Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Fisheries and Land Resources

September 13, 2018

Ms. Susan Squires
Director
Environmental Assessment Division
Department of Environment and Conservation

RE: 5 Year Operating Plan for Crown Managed Lands, Forest Management Districts 14 and 15 (Zone 6) for the period January 1, 2019-December 31, 2023

Pursuant to Section 49 of the *Environmental Protection Act* (2002), the Department of Natural Resources is pleased to submit for registration as an undertaking, the 5 Year Operating Plan for Crown managed lands in Forest Management Districts 14 and 15 (Zone 6) for the period of January 1, 2019 to December 31, 2023. Twelve copies of the Plan (2 paper and 10 digital- CDs) have been forwarded to you under separate cover.

This Plan represents the culmination of many months of preparation by Forest Service staff , including a number of one on one meetings with various agencies and a number of public open house meetings. The Plan outlines in considerable detail the forestry activities to be carried out over the coming five year period and provides a comprehensive description of the biological, physical and social environment in which these activities are to occur. The Plan is compliant with the *Forestry Act* (1990) and the *Sustainable Forest Management Planning Regulations*.

As part of the plan development, each member of the ADM Review Committee has been sent a copy of the proposed Forestry activities outlined in the Plan. Concerns by the Committee, along with the mutually agreeable mitigations are presented in the corresponding appendix. Thus, as a result of the Committee discussion, the Forest Service does not anticipate any inter-Governmental concerns to be raised during the EA assessment process.

If you have any questions regarding this registration, please contact Mr. Corey Wight at (709) 637-2091.

Bryan Oke
Director – Forest Ecosystem Management
Department of Fisheries and Land Resources

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REGISTRATION FORM

PURSUANT OF PART 10, ENVIRONMENTAL ASSESSMENT

SECTION 49 OF THE ENVIRONMENTAL ASSESSMENT ACT

Name of Undertaking:

Forest Management District 14 and Forest Management District 15 (Planning Zone 6) Five Year Operating Plan 2019-2023

Proponent:

(i) Department of Fisheries and Land Resources
Forestry and Wildlife
P.O. Box 280
Pasadena, NL
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(709) 686-2071

(ii) Assistant Deputy Minister

Mr. Steve Balsom
Forestry and Wildlife
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(iii)Principal Contact Person

Mr. Bryan Oke
Director of Forest Ecosystem Management
(709) 637-2296

The Undertaking:

(i) Nature of Undertaking

To conduct forestry activities (harvesting, silviculture, and road construction) for the years 2019 to 2023

(ii) Purpose/Rationale/Need for Undertaking

This undertaking will enable the Department of Fisheries and Land Resources to Commerically harvest approximately 152,900 m3 of timber, construct approximately 32 kilometers of resource access road and complete respective silviculture activities in Forest Management District's 14 & 15.

This undertaking is necessary to maintain the existing commercial industry and allow domestic harvest for home heating.

Description of Undertaking:

(i) Geographic Location

Forest Management Districts 14 and 15 encompass most of south western Newfoundland. They extend from Burgeo and Port aux Basques in the south to Deer Lake in the northeast and to Sally's Cove in the north. The districts share and overlap common eco-region characteristics and for forest management purposes have been combined to form Planning Zone 6. The overview and operational maps in the plan outline the general and exact locations of the zone.

(ii) Physical Features

The topography in the area ranges from coastal lowlands to rolling uplands and mountainous terrain.

(iii)Operation

Commercial harvesting will be carried out manually and with shortwood harvesters and forwarders and domestic harvesting will be done by chainsaw with extraction be snowmobile and ATV. Roads will be constructed using excavators and/or bulldozers and silviculture will be carried out using brushsaws, pottiputkis, and shovels. All operations and buffer requirements will be carried out in accordance with the Environmental Protection Guidelines for Ecologically Based Forest Resource Management and the Forestry Act.

(iv)Occupants

Loggers, equipment operators, truckers, sawmillers, silviculture workers and domestic cutters.

Approval of the Undertaking:

Commercial and domestic cutting permits as well as operating permits will be required from the District Forest Management Offices at St. Georges and Pasadena.

Schedule:

This plan is scheduled to commence on January 1, 2019 and end on December 31, 2023.

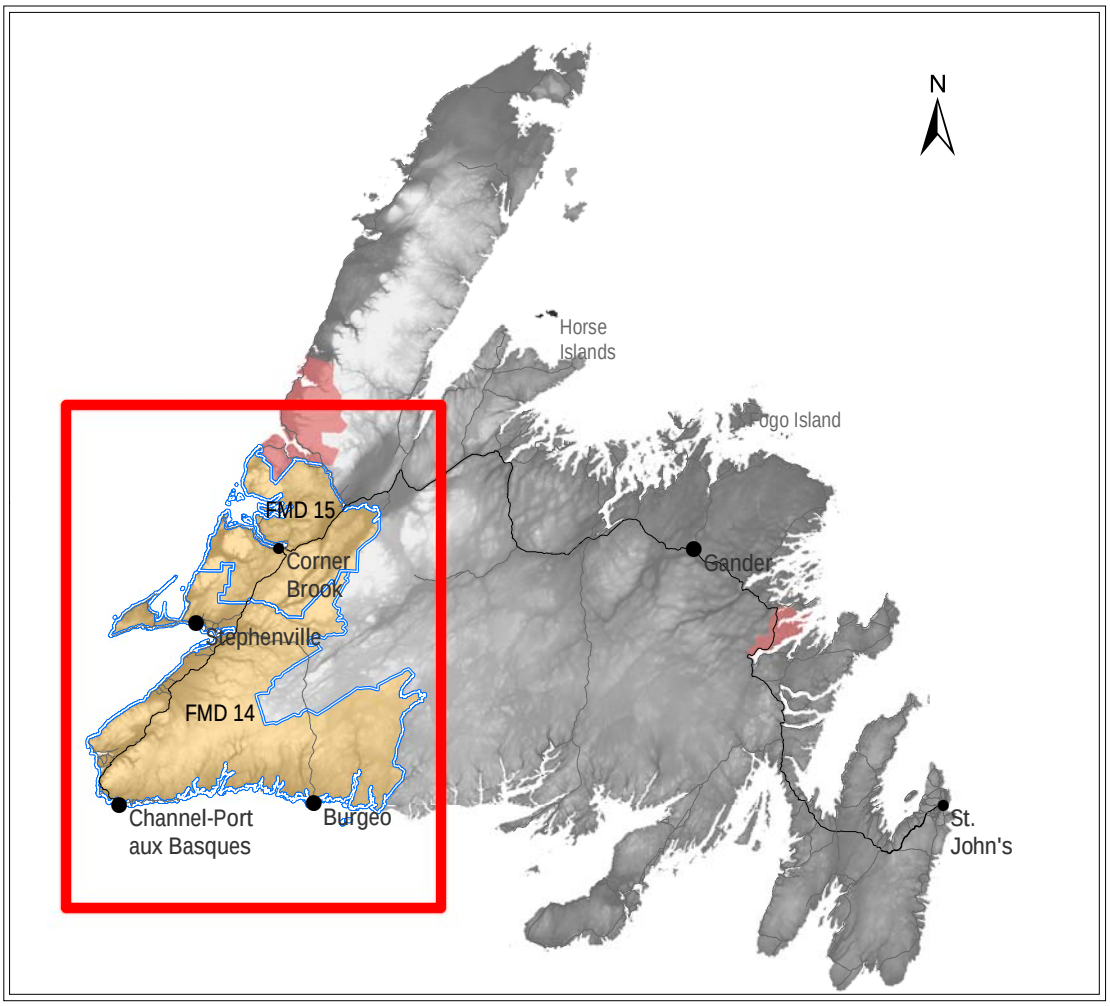
Sept 13th, 2018
Date

Steve Balsom
ADM-Forestry and Wildlife

FIVE YEAR SUSTAINABLE FOREST MANAGEMENT PLAN

2019-2023

PLANNING ZONE 6



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1.0 INTRODUCTION

Within the Forestry & Wildlife Branch, there are four (4) major planning documents guiding forest management activities, which include: Provincial Sustainable Forest Management Strategy (2014-2024), Five-Year Operating Plans, Annual Operating Plans, and Past Annual Reports.

This Five Year Operating Plan is developed under the legislated planning requirements and is required to endure an Environmental Assessment process. Sections that are provincial in scope such as carbon and global warming are 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 included in 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 are provided where applicable.

From a Forestry perspective, the island portion of the province is partitioned into eight (8) planning zones, which are based loosely on ecoregion location. Forest Management Districts that share common ecoregion characteristics are combined to form these zones. Districts 14 and 15 are combined to form Planning Zone 6. If a Zone is multi tenured, the requirement for submission to the Forestry & Wildlife Branch and to the Department of Environment for Environmental Assessment review, is one (1) Five Year Operating Plan for each owner in each zone. In this zone there will be two separate submissions for Five-year operating plans (Crown and Corner Brook Pulp and Paper Limited). 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 6 or the zone.

This document aims to fully integrate the presentation of information and discussions for crown land in the zone. District statistics other information from each district are identified and summarized for the zone. Tables and figures are 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 all ownerships in the zone as well as some broad comparative statistics. In this way the reader will

get a better overview of the entire zone in the context of all ownerships and not just crown land.

1.1 Description of the Land Base

1.2 General

1.2.1 Location

Planning Zone Six encompasses Forest Management Districts 14 and 15 (Figure 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 satellite office in Burgeo while District 15 is administered from Corner Brook.

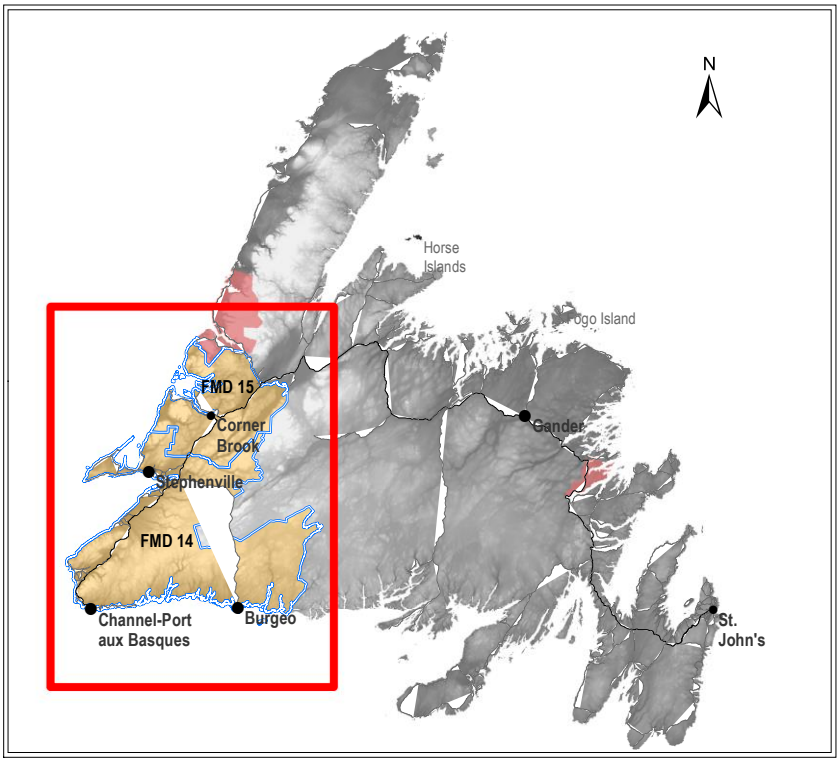

FIGURE 1 1: LOCATION OF PLANNING ZONE 6

1.2.2 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 and 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 annually.

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 Newfoundland Power and Paper Company limited and operated until 1928. At that time, operations combined under the control of the Canadian International Paper Company and operated to 1935, when Bowaters assumed operations. In 1985, the mill began operating under Kruger Incorporated and continues today, where it is considered an important economic driver of the local economy and the provincial forest industry.

In the early 1970's, a linerboard mill was established in Stephenville by the provincial government. The wood supply for this mill came from the Labrador Linerboard licenses in Districts 9, 14, 16 and Goose Bay. Unfortunately, this mill shut down in 1977 due to the uncertainty of wood supply and high cost of delivered timber from Labrador. The mill was purchased by Abitibi Price, converted to newsprint and reopened in 1981. However, despite having the most modern and efficient paper making machine in Newfoundland and Labrador, the mill closed in the fall of 2005.

1.2.3 Ownership

Crown and Corner Brook Pulp and Paper Limited (CBPPL) account for the two major tenure holders within the zone (Figure 1.2). Overall CBPPL, through timber licenses, accounts for 30 % of the total

land area in the zone, with the crown controlling 70%. The majority of these licenses are due to expire in 2037. The productive forest breakdown for the zone is approximately 50% for each tenure holder. In District 14, the crown controls 92% of the total land area and 63% of the productive forest. This is mainly due to the large area of unmapped crown land on the south coast. In District 15, CBPPL controls 64% of the total land area and 70% of the productive forest.

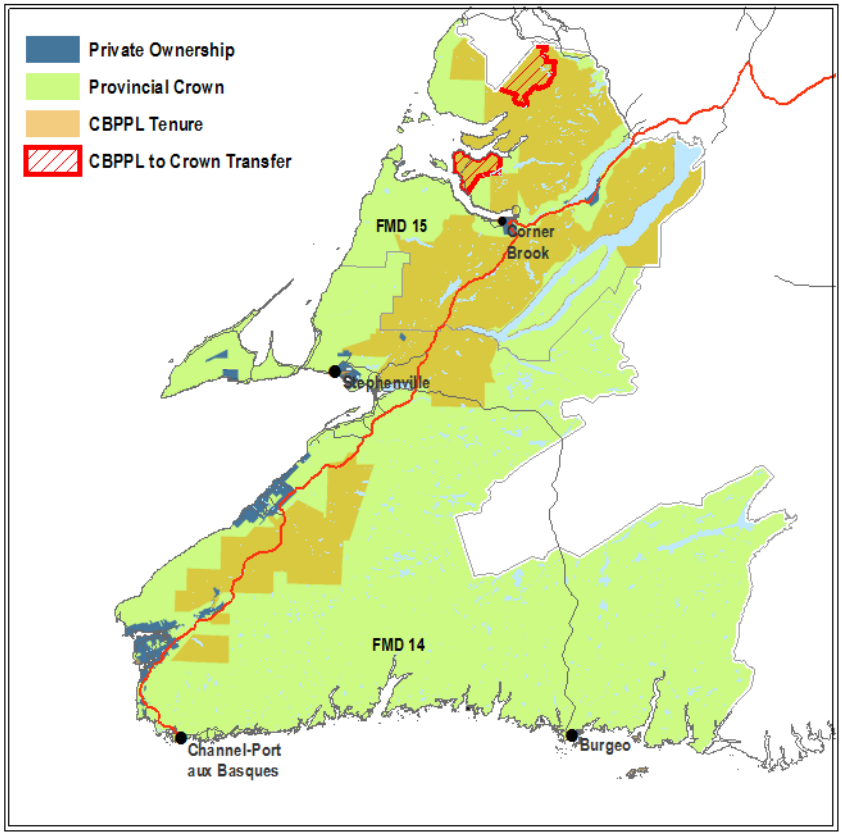

FIGURE 1. 2: ZONE 6 OWNERSHIP

1.3 Physical

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.

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.

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).

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.

1.4 Ecosystems

1.4.1 Forest Ecosystems

An ecosystem is a community of interacting and interdependent plants, animals and microorganisms, together with the physical environment within which they exist (adapted from Perry, 1994). 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 phenomena 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 favoured this fire-adapted species. In western and Northern Newfoundland the climate is somewhat moister and fires are far fewer in this region resulting in the ascendance of balsam fir, a species which is poorly adapted to fire.

