



Forest sustainability in the province of Newfoundland and Labrador, Canada

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1 Introduction

The combustion of wood for energy purpose is not considered to contribute to the augmentation of greenhouse gases concentration in the atmosphere, as long as the CO₂ emissions released during the combustion of wood are balanced by the growth of new trees. It is therefore essential to investigate if the forests in the region where the wood used for energy purpose are managed in a sustainable way, avoiding resources associated with overexploitation of forests, land use change, depletion of carbon stocks, etc.

In this framework, literature research was carried out to produce a summary of forest management in Newfoundland and Labrador, including general condition, management and sustainability assessment.

2 Newfoundland and Labrador forests overview

2.1 Location and distribution

The province of Newfoundland and Labrador is located in the country's Atlantic Region. It is the most easterly province of Canada. Newfoundland is an island while Labrador is part of the continent.

The province Labrador has an area of 371,690 km² of terrestrial lands, and 34,030 km² of fresh water, so 405720 km² in total¹.

The island of Newfoundland as an area of 11,1 million hectares (ha)² of which 5.2 million ha is forested. The area of Labrador is 29 million ha and 18 million ha of it is forested.

The province has a population of 528,700 citizens (2017)³. Most of the population lives in Newfoundland.

¹ <https://www.canada.ca/en/canadian-heritage/services/provincial-territorial-symbols-canada/newfoundland-and-labrador.html>

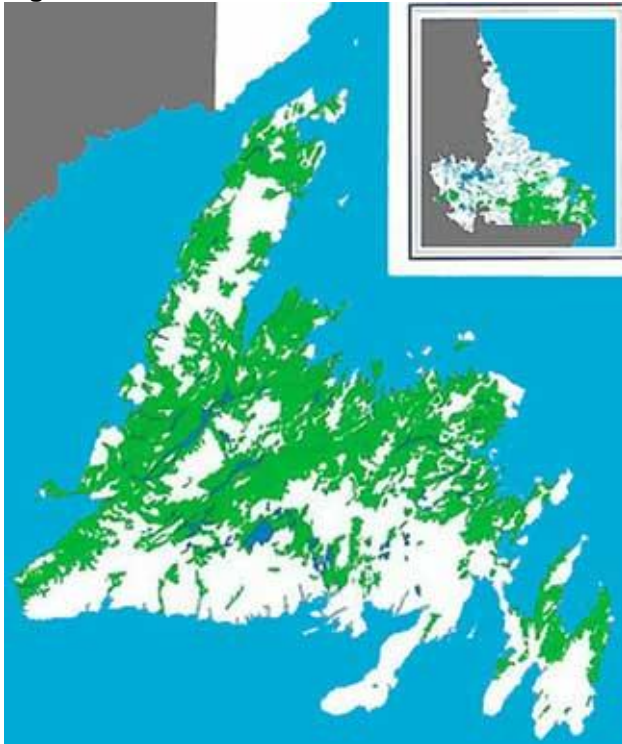
² http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

³ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

Figure 1: General map of Newfoundland and Labrador



Source: <https://geology.com/canada/newfoundland-and-labrador.shtml>

Figure 2: Productive forest area

Source: http://www.faa.gov.nl.ca/forestry/maps/prod_timber.html

The productive forest area corresponds to the land able to produce at least 35 m³/ha at rotation.

There are twenty-one tree species in the province of Newfoundland and Labrador⁴:

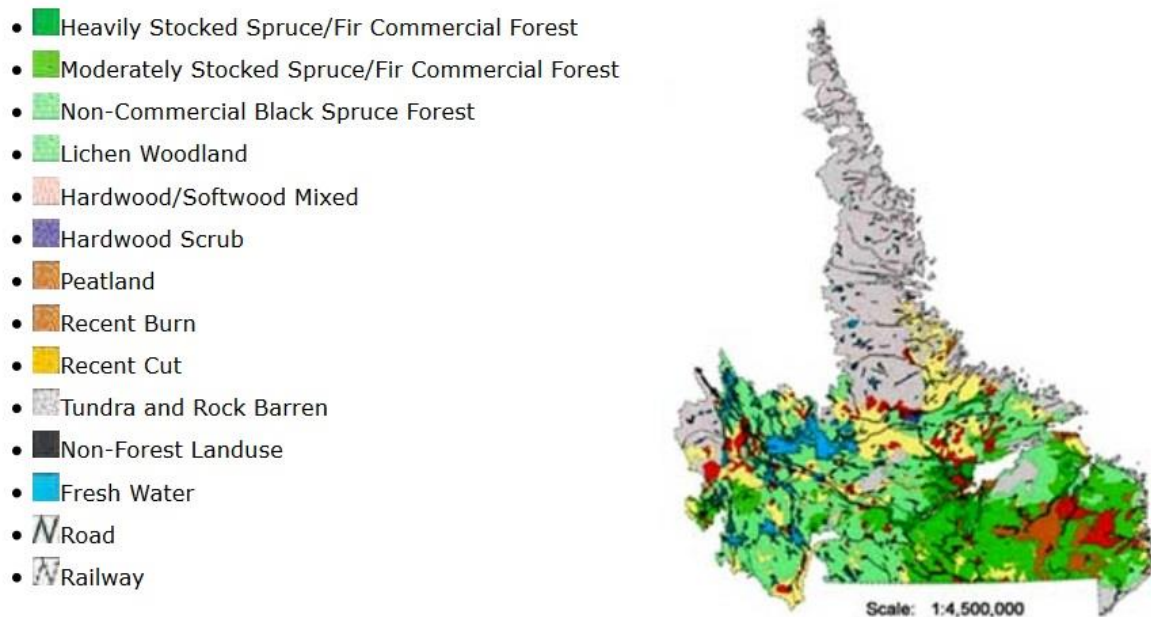
- American mountain ash (*Sorbus Americana* Marsh)
- Balsam fir (*Abies balsamea* [L.] Mill)
- Balsam poplar (*Populus balsamifera* L.)
- Black ash (*Frax inusnigra* Marsh)
- Black spruce (*Picea mariana* [Mill.] B.S.P.)
- Choke cherry (*Prunus virginia* L.)
- Jack pine (*Pinus banksiana* Lamb.)
- Mountain alder (*Alnus crispa* (Ait.) Pursh)
- Mountain maple (*Acer spicatum* Lam.)
- Mountain white birch (*Betula cordifolia* Regel)
- Pin cherry (*Prunus pensylvanica* Lf.)
- Red maple (*Acer rubrum* L.)
- Red pine (*Pinus resinosa* Ait.)
- Showy mountain ash (*Sorbus decora* [Sarg.] Schneid)
- Speckled alder (*Alnus rugosa* [Du Roi] Spreng.)
- Tamarack (*Larix laricina* [Du Roi] K. Koch)
- Trembling aspen (*Populus tremuloides* Michx.)
- White birch (*Betula papyrifera* Marsh.)
- White pine (*Pinus strobus* L.)
- White spruce (*Picea glauca* [Moench] Voss)
- Yellow birch (*Betula alleghaniensis* Brit.)

⁴ http://www.faa.gov.nl.ca/forestry/our_forest/treespecies/index.html and http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

Balsam fir is the most abundant tree in Newfoundland and second most abundant in Labrador. It is also the favourite Christmas Tree. Western Newfoundland commonly features stands of pure balsam fir. In Southwestern Labrador, only jack pine can be found. A third of Newfoundland's forest and two thirds of Labrador's forest are mainly occupied by black spruce, which is very tolerant to poor locations. Its dominance is due to repeated fires during the past century.

There is an important quantity of lakes, rivers and streams in Labrador⁵. They play a critical role in forming its ecology. Therefore, there is an important relationship between climate, topography, hydrology and vegetation resulting in a unique landscape.

Figure 3: Forest resource of Labrador



Source: http://www.faa.gov.nl.ca/forestry/maps/res_lab.html

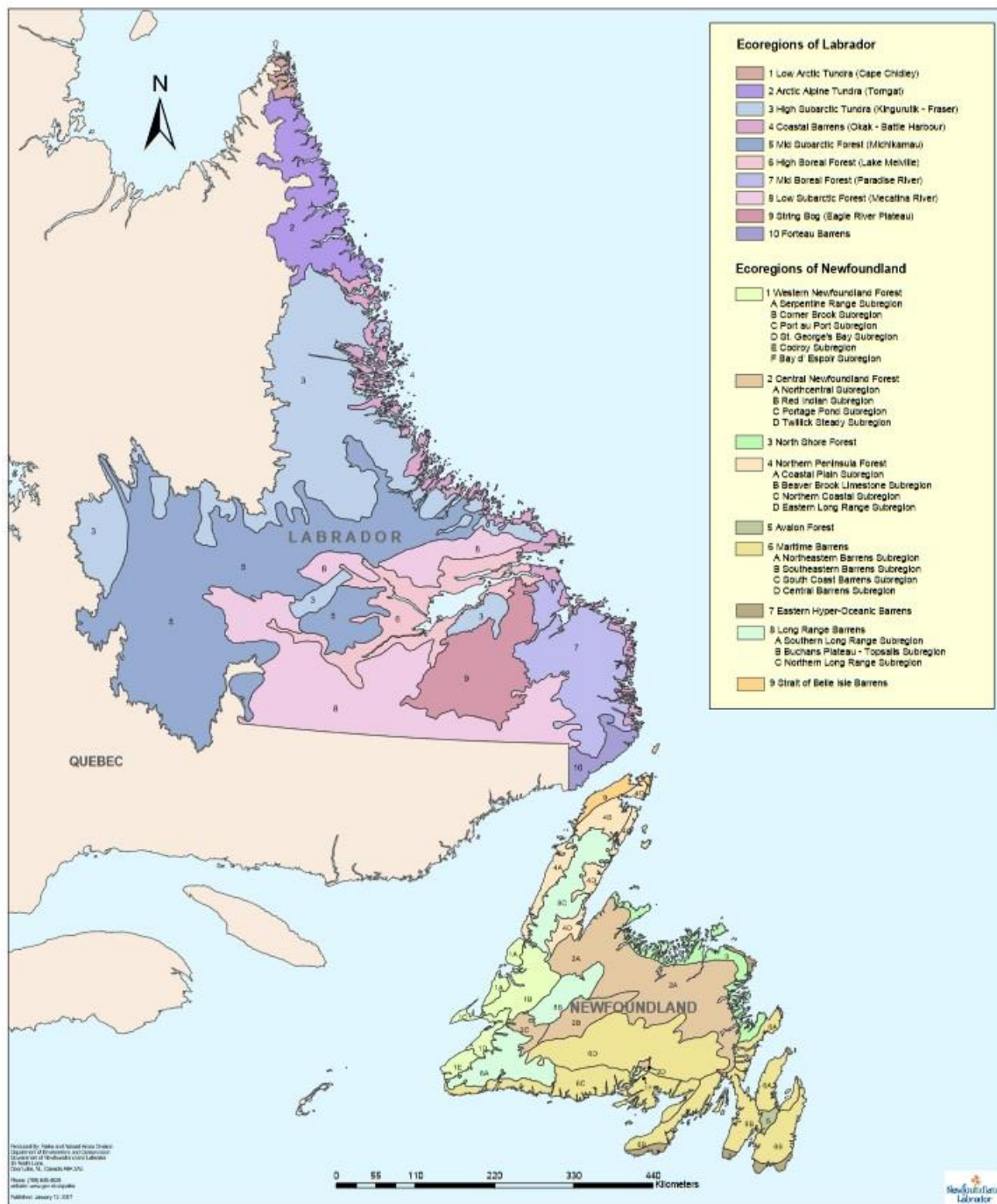
2.2 Ecological zones

Newfoundland and Labrador are divided into respectively nine and ten ecoregions⁶, which are areas with similar characteristics can be found: vegetation, soil, topographic position and bedrock⁷. The ecoregions of the province are illustrated by Figure 4.

