REGISTRATION FORM

PURSUANT OF PART 10, ENVIRONMENTAL ASSESSMENT

SECTION 49 OF THE ENVIRONMENTAL ASSESSMENT ACT

Name of Undertaking:

Forest Management Districts 2 and 3 (Planning Zone 2)
Five Year Operating Plan 2017-2021

Proponent:

(i) Department of Natural Resources
Forestry Services Branch

(ii) Assistant Deputy Minister

Mr. Stephen Balsom
Forestry and Agrifoods Agency
(709) 637-2627

(iii) Principal Contact Person

Mr. Ivan Downton
Forest Ecosystem Management Director
(709) 637-2349

The Undertaking:

(i) Nature of Undertaking

To conduct forestry activities (harvesting, silviculture and primary road construction) from 2017 to 2021 in Forest Management Planning Zone 2.

(ii) Purpose/Rationale/Need for Undertaking

This undertaking will enable the Forest Services Branch to harvest approximately **951,520** m3 of core landbase timber, construct approximately **95** kilometres of primary forest access road and undertake appropriate Silviculture prescriptions.

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

Description of Undertaking: (i) Geographic Location

Planning Zone 2 encompasses Forest Management Districts 2 and 3. It is located in eastern Newfoundland and extends from Long Harbour River, Northwest River, and Terra Nova National Park in the west to the Come By Chance in the east and includes all of the Bonavista Peninsula, Burin Peninsula, and all the islands in Placentia Bay. Districts 02 and 03 are administered from Clarenville District office with satellite offices in Southern Bay and Winterland. Major towns located within the zone include Clarenville, Port Blanford and Marystown. The districts share common ecoregion characteristics and for forest management purposes have been combined to form Planning Zone 3. 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 contains a diversity of terrain types with generally rolling topography. Coastal hills dominate the landscape from Bull Arm north to Trinity and then strike north across the peninsula to Keels. The elevations of the hills on the peninsula are within a range of 150-250 metres above sea level, with the highest peak reaching 260 metres.

(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, shovels and prescribed burning tools where required. All buffer requirements and operations will be carried out in accordance with the Environmental Protection Guidelines for Ecologically Based Forest Resource

Management and the Forestry Act. Operations will commence upon approval of undertaking and continue yearly until 2021.

(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.

Schedule:

This plan is scheduled to commence upon approval and end on December 31, 2021.

Oct 31, 2016
Date

Ivan Downton
Assistant Deputy Minister
Mr. Stephen Balsom
Forestry Services Branch

Crown Five Year Operating Plan
Forest Management Districts 02 and 03 (Zone 02)
2017-2021

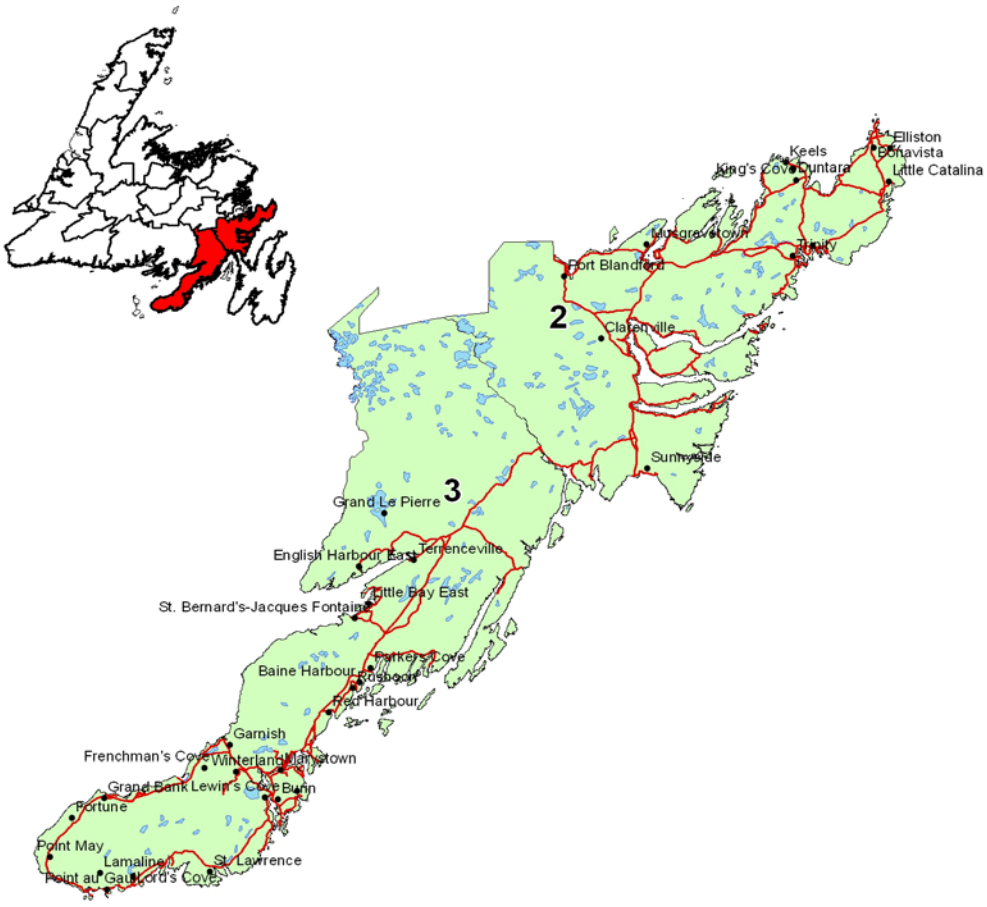

Table of Contents

List of Tables

List of Figures

List of Appendices

INTRODUCTION

The planning process for Forest Management District 02 has been well established through the completion of four previous five year plans. This document, however, represents the second attempt at developing a plan for Forest Management District 03. This is also the first plan in which forest inventory data was made available for District 03. The improved ability to accurately manage the forest ecosystem, represented by District 03, will be demonstrated in the planning of domestic cutting blocks, roads, silviculture, and minor commercial harvests. Both districts 02 and 03 are included in the scope of this one document which covers the planning period from January 1, 2017 to December 31, 2021.

This five year operating plan incorporates the new provincial planning requirements. In the past, there were five major planning documents; the provincial sustainable forest management strategy, the district strategy document, the five year operating plan, the annual operating plan, and the past annual report. This new planning framework has eliminated the district strategy document; however, its former contents are now split between the provincial sustainable forest management strategy and the five year operating plan. Sections that are provincial in scope such as carbon, global warming and criteria and indicators are now included in the 2014 - 2024 Provincial Sustainable Forest Management Strategy while sections that are more descriptive or depict local conditions such as values, forest characterization and ecosystem description are moved to the five year operating plan. Linkages between strategies from the provincial sustainable forest management strategy and on the ground activities in the five year operating plan will be provided where applicable.

Another major change to the planning process is the creation of eight planning zones on the island which are based primarily on ecoregion composition. Districts 2 and 3 are adjacent and share common ecoregion characteristics and collectively form Planning Zone Two. The requirement for submission to the Forestry Services Branch and for environmental assessment is one five year operating plan for each owner in each zone. The past requirement was one five year

operating plan by each owner in each district. This zone is comprised entirely of crown land so there will be only one submission by the crown. Throughout this five year plan, references will be made to Districts 02 and 03 individually but when combined they will collectively be referred to as Planning Zone Two or the zone. The planning team for this zone is located in Clarenville. Planning team format and structure will be discussed in a later section.

This document will try to fully integrate presentation of information and discussion for crown land in the zone, where possible. This will be done by combining statistics and other information from each district and reporting for the complete zone. However, tables and figures will be constructed such that information for individual districts will be available if a breakout is required. Discussion and information will be presented separately for each district where warranted based on unique and distinct differences in scope and content. The more descriptive sections of this plan will be generic in nature and give information for the entire zone as well as some broad comparative statistics.

Finally, this document will attempt to build on previous documents and on efforts of previous planning teams. Information will be updated as required or new sections will be added if any new information is available. Sections from previous documents will be included if they are still relevant, even if they were not discussed by the current planning team.

Section 1. Description of the Land Base

1.1General

1.1.1 Location

Planning Zone Two encompasses Forest Management Districts 2 and 3 (Figure 1). It is located in eastern Newfoundland and extends from Long Harbour River, Northwest River, and Terra Nova National Park in the west to the Come By Chance in the east and includes all of the Bonavista Peninsula, Burin Peninsula, and all the islands in Placentia Bay. Districts 02 and 03 are administered from Clarenville District office with satellite offices in Southern Bay and Winterland.

Forest Management District 2 (FMD2) is known as the Bonavista Peninsula Management District. Its boundaries to the east include all the coastline from Terra Nova National Park to Sunnyside. Its northern boundary follows North West River west to the Bay Du Nord Wilderness Area. Its eastern boundary follows the Pipers Hole River south to Swift Current. The southern boundary basically is a line crossing the isthmus between Come by Chance and Sunnyside. The population of District 2 is 25 290 (census - 2004). The peninsula portion of the District is the most densely populated, with coastal communities scattered around its sheltered bays. Major service centres are located at Clarenville and Bonavista. The southeastern and western (i.e. west of the Trans Canada Highway) portions of the District are remote and unpopulated. FMD 2 has a total gross area of 474 759 hectares, and a total productive forest area of approximately 179 288 hectares.

Forest Management District 3 (FMD3) is known as the Burin Peninsula Management District. It is bounded in the east by the Long Harbour River and to the north by Pipers Hole River which flow southeast to Swift Current. Its boundaries include all the coastline from Swift Current to Long Harbour encompassing all of the Burin Peninsula and all the islands in Placentia Bay. The population of the District is 20 962. The southern end of the peninsula is the most densely

populated, with communities scattered around the coast. Major service centres are located at Marystown and Grand Bank. The northern portions of the District are remote and encompass a large portion of the Bay Du Nord Wilderness Area. FMD 3 has a total gross area of 684 807 hectares.

The boundaries for these districts were originally proclaimed in Newfoundland Regulation 72/79 and filed on May 18, 1979 and revised under Consolidated Newfoundland Regulation 777/96 .

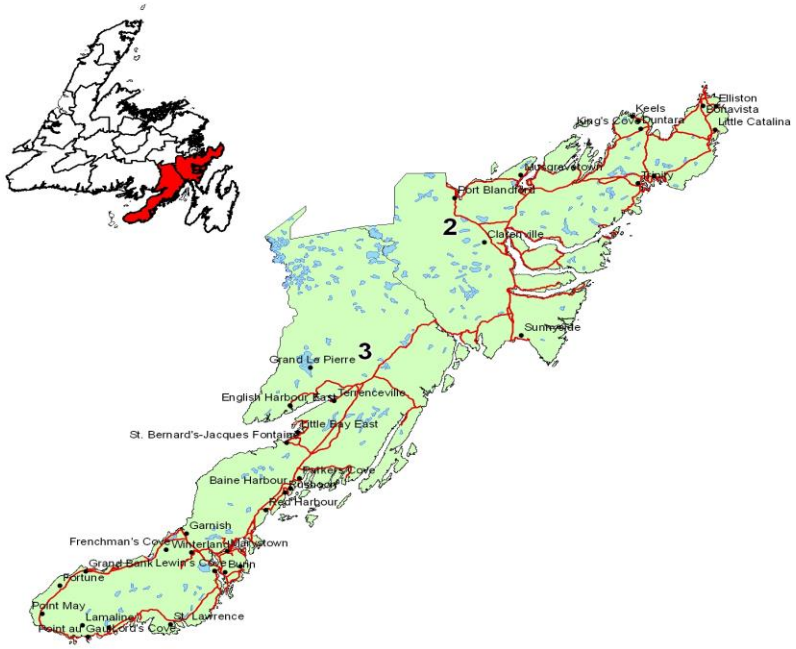

Figure 1. Location of Planning Zone 2

1.1.2 History

Typical of most rural Newfoundland regions, the economy was traditionally largely dependent on harvesting and primary processing of natural resources. Fishing and forestry have long been major contributors to local employment. The down-turn in the fishery caused by the crash of the northern cod stocks has had a dramatic impact on the economy in the region and has contributed to out-migration of young families from the area. Local wood supplies are currently well below the productive capacity of the forest due to past damage by high populations of forest insects and mismanagement. There is strong anecdotal information that suggests that Government historically failed to adequately regulate harvest quotas. There is also abundant evidence of past wasteful logging practices found throughout the District. Illegal over-harvest and poor utilization practices have been serious concerns in the past and have received the highest priority within the District=s compliance program. There is evidence, however, that these negative activities are on the decline. In addition, certain aspects of this industry appear to be strengthening due to modernization, accessing outside fibre supplies, and diversifying into higher valued end products. The Bonavista Peninsula has one of the more active and successful agricultural communities in the Province. Tourism has been a growth industry in the region as well.

1.1.3 Ownership

The entire land area located in Planning Zone Two is currently managed by the crown.

1.2 Physical

1.2.1Topography and Hydrology

The predominant physical feature throughout the District is rolling topography. Coastal hills dominate the landscape from Bull Arm north to Trinity and then strike north across the peninsula to Keels. The elevations of the hills on the peninsula are within a range of 150-250 metres above sea level, with the highest peak reaching 260 metres. The highest hills in the District are to the west of Clarenville and strike southwest to Swift Current. These hills reach elevations of up to 400 metres. Coastal relief is generally greater than that which occurs in the interior of the peninsula.

A relatively narrow plain is located in a transverse across the peninsula between Elliot=s Cove and Goose Bay. This plain is underlain by Cambro Ordovician shales and contains most of the land within the District which is best suited for agricultural development.

A narrow swath of rolling topography runs parallel and to the south of the Trans Canada Highway between Port Blandford and Clarenville. West of this land form, the District spreads out to its western boundary in an expansive plateau of barren land and bog, with very intermittent forests occurring in narrow riparian areas and on valley slopes. Many small ponds are interspersed throughout this plateau and the eastern half of the peninsula.

1.2.2 Geology

Carbon aging indicates that it has been approximately 7400 years since the last glaciation occurred on the Bonavista Peninsula. The direction of ice flow was from west to east in the northern part of the District and from west/northwest to east/southeasterly in the southern portion. Glaciation was responsible for the rolling topography prevalent in much of the District and for the glacial deposits in some of the regions valleys. Climatic change caused a relatively rapid retreat of ice flows and the unstratified deposition of glacial till. Retreat of a later glacial advance during this period caused some out wash deposits to form. Out wash material (in the form of sand and gravel deposits) is

present in various locations throughout the District. These deposits have been identified in the South West and North West Arm areas; west of Georges Brook; west of Lethbridge; in the Plate Cove area; south of the Northwest River and south of the Southwest River.

The type of rock, or parent material, underlying our forest soils is fundamental in the development of those soils. Some rock types, such as shales and slates, have many mineral elements which are essential to plant growth, and through geological time, become readily available. Generally, soils which form on parent material deriving from these type of rock group are fertile and can support favourable forestry/agricultural development. Geologic groups forming from igneous processes, such as granite, have far less inherent trace elements and generally lead to the development of soils in which fertility is a more limiting factor to plant growth.

The geologic groups located on the Bonavista Peninsula are described in the soils report for that region by Heringa and Woodrow (1991). The peninsula contains the following geologic groups: Musgravetown, Adeytown, Connecting Point, Love Cove, Harcourt, and Granite Rocks. Brief descriptions of these groups are provided below.

Musgravetown Group: The rocks are chiefly red and green coarse grained conglomerates, greywackes, arkose, and acidic to basic lavas of relatively shallow water origin. Near Musgravetown and Canning=s Cove, the soils have developed on a thick sequence of greenish conglomerates overlain by reddish conglomerate. Sandstone is interbedded with the conglomerate. The material in the red conglomerate is often rounded, poorly sorted, with fragments from sand size to 15 cm cobbles. The Ball Formation overlies the Canning=s Cove formation west of Musgravetown as acidic and some basic lavas and pyroclastic rocks; other formations contain sandstone and red pebble conglomerate, shale, some lava and tuff.

Adeytown Group: A sequence of red, green, and grey shales and slates with interbedded pink, green and grey limestone, some lime nodules, some white calcareous sandstone and a granule sandstone with carbonate cement. Also prominent beds of red massive limestone may be present interbedded with red shale and shell fragments.

Connecting Point Group: The rocks consist largely of black and grey slates, sandy and silty greywackes, with minor conglomerates or lavas and no carbonate rocks. Argillaceous slates are common with argillites, and thin beds of siltstone. Also present are greenish grey cherty quartzites, red quartzite and conglomerates.

Love Cove Group: Rocks of this formation occur only in the northwest and southwest corners of the map sheet. They include a wide variety of sedimentary and volcanic rocks interbedded with each other. In the southwest they include many chlorite schists, metamorphosed basic to acidic rocks, sandstones and conglomerates; in the northwest: feldspathized and granitized chlorite schists of metamorphosed acidic and basic rocks, sandstones and conglomerates occur. Individual bands or beds are generally less than 15 metres thick, thus many rocks types can be observed within a short distance, and in areas of scattered outcrops each outcrop is generally different from those near it.

Harcourt Group: A succession of alternating dark grey and black shales, silty shales, siltstone and some limestone. Numerous beds of grey siltstone are generally present and also black limestone nodules and beds with micaceous and other siltstone. Fossils may be found in thin black shale.

Granitic Rocks: Granite and granitic rocks occur in two small areas near the northwestern and southwestern margins of the map area. They are part of the Ackley batholith, which extends from Fortune Bay northeastward to the north side of Bonavista Bay and probably as far as Fogo Island northeast of the Island of Newfoundland. It consists mainly of an orange-pink to light red coarse grained porphyritic biotite granite. Orange-pink feldspar is generally the dominant mineral in the granite, but buff coloured sodic plagioclase is commonly present in amounts exceeding 15 percent. Small bodies of orange-red, medium-grained granite occur near Clarenville.

1.2.3 Soils

Soils develop over a long period of time and are influenced by the underlying parent material, topography, ground water, climate and living organisms (including plants, micro-organisms, animals

and man). The soils on the Bonavista Peninsula began forming after the last glacial retreat nearly 8000 years ago and are considered to be mature. Mature soils show well defined horizontal layers with varying mixtures of organic and mineral soil materials. The percentage of organic material in the horizons generally decreases with depth.

Under the Canadian System of Soil Classification, Management District 2 has representation of three Orders of soil, podzolic, gleysolic and organic. Each order represents soils that developed as a result of similar environmental influences.

Soils of the Podzolic Order are acidic, well to imperfectly drained and developed under coniferous or mixed forest or heath in cold climates. Well formed surface litter or organic layers (L-H) are a common characteristic of soils in this Order. Beneath the surface horizon, there is usually a mixed organic (Ah) layer which may be leached (Ae) and of lighter appearance. Beneath that there is a Podzolic B horizon, which has a lesser amount of organic material combined with varying degrees of iron and aluminum. Podzols on the Bonavista Peninsula can be further sub-divided into Ferro-Humic and Humo-Ferric Great Groups.

Soils of the Gleysolic Order develop under hydrophytic (water-loving) vegetation and are usually saturated with water. Soils in this Order may have a deep organic surface layer and dull coloured A and B horizons. These lower horizons often show mottling which results from a fluctuating water table. The only Great Group recorded on the Peninsula is the Gleysol.

Organic soils develop from organic deposits and contain greater than 30% organic matter and 17% organic carbon. These soils are usually saturated with water for a large part of the year.

Detailed soils maps for the Bonavista Peninsula are available in a report titled Soils of the Bonavista Peninsula (Heringa, P.K. and E.F. Woodrow, 1991).

The underlying parent material has a significant role in the soil forming process. It is one of the key factors which influence the fertility of soils. The presence of shale parent material under many of the soils on the Bonavista Peninsula has helped build nutrient rich forest soils. As a result, many

sites in this area are highly suitable for the development of productive forest or for agricultural development.

1.2.4 Climate

District 2 is located in the southeastern region of the province and lies generally between the $54^0$35' and $53^0$00' longitude and $47^0$40' and $48^0$45' latitude . Bordering the Atlantic Ocean on the eastern extremity, its climate is largely influenced by maritime conditions. Seasonal temperatures are moderated by this influence, yet conditions during certain seasons, especially the beginning of the growing season, can be harsh due to the cooling effect from the ice laden Labrador Current.

The average mean daily February temperature in the District ranges from -5 ^{0}C to -8 ^{0}C with the minimum being -14^0C. The average mean daily July temperature ranges from $^+$13 ^{0}C to +16^0C with the maximum being + 22 ^{0}C.The growing season in the District ranges between 140 and 160 days. Average precipitation ranges from 900mm - 1300mm and average snowfall ranges from 2.5 to 3.5m.

1.3 Ecosystems

1.3.1 The Forest Ecosystem

An ecosystem is a community of interacting and interdependent plants, animals and microorganisms, together with the physical environment within which they exist. It is important to remember that within an ecosystem, the interactions between the biotic and abiotic components are at least as important as the component themselves. Another critical characteristic of ecosystems is their overlapping boundaries. While each is definable in time and space, and distinguishable from adjacent ecosystems, each is intimately integrated with other local ecosystems. Additionally, each local ecosystem is nested within increasingly larger ecosystems. The scale at which an ecosystem is viewed is contingent on the species or abiotic characteristic under consideration. While planet Earth represents the ultimate global ecosystem, complex ecosystems also exist under fallen logs and rocks.