1.4.2 Ecoregions and Sub-Regions

Damman 1979, defined ecoregions as areas where 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. According to Damman, nine ecoregions are represented in Newfoundland. Each of these is further divided into sub-regions (also known as ecodistricts) All of the Newfoundland 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.

Figure 1.3 depicts Planning Zone 6 relative to Damman's ecoregion classification system. The Western Newfoundland Forest Ecoregion encompasses the majority of the area in District 15 while the Long Range Barrens Ecoregion covers the largest percentage of area in District 14.

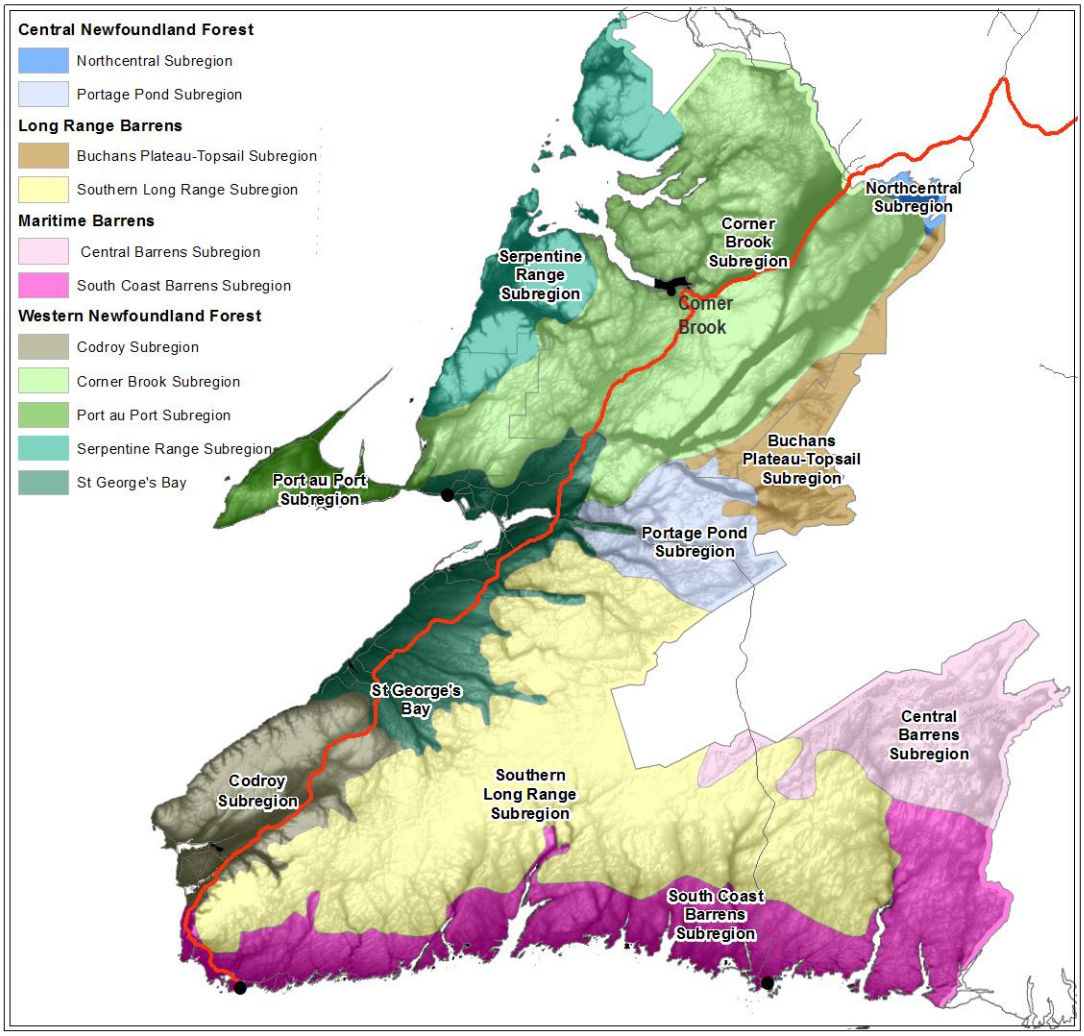

FIGURE 1.3: ECOREGIONS AND SUB-REGIONS PLANNING ZONE 6

TABLE 1. 1: PERCENTAGE OF ECOREGIONS AND SUB-REGIONS IN PLANNING ZONE 6.

Name of Ecoregion and Subregion	Total Area in Province	Percentage of Total Area in Districts			Relative Percentage of Ecoregion and Subregion in Districts		
	(ha)	14	15	Total	14	15	Combined
Long Range Barrens							
Buchans Plateau - Topsail Subregion	369811	15	7	22	4	5	4
Southern Long Range Subregion	599815	94	0	94	37	0	27
Western Newfoundland Forest	116278	100	0	100	8	0	6
Codroy Subregion	515637	11	82	93	4	75	23
Corner Brook Subregion	41579	100	0	100	3	0	3
Port au Port Subregion	145132	13	67	80	1	18	6
Serpentine Range Subregion	152185	99	1	100	10	<1	7
St. Georges Bay Subregion							
Central Newfoundland Forest							
Portage Pond Subregion	149319	55	2	57	5	< 1	4
Northcentral Subregion	2310742	0	<1	< 1	0	<2	<1
Maritime Barrens	1514392	10	0	10	10	0	7
Central Barrens Subregion	894252	30	0	30	18	0	13
South Coast Barrens Subregion							

1.4.2.1 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 sub-regions. The sub-regions 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.

1.4.2.1.1 Buchans Plateau – Topsails Sub-Region

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

1.4.2.1.2 Southern Long Range Sub-Region

The Southern Long Range Sub-region encompasses most of the center of District 14 and covers the upper reaches of the river valleys and the higher terrain. In these river valleys, more of the southern plant species are present particularly yellow birch. Speckled alder thickets occur on alluvial soils.

1.4.2.2 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 sub-regions of which five are represented in the zone.

1.4.2.2.1 Codroy Sub-region

This sub-region 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 sub-region.

1.4.2.2.2 Corner Brook Sub-Region

This sub-region extends from Bonne Bay to Stephenville and east to Grand Lake. In forestry terms, it is the only important sub-region in District 15. The sub-region 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 sub-region is dominated by shallow loamy soils over shale bedrock. However, the shallowness of the till does not adversely affect 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.

1.4.2.2.3 Port au Port Sub-Region

This sub-region 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 sub-region.

1.4.2.2.4 Serpentine Sub-Region

This sub-region 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.

1.4.2.2.5 St. George's Bay Sub-Region

This sub-region 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 sub-region but limestone is absent. The ecoregion is

forested but coastal areas are marginally productive. Ombrogenous (low plateau) bogs cover much of the lowlands.

1.4.2.3 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 metres. 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 140160 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 sub-region

1.4.2.3.1 Portage Pond Sub-Region

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

1.4.2.3.2 North Central Sub-Region

The North Central Sub-region has the highest maximum temperatures, lowest rainfall, and

highest forest fire frequency on the island. The sub-region extends from Clarenville to Deer Lake with a mostly rolling topography of less than 200 metres. The history of fire is evident by the pure black spruce forest with white birch and aspen stands that dominate the sub-region. This sub-region comprises less than one percent of the zone.

1.4.2.4 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.

1.4.2.4.1 Central Barrens Sub-Region

This sub-region 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 sub-regions. 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.

1.4.2.4.2 South Coast Barrens Sub-Region

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

1.5 Ecosystem Dynamics

1.5.1 Ecosystem Condition and Productivity

Landscape patterns determine the variety, integrity, and interconnectedness of habitats within a region. These landscape patterns are a direct result of the relationship amongst physical landforms and soils, disturbance history, and relationships among various species that make up 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.

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 is descriptive and explanatory in nature.

1.5.1.1 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% productive forest. As well, the relative proportion of site types is 21% good, 62% medium and 17% poor with a mean annual increment (MAI) of 3.4, 2.7, and, 1.3 m3/ha/yr respectively. The 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. 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 by tree species by ecoregion. This can be readily measured over time and manipulated through silvicultural 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.

1.5.1.2 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 depend 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 ecosystem's resilience is controlled by properties such as climate, parent soil, topography 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. Indicators include the percent and extent of area by forest type and age class and the percentage of disturbed areas that are successfully regenerated. Resilience is determined by measuring and monitoring these parameters. Forest activities must be carefully planned to not upset the natural balance and lower an ecosystem's resilience.

The ability of forest stands to regenerate themselves demonstrates their resiliency in the face of harvesting or some other natural disturbance. 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.

1.5.1.3 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 which include; species, structural 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), occurs only after long time periods or with outside inputs (eg. 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 in 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.

1.5.1.4 Disturbance regimes and Successional Patterns

There are four main driving forces that cause disturbance in the boreal forest. As stated in section 1.6.5, 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 a stand is weakened by some other agent like insects. For this reason successional patterns after insect damage and wind throw will be discussed together. The following is a brief synopsis of successional patterns after each major disturbance type by forest type and site type.

1.5.1.4.1 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%. The NSR rate is fairly constant across all site types. These sites would be candidates for planting with white, black or Norway spruce.

In the balsam fir types, regeneration success back to balsam fir is much higher averaging 85%. 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%.

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%.

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.

1.5.1.42 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%. 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%. 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% 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.

1.5.1.4.3 Insect

Balsam fir is highly susceptible to insect attack from the hemlock looper and spruce budworm whereby black spruce and hardwood is hardly impacted by these insects. For this reason, stands with a high component of balsam fir are more susceptible to insect attack and subsequent wind throw.

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% of the time, but can be significantly higher if pure stands of immature balsam fir are killed.

1.5.2 Biodiversity

Biodiversity is a term that maybe used to describe the variety of life on earth, and may include the variety of animals, plants and microorganisms that exist on our planet, including the genetic variety within these species and the variety of ecosystems they inhabit.

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

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

1.5.2.1 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. Species extinction maybe considered 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.

1.5.2.2 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 zone's forest. Responsible planning should design and implement measures which maintain or enhance viable populations of all 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.

1.5.2.3 Ecosystem 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 ecosystem 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.

1.6 Forest Characterization

1.6.1 Land Classification

Table 1.2 displays the land classification broken down by ownership and district for Planning Zone 6. The total mapped land area in the zone is approximately 2 million hectares. There are approximately 32,000 and 34,000 ha not mapped in Districts 14 and 15 respectively. The following discussion will focus mainly on the mapped area.

There are four basic categories that currently represent how the land is classified and include; productive, non-productive, non-forest and fresh water. Individual break outs by district and owner are shown in Table 2. Figures 4 and 5 displays the relative percentages of each major land class category in each district with all ownerships combined. 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.

In general, District 14 has 22% of its total land area in the productive forest category while District 15 has 49%. 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. This has implications for harvesting and road building costs which are generally higher when the forest is more fragmented. The Forest Services Branch is also 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 LAND CLASSIFICATION BY DISTRICT AN OWNERSHIP IN HECTARES FOR PLANNING ZONE 6.

Land Class	Ownership				Total		
	CROWN		CBPPL				
	14	15	14	15	14	15	Total
disturbed	6259	3239	2275	12961	8534	16200	24734
age class 1	30316	7408	17121	36463	47437	43871	91308
age class 2	41598	15634	26058	25059	67657	40692	108349
age class 3	30528	9646	21058	25110	51586	34756	86342
age class 4	20529	16281	5834	32450	26363	48731	75094
age class 5	31808	16946	14046	30744	45855	47690	93545
age class 6	27668	6785	6146	14249	33814	21034	54848
age class 7	40937	4415	3935	3180	44872	7595	52467
Total Productive	229643	80354	96473	180216	326118	260569	586687
softwood scrub	257917	28120	32364	53705	290282	81825	372107
hardwood scrub	7019	3312	2758	2847	9777	6159	15936
Total Non-Productive	264936	31432	35122	56552	300059	87984	388043
rock barren	132315	3747	26842	12237	136062	39079	175140
soil barren	255647	13671	15065	7818	269318	22883	292201
Bog	284010	18747	14190	25514	302757	39704	342462
cleared land	2637	217	983	605	2854	1589	4443
agriculture land	4020	219	798	152	4239	950	5189
residential	5289	98	3622	713	5387	4335	9722
right of ways	1127	695	823	658	1822	1481	3302
miscellaneous	1584	405	443	484	1989	926	2915
Total Non Forested	686629	37799	62766	48181	724428	110947	835374
Fresh Water	107571	48482	6734	18640	114305	67122	181427
Total All Classes	1288779	198067	201095	303589	1464910	526622	1991531

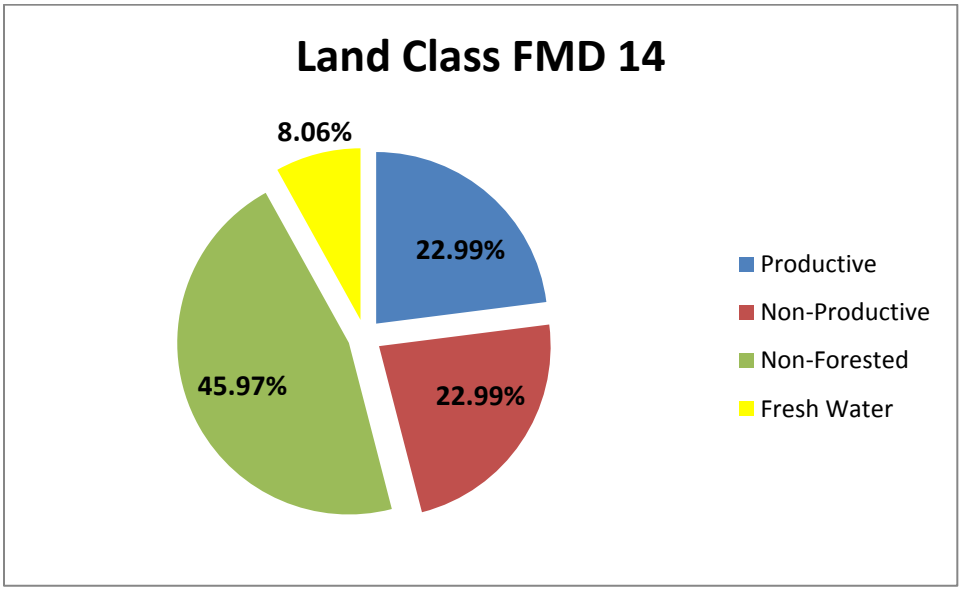

Figure 1.4: land class Breakdown for all ownerships District 14.

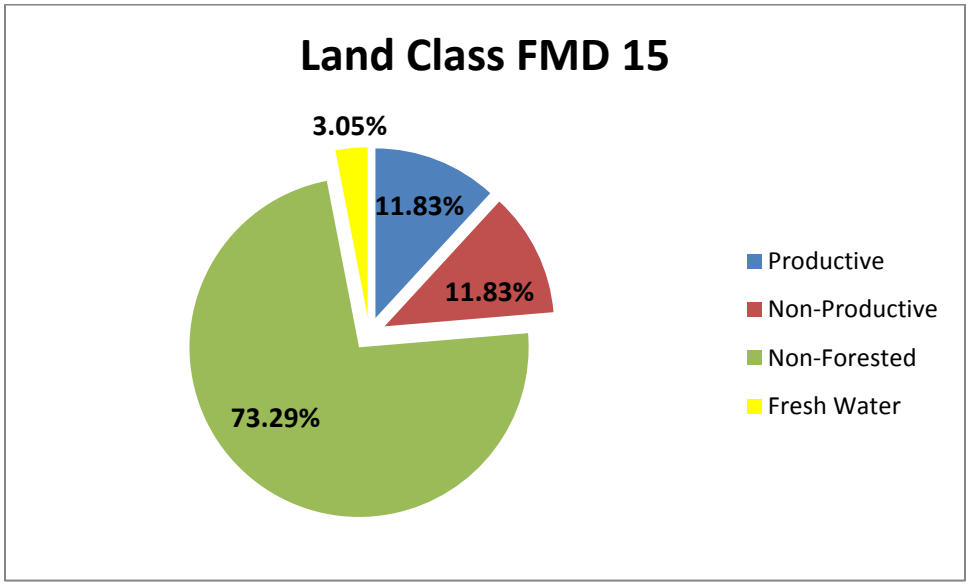

FIGURE 1.5: LAND CLASS BREAKDOWN FOR ALL OWNERSHIPS IN DISTRICT 15.

