VOLUME TWO

Labrador Nature Atlas

ECOZONES, ECOREGIONS AND ECODISTRICTS

JOHN L. RILEY, LINDSAY NOTZL AND RANDAL GREENE

NATURE CONSERVANCY CANADA

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Nunatsiavut Government

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Nature Conservancy Canada

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CONTENTS

Mealy Mountains. Valerie Courtois

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INTRODUCTION

Labrador is larger than the combined area of Nova Scotia, New Brunswick, Prince Edward Island, and the island of Newfoundland. Its land area is approximately 294,330 km^2.

LABRADOR SUPPORTS 26,000 RESIDENTS, and is one of the last relatively undeveloped landmasses in boreal and subarctic Canada. Less than one percent has been cleared or developed. Fifty-five percent of Labrador is open woodland or closed forest (or areas of past wildfire recovering to woodland or forest), and 20 percent is rockland, tundra, talus, sand barrens and steep slopes. Lakes and rivers occupy fifteen percent, and another ten percent is wetland, predominantly peatland. (See Roberts *et al.* 2006 for general overview)

Ecological Land Classification

The purpose of ecological land classification is to identify portions of the overall landscape that have similarities in their ecological characteristics. These geographic areas are distinguishable by their unique combinations of physical and biological features, such as their climate, geology, topography, soils, water, and vegetation. These elements of nature control or influence biological composition and productivity, and ecological processes. Mapped as landscapes of overall similarity, they provide a useful template for approximating the diversity of nature, its various potentials, and its responses to change.

Ecological land classification is hierarchical (or nested) in its organization, and ranges from the broad scale of *zones* to the finer scale of *districts*. At these three nested scales, such land units are useful for illustrating and communicating the variability of nature and the observed changes in the character of different landscapes.

Torngat Mountains, Nakvak Brook Valley. Geoff Goodyear

Ecological land units are also widely used as spatial frameworks for assessing the variability of land uses, the representation of nature for conservation purposes, and the adaptability of different areas to change, such as to climate change.

Development of Labrador's Ecological Land Classification and Rationale for Revisions

The mapping of ecological land units is closely related to the availability and accuracy of region-wide information about the natural features and ecological functions of a landscape. Since 2009, a number of new sources of information have become available, in the form of digital map coverages developed for the *Labrador Nature Atlas* by the *Labrador Conservation Blueprint* project.

Definitions

ECOZONE: An ecozone is an area of the earth's surface that shares characteristic geology and climate, expressed as a distinctive mosaic of landforms, vegetation, plants, wildlife and human activities.

ECOREGION: An ecoregion is a portion of an ecozone characterized by distinctive regional ecological characteristics of climate, physiography, vegetation, soils, water and fauna.

ECODISTRICT: An ecodistrict is a portion of an ecoregion characterized by distinctive local patterns of relief, landforms, soils, vegetation, water bodies and fauna.

The *Labrador Nature Atlas* includes region-wide mapping for the first time of ecological land units (ELUs), forest surveys, and land uses (or "human footprint"), as well as new mapping of features such as geology, land cover and wetlands, as examples. Also available are high-resolution satellite images, digital elevation models (DEM), and geographic information systems (GIS), which provide new means by which to assess and map the variability of Labrador's terrain.

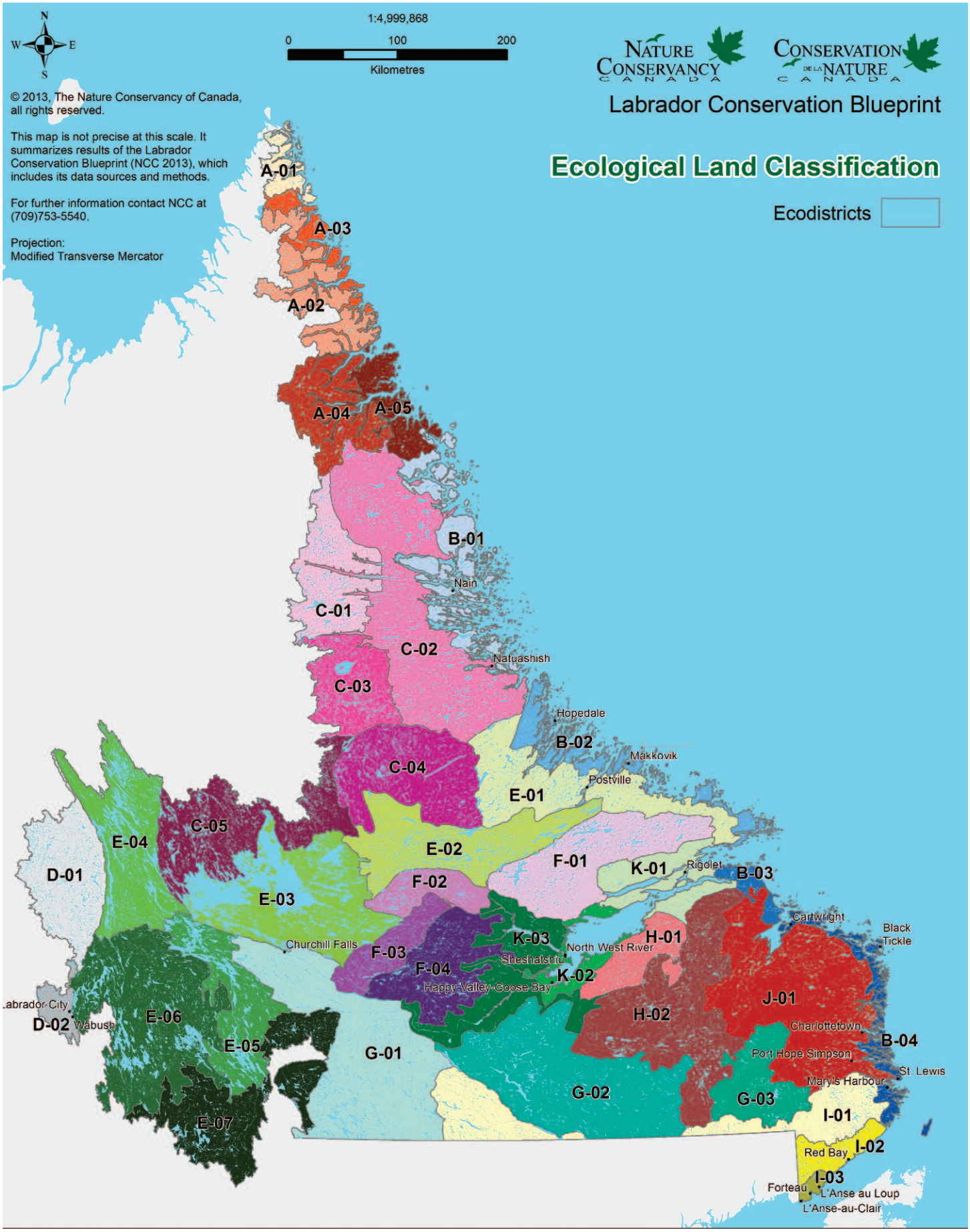
The landscapes of Labrador have been mapped and classified in a variety of previous studies, all of them based on similar criteria, which are its characteristic climates, geologies, landforms and vegetation. In 1978, Environment Canada's Lands Directorate completed a reconnaissance-level *Ecological Land Classification of Labrador*, which provided an initial integration of these elements of landscape variation (Lopoukhine *et al.* 1978). In 1990, Susan Meades completed a more detailed synthesis that described the *Natural Regions of Newfoundland and Labrador*, a work that very usefully integrated a variety of earlier studies and the contributions of dozens of experts.

In 1993, Environment Canada released a provisional *Ecoregions of Canada* (ESWG 1993), which proposed ecological regions for Labrador and, in 1995, Environment Canada revised its mapping of ecological land units based on jurisdictional studies, expert input and a new standard framework for such land units. This *National Ecological Framework* for Canada is the treatment followed by this revision of Labrador's ecological land classification. Its overall organization conforms with the earlier, complementary work of Meades and Lopoukhine, and with other treatments such as by the World Wildlife Fund (1999) and by Quebec (2010). The latter informal update of Quebec's ecological reference framework was particularly relevant to the many ecological land units that straddle the Quebec-Labrador boundary. Finally, again, the treatment described here is fundamentally informed by the new information and mapping assembled for the *Labrador Nature Atlas*, a product of the *Labrador Conservation Blueprint* project.

The *National Ecological Framework* was again revised in 1999 when it described, for the first time, three levels of nested land units for Labrador; ecozones (3), ecoregions (17) and ecodistricts (43) (available on-line at http://sis.agr.gc.ca/cansis/nsdb/ecostrat/1999report/intro.html. The treatment described here similarly includes ecozones (3), ecoregions (11) and ecodistricts (39), and represents a refinement based on new information while still conforming to the *National Ecological Framework for Canada*.

The ecozones, ecoregions and ecodistricts included in this treatment are tabulated in a summary included as Appendix A, annotated by their comparable land units in earlier treatments by Lopoukhine *et al* 1978; Meades 1990; ESWG 1993 and 1995; EC 1999; WWF 1999; and Quebec 2010. These sources are referenced at the end of the document. Earlier-used names for areas were re-used as much as possible.

Ecozone	Ecoregion		Ecodistrict	
Arctic Cordillera	A	Torngat	A-01	Cape Chidley
	A		A-02	Torngat Mountains
	A		A-03	Seven Islands
	A		A-04	The Domes
	A		A-05	Saglek
Taiga Shield	B	Coastal Barrens	B-01	Nain Coast
	B		B-02	Hopedale Coast
	B		B-03	Porcupine Strand
	B		B-04	Harbour
	C	Kingurutik – Fraser	C-01	Upper Kingurutik
	C		C-02	Fraser River
	C		C-03	Mistastin Lake
	C		C-04	Harp Lake
	C		C-05	North Michikimau
	D	McPhayden Plateau	D-01	McPhayden River
	D		D-02	Wabush
	E	Michikamau – Smallwood	E-01	Benedict Mountains
	E		E-02	Seal Lake-Postvlle
	E		E-03	Smallwood Reservoir
	E		E-04	Labrador Trough
	E		E-05	Atikonak Lake
	E		E-06	Joseph Lake
	E		E-07	Domagaya Lake
	F	Nipishish – Goose	F-01	Nipishish Lake
	F		F-02	Upper Naskaupi
	F		F-03	Red Wine Mountains
	F		F-04	Goose River
	G	Mecatina River	G-01	Churchill Falls
	G		G-02	Minipi
	G		G-03	St. Paul
	H	Eagle Plateau – Mealy Mountains	H-01	Mealy Mountains
	H		H-02	Eagle Plateau
Boreal Shield	I	North St. Lawrence	I-01	Border
	I		I-02	Forteau Barrens
	I		I-03	L'Anse Amour
	J	Paradise River	J-01	Paradise River
	K	Lake Melville	K-01	Rigolet
	K		K-02	Melville Lowlands
	K		K-03	Melville Valleys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This map is not precise at this scale. It summarizes results of the Labrador Conservation Blueprint (NCC 2013), which includes its data sources and methods.
For further information contact NCC at (709)753-5540.
Projection:
Modified Transverse Mercator
Nature Conservancy Canada
Conservation de la nature Canada
Labrador Conservation Blueprint
Ecological Land Classification
Ecodistricts
A-01
A-03
A-02
A-04
A-05
B-01
Nain
C-01
C-02
Natuashish
C-03
Hopedale
B-02
Makkovik
C-04
Postville
E-01
C-05
E-04
E-02
F-01
K-01
Rigolet
B-03
D-01
F-02
E-03
Cartwright
Black Tickle
K-03
H-01
Churchill Falls
F-03
North West River
Sheshatshiu
F-04
K-02
Happy Valley-Goose Bay
J-01
Labrador City
D-02
Wabush
E-06
H-02
Charlottetown
B-04
E-05
G-01
Port Hope Simpson
St. Lewis
Mary's Harbour
G-02
G-03
I-01
E-07
Red Bay
I-02
I-03
Forteau
L'Anse au Loup
L'Anse-au-Clair

ARCTIC CORDILLERA ECOZONE

(ESWG 1995; EC 1999, WWF 1999)

CANADA'S ARCTIC CORDILLERA ECOZONE includes some of the world's most spectacular mountain terrain. Its south-eastern extremity is the Torngat Mountains of northern-most Labrador. These massive Archean granite mountains are the highest mountains in eastern Canada, rising to 1652 m at Mount Caubvick in the Selamiut Range. Over 70 small glaciers exist in the Torngat Mountains, predominantly in deep shaded cirques. They are generally small (less than 1 km^2), the size of their associated *cirques*. Mountain peaks tower over wide, U-shaped valleys and deep *fjords* that extend many kilometres inland. Because of the extreme cold, high winds and lack of soil, the higher elevations of the ecozone are largely devoid of plants and animals, and sorted and frost-shattered rock prevails.

At lower elevations, tundra meadows of arctic forbs and ground-hugging shrubs occupy sheltered valleys, stream banks and coastlines. These are active biological oases during the brief arctic summer. Adjacent *fjords* and near shore waters are richly endowed with marine life. Complex tides and currents, localized upwellings of nutrients, and *polynyas* (waters that are ice-free year round) create productive aquatic ecosystems, which support globally-significant populations of Polar Bear, Narwhal and Walrus.

Labrador has experienced multiple periods of complete glaciation over the past two million years of the Pleistocene. During glacial maxima, sea levels were as much as 120 m below present levels, and a much broader coastal zone was variably covered and uncovered by glacial ice during the late Wisconsinan glacial period. The weight of continental glaciers depressed the Earth's crust and, following the last ice age, glacial meltwaters raised the sea above present levels, and the sea threw up raised beaches that mark former shorelines well above modern shore levels. These features attest to the continuing uplift of the Earth's crust, which is still rebounding by as much as 30 cm per century. Landforms resulting from glacial erosion include deep U-shaped valleys and steep-sided fjords, and high-elevation, bowl-like cirques, pyramidal peaks called *horns*, and knife-edged ridges called *arêtes*.

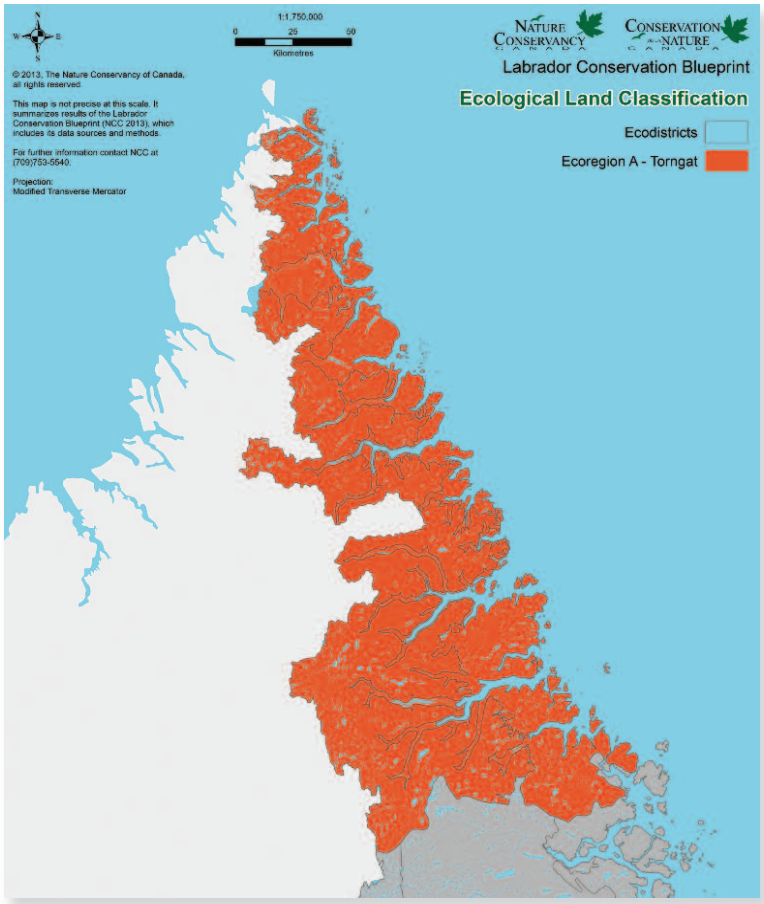
Overall, the arctic ecozone is the driest in Labrador, with a dry, low-arctic climate. Summers are short, and winters are long and cold. Climate varies significantly with elevation, and colder conditions prevail at higher elevations. The brief summer growing season of 80 to 100 degree-days above 5.6°C is enhanced by long day lengths. Mean daily temperatures in July range from +6° to +9°C, and in February from -19°C to -22°C. Average annual precipitation ranges from 400 mm to 700 mm, with up to an additional 3 m of winter snowfall.

The *National Ecological Framework for Canada* (ESWG 1995) treats the Arctic Cordillera Ecozone as a single ecoregion in Labrador, and this approach was also adopted by WWF's *Terrestrial Ecoregions of North America* (1999). In contrast, the Cape Chidley area is treated as a separate, colder region by Lopoukhine *et al.* (1978) as well as by Meades (1990).

Abram's Glacier in upper cirque valley, with tarn lakes in the lower cirques, 2010. Geoff Goodyear

A Torngat Mountains Ecoregion

Low Arctic/Arctic Alpine: ESWG 1995:ER-7; WWF 1999:ER-115; Québec 2010:LO6; includes Lopoukhine *et al.* 1978:LR-A, and Meades 1990:ER-1.



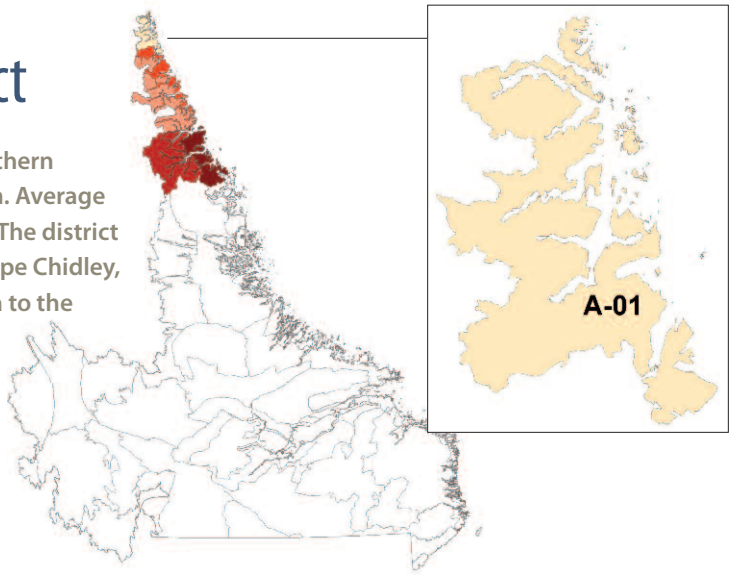
The Torngat Ecoregion is dominated by arctic vegetation, which transitions marginally to subarctic types in southern portions of the region, particularly in valleys and river corridors.

The Torngat Mountains are characterized by a sparse cover of lichen, moss, arctic sedges and grasses, and patches of arctic mixed evergreen and deciduous shrubs on sheltered, south-facing valley slopes. Unvegetated rock and arctic tundra (a low heath of lichens, mosses, and sedges) each comprise about 50 percent of higher-elevation sites. Occasionally, White Birch and willow thickets grow on less stable scree slopes, transitional between the tundra and open spruce woodlands. Low Black Spruce, underlain by moss and with mixed evergreen and deciduous shrubs, can dominate wetter sites.

Wildlife in the region is characterized by the full array of typical arctic mammals and birds, and the Torngat Mountains also provides seasonal habitat for Polar Bear and the montane Torngat Mountains Caribou herd. The region is home to the southernmost denning sites of Polar Bear on the North American east coast. It also supports the world's only population of tundra-dwelling Black Bears. The coastal area of this ecoregion lies along the Atlantic migratory flyway for seabirds and shorebirds.

Seven Islands : Valley leading Into Ramah Bay, 2010. Geoff Goodyear

A-01 Cape Chidley Ecodistrict



The Cape Chidley Ecodistrict is Labrador's most northern ecodistrict, rising from sea level to heights of 922 m. Average elevation is 246 m ASL (above sea level; NRC 2007). The district extends north from the Eclipse River to the tip of Cape Chidley, bordering Quebec to the west and the Labrador Sea to the east. It occupies a total of 1,512 km^2 (151,233 ha) of land area, which is roughly 0.5 percent of Labrador.

Climate

The Cape Chidley district has a Low Arctic climate (EWG 1989) and is characterized by short, cool summers and long, extremely cold winters. The growing season (temperatures above 5°C) lasts fewer than 94 days, due in part to its exposed topography and the influence of the cold Labrador Sea. Coastal ice and fog persist longer than elsewhere in Labrador. Ice floes are common and break-up on the coast may not occur until August in some years. Mean annual temperature is -5.6°C (CFS 2013). Mean annual precipitation minus potential evapotranspiration is 467 mm, the lowest in Labrador (Price *et al.* 2011). Along the coast, permafrost is extensive but discontinuous, while inland it is continuous in the valleys and mountains (Brown *et al.* 2001).

Geology and Substrates

The district's underlying bedrock consists primarily of granitic gneiss, granulite and paragneiss (NL DNR 2011a). Its stark, precipitous terrain is a mix of steep-sided, rounded mountain-tops separated by deeply incised fjords, and relatively flat terrain extending to the coast. Glaciation has moulded the fjords, as well as deep U-shaped valleys and sculpted cirques. Discontinuous, hummocky, sandy boulder moraine deposits are characteristic of upland areas (NL DNR 2011b). Steep talus-slopes and associated colluvial fans often drape the valley walls. Valleys contain former strand lines that are remnants of previous sea levels. Frost polygons are reported to occur, and acidic rock and cryosolic soils are the dominant surface materials (ESWG 1995).

Ivory Gull. Geoff Goodyear

Land Cover

The harsh climate, weak soil development and dominance of gneissic bedrock combine to support very little vegetation. Vegetation that does occur is largely restricted to sheltered, south-facing valley slopes and protected low elevations. No trees or tall shrubs (over 2 m in height) grow here. A tundra heath of lichens, mosses, sedges, grasses and dwarf shrubs dominates about 50 percent of upland surfaces. Extensive rocklands, *fellfields*, and other barely-vegetated ecosystems also occur. Moss heath occupies coastal headlands and ledges. Sporadic snowbed communities occur in sheltered areas. Arctic species are common. Few peatlands occur, but marshes line many of the rivers (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Water

The Cape Chidley Ecodistrict is situated within the Northern Labrador Sea drainage basin (WSC 2006). Overall, about six percent of the district is freshwater. The coast is characterized by harbours, bays, inlets, fjords and sounds, including Tunnisugjuak Inlet, Shungmiyuk Inlet, Grenfell Sound, Ikkudliayuk Fiord, Ekortiarsuk Fiord, Saglarsuk Bay and Eclipse Harbour.

Parmentor Island. Geoff Goodyear

Flora and Fauna

Sparse shelter and forage restrict wildlife to mammals such as Arctic Hare, Ermine, Ungava Collared Lemming and Arctic Fox (NatureServe 2012). Walrus and Narwhal are infrequently reported along the coast, and Polar Bear take advantage of seasonal habitats to prey on migratory seals (Lopoukhine *et al.* 1978, Meades 1990). Fish species include Arctic Char, sea-run Brook Trout and Threespine and Ninespine Stickleback (Anderson 1985).

Typical landbirds include Peregrine Falcon, Golden Eagle, Gyrfalcon, Snowy Owl, Rough-legged Hawk, Lapland Longspur, Hoary Redpoll, Rock Ptarmigan, Snow Bunting, and Northern Wheatear. Waterbirds, waterfowl and shorebirds such as Red-throated Loon, Canada Goose, Barrow's Goldeneye, Harlequin Duck, King Eider, Long-tailed Duck, Semipalmated Plover, Semipalmated Sandpiper, Red-necked Phalarope, Glaucous Gull, Great Black-backed Gull and Arctic Tern also occur (Meades 1990, Goudie *et al.* 1994).

The Galvano Islands — a cluster of small, rocky, low lying, treeless islands and islets 5 km east of Cape Kakkiviak — are significant for their breeding Common Eider, with roughly one percent of the total estimated northern race (*S.m. borealis*) breeding here. The cold Labrador Current flows south around the islands, and the area regularly remains ice-covered from December to early June (Russell and Fifield 2001a, IBA Canada 2012).

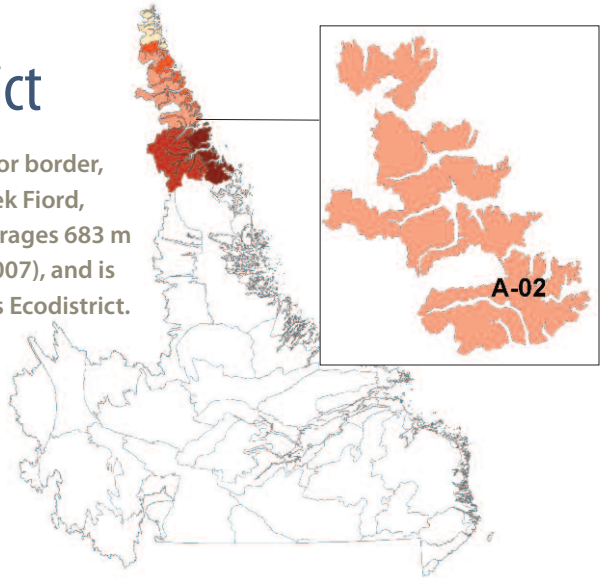
Land Use

No permanent settlements are located in the district. Wildlife is harvested primarily by Inuit from neighbouring communities in Labrador and Quebec. NORAD formerly operated a Northern Warning System (NWS) radar site at Cape Kakkiviak. The district is entirely located within the Torngat Mountains National Park.

Torngat Mountains National Park, Caubvik Glacier, 2010. Geoff Goodyear

A-02 Torngat Mountains Ecodistrict

The Torngat Mountains Ecodistrict extends west to the Labrador border, north to the Eclipse River, south to the Southwest Arm of Saglek Fiord, and east almost to the Labrador Sea. This montane district averages 683 m ASL, and rises from 190 m to a remarkable 1589 m ASL (NRC 2007), and is criss-crossed by the west-to-east lowlands of the Seven Islands Ecodistrict. It occupies 5,167 km^2 (516,700 ha), or 1.8 percent of Labrador.



Climate

The district has a Low Arctic climate, with short, cool summers and long, very cold winters (EWG 1989). The mean annual temperature is -6.4°C, and varies greatly with elevation and aspect (CFS 2013). The growing season is 82 days. Summer temperatures are tempered at the coast by the cold Labrador Sea. Sea ice usually persists until the end of June, but can persist until mid-July in years when on-shore winds dominate. Inland lakes remain frozen well into July, and snow can remain in isolated pockets year round (Lopoukhine *et al.* 1978, Meades 1990). Average annual precipitation minus potential evapotranspiration is 601 mm and ranges from 488 to 720 mm (Price *et al.* 2011). The Torngat Mountains have continuous and widespread permafrost, more discontinuous near the coast (Brown *et al.* 2001).

Geology and Substrates

The Torngat Mountains are the uplifted end of a Mesozoic peneplain dating from the Tertiary period. The bedrock is of the Churchill and Nain structural provinces, and is comprised of granulite and granitic gneiss, with sedimentary rocks overlying parts of the Nain structural province (NL DNR 2011a). The bedrock has been repeatedly eroded by glacial ice during the Pleistocene period, resulting in carved, spectacular landforms. The most recent glaciers variably covered the Torngat peaks, and the last of them did not entirely cover the Torngat, Kaumajet and Kinglapait mountain peaks, which remained above the ice as *nunataks*. Glacial landforms at lower elevations include lateral moraines at 275 m, 450 m, 700 m and 760 m ASL, and other glacial landforms include extensive rock detritus, end moraines, and minor glaciofluvial kames and terraces, sculpted bedrock cliffs, colluvial fans at the bases of cliffs, and perched alpine valley cirques, most of them occupied by tarn ponds. Valley floors usually consist of outwash terraces (Lopoukhine *et al.* 1978). The dominant soils are static and turbic crysols (ESWG 1995). Organic terrain occurs infrequently, although thin veneers may be found in snowbeds and sheltered areas.

Land Cover

Exposure is one of the key factors that hinder plant distribution in this tundra landscape. Weak soil development, substrate type, cold temperatures and desiccating winds contribute to a sparse cover of lichens, mosses, sedges, grasses and forbs. Conifer trees are absent. Localized sedge meadows are fed by seepage from late melting patches of snow. Exposed bedrock and ericads dominate the alpine terrain, with Arctic White Heather a characteristic species. Drier mountain ridges are occupied by shrub birches, Labrador Tea and Crowberry. The lower sheltered slopes harbour patches of dense vegetation in which shrubs such as alders and willows can be abundant. Minor fens and fluvial marshes occur along river terraces (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Water

The Torngat Mountains Ecodistrict is situated within the Northern Labrador Sea drainage basin (WSC 2006) and contains major reaches of several large rivers, including the Eclipse. Overall, less than three percent of the district is freshwater. Rivers are generally characterized by a level lower section flowing through a steep valley, followed by a transitional stretch of rapids and waterfalls leading to meandering plateau headwaters. Tributaries are made inaccessible to migrating fish by steep valley walls. Bottom substrates tend to be gravel and sand with shoals channelizing the river mouth. The rapid mid-sections and headwaters flow over bedrock, boulder and rubble. Most rivers flow in an easterly direction (Anderson 1985). There are few inland lakes in the district, and those that do occur, are low in productivity, so that trout, for example, are susceptible to overfishing (Lopoukhine *et al.* 1978).

Flora and Fauna

Mammals present in the district include Grey Wolf, Arctic Fox, Arctic Hare, Ungava Collared Lemming, Ermine, and Northern Bog Lemming (NatureServe 2012). The Torngat Mountains Caribou are the only mountain Caribou in the Arctic Cordillera and are a distinct population (Bergerud *et al.* 2008). Animals migrate altitudinally and disperse to calve in alpine and sub-alpine habitats (COSEWIC 2011). Calving generally occurs at higher elevations on tundra south to Hebron Fiord. In the winter, Caribou move east to Ungava Bay and may be seen close to the Nunavik community of Kuujjuaq. Caribou also overwinter near Hebron Fiord and Okak Bay along the Labrador coast. Rates of travel are highest during summer, fall and breeding (4 km/day), lowest during calving and post-calving (1.8 km/day), and intermediate in winter (2.2 km/day) (Schaefer and Luttich 1998). Torngat Caribou move about one-sixth of the distance between seasonal ranges as do the George River Caribou (COSEWIC 2011).

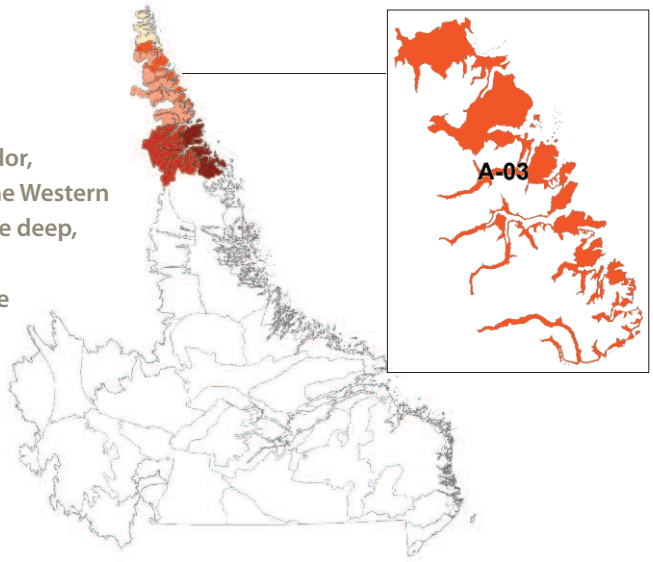
Land Use

The district has no permanent settlements. A former Inuit community, Ramah, was abandoned in 1907 (LISA Regional Planning Authority 2012). The district is located within the Torngat Mountains National Park. Quebec's Parc National Kuururjuaq abuts the Labrador border (CEC 2012).

Torngat Mountains Caribou. Chris P. Sampson

A-03 Seven Islands Ecodistrict

The Seven Islands Ecodistrict is located in northern Labrador, and is bounded in the north by the Eclipse Channel and the Western Arm of Saglek Fiord in the south. The district comprises the deep, ice-scoured, U-shaped valleys and fjords that separate the higher-elevations of the Torngat Mountains. Heights range from 0 – 1347 m and average 244 m ASL (NRC 2007). It is 2,704 km^2 (270,400 ha) in area, approximately one percent of Labrador.



Climate

Seven Islands falls within the Low Arctic Ecoclimatic Region, with short, cool summers and long, very cold winters (EWG 1989). It has a short growing season with fewer than 95 degree-days above 5°C; mean annual temperature is -5.5°C (CFS 2013). Microclimates vary greatly between north- and south-facing slopes, and between this low-elevation district and the adjacent Torngat Mountains. South-facing slopes receive more solar radiation and are warmer and drier, while north-facing slopes receive less insolation, and are moister and colder. Average annual precipitation minus potential evapotranspiration is 546 mm (Price *et al.* 2011). The Labrador Current flows south past the district, and coastal waters are mostly ice-covered from December to June. Permafrost is continuous and widespread (Brown *et al.* 2001).

Geology and Substrates

Valleys and fjords of the Seven Islands Ecodistrict are largely oriented east-to-west, with major north- and south-facing slopes and bottomlands as a result. Continental glaciers flowed eastward through the valleys, with their icefronts calving into the ocean. As the glaciers decayed, the valleys served as spillways flowing eastward. Deglaciation occurred in three phases, the latter two of which are marked by their trim lines on upper valley slopes. Lateral and end moraines and glaciofluvial landforms also occur in the valleys as evidence of this history, and more recent braided streams and deltas now occupy the valley floors. Bedrock cliffs with colluvial aprons rise above the valleys into adjacent mountains. The district's coastal marine deposits are overlain by organic soils, and higher, earlier sea levels are marked by strand lines as high as 49 m above sea level (Lopoukhine *et al.* 1978). The dominant bedrock is granitic, acidic gneiss of the Churchill and Nain structural provinces (NL DNR 2011a).

Land Cover

Lower slopes are dominated by cover of willows, dwarf shrubs, Labrador Tea, sedges, mosses and lichens, and many hardy arctic species. South-facing slopes have denser and more extensive vegetation than north-facing exposures. Some valley floors have seasonal flooding that restricts vegetation, while other areas are excessively drained, which also restricts vegetative growth (Lopoukhine *et al.* 1978, Meades 1990).

Water

The Seven Islands coastline stretches for 60 km and is generally rocky. High rocky headlands and small islets, and isolated rocks and shoals, characterize the coast, which is also frequently broken by long, fjord-like bays. The majority of the district falls within the Northern Labrador drainage basin (WSC 2006). Just over five percent of the land area is freshwater lakes and rivers. Important river systems traversing the area include the Eclipse, Kangalaksiorvik, Komaktorvik, Palmer, Nachvak and Stecker Rivers, as well as Kogarsok, Nachvak, and North Arm Brooks (Anderson 1985).

Flora and Fauna

The coasts are steep and provide little wildlife habitat. Caribou migrate through the district in summer months. (Schaefer and Luttich 1998). Year-round populations of Arctic Hare, Ermine, Grey Wolf, Arctic Fox, Ungava Collared Lemming, Northern Bog Lemming, and Rock Ptarmigan occur (Goudie *et al.* 1994, Harrington 1994, NatureServe 2012).The few beaches and other gradually sloped foreshores are frequented seasonally by Polar Bear tracking Harp and Ringed Seal as they migrate along the coast (Lopoukhine *et al.* 1978). Anadromous fish occur in the rivers and lakes (Anderson 1985).

Iron Strand. Geoff Goodyear

During September and October, medium concentrations of seabirds occur offshore (Lopoukhine *et al.* 1978). Over 20 percent of the eastern population of Harlequin Duck (*Histrionicus histrionicus*), which breed in Quebec's Gaspe Peninsula, stage and moult in the Seven Islands area. This population is designated as Threatened under Canada's *Species At Risk Act* and Vulnerable under the Provincial *Endangered Species Act* (NL Department of Environment and Conservation 2001). Seven Islands Bay is located midway between the Eclipse Channel and Cape Daley (IBA Canada 2012). Harlequin Duck breed on several of the rivers around Saglek and Hebron fjords (Trimper *et al.* 2008) The area is also important for breeding Common Eider (*S. m. borealis*), particularly Hogg Island (Russell and Fifield 2001a, IBA Canada 2012).

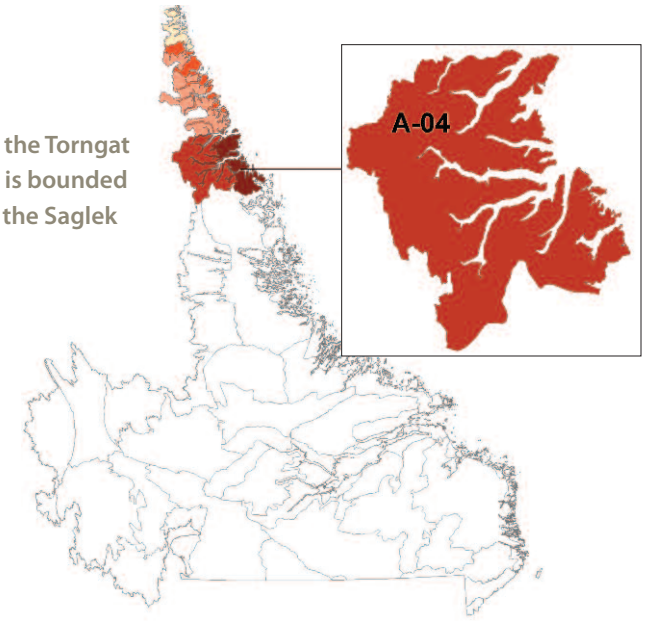
Land Use

There are no permanent settlement in the district. Ninety-nine percent of the district is located within the Torngat Mountains National Park, the excluded area being the garnet-rich Iron Strand area, which may have mineral potential.

The Domes, Saglek. Darroch Whitaker

A-04 The Domes Ecodistrict

The high-elevation Domes Ecodistrict is situated south of the Torngat Mountains and north of the George Plateau Ecodistrict. It is bounded to the west by the border with Quebec and to the east by the Saglek Ecodistrict, rising from 253 m to 1228 m ASL (NRC 2007). The Domes Ecodistrict is 5,740 km^2 (574,000 ha) in area, approximately two percent of Labrador.



Climate

The Domes Ecodistrict falls within the Low Arctic Eco-climatic Region, with cool, moist summers lasting about four months and long, very cold winters (EWG 1989). Its continental climate has a mean annual temperature of -5.5°C (CFS 2013), and a mean annual precipitation from 526 mm to 720 mm (Price *et al.* 2011). On average, there are 94 growing degree days per year. Permafrost is continuous inland (Brown *et al.* 2001).

Geology and Substrates

The district includes Precambrian bedrock of the Churchill and Nain structural provinces. The former are largely metamorphic gneisses while the latter are older basement gneisses (NL DNR 2011a). The upland terrain is dominantly exposed rock and ice-shattered detritus. Multiple glaciations eroded the district, and glacial landforms include U-shaped valleys and fjords, lowland meltwater channels, and cirques on the higher peaks. There are minor deposits of glaciofluvial materials, as well as more recent alluvial materials that mantle the valley floors. Organic terrain is sporadically distributed (Lopoukhine *et al.* 1978, NL DNR 2011b).

