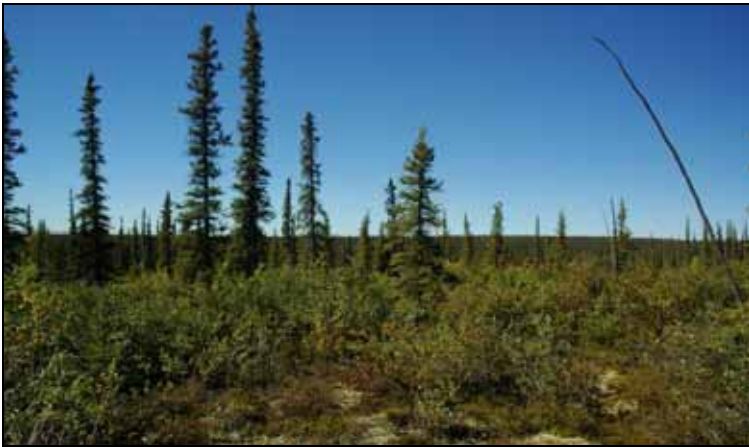


### 3.3.1 TAIGA PLAINS HIGH SUBARCTIC (HS) ECOREGION



Typical sites in the Taiga Plains High Subarctic (HS) Ecoregion are characterized by stunted, open stands of white spruce, black spruce and larch with understories of dwarf birch, willow, northern Labrador tea, cotton-grass, moss and lichen. Low shrub tundra is common on hilltops and higher elevation areas, and dwarf birch, willow, mountain avens, lichen and cotton-grass are common species. Cryosols and Brunisols are common soils, the latter associated with coarse-textured and/or well-drained surficial materials.



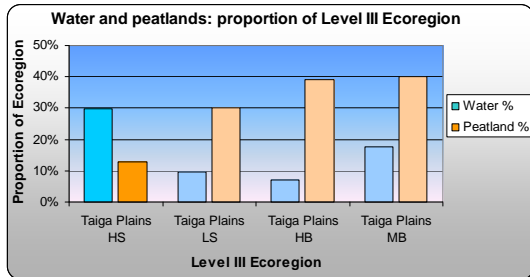
This stand of widely-spaced white and black spruce with an understory of dwarf birch, willow, northern Labrador tea and lichens in the Travaillant Upland is typical of the Taiga Plains HS Ecoregion. Soils are frozen for much of the year and only a thin surface layer thaws during the short summer.



Entire-leaved mountain avens (*Dryas integrifolia*), the floral emblem of the Northwest Territories, is a low-growing, mat-forming plant that occurs throughout the Taiga Plains Ecoregion and is particularly common within the Taiga Plains HS Ecoregion. It favours rocky or gravelly, calcium-rich sites.

### 3.3.1 TAIGA PLAINS HIGH SUBARCTIC (HS) ECOREGION

**Overview:** *The Taiga Plains HS Ecoregion occupies the northern third of the Taiga Plains. Undulating to hummocky till plains, slow-growing white and black spruce forests, and active permafrost features such as polygonal peat plateaus and earth hummocks are characteristic.*



(water proportion includes Great Bear Lake)



**Total area:** 170,082 km<sup>2</sup> (35% of Taiga Plains).  
Ecoregion shown in red.

#### General Description

The Level III Taiga Plains HS Ecoregion includes fourteen Level IV ecoregions that occupy the northern third of the Taiga Plains. The Taiga Plains HS Ecoregion spans approximately 400 km in a south – north direction. North of the 68<sup>th</sup> parallel, closed and open forests of white and black spruce give way to sparsely treed white spruce woodlands. Features characteristic of Low Arctic climates, such as patterned ground, earth hummocks, and treeless tundra become more common along the indistinct boundary with the Level II Southern Arctic Ecoregion. Gently sloping, level and undulating till occurs over much of the area, with some areas of significant topography. Peatlands are extensive in a few of the Level IV ecoregions, but occupy a relatively small proportion of the total area within the Taiga Plains Ecoregion relative to more southerly Level III ecoregions. Recent fires have burned over much of the region, and regenerating shrub lands are a widespread cover type. White spruce is the dominant tree species; density and vigour are a function of latitude, with closed stands more common in the south and very open, low-canopied woodlands in the north.

#### Climate

Inuvik is the only station in the region from which climate data have been collected over long periods, and climatic statistics have been modelled over large areas using these limited data. The climate is colder than the Taiga Plains LS Ecoregion to the south, and is characterized as High Subarctic by the Ecoregions Working Group (1989). Polygonal peat plateaus are the dominant wetland form, earth hummocks and patterned ground become common near the region's northern boundary, and tree growth becomes increasingly suppressed with increasing latitude. Climate models (Agriculture and Agri-Food Canada 1997) provide the following general statistics. The mean annual temperature ranges from –5 to –11°C. The mean temperature in January, the coldest month, ranges from –27 to –29°C, and from

8 to 16.5°C in July, the warmest month. Mean annual precipitation is between 170 and 340 mm, with the wettest period in June through October 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 9.0 and 10.0 mJ/m<sup>2</sup>/day, with low values of 0 to 0.6 mJ/m<sup>2</sup>/day in December and highs of 22 to 22.5 mJ/m<sup>2</sup>/day in June.

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

The Taiga Plains HS Ecoregion includes level to hummocky plains, rolling and ridged uplands with significant bedrock exposures in places, and Canada's largest delta. Undulating to hummocky, fine-textured and often bouldery till deposits are the most common landform. Peatlands are more extensive south of the Mackenzie Delta. Permafrost is continuous, and soils are dominantly mineral and Organic Cryosols. There are numerous lakes; Great Bear Lake, Canada's largest lake, lies entirely within this Ecoregion.

#### Vegetation

White spruce communities are the most common vegetation types; the species composition of white spruce communities is fairly consistent across the Ecoregion, but progressively more rigorous climates at higher latitudes result in reduced tree height and density, culminating in the transition to shrub-dominated tundra along a broad, poorly defined boundary with the Southern Arctic Ecoregion. Extensive fires have resulted in large areas of regenerating dwarf birch. Treeless lichen – dwarf birch communities cover polygonal peat plateaus. Jack pine does not occur in this Ecoregion; trembling aspen does occur, but only as stunted individuals on south-facing slopes and well-drained alluvial terraces.

### 3.3.1.1 Mackenzie Delta HS Ecoregion

**Overview:** *The Mackenzie Delta HS Ecoregion includes Canada's largest delta, an intricate network of small ponds, stream channels, and alluvial uplands with white spruce forests.*

**Summary:**

- Level alluvial deposits with thousands of ponds and many stream channels.
- Dense and relatively vigorous white spruce stands at the south end, that become more open and stunted towards the north.



**Total area:** 9,604 km<sup>2</sup> (5.6% of Taiga Plains Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 25 (0-100)

#### General Description

The Mackenzie Delta HS Ecoregion includes most of the Mackenzie River Delta, the largest delta in Canada. It is a broad, flat alluvial floodplain confined by the high banks of the Travaillant Upland HS Ecoregion and Level II Southern Arctic Ecoregion to the east, and the Level II Brooks Range Tundra Ecoregion to the west. The northern boundary with the Southern Arctic is defined by tree line; the southern boundary with the Arctic Red Plain HS Ecoregion is clearly marked by the vegetation change from regenerating shrublands and open black spruce to closed white spruce forests on the Delta. The Mackenzie River branches into three channels (Middle, Western, and Eastern) at the southern limits of the Delta, and Middle Channel is the largest. The Ecoregion is a complex of alluvial deposits and water. It is forested by closed and relatively diverse white spruce – tall shrub stands at the south end that become more open and stunted to the north, finally giving way to treeless dwarf birch shrublands near the Beaufort Sea. There are thousands of small ponds and numerous active and abandoned stream channels within this Ecoregion.

#### Geology and Geomorphology

The Mackenzie Delta HS Ecoregion is an outstanding example of a landscape influenced by active fluvial and thermokarst processes. Fluctuating water levels cut off old channels and create new ones; flood events deposit silts and sands on terraces and in low-lying ponds. Permafrost melting causes lakeshore subsidence, and trees collapse into the lakes creating a star-like pattern of dead snags. In places, streams have built up high levees (flood-deposited sediments along the banks) and they flow in channels elevated several meters above the surrounding lakes and forests.

#### Soils

Regosolic Turbic Cryosols are the dominant soil group, reflecting both the active fluvial environment (Regosolic soils have little or no horizon development) and permafrost influences.

#### Vegetation

Plant species and growth form on the Mackenzie Delta HS Ecoregion contrasts sharply with that of surrounding landscapes. In the southern half of the Ecoregion, tall, closed spruce stands with dense, tall green alder and willow understories, a diverse herb mat, and feathermosses are prevalent on well- to imperfectly-drained fine-textured alluvial terraces that have permafrost below the main rooting zone. Horsetails, reed-bentgrass and dense willow – green alder shrublands surround many of these stands on lower, wetter soils next to ponds and stream channels. On higher terraces and at higher latitudes within this Ecoregion, permafrost is closer to the surface and influences vegetation development. Spruce stands become open and stunted; dwarf birch, low-growing green alder and willow, and cloudberry constitute the main understory species in less diverse communities than those occurring in the south, and permafrost is only a few centimeters below the surface. Tree line occurs near the Delta's northern limits where it flows into the Beaufort Sea. Dwarf birch – willow shrublands with scattered white spruce and grasses on exposed dry slopes occur along the steeply sloping and dissected eastern bank of the Delta.

#### Water and Wetlands

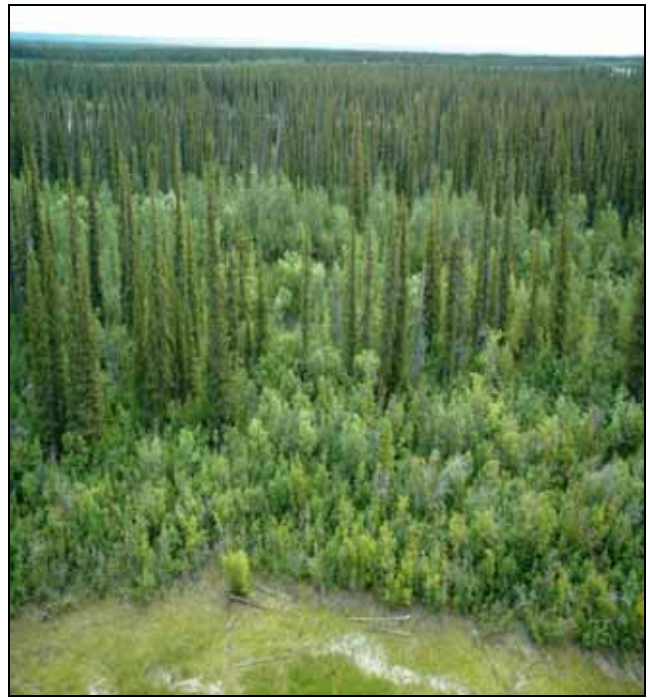
The largest watercourses in this Ecoregion are the three main channels of the Mackenzie River and the Arctic Red River that flows into the Mackenzie River near the Delta's southern border. Over 11,000 small ponds, mostly only a few hectares in size, cover over a third of the Ecoregion together with the main rivers. Wetland types along streambanks and pond shorelines include active and inactive delta marshes, shoreline marshes, shore fens and stream fens with horsetail, reed-bentgrass and sedge vegetation.

