Kruger Industrial

Corner Brook Pulp and Paper Limited
Woodlands

Name of Undertaking:	Forest Management District 14 and 15 (Zone 6) Five year Operating Plan 2919 – 2023
Proponent:	Corner Brook Pulp and Paper Limited P.O. Box 2001 Corner Brook, NL. A2H 6J4
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Purpose:	Carry out Forest Management activities as required.
Geographical Location:	Forest Management Districts 14 and 15 within Planning Zone 6 located on the west coast and south west coast of the island from Burgeo and Port aux Basques in the south to the southern boundary of Gros Morne National Park in the North,
Operation:	Timber harvesting, primary resource road construction, silviculture, and other forest management activities as required.
Occupations:	Equipment Operators, Loggers, Mechanics, Technicians, Scalers, Supervisors, Foresters, Consultants and Managers
Documents:	FMD 14 and 15 Five year Operating Plan 2019-2023
Approvals:	Department of Fisheries and Land Resources Department of Municipal Affairs and Environment Department of Fisheries and Oceans (Federal) Canadian Coast Guard
Schedule:	January 1, 2019 – December 31 2023

June 29, 2018
Date

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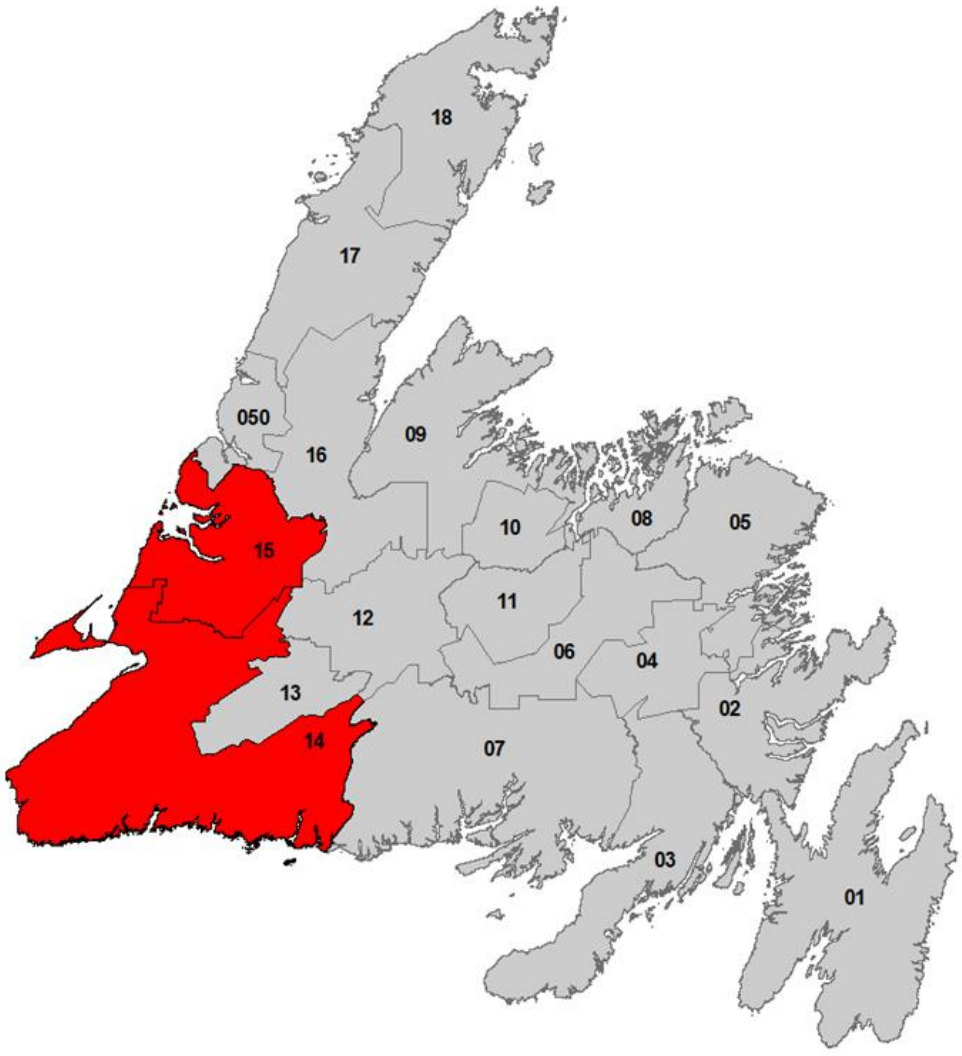
Kruger
Publication
Papers

Corner Brook Mill

Corner Brook Pulp and Paper Limited
Five - Year Operating Plan

Zone 6
Forest Management Districts 14 and 15

January 1, 2019 - December 31, 2023



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1. Introduction

This five year operating plan incorporates the new provincial planning requirements. In the past, there were five major planning documents; the provincial sustainable forest management strategy, the district strategy document, the five year operating plan, the annual operating plan, and the past annual report. This new planning framework has eliminated the district strategy document; however, its former contents are now split between the provincial sustainable forest management strategy and the five year operating plan. Sections that are provincial in scope such as carbon, global warming and criteria and indicators are now included in the provincial sustainable forest management strategy while sections that are more descriptive or depict local conditions such as values, forest characterization and ecosystem description are moved to the five year operating plan. Linkages between strategies from the provincial sustainable forest management strategy and on the ground activities in the five year operating plan will be provided where applicable.

Another major change to the planning process is the creation of eight planning zones on the island which are based primarily on ecoregion composition. Districts 14 and 15 are adjacent and share common ecoregion characteristics and collectively form Planning Zone Six. The requirement for submission to the Forestry Services Branch and for Environmental Assessment is one five year operating plan for each owner in each Zone. The past requirement was one five year operating plan by each owner in each district. This zone is comprised of both crown land and private tenure, however; so there will be only one submission by the crown and one by Corner Brook Pulp and Paper. Throughout this five year plan, references will be made to Districts 14 and 15 individually but when combined they will collectively be referred to as Planning Zone Six or the Zone.

This document will embark to fully integrate presentation of information and discussion for crown land in the zone, where possible. This will be done by combining statistics and other information from each district and reporting for the complete zone. However, tables and figures will be constructed such that information for individual districts will be available if a breakout is required. Discussion and information will be presented separately for each district where warranted based on

unique and distinct differences in scope and content. The more descriptive sections of this plan will be generic in nature and give information for the entire zone as well as some broad comparative statistics.

Finally, this document will build on previous documents. Information will be updated as required or new sections will be added if any new information is available. Sections from previous documents will be included if they are still relevant.

2. Landbase Description

2.1. General

Planning Zone 6 encompasses FMD's 14 and 16 (Map 1-1). It is located on the west and southwest coasts of the island and extends from Burgeo and Port aux Basques in the south to the southern boundary of Gros Morne National Park in the north. Major towns located within the zone are Deer Lake, Pasadena, Corner Brook, Stephenville, Port aux Basques and Burgeo. District 14 is administered from St. Georges with a depot in Burgeo while District 15 is administered from Corner Brook with a depot in Woody Point.

2.1.1. Location

Forest Management District 14 (Legal Description)

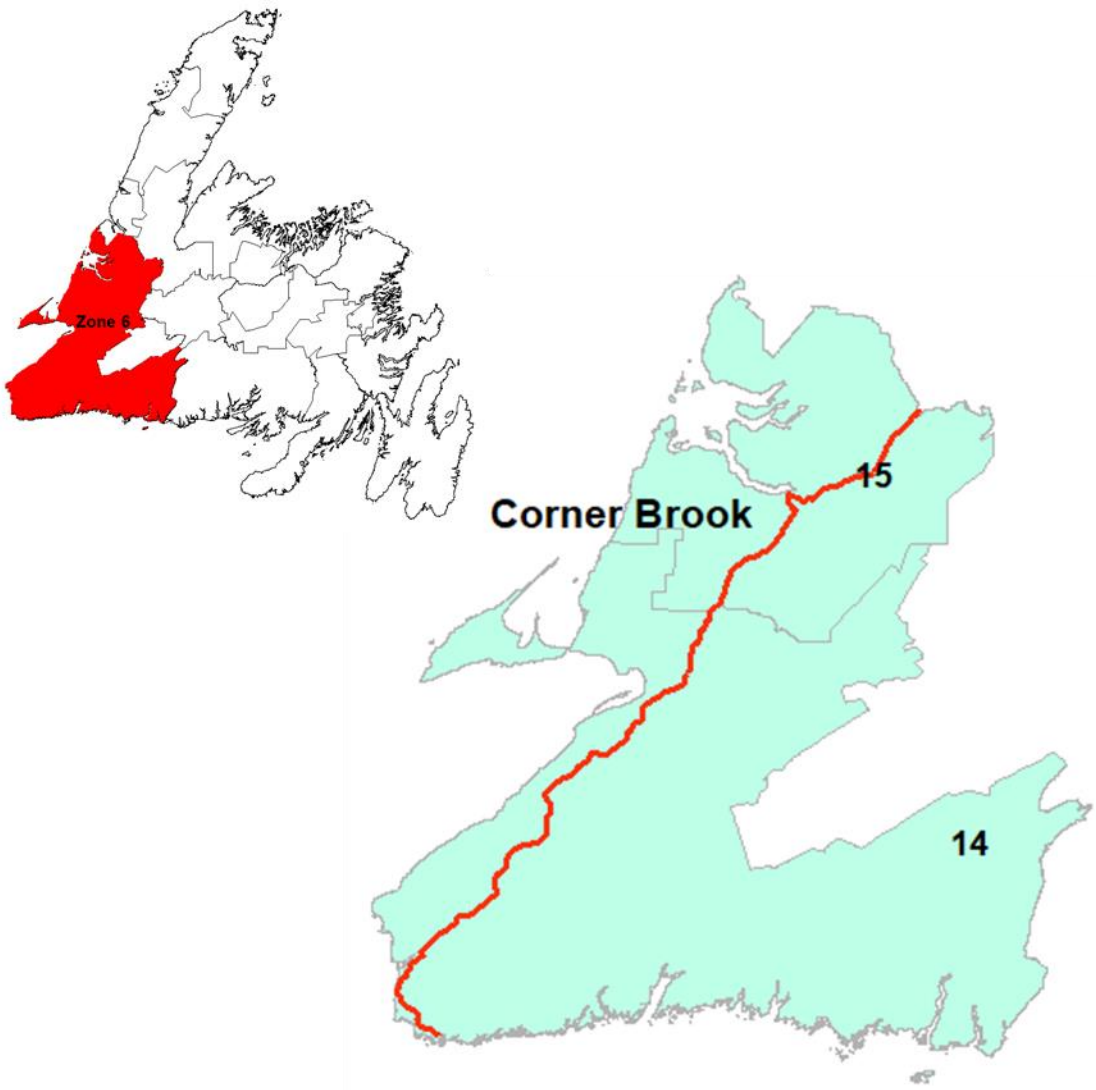
FMD 14 is known as the St. Georges district. Commencing at Grey River Point east of Ramea Island ; Then following the western boundary of Management District 7 to where it intersects the boundary of Management District 12; Then generally northwest along the boundary of Management District 12 to where it meets the boundary of Management District 13 west of Blizzard Pond; Then southwest; Then northwest; Then northeast along the boundary of Management District 13 to where it intersects the boundary of Management District 12; Then north along the boundary of Management District 12 to a point where it intersects Bowater Reid Lot 222,

Vol. 71, Folio 122; Then west to a point where the boundary of the Reid Lot intersects with the eastern boundary of a block of land licensed to Bowater Nfld. Ltd., Vol. 5, Folio 97; Then southwest along the boundary of the lot to where it intersects with the eastern boundary of Bowater Reid Lot 225, Vol. 71, Folio 125; Then south; Then west along the boundary of the said lot to a point where it intersects with the northern shore of Little Grand Lake ; Then generally northwest along the shore of Little Grand Lake to Lewaseechjeech Brook; Then following the brook generally northwest to a point where the brook enters Grand Lake ; Then generally west along the south shore of Grand Lake to where the waters of a brook commonly called Grand Lake Brook enters into Grand Lake; Then following the brook generally northwest to a point where the brook meets the Tans Canada Highway ; Then continuing generally southwest along the highway to a point where it interest with the boundary of Bowater Licensed Lot 3, Vol. 5, Folio 98; Then south; Then west along the boundary of the lot until it meets the boundary of Bowater Reid Lot 23, Vol. 71, Folio 16; Then west; Then north; Then east along the boundary of the lot until it meets the boundary of a block of land licensed to Bowater Nfld. Ltd., Vol. 5, Folio 98; Then north; Then east along the boundary of the block of land to where it meets the southwest corner of Bowater Reid Lot 25, Vol. 71, Folio 18; Then north along the boundary of the lot to where it meets the boundary of a block of land licensed to Bowater Nfld. Ltd, Vol. 5, Folio 98; Then north; Then east along the boundary of the block of land to where it meets the southwest corner of Bowater Reid Lot 27, Vol. 71, Folio 21; Then north along the boundary of the lot to its northwest corner; Then due west to the eastern boundary of Reid Lot 202, Vol. 71, Folio 104; Then south; Then west along the boundary of the lot to its southwest corner; Then due west to a point on the coast 0.8 kilometers north of Lewis Brook; Then generally south and east along the coast including all offshore islands to point of commencement.

Forest Management District 15 (Legal Description)

FMD 15 is known as the Corner Brook district. Commencing at a point approximately 2.1 kilometres northeast of Trout River where the west boundary of the Gros Morne National Park meets the waters of the Gulf of St. Lawrence; Then southeast along the southern boundary of the

park to a point where the boundary intersects with the Great Northern Peninsula Highway , near Wiltondale; Then in a general southeasterly direction along the Great Northern Peninsula Highway to a point where the highway meets the Trans Canada Highway near Deer Lake; Then southwest along the Trans Canada Highway to the Eric Hinton Bridge near the Bowater Company Station; Then generally southeast for approximately 1.3 kilometers to the Bowater Dam at the end of the Humber Canal ; Then generally east following the Humber Canal to Grand Lake ; Then continuing along the north and east shores of Grand Lake to a point where it meets Bowater Reid Lot 41, Vol. 71, Folio 34; Then southeast; Then northeast; Then south along the boundary of the lot to its southeastern corner where it meets a block of land licensed to Bowater Nfld. Ltd., Vol. 5, Folio 97; Then southwest along the boundary of the block of land to a point where it intersects with the eastern boundary of Bowater Reid Lot 222, Vol. 71, Folio 122; Then south and west along the boundary of the lot to a point where it intersects the boundary of Management District 14; Then generally southwest; Then west; Then generally north; Then generally west following the boundary of Management District 14 to a point where it enters the Gulf of St. Lawrence approximately 0.8 kilometers north of Lewis Brook; Then north along the coast including all offshore islands to point of commencement, also to include the Rocky Harbour enclave described as follows; Beginning at a point north of Bear Cove, Bonne Bay ; Then generally southeast following the boundary of Gros Morne National Park to the west side of East Arm; Then southwest and south following the boundary of the park to the bottom of South Arm; Then generally north following the boundary of the park to point of commencement.



Map 1- 1 Planning Zone / District Map, Zone 6.

2.1.2. History

The natural resources of the zone have played a major role in the well-being of the residents. Since the earliest settlement, the forest and fish resources were the mainstay of the economy. Generally, settlement occurred around the coastal areas where the fishery was prevalent. Initially the forest was used as a source of fuelwood as well as construction materials for houses and fishery related items (stages, lobster pots, boats etc.). Sawmills developed to supply the local demand for lumber and construction timber.

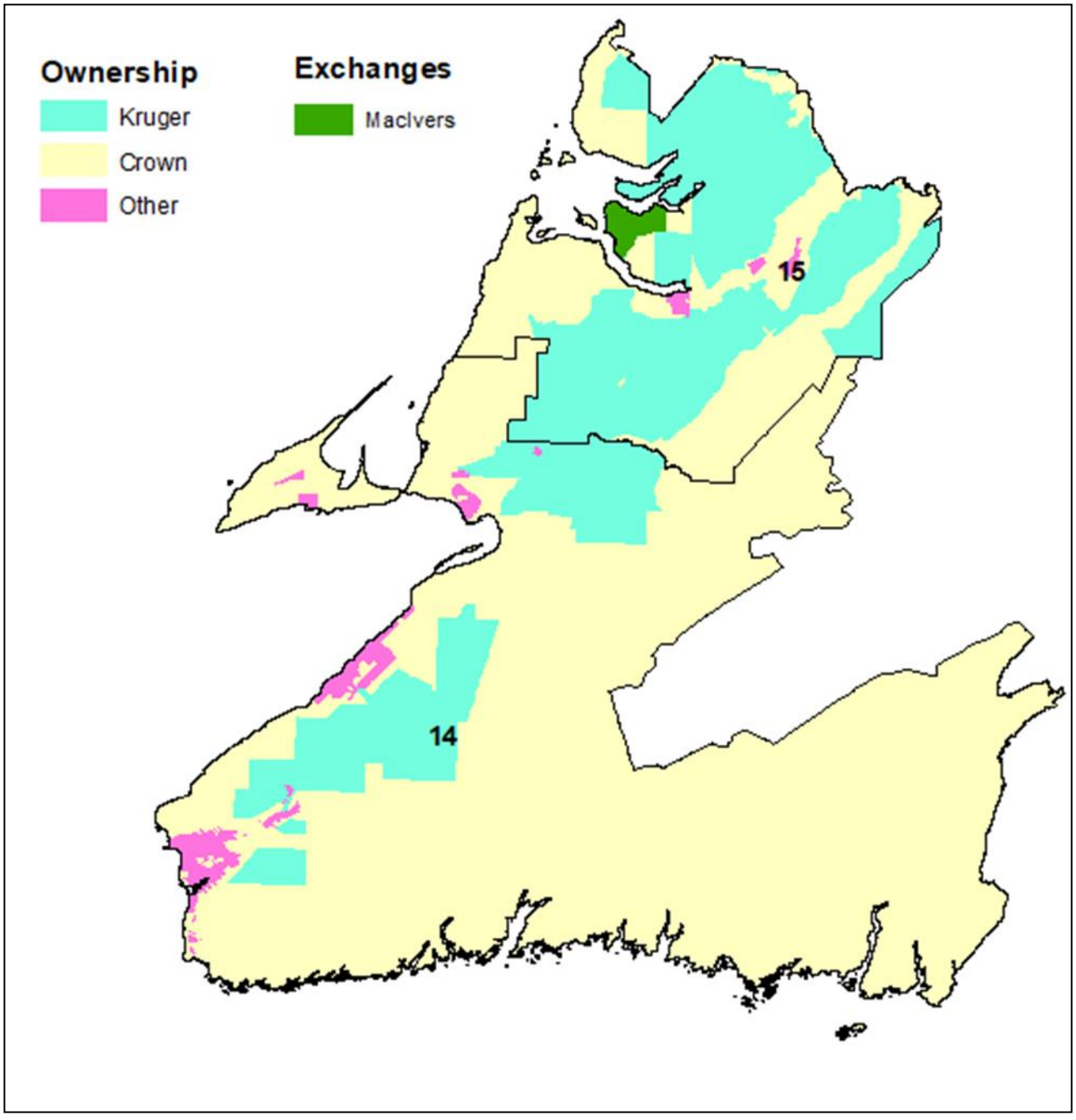
The first major sawmill was constructed near Corner Brook stream in 1863 and at peak production employed 45 people. In the 1900's forestry became the employment mainstay in the region. From 1921 to 1947 sawmills were established in Bonne Bay which produced approximately 6 million fbm of lumber per annum.

In 1923 the construction of a pulp and paper mill in Corner Brook and a hydro generation station at Deer Lake commenced; both developments were completed in 1925. The mill was initially owned by the Newfoundland Power and Paper Company limited and operated until 1928. At that time it was taken over by the Canadian International Paper Company before giving way to Bowaters in 1938. Bowaters operated the mill until 1985 when it was taken over by Kruger Inc., who operate the mill today. Woodlands employment peaked at 2000 employees and is still important to the local economy today employing fewer than 400 employees.

A linerboard mill was also established by the provincial government in Stephenville and opened in the early 1970's. The supply for this mill came from the Labrador Linerboard licenses in Districts 9, 14 and 16 and Goose Bay. This mill shut down in 1977 due to the uncertainty of supply and high cost of delivered timber from Labrador. The mill was purchased by Abitibi Price, converted to newsprint and reopened in 1981. Despite having the most modern and efficient paper making machine in Newfoundland and Labrador, the mill closed in the fall of 2005 in an attempt to bring the supply of newsprint more in line with the demand.

2.1.2.1. Ownership

There are two major tenure holders in the zone; crown and Corner Brook Pulp and Paper Limited (CBPPL) (Map 1- 2). CBPPL accounts for 26 percent of the total land area in the zone. Crown land accounts for 74 percent. The majority of these licenses are due to expire in 2037. The productive forest breakdown for the zone is 53 percent for CBPPL and 47% for crown. In FMD 14, the crown controls 76 percent of the total land area and 63 percent of the productive forest. This is mainly due to the large area of unmapped crown land on the south coast. During the fall of 2010, CBPPL sold some of it's landbase in FMD 15. Now in FMD 15, CBPPL controls 63 percent of the total land area and 70 percent of the productive forest.



Map 1- 2 Timber ownership and active transfers and exchanges occurring throughout Zone 6.

2.1.3. *Physical Description*

The planning zone is a large area (approx 1.5 million ha) covering much of southwestern Newfoundland. Physical features vary a great deal over such a large landscape. The following descriptions apply generally to the districts in the planning area.

2.1.3.1. *Topography and Hydrology*

The topography of the zone is generally rugged however the flat, high upland plateaus provide contrast. Lowland areas occur along the coast and extend inland in the river valleys as well as in interior basins. The hilly upland areas make up a large portion of the zone and generally contain the most productive sites. They are dissected with very rugged topography and with ridges commonly in excess of 300 m in height. Another major land feature is the flat-topped, high uplands. These plateaus are dissected by wide valleys which flow to the lowlands. The lower slopes of the Long Range Mountains in the east flatten out towards the coast into extensive plateau bogs, sometimes covering up to 10 km². The landscape is generally undulating and intersected by numerous ponds, lakes and streams. Forested land is naturally fragmented with bog, barren and ponds.

In the southwest, the lowland areas give rise to upland barren areas that are drained in an orderly fashion by major river valleys. Most of the South Coast is covered by gently rolling ground moraine, although areas of exposed bedrock are common. The unique hummocky terrain near Burgeo was formed by deposits of till from a retreating glacier. The interior of the southwest is a windswept, highland area with extensive barrens and elevations rising from 200m to more than 650m. Slope and basin bogs and fens are the dominant peatland.

The more prominent highland areas in the zone are Blow me Down Mountains, North Arm Hills, Mount Gregory, Lewis Hills, Annieopsquotch Mountains, and Cape Anguille Mountains.

Some of the major river basins in the zone are; Humber River, Harrys River, Serpentine River, Barachois Brook, Fishells River, Robinsons River, Crabbes River, Southwest Brook, Codroy River, Grey River, and White Bear River. With the exception of the latter two, these rivers originate in the highland areas and drain major watersheds before meandering through the fertile coastal lowlands.

2.1.3.2. Geology

The lowland portions of the zone are underlain by carboniferous deposits, mainly conglomerate, sandstone and shale. The age of these rocks is younger in the southern part of the zone at about 300 million years. The bedrock is mostly concealed by thick layers of glacial drift, outwash and delta deposits. The lowest elevations in the hilly uplands are underlain by Ordovician shales whereas the highest elevations are generally underlain by limestone, quartzite and, in the eastern portion, by Precambrian rocks such as gneiss and schist.

The Long Range Plateau, which runs north-south through the middle of District 15, is composed mainly of igneous and metamorphic rocks of which gneiss, granite and anorthosite are the most common. The Bay of Islands Range, which dominates the western side of District 15 and the

Northwestern part of District 14, is underlain by serpentinized dunite and periodotite, amphibolite and gabbroic rock. The serpentine rock type is particularly prevalent in the highest areas.

Three groups of rocks occur in the interior of District 14. The Notre Dame rocks are mostly sandstones, conglomerates, volcanic ash and lava that were created about 550 million years ago. Exploits rocks are volcanic ash and lava, sandstones, shales, and conglomerates formed about 500 million years ago. Gander zone rocks are sandstones, shales, and conglomerates formed about 550 million years ago. Some of these rocks have been metamorphosed into schist and gneiss. Large

granite intrusions (areas where molten rocks seeped up) occur in the central and western portion and are about 450 million years old.

The southern areas of District 14 are mostly granites created by intrusions 300 to 400 million years ago. They form an almost unbroken band from Rose Blanche to Harbour Breton.
Sandstones, shales and conglomerates, deposited about 500 to 550 million years ago, are found around Port aux Basques. These rocks belong to the dunnage zone and are also found farther east and north across the Burgeo highway and around Bay d'Espoir. Just east of La Poile Bay are ash and lava deposits that were created about 420 million years ago.

The entire zone has been severely glaciated and is mostly covered by glacial till. Extensive outwash deposits occur only in some of the major river valleys. “Plucking” of rock basins, now lakes, is noted and quarrying of the lee sides of some hills has been identified. Reorganization, and probably disorganization, of drainage is evident. Erratic boulders are found at the highest elevations however glacial debris is never found as a continuous blanket in the zone.

2.1.3.3. Soils

Extending north and south from the Bay of Islands there are two significant alpine rock barren areas known as the Bay of Islands Serpentinized Range (North Arm Mountain and the Blomidon Range). These have a sparse but botanically interesting flora which has adapted to the magnesium and related natural soil toxicity problems. The soils are orthic and gleyed regosols with horizon development restricted by frost churning (Roberts, 1980). The areas are geologically important and attract people from all over the world for viewing (Roberts and Proctor, 1992.) They are also important hiking and winter recreation areas both from a local and national perspective.

The dominant soils of the forested uplands and slopes are orthic humo-ferric (brown soils containing mostly inorganic material that occur on relatively dry sites) and ferro-humic podzols (dark soils with a high organic content and a high amount of iron and aluminum), some of which

are gleyed in the lower B horizon (Roberts, 1983). The presence of limestone and shale bedrock and tills derived from these calcareous substances and soil seepage (lateral movement of

moisture on slopes) are the most important factors for tree growth (Roberts, 1986, Meades and Roberts, 1992). The major site variables are landform, soils, drainage, moisture and fertility gradients, and understory vegetation. A prominent feature of this region is the presence of marl ponds, sometimes called living limestone ponds (Blue Ponds is a prime example). Significant soils in and around these ponds are orthic regosols and rego gleysols often with a mucky phase and very low trafficability.
The area adjacent to the Serpentinized Range west of Corner Brook includes many productive orthic ferro humic podzols derived from shale on long slopes. Forest growth is excellent on the well to moderately well drained, medium textured soils. However, erosion can be a problem if ground disturbance is moderate or worse.

The soils in the interior and southern part of District 14 are almost entirely humo ferric podzols. There are also some areas of exposed bedrock or bedrock with a thin soil covering (less than 10 cm).

2.1.3.4. Climate

The climate in this zone is one of the most favourable on the island with relatively warm summers and abundant precipitation. Conditions vary as a result of differences in topography and proximity to the coastline.

Annual precipitation is between 102 and 140 cm with the larger amounts associated with higher elevations. Annual snowfall is in the 317 to 508 cm range and often small patches of snow remain until late July in sheltered north facing valleys above 600 m.

Mean January temperature is -10 C and mean July temperature ranges from 16 C in valleys to 13 C in the highlands. The frost free period averages 110 days at the lower elevations and the growing season is between 130 to 160 days.