Rock cairn, Dome Mountain. Geoff Goodyear

Land Cover

Only the hardiest of arctic tundra species can withstand the area's harsh climate. Upper slopes are sparsely vegetated by lichens, mosses and arctic forbs and herbs. Unvegetated areas of exposed rock and disturbed soil are common. Ericaceous shrubs, willows and alders have a foothold on lower slopes. Slopes with southern exposures can support more diverse plant growth. Organic terrain is sparse, and permafrost palsas occur in peatlands (Lopoukhine *et al.* 1978, Meades 1990).

Water

Overall, more than five percent of the Domes Ecodistrict is covered by lakes and rivers. There are few wetlands other than those along lake and river margins. The entire area is contained within the Saglek drainage basin (WSC 2006). The headwaters of several important river systems are located in these uplands, including Southwest Arm Brook, Ikarut River and several large, unnamed rivers (Anderson 1985).

Flora and Fauna

Caribou migrate through the area in early July, after vegetation begins its peak growth (Schaefer and Luttich 1998). Mammals present in the district include Arctic Fox, Ermine, Arctic Hare, Ungava Collared Lemming, Northern Bog Lemming and Grey Wolf (Bergerud *et al.* 2008, NatureServe 2012).

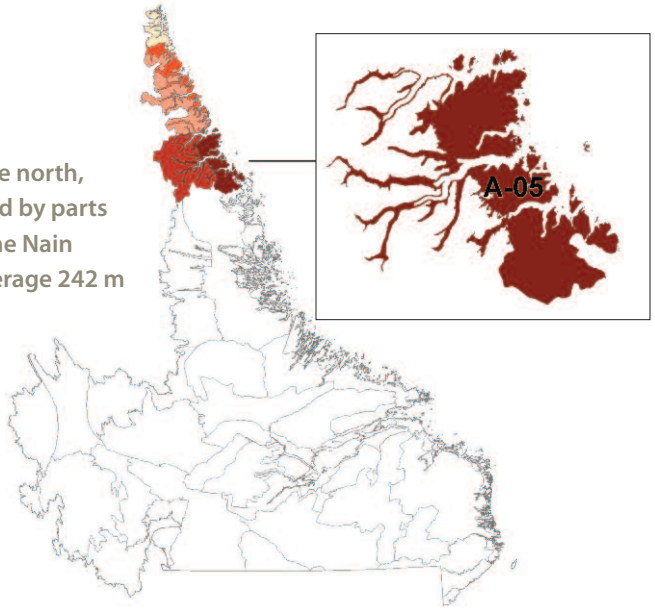
Land Use

Approximately two percent of the Domes Ecodistrict falls within the boundaries of the Torngat Mountains National Park. Approximately 95 percent of the district is zoned for Traditional Use under the proposed Labrador Inuit Settlement Area to conserve key habitats for Atlantic Salmon and Arctic Char as well as calving grounds of the migratory George River Caribou herd (LISA Regional Planning Authority 2012).

There are no permanent settlements here, and primary land uses include hunting, trapping, fishing, and outdoor recreation.

Grey Wolf. Geoff Goodyear

A-05 Saglek Ecodistrict



The Saglek Ecodistrict extends from the Saglek Fiord in the north, south to Mugford Bay. To the west, it dissects and is framed by parts of The Domes Ecodistrict. To the south, it is bordered by the Nain Coast and, to the east, by the Labrador Sea. Elevations average 242 m ASL, and range from sea level to 1229 m ASL (NRC 2007). The Saglek Ecoregion is 3,731 km^2 (373,080 ha), slightly more than one percent of Labrador.

Climate

The Saglek Ecodistrict buffers the inland Domes Ecodistrict from the influence of the Labrador Sea. Mean annual temperature is -4.3°C (CFS 2013). Although the area falls within the harsh Low Arctic Ecoclimatic Region (EWG 1989), it is moderated by proximity to the sea. Average annual precipitation minus potential evapotranspiration is 587 mm (Price *et al.* 2011). Permafrost is widespread along the coast (Brown *et al.* 2001).

Geology and Substrates

Bedrock is of the Nain and Churchill structural provinces, consisting of granulite and mylonitized gneisses, and quartzofeldspathic gneiss (NL DNR 2011a). The district includes many U-shaped valleys and fjords. Preglacial valleys were further scoured by the last glaciation, and they subsequently served as meltwater channels draining the decaying ice. They presently contain west-to-east flowing streams of moderate size, which drain the adjacent higher Domes Ecodistrict. Reworked glaciofluvial material and recent alluvium mantle the valley floors. Fans and aprons of colluvial deposits occur at the base of the steepest valley slopes. In the south, the valleys are wider and more rounded. Organic terrain is sparse, and becomes more abundant southward (Lopoukhine *et al.* 1978, NL DNR 2011b).

Land Cover

The growth of vegetation on valley floors is limited by seasonal flooding in spring and excessively-droughty substrates later on. South-facing slopes are the most favorable sites for plant growth. Willows, alders and shrub birches are abundant in favourable sites. Palsa bogs are more common than to the north (Lopoukhine *et al.* 1978, Meades 1990).

Water

Open water features cover just less than six percent of the Saglek district, and there are few additional wetlands. The entire area is contained within the Saglek drainage basin (WSC 2006). Important river systems traversing the area include Southwest Arm Brook, Kiyuktok Brook, Pangertok Inlet River, Ikarut River and several large, unnamed rivers (Anderson 1985).

Polar Bears, Torngat Mountains National Park. Chris P. Sampson

Torngat Mountains National Park. Chris P. Sampson

West Arm, Saglek Fiord. Geoff Goodyear

Flora and Fauna

Labrador's northern limits of conifer trees (White and Black Spruce) occur along the shores of Napaktok Bay, and woodlands occur rarely in favourable sites (Elliott and Short 1979). However, much of the spruce is low-lying *tuckamore* (or *krummholz*), and ericads and lichens dominate most exposed sites. Grey Wolf, Arctic Fox, Ermine, Arctic Hare, Ungava Collared Lemming, and Northern Bog Lemming are typical land mammals, as are Polar Bear on the coast and Caribou in the interior (Lopoukhine *et al.* 1978, Meades 1990, NatureServe 2012).

Land Use

The district has spectacular scenery, a coastal milieu and relatively easy access, particularly through the community of Nain, which serves as a supply and refueling centre for the district. Labradormiut (Labrador Inuit) maintain cabins (Aullavik) along the coast, and Ann Lake and Napaktok Bay support commercial outfitting lodges. The Labradormiut cultural heritage site of Hebron is also located here.

Parks Canada's Kangidluasuk base camp and research site, which serve as the gateway to Torngat Mountains National Park, are located at St. John's Harbour in Saglek Bay. Roughly three percent of the Saglek Ecodistrict is located within the Torngat Mountains National Park. Almost all of the area is zoned for Traditional Uses under the proposed LISA Land Use Plan, to conserve spawning areas for salmonids and the calving grounds for Caribou, as well as other features (LISA Regional Planning Authority 2012).

TAIGA SHIELD ECOZONE

(ESWG 1995; WWF 1999:ER-96)

THE RUSSIAN WORD *TAIGA* and the Algonquian word *muskeg* are used to describe the northern conifer woodlands and forests that stretch from Labrador to Alaska and from Siberia to Scandinavia, at the northern limits of tree growth. In Canada most of this zone is underlain by the ancient bedrocks of the Precambrian Shield. The Taiga Shield is one of Canada's largest ecozones, at 1.3 million km^2.

During the Precambrian, the bedrock was warped, folded, faulted and upthrust, and then subsequently weathered and eroded relentlessly by rain, water flow and freeze-thaw cycles. Diverse Precambrian bedrocks were laid bare. In some areas, volcanic rocks testify to the earliest eruptions of lava that created the Earth's crust, some of them originally as ancient sub-marine "pillows" of lava. Elsewhere, the first traces of bacterial microfossils are found in 3.5-billion-year-old Archaean rocks.

During the last two million years of the Pleistocene Epoch, the Shield was depressed, scoured and plucked by the advance of continental-scale glaciers, and blanketed by subglacially-deposited till moraines and other ice- and water-contact landforms. The Laurentide Ice Sheets were the largest on the globe. During subsequent glacial melt-out and local re-advances, a variety of glacial landforms were deposited, such as sorted sands and gravels. Of particular note are the long, sinuous esker ridges deposited in meltwater channels flowing under ice sheets. Most eskers are flanked by depressions and, in areas of frequent eskers, elongate adjacent lakes and wet lowlands are typical. In Labrador, many of these lowlands support expansive displays of open peatlands, many of then fens and many of them supporting mixed patterns of pools, raised ribs (or strings) and Tamarack-spruce swamp margins. Bog peatlands also occur where lateral water movement is constrained, and where deeper and more acidic peats have accumulated. These too can be treeless or support spruce trees. Permafrost persists southward in peatlands, and is generally discontinuous across the ecozone in Labrador.

The climate of the ecozone is subarctic, with short cool summers that have long daylight hours and winters that are long, dark and cold. In Labrador, mean annual temperatures range between about -1°C to -5°C, and up to 0°C in some areas. The cold offshore waters of the Labrador Current diminish most of the moderating effects of the Atlantic Ocean. Mean summer temperatures range between 6°C and 11°C, and mean winter temperatures between -11°C and -24.5°C. Annual precipitation ranges from 500 mm to 800 mm, and may exceed 1000 mm along the coast.

Vegetation is characterized by sparsely vegetated rocklands and sand plains, wetlands, shrublands and meadows, and by open woodlands and closed forests. Woodlands are usually associated with heavy lichen growth, which also grades into areas of open tundra. The limits of tree growth are along the colder edges of this ecozone, both by latitude and elevation. Black and White Spruce dominate the woodlands and forests, with Tamarack subdominant. Jack Pine occurs in Labrador only in the extreme southwest, near Ashuanipi Lake. In the southern half of the ecozone, White Spruce, Trembling Aspen, Balsam Poplar and White Birch can form richer mixed forests of modest extent and species richness, and mineral wetlands throughout are graced with alders, willows and many other shrubs.

Nunatsiavut. Chris P. Sampson

Forest fire is an integral part of the cycle of taiga development and has not been suppressed in this ecozone in Labrador, other than near communities and transmission and transportation corridors. As a result, the patterns of multiple, differently-aged burn areas overlapping on the landscape provides a remarkable illustration of the long, cyclic nature of forest succession and regeneration in the ecozone. The distinctive mosaics of vegetation that result include 1) early, bare burns with standing, tipping or burnt trees remaining; 2) early, lichen-dominated post-burn areas without trees or with residual standing snags; 3) mid-age, lichen-dominated post-burn areas with immature spruce developing; 4) mature, lichen-spruce woodlands; and 5) mature, fuller-canopy spruce woodlands with significant fuel loadings that invite the next fires. This succession in the Labrador subarctic can range from a few hundred years on productive, warmer-than-normal sites, to centuries on less productive, cooler-than-normal sites. The cyclic stages can all be interrupted by fire, insects and pathogens, and the subarctic taiga is a complex, multidimensional ecosystem, notwithstanding its relatively few constituent species.

The abundant water and coastal habitats attract hundreds of thousands of birds...

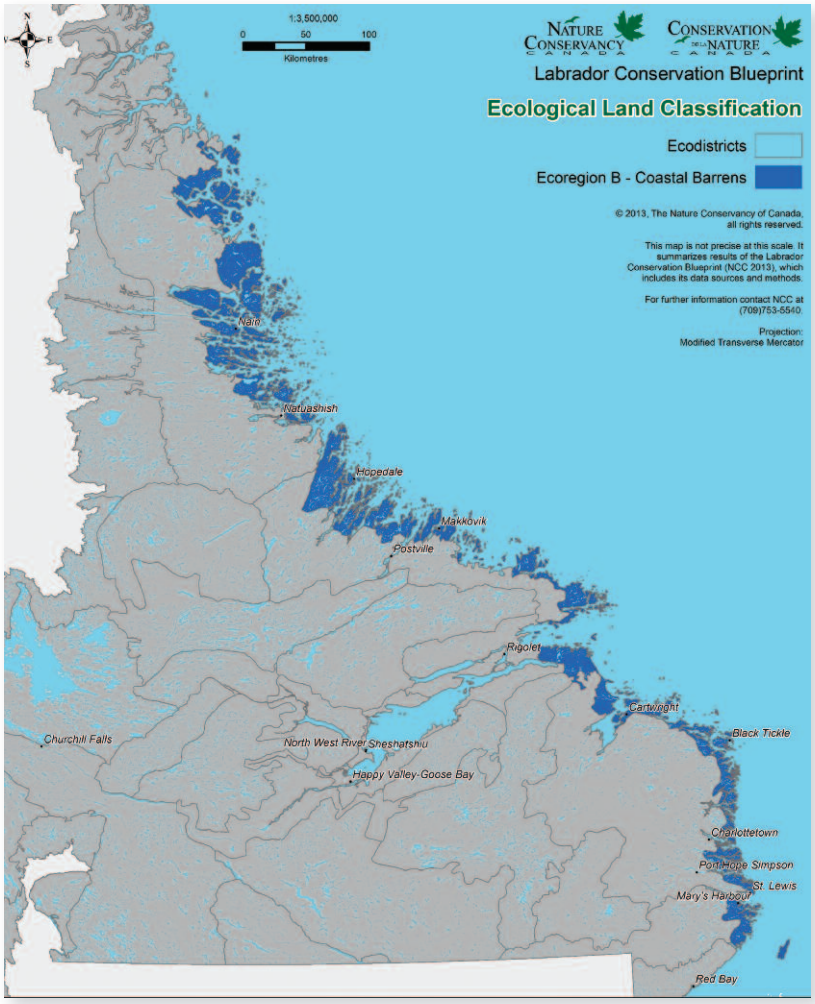
One of the most spectacular wildlife displays in the Taiga Shield is the return in early spring of migrating ducks, loons, and geese. The abundant water and coastal habitats attract hundreds of thousands of birds, some of which nest, while others feed and rest before journeying farther north to breed. The overlap of arctic and boreal bird species gives this area a special richness. At the southern limit of their summer range are such species as the Arctic Tern, while a host of other birds, including the Common Tern and White-throated Sparrow, reach their northern limits on the Taiga Shield.

Wildlife in the ecozone include Lynx, Beaver, Black Bear, Wolf, Porcupine, Snowshoe Hare, Red and Arctic Fox, and Caribou. Barren-ground Caribou migrate to calving areas in the Taiga Shield. The George River herd makes this journey each spring to calve. In all, there are 38 mammal species inhabiting the ecozone. The ecozone's waters are rich in freshwater fish, like Lake Trout, Whitefish and Northern Pike, and anadromous fish like Atlantic Salmon.

Thick-billed Murre colony northeast of Nain.
Canadian Wildlife Service

B Coastal Barrens Ecoregion

Maritime Low Subarctic: ESWG 1995:75; WWF 1999:ER-96; Meades 1990:E-4; QC 2010:103.



The Coastal Barrens ecoregion is composed of offshore islands, exposed headlands, and protected inlets, extending south from Napaktok Bay to the Battle Harbour area.

The ecoregion has a low-subarctic maritime climate influenced by the Labrador Sea and characterized by short, cool and moist summers and long, cold winters. The mean annual temperature is -3.5°C. The mean seasonal temperatures are 7°C and -13.5°C in summer and winter, respectively. Mean annual precipitation ranges from 600 mm in the north to over 1000 mm in the south.

The ecoregion is underlain by massive Archean granite, granitic gneiss, and acidic intrusives. Landforms include headlands and steep-sided, rounded mountains, with intervening, deeply incised U-shaped valleys and fjords extending inland from the coast. Discontinuous, sandy and bouldery glacial--moraine sediments dominate its surfaces, and steep talus, colluvial fans and alluvial and glaciofluvial sediments mantle the larger valley floors and islets. Scattered sizable bogs occur south of Davis Inlet, and salt marshes occur on many marine terraces. Permafrost is sporadic.

The region's moist, sheltered valley slopes support White Spruce forests with moss-rich understoreys, while coastal heath dominates its exposed headlands and bedrock ridges. The highest elevations have exposed bedrock, with mosses and lichens on sheltered lee slopes and in fractures. Alders, shrub birches and Labrador Tea dominate burned-over areas. Marine terraces support salt marshes, and plateau bogs occur on raised flats. Deeply incised U-shaped valleys and fjords occur between steep-sided, rounded mountains.

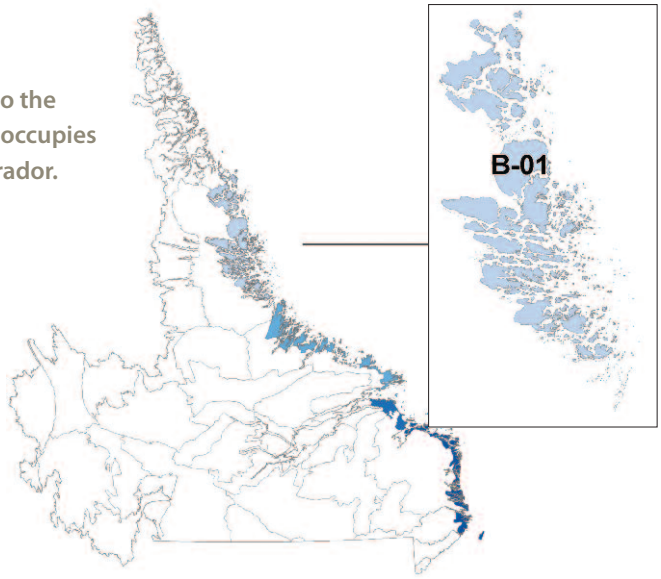
The region is part of the Atlantic migratory flyway and its coast and islands also support many important migratory seabird colonies, as well as areas for seal whelping. Caribou frequent the shores and islands south of Groswater Bay. Hunting, trapping, fishing, and outdoor recreation are common activities, as is mineral exploration. The Voisey's Bay mine was discovered in the mid-1990s, and continues to operate at this location south of Nain (ESWG 1999).

Devil's Lookout Island, Table Bay 2011. Geoff Goodyear
Male Common Eider, Table Bay. Alain Lusignan. Seal. Chris P. Sampson

Arctic Poppy (*Papaver radicatum*) and Fireweed (*Epilobium angustifolium*). John Riley

B-01 Nain Coast Ecodistrict

The Nain Coast Ecodistrict extends north from Sango Bay to the mouth of Okak Bay, including Mugford Bay in the north. It occupies 5,839 km^2 (583,900 ha), approximately two percent of Labrador.



Climate

The offshore Labrador Current cools the coast and influences the location of the treeline south and inland. The mean annual temperature is -3.0°C (CFS 2013). The prevailing influence of the Icelandic Low brings rain and snow that are exceptionally heavy for such a cold climate at sea level, with as much as five metres of snow each winter, which often does not melt until July. The mean annual precipitation minus potential evapotranspiration averages 643 mm (Price *et al.* 2011). The northern sections of the coast are more sheltered from harsh, coastal weather events by a deep archipelago of offshore islands, islets and shoals numbering in the hundreds and providing a 40 km-wide buffer from the open Labrador Sea. Discontinuous permafrost prevails (Brown *et al.* 2001).

Geology and Substrates

The Nain Coast Ecodistrict is part of the Nain structural province of the Canadian Shield, with metamorphic gneiss dominating, but also with igneous anorthosites (NL DNR 2011a). Bedrock exposures dominate and this northern coastal district is notable for its steep elevations, rising to heights of 1040 m ASL. Average elevation is 168 m ASL (NRC 2007). Steep and abrupt cliffs and slopes rise above the water and narrow valleys. Upland surficial deposits are minimal except for local colluvium. Marine deposits of silts and clays are minor in extent and well distributed along lower fjord valleys (NL DNR 2011b). Modern coastal deposits of beach ridges and sands are minor landforms. Overall the district includes the mouths of many deep, narrow fjord valleys that

almost all run parallel, west-to-east. Beaches are rare on the mainland but many island inlets support small beaches. Scattered organic terrain occurs and sizeable peatlands occur around Natuashish (Lopoukhine *et al.* 1978, Meades 1990).

Land Cover

The Nain Coast is characterized by coastal cliffs, rocky shores, inlets and coastal grasslands. The coastline south of Nain is made up of hundreds of islands, islets and shoals. Islands are primarily bare rock with scattered patches of tussock grasses. Some are steep-sided and dome-shaped, while others rise more gradually out of the Labrador Sea (Russell and Fifield 2001a, IBA Canada 2012). The cold climate and the onshore exposure to salt and wind reduce tree growth to the most sheltered sites, and dense krummholz of White Spruce, willows and shrubs is widespread even in sheltered sites. Lichen and Black Spruce are not salt tolerant, so their absence is characteristic. Bedrock headlands of any elevation support alpine-like tundra of dwarf and prostrate shrubs, forbs, sedges, grasses and mosses (Lopoukhine *et al.* 1978, Meades 1990).

Water

Slightly more than five percent of the district is covered by open water features, while less than one-half of one percent is in wetlands. Rivers in the northern portion of the district form part of the Okak drainage basin, those in the centre are part of the Tikkoatokok drainage basin, and in the south, the Kogaluk drainage basin (WSC 2006). Avakutak River flows north, emptying into Avakutak Bay in the Fraser River district. It drains the western slopes of the Kiglapait Mountains and the largest lake in the system, Kiglapait Tasialua Lake, which is 180 m in elevation.

Flora and Fauna

Typical mammals include Black Bear, Red Fox, Mink, Beaver, Red Squirrel, Deer Mouse, Porcupine, Meadow Vole, and Masked Shrew (NatureServe 2012).

Two Important Bird Areas are located in this district. Large numbers of nesting seabirds use the offshore islands southeast of Nain, including the Pyramids, Negro, Ukallik, Kidlit, Nunaksuk, Barbican, and the Castle. Peregrine Falcon and Golden Eagle nest on cliffs in this area (Whitford 1996). More than three percent of the North American population of Atlantic Puffin breed here, along with more than two percent of the North American population of Razorbill, and over one percent of the North American population of Glaucous Gull. Other breeding seabirds like Black Guillemot, Thick-billed and Common Murre, Great Black-backed Gull and Herring Gull also nest in the area. Polar Bear also use these islands year-round (Russell and Fifield 2001a, IBA Canada 2012).

Islands south of Nain — bounded roughly by Paul Island in the west, Humbys Island to the south, and Dog Island in the north — support large numbers of moulting sea ducks, especially Surf Scoter and occasional White-Winged and Black Scoter. At least one percent of the global population of Surf Scoter moult here. Harlequin Duck have also been known to congregate here in pre-moult flocks. Peregrine Falcon and Common Eider also nest within the area (Russell and Fifield 2001a, IBA Canada 2012).

Land Use

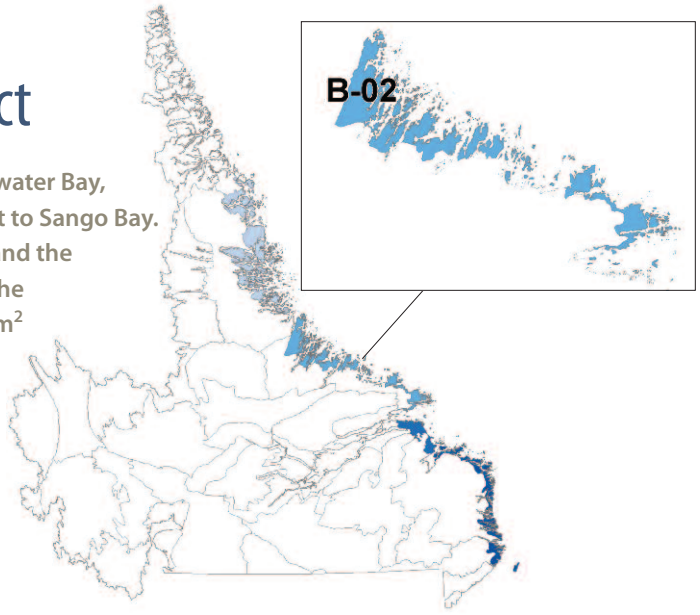
Residents of the ecodistrict are predominantly Labradormiut. Nain is the largest community, with a growing population of 1,188. Nain contains a Northern Warning Radar System site and runway. The Torngasok Cultural Centre is also located here. Hunting, trapping, fishing, and guiding and outfitting services are popular activities. Many of the islands have been, and continue to be, used for bird hunting and egg collecting (Russell and Fifield 2001a), and many remote cabins (Aullavik) of Inuit beneficiaries are located on the coast and offshore islands. Mining for nickel and Labradorite occurs at Voisey's Bay and Ten Mile Bay, respectively. Raw ore is shipped to smelters by boat. Hebron is a former Inuit community, abandoned in 1959.

More than half of the district is zoned as either Environmentally Sensitive Areas or Traditional Use Areas under the proposed Labrador Inuit Settlement Area Plan (LISA Planning Authority 2012).

Nain Harbour. John Riley

B-02 Hopedale Coast Ecodistrict

The Hopedale Coast Ecodistrict extends north from Groswater Bay, at the entrance to Lake Melville, along the Labrador coast to Sango Bay. It is bordered by the Nain Coast Ecodistrict to the North and the Labrador Sea to the east. Rising from sea level to 448m, the district averages 74m ASL (NRC 2007). It is about 4,000 km^2 (400,000 ha) in area, or 1.4 percent of Labrador.



Climate

The offshore Labrador Current cools the coast, resulting in a treeline that occurs as far south and inland as it occurs on the Atlantic seaboard. The prevailing climate is little tempered by the proximity of the Labrador Sea, and is harsh. The mean annual temperature is -1.4°C (CFS 2013). The near-constant influence of the Icelandic Low means that rain and snow are exceptionally heavy for so cold a climate at sea level. Mean annual precipitation minus potential evapotranspiration averages 697 mm (Price *et al.* 2011). Among the islands, bays and inlets, ice can persist until mid-June and set again in November. Offshore ice floes can be seen until July. Discontinuous permafrost prevails (Brown *et al.* 2001).

Geology and Substrates

The Hopedale Coast Ecodistrict is part of the Nain structural province of the Canadian Shield, with metamorphic gneiss dominating, but also with igneous anorthosites (NL DNR 2011a). Bedrock exposures dominate the higher elevations, but this central coastal district is characterized by shallow coastal elevations having infrequent massive headlands, and with broader intervening lowlands that extend farther inland. Offshore islands are less frequent, occur in separated clusters in coastal embayments, and provide less leeward shelter from coastal weather events. Beaches are rare on the mainland but occur on small islands (Lopoukhine *et al.* 1978).

Marine deposits of silts and clays are extensive, in coastal areas where they have been protected, but also occur farther inland at the heads of broad lowland embayments. Modern coastal deposits of beach ridges and sands are present (NL DNR 2011b). Overall the district is a shallow, flat terrain, whose lower valleys are broad embayments, not fjords, down which rivers of various sizes slowly drain.

Land Cover

The cold climate and the onshore exposure to salt and wind reduce tree growth to sheltered sites, and a dense krummholz of White Spruce, willows and shrubs is widespread even in sheltered sites. Black Spruce is not salt tolerant, and is absent. Bedrock headlands support shrublands and low krummholz, and a peaty turf of dwarf and prostrate shrubs, forbs, sedges, grasses mosses and lichens (Lopoukhine *et al.* 1978). Offshore islands are generally barren, with rocky shores. Topography varies from gently sloping rocky hills to steep cliffs. In areas with soil, the vegetative cover is often dense and composed mainly of heath species (Crowberry, Bakeapple) and tussock grasses. The coastline along the north side of Groswater Bay is low-lying, relatively flat terrain, with boulder-ridden mudflats that get exposed at low tide. Numerous coves and shallow bays occur, and many islands are located in close proximity to the shore (Russell and Fifield 2001b, IBA Canada 2012). Patches of spruce and Balsam Fir, with scattered White Birch, alders and willows grow on valley tills and outwash deposits. Spruce-lichen forests blanket well-drained river terraces (Lopoukhine *et al.* 1978). Many of the water-logged marine clays and silts support bog development.

Water

About two percent of the district is occupied by wetlands and eight percent by open-water features. Rivers in the north are part of the Adlatok drainage basin, the Kanairiktok drainage centrally, and the Big River basin in the south (WSC 2006). Major rivers include Michael, Adlatok, Hunt, Kanairiktok, and Big Rivers, as well as Jeanette Bay and Makkovik brooks and several un-named rivers (Anderson 1985).

Hopedale Coast. John Riley

Coastal Sea Grass (*Leymus mollis*), woven to make baskets. John Riley

Flora and Fauna

Mammals along the Hopedale Coast include Porcupine, Mink, Red Squirrel, Beaver, Woodchuck, Meadow Vole, Deer Mouse, Black Bear, Red Fox, Masked Shrew, and Grey Wolf (NatureServe 2012).

The Quaker Hat Island and a series of islands in Groswater Bay (Herring Islands, Caesar, Puffin, Tinker, North Green, and the Doughboy) are important for breeding Razorbill, Thick-billed and Common Murre, and Atlantic Puffin. More than one percent of the North American populations of these species nest here. Leach's Storm-Petrel, Great Black-backed and Herring Gull, and Black Guillemot also breed on these islands (Russell and Fifield 2001b, IBA Canada 2012). Peregrine Falcon nest on the coastal bluffs (Goudie *et al.* 1994)

The South Groswater Bay area supports significant concentrations of nesting, moulting and staging waterfowl, including at least 1,000 nesting pairs of Common Eider. The area may also be used by large numbers of moulting Black and Surf Scoter. Moulting Harlequin Duck and Common Eider depend on the area surrounding the Tumbledown Dick and Stag Islands, which lie at the mouth of Sandwich Bay (Thomas and Robertson 2008, Russell and Fifield 2001b, IBA Canada 2012).

Land Use

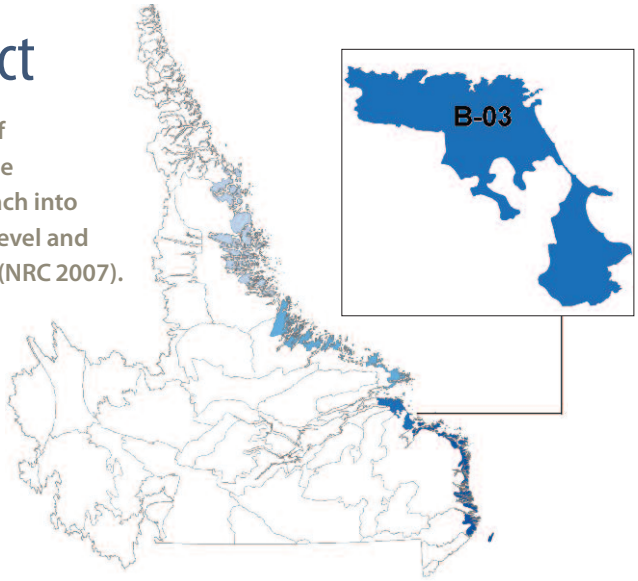
The residents of the ecodistrict are almost entirely Labradormuit living in the communities of Hopedale and Makkovik, with populations of 556 and 361, respectively. Hopedale has experienced a slight growth in population, and Makkovik's population has declined since 2006 (Statistics Canada 2011). Hunting, trapping, fishing, and guiding and outfitting services are frequent land uses. Many remote cabins (Aullavik) of Inuit beneficiaries, and a couple of commercial outfitting lodges, are located along the coast and on offshore islands. The north-coast snowmobile trail also traverses the district.

Sixty percent of the district is zoned as Environmentally Sensitive or Traditional Use, where development is limited under the proposed LISA Land Use Plan. This designation is intended to conserve seabird nesting colonies, salmonid fish spawning habitats, and other features (LISA Regional Planning Authority 2012).

Porcupine Strand. Jon Feldgajer

B-03 Porcupine Strand Ecodistrict

The Porcupine Strand Ecodistrict extends from the mouth of Groswater Bay south to the Sandwich Bay area, including the nearshore of Trunmore Bay. Cape Porcupine divides the beach into two separate reaches. Most of the district lies between sea level and 50 m ASL, although maximum heights extend to 293 m ASL (NRC 2007). It occupies approximately 1,114 km^2 (111,400 ha), a small proportion of Labrador at 0.4 percent.



Climate

A relatively wet portion of the Labrador coast, the average annual precipitation (minus potential evapotranspiration) is between 778 mm annually (Price *et al.* 2011). Fog occurs frequently, and low solar insolation combines with cold offshore currents to produce widespread maritime subarctic microclimates. The average annual temperature is -0.1°C (CFS 2013). Seabound ice can last into June (Lopoukhine *et al.* 1978)

Geology and Substrates

The district supports landforms consisting primarily of well-drained, sorted sands and gravels deposited postglacially at the mouth of the great Churchill-Melville glacial-meltwater channel, and re-deposited more recently as beach ridges. It is also underlain by clay-based marine deposits that limit drainage (NL DNR 2011b). Underlying bedrocks are anorthosites, gneisses and paragneisses of the Grenville structural province (NL DNR 2011a). Inland, hummocky terrain consists of poorly-drained sands that blend into a plain of deep, well-drained sands. This sand plain is broken sporadically by eskers and wind-eroded beach ridges, and extends west to the Paradise

River Ecodistrict. Local pondings and organic terrain are common in the poorly-drained sands close to the coast (Lopoukhine *et al.* 1978, NL DNR 2011a). Permafrost is sporadically distributed (Brown *et al.* 2001) and palsa mounds have developed in some bogs.

Land Cover

Bluffs of coarse sands interspersed with marine silts and clays occur along the coast but most distinctive is the Porcupine Strand, the *Wunderstrand* of Viking sagas, one of the longest uninhabited beaches on the Atlantic seaboard. It is almost 55 km long and its northern and southern beaches are the seaward expression of the large plain of sands and gravels that dominates the district. Extensive open spruce woodlands occur on well-drained sites and have lichen ground cover, as well as bog and fen peatlands on poorly drained sites underlain by marine deposits. Exposed trees have a distinct growth form with branches spreading parallel to the ground below the level of winter snow abrasion (*tuckamore* or *krummholz*). Shrubs are dominated by blueberries, Crowberry and shrub birches. Dense thickets of Black Spruce and Tamarack occur where alders form thickets along the protected coastline (Lopoukhine *et al.* 1978, Meades 1990).

Water

The district is split between the Hamilton Inlet and the Eagle River drainage basins (WSC 2006). In total, 5.5 percent of the district is in open-water features and 7.8 percent in wetland habitats. A few rivers such as Flatwater Brook and North River are incised to narrow valleys (Anderson 1985).

Flora and Fauna

Caribou use the district extensively, particularly in the summer at they move between the Strand and the Mealy Mountains. Black Bear are common scavenging the beaches. Other mammals present include Grey Wolf, Beaver, Woodchuck, Meadow Vole, Mink, Porcupine, Masked Shrew, Red Squirrel, Red Fox, Eastern Heather Vole, and Northern Bog Lemming (NatureServe 2012).

Cape Porcupine is a globally significant pre-moult staging site for Surf Scoter, and Black and White-winged Scoter are also found here. The Strand extends south of the Cape from Trunmore Bay to Duck Point, and north to Fish Cove Point. There are few large offshore islands here — a feature that is unique along the Labrador coast — but parts of the coast are protected from the full force of the sea by small islands and shallow waters. Scoter are often observed foraging for shellfish in the shallow, sandy waters a few metres from the beach (Russell and Fifield 2001b, IBA Canada 2012).

Porcupine Strand. Destination Labrador

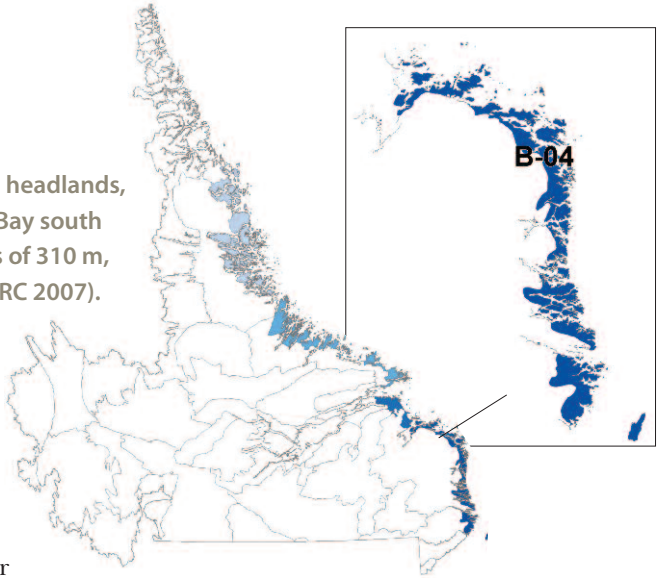
Land Use

There are no permanent settlements in the district but the Strand is an area of long occupation by successive Aboriginal cultures over many millennia. Hunting, trapping, fishing, and outdoor recreation are principal land uses. Many remote cabins are located here as well as one commercial outfitting lodge at Pack's Harbour. The south-coast snowmobile trail traverses the district. The Mealy Mountain National Park Reserve includes 72 percent of the ecodistrict. The rest of the district is zoned Traditional Use or Environmentally Sensitive under the proposed LISA Land Use Plan (LISA Regional Planning Authority 2012).

Battle Harbour. Jon Feldgajer

B-04 Harbour Ecodistrict

The Harbour Ecodistrict is the coastal reach of exposed headlands, sheltered inlets and islands extending from Sandwich Bay south to Temple Bay. The district extends inland to elevations of 310 m, although the majority of the area is below 50 m ASL (NRC 2007). It occupies 2,579 km^2 (257,900 ha), less than one percent of Labrador.



Climate

Its climate is maritime, with relatively cool, moist summers, and long, cold winters. The mean annual temperature is just above freezing (0.5°C) and summer and winter extremes are moderated by proximity to the Strait of Belle Island and the Atlantic Ocean (CFS 2013). Mean annual precipitation minus potential evapotranspiration averages 785 mm (Price *et al.* 2011). Inland, permafrost occurs in isolated patches (Brown *et al.* 2001).

Geology and Substrates

Bedrock is predominantly metamorphic gneiss of the Grenville structural province (NL DNR 2011a). From Cartwright to Battle Harbour, the coast is characterized by numerous islands and an irregular coastline. Exposure to waves, wind and ice results in extensive barren rock surfaces. A precipitous and jagged interface of land and water is common and sand beaches are sporadic. Southwest of Battle Harbour, the Strait of Belle Isle coast becomes more linear, indented only by bays where rivers flow into the strait (Lopoukhine *et al.* 1978). Inland, bedrock controls the topography and peat terrain occurs in patches on a landscape dominated by thin veneer tills (NL DNR 2011b).

Land Cover

Vegetation is stunted and limited to sheltered sites. The degree of exposure and lack of soil are dominant factors constraining the development of vegetation. White Spruce occurs closest to the coast and, inland, Tamarack and Black Spruce increase gradually on an otherwise tundra-like landscape. There is a rapid transition from this subarctic, maritime coastal district and the forest-dominated ecodistricts of the adjacent inland ecoregions (Lopoukhine *et al.* 1978, Meades 1990). Fire is recorded on 7.8 percent of the district.