#### Notable Features

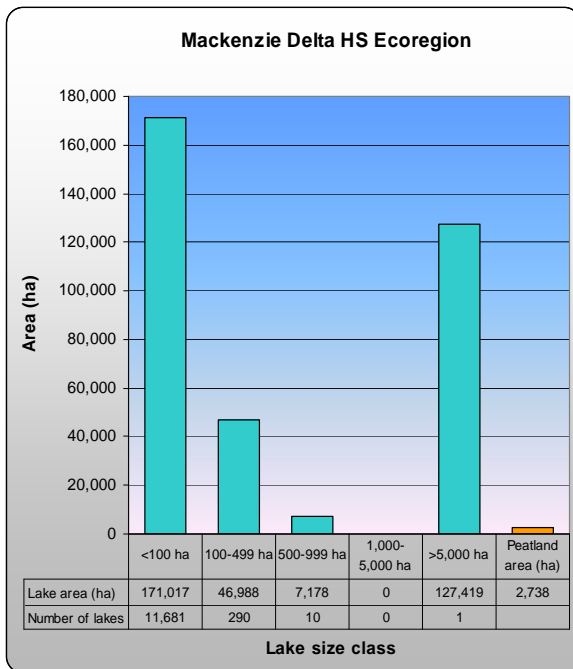
The Mackenzie Delta is the largest delta in Canada. This Ecoregion provides excellent habitat for a number of wildlife species.



This image provides a southwest view across the upper Delta toward the treeless British-Richardson Foothills and Mountains, east of Aklavik. The bright green patches are delta marshes.



Southwest of Inuvik, species-rich tall white spruce – shrub communities with reed grass and horsetail marshes are widespread.



Proportion of Ecoregion occupied by lakes: 36%  
 Proportion of Ecoregion occupied by bogs and fens: <1%



Stunted open white spruce, dwarf birch, green alder and willow grow on permafrost about 20 km north of Aklavik; compare this image to the image on the top right and note the change in growth form and composition due to climate changes from south to north.

### 3.3.1.2 Arctic Red Plain HS Ecoregion

**Overview:** *The Arctic Red Plain HS Ecoregion is an extensive, low-elevation complex of gently undulating glacial till and peatlands with slow-growing black spruce forests and nearly treeless lichen – peat moss bogs.*

#### Summary:

- Level to gently undulating till mantled by peat layers.
- Black spruce – low shrub forests, nearly treeless peat plateaus, shrubby fens, and regenerating burn shrublands are the dominant communities.



**Total area:** 22,907 km<sup>2</sup> (13.5% of Taiga Plains HS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 50 (25-350)

#### General Description

The Arctic Red Plain HS Ecoregion is a nearly level, low-elevation complex of till and peatlands. The Travailant Upland HS and Mackenzie Delta HS Ecoregions and the Level II Brooks Range Tundra Ecoregion provide well-defined boundaries to the east, north and west respectively; the boundary between this Ecoregion and the southerly Arctic Red Plain LS Ecoregion is less obvious. Most of the Ecoregion lies west of the Mackenzie River. The northernmost portion east and west of the Arctic Red River – Mackenzie River confluence is mainly an undulating to gently rolling till plain with some peatlands. South of the confluence, peat plateaus and imperfectly- to poorly-drained level to undulating till plains with thousands of small lakes and thermokarst ponds are the dominant landscape feature. A fine-textured lacustrine plain within this Ecoregion surrounds the southern outlier of the Travailant Upland HS Ecoregion. Open, slow-growing black spruce – shrub-lichen communities, nearly treeless lichen – peat moss bogs on peat plateaus, shrubby fens, and regenerating dwarf birch and Alaska paper birch – black spruce on recently burned upland areas are the main vegetation types. Small areas of relatively diverse white spruce or spruce – Alaska paper birch occur on alluvial flats and higher sloping terrain.

#### Geology and Geomorphology

The characteristic landforms south and west of the Mackenzie River–Arctic Red River confluence are gently undulating medium- to fine-textured till plains often mantled by peat deposits. North of the confluence, rolling to hummocky till and a few deeply incised tributaries of the Arctic Red River provide more significant terrain variation resulting in more limited areas of organic accumulation. A lacustrine – organic complex occupies the curved valley through which the Mackenzie River flows between the main Travailant Upland HS Ecoregion and its southern outlier. A large glacio-fluvial terrace complex occurs at about the midpoint of this valley, and alluvial deposits occur along its lower slopes and along the other major rivers. Thermokarst lakes are common throughout on organic terrain.

#### Soils

Upland soils are permafrost-affected Static and Turbic Cryosols; gleyed subgroups of the above Cryosols are probably common. Regosols and Brunisols are associated with recently deposited, well-drained alluvium. Organic Cryosols and Organic soils occur with polygonal peat plateaus and horizontal fens.

#### Vegetation

Black spruce forests with very open, uneven-aged canopies, scattered larch, slow growth rates and an understory of mountain cranberry, willow, red bearberry, dwarf birch and lichen are characteristic communities growing on fine-textured, imperfectly- to poorly-drained tills. Frequent fires have produced large areas of regenerating dwarf birch and Alaska paper birch with an understory of black spruce seedlings. Peat plateaus are vegetated by lichen – dwarf birch – northern and common Labrador tea – peat moss communities with scattered black spruce; sedge – peat moss communities occupy small internal collapse scars. White spruce and white spruce – Alaska paper birch stands with shrub and moss understories are restricted to alluvial terraces or sloping terrain that provide more favourable growth conditions than the prevailing climate.

#### Water and Wetlands

The Mackenzie, Arctic Red and Peel Rivers are the major watercourses. The largest named lakes are Tundra, Cardinal, Clearwater, Burnt and Campbell Lakes. Numerous shallow ponds and thermokarst lakes occur throughout the area, sometimes connected by small, slow-flowing creeks. Peat plateaus and shrubby horizontal fens are the most common and extensive wetland types. Small polygonal peat plateaus occur in northerly portions of this Ecoregion.

#### Notable Features

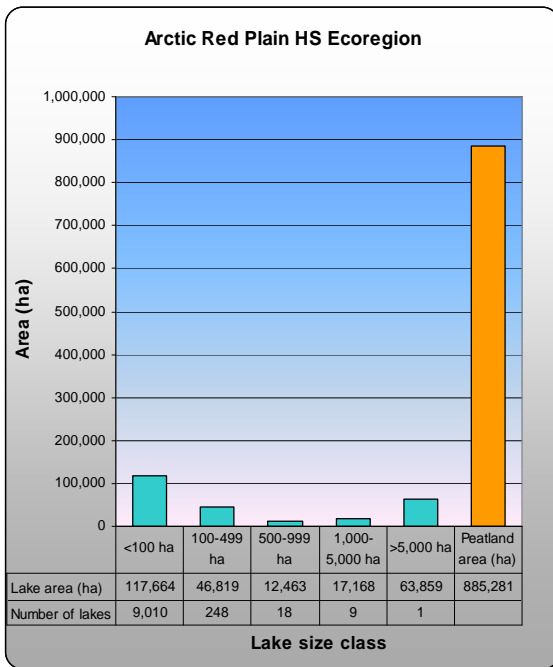
The “reversing delta” between Campbell Lake and the main Mackenzie Delta experiences water flows in both directions depending on water levels in the Mackenzie River.



A complex of peat plateaus, black spruce forests, shrubby fens and regenerating burns is typical of the Arctic Red Plain HS Ecoregion.



Typical vegetation includes treeless peat plateaus (centre of the image), surrounded by black spruce stands with scattered larch (light green trees).



Proportion of Ecoregion occupied by lakes: 11%  
 Proportion of Ecoregion occupied by bogs and fens: 38%



In the northeastern part of the Ecoregion, this “reversing delta” in the upper mid image lies between Campbell Lake and the Mackenzie Delta, and experiences two-way water flows depending on relative water levels; the eastern edge of the Mackenzie Delta is in the foreground and the Campbell Hills lie to the left.

### 3.3.1.3 Campbell Hills HS Ecoregion

**Overview:** *The Campbell Hills HS Ecoregion is a sparsely treed island of fractured limestone bedrock surrounded by the Mackenzie Delta to the west and till uplands to the east.*

**Summary:**

- Fractured bedrock outcrop with thin till and colluvial deposits.
- Stunted black spruce and shrubland communities.



**Total area:** 207 km<sup>2</sup> (0.1% of Taiga Plains HS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 50 (25-350)

#### General Description

The Campbell Hills HS Ecoregion is a gently domed limestone outcropping lying between the Mackenzie Delta HS and Travailant Upland HS Ecoregions. Although it is small, it contrasts strongly with the surrounding terrain and is therefore recognized as a separate ecoregion. Stunted, open black spruce-lichen or shrub communities occur in pockets of soil within fractured bedrock or on thin till or organic veneers over bedrock. Sheltered locales and moist colluvial slopes harbor white spruce – black spruce – Alaska paper birch shrub communities; stunted trembling aspen colonies are occasionally found on warm, dry southerly slopes. Runnels with black spruce – lichen and dwarf birch on gentle slopes and earth hummocks attest to the continual influence of permafrost and the cold climate. A local climatic event, the “burst of Beaufort”, frequently affects the Campbell Hills HS, Mackenzie Delta HS and the northern Arctic Red Plain HS Ecoregions throughout the year, where low cloud and fog are pushed across the Delta by northwest winds, accompanied by falling temperatures. The cloud and fog linger for longer periods in August and September than in June or July (Klock *et al.* 2000).

#### Geology and Geomorphology

The Campbell Hills are Devonian limestones and dolomites that lie atop the “Campbell Uplift” (Cook and Aitkin 1971). Exposed bedrock is the dominant feature. In places, the bedrock is heavily fractured and vertical cliff faces occur. Thin till and colluvial deposits are present, the latter commonly below cliff faces as rubbly talus slopes.

#### Soils

Colluvial deposition and continual frost action retard soil development and Regosolic Turbic Cryosols or Organic Cryosols are probably the main soil types. There is no soil development on bedrock or on rubbly colluvial talus slopes below cliff faces.

#### Vegetation

Topography and parent materials within the Campbell Hills HS Ecoregion change rapidly over distances of only a few meters, producing a correspondingly variable plant cover. The most widespread communities on thin, well-drained soils over bedrock are open, variable-aged black spruce – shrub – lichen stands mixed with shrublands that include willow, dwarf birch, mountain cranberry, red bearberry, northern and common Labrador tea, and occasionally stunted balsam poplar and trembling aspen. On the driest areas, sedge – grass communities grow in pockets of soil and lichen communities on exposed bedrock. Relatively diverse black spruce – white spruce stands, sometimes with Alaska paper birch and dense green alder and willow understories, occupy sheltered slopes and ravines. Runnels and bogs forested by open, stunted black spruce – lichen woodlands occur locally on gentle slopes and in depressions where organic veneers and blankets have developed.

#### Water and Wetlands

There are no major waterbodies within the Ecoregion; Campbell Lake and the “reversing delta” (see image on p. 27) lie adjacent to it. A few shallow ponds are scattered across the Ecoregion. Bogs with permafrost and sparse, stunted black spruce woodlands occur in small pockets and depressions; runnel patterns occur on gentle slopes.

#### Notable Features

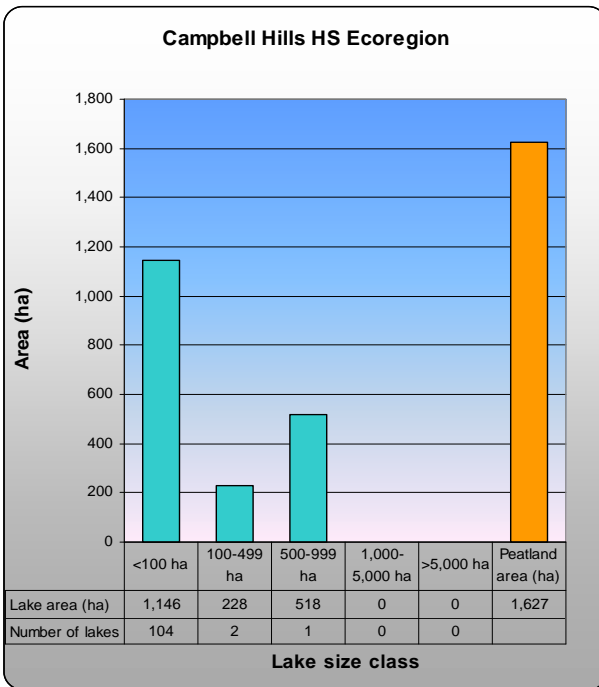
The Campbell Hills are a unique regional feature. Trembling aspen reaches its most northerly distribution in the Northwest Territories here and on nearby cutbanks above the Mackenzie Delta.