⁵ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

⁶ http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

⁷ http://www.faa.gov.nl.ca/forestry/maps/eco_nf.html

Figure 4: Ecoregions of Newfoundland and Labrador

The ecoregions of Newfoundland are divided into twenty-one subregions or ecodistricts.

Table 1: Main characteristics of each ecoregion of Newfoundland

Ecoregions	Topography	Climate	Vegetation
Trait of Belle Isle	<ul style="list-style-type: none"> - Coastal lowlands and a section of Newfoundland's highlands - Lowlands are dominated by sloping bog plateaus - Uplands covered with sandy and colluvial deposits, along with <i>acidic</i> till - Elevations from sea level to about 630 m above sea level - Wetlands covering more than 1/4 of the ecoregion 	<ul style="list-style-type: none"> - Cool summers and cold winters - Annual mean temperature: approximately 2.5°C, with a mean summer temperature of 10°C and a mean winter temperature of -5.5°C - Annual mean precipitation ranges from 900 mm to 1100 mm 	<ul style="list-style-type: none"> - Predominant vegetation includes dwarfed patches of white spruce with an understory of mosses - White spruce more common along the coast, whereas black spruce and tamarack are more common inland - Moss and lichen covering exposed areas
Northern Peninsula	<ul style="list-style-type: none"> - Most of the ecoregion has an elevation less than 125 m above sea level; however, it rises to about 450 m above sea level on the east side of the peninsula - Dominant Igneous rocks - Topography undulating to ridged 	<ul style="list-style-type: none"> - Maritime-type climate with cool summers and mild winters - Annual mean temperature: approximately 3°C; mean summer temperature of 11°C; mean winter temperature of -4.5°C - Annual mean precipitation ranges from 1000 mm to 1100 mm 	<ul style="list-style-type: none"> - Balsam fir is the dominant type of tree species, with black spruce becoming more common at higher elevations - Kalmia heath covers poorly-drained sites - Dwarf black spruce and evergreen shrubs are common on rock outcrops exposed to the wind
Southwestern Newfoundland	<ul style="list-style-type: none"> - Elevations from sea level to just over 800 - Lowland running from St. George's Bay to Grand Lake 	<ul style="list-style-type: none"> - Cool summers and snowy, cold winters - Annual mean temperature: around 4°C; mean summer temperature of 12°C; mean winter temperature of -3.5°C - Annual mean precipitation ranges from 1000 mm to 1200 mm 	<ul style="list-style-type: none"> - Balsam fir is the dominant type of tree species - Black spruce, tamarack, and shrubs grow in poorly drained sites
Northeastern Newfoundland	<ul style="list-style-type: none"> - Barrens common in along the coast - Elevations range from sea level to approximately 150 m - Bedrock outcrops are common 	<ul style="list-style-type: none"> - Cool summers and short, cold winters - the warmest summers of the coastal areas - Annual mean temperature around 4°C; with a mean summer temperature of 12.5°C; mean winter temperature of -3.5°C - This ecoregion is the driest part of the island, with a mean annual precipitation ranging from 900 mm to 1000 mm. 	<ul style="list-style-type: none"> - Black spruce, white spruce and balsam fir, with an understory of feathermoss, are the dominant tree species.
Central Newfoundland	<ul style="list-style-type: none"> - Higher elevations are rugged and rocky - Lower areas have a rolling terrain 	<ul style="list-style-type: none"> - Maritime conditions produce cool summers and short, cold winters - The most continental part of the island - Annual mean temperature: around 4.5°C; mean summer temperature of 12.5°C and mean winter temperature of -3.5°C - Annual mean precipitation from 1000 mm to 1300 mm 	<ul style="list-style-type: none"> - Domination by balsam fir and black spruce on steep, moist, upland slopes - Black spruce, paper birch, and aspen growing on disturbed sites - Kalmia heath and lichens found on drier sites
Long Range Mountains	<ul style="list-style-type: none"> - Elevations from sea level to approximately 815 m 	<ul style="list-style-type: none"> - Cool summers and cold winters with a great deal of snow - Annual mean temperature: approximately 4°C; mean summer temperature around 12°C; mean winter temperature around -4°C - Annual mean precipitation from 1000 mm to 1400 mm 	<ul style="list-style-type: none"> - Ecoregion covered by sparsely forested heath and moss barrens - Dwarf patches of black spruce and balsam, dwarf <i>kalmia</i> and mosses - Exposed sites support mixed evergreen and deciduous shrubs

Ecoregions	Topography	Climate	Vegetation
Maritime Barrens	<ul style="list-style-type: none"> - Elevation from sea level to approximately 250 m - Composed of a mixture of sedimentary rocks and granites - Uplands are rugged and rocky due to erosion - Lower areas have a rolling topography 	<ul style="list-style-type: none"> - Climate affected by the Atlantic Ocean, which makes it susceptible to long periods of fog - Cool summers and short, somewhat moderate winters along the coast and colder inland - Annual mean temperature around 5.5°C; mean summer temperature of 11.5°C; mean winter temperature of -1°C - Annual mean precipitation from 1200 mm to over 1600 mm 	<ul style="list-style-type: none"> - Balsam fir is the dominant tree species - Fires have led to the replacement of fir by sparse stands of black spruce, balsam fir, tamarack, and shrubs, along with mosses and lichen - <i>kalmia</i> and sphagnum moss grow on blanket and flat bogs
Avalon Forest	<ul style="list-style-type: none"> - Region composed of a mix sedimentary and volcanic rocks. 	<ul style="list-style-type: none"> - Climate influenced by the ocean, which produces cool summers and cold winters - Fog frequency is great, particularly in summer - Annual mean temperature around 5.5°C; mean summer temperature of 11.5°C; mean winter temperature of -1°C - Annual mean precipitation from 1400 mm to 1500 mm 	<ul style="list-style-type: none"> - Forest dominated by balsam fir - White birch grows well on north-facing slopes
South Avalon-Burin Oceanic Barrens	<ul style="list-style-type: none"> - Ecoregion composed predominantly of a mixture of sedimentary and volcanic strata - Elevations from sea level to approximately 200 m - Uplands have been dissected by stream erosion, their surfaces are peat-covered - Coastline rugged and rocky - Inland areas have a rolling terrain of low relief 	<ul style="list-style-type: none"> - Cool summers and short, relatively mild winters - Strongly affected by the Atlantic Ocean - Summers subjected to high fog frequencies and persistence - Annual mean temperature around 5.5°C; mean summer temperature of 11.5°C; mean winter temperature of -1°C - Annual mean precipitation from 1200 mm to 1500 mm 	<ul style="list-style-type: none"> - Dense carpets of moss and lichen, along with low-growing <i>ericaceous</i> shrubs - Dwarf <i>krummholz</i> of balsam fir grows on some upland sites

Source: <http://www.heritage.nf.ca/articles/environment/ecoregions-newfoundland.php>

Table 2: Main characteristics of each ecoregion of Labrador

Ecoregions	Topography	Climate	Vegetation
Low Arctic Tundra – Cape Chidley	<ul style="list-style-type: none"> - Flat coastal plains in the north, low steep-sided hills in the south - Elevation up to 630 m - Domination of higher ground by exposed bedrocks in hilly areas - steep slopes often covered with talus and alluvial fans 	<ul style="list-style-type: none"> - The driest and most arctic ecoregion of Labrador - The growing season is less than 60 days - Annual rainfall 500 mm - Annual snowfall < 3.0 cm - Seasonal flooding - Mean daily temperatures: February -20°C to -22°C; July 6°C to 7°C - The greatest changes in the number of daylight hours 	<ul style="list-style-type: none"> - Pink crowberry (<i>Empetrum nigrum</i>) - Lichen and mosses, sedges, ericaceous plants - Health moss (<i>Rhacomitrium lanuginosum</i>) - Snow-bed communities: dwarf willow, mountain heather - No trees or tall shrubs; another vegetation extremely limited
Alpine Tundra – Torngat	<ul style="list-style-type: none"> - Deep, U-shaped valleys - Torngat Mountains – the highest Canadian peaks east of the Rockies – and valleys and fjords that dissect them - Upper walls of the valleys mostly vertical rock faces; lower slopes often covered with talus - on valley floors: fens, marshes, braided streams, outwash terraces - Elevation from sea level to 1,670 m 	<ul style="list-style-type: none"> - Short and cool summers; long, dark and cold winters - The growing season is 60 to 80 days - Annual rainfall 850 to 900 mm - Annual snowfall 3.0 m - Mean daily temperatures: February -19°C to -22°C; July 7°C to 9°C 	<ul style="list-style-type: none"> - Willow – about 23 species in Labrador - No conifer trees excepted alder, white birch, balsam poplar - Shrubs, sedges, mosses and lichens on lower slopes - Mountain Heath (<i>Cassiope tetragona</i>) characteristic of the plateaus of the ecoregion - Dwarf birch, Labrador tea and black crowberry on dry mountain ridges - Snow-bed communities - Sedge meadows dominated by <i>Carex bigelowii</i> and dwarf willow
High Subarctic Tundra – Kingurutik/Fraser	<ul style="list-style-type: none"> - High plateaus and mountains dissected by fjords - Elevation from 600 to 1,000 m - Some of the highest mountains in Labrador, some of which remaining snow-covered year-round. 	<ul style="list-style-type: none"> - Short and cool summers; long, severe and very cold winters - The growing season is 80 to 100 days - Annual rainfall 950 to 1000 mm - Annual snowfall 3 to 4 m - Mean daily temperatures: February -16°C to -22°C; July 9°C to 13°C 	<ul style="list-style-type: none"> - Lichens (<i>Stereocaulon</i> species), willows, sedges, mosses and dwarf shrubs - Snow-bed communities - Shallow fens with sedges, sphagnum mosses, bog laurel - Lower elevations: white birch, yellow thickets, larch, balsam fir, black spruce - Limited vegetation, greatest in valleys - conifers and slightly more extensive forest cover than Alpine Tundra
Coastal Barrens – Okak/Battle Harbour	<ul style="list-style-type: none"> - Very variable because of the great distance this ecoregion spans from north to south - North: similar to Alpine Tundra ecoregion e.g. coastal inlets, fjords, wide U-shaped valleys with streams - South: barren, irregular coastline with sheer cliffs, numerous islands, and long sheltered inlets - Elevation from sea level to 630 m 	<ul style="list-style-type: none"> - Cool to warm summers; cold winters - The growing season is 100 to 120 days - Annual rainfall: 1000 to 1300 mm - Annual snowfall: 3 to 4 m - Mean daily temperatures: February -10°C to -19°C; July 9°C to 13°C 	<ul style="list-style-type: none"> - Conifers: black and white spruce - Black spruce tuckamore - Moss and lichens, which are dominant in uplands areas where there is very little soil and exposed bedrock is common - Barrens: black and pink crowberry - Bogs: black spruce and larch stands; sphagnum moss, Labrador tea, bog laurel and bakeapple
Mid Subarctic Forest – Michakamau	<ul style="list-style-type: none"> - Flat to rolling upland plateaus - Eskers (long, snake-like ridge or series of mounds made of sand and gravel deposited by a stream flowing in or under a glacier) and drumlins (egg-shaped hill composed of till that was shaped by a glacial flow) 	<ul style="list-style-type: none"> - Cool, short summers; long and severe winters - The growing season is 100 to 120 days - Annual rainfall: 900 to 1100 mm - Annual snowfall: 3.5 to 4.5 m 	<ul style="list-style-type: none"> - Black spruce is the most commonly tree occurring in this ecoregion - Lichen woodlands – open, park-like wooded areas with an understory of light-coloured lichens and shrubs such as Labrador tea and dwarf birch - Sphagnum moss