A forest ecosystem, as the term implies, is an ecosystem dominated by tree cover. At the coarsest level, the forests of Planning Zone Two, 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.

Similar to much of insular Newfoundland, the landscape in District 2 consist of a mosaic of barren, forest, and wetland. There are two types of barren (or heath) common to this area, including Kalmia (sheep laurel) and Empetrum(crowberry). Kalmia heath is the most prevalent throughout the District. The western portion of the District is dominated by heath barrens.

The morainal areas of the District, which occur primarily on the peninsula, support closed conifer stands comprised mostly of Black Spruce (Picea mariana(Mill.)B.S.P. and Balsam Fir (Abies

balsamea(L.) Mill) with White Spruce (Picea glauca (Moench) Voss) and Tamarack (Larix Laricina (Du Roi) K. Koch) occurring in pockets or as individual stems throughout the forest. Broadleaf trees, such as White Birch (Betula papyrifera Marsh.) occur sporadically in pure stands throughout the District and occur somewhat more commonly, similar to Trembling Aspen (Populus tremuloides Michx.), in mixed composition forest in association with other softwood species. White Pine (Pinus strobus L.) occur in isolated pockets of individual trees scattered through the northwestern portion of the District.

Wetlands are a common part of the landscape, but increase in predominance intermixed with barrens in the western portion of the District. Generally wetlands are considered to be those land areas that have a water table at, near or above the soil surface for a major portion of the year (Meades, S.J. 1990). Wetlands contain far greater biodiversity than other parts of the landscape, are very sensitive to heavy disturbance and deserve special protection from forestry or other types of heavy developments. The Canadian Wetland Classification System was used to classify the five classes of wetland in this area, including bog, fen, marsh, swamp and shallow water.

1.3.2 Ecoregions and Subregions

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 subregions (also known as ecodistricts) All of the Newfoundland ecoregions and subregions 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 2 depicts FMD2 relative to Damman's ecoregion classification system. FMD2 is located in a transition zone between central ecoregions, which have been influenced by interior continental-like climatic conditions, and eastern ecoregions, which have a greater coastal climate influence. Also, the

Bonavista Peninsula has a unique geological setting which has helped mold the ecosystem structure present there today - it has a much greater occurrence of shale and slate then is common in most of Newfoundland. As a result of the gradient climatical change as you move eastward through this District and the somewhat unique geological setting, three major ecoregions intersect on the Bonavista Peninsula (see figure 2.14) and actually come to an apex. These include the Central Newfoundland Ecoregion, the North Shore Ecoregion and the Maritime Barrens Ecoregion.

There are portions of two subregions of the Maritime Barrens Ecoregion located in FMD2, including the Northeast Barrens Subregion and the Central Barrens Subregion. In addition, the Eastern Hyper - Oceanic Barrens Ecoregion crosses the northeastern tip of the peninsula. Due to its strategic geographical positioning and the influences of climatic, geological and glacial factors, FMD2 has a diverse ecological setting with a corresponding natural diversity of plant and animal communities.

The major features of the ecoregions and subregions found in FMD2 are briefly described in this section. The following descriptions are taken from *Forest Site Classification Manual - A Field Guide to the Damman Forest Site Types of Newfoundland* (Meades and Moores, 1994).

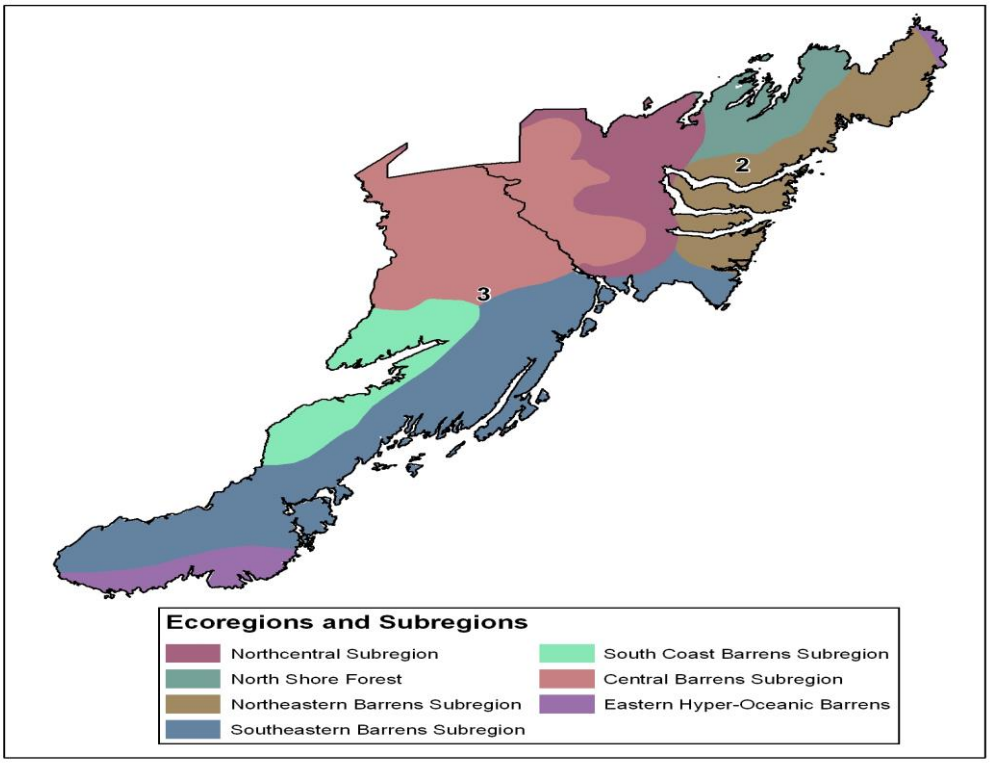

Figure 2: Ecoregions and Subregions of Forest Planning Zone 02

1.3.2.1 Central Newfoundland Forest Ecoregion

The Central Newfoundland Ecoregion has the most continental climate in insular Newfoundland. It has the highest summer and lowest winter temperatures. Because of the warm summers and the high evapo-transpiration losses, soils in the northern section of this ecoregion have a soil moisture deficiency. The *Hylocomium*-Balsam fir forest type occupies the zonal soils of this area. These soils are generally lighter in color and have a lower organic matter content compared to other ecoregions.

Forest fires have had an important role in the natural history of this region. Many sites have been converted to black spruce, while some of the richer sites are occupied by white birch and trembling aspen.

The Central Newfoundland Ecoregion has four subregions: IIA - Northcentral Subregion; IIB - Red Indian Lake Subregion; IIC - Portage Pond Subregion; IID - Twillick Steady Subregion. Of these, only the Northcentral Subregion is found in FMD2.

1.3.2.1.1. Northcentral Subregion

This subregion stretches from Clarenville in the east to Deer Lake in the west. It dissects District 2, forming a swath from Clode Sound on the northern boundary through the center of the District to Southwest Arm in the south, separating the interior barrens from the coastal ecoregions, and then swinging west to Piper=s Hole River. The North Central Forest Subregionhas higher summer temperatures, less rainfall and a greater occurrence of fire than any other region of insular Newfoundland. Pure Black Spruce forest dominates this area because of the prevalence of fire in the natural history of the ecoregion. Due to the low moisture levels, the coarse texture of the soils and the predominance of the Black Spruce forest type, this subregion is particularly susceptible to regeneration

1.3.2.2 North Shore Forest Ecoregion

The North Shore Forest Ecoregion does not have any subregions. It forms a coastal band approximately 20-25 kilometres wide extending from the Bonavista Peninsula in the east to the Baie Verte Peninsula in the west. The North Shore Forest Ecoregion occupies the northern half of the Bonavista Peninsula, bounded by the North Eastern Barrens Subregion in the south and the North Central Forest Subregion in the west. Black Spruce and Balsam Fir forest form a continuous forest except where barrens dominate on coastal headlands. The vegetation growing season is shorter and cooler than in the central part of the island, but it also has a frost free season which is several weeks longer. The summers are relatively dry and warm and soil moisture deficiencies may occur. Similar to the Central Newfoundland Forest Ecoregion, encroachment of ericaceous shrubs on drier nutrient poor sites after fire or cutting disturbance is common and presents a serious silvicultural problem. This problem is more prevalent after cutting.

1.3.2.3 Eastern Hyper-Oceanic Barrens Forest Ecoregion

The Eastern Hyper Oceanic Barrens Ecoregion occurs on the extreme south coast of the Avalon and Burin Peninsulas and in the Bay de Verde, Cape Freels and Bonavista areas. In District 2, the Eastern Hyper Oceanic Barrens Ecoregion is located on the very tip of the Bonavista Peninsula. Although at low elevation, this ecoregion has very cool summers due to the oceanic influence. The landscape is dominated by exposed coastal barren and blanket bogs and is completely without forest cover, except for Balsam Fir krummholz (ie. tuckamoor or low wind-swept scrub) (Figure 2.20). Arctic-alpine species occur even at sea level and are mixed with species common to southern coastal plain. This is a very unique ecological aspect of the oceanic barrens.

1.3.2.4 Maritime Barrens Forest Ecoregion

The Maritime Barrens Ecoregion extends from the eastern Peninsulas westward through south-central Newfoundland to Port-aux-Basques. It is divided into four subregions, two of which are partially located in FMD2. The Maritime Barrens Ecoregion is characterized by cool, foggy and windy summers and relatively mild winters. Intermittent snow cover is common within the coastal

portions of this ecoregion but increases in accumulation and duration in the interior barrens. The landscape pattern is one of almost pure Balsam Fir interspersed throughout extensive open heath-land. Productivity of the forest is better on long slopes which occur in infrequent valleys. A natural history of frequent wildfire occurrence in much of this ecoregion has had a significant influence in the development of this largely heath-covered landscape.

1.3.2.4.1 Northeastern Barrens Subregion

The North Eastern Barrens Subregion occupy the eastern third of the District. It is, generally speaking, that area east/southeast of a line running from Knights Cove southwest to Harcourt; and then south along the western end of Random Island and the bottoms of Northwest Arm and Southwest Arm to Queen=s Cove, and then southwest to Swift Current. This subregion has a lower frequency of fog and warmer summers than the other subregions of the Maritime Barrens Ecoregion, except for the Central Barrens Subregion. Portions of the landscape are, in fact, heavily forested - but these portions are interspersed throughout large expanses of soil/rock barrens, softwood scrub forest and local heath vegetation, usually along the coast. Balsam fir is the predominant tree species that occurs in the North Eastern Barrens Subregion. Natural regeneration of forests usually occurs after natural or cutting disturbance in this subregion. Fire is less prevalent than in other parts of the District. Natural forest succession usually occurs as a result of stand replacement insect or wind disturbances.

1.3.2.4.2 Central Barrens Subregion

This area occurs south of the Central Newfoundland Forest Ecoregion and north of the South Coast Barrens Subregion. In FMD2, the Central Barrens Subregion extends from the Northwest River south to Black River Pond in a strip of land bounded by the district boundary on the west and the Central Newfoundland Forest Ecoregion on the east. This subregion has warmer summers, less fog and more persistent snow cover then the other subregions in the Maritime Barrens Ecoregion. Forest patches, predominately composed of Balsam Fir Forest, are common throughout the barrens. Fire has played a significant role in the development of the ecology of the Central Barrens Subregion. Within FMD2, this subregion is unique in that it provides the eastern range for the Middle Ridge caribou herd.

1.4 Ecosystem Dynamics

1.4.1 Ecosystem Condition and Productivity

As with other parts of the Newfoundland's boreal forest, those of FMD2 have evolved in concert with a history of fire, insect attack and subsequent disease and wind throw. Human intervention in this forest has been extensive and widespread with a resultant significant impact on current landscape patterns. Landscape patterns determine the variety, integrity, and interconnectedness of habitats within a region. These landscape patterns are a direct result of the relationship between physical landforms and soils, disturbance history, and relationships among various species that makeup the ecosystem communities. These factors, while listed separately for clarity, are unavoidably interrelated. Landscape patterns play a pivotal role in determining the current conditions and health of forest ecosystems. These variables are evaluated in terms of productivity, stability and resilience.

Another important role determining the condition of a forest is change. Forests are an ever evolving entity, resisting stagnation, and constantly moving through their cycles of life, death, and renewal. The process of change over time is the essence of nature itself. It has been nature's underlying storyline since time began, and will continue to be until time ends. The main forces of change in our natural forest ecosystems are disturbance and succession. A definition of disturbance would indicate that it initiates a change in a community structure which often ends up in the replacement of one set of species by another. However, replacement is not always the end result (e.g., a species like black spruce is aided in germination by disturbances like forest fire). Disturbances range from the fall of a single tree, to the destruction of thousands of hectares by forest fires. While disturbances may be very destructive, they can often rejuvenate ecosystems and diversify landscapes. Succession involves changes in both community composition and in the ecosystem structure and process. Succession is the orderly change whereby the dominant species is replaced by another species, then another etc. until a new dominant species establishes a relatively stable community.

The following sections will discuss each of these concepts in more detail as they relate to the ecosystems of FMD2. For the most part this section will be descriptive and explanatory in nature. Specific examples of strategies and linkages to the Provincial Sustainable Forest Management Strategy will be detailed in subsequent sections.

1.4.1.1 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 dependant on primary productivity, it is this primary productivity component that drives the system. The level of primary production is dependant 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. An example of secondary productivity is the number of moose per unit area.

In practice, it is nearly impossible to measure the amount of biomass produced in an ecosystem, or the energy consumed in the process. However, in the Provincial Sustainable Forest Management Strategy, criteria and indicators to monitor productivity have been identified. One method outlined is tracking mean annual increment in m3/ha/yr of tree species by ecoregion. This can be readily measured over time and manipulated through silviculture treatments or affected by poor harvesting practices which increase soil compaction. One must also recognize the forests inherent biological limits however, when attempting to measure or manipulate site productivity.

Overall, the landscape in FMD2 has approximately 37 percent productive forest. As well, the relative proportion of site types is 2 percent good, 73 percent medium and 25 percent poor with a mean annual increment (MAI) of 2.6, 1.7, and, 0.8 m3/ha/yr respectively. This distribution of

productive sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils. The more productive areas of FMD2 occurs in the lowlands of the river valleys. These areas have deeper soils and less exposed bedrock. The landscape patterns are more consistent and the growing season is longer. In contrast, the eastern parts of FMD2 along the coast have soils are shallower with bedrock at or near the surface. The terrain in eastern parts is much rougher and the growing season is shorter.

1.4.1.2 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 ecosystems' resilience is controlled by properties such as climate, parent soil, relief and flora. The potential for populations to recover from low levels following disturbance by having adequate regeneration capacity and a balanced distribution of forest types and age classes provides a reliable measure of resilience at the landscape level. Other measures include the percent and extent of area by forest type and age class and the percentage of disturbed areas that are successfully regenerated. 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. 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.

1.4.1.3 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; species stability, structural stability, and process stability.

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

1.4.1.4 Disturbance Regimes and Successional Patterns

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

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

1.4.1.4.1 Harvesting

Regeneration patterns in the black spruce type after harvesting is generally back to the black spruce type with a minor component of balsam fir and some white birch on the better sites. There is a higher regeneration failure in this forest type with average not sufficiently restocked (NSR) rates at 25-30 percent across all ecoregion and site types. Another general trend is that the poorer the site quality the higher the NSR rate. These sites would be candidates for planting with black spruce or red and/or white pine. In some instances where balsam fir does regenerate on black spruce sites it becomes very chlorotic at a young age and is highly susceptible to attack from the balsam woolly adelgid. It therefore has not been considered as acceptable softwood regeneration species on these sites, and planting has become the norm.

In the balsam fir types, regeneration failure is much lower than the black spruce types averaging 15-20 percent across all ecoregion and site types. The majority of these sites will regenerate back to balsam fir after harvesting. There is also some regeneration of these sites to mixed balsam fir/black spruce and/or mixed softwood/ hardwood types. Regeneration pattern in the mixed wood types is generally back to mixed wood that is dominated by white birch and balsam fir with a minor spruce component. There is a higher component of white birch regeneration after harvesting in types that had a higher percentage of hardwood (hS) before harvest. Generally, the better the site class the more hardwood regeneration. Regeneration failure on the mixed wood types is highest in poor sites and lowest on the better sites averaging 10-15 percent.

There are two main white birch site types in the zone. The basic difference between them is terrain which impacts site quality. The G and H white birch sites are typically located on sloped terrain resulting in continual ground water movement or seepage slopes. These sites are prone to revert to alder dominated NSR sites in the absence of very hot ground fire as the disturbance mechanism. Consequently the management prescription to ensure productivity on these valuable sites is to plant

fast growing softwood species. The medium white birch sites are typically on more level terrain and will revert to white birch /balsam fir or white birch/black spruce after disturbance. Regeneration failure on these sites is low (10 percent). The management prescription to regenerate these site to white birch is to remove the overmature birch in a seed tree cut to provide a seed source for the next rotation of birch.

Harvesting of white birch in this zone has traditionally been for firewood purposes Recently, however, some of the harvest occurring has been directed to sawmilling with the development of a value added hardwood industry, which will place added pressure on the white birch resource in the zone. Evidence from domestic cutting in these types indicates that they will regenerate to mixed wood types dominated by balsam fir and white birch.

1.4.1.4.2 Fire

Since black spruce is a fire adapted species, it is not surprising that it is the most prolific regeneration species after fire across all forest types, site types and ecoregions within the zone. It regenerates as pure stands or in combination with white birch. Balsam fir is conspicuously absent after fire because most advanced regeneration in the under story is killed by the fire. Black spruce regeneration is somewhat correlated with the amount present in the pre fire stand. Generally, the higher the component of black spruce in the original stand, the higher the percentage of regeneration to black spruce. In mixed wood stands a higher component of white birch and sometimes trembling aspen is present after fire.

Regeneration after fire in white birch dominated stands is typically back to white birch, but can also include a black spruce component. Regeneration failure after fire is on average 20-25 percent across all forest types, typically being higher as sites get poorer and ground fire temperatures decrease. Generally, the poorer site types will revert to Kalmia dominated NSR and require planting to ensure adequate regeneration. When ground fire temperatures are lower, less of the humas layer is removed and regeneration failure increases due to lack of adequate seed bed.

1.4.1.4.3 Insect

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

In recent history, however, many insect killed fir stands have reverted to NSR due to the high browse rate on fir regeneration by moose in the zone. Disturbance by insect kill in young balsam fir stands can also cause succession to white spruce. 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 failure of fir sites after insect attack is low and only occurs approximately 15 percent of the time. Regeneration failure mostly occurs on sites where the immature balsam fir regeneration is killed by either insect attack as well, or over browsing by moose.

1.4.2 Biodiversity

Biodiversity is a term used to describe the variety of life on earth. A basic definition of biodiversity includes the variety of animals, plants and microorganisms that exist on our planet, the genetic variety within these species and the variety of ecosystems they inhabit.

Some scientists estimate the total number of species on earth between two and 100 million, however, the best estimate is considered to be within the range of 10-30 million. This is remarkable considering only 1.4 million species have actually been given names. The largest concentration of biodiversity on the planet is found in the tropical areas of developing countries. Small areas of rainforest often contain species that are found nowhere else on earth.

Mishandling even small tracts of land could lead to extinction of several species, one of which may hold the key for the prevention or cure of some disease. While the boreal forest does not have the extent of biodiversity that some of the equatorial regions possess, Canada does have just over 70,000 species of plants, animals, and micro organisms in its boreal and other forest regions. An equivalent number remain un-described or unreported by science. While the boreal forest has less diversity of large plants than many other forest regions, it has greater biological diversity in some micro organisms. For example, the boreal forest has fewer tree species than the tropical rainforest but 500 times as many

mycorrhizal fungi. Despite the large number of organisms contained within the boreal forest, only five percent are actually plants and vertebrates. The other 95 percent remain largely unrecorded and unstudied. As a result, we need to continually be conducting surveys and studies to manage with caution so that species are not inadvertently lost. Biodiversity provides such essential services as climate control, oxygen production, purification of freshwater supplies, carbon dioxide removal from the atmosphere, soil generation, and nutrient cycling for humans. Without the species that provide these processes, humanity would be unable to survive.

There have been several international initiatives during the 1900's directed at developing strategies to protect Earth's biodiversity. Canada signed the United Nations Convention on Biological Diversity in 1992 at the Rio de Janeiro earth summit. All governments at both the federal and provincial level have agreed to meet these objectives through implementation of the 1995 Canadian Biodiversity Strategy: Canada's Response to the Convention on Biodiversity.

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

1.4.2.1 Species Diversity

Species diversity describes the overall range of species in a given area or ecosystem. Species are groups of animals, plants, and micro organisms capable of producing fertile offspring. An example

would be all breeds of domesticated dogs are of the same species, while dogs and cats are members of different species. Species extinction is the most dramatic and recognizable form of reduced biodiversity; habitat loss the most drastic in terms of far reaching effect. 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.