This view looks north along the spine of the Campbell Hills towards Inuvik. Note the fracture patterns in the limestone bedrock that provide sheltered valleys where somewhat more vigorous and diverse plant communities occur.



Black spruce – lichen vegetation on thin soils over bedrock is typical across much of the Campbell Hills.



Proportion of Ecoregion occupied by lakes: 9%  
 Proportion of Ecoregion occupied by bogs and fens: 8%



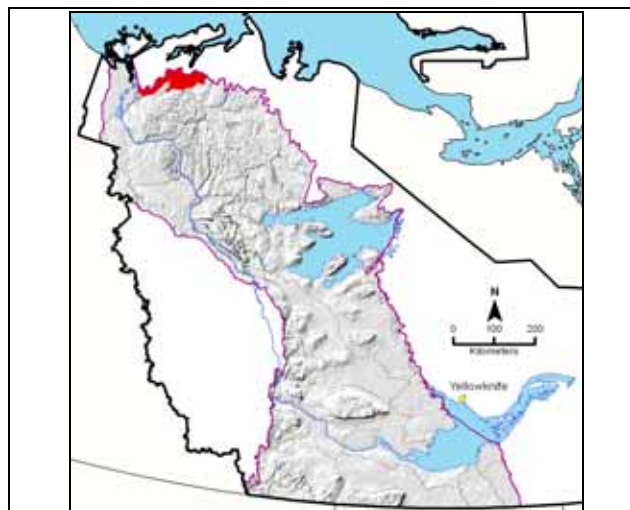
This stunted trembling aspen colony on the east side of the Campbell Hills overlooking Campbell Lake is near the northern limits of aspen growth in the Northwest Territories.

### 3.3.1.4 Sitidgi Plain HS Ecoregion

**Overview:** *The Sitidgi Plain HS Ecoregion is a mosaic of treed and treeless, undulating to hummocky till with many features characteristic of both High Subarctic and colder Low Arctic climatic regimes.*

**Summary:**

- Hummocky to undulating till.
- Treeless tundra areas and sparsely treed southerly slopes.



**Total area:** 4,933 km<sup>2</sup> (2.9% of Taiga Plains HS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 50 (0-200)

#### General Description

The Sitidgi Plain HS Ecoregion is the northernmost upland ecoregion in the Taiga Plains. A transitional tree line area marks its northern boundary with the Level II Southern Arctic Ecoregion. Because tree line is determined by changes in local and regional climates over time and is therefore dynamic, this boundary is best regarded as a broad line. Its southern boundary with the Travaillant Upland HS and Anderson Plain HS Ecoregions is not clearly defined. The Sitidgi Plain HS Ecoregion is mapped as a separate ecological system because of its lower elevation, somewhat more subdued terrain, and forest – tundra complex. The Ecoregion is an undulating to hummocky till plain, and peatlands account for less than 20 percent of the landscape. Patterned polygonal ground and earth hummocks that occur throughout are indicative of High Subarctic and Low Arctic climate influences. There are numerous small ponds, but wetlands are uncommon and are mainly polygonal peat plateaus. Stunted, widely spaced white spruce and treeless exposed tundra areas are characteristic, and indicate the poorly defined transitional nature of the boundary between the Level II Taiga Plains and Southern Arctic Ecoregions.

#### Geology and Geomorphology

Middle to upper Cretaceous shales underlie the Ecoregion. Hummocky to undulating medium- to fine-textured till is the main landform type. Patterned ground, earth hummocks and runnels are indicative of active permafrost processes.

#### Soils

Turbic Cryosols are widespread across the Ecoregion, with Organic Cryosols in fens and polygonal peat plateaus.

#### Vegetation

The characteristic plant cover is a mix of very sparsely treed white spruce woodlands with low dwarf birch shrub understories, and treeless tundra with dwarf birch, black crowberry, willow, cotton-grasses and sedges. Treeless areas can be extensive on exposed terrain or where slopes are predominantly north facing. They represent outliers of the Level II Southern Arctic Ecoregion that are too small to map at the Level II scale. Marginally improved growing conditions occur in the southern portion of the Ecoregion on warmer southerly slopes and in well-drained nutrient-rich riparian zones.

#### Water and Wetlands

Sitidgi Lake is the largest waterbody. Numerous small lakes occupy pothole depressions, and generally have well-drained shorelines. Wetlands are uncommon, but there is a locally extensive horizontal fen and northern ribbed fen area west of Sitidgi Lake. Fens and polygonal peat plateaus are generally restricted to small pockets by topography and moisture conditions.

#### Notable Features

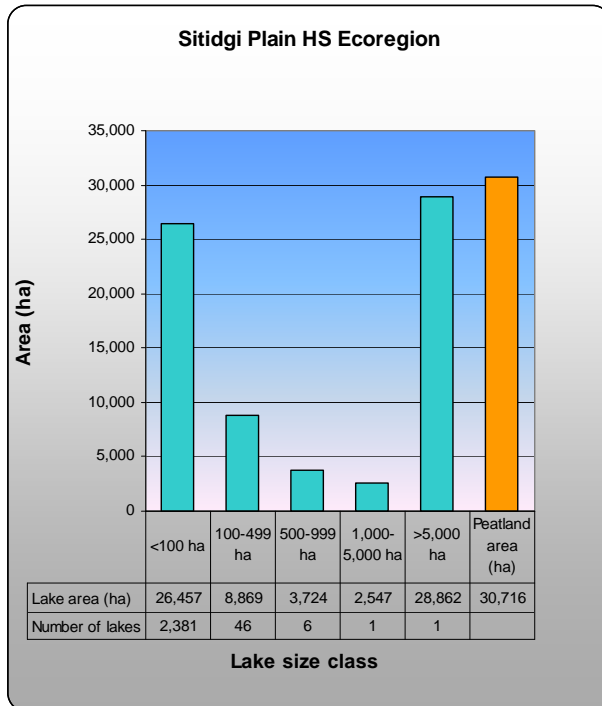
Vegetation and permafrost features indicate that the Sitidgi Plain HS Ecoregion is the coldest and probably the most arid ecoregion in the Taiga Plains.



Near the northern border of the Sitidgi Plain HS Ecoregion, scattered dwarf (2-5 m) white spruce grow on southerly slopes, and hilltops and northerly slopes are treeless.



Slightly better tree growth occurs on steeper south slopes along the southeast boundary of the Ecoregion.



Proportion of Ecoregion occupied by lakes: 14%  
Proportion of Ecoregion occupied by bogs and fens: 6%



The circular pond and the patterned ground surrounding it are the remnants of a pingo (an ice-cored conical permafrost feature that rises above the surrounding plain) that has melted.

### 3.3.1.5 Travaillant Upland HS Ecoregion

**Overview:** *The Travaillant Upland HS Ecoregion is a complex landscape of rolling and dissected till veneers over bedrock, hummocky till uplands, and variable forest cover types.*

**Summary:**

- Rolling and eroded till veneers and blankets over bedrock in the south, hummocky till uplands in the north.
- Relatively diverse white spruce stands in the south grading to sparsely treed low-canopied woodlands in the north.



**Total area:** 26,389 km<sup>2</sup> (15.5% of Taiga Plains HS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 225 (50-450)

#### General Description

The Travaillant Upland HS Ecoregion is a geologically and topographically complex landscape consisting of a main unit and a southwestern outlier. The main unit shares its eastern boundary with the Anderson Plain HS Ecoregion, its southeastern boundary with the North Mackenzie Plain LS Ecoregion, its western boundary with the Arctic Red Plain HS Ecoregion, and its northern boundary with the Sitidgi Plain HS Ecoregion. The outlying southwestern unit is completely surrounded by the Arctic Red Plain HS Ecoregion. The Travaillant Upland HS Ecoregion occurs at higher elevations and has more pronounced terrain features than all surrounding ecoregions. The southern half of the Ecoregion and its southwestern outlier are rolling and include deeply dissected bedrock-controlled landscapes, thin till veneers and blankets over glacially scoured bedrock, and hummocky till deposits. The northern half of the Ecoregion is mainly a hummocky till upland with scattered polygonal peat plateaus. Vegetation cover varies throughout the Ecoregion, with closed and relatively diverse white spruce forests in the southern third, more open spruce woodlands in central parts, and sparsely treed communities or shrubby tundra in the northern third. Recently burned, regenerating shrub communities share dominance with forested types throughout the Ecoregion.

#### Geology and Geomorphology

Much of the Ecoregion is underlain by Devonian marine shales. Devonian limestones and Cretaceous shales and sandstones that outcrop east and south of Travaillant Lake produce small flat-topped plateaus. The southern landscapes are most variable, with rolling and ridged glacially scoured bedrock and deeply incised meltwater channels and erosion gullies. Till veneers and blankets overly bedrock in the south; hummocky till uplands are the main landform type north of Travaillant Lake. Peatlands are more extensive in the northern half, where level or depressional areas allow organic deposits to accumulate. Glacio-fluvial deposits are locally extensive in the Travaillant Lake area and along the Iroquois River to the south.

#### Soils

Turbic Cryosols are widespread across the Ecoregion, reflecting continuous permafrost. Organic Cryosols occur with polygonal peat plateaus.

#### Vegetation

The characteristic vegetation type in the Travaillant Upland HS Ecoregion is white spruce forest with dwarf birch, mountain cranberry, northern and common Labrador tea, red bearberry, lichens and mosses. Species composition is reasonably consistent across the Ecoregion, but the density and height of white spruce varies widely in response to regional and local conditions. The Ecoregion spans nearly 300 km north to south. In the southern third and in the southwest outlier, climatic conditions are transitional from High Subarctic to Low Subarctic, and closed-canopy relatively diverse white spruce stands often with an Alaska paper birch component are common on rolling, hummocky and dissected till. Northern ribbed fens and well-treed runnel patterns are also more common in the south than elsewhere in the Ecoregion. Northward, in the Travaillant Lake area, more open spruce stands with lower canopies are typical on undulating to hummocky till and polygonal peat plateaus are more widespread. In the northernmost third, open spruce woodlands are most common, with patches of shrub – sedge tundra and landform features indicative of Low Arctic climates, such as earth hummocks and patterned ground in the extreme north by Sitidgi Lake. Recent fires have replaced much of the forest across the Ecoregion with regenerating dwarf birch stands.

#### Water and Wetlands

There are several named lakes, of which Travaillant, Manuel, Yeltea and Caribou Lakes are the largest. Thousands of small lakes occupy pothole depressions, and generally have dry shorelines without much wetland development. Polygonal peat plateaus are the most common wetland type especially around Travaillant Lake and to the north where terrain permits their development. Northern ribbed fens also occur in the south.