1.6.2 AGE CLASS

Individual tree ages in a stand can all be the same after forest fire or manual planting. However; in most cases the ages vary. Foresters describe ages in terms of age classes which generally

encompass 20 years. The age classes present in the zone are regenerating (age class 1, 0-20 years), immature (age class 2, 21-40 years), semi-mature (age class 3, 41-60 years), mature (age class 4, 61-80 years), and over mature (age class 5, 81-100 years), (age class 6, 100-120 years), (age class 7, 120+ years). The combined age class distribution in each district for the entire productive forest is shown in Figures 1.6 and 1.7. In general terms, the more balanced the age class distribution in a district, the higher the potential even flow sustained yield of timber can be realized. The age class structure for District 14 is described as an abundance of area in the young and old age classes with a dip in the intermediate age classes. In District 15, the age class structure is more balanced. Age class structures by owner and district will be discussed in more detail in each pertinent five year plan.

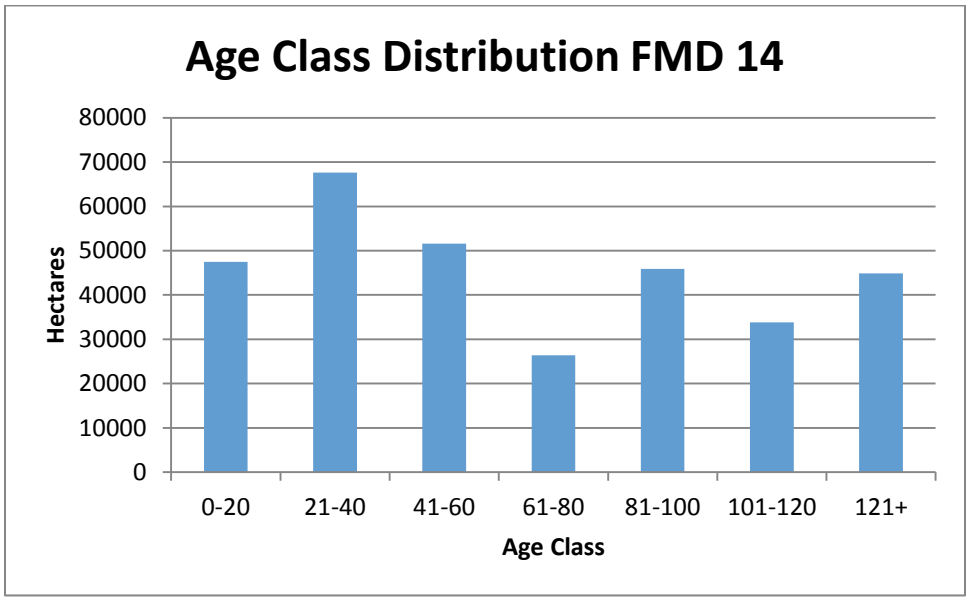

Figure 1.6: Age class distribution District 14.

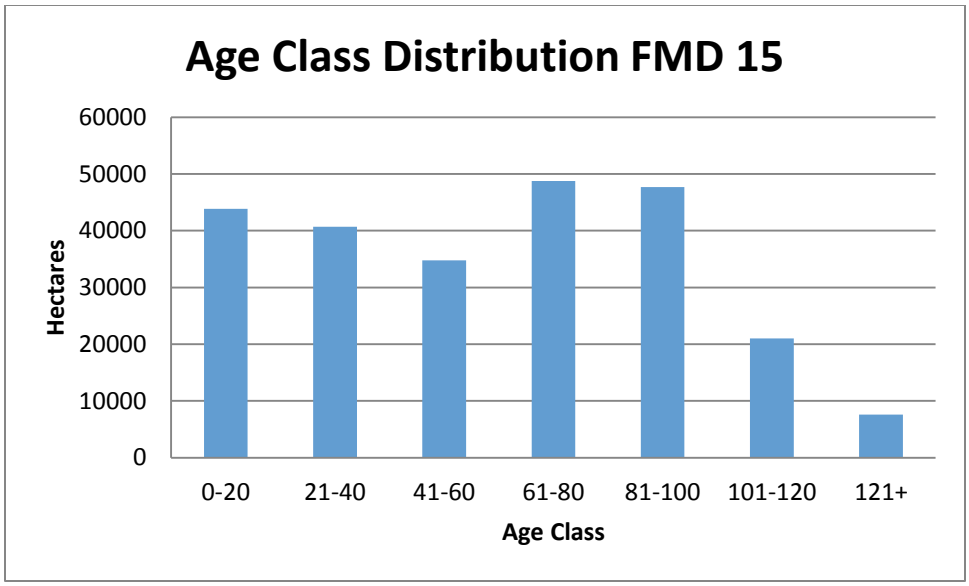

FIGURE 1.7: AGE CLASS DISTIBUTION DISTIRCT 15.

1.6.3 Site Class

The productive forest in the zone is further sub-divided along a gradient of productivity ranging from poor to good site class. The site class is determined through air photo interpretation supplemented with field checks and is based primarily on the ability of a particular site to produce timber. Site capability is determined on a number of factors some of which include soil fertility, moisture regime and geographic (slope) position. Generally, balsam fir and softwood hardwood working groups occupy the better sites in the zone. The black spruce working groups dominate the very dry and very wet areas that are of poorer site quality.

The distribution of area of all ownerships combined by site class for each district is shown in Figures 8 and 9. As with productivity, the proportion of better sites favours CBPPL timber limits. On average, good sites are capable of producing 3.4 m3/ha/yr, medium sites 2.7 m3/ha/yr, and poor sites 1.3 m3/ha/yr.

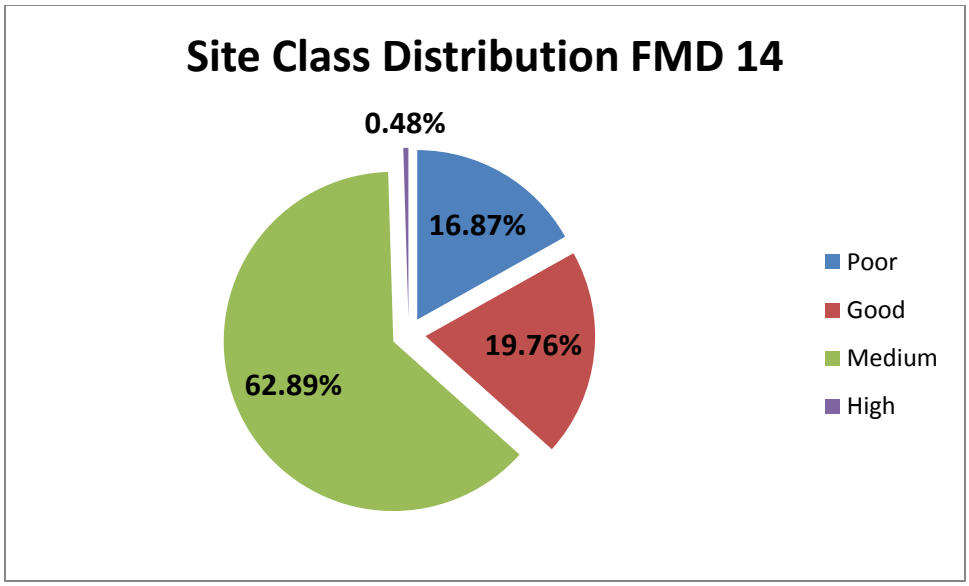

FIGURE 1.8: SITE CLASS DISTRIBUTION DISTRICT 14

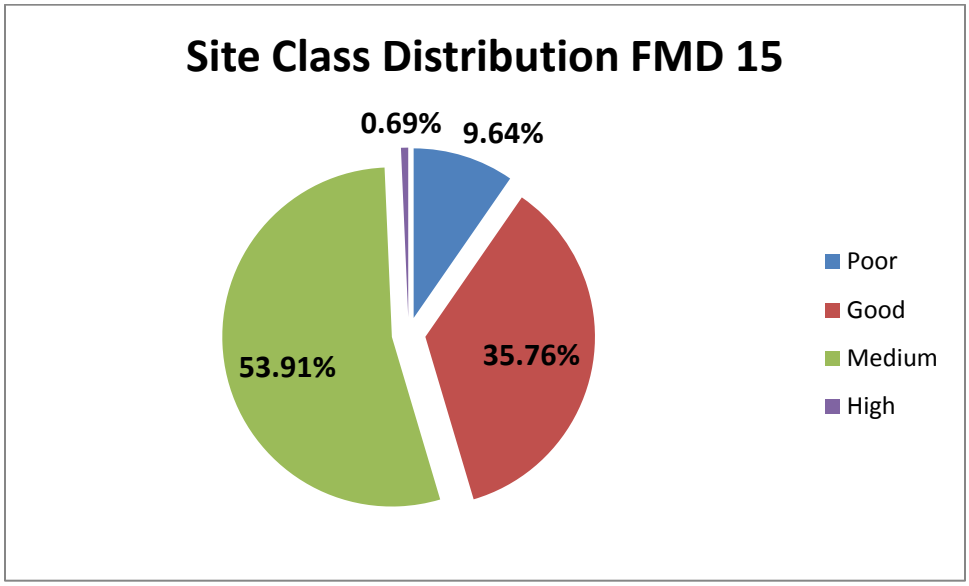

FIGURE 1.9: SITE CLASS DISTRIBUTION DISTRICT 15.

1.6.4 Species and Working Group

Working group describes the dominant tree species present in a forest stand. A species may occupy 100% 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 85% of the productive forest. Balsam fir (bF) is by far the most prolific accounting for 67 % of the working groups in District 14 and 60% in District 15 (Figures 1.10 and 1.11). 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 8% in District 14 and 15% in District 15. As with balsam fir, black spruce can occur as pure stands or in association with other species listed above. Softwood hardwood working groups occupy 9 & 13% 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 4% of the productive forest is classed as disturbed (DI). Disturbances include harvesting, 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.

1.6.5 Forest Disturbances

In the past 20-25 years, approximately 32,000 ha have been disturbed by some means on crown land within the zone. The main forest insects which have affected forests in western Newfoundland are the hemlock looper (1949, 1961, 1962, 1969, 1986-88, 1995, 1996), the spruce budworm (1956, 1978-80 to present at lower levels), the balsam woolly adelgid (1963, 1970-present) and the birch casebearer (1970-present). A chemical spray program was initiated in 1969, to aid in the control of the hemlock looper. Since then, the aerial application of insecticides has been used regularly as a management tool to control insect pests of balsam fir. However, in more recent years, a naturally occurring biological control agend known as biologically insecticide bacillus thurengiensis (bT), has been utilized in spray programs. Hemlock looper and the spruce budworm still continue to pose a significant threat to the forests of the zone and new infestations are likely to develop over the next 20 years.

Another insect of particular importance is the balsam fir sawfly, a native defoliator that rarely causes significant mortality. Typically, an infestation of this insect collapses due to parasitism and viral diseases well before lethal damage occurs. However, a sawfly epidemic began in the Bottom Brook area of District 14 in the early 1990's and spread northward into District 15. This infestation, which has now collapsed has resulted in serious growth loss in the affected forests. The balsam woolly adelgid is an ongoing insect pest of balsam fir, particularly in District 14. This insect occurs mainly on the coastal lowlands and impacts the newest tree growth causing node swelling and stagnation which results in severe growth loss of affected stands and poorer wood quality. To date there has been no available treatment for this insect other than stand conversion.

2.0 Past Activities

2.1 District 14

2.1.1 Overview

There was significant activity in District 14 from 2014 to 2018. There was over 38,000 m3 harvested commercially on Crown Land and 181,000 m3 harvested domestically on Crown Land. In addition, there was 25,000 m3 harvested domestically on CBPPL exchange areas in this district. There were 108 hectares silviculturally treated, and 4.5 km of access roads constructed/reconstructed

2.1.2 Harvesting

There was an under harvest of the AAC's on Crown in both Class 1 and Class 3 areas. An explanation of Class 1 and Class 3 landbases can be found in section 3.4.2. The main reasons are; the fragmentation of the forest, the difficult logging chances for commercial operations, and domestic harvest of hardwoods on CBPPL limits.

2.1.2.1 Commercial

There was approximately 38,518 m3 of softwood harvested commercially in District 14 in the last plan period (Table 2.1).

TABLE 2.1: SUMMARY OFCOMMERCIAL HARVEST IN DISTRICT 14 BY CROWN FOR 2014-2018.

District		Core				Operational (available)				Non-AAC Wood	
	Crown	AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
SWD	2014	41,164	4706.1			8,774	714.9			0	0
	2015	41,164	15,386			8,774	0				
	2016	41,164	6229.0			8,774	0				
	2017	41,164	4084			8,774	0				
	2018	41,164	4000			8,774	0				
	Sub-Total		29,699				714.9			0	0
		Core				Operational (Available)				Non-AAC Wood	
	Crown	AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
HWD	2014	1,804	1292.9			328	356			0	0
	2015	1,804	2404.0			328	0				
	2016	1,804	467.1			328	0				
	2017	1,804	655			328	0				
	2018	1,804	3000			328	0				
	Sub-Total		7819				356			0	0
District Total			37,518				1,070.9			0	0

2.1.2.2 DOMESTIC

Table 2.2 summarizes domestic harvesting on Crown Land over the last planning period. There were over 143,902 m3 of softwood harvested domestically in District 14. In addition, approximately 21, 700 m3 of hardwood was harvested during the period. It is expected that the domestic demand will remain constant at 2000 permits/year. Volumes harvested as birch or landing and cutover cleanup on CBPPL limits in District 14 are not listed in this total.

TABLE 2.2: SUMMARY OF DOMESTIC HARVEST IN DISTRICT14 BY CROWN FOR 2014-2018.

District 14		Core				Operational (Available)				Non-AAC Wood	
	Crown	AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
SWD	2014		19,249				4,457			2,661	
	2015		20,000				5,669			3,194	
	2016	43,706	25,725							3,138	
	2017	43,706	34,401							3,658	
	2018	43,706	34,401							3,658	
	Sub-Total		133,776				10,126			16,309	0
		Core				Operational (Available)				Non-AAC Wood	
	Crown	AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
HWD	2014						5,337			0	0
	2015						7,997				
	2016	1,435	1,400			328	1,400				
	2017	1,435	1,400			328	1,400				
	2018	1,435	1,400			328	1,400				
	Sub-Total		4,200				17,534			0	0
District Total			137,976				27,660			16,309	0

Domestic Harvest also occurred on Corner Brook Pulp & Paper transferred areas to Crown. The table below outlines this harvest in Forest Management District 14

TABLE 2.3 FMD 14 SUMMARY OF DOMESTIC HARVEST IN KRUGER BLOCKS MANAGED BY CROWN IN 2014-2018

District 14		Operational			
	Kruger Exchange Blocks	AAC	Domestic	Deviation	Total
HWD	2014		2,856		
	2015		5,632		
	2016		5,794		
	2017		5,632		
	2018		5,800		
	Sub-Total		25,714		

2.1.3 Silviculture

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	0	0
Site Preparation (raking)	13.6	0
Planting	579.8 (includes aerial seeding)	509.97 (includes aerial seeding)
Commercial Thinning	0	0
Prescribed Burning	867.4	107.80

TABLE 2.4 SUMMARY OF CROWN SILVICULTURE TREATMETNS IN DISTRICT 14 FROM 2014-2018.