The coast has numerous islands, islets and shoals. Offshore islands are bare rock, with a tundra-like heath of dwarf shrubs and scattered grasses and sedges in depressions. Closer to shore, islands may be vegetated with stunted conifer trees. Offshore islands have varied topographies, ranging from steep cliffs to gentle slopes and low-lying grades (Russell and Fifield 2001b, IBA Canada 2012).

Water

Less than one percent of the district is occupied by wetlands, and slightly less than eight percent is in lakes and rivers. The vast majority of the area falls within the Alexis River drainage basin, although some rivers to the north belong to the Eagle River basin (WSC 2006). Important rivers traversing the district include the St. Peter's, St. Charles, Mary's Harbour, Black Bear, Sandhill and Dykes Rivers, as well as Capelin Bay, Partridge Bay, Shoal Bay, and Reeds Pond Brooks (Anderson 1985).

Flora and Fauna

The Gannet Islands Ecological Reserve hosts the largest Razorbill colony in eastern North America with over 14 percent of the total North American population. Approximately 13 percent of the North American population of Atlantic Puffins, and 11 percent of the eastern North American population of Common Murre also depend on these islands. Other seabirds nesting here include Thick-billed Murre, Black Guillemot, Northern Fulmar, Black-legged Kittiwake, Great Black-backed Gull, and Leach's Storm-Petrel. Large flocks of moulting Harlequin Duck also congregate around the islands in summer months (Thomas and Robertson 2008, Russell and Fifield 2001b, IBA Canada 2012).

The Bird Islands support large colonies of nesting Atlantic Puffin and Razorbill. Other nesting seabirds found on the islands include Great Black-backed Gull, Leach's Storm-Petrel, and Thick-billed and Common Murre (Russell and Fifield 2001b, IBA Canada 2012).

Atlantic Puffin, Gannet Islands. Parks and Natural Areas Division

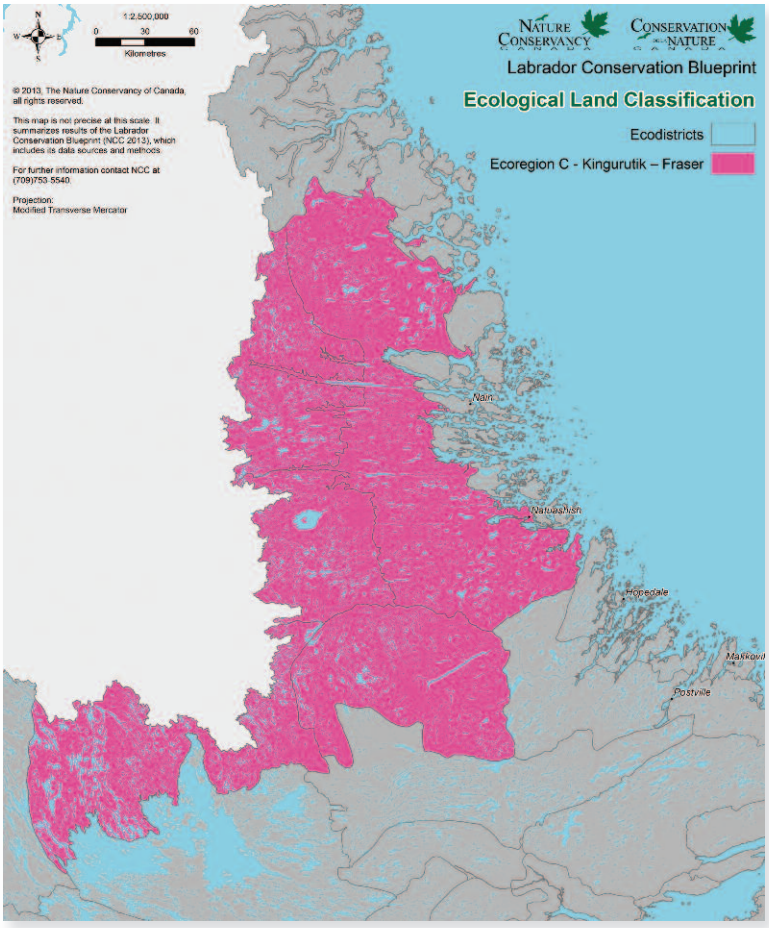
Harlequin Duck have been observed in pre-moulting concentrations around the inlets and islands of St. Peter Bay, which is also a major breeding and moulting area for Common Eider. Table Bay, to the north, is also significant for nesting Common Eider as well as moulting scoters (mostly Surf). Peregrine Falcons have been observed nesting on Devils Lookout Island in Table Bay (Russell and Fifield 2001c, IBA Canada 2012).

Land Use

South coast communities located within the Harbour Ecodistrict include Lodge Bay, Mary's Harbour, Penson's Arm, St. Lewis, Black Tickle, William's Harbour and the former Norman's Bay. Populations range from 78 to 207 people, all of them declining (Statistics Canada 2011). Fishing settlements and relicts of the historic fishery are frequent. It was this coast that inspired Jacques Cartier's famous description of Labrador, 'The Land God Gave Cain.' The traditional practice of collecting seabird eggs has declined in recent years (Lopoukhine *et al.* 1978, Russell and Fifield 2001c).

C Kingurutik-Fraser Ecoregion

High Subarctic: ESWG 1995:ER-78, EC 1999:ER-77



The Kingurutik-Fraser Ecoregion includes the south-eastern portion of the continental taiga that dominates the north-central Quebec-Labrador plateau.

This region is marked by cool summers and very cold winters. The mean annual temperature is approximately 4°C; the summer mean is 6.5°C and the winter mean is -15°C. Mean annual precipitation ranges from 600 mm in the east up to 800 mm in the west. Permafrost is extensive and discontinuous with low to moderate ice content in the northern third of the ecoregion, and with more sporadic, discontinuous occurrences southward.

The region is part of the Canadian Shield, and is an ancient erosion surface composed of massive early Precambrian granite, granitic gneiss, and acidic intrusives. Hummocky and drumlinized upper surfaces are covered by discontinuous, bouldery, sandy, till veneers. Elevations range from 630m to 1000m.

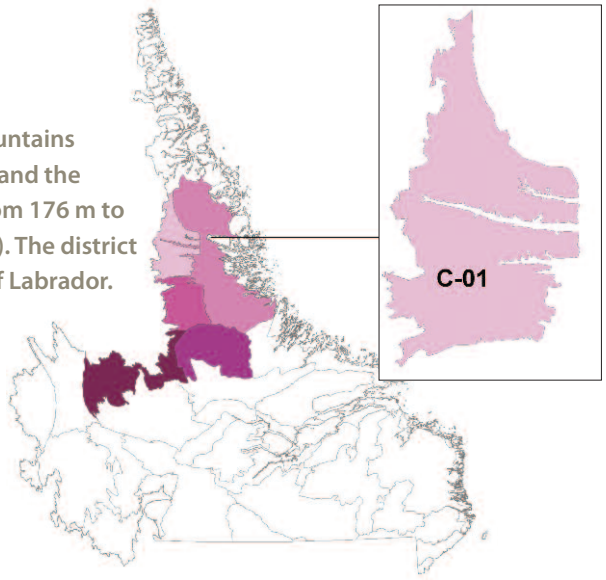
The higher elevations are dissected by the upper reaches of fjords and are dominated by extensive bare rocklands and tundra along with alpine heath of lichens, mosses, and sedges. Continuous vegetation occurs at lower, sheltered elevations and in depressions where snow accumulates and provides moisture through the growing season. Shallow peatland bogs and fens with perennially-frozen peat palsa occupy the lowlands and fluted microtopography of the plateau. Thickets of White Birch and willow frequently form the transition between tundra and very open spruce woodlands. Shrub birches, low Black Spruce, dwarf mixed evergreen and deciduous shrubs, and mosses dominate the peatlands and poorly drained sites. This ecoregion provides important habitat for Caribou, small mammals, waterfowl, and other birds. The region's inaccessible terrain provides opportunities for hunting, trapping, fishing, and outdoor recreation.

Fraser River: Waterfalls, Kogaluk River Valley. Geoff Goodyear

George River Caribou calving highlands. Isabelle Schmelzer

C-01 George Plateau Ecodistrict

The George Plateau Ecodistrict is bounded by the Torngat Mountains to the north, Quebec to the west, Mistastin Lake to the south, and the Fraser River to the east. Elevations on this high plateau rise from 176 m to more than 800 m, and average just over 500 m ASL (NRC 2007). The district occupies 6,923 km^2 (692,300 ha), approximately 2.4 percent of Labrador.



Climate

The George Plateau is distant from any moderating influences of the Labrador Sea and falls within the High Subarctic Ecoclimatic Region. Summers are short and cool; winters are long, severe and very cold (EWG 1989). Mean average temperature is -4.9°C (CFS 2013). Mean annual precipitation minus potential evapotranspiration averages 674 mm (Price *et al.* 2011). The growing season is 110 days. Permafrost is continuous in the district's northernmost extent, but it is discontinuous throughout the rest of the area (Brown *et a*l. 2001).

Geology and Substrates

The Shield bedrock is part of the Southeastern Churchill structural province, composed primarily of gneiss with some gabbro and other acidic intrusives (NL DNR 2011a). A corrugated topography with a distinctive north-south alignment of bedrock ridges characterizes the district .

Major areas are dominated by exposed bedrock and fractured, scattered rocks interspersed with shallow till. Morainic and glaciofluvial landforms occur, and impoundings of glacial meltwater have also deposited finer sediments in some lowlands (Lopoukhine *et al.* 1978, NL DNR 2011b).

Land Cover

The harsh continental climate restricts the vegetation to a sparse cover of arctic tundra lichens, mosses, prostrate ericads and willows, and sedges. Many of the exposed rocklands and cryoturbated soils are unvegetated or

support lichens and mosses only. *Stereocaulon* lichens dominate in comparison with the dominant *Cladonia* of more southern districts. Shallow fens with permanently frozen peat occupy small areas and organic deposits are more extensive than in areas to the north. Bare rock accounts for more than 50 percent of surface area, interspersed with alpine heath on the highlands and plateaus. Continuous vegetation occurs in depressions where snow accumulates or where meltwaters provide moisture through the growing season. White Birch, growing on the less stable scree, forms a transition between open rockland and tundra and spruce woodlands (Lopoukhine *et al.* 1978, Meades 1990).

Water

Overall, 0.2 percent of the district is occupied by wetlands and 16.3 percent by freshwater aquatic habitats. The district contains the headwaters of Fraser, Kingurutik, and Kogaluk Rivers, Kamanatsuk, Konrad and Anaktalik Brooks (Anderson 1985). The many waterbodies occurring throughout the district are largely unproductive and are susceptible to overfishing (Lopoukhine *et al.* 1978).

Flora and Fauna

Mammals in the area include Grey Wolf, Black Bear, Red Fox, Arctic Fox and Arctic Hare. Birds using barren tundra habitats include Peregrine Falcon, Rough-legged Hawk, Rock Ptarmigan, Snow Bunting, Gyrfalcon, Lapland Longspur and Snowy Owl. Shrubby thickets support Willow Ptarmigan, Tree Sparrow, and Northern Shrike (Meades 1990, Goudie *et al.* 1994, Whitford 1996).

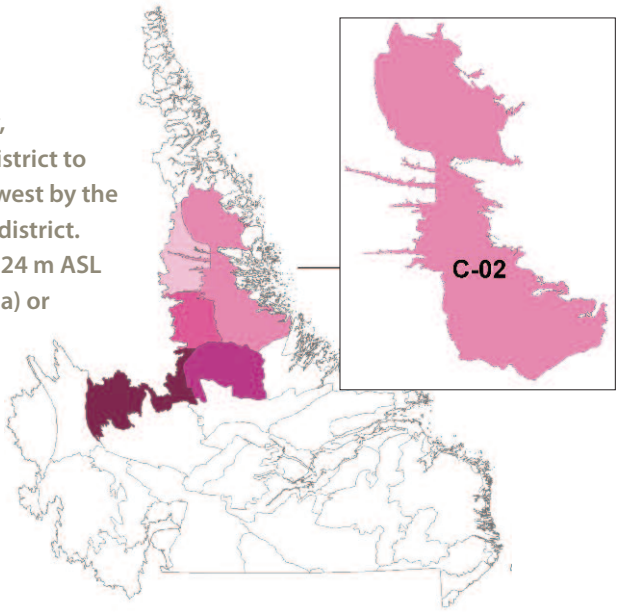
George River Caribou occur in the open-tundra and boreal habitats of northern Labrador. Their total population has cycled from lows of approximately 5,000 animals in the 1950s to highs of 775,000 in the 1980s (Couturier *et al.* 1996; Bergerud *et al.* 2008). This population is of the migratory ecotype and displays aggregated calving behaviour (Bergerud *et al.* 2008, COSEWIC 2011). George River Caribou move very long distances (sometimes >1,000 km) between calving and summering grounds in northern Québec and Labrador (Couturier *et al.* 1990, Bergerud *et al.* 2008, Taillon *et al.* 2012) and the southern boreal forest in winter. Calving grounds are not entirely fixed geographically over time at local scales, but they have been located in the same general areas for centuries (Couturier 2007, Taillon *et al.* 2012). The calving area for the George River Caribou herd is located in parts of this ecodistrict, and in the northern part of this ecoregion in general. Current population levels are estimated at just over 20,000 individuals, with low levels of calving success (NL DEC 2012).

George River Caribou. Valerie Courtois
George River Caribou in winter. Isabelle Schmelzer

Land Use

There are no permanent settlements in the district. Mineral exploration has been undertaken for nickel, copper and cobalt, and for rare earth elements. Hunting, trapping, fishing, and outdoor recreation are frequent land uses. Roughly 3.3 percent of the district is zoned to conserve the calving grounds of the George River Caribou herd under the proposed LISA Land Use Plan (LISA Regional Planning Authority 2012).

C-02 Fraser River Ecodistrict



The Fraser River Ecodistrict extends southward from Okak Bay, abutting the Domes district to the north and the Nain Coast district to the east. It is an area of rounded mountains, bordered on the west by the Western Plateau, and in the south by the Benedict Mountains district. The area rises from sea level to heights of 1038 m, averaging 324 m ASL (NRC 2007). The district encompasses 19,909 km^2 (1,990,900 ha) or almost seven percent of Labrador.

Climate

The continental climate has a mean annual temperature of -3.7°C (AA-FC 1999). Average annual precipitation minus potential evapotranspiration is 674 mm (Price *et al.* 2011). Permafrost is scattered in the south, widespread in central parts, and continuous in the northwest (Brown *et al.* 2001). The widespread forest cover in the valleys and lowlands indicates that climate is not as much a limiting factor to vegetation growth as it is in northern and surrounding districts (Lopoukhine *et al.* 1978).

Geology and Substrates

The mountainous interior terrain is a forbidding barrier to inland travel from the coast, especially the cliffs that border the Fraser and Kogaluk rivers. The glaciated, rounded mountains support open rocklands, frost shattered colluviums and erratics. Talus cones occur on steep upper bedrock slopes. The Fraser and Kogaluk river valleys that extend almost across Labrador, and the planed bedrock mountains and hills, are a direct result of glacial scouring. On the valley floors are colluvial aprons cascading down the slopes, glaciofluvial deposits reworked by modern streams, and assorted morainic materials (Lopoukhine *et al.* 1978, NL DNR 2011b). Both Nain and Churchill structural provinces are represented; bedrocks are anorthosites, gabbros and acidic intrusives (NL DNR 2011a).

Head of Fraser River. Geoff Goodyear

Notakwanon River Valley. Geoff Goodyear

Land Cover

At higher elevations, vegetation is minimal and lichens dominate. Shrub birches, willows and ericaceous shrubs can also occur above the tree line. Shrub growth on slopes consists of matted spruce, ericaceous shrubs and Tamarack, along with willows, alders, and shrub birches. Arctic species grow on the majority of sites in this area. The sheltered valleys support relatively large Black and White Spruce, and gnarled Tamarack grows on the slopes along with stunted spruce and Balsam Fir (Lopoukhine *et al.* 1978, Meades 1990).

Water

Overall, less than one percent of the district is wetlands and nine percent is open-water features. Rivers flow in an west-to-east direction and bottomland substrates consist mainly of sand and gravel. Major rivers traversing the area include the Fraser, Kingurutik, North, Adlatok, Hunt, Flowers, Notakwanon, and Kogaluk Rivers, as well as Konrad, Kogluktokoluk, Kamanatsuk, and Sango Brooks. Many tributaries are inaccessible to migrating fish due to steep canyon walls along the main valley. Large lakes such as the Tasialuk, Kingurutik, Cabot, and Tasisuak occur where river valleys widen.

Due to sparse vegetation and steep canyon walls, spring melt causes seasonal flooding in the lower rivers. The rivers are used for traditional hunting and fishing. The low productivity of the lakes and rivers makes them susceptible to overfishing. Arctic Char is the dominant fish species; Brook Trout, Atlantic Salmon, Lake Trout, Round Whitefish, and Threespine and Ninespine Stickleback also occur (Anderson 1985).

Flora and Fauna

The district provides habitat for the full range of taiga species, such as Black Bear and many smaller mammals, and Caribou make use of areas with heavy lichen growth. Cliff-dwelling raptors such as Peregrine Falcon, Golden Eagle, Gyrfalcon, and Rough-legged Hawk occur here (Whitford 1996), and Harlequin Duck breed in several rivers (Trimper *et al.* 2008).

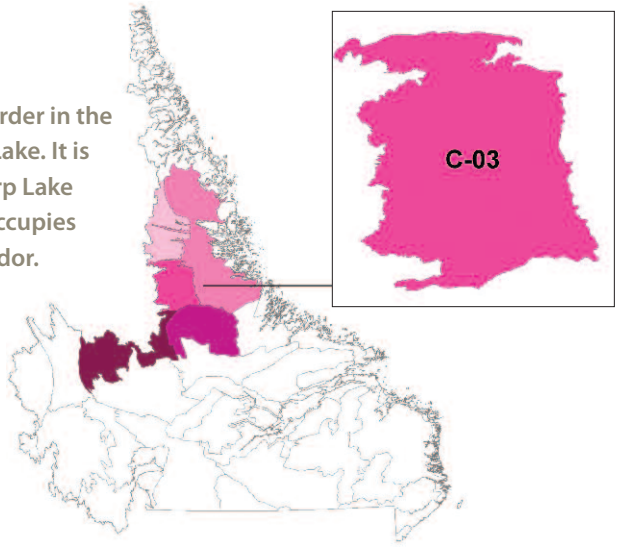
Land Use

The Innu community of Natuashish, population 931, is experiencing rapid population growth—40 percent since 2006 (Statistics Canada 2011). Hunting, trapping, fishing commercial outfitting, and outdoor recreation are principal land uses. Twenty percent of the district is zoned as Traditional Use under the proposed LISA Land Use Plan for the conservation of Atlantic Salmon and Arctic Char rivers, George River Caribou calving grounds, and other features (LISA Regional Planning Authority 2012).

Mistastin Lake Plain. John Riley

C-03 Mistastin Lake Ecodistrict

The Mistastin Lake Ecodistrict extends from the Labrador border in the west, east to Willow Lake and from there north of Mistastin Lake. It is bordered by the George Plateau Ecodistrict to the north, Harp Lake district to the south, and Fraser River district to the east. It occupies 5,894 km^2 (589,400 ha), approximately two percent of Labrador.



Climate

The district's climate is continental, part of the High Subarctic Ecoclimatic Region (EWG 1989). Average annual precipitation minus potential evapotranspiration is 681 mm (Price *et al.* 2011). The mean annual temperature is -4.4°C (CFS 2013), and permafrost is sporadic (Brown *et al.* 2001).

Geology and Substrates

Bedrock is of the Southeastern Churchill and Grenville structural provinces, mostly composed of monzonite, charnockite, and granite. Mistastin Lake originated from a meteor impact, resulting in a broad, flat terrain of brecciated meltrocks (NL DNR 2011a). This distinctive landform is called *Kameshtastan* ("where it is all blown away"), referring to the crumbling soils that are susceptible to blowouts. Also around Mistastin Lake are expanses of exposed bedrock, morainic veneer and glaciofluvial deposits. Broad river valleys, former lake beds and rolling hills composed of exposed rock, till and glaciofluvial materials characterize the district as a whole (NL DNR 2011b). Eskers occur and generally have a west-to-east alignment. Elevations range from 130 m to 763 m, averaging 476 m ASL (NRC 2007).

Land Cover

The tree limit in the western part of the Labrador-Ungava peninsula traverses the Mistastin Lake Ecodistrict. Stunted "candelabra" Black Spruce scattered among expanses of lichens are characteristic. Along watercourses and on lower slopes there is superior tree growth. The thick lichen carpets common to the district are mixed with scattered ericaceous shrubs, mosses and sedges. The latter species are concentrated on organic terrain. Excessively-drained sites have uninterrupted cover of lichens (Lopoukhine *et al.* 1978, Meades 1990).

Water

Less than one percent of the district is covered in wetlands, while more than 15 percent is covered by lakes and rivers. The headwaters of several important rivers such as the Notakwanon and Kogaluk Rivers, and Konrad and Kogluktokoluk Brooks are in the area (Anderson 1985).

Flora and Fauna

The terrain supports the George River Caribou herd, and many of the district's lichen-rich habitats are criss-crossed with Caribou trails. Arctic Hare, Short-eared Owl, and other open-range species occur here. Harlequin Duck breed on tributaries flowing into the lake (Trimper *et al.* 2008).

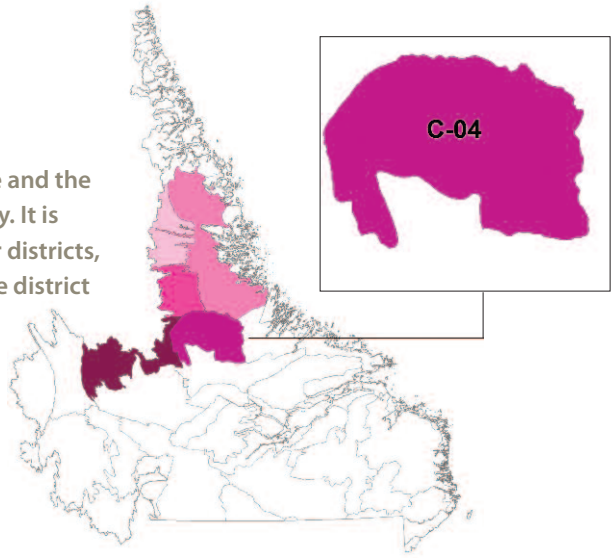
Land Use

Mistastin Lake is an important cultural and spiritual site for the Innu people of Sheshatshiu and Natuashish, in particular, who maintain traditional camping sites here year round. Some of Labrador's oldest-dated Aboriginal artifacts, dated to 9,200 years before present, reflect the cultural importance of Kameshtastan. Remote cottages and outfitting lodges are also located at Border Beacon and on Crystal Lake. Land uses include hunting, trapping, fishing, and outdoor recreation.

Mistastin Lake. John Riley
Kameshtastan. Isabelle Schmelzer

C-04 Harp Lake Ecodistrict

The Harp Lake Ecodistrict extends north of Snegamook Lake and the upper Kanairiktok River and south of the Adlatok River valley. It is bordered to the north by the Mistastin Lake and Fraser River districts, the North Michikamau district to the west, and the Seal Lake district to the south. The district is 9,643 km^2 (964,300 ha) in size, approximately 3.3 percent of Labrador.



Climate

The continental position of the district results in cool summers and very cold winters. The mean annual temperature is approximately -3.7°C (CFS 2013). The mean annual precipitation minus potential evapotranspiration averages 719 mm (Price *et al.* 2011). Permafrost is found in isolated patches with low ice content, mainly in wetlands (Brown *et al.* 2001).

Geology and Substrates

The district is primarily a rolling bedrock plain of the Southeastern Churchill and Grenville structural provinces, with numerous lakes. Some isolated rugged hills stand above the general surface with elevations ranging 72 m to 843 m, averaging 488 m ASL (NRC 2007).

Harp Lake. Joe Brazil

Deeply-incised valleys such as the one occupied by Harp Lake are characteristic. The district is underlain by massive Archean granites, granitic gneisses, and acidic intrusives (NL DNR 2011a). Barren rocklands are common and, elsewhere, the bedrock is sparsely overlain by thin veneers of hummocky, discontinuous morainal sediments (NL DNR 2011b). Colluvial fans, talus slopes, scattered rock debris, and a few glaciofluvial deposits at lower elevations are also characteristic landscape features (Lopoukhine *et al.* 1978).

Land Cover

Subarctic tundra vegetation is typical of the district. Lichens and mosses surround extensive areas of bare rock, while dwarf spruce and Tamarack mixed with heath species grow in scattered swales. The sheltered lower slopes, particularly in the east, support stands of White and Black Spruce forests, typically with a feathermoss understorey. Balsam Fir also occurs (Lopoukhine *et al.* 1978, Meades 1990). Wildfires have burned 5.1 percent of the district but fire is much more frequent in districts both to the north and south of Harp Lake. Lichen woodlands are restricted to a few river valley floors, most notably the Shipiskan.

Water

The Harp Lake Ecodistrict has approximately 0.5 percent of its area occupied by wetlands, but almost ten percent is open freshwater aquatic habitats. The district includes some of the headwaters of the Adlatok River, a major drainage flowing to the Labrador Sea. The Shipiskan River, a tributary of the Kanairiktok, forms the major southern basin and also traverses the district on its way to the Labrador Sea (WSC 2006). Deep lakes contain trout but are relatively unproductive (Anderson 1985).

Flora and Fauna

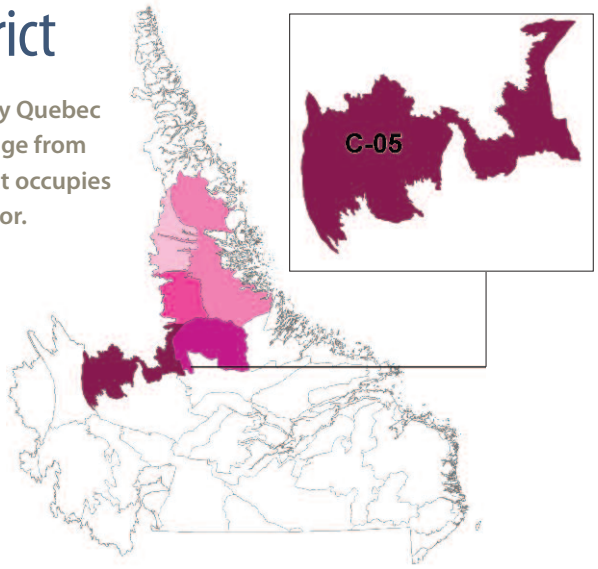
The upland barrens are generally poor wildlife habitat, although protected lower slopes contain habitat for the characteristic suite of taiga species. Cliff-nesting raptors such as Peregrine Falcon, Golden Eagle, and Gyrfalcon occur here (Whitford 1996), and Harlequin Duck are common (Trimper *et al.* 2008).

Land Use

There are no permanents settlements in the district. Hunting, trapping, fishing, and outdoor recreation are principal land uses, and there is no visible human footprint.

Rainbow by Harp Lake. Geoff Goodyear

C-05 North Michikamau Ecodistrict



The North Michikimau Ecodistrict is bordered on the north by Quebec and on the south by the Smallwood Reservoir. Elevations range from 253 m to 730 m, averaging 504 m ASL (NRC 2007). The district occupies 10,284 km^2 (102,84 ha), approximately 3.5 percent of Labrador.

Climate

The North Michikimau Ecodistrict falls within the High Subarctic Ecoclimatic Region (EWG 1989) and has a continental climate. The mean annual temperature is -3.8°C (CFS 2013). Mean annual precipitation minus potential evapotranspiration averages 622 mm (Price *et al.* 2011). Snow generally persists in places until May or June. Organic terrain is more prevalent in the district compared to farther north. In the majority of the district, permafrost occurs in isolated patches (Brown *et al.* 2001).

Geology and Substrates

The bedrock geology is part of the Southeastern Churchill structural province, primarily composed of Archean granite and gneiss with other acidic intrusives (gabbros). Sedimentary arkoses and conglomerates occur in the westernmost part of the district (NL DNR 2011a). Broad river valleys, former lake beds and rolling hills composed of exposed rock covered in a thin till veneer are characteristic. Coarse glaciofluvial deposits are very limited in extent, but are especially evident on the river terraces of the Kanairiktok Valley. Rogen moraines occur in the northeast near Border Beacon (NL DNR 2011b).

Land Cover

Broad lowland flats are covered with bog and fen peatlands, particularly around Adelaide, Crossroads, Woods, Snelgrove, Wade, and Robin Lakes. Wetlands are oriented north-south in the west, and west-east elsewhere. On higher ground, stunted Black Spruce are scattered in characteristic expanses of lichen. Thick carpets of lichen are mixed with scattered shrub heath, mosses and sedges. The latter species are concentrated on organic terrain. Some of the excessively-drained sites have uninterrupted, multi-aged patterns of lichen cover that originated from multiple wildfires over many centuries. Along watercourses and lower slopes, where better tree growth occurs, forests with feathermoss understoreys dominate (Lopoukhine *et al.* 1978, Meades 1990).

Water

The North Michikimau Ecodistrict is rich in both open freshwater features and wetlands, with 19 percent and 13 percent of the district occupied by these habitats, respectively. Important rivers traversing the district include the Ashuanipi and McKenzie, which flow into the Smallwood Reservoir (WSC 2006). The district contains many lakes of varying sizes including Montgomery, Snelgrove, Andre, Quartzite, Gill, Wade, Woods, Knox, Vezina, Crossroads, Le Soeur, and Adelaide.

Flora and Fauna

The district's many freshwater habitats support populations of Beaver, Muskrat, Otter, and Mink as well as shorebirds like the Least, Solitary and Spotted Sandpiper. Shrub thickets support Willow Ptarmigan, Tree Sparrow and Northern Shrike, while forests provide habitat for Merlin, Northern Flicker, Blackpoll Warbler, Three-toed Woodpecker, and Swainson's Thrush. Abundant wetlands sustain Rusty Blackbird, Lincoln's Sparrow, Short-eared Owl, and mammals such as Bog Lemming. Ubiquitous species include Black Bear, Lynx, Wolf, Ermine, Red Fox, Snowshoe Hare, Porcupine, Red Squirrel, and Masked Shrew (Meades 1990). Common fish species include Arctic Char, Brook and Lake Trout, Northern Pike, and Threespine and Ninespine Sticklebacks.

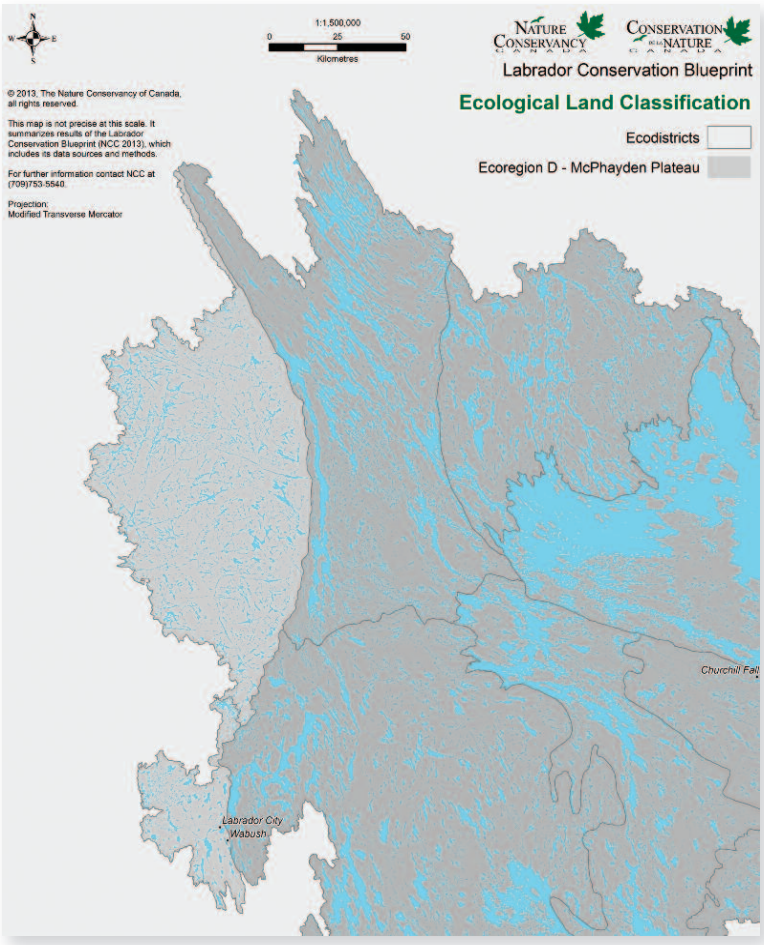
George River Caribou, and nesting Osprey and Bald Eagle are seasonally common in this district (Bergerud *et al.* 2008, Trimper pers. comm. 2013).

Land Use

There are no permanent settlements in the district, although there are a number of remote cabins. Seasonal hunting, trapping, fishing, and outdoor recreation activities are principal land uses. Commercial outfitting lodges are found on the McKenzie River at Andre Lake, Knox Lake, Woods River, Crossroads Lake, and Vezina Lake.

D McPhayden Plateau Ecoregion

Low Subarctic: ESWG 1993:ER-91; ESWG 1995:ER-74; QC 2010:IO3 & D07 in part.



The McPhayden Plateau (or Central Plateau) is part of the massive central Canadian Shield, the bulk of which lies in Quebec. Only a small portion occurs in western Labrador.

Labrador's westernmost ecoregion includes the McPhayden Plateau, also called the Kaniapiskau Plateau, and a small district to the northwest of Wabush and Labrador City. The region has cool summers and very cold winters. The mean annual temperature is about -4.5°C, averaging about 8.5°C in summer and -18°C in winter. The mean annual precipitation is in the order of 800 mm to 900 mm, of which 400 mm falls as snow.

The plateau is part of the Superior structural province, a rugged terrain of massive early Precambrian metamorphic and igneous gneissic bedrocks, averaging 750 m ASL. This is the only portion of the Superior structural province to occur in Labrador, and it is conspicuously etched with a myriad complex fracture systems aligned in multiple directions. As a result its terrain is sharply differentiated along its eastern boundary, where it meets the Labrador Trough, a terrain with a different bedrock and a distinctly northwest-southeast bedrock alignment of raised ridges and shallow troughs.

The highlands of the region are open lichen woodlands, primarily of Black Spruce, shrub birches, Northern Labrador Tea, and lichens. The shrub component usually comprises about 50 percent of the ground cover. Vegetative cover is more sparse on colder, dry sites, and poorly-drained sites support Labrador Tea, sedges, and *Sphagnum* mosses. Sporadic discontinuous permafrost with low ice content is prevalent throughout the region. Bare rock outcroppings are common. Characteristic wildlife includes Red Fox, Snowshoe Hare, Grey Wolf, Black Bear, waterfowl, and boreal landbirds.

McPhayden Plateau to the west (left) and Labrador Trough to the east (right), illustrating the differences in landform, topography and bedrock of two adjacent ecoregions and ecodistricts. Source: Labrador Nature Atlas

D-01 McPhayden River Ecodistrict

The McPhayden River Ecodistrict forms the westernmost part of Labrador, sloping gently east towards the Labrador Trough and the Smallwood Reservoir. The district's eastern boundary is marked by a scarp that is west of Howell's River and the Menihek Lakes. Elevations range from 472 m to 867 m, averaging around 600 m ASL (NRC 2007). The district encompasses 7,910 km^2 (791,000 ha), about three percent of Labrador.

Climate

The district's continental subarctic climate falls within the High Subarctic Ecoclimatic Region (EWG 1989). Average annual temperature is -3.9°C (CFS 2013). Annual precipitation (minus potential evapotranspiration) averages 601 mm (Price *et al.* 2011). Mean annual length of the growing season is 132 days. Permafrost is sporadic and discontinuous (Brown *et al.* 2001).

Geology and Substrates

The McPhayden or Kaniapiskau Plateau consists principally of rounded, rocky hills with thin and scattered drift (NL DNR 2011b). The bedrock of Precambrian metamorphic gneiss forms part of the Superior structural province (NL DNR 2011a). Bedrock is fractured at fine scales, resulting in a distinctive pattern of hills intersected by medium-size, weakly-connected lakes and ponds that are often linear in shape. A number of river valleys were glacial spillways (Lopoukhine *et al.* 1978). A few small wetlands occupy the lowland fractures.

Land Cover

Thin substrates, a high fire frequency, and climatic conditions combine to produce a predominantly open lichen woodland terrain with varying densities of shrub understorey. Black Spruce is the dominant tree species. Large burns of multiple ages overlay each other conspicuously across the region, covering 10.9 percent of it. The lakes, streams and rivers visibly criss-cross the land, but associated wetlands and peatlands are relatively small and inconspicuous by comparison. Deep, fresh soils line waterways and blanket lower slopes, where White and Black Spruce and Balsam Fir trees can grow to a considerable size (Lopoukhine *et al.* 1978, Meades 1990).

Water

Less than one percent of district supports wetland habitats, but nearly 12.5 percent is in open freshwater habitats such as lakes and rivers. The entire district falls within the Ashuanipi River drainage basin (WSC 2006).

Flora and Fauna

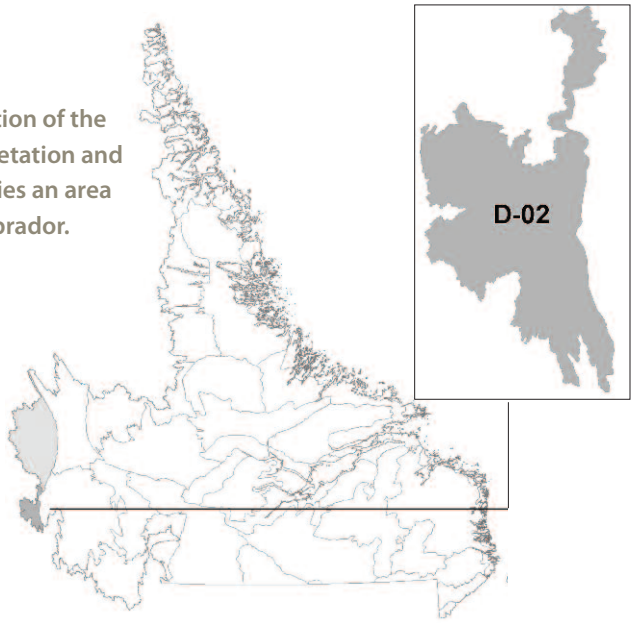
Bald Eagle, and Osprey occur in this district seasonally (SSLP 2012a). The district once supported the sedentary Kaniapiskau or McPhayden Woodland Caribou herd, which has declined or disappeared since the 1960s (Bergerud *et al.* 2008, D'Astous and Trimper 2010).

Land Use

There are no permanent settlements in the district, and hunting, trapping, fishing, and outdoor recreation are the principal land uses.

D-02 Wabush Ecodistrict

North and west of Wabush and Labrador City is a small portion of the central Laurentian Plateau, similar in terrain, landform, vegetation and wildlife to the McPhayden Ecodistrict to the north. It occupies an area of 1,339 km^2 (133,900 ha), approximately 0.5 percent of Labrador.