Severe windstorms have occasionally caused some blow down damage especially in shallow-rooted, over-mature stands. Periodic ice storms have also caused damage to predominantly hardwood stands.

There are significant local variations because of the many mountains and valleys. On mountain slopes and summits, winters are generally colder and the growing season is shorter than in the protected valleys. Mountain slopes also tend to receive more precipitation than low-lying valleys. The climate of the interior of District 14 is notable for its short growing season and permanent snow-cover throughout the winter. Snow covers about 60 percent of the landscape into late May which is about a month longer than in neighboring areas.

On the South Coast, the summers are colder due to the fog and prevailing onshore winds. This part of the zone also receives the most precipitation, mainly as rainfall.

2.1.4. Ecological Characteristics

2.1.4.1. Ecosystem Description

An ecosystem is a community of interacting and interdependent plants, animals and microorganisms, together with the physical environment within which they exist. It is important to remember that within an ecosystem, the interactions between the biotic and abiotic components are at least as important as the component themselves. Another critical characteristic of ecosystems is their overlapping boundaries. While each is definable in time and space, and distinguishable from adjacent ecosystems, each is intimately integrated with other local ecosystems. Additionally, each local ecosystem is nested within increasingly larger ecosystems. The scale at which an ecosystem is viewed is contingent on the species or abiotic characteristic under consideration. While planet Earth represents the ultimate global ecosystem, complex ecosystems also exist under fallen logs and rocks. A forest ecosystem, as the term implies, is an ecosystem dominated by tree cover. At the coarsest level, the forests of Planning Zone 6, like all forests on the island, form part of the boreal forest ecosystem. The boreal forest is a green belt, which spans much of the northern hemisphere. It stretches from the Atlantic shores of Scandinavia through Russia, across Alaska, through the mid latitudes of Canada until it reaches the Atlantic Ocean again in Newfoundland and Labrador.

One of the distinguishing characteristics of the boreal forest is the phenomenon of periodic, catastrophic stand replacement natural disturbances such as fire and insect outbreaks which typically give rise to uniform, even aged forests dominated by a few tree species. The tree species, which characterize the Canadian boreal forest, include black spruce, white spruce, balsam fir, eastern larch, trembling aspen, white birch and jack pine. All of these, with the exception of jack pine, commonly occur on the Island. However, by far the dominant species are black spruce and balsam fir; together they represent more than 90 percent of the growing stock on the island. Spruce is most abundant in north central Newfoundland where a climate characterized by relatively dry, hot summers has historically favored this fire-adapted species. In western Newfoundland the climate is somewhat moister and fires are far fewer in this region resulting in the ascendance of balsam fir, a species that is poorly adapted to fire. Like the rest of the Province, the forests of Planning Zone 6 (FMD's 15 and 16) are part of the larger boreal forest ecosystem.

The primary natural disturbance factors attributed to boreal forests are fire and insects. Forest fires were frequent and extensive in north-central Newfoundland and resulted in specific successional trends depending on site type. More often than not, the spruce component is increased following fire, whereas other disturbance types such as insects and cutting often results in an increase in the fir component. Repeated burning and cutting of dry, coarse-textured black spruce-feather moss site types can result in ericaceous species such as sheep laurel *Kalmia angustifolia* invading the site to produce heath-like conditions. Successional patterns on other forest cover types vary with site and type of disturbance. These are discussed in greater detail in subsequent sections of this report.

Forest development class, successional pattern and site type, influence the understory plant community throughout the district. The species composition and structure of these plants significantly impact on suitability of a site as wildlife habitat for various species. Some animals are very general in terms of habitat requirements and can occupy a wide range of site conditions, yet have specific seasonal requirements that can determine habitat quality. For example, the moose requires wintering areas with suitable combinations of available cover and browse. It is widely accepted that a variety of forest age classes can provide increased habitat and sustainability for many wildlife species. On the other hand, some species require a specific age class or habitat

condition to maintain healthy populations (e.g., Newfoundland marten (*Martes Americana atrata*)).

Aquatic ecosystems of the boreal forest are heavily dependent on forest cover for temperature regulation, nutrient cycling and stream flow regulation. Consequently, forest harvesting activities adjacent to riparian areas are critical to sustainability of fish habitat and maintenance of fish migration routes. Suitability of various streams and ponds as waterfowl breeding, feeding and resting areas are also dependent on adjacent forest cover. Biological production in streams is based on a combination of internal and external nutrient and energy pathways. Streamside vegetation has a strong influence on both since they are so closely linked to surrounding terrestrial events. Small streams in forested areas receive much of their materials from the surrounding terrestrial ecosystem. Detritus in the form of needle and leaf litter, twigs and branches, forms the major energy base for consumer organisms. In highly shaded headwater streams, algae production is often low and yields only a small and seasonally variable contribution to the overall energy budget. As streams become larger further downstream, sufficient light penetrates the forest canopy, and consumer populations can take advantage of both particulate detritus and algae (Toews and Brownlee 1981). For these reasons, maintenance of suitable riparian zones for protection of aquatic ecosystems, as well as providing wildlife travel corridors is a primary consideration of any forest management strategy.

Major watersheds within the Zone include portions of the Humber Upper, Humber Lower, Port au Port Bay, St. George's Bay, La Poile Bay, White Bear Bay. Many of these are associated with protected water supplies for communities within the districts. Small to medium sized lakes and ponds are common throughout the zone.

2.1.4.1.1. Ecoregions and Subregions

With the evolution of an ecosystem approach to forest resource management, it would be advantageous to have a standard framework to classify combinations like general climate and regional physiography, as well as the other components of an ecosystem, into distinguishable

regions. Fortunately, such a framework exists, in a publication entitled *Ecoregions and Sub regions of Insular Newfoundland* (after Damman, 1983).

Damman defined ecoregions as areas where a comparable vegetation and soil can be found on sites occupying similar topographic positions on the same parent material, provided that these sites have experienced a similar history of disturbance. Thus, an ecoregion cannot be defined in isolation from the physical landscape, but vegetation toposequence, vegetation structure; floristic composition and floristic distributions can provide the primary criteria (Damman, 1979). According to Damman, Newfoundland consists of nine ecoregions, which can be further divided into several sub regions. Labrador has ten ecoregions. Each of the Newfoundland and Labrador ecoregions and sub regions contain many of the same ecosystem variables. It is the dominance and variance of these variables (e.g., vegetation and climate) that determine their classification. FMD's 14 and 15 contain 4 of the ecoregions outlined by Damman (1983).

They are:
1 – Western Newfoundland Forest Ecoregion;
2 – Long Range Barrens Ecoregion;
3 – Central Newfoundland Forest Ecoregion;
4 – Maritime Barrens Ecoregion
(see Map 1-3).

The following descriptions are taken from *Forest Site Classification Manual - A Field Guide to the Damman Forest Site Types of Newfoundland* (Meades and Moores, 1994).

Western Newfoundland Forest Ecoregion

The Western Newfoundland Ecoregion runs from the mouth of the Codroy Valley in the southwest corner of the island, northwest to Bonne Bay and eastward to Grand Lake. It encompasses almost all of District 15. This ecoregion is characterized by a humid climate with a relatively long frost-free period. It contains some of the most favourable sites for forest growth although there is considerable variation due to altitude and proximity to the coast. The Dryopteris-Hylocomium-

balsam fir Damman type is the zonal forest for this region. The zonal soils are nutrient rich humic podzols with a very dark podzolic B horizon due to humus enrichment.

The ecoregion is home to more than 700 species of vascular plants (about 2/3 of the flora), more than 300 species of mosses and more than 35 different vegetation types (Bouchard et al., 1978, Robertson and Roberts, 1982, Belland, 1987, Bouchard et al., 1991). The absence of prolonged dry periods appears to have excluded fires from all but the coarsest textured soils. Consequently, balsam fir rather than black spruce is the dominant forest cover. Yellow birch is common and it displays its best growth in protected valleys below 200m elevation. It is absent at higher elevations and north of Deer Lake. Red maple is also most common and robust in this ecoregion. Other species which occur here include white spruce, eastern larch, trembling aspen, balsam poplar, white pine and black ash. Red pine, the rarest coniferous tree species in

Newfoundland (Roberts, 1985), does not occur in the district: its nearest location is the Howley-Sandy Lake area, 30 km to the northeast.

As a general rule overstocking is a more common silvicultural problem than understocking in western Newfoundland. Localized regeneration failures can occur in forests with a very dense fern and herb stratum such as the Rubus-balsam fir and the Dryopteris-balsam fir forest types. On these types, hardwoods, particularly mountain maple on seepage slopes, can form semi-stable thickets. These thickets may eventually develop into hardwood forest types. The development of Ericaceous heath after logging or fire is only observed on very small areas of coarse textured till. This is in stark contrast to central Newfoundland where succession to Kalmia heath is a common occurrence. The Western Newfoundland Ecoregion is subdivided into six subregions of which five are represented in the zone.

1- Codroy Subregion

This subregion covers the southwest coast of District 14 and includes the Codroy Valley and Cape Anguille Mountains. The topography is rugged with deep, heavily forested, protected valleys. The most climatically favourable sites occur within this subregion.

2- Corner Brook Subregion

This subregion extends from Bonne Bay to Stephenville and east to Grand Lake. In forestry terms, it is the only important subregion in District 15. The subregion is characterized by hilly to undulating terrain. The soil parent materials are dominated by slates and limestone till. Areas with calcareous till are distinguished by the occurrence of light colored marl deposits around ponds and in valleys. The parent material consists of shallow, stony silt loam underlain by limestone bedrock or calcareous basal till. The rugged topography is dominated by the Taxus- balsam fir and Dryopteris-Rhytidiadelphus-balsam fir site types.

The hilly, non-calcareous terrain in this subregion is dominated by shallow loamy soils over shale bedrock. However, the shallowness of the till does not adversely effect forest growth since nutrient rich seepage waters are held in the rooting zone by bedrock or a fragipan layer. The steep topography is dominated by the Dryopteris-balsam fir forest and supports some of the most productive stands in Newfoundland.

3- Port au Port Subregion

This subregion covers the Port au Port Peninsula. Soils are shallow and wind exposed limestone barrens are common; however, the herbaceous flora is rich and diverse. Many calcareous arctic-alpine species, gulf endemics and Cordilleran disjuncts are characteristic of this subregion.

4- Serpentine Range Subregion

This subregion dominates the western side of District 15 and extends from the Lewis Hills in the south to Bonne Bay in the north, spanning both shores of the Bay of Islands. The area is mountainous with elevations exceeding 800m. The vegetation is sparse, low and dominated by rock barrens. Despite this, the serpentine and ultra basic rock types support numerous rare plant species.

5- St. George's Bay Subregion

This subregion occurs on the western portion of District 14 and extends coastally, from Port aux Port to Codroy. It has flat to rolling topography and the deep soil deposits are mainly glacial or

glacial-fluvial till. Gypsum is present in this subregion but limestone is absent. The ecoregion is forested but coastal areas are marginally productive. Ombrogenous (low plateau) bogs cover much of the lowlands.

Central Newfoundland Forest Ecoregion

This ecoregion is located in the north-central part of the island with a small outlet near Bay d'Espoir. The topography is gently rolling to hilly with most elevations between 150 and 450 meters. It has the most continental climate in insular Newfoundland with the warmest summers and coldest winters. It has the least wind and fog of any ecoregion and a growing season of 140-160 days and average precipitation of 900-1300mm.

This ecoregion is heavily forested and is the most distinctly boreal part of the island. Balsam fir, black spruce, and to a lesser extent white birch are the dominant tree species. There is an extensive fire history thus fire origin stands of black spruce and white birch cover extensive areas in the northern and eastern portions. Trembling aspen forms local stands after
fire but is restricted to the central and northern portion.

Hylocomium-balsam fir is the zonal forest type and is dominant in areas not disturbed by fire. Kalmia-black spruce and Pleurosium-balsam fir forests are also common. The Kalmia-black spruce-lichen forests, which occur on outwash sands and gravels, are unique to this ecoregion. Red pine also occurs but is restricted to extremely dry sites. This ecoregion comprises less than five percent of the zone mostly in the Portage Pond subregion

1- Portage Pond Subregion

This subregion includes the Annieopsquotch Mountains with elevations up to 677 metres. It has rugged topography and is heavily forested, primarily with balsam fir.

2- North Central Subregion

The North Central Subregion has the highest maximum temperatures, lowest rainfall, and highest forest fire frequency on the island. The subregion extends from Clarenville to Deer Lake with a mostly rolling topography of less than 200 meters. The history of fire is evident by the pure black

spruce forest with white birch and aspen stands that dominate the subregion. This subregion comprises less than one percent of the zone.

Maritime Barrens Ecoregion

This ecoregion extends from the east coast of Newfoundland to the west coast through to the south central portion of the island. It is characterized by relatively mild winters with intermittent snow cover and the coldest summers with frequent fog and strong winds. The dominant landscape pattern consists of usually stunted, almost pure stands of balsam fir, broken by extensive open heathland. Good forest growth is localized on long slopes of a few protected valleys. The heaths are dominated by Kalmia angustifolia on protected slopes where snow accumulates and by cushions of Empetrum nigrum, or Empetrum eamesii on windswept ridges.

1- Central Barrens Subregion

This subregion includes the barrens between the forests of Central Newfoundland and the foggy zone along the south coast. Summers are warmer, fog is less frequent, and snow cover is more persistent than in other subregions. Forest patches are common throughout the barren but Arctic-alpine species are poorly represented. Speckled alder is present but does not form alder swamps and bogs are slightly domed to raised.

2- South Coast Barrens Subregion

This ecoregion covers the wind-exposed foggy zone along the South Coast. Elevations over 300 metres occur in most parts of this subregion. It provides important wintering ground for caribou due to the thin snow cover.

Long Range Barrens Ecoregion

This ecoregion comprises the highlands extending from the southwest coast to the northern part of the Northern Peninsula. It consists of three distinct units, the Southern Long Range, the Buchan's Plateau-Topsails, and the Northern Long Range subregions. The subregions are separated by areas of more or less continuous forest with the former two occurring in the zone.

Fire is of little importance and has played no role in the formation of these barrens. There are large areas of exposed bedrock in this ecoregion which are acidic in nature.

Cool summers and cold winters are typical of this ecoregion. The mean daily temperatures are relative low therefore the vegetative season is short. Snowfall can exceed 5 m and drifting is extreme throughout the winter. Snow cover is permanent throughout the winter and persists through to late spring. Western and southwestern facing slopes are severely exposed due to the prevailing winds from this direction.

This ecoregion contains mainly barren vegetation with shallow ribbed fens and tuckamore dominating the landscape. Sheep laurel heath is the predominant dwarf shrub vegetation with pink crowberry dominated Empetrum heath covering exposed areas that are subject to active erosion. Arctic alpine vegetation ie (Diapensia and Loiseleuria) is common on all highlands and exposed sites. In areas with persistent snow cover, snow bank species such as moss heather, mountain sorrel and dwarf bilberry are common.

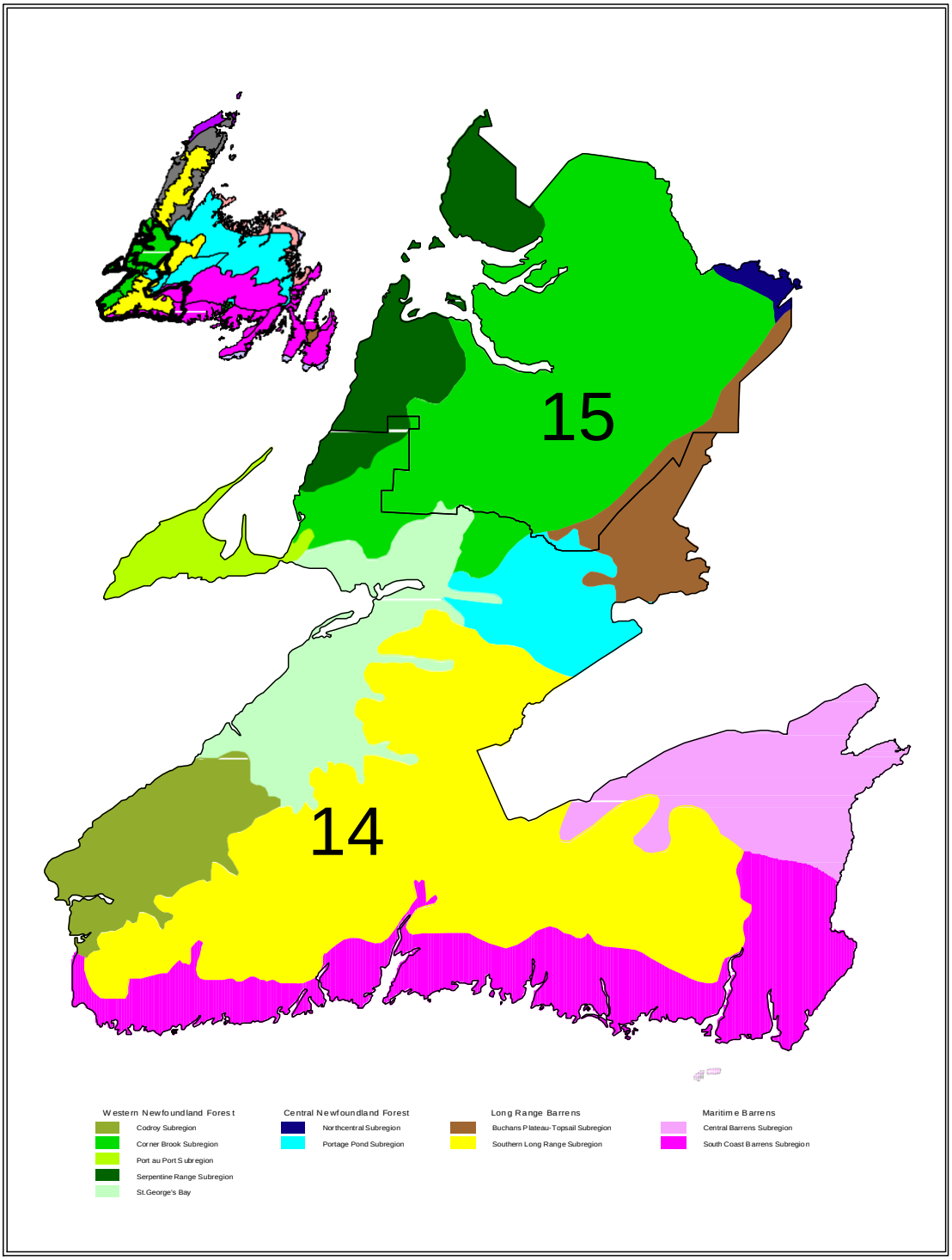
Extensive areas of tuckamore, mostly of black spruce less than one metre high, occur on slopes and in valleys, but are absent from hill summits. Speckled alder is completely absent being replaced by sweet gale along brooks. Mountain alder is common on wet and dry sites but does not form alder swamps. Shallow peatlands, patterned fens and slope bogs cover extensive areas.

1- North Central Sub region

This sub region has the highest maximum temperatures, lowest rainfall and highest forest fire frequency than anywhere else in Newfoundland. The sub region extends from Clarenville to Deer Lake with a mostly rolling topography of less than 200 meters (asl.). The history of fire is evident by the pure black spruce forest and trembling aspen stand that dominate the region.

2- Buchans Plateau – Topsail Subregion

The Buchan's Plateau-Topsails Subregion lies between Grand Lake and Red Indian Lake and its western edge extends into District 15. Most of the subregion is barren. Dwarf shrub heaths, shallow patterned peatlands, and areas with low krummholtz dominate the landscape.



Map 1- 3 Ecoregions/Subregions occurring throughout Zone 6.

Table 1- 1 Ecoregions/ Subregions within Zone 6

2018	Eco/Subregion		District 14		District 15		Zone 6 (D14&D15)
Zone 6	Area (ha)		Total % Area	Relative % of	Total % Area	Relative % of	Combined relative % of
Eco/Subregions	in Province	in District	Occupied in District	Subregion in Distric	Occupied in District	Subregion in Distric	Subregions in Zone
Western Newfoundland Ecoregion							
Corner Brook Subregion	490,878		12%	4	86	75	23
Serpentine Range Subregion	118,261		16%	1.2	84	17.7	5.7
Port au Port Subregion	39,250		10000%	2.6	0	0	2
Codroy Subregion	118,230		10000%	7.9	0	0	5.7
Bay d'Espoir Subregion	23,573.8		0%	0	0	0	0
St. George's Subregion	153,579		50%	0	99.5	27.2	7.5
Section Sub-total	*943,771*						
Long Range Barrens Ecoregion							
Buchans Plateau-Topsail Subregion	369,811		1600%	3.8	7	4.6	4.1
Southern Long Range Subregion	599,801.8		9400%	37.7	0.0	0.0	27.5
Northern Long Range Subregion	590,353		0%	0.0	0.0	0.0	0
Section Sub-total	*1,559,967*						
Maritime Barrens							
South Coast Barrens Subregion	867,400		0%	0.0	31.0	18.0	13.1
Central Barrens Subregion	1,524,523		0%	0.0	9.1	9.3	6.7
South-Eastern Barrens Subregion	964,978.0		0%	0.0	0.0	0.0	0
North-Eastern Barrens Subregion	380,775.9		0%	0.0	0.0	0.0	0
Section Sub-total	*3,737,677*						
Central Newfoundland Forest							
Northcentral Subregion	2,284,881		40%	0.6	0.0	0.0	0.5
Red Indian Subregion	393,992.0		0%	0.0	0.0	0.0	0
Portage Pond Subregion	149,320		200%	0.5	53.8	5.4	4.2
Section Sub-total	*2,828,193*						
Grand Total	***9,069,608***						**100**

2.1.4.2. Ecosystem Condition and Productivity

As with other parts of the Newfoundland's boreal forest, those of Planning Zone 6 have evolved in concert with a history of fire, insect attack and subsequent disease and wind throw. Human intervention in this forest has been extensive and widespread with a resultant significant impact on current landscape patterns. Landscape patterns determine the variety, integrity, and interconnectedness of habitats within a region. These landscape patterns are a direct result of the relationship between physical landforms and soils, disturbance history, and relationships among various species that makeup the ecosystem communities. These factors, while listed separately for clarity, are unavoidably interrelated. Landscape patterns play a pivotal role in determining the current conditions and health of forest ecosystems. These variables are evaluated in terms of productivity, stability and resilience.

Another important role determining the condition of a forest is change. Forests are an ever evolving entity, resisting stagnation, and constantly moving through their cycles of life, death, and renewal. The process of change over time is the essence of nature itself. It has been nature's

underlying storyline since time began, and will continue to be until time ends. The main forces of change in our natural forest ecosystems are disturbance and succession. A definition of disturbance would indicate that it initiates a change in a community structure, which often ends up in the replacement of one set of species by another. However, replacement is not always the end result (e.g., a species like black spruce is aided in germination by disturbances like forest fire). Disturbances range from the fall of a single tree, to the destruction of thousands of hectares by forest fires. While disturbances may be very destructive, they can often rejuvenate ecosystems and diversify landscapes. Succession involves changes in both community composition and in the ecosystem structure and process. Succession is the orderly change whereby the dominant species is replaced by another species, then another etc. until a new dominant species establishes a relatively stable community.

The following sections will discuss each of these concepts in more detail as they relate to the ecosystems of Planning Zone 6. For the most part this section will be descriptive and explanatory in nature.

2.1.4.2.1. Productivity

Productivity is the accrual of matter and energy in biomass. In simple terms, primary productivity is the sum total of all biomass produced through photosynthesis. Secondary productivity occurs when this “primary” biomass is ingested and is added to that organism’s biomass. Since secondary productivity is directly dependent on primary productivity, it is this primary productivity component that drives the system. The level of primary production is dependent on the ability to produce biomass. This in turn is dependent on landscape features, soil, climate etc. In general terms, the more productive (ability to grow trees) a site is, the higher level of primary productivity. For example a forested stand would have a higher primary productivity than a bog or a good site would have a higher potential than a poor site. Overall, the landscape in Planning Zone 6 has approximately 45 percent productive forest. This distribution of productive sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils. The more productive areas of the zone occur in the lowlands and gently rolling uplands of the zone..

The landscape patterns are more consistent and the growing season is longer. These areas have deeper soils and less exposed bedrock. The landscape patterns are more consistent and the growing season is longer. In the extreme western and northwestern parts of District 15 and the south central and south west portion of District 14 the soils are shallower with bedrock at or near the surface. The terrain is much rougher and the growing season is shorter. In practice, it is nearly impossible to measure the amount of biomass produced in an ecosystem, or the energy consumed in the process. However, in the Provincial Sustainable Forest Management Strategy, criteria and indicators to monitor productivity have been identified. One method outlined is tracking mean annual increment in m3/ha/yr of tree species by ecoregion. This can be readily measured over time and manipulated through silviculture treatments or affected by poor harvesting practices, which increase soil compaction. An example of secondary productivity is the number of moose per unit area. One must also recognize the forests inherent biological limits however, when attempting to measure or manipulate site productivity.

2.1.4.2.2. Resilience

Ecosystem resilience reflects the ability of the ecosystem to absorb change and disturbance while maintaining the same productive capacity and the same relationships among populations. Healthy forest ecosystems maintain their resilience and adapt to periodic disturbances. The renewal of boreal forest ecosystems often depends on these disturbances. Resilience is characterized by the forest's ability to stabilize vital soil processes and maintain succession whereby the system is returned to a community composition and the productivity level is consistent with the ecosystems physical constraints. To a large degree, a forest ecosystems' resilience is controlled by properties such as climate, parent soil, relief and flora. The potential for populations to recover from low levels following disturbance by having adequate regeneration capacity and a balanced distribution of forest types and age classes provides a reliable measure of resilience at the landscape level. Other measures include the percent and extent of area by forest type and age class and the percentage of disturbed areas that are successfully regenerated. Measuring and monitoring these parameters determine resilience.

Forest activities must be carefully planned to not upset the natural balance and lower an ecosystem's resilience. An example is harvesting on the more fragile sites where steep slopes and shallow soil over bedrock increase the potential of site degradation beyond repair.

2.1.4.2.3. Stability

Nature is constantly changing and going through the unending processes of disturbance, growth, senescence, and decay. Therefore, stability of a forest ecosystem does not refer to one fixed position without variation. Ecosystem stability is more accurately defined as the maintenance of ecosystem changes within certain boundaries and the functional continuation of important potentials and processes such as energy capture. There are three levels of stability; species stability, structural stability, and process stability.

Species stability is the maintenance of viable populations or meta-populations of individual species. Structural stability is the stability of various aspects of ecosystem structure such as food web organization or species numbers. Process stability is the stability of processes such as primary productivity and nutrient cycling. To put stability in perspective, it must ensure that the system does not cross some threshold from which recovery to a former state is either impossible, (extinction) or occurs only after long time periods or with outside inputs (loss of topsoil) Some indicators of stability which can be monitored are: area of forest converted to non-forest use, area, percentage and representation of forest types in protected areas, percentage and extent of area by forest type and age class, and change and distribution and abundance of various fauna. These indicators can be measured and monitored to ensure stability is maintained and to evaluate the impact, if any, of forest activities on ecosystem stability.

2.1.4.2.4. Disturbance Regimes and Successional Patterns

There are four main driving forces that cause disturbance in the boreal forest. Harvesting accounts for the majority of disturbance in the zone and occurs on a regular and consistent basis. Fire and insect damage are the other two major disturbances and occur on a more irregular or cyclic basis. With the exception of a major atypical windstorm, wind throw usually occurs after some other agent like insects and/or disease weakens a stand. For this reason successional patterns after insect

damage and wind throw will be discussed together. The following is a brief synopsis of the typical successional patterns that occur in the zone after each major disturbance type.

