REGISTRATION FORM

PURSUANT OF PART 10, ENVIRONMENTAL ASSESSMENT

SECTION 49 OF THE ENVIRONMENTAL ASSESSMENT ACT

Name of Undertaking:

Forest Management District 1(Planning Zone 1) Five Year Operating Plan 2017-2021

Proponent:

(i) Department of Fisheries, Forestry, and Agrifoods
Forest Service of Newfoundland and Labrador

(ii) Assistant Deputy Minister

Mr. Stephen Balsam
Forest Service of Newfoundland and Labrador
(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 1.

(ii) Purpose/Rationale/Need for Undertaking

This undertaking will enable the Forest Services Branch to harvest approximately 293,621 m3 of core landbase timber, construct approximately 16 kilometres of forest access road construction 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 1 encompasses FMD 01, which is essentially the Avalon Peninsula, east of Come by Chance. The overview and operational maps in the plan outline the general and exact locations of the zone.

(ii) Physical Features

The Avalon Peninsula is commonly described physiographically as an area of rolling uplands interspersed with small plateaux. Widespread bogs in many parts of the Avalon act as sponges to absorb heavy rainfall and to moderate runoff.

(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 Doornton
for Assistant Deputy Minister
Mr. Stephen Balsam
Forestry Services Branch

FIVE YEAR SUSTAINABLE FOREST MANAGEMENT PLAN





for

FOREST MANAGEMENT DISTRICT 1

for the period January 1, 2017 to December 31, 2021

June 1

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1.0 DESCRIPTION OF THE LAND BASE

1.1 General

1.1.1 Location

Planning Zone 1 encompasses the entire Forest Management District 1 and is essentially the Avalon Peninsula, east of Come by Chance. Information on geology, soils, climate and further information on drainages, peatland and ecological land classification on the Avalon can be obtained at the Paddy's Pond District office. The surface area of the Avalon Peninsula is approximately 969,000 hectares (ha). The 628,800 hectares of Crown land included in intensive forest inventory of the Avalon is broken down, based on 2005 updates of satellite imagery and other updates to aerial photography as follows;

District 1, the Avalon Peninsula, is the third largest in surface area on the island of Newfoundland. It contains approximately half the human population of the province and therefore records the most wildfires, human-animal conflicts, complaints on illegal activity and referrals for allocation of crown land.

Figure 1: Zone 1 Planning landbase

1.1.2 Ownership

With the exception of private land, the entire land area located in Planning Zone One is currently managed by the crown. There is no ownership of land by Corner Brook Pulp and Paper.

1.2 Physical

1.2.1Topography and Hydrology

The Avalon Peninsula is commonly described physiographically as an area of rolling uplands interspersed with small plateaux. Uplands extending up to about 300 m ASL, and rarely over 400 m ASL, characterize the Bay de Verde, and St. John's Peninsulas, and the Cape Shore and southern Avalon areas. Plateaux between 100 and 150 m ASL are common in some parts of the Avalon Peninsula, particularly the southern Avalon. These areas have previously been described as erosional surfaces or peneplains (Twenhofel and MacClintock 1940). The largest area of lowland extends northward from St. Mary's Bay.

The five major drainage divides are included with more detailed water resources information on overview maps included in Figure 1 attached. As a result of the geology of the Avalon, ground water flow systems are closely tied to surface water systems. Although Northwest Brook is the only river longer than 20 miles (32 km), on the Avalon, several streams are between 16 and 32 km long. Many larger rivers originate from chains of ponds which tend to follow circuitous routes before flowing directly to the coast. There are twenty-one scheduled rivers for Atlantic salmon fishing on the Avalon.

Biological production in streams is based on a combination of internal/external nutrient and energy pathways. Stream side vegetation has a strong influence on both since they are so tightly linked to surrounding terrestrial events. Small streams in forested regions receive much of their materials from the surrounding terrestrial ecosystem; detritus in the form of needle and leaf litter, twigs and branches, forms the major energy base for consumer organisms. In highly shaded headwater streams, algae production is often low and yields only a small and seasonally variable contribution to the overall energy budget. As streams enlarge further downstream, sufficient light penetrates the forest canopy and consumer populations can take advantage of both particulate detritus and algae (Toews and Brownlee 1981).

Widespread bogs in many parts of the Avalon act as sponges to absorb heavy rainfall and to moderate runoff. The evolution of peatlands on the Avalon has been mainly influenced by the wet maritime climate. Morphologically they are mostly blanket peatlands. Dwarf shrub-*sphagnum* bogs occur primarily in the forested parts of the Peninsula and acquire nutrients mainly in the form of precipitation. Sedge-*sphagnum* bogs receive groundwater from surrounding upland soils and are more often in association with heathland, barren or scrub. Fen deposits are most often found in areas where more nutrient rich soils are located. Fen vegetation is meadow like and distinguished from bog vegetation by the presence of more exacting plant species such as dwarf birch, rose, and more sedge and grass species (Pollett 1986).

1.2.2 Geology

Considering bedrock geology, the eastern Avalon Peninsula is underlain by a succession of late Precambrian volcanic and plutonic rocks that are exposed in an anticlinal dome, which extends southward from Conception Bay. These are the oldest rocks in the area. They are overlain on all sides by successively younger, marine, deltaic and fluvial sedimentary rocks. In the western Avalon Peninsula, younger, late Precambrian volcanic rocks occur immediately below and within the fluvial sedimentary units. A less extensive suite of latest Precambrian plutons locally intrude the volcanic and marine sedimentary assemblages.

Cambrian to earliest Ordovician shales, limestones, sandstones and rare volcanic flows are preserved in outliers in several areas of the Avalon Peninsula. They rest uncomfortably on different parts of the late Precambrian stratified succession and on plutonic rocks.

Early Silurian and Devonian mafic intrusions are emplaced into Cambrian rocks in the southwestern part of the Avalon Peninsula and represent the youngest exposed rocks in this part of the Avalon Zone.

Considering Quaternary geology, it is likely that the Avalon Peninsula was completely glaciated during the last glacial period, and maintained glacier cover until around 9000 years BP. The pattern of ice flow is complicated. There was a main dispersal centre at the head of St. Mary=s Bay which flowed radially outward. However, the spines of the sub-peninsulas also maintained independent glaciers from which

flow was also radial. These smaller centres became dominant as the main ice cap melted. The pattern of ice flow is shown by glacial striae on rock surfaces.

Glacial sediment is generally thin across the Avalon Peninsula and composed of locally derived material. Thicker sediment is found north of St. Mary=s Bay. It commonly takes the form of parallel ridges of sediment aligned perpendicular to the last direction of ice flow. These Rogen moraines were formed at the base of a glacier moving northward towards Conception Bay. Areas of glaciofluvial sand and gravel are found within many of the major valleys, although sediment is commonly thin.

Surficial geology maps for the Avalon Peninsula are available at 1:250 000 and 1:50 000 scales and a detailed discussion of the surficial geology of the Avalon Peninsula in Henderson (1972).

1.2.3 Soils

Most of the existing soils on the Avalon Peninsula are derived from glacial and fluvoglacial deposits from the last glaciation. Organic deposits, shore deposits, and tracts of alluvium along streams compose the remaining soil building parent material. Steepness of slope largely determines susceptibility to erosion. These conditions have combined to produce soils of a wide variety of fertility.

Under cool, humid climatic conditions mineral soils produced from local parent materials are stony podzols which are generally thin, full of fresh rock fragments, and strongly acidic. Often they are of low fertility with a gray leached top layer and yellow brown subsoil. Widespread accumulations of vegetative matter in various stages of decomposition form soils of muck and peat. The soils of the Avalon have been mapped and classified into forty-three different soil series (Herringa 1981).

The growing season in the Central Avalon is the longest in the province at 190 days (Robertson et al, 1993) and soils are better in terms of topsoil depth and finer textures on some parts of the Avalon (Page, 1971; Roberts 1983), than in many parts of the province. This is particularly true in sheltered valleys of the Avalon. While stoniness and rolling topography are two of the limiting factors for agriculture, they are not limiting for coniferous tree growth. Soils are acidic and drainage often poor on fine textured bottom slopes resulting in dense, slow-growing black spruce and balsam fir forests at these

sites. At mid-slope conditions with fine textured soils, balsam fir trees on the Avalon have among the largest diameters in NL; however, height is frequently lower, particularly in exposed areas.

1.2.4 Climate

The Management District lies at the Southeast corner of the Province generally between 46° 35' and 48° 10' latitude and 52° 40' and 54° 15' longitude. The climate is typically maritime with temperature extremes moderated by the surrounding ocean. Mean summer (JJA) temperatures are 12 - 14° C with winter (DJF) temperatures averaging -4° C. Precipitation ranges from 1100 to 1600 mm and is well distributed throughout the year. Potential evapotranspiration is 475 to 500 mm per year. Frost free days on the Avalon range from 100 to 160 per year and the vegetative growing season (summation of degrees above 5° C each day) is 900 to 1200 per year. These summary data are based on the 1961-90 period of climatic Anormals@, which is the averaging period in current use in Canada. Such averages do not reflect interannual and decadal-scale variability. For example, winter snow cover on the Avalon is highly variable and this has effects on stream flow, soil moisture and soil temperature. Nor do the data reflect trends or recent extremes. Globally, the decade of the 1990s was the warmest in over a century. On the other hand, warming over northeastern Canada and the northwest Atlantic over the past 5 decades was less than occurred in central and western regions, a pattern that will likely persist.

Climate change studies reported by the Intergovernmental Panel on Climate Change (IPCC) provide strong and convincing evidence of global climate change as a result of human activities. Increased levels of greenhouse gases are projected to cause warming through the end of the century, particularly in middle and high latitudes, with winter and nighttime temperatures increasing the most. Precipitation is generally expected to increase in middle and high latitudes, but increased evapotranspiration will mean lower soil moisture in most areas of the continent. Variability and extremes of weather events, such as winter storms and tropical cyclones, are expected to increase. Impacts on boreal forests in general are expected to be significant as reported below (IPCC, 1996);

- Impacts of anthropogenic climate change are likely to be greater on boreal forests than temperate and tropical forests.

- An increase in fire frequency and pest outbreaks is likely, resulting in decreasing average age, biomass, and carbon store.

- At its southern boundary, boreal coniferous forest is likely to give way to temperate zone pioneer species or grasslands.

- Northern and altitudinal forest limits are likely to advance slowly into areas occupied by tundra.

- Where water is not limiting, net primary productivity is likely to increase in response to warming, partly mediated by increased nitrogen mineralization.

- There may be a net loss of carbon from the ecosystem because of associated increases in soil organic matter decomposition.

To go much beyond such general statements would require a level of precision that climate models do not have. Likely scenarios could be applied to the region including past experience and knowledge of the local climate and climate-forest relations. Tentative scenarios could include;

- increasing year to year variability in snow fall

- possible longer dry periods in the summer

- likely more frequent blowdown events

There is uncertainty in climate models and a high probability for disruptions to the current forest ecology over the next few decades.