In District 02, a number of species appear to be healthy and thriving. For example, there is an abundance of moose. In fact, in some areas of the District (e.g., Lethbridge) there is a high density of moose, to the point where they are causing significant damage to farm crops due to heavy browsing.

Many of the mammalian species found in District 2 have been introduced and some present significant ecological concerns regarding potential impact on biodiversity. In neighbouring Terra Nova National Park for example, only 12 of the 21 terrestrial mammals are endemic (or native) to insular Newfoundland. Some of the concerns associated with introduced species include increased levels of predation and competition; introduction and transmission of disease; disruption of food webs and other ecosystem processes; and homogenization through loss of indigenous (native) biodiversity.

Moose (Alces alces), Snowshoe Hare (Lepus americanus), Red Squirrels (Tamiasciurus hudsonicus), Mink (Mustella vison), and Masked Shrew (Sorex cinereus) are examples of introduced species in District 2. Some of these species have very widespread and noticeable impacts on the ecosystem. For example, the herbivory habits of moose affects the composition and structure of forest understories and of future stand canopies. These altered forest structures will impact on the associations of mammalian and avian fauna at both the stand as well as the landscape level. Other species, such as Coyote (Canis latrans), are recent migrants to the Island, but can still have significant ecological impacts (on predator/prey relationships within the food chain for example).

The silviculture treatment known as pre-commercial thinning (PCT) is an activity that reduces the number of stems on a site so that the ones remaining will have less competition for sunlight and soil nutrients. The result is faster growth and larger diameters for the remaining trees. When timber management was the focus, PCT treatments left only the species that were preferred for pulpwood or sawlog harvesting. With the shift in management approach, PCT treatments now leave a portion of hardwoods or other softwoods (e.g., Tamarack, and Pine). Leaving a variety of

tree species on a site will help to maintain species diversity of both plant and animal life within a forest.

Newfoundland has two native pine species; White Pine (Pinus storbus L.) and Red Pine (Pinus resinosa Ait). White Pine used to be a significant component of the landscape during the early part of the century. It naturally occurred in individual stems or small clumps scattered throughout the landscape. Over-exploitation and disease has reduced its numbers to a fraction of what they used to be Predation of White Pine cones by the introduced red squirrel has been recorded to be as high as 85% (English-1998). This is having further impact on the regeneration success of natural White Pine in insular Newfoundland and, in fact, may be keeping the species in a predator pit. (A predator pit occurs when predation keeps the population level of a species far below the level which the habitat can support. Also, many nutrient poor sites in the Central Newfoundland Ecoregion are ecologically suited to Red Pine. Red Pine occurs naturally in Newfoundland as small pure (ie. Red Pine mono-culture) stands. However, Red Pine is practically non-existent in District 02. In the future, plantations and some naturally regenerating sites will be planted with a proportion of White Pine. Red Pine will be planted on dry nutrient poor sites. This management practice will increase both species and ecosystem diversity in the district.

The most prominent rare animal species for consideration under the forest ecosystem plan is the Newfoundland Marten (*Martes americana atrata*). This weasel-like mammal is currently classed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The primary concern for maintaining the species is habitat protection and reduction of incidental snaring. Efforts to promote the reestablishment of the marten in eastern Newfoundland are centered around the release of several animals in the Terra Nova National Park ***and portions of the upper Terra Nova River watershed***, introduction of a modified snaring program in areas adjacent to the Park and restricted, or modified cutting regimes to maintain critical habitat structure. The northwestern section of District 02 encompasses part of the marten study area. A small nucleus population of 8 animals were re-introduced in the park during the early 1980's. *Since that time, further re-introductions and ongoing management efforts have seen a significant increase in that population. The Newfoundland Marten population in eastern Newfoundland is now estimated to be in excess of 35 animals.*

1.4.2.2 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 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.

Forest activities have the potential to cause major changes in genetic diversity if they are practiced without due regard to the ecosystems. Clear-cutting physically removes large volumes of tree mass from a site. Some sites do not regenerate adequately due to the invasion by an ericaceous shrub known as *Kalmia* or because of some other successional pattern which precludes the reestablishment of forest conditions similar to those which existed prior to harvest. In these situations, reforestation is necessary to reestablish a new forest and to maintain the ecological function of the site. Black Spruce and White Spruce are the predominant species used in planting programs throughout most of the province and this District is no different. Historically, seed for this planting program has been collected from across the landscape in the Central Newfoundland and Northshore ecoregions and are not from genetically manipulated stock. Individual plantations have the potential to contain seedlings from seed sources scattered throughout central and eastern Newfoundland. Therefore, albeit inadvertently, the past planting program in Newfoundland probably increased the gene pool available in its forest on a site specific basis. The practice will continue into the foreseeable future.

However, the genetic improvement of Newfoundland's planting stock has been researched for over 30 years. The early thrust was to identify the fastest growing, straightest, and healthiest individual trees in the wild and either collect seed or clone them by grafting branch tips. To date, over 850 of these individual trees representing 5 native species are planted in seed orchards located at the Wooddale Provincial Tree Nursery and in Western Newfoundland near Pynn's Brook. These

orchards will soon reach seed bearing age. Now, by mating each of these superior trees with another trying to find the parent combinations that produce even faster growing trees, it is hoped that future plantations will grow as much as 20 percent faster than they are currently growing. This would mean that more wood volume would be available in a shorter period of time lessening the demand on natural ecosystems.

Some people argue in favour of selective cutting as a means of sound forest management. The main problem with this approach is that during cutting, the tendency is to take the best trees for use and leave the poorer ones to grow. From a commercial forestry perspective**,** the trees left behind are often genetically inferior to the ones that were selected for harvest. Over time, the trees that develop on the site will have been derived mainly from the poorer quality trees that were left as each selective pass occurred. The result is a forest that does not meet its full productive potential, generally with lower merchantable volumes than naturally developing stands. These situations are more prevalent around communities that have relied heavily on the forest resource for fishing material, home building, fuel, and so on. In essence, selective cutting can be compared to the genetic tree improvement program working in reverse. Instead of favouring desired commercial log characteristics it favours undesirable commercial tree characteristics such as high stem taper, large branches, slow growth rates and stem sweep. It accomplishes this by the repeated action of removing trees with the higher quality logs from an area and leaving the poorer quality trees to reproduce. Over the long term, selective cutting (or high-grading), will reduce the yield of commercial forest products from the forest.

The District 02 management plan must strive to maintain and protect the genetic diversity that exists within its boundaries. This will, in turn, translate into a variety of other benefits for forest users - not only the human element, but for wildlife as well.

1.4.2.3 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, micro organisms and the soil, water, and air they occupy create virtually limitless ecosystems around the world.

A forest interspersed with barrens, marshes, lakes and ponds provide for diversity across the landscape. Each ecoregion in the province should have representative areas protected which displays the diversity where such exists. With this in mind, DNR supports the development of a Proposed Ecological Reserve in FMD 2 as a representative of the Maritime Barrens Ecosystem. These areas can serve as a benchmark from which to measure and guide management decisions. These representative areas protect the wilderness of the ecoregion and are vital for guiding management actions. As benchmark areas, they will illustrate the multi-species mosaic that planning actions must maintain.

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

As well, logging is becoming an increasingly significant disturbance factor in the boreal forests. Wildfire is paramount in controlling the dynamics of the drier, continental boreal forests of western Canada and Alaska. In Newfoundland, fire tends to be important in the forests of central region, characterized by its continental-like climate. The occurrence of old-growth forests on the Island of Newfoundland is unknown. Except for the old-growth research conducted in the upper Main River watershed, empirical definitions of old-growth according to forest types and edaphic conditions are not available. Furthermore, the frequency of natural forest disturbances and their role in shaping landscape level forest composition and structure of the Island's forests are little understood. However, given our general knowledge of the historic occurrence of fire, insect and wind disturbance in Newfoundland's forests, as well as recognition of a century of logging activity across the Island, it is reasonable to assume that primary old-growth forests on the Island are not common. DNR does acknowledge that the older cohorts in the age class structure of a district are important from many ecosystem perspectives. Accordingly, during the 2010 wood supply modeling, the maintenance of 15 % of the overmature cohort (i.e. 81+ years) on the landscape over the forecast horizon was a requirement on a district basis. This will be discussed further in other sections.

Riparian areas are characterized by a transition from aquatic to upland vegetation. The width of a riparian area varies depending on steepness of slopes, the soil properties and the permanence of the water body. Riparian areas cover only a small portion of the land in a watershed, but because they are often more diverse and productive than upland areas, these habitats are critical to wildlife and fish and are important reservoirs of biodiversity.

Studies have shown that many wildlife species are more abundant in riparian upland areas. Some species are entirely dependant on riparian habitats, while others such as humans, use them for a portion of their life aesthetic and spiritual needs. The long-term stewardship of riparian habitats for the purpose of maintaining biodiversity ensures wildlife habitat, control of stream temperature, maintenance of plant and animal genetic variety and a legacy for future generations.

1.4.2.4 Mammal and Avian Distributions by Ecoregion

A variety of mammals and birds inhabit the ecoregions in District 02, many of which can often be used as indicators for measuring certain aspects of the criteria and indicators process.

Representative species for each of the province's ecoregions are listed in *Natural Regions of Newfoundland and Labrador (Susan Meades,1990).* The species listed below were taken from that text and are representative mammals and birds that one would expect to find in the various ecoregions. However, all of the species are not necessarily found in the portions of those ecoregions which are located within the boundaries of District 2. Also, these lists are not inclusive of all species that occur within the ecoregion - rather the list includes representative species. These are listed as follows (taken from Natural Regions of Newfoundland and Labrador by Susan Meades, 1990):

Central Newfoundland Forest Ecoregion

Barren Habitats:

Mammals:	Caribou (important region during migration)		

Forest and Shrub Habitats:

Mammals:	Caribou	Moose	Lynx
	Pine Marten	Mink	Red Squirrel
	Eastern Chipmunk	Snowshoe Hare	
	Northern Long-eared Bat	Little Brown Bat	
	Deer Mouse (near human habitation)		
Birds:	Sharp-shinned Hawk	Goshawk	Bald Eagle
	Yellow-Rumped Warbler	Osprey	Merlin
	Spruce Grouse	Hermit Thrush	
	Ruffed Grouse	Boreal Owl	Gray Jay
	Great Horned Owl	Willow Ptarmigan	
	Yellow-bellied Flycatcher	Northern Flicker	

Ubiquitous - occurring in a variety of habitats:

Mammals:	Black Bear	Red Fox	Ermine
	Meadow Vole	Masked Shrew	
Birds:			

Aquatic Habitats:

Mammals:	Beaver	Muskrat	Otter
Birds:	Green-winged Teal	Canada Goose	Ring-necked Duck
	Common Loon		
Amphibians:	Green Frog		

Wetland Habitats - marshes, peatlands:

Birds:	Northern Hawk-Owl	Lincoln's Sparrow

North Shore Forest Ecoregion

Forest and Shrub Habitats:

Mammals:	Caribou	Lynx	Mink
	Moose	Snowshoe Hare	Little Brown Bat
	European Bank Vole (introduced to Yellow Fox Island)		

Birds:	Bald Eagle	Osprey	Boreal Owl
	Gray-cheeked Thrush	Grey Jay	Blackpool Warbler
	Yellow Warbler	Wilson's Warbler	

Ubiquitous - occurring in a variety of habitats:

Mammals:	Black Bear	Red Fox	Ermine
	Meadow Vole	Masked Shrew	Blue Jay
	Common Redpoll		
Birds:			

Aquatic Habitats:

Mammals:	Beaver	Muskrat	Otter
Birds:	Common Eider	Common Tern	Common Murre
Amphibians:	Green Frog		

Maritime Barrens Ecoregion (Northeastern Barrens Subregion)

Barren Habitats:

Mammals:	Caribou		
Birds:	Rough-legged Hawk	Savannah Sparrow	

Forest and Shrub Habitats:

Mammals:	Moose	Lynx	Snowshoe Hare
	Red Squirrel	Eastern Chipmunk	Mink
	Little Brown Bat	Hoary Bat	
	Northern Long-eared Bat		
Birds:	Bald Eagle	Goshawk	Pine Grosbeak
	Osprey	Blackpoll Warbler	Merlin
	Dark-eyed Junco	Grey-cheeked Thrush	Red Crossbill
	Sharp-shinned Hawk	Northern Water Thrush	
	Willow Ptarmigan	Yellow Warbler	

Ubiquitous - occurring in a variety of habitats:

Mammals:	Red Fox	Black Bear	Ermine
	Meadow Vole	Masked Shrew	
Birds:	Starling	Blue Jay	House Sparrow

Aquatic Habitats:

Mammals:	Beaver	Muskrat	Otter
Birds:	Canada Goose	Belted Kingfisher	Common Loon
	Ring-billed Gull	Black-backed Gull	Common Tern
	Leach's Storm Petrel	Atlantic Puffin	
	Black-legged Kittiwake		
Amphibians:	Green Frog		

Wetland Habitats - marshes, peatlands:

Birds:	Northern Harrier	Short-eared Owl	Common Snipe
	Swamp Sparrow		

Eastern Hyper-oceanic Barrens Ecoregion

Barren Habitats:

Mammals:	Caribou (summer)		
Birds:	Rough-legged Hawk	Snowy Owl	Savannah Sparrow
	Water Pipit		

Forest and Shrub Habitats:

Mammals:	Moose	Lynx	Snowshoe Hare
	Red Squirrel	Little Brown Bat	
Birds:	Blackpoll Warbler	Northern Water Thrush	Dark-eyed Junco
	Willow Ptarmigan	Mourning Warbler	Yellow Warbler

Ubiquitous - occurring in a variety of habitats:

Mammals:	Red Fox	Mink	Ermine
	Meadow Vole	Masked Shrew	
Birds:			

Aquatic Habitats:

Mammals:			
Birds:	Northern Gannets	Common Murre	Leach's Storm-Petrel
	Black-legged Kittiwake		Atlantic Puffin
Amphibians:	Green Frog		

Wetland Habitats - marshes, peatlands:

Birds:	Northern Harrier	Short-eared Owl	Common Snipe
	Swamp Sparrow		

1.5 Forest Characterization

1.5.1 Land Classification

There are four basic categories that currently represent how the forest within a forest management district is classified; productive forest, non productive forest, non-forest and fresh water. The total mapped area in FMD2 is approximately 0.5 million hectares. Of this approx 179 492 ha is productive forest, 123 523 ha is nonproductive, 133 754 ha is non-forest, and 40 867 ha is water. Figure 3 displays the relative percentages of each major forest class category found within the district. Productive forest is defined as forested area that is capable of producing 60 m³/ha at rotation. Essentially, this is the forested area that sustains industry in the province.

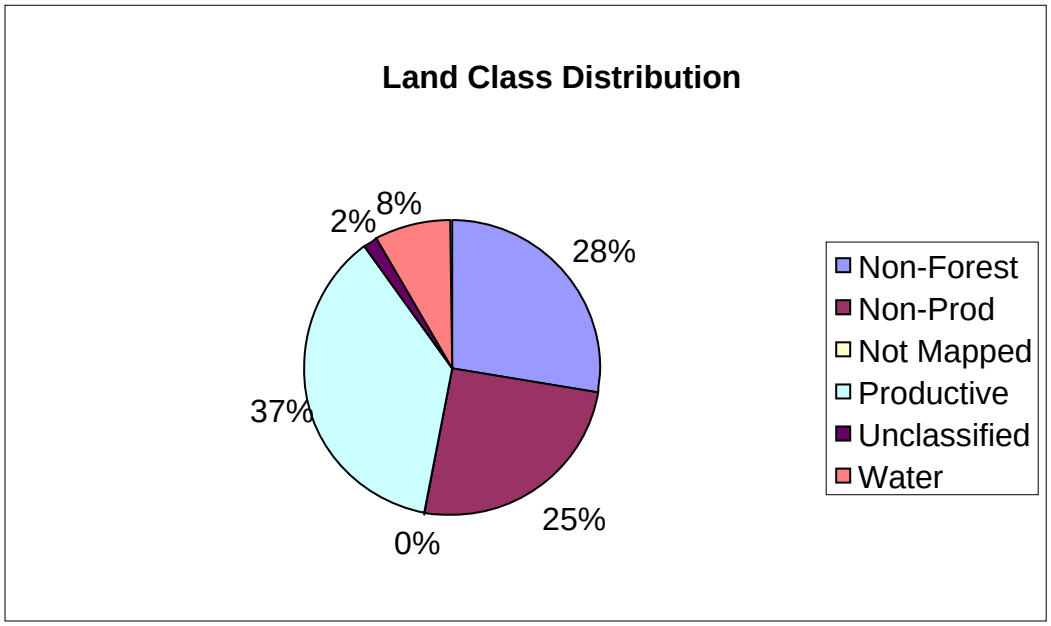

Figure 3: Land Class Distribution for District 02

Table 1 displays the land classification broken down by district for Planning Zone 02. All units are in hectares. The total mapped area in the zone is approximately 775,000 ha.

Land Class	District		Total
	2	3	
disturbed	7921	2469	10390
0-20 years	29168	8065	37233
21-40 years	23489	14766	38255
41-60 years	7315	13952	21267
61-80 years	5427	13868	19295
81-100 years	16804	8506	25310
101-120 years	6699	3411	10110
120+ years	4470	6893	11363
Total Productive	101293	71930	173223
softwood scrub	95082	61588	156670
hardwood scrub	3722	5458	9180
Total Non-Productive	98804	67046	165850
non-vegetated	39370	102147	141517
vegetated non-forested	61338	108468	169806
cleared land	614	319	932
agriculture land	236	360	596
residential	2634	2212	4846
right of ways	809	679	1487
resource roads	378	13	391
Total Non Forested	105378	214197	319576
Fresh Water	39370	78477	117847
Total All Classes	344845	431650	776495

Table 1: Land Classification by district and area for Zone 02

1.5.2 Age Class

Individual tree ages in a stand can all be the same after fire or planting but in most cases the ages vary. Foresters describe forest stand age in terms of age classes which generally encompass 20 years. The age classes present in the zone are described as 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 age class distribution in each district for the entire productive forest is shown in Figures 4 and 5. 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 since continuous timber supply is limited by the age class with the lowest area. The age class structure for Districts 02 is typical of the rest of the island with an abundance of area in the young and old age classes and a dip in the intermediate age classes. District 03 shows a more balanced distribution. Strategies to rectify any age class imbalances or impacts on wood supply are employed during the timber supply analysis.

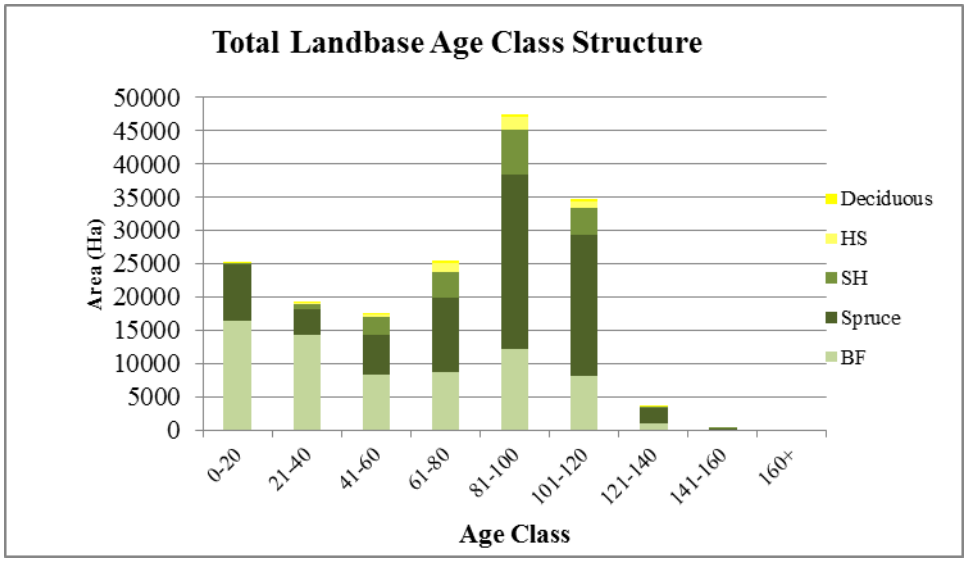

Figure 4: Age class distribution for District 02

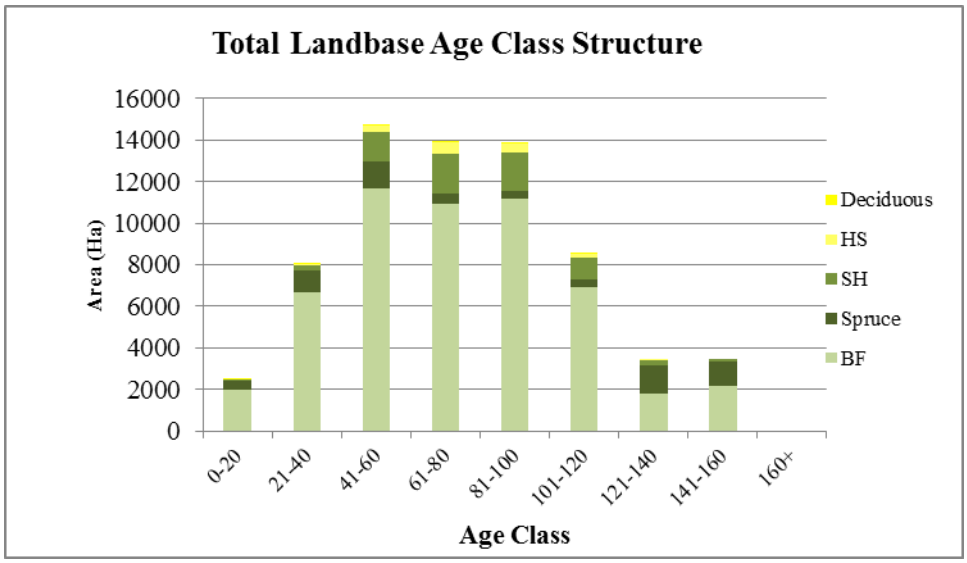

Figure 5: Age class distribution for District 03

1.5.3 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 sites ability to produce timber. Site capability is determined on a number of factors including soil fertility, moisture regime and geographic (slope) position. In the zone, medium site types are most abundant accounting for approximately two-thirds of the productive area in District 02 and roughly half in District 03. The distribution of area by site class for each district is shown in Figures 6 and 7. On average, good sites are capable of producing 2.6 m3/ha/yr, medium sites 1.7 m3/ha/yr, and poor sites 0.8 m3/ha/yr.