2.1.4.2.4.1. *Harvesting*

Regeneration patterns in the black spruce type after harvesting is mainly back to the black spruce type especially on the poorer sites. The component of balsam fir regeneration increases as the sites get better. There is substantial regeneration failure in this forest type with average not sufficiently restocked (NSR) rates of approximately 20 percent. The NSR rate is fairly constant across all site types. These sites would be candidates for planting with white or black spruce.

In the balsam fir types, regeneration success back to balsam fir is much higher averaging 85 percent. Regeneration rates to balsam fir are higher on the poor sites and fall off somewhat on the good sites where a small hardwood component exists. Regeneration failure is low across all ecoregion types at 5 percent.

Regeneration pattern in the mixed wood types is generally to balsam fir or back to mixed wood that is dominated by balsam fir. There is also a component of white spruce regeneration after harvest on these mixed wood types. There is a higher component of white birch regeneration after harvesting in types that had a higher percentage of hardwood before harvest. As well, the better the site class the more hardwood regeneration. Regeneration failure on the mixed wood types is variable across site types and ecoregions depending on local conditions but averages 20 percent.

Regeneration after harvest on the hardwood types is variable. Sites regenerate back to hardwood or to balsam fir in varying proportions. Mixed wood regeneration is also common. Usually the better the site the more likely the site will regenerate to hardwood. Since the timber supply for hardwood is so sensitive to regeneration of hardwood types, this component merits further survey.

2.1.4.2.4.2. Fire

On the black spruce types regeneration is usually back to black spruce with a minor component of white birch. More white birch regenerates after fire on the better sites. Regeneration failure on the

black spruce types is common after fire averaging 45 percent. Generally the rate of regeneration failure increases as the sites get poorer. On the balsam fir types regeneration is usually back to mixed wood dominated by balsam fir with a minor component of pure black spruce. More white birch regenerates after fire on the better sites. Regeneration failure on the balsam fir types is common after fire averaging 35 percent. Generally the rate of regeneration failure increases as the sites get poorer. On the mixed wood types regeneration is variable. The softwood hardwood sites regenerate the birch and mixed wood while the hardwood softwood sites tend to have a higher component of black spruce. The component of hardwood in the regeneration increases as the sites get better. Regeneration failure on the mixed wood forest types averages 20 percent and decreases as the component of hardwood in the original stand increases. Regeneration on the hardwood types is generally to hardwood and can be dominated by aspen if it was present in the original stand. Black spruce regeneration also occurs after fire.

2.1.4.2.4.3. *Insect*

Balsam fir is highly susceptible to insect attack from the hemlock looper, balsam woolly adelgid, balsam fir sawfly, and spruce budworm, whereas black spruce is hardly impacted by these insects. For this reason, stands with a high component of balsam fir are more susceptible to insect attack and subsequently wind throw. Mature balsam fir types usually regenerate to balsam fir or to balsam fir hardwood mixtures.

Mature balsam fir types usually regenerate to balsam fir or to balsam fir hardwood mixtures. Disturbance by insect kill in young balsam fir stands can cause succession to white spruce. In black spruce stands regeneration is usually back to black spruce and increases as the sites improve. Regeneration patterns in mixed wood types usually depend on the type of mixture. If black spruce is a component then it will persist and form part of the new stand. Otherwise balsam fir and balsam fir/hardwood mixtures regenerate after insect attack. Regeneration patterns in the hardwood types are variable. Regeneration failure occurs approximately 20 percent of the time but can be significantly higher if pure stands of immature balsam fir are killed.

2.1.4.3. Biodiversity

Biodiversity is a term used to describe the variety of life on earth. A basic definition of biodiversity includes the variety of animals, plants and microorganisms that exist on our planet, the genetic variety within these species and the variety of ecosystems they inhabit.
Mishandling even small tracts of land could lead to extinction of several species, one of which may hold the key for the prevention or cure of some disease. While the boreal forest may not have the same extent of biodiversity that some of the equatorial regions possess, Canada does have many species of plants, animals, and microorganisms in its boreal and other forest regions.

Biodiversity provides such essential services as climate control, oxygen production, and purification of freshwater supplies, carbon dioxide removal from the atmosphere, soil generation, and nutrient cycling for humans. Without the species that provide these processes, humanity would be unable to survive.

The three components of biodiversity are species diversity, genetic diversity, and ecosystem diversity.

2.1.4.3.1. Species Diversity

Species diversity describes the overall range of species in a given area or ecosystem. Species are groups of animals, plants, and microorganisms capable of producing fertile offspring. An example would be all breeds of domesticated dogs are of the same species, while dogs and cats are members of different species. Species extinction is the most dramatic and recognizable form of reduced biodiversity. The prevention of species extinction is a key factor in the conservation of biodiversity. Changes in species population levels indicate the potential for serious changes in ecosystem integrity.

2.1.4.3.2. Genetic Diversity

Genetic diversity describes the range of possible genetic characteristics found within and among different species. Hair and eye colour, weight and height, are examples of genetic diversity found

in humans. Genetic diversity within species is the foundation of all biodiversity. Assessing genetic diversity does not mean tracking every gene in the zones forest. Responsible planning should design and implement measures which maintain or enhance viable populations of forest vegetation species and which use the genetic diversity of commercially important species to a maximum benefit. The genetic diversity of commercially important species can also be managed to increase economic benefit from some portions of the landscape while allowing other portions to provide greater social and ecological values. Genetic diversity is the basis by which populations (flora and fauna) can adapt to changing environmental conditions.

2.1.4.3.3. Landscape Diversity

Ecosystem diversity describes the range of natural systems found throughout a region, a country, a continent or the planet. Wetlands and grasslands are examples of ecosystems in Canada. A complex and intricate mix of plants, animals, microorganisms and the soil, water, and air they occupy create virtually limitless ecosystems around the world.

A forest interspersed with barrens, marshes, lakes and ponds provides for diversity across the landscape. Each ecoregion in the province should have representative areas protected which displays the diversity where such exists. These areas can serve as a benchmark from which to measure and guide management decisions. These representative areas protect the integrity of the ecoregion and are vital for guiding management actions. As benchmark areas, they will illustrate the multi-species mosaic that planning actions must maintain. Representative and protected areas will be discussed in more detail in Section 4.

As stated, specific examples of on the ground actions in support of these concepts will be presented throughout the plan

A forest interspersed with barrens, marshes, lakes and ponds provide for diversity across the landscape. Each ecoregion in the province should have representative areas protected, which displays the diversity where such exists. With this in mind, CBPPL supports the development of the Natural Areas System Plan for the subregions in this planning zone. These areas can serve as a benchmark from which to measure and guide management decisions. These representative areas

protect the wilderness of the ecoregion and are vital for guiding management actions. As benchmark areas, they will illustrate the multi-species mosaic that planning actions must maintain.

Old growth forests are valued for their contributions to society in the sense of heritage, culture, aesthetics, and spirituality. Old-growth forests are best understood within the general context of forest disturbance. Disturbance is ubiquitous in forest ecosystems and may be defined as any relatively discrete event in time that disrupts ecosystems, community or population structure and changes resources, substrate availability, or the physical environment. Disturbances occur over a wide range of spatial and temporal scales and normally interact one with the other to produce the complexity of forest types found across our landscapes. Theoretically, boreal forests not disturbed by fire, insect or wind disturbance for long periods of time will revert to multi-cohort, self-perpetuating, gap-driven forests. When viewed from the perspective of forest-level disturbance, it may be stated that old-growth forests are common in areas not prone to recurrent or periodic stand replacing disturbance from fire, insects or wind. In situations where stand initiating events are rare, then old growth will tend to dominate. The disturbance forces, which would naturally recycle mature forests, are absent and therefore forests will tend to grow to the old-growth stage. Old-growth forests are thus composed entirely of trees, which have developed in the absence of stand replacing disturbance. Old-growth fir-spruce forests will self-perpetuate through small-scale gap dynamics in the absence of large-scale disturbance. Old-growth conditions in the Canadian boreal forest are rare or uncommon. This is understandable given the ubiquity of landscape-level fires and recurrent insect outbreaks.

As well, logging is becoming an increasingly significant disturbance factor in the boreal forests. Wildfire is paramount in controlling the dynamics of the drier, continental boreal forests of western Canada and Alaska. In Newfoundland, fire tends to be important in the forests of central region, characterized by its continental-like climate. The occurrence of old-growth forests on the Island of Newfoundland is unknown. Except for the old-growth research conducted in the upper Main River watershed, empirical definitions of old growth according to forest types and edaphic conditions are not available. Furthermore, the frequency of natural forest disturbances and their role in shaping landscape level forest composition and structure of the Island’s forests are little understood. However, given our general knowledge of the historic occurrence of fire, insect and

wind disturbance in Newfoundland's forests, as well as recognition of a century of logging activity across the Island, it is reasonable to assume that primary old-growth forests on the Island are not common. DNR does acknowledge that the older cohorts in the age class structure of a district are important from many ecosystem perspectives. Accordingly, during the 2016 wood supply modeling, the maintenance of 15 % of the overmature cohort (i.e. 81+ years) on the landscape over the forecast horizon was a requirement on a district basis. This will be discussed further in other sections.

2.1.5. Forest Characterization

A forecast description of the future forest structure and composition anticipated from the implementation of the proposed forest activities under the plan.

2.1.5.1. Land Classification

There are six broad categories that currently represent how the land within a forest management district is classified 1) Regulatory alienations, 2) Non-harvestable inventory types, 3) Water features, 4) Operational alienations, 5) Non-Timber Values and 6) Productive forest. The sixth category represents the harvestable landbase and is further subdivided into Core, & Operational. Regulatory alienations are areas which have a legal restriction which prevents harvesting. Non-harvestable inventory types are areas such as bog or scrub forest. Water features are simply bodies of water (lakes, ponds, rivers..etc) Operational alienations are areas which cannot be harvested due to a physical impediment (i.e extreme steep slopes). Non-Timber Values represent areas in which harvesting is not permitted due to a use other than harvesting such as agriculture or aesthetics. In this case productive forest is any forested area that is not restricted from harvest and is capable of producing at least 60 m^3/ha of merchantable timber. The ratios across ownerships in each district are skewed toward CBPPL because it has a greater percentage of productive area. This is because crown land holdings in both districts is concentrated near the coast or near interior barrens where site productivity in not as good.

The total landbase for Zone 6 (Table 1-2, Figure 1-1, Map 1-3) is approximately 2.06 million hectares and is subdivided into the 6 categories as follows:

1) Regulatory alienations 423,079 ha
2) Non-harvestable inventory types 655,191 ha
3) Water features 157,421 ha

4) Operational alienations 475,097 ha
5) Non-Timber Values 3,066 ha
6) Productive forest
    - Core 286,285 ha
    - Operational 60,807 ha

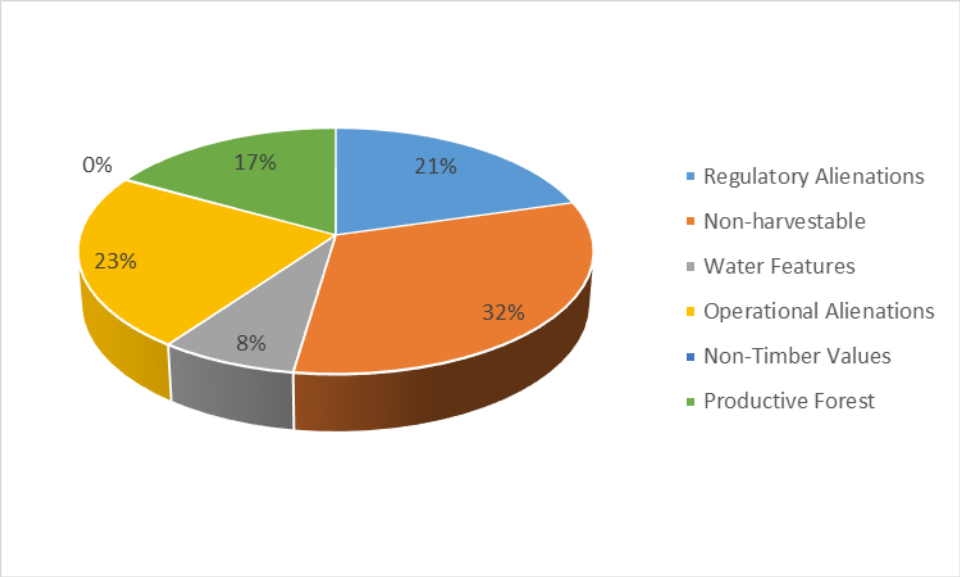


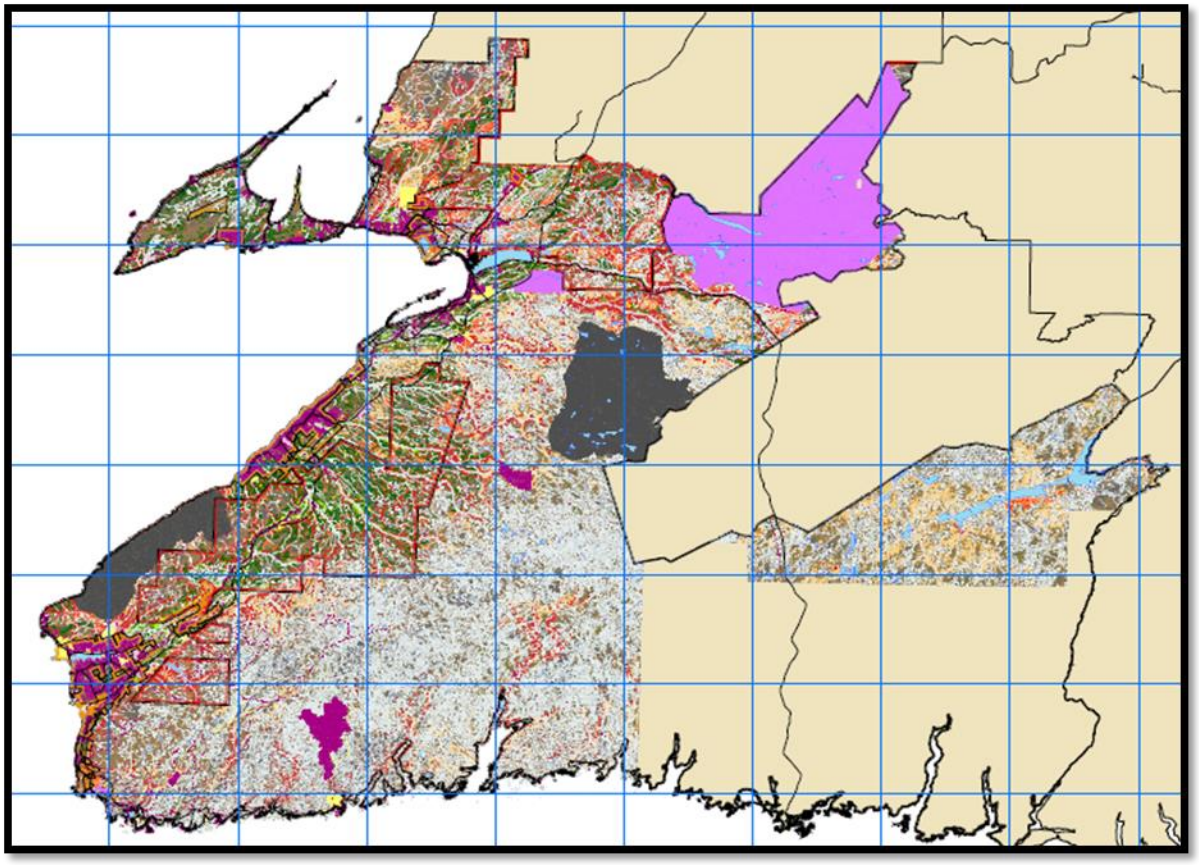
Figure 1- 1 Landbase Classification

Up until now the landbase descriptions, ecosystem description, discussion on biodiversity and general forest characterization have been at the Zone level. From this point forward information presented will specifically to CBPPLs tenure in FMDs 14 and 15.

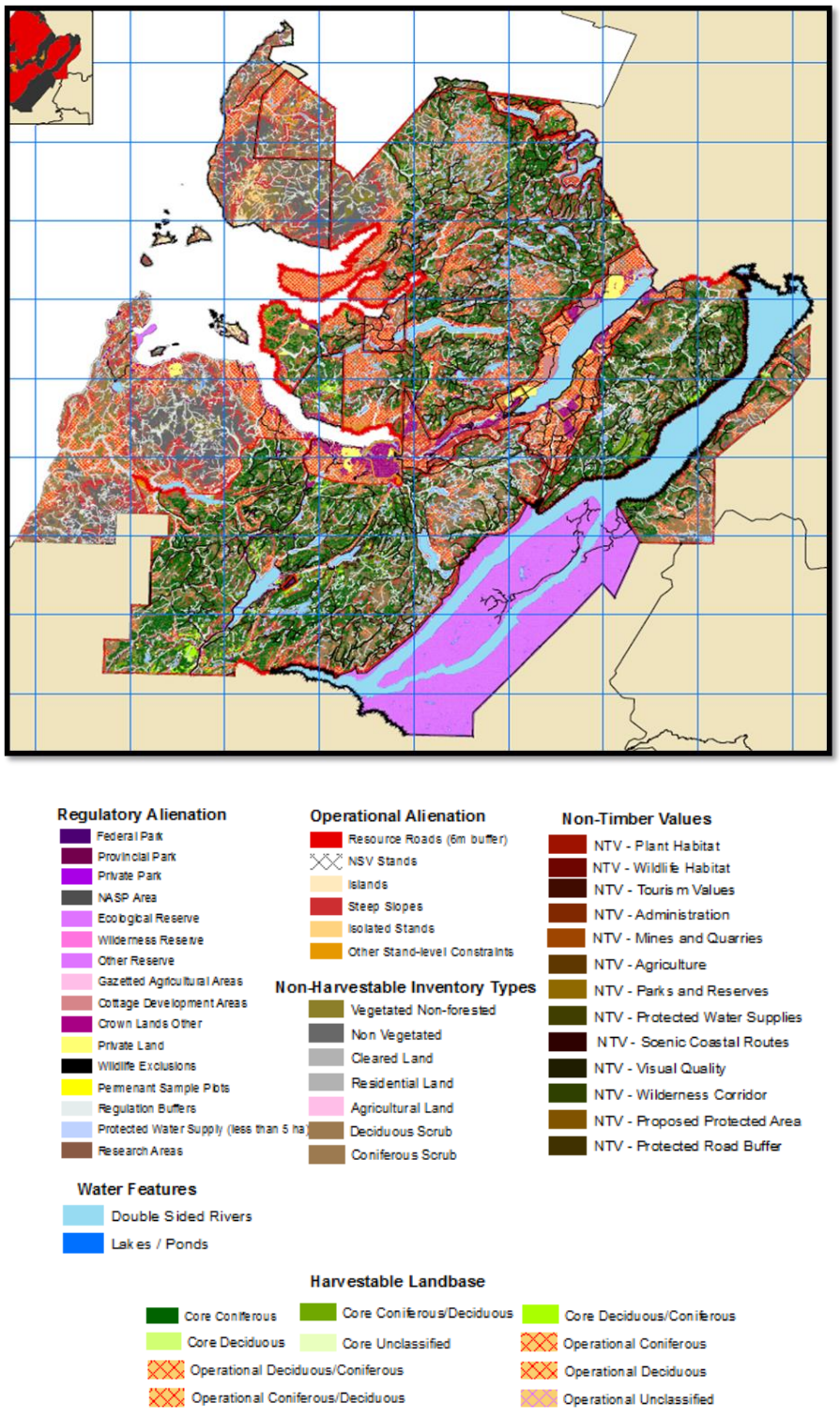
In general, District 14 has 37 percent of its total land area in the productive forest category while District 15 has 56 percent. This is mainly due to the high proportion of area in the bog, barren, and scrub category in the coastal and interior areas in District 14. The higher the percentage of productive forest generally means that the forest is more contiguous and not as fragmented by bog, scrub and water. This has implications for harvesting and road building costs which are generally higher when the forest is more fragmented. Another point is that the Forest Service is now classifying scrub by site, height and density class as new inventories are completed. This information will be invaluable in determining which scrub areas are marginally productive or can meet some other non-timber objective.

Table 1- 2 Zone 6 Landbase Classification Table

Date:	7/29/2015	Zone 6					
	Landbase Classification	Forested Area (ha)	Non Forested (ha)	Forested Area (ha)	Non Forested (ha)	Total Area (ha)	% Of Total
1	**Regulatory Alienations**	Crown		Kruger			
1.a	***Parks***	0.0	0.0	0.0	0	0	
1.a.1	Federal	0.0	0.0	0.0	0.0	0.0	0.0%
1.a.2	Provincial	2,025.0	1,589.7	1,361.0	319.8	5,295.6	0.3%
1.a.3	Private	0.0	0.0	0.0	0.0	0.0	0.0%
1.a.4	Natural Areas System Plan	27,917.1	28,318.6	937.3	558.6	57,731.6	2.8%
1.b	***Reserves***	0.0	0.0	0.0	0.0	0.0	
1.b.1	Ecological	0.0	0.0	0.0	0.0	0.0	0.0%
1.b.2	Wilderness	0.0	0.0	0.0	0.0	0.0	0.0%
1.b.3	Others	92,116.9	29,082.2	34.2	3.8	121,237.2	5.9%
	Other	0.0	0.0	0.0	0.0	0.0	
1.c.1	Agricultural Areas	469.9	586.3	19.0	34.5	1,109.6	0.1%
1.d.1	Cottage Development Areas	957.7	14.4	15.1	7.7	994.9	0.0%
1.d.2	Crown Lands Other	26,152.3	16,866.2	1,941.0	1,026.0	45,985.5	2.2%
1.d.3	Private Land	5,261.4	1,834.1	624.8	104.4	7,824.7	0.4%
1.e.1	Wildlife Exclusions	0.2	4.6	0.0	0.0	4.8	0.0%
1.f.1	Permanent Sample Plots (PSP's)	87.1	7.8	291.7	23.9	410.5	0.0%
1.f.2	Regulation Buffers Water (30m)	49,002.2	92,265.4	32,468.1	8,704.3	182,440.0	8.9%
1.g.1	Protected Water Supply Areas	15.4	28.8	0.0	0.0	44.1	0.0%
1.h.1	Research Areas	0.0	0.0	0.0	0.0	0.0	0.0%
	Section Sub-total	*204,005.2*	*170,598.0*	*37,692.3*	*10,783.0*	*423,078.5*	*20.5%*
	Non-Harvestable						
2	**Inventory Types**						
2.a.1	Coniferous Scrub	141,933.7	0.0	76,921.8	0.0	218,855.5	10.6%
2.b.1	Deciduous Scrub	5,731.7	0.0	3,582.3	0.0	9,314.0	0.5%
2.c.1	Vegetated Non-forested	0.0	121,964.5	0.0	37,355.5	159,320.0	7.7%
2.d.1	Non Vegetated	0.0	229,491.1	0.0	31,787.2	261,278.3	12.7%
2.e.1	Cleared Land	0.0	1,619.2	0.0	524.7	2,143.9	0.1%
2.f.1	Residential Land	0.0	2,739.9	0.0	286.9	3,026.8	0.1%
2.g.1	Agricultural Land	0.0	1,230.1	0.0	22.4	1,252.5	0.1%
	Section Sub-total	*147,665.4*	*357,044.9*	*80,504.1*	*69,976.7*	*655,191.0*	*31.8%*
3	**Water Features**						
3.a	***Water Bodies***						
3.a.1	Lakes/Ponds	0.0	123,373.5	0.0	23,447.8	146,821.3	7.1%
3.a.2	Double Sided Rivers	0.0	8,681.0	0.0	1,919.0	10,600.1	0.5%
	Section Sub-total		*132,054.5*		*25,366.8*	*157,421.4*	*7.6%*
4	**Operational Alienations**						
4.a	***Roads***						
4.a.1	Right Of Way (Roads)	0.0	1,099.1	0.0	1,079.1	2,178.2	0.1%
4.a.2	Resource Roads (6m buffer)	492.5	68.5	1,635.0	47.1	2,243.1	0.1%
4.b	***Stand Level***	0.0	0.0	0.0	0.0	0.0	
4.b.1	NSV Stands	5,272.8	0.0	5,270.1	0.0	10,542.9	0.5%
4.b.2	Islands	539.3	0.0	7.9	0.0	547.2	0.0%
4.b.3	Steep Slopes	33,479.8	15,867.5	31,731.5	3,227.9	84,306.6	4.1%
4.b.4	Isolated Stands	39,287.2	0.0	42.3	0.0	39,329.5	1.9%
4.b.5	Other Stand-level Constraints	1,821.6	0.0	2,212.5	0.1	4,034.1	0.2%
4.b.6	Area Not Interpreted	0.0	331,915.0	0.0	0.0	331,915.0	
	Section Sub-total	*80,893.2*	*348,950.0*	*40,899.3*	*4,354.2*	*475,096.6*	*23.1%*
5	**Non-Timber Values**						
5.a.1	Plant Habitat	273.7	6.9	0.0	0.0	280.5	0.0%
5.b.1	Wildlife Habitat	54.2	50.0	6.7	37.3	148.2	0.0%
5.c.1	Tourism Values	21.3	0.0	0.0	0.0	21.3	0.0%
5.d.1	Administration	694.6	0.0	0.0	0.0	694.6	0.0%
5.e.1	Mines and Quaries	1.4	0.0	0.0	0.0	1.4	0.0%
5.f.1	Agriculture	0.0	0.0	0.0	0.0	0.0	0.0%
5.g.1	Parks and Reserves	20.8	0.0	0.0	0.0	20.8	0.0%
5.h.1	Protected Water Supplies	327.9	0.0	30.4	0.0	358.3	0.0%
5.i.1	Scenic Coastal Routes	0.0	0.0	0.0	0.0	0.0	0.0%
5.j.1	Visual Quality	235.9	0.0	1,304.9	0.0	1,540.8	0.1%
5.k.1	Wilderness Coridor	0.0	0.0	0.0	0.0	0.0	0.0%
5.l.1	Proposed Protected Area	0.0	0.0	0.0	0.0	0.0	0.0%
5.m.1	Protected Road Buffer	0.0	0.0	0.0	0.0	0.0	0.0%
	Section Sub-total	*1,629.7*	*56.9*	*1,342.0*	*37.3*	*3,065.9*	*0.1%*
6	**Harvestable Landbase**						
6.a.1	Core Coniferous	57,888.6	0.0	194,674.2	0.0	252,562.8	12.3%
6.a.2	Core Coniferous/Deciduous	6,030.5	0.0	16,135.6	0.0	22,166.1	1.1%
6.a.3	Core Deciduous/Coniferous	2,156.3	0.0	5,182.5	0.0	7,338.8	0.4%
6.a.4	Core Deciduous	412.0	0.0	1,706.2	0.0	2,118.3	0.1%
6.a.5	Core Unclassified	460.0	0.0	1,638.8	0.0	2,098.8	0.1%
	Section Sub-total	66,947.4		219,337.4		286,284.8	13.9%
6.b.1	Operational Coniferous	31,325.6	0.0	15,622.1	0.0	46,947.7	2.3%
6.b.2	Operational Coniferous/Deciduous	5,681.6	0.0	4,150.8	0.0	9,832.4	0.5%
6.b.3	Operational Deciduous/Coniferous	1,820.7	0.0	1,035.5	0.0	2,856.2	0.1%
6.b.4	Operational Deciduous	*695.3*	0.0	160.6	0.0	855.9	0.0%
6.b.5	Operational Unclassified	*218.4*	0.0	96.3	0.0	314.7	0.0%
	Section Sub-total	*39,741.6*		21,065.2		60,806.9	3.0%
	Section Sub-total	*106,689.0*		*240,402.6*		*347,091.6*	*16.8%*
	Grand-total	*540,882.5*	*1,008,704.3*	*400,840.3*	*110,518.0*	*2,060,945.1*	*100.0%*



Map 1- 4a Landbase Classification Map – FMD 14.