Climate

The district is part of the Mid Subarctic Ecoclimatic Region and is marked by cool summers and very cold winters (EWG 1989). The average annual temperature is -3.1°C (CFS 2013). Average annual precipitation minus potential evapotranspiration is 612 mm (Price *et al.* 2011). Permafrost is found in isolated patches with low ice content, except in the district's northernmost reaches where it is sporadic and discontinuous (Brown *et al.* 2001).

Geology and Substrates

The bedrock is predominantly of massive Precambrian granite and gneiss, part of the Superior structural province. Rare dolomite marble deposits are concentrated in the vicinity of Wabush (NL DNR 2011a). The district's uplands are bedrock-controlled, while the rest is blanketed by with thin glacial drift. Coarse glaciofluvial deposits are sporadic (NL DNR 2011b). Like the McPhayden Plateau, the Wabush Ecodistrict is conspicuously etched with complex bedrock fractures running in multiple directions. The rolling terrain of this former erosion surface lies between 524 m and 904 m, averaging 631 m ASL (NRC 2007).

Iron mining in Labrador West. Tina Leonard

Land Cover

Wildfires are evident on 15.7 percent of the district but overall the district has some of the most mature lichen cover in Labrador, with the brightest albedo. The fractured bedrock terrain is organized as a distinctive, dense pattern of rocky hills supporting open lichen-rich spruce woodlands, intersected by medium-size, weakly-connected lakes, ponds and wetlands occupying the lowland fractures. Closed stands of Black Spruce and Balsam Fir are dominant along lower slopes, whereas upper slopes are dominated by more open stands of Black Spruce with some White Spruce and White Birch (Lopoukhine *et al.* 1978, Meades 1990).

Black Spruce blueberry forest, Duley Lake Provincial Park. NL Parks and Natural Areas Division

Water

Overall, less than one percent of the district is occupied by wetlands and almost 13 percent by open-water features. The entire district falls within the Ashuanipi River drainage basin (WSC 2006). Important lakes here include Lac Jean, Virot, Huguette, Long, Little Wabush, Lorraine, Carol, and Luce Lakes. The Walsh River traverses the district.

Flora and Fauna

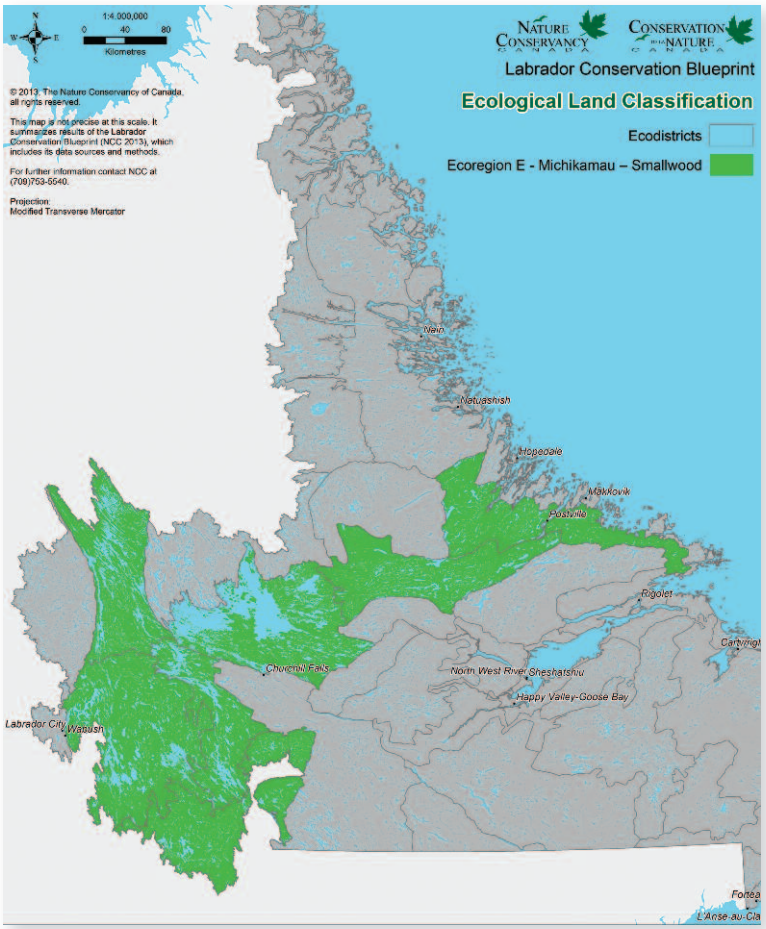
Characteristic wildlife species include Black Bear, Grey Wolf, Moose, Lynx, and Snowshoe Hare. Bird species include Canada Goose, Ruffed Grouse, and American Black Duck (ESWG 1995 SSLP 2012b).

Land Use

The expanding population centres of Labrador City and Wabush are located in the district. Together these areas have a total population of approximately 10,000 (Statistics Canada 2011). Iron ore mining is the principle industry, with several open pit mines located near town centres. Extraction for aggregate and for dolomite used in pelletizing ore also occurs, as does limited forest harvesting and extensive bush access for hunting, fishing and other recreational activities. Cabin-building is commonplace. The district includes Duley Lake Provincial Park, which occupies 0.6 percent of the district.

E Michikamau -Smallwood Ecoregion

Low Subarctic: ESWG 1995:ER-78; EC 1999:ER-78; Meades 1990:ER-5.



The Michikamau - Smallwood Ecoregion encompasses the upland plateaus of central and western Labrador.

The largest portion of the region lies west and south of the Smallwood Reservoir, spanning the Labrador-Quebec boundary in southwestern Labrador. The remainder extends across central Labrador from the Smallwood Reservoir in the west to Postville near the Coastal Barrens Ecoregion. The region is marked by cool summers and very cold winters. The mean annual temperature is approximately -3.5°C. The mean summer temperature is 9°C and the mean winter temperature is -15°C. The mean annual precipitation ranges from 700 mm in the north, to 1,000 mm along the Labrador border to the south.

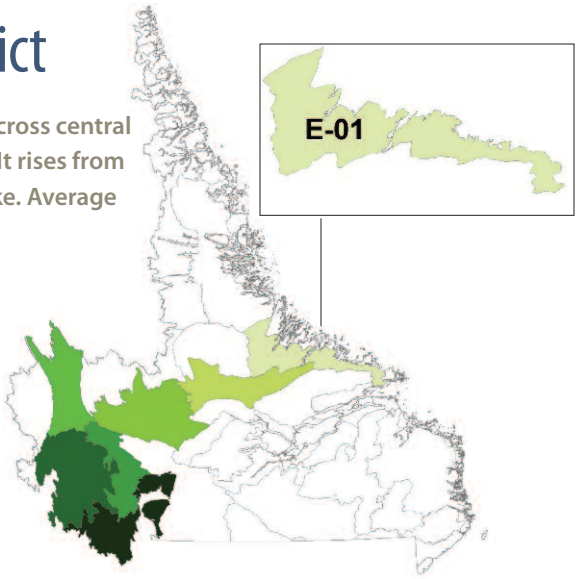
Overall, the region is a flat, rolling plateau with numerous lakes and isolated rugged hills composed of early, acidic Precambrian granite and gneiss, with intrusives frequently rising as much as 150 m above the general terrain. The bedrocks are part of the Churchill, Grenville, Nain, and Makkovik structural provinces, of sedimentary, metamorphic and volcanic rocks and acidic intrusives. Glacial landforms include numerous eskers and drumlins, and deep tills and glaciofluvial deposits overlaying the bedrock. Permafrost occurs in scattered patches, in peatlands only towards the south.

The region's tree cover is transitional between the open woodlands, taiga and tundra of the north, and more closed spruce forests to the south. Frequent wildfires are evident, and are part of a cyclic regeneration of vegetation, which succeeds to lichen woodlands towards the north (and on dry sites) and to denser woodlands in the wetter south. Southern areas are characterized by closed stands of lichen-rich White Spruce woodland with understoreys of feathermoss. Lowlands support Black Spruce-*Sphagnum* sites, and open fen peatlands are characteristic of the region, increasing in frequency toward the west, where they are variably patterned with ponds, pools and ribs. Tamarack fens and swamps often border streams and drainways. Balsam Fir is rare, and Trembling Aspen reaches its northward limit here. The southwestern edge of the region supports small stands of Jack Pine near Ashuanipi Lake, the species' only natural occurrence in Labrador. The region provides habitat for a wide range of wildlife including; Caribou, Moose, Porcupine, Lynx, Marten, Snowshoe Hare, Black Bear, Red Fox, Osprey, Bald Eagle, and several species of waterfowl. Common fish include Arctic Char, Atlantic Salmon, Brook Trout, Lake Trout, Northern Pike, and Sucker.

Joseph Lake: Lichen Woodland. Jean-Francois Senecal

E-01 Benedict Mountains Ecodistrict

The Benedict Mountains Ecodistrict extends from west to east across central Labrador, and south from the Hunt River valley to the Big River. It rises from sea level to 804 m ASL in the mountain range that is its namesake. Average elevation is 156 m ASL (NRC 2007). The area occupies 9,378 km^2 (937,800 ha), approximately 3.2 percent of Labrador.



Climate

The climate is cold, with a mean annual temperature of -1.7°C (CFS 2013). Average annual precipitation minus potential evapotranspiration is 702 mm (Price *et al.* 2011). Permafrost is widespread towards the north and on the Benedict Mountains, and is scattered elsewhere (Brown *et al.* 2001).

Geology and Substrates

Uplands are generally rugged and occur in parallel ridges with exposed bedrock tops and side-slopes mantled in thin veneer tills. Deeper tills occur on lower slopes. Lowlands are centered on broad west-to-east watercourses and their valleys. Towards the coast, a few larger valley bottoms have fine-textured marine sediments that support peatlands. The rounded Benedict Mountains occur in the eastern section of the district and rise abruptly behind the coast (Lopoukhine *et al.* 1978). Bedrock is predominantly Precambrian igneous, acidic intrusives and associated metamorphic rocks (NL DNR 2011a). The dominant landforms are bedrock outcrops with thin mantling veneer tills, and slope-bottom colluvial deposits. Some glaciofluvial deposits also occur in the valleys (NL DNR 2011b).

Land Cover

The extensive areas of rockland, glaciofluvial deposits, dunes and till veneers are well drained and support slow-growing, sparse, lichen-rich spruce woodland. More productive White Spruce and Balsam Fir forests grow in sheltered areas and lower slopes in hilly areas. Trembling Aspen reaches its northern limit in the district (Lopoukhine *et al.* 1978, Meades 1990). Large wetlands are uncommon. The lack of tree cover on the Benedict Mountains is striking, as is the paucity of wildlife, and past wildfire has been recorded on 16 percent of the district.

Water

Wetlands comprise less than two percent of the Benedict Mountains Ecodistrict; ten percent is open water habitat. The region is dominated by two large river systems, the Kanairiktok and the Adlatok, each of which has a drainage area of more than 10,000 km^2. Other important rivers traversing the district include Michael, Tukialik, Pamiulik, Big, Makkovik, Kaipakok, and English. Rivers are characterized by slow to medium flows as they meander through substantial sand and gravel deposits. Many large lakes such as Snegamook are surrounded by low mountains and high bedrock outcroppings. Near the coast, the plateau ends abruptly and the lower sections of many rivers are obstructed by rapids and falls (Anderson 1985).

Flora and Fauna

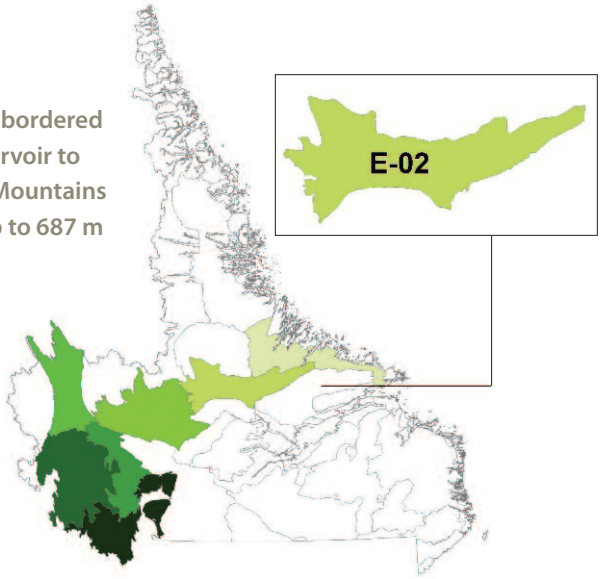
The widespread areas of open lichen rockland and woodland in the district provide potential habitat for Woodland Caribou, which were once common in the district (Bergerud *et al.* 2008), but are now believed extirpated (Trimper, pers. comm. 2013). Generally, habitats are under-utilized by wildlife.

Land Use

The community of Postville is located in the district. It had a population of 206 in 2006 but it has since declined by six percent (Statistics Canada 2011). Over 12 percent of the district is zoned for Traditional Use under the LISA Land Use Plan, chiefly to maintain Atlantic Salmon and Arctic Char spawning areas, and other traditional Inuit activities (LISA Regional Planning Authority 2012).

E-02 Seal Lake Ecodistrict

The Seal Lake Ecodistrict extends across central Labrador. It is bordered to the north by the Harp Lake Ecodistrict, the Smallwood Reservoir to the west, the Upper Naskaupi to the south, and the Benedict Mountains Ecodistrict to the east. Elevations average 330 m and range up to 687 m ASL (NRC 2007). The district occupies 9,956 km^2 (995,600 ha), slightly more than three percent of Labrador.



Climate

The climate is cold, with a mean annual temperature of -2.4 °C (CFS 2013). Average annual precipitation minus potential evapotranspiration is 688 mm (Price *et al.* 2011). Permafrost is widespread (Brown *et al.* 2001).

Geology and Substrates

The terrain is predominantly of rugged hills, broad valleys and organic lowlands, largely oriented linearly in a west-east direction. Bedrocks are Precambrian igneous granite, gneiss and gabbro, with distinctive metasedimentary siltstone, sandstone and dolomite in the west (NL DNR 2011a). Sand and gravel plains, deltas and kame terraces are also frequent and the terrain is characterized by strongly-defined linear west-east ridges and valleys. There are sand dunes on the shores of Snegamook Lake and along the Kaipokok River.

Land Cover

The extensive areas of rockland, glaciofluvial deposits, dunes and till veneers are well drained and support slow-growing, sparse, lichen-rich spruce woodland. More productive White Spruce and Balsam Fir forests grow in sheltered areas and on lower slopes in hilly areas. Trembling Aspen reaches its northern limit in the district (Lopoukhine *et al.* 1978, Meades 1990). Large wetlands are uncommon, and past wildfire has been recorded on 19 percent of the district.

Water

Overall, 1.2 percent of the Seal Lake Ecodistrict is composed of wetlands and 14 percent is open water (NRC 2007). Important rivers traversing the area include the Shipiskan, Kanairiktok, Naskaupi, and Thomas (Anderson 1985). The district contains several lakes such as Shipiskan, Colford, Wuchusk, Seal, Naskaupi, Caribou, and Desolation Lakes.

Flora and Fauna

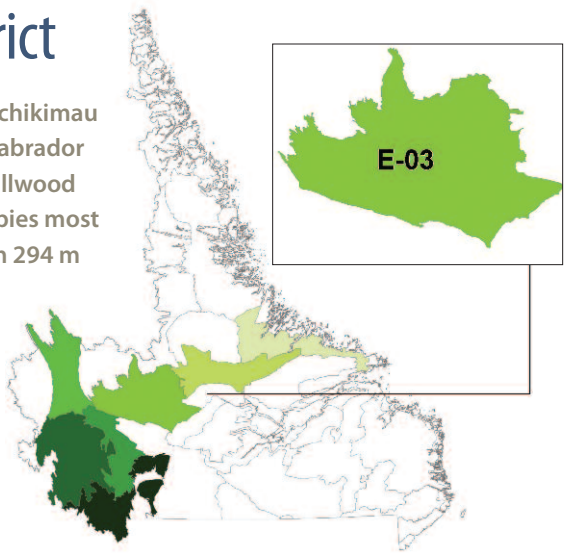
The George River Caribou herd migrates through the area during their winter migration. Black Bear, Grey Wolf, Lynx, Red Fox, Porcupine and Red Squirrel are ubiquitous. Habitat for waterfowl is of high quality and abundance. Harlequin Duck are found on the Shipiskan River and the Kanairiktok River(Lopoukhine *et al.* 1978, Meades 1990, Trimper *et al.* 2008).

Land Use

No settlements are located in the district. The long rivers and spectacular scenery attract hunters, anglers, trappers, and outdoor enthusiasts. The district has a long history of cultural use by Innu peoples. There is high potential for uranium mining based on large concentrations in the Central Mineral Belt.

Canada Lynx. Steve Michelin

E-03 Smallwood Reservoir Ecodistrict



The Smallwood Reservoir Ecodistrict is bordered by the North Michikimau district to the north, the Churchill Falls district to the south, the Labrador Trough to the west and the Seal Lake district to the east. The Smallwood Reservoir covers 6527 km^2 (Bazjak and Roberts 2011b), and occupies most of the district's north and western sections. Elevations range from 294 m to 658 m ASL. The working level of the reservoir is 472 m ASL (NRC 2007). The district occupies 14,512 km^2 (1,451,195 ha), approximately five percent of Labrador's total area.

Climate

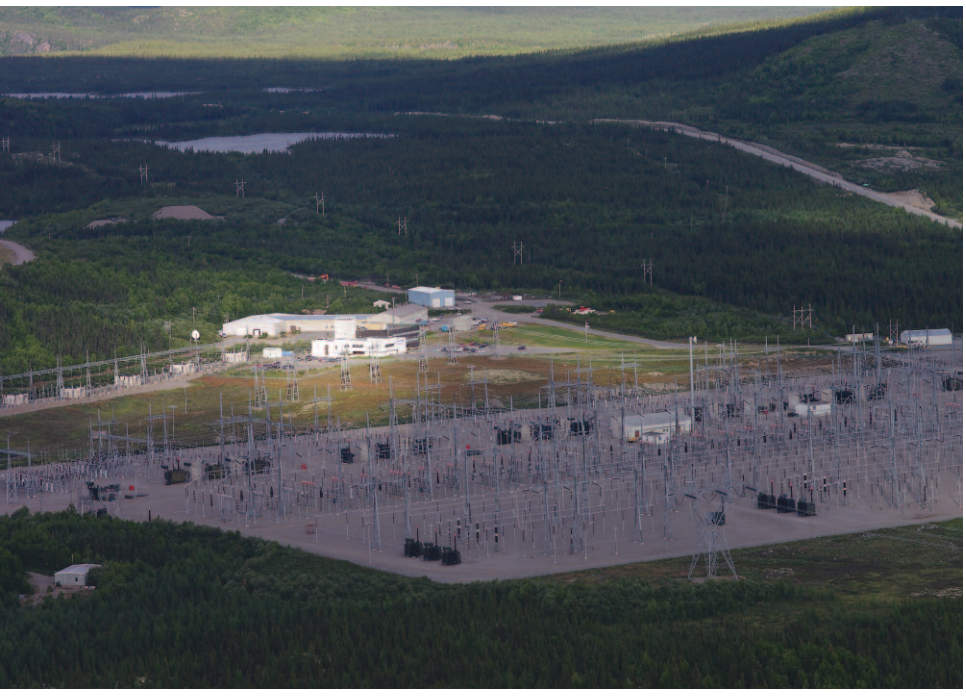
The district's continental climate falls within the Mid Subarctic Ecoclimatic Region (EWG 1989) and is characterized by cool, short summers and long, severe winters. The reservoir moderates the local climate. Mean annual growing season is 136 days. Average annual temperature is -3.1°C (CFS 2013), while average annual precipitation minus potential evapotranspiration is between 642 mm (Price *et al.* 2011). Isolated patches of permafrost occur in peatlands (Brown *et al.* 2001).

Geology and Substrates

The underlying bedrock is of the Churchill and Grenville structural provinces; the former chiefly composed of sedimentary, gneissic and other acidic intrusive rocks, and the latter of granite, granodiorite and syenite (NL DNR 2011a). Bedrock outcrops are uncommon, as the district is characterized by relatively deep glacial till and by esker and drumlin ridges. West-east oriented west rogen moraines are prominent to the northeast and southwest. Glaciofluvial deposits are sporadic. Organic terrain is concentrated in the north, northeast and central portions of the district (NL DNR 2011b).

Land Cover

The district is transitional between the boreal forest to the south and woodland-tundra vegetation to the north. Open and semi-open Black Spruce forests with feathermoss or dwarf-shrub understoreys occur on well to moderately-drained sites. Some areas support fairly dense conifer forests that contain Balsam Fir and White Spruce.



Dry sites are dominated by open *Cladonia* and *Cladina* woodlands with varying shrub cover. On wet bottom slopes treed swamps grade into open string bog-fen complexes with scattered Tamaracks on poorly drained flats. White Birch is found in pure and mixed stands on disturbed sites. Extensive wildfires have burned in the southeast, and forest regeneration is slow. Poor sites have been converted to heath barrens where fires were particularly severe (Bazjak and Roberts 2011a,b,c).

The Smallwood Reservoir inundated numerous lakes and extensive forests and organic terrain. Impacts included de-watered sections of the Churchill River, lowered water levels in other lakes, and new shorelines. Mud flats have developed in places where the near shore lake bottom was gently sloping. More broadly, shores in the district support alder-willow thickets along shorelines, while tundra-like meadows of mosses and sedges occur on higher, drier ground. Areas where vegetation was removed due to construction have been re-colonized by alders (Bazjak and Roberts 2011a,b,c).

Water

The Smallwood Reservoir is the largest man-made feature in Labrador, and nearly half of the district is covered by water. Water is stored behind 88 dikes and five control structures, with one major outlet (Bazjak and Roberts 2011a). Drainage basins include the Smallwood Reservoir itself as well as the Kanairiktok and Naskaupi River Diversions (WSC 2006). Overall 8.6 percent of the district is covered in wetlands.

The district contains lakes such as Hope Lake, Disappointment Lake, and Ptarmigan Lake, the famed locales for the ill-fated journey of Leonidas Hubbard and George Wallace to Michikamau Lake, chronicled in the book *The Lure of the Labrador Wild*.

Flora and Fauna

The Smallwood Reservoir Ecodistrict provides abundant forage and breeding habitat for waterfowl. During construction, the downstream slopes of many dykes were seeded with grass, providing forage for nesting Canada Geese (Bazjak and Roberts 2011c). Osprey and Bald Eagle are common nesting raptors in the district (SSLP 2012a).

Land Use

The road network established during the construction of the Smallwood Reservoir makes this one of the most accessible districts in Labrador. There are numerous quarries and gravel pits opened to build the dykes and roads (Bazjak and Roberts 2011c). Many residents of Churchill Falls have remote cabins in the area. The control structures at Esker and Lobstick are popular places to fish for large Lake Trout and Northern Pike. A few commercial outfitting lodges are also located here.

Churchill Falls transmission site, above underground turbine housings. John Riley

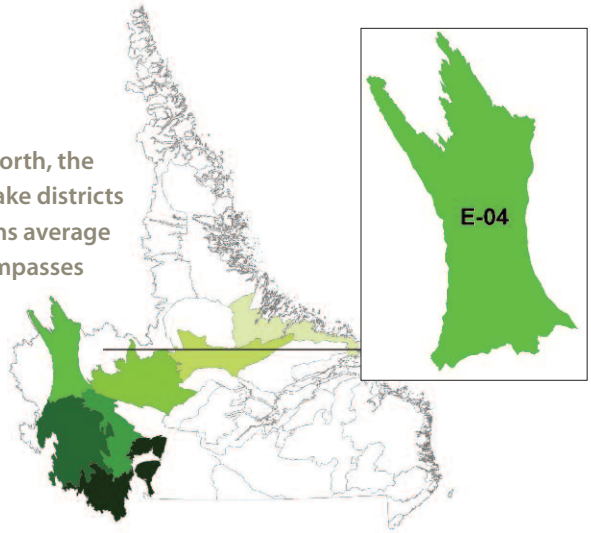
Smallwood Reservoir. Lindsay Notzl

Dewatered Churchill River. John Riley

Labrador Trough, esker-defined lakes. John Riley

E-04 Labrador Trough Ecodistrict

The Labrador Trough Ecodistrict is bounded by Quebec to the north, the McPhayden Plateau to the west, the Lac Joseph and Atikonak Lake districts to the south, and the Smallwood Reservoir to the east. Elevations average 505 m, and range from 455 m to 918 m ASL (NRC 2007). It encompasses 9,938 km^2 (993,800 ha), approximately 3.4 percent of Labrador.



Climate

The district is part of the Mid Subarctic Ecoclimatic Region (EWG 1989) and is characterized by cool summers and very cold winters. The mean annual temperature is -3.7°C (CFS 2013). Average annual growing degree days are 133 days. Mean annual precipitation minus potential evapotranspiration averages 584 mm (Price *et al.* 2011). Permafrost occurs in isolated patches, except in the extreme north where it is more sporadically distributed (Brown *et al.* 2001).

Geology and Substrates

The Labrador Trough Ecodistrict is relatively level terrain interspersed with long ridges and troughs. The ridges and troughs are linear and oriented northwest-to-southeast in the north, and west-to-east in the south.

Its characteristic topography gives rise to the descriptive term, the Labrador Trough.

The underlying bedrock is of sedimentary and volcanic origins. The terrain is characterized by a series of sinuous ridges and valleys, conforming to an underlying bedrock of early Precambrian sedimentary and metamorphic shale, slate, sandstone, dolostone, quartzite and basalt. Outcropping is infrequent and calcareous marbles outcrop sporadically. Otherwise, bedrock is of the Churchill and Grenville structural provinces (NL DNR 2011a).

Land Cover

Characteristic uplands of the district include the trough's long ridges and many long eskers which support conifer forest and lichen-spruce woodland. The hills and ridges are generally well-mantled with a mix of well-drained veneer tills, glaciofluvial materials, drumlins and eskers (NL DNR 2011b). The lowlands between ridges are poorly drained for the most part and support open waters, wetlands and peatlands. The district has more interconnected elongated lakes, wetlands and peatlands than other parts of Labrador. Wetlands are primarily sloping fen peatlands patterned with ponds, pools and ribs. The peatland ribs, edges and margins are frequently more bog-like and support Black Spruce and Tamarack. These are some of the largest expanses of open peatlands in the eastern Taiga Shield Ecozone. Where they have moderate slopes and drainage, particularly southward, the lowlands support dry woodlands and forests. Fifteen percent of the district shows signs of past wildfire.

Water

Overall, seven percent of the district contains wetland habitats, while a further 26 percent of the district is occupied by open-water aquatic habitats. Waterbodies and watercourses drain into the Smallwood Reservoir, the Ossokmanuan Reservoir and the Ashuanipi River (WSC 2006). Many large to medium-sized lakes including Atikamagen, Petitsikapau, Marble, Astray, Dyke, Swampy, Pearl, Greig, Blanchet, and Sims Lakes are scattered across the landscape.

Flora and Fauna

Waterfowl habitat is extensive and of high quality. The district is also home to numerous other bird species and many small mammals typical of the taiga biome. Harlequin Duck breed on several rivers (Trimper *et al.* 2008).

Land Use

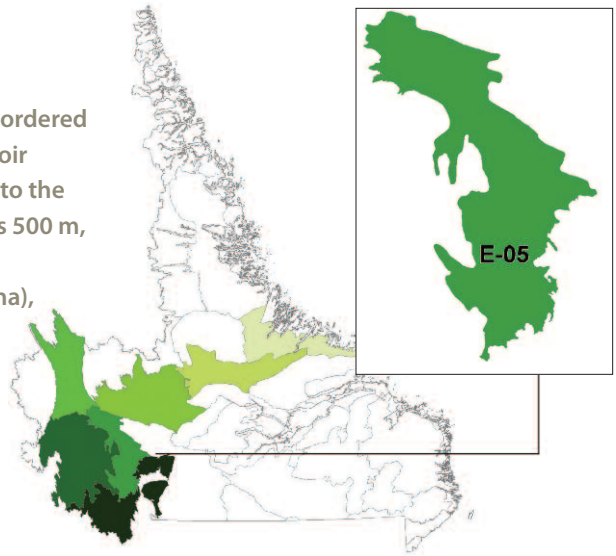
Mineral exploration is expanding in the district, as are open-pit iron ore mines and their associated infrastructure, pits and quarries. The Quebec North Shore and Labrador Railway, which ships iron ore to the port at Sept Iles, and its service roads, provide access to the area.

Labrador Trough, patterned fen peatland. John Riley

Bog-fen complex south of Atikonak Lake. John Riley

E-05 Atikonak Lake Ecodistrict

The Atikonak Lake Ecodistrict in southwestern Labrador is bordered to the north by the Labrador Trough and Smallwood Reservoir ecodistricts, to the west by the Joseph Lake Ecodistrict, and to the east by the Churchill Falls Ecodistrict. Its average elevation is 500 m, and elevations range from 396 m to 686 m ASL (NRC 2007). The Atikonak Lake Ecodistrict occupies 7,257 km^2 (725,695 ha), approximately 2.5 percent of Labrador.



Climate

The Atikonak Lake Ecodistrict's mean annual temperature is -2.7°C (CFS 2013). Average annual precipitation minus potential evapotranspiration range is 618 mm (Price *et al.* 2011). Permafrost is sporadic and isolated (Brown *et al.* 2001).

Geology and Substrates

Bedrock is of the Churchill and Grenville structural provinces, the former composed of sedimentary, metamorphic and intrusive rocks, and the latter of Precambrian granite and metamorphic gneiss (NL DNR 2011a). Deep, well drained glacial deposits cover much of the district, manifest as rolling, level terrain with hills composed of thick veneer tills, glaciofluvial materials, and drumlins (NL DNR 2011b).

Land Cover

The district is dominated by Black Spruce-lichen-shrub woodland and forest. South-facing slopes and valleys have warmer microclimates, and support broadleaf forests, for example White Birch, with a rich diversity of fruit-bearing shrubs and other vegetation attractive to wildlife. Mature forest occurs on warmer-than-normal sites, but elsewhere the combination of the poor soils, altitude, harsh continental climate, and wildfires retard the development of closed-canopy forests. Extensive White Birch-shrub stands take over many burns, and lichen woodlands regenerate

on drier sites (Lopoukhine *et al.* 1978, Meades 1990). Poorly-drained terrain is dominated by linear peatland basins composed of open string fens and bogs with significant pool and rib development. These features are particularly evident in the headwaters south and east of Joseph and Atikonak lakes, and downstream of the latter lake. Lakes, rivers, wetlands and peatlands are dominant and characteristic features of the district.

Water

The entire district is contained within the Ossokmanuan Reservoir drainage basin (WSC 2006). Many rivers and streams drain the district, most of them flowing into Atikonak Lake, a large shallow lake with myriad indented shores, islands, bays, beaches, spits and shoals. Overall, waterbodies cover 27.3 percent of the district, and the relatively flat terrain results in poor drainage and extensive wetlands (> 19 percent), most of which are peatlands, particularly basin bogs and string fens.

Flora and Fauna

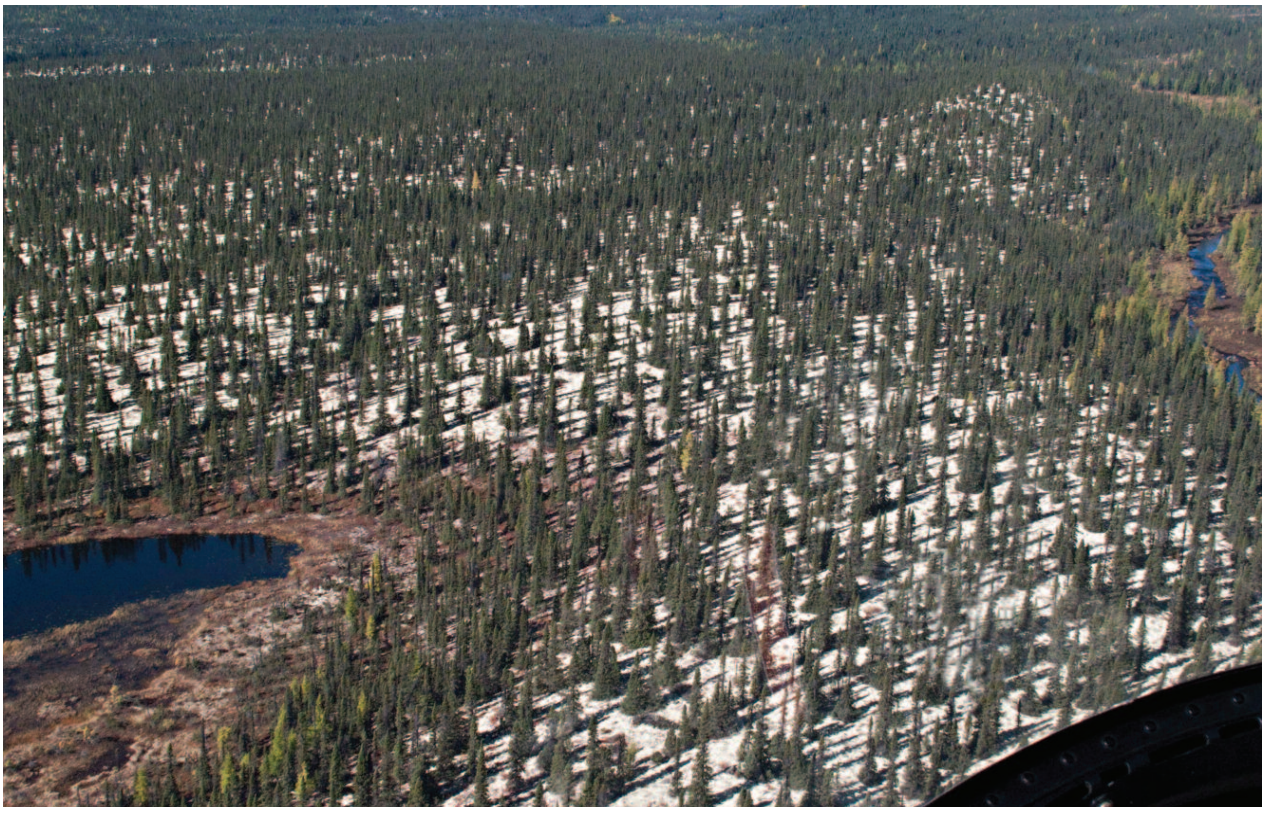
The Atikonak Lake Ecodistrict provides important winter forage habitat for the Threatened Lac Joseph Woodland Caribou herd. Caribou also calve on many islands in Atikonak Lake. The district is home to many other species, particularly waterfowl.

Land Use

The northern portion of the district contains the Ossokmanuan Reservoir, part of the former Twin Falls hydroelectric project that provided power for mining operations in Labrador City and Wabush; the waters were later diverted to the Smallwood Reservoir. The transmission corridor that exports power from Churchill Falls to Quebec crosses the district. A Lac Joseph-Atikonak Ecological Reserve has been proposed, which would include portions of both this and the adjacent Joseph Lake Ecodistrict.

Outlet of Atikonak Lake. John Riley

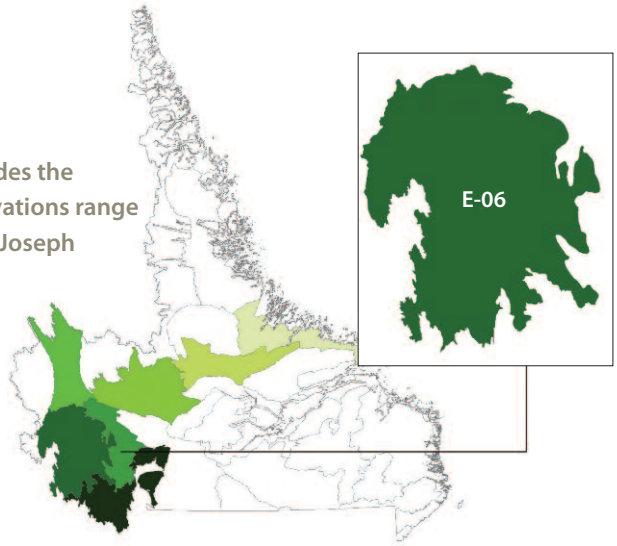
Atikonak Lake lichen woodland. Isabelle Schmelzer



Lac Joseph Woodland Caribou. Tony Parr

E-06 Joseph Lake Ecodistrict

The Joseph Lake Ecodistrict in southwestern Labrador includes the Joseph Lake, as well as the Lake Ashuanipi, watersheds. Elevations range from 478 m to 828 m, averaging 560 m ASL (NRC 2007). The Joseph Lake Ecodistrict encompasses 16,077 km^2 (1,607,700 ha), approximately 5.5 percent of Labrador.



Climate

The average annual temperature of the Joseph Lake Ecodistrict is -3.0°C (CFS 2013). Mean annual precipitation minus potential evapotranspiration averages 597 mm (Price *et al.* 2011). Permafrost is sporadic and occurs only in isolated pockets (Brown *et al.* 2001).

Geology and Substrates

Bedrock is of the Churchill and Grenville structural provinces, the former composed mainly of sedimentary, metamorphic and intrusive rocks, and the latter of Precambrian granite and metamorphic gneiss (NL DNR 2011a). Deep, well drained glacial deposits cover much of the district. A rolling, level terrain characterizes much of the area, with the topography conforming to thick surficial veneer tills, glaciofluvial materials, and drumlins (NL DNR 2011b).

Land Cover

The district is dominated by open lichen-shrub and lichen woodlands, which are characteristic of the area. Mature forests can occur on warmer-than-normal sites, but the altitude, harsh continental climate, poor soils and wildfires (evident on 8.2 percent of the district) retard the development of mature forests. South-facing slopes and valleys have warmer microclimates, and can even support broadleaf forests, for example of White Birch, with abundant fruit-bearing shrubs. Many wildfires have burned over time throughout the district. Extensive White Birch-shrub expanses often succeed on recently burned sites, and lichen woodlands on drier

sites (Lopoukhine *et al.* 1978, Meades 1990). The only known naturally occurring stand of Jack Pine forest in Labrador is found in the Redfir-Kapitagas Channel Ecological Reserve to the west.

Water

The Joseph Lake Ecodistrict is also rich in wetlands, which cover approximately 12 percent of the district, primarily extensive bog and fen wetland complexes. Over 19 percent of the district is composed of open freshwater habitats. Many lowland rivers and streams connect and drain large, shallow lakes, such as Joseph and Ashuanipi lakes, which are characterized by indented shores, islands, bays, beaches, spits and shoals. Upland areas contain many small lakes and streams.

Flora and Fauna

The Lac Joseph Woodland Caribou herd is designated as Threatened under both Federal and Provincial regulation. Many islands in the district's large lakes provide key calving habitats for this herd (NL DEC 2011), which has been assessed as having a high likelihood of persistence (EC 2012).

The district is home to much other wildlife, including Canada Geese, Moose, Grey Wolf, Porcupine, Beaver, Snowshoe Hare and Black Bear (NatureServe 2012).

Land Use

The proximity of Labrador City and Wabush to the northern edge of the district brings associated land uses, but southern sections are largely unfrequented and land uses are limited. The Quebec North Shore and Labrador Railway crosses the district on its route to Sept-Îles, Quebec, with junctions at Seahorse, Embar, Pitaga, Oreway, Dry Lake, Ashuanipi and Ross Bay. The transmission corridor that exports power from Churchill Falls to Quebec also crosses the district.