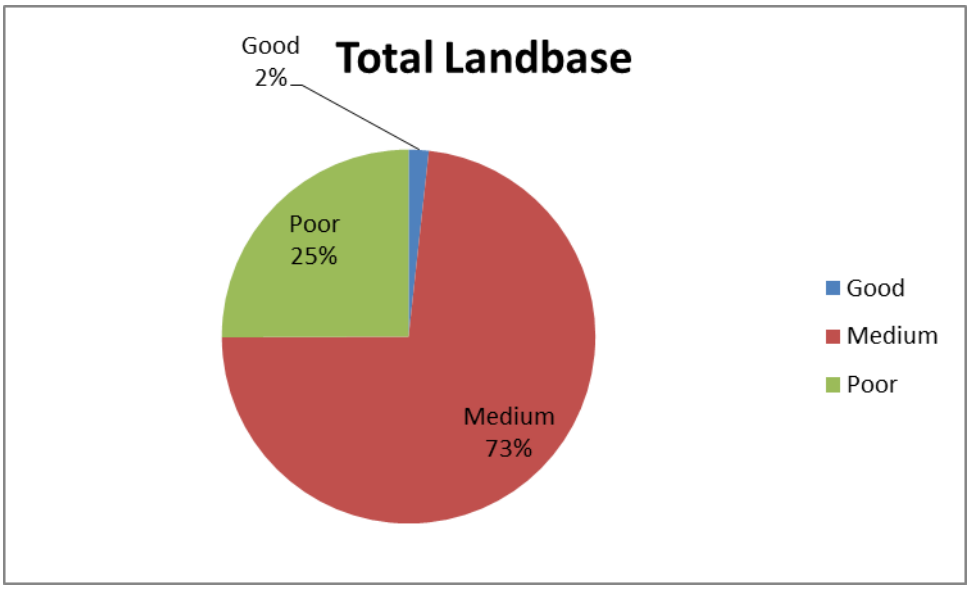

Figure 06: Site class breakdown for District 02

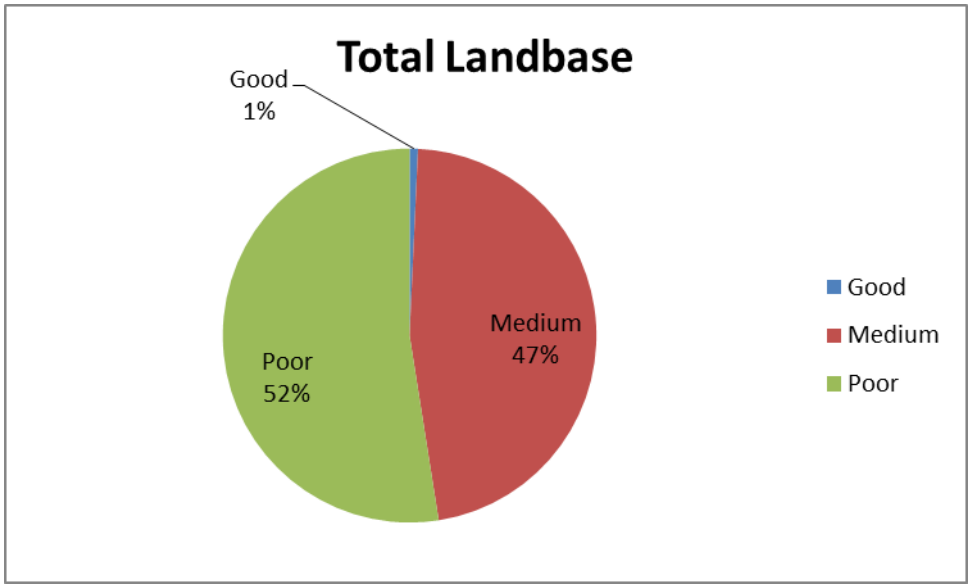

Figure 07: Site class breakdown for District 03

1.5.4 Species and Working Group

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

In the zone, the softwood working groups dominate accounting for over 85 percent of the productive forest. Black Spruce and Balsam Fir stands are of equal distribution in District 02, whereas District 03 is composed almost entirely of stands containing predominately Balsam Fir (Figures 08 and 09). The black spruce working group can occur as pure stands or in association with balsam fir, white spruce, white birch, trembling aspen or larch in varying species compositions. Balsam fir can occur in pure stands or in association with one or more of the species listed above. The softwood hardwood working group occurs as varying mixtures of fir, spruce, and birch. The hardwood softwood, white birch, and white spruce working groups occupy a small portion of the productive forest in each district.

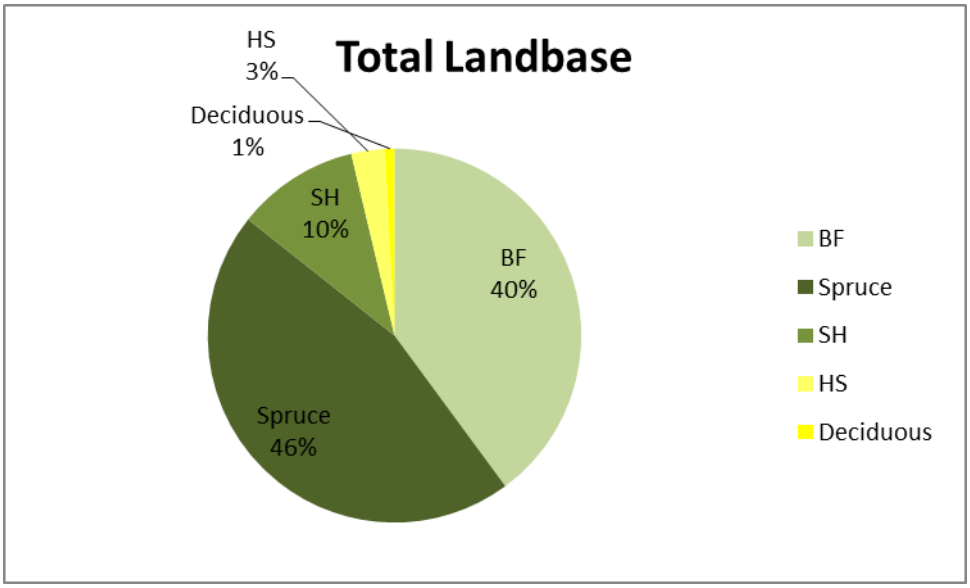

Figure 08: Working group breakdown for District 02

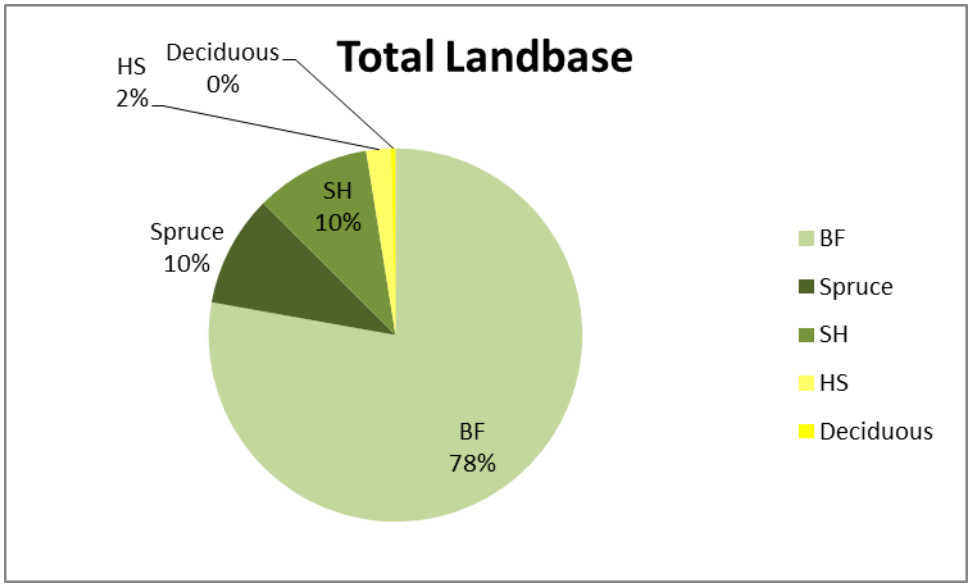

Figure 09: Working group breakdown for District 03

1.5.5 Forest Disturbances

Disturbance patterns in the boreal forest normally encompass a high incidence of wildfire combined with periodic outbreaks of insect infestations, disease, and wind throw. Human disturbance has historically been in the form of large-scale timber harvesting and forest fires due to human causes, as well as forest removal for residential, agricultural, and/or industrial developments.

The Bonavista Peninsula is very representative of these disturbance patterns. Historical records reveal that virtually all of the forest area has been swept by wildfires. Most of the FMD2 productive timberlands in existence at the turn of the century were destroyed by large forest Fires which occurred during the late 1880's and early 1900's (1907). This accounts for the large black spruce component of the forest which re-seeded on many burnt sites. The remaining unburned portions have to some degree been affected by one or more periods of high insect populations during the late 1970's and early 1980's. The Forestry and Wildlife Branch reported that in excess

of 12,900 hectares of productive forest were affected by the episodic highs of Spruce Budworm *Choristoneura fumiferana* and to a lesser extent Hemlock Looper *Lambdina fiscellaria* infestations during that period. The forests most heavily damaged by extremely high budworm populations are located near Ocean Pond, Canning's Cove, and Deer Harbour just north of Sunnyside. Hemlock Looper damage was concentrated in the Ocean Pond and Burgoyne's Cove area**.**

Wind damage has been witnessed to occur infrequently in naturally developing stands that have not had other disturbance impacts. The frequency and scale of wind disturbance in these type stands is anticipated to increase as the older portion of the District's forest moves through senescence. Insect damage during the late 1970's and early 1980's and the widespread practice of partial stand cutting has contributed to subsequent wide-spread wind throw throughout much of the District. Recent weather events, including ice storms in 2008 and 2009 and hurricane IGOR in 2010, have exacerbated the situation and have resulted in extensive damage throughout FMD2. The majority of wind throw areas exist as small-sized openings, most of which will regenerate naturally to Balsam Fir. The most prevalent forest pathogen in District 02 is heart rot which is common to selected mature Balsam Fir stands. Sap rot and root rot are also present in these forests, but are much less common.

Human disturbance on the Bonavista Peninsula and surrounding area has been characterized by decades of extensive patch cutting, frequent man-caused Fires and to a lesser extent forest clearing for residential and agricultural development. The Bonavista Peninsula area is one of the earliest settled portions of North America, colonies having been established by the English about the year 1600.

Prior to the twentieth century, the principal occupation of the population involved some aspect of the fishery. Consequently, the only harvesting of timber was for use in the fishery for boat building, stores, stages, housing materials and for fuelwood. The wood for these requirements was taken from forests as close as possible to the coast.

After the turn of this century, forest harvesting activities increased as selective logging and patch clear-cutting were conducted to obtain boat timbers and pulpwood for export, sawlogs and firewood for domestic use and mining timbers. Patch clear-cutting was prominent near waterways to supply sawlogs to several water-powered sawmills. These mills, which were

prevalent in the lumbering communities of Musgravetown, Bloomfield and Lethbridge, operated up to the 1950's, and depended heavily on the coastal forests subsequently alienated as a result of the creation of the Terra Nova National Park in 1957. Other industries utilizing smaller-diameter, sub-merchantable timber, such as biscuit box and barrel manufacturing plants were also established and flourished during this period. Since the majority of the existing timber resource included immature stands, these were the dominant source supplying these industries.

Between 1950 and 1970 the water-powered sawmills, biscuit box and barrel manufacturing plants were phased out. During the latter part of this period, forest stands established prior to 1930 began to produce merchantable size sawlogs. This contributed to development of the District's current small sawmill industry. The sawmills of the Peninsula were characterized until recently by small family affairs operated by two to three men. The layout of the remaining mills of this type is essentially the same today as they were when the industry was established, consisting of a hand-operated push table, or a mechanical log carriage. Over the past ten years, several modern sawmills have been established. These are heavily dependant on raw material from outside FMD2. From the earliest beginnings, operators of the small mills predominantly practiced selective logging, or high grading (i.e., cutting individual trees or small groups of trees). Consequently, it was necessary to cover a large area to obtain a sufficient annual harvest. This practice, as employed by in excess of 500 sawmillers over many decades has led to a widespread disturbance pattern throughout the district. As a result, the forest structure is quite broken with a much higher level of small openings or clearings than would be seen in naturally developing undisturbed stands. The many small openings present in the forest in FMD2 has created ideal conditions for the spread and establishment of kalmia. Kalmia is an invasive ericaceous shrub that quickly dominates a site given favourable conditions and prevents the normal development of the forest. It can seriously impede the ability of the forest ecosystem to provide many social and economic values. Over the past two decades this disturbance pattern has been somewhat modified through the implementation of silviculture site rehabilitation projects and increased commercial clear-cutting.

Current inventory data for FMD2 can be used to identify disturbed areas. Figure 10 illustrates the distribution of forest disturbances in the district. Harvesting represents the largest disturbance

with 7462 ha of cutover identified. The approximately 2600 ha of Windthrow have become the most significant of all severe natural disturbances and contributes to 22 % of total. This is due mainly to the abundance of overmature timber on the landscape and, as a result of Hurricane Igor and other weather events, is suspected to significantly increase when the next forest inventory is completed. Severe Insect damage represents 9 % of total disturbances represented. It should be noted however that light to moderate insect damage is not represented in this distribution and likewise the level of Adelghid damage is difficult to quantify. Most of the insect damage occurred in balsam fir forest types. Fire, at 6 % of the district, has had significantly less impact than the other disturbances in recent years. It should be noted that these areas are not mutually exclusive and there is overlap between disturbances. (ie. insects may have killed a stand, resulting in wind damage to weakened trees, followed by salvage harvesting, and then perhaps fire).

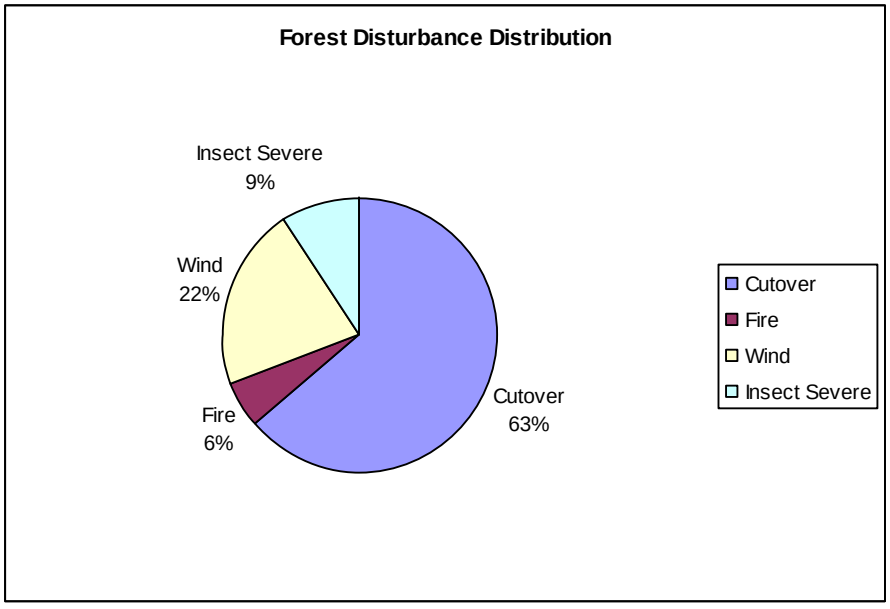

Figure 10: Disturbance distribution for Forest Management District 2.

Section 2. Past Activities

2.1 District 02

2.1.1 Harvesting

2.1.1.1 Commercial

Table 2 summarizes the commercial harvest in District 02 for 2012-2016.

District: 02		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd	Crown	**260,440**	207,196	53,244		**8,112**	0	8112			
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Hwd	Crown	**9,761**	10,448	-687		**5,000**	5,704	-704			
	Sub-total										
District Total											

Table 2: Summary of commercial harvest in District 02 by Crown from 2012 to 2016

Note: 2016 harvest is estimated.

2.1.1.2 Domestic

Table 3 summarizes the domestic harvest in District 02 by Crown from 2012 to 2016

District: 02		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	*Operationa*	*Regulatory*
Swd				0		**178,292**	170951	7341			
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	Operational	Regulatory
Hwd				0		**4000**	2433	1567			
	Sub-total										
District Total											

Table 3: Summary of Domestic harvest in District 02 by Crown for 2012 to 2016

Note: 2016 harvest is estimated.

2.1.2 Silviculture

Table 4 summarizes the completed silviculture treatments for the past planning period.

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	0	0
Site Preparation	874.41	718.99
Planting	735.00	639.69
Commercial Thinning	0	0
Cone Collection	0	0

Table 4: Summary of silviculture treatments on crown land in District 02 from 2012 to 2015

2.1.3 Road Construction

Table 5 summarizes forest access road construction in District 02 and 03 from 2012-2015.

Roads		
	Proposed (km)	Constructed (km)
New Construction Crown Built	32.49	13.57
New Construction Contractor Built	19.65	5.81
Re-Construction	99.10	67.70
Total	151.24	87.08
Bridges	7	5

Table 5: Summary of access roads constructed in District 02 and 03 from 2012 to 2015

2.1.4 Natural Disturbance

2.1.4.1 Fire

District 02 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. There were no significant fires during the last planning period.

2.1.4.2 Insect

While the presence of balsam woolly adelghid continues to be a concern in the zone, there was no recorded defoliation from hemlock looper or spruce budworm. No treatment was carried out for looper, budworm, or adelgid in the last 5 years.

2.2 District 03

2.2.1 Harvesting

2.2.1.1 Commercial

Table 6 summarizes the commercial harvest in District 03 for 2012-2016.

District: 03		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd	Crown	**0**	848	-848		**0**	0	0			
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Hwh	Crown	**0**	0	0		**0**	0	0			
	Sub-total										
District Total											

Table 6: Summary of commercial harvest in District 03 by Crown from 2012 to 2016

Note: 2016 harvest is estimated.

2.1.2.2 Domestic

Table 7 summarizes the domestic harvest in District 03 by Crown for 2012 to 2016

District:		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd		**0**	78,288	-78,288		**0**	0	0			
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	Operational	Regulatory
Hwd		**0**	0	0		**0**	0	0			
	Sub-total										
	District Total										

Table 7: Summary of domestic harvest in District 03 by Crown from 2012 to 2016

Note: Commercial 2016 harvest is estimated.

2.2.2 Silviculture

Table 8 summarizes the completed silviculture treatments for the past planning period.

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	0	0
Site Preparation	0	0
Planting	0	0
Commercial Thinning	0	0
Cone Collection	0	0

Table 8: Summary of silviculture treatments on crown land in District 03 from 2012 to 2015

2.2.3 Road Construction

Table 9 summarizes forest access road construction in District 02 and 03 from 2012-2015.

Roads		
	Proposed (km)	Constructed (km)
New Construction Crown Built	32.49	13.57
New Construction Contractor Built	19.65	5.81
Re-Construction	99.10	67.70
Total	151.24	87.08
Bridges	7	5

Table 9: Summary of access roads constructed in District 02 and 03 from 2012 to 2015

2.2.4 Natural Disturbance

2.2.4.1 Fire

District 03 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. There were no significant fires during the last planning period.

2.2.4.2. Insect

While the presence of balsam woolly adelghid continues to be a concern in the zone, there was no recorded defoliation from hemlock looper or spruce budworm. No treatment was carried out for looper, budworm, or adelgid in the last 5 years.

Section 3. Timber Supply Analysis

The current annual allowable cuts for each district in Zone 02 are in effect from January 1, 2016 to December 31, 2020.

