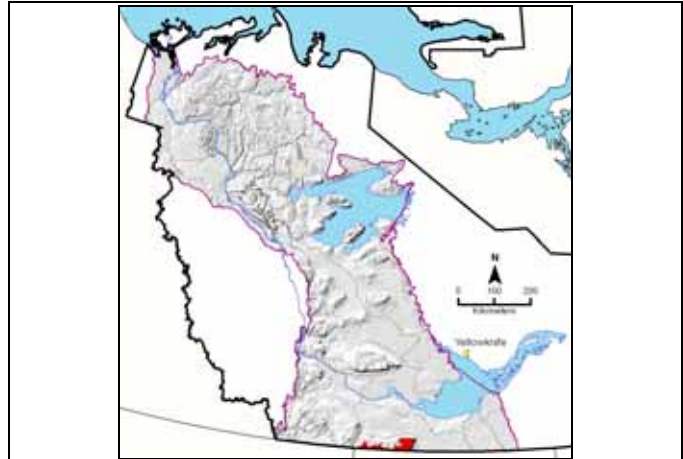
Polygonal peat plateaus occur in the easternmost part of the Ecoregion and might be remnant features of a colder climate in past years. The large cracks are water filled and have no permafrost to depths of more than a meter; the whitish areas are lichen and peat moss (mainly *Sphagnum*) covered treeless areas with permafrost 30 to 40 cm below the surface.

### 3.3.2.14 Cameron Plateau LS Ecoregion

**Overview:** Rolling to hummocky glacial till with open black spruce and occasionally lodgepole pine stands and extensive areas of peat plateaus and veneer bogs are typical of the Cameron Plateau LS Ecoregion.

**Summary:**

- Level to gently sloping organic veneers and blankets with peat plateaus and veneer bogs.
- Rolling to hummocky till uplands with black spruce forests are secondary.
- Lodgepole pine and pine hybrids at higher elevations.



**Total area:** 1,833 km<sup>2</sup> (1.1% of Taiga Plains LS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 700 (475-875)

#### General Description

The Cameron Plateau LS Ecoregion occurs at the highest elevations (600-800 mASL) in the Cameron Hills. Its boundary with the Cameron Slopes MB Ecoregion is often abrupt; frozen bogs atop the plateau may occur within a few meters of mixed-wood stands on the failing sideslopes. Its lower boundary with the Cameron Upland HB Ecoregion is similarly defined by the occurrence of permafrost features such as veneer bogs and peat plateaus. The southern boundary is the Alberta–Northwest Territories border. Rolling and hummocky till is the dominant upland landform; gently sloping to level till is usually covered by organic veneers and blankets that occupy extensive areas in the southern part of the Ecoregion. Black spruce–low shrub–lichen communities occur extensively on well-drained uplands. Lodgepole pine forests and forests composed of jack pine – lodgepole pine hybrids are locally common on well-drained sites at the highest elevations in the northeast part of the Ecoregion. Deciduous and mixed-wood communities are uncommon and localized to warm slopes or stream terraces. Bogs with stunted open black spruce woodlands and collapse scar communities are characteristic wetland vegetation types that occur throughout the area in association with peat plateaus and organic veneers on slopes. The Cameron Hills exert a local influence on weather; in summer, thunderstorms are more frequent (Klock *et al.* 2000), and rainfall amounts are likely higher in this Ecoregion than in the surrounding lowland terrain.

#### Geology and Geomorphology

Cretaceous marine shales underlie level to undulating, hummocky, rolling and fluted till deposits. Small inclusions of glacio-fluvial and alluvial materials occur along old meltwater channels or present-day streams. Peatlands of variable thickness have developed on level to gently sloping areas.

#### Soils

Organic Cryosols are the dominant soil type in wetlands. Acidic, fine-textured Brunisols are the main upland soil type.

#### Vegetation

Vegetation in the Cameron Plateau LS Ecoregion is similar to that described for the Boreal Subarctic Natural Subregion in Alberta (Natural Regions Committee 2006). The characteristic wetland vegetation type is a species-poor bog; open black spruce with common and northern Labrador tea, cloudberry, lichen, peat mosses and feathermosses occur on peat plateaus underlain by permafrost, while sedges, cotton-grasses and peat mosses occupy the collapse scars. Well- to imperfectly-drained upland sites are typically forested by open, slow-growing black spruce with common and northern Labrador tea, alpine bilberry, lichen, and feathermoss understories. Lodgepole pine or lodgepole pine – jack pine hybrid stands with species-poor lichen-dominated understories are locally common at higher elevations on well-drained sites, mainly in the eastern part of the Ecoregion. Trembling aspen and mixed-wood stands are uncommon on southerly slopes or on coarse-textured alluvial terraces where microclimates are sufficiently warm and dry. Northern ribbed fens occur between till ridges and are sometimes intricately patterned.

#### Water and Wetlands

Silt Lake is the only named lake in this Ecoregion. Linear ponds occupy depressions between glacial flutings in the southeast portion, and numerous small pothole lakes occupy low areas in undulating and hummocky till in the western portion. Peat plateaus on level areas and veneer bogs on slopes are extensive across the southern half; intricately patterned northern ribbed fens are interesting local features.

#### Notable Features

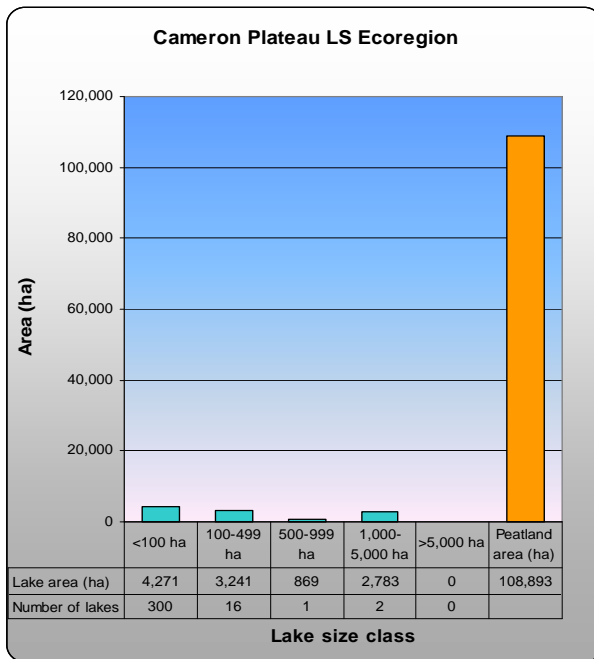
This Ecoregion is the most southerly representative of the Taiga Plains LS Ecoregion in the Northwest Territories. Outstanding examples of glacial fluting occur in the southeast corner, and intricately patterned northern ribbed fens in the northeast. Lodgepole pine reaches its easternmost limits in the Northwest Territories here.



Black spruce on hummocky till is a dominant landscape feature in the eastern part of the Cameron Plateau LS Ecoregion.



Veneer bogs, a permafrost feature that occurs on sloping terrain, show in this image as grayish-white areas. They are lichen-dominated and sparsely treed.



Proportion of Ecoregion occupied by lakes: 6%  
 Proportion of Ecoregion occupied by bogs and fens: 59%



A striking example of glacial fluting occurs on the eastern portion of the Ecoregion, with light green lodgepole pine on the higher ridges, or flutes, and bogs forested by dark-toned black spruce in the depressions.