Ecoregions	Topography	Climate	Vegetation
	frequently separated from each other by pockets of wetlands	- Mean daily temperatures: February -17°C to -22°C; July 11°C to 13°C	- North: white spruce - White spruce and balsam fir on protected slopes where drainage is good - Larch, trembling aspen, jack pine (found only in this ecoregion throughout the province)
High Boreal Forest – Lake Melville	- Elevation: 500 m - 2 distinctive components: Churchill River valley (U-shaped) and the coastal plain around Lake Melville - Flat river terraces separating different forest types	- The most favourable climate in Labrador - Shorter winters; warmer summers than surrounding areas - Growing season is 120 to 140 days - Annual rainfall 1000 to 1100 mm - Annual snowfall 4.0 m - Mean daily temperatures: February -14°C to -18°C; July 13°C to 14°C	- Balsam fir, white birch, trembling aspen, black spruce, lichen, common wood sorrel - Floor covering of feathermoss, herbs - Ribbed fens - Sphagnum mosses
Mid Boreal Forest – Paradise River	- Elevation: 170 to 500 m - Broad river valleys and numerous rock outcrops - Rolling upland areas cover shallow tills, the lowland areas contain deeper tills - Eskers (ridges or series of mounds formed by melting glaciers) - Valleys: domed bogs - Upland sites: kalmia heaths (barrens found in sheltered, inland sites and dominated by dwarf shrubs such as sheep laurel, which belong to the genus, <i>Kalmia</i>)	- Cool to warm summers; short cool winters The growing season is 120 to 140 days - Annual rainfall: 1000 to 1300 mm - Annual snowfall: 4 to 5 m - Mean daily temperatures: February -12°C to -15°C; July 12°C to 13°C	- Balsam fir and black spruce are the most common vegetation cover - Hardwood species: white birch, trembling aspen - Floor covering: feathermoss, herbs - Lichen-dominated woodlands replacing black spruce/feathermoss forests after forest fires - Lichens and mosses in the clearings - Valleys: peat accumulations of 4 to 9 m deep (composed mostly of sphagnum and heath mosses; pitcher plant, round-leaved sundew, bog rosemary, bog laurel, Labrador tea) - Kalmia heaths on more exposed highland areas, with sheep laurel, Labrador tea, lowland blueberry
Low Subarctic Forest – Mecatina River	- Elevation from 500 to 670 m - Rolling hills covered by shallow till and dissected by broad, flat river valleys - Bedrock outcrops - Drumlins (oval or egg-shaped hill that formed at the base of a moving glacier)	- Cool to warm summers; cold winters The growing season is 120 to 140 days. - Annual rainfall: 1000 to 1300 mm - Annual snowfall: 3.5 to 5 m - Mean daily temperatures: February -13°C to -21°C; July 13°C	- Ecoregion characterized by black spruce forests - Less commonly balsam fir and white spruce - Lichen woodlands: widely spaced black spruce with understory of light-coloured lichens (<i>Cladonia</i> species) and some shrubs – Labrador tea, dwarf birch, blueberry - Black spruce with understory of sphagnum moss - Larch
String Bog – Eagle River Plateau	- Elevation: 500 to 670 m - Large areas of wetlands broken by shallow, fast-flowing rivers or streams and the occasional esker - Bogs and lakes	- Cool summers; cold winters The growing season is 120 to 140 days - Annual rainfall: 1000 to 1200 mm - Annual snowfall: 5 m	- Black spruce and larch with understory of Labrador tea and Schreber's moss (branching, light green to golden moss forming extensive mats) - Sphagnum mosses, feathermosses, sedges

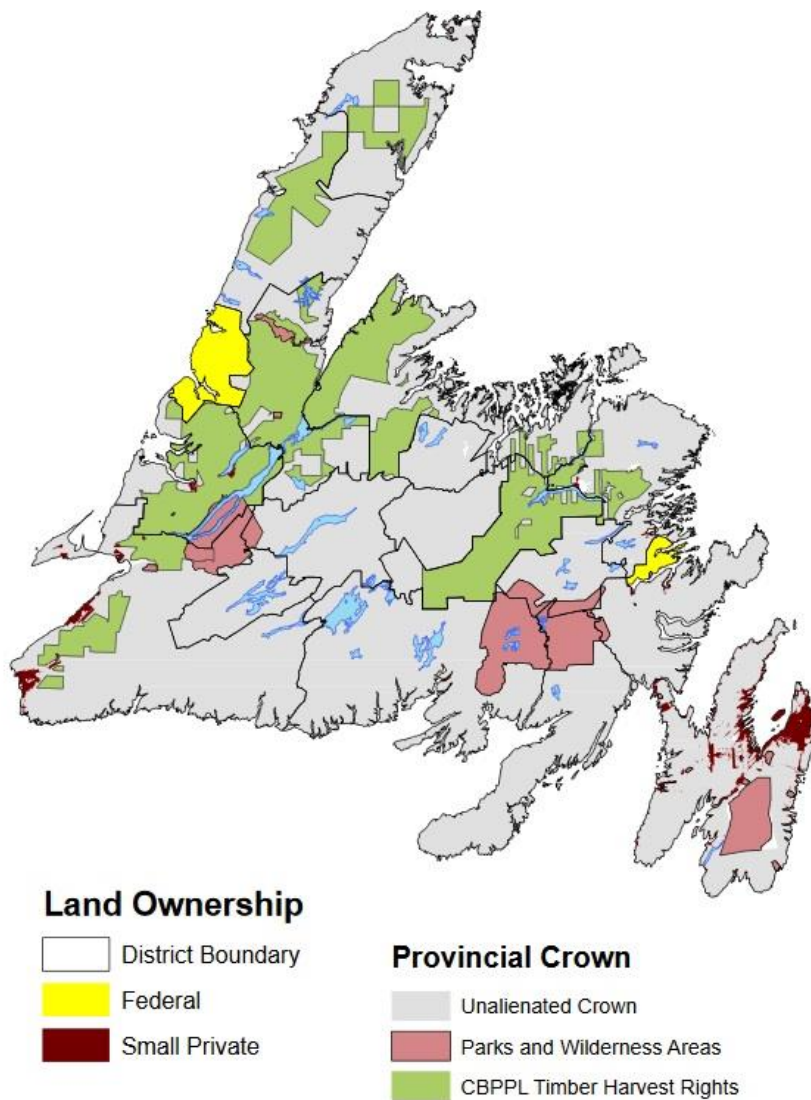
Ecoregions	Topography	Climate	Vegetation
		<ul style="list-style-type: none"> - Mean daily temperatures: February -13°C to -16°C; July 13°C 	<ul style="list-style-type: none"> - Alder thickets commonly along stream and river banks - Balsam fir and white spruce - Lichen woodlands - White birch forming stands in burned areas -
Forteau Barrens	<ul style="list-style-type: none"> - Low, flat-topped hills rising from sea level to 500 m - Crests of hilltops frequently strewn with loose rock - Hills dissected by streams 	<ul style="list-style-type: none"> - Cool and rainy summers; mild to cold winters - Frequent strong winds and storms - The growing season is 100 to 120 days - Annual rainfall: 1200 to 1400 mm - Annual snowfall: 3.5 to 4.5 m - Mean daily temperatures: February -9°C to -12.5°C; July 12°C 	<ul style="list-style-type: none"> - Small and scrubby black spruce, larch, balsam fir, willows, ericaceous shrubs - lichen cover with pink crowberry and alpine bilberry - white spruce along the coast - Wetland plants – cotton grass and sphagnum mosses – in bogs

Source: <http://www.flr.gov.nl.ca/publications/parks/index.html#posters>

2.3 Forest ownership

96% (22,298,112 ha) of the province forested lands are public, while 4% (929,088 ha) are private⁸.

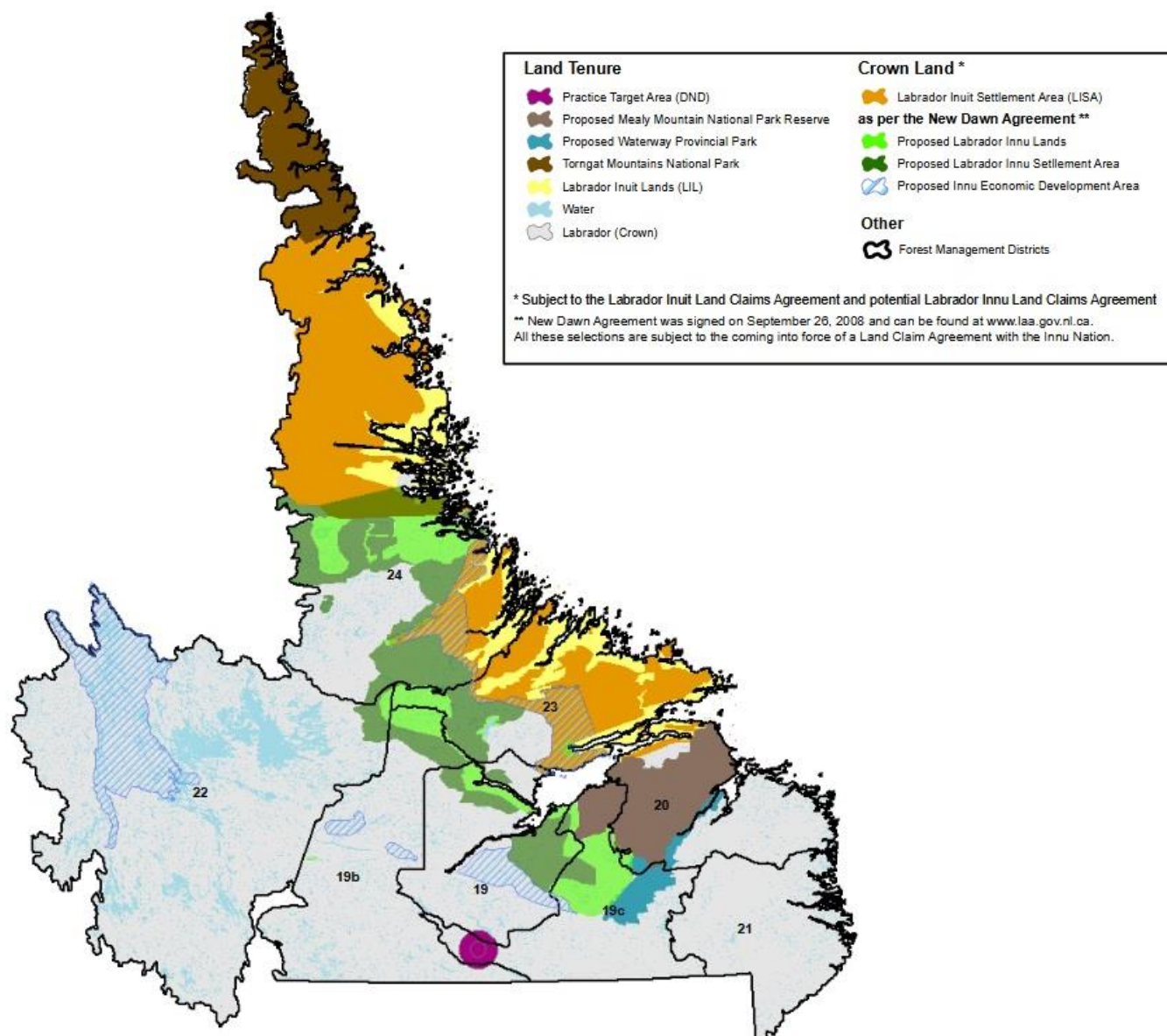
Figure 5 : Land and timber ownership in Newfoundland