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 "rolled up" provide us with the annual allowable harvest level for the island.

3.2 Guiding Principles and Policy Direction

The key underlying principles that guided this analysis were: (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 establishing sustainable timber harvest levels, legislation requires that harvesting not exceed the established AAC's. Likewise, government's policy is to optimize forest industry opportunities from the sustainable fiber supply. Government also requires consultation be conducted during the timber analysis. In this analysis, public input was achieved through the district managers and, in some cases, planning teams. The forest industry was consulted directly

throughout the process. As well, there was a 30 day consultation process whereby a draft of the gross AAC's and methodology was published on the government web site for public review and comment.

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, and limited intermediate aged forests. This imbalance is not unusual in a boreal forest where cyclic catastrophic disturbances are common. Figure 8 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 a matrix of measures is employed which is designed to fill the gap in the age structure. These range from an aggressive forest protection program to keep the mature and over-mature stands alive as long as possible so that they can be harvested before they collapse naturally, harvesting programs that attempt to exclusively target the oldest stands first in order to minimize the harvesting pressure on the naturally weak intermediate age classes, and thinning of the regenerating forest so that it becomes operable at an earlier age.

Another important aspect of the province's forest that poses a challenge to forest managers is the natural fragmentation of the resource. The province's landscape is carved by many ponds, bogs, rivers, streams, and rock outcrops resulting in relatively small pockets of timber scattered across the landscape. This makes the determination of an economic timber supply very challenging given that each stand has unique economic characteristics.

Arguably the most important factor affecting present and future AAC's is the land base. The land base available for forest activity is constantly being eroded by other users. There is an approximate correlation between AAC and land base in that a one percent loss of land base represents a one percent drop in AAC. It is important therefore that we minimize loss to the

forest land base and continue to explore ways to grow more volume on the existing land base to mitigate this loss.

3.4 Timber Supply Analysis

In 2015, the Forest Services Branch began another review of the provincial timber supply which was completed in March of 2016. 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 requires 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. An estimate of forest stock is kept current through an update program which is conducted each year to account for all natural and man-made disturbances such as fire, insects, and harvesting, and any enhancement programs such as 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) can be harvested with reasonable economic restrictions (expensive wood) and b) highly unlikely to be harvested under current economic conditions. Only the former 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 these non-timber values had 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. In any one year, less than1% 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 meter (from waters edge) uncut buffer. In addition to these legislated water buffers, District Ecosystem Managers, in consultation with planning teams, have increased buffer zone widths beyond the 20 meter minimum to protect special values such as; salmon spawning areas, cabin development areas, aesthetic areas, wildlife habitat, outfitting camps, etc.

3.4.2.1.2 Protected Areas

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

3.4.2.2 Timber Related

Compounding the effect of downward pressure on the AAC, the department also reduces the AAC's by taking into account other potential losses of timber:

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 to determine the quantity and quality of fiber remaining. The estimates of loss from these surveys are used to reduce the AAC.

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 class 1 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., the Northern Peninsula, Western Newfoundland) and other factors likely to affect yield.

Yield curves are a key element in a wood supply analysis. In fact, the validity, or "usefulness", of the wood supply analysis is determined by the truth, or "correctness", of the yield forecasts. While there is no way of predicting with certainty how stands will actually grow in the future, care must be taken to ensure that the yield projections used are realistic and reasonable. Respecting the sensitivity and importance of these forecasts, the Forest Services Branch (FSB) 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 FSB'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. As well, special yield curve sets were developed for defined geographic areas with demonstrated uniqueness. These included areas where chronic insect activity is ongoing and areas that have unique growth characteristics.

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 minimize 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 mills and employment. .

3.4.4.2 Spatial Analysis

A major improvement in this wood supply analysis is the introduction of 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. While, the 2001 approach was an improvement over previous wood supply analysis where no harvest scheduling was done, the software used cannot realistically know all the operational restrictions within a forest management district. In the manual process, the 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 see if it is sustainable and see if non-timber objectives are met. In most case, this harvest schedule has to go through several cycles before an acceptable harvest schedule could be found. 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 to identify other forest stands that are not as accessible for harvesting.

Manual harvest scheduling has several major 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 that delay or restrict the harvesting of stands. These restrictions, which were previously unaccounted for, have made our past AAC's higher than was realistically sustainable. Secondly, the mapped 25 year harvest schedules build credibility into the forest management process. A common misconception is that the province is running out of wood and soon will not be able to support existing forest industries. 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 and 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 that 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 tied directly to discreet forest areas, and these forest areas can be the link that allows 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 before they become an issue. Finally, the harvest schedule maps developed for the wood supply analysis can be a starting point for the 5 year 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 only done for the class 1 land base. 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.

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. 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 2015 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 2016 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 thinning levels (ha) used in the analysis for districts 02 and 03 were 0 ha. The planting levels (ha) for districts 02 was 300 ha, While the planting levels in District 03 was 0 ha.

3.5 Inventory Adjustments

One of the limitations of the current wood supply model is its inability to account for volume depletions outside of what is reported for harvesting operations. The model produces a gross merchantable volume (GMV) figure which needs to be adjusted to account for volume losses as a result of; fire, insects and disease, timber utilization practices and the presence of stand remnants. In previous analyses the lack of province wide digital stand information, the absence of computer tools and the small number of people involved with the wood supply analysis, resulted in a high degree of uncertainty around values derived for each depletion. It was recognized that a need existed to study each component more intensely and to expand the time frame and staff responsible for such an analysis. Such was the task of the Forest Engineering and Industry Services Division whose staff, over a seven year period, completed an analysis of the individual components.

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 FSB.

3.5.2 Insects

An aerial mortality survey was completed on areas with historically high insect infestations. This information along with a GIS analysis of areas salvaged enabled FSB to determine the

amount of productive area lost to insect mortality each year. These numbers were in turn reviewed by district managers and adjustments were made for local conditions.

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). Surveys were conducted province wide and on all tenures over a five year period. 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 Districts 02 is 22 percent.

3.6 Results

It should be noted that the Wood Supply Allocation period (2016-2020) is offset by one year from the planning period (2017-2021). The results of the timber supply analysis, for Districts 02 and 03, is shown in Table 10.

	Softwood Class 1 (m3)	Softwood Class 3 (m3)	Softwood Domestic (m3)	Hardwood (m3)
District 02	60840	8112	32292	2395
District 03	0	0	13391	0

Table 10: Annual Allowable Cut results for Districts 02 and 03 for 2016-2020

Section 4. Values

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. It ensures the needs of the present are met without compromising the ability of future generations to meet their needs 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 is a high priority for many of the residents Newfoundland and Labrador. 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 and Labrador'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

and Labrador's public has had free range in our pristine wilderness, a fact that can not be ignored when planning for the zone.

All are key interlocking components and each must be maintained if sustainable development is to be achieved.

4.1 Value Structure

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

Many of the values in the zone were identified by this or previous 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

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.

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.

4.1.1 Biotic Values

4.1.1.1 Big Game

4.1.1.1.1 Moose

Characterization:

Moose are not native to the island. A pair was introduced to Gander Bay in 1878 and two pairs were introduced to Howley in 1904 (Northcott, 1980). Today, moose are distributed throughout the island and the population is estimated to be about 125,000 - 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 27, 28, 29, 30, 38, and 47 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.

4.1.1.1.2 Caribou

Characterization:

Caribou is the only native ungulate species on the island (Northcott, 1980). Prior to the railway being built in 1898 there was a healthy population on the island but by 1930 the population had declined to about 2,000 animals (Murphy and Minty 1993). Between 1980 and 2000 the number

of caribou has increased considerably on the island with a population estimated at 70,000+ animals. In the past few years however populations have declined significantly with Planning Zone 2 being no exception. All or portions of caribou management areas 64, 73, and 74 are located in the zone.

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 hunting.

4.1.1.1.3 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 but is crudely estimated to be about 6 - 10,000 animals (Christine Doucette, Pers. Comm.). All or portions of black bear management areas 27, 28, 29, 30,38, and 47 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.

Moose

Mature stands of timber serve as moose shelter or moose yards and will be identified in consultation with the Wildlife Division.

Caribou

- In areas where caribou utilize lichens, a minimum amount of forest which supports these lichens should be maintained for caribou.

Because the caribou population has experienced a decline in the past, the WD in conjunction with forestry division and industry has identified important caribou habitat areas which were incorporated into a document produced by WD entitled *Forest Management Guidelines for Woodland Caribou for the Island of Newfoundland 2007*. Since that time new information has been collected from radio collared animals which suggest that usage of the habitat and dispersion across the landscape is different from the original thinking. This data will be used to develop a new set of caribou guidelines.

Bear

A 50-metre, no-cut, treed buffer must be maintained around known bear den sites (winter) or those encountered during harvesting. This distance will be reviewed when the EPG's are updated. Den sites must be reported to the WD.

4.1.1.2 Furbearers

Characterization:

A number of furbearers occur in the zone the more prominent of which include 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:

- water quality maintenance;
- riparian buffer zones along aquatic areas;
- maintaining a mosaic of forest age and development classes
- 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.
10 trees or snags per ha (preference to tress >50 cm) are to be left standing to provide habitat for various species.

4.1.1.3 Species of Interest

4.1.1.3.1 American Marten

Characterization:

Before 1900, American marten ranged over most of the forested areas of the island, however in 1934 numbers had declined significantly and marten were only found in limited regions. (Bergerud, 1969). In 1986, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed the Newfoundland population of the American marten and the species was listed as threatened. Revisions in 1996 and 2000 resulted in an uplisting to endangered due to further declines. Habitat loss, trapping and incidental snaring are possible reasons for the marten population decline. The status of marten has been upgraded from endangered to threatened in 2007 because new population estimates were stable and distribution of marten was increasing. The American marten (island population) is listed as threatened under both the federal *Species at Risk Act* and provincial *Endangered Species Act*.

Since the initiation of the live-trapping program, it has been revealed that Main River, Little Grand Lake and Red-Indian Lake are high-density marten areas on the island. Based on this information, it is important that marten habitat be protected in these areas. Furthermore, it is important that some remnant stands of old growth (80+) forests be left throughout the zone and provision made to have connectivity (i.e., unbroken corridors of forest) between such stands. To accomplish this, a landscape approach to habitat management was initiated by the Forest Service in 1999. This involved working with stakeholders to identify critical or potential marten habitat, locating possible corridors, and identifying areas which would not be cut in the near future. This initiative has been ongoing since that time. To identify all factors affecting marten survival, stakeholders from the Canadian Forest Service, WD, Corner Brook Pulp and Paper and the Forestry and Agrifoods Agency sit on the Newfoundland Marten Recovery Team. The primary functions of the Recovery Team are to prepare and periodically revise the recovery plan for American marten in Newfoundland and to provide advice to Government on species recovery.

The recovery plan may include short and long-term population goals and outlines actions required to reach recovery goals. The team has identified critical marten habitat and is in the process of determining what forestry activities should be permitted within the boundaries of critical habitat. The team is also investigating the best way to approach long-term landscape level planning for marten recovery.

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.

Early indications from Brian Hearn's work with the harvest schedule indicate 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 schedule 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. More testing of the model needs to be undertaken especially on the distribution of suitable habitat and on the occupancy of this habitat.

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

A draft of a new recovery plan for marten is currently being developed but is not available during this planning phase

4.1.1.4 Water Resources

Characterization:

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

In Planning Zone F02, water is used beneficially for numerous purposes. Most of the communities within the zone have water supplies. Eighteen 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. .

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 EPG's 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. The FSB is currently pursuing an environmental management system and have developed standard operating procedures which are used provincially

4.1.2 Human Values

4.1.2.1 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. FMD2, in the last five years has supported a combined, commercial and domestic, annual allowable cut (AAC) on Crown land of approximately 80 000 m^3 softwood and 1900 m^3 hardwood.

Domestic harvesting still provides fuelwood to heat many homes and sawlog material for residential home construction. Annually, there are approximately 2500 domestic crown permits issued in FMD2 and 1300 permits in FMD3.

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

Silviculture treatments are important to the forest resource because it ensures a vigorous and healthy forest is maintained. Forest renewal activities ensure productive landbase 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.

Protection of the forest from various disturbances is also a major characteristic of resource management. Because of the long fire history in the zone, protection through well maintained and/or upgraded initial attack equipment (i.e. water bombers, pumps, hose and trucks) and well trained fire management staff is required. A large fire today in the older softwood forest would be devastating to industry. While insect kill has not been a major disturbance in recent years, protection is still critical since there is a significant area of thinned balsam fir stands, which is paramount to future AAC's. Protection of other resource values through modification of activities and enforcement is also important.

Spruce and Fir

Black spruce, white spruce and balsam fir are the main sawlog and pulpwood species within the province. Within this district, black spruce accounts for the majority of the softwood harvest. Black spruce fiber is valued for its strength properties in lumber and pulp and paper products. Additionally, spruce and fir-dominated stands comprise more than 77 % of the available forested habitat in the zone. These species are managed for maximum sustainable harvest levels though the harvesting and silviculture strategies referred to later in section 6. Protection and long term sustainability of these species will be achieved through strict adherence to AAC's and refinements to future woodsupply analysis.

White Birch

Traditionally, white birch has been a valued species for domestic fuelwood. However; it is now emerging as an important value-added species within the sawmilling and value added manufacturing industries of the province. It also has recently been researched for its ability to produce sap and the subsequent global marketability of this product.

Additionally, white birch benefits the cycling of nutrients, the structure of forest soils, and can help in the reduction of insect infestations and in the decrease in spread rates of forest fires (Perry, 1994). White birch dominated stands comprise approximately <10% of the forested land base in FMD2. With efforts to manage this species on a sustainable basis, in 2002 the first AAC's were developed for white birch and were refined in the 2016 woodsupply analysis. One of the criteria of species sustainability is its ability to regenerate. To aid in the sustainability of white birch, silvicultural prescriptions are being considered and designed to favor its regeneration. Implementation of this prescription would help facilitate a birch component on the landscape, increasing the diversity of both flora and fauna and maintaining natural processes within managed stands.

Critical Elements:

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

- maintenance or enhancement of productive land base
- planting of non-regenerating areas
- minimizing loss of land base to other users
- minimize losses to fire, insect and disease

- timely access road construction
- enhancement of younger age classes through thinning to correct age class imbalance

Guiding Principles:

- enforcement of forestry act, regulations, guidelines and policies
- minimize loss of productive land base through spatial and temporal compromises and continuous dialogue with other resource users
- education (staff, public, operators)
- aggressively conduct silviculture, access road, and protection activities
- implement best management practices. The *EPG's* outline courses of action and mitigative measures for forest activities. These EPG's are outlined in their entirety in Appendix 1 with some highlighted subject areas listed below.
    - garbage disposal
    - fuel storage
    - mineral soil exposure
    - buffer requirements
    - road and bridge construction
    - silviculture and harvesting activities

4.1.2.2 Agriculture

Characterization:

Studies show 100,000 ha or 0.9% of the Island has mineral soils suitable for farming. There is substantial agriculture industry in the district, with considerable potential to expand and provide increased economic benefits. Commercial agriculture is concentrated in the Lethbridge and Port Blandford areas. Agricultural products produced represent a significant portion of the total agriculture industry in the province. There are 19 commercial farms in FMD2 and 8 in FMD3, which include farms in the livestock sector (poultry, beef, hogs, sheep and fur), as well as in the Crops Sector (vegetables, small fruit, forages, Christmas trees and greenhouses production). In the past few years, over 40 hectares have been developed for intensive blueberry management in FMD2, however this area is not currently in full production. Recently, in the province there has been a thrust to develop the cranberry industry. Cranberries originating from managed areas have the potential to draw a higher market value than wild berries.

Critical Elements:

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

Guiding Principles:

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

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

- New agriculture leases should include a business plan approved by the Forestry and Agrifoods Agency of the Department of Fisheries, Forestry and Agrifoods.
- All merchantable timber located on proposed agriculture leases shall be harvested, in a timely manner, by existing commercial timber harvesters and that volume balanced against the current AAC.
- Where possible, existing commercial timber harvesters should be encouraged to work with farmers to clear existing leases for development.
- Existing farms be permitted to expand. Expansion will be on adjacent lands or on suitable lands within the district and area.

4.1.2.3 Mining

Characterization:

Within FMD2, there is a diverse geological environment which hosts a wide variety of both metallic and industrial minerals including, but not restricted to; copper, nickel, lead, bitumen, granite, gneiss, marble, gold, asbestos, silver, iron, limestone molybdenum, uranium and thorium. There is also granite with dimension stone potential. Some of the geologic history of the zone features rock types and rock formations which indicate the processes and geologic ancestry of the parent material, from which some of the soils of the districts ecoregions were derived. In FMD2, there are 2463 claims staked in 110 mineral exploration licenses and one mining lease for slate at Nut Cove. The majority of claims has been staked for their precious (e.g. gold, silver) and base (e.g. zinc, copper) metal and dimension stone (e.g. granite, gabbro) potential. In addition, some claims have been staked for their industrial mineral (e.g. silica, mica, talc) potential. Exploration activities typically consist of prospecting, geological mapping, grid line-cutting, geochemical surveys, ground and airborne geophysical surveys, mechanized trenching and diamond drilling. In addition, there are 120 of active quarries in the FMD2 which generate significant royalties.

Similarly, in FMD3, there are 3053 claims staked in 204 mineral exploration licenses with 3 mining leases (all for fluorite in St. Lawerence) and 104 active quarries.

These figures are included to illustrate the significant contribution that mining has to the local and provincial economy.

Critical Elements:

Location of deposits close to markets is vital in controlling aggregate costs which often increase dramatically with increased transportation distances.

Guiding Principles:

Harvesting timber for prospecting lines must meet the same rigor as commercial harvesting. The mining industry should enact best management practices to minimize negative impact on ecosystem values.

- 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 can not 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.

4.1.2.4 Historic Resources

Characterization:

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

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

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

Archaeological surveys have been carried out in several areas within the zone over the years, however many areas still remain to be surveyed. To date there are many archaeological sites within the zone which are protected under the Historic Resources Act. 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.

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 protect known archaeological sites and potential unknown sites are protected from forestry activity 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.

4.1.2.5 Newfoundland T'Railway and Other Recreational Trails

Characterization:

Newfoundland Trailway

A large section of the Newfoundland and Labrador T'Railway Provincial Park lies in the zone and has an impact on forestry operations. The former CNR right of way, which varies from 25 to 100 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 Parks and Natural Areas Division 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 Ac*t 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. The T'Railway is a linear park that is approximately 850 km in length. It is used primarily by snowmobile and all terrain vehicle owners. 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.

Other Trails

As one of the referral agencies for Crown Land development, the Department of Fisheries, Forestry, and Agrifoods has an important role in the approval of recreational trail systems. Ultimately, the Department also plays an important role in the maintenance of the trails through enforcement of its cutting of timber regulations - which is critical in controlling indiscriminate cutting of the treed buffers and preserving the natural aesthetics of selected trail systems.

Request for recreational trails arise from a number of stakeholders: including cabin associations; cross-country ski trail associations; municipalities; snowmobile associations; and tourism development associations. In all instances, these stake-holders are interested in preserving the aesthetics of well-travelled recreational routes. Most cabin associations which seek the designation of a buffered trail are located in remote locations accessed only by an ATV trail. Cross-country ski trails are generally circular routes near communities with a strong interest in this winter sport. Municipalities often ask for protection of popular hiking trails to points of interest near their communities. All known cross-country ski trails, hiking trails, ATV trails and snow-mobile trails are shown on the Map Series in Appendix 6.0.

The Discovery Trail Tourism Association has developed a series of scenic coastal hiking trails along the northeastern end of Bonavista Peninsula in an effort to offer new attractions in the area and help an already well-established and growing local tourism industry. These trail systems are particularly sensitive to indiscriminate cutting and, if properly protected, provide an opportunity to support further economic growth in the area. It is widely recognized in the tourism industry that growth of an area as a tourist destination and the duration of stay by visiting tourists is highly dependent on the number, the quality and the diversity of attractions in the area. The Bonavista Peninsula has an abundance of very

attractive seascapes that are appealing to visiting non-residents and locals alike - and deserve to be given adequate protection for economic as well as social reasons. Indeed, there are 5-star inns on the Peninsula which include these trails, some of which have been recognized as world class, as recommended attractions for visiting guests' itineraries. It is important in growing our local tourism industry that these visitors, from all corners of the globe, leave as envoys who can spread a positive word about our unique landscapes.

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 meters away from the track before a landing or turnaround is constructed.
- where feasible and possible, harvesting using the T'Railway shall try and avoid peak snowmobile and ATV seasons.
- The Forestry Services Branch will assume a role in the future with regard to new trail approvals similar to its previous practise. During the referral process, DNR will consider the environmental impact, from an ecosystem perspective, and the impact on production forest of all new trail developments. All request for trail buffers will be carefully considered by DNR staff. Approval will be granted for protected trail buffers if the trail locations are reasonable with respect to the impact on the Districts production forest base. If there are request for recreational trail development within the District=s production forest, then District staff will seek to find routes which will minimize the impact on the production forest and at the same time meet the needs of the stakeholders seeking the new trail approval. New trails will be included on the Districts GIS system as they are developed.