Map 1- 5b Landbase Classification Map – FMD 15.

2.1.5.2. Forest Profile

2.1.5.2.1. Species Composition

Working group describes the dominant tree species present in a forest stand. This species may occupy 100 percent of crown closure of a stand or may be present in association with other species. The working group designation describes the stand in general terms based on the prevalent species whereby species composition describes specifically, the relative proportion of each individual tree species that make up a stand.

In the zone, the softwood working groups dominate accounting for over 90 percent of the productive forest. Balsam fir (bF) is by far the most prolific accounting for 72 percent of the working groups in District 14 and 15 (Figures 1-2). Balsam fir can occur in pure stands or in association with one or more of black spruce, white spruce, white birch, or larch in varying species compositions. The black spruce (bS) working group accounts for approximately 10 percent in each District. As with balsam fir, black spruce can occur as pure stands or in association with other species listed above. Softwood hardwood working groups occupy nine and 13 percent of the productive forest area in Districts 14 and 15 respectively. This working group occurs as varying mixtures of fir, spruce, and birch. The hardwood softwood (hS), and white birch (wB), white spruce (wS) working groups occupy around five percent of the productive forest in both districts. Approximately three percent of the productive forest is classed as disturbed (DI). Disturbances include harvesting, which accounts for most of the total, insect damage, fire, wind throw, and flooding. The relative percentages hold true for all ownerships in both districts with the exception of black spruce in District 14. There is a higher percentage of black spruce on crown land because there are more poor sites.

The following provides a more detailed outline for some of the larger groups, with additional descriptions of the selected accompanying forest types, as described by Meades and Moores, 1994.

A) Black Spruce - *Picea marina* (Mill.) B.S.P. Within this working group there are three main forest types that characteristically represent black spruce. These include: black spruce forest, black spruce fen, and *kalmia*-black spruce forest.

Black spruce forest includes a forest that has a thick humus layer with mainly black spruce as the dominant tree species. The sites within this forest type have a wide range of moisture from dry to wet and the fertility ranges from very poor to rich. Because there is such a wide range in both moisture and fertility, this forest type had to be broken down into six specific forest types. These include: *sphagnum*-black spruce, black sprucefeathermoss/ bedrock, black spruce-feathermoss/very dry, black sprucefeathermoss/ dry, black spruce-feathermoss/bog, and black spruce-feathermoss/moist. This forest types produce merchantable timber.

Black spruce-fen is characterized by an abundance of understory that is usually described as fertile but poorly drained. Due to this poor drainage the black spruce in this forest type are usually stunted. These forests are considered important wildlife and plant habitats because of the high fertility, and usually grow in open settings. As a result of the open grown, stunted trees, this forest type is not usually merchantable from a commercial harvesting perspective. This forest type is divided into two forest types: *carex*-black spruce and *osmunda* - black spruce.

Kalmia-black spruce represents a black spruce forest that is associated with bogs. The trees are open grown with black spruce as the dominant tree, which is usually stunted with abundant shrubs and mosses growing throughout its understory. These sites are normally infertile but range from dry to very moist. This forest type, because of small variations, can be broken down into four forest types: *nemopanthus-kalmia* black spruce, *sphagnum-kalmia*-black spruce, *kalmia*-black spruce, and *cladonia-kalmia*-black spruce.

These forest types are usually considered unmerchantable and are common throughout the districts. All three of these forest types are the result of regeneration on areas burned a number of times over the years. The natural succession following fire in Newfoundland’s Boreal Forest is towards black spruce with limited amounts of certain pioneer species such as white birch and trembling aspen. Sites occupied by black spruce are usually away from river valleys and any flood plains in these valleys. Most black spruce occupy hillsides, ridges, and open barrens. Areas that are generally made up of rock outcrops contain black spruce as well.

B) Balsam Fir - *Abies balsamea (*L.) Mill. Another major forest type is the balsam fir forest. In some districts of the province this type is the dominant species. This species occupies sites that are usually fertile and moist but because these districts have a recurring history of fire, balsam fir cannot become established as they do not naturally occupy burned areas. Due to the complexities of the balsam fir forest type, it can be divided into several types. These are: *equisetum-rubus*balsam fir, *rubus*-balsam fir, *clintonia*-balsam fir, *taxus*-balsam fir, *dryopterishylocomium*-balsam fir, *dryopteris*-balsam fir, *dryopteris-rhytidiadelphus*balsam fir, *dryopterislycopodium*-balsam fir, *hylocomium*-balsam fir, *gaultheria*-balsam fir, *pleurozium*-balsam fir, *carex*-balsam fir, and *sphagnum*-balsam fir. They normally occupy river valleys and flood plains as pure stands or mixed with hardwoods, along with side slopes to these valleys.
All balsam fir forest types have balsam fir as the main tree species, with white birch usually abundant throughout. The *rubus*-balsam fir forest type is found in low to mid-sloped areas that are moist. This forest type has an abundant herb layer but is limited to certain types which differentiate it from the *equisetum-rubus*-balsam fir forest type, which has a more diverse herb layer. The *dryopterislycopodium*- balsam fir forest type has narrow moisture regime from moist to somewhat moist that is nutrient rich. This forest type has ground cover that is dominated by ferns and certain moss types and plants that are specific to this type. The *hylocomium* balsam fir forest type is also moist to somewhat moist but is dominated by a layer of moss instead of the ferns. The *pleurozium*-balsam fir forest type has balsam fir and black spruce as the main tree species with few white birch. The moss layer is made up mainly of *pleurozium* schreberi and is found on dry to well drained areas such as dry ridges and outwash deposits. The *carex*-balsam fir forest type has willow found in it. The *sphagnum*-balsam fir is dominated by *sphagnum* moss on the forest floor and is poorly drained.

C) White Birch - *Betula papyifera* Marsh. This working group represents the major hardwood component for the forests of the province,. White birch is normally found on the fertile sites along streams and rivers, as well as flood plains. It can also be found on fire origin locations as it is a pioneer species that seeds into an area once the forest cover is removed by fire. Pure white birch stands are not that common in the province. There are a number of white birch forest types, all depending upon the understory growth and the associated soil type.

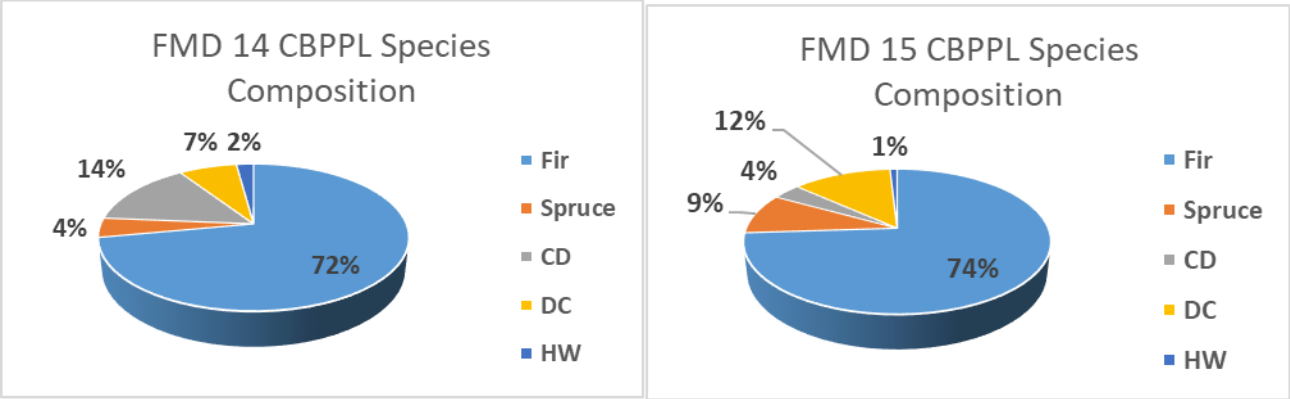


Figure 1- 2 Working group (species composition) by FMD

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2.1.5.2.2. Age Class

Individual tree ages in a stand can all be the same after disturbance such as fire or harvesting; however in most cases the ages vary. Forest managers describe stand ages in terms of age classes which generally encompass 20 years. The age classes present in the zone are:

Age (years)

0 - 20 regenerating

21 – 40 immature

41 – 60 semi-mature

61 – 80 mature

81 - 100 over mature

101 - 120 over mature

121 -140 over mature

141 – 160 over mature

161 + (actually represents uneven-aged stands)

The age class distribution for CBPPL tenure in Planning Zone 6, for the entire productive forest, is shown in Figure 1-3 for both FMDs 14 & 15. In general terms, the more balanced the age class distribution in a district, the higher the potential for an even flow sustained harvest of timber, because continuous timber supply is limited by the age class with the lowest frequency of occurrence. A balanced age distribution in the forest would also allow for the highest biodiversity by making habitat available at all stages of development, with the equivalent proportions of the

forest to moving from one stage of development to the next over time. This would result in an ongoing renewal of habitat.

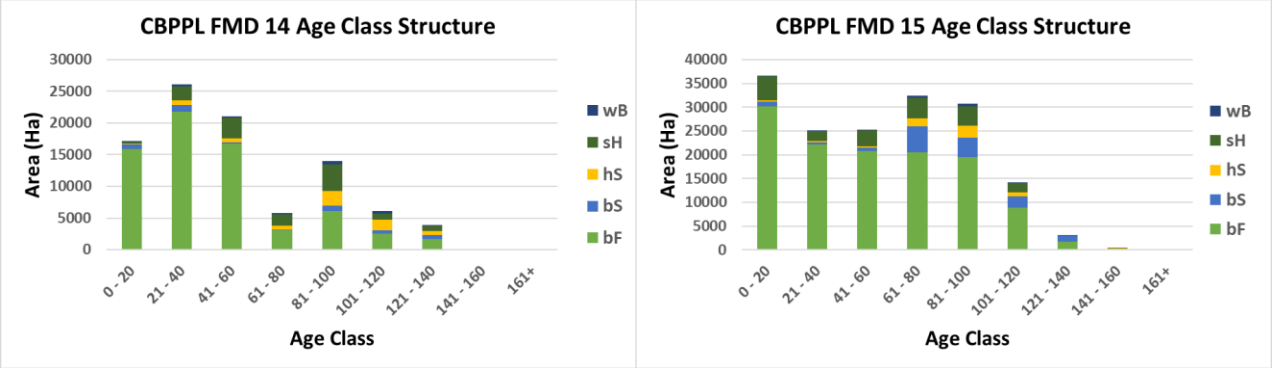


Figure 1- 3 Working group by Age Class by tenure

It can be seen that FMD 14 has an unbalanced age class structure with more productive forest falling in the younger age classes. This unbalanced age class structure limits the maxim sustainable harvest levels as the mature forest will have to be harvested before the immature stands can reach their peak yields. This is particularly evident in looking at the Core landbase which is the largest portion of the productive forest comprising the FMD 14 AAC for CBPPL (Figure 1-4). In both cases FMD 15 is balanced which allows for maximization of the potential AACs in that FMD.

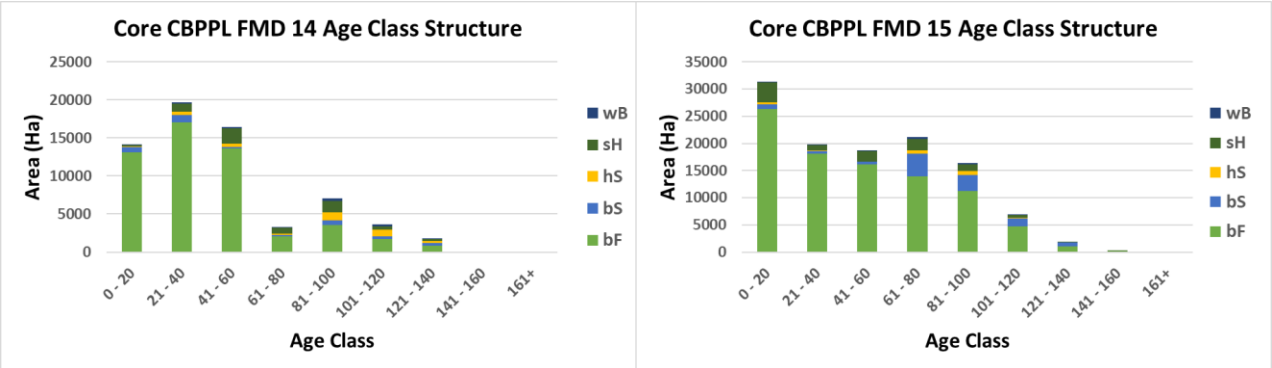


Figure 1- 4 Working group by Age Class by tenure for Core Landbase

2.1.5.2.3. Site Class

The Forest Services Branch has identified four site classes that refer to the potential of a given site to produce timber. These are high, good, medium and poor. The classes are based on a number of factors, some of which are soil type, moisture content, slope, and fertility. Site class is determined through air photo interpretation supplemented with field checks. The classes indicate the volume of wood fiber that a site has the capability of producing under natural conditions by the time the trees reach their rotation age (which averages, generally, between 60 and 80 years depending on the species and the location). On average, good sites are capable of producing > 2.6 m3/ha/yr,

medium sites 1.7 m3/ha/yr, and poor sites 0.8 m3/ha/yr. The following indicates the average potential in cubic meters per hectare for each site class at maturity (based on the provincial average).

Class m3 /ha

High 200+

Good 150

Medium 120

Poor 80

Since the occurrence of high site classes is so rare on the Island the Forest Service branch has combined the Good and High site types into the Good site type for the purpose of timber supply. The medium site class is by far the largest in the districts within CBPPL tenure in Planning Zone 6, holding approximately 70% of the total productive area found across FMDs 5 & 6. Figure 1-5 presents the site class information in graphic form to show the levels of site class in each district for CBPPL tenure.

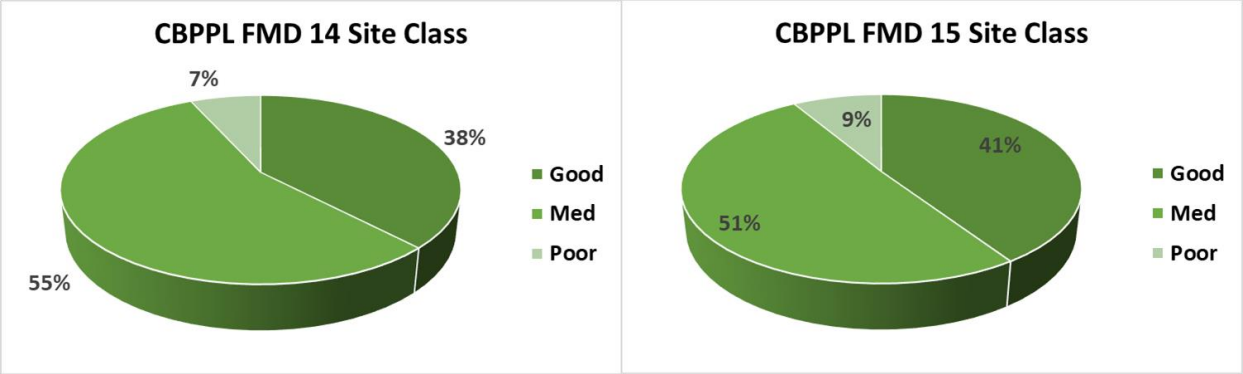


Figure 1- 5 Site class distribution by tenure and AAC class.

2.2. Past Planning Activities

2.2.1. Harvesting

2.2.1.1. Commercial Activity

Table 1- 3 Commercial harvest summary table CBPPL FMD 14 2014-2018

Timeframe		Year	Core					Operational - Available				
				Harvested		Remaining			Harvested		Remaining	
			AAC	*m3*	*%*	*m3*	*%*	AAC	*m3*	*%*	*m3*	*%*
Annual	***Softwood***	1	97,700	3,750	4%	93,950	***96.2%***	17,300	-	0%	17,300	100.0%
		2	97,700	51,526	53%	46,174	***47.3%***	17,300	-	0%	17,300	100.0%
		3	114,226	142,167	124%	(27,941)	***-24.5%***	8,036	163	2%	7,873	98.0%
		4	114,226	92,400	81%	21,826	***19.1%***	8,036	-	0%	8,036	100.0%
		5	114,226	98,450	86%	15,776	***13.8%***	8,036	-	0%	8,036	100.0%
5 Year			538,078	388,293	72%	149,785	***27.8%***	58,708	163	0%	58,545	99.7%
Timeframe		Year	Core					Operational - Available				
				Harvested		Remaining			Harvested		Remaining	
			AAC	*m3*	*%*	*m3*	*%*	AAC	*m3*	*%*	*m3*	*%*
Annual	***Hardwood***	1	1,400	-	0%	1,400	***100.0%***	800	-	0%	800	100.0%
		2	800	-	0%	800	***100.0%***	800	-	0%	800	100.0%
		3	1,722	15,589	905%	(13,867)	***-805.3%***	-	18	#DIV/0!	(18)	#DIV/0!
		4	1,722	-	0%	1,722	***100.0%***	-	-	#DIV/0!	-	#DIV/0!
		5	1,722	-	0%	1,722	***100.0%***	-	-	#DIV/0!	-	#DIV/0!
5 Year			7,366	15,589	212%	(8,223)	-111.6%	1,600	18	1%	1,582	98.9%

Table 1- 4 Commercial harvest summary table CBPPL FMD 15 2014-2018

Timeframe		Year	Core					Operational - Available				
				Harvested		Remaining			Harvested		Remaining	
			AAC	*m3*	*%*	*m3*	*%*	AAC	*m3*	*%*	*m3*	*%*
Annual	***Softwood***	1	249,300	205,668	82%	43,632	***17.5%***	47,100	9,282	20%	37,818	80.3%
		2	249,300	226,114	91%	23,186	***9.3%***	47,100	-	0%	47,100	100.0%
		3	262,974	168,625	64%	94,349	***35.9%***	20,457	5,085	25%	15,372	75.1%
		4	262,974	156,500	60%	106,474	***40.5%***	20,457	-	0%	20,457	100.0%
		5	262,974	101,996	39%	160,978	***61.2%***	20,457	-	0%	20,457	100.0%
5 Year			1,287,522	858,903	67%	428,619	***33.3%***	155,571	14,367	9%	141,204	90.8%
Timeframe		Year	Core					Operational - Available				
				Harvested		Remaining			Harvested		Remaining	
			AAC	*m3*	*%*	*m3*	*%*	AAC	*m3*	*%*	*m3*	*%*
Annual	***Hardwood***	1	2,900	-	0%	2,900	***100.0%***	1,600	-	0%	1,600	100.0%
		2	2,900	376	13%	2,524	***87.0%***	1,600	-	0%	1,600	100.0%
		3	1,435	-	0%	1,435	***100.0%***	82	-	0%	82	100.0%
		4	1,435	-	0%	1,435	***100.0%***	82	-	0%	82	100.0%
		5	1,435	-	0%	1,435	***100.0%***	82	-	0%	82	100.0%
5 Year			10,105	376	4%	9,729	96.3%	3,446	-	0%	3,446	100.0%

2.2.1.2. Domestic Activity

CBPPL doesn't manage its landbase for domestic harvesting with segregated blocks. Historically CBPPL issues 100 domestic permits, in each of its Zone 6 tenures, for the harvest of non-commercial species (hardwoods & larch).

2.2.2. Silviculture

The past levels of silviculture (2014-2018) in Zone 6 were less than anticipated. Since the AACs in Zone 3 have been undercut for the previous period the levels of silviculture are accordingly lower.

Table 1- 1 Summary of completed silviculture activity (2014-2018)

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	1942	1232
Planting	1725	1739
Scarification (Site Prep) Herb	1585	1210
Commercial Thinning	0	0
Cone Collection	0	0

2.2.3. Forest Access

The amount of road proposed was much greater in the past five years (2014-2018) than was actually constructed. The roads proposed were anticipation of either harvesting the full AAC or in anticipation of having to shift operations for unforeseen circumstances (operational flexibility). However the volume harvested in both districts could be mostly obtain through existing networks therefore reducing the amount of construction required.

Table 1- 2 Summary of forest access roads built 2014 to 2018.

Roads		
District	Proposed	Constructed (km)
14	202.83	43.3
15	276.11	99.3
	478.94	142.61

2.2.4. Natural Disturbances

2.2.4.1. Fire

Planning Zone 6 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. Over the past planning period there were 32 reported forest fires but only 180 ha of productive forest was burnt.

2.2.4.2. Insects

There has been little insect activity in the Zone over the past 5 years. With the exception of the balsam wooly adelgid (aka aphid), no other insect infestations have been documented by the Forest Insect and Disease Branch of the Department of Natural Resources in Planning Zone 6. The balsam woolly adelgid continues to be a problem insect pest in FMD 14 with stand conversion the only silvicultural option.

3. Timber Supply Analysis

The current annual allowable cuts for each district are in effect from January 1, 2016 to December 31, 2020.

3.1. Methodology

The province reviews its timber supply every five years in order to account for any changes in forest land base, growth rates, and management strategies. This schedule is consistent with the Forestry Act, 1990, which established management by forest management district and mandates that a wood supply analysis be completed every five years. The result of this analysis is a new set of annual allowable cuts (AAC's) for each forest management district. These AAC's are defined as the maximum annual rate at which timber can be harvested at a sustainable level indefinitely into the future (in reality, the AAC figures are applicable for a period of 160 years into the future and not infinity). Annual allowable cuts must be calculated on a district basis, however when "rolled up" provide us with the annual allowable harvest level for the island.

Forest Modeling:

- 160 year planning horizon
- harvest strategies (Even flow, Step up Harvest, non-declining)

Baseline Constraints:

- Even flow harvest level
- Silviculture treatment levels
- 2X Operable Growing Stock
- 15% age 81 + Old Growth Minimum

Table 1- 3 Provincial AAC classes

Timber Class	AAC	Description
AAC	*Core*	Unalienated Land - First priority in terms of timber harvesting landbase. Free to harvest
	Operationally Available	Unalienated Land - Secondary timber harvesting landbase. Free to harvest but operationally restrictived (steep slopes, timing of harvest, etc)
Non-AAC	*Regulatory*	Alienated from harvest by regulations (parks, stream buffers, etc)
	Operationally Unavailable	Alienated from harvest by operational restrictions (steep slopes, isolate stands, etc)

3.1.1. Guiding Principles and Policy Direction

The key underlying principles that guide this analysis are:
(i) the AAC must be sustainable;
(ii) the level of uncertainty (risk) associated with the AAC must be minimized by using empirical information wherever possible;
(iii) there must be conformity between information and assumptions used in the analysis and actions and decisions taken on the ground;
(iv) the analysis must be consistent with other forest values and objectives; and
(v) the timber supply calculation must consider economic factors, not solely the physical supply of timber.

In concert with the policy of establishing sustainable timber harvest levels, Government policy requires that harvesting not exceed the established AAC's. Likewise, Governments policy is to optimize forest industry opportunities from the sustainable fiber supply. Government also requires consultation be conducted during the timber analysis. The forest industry was consulted directly throughout the process.

3.1.2. Factors Affecting Timber Supply

The forests of insular Newfoundland are very variable in terms of age distribution. Typically, there are significant amounts of mature/over-mature forest and regenerating forest, but limited intermediate age forests. This imbalance is not unusual in a boreal forest where cyclic catastrophic disturbances are common. Figure 4 illustrates this age class imbalance. The insufficient amount of intermediate age forest on the island is one of the most important factors influencing AAC's, therefore it is the basis for many of our forest management strategies. Essentially; we are employing a matrix of measures designed to fill the gap in our age structure, which include: an aggressive forest protection program, harvesting programs that attempt to exclusively target the oldest stands first, and thinning the regenerating forest so that it becomes operable at an earlier age. Another important aspect of the Province's forest posing a challenge to

forest managers is the natural fragmentation of the resource. The Province's landscape is characterized by many ponds, bogs, rivers, streams, and rock outcrops resulting in relatively small pockets of timber. This makes the determination of an economic timber supply very challenging given that each stand has unique economic characteristics. Arguable the most important factor affecting present and future AAC's is the available productive landbase. However, this productive landbase available for forest activity is constantly being evaluated by the demands/requirements of other stakeholder values. Therefore, it is important that we manage relationships with other users to minimize loss to the forest landbase, while taking into account these other values. As well, to mitigate losses to the productive landbase, we must continue to explore ways for growing more volume on the existing landbase.

In 2015, the Forest Service began another review of the provincial timber supply. Consistent with Department's vision, the analysis was structured to determine sustainable timber supplies while respecting a multitude of social, economic and environmental objectives. Timber supply, in this context, refers to the rate at which timber is made available for harvesting on a sustainable basis. The determination of supply (represented as AAC's) involved the use of computer models that forecast the sustainability of possible AAC levels. These models require three basic inputs. First, a description of the current state of the forest (forest characterization and availability), second, the growth rates associated with the current forest, and third, the management strategies applied to the forest. To arrive at these basic inputs require careful and detailed consideration of a broad range of both timber and non-timber values. More specifically, the following was considered in determining the sustainable timber supply.

3.1.2.1. Land Characterization

To get a current description of the forest resource (or stock), the Province has invested significant resources into creating and maintaining a Provincial Forest Inventory. Although the latest inventories used in the 2016 Wood Supply Analysis for this zone, the estimate of forest stock is kept current through an annual update program. This program accounts for all natural and man-made disturbances such as: fire, insects, harvesting, and any enhancement programs, including tree

planting and pre-commercial thinning. Also, each stand in the forest inventory is updated to reflect any yield changes that may have occurred since the previous inventory update

3.1.2.2. Land Availability

The updated Forest Inventory was reviewed and classified at the stand level on the basis of the availability of each stand for harvest. The classification system consists of two broad classes being available for the AAC calculation;

Core - available for harvest under normal conditions, and
Operational - has restrictions for harvesting due to economic constraints.

The remaining productive forest has been removed for varying social/legislative reasons. The major removals are listed below:

3.1.2.2.1. Non-Timber Related

Consideration of non-timber values has a direct impact on Provincial AAC's. It is obvious that as the amount of productive forest land available for timber management drops, so too will the AAC. With the current restrictions, the AAC landbase (area where harvesting operations can occur) is only 18 % of the total productive forest land base. On average, in any one year, less than 1% of the productive forest land base is influenced by harvesting operations.

3.1.2.2.2. No-Cut Buffer Zones

The Province has guidelines that require all water bodies (visible on a 1:50,000 map sheet) be given a minimum 20 meter uncut buffer (from water's edge). In addition to these legislated water buffers, District Ecosystem Managers, in consultation with various stakeholders, have increased buffer zone widths beyond the 20 meter minimum to protect special values such as: salmon spawning areas, cottage development areas, aesthetic areas, wildlife habitat, outfitting camps, etc.