Source: http://www.faa.gov.nl.ca/forestry/maps/pdf/timber_ownership.pdf

⁸ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

Figure 6: Labrador major land designations



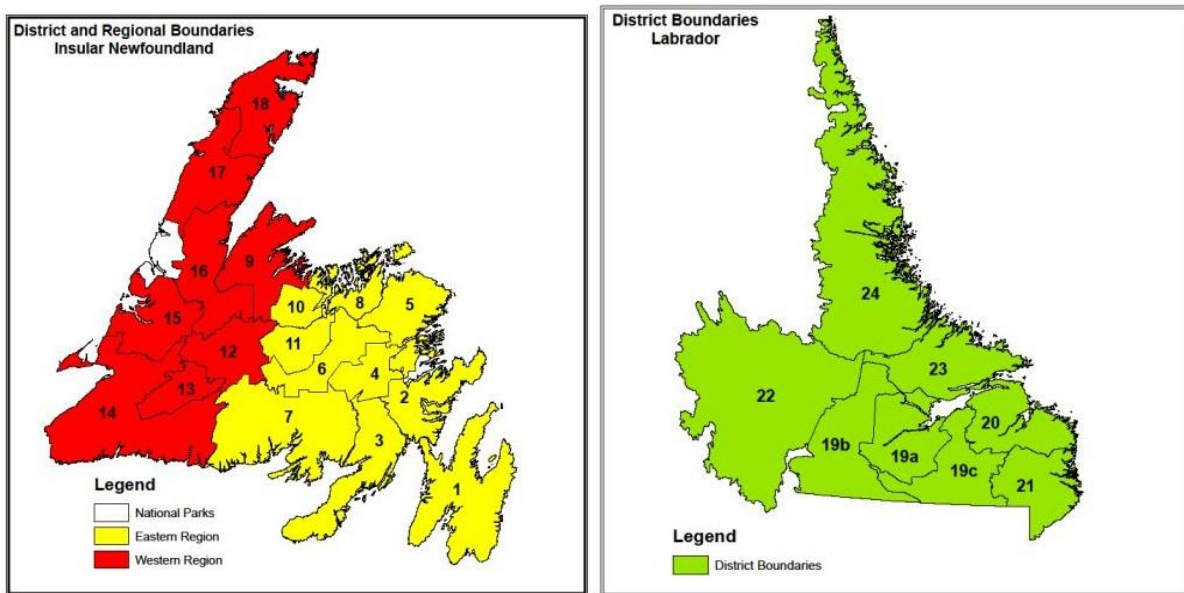
Source: http://www.faa.gov.nl.ca/forestry/maps/pdf/labrador_land_designations.pdf

2.4 Competent authorities

Forest management in Canada is essentially at the level of the provinces. At the federal level, the authorities in charge in each province cooperate with the Canadian Council of Forest Ministers, which is more a discussion platform than a decision-making entity. The decision power is at the level of the provinces.

In Canada, regions are in charge of administration and support of district planning⁹, as well as management and enforcement activities. Districts, for their part, are responsible for operational planning, program implementation, monitoring and enforcement. The different boundaries of districts and regions of the province are shown by the following figure.

⁹ http://www.faa.gov.nl.ca/forestry/maps/reg_bound.html

Figure 7 : District and regional boundaries of Newfoundland and Labrador

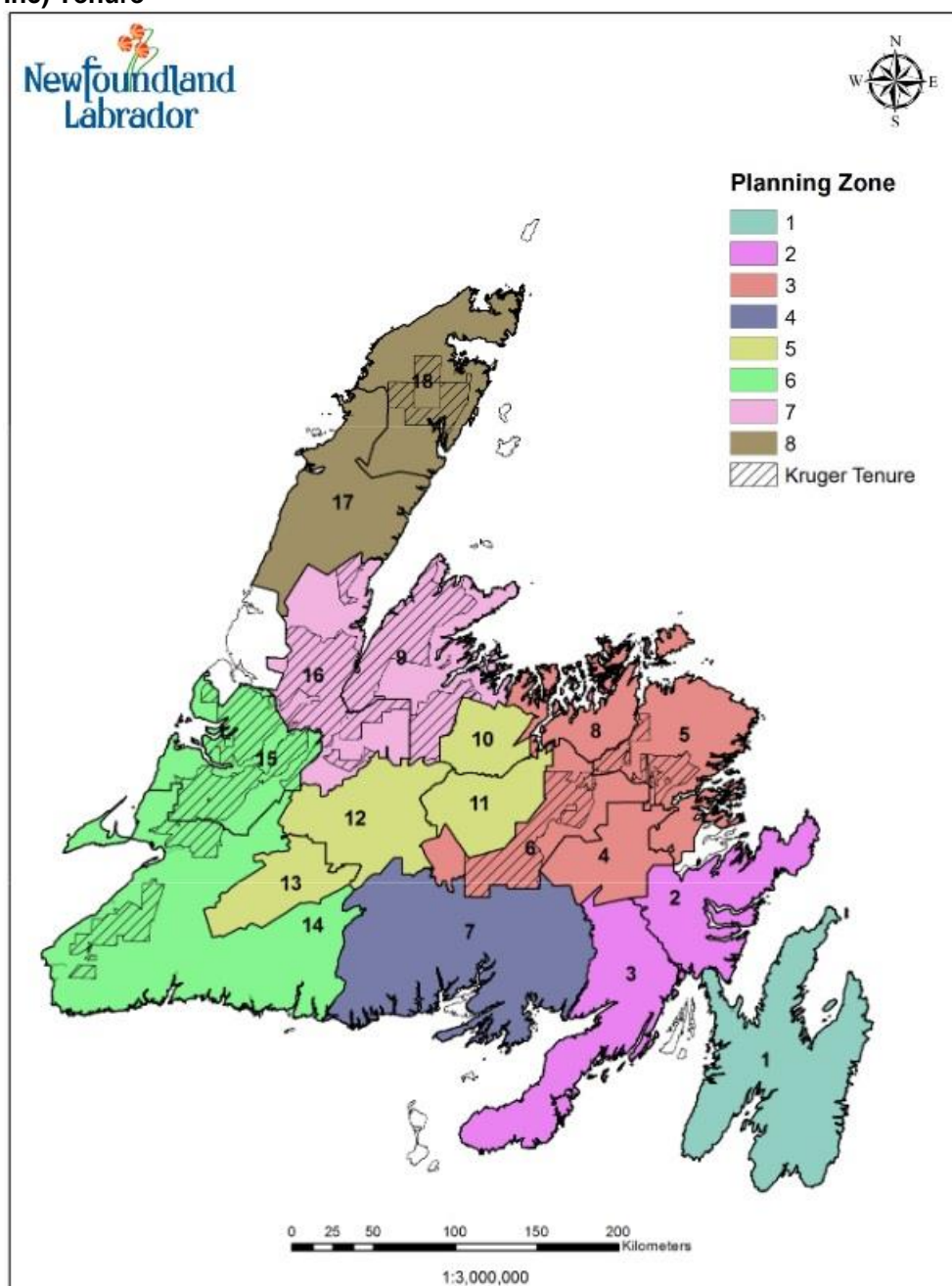
Source: http://www.faa.gov.nl.ca/forestry/maps/reg_bound.html

In Newfoundland and Labrador's public lands, the Department of Natural Resources (DNR) delivers cutting, operating and fire permits, and timber and mill licences¹⁰.

Newfoundland is organized into eighteen planning zones, as shown on Figure 8, while management planning of Labrador is based on districts. A five-year operating plan, an annual operating plan and a past annual report are developed by each District, and subject to the *Environmental Protection Act* and associated regulations. Every five years, a provincial wood supply analysis is also conducted, and every ten years the province's 20-year Sustainable Forest Management Strategy is updated.

¹⁰ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

Figure 8 : Newfoundland planning zones, districts and Corner Brook Pulp and Paper* (Kruger Inc) Tenure



Source: http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

*Corner Brook Pulp and Paper Limited (owned by Kruger Inc.) is the only tenure holder in Newfoundland and Labrador¹¹.

Forest management is governed by the *Forestry Act* and related regulations¹²:

- *Forestry Act*¹³: to revise the law respecting the management, harvesting and protection of the forests of the province¹⁴.
 - *Cutting of Timber Regulations*
 - *Directed Sale of Timber Regulations*

¹¹ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

¹² https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

¹³ <http://www.faa.gov.nl.ca/departement/legislation.html#forestry>

¹⁴ <http://www.faa.gov.nl.ca/departement/legislation.html#forestry>

- *Forest Land Management and Taxation Regulations*
- *Forest Fire Regulations*
- *Forest fire Liability and Compensation Regulations*

Other acts and regulations are also involved¹⁵:

- *Forest Protection Act: to provide for the establishment and maintenance of a forest protection association in the province.*
- *Abitibi-Consolidated Rights and Assets Act: to return to the Crown certain rights relating to timber and water use vested in Abitibi-Consolidated and to expropriate assets and lands associated with generation of electricity enabled by those water use rights.*
- *Sustainable Forest Management Regulations*
- *Forest Management Districts Proclamation*
- *Mill Regulations*
- *Timber Royalty Regulations*
- *Timber Scaling Regulations*
- *Forest fire Offence and Penalty Regulations*

The administrative management structure existing today was established by the *Forest Land Management and Taxation Act*¹⁶.

In Newfoundland and Labrador's private lands, general civic or commercial law is the reference for landowners to protect their property and apply business transaction's terms¹⁷.

2.5 Overview of wood-related industry

Commercial forestry has been concentrated in centre and west parts of Newfoundland¹⁸. It has focused on the harvest of black spruce and balsam fir, which are conifer species. 2,403,612 ha of Newfoundland and 5,470,500 ha of Labrador are available or partially available for harvest¹⁹.

In 2014 wood products industry of Newfoundland and Labrador was valued at CAD 305.2 million²⁰. The different sectors of the province are:

- Pulp and paper sector
- Sawmilling sector
- Value-added manufacturing sector
- Wood energy sector

Table 3: Values of Newfoundland and Labrador's wood products industries (2014)

Sector	Quantity	Value (CAD)
Pulp and Paper	241,400 tonnes	161 million
Sawmilling	65 million FBM ²¹	41 million
Value added	-	85 million
Wood Energy	-	18.2 million
Total		305.2 million

Source: http://www.faa.gov.nl.ca/publications/pdf/Wood_Prod_Ind_2014.pdf

Pulp and paper is the most valuable sector of the forestry in the province.