4.1.2.6 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 rich 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 in or adjacent to FMD2 include: the T'Railway, Terra Nova National Park, Bay Du' Nord Wildnerness Area, and Lockston Path Park. As well there is a candidate proposed ecological reserve area representing the Northeastern Subregion of the Maritime Barrens Ecoregion which currently has interim protection.

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 and 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.

4.1.2.7 Outfitting

Characterization:

The outfitting industry has been an integral component of the tourism industry in Central Newfoundland 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 many outfitters operating

within the boundaries of the zone that operate and maintain main and/or line camps. These operations provide seasonal employment for many local individuals.

An economic impact study conducted in 1995 by the Department of Industry, Trade and Technology suggests that each big game license has a net economic impact of $6864. By approximating this value at $7500 for 2010, it can be seen that big game alone 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. Forest access roads inevitably impact the ability of a camp to maintain its remote status. Increasing accessibility through increased access roads can also lead to increased hunting and fishing pressures in a given area. This can in turn lead to decreased success rates of tourists. This is of particular concern since Newfoundland is often the hunting destination of choice due to success rates upwards of 80 percent. An increase in access roads also tends to lead to increased cottage development that in turn can have an impact on both remoteness and game availability.

Removal of large areas of forest has the immediate effect of destroying big game habitat, particularly winter cover, although this impact has been poorly studied (particularly in remote areas). Forest harvesting also has the ability 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 that which has been experienced by the senses.

In some cases, past harvesting practices has resulted in increased levels of garbage (skidder tires, abandoned buses, heaps of oil containers, etc.). This can be frustrating for outfitters who concentrate on not leaving permanent marks on the landscape. Possible erosion caused by hillside logging and heavy equipment use is also a concern - particularly due to its possible effects on water quality for fish habitat.

Guiding Principles:

Through consultations with any outfitter located within the zone, it maybe deemed necessary to establish a managed forest area around the established outfitting lodge.

- consideration should be given to decommissioning roads and bridges (where possible) after harvesting is completed. This will eliminate damage to the hunting area by reducing the possibilities of increased hunting pressure. When roads are in use actively for harvesting purposes, access to hunters should be restricted or limited.
- harvest in the winter whenever possible. Winter roads are less passable in summer and fall and will help to reduce traffic. These roads will also be cheaper and easier to decommission.
- construct new roads as far away from existing outfitting camps as possible Harvesting should be restricted around hunting and fishing camps during their season of operation. At these times, harvesting should occur as far away as possible from outfitters.
- forest operations should be carried out in compliance with existing regulations
-efforts should be made to ensure that the integrity of the view from outfitter cabins is maintained when conducting forest operations.
- forest operations should ensure that whatever is brought into an area is removed from the area once harvesting is complete.

4.1.2.8 Recreation

Characterization:

The Trinity, Placentia, Fortune, and Bonavista Bay areas have 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 on the many rivers, walking the many hiking trails traversing the numerous ski and hundreds of kilometers of managed, groomed snowmobile trails, and excellent opportunities for hunting, fishing and adventure tourism 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 will result in a decrease in these recreational activities for some period of time.

***A**ccessibility*

An increase in forest access roads will inevitably increase the amount of accessibility to remote areas. This in turn will 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 and 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 some forest access roads near remote areas is 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*

In areas where high concentrations of recreational activities occur, aesthetic views should be maintained using landscape design techniques where possible, when conducting forest operations. This is especially relevant in areas where the recreational activities are occurring because of the aesthetic view. Reforestation of areas with high aesthetic values should occur without delay in returning the site to a forested condition.

4.1.2.9 Tourism

Characterization:

The tourism industry in Newfoundland and Labrador is based on our natural and cultural resources. Protection of these resources is critical for the industry to survive and grow**.** Newfoundland and Labrador 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 contributes approximately $800 million annually to the provincial economy and provides 15,000 person years of employment (presentation by Derek Stewart to the planning team, 2010). Government tax revenue from tourism in 1998 was estimated to be $105 million and continues to increase. The worldwide growth of tourism at rate of 41 percent, the national growth of 25 percent and the provincial growth of 33 percent indicates tourism is Newfoundland and Labrador's best opportunity for economic diversification and growth.

There are many excellent tourist destinations in the zone. There are historic locations including Trinity and Bonavista, as well as wilderness tourism destinations in Terra Nova National Park and the Bay Du' Nord Wilderness Area. The Department of Tourism has also identified a number of coastal areas that are important for long term tourism development, which includes adventure tourism, in Clode Sound, Sweet Bay, and Smith Sound. Many tourists come for the outdoor recreational opportunities or to partake of the excellent scenery.

Critical Elements:

- viewscape
- accessibility
- wilderness ambiance
- remoteness

Guiding Principles:

Work with Terra Nova National Park, provincial parks, Tourism division, local tourism operators, and local town councils to implement strategies to minimize the visual impact of harvesting operations on the aesthetic values associated with viewscapes. By bringing together the FSB, and the tourism operators, strategies will be discussed, negotiated, and implemented to provide a balance between harvesting and the values associated with tourism. If required, the FSB, local Town Councils, tourism operators, Tourism Division and other relevant groups will get together to examine the relevant issues, where applicable, in the zone.

District staff are currently committed to applying viewscape preservation principles in the Clode Sound, South West River Valley, and Princeton Pond areas. The decision has also been made to defer some previously planned harvesting in the Charleston area until such time that visible cutovers have had enough time to "green up". It should also be noted that the previously planned harvest area in Sweet Bay has been postponed for this planning period as the commitment to viewscape preservation strategies, among other constraints, resulted in the area being deemed uneconomical to harvest.

4.1.2.10 The Greater Terra Nova National Park Ecosystem

Characterization:

The primary role of Canada's national parks is maintenance of 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 TNNP) 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 aside 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 old-growth forest and associated species may impair the ecological integrity of TNNP in ways that are not currently understood. In recent history, the endangered Newfoundland pine marten has been relocated to the park and in some of the adjacent forest. Habitat connectivity with other core populations may be critical to long term survival of marten in TNNP. 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.

Critical Elements:

- to maintain ecological integrity

- to maintain native biodiversity and natural processes.

- to maintain viable wildlife populations

Guiding Principles:

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

- maintain species composition as well as the age structure and ecological functions of the various forest-types across the landscape over the long term.
- maintain proportion of interior forest (mature forest >250 m from an “edge”)
- maintain landscape connections between the park and the surrounding landscape. This would require effective, permeable movement zones between populations and/or critical habitats.
- manage and operate according to the precautionary principle, particularly as it relates to species at risk.
- ensure landscape characteristics are maintained that allow marten to achieve

their habitat requirements at the landscape scale This could mean ensuring forest management practices allow for a continuous distribution of marten habitat and home ranges to the park boundary. A conservative approach that preserves future options should be adopted until the marten guidelines are fully developed.

- A wildlife corridor is currently, and will continue to be, maintained along the North West River that will link the Terra Nova National Park with the Bay-Du-Nord Wilderness area and the headwaters of the Terra Nova River system.
- District staff are currently committed to applying viewscape preservation principles in the Clode Sound area.

Section 5. Mitigations

Site specific mitigations arising from concerns identified during the planning process and from other regulatory agencies are identified on the summary sheets accompanying each operating area in Appendices 3. As well, guiding principles which outline procedures to follow should an unforeseen conflict arise have been identified for each value in Section 4. Highlights of the mitigative measures that arose as a result of planning team meetings and local concerns for each district are listed below in the attached table. More specific details by individual operating area can be found on the map cover sheets.

Contact / Stakeholder	Contact Method	Issues / Concern Raised During 2016 Planning Process	Forestry Services Branch Response / Mitigation / Resolution
Craig Pardy, LSD George's Brook Milton	Email and District Office Meeting.	Email February 15,2016 - Commercial Harvest Blocks CC02019, CC02020. The LSD of George's Brook-Milton requested that there would be no cutting within George's Brook Protected Public Water Supply Area.	District 02 staff met with LSD February 29, 2016 and presented description of forest management practices. monitoring, and environmental protective measures associated with forestry development in PPWSA. Information was well received and, via email response on March 02, 2016, LSD gave approval to proceed with proposals as identified in the Application for Permit in George's Brk PPWSA.
Bob Hiscock Town Clarenville	Letter and Meeting at Town Hall	Domestic block CC02507 – Concern that uncontrolled cutting within town boundaries would affect future development plans. Also concerned with preserving slope stability and esthetics. Requested that there would be no cutting north east of the TCH in this block.	District 02 staff met with Town reps Bob Hiscock and Rick Wells on April 11, 2016 at the Clarenville Town Hall and presented description of forest management practices. monitoring, and environmental protective measures associated with forestry development within town boundaries and within the Shoal Harbour River PPWSA. District 02 Staff met with Clarenville Town Council on May 3, 2016 to further discuss concerns and specific areas needing protection. Response letter May 13, 2016 stated no concerns with harvest in PPWSA and had revised no cut request n Block 7. Harvest Block 7 was revised as per request.
Cyril Bennett, Town Port Blandford	Letter	Letter September 21, 2015 - Commercial Harvest Blocks CC02015, CC02016. The Town of Port Blandford identified concerns regarding Commercial cutting within domestic cutting areas and sensitive town viewscapes.	Response letter sent on November 25, 2015 including maps of harvest proposals. District 02 staff conducted field visit with Councilor Bennett at Port Blandford on January 26, 2016 and presented maps describing harvest plans. Information was well received and Mr. Bennett was in agreement with proposals.
Vida Greening, Town	Letter	Letter April 15, 2016 – Domestic Harvest Block CC02532. The Town of Port Blandford requested extension to harvest block due to loss	Response email sent on April 19, 2016 indicated that request could not be accommodated due to conflicting values such

Port Blandford		associated with crown land applications.	as private land, viewscape buffers, and young forest.
Alje Mitchell, Town Marystown	Letter	Letter April 10, 2015 – Domestic Harvest Block CC03508. The Town of Marystown requested that the no cut buffer on Clam Pond Road be amended from 100 m to 30 m. Phone call April 05, 2016 – requesting again the buffer be reduced to 30 m and informing FSB that PPWSA boundary has changed.	Response letter sent on April 28, 2015 deferring decision to 5 year planning process. Response email April 06, 2016 confirming that the Harvest Block has been amended to decrease the no cut buffer on Clam Pond Road to 30 m.
Dennis Penney, LSD Cannings Cove.	Suggestion at District Office	Domestic Harvest Block CC02531. Residents expressed concerns over lack of available timber for fuelwood in existing blocks.	Extension added to Domestic Harvest Block CC02531 in the area between Big Pond and Clode Sound.
Donna Chaulk Town Elliston	Letter	Letter April 06, 2016 - Domestic Harvest Block CC02568. No Concerns with proposed harvest block.	N/A
Samantha Hynes Town Terrenceville	Fax	Fax April 06, 2016 - Domestic Harvest Block CC03516. Town Council requesting no cutting within water reservoir or on the south slopes from Pardy's Point to Big Southest brook.	Map for Domestic Harvest Block 316 was amended as per town's request. Town was notified via email April 15, 2016.
Nora Ricketts Town Kings Cove	Letter	Letter April 14, 2016 - Domestic Harvest Block CC02554. Requesting that block be extended to include area north of highway..	Request could not be accommodated due to conflicting values.
Terry Hardwick LSD Smiths Sound	Email	Email April 15, 2016 – Domestic Harvest Block CC02519. Requested that there be no cutting within a proposed "Protected Public Water Supply Area" WS-G-037.	Map for Domestic Harvest Block 219 was amended as per town's request. Town was notified via email April 15, 2016.
Andrea Kettle Town St. Lawrence		Email April 07, 2016 - Domestic Harvest Block CC03504. Requesting that the "Municipal Habitat Stewardship Agreement Area" be designated as no cutting. Phone call: Discussed previous request by Greq Quirke, Town Manager, to identify no cutting 2 km west of town.	Map for Domestic Harvest Block 304 was amended as per town's request. Town was notified via email April 15, 2016.
Bruce Mercer Town Swift Current	Email	Email March 23, 2016 - Domestic Harvest Block CC02541. Concern about roadside cutting through community.	FSB Response email sent on March 24, 2016 indicated that domestic cutting permits do not allow cutting within 100 m of highway.
Ginger Walsh Town Winterland	Email	Email April 06, 2016 - Domestic Harvest Block CC03506. No Concerns with proposed harvest block.	N/A
LSD Garden Cove	PPWSA permit application	Domestic Harvest Block CC02542. Through the application process, required to obtain permit to harvest domestic timber in Public Protected Water Supply Area, the LSD for Garden Cove requested no cutting within the PPWSA.	FMD2 staff consulted with Provincial Water Resources Division. A no cut buffer of 300 m was established around intake pond in the Garden Cove PPWSA..
LSD Burgoynes Cove	PPWSA permit application	Domestic Harvest Block CC02513. Through the application process, required to obtain permit to harvest domestic timber in Public Protected Water Supply Area, the LSD for Garden Cove requested no cutting within the PPWSA.	FMD2 staff consulted with Provincial Water Resources Division. Agreed to no cutting in PPWSA. Extension added to Domestic Harvest Block CC02513 to accommodate local domestic timber requirements.

Residents Open Hall	Suggestion at District Office	Domestic Harvest Block CC02552. Eastern Pond PPWSA previously designated as no cutting and excluded from domestic harvest block. As the Eastern Pond PPWSA has been repealed, residents requested authority to cut timber in area.	FMD2 staff consulted with Provincial Water Resources Division. Domestic Harvest Block CC02552 was extended to include area previously part of Eastern Pond PPWSA.
Residents Harcourt	Suggestion at District Office	Domestic Harvest Block CC02519. Residents expressed concerns over lack of available timber for fuelwood in existing blocks.	Extension added to Domestic Harvest Block CC02519 in the Harcourt Forest Access Road area.
Sherman Stanley, Residents Petley	Suggestion at District Office	Domestic Harvest Block CC02512. Residents expressed concerns over lack of available timber for fuelwood in existing blocks. Requested that domestic cutting be allowed along entire length of Bluff Head Pond Road.	Extension added to Domestic Harvest Block CC02512 in the Bluff Head Pond Road area. Did not extend the entire distance requested due to commercial harvesting opportunities in area..
David Martin, Hickman's Harbour	Suggestion at District Office	Domestic Harvest Block CC02504. Residents expressed concerns over lack of available timber for fuelwood in existing blocks.	Extension added to Domestic Harvest Block CC02504 in the Hickmans Harbour Forest Access Road area.
Barry Pelley, Residents George's Brook	Suggestion at District Office	Domestic Harvest Blocks CC02506, CC02520. Residents expressed concerns over lack of available timber for fuelwood in existing blocks	Extension added to Domestic Harvest Block CC02506 in the Muddy Hole Brook area. Extension added to Domestic Harvest Block CC02520 in the Ryders Brook area.
Ken Sparkes NALCOR Lower Curchill Project	Email and District Office Meeting.	CC02012, CC02013, CC02014. Harvest Block overlaps with Labrador-Island Transmission Link and Trail issued to NALCOR.	District 02 FSB staff met with Ken Sparkes (Lower Churchill Project – NALCOR) on May 4, 2016 at FSB district office, to review plans. No concerns with proposed plans for 2017 to 2021. Ongoing communication will occur while clearing/cutting operations are ongoing.
Dean Crocker, Beaulieu's Caribou Hunts 2005 Limited	Email Meeting at Lodge	Commercial block CC02009 – Dean Crocker Owns/operates an outfitting lodge, Deep country Lodge, in Deep Bight area. Concerns raised include; resource road development has increased public access, timber removal will affect viewscape and habitat of big game animals, and wood trucks will have negative affect on client experience during spring and fall hunting seasons as well as winter snowmobiling.	As part of its mitigation process, FSB does not intend to approve any cabin referrals in harvest area and will encourage Crown Lands to not approve any requests" FSB has agreed to employ view scape preservation principles when planning at the operational level, and committed to not harvesting during winter snowmobile season. As is previous years FMD2 staff will work with Mr. Crocker and Commercial Harvester to accommodate harvest/hunting schedules.
Kirstin Miller, Wildlife Division	PreConsult Review	Response Email February 01, 2016 - Domestic Harvest Blocks CC02528, CC02568 overlap with Bonavista Stewardship Management Unit. Requested no cutting and 50 metre no cut buffer along waterbodies.	Areas of Overlap with Bonavista Stewardship Management Unit were excluded from Domestic Harvest Blocks CC02528, CC02568.
Jeri Graham, Parks and Natural Areas Division	PreConsult Review	Response Email January 13, 2016 - No Concerns with Commercial Harvest Blocks..	N/A
Jeri Graham, Parks and Natural Areas Division	PreConsult Review	Response Email January 13, 2016 – Concern about Permits to use Trailway for transportation of timber. Concerns about cutting visible from Trailway.	A 100 meter buffer will be established along the T'railway. As pursuant to Section 10 of the Provincial Parks Regulations the Forest Services Branch will request a permit to access the T'Railway prior to any harvesting

			operations. District 02 FSB staff requested, via email to Geoff Bailey of PNAD, a "permits to use Trailway" for transport of commercial timber on January 26, 2016.
Stephen Hinchey, Mineral Lands Division	PreConsult Review	Response Email January 28, 2016 - No Concerns	N/A
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02001, CC02014, CC02016, CC02029, CC02035, CC02036, CC02040, CC02047, CC02049, CC02050. A permit from Service NL may be required for harvesting within Protected Road Zone.	As pursuant to Section 61 of the Urban and Rural Planning Act, the Forest Services Branch will request a permit, to develop within the building control lines of a Protected Road, prior to any harvesting operations.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02035, CC02047. Consultation with Newfoundland Power is required for operating inside a powerline easement.	The Forest Services Branch will consult with Newfoundland Power prior to conducting any harvesting operations inside a powerline easement.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02012, CC02013, CC02014. Harvest Block overlaps with Labrador-Island Transmission Link and Trail issued to NALCOR. Consultation with NALCOR required.	District 02 FSB staff met with Ken Sparkes (Lower Churchill Project – NALCOR) on May 4, 2016 at FSB district office, to review plans. No concerns with proposed plans for 2017 to 2021. Ongoing communication will occur while clearing/cutting operations are ongoing.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02002, CC02005, CC02025, CC02041. Harvest Block overlaps existing Grant.	Crown Cutting permits authorize cutting on crown land only. Any private land located within boundary of domestic harvest block should be identified by owner
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02015, CC02029. Harvest Block overlaps existing Agriculture Lease.	Crown Cutting permits authorize cutting on crown land only. Any agriculture land located within boundary of domestic harvest block should be identified by owner.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02008, CC02014, CC02015, CC02020, CC02023, CC02027, CC02042, CC02045, CC02051. Remote Cottage. Minimum 20 m buffer required around structure.	The Forest Services Branch will maintain a minimum 20 m no cut buffer around remote cottages with registered "License to Occupy".
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02010, CC02011. Inside White Hills Crown Lands Reserve. Consultation with Alpine Development Alliance Corporation.	District 02 FSB staff met with Geoff Bailey of White Hills Alpine Development Alliance Corporation, on April 11, 2016, to review plans. April 13, 2016 - email from Geoff Bailey indicated no concerns with proposed plans for 2017 to 2021.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02011, CC02012, CC02013, CC02019. Harvest block within Shoal Harbour River protected Public Water Supply Area. Consultation with Town Clarenville required.	District 02 staff met with Town reps Bob Hiscock and Rick Wells on April 11, 2016 at the Clarenville Town Hall and presented description of forest management practices. monitoring, and environmental protective measures associated with forestry development within town boundaries and within the Shoal Harbour River PPWSA.