3.1.2.2.3. Pine Marten and Caribou Habitat

Habitat specialists are working in consultation with industry to study both species and ensure adequate habitat will be available for pine marten and caribou into the future. This work is examining the quantity and quality of habitat, as well as, the connectivity of habitat. With respect to Caribou, the Forest Services Branch, Corner Brook Pulp and Paper and the Wildlife Division are

working together to develop an adaptive management strategy. This initiative started during the development of Zone 5 planning process in 2011 and will be further explained in Section 4.2.1.1.2

3.1.2.2.4. Wildlife Corridors

As part of the evaluation process for harvesting plans, wildlife specialists sometimes recommend managed corridors to ensure various species of wildlife have sufficient cover to move around the landscape. These corridors are temporal in nature and generally have little impact on timber supply.

3.1.2.2.5. Protected Areas

All established and proposed protected areas are removed from the AAC calculations.

3.1.2.2.6. Watersheds

For each of the forest management districts in Planning Zone 6, all of the public protected water supply areas (eg Corner Brook Water Supply) and some of the larger watersheds were digitized and captured within the forest inventory. These watersheds were added to the database in order to address any concerns about forest management within these watersheds and to permit the Forest Service to report on proposed activities within these watersheds over time.

3.1.2.2.7. Operational Constraints

Areas that are inaccessible (surrounded by bogs or hills), timber on steep slopes, and low volume stands are removed from the AAC calculation up front. Also, significant adjustments are applied to the Provincial Forest Inventory for stands deemed operable in the timber analysis but left unharvested within operating areas. The reasons for this are linked to the character of Newfoundland's forests; low volume, steep slopes, rough terrain, and excessively wet ground conditions etc. Again, all these timber and non-timber related issues are applied directly in the AAC calculation to ensure harvest levels do not exceed the sustainable level. With the introduction of new values and the broader application of current values, the pressure on future AAC's will continue to increase.

3.1.2.2.8. Growth Forecasting

A key requirement for forecasting future wood supply is an understanding of how forest stands grow and develop through time. That is, as a forest stand develops, how much merchantable (i.e. harvestable) volume does it carry at any given point? These yield forecasts (referred to as yield curves) are required for each type of forest stand (called a stratum) comprising the forest under consideration. In Newfoundland, there are dozens of distinct forest strata for which separate yield curves are required. These are defined by the tree species in question (e.g., balsam fir, black spruce), the site quality (e.g., good, medium, poor), the geographic region (e.g., Western Newfoundland) and other factors likely to affect yield. Yield curves are a key element in a wood supply analysis. In fact, the validity, or "usefulness" of the wood supply analysis is determined by the truth or "correctness" of the yield forecasts. While there is no way of predicting with certainty how stands will actually grow in the future, care must be taken to ensure that the yield projections used are realistic and reasonable. Respecting the sensitivity and importance of these forecasts, the Forest Services Branch has directed a large portion of its resources and time into developing realistic yield curves. Two growth models were used, one for projecting stand development under natural conditions and the other for projecting growth under managed (i.e., silviculturally enhanced) conditions. Tree and stand development data generated from the Forest Service's Forest Inventory Program were used to make stand growth predictions. These projections were then checked against empirical data from thousands of temporary plots established throughout the Island. If the projections varied from the real life evidence, the curves were adjusted to make them more accurate. In this analysis, yield curves were developed on an ecoregion basis to more accurately portray the varied stand growth within and among the districts.

3.1.2.2.9. Management Strategies

With the current state of the forest described and the yield forecasts developed, the next step was to design a management strategy for each sector of the forest. The key objective was to maximize long term AAC while at the same time taking into account other forest values. This involved developing strategies that minimized fiber losses and enhance forest sustainability.

3.1.2.2.10. Harvest Flow Constraints

An even-flow harvest constraint was used in the analysis to maximize the sustainable harvest level. This strategy produced the maximum even flow harvest but resulted in less than optimum economic use of the forest resource. If no even flow constraint is used and harvest levels are permitted to fluctuate in response to market value, the overall economic potential of the forest will increase. However, the lower economic potential is offset by stability in manufacturing plants and employment.

3.1.2.2.11. Planning Horizons

Given the Province's commitment to long term sustainability of our forest resource, timber supplies were projected 160 years (equivalent to two forest rotations) into the future to ensure actions and strategies applied today will result in a sustainable forest in the future. Long term planning is fundamental in timber supply forecasting and ecosystem management as well.

3.1.2.2.12. Operable Growing Stock Buffer

The Province imposed an operable growing stock constraint in the analysis to ensure the sustainability of calculated timber supplies. The constraint imposes a condition that in any period there must be a minimum operable growing stock of two times the harvest level on the landscape. In other words, for every hectare that is harvested another harvestable hectare must exist on the landscape. The requirement for a growing stock buffer is based on a number of factors. First, several of our non-timber objectives are not explicitly accounted for in our planning process and therefore will require a growing stock buffer to achieve them. Second, we are unable to follow optimum harvest schedules explicitly due to operational restrictions on harvesting. Third, the Province is not willing to assume high risk with the sustainability of the timber supply. For these reasons a growing stock constraint of two times was used. This constraint was used in concert with harvest scheduling to help map out a reasonable harvest for the next 20 years.

3.1.2.2.13. Old Forest Targets

Consistent with our ecosystem policy, the province introduced into the analysis an old forest target that at least 15 percent of forests be older than 80 years. While this is a minimum target, actual

results are usually higher. This initiative was designed to provide a coarse filter approach to maintaining representative forest structure. It ensures the presence of certain amounts of old forest across the landscape into the future. With advances in modeling, this target can now be tracked across a district rather than a single ownership. This has resulted in this strategy being less restrictive than the last analysis. As well, the site class distribution of the older forest reserve is being examined in an attempt to make it representative of each ecoregion and subregion.

3.1.2.2.14. Operability Limits

Operability limits are the time windows in which forest management actions such as harvesting can be undertaken within forest stands. Stand growth development as measured in stand merchantable timber volume and individual piece size of trees determine a stands readiness for harvest. In some young stands, one can have acceptable harvest volumes, but still have trees that are too small to harvest. In the wood supply analysis both stand volume and tree size were used to determine the earliest age when a stand could be initially harvested. In addition to determining the absolute earliest age a stand can be harvested, it was recognized that not all stands on the same site develop exactly the at the same rate. The ending operability limits or the last age in which a stand can be harvested before it becomes too old to harvest is solely determined on a minimum stand volume of between 60 to 80 m3/ha, after which that stand does not have enough volume to make it economical to harvest. It should be noted that while the operability limits define the extreme end points of when stands can be harvested, very few stands are ever harvested at these extreme points. In order to meet other non-timber objectives and in order to maximize the total volume of wood harvested the model schedules stands to harvest somewhere inside the operability limit window.

3.1.2.2.15. Silviculture

Silviculture is one of the main forest management tools available to forest managers when they are analyzing the many different future forests that are generated using the wood supply modelling software. The silvicultural actions use in the 2016 analysis include; 1) precommercial thinning of

balsam fir, black spruce, and softwood hardwood stands, and 2) full plant of any areas that do not regenerate naturally with either white spruce, black spruce, or Norway spruce.

3.1.3. *Forest Profile Dynamics*

Two of the most readily available parameters used to measure harvest sustainability and impacts associated with future forests, are 1) age class distribution (Figure 1-6) and 2) species composition (Figure 1-7) . Cumulatively, these two parameters define forest structure.

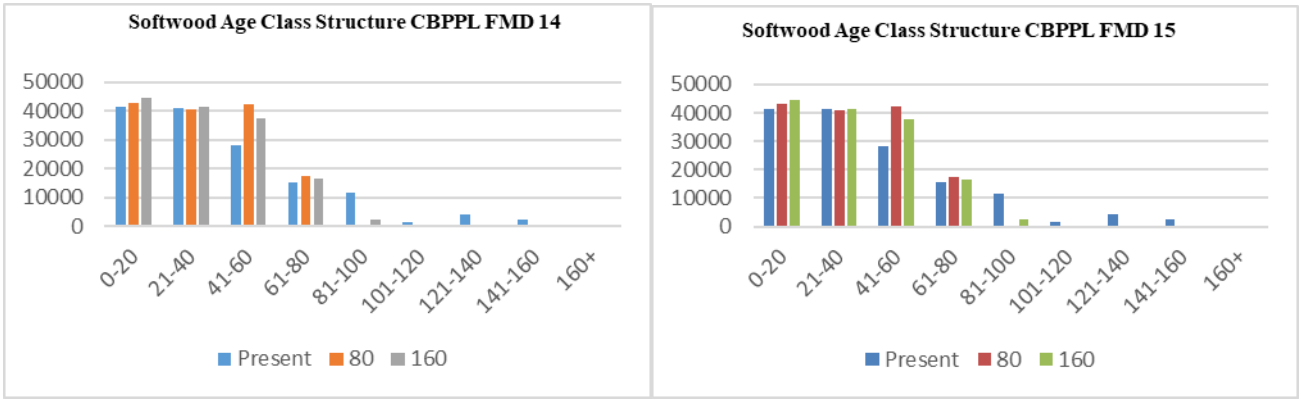


Figure 1- 6 Core Softwood Age Class Structure for Planning Horizon

The general trends for the age class structure at the end of each 80 year rotation ends to mimic the initial age class structure of present day, with minor variations. This isn't surprising as the management strategy of oldest first harvesting and even flow harvesting will facilitate this. To balance the ageclass structure it would be necessary to do varying amounts of silviculture coupled with an uneven harvest flow of wood. The species composition in the Zone shifts slightly towards Spruce dominated stands. This is due the spruce planting planned for in the modeling constraints. These are forecasts in the model and if through survey work it doesn't hold true then planting and/or crop selection thinning will need to be performed on these stands to ensure spruce regeneration.

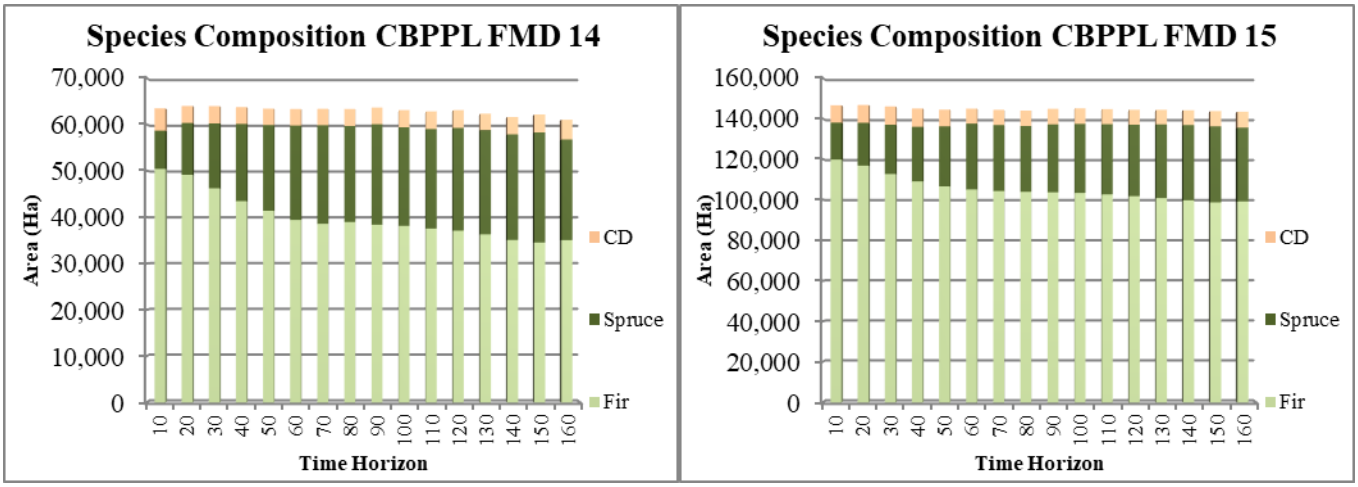


Figure 1- 7 Core Species Composition for Planning Horizon

3.1.4. AAC Adjustments

3.1.4.1. GMV Volume Adjustments

Reductions are applied to the Net AAC, Gross Merchantable Volume (GMV) which account for net losses due to natural disturbances, operational factors or timber utilization.

3.1.4.1.1. Natural Disturbances

Projected future losses related to Fire, Insect and Disease are calculated by FEIS section and are based on historical five year running average.

3.1.4.1.2. Operational Losses (Predicted versus Actual Volumes)

Operational losses associated with stand level utilization and volume predictions are calculated based on data derived from commercial harvesting blocks (roughly 10% sample) occurring throughout the District over the previous five year period. Timber supply volume predictions are compared on a block by block basis against actual reported harvest volumes and a percentage difference, generally a reduction, is applied to the AAC to account for current and future operational losses. The Zone 6 operational loss is 18% for the 2016-2020 period.

3.1.4.2. Spatial Blocking Adjustments

Spatial blocking adjustments refer to the operational loss associated with the spatial scheduling. More specifically, the 20 year harvest schedule integration and the volume differences between the aspatial AAC and the spatially scheduled AAC. A major improvement that occurred in both the previous and the 2010 wood supply analysis is manual harvest scheduling. In 2001, the harvest scheduling was an automated process where the software picked the stands to be harvested over the 25 years based on user supplied criteria. The 2001 approach was an improvement over previously wood supply processes because there was no harvest scheduling completed. Basically, the software used cannot realistically know all the operational restrictions within a forest management district. By utilizing the spatial manual process, on the ground conditions that restrict harvesting are accounted for when a spatial harvest schedule is defined. The approach for 2016 was to use a 20 year harvest schedule using a 10 year harvest period. This was for two reasons; First to reduce modelling complexity at the aspatial level and secondly to align the amount of scheduled wood with the 2 times AAC allowed in a 5 year plan.

The proposed harvest schedule is then played back through the modeling software to evaluate its sustainability and determine if non-timber objectives are achieved. In most cases, the harvest scheduling exercise has to go through several iterations before an acceptable harvest schedule could be realized. The spatial arrangement of areas for timber harvesting is especially challenging in this province because of the natural fragmentation of our forests. This model provided forest planners with the ability to mimic realistic timber harvest schedules based on current practices and identify forest stands that are considered not as accessible for harvesting.

Manual harvest scheduling has several benefits. First, it fosters the long term sustainability of our AAC’s by mimicking current harvest practices and accounting for actual on the ground conditions which delay or restrict harvesting of stands. Secondly, the mapped 20 year harvest schedules build credibility into the forest management process. Every stand that will be harvested over the next 20 years must already be in the second (20-40 years old) or third (41-60) age class, can be easily identified and highlighted on the harvest schedule maps. Being able to see the wood that will be harvested in the future will help reassure people the resource is being used in a responsible manner. Next, harvest scheduling will help integrate the management of other forest resource values into timber management planning. All forest values can be typed directly to discreet forest

areas, providing the link allowing the many different forest values to be managed simultaneously. The forested areas needed for each resource can be mapped and potential conflicts can be addressed.

Finally, the harvest schedule maps developed for the wood supply analysis can be a starting point for the 5 year management planning process, especially the first period. The harvest schedule maps, if done correctly, can help reduce the work of the 5 year planning process. One point to note is that harvest scheduling is completed only for the Core landbase. The Operational AAC, for the most part, is opportunistic at best and is harvested only if extra effort is applied. It is not scheduled because of the uncertainty of obtaining extra funding for access and harvesting. The Zone 6 blocking adjustment is approximately 4% for the 2016-2020 period.

3.2. *AAC Results & Outputs*

The AACs for CBPPL tenure for Softwood in Zone 6 as a whole have gone down by just under five percent. The Core softwood however has only been reduced by less than one percent. If the numbers are examined on a FMD basis CBPPL has actually made gains in FMD 5, where historically the entire AAC has been utilized. The operationally constrained AAC has gone down in both FMDs while the hardwood AACs have increased. The hardwood increase is due to the changes in sustainability parameters by the Crown.

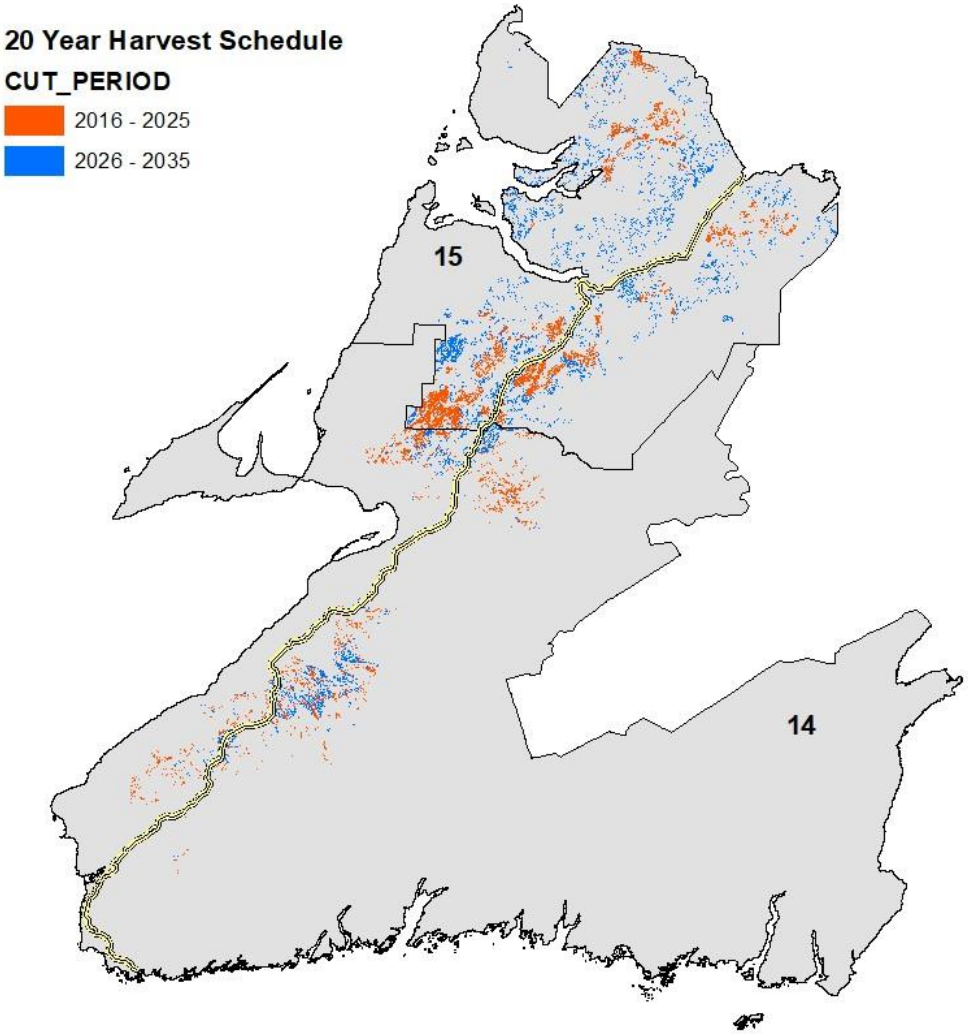
Table 1- 8 Annual Allowable Cut results 2011 through 2020.

Land Tennure		Zone	District #	Provincial Annual Allowable Cut (AAC) 2011 - 2015					
				Softwood Volume (m^3/yr)			Hardwood Volume (m3/yr)		
				Core	Operationally Constrained	***Sub-total***	Core	Operationally Constrained	***Sub-total***
Kruger	***Island***	6	14	97,700	17,300	115,000	1,400	800	2,200
			15	249,300	47,100	296,400	2,900	1,600	4,500
			Sub-total	***347,000***	***64,400***	***411,400***	***4,300***	***2,400***	***6,700***

Land Tennure		Zone	District #	Provincial Annual Allowable Cut (AAC) 2016 - 2020					
				Softwood Volume (m^3/yr)			Hardwood Volume (m3/yr)		
				Core	Operationally Constrained	***Sub-total***	Core	Operationally Constrained	***Sub-total***
Kruger	***Island***	6	14	114,226	8,036	122,262	2,100	0	2,100
			15	262,974	20,457	283,431	1,750	82	1,832
			Sub-total	***377,200***	***28,493***	***405,693***	***3,850***	***82***	***3,932***

3.2.1. *20 year Harvest Schedule*

The spatial harvest schedule was first introduced during the 2006 TSA and represents a significant advancement towards operationalizing provincial AACs, as it represents the stand level boundaries intended for the next 20 years of harvest. Although this scheduling results in a reduction to the AAC it ads anther safeguard to ensuring sustainability on the landbase. Also when considering long term planning, with respect to other stake holders, the harvest schedule helps in conflict resolution. Note: The first 10 years of the harvest schedule define the five year plan proposed harvest and represent the basis upon which harvest compliance is measured. Map 1-5 represents the harvest schedule constructed during the 2016-2020 timber supply analysis.



Map 1- 6 20 Year Harvest Schedule for Zone 6 from the 2016 TSA

3.2.2. *Harvest Profile*

Harvest profiling is the more traditional measure of AAC sustainability and is represented by the Species Working Group by Age Class combinations targeted in the 20 year harvest schedule. The harvest profile is based on the first ten years of harvest, as identified in the 20 year spatial harvest schedule (Figure 1-8). Historic harvest profiles are based upon the previous five years of harvesting and will be used to define the harvest profiling of the next wood supply analysis.

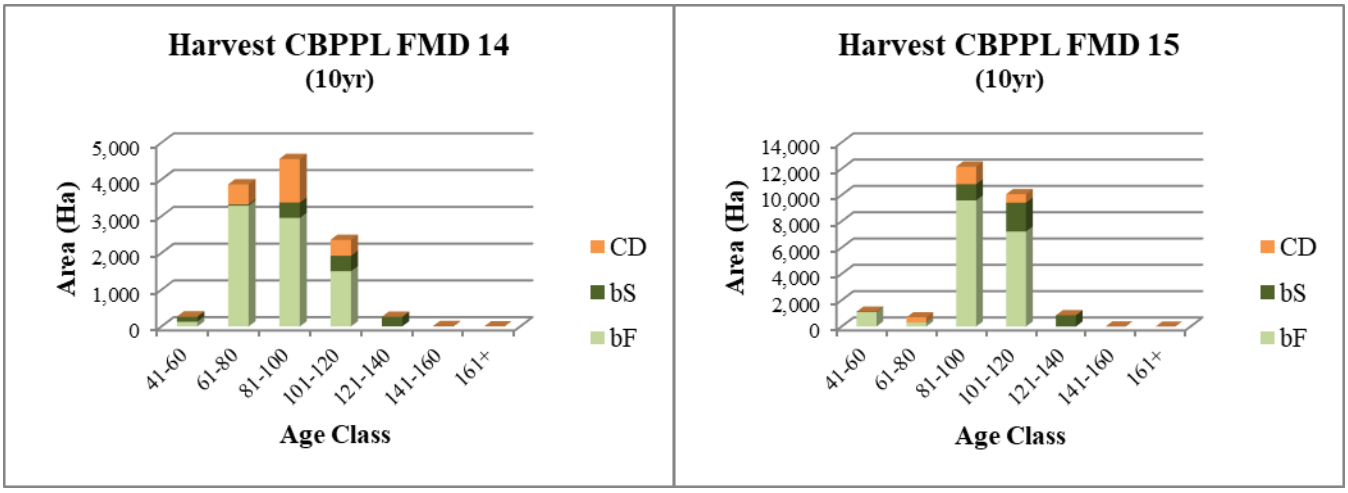


Figure 1-8 Harvest Profile from the most recent Timber Supply Analysis

The harvest profile for CBPPL tenure lends itself to the oldest first management strategy practiced throughout the province. However some of the stands targeted in the harvest schedule tend towards the lower operability limits. This is a consequence of fragmentation (the younger timber is mixed with the older) coupled with having to layout large blocks of timber for operational feasibility.

4. Resource Values

4.1. *Guiding Principles of Sustainability*

There are five guiding principles of overall sustainability, which include; environmental, economic, political, social, and cultural sustainability. Environmental sustainability looks directly at ecosystem health, both now and in the future. Ecosystem health is determined by such factors as ecosystem integrity, biodiversity, productive capacity, and resiliency. The five year operating plan must ensure these factors are intact.

Economic sustainability demands that forest resources be managed and distributed efficiently and equitably among the stakeholders, within the capacity and limits of the forest ecosystem. Economic development has been given top priority by many of Newfoundland's people and their representative, the government. However, economic development should not proceed without the incorporation of the other factors into the decision making process.

Political sustainability refers to goals and management objectives being applicable, administrable, and practical. These goals and objectives must maintain these qualities well into the future with the aid of public input and support. Social sustainability means fairness and equity to all stakeholders. Cultural sustainability is attained by applying Newfoundland's culture to the planning process. A forest management strategy cannot be successful without allowances within the strategy for traditional access and use of the land. For generations, many of Newfoundland's public had free range in our pristine wilderness, a fact that cannot be ignored when planning for the zone. All are key interlocking components and each must be maintained if sustainable development is to be achieved. CBPPL is guided by the Sustainable Forest Management (SFM) Plan developed for their defined forest area.

4.1.1. CBPPL Sustainable Forest Management (SFM) Plan Introduction

The forest industry in Canada has evolved from the management of the timber resource to the management of the forest ecosystem. Previously, forest managers developed forest management plans in isolation, focusing on timber. But as the public began requesting the inclusion of other values, consultations with the public and other resource managers evolved simultaneously with the consideration of non-timber values. This has become a cornerstone of sustainable forest management.

Corner Brook Pulp and Paper Limited (CBPPL) has joined in this shift to sustainable forest management by incorporating social, environmental and economic values in the sustainable development of Newfoundland's forests. Forestry Services and CBPPL have incorporated public consultations in the forest management planning process since the 1980s, developing a positive relationship among the government, CBPPL, and the community. Public involvement in the

identification of values and the development of management plans benefits present as well as future generations.

The Sustainable Forest Management (SFM) Plan for the forested land on insular Newfoundland for which CBPPL has management responsibility, described as the Defined Forest Area (DFA). It was developed with the cooperation of the Public Advisory Committee (PAC), a group of dedicated individuals and organizations interested in sustainable development of the forests of the DFA. The planning process involves public consultation, and follows the principles of sustainable forest management.

CBPPL's first SFM Plan was developed over 16 months and released in July 2004. In late 2008, the Canadian Standard Association released a draft revised standard (CSA Z809-08), and the PAC began updating CBPPL's plan to conform to the new standard, incorporating lessons learned and continual improvement. In 2012, CBPPL was also certified to Forest Stewardship Council (FSC) Boreal Standard.

CBPPL wishes to illustrate to the public (the landowners) and to its customers that the DFA is being managed on a sustainable basis. To this end, CBPPL seeks to maintain certification to CAN/CSA-Z809, Canada's national sustainable forest management (SFM) Standard, and the FSC Boreal Standard. CAN/CSA-Z809 gives organizations a system for continually improving their forest management performance and engaging interested parties in a focused participation process. The FSC Boreal Standard advocates the precautionary and adaptive management approaches to dealing with uncertainty in forest management. Rigorous and regular independent third-party audits are involved in certification to both standards.

A major strong point of the CSA Standard is the involvement of the public in the planning of forest management activities. As mentioned before, this is something CBPPL has already incorporated into their planning process. The public identifies forest values of specific importance to environmental, social, and economic concerns and needs. Another benefit of the requirements of this Standard is providing a link between local level sustainable forest management and forest policy on a provincial and national scale. This is accomplished through the use of the Canadian

Council of Forest Ministers (CCFM) Criteria and Elements for sustainable forest management, which identifies local forest values across Canada. This Standard identifies 35 required core indicators under these criteria and elements. The Standard also deals with performance, by allowing the public to set targets at the local level, to which the organization will be held accountable. Finally, the CSA Standard requires a system to ensure that both the public participation and performance requirements are satisfied (CSA 2008).