#### Notable Features

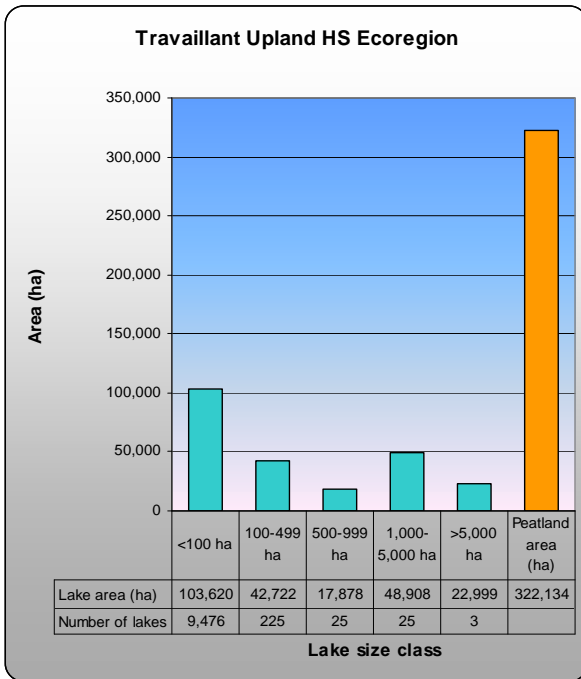
The Travaillant Lake HS Ecoregion is a relatively diverse area compared to neighbouring Ecoregions. Spectacular displays of fireweed in late July on ridges in the southern part are the result of extensive recent fires.



The landscape north of Travaillant Lake is an extensively burned, undulating to hummocky plain; an area of dark green spruce woodland is in the midground.



Open white spruce stands with dwarf birch, Labrador tea and green alder shrubs grow on hummocky till east of Travaillant Lake.



Proportion of Ecoregion occupied by lakes: 9%  
Proportion of Ecoregion occupied by bogs and fens: 12%

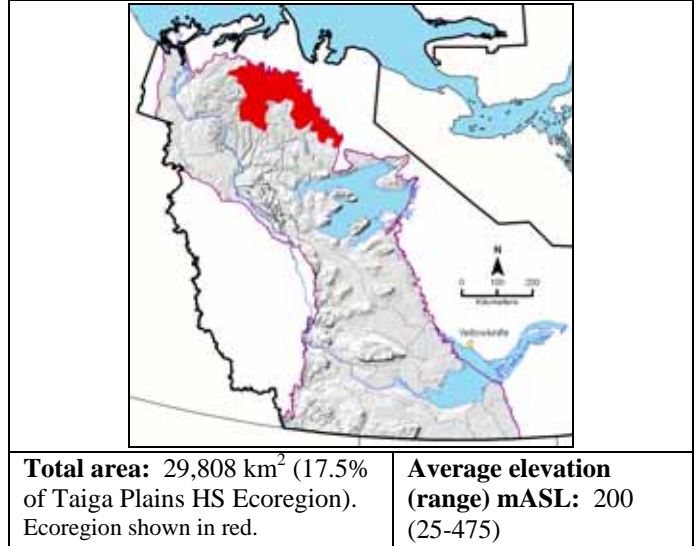
Comparatively diverse and vigorous white spruce forests grow on well-drained and relatively warm southerly till slopes east of Travaillant Lake; a typical ground view of these stands is shown in the image at the top right.

### 3.3.1.6 Anderson Plain HS Ecoregion

**Overview:** *Hummocky and undulating till deposits, thousands of shallow ponds, and stunted, spruce – low shrub – lichen woodlands are typical of the Anderson Plain HS Ecoregion.*

**Summary:**

- Hummocky and undulating till with many ponds but few wetlands.
- Sparsely treed white spruce – low shrub – lichen woodlands grading into open, treeless plains to the north.



#### General Description

The Anderson Plain HS Ecoregion includes the northwesterly-sloping drainage basin of the Anderson River. It is bordered on the north by the Level II Southern Arctic Ecoregion, on the west by the higher rolling hills of the Travaillant Upland HS Ecoregion, and on the south by the Colville Upland HS Ecoregion. Its boundary with the Level II Southern Arctic Ecoregion is marked by tree line beyond which trees no longer grow, associated with Low Arctic climates. Because tree line is determined by changes in local and regional climates over time and is therefore dynamic, this boundary is best regarded as a broad line. Most of the Ecoregion is a hummocky or undulating till plain with pockets of coarse-textured glacio-fluvial and eolian materials. Permafrost features indicative of High Subarctic and Low Arctic climates, such as patterned polygonal ground and earth hummocks, occur in the northern part. There are numerous shallow ponds, some of which are calcareous; wetlands are relatively uncommon and are mainly northern ribbed fens or polygonal peat plateaus. The characteristic upland vegetation is low-growing white spruce – dwarf birch – lichen woodlands that become more stunted and sparsely treed toward the north. Spruce attains better growth on south facing slopes and alluvial flats where temperature and drainage conditions are more favourable and contribute to a longer growing season.

#### Geology and Geomorphology

Cretaceous shales and Devonian limestones and dolomites, the latter along the Anderson River and northwest of Lac Manoir, underly the Ecoregion. Calcareous ponds, water-filled sinkholes and occasional rock outcrops indicate the location and influence of Devonian bedrock. Hummocky or undulating, medium- to fine-textured till is the dominant landform. Esker complexes, kame deposits, and eolian plains and poorly defined dunes occur in pockets; the meandering Anderson River has deposited large alluvial terraces. Near tree line, patterned ground, earth hummocks, and slope failures due to permafrost melting become locally common and indicate the influence of colder Low Arctic climates.

#### Soils

Almost all mineral soils are permafrost-affected and are classed as Turbic Cryosols. Minor occurrences of Organic Cryosols and Brunisols occur with polygonal peat plateaus and alluvial or glacio-fluvial materials, respectively.

#### Vegetation

Low-canopied open white spruce woodlands with an understory of dwarf birch, common and northern Labrador tea, mountain cranberry and reindeer lichen are the most common forest type. This stand type is common throughout the Level III Taiga Plains HS Ecoregion. In the southern Anderson Plain HS Ecoregion, stands are dense enough to carry ground and crown fires, and burned stands with dwarf birch regeneration are fairly common. Towards the northern boundary, open forests give way to very sparsely treed woodlands that are probably too well spaced to carry fire; where fires have occurred, tree regeneration takes a very long time because of slow growth and limited seed supplies. Large treeless dwarf birch-dominated shrublands occur south of the mapped tree line because fire has removed the tree cover or local conditions are too extreme for tree growth; the northern part of this Ecoregion experiences climatic conditions that are a mix of climates in the Level III Taiga Plains HS Ecoregion and the colder, more northerly Level II Southern Arctic Ecoregion.

#### Water and Wetlands

The Anderson River and its main tributary, the Carnwath River, flow through the Ecoregion. Niwelin Lake, Estabrook Lake, and the western third of Horton Lake are the main named waterbodies. Thousands of shallow ponds occupy depressions between hummocks. Wetlands are sparsely distributed and where they occur are treeless polygonal peat plateaus or treeless northern ribbed fens.

#### Notable Features

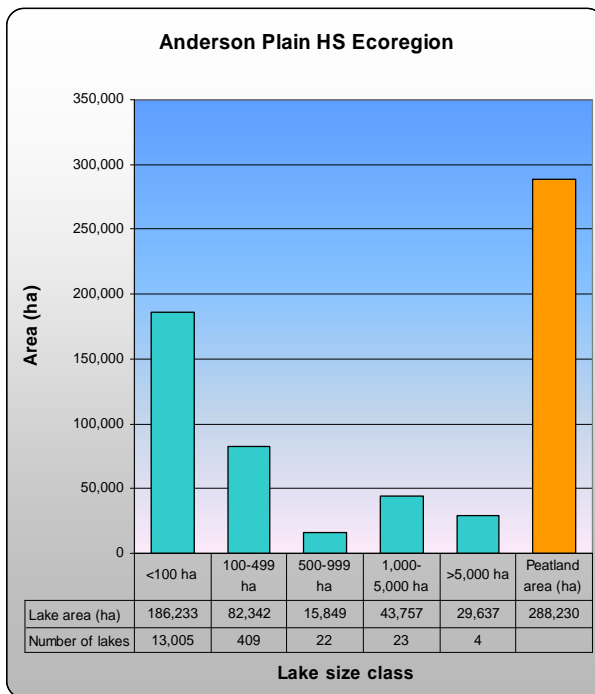
This Ecoregion has the largest land area of all Level IV ecoregions in the Taiga Plains HS Ecoregion.



Undulating till with burned and unburned white spruce – shrub – lichen forests is a typical landscape pattern south part of the Anderson Plain HS Ecoregion.



Sparsely treed rolling to undulating till east of the Anderson River near tree line is typical of the north part of the Ecoregion.



Proportion of Ecoregion occupied by lakes: 12%  
 Proportion of Ecoregion occupied by bogs and fens: 10%



On the floodplain and valley slopes of the Anderson River, the dark patches on terraces and valley slopes are closed white spruce stands and the lighter green areas are shrublands and sedge meadows.

### 3.3.1.7 Colville Upland HS Ecoregion

**Overview:** *The Colville Upland HS Ecoregion includes hummocky till and glacio-fluvial deposits; much of the area has burned within the last several decades, and low-canopied white spruce forests and regenerating shrublands are characteristic cover types.*

**Summary:**

- Hummocky till plains with significant areas of hummocky well-drained glacio-fluvial deposits.
- Variable white spruce – lichen communities and regenerating post-burn communities.



**Total area:** 12,451 km<sup>2</sup> (7.3% of Taiga Plains HS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 250 (125-400)

#### General Description

The Colville Upland HS Ecoregion is an extensive hummocky till landscape with many small pothole lakes and several large lakes. It is distinguished from the more northerly Anderson Plain HS Ecoregion by more pronounced local terrain variations and vegetation cover indicating slightly warmer climatic conditions; unlike the Anderson River drainage basin. The Colville Hills HS Ecoregion, the lower-elevation, nearly level Colville Plain HS Ecoregion and the northern extension of the North Mackenzie Plain LS Ecoregion border it on the south and southwest. Hummocky medium- to fine-textured till deposits with numerous pothole lakes and imperfectly- to poorly-drained depressions are the dominant landform, and well-drained glacio-fluvial deposits also occupy significant areas. Uneven-aged, low-canopied white spruce – low shrub – lichen forests are characteristic of upland sites, but several major fires over the last few decades have replaced much of this forest type with regenerating white spruce – dwarf birch shrublands. In the northernmost part of the Ecoregion, these stands assume a very open growth form similar to that which occurs close to tree line; towards the southwest corner, conifer growth improves and small, scattered mixed-wood stands occur on south-facing slopes.

#### Geology and Geomorphology

Medium- to fine-textured, hummocky till is the most widespread landform, but hummocky glacio-fluvial deposits are also common. Peatlands underlain by permafrost have developed in imperfectly- to poorly-drained depressions between till hummocks. Patterned ground and areas of slope failure due to permafrost melting are present in some areas.

#### Soils

Most soils on hummocky till are probably Turbic Cryosols. Deep, well-drained glacio-fluvial deposits are likely not affected to the same degree by permafrost, and Brunisolic soils are likely to occur. Organic Cryosols or Gleysolic Turbic Cryosols can be expected in depressions between hummocks.

#### Vegetation

Vegetation patterns are similar to those of the Colville Plain HS Ecoregion, except that regenerating white spruce-dwarf birch shrublands cover a much larger area. The characteristic mature stand type is uneven-aged white spruce – dwarf birch – willow communities with a significant lichen component in more open stands. These stands are very open woodlands near the northern boundary, but in contrast trees are relatively tall and dense toward the southwest, where white spruce and Alaska paper birch occur together in small patches on southerly slopes. Rapidly drained sites occurring on level to hummocky glacio-fluvial and eolian deposits are generally too dry and nutrient-poor to support communities other than open white spruce – lichen stands with very sparse shrub understories or lichen-dwarf birch communities. Wetlands are not as widespread as in the Colville Plain HS Ecoregion because hummocky topography limits their extent; veneer bogs with black spruce – lichen communities on thin peat veneers and blankets between till hummocks are more common.