			District 02 Staff met with Clarenville Town Council on May 3, 2016 to further discuss concerns and specific areas needing protection. Response letter May 13, 2016 stated no concerns with harvest in PPWSA. There will be no harvest scheduled within Environmental Protection Zones, which will be identified on domestic harvesting maps.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02014, CC02016. Consultation with the Town of Port Blandford is required.	District 02 staff conducted field visit with Councilor Cyril Bennett at Port Blandford on January 26, 2016 and presented maps describing harvest plans. Information was well received and Mr. Bennett was in agreement with proposals.
Peter Hearns, Land Manage Division	PreConsult Review	Response Email (table) February 05, 2016 – CC02011, CC02012, CC02029, CC02055. Licensed Snowmobile and/or ATV trail. Consultation with NL Snowmobile federation is required to identify required no cut buffers. Specific no cut buffers are also identified in ATV trail licenses issued by Lands Branch.	A 100 meter buffer will be established along the T'railway.
Rob Mayo, Land Manage Division	Crown Land Application Process	Domestic Harvest Block CC02532. Lands Division requested that significant amount of recent grants be identified on domestic harvest maps.	Domestic Harvest Block CC02532 amended to exclude 100m buffer along shoreline in Port Blandford.
Geoff Bailey White Hills Alpine Development Alliance Corp.	Email and District Office Meeting.	• In previous planning processes the White Hills Alpine Development Alliance Corp. has expressed concern regarding the impact of forestry activity on their facilities as well as the impact that increased logging traffic in the area would have on public safety and the condition of a section of the White Hills road that had been upgraded (paved) as part of the White Hills Development. While no concern was expressed by the committee recently, they were invited to district office to review plans. Geoff Bailey visited the office reviewed maps and plans on April 11, 2016.	• FSB has established a large "no-cut" reserve around White Hills to protect the recreational value present there. • FSB has also constructed an alternate route to access the timber in the area and restricted the use of the paved road infrastructure, that had originally been constructed as forest access road during the 1980s, to light forestry traffic only. • April 13, 2016 email from Geoff Bailey indicated no concerns with proposed plans for 2017 to 2021
Kirby Tulk TNNP.	Meeting at Terra Nova National Park	2011-2016 FYOP concerns and follow-up consultation. Domestic Harvest Blocks CC02525, CC02531, CC02532,CC02561 would have negative impact on viewscapes in the Clode Sound Area as seen from particular vantage points in Terra Nova National Park.	FMD2 staff met with Kiby Tulk at TNNP office on May 11, 2016. Proposals were reviewed.
Kirby Tulk TNNP.	Meeting at Terra Nova National Park	2011-2016 FYOP concerns and follow-up consultation. Commercial Harvest Blocks CC02014, CC02015, CC02016, CC02033, CC02034 would have negative impact on viewscapes in the Clode Sound Area as seen from particular vantage points in Terra Nova National Park.	FMD2 staff met with Kiby Tulk at TNNP office on May 11, 2016. Proposals were reviewed.
DNR staff and domestic permit holders	Suggestion at District Office	Local domestic cutters have made numerous requests to harvest the significant amount of deadwood and blowdown scattered throughout	The following condition will be added to domestic cutting permits in FMD 2 and 3. "The cutting of deadwood and blowdown is

		FMD 2 and 3 as a result of Hurricane IGOR and other weather events. Much of this timber is located outside of domestic harvest blocks and the geographic nature of the issue creates logistical challenges in creating the maps required to permit cutting.	permitted in areas outside of designated domestic harvest blocks, but not within areas, designated for no harvest activity."
DNR staff and domestic permit holders		Cottage owners do not have avenues to legally obtain permission to harvest the timber located on the "license to occupy" issued by Crown Lands Division.	The following condition will be added to domestic cutting permits in FMD 2 and 3. "The cutting of timber is permitted in areas identified on a valid "license to occupy" issued to the domestic permit holder.
John Angelopolous Tourism and Culture	ADM Review	Response Letter July 27, 2016. Recommendations that Consultation be made with two Local outfitters, Dean Crocker and Bob Efford, to discuss potential impacts of harvesting and access on outfitting business and necessary mitigations.	FMD2 staff met with Dean Crocker at FSB district office on May 11, 2016. No response to email sent to Bob Efford contacted by email sent August 24, 2016..
John Angelopolous Tourism and Culture	ADM Review	Response Letter September 9, 2016. Recommendations that consultation continue to take place with Mr. Dean Crocker and mitigations agreed upon. It is recommended that forest harvesting not occur in CC02009 from September 15 – November 9.	FMD2 staff met with Dean Crocker at FSB district office on May 11, 2016. As in previous years FMD2 staff will work with Mr. Crocker and Commercial Harvester to accommodate harvest/hunting schedules.
John Angelopolous Tourism and Culture	ADM Review	Response Letter July 27, 2016. CC02011, CC02012, CC02013, CC02014, CC02019, CC02020, CC02029, CC02035, CC02042, CC02047, CC02049. CC02050, CC02052, CC02055, CC02056. Recommendation that forest harvesting along Routes 230, 235, and TCH not be visible. FYOP should indicate how highway viewscapes will be managed to minimize harvest visibility .	"Forest Service, where operationally feasible, will implement strategies to provide a balance between forest harvesting and the non-timber values identified by Tourism." At a minimum, the Forest Service will maintain100 m no cut buffer along all highways.
Kirstin Miller, Wildlife Division	ADM Review	Response Email September 19, 2016. Commercial Harvest Blocks CC0213 and CC02048 are within an area identified as core marten habitat, marten occupancy and high value habitat for American Marten. Harvesting in these areas is <u>not to occur</u> between April 1st to June 30th which is the critical denning period for marten.	FSB agrees that commercial harvesting operations are <u>not to occur</u> in CC0213, CC02048 between April 1st to June 30th which is the critical denning period for marten:
Kirstin Miller, Wildlife Division	ADM Review	Response Email September 19, 2016. Commercial Harvest Blocks CC02045 (A,B,C), CC02048 (A), CC02011, CC02018 (A, B, C, D, E, F, G), CC02014 (A, B, C, D), CC02017 (B, C, D, E, F), CC02012 (A, B, C, D, E, F), CC02019 (A, B, C), CC02020 (A, B, C, D, E ,F), CC02034 (A, B, C), CC02017 (A), CC02016 (A, B, C, D), CC02046, CC02047 (A), CC02033 (A, B, C), CC02015 (A, B, C, D), CC02032 (A, B), CC02031 (A, B, C, D, E), and CC02044 (C) are areas identified as core marten habitat, marten occupancy and high value habitat for American Marten. Where	FSB agrees that, where operationally feasible, commercial harvesting operations <u>will be avoided</u> in Commercial Harvest Blocks CC02045 (A,B,C), CC02048 (A), CC02011, CC02018 (A, B, C, D, E, F, G), CC02014 (A, B, C, D), CC02017 (B, C, D, E, F), CC02012 (A, B, C, D, E, F), CC02019 (A, B, C), CC02020 (A, B, C, D, E ,F), CC02034 (A, B, C), CC02017 (A), CC02016 (A, B, C, D), CC02046, CC02047 (A), CC02033 (A, B, C), CC02015 (A, B, C, D), CC02032 (A, B), CC02031 (A, B, C, D, E), and CC02044 (C) from April to June which

		possible and operationally feasible, harvesting activities in marten core areas should be avoided from April to June due to marten denning.	is the critical denning period for marten:
Kirstin Miller, Wildlife Division	ADM Review	Response Email August 16, 2016. Domestic harvest within marten critical and recovery habitat should not occur between April 1st to June 30th which is the critical denning period for marten.	FSB has no domestic harvest blocks proposed within Marten Critical Habitat.
Parks and Natural Areas Division	ADM Review	Response August 15, 2016. It appears that FSB plans to use the T'Railway Provincial Park to access commercial harvest blocks (e.g., CC02009, CC02012, CC02013) and to construct Beaver Pond Road so that it abuts the T'Railway, based on the shapefiles provided. However, FSB's plans for the T'Railway are unclear given the lack of information on this matter in the registration document. PNAD requests more information (e.g., which sections of the T'Railway are proposed for use, the nature of use and the equipment to be used, and duration of use).	FSB has no plans to use the T'Railway Provincial Park, to access commercial harvest block CC02012. FSB plans to use 2.0 km of the T'Railway Provincial Park at Thorburn Lake to access commercial harvest block CC02013 and to transport harvested timber annually from May and November. FSB plans to use 7.0 km of the T'Railway Provincial Park, between Northwest Brook Access Road and Beaver Pond Access Road to access commercial harvest block CC02009 and to transport harvested timber annually from May and November. Identified on Commercial Harvest Plan Maps and associated Operating Area Sheets.
Parks and Natural Areas Division	ADM Review	Response August 15, 2016. Pursuant to Section 10 of the Provincial Park Regulations, a Temporary Vehicle Access permit is required to access sites via the T'Railway with anything other than an approved off-road vehicle. A permit is also required if access to any sites requires disturbing the state of the T'Railway (e.g., installation of infrastructure such as a road, driveway, culvert, etc; or upgrading or maintenance to existing access points along the T'Railway). Permits may be requested by emailing trailway@gov.nl.ca.	As pursuant to Section 10 of the Provincial Parks Regulations the Forest Services Branch will request a permit to access the T'Railway prior to any harvesting operations. District 02 FSB staff requested, via email to Geoff Bailey of PNAD, a "Permit to use Trailway" for transport of commercial timber on January 26, 2016. Domestic Cutting Permit holders, utilizing anything other than an approved off-road vehicle for hauling, will be instructed to obtain "Permit to access the T'Railway".
Tourism	Previous Plan	The Discovery Trail Tourism Association expressed concern about the impact of regulated domestic cutting near, or visible from, a series of hiking trails developed around the District.	The District has established a minimum of 50 metre no-harvest buffers along these hiking trails and, in some instances, has amended domestic cutting blocks to remove particularly sensitive areas from future harvesting.
Cottage Areas	Previous Plan	Cabin owners in the Princeton Pond cabin area are concerned about how logging may impact their use of the area. They are mostly concerned about the visual impact of large-scale clear-cutting on the landscape.	FSB has consulted with the cabin owners and has committed to adopt landscape design principles. Through consultation, DNR staff have identified other issues that are also being addressed. DNR will leave appropriate buffering on a case-by-case basis around all cabins with legal title.
PNAD	Previous		FSB will maintain a 100m no-cut buffer around Lockston Path Provincial Park.

	Plan		
Boy Scouts and Girl Guides of Canada	Previous Plan	North Pond is the home of provincial camps for the Girl Guides of Canada and Scouts Canada. During the 2001-06 planning process, leaders of these organizations expressed concern about proposed logging activity around North Pond and referenced an unofficial commitment that previous administrations had given to establish a no-cutting reserve around the pond	This reserve, consisting of 1700 ha within a 750m no-cut buffer, was established in the 2001-06 plan. The reserve forms part of the wildlife corridor established along the Northwest River. This No cut buffer was incorporated into the "Large Intact Landscape" identified in Provincial Sustainable Forest Management Strategy, which directs that commercial harvest be deferred until 2024.
Endangered Species (Boreal Felt Lichen)	Previous Plan	As a result of an amendment to the 2001-06 Five Year Plan, concerns were expressed about the presence of Erioderma lichen in a proposed extension to a domestic cutting block in the Come by Chance area.	FSB conducted a field survey for Erioderma in the proposed cutting block. Areas in which Erioderma thalli were determined to be present were removed from the domestic cutting block. These no-cutting zones will be carried forward to this planning period.
Salmonids	Previous Plan		FSB will maintain a 100m buffer on all scheduled salmon rivers within FMD02/03.

Section 6. Public Consultation Process

6.1 Planning Objectives

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. The Department issued a Press Release on August 09, 2016 with the title "Dates Set to Discuss Five-Year Forest Management Operating Plans". In addition to the Press Release, Tweets were also sent out on August 09, 2016 from @gov.nl

For Zone 2, there were 2 formal meetings held

- August 24, from 2pm-7pm at the Clarenville District Office in Clarenville
- August 25, from 2pm-7pm at the Winterland District Office in Winterland

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

Section 7. Management Objectives and Strategies

7.1 Harvesting

The forest in the zone is part of the boreal forest which is characterized by stand-replacing natural disturbances result in the formation of relatively even aged stands. The clearcut silvicultural system most closely emulates this natural disturbance pattern. 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 where the cuts are relatively small and dispersed resulting in the creation of a range of age and development classes.

7.1.1 Commercial

Section 3 outlines the general approach for the timber supply analysis and outlines the specific results for all districts in the zone. The model used to calculate the annual allowable cut is a spatial optimization model which outlines a specific course and timing of actions. The harvest schedule outlines 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 to maintain the validity of the AAC.

The older unalienated timber that is in the worst condition and losing volume fastest is targeted as a high harvest priority. Younger stands that have been damaged by insects and disease also receive high priority. In managed stands, this priority changes to allow for a faster rotation on good sites that have been silviculturally treated.

Specific commercial strategies are:

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

7.1.2 Domestic

The harvest of domestic fuelwood and sawlogs occurs from designated domestic cutting blocks and cutover, landing and roadside clean up. 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 there are concentrations of timber eligible for harvest. 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 which is why the AAC adjustment (spatial net down) is higher than in commercial areas. Utilization of cutover residue, dead timber and scrub areas that are not part of the timber supply analysis help make up for this difference.

Specific domestic strategies are:

- target low volume stands that have poor commercial harvest chance
- encourage use of poor quality hardwood (birch, larch and aspen). In areas where there are future softwood commercial operations, domestic harvesting is limited to non-commercial hardwoods
- target dead, burnt and insect damaged stands that are beyond commercial salvage
- 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 (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 percent regeneration failure rate (NSR) across all disturbance and site types. Areas that do not regenerate naturally are renewed by some combination of site preparation and planting or gap planting. Areas that adequately regenerate 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. There is concern about the type (species) of regeneration because of the presence of balsam woolly adelgid in parts of the zone. This insect causes growth loss and impacts the form and quality of balsam fir trees. In adelgid infested areas, regeneration to balsam fir may not necessarily be acceptable depending on the severity of attack. In other areas, the presence of kalmia causes problems because of its allelopathic effect on natural and artificial black spruce regeneration. Prescriptions to treat 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 disturbances caused 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. There is usually some form of mechanical site preparation before a site is planted to reduce the thickness of the duff layer and in some cases remove or disturb kalmia that is present. Prescribed burning is also used to sanitize some sites where adelgid is present. This treatment reduces the slash loading and duff thickness to prepare the site for planting and kills any balsam fir which could potentially perpetuate the adelgid problem. Full 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 has been done with herbicides 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 non crop tree species that occupy the site. In other instances, herbicides are used to control Kalmia either before or after planting. Herbicides, while used sparingly, are sometimes a necessary tool to help establishment of a new forest, particularly on the better sites.

When there is complete regeneration failure requiring full planting, the site is prepared if necessary, and planted with black or white spruce and to a lesser extent, Norway spruce. In cases where adelgid has

been a problem, balsam fir regeneration is sometimes ignored and the site is planted with spruce seedlings. In instances where there is partial regeneration failure and the site does not have enough stocking of desired species, the area can be gap planted to increase the seedling density to acceptable stocking standards. On adelgid sites partially regenerated to balsam fir, planting is done through the existing regeneration to obtain a sufficient stocking level of an adelgid resistance species. Gap planting is done with spruce seedlings, 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 sources. Seed orchards have been established at Pynns Brook and Wooddale to produce seed from plus trees collected throughout the province. Plus trees are normally selected because they have superior growth and physiological characteristics. It is hoped that once the orchard is in full production, the majority of the planting stock will be grown from this source. The ultimate goal is to plant 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.

Surveys and anecdotal information indicate that hardwoods form a significant portion of stand composition after planting. This is especially true on scarified areas because scarification promotes hardwood establishment.

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. This prescription results in a mixed softwood stand (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 occasionally done in older balsam fir stands (either natural or previously thinned) 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. As with precommercial thinning, spruce and hardwoods are left where possible to increase the stand diversity. Surveys conducted on precommercially thinned areas many years after treatment have shown that a very large portion of the plots in the treated areas contain hardwoods.
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. Commercial thinning has yet to be done in the zone and diameter limit thinning has been done sparingly, however, recent indications of root rot and blowdown in thinned stands may increase their importance.

In recent years the precommercial thinning program has dropped significantly. This trend is expected to continue.

Specific silviculture stratagies are:

- 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 promote enhanced stand development, reduce rotation age, and increase the percentage of sawlogs
- leave hardwoods, where possible, in pre-commercially thinned areas to increase stand diversity

- where possible, promote species mixes particularly with spruce and hardwoods to reduce susceptibility to insect attack and increase biological diversity
- where possible, use seedlings grown from local seed sources to protect genetic diversity
- ensure levels of planting and thinning used in the wood supply analysis are achieved
- work towards pre harvest planning to identify areas with potential silviculture problems so that optimal 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 and commercial values such as hunting, fishing, skiing, berry picking, hiking and mineral exploration. Roads can also have a negative impact both from an environmental perspective (loss of productive land base, sedimentation, habitat fragmentation etc.) and other value perspective (eg. 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. Roads will be 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 will be maximized to minimize the amount of road constructed. These principles ensure that the minimum amount of road will be built which effectively reduces the loss of productive forest land base while also minimizing the amount of environmental disturbance.

In sensitive and wet areas, winter harvesting and road construction are encouraged and are often the only option. This minimizes environmental disturbance while providing access to valuable timber.

In many instances forest access roads “open up” new areas which are then subject to cabin development (often illegal). 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. In such instances cabin development should be controlled to limit local access. Road decommissioning may also be considered, depending on cost and mitigation of conflicting uses for that road. It is recognized that roads built for forestry activities are used by other

stakeholders. Any road or bridge decommissioning should be discussed by the planning team to determine impacts and formulate alternatives (cost sharing to replace an old bridge etc.).

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.
The crown has inherited a large road infrastructure in the zone. It is not reasonable to expect this infrastructure to be maintained in perpetuity. Much of the infrastructure has already deteriorated and will become a public safety issue/liability if not addressed. Road and bridge maintenance and/or decommissioning is an issue and needs to be addressed on a case by case basis.

Specific roads strategies are:

- 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
- determine impacts and explore alternatives (cost sharing) in areas where road and bridge decommissioning impacts other stakeholders
- 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 in section 1.5.5, insects have been a major natural disturbance factor in the zone. Balsam fir is susceptible to most of the major insects including spruce budworm, hemlock looper, and balsam woolly adelgid. In the past, salvage harvest efforts were possible in newly disturbed stands . In recent years, quality standards at local pulp mills have changed to require a timely supply of fresh, green timber. As a result, the window to salvage insect damaged timber is now one to two years after

mortality. On a positive note, access to most areas has increased and improved allowing for quicker reaction to salvage insect mortality.

In recent years, the hemlock looper and spruce budworm have not been a problem in the zone However, populations of these insects are closely monitored and treatment is employed where warranted. The adelgid problem is currently of the greatest concern in Zone 02. Alternative silviculture prescriptions (centered on minimizing fir regeneration in susceptible areas) are being employed to minimize the impact of this insect.

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 is not compromised. Yield curves are adjusted in areas that have been chronically attacked by insects to account for growth loss.

Specific insect and disease strategies are:

- 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

As outlined in previous sections, there has been a cyclic fire history in the zone resulting in significant losses from major fires. A fire in an unusually dry year can have devastating effects on the forest and

can exacerbate an already tight wood supply situation. The zone can minimize the risk of a serious fire by maintaining a highly trained, efficient and effective fire control program and by minimizing the risk in forest stands through maintenance of forest health and vigour.

Specific fire strategies are:

- use silvicultural treatments and protection from insects to increase health and vigour of stands
- maintain fire control capabilities
- promote species mixes in stands to minimize risk

7.4.3 Windthrow

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 forest health and vigour mainly through silvicultural treatments and protection from insects.

Specific windthrow strategies are:

- 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 each others values and positions is gained. The more we know about each others 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 during the planning team meetings 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. Other such vehicles for information and education which may be pursued are:

Specific information and education strategies are:

- field trips
- school visits
- commercial operator environmental training programs
- information meetings
- training courses
- seminars
- general day to day contact

Section 8. Proposed Activities

8.1 District 02

8.1.1 Harvesting

In District 02 the majority of the harvest is scheduled for commercial purposes. However, like most traditional crown districts, much of the landbase is located near the coast where there are many communities and the domestic demand is high. Subsequently, there is a significant amount of domestic timber allocated to meet the demand.

The AAC for district 02 will not be exceeded in this planning period

8.1.1.1 Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest approximates the harvest schedule that was used to determine the AAC in Section 3. The allocated operating area and associated harvest volumes represent as much as two times the actual proposed harvest (Table 11). The purpose of including more volume than is actually proposed is to allow for operational flexibility and inventory deviations within operating areas without having to constantly amend the plan.

8.1.1.2 Domestic

Table 12 outlines the proposed domestic harvest Harvesting 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 fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 16 m3. Crown Domestic cutting permits also allow the cutting of deadwood and blowdowns anywhere in the district and on any crown land license to occupy.