The FSC Boreal Standard promotes "healthy forests providing an equitable sharing of benefits from their use while respecting natural forest processes, biodiversity and harmony amongst their inhabitants." This is achieved through implementation of the precautionary approach, i.e., avoiding actions that may lead to irreversible change in ecosystem function. To achieve this, alternative management strategies must be considered, including no management/harvesting. The Boreal Standard also encourages adaptive management, which is implementing new management approaches in a structured scientific manner, by monitoring the results of the new approach and adjusting the approach based on the monitoring results. These two approaches will work together, implementing management strategies that ensure no negative consequences and monitoring these strategies for effectiveness.

CBPPL Woodlands' Environmental Management System (EMS) is the vehicle that ensures fulfillment of the CSA SFM and FSC Boreal Standard requirements. CBPPL's EMS is a registrant (2001) to the ISO 14001 Standard, a standard that incorporates environmental aspects and continual improvement into all forest operations. EMS applies to all Woodlands operations controlled by the Company including management planning, road construction and maintenance, harvesting operations, transportation of fibre, silviculture, and support services. The documented procedures of EMS will provide the system to satisfy all requirements of the ISO 14001, CSA-Z809, and FSC Boreal standards.

Throughout the SFM, references are made to Indicator Profiles (e.g. Indicator Profile 6.3.2). The Indicator Profiles, located in the final section of the Plan (which can be found on CBPPLs website), contain the background information, management strategy, and implementation details for each of the indicators of sustainable forest management selected by the PAC.

The SFM Plan illustrates how CBPPL has satisfied the requirements of the CAN/CSA-Z809-08 as laid out in the SFM Standard, by implementing the public participation, system, and performance requirements for the DFA. The auditing process, conducted by an independent third party, determines whether the SFM requirements are implemented at the DFA level. For FSC certification, the SFM Plan provides management objectives, strategies, performance indicators and monitoring strategies for biodiversity, species at risk, unique environmental features, watersheds, etc.. It also provides direction to other documentation that fulfills the requirements of the indicators in Principle 7 Management Plan of the Boreal Standard.

4.2. Values Structure

The forest ecosystems of the zone provide a wide range of values to different individuals and groups. These include consumptive values such as timber products, hunting, trapping, sport fishing, and berry picking, and non-consumptive values like skiing, snowmobiling, hiking, and bird watching. Also, there are intrinsic and intangible values such as a feeling of wilderness and peace which some people describe as spiritual. Although difficult to spatially describe or quantitatively measure, these spiritual values are considered to be a product or an accumulation of all values.

Other values such as water quality, parks and protected areas etc. provide for the protection of the forest ecosystems which can enhance the other values listed above. Many of the values in the zone were identified by this or previous or planning teams. Presentations of pertinent information on each value by knowledgeable individuals or groups provided stakeholders with relevant information to make informed decisions. Other values, while not specifically outlined by the planning team, are also identified and discussed to provide a more complete description of the range of values found in the zone. The following represents a framework for characterizing values in a clear and consistent manner. This approach consists of three components:

Characterization

- Description: Why the value is important, types of activities, intensity, spatial extent, employment, etc.

- Data in support: Statistical references.

Critical Elements

- Forest Features: Elements at risk from harvesting or enhanced by harvesting (viewscapes, adjacency to water, mountains, habitat, wilderness ambiance, road access, etc.)

Guiding Principles

A guiding principle is defined as "a fixed or predetermined policy or mode of action".
These ‘modes of action’ would be implemented in the five year plan in the form of:
1. policies that should be in place to protect or enhance the resource value;
2. methods for negotiation or inclusion of other stakeholders in resolving potential conflicts;
3. special management provisions/strategies - such as buffer zone consideration, temporal operating periods, modified harvesting, or a best management policy; and/or
4. models and/or forecasting strategies to determine economic contribution, biodiversity impact, or community sustainability

Individual values were discussed both at the strategic and operational level. Strategic level information (characterization, critical elements, and guiding principles) are the focus of discussion in this section. They provide a mechanism to resolve conflicts that might arise throughout or after the five year planning process. Where possible, the physical location of the value on the landscape (operational level) was also identified during the discussion of values (appendix 6). This helps facilitate the preparation of the five year operating plan by identifying potential areas of conflicting use early into the process. In many instances, the Environmental Protection Guidelines (EPG’s, Appendix 2) form the guiding principles for a value. Quite often the spatial extent or location of all values is not known (eg., raptor nests). Specific guidelines are still listed in order to provide a direction or course of action when and if these values are encountered.

4.2.1. Biotic Values

4.2.1.1. Big Game

4.2.1.1.1. Moose

Characterization:

Moose are not native to the island. Today, moose are distributed throughout the Island and the population is estimated to be about 125 - 140,000. Currently, moose are managed on an area/quota system in the province. The Island is divided into 50 management areas and license quotas are set annually for each area. Quotas are set based upon the management objective for each area (i.e., whether it is desired that the population increase, decrease or stabilize). Generally, if an area has too high of a moose population, managers will increase quotas to bring down the population in order to prevent damage to the habitat. However, if the habitat is in good condition, and the area could support more animals, future quotas may be increased. All or portions of 10 moose management areas 5, 6, 7, 8, 9, 10, 11, 18, 19, and 43 are located within the zone.

Critical Elements:

Harvesting is not expected to have a negative impact on moose populations in the zone because moose prefer the early serial stages of a forest and generally do well in areas after harvesting

4.2.1.1.2. Caribou

Characterization:

Caribou is the only native ungulate species on the island. Biologists estimate that prior to the railway being built in 1898 the population on the Island was approximately 100,000 animals but by 1930 the population had declined to about 10,000 animals. Between 1980 and 2000 the number of caribou has increased considerably on the Island with a population estimated at 90-100,000 animals. In the past few years however populations have declined significantly, with Planning Zone 6 being no exception. All or portions of 3 caribou management areas 61, 62, and 75, are located in the zone.

Critical Elements:

It is unclear how forestry activities in the immediate vicinity of calving areas during the calving period may have an impact on caribou populations. Recent studies and anecdotal information has indicated that harvesting restriction zone around caribou calving zones may be significantly larger

than first thought. It has also been shown that as roads are constructed and access is improved into remote areas, there is generally an increase in the number of animals which are killed due to road-kill and poaching.

CBBPL has worked with the Wildlife division to create connectivity corridors for this plan and will follow the EPGs with respect to caribou management.

4.2.1.1.3. Black Bear

Characterization:

The black bear is native to the Island and is found in forested areas. Currently, the number of black bears occurring on the Island is not known (due to difficulty in conducting a census) but is crudely estimated to about 6 - 10,000 animals.

Critical Elements:

- den sites for winter hibernation;
- forest cover

Guiding Principles:

Big Game Management Strategy (moose, caribou and black bear)

Management of big game species in the Province is accomplished by a planning process in which a Big Game Management Plan is prepared annually by the Wildlife Division of the Department of Tourism Culture and Recreation. This process takes into consideration information provided by the public and wildlife and forestry staff. Each year the Wildlife Division reviews all relevant data, such as recent census work, information provided on license returns, and jawbone or skull data and makes decisions on types and numbers of licenses of each species in each management area. Management of big game in the zone will continue to be addressed through this process.

Environmental Protection Guidelines

Moose

- where mature stands of timber are required for moose shelter and yards, they will be identified in consultation with the Wildlife Division.

Caribou

- to ensure the continued protection of these animals the following EPG's will be followed during forestry activities;
- in areas where caribou utilize lichens, a minimum amount of lichen forest must be maintained for caribou. (This amount is to be determined through consultation with Wildlife Division);
- harvesting and road construction will be minimized during the May 15 to July 30 calving period in operating areas adjacent to known calving areas;
- forest access roads, borrow pits and quarries shall avoid, where possible: known sensitive wildlife areas such as, calving grounds, post calving areas, caribou migration routes, caribou rutting areas and wintering areas.

As stated, both the Forest Services Branch and the Wildlife Division is in the process of identifying impacts of forest harvesting on critical caribou habitat areas through a research study that is being conducted in zone 5. The results of this adaptive management strategy will be applied to the forest areas identified in this plan. However, until the results of that study are finalized, the Forest Services Branch will work closely with the Wildlife Division with respect to areas proposed within this planning document.

Bear

A 50-metre, no-cut, treed buffer must be maintained around known bear den sites (winter) or those encountered during harvesting. Den sites must be reported to the Wildlife Division.

4.2.1.2. Furbearers

Characterization:

Ten species of furbearers occur in the zone; lynx, red fox, beaver, otter, muskrat, shorttailed weasel, red squirrel, mink, coyote, and pine marten (will be discussed in more detail in next section). Of these, red squirrel, mink and coyote are not native.

Critical Elements:

- forest cover for protection;
- water quality maintenance;
- riparian buffer zones along aquatic areas;
- snags and coarse woody debris (denning, nesting sites, etc.)

Guiding Principles:

Fur Bearer Management Strategy:

Recommendations concerning the management of furbearer species are developedannually by the Wildlife Division, upon consultation with provincial trappers, Newfoundland and Labrador Trappers Association, general public, and departmental staff. Like the small game management plan, the fur management plan, reviews the status of each fur bearer species annually and addresses the season dates and lengths, and if necessary closure of areas (or no open season). Management of all fur bearing species in the zone will continue to be managed through this process.

Environmental Protection Guidelines:

To protect beaver habitat, all hardwoods within 30 metres of a waterbody occupied by beaver will remain standing during harvesting operations.

4.2.1.3. Salmonids

Characterization:

The Atlantic salmon and the brook trout are native to the Island and are found inwaterways surrounded by forested areas. There are numerous scheduled salmon rivers in Planning Zone 6.

Critical Elements:

- water quality maintenance;
- riparian buffer zones along water systems

Guiding Principles:

Salmonid Management (Atlantic salmon and brook trout)

Management of Atlantic salmon and brook trout in the Province is delivered by the Federal Department of Fisheries and Oceans (DFO). DFO annually sets bag limits, season dates and river closure dates based on extreme water temperature.

Protection

- DFO recommends that a 100 metre no-cut buffer zone be left in designated sensitive spawning areas .
- under the Environmental Protection Guidelines designated protected public water

supply areas (PPSWA's) also provide protection for these species through existing Environmental Protection Guidelines that apply to these areas (ie. increased buffers, usually 150 meters on intake ponds, 75 meters on main river stems, 50 meters on major tributaries and minimum 30 meter buffer regulated in the rest of the district).

4.2.1.4. Song Birds

Characterization:

The distribution of songbird species in a forest ecosystem is widely considered to be a relative indicator of ecosystem health. Many songbird species are distinct to specific habitats (Whitaker et al., 1997) therefore; the presence, absence, or health of a specific songbird population can indicate the health of its corresponding habitat. Songbirds are also the natural predators of our native Lepidoptera pests (ie. looper and budworm) and help to control these populations. Consequently, their value cannot be underestimated.

Critical Elements:

- forest cover for protection;
- water quality maintenance;
- riparian buffer zones along aquatic areas;
- variety of forest seral stages and species (nesting sites, habitat, etc.)

Protection of songbird species will mainly involve protection of their habitat through the various methods discussed in earlier sections.

4.2.1.5. Other Avian Species

Characterization:

Other valued avian species include ptarmigan, grouse, migratory birds and raptors. The former includes important game species, while the latter (ie. raptors) occupy higher trophic levels in the food chain. Higher level trophic feeders are considered important indicators of ecosystem health as they are sensitive to environmental stress. Population trends for these species as defined by the Wildlife Division and Canadian Wildlife Service (CWS) are available on a regional basis.

Critical Elements:

- forest cover for protection;
- water quality maintenance;
- riparian buffer zones along aquatic areas;

- snags and coarse woody debris (prey habitat)
- buffer zones on nesting sites
- The locations of all known bald eagle and osprey nests will be identified on all cutting maps and harvesters will be informed of their locations by Forest Services Staff. Regular operator checks and routine patrols of domestic cutting areas by Forestry Staff will ensure compliance of these guidelines.
- On recommendation by the CWS, sensitive waterfowl habitat has been protected through increased buffers of 50 meters on certain ponds. As well, the establishment of municipal wetland conservation areas in the planning zone by Eastern Habitat Joint Venture through stewardship agreements with municipalities (eg. Whitmans Pond – Town of Gander).

4.2.1.6. Rare and Endangered Species

4.2.1.6.1. Pine Marten

Characterization:

Before 1900, marten ranged over most of the forested areas on the island. Unfortunately, due to a variety of reasons, the population levels dropped where this species was listed to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered. Habitat loss, predation, disease and accidental trapping and snaring are thought to be primary reasons for marten population decline in Newfoundland. Marten still naturally occurs in three main areas on the island including: Main River watershed, Little Grand Lake and Red-Indian Lake areas. Additionally, marten also now exist at Terra Nova National Park (TNNP) and surrounding landscape. As well, in the Bay Du' Nord Wilderness Area around Lake St. John through a relocation effort by the Eastern Newfoundland Pine Marten Recovery Team. The population estimate today is approximately 300- 600 animals. Once listed as Endangered, COSEWIC has now downgraded the marten listing to Threatened.

Since the initiation of the live-trapping program, it has been revealed that the Main River watershed to the north of District 15 is a high-density marten area (on the island) and densities are comparable to those found in the Little Grand Lake and Red-Indian Lake areas. Based on this information, it is important that marten habitat be protected in these areas. Furthermore, it is important that some remnant stands of old growth (80+) forests be left throughout the zone and provision made to have connectivity (i.e., unbroken corridors of forest) between such stands. To

accomplish this, a landscape approach to habitat management was initiated by the Forest Service in 1999. This involved working with stakeholders to identify critical or potential marten habitat, locating possible corridors, and identifying areas which would not be cut in the near future. This initiative has been ongoing since that time. To identify all factors affecting marten survival, stakeholders from the Forest Service, Wildlife Division and the paper companies sit on a recovery team for Newfoundland marten. The purpose of this team is to set short-term and long- term population goals for the species, and to recommend ways in which they may be accomplished. The team has identified critical and recovery marten habitat and is now determining which forest activities can take place within these areas.

Critical Elements:

- sufficient habitat to support a viable population of marten;
- areas of known marten populations remain closed to snaring and trapping

Guiding Principles:

The basic unit for evaluation will be home range size for male (30km^2) and female (15km^2). All forest types can be considered marten habitat if they meet the following requirements:

- sufficient habitat to support a viable population of marten;
- 70% or greater of that unit must be suitable habitat; - 40% or greater of the unit should have trees greater than or equal to 9.6m in height;
- The remaining portion of the 70% (30% or less) should have trees between 6.6 and 9.5m;
- 50% of the unit should be contiguous; stands will have to be within 50 m of an adjacent habitat to be considered contiguous.
- A qualifying stand will have to be within 150 m of another stand or habitat patch to be considered as habitat.
- minimum patch size equals 20 ha;
- basal area requirement equals 40 m^3/ha (~18 m^2);
- hardwood stands (insect kill, wind throw) will be considered where crown closure is greater than or equal to 30%;
- Softwood scrub that meets the minimum requirements (6.5 m) will be considered habitat.

Where height is not known, softwood scrub within 50 m and adjacent to a qualifying stand is considered as habitat. As stated, critical and recovery pine marten habitat is being or has been identified. The development and evolution of the marten habitat suitability model in recent years has been a useful tool in identifying potential marten habitat and evaluating impacts of harvesting on this habitat and resultant changes to population levels. Continued development and refinement of this model will provide more a reliable means of evaluating impacts of harvesting on marten habitat in the future. There is also ongoing research into a variety of aspects of marten dynamics through the Model Forest, Canadian Forest Service, and University of Maine. Recommendations resulting from any of these ongoing initiatives will be incorporated into harvesting prescriptions as required.

4.2.1.6.2. Banded Killifish

Characterization:

The Newfoundland population of Banded Killifish was first listed as special concern in 1989 due to the limited area of occupancy, limitation on potential for range expansion, and potential threats from logging and other activities that could lead to habitat degradation (Chippett, 2003). In 2003 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommended the status of special concern should be maintained. Banded killifish populations in Newfoundland are distributed over a wide range, but local populations are restricted to very confined regions within their respective watersheds. Populations appear to be locally abundant in representative areas that were sampled (i.e. Indian Bay watershed, Loch Leven and Freshwater Pond). Although multiyear data is not available, population estimates from 1999 indicate that over 20,000 individuals exist in the Indian Bay watershed. Estimates are not available for other local populations (Chippett, 2003). Although no killifish have been officially reported in other areas of the planning zone, it is highly likely other areas may contain suitable habitat.

Critical Elements:

- water quality maintenance;
- riparian buffer zones

Guiding Principles:

- guidelines for the protection of freshwater fish habitat are developed by DFO's Habitat Management Branch

- Designated protected public water supply areas (PPSWA's) also provide protection. As well, applying existing Environmental Protection Guidelines to these areas (ie. increased buffers, 150 meters on intake ponds, 75 meters on main river stems, 50 meters on major tributaries and minimum 30 meter buffer regulated in the rest of the district).
- Protection of this species is also strengthened through partnerships with the community based watershed management groups.

4.2.1.6.3. Red and White Pine

Characterization:

Provincially, the range of white pine is shrinking due to a variety of reasons including past harvesting practices and infection from blister rust. However, significant stands of white pine still exist in forest management districts of Planning Zone 6. Red pine is the rarest tree species in the province with a distribution of some 22+ small stands (<15,000 trees in total). There is low representation of red pine in this Planning Zone. However, since both of these species occur in Planning Zone 6, local protection is required to maintain local and provincial biodiversity.

Critical Elements:

- maintenance or enhancement of stands on the landbase
- minimizing loss of trees/stands through public education
- minimize losses to fire, insect and disease
- enhancement of younger age classes through planting natural regeneration and pruning to ensure continuance of the species
- maintenance of native genetic stock

Guiding Principles:

- enforcement of forestry act, regulations, guidelines and policies
- gene preservation gardens for these species and a clonal orchard for white pine have been developed by DNR at Wooddale Tree Nursery. At some point, the goal is to produce seed from these gardens/orchards to grow pine seedlings of native origin.
- some native red pine stands are protected under reserve status.
- DNR has adopted a no cutting policy of pine by non traditional users and a phase out of cutting by traditional commercial users. Currently, no commercial operators harvest pine in Planning Zone 6.

- protection of these species in planning zone is expected to be strengthened by public education and no-cut conditions on permits (both domestic and commercial).
- implementation of silviculture treatments designed to merge pine back into the landscape.
- DNR is collecting seed from red pine stands of native origin and the collection of white pine scions for the clonal orchard at Woodale - DNR also implements stand level silviculture prescriptions such as pruning of immature
white pine to reduce the infection rate of blister rust and cone production enhancement on red pine to ensure an adequate supply of native red pine seed.

4.2.1.6.4. Red Crossbill

The red crossbill, is currently listed as endangered. The Newfoundland Forest Service currently has a representative on the recovery team for this species. Any recommendations on modified forestry activities, if any, will be developed with input from all members.

4.2.1.7. Water Resources

Characterization:

The protection of water resources has emerged as a major issue in recent years both nationally and provincially. Events such as the E.coli 0157 outbreak in Walkerton, Ontario, Newfoundland's Triahlomethane (THM) controversy, and numerous incidents of giradiasis in community water supplies have heightened public awareness on water issues. While much of the current focus is directed towards drinking water, it is also recognized that an equal importance must be attached to waters which have other beneficial uses. Human impacts both locally and globally have the potential to impair water for future uses.

In Planning Zone 6, water is used beneficially for numerous purposes. Most communities within the zone have water supplies. Thirty eight of these supplies are protected under the province's Protected Water Supply Program. Recreational waters within this zone are used for activities such as fishing, boating and as a water supply source for numerous cabin owners.

Human activity on the land has the potential to alter water quality and water quantity. Commercial forest harvesting is the predominant activity and occurs throughout the zone. Hydroelectric

development has resulted in several river diversions. There is a vast array of roads associated with the harvesting and traditional access routes as well as newly constructed roads which dissect the unit. Mining operations within the zone are limited to mostly small quarrying operations associated with road construction. Some exploration activity for hydrocarbons, dimension stone and base metals has occurred sporadically throughout the region.

Critical Elements:

Forest management activities such as road construction, maintenance, timber harvesting, and silviculture may potentially alter the quality of water draining from watersheds. As well as other defining characteristics such as stream hydrology, sediment loadings, stream characteristics, and aquatic discharges from municipalities. Careless storage and handling of fuels by industrial and recreational users, stream diversions and agricultural operations are other examples.

Guiding Principles:

There are numerous protective measures listed in the Environmental Protection Guidelines under the broad categories of road construction, stream crossings, road abandonment, fuel oil handling and storage, support services and structures, harvesting, silviculture, and protected water supply areas. The EPG's are listed in their entirety in Appendix 2 and specific guidelines under the above sections can be found there.

4.2.2. Human Values

4.2.2.1. Timber Resource

Characterization:

One of the major resource values of the forest ecosystem is the harvesting of timber to provide forest products. The market value of forest products harvested on CBPPL limits in Zone 6 is more than $50 million and provides direct employment for approximately 240 employees from more than 50 communities. Historically timber has been harvested since the first inhabitants settled in the zone. Initial uses were mainly domestic in nature to supply timber to build houses, fishing sheds and equipment and for heating and cooking. With the increase in population, more commercial uses have arisen to supply lumber and pulp and paper products.

Commercial logging contractors are allocated approximately 50 percent of the annual allowable cut on CBPPL limits in the zone. Commercial harvesting and sawmilling activity provides many

jobs in harvesting, sawmilling, trucking, pulp and paper manufacturing and related spin off industries for local residents. There are approximately 240 direct jobs created by the industry with an estimate of nearly twice that many in spin off industries.

Domestic harvesting still provides fuelwood to heat many homes and sawlog material for residential house construction in the zone. In fact, the easy access to domestic sawlogs and lumber is one of the reasons why this province has the highest rate of home ownership in the country. There are between 2800-2900 domestic cutting permits issued annually by the Crown which accounts for approximately 65 percent of the harvest on crown land. On CBPPL limits in Zone 6, the company issues approximately 500 domestic firewood permits.

Silviculture treatments are important to the forest resource of the zone because they ensure a vigorous and healthy forest is maintained. Forest renewal activities are critical because they ensure that the productive land base is maintained by planting areas that are not sufficiently restocked. Forest improvement activities help improve and enhance the growing stock which can reduce harvest cost, enhance forest product options and increase sustainable timber supply. There is approximately $1.3 million spent on silviculture in the zone each year creating more than 40 seasonal jobs for CBPPL.

Timely access to timber is critical to planning any forestry operations. Primary, secondary and tertiary roads form an integral part of operating areas and are used after timber extraction is completed for silviculture and recreational purposes. In excess of $450 000 is spent by CBPPL to construct forest access roads each year in the zone.

Protection of the forest from various disturbances is also a major characteristic of resource management. Because of the long insect history in the zone, protection through integrated pest management techniques is an important activity. While fire has not been a major disturbance, protection is still critical since a large fire can potentially be devastating. Protection of other resource values through modification of activities and enforcement is also important.

Spruce and Fir

Balsam Fir, white spruce and black spruce are the main saw log and pulpwood species within the province. Within this planning zone, balsam fir accounts for more than 90 % of the softwood harvest. Balsam fir is very important for its contribution to positive opacity properties of news print and is also excellent for lumber..

These species are managed for maximum sustainable harvest levels though the harvesting and silviculture strategies referred to later in section 6. Protection and long-term sustainability of these species will be achieved through strict adherence to AAC's and refinements to future wood supply analysis.

White Birch

Traditionally, white birch has been a valued species for domestic fuel wood. However; it is now emerging as an important value-added species within the sawmilling and value added manufacturing industries of the province. It also has recently been researched for its ability to produce sap and the subsequent global marketability of this product. Additionally, white birch benefits the cycling of nutrients, the structure of forest soils, and can help in the reduction of insect infestations and in the decrease in spread rates of forest fires (Perry, 1994). White birch dominated stands comprise approximately 8% of the forested land base in the planning zone.

With efforts to manage this species on a sustainable basis, in 2002 the first AAC's were developed for white birch and were refined in the 2005 wood supply analysis.

Critical Elements:

The overall objective is to ensure the AAC is maximized while taking into account other resource values and conducting environmentally sound operations. This is achieved by

- maintenance or enhancement of productive landbase
- planting of non-regenerating areas
- maintenance of the white birch component
- minimizing loss of landbase to other users
- minimize losses to fire, insect and disease - timely access road construction
- enhancement of younger age classes through thinning to correct age class imbalance
- maintain both a sawlog, pulpwood and firewood industry

- maintain support of local research into birch sap production

Guiding Principles:

- enforcement of forestry act, regulations, guidelines and policies
- maintenance of AAC's; adherence to harvest schedules
- minimize loss of productive land base through spatial and temporal compromises and continuous dialogue with other resource users
- maintenance of white birch sap production and harvesting activities occur at the landscape level without negative impacts to either activity
- education (staff, public, operators)
- aggressively conduct silviculture, access road, and protection activities
- implement best management practices.

The Environmental Protection Guidelines for Ecologically Based Forest Resource Management outline courses of action and mitigative measures for conducting forestry activities. These EPG's are outlined in their entirety in Appendix 2 with some highlighted subject areas listed below:

- silviculture and harvesting activities
- mineral soil exposure
- buffer requirements
- road and bridge construction
- garbage disposal
- fuel storage

4.2.2.2. Agriculture

Characterization:

There are 80-100 farms in the zone; the majority of which are located in the Humber Valley, Codroy Valley, and Bay St. George (Robinsons, Highlands Flat Bay) areas. These farms employ 250-300 people with gross farm receipts of $15-20 million. Main commodities produced in the zone are dairy, vegetables, and greenhouse products. Other commercial items include fur, berries, eggs, hogs, sheep, beef, honey, and sods. Additionally, there are hundreds of subsistence farming plots scattered throughout the zone. The vegetables grown on these plots are used to supplement food requirements during the winter months. There are also several pastures and areas designated for hay production.

The wild berry industry (bakeapple, partridgeberry, strawberry, blueberry, and raspberry) plays a significant role in the economic picture for the zone. While there is no actual record of domestic production, thousands of kilograms of berries are harvested annually. These berries are sold locally and to travelling tourists.

Critical Elements:

Surveys indicate approximately five percent of soils in the province are suitable for agriculture. It is difficult to identify and plan all sites for potential future agriculture use and often this will result in conflicts with other land uses, particularly forestry because these sites are of high growing capability. Although a suitable landbase is the first critical element necessary for a successful agriculture operation, markets and the interest of individuals are also prime factors in the development and location of future farms. In the spirit of managing the ecosystem for multiple benefits, provisions will be available for the agriculture industry to expand.

Guiding Principles:

Lands designated for forest management can include areas with high potential for agriculture. Consequently; the Forest Services Branch will work with the Department of Agriculture to determine where potential opportunities exist for agriculture development areas. The agriculture leasing policy initiated in 1976 ensures new or existing land allocated for agriculture continues to be used for agriculture. The leases have no provision for fee simple grants and must be used exclusively for agriculture purposes.

4.2.2.3. Mining

Characterization:

There is a significant mining presence in the zone, particularly in District 14. Some of the major mines, past and present, have been located at Hope Brook, Agathuna, Lower Cove, and Flat Bay producing gold, gypsum, limestone, dolomite and aggregate. Smaller mines harvesting other products are located throughout the zone. In recent years, oil exploration has seen a number of sites developed with major exploration work using seismic lines occurring. There are also a number of active aggregate and quarry leases located throughout the zone. These are usually for very small areas which can be rehabilitated; thereby, minimizing their impact upon the forest ecosystem. Exploration activities continue to form a large portion of the activities in the zone.