#### Water and Wetlands

Aubry Lake is the largest named lake in the Ecoregion. There are no major watercourses. There is no organized internal drainage; pothole lakes are abundant in hummocky till areas.

#### Notable Features

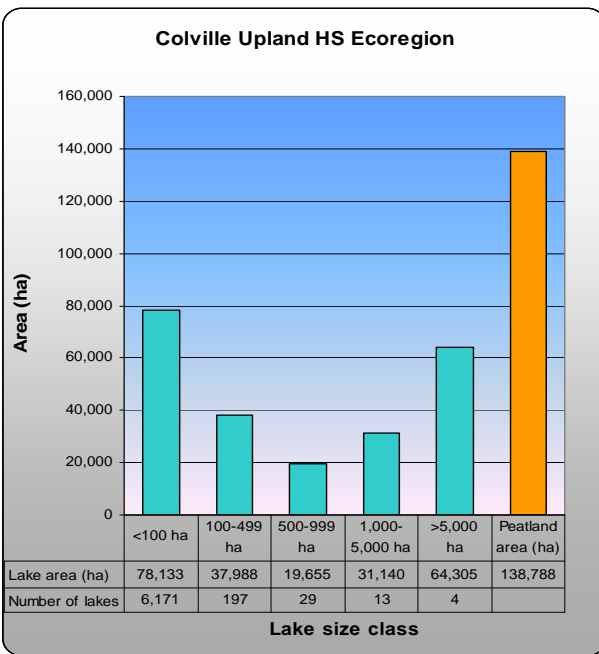
The Colville Upland HS Ecoregion has vegetation and landform features that are typical of intermediate climates within the Taiga Plains HS Ecoregion.



On the Colville Upland HS Ecoregion north of Aubry Lake, hummocky and undulating till supports stunted forests and regenerating shrublands. There are numerous ponds; localized polygonal peat plateaus usually border the ponds.



North of Aubry Lake, white spruce – shrub communities grow on hummocks, whitish-gray spruce – lichen stands occupy lower intervening areas, and paper birch regeneration is evident on a warmer site on a south-facing hillside (light green, center of picture).



Proportion of Ecoregion occupied by lakes: 19%  
 Proportion of Ecoregion occupied by bogs and fens: 11%



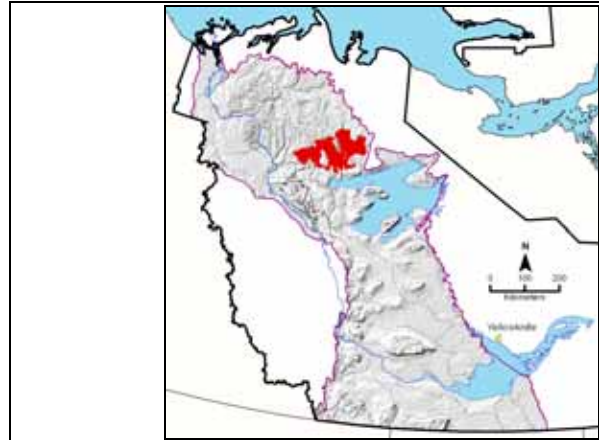
Hummocky glacio-fluvial deposits with open spruce – dwarf birch – lichen communities and small pothole lakes with limited shore or floating fen development are common throughout the Ecoregion.

### 3.3.1.8 Colville Plain HS Ecoregion

**Overview:** *The Colville Plain HS Ecoregion occupies a regional low, where level to undulating till plains, white spruce – lichen woodlands, numerous ponds and polygonal peat plateaus are the main landscape features.*

**Summary:**

- Mostly level to gently undulating till plains with peatlands (polygonal peat plateaus) in low-lying areas.
- Variable white spruce –lichen communities, polygonal peat plateau and patterned fen wetlands.



**Total area:** 11,686 km<sup>2</sup> (6.9% of Taiga Plains HS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 275 (175-475)

#### General Description

The Colville Plain HS Ecoregion is a level to gently undulating low-elevation plain surrounding parts of the Colville Hills HS Ecoregion. The Colville and Manoir Ridges and the higher-elevation, hummocky Colville Upland HS Ecoregion form its northern boundary. The somewhat higher hummocky to rolling terrain of the Anderson Plain HS and Great Bear Upland HS Ecoregions border it to the east and south, respectively. Imperfectly- to poorly-drained till plains surrounding numerous lakes that are often encircled by treeless polygonal peat plateaus are typical of the Ecoregion. Well-defined permafrost-influenced runnel patterns occur on gently rolling slopes south of Lac Manoir. Open, low-canopied white spruce – low shrub – lichen forests with black spruce and larch are the characteristic upland cover type. Conifer growth improves around lakeshores, on slopes and along streams. Glacio-fluvial and eolian deposits that support open white spruce – lichen communities are scattered throughout the Ecoregion. Sparsely treed patterned sedge fens with thermokarst ponds are most common west of Lac Belot.

#### Geology and Geomorphology

Cretaceous marine shales underlie the central portion of the Ecoregion. Elsewhere, Cretaceous shales and Devonian limestones are interspersed, and scattered calcareous ponds south of Lac Manoir and Colville Lake and west of Lac Belot indicate the likely presence of Devonian formations. Medium- to fine-textured, level to gently undulating till deposits are the dominant landform. Peatlands overlying till are mainly restricted to low-lying areas such as lakeshores, where polygonal peat plateaus occur most frequently.

#### Soils

Most soils are probably permafrost-affected Turbic Cryosols. Organic Cryosols occur with polygonal peat plateaus.

#### Vegetation

Extensive uneven-aged white spruce – dwarf birch – willow communities with a significant lichen component in more open stands are the dominant vegetation cover. Black spruce and larch are associated species. Cold sites and rigorous climates limit tree growth over much of the area. Closed-canopy, relatively tall conifer stands occur on sites that provide better growing conditions such as southerly slopes, well-drained lakeshores and alluvial deposits. There is a general east to west gradient of improving growth as closed-canopy conifer stands become more extensive and mixed white spruce – Alaska paper birch stands occur in small patches on ridged till. Rapidly drained and dry sites, such as those found on the glacio-fluvial and eolian deposits scattered throughout the Ecoregion, support open white spruce – lichen stands with sparse shrub understories. On gently rolling terrain mainly to the east, alternating strips of spruce – lichen and spruce – shrub communities perpendicular to slope define runnel patterns. Thick lichen mats with scattered dwarf birch, northern and common Labrador tea, and cloudberry are the dominant cover on polygonal peat plateaus, which are extensive around lakes and particularly in the Lac Manoir area. Northern ribbed fens with thermokarst ponds are more common in this Ecoregion than in more northerly ecoregions, and sedges, cotton-grasses, willows, and dwarf birch are typical species.

#### Water and Wetlands

The Colville Plain HS Ecoregion contains most of the large named lakes in the Colville area, including Lac Belot, Colville Lake, Lac De Bois, Lac Manoir, and Kilekale Lake. Because the Ecoregion is surrounded by higher terrain, organized drainage patterns are absent. Small, shallow lakes are especially numerous east of Lac Belot. Polygonal peat plateaus and northern ribbed fens are the most common wetland types.

#### Notable Features

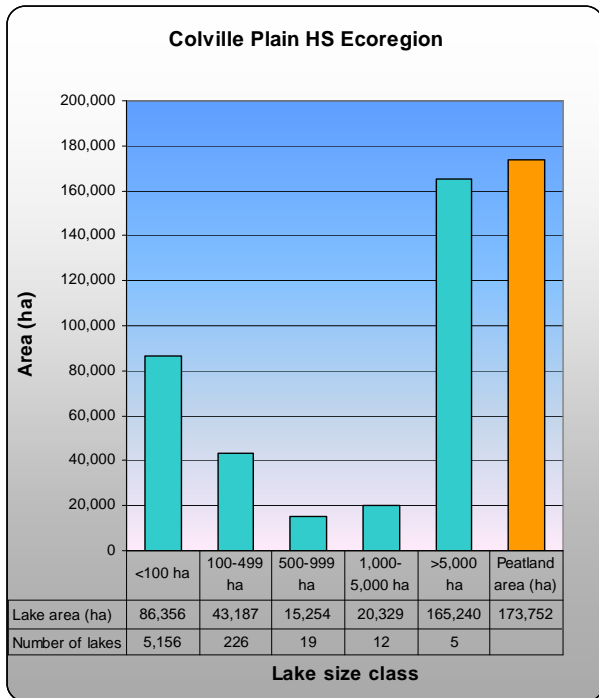
Colville Lake is one of several International Biological Program sites in the Taiga Plains that were recommended for protection in the 1960's and 1970's (Nettleship and Smith 1975).



In the Colville Plain HS Ecoregion east of Lac de Bois; there are numerous ponds, localized polygonal peat plateaus, and stunted forests.



Vegetation growth improves west of Lac Belot toward the North Mackenzie Plain LS Ecoregion and the Mackenzie River valley, indicating somewhat warmer conditions on the west side of the Ecoregion.



Proportion of Ecoregion occupied by lakes: 28%  
 Proportion of Ecoregion occupied by bogs and fens: 15%



This trembling aspen – white spruce – juniper – Canada buffaloberry community on a steep south slope by Colville airstrip is an uncommon community type in the High Subarctic.

### 3.3.1.9 Colville Hills HS Ecoregion

**Overview:** *Long, narrow ridges rising several hundred meters above the surrounding lands with forested lower slopes and shrub tundra at the highest elevations define the Colville Hills HS Ecoregion.*

**Summary:**

- Bedrock ridges with exposed bedrock and till blankets and veneers.
- White spruce – lichen communities, with shrub tundra at the highest elevations.



**Total area:** 2,952 km<sup>2</sup> (1.7% of Taiga Plains HS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 350 (225–675)

#### General Description

The Colville Hills HS Ecoregion is a series of narrow ridges and low hills enclosing Colville Lake and Lac Belot. There are three main ridges. Belot Ridge lies furthest west and trends north – south; it is approximately 100 km in length and three to 11 km wide, attaining a maximum elevation of over 500 mASL. To the east, Manoir Ridge parallels Belot Ridge and has similar dimensions, but exceeds 600 mASL in places. Colville Ridge runs east – west just north of Colville Lake and connects the other two ridges; it is about 50 km long, three to five km wide, and more subdued at only 300 mASL. An isolated upland area south of Colville Lake and east of Lac Belot reaches maximum elevations of 400 mASL and is included with the Colville Hills HS Ecoregion because it shares common topographic and geologic attributes. Most of the ridges and hills are forested by open white spruce – lichen stands, and well-developed runnel patterns occur on the slopes, particularly on the southern hill outlier. At higher elevations, open spruce woodlands occur and are characteristic of areas further north in the Northern Great Bear Plain HS. Tree line is at about 500 mASL; the highest areas exhibit Low Arctic climatic attributes such as earth hummocks, patterned grounds, and slope failures due to permafrost melting.

#### Geology and Geomorphology

Belot Ridge and the southern hill outlier are composed of Devonian limestones of the Bear Rock formation. Colville and Manoir Ridges are composed of more erosion-resistant Cambrian dolomites (Cook and Aitken 1971). Rock outcrops define the ridgeline of Belot and Manoir Ridges; till veneers and blankets mantle the bedrock on Colville Ridge, the southern hill outlier, and the lower slopes of Belot and Manoir Ridges. Lac Belot Ridge includes some notable karst features (Ford 2008).

#### Soils

There is no soil development on bedrock exposures. Most soils are probably permafrost-affected Static and Turbic Cryosols. Organic Cryosols occur with polygonal peat plateaus.