¹⁵ <http://www.faa.gov.nl.ca/departement/legislation.html#forestry>

¹⁶ http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

¹⁷ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

¹⁸ http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

¹⁹ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

²⁰ http://www.faa.gov.nl.ca/publications/pdf/Wood_Prod_Ind_2014.pdf

²¹ board-foot. 1 FBM \approx 0.002359737 m³ https://en.wikipedia.org/wiki/Board_foot

Table 4: Newfoundland and Labrador's largest forest product export markets (2012)

Country	United States	Brazil	European Union
Percentage of exportation	49%	32%	14%
Total forest product sales	\$118 million		

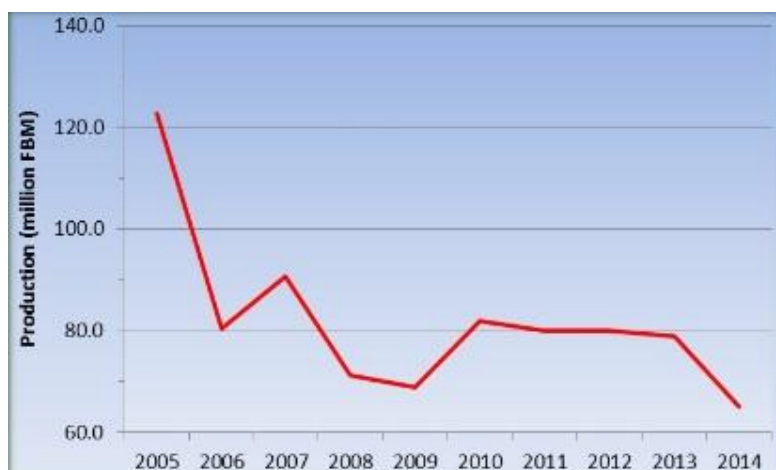
Source:

https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

The United States represent the biggest part of the market.

In a decade, the amount of newsprint shipments has decrease, especially between 2008 and 2009. Since 2009, it is relatively stable. In 2014, 241,400 tonnes of newsprint were shipped to various markets by Corner Brook Pulp and Paper Ltd. (CBPPL), which is the major industrial operator in the province. In 2013, 242,200 tonnes were shipped. CBPPL is situated on the island's west coast²². It is the only newsprint producer in Newfoundland and Labrador.

The sawmilling sector is a significant source of employment in Newfoundland and Labrador. 1000 sawmilling permits are issued each year by the Forestry Services Branch. Three large sawmills are producing about 90% of the total production, when five medium sawmills are producing only 5%. The following figure is presenting sawmill production between 2005 and 2014.

Figure 9: Evolution of provincial sawmill production from 2005 to 2014Source: http://www.faa.gov.nl.ca/publications/pdf/Wood_Prod_Ind_2014.pdf

The production was stable between 2010 and 2013 at approximately 80 million FBM. In 2014 and after a decrease in the production, total lumber production in the province was about 66 million FBM. It was about 79 million FBM in 2013.

The sawmilling sector is supporting other industries in Newfoundland and Labrador, by selling wood chips, wood shavings and hog fuel to CBPPL and the agriculture industry. Wood chips are used by CBPPL in their manufacturing process. They also use hog fuel as an alternative to oil, used to fuel boilers.

The sales to other industries in 2014 were about 112,000 m³ of wood chips and 42,000 tonnes of wood shavings and hog fuel.

The value-added manufacturing corresponds to *the process of making specialty wood products from commodity wood products*. The value-added sector of the province produces a large variety of wood products, such as wood siding and roof trusses. The sector consists of small companies and sales mainly to the local market. There are more than 100 companies from all regions in Newfoundland and Labrador. It generates approximately \$85 million per year. Species used are depending on the

²² http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

manufactured product, it can be local species (eastern larch, white birch, yellow birch, black spruce, etc.) or imported species²³. (p.43)

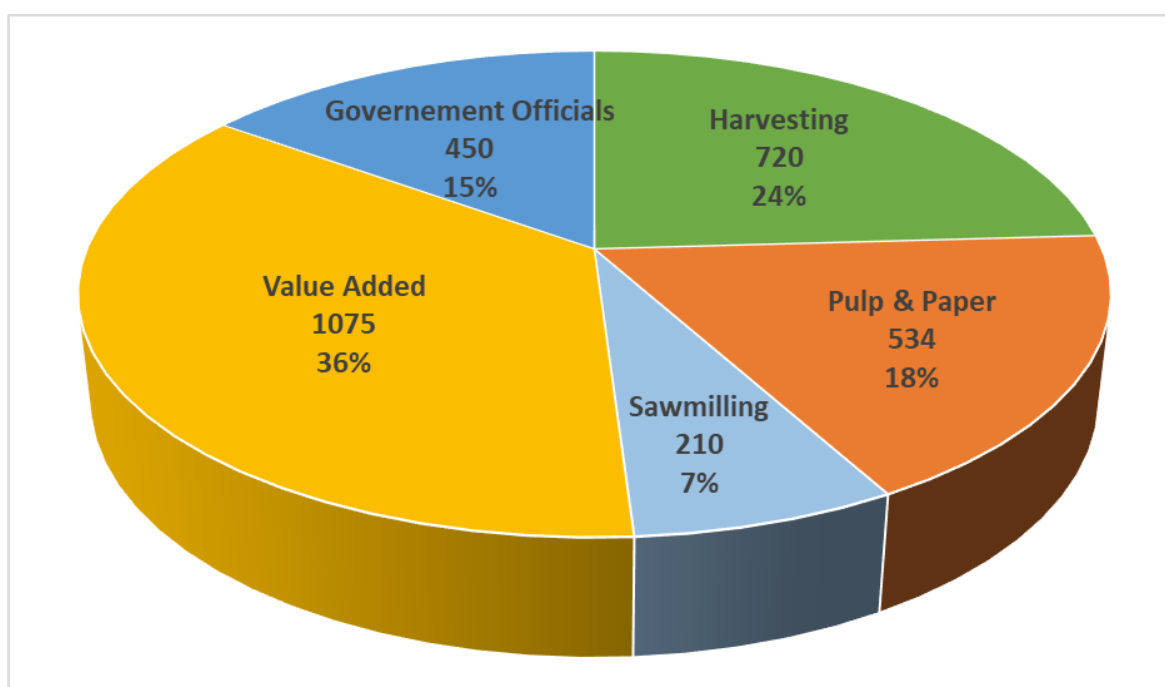
Wood energy sector is dominated by commercial firewood. About 90,000 m³ were harvested in 2014 in Newfoundland and Labrador, for approximately CAD 17.8 million.

Wood pellets, another source of wood energy, were produced by two wood pellet producers in 2014. The combined production was upwards of 1000 tonnes for about CAD 300,000.

Finally, briquettes are produced from wood chips and sawdust compressed into a brick's shape. About 450 tonnes were produced in 2014, for more than CAD 100,000.

The number of people working in wood industry in 2014 can be seen on Figure 11.

Figure 10: Industry direct employment in 2014



Source: http://www.faa.gov.nl.ca/publications/pdf/Wood_Prod_Ind_2014.pdf

Wood products industry is a significant source of income in Newfoundland and Labrador. In 2014, 2550 people were directly employed in this industry (about 5100 people if indirect employment considered). The value-added sector is responsible for a third of wood industry employment. Harvesting represents a quarter. Sawmilling is the sector employing the less people throughout the industry.

3 Sustainability of Newfoundland and Labrador forest

3.1 Evolution of forest area and risk of conversion

Over the past 25 years, the forest area in Canada has remained stable losing 1.2 million ha (0,34%). The main cause for this decrease is the clearing of forest land for new, non-forest land uses, for example: agriculture, road and hydroelectric developments. Over the next 10 to 20 years, the overall forest area is expected to remain stable.

²³ http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

Table 5: Estimated area (millions of hectares) of forest in Canada

Year	1990	1995	2000	2005	2010	2015
Forest area	348.3	348.0	347.8	347.6	347.3	347.1

Source: The state of Canada's Forests – Annual Report 2017

It is very difficult to find reliable figures about the net loss of forest surfaces in New Brunswick. This parameter is not subject to a specific monitoring, and the forest areas lost annually are so small compared to the vast forest areas that the comparison of estimated forest areas year to year is more likely to reflect changes in the methodology and the accuracy of the survey, rather than the land use change.

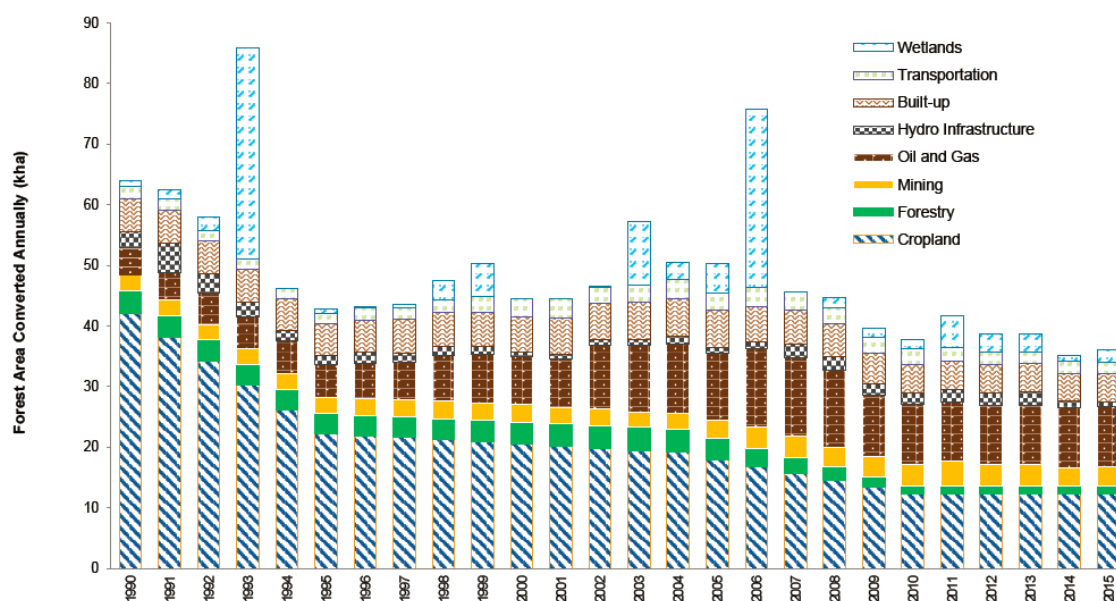
The New Brunswick forest covers about 6,1 M hectares and about 1% is harvested every year. It is estimated that 67 % of harvested forest are naturally regenerated and 33% are artificially regenerated.

The FSC risk assessment platform (www.globalforestregistry.org) considers that Canada (as a whole) is at unspecified risk in terms of conversion of forest to other land uses, because the following criterion is verified at the country level:

- There is no net loss AND no significant rate of loss ($> 0.5\%$ per year) of natural forests and other naturally wooded ecosystems such as savannahs taking place in the eco-region in question.

On Figure 11 hereunder, we can see the estimated forest conversion per year between 1990 and 2015, with indication of the new land use after conversion, for Canada as whole. In this period, the yearly forest areas lost to other land uses was between 35,000 and 85,000 ha per year: that is between 0.010% and 0.025% of Canada's huge forest areas. Some of those conversions has been partially compensated by the plantation of new forests (in particular at the expense of marginal agricultural land), as some provinces have an active afforestation policy. Note that 2006 and 1993 have seen a particularly large forest area converted to wetlands, because of the creation of large reservoirs.

Unfortunately, similar statistics in terms of forest conversion are not available specifically for Newfoundland and Labrador.