Operating Area					Volume Harvested (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrainted	Sub-total	Non AAC Wood	Core	Operational Constrainted	Sub-total	Non AAC Wood
CC02001	Goobies	Crown	43.57		986	0	986	3249	32	0	32	
CC02002	Hatchet Cove	Crown	162.71		1267	184	1451	10630	386	0	386	
CC02003	Burnt Point	Crown	243.75		18622	0	18622	3295	2070	0	2070	
CC02004	Snook's Harbour	Crown	56.86		5678	0	5678	0	532	0	532	
CC02005	Foster's Marsh	Crown	258.75		19382	0	19382	5080	2031	0	2031	
CC02006	Hickman's Hr Road	Crown	202.25		1675	0	1675	18820	37	0	37	
CC02007	Bluff Head Pond	Crown	57.95		3684	56	3739	211	260	2	262	
CC02008	Northwest Brook	Crown	34.79		2485	0	2485	1049	521	0	521	
CC02009	Beaver Pond	Crown	292.55		22837	2865	25702	3148	1457	243	1700	
CC02010	Clarenville	Crown	51.22		6652	0	6652	0	687	0	687	
CC02011	White Hills	Crown	444.52		24067	15	24082	21697	1042	1	1042	
CC02012	Shoal Harbour Pond	Crown	726.69		75272	492	75764	3887	9310	16	9326	
CC02013	Thorburn Lk South	Crown	134.21		12450	0	12450	0	803	0	803	
CC02014	Southwest Rr Valley	Crown	853.81		104549	0	104549	0	5206	0	5206	
CC02015	Port Blandford	Crown	251.64		17725	0	17725	5565	1588	0	1588	
CC02016	Thorburn Lk North	Crown	312.39		23503	372	23875	808	3407	97	3504	
CC02017	George's Pond	Crown	358.82		40934	551	41485	0	2767	102	2869	
CC02018	Salt Lake	Crown	359.12		21828	6728	28555	226	3035	916	3951	
CC02019	Shoal Hr Valley	Crown	214.90		14927	0	14927	0	3306	0	3306	
CC02020	Muddy Hole Brook	Crown	118.30		11588	0	11588	0	1114	0	1114	
CC02021	George's Brook	Crown	12.61		774	0	774	0	143	0	143	
CC02022	Barton	Crown	12.92		791	0	791	0	23	0	23	
CC02023	Harcourt Access Rd	Crown	152.88		8018	0	8018	2173	505	0	505	
CC02024	Jack's Pond	Crown	19.33		1368	0	1368	0	68	0	68	
CC02025	Nut Cove	Crown	34.22		1284	814	2098	705	318	1	319	
CC02026	Burgoynes Cove Rd	Crown	164.25		5095	0	5095	8181	399	0	399	
CC02027	Northwest Pond	Crown	210.38		11422	0	11422	1840	417	0	417	
CC02028	Big Pond	Crown	179.20		10344	943	11286	0	2324	41	2365	
CC02029	Gull Pond	Crown	74.78		4811	0	4811	0	159	0	159	
CC02030	Island Pond	Crown	45.53		3271	0	3271	0	204	0	204	
CC02031	Bloomfield Road	Crown	180.52		13938	0	13938	0	798	0	798	
CC02032	North Brook	Crown	247.75		24776	1048	25824	1443	3878	34	3911	
CC02033	Branches Pond Rd	Crown	324.80		26297	0	26297	645	2920	0	2920	
CC02034	Stagg Steady	Crown	91.04		4693	0	4693	848	1472	0	1472	
CC02035	Birchy Shute	Crown	161.91		11358	0	11358	1891	1631	0	1631	
CC02036	New Country	Crown	291.92		22452	0	22452	0	2062	0	2062	
CC02037	Dalton's Pond	Crown	75.70		4790	0	4790	0	399	0	399	
CC02038	Rocky Pond	Crown	28.36		2119	0	2119	0	353	0	353	
CC02039	Ocean Pond	Crown	157.42		8399	0	8399	327	775	0	775	
CC02040	Rattle Falls	Crown	84.86		8879	0	8879	0	304	0	304	
CC02041	Princeton Pond	Crown	149.65		10318	334	10652	0	465	152	617	
CC02042	Blue Gull Pond	Crown	214.68		7752	4873	12624	245	185	279	463	
CC02043	Portland	Crown	383.65		21546	0	21546	0	6175	0	6175	
CC02044	Winterbrook	Crown	264.47		15914	0	15914	48	5258	0	5258	
CC02045	Bakeapple Bog	Crown	160.53		10313	443	10756	0	2027	24	2051	
CC02046	Chance Harbour	Crown	214.53		12889	0	12889	103	1714	0	1714	
CC02047	Charleston	Crown	270.69		15554	0	15554	0	1701	0	1701	
CC02048	Souther Bay	Crown	272.04		18107	0	18107	19	2605	0	2605	
CC02049	Summerville Station	Crown	67.17		3502	119	3622	0	866	26	892	
CC02050	Trinity Pond	Crown	102.11		4644	0	4644	3588	901	0	901	
CC02051	Plate Cove Road	Crown	1116.12		117138	222	117360	5201	5837	8	5845	
CC02052	Stock Cove Road	Crown	349.07		34909	0	34909	642	1800	0	1800	
CC02053	Trout Pond	Crown	15.16		1485	0	1485	0	67	0	67	
CC02054	World Pond	Crown	776.57		48797	500	49298	20945	2656	17	2674	
CC02055	Ryder's Brook	Crown	133.77		4836	0	4836	4746	742	0	742	
CC02056	Black Bay	Crown	156.43		8274	740	9014	0	1253	239	1491	
CC02057	Terra Nova South	Crown	89.00		10552	0	10552	0	384	0	384	
Totals					**951520**	**21298**	**972817**	**131253**	**93384**	**2196**	**95579**	

Table 11: Proposed commercial harvest in District 02 for 2017-2021

Operating Area				Number of Permits per year		Estimated 5 year Volume (m3)	
Number	Name	Tenure	Total Area (ha)	Commercial	Domestic	Softwood	Hardwood
CC02501	Sunnyside	Crown			43	3440	
CC02502	Come by Chance	Crown			23	1840	
CC02503	Goobies	Crown			38	3040	
CC02504	Hickman's Hr	Crown			52	4160	
CC02505	Adeytown	Crown			33	2640	
CC02506	George's Brook	Crown			95	7600	
CC02507	Clarenville	Crown			149	11920	
CC02508	White Hills	Crown			6	480	
CC02510	Elliott's Cove	Crown			31	2480	
CC02511	Aspey Brook	Crown			9	720	
CC02512	Britannia	Crown			39	3120	
CC02513	Burgoynes Cove	Crown			30	2400	
CC02514	Weybridge	Crown			34	2720	
CC02517	Branches Pd Rd	Crown			21	1680	
CC02518	Lethbridge Rd	Crown			7	560	
CC02519	Harcourt	Crown			44	3520	
CC02520	Monroe	Crown			10	800	
CC02521	Ocean Pond Rd	Crown			19	1520	
CC02522	Sweet Bay Rd	Crown			7	560	
CC02523	Plate Cove Rd	Crown			37	2960	
CC02524	Hillview	Crown			88	7040	
CC02525	Bunyans Cove	Crown			89	7120	
CC02526	Hodges Cove	Crown			83	6640	
CC02527	Trinity Pond	Crown			28	2240	
CC02528	Bonavista	Crown			22	1760	
CC02529	Catalina Road	Crown			15	1200	
CC02530	Lockston Path S	Crown			21	1680	
CC02531	Musgravetown	Crown			44	3520	
CC02532	Port Blandford	Crown			76	6080	
CC02533	Morleys Siding	Crown			8	640	
CC02534	Hatchet Cove	Crown			22	1760	
CC02535	Bloomfield	Crown			55	4400	
CC02536	Lethbridge	Crown			78	6240	
CC02537	Little Heart Ease	Crown			30	2400	
CC02538	Open Hall	Crown			18	1440	
CC02539	Long Beach	Crown			19	1520	
CC02540	Random Heights	Crown			13	1040	
CC02541	Swift Current	Crown			28	2240	
CC02542	Garden Cove	Crown			20	1600	
CC02543	Lady Pond Rd	Crown			4	320	
CC02544	North Harbour	Crown			10	800	
CC02545	Portland	Crown			59	4720	
CC02546	Winterbrook	Crown			16	1280	
CC02548	Charleston	Crown			32	2560	
CC02549	Princeton	Crown			35	2800	
CC02550	Sweet Bay	Crown			12	960	
CC02551	Summerville	Crown			22	1760	
CC02552	Plate Cove	Crown			33	2640	
CC02553	Duntara	Crown			40	3200	
CC02554	Kings Cove	Crown			85	6800	
CC02555	Amherst Cove Rd	Crown			17	1360	
CC02556	Newmans Cove	Crown			60	4800	
CC02557	Trinity Bay North	Crown			131	10480	
CC02558	Port Rexton	Crown			55	4400	
CC02559	Trouty	Crown			47	3760	
CC02560	Trynors Pit	Crown			2	160	
CC02561	Chain Pond	Crown			7	560	
CC02562	Robinsons Bight	Crown			11	880	
CC02563	Kings Cove Rd	Crown			0	0	
CC02564	Stock Cove	Crown			17	1360	
CC02565	Lockston Path N	Crown			9	720	
CC02566	English Harbour	Crown			7	560	
CC02567	Little Catalina	Crown			7	560	
CC02568	Elliston	Crown			37	2960	
CC02569	Chute Brook	Crown			2	160	
CC02570	Amherst Cove	Crown			41	3280	
CC02571	Thorburn Lake	Crown			10	800	
CC02572	Deer Harbour Pd	Crown			1	80	
CC02573	Deer Harbour	Crown			1	80	
CC02574	Hachet Cove Rd	Crown			1	80	
CC02576	Lockston	Crown			8	640	
CC02577	St Jones Without	Crown			0	0	
Total			**0**	**0**	2303	184240	**0**

Table 12: Proposed Domestic harvest in District 02 for 2017 to 2021

8.1.2 Silviculture

Balsam fir is highly susceptible to insect and disease attack and has less desirable fibre quality and properties than spruce for papermaking and lumber production. Since spruce is the more desirable species at this time, more aggressive approaches to maintaining and enhancing spruce content on sites will be employed in the next five years.

There are two silviculture prescriptions scheduled; planting/gap planting including site preparation (mechanical, prescribed burning and/or herbicide), where required, and thinning (pre-commercial/diameter limit and commercial). Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. Full planting is required where 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 conducted on regenerating stands (0 - 25 years) to reduce the high density and concentrate the growth on the remaining crop trees thus reducing the time to harvest. Diameter limit /commercial thinning is carried out on immature stands (25-40 years) and is designed to produce a sawlog crop while salvaging any trees thinned as pulpwood or fuelwood.

Both districts all share the common challenge of having to contend with the growing problem associated with balsam woolly adelgid. The range and severity of this insect is increasing within the province and it continues to target balsam fir trees by severely reducing both growth rates and productivity of certain sites to the point where commercial viability is questionable. The silviculture program over the next five year period will help mitigate the impacts of this insect on sites dominated by balsam fir. As the problem with this insect is still relatively new in these districts and the extent of affected areas and rate of spread is still unknown, it is extremely difficult to identify specific areas for management at this time.

Potential silvicultural treatment areas need to undergo reconnaissance and / or intensive surveys to determine the regeneration level and severity adelgid attack. Such surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be

identified. Silviculture prescriptions have been developed however, for implementation on specific site conditions. These prescriptions are described below.

Areas that are scheduled for commercial harvest or have been harvested are identified on the operating area maps and are candidates for planting or gap planting to black, white or Norway spruce. These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting and the presence of adelgid. Adelgid damage evaluation will be based on damage class as described below.

Code	Damage Class	Description
1	undamaged	normal branch, no visible symptoms of attack
2	light	node swelling indistinct, apparent only at close examination
3	light to moderate	node swelling distinct, some stunting or distortion present
4	moderate	distortion prominent, branch tip inhibited, thinly foliated
5	moderate to severe	as in moderate but terminals and some branches bare from tips up to 30 cm or up to one half the length of short branches
6	severe	as in moderate but terminals and some branches bare for more than 30 cm or more than one half the length of short branches
7	dead trees	inner bark brown at breast height and symptoms or signs of adelgid attack present

If balsam woolly adelgid damage is less than Code 3 in adjacent stands then balsam fir will be considered an acceptable regeneration species. If balsam woolly adelgid damage is greater than Code 2 in adjacent stands then balsam fir will not be considered an acceptable regeneration species. Sites not meeting required stocking levels will be either full planted or gap planted with spruce, as required, to bring them up to minimum stocking levels.

Site preparation using either mechanical methods or prescribed burning will be employed on suitable sites that have impediments to planting. On black spruce cutovers where kalmia is present, mechanical site preparation (row scarification) or prescribed burning will be used to disturb the kalmia and create suitable microsites to plant black spruce. In fir areas, burning is a preferred treatment to sanitize the site of any existing adelgid infested trees.

Immature and regenerating stands have been identified within operating areas. If the regenerating species is balsam fir then the presence of a balsam woolly adelgid will be evaluated using reconnaissance surveys. If presence of balsam woolly adelgid is non existent or light (Codes 1and 2) then the balsam fir stands will be considered for thinning (pre-commercial, diameter limit or commercial thinning) but, if presence of balsam woolly adelgid is Code 3 or higher in the areas the stands will be left to develop naturally. An increasing balsam woolly adelgid presence may cause the pre-commercial thinning program to diminish over time in favour of planting. Root rot in the older pre-commercially thinned stands may make commercial and diameter limit thinning more important in the future.

Note that while a prescription approach has been employed, stands that can be potentially silviculturally treated are explicitly identified on operating area maps. Stands that are identified as scheduled for harvest, and cutover,s are eligible for planting and immature stands are eligible for thinning.

8.1.3 Primary Access Roads and Bridges

Table 13 outlines the forest access roads scheduled to be constructed in District 02 in the next five years to access timber for commercial purposes. All roads will be built to the specifications of the Class C-2 standard and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Harvest Block			Culverts	Bridges
Weybridge	CC02005	C	3.50		
Beaver Pond	CC02009	C	0.75	1	
White Hills	CC02011	C	2.00		
Shoal Harbour Pond	CC02012	C	2.00		1
Shoal Harbour Pond	CC02012	R	1.35		
Shoal Harbour Pond	CC02012	C	2.70		
Shoal Harbour Pond	CC02012	C	1.70	1	
Thorburn Lake	CC02013	C	1.00		
Southwest River	CC02014	R	4.50	1	
Southwest River	CC02014	C	1.20		
Southwest River	CC02014	R	4.80	2	
Southwest River	CC02014	R	1.20		
Southwest River	CC02014	C	1.70		
Southwest River	CC02014	R	0.90		
Southwest River	CC02014	C	1.60	3	
Port Blandford	CC02015	C	1.10		
Thorburn Lake	CC02016	C	1.40		
Thorburn Lake	CC20216	R	1.30		
George's Pond	CC02017	C	0.40		
George's Pond	CC02017	C	1.10		
George's Pond	CC02017	C	1.70		
George's Pond	CC02017	C	1.30	1	
George's Pond	CC02017	C	1.00		
George's Pond	CC02017	C	1.60		
Salt Lake	CC02018	R	2.00		
Salt Lake	CC02018	C	2.00	1	
Shoal Harbour	CC02019	C	2.00		
Shoal Harbour	CC02019	C	1.50	1	
Muddy Hole Brook	CC02020	C	1.10		
Muddy Hole Brook	CC02020	R	1.50	1	
Northeast Pond	CC02027	C	1.30		
Big Pond	CC02028	C	1.00		
Big Pond	CC02028	C	1.00		
Big Pond	CC02028	C	0.80		
North Brook	CC02032	C	1.50	1	
Branches Pond Rd	CC02033	C	0.80		
Stagg Steady	CC02034	C	1.40		
New Country	CC02036	C	2.00	1	
Dalton's Pond	CC02037	C	1.80	1	
Ocean Pond	CC02039	C	1.10		
Ocean Pond	CC02039	C	1.10		
Rattle Falls	CC02040	C	0.70	1	
Portland	CC02043	C	0.50		
Winterbrook	CC02044	C	0.50	1	
Bakeapple Bog	CC02045	C	0.80	1	
Bakeapple Bog	CC02045	C	0.60		
Charleston	CC02047	C	3.30	2	
Southern Bay	CC02048	C	1.50		
Plate Cove Road	CC02051	C	1.70	1	
Plate Cove Road	CC02051	C	1.40		
Plate Cove Road	CC02051	C	5.80	2	
Plate Cove Road	CC02051	C	2.00	1	
Plate Cove Road	CC02051	C	1.50	1	
Plate Cove Road	CC02051	R	3.20	3	
Plate Cove Road	CC02051	C	1.20		
Plate Cove Road	CC02051	C	0.70		
Stock Cove Road	CC02052	C	1.20		
World Pond	CC02054	C	0.80	1	
World Pond	CC02054	C	2.00	1	
		Sub-total	**95.10**	**30**	**1**

Table 13: Summary of primary access road construction in District 02 for 2017-2021

8.1.4 Activities in Protected Water Supply Areas

In operating areas where operations are scheduled to occur in protected water supply areas (PWSA), 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, approval under the Water Resources Act must be obtained annually by the Forestry and Agrifoods Agency before any commercial or domestic harvesting commences inside the PWSA.

8.1.5 Environmental Protection

8.1.5.1 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 Clarenville and Winterland 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 in Gander that are available for initial attack.

8.1.5.2 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.

8.1.5.3 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.

8.1.6 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.

8.1.7 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.

8.2 District 03

8.2.1 Harvesting

In District 03, like most traditional crown districts, much of the landbase is located near the coast where there are many communities and the domestic demand is high. Subsequently, there is a significant amount of domestic timber allocated to meet the demand. There is also a minimal amount allocated for small commercial firewood operations.

The AAC for district 03 will not be exceeded in this planning period

8.2.1.1 Commercial

Has the entire land base in District 03 has been identified as Noncommercial. The timber scheduled for small commercial firewood harvest in the district is located within the Domestic Harvest Blocks. The commercial allocation is part of the AAC identified in Section 3. The allocated operating area and associated harvest volumes are identified in Table 14.

Operating Area					Volume Harvested (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrainted	Sub-total	Non AAC Wood	Core	Operational Constrainted	Sub-total	Non AAC Wood
CC03502	Molliers	Crown		1	20							
CC03505	Grand Beach	Crown		1	20							
CC03506	Main Brook	Crown		2	40							
CC03507	Garnish	Crown		1	20							
CC03508	Marystown	Crown		1	25							
CC03509	Burin	Crown		1	20							
CC03510	Red Harbour	Crown		1	25							
CC03511	Boat Harbour	Crown		3	100							
CC03513	St Bernards	Crown		1	20							
CC03516	Terrenceville	Crown		1	30							
CC03518	Grand LePiere	Crown		1	30							
CC03520	Monkstown	Crown		1	25							
Totals				**15**	**375**							

Table 14: Proposed Commercial Harvest in District 03 for 2017 to 2021

8.2.1.2 Domestic

Table 15 outlines the proposed domestic harvest. Harvesting 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 fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 16 m3. Crown Domestic cutting permits also allow the cutting of deadwood and blowdowns anywhere in the district and on any crown land license to occupy.

Operating Area				Number of Permits per year		Estimated 5 year Volume (m3)	
Number	Name	Tenure	Total Area (ha)	Commercial	Domestic	Softwood	Hardwood
CC03501	Fortune	Crown			64	5120	
CC03502	Molliers	Crown			95	7600	
CC03503	Lords Cove	Crown			38	3040	
CC03504	Lawn	Crown			76	6080	
CC03505	Grand Beach	Crown			34	2720	
CC03506	Main Brook	Crown			158	12640	
CC03507	Garnish	Crown			56	4480	
CC03508	Marystown	Crown			121	9680	
CC03509	Burin	Crown			148	11840	
CC03510	Red Harbour	Crown			61	4880	
CC03511	Boat Harbour	Crown			70	5600	
CC03512	Petite Forte	Crown			25	2000	
CC03513	St. Bernards	Crown			24	1920	
CC03514	Bay L'Argent	Crown			30	2400	
CC03515	Baie De Leau	Crown			14	1120	
CC03516	Terrenceville	Crown			29	2320	
CC03517	English Harbour E	Crown			3	240	
CC03518	Grand LePierre	Crown			17	1360	
CC03519	Monkstown Rd	Crown			5	400	
CC03520	Monkstown	Crown			18	1440	
CC03521	Sandy Harbour River	Crown			1	80	
Total			**0**	**0**	**1087**	**86960**	**0**

Table 15: Proposed Domestic Harvest in District 03 for 2017 to 2021

8.2.2 Silviculture

Balsam fir is highly susceptible to insect and disease attack and has less desirable fibre quality and properties than spruce for papermaking and lumber production. Since spruce is the more desirable species at this time, it would be the seedling of choice to regenerate any harvested area. Due to the minimal amount of commercial clearcutting, however, there is little silviculture activity anticipated in District 03 during this planning period.

8.2.3 Primary Access Roads and Bridges

There are no forest access roads planned for District 03. Table 13 outlines the forest access roads scheduled to be constructed in Zone 02 in the next five years to access timber for commercial purposes. All roads will be built to the specifications of the Class C-2 standard and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

8.2.4 Activities in Protected Water Supply Areas

In operating areas where operations are scheduled to occur in protected water supply areas (PWSA), 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, approval under the Water Resources Act must be obtained annually by the Forestry and Agrifoods Agency before any commercial or domestic harvesting commences inside the PWSA.

8.2.5 Environmental Protection

8.2.5.1 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 Clarenville and Winterland 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 in Gander that are available for initial attack.

8.2.5.2 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.

8.2.5.3 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.

8.2.6 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.

8.2.7 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.

Section 9 Plan Administration

9.1 Monitoring

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

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. In 2015 the Forestry Services Branch of the Forestry and Agrifoods Agency was registered to ISO-14001 (2004). Conservation Officer will continue to monitor operations in the zone to ensure compliance with this Environmental Management System during this planning period.

Permit holders and contractors are also subject to financial penalties if work does not meet 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 Forestry and Agrifoods Agency and one that must be submitted to the Environmental Assessment Division for public review. Changes to this plan can be approved by the Forestry and Agrifoods Agency if they are:

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

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

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

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

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

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

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