#### Vegetation

Forest cover across this Ecoregion is reasonably uniform in terms of species composition, but exhibits variations in stand structure with elevation and slope. Lower to mid slope positions support relatively well-developed white spruce – lichen stands compared to those further upslope and in the surrounding lower terrain. On steep south-facing protected slopes, trembling aspen may occur as scattered, stunted individuals. At increasing elevations, spruce stands become more open and above about 500 mASL, grade into treeless shrubby tundra. Tundra communities include willows, dwarf birch, black crowberry, cotton-grasses, sedges and lichens. There are few wetlands; polygonal peat plateaus occur along the lower slopes of the Colville Ridge where it meets the northern shore of Colville Lake.

#### Water and Wetlands

The only named lake within this Ecoregion is Tweed Lake, located within the southern hill outlier. There are no permanent watercourses, and very few wetlands. Veneer bogs probably occur in association with runnels that are especially prevalent on the southern hill outlier; polygonal peat plateaus occur along the lower slopes of the Colville Ridge near Colville Lake.

#### Notable Features

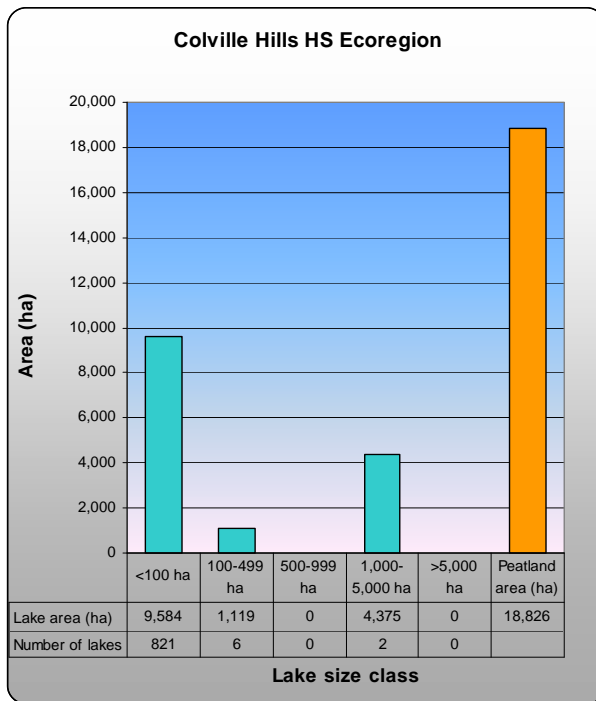
The Colville Hills are a striking feature, rising three to four hundred meters above the surrounding lands. They provide valuable habitat for a number of wildlife species including musk ox.



In this northerly view along Belot Ridge, the westernmost ridge in the Colville Hills HS Ecoregion, the lighter patches are bedrock exposures, and the dark forests are white spruce with a lichen understory.



On Manoir Dome at the north end of Manoir Ridge, the lower slopes are forested, and the upper slopes are treeless shrubby tundra and barren ground.



Proportion of Ecoregion occupied by lakes: 5%  
 Proportion of Ecoregion occupied by bogs and fens: 6%



Treeless shrubby tundra and bedrock exposures occur on top of Manoir Dome.

### 3.3.1.10 Great Bear Upland HS Ecoregion

**Overview:** *The Great Bear Upland HS Ecoregion includes seven units occurring north of Great Bear Lake or on high-elevation terrain to the south; undulating to hummocky till with open spruce woodlands are characteristic landscapes.*

**Summary:**

- Hummocky and undulating till.
- Sparsely treed white spruce with lichen – shrub understory is typical; hummocky and sloping tills on the northernmost unit show better growth.
- Wetlands are uncommon except in the northernmost unit, where polygonal peat plateaus can be locally extensive.
- Three very small treeless units at the highest elevations on šehdacho have cold Low Arctic climates and features.



<p><b>Total area:</b> 6,997 km<sup>2</sup> (4.0% of Taiga Plains HS Ecoregion). Ecoregion shown in red.</p>	<p><b>Average elevation (range) mASL:</b> 350 (150-700)</p>
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**General Description**

The Great Bear Upland HS Ecoregion includes seven separate land units. The main unit occurs on generally south-sloping uplands north of Great Bear Lake between 200 and 400 mASL. The other much smaller units occur to the south at elevations of over 500 mASL on Sahoyúé – šehdacho and along the crest of a long ridge south of McVicar Arm; they are embedded within the Great Bear Upland LS Ecoregion. White spruce – shrub – lichen woodlands with short, widely spaced trees are widespread across all of the units on undulating and hummocky till. Polygonal peat plateaus occupy extensive areas on gently undulating to level terrain in the largest, most northerly unit; in the other units, wetlands are less extensive because of hummocky terrain. South-facing slopes and hummocky tills in the eastern portion of the large northernmost unit support denser and taller white spruce stands; this area is referred to on old topographic maps as the “Big Spruce Hills”. At the very highest elevations on šehdacho (Scented Grass Hills), there are three small nearly treeless, hummocky till plateau areas that are distinctly different from the surrounding forested areas. Permafrost features such as earth hummocks, patterned ground, and slope failures due to permafrost melting are evident in these areas, where scattered and stunted individual trees grow only in protected locales. These features indicate colder climates at higher elevations in this area, and bear strong similarities to vegetation and permafrost features that are characteristic of the Level II Southern Arctic Ecoregion; however, these areas are too small to represent as ecoregions.

**Geology and Geomorphology**

Cretaceous shales underlie most of the Ecoregion and are blanketed by till; Devonian limestones outcrop along the lakeshore at the west end of Smith Arm. Hummocky and undulating variable-textured till is the dominant glacial landform. The southern units are generally coarse-textured deposits with steep-sided hummocks, small pothole lakes and little wetland development. Organic veneers and blankets cover significant areas of gently undulating to level till in the northernmost unit.

**Soils**

Organic and Turbic Cryosols are associated with polygonal peat plateaus and medium- to fine-textured till deposits, respectively.

Brunisols are associated with well-drained coarse-textured hummocky till deposits where the permafrost table is well below the surface.

**Vegetation**

The main cover type occurring on all units is a sparsely treed low-growing white spruce woodland with patchy dwarf birch, willow, black crowberry, mountain cranberry, red bearberry and a carpet of lichens. This community is found on undulating to hummocky, variably-textured till and its composition and form is a characteristic vegetation feature of the Level III Taiga Plains HS Ecoregion. Treeless polygonal peat plateaus with lichen – dwarf birch – northern Labrador tea cover are locally extensive on level to gently undulating terrain on the northernmost unit. Relatively diverse, taller and denser white spruce communities occur on hummocky and sloping till along the eastern third of the northernmost unit. Unusual miniature trembling aspen and balsam poplar forests grow on some south-facing hummock slopes in the southerly high-elevation units. Treeless shrubby tundra occupies three small areas at the highest elevations on šehdacho.

**Water and Wetlands**

There are no named lakes in this Ecoregion. Several small rivers and streams (Katsyedik River, Olmstead Creek, Glacier Ice Creek, Big Spruce River) flow across the northernmost unit into Great Bear Lake. Small pothole lakes occur in hummocky till areas. Wetlands are uncommon especially on the southern units where closely spaced till hummocks restrict wetland development, but polygonal peat plateaus cover significant areas on level to undulating till.

**Notable Features**

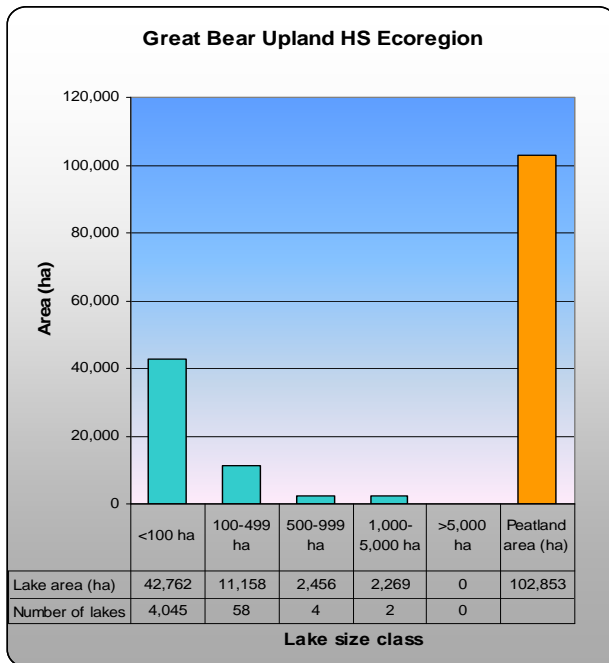
The south-facing slope of the large northern unit has forest cover more typical of the somewhat warmer Level III Taiga Plains LS Ecoregion. Sahoyúé–šehdacho has recently been designated as a national historic site; the Great Bear Upland HS Ecoregion contributes to its overall diversity.



Undulating to hummocky till with open, short white spruce forests and whitish polygonal peat plateaus around lakes is a common landscape in the Great Bear Upland HS Ecoregion.



Taller, denser spruce forests occur on sloping hummocky till within the northernmost of seven units; Great Bear Lake is in the background.



Proportion of Ecoregion occupied by lakes: 9%  
 Proportion of Ecoregion occupied by bogs and fens: 15%



Treeless tundra with a few stunted white spruce occurs on the plateau top of heidacho. Tree branches are sheared from the lower trunk by ice crystal abrasion, and the cushion of needle-bearing branches at the base indicates the typical depth of a protective snow layer. Great Bear Lake is visible in the distance.

### 3.3.1.11 Great Bear Plain HS Ecoregion

**Overview:** *Great Bear Lake is the most conspicuous feature of the Great Bear Plain HS Ecoregion, which otherwise includes low-elevation shorelines along Smith Arm and the north side of Şehdacho.*

#### Summary:

- Narrow zone of till and glacio-lacustrine deposits at low elevations along Smith Arm and the north shore of Şehdacho.
- Sparsely treed white spruce – shrub – lichen woodlands, polygonal peat plateaus, and runnel patterns are typical.



**Total area:** 32,683 km<sup>2</sup> (19.2% of Taiga Plains HS Ecoregion). Ecoregion shown in red.

**Average elevation (range) mASL:** 150 (125-375)

#### General Description

The Great Bear Plain HS Ecoregion is the second largest Level IV ecoregion in the Taiga Plains but over 93 percent of its area is Great Bear Lake. The land portion of this Ecoregion accounts for only about 2,402 km<sup>2</sup> of the total area, which does not include the islands in Great Bear Lake. It includes the shorelines and low central area of Şehdacho (Scented Grass Hills) peninsula and the western and northern shorelines of Smith Arm below 200 mASL, and all of the islands in Great Bear Lake. Sparsely treed white spruce woodlands on gently sloping to hummocky till and lacustrine deposits and extensive polygonal peat plateaus and runnel patterns are typical of the western and northern shorelines of Smith Arm and Şehdacho. An area of comparatively good conifer growth on the north side of Şehdacho may be the consequence of higher elevations and slopes that provide more favorable growing conditions.

#### Geology and Geomorphology

Gently sloping to hummocky till deposits and coarse-textured lacustrine deposits are the dominant parent materials on the uplands. Beach ridges indicate the former extent of glacial Lake McConnell and isostatic rebound following the retreat of glacial ice. Glacial meltwaters have cut deeply into Devonian limestones at the southwest corner of Smith Arm, leaving vertical cliff faces many meters high in places.

#### Soils

Turbic Cryosols occur with mineral soils. Brunisols are likely associated with well-drained coarse-textured glacio-lacustrine deposits where the permafrost table is well below the surface. Organic Cryosols are associated with polygonal peat plateaus.