1.3 Ecosystems

1.3.1 Forest Ecosystems

An ecosystem is a community of interacting and interdependent plants, animals and microorganisms, together with the physical environment within which they exist (adapted from Perry, 1994). It is important to remember that within an ecosystem the interactions between the biotic and abiotic components are at least as important as the component themselves. Another critical characteristic of ecosystems is their overlapping boundaries. While each is definable in time and space, and distinguishable from adjacent ecosystems, each is intimately integrated with other local ecosystems. Additionally, each local ecosystem is nested within increasingly larger ecosystems. The scale at which an ecosystem is viewed is contingent on the species or abiotic characteristic under consideration. While planet earth represents the ultimate global ecosystem, complex ecosystems also exist under fallen logs and rocks.

A forest ecosystem, as the term implies, is an ecosystem dominated by tree cover. At the coarsest level, the forests of Planning Zone One, like all forests on the island, form part of the boreal forest ecosystem. The boreal forest is a green belt which spans much of the northern hemisphere. It stretches from the Atlantic shores of Scandinavia through Russia, across Alaska, through the mid latitudes of Canada until it reaches the Atlantic Ocean again in Newfoundland and Labrador. One of the distinguishing characteristics of the boreal forest is the phenomena of periodic, catastrophic stand replacement natural disturbances such as fire and insect outbreaks which typically give rise to uniform, even aged forests dominated by a few tree species.

The tree species which characterize the Canadian boreal forest include black spruce, white spruce, balsam fir, eastern larch, trembling aspen, white birch and jack pine. All of these, with the exception of jack pine, commonly occur on the Island. However, by far the dominant species are black spruce and balsam fir; together they represent more than 90 percent of the growing stock on the island. Spruce is most abundant in North Central Newfoundland where a climate characterized by relatively dry, hot summers has historically favoured this fire-adapted species. In Western and Northern Newfoundland the climate is somewhat moister and fires are far fewer in this region resulting in the ascendance of balsam fir, a species which is poorly adapted to fire.

1.3.2. 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.

The three ecoregions found on the Avalon Peninsula (with their corresponding number under Dammans mapping) are:

1. The Avalon Forest Ecoregion (Ecoregion V)
2. The Maritime Barrens Ecoregion (Ecoregion VI)
3. The Eastern Hyper-Oceanic Ecoregion (Ecoregion VII)

A subregion is a division within an ecoregion with differences not significant enough to constitute a separate ecoregion. The Maritime Barrens Ecoregion of Newfoundland has four subregions, two of which are located on the Avalon;

i. Northeastern Barrens Subecoregion (Dammans VI A)
ii. Southeastern Barren Subecoregion (Dammans VI B)

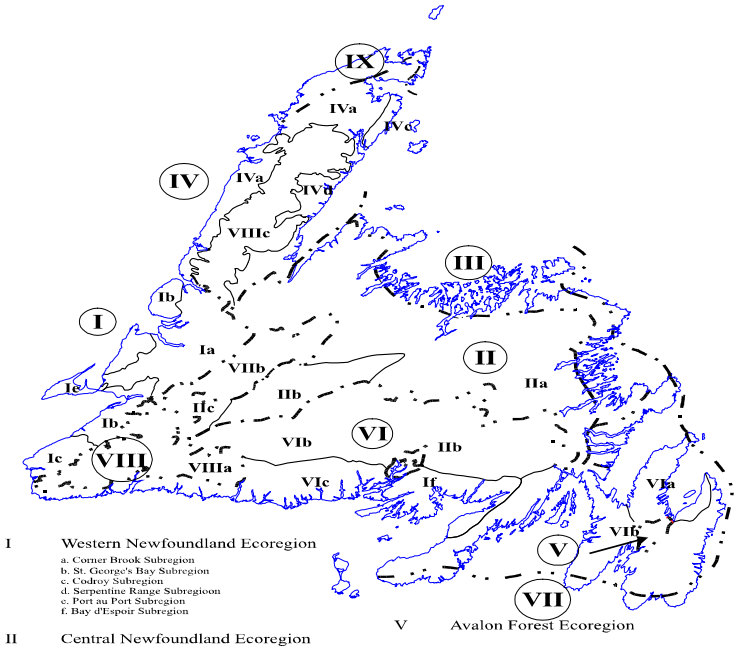

Figure 2. Ecoregions and subregions of Insular Newfoundland

Figure 2: Ecoregions and sub-regions of Insular Newfoundland

The Avalon Forest Ecoregion represents a sheltered outlier within the more open and exposed Maritime Barrens Ecoregion. Pure stands of balsam fir with a significant mixture of white and yellow birch dominate this region. The excessively moist climate and ribbed moraine topography give this small ecoregion its uniqueness. Aspect appears to be a significant factor controlling forest composition and growth. Fragic Ferro-Humic Podzol soils give way to gleyed ferro-humic podzols in south facing slopes. (Meades and Moores 1989).

The Maritime Barrens Ecoregion has the coldest summers with frequent fog and strong winds. Winters are relatively mild with intermittent snow cover particularly near the coastline. Subregion A (Figure 2) has lower fog and somewhat higher temperatures than subregion B. In subregion A alpine species and yellow birch are absent and soils of orthic humo-ferro podzols grade to fibric humisols as slopes are descended. Subregion B has frequent heathlands but good specimens of yellow birch. Typic folisol grades to peaty gleyed humic podzols as soils are examined going down slope.

The Eastern Hyper-Oceanic Barrens Ecoregion includes the extreme southern part of the Avalon Peninsula and the northwest coast near Bay de Verde. Elevation is less than 200 m with the extreme oceanic climate precluding the development of forest other than balsam fir tuckamore (*krummholz*). Forest stands can be found in the more sheltered valleys of the ecoregion. Rock barren is common throughout.

1.4 Ecosystem Dynamics

1.4.1 Ecosystem Condition and Productivity

Landscape patterns determine the variety, integrity, and interconnectedness of habitats within a region. These landscape patterns are a direct result of the relationship amongst physical landforms and soils, disturbance history, and relationships among various species that make up the ecosystem communities. These factors, while listed separately for clarity, are unavoidably interrelated. Landscape patterns play a pivotal role in determining the current conditions and health of forest ecosystems. These variables are evaluated in terms of productivity, stability and resilience.

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

The main forces of change in our natural forest ecosystems are disturbance and succession. A definition of disturbance would indicate that it initiates a change in a community structure which often ends up in the replacement of one set of species by another. However, replacement is not always the end result (e.g., a species like black spruce is aided in germination by disturbances like forest fire).

Disturbances range from the fall of a single tree, to the destruction of thousands of hectares by forest fires. While disturbances may be very destructive, they can often rejuvenate ecosystems and diversify landscapes.

Succession involves changes in both community composition and in the ecosystem structure and process. Succession is the orderly change whereby the dominant species is replaced by another species, then another etc. until a new dominant species establishes a relatively stable community.
The following sections will discuss each of these concepts in more detail as they relate to the ecosystems of Planning Zone One. 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 dependent on primary productivity, it is this primary productivity component that drives the system.

The level of primary production is dependent on the ability to produce biomass. This in turn is dependent on landscape features, soil, climate etc. In general terms, the more productive (ability to grow trees) a site is, the higher level of primary productivity. For example a forested stand would have a higher primary productivity than a bog and a good site would have a higher potential than a poor site.

Overall, the landscape in Planning Zone One has approximately 26 percent productive forest. As well, the relative proportion of site types is 2 percent good, 74 percent medium and 24 percent poor with a mean annual increment (MAI) of 2.6, 1.6, and, 0.9 m3/ha/yr respectively. The distribution of productive

sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils.

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 following a disturbance. To a large degree, a forest ecosystem's resilience is controlled by properties such as climate, parent soil, topography and flora.

The potential for populations to recover from low levels following disturbance by having adequate regeneration capacity and a balanced distribution of forest types and age classes provides a reliable measure of resilience at the landscape level. Indicators include the percent and extent of area by forest type and age class and the percentage of disturbed areas that are successfully regenerated. Resilience is determined by measuring and monitoring these parameters. Forest activities must be carefully planned to not upset the natural balance and lower an ecosystem's resilience.

The ability of forest stands to regenerate themselves demonstrates their resiliency in the face of harvesting or some other natural disturbance. An example is harvesting on the more fragile sites where steep slopes and shallow soil over bedrock increase the potential of site degradation beyond repair or where insect and wind damage has occurred and excessive browsing has impaired regeneration.

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 (eg. loss of topsoil).

Some indicators of stability which can be monitored are: area of forest converted to non-forest use, area, percentage and representation of forest types in protected areas, percentage and extent of area by forest type and age class, and change in distribution and abundance of various fauna. These indicators can be measured and monitored to ensure stability is maintained and to evaluate the impact, if any, of forest activities on ecosystem stability.

1.4.1.4 Disturbance Regimes and Successional Patterns

In 1989, Meades and Moores published a field guide to the Damman Forest types of Newfoundland. The balsam fir forest types of the Avalon are stable (ie. they naturally come back to the same forest type) following cutting, insect infestation and windthrow but, after disturbance by fire, often go to spruce or hardwood forest types. Spruce types generally go to another spruce type following fire, but after cutting to a more open spruce type or heath in the absence of silvicultural treatment. Soil characteristics may be the cause for some barren/heath development following a disturbance and from a silvicultural stand point may require scarification to make them productive. More information on forest types and successional pathways is available at the Paddy's Pond District office.

The boreal forest, of which the forests of the Avalon are part, have evolved in concert with fire, insects and wind throw which are the main agents that recycle our forests. These agents leave stands regenerating with the same age of trees although these trees can have quite different diameters or sizes as the stand develops. There is generally a mix of forest stands of different sizes and stands of different ages over the landscape. Human interventions in the forest have often ignored natural dynamics, and have left a forest that often does not equate to the natural model. This is quite evident on the Avalon

which has sustained the highest human population and therefore the greatest pressure on the forest resources since European contact.

1.4.1.4.1 Harvesting

Human use of the forest has also influenced development through cutting and burning. Fuelwood cutting has been a common practice since European settlers arrived on the Avalon. This common practice involved small clearcut patches, usually less than one acre in extent (Wilton 1956). There was clearcutting of young stands for pitprops from the 1930's to 50's, pulpwood shipped to the AND Company in the early 1950's, clearcutting for pressboard production from the mid - 1950's to 1980 and approximately four million board feet (fbm) per year of lumber produced at that time (the latter largely by selective logging). Much of the early cutting was concentrated along waterways and the reaches of watersheds where water driving was possible. Contractors for Newfoundland Fiberply cut areas in Salmonier, Windsor Lake, Island Pond Ridge, Spread Eagle and other areas of the Avalon. Current lumber production approximates 1.7 million fbm from crown land and 500,000 from private per year from timber harvested on the Avalon. Commercial operations ensure timber is fully utilized in local markets. Large diameter wood is used for lumber and pallet production, small diameter wood is sold as fuelwood, slabs from sawlogs are also utilized as fuelwood, and many operators sell sawdust and shavings to the farming industry for bedding.

1.4.1.4.2 Fire

Historically, fire and insect infestation have been the agents that cause widespread mortality in the forest. Since the 1600's over 163 000 hectares have burned involving in excess of twelve hundred fires (Wilton and Evans, 1974). Most of the Avalon has burned at one time or another with the most recent large scale wildfires occurring on the Bay de Verde Peninsula and the Southern Shore in the 1960's. The Spread Eagle fire was the largest fire on the Eastern half of the island in 1999. After a fire, forest regeneration is usually successful; however, repeated burning of certain areas of the Avalon caused a loss of available seed source as well as soil degradation which, combined, resulted in failure of tree regeneration and invasion by ericaceous shrubs and low ground vegetation. Over 80 000 hectares of the Avalon Peninsula that were once forested are currently in heath condition.