2.1.4 Road Construction

TABLE 2. 5: SUMMARY OF CROWN ACCESS ROADS BUILT (PRIMARY AND SECONDARY) IN PLANNING ZONE 6 FROM 2014-2018.

Roads		
	Proposed (km)	Constructed (km)
New Construction	11.4	4.5
Re-Construction	0	0
Total	11.4	4.5
Bridges	0	1

2.1.5 Natural Disturbance

2.1.5.1 Fire

District 14 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. Over the past planning period there were 42 reported forest fires but only 54.6 ha of productive forest was burnt. Most of these fires were small grass fire which occurred early in the spring.

2.1.5.2 Insect

The population of balsam fir sawfly collapsed in District 14 in the early 2000's and moved

eastward into District 15. There has been no defoliation or treatment for either the hemlock looper or balsam fir sawfly in District 14 in the last 17 years. Damage caused by the balsam woolly adelgid is still evident within previously effected, as well as, new areas.

2.2 District 15

2.2.1 Overview

There has been modest activity by the crown in District 15 from 2014 to 2018. There was slightly over 4,700m3 of softwood commercially harvested on crown land during this period. There was 10 km of access road maintenance / constructed and 270 ha silviculturally treated.

2.2.2 Harvesting

There was significant under harvesting of the AAC's on crown in both class 1 and class 3 areas. The main reason was the over-estimation of the AAC in 2001 due to an outdated forest inventory.

2.2.2.1 Commercial

Commercial softwood harvesting accounted for 4,702 m3 in District 15 between 2014 and 2018.

TABLE 2.6: SUMMARY OF CROWN AAC COMMERCIAL HARVEST IN FMD 15 FROM 2014 TO 2018.

District		Core				Operational (available)				Non-AAC Wood	
Crown		AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
SWD	2014	21,100	1,288			8,300				0	0
	2015	21,100	2,556			8,300					
	2016	6,109	858			12,546					
	2017	6,109	0			12,546					
	2018	6,109	0			12,546					
	Sub-Total		4,702							0	0
		Core				Operational (Available)				Non-AAC Wood	
HWD	Crown	AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
	2014	400				700				0	0
	2015	400				700					
	2016	2,214				656					
	2017	2,214				656					
	2018	2,214				656					
	Sub-Total									0	0
District Total			4,702							0	0

2.2.2.2 DOMESTIC

During the 2014-2018 planning period, domestic softwood harvesting accounted for 161,532 m3 on Crown Land and 21,436 m3 on CBPPL Exchanged Land. Local residents have a very strong attachment of the forest in the district, which coupled with the price of oil has resulted in domestic cutting increasing to 1200 -1400 permits annually.

TABLE 2.7 SUMMARY OF CROWN AAC DOMESTIC HARVEST IN FMD 15 FROM 2014 TO 2018

District		Core				Operational (Available)				Non-AAC Wood	
	Crown	AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
SWD	2014		19,249				4,457			2,661	
	2015		20,000				5,669			3,194	
	2016	35,916	25,725							3,138	
	2017	35,916	34,401							3,658	
	2018	35,916	34,401							3,658	
	Sub-Total		131,776				10,126			16,309	0
		Core				Operational (Available)				Non-AAC Wood	
	Crown	AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
HWD	2014									0	0
	2015										
	2016	1,107	1,107								
	2017	1,107	1,107								
	2018	1,107	1,107								
	Sub-Total		3,321							0	0
District Total			135,097				10,126			16,309	0

TABLE 2.8 FMD 15 SUMMARY OF DOMESTIC HARVEST IN KRUGER BLOCKS MANAGED BY CROWN IN 2014-2018

District	Kruger Exchange Blocks	Core			
		AAC	Domestic	Deviation	Total
SWD	2014		3,765		
	2015		3,375		
	2016		3,944		
	2017		4,069		
	2018		4,100		
	Sub-Total		19,253		
		Operational			
HWD	Crown	AAC	Domestic	Deviation	Total
	2014		418		
	2015		375		
	2016		438		
	2017		452		
	2018		500		
	Sub-Total		2,183		
District Total			21,436		

2.2.3 SILVICULTURE

Table 2.8 summarizes proposed and completed silviculture treatments for the 2014-2018 planning period

TABLE 2.9: SUMMARY OF SILVICULTURE TREATMENTS IN DISTRICT 15 2014-2018.

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	0	0
Site Preparation (raking)	0	0
Planting	311.40	270.05
Commercial Thinning	0	0
Prescribed Burning	0	0

2.2.4 Road Construction

There were no primary access roads built in District 15 for the 2014-2018 planning period. However Table 2.9 summarizes the secondary completed forest access road construction and reconstruction for the same period.

TABLE 2.10: SUMMARY OF ROAD CONSTRUCTION IN DISTRICT 15 2014-2018.

Roads		
	Proposed (km)	Constructed (km)
New Construction	10.4	10.4
Re-Construction	0	0
Total	0	10.4
Bridges	0	0

2.2.5 Natural Disturbance

2.2.5.1 Fire

District 15 does not have an active fire history due to its long winters and abundant precipitation. In fact there were only 8 fires recorded in the last planning period which burnt 2.6 ha of productive forest.

2.2.5.2 Insect

Populations of the balsam fir sawfly collapsed in District 15 in 2009 and no areas of moderate to severe defoliation have been observed since. Hemlock looper populations have also remained at low levels over the last eight year with only 741 ha of forest in the White's River area treated with bacillus thurengiensis (Btk) in 2015 and 69 ha of moderate to server defoliation observed. Egg mass surveys conducted in the fall of 2015 to forecast hemlock looper populations in 2016 detected moderate to high population in the Main River area, however, unknown factors caused these populations to collapse naturally without any intervention. Areas with trees damaged by the balsam woolly adelgid have increased in District 15 over the last 2-3 years.

3.0 TIMBER SUPPLY ANALYSIS

3.1 INTRODUCTION

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 added together, provide the annual allowable harvest level for the island.

3.2 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.

3.3 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.

3.4 Timber Supply Analysis

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.

3.4.1 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

3.4.2 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;

Class 1 - available for harvest under normal conditions, and

Class 3 - has restrictions for harvesting due to economic constraints.

The Class 3 has been further subdivided into:

a) area can be harvested with reasonable economic restrictions (expensive wood) and

b) area is highly unlikely to be harvested under current economic conditions.

Only the first portion of Class 3 is used to calculate an AAC for that category. The categories associated with the portion of Class 3 land, which are deemed unavailable for harvest, incorporates a broad range of timber and non-timber values. These values include:

3.4.2.1 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.

3.4.2.1.1 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 metre uncut buffer (from waters edge). In addition to these legislated water buffers, District Ecosystem Managers, in consultation with various stakeholders, have increased buffer zone widths beyond the 20 metre minimum to protect special values such as: salmon spawning areas, cottage development areas, aesthetic areas, wildlife habitat, outfitting camps, etc.

3.4.2.1.2 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, both the Forest Services Branch 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

3.4.2.1.3 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.

3.4.2.1.4 Protected Areas

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

3.4.2.1.5 Watersheds

For each of the forest management districts in Planning Zone 3, all of the public protected water supply areas and some of the larger watersheds (eg Gander River and Terra Nova River) 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.

3.4.2.2 Timber Related

The Agency also reduces the gross AAC's by taking into account other potential losses of timber, which include:

3.4.2.2.1 Insect/Fire/Disease Losses

The Department reduces AAC's to account for anticipated future losses resulting from insects, disease and fire using historical information.

3.4.2.2.2 Logging Losses

Surveys of recent harvested areas are conducted each summer throughout the Province todetermine the quantity and quality of fiber remaining. The estimates from these surveys are used to reduce the available AAC. As well, information is gathered throughout the AAC period to determine projected volume against the actual harvested volumes within a given area. The difference is evaluated and applied to net down the gross AAC numbers.

3.4.2.2.3 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. These factors and their impacts on timber supply will be further discussed in section 3.5.

3.4.3 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., Central 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.

3.4.4 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.

3.4.4.1 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.

3.4.4.2 Spatial Analysis

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 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 25 year harvest schedules build credibility into the forest management process. Every stand that will be harvested over the next 25 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 two periods. 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 Class 1 landbase. The Class 3 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.

3.4.4.3 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.

3.4.4.4 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 25 years.

3.4.4.5 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. In fact, over the next 25 years there is an average of 24, 18, 39, and 36 percent of 81+ timber left on the landscape for Districts 10, 11, 12, and 13 respectively. There is approximately one percent of the productive landbase disturbed by harvesting each year. 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.

3.4.4.6 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 2011 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. A small portion of a stand will develop faster; a small portion will lag behind; with the bulk of the stand type representing the average condition. Therefore, the first operability limit was staggered by 5 year intervals with the 10 percent, 30 percent, and 60 percent assigned to each availability class listed above respectively. 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.

3.4.4.7 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 2006 analysis include; 1) precommercial thinning of balsam fir, black spruce, and softwood hardwood stands, 2) full plant of any areas that do not regenerate naturally with either white spruce, black spruce, or Norway spruce, and 3) gap planting of either black spruce or balsam fir stands with either white spruce or black spruce. Gap plant is the filling of "holes" within stands that have inadequate natural regeneration of either balsam fir or black spruce.

The planting levels (ha) for districts 04, 05, 06, and 08 used in the analysis were 300, 300, 400 and 400 ha respectively.

3.5 Inventory Adjustments

One of the limitations of the current wood supply model is the inability to account for volume depletions outside of what is reported for harvesting operations. The model produces a gross merchantable volume (GMV) figure which requires adjustment to account for volume losses as a result of: fire, insects, disease, timber utilization practices and the presence of stand remnants.

3.5.1 Fire

An estimate of productive area loss as a result of fire was based on an analysis of the historical fire statistics maintained by Forestry Services Branch.

3.5.2 Insects

No forest mortality was documented by Forest Insect and Disease Surveys by the Forestry Services Branch in FMD's 4, 5, 6 and 8 during the last five year period. Long term averages of area of timber mortality from insect defoliation were used as the deductions in Planning Zone 3.

3.5.3 Timber Utilization

Information for this adjustment was derived from a series of intensive on-the-ground surveys, which measured the amount of wood remaining on cutovers following harvesting. This wood was comprised of solid merchantable wood (logging losses) and wood with inherent cull (butt/heart rot). Information was analyzed by harvesting system and season.

3.5.4 Stand Remnants

Following harvesting operations, small fragments of stands often are left for a variety of reasons (operational constraints, low volume stands, terrain conditions). These often result in the inability of the operator to achieve volumes predicted by the computer models. A series of surveys were conducted across the province and the results analyzed to determine the amount of productive area attributed to remnants.

The total inventory adjustment for the Crown is 21 %. The Class III inventory adjustment figures are the same for all districts/tenures. Hardwood inventory adjustment figures for all tenures/districts are the same as the Class 1 softwood figures noted above. Hardwood stands are resistant to fire and it is anticipated that there will be little utilization loss due to the high value for fuelwood.

3.6 RESULTS

The previous discussion in this chapter on woodsupply forms the basis of the 2016 analysis.

TABLE 3.1. ANNUAL ALLOWABLE CUT RESULTS FOR DISTRICTS IN PLANNING ZONE 6 2016-2020.

District	Ownership	Softwood			Hardwood		
		Core	Operational	Domestic	Core	Operational	Domestic
14	Crown	41,164	8,774	43,706	1,804	328	1,435
15	Crown	6,109	12,546	35,916	2,214	656	1,107

4.0 VALUES

4.1 GUIDING PRINCIPLES OF SUSTAINABILITY

There are five guiding principles of overall sustainability; environmental, economic, political, social, and cultural sustainability.

Environmental sustainability looks directly at ecosystem health, both now and in the long run. Ecosystem health is determined by such factors as ecosystem integrity, biodiversity, productive capacity, and resiliency as previously discussed. The five year operating plan must ensure that these factors are intact or there would be very few values left to manage.

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. This will probably remain the case until the economy improves. However, economic development should not proceed without the incorporation of the other factors into the decision making process.

Political sustainability refers to the goals and management objectives being applicable, administrable, and practical. These goals and objectives must then maintain these qualities well into the future with the aid of public input and support.

Social sustainability means fairness and equity to all stakeholders. The forest management strategy should not jeopardize the basic needs of the public; therefore, public involvement and awareness, participation, and decision-making clout are a necessity.

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 has 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.

4.2 Value Description

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 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
5. Each individual value was 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 each value. This will help facilitate the preparation of later sections of this plan by identifying potential areas of conflicting use early into the process.
6. In many instances, the Environmental Protection Guidelines (EPG's) **(**Appendix 1**)** 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 and are distributed throughout the island, where 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 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 moose management areas 5-13, 18, 19, 27 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 seral 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 (Northcott, 1980). 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 had increased considerably on the island with a population estimated at 90,000- 100 000 animals. In the past few years however populations have declined significantly with Planning Zone 6 being no exception. All or portions of caribou management areas 61, 62, 63 and 75 are located in the zone. Core caribou areas 19 to 26 are located in the zone representing the Buchans, LaPoile and Grey River caribou herds.

Critical Elements:

Recent studies and anecdotal information has indicated that the 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 .

4.2.1.1.3 Black Bear

Characterization:

The black bear is native to the island and is found in forested areas (Northcott, 1980). 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 be about 6 - 10,000 animals (Christine Doucette, Pers. Comm.). All or portions of black bear management areas 5-13, 18, 19, 27 and 43 are located within the zone.

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 (WD) of the Department of Environment and Conservation. This process takes into consideration information provided by the public and wildlife and forestry staff. Each year the WD 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 required for moose shelter and moose yards are required, they will be identified in consultation with the Wildlife Division.

Caribou

Both the Wildlife Division and Forestry Services Branch have identified important caribou

habitat areas within the province and have developed some best management practices which include:

- 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.

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 IFWD.

4.2.1.2 FURBEARERS

Characterization:

Ten species of furbearers occur in the zone; lynx, red fox, beaver, otter, muskrat, short-tailed 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 developed annually, upon

consultation with provincial trappers, Newfoundland and Labrador Trappers Association, general public, and departmental staff. Like the big 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 are to be left standing during harvesting operations.

4.2.1.3 Species of Interest

4.2.1.3.1 American 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. Representatives from TNNP, Forest Services Branch, Wildlife Division and CBPPL are represented as stakeholders of the recovery team. The purpose of this team is to set short-term and long-term population goals for the species in eastern Newfoundland and recommend ways which this may be accomplished. The Team has been established for some time now and has worked on the process of evaluating critical and recovery marten habitat and determining which forest activities can take place within these areas. Approximately, 16 marten have been relocated to these areas and the population estimate today is approximately 300. Once listed as Endangered, COSEWIC has now downgraded the marten listing to Threatened.

It is important marten habitat is protected in this area and some remnant stands of old growth (80+) forests remain throughout the zone. 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.

Critical Elements:

. sufficient habitat to support a viable population of marten;
. areas of known marten populations remain closed to trapping - only allow use of legal snare wire types

Guiding Principles:

Critical marten habitat 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 potential impacts of harvesting on this habitat and resultant changes to population levels. Continued development and refinement of this model will provide a more reliable means of evaluating impacts of harvesting on marten habitat in the future. Brian Hearn's work with the harvest schedule indicated that there is abundant suitable habitat in districts tested and that the amount will increase over the next 10 years, even if the full harvest is implemented. Work is now underway to extend this analysis to 20 years. Anecdotal evidence also seems to suggest that snaring and trapping may be the main impediments to marten recovery. Maintenance of appropriate forest habitat is also integral to the long-term recovery of this species.