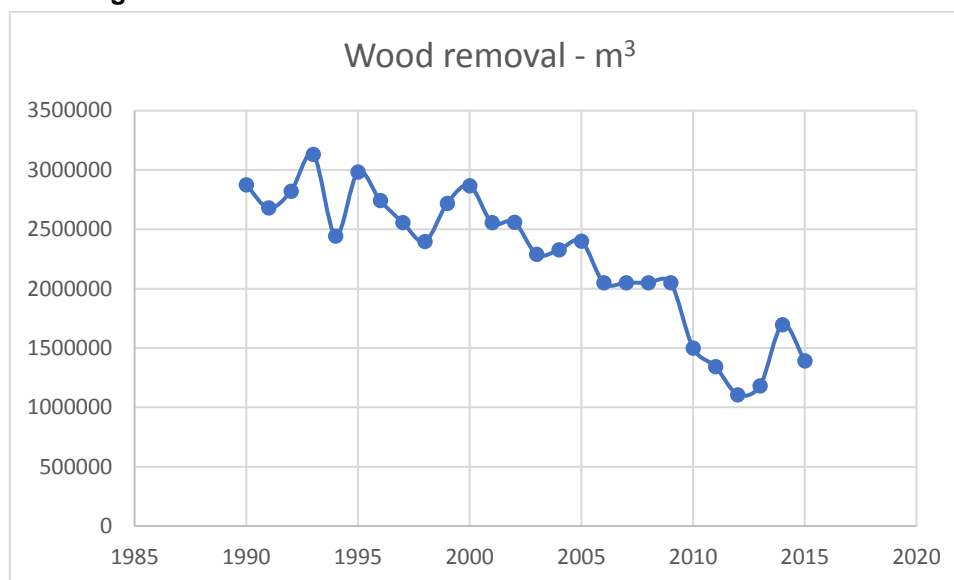
Figure 11: Annual forest conversion in Canada per end land use (1990-2015)

Source : National Inventory Report 1990–2015: Greenhouse Gas Sources and Sinks in Canada

3.2 Standing trees volumes and removals

No information is readily available regarding the standing trees volumes in Newfoundland and Labrador. More information is available regarding the volumes harvested, as is presented at the following figure showing the volumes harvested each year between 1990 and 2015. The figures show a general decreasing trend in the harvested volumes.

Figure 12 : Volumes of wood harvested between 1990 and 2015.



Source: National Forestry Database. Forest products

In terms of harvested volumes, there is a specific system in place to plan and monitor the activities. At the provincial level, the government sets an Allowable Annual Cut (AAC) for most public land and some of the private land. This system has been implemented to prevent overexploitation of the resources. The AAC is calculated based on: (1) land base (that is, how much forested land is available to harvest sustainably), (2) the volume of wood on the land base, (3) its growth/yield rate and spatial distribution, and (4) sustainability parameters managed for throughout time. The AAC is recalculated every 5 years and is calculated by district and tenure.

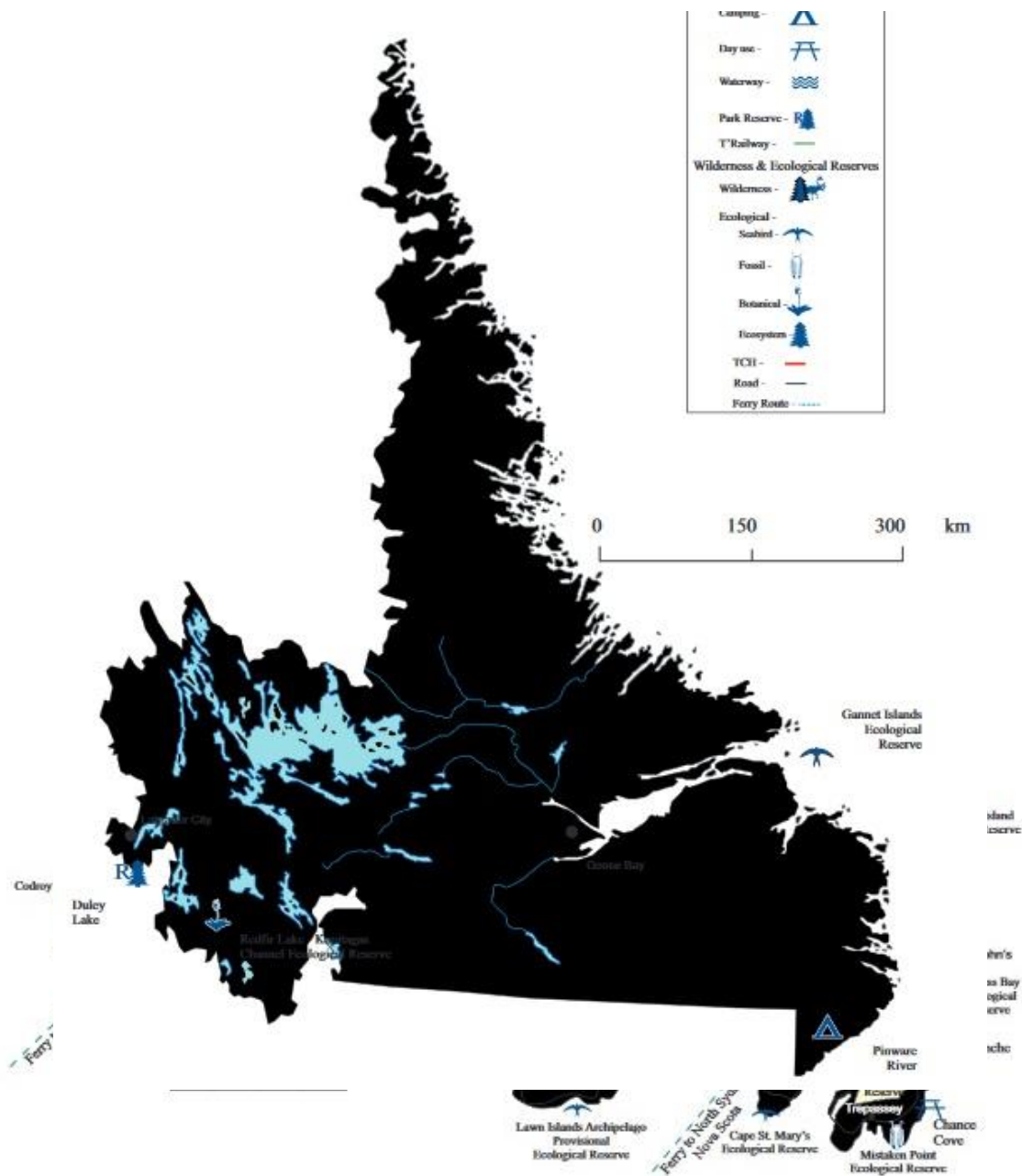
The AAC for the 2011-2016 period for Newfoundland and Labrador is 2,611,685 m³ of softwood and 53,900 m³ of hardwood²⁵.

3.3 Protection of ecosystems and biodiversity

1,862,062 ha of the province are allocated to parks and protected areas²⁴. Different protection status are available: they are listed in tables on the following pages.

²⁴ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

Figure 13: Provincial parks and reserves



Source: <http://www.tcii.gov.nl.ca/parks/>

Table 6: Types of Protected Areas in Newfoundland and Labrador

Agency	Legislation	Type of Protected Area
Parks & Natural Areas Division Natural Heritage Branch Department of Environment & Conservation Newfoundland & Labrador	Wilderness and Ecological Reserves Act Provincial Parks Act National Parks Lands Act	Wilderness and Ecological Reserve Provincial Park
Wildlife Division Natural Heritage Branch Department of Environment & Conservation Newfoundland & Labrador	Wild Life Act Endangered Species Act ^a	Wildlife Reserve Wildlife Park
Lands Division Department of Environment & Conservation Newfoundland & Labrador	Lands Act ^b	Crown Reserve Special Management Area
Oceans Programs Division Science, Oceans and Environment Branch Department of Fisheries and Oceans	Ocean Act Federal Fisheries Act	Marine Protected Area
Parks Canada	Canada National Parks Act Parks Canada Agency Act Canada National Marine Conservation Areas Act National Historic Sites and Monument Board Act	National Park National Marine Conservation Area
Canadian Wildlife Service Environment Canada	Migratory Bird Convention Act Canada Wildlife Act Cooperative Management Wildlife Area Species at Risk Act ^a	Migratory Bird Sanctuary National Wildlife Area Marine Wildlife Area

^a This legislation is not designed to establish protected areas, however, it can prescribe land use activities and has implications for the establishment and management of protected areas.

^b This legislation can be used to grant temporary protection to an area of land, the lead agency is Lands Branch, Environment and Conservation, but authority for site management can be designated to other Ministers.

Source: http://www.flr.gov.nl.ca/publications/parks/factsheets/pa_agencies_mar2005.pdf

Table 7: Type and surface of Parks and Protected Areas of Newfoundland and Labrador

Parks and Protected Areas	Surface (ha)
National Parks	1,190,490
Provincial Parks	36,686
National Historic Sites	3,840
Private Protected Areas	2,669
Wilderness, Ecological, Public and Wildlife Reserves	623,462
Special Management Areas	4,913

Source:

https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

Table 8: Conservation and recreation purposes of the three types of protected areas established and managed by the Government of Newfoundland and Labrador

Provincial Protected Areas	Conservation and recreation purpose
Wilderness reserves	<p>Large protected areas (greater than 1,000 km²) designed to protect significant natural features and landscapes, and to provide wilderness settings for low-impact outdoor recreation. Wilderness reserves also serve as study areas for researchers, teachers, and students.</p> <p>There are two wilderness reserves in the province.</p>
Ecological reserves	<p>Protected areas of less than 1,000 km² - smaller than wilderness reserves - that are created for two main purposes:</p> <ul style="list-style-type: none"> - to protect representative examples of ecosystems or ecoregions - to protect unique, rare, or endangered plants, animals, or other elements of our natural heritage. In this province, the reserves in this category are divided into three general types: botanical, fossil, and seabird ecological reserves. <p>There are 18 ecological reserves in the province.</p>
Provincial parks	<p>Provincial parks vary in size and are set in a variety of environments across the province - from beaches to woods, riversides, and hilltops. They are places where residents and tourists come to celebrate, discover, explore, understand, and appreciate the province's natural heritage. Parks are used mainly for camping and outdoor recreation, but they also provide protection for the natural features and species within their borders.</p> <p>There are 31 provincial parks in the province.</p>

Source: http://www.flr.gov.nl.ca/natural_areas/apa/panl/nl.html

3.4 Protection of water

In Newfoundland and Labrador, several legal provisions aim to ensure that the quality of surface water and groundwater is appropriately protected, the provincial *Environmental Protection Act* and the *Water Resources Protection Act*²⁵. The *Water Resources Management Division* is in charge of water resources management and has programs to *protect, enhance, conserve, develop, control and effectively utilize the water resources of Newfoundland and Labrador*. The Division's activities are the following:

- Acts as a lead government agency in drinking water quality monitoring and reporting;
- Regulates public water and wastewater systems;
- Provides operator education, training and certification to water and wastewater operators;
- Manages groundwater resources;
- Manages allocation of water use and grants water rights;
- Regulates alterations of water bodies;
- Participates in environmental assessments;
- Operates and maintains hydrometric, climate and water quality networks;
- Conducts hydrological modelling studies and;
- Conducts water use studies for all sectors.

Legal provisions for the protection of water in forest management are mainly defined in the following pieces of legislation:

- "Crown Lands Act",
- "Water Resources Act".