Critical Elements:

To minimize the impact of mining and mineral exploration upon the forest ecosystem while providing a source of energy and aggregate material.

Guiding Principles:

- Ensure that quarries and open-pit mines are rehabilitated
- Ensure that the organic overburden is stockpiled and stored in a manner so that it can be used to rehabilitate the site.
- Avoid planning silviculture activity in areas adjacent to mines or quarries.
- Every attempt will be made to extract timber harvested as part of oil and mining exploration and
development.
- If timber can not be feasibly extracted using conventional means then timber shall be piled so that it may be extracted during winter months by snowmobiles.
- A mineral exploration company that proposes to explore or develop within a silviculturally treated area must carry out its exploration program with minimal disturbance and provide compensation as required

This plan will not impede mineral exploration and/or development on mineral licenses within the planning area. Proposed harvesting activities are identified in the annual operating plan.

4.2.2.4. Historic Resources

Characterization:

The provincial archeology office (PAO) is the agency responsible for the management and protection of archaeological sites and artifacts in Newfoundland and Labrador. This program is carried out under the Historic Resources Act which ensures that developments with potential to have adverse impacts on historic resources are investigated as and monitored by a qualified archaeologist through archaeological impact assessments.

Archaeological sites are non-renewable resources and play a vital role in understanding our heritage. It is important to professionally record as much information possible at an archaeological site in order that one may fully understand its history. In order to do this properly the site must not

be disturbed. Very often, archaeological sites are small, spatially bounded units; therefore protecting these resources usually does not have an adverse impact on forestry activities.

Archaeological surveys have been carried out in several areas within the zone over the years, however many areas still remain to be surveyed. To date there are 120 known archaeological sites within the zone which are protected under the Historic Resources Act. These sites show evidence of Maritime Archaic Indian, Palaeoeskimo, Beothuk, Mi'kmaq and European occupation. There is potential for other historic resources to be found in the zone.

Archaeology projects provide many seasonal jobs and many of these people are successful in obtaining employment in archaeology and conservation for longer periods of time. By calling for archaeological impact assessments on projects which have potential to negatively impact historic resources. The PAO is providing jobs for consulting archaeologists in the province. New businesses are created as a result of archaeological projects. These businesses include bed and breakfasts, boat tours, restaurants and gift shops. Presently, there is no active archaeology within the zone and there are no developed archaeological sites which would attract tourists.

Critical Elements:

Major threats to historic resources are projects involving activities which disturb soil layers and/or provide unintended public access to the archaeological resources. Forestry activities such as construction of access roads and bridges, harvesting and mechanical site preparation have the potential to negatively impact valuable historic resources. When impact assessments are carried out and new sites found, it adds to our understanding of Newfoundland and Labrador's heritage. When archaeological sites are discovered through impact assessments, these resources are protected from damage or destruction.

Guiding Principles:

Any project involving land-use has the potential to adversely impact historic resources. Therefore, it is important the Provincial Archaeology Office is involved at the planning stage to ensure mitigative measures that protect historic resources. Known archaeological sites and potential unknown sites are protected by utilizing no harvest buffer zones, whereas archaeological assessments may be required in other areas. Archeological buffers are typically required along rivers and ponds, as well as, along the coastline where there is a high potential for archaeological

resources to be found. Occasionally there are accidental discoveries made of historic resources. In the event this does happen, activities should cease in this area and contact be made immediately with the Provincial Archaeologists at 729-2462.

4.2.2.5. The Greater Gros Morne Ecosystem

Characterization:

The primary role of Canada's national parks is to maintain ecological integrity. Although enshrined in policy for many years, this role has recently been given prominence in legislation by the passing of the Canada National Parks Act in October 2000. The Report of the Panel on Ecological Integrity of Canada's National Parks (February 2000) noted that parks all across the country (including GMNP) are under threat from stresses both within and outside the national parks. Ninety percent of forested parks are under stress from external forestry activities.

The primary challenge for national parks in maintaining their ecological integrity is that most parks are part of larger ecosystems and the area set side for the parks is not large enough to protect the full integrity of that ecosystem. Large-scale changes on the landscape surrounding parks can isolate the park ecologically creating an "island". Parks Canada must work with adjacent land managers in striving to achieve its mandate.

Biodiversity goes beyond the range of wildlife and plant species to include the range of habitats and landscapes. Loss of special habitats such as the old-growth forest and associated species may impair the ecological integrity of GMNP in ways that are not currently understood. While ecological integrity has prominence regarding the management of national parks, legislation and policy dictate broader responsibilities for national parks. These include providing opportunities for Canadians and others to have high-quality experiences in a natural setting.

Currently, 61 percent of GMNP is classified as Zone II - Wilderness. The southwestern portion of this zone borders on District 15. The Long Range Traverse, a 3-4 day hike within GMNP, currently has a reputation as a high-quality wilderness experience due to its remoteness and difficult access. Increased access, as a result of forestry operations can threaten this wilderness quality. The presence of the endangered Newfoundland pine marten has been noted in the northern and southern areas of the park. Those sighted in the south are not closely connected with a core population and are likely "dispersers" from either the Little Grand Lake/Red Indian

Lake or Main River populations. Habitat connectivity with these other core populations may be critical to long term survival of marten in GMNP.

Critical Elements:

- to maintain ecological integrity
- to maintain native biodiversity and natural processes.
- to maintain viable wildlife populations

Guiding Principles:

The long-term effect on the park's ecological integrity can rarely be isolated to one cause and is more often due to the effects of many activities. For that reason it would be important to assess the cumulative environmental effects of all activities as part of the forest management planning process.

- maintain species composition as well as the age structure and ecological functions of the various forest-types across the landscape over the long term.
- maintain proportion of interior forest (mature forest >250 m from an “edge”)
- maintain landscape connections between the park and the surrounding landscape. This would require effective, permeable movement zones between populations and/or critical habitats.
- manage and operate according to the precautionary principle, particularly as it relates to species at risk.
- ensure landscape characteristics are maintained that allow marten to achieve their habitat requirements at the landscape scale. This could mean ensuring forest management practices allow for a continuous distribution of marten habitat and home ranges to the park boundary. A conservative approach that preserves future options should be adopted until the marten guidelines are fully developed.

4.2.2.6. Recreational Trails

Characterization:

Newfoundland T’Railway

A large section of the Newfoundland T’Railway Provincial Park lies within the zone and has an impact on forestry operations. The former CNR right-of-way, which is 25 feet each side of the center line, is the main route for the T’Railway, with some minor deviations. It provides for an all season, multi-use recreation corridor developed and managed with community partners to maximize adventure tourism and recreational opportunities. The T’Railway is protected for the

present and future enjoyment of the public, as part of a system of provincially designated parks and natural areas. The Provincial Parks Act provides the legislative framework for the administration and management of the T'Railway, which constitutes the Province's contribution to the Trans Canada Trail System. It is the largest provincial park in the Province with the most users. It is used primarily for snowmobiling, skiing, hiking, walking and all-terrain vehicle usage. Other new or historical uses such as commercial and domestic harvesting access, quarry and mining access and cottage access are also permitted with a special permit.

Critical Elements:

- protection of the historical landscape integrity of trail corridors
- preservation of the scenic quality along trail corridors
- control of land usage adjacent to trails

Guiding Principles

- coordination of activities with various other agencies responsible for land management outside the T'Railway corridor to ensure that the integrity of the park is maintained
- coordinate and build partnerships with other stakeholders and user groups such as communities, industry and recreational organizations for the long term maintenance and development of the trails
- in an attempt to preserve the natural value of the T'Railway, other land management agencies are requested to maintain a 100 m buffer and to consider viewscapes in their harvesting and development plans. Buffers of varying widths have also been applied to other trails in the planning zone.

4.2.2.7. Parks and Protected Areas

Characterization:

The mission statement of the natural areas program is to protect in an unimpaired condition, large wilderness examples of provincial ecoregions including their natural processes and features and rare natural phenomena, so as to preserve the diversity and distinctiveness of the Province's ecologically sustainable future for the benefits of present and future generations. Natural areas are store houses of natural diversity that exists in a wild, pristine state. They serve as ecological bench marks indicating the natural succession of forest ecosystems. They also preserve in perpetuity, provincially significant representative and special natural features and outstanding recreational environments.

There are many types of protected areas in the province. The Wilderness and Ecological Reserves Act enables the Province to establish the following; wilderness reserves (Component 1), ecological reserves (Component 2) and protected sites (Component 3). Component 1 reserves are defined using the critical habitat of high level, wide ranging species i.e. caribou. They generally cross ecoregion boundaries, protect complete systems and are large (> 1000 km²). Component 2 reserves protect representative samples of ecoregions (not included in Component 1 reserves) and are mid-sized (50-1000 km²). Component 3 reserves protect exceptional natural features, such as, rare species or areas of unusual biological richness and are generally small (< 50 km²). The benefits of protected areas are to preserve biodiversity, provide areas for scientific research, provide opportunities for environmental education and provide standards against which the effects of development can be measured. Protected areas in the zone include: the T'Railway, Gros Morne National Park, the Little Grand Lake Reserve, as well as several Natural Areas System Plan candidate reserves.

Critical Elements:

- preservation of biodiversity
- maintenance of protected area integrity
- maintain natural processes and features

Guiding Principles:

- the Province of Newfoundland's Natural Areas Systems Plan recommends that a minimum of 12% of the province's entire land base be protected.
- only allow traditional (hiking, berry picking, hunting etc.) activities, educational activities and scientific research within protected areas provided the integrity of the reserve is not compromised
- prohibit all forms of new development such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads and trails and cottages and new structures.
- where forestry operations are within one kilometer of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary

4.2.2.8. Outfitting

Characterization:

An economic impact study conducted in 1995 by the Department of Industry, Trade and Technology suggests a big game license has a net economic impact of $6864. By approximating this value at $7000 for 2006, it is possible to estimate the economic contributions of this industry:

approximately 300 licenses * $7000 / license = $2.1 million. An additional $135 000 is estimated to be brought in from fishing. (Bear hunting has not been included in the above figures). Given that 85 percent of the hunting market comes from the United States of America, it follows that the above monetary figures are reflections of money entering the Province from elsewhere. It should be recognized that the outfitting industry provides this revenue to the Province each season and has the potential to do so indefinitely.

Over the past ten years, a significant number of traditional hunting and fishing businesses have diversified into non-consumptive aspects of the tourism industry. Such activities include, but are not limited to: snowmobiling, dog sledding, kayaking, canoeing, nature viewing, hiking, and wildlife photography. The ability to diversify has positively impacted the viability of outfitting operations and as such, increasing numbers of operators are considering these opportunities. Diversification can lengthen seasons of operation, increase and lengthen employment and reduce dependency on a single sector of the tourism industry. Pristine wilderness settings are necessary for many of these types of diversification.

Critical Elements:

Remote outfitting camps are dependent on their remoteness, where forest access roads potentially impact the ability of a camp to maintain its remote status. Increasing accessibility through establishment of access roads may lead to increased hunting and fishing pressures in a given area, which may lead to decreased success rates of tourists. Forest access roads may also lead to increased resource development, which has a potential negative an impact on both remoteness and game availability. Forest harvesting may also have the potential to impact negatively upon travel corridors, bear denning areas, and caribou feeding and calving areas.

While clients of big game and fishing outfitters are primarily interested in hunting or fishing experiences, they also show a great respect and admiration for pristine conditions and a healthy looking landscape. The landscape view experienced by clients plays a large role in leaving a lasting impression of the province. The view also has a direct impact on repeat client bookings and recommending the destination to others. Viewscapes become even more important once outfitters begin diversification into non-consumptive tourism activities. With these activities, there is no trophy to bring home and that which is taken away is the experiences (i.e. sights, sounds, smells, etc.).

Guiding Principles:

It is necessary to ensure properly managed areas remain around outfitting camps, which have been determined by relevant parties. These types of Buffer zones can be difficult tonegotiate due to varying ranges of activity from operator to operator. Some operators make use of areas that are 8 to 10 kilometers away from the main lodge.

- consideration should be given to decommissioning roads and bridges (where possible) after forestry activity is completed. This will eliminate potential negative aspects to the hunting area by reducing the possibilities of increased hunting pressure. Access to hunters will be restricted or limited when roads are actively used for harvesting purposes. -cottage development is prohibited within established outfitting buffers.

- where possible, harvest areas in the winter. Winter roads are less passable in summer and fall, which will facilitate reduced traffic.

- where possible, construction of new forest access roads should occur away from existing outfitting camps. Harvesting should be restricted around hunting and fishing camps during their season of operation. At these times, harvesting should occur as far away as possible from outfitters.

- forest operations will be undertaken in compliance with existing regulations

-efforts will be made to ensure the integrity of viewscapes from outfitter cottages is maintained when conducting forest operations.

- forest operations will be evaluated to should any garbage is removed.

4.2.2.9. Recreation

Characterization:

Southwestern Newfoundland has outstanding scenery, interesting topography, and opportunities for viewing wildlife and flora in a natural setting. These elements represent a small list of reasons why the zone is used extensively for recreational purposes. Hiking, skiing, canoeing, and snowmobiling are major recreational activities in the area. Non-timber recreational values are expected to play an increasing role in forest management practices.

Canoeing and kayaking around the coastline and on the many rivers, the hiking trails (especially the Appalachian Trail), numerous ski and hundreds of kilometers of managed, groomed snowmobile trails, and excellent hunting, fishing and adventure tourism areas highlight some of the recreational opportunities in the zone.

Critical Elements:

Wilderness

Backcountry recreational activities are dependent on the existence of natural pristine wilderness areas. The temporary removal or alteration of this pristine wilderness through forest harvesting practices may result in decreased recreational activities for a given period of time.

Accessibility

An increase in forest access roads may increase accessibility to remote areas. In turn, this may increase the amount of traffic in an area (both vehicular and pedestrian) and decrease the value of the experience for many recreational activities. The majority of individuals involved in recreational activities are concerned about viewscapes. Many of the recreational activities occur because of particular viewscapes.

Guiding Principles:

To prevent negative ecological effects and provide positive experiences, access and levels of recreational activities can be monitored. Public surveys can be used to measure the experiences and the levels of recreation occurring in the zone.

Wilderness

If possible, forest operations should avoid wilderness areas where high concentrations of recreational activities occur. Where operations are necessary, stakeholder meetings could prevent conflicts through temporal scheduling.

Limiting Accessibility

Decommissioning of forest access roads could be a possible option when forestry activities are completed. Where possible, harvesting should be conducted using winter forest access roads, which creates less traffic and better facilitates decommissioning. Where possible, the Land Branch of the Department of Environment and Conservation shall plan cottage development along newly developed forest access roads in conjunction with Forestry Services. This will allow for planned cottage development areas and potential Crown land reserves to help minimize potential land use conflicts.

Viewscape

Aesthetic views using landscape design techniques will be utilized in areas where forest perations occur with high concentrations of recreational activities.

4.2.2.10. Tourism

Characterization:

The tourism industry in Newfoundland and Labrador is based on natural and cultural resources, where protection is important for the industry to survive and grow**.** The tourism industry in Newfoundland and Labrador has experienced significant growth since 1997. Tourism Industry has been contributing between $580 and $700 million annually to the provincial economy. Government tax revenue from tourism in 1998 was estimated to be $105 million. The worldwide growth of tourism at rate of 41 percent, the national growth of 25 percent and the provincially growth of 33 percent indicates tourism is Newfoundland and Labrador's best opportunity for economic diversification and growth.

There are many excellent tourist destinations in the zone. Gros Morne National Park and J. T. Cheesman, Barachois and Sandbanks Provincial Parks, Rose Blanch Lighthouse, and Captain Cook Lookout are just a few examples of the more formal and prominent tourist attractions. Many tourists also come for the outdoor recreational opportunities or to partake of the excellent scenery..

Critical Elements:

- viewscape
- accessibility
- wilderness ambiance
- remoteness

Guiding Principles:

Work with GMNP, provincial parks, tourism division and tourism operators as required to implement strategies to minimize the visual impact of harvesting operations on the aesthetic values associated with viewscapes. By bringing together GMNP, CBPPL, NFS, and the tourism operators, strategies will be discussed, negotiated, and implemented to provide a balance between harvesting and the values associated with tourism. If required, the Forest Service, CBPPL, local Town Councils, Parks Division and other relevant groups will get together to examine the viewshed issues where applicable in the zone.

5. Mitigations

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
NLOA	Cory Foster	14 &15		Letters to inform Outfitters of the process were sent to Outfitters in FMD14 and FMD 15 • JDI Outdoor Adventures (Gerry Pumphrey) FMD14 • Jennings Enterprises LTD (Dave McLaughlin) FMD14 • Moose Creek Lodge Inc. (Rob Cullymore) FMD14 • Moose Hill Cabins (David Gillam) FMD 14 • Besaw's Log Cabin Outfitters (Pius Besaw) FMD 14 &15 • Newfoundland Outfitting Limited (Ray Humber) FMD 15 • Newfoundland Big Game Adventures (Sharon Brake) FMD15 • Ray's Hunting and Fishing Lodge Ltd (Ray Broughton) FMD15 • Serpentine Valley Outfitting Ltd (Gary Sparks) FMD 15 • Where-Ya-Wannabee Outfitting Lodge (Terry Smith) FMD 15 • X—Treme Backcountry Adventures Outfitting (Vivian Hutchcroft) FMD 15	See below for outfitters responding.
Outfitter	Sharon Brake	FMD 15		Outfitter on Bear Lake – Concern with proposed Forest Management activity and potential impact on their business	CBPPL agrees to leave an area adjacent to their lodge as delineated on the Five Year plan and AOP maps. Mrs Brake understands should the leave area begin to break up due to insect or wind throw CBPPL will have to harvest the dying stands. Mrs. Brake was completely satisfied and followed up with an email April 10: Hi, *thank you for meeting with us. It was a good meeting we got to meet you and to talk about the cutting in around our lodge. you were great to talk and it was nice for you*

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
					listened to our concerns, and help us with our concerns with the cutting. its nice to know you guys are there to help the outfitters and stop and listen to us. we will keep in touch thank you sharon Sent from Outlook
Outfitter	Pius Besaw	FMD 14 &15		Outfitter Moose Management District (MMD) 6 - Concerns with proposed Forest Management activities in MMD 6 and potential impacts. Requested a more detailed map to evaluate potential impacts also to help him plan his Moose harvest activity in MMD 6. Pius used CBPPL road network as well as fly in to cater to hunters	Met to discuss our proposed 5YP areas in Moose Management area 6 - no conflict anticipated in 2018 and 2019 or the future if we continue to communicate annually. His biggest concern is public access and Cabins in the area.
Outfitter	David Gillam	FMD 14		Outfitter Codroy Pond – Concerned with proposed Forest Management Activity impacting his business	CBPPL Planners met with David Gillam on May 22nd 2018. CBPPL agreed to a block boundary adjustment to accommodate his concerns and also agreed to revisit the access road location. Mr Gillam would like us to keep the road location as low as we possibility can along the side hill below his lodge.
Outfitter	Wayne Straton	15		Email dated March 29, 2018: As per our conversation regarding your 5 year harvest plan. I see nothing that would affect our outfitting business at serpentine lake. I would like to take this opportunity to thank CBPPL for their commitment to the outfitting industry by having consultation with outfitters to ensure that their wood harvest has minimal effect on our	No further consultation required

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
				business. Wayne Stratton	
Outfitter	Vivian Hutchcroft	FMD 15		Outfitter Cloudy pond – Fishing and ATV touring business. - Wanted to know when we were planning to upgrade existing road to their lodge. CBPPL road network in the area has a positive impact on their business. Requested a small leave area directly across the lake (view shed) but understands should the leave area begin to break up due to insect or wind throw CBPPL will have to harvest the dying stands	CBPPl couldn't give a definitive date but invited Vivian to say in touch
Cabin Owner	Maureen Ivany	FMD 15		Cabin Owner Slab Pond – requested a meeting to review agreements with the cabin owners during the previous 5 year plan process and to reestablish and agreement going forward. They are also concerned with the traffic in the area.	CBPPL Planner met with Maureen Ivany and George Randell on May 18 2018. Agreed to leave 100 meter buffer on Slab pond and a 100 meter buffer on the brook being used as a water supply for the cabins in the area. CBPPL will not harvest birch stand adjacent to the pond. Will look for a new road location to avoid the side slope adjacent to the lake. At the June 27th public consultation in district 14, Maureen expresses her concerns again and indicated she would be submitting a public consultation response form.
NLSF	Tony Sheppard Stephen Hooper	FMD 014 &15		Newfoundland and Labrador Snowmobile Federation (NLSF) concerned with proposed development in the Gallants area and responding to members concerns regarding the impact on the Camp 38 snowmobile trail, Concerns from snowmobilers that the trail will lose its beauty and popularly	The Trail network in this area follows an old logging road. Our access to the block follows the road wherever possible to minimize soil disturbance, (provided grades and alignment are acceptable). We didn't follow the old road at the beginning for the first 5 kilometers because some of it was inside the buffer along North Brook. This Buffer will be maintained. NLSF will reestablish old route from Logger school road to Gallants via twin ponds. This route was previously part of the

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
					groomed trail network in the area. CBPPL agreed to fund 2 days excavator hire to clear alders along the route. CBPPL agreed to leave 100 meter buffer along the existing 38 trail (First 5 Kms) and would not harvest below the trail along this section Met with Snowmobile Federation for a post season meeting. Good meeting, emphasized importance of staying in touch as per our commitments with the Federation. Committed to continue annual fall review meeting. This process has been ongoing for several years and has benefited both CBPPL and the Federation; for example, CBPPL constructing new bypass trails in several locations to avoid conflicts, identified and corrected safety concerns at snowmobile crossing sites, and installed safety awareness signs at crossing sites.
Constituency Assistant to MHA John Finn	Stephen Wheeler	FMD 14 & 15		Regarding concerns expresses by some constituents of our plans for the North Brook area and wanted to know if we would be buffering the existing road known locally as the camp 38 trail	Access to the block follows the road wherever possible to minimize soil disturbance, (provided grades and alignment are acceptable). We didn't follow the old road at the beginning for the first 5 kilometers because some of it was inside the buffer along North Brook. This Buffer will be maintained. NLSF will reestablish old route from Logger school road to Gallants via twin ponds. This route was previously part of the groomed trail network in the area. CBPPL agreed to fund 2

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
					days excavator hire to clear alders along the route. When we do follow the old road for the next 5 – 6 kms it will be upgraded to our Class two standard (46 meter wide Right of Way with a road running surface 7.5 meters wide . Contacted Stephen Wheeler to explain CBPPL position with regard to Sustainable Forest Management and our use of existing infrastructure where possible. Mr. Wheeler understood our position. CBPPL agreed to leave 100 meter buffer along the existing 38 trail (First 5 Kms) and would not harvest below the trail along this section
Qalipu First Nation	Jonathon Strickland	FMD 14 &15		Digital plan information was provided for review and comment.	No further consultation scheduled to date.
Town Of Gallants	Wendy Abbot	FMD 14 & 15		Requested a meeting with CBPPL ,Department of Transportation Representative ,and Local MHA to discuss concerns with regard to CBPPLned operations in the area	Meeting set for Monday June 18th Meeting was held on June 18th at the Town Hall. Town was represented by 3 council members and the Town clerk. Local MHA Scott Reid was also present. CBPPL was represented by Faron Knott, Cory Chubbs and Mike McCarthy. The councils main concerns were Safety and road repairs (should the provincial highway leading to the town become damaged by increase in heavy traffic). CBPPL representatives assured the town safety was a top priority for CBPPL. Town expressed concern with two areas along the provincial highway access to the town. 1 near the TCH a blind curve with poor sight distance and 2.another curve at a culvert crossing. MHA Scott

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
					Reid to contact Local transportation officials and CBBP agree to meet with them. The meeting with Department of Transportation will also address the issue of damage to pavement during the period we are harvesting in the area. CBPPL currently applies calcium to the town road annually. A concern from 1 member that this may not be enough and asked us to consider paving a section of the T'Railway park. CBPPL committed to maintaining dust control along section of the T'Railway but could not commit to paving
CBPPL Public Advisory Committee (PAC)	**Members Present for review meetings** • John Baird-FABEC • Wilfred Bartlett – General Public • James Blackwood-Town Of Gander • Mike Brake – General Public • Overton Colbourne-General Public • Sean Dolter-Facilitator • Cory Foster –	FMD 14 & !5		Members were asked to review Maps and provide comments / questions. CBPPL Woodlands staff were present to meet with PAC members to discuss the plan	No further consultation scheduled to date.

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
	NLOA • Terrance Fudge – BCLL • Keith Goulding – Qalipu FN • Darrell Harris – CFS • Lew Hounsell – General Public • Carl Howell – IBEC • Danica Jackson-Park- Ducks Unlimited • Glen Knee – CAN • Dean Major – Majors Contracting • Cyril Pelley – General Public (Outfitter) • Tom Philpot – General Public • Ralph Rice – General Public • Paul Taylor –				

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
	Department of Tourism • Lindy Vincent – Unifor local 60 N • Stephen Hooper - NLSF				
Town of Steady Brook Watershed Committee	Marg Howlett	15		Committee members: Marg Howlett – Chair/Councilor Carla Hayes – MAE-WRMD Mike McCarthy / Faron Knott - CBPP Fraser Dwyer - Resident Jerry Dawe – Councilor Tim Anderson - FLR CBPPL presented maps and reviewed proposed activity planned inside protected watershed area. Councilor Jerry Dawe wanted to know CBPPL Policy for issuing domestic Firewood permits inside the watershed.	Maps were left with the committee. Councilor Jerry Dawe and Marg Howlett will present to council. General consensus of the committee was if CBPPL continued to operate in accordance with the conditions of the permit from Water Resources and follow Management Strategies outlined in the Steady Brook Lake Watershed Management Plan, there would be no negative impact to water quality for the town. CBPPL only issue permits for hardwood and off species and is confined to areas already harvested. Carla Hayes to check if CBPP can issue cutting permits in watershed area, what restrictions if any are required, and inform Faron Knott, Mike McCarthy of findings. To be brought back to next meeting No further consultation scheduled to date.
Department of Fisheries and Land Resources , Inter - Departmental Review	Brian Oke:	FMD 14 & 15		Internal review was complete and no issues were raised that would warrant further assessment through the EA process.	CBPPL will comply with conditions outlined in the Certificate of Managed Lands

Stakeholder	Contact	FMD		ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT on CBPPL Timber Limits (Government Depts. and on-on-one consultations with known stakeholders) Forest Management District 14 & 15	Mitigation
Wildlife Branch of the Department of Fisheries and Land Resources	Wayne Barney	FMD 14 & !5		Meeting were held with Wildlife division and concerns were raised with regard to habitat requirements and species at risk.	Corner Brook Pulp and Paper will continue to work with the Wildlife division to address concerns related to wildlife habitat, and species at risk.
Tourism, Culture, Industry, and Innovation	John Angelopoulos	FMD 14 & 15		Digital information highlighting the proposed harvest and primary road construction activities for the 2019 – 2023 plan was provided to the Department of Tourism, Culture, Industry, and Innovation late in April 2018 for analysis.	The Department will provide comments on individual areas. Most concerns expressed have been where areas have a high visual impact CBPPL will work with the department to mitigate concerns expressed.
Tourism, Culture, Industry, and Innovation	Paul Taylor (Government Public Consultation Process)	FMD 14 & 15		Reviewed Plans - will work with CBPPL on issues if they arise. Pleased that we reached out to outfitters prior to the submission.	visual impact CBPPL will work with the department to mitigate concerns expressed.
UNIFOR 60N Loggers Union	Lindy Vincent (Government Public Consultation Process)	FMD 14 & 15		No concerns with the plan as proposed but would like to receive further planning News and information from Government	CBPPL will provide additional information regarding the companies planning process upon request
NL Forestry Industry Association	Bill Dawson (Government Public Consultation Process)	FMD 14 & 15		No concerns with the plan as proposed but would like to receive further planning News and information from Government	CBPPL will provide additional information regarding the companies planning process upon request

6. *Public Consultation*

A component of forest-management planning in this province is public engagement. Since the 1990s forest management plans have been developed with advice from public planning teams. This process was designed to garner advice from the public and was intended to improve forest management practices at the local scale while also mitigating land-use conflicts. Because the forest management planning process is the only regular interface for public input, the planning teams have become a catch-all for many provincial resource management issues. In many cases, issues raised extend beyond the district or zonal boundaries, and may even be outside the scope of the planning team mandate. It is important to note, that the forest management planning and consultation process has had a measure of success. Diligent work by district managers and planners has led to the submission and implementation of many plans over the past several decades.