Ecoregion V (Central Avalon) has been spared the ravages of fire that decimated the surrounding landscape because of an excessively moist climate (Meades and Moores 1989). The development of the extensive heath landscape in Ecoregion VI (Maritime Barrens) was precipitated by indiscriminate burning by European settlers.

1.4.1.4.3 Insect

Recording of insect outbreaks began in the early 1900's and severe hemlock looper outbreaks occurred in 1920 - 1926, 1968, 1972, 1983 and 1986 (Otvos et al, 1979). The first spruce budworm outbreak was recorded in Bell Island in 1942 and spread to other parts of the Avalon by 1947. A major spruce budworm outbreak occurred from 1978 - 1982 with a high of 69 000 ha of severe defoliation in 1979 (Otvos and Moody, 1978). Parts of the Trinity Shore, the Northeast Avalon, Southern Shore and Central Avalon were most affected. Periodic outbreaks of the hemlock looper have caused balsam fir mortality throughout the Avalon. Severe insect outbreaks generally cause mortality of Balsam fir stands and areas of tree mortality may range in size from 0.25 ha up to hundreds of hectares. Forest regeneration after insect infestation is usually successful and the new stand is generally composed of species that comprised the previous one.

1.4.1.4.4 Wind

Wind damage occurs periodically dependent on climate factors, amount of mature forest (60 yrs +) and recent forest history. Boreal forest tree species are typically shallow rooted making them prone to wind damage. Wind throw generally tends to be relatively small scale unlike fire or insect damage, however severe wind events can be significant and when combined with insect damage forests the effect can be drastic. The most recent severe wind damage occurred in 1994 - 95 with approximately 4650 ha of mature and senescent forest windthrown on the Avalon Peninsula. With the exception of areas that were salvage harvested the bulk of the blowdown areas have failed to regenerate and have turned to grassland in most cases. The district continues to work on regenerating these sites through planting programs.

1.4.1.4.5 Herbivory

The introduction of moose to the province in 1904 has provided us with a remarkable example of population growth in the absence of major predators. From a founding population of only four animals, moose numbers in insular Newfoundland now exceed 150,000. This growth however has not been without growing pains. In the late 1950's it was reported that moose densities in Central Newfoundland had grown to a level whereby they were depleting their food resources to a seriously low level. On the south coast a major decline in the moose population was directly attributable to over browsing of their range. The moose has provided many benefits to Newfoundlanders and is now part of our ecosystem. Moose was first reported on the Avalon in 1941 (Pimlott, 1953). Moose should not be managed as a premier species but as part of the ecosystem. In areas of the Avalon where moose browsing is severely impeding the growth of hardwood, softwood and other native flora, a feedback mechanism should be emplaced to provide those setting quotas with data necessary to ensure a healthy moose population is maintained and that the integrity of the habitat is not compromised. Currently there is a significant lack of hardwoods growing to maturity as their growth is being curtailed at an early age through browsing. In fact most birch barely even establish before they are browsed by moose/rabbits. If seedlings are protected from browsing (exclosures) there are no other factors limiting growth.

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 conduct more surveys and studies and manage with caution so that species are not inadvertently extirpated.

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

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. 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.

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 all forest vegetation species and which use the genetic diversity of commercially important species to a maximum benefit. The genetic diversity of commercially important species can also be managed to increase economic benefit from some portions of the landscape while allowing other portions to provide greater social and ecological values. Genetic diversity is the basis by which populations (flora and fauna) can adapt to changing environmental conditions.

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

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

1.5 Forest Characterization

Forested land accounts for some 57% of the inventoried crown landbase. The forested portion can be further divided into 26% productive forest and 31% scrub, based on its ability to produce ten cubic meters per hectare of timber (if one were to consider a timber volume measure). It is important to note that the productive forested area is less than 20% of the area of the Avalon and that forest operations would occur on less than 2% of the productive forest landbase annually. Rarely does productive forest extend above the 500 foot (150 m) elevation on the Avalon. Approximately 55 % of the more productive forests, in the terms of growth, occur on mineral soil representing about 10 % of the surface area of the Peninsula (Wilton 1956) notably in the Avalon Forest Ecoregion.

Natural and human induced events have influenced the forest condition and productivity of the Avalon forest ecosystem. Avalon forests are resilient and regenerate to the original forest after disturbance (Meades and Moores 1989). Of course moose and rabbit populations now heavily influence regeneration patterns. Using an age-class distribution graph, Figure 1, the forest ecosystem is divided into specific age-classes. The data is based on 1995 photography, annual inventory updates, and adjusted for current time frame. As the forest grows it moves to the right into older age classes, until it returns to the first age class following disturbance. The age class distribution is one tool used to capture current forest development patterns.

1.5.1 Land Classification

Table 2 displays the land classification broken down by district for Planning Zone One. The total mapped land area in the zone is approximately 818,272 hectares.

There are four basic categories that currently represent how the land is classified; productive, non productive, non-forest and fresh water. Individual break outs by district are shown in Table 2. Figures 3, 4, 5, and 6 display the relative percentages of each major land class category found within in each district.

Productive forest land comprises approximately 26 percent of the zone. As well, the relative proportion of site types is 2 percent good, 74 percent medium and 24 percent poor. The distribution of productive

sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils.

Table 1: Land Classification area for Planning Zone 1.

Land Class	District 1 (area in ha)
Disturbed	15,718
0-20 years	26,092
21-40 years	34,788
41-60 years	69,552
61-80 years	88,569
81-100 years	13,897
101-120 years	650
120+ years	28
Total Productive	249,294
Softwood Scrub	124,306
Hardwood Scrub	8,279
Total Non-Productive	132,585
Rock Barren	28,190
Soil Barren	176,476
Bog	155,643
Cleared Land	5,844
Agriculture Land	7,712
Residential	32,517
Right of Ways	3,545
Miscellaneous	26,466
Total Non Forested	436,393
Fresh Water	90,014
Total All Classes	908,286

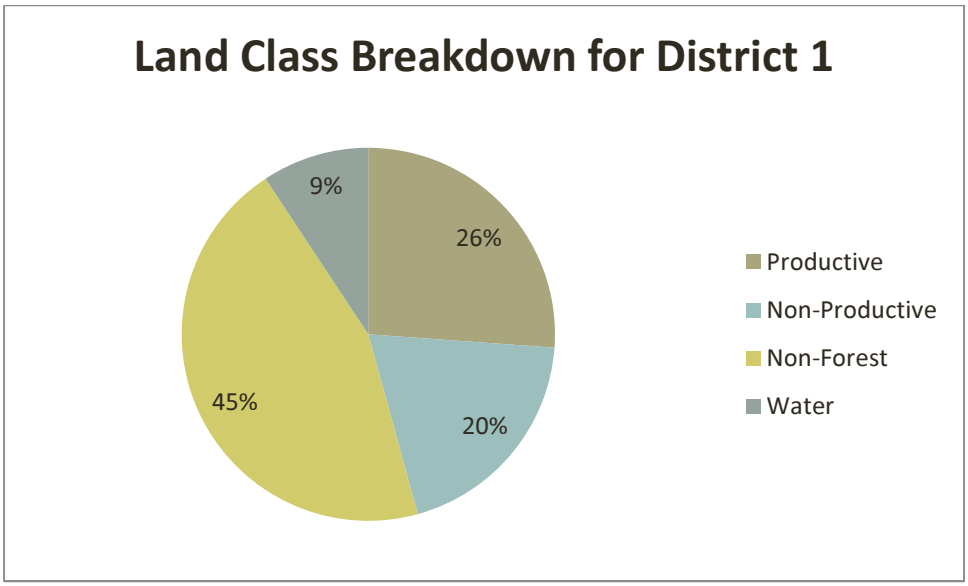

Figure 3: Land class breakdown for Planning Zone 1

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 for the entire productive forest is shown in Figures 7. In general terms, the more balanced the age class distribution in a district, the higher the potential even flow sustained yield of timber can be since continuous timber supply is limited by the age class with the lowest area. Strategies to rectify any age class imbalances or impacts on wood supply are employed during the timber supply analysis.

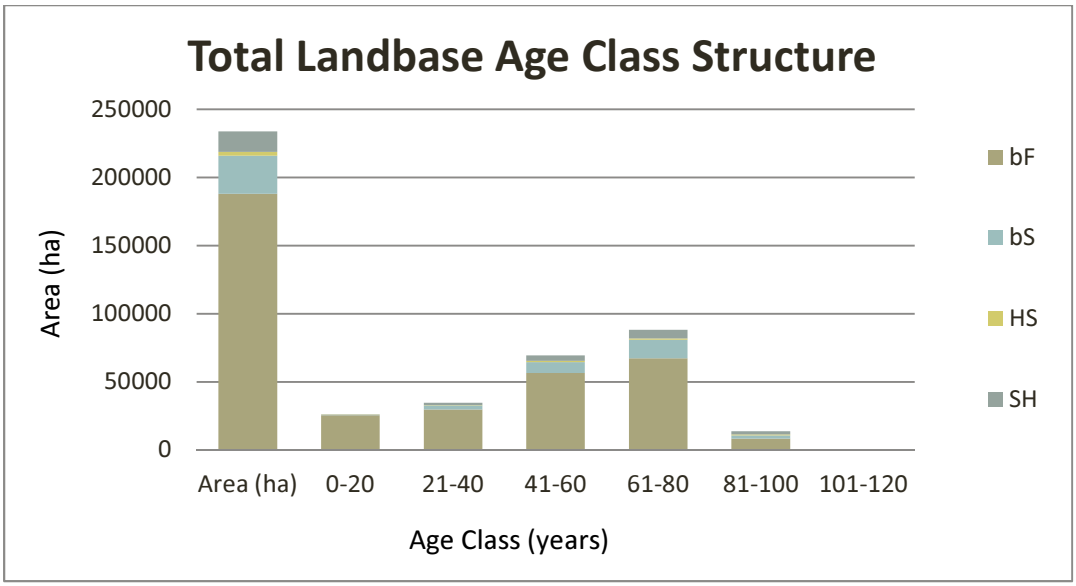

Figure 4: Age class distribution for Planning Zone 1

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. The distribution of area by site class is shown in Figures 11. On average, good sites are capable of producing 2.6 m3/ha/yr, medium sites 1.6 m3/ha/yr, and poor sites 0.9 m3/ha/yr.