²⁵ <http://www.mae.gov.nl.ca/waterres/>

The most relevant provisions can be summarised as follows²⁶:

The Water Resources Act (Government of Newfoundland and Labrador 2002) makes specific reference to the protection of water and restrictions on activities harmful to wetlands; several policy directives that flow out of this Act are designed to protect wetlands. The two most relevant policy directives are Infilling Bodies of Water (Government of Newfoundland and Labrador 1991b), which restricts the filling of a water body and outlines permitting requirements, and Development in Wetlands (Government of Newfoundland and Labrador 1997). The latter policy's objective is to prevent developments in wetlands that adversely affect the water quantity, water quality, hydrologic characteristics or functions, and terrestrial and aquatic habitats of the wetlands. There is specific reference to activities that are not permitted (e.g., infilling, drainage, dredging, canalization, removal of vegetation cover or removal of soil or organic cover). Developments that require written permission include preparing the area for agriculture, peat extraction, and forestry activities.

The Lands Act (Government of Newfoundland and Labrador 1991a), although it does not make reference to wetlands, does make specific reference to a Crown reserve around water (including ponds). The reserve, either 10 or 15 m, requires the grantee, lessee or licensee to be licensed to use this Crown reserve.

The main concern identified by Newfoundland and Labrador's Provincial Sustainable Forest Management Strategy (2014-2024)²⁷ in terms of impact of forestry on aquatic ecosystems is the impact of river crossings by the vehicles and machinery involved in tree harvesting, which can negatively influence water quality. The Forestry Service Branch (FSB) mitigates those impacts through implementation on guidelines developed by the Department of Fisheries and Oceans and the Water Resources Division of ENVC.

The province has not published any indicator about the state of water quality in forests and/or the actual enforcement of the applicable legislation and guidelines.

3.5 Protection of soils

Even though the Provincial Sustainable Forest Management Strategy (2014-2024)²⁸ of Newfoundland and Labrador does recognise the importance of forest to *maintain productive soils*, the strategy does not identify any action specific to soil quality protection and/or monitoring (fertility, erosion, compaction etc...). We did not find any provision specific to soil in the main pieces of legislation applicable to forest management, i.e. the "Crown Lands Act", the "Forestry Act" and the "Water Resources Act".

3.6 Protection of carbon stocks

Even though the Provincial Sustainable Forest Management Strategy (2014-2024)²⁹ of Newfoundland and Labrador states that *Canadian carbon accounting/budgeting models will be used to report on the interaction between forest management and carbon forest dynamics* and that *five-year forest management plans will include explicit reference to how forest management will take into account climate change adaptation and mitigation*, consolidated carbon inventories in forest ecosystems are not available yet at the level of the province.

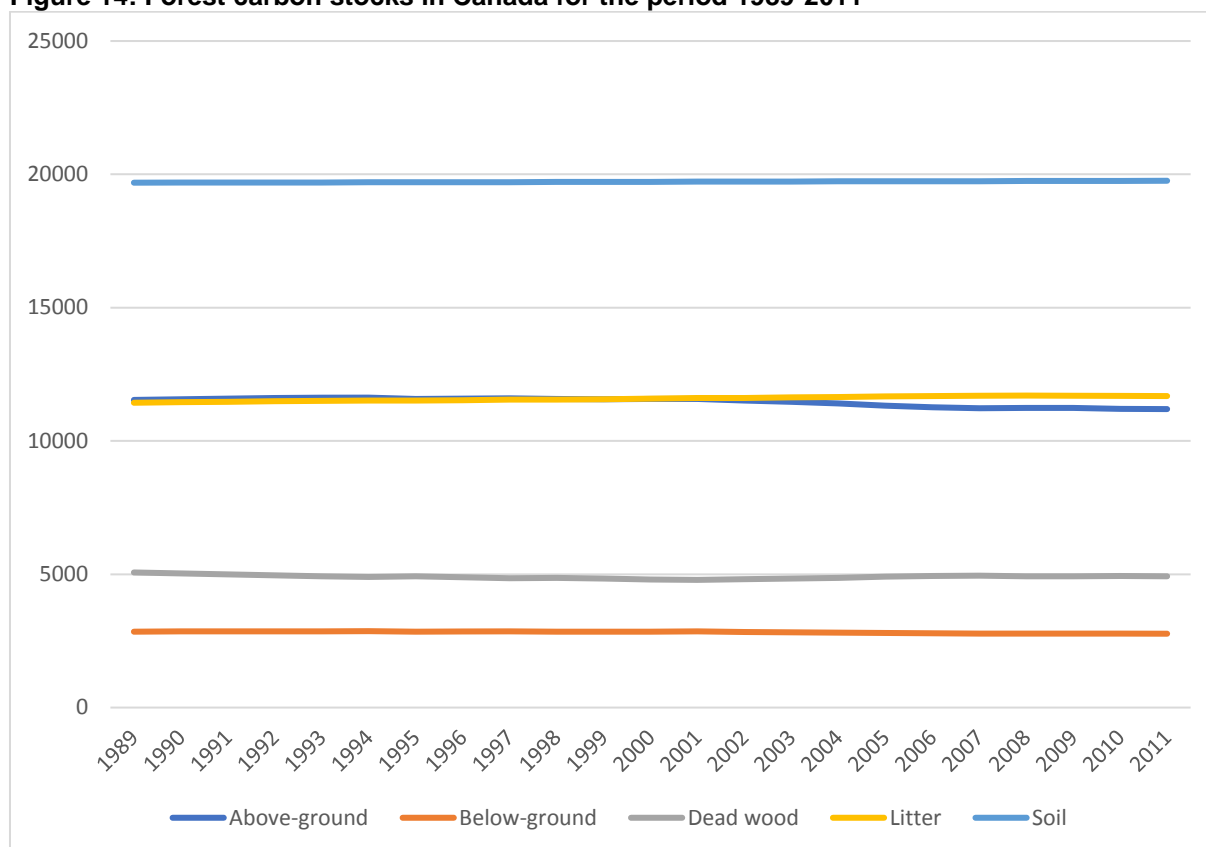
In Canada as a whole such estimations have been assessed in the framework of the Kyoto protocol though. An estimation is provided for the period 1989 to 2011 on **Error! Reference source not found..**

²⁶ National Council for Air and Stream Improvement, Inc. (NCASI). 2007. Synthesis of technical information on forest wetlands in Canada. Technical Bulletin No. 938. Research Triangle Park, N.C.: National Council for Air and Stream Improvement, Inc.

²⁷ http://www.faa.gov.nl.ca/publications/pdf/psfms_14_24.pdf

²⁸ Idem

²⁹ Idem

Figure 14: Forest carbon stocks in Canada for the period 1989-2011

We can see on **Error! Reference source not found.** that the carbon stock in forest has been quite stable during this period in each of the respective compartments. The carbon in above-ground biomass, below ground biomass and dead wood is thought to have decreased by about 3%. At the same time the estimated carbon stock in litter has increased by 3% and the estimated carbon stock in soil, the largest compartment, has increased by 0.4%. In total, there is a loss of carbon stock of 0.5% between 1989 and 2011, as the total carbon stock decreased from 50.57 billion tons C, down to 50.32 billion tons C. Even though it is a tiny proportion of the total stocks, it represents in average a yearly release of 11 million tons CO₂ over a period of 22 years.

3.7 Protection of air quality

The main impact of forestry on air quality relates to fire. It includes wild fire (which are unintended) and prescribed fire (which is used as part of forest management under controlled conditions).

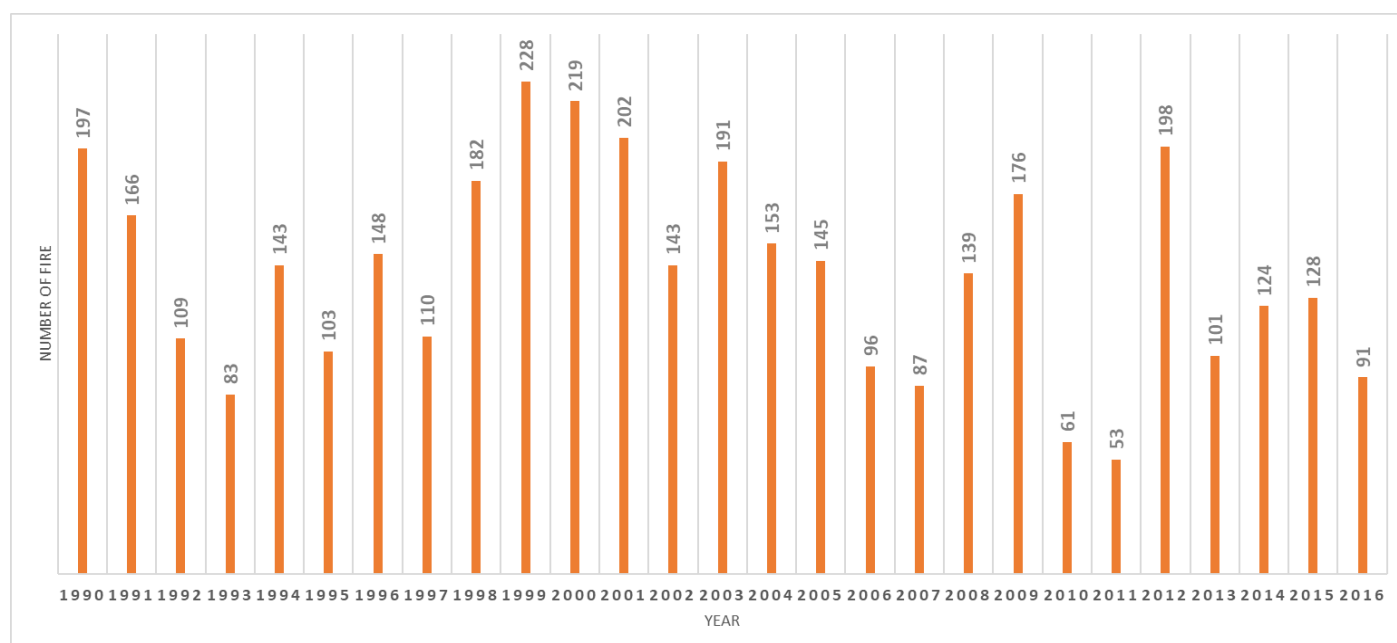
In Newfoundland and Labrador, four regulations in forestry are related to air quality³⁰:

- *Forestry Act*
- *Forest Fire Regulations*
- *Forest Fire Offence and Penalty Regulations*
- *Forest Fire Liability and Compensation Regulations*