The Redfir-Kapitagas Channel Ecological Reserve occupies 0.6 percent of the area. A Lac Joseph-Atikonak Ecological Reserve has been proposed, which would include portions of both ecodistricts. Quebec's proposed Lac Ménistouc Biodiversity Reserve abuts the district to the southwest (CEC 2012).

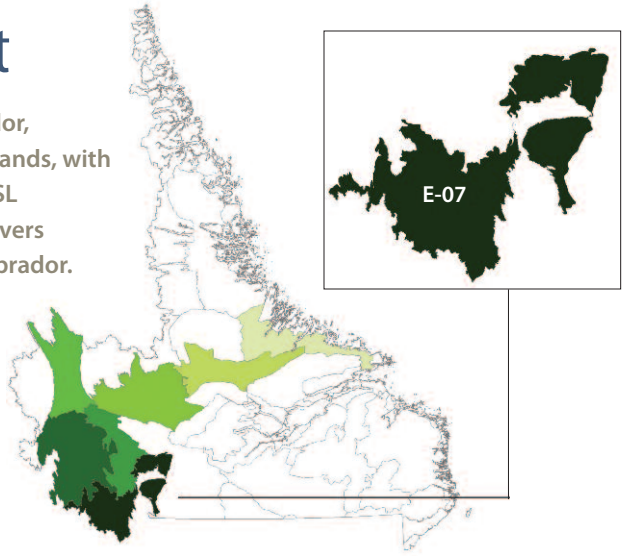
Rough Aster: *Aster radula*. John Riley

Wetland, Lac Joseph. Isabelle Schmelzer

Cladonia stellaris and other lichens. Jean-Francois Senecal

E-07 Domagaya Lake Ecodistrict

Surrounding the Romaine River indent in southwest Labrador, the Domagaya Ecodistrict is an area of massive bedrock uplands, with elevations averaging 616 m ASL. Elevations rise to 967 m ASL in the vicinity of Domagaya Lake (NRC 2007). The district covers 10,305 km^2 (1,030,500 ha), approximately 3.5 percent of Labrador.



Climate

The district has a continental climate, with a mean annual temperature of -2.7°C (CFS 2013). Average annual precipitation minus potential evapotranspiration is 690 mm (Price *et al.* 2011). Permafrost is sporadic, and occurs in isolated areas (Brown *et al.* 2001).

Geology and Substrates

The bedrock is part of the Grenville structural province, a complex mix of Precambrian igneous granite and gneiss, metamorphic gneiss, anorthosite, and metasedimentary gneiss (NL DNR 2011a). Thin veneer tills mantle the bedrock, with deeper tills and organic terrain occurring in lowland areas. Glaciofluvial deposits, eskers and drumlin fields also occur, and are most densely concentrated to the east of the Romaine River indent where they form linear patterns of down-glacier ridges and troughs (NL DNR 2011b).

Land Cover

The highest elevations are tree-less, with tundra-like vegetation of dwarf and low shrubs, sedges, lichens and mosses. Forest occurs on lower elevations and in valleys where tills and glaciofluvial deposits are thicker and soils have developed. Black Spruce-lichen woodland is the most prevalent cover, but lower slopes and well-drained lowlands also support closed Black Spruce forests. Balsam Fir and White Spruce occur sporadically, and Tamarack occurs along drainways, shores, and wetland edges. Wildfires in the Atikonak watershed have reduced much of the lowland forest cover to open lichen woodland and to regenerating expanses of birches, shrub thickets and lichen (Lopoukhine *et al.* 1978, Meades 1990). To the east of the Romaine River indent, wildfires occur less frequently, and closed-canopy spruce-feathermoss forest predominates, reflecting moister conditions. Characteristic wetlands are large peatland basins, predominantly domed bogs and string fens, with treed bog and fen ribs and margins.

Water

The district includes the headwaters of various major rivers including the Romaine, Atikonak and Natashquan rivers of the Romaine and Ossokmanuan Reservoir drainage basins (WSC 2006). Just over three percent of the district is comprised of wetland habitats, and 10.6 percent is covered by lakes, rivers and other open freshwater habitats.

Flora and Fauna

The district contains important calving and wintering grounds for the Lac Joseph Woodland Caribou herd, which is designated as a Threatened population. It numbers about 1,285 individuals, and is declining.

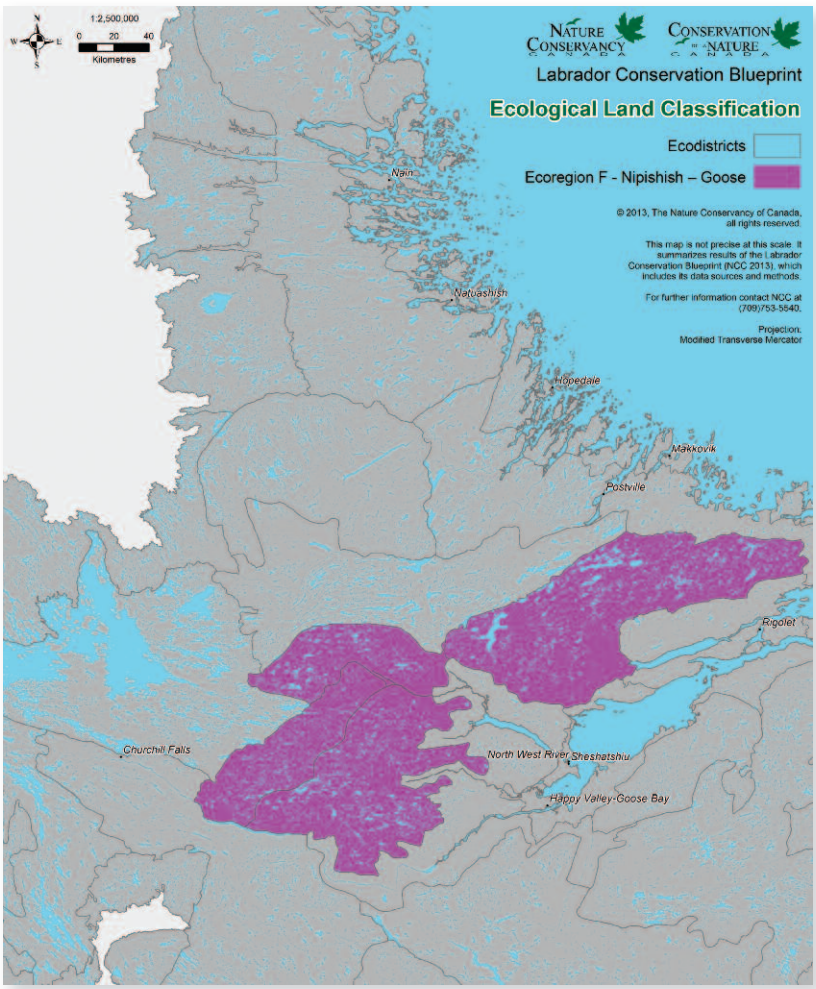
Land Use

The district is infrequently accessed. Quebec's proposed La Romaine hydroelectric project and associated infrastructure are likely to increase access and use of the area. Adjacent to the district are Quebec's proposed Massif des lacs Belmont et Magpie, and Buttes du lac aux Sauterelles Biodiversity Reserves (CEC 2012).

Romaine Hills. Isabelle Schmelzer
Lapland Pincushion, *Diapensia lapponica*. John Riley
Arctic Goldenrod, *Solidago multiradiata*. John Riley

F Nipishish-Goose Ecoregion

Low Subarctic: Lopoukhine et al. 1978:LR-0; ESWG 1993:ER-85,93,94,96; ESWG 1995,EC 1999:ER-80,83,84,85.



The Nipishish-Goose Ecoregion is a broad bedrock plateau located on the north and west flank of the Lake Melville lowlands.

This region's various landforms and landscapes are transitional to the more temperate and coastal conditions that prevail in the adjacent Boreal Shield Ecozone. Mean annual temperatures are approximately -3.5°C, warmer than those to the north and west, and average annual precipitation ranges from 800 mm to 1000 mm, with 400 cm to 500 cm of snowfall. Permafrost is limited and scattered.

The region's bedrock is part of the Grenville structural province, predominantly acidic igneous granites and gneisses on the Nipishish Plateau; a series of volcanic sills occurs in the east. Western districts and the Red Wine Mountains are predominantly metamorphic gneiss. The district is characterized by a rolling plateau, with the exception of the Red Wine Mountains, and its predominant landforms are bedrock exposures and till plateaus of varying depth, with drumlins, kames and eskers.

Lichen-rich spruce woodlands with very open canopies predominate, but sites such as protected south-facing side slopes can support woodlands with large White Spruce and Balsam Fir. Large, overlapping wildfires of multiple ages criss-cross the rocklands and the well-drained tills and glaciofluvial deposits of the region, and demonstrate very slow regeneration. Well-drained lowlands can also support lichen woodlands but, in sites where drainage is impeded, the lowlands support wetlands, predominantly fen peatlands with Black Spruce and Tamarack on their edges and in richer sites.

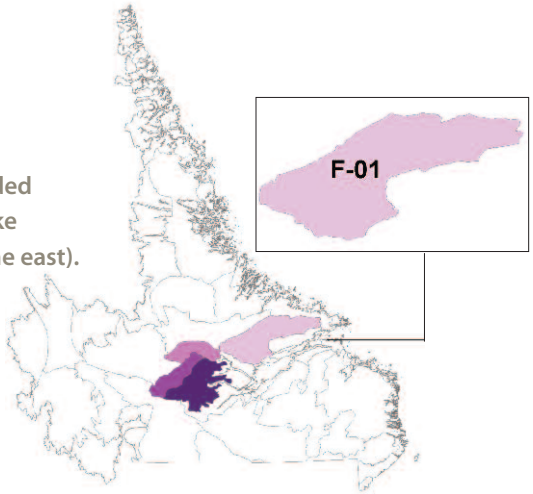
Numerous lakes and cascading streams provide diverse recreational and fishing opportunities.

Nipishish Lake margins. John Riley

Nipishish Lake. John Riley

F-01 Nipishish Lake Ecodistrict

The Nipishish Lake Ecodistrict lies north of Lake Melville. It is bounded to the north by the Michikamau-Smallwood Ecoregion (the Seal Lake Ecodistrict to the west and the Benedict Mountains Ecodistrict to the east). To the south is the Melville Lowland Ecoregion of the Boreal Shield. The district rises from sea level to 493 m, with average elevations of approximately 300 m (NRC 2007). It occupies 9,632 km^2 (963,200 ha), approximately 3.3 percent of Labrador.



Climate

The district is located within the Low Subarctic Ecoclimatic Region (EWG 1989) and is only marginally influenced by the Labrador Sea. The mean annual temperature is approximately -1.6°C (CFS 2013). There are 138 growing days per year, and lakes are ice-free for 150 to 180 days. Mean annual precipitation minus potential evapotranspiration averages 766 mm (Price *et al.* 2011).

Geology and Substrates

Archean granites, granitic gneisses with intrusions of gabbro, amphibolites, and mafic granulites are dominant bedrocks (NL DNR 2011a). The terrain is rough and undulating. Predominant landforms are bedrock exposures and, overlaying the bedrock, till moraine of varying depth and waterlain sands in the valleys (NL DNR 2011b).

Almost the entire district shows signs of wildfire and, as a result, the surficial terrain and its landforms such as eskers, drumlins and kame-and-kettle swarms are readily visible. Podzolic soils dominate, with major inclusions of brunisols and of organics in wetlands (ESWG 1995). Permafrost is isolated and occurs mainly in wetlands (Brown *et al.* 2001).

Land Cover

The district's forests are transitional both to taiga communities to the north and to closed-canopy boreal forests to the south. Higher elevations support lichen tundra, rocklands and fellfields. Large patterned bogs and fens occur at lower elevations on flat terrain. The terrain is generally well-drained and supports multi-aged burns on 23.4 percent of the district, which succeed sequentially from open lichen sites, to infilling lichen woodland, and to spruce woodland again. Burn successions reflect different fire ages and heat intensities. Sheltered sites can produce large Black Spruce trees but open lichen and lichen-shrub woodlands dominate overall (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Water

Approximately five percent of the Nipishish Lake Ecodistrict area is occupied by wetland habitats, and an additional 11.4 percent is open freshwater habitats. Much of the district falls within the Big River drainage basin (WSC 2006). The headwaters of important river systems including the Crooked, Sebaskachu, Mulligan River, Double Mer, and Tom Luscombe Brook originate here (Anderson 1985). The largest lake in the district is Nipishish Lake.

Harlequin Duck. Darroch Whitaker

Flora and Fauna

The district provides habitat for Caribou, Moose, Black Bear, Red Fox, Lynx, other small mammals. Many other abundant waterfowl and landbirds also depend on habitats in the area. Harlequin Duck breed on several rivers in the district (Trimper *et al.* 2008).

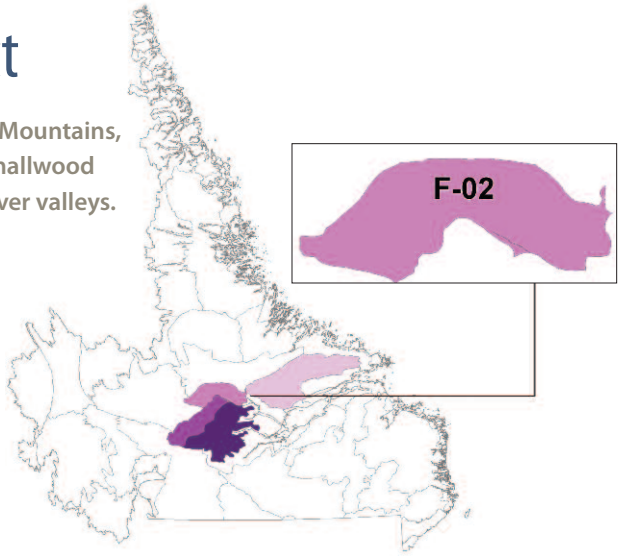
Land Use

Primary land uses are hunting, fishing, trapping and outdoor recreation. The snowmobile trail connecting northern coastal communities to Happy Valley-Goose Bay runs through the district. Remote cabins and outfitting camps are located on Double Mer River and Nipishish Lake. Approximately two percent of the district is zoned for Traditional Use under the proposed LISA Land Use Plan, to conserve spawning rivers important for Atlantic Salmon and Arctic Char and preserve other traditional activities (LISA Regional Planning Authority 2012).

Open lichen terrain. John Riley

F-02 Upper Naskaupi Ecodistrict

The Upper Naskaupi Ecodistrict lies north of the Red Wine Mountains, and south of Seal Lake. It is bordered to the west by the Smallwood Reservoir and to the east by the Beaver River and Susan River valleys. It occupies 3,147 km^2 (314,700 ha), approximately 1.1 percent of Labrador.



Climate

The district is located in the Low Subarctic Ecoclimatic Region (EWG 1989), with cool summers and very cold winters. Average annual temperature is -2.6°C (CFS 2013). The average length of the growing season is 136 days. Lakes are free of ice for 150 to 180 days. Mean annual precipitation minus potential evapotranspiration averages 713 mm (Price *et al.* 2011). Permafrost is found in isolated patches, generally in the deeper peatlands (Brown *et al.* 2001).

Geology and Substrates

The district is primarily a rolling plain of exposed bedrock with numerous lakes. Some isolated rugged hills stand above the general surface with elevations ranging to over 700m ASL. Average elevations are approximately 450m ASL (NRC 2007). The district is composed of massive Precambrian granite, granodiorite, syenite, gneiss, and acidic intrusives (NL DNR 2011a). A sparse cover of hummocky, discontinuous till veneers dominates the higher elevations. Glaciofluvial deposits are sporadically distributed in river terraces; these are especially evident in the Red Wine River and Wapustan River valleys (NL DNR 2011b).

Naskaupi River. John Riley

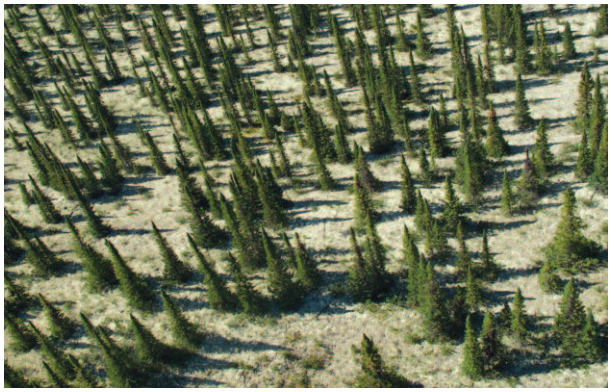
Grand Lake area. John Riley Below: Lichen shrub woodland. Isabelle Schmelzer

Land Cover

Overall, lichen-spruce woodlands and lichen-shrub woodlands dominate the district. One quarter of the district shows evidence of past burns, which are regenerating to open-canopy Black Spruce woodland with lichen ground cover. More mesic, open-canopy spruce forests with feathermoss understoreys are found mainly in the north and eastern sections of the district. Black Spruce is the most common tree, and Trembling Aspen is at its northern limit. Balsam Fir is restricted to rare medium-textured sites (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995). Bogs, fens and swamps occur around the shores of larger lakes.

Water

The district is located in the Naskaupi drainage basin (WSC 2006). Important river systems traversing the area include the Red Wine River, Naskaupi, Wapustan River, and North Pole Brook, which flow into Grand Lake (Anderson 1985). The largest lake in the district is Dorothy Lake; many lakes remain unnamed. Overall 6.2 percent of the district is in wetland habitats, while 10.4 percent is covered by open freshwater habitats.



Flora and Fauna

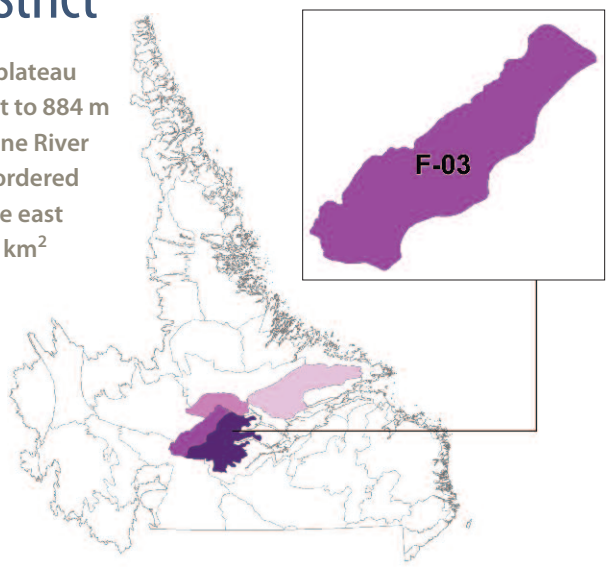
The district supports Red Fox, Black Bear, Grey Wolf, Porcupine, Snowshoe Hare, Red Squirrel, Caribou, and many small mammals like Deer Mouse. Many species of waterfowl and other birds are also present. Harlequin Duck breed on rivers in the district (Trimper *et al.* 2008).

Land Use

The Upper Naskaupi supports no permanent settlements and the human footprint is indiscernible. Land uses include fishing, hunting, trapping, and outdoor recreation.

F-03 Red Wine Mountains Ecodistrict

The Red Wine Mountain Ecodistrict is a high, tilted bedrock plateau averaging 535 m ASL, and rising from 106 m in the southeast to 884 m ASL in the northwest (NRC 2007). It extends from the Red Wine River valley in the north to Winokapau Lake in the south, and is bordered in the west by the Smallwood Reservoir Ecodistrict and in the east by the Goose River Ecodistrict. This area encompasses 3,446 km^2 (344,608 ha), slightly more than one percent of Labrador.



Climate

The district is located in the Low Subarctic Ecoclimatic Region. Summers are cool and span approximately five months, and winters are very cold and snowy (EWG 1989). Generalized climate data suggest a mean annual temperature of -2.7°C (CFS 2013); however, the tundra-like vegetation at higher elevations illustrate the harsher microclimates in many areas. The average annual precipitation minus potential annual evapotranspiration is 723 mm (Price *et al.* 2011). Permafrost occurs in isolated patches in wetlands and high elevations (Brown *et al.* 2001).

Geology and Substrates

Bedrock exposures dominate the landscape, and glacial till veneers and glaciofluvial valley deposits are almost absent. The bedrock is dominated by early Precambrian mafic gneiss outcrops (NL DNR 2011a), which constitute the high ridges of the mountains. Here, alpine rock barrens, variably lichen-covered, rise above the tree line and extend over a large part of the district (Lopoukhine *et al.* 1978). Scattered deposits of coarse sands are limited to portions of the Goose, Metchin and Beaver Rivers (NL DNR 2011b). Eskers are generally oriented west-to-east (Lopoukhine *et al.* 1978).

Red Wine Mountains. Isabelle Schmelzer

Red Wine Mountains. Isabelle Schmelzer

Land Cover

Black and White Spruce tree cover is sparse on leeward slopes and lower elevations. Upper elevations support tundra heath, lichens and mosses surrounding bare rock. This is especially evident in the northeastern and central portions of the district. Dwarf Black Spruce and Tamarack with moss and shrub understoreys grow in scattered swales (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995). Lichen woodlands and lichen-shrub woodlands are concentrated in the Goose and Metchin River valleys. There are few wildfires except at lower elevations in the southwestern portion of the district. Wetlands are relatively few, occurring in small depressions, bedrock catchments and drainways.

Water

Approximately two percent of the district is wetland, while 9.2 percent is in open water. The Goose, Metchin, and Beaver Rivers rise in headwaters on this upland plateau, and their deranged drainage patterns are typical of Canadian Shield landscapes. The many ponds and lakes are due to poor surface drainage and a highly-variable topography. Larger lakes in the system include Wilson and Ptarmigan.

Flora and Fauna

The barren uplands are generally poor wildlife habitat, although some species make use of habitats located on protected lower slopes. The deep lakes contain Brook Trout but are relatively unproductive. The Red Wine Mountains support a declining resident Woodland Caribou herd, which has shifted its core range south and west from the mountains, to lower elevations (I. Schmelzer, pers. comm.).

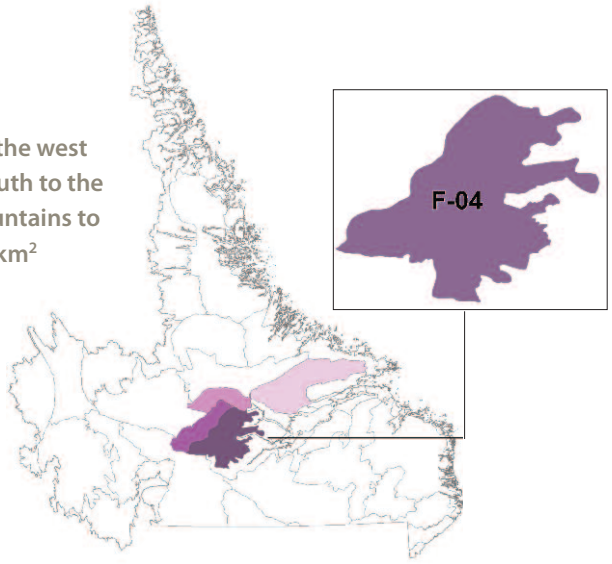
Land Use

No permanent settlements are located in the district; common land uses include hunting, fishing, trapping and outdoor recreation. A section of the Trans-Labrador Highway between Happy Valley-Goose Bay and Labrador City-Wabush crosses the southern part of the district, and is associated with numerous quarries along its route. The transmission line carrying power from Churchill Falls to Happy Valley-Goose Bay runs parallel to the highway. The Department of National Defense operates observation posts and camera target sites for military fly-over training in the area (T. Chubbs, pers. comm.). Approximately 50 percent of the district was excluded from forest harvesting under the FMD 19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012).

Crystal Falls. Isabelle Schmelzer

F-04 Goose River Ecodistrict

The Goose River Ecodistrict is located in central Labrador, to the west of Lake Melville. It extends from the Red Wine River valley south to the Lower Churchill River valley, and east from the Red Wine Mountains to the Melville Valleys Ecodistrict. The area encompasses 6,981 km^2 (698,100 ha), or 2.4 percent of Labrador.



Climate

Unaffected by the Labrador Sea, the district's climate is continental and falls within the Low Subarctic Ecoclimatic Region (EWG 1989). Mean annual temperature is approximately -1.9°C (CFS 2013). The average length of the growing season is 142 days, and most lakes are ice-free for 150 to 180 days. Average annual precipitation minus potential annual evapotranspiration is 725 mm (Price *et al.* 2011). Permafrost is isolated, occurring only in peatlands (Brown *et al.* 2001).

Geology and Substrates

The district is an undulating, flat-to-dissected plain averaging 417 m ASL, with broad river valleys and rolling hills that rise from 61 m to 624 m ASL (NRC 2007). The district's bedrock forms part of the Grenville structural province, and is composed of Precambrian granite, paragneiss and other acidic intrusives like gabbro, amphibolite and granulite (NL DNR 2011a). Its surface is mantled with hummocky and drumlinized sandy tills of variable thickness. Glaciofluvial kames and terraces of mixed sand and gravel are restricted to a few valley floors, such as that of the Goose and Beaver Rivers (NL DNR 2011b). Eskers are conspicuous along some of the tributaries flowing into the lower Churchill River. Podzolic soils dominate, with significant inclusions of brunisols and organic soils (ESWG 1995).

Land Cover

The dominant vegetation consists of low, open and sometimes closed patches of Black Spruce with an understorey of shrub birches, Labrador Tea, lichens and mosses. Balsam Fir is restricted to moist slopes. Black Spruce is the climax species, and Tamarack is a common component of forests in wet and open areas. Wildfires do not play a dominant role in vegetation succession and, where they occur, they rapidly succeed to shrublands dominated by shrub birches, ericaceous shrubs, and moderate lichen cover. Lichen woodlands occur mainly on glaciofluvial deposits in valley bottoms and on exposed rocklands with thin till veneers. Extensive fen peatlands occur on poorly drained sites (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Water

Overall, 8.6 percent of the district is occupied by wetland habitats while 10.4 percent is covered by open-water habitats. Important river systems traversing the area include the Goose and several tributaries of the Lower Churchill which flow into Goose Bay and Lake Melville; the Beaver and the Susan Rivers flowing into Grand Lake; and the Red Wine River flowing into the Naskaupi (Anderson 1985, WSC 2006)

Flora and Fauna

Typical mammals include Caribou, Moose, Grey Wolf, Black Bear, Lynx and Red Fox (Trimper *et al.* 1996). Osprey nest in the area (SSLP 2012a).

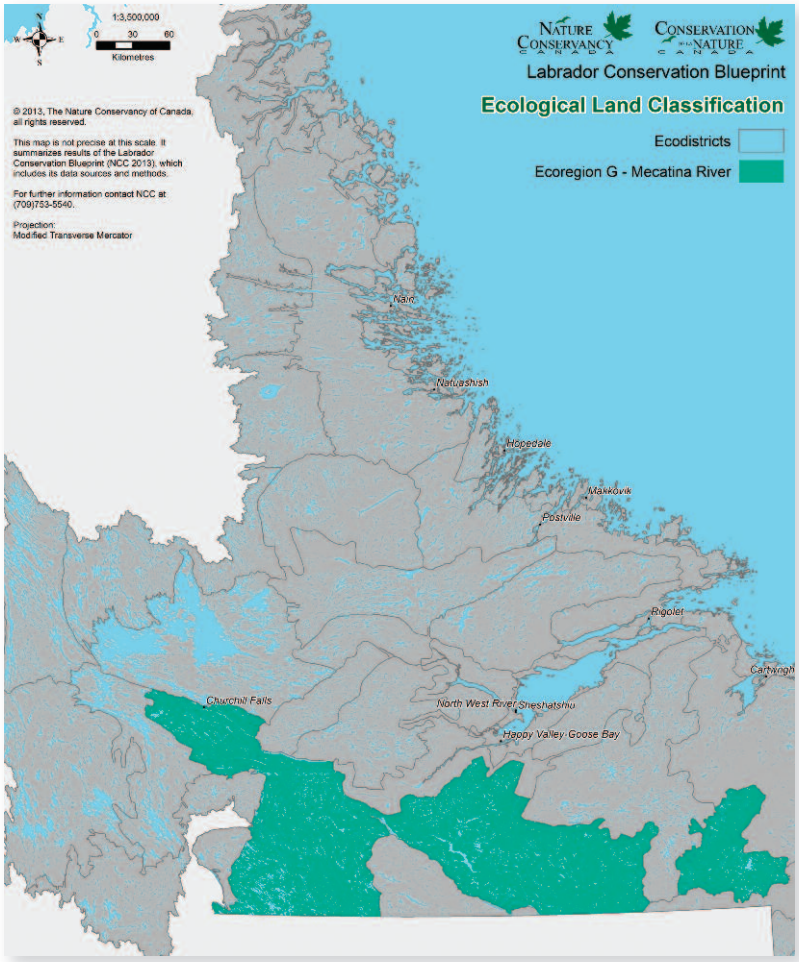
Land Use

Land uses include hunting, trapping and outdoor recreation. A section of the Trans-Labrador Highway connecting Happy Valley-Goose Bay to Labrador City-Wabush crosses the southern portion of the area. Numerous cabins and road-construction quarries are located along its length. The transmission line from Churchill Falls to Goose Bay runs parallel to the highway. One outfitting lodge is found in the district. More than 93 percent of the district was restricted from forest harvesting activities as part of the Protected Areas Network established in the FMD 19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012).

Goose River. Isabelle Schmelzer
Goose River string bog and fen. Jean-Francois Senecal
Goose River shrub-rich swamp. Jean-Francois Senecal

G Mecatina River Ecoregion

Low Subarctic: ESWG 1993:ER-92; EC 1999:ER-86.



The Mecatina River Ecoregion is the southernmost subarctic or Taiga Shield Ecoregion in Labrador.

It includes much of the terrain between the Churchill River watershed and Labrador's southern border, extending northwest to the Smallwood Reservoir. In its east, it contains the headwaters of the St. Paul and Alexis River watersheds, and lies south of the Eagle Plateau. Its mean annual temperature is -1°C, with average summer temperatures of 10°C, and mean winter temperatures of approximately -13°C. Mean annual precipitation increases from north to south in the range of 750 mm to 1100 mm.

The region is underlain by massive Precambrian igneous granites, gneisses, gabbros, and acidic intrusives, as well as metamorphic gneiss of the Grenville structural province. It is a rough and undulating terrain that averages between 300 m and 500 m ASL. The region has a distinctive pattern of rock knobs mantled with sandy morainal deposits of variable thickness that are oriented in a general northwest-to-southeast direction, and with some knob swarms also oriented at right angles. There are extensive areas of excessively well-drained coarse sediments throughout, similarly oriented northwest-to-southeast. Glaciofluvial deposits are sporadically distributed in the form of eskers and river-valley terraces. Permafrost occurs mainly in wetlands. Wildfire scars dominate the drier, western terrain of the region, and similar large-scale wildfire scars also occur in the east, although fewer in number and smaller in size.

In the north and west, where till overburden and soils are thin and excessively well-drained, open lichen systems dominate where wildfires have burned the woodlands. Where there is deeper overburden, more developed soils and moister conditions (generally towards the south and east), the vegetation is predominantly open woodland with occasional open rocklands. On better sites, and also increasing to the south and east, the terrain supports closed stands of spruce and fir with understoreys of feathermoss, shrub birches, Labrador Tea, and mosses. These forests are transitional to the more closed-canopy conifer forests of the boreal forests immediately to the south. Black Spruce is the climax species in the region, while Balsam Fir is restricted to rare, moist, medium-textured materials.

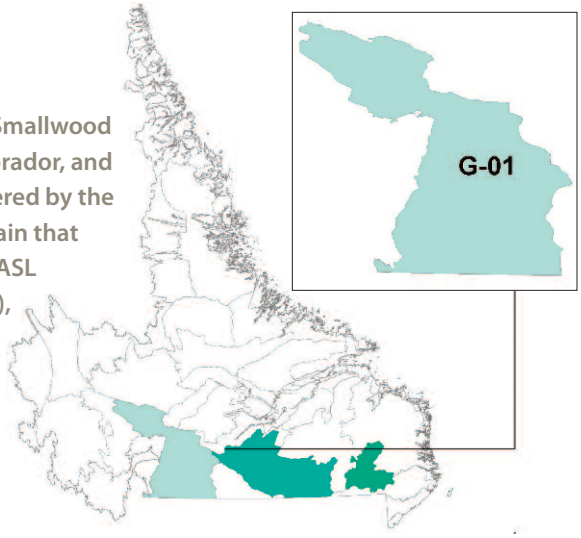
The region provides habitat for Moose, Black Bear, Red Fox, Lynx, small mammals, Osprey, waterfowl and other birds. Western parts of the area are accessible from the Trans-Labrador Highway, along which Churchill Falls is the principal community. Land uses include hunting, trapping, fishing and outdoor recreation.

Churchill River. Jean-Francois Senecal

Boudoin Canyon. Lindsay Notzl

G-01 Churchill Falls Ecodistrict

The Churchill Falls Ecodistrict extends southeast from the Smallwood Reservoir and Churchill Falls, to the southern border of Labrador, and eastward to the Dominion Lake area. To the west it is bordered by the Atikonak Lake Ecodistrict. It is a rough and undulating terrain that averages 470 m ASL; elevations range from 89 m to 721 m ASL (NRC 2007). The district occupies 17,266 km^2 (1,726,600 ha), approximately 5.9 percent of Labrador.



Climate

The climate is one of warm summers and cold winters. The district is warmer and drier in the north, and colder and wetter towards the Quebec border. Annual mean temperature is -1.9°C (CFS 2013). Average annual precipitation minus potential evapotranspiration is 716 mm (Price *et al.* 2011). Lakes are ice-free for 150 to 180 days and the growing season lasts approximately 143 days. Permafrost occurs in isolated pockets (Brown *et al.* 2001).

Geology and Substrates

The district's bedrock is part of the Grenville structural province, principally Precambrian granitic gneiss and paragneiss with intrusions of gabbro, amphibolite and granulite. A very small proportion is occupied by calcareous rocks (NL DNR 2011a). The district's geomorphological features are oriented northwest to southeast. Broad river valleys, rolling topography with numerous bedrock hills and knobs, and some drumlinized till deposits characterize the area. Some valleys, such as the Fig River valley are broad and full of coarse well-drained glaciofluvial deposits and recent alluvium. However, glaciofluvial deposits are less frequent in the district than in other downstream valleys to the east. Upper slopes are covered with a thin till veneer. Bedrock outcrops are most common near and at the top of numerous hills (NL DNR 2011b). Impeded drainage has resulted in the development of localized organic terrain.

Land Cover

Lichen-rich woodland and forest is the predominant vegetation. Towards the southeast, closed-canopy forests of Black and White Spruce and Balsam Fir dominate on uplands and the protected slopes (Lopoukhine *et al.* 1978). Understoreys are dominated by feathermoss and shrub with few lichens. These stands are up to 10 m to 12 m tall, with 20 to 60 percent canopy closure (NL DNR 2011).

Towards the northwest the terrain is less burned and mature forests of Black Spruce occur. White Spruce and Balsam Fir forests occur on moist sites bordering streams and on slopes. A minor hardwood component occurs on richer, south and east-facing slopes. Stream courses and the shores of lakes and streams support spruce and Tamarack (Lopoukhine *et al.* 1978).

Bottomlands with coarse, well-drained glaciofluvial sands and gravels, such as along the Fig River, are susceptible to wildfire. Much of the terrain has been burned by frequent and intense fires. As a result, many of the river valleys support regenerating open lichen-shrub expanses and lichen-spruce woodlands. The highest bedrock plateaus and raised-knob rocklands also have areas with no tree cover. Wetlands and peatlands occur in isolated patches and many are relatively small in size (Lopoukhine *et al.* 1978).

Water

Overall, 6.8 percent of the district is in wetland habitats, while 10.7 percent is open freshwater habitats (NRC 2007). Important rivers traversing the area include the Fig, Elizabeth, Metchin, Cache, Senecal, Katchekaosipou, Little Mecatina, and Natashquan Rivers, which flow into the St. Lawrence River. Drainage basins in the district include the Upper Churchill, Little Mecatina and Natashquan (WSC 2006), and the larger lakes include Winokapau, Senecal, Belisle, Gaillot, Mabille and Plancouet Lakes.

Flora and Fauna

Moose and Grey Wolf occur in river valleys (Trimper *et al.* 1996). Black Bear, Red Fox, Lynx, River Otter, Marten, Mink, Snowshoe Hare, Red Squirrel, and Porcupine are widespread mammals. Osprey, Red-tailed Hawk, and Harlequin Duck are known to breed here (Trimper *et al.* 2008 SSLP 2012b).

Land Use

Churchill Falls has the second-largest hydroelectric-generating capacity in North America (5,428 MW), and is the second-largest underground power station in the world. The dewatered upper Churchill River and the

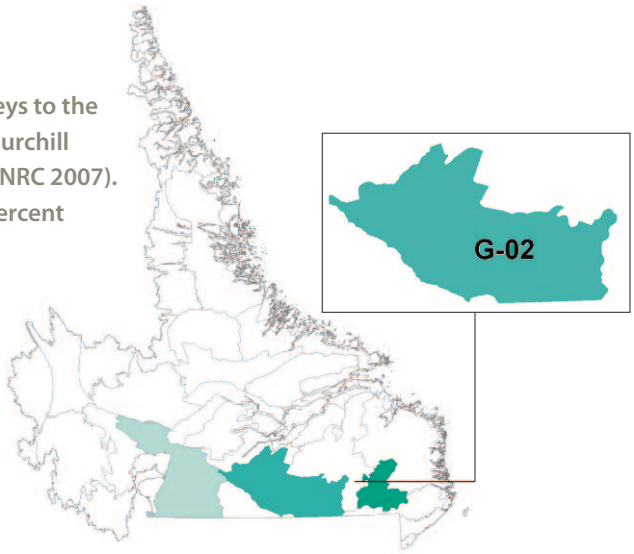
Churchill River upstream and downstream of Churchill Falls. John Riley

augmented downstream waters are modified riparian systems, but the riparian impacts are modest in areal extent (Roberts and Bazjak 2011a,b,c). Most of the approximately 650 residents of the town of Churchill Falls are employed by the Churchill Falls Labrador Corporation Limited (CFLCo), a joint-partnership of Nalcor and Hydro-Québec. This area is a popular destination for sport fishing, as various dam-related infrastructure have created habitat for large Lake and Brook Trout, land-locked Atlantic Salmon (ouananiche), and Northern Pike.

The northern portion of the district is crossed by the Trans-Labrador Highway and easy access allows for hunting, fishing, trapping, outdoor recreation, and cottage building. Roughly 31 percent of the district was restricted from forest harvesting under the FMD19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012). South of the district, Quebec has proposed the Vallée de la rivière Natashquan Biodiversity Reserve along the Labrador border (CEC 2012).

G-02 Minipi Ecodistrict

The Minipi Ecodistrict extends south from the Melville Valleys to the Labrador border and west from the Eagle Plateau to the Churchill Falls Ecodistrict. Elevations range from 96 m to 600 m ASL (NRC 2007). It occupies 16,349 km^2 (1,634,900 ha), approximately 5.5 percent of Labrador.