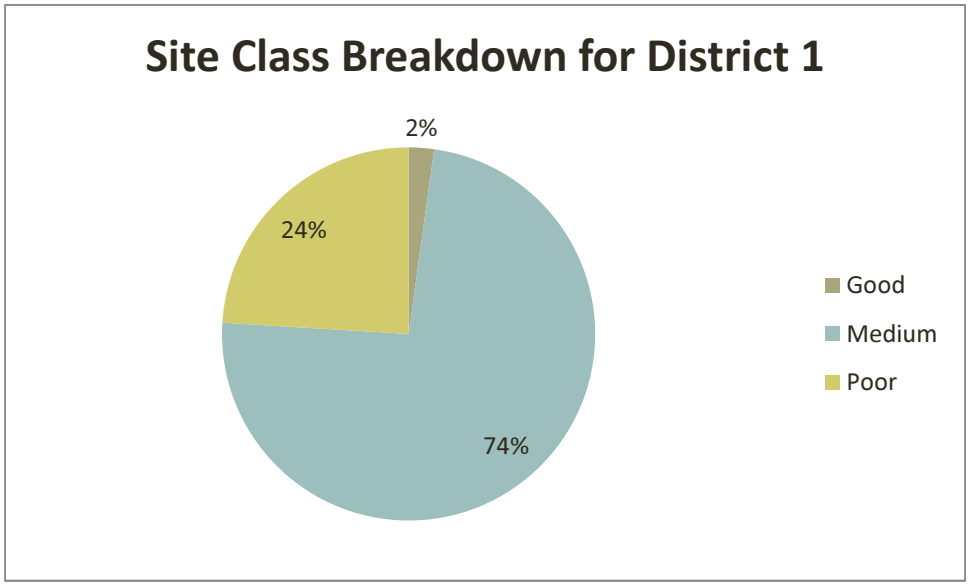

Figure 5: Site Class Breakdown for Planning Zone 1.

1.5.4 Species and Working Group

The Avalon naturally contains all tree species that occur in insular Newfoundland with the exception of red pine and black ash. The forests however are dominated by balsam fir, black spruce and white birch. Wilton, (1956) reported that white pine on the Avalon was of considerable importance but cutting and disease had reduced this species to a rarity. Eastern larch (juniper) declined throughout eastern North America in the late 1800's (Roberts and Van Nostrand 1995) but is becoming common once again particularly on exposed mineral soils or poorer sites.

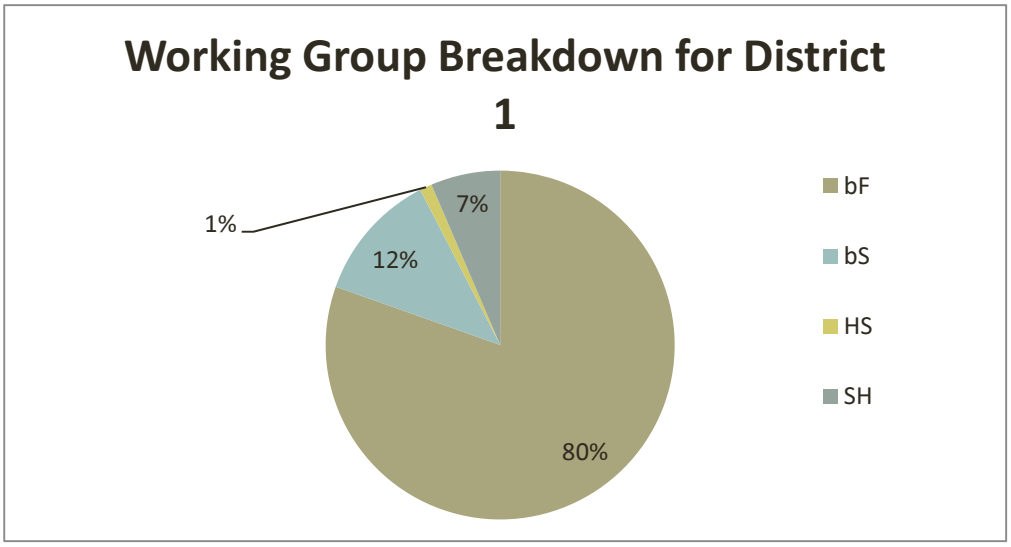

Figure 6: Working group breakdown for Planning 1.

1.5.5 Forest Disturbances

Loss of productive forest land to competing land uses (such as cottages, agriculture, residential, roadways, quarrying and other commercial use) on both crown and private land is probably the greatest threat to forestry and conservation. Although differences in the periodically inventoried area preclude direct analyses of losses, in terms of crown land in general from 2007 to 2011, approximately 838 ha of new Crown land titles per year were issued, totaling 3,773 ha, of which 42% (1,600 ha) was for the Vale INCO Long Harbour facility. From 2011 – 2016 approximately 3665ha were lost through various agiculture leases, cabins, grants, residential and industrial developments. Many titles were issued in areas that would not have realistically affected the productive forest base. No issuances of new titles on areas identified as productive forest, silviculture, commercial or domestic cutting areas would have occurred without referral to Forestry Branch.

The rate of forest land alienation may continue to increase in the current plan period with the continued demographic shift in the island's population towards the Northeast Avalon and with attempts to satisfy expanding cabin development areas and agriculture development. The land base erosion represents a threat not only to sustainable timber and habitat production, but also to the myriad of values people hold of the forest and to the ecological functions that forested land provides.

Conversely, opportunities exist for value added timber products and non-timber forest products which can be integrated with sustained timber production. Institution of some form of land use planning or the designation of reserves for forestry and ecological purposes can bring more certainty for the long term. Utilization of woody material currently below merchantability standards can be applied to domestic heating and other energy needs, and simultaneously provide economic opportunity and employment.

The forests are a valuable and renewable natural resource. Sawmillers and other forest operators have contributed to the rural lifestyle and economy of the Avalon for generations, and they require assurance that sustainable forest operations are secured for future generations in balance with environmental and social considerations. These three realities are recognized in the sustainable forest management approach. Sustainable forest management is both a challenge and an opportunity for the present and for the future as reflected in Planning Team discussions.

2.0 PAST ACTIVITIES – DISTRICT 1

2.1 Harvesting

2.1.1 Commercial

Table 2 summarizes the commercial harvest in District 1 for 2011-2015. Commercial and domestic harvest was below the AAC for the period.

Table 2: Summary of commercial harvest in District 1 by Crown for 2011 to 2015

District: 1		Core	Operational Available
		Harvested	*Harvested*
Swd	2011-2015	50,036	2297
Hwd	2011-2015	0	0

2.1.2 Domestic

Table 3:Summary of domestic harvest in District 1 by Crown for 2011 to 2015

District: 1		Core	Operational Available
		Harvested	*Harvested*
Swd	2011-2015	107,984	6300
Hwd	2011-2015	0	0

2.1.3 Silviculture

Table 4: Summary of silviculture treatments on crown land in District 1 from 2011 to 2015

Treatment Type	Area (ha)
	Treated
Pre Commercial Thinning	50
Site Preparation	
Planting	410
Herbicide	
Commercial Thinning	
Cone Collection	

2.1.4 Road Construction

Table 5: Summary of forest access road construction in District 1 for the period 2011-2015.

Roads	
Treatment Type	(km)
Construction	6.7
Re-construction	
Decommission	9.6
Bridge removal	2 bridges

2.2 Natural Disturbance

2.2.1 Fire

District 1 has had approx. 200 fires in the past five years for a total area burned of 515 ha.

2.2.2 Insect

There was no defoliation and treatment for either the hemlock looper or balsam woolly adelgid in the last 5 years.

3.0 TIMBER SUPPLY ANALYSIS

The current annual allowable cuts for each district are in effect from January 1, 2011 to December 31, 2016.

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.

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.

On the Avalon, land base erosion is one of the key threats to the sustainability of the forest industry. On average approximately 3600 ha are permanently removed from the land base over a five year planning period. This is the result of cabin development, agriculture development, quarry development, residential and industrial development.

3.4 Timber Supply Analysis

In 2003, the Forestry Services Branch began another review of the provincial timber supply which was completed in March of 2006. 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 Forest 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 than 1% of the productive forest land base is influenced by harvesting operations.

3.4.2.1.1 No-Cut Buffer Zones

The province has guidelines that require all water bodies (visible on a 1:50,000 map sheet) be given a minimum 20 meter (from water's 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 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.

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 Forestry 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 land base 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 sub region.

3.4.4.6 Operability Limits

Operability limits are the time windows in which forest management actions such as harvesting can be undertaken within forest stands. Stand growth development as measured in stand merchantable timber volume and individual piece size of trees determine a stands readiness for harvest. In some young stands, one can have acceptable harvest volumes, but still have trees that are too small to harvest. In the 2011 wood supply analysis both stand volume and tree size were used to determine the earliest age when a stand could be initially harvested. In addition to determining the absolute earliest age a stand can be harvested, it was recognized that not all stands on the same site develop exactly the at the same rate. A small portion of a stand will develop faster; a small portion will lag behind; with the bulk of the stand type representing the average condition. Therefore, the first operability limit was staggered by 5 year intervals with the 10 percent, 30 percent, and 60 percent assigned to each availability class listed

above respectively. The ending operability limits or the last age in which a stand can be harvested before it becomes too old to harvest is solely determined on a minimum stand volume of between 60 to 80 m3/ha, after which that stand does not have enough volume to make it economical to harvest. It should be noted that while the operability limits define the extreme end points of when stands can be harvested, very few stands are ever harvested at these extreme points. In order to meet other non-timber objectives and in order to maximize the total volume of wood harvested the model schedules stands to harvest somewhere inside the operability limit window.

3.4.4.7 Silviculture

Silviculture is one of the main forest management tools available to forest managers when they are analyzing the many different future forests that are generated using the wood supply modelling software. The silvicultural actions use in the 2006 analysis include; 1) pre-commercial thinning of balsam fir, 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) for district 1 used in the analysis were 50 ha. The planting levels (ha) for district 1 used in the analysis were 50 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 1 was 15 percent.

3.6 AAC Results

The results of the timber supply analysis for district 1 is shown in Table 6.

Table 6: Annual Allowable Cut results for District 1 for woodsupply period 2016-2021.

	Core Softwood (m3)	Operational Softwood (m3)	Core Hardwood (m3)
District 1	21, 080	85	157

4.0 VALUES

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 cannot be ignored when planning for the zone.

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

4.1 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:

A. Characterization

• Description: Why the value is important, types of activities, intensity, spatial extent, employment, etc.
• Data in support: Statistical references.

B. Critical Elements

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

C. 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:

I. policies that should be in place to protect or enhance the resource value;
II. methods for negotiation or inclusion of other stakeholders in resolving potential conflicts;
III. special management provisions/strategies - such as buffer zone consideration, temporal operating periods, modified harvesting, or a best management policy; and/or
IV. 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) 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.

4.1.1.1 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.

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.

Critical Elements:

Recent studies and anecdotal information has indicated that the harvesting restriction zone around caribou calving zones may be significantly larger than first thought. It has also been shown that as roads are constructed and access is improved into remote areas, there is generally an increase in the number of animals which are killed due to road-kill and poaching.

4.1.1.1.3 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.). The population on the Avalon is extremely small with reports of one or two bear sightings per year at the district office.

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

No harvesting is proposed in areas that are known caribou habitat. Forest management activities should have no impact on caribou populations in District 1.

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.

4.1.1.3 Species of Interest

Biological diversity and species abundance are one of the indications of a healthy forest and a healthy ecosystem. While most of the native species found in District 1 are healthy and relatively abundant there are others that are considered species at risk.

Species at risk in Newfoundland and Labrador are assessed and monitored mainly by two organizations, The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and by the Wildlife Division of the Department of Environment and Conservation, Government of Newfoundland and Labrador. The two groups work together to maintain a listing, along with management and recovery programs, for any species listed under the *Endangered Species Act* (Government of Newfoundland and Labrador). At present time there are 32 species listed under the Act of which 10 are endangered, 9 threatened and 13 listed as vulnerable.

In District 1 only 6 species (5 birds and 1 lichen) on the list are of consideration in this five year operating plan (Table 7). However there is one additional lichen which is under consideration by the Wildlife

Division for listing and there is a possibility of two others (1 fish and 1 mammal) if populations continue to decline(Table 8).