The current timber supply model is constructed in such a way that analysis of marten critical habitat can be evaluated at the landscape level. Recommendations resulting from any of these ongoing initiatives will be incorporated into harvesting prescriptions, as required.

4.2.1.3.2 Piping Plover

Characterization:

The piping plover, (*Charadrius melodus*), is a small sandy coloured shorebird which can be found on sandy beaches in North America. It is distinguished from other plovers by its yellow-orange

legs, a black band across its forehead and a black ring around the base of its throat (the band may be complete or open in the front). The Atlantic Coast population is considered a distinct subspecies (*C.m. melodus*) and breeds on coastal beaches from Newfoundland to North Carolina and winters mainly from North Carolina to Florida although some may migrate further south.

This species is listed federally as endangered by COSEWIC as well as provincially in Newfoundland under the Endangered Species Act. In 2007, only 28 breeding pairs were found on the island of Newfoundland with all but one pair being found on the Southwest Coast. Beaches inhabited by piping plover in 2007 were as follows: Stephenville Crossing, Little Codroy (MacDougals), Grand Bay West, Cape Ray Beach in Cheeseman Park, Sand Banks Park, Big Barasway, Burgeo, and Seal Cove in the Coast of Bays area (east coast). Surveys in previous years revealed that they nested at three additional sites: Sandy Point, Flat Bay and Searston Beaches'.

Preferred nesting habitat is relatively undisturbed wide sandy beaches or beaches with sand and scattered cobble, gentle slopes, beach wrack (seaweed and other marine material which washes ashore) for hiding and foraging, and tidal flats (muddy areas) or backwater lagoons (areas with a mix of fresh and saltwater in back of the beach). The latter are rich in invertebrates and provide excellent feeding sites for adults and chicks.

Due to the low numbers of breeding pairs on the island, any loss of individuals can significantly affect annual productivity. In 2007, productivity on the island was very low with only 0.5 young surviving to fledge per nesting pair. Perhaps the greatest threat to piping plover in Newfoundland is the use of ATV's on nesting beaches. Adults are driven off their nests by ATV's and the eggs are vulnerable to being run over. The tracks left in the sand by these vehicles are very dangerous because the chicks can get trapped in the ruts and perish. Another problem for plover is people allowing their dogs to roam free on nesting beaches. Dogs may drive adults off the nests exposing the eggs to predation. Pollution and litter on beaches also pose problems for piping plover by affecting habitat quality and by attracting predators (such as gulls, fox, and mink) when there are food scraps in the garbage. Enforcement officials from District 14 actively patrol nesting sites to enforce protection legislation and educate the public.

Critical Elements:

1. Pristine beaches
2. Beach wrack
3. Undisturbed natural features such as dunes, dune grass, and lagoons

Guiding Principles:

(1) Avoid using ATV's or other motorized vehicles on nesting beaches during the critical nesting and brood rearing period (mid May to late July). Travel on the beach should be close to the waters edge.
(2) Dogs should be kept on the leash when traveling on nesting beaches from early April until early August. If plovers or nests are encountered the area should not be used.
(3) Respect all fences or markers placed around nests or nesting areas and stay away
(4) Do not harass piping plover or their nests. Never touch or remove eggs or attempt to catch or chase newly hatched chicks.
(5) Dumping garbage or leaving (or burying) food scraps on beaches should be avoided.
(6) Report any violations you discover to either District Forestry Office or the Wildlife Division Office in Corner Brook.

4.2.1.3.3 Rare Plants

Characterization:

Approximately 300 plant species, or about a quarter of all plant species on the island of Newfoundland, are considered to be rare and are known from 20 or fewer locations on the island. Rare plants are often found in habitat types that are themselves rare or at least fairly restricted on the island. While the limestone barrens of the Great Northern Peninsula have garnered wide recognition as an important rare plant area, limestone barrens also exist further south along the west coast of Newfoundland, and other habitats with a high rare plant diversity exist on the central and southern west coast as well

The areas with limestone barrens include the western Port au Port Peninsula, and Table Mountain west of Stephenville. Although none of the three species listed federally and provincially as endangered occur south of Port au Choix, the southern limestone barrens nevertheless are rich in rare plant species, some of which are not found on the Great Northern Peninsula. For example, the only known locations of the Mackenzies's sweetvetch in Newfoundland are on the western Port au

Port Peninsula.

Other rare plant hotspots include the following:

-The Bay of Islands region, especially the Corner Brook Area, which has abundant limestone. While this area generally does not have large expanses of limestone barrens, open limestone cliffs, talus slopes and wetlands on limestone are abundant. The flora is somewhat similar to limestone barrens but the most arctic/alpine species do not occur in this area.

-The Stephenville Crossing/St. Georges River/Flat Bay area, has rare plants characteristic of salt marshes, coastal dunes, and shallow pond and river shores

-The lower reaches of Robinson's River, Crabbes River and Middle Barachois River host a variety of rare plants on river gravels and in the flood plain.

-The Codroy valley, which is warmer than most of Newfoundland and its complement of rare plants contains species characteristic of river floodplain and brackish estuary habitat, wetland species of the Coastal Plain element (distributed mainly on the Eastern Seaboard of North America), as well an arctic/alpine flora on barren mountain summits

-The Lewis Hills and Blow me Down Mountains, which have barren serpentine soils (rich in iron, magnesium and heavy metals) and support a special rare plant flora tolerant of these toxic conditions

-The Port aux Basques area harbours rare plants in sheltered stream valleys and coastal back dunes.

Most of the rare plant species throughout Newfoundland are inhabitants of fairly open habitats, such as river gravels, salt marshes, wetlands, aquatic habitats and barrens; all areas where no forestry operations are practiced. However, there are a number of rare plants that prefer or tolerate the partial shading found in forests. These are scattered throughout Districts 14 and 15, and often occur as single occurrences of rare plant species, rather than in groups of several rare species. Some species in forest habitat are protected from harvesting operations by buffers along watercourses, but some locations are not protected. Rare forest species are more likely to be found in moist sites with nutrient rich or calcium influenced soils, and is commonly associated with open forests or small forest gaps.

In forested areas many rare plant locations probably remain unknown because areas with only very scattered rare plants do not draw much botanical attention. The known rare plant distribution is very much a reflection of survey effort, which is by no means evenly distributed across the island. Botanical surveys have been mostly done within a few kilometres of major roads, and known plant hotspots generally inspire repeated botanical surveys. Many areas of

central and southern part of western Newfoundland appear to be devoid of rare plants, but it is likely that they have never been visited by botanists.

Critical Elements:

-quarrying and road construction
-logging and extraction using heavy equipment
-mechanical site preparation
-all terrain vehicle traffic also poses a potential threat in some areas

Guiding Principles:

. To ensure that rare and endangered plant species present in the district do not become extinct because of forest management operations.
. To identify and protect rare plant habitat
. To educate department personnel and the public on the locations and importance of rare plants

-Encourage domestic harvesting in the winter
-Identify and update all rare plant sites on GIS forestry data base
-Ensure that areas containing rare plants are marked and posted
-Work with the IFWD to develop mitigative measures in areas where rare plants occur.

4.2.1.3.4 Harlequin Duck

Characterization:

The eastern North American population of harlequin duck was listed as endangered in Canada in 1990, however in May of 2001 the status was changed to special concern. In Newfoundland these birds breed along clear, turbulent rivers, in Labrador on the Northern Peninsula and south coast. These birds winter along the east coast at Cape St. Mary's. In District 14, harlequins are present near Burgeo.

Critical Elements:

-Buffered rivers near or around waterfowl breeding, moulting, and staging areas.

Guiding Principles:

CWS recommend that a 100 metre buffer zone be left on any river where harlequins are found. On all other stretches of these rivers, a treed buffer of at least 30 metres should be maintained for

other waterfowl species utilizing the area. This is in agreement with the Department's Environmental Protection Guidelines which state that a minimum 30 metre, no-cut, treed buffer will be maintained from the high watermark in waterfowl breeding, moulting, and staging areas.

4.2.1.3.5 Other Species

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

4.2.1. Water Resources

Characterization:

The protection of water resources has emerged as a major issue in recent years both nationallyand 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, use and maintenance, timber harvesting, and silviculture may substantially 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 1 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 resource values is harvesting of timber to provide forest products. 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, heating and cooking. With the increase in population, more commercial uses have arisen for timber, which includes: lumber, pulp and paper products, and value added products.

Commercial harvesting and sawmilling activity provides many jobs in harvesting, sawmilling, trucking, pulp and paper manufacturing and related spin off industries for local residents.

Domestic harvesting still provides fuelwood to heat many homes and sawlog material for residential house construction in the zone. There are between 2800-2900 domestic cutting permits issued annually on crown land.

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.

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.

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.

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. 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. 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 that approximately five percent of the soils in the province are suitable for agriculture. It is not possible to identify and plan all sites for future agriculture use and often there is a conflict with other land uses particularly forestry because these sites are of high growing capability. Although a suitable land base 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 must be given for the agriculture industry to expand. This is particularly important for areas outside established agriculture areas.

Guiding Principles:

Lands designated for forest management can include areas with high potential for agriculture. Consequently, the forest landholders will work with the Forestry & Wildlife Branch to determine if opportunities exist for an exchange between agriculturally viable forest areas with unsuitable agriculture land within the Agriculture Development Areas. There is currently an AOI initiative ongoing with the Agriculture Division to identify and designate suitable agricultural areas in each district.

The agriculture leasing policy initiated in 1976 ensures that 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

The following will provide guidance for the development of agriculture within the zone:

- Home gardening leases should be confined to areas already developed for this activity

- New agriculture leases should include a business plan approved by the Forestry and Agrifoods Agency.

- Wood harvested on agriculture leases shall be completed under a crown cutting permit.

- First "Right of Refusal" for the harvesting of timber will be given to existing forestry commercial permit holders

- Where possible, existing commercial forest operators should be encouraged to work with farmers to clear new land for development.

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. The organic overburden should be stockpiled and stored in a manner so that it can be used to rehabilitate the site.
- Maintain updated maps of mineral potential, mineral claims and aggregate and quarry areas at the district office.
- Avoid planning silviculture activity in areas adjacent to mines or quarries
- Make every attempt to extract timber harvested as part of exploration and development. If timber cannot be feasibly extracted using conventional means then timber shall be piled so that it may be extracted during winter months by snowmobiles
- Mineral exploration that proposes to explore or develop within a silviculturally treated area must be undertaken with minimal disturbance and provide compensation as required
- Mineral exploration and/or development on mineral licenses within the zone will not be impeded. Specific proposed harvesting activities are identified in the annual operating plan.
- Quarry permits are required for aggregate material taken outside of the road ROW for purposes of road construction
- Non-compliance with exploration permits will be passed to the District Manager and submitted to Mines Division, Dept. of Natural Resources.

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 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 as 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, mechanical site preparation and regeneration have the potential to destroy historic resources.

While forestry activities can have adverse impacts on historic resources there are also beneficial effects. Where 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 and preserved.

Guiding Principles:

Any project involving land-use has the potential to adversely impact historic resources; therefore it is important that the provincial archaeology office be involved at the planning stage in order to ensure that mitigative measures to protect historic resources are developed at the earliest possible time.

In order to ensure that known archaeological sites and potential unknown sites are protected from forestry activities buffer zones will be necessary in some areas whereas archaeological assessments may be required in others. Known archaeological sites must be avoided and buffers will be required around them. Buffers will also be required along all rivers and ponds, as well as along the coastline where there is potential for archaeological resources to be found.

Occasionally there are accidental discoveries made of historic resources. In the event that 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 threatened 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. The following guiding principles should be applied;

. 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 NEWFOUNDLAND T'RAILWAY

Characterization:

A large section of the Newfoundland T'Railway Provincial Park lies in the zone and has an impact on forestry operations. The former CNR right of way, which is 50 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 in conjunction with the T'Railway Council to maximize adventure tourism and recreational opportunities.

The T'Railway is protected for the present and future enjoyment of the public as part of the 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.

The T'Railway 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 cross country skiing, hiking, biking, snowmobile and all terrain vehicle usage. Other new or historical uses such as commercial and domestic harvesting, quarry and mining access and cabin access are also allowed with a special permit.

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Critical Element

. protection of the historical landscape integrity of the T'Railway corridor
. preservation of the scenic quality along the corridor
. control of land usage adjacent to the T'Railway

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
- build partnerships with other stakeholders and user groups such as communities, industry and recreational organizations for the long term maintenance and development of the T'Railway
- in an attempt to preserve the natural value of the T'Railway, other land management agencies are requested to maintain a 100 m buffer along the right of way and to consider viewscapes in their harvesting and development plans.

- where access is required from the T'Railway, all roads shall be 100 metres away from the track before a landing or turnaround is constructed.
- where feasible, harvesting using the T'Rrailway shall be from May to December to avoid conflict with other user groups.

4.2.2.7 Parks and Protected Areas

Characterization:

The mission statement of the provincial Natural Areas Program is to protect, in an unimpaired condition, large wilderness areas, representative examples of all of the province's ecoregions including their natural processes and features, and rare natural phenomena, so as to preserve the diversity and distinctiveness of the province's ric natural heritage and to support an ecologically sustainable future for the benefit of present and future generations.

There are several different types of conservation areas in the province that contribute to the provincial system of protected areas, as recognized by the International Union for the Conservation of Nature. Wilderness reserves and ecological reserves are established via the *Wilderness and Ecological Reserves Act*. Wilderness reserves are generally large (>1000 km2) and are designed to protect complete ecological systems. Ecological reserves may be established to protect representative samples of each of the province's natural regions (ecoregions) with a mid-sized reserve (50-1000 km2), or to protect exceptional natural features, occurring in an area <10 km2, such as rare species or areas of unusual biological richness .Provincial Parks, established under the *Provincial Parks Act*, do play a conservation role but are primarily established as sites for outdoor recreation and nature-based education. Wildlife reserves may be established under the *Wildlife Act* for the protection of specific species or habitats, and public or crown reserves may be established for conservation reasons under the *Lands Act*. Finally, National Parks such as Terra Nova, Gros Morne and Torngat Mountains are established under the federal *National Parks Act*.

The benefits of protected areas are to preserve biodiversity, provide areas for scientific research, provide opportunities for environmental education, provide standards against which the effects of development can be measured, and provide natural venues for recreation, enjoyment of nature and ecotourism.

Protected areas include the T'Railway and Little Grand Lake public, wildlife and ecological reserves. Major parks include Gros Morne National Park, and J. T. Cheeseman, Sandbanks, and Barachois Provincial Parks. There are also some areas being considered through the Natural Areas System Planning process as study areas for future protected areas. At the time of the forest management planning process for Zone 7, these areas have not yet been finalized or released for public review.

Critical Elements:

- preservation of biodiversity
- maintenance of protected area integrity
- maintain natural processes and features
- act as control areas against which an assessment of forest management activities elsewhere on the landscape may be made

Guiding Principles:

- the type of activities encouraged or permitted within the different protected areas in the province depends entirely on the type of protected area and the reasons for its establishment
- generally all non-consumptive activities are permitted; educational activities and scientific research within protected areas generally require a permit but are encouraged
- in most protected areas, new development is prohibited, such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads and trails and cabins and new structures; legislation for Wildlife and Crown Reserves is generally more flexible than the other Acts.
- a 500 m no roads buffer is to be maintained around all existing and proposed protected areas to reduce access and resulting damage from motorized vehicles

- where forestry operations are within one kilometre of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary and any amendments to the forest plan within that buffer should be brought to the attention of the managing agency

4.2.2.8 OUTFITTING

Characterization:

The outfitting industry has been an integral component of the tourism industry on the southwest coast since the early 1900's. This region has always been a popular hunting and fishing destination because of the pristine environment and abundance of fish and wildlife species.