Climate

The climate falls within the Low Subarctic Ecoclimatic Region, characterized by cool summers lasting four to five months, and cold, snowy winters (EWG 1989). The growing season is 143 days. Average annual temperature is -1.1°C (CFS 2013). Average annual precipitation minus annual potential evapotranspiration is 842 mm (Price *et al.* 2011).

Geology and Substrates

The Minipi Ecodistrict's terrain is underlain by bedrock of the Grenville structural province. The majority of it is Late Paleoproterozoic gabbro, amphibolite, and granulite (NL DNR 2011a). It is a district of high rolling topography with elevations averaging 420 m ASL. Generally thin till overburden and thin soils mantle the many bedrock knobs and knolls that characterize the district (Lopoukhine et al. 1978). The bottomlands of major river valleys such as Minipi, Little Mecatina and St. Augustin are filled with coarse, well-drained glaciofluvial sands and gravels, which make them susceptibleto wildfires (NL DNR 2011b). Permafrost occurs in isolated patches, mainly in peatlands in the north (Brown *et al.* 2001).

Land Cover

The dominant vegetation is Black and White Spruce and Balsam Fir forest, which occurs on both uplands and more protected, moist sites above the rivers and drainage ways. Forest understoreys are typically feathermoss and shrub, with little lichen (Lopoukhine *et al.* 1978). Stands are often 10 m to 12 m tall, with 40 to 70 percent canopy closure (NL DNR 2011). As a result of wildfire, many of the river valleys support lichen-spruce woodlands, such as the the Little Mecatina and several major tributaries of the Mecatina and the upper Kenamu. Older burns support low shrub thickets that are gradually transitioning to closed forest (Lopoukhine *et al.* 1978). The district has large wildfire burns which define the distribution of closed-canopy forests. Areas of recent burns decline toward the east.

High bedrock exposures support relatively sparse lichen cover compared to other districts, and are instead often covered with dense shrubs and matted patches of Black Spruce. *Sphagnum*, sedges, cottongrasses and other wetland species occupy the small, poorly drained depressions. Small bogs occur in valleys and scattered depressions (Lopoukhine *et al.* 1978). Wetlands are concentrated in the headwaters of the Joir, Michaels, Matse, and St. Augustin Rivers.

Minipi River. Lorraine Cooper

Trophy Brook Trout, Cooper's Minipi Camp. Lorraine Cooper

Lake Minipi
Lorraine Cooper

Osprey fledgling
Geoff Goodyear

Water

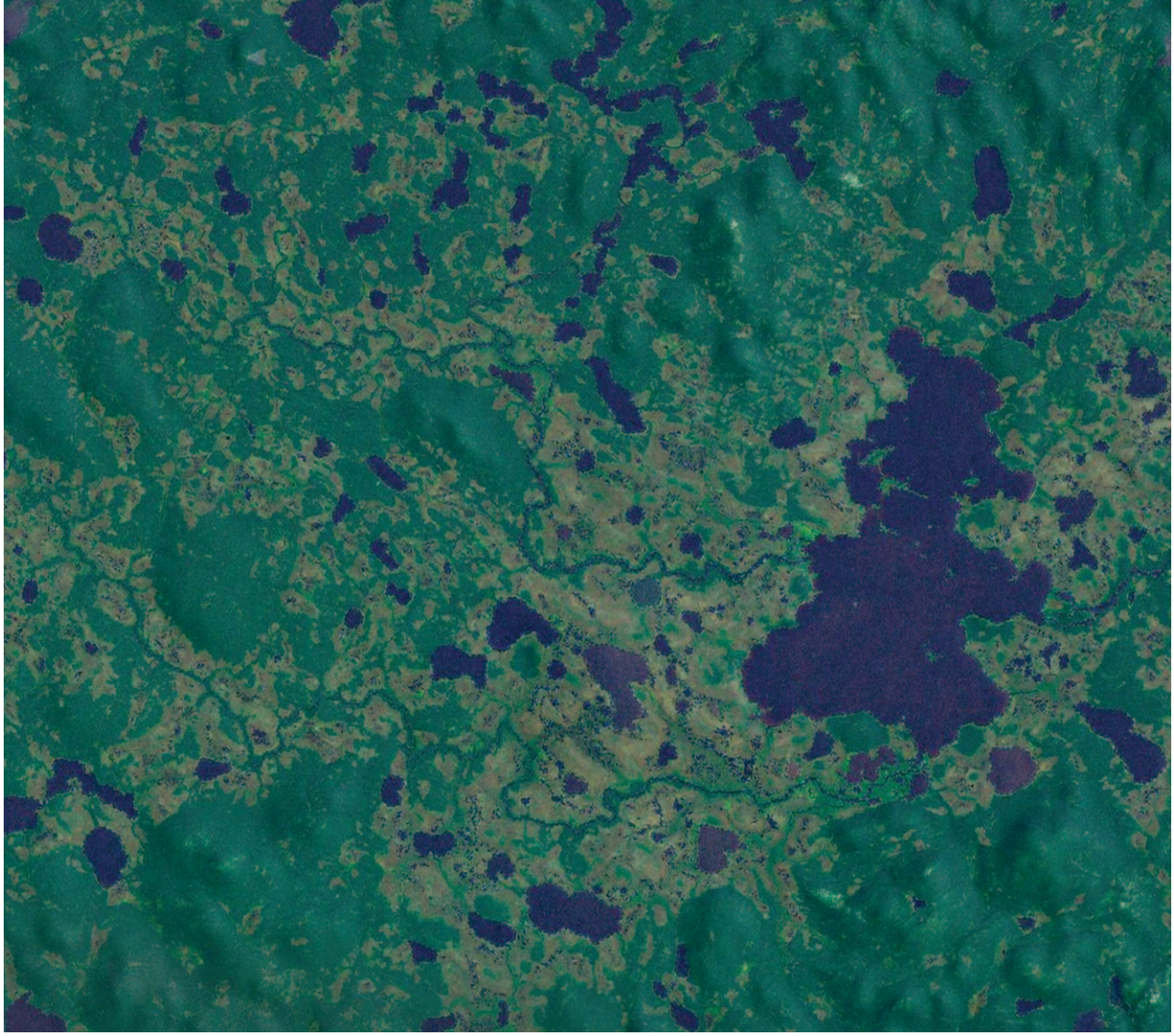
Important river systems traversing the area include the Little Mecatina and St. Augustin Rivers and their tributaries draining into the St. Lawrence; the Traverspine and the Kenamu draining into Lake Melville; and the Dominion and Minipi Rivers which flow into the Lower Churchill (WSC 2006). The largest lakes in the district are Dominion and Minipi. Wetlands occupy six percent of the district as a whole, and nearly seven percent of the district is open freshwater habitats.

Flora and Fauna

The district provides habitat for Moose and for the characteristic suite of Taiga Shield mammals, plant life and birds including Osprey, Bald Eagle and Harlequin Duck (Trimper *et al.* 2008).

Land Use

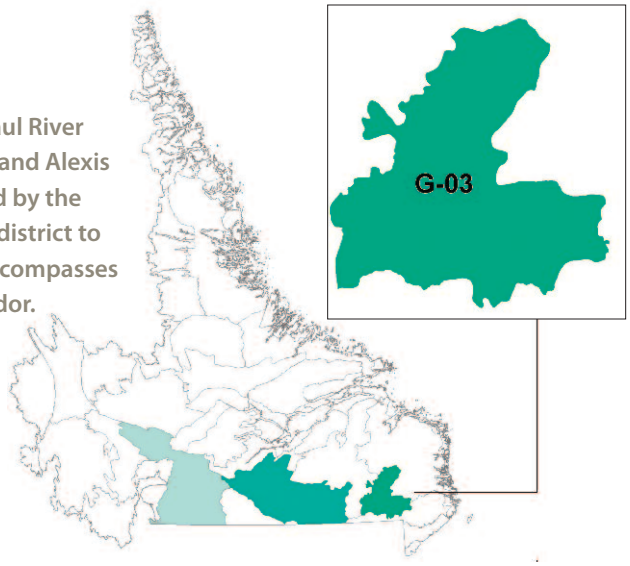
There are no permanent settlements in the district, and common land uses include hunting, trapping, fishing and outdoor recreation. The Minipi area is a famed destination for Brook Trout fishermen, and several outfitting camps are located there. The Trans-Labrador Highway crosses the district. The Department of National Defense's Practice Target Area has been used in the past for precision-guided missile training (T. Chubbs, pers. comm.). Commercial forest harvesting was restricted from 32.3 percent of the district by the FMD19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012). Approximately 2.4 percent of the district is located within the proposed Waterway Provincial Park along the Eagle River.



Southeastern St. Paul Ecodistrict – Lowland peatlands surrounding low, forested, and shallowly mantled bedrock hills. Source: ESRI.

G-03 St. Paul Ecodistrict

The St. Paul Ecodistrict is the headwater plateau of the St. Paul River draining south to the Gulf of St. Lawrence, and the St. Lewis and Alexis River watersheds draining to the Labrador Sea. It is bordered by the Paradise River district to the north and east, the Eagle River district to the west, and the Border district to the south. The district encompasses 4,948 km2 (494,784 ha), approximately 1.7 percent of Labrador.



Climate

The district's climate falls within the Low Subarctic Ecoclimatic Region (EWG 1989), with a continental climate that is removed from the moderating effects of the Atlantic Ocean. Summers are characteristically cool and wet, and winters are cold. Growing degree days are 138, and lakes are free of ice an average 180 days per year. Mean annual temperature is -0.8°C (CFS 2013). Mean annual precipitation minus potential annual evapotranspiration averages 919 mm (Price *et al.* 2011).

Geology and Substrates

The district is part of the Grenville structural province, composed of Precambrian granite, syenite, and gneiss with intrusions of gabbro, anorthosite and ultramafite (NL DNR 2011a). It is a rugged bedrock terrain

generally sloping from elevations of 580 m ASL in the northwest to 196 m ASL in the southeast, averaging 381 m ASL (NRC 2007). The lower valleys of the St. Paul and Alexis rivers are approximately 200 m ASL Thin veneers of sandy till moraine mantle the bedrock, and well-drained glaciofluvial deposits occupy the St. Paul valley floor. Drumlins are particularly evident in the northeastern uplands (NL DNR 2011b)

The southeastern half of the district is a more level plateau where impermeable substrates, poor surface drainage and a wet climate have encouraged widespread peatland development, a dominant feature of the district (Lopoukhine *et al.* 1978). Organic terrain is common throughout the area and permafrost occurs in isolated patches (Brown *et al.* 2001).

Land Cover

In general the district has very few wildfires and is characterized by extensive areas of Black Spruce forest (7 m to 12m tall) with a feathermoss understorey (NL DNR 1974). Fire has occurred only on the well-drained, sand terraces of the St. Paul River valley. Closed-canopy stands of Black and White Spruce and Balsam Fir can occur on protected, moister sites. The highest bedrock summits and knolls in the northwest have sparse till overburden and support open, unforested rocklands with relatively little lichen cover. Colder-than-normal bedrock exposures and exposed hilltops are covered with dwarf Black Spruce krummholz (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Extensive peatlands occur on low flats, although densities are not as high as in the Eagle Plateau Ecodistrict. Basin bogs and string fens are common, the former with raised-dome centres and often thinly blanketing bedrock, and the latter ribbed and with open pools. Both are often surrounded by thin borders of Black Spruce and Tamarack (NRC 2007).

Water

This is an extremely wetland-rich district compared with other parts of Labrador. Almost twenty percent of the district is occupied by wetland habitats. Another 5.6 percent of the land is covered by open-water habitats. The headwaters of the St. Lewis, Alexis and St. Paul Rivers all flow from this area (Anderson 1985).

Flora and Fauna

The district provides habitat for Moose, Black Bear, Marten, Red Fox and a wide diversity of fauna, waterfowl and raptors (Meades 1990, SSLP 2012b).

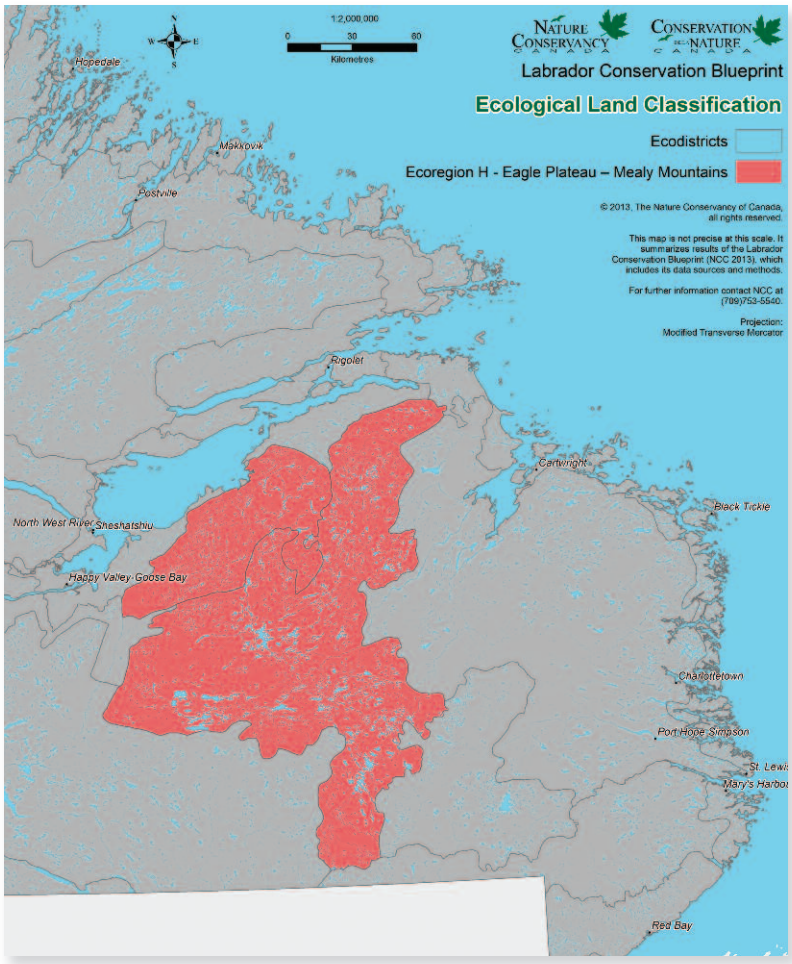
Land Use

There are no permanent settlements in the St. Paul Ecodistrict and the landscape remains untouched by human industrial activities. Overall the area provides opportunities for hunting, fishing, trapping and outdoor recreation.

River Beauty (*Epilobium latifolium*). John Riley

H Eagle Plateau - Mealy Mountain Ecoregion

Montane Mid Subarctic: ESWG 1993:ER-89, 90; EC 1999:ER-81,82; QC 2010:E07.



The Mealy Mountains and Eagle River Plateau that slopes from the mountains towards the south and east comprise this Ecoregion. Mean annual temperature is approximately -2°C and ranges from 8.5°C in the summer to -11°C in the winter. It is a moist region, with mean annual precipitation ranging from 900 mm to 1200 mm, and with some of the highest snowfall accumulation in Labrador.

The bedrock is part of the Grenville structural province, predominantly of Precambrian anorthosite, granite and gneiss, massively eroded and planed by glaciers, and only thinly covered in parts by hummocky, boulder-rich and sandy morainal veneers. The high Mealy Mountains are rounded bedrock masses with fractured linear lowlands and scarps, and with very little overburden. The lower Eagle River Plateau slopes to the south and east and is of similar bedrock, but is more subdued topographically and has more overburden; where there is poor lateral surface drainage there are extensive peatlands. Permafrost is sporadically distributed, and occurs mainly in peatlands.

The larger, expansive Eagle Plateau Ecodistrict is characterized by peatlands, particularly in the south, which are framed by exposed bedrock highs and connected by various shallow drainways. Open pools cover many of the lowland string fen peatlands, and the fen vegetation includes brown mosses, *Sphagnum* mosses, sedges and low shrubs. The basin bogs and thin blanket bogs covering bedrock slopes are dominated by *Sphagnum* mosses, Labrador Tea, and sedges. Dwarf Black Spruce and Tamarack are characteristic trees of the peatland edges, ribs and drainways. Black Spruce woodlands with an understorey of lichen, mosses and Labrador Tea are common on bedrock slopes, and alder thickets flank the streams and rivers. The topography is relatively level with some gentle surfaces and a few eskers.

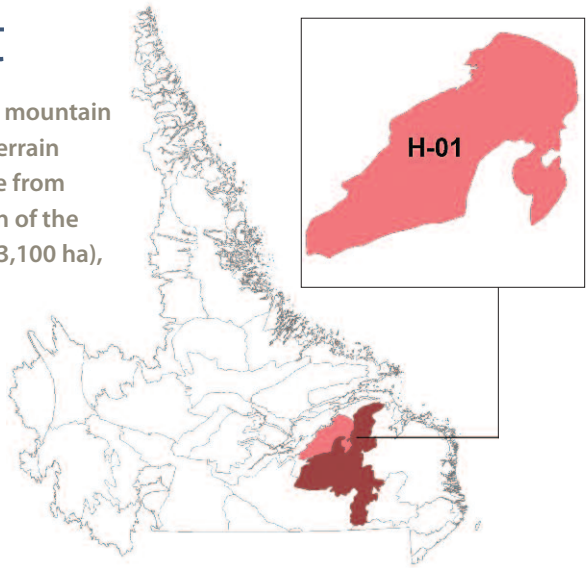
The region provides habitat for Caribou, Moose, Black Bear, Red Fox, Lynx, and numerous waterfowl. Tree-nesting raptors such as Bald Eagle and Osprey are particularly common here. Opportunities exist for hunting, trapping, fishing, outdoor recreation, and wilderness-oriented tourism.

Peatland margin on the Eagle Plateau. Valerie Courtois

Cave Creature Lake, Memekueshu-nipi. Jon Feldgajer

H-01 Mealy Mountains Ecodistrict

The Mealy Mountains Ecodistrict includes the main body of the mountain range south of Lake Melville, which is the most rugged alpine terrain in Labrador south of the Torngat Mountains. The mountains rise from sea level to their highest peak at 1,188 m. The average elevation of the district is 530m (NRC 2007). The district occupies 3,631 km^2 (363,100 ha), approximately 1.2 percent of Labrador.



Climate

The district is located in the Mid Subarctic Ecoclimatic Region (EWG 1989) and is characterized by short, cool summers and very cold winters. The growing season is 133 days. Mean annual temperatures are approximately -1.8°C (CFS 2013). At lower elevations along Lake Melville, the maritime influence warms and moistens local microclimates and average temperatures can be up to 2°C warmer. By contrast, the highest peaks are snow-covered year round. Mean annual precipitation minus potential annual evapotranspiration averages 859 mm (Price *et al.* 2011).

Geology and Substrates

Massive fractured bedrock of the Grenville structural province predominates, with intrusive igneous rock (anorthosite) criss-crossed with massive dykes and sills, and with abrupt, sub-parallel scarps on the north and

west slopes. Glacial features at high elevation include glacial *striae*, *roches moutonées*, *erratics* and *perched blocks*. Talus slopes and fellfields are common and other surficial materials are minimal. Frost action has scattered a colluvial veneer over large rockland areas, and local moraines and kame deposits are present in some of the valleys. Numerous sub-parallel lakes occupy deep fracture valleys that run west-east and north-south across the highlands, linked by many small streams and falls (Lopoukhine *et al.* 1978, NL DNR 2011a,b). Subsurface drainage is minimal and permafrost is isolated (Brown *et al.* 2001).

Land Cover

Tree cover is sparse. The rolling terrain above the treeline is dominated by rock tundra, lichens, prostrate shrubs, and alpine forbs, grasses and sedges. Sheltered slopes and valleys harbour stunted Black Spruce and Balsam Fir, and weakly-drained depressions support small, shallow fen peatlands (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Water

Part of the district falls within the Lake Melville drainage basin, and the rest within the Eagle River drainage basin (WSC 2006). Approximately one percent of the district is occupied by wetlands, and seven percent by lakes, rivers and other open freshwater habitats. Larger river systems crossing the area include the Kenemish, Kenamu, and English Rivers (Anderson 1985). Larger lakes include Awesome and Cave Creature Lakes.

Flora and Fauna

The district provides habitat for Moose, Black Bear, Grey Wolf, and a wide diversity of other fauna. The threatened Mealy Mountain Caribou calve in the peatland complexes in the headwaters of the English, North, White Bear and Eagle Rivers, and inland from the coast to the east. In winter, they move into the mountains or onto the lowlands on the south shore of Lake Melville. They also use coastal areas and offshore islands from the mouth of Groswater Bay to Sandwich Bay, as well as the Porcupine Strand (Schmelzer and Wright 2012e).

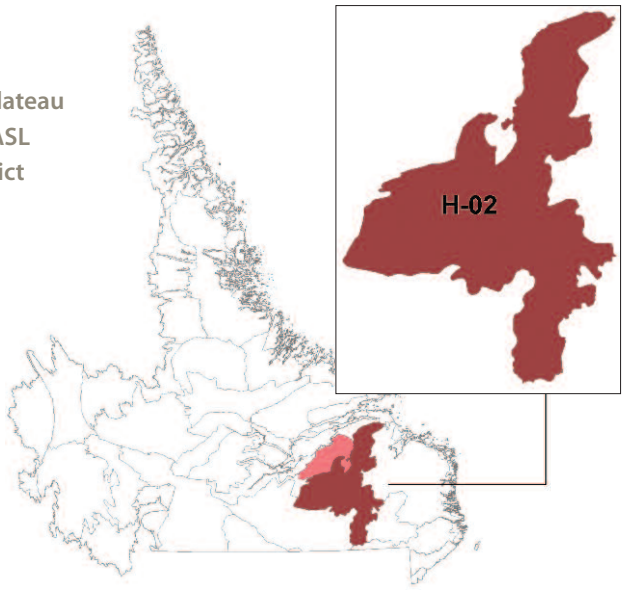
Land Use

The Mealy Mountains Ecodistrict is highly scenic and attracts adventurous outdoor enthusiasts, although access is limited. Hunting, fishing and trapping are long-standing land uses. Eighty-two percent of the district is part of the Mealy Mountains National Park Reserve. Almost two-thirds of the remaining district was constrained from forestry activities under the FMD 19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012).

Mealy Mountains. Scott Taylor

H-02 Eagle Plateau Ecodistrict

The Eagle Plateau Ecodistrict is a relatively level, sloping plateau south and east of the Mealy Mountains, averaging 386 m ASL Elevations range from 31 m to 752 m (NRC 2007). The district encompasses 13,941 km^2 (1,394,100 ha), approximately 4.7 percent of Labrador.



Climate

The Eagle Plateau district is located in the Mid Subarctic Ecoclimatic Region (EWG 1989) and is characterized by cool summers and cold, snowy winters. The growing season is 139 days. The mean annual temperature is -1.1°C (CFS 2013). Average annual precipitation minus potential annual evapotranspiration is 874 mm (Price *et al.* 2011).

Geology and Substrates

The district is part of the Grenville structural province, dominated by acidic granite and gneissic bedrocks, and other acidic intrusives (NL DNR 2011a). The terrain is predominantly low and level towards the southeast, rising to a higher plateau northwest towards the Mealy Mountains. Glacial landforms include a few eskers and some meltwater deposits but the prevailing terrain is a low rolling plateau of exposed rocklands and open lichen woodlands. Lakes and ponds are particularly frequent towards the south. Permafrost occurs in isolated patches (Brown *et al.* 2001).

Land Cover

Broad expanses of string bogs are characteristic of the district and a few shallow river valleys traverse the plateau. Poor surface drainage, wet climate and impermeable substrates have encouraged widespread peatland development, especially on the lower elevation to the south. String fens and blanket bogs are common, the former ribbed and with many open pools and the latter often very thinly blanketing bedrock slopes. Both are often surrounded by thin borders of Black Spruce with feathermoss understoreys and intermittent Tamarack. Well-drained areas with soil support White Spruce and Balsam Fir, and drainways are lined with alders. Eskers and localized glaciofluvial deposits support lichen-rich and lichen shrub woodlands. Closed conifer forest occurs most notably on bedrock controlled slopes approaching the Mealy Mountains (Lopoukhine *et al.* 1978, Meades 1990, ESWG 1995).

Water

The district includes much of the headwaters of the Eagle, White Bear, North and Paradise Rivers (Anderson 1985). It is a wetland-rich district, with more than 17 percent of its area occupied by wetland habitats, and 10.4 percent by other open freshwater habitats.

Flora and Fauna

The district provides habitat for Grey Wolf, Moose, Black Bear, American Marten, Red Fox, Woodland Caribou and a wide diversity of fauna, including high numbers of waterfowl and raptors.

Land Use

The Eagle Plateau Ecodistrict provides opportunities for hunting, trapping and outdoor recreation. The rivers in the district, especially the Eagle, are famed for Atlantic Salmon and support many sport fishing camps. The northern and eastern portion of the district was designated the Mealy Mountains National Park Reserve in 2010, and the Eagle River watershed was identified as a proposed Provincial Waterway Park. These areas account for 45 percent of the district. Additional areas were excluded from forest harvesting under the FMD19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012).

Eagle Plateau, string fen. Valerie Courtois
Eagle River. Destination Labrador
Eagle River Atlantic Salmon. Jon Feldgajer

BOREAL SHIELD ECOZONE

(ESWG 1995; EC 1999; WWF 1999)

CANADA'S LARGEST CONTINUOUS ECOSYSTEMS are its boreal forests, woodlands and muskeg, spanning the continent from the Atlantic Ocean to the Rockies and the Arctic Ocean. This is the largest of Canada's Ecozones at 1.8 million km^2, including more than a fifth of Canada's landmass. The vast majority occurs on the Canadian Shield, North America's geologic foundation, on which subsequent geologic processes have operated, variously eroding and depositing overlying materials over thousands of millennia.

The Shield was formed 4.5 to 0.6 billion years ago in the Precambrian Era, as a mountain terrain thrown up by the warping, folding and faulting of the Earth's crust. It is now a transcontinental bedrock plain, eroded and weathered over billions of years. In the last two million years, during the Pleistocene Epoch, erosion increased as the climate cooled and the land was depressed, scoured and plucked by multiple, continental-scale glaciers. The Laurentide ice sheets were the globe's largest. They distributed deposits such as till moraines, eskers and drumlins, and carved features such as roches moutonées. After the last glaciation, deposits laid down by postglacial ice and water included kames, colluvial fans, deltas, terraces and beach ridges. Their final recession added features such as erratics, sand, gravel and other deposits. Eroded basins, depressions, and bedrock fractures are filled with the ecozone's distinctive millions of lakes, ponds, wetlands and peatlands.

The climate of the zone is generally continental with long cold winters and short warm summers. Oceanic air masses bring relatively high levels of precipitation, as much as 1,100 mm in southwest Labrador. The average midwinter temperature is -15°C, while in midsummer it averages 17°C.

Boreal conifer forest. Jon Feldgajer

Almost 88 percent of the zone is forested by hardy and adaptable trees such as Black and White Spruce. Typical broadleaf trees are White Birch, Trembling Aspen and, to a lesser degree, Balsam Poplar, and conifers include Balsam Fir. Wildfires are the rejuvenating force in forest succession and are responsible for triggering natural regeneration in the absence of commercial forestry. Typical of the zone are its innumerable peatlands, marshes and other wetlands, which cover nearly 20 percent of the zone. These habitats are of great biological diversity and productivity.

Emblematic wildlife include the Beaver, Moose, Woodland Caribou, Wolf and Black Bear, and the Lynx, Snowshoe Hare, Marten, Muskrat, and Mink are also common. In offshore marine environments, Labrador waters support seven species of seals and over a dozen whale species. The biologically-rich marine areas of the Strait of Belle Isle support commercial marine fisheries and provide rocky shores for nesting seabirds. Lake Trout, Lake Whitefish, and Northern Pike are common fish species in onshore lakes. Each spring the abundant waters of the ecozone attract hundreds of thousands of ducks, Common Loon, and Canada Goose, either to breed or to rest and feed before flying north to breed. Waterfowl that commonly breed here include the American Black Duck, Ringnecked Duck, Green-winged Teal, and Canada Goose. Boreal Owl, Great Horned Owl, Evening Grosbeak, Osprey, and a hundred other landbirds also breed here. Canada's Boreal Shield Ecozone has been called "North America's Bird Nursery" and it exports billions of birds southward each fall.

The Boreal Shield Ecozone is also rich in fur, timber and mineral resources, which are the backbone of the Boreal Shield economy. Carbon sequestration, water storage and purification, and wildlife habitat are boreal ecological services of global significance.

I North St. Lawrence Ecoregion

Oceanic High Boreal: ESWG 1995, EC 1999:ER-103; QC 2010:EO3,EO5.

The North St. Lawrence Ecoregion encompasses the north shore of the Gulf of St. Lawrence, northward to include most of the headwaters of the north-shore drainage, as well as the south-easternmost coast of Labrador on the Strait of Belle Isle.

The climate is marked by cool, rainy summers and cold winters. The mean annual temperature of the region is approximately 0 to 1°C, averaging 11°5 C in the summer and -9°C in winter. Annual precipitation ranges from 900 mm to 1,000 mm, with an average yearly snowfall of 400 cm. Average temperatures are warmer with increasing proximity to the Strait of Belle Isle; mean annual temperatures here are approximately 1°C. The region is without permafrost in Labrador.

Red Bay Barrens. Lindsay Notzl

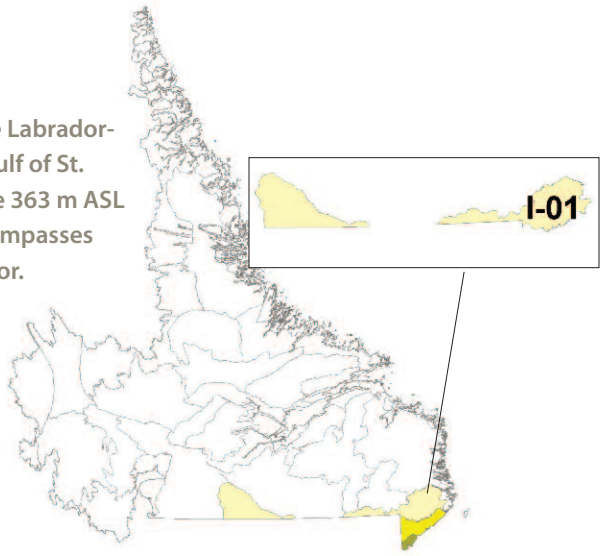
The region is the eastern extremity of the St. Lawrence Lowlands. At the Strait of Belle Isle, the coast is exposed to near-constant winds. The topography is a series of flat-topped, mesa-like hills dissected by streams of various sizes. The bedrock is predominantly Precambrian metamorphic gneiss and granitic and acidic intrusives, but also includes Cambrian sandstone, basalt and limestone. The overburden and soils are thin in the east but deeper towards the interior on slopes and hilltops. Lower valley slopes and floors contain deeper alluvial, glaciofluvial and morainal material. Shallow organic terrain occurs sporadically, and hilltops are strewn with loose rock.

Forests vary from tall closed-crown spruce forests at unburned interior sites on both lowlands and uplands, to low (less than 8 m), closed forests, and dense tuckamore of Black Spruce, Balsam Fir and White Spruce on moist slopes and sites near the coast, where unvegetated or lichen-covered bedrock exposures dominate. Matted low thickets of ericaceous shrubs also occur, and *Sphagnum* mosses, cottongrasses and other wetland species occupy scattered wet, peaty pockets. Sheltered slopes have potential for good tree growth, but wildfires and domestic timber harvesting have reduced the stock.

Historically, residents have worked at offshore and nearshore fishing. Forteau Bay, Pinware Bay and other bays provide natural harbours close to Atlantic Cod grounds and Atlantic Salmon runs. Recreation and tourism are other popular activities; with the completion of the Trans-Labrador Highway, it is now a gateway for travellers.

I-01 Border Ecodistrict

The Border Ecodistrict consists of two boreal sections along the Labrador-Quebec provincial boundary at the northeastern edge of the Gulf of St. Lawrence (also called the Mecatina Plateau). Elevations average 363 m ASL and range from sea level to 614 m (NRC 2007). The district encompasses 8,981 km^2 (898,100 ha), approximately three percent of Labrador.



Climate

The district is located in the Oceanic High Boreal Ecoclimatic Region (EWG 1989) and is influenced by the Gulf of St. Lawrence. Summers are cool and rainy, while winters are cold. Mean annual temperature is -0.7°C (CFS 2013). The average annual precipitation minus potential evapotranspiration is 856 mm (Price *et al.* 2011).

Geology and Substrates

The uplands are bedrock dominated and are of the Grenville structural province, consisting of Precambrian granites, syenites, and granitic plutons (NL DNR 2011a). Overburden is thin, and wildfires relatively infrequent and small. Permafrost occurs in isolated patches, mainly in organic deposits in wetlands (Brown *et al.* 2001).

Land Cover

The warmer, wetter climate of the district results in productive forest growth on upland and lowland sites alike. Black Spruce forest dominates the uplands; trees can grow up to 12 m tall and have canopies more than 40 percent closed (NL DNR 2011). Feathermoss rather than lichen prevails as ground cover. Forested lowlands occur along the mid-reaches of the St. Augustin watershed (lower Matse and Michaels tributaries) where the spruce forests can include up to 50 percent broadleaf trees. Open wetlands and peatlands are infrequent and confined to narrow lowlands. Wildfires are evident on less than four percent of this district. Valleys with well-drained alluvial deposits are the portion of the district most susceptible to wildfire, and support open lichen woodland in some areas.

Water

The forests and woodland uplands of the Border Ecodistrict extend across the Labrador border into Quebec, and include parts of the headwaters of the St. Paul, Coxipi, St. Augustin, Little Mecatina and Natashquan drainage basins (WSC 2006). Important rivers traversing the area include the Forteau, St. Peter's, St. Charles, Mary's Harbour and Temple Brook, which drain into the Atlantic Ocean (Anderson 1985). Approximately four percent of the district is in wetland habitats, and 6.6 percent is covered by open-water habitats.

Flora and Fauna

The district supports the full range of northern boreal wildlife, including Moose.

Land Use

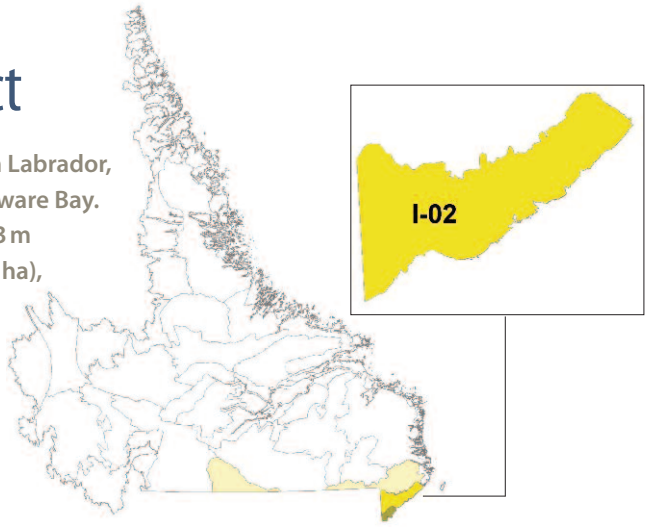
There are no permanent communities in the district. Hunting, trapping, fishing, and outdoor recreation are primary land uses. Roughly eleven percent of the area was excluded from forestry under the FMD19 Forest Ecosystem Management Plan (NL DNR and Innu Nation 2012). The Province of Quebec has proposed the Basses collines du lac Guernesé Biodiversity Reserve adjacent to the district (CEC 2012).

Little Mecatina River.
Institute for Environmental Monitoring and Research

Inukshuk, Red Bay boardwalk. Lindsay Notzl

I-02 Red Bay Barrens Ecodistrict

The Red Bay Barrens Ecodistrict is located in southeastern Labrador, from Temple Bay south along the Strait of Belle Isle to Pinware Bay. Elevations rise from the coast to 539 m ASL, averaging 263 m (NRC 2007). The district encompasses 2,064 km^2 (206,400 ha), approximately 0.7 percent of Labrador.



Climate

The climate of the district is under the influence of the ocean and marked by cool, rainy summers and mildly cold winters. The mean annual temperature is approximately 0.1°C (CFS 2013). Temperatures are moderated by the ocean, and the district has the least range of seasonal temperatures in Labrador. Ice floes disintegrate by mid-May and rarely persist into late June. Strong winds and frequent storms occur due to its proximity to the Strait of Belle Isle. The growing season lasts for 143 days. The mean annual precipitation minus potential evapotranspiration range averages 932 mm (Price *et al.* 2011).

Geology and Substrates

The bedrock is of the Grenville structural province, mainly Precambrian metamorphic gneissic rocks, granites, and acidic intrusives. Cambrian sandstones and limestones form small, localized outcrops (NL DNR 2011a). The terrain is rough and undulating, and bedrock dominates most sites. Surface deposits are very thin,

Krummholz or tuckamore. Valerie Courtois Below: Red Bay. Lindsay Notzl

discontinuous, bouldery, sandy morainal veneers, with some deeper deposits of morainal material, alluvian and glaciofluvial and recent peat deposits on lower valley slopes and bottoms (NL DNR 2011b). Permafrost occurs in isolated patches, mainly in organic deposits in the interior (Brown *et al.* 2001). South of Temple Bay, the coastline is characteristically linear and is indented by bays where rivers flow into the Strait of Belle Isle (Lopoukine *et al.* 1978).

Land Cover

Rocklands dominate on upland ridges and coastal headlands, and are either bare or covered with lichens. This is a function of coastal exposure and long wildfire history. Subarctic species such as Pink Crowberry, Alpine Bilberry, and the lichen *Cetraria nivalis* occur in areas with shallow

and discontinuous snow cover. Tree growth is limited by wind and wet soils. Vegetation in general and forests in particular are limited to sheltered sites and sites with overburden such as the Temple Brook and Pinware River valleys. Black Spruce is not salt tolerant and is replaced by White Spruce near the coast. While much of the coastline is rocky, several large bays have extensive sandy beaches. Inland in valleys, Tamarack and Black Spruce can grow to 10 m to 12 m tall, but the district has an otherwise tundra-like appearance. Black and White Spruce krummholz or tuckamore dominate most protected, moist sites. *Sphagnum* mosses, sedges, cottongrasses, and other wetland species occupy poorly drained depressions and bogs on lower slopes. Peatlands are usually slope bogs (Meades 1990).

Water

Relatively few wetlands occur in the district, occupying 1.2 percent of the area; slightly more than six percent of the district is open freshwater habitat. Important rivers traversing the area include Forteau River in the south and Temple Brook in the north. The district also includes the headwaters of Forteau Brook and L'Anse au Loup Brook, which drain into the Strait of Belle Isle (Anderson 1985).

Flora and Fauna

The district supports seals, many small mammals, and seabirds. Humpback, Fin, Pothead and Minke whales, and porpoises and dolphins, are frequently sighted along the coast during summer and early autumn. Killer Whales have also been reported. The area is on the Atlantic migratory flyway and avifaunal resting areas are common. Northern Harrier nest on the hillsides, and Common Murre use the near-shore waters. Many of the district's plants, such as Purple Saxifrage, Moss Campion and others, are dwarf alpine species (Parks Canada 2011).