Table 7: Listed Species

Common Name	Scientific Name	Designation
Red Crossbill	*Loxia curviristra percna*	Endangered
Rusty Blackbird	*Euphagus carolinus*	Vulnerable- **NL ESA** Special concern - **SARA**
Olive Sided Flycatcher	*Contopus cooperi*	Threatened - **NL ESA** Threatened - **SARA**
Short Eared Owl	*Asio flammeus*	Vulnerable
Gray Cheeked Thrush	*Catharus minimus*	Vulnerable
Boreal Felt Lichen	*Erioderma pedicellatum*	Vulnerable
Blue felt lichen		Vulnerable

Table 8: Possible Listed Species

Possible listed species	Scientific Name	Proposed Designation
Graceful Felt Lichen	*Erioderma mollissimum*	TBD
Woodland Caribou	*Rangifer terrandus*	TBD
Atlantic Salmon	*Salmo salar* *(South Coast Population)*	TBD

The provincial designations differ somewhat than those of COSEWIC. The designation of Vulnerable corresponds to the COSEWIC designation as species of Special Concern.

Under the *Endangered Species Act* the designations of Endangered, Threatened or Vulnerable are treated the same for protection, management and recovery however penalties for destroying, moving or disturbing an individual are only in place for the Endangered or Threatened categories. The protection for species identified as Vulnerable would be through pre-harvest planning and as a condition on a Commercial Cutting Permit under the Forestry Act. Conservation Officers, as is policy, prepare the pre-harvest plans and lay out harvest blocks using the criteria set forth by the Department of Environment and Conservation for any species listed under the Endangered Species Act. The Department of Justice has the authority to enforce the Endangered Species Act.

While all species are considered when developing the District's Five Year Plan, Species at Risk, in all their designations are given a higher priority in planning when and where to operate. Through legislation, Environmental Assessments and consultation with the Wildlife Division mitigations are developed to minimize the impact of any forestry activity on the health and well being of any of the species listed, and even some that aren't.

An example of this would be the Boreal Felt Lichen. Before the Boreal Felt Lichen was designated by COSEWIC or even before there was legislation enacted to protect Endangered Species in Newfoundland, buffering the areas around lichen populations, lichen searches and even avoidance of areas in which the lichen occur are common practice. Once legislation was enacted DNR produced a protocol for dealing with forestry activities in all areas on the Avalon Peninsula. While the possibility of finding BFL in some areas scheduled for harvest is remote, a search is still conducted using the protocol as designed by the Wildlife Division. In cases where the lichen is found, harvesting strategies are modified to minimize the impact on the species based on conditions as prescribed by the Wildlife Division. In areas with highly concentrated populations harvesting is often postponed and or cancelled.

In this planning period, District 1 used habitat parameters for the listed species to assist in the modeling for District 1. The model is used to provide an Annual Allowable Cut while also maintaining the mosaic of various age classes of forest which provide for the habitat requirements of the species at risk. DNR continues to assist the Wildlife Division in population counts, searches, research and development of mitigations to allow for the sustainable harvest of our forests while maintaining suitable habitat for species at risk.

Critical Elements:

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

Guiding Principles:

- To ensure that rare and endangered plant species present in the zone do not become extinct because of forest management operations.
- To identify and protect rare plant habitat
- To educate department personnel and the public on the locations and importance of rare plants
- Encourage domestic harvesting in the winter
- Identify and update all rare plant sites on GIS forestry data base
- Ensure that areas containing rare plants are marked and posted
- Work with the DoEC to develop mitigative measures in areas where rare plants occur.
- Pre harvest surveys to idenitify any at risk species

Guiding Principles:

- a 50-metre treed buffer will be established around designated sensitive waterfowl areas. As well, no forestry activities are recommended during the brood rearing, breeding, and staging period
- a minimum 30-metre, no-cut, treed buffer must be maintained from the high water mark in other waterfowl breeding, molting, and staging areas.

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 One, water is used beneficially for numerous purposes. Most communities within the zone have water supplies. Recreational waters within this zone are used for activities such as fishing, boating and as a water supply source for numerous cabin owners.

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 ensures all watershed permitting is approved for all operations within watersheds and FSB operators are trained in ISO140001 that has stricter operating guidelines for operations within protected water supplies.

4.1.2 Human Values

4.1.2.1 Timber Resource

Characterization:

One of the major resource values of the forest ecosystem is the harvesting of timber to provide forest products. While a significant forest industry and healthy forest economy exists there is potential to provide further contribution to the local and provincial economy. Historically timber has been harvested since the first inhabitants settled in the zone. Initial uses were mainly domestic in nature to supply timber to build houses, fishing sheds and equipment and for heating and cooking. With the

increase in population, more commercial uses have arisen to supply lumber and pulp and paper products.

Domestic harvesting is allocated the majority of the AAC in District 1. The landbase in district 1 is most suited for domestic harvesting. In this latest plan additional inventoried land and re-classification of the landbase has seen domestic AAC increase substantially. Domestic harvesting provides fuelwood to heat many homes and sawlog material for residential construction in the zone. District 1 demand for fuelwood by residents is extremely high and is anticipated to continue to be in demand as other energy costs rise and the availability of fuelwood decreases. Domestic harvest areas for some communities however are under threat from other land uses specifically quarries, agriculture, and community support for the activity.

Commercial logging contractors are allocated a small portion of annual allowable cut in the zone. Commercial harvesting and sawmilling activity provides many jobs in harvesting, sawmilling, trucking, and related spin off industries for local residents.

Silviculture treatments are important to the forest resource of the zone because they ensure a vigorous and healthy forest is maintained. Forest renewal activities are critical because they ensure that the productive land base is maintained by planting areas that are not sufficiently restocked. Forest improvement activities help improve and enhance the growing stock which can reduce harvest cost, enhance forest product options and increase sustainable timber supply. There will be a significant investment on silviculture in the zone each year creating seasonal employment.

Timely access to timber is critical to planning any forestry operations. Primary, secondary and tertiary roads form an integral part of operating areas and are used after timber extraction is completed for silviculture and recreational purposes. A significant amount of money will be spent by the crown to construct forest access roads each year in the zone and ensure maintenance of infrastructure. In the past road decommissioning was a favored practice but discussions with planning team members at annual planning team meetings it was decided that decommissioning would be completed once all management operations were ceased, including silviculture.

Protection of the forest from various disturbances is also a major characteristic of resource management. Because of the long insect history in the zone, protection through integrated pest management techniques is an important activity. Fire has been a major disturbance, so protection is critical since a large fire can potentially be devastating. Protection of other resource values through modification of activities and enforcement is also important.

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:

Agricultural activity is limited in the zone. Additionally, hundreds of subsistence farming plots are scattered throughout the zone. The vegetables grown on these plots are used to supplement food requirements during the winter months. There are also several pastures and areas designated for hay production.

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

Critical Elements:

Surveys indicate that approximately five percent of the soils in the province are suitable for agriculture. It is not possible to identify and plan all sites for future agriculture use and often there is a conflict with other land uses particularly forestry because these sites are of high growing capability. Although a suitable land base is the first critical element necessary for a successful agriculture operation, markets and the interest of individuals are also prime factors in the development and location of future farms. In the spirit of managing the ecosystem for multiple benefits, provisions must be given for the agriculture industry to expand. This is particularly important for areas outside established agriculture areas.

Guiding Principles:

Lands designated for forest management can include areas with high potential for agriculture. Consequently, the forest landholders will work with the Forestry and Agrifoods Agency to determine if opportunities exist for an exchange between agriculturally viable forest areas with unsuitable agriculture land within the Agriculture Development Areas. Areas of interest are currently being evaluated in each district between agriculture and forestry to determine best end use.

The agriculture leasing policy initiated in 1976 ensures that new or existing land allocated for agriculture continues to be used for agriculture. The leases have no provision for fee simple grants and must be used exclusively for agriculture purposes

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

- Home gardening leases should be confined to areas already developed for this activity.
- New agriculture leases should include a business plan approved by the Forestry and Agrifoods Agency.
- Wood harvested on agriculture leases shall be completed under a crown cutting permit.
- Where possible, existing commercial forest operators should be encouraged to work with farmers to clear new land for development.

4.1.2.3 Mining

Characterization:

There is a minimal mining presence in the zone. The most significant impact to forest landbase is quarry development for rock, sand, and gravel. These activities support residential and commercial development on the Avalon and are a major economic driver for the region. The downside is that often these products are located on the most productive forest sites or near communities where the only forest to support domestic harvest users exist.

Critical Elements:

To minimize the impact of mining and mineral exploration on the forest ecosystem.

Guiding Principles:

- Ensure that quarries and open-pit mines are rehabilitated. The organic overburden should be stockpiled and stored in a manner so that it can be used to rehabilitate the site.

- Avoid planning silviculture activity in areas adjacent to mines or quarries.

- Make every attempt to extract timber harvested as part of exploration and development. If timber cannot be feasibly extracted using conventional means then timber shall be piled so that it may be extracted during winter months by snowmobiles.

- Mineral exploration that proposes to explore or develop within a silviculturally treated area must be undertaken with minimal disturbance and provide compensation as required

- Mineral exploration and/or development on mineral licenses within the zone will not be impeded. Specific proposed harvesting activities are identified in the annual operating plan.

- Quarry permits are required for aggregate material taken outside of the road ROW for purposes of road construction

- When forest activities have been completed, road/bridge rehabilitation and decommissioning plans will be identified in the AOP and made available to the Mines branch at their request

- 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.

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

Characterization:

A large section of the Newfoundland and Labrador T'Railway Provincial Park lies in the zone and has an impact on forestry operations. 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.

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.

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.

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:

There is not a significant outfitting presence in planning zone one. However there are many business operators that cater to such activities of kayaking, canoeing, nature viewing, hiking, and wildlife

photography, whale watching etc. Pristine wilderness settings are necessary for many of these types of these operations to continue to succeed and grow.

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:

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

Canoeing and kayaking on the many rivers, walking the many hiking trails (especially the East Coast Trail), 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).

Critical Elements:

- viewscape
- accessibility
- wilderness ambiance
- remoteness

Guiding Principles:

Work with provincial parks, tourism division and tourism operators to implement strategies to minimize the visual impact of harvesting operations on the aesthetic values associated with viewscapes. 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.

5.0 MITIGATIONS

Domestic cutting has been raised as an issue throughout the zone. In previous plans we met with communities whose residents depended heavily on access to fuelwood for their homes. Through this process we made significant changes to domestic cutting areas to provide closures in some which would permit regeneration and opening of new areas to ensure supply for residents. In this planning process we continued to refine our domestic areas and minimize the number of blocks on the gorund to manage. Residents on the Avalon can be assured that there is access to fuelwood or saw material for their domestic use. All cutting will be regulated by a domestic cutting permit which will specify the area, species, and volume to be harvested, utilization standards, and any special conditions.

Decommissioning of roads and particularly bridges has also been an issue. There has been a number of water crossing structures identified throughout the zone where safety has become or is becoming an issue due to age and condition. Concern has been expressed that randomly removing these structures will limit access to some stakeholders. While no decommissioning has explicitly been identified in this five year operating plan, it is still the intent of the Forestry and Agrifoods Agency to decommission/replace water crossing structures starting in 2016. With the exception of any major catastrophic event, any structures that are scheduled for decommissioning will be identified in the annual operating plan.