There are in excess of 300 big game licenses assigned to outfitters in the zone. An economic impact study conducted in 1995 by the Department of Industry, Trade and Technology suggests that a big game license has a net economic impact of $6864. By approximating this value for 2018, it can be seen that big game has a significant impact on the local economy. The many trout and salmon destinations in the zone also make fishing an important economic contributor.

Over the past 10 years, a significant number of traditional hunting and fishing facilities have diversified into the non-consumptive areas 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 to negotiate due to varying ranges of activity from operator to operator. Some operators make use of areas that are 8 to 10 kilometres away from the main lodge.

- in consultation with other stakeholders, roads and/or bridges may be decommissioned after forestry activities are conpleted
- new roads will be constructed as far away from existing outfitting camps as possible. Harvesting may be restricted around hunting and fishing camps during their season of operation.
- forest operations should be carried out in compliance with existing regulations and the EPG's -the forest service will work with outfitters to ensure that the integrity of the view from outfitter cabins is considered when conducting forest operations.

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 kilometres 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 a decrease in these recreational activities for some period of time.

***A**ccessibility*

An increase in forest access roads will potentially increase the amount of accessibility to remote areas. This in turn may increase the amount of traffic in an area (both vehicular and pedestrian) and decrease the value of the experience for many recreational activities.

Viewscapes

The majority of individuals who are involved in recreational activities are concerned about viewscapes. Many of the recreational activities occur because of a particular viewscape. The destination for many individuals is a result of the viewscape in that particular region.

Guiding Principles:

To prevent negative ecological effects and to ensure a positive experience, 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

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

Limiting Accessibility

Decommissioning of forest access roads could be a possible option when harvesting operations are completed. Harvesting should be conducted using winter forest access roads where possible. Winter roads create less traffic and require less effort to decommission.

***V**iewscape*

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

4.2.2.10 TOURISM

Characterization:

The tourism industry in Newfoundland and Labrador is based on our natural and cultural resources. Protection of these resources is critical for our industry to survive and grow**.** We currently have the resources to compete internationally with tourist destinations; however, competition for the international traveler is high in the tourism marketplace. The tourism industry in Newfoundland and Labrador has experienced significant growth since 1997. Tourism has been contributing between $580 million and $700 million annually to the provincial economy.

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 to implement strategies to minimize the visual impact of harvesting operations on the aesthetic values associated with viewscapes. Strategies will be discussed, negotiated, and implemented to provide a balance between harvesting and the values associated with tourism.

5.0 MITIGATIONS

Stakeholder	Contact	FMD	Operating Area	ISSUES / CONCERNS RAISED DURING 2019-2023 PLAN DEVELOPMENT (Interdepartment Review, ADM Review and on-on-one consultations with interested stakeholders)	Mitigation
Natural Areas	Jeri Graham	14	cc14010	The proposed new commercial harvest block cc14010 and the associated new road (both called Flat Bay Brook Operating Area) are in Barachois South area of interest. We request that this block and road be removed from the proposed 5-yr plan.	Remove Operating area from Proposed Plan
Wildlife	Jana Fenske	14	ck14013	These cut blocks are within Marten CH. The Wildlife Division would like to defer discussions on these areas to the last 2 years of the proposed 5 year plan. These 3 areas will therefore be no-go areas for at least 2019, 2020 and 2021 and revisited in 2021. (Wildlife)	Upon discussion, it was decided to leave in the proposed plan. This is a small enough area it should have minimal impact on habitat as well as fact that if harvested will likely be chain saw harvesting.
		14	ck14015	These cut blocks are within Marten CH. The Wildlife Division would like to defer discussions on these areas to the last 2 years of the proposed 5 year plan. These 3 areas will therefore be no-go areas for at least 2019, 2020 and 2021 and revisited in 2021. (Wildlife)	Upon discussion, it was decided to leave in the proposed plan. Currently have road infrastructure in place.
		14	ck14017	These cut blocks are within Marten CH. The Wildlife Division would like to defer discussions on these areas to the last 2 years of the proposed 5 year plan. These 3 areas will therefore be no-go areas for at least 2019, 2020 and 2021 and revisited in 2021. (Wildlife)	Upon discussion, it was decided to remove this proposed harvest area from the plan

		14	cc14021	The lichen species Degelia plumbea, a listed species under the Newfoundland and Labrador Endangered Species Act (NLESA), has been found on yellow birch stands within this area. We would like to request this area to be closed for cutting permits. (Wildlife)	Upon discussion, it was decided to leave in proposed plan. This is an important block for commercial hardwood harvesters in the district. Agreed to adopt CBPPL max DBH 50 cm as well as give priority to hardwood regeneration. In addition, Gap Plant where necessary.
Parks	Tina Leonard	14 & 15		Parks Division has a standing agreement that there is to be no cutting/harvesting within a 100 metre buffer and there are to be no new road or trail construction within 500 metres of the park boundary. We would like that these provisions to be incorporated into all mapping and written into the Guiding Principles section under 4.2.2.6 Parks and Protected Areas of the environmental assessment registration document. (Parks)	A 500 meter no road construction agreement is incorporated into plans. However, further discussion is required around the 100 meter buffer around all parks.
		14 & 15		Recommend that viewscapes around Provincial Parks be left intact by using mitigation measures where possible so as to ensure that the visitor experience to the park will be preserved especially near Barachois Provincial Park where the provided shapefile boundary from the park is ~ 100 metres. (Parks)	Upon review and analysis, it was decided to leave as is in the plan. The closest area to the park is a domestic area. The closest commercial block is 1.3 km from the boundary and almost 4 km from the campground.
		14 & 15		It is also recommended that forest cutting/harvesting and road building to be done outside of seasonal operating times. (Parks)	Upon review and analysis, it was decided to leave as is in the plan. The closest area to the park is a domestic area. The closest commercial block is 1.3 km from the boundary and almost 4 km from the campground.
Unifor Local 60N	Lindy Vincent	14 & 15		Attended the open house session in Massey Drive and did not have any concerns or issues with Crown Proposal. Indicated that he would like to receive any further forestry planning news and information.	An email was sent out on Wednesday, June 27 from District Manager providing the like to the government website were planning information is stored

Nl Forestry Association	Bill Dawson	14 & 15		Attended the open house session in Massey Drive and did not have any concerns or issues with Crown Proposal. Indicated that he would like to receive any further forestry planning news and information. In particular, a copy of the Environmental Policy.	An email was sent out on Wednesday, June 27 from the District Manager providing a digital copy of the Policy dated April 4, 2018
Dept of Tourism	Paul Taylor	14 &15		Attended the open house session in Massey Drive. Indicated that at this time, he would not be providing any comments on the plan. A letter was received from Tourism during the ADM Review	Response letter sent back to Tourism from ADM review addressing concerns and offering further discussions on topics of viewscape awareness
Concern Citizen	Glen Downey	14 & 15		Attended the open house session in Barachois Brook and did not have any concerns or issues with Crown Proposal. Indicated that he would like to receive any further forestry planning news and information	
Cabin Owner	Maureen Ivany	15	Domestic Block 29	Attended the open house session in Barachois Brook and did not have any concerns or issues with Crown Commercial Proposal. However, there was a concern regarding a Domestic Proposal on the Southern portion of FMD 15 on CBPPL Tenure, but where there is a crown hardwood agreement. Don't want any cutting of trees around the pond or near her cabin. She indicated that she will be submitting a Public Consultation Form regarding this concern	Through discussion with the District Manager, and District Conservation Officers, the boundary was modified to exclude this cabin area.
	Calvin White	14		Attended the open house session in Barachois Brook. Had concern with Flat Bay Block. He indicated that he will be submitting a Public Consultation From regarding this concern	Upon a discussion with District Manager, the area (CC14023) was removed from the Proposed Plan
Residents of the St. George's Area	Cyril Parsons Stanley Parsons Hayward Bennett Pauline Bennett Gerard LeRoux	14	CC14009	Request block CC14009 remain exclusive to domestic cutting, as the block has been a traditional domestic area.	CC14009, Dribble Brook Block will remain open to domestic cutting only

	Francis LeRoux Melvin White Allan MacDonald Kevin MacDonald				
Resident of Humber Valley	Paul Dowdon	15	Domestic Block Humber Valley Deer Lake	Requested Domestic block be open to softwood cutting in addition to hardwood.	The block conditions were amended to include softwood species in domestic cutting (exclusive of silviculture treated areas).
Dept of Municipal Affairs and Environment				Letter was received as part of the ADM review process regarding topics of Green House Gas (GHG) and Carbon Accounting.	Response letter sent addressing concerns and offering further discussions on topics of Climate Change awareness.
Stakeholder	**Contact**	**FMD**		**ISSUES / CONCERNS ADDRESSED DURING 2014-2018 PLAN DEVELOPMENT THAT WILL BE TRANSFERRED INTO THE 2019-2023 FIVE-YEAR PLAN**	**Mitigation**
		14 &1		Salmon Rivers	A minimum 100 meter no cut buffer will be applied to all scheduled salmon rivers

		5			within the zone
		14 & 15		Protected Public Water Supply Areas (PPWSA's)	Approvals will be obtained from Water Resources prior to any forestry work inside a PPWSA. Any activity will occur under the direction of permits and the Environment
				Appalacian Trail	Maintenance of a 10 meter buffer along the trail which passes through Stephenville Crossing
		14 & 15		Snowmobile Trail	20 meter buffer will be maintained
		14 & 15		T.railway	100 meter buffer will be maintained
		14 & 15		Cabins	20 meter buffer maintained around approved cabins, registered with Crown Lands

6.0 Public Consultation Process

6.1 Planning Framework

Forest Resource managers in Canada are striving for a society that successfully integrates economic, environmental and social considerations into all resource-related decision making. Since the early 1990's, there has been a country-wide shift from single resource management to a more comprehensive approach of forest ecosystem management. Sustainable Forest Management (SFM) must be balanced in light of social, economic, and environmental issues. In the context of SFM, this shift has resulted in a move from the traditional narrow focus of timber management, to incorporate non-timber values into the management planning framework. Another term that has become closely associated with SFM is "sustainable development" or in this case "sustainable forests", which not only takes into account the social, cultural, economic, and environmental benefits of the present, but those of future generations as well. Involvement of Interested Stakeholders into the five-year planning process is recognized by the Forestry Services Branch as a key component to achieving sustainable development.

As a result of the 1995 Environmental Preview Report, the Forestry Services Branch adopted an adaptive management planning process, which has three objectives:

1. Establish a productive planning framework to include all stakeholders. An effective planning framework must have information and issues defined at the beginning of the process.

2. Learn more about forest ecosystems while they are being actively managed (i.e. adaptive management). Adaptive management incorporates strategies which help us learn about the forest ecosystem and to deal with uncertainties.

3. Establish an ecosystem approach to forest management which integrates the scientific knowledge of ecological relations and limits of growth with social values. This will help to attain the goal of sustaining natural ecosystem integrity and health over the long term.

Adaptive management makes decisions based on input from interested stakeholders and establishes a continuous learning program. The adaptive approach allows us to communicate, share information and learn about forests being managed. This sharing of information, both old and new, then provides the flexibility necessary to adjust to changes and to set new goals**.** Such interaction is an absolute necessity for a subject as complex as an ecosystem.

6.2 Stakeholder Involvement

Since the mid 1990's, for each five-year plan, the Forestry Services Branch embarked upon a rigorous public consultation process involving a series of meetings spanning a number of months at an established venue, where interested stakeholders could discuss a range of forest management issues at an operational level.

With respect to the strategic level, in 2014, the Forestry Services Branch released a 10- year Provincial Sustainable Forest Management Strategy (PSFMS) Document (2014-2024), which emerged through wide consultation with citizens of the Province. The 2014-2024 PSFMS builds on the strengths of the previous strategy plans and uses a landscape-scale planning approach to implement the progressive and innovative ecological policies required for Sustainable Forest Management (SFM). The strategy builds on the strengths of the many modern and high-quality forest management programs that are currently being implemented in this province to ensure a vibrant and competitive forest industry.

Taking into account the many five-year plans successfully implemented within the province since the mid 1990's through public consultation processes and the recent PSFMS developed through public consultations, The Forestry Services Branch strives to improve its methods to garner advice from the public while also mitigating land-use conflicts. To this effect, as new five-year plans are being developed and implemented provincially, relevant issues raised from previous planning processes are considered the foundation the new plans.

In 2016, in addition to transferring issues/concerns/mitigations from previous planning processes, a revised approach of stakeholder involvement for the development of this plan was implemented. Known interested stakeholders from previous planning processes were engaged on a "one-on-one"

basis to evaluate potential activity prior to the plan submission to the Environmental Assessment Process. A Draft version of all maps for Zone 6 was posted to the Government Website on June 19, 2018. The Department placed an advertisement in the Western Star on Saturday, June 16, 2018, indicating to the general public that meetings will be occurring. The Dates and locations of meetings are indicated below. In addition to the Press Release, Tweets were also sent out from @gov.nl

For Zone 6, there were 2 formal meetings held

- June 26, 2018, from 2-4 pm and 5-9 pm at the Massey Drive Forest Management District Office
- June 27, 2018, from 2-4 pm and 5-9 pm at the St. George's Forest Management District Office

In addition to the meetings, Formal letters (through regular mail and email dated Friday, June 22, 2018), explaining the process and timeframe for elevating any concerns were sent out to the respective affected Municipalities within the Zone as indicated in the table below.

Burnt Island	Coxs Cove	Gilliams	Humber Arm South
Cape St. George	Deer Lake	Glenburnie-Birchy Head-Shoal Brook	Irishtown-Summerside
Corner Brook	Gallants	Hughes Brook	Isle aux Morts
Kippens	Lark Harbour	Lourdes	McIvers
Meadows	Mount Moriah	Rocky Harbour	Pasadena
Port au Port East	Port au Port West-Aguathuna-Felix Cove	Reidville	Rose Blanche - Harbour Le Cou
St. George's	Steady Brook	Stephenville	Stephenville Crossing
Trout River	Woody Point	Burgeo	Cormack
Cow Head	Parson's Pond	St. Pauls	

Finally, in the effort to reach out to all interested stakeholders, the Department strategically placed flyers explaining the process throughout the zone at the below locations:

- Port aux Basques (Colemans, Irving, Foodland,Credit Union, A-1 Convenience)
- Codroy Valley (Gales Produce, Credit Union, Mountain View Convenience)
- Port au Port Peninsula (Three Rock Convenience, Mainland Convenience)
- St. George's (Credit Union, St. Georges Pharmacy, Irving Gas Station, Midtown Variety, Town Office)
- Stephenville Crossing (Town Office, Irving Convenience, Colemans, Skinners Pharmacy, Karl's Canteen)
- Stephenville (Town Office, Canadian Tire Gas Bar, Esso, Ultramar, Colemans)
- Gallants (Community Centre)
- Lourdes (Gas Station)
- Mainland (Development Association Office)
- Cape St. George (Council Office)
- Kippens (Community Bulletin Board)

The results of stakeholder involvement are identified in the Mitigations Table in Section 5.

7.0 Management Objectives and Strategies

7.1 Harvesting

The forest in the zone is part of the boreal forest which is characterized as being disturbance driven resulting in the formation of relatively even aged stands. The clearcut silvicultural 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 clearcut 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.