The stakeholder involvement process into the development of new five year operating plans in 2016 has changed from the historical process. Over the years, Managers have seen a reduction in public participation in many zones. In anticipation of capturing an increased public awareness, the District Ecosystem Managers in conjunction with CBPPL have reached out to a number of known stakeholders in each district during the winter/spring of 2018 as plan was being developed. To support further public consultation, a process has begun of scheduling a number of "open house" sessions over the summer months. The Zone will have a minimum of one , full open house session and any additional sessions within a zone will occur as required.

Prior to these sessions, it is anticipated that all five year plan maps , including CBPPL , (each zone) will be posted to the government website (as well as to CBPPLs own website) and a press release given to the public to inform of new proposed five year plans and provide the cyber location to the proposed plans. It is anticipated the general public will review these plans at their own leisure.

Zonal "opens house" sessions will commence mid-July and continue throughout the summer as required. These sessions will be located at strategic locations, and when fully identified, it is

anticipated another press release will be given to inform the public of location and time to visit and discuss any concerns / issues.

A common brochure will be developed and approved by communications, outlining forest management planning and the five year planning process. Overview Maps and other required mapping will be printed and made available to public as required.

No formal presentations will be scheduled for these sessions, as they are intended to identify any stakeholder concerns with the proposed operational activity.

7. Management Goals, Objectives and Strategies

7.1. Harvesting

The forest in this zone is part of the boreal forest, which is characterized as being disturbance driven resulting in the formation of relatively even aged stands. The clear-cut silviculture system most closely emulates this natural disturbance pattern and therefore is the most preferred method employed for harvest. The size, shape, arrangement and juxtaposition of clear-cut areas vary across the landscape depending on localized topography and terrain conditions. A modification of the clear-cut system takes place in domestic areas whereby the cuts are relatively small and disbursed resulting in the creation of a range of age and development classes. The clear-cut system is the only harvest system being considered in the zone at this time.

7.1.1. Commercial

Section 3 outlines in detail a general approach for the timber supply analysis and specific results and sensitivity analysis for the zone. The model used to calculate wood supply is a maximization model, outlining a specific course of action and timing of such actions to maximize timber production. The harvest schedule is an example, which indicates the specific forest stratums to be harvested, and an indication on the timing of such harvest. The districts must follow this schedule as closely as possible in order for the AAC to remain valid. In general, the oldest timber considered in worst condition and losing volume fastest is targeted as first harvest priority. Younger stands that have been damaged by insects and disease may also receive high priority.

Once managed stands are eligible for harvest, this priority may change in some cases to allow for a faster rotation on good sites that are silviculturally treated.

There is an insufficient supply of timber on Crown Land, particularly sawlogs, to supply the current sawmill industry. To help alleviate this problem the Crown has negotiated a series of transfers and exchanges with CBPPL in order to secure a stable supply of timber for these mills. With this arrangement, these sawmills utilize the sawlog material from these areas and sell the pulpwood and pulp chips (sawmills residue) to CBPPL. As well, these operators exchange pulpwood from their Crown cutting permits with CBPPL for sawlogs which also increases their supply.

Specific commercial strategies are as follows:
- Continue to encourage and promote growth in the sawmill industry through exchanges and transfers

7.1.2. Domestic

The harvest of domestic fuel wood from CBPPL limits in the Zone is confined to Cutover cleanup and the harvesting of non-commercial species.

7.1.3. Hardwoods

The harvest of white birch occurs throughout the planning zone in close association with softwood harvest for saw logs, pulpwood and firewood. Hardwood utilization by CBPPL is limited to the issuance of several hundred domestic permits to allow residents of the zone to harvest non-commercial species for home heating use and 3-5 commercial firewood permits.

7.1.4. Silviculture

Section 2.1.4.2.4 describes regeneration patterns of major tree species by each disturbance type and generally by ecoregion. On average, there is 20 % natural regeneration failure rate (NSR) across all disturbance types. Generally, areas not regenerating naturally are renewed by some combination of site preparation and planting. Areas regenerated naturally are either left to develop

naturally or may receive an intermediate stand density management treatment. In the case of balsam fir, which is a prolific regenerator and usually forms an overstocked stand, some form of thinning is usually applied to improve the growth and development characteristics of the regenerating stand. However; recently in FMD's 14 &15, there is concern about the type (species) of regeneration because of increased presence of balsam woolly adelgid in the area.

7.1.4.1. Forest Renewal

Forest renewal silviculture treatments are designed to ensure a new forest is established after disturbance by harvesting, insect, wind or fire. In most regions of the Province, prescriptions normally involve some form of treatment to prepare the site for accepting seedlings. Planting (either full or gap) is completed to ensure stocking of desired species is at acceptable levels. To ensure this, significant site preparation has been undertaken by the Crown within this zone. Treatment of black spruce and balsam fir sites, which have been harvested normally, involves row scarification. This treatment of disc trenching the site one year prior to planting is required to produce an acceptable number of microsites, which created via row scarification are superior because they are a mixture of organic material and mineral soil.

Kalmia is an ericaceous species inhibiting growth of spruce seedlings through the production of chemicals considered toxic to spruce. As well, Kalmia restricts available nutrients on the site, causing not enough nutrients for spruce seedlings to grow properly. Where present, Disc trenching breaks up Kalmia root mats and allows the site to be better accessible and suitable for planting through the alignment of harvesting slash. The majority of the planting requirement in the zone is considered full planting of disturbed sites and without scarification, planted seedling success in Planning Zone 6 would be much lower than realized today. Depending on the site capability, the preferred planted seedling species is mainly with black or white spruce and to a lesser extent Norway spruce, larch (eastern and Japanese), red or white pine. This treatment is designed to regenerate disturbed sites to a stocking level that will produce equal or better harvest volumes than the original stand on similar tree numbers and shorter rotation lengths. Gap planting is completed with the same species as above, coupled with the natural regeneration already present on site results in a mixed softwood forest.

Where possible, seedlings are grown with seed from local seed sources. A seed orchard has been established at Wooddale Provincial Tree Nursery to produce seed from plus trees collected throughout the Planning Zone. Plus trees are normally selected because they have superior growth and physiological characteristics. First generation white spruce seed has already been produced at the nursery and some seedlings grown from this genetically superior source have already been planted in the zone. The ultimate goal is to establish plantations that have superior growth characteristics and thus increase yield and lower rotation lengths, while still maintaining genetic diversity.

Exotic species have been planted in operational trials at limited locations in the zone, however CBPPL only plants species native to the province. These mainly include Japanese larch and Norway spruce because of their superior growth capabilities on particular sites. However, it is not anticipated this will form any substantive proportion of the provincial planting program. In some limited cases, herbicide treatment may be required. Herbicides, while used sparingly, are sometimes a necessary tool to help establishment of a new forest, particularly on the better sites. In this planning zone, these sites are typically rated as “good or high” capability and are located on seepage slopes. These sites typically revert to NSR dominated with alder after disturbance. Reforestation of these sites is important as they are the best growing sites in the planning zone, and placing them back into rotation will help maintain the productive forestland base. A herbicide treatment will allow the planted crop species to “get the jump” on the competition through suppression of the alders occupying these sites. Non-crop species and other forest plants and shrubs typically rebound after suppression with herbicide, minimizing the long-term biodiversity on the area.

Natural regeneration of softwood species throughout the zone typically relied on the excellent dispersal of balsam fir after clear cutting. However, as stated earlier balsam fir in this zone has become seriously infected with aphid. As a result, natural regeneration of balsam fir is seldom accepted. However, natural regeneration of white birch is becoming an issue in this planning zone. As noted in earlier sections white birch is an emerging commercial species. To ensure the long-term viability of white birch supplies, regeneration methods will have to be implemented. Planting of white birch is not seen as a realistic option as the high populations of moose and rabbits in this

zone would destroy seedlings as a browse source. It is recognized that replacement of white birch dominated stands after disturbance will require the establishment of a dense seedling cover. Over time the seedlings that are not browsed can be developed into valuable trees through other silvicultural techniques (e.g. thinning and pruning). Some white birch sites have been harvested in the planning zone utilizing seed tree harvesting. This technique involves leaving a specified number of white birch seed trees on applicable sites as seed sources for the next generation. Since white birch is a very prolific seed producer/ disperser, only limited seed trees are required (i.e. 2-10 per ha). The next phase of seed tree regeneration will involve a light broadcast scarification of harvested sites to produce as many microsites for white birch seedling establishment as possible.

7.1.4.2. Forest Improvements

Forest improvement prescriptions are designed to treat established forest stands in an attempt to enhance development. These treatments usually involve thinning overstocked balsam fir stands at either a young age 10 -15 years (precommercial thinning), or an intermediate age 25 - 35 years (commercial thinning) or cleaning/maintenance of young plantations 10-15 years of balsam fir in growth. Precommercial thinning and plantation cleaning reduce density levels in overstocked areas in order to maximize volume increment and operability (piece size) in the shortest period of time. Trees removed are not of merchantable size and are left behind to return the nutrients to the site. In the planning zone, balsam fir is usually thinned to favor any spruce that may be in the stand. In this way a mixed softwood stand is produced (depending on the original density of spruce) which is more diverse and less susceptible to insect infestation. As well, any hardwood species that are not in direct competition with spruce or fir are left to increase the biodiversity of the stand. Commercial thinning activity is undertaken on older balsam fir stands and is designed to capture mortality that would normally occur in the stand through self-thinning. The trees harvested are of commercial size and are extracted and utilized. The remaining trees are left to grow, free from competition and are harvested when mature. By salvaging this eminent mortality a higher yield can be obtained in these stands. As with precommercial thinning, spruce and hardwoods are left where possible to increase the stand diversity. This treatment has hardly been used in the zone. Both types of thinning and will produce large diameter stems in a shorter time period which should increase the percentage of merchantable volume in stands that is suitable for saw log material. Specific silviculture strategies include:

- Ensure regeneration of areas disturbed by harvest, insect, wind and fire to prevent loss of and/or increase the future productive forestland base
- Use thinning/cleaning techniques in young stands to increase stand development, reduce rotation age, and improve stand quality through removal of aphid attacked balsam fir regeneration and increase the percentage of saw logs in stands
- Where possible, promote species mix, particularly with spruce and hardwoods to reduce susceptibility to insect attack and increase biological diversity
- Where possible, use seedlings grown from local seed sources to protect genetic diversity
- Ensure levels of planting and thinning used in the wood supply analysis are achieved
- Work towards pre harvest planning to identify areas with potential balsam woolly adelgid problems so that alternate silvicultural prescriptions can be promptly employed
- Continue development and implementation of silvicultural strategies designed to regenerate existing white birch dominated stands to white birch where applicable, as well as strategies designed to develop the white birch component of managed stands

7.1.5. Forest Access Roads

Timely access to harvesting areas is the key to successful implementation of harvest allocations. Roads also provide access for other recreational values such as hunting, fishing, skiing, berry picking and hiking. However, it is recognized roads can also have a negative impact both from an environmental perspective (loss of productive land base) and other value perspective (access near remote outfitting lodges).

As a general principle from both an environmental and cost perspective, the minimal amount of road required to effectively harvest available timber will be built. As well, roads are constructed to standards (e.g. width of right-of-way and driving surface etc.) that are the minimum required to access the timber in a safe and effective manner. Forwarding distances are maximized to the economic limit to minimize the amount of road constructed. These principles ensure the loss of productive land base and environmental disturbance are minimized. In sensitive and wet areas, winter harvesting and road construction are encouraged, to minimize environmental disturbance. In many instances, forest access roads “open up” new areas which are then subject to cabin development. Forest roads also provide access to remote areas where outfitting businesses operate.

This generally leads to competition for hunting areas between local and “sport” hunters and may detract from the “remote” designation of the lodge. In such instances cabin development should be controlled to limit local access. As well, road decommissioning may also be considered, depending on cost and mitigation of conflicting uses for a particular road.

The nature of the current wood supply, is that harvestable areas or stands are becoming smaller and more dispersed. Achievement of allocated harvest is contingent on accessing these areas and stands. Therefore, more road infrastructure is required to access this timber. Specific strategies include:

- Where possible, build winter roads to access sensitive and wet areas
- Minimize amount of road built by maximizing forwarding distances
- Use minimum road standard to safely and effectively match the logging chance
- Work with appropriate agencies (crown lands) to control cabin development
- Where possible, consider road decommissioning in areas of concern for other values (e.g. near remote outfitting lodges, PPWSA’s)

7.1.6. Forest Protection

7.1.6.1. Insect and Disease

While having been a major natural disturbance factor within the zone, insects are now considered of lesser importance. Balsam fir is susceptible to most of the major insects and is in lower proportion throughout the zone than in the past. The budworm and looper damaged fir stands of the 1970’s and 1980’s that were salvage harvested have been replaced with planted less susceptible spruce species.

The major insect found throughout the zone today is the balsam woolly adelgid. It seems to be moving further inland, causing growth problems in young balsam fir stands. As outlined in the harvesting and timber supply analysis sections, wood supply forcast is based on following a rigid predetermined harvest schedule and minimizing inventory deductions (of which insect damage is a portion). In the event of a major insect infestation, salvage efforts may change harvest priorities,

resulting in the optimal harvest schedule not being followed. If insect damaged stands cannot be harvested in a timely manner, an additional harvest in the form of unsalvaged mortality may occur resulting in inventory deductions that are higher than anticipated. In both circumstances, deviations from harvest schedules and inventory adjustment levels will be closely monitored to ensure that validity of AAC calculations are not compromised.

Specific strategies include:

- Use silvicultural techniques at the stand level to alter species mix and increase stand vigor; making stands less susceptible to insect attack (eg planting and cleaning).

- Where possible, use harvest-scheduling techniques to alter species mix across the landscape to avoid promotion for severe insect infestation

- Where possible, use species conversion techniques to convert adelgid susceptible balsam fir to other less susceptible species

- In conjunction with Provincial and Federal initiatives, use pertinent and approved biological and chemical insecticides such as BTK, Mimic, Neemix4.5 and NeabNPV (virus)

- In co-operation with Provincial insect and inventory divisions, monitor and measure adelgid infested stands to help refine yield curves to be used in the next timber supply analysis

7.1.6.2. Fire

Historically, fire has not been a major natural disturbance factor within this zone. However, a fire in an unusually dry year can have devastating effects on the forest and can exacerbate an already tight wood supply situation. The zone can minimize the risk of a serious fire by maintaining a highly trained, efficient and effective fire control program and by minimizing the risk in forest stands through maintenance of health and vigor. Specific strategies
include:

- Ensure harvest schedule is followed targeting oldest/worst condition (and high fire risk) stands
- Maintain fire control capabilities by both the Crown and Industry
- Where possible, promote species mixes (white birch) in stands to minimize risk

7.1.6.3. Wind Throw

Wind throw or blow down occurs in stands that are old and decrepit or in stands that have been predisposed by some other disturbance such as insects and disease. Blow down can also be

increased in high-risk stands when unnatural edges are left on cutovers such as in the case buffers. To minimize the effects of blow down, stands will be managed to promote health and vigor mainly through silvicultural treatments and protection from insects.

Specific strategies include:

- Avoid thinning in areas with high wind damage potential (hilltops on high elevations etc.

- Maintain forest in healthy vigorous condition through silvicultural treatments and protection from insects

-Design cut blocks to follow contours and natural boundaries to minimize risk of wind throw to residual forest

-Investigate techniques to minimize the risk blow down in buffers (i.e. buffer management).

- Ensure harvest schedule is followed to target the oldest worst condition (and risk) timber first.

- Continue to sample overmature stands for signs of imminent breakup (e.g. wind throw and butt rot) and update harvest schedule on a 5 year basis accordingly to capture mortality

7.1.7. Information and Education

Information and education is important to providing for more active and effective participation in the forest management planning process. Through interaction with various user groups and the general public, we gain a better understanding of each other's values and positions. Information about a stakeholder's values and the location on the landscape provides a better ability to mitigate any potential negative impacts of harvesting activity on these values. For example, learning where a cabin is located can help planners when selecting areas for harvest and provide a contact to discuss impacts and mitigations. Public Planning team meetings provide a good exchange of information and ideas about a particular piece of land base. It is through such forums that information can be shared that provides a basis for more effective and informed participation. As a Forest Industry, other such vehicles for information and education, which will be actively pursued, include:

- Field trips (e.g. Crown and paper company woodlands tours, mill tours)

- School visits

- Open houses

- Commercial operator environmental training programs

- Information meetings

- Training courses

- Seminars

- General day-to-day contact

8. Proposed Activities

*8.1.1. **Harvesting***

This section will outline all forest activities that will occur on CBPPL Limits in District 14 & 15 from 2017-2021. More specifically, all proposed harvesting, silviculture and access road construction activities as well as environmental protection measures, activities inside protected water supply areas, surveys, and information and education initiatives will be presented and discussed in detail.

To present a more comprehensive overview of proposed activities on the entire district an overview map is presented in Appendix 2. Maps of individual operating areas and summary sheets are also presented in Appendix 2. The summary sheets give a brief description of each area, the type of activities that will occur and any issues raised and mitigative measures employed.

8.1.1.1. Commercial

The timber scheduled for harvest in the district is over mature with some small pockets of mature dispersed throughout. This proposed harvest follows the harvest schedule that was used to determine the AAC in Section 3. The proposed harvest blocks have more volume proposed than the AACs, however for operational flexibility Forest Services branch allows for 10 years harvest volume to be proposed with the stipulation that the 5 year AAC be adhered to.

Table 1- 4 Proposed commercial harvest activity FMD 14 2019-2023

Operating Area					Volume Harvested (m^3)			
					Softwood			
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrainted	Sub-total	Non AAC wood
K-14-61	Black Duck	CBPP	1064.8		108512			
K-14-62	Camp 185	CBPP	1233.9		89681			
K-14-63	Fischell's River	CBPP	168.64		12658			
K-14-64	Camp 180	CBPP	937.71		63172			
K-14-65	McPherson's Pond	CBPP	955.08		82547			
K-14-66	Codroy Pond	CBPP	500		49581			
K-14-67	Barachois	CBPP	538.98		40067			
K-14-68	Pasture Road	CBPP	240.25		16010			
Sub-Total			**5639**		**462227**			

Table 1- 5 Proposed commercial harvest activity FMD 15 2019-2023

Operating Area					Volume Harvested (m^3)			
					Softwood			
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrainted	Sub-total	Non AAC wood
K-15-60	North Brook	CBPP	3105.93		380862			
K-15-61	Crescent Pond	CBPP	1721.19		170779			
K-15-62	Howards	CBPP	1045.34		91496			
K-15-63	Stag Lake	CBPP	329.66		29274			
K-15-64	Stag Hill	CBPP	1111.02		117914			
K-15-65	Steady Brook Lake	CBPP	352.97		36792			
K-15-66	Pynn's Brook	CBPP	451.27		41958			
K-15-68	Goose Arm	CBPP	2361.44		226315			
K-15-69	12 Mile Dam	CBPP	127.54		12189			
K-15-70	Alder Brook	CBPP	320.34		30821			
Sub-Total			**10927**		**1138401**			

8.1.1.2. Domestic

There are no large scale domestic blocks on CBPPL tenure. Permits for non-commercial species can be obtained from CBPPL and have historically been approximately 100 per FMD. The Company policy as it relates to domestic and commercial cutting of hardwoods is that after

pulpwood harvesting operations have been completed in an area, domestic and commercial cutting for fuel wood will be allowed on cutover areas to cut hardwoods left behind.

8.1.1.3. Silviculture

There are two silviculture prescriptions scheduled for the next five years; planting/gap planting including site preparation where required, and pre commercial thinning. Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. There is full planting when there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Precommercial thinning is prescribed to reduce the density on overstocked regeneration so that growth can be concentrated on the remaining crop trees and thus reduce the time to harvest.

Areas that are scheduled for commercial harvest or have been recently harvested have been identified on the operating area maps and are candidates for planting or gap planting to black or white spruce. Site preparation using either mechanical means or prescribed burning will be employed on suitable sites that have impediments to planting. Approximate estimates for the next

8.1.2. ***Forest Access Roads & Water***

Harvesting of timber on existing resource roads has become a more prevalent in order to minimize construction costs associated with building new infrastructure. As such, in this plan, there is no anticipated new road infrastructure. If the need arises, it will be addressed accordingly.

Table 1- 6 Proposed Silviculture Zone 6 2019-2023

Treatment	FMD	Area (ha)
Precommercial Thinning	14	200
	15	800
Sub-Total		**1000**
Planting	14	600
	15	1800
Sub-Total		**2400**
Scarification	14	0
	15	0
Sub-Total		**0**
Other (Herbicide)	14	0
	15	1500
Sub-Total		**1500**
Grand-Total		**4900**

8.1.3. ***Forest Protection***

Identify forest protection measures planned, as outlined below:

8.1.3.1. Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been few timber losses. Despite this fact the district must remain vigilant in its fire suppression program to ensure any future losses are minimized. There are fire crews and equipment stationed at St Georges, Massey Drive and Pasadena District offices in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional level in Gander and provincial level in Corner Brook is available should the need arise. Gander houses the bank of provincial fire equipment and as well is the base for 2 air tankers and a helicopter with a crew of fire fighters for initial attack.

8.1.3.2. Insects and Disease

No significant forest mortality was documented by Forest Insect and Disease Surveys by the Forestry Services Branch in FMD's 14 and 15 during the last five year period. Monitoring and protection for insects and disease is done out of the forest protection division in Corner Brook.

8.1.3.3. Wind Throw

Wind throw is not a major concern on CBPPL limits for FMDs 14 and 15. Where wind throw may occur CBPPL will utilize the strategies outlined in section 7.1.6.3 of this plan.

8.1.3.4. Surveys

Utilization surveys will be conducted on all cutovers to insure loss of merchantable timber is minimized. CBPPL will work with the Industry Services Division in Corner Brook to implement a yield comparison study to compare the expected volume in an operating area to those actually attained. The results of this survey will help refine the inventory deduction described in Section 3.

As previously mentioned, reconnaissance and intensive regeneration surveys will be conducted on cutovers created during the next five years as well as those created in the past five years to determine the need for planting. As well, reconnaissance surveys will be done on regenerating stands to determine the suitability for precommercial thinning.

*8.1.4. **Activities in Protected Public Water Supply Areas***

For harvesting operations inside PPWSA's, wider buffers will be used and the pertinent EPG's will be attached to any permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, a Certificate of Approval under Section 10 of the Environment Act must be obtained before any domestic harvesting commences inside the PPWSA.

Table 1- 8 Operating area overlap with PWSA

Operating Area	FMD	Area in PWSA
12 Mile Dam	15	611
Glide Lake	15	12,687
North Brook	15	586
Serpentine North	15	68
Steady Brook Lake	15	3,147
Sub-total		**17,100**

8.1.5. *Information and Education*

CBPPL in conjunction with Forestry Services will continue to attempt to educate the general public to ensure meaningful and effective consultation and input can be attained. This will be accomplished through fieldtrips and meetings, school presentations, open houses, meetings and National Forest Week activities.

8.2. **Plan Administration**

8.2.1. *Monitoring*

Monitoring of planned activities is critical to ensure objectives and operations are carried out in a manner consistent with various guidelines and provincial and federal legislation. Monitoring occurs at the operational level and the planning level.

8.2.1.1. Operational Level

Annually, Corner Brook Pulp and Paper Limited is issued a Certificate of Managed Land. Attached to this Certificate are schedules that set out the conditions that must be followed in order to maintain managed land status. Schedule five contains the Environmental Protection Guidelines (EPG). Industry planning and operations must comply with schedule five or the land can be declared unmanaged and fines levied. NFS staff will monitor for compliance with schedule five and recommend managed or unmanaged status.

All planned activities are monitored by the NFS to ensure all guidelines and regulations pertaining to environmental protection, harvesting, road construction, and silviculture are followed. Any infractions or deviations from the regulations or guidelines are dealt with as required under the Forestry Act.

In addition to the monthly Government monitoring for compliance Corner Brook Pulp and Paper Limited has put in place an Environmental Management System (EMS), which was registered to the internationally recognized environmental standards ISO 14001, CSA Z809 and the FSC Boreal Standard. For more information, see section 6 of the plan.

As part of this EMS, many monitoring activities take place throughout the year (checking for non-compliances) including:

- Field inspections (Number 1, 2 and 3) completed by contractors and Operations Superintendents,
- Yearly internal EMS audit,
- Yearly external EMS and field surveillance audits,
- External compliance audit every five (5) years,
- External communication from the public through our web site, cbppl.com.

All non-compliances are documented and reported to the EMS Management Review Committee. All non-compliances are reviewed by the EMS Committee, and corrective action is implemented where and when required.

8.2.1.2. Planning Level

The strategic planning section at forestry services monitors the implementation of this Five Year Operating Plan for this zone. This is a crucial role, as many implementation commitments are stated in the plan. The primary function of the planning section is to monitor plan implementation for consistency with commitments in the plan though approval of the Annual Operating Plans derived from this plan and review of the past annual reports associated with each year's activities. The section will identify concerns with plan implementation provide recommendations for plan changes and establish protocol for concerns reported to them. Additional meetings between CBPPL, Strategic Planning and/or relevant stakeholders may be required to review amendments or provide recommendations should changes be required as a result of a catastrophic event such as fire which may precipitate changes to the plan.

8.2.2. Amendments

Due to the dynamic nature of forest activities, amendments are often required because of changes in the forest, operational realities, imposition of addition requirements or guidelines, or some other unforeseen circumstance. These changes to the five year operating plan must be submitted as

amendments and approved before they are implemented. There are two types of possible amendments for this plan, one that can be approved internally by the Forestry and Agrifoods Agency and one that must be submitted to the Environmental Assessment Division for public review. Changes to this plan can be approved by the Forestry and Agrifoods Agency if they are:

-within one kilometer of an operating area described in the five year operating plan, an additional area for timber harvesting that is, in total, not more than 50 hectares in each year of the plan

- within a forest management district, an additional areas for silviculture treatment of not more that 20 percent of the total operating area described in the five year operating plan over the five year term of the plan

- within an operating area described in the five year operating plan, not more than one kilometer, in total, of new primary forest access road in addition to existing and proposed primary forest access road in each year of the plan

- adjacent to an operating area described in the five year operating plan, not more than half a kilometer, in total, of new primary forest access road in each year of that plan.

Changes that are not covered by the above must be submitted for Environmental Assessment (EA) in the form of an amendment to the five year operating plan. Prior to approval through EA, the amendment has to be approved by the Ecosystem Management Division of the Forest Service.

Amendments will be reviewed by the monitoring committee if the District Manager deems that they represent a significant change to the plan.