There will be no forestry activity inside existing and proposed protected areas. A 500 m no roads buffer will be maintained around all existing and proposed protected areas.

Highlights of the mitigative measures that arose as a result of planning team meetings and local concerns for each district are listed below in table. More specific details by individual operating area can be found on the map cover sheets.

Table 9: Mitigative Measures Highlights

Stakeholder	Contact	FMD	ISSUES / CONCERNS RAISED DURING 2017-2021 PLAN DEVELOPMENT (PRE-ADM Review and on-on-one consultations with known stakeholders from previous planning processes)	Mitigation
Parks & Natural Areas	Jeri Graham	FMD 1	Overlap of harvest blocks with PNAD areas of interest. T'railway concerns	All overlap boundaries removed and no operations planned within current or proposed protected areas. A 100m buffer will be established along the T 'railway. As pursuant to Section 10 of the Provincial Parks Regulations the Forest Service's Branch will request a permit to access the T 'Railway prior to any harvesting
Wildlife Division	Kirsten Miller	FMD 1	**CC01014 – Neils Pond**: Some concentration of areas with Erioderma pedicellatum. **CC01006 – Munn Block South** : Overlap with Stewardship Management Zone. These areas are established in agreement between WD and the Town of Whitbourne. The Town is to be consulted on proposed harvest within the Stewardship Management Zone (cross hatched area). **CC01027 – Healeys Pond** : Overlap with Stewardship Management Zone. These areas are established in agreement between WD and the Town of Whitbourne. The Town is to be consulted on proposed harvest within the Stewardship Management Zone (cross hatched area). **Silvicuture in stewardship zones (01006 and 01027)**	We will provide stand level maps to wildlife division prior to any activity taking place and we will also ensure pre-harvest surveys completed and proper buffering in place. The Forest Service has removed the overlap section with the Stewardship Management Zone. The Forest Service has removed the overlap section with the Stewardship Management Zone. The forest service has removed the overlap with this zones and no work will occur.
Crown Lands		FMD 1	**Country Pond, Old Witless Bay Line, Foxtrap, and Witless Bay**	Forestry Services is aware of this and have a long

			country Pond are all within the Butterpot/Witless Bay Line Environmental Development and Control area.	standing history of operating within the area. Operations have minimal environmental impact, are ISO registered operations, and all harvest sites are replanted and roads decomssioned. All permitting as requested will be acquired.
			Many operating areas identified as within municipal boundaries/watersheds	All permits required and all approvals will be acquired prior to commencing any operations.
			Remote Cottages	Remote cottages identified in some operating areas. All required buffering etc. will be applied to remote cottages in these areas. Do to high number of remote cabins and large operating areas if buffers are identified on proposed maps the forest service will ensure they are maintained at the field level.
			Private Land	All domestic and commercial areas have been modified to ensure no overlap with private land.
			Approved atv and snowmobile trails	The forest Service will ensure approved trails are left undisturbed and undamaged.
			Cottage development areas	The Forest Service will work with the Lands Branch on any operations around cottage development areas. Including respecting the 120m buffer.
			Protected road zones and Butter Pot witless bay environs permits	The forest service will ensure permits are in place prior to commencing operations. A 100m protected road buffer is part of forest service harvesting conditions on permit.
			Long Harbour 01034 – concerns raised with zoning	The forest service confirms this area does not conflict with commercial zoning and falls within rural zoning where forestry is approved activity.
			Multiple instances of overlap for Rural and open space/conservation zones	Given the large extent of operating areas there are some areas identified as overlapping. The forest

				Service will ensure activity only occurs with the approved rural zoning and ensure buffers along all conservation zones, streams, lakes etc.
Mines & Energy			Should future quarry or mineral resource developments or exploration programs (i.e. new quarry development, existing quarry expansion, new mine development, quarry materials exploration, mineral exploration) be considered by Forestry as having the potential to cause a significant impact on the forest resource and forest resource users, then Forestry should work closely with the Mines Branch and the proponent to ensure that mutual impacts are minimized. Other Forest Management Plans, in relation to mineral exploration, have stated that parties carrying out mineral exploration should "Make every attempt to extract timber harvested as part of exploration and development. If timber cannot be feasibly extracted using conventional means then timber shall be piled so that it may be extracted during winter months by snowmobiles." Many mineral exploration companies, having abided by this principle in the past, have stated that often the timber they have stacked is not harvested but rather remains untouched. In addition, the Mines Branch, for the past several years, has been advising mineral exploration companies to use any timber they may have to cut for the purposes of corduroy over soft ground (to prevent rutting) and site rehabilitation (e.g. scatterring over disturbed sites, especially those having lost their original organic cover), and the Mines Branch is presently finalizing a draft set of 'Environmental Requirements and Recommendations for Mineral Exploration' which will encode practices such as these which minimize the environmental impact of mineral exploration. For these reasons, and in light of the referral process described below, the Mines Branch requests that the Forestry Services Branch reconsider the above statement. All applications for 'exploration approval' for exploration programs beyond basic prospecting and low-impact sampling are referred to the Forestry Services Branch (among other government agencies) and Forestry should continue to use these opportunities to communicate any project-specific concerns or requirements. Project-specific concerns and requirements are addressed in the conditions under which the exploration work is	District 1 Forest management staff will continue to work closely with the Mines and Energy staff to ensure a beneficial relationship for both resource developers is achieved. Forestry services will keep Mines and Energy abreast of any proposed road decommissioning's or constructions.

			approved. As has been recognized in other Forest Management Plans, many forest access roads and bridges are used by other land users, among them parties carrying out mineral exploration or quarrying. The Mines Branch requests that it be forwarded plans to decomission roads or bridges as a matter of course to ensure that all road/bridge rehabilitation and decommissioning plans are reviewed to consider whether mineral exploration, quarrying, or mining may be affected. Paddys Pond Operating Area – Possible conflict with the Harbour Arterial Workings Area	This operating area is proposed for this planning period as a conditional area in the event that another development be proposed. It is anticipated that at some point in the future this area will be developed. The Forestry Services Branch has identified significant timber in the area and wants to be prepared to harvest this timber to support local operators should development of area go ahead. We will work with Mines and Energy to ensure no impacts on their operations.
Tourism Agriculture			Viewscape concerns along highways and trails Forestry operations must not impact existing agriculture operations Fur farm buffers Overlap with AOI's	The Forest Service, where operationally feasible, will implement strategies to provide a balaence between forest harvesting and the non – timber values identified by Tourism. The Forest Service works closely with the East Coast Trail to ensure no impacts from harvesting including providing a buffer on trail from domestic cutting. The Forest Service will ensure buffer on T'railway. Forest Service will ensure that current agriculture operations are not impacted and post harvest work is discussed with agriculture in AOI's. The forest service will ensure buffers on fur farms as required. The forest service will not impact the development of agriculture operations in AOI's that were initially agreed upon under consultation with previous

				manager Hazen Scarth. The forest service will continue to work with agriculture to ensure harvesting of aoi's benefit commercial forest operators and any post-harvest work in aoi's are agreed upon with agriculture.
Stakeholder	**Contact**	**FMD**	**ISSUES / CONCERNS ADDRESSED DURING 2012-2016 PLAN DEVELOPMENT THAT WILL BE TRANSFERRED INTO THE 2017-2021 FIVE-YEAR PLAN**	**Mitigation**
Local Deer Park Service District	Dave Chaulk	FMD 1	Have concern with road degradation as a result of harvest activities and safety on roads during operations.	DNR has maintained a good working relationship with the local service district and will continue to perform road maintenance on access roads being used for the forest industry.
Planning team member	Ian Goudie	FMD 1	Mr. Goudie has raised concerns with planned activities in the Bad Pond Operating area. His main concerns are for caribou and lichen habitat. Besides the concerns rose on Bad Pond, Mr. Goudie has advised in writing that he has no has no other major concerns with our proposed five year plan.	The forest service agrees with Mr. Goudie that the area has been browsed extensively by moose, resulting in a low seed bank throughout the grassland, which limits future forest development. From a forest ecosystem perspective, to facilitate successful forest regeneration, the area requires sufficient cleanup of over mature, dead and blown down trees. The forest service will ensure the land base is sufficiently prepared and planted with tree species that provides diversity and habitat. Regeneration plans will ensure a natural forest state and include the planting of balsam fir, birch, and a low density spruce which has shown to provide browsing protection for fir and birch regeneration. The Five Year Operating Plan has undergone reviews by various stakeholders, including other government departments where any potential

				concerns raised are evaluated, discussed, and mitigations established. To this effect, both Parks and Natural Areas (PNAD) and the Wildlife Division have reviewed the Zone 1 plan, with no objections elevated regarding the current proposal for the Bad Pond Operating area. The Centre for Forest Science and Innovation, will continue to engage with Mr. Goudie to alleviate any concerns he has with respect to this particular area going forward.

6.0 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. A Draft version of all maps and text was posted to the Government Website on August 01, 2016. 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 1, there were 5 formal meetings held from the period 2:00 pm – 4:30pm and 6pm – 8:00pm at the following locations:

- August 22, 2016 at Voisey's Brook Park, Indian Meal Line in Portugal Cove

- August 23, 2016 at Recreation Building in the Town of Witless Bay
- August 24, 2016 at Royal Canadian Legion in the Town of Carbonear
- August 25, 2016 at Lion's Club in the Town of WhitBourne
- August 29, 2016 at the Wilds Golf Resort in Salmonier Line

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

7.0 MANAGEMENT OBJECTIVES AND STRATEGIES

7.1 Harvesting

The forest in district 1 is part of the boreal forest which is characterized by stand-replacing natural disturbances result in the formation of relatively even aged stands. The clear-cut 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 clear-cut 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. Due to the natural stand size within district 1, commercial harvesting is also a modified version of a clear cut with smaller patch cuts the norm with significant leave trees remaining.

7.1.1 Commercial

Section 3 outlines the general approach for the timber supply analysis and outlines the specific results for the district. 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 district 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

- 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
- monitor harvest areas for regeneration and implement silviculture operations where required
- given the increase in development, increased demand for fuelwood the forestry services branch will try to protect community domestic forests to ensure a sustainable supply of timber for fuelwood users.

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. The district has significant forest land converted to heathland from excessive moose browsing. The FSB will continue to target these sites for planting/regeneration.

7.2.1 Forest Renewal

Since maintenance of the forestry land base 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.

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 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. 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.

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.
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. Only older commercial thinnings exist 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 browsing, 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 harvest and 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. In the past planning teams and the FSB had agreed to a decommissioning plan that would see equal amount of road decommissioned for what was newly built. This was discussed at the last planning team field trip and all members agreed that the current agreement would no longer be viable going forward given the minimal amount of road construction taking place and the requirement for areas to be in a free to grow stage prior to decommissioning. The FSB however will decommission when it is best suited for overall management/costs/ and protection of the environment and forest resource. 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.).

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 where feasibly possible
- determine impacts and explore alternatives (cost sharing) in areas where road and bridge decommissioning impacts other stakeholders

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, severe mortality has occurred in District 1 followed by significant windthrow resulting in massive salvage efforts. The FSB will continue to act quickly should future events occur to ensure the timely salavage of wood impacted by such events.

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 history of fire in the district. The FSB 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
- educate the public
- increase use of fire smart programwith communities

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.