6.1.1 Commercial

Section 3 outlines in some detail the general approach for the timber supply analysis and specific results and sensitivity analysis for both districts in the zone. The model used to calculate the wood supply is a maximization model which outlines a specific course of action and timing of such action to maximize timber production. The harvest schedule indicates the specific forest strata to be harvested and 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 that is in the 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.

Specific commercial strategies are as follows:

- utilize irregular cut block sizes that follow contours and natural boundaries where possible
- consider maintenance of unharvested corridors between harvest blocks to act as wildlife utilization corridors
- vary buffer widths to protect other values (ie. larger buffers on salmon rivers)
- where possible, utilize winter harvest on wet and sensitive sites
- maintain current size and distribution of clear cuts
- use landscape design techniques to mitigate viewshed impacts on areas of concern
- keep losses through timber utilization to a minimum (< 6 m3/ha)

7.1.2 Domestic

The harvest of domestic fuelwood and sawlogs occurs from four main sources in the zone and include; designated domestic cutting blocks on crown land, cutover clean up on crown and industry limits, landing and roadside clean up on both crown and industry limits, and from hardwood harvest on industry limits. For the designated cutting blocks, the harvest scheduling and priorities apply, however it may not always be practical to follow. Domestic cutting blocks are generally established near communities where concentrations of timber that is eligible for harvest exist. Mixed within these blocks may be timber that normally would not be scheduled for harvest in the planning period. Ideally, each individual domestic cutter would be issued their own cutting block which would ensure harvest of optimal stands. This is not practical however and domestic cutters are allowed to cut anywhere within the designated area provided that immature timber is not harvested. For this reason, the optimal harvest schedule may not always be followed in domestic areas. Utilization of cutover residue, dead timber and scrub areas which are not part of the timber supply analysis, more than makes up for this difference however. Domestic cutting occurs as very small patch clearcuts randomly distributed across the landscape and cutovers generally not large enough to have an impact on the viewswcape.

Specific domestic strategies are as follows:

- target low volume stands that have poor commercial harvest chances
- encourage use of under utilized species (birch, larch and aspen)
- target dead and insect damaged stands that are beyond commercial salvage.
- where possible, target alienation class 3 lands that have low commercial potential
- in areas of high domestic demand, limit volume allocation in designated cutting areas and encourage alternate sources (birch, cutovers, landings, scrub etc)
- monitor stands harvested in domestic cutting areas for compliance to the harvest schedule and change areas available for harvest to reflect this schedule

7.2 Silviculture

Section 1.4.1.4 describes the regeneration patterns of the major tree species by each disturbance type and generally by ecoregion. On average, there is a 20% regeneration failure rate (NSR) across all disturbance types. Generally, areas that do not regenerate naturally are renewed by some

combination of site preparation and planting or gap planting. Areas that are regenerated are left to develop naturally. 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. In District 14 and parts of District 15 there is concern about the type (species) of regeneration because of the presence of balsam woolly adelgid in the lowlands. In these areas, regeneration to balsam fir may not necessarily be acceptable on certain site types. Prescriptions to deal with these problems will be presented in sections to follow.

7.2.1 Forest Renewal

Since maintenance of the forestry landbase is crucial, forest renewal treatments are the most important silviculture technique in the zone. Forest renewal silvicultural treatments are designed to ensure that a new forest is established after disturbance by harvesting, insect, wind or fire. In most regions of the province these prescriptions normally involve some form of treatment to prepare the site to accept planted seedlings. In some parts of the zone planting is usually done without mechanical site preparation however prescribed burning is the preferred site preparation method due to adelgid presence. Planting, whether full planting or gap planting is done to ensure stocking of desired species is at acceptable levels.

Treatment to prepare sites that have been overgrown with hardwoods and other herbaceous species with herbicides has been done to reduce this competition and make the site more accessible and suitable for planting. Release herbicide treatment is also done which reduces the competition for a few years to allow planted seedlings to get established and “get the jump” on the noncrop tree species that occupy the site. Herbicides, while used sparingly, are sometimes a necessary tool to help establishment of a new forest, particularly on the better sites.

Complete regeneration failure requiring full planting is rare in the zone because of the excellent regeneration capabilities of balsam fir. When it does happen however, the site is prepared, if necessary, and planted with mainly black or white spruce and to a lesser extent Norway spruce. In some cases where adelgid has been a problem, balsam fir regeneration is ignored and the site is planted anyway. In instances where regeneration failure is incomplete but the site does not have enough desired regeneration, the area can be gap planted. This treatment is designed to increase the stocking on sites that have not regenerated to sufficient levels or on sites that have sufficient

balsam fir regeneration but have a high adelgid risk. On these sites planting is done through the existing regeneration to obtain a sufficient stocking level of an adelgid resistance species. Gap planting is done with the same species as above, and, coupled with the natural regeneration already present on site, result in a mixed softwood forest.

Where possible, seedlings are grown with seed from local seed sources. Seed orchards have been established at the Wooddale Provincial Tree Nursery to produce seed from plus trees collected throughout the province. Plus trees are trees that exhibit superior growth and physiological characteristics. All planting stock is now produced from genetically improved seed. The ultimate goal is to establish plantations with seedlings that have superior growth characteristics and thus increase yield and maintain genetic diversity. Exotic species have been planted in trials at some locations in the zone, however, it is not anticipated that they will form any substantive proportion of the planting program in the future.

7.2.2 Forest Improvement

Forest improvement prescriptions are designed to treat existing, 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 and diameter limit thinning). In areas that have high moose browsing potential, the precommercial thinning age is increased to 20 – 25 years so that the crop trees are tall enough to be out of reach of moose.

Precommercial thinning reduces density levels in overstocked stands 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 zone, balsam fir is usually thinned to favour 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 and diameter limit thinning is done in older balsam fir stands and is designed to

capture any mortality that would normally occur in the stand through self thinning. The trees from commercial thinning operations 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. This treatment has been done sparingly in the zone. As with precommercial thinning, spruce and hardwoods are left where possible to increase the stand diversity. Both types of thinning will produce large diameter stems in a shorter time period which should increase the percentage of merchantable volume that is suitable for sawlog material and decrease the harvest cost.

Specific strategies:

- ensure regeneration of areas disturbed by harvest, insect, wind and fire to prevent loss of productive land base
- use thinning techniques in young stands to increase stand development, reduce rotation age, and increase the percentage of sawlogs in stands
- where possible, promote species mixes particularly with spruce, white pine and hardwoods to reduce susceptibility to insect attack and increase biological diversity
- where possible, use seedlings grow 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 adelgid problems so that alternate silvicultural prescriptions can be promptly employed

7.3 Access Roads

Timely access to harvesting areas is the key to successful implementation of harvesting plans. Roads also provide access for other recreational values such as hunting, fishing, skiing, berry picking and hiking. 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 a cost perspective, the minimal amount of road will be built to effectively harvest available timber. As well, roads are constructed to specifications that minimize right-of-way and running surface width but still 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 that the minimum amount of road is built and that loss of productive land base and environmental disturbance is minimized.

In sensitive and wet areas, winter harvesting and road construction are encouraged and are often the only option. This minimizes environmental disturbance and provides access to areas that would otherwise be left unharvested.

In many instances forest access roads "open up" new areas which are then subject to cabin development. They 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. Road decommissioning may also be considered, depending on cost and mitigation of conflicting uses for that road.

The nature of the current wood supply, particularly on class 3 areas, is that harvestable areas or stands are becoming smaller and more remote and scattered. Achievement of the allocated harvest is contingent on accessing these areas and stands; therefore more roads are needed to access this timber.

Specific strategies:

- 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
- consider road decommissioning on roads near remote outfitting lodges and other areas of concern where requested and
- where feasibly possible explore all avenues to secure funding for road construction and
- encourage operators to build their own roads in exchange for royalty reductions

7.4 Forest Protection

7.4.1 Insects and Disease

As indicated previously, insects have been a major natural disturbance factor in the zone. The main tree species, balsam fir, is susceptible to most of the major insects including spruce budworm, hemlock looper, balsam fir sawfly, and balsam woolly adelgid. In the past, severe mortality has occurred resulting in massive salvage efforts.

Populations of hemlock looper and balsam fir sawfly were building in the late 1990's and resulted in mortality and growth loss and a subsequent treatment program in the early 2000's. Since that time, the populations of these insects have been in decline in District 14. However; in District 15, balsam fir sawfly populations in the northern parts have increased resulting in a treatment program in 2008. While the adelgid problem was mostly detrimental in stands on the lowland areas of District 14, the insect is starting to impact stands in the entirety of Zone 6.

As outlined in the harvesting and timber supply analysis sections, the timber supply 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 and thus the optimal harvest schedule may not be 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 eventualities, deviations from harvest schedules and inventory adjustment levels will have to be closely monitored to ensure that the validity of the AAC calculations is not compromised. Yield curves are also adjusted in areas that have been chronically attacked by balsam woolly adelgid and balsam fir sawfly to account for growth loss.

Specific strategies:

- use silvicultural techniques at the stand level to alter species mix and increase stand vigor to make stands less susceptible to insect attack
- where possible, use harvest scheduling techniques to alter species mix across the landscape to avoid "setting the table" for severe insect infestation
- in conjunction with provincial and federal initiatives, use pertinent and approved biological and chemical insecticides such as BTK virus)

7.4.2 Fire

Most of the zone has little fire history due to the relatively abundant rainfall and above average snowfall; however, some fires have occurred. A fire in an unusually dry year can have devastating

effects on the forest however 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 vigour.

Specific strategies:

- use silvicultural treatments and protection from insects to increase health and vigour of stands
- maintain fire control capabilities by both the crown and industry at the District level.
- where possible, promote species mixes in stands to minimize risk

7.4.3 Wind Throw

Wind throw usually occurs in stands that are old and decrepit or in stands that have been predisposed by some other disturbance such as insects and disease. To minimize the effects of blow down, stands will be managed to promote health and vigour mainly through silvicultural treatments and protection from insects.

Specific strategies:

- 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 windthrow to residual forest

7.5 Information and Education

Information and education is one of the key elements to providing for more active and effective participation in the planning process at all levels. Through interaction with various user groups and the general public, a better understanding of other values and positions is gained. The more we know about other values and where these values are located on the landscape the better the ability to mitigate any potential impacts of harvesting 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. Many comments were made over the last several planning processes

about the good exchange of information and ideas that occurred. It is through such forums that information can be shared which will provide a basis for more effective and informed participation in such processes.

8.0 Proposed Activities

8.1 District 14 and 15

8.1.1 Overview

This section will outline forest activities proposed on Crown Land and land transferred to the Crown from Corner Brook Pulp and Paper (CBPPL) in Planning Zone 6 for the period 2019-2023. 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. Maps of individual operating areas and summary sheets are also presented in Appendix. 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.

8.2 Allocation of Timber Supply

The allocation of timber supply in Planning Zone 6 is split among industry and domestic use. Overall, the commercial harvest accounts for the majority of all AAC timber and is derived from Class I Landbase. More discussion on commercial and domestic activity is provided in the upcoming sections.

8.2.1 Commercial

The Tables below indicate Crown's proposed harvest by operating area in FMD's 14 & 15. These areas are shown on an overview map and on individual scale maps in appendix.

TABLE 8.1 SUMMARY OF PRPOSED CROWN COMMERCIAL HARVEST AREAS IN FMD 14 FOR 2019-2023.

Operating Area					Proposed Commercial Harvest (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number Of permits	Core	Operational Constrained	Sub-Total	Non AAC	Core	Operational Constrained	Sub-Total	Non AAC
CC14001	Robinsons Pond	Crown	56	1	6,250	0	6,250		0	0	0	
CC14003	Woody Hill	Crown	64	1	3,408	4,957	8,365		0	202	202	
CC14007	Little Barachois	Crown	119	1	2,348	0	2,348		4,690	0	4,690	
CC14008	Magnatite Road	Crown	286	2	5,250	7,941	13,191		2,879	3,140	6,019	
CC14011	Flat Bay Hill	Crown	17	1	133	0	133		645	432	1,077	
CC14014	Harrisons Brook West	Crown	121	1	7,294	0	7,294		3,524	0	3,524	
CC14015	Harrisons Brook East	Crown	61	1	1,899	776	2,675		2,088	347	2,435	
CC15006	MacKenzies Brook	Kruger	263	1	32,002	0	32,002		1,179	0	1,179	
CC14018	Middle Barachois	Crown	66	2	2,999	0	2,999		2,814	0	2,814	
CC14019	Mitchells Pond	Crown	76	2	3,194	455	3,649		2,921	0	2,921	
CC14021	Oregans	Crown	508	1	16,643	67	16,710		43,752	33	43,785	
CC14022	Ryans Brook	Crown	151	1	1,905	12	1,917		10,050	59		
CC14024	Brooms Brook West	Crown	45	1	1,303	470	1,773		1,081	477	1,558	
CC14025	Granddaddy's	Crown	84	1	7,124	0	7,124		55	0	55	
CC14026	Low Brook	Crown	98	2	5,776	2,970	8,746		307	418	725	
Totals					65,536	17,648	83,174		74,806	5,108	69,805	

TABLE 8.2: SUMMARY OF PROSED COMMERCIAL HARVEST AREAS IN FMD 15 FOR 2019-2023.

Operating Area					Proposed Commercial Harvest (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number Of permits	Core	Operational Constrained	Sub-Total	Non AAC	Core	Operational Constrained	Sub-Total	Non AAC
CC15014	South Brook	Crown	385	1	0	39,851	39,851		0	3,668	3,668	
CC15009	Bonne Bay Big Pond	Crown	197	2	12,724	5,914	18,638		11,388	543	11,931	
CC15006	MacKenzies Brook	Kruger	263	1	32,002	0	32,002		1,179	0	1,179	
Totals			845	4	44,728	45,765	90,491		12,567	4,211	16,778	

TABLE 8.3: SUMMARY OF PROPOSED KRUGER EXCHANGE COMMERCIAL HARVEST AREAS IN FMD14 FOR 2019-2023.

Operating Area					Proposed Commercial Harvest (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number Of permits	Core	Operational Constrained	Sub-Total	Non AAC	Core	Operational Constrained	Sub-Total	Non AAC
CK14006	Black Duck	Kruger	11	1	1,022	0	1,022		656	0	656	
CK14013	Southwest Brook	Kruger	21	1	1,648	0	1,648		3,682	0	3,682	
Totals					2,670	0	2,760		4,338	0	4,338	

TABLE 8. 4: SUMMARY OF PROPOSED KRUGER EXCHANGE COMMERCIAL HARVEST AREAS IN FMD 15 FOR 2019-2023.

Operating Area					Proposed Commercial Harvest (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number Of permits	Core	Operational Constrained	Sub-Total	Non AAC	Core	Operational Constrained	Sub-Total	Non AAC
CK15005	Governor's Pond	Kruger	2,600	3	233,633	68,075	301,708		11,388	4,896	16,284	
Totals			2,600	3	233,633	68,075	301,708		11,388	4,896	16,284	

The areas proposed are within the acceptable variance for planned harvesting since the 2016 Wood Supply Analysis is designed to ensure operable growing stock is maintained at a minimum of two times the AAC throughout the 160 year planning horizon. Simply put, under this analysis, there will always be at least twice as much merchantable timber available on the landbase than harvested in any one period. The actual total harvest volume for each Land class for the five year 2016 woodsupply period will not exceed the total allowable harvest. This means that at any given year, the proposed and actual harvest level may fluxuate from the actual AAC number, but the maximum allowable harvest over the five-year period will not be exceeded.

When determining the allocation of woodsupply areas to commercial operators, the following outlines the Forest Services Branch priority:

- First priority is given to damaged and diseased stands, where feasible. However, realistically in this zone, there is limited potential because only a small portion of the production forest currently shows evidence of insect or disease damage, which is interspersed.
- Second priority is to harvest merchantable, over mature stands. Most scheduled operating areas consist of a portion of stands in the 81 + year old age class.
- Third priority is to harvest merchantable mature stands.