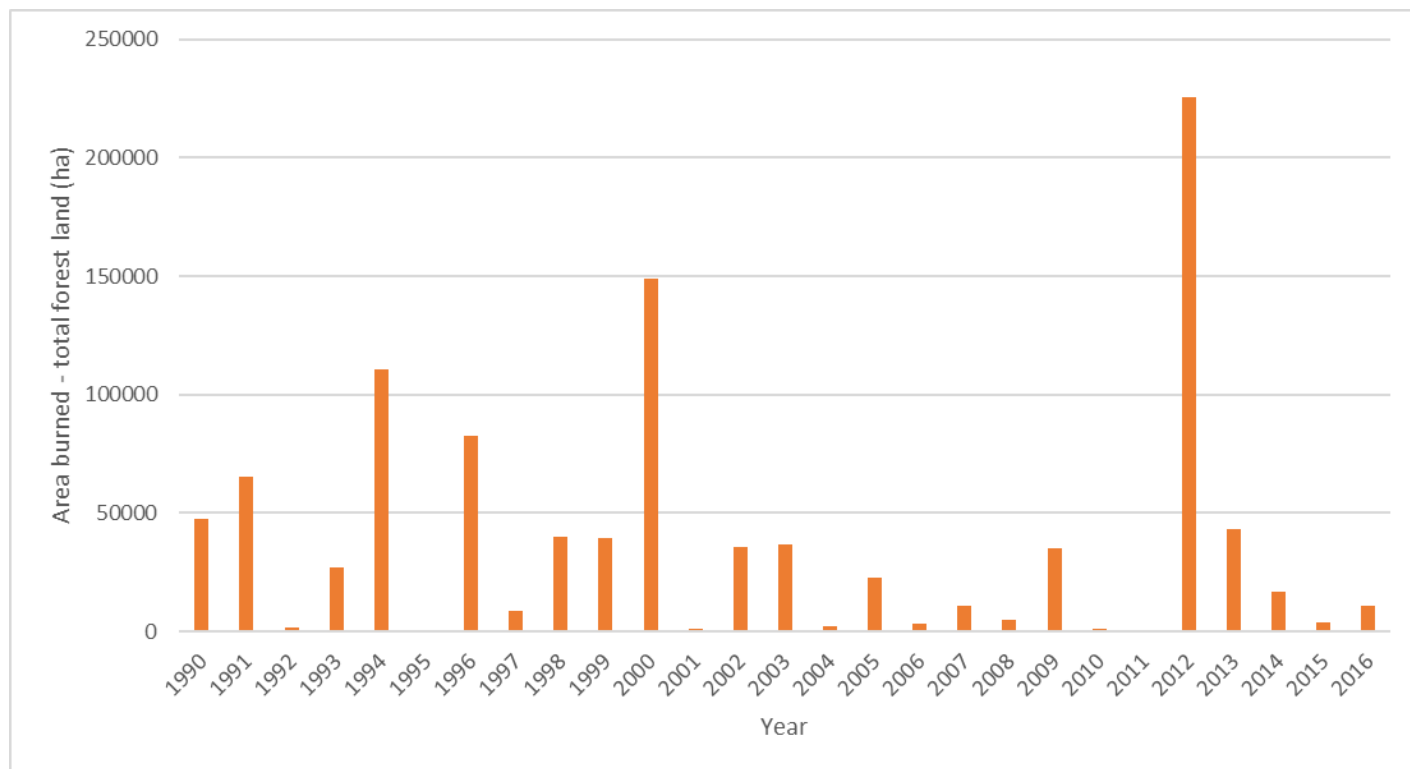
The forestry act involves the need for a permit for igniting a fire in forest or less than 300 metres from a forest during the “fire season” (which is defined annually by the ministry). Permission might be denied if risks of propagating to a wild fire exists.

The statistics about accidental wildfires in the province are presented below. The area impacted by wildfire during the last 20 years remains under 50,000 ha yearly, except in 2000 and 2012 which have been particularly severe, with respectively 150,000 and >200,000 ha burnt.

³⁰ <http://www.faa.gov.nl.ca/departement/legislation.html#forestry>

Figure 15: Number of forest fires in Newfoundland and Labrador from 1990 to 2016

Source: http://nfdp.ccfm.org/data/compendium/html/comp_31e.html

Figure 16: Area burned – total forest land (ha) – in Newfoundland and Labrador from 1990 to 2016

Source: http://nfdp.ccfm.org/data/compendium/html/comp_31e.html

91 fires burning 10,953.5 hectares occurred in 2016. It was below the 10-year average (2007-2016) of 116 fires per year.

3.8 *Illegal logging*

The FSC risk assessment platform (www.globalforestregistry.org) considers that Canada is at low risk in terms of illegal logging, because the following criteria are all verified:

- Evidence of enforcement of logging related laws in the district³¹
- There is evidence in the district demonstrating the legality of harvests and wood purchases that includes robust and effective system for granting licenses and harvest permits³²
- There is little or no evidence or reporting of illegal harvesting in the district of origin³³
- There is a low perception of corruption related to the granting or issuing of harvesting permits and other areas of law enforcement related to harvesting and wood trade.³⁴

3.9 *Civil rights and traditional rights*

The FSC risk assessment platform (www.globalforestregistry.org) considers that Canada is at low risk in terms of violation of civil and traditional rights, because the following criteria are all verified:

- There is no UN Security Council ban on timber exports from the country concerned
- The country or district is not designated a source of conflict timber (e.g. USAID Type 1 conflict)
- There is no evidence of child labour or violation of ILO Fundamental Principles and Rights at work taking place in forest areas in the district concerned
- There are recognized and equitable processes in place to resolve conflicts of substantial magnitude pertaining to traditional rights including use rights, cultural interests or traditional cultural identity in the district concerned
- There is no evidence of violation of the ILO Convention 169 on Indigenous and Tribal Peoples taking place in the forest areas in the district concerned.

3.10 *Forest certification*

The main forest certification schemes used in Newfoundland and Labrador are³⁵:

- CSA (Canadian Standards Association - Group Sustainable Forest Management System³⁶) which is endorsed by PEFC (Programme for the Endorsement of Forest Certification)
- FSC (Forest Stewardship Council³⁷), which is specifically suitable for small private owners.

Corner Brook Pulp and Paper Limited has 1.419 million ha (29% of the forested lands of Newfoundland) certified under both CSA and FSC schemes.

The evolution of certified surfaces is presented on the graph below. Some FMU have discontinued certification in 2008, resulting in a decrease of certified forest areas.

³¹ www.illegal-logging.info ; www.eia-international.org ; <http://www.ahec-europe.org/>

³² www.illegal-logging.info ; www.eia-international.org ; <http://www.ahec-europe.org/>

³³ www.illegal-logging.info ; www.eia-international.org ; <http://www.ahec-europe.org/>

³⁴ <http://www.transparency.org/cpi2012/results>

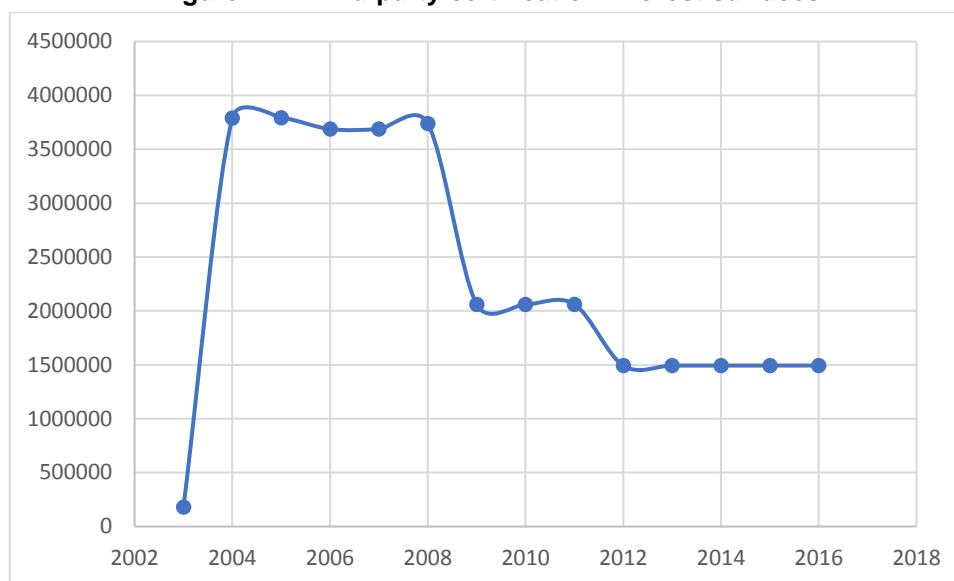
³⁵ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

³⁶ <http://www.csasfmforests.ca/>

³⁷ www.fsc.org

The Labrador portion of the province does not have any third-party certified forests³⁸

Figure 17 : Third-party certification – forest surfaces



Source: Certification Canada, Canadian statistics.

4 Conclusions

Labrador and Newfoundland Province has a total forest area of 23,2 million of ha (Labrador : 18 million ha and Newfoundland : 5,2 million ha)³⁹. This area represents about 57% of the province's land area. About 34% of the forest land is considered potentially available for timber harvesting (timber harvesting land base - THLB). The province is very diverse in terms of ecological conditions, and the forest is present in most of them (coast, forests, wetlands and moors). Newfoundland and Labrador are divided into respectively nine and ten ecoregions. Central Labrador contains most of the forest.

Approximately 96% of province's forest land area is publicly-owned (mostly Crown land administered by the provincial Ministry of Natural Resources). Private ownerships accounts for the remaining 4%. - Forest planning activities have been conducted in 18 forest management districts in Newfoundland and Labrador. Each district is responsible for developing a five-year operating plan, an annual operating plan and an annual report for the previous year.

Conifers predominate largely in Newfoundland-Labrador and account for the great majority of all forest species. The main commercial species are black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*). The dense forest dominated by black spruce are composed of a diverse mosaic of vegetation types, such as open-cut sphagnum forests, lichen forests, a mix of hardwood (birch, aspen and poplars), swamps with stands of black spruce and a variety of other types of wetlands.

The Labrador has little commercial forest area. Indeed, a significant portion of western and southeastern Labrador is forest land, only sporadic mosaic of commercial trees is distributed throughout the territory. Northern Labrador consists mainly of low-density stands, non-forest and unproductive lands. Only 2% of northern Labrador have commercially productive lands.

The forest area of Newfoundland-Labrador is not systematically monitored in terms of surface on a yearly basis. In Canada as a whole, the estimated forest conversion per year between 1990 and 2015 was between 35,000 and 85,000 ha per year (between 0.010% and 0.025% yearly). Some of those losses are compensated by afforestation programmes (at the expense of marginal agricultural land).

³⁸ https://www.sfmcanada.org/images/Publications/EN/NL_info_Provinces_and_territories_EN.pdf

³⁹ https://www.sfmcanada.org/images/Publications/FR/NL_info_Provinces_and_territories_FR.pdf

The volume of harvested wood slowly decreased between 1995 and 2010, from about 3 million cubic meters by year to about 1,5 million cubic meters by year. Between 2010 and 2015, the annual volume of harvested wood fluctuated around 1,5 million cubic meters.

The most part of protected area is concerned by the two national parks (about 1,2 million ha). Provincial parks represent an area of 36 686 ha and integral-ecological reserves have a total area of 623 462 ha. In total, 1,862,062 ha of the province are allocated to parks and protected areas.

Legal provisions for the protection of water are included in the “Forestry Act” and the “Water Resources Act”, including some limitation in terms of harvesting around water bodies. Guidelines are referred to for good practice in terms of water crossing by forestry related vehicles and machinery in order to mitigate detrimental impact on water quality. No monitoring of compliance with the legislation/guidelines has been published.

No provisions in terms of protection of forest soil have been found in the legislation even though maintaining productive soil is recognised as an objective in the Provincial Sustainable Forest Management Strategy (2014-2024).

Forest carbon monitoring is intended to be in place in Forest Management Plan but no forest carbon inventory is available at provincial level. In Canada as a whole, the forest carbon stock is estimated to have decreased by 0.5% between 1989 and 2011, through a decrease in living/dead biomass volume, partly compensated by an increase of carbon in soil and litter.

Legal provisions are in place to control intended ignition of fire during the fire season and reduce risks of wild fires. The area impacted by wildfire during the last 20 years remains under 50,000 ha yearly, except in 2000 and 2012 which have been particularly severe.

The FSC risk assessment platform considers that Canada is at low risk in terms of violation of illegal logging and in terms of violation of traditional and civil rights. Certification systems used in Newfoundland-Labrador include the sustainable forest management plan (CAN/CSA-Z809). Corner Brook Pulp and Paper Limited has 1,419 million ha (29% of the forested lands of Newfoundland) certified under both CSA and FSC schemes.

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