Land Use

Red Bay is the primary community in the district but its population of 194 is decreasing (Statistics Canada 2011). Land uses include hunting, trapping, tourism, and outdoor recreation. The long ice-free season and proximity to fishing grounds have attracted fishermen for millennia, and there are many historic sites and smaller settlements. Prehistoric peoples hunted seals and Walrus and fished for Atlantic Salmon. During the 1500s, Basque whalers harvested Right and Bowhead Whales for oil, which was exported to Europe. They also established the Atlantic Cod fishery. Settlers also harvested seals, and the eggs of Common Eider.

The Red Bay National Historic Site is under consideration for designation as a UNESCO World Heritage Site. Quebec is proposing the establishment of the Collines de Brador Biodiversity Reserve adjacent to the district (CEC 2012).

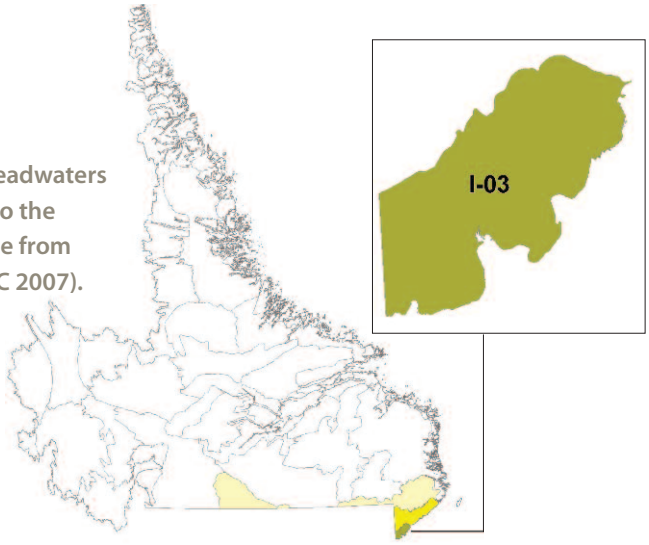
Red Bay boardwalk. Jon Feldgajer

Red Bay in fog. Lindsay Notzl

Forteau coastal trail. Jon Feldgajer

I-03 L'Anse-Amour Ecodistrict

L'Anse-Amour is Labrador's most southeastern ecodistrict. It is defined by the Pinware River valley to the north, the headwaters of the East Brador River to the west, the Strait of Belle Isle to the east and the Labrador border to the south. Elevations range from sea level to 342 m, with an average elevation of 150 m (NRC 2007). It occupies approximately 0.1 percent of Labrador (432 km^2, or 43,200 ha).



Climate

The L'Anse-Amour district is located within the Oceanic High Boreal Ecoclimatic Region (EWG 1989), and is distinctly maritime and relatively mild overall. The growing season lasts 151 days. Mean annual temperature is 0.8°C (CFS 2013), while average annual precipitation minus potential annual evapotranspiration is 911 mm (Price *et al.* 2011).

Geology and Substrates

The district's distinctive bedrock consists of Cambrian sandstone and limestone unconformably overlying Precambrian gneiss and granite (NL DNR 2011a). The district is the eastern extremity of the boreal St. Lawrence lowland, and its landforms are a series of flat-topped mesa-like hills dissected by streams (Lopoukhine *et al.* 1978). Soils are thin, derived from tills and glaciofluvial materials. Lower slopes and valleys are mantled with marine silts and clays (NL DNR 2011b). Thin peat terrain blankets the level hilltops, which are dotted with glacial erratics. This is the only district in Labrador without permafrost (Brown *et al.* 2001).

Land Cover

Low krummholtz of White and Black Spruce, Balsam Fir, willows and ericads occur throughout, with ground cover of mosses, cotton grasses and other wetland species commonplace. Lichens co-dominate (Lopoukhine *et al.* 1978). Various calcium-loving plant species occur in the district but not elsewhere in Labrador.

Water

Overall, 2.6 percent of the L'Anse Amour Ecodistrict is occupied by wetlands, while about six percent is open freshwater habitats. The district is located in the Belle Isle drainage basin (WSC 2006). Important river systems traversing the area include Blanc-Sablon River, Forteau Brook, and L'Anse au Loup Brook (Anderson 1985). Large lakes include Inside Pond, First Pond, L'Anse-au-Loup Big Pond, and L'Anse-au-Loup Little Pond.

Flora and Fauna

The area is on the Atlantic migratory flyway, and avifaunal resting areas are common. The rounded headlands of Point Amour and Forteau Point concentrate the flow of migrating seabirds and waterfowl along the coast. Consequently, large numbers of Common Eider, Black Guillemot, Thick-billed and Common Murre, and Razorbill move through the district. Strong tidal currents also attract seabirds, whales and Harp Seal during migration (Russell and Fifield 2001c, IBA Canada 2012). Species at the periphery of more southern ranges also occur here, such as the Rock Vole (Banfield 1974). A range of rare plant species that are restricted to limestone substrates occur in Labrador only in the L'Anse Amour Ecodistrict, such as Fernald's Milk-vetch.

Land Use

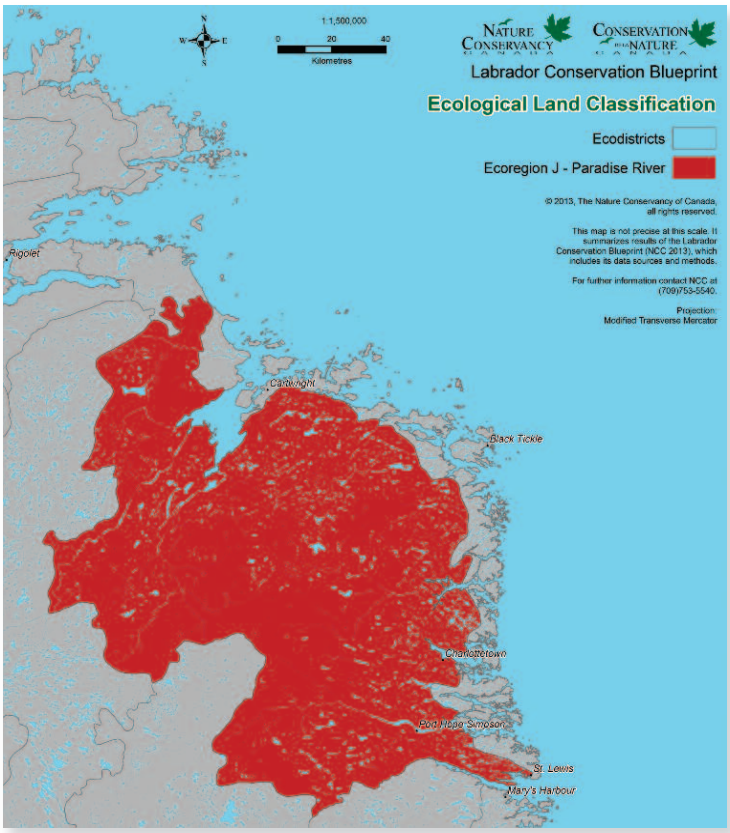
Communities in the district include Pinware, Forteau, West St. Modeste, L'Anse-au-Clair, and L'Anse au Loup. Their populations range from 107 to 550 people and have declined since the last census (Statistics Canada 2011). Fishing is the primary activity. From June to December, the Strait is a relatively heavily-used shipping route for the transportation of goods between Europe and the St. Lawrence - Great Lakes (Russell and Fifield 2001c).

Pinware River Provincial Park is located in the district and occupies 0.2 percent of the district. Nalcor Energy's proposed Labrador-Island transmission link, which would conduct hydroelectricity from Muskrat Falls to the Island of Newfoundland, cross the district.

L'Anse Amour Beach. Lindsay Notzl

J Paradise River Ecoregion

Maritime Mid Boreal: ESWG 1995 & EC 1999:ER-104; QC 2010:EO6.



The Paradise River Ecoregion is located in southeastern Labrador and, although inland from the Atlantic Ocean, is significantly influenced by its oceanic effects, such as on its climate.

The mean annual temperature is approximately 0°C. The mean summer temperature is 8.5°C, and the mean winter temperature is -8.5°C. Mean annual precipitation ranges from 900 mm along the coast to 1100 mm inland.

Bedrock in the region is of massive Precambrian granites, granitic gneisses, and acidic intrusives. The terrain is rough and undulating, and deeply dissected. Its surface rises rapidly from the east to elevations up to 365 m ASL, and is variably covered with thin, sandy till deposits. Glaciofluvial deposits occur sporadically in the form of eskers and river terraces. Permafrost occurs in isolated patches, in peatlands.

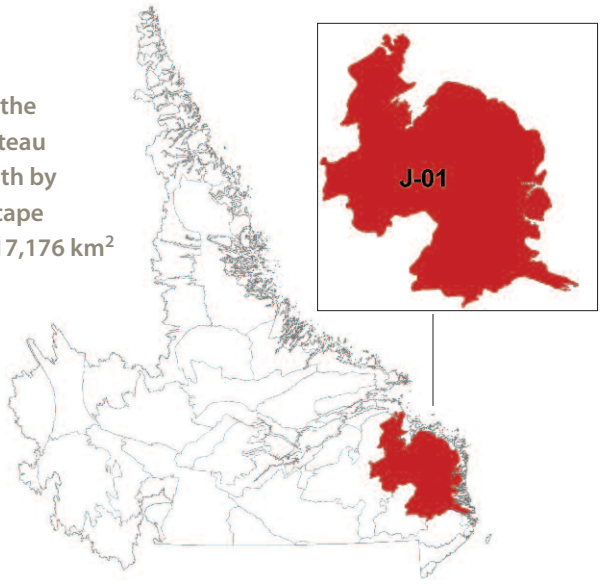
Forests occur on sheltered, unburned, moister sites and are dominated by closed stands of Balsam Fir and Black Spruce with understoreys of feathermoss. White Birch, Trembling Aspen, and Black Spruce are typical of disturbed sites. Dry sites are characterized by open lichen woodlands of Black Spruce, *Kalmia* shrubs and sparse vegetation. Forests can be productive but wildfires have converted large areas to open rockland, open lichen stands, and young spruce woodlands. A dwarf, open or sometimes closed cover of Black Spruce and Tamarack with ericaceous shrubs occurs on sporadic raised dome bogs and basin fens.

The region provides habitat for Caribou, Moose, Black Bear, Red Fox, Lynx, other small mammals, waterfowl, and other birds.

Eagle River rapids. Valerie Courtois

J-01 Paradise River Ecodistrict

The Paradise River Ecodistrict is bounded to the north by the Porcupine Strand Ecodistrict, to the west by the Eagle Plateau district, to the east by the Harbour district, and to the south by the St. Paul and Border districts. It is an undulating landscape that averages 190 m in elevation (NRC 2007). It occupies 17,176 km^2 (1,717,600 ha), approximately 5.8 percent of Labrador.



Climate

The climate of the Paradise River Ecodistrict falls within the Maritime Mid-Boreal Ecoclimatic Region (EWG 1989), characterized by cool summers and short cold winters. It is not as strongly affected by maritime climate and weather as other strictly coastal districts. The growing season is 144 days. The average annual temperature is -0.2°C (CFS 2013). Mean annual precipitation minus annual potential evapotranspiration averages 836 mm (Price *et al.* 2011).

Geology and Substrates

The dominant bedrock in the district is massive Archean granite, and metamorphic gneiss, amphibolite, gabbro, and other acidic intrusives (NL DNR 2011a). The district is rough and undulating with deeply dissected lower-elevation slopes. Its surface rises rapidly from the east to elevations of 719 m ASL, and it is covered with thin sandy morainal deposits of variable thickness. Glaciofluvial deposits are sporadic and include eskers and river terraces (NL DNR 2011b). Permafrost occurs in isolated patches, mainly in wetlands (Brown *et al.* 2001).

Land Cover

The district's forests are dominated by closed stands of Black Spruce and Balsam Fir, typically with understoreys of feathermoss on moist upland slopes. Middle seepage slopes are dominated by spruce-fir-birch forests, with rich herb understoreys. Evidence of recent and old fires occurs throughout the area and signs of past wildfire are evident on 23.2 percent of the district. White Birch and Trembling Aspen are typical of moist slopes that have been disturbed. Regeneration after fire is generally inadequate, and lichen woodlands can replace spruce-feathermoss forests on well-drained sites after fire. Dry sites are characterized by open lichen-spruce woodlands, and a dwarf, open or sometimes closed cover of Black Spruce and Tamarack with low ericaceous shrubs is found on raised dome bogs (Lopoukhine *et al.* 1978, Meades 1990).

Water

Wetlands occupy 3.7 percent of the district, while 5.7 percent of the district is in lakes, rivers and other open freshwater habitats. Important rivers traversing the area include the St. Lewis, Alexis, Gilbert, White Bear Arm, Hawke, Black Bear, Porcupine Harbour, Sandhill, Dykes, Paradise, Eagle, White Bear, and North rivers, as well as Bobby's Brook, Shinney's Waters, Capelin Bay Brook, and Reeds Pond Brook. Many of these are famed for their Atlantic Salmon populations (Anderson 1985).

Flora and Fauna

The forests in the region are productive and provide habitat for Caribou, Moose, Black Bear, Red Fox, Lynx, American Marten, Porcupine, Snowshoe Hare, small mammals, waterfowl, and other birds.

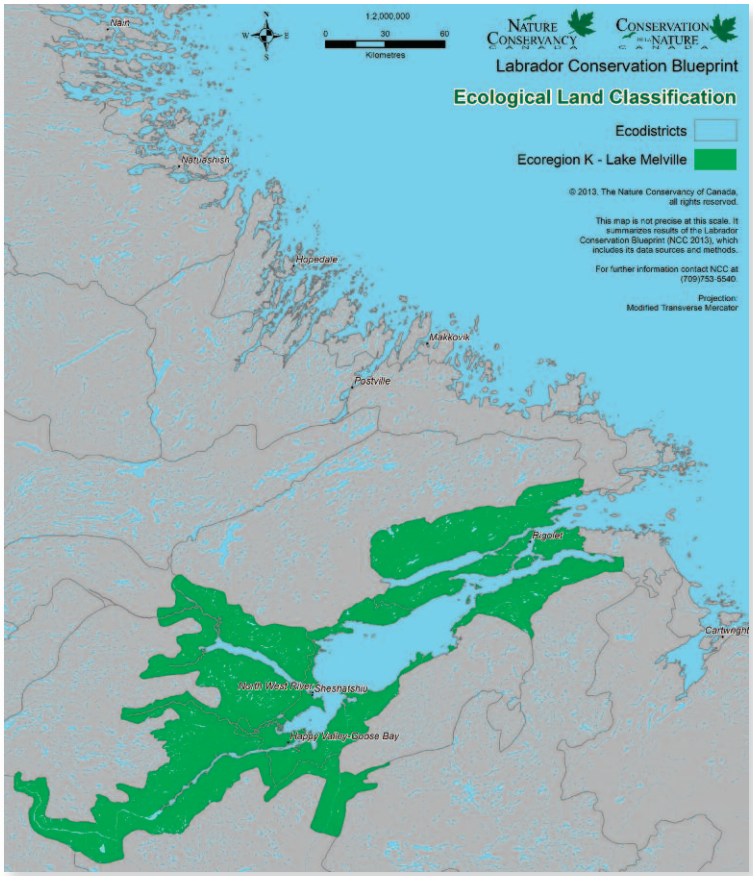
Land Use

The main communities are Cartwright, Charlottetown, and Port Hope Simpson, with populations of 516, 264 and 441, respectively. Both Cartwright and Port Hope Simpson have declined in population since 2006, while Charlottetown's population has increased since 2006. There is a small settlement on the Paradise River itself for which no population data are available (Statistics Canada 2011).

Almost 16 percent of the Paradise River Ecodistrict is located in the Mealy Mountains National Park Reserve and the adjacent proposed Eagle River Waterway Provincial Park.

K Lake Melville Ecoregion

Humid High Boreal: ESWG 1995 & EC 1999:ER-105; QC 2010:EO6.



The Lake Melville Ecoregion is a wide extension of the Boreal Ecozone west into the Taiga Shield Ecozone up the ancient Lake Melville Rift Valley (about 600 million years old).

The Lake Melville Ecoregion extends west up the Churchill River Valley as far as Winokapau Lake, and up several other river valleys entering Hamilton Inlet. Elevations range from sea level to about 350 m ASL, with a few hills up to 500 m ASL. The Mealy Mountains rise abruptly to the southeast, and the high bedrock plateau to its north occupies much of central Labrador. The region is warmed by Lake Melville and has humid, cool summers and cold winters. The mean annual temperature is approximately -2°C, averaging 8.5°C in summer and -13°C in winter. Mean annual precipitation ranges from 900 mm to 1,000 mm.

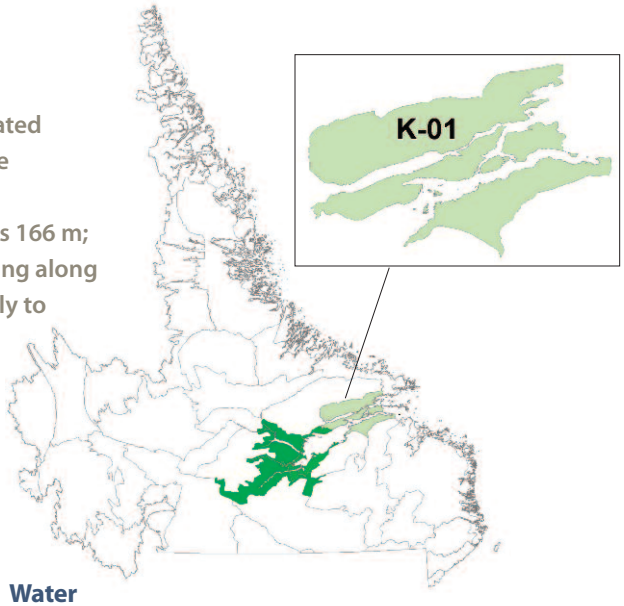
The region's bedrocks are predominantly Precambrian granite, gneiss, and acidic intrusives, with some major lowland areas of less acidic Cambrian sandstone and conglomerate. Landforms are diverse and include coastal marine clay lowlands surrounding Hamilton Inlet. Large flat terraces and scattered beachridges occupy the same area. Raised relict beaches along the valley walls date from the period of sea inundation at the time of deglaciation. Coarse-textured, well-drained terraces and kames occupy larger river valleys and are steeply pitched in places and actively slumping. Other glacial landforms include drumlins, and the drumlins and lakes in the region are mainly oriented west-east.

The region contains the most productive forests in Labrador, which occur on deep terrace and slope deposits with well-developed soils. Wildfire plays less of a role in forest succession and burn scars are fewer and smaller than in other regions due to moister site conditions. The mixed forests are dominated by productive, closed stands of Balsam Fir, Black Spruce, White Birch, and Trembling Aspen, as well as many plants at their northern range limits in Labrador. Extensive arrays of patterned, pool-and-rib bog and fen basins occur on marine clays at low elevations. At higher elevations, open ribbed fens are often found in small depressions. Permafrost occurs in isolated patches, mainly in peatlands west of Lake Melville. Bedrock outcrops are abundant on high grounds that flank the Melville Rift Valley to the north and south. Open woodlands and dry lichen rocklands also occur in the region.

Happy Valley-Goose Bay, North West River, Mud Lake, and Sheshatshiu are the administrative, service and transport centres of Labrador. Land uses by residents extend far and wide around Lake Melville and its tributary valleys. The Trans-Labrador Highway and numerous summer and winter trails, including a long-distance snowmobile trail, cross the region. Many people have cabins and common land uses include hunting, trapping, fishing and the full range of outdoor activities. The region was the centre of forest harvesting and other silviculture activities that peaked in the early 1970s.

Trembling Aspen. Valerie Courtois

K-01 Rigolet Ecodistrict



The Rigolet Ecodistrict includes the more exposed and elevated terrain of the eastern portions of Lake Melville, as well as the distinctive lowlands of Double Mer and the watershed of Tom Luscombe Brook. The average elevation of the district is 166 m; Mokami Hill reaches 723 m ASL (NRC 2007). The flats occurring along Hamilton Inlet and Groswater Bay are narrow and rise quickly to bedrock-controlled slopes and uplands to the north and south, especially abrupt to the rugged Mealy Mountains to the south. The district occupies 4,443 km^2 (444,300 ha), approximately 1.5 percent of Labrador.

Climate

The district is located within the Humid High Boreal Ecoclimatic Region (EWG 1989) and has relatively warm summers and short winters. The growing season lasts 144 days, and mean annual temperature is -0.8°C (AA-FC 1999). The mean annual precipitation minus annual potential evapotranspiration averages 767 mm (Price *et al.* 2011).

Geology and Substrates

Acidic Precambrian bedrocks with intrusions of gabbro, amphibolite and granulite underlay the district. Arkoses and conglomerates form local outcrops (NLDNR 2011a). Double Mer is the largest expanse of low, flat terrain in the district, consisting of marine clays and silts and glaciolacustrine sands and gravels deposited in the Melville Rift Valley meltwater channel as the last glacier decayed. The Backway also contains significant glaciomarine and marine deposits (NL DNR 2011b). Permafrost occurs in isolated patches (Brown *et al.* 2001).

Land Cover

Much of the district is wooded, mostly with Black Spruce forming open to sparsely-treed canopies. Local pockets of more closed-canopy spruce-fir forest also occur, as does mixedwood forest. Tom Luscombe Brook in the northeast part of the district is notable for its waterfowl concentrations, attracted especially to the wetlands of the lower valley. Isolated patches of permafrost occur mainly in peatlands. Mokami Hill is dominated by lichen rocklands and tundra-like vegetation on its crests. There and elsewhere, the acidic Precambrian bedrock outcrops also support dry lichen rocklands and open lichen woodland (Lopoukhine *et al.* 1978, Meades 1990). Wildfires are less frequent here than in areas to the north (NL DNR 2012).

Water

The majority of the Rigolet Ecodistrict is located in the Hamilton Inlet drainage basin (WSC). Over five percent of the area is comprised of wetlands, and a further three percent is in open-water habitats. Important river systems traversing the area include Tom Luscombe Brook, West Brook, and Middle Brook, as well as some unnamed rivers described in Anderson's *Rivers of Labrador* (1985). Key waterbodies include The Narrows, Double Mer and the Backway.

Flora and Fauna

Typical fauna include the Black Bear, Ermine, Red Fox, and Wolf. Forest and shrub habitats support Moose, Porcupine, Mink, Snowshoe Hare, Lynx, and Marten, and small mammals such as the Northern Flying Squirrel and Southern Red-backed Vole. Birds include the same breeders as in other parts of the ecoregion, including many species of raptors, woodpeckers and warblers. Aquatic habitats support Beaver, Muskrat, River Otter, Canada Goose, Semipalmated Plover, Spotted Sandpiper, and amphibians such as the American Toad, Northern Leopard Frog, Wood Frog, Mink Frog, Blue-spotted Salamander and Two-lined Salamander (Meades 1990, Nature Serve 2012). Spring Peeper have been recorded here.

The Goose Brook Important Bird Area is located at the mouth of Goose Brook. Its extensive mud and sand flats are exposed at low tide. Surrounding lands consist of flat meadows and shallow peatlands. The tidal flats are open to wildlife earlier than surrounding saltwaters and provide early feeding for waterfowl during spring migration. Goose Bay supports globally significant concentrations of staging Canada Geese in the spring and fall,

Thunderstorm Rigolet. Geoff Goodyear, Below: Surf Scoter. Scott Gilliland

representing about five percent of the North Atlantic population. This is the most important staging area for Canada Geese in Labrador (Russell and Fifield 2001b, IBA Canada 2012).

The Backway is a 35-km-long by 3-km-wide saltwater bay at the eastern end of Lake Melville that is sheltered from the ocean by surrounding wooded hills and Mount Gnat to the east. The coastline of this secluded bay is flat, with sand and clay mudflats extending far offshore. The area supports the largest concentration of Surf Scoters ever recorded in eastern Canada (approximately three percent of the global population). These birds may be aggregations of smaller pre-moult flocks that occur in June and early July (Russell and Fifield 2001b, IBA Canada 2012).

Land Use

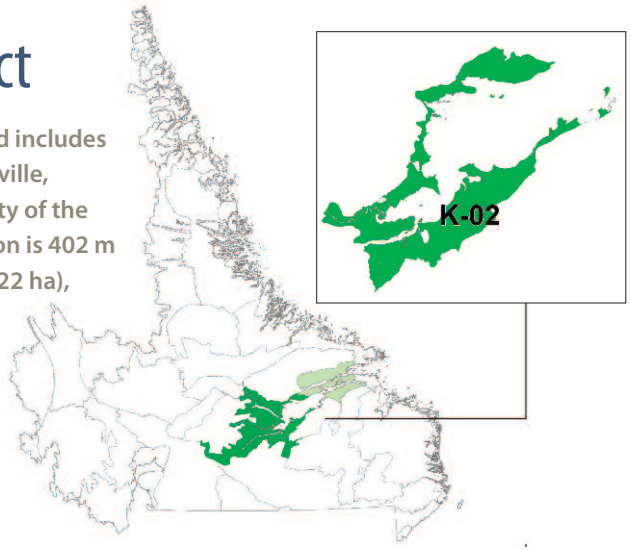
With a population of 306, Rigolet is the only community in the district and the number of residents is increasing (Statistics Canada 2011). Hunting, trapping, fishing and outdoor recreation are important land uses. Rigolet provides access and outfitting for the nearby coast and shores, and to inland destinations like Double Mer and Tom Luscombe Brook.

Overall, less than eight percent of the district is contained in the Mealy Mountains National Park Reserve. In addition, approximately 40 percent of the area is designated as a Traditional Use Zone under the proposed Labrador Inuit Settlement Area (LISA) Land Use Plan, intended to conserve environmentally sensitive areas such as Atlantic Salmon and Arctic Char spawning rivers, and other coastal habitats supporting traditional activities (LISA Regional Planning Authority 2012).

Coastal string fen. John Riley

K-02 Melville Lowland Ecodistrict

The Melville Lowland Ecodistrict is a broad coastal plain, and includes the lowest elevations around the western limits of Lake Melville, Goose Bay, and the mouth of the Churchill River. The majority of the region is lower than 50 m in elevation; its maximum elevation is 402 m ASL (NRC 2007). The district encompasses 2,025 km2 (202,522 ha), less than one percent of Labrador.



Climate

The Melville Lowland Ecodistrict is located in the Humid High Boreal Ecoclimatic Region (EWG 1989) and has relatively warm summers and short winters. The growing season lasts 155 days. Mean annual temperature is 0°C (CFS 2013). Average annual precipitation minus potential evapotranspiration is 686 mm (Price *et al.* 2011), and the district is slightly drier than the adjacent Rigolet or Melville Valleys Ecodistricts. Permafrost is minor and isolated (Brown *et al.* 2001).

Geology and Substrates

The district's predominant surficial geology is of flat, marine silts and clays, and glaciofluvial sands and gravels that were deposited after the last glaciation in the major downstream drop-zone of the Melville Rift Valley, which served as a major meltwater outlet for the decaying Laurentian ice sheet. The meltwater river was the precursor of the Churchill River (NL DNR 2011b). These flat deltaic and terrace deposits occur alongside scattered beach ridges, and they deeply overlay a characteristic bedrock of Cambrian sandstone and conglomerate, which outcrops only rarely (NL DNR 2011a).

Land Cover

Wetlands — and peatlands in particular — are a dominant theme of the district, including major open basin bogs, with domed bog centres, string bog and fen drainways, linear pool patterning, and Black Spruce and Tamarack margins. Other large basin bogs are more homogeneous expanses dominated by ericaceous low shrubs and low-density Black Spruce. Many salt marshes also occur (B. Roberts, pers. comm.). Extensive willow-alder thickets occur in depressions and along drainways, and marshes have developed along the lower rivers and shorelines, especially at the mouth of the Churchill River. Exposed beaches and strands around Goose Bay and western Lake Melville are typical of the district.

Where glaciofluvial deposits are well-drained, open lichen and low-density spruce woodlands dominate and are prone to wildfire, such as around the town of Happy Valley-Goose Bay. Elsewhere, where fire has not occurred for centuries, dense spruce-fir-birch-aspen forests can develop. Wildfire plays an important role in forest regeneration, but to a lesser extent than elsewhere in Labrador (Lopoukhine *et al.* 1978, Meades 1990).

Water

Overall, 2.4 percent of the district is covered by open-water habitats, and more than 14 percent with wetland habitats (NRC 2007), making this one of the most wetland-rich districts in Labrador. Important rivers such as the Kenemish, Kenamu, Traverspine, Goose, Sebaskatchu, Mulligan, and Lower Churchill drain into Goose Bay and Lake Melville through the district. Important lakes include Saltwater Pond (also known as Gosling Lake) and Little Lake.

Flora and Fauna

The district supports a diverse assemblage of wildlife, including Moose, Black Bear, Lynx, Wolf, Marten, Flying Squirrel, Red Fox, Porcupine, Ermine, Snowshoe Hare, Red Squirrel, Beaver, Mink, Muskrat, Otter, and small mammals including Little Brown Bat, Heather Vole, Masked Shrew, and Red-backed Vole. Breeding birds include the Bald Eagle, Red-tailed Hawk, Merlin, Spruce and Ruffed Grouse, Osprey, Goshawk, Great Horned Owl, Northern Flicker, and other species of woodpeckers, and numerous species of warblers. Saltwater aquatic habitats support many gulls and Common Tern, especially at the rapids connecting Little Lake to Grand Lake (Meades 1990).

Land Use

The town of Happy Valley-Goose Bay is located in the district, as are the communities of Sheshatshiu, North West River, and Mud Lake. Development of the Muskrat Falls hydroelectric site will mean rapid growth for Happy Valley-Goose Bay, but the population remained stable at 7,552 between the most recent censuses in 2006 and 2011. By 2011, the population of Sheshatshiu had expanded by almost one-quarter since 2006 to 1,314 people. The adjacent community of North West River had 553 residents as of 2011; data are not available for Mud Lake (Statistics Canada 2011). Residents make full use of the district and enjoy hunting, fishing, trapping, hiking, off-roading, cabin building, and all forms of outdoor activities.

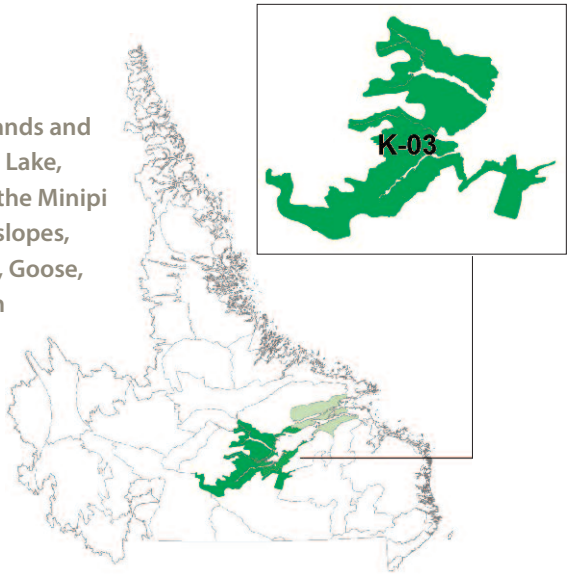
Approximately 4.3 percent of the south-eastern portion of the ecodistrict is part of the Mealy Mountains National Park Reserve. Areas to the north-east are identified as Environmentally Sensitive Areas and Traditional Land Use zones under the proposed LISA Land Use Plan (LISA Regional Planning Authority 2012). A large part of the area (66 percent) was also excluded from forest harvesting by the Forest Ecosystem Management Plan for District 19A (NL DNR and Innu Nation 2012).

Melville Lowlands: Moose and calf.
Valerie Courtois

View from Peace Rock. Jon Feldgajer

K-03 Melville Valleys Ecodistrict

The Melville Valleys Ecodistrict extends west of the Melville Lowlands and encompasses the valleylands of the Churchill River to Winokapau Lake, including Gull Island, Muskrat Falls, and tributary valleys such as the Minipi and Dominion rivers. It also includes the lower elevations, valley slopes, bottoms and river beds of the Naskaupi, Red Wine, Susan, Beaver, Goose, Traverspine, Kenemich, and Kenamu rivers. Elevation ranges from sea level to 581 m, although the average elevation is 257 m (NRC 2007). The total area of the district is 8,041 km^2 (804,100 ha), approximately 2.7 percent of Labrador.



Climate

The district is located within the Humid High Boreal Ecoclimatic Region (EWG 1989) and has warmer summers and shorter winters than surrounding districts. It is one of the most temperate climates in Labrador. The growing season lasts 149 days. Mean annual temperature is -0.9°C (CFS 2013), while mean annual precipitation minus annual potential evapotranspiration averages 712 mm (Price *et al.* 2011). Permafrost occurs only in isolated patches, mainly in peatlands (Brown *et al.* 2001).

Geology and Substrates

The underlying bedrock is acidic metamorphic rock, with sedimentary arkoses and conglomerates forming local outcrops (NL DNR 2011a). The district's topography consists of undulating uplands with flat river terraces. Dominant landforms are the valley channels, slopes and bottomlands, consisting primarily of coarse, re-worked glaciofluvial sands, gravels and silts, deeply cut by the rivers and with broad, deep slopes flanking the valleys (NL DNR 2011b). Well-drained terraces and kames occupy the larger river valleys and are steeply pitched in places, and actively slumping where undercut by rivers. The largest of the deep terrace deposits occur upstream of Goose Bay and decrease in extent westward up the Churchill valley. Glacial landforms such as drumlins, lakes and valleys are largely oriented west-east. Fine glaciomarine and marine deposits are found in the lower Churchill Valley and the lower Beaver, Susan and Naskaupi valleys, and glaciolacustrine deposits mantle the lower Kenamu flats (NL DNR 2011b).

Land Cover

Labrador's most productive forests occur in the district on deep terrace and slope deposits where more organic-rich soils have developed. North-facing valleys are characterized by predominantly close-crown spruce-fir forests, while south-facing valleys also support significant broadleaf forests of White Birch and Trembling Aspen, and mixedwood fir-spruce-birch forests. Beginning in the western Churchill Valley, and increasing in size eastward, there are areas of broadleaf forest on slopes that face south and east. Parts of the Churchill Valley such as downstream of Winokapau Lake and in the Gull Island area are dominated by broadleaf forests of Trembling Aspen, White Birch, and Balsam Poplar and are rich with wood ferns (*Dryopteris* spp.), Beech Fern, clubmosses, Mountain Maple, and Indian Pipe. These are Labrador's most species-diverse forests. Lichen woodlands also occur on well-drained lower river terraces (Lopoukhine *et al.* 1978, Meades 1990).

Drainage is largely internal and wetlands are infrequent. Extensive willow-alder thickets and wide flood-scoured riparian meadows occur along the valley bottoms. Wildfire plays a moderate role in forest regeneration in the district compared to other parts of Labrador (13.7 percent of the district). Fires are generally restricted to droughty uplands and river terraces, where regeneration tends to be poor. They occur less frequently on the slopes of river valleys but, where they occur, regeneration is dominated by birch and aspen (Lopoukhine *et al.* 1978, Meades 1990, NL DNR 2012).

White Birch forest. Larry Innes

Water

Drainages located in the Melville Valleys include the Naskaupi, Goose Bay, Grand Lake, Lower Churchill, and Lake Melville (WSC 2006). Only one percent of the area is occupied by wetlands, and 3.8 percent is in open-water habitats. The district includes the lower valleys of the Melville Rift Valley, which was the major glacial meltwater channel for the Laurentian ice sheet in southern Labrador. Important rivers traversing the area include the Crooked, Naskaupi, Red Wine, Beaver, Susan, and Cape Caribou rivers that flow into Grand Lake; and the Sebaskatchu, Goose, Traverspine, Kenemich, and Kenamu rivers flowing into Lake Melville (Anderson 1985). The largest lake in the district is Grand Lake.

Melville Valleys: Churchill River, Fall. Geoff Goodyear

Flora and Fauna

Ubiquitous fauna include Black Bear, Red Fox, Ermine, and Wolf. Forest and shrub habitats support Moose, Porcupine, Mink, Snowshoe Hare, Lynx, and Marten, and small mammals such as the Northern Flying Squirrel and Southern Red-backed Vole. Birds include many species of raptors, woodpeckers and warblers. Aquatic habitats support Beaver, Muskrat, River Otter, Mink, Canada Goose, Semipalmated Plover, Spotted Sandpiper, and amphibians such as the American Toad, Northern Leopard Frog, Wood Frog, Mink Frog, Blue-spotted Salamander, and Two-lined Salamander (Meades 1990, NatureServe 2012). Fish include Atlantic Salmon, Brook Trout, Lake Trout, Lake Whitefish, Rainbow Smelt, Longnose Sucker, White Sucker, and Northern Pike (Anderson 1985, Meades 1990)

Land Use

No permanent settlements are located in the district. Land use activities include construction, limited forestry, transportation, bush camps, fishing, hunting, trapping, and outdoor recreation. Fifty-two percent of the district was restricted from forestry activities by the Forest Management District 19A Protected Areas Network (NL DNR and Innu Nation 2012).

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Appendix A REVISIONS TO ECODISTRICT BOUNDARIES

ARCTIC CORDILLERA ECOZONE

(ESWG 1995; EC 1999; WWF 1999)

A Torngat Mountains Ecoregion

(Low Arctic/Arctic Alpine)

A-01 Cape Chidley Ecodistrict

(Lopoukhine *et al.* 1978:LR-A; Meades 1990:ER-1; ESWG1993:ED-12)

Lopoukhine *et al.*1978 recognized Cape Chidley as a distinct Land Region (A) separate from the Torngat Mountains to the south. In 1990 Meades combined it with the Alpine Tundra (Torngat) Ecoregion. The National Ecological Framework (ESWG 1995) also included it as part of its Torngat Mountains region, which included three ecodistricts; the Cape Chidley Ecodistrict corresponds roughly to ecodistrict 12.

A-02 Torngat Mountains Ecodistrict

(Lopoukhine *et al.* 1978:LR-C; Meades 1990:E-R2; ESWG 1993:ED-11)

Lopoukhine *et al.* (1978) treated this as part of the Torngat (C) Land Region, which had ten Land Districts (C1-C10); the area treated here corresponds to the C1-C8 Land Districts, and two southern outliers, the Kaumajet and Kinglapait Mountains (C9 and C10, respectively) are included here in the Coastal Barrens Ecoregion. Meades (1990) treated the area as part of the Alpine Tundra (Torngat) Ecoregion, and the Ecological Stratification Working Group (1995) included it as part of its Torngat (7) Ecoregion.

A-03 Seven Islands Ecodistrict

(Lopoukhine *et al.*1978:LR-B; ESWG 1993:ED-11)

Lopoukhine *et al.* (1978) recognized the Seven Islands areas as a distinct Land Region (B) made up of four Land Districts; the Seven Islands Ecodistrict corresponds roughly to Districts B1 through B4. Meades (1990) did not separate this lowland area from the uplands of the Alpine Tundra (Torngat) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) similarly did not separate it, including it as part of the Torngat (7) Ecoregion.