#### Vegetation

Open, low-canopied white spruce with a shrub understory including dwarf birch, mountain cranberry, and northern and common Labrador tea is typical of upland sites near the lakeshore. Treeless polygonal peat plateaus cover extensive areas around the western and northern shores of Smith Arm, Şehdacho, and on many of the islands. Runnel patterns occur wherever slopes are sufficient to allow downslope water flow, and spruce – low shrub communities alternate with spruce – lichen communities to form the characteristic striped appearance. Taller and denser white spruce forests grow on a slightly elevated

hummocky bench on the north side of Şehdacho, possibly because this area escapes the cooling effect of the lake and because slopes provide locally favourable conditions. Trembling aspen stands are rare, and are restricted to warm, dry sites such as till knobs or eskers.

#### Water and Wetlands

Great Bear Lake is the most significant feature of this Ecoregion. It is the largest lake located entirely within Canada, with a surface area of 31,153 km<sup>2</sup>, a maximum depth of 446 m, a volume of 2,236 km<sup>3</sup> and 2,719 km of shorelines excluding islands (International Lake Environment Committee, n.d.). Both Great Bear Lake and Great Slave Lake are enormous heat reservoirs; they freeze and thaw months later than other lakes in the region. The median dates of freeze-up and break-up for Great Bear Lake are November 25 and July 5, respectively (Klock *et al.* 2000).

Surface water temperature readings of Great Bear Lake taken in July and August 1964-5 were between 3-5°C (International Lake Environment Committee n.d.), much cooler than the average local air temperatures of 10-12°C for those months. Way *et al.* (2005) indicate that an immense mid-summer inversion observed in 2004 above a mid-lake island was due to the presence of this large cold lake in a warmer large-scale regime. It is likely that Great Bear Lake has a significant summertime cooling effect on adjacent land areas; the lack of tree growth and the extensive occurrence of polygonal peat plateaus and other permafrost features immediately adjacent to the lake are evidence of its effect on local vegetation patterns. Winter winds that blow for long distances across the ice probably contribute to treeless tundra-like conditions along shorelines and on most of the islands through dessication and ice crystal abrasion of the few trees that do become established.

#### Notable Features

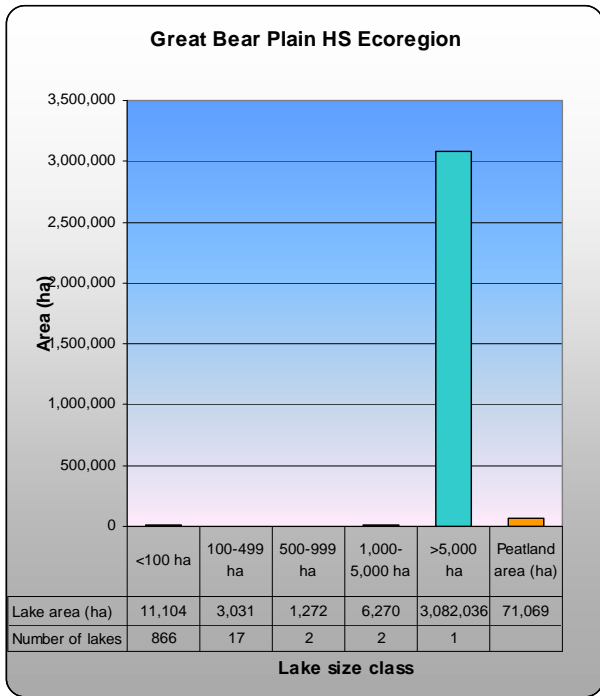
Great Bear Lake is one of the world's largest freshwater lakes. Parts of the Ecoregion lie within Şehdacho; Sahoyúé – Şehdacho has recently been designated as a national historic site.



Stunted white spruce woodlands and polygonal peat plateaus are characteristic of the area along the north shore of Smith Arm, here seen in a westward view.



Upland areas above the lake's climatic influence promote somewhat better white spruce growth.



(Great Bear Lake included)

Proportion of Ecoregion occupied by lakes: 95%  
 Proportion of Ecoregion occupied by bogs and fens: 2%



A meltwater channel carved deeply into Devonian limestones is an interesting feature in the western part of the Ecoregion.

### 3.3.1.12 Grandin Plain HS Ecoregion

**Overview:** *The Grandin Plain HS Ecoregion is nearly level, and includes bedrock controlled sparsely treed landscapes along the shore of Great Bear Lake, and gently undulating, sparsely treed fluted till further inland.*

**Summary:**

- A narrow band 5-15 km wide adjacent to Great Bear Lake with bedrock exposures, patchy tree cover and calcareous ponds occupies part of the Ecoregion.
- A gently undulating fluted till plain occupies most of the Ecoregion, with mostly open, stunted white spruce forests, polygonal peat plateaus and numerous shallow linear lakes.



<b>Total area:</b> 3,744 km <sup>2</sup> (2.2% of Taiga Plains HS Ecoregion). Ecoregion shown in red.	<b>Average elevation (range) mASL:</b> 225 (125-500)
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#### General Description

The Grandin Plain HS Ecoregion is a low relief till and bedrock plain adjacent to Dease Arm on Great Bear Lake. Its northern and western boundary is defined by the surrounding uplands at approximately 300 mASL where slopes and terrain variability increase markedly; tree line occurs along this boundary and Low Arctic climatic features such as patterned ground and earth hummocks are common north of it. Its eastern boundary is defined by the higher-elevation Grandin Upland HS Ecoregion. The Grandin Plain HS Ecoregion includes two main landscape types: thin bedrock-controlled nearly level washed tills and lacustrine materials extending five to 15 km in from the lakeshore, and gently undulating fluted till further inland. Bedrock exposures are prominent features along the narrow eastern portion along the back bay of Dease Arm. Tree growth is very sparse on the bedrock-controlled terrain and takes the form of open white spruce-shrub woodlands; there are very few wetlands, but calcareous ponds and seeps (horizontal and spring fens) are locally common. Open, stunted white spruce – shrub stands are characteristic of uplands in the fluted till area, with treeless lichen-covered polygonal peat plateaus in the swales. Hummocky glacio-fluvial deposits scattered throughout the area of fluted terrain support open spruce – lichen woodlands.

#### Geology and Geomorphology

Ancient Precambrian Proterozoic shales, mudstones and limestones outcrop along the back bay of Dease Arm and underlie the eastern part of the Ecoregion. Devonian limestones and dolomites lie beneath the central and western portions. Calcareous ponds and seeps are indicative of bedrock influences near or at the surface. Coarse-textured lacustrine deposits and water-washed tills form veneers and blankets over bedrock close to shore; beach ridges indicate the former extent of glacial Lake McConnell. Further inland, fluted and gently undulating fine- to medium-textured till deposits mask bedrock effects. There are a few locally extensive hummocky coarse-textured glacio-fluvial deposits.

#### Soils

Undulating till upland soils are probably permafrost-affected Turbic Cryosols. Brunisols are probably associated with well- drained lacustrine and glacio-fluvial deposits. Organic Cryosols occur with polygonal peat plateaus.

#### Vegetation

Vegetation patterns in the Grandin Plain HS Ecoregion are controlled by climate and landform characteristics. Colder conditions at higher elevations to the north and west preclude tree growth. Bedrock exposures along Dease Arm are mostly unvegetated, with patchy shrublands, lichen – dryland sedge communities, or very open white spruce – dwarf birch woodlands in pockets on bedrock or between exposures. On thin washed tills and glacio-lacustrine deposits over bedrock, and on hummocky glacio-fluvial deposits, treeless dwarf birch – dryland sedge communities are interspersed with very open white spruce – dwarf birch stands. Open, stunted white spruce stands with sparse dwarf birch – lichen understories are characteristic of well- to imperfectly-drained fluted till uplands; treeless polygonal peat plateaus with continuous lichen cover and sparse dwarf birch and Labrador tea cover occupy the poorly-drained swales. Tree growth improves somewhat to the west toward the “Big Spruce Hills” at slightly higher elevations, possibly because the cooling effect of Great Bear Lake is reduced by distance and elevation (refer to Section 3.3.1.11 for further discussion of the lake effect).

#### Water and Wetlands

The Ecoregion borders Great Bear Lake; the only named water body within it is Sulley Lake. The Haldane and Bloody Rivers flow through it from north to south. Calcareous ponds and seeps occur where limestone bedrock is close to or at the surface; numerous shallow linear lakes occupy the swales between flutes. Wetlands are uncommon in bedrock-controlled areas; calcareous horizontal fens and spring fens are locally abundant in some places. Polygonal peat plateaus are common in the fluted terrain and in level or depressional poorly-drained areas.

#### Notable Features

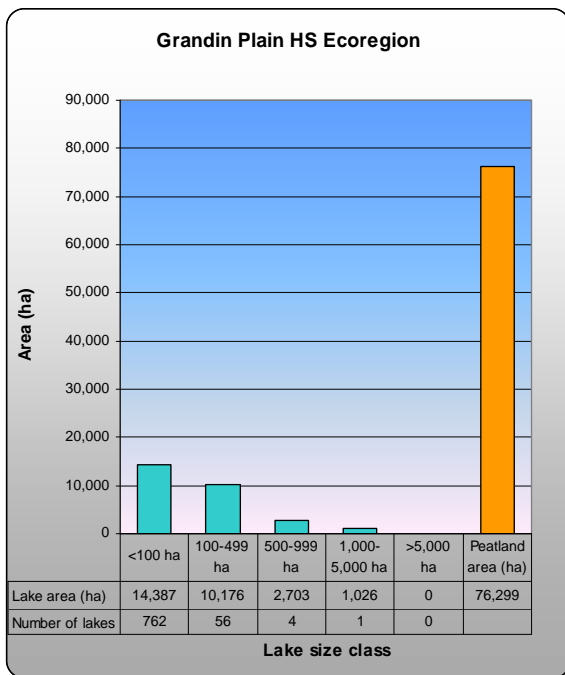
Bedrock exposures of the extent visible along the back bay of Dease Arm are uncommon in the Taiga Plains.



Open, stunted white spruce on uplands (dark tones) and lichen-covered frozen polygonal peat plateaus (lighter tones with dark-colored cracks) is typical on gently undulating fluted terrain.



The lakeshore zones of this Ecoregion are sparsely treed level plains or gentle bedrock-controlled slopes with scattered calcareous ponds and horizontal fens (lighter green area in mid-image).



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

Prominent bedrock exposures scoured by glacial ice are striking features along the back bay of Dease Arm.

### 3.3.1.13 Grandin Upland HS Ecoregion

**Overview:** *The Grandin Upland HS Ecoregion occupies a gently domed low-elevation peninsula jutting into Great Bear Lake; stunted white spruce woodlands and shrub – lichen communities on till and coarse-textured lacustrine materials are characteristic.*

**Summary:**

- Hummocky and rolling till on peninsula with coarse-textured lacustrine and washed till deposits along the lakeshore.
- Open and stunted to closed, relatively tall and dense white spruce forests, lichen – dryland sedge – low shrub communities.
- Wetlands, including permafrost forms, are uncommon.



<p><b>Total area:</b> 5,628 km<sup>2</sup> (3.3% of Taiga Plains HS Ecoregion). Ecoregion shown in red.</p>	<p><b>Average elevation (range) mASL:</b> 250 (150-500)</p>
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**General Description**

The Grandin Upland HS Ecoregion includes most of the peninsula between Dease and McTavish Arms on Great Bear Lake and the upland area east of Dease Arm to tree line. Rolling and hummocky till on uplands above about 300 mASL forms the core of this Ecoregion; coarse-textured lacustrine and wave-washed till deposits occur on the peninsula’s lower slopes in a crescent five to 15 km wide. Its northern and eastern boundary with the Level II Southern Arctic Ecoregion is marked by tree line and a greater incidence of Low Arctic features such as patterned ground and earth hummocks. More variable topography in the core area and correspondingly variable vegetation patterns differentiate this Ecoregion from the adjacent Grandin Plain HS Ecoregion; both Ecoregions have comparable vegetation and terrain on low-lying areas adjacent to Great Bear Lake. Vegetation cover is variable on hummocky to rolling till uplands, ranging from very open white spruce – shrub woodlands near tree line and to closed, relatively tall white spruce – shrub forests on southerly slopes and around hummock bases where moisture and temperature conditions are more favourable.