Some of the operating areas listed in the previous table have been proposed specifically to target cleanup of small stands of scheduled AAC and are required to meet scheduled commercial allocations. The stands have mainly resulted from previous commercial harvesting and because of their small size (ie. ranging from 2 ha to 20 ha), proposed commercial operations will more closely approximate domestic harvesting. Due to the varied economic feasibility of harvesting individual stands, not all stands identified maybe able to be harvested.

Some of the proposed operating areas contain merchantable timber that is currently designated as Class III (ie. operationally constrained). Stands in this category are typically difficult to access and/or harvest from both physical and economic aspects. As a result, they have been removed from the landbase used to calculate the sustainable Class I AAC. The designation of these stands has been set

for the period 2016 to 2020, after which time the landbase will be reviewed in preparation for the next wood supply analysis. It is the intent of the department that this designation of timber will also be harvested in a sustainable manner.

8.1.2.2 DOMESTIC

Table 8.5 and Table 8.6 below indicates the proposed Domestic Harvesting and will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. Most cutting occurs in winter with extraction by snowmobile or ATV. Domestic permit allocation ranges from 14.4 m3 to 25 m3. The lower amount is issued on the Port au Port Peninsula where demand and supply are relatively equal. There is little migration of the harvest to other parts of the district therefore close scrutiny on the number of permits must be maintained due to the expected increase because of oil prices. In most other parts of the district the amount issued per permit is higher because of greater supply and harvest on CBPPL limits.

TABLE 8. 5: SUMMARY OF AAC DOMESTIC HARVEST FOR FMD 14 FOR 2019-2023.

FMD 14					Estimated 5 year volume (m^3)	
Number	Name	Tenure	Total Area (ha)	Number of Permits	Softwood	Hardwood
CC14501	Port au Port	Crown	2,846	4,410	61,740	
CC14502	Point au Mal	Crown	772	330	7,260	
CC14503	Stephenville	Crown	341	870	19,140	
CC14504	Stephenville Crossing	Crown	402	480	10,560	
CC14506	Main Gut	Crown	368	320	7,040	
CC14509	Barachois	Crown	188	65	1,430	
CC14510	St. George's	Crown	370	465	10,230	
CC14515	Flat Bay	Crown	625	580	12,760	
CC14516	Heatherton	Crown	187	145	3,190	
CC14518	Mine Road	Crown	46	30	660	
CC14519	Jefferey's	Crown	92	155	3,410	
CC14522	St. Fintan’s	Crown	112	125	2,750	
CC14523	Broom’s Brook East	Crowm	16	0	1,456	
CC14526	Highlands	Crown	129	30	660	
CC14527	South Branch	Crown	129	170	3,740	
CC14528	Overfalls Brook	Crown	152	170	3,740	
CC14529	Limestone Brook	Crown	114	15	330	
CC14530	O’Regans	Crown	313	125	2,750	
CC14531	Codroy	Crown	359	275	6,050	
CC14534	Port Aux Basques	Crown	73	290	6380	
CC14532	St. Andews	Crown	0	5	110	
CC14541	South Coast	Crown	011	385	8,470 non AAC	
CC14542	Burgeo	Crown	106	395	8,690 non AAC	
CC14543	Cold Brook	Crown	1,637	100	2,200	
CC14545	Jourois Brook	Crown	193	6	660	
CC14555	Southwest Brook	Crown	25	80	1,760	
Total	Domestic	Crown	9,606	10,016	169,896	
CK14549	Round Valley	Kruger	1,736	90	1,980	
CK14550	Morris Brook	Kruger	1,088	70	1,540	
CK14551	Bald Mountain	Kruger	2,220	155	3,410	
CK14552	Camp 180	Kruger	2,290	115	2,530	
CK14556	Robinson's	Kruger	1,122	45	990	
CK14557	Black Duck	Kruger	1,020	235	5,170	
CK14558	Camp 38	Kruger	287	130	2,860	
CK14559	White's Road	Kruger	600	280	6,160	
CK14555	Southwest Brook	Kruger	1,241	55	1,210	
CK14554	Camp 185	Kruger	2,444	105	2,310	
Total	Domestic	Kruger	14,048	1,280	28,160	

FMD 15					Estimated 5 year volume (m^3)	
Number	Name	Tenure	Total Area (ha)	Number of Permits	Softwood	Hardwood
CC15501	Sally's Cove	Crown	1538	95	2,185	
CC15502	Rocky Harbour	Crown	5585	745	17,135	
CC15503	Woody Point	Crown	1524	100	2,300	
CC15504	Trout River	Crown	398	320	7,360	
CC15009	Bonne Bay Big Pond	Crown	173	155	2,325	
CC15512	Old Mans Pond	Crown	698	85	1,275	
CC15013	Gillams	Crown	1,263	680	10,200	200
CC15514	Wild Cove	Crown	599	270	4,050	
CC15515	Corner Brook Ring Rd	Crown	122	85	1,275	
CC15516	Mount Moriah	Crown	524	325	4,875	
CC15517	Benoits Cove	Crown	392	1060	15,900	
CC15518	Lark/York Harbour	Crown	96	440	6,600	
CC15520	Little Rapids	Crown	43	70	1,050	
CC15521	Pasadena	Crown	1,128	820	12,300	
CC15522	St. Jude's	Crown	250	285	4,275	
CC15523	Deer Lake North	Crown	549	190	2,850	
CC15524	Goose Arm	Crown	78	275	4,125	
CC15525	Jack Ladder	Crown	309	185	2,775	100
Total	Domestic	Crown	15,096	5,640	102,855	300
CK15005	Governors Pond	Kruger	16,337	45	5,175	
CK15519	McIvers Coxs Cove	Kruger	192	237	3,555	
Total	Domestic	Kruger	16,529	282	8,730	

TABLE 8. 6: SUMMARY OFAAC DOMESTIC HARVEST FOR FMD 15 FOR 2019-2023.

8.3 SILVICULTURE

There are two silviculture prescriptions scheduled for the next five years; planting/gap planting including site preparation (burning and/or herbicide), 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. Pre-commercial thinning is done to reduce the density on overstocked regeneration so that growth can be concentrated on the remaining crop trees and thus increase piece size and reduce the time to harvest.

As stated in previous sections, there is a significant problem with balsam woolly adelgid on the lowland areas in District 14. This insect affects balsam fir trees by severely reducing growth rates and therefore reducing the productivity of some sites to a point where commercial viability is questionable. The silviculture program in the next five years will be designed to mitigate the impacts of this insect on sites dominated by balsam fir. Potential silvicultural treatment areas need to undergo reconnaissance and/or intensive surveys to determine the severity of adelgid and competition problems. These surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be identified. There has been silviculture prescriptions developed however, which will be implemented for specific on the ground conditions. These prescriptions are described below.

Areas that are scheduled for commercial harvest or have been harvested in the past five years are identified on the operating area maps and are candidates for planting or gap planting to black, white or Norway spruce and white pine. White pine is included as a small percentage in the species mix in an attempt to maintain this species on the landscape.

These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting and the presence of adelgid. If adelgid damage is moderate to severe in adjacent stands then balsam fir will not be considered an acceptable regeneration species.

If these sites are partially regenerated to spruce then they can be gap planted provided there are no impediments to planting. If there is complete regeneration failure to spruce then these sites will be fully planted. Site preparation using either mechanical means or prescribed burning will be employed on suitable sites that have impediments to planting. Burning is a preferred treatment to sanitize the site of any existing adelgid infested trees.

If adelgid damage is nonexistent or light in adjacent stands then balsam fir will be considered an acceptable regeneration species. Sites that are partially regenerated will be gap planted and sites that have complete regeneration failure will be fully planted. Site preparation will be employed if necessary.

The silviculture level used in the timber supply analysis for District 14 is 100 ha of planting per year. Depending on survey results, it is anticipated that this level will be surpassed during the planning period.

Immature and regenerating stands have been identified within operating areas and are shown on the maps. If the regenerating species is balsam fir then the presence of adelgid will be evaluated using reconnaissance surveys and/or local experience. If presence of adelgid is nonexistent or light then the balsam fir stands will be considered for precommercially thinning, however, if presence of adelgid is moderate to severe in the areas, the stands will be left to develop naturally. In the timber supply analysis 25 ha of precommercial thinning per year was used to calculate the AAC on crown land. This represents a minimum amount and it is likely that a larger area will be treated in the next five years. The adelgid presence however, will see the precommercial thinning program diminish over time in favour of planting. It should be noted that there should be few treatable regenerating stands which have moderate to severe adelgid infestation available on the landscape. These stands would have been identified at the harvesting stage and site prepared and planted.

8.4 Primary Access Roads and Bridges

Proposed access road construction by the Crown for the next five years in Planning Zone 6 is detailed in the tables below and outlined on an overview map and on individual 1:50,000 scale topographic maps in Appendix 1.

A total of 32.45 km of roadwork is planned for construction during this period, comprising of Primary, Secondary and Reconstruction. As well, there are an estimated 3 culverts and 3 bridges that will be installed.

It is proposed that primary roads in the zone will be constructed by the Agency under tendered contract. These roads are the main trunks into operating areas. It is anticipated that most secondary roads in the zone will be built by Crown commercial operators. This breakdown, however, is dependent on funding and is therefore subject to change. Associated with the proposed road construction are water crossings which will require the installation of appropriate sized culverts or bridges. The size and design features of each crossing will be determined through field

work prior to construction of the associated road system, and is subject to all provincial and federal legislation / guidelines.

The majority of the road construction will be conducted to facilitate access into mature and over mature stands for the primary purpose of accommodating commercial harvesting operations. As well, these forestry roads will be used to provide access for silviculture operations. Other uses of forest access roads include: domestic cutting and recreation (ie. hunting, fishing, cottage access and berry picking). Consideration for the variety of tourism/recreation values that exist within the boundary of Planning Zone 3, road-specific decommissioning is to be considered on an area specific basis should a conflict of values exist.

Decommissioning of specific roads to protect other ecosystem values can take the form of removing bridges and culverts, in addition to replacing excavated material from adjacent embankments back into the roadway to restore the areas as close as possible to their natural state. The degree of decommissioning will ultimately depend on the value being protected. The scheduling of road decommissioning is undertaken upon the completion of harvesting and silviculture activities within identified areas of concern. While the Forestry & Wildlife Branch can adopt this approach as a goal of the plan, the implementation of this strategy will be entirely dependent upon the ability to prevent the establishment of permanent structures such as cottages along the road routes proposed for decommissioning.

While the department can commit to refusing approval of cottage sites in areas identified through the planning process to be decommissioned, the actual authority rests with the Crown Lands Division of the Department of Fisheries and Land Resources. During this upcoming planning period district staff will continue to liaison with Crown Lands Division in identifying operational roads requiring decommissioning (see table 10 and section 8 for roads to be decommissioned).

TABLE 8. 7: SUMMARY OF CROWN PROPOSED ROAD CONSTRUCTION IN FMD 14 2019-2023.

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Harvest Block			Culverts	Bridges
Black Duck	CK14006	Construction	1.2		1
Flat Bay Hill	CC14011	Construction	1.2		
Harrisons Brook West	CC14014	Construction	0.5		
Little Barachois	CC14007	Construction	0.5		
Low Brook	CC14026	Construction	1.7		
Magnatite Road	CC14008	Construction	3.4		
Middle Barachois	CC14018	Construction	3.0		
Oregans	CC14021	Construction	1.3		
Robinsons Pond	CC14001	Construction	1.0		
Woody Hill	CC14003	Construction	2.5		

TABLE 8.8: SUMMARY OF CROWN PROPOSED ROAD CONSTRUCTION IN FMD 15 2019-2023.

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Harvest Block			Culverts	Bridges
Governors Pond	CK15005	Construction	7.60	1	2
Mackenzies	CK15006	Construction	3.97	1	0
Bonne Bay Big Pond	CK15009	Construction	2.72	0	0
South Brook	CC15014	Construction	1.86	1	0

8.5 Activities in Protected Water Supply Areas

There are both commercial and domestic operations scheduled to occur in protected water supply areas (PWSA) as outlined in table 8.9. There are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any commercial or domestic 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 by the Forest Service before any commercial or domestic harvesting commences inside the PWSA.

TABLE 8. 9. OPERATIONS SCHEDULED TO OCCUR IN PROTECTED WATER SUPPLY AREAS

Harvest	Area Number	Area Name
Commercial	CC14008	Magnatite Road
	CC14501	Port au Port
	CC14503	Stephenville
	CC14504	Stephenville Crossing
	CC14509	Little Barachois
	CC14510	St. Georges
Domestic	CC14541	South Coast
	CC14542	Burgeo
	CC14543	Cold Brook
	CC15502	Rocky Harbour Enclave
	CC15503	Woody Point Enclave
	CC15512	Old Mans Pond
	CC15513	Gillams
	CC15514	Wild Cove
	CC15516	Mount Moriah
	CC15517	Benoits Cove
	CC15518	Lark York Harbour
	CC15521	Pasadena
	CC15522	St. Jude's
	CK14559	Whites Road
	CK15519	McIvers Coxs Cove

8.6 Environmental Protection

8.6.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been little merchantable volume lost. There have been major fires in the past however, so 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 Corner Brook and Pasadena in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional and provincial level is available should the need arise. There are air tankers stationed at Deer Lake and Gander and helicopters at Pasadena that are available for initial attack.

8.6.2 Insect and Disease

Monitoring and protection programs for insects and disease is done are coordinated by the forest protection division in Corner Brook. District staff are always available however to provide assistance in detection, monitoring, and protection against insects and disease.

8.6.3 General Environment

The environmental protection guidelines form the basis for protecting the environment from the effects of forest activities. Commercial forest activities can have a significant environmental impact if not conducted properly. The guidelines are designed to provide site specific measured to ensure that these impacts are avoided. Highlights of measures to avoid these impacts include no activity buffer zones, modification of harvesting design and equipment, avoidance of sensitive site during critical periods, consultation with other regulatory agencies and of course, monitoring. Specific measures that govern each forestry activity are detailed in Appendix 1.

8.6.4 Surveys

Utilization surveys will be conducted on both commercial and domestic cutovers to ensure loss of merchantable timber is minimized. The district will work in conjunction with the Industry Services Division in Corner Brook to implement a yield comparison study to compare the expected volume in an operating areas 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 commercial 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.

8.6.5 Information and Education

The district will continue its attempt to educate the general public to ensure meaningful and effective consultation and input can be attained. This will be accomplished through planning team fieldtrips and meetings, school presentations, open houses, annual participation with the Teacher Institute, meetings and National Forest Week activities.

9.0 Plan Administration

9.1 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.

All harvesting activity is regulated using a permitting system and all activities are inspected and monitored on the ground by conservation officers to ensure compliance with the Forestry Act and regulations, cutting permit conditions, and Environmental Protection Guidelines. Permit holders and contractors are also subject to financial deductions if work does not meet contract specifications. Conservation officers conduct inspections on a weekly or monthly basis depending on the level of activity. These inspections may entail surveys such as utilization assessment to ensure compliance with permit conditions.

9.2 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 Newfoundland Forest Service and one that must be submitted to the Environmental Assessment Division for public review. Changes to this plan can be approved by the Newfoundland Forest Service if they are:

- within one kilometre 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

kilometre, 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 that half a kilometre, 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. Once approved through EA the amendment still has to be approved by the Ecosystem Management Division of the Forest Service however.

Amendments requiring submission through EA will be reviewed by the monitoring committee. Other amendments will be reviewed by the monitoring committee if the District Manager deems that they represent a significant change to the plan.

LITERATURE CITED

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