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

8.0 PROPOSED ACTIVITIES

8.1 District 1

8.1.1 Harvesting

In District 1 the majority of the harvest is scheduled for domestic purposes due to significant landbase realized in new inventory, a land base that is located near the coast where there are many communities, and a significant demand for domestic fuelwood. Due to this demand and increasing demand on the landbase from other users the commercial forest industry makes up a smaller component of the annual harvest. Nevertheless this small component has a big impact on the economy in district 1. District 1 commercial users maximize benefits from every m3 of wood harvested versus other areas in the province.

The AAC for district 1 will not be exceeded in this planning period

8.1.1.1 Commercial

The timber scheduled for commercial harvest in the district is over mature 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 10). 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 11 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 varies from 7 to 9m3, depending on ecozones.

Table 10: Proposed commercial harvest in District 1 for 2017-2021

District 1				Volume Harvested (m^3)								
				Softwood					Hardwood			
Number	Name	Tenure	Area (ha)	Core	Operational Constrainted	Sub-total	Non AAC wood		Core	Operational Constrainted	Sub-total	n AAC Wo
CC01001	Rod and Gun Club	Crown	141.55	498.08	1168.78	1666.86			0	0	0	
CC01002	Tower Road	Crown	2171.17	28791.41	0	28791.41			0	0	0	
CC01003	Bad Pond	Crown	584.28	1410.98	2149.82	3560.8			0	0	0	
CC01004	Black Duck Gully	Crown	143.52	8636.62	0	8636.62			839	0	839	
CC01005	Goulds Brook	Crown	274.74	3456.97	0	3456.97			143	0	143	
CC01006	Munn Block South	Crown	37.08	2091.18	0	2091.18			0	0	0	
CC01007	Snow's Pond	Crown	163.18	955.24	0	955.24			0	0	0	
CC01008	Island Pond Ridge	Crown	107.86	4890.37	0	4890.37			160	0	160	
CC01009	Mosquito Pond	Crown	61.46	858.62	107.9	966.52			0	0	0	
CC01010	Henders	Crown	976.79	43973.88	0	43973.88			0	0	0	
CC01011	Nine Mile Road	Crown	25.46	284.22	0	284.22			0	0	0	
CC01012	Nord Pond	Crown	156.97	5733.07	0	5733.07			0	0	0	
CC01013	Keough's Gully	Crown	119.05	2007.18	0	2007.18			0	0	0	
CC01014	Neil's Pond	Crown	93.2	888.91	0	888.91			0	0	0	
CC01015	Mushroom Gully	Crown	6.21	115.23	0	115.23			0	0	0	
CC01016	Tors Cove	Crown	101.83	6922.33	0	6922.33			0	0	0	
CC01017	Witless Bay Country Pond	Crown	309.5	11374.31	0	11374.31			0	0	0	
CC01018	Old Witless Bay Line	Crown	352.08	16526.53	0	16526.53			0	0	0	
CC01019	Country Pond	Crown	112.99	3825.19	0	3825.19			0	0	0	
CC01020	Wych Hazel Pond	Crown	71.03	2636.67	0	2636.67			0	0	0	
CC01021	Paddy's Pond	Crown	147.87	10226.95	0	10226.95			0	0	0	
CC01022	Northern Pond	Crown	82.98	0	3419.87	3419.87			0	0	0	
CC01023	Petty Harbour Long Pond	Crown	71.15	5024.5	30.63	5055.13			0	0	0	
CC01024	Duff's Straight	Crown	79.51	4764.5	0	4764.5			0	0	0	
CC01025	Rantem Cove	Crown	206.97	3036.42	721.92	3758.34			174	923	1,096	
CC01026	Little Ridge	Crown	77.27	1702.32	0	1702.32			143	0	143	
CC01027	Healey's Pond	Crown	50.53	1109.76	0	1109.76			126	0	126	
CC01028	Barrets Pond	Crown	211.11	2502.57	1496.9	3999.47			950	820	1,770	
CC01029	Spread Eagle Peak	Crown	37.56	1118.07	0	1118.07			0	0	0	
CC01030	Spread Eagle	Crown	1084.46	14595.78	5092.85	19688.63			1,535	561	2,096	
CC01031	Blaketown	Crown	113.92	2212.51	0	2212.51			81	0	81	
CC01032	Spread Eagle Brook	Crown	16.14	363.02	0	363.02			0	0	0	
CC01033	Beaver Pond	Crown	327.84	11695.09	0	11695.09			335	0	335	
CC01034	Long Harbour	Crown	509.67	18397.76	378.1	18775.86			425	0	425	
CC01035	Suttons Pond	Crown	198.1	11510.6	0	11510.6			0	0	0	
CC01036	Beaver Pond A	Crown	178.2	11360.45	0	11360.45			0	0	0	
CC01037	White Hills Pond	Crown	25.79	1511.19	0	1511.19			0	0	0	
CC01038	White Hill Pond	Crown	171.79	8122.63	0	8122.63			0	0	0	
CC01039	Gull Pond	Crown	160.02	4031.76	0	4031.76			0	0	0	
CC01040	Big Round Pond	Crown	288.51	10140.22	0	10140.22			0	0	0	
CC01041	Island Pond Gully	Crown	161.43	3559.62	0	3559.62			0	0	0	
CC01042	Yellow Marsh	Crown	38.23	749.24	0	749.24			178	0	178	
CC01043	Pitchers Pond	Crown	64.8	786.24	0	786.24			0	0	0	
CC01044	Tilt Hill Gully	Crown	106.72	4087.36	0	4087.36			0	0	0	
CC01046	Heart's Delight Brook	Crown	96.67	1012.28	0	1012.28			0	0	0	
CC01047	Pierces Pond A	Crown	17.55	835.26	0	835.26			0	0	0	
CC01048	Pierces Pond	Crown	40.78	1331.81	0	1331.81			0	0	0	
CC01049	Brimstone Pond	Crown	49.58	1228.38	0	1228.38			0	0	0	
CC01050	Peak Pond	Crown	37.35	957.98	592.37	1550.35			0	0	0	
CC01052	Murphys Pond	Crown	41.38	0	761.29	761.29			0	0	0	
CC01053	Foxtrap Pasture	Crown	365.11	9769.36	0	9769.36			0	0	0	
Totals			11,190	293,621	15,920	309,541	0		5,088	2,304	7,392	0

Table 11: Proposed domestic harvest in District 1 for 2017 to 2021

District 1					Estimated Volume	
Number	Name	Tenure	Total Area (ha)	Number of Permits	Softwood	Hardwood
CC01501	Chapel Arm	Crown	1130.8		23473.74	1745.1
CC01502	Bellevue	Crown	3758.03		55834.24	12711.68
CC01503	Spread Eagle Peak	Crown	70.14		1536.27	259.26
CC01504	Southern Harbour	Crown	570.95		7090.61	528.18
CC01505	Arnold's Cove	Crown	2467.69		15296.05	1999.1
CC01506	Chance Cove	Crown	209.62		3136.86	207.43
CC01507	Broad Lake	Crown	724.5		11057.61	1727.8
CC01508	Bellevue	Crown	2140.95		24643.45	9512.11
CC01509	Chance CoveA	Crown	296.66		0.12	0.01
CC01510a	Remote Ocean Pond	Crown	4.69		342.4	11.69
CC01510b	Remote Ocean Pond	Crown	3.27		457.17	15.6
CC01510c	Remote Ocean Pond	Crown	6.71		367.22	21.25
CC01510d	Remote Ocean Pond	Crown	15.54		252.8	8.63
CC01510e	Remote Ocean Pond	Crown	3.33		460.96	15.73
CC01510f	Remote Ocean Pond	Crown	10.98		1585.71	54.13
CC01510g	Remote Ocean Pond	Crown	3.12		805.64	27.5
CC01510h	Remote Ocean Pond	Crown	2.78		386.63	13.2
CC01510j	Remote Ocean Pond	Crown	5.45		890.12	232.85
CC01510l	Remote Ocean Pond	Crown	83.16		8589.27	353.88
CC01510m	Remote Ocean Pond	Crown	4.26		382.25	13.05
CC01510n	Remote Ocean Pond	Crown	4.53		129.93	4.44
CC01510o	Remote Ocean Pond	Crown	3.17		1387.98	47.38
CC01510p	Remote Ocean Pond	Crown	6.73		2614.58	67.99
CC01510q	Remote Ocean Pond	Crown	29.94		6028.09	199.66
CC01510r	Remote Ocean Pond	Crown	27.42		2714.5	105.16
CC01510s	Remote Ocean Pond	Crown	5.72		5178.78	174.51
CC01510t	Remote Ocean Pond	Crown	9.91		4092.99	132.31
CC01511	Carbonear Long Pond	Crown	187.8		3350.83	123.34
CC01512	Western Island Pond	Crown	683.35		14538.46	1065.1
CC01513	Backside Pond	Crown	310.41		11484.54	571.75
CC01514a	Glover Road	Crown	145.25		5747.84	196.04
CC01514b	Glover Road	Crown	92.86		2505.61	200.72
CC01514c	Glover Road	Crown	300.92		14581	613.94
CC01515	Cat Hills	Crown	476.82		7198.47	532.95
CC01516	Hopeall	Crown	527.29		16032.4	984.95
CC01517a	Spider Pond	Crown	158.57		4271.41	175.48

CC01517b	Spider Pond	Crown	101.4		1934.27	70.22
CC01518	Tickle Pond	Crown	451.94		7862.06	1019.91
CC01519a	Valley Ponds	Crown	246.17		1990.24	67.93
CC01519b	Valley Ponds	Crown	361.12		7440.77	251.46
CC01519c	Valley Ponds	Crown	99.47		2489.86	100.71
CC01522	North Shore	Crown	24721.12		7841.53	445.27
CC01523	Bay de Verde	Crown	7575.48		7589.12	366.36
CC01524a	Tim Millers Pond	Crown	96.9		7797.21	175.69
CC01524b	Tim Millers Pond	Crown	122.39		5168.73	185.06
CC01524c	Tim Millers Pond	Crown	78.02		2121.75	81.14
CC01525	Turk's Cove	Crown	591.72		17230.91	434.01
CC01526	New Perlican River	Crown	858.08		28080.52	773
CC01527	Mizzen Hill	Crown	319.55		3296.69	105.82
CC01528a	Heart's Desire	Crown	755.1		19260.87	1790.82
CC01528b	Heart's Desire	Crown	72.34		250.82	8.56
CC01528c	Heart's Desire	Crown	168.2		3317.47	152.2
CC01528d	Heart's Desire	Crown	196.3		2617.06	94.84
CC01528e	Heart's Desire	Crown	33.45		61.56	2.1
CC01529a	Long Pond	Crown	30.68		231.61	0
CC01529b	Long Pond	Crown	127.98		451.22	1.83
CC01530	Hanging Hill Pond	Crown	54.46		1013.51	34.59
CC01531	Heart's Delight	Crown	1105.49		14690.46	412.84
CC01532	Fling's Long Pond	Crown	409.33		1274.71	43.51
CC01533a	Salt Pit Pond	Crown	73.07		1147.18	15.72
CC01533b	Salt Pit Pond	Crown	86.88		1651.16	32.97
CC01534a	Cavendish	Crown	37.01		845.67	39.53
CC01534b	Cavendish	Crown	16.78		1101.56	113.74
CC01535	Little Harbour	Crown	663.1		13962.58	2253.27
CC01536a	Fair Haven	Crown	312.69		6603.76	866.27
CC01536b	Fair Haven	Crown	213.48		2097.43	92.54
CC01536c	Fair Haven	Crown	188.04		2454.17	96.78
CC01537	Norman's Cove	Crown	436.23		12473.13	1022.48
CC01538	Long Harbour	Crown	286.08		3139.98	140.58
CC01539	Hopeall	Crown	825.05		11886.47	1637.74
CC01540	Barrett's Pond	Crown	297.01		4121.91	571.27
CC01541	Three Mast Pond	Crown	596.88		7911.84	1320.84
CC01542	Ship Harbour	Crown	355.77		2108.35	97.02
CC01543	Ship Harbour Brook	Crown	366.84		641.8	21.91
CC01544	Rattling Brook	Crown	374.59		5231.54	206.63
CC01545	Ville Marie	Crown	335.94		1326.98	45.29
CC01546	Argentia Access	Crown	193.13		7753.32	2253.34