**Geology and Geomorphology**

The Ecoregion is underlain entirely by ancient Precambrian shales, sandstones and limestones that are exposed in a few places on the peninsula and east of Dease Arm. Calcareous ponds and seeps are locally common east of Dease Arm. Coarse-textured lacustrine deposits and water-washed tills are the dominant parent materials on the narrow band between Great Bear Lake and the till uplands; intricately patterned gravelly beach ridges indicate the former extent of glacial Lake McConnell. Hummocky to rolling, fine- to medium-textured bouldery till covers most of the Ecoregion. Glacio-fluvial deposits are most common on the upland but cover a relatively small area.

**Soils**

Hummocky till upland soils are probably permafrost-affected Turbic Cryosols. Brunisols are the most likely soil on well-drained till hummock tops and coarse-textured lacustrine and glacio-fluvial deposits. Organic Cryosols occur with polygonal peat plateaus.

**Vegetation**

The characteristic vegetation type in the Grandin Upland HS Ecoregion is open, low-canopied white spruce with dwarf birch, mountain cranberry, northern and common Labrador tea, and lichen. This cover type has a consistent species composition, but assumes variable forms depending on local and regional climate, moisture and nutrients. Open white spruce woodlands with stunted, widely spaced trees and sporadic shrub cover occur on glacio-lacustrine and beach ridge deposits along Great Bear Lake, on rapidly drained glacio-fluvial deposits, and near tree line to the east. Tree growth restrictions are probably due to a combination of regional climate and local cooling close to the lake (refer to Section 3.3.1.11 for discussion of lake effect), to inadequate moisture, and to colder Low Arctic conditions at higher elevations to the east. On hummocky uplands, relatively vigorous closed-canopy white spruce stands occur on warm south facing slopes, in low areas where moisture is adequate for growth, and along stream channels. Hummock tops subject to excessive dessication and exposure may not support tree growth, and are often vegetated by dwarf birch – dryland sedge – lichen communities. Wetlands are uncommon; small northern ribbed fens occur on gentle slopes in the uplands, and polygonal peat plateaus have developed mainly near the shoreline of Great Bear Lake.

**Water and Wetlands**

The Ecoregion borders Great Bear Lake; Greenhorn Lakes are the major named waterbodies within it, and the Greenhorn and Dease Rivers flow through it into Great Bear Lake. A few shallow lakes occur in hummocky till deposits on the upland. Northern ribbed fens occur sporadically on gentle slopes and polygonal peat plateaus have developed near Great Bear Lake.

**Notable Features**

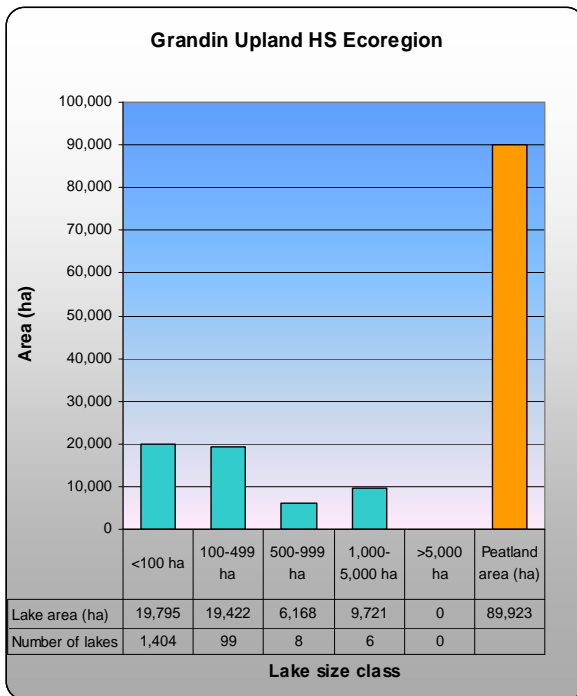
The peninsula includes four International Biological Program sites recommended for protection (Nettleship and Smith 1975).



Gravelly beach ridges occur along the south shoreline of the Grandin Upland HS Ecoregion. Open white spruce, low shrubs and lichen mats grow on the ridges; denser tree and shrub growth occurs on lacustrine flats to the right.



This typical landscape in the core area includes hummocky till deposits that are too dry on top for forest growth, and low-lying areas between hummocks that have enough moisture to support open, stunted white spruce stands and in places northern ribbed fens (light green tones).



Proportion of Ecoregion occupied by lakes: 9%  
 Proportion of Ecoregion occupied by bogs and fens: 15%



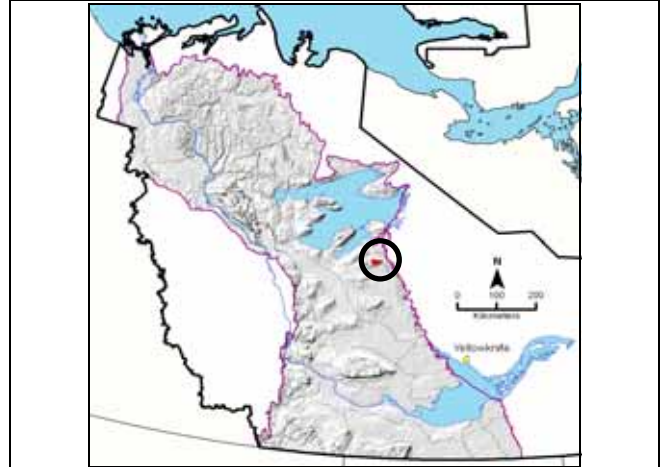
Long, narrow eskers and extensive eolian deposits with white spruce, dwarf birch and lichen occur on the upper part of the peninsula.

### 3.3.1.14 Lac Grandin Upland HS Ecoregion

**Overview:** *The Lac Grandin Upland HS Ecoregion includes a small, high-elevation area of hummocky till with spruce communities typical of High Subarctic climates, along with weakly developed permafrost feature in mineral soils.*

**Summary:**

- Hummocky, coarse-textured till.
- Sparsely treed white spruce with lichen and shrub understory is typical.
- Wetlands are uncommon.



**Total area:** 194 km<sup>2</sup> (0.1% of Taiga Plains HS Ecoregion).  
Ecoregion shown in red.

**Average elevation (range) mASL:** 625 (550-700)

#### General Description

The Lac Grandin Upland HS Ecoregion occupies terrain above 600 mASL on the northernmost of the two uplands comprising the Lac Grandin Upland LS Ecoregion. The boundary between the Lac Grandin Upland HS and Lac Grandin Upland LS Ecoregions is defined by a transition from somewhat open white spruce stands on slopes to sparsely treed white spruce woodlands on a hummocky till plateau, with weakly patterned ground and scattered polygonal peat plateaus. White spruce – shrub – lichen woodlands with short, widely spaced and slow-growing trees on coarse-textured well-drained till hummocks are characteristic of this Ecoregion.

#### Geology and Geomorphology

Cretaceous shales underlie the Ecoregion and are covered by till. Coarse-textured and bouldery hummocky till is the dominant glacial landform. Organic veneers occur around lakes where the water table is sufficiently high to allow bog formation.

#### Soils

Turbic Cryosols are associated with medium- to fine-textured till deposits. Brunisols and Regosols occur with well-drained coarse-textured hummocky till deposits where the permafrost table is well below the surface. Organic Cryosols occur with polygonal peat plateaus.

#### Vegetation

The main cover type is similar to that found at high elevations on hummocky till in the Great Bear Upland HS Ecoregion to the north – sparsely treed low-growing white spruce woodland with patchy dwarf birch, willow, black crowberry, green alder, mountain cranberry, red bearberry, and sedge. Species diversity is relatively low, and treeless polygonal peat plateaus and veneer bogs with lichen – dwarf birch – Labrador tea cover are less common than in surrounding ecoregions.

#### Water and Wetlands

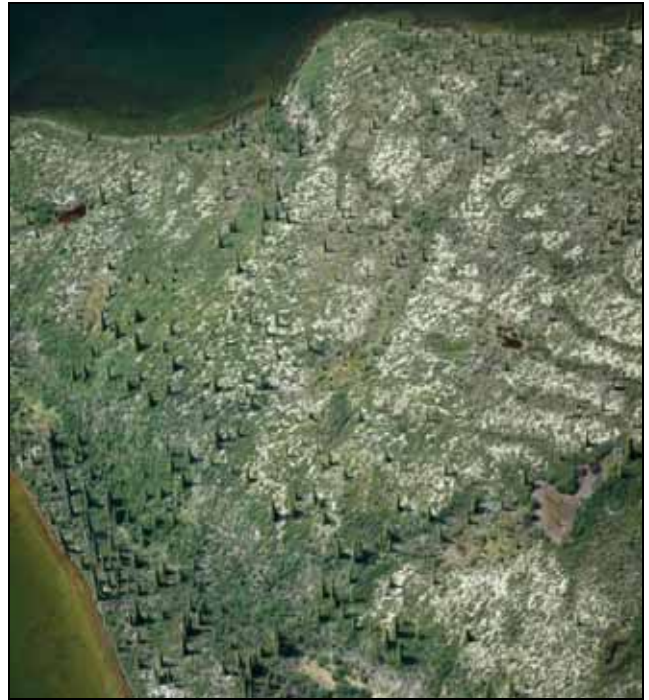
Ortona Lake is the only named water body in this Ecoregion. A few small pothole lakes occur in rounded depressions between till hummocks. Wetlands are uncommon because the well-drained irregular terrain is not conducive to extensive wetland development.

#### Notable Features

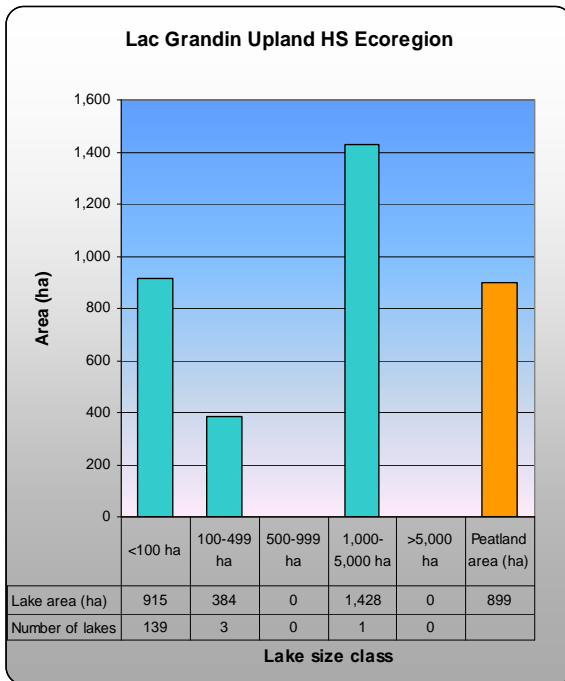
This Ecoregion includes the most southerly High Subarctic white spruce woodland communities and patterned ground in the Taiga Plains. Pronounced taper on the trees, spiral-grained wood visible on snags and closely spaced annual growth rings are indicative of the severe climate.



Hummocky till, sparsely treed white spruce woodlands, few wetlands, and many shallow lakes characterize the Lac Grandin Upland HS Ecoregion.



Weakly patterned mineral soil is a feature of northern High Subarctic and Low Arctic climates. The grayish crisscrossing cracks highlighted by light-colored lichen mats are created by frost action in cold areas.



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



The spiral grain, narrow crown and highly tapered trunk of this white spruce snag on a southerly green alder-covered slope attest to the harsh climate.