A-04 Domes Ecodistrict

(ESWG 1993:ER-74; Lopoukhine *et al.* 1978:LR-F; ESWG 1993:ED-13; QC 2010:LO3)

A-05 Saglek Ecodistrict

(ESWG 1993:ER-74; Lopoukhine *et al.* 1978:LR-E; ESWG 1993:ED-13;QC 2010:LO3)

TAIGA SHIELD ECOZONE

(ESWG 1995; EC 1999; WWF 1999)

B Coastal Barrens Ecoregion

(Maritime Low Subarctic) (ESWG 1995:ER-79; WWF 1999:ER-96; Meades 1990:ER-4; QC 2010:103)

B-01 Nain Coast Ecodistrict

(Lopoukhine *et al.* 1978:LR-I, north)

Lopoukhine *et al.*(1978) classified this area as belonging to the Hopedale Land Region (I), which they divided into three Land Districts (I1-I3); the Nain Coast Ecodistrict corresponds roughly to Land Region I1. Meades (1990) included the district in the Coastal Barrens (Okak-Battle Harbour) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) placed the area within the Coastal Barrens Ecoregion (79), comprised of two Ecodistricts — 317 and 319; Labrador's northern coastline is outlined by Ecodistrict 317, while the south coast is contained in Ecodistrict 319. The north coast has been further divided in this treatment. The Nain Coast Ecodistrict includes most lands up to 50 to 100m ASL, and the lowlands beneath the major coastal scarps, mountains and hills.

B-02 Hopedale Coast Ecodistrict

(Lopoukhine *et al.* 1978:LR-I, south)

In 1978 Lopoukhine called this the Hopedale Land Region (I), with three sub Land Districts (I1-I3); the Hopedale Coast Ecodistrict corresponds roughly with I2 and I3. Meades (1990) treated the area as part of the Coastal Barrens (Okak-Battle Harbour) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) also included it in the Coastal Barrens Ecoregion (79), which was further divided into two ecodistricts — 317 and 319; the Hopedale Coast Ecodistrict is a part of Ecodistrict 317, which encompassed Labrador's entire northern coast. The present ecodistrict includes most lands between 50 to 100m ASL, and the lowlands below the major coastal scarps, mountains and hills.

Atlantic Puffin Colony, Groswater Bay. Canadian Wildlife Service

B-03 Porcupine Strand Ecodistrict
(Lopoukhine *et al.* 1978:LR-W, LDW1-3)

The Porcupine Strand Ecodistrict roughly corresponds to Lopoukhine's Land Region W (1978; including four subdistricts, W1-W4), with the exception of the lowlands around Tom Luscombe Brook northeast of Groswater Bay (W1) and the southern portion of W4, including Diver and Earl Islands, and the mainland around the town of Cartwright. Meades (1990) included the district in the Coastal Barrens (Okak-Battle Harbour) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) included it in the Coastal Barrens (79) Ecoregion, separating it as Ecodistrict 319.

B-04 Harbour Ecodistrict
(Lopoukhine *et al.* 1978:LR- Z)

C Kingurutik - Fraser River Ecoregion

(High Subarctic) (ESWG 1995, EC 1999:ER-77)

C-01 George Plateau Ecodistrict
(ESWG 1993:ER-77; Lopoukhine *et al.* 1978:LR-D; QC 2010:LO4; Meades 1990:ER-3 in part)

Lopoukhine *et al.* (1978) treated this area as part of the Western Plateau (D) Land Region, divided into six Land Districts (D1-D6); the George Plateau Ecodistrict includes Land Districts D4-D6, and excludes Land Districts D1-D3, which are treated here as part of the Torngat Mountains Ecodistrict. Meades (1990) extended the area of her High Subarctic Tundra (Kingurutik-Fraser) Ecoregion to include a larger area. The Ecological Stratification Working Group (ESWG 1995) also classified it as part of the Kingarutuk-Fraser River (77) Ecoregion; the above described area falls within Ecodistrict 306. (Also conforms to QC 2010:LO4.)

C-02 Fraser River Ecodistrict
(ESWG 1993:ER-78; Lopoukhine *et al.* 1978:LR-G, H; Meades 1990:ER-3 in part; QC 2010:02)

The Fraser River Ecodistrict described above falls within Lopoukhine's (1978) Central Ranges and Fraser River (G& H) Land Regions and Land Districts G1-G7 and H1-H4. However, we have excluded Land District H4 which has been classified as part of the Postville-Benedict Mountains Ecodistrict. This area falls within Meades' (1990) High Subarctic Tundra (Kingurutik-Fraser) Ecoregion and the Ecological Stratification Working Group's (1995) Kingarutuk-Fraser River (77) Ecoregion. The ESWG subdivided this area into two separate Ecodistricts - 307 and 309. (Also conforms to QC 2010:02.)

C-03 Mistastin Lake Ecodistrict
(ESWG 1993:ER-86; Lopoukhine *et al.* 1978:LR-J; QC2010:LO1)

Lopoukhine *et al.* (1978) called this area the Mistastin Lake (J) Land Region, sub-divided into Land Districts J1-J3. Meades (1990) included the district within the High Subarctic Tundra (Kingurutik-Fraser) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) maintained the area as part of the Kingarutuk-Fraser River (77) Ecoregion and described landscape variations at the ecodistrict level; the ecodistrict described here is part of the northern portion of ESWG Ecodistrict 308. (Also conforms to QC 2010:LO1.)

C-04 Harp Lake Ecodistrict
(ESWG 1993:ER-88; Lopoukhine *et al.* 1978:LR-K)

C-05 North Michikamau Ecodistrict
(Lopoukhine *et al.* 1978:LR-J in part; QC 2010:K02)

The majority of the North Michikamau Ecodistrict was treated by Lopoukhine *et al.* (1978) as part of the Mistastin Lake (J) or Smallwood Reservoir (M) Land Regions. The ecodistrict described here conforms their Land Districts J4 and J7 to J9, as well as M6 to M7. Meades (1990) included the area in the High Subarctic Tundra (Kingurutik-Fraser) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) also included it as part of the Kingurutik-Fraser Ecoregion, and further divided it into ecodistricts; this area is predominantly encompassed by the un-described Ecodistrict 308. (Also conforms to QC 2010:K02.)

D McPhayden Plateau Ecoregion

(Low Subarctic) (ESWG 1993:ER-91; ESWG 1995: ER-74; QC 2010:IO3 & D07 in part)

D-01 McPhayden River Ecodistrict
(Lopoukhine *et al.* 1978:LR-P; QC 2010:IO3)

D-02 Wabush Ecodistrict
(ESWG 1995:ER-101; Lopoukhine *et al.* 1978:LR-Q in part; QC 2010:DO7 in part)

This part of western Labrador has been variously assigned to either the Taiga Shield or the Boreal Shield Ecozones (ESWG 1993, 1995; WWF 1999, QC 2010). The Wabush Ecodistrict, however, is a distinctive Labrador landscape, and was treated as such by Riche (2002), as an extension of the Central Laurentian Plateau Ecoregion (McPhayden River). It also conforms to QC 2010: DO7 in part; ESWG 1995: ER-97/101; Lopoukhine *et al.* 1978:LR-Q in part.

E Michikamau - Smallwood Ecoregion

(Low Subarctic) (ESWG 1995:ER-78; ESWG 1999: ER-78; Meades 1990:ER-5)

E-01 Benedict Mountains Ecodistrict
(ESWG 1993:ER-82; Lopoukhine *et al.* 1978:LR-L in part,N; QC 2010:U04)

E-02 Seal Lake Ecodistrict
(ESWG 1993:ER-82; Lopoukhine *et al.* 1978:LR-L in part,N; QC 2010:U04)

E-03 Smallwood Reservoir Ecodistrict
(QC 2010:U03; Lopoukhine *et al.* 1978:LR-M in part)

E-04 Labrador Trough Ecodistrict
(ESWG 1995:ER-95; Lopoukhine *et al.* 1978:LR-M in part)

E-05 Atikonak Lake Ecodistrict
(Lopoukhine *et al.* 1978:LR-Q in most part)

E-06 Joseph Lake Ecodistrict
(Lopoukhine *et al.* 1978:LR-Q in most part)

E-07 Domagaya Lake Ecodistrict
(Lopoukhine *et al.* 1978:LR-R in most part)

F Nipishish – Goose Ecoregion

(Low Subarctic) (Lopoukhine *et al.* 1978:LR-0; ESWG 1995,EC 1999:ER-80,83,84,85)

F-01 Nipishish Lake Ecodistrict
(ESWG 1995,EC 1999:ER-80; Lopoukhine *et al.* 1978:LR-0 in part)

F-02 Upper Naskaupi Ecodistrict
(ESWG 1995,EC 1999:ER-83; Lopoukhine *et al.* 1978:LR-0 in part)

F-03 Red Wine Mountains Ecodistrict
(ESWG 1995, EC 1999:ER-84)

F-04 Goose River Ecodistrict
(ESWG 1995, EC 1999:ER-85; Lopoukhine *et al.* 1978:LR-0 in part)

G Mecatina River Ecoregion

(Low Subarctic) (ESWG 1993:ER-92; EC 1999:ER-86)

G-01 Churchill Falls Ecodistrict
(Lopoukhine *et al.* 1978:LR-S; Meades 1990:ER-8 in large part)

G-02 Minipi Ecodistrict
(Lopoukhine *et al.* 1978:LR-S and X in part)

G-03 St. Paul Ecodistrict
(Lopoukhine *et al.* 1978:LR-X; Meades 1990: ER-8 in part)

H Eagle Plateau – Mealy Mountain Ecoregion

(Mid Subarctic) (ESWG 1993:ER-89,90; EC 1999: ER-81,82)

H-01 Mealy Mountains Ecodistrict
(Lopoukhine *et al.* 1978:LR-U, U1&2; Meades 1990:outlier of ER-3)

The Mealy Mountains Ecodistrict was included in Lopoukhine's Mealy Mountains (U) Land Region (1978), excluding Land District U3. Meades (1990) considered the area an outlier of the High Subarctic Tundra (Kingurutik-Fraser) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) also included it in the Kingurutuk-Fraser River (81) Ecoregion, but separated out the Mealy Mountains themselves at the Ecodistrict level; the area here corresponds roughly to un-described Ecodistrict 321.

H-02 Eagle Plateau Ecodistrict
(Lopoukhine *et al.* 1978:LR-V; Meades 1990:ER-9) Lopoukhine *et al.* (1978) treated this area as part of the Eagle River (V) Land Region, excluding two of his 11 Land District, V-2 and V-7. Meades (1990)included the area in the String Bog (Eagle River Plateau) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) subdivided the Eagle Plateau (82) Ecoregion into two separate un-described Ecodistricts – 322 and 323.

BOREAL SHIELD ECOZONE

(ESWG 1995; EC 1999; WWF 1999)

I North St. Lawrence Ecoregion

(Oceanic High Boreal) (EC 1995, 1999:ER-103; QC 2010:EO3,EO5)

I-01 Border Ecodistrict
(ESWG 1995, EC 1999:ER-103; QC 2010:E03,E05)

Lopoukhine *et al.* (1978) treated much of this area as the St. Paul Land Region (X). The Border Ecodistrict as treated here includes part of their Land Districts X1, X2 and X4. The more coastal section corresponds with Lopoukhine's Harbour Land Region (Z; Land District Z-3 in most part). The Y-11 Land District of the Paradise River (Y) Land Region is also contained in this area.

Meades (1990) considered the border sections as part of the Low Subarctic Forest (Mecatina River) Ecoregion. The ESWG (1995) assigned the majority of this area to the Mecatina Plateau (103) Ecoregion, and the un-described 444, 445 and 446 Ecodistricts. A small portion is also included in the Paradise River (104) Ecoregion, and the southern portion of the 448 Ecodistrict. (Also conforms to QC 2010:E03, E05.)

I-02 Red Bay Barrens Ecodistrict

(NL 2007:ER-10; Lopoukhine *et al.* 1978:LR-Z in part; Meades 1990:ER-10)

Lopoukhine *et al.* (1978) treated this area as part of the Harbour Land Region (Z), which they divided into four Land Districts (Z1 to Z4); the area treated here includes Land District Z-4, and most of Z-2 and Z-3. Meades (1990) assigned the area to the Forteau Barrens Ecoregion. The ESWG (1995) treated it as part of the Mecatina Plateau Ecoregion (103), which it divided into four Ecodistricts; the Red Bay Barrens Ecodistrict falls within Ecodistrict 443, which was delineated but not described.

I-03 L'Anse-Amour Ecodistrict

(Lopoukhine *et al.* 1978:LR-AA)

Lopoukhine *et al.* (1978) treated this as a separate L'Anse Amour Land Region (AA), comprised of a single Land District (AA1). In 1990 Meades extended the area north to Camp Bay, and named it the Forteau Barrens Ecoregion. Later, the Ecological Stratification Working Group (ESWG 1995) assigned the area to the Mecatina Plateau Ecoregion (103), which it split into four unnamed Ecodistricts (443-446); the L'Anse Amour Ecodistrict described here is part of Ecodistrict 443, roughly corresponding to Meades' region.

J Paradise River Ecoregion

(Maritime Mid Boreal) (ESWG 1995 & EC 1999: ER-104; QC 2010:EO6)

J-01 Paradise River Ecodistrict

(Lopoukhine *et al.* 1978:LR-Y; Meades 1990:ER-7)

Lopoukhine *et al.* (1978) treated this area as part of the Paradise River (Y) Land Region, which they divided into ten Land Districts (Y1-Y10); the Paradise River Ecodistrict described here includes all these as well as their Land District U-3, an outlier of the Mealy Mountains Land Region (U). Meades (1990) included the entire area in the Paradise River Ecoregion. The Ecological Stratification Working Group (ESWG 1995) further subdivided the Paradise River (104) Ecoregion into two un-described Ecodistricts – 448 and 449.

K Lake Melville Ecoregion

(Humid High Boreal) (ESWG 1995 & ED 1999: ER-105; QC 2010:EO6)

K-01 Rigolet Ecodistrict

(Lopoukhine *et al.* 1978:LR-T,LD T9-13 in most part)

The district is part of Lopoukhine's (1978) Lake Melville (T) Land Region (Land Districts T9-T13). Meades (1990) included it in the High Boreal Forest (Lake Melville) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) later classified it as belonging to its un-described Ecodistrict 451, within the Lake Melville (105) Ecoregion.

K-02 Melville Lowland Ecodistrict

(Lopoukhine *et al.* 1978:LR-T,T4-6 in most part; Meades 1990:ER-6 in part)

Lopoukhine *et al.* (1978) included this area in their Lake Melville (T) Land Region (sub- Land Districts T4-T6). Meades (1990) treated the area as part of the High Boreal Forest (Lake Melville) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) treated the area as part of the Lake Melville (105) Ecoregion, which it divided into three Ecodistricts; the Melville Lowland Ecodistrict, as treated here, corresponds roughly to its un-described Ecodistrict 452.

K-03 Melville Valleys Ecodistrict

(Lopoukhine *et al.* 1978:LR-T, T1-3 in most part)

Lopoukhine *et al.* (1978) treated this as part of the Lake Melville (T) Land Region, which consisted of 13 Land Districts; the Melville Valleys Ecodistrict as treated here corresponds mainly to Lopoukhine's Land Districts T1-T3 and T7-T8. Meades (1990) treated the district as part of the High Boreal Forest (Lake Melville) Ecoregion. The Ecological Stratification Working Group (ESWG 1995) also mapped the area as part of the Lake Melville (105) Ecoregion, further subdivided into three Ecodistricts, of which this area is the unnamed ecodistrict 452.

Paradise River. Valerie Courtois

Appendix B ECODISTRICT SUMMARY STATISTICS

A selection of summary ecodistrict statistics follow. They use abbreviations for types of bedrock and surficial geology, landform and land cover, as follows.

Geology – Bedrock and Surficial

A = Other rocks (e.g. impactites)
B = Acidic sedimentary/ metasedimentary
C = Acidic shale
D = Calcareous sedimentary
E = Moderately calcareous sedimentary
F = Acidic granitic
G = Intermediate/Mafic
H = Ultramafic
I = Sandy, coarse sediments
J = Fine, clayey sediments
K = Unknown

Landform

A = Cliff
B = Steep slope
C = Hill (gentle slope)
D = N-facing upper sideslope
E = S-facing upper sideslope
F = Dry flat
G = Wet flat
H = Valley/toe slope
I = N-facing lower sideslope
J = S-facing lower sideslope
K = Water

Land Cover TAIGA AND BOREAL

A = Hardwood Shrub
B = Lichen/Shrub Woodland
C = Softwood - Sparse
D = Softwood - Open
E = Softwood - Dense
F = Hardwood/Mixedwood-Dense
G = Burn/Bare
H = Alpine
I = Cleared/Developed
J = Water
K = Wetland
L = Unknown

Land Cover ARCTIC CORDILLERA

M = Snow/Ice
N = Bare/Rock
O = Shrub/Herb
P = Tall Shrub
Q = Tundra
R = Cleared/Developed
S = Water
T = Wetland
U = Unknown

	Cape Chidley	Torngat Mountains	Seven Islands	Domes	Saglek	Nain Coast	Hopedale Coast	Porcupine Strand	Harbour	George Plateau
Ecodistrict	**A-01**	**A-02**	**A-03**	**A-04**	**A-05**	**B-01**	**B-02**	**B-03**	**B-04**	**C-01**
Elevation (m) range	0-922	190-1589	0-1347	253-1228	0-1229	0-1040	0-448	0-293	0-310	176-801
(average)	(246)	(683)	(244)	(586)	(242)	(168)	(74)	(51)	(52)	(517)
Geology (% district)										
1st most common type	F (64.8)	F (63.4)	F (53.8)	F (56.3)	F (67.1)	G (37.2)	F (79.0)	J (34.7)	F (56.7)	F (81.0)
2nd most common type	K (9.6)	B (12.4)	I (21.5)	B (27.6)	I (12.9)	F (32.4)	K (8.2)	F (32.3)	K (17.7)	I (11.2)
3rd most common type	J (8.9)	I (9.1)	C (8.4)	I (8.0)	G (6.9)	H (16.0)	J (7.4)	I (26.3)	C (13.6)	G (3.2)
Landform (% district)										
1st most common type	B (17.9)	B (22.6)	A (18.7)	C (15.4)	H (14.9)	B (14.6)	H (17.1)	F (33.0)	H (17.7)	F (23.6)
2nd most common type	A (11.0)	A (21.5)	B (18.6)	H (15.3)	B (14.0)	H (13.4)	C (15.4)	G (26.7)	C (16.9)	C (19.5)
3rd most common type	I (10.9)	J (9.7)	H (13.1)	E (11.8)	E (11.1)	J (12.5)	F (11.3)	H (12.9)	F (13.7)	H (17.0)
Land Cover (% district)										
1st most common type	N (66.9)	N (62.2)	N (45.2)	N (62.3)	N (40.3)	G (31.2)	G (47.3)	C (34.9)	C (35.2)	G (44.7)
2nd most common type	O (14.0)	M (18.1)	M (35.0)	O (10.8)	O (30.0)	C (29.7)	C (20.9)	D (23.5)	G (20.8)	B (20.5)
3rd most common type	M (7.4)	O (7.2)	U (7.7)	M (8.4)	U (9.7)	D (18.1)	D (12.3)	B (10.4)	D (19.8)	J (16.3)
Peatlands (% of district)	0	0	0	0	0	0.4	1.8	7.8	0.9	0.2
Open Water (% of district)	5.9	2.9	5.3	5.4	5.8	5.3	8.1	5.5	7.7	16.3
Recorded Fires (% district)	0	0	0	0	0	0.3	1.6	1.8	7.8	0
Climate										
Average Temperature (°C)	-5.6	-6.4	-5.5	-5.5	-4.3	-3.0	-1.4	-0.1	0.5	-4.9
Average Precipitation (mm)	596.3	711.6	657.5	768.7	736.5	864.0	867.5	1,041.8	987.0	860.3
Average Moisture (mm) (precipitation minus potential evapotranspiration per year)	467.0	601.0	546.0	636.0	587.0	643.0	697.0	778.0	785.0	674.0
Avg Growing Season (days)	94	82	94	94	107	124	140	148	150	110
Disturbance (% of district) (Human Footprint)	0	0	0	0	0.1	2.2	0.4	1.0	4.4	0
	ARCTIC CORDILLERA ECOZONE					TAIGA SHIELD ECOZONE				

	Fraser River	Mistastin Lake	Harp Lake	North Michikamau	McPhayden River	Wabush	Benedict Mountains	Seal Lake	Smallwood Reservoir
Ecodistrict	**C-02**	**C-03**	**C-04**	**C-05**	**D-01**	**D-02**	**E-01**	**E-02**	**E-03**
Elevation (m) range	0-1038	130-763	72-843	253-730	472-867	524-904	0-804	1-687	294-658
(average)	(324)	(476)	(488)	(504)	(603)	(631)	(156)	(330)	(480)
Geology (% district)									
1st most common type	F (53.6)	F (71.5)	G (85.4)	F (71.5)	F (81.4)	F (37.0)	F (75.5)	F (29.1)	F (63.8)
2nd most common type	G (18.2)	I (21.4)	F (10.8)	G (10.6)	B (12.4)	B (23.1)	I (10.1)	G (25.1)	I (16.5)
3rd most common type	I (15.2)	G (4.0)	I (2.9)	I (7.4)	I (4.0)	C (15.6)	G (6.0)	B (24.7)	G (10.1)
Landform (% district)									
1st most common type	H (13.1)	C (17.8)	H (15.8)	G (23.5)	H (18.5)	F (20.8)	H (17.4)	C (16.6)	K (45.0)
2nd most common type	C (12.4)	H (17.0)	C (15.3)	F (23.2)	C (16.8)	H (17.5)	C (16.7)	H (15.9)	G (21.4)
3rd most common type	B (11.5)	F (16.4)	F (9.9)	K (19.0)	F (12.8)	C (17.1)	F (11.4)	F (14.1)	F (20.3)
Land Cover (% district)									
1st most common type	C (31.1)	C (46.5)	G (42.6)	C (19.7)	C (40.0)	H (40.2)	D (33.5)	D (37.7)	J (45.0)
2nd most common type	G (24.9)	J (15.4)	C (15.3)	J (19.0)	H (25.7)	I (18.4)	G (23.1)	G (20.9)	D (16.1)
3rd most common type	D (22.1)	G (14.6)	D (13.1)	D (18.0)	J (12.5)	C (17.1)	C (22.3)	C (14.9)	C (14.8)
Peatlands (% of district)	0.7	0.6	0.5	13.1	0.7	0.9	1.8	1.2	8.6
Open Water (% of district)	9.1	15.4	9.8	19.0	12.5	12.6	10.0	14.0	45.0
Recorded Fires (% district)	2.0	0	5.1	4.9	10.9	15.7	16.0	18.8	4.0
Climate									
Average Temperature (°C)	-3.7	-4.4	-3.7	-3.8	-3.9	-3.1	-1.7	-2.4	-3.1
Average Precipitation (mm)	859.3	869.2	879.8	809.3	816.4	849.1	883.4	870.8	811.8
Average Moisture (mm) (precipitation minus potential Evapotranspiration per year)	674.0	681.0	719.0	622.0	601.0	612.0	702.0	688.0	642.0
Avg Growing Season (days)	119	118	124	130	132	136	139	136	136
Disturbance (% of district) (Human Footprint)	0.4	0	0	0	0	18.4	0.2	0	0.9

	Labrador Trough	Atikonak Lake	Joseph Lake	Domagaya Lake	Nipishish Lake	Upper Naskaupi	Red Wine Mountains	Goose River	Churchill Falls	Minipi
Ecodistrict	**E-04**	**E-05**	**E-06**	**E-07**	**F-01**	**F-02**	**F-03**	**F-04**	**G-01**	**G-02**
Elevation (m) range	455-918	396-686	478-828	404-967	0-493	43-702	106-884	61-624	89-721	96-600
(average)	(505)	(501)	(560)	(616)	(297)	(449)	(535)	(417)	(470)	(420)
Geology (% district)										
1st most common type	C (44.4	C (36.9)	C (43.4)	C (38.5)	F (64.0)	F (65.5)	C (61.9)	C (63.7)	F (54.7)	F (52.3)
2nd most common type	I (21.9	F (29.3)	I (23.7)	F (23.5)	I (33.6)	C (17.4)	G (28.4)	F (23.3)	C (25.6)	G (23.7)
3rd most common type	B (18.8	I (18.3)	G (14.4)	G (21.6)	G (1.3)	I (10.9)	F (8.4)	I (6.6)	I (15.2)	I (23.0)
Landform (% district)										
1st most common type	K (25.4	G (30.6)	F (26.5)	F (18.1)	F (28.3)	F (25.0)	C (18.1)	F (27.9)	F (26.5)	F (25.6)
2nd most common type	G (25.0)	F (27.9)	G (26.0)	H (17.0)	G (20.8)	C (18.9)	H (16.9)	G (18.7)	G (19.1)	G (18.5)
3rd most common type	F (22.2	K (27.3)	K (19.5)	C (16.5)	C (16.0)	H (16.8)	F (11.6)	C (17.0)	C (16.1)	C (18.4)
Land Cover (% district)										
1st most common type	J (26.1	J (26.7)	C (21.3)	H (46.4)	C (32.9)	G (25.2)	D (25.4)	D (44.1)	D (45.6)	D (46.0)
2nd most common type	D (21.4)	D (24.5)	D (17.3)	D (14.7)	G (26.3)	D (24.4)	H (22.7)	C (24.0)	C (17.4)	E (16.6)
3rd most common type	C (19.3	K (19.4)	J (19.5)	C (11.9)	D (16.4)	C (22.5)	C (20.6)	J (10.4)	J (10.7)	C (13.9)
Peatlands (% of district)	7.1	19.4	12.3	3.3	5.1	6.2	1.9	8.6	6.8	6.0
Open Water (% of district)	26.1	27.3	19.5	10.6	11.4	10.4	9.2	10.4	10.7	6.9
Recorded Fires (% district)	14.8	4.7	8.2	4.5	23.4	24.5	3.5	3.5	7.6	3.1
Climate										
Average Temperature (°C)	-3.7	-2.7	-3.0	-2.7	-1.6	-2.6	-2.7	-1.9	-1.9	-1.1
Average Precipitation (mm)	790.4	800.1	804.1	872.3	988.1	894.6	901.8	931.7	912.5	1,110.6
Average Moisture (mm) (precipitation minus potential Evapotranspiration per year)	584.0	618.0	597.0	690.0	766.0	713.0	723.0	725.0	716.0	842.0
Avg Growing Season (days)	133	140	137	136	138	136	137	142	143	143
Disturbance (% of district) (Human Footprint)	3.2	0.8	1.6	0.2	0.3	0.0	0.6	0.7	0.7	0.3

TAIGA SHIELD ECOZONE

	St. Paul	Mealy Mountains	Eagle Plateau	Border	Red Bay Barrens	L'Anse-Amour	Paradise River	Rigolet	Melville Lowland	Melville Valleys
Ecodistrict	**G-03**	**H-01**	**H-02**	**I-01**	**I-02**	**I-03**	**J-01**	**K-01**	**K-02**	**K-03**
Elevation (m) range	196-580	0-1188	31-752	0-614	0-539	0-342	0-719	0-723	0-402	0-581
(average)	(381)	(530)	(386)	(363)	(263)	(151)	(190)	(166)	(46)	(257)
Geology (% district)										
1st most common type	F (64.3)	G (59.4)	F (74.7)	F (75.0)	F (77.8)	E (54.2)	F (52.0)	F (51.2)	J (70.5)	F (57.4)
2nd most common type	I (19.2)	F (34.3)	I (11.3)	G (14.9)	B (10.3)	F (23.4)	G (19.7)	J (18.7)	I (14.9)	C (16.4)
3rd most common type	G (16.1)	C (4.1)	C (10.2)	I (8.9)	I (7.4)	J (21.3)	C (19.3)	G (10.3)	F (6.0)	G (9.5)
Landform (% district)										
1st most common type	F (32.9)	H (13.5)	F (26.8)	H (20.5)	H (19.1)	C (23.4)	H (20.7)	H (20.2)	G (36.8)	H (19.7
2nd most common type	G (28.9)	B (12.1)	G (24.2)	C (20.2)	C (19.1)	H (21.8)	C (19.7)	F (17.6)	F (31.5)	C (19.2)
3rd most common type	C (14.1)	C (12.0)	C (13.3)	F (19.3)	F (11.0)	F (18.2)	F (15.7)	C (16.6)	H (10.9)	F (11.1)
Land Cover (% district)										
1st most common type	D (52.5)	C (28.3)	C (34.4)	D (58.0)	C (34.7)	D (38.2)	D (26.1)	C (36.6)	E (25.9)	E (37.6)
2nd most common type	K (19.6)	G (21.7)	D (29.5)	C (11.0)	D (33.9)	C (29.5)	G (23.2)	D (35.0)	D (21.3)	D (30.2)
3rd most common type	C (15.8)	D (20.7)	K (17.2)	E (8.1)	G (14.2)	I (14.8)	C (21.0)	E (8.2)	K (14.1)	G (13.8)
Peatlands (% of district)	19.6	1.0	17.2	3.7	1.2	2.6	3.7	5.5	14.1	1.0
Open Water (% of district)	5.6	6.9	10.4	6.6	6.3	6.1	5.7	3.3	2.4	3.8
Recorded Fires (% district)	4.8	0.5	0.6	3.7	5.6	0.1	23.2	4.1	2.7	13.7
Climate										
Avg Annual Temperature (°C)	-0.8	-1.8	-1.1	-0.7	0.1	0.8	-0.2	-0.8	0.0	-0.9
Average Precipitation (mm)	1,165.5	1,124.0	1,134.3	1,094.4	1,170.1	1,147.2	1,066.7	1,022.2	962.8	957.3
Average Moisture (mm) (precipitation minus potential Evapotranspiration per year)	919.0	859.0	874.0	856.0	932.0	911.0	836.0	767.0	686.0	712.0
Avg Growing Season (days)	138	133	139	143	143	151	144	144	155	149
Disturbance (% of district) (Human Footprint)	0	0.1	0.4	0.4	2.5	14.8	1.6	0.6	12.1	3.6

Appendix C LANDSCAPE CHARACTER

To assist in describing the ecodistricts of Labrador, a statistical analysis was undertaken to identify those landscapes that might be considered characteristic of the ecodistricts of Labrador.

The mapped data and information used in this analysis are summarized in the *Labrador Nature Atlas* (Notzl *et al.* 2013) and are on-line at **nlnatureatlas.ca**:

- Ecodistricts
- Climate (precipitation minus potential evapotranspiration, a measure of moisture and temperature)
- Geology (the underlying substrate)
- Landform (the combination of slope, aspect and grade of an area)
- Land cover (the vegetation as a measure of wildlife habitat and site productivity)
- Land and water edge (the areas of higher relative productivity and ecosystem services)
- Density of wetlands/peatlands (wet habitats, as a measure of wildlife productivity, water retention, and carbon storage)

The analysis made the following general assumptions:

- All Labrador south of the Arctic Cordillera Ecozone was considered, regardless of its regulatory or ownership status [1];
- Subwatersheds (or catchments) were the land units analyzed, including relatively undisturbed subwatersheds (>75% based on "human footprint" analysis;
- Subwatersheds were aggregated to meet average-fire-size criteria, assigned on five Labrador fire zones [1];
- The analysis sought out the half of aggregated subwatersheds ranking as most characteristic;
- Character is a relative rather than absolute measure, so a gradient of statistical outcomes was sought, in this case, the percent likelihood a subwatershed being identified as characteristic in the 100 highest scoring analytical outcomes.

An illustrative map (opposite page) is provided to illustrate ecodistrict landscape character. The darker the colour of the subwatershed, the more statistically characteristic it may be of the ecodistrict, based on these imputs.

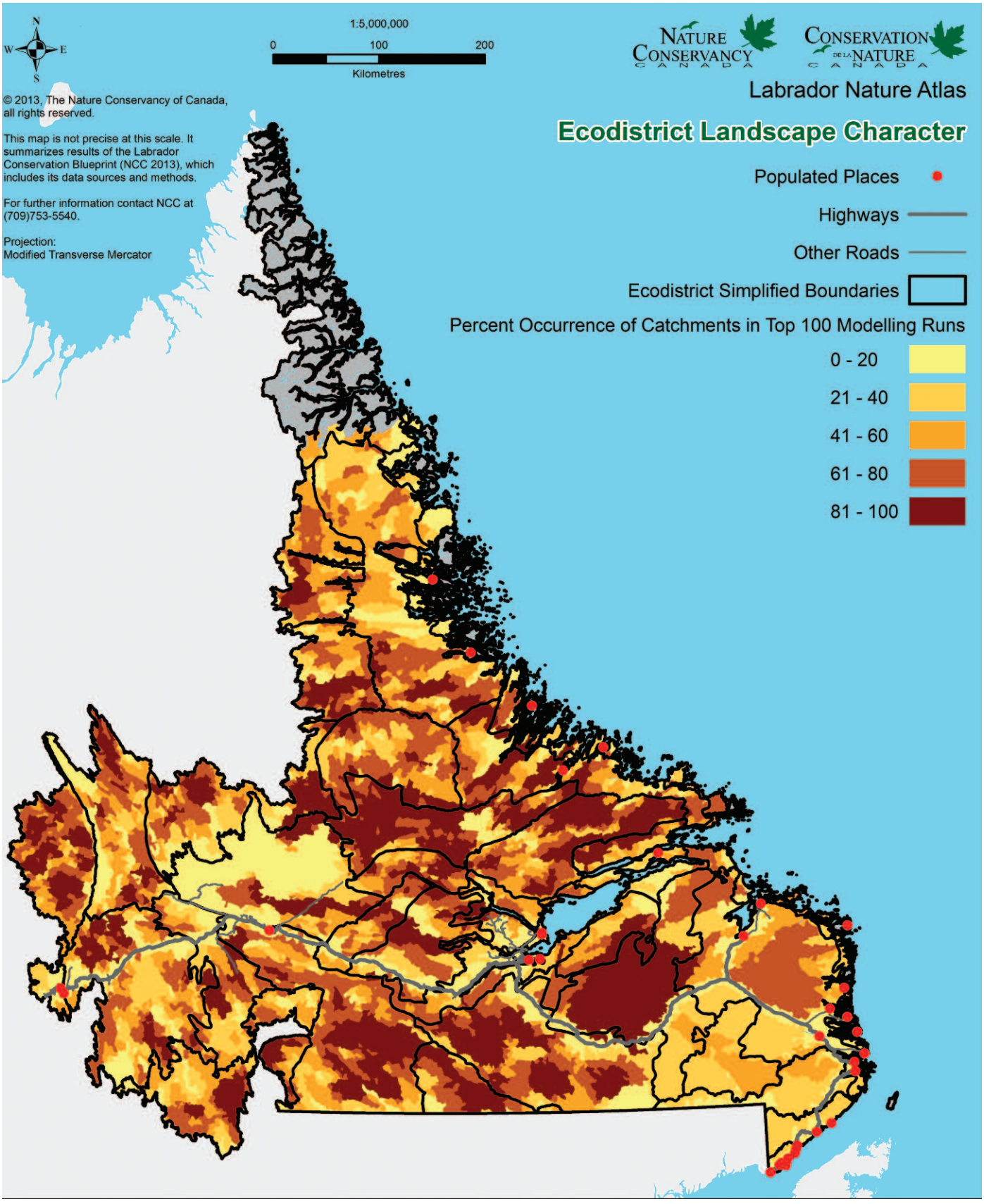
Similar but different analyses were completed for the NL Department of Environment and Conservation (NL DEC) Parks and Natural Areas Division (PNAD) as part of a conservation assessment of Labrador. For additional information on that work, contact PNAD at 33 Reid's Lane, Deer Lake, NL A8A 2A3. The analysis was conducted using freely available software, BEACONS, developed by the Dept. of Renewable Resources, University of Alberta (http://www.beaconsproject.ca/toolbox).

References

Notzl, L., R.Greene and J.L.Riley. 2013. *Labrador Nature Atlas.* Nature Conservancy of Toronto. Toronto, Ontario. (Also on-line <nlnatureatlas.ca>)

University of Alberta. BEACONS software toolbox. (http://www.beaconsproject.ca/toolbox)

[1] Fire-size thresholds are not assigned for the Arctic Cordillera Ecozone and no analysis was undertaken for that area.


N
W
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1:5,000,000
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100
200
Kilometres
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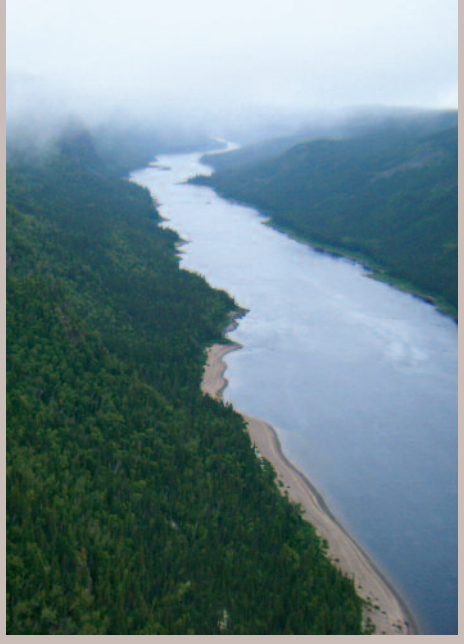
This map is not precise at this scale. It summarizes results of the Labrador Conservation Blueprint (NCC 2013), which includes its data sources and methods.
For further information contact NCC at (709)753-5540.
Projection:
Modified Transverse Mercator
Nature Conservancy Canada
Conservation de la nature Canada
Labrador Nature Atlas
Ecodistrict Landscape Character
Populated Places
Highways
Other Roads
Ecodistrict Simplified Boundaries
Percent Occurrence of Catchments in Top 100 Modelling Runs
0 - 20
21 - 40
41 - 60
61 - 80
81 - 100



Churchill River Valley. *Jean-Francois Senecal*
Battle Harbour. *Jon Feldgajer*
George River Caribou. *David Elliott*

The *Labrador Nature Atlas* is a product of the *Labrador Conservation Blueprint,* a private-public partnership from 2009 to 2013 led by the Nature Conservancy of Canada (NCC).

Its goal was to assemble, map and share the highest-quality, best-available information on the geography and biological features of Labrador; to use the data to characterize the ecological diversity of Labrador; to support superior resource stewardship and conservation planning; and to share project results widely with interested audiences.

This report on the Ecozones, Ecoregions and Ecodistricts of Labrador is one of the products of the *Labrador Nature Atlas* and describes the natural geographic variability of Labrador.

Labrador is larger than the combined area of Nova Scotia, New Brunswick, PEI and the island of Newfoundland. It supports 26,000 residents, and is one of the last relatively undeveloped landmasses in boreal and subarctic Canada. Less than one percent has been cleared or developed. Fifty-five percent of the "Big Land" is open woodland or closed forest (or land recovering from past wildfires), and 20 percent is rockland, tundra, talus, sand barrens and steep slopes. Lakes and rivers occupy fifteen percent, and another ten percent is wetland, predominantly peatlands. This revised ecological land classification for Labrador includes three ecozones, 11 ecoregions and 39 ecodistricts, and conforms to the National Ecological Framework for Canada.

A partnership between NCC and Memorial University provides interactive on-line access to the *Newfoundland and Labrador Nature Atlas* through the Grenfell Campus, Memorial University of Newfoundland, on-line at **nlnatureatlas.ca.**

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