CC01547	Southeast River	Crown	728.67		24067.11	1114.62
CC01548	Southeast Placentia	Crown	657.73		12338.65	525.66
CC01551a	Great Barasway	Crown	227.28		4611.64	154.31
CC01551b	Great Barasway	Crown	107.72		2691.46	89.64
CC01552	Gooseberry Cove	Crown	149.61		1599.16	58.08
CC01553	Patrick's Cove	Crown	330.66		2261.22	73.67
CC01554	Cuslett	Crown	384.33		1907.49	71.32
CC01556	Branch	Crown	2449.8		13538.06	520.18
CC01557a	North Harbour	Crown	102.23		1513.68	100.92
CC01557c	North Harbour	Crown	115.71		524.71	38.38
CC01557d	North Harbour	Crown	223.75		268.79	31.76
CC01557e	North Harbour	Crown	377.3		1124.97	48.55
CC01558	White Heart	Crown	641.28		8133.83	647.49
CC01559	Colinet River	Crown	872.27		8953	715.66
CC01559	Colinet River	Crown	872.27		8953	715.66
CC01560b	Harricott	Crown	257.98		296.75	16.27
CC01560c	Harricott	Crown	97.53		904.61	69.65
CC01561	Mount Carmel	Crown	675.4		10627.14	489.72
CC01562	Forest Field	Crown	941.54		19701.12	1840.17
CC01563a	Back River	Crown	131.63		2343.16	103.84
CC01563b	Back River	Crown	110.98		1697.98	72.07
CC01564b	Admiral's Beach	Crown	1125.71		2659.93	126.12
CC01565	Mall Bay	Crown	3433.94		3013.38	117.75
CC01566	Riverhead	Crown	1453.07		6155.85	214.5
CC01567	St. Mary's	Crown	2522.37		21244.07	4279.06
CC01568	Gaskiers	Crown	859.65		130.99	4.47
CC01569a	Peter's River	Crown	3947.39		6147.17	441.79
CC01570	St. Shott's	Crown	852.8		3759.02	128.31
CC01571	Trepassey Bay	Crown	716.85		1737.96	64.18
CC01572	Biscay Bay	Crown	7066.33		43251.38	2602.02
CC01573a	Cappahayden	Crown	10000.48		505.88	17.27
CC01573b	Cappahayden	Crown	2894.54		1814.76	67.78
CC01574	Gull Pond	Crown	932.99		4362.76	148.92
CC01575	Renew's South	Crown	776.99		13960.18	466.2
CC01576	Kingman's Cove	Crown	582.9		1649.05	70.21
CC01577	Renews Track	Crown	396.4		503.02	17.17
CC01578	Riverhead Pond	Crown	1074.37		9722.41	354.14
CC01579	Aquaforte	Crown	256.14		945.1	8.1
CC01580	Calvert	Crown	505.56		35543.12	1726.36
CC01581	Station	Crown	73.77		2099.7	165.78
CC01582	Cape Broyle Head	Crown	792.98		28297.55	1229.81

CC01583	Cape Broyle	Crown	670.84		20552.27	1853.15
CC01584	Shores Cove	Crown	234.93		672.94	22.97
CC01585	Whitehorse	Crown	250.36		4862.88	330.95
CC01586	Horsechops	Crown	503.97		22982.8	846.73
CC01587	Lamanche	Crown	485.54		15513.77	792.02
CC01588	Burnt Cove	Crown	467.69		9904.9	433.73
CC01589	Tors Cove Pond	Crown	87.43		1664.61	120.79
CC01590	Mobile Road	Crown	268.86		8839.78	463.48
CC01591	Country Pond	Crown	1289.57		34961.23	1272.25
CC01592	Gallows Cove	Crown	103.38		5439.27	229.83
CC01593	Gunridge	Crown	161.55		3305.18	141.06
CC01594	Roundabout	Crown	399.3		8100.51	537.5
CC01595	Mundy Pond	Crown	103.7		1137.24	25.52
CC01596	White Hills Pond	Crown	213.99		4789.22	208.62
CC01597	Crown Hill	Crown	2212.32		60045.39	4776.23
CC01598	Biscayne Cove	Crown	630.82		16975.86	501.76
CC01599	Blackhead	Crown	92.48		3688.92	140.51
CC01600	Stiles Cove	Crown	107.35		2246.85	76.2
CC01601	Bauline Line	Crown	2412.54		74812.5	2634.34
CC01602	Stickles Pond	Crown	1261.38		20182.89	923.87
CC01603	Patrick's Path	Crown	369.7		16107.06	634.85
CC01604	Western Island Pond	Crown	292.99		2158.13	38.31
CC01605	Wych Hazel Pond	Crown	396.66		996.43	61.56
CC01606	Thomas Pond	Crown	372.16		2144.7	48.88
CC01607	Big Pond Valley	Crown	529		7017.33	565.06
CC01608	Legion Road	Crown	370.99		2918.92	201.54
CC01609	Andrew's Road	Crown	301.2		923.7	30.05
CC01610	Duff's Straight	Crown	358.94		1878.1	83.2
CC01611	Whiskey Pit	Crown	140.16		3080.76	116.11
CC01612	Road 3 Deer Park	Crown	63.91		1075.94	54.21
CC01613a	Peak Pond	Crown	146.74		2284.86	62.68
CC01613b	Peak Pond	Crown	51.91		621.04	0
CC01614	Crawley's Marsh	Crown	229.53		3104.25	193.59
CC01615	Nine Island Pond South	Crown	189.11		2140.58	73.07
CC01616	Island Pd. Ridge	Crown	204.24		7691.76	1033.77
CC01617	Black Ridge	Crown	200.22		4966.94	130.66
CC01618	Lees Gully	Crown	291.41		2998.4	151.13
CC01619	Brien's Pond	Crown	1489.31		21335.76	934.5
CC01620a	Fox Marsh	Crown	62.26		1973.23	493.84
CC01620b	Fox Marsh	Crown	21		843.81	66.62
CC01621	Brigus Junction	Crown	123.25		796.46	27.15

CC01622	Cubids Long Pond	Crown	182.09		78.6	2.68
CC01623	Goulds Brook	Crown	291.65		1425.49	53.27
CC01624a	Snow's Ridge	Crown	228.27		2009.09	77.83
CC01624b	Snow's Ridge	Crown	244.82		3482.69	145.05
CC01625	North River	Crown	137.89		4363.16	161.76
CC01626	Bay Roberts Long Pond	Crown	150.47		4719.09	269.84
CC01627	Hooper's Pond	Crown	333.33		4026.72	937.57
CC01628	Goose Pond	Crown	268.96		5545.54	2021.58
CC01629	Shearstown Agric.Road	Crown	161.96		603.65	20.6
CC01630	Dark Hills	Crown	920.68		19574.19	4080.31
CC01631a	Second Pond	Crown	38.81		446.8	3.83
CC01631b	Second Pond	Crown	20.29		147.49	5.03
CC01631c	Second Pond	Crown	93.42		3541.29	63.21
CC01632a	Seymour's Gullies	Crown	222.57		11104.91	738.73
CC01632b	Seymour's Gullies	Crown	78.24		4520.74	288.66
CC01633	Bad Pond	Crown	27.63		810.78	32.44
CC01634	Blaketown	Crown	1867.48		51539.24	5985.97
CC01635	Colinet Road	Crown	163.58		1047.18	100.81
CC01636a	Broad Cove Pond	Crown	151.82		2433.4	327.86
CC01636b	Broad Cove Pond	Crown	584.58		17018.91	1742.08
CC01637	Denny's Pond	Crown	821.49		16171.97	1117.16
CC01638	Tower Road	Crown	173.48		11481.38	219.4
CC01639	Merrymeeting Pond	Crown	1475.02		14970.57	498.2
CC01640	Swansea	Crown	670.61		5507.98	82.1
CC01641	Shoal Bay Road	Crown	1821.63		47836.85	2944.12
Sub-total						
Grand-total			**138732.94**	**0**	**1446624**	**115099.63**

8.1.2 Silviculture

There are two silviculture prescriptions scheduled; planting/gap planting and thinning (pre-commercial/diameter limit and commercial). Planting is designed to return a site to a minimum stocking level with the desired species. 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.

Potential silvicultural treatment areas need to undergo reconnaissance and / or intensive surveys to determine the regeneration level . 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.

The FSB continues to identify areas that have blowdown and converted to grassland as a result of excessive browsing. These areas are top priority for planting and restoring to forested land again over this five year planning period. Not all areas can be identified at this point. Continued aerial photo review and field reconnaissance will add additional area for planting over the life of the plan.

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 cutovers are eligible for planting and immature stands are eligible for thinning.

8.1.3 Primary Access Roads

Table 12 outlines the forest access roads scheduled to be constructed in District 1 in the next five years to access timber for commercial purposes. All roads will be built to the specifications of the Class D standard and all pertinent EPG's will be followed. Some modifications may be made to ensure adequate landings, turnarounds, and offtakes. 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.

Table 12: Summary of primary access road construction in District 1 for 2017-2021

District1		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Number			Culvert	Bridge
Tower Road	CC01002	Construction	2.13		
Bad Pond	CC01003	Construction	2.47		
Black Duck Gully	CC01004	Construction	1.19		
Snow's Pond	CC01007	Construction	0.72		
Snow's Pond	CC01007	Construction	1.08		
Henders	CC01010	Construction	2.15		
Witless Bay Country Pond	CC01017	Construction	1.71		
Old Witless Bay Line	CC01018	Construction	0.49		
Old Witless Bay Line	CC01018	Construction	0.48		
Spread Eagle	CC01030	Construction	1.04		
Spread Eagle	CC01030	Construction	1.69		
Suttons Pond	CC01035	Construction	0.99		
		Total	**16.14**	**0**	**0**

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. In addition the FSB is now ISO certified which means stricter operator guidelines and monitoring within these zones.

8.1.5.1 Fire

Large wildfires have no been prevalent in the district in the past number of years and as a result there have been little merchantable volume lost. The majority of the fires have been maintained under 5 ha in size and are generally located near communities.

There are fire crews and equipment stationed at Paddys Pond, Salmonier, Whitbourne, and Hearts Desire 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 St. John's and Gander and helicopters in St. John's and Gander that are also 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.

As previously stated the FSB has achieved ISO14001 certification of all crown land operations. This environmental management system strengthens our environmental protection during operations.

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.

9.0 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. 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.